This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING: See Structures Plans General Notes and Specification Section 415 and 932.

GUARDRAIL: For Guardrail connection details see Index 400.

SUPERELEVATED BRIDGES: At the option of the Contractor the Traffic Railing on superelevated 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 ½ V-Grooves plumb. Space V-Grooves equally between ½ Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

TRAFFIC RAILING NOTES

- For Railing End Transition see Detail “A” (Typical except as noted below)
- Edge of Approach Slab (Coping)
- ½ Intermediate Open Joint (see Notes)
- ½ V-Groove in both faces and top of Traffic Railing
- Deck Joint (see Notes)
- Edge of Approach Slab (Coping)
- For Railing End Transition see Detail “A” (Typical except as noted)

NAME, DATE, 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 Name shall be as shown in the General Notes in the Structures Plans. 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 V-Grooves. V-Grooves shall be formed by preformed letters and figures.

BARRIER DELINEATORS: For Barrier Delineators see Index 400.

SUPER ELEVATED BRIDGES: At the option of the Contractor the Traffic Railing on superelevated 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.

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BARRIER DELINEATORS: For Barrier Delineators see Index 400.

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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 ½ V-Grooves plumb. Space V-Grooves equally between ½ Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

TRAFFIC RAILING NOTES

- For Railing End Transition see Detail “A” (Typical except as noted below)
- Edge of Approach Slab (Coping)
- ½ Intermediate Open Joint (see Notes)
- ½ V-Groove in both faces and top of Traffic Railing
- Deck Joint (see Notes)
- Edge of Approach Slab (Coping)
- For Railing End Transition see Detail “A” (Typical except as noted)

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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 ½ V-Grooves plumb. Space V-Grooves equally between ½ Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

TRAFFIC RAILING NOTES

- For Railing End Transition see Detail “A” (Typical except as noted below)
- Edge of Approach Slab (Coping)
- ½ Intermediate Open Joint (see Notes)
- ½ V-Groove in both faces and top of Traffic Railing
- Deck Joint (see Notes)
- Edge of Approach Slab (Coping)
- For Railing End Transition see Detail “A” (Typical except as noted)
**SECTION A-A**

**TYPICAL SECTION THRU TRAFFIC RAILING**

(Section thru Bridge Deck shown, Section thru Approach Slab and Retaining Walls similar)

**VIEW B-B**

(Section thru Approach Slab shown, Section thru Retaining Walls similar)

**OPTIONAL HEADED ANCHOR SECTION USING BAR 5V1 CONFIGURATION**

(Bars 5V3 Similar)

**DETAIL "A"**

(Railing on Approach Slab shown, Railing on Retaining Wall similar)

*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'-6" from each gutter line. A bond breaker will be required. See Structures Plans, Superstructure Sheets for details.*

**NOTES:**
Rotate Bars 5V in Railing End Transition to maintain cover. Begin placing Railing Bars 5P and 5V on Approach Slab at the barrier end and proceed toward Begin or End Bridge to avoid conflict with guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge.

**CROSS REFERENCE:**
For locations of Section A-A and View B-B see Sheet 1.
NOTES:
1) Concrete Parapet reinforcement is not effected 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) Traffic Railing reinforcement vertical Bars 5V & 5P may be shifted up to 1" (Max.) and rotated up to 10 degrees as required to allow proper placement. Bars 5V adjacent to expansion joints shall be field adjusted to maintain clearance and spacing, extra Bars 5V will be required. Bars 5V bottom horizontal portion shall be cut so as to maintain maximum bottom horizontal length of bar to each vertical leg being placed, the remainder of bar shall be discarded. Cut Bars 5V may be rotated to maintain clearance.
4) 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.
5) ¾" Intermediate Open Joints and ½" V-Grooves in railing shall be placed perpendicular or radial to the gutter line. See Structures Plans, Superstructure and Approach Slab Sheets for locations.
6) At begin or end approach slab extend slab at the railing ends 3" gutter side or back face of railing as required to allow sliding for casting of the railing.
7) Begin placing Railing Bars SP and 5V 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 SP and 5V 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 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.
The above quantities are based on a 2% deck cross-slope; railing on low side of deck.

Concrete Paint Recessed Surfaces Black

45° 38" 45° 6"

Embed. 2" Cover

2" C o v e r

2" Cover

(Typ.)

5 1 2" 2 '-4 "

Portion of Bar 5V to be used Field Cut & Discard - Contractor’s option 2 '-5 "

3" ØB ØA

Length as Required

5 1 2" 5'-7"

As Reqd.

5 5'

S V

ØA and ØB shall be 90° if Contractor elects to place railing perpendicular to the deck and approach slabs.

Pre-cured Silicone Sealant (4" wide)

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. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.

DETAIL "B" - SECTION AT INTERMEDIATE OPEN JOINT

PRE-CURED SILICONE SEALANT (4" wide)

PRE-CURED SILICONE SEALANT

REINFORCING BAR NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. The Ø and the 2'-4" vertical dimensions shown for Bar 5V are based on a bridge deck without a raised sidewalk. If a raised sidewalk is to be provided, increase these dimensions 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 a 8" deck with ØA = ØB = 90°
4. All reinforcing bars at the open joints shall have a 2" minimum cover.
5. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-2".

ALTERNATE REINFORCING NOTES:
1. At the option of the Contractor, Headed Anchor Bars 5V1, 5V2, and/or Spirals 5P1 may be utilized in lieu of all Bars 5S and SP Anchor Bars must be submitted to the Engineer for approval and supported by successful independent testing. Bar 5S2 may be cast-in-place or adhesive bonded dowels.
2. Adhesive Anchor Bars 5S1 and 5S2 must be installed in accordance with Specification Section 416 and 937.

ALTERNATE REINFORCING BAR DETAILS

SPRAL LAYOUT & LONGITUDINAL SPLICE DETAIL

GFRP REINFORCING BAR BENDING DIAGRAMS

BILL OF REINFORCING STEEL

ROADWAY CROSS-SLOPE

LOW GUTTER HIGH GUTTER

MARK SIZE LENGTH

P 5 5'-7"

S 5 5'-2"

V 5

As Reqd.

REINFORCING BAR NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. If the 6" and the 2'-4" vertical dimensions shown for Bar 5V are based on a bridge deck without a raised sidewalk. If a raised sidewalk is to be provided, increase these dimensions 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 a 8" deck with ØA = ØB = 90°
4. All reinforcing bars at the open joints shall have a 2" minimum cover.
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1. At the option of the Contractor, Headed Anchor Bars 5V1, 5V2, and/or Spirals 5P1 may be utilized in lieu of all Bars 5S and SP Anchor Bars must be submitted to the Engineer for approval and supported by successful independent testing. Bar 5S1 may be cast-in-place or adhesive bonded dowels.
2. Adhesive Anchor Bars 5S2 must be installed in accordance with Specification Section 416 and 937.

ALTERNATE REINFORCING BAR DETAILS

SPRAL LAYOUT & LONGITUDINAL SPLICE DETAIL

ALTERNATE REINFORCING BAR DETAILS

SPRAL LAYOUT & LONGITUDINAL SPLICE DETAIL