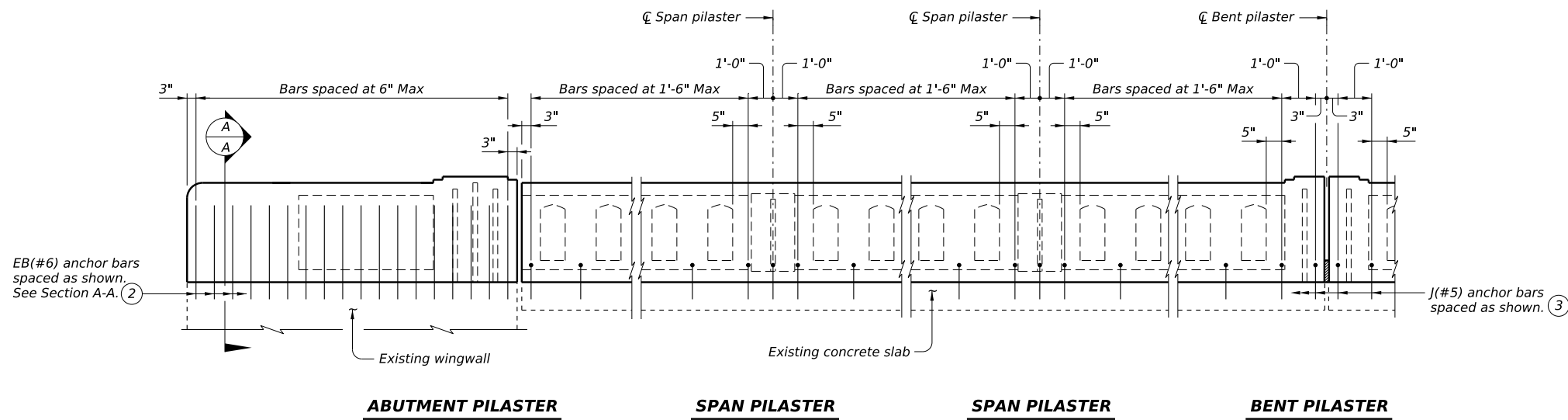
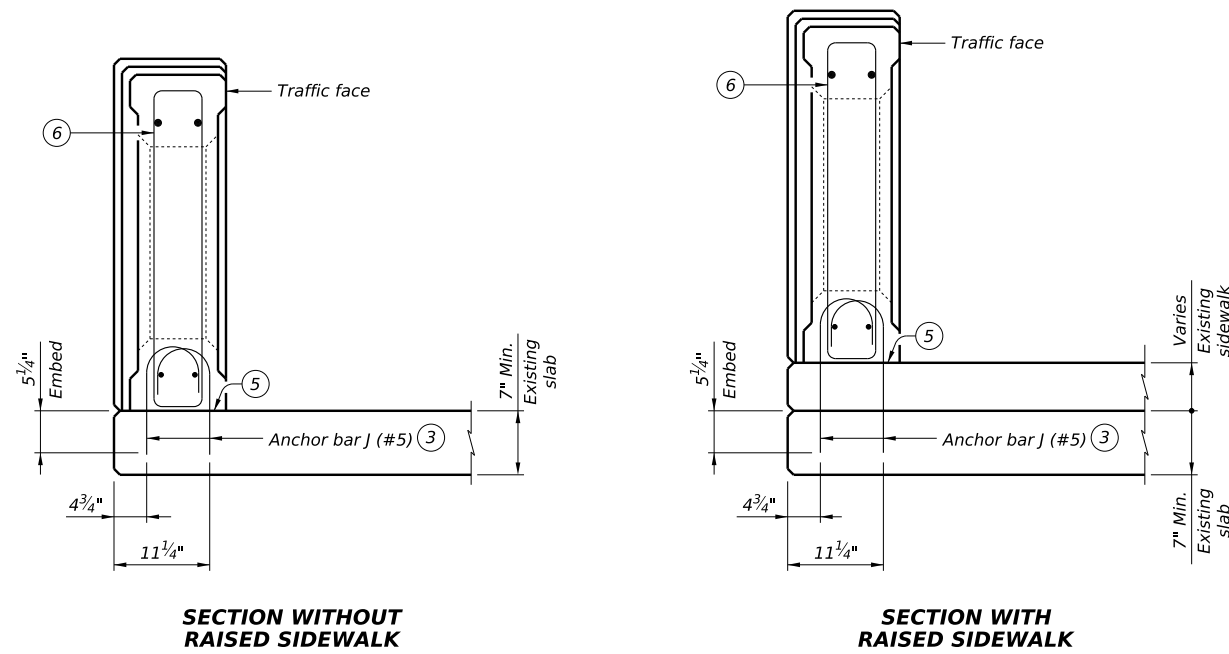


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**ROADWAY ELEVATION OF RAIL RETROFIT** ①



**SECTIONS THRU RAIL POST** ④

- ① Showing spacing of Bar EB(#6) and Bar J(#5) adhesive anchor in a rail retrofit condition. Reinforcing steel and terminal connections not shown for clarity. See rail standard for details and notes not shown.
- ② Embed EB(#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 1/4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit either the signed and sealed calculations or the Manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."
- ③ Use drill equipped with depth gauge stop device to keep from drilling through bottom of slab. If hole extends through to bottom of slab, plug bottom of hole prior to placing adhesive anchorage system. Do not drill a substitute hole next to drill through hole. Embed J(#5) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 1/4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit either the signed and sealed calculations or the Manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."
- ④ Showing location or locations of anchor bars in a rail retrofit condition. See appropriate rail standard for details and notes not shown. Replace Bars U (#5) with 2 Bars J (#5) oriented as shown.
- ⑤ Do not cast rails or parapet walls on top of overlays or seal coats.
- ⑥ See appropriate rail standard for reinforcing steel.

SHEET 1 OF 2



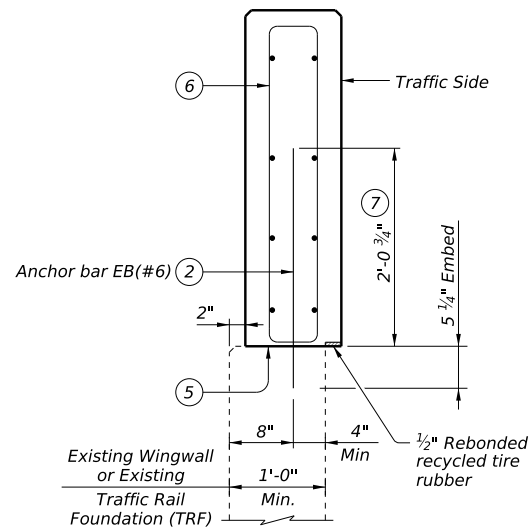
**RETROFIT GUIDE FOR TEXAS CLASSIC RAILS (TYPE T411 AND TYPE C411 RAILS)**

**(Not to be used as a standard) TC411-R**

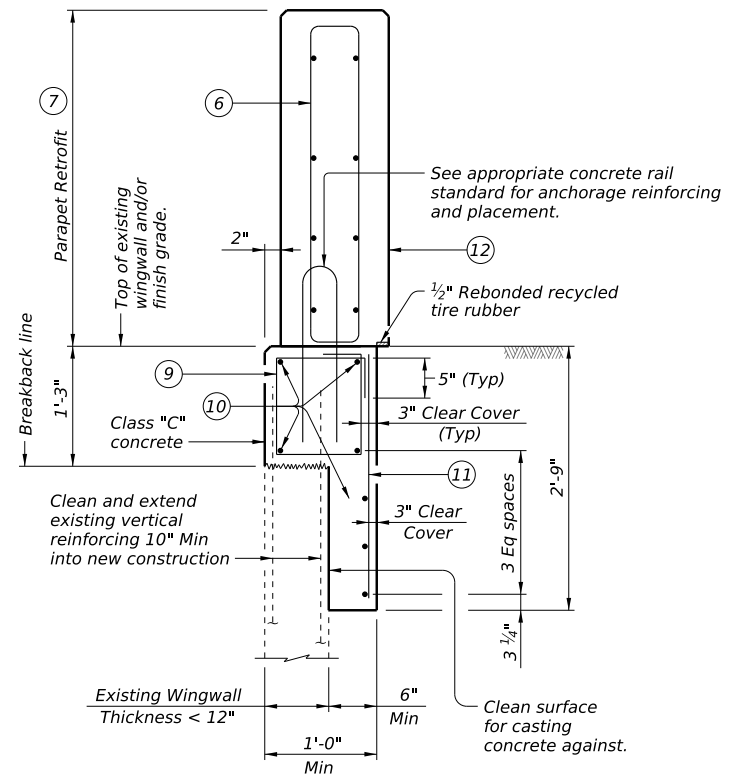
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**SECTION A-A (8)**



**SECTION OF EXISTING PARALLEL WINGWALLS LESS THAN 12" THICK**

This sheet is to be used as a guide for retrofitting existing structures with rails listed on this sheet. Details with appropriate notes from this guide should be prepared for the specific application. Dimensions of existing slab thickness, curb widths, heights, etc., should be shown. Particular care should be taken in identifying the bridge abutment wingwall conditions and providing for proper reinforcement anchorage and approach guard fence post positioning. This sheet may not be used without modification and the details shown may need to be amended if the exact existing condition is not covered. In all cases, details and notes not required must be crossed out or eliminated and "(MOD)" added to indicate modification of the sheet. This note and the phrase "(Not to be used as a standard)" must be removed and the sheet must be signed and sealed by a Professional Engineer.

**CONSTRUCTION NOTES:**

Field verify dimensions before commencing work and ordering materials.  
 Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 5 anchors per 100 anchors installed. Perform corrective measures to provide adequate capacity if any of the tests do not meet the required test load. Repair damage from testing as directed.

**MATERIAL NOTES:**

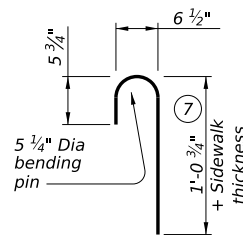
Provide Grade 60 reinforcing steel.  
 Epoxy coat or galvanize all reinforcing steel if required elsewhere.  
 (#6) and (#5) anchor bars used for the adhesive anchorage system must not be epoxy coated within the required embedment.

**GENERAL NOTES:**

Use of these retrofit details will result in a railing acceptable for the MASH Test Level indicated on the applicable rail standard.  
 Rail anchorage details shown on this guide may require modification for select structure types. See appropriate details elsewhere in plans for these modifications. Not all possible combinations of existing railing, curbs, parapets etc. have been shown on this sheet. Other combinations and reinforcement arrangements are permissible if they meet the same strength requirements as indicated on this guide. Do not remove any part of a curb until it has been evaluated to not be a load-carrying structural component.  
 Removal and replacement of backfill, subgrade, and asphalt or concrete pavement necessary for this installation is considered subsidiary to the retrofit railing.  
 Payment for a rail retrofit will be as per Item 451, "Retrofit Railing" by the type of the rail retrofit. All details shown herein are subsidiary to rail retrofit.

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

- (2) Embed EB(#6) anchor bars with a Type III, Class C, D, E, or F anchor adhesive. Minimum adhesive anchor embedment depth is 5 1/4". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit either the signed and sealed calculations or the Manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing."
- (5) Do not cast rails or parapet walls on top of overlays or seal coats.
- (6) See appropriate rail standard for reinforcing steel.
- (7) Increase by amount of existing overlay/seal coat thickness, not to exceed 2". If thickness of existing overlay or seal coat is greater than 2" at toe of rail, taper overlay at a 1:10 or flatter slope over shoulder width to a thickness of 2" or less at toe of rail.
- (8) Showing location or locations of anchor bars in a rail retrofit condition. See appropriate rail standard for details and notes not shown.
- (9) Space (#4) stirrups at 8" Max. (Spaced 3 1/4" longitudinally from retrofitted ends of wingwall).
- (10) 7 ~ (#5) bars with 3" end cover.
- (11) Space (#4) bars at 8" Max with 3" end cover, spaced with (#4) stirrups.
- (12) Face of rail and/or toe of rail. Location or placement of rail retrofit must match face of rail and/or toe of rail on bridge.



**ANCHOR BAR J (#5)**

DATE:  
FILE:

		<b>Bridge Division Standard</b>	
<b>RETROFIT GUIDE FOR TEXAS CLASSIC RAILS</b> <b>(TYPE T411 AND TYPE C411 RAILS)</b>  <b>(Not to be used as a standard)</b> <b>TC411-R</b>			
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