

NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION



BUREAU OF BRIDGE DESIGN



Steel Bridge and Approach Railing Detail Sheets - REVISION HISTORY

Date of Revision	Name of Detail Sheet	Revision Description	Background
12/11/2023	Snow Screen with Steel Bridge Rail Protective Screen with Steel Bridge Rail	<p>Removed T2 Bridge Rail Section Revised posts to show clipped top Revised location of top bolt rail to screen attachment</p> <p>Note #8 on Snow Screen Sheet: Removed "Item 563.223, Bridge Rail T2 with Snow Screening"</p> <p>Note #8 on Protective Screen Sheet: Removed "Item 563.221, Bridge Rail T2 "</p>	<p>The back of the bridge rail post is now clipped following the MASH simulation recommendation. This caused the top fence attachment to be 7.5" lower on the post and a larger cantilevered section that most likely be bent due to snow pushed onto it from the snow plows. It was decided that since T2 is no longer being placed on state bridges, except for unique situations, fencing shall only be placed on T3 or T4 railing, which is taller and will have less cantilevered fencing.</p>
9/27/2023	T2 Steel Bridge Approach Rail T3 Steel Bridge Approach Rail T4 Steel Bridge Approach Rail	<p>Revised Section A-A (Post Rail Assembly): Removed granite curb installation dimenstions and reworded items.</p>	<p>Made a separate Bridge Approach Rail Curb Detail and placed on Bridge Details webpage. The installation of the approach curb is done by a different Contractor than the rail installation. The sheet is intended for bridge approach rail fabrication so the approach curb installation is now on a separate detail that should be placed with roadway details.</p>
9/15/2023	Snow Screen Protective Screen	<p>Removed: Double-Pigtailed Tie Detail</p> <p>Revised Note #2: To: HOOK-TYPE TIES SHALL BE STANDARD ROUND 9 GAUGE ALUMINUM-COATED STEEL OR 6 GAUGE ALUMINUM ALLOY CONFORMING TO ASTM F626. HOOK-TYPE TIES SHALL BE WRAPPED AROUND CHAIN-LINK FABRIC TWICE (DOUBLE PIGTAILED) AT BOTH ENDS. AN APPROVED ALTERNATIVE: POWER FASTENED PREFORMED TYPE TIES SHALL BE 9 GUAGE PREFORMED GALVANIZED STEEL ROUND WIRE CONFORMING TO ASTM F567-14 8.4, SPACE TIES@ 6" O.C. TO BOTTOM RAIL AND@ 12" O.C. TO ALL POSTS AND OTHER RAILS.</p> <p>From: WIRE TIES SHALL BE STANDARD ROUND 9 GAUGE ALUMINUM-COATED STEEL OR 6 GAUGE O.C. ALUMINUM ALLOY CONFORMING TO ASTM F 626. ALL TIES SHALL BE WRAPPED AROUND CHAIN-LINK FABRIC TWICE (DOUBLE PIGTAILED) AT BOTH ENDS. SPACE TIES @ 6" O.C. BOTTOM RAIL AND @ 12" O.C. TO ALL POSTS AND OTHER RAILS.</p>	<p>The Double-Pigtailed Tie detail was confusing and not showing how the hook tie was installed. It was removed and the method of tying is noted in note #2.</p> <p>Installer of fencing emailed and said the standard method that is now used to tie the fencing is the power fastened preformed ties and ask for this method to be an approved alternative. It was approved and the note updated.</p>
7/31/2023	All Steel Bridge and Approach Railing, Snow Screen, and Protective Screen Detail Sheets	<p>Converted from MicroStation V8i to MicroStation Connect. Changes made are shown with highlights on this Detail Sheet.</p>	

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2/16/2021	T2 Steel Bridge Rail T3 Steel Bridge Rail T4 Steel Bridge Rail	<p>Section View: Removed Detail B reference Revised Retroreflective Delinator note: To: "See Note #17"</p> <p>Back Elevation View: Added "+/- 6" "</p> <p>Revised Rail Note #6: To: "(6) AT INTERIOR SPLICES, PIPE SPACERS SHALL BE USED ON ONLY ONE SIDE OF THE SPLICE TO ALLOW MOVEMENT ON THAT SIDE. AT EXPANSION SPLICES, AND AT AT END SPLICES, PIPE SPACERS SHALL BE USED ON BOTH SIDES OF THE SPLICE TO ALLOW SPLICES, PIPE SPACERS SHALL BE USED ON BOTH SIDES OF THE SPLICE TO ALLOW." From: "6) AT INTERIOR SPLICES, PIPE SPACERS SHALL BE USED ON ONLY ONE SIDE OF THE SPLICE TO ALLOW MOVEMENT ON THAT SIDE. THE TOP AND BOTTOM RAIL SHALL RECEIVE THE SAME TREATMENT. AT END SPLICES PIPE SPACERS SHALL BE USED BOTH SIDES OF THE SPLICE TO ALLOW MOVEMENT ON EACH SIDE."</p>	<p>Added +/- 6" to clarify the hoop bars don't need to be exactly centered around post.</p> <p>Clarified Note #6</p>
2/16/2021	T2 Steel Bridge Approach Rail (Steel Posts) T3 Steel Bridge Approach Rail (Steel Posts) T4 Steel Bridge Approach Rail (Steel Posts)	<p>Plan View: Added note: "Mortar Joint (Seal with Item 562.1)" Replaced: "Roadway Item" with "Item 609.01"</p> <p>Section A-A: Revised note: To: Double Recessed Nut with Rock Washer (Typ) From: Hex Nut with Round Washer (Typ) Revised Note: To: "Approach Curb (Item 609.01)" From: "Approach Curb (If Required)" Deleted extra 5/8"Ø A307 bolt note</p> <p>Details Thrie-Beam Terminal Connector, Detail A, Section B-B: Revised all reference to 3/4"Ø bolts To: "3/4" Ø A307 Carriage Bolts" From: "3/4" E Button Head Bolts"</p>	<p>Spoke with a Contractor who installs the units. The 3/4"Ø are carriage bolts. All carriage bolts have a round head. Button head bolts don't have a square shoulder under the head that carriage bolts have which is needed to provide resistance while tightening. Clarified the 3/4"Ø bolts are called out as carriage bolts.</p>
8/29/2019	T3 Steel Bridge Rail	Put back missing reinforcing bars in curb in Section View	Reinforcing bars were mistakenly removed.

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6/25/2019	T2 Steel Bridge Rail T3 Steel Bridge Rail T4 Steel Bridge Rail	Revised Post Assembly: Added deck reinf. Deleted Detail A & Section A-A Changed Detail B & Sec B-B to Section A & Sec A-A Removed Stud Weld Detail Revised Rail Notes: #(8) Removed Detail B reference Revised Material Notes: #(14) Reomved 1st sentence referencing threaded studs Deleted #(16) referencing threaded studs. Renumbered (17) & (18)	Clarified posted assembly showing deck reinforcing required to meet the crash testing. Removed Detail A, Section A-A and Stud Weld Detail and notes referencing the threaded stud weld option. Spoke with Contractor who installs the railing and the threaded stud welded connection has never been used nor was it crash tested. Now, only the bolt detail shall be shown for installation.
6/25/2019	T2 Steel Bridge Approach Rail (Steel Posts) T3 Steel Bridge Approach Rail (Steel Posts) T4 Steel Bridge Approach Rail (Steel Posts)	Revised Section A-A (Post Rail Assembly) note: To: 5/8" \varnothing x 9 1/2" button head bolt (Typ) From: 5/8" x 1 1/2" \varnothing hex head bolt (Typ) Revised showing bolt attaching to the front flange instead of the rear flange.	Spoke with Contractor who installs the units. The approach units have been installed with bolt attached to the front flange and not the rear flange.
3/20/2018	T2 Steel Bridge Approach Rail (Steel Posts) T3 Steel Bridge Approach Rail (Steel Posts) T4 Steel Bridge Approach Rail (Steel Posts)	Added note to Elevation - Approach Rail: "DO NOT BEND" Removed 5'-0" dimension from sidewalk note on plan view of T4 Steel Bridge Approach Rail sheet.	Two sections of the bridge approach rail cannot be bent to a radius: connection plate (2'-5 1/8" section) and thrie-beam to w-beam transition section (6'-3"). These sections must be shown laid out on a tangent. Sidewalk width may vary depending on project.

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11/1/2016	Snow Screen with Steel Bridge Rail Protective Screen with Steel Bridge Rail	<p>Revised all descriptions of vertical pipe size: From: 2" pipe To: 2 3/8" O.D. pipe</p> <p>Revised all descriptions of horizontal pipe size: From: 1 1/4" pipe To: 1 5/8" O.D. pipe</p> <p>Revised all description of clamp: From: Boulevard Clamp To: In-Line Clamp Removed note: "12 gauge galvanized steel or 3/16" aluminum (min. thickness)"</p> <p>Revised General Notes: (1) Removed: "Zinc coated conforming to AASHTO M181, Type I, Class D (ASTM A 392)" and "or 6 gauge aluminum alloy conforming to AASHTO M181, Type III (ASTM F 1183)" (2) Removed: "Zinc or" (3) Removed: "or aluminum alloy conforming to AASHTO M181 (ASTM B 429, alloy 6063 T6)" and "Nominal pipe sizes are shown in the drawings." (4) Removed: "Boulevard" and "or aluminum alloy conforming to AASHTO M181 (ASTM F 626)" Added: "All bar bands shall have a beveled edge."</p>	Speaking with bridge railing installers, aluminium has not been used for bridge railing since 1980's. Only steel is used except for wire ties (both aluminium and steel can be used). Zinc coating was also removed because galvanizing is the best coating and widely provided by suppliers. The pipe sizes were revised to reflect supplier's description. The In-Line clamps have different dimensions depending on fabricator. As long as we note to use 3/8" carriage bolts, we will get the heavier clamp.
11/1/2016	T2 Steel Bridge Rail T3 Steel Bridge Rail T4 Steel Bridge Rail	<p>Revised note in cloud: To: <i>No modifications permitted to this sheet, except as noted below:</i> From: Modifications permitted for this sheet:</p>	Clarified note.

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3/12/2016	T2 Steel Bridge Approach Rail T3 Steel Bridge Approach Rail T4 Steel Bridge Approach Rail	<p><u>Notes:</u> Added note #2 and renumbered notes: W6x25 posts shall be the same material as the bridge rail posts. W6x8.5 posts shall be the same material as the w-beam guardrail posts.</p> <p><u>Revised old note #3 to new note #4:</u> To: <i>Weld bars adjusted for slope & bend. Use complete joint penetration butt weld (B-U2).</i> From: T2: Weld bottom splice bar to fit bend. Use complete joint penetration butt weld (B-U2). T3: Weld splice bar to fit bend. Use complete joint penetration butt weld (B-U2). T4: Weld splice bar and rail tubes to fit bend. Use complete joint penetration butt weld (B-U2).</p> <p><u>End Cap Details:</u> Revised "TS" reference to "HSS" reference.</p> <p><u>Section A-A (Post Rail Assembly):</u> Revised dimension to break-in-slope: To: 2'-6" From: 2'-8" Minimum Revised location of break-in-slope and measured to face of rail. Added note: 5/8" x 1 1/2" \varnothing hex head bolt (typ)</p> <p><u>Rail Post (W6x25):</u> Added note: <i>Install two bolts (4 slots in posts flange optional)</i></p> <p><u>Elevation - Approach Rail:</u> Revised note To: <i>Splice bars (Paid under approach rail unit) (See note #4)</i> From: Splice Bar (Bent) see note #3 (End splice to be paid under bridge approach rail) (typ)</p> <p><u>Elevation - Approach Rail T4:</u> Changed reference TS to HSS, revised view of bottom rail (added a line)</p> <p><u>Section B-B (Connection Plate):</u> Revised note To: <i>Outline of terminal connector</i> From: Outline of terminal connector rail slots</p> <p><u>Section B-B (Connection Plate) T4:</u> Added carriage bolt to bottom rail</p>	Clarified post material. Updated tube call out to HSS. Revised break-in-slope location. Minor revisions.

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3/12/2016	T2 Steel Bridge Rail T3 Steel Bridge Rail T4 Steel Bridge Rail	<p><u>Back Elevation View:</u> Added note: <i>Install two bolts (4 slots in post flange optional)</i> Revised location of call out for slotted holes in post.</p> <p><u>Rail Notes:</u> Note #7: Added "(See Section 563.3.2.1)" Note #8: Revised % zinc by weight from "94%" to "92%". Added "Section 550.2.9.1".</p>	Contractor requested to drill additional holes for when the rail doesn't line up with the hole during installation. Bending requirements are now noted in the specification.
5/10/2015	T2 Steel Bridge Rail T3 Steel Bridge Rail T4 Steel Bridge Rail	Added: "Face of Rail" note to Anchor Plate Detail	Clarification on what direction the anchor plate shall be placed in the curb. The reduced plate section due to the hole is to be on the side with the back anchor rods.
2/3/2015	T4 Steel Bridge Approach Rail (Steel Posts)	<p>Revised note #3 to: <i>Weld splice bars to fit bend. Use complete joint penetration butt weld (B-U2).</i></p> <p>From: Weld bottom splice bar to fit bend. Use complete joint penetration butt weld (B-U2).</p>	Clarification that only the top two splice bars shall be welded.
2/3/2015	T3 Steel Bridge Approach Rail (Steel Posts)	<p>Revised note #3 to: <i>Weld splice bars to fit bend. Use complete joint penetration butt weld (B-U2).</i></p> <p>From: Weld bottom splice bar to fit bend. Use complete joint penetration butt weld (B-U2).</p>	Clarification that all splice bars shall be welded.
2/3/2015	T2 Steel Bridge Approach Rail (Steel Posts)	<p>Revised "Elevation View" note to: <i>Splice bar (bent) See note #3 (End splice bar to be paid under bridge approach rail (Typ))</i></p> <p>From: Splice bars (bottom bent) See note #3 (End splice bar to be paid under bridge approach rail (Typ))</p> <p>Revised note #3 to: <i>Weld splice bar to fit bend. Use complete joint penetration butt weld (B-U2).</i></p> <p>From: Weld bottom splice bar to fit bend. Use complete joint penetration butt weld (B-U2).</p>	Clarification on what splice bar shall be welded. The top splice bar does not need to be welded.
5/10/2015	T2 Steel Bridge Rail T3 Steel Bridge Rail T4 Steel Bridge Rail	Added: "Face of Rail" note to Anchor Plate Detail	Clarification on what direction the anchor plate shall be placed in the curb. The reduced plate section due to the hole is to be on the side with the back anchor rods.

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2/3/2015	T4 Steel Bridge Approach Rail (Steel Posts)	Revised note #3 to: <i>Weld splice bars to fit bend. Use complete joint penetration butt weld (B-U2).</i> From: Weld bottom splice bar to fit bend. Use complete joint penetration butt weld (B-U2).	Clarification that only the top two splice bars shall be welded.
2/3/2015	T3 Steel Bridge Approach Rail (Steel Posts)	Revised note #3 to: <i>Weld splice bars to fit bend. Use complete joint penetration butt weld (B-U2).</i> From: Weld bottom splice bar to fit bend. Use complete joint penetration butt weld (B-U2).	Clarification that all splice bars shall be welded.
2/3/2015	T2 Steel Bridge Approach Rail (Steel Posts)	Revised "Elevation View" note to: <i>Splice bar (bent) See note #3 (End splice bar to be paid under bridge approach rail (Typ))</i> From: Splice bars (bottom bent) See note #3 (End splice bar to be paid under bridge approach rail (Typ)) Revised note #3 to: <i>Weld splice bar to fit bend. Use complete joint penetration butt weld (B-U2).</i> From: Weld bottom splice bar to fit bend. Use complete joint penetration butt weld (B-U2).	Clarification on what splice bar shall be welded. The top splice bar does not need to be welded.
3/25/2014	T2 Steel Bridge Approach Rail T3 Steel Bridge Approach Rail T4 Steel Bridge Approach Rail	Revised "Elevation View Approach Rail" guardrail height from 2'-6" to 2'-7".	Revised the w-beam guardrail height to match Highway Design's change to 31". The bridge approach rail height is 34". The transition section was not revised for the 1" change. A beam guardrail installer was contacted and said the 1" vertical difference can be adjusted in the field.
3/25/2014	T2 Steel Bridge Approach Rail T3 Steel Bridge Approach Rail T4 Steel Bridge Approach Rail	Revised "Plan View Approach Rail" note to: <i>Synthetic Blockout for W-Beam Guardrail</i> From: Synthetic Blockout for W-Beam Guardrail (8" Deep (Nominal) x 1' 2" Long) (Typ) (See Special Provisions)	Removed blackout description.
3/9/2014	T2 Steel Bridge Rail T3 Steel Bridge Rail T4 Steel Bridge Rail	Added note to "Modifications Permitted for this Sheet": <i>2. ITEM NUMBER AND DESCRIPTION IF SNOW SCREENING AND/OR PROTECTIVE SCREENING WILL BE USED</i>	New note allows modification to the item number when using snow or protective screening.