ASSEMBLY DETAIL

1'-8" Curb   Clear Roadway

FF Curb and Rails

4"

1'-1¾"

3"

2'-8⅝"

1'-0⅞"

6"

Rail Bolt Assembly (See Rail Bolt Detail and Note No. 3)

3½" Proj (Typ)

⅞"φ x 1'-3½" HS Bolt (5" thread) w/2 Hex Nuts & 2 Washers. Wrench tight. (3 req'd per post)

Upper Anchorage (Place under and against top mat of reinforcing steel)

Typ ¼

Typ Tack

Lower Anchorage

(Shown near ℄ Post)
(Bridge slab shown, approach slab similar)

POST DETAILS

(See View A-A for anchor bolt hole spacing)

SIDE VIEW

2¼"
4½"   3¼"

Typ   Typ ⅛

℔ ⅝ x 10 x 2'-2" (2 Ea)

2'-2"
1'-1"   1'-1"

Typ ¼   ¾

4"   3⅜"   9⅝"   2'-2⅝"

9¼"   5⅝"

℔ ⅝ x 11½"

¾   ¾

10"

11½"

FRONT VIEW

3½"
2¼"   2¼"

Bar 4x ¾ x 0'-8"   2"

Bar 3x ¾ x 0'-8"

1 1/16" x 1¾" Slot (Typ)

Typ ½   1¾"   1½"   1½"

2"

3½"   8"   3½"

1'-3"

RAIL BOLT DETAIL

5/16 x 2 x 0'-5½" ℔ Washer w/ ⅞"φ Holes (Centered)

Bar ⅝φ x 0'-8½"

1¼" R

3½"

Lock Washer (Typ)

Hex Nut (Typ)

1"   3½"   1"

5½"

1½" Thread (Typ)

PLAN

(X posts req'd on bridge)
(X posts req'd on approach slabs)

SECTION B-B

3'-0"
1½"   7½"   2'-3"

⌖ Bar 2½ x ⅜ x 3'-0" (Typ)

⌖ Bar 2½ x ⅜ x 1'-2" (Typ)

1½"   5½"
1'-2"
5½"   1½"

1¼"φ Hole (Typ)

½" R Notch (Typ)

1'-1"   5 Alt Spa @ @ 4" = 1'-8"   3" (Typ)

(Showing upper anchorage)
(⌖Not galvanized)
(Anchor bolts and slab not shown)

SECTION B-B

1'-6"
2"   7½"   8½"

6½"   6½"
2'-0"
5½"   5½"
6½"   6½"

⌖Bar 3x ½ x 0'-3"

⌖Bar 3x ½ x 1'-6"

1"φ Hole (Typ)

⌖Bar 3x ½ x 2'-0"

(Showing lower anchorage)
(⌖Not galvanized)
(Anchor bolts and slab not shown)

VIEW A-A

1'-8" Curb   Clear Roadway

5¾"   11½"   2¾"
2"   7½"   2"

℄ Post   2"

1'-3"

2"   5½"   5½"   2"

FF Curb

℔ ⅝ x 11½ x 1'-3"

1¼"φ Hole (Typ)

7¾"   7½"   4¾"

(Anchor bolts, rails, and rail bolts not shown)

Note: 1) Ensure the expansion splice is located in the railing panel which passes over the bridge expansion joint as indicated on the plan.
2) Anchor bolts may be tack welded to lower anchorage (Shop or field).
3) At post locations, drill two 1 1/16"φ holes in the rails to receive rail bolts (Shop or field). See Post Details for hole spacing.
4) Before installing rails, paint all cut, drilled, or otherwise damaged surface areas of the railing components with two coats of zinc rich paint conforming to the requirements of ASTM A 780.
5) After installing the rails, paint all exposed bolt threads with two coats of zinc rich paint conforming to the requirements of ASTM A 780.

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3 3/4" 6"

3"

3"

1"φ Hole (Typ)
(Top & Bott
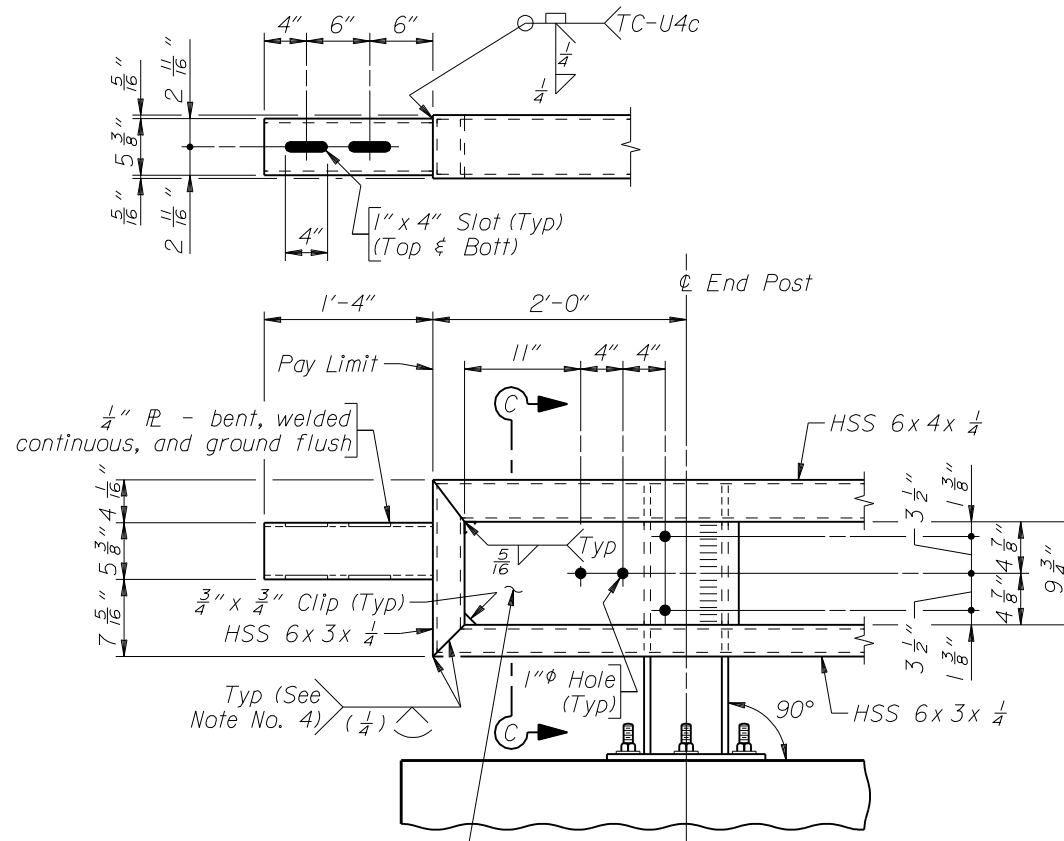of both rails)

4" 6" 6"

TC-U4c

1" x 4" Slot (Typ)
(Top & Bott)

ELEVATION AT TERMINAL TYPE ①
(Box beam guardrail connection)

Pay Limit

2'-0"

1'-0" 8" 4"

Top of Rail
Taper Plates
(See details)

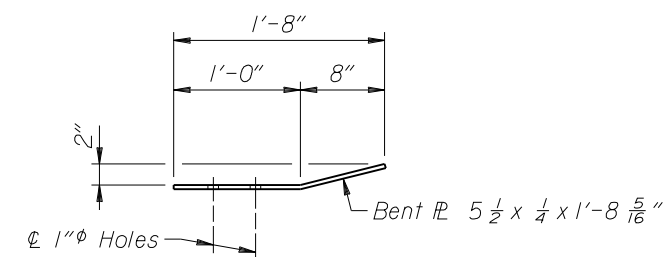₵ End Post

HSS 6x4x 1/4

2"

1'-0 3/4"

1"

2"

90°

HSS 6x3x 1/4

ELEVATION AT TERMINAL TYPE ②
(Box beam guardrail connection, Interstate exit end only)
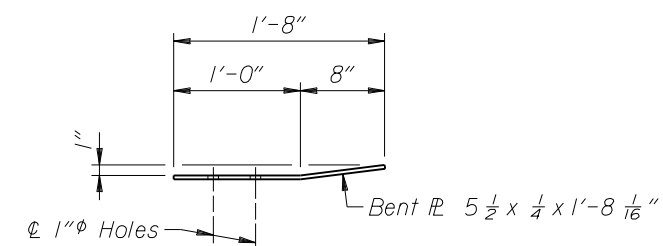(With provision for temporary corrugated beam guardrail connection)

Pay Limit

1'-4" 2'-0"

11" 4" 4"

₵ End Post

1/4" ℙ — bent, welded
continuous, and ground flush

HSS 6x4x 1/4

Typ

3/4" x 3/4" Clip (Typ)
HSS 6x3x 1/4

Typ (See
Note No. 4) (1/4)

1"φ Hole
(Typ)

90°

HSS 6x3x 1/4

Bent ℙ 5/16 x 9 3/4
(See Bent Plate Section)
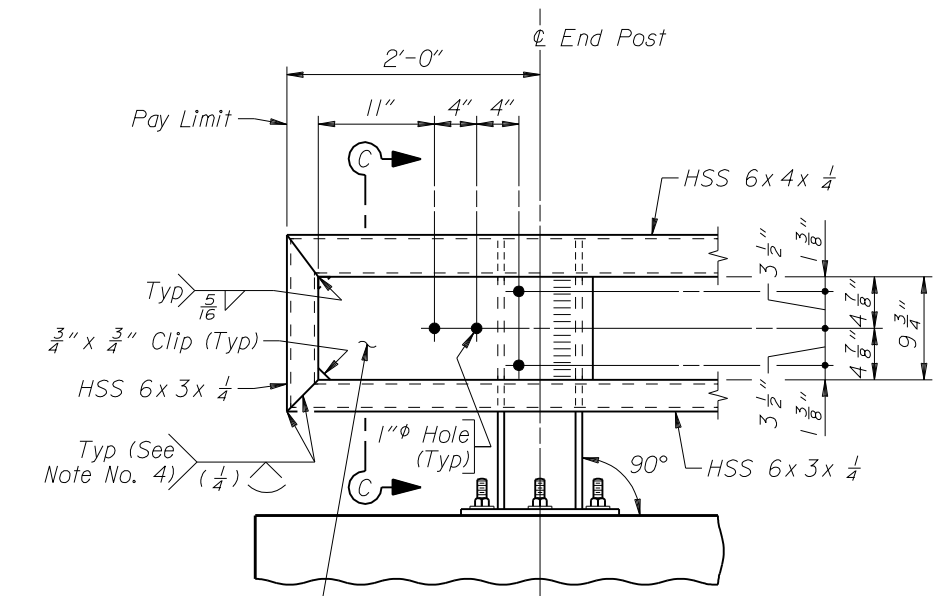
ELEVATION AT TERMINAL TYPE ③
(Corrugated beam guardrail connection
or no guardrail connection)

Pay Limit

2'-0"

11" 4" 4"

₵ End Post

HSS 6x4x 1/4

Typ 5/16

3/4" x 3/4" Clip (Typ)

HSS 6x3x 1/4

Typ (See
Note No. 4) (1/4)

1"φ Hole
(Typ)

90°

HSS 6x3x 1/4

Bent ℙ 5/16 x 9 3/4
(See Bent Plate Section)

3 Sides (1/4)
G

5 1/2"

Bent ℙ 5 1/2 x 1/4

HSS 6x4x 1/4
or HSS 6x3x 1/4
(See Note No. 5)

₵ 1"φ Holes

END VIEW

1'-8"

1'-0" 8"

2"

₵ 1"φ Holes

Bent ℙ 5 1/2 x 1/4 x 1'-8 5/16"
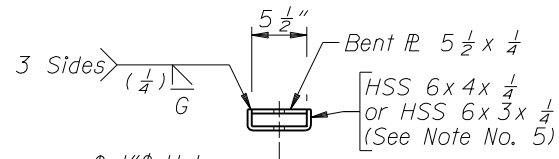
ELEVATION OF BENT PLATE FOR TOP RAIL
(HSS 6x4x 1/4 not shown)

1'-8"

1'-0" 8"

1"

₵ 1"φ Holes

Bent ℙ 5 1/2 x 1/4 x 1'-8 1/16"

ELEVATION OF BENT PLATE FOR BOTTOM RAIL
(HSS 6x3x 1/4 not shown)

RAIL TAPER PLATE DETAILS

Bent ℙ 5/16 x 9 3/4 x 2'-3 1/8"

2" R

End Post

Clear
Roadway

1'-11 1/4" 2 3/4"

2'-2"

2 3/4"

FF Rail
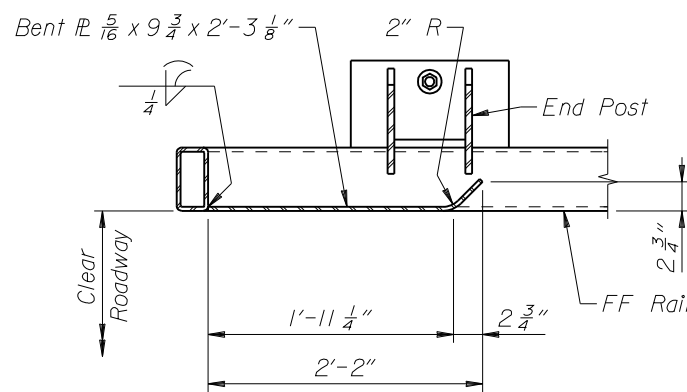
BENT PLATE SECTION
(Top rail not shown)
(Req'd at Type ② and ③ Terminals)

2" 4"

Clear
Roadway

HSS 6x4x 1/4

Bar 2x 1/4 x 0'-9 3/4"
(Place edge flush
w/RF rails)

HSS 6x3x 1/4
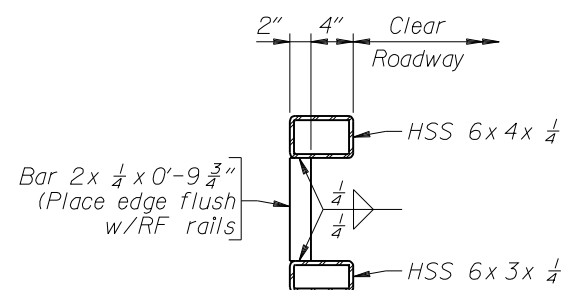
BRACE BAR DETAIL
(See Note No. 3)

Clear
Roadway

HSS 6x4x 1/4

Bent ℙ 5/16 x 9 3/4
(Place flush w/
FF rails)

HSS 6x3x 1/4
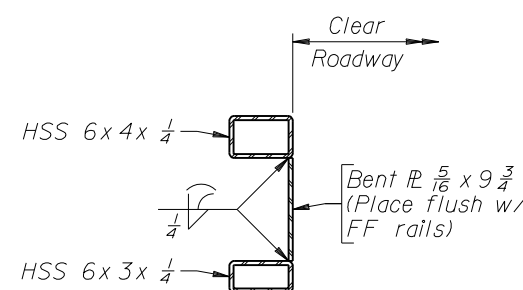
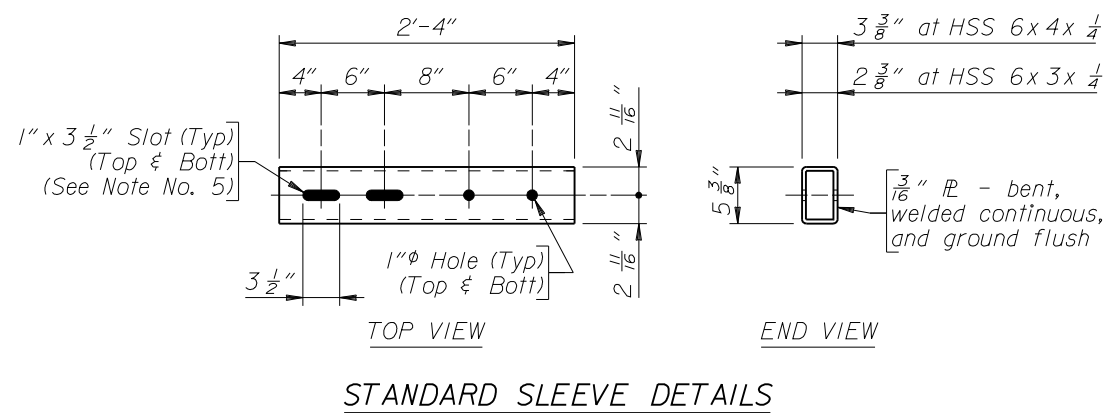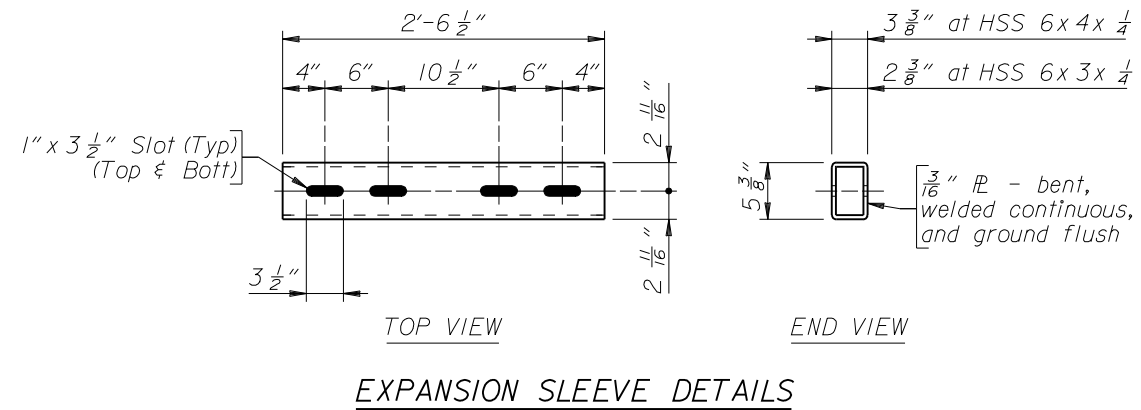**SECTION C-C**

Note: 1) Either top or bottom rail in terminal section may be
the longer rail.
2) Ensure each rail length is continuous over a minimum
of two posts. Railing that is part of a type ② or ③
terminal is continuous if either the top or bottom rail
in the terminal is continuous over a minimum of two
posts.
3) Ensure a brace bar is placed 2'-0" from the splice end
of the shorter tube at type ② and ③ terminals.
4) Ensure the fabricator prepares a sample of the indicated
joint and it is macroetched to demonstrate that the required
effective throat is achieved.
5) Cut top and bottom rails for Terminal Type ① as required
for fabrication of tapered end sections.

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STANDARD SPLICE
(Top or bottom rail)

$\frac{1}{2}''$ 1'-6'' ℄ Post

$3\frac{3}{4}''$ 6''

Standard Sleeve

DOUBLE-BOLTED SPLICE
(Top or bottom rail)

$\frac{1}{2}''$ 1'-6'' ℄ Post

$3\frac{3}{4}''$ 6'' $3\frac{3}{4}''$ 6''

Standard Sleeve

EXPANSION SPLICE
(Top and bottom rail)
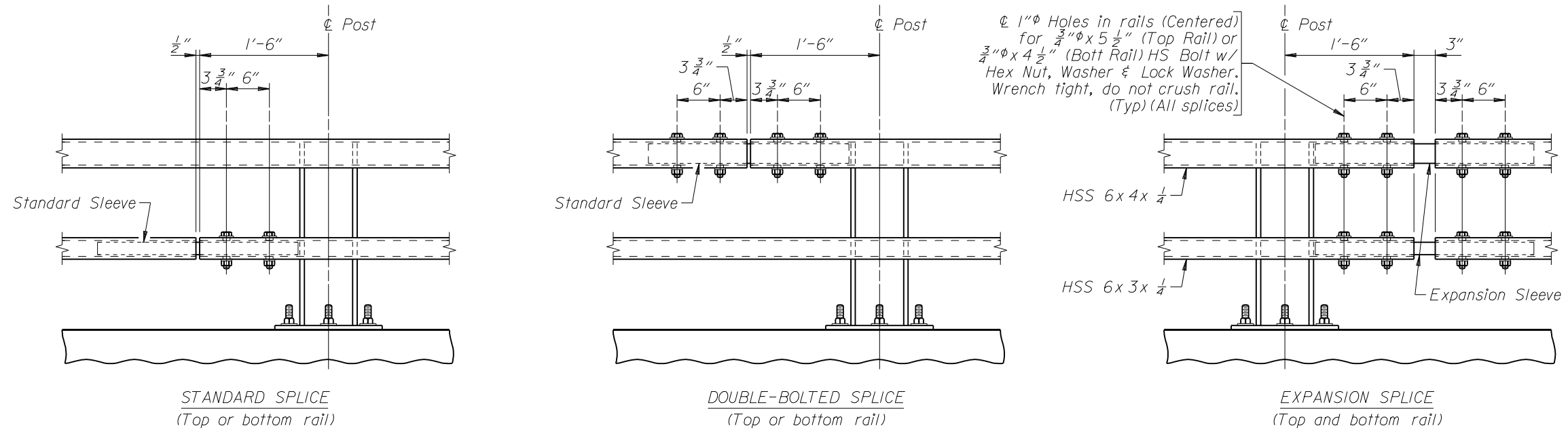
℄ 1''φ Holes in rails (Centered)
for $\frac{3}{4}''φ x 5\frac{1}{2}''$ (Top Rail) or
$\frac{3}{4}''φ x 4\frac{1}{2}''$ (Bott Rail) HS Bolt w/
Hex Nut, Washer & Lock Washer.
Wrench tight, do not crush rail.
(Typ)(All splices)

℄ Post

1'-6'' 3''

$3\frac{3}{4}''$ 6'' $3\frac{3}{4}''$ 6''

HSS 6x4x$\frac{1}{4}$

HSS 6x3x$\frac{1}{4}$

Expansion Sleeve

SPLICE DETAILS

EXPANSION SLEEVE DETAILS

2'-6$\frac{1}{2}''$

4'' 6'' 10$\frac{1}{2}''$ 6'' 4''

2$\frac{11}{16}''$

1'' x 3$\frac{1}{2}''$ Slot (Typ)
(Top & Bott)

3$\frac{1}{2}''$

2$\frac{11}{16}''$

3$\frac{3}{8}''$ at HSS 6x4x$\frac{1}{4}$

2$\frac{3}{8}''$ at HSS 6x3x$\frac{1}{4}$

5$\frac{3}{16}''$

$\frac{3}{16}''$ ℄ – bent,
welded continuous,
and ground flush

TOP VIEW   END VIEW

STANDARD SLEEVE DETAILS

2'-4''

4'' 6'' 8'' 6'' 4''

2$\frac{11}{16}''$

1'' x 3$\frac{1}{2}''$ Slot (Typ)
(Top & Bott)
(See Note No. 5)

3$\frac{1}{2}''$

1''φ Hole (Typ)
(Top & Bott)

2$\frac{11}{16}''$

3$\frac{3}{8}''$ at HSS 6x4x$\frac{1}{4}$

2$\frac{3}{8}''$ at HSS 6x3x$\frac{1}{4}$

5$\frac{3}{16}''$

$\frac{3}{16}''$ ℄ – bent,
welded continuous,
and ground flush

TOP VIEW   END VIEW

Note: 1) In rehabilitation work, ensure railing that cannot
          feasibly be made continuous over a minimum of
          two posts has a double-bolted splice.
       2) Splices may be located on either side of post.
       3) Not more than one splice is permitted per side
          of post, except at expansion splices.
       4) Do not shop splice rails.
       5) Slots may be omitted in standard sleeves where
          bolts are required on one side of splice only.

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Q'S. ___ X ✓ X ___

Design Section X

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