



3D VIEW OF RAILING WITH TYPE 1 - PICKET INFILL PANEL
(42" Height shown, 48" Height Similar)

TABLE 1 - RAILING MEMBERS			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Post "A"	HSS 2½ x 1½ x 1⁄8	2.50" x 1.50"	0.125"
Post "B"	HSS 2½ x 1½ x 3⁄16	2.50" x 1.50"	0.188"
Top Rail	2½" NPS (Sch. 10)	2.875"	0.120"
	HSS 3.000 x 0.120	3.000"	0.120"
End Hoops	2½" NPS (Sch. 10)	2.875"	0.120"
	HSS 3.000 x 0.120	3.000"	0.120"
Top Rail Joint/Splice Sleeves	HSS 2.500 x 0.125	2.500"	0.125"
Intermediate & Bottom Rail	HSS 2 x 2 x 3⁄16	2.00" x 2.00"	0.188" ⁽¹⁾
Int. & Bottom Rail Post Connection Sleeve	HSS 1.500 x 0.125	1.500"	0.125" ⁽¹⁾
Handrail Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
	HSS 1.500 x 0.125	1.500"	0.125"
Handrails	1½" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	¾" Ø Round Bar	0.750"	N/A
Pickets (Type 1 Infill Panel)	¾" Ø Round Bar	0.750"	N/A
Infill Panel Members (Types 2 - 5)	Varies (See Details)	Varies	Varies

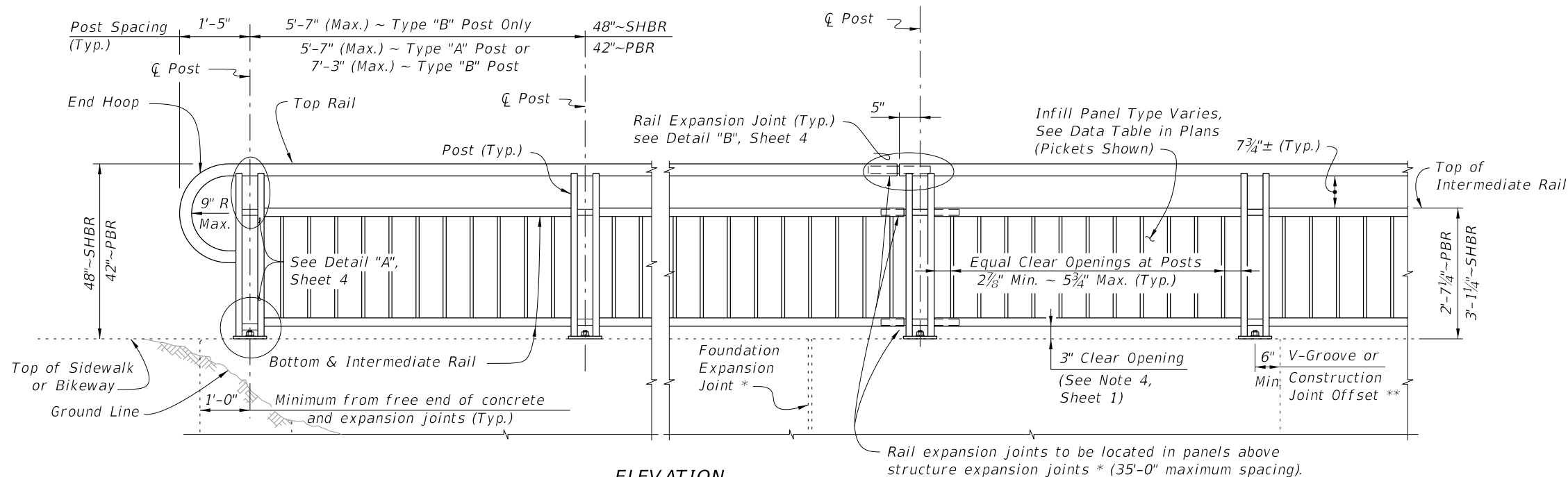
TABLE 1 NOTES:

(1) 0.125" wall thickness permitted for rails with post spacings less than 5'-8", except that Post Connection Sleeve must be 1¼" NPS (Sch. 40).

NOTES

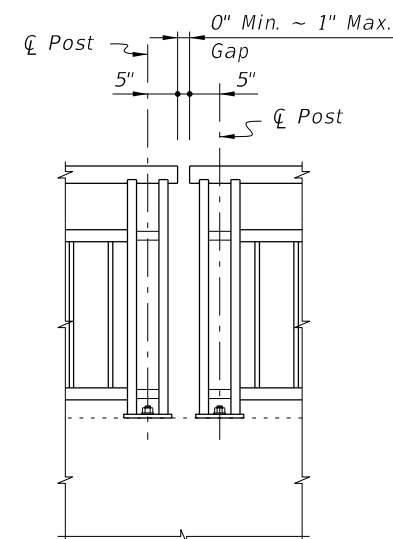
- Notes:
- Shop Drawings are required; see Specification Section 515
 - For bridge mounted railings work this Index with Index 515-051 Bridge Bicycle/Pedestrian Railing
 - Materials:
 - Pipe Rails and Pickets: ASTM A500 Grade B, C or D, or ASTM A53 Grade B for standard weight pipe (Schedule 40) and ASTM A36 for bars.
 - Structural Tube: ASTM A500 Grade A, B, C, or D or ASTM A501
 - Steel Plate: ASTM A36 or ASTM A709 Grade 36
 - U-Channels and filler plates: ASTM A36 or ASTM A1011 (Grade 36).
 - Stainless steel (SS) screws: Type 316 or 18-8 Alloy
 - Galvanized Steel Fasteners: coated in accordance with Specification Section 962.
 - Hex Head Bolts: ASTM A 307
 - 7⁄8" diameter single bolt option, Grade 36
 - 7⁄16" four bolt option, Grade 55
 - Adhesive Anchors: ASTM F1554 fully threaded rods, Grade 55
 - Hex Nuts: ASTM A563
 - Flat Washers: ASTM F436
 - Plate Washers: ASTM A36 or ASTM A706 Grade 36.
 - Shims: ASTM B209 Alloy 6061
 - Bearing Pads: 1⁄8" Plain, Fabric Reinforced or Fabric Laminated pads that meet the requirements of Specification Section 932 for Ancillary Structures.
 - Fabricate pickets and vertical panel elements parallel to the posts; except Type 2, 3 and 5 panel infills may be fabricated parallel to the longitudinal grade. Maintain a maximum clear opening of 5⁄8" for standard installations and 3⁄8" when a 4" sphere requirement is indicated in the Data Tables.
 - Maximum spacing between expansion joints is 40'-0". Locate an Expansion Joint between the posts on either side of the Deck Expansion Joint.
 - Field splices are similar to the Expansion Joint Detail and may be approved by the Engineer to facilitate handling; but the top rail must be continuous across a minimum of two posts.
 - For intermediate and bottom horizontal rails, the screwed joints shown may be substituted with alternate joints shown in detail "K".
 - Make corners and changes in tangential longitudinal alignment with a 9" bend radius or terminate adjoining sections with mitered end sections when handrails are not required.
 - For changes in tangential longitudinal alignment greater than 45°, position posts a maximum of 2'-0" each side of the corner but not at the corner apex.
 - For curved longitudinal alignments, shop bend the top and bottom rails and handrails to match the alignment radius.
 - Handrails are required and must be continuous at landings for:
 - Grades Steeper than 5%,
 - Three or more steps
 - Installation: Cutting of reinforcing steel is permitted for post installed anchors.

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ELEVATION
(Showing Outside Face of Railing with Type "A" Posts)

TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%
(Type 1 - Picket Railing Shown, Other Types Similar)



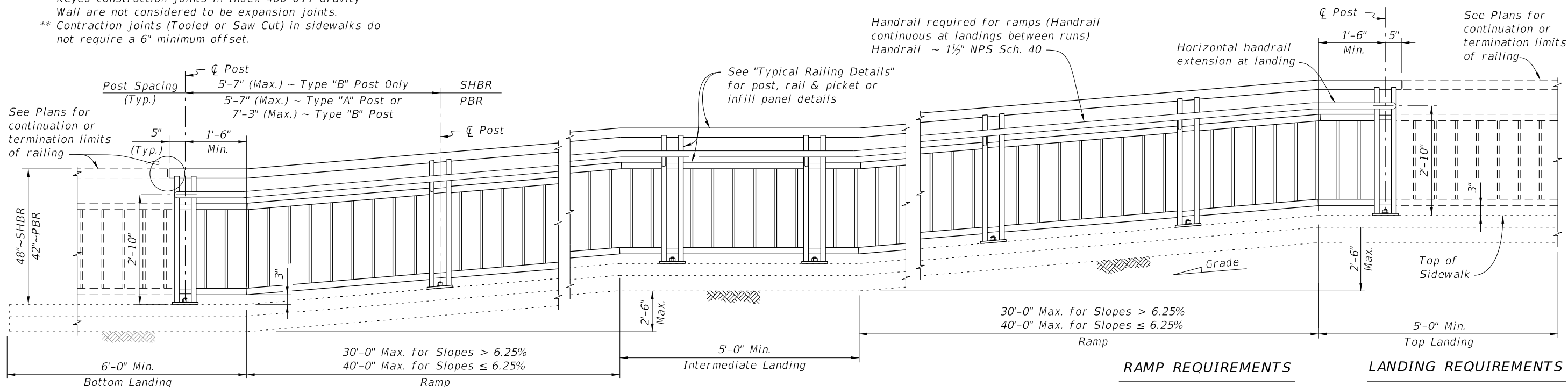
Note: Non-continuous corners are permitted when handrails are not required.

EXPANDED ELEVATION AT CORNERS

DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS

NOTES:

- * Keyed construction joints in Index 400-011 Gravity Wall are not considered to be expansion joints.
- ** Contraction joints (Tooled or Saw Cut) in sidewalks do not require a 6" minimum offset.



ELEVATION

(Showing Inside Face of Railing with Type "A" Posts)

RAILINGS ON GRADES STEEPER THAN 5%
(Type 1 - Picket Railing Shown, Other Types Similar)

RAMP REQUIREMENTS

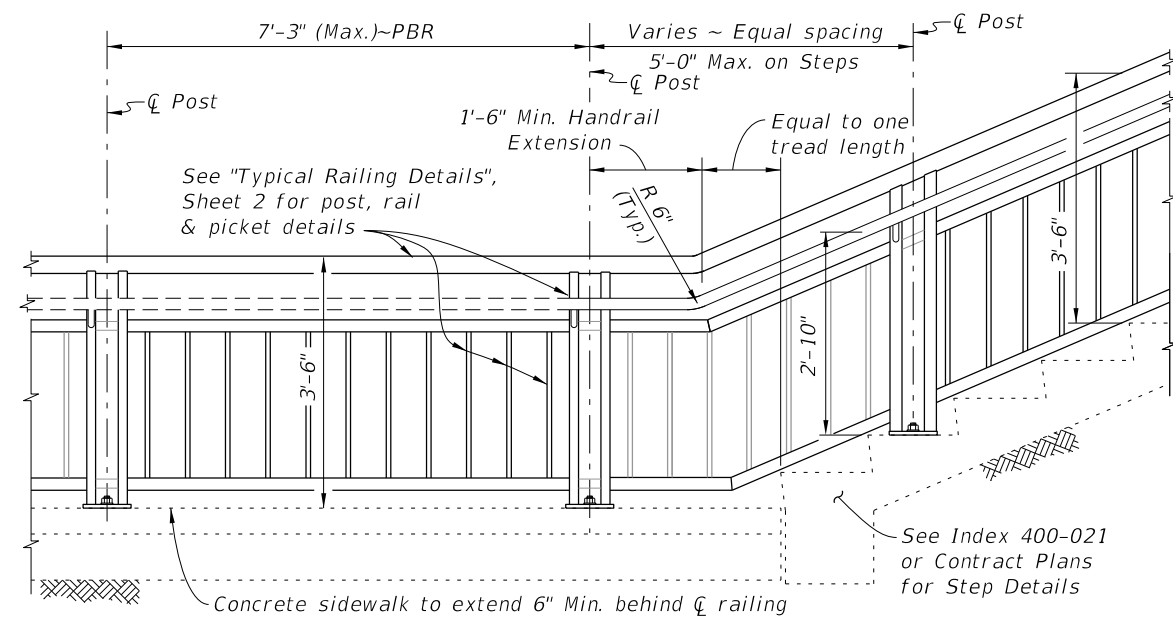
For slopes greater than 5%:
Max. ramp slope = 8.33%
Max. ramp cross-slope = 2.0%

LANDING REQUIREMENTS

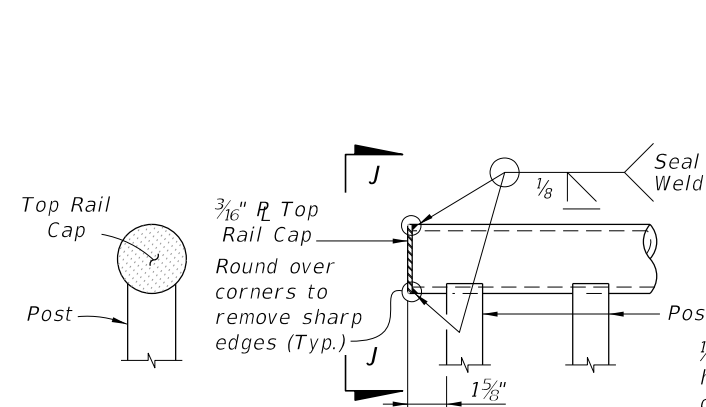
Max. landing slope = 2%
Max. landing cross-slope = 2%

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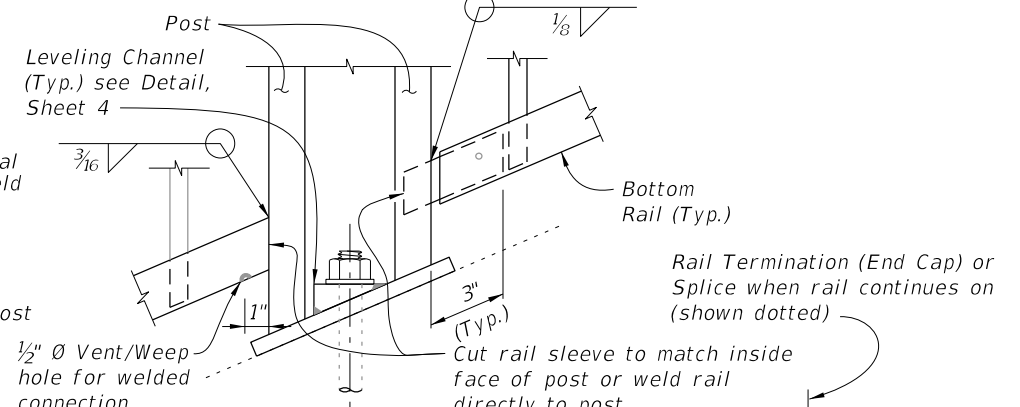
LAST REVISION 11/01/16	DESCRIPTION:	 FY 2027-28 STANDARD PLANS	PEDESTRIAN/BICYCLE RAILING (STEEL)	INDEX 515-052	SHEET 2 of 8
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RAILING CONTINUATION BEYOND STEPS OR STAIRS
(Bottom shown, Top similar)

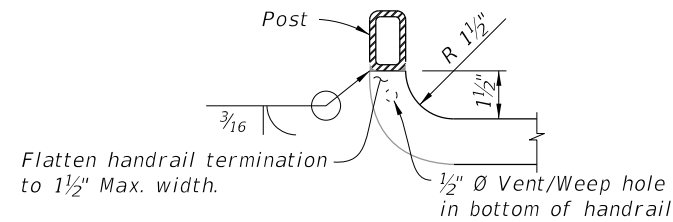


VIEW J-J DETAIL "J" - ELEVATION VIEW TOP RAIL TERMINATION

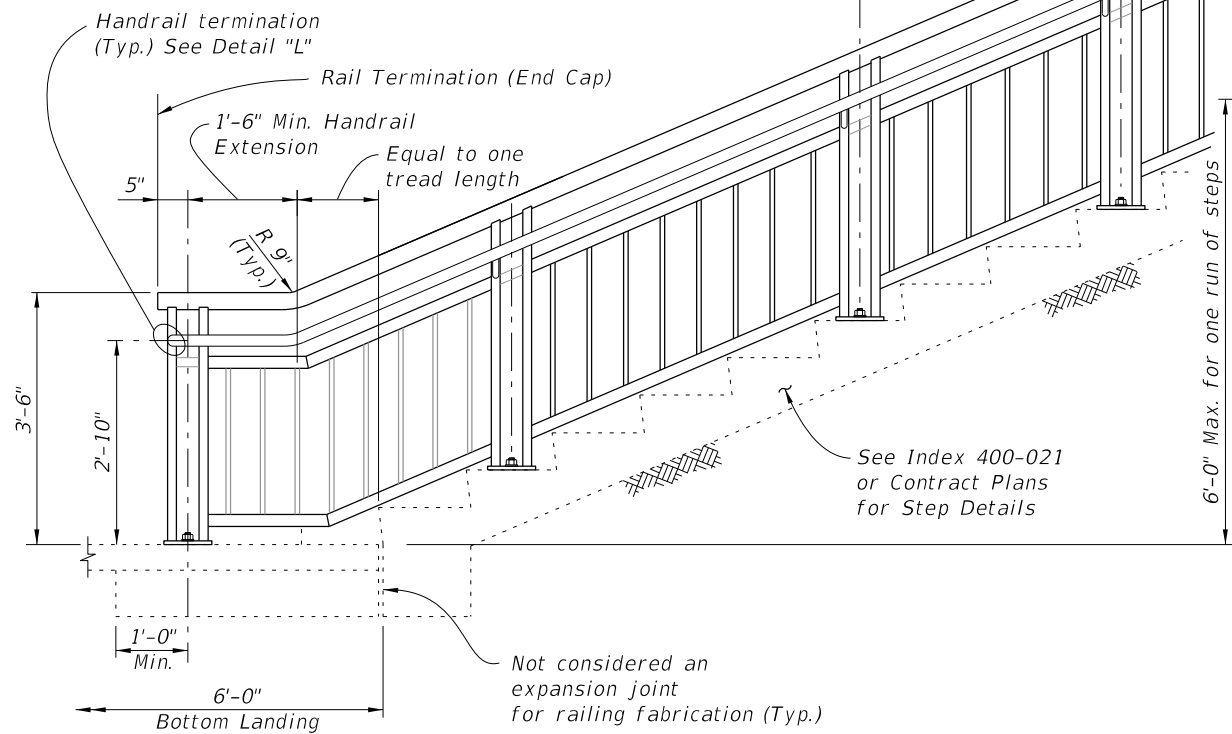


DETAIL "K" - ELEVATION VIEW BOTTOM RAIL CONNECTION (Intermediate Rail Similar)

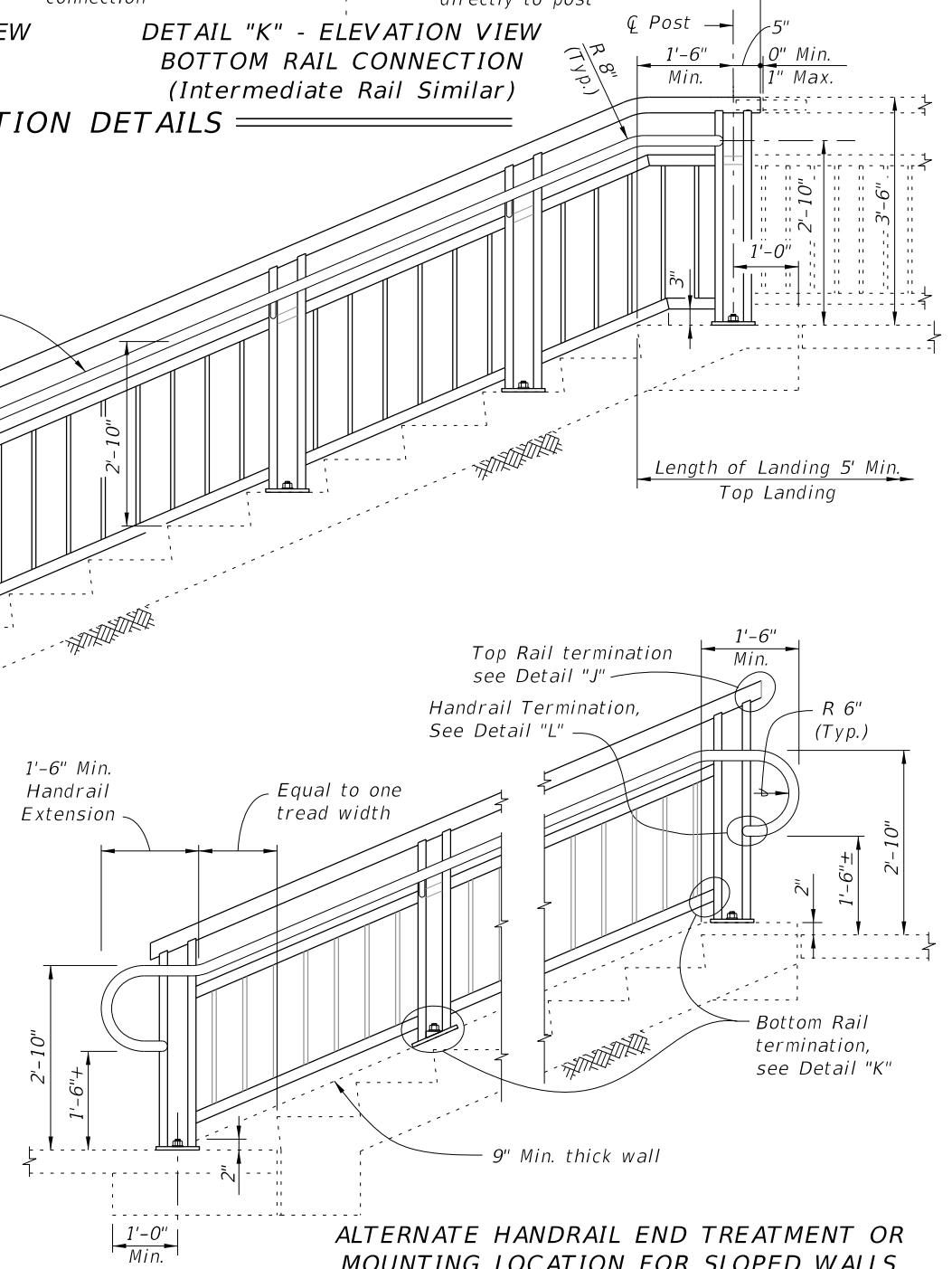
RAIL TERMINATION DETAILS



DETAIL "L" - PLAN VIEW HANDRAIL TERMINATION



ELEVATION
(At-Grade Steps shown, Elevated Stairs similar)

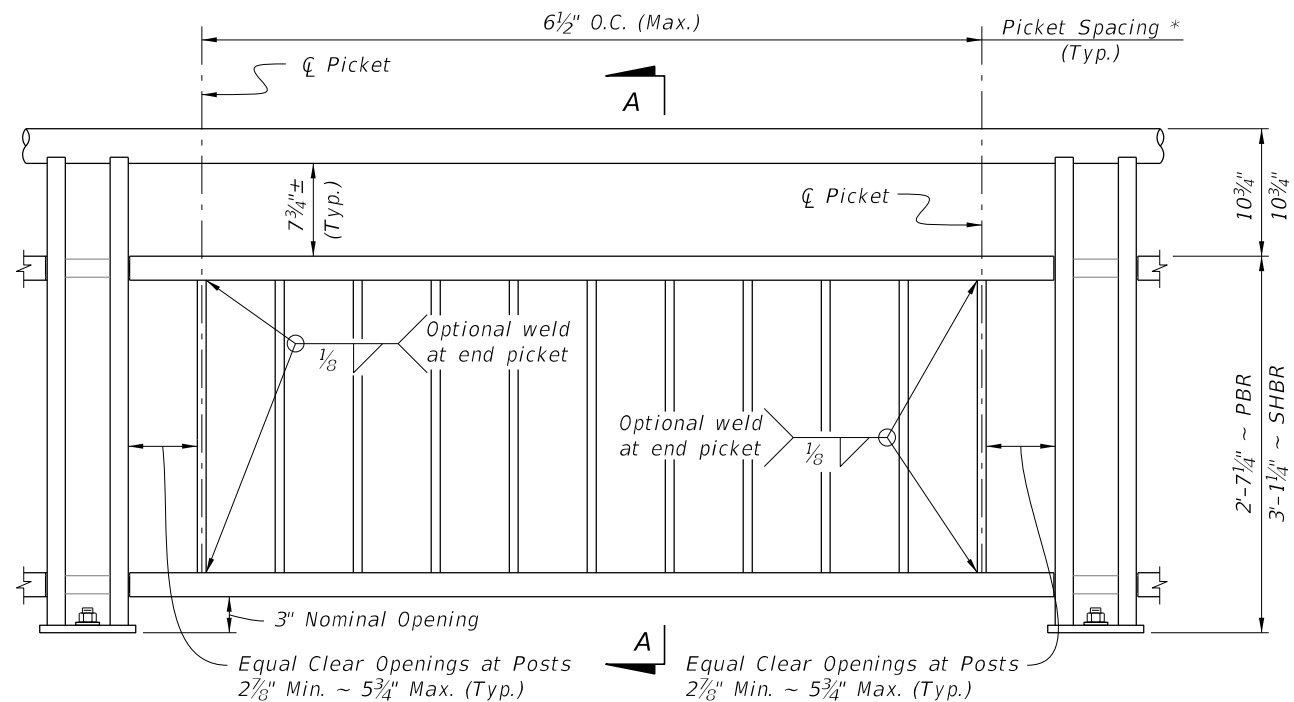


ALTERNATE HANDRAIL END TREATMENT OR MOUNTING LOCATION FOR SLOPED WALLS

RAILINGS ON STEPS & STAIRS

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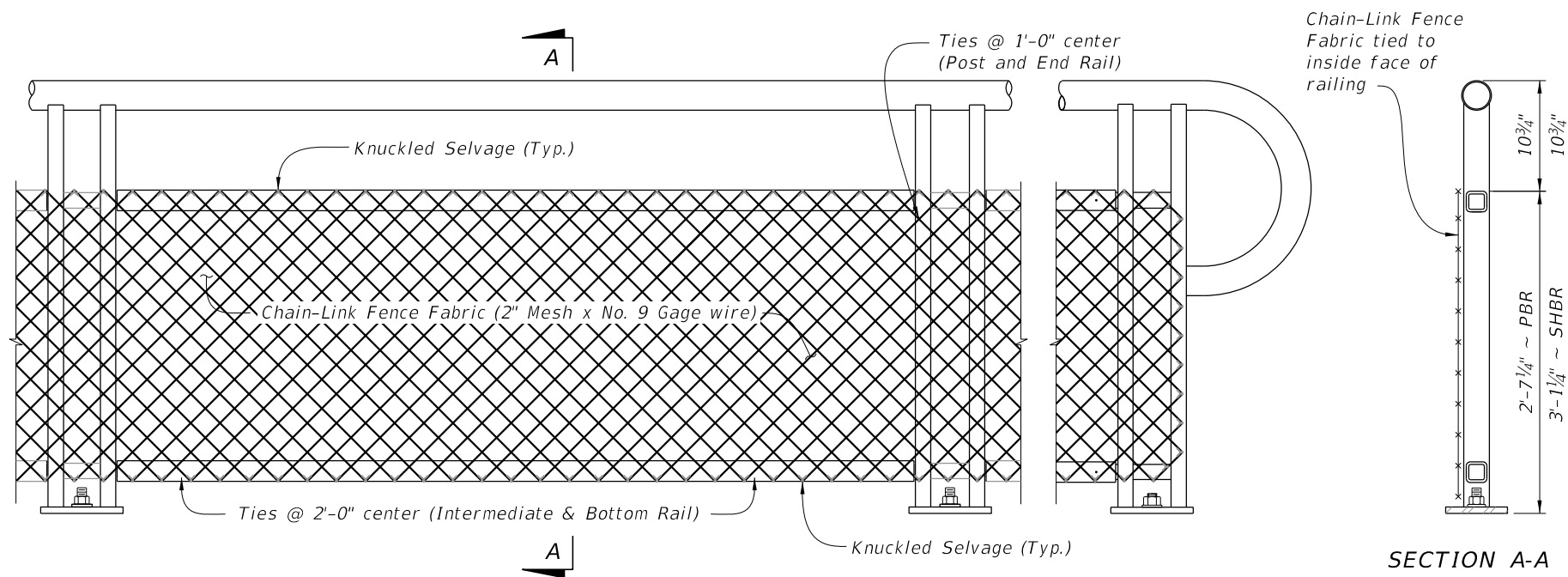
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TYPE 1 - PICKET INFILL PANEL

PICKET NOTES:

- * Picket Spacing of 6 1/2" centers is based on a 3/4" Ø Bar for standard applications. When shown in the Contract Plans a 4 1/2" picket spacing may be required. See Note 4 (Sheet 1).

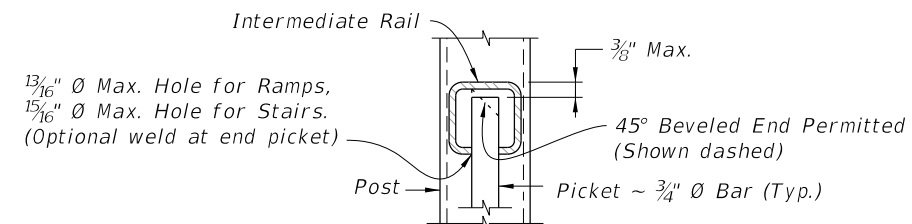


TYPE 2 - CHAIN-LINK (Continuous Infill Panel)

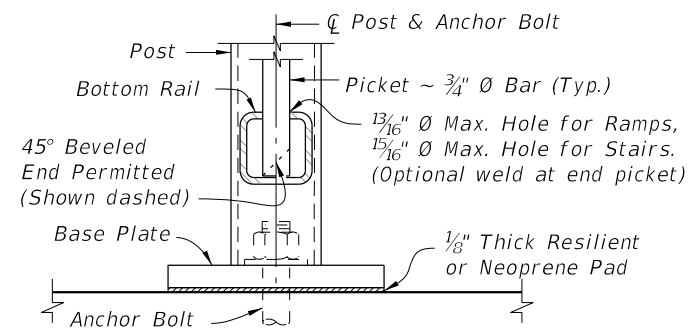
NOTES:

- 1. See Plans for Infill Panel option required.

SECTION A-A



DETAIL "1A"
(Top of Picket Connection)



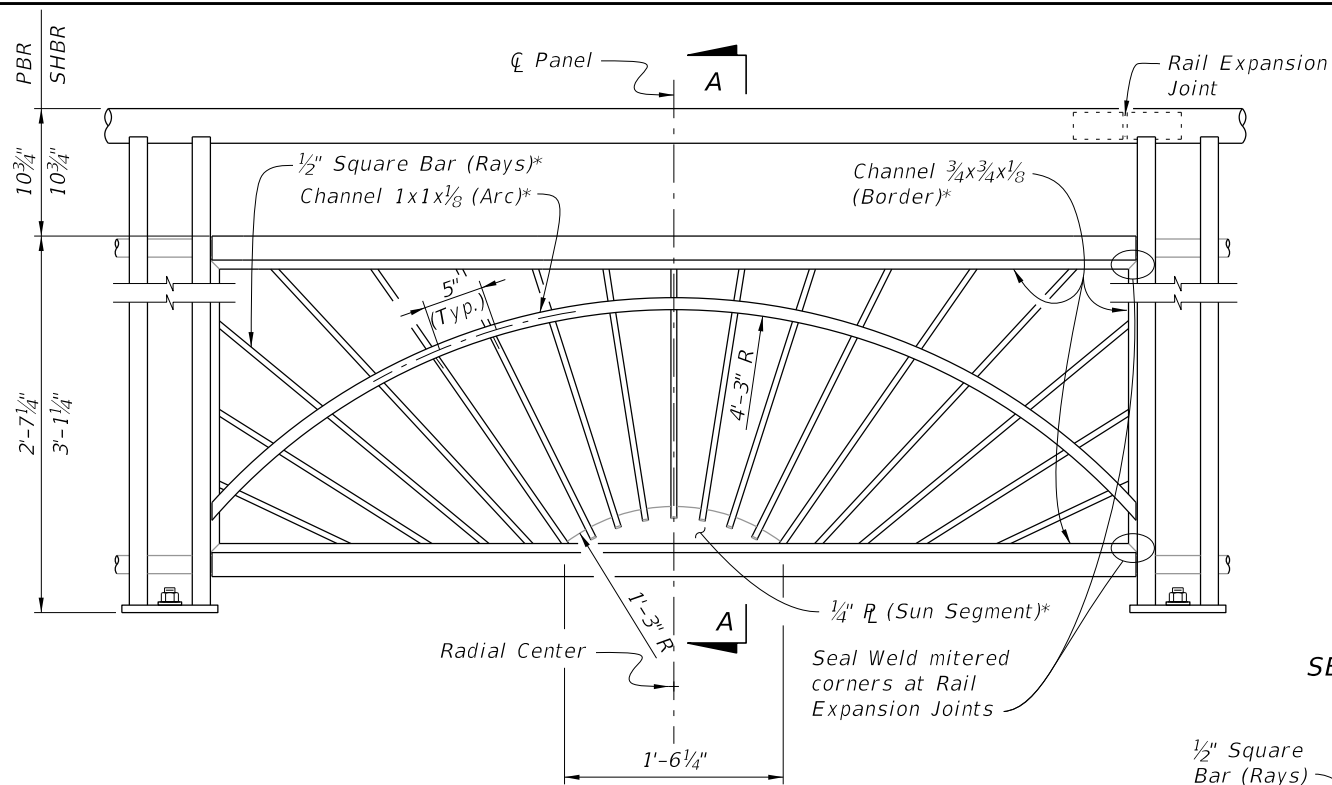
DETAIL "1B"
(Bottom of Picket Connection)

SECTION A-A

TABLE 2 - CHAIN-LINK PANEL COMPONENT MATERIALS		
COMPONENT	ASTM	COMPONENT INFORMATION
Chain-Link Fence Fabric (2" mesh with knuckled top and bottom selvage)	A 392	Zinc-Coated Steel - No. 9 gage (coated wire diameter), Class 2 Coating
	A 491	Aluminum-Coated Steel - No. 9 gage (coated wire diameter)
	F 668	Polyvinyl Chloride (PVC) Coated Steel - No. 9 gage Zinc-Coated Wire (metallic-coated core wire diameter) ~ See Plans for specified color of PVC.
Tie Wires	F 626	Zinc-Coated Steel Wire - No. 9 gage with coating to match Chain-Link Fence Fabric.
Tension Bars	F 626	3/16" (Min. thickness) x 3/4" (Min. width) x 2'-3' (Min. height) Steel Bars
Miscellaneous Fence Components	F 626	Zinc-Coated Steel

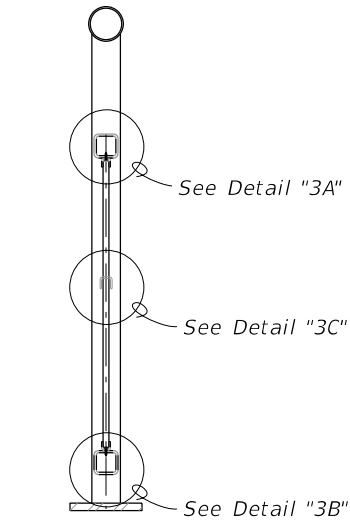
CHAIN-LINK PANEL NOTE:

Chain-Link Fence Fabric shall be continuous along limits of railing. Splicing of Chain-Link panels using Tension Bars at 20'-0" minimum increments is permitted.

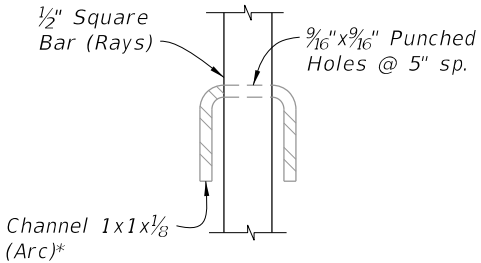


TYPE 3 - SUNSHINE INFILL PANEL

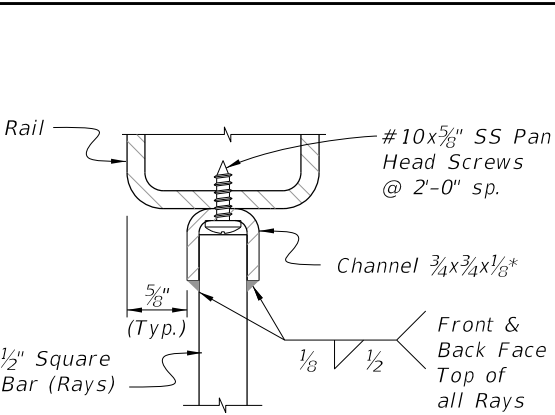
* Arc, Rays and Sun Segment may be formed in a single panel from 1/2" steel plate pattern cut with laser or plasma CNC, welded to a 1x1x1/8 Angle Border or the 3/4x3/4x1/8 Channel Border shown.



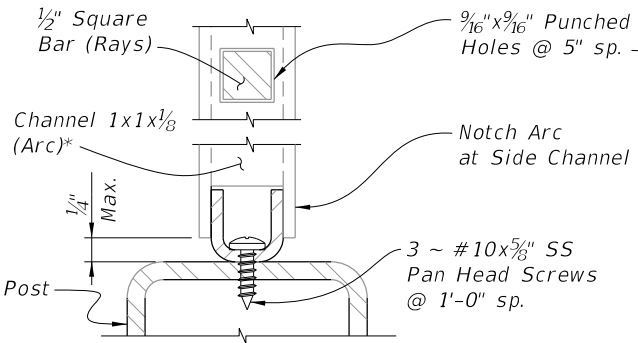
SECTION A-A



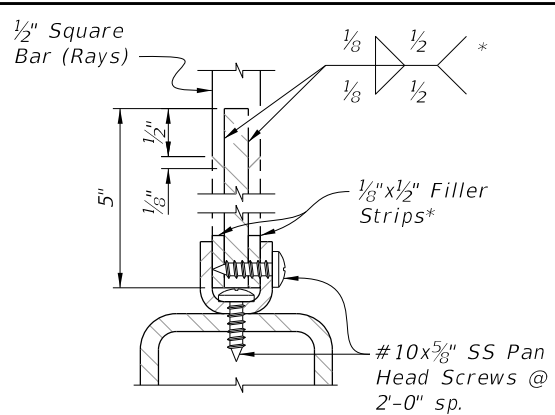
DETAIL "3C"
RAY/ARC CONNECTION



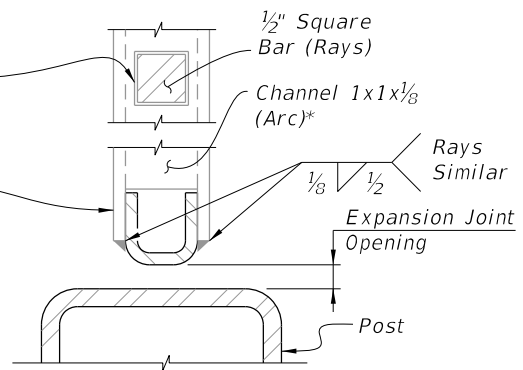
DETAIL "3A"
INTERMEDIATE RAIL/RAY
CONNECTION



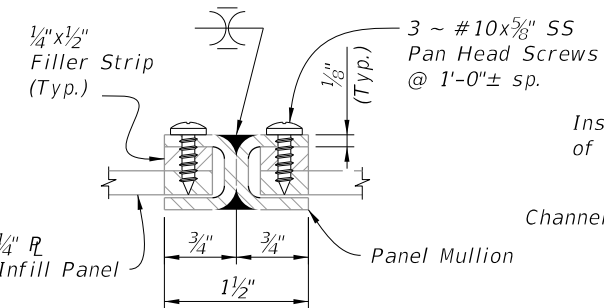
DETAIL "3D"
ARC/POST CONNECTION
(Continuous Top Rail)



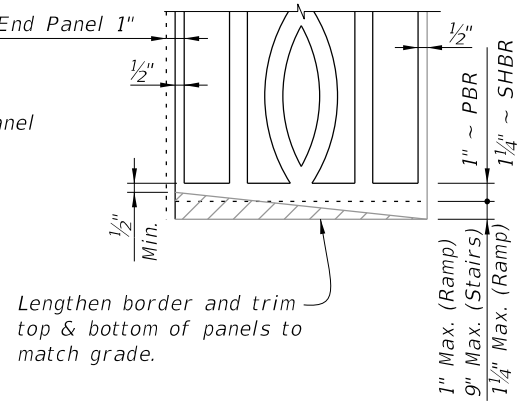
DETAIL "3B"
BOTTOM RAIL/RAY CONNECTION



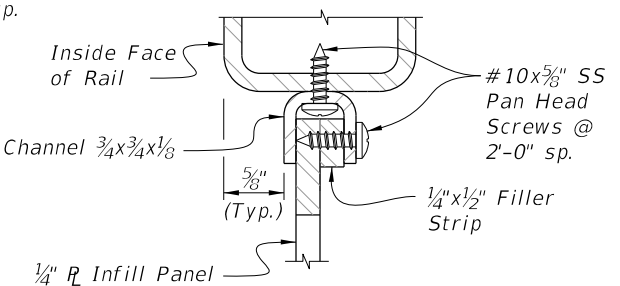
DETAIL "3E"
PANEL END CONNECTION
AT POST WITH EXPANSION JOINT



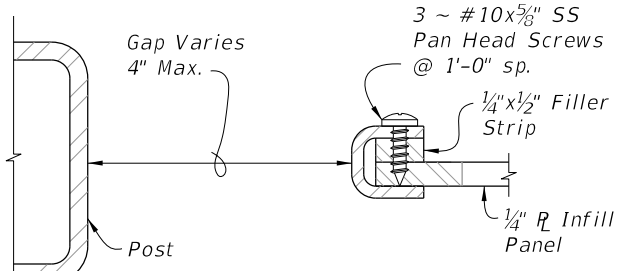
SECTION C-C
PANEL/SPLICE CONNECTION



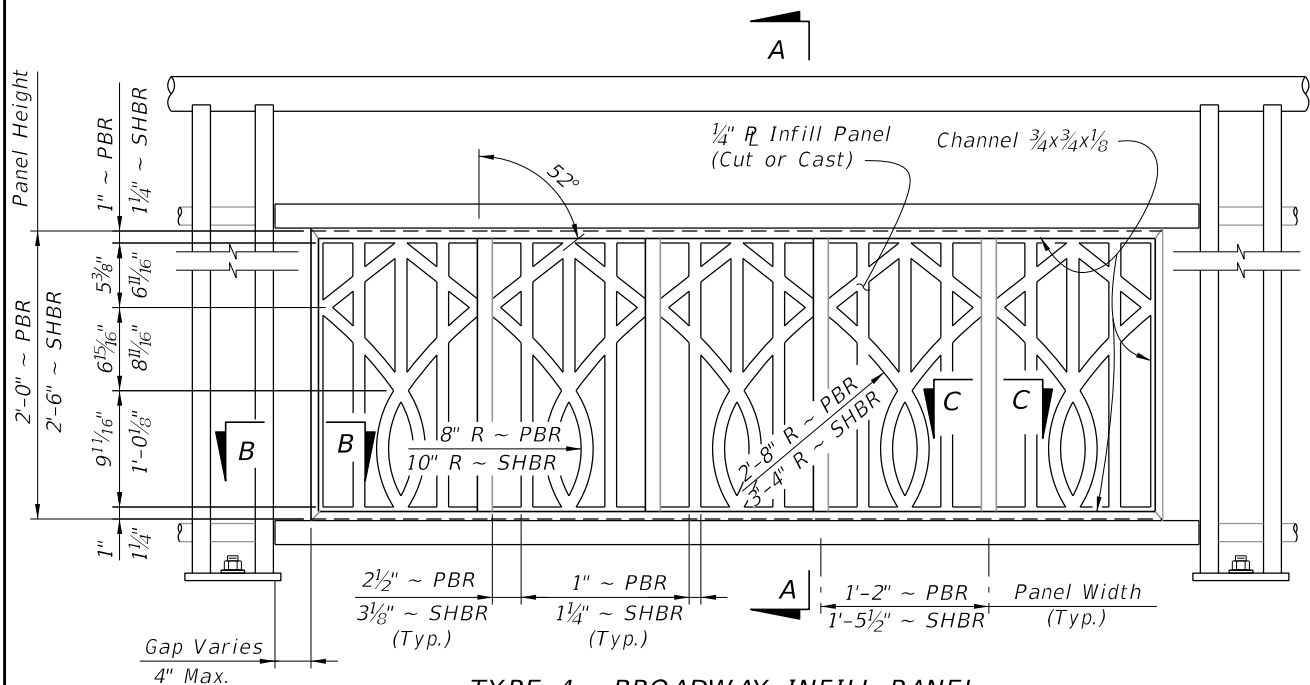
PANEL ADJUSTMENT FOR RAILINGS
ON GRADES



DETAIL "4A"
PANEL/RAIL CONNECTION
(Top Shown, Bottom Similar)

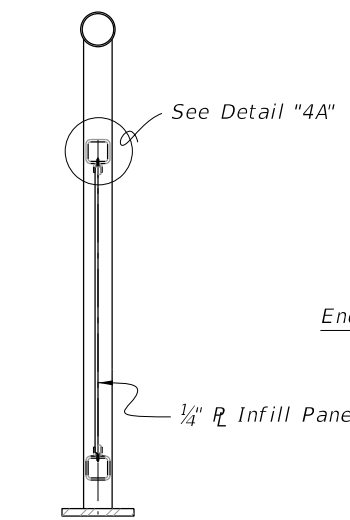


SECTION B-B
PANEL END CAP



TYPE 4 - BROADWAY INFILL PANEL

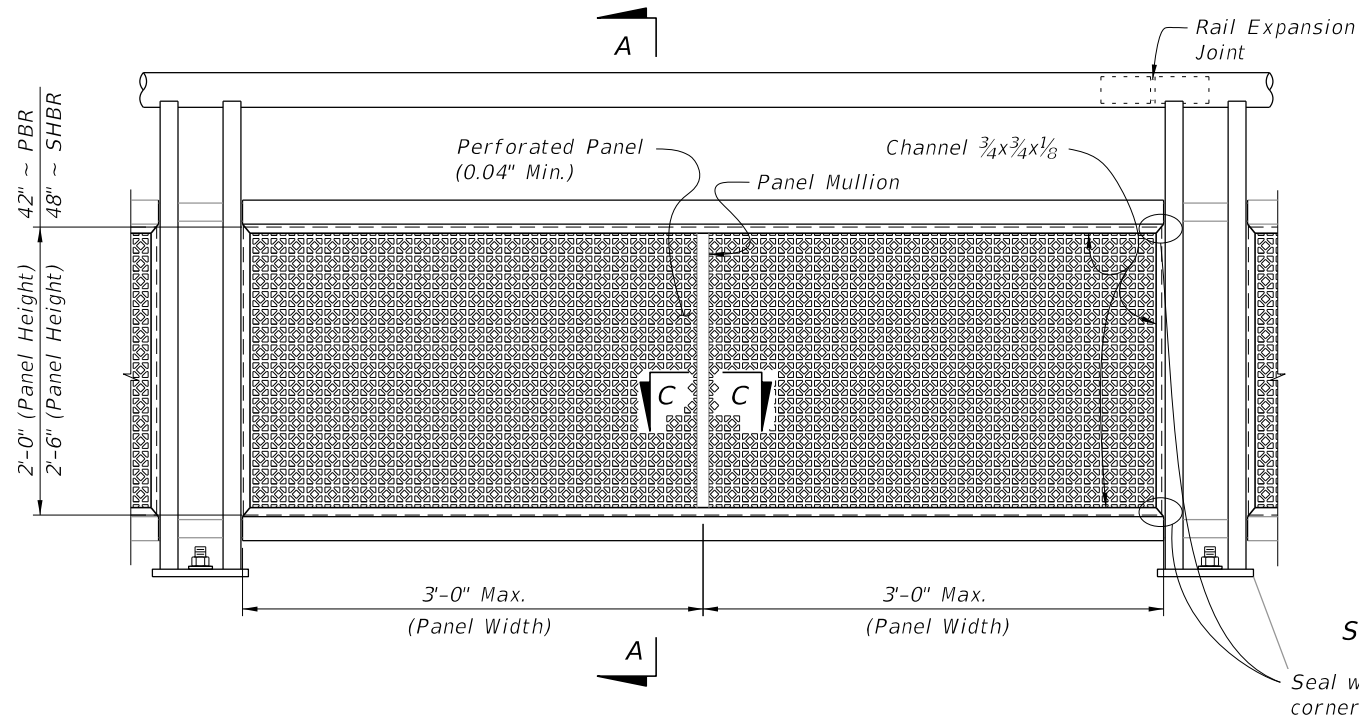
NOTE:
See Plans for Infill Panel Option required.



SECTION A-A

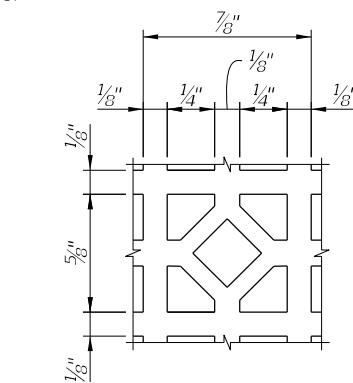
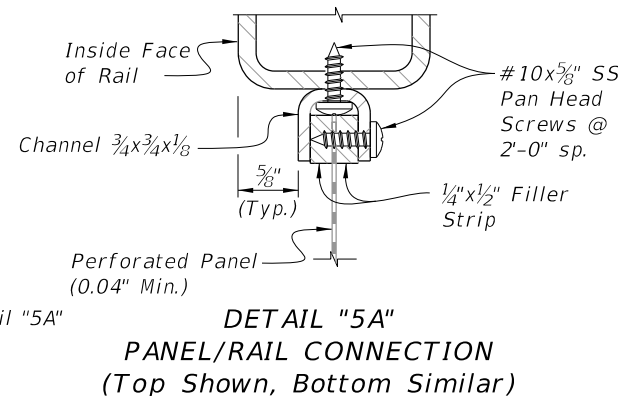
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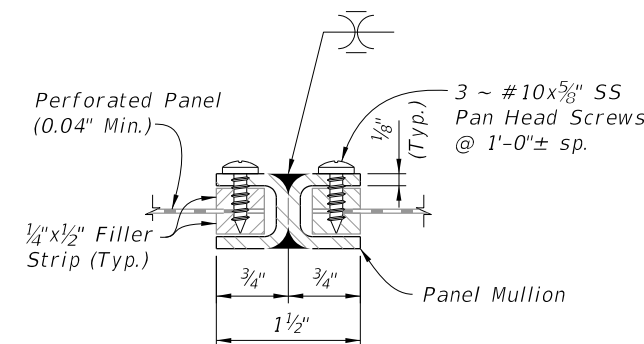
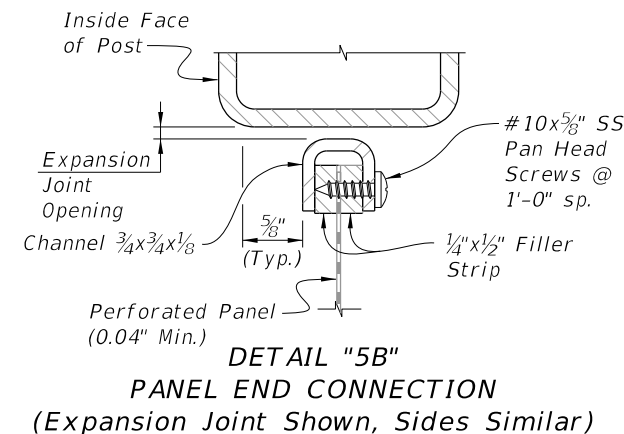


TYPE 5 - PERFORATED INFILL PANEL

SECTION A-A



REPEATING PATTERN DETAIL FOR PERFORATED PANEL



SECTION C-C PANEL/SPLICE CONNECTION

NOTES:

1. See Plans for Infill Panel Type required.



FY 2027-28
STANDARD PLANS

PEDESTRIAN/BICYCLE RAILING (STEEL)

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