This Traffic Railing Retrofit has been structurally evaluated to be equivalent or greater in strength to a design which has been successfully crash tested previously and approved for a NCHRP Report 350 Test Level 4 rating, except for the Tapered End Transition on Index 521-480.

CONCRETE: Concrete for the Traffic Railing (Vertical Face Retrofit), Spread Footing Approaches and replacement curb sections shall be Class IV. Concrete for Curb Transition Blocks shall be Class II (Bridge Deck).

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60, except Expansion Dowel Bar B which shall be ASTM A36 smooth round bar hot dip galvanized in accordance with the Specifications.

EXPANSION SLEEVE ASSEMBLY: Pipe sleeve shall be ASTM D2241 PVC pipe, SDR13.5. End Cap shall be ASTM D2246 PVC socket fitting, Schedule 40. End of Sleeve assembly at railing open joint shall be sealed with silicone to prevent concrete intrusion during railing casting. A compressible expanded polystyrene plug is required in the opposite end of the assembly for correct dowel positioning during railing casting. Correct dowel positioning is required in order to provide for thermal movement of the deck.

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 2,800 lbs. for Dowel Bars 6D on the inside face (traffic side) of the railing (1'-0" embedment) and 3,800 lbs for Dowel Bars 6D along the outside face of the traffic railing (5" min. embedment).

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

NAME, DATE AND BRIDGE NUMBER: The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver’s right side when approaching the bridge. The Date shall be the year the bridge was constructed. Letters and figures may be 3" tall black plastic as approved by the Engineer or Ƅ" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

ELEVATION MARKERS: Elevation Markers need not be replaced when portions of the existing traffic railing carrying existing elevation markers are removed.

BARRIER DELINÉATORS: Barrier Delinéators shall meet Specification Section 993. Install Barrier Delinéators on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table below. Correct dowel positioning during railing casting. Correct dowel positioning is required in order to provide for thermal movement of the deck.

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 2,800 lbs. for Dowel Bars 6D on the inside face (traffic side) of the railing (1'-0" embedment) and 3,800 lbs for Dowel Bars 6D along the outside face of the traffic railing (5" min. embedment).

PARTIAL ELEVATION OF RAILING SHOWING FINGER/SLIDING PLATE JOINT - SCHEMES 2 THRU 5
(Begin or End Bridge Shown, Intermediate Joints Similar)

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<tr>
<th>Item</th>
<th>Unit</th>
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<tr>
<td>Concrete</td>
<td>CY/FT</td>
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</tr>
<tr>
<td>Reinforcing Steel</td>
<td>LB/FT</td>
<td>13.27</td>
</tr>
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(Quantities are based on a 9" curb, no curb cross slope and 2'-0" embedment length of Bars 6D. If the curb height or embedment length differs from that shown, increase or decrease quantity by the given per inch increment.) See Index 521-480, Sheet 4 for Spread Footing Approach Quantities.
**CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM**

**BILL OF REINFORCING STEEL**

<table>
<thead>
<tr>
<th>MARK</th>
<th>SIZE</th>
<th>LENGTH</th>
<th>INDEX NO.</th>
<th>NOTE NOS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4</td>
<td>2'-0&quot;</td>
<td>521-482 ONLY</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>1&quot; Ø</td>
<td>2'-0&quot;</td>
<td>521-481 thru 521-483</td>
<td>2 &amp; 5</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>2'-0&quot;</td>
<td>521-481 thru 521-484</td>
<td>1.2 &amp; 3</td>
</tr>
<tr>
<td>D</td>
<td>6</td>
<td>2'-0&quot;</td>
<td>521-481 thru 521-484</td>
<td>2 &amp; 3</td>
</tr>
<tr>
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<td>5</td>
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<td>521-484 ONLY</td>
<td>1 &amp; 3</td>
</tr>
<tr>
<td>F</td>
<td>5</td>
<td>4'-3&quot;</td>
<td>521-484 ONLY</td>
<td>1 &amp; 3</td>
</tr>
<tr>
<td>G</td>
<td>4</td>
<td>4'-3&quot;</td>
<td>521-481 thru 521-483</td>
<td>1 &amp; 3</td>
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<td>1 &amp; 3</td>
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<td>S</td>
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<td>2'-0&quot;</td>
<td>521-481 thru 521-484</td>
<td>2,3 &amp; 4</td>
</tr>
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</table>

**REINFORCING STEEL NOTES:**

1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the railing on a retaining wall shall be the same as detailed for a bridge deck.
3. All reinforcing steel in the Vertical Face Retrofit Railing shall have a 2" minimum cover.
4. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-2".
5. Expansion Dowel Bar B shall be ASTM A36 smooth round bar and hot-dip galvanized in accordance with the Specifications.

**REVISIONS**

- **11/01/16**
- **REVISION**
- **LAST REVISION**

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**NOTE NOS. 2” sp. (Typ.)**

**2'-0” Int. Open Joint**

**DESCRIPTION:**

Specifications.

- The reinforcement for the railing on a retaining wall shall be the same as detailed for a bridge deck.
- All bar dimensions in the bending diagrams are out to out.

**REINFORCEMENT STEEL NOTES:**

1. Shift to clear Bars 6D for skewed joints.
2. See Index 521-481 thru 521-484 for spacing of Bars 6D.

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**TRAFFIC RAILING - (VERTICAL FACE RETROFIT) TYPICAL DETAILS & NOTES**

**INDEX NO.**

521-480

**SHEET**

2 of 2

**FY 2019-20**

**STANDARD PLANS**

**PARTIAL PLAN OF RAILING (SKEW ANGLE θ GREATER THAN 20°) (Skewed Deck Joint at Begin or End Bridge Shown, Skewed Deck Joint at Intermediate Pier or Bent Similar)**

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**PARTIAL PLAN OF RAILING (SKEW ANGLE θ = 20° OR LESS) (Skewed Deck Joint at Begin or End Bridge Shown, Skewed Deck Joint at Intermediate Pier or Bent Similar)**

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**SKEW DETAIL**