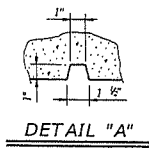
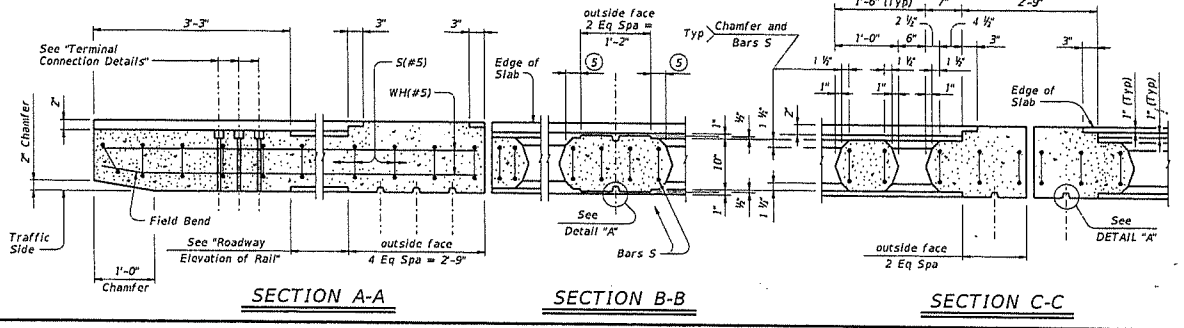
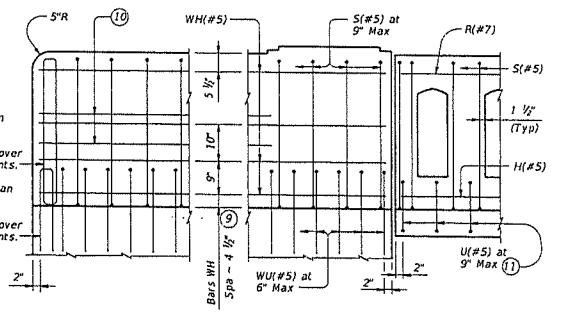
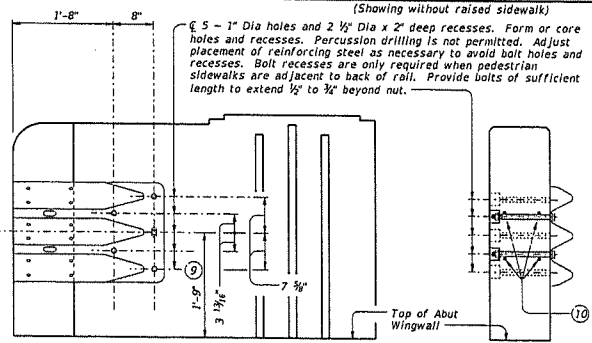
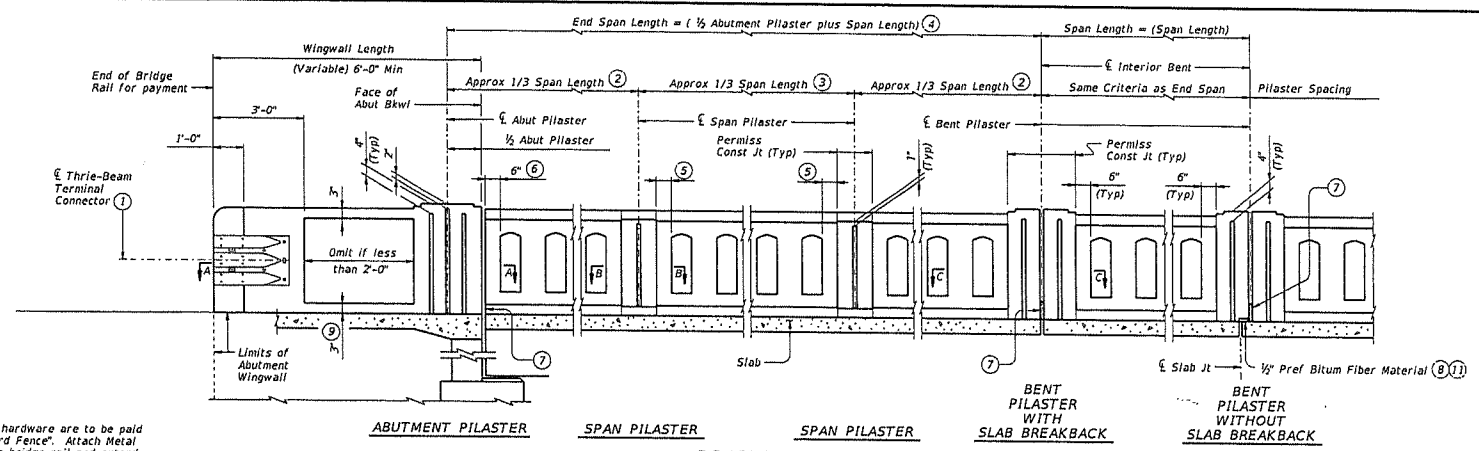


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- ① Terminal Connectors and associated hardware are to be paid for under the Item "Metal Beam Guard Fence". Attach Metal Beam Guard Fence Transitions to the bridge rail and extend along the embankment unless otherwise shown in the plans.
- ② Number of windows in exterior bays are equal.
- ③ Number of windows in interior bay(s) are not less than the amount in exterior bays (Note 2).
- ④ Space Span Pilasters at 1/3 span length (Approx) when spans are 100 ft and less, as shown. Space Span Pilasters at 1/5 span length (Approx) for spans greater than 100 ft.
- ⑤ Dimension is the same for all posts adjacent to Span Pilasters in a span. Dimension may vary from span to span. Min = 3". Max = 7 1/2".
- ⑥ Min = 6". Max = 1'-3".
- ⑦ Provide rail joints at ends of all spans the same width as Slab joint opening, except that Rail Joints over construction joints must be 1/2" Min to 3/4" Max in width. Joints must be open if slab joint opening is not sealed. Joints over construction joints and over sealed deck joints must be plugged. Forming material used in joints may be left in place if it is light in color and compressible, such as the following materials: polystyrene, molded cork granules, sponge rubber sheet, etc. If forming material is not left in place, plug the bottom 6" with slab joint sealing compound to prevent drainage and staining.
- ⑧ Place Preformed Bituminous Fiber Material between slab and rail when rail extends over expansion joint. Shift Bars U as necessary.
- ⑨ Increase 2" for structures with overlay.
- ⑩ Place 4 additional Bars WH(#5) 3'-8" in length inside Bars S(#5) and centered 2'-0" from end of rail when Terminal Connections are required. Field bend as needed.
- ⑪ Shift U Bars from region below 1/2" Preformed Bituminous Fiber Material at Joints.



ELEVATION SHOWING TYPICAL REINFORCING PLACEMENT (Showing without raised sidewalk)

The use of this railing is restricted to speeds of 45 mph or less.

Texas Department of Transportation  
 Bridge Division Standard

**COMBINATION RAIL TEXAS CLASSIC**

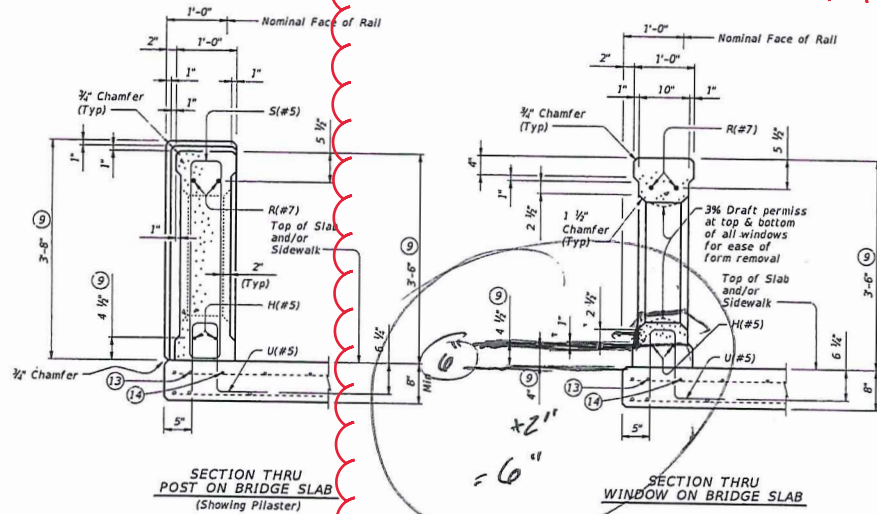
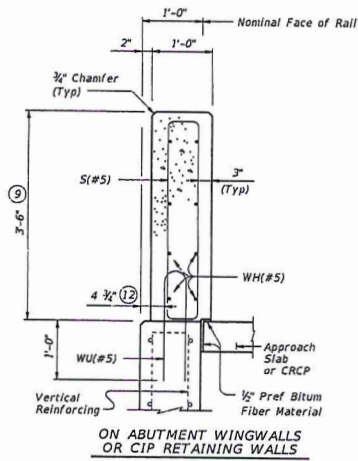
**TYPE C411**

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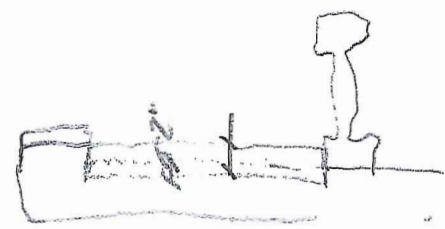
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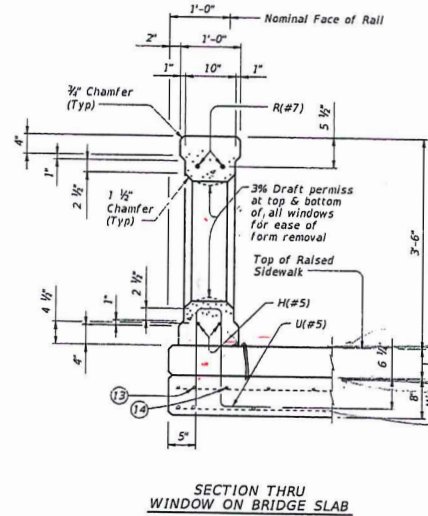
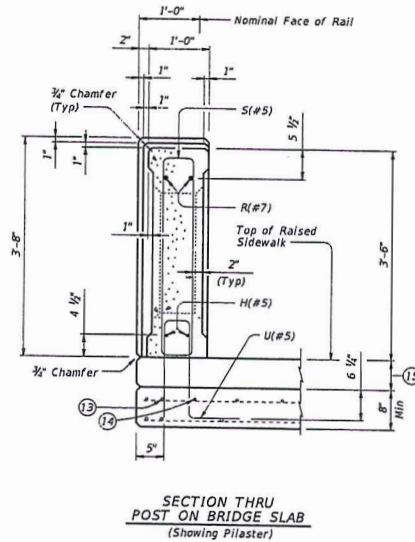
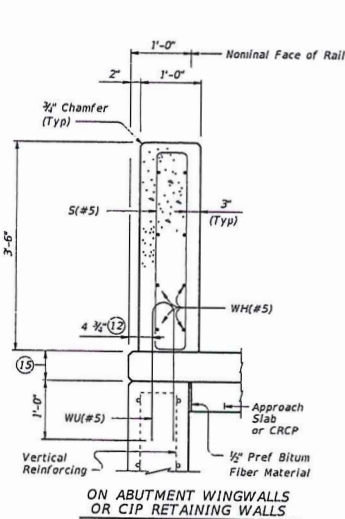
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SECTIONS THRU RAIL WITHOUT RAISED SIDEWALK



- ⑨ Increase 2" for structures with overlay.
- ⑫ 5 1/2" when vertical reinforcing has closer clear cover over horizontal reinforcing in abutment, wingwalls or retaining walls on traffic side of wall.
- ⑬ As an aid in supporting reinforcement, additional longitudinal bars may be used in the slab with the approval of the Engineer. Such bars must be furnished at the Contractor's expense.
- ⑭ The longitudinal slab bar may be adjusted laterally 5" plus or minus to tie reinforcing.
- ⑮ Raised Sidewalk



SECTIONS THRU RAIL WITH RAISED SIDEWALK

SHEET 2 OF 3

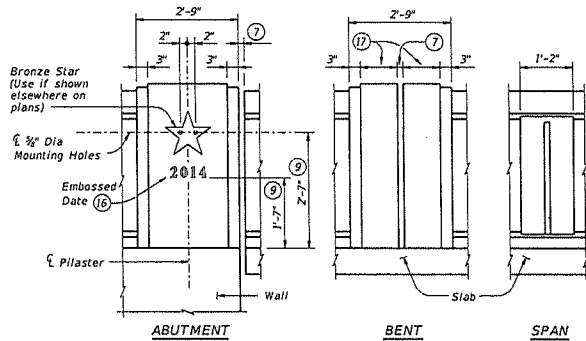
Texas Department of Transportation  
Bridge Division Standard

COMBINATION RAIL  
TEXAS CLASSIC

TYPE C411

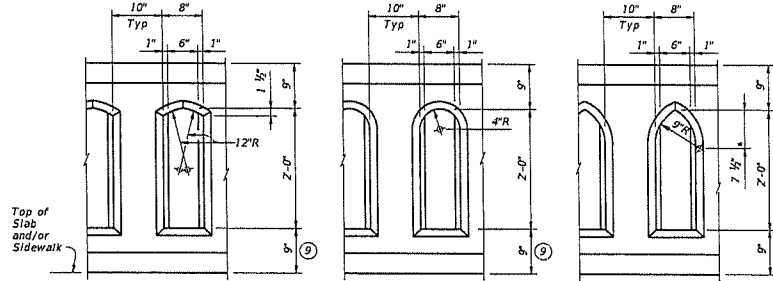
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REVISED: March 2018	CONF: RECY	JOB: JRE	PROJECT: HIGHWAY	
REVISIONS:				
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**EXTERIOR PILASTER ELEVATIONS**

(Showing without raised sidewalk)

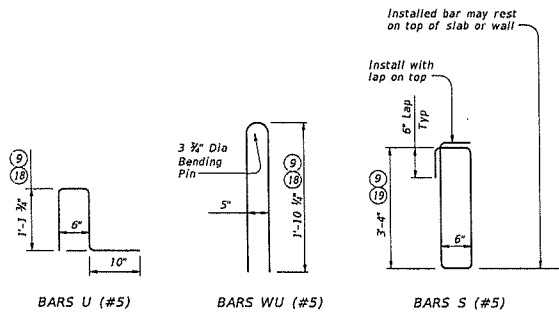


**TYPE A**

**TYPE B**

**TYPE C**

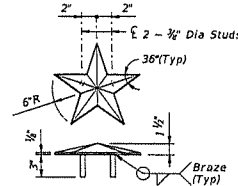
**WINDOW TYPES**



**BARS U (#5)**

**BARS WU (#5)**

**BARS S (#5)**



**BRONZE STAR DETAIL**

Two known manufacturers are:  
 1. Kassons Castings  
 Austin, Texas  
 2. Southwell Company  
 San Antonio, Texas

- ⑦ Provide rail joints at ends of all spans the same width as Slab joint opening, except that Rail Joints over construction joints must be 1/2" Min to 3/4" Max in width. Joints must be open if slab joint opening is not sealed. Joints over construction joints and over sealed deck joints must be plugged. Forming material used in joints may be left in place if it is light in color and compressible, such as the following materials: polystyrene, molded cork granules, sponge rubber sheet, etc. If forming material is not left in place, plug the bottom 6" with slab joint sealing compound to prevent drainage and staining.
- ⑨ Increase 2" for structures with overlay.
- ⑬ Construction year (use if shown elsewhere on plans) 3" High "Platin Bold" Typeface with 1/4" recess. Placed at one Abutment only or as directed by the Engineer.
- ⑰ Dimensions must be the same on each side of joint.
- ⑱ For raised sidewalks, add sidewalk height to total bar height. Use sidewalk height at rail's location.
- ⑲ Reduce by 2" or field bend over Proformed Bituminous Fiber Material to gain cover.
- ⑳ Bronze Star dimensions of the final product can be slightly smaller due to shrinkage after casting.

**CONSTRUCTION NOTES:**

Attach Bronze Star with a Type III Class C, D, E, or F epoxy adhesive. Clamp star until epoxy achieves set. Remove any visible epoxy "squeeze out" from under star.  
 Face of rail and pilasters, parapet must be plumb unless otherwise approved.  
 Apply a one rub finish to all railing surfaces unless otherwise shown elsewhere on the plans.

**MATERIAL NOTES:**

Provide Class "C" concrete for railing. Provide Class "C" (HPC) concrete if shown elsewhere in the plans.  
 Provide Grade 60 reinforcing steel.  
 Epoxy coat or galvanize all reinforcing steel if slab bars are epoxy coated or galvanized.  
 Bronze Star must be cast of architectural bronze having the following composition: Copper 85 %, Tin 5 %, Lead 5 %, Zinc 5 %.  
 Provide bar laps, where required, as follows:  
 Uncoated or galvanized - #5 = 2'-0"  
 Uncoated or galvanized - #7 = 2'-11"  
 Epoxy coated - #5 = 3'-0"  
 Epoxy coated - #7 = 4'-4"

**GENERAL NOTES:**

This rail was evaluated based on the results of previous crash tests and approved for a NCHRP Report 350 TL-2 rating. This rail is only approved for low speed use, speeds of 45 mph and less.  
 Do not use this railing on bridges with expansion joints providing more than 5" movement.  
 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 will not be required for this rail.  
 See Bridge Layout or other plan sheets for the following: dimensions with the number of span pilasters, dimensions with the number of windows, window type, inclusion of bronze stars, inclusion of construction year with abutment identity.  
 Submit erection drawings showing span number, span pilaster locations, number of windows between pilasters and spacing to first window (see Note 6) to the Engineer for approval.  
 Average weight of railing with no overlay increase and no pilasters is 350 plf.

Cover dimensions are clear dimensions, unless noted otherwise.  
 Reinforcing bar dimensions shown are out-to-out of bar.

SHEET 3 OF 3

<b>COMBINATION RAIL</b> <b>TEXAS CLASSIC</b>			
<b>TYPE C411</b>			
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