THREE-BEAM PANEL: Steel Three-Beam Elements shall meet the requirements for Class B (10 Gauge) Guardrail of AASHTO M 180, Type II (Zinc coated). The minimum panel length for Three-Beam Elements shall be 12'-0". Field drilled holes for Post connections shall be 3/4" by 21/2" slotted holes.

BOLTS, NUTS AND WASHERS: Bolts, nuts and round washers shall be in accordance with AASHTO M180. Plate Washers shall be in accordance with ASTM A266 or ASTM A709 Grade 36.

COATINGS: All Nuts, Bolts, Anchors, and Washers shall be hot-dip galvanized in accordance with the Specifications.

THREE-BEAM EXPANSION SECTION: Three-Beam Expansion Sections shall be installed at locations shown in the Plans. Install nuts for splice bolts finger-tight at 21/2" slots in three-beam expansion sections. Nuts shall fully engage bolts with a minimum of one bolt thread extending beyond the nuts. Distort the first thread on the outside of the nut to prevent loosening. Tighten bolts in 3/4" slots at guardrail post(s) that lie between the slotted expansion splice and bridge deck joint so that the bolt heads are in full contact with three-beam elements, but not so tight as to impede movement due to expansion.

WOOD BLOCKS: All wood blocks, including required wedge shaped blocks shall be Pressure Treated lumber in accordance with Specifications Section 955. Bolt holes in blocks to be centered (+/-).

BRIDGE NAME PLATE: If a portion of the existing Traffic Railing is to be removed that carries the bridge name, number and date, or if the installation of the Traffic Railing (Three-Beam Retrofit) will obscure the bridge name, number and date, then replace the information that has been removed or obscured, with 3" tall black lettering on white nonreflective material.

PAYMENT: Payment will be made under Three-Beam Panel Retrofit which shall include all materials and labor required to install the retrofit railing. Transition Blocks and Curb, Bridge Name Plate and Barrier Delineator, where required, will not be paid for directly but shall be considered incidental work.

NOTE: All Three Beam Panels shall be lapped in the direction of adjacent traffic. At the Contractor's option, laps may be extended. Field drill holes in Trailing Three-Beam Panel as required.

THREE-BEAM PANEL SPLICE
THREE-BEAM PANEL RETROFIT (CONCRETE HANDRAIL)
NOTES:

1. Dimensions and elevations for existing guardrails to be verified by the Contractor before beginning construction.

2. Provide Transition Block as shown or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of the traffic face of Transition Block or Curb shall match existing bridge curb. See Sheet 4 for Transition Block details. Block may be omitted on trailing ends with no opposing traffic.

3. Do not bolt nested rails to the blocks and posts at posts (a), (c) & (e).

Wingwall mounted railing section (if present; length varies)

Directions of Adjacent Traffic

PARTIAL PLAN - APPROACH TRANSITION

Traffic Railing (Thrie-Beam Panel Retrofit) - Class B (10 Gauge) Panels

PARTIAL ELEVATION - APPROACH TRANSITION

Guardrail Approach Transition

W-Beam Guardrail

See Index 400

PARTIAL PLAN - TRAILING END TRANSITION

Traffic Railing (Thrie-Beam Panel Retrofit) - Class B (10 Gauge) Panels

PARTIAL ELEVATION - TRAILING END TRANSITION

Guardrail Trailing End Transition

W-Beam Guardrail - See Index 400

NOTES:

1. Dimensions and elevations for existing guardrails to be verified by the Contractor before beginning construction.

2. Provide Transition Block as shown or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of the traffic face of Transition Block or Curb shall match existing bridge curb. See Sheet 4 for Transition Block details. Block may be omitted on trailing ends with no opposing traffic.

3. Do not bolt nested rails to the blocks and posts at posts (a), (c) & (e).
**ELEVATION VIEW A-A (At Double Posts)**

(View at Intermediate Double Posts shown; View at Expansion Joints similar)

- Existing Concrete Traffic Railing
- Thrie-Beam Panel
- Open Joint (Varies)
- Wingwall mounted railing section
- 5½" x 10" x 2" Wood Block (Typ.)
- Existing Curb
- Existing Bridge Deck

**ELEVATION VIEW A-A (At Single Post)**

- ¾" Post Bolt, Nut, Round Washer & Plate Washer (Typ.)
- Existing Curb
- Thrie-Beam Panel
- 5½" x 10" x 2" Wood Block (Typ.)
- Existing Bridge Deck

**ELEVATION VIEW A-A (At End Post)**

- ¾" Post Bolt, Nut, Round Washer & Plate Washer (Typ.)
- Existing Curb
- Thrie-Beam Panel
- 5½" x 10½" x 2" Wood Block (Typ.)
- Existing Bridge Deck

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**TYPICAL SECTION THRU RAILING POST ON BRIDGE DECK**

- Thrie-Beam Panel
- Front Face of
- Existing Concrete Traffic Railing
- Wood Block**
- Wedge Shaped Wood Block**
- Existing Concrete wedge or existing wedge shaped wood block
- ¾" Post Bolt, Nut, Round Washer & Plate Washer (Typ.)

**NOTES:**

1. Post Bolts shall be ¾" ø x 14" long set in ¾" ø core drilled holes, see Sheet No. 1.
2. Shift Post Bolt holes minimally inward toward center of posts if existing reinforcement is encountered during drilling of holes. If reinforcement is still encountered, notify the Engineer before proceeding with drilling.
3. Post Bolt spacing not to exceed 8'-0" (± 1').

**For End Posts with an existing wedge shaped wood block, remove existing wood block and replace with new Wedge Shaped Wood Block (See Sheet 1 for notes and details).**
**PLAN VIEW OF TRANSITION BLOCK**

(GUARDRAIL NOT SHOWN FOR CLARITY)

**ELEVATION OF TRANSITION BLOCK**

(GUARDRAIL AND POSTS NOT SHOWN FOR CLARITY)

**ESTIMATED QUANTITIES PER TRANSITION BLOCK**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
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<tr>
<td>Concrete Class II (Bridge Deck)</td>
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<tr>
<td>Reinforcing Steel</td>
<td>LB</td>
<td>61</td>
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<tr>
<td>Guardrail (Reset)</td>
<td>LF</td>
<td>12.5</td>
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</table>

**NOTES:**

ANCHOR RODS: Steel Anchor Rods shall be ASTM A36, ASTM A709 Grade 36 or ASTM A615 Grade 60 hot-dip galvanized in accordance with Specification Section 962.

ADHESIVE-BONDED DOWELS: Adhesive Bonding Material Systems for Dowels shall comply with Specification Section 937 (Type HV) and be installed in accordance with Specification Section 416.

Adhesive Bonded Dowels are shown installed in an existing curb or sidewalk integrally reinforced with Approach Slab, Wingwall or Bridge Deck. For installations in existing detached curbs or sidewalks, install dowels in available sound concrete.

Shift bars (as needed) to install six dowels into existing bridge or approach slab mounted curb.