This Traffic Railing Retrofit has been structurally evaluated to be equivalent or greater in strength to a design which has been successfully crash tested in accordance with NCHRP Report 350 TL-4 criteria.

CONCRETE: Concrete for Transition Blocks and CurbS shall be Class II (Bridge Deck).

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60.

THRIE-BEAM GUARDRAIL: Steel Thrie-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 Thrie-Beam Elements shall be 12'-6". Field drilled holes for Post connections shall be 1" by 2½ slotted holes.

GUARDRAIL BOLTS: Guardrail bolts, nuts and washers shall be in accordance with AASHTO M180.

GUARDRAIL POSTS AND BASE PLATES: Posts and Base Plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

ANCHOR BOLTS, NUTS AND WASHERS: Adhesive-Bonded Anchors and Anchor Bolts shall be fully threaded rods in accordance with ASTM F1554 Grade 105 or ASTM A193 Grade B7. At the Contractor’s option, Anchor Bolts for through bolting may be in accordance with ASTM A499. All Nuts shall be single self-locking hex nuts and in accordance with ASTM A563 or ASTM A194. Flat Washers shall be in accordance with ASTM A498 and Plate Washers (for long slotted holes only) shall be in accordance with ASTM A36 or ASTM A709 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Distorted threads and the exposed trimmed ends of anchors shall be capped with a galvanizing compound in accordance with the Specifications.

COATINGS: All Nuts, Bolts, Anchors, Washers, Guardrail Posts, Anchor Plates and Base Plates shall be hot-dip galvanized in accordance with the Specifications. Guardrail Post Assemblies shall be hot-dip galvanized after fabrication.

ADHESIVE-BONDED ANCHORS AND DOWELS: Adhesive Bonding Material Systems for Anchors and Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416. The field testing proof loads required by Specification Section 416 shall be 15,000 lbs. for ½" of anchor bolts; 55,000 lbs. for the 1½" anchor bolts with 13" embedment; and 30,500 lbs. for the 1½" anchor bolts with 9" embedment.

BRIDGES ON CURVED ALIGNMENTS: The details presented in these Standards are shown for bridges on tangent alignments. Details for bridges on horizontally curved alignments are similar.

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BARRIERS ON CURVED ALIGNMENTS: The details presented in these Standards are shown for bridges on tangent alignments. Details for bridges on horizontally curved alignments are similar.

POST SPACING: Posts shall be located along the length of the bridge at typical 6'-3" or 3'-1½" spaces. Utilize the Modified Post Spacing at Intermediate Deck Joints Details as required to clear deck joints. Establish post spacing along the bridge and Roadway Guardrail Transition beginning with the Key Post. The variable post spacings located near begin and end bridge may be utilized to optimize the typical post spacing. Variable lengths of guardrail overlap are also permitted to optimize the typical post spacing. Symmetry of post spacing is not necessary.
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
MODIFIED POST SPACING AT INTERMEDIATE DECK JOINTS DETAIL FOR INDEX NOS. 471, 475 & 476

PARTIAL PLAN
INTERMEDIATE JOINT SKEW DETAIL

THRIE-BEAM EXPANSION SECTION
TRAFFIC RAILING - (THREE-BEAM RETROFIT)

**DESCRIPTION:**
GUARDRAIL POST ASSEMBLY DETAIL

**POST DIMENSION TABLE**

<table>
<thead>
<tr>
<th>POST</th>
<th>CURB HEIGHT (DIM. A)</th>
<th>DIM. X</th>
<th>DIM. Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post &quot;A&quot;</td>
<td>7&quot; to 7&quot;</td>
<td>11½&quot;</td>
<td>2'-0&quot;</td>
</tr>
<tr>
<td>Post &quot;B&quot;</td>
<td>&gt; 7&quot; to 10&quot;</td>
<td>9½&quot;</td>
<td>1'-10&quot;</td>
</tr>
<tr>
<td>Post &quot;C&quot;</td>
<td>&gt; 10&quot; to 1'-0&quot;</td>
<td>7½&quot;</td>
<td>1'-8&quot;</td>
</tr>
</tbody>
</table>

Note: Dim. A is equal to the exposed curb height. For location of Dim. A see Index Nos. 471 thru 476, Sheet 1.

**OFFSET BLOCK DETAIL**

- ⅜" ø Holes (Typ.)
- ⅝" ø Holes (Typ.)

**PLATE WASHER DETAIL**

- ⅜" ø Anchor Bolts with Plate Washers (Typ.)

**ANCHOR PLATE DETAIL**

- 1⅜" x 3⅛" Long Slotted Holes for Anchor Bolts with Plate Washers (Typ.)
- 9/16" ø Hole (centered)

**TYPICAL SECTION THRU THREE-BEAM GUARDRAIL (EXPANSION SECTION SIMILAR)**

- ⅝" OVAL SHOULDER BUTTON HEAD BOLT

**APPLICATION**

<table>
<thead>
<tr>
<th>L</th>
<th>THREAD LENGTH</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>⅜&quot;</td>
<td>Full Length</td>
<td>Rail Splice Bolt, Post Bolt for Index Nos. 471, 473 &amp; 476</td>
</tr>
<tr>
<td>Varies (8&quot; Min.)</td>
<td>4&quot; Min.</td>
<td>Post Bolt for Index Nos. 472, 473, 474, 475 &amp; 476</td>
</tr>
</tbody>
</table>

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**GENERAL NOTES & DETAILS**

1. Offset blocks shall be timber or Approved Alternate. Uniformity of block size and alignment of guardrail shall be maintained along length of retrofit.
2. Post bolt holes in offset blocks to be centered (± ⅛")
3. Timber offset blocks shall be dressed on all four sides (S4S).
4. Block assemblies for Special Offset Blocks can be made up of 2 or 3 Special or Standard Offset Blocks, field dressed as required.

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 Guardrail Panel as required.

Note: The Anchor Plate and Plate Washer are applicable only to 1⅜" Anchor Bolts that are to be thru-bolted for Index Nos. 471 & 476.

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