This railing has been structurally evaluated to be equivalent or greater in strength to other single-slope railings which have been crash tested to MASH TL-4 Criteria.

CONCRETE AND REINFORCING STEEL: See Structures Plans General Notes.

GUARDRAIL: For Guardrail connection details see Index 400.

SUPERELEVATED BRIDGES: At the option of the Contractor the Traffic Railing on superleveled bridges may be constructed perpendicular to the roadway surface. If an adjoining railing is constructed plumb, transition the end of the Traffic Railing from perpendicular to plumb over a minimum distance of 20'-0". The cost of all modifications will be at the Contractor's expense.

PEDESTRIAN AND BICYCLE RAILING: See Index 821 and 822 for Notes, Details and post spacings for Traffic Railings with Aluminum Pedestrian /Bicycle Bullet Railings.

V-GROOVES: Construct  $\frac{1}{2}$" V-Grooves plumb. Space V-Grooves equally between $\frac{1}{2}$" Open Joints and/or Deck joints and at V-Groove locations on Retaining Wall footings.

END TRANSITION: When guardrail approaches are shown in the Plans, provide the Tapered End Transition as shown. When a concrete traffic railing or barrier wall is shown in the Approaches, see the Structures Plans for the end transition details.

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 placed on the driver's left side when approaching the bridge. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by $\frac{1}{2}$" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

BARRIER DELINEATORS: Barrier Delineators shall meet Specification Section 993. Install Barrier Delineators on top of the Traffic Railing 2' from the face on the traffic side at the spacing shown in the table above. Barrier Delineator color (white or yellow) shall match the color of the near edgeline. The cost of the Barrier Delineators shall be included in the Contract Unit Price for the Traffic Railing.

JOINTS: See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Joint connections at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For Treatment of Railings on skewed bridges see Sheet No. 3.

Provide $\frac{1}{2}$" Intermediate Open Joints at:
1. Superstructure supports where slab is continuous.
2. Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.
* Where railings of adjacent bridges are to be built back to back, the outside vertical plane of the railing and deck/approach slab may coincide along a plane centered 1'-4" from each gutter line. A bond breaker will be required. See Structures Plans, Superstructure Sheets for Details.

**CROSS REFERENCE:** For locations of Section A-A and View B-B see Sheet 1.

**NOTE:** See Structure Plans for Special End Transition details if Index 410 Concrete Barrier Wall is used beyond the Approach Slab or Retaining Wall. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Transition is omitted, extend Typical Section to end of the Approach Slab or limiting station on Retaining Wall, and space Bars 4P and 4V at 6" (Typ.)
NOTES:
1) Concrete Parapet reinforcement is not affected by skew angle, see Index No. 820 for details.
2) Parapet expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure Sheets for details.
3) Railings shall be treated similar to the Partial Plan View of Bridge Deck with Traffic Railing.
4) Railings shall be treated similar to the Partial Plan View of Bridge Deck with Traffic Railing.
5) Traffic Railing reinforcement vertical Bars 4V & 4P may be shifted up to 1" (Max.) and rotated up to 10 degrees as required to allow proper placement. Bars 4V adjacent to expansion joints shall be field adjusted to maintain clearance and spacing; extra Bars 4V may be required.
6) Railings shall be treated similar to the Partial Plan View of Bridge Deck with Traffic Railing.
7) Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. Expansion joint at the inside face of parapet shall be turned perpendicular or radial to this line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
8) ½" Intermediate Open Joints and V-Grooves in railing and parapet shall be placed perpendicular or radial to the gutter line or inside face of parapet line. See Structures Plans, Superstructure Sheets for locations.
9) At begin or end approach slab extend slab at the railing ends P (gutter side or back face of railing as required) as shown to provide a base for casting of the railing. Field trim toe of Bars 4V by 1 inch as required to maintain concrete cover at edge of deck.
10) Begin placing Railing Bars 4P and 4V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 4P and 4V shall be made immediately adjacent to Begin or End Bridge.

GENERAL NOTES:
1) Work this Sheet with Traffic Railing, Pedestrian/Bicycle Railing, and Approach Slab Indexes as applicable.
2) Deck Expansion Joint at begin or end bridge shown. Deck Expansion Joints at ¼ Pier or Intermediate Bents are similar.
3) Partial Plan Views shown are intended as guides only. See Structures Plans, Superstructure and Approach Slab Sheets for skew angles, joint orientation, dimensions and details.
4) Railings on Raised Sidewalks shall be treated similar to the Partial Plan View of Bridge Deck with Traffic Railing.
5) Welded Wire Reinforcement is used in lieu of conventional reinforcement, placement of the WWR vertical elements shall be similar to those shown above. Clipping of horizontal elements to facilitate placement shall be minimized where possible. When clipping is required, supplement horizontal elements by lap splicing with deformed bars having an equivalent area of steel.
The above quantities are based on a 2% deck cross-slope; railing on low side of deck.

Estimating Traffic Railings

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<thead>
<tr>
<th>QUANTITY</th>
<th>UNIT</th>
<th>QUANTITY</th>
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<tbody>
<tr>
<td>Reinforcing Steel</td>
<td>LY/FT</td>
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<tr>
<td>Pre-Cured Silicone Sealant (4&quot; wide)</td>
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<td></td>
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<tr>
<td>Paint</td>
<td>Black</td>
<td>22.82</td>
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</tbody>
</table>

The above quantities are based on a 2% deck (cross slope; railing on low side of deck).

**Reinforcing Steel Notes:**

1. All bar dimensions in the bending diagrams are out to out.
2. The 1'-6" vertical dimensions shown for Bar 4V is based on a bridge deck without a raised sidewalk. If a raised sidewalk is to be provided, increase this dimension to achieve a 6" minimum embedment into the bridge deck. See Structures Plans, Superstructure and Approach Slab Sheets.
3. The reinforcement for the railing on a retaining wall shall be the same as detailed above for an 8" deck with ØB = 90°.
4. All reinforcing steel at the open joints shall have a 2" minimum cover.
5. Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 2'-0".

**Intermediate Joint Seal Notes:**

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-Cured Silicone Sealant in accordance with Specification Section 932.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. Include the cost of the Pre-Cured Silicone Sealant in the Contract Unit Price for the Traffic Railing.

**Estimated Traffic Railing Quantities**

<table>
<thead>
<tr>
<th>ITEM</th>
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<tr>
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<td>CY/CF</td>
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<td>22.82</td>
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</tbody>
</table>

**Splice Detail** (Between WWR Sections)

Pre-Cured Silicone Sealant (4" wide)

**Detail "B" - Section At Intermediate Open Joint**