

NOTES

APPLICATION: Nested Type 5 Guardrail with Tubular Backup is accepted to NCHRP 350 Test Level 3. The only Bridge Terminal Assembly that is permitted to be used with this system is detailed on SCD GR-3.4. This system cannot be used with any other BTA.

GALVANIZING: Rails, posts, base plates, bolts, nuts, washers and all tubular steel are to be galvanized as specified in CMS 711.02.

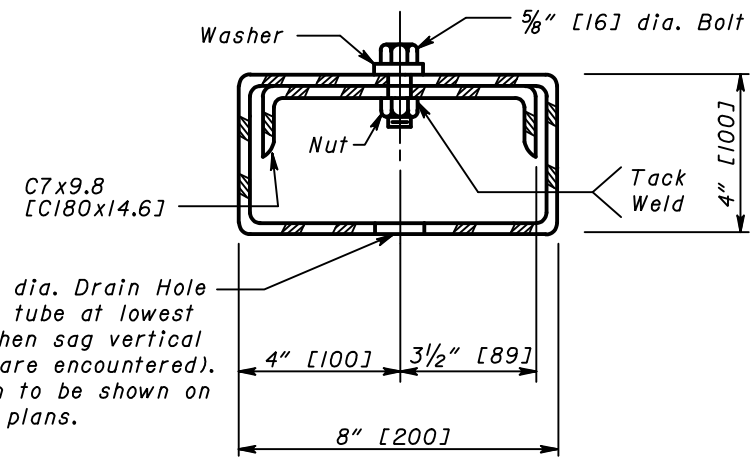
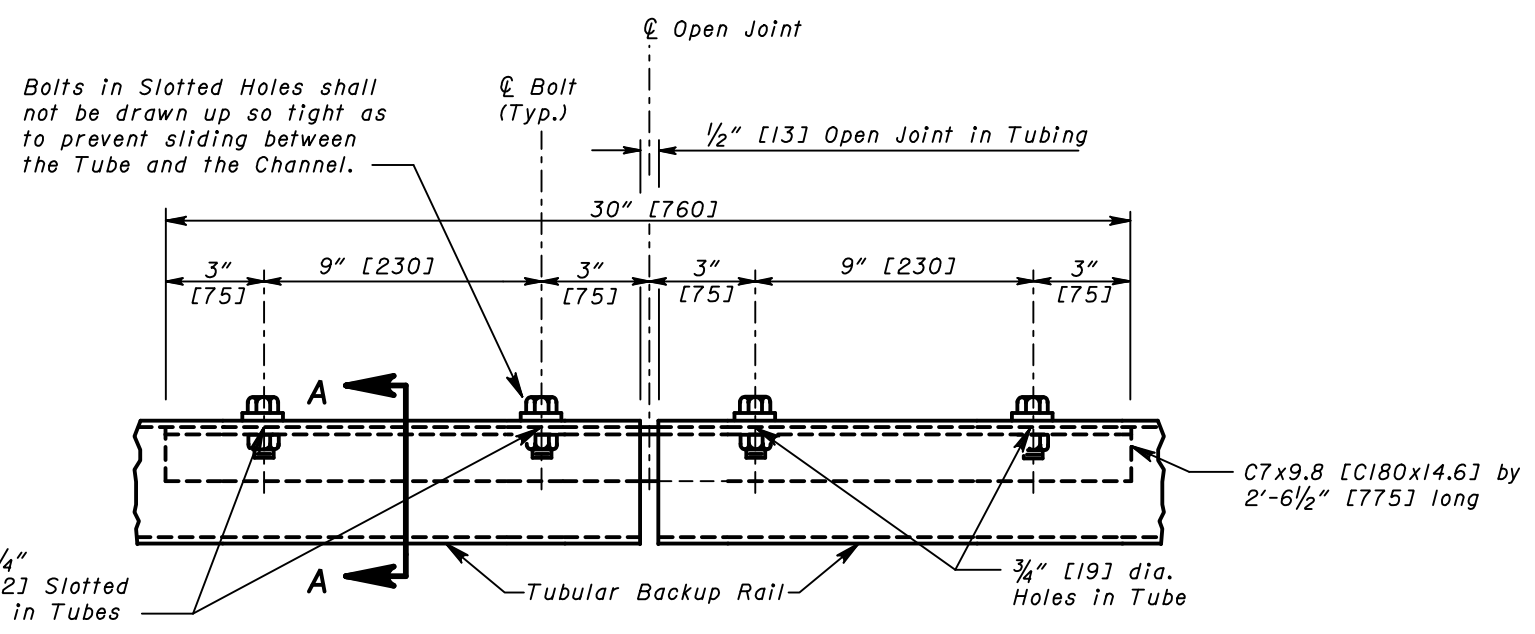
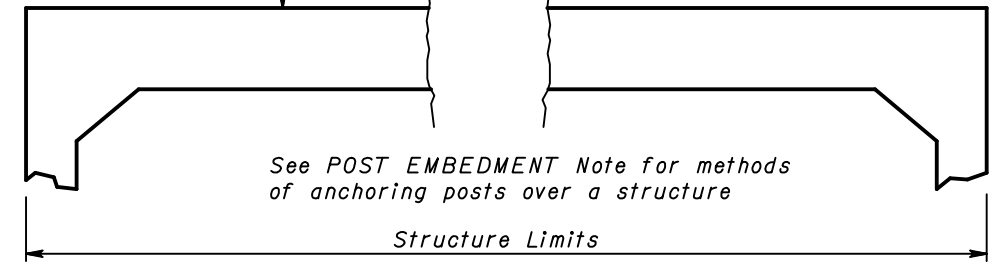
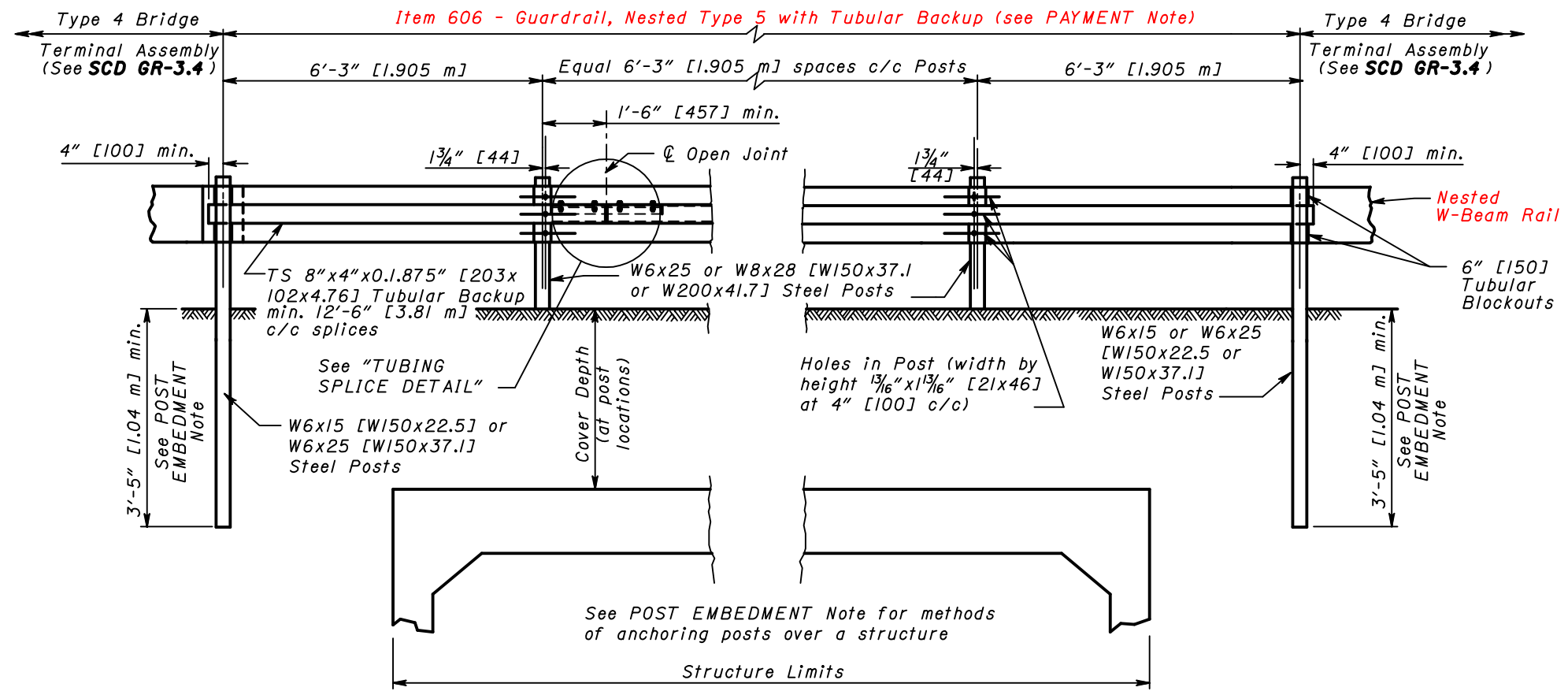
POST EMBEDMENT: Normal embedment depth is 3'-5" [1.04 m] (See SCD GR-1.1). For installation methods for posts of various cover over structures, see Sheet 2.

ANCHORING: Partial-depth anchoring is preferred to through-bolting. For partial depth anchoring use non-shrink, non-metallic grout as specified in CMS 705.20. Minimum embedment depths are 9" [225] for 7/8" [22] bolts and 10" [250] for 1/4" [32] bolts.

THROUGH-BOLTING: Drilling methods that cause spalling of the concrete where the bit passes through the underside of the slab is not permitted. In haunches 6:1 or flatter, use beveled plate washers on the bottom surface to compensate for the slope. Through-bolting is not permitted in haunch areas with a slope greater than 6:1.

SIDE-MOUNTED POST ANCHORAGES TO STRUCTURES: Install anchorages according to Structural Engineering's Standard Drawing DBR-2-73 and is paid under Item 517 - Railing.

PAYMENT: Item 606 - Guardrail, Nested Type 5 w/Tubular Backup is paid in Feet [Meters] for the length specified in the plans and shall include tubular backup as per Item 707.10, rails, posts and all other hardware, material and labor required to construct the guardrail as shown. The specified lengths should be for full W-Beam panels, i.e. evenly divisible by 12'-6" [3.81 m].



TUBING SPLICE DETAIL

SECTION A-A

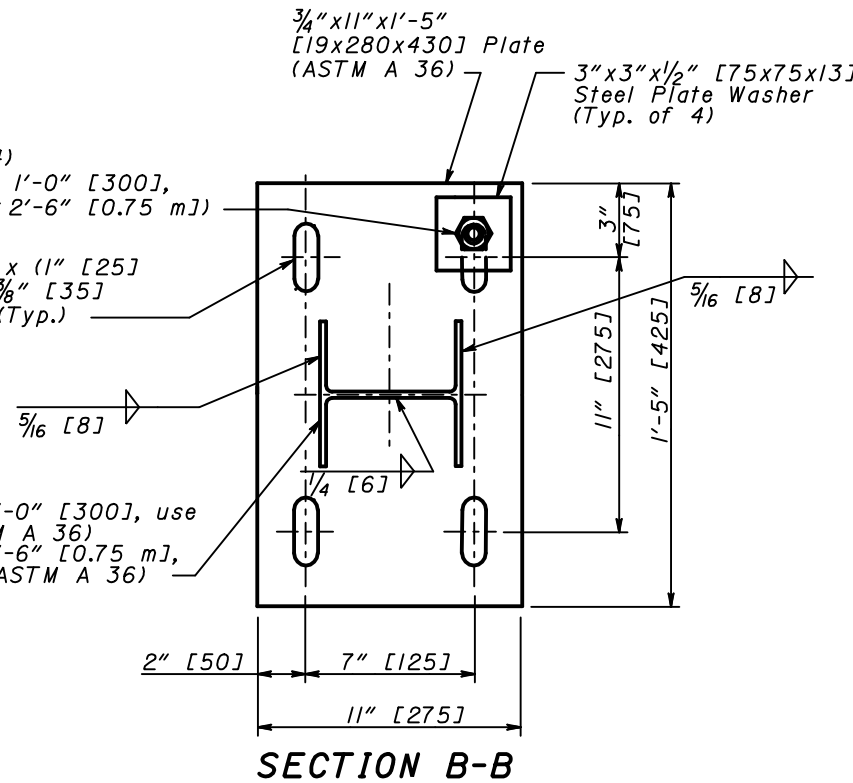
THIS DRAWING REPLACES GR-2.2 DATED 4-18-03.

ROADWAY ENGINEERING SERVICES	STDS. ENGR.	OHIO DEPARTMENT OF TRANSPORTATION	X-XX-XX
	D. Focke	ROADWAY DESIGN ENGINEER	DATE
STANDARD ROADWAY CONSTRUCTION DRAWING	All metric dimensions (in brackets []) are in millimeters unless otherwise noted.		
NUMBER	ROADWAY ENGINEERING SERVICES		
GR-2.2	NESTED TYPE 5 GUARDRAIL WITH TUBULAR BACKUP		
1 / 2			

ASTM A 325 Bolt with Nut (Typ. of 4)
 (7/8" [22] dia. for Cover Depth "A" ≤ 1'-0" [300],
 1 1/4" [32] dia. for 1'-0" [300] < "A" < 2'-6" [0.75 m])

3" [76] Slotted Hole x (1" [25]
 for 7/8" [22] Bolts, 1 3/8" [35]
 for 1 1/4" [32] Bolts) (Typ.)

For Cover Depth "A" ≤ 1'-0" [300], use
 W6x25 [W150x37.1] (ASTM A 36)
 For 1'-0" [300] < "A" < 2'-6" [0.75 m],
 use W8x28 [W200x41.7] (ASTM A 36)

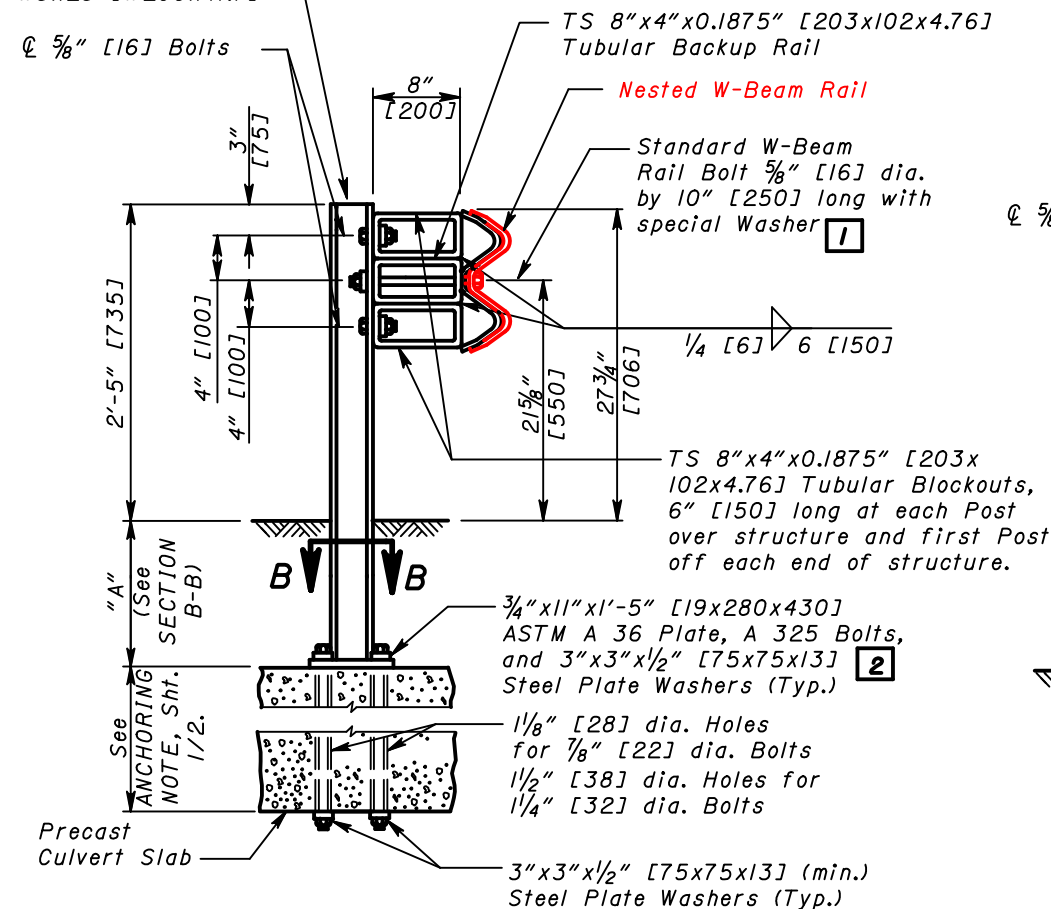


LEGEND

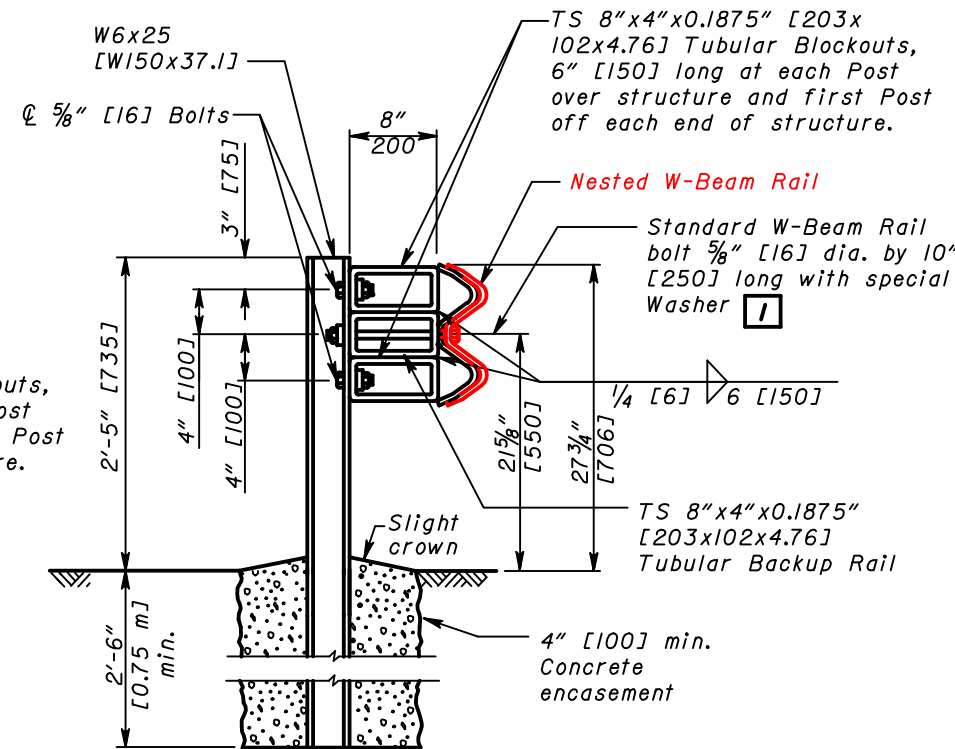
- 1 For details of special washer, see AASHTO M 180.
- 2 Embed plate in sealant as per Federal Specification TT-S-00230C, Type II.

W6x25 [W150x37.1] or
 W8x28 [W200x41.7]

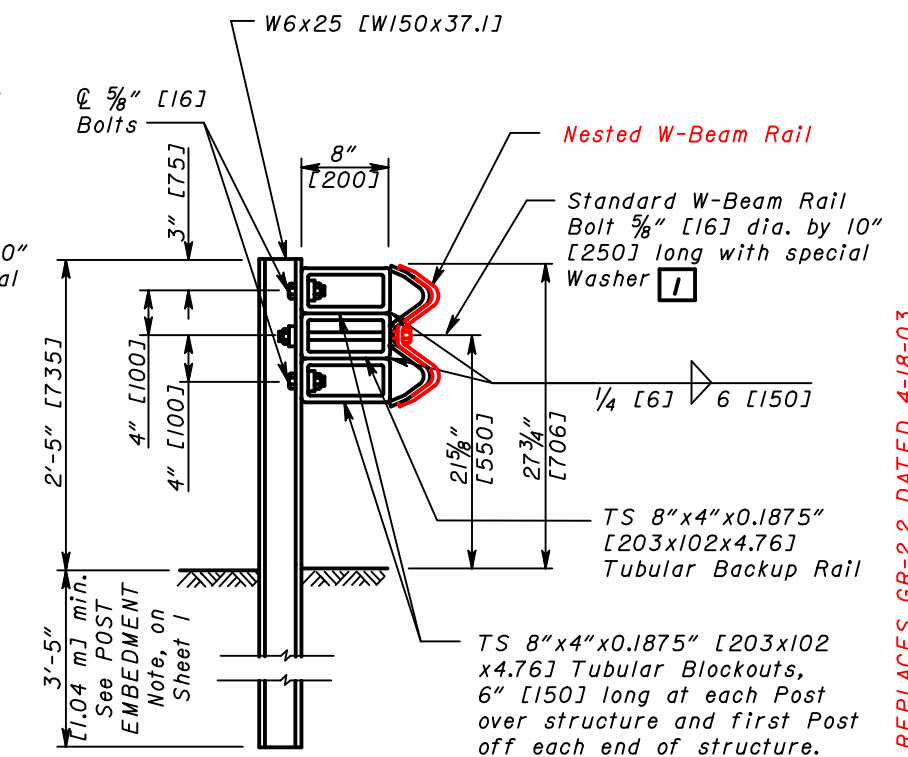
Ø 5/8" [16] Bolts



COVER DEPTH LESS
 THAN 2'-6" [0.75 m]



COVER DEPTH EQUAL TO OR
 GREATER THAN 2'-6" [0.75 m],
 BUT LESS THAN 3'-5" [1.04 m]

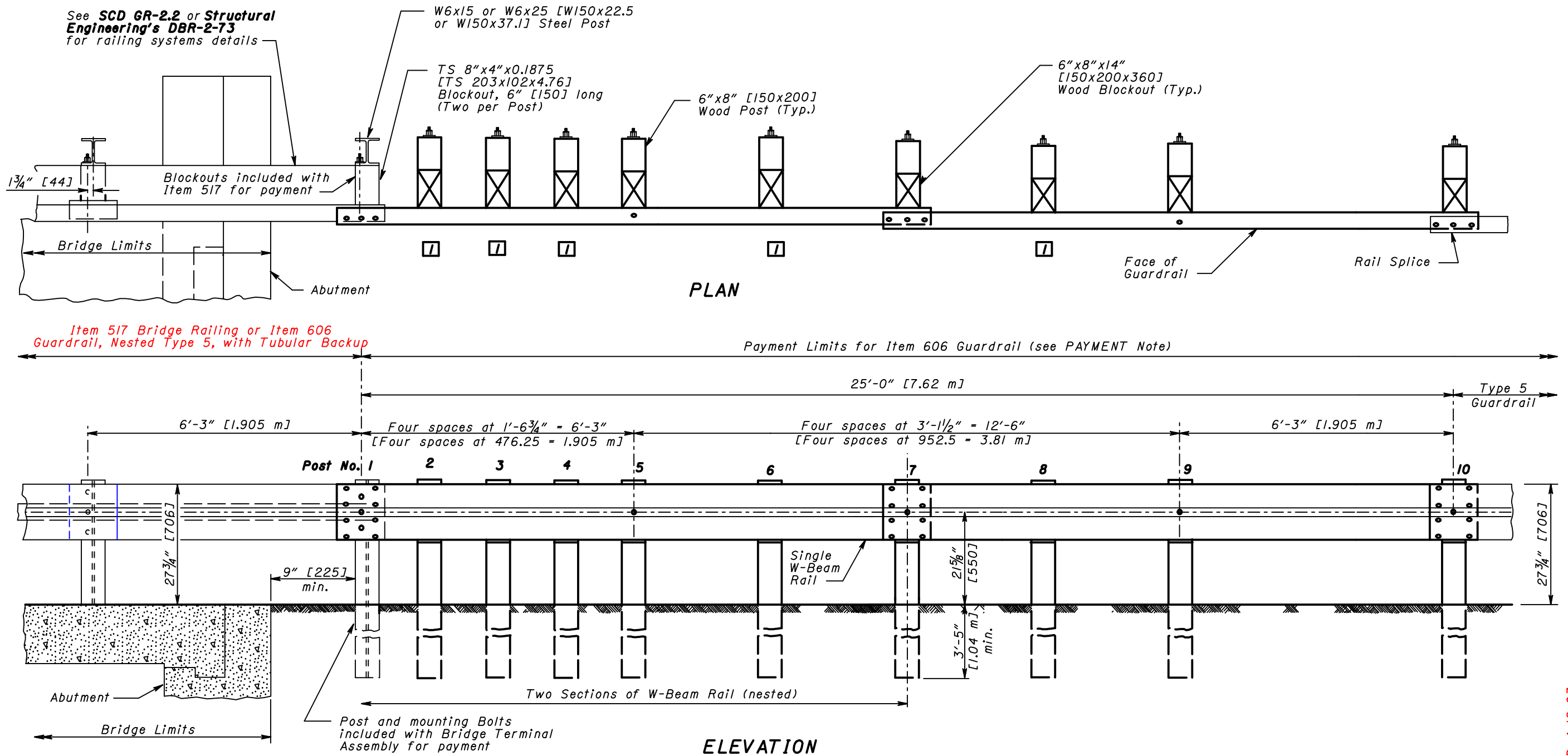


COVER DEPTH GREATER THAN
 OR EQUAL TO 3'-5" [1.04 m]

METHODS FOR ANCHORING POSTS

THIS DRAWING REPLACES GR-2.2 DATED 4-18-03.

ROADWAY ENGINEERING SERVICES	STDS. ENGR. D. Focke	OHIO DEPARTMENT OF TRANSPORTATION	X-XX-XX	DATE
All metric dimensions (in brackets []) are in millimeters unless otherwise noted.				
STANDARD ROADWAY CONSTRUCTION DRAWING				
NESTED TYPE 5 GUARDRAIL WITH TUBULAR BACKUP				
NUMBER GR-2.2				
2 / 2				



NOTES

GENERAL: For additional details, see **SCD GR-1.1**.

APPLICATION: The Type 4 Bridge Terminal Assembly shall connect Type 5 Guardrail runs to Type 5 Guardrail with Tubular Backup or to Deep Beam Bridge Guardrail (as shown on **Structural Engineering SCD DBR-2-73**). **Do not use on the NHS.**

DETAIL INFORMATION: The first post off the bridge shall be steel (W6x15 or W6x25 [W150x22.5 or W150x37.1]). All holes in the off-structure end of the approach panel rail section spanning the abutment are slotted $\frac{3}{4}$ "x2 $\frac{1}{2}$ " [19x64]. Tighten the bolts as specified for expansion joints in Item 606.05.

POSTS: Posts may be set in drilled holes or driven to grade. See **SCD GR-1.1** for additional Post embedment details. Guardrail is not attached to certain posts (see LEGEND).

WOOD POSTS - Use square sawed pressure treated wood as specified in CMS 710.14 and fabricated with square ends. Bore bolt holes and trim the tops of posts, if required, after the posts are set.

STEEL POSTS - are allowed as an alternate. Use W6x9 [W150x13.5] or W6x8.6 [W150x12.6] in lieu of the 6"x8" [150x200] wood post. Use same post material throughout assembly.

BLOCKOUTS: Use wood blockouts only. Steel or plastic blockouts are not permitted. Notched wood blockouts are used with steel posts.

FLARED GUARDRAIL: Start Standard Guardrail Flares as shown on **SCD GR-5.1** at or beyond Post No. 10; however, the flare may begin at Post No. 7.

PAYMENT: **Item 606 - Bridge Terminal Assembly, Type 4, Each**, includes the cost of extra components, in excess of normal guardrail, for additional posts and other hardware. The TS 8"x4" [200x100] spacers and tubular backup rail extending to the first post off the bridge is included with **Item 517 - Railing**, or **Item 606 - Guardrail, Nested Type 5, with Tubular Backup**, for payment.

LEGEND

- Guardrail is not attached to posts at Posts 2, 3, 4, 6, and 8. Blockout is fastened to post with standard Post Bolt.

THIS DRAWING REPLACES GR-3.4 DATED 4-18-03.

DATE	X-XX-XX
ROADWAY DESIGN ENGINEER	
STDS. ENGR.	D. Focke
OHIO DEPARTMENT OF TRANSPORTATION	
ROADWAY ENGINEERING SERVICES	
BRIDGE TERMINAL ASSEMBLY, TYPE 4	
CONSTRUCTION DRAWING	
NUMBER	GR-3.4