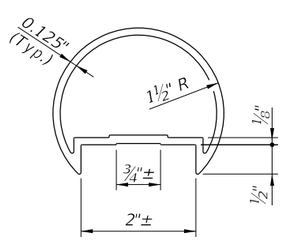
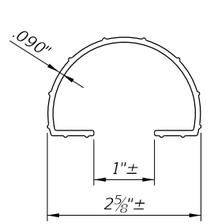
3D VIEW OF RAILING WITH TYPE 1 - PICKET INFILL PANEL
(42" Height shown, 54" Height Similar)

TABLE 1 - RAILING MEMBERS				
MEMBER	ALLOY(1)	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	6061-T6	RT 2x2x.250	2.00" x 2.00"	0.250"
Top Rail	6061-T6	2½" NPS (Sch. 10) 3" Round Top Cap Rail	2.875" 3.000"	0.120" 0.125"
End Hoops	6063-T5	2½" NPS (Sch. 10) 3.00 OD x 0.125 Wall	2.875" 3.000"	0.120" 0.125"
Top Rail Joint/Splice Sleeves	6063-T5	2.50 OD x 0.125 Wall Top Cap Rail Inner Sleeve	2.500" 2.800"	0.125" 0.090"
Intermediate & Bottom Rail	6061-T6	RT 2x2x.250	2.00" x 2.00"	0.250"(2)
Int. & Bottom Rail Post Connection Sleeve	6063-T5	1.50 OD x 0.125 Wall	1.500"	0.125"
Handrail Joint/Splice Sleeves	6063-T5	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	6061-T6	1½" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	6061-T6	¾" Ø Round Bar	0.750"	N/A
Pickets (Type 1 Infill Panel)	6061-T6	¾" Ø Round Bar	0.750"	N/A
Infill Panel Members (Types 2 – 5)	6063-T5	Varies (See Details)	Varies	Varies

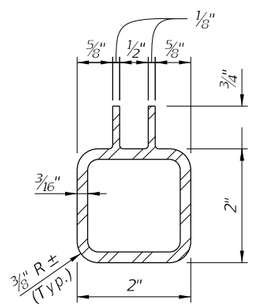
TABLE 1 NOTES:
(1) Alloy 6061-T6 or 6063-T52 & T6 may be substituted for Alloy 6063-T5.
(2) 0.188" wall thickness permitted for rails with post spacings less than 5'-9".



3" ROUND TOP CAP RAIL



TOP CAP RAIL INNER SPLICE SLEEVE



ALTERNATIVE BOTTOM & INTERMEDIATE RAIL SECTION FOR TYPE 3, 4 & 5 RAILINGS

ALTERNATE TOP RAIL SECTION

NOTES

DESIGN LOADS, GEOMETRY AND APPLICABILITY:
See the Instructions for Design Standards for the design loads, geometry and applicability requirements.

GENERAL:
Adequate foundation support shall be provided for anchorage and stability against overturning. See Index No. 861 for special requirements and modifications for use on bridges. The railing shown on these drawings requires a handrail for ramps steeper than a 5% grade to conform with the requirements of the Americans with Disabilities Act (ADA).

RAILS, PANELS AND POSTS:
Structural Extrusions, Tube, Pipe and Bar shall be in accordance with Table 1 and ASTM B221 or ASTM B429. Top, bottom and intermediate rail corner bends with maximum 4'-0" post spacing, may be Alloy 6063-T6. Perforated panels (Type 5) shall be Alloy 3003-H14. Posts shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Pickets and vertical panel elements shall be fabricated parallel to the posts, except that Type 2, 3 & 5 panel infills may be fabricated parallel to the longitudinal grade. Corners and changes in tangential longitudinal alignment shall be made continuous with a 9" bend radius or terminate at adjoining sections with mitered end sections when handrails are not required. For changes in tangential longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2'-0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails and handrails shall be shop bent to match the alignment radius.

BASE PLATES AND RAIL CAPS:
Base Plates and Post Cap plates shall be in accordance with ASTM B209, Alloy 6061-T6.

SHIM PLATES:
Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061 or 6063. Shim plates shall be used for foundation height adjustments greater than ¼" and localized irregularities greater than ⅛". Field trim shim plates when necessary to match the contours of the foundation. Beveled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of ½", unless longer anchor bolts are provided for the exposed thread length.

ANCHOR BOLTS:
Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts for Adhesive Anchors shall be threaded full length. Cutting of reinforcing steel is permitted for drilled hole installation. Expansion Anchors are not permitted. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking nuts. All nuts shall be in accordance with ASTM A563 or ASTM A194. Flat Washers shall be in accordance with ASTM F436 and Plate Washers (for long slotted holes only), shall be in accordance with ASTM A36 or ASTM A709 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Distorted threads and tack welds shall be coated with a galvanizing compound in accordance with the Specifications.

RESILIENT AND NEOPRENE PADS:
Resilient and Neoprene pads shall be in accordance with Specification Section 932 except that testing of the finished pads shall not be required. Neoprene pads shall be durometer hardness 60 to 80.

JOINTS:
All welded joints are to be ground smooth. Expansion joints shall be spaced at a maximum 35'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate handling, but top rail must be continuous across a minimum of two posts.

WELDING:
All welding shall be in accordance with the American Welding Society Structural Welding Code (Aluminum) ANSI/AWS D1.2 (current edition). Filler metal shall be either ER5183, ER5356 or ER5556. Nondestructive testing of welds is not required. Filler metal for plug welds and bend splices may be ER4043.

COATINGS:
The aluminum railing shall be mill finish unless otherwise noted in the Contract Documents. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Specification Section 962.

SHOP DRAWINGS:
Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations, post and panel type, anchor bolt installation "Case" or lengths, must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

PAYMENT:
Railing shall be paid for per linear foot (Item No. 515-2-abb). Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, panels, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the railing.

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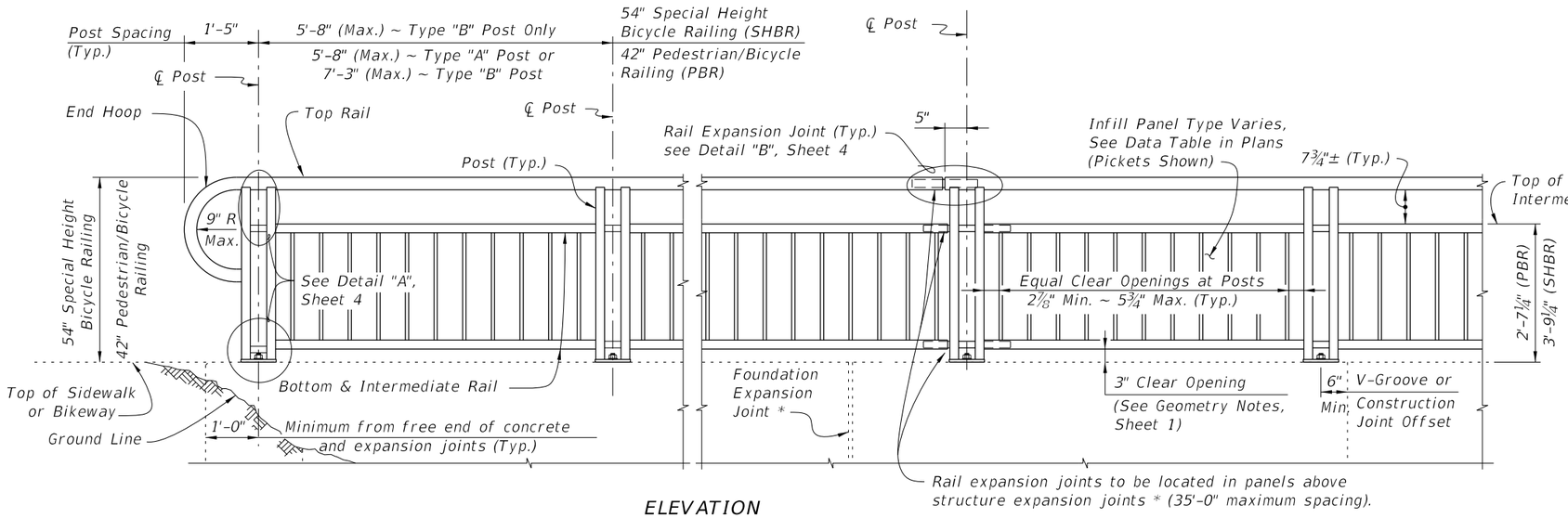
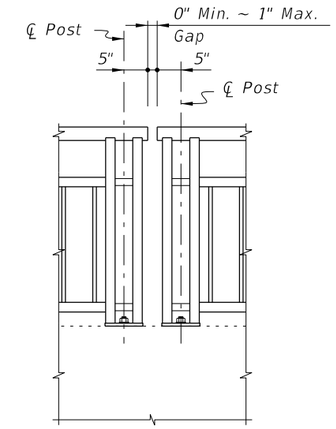
01/01/12			FDOT DESIGN STANDARDS FY 2012/2013	ALUMINUM PEDESTRIAN/BICYCLE RAILING	INDEX NO. 862	SHEET NO. 1



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



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

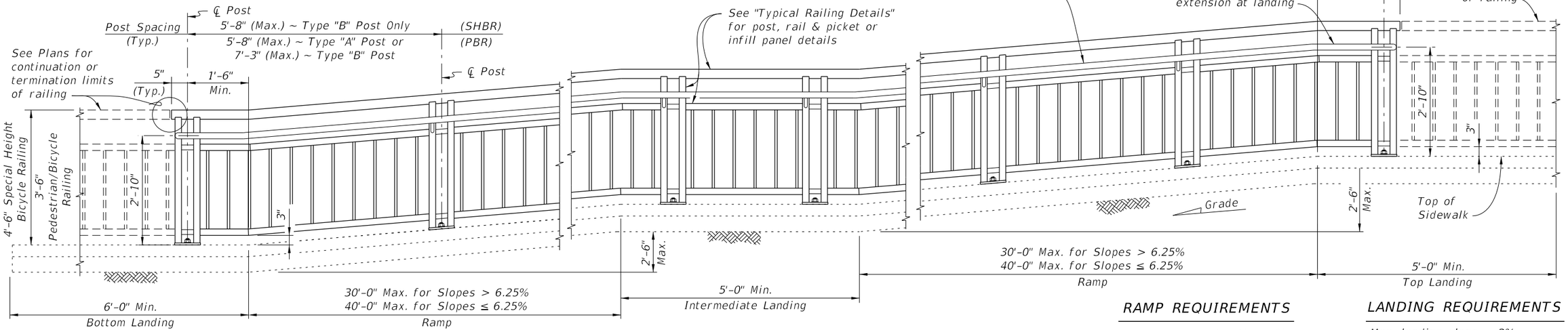
EXPANDED ELEVATION AT CORNERS

TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%

(Type 1 - Picket Railing Shown, Other Types Similar)

DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS

NOTES:
** Keyed construction joints in Index No. 6011 Gravity Wall are not considered to be expansion joints.*



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

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%

RAILINGS ON GRADES STEEPER THAN 5%

(Type 1 - Picket Railing Shown, Other Types Similar)

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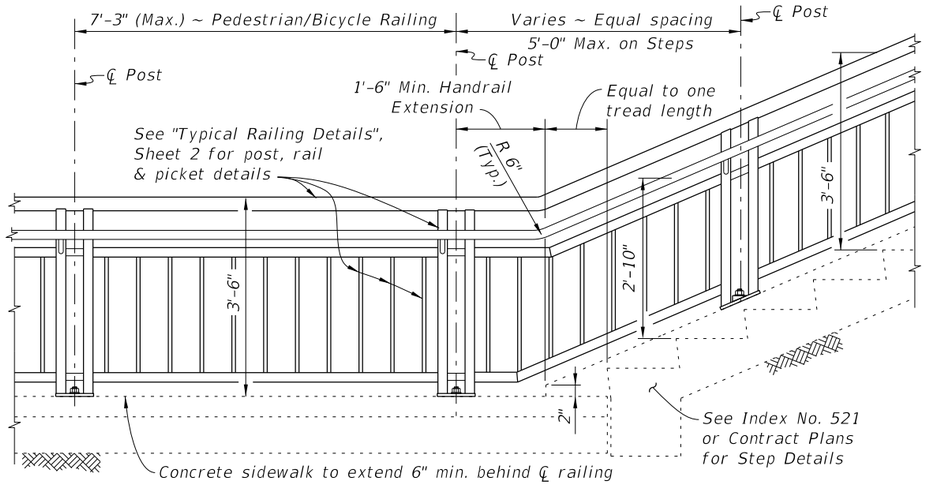
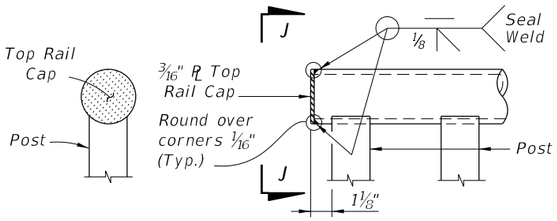
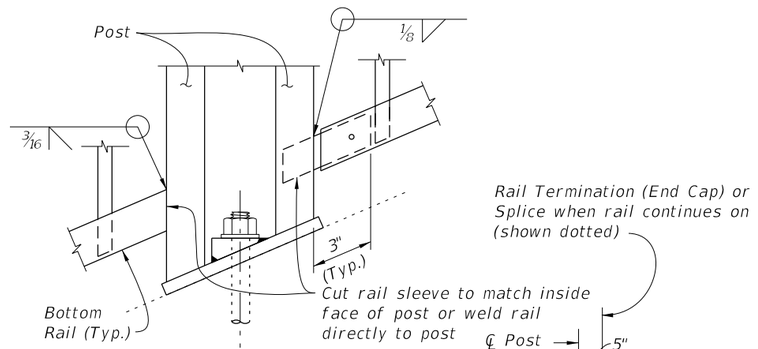
ALUMINUM PEDESTRIAN/BICYCLE RAILING



RAILING CONTINUATION BEYOND STEPS OR STAIRS
(Bottom shown, Top similar)

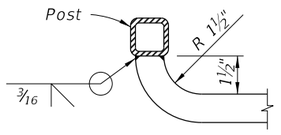


VIEW J-J DETAIL "J" - ELEVATION VIEW
TOP RAIL TERMINATION



DETAIL "K" - ELEVATION VIEW
BOTTOM RAIL CONNECTION

RAIL TERMINATION DETAILS



DETAIL "L" - PLAN VIEW
HANDRAIL TERMINATION

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

ALTERNATE END TREATMENT

RAILINGS ON STEPS & STAIRS

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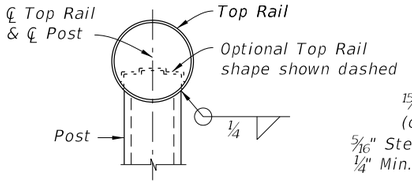


SECTION A-A
(Top Rail Connection)

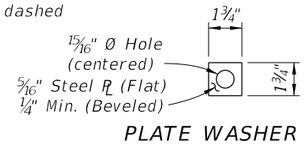
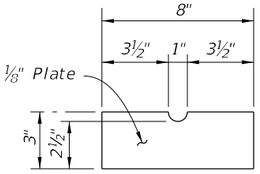
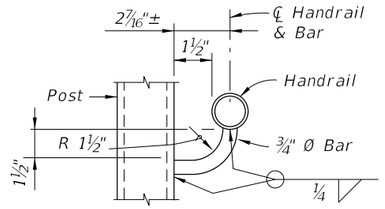


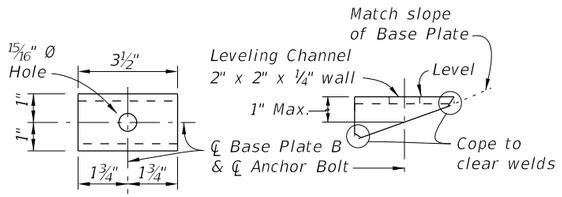
PLATE WASHER
DETAIL



SHIM PLATE DETAIL

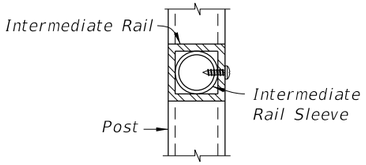


SECTION B-B
(Handrail Connection)

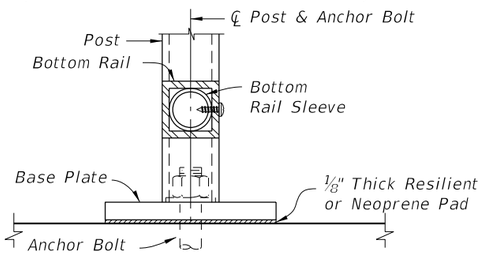


TOP VIEW SIDE VIEW

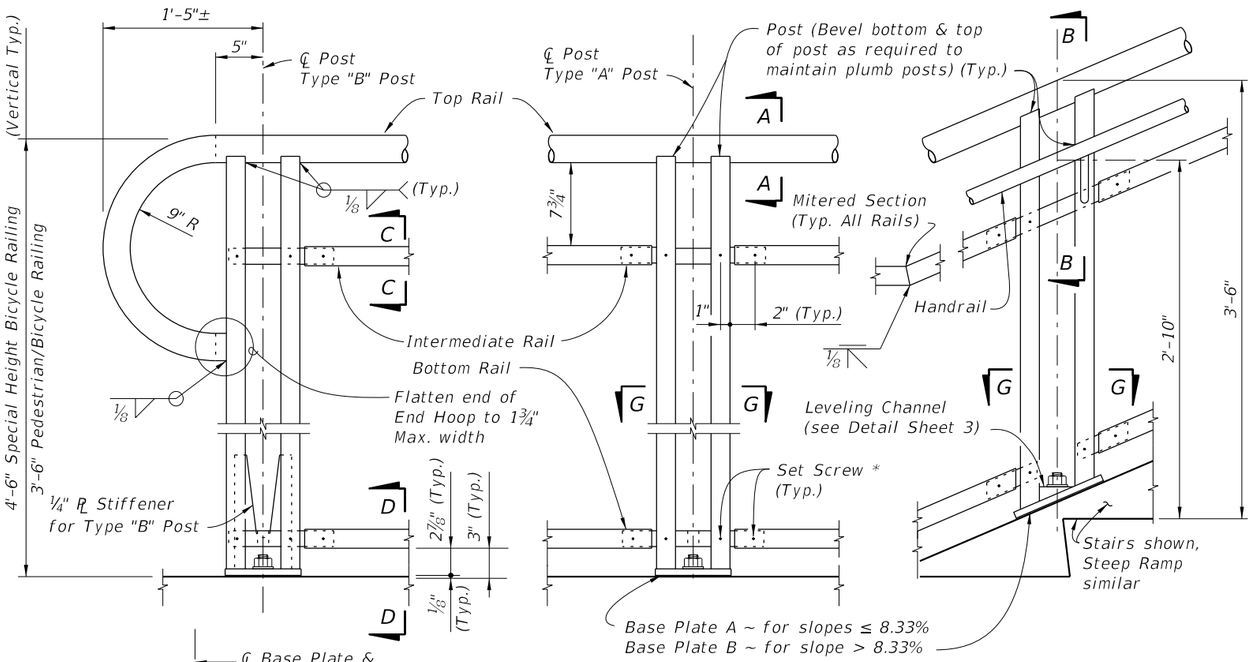
LEVELING CHANNEL DETAIL



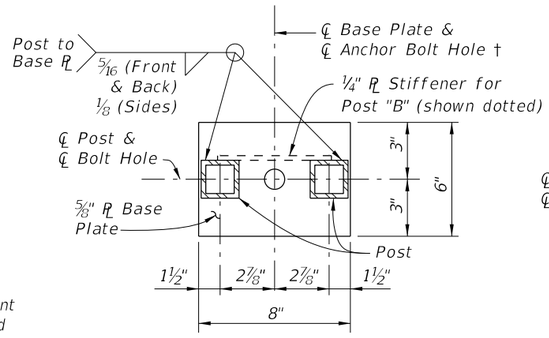
SECTION C-C
(Intermediate Rail Connection)



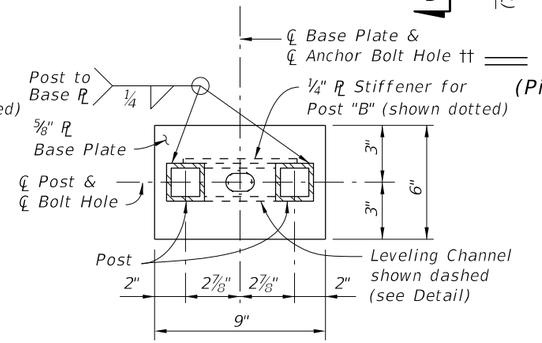
SECTION D-D
(Bottom Rail Connection)



DETAIL "A" - RAIL CONNECTIONS
(Pickets/Panels Not Shown for Clarity)

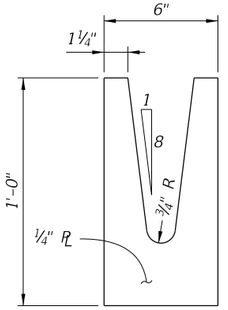


BASE PLATE A



BASE PLATE B

SECTION G-G - BASE PLATE DETAILS



POST "B" STIFFENER
DETAIL

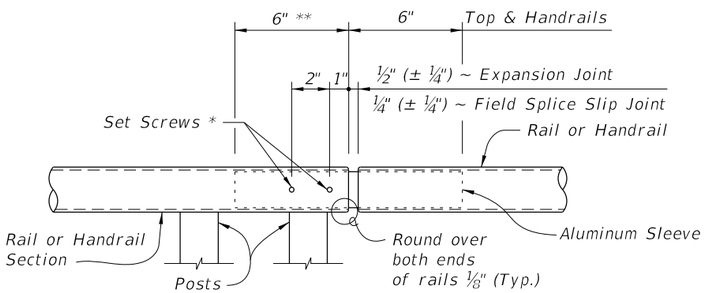
NOTES:

† *Base Plate A (Ramps – Bolts normal) use 1 1⁄16" Ø Holes for Anchor Bolts with Flat Washers for slopes ≤ 8.33%.*

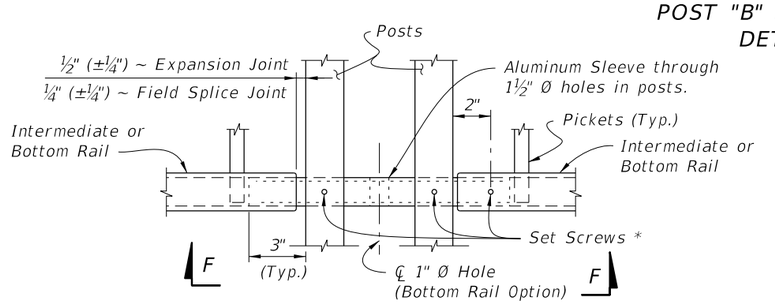
†† *Base Plate B (Stairs – Bolts plumb) use 1¼" Ø Holes for Anchor Bolts with Beveled Plate and Washers for slopes > 8.33% to ≤ 15%; use 15⁄16" x 1½" Slotted Holes with Leveling Channel for slopes > 15%.*

* *¼" Ø x ¾" Pan Head Aluminum (Alloy 2024–T4 or 7075–T73) or Stainless Steel (Type 316 or 18–8 Alloy) Set Screws. Screws must be set flush against the outside face of rails & posts and underside of handrails. A single ¾" Ø plug weld may be substituted for the Set Screws.*

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

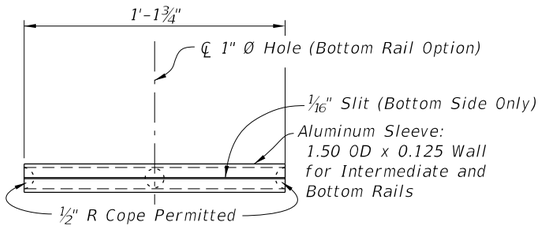


ROUND RAILS - TOP RAIL OR HANDRAIL
(Top Rail at Expansion Joint Shown)



SQUARE RAILS - INTERMEDIATE OR BOTTOM RAIL
(Bottom Rail Shown at Expansion Joint Shown)

DETAIL "B" - EXPANSION JOINT (FIELD SPLICE SLIP JOINT SIMILAR)



VIEW F-F
INTERMEDIATE OR BOTTOM RAIL -
ALUMINUM SLEEVE DETAIL (Bottom Side Shown)

CROSS REFERENCE:

For location of Details "B", See Sheet 2.

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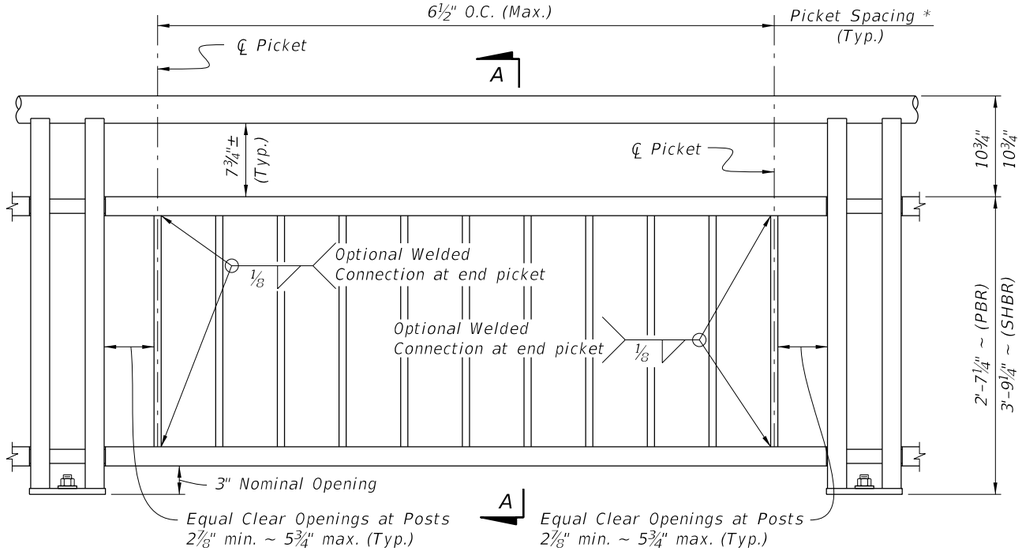
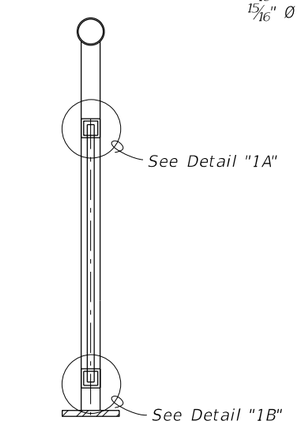
01/01/11			FDOT DESIGN STANDARDS FY 2012/2013	ALUMINUM PEDESTRIAN/BICYCLE RAILING	INDEX NO. 862	SHEET NO. 4



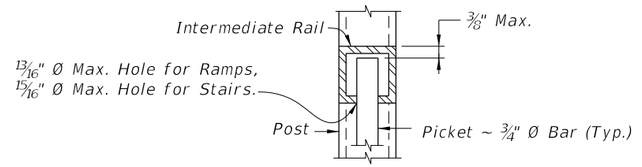
TYPE 1 - PICKET INFILL PANEL

PICKET NOTES:

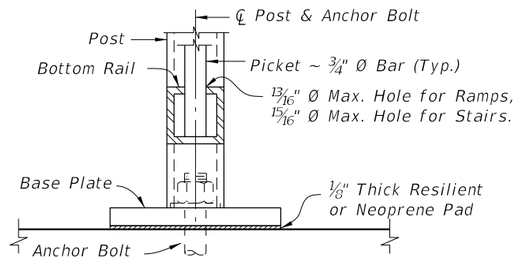
* Picket Spacing of 6½" centers is based on a ¾" NPS for standard applications. When shown in the Contract Plans a 4½" picket spacing may be required. If an alternate design is used, maintain a maximum clear opening of 5⅛" for standard installations and 3⅜" for special conditions.



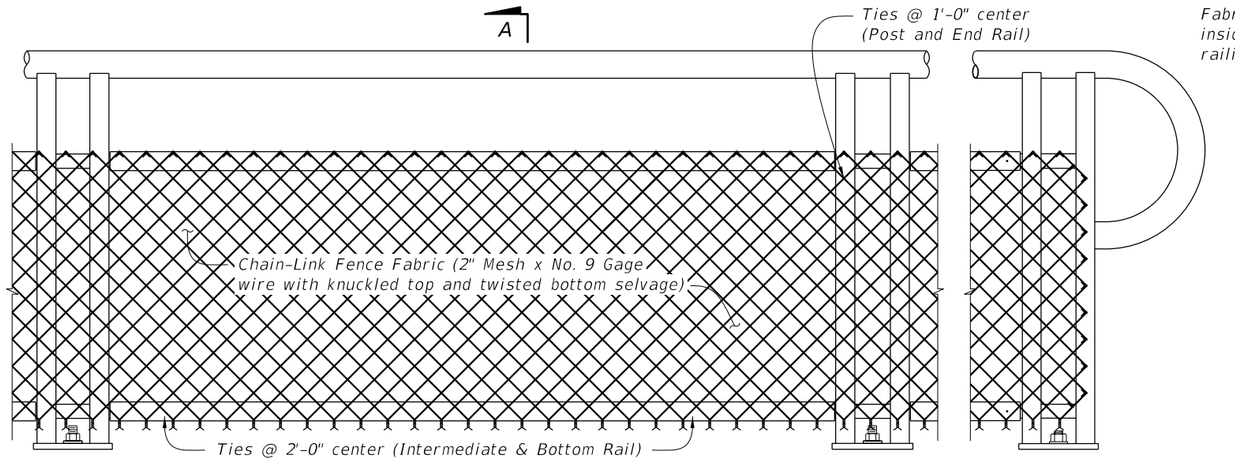
SECTION A-A



DETAIL "1A"
(Top of Picket Connection)



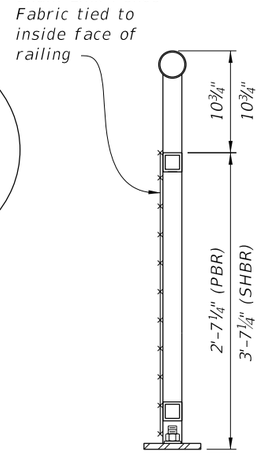
DETAIL "1B"
(Bottom of Picket Connection)



TYPE 2 - CHAIN-LINK (Continuous Infill Panel)

NOTES:

1. See Plans for Infill Panel option required.



SECTION A-A

TABLE 2 - CHAIN-LINK PANEL COMPONENT MATERIALS		
COMPONENT	ASTM	COMPONENT INFORMATION
Chain-Link Fence Fabric (2" mesh with twisted bottom and knuckled top 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 ¾" (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.

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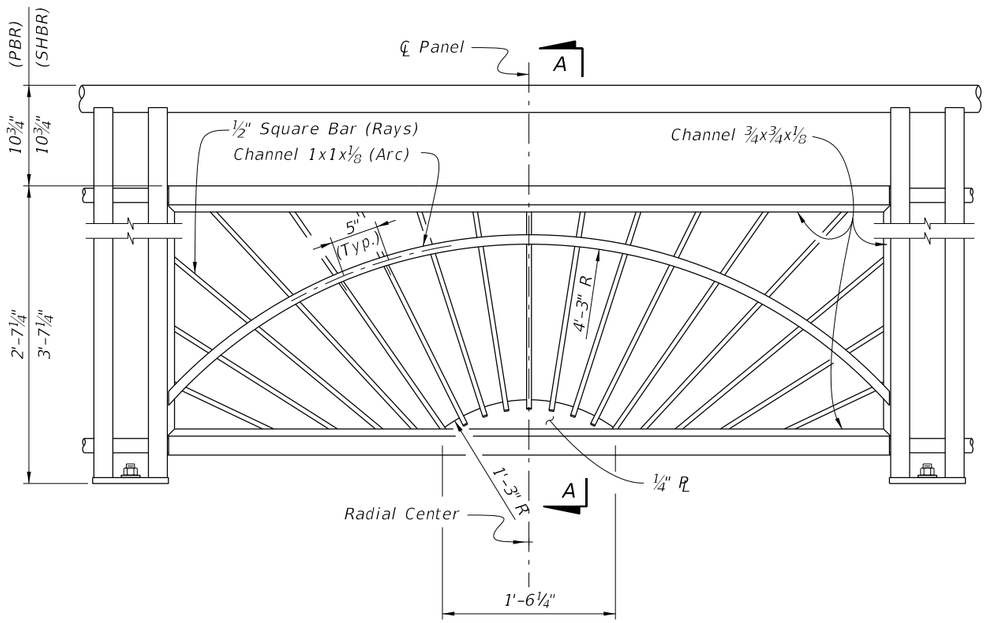
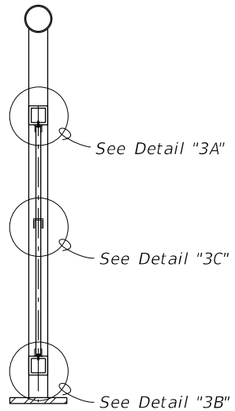
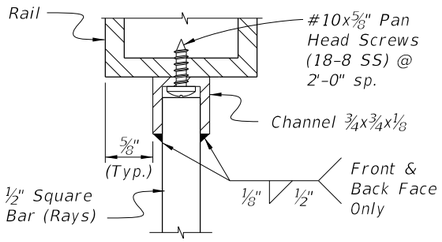


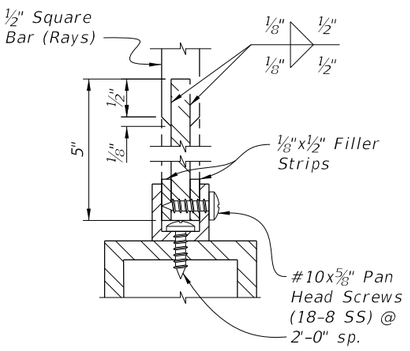
TYPE 3 - SUNSHINE INFILL PANEL



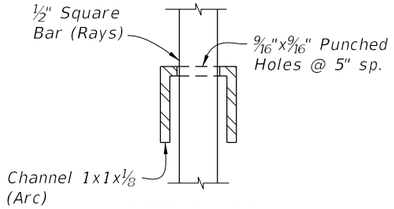
SECTION A-A



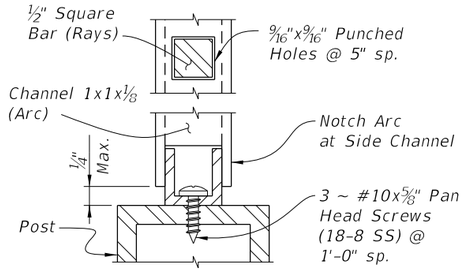
DETAIL "3A"
INTERMEDIATE RAIL/RAY CONNECTION



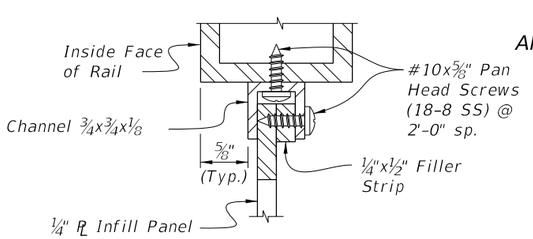
DETAIL "3B"
BOTTOM RAIL/RAY CONNECTION



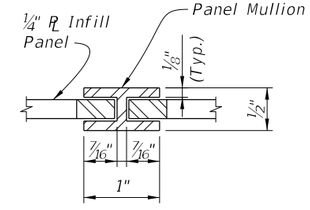
DETAIL "3C"
RAY/ARC CONNECTION



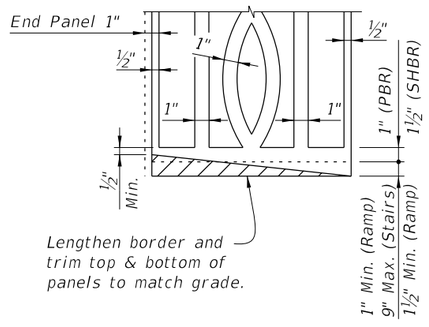
DETAIL "3D"
ARC/POST CONNECTION



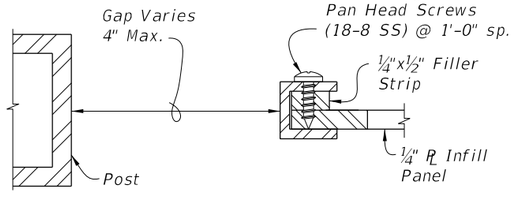
DETAIL "4A"
PANEL/RAIL CONNECTION
(Top Shown, Bottom Similar)



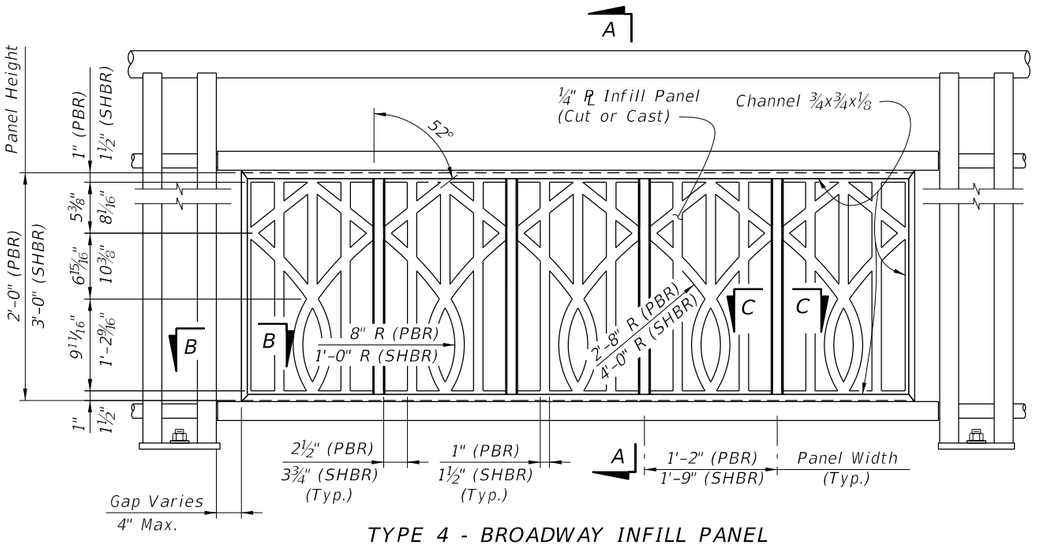
SECTION C-C
PANEL/SPLICE CONNECTION



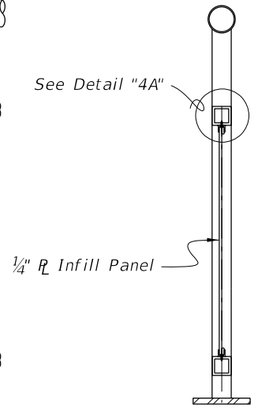
PANEL ADJUSTMENT FOR RAILINGS ON GRADES



SECTION B-B
PANEL END CAP



TYPE 4 - BROADWAY INFILL PANEL

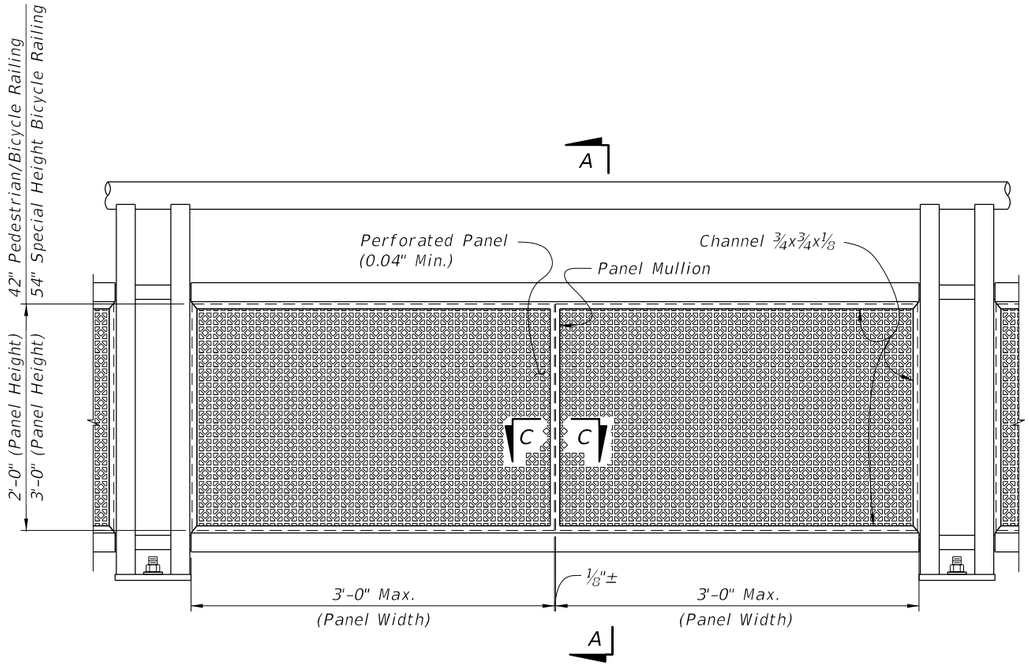


SECTION A-A

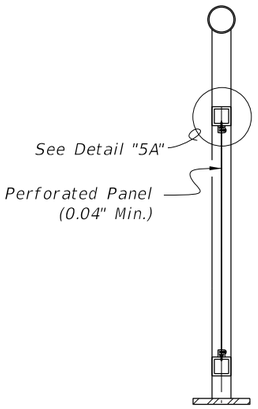
NOTES:

1. See Plans for Infill Panel Option required.

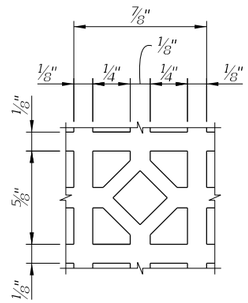
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/11			FDOT DESIGN STANDARDS FY 2012/2013	ALUMINUM PEDESTRIAN/BICYCLE RAILING	862	6



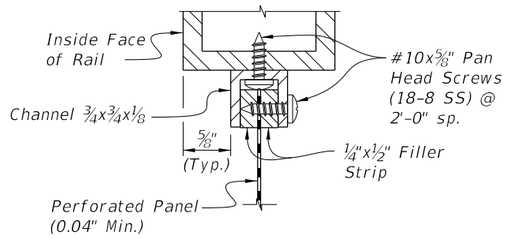
TYPE 5 - PERFORATED INFILL PANEL



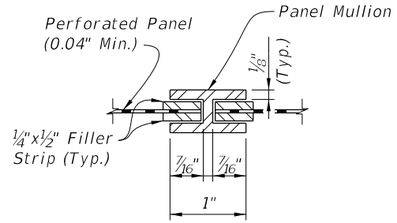
SECTION A-A



REPEATING PATTERN DETAIL
FOR PEFORATED PANEL

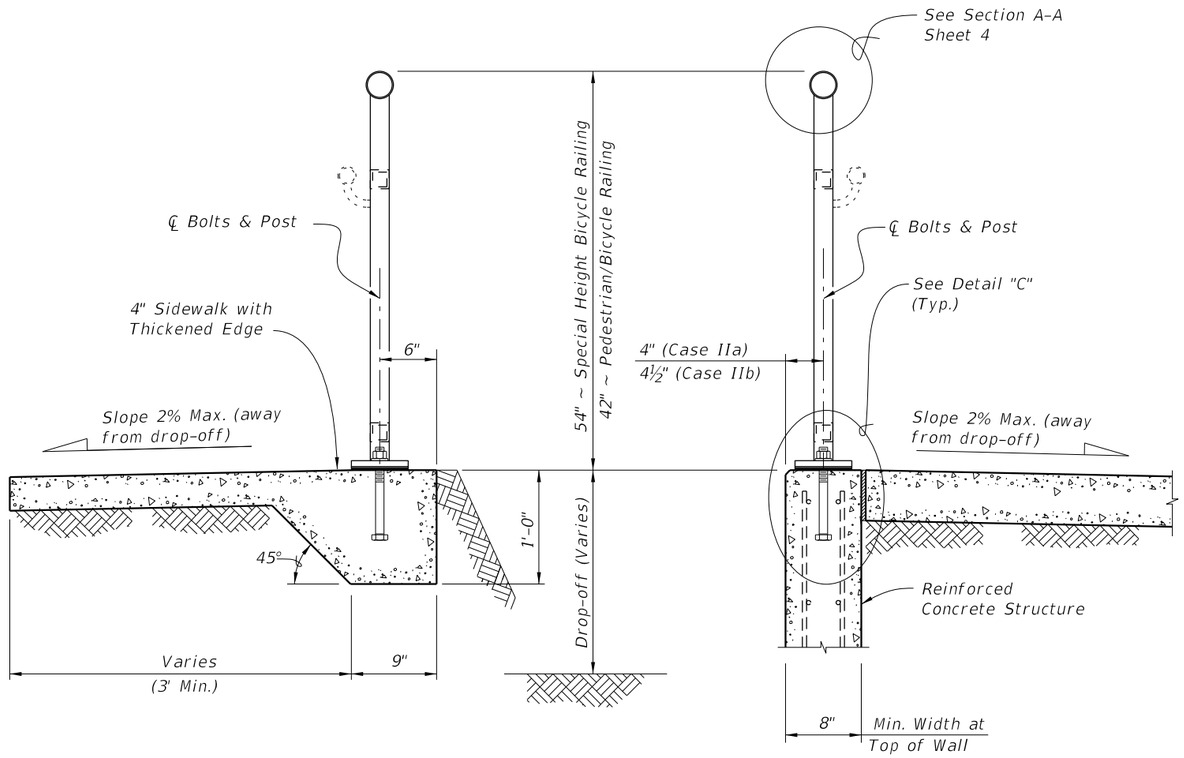


DETAIL "5A"
PANEL/RAIL CONNECTION
(Top Shown, Bottom & Sides Similar)



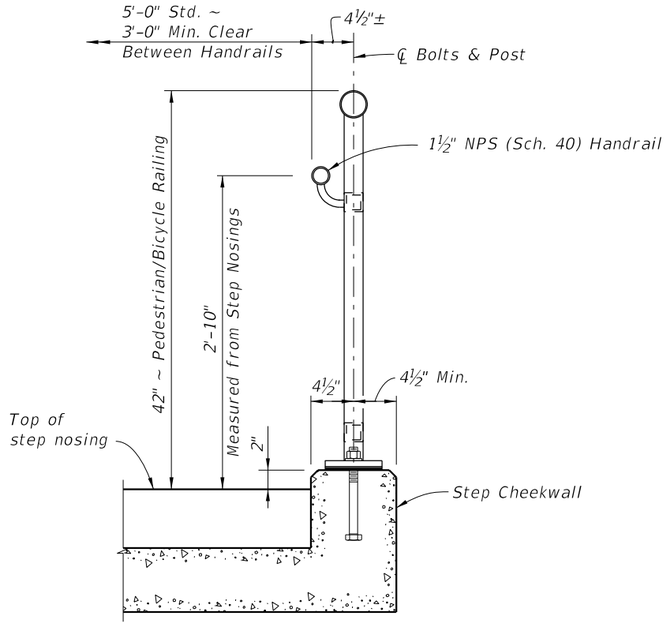
SECTION C-C
PANEL/SPLICE CONNECTION

LAST REVISION	REVISION	DESCRIPTION:				
01/01/11			FDOT DESIGN STANDARDS FY 2012/2013	ALUMINUM PEDESTRIAN/BICYCLE RAILING	INDEX NO. 862	SHEET NO. 7

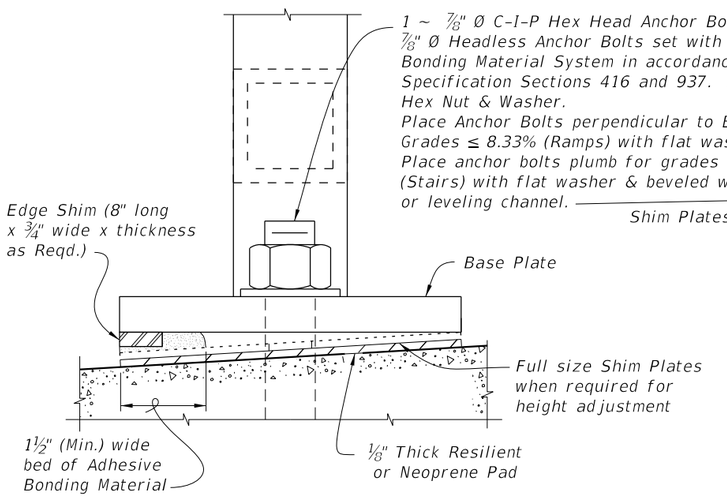


TYPICAL SECTION ON CONCRETE SIDEWALK
(Case I)

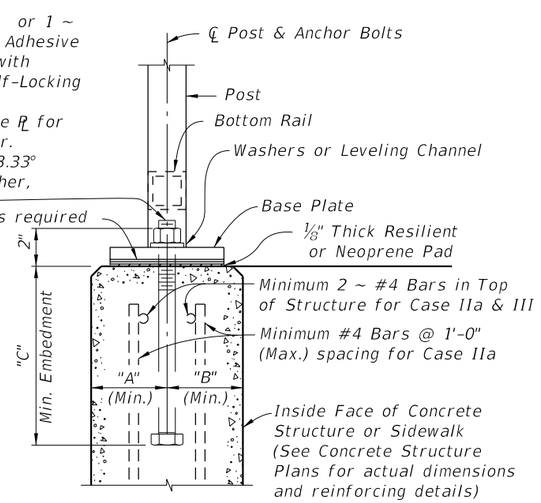
TYPICAL SECTION ON RETAINING WALL
(Case II)



TYPICAL SECTION ON STEPS & STAIRS
(Case III)



DETAIL "D" (OPTIONAL SHIMMING DETAIL
FOR CROSS SLOPE CORRECTION)
(Used in lieu of Beveled Shim Plates)



DETAIL "C"
(Cast-In-Place Anchor Bolts shown,
Adhesive Anchors similar)

ANCHOR BOLT TABLE							
CASE	STRUCTURE TYPE	DIMENSIONS			ANCHOR LENGTH		ANCHOR SIZE
		"A" Edge Dist.	"B" Edge Dist.	"C" Embedment	C.I.P Hex Head Bolt	Adhesive Anchor	
I	Unreinforced Concrete	6"	1'-2"	9"	10½"	11"	⅞" Ø
IIa	Reinforced Concrete	4"	4"	9"	10½"	11"	⅞" Ø
IIb	Gravity Wall Index No. 6011	4½"	3½" @ top	1'-0" *	1'-1½"	1'-2"	⅞" Ø
III	Step Cheekwall	4½"	4½"	9"	10½"	11"	⅞" Ø

* Embedment length "C" may be reduced to 9" for the 42" height railings for Case IIb, when the post spacing does not exceed 5'-0".

LAST REVISION	REVISION	DESCRIPTION:				
01/01/11			FDOT DESIGN STANDARDS FY 2012/2013	ALUMINUM PEDESTRIAN/BICYCLE RAILING	INDEX NO. 862	SHEET NO. 8