1. Shop Drawings are required.
2. Work this Index with Index 852 Steel Bicycle/Pedestrian Railing Details and Specification Section 515. Refer to the IDS for Design Criteria and Limits of Use.
3. Materials:
   A. Steel: Galvanized after fabrication
      b. Support Bracket (Scheme 3) L-shape and Stiffener Plate: ASTM A36
      c. Bottle-guard (Schemes 1 & 3) L-shape: ASTM A36
   B. Concrete: Same as bridge deck
   C. Pre-cured Silicone Sealant: Specification Section 932
   D. Bearing Pads: Provide 3⁄8"Plain, Fabric Reinforced or Fabric Laminated bearing pads that meet the requirements of Specification Section 962 for Ancillary Structures.
4. See Structures Plans, Superstructure Sheets for bridge information including concrete type, deck expansion joint locations and orientations, and thermal movement.
5. Railings:
   A. For thermal movement greater than 4" (up to a maximum of 5'), clear opening between adjacent pickets, or panels at Rail Expansion Joints above Deck Joints must be reduced to 3½".
   B. For treatment of railings on skewed bridges see Index 420.
6. Curbs:
   A. Match open curb joints at Deck Expansion Joint locations to the deck joint dimension.
   B. Construct Concrete Curb (Scheme 2) vertical with the top surface finished level transversely. See Concrete Curb Details Sheet 3.
   C. Provide 3⁄8" Intermediate open joints in curbs coinciding with the 3⁄8" joints in the traffic railing.
7. Payment: Support bracket (Scheme 3) is incidental to the cost of railing. Curb concrete and reinforcing steel (Scheme 2) are included in the bridge deck quantities.
**SCHEME 1A - DETAILS**
(Adhesive Anchor Option shown)

- **THRU-BOLT PLATE WASHER DETAIL**
  - 1 1/2" Ø Hole for Anchor Bolts (centered)
  - 3/4" Ø Hex Head Bolt with 1 1/2" Core Drilled Hole
  - 3/4" Thick Bearing Pad (Typ.)
  - Flat Washer

**SCHEME 1B - DETAILS**
(Thru-Bolt Option)

- **Thru-Bolt Plate Washer**
  - 1 1/2" Ø Hex Head Bolt with 1 1/2" Core Drilled Hole
  - 3/4" Thick Bearing Pad (Typ.)
  - Flat Washer

**SCHEME 1 - TYPICAL SECTION THROUGH DECK MOUNTED RAILING**

- **Thru-Bolt**
  - Bolt & Post
  - Plate Washer

**SCHEME 2 - TYPICAL SECTION THROUGH CURB MOUNTED RAILING**

- **PLATE WASHER DETAIL**
  - 3 1/2" Ø Hole (Centered)
  - 3/4" Ø Hex Head Bolt with 3/4" x 25" Long Slotted Hole
  - 3/4" Ø Stiffener
  - 3/4" x 6" x 1/2" Angle Assembly

**SCHEME 3 - TYPICAL SECTION THROUGH SIDE MOUNTED RAILING (RETROFIT)**

- **PLAN VIEW**
  - 3/4" Ø Hole (Centered)
  - 3" Ø x 3/4" Long Slotted Hole

**SCHEME 3 - SIDE-MOUNTED SUPPORT BRACKET DETAILS**

- **ELEVATION VIEW**
  - 1 1/2" Ø Holes for Anchor Bolts
  - Bolt, Rail Post & Angle Assembly
  - Index 852 Railing
  - Fill void with non-shrink grout

**INDEX NO.**

- **SCHEME 1**
  - Typical Section Through Deck Mounted Railing
  - Thru-Bolt Option

- **SCHEME 2**
  - Typical Section Through Curb Mounted Railing

- **SCHEME 3**
  - Typical Section Through Side Mounted Railing (Retrofit)
DETAIL "B" EXPANSION JOINT (FIELD SPlice SIMILAR)

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

<table>
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| S    | 4    | As Reqd.

DETAIl "A" - SECTIOn AT INterMEDIATE oPEn JoINT

INTERMEDIATE JOINT SEAL NOTE:
At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant. Apply sealant prior to any Class V finish coating and remove any curing compound and loose material from the surface prior to application of bonding agent.

ESTIMATED CONCRETE CURB QUANTITIES (SCHEME 2)

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<tr>
<td>Reinforcing Steel</td>
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SCHEME 2 - CONCRETE CURB DETAILS

SCHEME 1 - BOTTLE GUARD DETAIL

CROSS REFERENCE:
See Sheet 1 for Bridge Railing Notes.

SCHEME 3 - BOTTLE GUARD DETAIL

TYPICAL SECTION THROUGH BOTTOM RAIL (Post Not Shown for Clarity)

DETAIL "B" EXPANSION JOINT (FIELD SPlice SIMILAR)

SQUARE RAILS - INTERMEDIATE OR BOTTOM RAIL

INTERMEDIATE OR BOTTOM RAIL - STEEL SLEEVE DETAIL (Bottom Side Shown)

ROUND RAILS - TOP RAIL OR HANDRAIL

* 5/8" Ø x 3/32" Pan Head Stainless Steel (Type 316 or 18-8 Alloy)

** Embedded length may be 4" for plug welded connection.

*** Increase handrail sleeve embedment to 8" for Expansion Joint openings greater than 2".

**** Expansion Joint opening shall match the clear opening in the deck joint but not greater than 3".

ALTERNATE REINFORCING (WWR) DETAILS

NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4" are not permitted.

SPICE DETAILS (Between WWR Sections)

CURB REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the curb on a retaining wall shall be the same as detailed for an 8" deck.
3. All reinforcing steel at the open joints shall have a 2" minimum cover.
4. Bars 4S may be continuous or spliced at the construction joints.
   Bar splices for Bars 4S shall be a minimum of 1'-8".
5. Deformed Welded Wire Reinforcement (WWR) meeting the requirements of Specification Section 931 may be used in lieu of all Bars 4P and 4S.

QUANTITY | UNIT | ITEM |
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BRIDGE PEDESTRIAN/BICYCLE RAILING (STEEL)

BREVIARY OF DESIGN STANDARDS

Fy 2017-18

INDEX NO. 851 SHEET NO. 3 OF 3

LAST REVISION: 81/01/16 DESCRIPTION: 11/01/16