


DESIGN STANDARDS

FOR DESIGN, CONSTRUCTION, MAINTENANCE AND UTILITY
OPERATIONS ON THE STATE HIGHWAY SYSTEM

2010

TOPIC NO. 625-010-003

Approved For Use On Federal Aid Projects


For Martin Knopp, Division Administrator

State of Florida, Department Of Transportation
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I hereby certify that this Design Standard Book was compiled under my responsible charge from designs prepared, examined, adopted and implemented by the Florida Department of Transportation in accordance with established procedures, and as approved by the Federal Highway Administration.

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**Revisions
Design Standards 2010**

Index Number	Sheet Number	Description	Index Number	Sheet Number	Description
001	1 thru 3	Added the following standard abbreviations: B Base Line, Base Line Control F Flow Line GRI Geosynthetic Research Institute HDPE High Density Polyethylene NPS Nominal Pipe Size Deleted the following standard abbreviations: Bbl Barrel FRCP Fiber Reinforced Concrete Pipe FRP Fiber Reinforced Pipe FS Far Side	233	1 thru 2	Index was expanded due to font size change.
			234	1 thru 2	Index was expanded due to font size change.
				2 of 2	Under Pavement & Sodding detail changed "1/2" Exp. Joint" to "1/2" Preformed Joint Filler".
			235	1 of 2	"GENERAL NOTES", Note 3, deleted "Alternate B" replaced with "Index 200"; Note 8 changed "Specification Section 962" to "Specification Section 975".
			245	1 of 1	"GENERAL NOTES" Note 2, delete and replace with the following: "Concrete shall be Class I (Structural), except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications. Box shall be reinforced with No. 3 bars (Grade 60) on 8" centers both ways, sides and bottom.
002	2 of 3	Deleted Hand Drafting Symbols			
102	2 of 3	NOTES FOR SYNTHETIC BALES OR BALE TYPE BARRIERS, Note 2, deleted the text "trenched 3" to 4" and" from the first sentence.	250	1 of 2	"GENERAL NOTES" Note 5, deleted and replaced with the following: "Concrete shall be Class I (Structural), except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications."
104	2 of 2	RURAL DIVIDED detail, changed "5' Shoulder Pavement" to "4' Shoulder Pavement".			
105	1 of 1	TREATMENT I, Criteria for using Treatment I, replaced text of the last bullet with the following: "resurfacing build-up is less than 3" "	251	1 of 2	"GENERAL NOTES" Note 4, deleted and replaced with the following: "Concrete shall be Class II, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications."
200	1 of 5	TOP SLAB REINFORCING STEEL DIAGRAM (ALTERNATE B) to the notes "2 Additional Bars A @ 5" O.C." and "2 Additional Bars B @ 5" Max. O.C. Each Side Of Opening", added "(Minimum #4 Bars)".	252	1 of 2	"GENERAL NOTES" Note 4, deleted and replaced with the following: "Concrete shall be Class II, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications."
	2 of 5	Note 9, Delete second sentence and substitute, "Additional bars used to restrain hole formers for precast structures with grouted pipe connections, may be left flush with the hole surface."	253	1 of 2	"GENERAL NOTES" Note 4, deleted and replaced with the following: "Concrete shall be Class II, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications."
	4 of 5	SLAB AND WALL DESIGN TABLE NOTES, added the following to the end of Note 10: "See Index No. 201, Sheet 4 for allowable bar spacing adjustments when larger areas of reinforcing are substituted."	255	1 of 2	"GENERAL NOTES" Note 4, deleted and replaced with the following: "Concrete shall be Class II, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications."
201	4 of 5	"Revised title of notes to ""NOTES FOR PRECAST OPTIONS AND EQUIVALENT REINFORCEMENT SUBSTITUTION"" and added the following to Note 4, ""When an increased area of reinforcing is provided, then the maximum bar spacing may be increased by the squared ratio of increased steel area, but not to exceed 12 inches: Max. Bar Spacing Provided < Max. Bar Spacing Required x (Steel Area Provided/Min. Steel Area Required) ² "	260	1 of 1	"GENERAL NOTES" Note 3 changed "Specification Section 962" to "Specification Section 975".
205	1 of 6	Changed maximum size of allowed PVC pipe to 36".	261	1 of 3	"GENERAL NOTES" Note 4 changed "Specification Section 962" to "Specification Section 975".
	2 of 6	ROUND PIPE DIMENSIONS, deleted the column, "Wall Thickness (In.) Class III" and subcolumn "NRCHP" and heading "SRCP". Also deleted the ** note at the bottom of the table.	264	1 thru 2	Index was expanded due to font size change. General note 3 changed.
	3 of 6	NOTES: deleted note 4; table "PIPE ARCH: SPIRAL RIB: 3/4" x 3/4" x 7 1/2" RIB SPACING..." deleted references to note 4; table "ROUND PIPE - SPIRAL RIB", "Maximum Height of Fill (Ft.)", "Sheet Thickness In Inches (Gage)", "0.138 (10)" added measurements.	270	1 of 1	"GENERAL NOTES" Note 2 changed "Specification Section 941-1.5" to "Specification Section 449". Changed Note 3.
210	1 of 1	Delete General Note 4, and substitute the following: "For precast units the rear wall and apron may be precast as a separate piece from the top slab. Provide a minimum of 7 ~ #4 dowels in accordance with Index No. 201 "OPTIONAL CONSTRUCTION JOINTS".	272	6 of 6	Reordered "GENERAL NOTES" and changed "Class I concrete" to "Class NS concrete".
			273	1 thru 7	Index was expanded due to font size change.
				7 of 7	"GENERAL NOTES", Note 8, deleted "Class I concrete" and substituted "Class NS concrete".
211	1 thru 5	Revised index completely 3 sheets added, Reinforcing configuration and C.I.P. details revised; precast and WWR details added. Changed Note 4 to allow 4'-0" round risers.	280	1 thru 3	Index was expanded due to font size change.
213	1 of 1	In PLAN view changed "1/2" Exp. Joint (Typ)" to "1/2" Preformed Joint Filler (Typ)".		1 of 3	"DISSIMILAR TYPES CONCRETE JACKET FOR CONNECTING DISSIMILAR TYPES OF PIPE AND CONCRETE PIPES WITH DISSIMILAR JOINTS" detail, added the note, "Alternate connection must be approved by the State Drainage Engineer."
218	2 of 2	"STEEL GRATE", "TOP VIEW", for the overall dimension on the left side of the grate, inserted "44 1/4" ". For the small dimension at the upper left corner of the grate, inserted "3 1/2" ".	282	1 thru 3	Index was expanded due to font size change.
219	1 of 2	In PLAN view and Section HH changed "Expansion Joint (Typ)" and "Expansion Material Joint" to "1/2" Preformed Joint Filler (Typ)".		1 of 3	"FRONT ELEVATION" and "SECTION AA" details changed "1/2" Exp. Matl. " to "1/2" Preformed Joint Filler".
220	1 of 3	"GUTTER INLET TYPE S", "SECTION BB", Changed the vertical dimension between the top of the inlet and the grate elevation from "5 1/2" to "4 1/2" ". "SECTION AA", at the top right corner, for precast thickness changed " 6" " to " 3" " (same as left side). "SECTION BB", at the top, changed "3'-11" Precast" to " 4'-3" Precast". "PLAN", at the top, changed " 3'-11" Precast to " 4'-3" Precast".	284	2 of 3	"PLAN" and "SECTION AA" details changed "1/2" Exp. Matl. " to "1/2" Preformed Joint Filler".
			287	1 of 1	Deleted note "1" and substituted the following: "1. Spillway to be paid for as Shoulder Gutter, LF." Deleted note "2", and substituted the following: "2. If spillway empties into an unpaved ditch the detail should be modified as necessary."
			287	1 thru 4	Sheet 3 is new. Renumbered other sheets.
				1 of 4	Changed all 3 occurrences of "Class I concrete" to "Class NS concrete".
			288	1 of 1	New Index added "DEEP WELL INJECTION BOX".
230	1 of 2	In "PLAN" view changed "1/2" Exp. Joint (typ)" to "1/2" Preformed Joint Filler (Typ)". Section E-E, Changed 4Z15.9 shape to built up section (3.5 x 3 x 1/2 L + 1/2 x 3 Bar) for grating.	289	6 of 7	Changed "FLARED ENDWALL" to "FLARED WINGWALL" and "STRAIGHT ENDWALL" to "STRAIGHT WINGWALL".
231	1 of 3	"DITCH BOTTOM INLET TYPE B", "SECTION BB", upper left side, deleted the dimension "2'-6" (Min.)" and replaced with "1'-10" (Min.)".	291	1 of 5	Changed "Class I Concrete" to "Class NS".
232	1 thru 7	Index was expanded due to font size change.		5 of 5	Changed "Bond Beam" to "Link Slab", and "Class I Concrete" to "Class NS".
			292	2 of 14	"GENERAL NOTES" note 1, changed AASHTO LRFD Bridge Specifications, to "4th Edition"; added note 10.

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Index Number	Sheet Number	Description	Index Number	Sheet Number	Description
295	1 of 1	"GENERAL NOTES" Note 2 changed "Specification Section 962" to "Specification Section 975".	421	1 of 3	Changed REFLECTIVE RAILING MARKERS note, "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing along the centerline at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."
300	1 thru 2	Index was expanded due to change in font.			
304	6 of 6	Added alternate location of detectable warnings on linear ramps. Added note "On curb ramps, landings and flush transitions perpendicular to the curb line: Rows of domes shall be aligned with the centerline of the ramp. (See Pictorial View A)" at top of sheet. Added Rail Road Crossing PLAN view.	422	1 of 3	Added the following to the NAME, DATE AND BRIDGE NUMBER note: "The Name shall be as shown in the General Notes in the Structures Plans."; Changed REFLECTIVE RAILING MARKERS note.
305	1 & 4 of 4	Deleted bar spacing table and revised notes (Sheet 1); Changed width of outside lanes (Sheet 4).			Changed REFLECTIVE RAILING MARKERS note, "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."
307	2 of 3	"UTILITY CONFLICT PIPES THRU STORM SEWER STRUCTURES" changed to "UTILITY CONFLICT PIPES THRU STORM DRAIN STRUCTURES"			
310	1 of 2	"SIDEWALK WITH EDGE BEAM FOR SURFACE MOUNTED RAILINGS", "Clear Width", deleted "3' Min." and substituted "4' Min. *".	423	1 of 3	Added the following to the NAME, DATE AND BRIDGE NUMBER note: "The Name shall be as shown in the General Notes in the Structures Plans."; Bicycle Railing to "Special Height Bicycle Railing" and Post "B" to Post "B1".
		"NOTES FOR CONCRETE SIDEWALK ON CURBED ROADWAYS", deleted "Note 1", and substituted the following: "1. Sidewalks shall be constructed in accordance with Section 522 of the FDOT Standard Specifications. Public sidewalk curb ramps shall include detectable warnings and be constructed in accordance with Index No. 304. Detectable warnings are not required where sidewalks intersect urban flared turnouts."			"TRAFFIC RAILING-(32" VERTICAL SHAPE)", deleted the "REFLECTIVE RAILING MARKERS" note and substituted the following: "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."
		"Note 3" , deleted.		2 of 3	Changed Bicycle Railing to "Special Height Bicycle Railing" and Post "B" to Post "B1".
	2 of 2	"NOTES FOR CONCRETE SIDEWALKS ON UNCURBED ROADWAYS", Changed Note 2 to "Provide detectable warnings that extend the fullwidth of the sidewalk and 24" deep from the edge of pavement where sidewalks adjoin the following vehicular ways: side roads and streets driveways with signalized entrances driveways with entrance volumes greater than 600 vpd driveways with entrance speeds of 25 mph or greater right in - right out composite driveways.		3 of 3	Changed 83 degrees to 93 degrees in CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM Cross-slope table.
400	1 thru 26	Index expanded by one sheet due to font size change and added new sheet 2, "APPROACH END ANCHORAGE DETAILS", Index renumbered.	424	1 of 7	Added the following to the NAME, DATE AND BRIDGE NUMBER note: "The Name shall be as shown in the General Notes in the Structures Plans."
	1 of 26	"GENERAL NOTES" Note 17 changed "Specification Section 971" to "Specification Section 975".	425	1 of 3	"TRAFFIC RAILING - (CORRAL SHAPE)", deleted the "REFLECTIVE RAILING MARKERS" note and substituted the following: "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."
	2 of 26	New sheet added showing limits of pay for guardrail, details of shoulder treatment and miscellaneous asphalt for guardrail approach end treatments.			Added the following to the NAME, DATE AND BRIDGE NUMBER note: "The Name shall be as shown in the General Notes in the Structures Plans."
	3 of 26	Corrected spelling of guardrail in last paragraph.			"TRAFFIC RAILING - (42" F SHAPE)", added the following note: "REFLECTIVE RAILING MARKERS: Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."
	15 of 26	"LOCATIONS ON FRONT SLOPES", deleted the details for guardrail on slope and rubrail termination and the chart for lateral placement on slopes. (See sheet 26)			
	16 of 26	Deleted "REFLECTORS- DETAIL M" (See sheet 17)			
	26 of 26	Added "GUARDRAIL ON SLOPES", details for guardrail on slope and rubrail termination and the chart for lateral placement on slopes.	470	1 of 3	Added Field testing proof loads to the ADHESIVE BONDED ANCHORS AND DWELS note; "TRAFFIC RAILING-(THRIE BEAM RETROFIT) GENERAL NOTES & DETAILS", deleted the "BRIDGE NAME PLATE" note and substituted the following: "If a portion of the existing Traffic Railing is to be removed that carries the bridge name, number and or date, or if the installation of the Traffic Railing (Thrie Beam Retrofit) will obscure the bridge name, number and or date, then replace the information that has been removed or obscured, with 3" tall black lettering on white nonreflective sheeting applied to the top of the adjacent guardrail. The information must be clearly visible from the right side of the approaching travel lane. The sheeting and adhesive backing shall comply with Specification Section 994 and may comprise of individual decals of letters and numbers."
410	1 thru 25	Index completely revised and reorganized.			
411	2 of 10	Changed tangent offsets In Detail 'A' to "2.49'-Design Speed ≤45 mph; 1.76' - Design Speed ≥50 mph".			
	4 of 10	Changed tangent offsets In Detail 'B' to "2.49'-Design Speed ≤45 mph; 1.76' - Design Speed ≥50 mph".			
414	1 of 15	Updated Specification reference Section 971 to 975; Added steel option to ALTERNATE DESIGN note.			
	5 of 15	Added PTFE tape option to anchor bolt details.			
415	4 of 10	"NOTES FOR WALL END SHIELDING", Note 1, changed the second sentence to: "Except where the plans designate a particular type crash cushion for a specific location, the contractor has the option to construct any of the redirective crash cushions listed on the Qualified Products List, subject to the uses and limitations described on their respective drawings."		3 of 3	Added the following note: "NEOPRENE PADS: Neoprene pads must be plain pads with a durometer hardness of 60 or 70 and meet the requirements of Specification Section 932, except that testing of the finished pad will not be required."
		"ANCHOR PLATE BDLTS", upper note, changed "?" to "3/4"."	471	2 of 4	Changed offset of 7/8" dia. anchor bolts to 2 3/4" from back edge of base plate in SECTION B-B.
420	1 of 3	Added the following to the NAME, DATE AND BRIDGE NUMBER note: "The Name shall be as shown in the General Notes in the Structures Plans."; Changed REFLECTIVE RAILING MARKERS note.	472	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".
		Changed REFLECTIVE RAILING MARKERS note, "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing."	473	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".
			474	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".
				4 of 4	"SECTION C-C", changed "Resilient Pad" to "Neoprene Pad".

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Index Number	Sheet Number	Description	Index Number	Sheet Number	Description
475	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".	600	3 of 13	LANE WIDTHS, in the second sentence, change the word "expected" to "excepted".
476	2 of 4	"SECTION A-A" and "SECTION B-B", changed "Resilient Pad" to "Neoprene Pad".		5 of 13	Changed note under "SIGN COVERING AND INTERMITTENT WORK STOPPAGE SIGNING"; added information for the use of the new "PROJECT INFORMATION SIGN".
480	1 of 2	"TRAFFIC RAILING-(VERTICAL FACE RETROFIT) GENERAL NOTES & DETAILS", added the following to the "ADHESIVE-BONDED ANCHORS AND DOWELS" note, "The field testing proof loads required by Specification Section 416 shall be 23,800 lbs. for Dowel Bars 6D on the inside face (traffic side) of the railing (1'-0" embedment) and 18,500 lbs for Dowel Bars 6D along the outside face of the traffic railing (5" min. embedment)." Added NEOPRENE PADS note. Also deleted the "REFLECTIVE RAILING MARKERS" note and substituted the following: "Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table below. Reflector color (white or yellow) shall match the color of the near edgeline."		6 of 13	GENERAL NOTES, deleted note 1, substituted the following: "1. All signs shall be post mounted when work operations exceed one day except for: a) Road closure signs mounted in accordance with the vendor drawing for the Type III Barricade shown on the QPL. b) Pedestrian advanced warning or regulatory signs mounted on sign supports shown on the QPL." "2 POST SIGN SUPPORT MOUNTING DETAILS", updated text to include a tolerance between sign supports. Insert "+/- 3" " after "1'-6" " and insert "+/- 6" " after "2'-6" " . POST AND FOUNDATION TABLE FOR WORK ZONE SIGNS, expanded Note 2 by adding: "unless otherwise specified in the vendor drawing on the QPL."
	2 of 2	CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM, added Bars 5E, 5F and 4G for Index No. 484			POST MOUNTED SIGN NOTES, added new notes 1 and 12.
484	1-10 of 10	New Index added TRAFFIC RAILING (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH		7 of 13	Added new sheet showing Project Information Sign and renumbered index.
500	2 of 2	"HALF SECTION" detail, deleted "Storm Sewer Mains" replaced with "Storm Drain Trunk Lines"			
501	3-9 of 9	Changed the REQUIRED TEST METHOD for Burst Strength, Soil-Geosynthetic Friction, Creep Reduction Factor & Joint Overlap to ASTM D 6706.	605	1 of 1	"GENERAL NOTES", deleted the text of "Note 8" and substituted the following: "The two channelizing devices directly in front and directly at the end of the work area may be omitted provided vehicles in the work area have high intensity rotating, flashing, oscillating or strobe lights operating." Added new heading "DURATION NOTE" and placed the following note under this heading: 1. ROAD WORK AHEAD sign may be omitted if all of the following conditions are met: a) Work operations are 60 minutes or less. b) Speed is 45 mph or less. c) No sight obstructions to vehicles approaching the work area for a distance of 600 feet. d) Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating. e) Volume and complexity of the roadway has been considered.
	4 of 9	Updated values for COMTRAC 70.70; Deleted AMOCD 2006, 2016 & 2044; Added GEOTEX 315ST, 2x2HF, 4x4, 3x3HF, 4x4HF & 4x6 woven geogrids.			
	5 of 9	Changed Joint Strength Overlap value to 1.2 for all Marafi products.			
	6 of 9	Deleted Application Usage 3 & 4 for SYNTEN SF 11 & SF 12.			
	7 of 9	Added Fornir 20			
	8 of 9	Changed Creep Resistance and Creep Reduction Factors for TENSAR BX 1120, BX 1200, BX 1220 & BX 1500			
	9 of 9	Updated values for TENAX MS 220 & TENAX MS 330. Added Combigrid 30/30, Secugrid 20/20 & 30/30 extruded geogrids.	625	1 of 1	New Index added "TEMPORARY ROAD CLOSURE- 5 MINUTES OR LESS".
505	1-4 of 4	Sheet 3 is new. Renumbered other sheets.	655	1-3 of 3	New Index added "TRAFFIC PACING-LIMITED ACCESS".
515	5 of 7	In second symbolized note changed "Section 102-6" to "Section 102-8".	667	1-6 of 6	New Index added "TOLL PLAZAS".
	6 of 7	"PAVEMENT STRUCTURE FOR TURNOUTS AND AUXILIARY LANES TABLE 515-1", "NOTES", Note 5, Deleted "Class I concrete" substituted "Class NS concrete".	801	1 of 3	"GENERAL NOTES", Note 15 and 21, deleted "Class I" and substituted "Class NS".
518	3 of 3	Revised width of rigid pavement outside travellane and changed location of rumble strip.	802	1-3 of 3	Added tolerance to ground clearance; revised Notes 7a and 7b; rearranged sheets.
520	1 of 1	"GENERAL NOTES", Note 7, Deleted "Class I Concrete (Retaining Walls)" and substituted "Class NS Concrete"		1 of 3	"GENERAL NOTES", Note 6 and 13, deleted "Class I concrete" and substituted "Class NS concrete" for all occurrences.
546	1 of 6	Added detail "PLAN", "PICTORIAL" and ** note. Index sheets reordered.	803	1 of 1	"GENERAL NOTES", Note 4, deleted both occurrences of "Class I" and substituted "Class NS".
	5 of 6	Under "NOTES FOR 4-LANE DIVIDED ROADWAY", Note 1, changed reference from "Sheet 6" to "Sheet 2".	810	2 of 4	Deleted "Section 971" and substituted "Section 975" in ANCHOR RODS, NUTS AND WASHERS note.
600	2 of 13	OVERHEAD WORK, deleted "OPTION 4 - - -" and substituted the following: OPTION 4 (OVERHEAD WORK MAINTAINING TRAFFIC WITH NO ENCROACHMENT BELOW THE OVERHEAD WORK AREA) Traffic shall be detoured, shifted, diverted or paced as to not encroach in the area directly below the overhead work operations in accordance with the appropriate standard index drawing or detailed in the plans. This option applies to, but not limited to, the following construction activities: (a) Beam, girder and segment placement. (b) Deck form placement and removal. (c) Concrete deck placement. (d) Railing construction located at edge of deck. (e) Structure demolition. DEFINITIONS, added the following after definition of TRAVEL WAY: a. Travel Lane: The designated widths of roadway pavement marked to carry through traffic and to separate it from opposing traffic or traffic occupying other lanes. b. Auxiliary Lane: The designated widths of roadway pavement marked to separate speed change, turning, passing and climbing maneuvers from through traffic. CLEAR ZONE WIDTHS FOR WORK ZONES, deleted the text "travel" in the first sentence and substituted "traffic". Replaced chart "CLEAR ZONE WIDTHS FOR WORK ZONES".	811	3 of 3	Deleted "Section 971" and substituted "Section 975" in ANCHOR RODS, NUTS AND WASHERS note.
			812	2 of 4	Deleted "Section 971" and substituted "Section 975" in ANCHOR RODS, NUTS AND WASHERS note.
			820	1 of 1	Changed Top Rail to "Special Height Bicycle Railing" and added new Post "B2" for 3'-6" height Pedestrian/Bicycle Railing.
			821	1 of 1	Changed designation of 4'-6" tall railing to "Special Height Bicycle Railing" and added 3'-6" tall Pedestrian/Bicycle Railing.
			822	1 of 2	Changed designation of 4'-6" tall railing to "Special Height Bicycle Railing" and "Post B" to "Post B1"; Added "Post B2" details.
			850	1 of 5	Changed "Pedestrian Railing" to "Pedestrian/Bicycle Railing" and "Bicycle Railing" to "Special Height Bicycle Railing"; Added anchor bolt requirements to SHOP DRAWINGS note.
				2 of 5	Added "DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS" detail. Changed Pedestrian and Bicycle Railing designation; maximum ramp length for slopes less than 6.25%; and minimum clear picket opening at post to 3/4".
				3 of 5	Changed Pedestrian and Bicycle Railing designation.
				4 of 5	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAILS "D" & "E", option to notch post in SECTION G-G, and 1/4" joint tolerance in DETAIL "D".
				5 of 5	Added DETAIL "F" and note (*) to ANCHOR BOLT TABLE. Changed Pedestrian and Bicycle Railing designation. Corrected height dimension on steps to top of nosing.

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Index Number	Sheet Number	Description	Index Number	Sheet Number	Description
851	1 of 2	Changed Pedestrian and Bicycle Railing designation.	5204	1 of 1	Changed "Ribbed" to "Slotted" in PLUG DETAIL.
	2 of 2	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAIL "B". Changed field splice joint tolerance to 1/4" in DETAIL "B".	5205	1, 3, 4 & 6 of 7	Added note in Elevation Views to 'Extend post 2" above high side wall panel when post caps are shown in the plans'.
860	1 of 5	Changed "Pedestrian Railing" to "Pedestrian/Bicycle Railing" and "Bicycle Railing" to "Special Height Bicycle Railing"; Added anchor bolt requirements to SHOP DRAWINGS note. Added filler metal ER4043 to WELDING note.		2 of 7	Added tolerance between Top of Precast Collar and Auger Cast Pile; Changed "Composite Bearing Pads" to "Fiber Reinforced Bearing Pads".
	2 of 5	Added "DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS" detail. Changed Pedestrian and Bicycle Railing designation; maximum ramp length for slopes less than 6.25%; and minimum clear picket opening at post to 3/4".		5 of 7	Changed "Composite Bearing Pads" to "Fiber Reinforced Bearing Pads".
	3 of 5	Changed Pedestrian and Bicycle Railing designation.	5206	7 of 7	Added "Octagonal Precast Collar" details and tolerance between Top of Precast Collar and Auger Cast Pile; Changed "Composite Bearing Pads" to "Fiber Reinforced Bearing Pads".
	4 of 5	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAILS "D" & "E"; option to notch post in SECTION G-G; 1/4" joint tolerance in DETAIL "D"; Type B (Nonwelded) connection detail in SECTION A-A. Changed Expansion Joint sleeve embedded length to 10" in DETAIL "D" and picket fillet weld size to 1/8", handrail and top rail fillet weld size to 1/4", and base plate fillet weld size to 3/8".	5207	1 of 1	Added "POST LENGTH WITH CAP" column, BARS D, P5 thru P8 to table and bar bending details for corner posts.
	5 of 5	Added DETAIL "F" and note (*) to ANCHOR BOLT TABLE. Changed Pedestrian and Bicycle Railing designation. Corrected height dimension on steps to top of nosing.	5210	1 of 1	New Index added "PRECAST SOUND BARRIERS-PRECAST POST CAPITAL".
861	1 of 2	Changed designation of 54" tall railing to "Special Height Bicycle Railing".	5211	2 of 5	Changed NAME, DATE AND BRIDGE NUMBER note, and "Ribbed" to "Slotted" in NEOPRENE DIAPHRAGM PLUG DETAIL. Added REFLECTIVE RAILING MARKERS note and SELECTIVE RAILING MARKER SPACING table.
	2 of 2	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAIL "B". Changed field splice joint tolerance to 1/4" and "Steel Sleeve" to "Aluminum Sleeve" in DETAIL "B".	5212	3 of 3	Changed "Ribbed" to "Slotted" in NEOPRENE DIAPHRAGM PLUG DETAIL. Corrected Anchor Pin diameter on FIRE HOSE ACCESS DETAIL.
870	1 of 5	Deleted Pedestrian and Bicycle designations from DESIGN LIVE LOADS and ALTERNATE DESIGN notes.	5300	2 of 2	Added note for "Full Depth Structural Asphalt" above junction slab and changed coping dimension to 6" Min.
	2 of 5	Deleted 4'-6" Bicycle Railing option and "*" note. Changed maximum ramp length for slopes less than 6.25%.		3 of 19	Increased max. gap at back of precast coping and added timber blocking.
	3 of 5	Deleted 4'-6" Bicycle Railing option.		6 of 19	Added note for "Full Depth Structural Asphalt" above junction slab and increased max. gap at back of precast coping.
	4 of 5	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAILS "D" & "E"; and 1/4" joint tolerance in DETAIL "D". Deleted Intermediate Rails from DETAILS "B" and "C".		7 of 19	Added note for "Full Depth Structural Asphalt" above junction slab.
	5 of 5	Added DETAIL "F". Deleted 4'-6" Bicycle Railing option. Corrected height dimension on steps to top of nosing.	11200	12 & 15 of 19	Increased max. gap at back of precast coping. Corrected size of Bar 5U1 in BILL OF REINFORCING TABLE
880	1 of 5	Deleted Pedestrian and Bicycle designations from DESIGN LIVE LOADS and ALTERNATE DESIGN notes.		1-2 of 2	Deleted sheet 2
	2 of 5	Deleted 4'-6" Bicycle Railing option and "*" note. Changed maximum ramp length for slopes less than 6.25%.		1 of 2	Revised and rearranged notes, sheet renumbered to 1 of 2.
	3 of 5	Deleted 4'-6" Bicycle Railing option.	11300	2 of 2	Renumbered sheet 3 of 3 to sheet 2 of 2 revised and rearranged notes. Deleted "Class 1 (Special) Concrete" replaced with "Class 1 Concrete".
	4 of 5	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAILS "D" & "E"; and 1/4" joint tolerance in DETAIL "D". Deleted Intermediate Rails from DETAILS "B" and "C".	11310	1 of 1	Hanger table values revised; connection bolt size revised; sign depth for horizontal splice changed to 10'. U-Bolt material spec (A325) added to Typical Detail of Sign & Truss Connection.
	5 of 5	Added DETAIL "F". Deleted 4'-6" Bicycle Railing option. Corrected height dimension on steps to top of nosing.	11320	1 of 5	Deleted A307 bolts and Palnut (Note 4e). Changed foundation concrete (Note 7). Changed to 1/2" mesh (Note 9). Deleted grout pad and notes (former Notes 7c & 9). Added CSL tube note (Note 14).
5100	2 of 2	Changed to plastic sleeve expansion joint and "Premoulded Expansion Material" to "Preformed Joint Filler". Changed wall and expansion joint key.		2 of 5	Changed foundation standoff distance and changed drilled shaft detail. Deleted grout pad and added wire screen. Added CSL tubes. Changed FC & FL reinforcing.
5200	1 of 1	Post caps added to note C.1.b; Changed note K.2 to allow 8 ft height panels. Added note K.11; Changed notes H.1, H.2 and D.2; Deleted note H.3.		5 of 5	Changed bolt spacing connection details.
5201	1 of 1	Texture Type "I" (Cut Coral Block) added.		1 of 5	Deleted A307 bolts and Palnut (Note 4e). Changed foundation concrete (Note 7). Changed to 1/2" mesh (Note 9). Deleted grout pad and notes (former Notes 7c & 9). Added CSL tube note (Note 14).
5202	1 of 4	Added precast post cap; Changed clearance tolerance on stepped panel and Neoprene Pad options.		2 of 5	Changed foundation standoff distance. Deleted grout pad and added wire screen.
	3 of 4	Changed #4 Bar Mark to Bars P5 and P6 for Pile/Post Options A, B, & E; changed Texture Thickness to 1 1/4" Max.		4 of 5	Changed bolt spacing connection details.
5203	1 of 5	Added precast post cap; Changed clearance tolerance on stepped panel and Neoprene Pad options.		5 of 5	Changed drilled shaft detail. Added CSL tubes.
	3 of 5	Changed #4 Bar Mark to Bars P5 & P6 for Pile/Post Options A, B & E, and changed texture thickness dimension to 1/4" Max.	11860	1 of 8	Changed SINGLE COLUMN GROUND SIGN NOTES, Note 11, and GUIDE TO USE THIS STANDARD, Note 4 and example. Modified concrete classification. Modified "ALUMINUM COLUMN (POST) SELECTION TABLE".
	4 of 5	New sheet added for 45 degree corner post.		2 of 8	Changed maximum limits of sign cluster area and width in NOTE.
	5 of 5	Renumbered from Sheet 4 of 4.		3 of 8	Added Aluminum Soil Plate details and notes. Changed Post and Foundation Table depth values. Modified "ALUMINUM COLUMN (POST) SELECTION TABLE".
				4 of 8	Deleted "Signs at 90°" note. Added "For" note. Changed number of Z-brackets for STOP and RECTANGULAR sign. Changed '1" Min.' to '0" Min.' and sign panel edge distance in VIEW A-A. Modified U-bolt size. Changed panel overhang length.
			17302	5 of 8	Modified "DRIVEN POST DETAIL IN CONCRETE".
			17328	1 of 1	CASE II, and CASE VIII dimensions and notes revised.
				1 of 1	Weigh Station and combination Weigh Station and Inspection Station signing details separated.

**Revisions
Design Standards 2010**

Index Number	Sheet Number	Description	Index Number	Sheet Number	Description
17344	2, 3, 4 & 6 of 6	SCHOOL SIGNS AND MARKINGS, on each sheet, in the Distance table at the bottom of the sheet, deleted the "A" column. Also deleted the "A" dimension from the detail drawings.	17725	1 of 2	Round pole note revised; pole height dimensions added to Type P-III through P-VIII; Copper Ground note changed.
17345	2 of 4	NORMAL TAPERED ENTRANCE WITH ADDED LANE, note in lower left corner, arrow now points to the reflective markers on the LEFT side of the ramp.		2 of 2	Notes revised and rearranged, D(feet) changed to H(feet) in both tables.
	4 of 4	Deleted note 2	17727	1-2 of 2	Schedule 40 aluminum pipe (T6061) added as an alternate to stainless steel pipe in assembly details and signalhead notes. Added backplates to signalhead details.
17346	1-14 of 14	Completely revised and renumbered.	17736	1 of 1	Added notes 5 & 6.
17347	1-4 of 4	New Index BICYCLE MARKINGS added.	17743	1 of 3	Updated assembly dimensions. Changed drilled shaft reinforcing.
17349	1 of 1	Case I and Case II revised; 18" x 18" marker detail revised; notes at bottom right revised.		2 of 3	Updated assembly dimensions. Changed drilled shaft reinforcing. Changed T3-BF.
17355	1 of 11	Revised signs FTP-9A-06 & FTP-9B-06 and notes.		3 of 3	Updated assembly dimensions. Changed drilled shaft reinforcing.
	7 of 11	For all signs with 1-800 phone number, deleted "1-800-998-RIDE" and substituted "1-8XX-XXX-XXXX" and below each sign added note: "Design Project Manager or Transit Administrator will supply correct 1-8XX number".	17745	1 of 5	QPL requirements added in new note 17; added backplates to pole detail; Notes 6 & 14 revised, deleted note 19.
	8 of 11	Revised sign FTP-68A-06, bolt holes located outside of sign message, notes revised. Sign FTP-69-06 and FTP-68B-06 message and spacing revised.	17748	2 of 5	Revised foundation reinforcing details, Section AA, Section DD and Foundation Plan details.
	9 of 11	Revised sign FTP-82-08 and arrow detail. Added Sign FTP-83-08.		1 of 1	Option 1 deleted and Options 2 and 3 renumbered; Note 1 revised. Added backplates to signalhead displays.
17356	1 of 1	Removed signalhead from detail. Single point attachment details deleted from Index. (Deleted sheet 1.)	17784	1 of 2	Dimensions revised on Figures A & B. Note 5 and Note to Designers revised.
17359	1 of 2	Changed delineators to object markers; revised reference notes; sign W13-1 made optional. RURAL NARROW BRIDGE TREATMENT, changed the DM3L on the right side of the roadways to an DM3R.	17890	2-3 of 3	Added backplates to signalhead displays.
	2 of 2	Notes revised; inserts reorganized	17900	7 of 7	Changed pole type callouts, deleted "N-III" and substituted "P-III".
17500	1 of 3	Deleted concrete pole detail, added METAL POLE DETAIL AND WIRING DIAGRAM.	18111	1-2 of 2	Index totally revised.
	2 of 3	Note 7, deleted "class I Concrete (Miscellaneous)" replaced with "Concrete and reinforcing for slabs around poles and pullboxes shall be included in the price for pullbox or pole."	18113	1-2 of 2	Index totally revised.
	3 of 3	Note 7, deleted "class I Concrete (Miscellaneous)" replaced with "Concrete and reinforcing for slabs around poles and pullboxes shall be included in the price for pullbox or pole."	20110	1 of 1	Changed Insert Detail for Diaphragm Reinforcing.
17501	1 of 1	Deleted note 28.	20199	1 of 1	Changed BEAM CAMBER AND BUILD-UP NOTES.
17502	3 of 7	Changed Note 9. Added Notes 10 & 11. Changed Notes 11 & 12. Deleted grout pad notes (former Notes 4 & 9). Added CSL tube note (Note 11).	20210	2 of 2	Added "Type Q" Epoxy to Note 9.
	4 of 7	Added ID plate and changed base plate thickness. Deleted grout pad. Changed drilled shaft reinforcing.	20299	1 of 1	Changed BEAM CAMBER AND BUILD-UP NOTES.
	5 of 7	Changed Weld symbol in SECTION A-A. Added padlock tab to HANDHOLE RING. Added Section E-E detail and bottom baseplate washer to SECTION C-C. Deleted grout pad and added wire screen. Added CSL tubes.	20500	1 of 1	Added Type C Pads for larger skew ranges. Changed specification of elastomer from "durometer" to "shear modulus".
	6 of 7	Grout notes and details removed, new wire screen.	20501	1 of 1	Changed Note 4.
	7 of 7	Note 3, changed "Concrete class" to "concrete NS"	20502	1 of 1	Changed Note 4.
17503	1 of 1	Index deleted.	20602	1 of 1	Changed EDC location to 1D from tip of pile.
17504	1 of 1	Dimensions 5'-6" added for height of meter base. Pole type changed from type "N" to type "P".	20900	2 of 2	Changed coping width and End Bent lug from 6" to 5½" thickness.
17505	1 of 2	Mercury Vapor Luminaires changed to Induction Luminaires. Luminaire chart deleted, dimensions revised on spacing detail note and added to structure detail.	20910	2 of 2	Changed coping width and End Bent lug from 6" to 5½" thickness.
17515	1 of 8	Added median barrier mounted light poles. Moved notes to sheet 2.	21100	1 of 3	Deleted redundant notes from Specification Section 458.
	2 of 8	New Sheet for Notes. Change Note 7 for QPL Criteria. Modified concrete classification. Added notes for median barrier mounted light pole and foundation.		3 of 3	Changed Sidewalk Cover Plate edge treatment.
	3 of 8	Sheet renumbered from 2 to 3. Added double arm configuration to ARM ELEVATION.	21110	1 of 2	Deleted redundant notes from Specification Section 458. Changed last line of title of bottom left detail to "DECK WITH SLOPES 2% OR GREATER".
	4 of 8	Allowed fusion weld reinforcing cage (*) and changed foundation concrete note. Added 1" dimension to Double Nuts in FOUNDATION. Modified concrete classification. Renumbered sheet from 3 of 3 to 4 of 8.		2 of 2	Changed Sidewalk Cover Plate edge treatment.
	5-8 of 8	New Sheets for median barrier mounted light pole.	21200	1 of 2	Added "Anchor Plate (dashed lines) (provide Design) to ELEVATION VIEW and TYPICAL SECTION. Added design of anchor bolts and accessories.
17600	2 of 3	Added detail for pole foundation to be used only behind guardrail.		2 of 2	Added design of anchor bolts and accessories.
	3 of 3	GENERAL NOTES, note 2, changed "Class II Concrete" to "Class I Concrete"; changed note 4.	21600	1 of 7	Clarified INSTRUCTIONS TO DESIGNER for variable end span lengths.
17723	1 of 3	Changed Note 5i, 6 and 7. Added Note 8. Deleted grout pad and notes (former Notes 4d & 7). Added CSL tube note (Note 9).		3 of 7	Added vertical dimensions between deck surface and underside of bearings, including depth of Truss Panel.
	2 of 3	Changed number of bolts in VIEW B-B, number and size of foundation reinforcing bars, and TABLE OF STRAIN POLE VARIABLES. Added foundation standoff distance and washer for base plate. Deleted grout pad and added wire screen. Added CSL tubes. Changed drilled shaft reinforcing.	21802	1 of 1	Changed "Methyl Methacrylate" to "High Molecular Weight Methacrylate".
	3 of 3	Changed note in VIEW E-E; Added ¼" and ⅜" cable clamps and changed weld criteria. Changed clevis size.	21803	1-2 of 3	Revised call-outs for Grout Outlets; Changed "Methyl Methacrylate" to "High Molecular Weight Methacrylate".
				3 of 3	Shrink wrap deleted from Duct Coupler Detail. Revised call-outs for Duct Couplers; Changed "Methyl Methacrylate" to "High Molecular Weight Methacrylate".

A Area or Amperes
AAA American Automobile Association
AADT Annual Average Daily Traffic
AASHTO American Association Of State Highway Officials
AASHTO American Association Of State Highway And Transportation Officials
ABC Asphalt Base Course
Abd. Abandoned
ABS Acrylonitrile-Butadiene-Styrene Pipe
AC, Ac. Acre
AC or Asph. Conc. Asphaltic Concrete
Accel. Acceleration
ACI American Concrete Institute
Act. Actuated
ADA The Americans With Disabilities Act
Adh. Adhesive
Adj. Adjust
ADT Average Daily Traffic
AFAD Automatted Flagger Assistance Device
Agg. Aggregate
Ah. Ahead
AISC American Institute Of Steel Construction
Alt. Alternate
Al. Aluminum
AM 12:00 Midnight Until 11:59 Noon
ANSI American National Standards Institute
ADS Apparent Opening Size
Appl.. Applied, Application
Apprh. Approach
Approx. Approximate
ARTBA American Road & Transportation Builders Association
Artf. Artificial
Asph. Asphalt
Assem. Assembly
Assn. Association
Assoc. Associate, Association
ASTM American Society For Testing And Materials
ATPB Asphalt Treated Permeable Base
Attn. Attention
Attnuatr. Attenuator
Aux. or Auxil. Auxiliary
Ave. Avenue
AWG American Wire Gauge
AWS American Welding Society
Az Azimuth

B to B Back to Back
Basc. Bascule
Bd. or Bnd. Bond or Bonded
BC Bottle Cap or Bolt Circle
B/C, B.C. Back Of Curb
BCCMP Bituminous Coated Corrugated Metal Pipe Culvert
BCPA Bituminous Coated Pipe Arch Culvert
BCPCMP Bituminous Coated And Paved Corrugated Metal Pipe Culvert
BCPPA Bituminous Coated And Paved Pipe Arch Culvert
BCT Breakaway Cable Terminal
BCWE Base Clearance Water Elevation
BE Buried Electric
Beg. Begin
Bit. Bituminous
Bk. Back
BL, BLC, or B̄ Base Line, Base Line Control
Bldg. Building
Blkhd. Bulkhead
BLDN Begin Length Of Need
Blvd. Boulevard
BM Bench Mark
Bndry. Boundary
Bdr. Border
Bot. Bottom
BO Basin Outlet
BOS Beginning Of Survey
BP Borrow Pit
Bq. Becquerel

Br. Bridge
Brg. Bearing
Brkwy. Breakaway
BT Buried Telephone Cable or Duct
Btfly. Butterfly
BW Barbed Wire, Bottom Width or Both Ways
C Cantilever Length, Cut, Colorless, Coulomb or Cycle Length
°C Degree Celsius
C & G Curb And Gutter
CA Coarse Aggregate
Cap. Capacity
CAP Corrugated Aluminum Pipe
Caps. Capital Letters
CASP Corrugated Aluminized Steel Pipe
CATV Cable Television
CB Catch Basin
CBC Concrete Box Culvert
CBS Concrete Box Structure
CC, C/C, C to C, or C.C. Center to Center, Crash Cushion
CCEW Center to Center Each Way
CCTV Closed-Circuit Television
CD Cross Drain, Cross Direction (Geotextiles)
cd Candela
Cem. Cement or Cemetery
Cem'd. Cemented
CFS Cubic Feet Per Second
Ch. Channel
Chchg. Channel Change
Chg. Changeable
CI Cast Iron
CIP Cast Iron Pipe
CIPL, C.I.P., C-I-P Cast In Place
circ. Circumference
Ckt. Circuit
Cl. or Clear Clearance
CL, C/L or C̄ Center Line
CM Concrete Monument
CMB Concrete Median Barrier
CMP Corrugated Metal Pipe
CMPA Corrugated Metal Pipe Arch
Co. County or Company
Col. Column
Com. Commercial or Common
CDMM Committee or By Committee
Comp. Composite
Con. Connect or Connection
Conc. Concrete
Const. Construct or Construction
Contrl. Controller
Cont. Continuation
Contr. Contractor
Coord. Coordinate
Cor. Corner
Corr. Corrugated
CP Concrete Pipe
CPE Corrugated Polyethylene Pipe
CPT Cone Penetration Test
CR Control Radius or County Road
CRA Clear Recovery Area
Crs. or Cse. Course
CS Curve To Spiral
CSP Corrugated Steel Pipe
CT Clear Trunk
CTPB Cement Treated Permeable Base
Ctivr. Cantilever
Ctr., Ctrs. Center
CU or Cu Copper
Culv. Culvert
Cwt. Hundredweight
CY, Cu. Yd., CY, or C.Y. Cubic Yard
Cyl. Cylindrical

D Degree Of Curvature, Depth, Density, Distance, Diameter or Directional Distribution
DA Drainage Area or Deflection Angle
DBH Diameter At Breast Height
DBI Ditch Bottom Inlet
Dbl. Double
DCS Degree Of Curvature (Spiral)
DD Dry Density
DDHV Directional Design Hour Traffic
Decel. Deceleration
Deg. Degree
Delin. Delineators
Demobl. Demobilization
Dept. Department
Det. Detour, Detection, Detectable
DFE Design Flood Elevation
DGN or Dgn. Design
DHV Design Hourly Volume
DHW Design High Water
DT Ditch
DI Drop Inlet
Dia. or D Diameter
Dim. Dimension
Disp. Disposal
Dist. Distance
DLS District Location Surveyor
DMM Domestic Mail Manual
DOT Department Of Transportation
DPI or D.P.I. Ditch Point Intersection
Dr. or DR. Drain, Drive or Design Review
DR Design Review
Driv. Driven
Drwy. Driveway
DS Design Speed
DSL Design Service Life
Dwg. Drawing
E East or External Distance
e Rate Of Superelevation
E to E End to End
EA or Ea. Each
EB Eastbound
EIA Electronic Industries Alliance
El. or Elev. Elevation
Elast. Elastomeric
Elec. Electric
Ellip. Elliptical
Embk. Embankment
Emul. Emulsified
Encl. Enclosure
Engr. Engineer
EOS End Of Survey or Equivalent Opening Size
E.P. or EOP Edge Of Pavement
EPDM Ethylene Propylene Diene Monomer
Eq. Equation or Equal
Equip. Equipment
Esmt. Easement
Est. or Estm. Estimate
Est. Establish or Established
Etc. or etc. Et Cetera (And So Forth)
ETP Electronic Tough Pitch
EW Endwall
Ex. Except, Example
Exc. or Excav. Excavation
Exist. Existing
Exp. Expansion
Ext. Extension
Exwy. Expressway

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STANDARD ABBREVIATIONS

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001	

F	Fill, Farad	HW or H.W.	High Water or Hot Water	M	Mass, Middle Ordinate Length or Mega	N m	Newton Meter
F or Final	Final Quantity	Hwy.	Highway	m	Meter or Milli	No.	Number
F & I	Furnish & Install	Hyd.	Hydraulic	m ²	Square Meter or Meter Square	Nom.	Nominal
F to F	Face to Face	Hz	Hertz	m ³	Cubic Meter or Meter Cubed	Norm.	Normal
FA	Federal Aid or Fine Aggregate			m ³ /m	Cubic Meter Per Meter	N.P.	Non Plastic
FAC	Florida Administrative Code	I	External Angle (Delta), Interstate	m/s	Meters Per Second	NPS	Nominal Pipe Size
FAP	Federal Aid Project	Intchg. or Ichg.	Interchange	Mach.	Machine	NPT	National Pipe Thread
FC	Friction Course	IES	Illuminating Engineering Society	Maint.	Maintenance	NRCP	Non-Reinforced Concrete Pipe
FD	French Drain	ID, I.D.	Inside Diameter or Identification	Matl.	Material	NS	Non Stress, Not Suitable or Near Side
Fdn.	Foundation	IMC	Intermediate Metal Conduit	Max.	Maximum	NT, N&T	Non Traffic, Nail & Tin
FDDT	Florida Department Of Transportation	In.	Inch or Inches	MB	Median Barrier	NTS	Not To Scale
FE	Floor Elevation	Inc.	Incorporated or Including	MBM	Thousand (Feet) Board Measure	NW	Northwest
Fed.	Federal	Incl. or Inc.	Included	MD	Machine Direction (Geotextiles)		
Fert.	Fertilizer	Ind.	Industry or Industrial	Med.	Median	Opass	Overpass
FES	Flared End Section	INV. or Inv.	Invert	Mega	One Million	Q to Q, o to o or O.D.	Out to Out
FETS	Flared End Terminal Section	IP	Iron Pipe	Memb.	Member	QA	Overall
FH	Fire Hydrant	Install.	Installed	MES	Mitered End Section	Q.B.G.	Optional Base Group
FHWA	Federal Highway Administration	Isect.	Intersection	Mess.	Message	QC or Q.C.	On Center
Fig.	Figure	Isl.	Island	Mfg.	Manufactured or Manufacturer	OD or O.D.	Outside Diameter
Fin.	Finish	IR	Iron Rod	MG	1000 Gallons	OE	Overhead Electric
F.L., FL or \bar{F}	Flow Line	ITE	Institute Of Transportation Engineers	MH, M.H.	Manhole, Mounting Height	OH, OHD or Ohd.	Overhead
FL, Fl. or Fla.	Florida	ITS	Intelligent Transportation Systems	MHW	Mean High Water	Opt.	Option, Optional or Optically
Flex.	Flexible			μ	Micro	OT	Overhead Telephone
FNQ	Fuse (Type Slow Burn)	J	Joule	Mi.	Mile	Oz.	Ounce
FDC	Fiber Optics Cable	JB	Junction Box	Micro	One-Millionth	Ω	Ohm
FPM or fpm	Feet Per Minute	Jct.	Junction	Mid.	Middle	P	Passenger Car & Light Delivery Truck
FPS or fps	Feet Per Second	Jt.	Joint	Mil	One-Thousandth Of An Inch	P or Plan	Plan Quantity
FR or Fr.	Frame			Mil.	Military	Pa	Pascal
Frang.	Frangible	K	Design Hour Factor or Kelvin	Milli	One-Thousandth	Par.	Parallel
Freq.	Frequency	k	Kilo (prefix)	Min.	Minimum or Minute	Pa.s	Pascal Second
F.S.	Florida Statutes	kg	Kilogram	Misc.	Miscellaneous	Part.	Participation or Partition
Ft.	Foot or Feet	kg/m	Kilogram Per Meter	mL	Milliliter	Pavt.	Pavement
FTB	Floating Turbidity Barrier	kg/m ²	Kilogram Per Square Meter	MLW	Mean Low Water	PC	Point Of Curvature
FTBA	Florida Transportation Builder Association	kg/m ³	Kilogram Per Cubic Meter	mm	Millimeter	PCBC	Precast Concrete Box Culvert
FTP	Florida Traffic Plans	Kilo	One Thousand	mobl.	Mobilization	PCC	Point Of Compound Curvature or Plain Cement Concrete
Furn.	Furnish	Kip	1000 Pounds	Mod.	Modify or Modified	PCE	Permanent Construction Easement
		km	Kilometer	Mol	Mole	PE	Professional Engineer
		km/h	Kilometer Per Hour	Mon.	Monument	Ped	Pedestrian or Pedestal
G	Giga or Gauss	kn	Knot	MOT	Maintenance Of Traffic	Pen.	Penetration
g	Gram or Gravity	kN	Kilonewton	MP	Mile Post	PG	Profile Grade
Galv.	Galvanized	kPa	Kilopascal	MPa	Megapascal	PGL	Profile Grade Line
Ga.	Gauge or Gage	ksi	Kips Per Square Inch	MPH or mph	Miles Per Hour	Ph.	Phase
Ga. or Gal.	Gallon	kV	Kilovolt	MSL	Mean Sea Level	pH	Measure Of Acidity or Alkalinity
Gar.	Garage	kVA	Kilovolt Ampere	MSTCSD	Minimum Specifications For Traffic Control Signal Devices	PI	Point Of Intersection
GD	Gutter Drain	kWh	Kilowatthour			Pkg.	Parking
GFI	Ground Fault Interrupter			Mtd.	Mounted	Pkwy.	Parkway
GIP	Galvanized Iron Pipe	L	Length, Length Of Curve, Liter, Left	MUTCD	Manual On Uniform Traffic Control Device	PL or \bar{P}	Property Line or Plate
GM	Gas Main	2-L	Two-Lane	MUTS	Manual On Uniform Traffic Studies	PM	12:00 Noon Until 11:59 Midnight
GP	Grade Point	2L1W	Two-Lane One-Way			POC	Point On Curve
Gr.	Grade, Guardrail or Grate	2L2W	Two-Lane Two-Way	N	North or Newton	PDST	Point On Semi-Tangent
Gr. or Gro.	Gross	LA or L/A	Limited Access	N/m	Newtons Per Meter	POT	Point On Tangent
GRC	Galvanized Rigid Steel Conduit	Lat.	Lateral or Latitude	N/m ²	Newtons Per Square Meter	PP	Power Pole
Grd.	Ground	Lb.	Pound	N/m ³	Newtons Per Cubic Meter	PPB	Pier Protection Barrier
GRI	Geosynthetic Research Institute	LBS.	Pounds	N/mm ²	Newtons Per Square Millimeter	Pr.	Pair
gross km	Gross Kilometer	lb/sy	Pounds Per Square Yard	NA or N/A	Not Available or Not Applicable	PRC	Point Of Reverse Curvature
Gr. Wt. or gr. wt.	Gross Weight	LBR	Limerock Bearing Ratio	N & C	Nail & Cap	Prct.	Precast
Gttr.	Gutter	LC	Long Chord	N & D	Nail & Disk	Prest.	Prestressed
		LED	Law Enforcement With Flashing Lights And Radar	NAVD	National American Vertical Datum	Prob.	Probability
H	Henry	LFD	Load Factor Design	NB	Northbound	Prod.	Product, Production, Producer or Produced
h	Hour or Hecto	Lgth.	Length	NC	National Coarse or Normal Crown	Prog.	Program or Progression
ha	Hectare	Lin.	Linear	NCHRP	National Cooperative Research Program	Proj.	Project or Projection
HAR	Highway Advisory Radio	lm	Lumen	NDCBU	Neighborhood Delivery And Collection Box Unit	PRM	Permanent Reference Monument
HB	Hay Bales	Lmrk.	Limerock	NE	Northeast	Prop.	Proposed
HC	Horizontal Clearance	LDS	Limit Of Clear Sight	net km	Net Kilometer	Prov.	Provisions
HD	High Density or Heavy Duty	Loc., LD	Location	NEMA	National Electrical Manufacturers Association	PRS	Portable Regulatory Sign
HD or Hd.	Head	Long.	Longitude	NGVD	National Geodetic Vertical Datum of 1929	PS & E	Plans, Specifications And Estimates
HDPE	High Density Polyethylene	LRFD	Load Resistance Factor Design	NGS	National Geodetic Survey	PSF or psf	Pounds Per Square Foot
Hdl.	Headwall	LS	Length Of Spiral	NHS	National Highway System	PSI or psi	Pounds Per Square Inch
HH	Heavy Hex	LT	Left Turn	NHW	Normal High Water	PT	Point Of Tangency or Pressure Treated
Hndrl	Handrail	Lt.	Left	NIC	Not In Contract	PVC	Polyvinyl Chloride
HDA	Hand/Off/Automatic	Ltd.	Lighted or Limited	NJ	New Jersey	PW	Pressure Water
Horiz. or Hor.	Horizontal	Lum.	Luminaire				
HP	High Pressure or Horsepower	L/W	Lightweight				
Hr.	Hour	lx	Lux				
HS	High Strength						
HSHV	High Strength Horizontal Vertical						
Hse.	House						
Ht.	Height						

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STANDARD ABBREVIATIONS


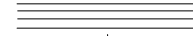

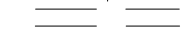
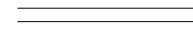

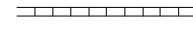
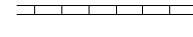

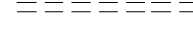
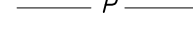
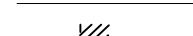

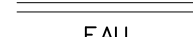

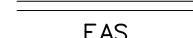
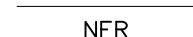
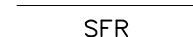
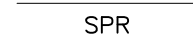

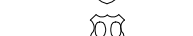
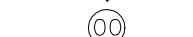
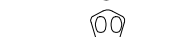



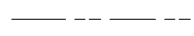
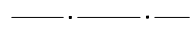
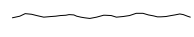
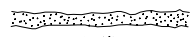







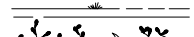
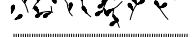






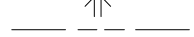
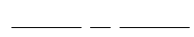

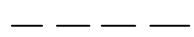
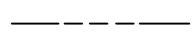



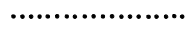
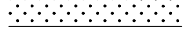
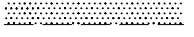
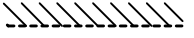
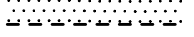
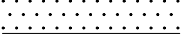















































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001	

				UNITS OF MEASURE	
				US MEASUREMENT	
Q	Peak Discharge or Flow Volume	SRASP	Spiral Rib Aluminized Steel Pipe	V	Volt, Velocity, Volume or Hourly Volume
QPL	Qualified Products List	SRCP	Steel Reinforced Concrete Pipe	Var.	Varies, Variable or Variance
R	Right	SRD	State Road Department	VC	Vertical Curve
R or Rad.	Radius	SRSP	Spiral Rib Steel Pipe	VCP	Vitrified Clay Pipe
R or Rng.	Range	SS	Sanitary Sewer	VECP	Value Engineering Change Proposal
rad	Radian	SSMD	Solid State Modular Design	Veh.	Vehicle
rad/s	Radian Per Second	ST	Surface Treatment or Spiral To Tangent	Vert.	Vertical
RBAC	Rock Base Asphaltic Concrete	St. or ST.	Street	VF	Vertical Foot
RBST	Rock Base Surface Treatment	Sta.	Station	Vh	Verified Horizontal Location
RC	Reverse Crown	Stab.	Stability or Stabilization	VMS	Variable Message Sign
RCP	Reinforced Concrete Pipe	STB	Staked Turbidity Barrier	Vol.	Volume
RCPA	Reinforced Concrete Pipe Arch	Std.	Standard	VP	Vertical Panel
Rd.	Road or Round	Stg.	Strong	VPD or Vpd.	Vehicles Per Day
Rdsd.	Roadside	Stge.	Storage	VPH or Vph.	Vehicles Per Hour
Rdwy.	Roadway	Stl.	Steel	VPHPL or Vphpl.	Vehicles Per Hour Per Lane
Rec.	Recovery	Str.	Structure	VRMS	Volts Root Mean Square
Rect.	Reticuline or Rectangular	Sty.	Story	Vv	Verified Vertical Elevation
Ref.	Reference	SU	Single Unit Trucks	Vvh	Verified Vertical Elevation And Horizontal Location
Refl.	Reflective	Sub. or Subs.	Subsoil	VW	Variable Width
Reg.	Region, Regular, Registered or Regulation	Sub. or Subst.	Substitute	W	Width, Wide, West or Watt
Reinf.	Reinforced or Reinforcing	Subgr.	Subgrade	W/C	Water-Cement Ratio
Rejuv.	Rejuvenation	Suppts.	Supports	WB	Westbound
Reloc.	Relocated	SUR or Sur.	Survey	Wb.	Weber
Rem.	Removal	Surf.	Surface	WB40	Intermediate Semi Trailer
Repl.	Replace	SW	Southwest	WB50	Large Semi Trailer
Req. or Reqd.	Required	SW or Swk.	Sidewalk	WB62	Interstate Semi Trailer
Res.	Residence or Residential	Sys. or Syst.	System	WB67D	Tandem Semi Trailer
RGS	Rigid Galvanized Steel	Sv	Sievert	WM	Water Main
RHW	Insulation (Moisture & Heat Resistant Rubber)	Sym.	Symmetrical	W.P.I.	Work Program Item
RM	Reference Monument	T	Tangent, Length Of Curve, Percent Trucks, Tesla,	WT	Water Table Or Weight
r/min	Revolution Per Minute	T, TWP or Twp.	Township	WWF	Welded Wire Fabric
RP	Reference Point	t	Metric Ton	WWR	Welded Wire Reinforcing
rpm	Revolution Per Minute	tan.	Tangent	X	Coordinate Value (East-West Direction) or Extra
RPM	Raised Reflective Pavement Markers	TBM	Temporary Bench Mark	X Rd.	Cross Road
r/s	Revolution Per Second	TC	Tangent To Curve	Xing.	Crossing
RR	Railroad	TCB	Temporary Concrete Barrier	Xsec.	Cross Section
RSDU	Radar Speed Display Unit	TCE	Temporary Construction Easement	Y	Coordinate Value (North-South Direction)
Rsf.	Resurface	TCP	Terra Cotta Pipe	Yd.	Yard
Rt.	Right	TCZ	Traffic Control Zone	Yr.	Year
RU	Rack Unit	TDLC	Transportation Design For Livable Communities		
R/W, RDW	Right Of Way	Tel.	Telephone		
RX	Receive	Temp.	Temperature or Temporary		
S or s	Speed, South, Siemens, Or Second	Theo.	Theoretical		
SAHM	Sand-Asphalt Hot Mix	THRMP/LSTC	Thermoplastic		
SAN or San.	Sanitary	THW or THWN	Insulation (Flame Retardant, Moisture And Heat Resistant Thermoplastic)		
SB	Southbound	Thick.	Thickness		
SBAC	Shell Base Asphaltic Concrete	Tk	Thick, Thickness or Truck		
SBRM	Sand Bituminous Road Mix	Tn.	Ton		
SBST	Shell Base Surface Treatment	Traf.	Traffic		
SC	Seal Coat or Spiral To Curve	Trans.	Transition, Transverse, Translate or Transportation		
Sch.	Schedule	Treat.	Treatment		
SCST	Sand-Clay Surface Treatment	TS	Tangent To Spiral		
SD	Side Drain, Storm Drain	TSC	Length Of Tangent (Spiral Curve)		
SE	Southeast	TTC	Temporary Traffic Control		
Sec.	Second	TVSS	Transient Voltage Surge Suppression		
Sect.	Section	TX	Transmit		
Sed.	Sediment	Typ.	Typical		
Sep.	Separator	Upass.	Underpass		
Seq.	Sequential	UG	Underground		
Serv.	Service	UL	Underwriters Laboratories		
SF	Adjustment Factor In Percent, Silt Fence	Ult.	Ultimate		
SG	Subgrade	Ultd.	Unlimited		
SG	Specific Gravity	Unddr.	Underdrains		
Sh. or Sht.	Sheet	Undrdwy.	Underroadway		
Shldr.	Shoulder	UNL or Undl.	Unloaded		
SHW	Seasonal High Water	Untr.	Untreated		
SIP	Stay In Place	UPS	Uninterruptible Power Supply		
SP	Superpave	USC & GS	US Coast and Geodetic Survey (now National Geodetic Survey)		
Spa.	Space	USGS	US Geological Survey		
Spcg. or Sp.	Spacing	USPS	United States Postal Service		
Spec.	Specification	Util.	Utilities		
SPT	Standard Penetration Test	UV	Ultraviolet		
Sq. Ft., SF, or S.F.	Square Foot				
Sq. In.	Square Inch				
Sq. Yd., SY or S.Y.	Square Yard				
SR or S.R.	State Road				
SRAP	Spiral Rib Aluminum Pipe				

The abbreviations listed are the standard for contract plans production. This list is not all inclusive. Other Department accepted abbreviations may be used when deemed more appropriate. Where special abbreviations are used a descriptive tabulation may be necessary in the plans.

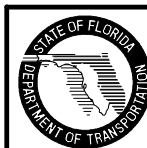


STANDARD SYMBOLS FOR KEY MAP

 Highway With Full Control of Access  Highway With Frontage Roads  Highway Interchange  Proposed Controlled Access Highway  Divided Highway  Hard Surfaced Road  Soil, Gravel Or Shell Surfaced Road  Graded And Drained Road  Unimproved Road  Primitive Road  Private Road  Streets In Inset Or Delimited Areas  Extension Of Local Roads Within Cities  FAI Federal Aid Interstate Highway  FAU Federal Aid Urban Highway  FAP Federal Aid Primary Highway  FAS Federal Aid Secondary Highway  NFR National Forest Road  SFR State Forest Road  SPR State Park Road  Interstate Highway  US Numbered Highway  State Highway  County Road	 Free Ferry  Toll Ferry  Canal Or Drainage Ditch  Intracoastal Waterway  Narrow Stream  Wide Stream  Dam  Dam Or Spillway With Lock  Dam With Road  Flood Control Structure  Lake, Reservoir Or Pond  Intermittent Pond  Meandered Lake  Marsh Or Swamp  Mangroves  Levee Or Dike  Levee Or Dike With Road  Highway Bridge  Small Bridges Closely Spaced  Drawbridge  Highway Grade Separation  Tunnel  State Boundary Line  County Boundary Line  Civil Township Boundary  Extended Township Line  Land Grant Line  Land Section Line  State Survey Section Line  Survey By Others  Location Of Inset Boundary Within Map  Military Reservation Boundary  College Or University Boundary  Corporate Limits  Delimited Area, Population Est.  Reservation, Forest Or Park Boundary  Wildlife Refuge Boundary	 Residential Area Under Development  Lighthouse  State Capital  County Seat  Other City Or Village  Seminole Indian Village  Welcome Station  Wayside Park Or Small Park  Park With Boat Ramp  Boat Ramp  Museum  Recreational Area Or Historic Site  Scenic Site  Post Office  School  Church  Cemetery  Church And Cemetery  Hospital, Health Center Or Rest Home  Toll House, Port Of Entry Or Weight Station  Fair Grounds, Race Course Or Rodeo Arena  Mine Or Strip Mine  Governmental Research Station	 Agricultural Inspection Station  Farmers Market  Game Preserve  Game Checking Station  Bird Sanctuary  Fire Control Headquarters  Lookout Tower  Fire Station  Patrol Or Police Station  Correctional Institution Or Road Camp  Department of Transportation Facility  Coast Guard Station  Armory  Junkyard  Sanitary Fill  Sewage Disposal Plant  Incinerator  Power Plant  Power Substation  Communications Facility  Locked Gate Or Fence  Triangulation Station
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GENERAL NOTE

1. Symbols on this Index are intended for use on all Roadway, Signing And Marking, Signalization, and Lighting projects. For work zone traffic control symbols refer to Index 600. When additional or similar symbols are used, legends or notations may be required for clarity.



2010 FDOT Design Standards

STANDARD SYMBOLS

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STANDARD SYMBOLS FOR PLAN SHEETS

GENERAL SYMBOLS

	State Line
	County Line
	Township Line
	Section Line
	City Line
	Base Or Survey Line
	Right-Of-Way
	Easement Line
	Limited Access Line
	Fence Line
	National Or State Park Or Forest
	Grant Line
	Railroad (Drainage Maps)
	Railroad (Detail Plans)
	Fence (Limited Access)
	Box Culvert
	Bridge
	Pipe Culvert-Mitered End Section
	Pipe Culvert-Straight Endwall
	Pipe Culvert-U-Type Endwall
	Pipe Culvert-Median Drain
	Pipe Culvert-Other End Treatments
	18" SD Storm Drain (Proposed)
	18" SD Storm Drain (Existing)
	Inlet
	Manhole
	Tied Longitudinal Joint
	Keyed Longitudinal Joint
	Doweled Transverse Expansion Joint
	Doweled Transverse Contraction Joint
	Transverse Contraction Joint Without Dowels
	Survey Reference Point
	ALACHUA Triangulation Station
	B.M. NO. 112 Bench Mark
	Point Of Intersection
	North Arrow
	Edges Of Existing Pavement And Sidewalk
	Guardrail
	c.c. Crash Cushion (Attenuator)
	Piling Pier Column
	Concrete Monument
	Base Line
	Centerline
	Flow Line
	Property Line
	Delta Angle
	Approximate
	Round Or Diameter

	Curb
	Curb And Gutter
	Water Well, Spring
	Levee
	MP 327 Railroad Mile Post
	Railroad Signal With Gate
	Railroad Switch
	Gate
	Pump Island
	Storage Tank (Surface)
	Storage Tank (Underground)
	Mine Or Quarry
	B.P. Borrow Pit
	Church
	Store
	RES Residence
	B Barn
	School
	Synthetic Bales
	Silt Fence
	Floating Turbidity Barrier
	Staked Turbidity Barrier
	Stream
	Shore Line
	Marsh
	Wetland Boundary (Proposed)
	Wetland Boundary (Existing)
	Hedge
	Trees
	Edge Of Wooded Area
	Shrubbery
	Grove Or Orchard
	Definition Of Skew For Cross Drains And Barrels Of Concrete Box Culverts
	Rt. Skew Lt.
	Concrete
	Wood
	e Rate Of Superelevation

UTILITY ADJUSTMENT SYMBOLS

EXISTING	PROPOSED	EXISTING	PROPOSED
		W - - - - 6" - - - - W	W W W W W W 6" M M M M M M M M Water Main
		NPW - - - - 6" - - - - M M N	NPW NPW 6" M M N M M N Non Potable Water
		S - - - - 8" - - - - S	S S S S S S 8" S S S S S S Sanitary Sewer
		G - - - - 6" - - - - G	G G G G G G 6" G G G G G G Gas
		RD - - - - 4" - - - - RD	RD RD RD 4" RD RD RD Roof Drain
		PET - - - - 8" - - - - PET	PET PET 8" PET PET Petroleum
		STM - - - - 12" - - - - STM	STM STM 12" STM STM Steam
		CAS - - - - 12" - - - - CAS	CAS CAS 12" CAS CAS Casing
		DT - - - - 4"x4" - - - - DT	DT DT 4"x4" DT DT Duct
		BE - - (7.5 kV) - - - - BE	BE BE (7.5 kV) BE BE Buried Electric
		OE - - (7.5 kV) - - - - OE	OE OE (7.5 kV) OE OE Overhead Electric
		BTV - - - - 3" - - - - BTV	BTV BTV 3" BTV BTV Buried Cable Television
		OTV - - - - 2" - - - - OTV	OTV OTV 2" OTV OTV Overhead Cable Television
		BT - - - - 2" - - - - BT	BT BT 2" BT BT Buried Telephone
		OT - - - - 2" - - - - OT	OT OT 2" OT OT Overhead Telephone
		BFO - - - - 2" - - - - BFO	BFO BFO 2" BFO BFO Buried Fiber Optic
		OFO - - - - 1" - - - - OFO	OFO OFO 1" OFO OFO Overhead Fiber Optic

See General Note, Sheet 1 of 3



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STANDARD SYMBOLS

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STANDARD SYMBOLS FOR PLAN SHEETS

TRAFFIC SIGNALS SYMBOLS

EXISTING	PROPOSED	
		Traffic Signal Head (Span Wire Mounted)
		Traffic Signal Head (Pedestal Mounted)
		Traffic Signal Head (Mast Arm Mounted)
		Traffic Signal Pole (Concrete, Wood, Metal)
		Vehicle Detector (Loop)
		Signal Cable (On Messenger Wire)
		Conduit
		Vehicle Detector (Points)
		Pedestrian Detector
		Pedestrian Signal Head (Pole Or Pedestal Mounted)
		Controller Cabinet (Base Mounted)
		Controller Cabinet (Pole Mounted)
		Walk - Dont Walk
		Flashing Dont Walk
		Signal Face Number
		Signal Lens
		Programmed Signal Head
		Messenger Wire
		Pole Tabulation Cross Reference
		Pole Tabulation Cross Reference (Joint Use Pole)
		Signal Phase

LIGHTING SYMBOLS

EXISTING	PROPOSED	
		Pole & Luminaire
		Existing Pole & Luminaire To Be Removed
		Final Position Of Relocated Or Adjusted Pole & Luminaire
		High Mast Lighting Tower
		City Or Utility Owned Luminaire & Pole
		PVC (Polyvinyl Chloride) Lighting Conduit And Conductors
		Rigid Galvanized Lighting Conduit And Conductors
		Lighting Pull-Box
		Light Distribution Point
		Joint Use Pole
		Pier Cap Underdeck Luminaire
		Pendant Hung Underdeck Luminaire

SIGNING AND PAVEMENT MARKING SYMBOLS

	Pavement Arrow
	Single Solid Line
	Double Solid Line
	Skip Line
	Stop Bar
	Traffic Sign (Post Mounted)
	Traffic Sign (Overhead)
	Sign Number
	Sign Item Number
	Traffic Flow Arrow

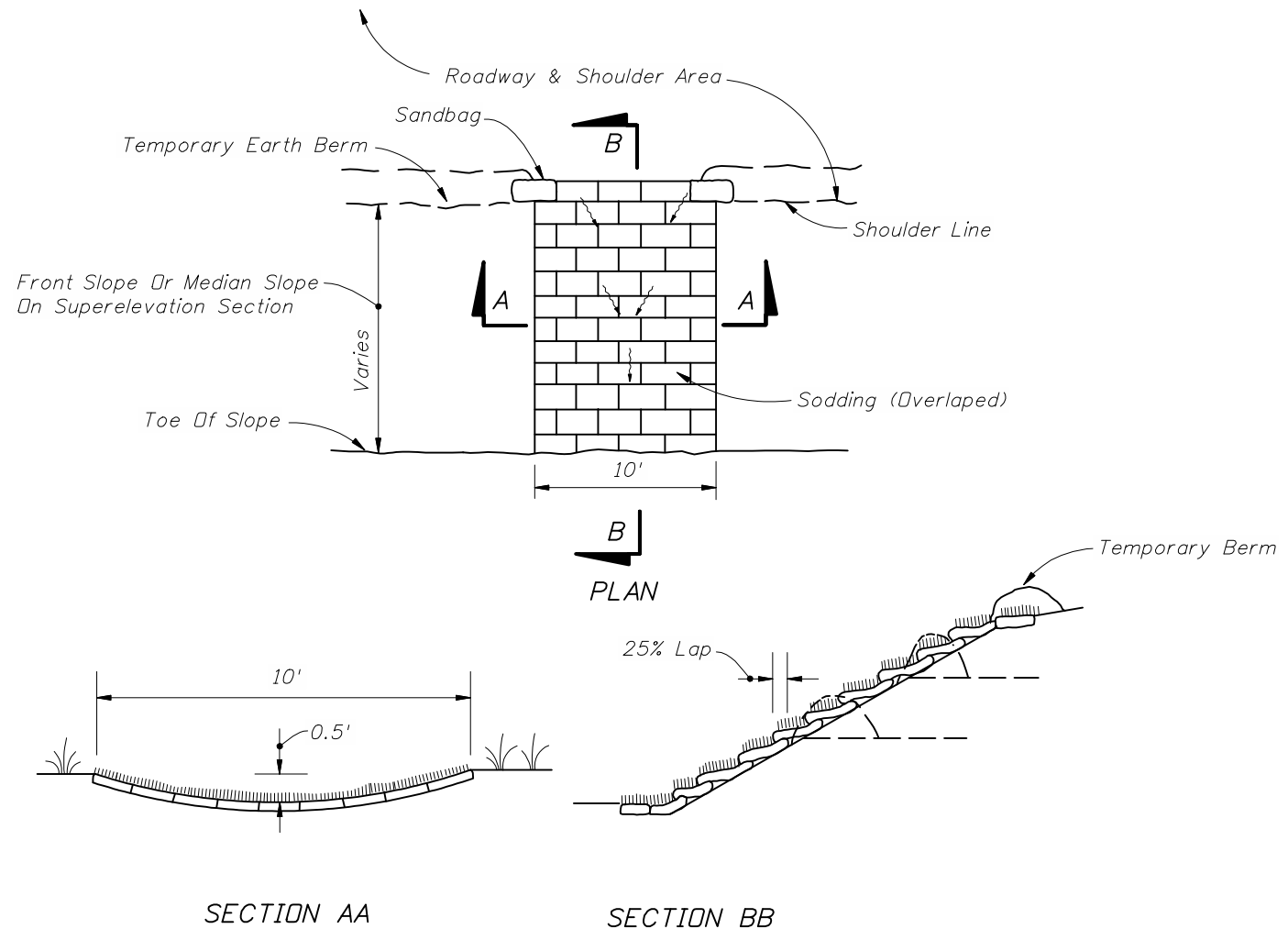
See General Note, Sheet 1 of 3



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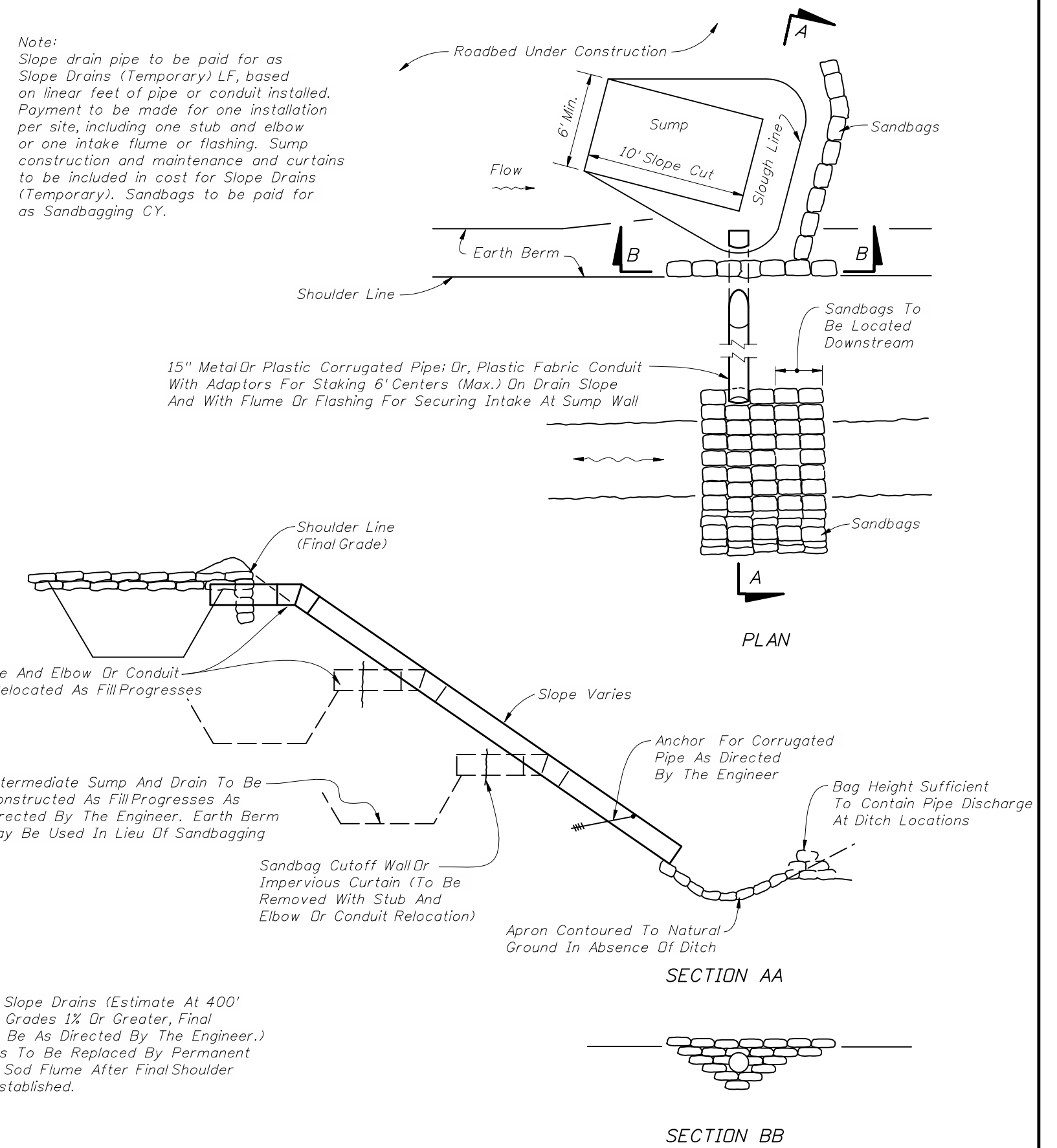
STANDARD SYMBOLS

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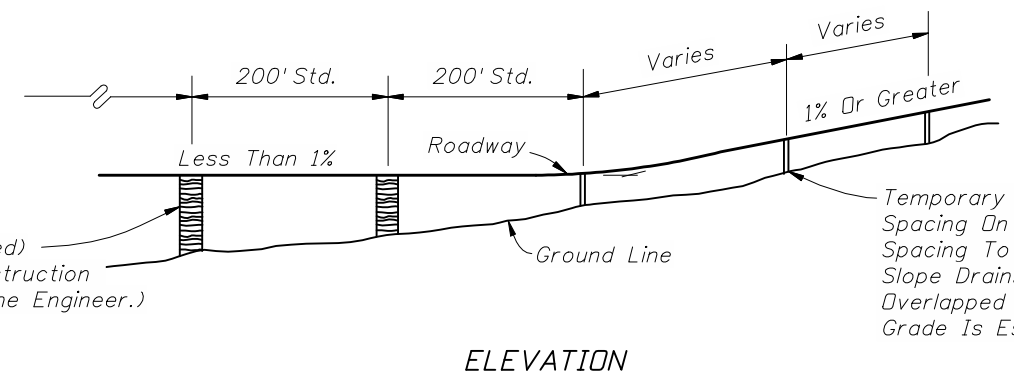


SECTION AA
SECTION BB
SOD FLUME (SODDING OVERLAPPED)

Note:
Slope drain pipe to be paid for as Slope Drains (Temporary) LF, based on linear feet of pipe or conduit installed. Payment to be made for one installation per site, including one stub and elbow or one intake flume or flashing. Sump construction and maintenance and curtains to be included in cost for Slope Drains (Temporary). Sandbags to be paid for as Sandbagging CY.



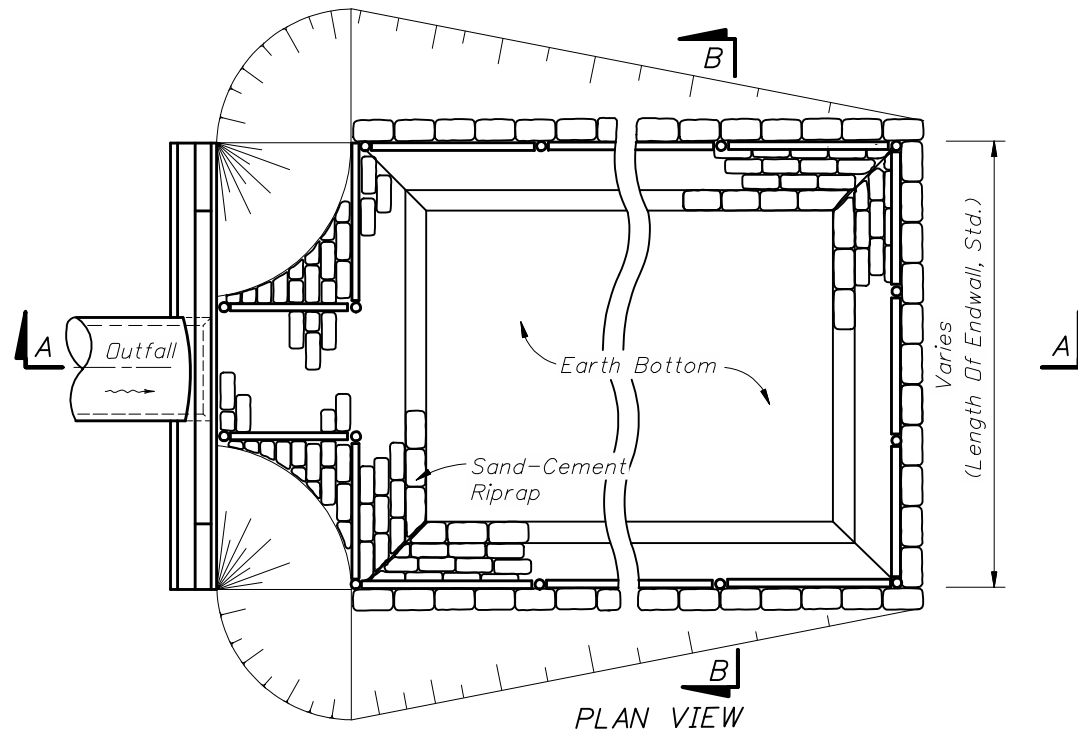
TEMPORARY SLOPE DRAIN



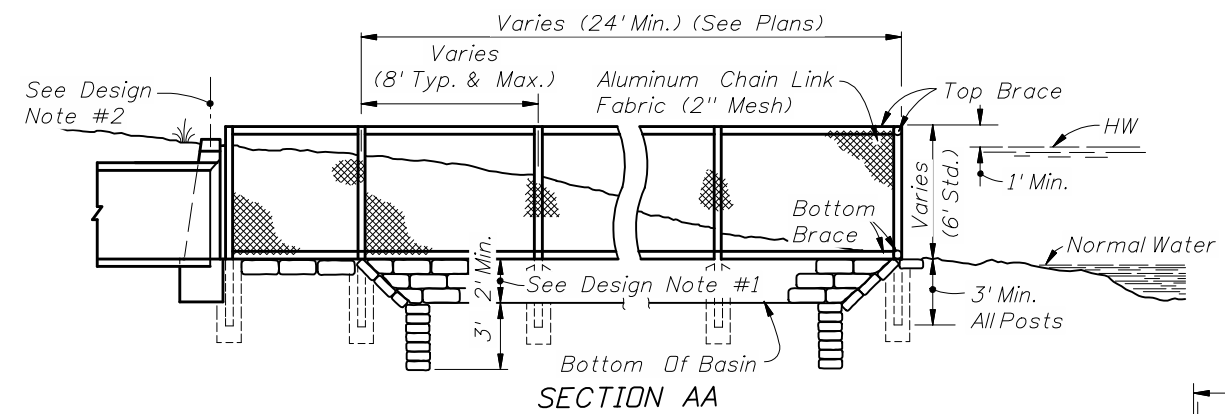
SLOPE DRAIN APPLICATION

Temporary Slope Drains (Estimate At 400' Spacing On Grades 1% Or Greater, Final Spacing To Be As Directed By The Engineer.) Slope Drains To Be Replaced By Permanent Overlapped Sod Flume After Final Shoulder Grade Is Established.

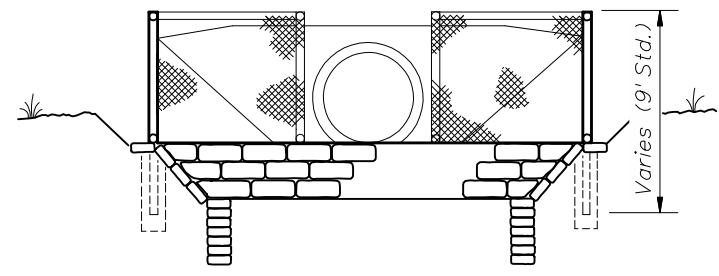




PLAN VIEW

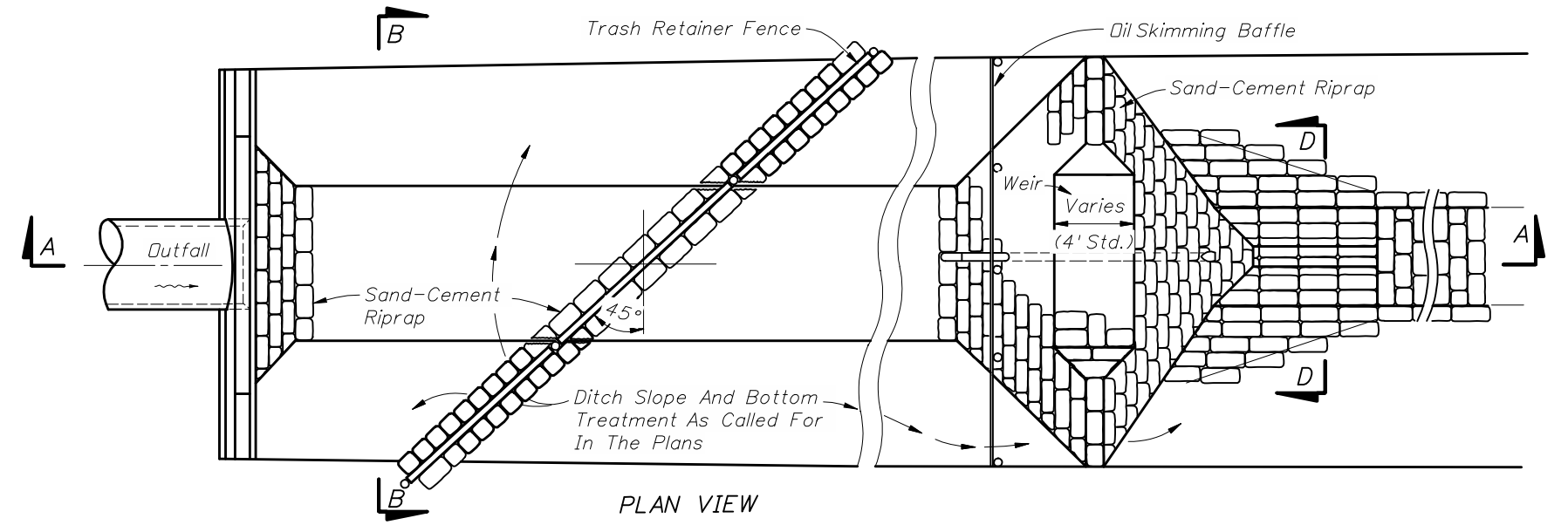


SECTION AA

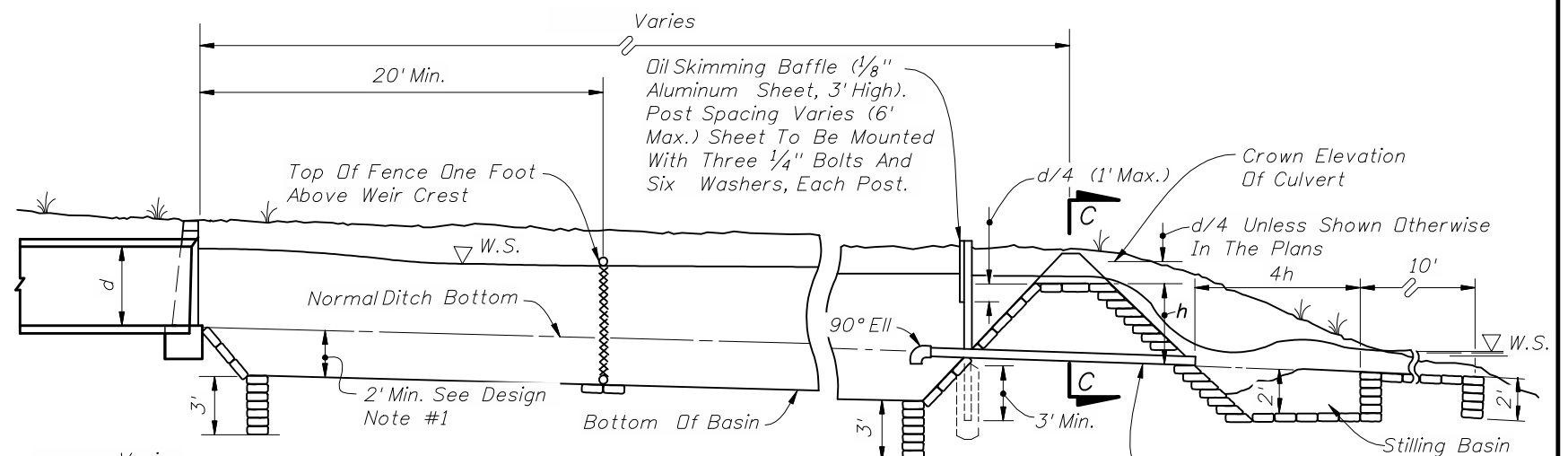


SECTION BB

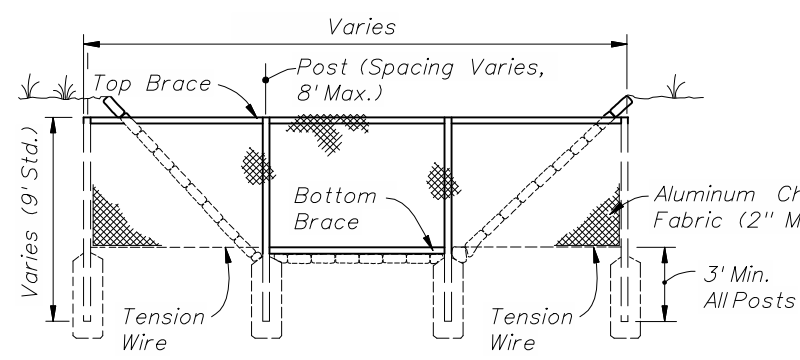
INTENDED FOR USE WHEN THE STORM SEWER OUTFALLS ADJACENT TO A SHORE LINE
TYPE A



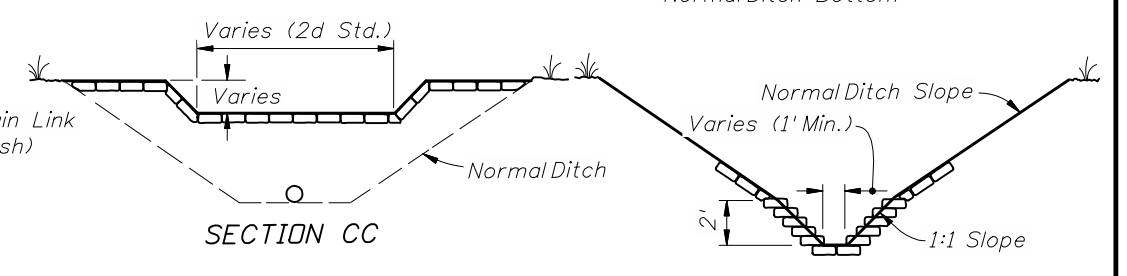
PLAN VIEW



SECTION AA



SECTION BB



SECTION CC

SECTION DD

INTENDED FOR USE WHEN THE STORM SEWER OUTFALLS IN AN OPEN DITCH
TYPE B

GENERAL CONSTRUCTION NOTES

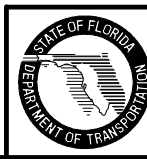
1. Fence materials shall be aluminum or concrete only.
2. Aluminum posts shall be 3" diameter minimum. Aluminum railbraces shall be in accordance with Index No. 802. Concrete posts and railbraces shall be in accordance with Index No. 801. All posts to be set in concrete.
3. Fabric shall be installed to inside of posts and railbraces, and tied to posts and braces at 6" centers.
4. For additional details on fencing, see Index Nos. 801 and 802.
5. All basin slopes to be 1:1 unless detailed otherwise in the plans.
6. Sediment basins to be constructed prior to commencement of upland construction. Maintenance and clean out to be by the Contractor until acceptance of project by the Engineer.

DESIGN NOTES

1. Basins should be as deep as practical with a minimum depth of 2.0 feet.
2. In Type A, when the top of endwall is below high water, fence also will be required along the top of the endwall.
3. In Type B, the weir shall be located as far from the endwall as practical. On steep ditch grades two or more weirs may be required. Intermediate weirs shall be constructed without stilling basins.
4. In Type B, the 6" PVC shall be constructed unless shown otherwise in the plans.

GENERAL NOTES

1. The cost for Type A and Type B trash retainer and sediment basins shall include the cost for riprap, fencing, baffles, piping and for sump and weir earthwork over and above ditch excavation called for in the plans. Payment for both Type A and Type B shall be under the contract unit price for Sediment Basins, Each. Cleanouts as called for in the plans shall be paid for under the contract unit price for Sediment Basin Cleanouts, CO.



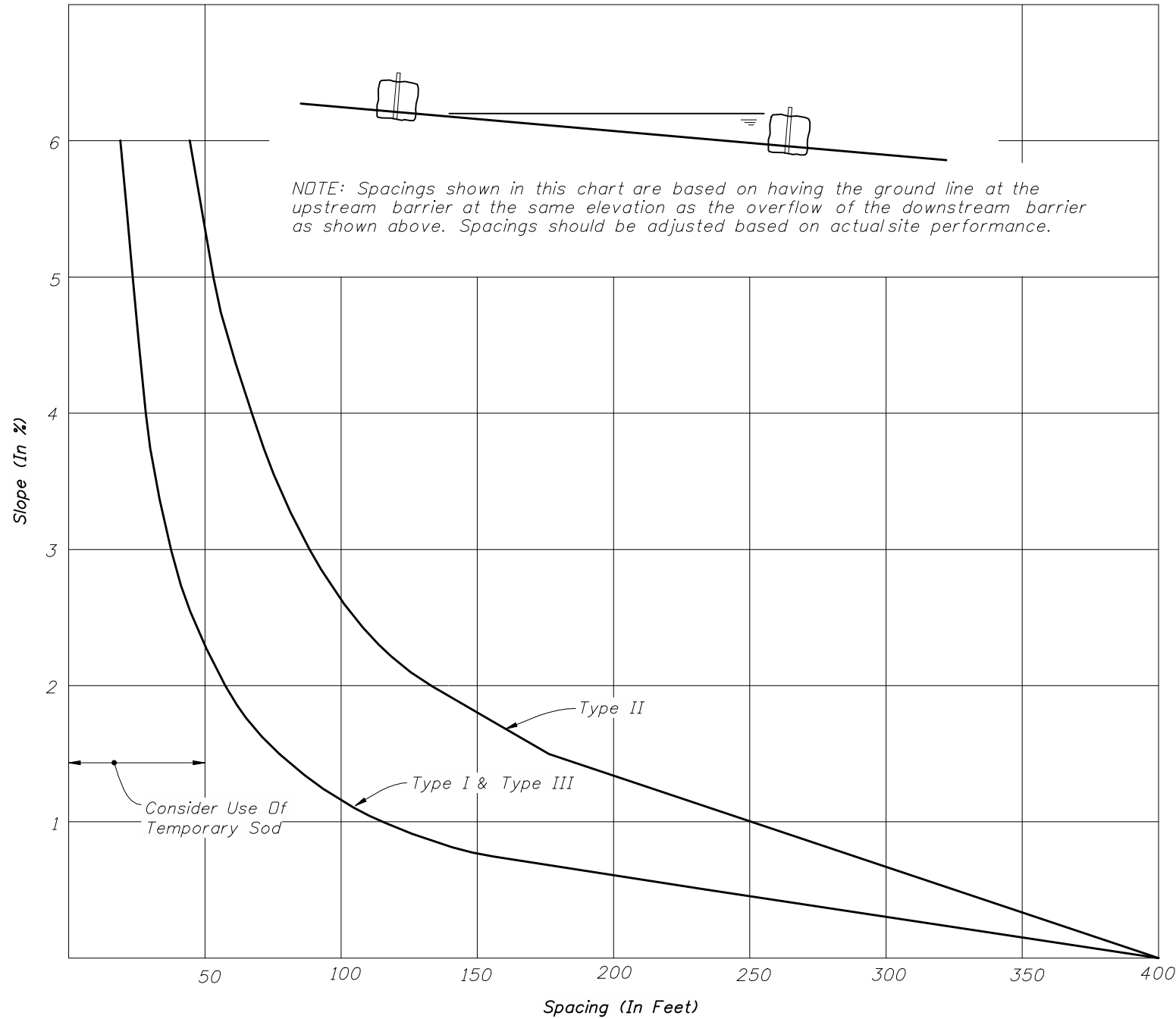
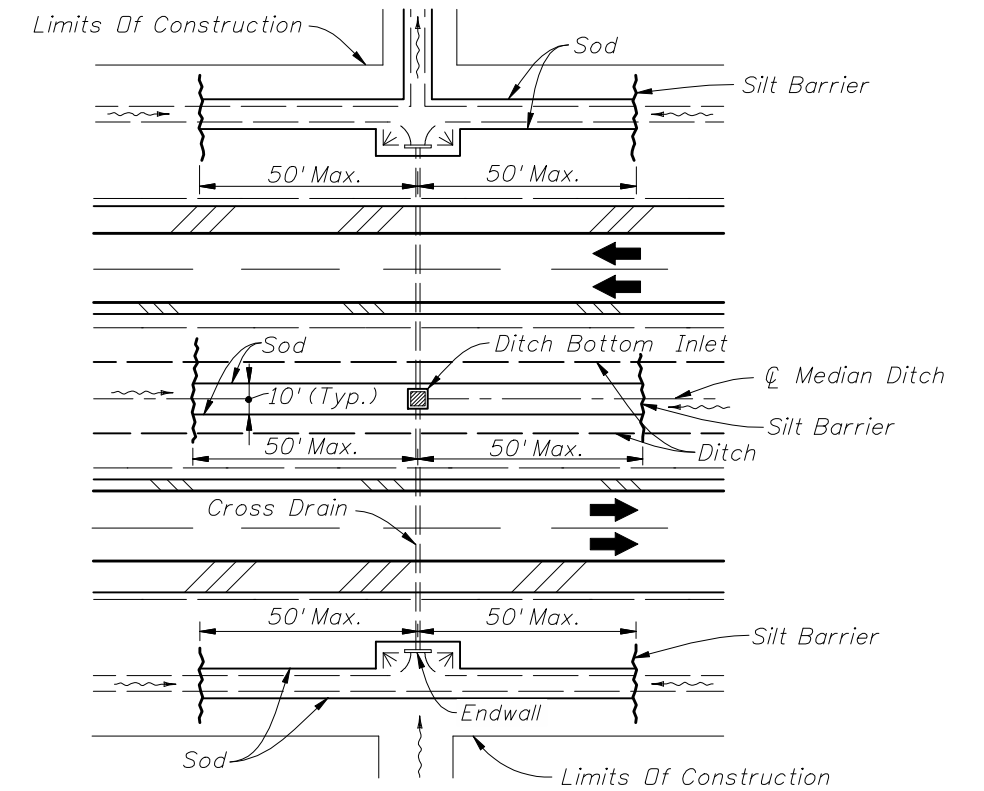


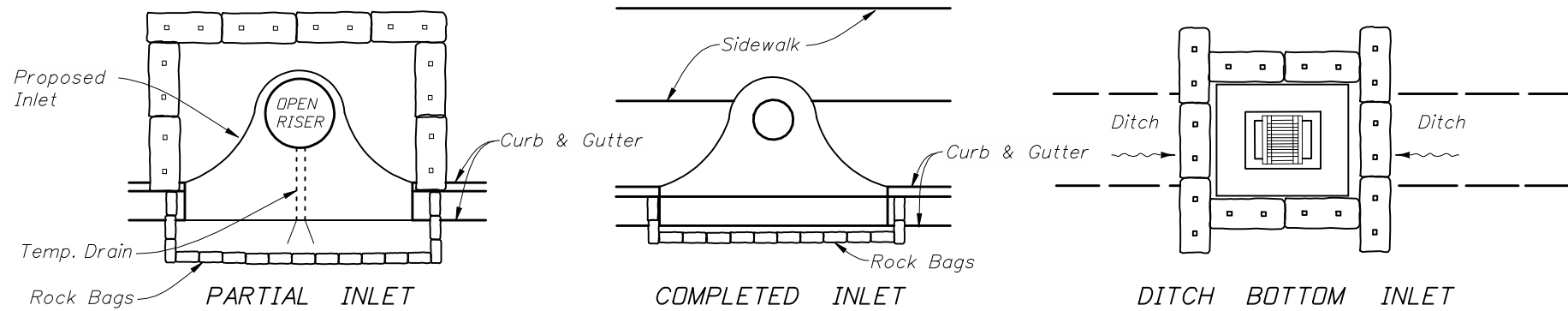
CHART I

RECOMMENDED SPACING FOR SYNTHETIC BALES OR BALE TYPE BARRIERS AND TYPE III SILT FENCE

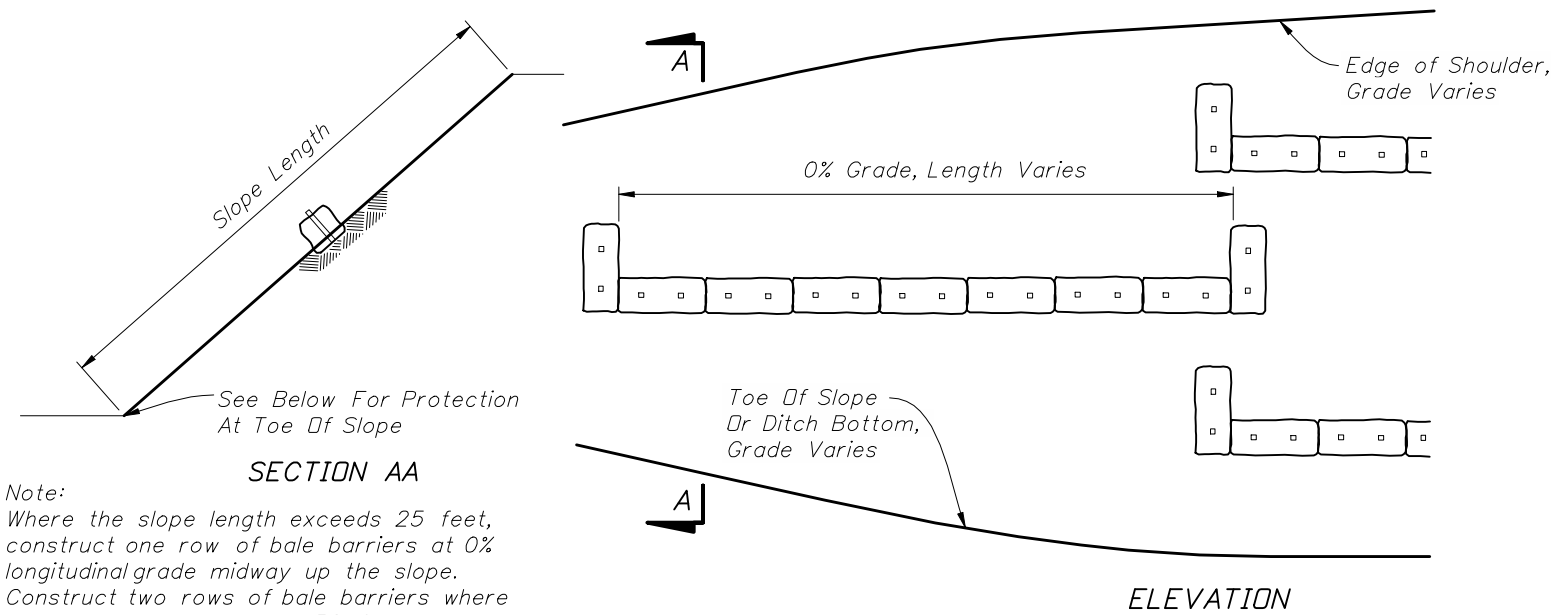


DITCH INSTALLATIONS AT DRAINAGE STRUCTURES



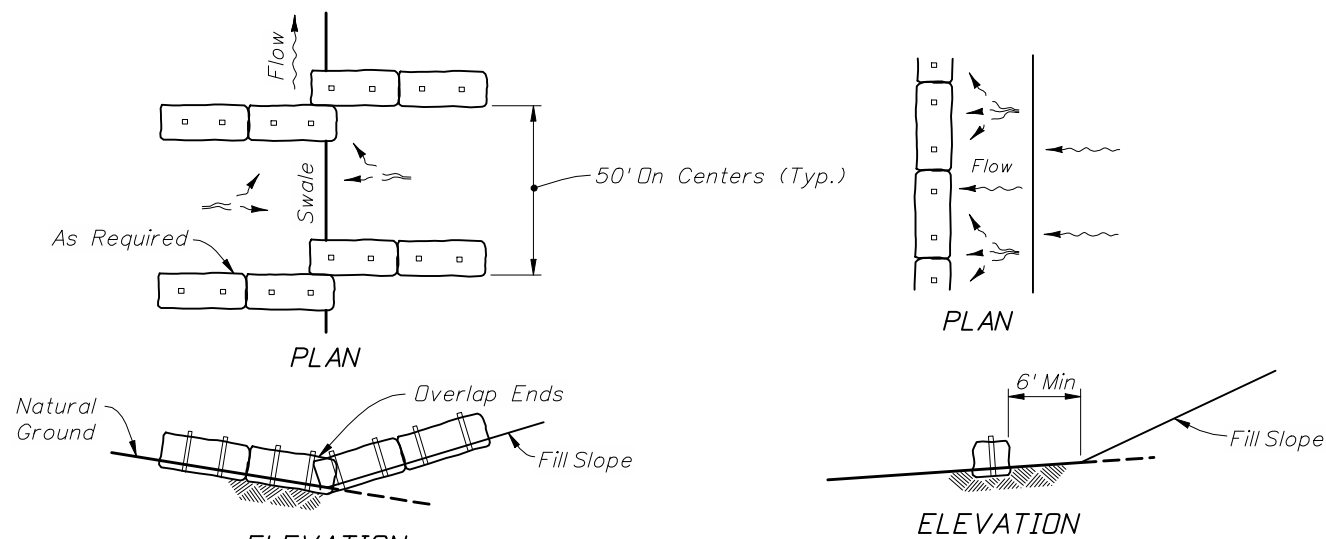


PROTECTION AROUND INLETS OR SIMILAR STRUCTURES



Note:
Where the slope length exceeds 25 feet, construct one row of bale barriers at 0% longitudinal grade midway up the slope. Construct two rows of bale barriers where the slope length exceeds 50 feet.

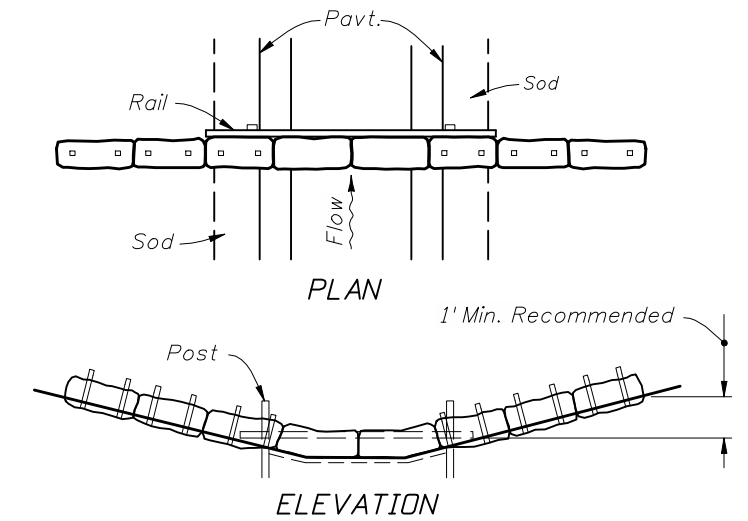
ALONG FILL SLOPE



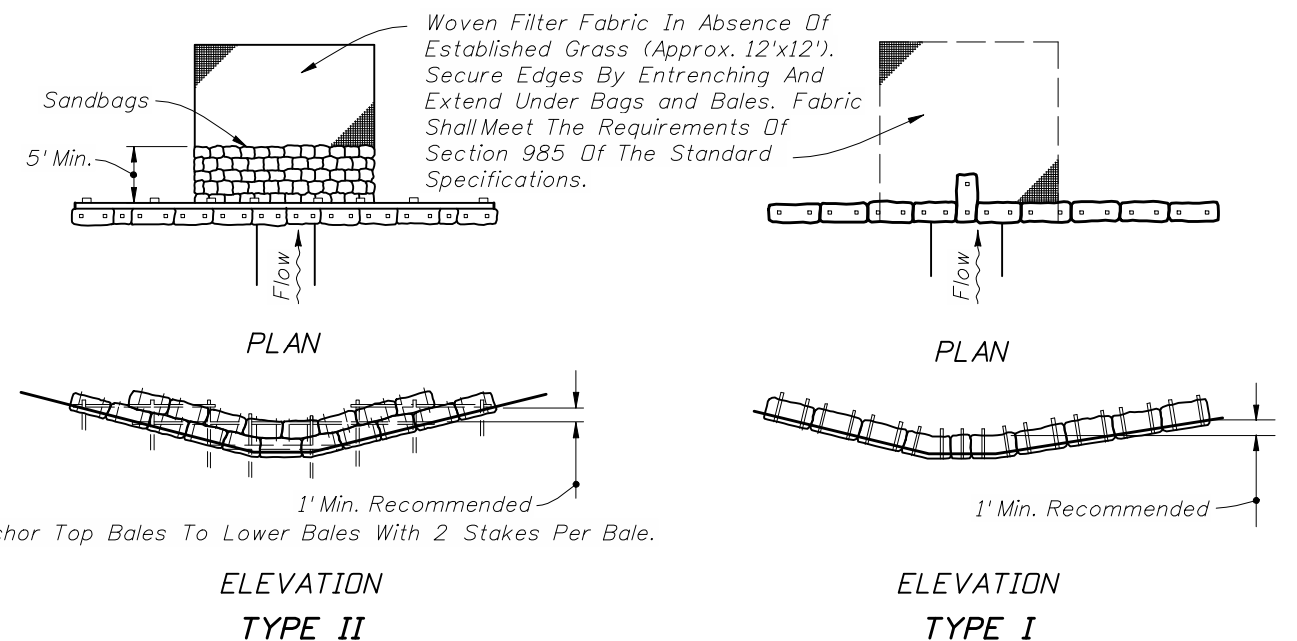
TO BE USED WHERE THE NATURAL GROUND SLOPES TOWARD THE TOE OF SLOPE

**AT TOE OF SLOPE
BARRIERS FOR FILL SLOPES**

TO BE USED WHERE THE NATURAL GROUND SLOPES AWAY FROM THE TOE OF SLOPE



SYNTHETIC BALES OR BALE TYPE BARRIERS FOR PAVED DITCHES

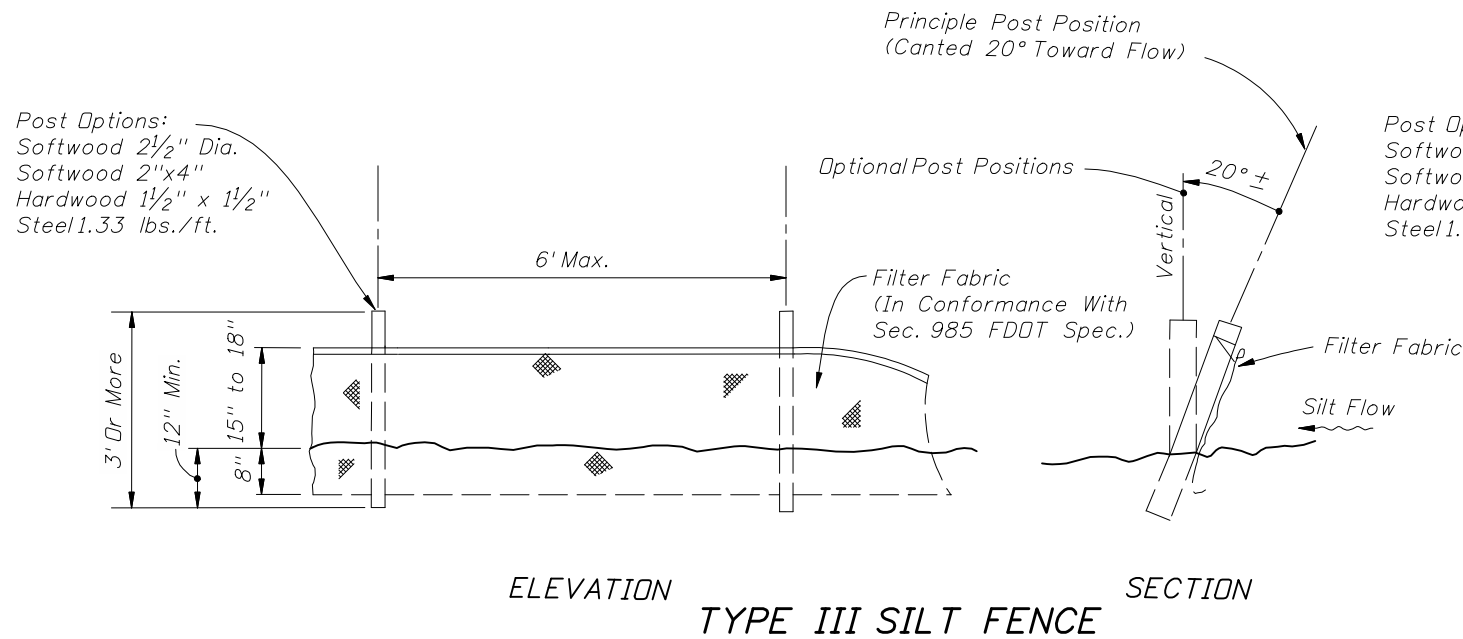


SYNTHETIC BALES OR BALE TYPE BARRIERS FOR UNPAVED DITCHES

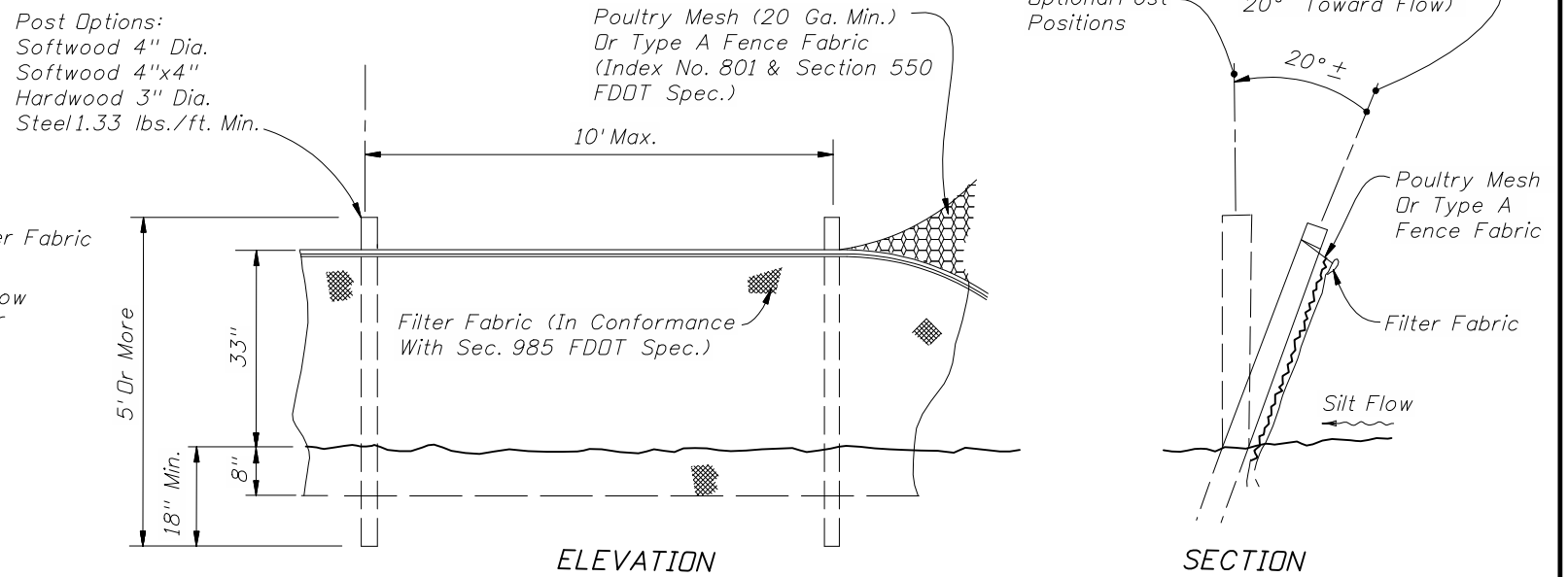
NOTES FOR SYNTHETIC BALES OR BALE TYPE BARRIERS

1. Type I and II Synthetic Barrier should be spaced in accordance with Chart 1, Sheet 1.
2. Bales shall be anchored with 2-1" x 2" (or 1" dia.) x 4' wood stakes. Stakes of other material or shape providing equivalent strength may be used if approved by the Engineer. Stakes other than wood shall be removed upon completion of the project.
3. Rails and posts shall be 2" x 4" wood. Other materials providing equivalent strength may be used if approved by the Engineer.
4. Adjacent bales shall be butted firmly together.
5. Where used in conjunction with silt fence, bales shall be placed on the upstream side of the fence.
6. Bales to be paid for under the contract unit price for Synthetic Bales, LF. The unit price shall include the cost of filter fabric for Type I and II Barriers. Sandbags shall be paid for under the unit price for Sandbagging, CY. Rock bags to be paid for under the contract unit price for Rock Bags, EA.





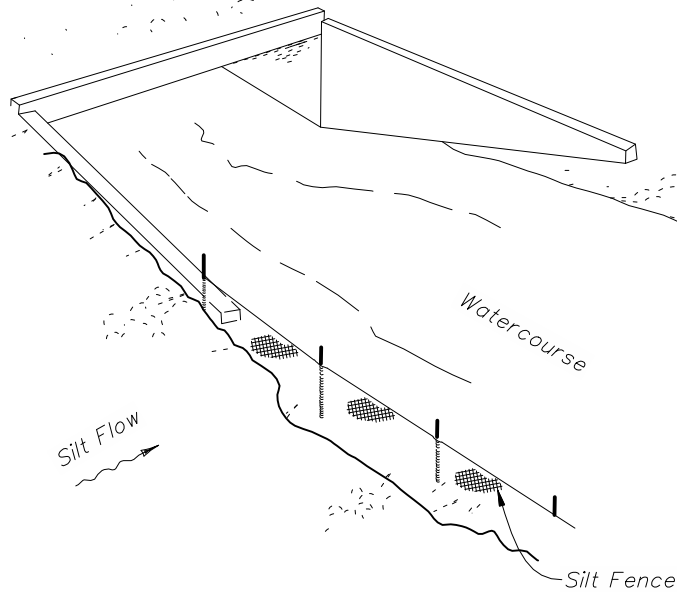
ELEVATION SECTION
TYPE III SILT FENCE



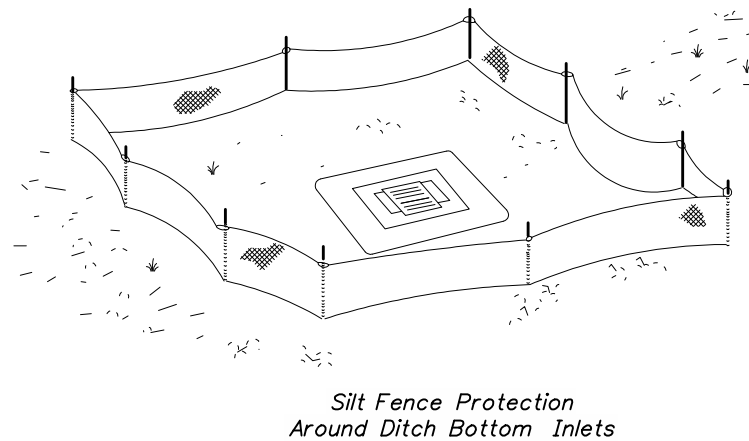
ELEVATION SECTION
TYPE IV SILT FENCE



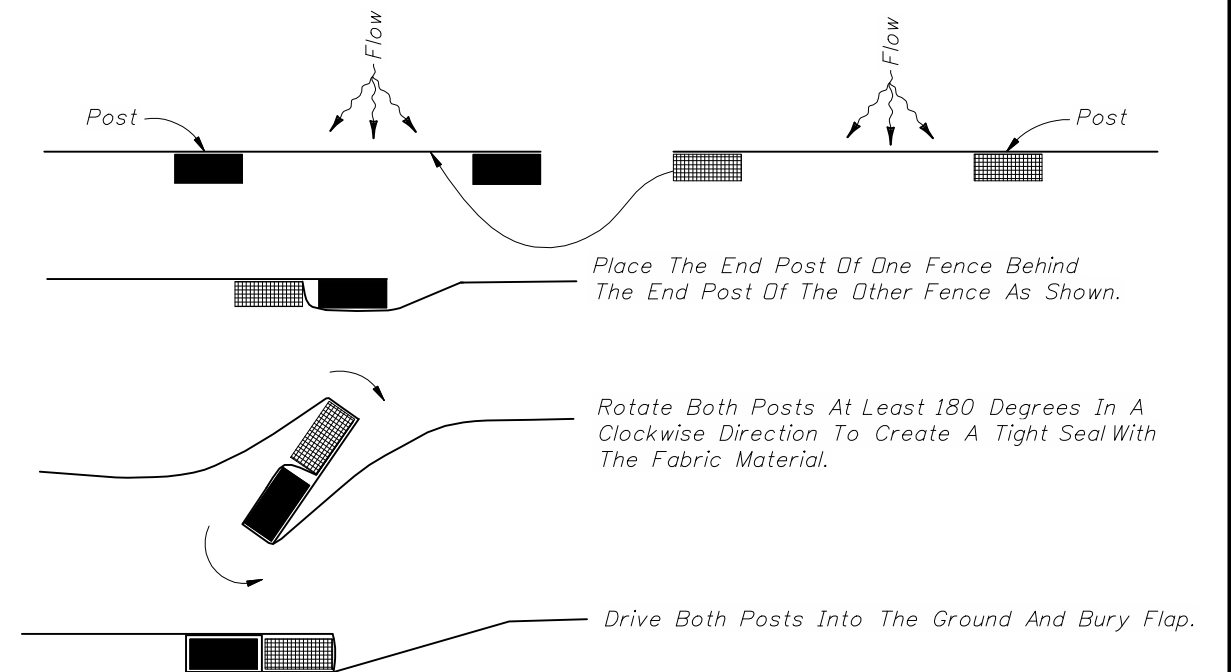
Silt Fence Protection In Ditches With Intermittent Flow



SILT FENCE APPLICATIONS



Silt Fence Protection Around Ditch Bottom Inlets

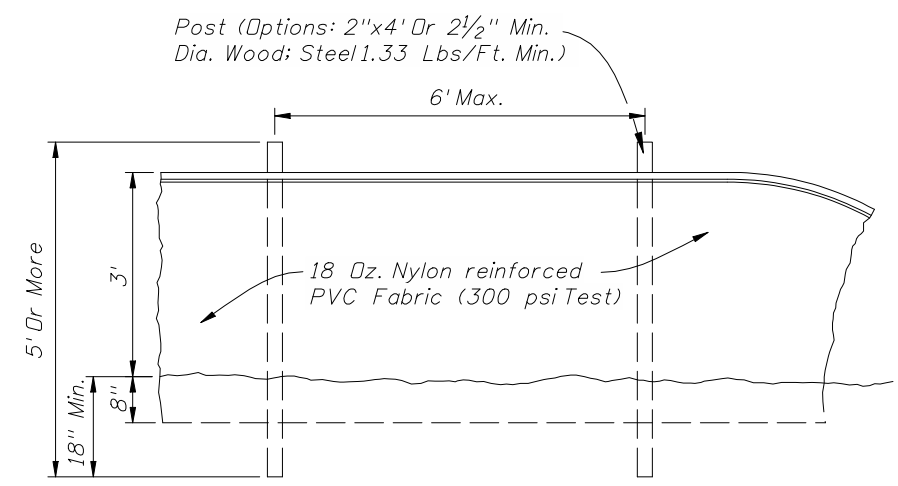
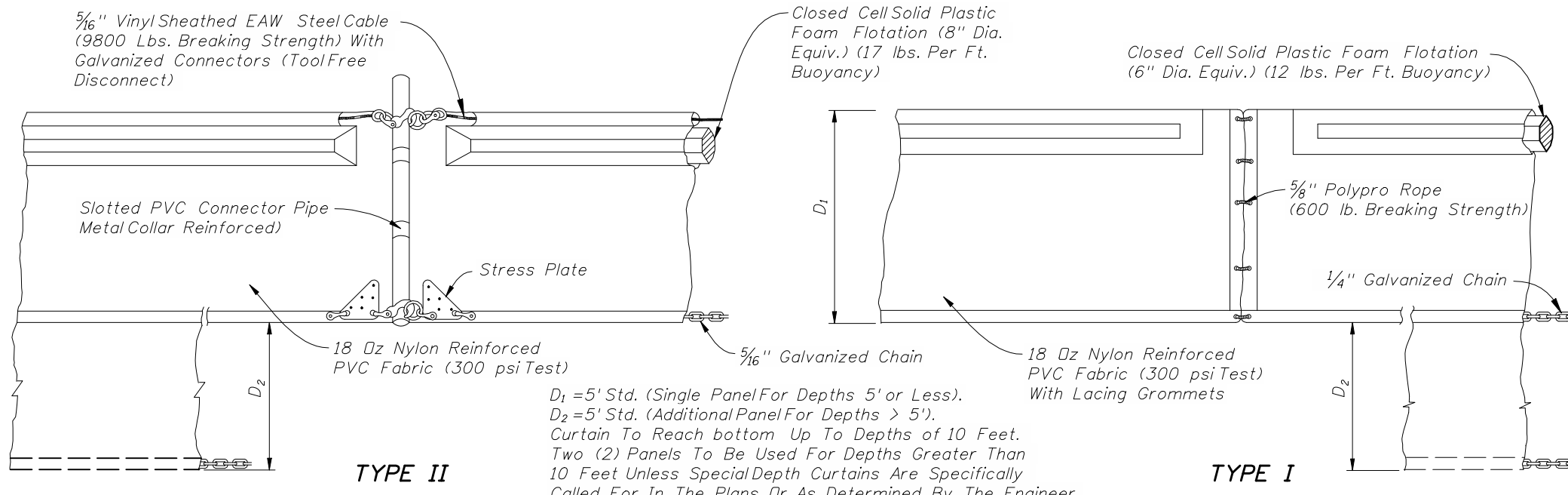


PLAN VIEW
JOINING TWO SILT FENCES

NOTES FOR SILT FENCES

1. Type III Silt Fence to be used at most locations. Where used in ditches, the spacing for Type III Silt fence shall be in accordance with Chart 1, Sheet 1.
2. Type IV Silt Fence to be used where large sediment loads are anticipated. Suggested use is where fill slope is 1:2 or steeper and length of slope exceeds 25 feet. Avoid use where the detained water may back into travel lanes or off the right of way.
3. Do not construct silt fences across permanent flowing watercourses. Silt fences are to be at upland locations and turbidity barriers used at permanent bodies of water.
4. Where used as slope protection, Silt Fence is to be constructed on 0% longitudinal grade to avoid channelizing runoff along the length of the fence.
5. Silt Fence to be paid for under the contract unit price for Staked Silt Fence, (LF).





STAKED TURBIDITY BARRIER

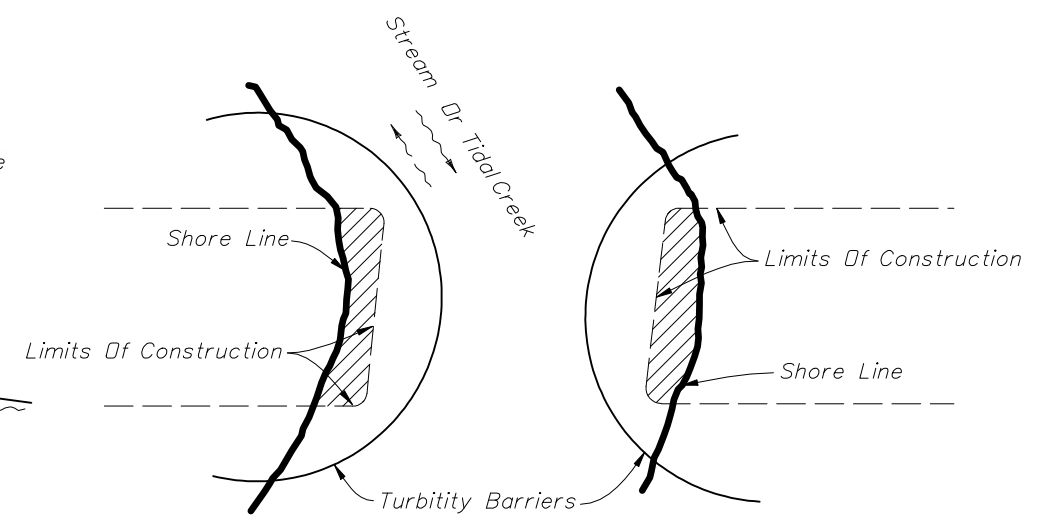
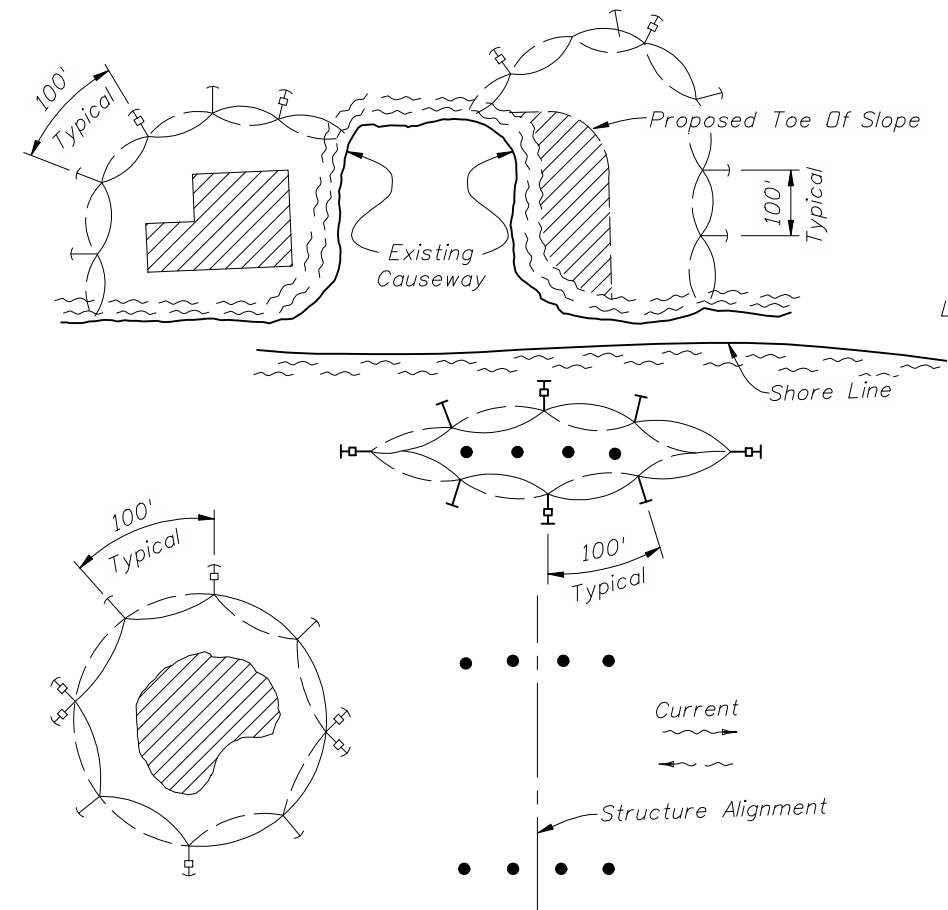
$D_1 = 5'$ Std. (Single Panel For Depths 5' or Less).
 $D_2 = 5'$ Std. (Additional Panel For Depths > 5').
 Curtain To Reach bottom Up To Depths of 10 Feet.
 Two (2) Panels To Be Used For Depths Greater Than 10 Feet Unless Special Depth Curtains Are Specifically Called For In The Plans Or As Determined By The Engineer.

NOTICE:
 COMPONENTS OF TYPES I AND II MAY BE SIMILAR OR IDENTICAL TO PROPRIETARY DESIGNS. ANY INFRINGEMENT ON THE PROPRIETARY RIGHTS OF THE DESIGNER SHALL BE THE SOLE RESPONSIBILITY OF THE USER. SUBSTITUTIONS FOR TYPES I AND II SHALL BE AS APPROVED BY THE ENGINEER.

FLOATING TURBIDITY BARRIERS

LEGEND

- Pile Locations
- ▨ Dredge Or Fill Area
- Mooring Buoy w/Anchor
- Anchor
- Barrier Movement Due To Current Action



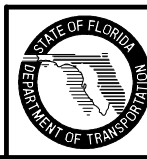
- Notes:**
1. Turbidity barriers are to be used in all permanent bodies of water regardless of water depth.
 2. Number and spacing of anchors dependent on current velocities.
 3. Deployment of barrier around pile locations may vary to accommodate construction operations.
 4. Navigation may require segmenting barrier during construction operations.
 5. For additional information see Section 104 of the Standard Specifications.

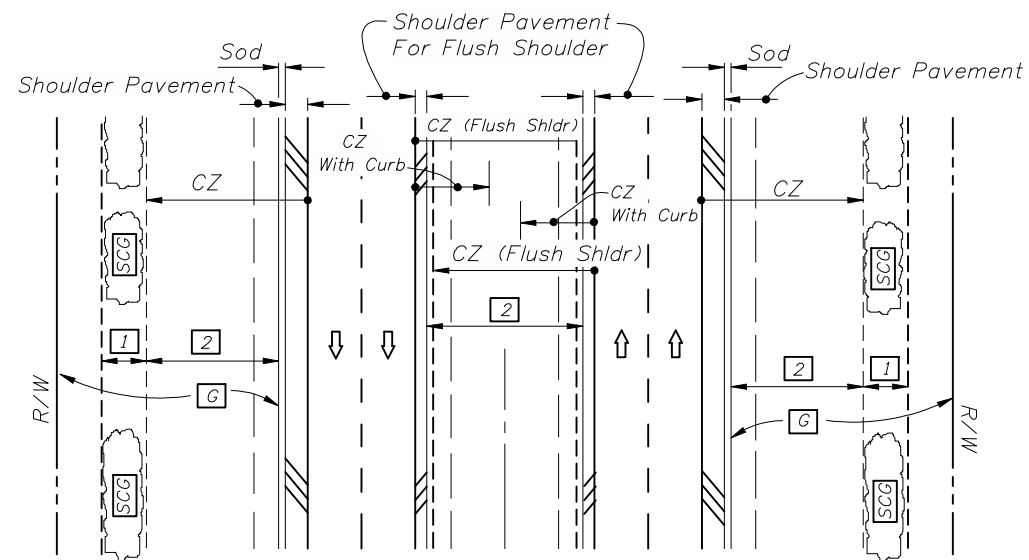
Note:
 Turbidity barriers for flowing streams and tidal creeks may be either floating, or staked types or any combinations of types that will suit site conditions and meet erosion control and water quality requirements. The barrier type(s) will be at the Contractor's option unless otherwise specified in the plans, however payment will be under the pay item(s) established in the plans for Floating Turbidity Barrier and/or Staked Turbidity Barrier. Posts in staked turbidity barriers to be installed in vertical position unless otherwise directed by the Engineer.

GENERAL NOTES

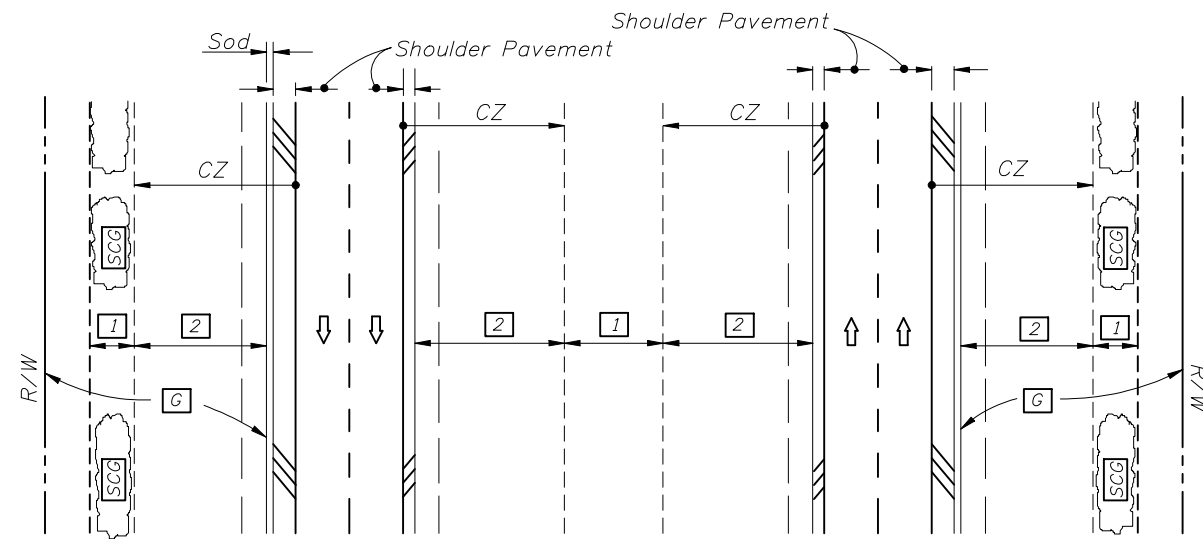
1. Floating turbidity barriers are to be paid for under the contract unit price for Floating Turbidity Barrier, LF.
2. Staked turbidity barriers are to be paid for under the contract unit price for Staked Turbidity Barrier, LF.

TURBIDITY BARRIER APPLICATIONS

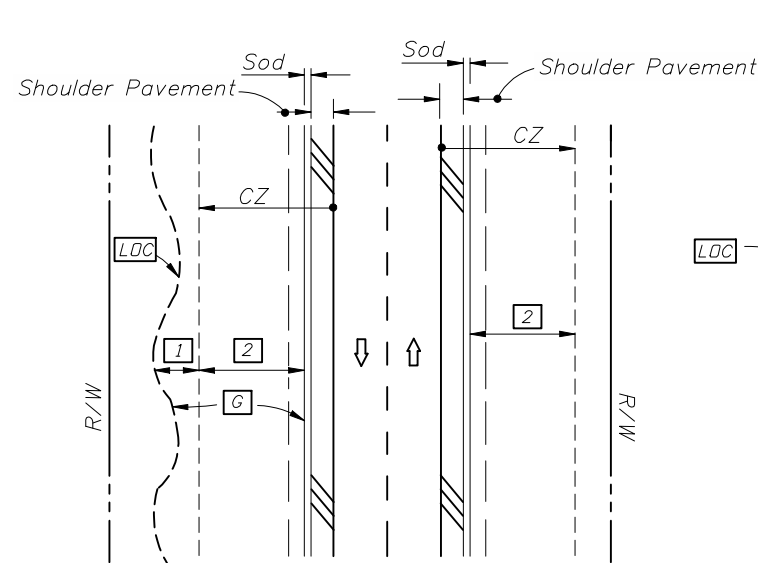




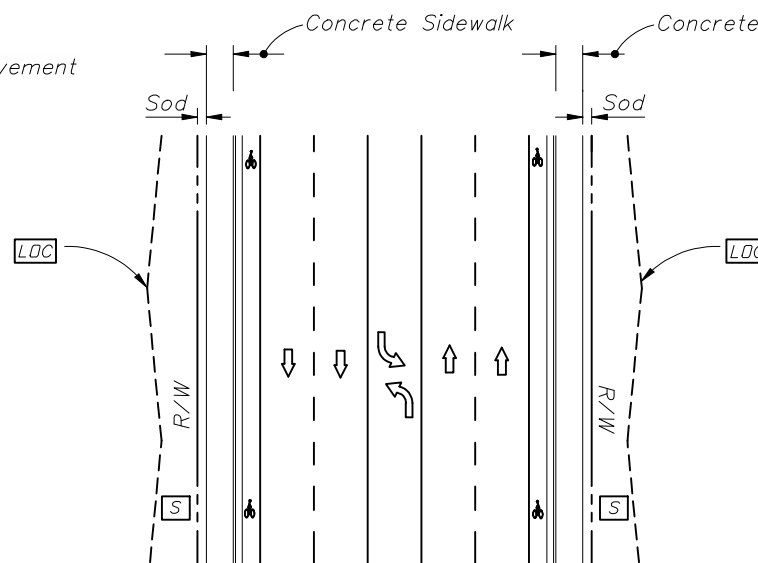
DIVIDED NARROW MEDIAN WITH OR WITHOUT CURBED MEDIAN



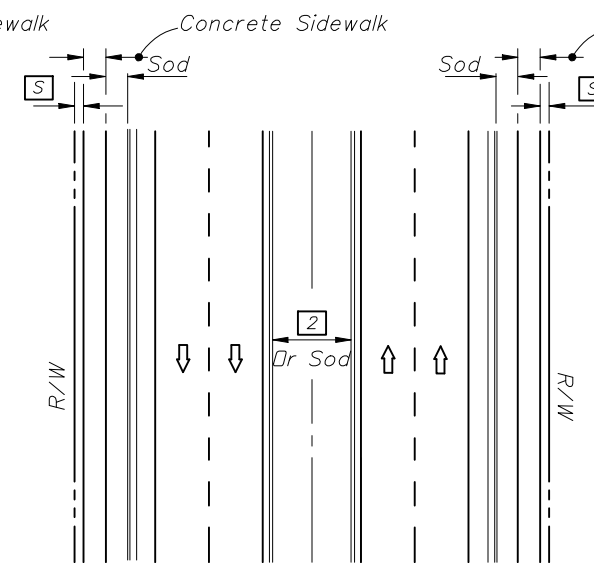
DIVIDED WIDE MEDIAN WITH OR WITHOUT CURBED MEDIAN Concrete Sidewalk



UNDIVIDED FLUSH SHOULDER



UNDIVIDED CURBED



DIVIDED CURBED

- LEGEND**
- 1 Wildflower Group #1
 - 2 Wildflower Group #2
 - G Turf (To Limit of Construction)
 - SCG Selective Clearing And Grubbing
 - LDC Limits Of Construction
 - S Turf

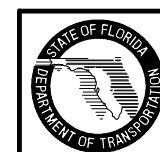
WILDFLOWER SEEDING RATES	
Common Name (Botanical Name)	lbs/ac
#1 Group	
Black-Eyed Susan (<i>Rudbeckia hirta</i>)	2
Lance-Leaf Tickseed (<i>Coreopsis lanceolata</i>)	10
Goldenmane Tickseed (<i>Coreopsis basalis</i>)	10
Leavenworth's Tickseed (<i>Coreopsis leavenworthii</i>)	10
Fire Wheel (<i>Gaillardia pulchella</i>)	10
Softhair Coneflower (<i>Rudbeckia mollis</i>)	2
Crimson Clover (<i>Trifolium incarnatum</i>)	15
#2 Group	
Annual Phlox (<i>Phlox drummondii</i>)	10
Moss Verbena (<i>Verbena tenuisecta</i>)	6
Leavenworth's Tickseed (<i>Coreopsis leavenworthii</i>)	10
Fire Wheel (<i>Gaillardia pulchella</i>)	10
Crimson Clover (<i>Trifolium incarnatum</i>)	15

Note: Wildflower seeding rates are for restoring impacted wildflower areas.

GENERAL NOTES

- All turf establishment shall be performed meeting the requirements of Section 570 of the Standard Specifications.
- Activities such as clearing, grading, and excavating that will disturb one or more acres of land require coverage under the Generic Permit for Stormwater Discharge from Large and Small Construction Activities from the Florida Department of Environmental Protection, and implementation of appropriate pollution prevention measures to minimize erosion and sedimentation and properly manage stormwater.
- Confirm compatibility of wildflower with Seeding Zones.

SEEDING ZONES

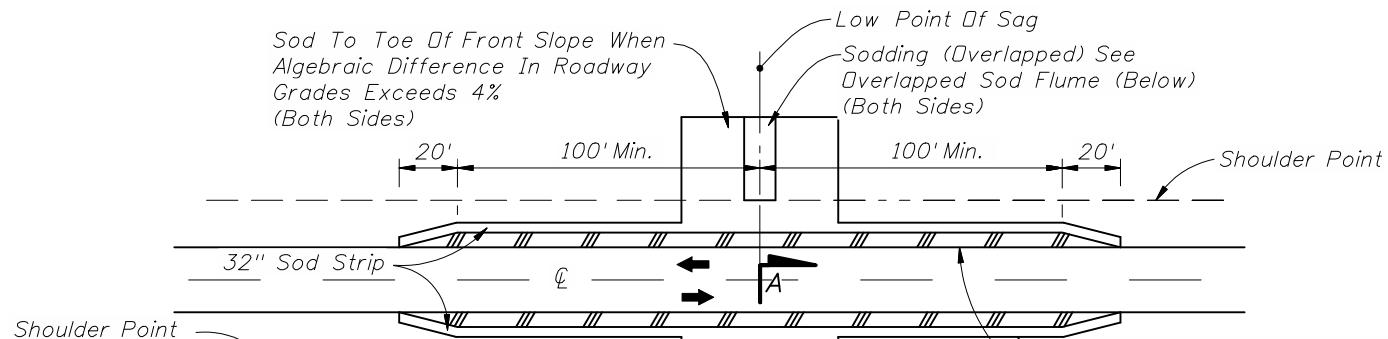


2010 FDOT Design Standards

PERMANENT EROSION CONTROL

Last Revision 07/01/07 Sheet No. 1 of 2

Index No. 104



Sodding (Overlapped) See Overlapped Sod Flume (Below) (Both Sides)

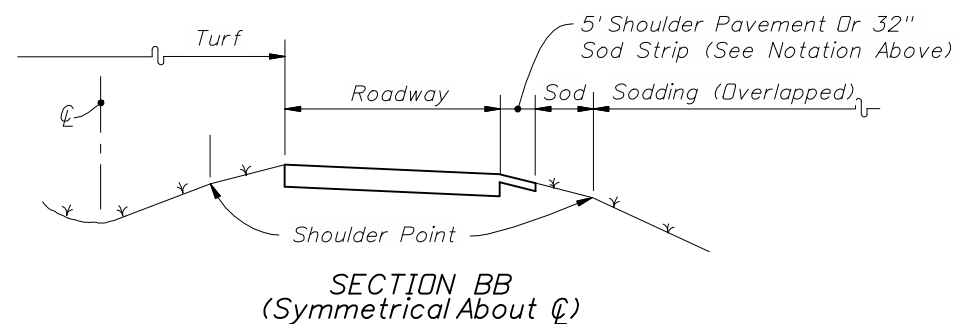
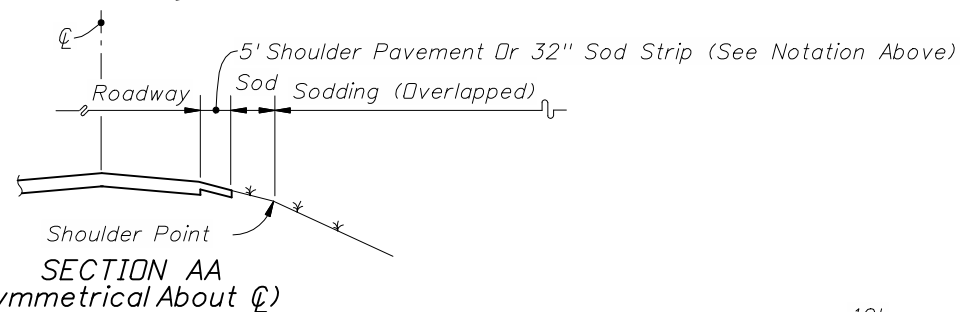
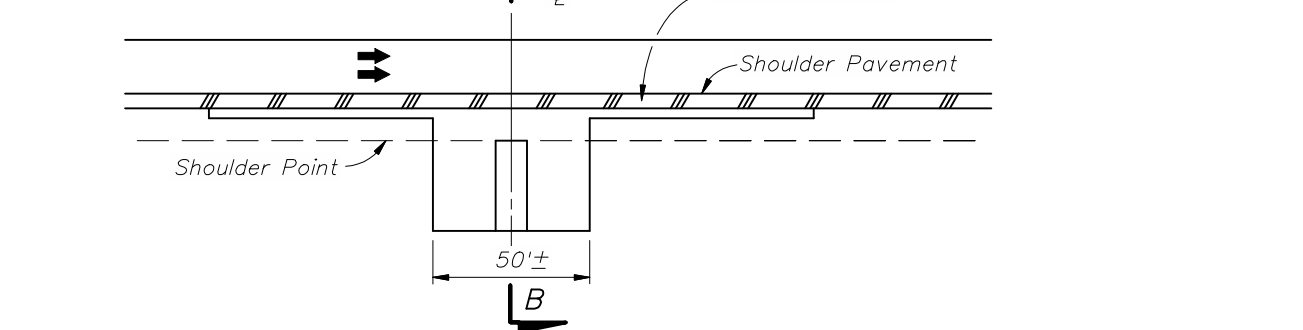
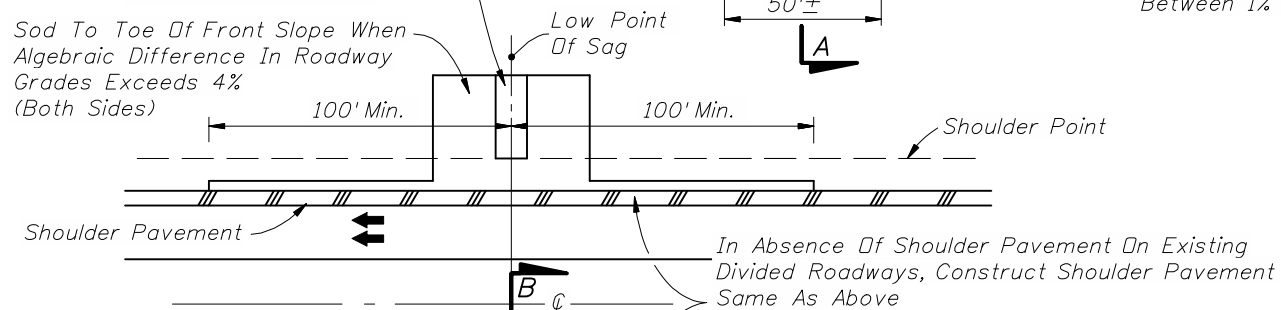
Sod To Toe Of Front Slope When Algebraic Difference In Roadway Grades Exceeds 4% (Both Sides)

Low Point Of Sag

Shoulder Point

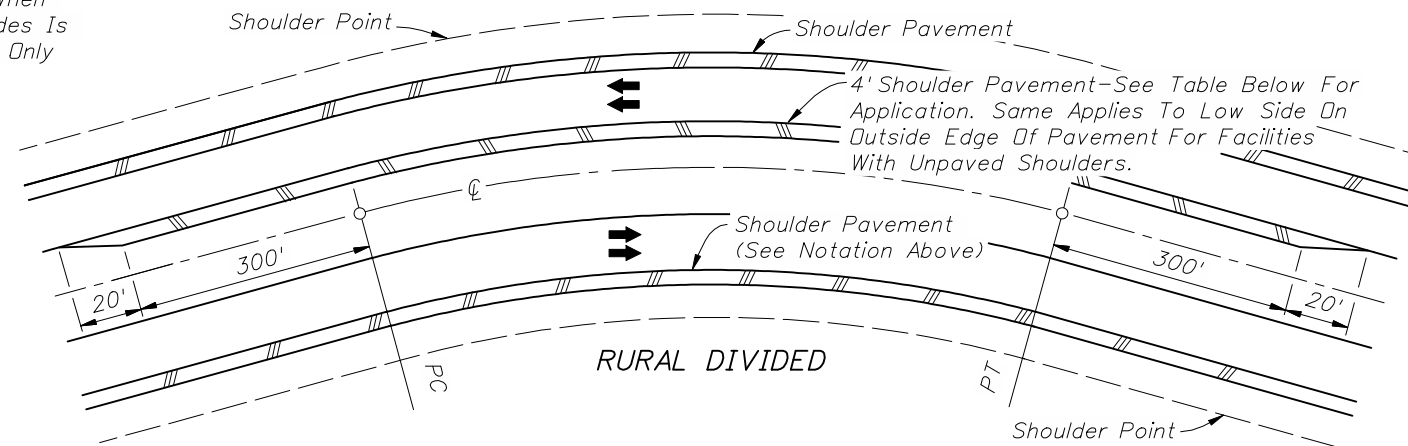
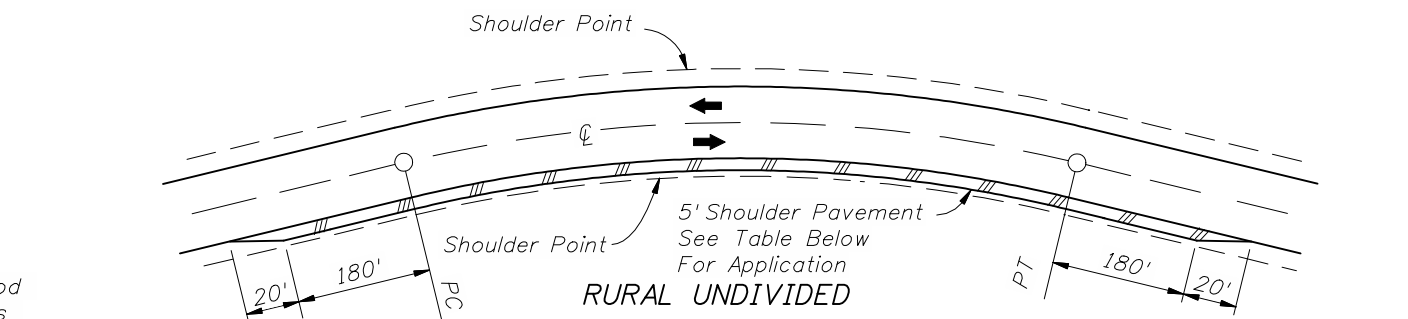
50'±

Use 5' Shoulder Pavement And 32" Sod Strip When Negative Grade Intersects Positive Grade And Algebraic Difference In Roadway Grades Is 2% Or Greater; When Algebraic Difference In Roadway Grades Is Between 1% & 2% Use 32" Sod Strip Only



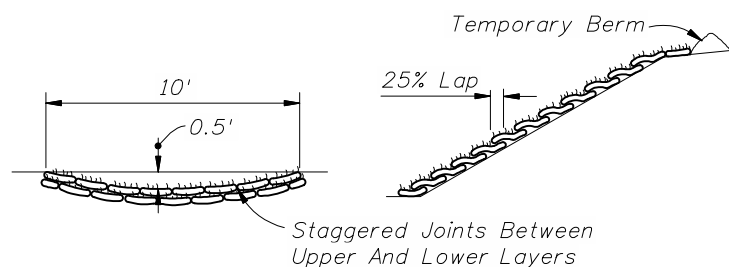
SHOULDER AND SLOPE TREATMENT IN SAG VERTICAL CURVES

TREATMENTS FOR PROTECTION FROM CONCENTRATED ROADWAY RUNOFF EROSION AND SHOULDER RAVELING



CRITERIA FOR PAVING SHOULDER ON DIVIDED AND UNDIVIDED FACILITIES		
Design Speed (mph)	Degree Of Curve	Note: Shoulder Pavement is required on all curves meeting the criteria tabulated. For curves not meeting the criteria, shoulders are to be paved where erosion of the shoulder is evident or anticipated.
30	7° Or Greater	
40	5° Or Greater	
50	4° Or Greater	
60	3° Or Greater	
65	3° Or Greater	
70	2° Or Greater	

SHOULDER AND SLOPE TREATMENT FOR SUPERELEVATED ROADWAYS

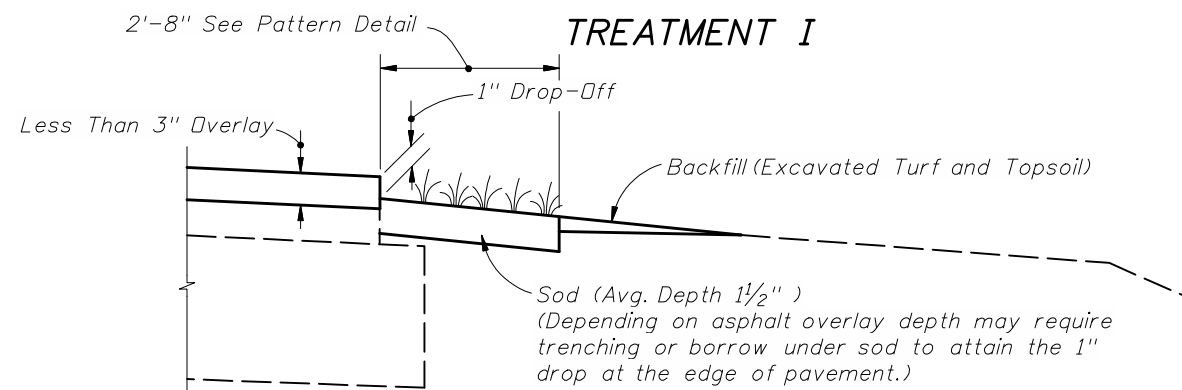


TRANSVERSE SECTION LONGITUDINAL SECTION
OVERLAPPED SOD FLUME

NOTES

1. These treatments are applicable to new construction, reconstruction and RRR projects. Project requirements for shoulder pavement and sodding that exceed the limits of this standard take precedence.
2. For sodding adjacent to ditches and at headwalls, see Index No. 281.
3. All front slopes steeper than 1:3 are to be sodded.

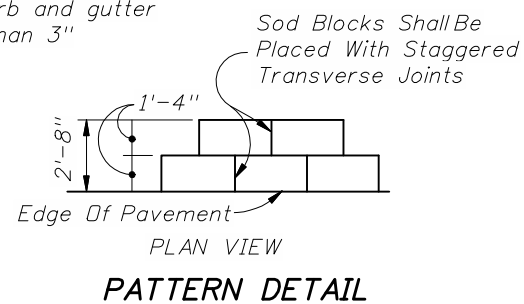




COMPLETED SHOULDER

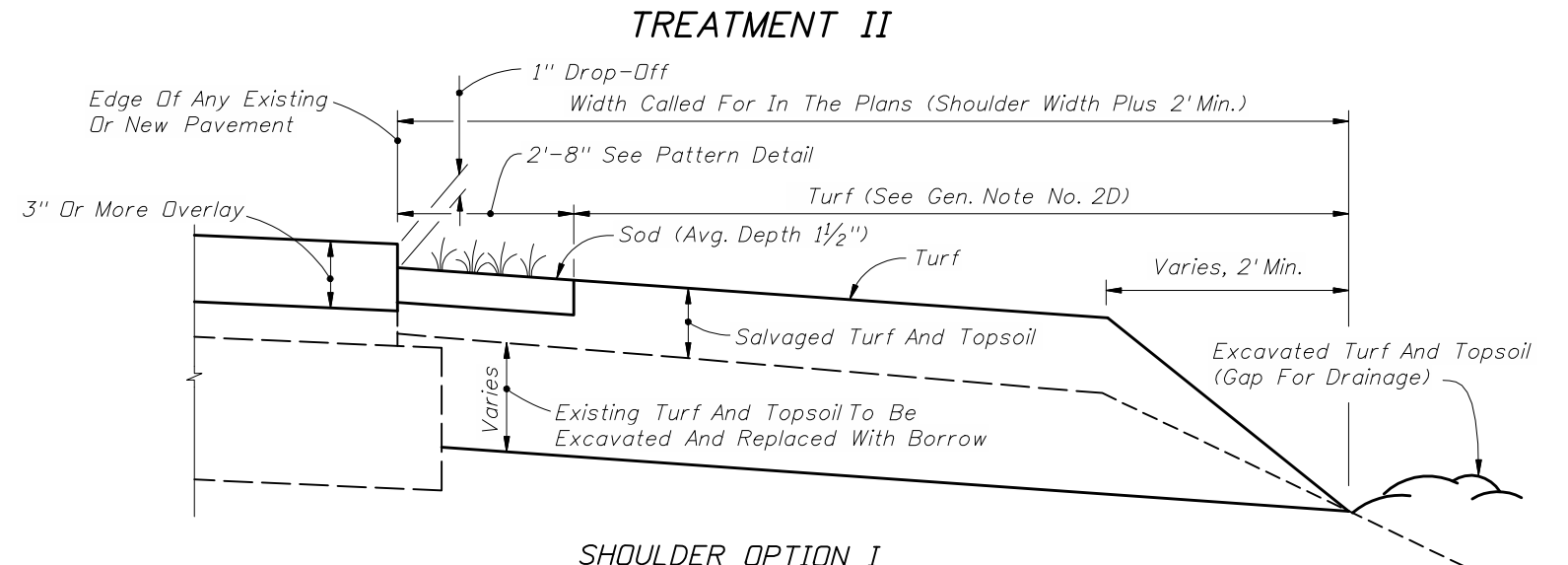
CRITERIA FOR USING TREATMENT I

- Project---
- is resurfacing, widening and resurfacing or construction of shoulder pavement
 - is rural or is urban without curb and gutter
 - resurfacing build-up is less than 3"

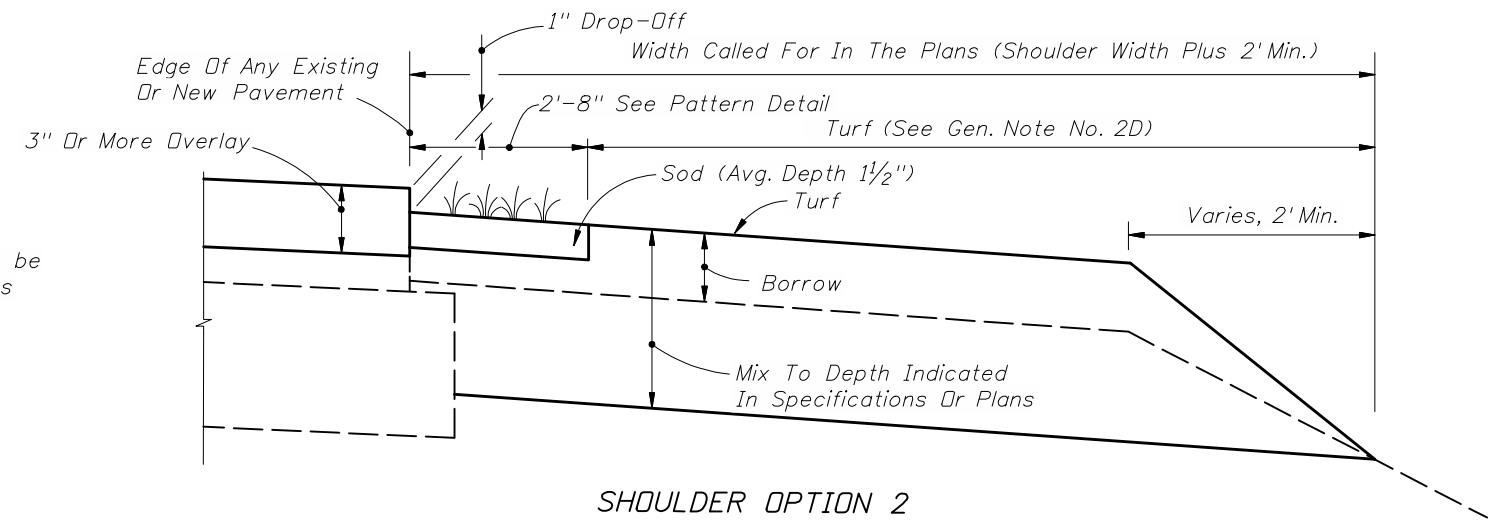


GENERAL NOTES

- Treatment I:**
 - If trenching under sod is necessary to achieve the required 1" drop-off, excavated turf and topsoil are to be used for filling voids and low areas at the edge of pavement or for flushing along the edge of sod. Excess material to be uniformly distributed over the shoulder.
 - Payment for sod, excavation of turf and topsoil and for back fill of this material under Treatment I is to be included in the contract unit price for Performance Turf, SY.
- Treatment II:**
 - All borrow shall meet requirements for a "Select" material in accordance with Index 505 and Section 120 of the Standard Specifications.
 - Borrow may be used in lieu of excavated turf and topsoil when economically feasible, however the upper 6" shall meet the requirements of Section 162 "Finished Soil Layer". There will be no additional payment for substituting borrow for excavated turf and topsoil.
 - When existing turf and topsoil do not meet the requirements of Section 162 "Finished Soil Layer", provide additive materials as necessary in the upper 6" to meet the requirements of Section 162. There will be no additional payment for additives.
 - Payment for Treatment II will be under Finished Soil Layer. Sod and other materials for turf establishment shall be paid for as Performance Turf, SY.
- Special attention is to be directed to the construction of the required 1" drop-off at the edge of pavement.
- Activities such as clearing, grading, and excavating that will disturb one or more acres of land require coverage under the Generic Permit for Stormwater Discharge from Large and Small Construction Activities from the Florida Department of Environmental Protection, and implementation of appropriate pollution prevention measures to minimize erosion and sedimentation and properly manage stormwater.
- Turf Establishment:**
 - Wildflowers destroyed by shoulder sodding and turf operations are to be reestablished under the seeding rates prescribed for permanent wildflower #2 Group shown by table on Index 104.
 - All turf establishment shall be performed meeting the requirements of Section 570 of the Standard Specifications.



SHOULDER OPTION I



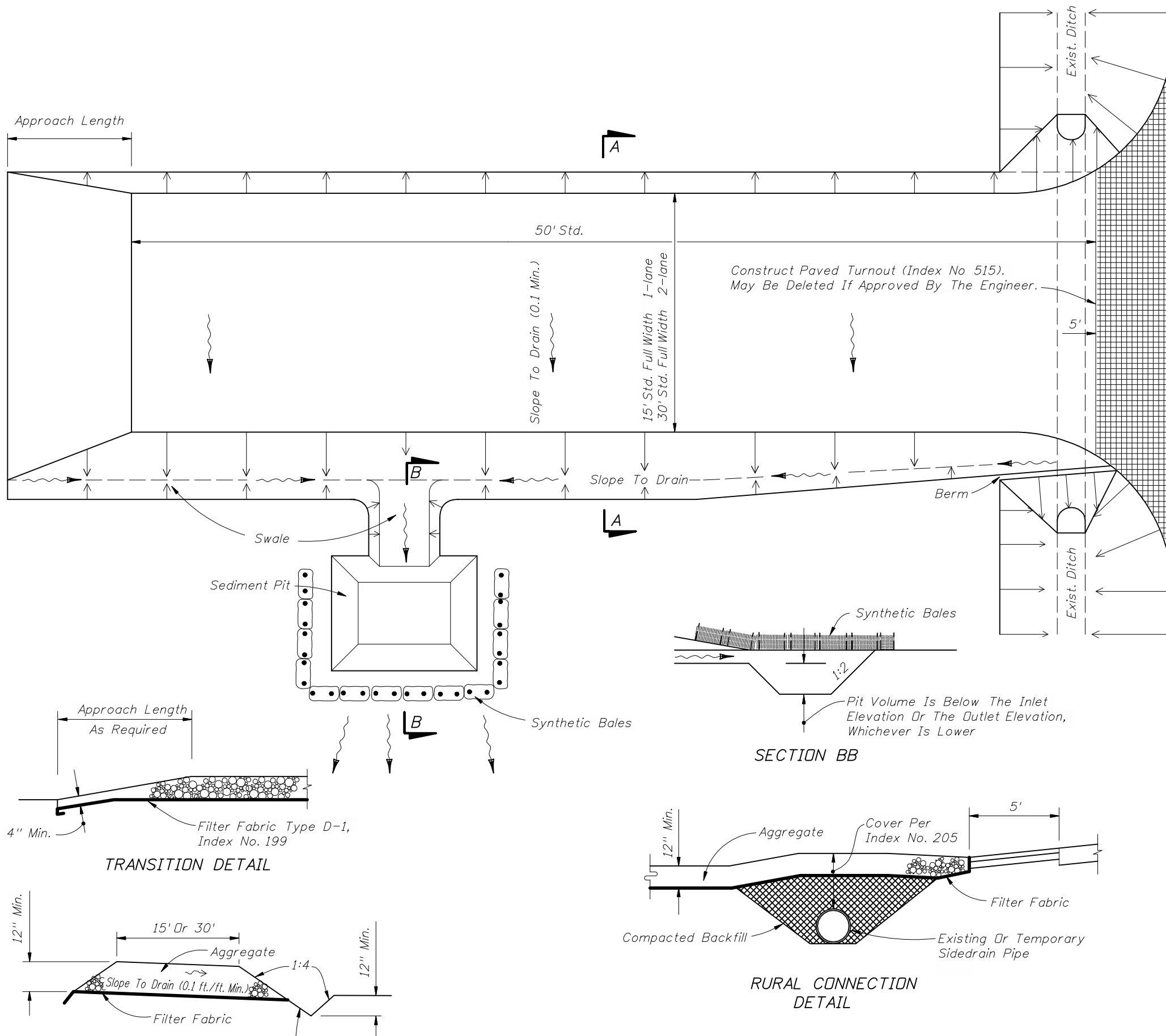
SHOULDER OPTION 2

CRITERIA FOR USING TREATMENT II

- Project---
- is resurfacing or construction of shoulder pavement
 - is rural or is urban without curb and gutter
 - resurfacing build-up is 3" or more

A SIMILAR TREATMENT MAY BE USED FOR PROJECTS THAT REQUIRE SHOULDER WIDENING. DETAILS ARE TO BE SHOWN IN THE PLANS.





Existing Roadway
Edge Of Pavement

GENERAL NOTES

1. A Soil Tracking Prevention Device (STPD) shall be constructed at locations designated by the engineer for points of egress from unstabilized areas of the project to public roads where off-site tracking of mud could occur. Traffic from unstabilized areas of the construction project shall be directed thru a STPD. Barriers, flagging, or other positive means shall be used as required to limit and direct vehicular egress across the STPD.
2. The Contractor may propose an alternative technique to minimize off-site tracking of sediment. The alternative must be reviewed and approved by the Engineer prior to its use.
3. All materials spilled, dropped, or tracked onto public roads (including the STPD aggregate and construction mud) shall be removed daily, or more frequently if so directed by the Engineer.
4. Aggregates shall be as described in Section 901 excluding 901-2.3. Aggregates shall be FDOT size #1. If this size is not available, the next available smaller size aggregate may be substituted with the approval of the Engineer. Sizes containing excessive small aggregate will track off the project and are unsuitable.
5. The sediment pit should provide a retention volume of 3600 cubic feet/acre of surface area draining to the pit.
When the STPD is isolated from other drainage areas, the following pit volumes will satisfy this requirement:
 $15' \times 50' = 100 \text{ ft.}^3$ $30' \times 50' = 200 \text{ ft.}^3$
As an option to the sediment pit, the width of the swale bottom can be increased to obtain the volume. When the sediment pit or swale volume has been reduced to one half, it shall be cleaned. When a swale is used, synthetic bales or silt fence shall be placed along the entire length.
6. The swale ditch draining the STPD shall have a 0.02% minimum and a 1.0% maximum grade along the STPD and to the sediment pit.
7. Mitered end sections are not required when the sidedrain pipe satisfies the clear zone requirements.
8. The STPD shall be maintained in a condition that will allow it to perform its function. To prevent off-site tracking, the STPD shall be rinsed (daily when in use) to move accumulated mud downward thru the stone. Additional stabilization of the vehicular route leading to the STPD may be required to limit the mud tracked.
9. A STPD shall be paid for under the contract unit price for Soil Tracking Prevention Device, EA. The unit price shall constitute full compensation for construction, maintenance, replacement of materials, removal, and restoration of the area utilized for the STPD; including but not limited to excavation, grading, temporary pipe (including MES when required), filter fabric, aggregate, paved turnout (including asphalt and base construction), ditch stabilization, approach route stabilization, sediment removal and disposal, water, rinsing and cleaning of the STPD and cleaning of public roads, grassing and sod. Synthetic Bale or Bale Type Barrier shall be paid for under the contract unit price for Synthetic Bales, LF. Silt fence shall be paid for under the contract unit price for Staked Silt Fence, LF.
10. The nominal size of a standard STPD is 15' x 50' unless otherwise shown in the plans. If the volume of entering and existing vehicles warrant, a 30' width STPD may be used if approved by the Engineer. When a double width (30') STPD is used, the pay quantity shall be 2 for each location.



2010 FDOT Design Standards

**SOIL TRACKING PREVENTION DEVICE
TYPE A**

Last Revision 07/01/07	Sheet No. 1 of 1
Index No. 106	

STANDARD CRITERIA

CLASS	TYPE (1)	APPLICATION DESCRIPTION	INDEX NO.	PERMITTIVITY SEC ⁻¹	ADS SIEVE#	MIN. GRAB TENSILE STRENGTH kN	MIN. SEWN STRENGTH kN/m	MIN. PUNCTURE kN	MIN. TRAPEZOIDAL TEAR kN	MIN. WIDE WIDTH TENSILE STRENGTH kN/m	UV RESISTANCE (Min. Allowed)		COMMENTS
											%	Time (Hrs.)	
DRAINAGE (D)	D-1	Revetment (Special)		(See D-2)	(See D-2)	1.40	1.26	0.50	0.50		50	500	Woven Monofilament Geotextiles only (Elongation <50%) Provide 12" thick bedding stone layer.
	D-2	Revetment (Standard)		281	% SOIL PASSING No. 200 SIEVE <15% 0.7 15% to 50% 0.2 >50% 0.1	% SOIL PASSING No. 200 SIEVE <15% 40 15% to 50% 60 >50% 70*	Woven Monofilament 1.10 Other Geotextiles: Elongation <50% 1.40 ≥50% 0.90	Woven Monofilament 0.99 Other Geotextiles: Elongation <50% 1.20 ≥50% 0.81	Woven Monofilament 0.40 Other Geotextiles: Elongation <50% 0.50 ≥50% 0.35	Woven Monofilament 0.25 Other Geotextiles: Elongation <50% 0.50 ≥50% 0.35	50	500	Woven Geotextiles only. No Slit Film Geotextiles allowed. Provide 12" thick bedding stone layer for revetment (standard). The bedding layer may be omitted if a D-1 fabric is used with revetment (standard). ***Bedding Stone not required for Articulating Block. *For cohesive soils with a plasticity index >7, maximum average role value for ADS is number 50 sieve.
		Articulating Block****											
		Gabions											
		Rock, Rubble, Broken Concrete											
	D-3	Underdrain ***	286	% SOIL PASSING No. 200 SIEVE <15% 0.5 15% to 50% 0.2 >50% 0.1	% SOIL PASSING No. 200 SIEVE <15% 40 15% to 50% 60 >50% 70*	Elongation <50% 1.10 ≥50% 0.70	Elongation <50% 0.99 ≥50% 0.63	Elongation <50% 0.40 ≥50% 0.25	Elongation <50% 0.40** ≥50% 0.25	50	500	No woven slit film fabrics allowed. *For cohesive soils with a plasticity index >7, maximum average role value for ADS is number 50 sieve. **Required Trapezoidal tear for woven monofilament is 250. ***See Index No. 286 for the permittivity and ADS values of the internal filter fabric of Type V Underdrain.	
		French Drain	285										
		Sheet Piling Filter	280										
		Filter Fabric Jacket (Culvert)	287										
	D-4	Slope Pavement (Sand-Cement)	281	0.5	40	0.80	0.72	0.22	0.155	50	500	Non-woven, needle-punch only. Elongation ≥50%	
		Ditch Pavement (Sand-Cement)											
	D-5	Mechanical Stabilized Retaining Wall		0.5	40	0.40	0.36	0.22	0.175	50	500		
Cast-In-Place Retaining Wall													
D-6	Slope Pavement (Concrete)	281	0.5	40	0.80	0.72	0.22	0.155	50	500	Non-woven, needle-punch only. Elongation ≥50%		
	Ditch Pavement (Concrete)												
EROSION (E)	E-1	Staked Silt Fence	102	0.05	NA	0.40	0.36	NA	0.155		80	500	Min. Filtration Efficiency of 75% & min. flow rate of 0.3 gal.
	E-2	Wind Screen		0.05	NA	0.40	0.36	NA	NA		80	150	
	E-3	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 1)	NA	NA	NA	NA	NA	NA	NA	2 x 1	80	500	Use where design shear stress is ≤100 Pa
	E-4	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 2)	NA	NA	NA	NA	NA	NA	NA	4 x 2	80	500	Use where design shear stress is ≤170 Pa
	E-5	Plastic Erosion Mat (Turf Reinforcement Mat) (Type 3)	NA	NA	NA	NA	NA	NA	NA	8 x 4	80	500	Use where design shear stress is ≤240 Pa

(1) Type refers to FDOT class and application.

TABLE I

GENERAL NOTES

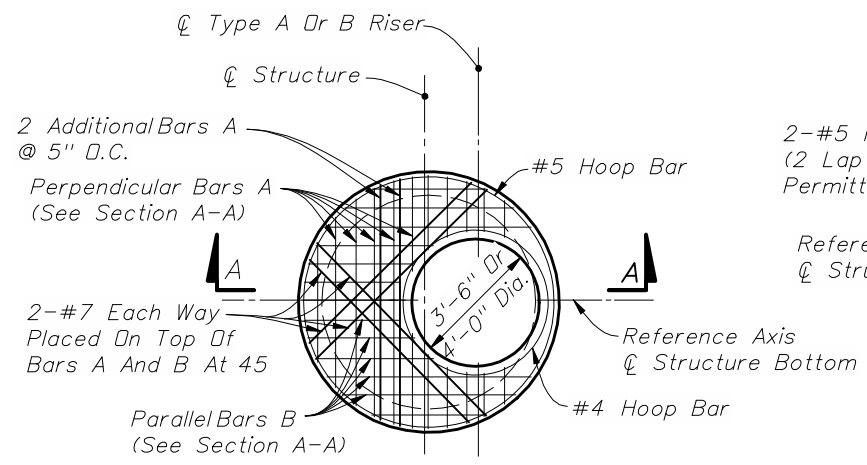
DESIGN NOTES

Test	Unit	Test Method
Permittivity	sec ⁻¹	ASTM-D-4491
ADS	mm	ASTM-D-4751
Elongation	%	ASTM-D-4632
Grab Tensile Strength	kN	ASTM-D-4632
Wide With Tensile Strength	kN/m	ASTM-D-4595
Maximum Design Velocity	M/sec	See Design Note 3
Sewn Strength	kN/m	ASTM-D-4884
Puncture	kN	ASTM-D-4833
Trapezoidal Tear	kN	ASTM-D-4533
Ultraviolet Resistance	% Retained In Strength	ASTM-D-4355
Filtration Efficiency	%	ASTM-D-5141
Flow Rate	L ³ /min.	ASTM-D-5141

- Specifications for geotextiles are in Section 985. Physical criteria for each application is provided by this standard, in conjunction with those sections.
- All values except ADS are MINIMUM AVERAGE ROLL values in the weakest principal direction. Values for ADS are MAXIMUM AVERAGE ROLL values.
- Test soil or fill material adjacent to the geotextile for gradation to select values for permittivity and ADS.
- Unless specifically restricted in COMMENTS column, any type of material meeting specification 985 may be used.
- Wide width tensile strength is expressed in units of measure of kN/m, in machine direction and cross direction, as MD x CD.

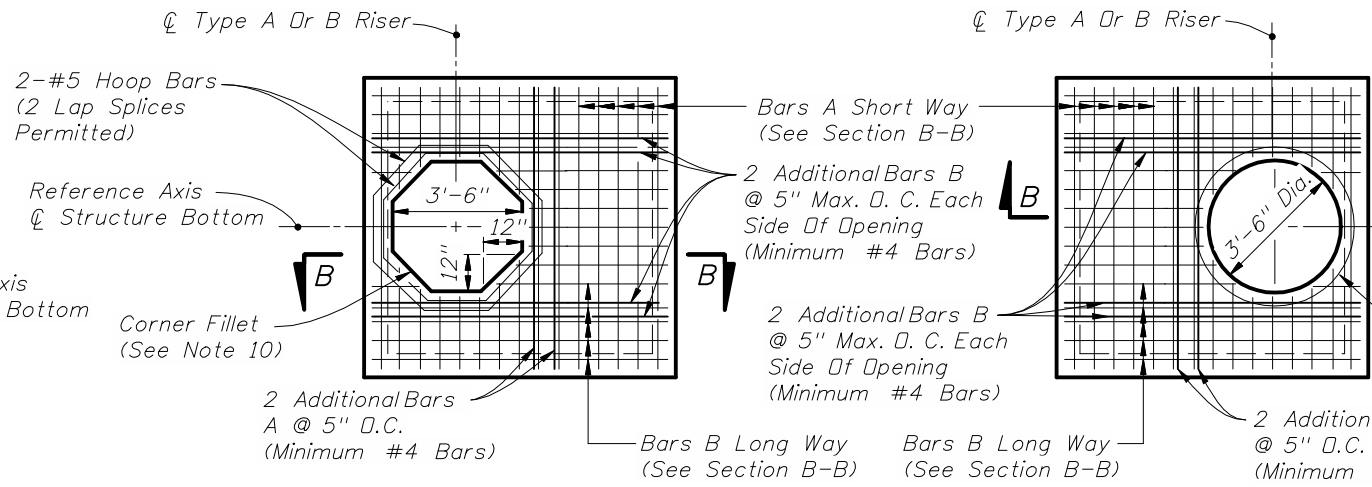
- The Designer shall review this criteria and adjust the values as necessary to satisfy project requirements. These adjustments shall be called for in the plans or contained in the project special provisions.
- UV Resistance: The value represents the percent minimum textile strength retained (ASTM-D-4632) after weathering per ASTM-D-4355 for the test period (hours).
- Shear stress limits for plastic erosion mats determined by 30 minutes sustained flow in unvegetated state as determined by tests performed by Utah State University, Texas Transportation Institute or an independent testing laboratory approved by the State Drainage Engineer.





NOTE:
 Not Applicable For Type A, B, C, D & E Ditch Bottom Inlets Or Type S & V Gutter Inlets.
 See Index Nos. 220, 221, 230, 231 & 232.

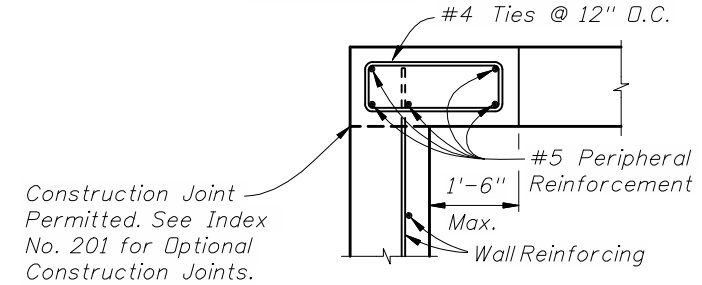
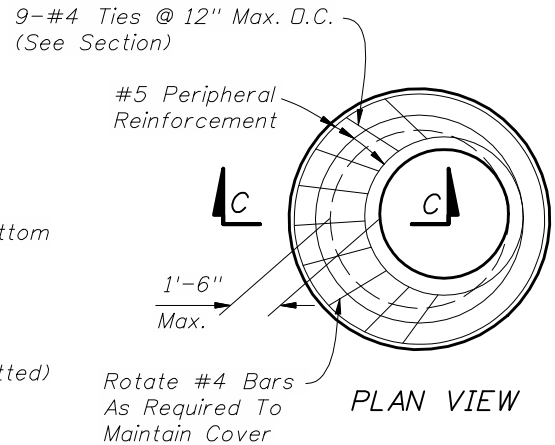
TOP SLAB REINFORCING STEEL DIAGRAM (ALTERNATE A)



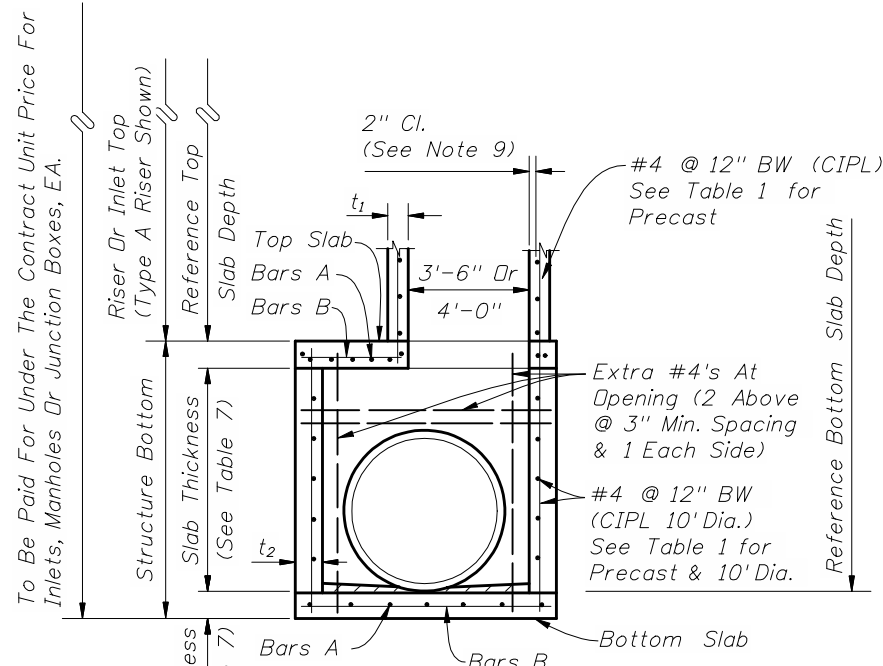
SQUARE OPENING WITH CORNER FILLETS

ROUND RISER OPENING

TOP SLAB REINFORCING STEEL DIAGRAM (ALTERNATE B)

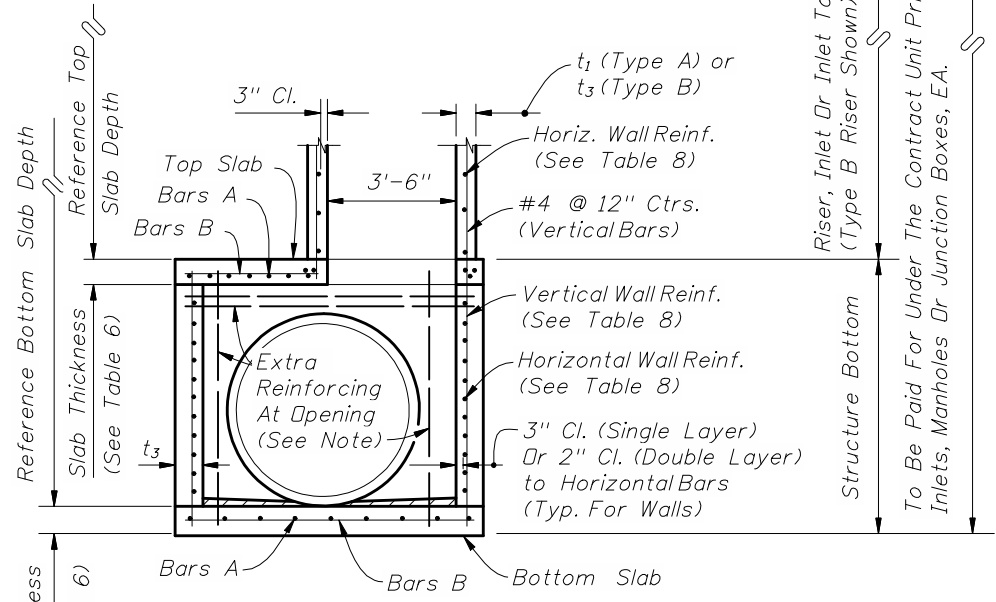


SECTION C-C SPECIAL TOP SLAB*



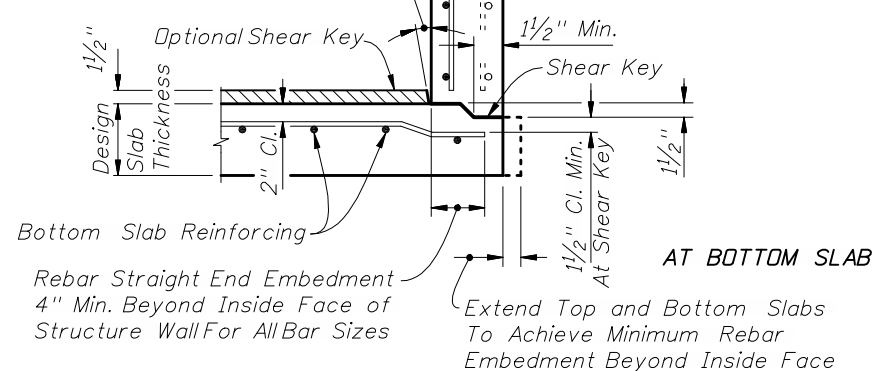
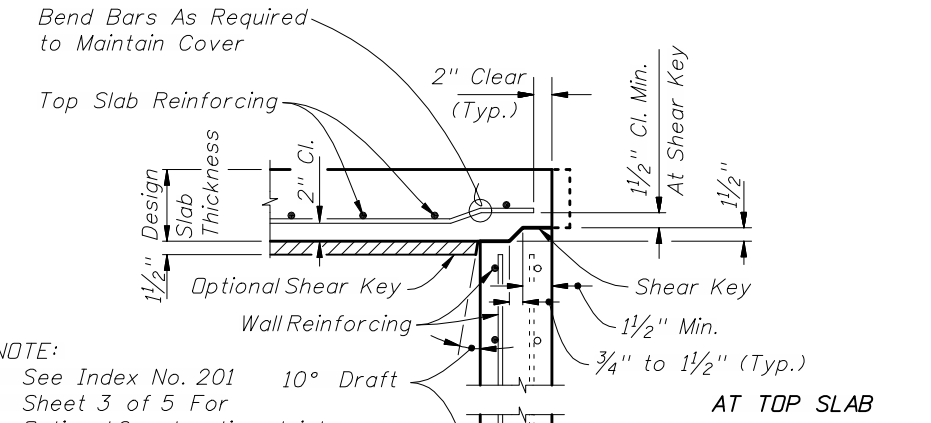
*NOTE:
 When the inside diameter of a round structure is not more than 1'-6" larger than the opening in the riser or top slab, the top of the structure or riser shall be constructed according to the "Special Top Slab" details on this sheet.

SECTION A-A (ALTERNATE A)



NOTE:
 Provide one extra #4 bar reinforcement each side of each opening and two extra #4 bars at 3" min. spacing above each opening.

SECTION B-B (ALTERNATE B)



TYPICAL SLAB TO WALL DETAILS FOR PRECAST STRUCTURES



**ROUND STRUCTURE BOTTOMS
(ALTERNATE A) & ROUND RISERS—TABLE 1**

Wall Thickness (t_1 & t_2) and Vertical & Horizontal Areas of Reinforcement (A_s)

Type	Structure / Riser Diameter (feet)	Cast-In-Place Items Class II Concrete			Precast Items				
		t_1 Riser (inches)	t_2 Bottom (inches)	A_s (in. ² /ft.)	Class II Concrete			ASTM C478	
					t_1 Riser (inches)	t_2 Bottom (inches)	A_s (in. ² /ft.)	t_1 or t_2 (inches)	A_2 *** (in. ² /ft.)
P	3'-6"	6	8	0.20	6	8	0.20	4**	0.105
P	4'-0"	6	8	0.20	6	8	0.20	5**	0.120
J	5'-0"	-	8	0.20	-	8	0.20	6**	0.150
J	6'-0"	-	8	0.20	-	8	0.20	6	0.180
J	7'-0"	-	8	0.20	-	8	0.20	7	0.210
J	8'-0"	-	8	0.20	-	8	0.24	8	0.240
J	10'-0"	-	10	0.40##	-	10	0.40##	10	0.300
J	12'-0"	-	10	0.40##	-	12	0.40##	12	0.360

TABLE 1 NOTES:

##Provide 0.20 eq. in.²/ft. at each face, 12" max. bar spacing.

**Modified minimum wall thickness.

***Min. total circumferential reinforcement for continuous steel hoops:

$A_2 = 0.50$ sq. in. for riser section height equal or less than 2'-0" (2 hoop min.)

$A_2 = 0.75$ sq. in. for riser section height more than 2'-0" up to 4'-0" (3 hoop min.)

Areas of reinforcing for precast items are based on Grade 60 reinforcing;

No reduction in the area of reinforcement is allowed for welded wire fabric in Table 1;

Area of vertical reinforcing may be reduced in accordance with ASTM C478.

**SQUARE & RECTANGULAR STRUCTURES
(ALTERNATE B) — TABLE 2**

Type	Wall Length (feet)	Max. Depth (feet)	Wall Thickness (t_3)	
			CIPL (in.)	Precast (in.)
P	≤3'-6"	40	6 Riser 8 Bottom	6
J	4'-0"	40	8	6
J	5'-0"	22	—	6
J	6'-0"	15	—	6
J	5'-0" to 9'-0"	40	8	8
J	10'-0"	26	8	8
J	≥10'-0"	40	10	10

TABLE 2 NOTES:

See Table 8 for Reinforcing Schedule.

GENERAL NOTES

- Standard structure bottoms 4'-0" diameter and smaller (Alt. A) and 3'-6" square (Alt. B) are designated Type P. Larger standard structure bottoms are designated Type J. Risers are permitted for all structures. Round risers are designated Type A, square risers are designated Type B.
- Walls of circular structures (Alt. A) constructed in place may be of brick or reinforced concrete. Precast and rectangular structures (Alt. B) shall be constructed of reinforced concrete only.
- Wall thickness and reinforcement are for either reinforced cast-in-place or precast concrete units except that precast circular units may be furnished with walls in accordance with ASTM C478 (see modified wall thicknesses in Table 1).
- Top and bottom slab thickness and reinforcement are for precast and cast-in-place construction. All concrete shall be of Class II concrete, except use Class IV concrete when shown in the Plans, for special applications of structures located in extremely aggressive environments. Concrete as specified in ASTM C478 (4000 psi) may be used in lieu of Class II concrete for precast items manufactured in accordance with Specifications Section 449.
- All reinforcement shown is ASTM A615/A615M Grade 60 steel, deformed bar. Equivalent area Grade 40 steel or equivalent area ASTM A185 (smooth) or ASTM A497 (deformed) welded wire fabric may be substituted according to Index No. 201, unless otherwise noted.
- Alt. A or Alt. B structure bottoms may be used in conjunction with curb inlet tops Types 1, 2, 3, 4, 5, 6, 9, and 10, and any manhole or junction box unless otherwise shown in the plans or other standard drawings. Alt. B structure bottoms may be used in conjunction with curb inlet Types 7 & 8, or any ditch bottom inlet unless otherwise shown in the plans or other standard drawings.
- Rectangular structures may be rotated as directed by the Engineer in order to facilitate connections between the structure walls and storm sewer pipes.
- Except when ACI hooks are specifically required, reinforcement in top and bottom slab shall be straight embedment.
- All reinforcement must have 2" minimum cover except for 3'-6" diameter precast circular units manufactured under ASTM C478, keyed construction joints, and pipe openings must all have 1½" minimum cover, unless otherwise shown. Additional bars used to restrain hole formers for precast structures with grouted pipe connections, may be left flush with the hole surface. Cut or bend reinforcement at pipe openings to maintain cover. Exposed ends of reinforcing at precast pipe openings and grouted joints must be removed to 1" below the concrete surface and sealed with a Type F epoxy in accordance with Specification Section 926. Horizontal steel in rectangular structures shall be lapped a minimum of 30 bar diameters or by standard hooks at corners.
- The corner fillets shown are necessary for rectangular structures used with circular risers and inlet throats and when used on skew with rectangular risers, inlets and inlet throats. Fillets will be required in the top slab of the Alt. A structure bottoms when used with the Alt. B risers. Each fillet shall be reinforced with two #5 bars.
- Inlet walls, throats, risers or manhole tops shall be secured to structures as shown on Index No. 201 (Sheet 3 of 5) Optional Construction Joints.
- Structures with depths over 14' below the mean high water table are to be checked for flotation by the designer of the drainage project.
- Units larger than specified standards may be substituted at the contractor's option when these units will not cause or increase the severity of utility conflicts. Such larger units shall be furnished at no additional cost to the Department. Larger Alt. A units cannot replace Alt. B units without approval of the Engineer. This note applies to this Index only.
- For manhole and junction box tops, for frames and covers, and, for supplementary details see Index No. 201.
- Type J structure bottoms must have a minimum 6'-0" wall height when possible, for maintenance access.



TABLE 3-MINIMUM STRUCTURE SIZES FOR SINGLE PIPE CONNECTION PER SIDE

PIPE SIZE	RECTANGULAR Side Dimension (L)		ROUND Diameter (D)	
	Single Pipe Per Side	Note Number	Single Pipe or $\theta=180^\circ$	2 to 4 Pipes $\theta=90^\circ$
18"	3'-6"		3'-6"	4'-0"
24"	3'-6"		3'-6"	5'-0"
30"	3'-6"/4'-0"	2	4'-0"	6'-0"
36"	4'-0"/5'-0"	3	5'-0"	7'-0"
42"	5'-0"		6'-0"	7'-0"
48"	6'-0"		6'-0"	8'-0"
54"	6'-0"		7'-0"	10'-0"
60"	7'-0"		7'-0"	10'-0"
66"	7'-0"/8'-0"	4	8'-0"	12'-0"
72"	8'-0"		8'-0"	12'-0"
78"	9'-0"		10'-0"	12'-0"
84"	9'-0"		12'-0"	N/A

TABLE 3 NOTES:

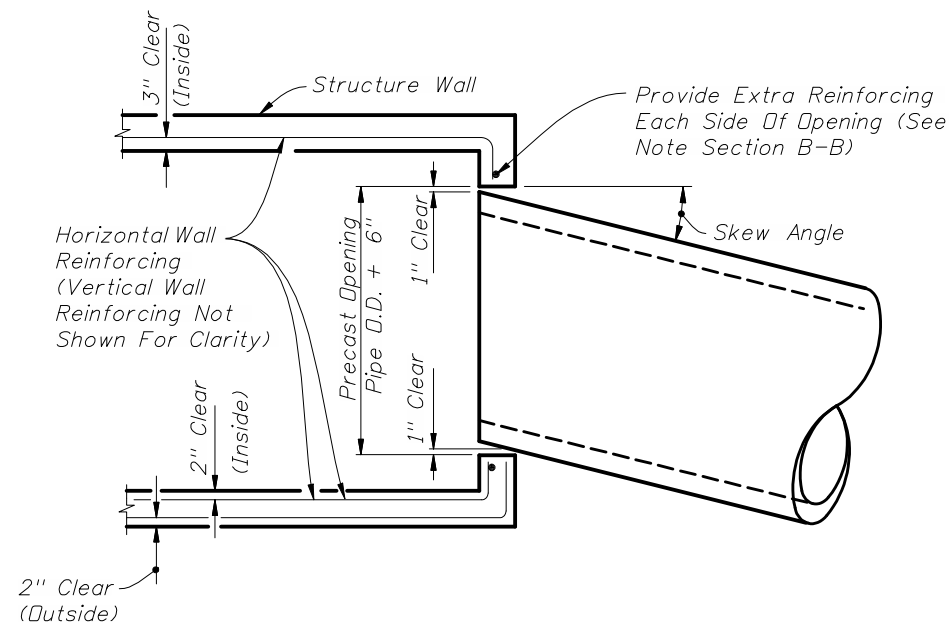
- For Round Structures with variable angles between pipes and variable pipe sizes, refer to the FDOT Storm Drain Handbook.
- For 3'-6" Precast Square Structure Bottoms, 30" Pipes with similar invert elevations are not permitted in adjacent walls. Use 4'-0" Side Dimensions when 30" pipe openings are required on adjacent walls and the difference in flow lines is less than 3'-0".
- For 4'-0" Precast Square Structure Bottoms, 36" Pipes with similar invert elevations are not permitted in adjacent walls. Use 5'-0" Side Dimensions when 36" pipe openings are required on adjacent walls and the difference in flow lines is less than 3'-0".
- For 7'-0" Precast Square Structure Bottoms, 66" Pipes with similar invert elevations are not permitted in adjacent walls. Use 8'-0" Side Dimensions when 66" pipe openings are required on adjacent walls and the difference in flow lines is less than 4'-0".

TABLE 4-MINIMUM SIZES FOR MULTIPLE PARALLEL PIPE CONNECTIONS FOR RECTANGULAR STRUCTURE BOTTOMS

PIPE SIZE	PIPE SPACING (S)	MINIMUM WALL LENGTH (L) FOR NUMBER OF PARALLEL PIPES		
		2	3	4
18"	2'-10"	6'-0"	8'-6"	11'-0"
24"	3'-5"	6'-6"	10'-0"	13'-6"
30"	4'-3"	8'-0"	12'-6"	16'-6"
36"	5'-1"	9'-6"	14'-6"	19'-6"
42"	6'-0"	11'-0"	17'-0"	-
48"	6'-9"	12'-6"	19'-0"	-
54"	7'-8"	14'-0"	-	-
60"	8'-6"	15'-0"	-	-
66"	9'-0"	16'-6"	-	-
72"	10'-0"	18'-0"	-	-
78"	10'-9"	19'-0"	-	-
84"	11'-8"	20'-6"	-	-

TABLE 4 NOTES:

- Minimum wall lengths based on precast structures, using concrete pipe with maximum skew angles per Table 5.
- Wall lengths exceeding 20'-0" require special designs.

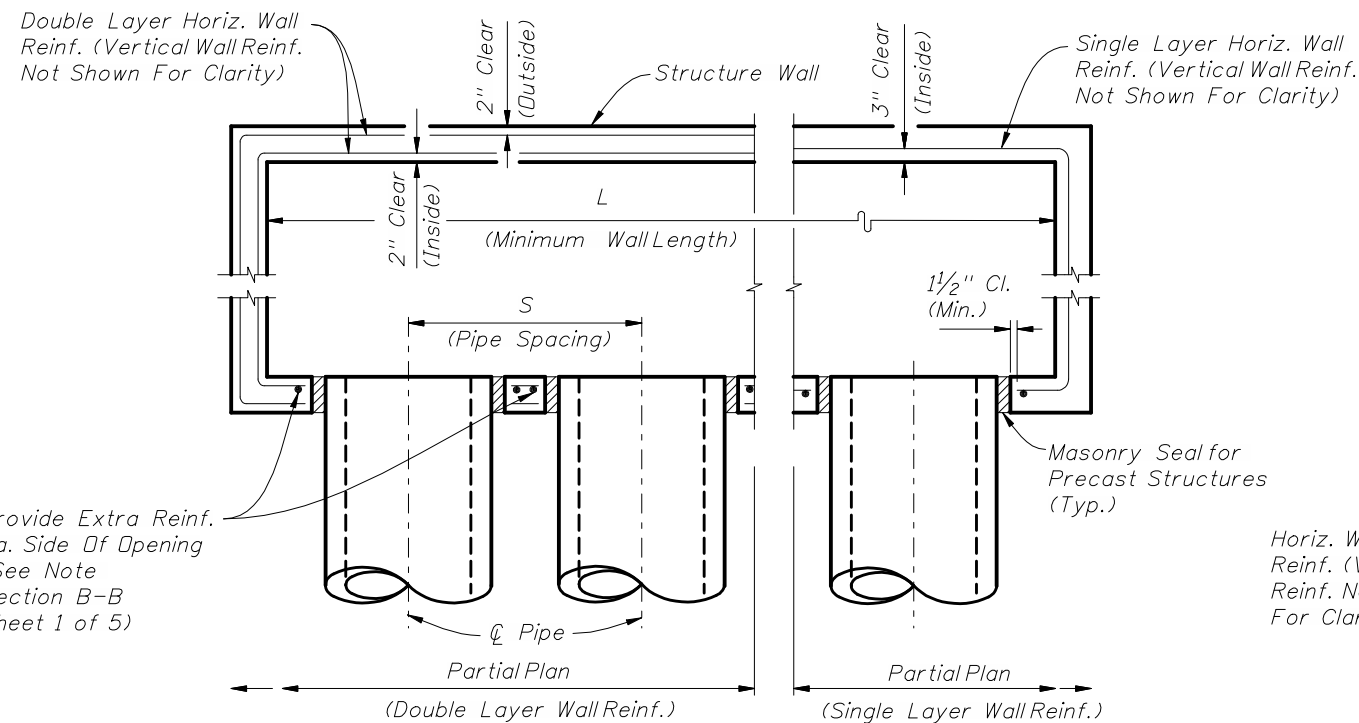


MAXIMUM PIPE SKEW FOR PRECAST ROUND OPENINGS PLAN VIEW

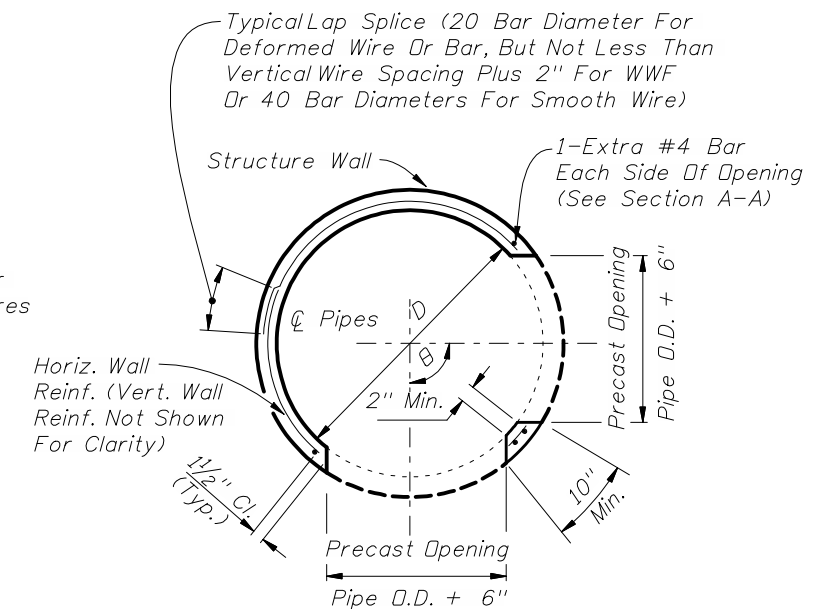
WALL THICKNESS	PIPE SIZE												
	18"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	
MAXIMUM SKEW ANGLE	8"	19°	17°	16°	16°	15°	14°	14°	13°	13°	13°	12°	12°
	6"	21°	20°	18°	17°	17°	16°	15°	15°	14°	14°	13°	13°

TABLE 5 NOTES:

These values are based on 2" clearance for precast structures. Larger skews are possible for Cast-In-Place Structures or elliptical pipe openings when approved by the Engineer.



MULTIPLE PARALLEL PIPE CONNECTIONS DETAIL PLAN VIEW



PRECAST ROUND STRUCTURES WITH MULTIPLE PIPE CONNECTIONS

STRUCTURE SIZES FOR PIPE CONNECTIONS

SLAB DESIGNS - SQUARE AND RECTANGULAR STRUCTURES (TABLE 6)
 (ALL SLABS 8" THICK EXCEPT AS NOTED - REINFORCING PARALLEL TO SHORT WAY AND LONG WAY)

SHORT-WAY		LONG-WAY	
SLAB DEPTH	SCHEDULE (Bars A)	SLAB DEPTH	SCHEDULE (Bars B)
SIZE: 3'-6" x UNLIMITED			
≥0.5' < 8'	B10	≥0.5' < 24'	B10
8' < 13'	B5.5	24'-40'	B5.5
13' < 31'	C6.5		
31'-40'	D7		
SIZE: 4' x UNLIMITED			
≥0.5' < 7'	B5.5	≥0.5' < 15'	B10
7' < 19'	C6.5	15' < 29'	B5.5
19' < 31'	D7	29'-40'	C6.5
31'-40'	E5		
SIZE: 5' x 5'			
≥0.5' < 3'	C6.5	≥0.5' < 3'	C6.5
3' < 7'	B5.5	3' < 13'	C6.5
7' < 22'	C6.5	13' < 22'	D7
22' < 29'	D7	22' < 29'	D4.5
29'-40'	E5	29'-40'	E5
SIZE: 5' x 6'			
≥0.5' < 12'	C6.5	≥0.5' < 3'	C6.5
12' < 26'	D7	3' < 9'	B5.5
26'-40'	E5	9' < 23'	C3.5
		23' < 35'	D4.5
		35'-40'	E5
SIZE: 5' x 7'			
≥0.5' < 10'	C6.5	≥0.5' < 10'	B5.5
10' < 20'	D7	10' < 31'	C3.5
20' < 34'	E5	31'-40'	D4.5
34'-40'	F5		
SIZE: 5' x 8'			
≥0.5' < 7'	C6.5	≥0.5' < 8'	B10
7' < 13'	D7	8' < 17'	B5.5
13' < 24'	E5	17' < 25'	C6.5
24'-40'	F5	25'-40'	C3.5
SIZE: 5' x 9'			
≥0.5' < 8'	C6.5	≥0.5' < 14'	B10
8' < 14'	D7	14' < 24'	B5.5
14' < 25'	E5	24' < 34'	C6.5
25'-40'	F5	34'-40'	C3.5
SIZE: 5' x UNLIMITED			
≥0.5' < 8'	C6.5	≥0.5' < 14'	B10
8' < 14'	D7	14' < 24'	B5.5
14' < 25'	E5	24' < 34'	C6.5
25'-40'	F5	34'-40'	C3.5

SHORT-WAY		LONG-WAY	
SLAB DEPTH	SCHEDULE (Bars A)	SLAB DEPTH	SCHEDULE (Bars B)
SIZE: 6' x 6'			
≥0.5' < 13'	C6.5	≥0.5' < 10'	C3.5
13' < 23'	D7	10' < 18'	D4.5
23'-40'	E5	18' < 27'	E5
		27' < 33'	E3
		33'-40'	F5
SIZE: 6' x 7'			
≥0.5' < 8'	C6.5	≥0.5' < 8'	C6.5
8' < 16'	D7	8' < 12'	C3.5
16' < 28'	E5	12' < 21'	D4.5
28'-40'	F5	21' < 28'	E5
		28' < 35'	E3
		35'-40'	F5
SIZE: 6' x 8'			
≥0.5' < 6'	C6.5	≥0.5' < 6'	B5.5
6' < 13'	D7	6' < 11'	C6.5
13' < 22'	E5	11' < 17'	C3.5
22' < 35'	F5	17' < 22'	D4.5
35'-40'	G5	22' < 32'	E5
		32'-40'	E3
SIZE: 6' x 9'			
≥0.5' < 8'	D7	≥0.5' < 8'	B5.5
8' < 14'	E5	8' < 14'	C6.5
14' < 24'	F5	14' < 21'	C3.5
24'-34'	G5	21' < 25'	D4.5
		25'-34'	E5
SIZE: 6' x UNLIMITED			
≥0.5' < 8'	D7	≥0.5' < 8'	B5.5
8' < 14'	E5	8' < 14'	C6.5
14' < 24'	F5	14' < 21'	C3.5
24'-34'	G5	21' < 25'	D4.5
		25'-34'	E5
SIZE: 7' x 7'			
≥0.5' < 8'	C6.5	≥0.5' < 4'	C6.5
8' < 15'	D7	4' < 7'	C3.5
15' < 26'	E5	7' < 11'	D4.5
26'-40'	F5	11' < 22'	E3
		22' < 32'	F3.5
		32'-40'	G3.5
SIZE: 7' x 8'			
≥0.5' < 5'	C6.5	≥0.5' < 5'	C6.5
5' < 11'	D7	5' < 8'	C3.5
11' < 19'	E5	8' < 13'	D4.5
19' < 30'	F5	13' < 22'	E3
30'-40'	G5	22' < 30'	F3.5
		30'-40'	G3.5
SIZE: 7' x 9'			
≥0.5' < 9'	D7	≥0.5' < 7'	C6.5
9' < 15'	E5	7' < 10'	C3.5
15' < 25'	F5	10' < 14'	D4.5
25'-34'	G5	14' < 21'	E5
		21' < 29'	F5
		29'-34'	F3.5

SHORT-WAY		LONG-WAY	
SLAB DEPTH	SCHEDULE (Bars A)	SLAB DEPTH	SCHEDULE (Bars B)
SIZE: 8' x 8'			
≥0.5' < 10'	D7	≥0.5' < 9'	D4.5
10' < 19'	E5	9' < 13'	E5
19'-30'	F5	13' < 18'	F5
		18' < 23'	F3.5
		23'-30'	G3.5
SIZE: 8' x 9'			
≥0.5' < 8'	D7	≥0.5' < 7'	D7
8' < 14'	E5	7' < 9'	D4.5
14' < 23'	F5	9' < 15'	E3
23'-31'	G3.5	15' < 20'	F5
		20' < 23'	F3.5
		23'-31'	G3.5
SIZE: 9' x 9'			
≥0.5' < 8'	D7	≥0.5' < 7'	D4
8' < 14'	E5	7' < 10'	E5
14' < 22'	F5	10' < 17'	F3.5
		17' < 22'	G3.5
SIZE: 9'x9'x10" SLAB THICKNESS			
22' < 36'	F5	22' < 31'	F3.5
36'-40'	G5	31'-40'	G3.5
SIZE: 10'x10'x10" SLAB THICKNESS			
≥0.5' < 7'	C6.5	0.5' < 6'	C6.5
7' < 10'	D7	6' < 9'	D4.5
10' < 18'	E5	9' < 15'	E5
18' < 27'	F5	15' < 22'	F5
27'-32'	G5	22'-32'	G3.5
SIZE: 12'x12'x12" SLAB THICKNESS			
≥0.5' < 10'	D7	≥0.5' < 8'	D7
10' < 16'	E5	8' < 14'	E5
16' < 25'	F5	14' < 22'	F5
25'-35'	G5	22' < 30'	G5
		30'-35'	H4

SLAB AND WALL DESIGN TABLE NOTES

- Size is the inside dimension(s) of a structure.
- Slab reinforcement is appropriate for top, intermediate, and bottom slabs.
- Bottom Slabs for precast 3'-6" x 3'-6" rectangular structures at 15' depth or less, may be 6" thick.
- Slab depth is measured from finished grade to top of slab.
- Wall depth is measured to the top of the bottom slab for boxes and to the top of the intermediate slab for risers.
- Wall height is the distance between top of lower slab to bottom of upper slab. Maximum wall height is 12' for wall lengths exceeding 5', or 10' for wall lengths exceeding 12'.
- Wall lengths exceeding 6'-0" require two layers of reinforcing (See Table 8) with 2" of cover from the horizontal bars to the inside and outside faces for each layer.
- Wall lengths exceeding the dimensions or depths shown in Table 8, or 12'-0" diameter require a special design.
- Wall thickness and reinforcing for rectangular structures is the same for both long and short sides.
- Reinforcing schedules with larger areas of steel may be substituted for schedules with smaller bar or wire spacing, except that Schedule B10 may not be substituted for Schedule A6. See Index 201, Sheet 4 for allowable bar spacing adjustments when larger areas of reinforcing are substituted.

SLAB DESIGNS - ROUND STRUCTURES (TABLE 7)

SLAB DEPTH	SLAB THICKNESS	REINF. (2-WAY) SCHEDULE
SIZE: 3'-6" DIAMETER		
2'-15'	6" Precast	C6.5
0.5' < 30'	8"	A6
30'-40'	8"	B5.5
SIZE: 4'-0" DIAMETER		
≥0.5' < 19'	8"	A6
19' < 30'	8"	B5.5
30'-40'	8"	C6.5
SIZE: 5'-0" DIAMETER		
≥0.5' < 15'	8"	B5.5
15' < 26'	8"	C6.5
26' < 35'	8"	D7
35'-40'	8"	D4.5
SIZE: 6'-0" DIAMETER		
≥0.5' < 9'	8"	B5.5
9' < 15'	8"	C6.5
15' < 22'	8"	C3.5
22' < 30'	8"	D4.5
30'-40'	8"	E5
SIZE: 7'-0" DIAMETER		
≥0.5' < 8'	8"	C3.5
8' < 16'	8"	D4.5
16' < 23'	8"	E5
23' < 27'	8"	E3
27'-40'	8"	F3.5
SIZE: 8'-0" DIAMETER		
≥0.5' < 10'	8"	D4.5
10' < 16'	8"	E5
16' < 19'	8"	E3
19' < 29'	8"	F3.5
29'-40'	10"	F5
SIZE: 10'-0" DIAMETER		
≥0.5' < 12'	10"	D4.5
12' < 20'	10"	E5
20' < 28'	10"	F5
28'-40'	10"	G3.5
SIZE: 12'-0" DIAMETER		
≥0.5' < 8'	10"	D4.5
8' < 13'	10"	E5
13' < 18'	10"	F5
18' < 26'	10"	G3.5
26'-40'	12"	G3.5



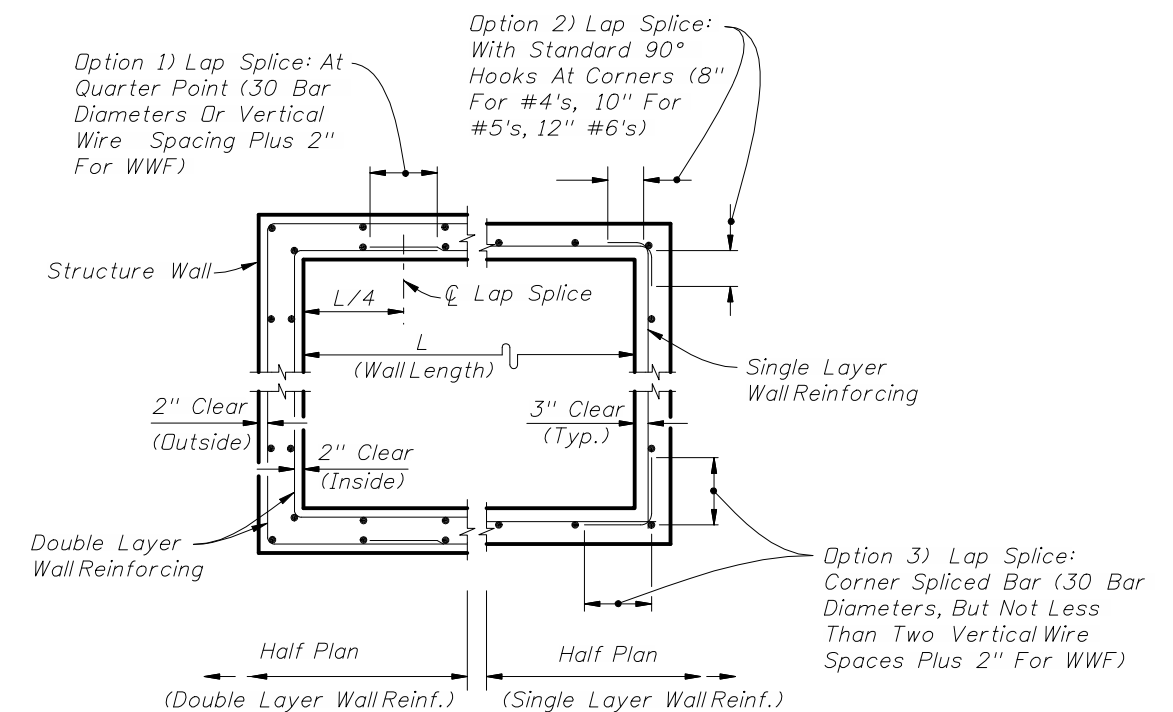
WALL DESIGNS - RECTANGULAR STRUCTURES (TABLE 8)

VERTICAL REINFORCING		HORIZONTAL REINFORCING		WALL THICKNESS	
WALL DEPTH	SCHEDULE	WALL DEPTH	SCHEDULE		
SIZE: 3'-6" & RISERS					
≥1.17'-40'	A12	≥1.17' < 10'	B10	6"/8"	
		10' < 18'	B5.5	6"/8"	
		18' < 29'	C6.5	6"/8"	
		29'-40'	C3.5	6"/8"	
SIZE: 4'-0"					
≥1.17'-40'	A12	≥1.17' < 6'	B10	6"/8"	
		6' < 10'	B5.5	6"/8"	
		10' < 20'	C6.5	6"/8"	
		20' < 28'	C3.5	6"/8"	
		28'-40'	D4.5	6"/8"	
SIZE: 5'-0"					
≥1.17'-40'	A12	≥1.17' < 5'	B5.5	6"/8"	
		5' < 9'	C6.5	6"/8"	
		9' < 15'	C3.5	6"/8"	
		15' < 22'	D4.5	6"/8"	
		22'-40'	E3	8"	
SIZE: 6'-0"					
≥1.17' < 26'	A12	≥1.17' < 9'	C3.5	6"/8"	
		9' < 15'	D4.5	6"/8"	
		15' < 26'	E3	8"	
	Inside	Outside	Inside	Outside	
26' - 40'	A12	A12	D7	D7	8"
SIZE: 7'-0"					
	Inside	Outside	Inside	Outside	
≥1.17' < 25'	A12	A12	B10	B10	8"
25'-40'	B10	B10	B5.5	B5.5	8"
			10' < 20'	C6.5	8"
			20' < 30'	D7	8"
			30'-40'	E5	8"
SIZE: 8'-0"					
	Inside	Outside	Inside	Outside	
≥1.17' < 20'	A12	A12	B5.5	B5.5	8"
20'-40'	C6.5	C6.5	C6.5	C6.5	8"
			13' < 22'	D7	8"
			22' < 31'	E5	8"
			31'-40'	F5	8"

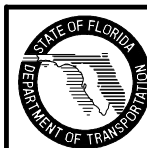
VERTICAL REINFORCING		HORIZONTAL REINFORCING		WALL THICKNESS	
WALL DEPTH	SCHEDULE	WALL DEPTH	SCHEDULE		
SIZE: 9'-0"					
	Inside	Outside	Inside	Outside	
≥1.17' < 12'	A12	A12	≥1.17' < 8'	C6.5	8"
12' < 28'	C6.5	C6.5	8' < 15'	D7	8"
28'-40'	D7	D7	15' < 23'	E5	8"
			23'-40'	F5	8"
SIZE: 10'-0"					
	Inside	Outside	Inside	Outside	
≥1.17' < 10'	B10	B10	≥1.17' < 10'	D7	8"
10' < 21'	C6.5	C6.5	10' < 17'	E5	8"
21' < 26'	D7	D7	17' < 26'	F5	8"
26'-40'	C6.5	C6.5	26'-40'	F5	10"
SIZE: 12'-0"					
	Inside	Outside	Inside	Outside	
≥1.17' < 10'	B10	B10	≥1.17' < 10'	D7	10"
10' < 21'	C6.5	C6.5	10' < 17'	E5	10"
21' - 40'	D7	D7	17' < 26'	F5	10"
			26'-40'	G5	10"
SIZE: 20'-0"					
	Inside	Outside	Inside	Outside	
≥1.17' < 10'	C6.5	C6.5	≥1.17' > 10'	E5	10"
10' < 17'	D7	D7	10' < 17'	F5	10"
17' - 30'	E5	E5	17' - 30'	G5	10"

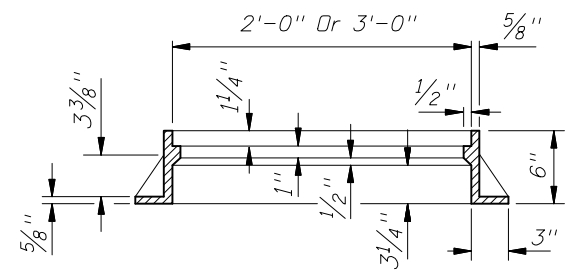
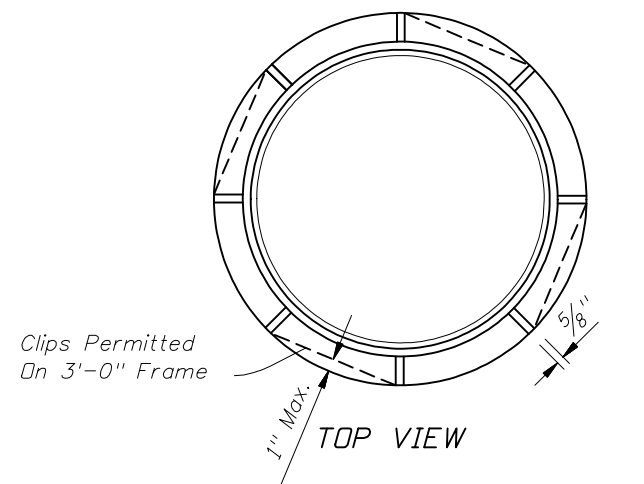
REINFORCING SCHEDULE				
SCHEDULE	GRADE 60 BARS OR 65 KSI & 70 KSI WELDED WIRE FABRIC			
	GRADE 60 AREA (in. ² /ft.)	MAXIMUM SPACING		
		GR 60 BARS	WWF EQUIV. AREA*	
		65 KSI	70 KSI	
A12	0.20	12"	8"	8"
A6	0.20	6"	5"	4 1/2"
B10	0.24	10"	8"	7 1/2"
B5.5	0.24	5 1/2"	5"	4"
C6.5	0.37	6 1/2"	6"	5"
C3.5	0.37	3 1/2"	3"	2 1/2"
D7	0.53	7"	6"	5"
D4.5	0.53	4 1/2"	4"	3 1/2"
E5	0.73	5"	4"	4"
E3	0.73	3"	3"	3"
F5	1.06	5"	4"	4"
F3.5	1.06	3 1/2"	3"	3"
G5	1.45	5"	4"	4"
G3.5	1.45	3 1/2"	3"	3"
H4	1.75	4"	3"	3"

*Equivalent Area Welded Wire Fabric may be substituted in accordance with Index No. 201, Sheet 4.

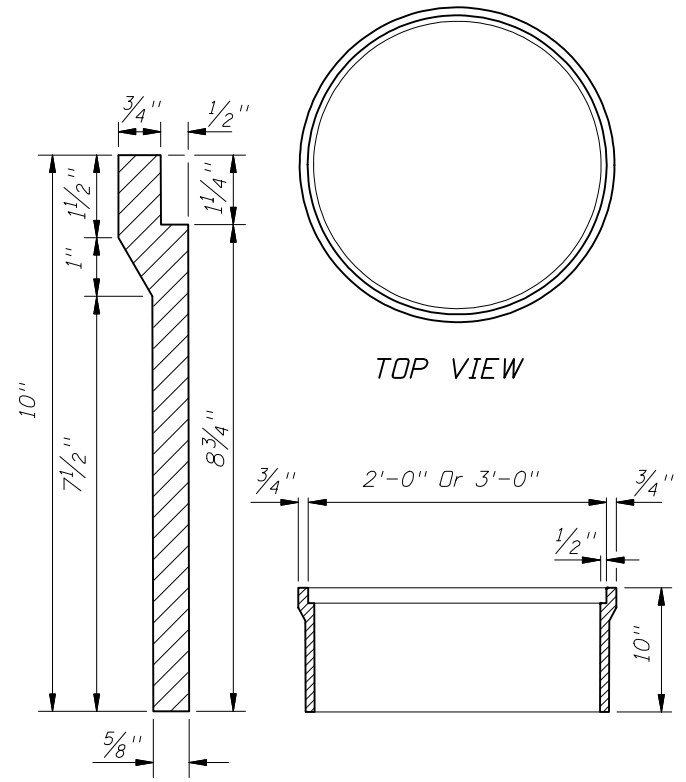


WALL REINFORCING SPLICE DETAILS (ALTERNATE B)

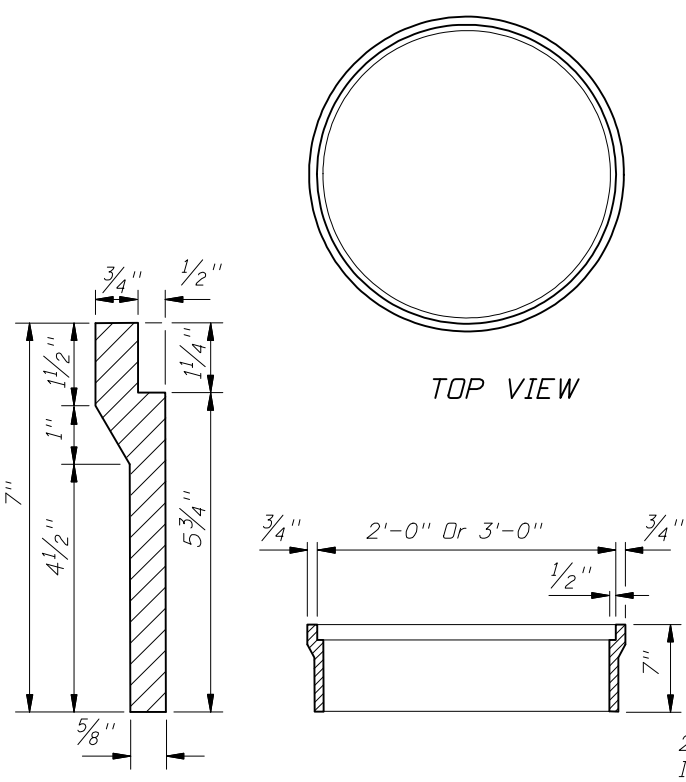




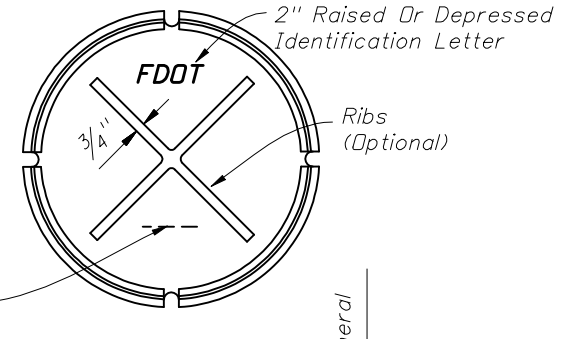
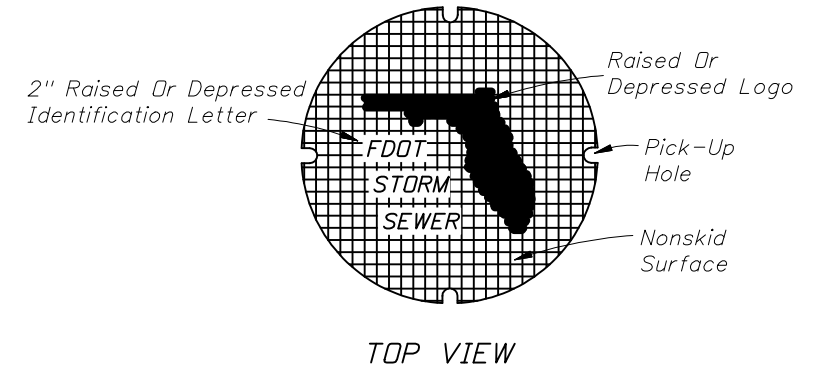
SECTION
For Manholes
TYPE I



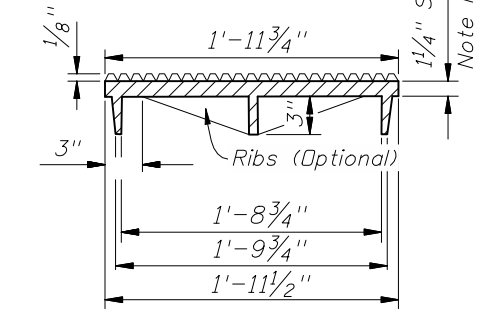
WALL SECTION SECTION
For Curb Inlets Types 1, 2, 3, & 4
TYPE II



WALL SECTION SECTION
For Curb Inlets Types 7 & 8
TYPE III



2" Raised Or Depressed Identification Number. Covers With And Without Ribs Shall Bear The Same Product Identification Number.



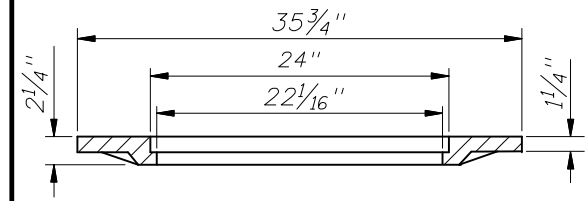
SECTION
COVER FOR ALL FRAMES

NOTES (FRAMES, AND COVER)

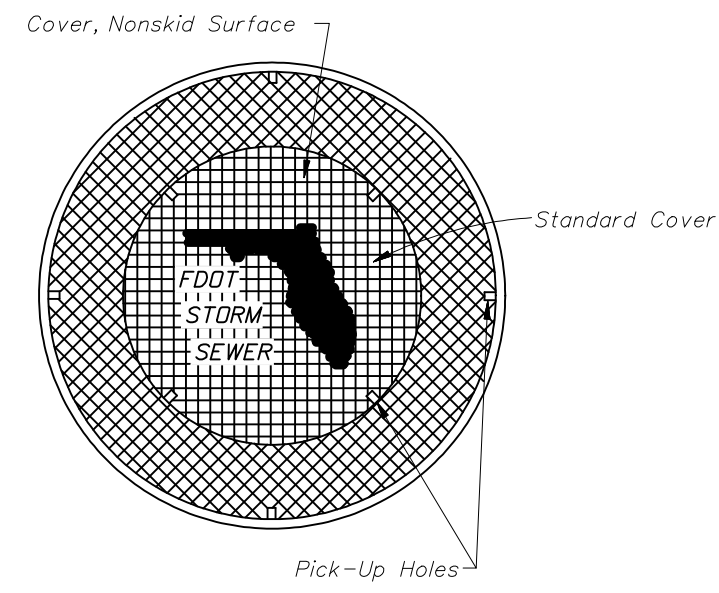
1. The standard cover is to be used for all frames Types I, II, III and the 2-piece cover, and is the replacement cover for all previous frames with 1 1/2 inch deep seats (traffic type). The 185 lb. cover (nontraffic type), 1984 Roadway and Traffic Design Standards Index No. 201, is the replacement cover for existing frames with 1/2 inch deep seats. Installation of frame with 1/2 inch deep seats is not permitted.
2. Use the 2'-0" cover, unless the 2-piece cover is called for in the plans, except at inlets and manholes with sump bottoms use the 2-piece cover when the sump depth exceeds 2', unless otherwise noted.

DESIGNER NOTE:

Consider using the 2-piece cover where depths exceed 5' and manual entry may be required for cleaning. Clearly note the requirement for a 2-piece cover, on the Drainage Structure sheets in the plans.



2-PIECE COVER

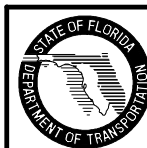


For Use With Types I, II And III Frames With 3'-0" Opening

2-PIECE COVER

CAST IRON FRAMES

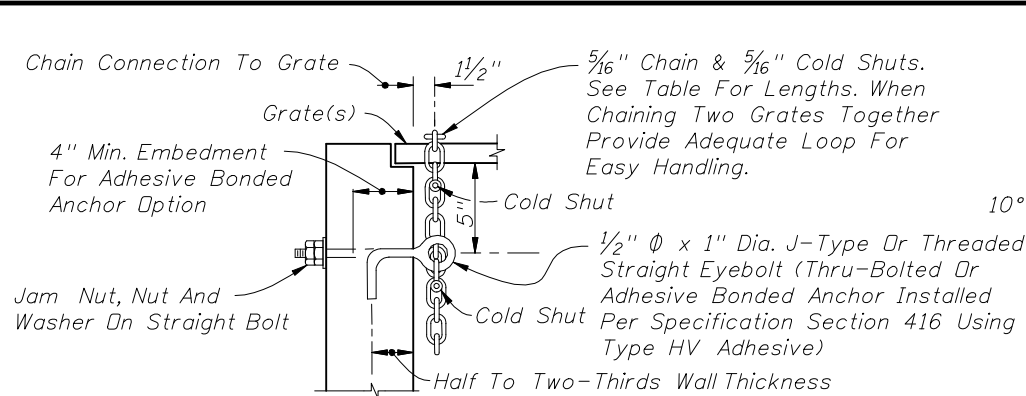
WEIGHT OF CASTINGS						
Frame Type	2' OPENING		3' OPENING			
	Frame	Cover (Std.)	Frame	2-Piece Cover		
				Inside	Outside	Total
I	155 Lbs.	190 Lbs.	220 Lbs.	190 Lbs.	220 Lbs.	410 Lbs.
II	145 Lbs.	190 Lbs.	255 Lbs.	190 Lbs.	220 Lbs.	410 Lbs.
III	90 Lbs.	190 Lbs.	180 Lbs.	190 Lbs.	220 Lbs.	410 Lbs.



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SUPPLEMENTARY DETAILS FOR
MANHOLES AND INLETS

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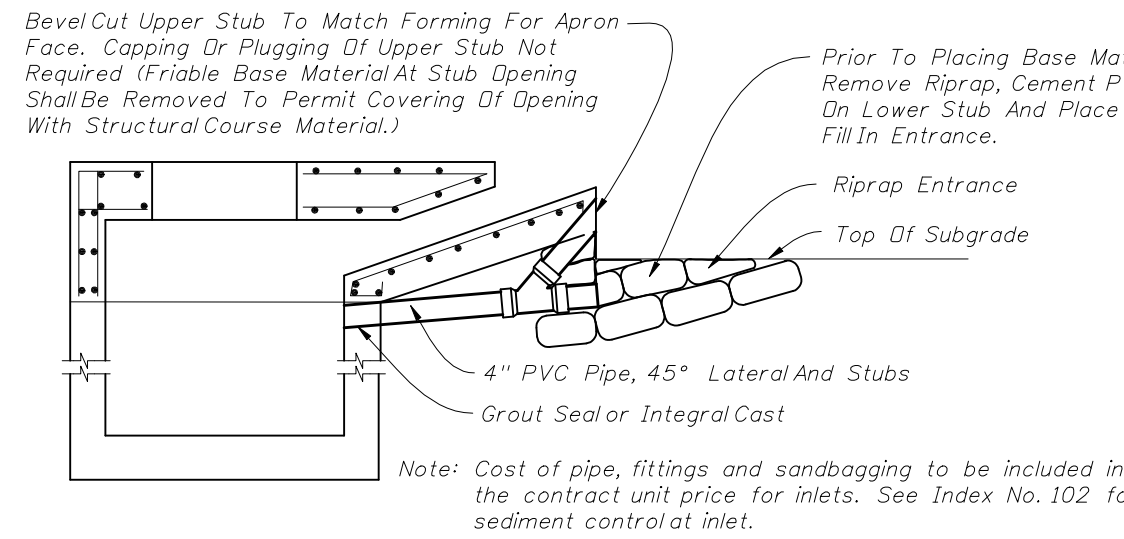


NOTE: When Alternate "G" grate is specified, the chain, bolt, nuts, washer and cold shuts shall be galvanized in accordance with Section 425 of the Standard Specifications.

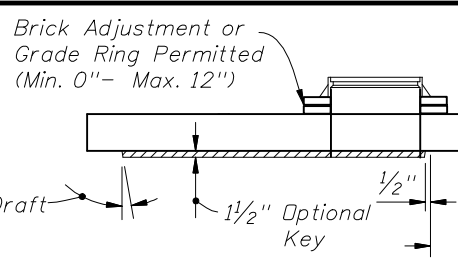
Cost of eyebolt and chain to be included in the contract unit price for inlets.

EYEBOLT AND CHAIN REQUIREMENTS				
Index Number	Inlet Type	Eye Bolts	Length Of Chain	Handling & Remarks
217	(MB) 1	1	4'-0"	Slide & Spin
	(MB) 2	1	4'-0"	Slide & Spin
	(MB) 3	2	2 @ 4'-0"	Slide & Spin
	(MB) 4	2	2 @ 4'-0"	Slide & Spin
	(MB) 5	2	2 @ 4'-0"	Slide & Spin
218	(BW)	1	3'-8"	Slide Or Slide & Spin
219	(BW, RGD)	1	4'-0"	Slide & Spin
220	S	1	4'-0"	Slide & Spin
221	V	1	4'-0"	Slide & Spin
230	A	1	3'-0"	Slide
231	B	1	5'-0"	Slide & Spin
232	C	1	2'-6"	Slide & Spin
	D	1	2'-6"	Slide & Spin
	E	2	2 @ 2'-6"	Slide & Spin
	H	2	2 @ 2'-6"	Flip Ctr. Grate and Slide & Spin Single Free Grate
			1 or 2 @ 1'-6"	Ctr. Grate(s) Chained To One End Grate
233	F	1	3'-6"	Flip Or Slide & Spin
	G	1	6'-0"	Slide
			2'-0"	Lifting Loop
234	J	1	4'-0"	Slide & Spin

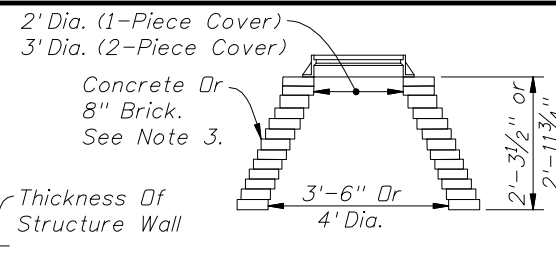
EYEBOLT AND CHAIN FOR LOCKING GRATES TO INLETS



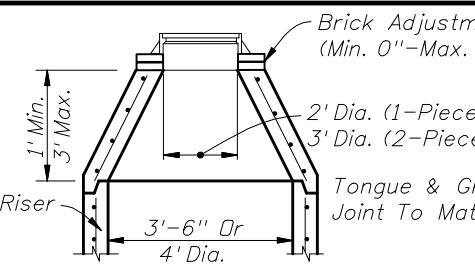
TEMPORARY DRAINS FOR SUBGRADE AND BASE



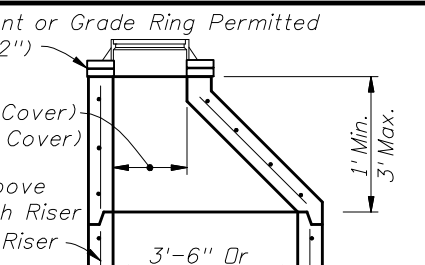
SECTION TYPE 7
Note: See Slab Designs Index No. 200.



BRICK OR CONCRETE



PRECAST CONCENTRIC CONE TYPE 8



PRECAST ECCENTRIC CONE TYPE 8

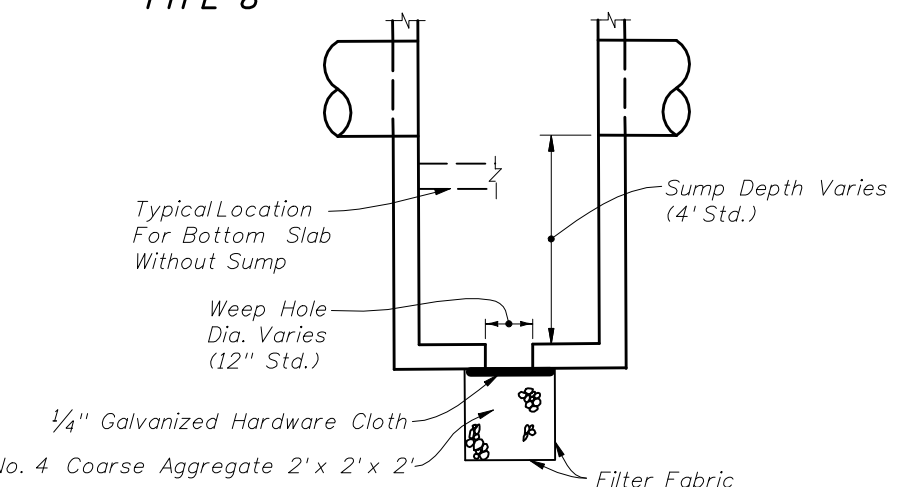
MANHOLE TOPS

NOTES (TOPS)

- Manhole top Type 7 slabs shall be of Class II concrete. Concrete as specified in ASTM C478 may be used for precast units; see General Note No. 3.
- Manhole top Type 7 slabs may be of cast-in-place or precast construction. The optional key is for precast tops and in lieu of dowels. Frame and slab openings are to be omitted when top is used over a junction box.
- Manhole top Type 8 may be of cast-in-place or precast concrete construction or brick construction. For concrete construction, the concrete and steel reinforcement shall be the same as the supporting wall unit. An eccentric cone may be used.
- Manhole tops shall be secured to structures by optional construction joints as shown on Sheet 3 of 4.
- Frames can be adjusted a maximum 12" height with brick or precast ASTM C478 grade rings.
- Substitution of manhole top Type 8 for manhole top Type 7 is allowed provided that minimum dimensions shown above are not reduced.
- Substitution of Manhole top Type 7 for Type 8 is allowed if the minimum thickness (h) above pipe opening cannot be maintained with manhole top Type 8.

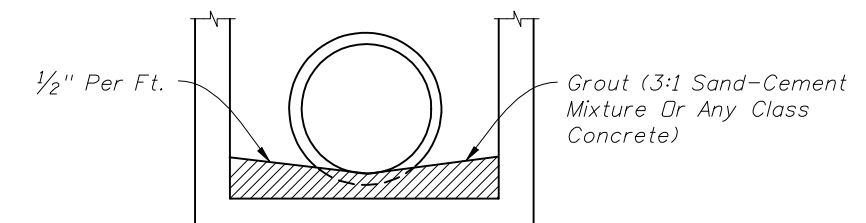
DESIGN NOTES

- Manhole top Type 8 should be specified in the plans when depths shown above can be maintained.



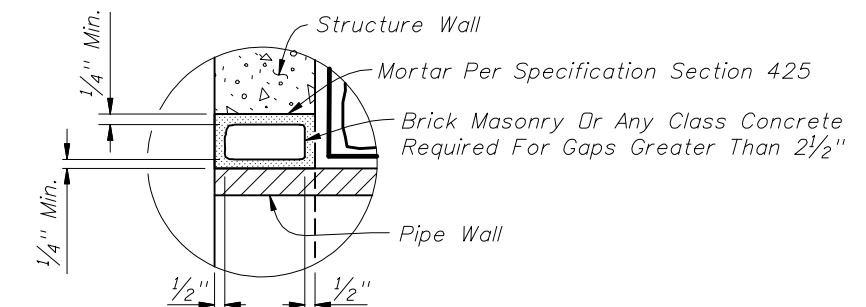
NOTE: Sump bottom appropriate for all manhole and inlet types. Sumps are to be constructed in inlet and manholes connected to French Drains unless excluded in the plans. At other locations, sump is to be constructed only where called for in the plans. Weep holes to be constructed in sump bottom only where called for in the plans. Cost of sump bottom and weep hole to be included in the contract unit price for inlet or manhole.

SUMP BOTTOM



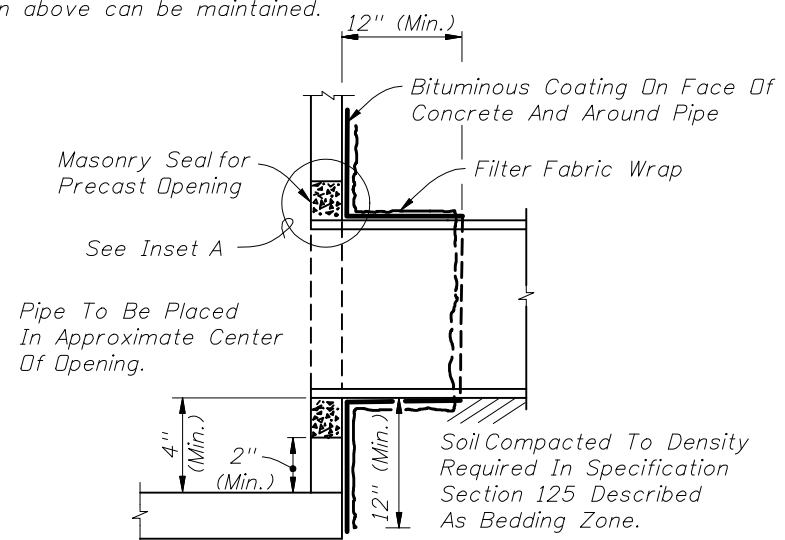
FOR ALL STRUCTURES UNLESS EXCLUDED BY SPECIAL DETAIL

ALL PIPE TYPES DRAINAGE STRUCTURE INVERT



INSET A

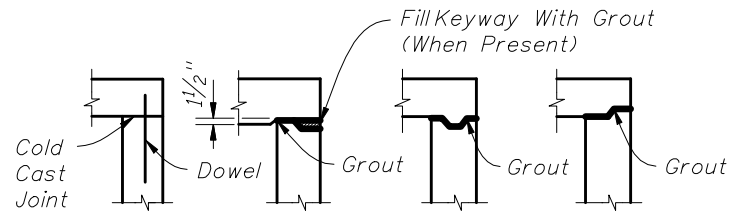
FILTER FABRIC WRAP ON GROUTED PIPE TO STRUCTURE JOINT



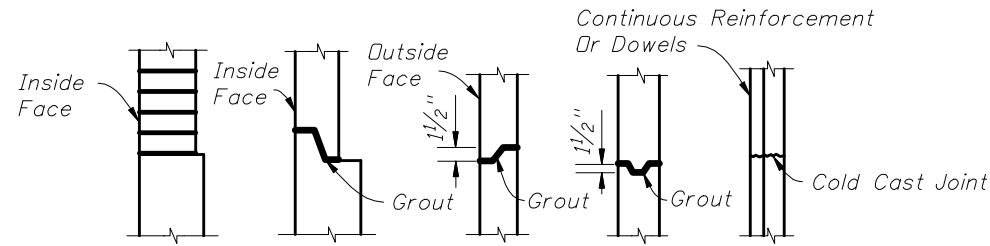
2010 FDOT Design Standards

SUPPLEMENTARY DETAILS FOR MANHOLES AND INLETS

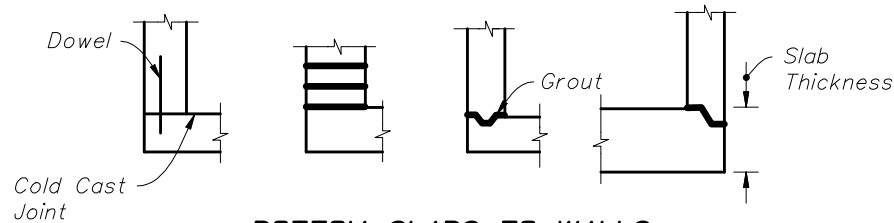
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TOP SLABS TO WALLS



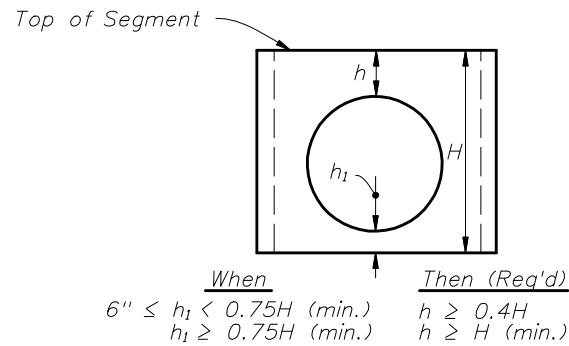
WALL JOINTS



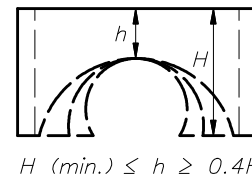
BOTTOM SLABS TO WALLS

- One or more types of joints may be used in a single structure, except brick wall structure. Brick wall construction is permitted on circular units only.
- All grouted joints are to have a maximum thickness of 1".
- Keyways are to be a minimum of 1 1/2" deep.
- Joint dowels are to be #4 bars, 12" long with a minimum of 6 bars per joint approximately evenly spaced for circular structures or at maximum 12" spacing for rectangular structures. Bars may be either Adhesive Bonded Dowels in accordance with Specification Section 416, or placed approximately 6" into fresh concrete leaving the remainder to extend into the secondary cast. Welded wire fabric may be substituted for the dowelbar in accordance with the equivalent steel area table on Sheet 4.
- Minimum cover on dowel reinforcing bars is 2" to outside face of structure.
- Joints between wall segments and between wall segments and top or bottom slabs may be sealed either by preformed plastic gasket material using the procedures given in Section 430-7.3.1 of the Specifications or by non-shrink grout, in accordance with Section 934 of the Specifications.
- Approved product inserts may be used in lieu of dowel embedment.

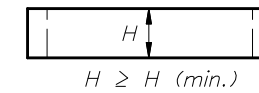
OPTIONAL CONSTRUCTION JOINTS



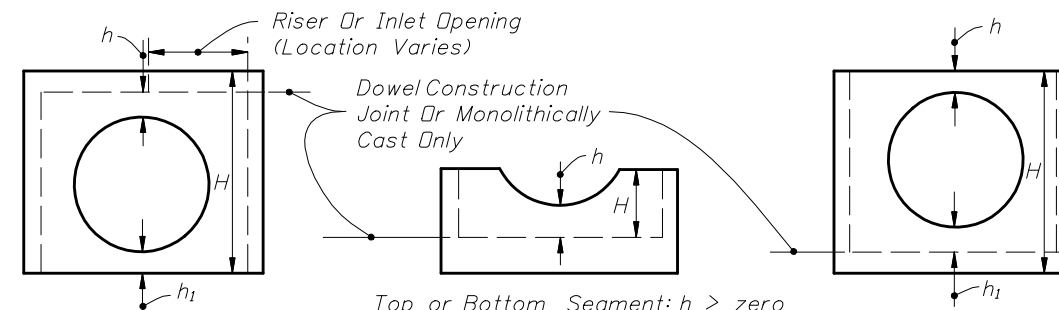
SEPARATE RISER SEGMENTS WITH CONSTRUCTION JOINTS OTHER THAN DOWEL OPTION



Segments may be inverted. Opening for pipe shall be the pipe DD plus 6" (± 2" tolerance). If h can not be attained, then a top or bottom slab must be attached to the segment as shown below.



Minimum Value For H	
H (min.)	Box Or Riser Diameter
1'-0"	3'-6" & 4'-0"
1'-6"	5'-0" & 6'-0"
2'-0"	>6'-0"



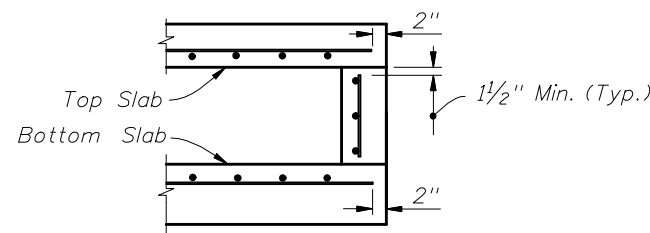
Top or Bottom Segment: $h \geq \text{zero}$
 $h \geq \text{zero and } h_1 \geq 6"$ (H (min.) Tabulated Above Do Not Apply) $h_1 \geq \text{zero and } h \geq 6"$

SEGMENTS FOR SLAB TO WALL DOWEL CONSTRUCTION JOINTS OR MONOLITHICALLY CAST SEGMENTS

NOTE: h may be less than 6" when approved by the Engineer, but not for inlet segments at finish grade elevation.

COMPARATIVE SIDE VIEWS

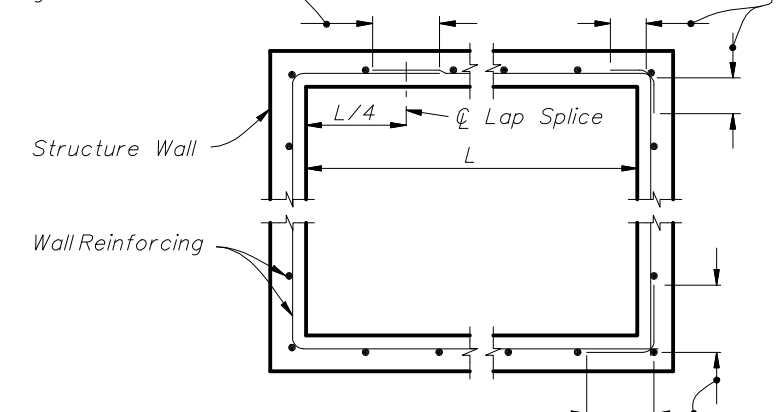
MINIMUM DIMENSIONS FOR BOX AND RISER SEGMENTS



(NOTE: NOT APPLICABLE AROUND MANHOLE AND RISER OPENINGS)

REBAR STRAIGHT END EMBEDMENT FOR TOP AND BOTTOM SLABS

Option 1) Lap Splice: At Quarter Point (30 Bar Diameters Or Vertical Wire Spacing Plus 2" For WWR)
 Option 2) Lap Splice: Standard 90° Hooks At Corners (8" For #4's, 10" For #5's, 12" for #6's)



Option 3) Lap Splice: Corner Spliced Bar (30 Bar Diameters, But Not Less Than Two Vertical Wire Spacings Plus 2" For WWR)

WALL REINFORCING SPLICE DETAILS



EQUIVALENT STEEL AREA TABLE

SCHEDULE	GRADE 60 REINFORCING BAR		EQUIVALENT GRADE 40 REINFORCING BAR		EQUIVALENT 65 KSI SMOOTH WELDED WIRE REINFORCEMENT		EQUIVALENT 70 KSI DEFORMED WELDED WIRE REINFORCEMENT	
	Bar Size & Spacing	Steel Area (in ² /ft)	Bar Size & Spacing	Min. Steel Area (in ² /ft)	Style Designation	Min. Steel Area (in ² /ft)	Style Designation	Min. Steel Area (in ² /ft)
A	#3 @ 6½" Ctrs. #4 @ 12" Ctrs.	0.20	#3 @ 4½" Ctrs. #4 @ 8" Ctrs. #5 @ 12" Ctrs.	0.30	3"x3"-W4.6xW4.6 4"x4"-W6.2xW6.2 6"x6"-W9.2xW9.2	0.1846	3"x3"-D4.3xD4.3 4"x4"-D5.7xD5.7 6"x6"-D8.6xD8.6	0.1714
B	#3 @ 5½" Ctrs. #4 @ 10" Ctrs.	0.24	#3 @ 3½" Ctrs. #4 @ 6½" Ctrs. #5 @ 10" Ctrs.	0.36	3"x3"-W5.5xW5.5 4"x4"-W7.4xW7.4 6"x6"-W11.1xW11.1	0.2215	3"x3"-D5.1xD5.1 4"x4"-D6.9xD6.9 6"x6"-D10.3xD10.3	0.2057
Special 1	#3 @ 5" Ctrs. #4 @ 9" Ctrs.	0.267	#3 @ 3" Ctrs. #4 @ 6" Ctrs. #5 @ 9" Ctrs.	0.40	3"x3"-W6.2xW6.2 4"x4"-W8.2xW8.2 6"x6"-W12.3xW12.3	0.2465	3"x3"-D5.7xD5.7 4"x4"-D7.6xD7.6 6"x6"-D11.4xD11.4	0.2289
C	#3 @ 3½" Ctrs. #4 @ 6½" Ctrs. #5 @ 10" Ctrs.	0.37	#4 @ 4" Ctrs. #5 @ 6½" Ctrs. #6 @ 9½" Ctrs.	0.555	3"x3"-W8.5xW8.5 4"x4"-W11.4xW11.4 6"x6"-W17.1xW17.1	0.3415	3"x3"-D7.9xD7.9 4"x4"-D9.6xD9.6 6"x6"-D15.9xD15.9	0.3171
D	#4 @ 4½" Ctrs. #5 @ 7" Ctrs. #6 @ 10" Ctrs.	0.53	#4 @ 3" Ctrs. #5 @ 4½" Ctrs. #6 @ 6½" Ctrs.	0.795	3"x3"-W12.2xW12.2 4"x4"-W16.3xW16.3 6"x6"-W24.5xW24.5	0.4892	3"x3"-D11.4xD11.4 4"x4"-D15.1xD15.1 6"x6"-D22.7xD22.7	0.4543
E	#4 @ 3" Ctrs. #5 @ 5" Ctrs. #6 @ 7" Ctrs.	0.73	#5 @ 3½" Ctrs. #6 @ 4½" Ctrs. #7 @ 6½" Ctrs.	1.095	3"x3"-W16.8xW16.8 4"x4"-W22.5xW22.5 6"x6"-W33.7xW33.7	0.6738	3"x3"-D15.6xD15.6 4"x4"-D20.9xD20.9 6"x6"-D31.3xD31.3	0.6257
F	#5 @ 3½" Ctrs. #6 @ 5" Ctrs. #7 @ 7" Ctrs.	1.06	#6 @ 3" Ctrs. #7 @ 4½" Ctrs. #8 @ 6" Ctrs.	1.59	3"x3"-W24.5xW24.5 4"x4"-W32.6xW32.6 6"x6"-W48.9xW48.9	0.9785	3"x3"-D22.7xD22.7 4"x4"-D30.3xD30.3 6"x6"-D45.4xD45.4	0.9086
Special 2	#5 @ 3" Ctrs. #6 @ 4" Ctrs. #7 @ 5½" Ctrs.	1.24	#7 @ 4" Ctrs. #8 @ 5" Ctrs.	1.86	3"x3"-W28.6xW28.6 4"x4"-W38.2xW38.2 6"x6"-W57.2xW57.2	1.1446	3"x3"-D26.6xD26.6 4"x4"-D35.4xD35.4 6"x6"-D53.1xD53.1	1.0629
G	#6 @ 3½" Ctrs. #7 @ 5" Ctrs.	1.46	#7 @ 3" Ctrs. #8 @ 4" Ctrs.	2.19	3"x3"-W33.7xW33.7 4"x4"-W44.9xW44.9	1.3477	3"x3"-D31.3xD31.3 4"x4"-D41.7xD41.7	1.2514

GENERAL NOTES

- For square or rectangular precast drainage structures, either deformed or smooth welded wire reinforcement may be used provided:
 - The smooth welded wire reinforcement shall comply with ASTM A185 and deformed welded wire reinforcement shall comply with ASTM A497.
 - Width and length of the unit is four times the spacing of the cross wires.
 - Wire reinforcement shall be continuous around the box, and lapped in accordance with Option 1 or 3 as shown in the Wall Reinforcing Splice Details.
- Horizontal steel in the walls of rectangular structures shall be lap spliced in accordance with Option 1, 2 or 3 as shown in the Wall Reinforcing Splice Details.
- Welding of splices and laps is permitted. The requirements and restrictions placed on welding in AASHTO M259 shall apply.
- Rebar straight end embedment of peripheral reinforcement may be used in lieu of ACI standard hooks for top and bottom slabs except when hooks are specifically called for in the plans or standard drawings.
- Concrete as specified in ASTM C478, (4000 psi) may be used in lieu of Class II concrete in precast items manufactured in plants which meet the requirements of Section 449 of the Specifications.
- Precast opening for pipe shall be the pipe OD plus 6" (± 2" tolerance). Mortar used to seal the pipe into the opening will be of such a mix that shrinkage will not cause leakage into or out of the structure. Dry-pack mortar may be used in lieu of brick and mortar construction to seal openings less than 2½" wide.
- For pay item purposes, the height used to determine if a drainage structure is less than or greater than 10 feet shall be computed using
 - the elevation of the top of the manhole lid,
 - the grate elevation or the theoretical gutter grade elevation of an inlet, or
 - the outside top elevation of a junction box less the flow line elevation of the lowest pipe or to top of sump floor.

NOTES FOR PRECAST OPTIONS & EQUIVALENT REINFORCEMENT SUBSTITUTION

- Details for optional precast inlet construction up to depths of 15' are shown on the inlet indexes.
- When precast units are used in conjunction with Alt. "B" Structure Bottoms, Index No. 200, the interior dimensions of an Alt. "B" Bottom can be adjusted to reflect these inlet interior dimensions.
- Concrete which meets the requirements of ASTM C478 or Class IV must be used for precast structures constructed with 6" wall or slab thickness.
- Reinforcement can be either deformed bar reinforcement or welded wire reinforcement. Bar reinforcement other than 60 ksi may be used, however only two grades are recognized: Grade 40 and Grade 60. Smooth welded wire reinforcement, will be recognized as having a design strength of 65 ksi and deformed welded wire reinforcement will be recognized as having a design strength of 70 ksi. The area of reinforcement required may be adjusted in accordance with the Equivalent Steel Area Table provided. For bars and spacings not given, the steel area required can be determined by the following equations:

$$\text{Grade 40 Steel Area} = A_{S40} = \frac{60}{40} \times A_{S60}$$

$$\text{Smooth Welded Wire Reinforcement Steel Area} = A_{S65} = \frac{60}{65} \times A_{S60}$$

$$\text{Deformed Welded Wire Reinforcement Steel Area} = A_{S70} = \frac{60}{70} \times A_{S60}$$

continued...

When a reduced area of reinforcement is provided, any maximum bar spacing shown must also be reduced as determined by the following equations, unless otherwise shown:

$$\begin{aligned} \text{Max. Grade 40 Bar Spacing} &= \text{Grade 60 Bar Spacing} \\ \text{Max. Smooth Welded Wire Spacing} &= \text{Grade 60 Bar Spacing} \times 0.86 \\ \text{Max. Deformed Welded Wire Spacing} &= \text{Grade 60 Bar Spacing} \times 0.74 \end{aligned}$$

When an increased area of reinforcing is provided, then the maximum bar spacing may be increased by the squared ratio of increased steel area, but not to exceed 12":

$$\text{Max. Bar Spacing Provided} \leq \text{Max. Bar Spacing Required} \times \left(\frac{\text{Steel Area Provided}}{\text{Min. Steel Area Required}} \right)^2$$

In no case will reinforcement with wires smaller than W3.1 or D3.1, or spacings greater than 8" be permitted. Bar reinforcement shall show the minimum yield designation grade mark or either the number 60 or one (1) grade mark line to be acceptable at the higher value. Maximum bar spacing shall not be greater than two (2) times the slab thickness with a maximum spacing of 12" or three (3) times the wall thickness, with a maximum spacing of 18" for vertical bars and 12" for horizontal bars.



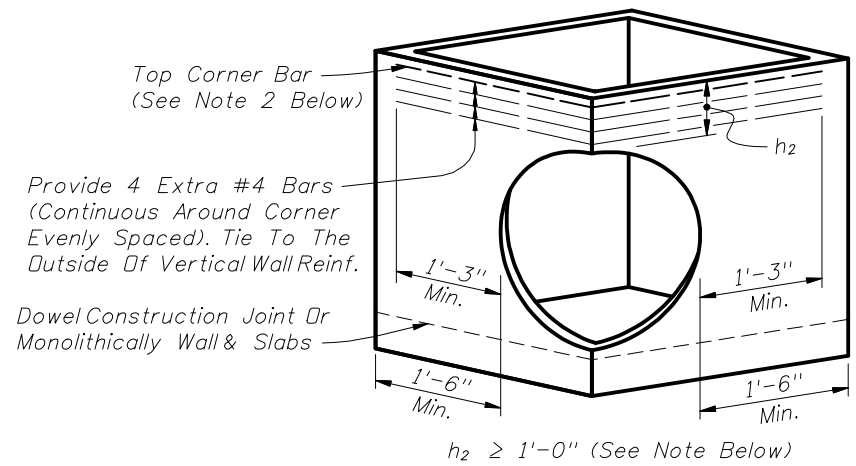
2010 FDOT Design Standards

**SUPPLEMENTARY DETAILS FOR
MANHOLES AND INLETS**

Last Revision
07/01/09

Sheet No.
4 of 5

Index No.
201

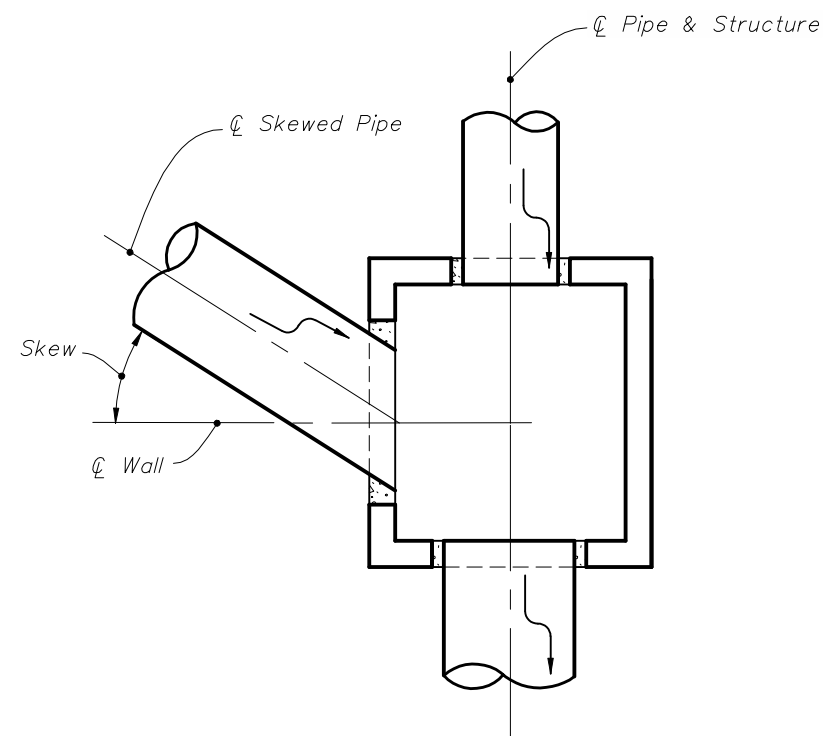


DESIGNER NOTE: Rectangular structures with corner openings are not recommended. Use round structure bottoms when possible.

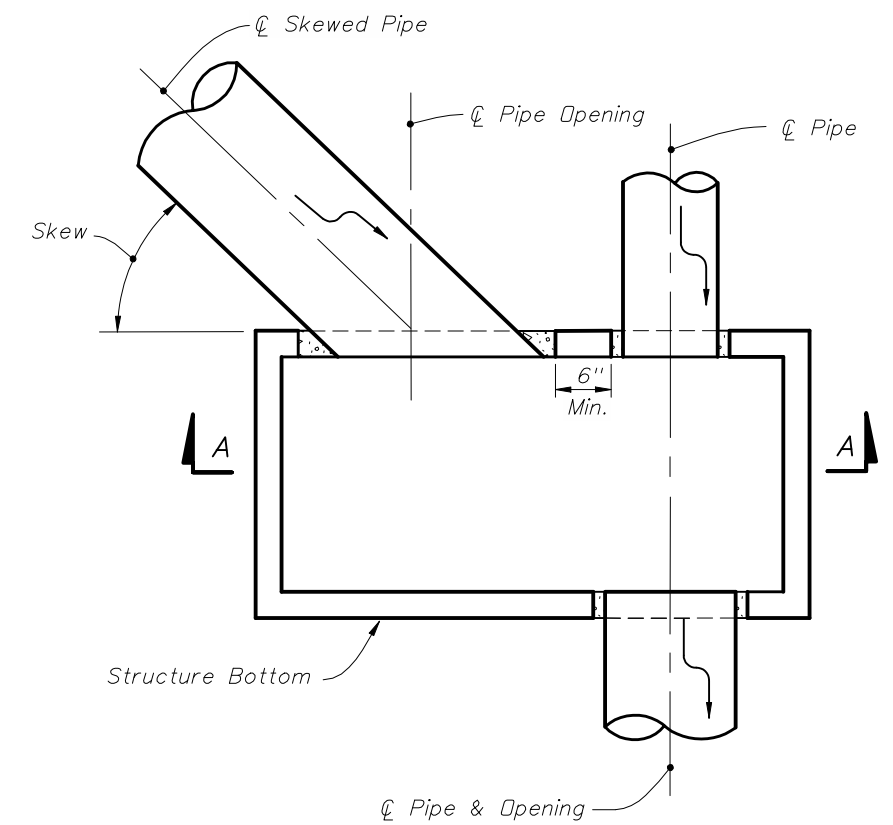
PICTORIAL VIEW

- NOTE: 1. h₂ may be less than 1'-0" when approved by the Engineer or when a minimum 1'-0" deep segment, 8" slab or curb inlet is provided above the corner opening.*
- 2. For inlet segments at finish grade elevation substitute a #8 Bar for the top corner bar when h₂ is less than 2'-0".*
- 3. Rectangular structures with corner openings must be approved by the Engineer.*

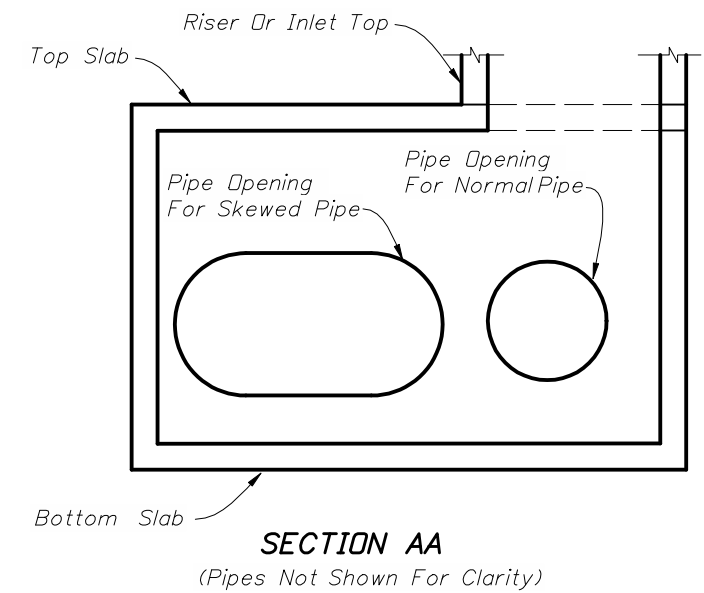
RECTANGULAR SEGMENT WITH PIPE OPENING AT CORNER



**PLAN VIEW FOR SKEWS ≤ 45°
(Not Centered)**



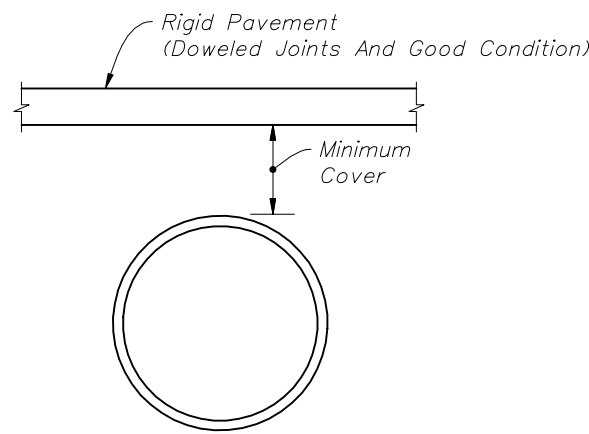
**PLAN VIEW FOR SKEWS > 45°
(Not Centered)**



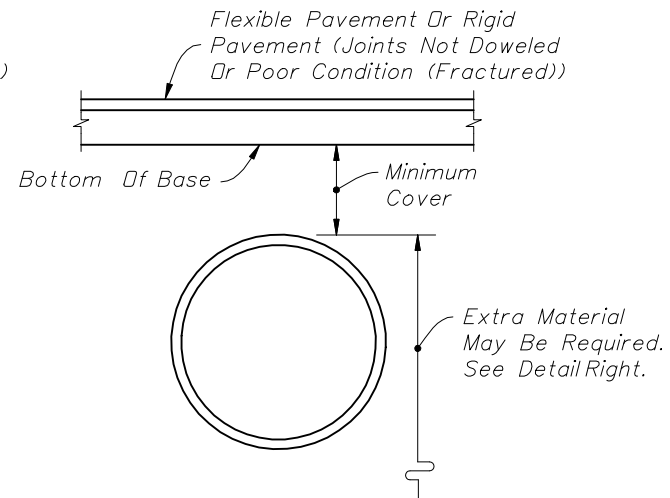
**SECTION AA
(Pipes Not Shown For Clarity)**

DETAILS FOR SKEWED PIPES IN RECTANGULAR STRUCTURES

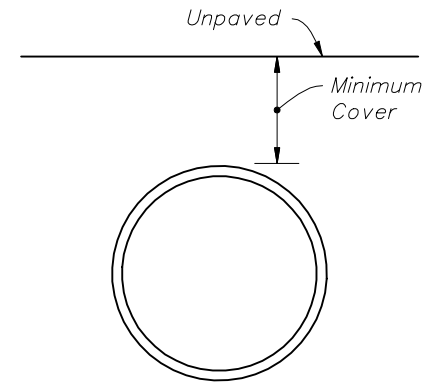




RIGID PAVEMENT



FLEXIBLE PAVEMENT



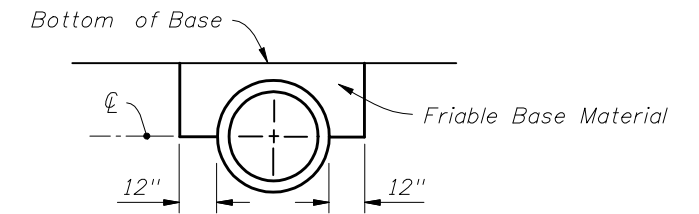
UNPAVED

PIPE TYPE/SIZE & SHAPE	MINIMUM COVER
CONCRETE (See Note 6)	
Round & Elliptical	9"
CORRUGATED STEEL	
15"-72" Round & Arch Equiv.	9"
78" & Larger Round & Arch Eq.	15"
CORRUGATED ALUMINUM	
15"-72" Round & Arch Equiv.	9"
78"-102" Round & Arch Equiv.	15"
108" & Larger Round	18"
CORRUGATED POLYETHYLENE	
15"-60" Round	9"
POLYVINYL CHLORIDE	
15"-36" Round	9"

PIPE TYPE/SIZE & SHAPE	MINIMUM COVER
CONCRETE (See Note 6)	
Round & Elliptical	7"
CORRUGATED STEEL	
12"-30" Round	12" [12"]
36"-48" Round	18" (12") [15"]
54"-72" Round	21" (15") [18"]
78"-96" Round	(18") [27"]
102" & Larger Round	(24") [33"]
15"-30" Arch Equiv.	18" [18"]
36"-48" Arch Equiv.	24" (12") [18"]
54"-72" Arch Equiv.	27" (15") [24"]
78"-96" Arch Equiv.	(18") [30"]
102" & Larger Arch Equiv.	(24")
CORRUGATED ALUMINUM	
12"-24" Round	15" [12"]
30"-48" Round	18" (12") [18"]
54"-72" Round	24" (18") [24"]
78"-102" Round	(24") [30"]
108" & Larger	(30")
15"-24" Arch Equiv.	24" [21"]
30"-48" Arch Equiv.	27" (15") [24"]
54"-72" Arch Equiv.	30" (18") [27"]
78"-90" Arch Equiv.	(24") [30"]
96"-102" Arch Equiv.	(30")
CORRUGATED POLYETHYLENE	
15"-60" Round	15"
POLYVINYL CHLORIDE	
15"-36" Round	15"

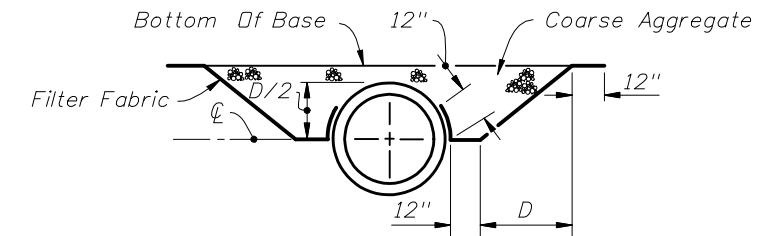
PIPE TYPE/SIZE & SHAPE	MINIMUM COVER	
	COMMERCIAL	NON-COMMERCIAL
CONCRETE (See Note 6)		
Round & Elliptical	12"	3"
CORRUGATED STEEL		
12"-30" Round	18" [15"]	12" [12"]
36"-48" Round	18" (12") [15"]	12" (12") [12"]
54"-72" Round	18" (12") [15"]	15" (12") [12"]
78"-96" Round	(18") [27"]	(12") [12"]
102" & Larger Round	24" [33"]	18" [21"]
15"-30" Arch Equiv.	18" [18"]	12" [12"]
36"-48" Arch Equiv.	24" (12") [21"]	18" (12") [15"]
54"-72" Arch Equiv.	30" (18") [24"]	24" (12") [18"]
78"-96" Arch Equiv.	(24") [27"]	(18") [21"]
102" & Larger Arch Equiv.	(30")	(24")
CORRUGATED ALUMINUM		
12"-24" Round	21" [21"]	15" [15"]
30"-48" Round	24" (18") [21"]	18" (12") [15"]
54"-72" Round	30" (24") [27"]	24" (18") [21"]
78"-102" Round	(30") [33"]	(24") [27"]
108" & Larger	36"	30"
15"-24" Arch Equiv.	27" [24"]	24" [21"]
30"-48" Arch Equiv.	33" (21") [27"]	27" (15") [21"]
54"-72" Arch Equiv.	36" (24") [30"]	30" (18") [24"]
78"-90" Arch Equiv.	(30") [36"]	(24") [30"]
96"-102" Arch Equiv.	(36")	(30")
CORRUGATED POLYETHYLENE		
15"-60" Round	21"	15"
POLYVINYL CHLORIDE		
15"-36" Round	21"	15"

MINIMUM COVER FOR CONCRETE, STEEL, ALUMINUM, POLYETHYLENE AND POLYVINYL CHLORIDE PIPE



The cost of furnishing and installing the extra base material shall be included in the cost of the culvert.

FRIABLE BASE



The coarse aggregate shall be placed in 6 inch lifts and compacted sufficiently as to be firm and unyielding. The coarse aggregate shall be gravel or stone meeting the requirements of Standard Specification Sections 901-2 or 901-3 respectively. The gradation shall meet Section 901-1.4, Grades 4, 467, 5, 56, or 57 unless restricted in the plans. The filter fabric shall be Type D-3 (See Index No. 199). The cost of furnishing and installing the coarse aggregate and filter fabric shall be included in the cost of the culvert.

ASPHALTIC CONCRETE BASE

Note: Extra material is required when cross culverts are located on facilities subject to high speed traffic (>255 mph) or high traffic volumes (> 1600 ADT) and the cover is less than 12 inches for concrete pipe, 15 inches for corrugated steel pipe, and 18 inches for corrugated aluminum pipe, corrugated polyethylene and corrugated polyvinyl chloride pipe.

EXTRA MATERIAL FOR CROSS CULVERTS UNDER FLEXIBLE PAVEMENTS

GENERAL NOTES

- The tabulated values are recommended minimum dimensions to withstand anticipated highway traffic loads. Additional cover may be required to support construction equipment loads or highway traffic loads before pavement is completed. Some size thickness combinations may require minimum cover greater than those listed above. See Sheets 2, 3, & 4.
- Less than the tabulated minimum cover may be used provided suitable method(s) are detailed in the plans.
- Values shown in parenthesis () are for 3" x 1" corrugations which must be specified to utilize the lesser cover.
- The tabulated values in the brackets [] apply to Type 1-R (Spiral Rib) pipe which must be specified to utilize the lesser cover.
- Commercial and noncommercial refers to typical vehicular utilization of unpaved roads and drives where rutting and cover displacement may occur.
- For Pipe Class S with diameters of 12" to 30", the minimum height of fill measured from top of finished grade to outside top of pipe is 3 feet.



ROUND PIPE DIMENSIONS

Equiv. Dia. (In.)	Area (Sq. Ft.)	Wall Thickness (In.)* CLASSES II, III, IV, V B WALL
12	0.8	2
15	1.2	2 1/4
18	1.8	2 1/2
24	3.1	3
30	4.9	3 1/2
36	7.1	4
42	9.6	4 1/2
48	12.6	5
54	15.9	5 1/2
60	19.6	6
66	23.8	6 1/2
72	28.3	7
78	33.2	7 1/2
84	38.5	8
90	44.4	8 1/2
96	50.3	9
102	56.7	9 1/2
108	63.7	10
114	70.9	—
120	78.5	—

* For Informational Purposes Only.
Do Not Specify Wall Thickness.
Option B Wall Is Industry Standard.

ELLIPTICAL PIPE DIMENSIONS

Nominal Dimensions				Equiv. Dia. (In.)	Area (Sq.Ft.)	Wall Thickness (In.) Classes HE II, III, IV VE II, III, IV
Horiz.		Vert.				
Rise (In.)	Span (In.)	Rise (In.)	Span (In.)			
NA	NA	NA	NA	12	NA	NA
12	18	18	12	15	1.3	2 1/2
14	23	23	14	18	1.8	2 3/4
19	30	30	19	24	3.3	3 1/4
24	38	38	24	30	5.1	3 3/4
29	45	45	29	36	7.4	4 1/2
34	53	53	34	42	10.2	5
38	60	60	38	48	12.9	5 1/2
43	68	68	43	54	16.6	6
48	76	76	48	60	20.5	6 1/2
53	83	83	53	66	24.8	7
58	91	91	58	72	29.5	7 1/2
63	98	98	63	78	34.6	8
68	106	106	68	84	40.1	8 1/2
72	113	113	72	90	46.1	9
77	121	121	77	96	52.4	9 1/2
82	128	128	82	102	59.2	10
87	136	136	87	108	66.4	10 1/2
92	143	143	92	114	74.0	11
97	151	151	97	120	82.0	11 1/2

For Informational Purposes Only

ROUND PIPE INSTALLATIONS

PIPE DIAMETER	Maximum Height of Fill (ft.)					
	Class S	Class I	Class II	Class III	Class IV	Class V
12"-30"	9	13	17	24	36	55
36"-54"	8	12	16	22	34	52
60"-78"	7	11	15	21	33	51
84"-96"	6	10	14	20	32	49
Pipe Class S	D-Load=600 Lbs./Ft./Ft. (0.01" Crack) D-Load=900 Lbs./Ft./Ft. (Ultimate)					
Pipe Class I	D-Load=800 Lbs./Ft./Ft. (0.01" Crack) D-Load=1200 Lbs./Ft./Ft. (Ultimate)					
Pipe Class II	D-Load=1000 Lbs./Ft./Ft. (0.01" Crack) D-Load=1500 Lbs./Ft./Ft. (Ultimate)					
Pipe Class III	D-Load=1350 Lbs./Ft./Ft. (0.01" Crack) D-Load=2000 Lbs./Ft./Ft. (Ultimate)					
Pipe Class IV	D-Load=2000 Lbs./Ft./Ft. (0.01" Crack) D-Load=3000 Lbs./Ft./Ft. (Ultimate)					
Pipe Class V	D-Load=3000 Lbs./Ft./Ft. (0.01" Crack) D-Load=3750 Lbs./Ft./Ft. (Ultimate)					

Note: At the option of the pipe supplier or the contractor, a Pipe Class with greater strength may be substituted for the Pipe Class designated in the plans.

ELLIPTICAL PIPE INSTALLATIONS (All Sizes)

Installation	Maximum Height Of Fill (Ft.)	Pipe Class	Bedding Class
Horizontal	1-6*	HE II*	C
	7-10	HE III	C
	11-16	HE IV	C
	17+	Special Design	Modified
Vertical	1-6*	VE II*	C
	7-10	VE III	C
	11-16	VE IV	C
	17+	Special Design	Modified
Pipe Class HE II And VE II	D-Load=1000 Lbs./Ft./Ft. (0.01" Crack) D-Load=1500 Lbs./Ft./Ft. (Ultimate)		
Pipe Class HE III And VE III	D-Load=1350 Lbs./Ft./Ft. (0.01" Crack) D-Load=2000 Lbs./Ft./Ft. (Ultimate)		
Pipe Class HE IV And VE IV	D-Load=2000 Lbs./Ft./Ft. (0.01" Crack) D-Load=3000 Lbs./Ft./Ft. (Ultimate)		

*Note: HE III and VE III pipe required for depths of cover less than 2' for 15", 18" and 24" equivalent.

PIPE DIMENSIONS CONCRETE PIPE

POLYETHYLENE PIPE

DIAMETER	HEIGHT OF MAXIMUM FILL (Ft.)
12"-60"	17'

POLYVINYL CHLORIDE PIPE

DIAMETER	HEIGHT OF MAXIMUM FILL (Ft.)
12"-36"	17'

MAXIMUM COVER FOR PLASTIC PIPE

MAXIMUM COVER HEIGHTS CONCRETE PIPE

Note: Height of fill (maximum cover) is measured from top of finished grade to outside top of pipe.



Notes:

Increase the minimum cover values shown on Sheet 1 of 6 by 6" for gage and size combinations below the heavy lines.

Height of fill (maximum cover) is measured from top of finished grade to outside of pipe.

*Recorrugated end not available. May be considered for cross drain and side drain applications only.
 NA-Not Available
 NS-Not Suitable (For Highway H-20 or HS-20 Loadings)

① Limited availability of this product. Check availability before specifying (generally limited to 3" x 1" corrugation pipe arch fabricated from 60" and smaller diameter round pipe in 12 ga. and thicker material).

② 360° perforated pipe arch (french drain pipe) is not recommended. Do not specify without checking suitability and availability.

③ 5" x 1" corrugated pipe is currently not manufactured for the Florida market. Check availability before specifying.

ROUND PIPE - 2 2/3" x 1/2" CORRUGATION							
D (In.)	Area (Sq. Ft.)	Maximum Height Of Fill (Ft.)					Min. Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.064 (16)	0.079 (14)	0.109 (12)	0.138 (10)	0.168 (8)	
12	0.79	100+	100+	NA	NA	NA	See Sheet 1 of 6
15	1.23	100+	100+	NA	NA	NA	
18	1.77	100+	100+	100+	NA	NA	
21	2.40	100+	100+	100+	NA	NA	
24	3.14	100+	100+	100+	NA	NA	
30	4.91	85	100+	100+	NA	NA	
36	7.1	71+	88	100+	100+	NA	
42	9.6	60+	76	100+	100+	NA	
48	12.6	53	66	93	100+	100+*	
54	16.0	NS	59	82	100+	100+*	
60	19.6	NS	NS	74	95	100+*	
66	23.8	NS	NS	NS	87	100+*	
72	28.3	NS	NS	NS	79	97*	
78	33.2	NS	NS	NS	NS	90*	
84	38.5	NS	NS	NS	NS	83*	

ROUND PIPE - 3" x 1" CORRUGATION							
D (In.)	Area (Sq. Ft.)	Maximum Height Of Fill (Ft.)					Min. Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.064 (16)	0.079 (14)	0.109 (12)	0.138 (10)	0.168 (8)	
36	7.1	81	100+	100+	NA	NA	See Sheet 1 of 6
42	9.6	70	87	100+	NA	NA	
48	12.6	61	76	100+	100+	NA	
54	16.0	54	68	95	100+	NA	
60	19.6	48	61	85	100+	NA	
66	23.8	44	55	78	100	100+*	
72	28.3	40	51	71	91	100+*	
78	33.2	37	47	66	84	100+*	
84	38.5	35	43	61	78	100+*	
90	44.2	32	40	57	73	90*	
96	50.3	NS	38	53	68	84*	
102	56.7	NS	36	50	64	79*	
108	63.6	NS	NS	47	61	75*	
114	70.9	NS	NS	45	58	71*	
120	78.5	NS	NS	42	55	67*	
132	95.0	NS	NS	NS	50	61*	

ROUND PIPE - 5" x 1" CORRUGATION ③							
D (In.)	Area (Sq. Ft.)	Maximum Height Of Fill (Ft.)					Min. Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.064 (16)	0.079 (14)	0.109 (12)	0.138 (10)	0.168 (8)	
36	7.1	72	90	100+	NA	NA	See Sheet 1 of 6
42	9.6	62	77	100+	NA	NA	
48	12.6	54	68	95	100+	NA	
54	16.0	48	60	84	100+	NA	
60	19.6	43	54	76	98	NA	
66	23.8	39	49	69	89	100+*	
72	28.3	36	45	63	81	100*	
78	33.2	33	41	58	75	92*	
84	38.5	31	38	54	70	85*	
90	44.2	29	36	50	65	80*	
96	50.3	NS	34	47	61	75*	
102	56.7	NS	32	44	57	70*	
108	63.6	NS	NS	42	54	66*	
114	70.9	NS	NS	40	51	63*	
120	78.5	NS	NS	38	49	60*	
132	95.0	NS	NS	NS	44	54*	

PIPE ARCH: SPIRAL RIB: 3/4" x 3/4" x 7 1/2" RIB SPACING PIPE ARCH: SPIRAL RIB: 3/4" x 1" x 11 1/2" RIB SPACING PIPE ARCH - 2 2/3" x 1/2" CORRUGATION							
Span (In.)	Rise (In.)	Equiv. Round Pipe (In.)	Area (Ft.²)	Minimum Sheet Thickness Required (In.) (Ga.)	Maximum Height Of Fill (Ft.)		Min. Cover (Ft.)
					Maximum Corner Pressure Lbs./Ft.²		
					4000	6000	
17	13	15	1.1	0.064 (16)	12	14	See Sheet 1 of 6
21	15	18	1.6	0.064 (16)	10	14	
24	18	21	2.2	0.064 (16)	7	13	
28	20	24	2.9	0.064 (16)	5	11	
35	24	30	4.5	0.064 (16)	NS	7	
42	29	36	6.5	0.064 (16)	NS	7	
49	33	42	8.9	0.079 (14)	NS	6	
57	38	48	11.6	0.109 (12)	NS	8	
64	43	54	14.7	0.109 (12)	NS	9	
71	47	60	18.1	0.138 (10)	NS	10	
77	52	66	21.9	0.168 (8)*	5	10	
83	57	72	26.0	0.168 (8)*	5	10	

PIPE ARCH-3" x 1" ①②③ and 5" x 1" ②③ CORR.							
Span (In.)	Rise (In.)	Equiv. Round Pipe (In.)	Area (Ft.²)	Minimum Sheet Thickness Required (In.) (Ga.)	Maximum Height Of Fill (Ft.)		Min. Cover (Ft.)
					Maximum Corner Pressure Lbs./Ft.²		
					4000	6000	
40	31	36	7.0	0.079 (14)	8	12	See Sheet 1 of 6
46	36	42	9.4	0.079 (14)	8	13	
53	41	48	12.3	0.079 (14)	8	13	
60	46	54	15.6	0.079 (14)	8	13	
66	51	60	19.3	0.079 (14)	9	13	
73	55	66	23.2	0.079 (14)	11	16	
81	59	72	27.4	0.079 (14)	11	17	
87	63	78	32.1	0.079 (14)	10	16	
95	67	84	37.0	0.079 (14)	11	17	
103	71	90	42.4	0.109 (12)	10	15	
112	75	96	48.0	0.109 (12)	10	16	
117	79	102	54.2	0.109 (12)	10	15	
128	83	108	60.5	0.138 (10)	9	14	
137	87	114	67.4	0.138 (10)	8	13	
142	91	120	74.5	0.168 (8)	7	12	

ROUND PIPE - SPIRAL RIB RIB SPACING (3/4" x 3/4" x 7 1/2") or (3/4" x 1" x 11 1/2")							
D (In.)	Area (Sq. Ft.)	Maximum Height Of Fill (Ft.)					Min. Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.064 (16)	0.079 (14)	0.109 (12)	0.138 (10)	0.168 (8)	
12	0.79	NA	NA	NA	NA	NA	See Sheet 1 of 6
15	1.23	NA	NA	NA	NA	NA	
18	1.77	68	72	NA	NA	NA	
21	2.40	58	62	100+	NA	NA	
24	3.14	51	72	100+	100+	NA	
30	4.91	41	58	97	100+	NA	
36	7.1	34	48	81	100+	NA	
42	9.6	29	41	69	100+	NA	
48	12.6	26	36	61	100+	NA	
54	16.0	23	32	54	91	NA	
60	19.6	NS	29	49	83	NA	
66	23.8	NS	26	44	74	NA	
72	28.3	NS	24	40	67	NA	
78	33.2	NS	NS	37	59	NA	
84	38.5	NS	NS	35	54	NA	
90	44.2	NS	NS	32	48	NA	
96	50.3	NS	NS	30	45	NA	
102	56.7	NS	NS	29	40	NA	
108	63.6	NS	NS	27Ⓐ	36	NA	

Ⓐ = 3/4" x 1" x 11 1/2" Only

MAXIMUM COVER FOR CORRUGATED STEEL PIPE ROUND AND PIPE ARCH



ROUND PIPE - 2 2/3" x 1/2" CORRUGATION							
D (In.)	Area (Sq. Ft.)	Maximum Height Of Fill (Ft.)					Min. Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.060 (16)	0.075 (14)	0.105 (12)	0.135 (10)	0.164 (8)	
12	0.8	90	100+	NA	NA	NA	See Sheet 1 of 6
15	1.2	72	90	NA	NA	NA	
18	1.8	59	75	100+	NA	NA	
21	2.4	52	65	92	NA	NA	
24	3.1	44	56	79	NA	NA	
30	4.9	35 DR	44	63	NA	NA	
36	7.1	NS	36 DR	52	68	NA	
42	9.6	NS	NS	44 DR	58	NA	
48	12.6	NS	NS	38 DR	50 DR	61	
54	15.9	NS	NS	34 DR	45 DR	54 DR	
60	19.6	NS	NS	NS	39 DR	49 DR	
66	23.8	NS	NS	NS	NS	44 DR	
72	28.3	NS	NS	NS	NS	40 DR	

ROUND PIPE - 3" x 1" CORRUGATION							
D (In.)	Area (Sq. Ft.)	Maximum Height Of Fill (Ft.)					Min. Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.060 (16)	0.075 (14)	0.105 (12)	0.135 (10)	0.164 (8)	
36	7.1	33	42	60	NA	NA	See Sheet 1 of 6
42	9.6	28	36	51	NA	NA	
48	12.6	24	31	45	58	NA	
54	15.9	21	28	39	51	NA	
60	19.6	19	24	35	46	NA	
66	23.8	15DR	22	32	42	51	
72	28.3	NS	20DR	29	38	47	
78	33.2	NS	15DR	27	35	43	
84	38.5	NS	NS	24DR	32	40	
90	44.2	NS	NS	23DR	30	37	
96	50.3	NS	NS	21DR	28DR	34	
102	56.7	NS	NS	NS	26DR	32	
108	63.6	NS	NS	NS	24DR	30DR	
114	70.9	NS	NS	NS	NS	28DR	
120	78.5	NS	NS	NS	NS	27DR	

ROUND PIPE - SPIRAL RIB RIB SPACING (3/4" x 3/4" x 7 1/2")							
D (In.)	Area (Sq. Ft.)	Maximum Height Of Fill (Ft.)					Min. Cover (Ft.)
		Sheet Thickness In Inches (Gage)					
		0.060 (16)	0.075 (14)	0.105 (12)	0.135 (10)	0.164 (8)	
12	0.79	NA	NA	NA	NA	NA	See Sheet 1 of 6
15	1.23	63 ①	87 ①	NA	NA	NA	
18	1.77	55	76	NA	NA	NA	
21	2.40	47	65	NA	NA	NA	
24	3.14	41	57	NA	NA	NA	
30	4.91	33 DR	45	73	NA	NA	
36	7.1	NS	38 DR	61	NA	NA	
42	9.6	NS	NS	52	NA	NA	
48	12.6	NS	NS	46	65	NA	
54	16.0	NS	NS	40 DR	57	NA	
60	19.6	NS	NS	NS	52	NA	
66	23.8	NS	NS	NS	47 DR	NA	
72	28.3	NS	NS	NS	NS	NA	
78	33.2	NS	NS	NS	NS	NA	
84	38.5	NS	NS	NS	NS	NA	
90	44.2	NS	NS	NS	NS	NA	
96	50.3	NS	NS	NS	NS	NA	

█ - Note:
Special installation required. Refer to AASHTO Standard Specifications for Highway Bridges or ASTM B788-88 and manufacturer's recommendations.

PIPE ARCH - 2 2/3" x 1/2" CORRUGATION ②							
Span (In.)	Rise (In.)	Equiv. Round Pipe (In.)	Area (Sq. Ft.)	Minimum Sheet Thickness Required (In.) (Ga.)	Maximum Height Of Fill (Ft.)		Min. Cover (Ft.)
					Maximum Corner Pressure-Lbs./Sq.Ft.		
					4000	6000	
17	13	15	1.1	0.060 (16)	12	15	See Sheet 1 of 6
21	15	18	1.6	0.060 (16)	10	14	
24	18	21	2.2	0.060 (16)	7	13	
28	20	24	2.9	0.075 (14)	5	11	
35	24	30	4.5	0.075 (14)	NS	7	
42	29	36	6.5	0.105 (12)	NS	7	
49	33	42	8.9	0.105 (12)	NS	6	
57	38	48	11.6	0.135 (10)	NS	8	
64	43	54	14.7	0.135 (10)	NS	9	
71	47	60	18.1	0.164 (8)	NS	10	
77	52	66	21.9	0.164 (8)	NS	10	
83	57	72	26.0	0.164 (8)	NS	10	

PIPE ARCH - 3" x 1" CORRUGATION ①②							
Span (In.)	Rise (In.)	Equiv. Round Pipe (In.)	Area (Sq. Ft.)	Minimum Sheet Thickness Required (In.) (Ga.)	Maximum Height Of Fill (Ft.)		Min. Cover (Ft.)
					Maximum Corner Pressure-Lbs./Sq.Ft.		
					4000	6000	
40	31	36	7.0	0.060 (16)	8	12	See Sheet 1 of 6
46	36	42	9.4	0.060 (16)	8	13	
53	41	48	12.3	0.060 (16)	8	13	
60	46	54	15.6	0.075 (14)	8	13	
66	51	60	19.3	0.075 (14)	8	13	
73	55	66	23.2	0.105 (12)	11	16	
81	59	72	27.4	0.105 (12)	11	17	
87	63	78	32.1	0.105 (12)	10	16	
95	67	84	37.0	0.105 (12)	11	17	
103	71	90	42.4	0.135 (10)	10	15	
112	75	96	48.0	0.135 (10)	10	16	
117	79	102	54.2	0.164 (8)	10	15	

PIPE ARCH - SPIRAL RIB RIB SPACING (3/4" x 3/4" x 7 1/2")							
Span (In.)	Rise (In.)	Equiv. Round Pipe (In.)	Area (Sq. Ft.)	Minimum Sheet Thickness Required (In.) (Ga.)	Maximum Height Of Fill (Ft.)		Min. Cover (Ft.)
					Maximum Corner Pressure-Lbs./Sq.Ft.		
					4000	6000	
16	14	15	1.2	0.060 (16)	12	13	See Sheet 1 of 6
20	16	18	1.7	0.060 (16)	10	12	
23	19	21	2.3	0.060 (16)	7	11	
27	21	24	3.0	0.060 (16)	5	10	
33	26	30	4.7	0.075 (14)	NS	9	
40	31	36	7.0	0.075 (14)	NS	8	
46	36	42	9.4	0.105 (12)	NS	8	
53	41	48	12.3	0.105 (12)	NS	8	
60	46	54	15.6	0.105 (10)	NS	8	
66	51	60	19.3	0.135 (10)	NS	8	
73	55	66	23.2	NS	NS	8	
81	59	72	27.4	NS	NS	8	

MAXIMUM COVER FOR CORRUGATED ALUMINUM ALLOY ROUND PIPE AND PIPE ARCH

Notes:

Increase the minimum cover values shown on Sheet 1 of 6 by 6" for gage and size combinations below the heavy lines.

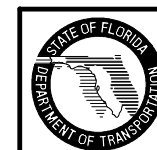
Height of fill (maximum cover) is measured from top of finished grade to outside top of pipe.

NA-Not Available

NS-Not Suitable (For Highway H-20 or HS-20 Loadings)

DR-Design Review is recommended for each specific application. The review should identify any special handling, installation, backfill procedures, and construction load restrictions which may be required. (The review performed by the designer does not relieve the contractor from analyzing and taking any necessary precautions required to protect partially or completely constructed pipe from the equipment used during construction.) (NOTE: The DESIGNER may use a thicker gage in lieu of the Design Review.)

- ① Limited availability of this product. Check availability before specifying.
- ② 360° perforated pipe (french drain pipe) is not recommended in the pipe arch shape. Do not specify without checking both for suitability and availability.
- ③ This size and gage combination must be strutted during installation per manufacturer's recommendations. Extra care will be required during handling and installation.
- ④ Use of this size and gage combination must be approved by the State Drainage Engineer.



**Aluminum Structural Plate
Height of Cover Limits***
Combination Metal Thickness, Reinforcing Rib Type, and Rib Spacing
Arch Shape- HS 20 Live Load

Span (Ft.-In.)	Rise (Ft.-In.)	Area (Sq.Ft.)	Minimum Height of Cover (Ft.)					
			1.00	1.50	2.00	2.50	3.00	3.50
5-0	1-9	7	0.125 (45)	0.100 (31)	0.100 (31)	0.100 (31)	0.100 (31)	0.100 (31)
	2-3	9						
	2-7	10						
6-0	1-10	8	0.125-II-18 (37)	0.100 (25)	0.100 (25)	0.100 (25)	0.100 (25)	0.100 (25)
	2-4	10						
	2-9	13						
	3-2	15						
7-0	2-4	12	0.125-II-18 (32)	0.100 (22)	0.100 (22)	0.100 (22)	0.100 (22)	0.100 (22)
	2-10	15						
	3-3	18						
	3-8	20						
8-0	2-11	17	0.125-II-9 (28)	0.150 (37)	0.100 (19)	0.100 (19)	0.100 (19)	0.100 (19)
	3-4	20						
	4-2	26						
9-0	2-11	19	0.125-IV-9 (25)	0.125-II-18 (25)	0.100 (17)	0.100 (17)	0.100 (17)	0.100 (17)
	3-10	26						
	4-8	33						
10-0	3-6	25	0.125-IV-9 (22)	0.125-II-18 (22)	0.125 (22)	0.100 (15)	0.100 (15)	0.100 (15)
	4-5	33						
	5-2	41						
11-0	3-6	28	0.175-IV-9 (32)	0.125-II-18 (20)	0.125-II-27 (20)	0.100 (14)	0.100 (14)	0.100 (14)
	4-6	37						
	5-8	50						
12-0	4-1	35		0.125-IV-18 (18)	0.125-II-27 (18)	0.125 (18)	0.100 (12)	0.100 (12)
	5-0	45						
	6-3	59						
13-0	4-1	38		0.150-IV-18 (23)	0.125-II-27 (17)	0.150 (23)	0.100 (11)	0.100 (11)
	5-1	49						
	5-11	59						
	6-9	70						
14-0	4-8	47		0.125-IV-9 (16)	0.125-IV-27 (16)	0.125-II-27 (16)	0.100 (11)	0.100 (11)
	5-7	58						
	6-5	70						
	7-3	81						
15-0	4-8	50		0.125-IV-9 (15)	0.125-IV-27 (15)	0.125-II-27 (15)	0.125 (15)	0.125 (15)
	5-8	63						
	6-7	75						
	7-5	87						
16-0	4-8	50		0.125-IV-9 (15)	0.125-IV-27 (15)	0.125-II-27 (15)	0.125 (15)	0.125 (15)
	5-3	60						
	6-2	73						
	7-1	86						
17-0	5-3	64		0.150-IV-9 (18)	0.125-IV-18 (14)	0.125-II-27 (14)	0.150 (18)	0.125 (14)
	6-3	78						
	7-2	92						
	8-0	105						
18-0	5-3	64		0.225-IV-9 (27)	0.150-IV-18 (17)	0.125-II-27 (13)	0.175 (20)	0.150 (17)
	6-3	78						
	7-2	92						
	8-0	105						
19-0	5-9	75			0.175-IV-18 (19)	0.125-IV-27 (12)	0.200 (22)	0.175 (19)
	6-9	90						
	7-8	105						
	8-6	119						
19-0	8-11	126						
	6-4	87						
	7-4	103						
	8-2	118						
	9-0	133						
9-5	141							

**Aluminum Structural Plate
Height of Cover Limits***
Combination Metal Thickness, Reinforcing Rib Type, and Rib Spacing
Round Shape- HS 20 Live Load

Diameter (Ft.-In.)	Area (Sq. Ft.)	Minimum Height of Cover (Ft.)					
		1.00	1.50	2.00	2.50	3.00	3.50
5-0	19	0.125 (45)	0.100 (31)	0.100 (31)	0.100 (31)	0.100 (31)	0.100 (31)
5-6	23	0.125-II-18 (37)	0.100 (25)	0.100 (25)	0.100 (25)	0.100 (25)	0.100 (25)
6-0	28						
6-6	32	0.125-II-18 (32)	0.100 (22)	0.100 (22)	0.100 (22)	0.100 (22)	0.100 (22)
7-0	38						
7-6	44	0.125-II-9 (28)	0.150 (37)	0.100 (19)	0.100 (19)	0.100 (19)	0.100 (19)
8-0	50						
8-6	56	0.125-IV-9 (25)	0.125-II-18 (25)	0.100 (17)	0.100 (17)	0.100 (17)	0.100 (17)
9-0	63						
9-6	71	0.125-IV-9 (22)	0.125-II-18 (22)	0.125 (22)	0.100 (15)	0.100 (15)	0.100 (15)
10-0	79						
10-6	87	0.175-IV-9 (32)	0.125-II-18 (20)	0.125-II-27 (20)	0.100 (14)	0.100 (14)	0.100 (14)
11-0	95						
11-6	104		0.125-IV-18 (18)	0.125-II-27 (18)	0.125 (18)	0.100 (12)	0.100 (12)
12-0	114						
12-6	124		0.150-IV-18 (23)	0.125-II-27 (17)	0.150 (23)	0.125 (17)	0.125 (17)
13-0	134						
13-6	145		0.125-IV-9 (16)	0.125-IV-27 (16)	0.125-II-27 (16)	0.150 (21)	0.150 (21)
14-0	156						
14-6	167		0.125-II-54 (15)	0.125-IV-9 (15)	0.125-IV-27 (15)	0.125-II-27 (15)	0.125-II-54 (15)
15-0	179						
15-6	191		0.150-IV-9 (18)	0.125-IV-18 (14)	0.125-II-27 (14)	0.150-II-54 (18)	0.150-II-54 (18)
16-0	204						
16-6	217		0.225-IV-9 (27)	0.150-IV-18 (17)	0.150-II-27 (17)	0.150-II-27 (17)	0.150-II-27 (17)
17-0	231						
17-6	245			0.175-IV-18 (19)	0.175-II-27 (19)	0.175-II-27 (19)	0.175-II-27 (19)
18-0	259						
18-6	274			0.175-IV-9 (18)	0.175-IV-27 (18)	0.175-II-27 (18)	0.175-II-27 (18)
19-0	289						
19-6	305			0.200-IV-9 (20)	0.200-IV-27 (20)	0.200-II-27 (20)	0.200-II-27 (20)

* Number in () below combination indicates maximum cover for the given combination plate thickness, rib type and rib spacing. All maximum cover depths are given in feet. (See Note Number 2 Under Structural Plate Notes Sheet 6 of 6).

MINIMUM AND MAXIMUM COVER FOR ALUMINUM STRUCTURAL PLATE



2010 FDOT Design Standards

COVER HEIGHT

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**Aluminum Structural Plate
Height of Cover Limits***
Combination Metal Thickness, Reinforcing Rib Type, and Rib Spacing
Underpass Shape- HS 20 Live Load

Span (Ft.-In.)	Rise (Ft.-In.)	Area (Sq.Ft.)	Minimum Height of Cover (Ft.)					
			1.00	1.50	2.00	2.50	3.00	3.50
6-1	5-9	28	0.125-II-18 (29)	0.100 (25)	0.100 (25)	0.100 (25)	0.100 (25)	0.100 (25)
6-3 6-3 6-2 6-4 6-3 6-5	6-1 6-5 6-11 7-3 7-9 8-1	30 32 34 37 39 42	0.125-II-18 (25)	0.100 (22)	0.100 (22)	0.100 (22)	0.100 (22)	0.100 (22)
12-1	11-0	106		0.125-IV-18 (14)	0.125-II-27 (14)	0.125 (14)	0.100 (12)	0.100 (12)
12-10 13-0	11-2 12-0	114 124		0.150-IV-18 (13)	0.125-II-27 (13)	0.150 (13)	0.125 (13)	0.125 (13)
13-8 14-0	12-4 12-11	133 143		0.125-IV-9 (12)	0.125-IV-27 (12)	0.125-II-27 (12)	0.125-II-54 (12)	0.125-II-54 (12)
14-6 14-8	13-5 14-1	155 165		0.125-IV-9 (11)	0.125-IV-27 (11)	0.125-II-27 (11)	0.125-II-54 (11)	0.125-II-54 (11)
15-5 15-6	14-5 15-2	177 190		0.150-IV-9 (11)	0.125-IV-18 (11)	0.125-II-27 (11)	0.125-II-27 (11)	0.125-II-2 (11)
16-2 16-6 16-8	15-6 16-0 16-4	200 208 215		0.225-IV-9 (10)	0.150-IV-18 (10)	0.150-II-27 (10)	0.150-II-27 (10)	0.150-II-27 (10)

**Aluminum Structural Plate
Height of Cover Limits***
Combination Metal Thickness, Reinforcing Rib Type, and Rib Spacing
Pipe-Arch Shape- HS 20 Live Load

Span (Ft.-In.)	Rise (Ft.-In.)	Area (Sq-Ft)	Minimum Height of Cover (Ft.)					
			1.00	1.50	2.00	2.50	3.00	3.50
6-7 6-11	5-8 5-9	30 32	0.125-II-18 (25)	0.100 (22)	0.100 (22)	0.100 (22)	0.100 (22)	0.100 (22)
7-3 7-9 8-1	5-11 6-0 6-1	34 37 39	0.125-IV-18 (22)	0.150 (22)	0.100 (19)	0.100 (19)	0.100 (19)	0.100 (19)
8-5 8-10	6-3 6-4	42 45	0.125-IV-9 (19)	0.125-II-18 (19)	0.100 (17)	0.100 (17)	0.100 (17)	0.100 (17)
9-3 9-7 9-11	6-5 6-6 6-8	47 50 53	0.125-IV-9 (17)	0.125-II-18 (17)	0.125 (17)	0.100 (15)	0.100 (15)	0.100 (15)
10-3 10-9 11-1	6-9 6-10 7-0	56 58 61	0.175-IV-9 (16)	0.125-II-18 (16)	0.125-II-27 (16)	0.100 (14)	0.100 (14)	0.100 (14)
11-5 11-9	7-1 7-2	64 68		0.125-II-18 (14)	0.125-II-27 (14)	0.125 (14)	0.100 (12)	0.100 (12)
12-3 12-7 12-11 13-1 13-1	7-3 7-5 7-6 8-2 8-4	71 74 77 83 87		0.150-IV-18 (13)	0.125-II-27 (13)	0.150 (13)	0.100 (11)	0.100 (11)
13-11 14-0 13-11	8-5 8-7 9-5	90 94 102		0.125-IV-9 (12)	0.125-IV-27 (12)	0.125-II-27 (12)	0.100 (11)	0.100 (11)
14-3 14-8 14-11	9-7 9-8 9-10	106 110 114		0.125-IV-9 (11)	0.125-IV-27 (11)	0.125-II-27 (11)	0.125 (11)	0.125 (11)
15-4 15-7 16-1	10-0 10-2 10-4	119 123 128		0.150-IV-9 (11)	0.125-IV-18 (11)	0.125-II-27 (11)	0.125-II-54 (11)	0.125 (11)
16-4	10-6	132		0.225-IV-9 (10)	0.150-IV-18 (10)	0.125-II-27 (10)	0.125-II-54 (10)	0.125-II-54 (10)

ALUMINUM STRUCTURAL PLATE NOTES

1. Allowable cover (minimum & maximum) is measured from the outside valley of crown plate to the bottom of flexible pavement or from the outside valley of the crown plate to the top of rigid pavement. Minimum cover must be maintained in unpaved areas. Maximum cover is measured at the highest fill and/or the highest pavement elevation.

2. To find the minimum material requirements for the aluminum structural plate structure:

- Select the span in the left hand column that is equal to or larger than structure size required.
- Select the cover in the top row that is equal to or smaller than that required for the site.
- Intersect appropriate span and cover to find the appropriate plate.
Example: Round Pipe, Span= 17'-0", Height of Cover= 2'-7" (use 2.5 ft. in table). Ans: 0.150-II-27 (17)

The table selections show metal thickness, rib type, rib spacing and maximum cover. Example: 0.150-II-27=0.150" thick plate structure with Type II rib at 27" on centers on the crown. Number (17) in parenthesis below combination indicates maximum cover in feet for the given combination of plate thickness, rib type, and rib spacing.

3. Arch shapes shown are single radius and have a rise-to-span ratio of 0.30 to 0.53. Structures with rise-to-span ratios of less than 0.30 are typically not used because of structural considerations.

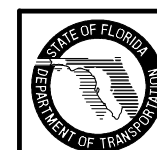
4. Tables based on HS 20 wheelloads.

DESIGN NOTES

- The plans must call out size, metal thickness, reinforcing rib type and rib spacing.
- Pipe-arch and underpass shapes will generate high corner bearing pressures against the sidefill and foundation. The height of cover is directly affected by these bearing pressures. The surrounding soil and foundation must be checked to ensure that they to react against these pressures to avoid inducing excessive strain in plate.

* Number in () below combination indicates maximum cover for the given combination plate thickness, rib type and rib spacing. All maximum cover depths are given in feet. (See Note Number 2 Under Structural Plate Notes)

MINIMUM AND MAXIMUM COVER FOR ALUMINUM STRUCTURAL PLATE



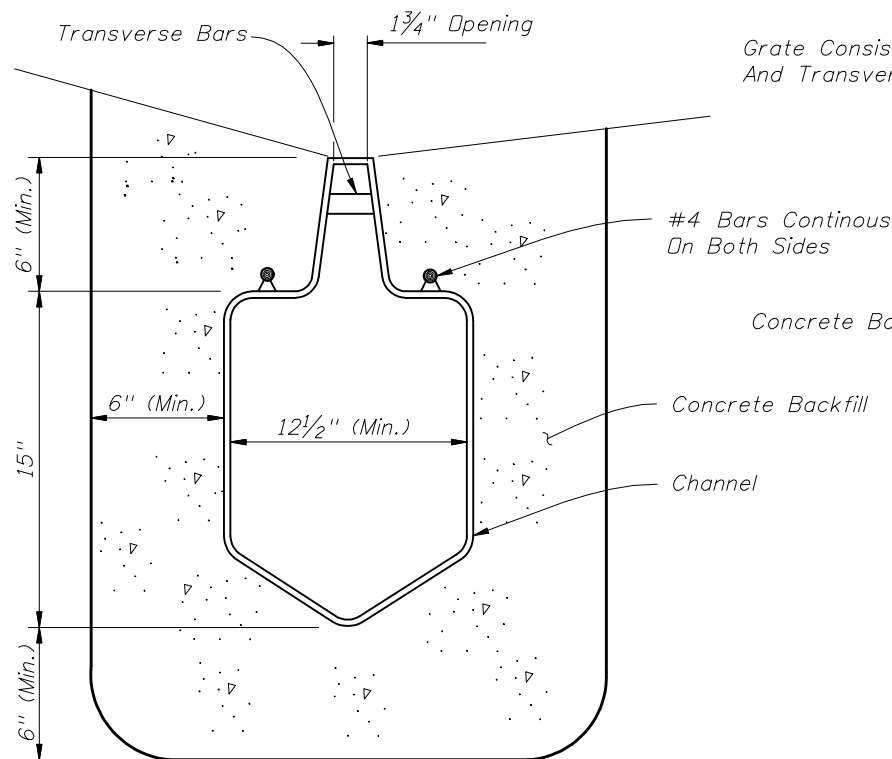
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COVER HEIGHT

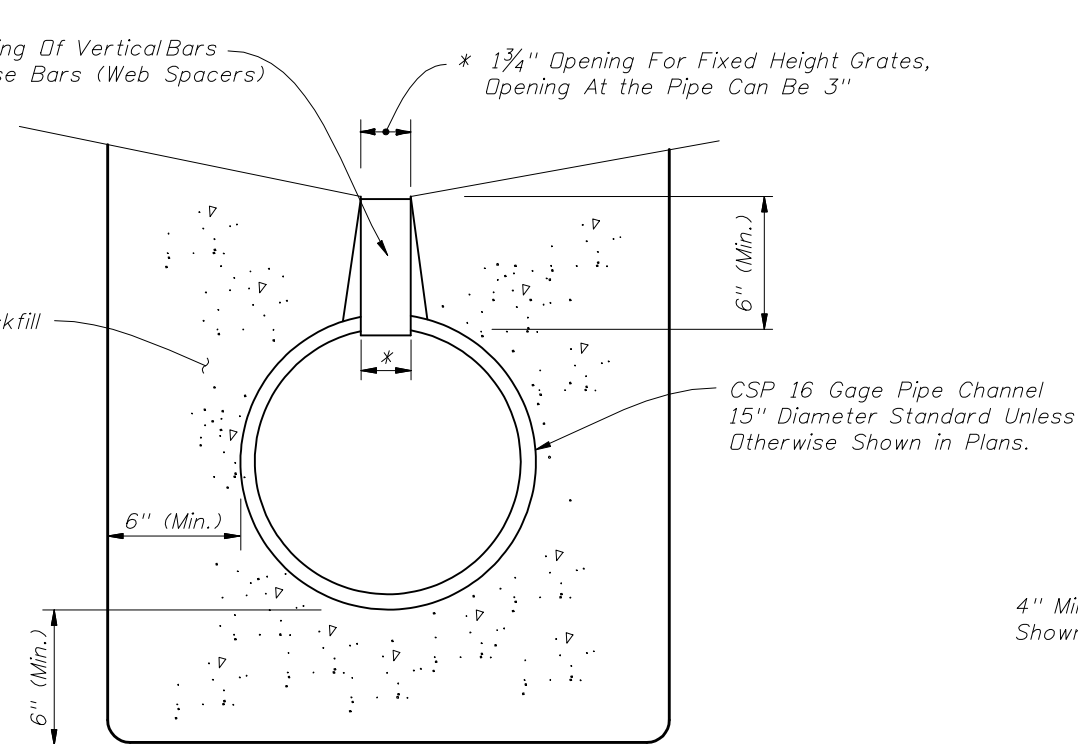
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Sheet No.
6 of 6

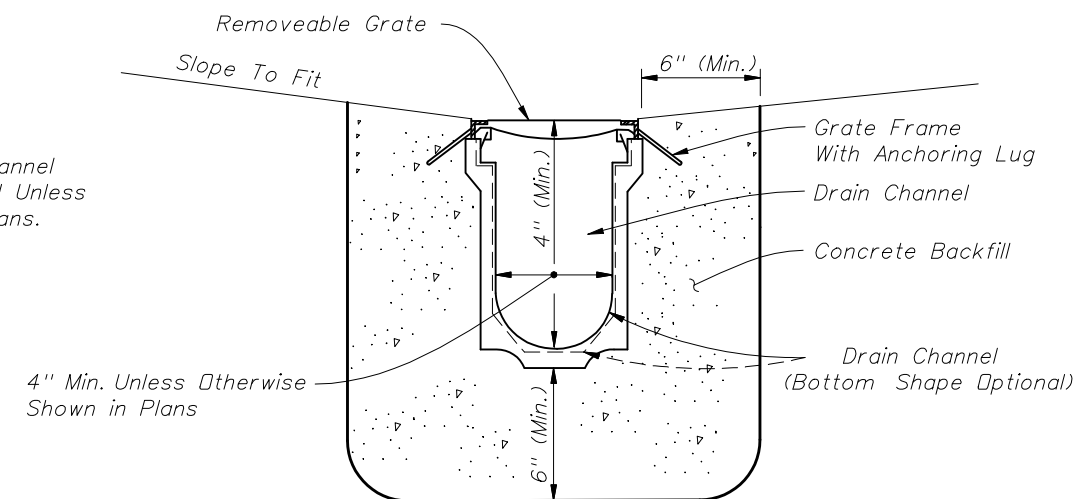
Index No.
205



PREFORMED POLYETHYLENE ALTERNATE



ROUND CSP ALTERNATE



PREFORMED CHANNEL WITH REMOVABLE GRATE

SEE SHEET 2 FOR TYPICAL LOCATIONS

TYPE I (NON-REMOVABLE GRATE)

SEE SHEET 2 FOR TYPICAL LOCATIONS

TYPE II

GENERAL NOTES

1. Trench drain is intended for use in gutters and driveways as shown on the typical locations on Sheet 2. Type I is intended for use in Type E, F and drop curbing, and adjacent to traffic separators and standard barrier walls. The width of the channel grate for Type I Trench Drain shall be 1 3/4" throughout the length of its application. The linear slope or gradient for Type I may be manufactured by varying the depth of the channel neck. Type II may also be used in those locations if an independent laboratory certifies that the grating used has an open area equal to at least 0.27 square feet per linear foot. Type II is primarily intended for use in valley gutter across driveway openings and drop curbing; Type I may also be used in those locations. The width of the channel grate for Type II Trench Drain shall be the same as the width of the channel. The linear slope or gradient for Type II may be manufactured by varying the depth of the channel. Trench Drain shall not be placed in designated pedestrian paths unless ADA compliant grates are used.
2. Unless shown in the plans, outlet pipes and preformed channel inverts shall be sloped 0.6% or steeper toward the outlet regardless of the surface slope.
3. Trench drain may be stubbed directly into drainage structures, or outlet pipes may be used to connect trench drain to drainage structures.
4. A cleanout port compatible with the manufactured system shall be provided for Type I drains at the upstream end and at intervals not to exceed 50 feet. The cleanout port shall provide an opening 6" to 10" wide (transverse to the trench drain length) and 18" to 24" long. Where cleanouts are placed adjacent to raised curb or separator, the curb or separator shall be formed around the cleanout. The cleanout shall have a removable load resistant cover or grate.
5. Trench excavation must allow for a minimum of 6" of concrete to be placed under and alongside the trench drain channel system. Concrete backfill shall meet the requirements of Section 347 of the Standard Specifications. At the end of all units (Type I or II), the concrete backfill shall extend 6" minimum past the end of the drain opening.
6. Transverse bars for Type I Trench Drain shall be spaced 4" to 6" on center.
7. Whenever the work disturbs existing conditions or work already completed, restore the same to its original condition in every detail. All such repair and replacement shall meet the approval of the Engineer.
8. Payment to be made under the contract unit price for Trench Drain, LF.

DESIGN NOTES

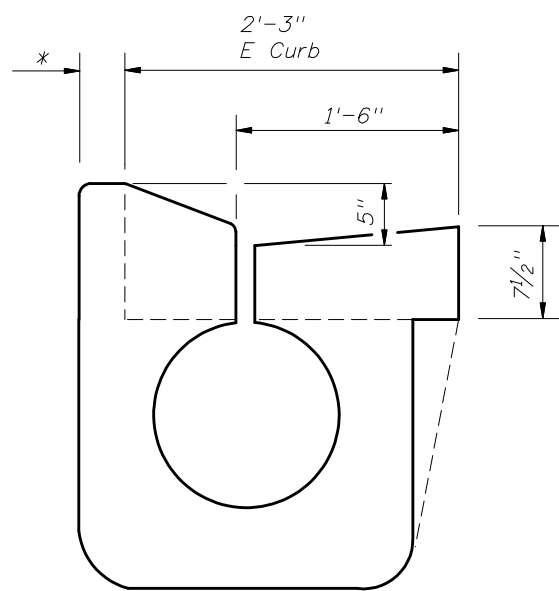
1. Where placed adjacent to reinforced concrete barrier wall or median barrier wall, the designer shall detail in the plans the position of the drain relative to the barrier wall to avoid conflicts with the barrier wall footing. See Index No. 410.
2. The designer shall identify the following in the plans:
 - (a) The type of drain at each location.
 - (b) The begin and end locations of the Trench Drain.
 - (c) The location of the outlet pipe if the Trench Drain is not stubbed directly into a drainage structure.
 - (d) The design flow (Q) for the Trench Drain must be shown on the plans.
3. Capture efficiency for Type I Trench Drain may be computed using the equations for slotted drain in FHWA's HEC 12 & 22. Grate Type I and Type II must have at least 30% open area.
4. Round pipe alternate is available in 12, 18, 24 and 36 inch CSP.
5. Type II Preformed Channel with integral anchoring lugs are applicable.



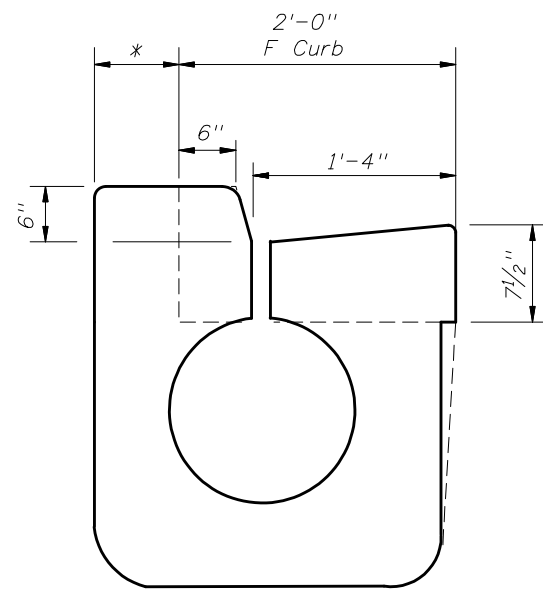
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TRENCH DRAIN

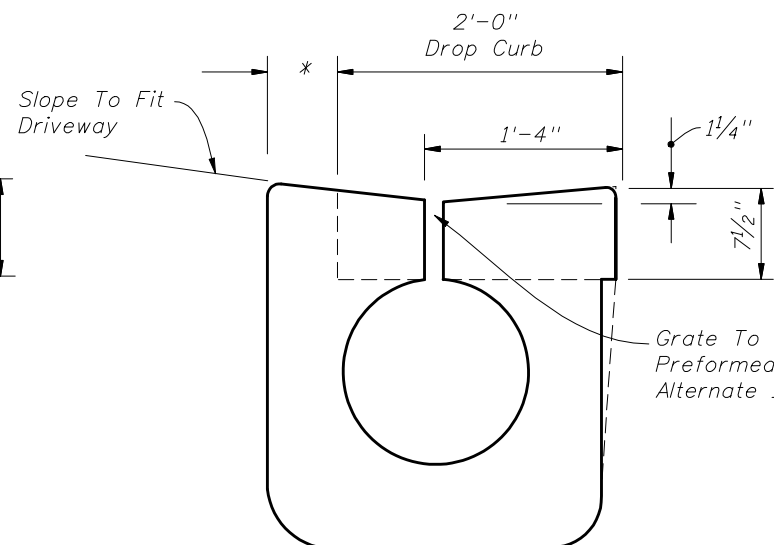
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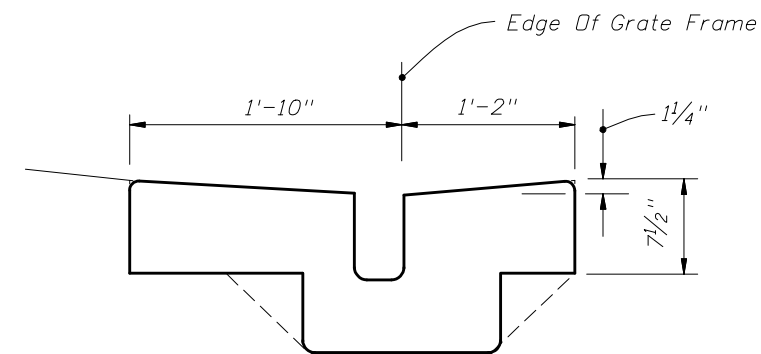
WITHIN TYPE E CURB



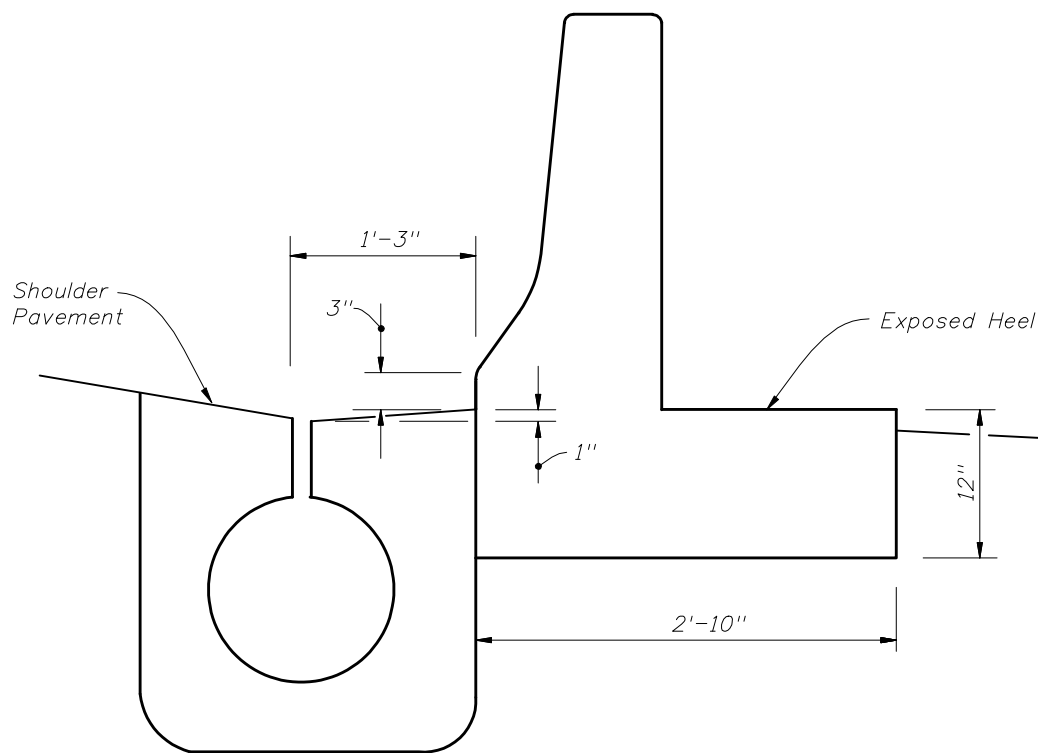
WITHIN TYPE F CURB



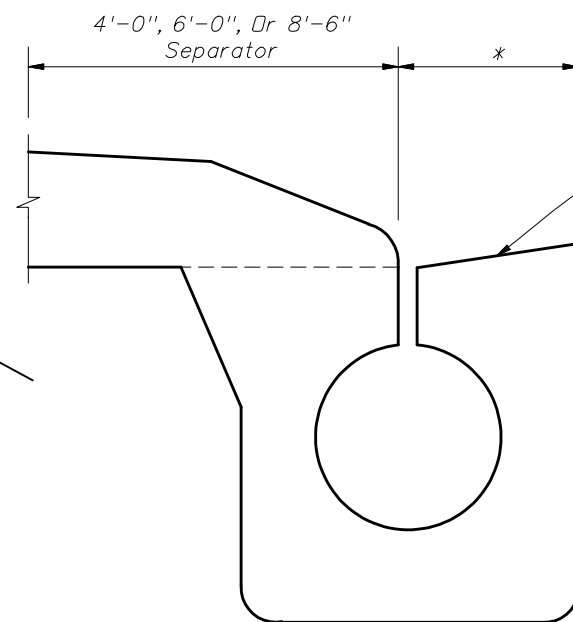
WITHIN DROP CURB



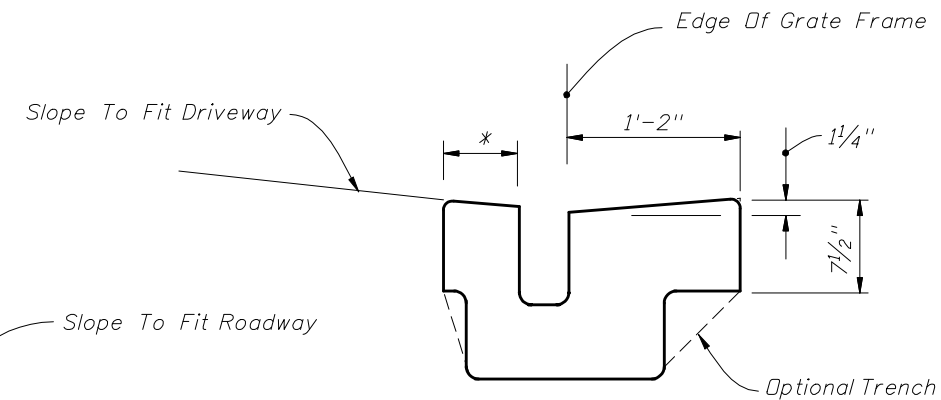
WITHIN VALLEY GUTTER



ADJACENT TO SHOULDER BARRIER WALL



ADJACENT TO TRAFFIC SEPARATOR



WITHIN DROP CURB
TYPICAL LOCATIONS FOR TYPE II

ROUND PIPE ALTERNATE SHOWN, BUT PREFORMED POLYETHYLENE ALTERNATE ACCEPTABLE

TYPICAL LOCATIONS FOR TYPE I

* As Necessary To Provide 6" Of Concrete On This Side Of Drain

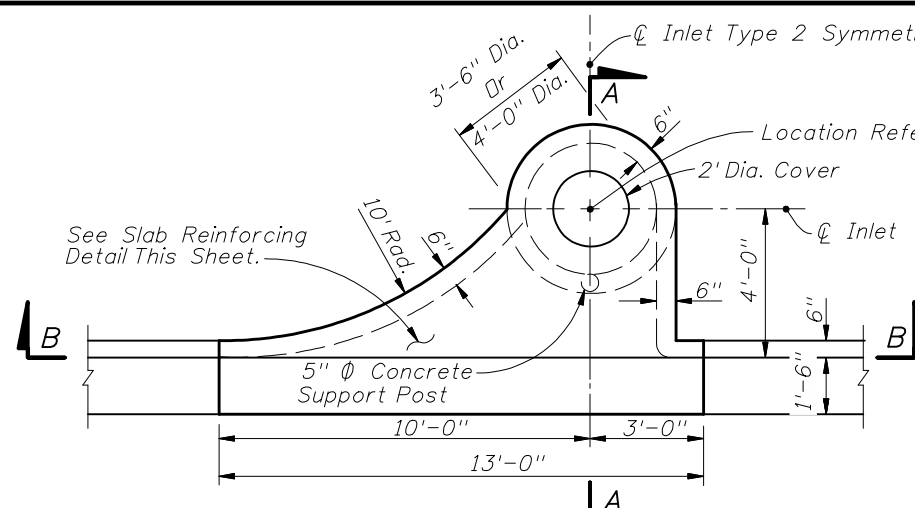


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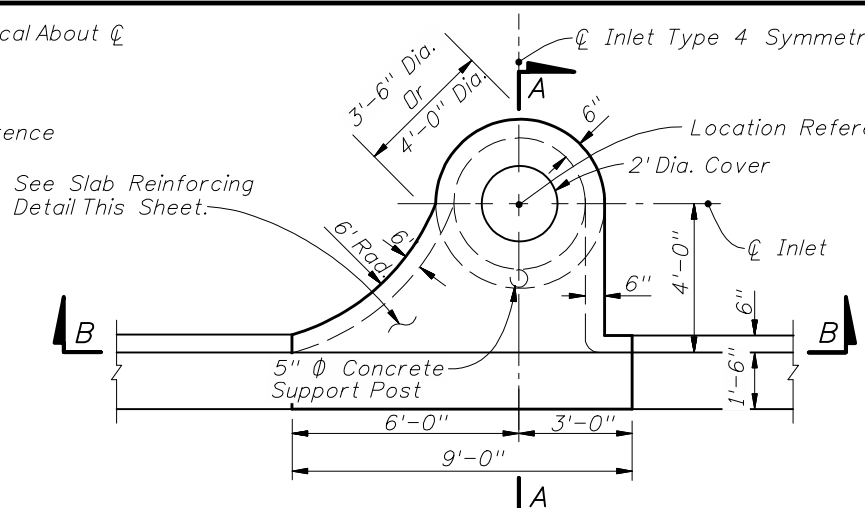
TRENCH DRAIN

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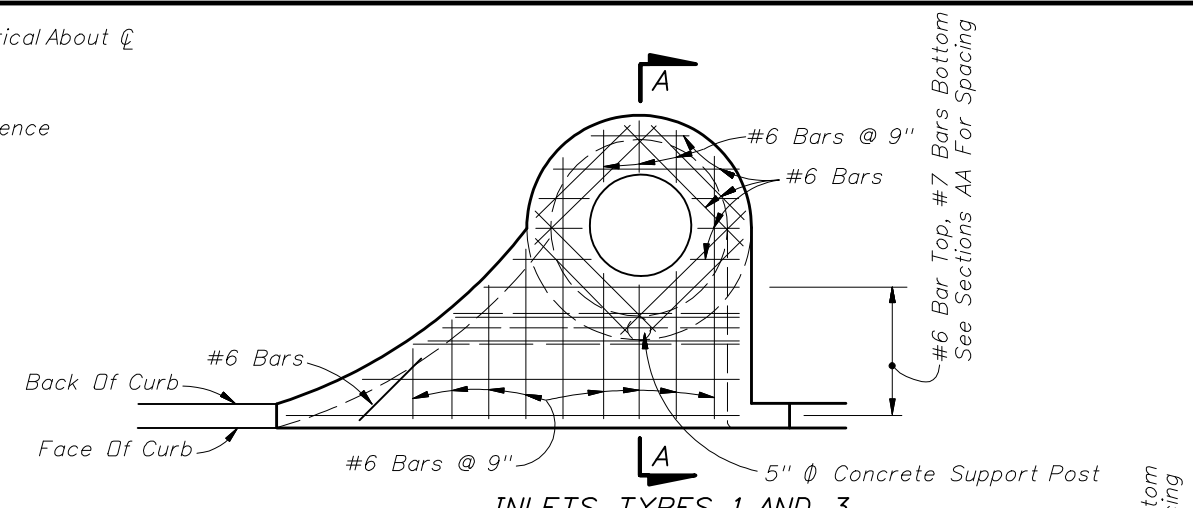
Index No. 206



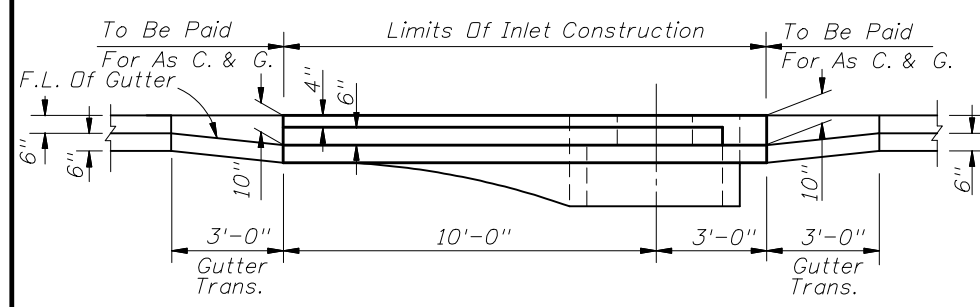
PLAN (INLET TYPE 2 SYMMETRICAL ABOUT \mathcal{C})



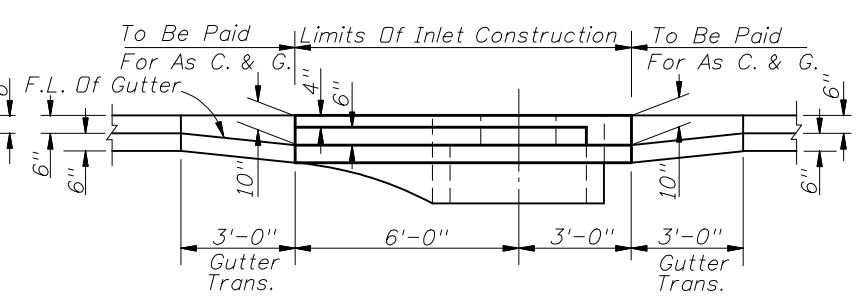
PLAN (INLET TYPE 4 SYMMETRICAL ABOUT \mathcal{C})



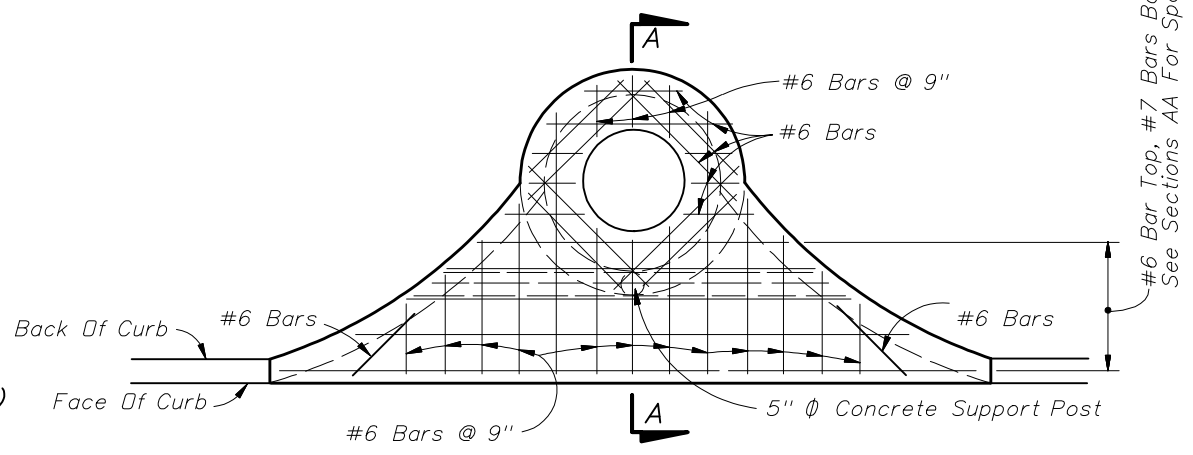
INLETS TYPES 1 AND 3



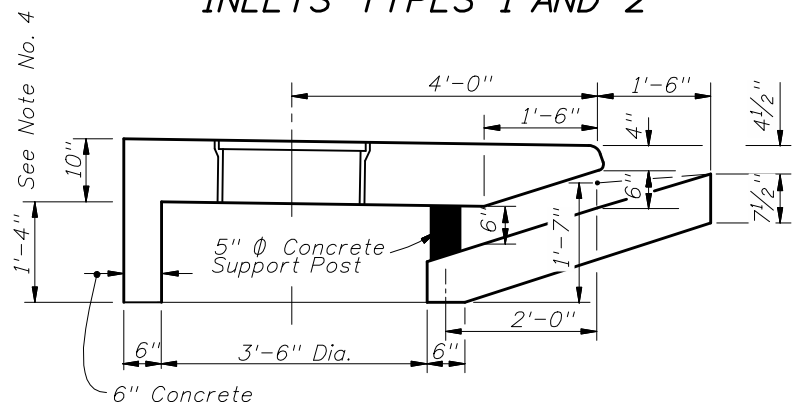
SECTION BB (INLET TYPE 2 SYMMETRICAL ABOUT \mathcal{C})
INLETS TYPES 1 AND 2



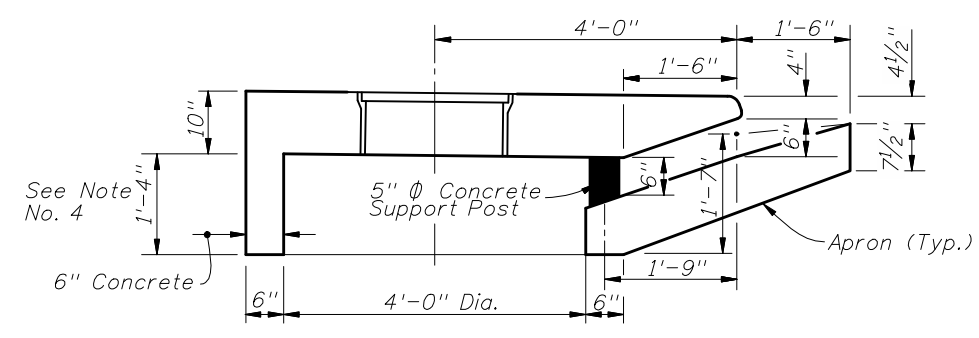
SECTION BB (INLET TYPE 4 SYMMETRICAL ABOUT \mathcal{C})
INLETS TYPES 3 AND 4



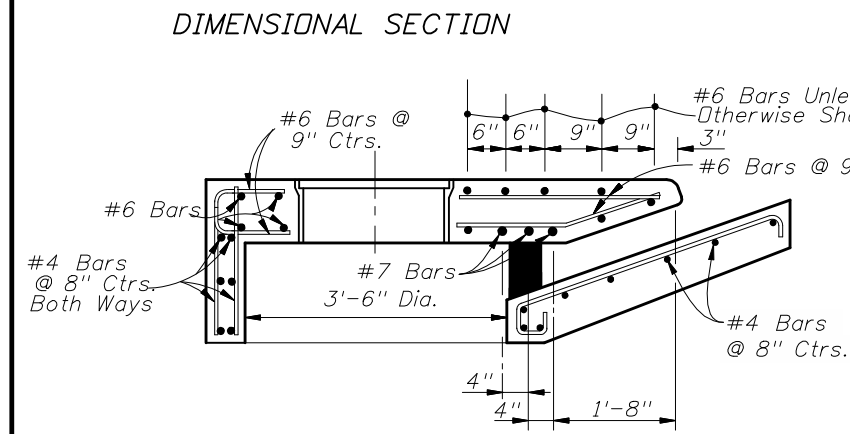
INLETS TYPES 2 AND 4
SLAB REINFORCING



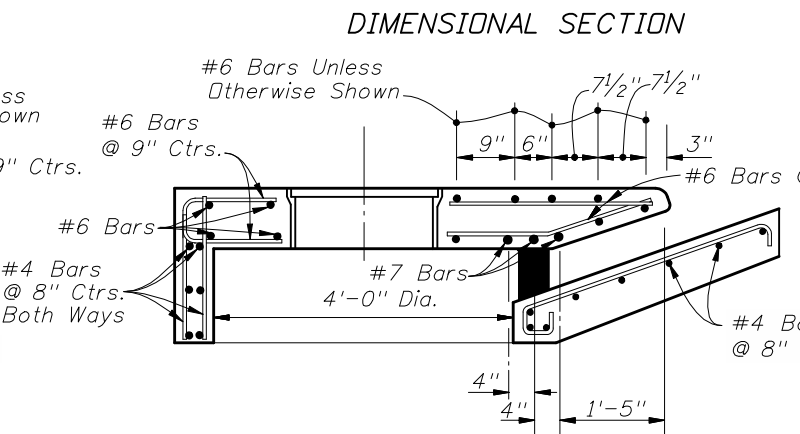
DIMENSIONAL SECTION



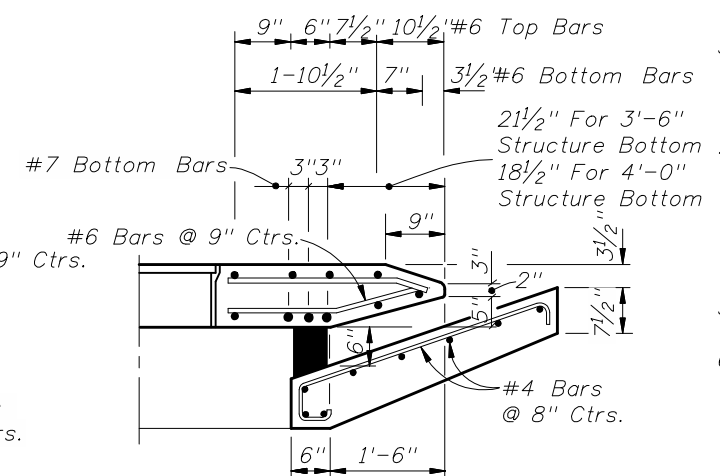
DIMENSIONAL SECTION



REINFORCING SECTION
3'-6" DIA. STRUCTURE BOTTOM (SECTION AA)



REINFORCING SECTION
4'-0" DIA. STRUCTURE BOTTOM (SECTION AA)



DIMENSION & REINFORCING HALF SECTION
TYPES A & E CURB (HALF SECTION AA)
(TYPE E GUTTER SHOWN)

GENERAL NOTES

- The finished grade and slope of the inlet tops are to conform with the finished cross slope and grade of the proposed sidewalk and/or border.
- When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when necessary.
- All steel in inlet top shall have 1/4" minimum cover unless otherwise shown. Inlet tops shall be either cast-in-place or precast concrete.
- For precast units the rear wall and apron may be precast as a separate piece from the top slab. Provide a minimum of 7 #4 dowels in accordance with Index No. 201 "OPTIONAL CONSTRUCTION JOINTS".
- For supplemental details see Index No. 201.
- Only round concrete support post will be acceptable.
- These inlets are designed for use with standard curb and gutter Types E and Type F. Locate inlet outside of pedestrian crosswalks.
- For structure bottoms see Index No. 200.
- Inlet to be paid for under the contract unit price for inlets (Curb) (Type_), Each.

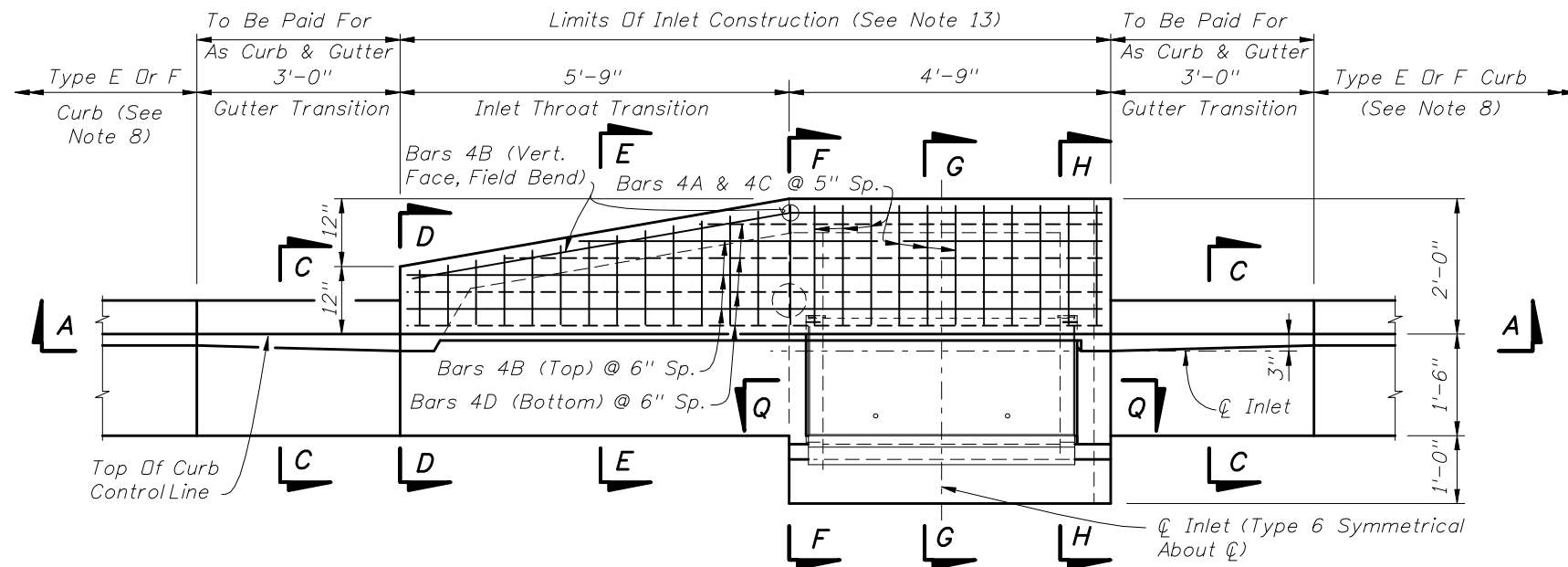
TRANSVERSE SECTIONS FOR INLETS TYPES 1, 2, 3 & 4



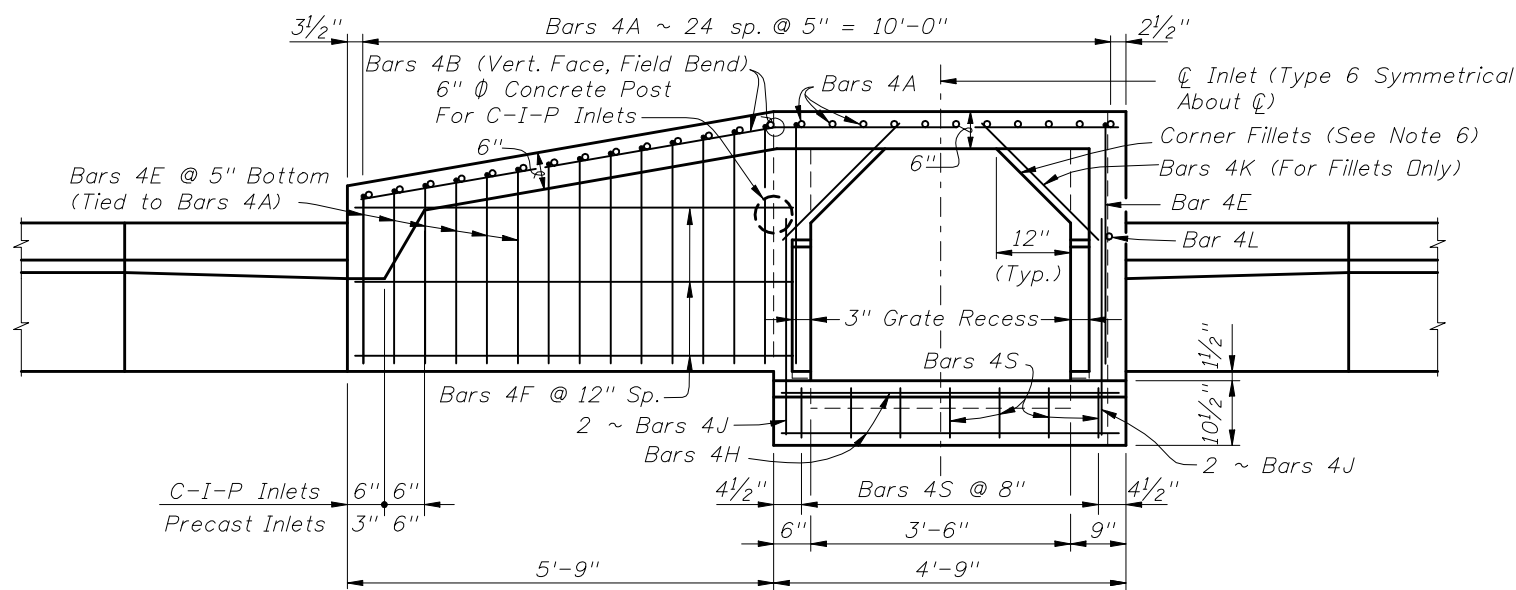
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CURB INLET TOPS TYPES 1, 2, 3 & 4

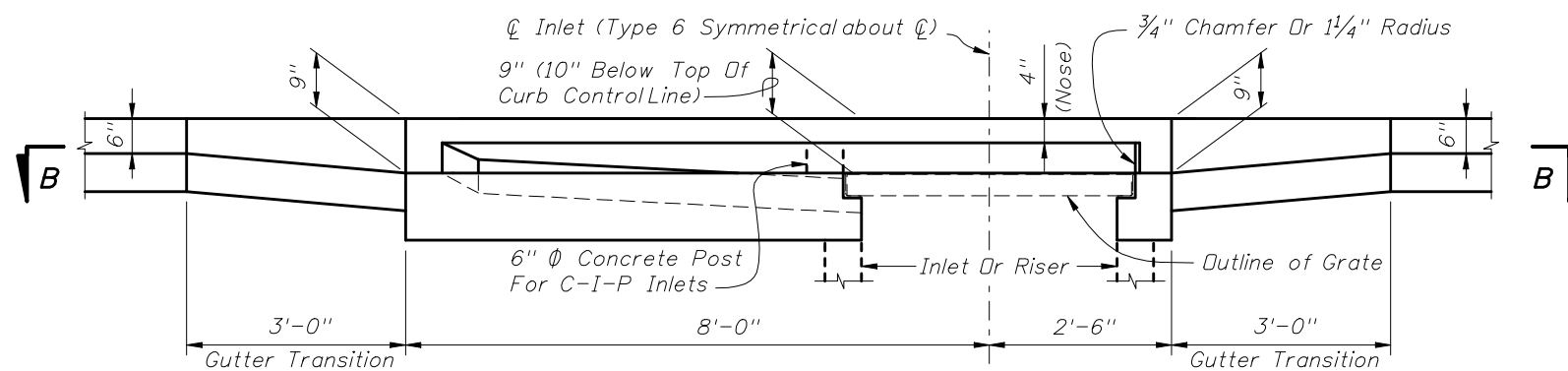
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TOP VIEW

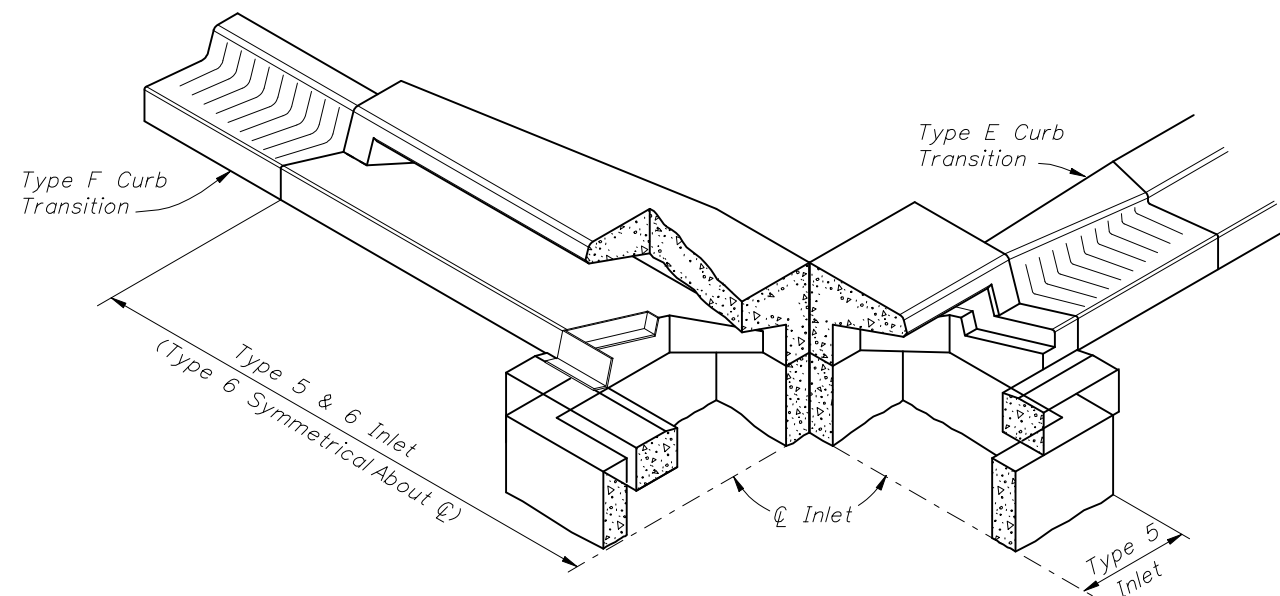


SECTION BB



SECTION AA
(At CL Inlet)

INLET TYPE 5
(Curb Inlet Type 6 Symmetrical With Left Half)



SKETCH SHOWING FRAME SEAT AND THROAT RECESS

GENERAL NOTES

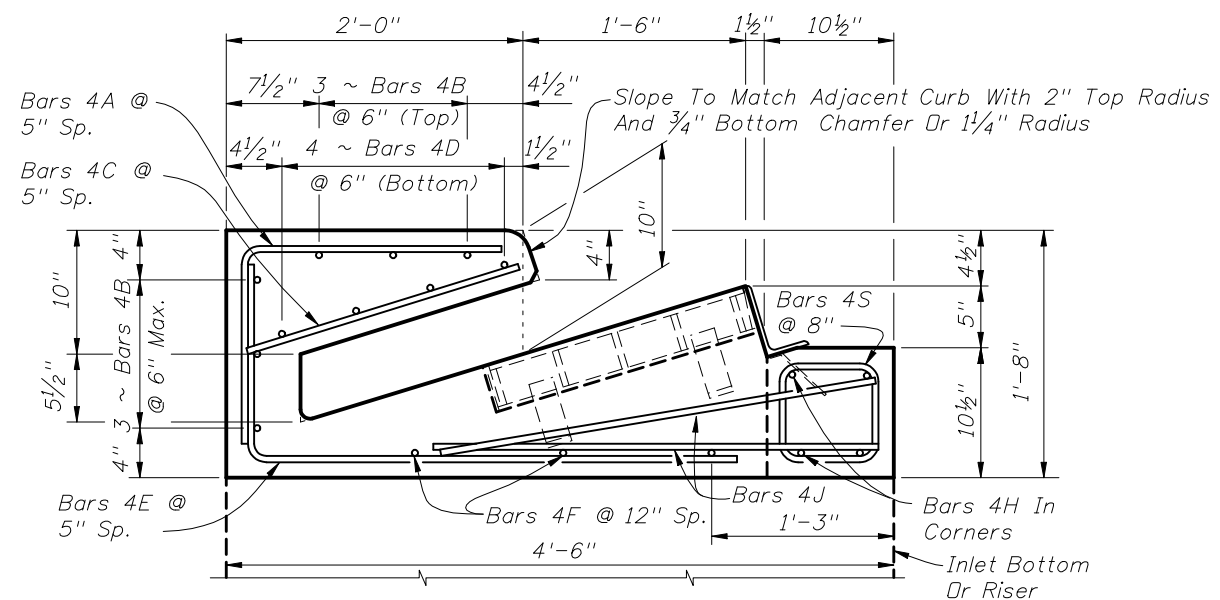
1. The finished grade and slope of the inlet tops are to conform with the finished cross slope and grade of the proposed sidewalk and/or border.
2. For inlets constructed on a curve, refer to the plans to determine the radius, and modify the inlet details accordingly. Bend steel when necessary.
3. All reinforcing steel to be Grade 60 bars with 1 1/4" minimum cover unless otherwise shown, see Sheet 4 for equivalent area Welded Wire Reinforcement details.
4. Inlet tops shall be either cast-in-place or precast concrete. Precast units shall conform to the dimensions shown or in accordance with approved shop drawing's. Request for shop drawing approval shall be directed to the State Drainage Engineer.
5. Concrete meeting the requirements of ASTM C478 (4,000 psi) may be used in lieu of Class II concrete for precast units, manufactured in plants which meet the requirements of Section 449 of the Specifications.
6. Corner fillets are required at inlet opening for precast units or C-I-P units used in conjunction with circular inlet bottoms or skewed rectangular inlet boxes. Finish top of fillets flush with drain throat bottom and match slope.
7. For inlet bottoms see Index No. 200. Inlet tops are to be used with Type P bottoms, or Type J bottoms with 3'-6" square (Type B), 3'-6" or 4' round (Type A) risers or top slab openings.
8. These inlet tops are designed for use with standard curb and gutter Type E and Type F. Locate inlet outside of pedestrian crosswalks. For Type E curb, transition the shape of the curb over the gutter transition length to match the face of the inlet (Type F).
9. See Index No. 201 for supplemental details.
10. All steel used for frame and grate shall meet the requirements of ASTM A36/A36M.
11. Either cast iron grates or steel grates may be used.
12. When Alternate "G" grate is specified in the plans either the cast iron grate and galvanized steel frame or the galvanized steel grate and frame must be used. Grates are to be grouted in accordance with the grouting detail shown on Sheet 5, in lieu of tack welding.
13. Inlet to be paid for under the contract unit price for Inlets (Curb) (Type -), Each.



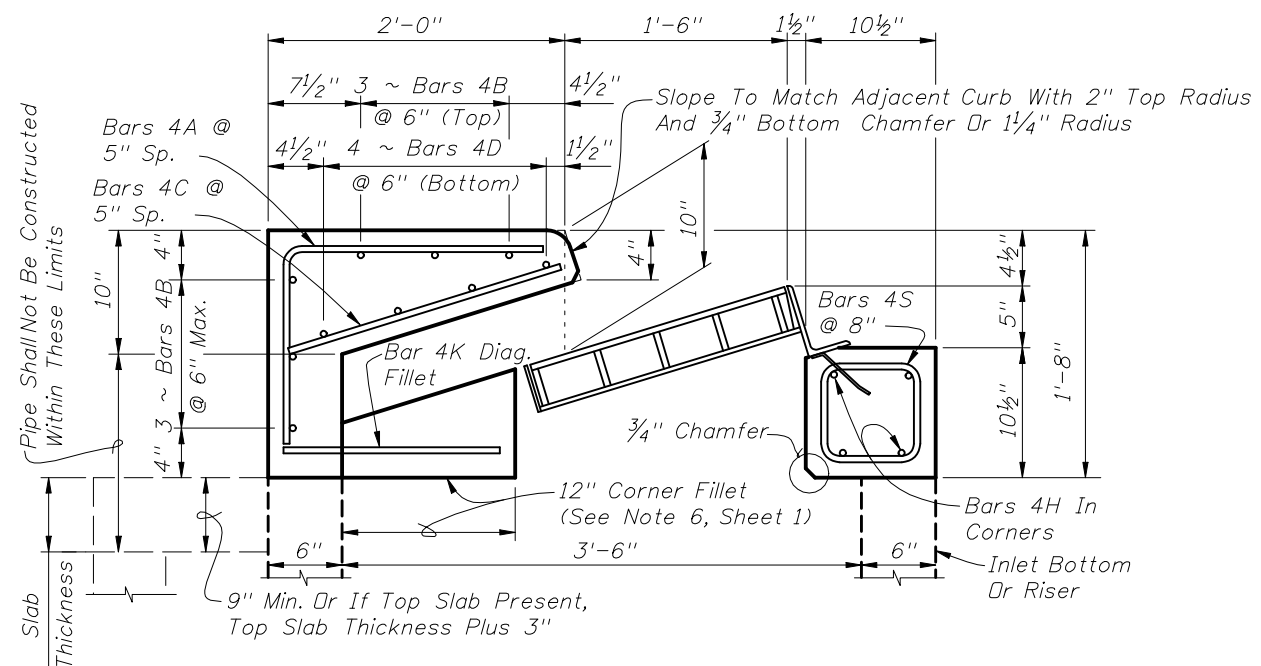
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CURB INLET TOPS
TYPES 5 & 6

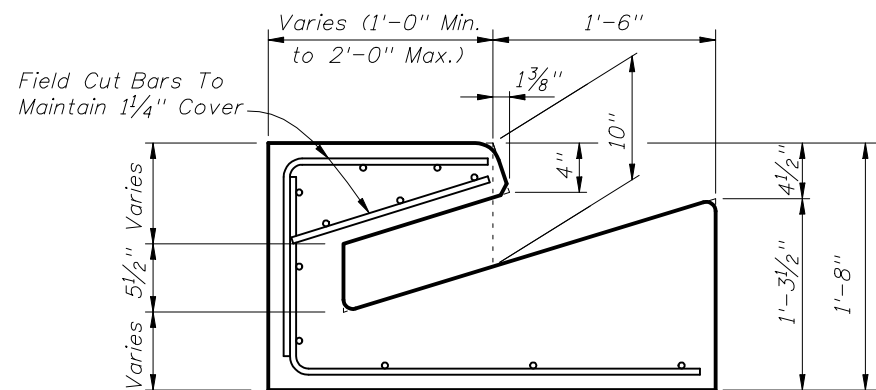
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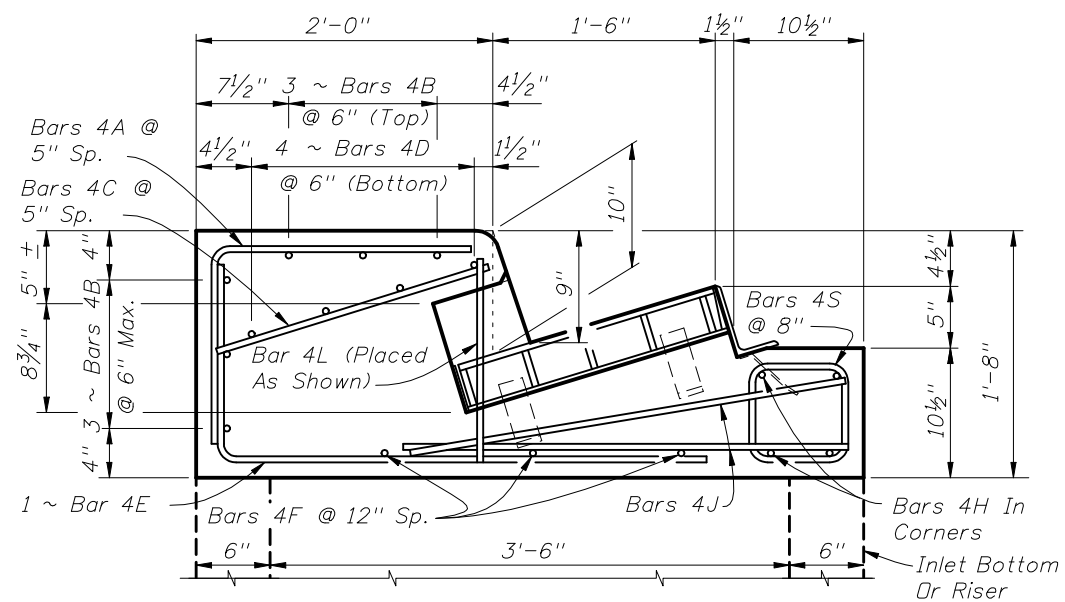
SECTION FF



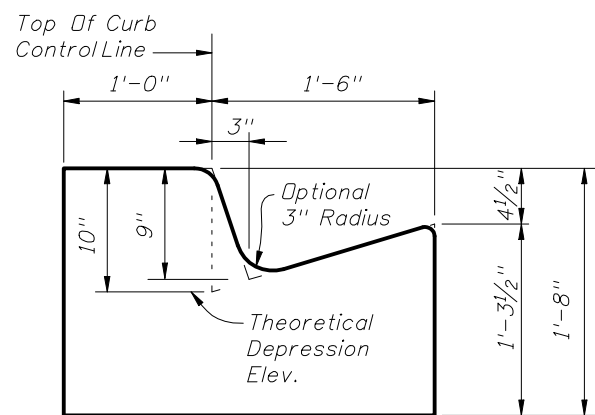
SECTION GG



SECTION EE



SECTION HH
(Type 5 Inlet Only)



SECTION DD
(End View Of Inlet)

CROSS REFERENCES:
For General Notes See Sheet 1.
For Location Of Sections DD Thru HH See Sheet 1.

PRECAST DETAILS



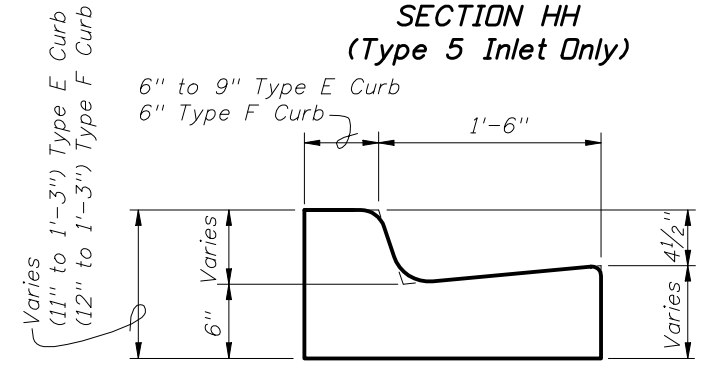
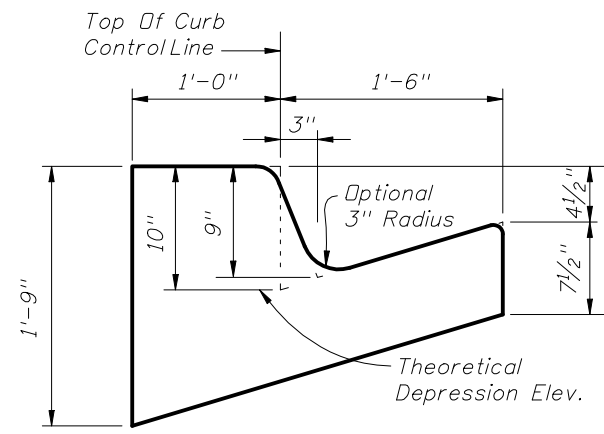
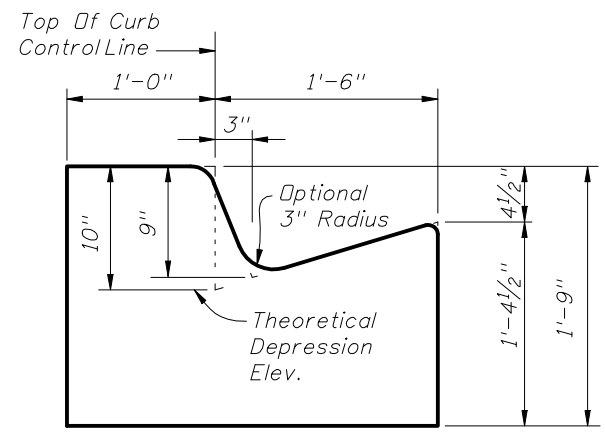
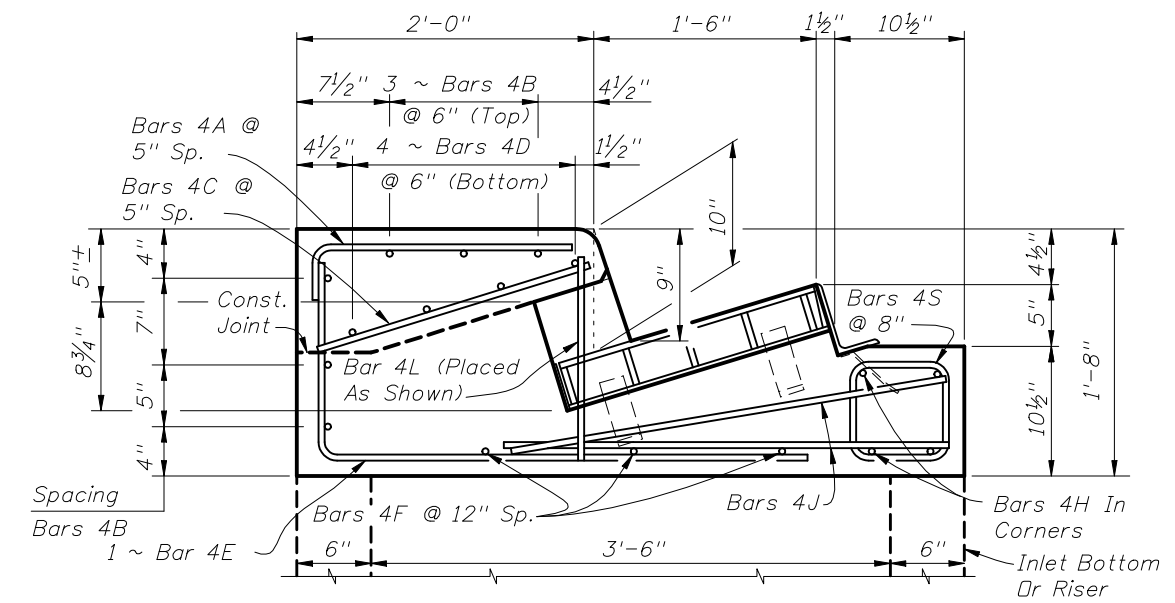
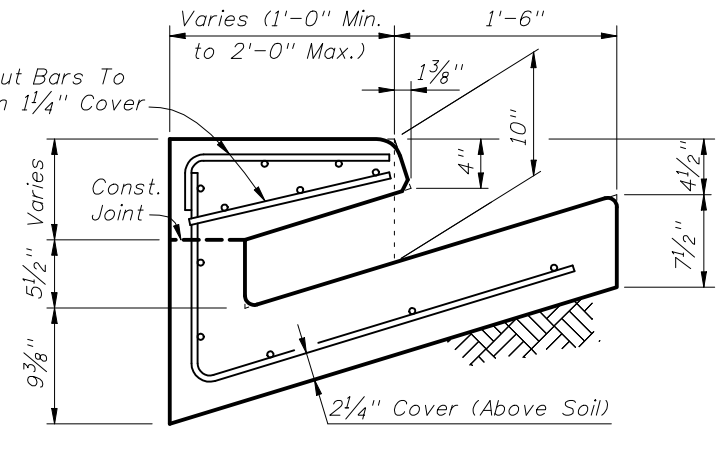
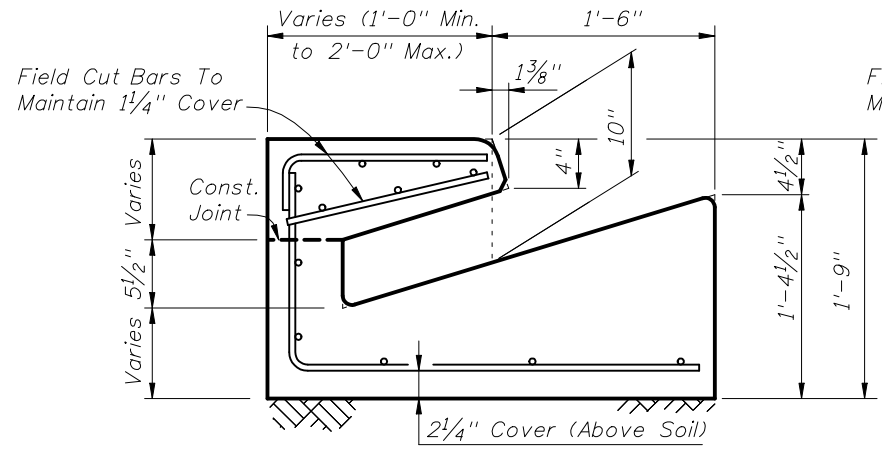
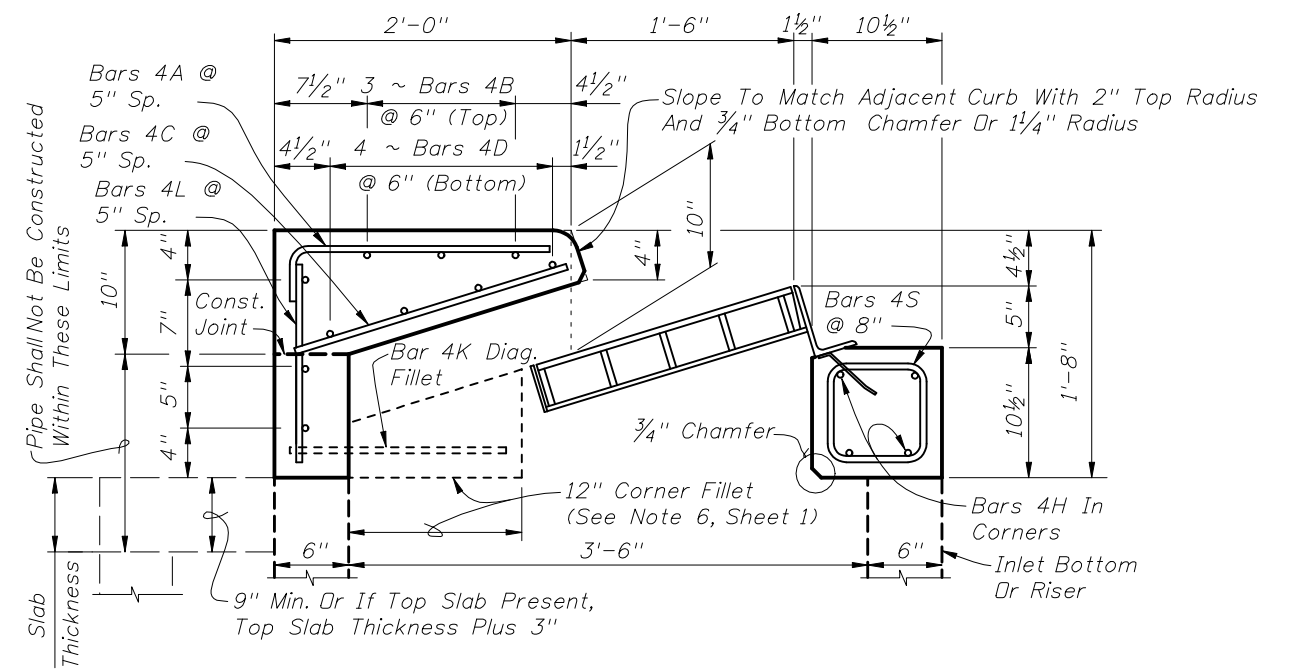
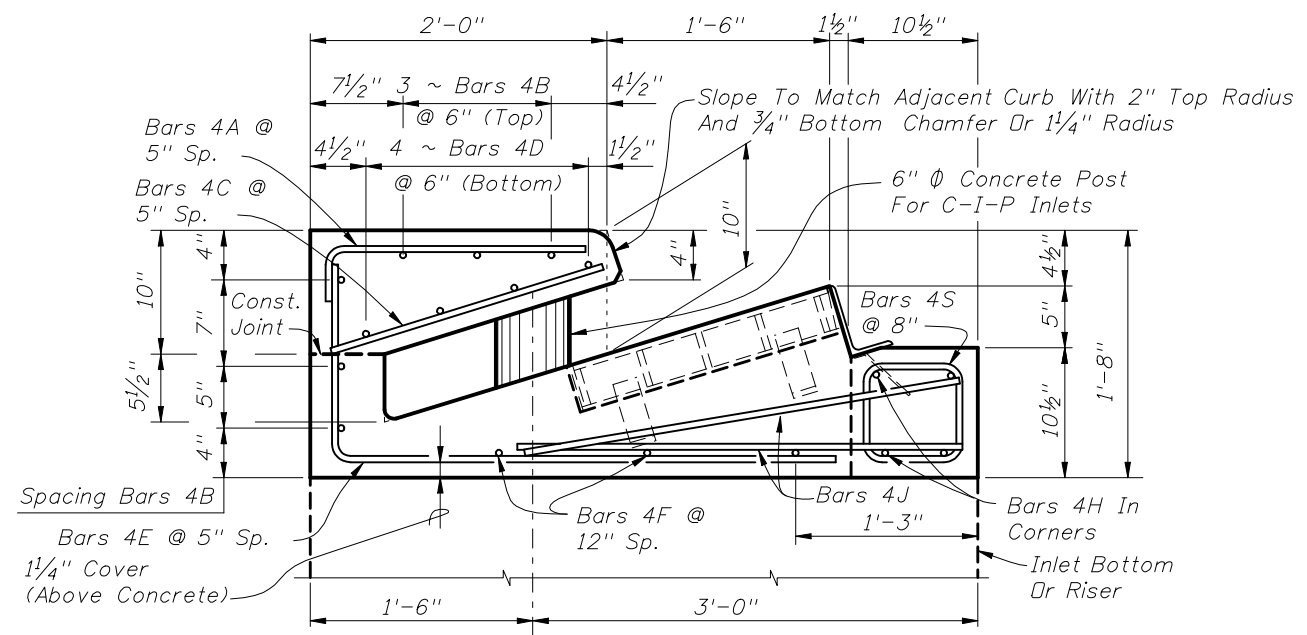
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CURB INLETS TOPS
TYPES 5 & 6

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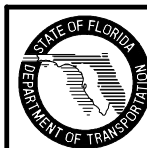
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2 of 5

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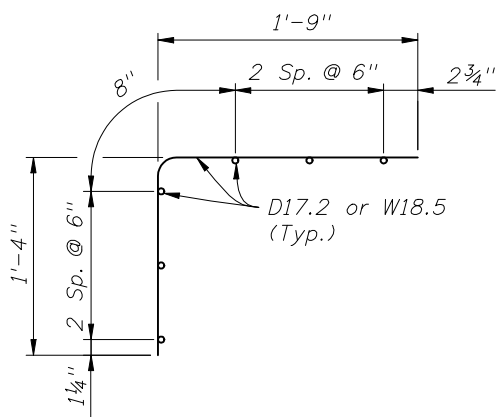


CROSS REFERENCES:
For General Notes See Sheet 1.
For Location Of Sections CC Thru HH See Sheet 1.

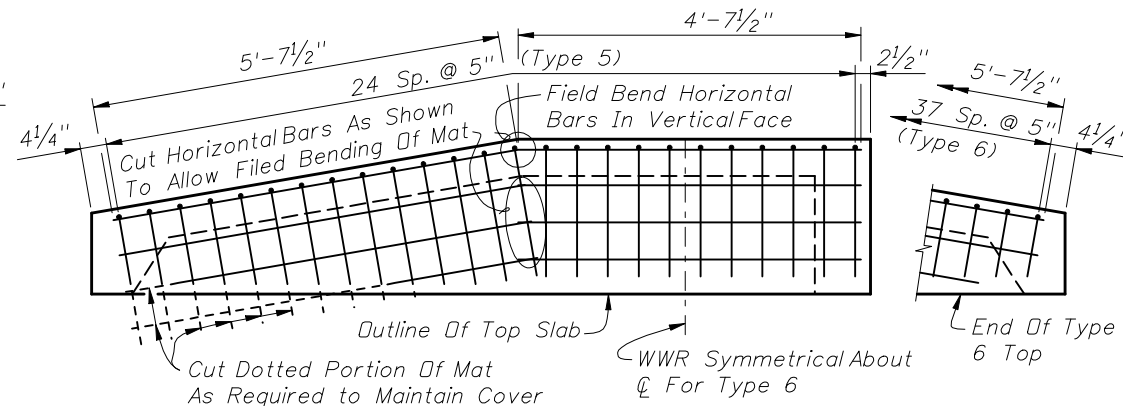
CAST-IN-PLACE DETAILS



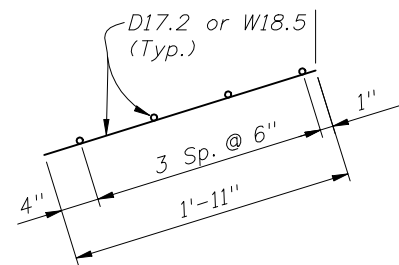
ALTERNATE REINFORCING STEEL DETAILS FOR WELDED WIRE REINFORCEMENT (WWR)



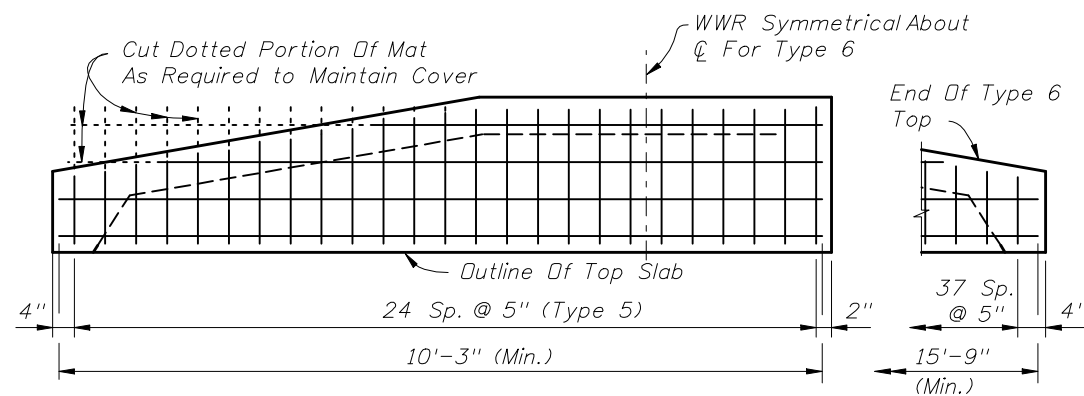
WELDED WIRE REINFORCEMENT
PIECE NO. 1



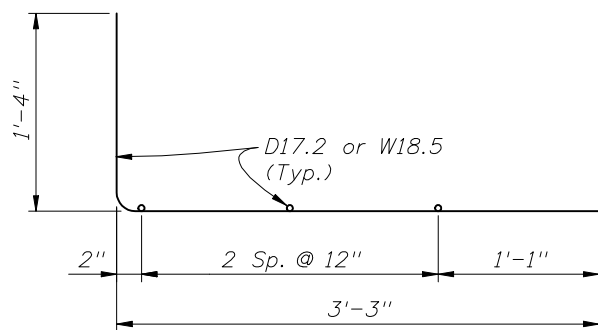
PLACEMENT SCHEMATIC FOR WELDED WIRE
REINFORCEMENT PIECE NO. 1



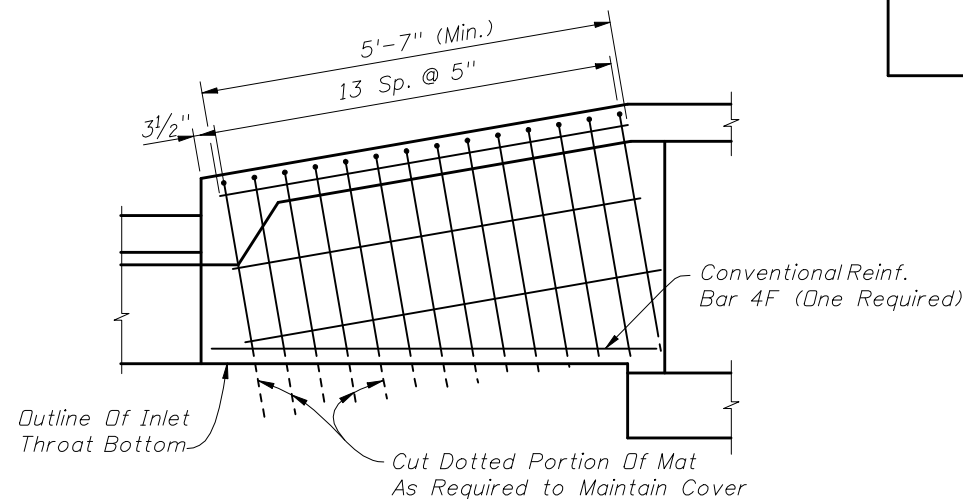
WELDED WIRE REINFORCEMENT
PIECE NO. 2



PLACEMENT SCHEMATIC FOR WELDED WIRE
REINFORCEMENT PIECE NO. 2



WELDED WIRE REINFORCEMENT
PIECE NO. 3

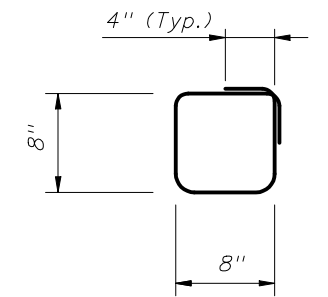


PLACEMENT SCHEMATIC FOR WELDED WIRE
REINFORCEMENT PIECE NO. 3

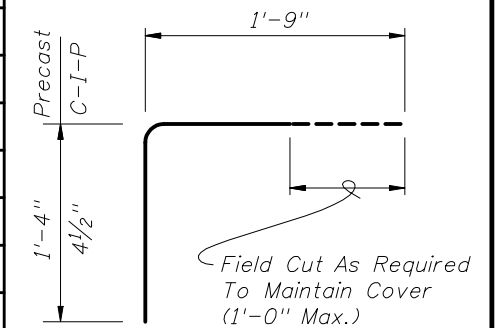
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

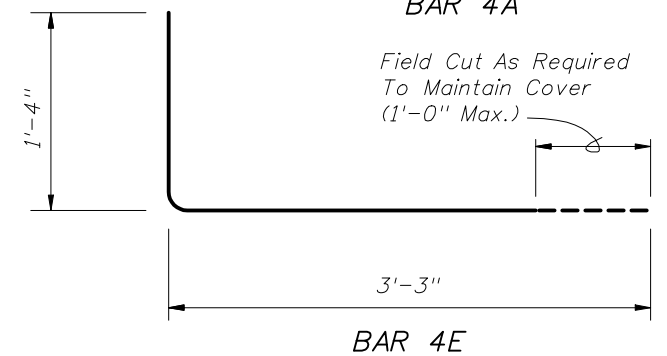
MARK	SIZE	TYPE 5 INLET		TYPE 6 INLET	
		NO.	LENGTH	NO.	LENGTH
A (Precast)	4	25	3'-1"	38	3'-1"
A (C-I-P)	4	25	2'-1 1/2"	38	2'-1 1/2"
B	4	6	10'-3"	6	15'-9"
C	4	25	11" to 1'-11"	38	11" to 1'-11"
D	4	4	10'-3"	4	15'-9"
E	4	16	4'-7"	30	4'-7"
F	4	3	6'-0"	6	6'-0"
H	4	4	4'-6"	4	4'-6"
J	4	4	3'-0"	4	3'-0"
K (Fillet)	4	2	2'-3"	2	2'-3"
L (Precast)	4	1	1'-4"	0	---
L (C-I-P)	4	10	1'-4"	9	1'-4"
S	4	7	3'-2"	7	3'-2"



BAR 4S



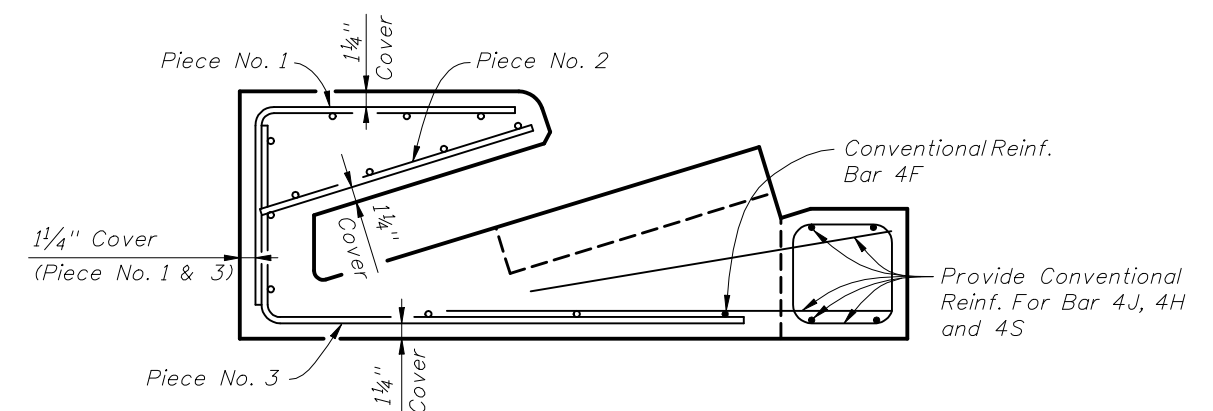
BAR 4A



BAR 4E

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. Bars 4A and 4E may be combined into a single bar.
3. Welded Wire Reinforcement shall comply with ASTM A185 or ASTM A497.



TYPICAL SECTION SHOWING
WELDED WIRE REINFORCEMENT



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CURB INLETS TOPS
TYPES 5 & 6

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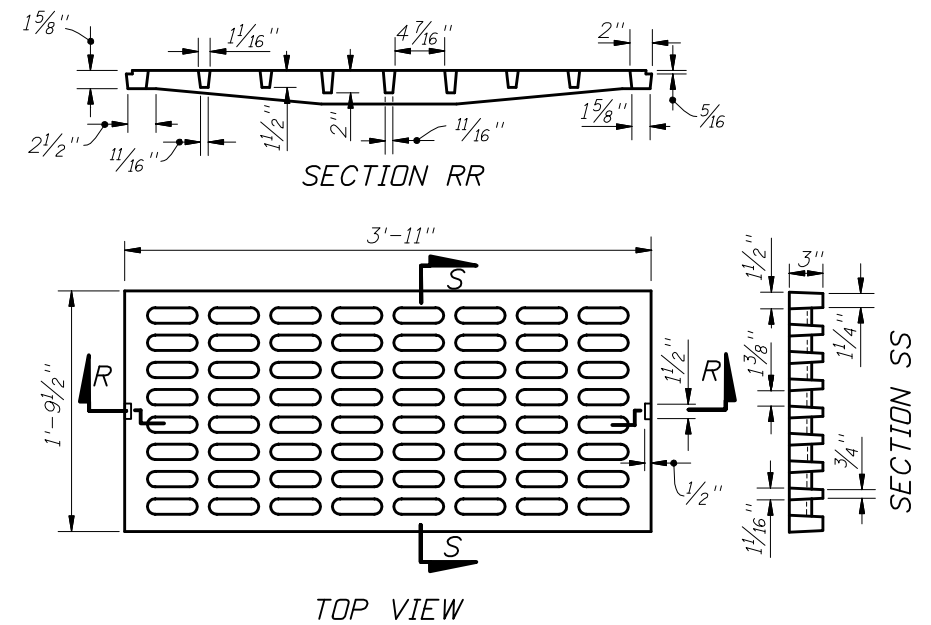
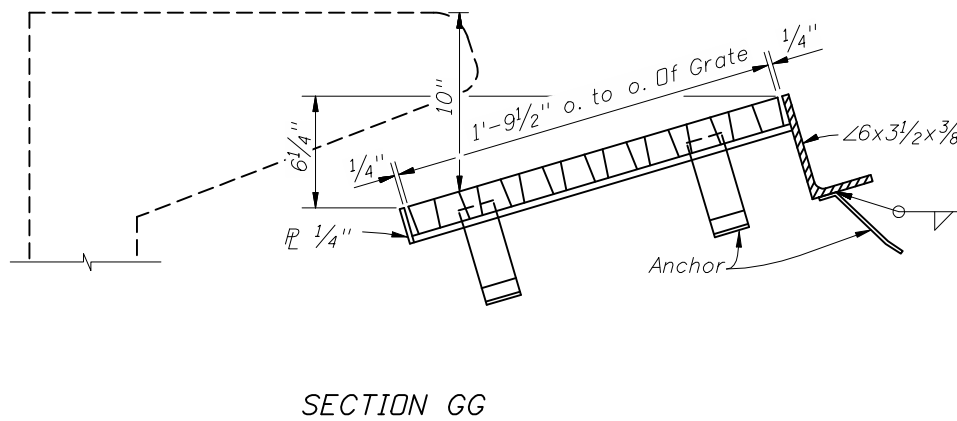
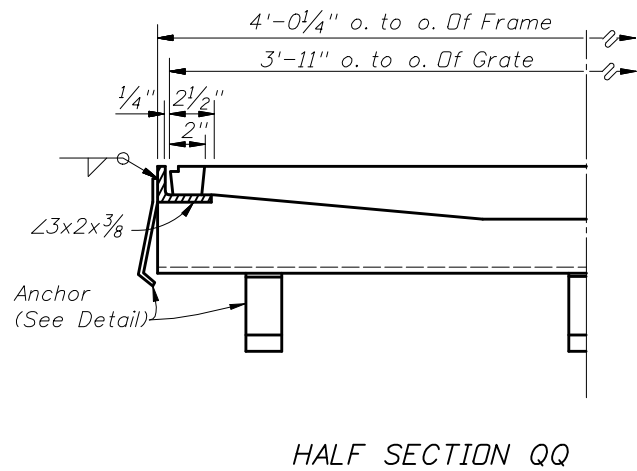
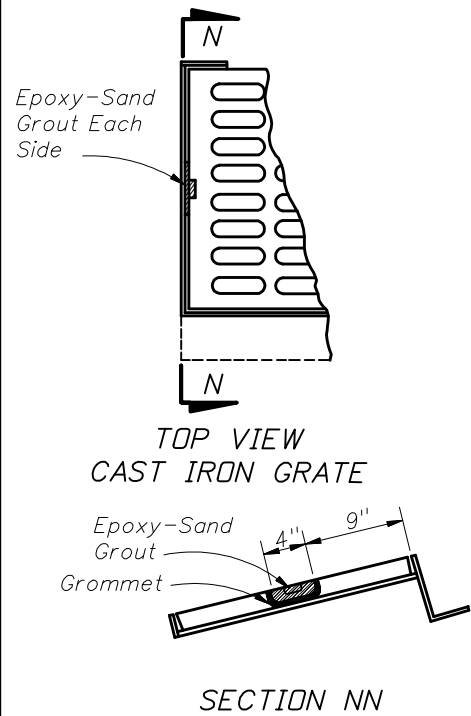
07/01/09

Sheet No.

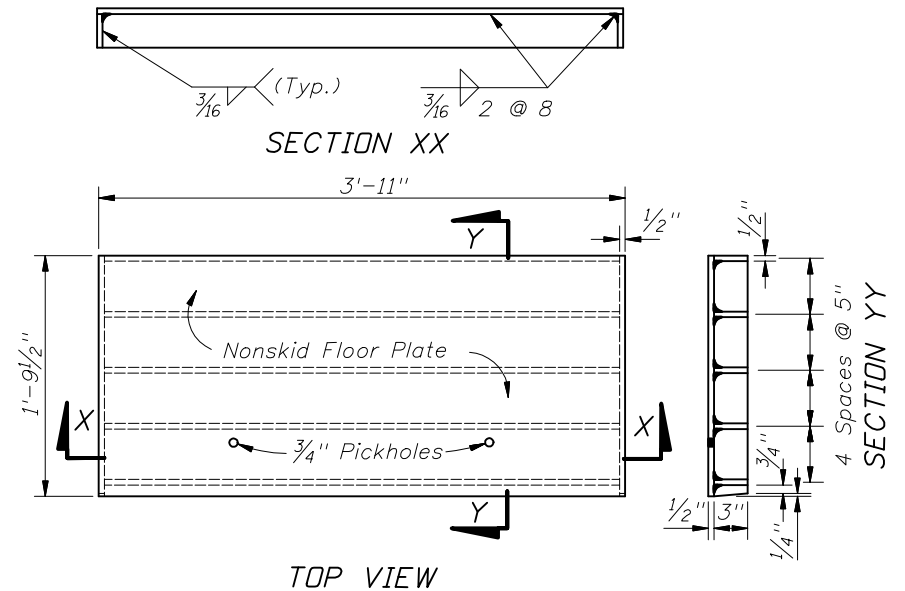
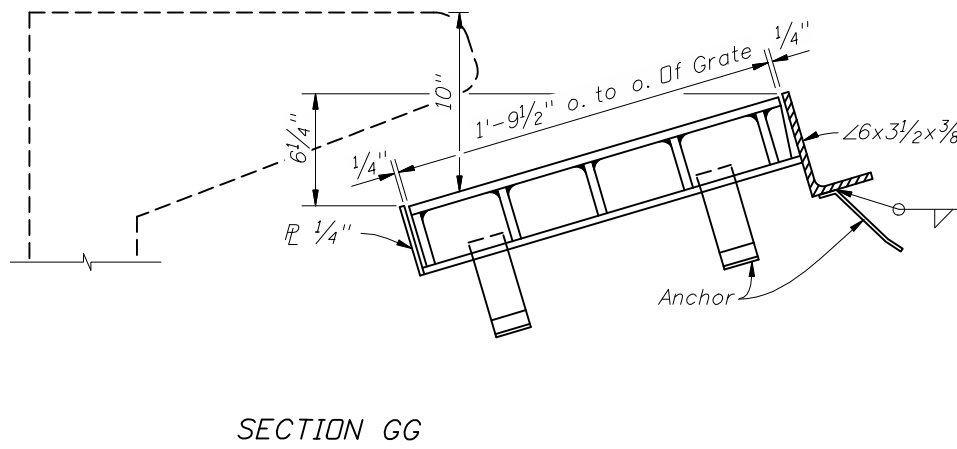
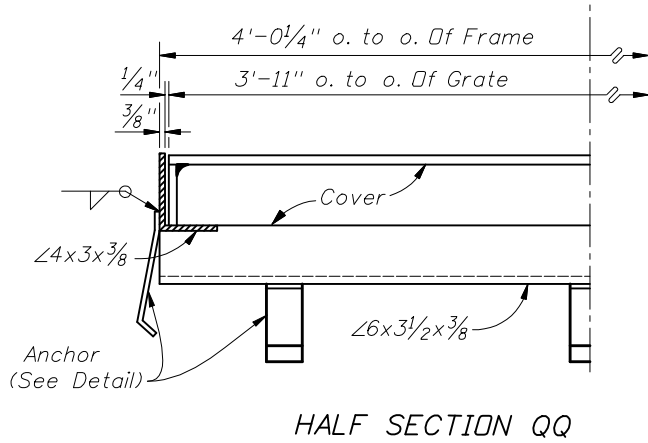
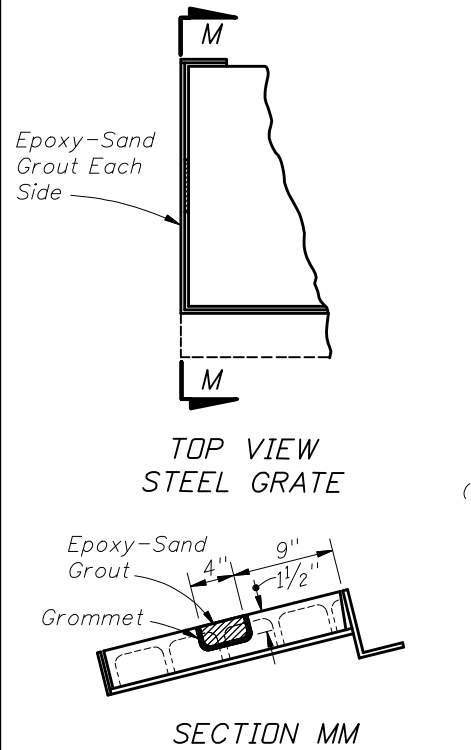
4 of 5

Index No.

211

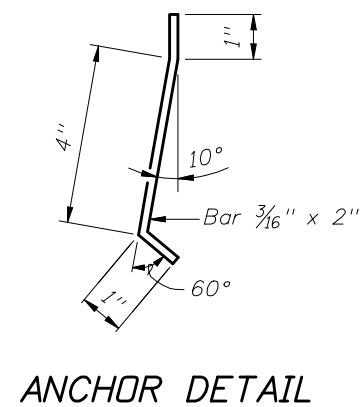
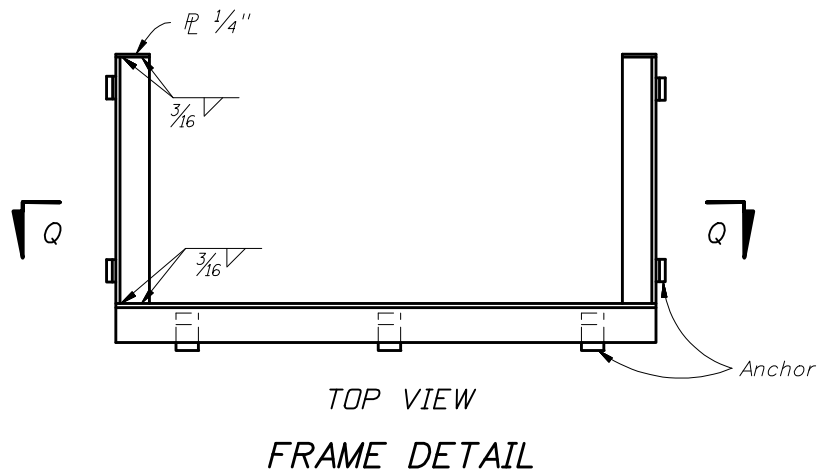


CAST IRON GRATE

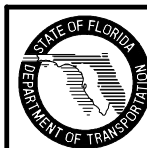


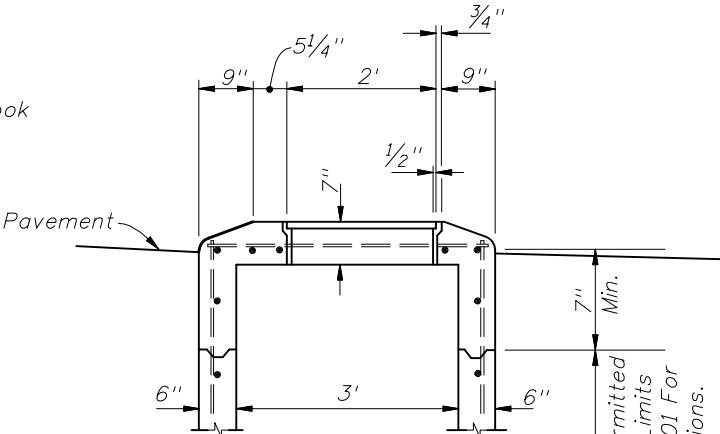
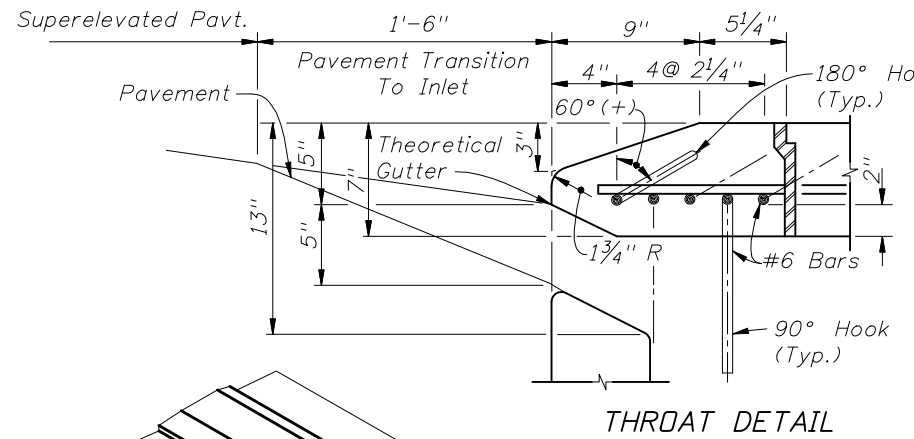
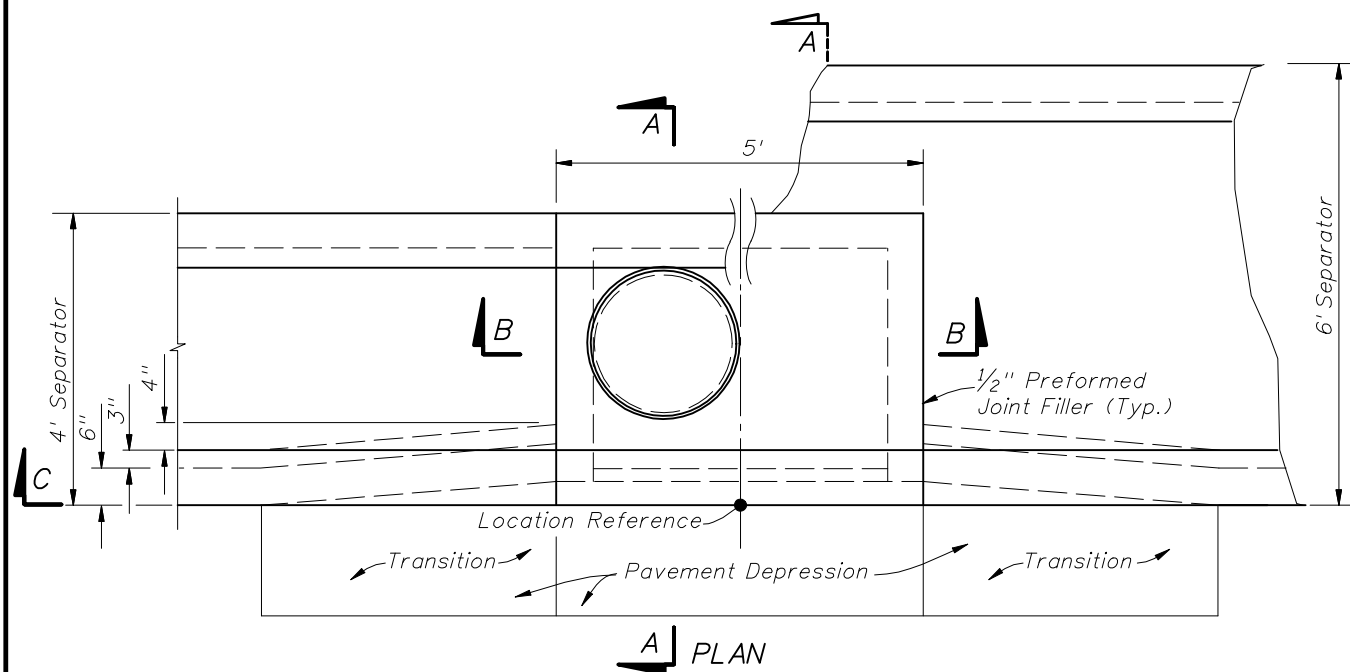
STEEL GRATE

GROUTING DETAILS



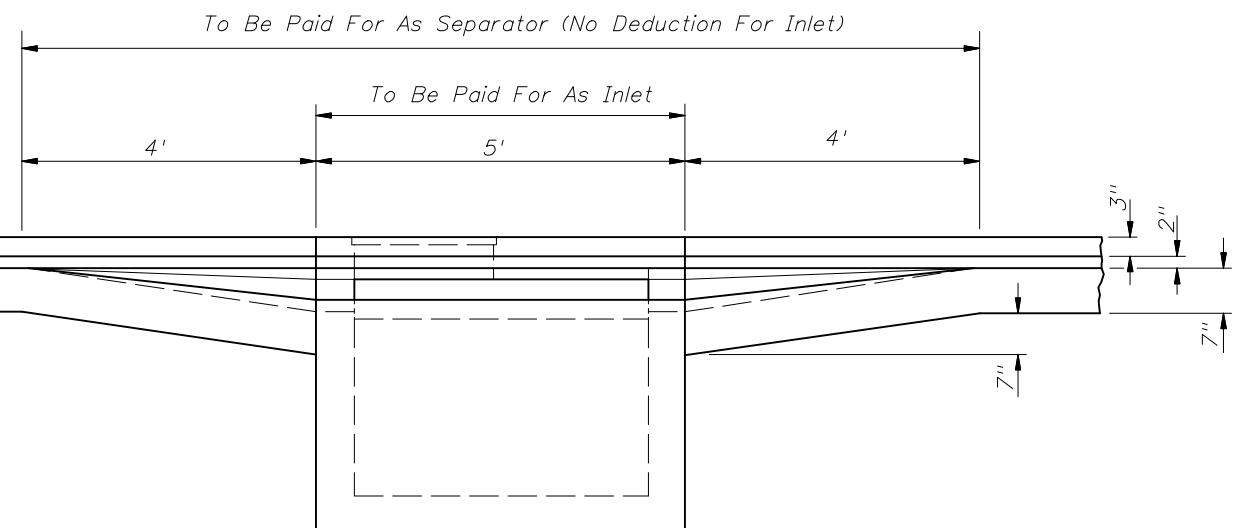
CROSS REFERENCES:
For Location Of Section GG and QQ
See Sheet 1.





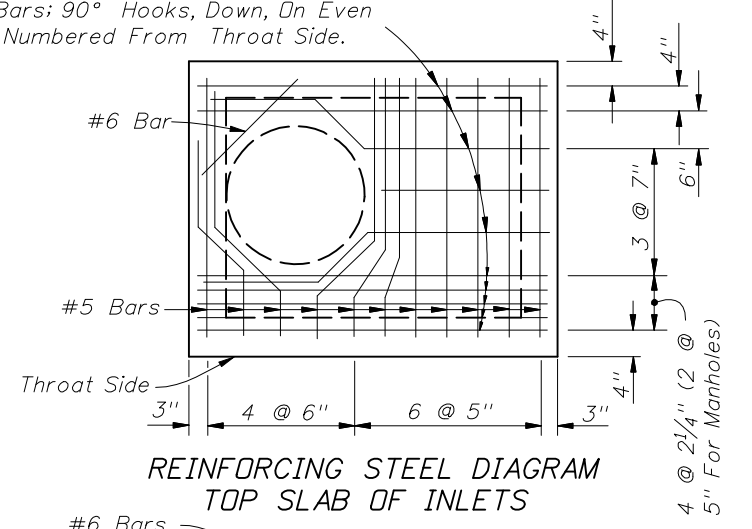
#6 Bars
 ACI Std. Hooks Required Each End Of
 Straight Bars And Right End Of Bent
 Bars: 180° Hooks, Canted 60°(+), On
 Odd Bars; 90° Hooks, Down, On Even
 Bars Numbered From Throat Side.

Const. Joints Permitted
 Between These Limits
 See Index No. 201 For
 Minimum Dimensions.



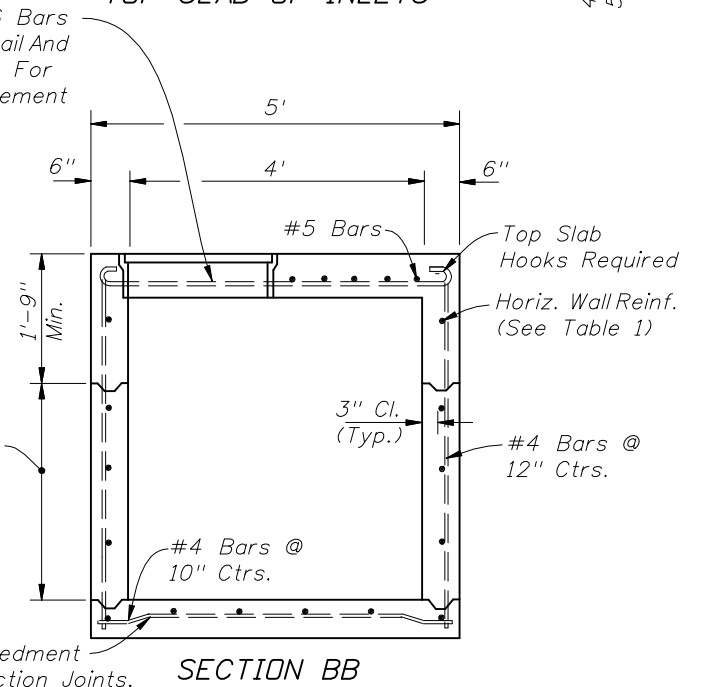
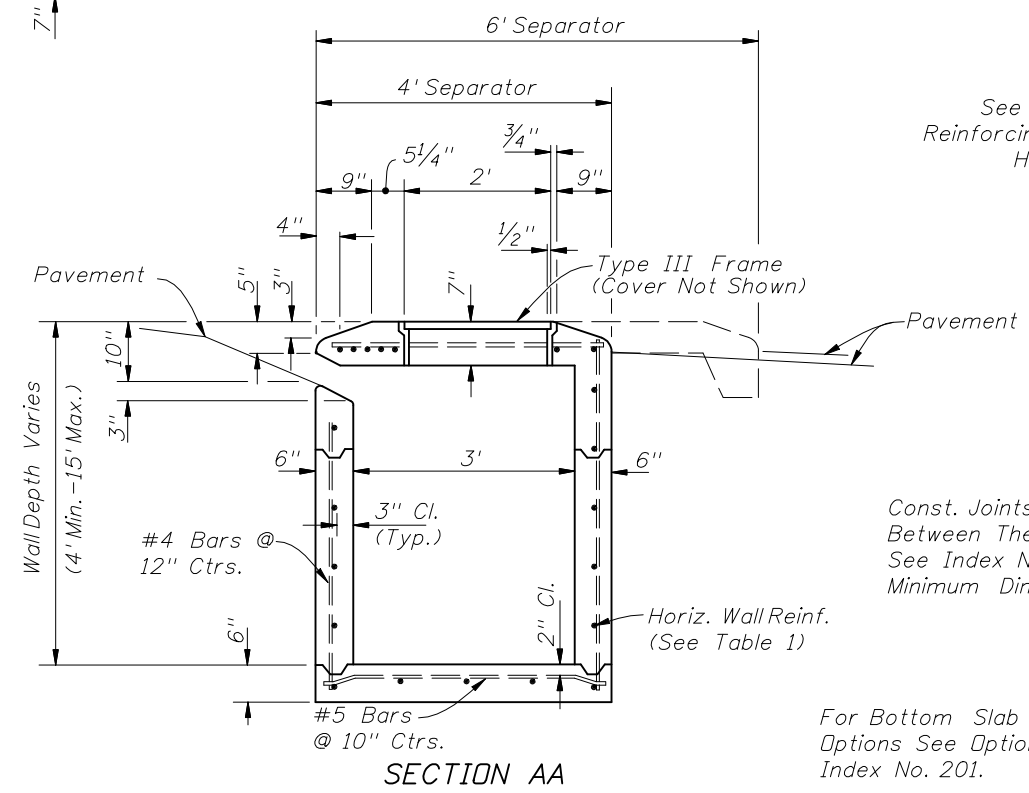
HORIZONTAL WALL REINFORCING
 SCHEDULE (TABLE 1)

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0' - 6'	A12	0.20	12"	8"
6' - 10'	A6	0.20	6"	5"
10' - 13'	A4	0.20	4"	3"
10' - 15'	B5.5	0.24	5 1/2"	5"



GENERAL NOTES

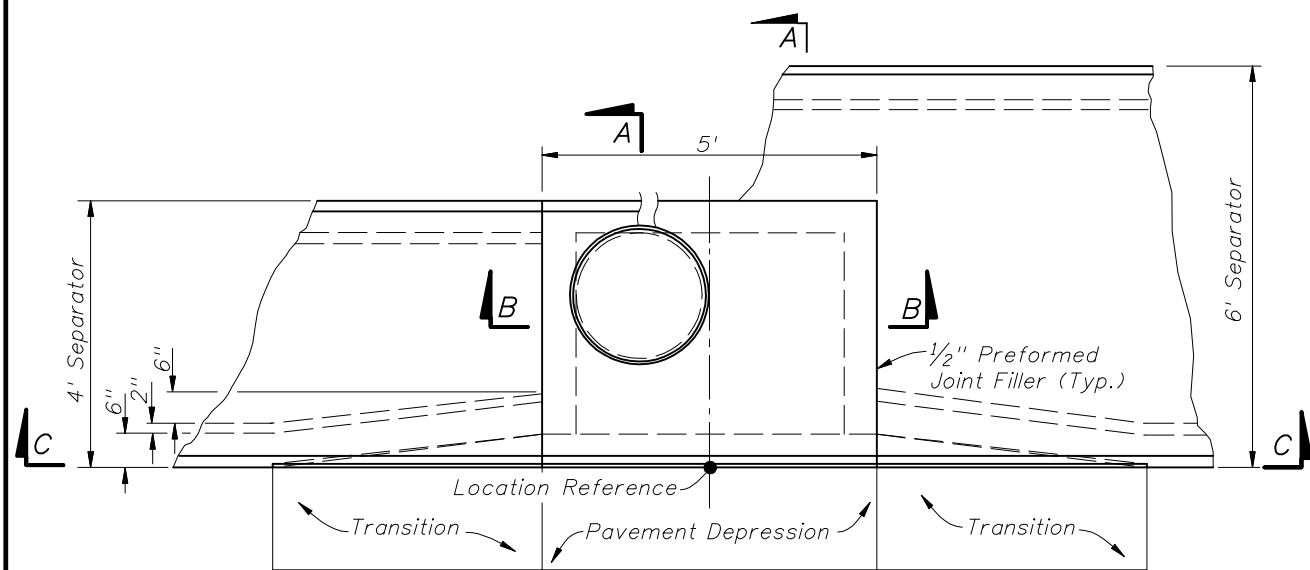
1. This inlet is used in Traffic Separators Types I and II; or, in separators constructed with Curbs Types A, B and E and sidewalk paving, which cannot accommodate Inlets Types 1, 2, 3, 4, 5, or 6. Use of this Inlet on through traffic side of the separator is not permitted in medians with Curb Types A and B. Locate inlet outside of designated pedestrian travelway.
2. All reinforcing to be Grade 60 bars with 2" min. cover unless otherwise shown. See Index No. 201 for equivalent area of welded wire fabric. Cut or bend bars out of way of pipe when necessary. Bars to clear pipe by 1 1/2"
3. Recommended maximum pipe sizes are 24" longitudinal and 30" transverse. For larger pipe, inlets with Alt. B bottoms, Index No. 200 are recommended.
4. For supplementary details see Index No. 201.
5. All dimensions are for both precast and cast-in-place inlets unless otherwise shown.
6. Inlet to be paid for under the contract unit price for Inlets (Curb) (Type 7), Each.



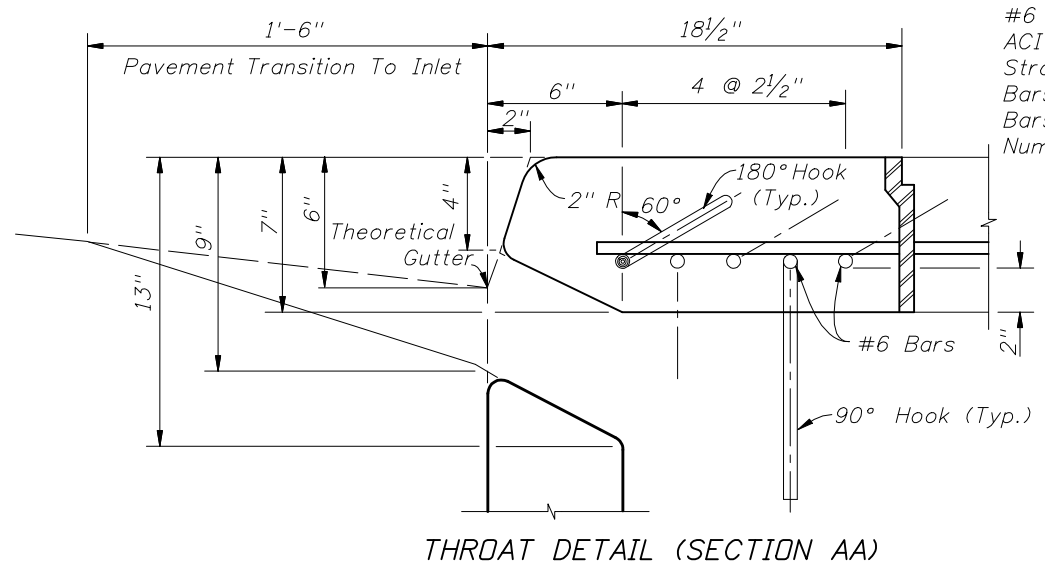
Const. Joints Permitted
 Between These Limits-
 See Index No. 201 For
 Minimum Dimensions.

For Bottom Slab Rebar Embedment
 Options See Optional Construction Joints,
 Index No. 201.

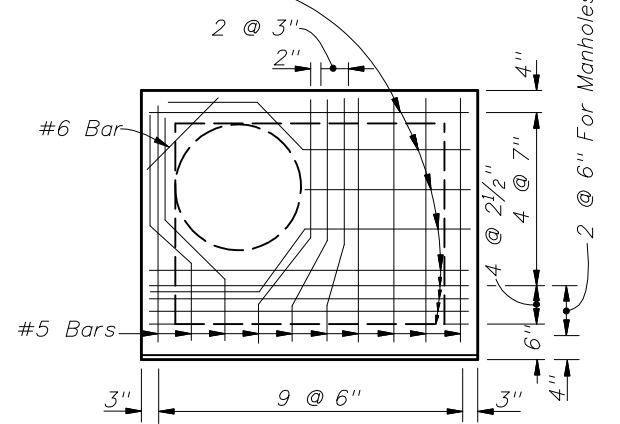




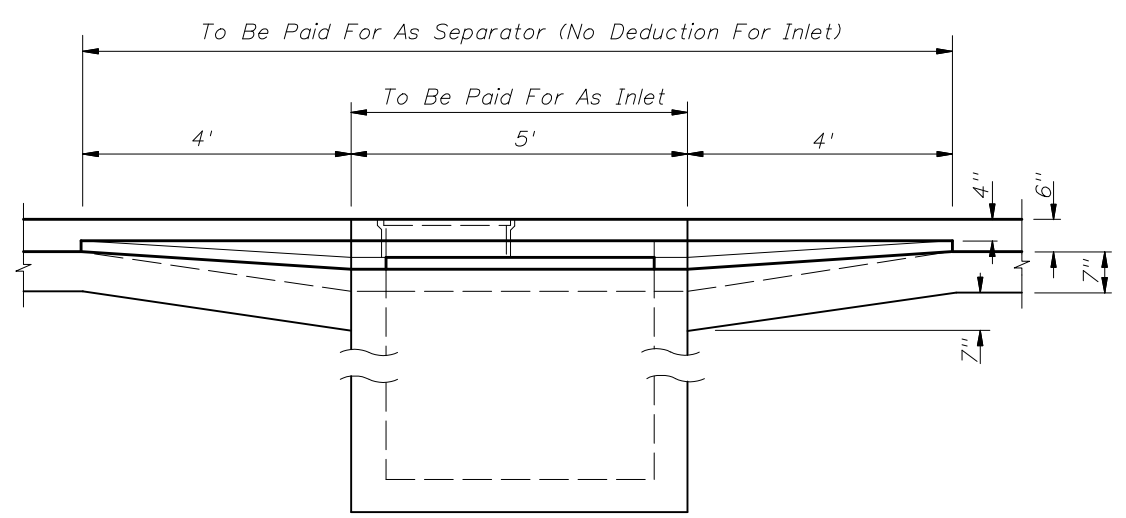
PLAN



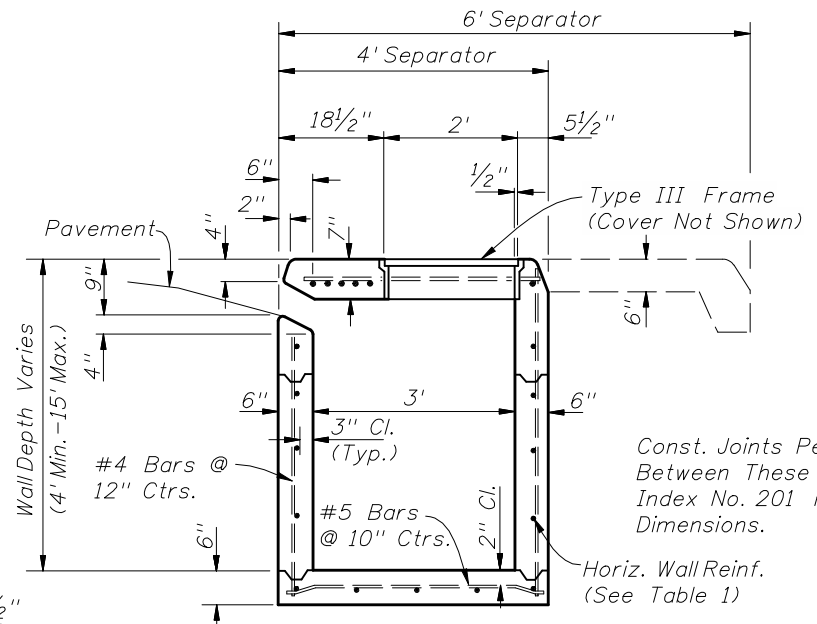
#6 Bars
 ACI Std. Hooks Required Each End Of
 Straight Bars And Right End Of Bent
 Bars. 180° Hooks, Canted 60° (+), On Odd
 Bars; 90° Hooks, Down, On Even Bars
 Numbered From Throat Side.



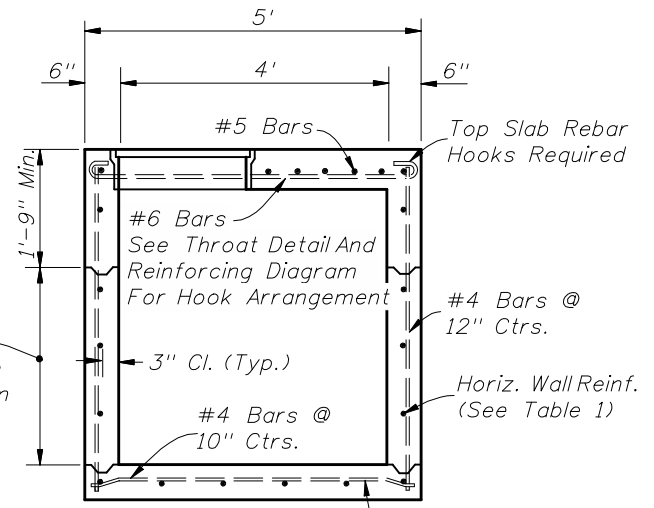
REINFORCING STEEL DIAGRAM
 TOP SLAB OF INLET



SECTION CC



SECTION AA

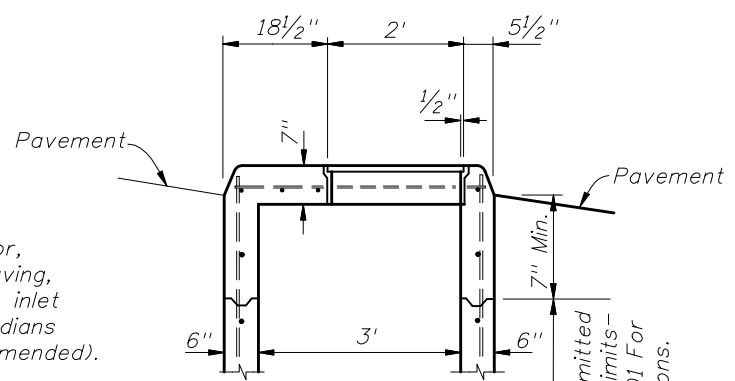


SECTION BB

For Bottom Slab
 Rebar Embedment
 Options See Optional
 Construction Joints,
 Index No. 201.

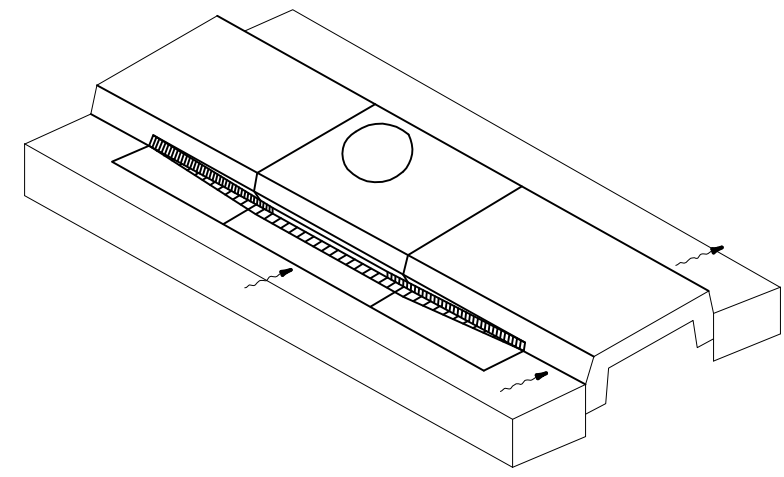
GENERAL NOTES

1. This inlet is to be used only in Traffic Separators Types IV and V; or, in separators constructed with Curbs Types D and F and sidewalk paving, which cannot accommodate Inlets Types 1, 2, 3, 4, 5 or 6. Use of this inlet on the through traffic side of the separator should be avoided in medians constructed with Curb Type D (Curb inlets Types 9 or 10 are recommended). Locate inlet outside of designated pedestrian travelway.
2. All reinforcing to be Grade 60 bars with 2" min. cover unless otherwise shown. See Index No. 201 for equivalent area of welded wire fabric. Cut or bend bars out of way of pipe when necessary. Bars to clear pipe by 1/2".
3. Recommended maximum pipe sizes are 24" longitudinal and 30" transverse. For larger pipe, inlets with Alt. B bottoms, Index No. 200 are recommended.
4. For supplemental details see Index No. 201.
5. All dimensions are for both precast and cast-in-place inlets unless otherwise shown.
6. Inlet to be paid for under the contract unit price for Inlets (Curb) (Type 8), Each.



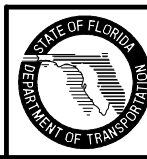
MODIFICATION WHEN USED
 AS A MANHOLE

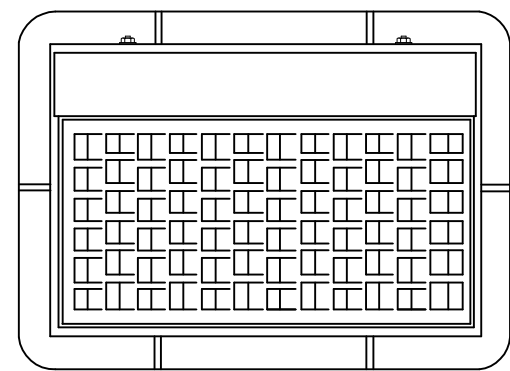
Const. Joints Permitted
 Between These Limits—
 See Index No. 201 For
 Minimum Dimensions.



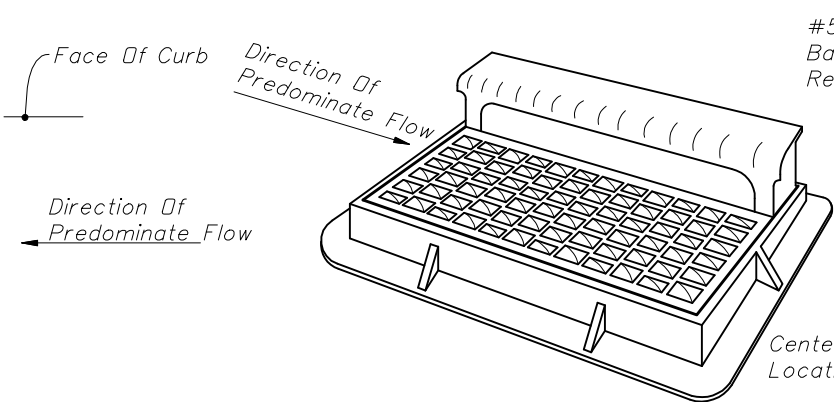
HORIZONTAL WALL REINFORCING
 SCHEDULE (TABLE 1)

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0' - 6'	A12	0.20	12"	8"
6' - 10'	A6	0.20	6"	5"
10' - 13'	A4	0.20	4"	3"
10' - 15'	B5.5	0.24	5 1/2"	5"



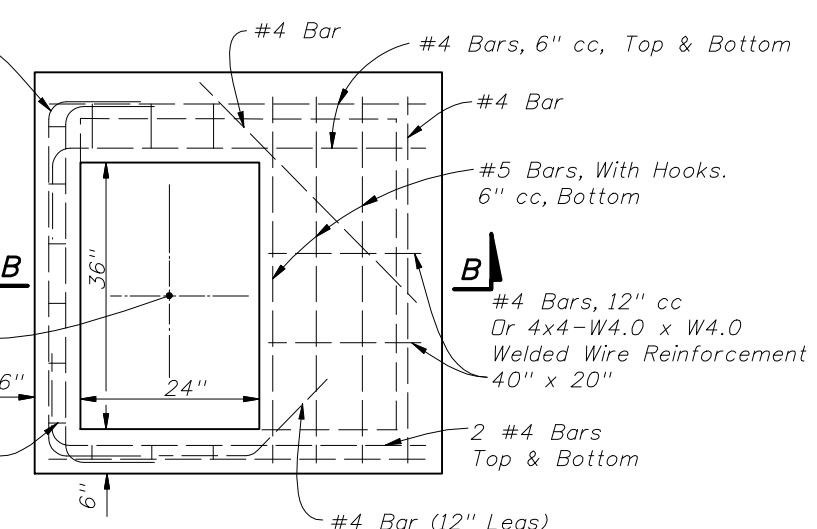


TOP VIEW

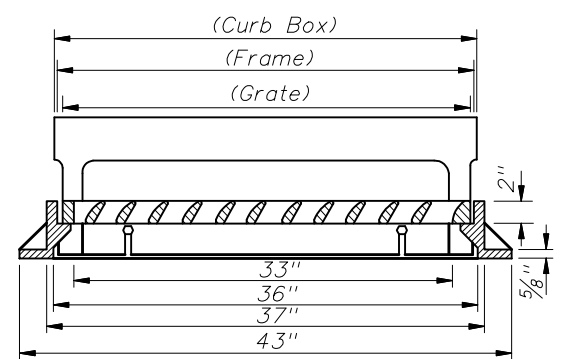


#5 Bars Top #6 Bars Bottom 12" Returns, Each (Min.)

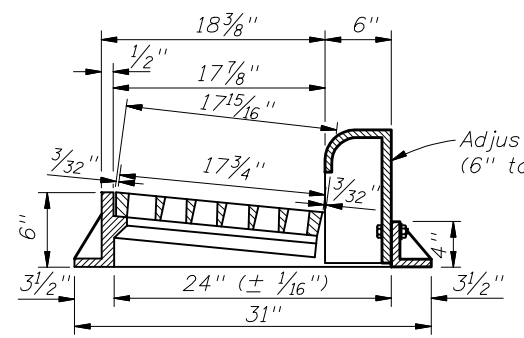
#4 Bars Continuous Or 12" Returns (Same Below)



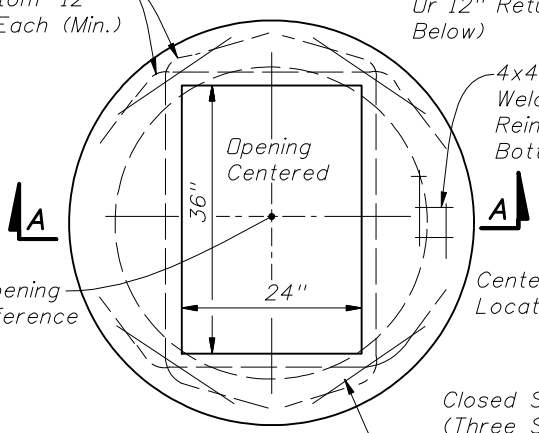
TOP VIEW



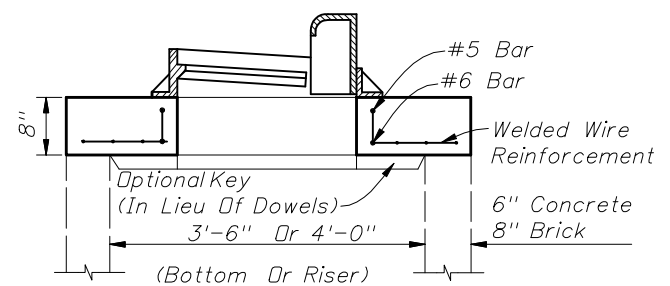
LONGITUDINAL SECTION



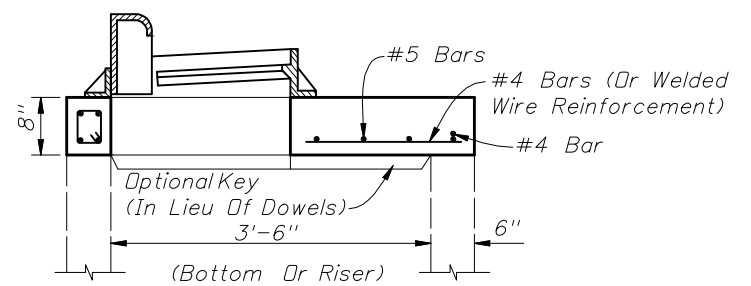
TRANSVERSE SECTION



TOP VIEW



SECTION AA (SEE NOTE 6 BELOW)



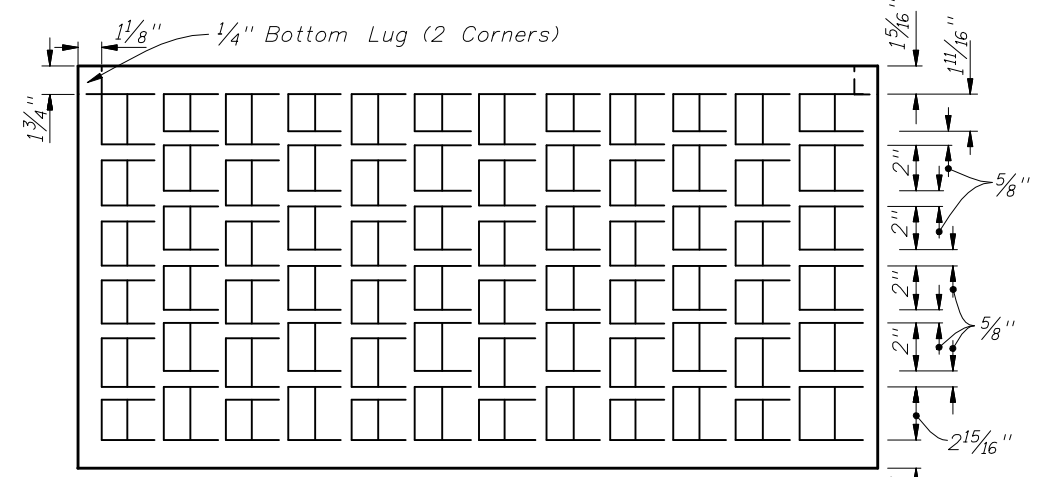
SECTION BB (SEE NOTE 6 BELOW)

TOP SLABS

GENERAL NOTES

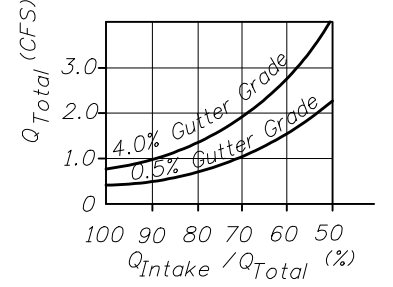
1. This inlet is primarily intended for locations with light to moderate flows where right of way does not permit the use of throated Curb Inlets Types 1 through 6. The typical application is on curb returns to city streets. The inlet grate is suitable for pedestrian and bicycle traffic.
2. This inlet to be located outside of curb ramp area in vertical faced curbs such as Curb and Gutter Type F. Grate shall be oriented with vanes directed toward predominate flow.
3. For structure bottoms see Index No. 200. For supplemental details see Index No. 201.
4. All steel in slab tops shall have 1 1/4" minimum cover unless otherwise shown. Tops shall be either cast-in-place or precast concrete.
5. For Alternate B applications, top slab openings shall be placed such that 2 edges of inlet frame will be located directly above bottom wall or riser wall.
6. When used on a structure with dimensions larger than those detailed above and risers are not applied, the top slab shall be constructed using Index No. 200 with the slab opening adjusted to 24"x36". The "Special Top Slab" on Index No. 200 is not permitted.
7. Frame may be adjusted with one to six courses of brick.
8. Cast iron frame grate and hood to be U.S. Foundry 5130-6016, Neenah Foundry R-3067-L, or approved equal. Inlet and grate detail shown is Neenah R-3067-L. Vaned grates with approximately equal openings will be permitted that satisfy AASHTO HS-20 loading. Grates shall be reversible, right or left.

FRAME AND GRATE

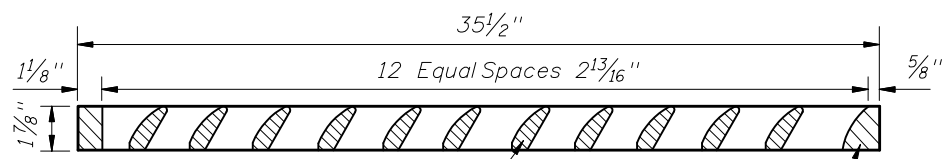


TOP VIEW

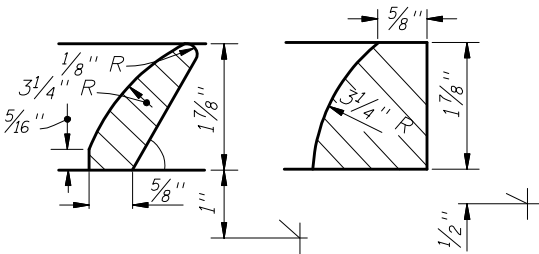
Approximate Debris Free Capacity (0.02 Pavement Cross Slope)



EFFICIENCY CURVE



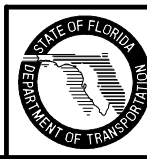
SECTION



DETAIL A

DETAIL B

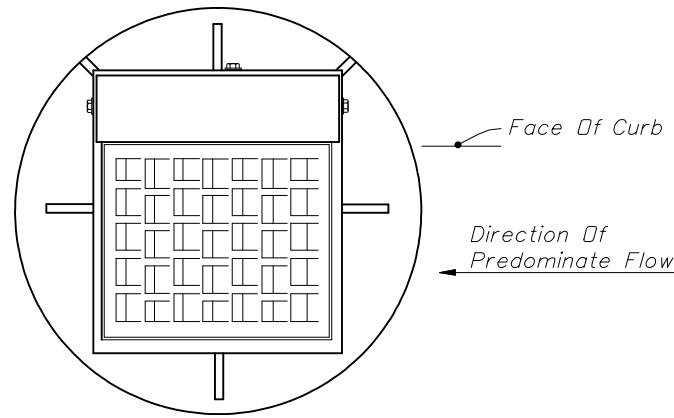
GRATE DETAIL



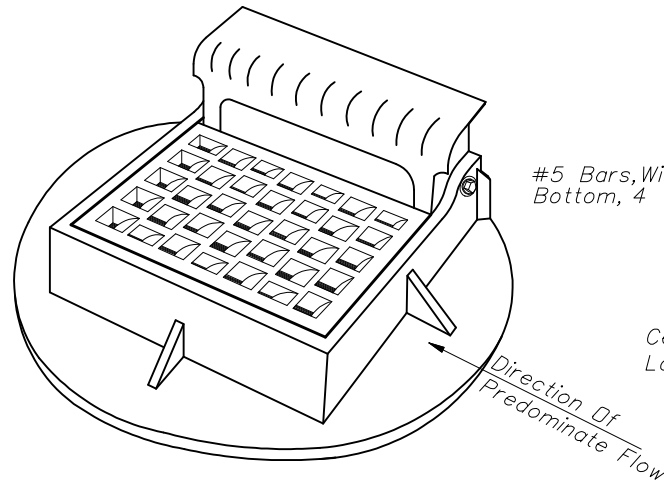
2010 FDOT Design Standards

CURB INLET TOP TYPE 9

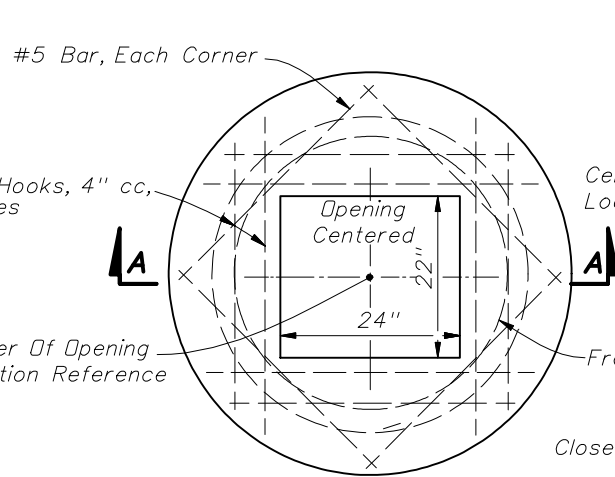
Last Revision	Sheet No.
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Index No.	
214	



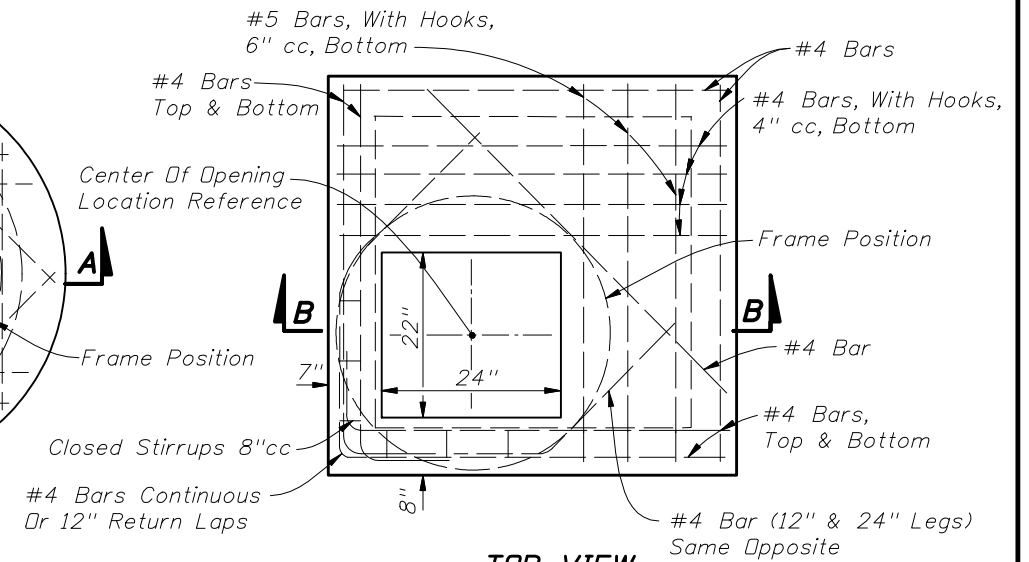
TOP VIEW



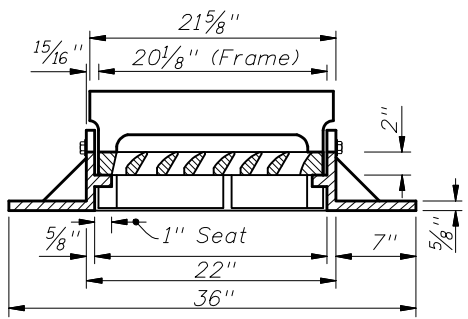
#5 Bars, With Hooks, 4" cc, Bottom, 4 Sides



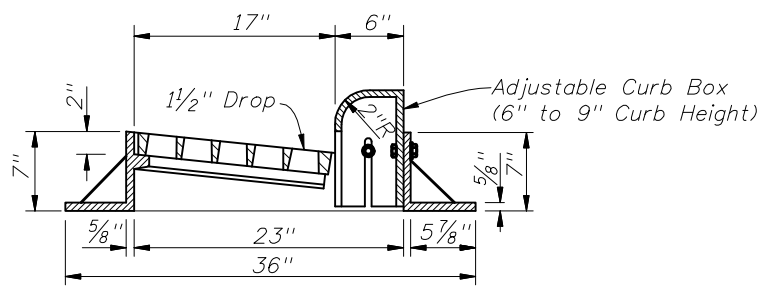
TOP VIEW



TOP VIEW

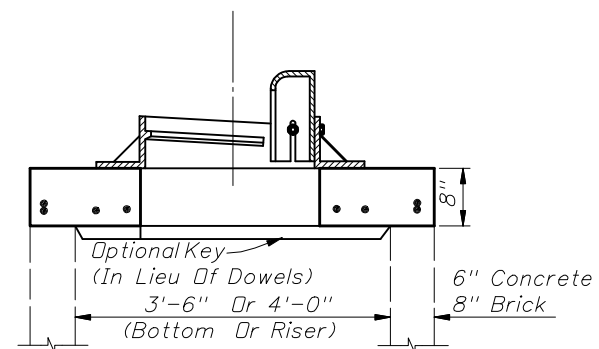


LONGITUDINAL SECTION

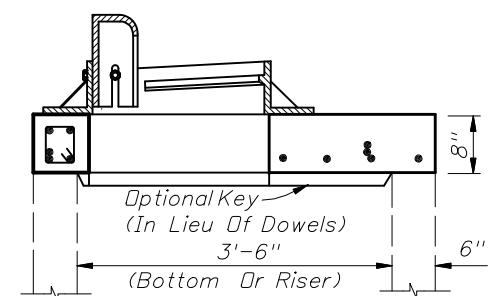


TRANSVERSE SECTION

FRAME AND GRATE

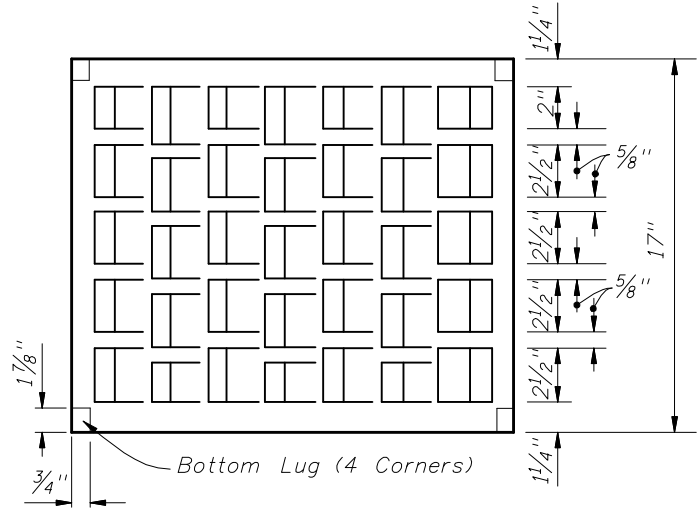


SECTION AA (SEE NOTE 6 BELOW)

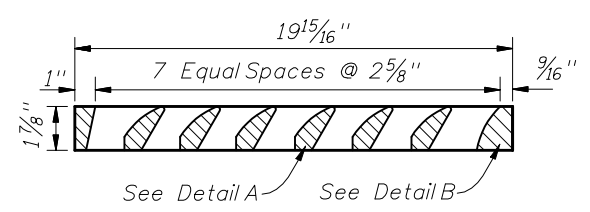


SECTION BB (SEE NOTE 6 BELOW)

TOP SLABS



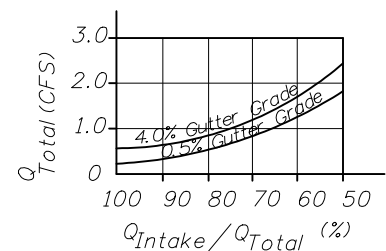
PLAN



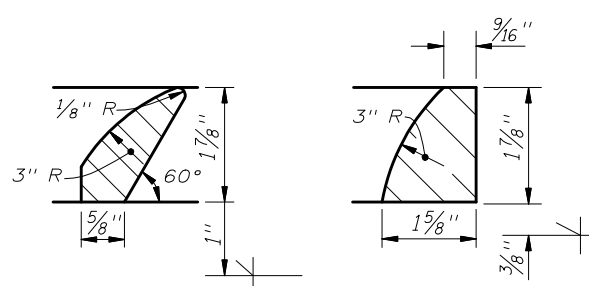
SECTION

GRATE DETAIL

Approximate Debris Free Capacity (0.02 Pavement Cross Slope)



EFFICIENCY CURVE

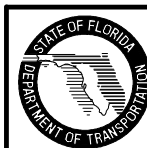


DETAIL A

DETAIL B

GENERAL NOTES

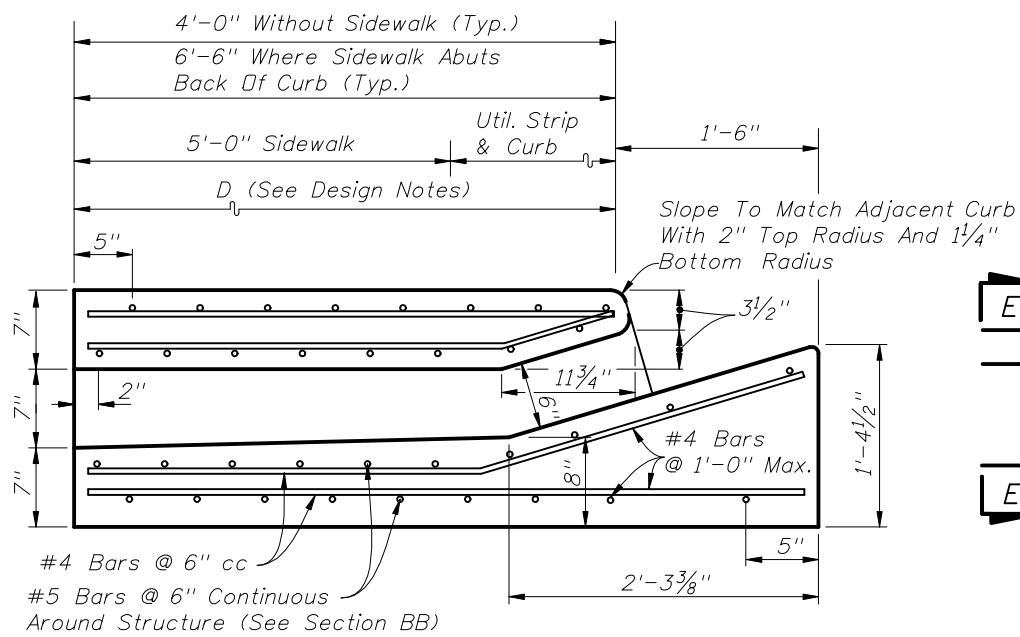
1. This inlet is primarily intended for locations with light flows where right of way does not permit the use of throated Curb Inlets Types 1 through 6. The typical application is on curb returns to city streets. The inlet grate is suitable for pedestrian and bicycle traffic.
2. This inlet to be located outside of curb ramp area in vertical faced curbs such as Curb and Gutter Type F. Grate shall be oriented with vanes directed toward predominate flow.
3. For structure bottoms see Index No. 200. For supplemental details see Index No. 201.
4. All steel in slab tops shall have 1 1/4" minimum cover unless otherwise shown. Tops shall be either cast-in-place or precast concrete.
5. For Alternate B applications, top slab openings shall be placed such that 2 edges of inlet frame will be located directly above bottom or riser walls.
6. When used on a structure with dimensions larger than those detail above and risers are not applied, the top slab shall be constructed using Index No. 200 with the slab opening adjusted to 24"x36". The "Special Top Slab" on Index No. 200 is not permitted.
7. Frame may be adjusted with one to six courses of brick.
8. Cast iron frame grate and hood to be U.S. Foundry 5161-6019, Neenah Foundry R-3065-L, or approved equal. Inlet and grate detail shown is Neenah R-3065-L. Vaned grates with approximately equal openings will be permitted that satisfy AASHTO HS-20 loading. Grates shall be reversible.



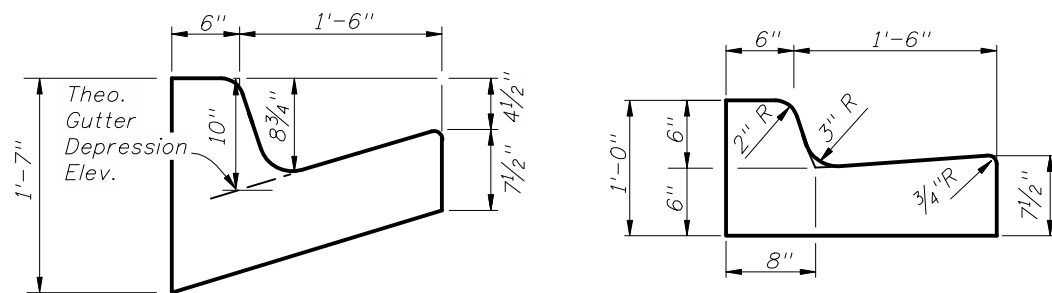
2010 FDOT Design Standards

CURB INLET TOP TYPE 10

Last Revision	Sheet No.
04	1 of 1
Index No.	
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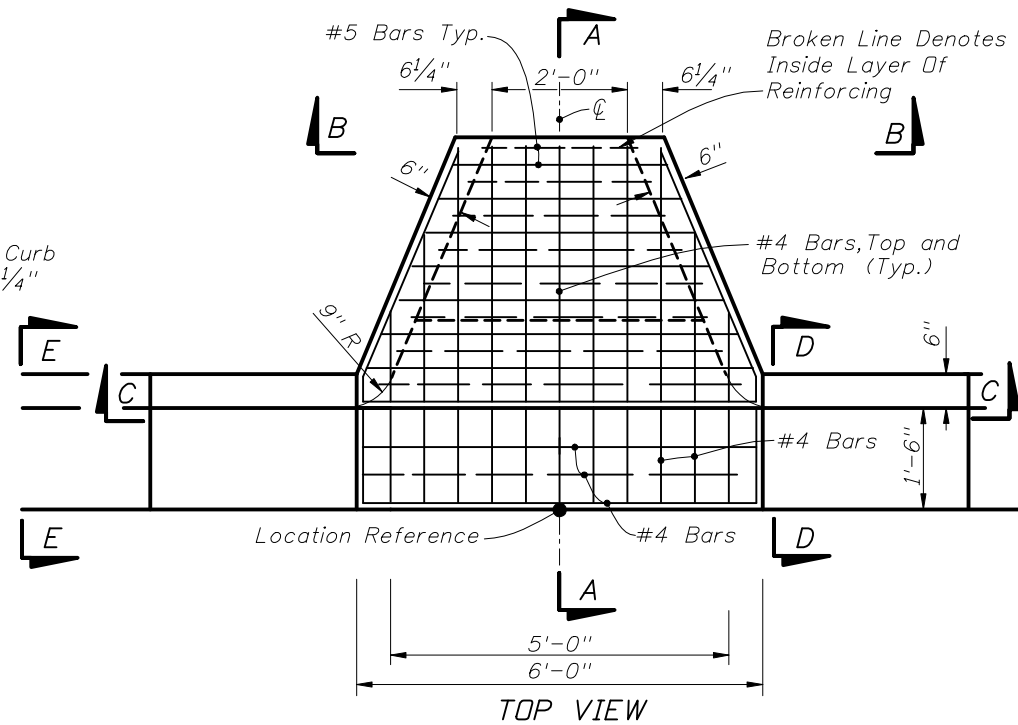


SECTION AA

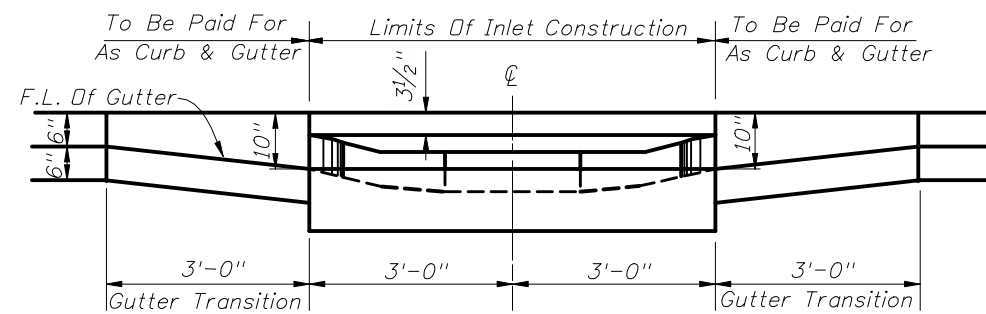


SECTION DD

Curb And Gutter Type F
SECTION EE



TOP VIEW



SECTION CC
SINGLE BARREL FLUME

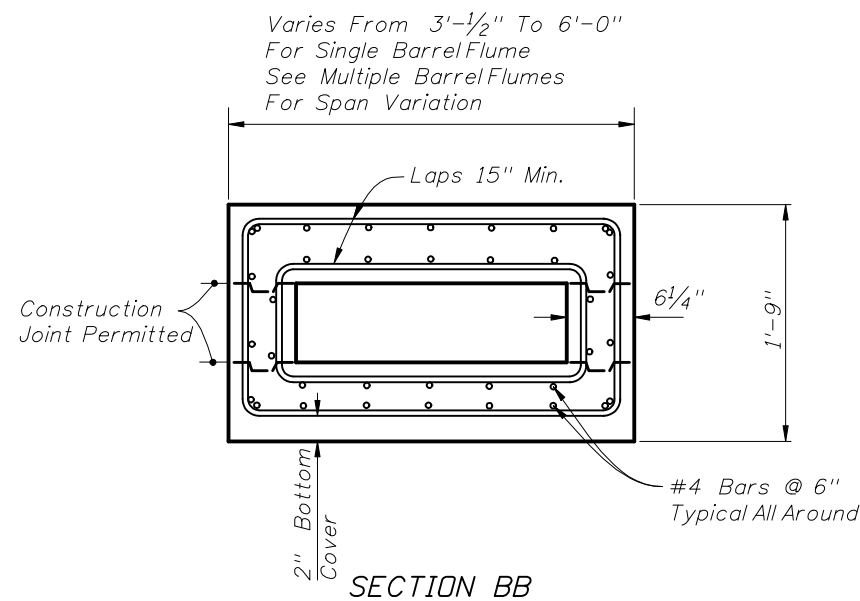
GENERAL NOTES

1. The finished grade and slope of the inlet top are to conform with the finished cross slope and grade of the proposed sidewalk and/or border.
2. When inlets are to be constructed on a curve, refer to the plans to determine the radius and, where necessary, modify the inlet details accordingly. Bend steel when necessary.
3. All steel shall have 1/4" minimum cover unless otherwise shown. Inlets can be either cast-in-place or precast concrete. Chamfer all exposed edges 3/4".
4. All reinforcement is ASTM A615/A615M Grade 60 steel, either smooth or deformed. Equivalent area grade 40 steel or 65 ksi welded wire fabric may be substituted.
5. Inlets to be paid for under the contract unit price for Inlets (Closed Flume) EA.

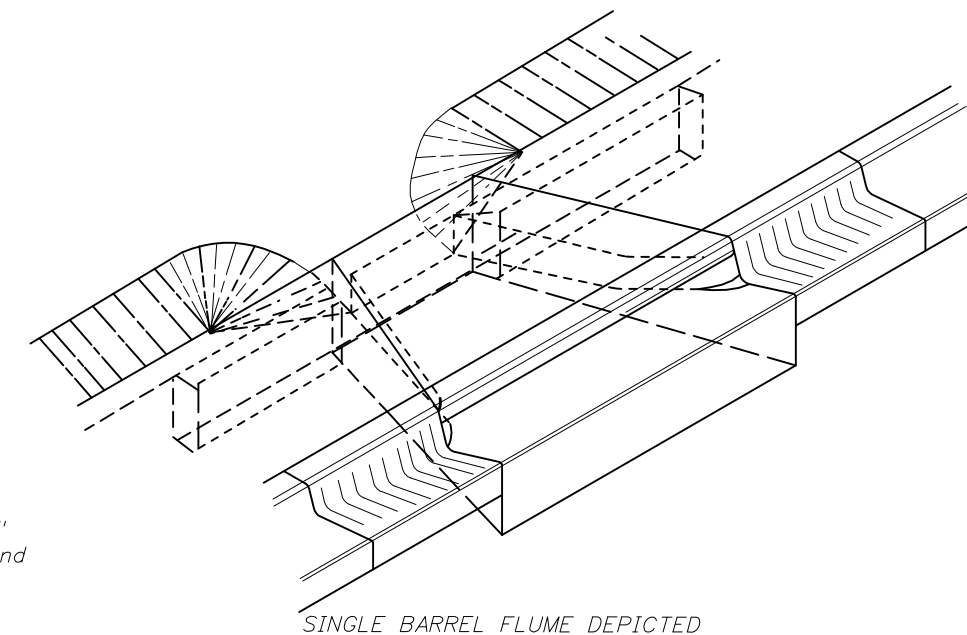
DESIGN NOTES

1. These inlets are designed for use with Type F curb and gutter only. Locate inlet outside of curb ramp area.

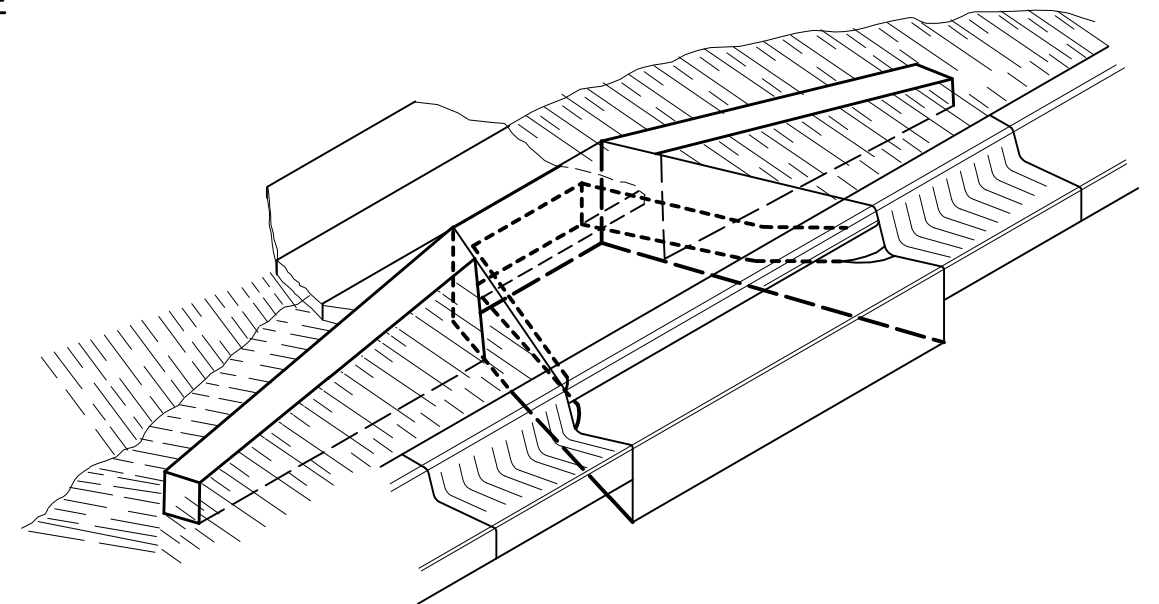
The Single Barrel Flume is intended for locations with light to moderate flows. Multiple Barrel Flumes must be selected to meet design heavy flows.
2. Designer must specify Flume Type, "D" dimension, number of barrels and guiderail requirements in plans.
3. Designer must specify where energy dissipating bricks are required.



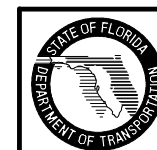
SECTION BB

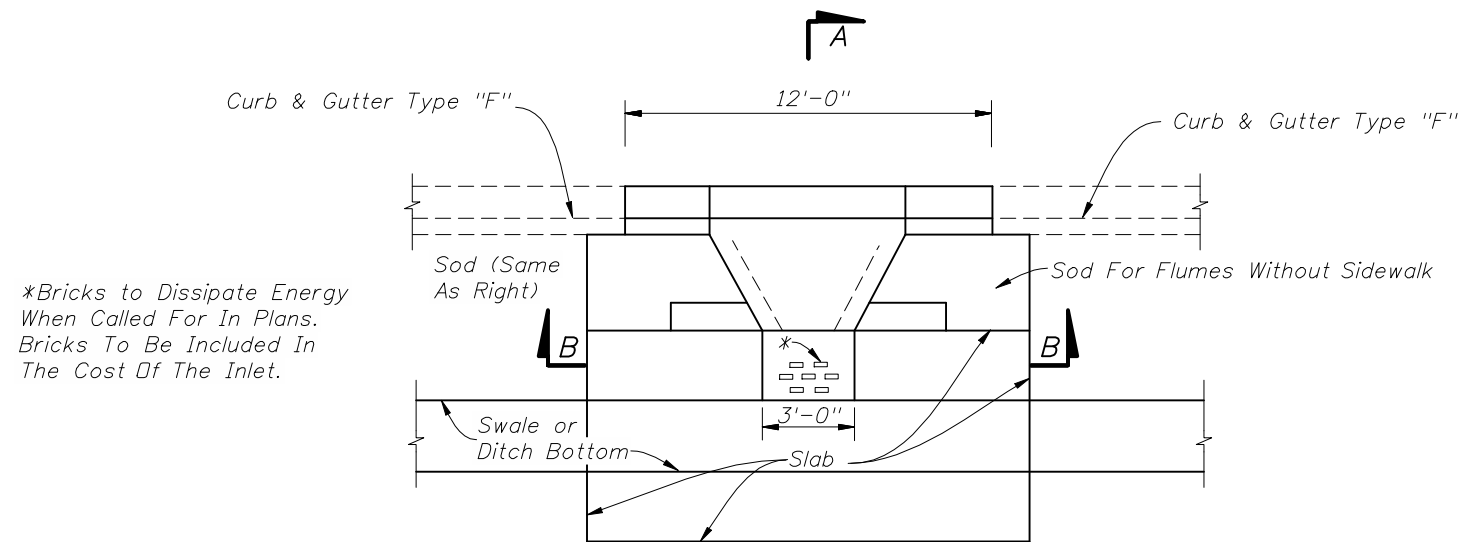


SINGLE BARREL FLUME DEPICTED
FLUME W/SIDEWALK INLET (CLOSED FLUME) TYPE I



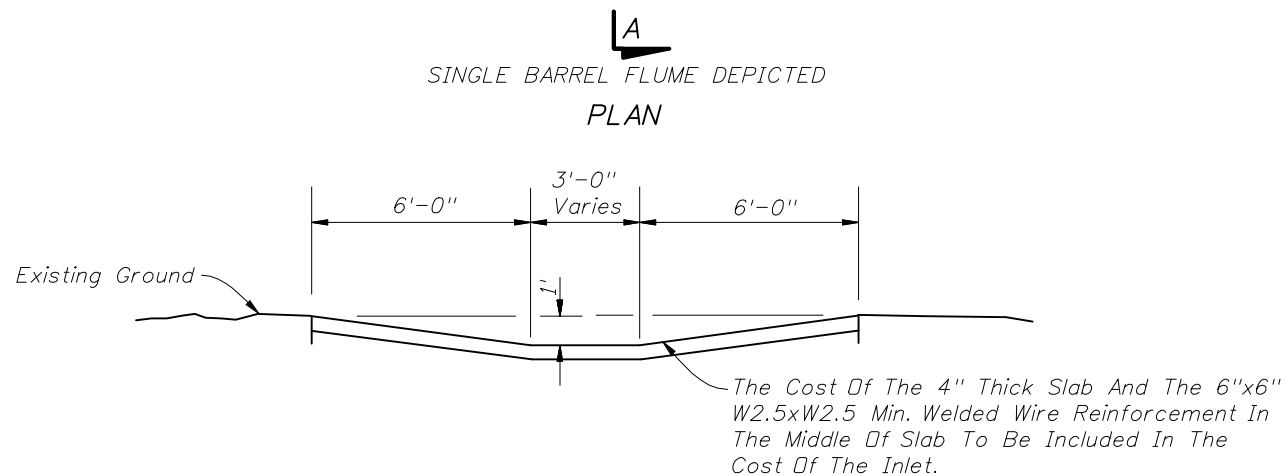
SINGLE BARREL FLUME DEPICTED
FLUME W/O SIDEWALK INLET (CLOSED FLUME) TYPE II



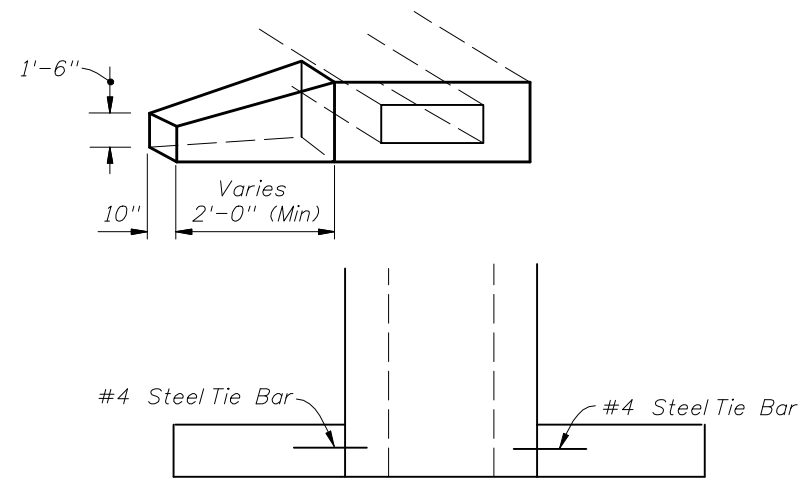


*Bricks to Dissipate Energy When Called For In Plans. Bricks To Be Included In The Cost Of The Inlet.

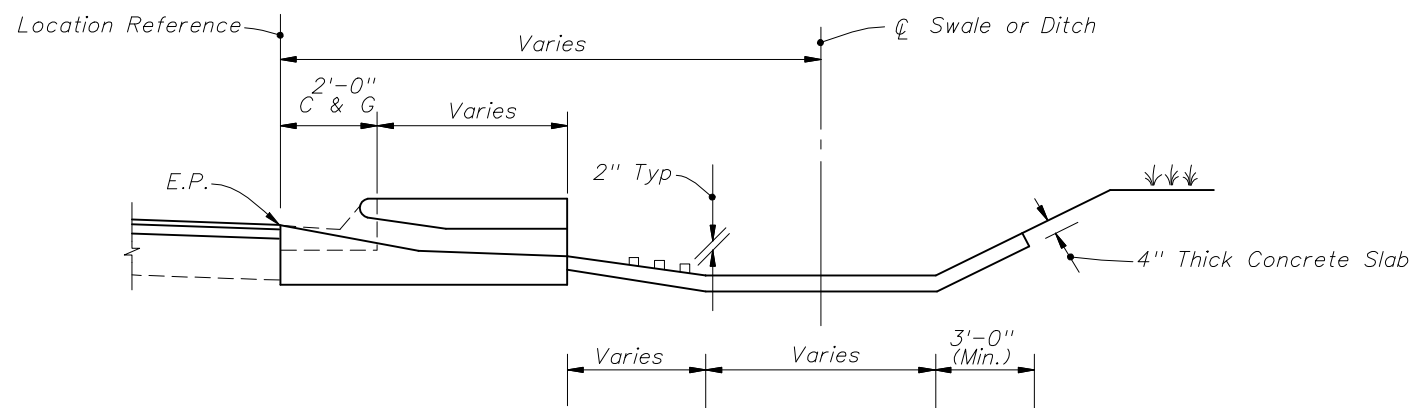
SINGLE BARREL FLUME DEPICTED
PLAN



SINGLE BARREL FLUME DEPICTED
SECTION BB

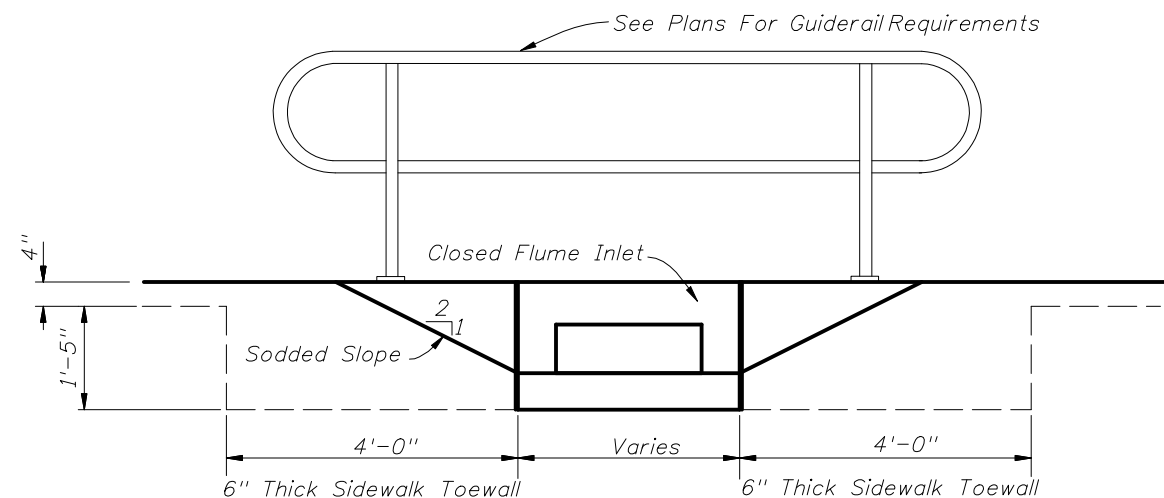


SINGLE BARREL FLUME DEPICTED
ENDWALL



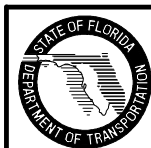
Ditch Pavement To Be Adjusted When Inlet Present
SECTION AA

SLOPES, DITCH APRON AND ENDWALLS



SINGLE BARREL FLUME DEPICTED
ELEVATION

GUIDERAIL FOR FLUME IN SIDEWALK

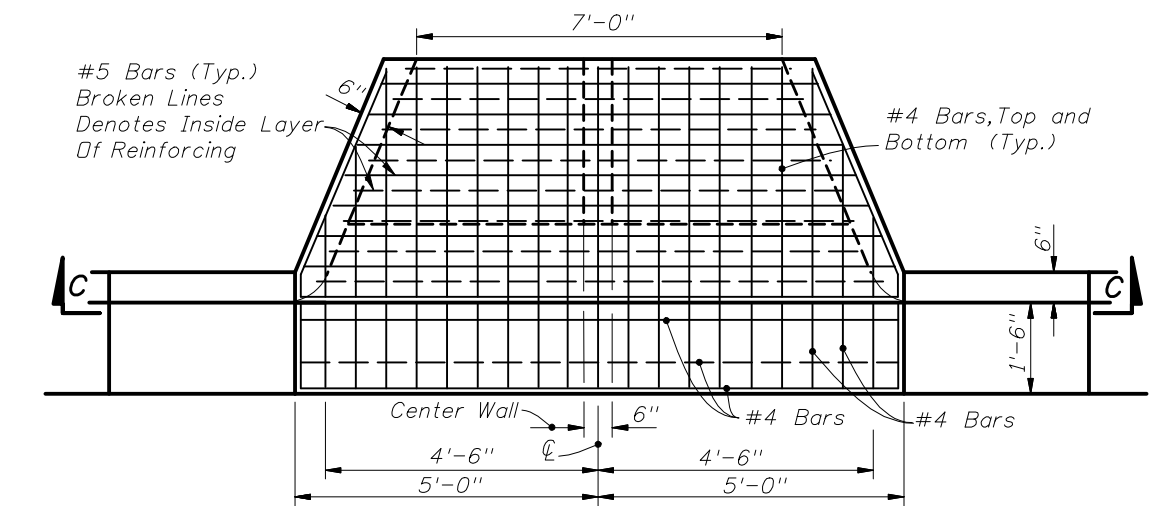


2010 FDOT Design Standards

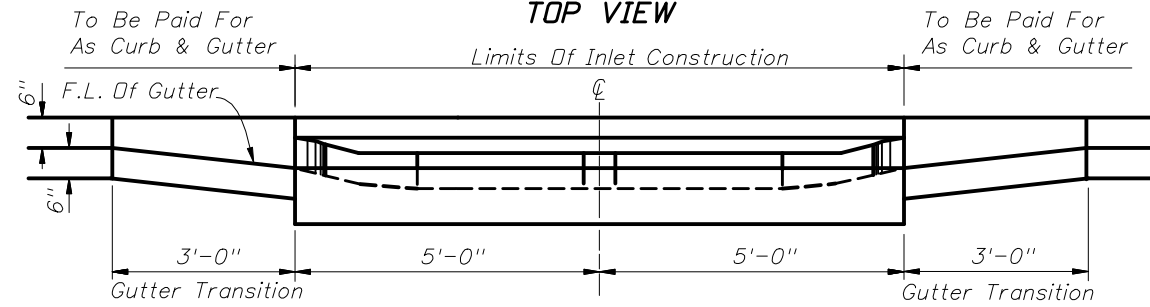
CLOSED FLUME INLET

Last Revision
07
Sheet No.
2 of 3

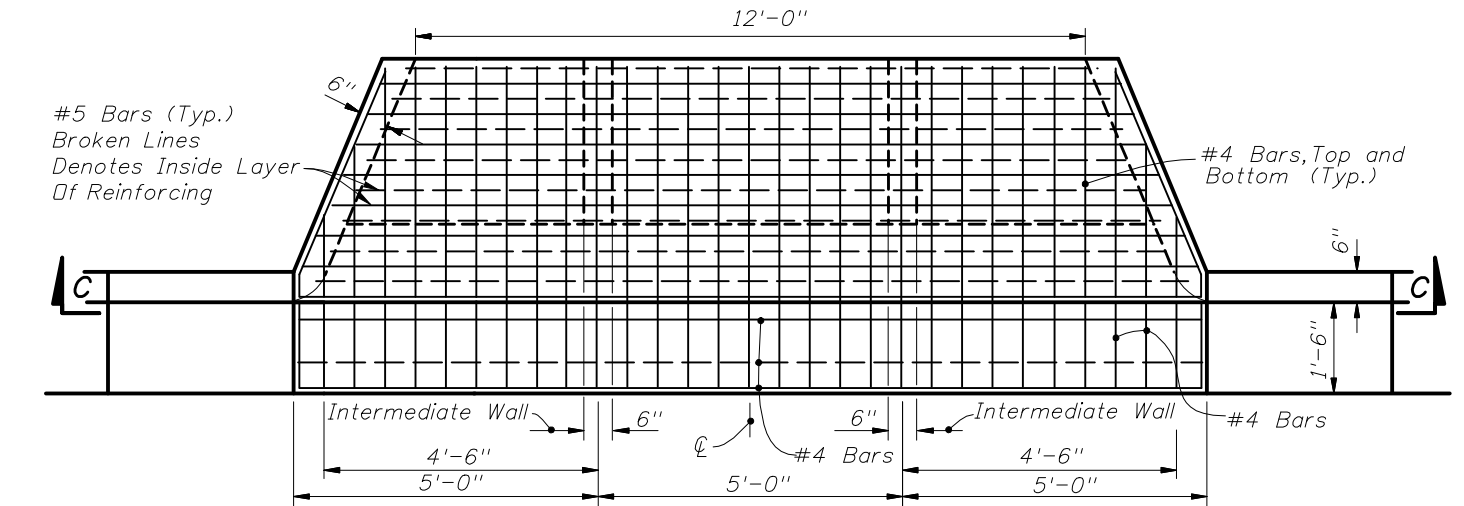
Index No.
216



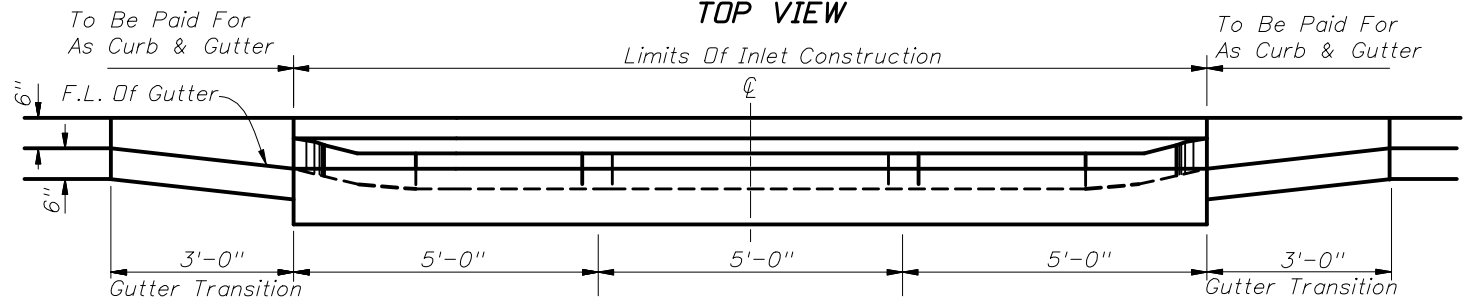
TOP VIEW



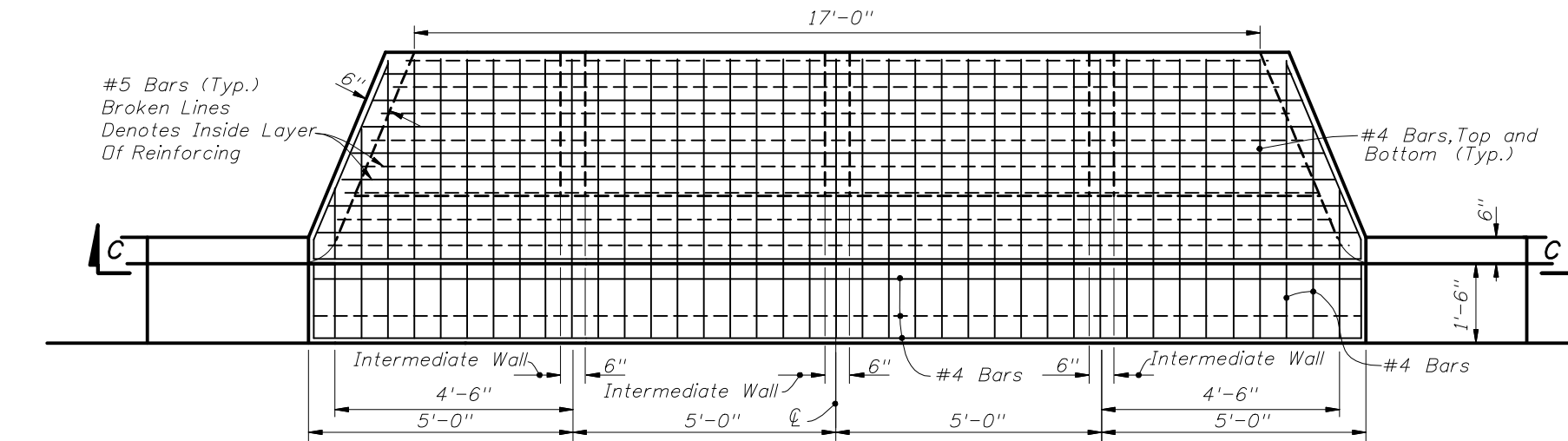
**SECTION CC
DOUBLE BARREL FLUME**



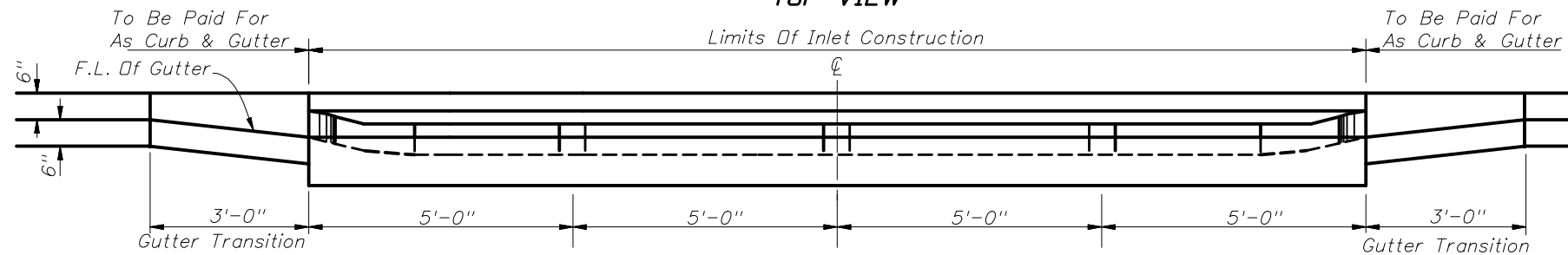
TOP VIEW



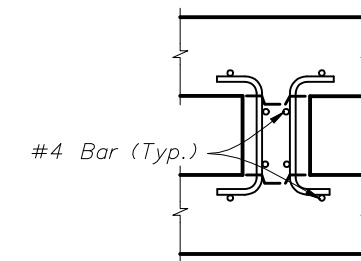
**SECTION CC
TRIPLE BARREL FLUME**



TOP VIEW



**SECTION CC
QUADRUPLE BARREL FLUME**



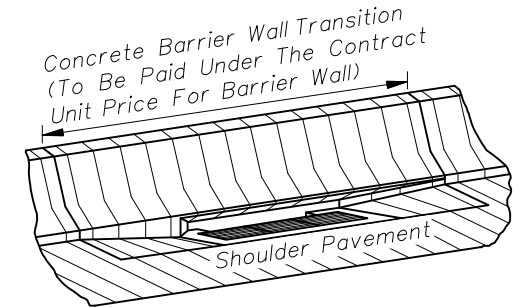
INTER-WALL REINFORCING

NOTE: See Single Barrel Flume For Base Dimensions.



☉ Inlet
Symmetrical About ☉ For Inlet Types 2 & 4 And
For Double Throat Side Of Inlet Type 5. See
Tabular Description Of Inlets, General Note 1.

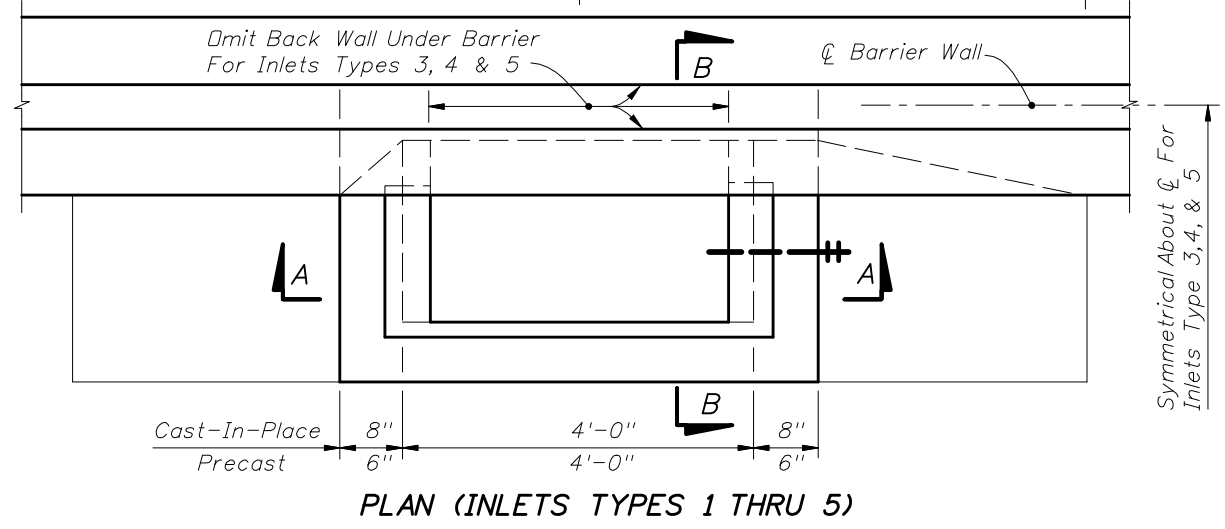
Shoulder Slope	Grate Slope Rate	Drop Height		Remarks
		CIPL	Precast	
0.03	1:6	1 7/16"	1 5/16"	Std. Median Concrete Shoulder
0.05	1:6	1 1/16"	7/8"	Std. Median Flexible Shoulder
0.06	1:6	1 3/16"	5/8"	
0.07	1:5	1 5/8"	1 3/8"	
0.08	1:5	1 3/8"	1 1/16"	
0.09	1:5	1 1/8"	1 5/16"	
0.10	1:5	7/8"	1 1/16"	e (max)



PICTORIAL VIEW (TYPE I SHOWN)

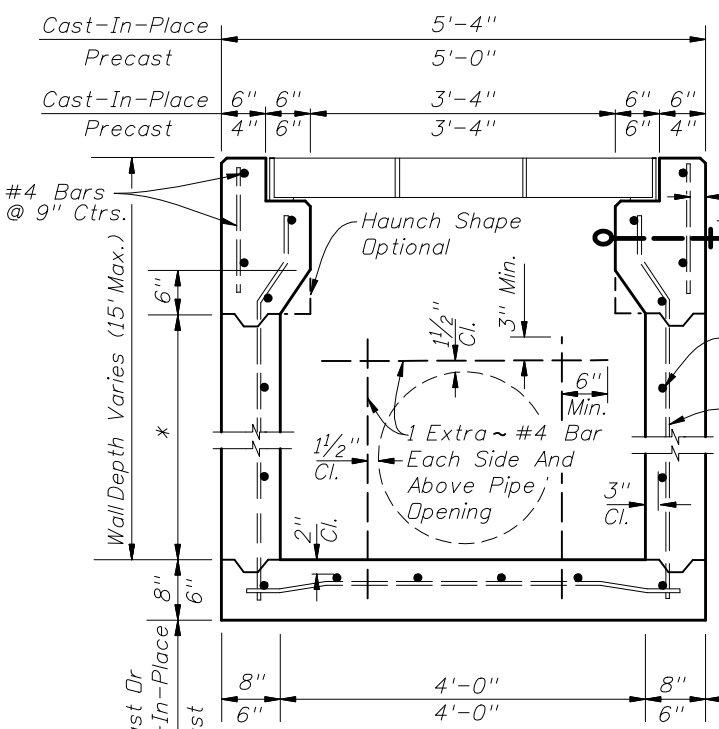
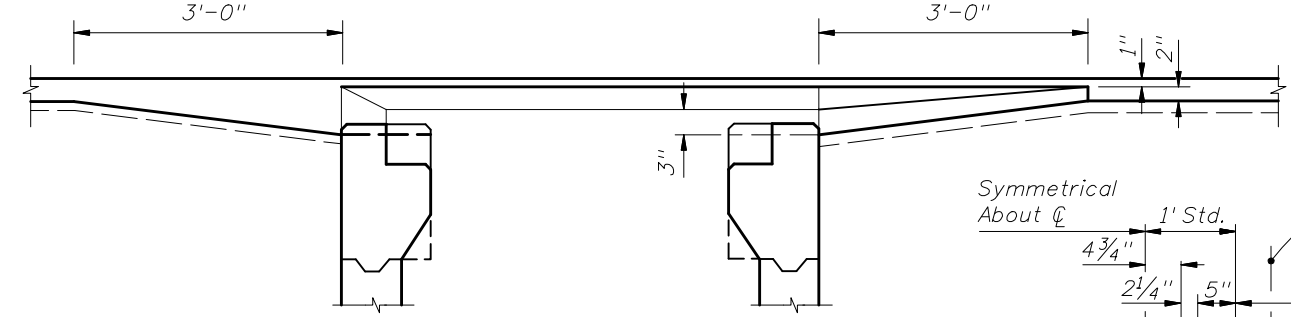
GENERAL NOTES

- Inlet Descriptions:**
Type 1 Single throat, one side of barrier wall.
Type 2 Double throats, one side of barrier wall.
Type 3 Two single throats, opposite side of barrier wall.
Type 4 Two double throats, opposite sides of barrier wall.
Type 5 Double throats, one side of barrier wall, and single throat other side of barrier wall.
- For grate details see Index No. 220. The parallel bar grate shall be used unless the reticulate grate is called for in the plans. The reticulate grate shall be specified where bicycle traffic is anticipated. Not suitable for pedestrian traffic.
- All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
- For standard concrete barrier wall dimensions, and for dimensions of concrete barrier wall incorporating light standards within the wall, see Index No. 410.
- Reinforcing steel shall have 2" minimum cover. Horizontal wall reinforcing must be positioned 3" from the inside face unless otherwise shown.
- All reinforcing is Grade 60 #4 bars. See Index No. 201 for equivalent area of welded wire fabric for inlet. Longitudinal steel bars extend over full length of concrete barrier wall transition. Tie bars @ 12" ctrs. Reinforcing to be paid for under the contract unit price for Concrete Barrier Wall, LF.
- For supplemental details see Index No. 201.
- All dimensions are for both precast and cast-in-place inlets unless otherwise noted.
- Inlets to be paid for under the contract unit price for Inlets (Median Barrier Type...), EA. Barrier wall to be paid for under the contract unit price for Concrete Barrier Wall, LF.

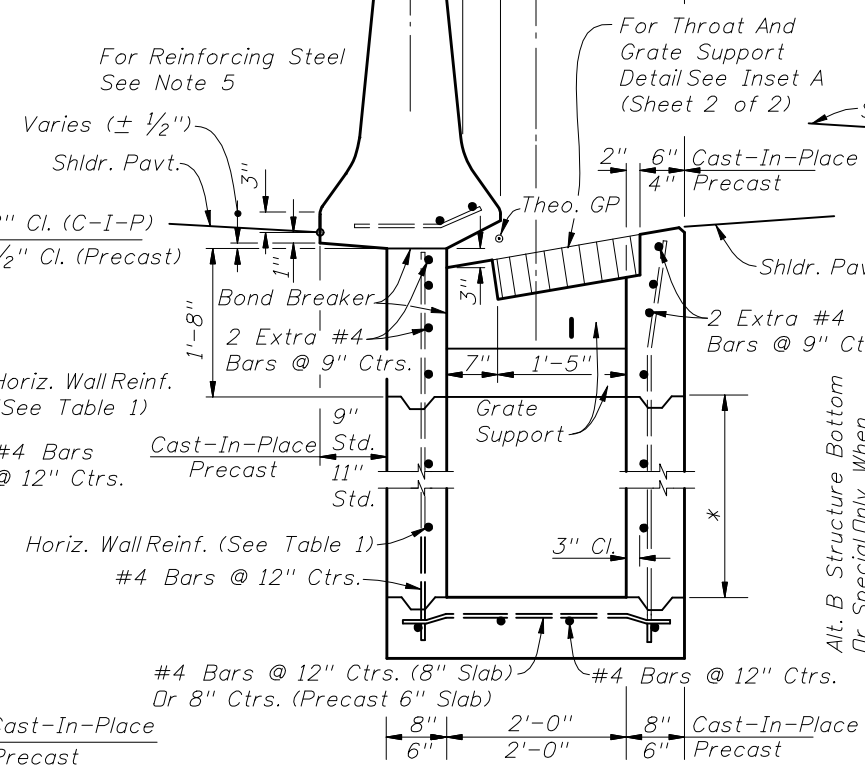


HORIZONTAL WALL REINFORCING SCHEDULE (TABLE 1)

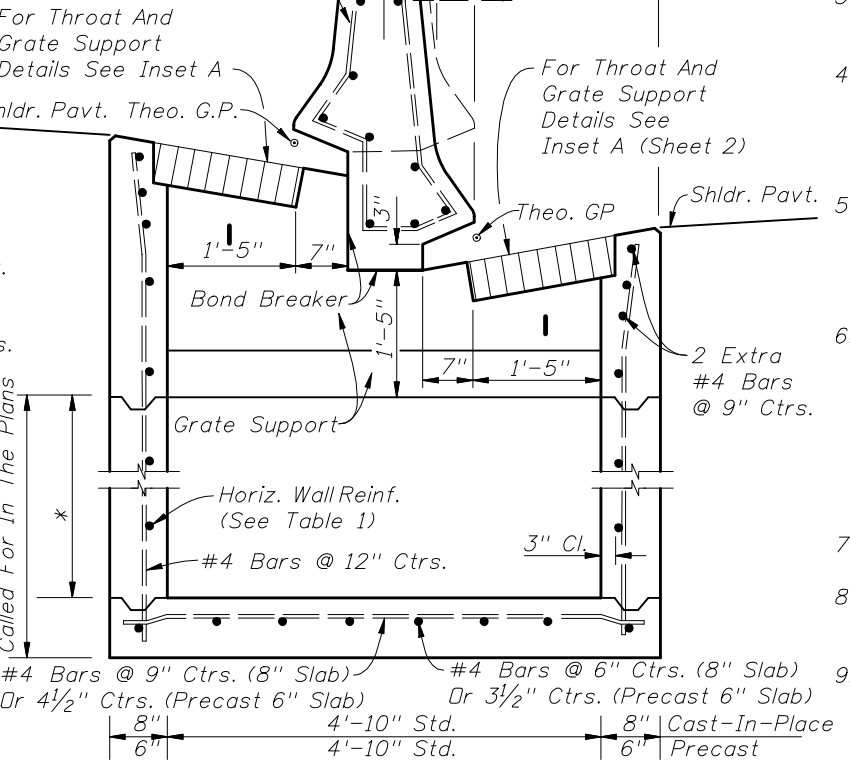
WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0'-3'	A12	0.20	12"	8"
3'-6'	A6	0.20	6"	5"
6'-9'	B5.5	0.24	5 1/2"	5"
9'-15'	C6.5	0.37	6 1/2"	6"



(Pipe Opening Shown)
SECTION AA



SECTION FOR INLETS TYPES 1 & 2

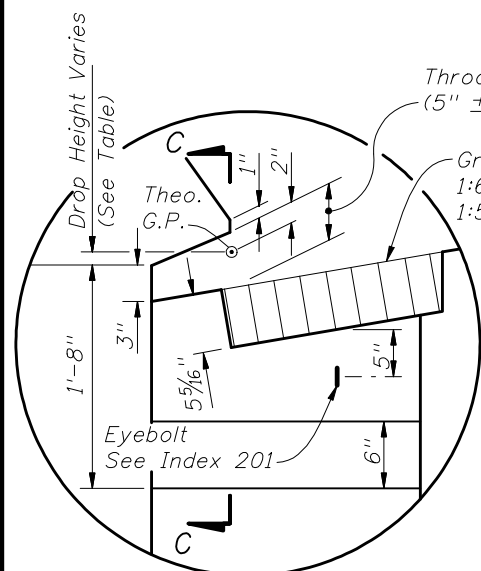


SECTION FOR INLETS TYPES 3, 4 & 5 (NON-SYMMETRICAL SECTION SHOWN)

*Const. Joint Permitted Between These Limits
See Index No. 201 For Min. Dimensions

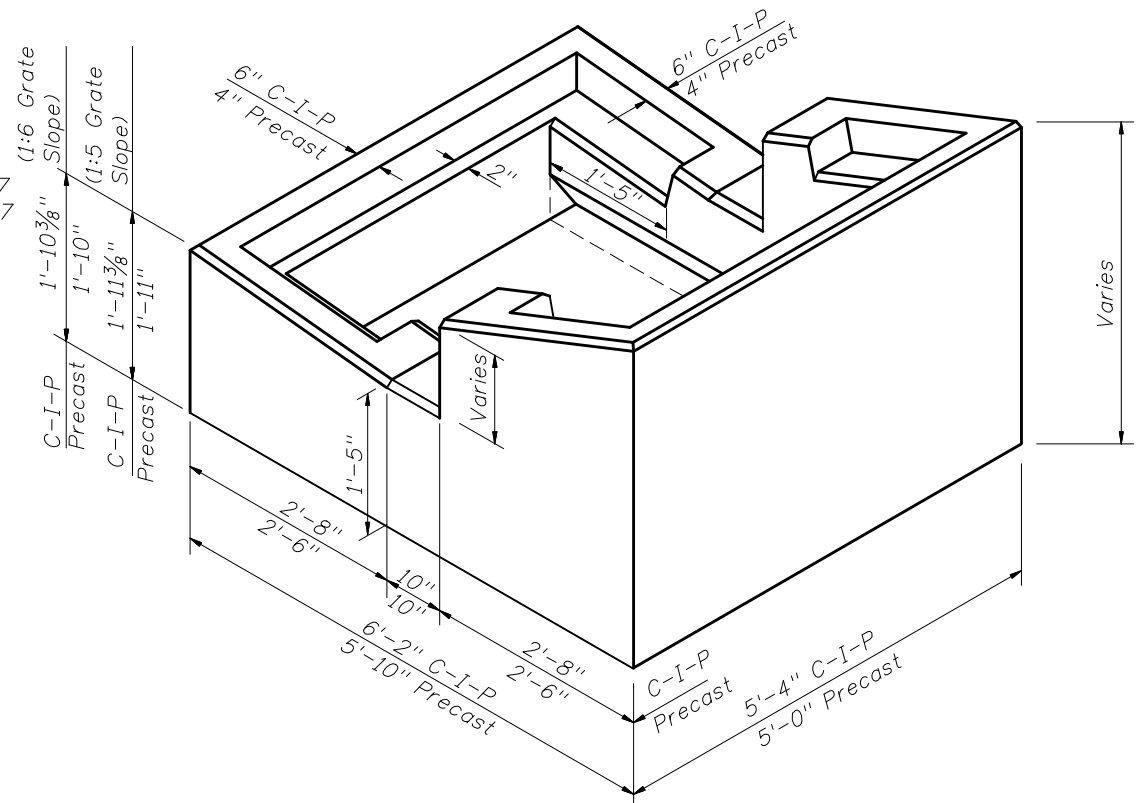
(Pipe Opening Not Shown)
SECTION BB



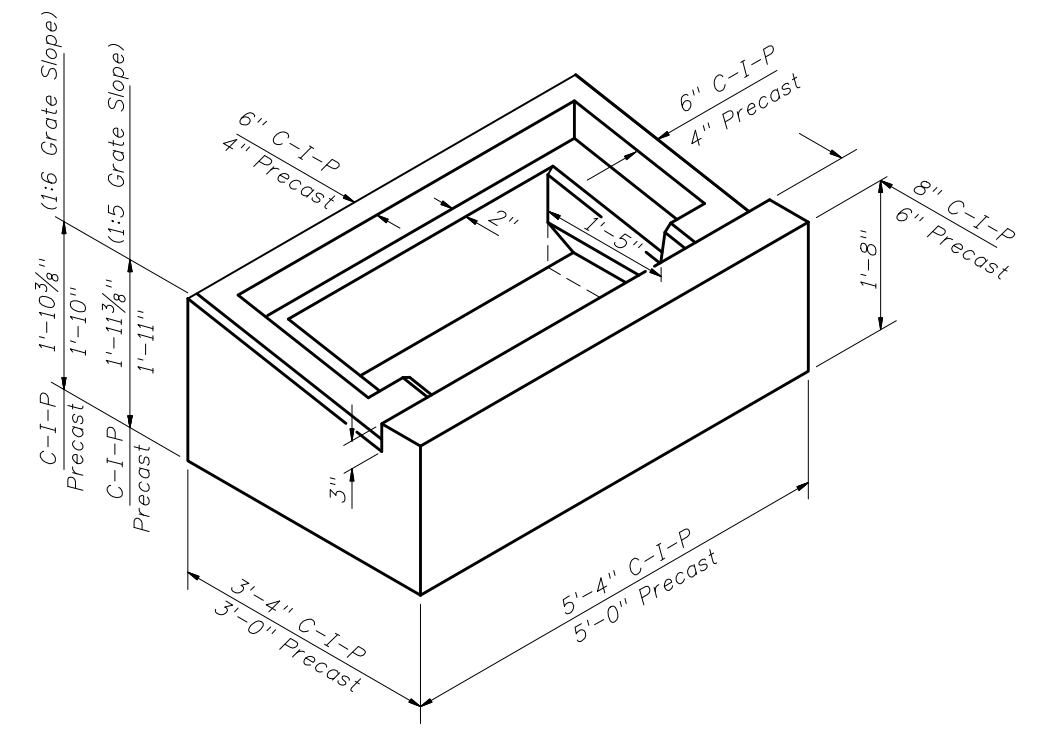


INSET A

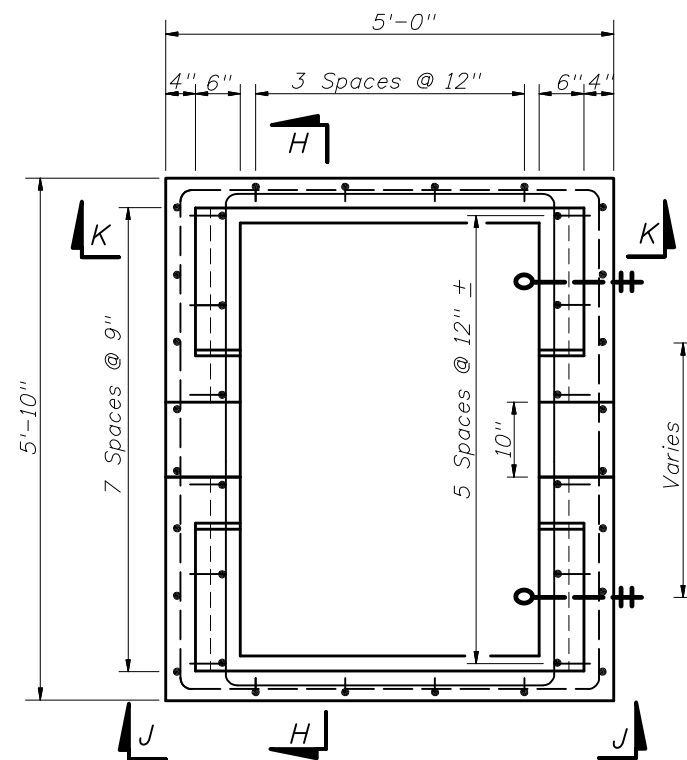
Drop Height Varies (See Table)
 Theo. G.P.
 Eyebolt See Index 201
 Throat Varies (5" ± 1/2")
 Grate Slope
 1:6 For Shoulder Slope < 0.07
 1:5 For Shoulder Slope ≥ 0.07



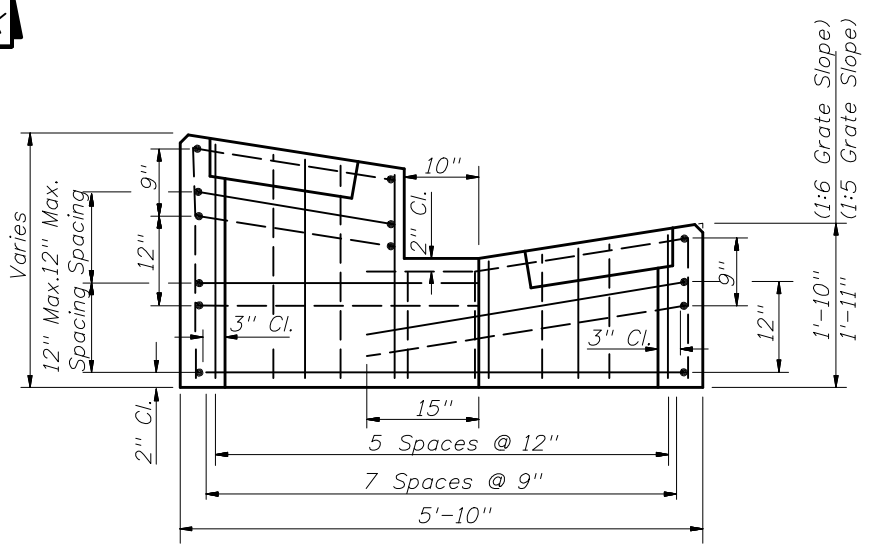
PICTORIAL VIEW OF INLET COLLAR (TYPES 3, 4, & 5)



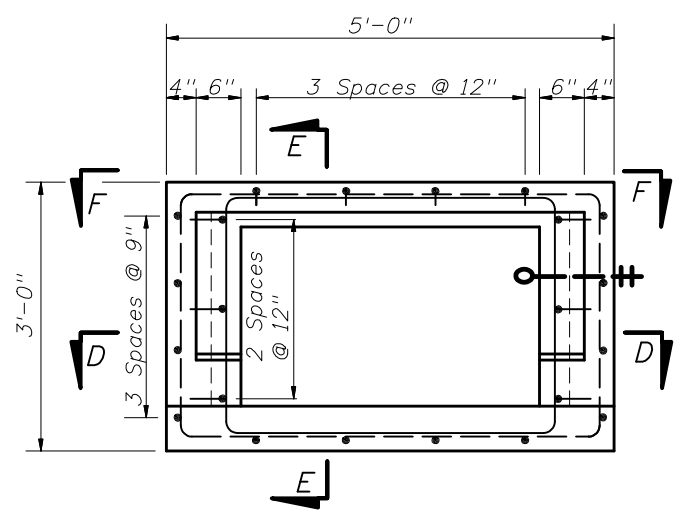
PICTORIAL VIEW OF INLET COLLAR (TYPES 1 & 2)



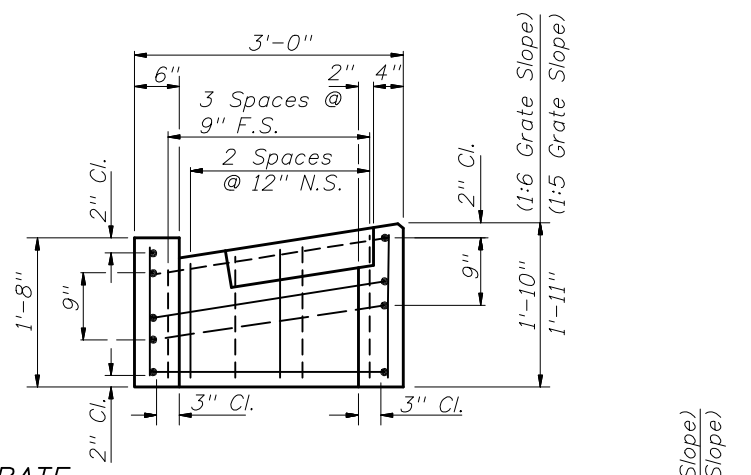
TOP VIEW OF INLET COLLAR WITHOUT GRATE



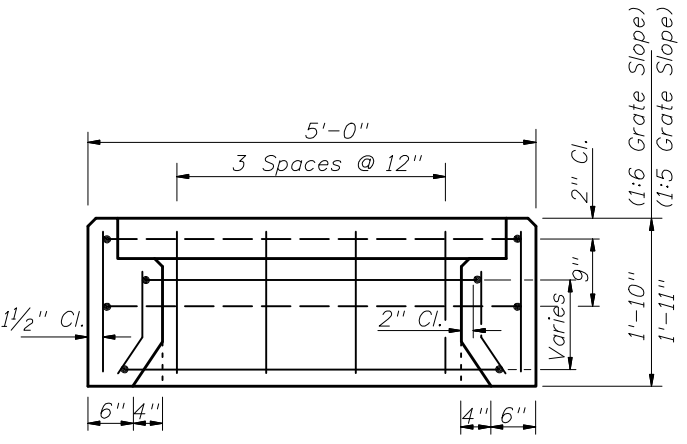
SECTION HH



TOP VIEW OF INLET COLLAR WITHOUT GRATE

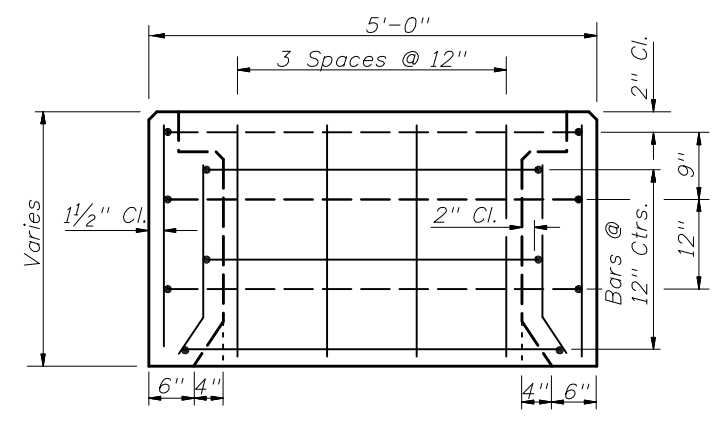


SECTION EE

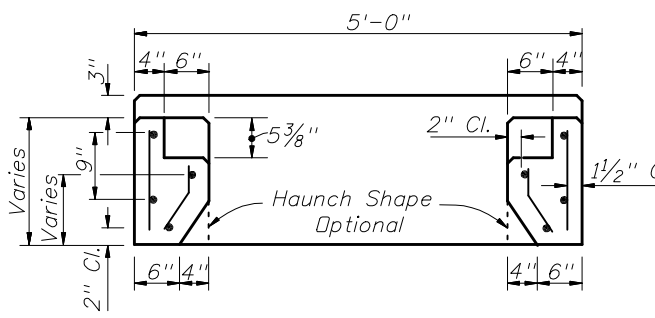


VIEW KK

PRECAST COLLAR REINFORCING DETAILS (TYPES 3, 4 & 5)
 (C-I-P COLLAR REINFORCING DETAILS SIMILAR)

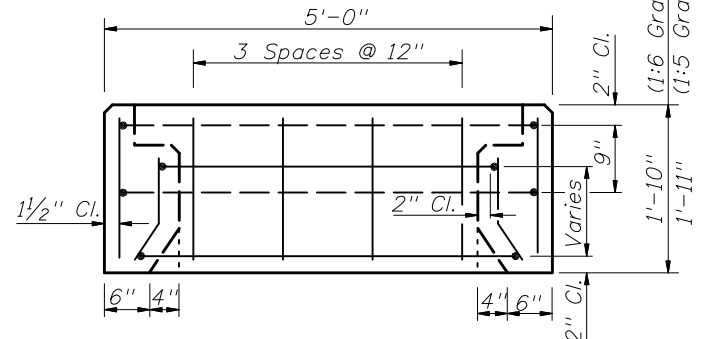


VIEW JJ

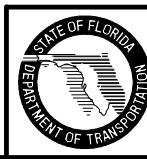


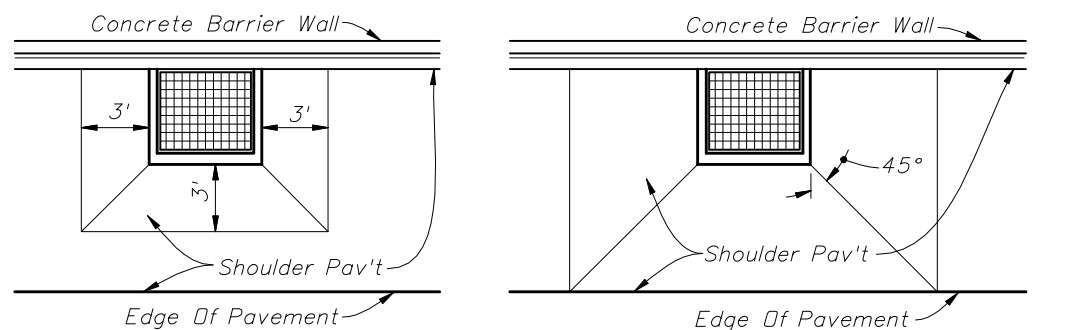
SECTION DD

PRECAST COLLAR REINFORCING DETAILS (TYPES 1 & 2)
 (C-I-P COLLAR REINFORCING DETAILS SIMILAR)

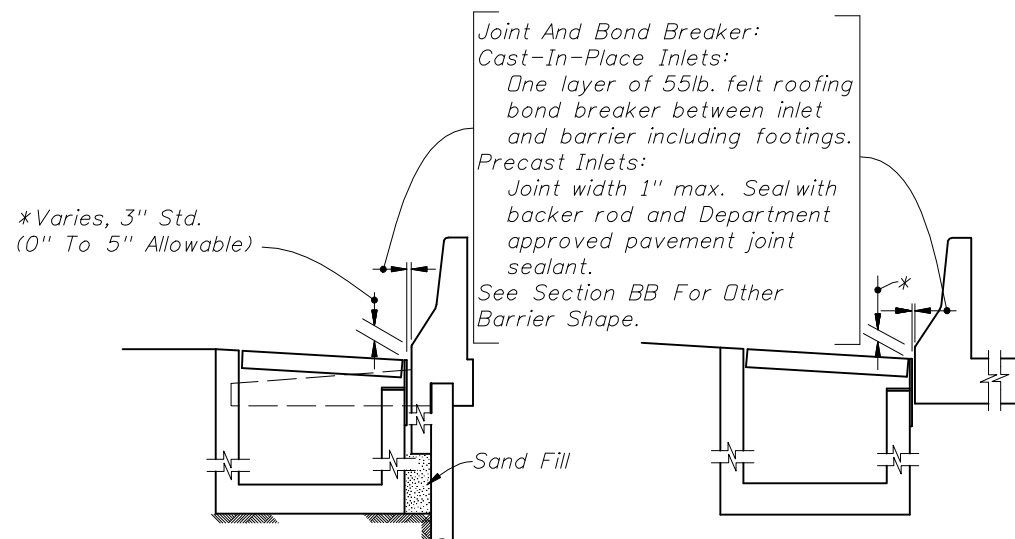


VIEW FF

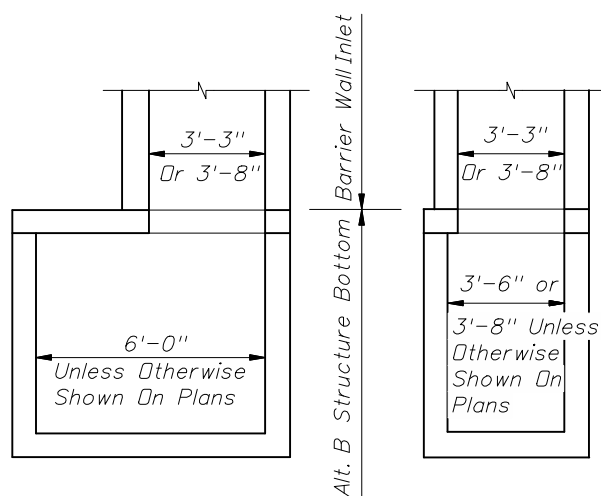




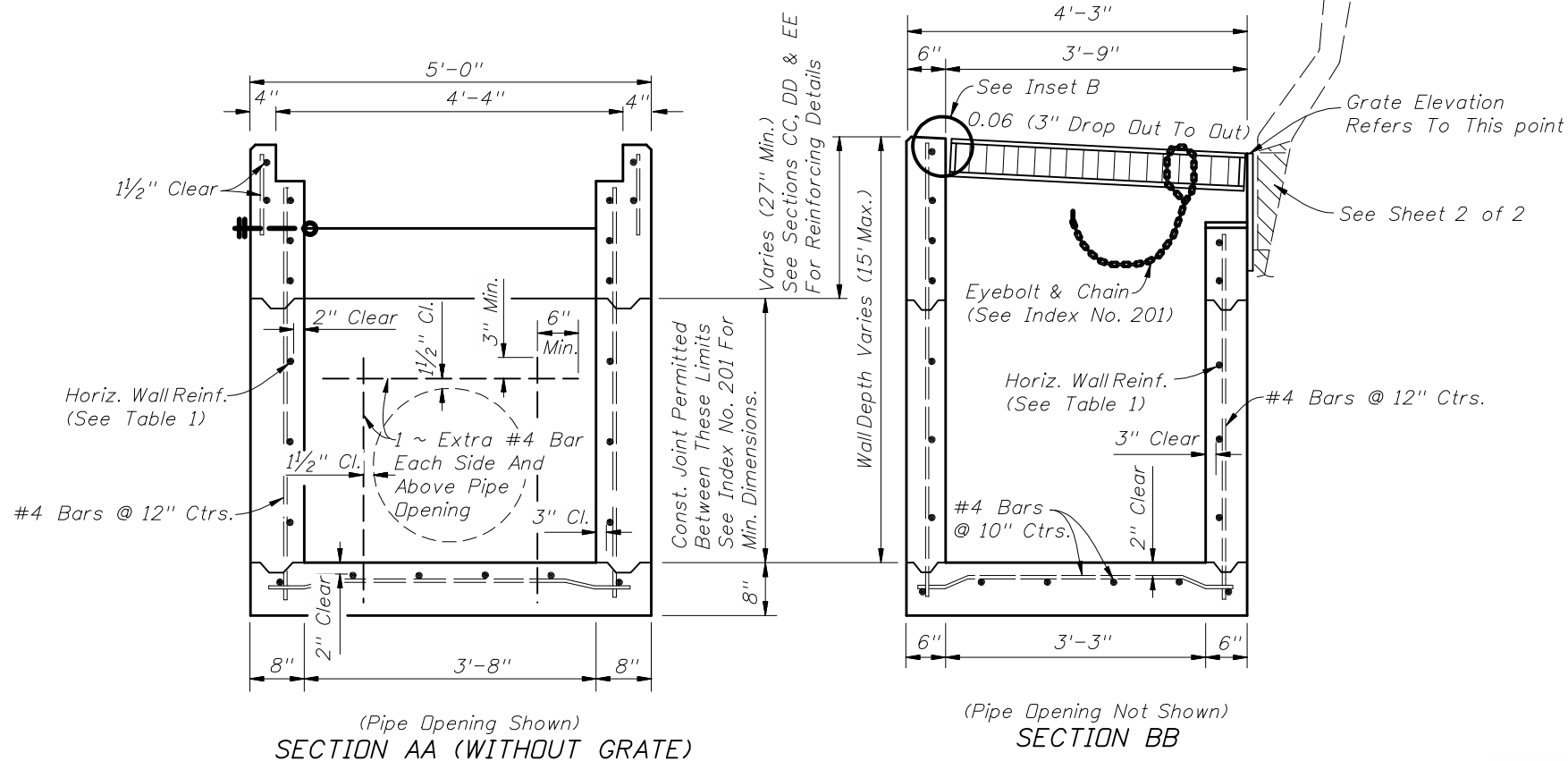
LOW SIDE SUPERELEVATION PAVEMENT WARP FOR SHOULDERS IN SUPERELEVATION HIGH SIDE TRANSITION PAVEMENT WARP FOR SHOULDERS IN SUPERELEVATION



BARRIER WALL / RETAINING WALL SINGLE FACE ROADWAY BARRIER INLET SECTION AT WALLS

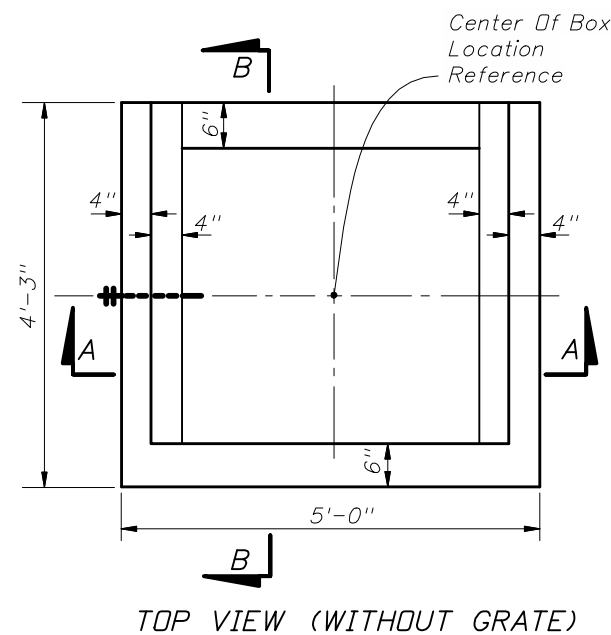


Note: Alt. B Structure Bottom Only. See Index No. 200. INLET WITH STRUCTURE BOTTOM



GENERAL NOTES

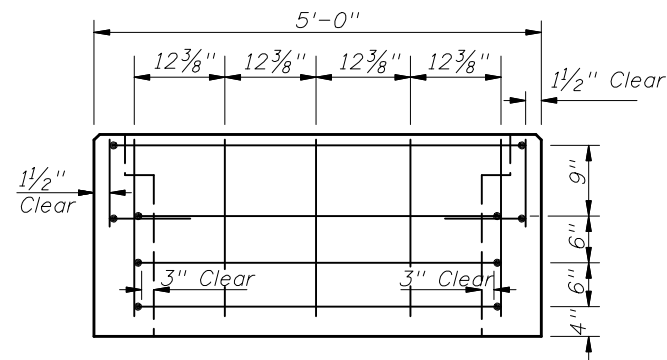
1. This inlet is primarily intended for use adjacent to concrete barrier walls on paved shoulders. Use of the inlet adjacent to other wall types shall be approved by the Drainage Engineer. The inlet is suitable for bicycle and occasional pedestrian traffic, but should not be placed in a designated pedestrian travel way. It is not intended for use in curb and gutter or other areas where throated inlets are required, nor areas subject to high debris.
2. Inlets located in embankments constructed with earth anchored retaining wall shall be designed with minimum depths to reduce adverse impact on the anchorage system. Runs of pipe parallel to and near anchored wall shall be avoided wherever practical. Special coordination must be exercised during the design and construction of storm water systems within anchored wall systems.
3. Inlet bottoms and/or tops may be either precast or cast-in-place. Whether cast as a single unit or as multiple segments, and whether precast or cast-in-place, the upper 2'-3" of the inlet shall be reinforced in accordance with sections CC, DD and EE.
4. All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
5. When Alternate G grate is specified in the plans, the grate is to be hot-dip galvanized after fabrication. Field installation of the filler bar called for in Inset B will not be permitted, thereby requiring tolerance adjustment during fabrication and/or casting, or, matching grate to structure prior to galvanizing.
6. All reinforcing is Grade 60 bars. See Index No. 201 for equivalent area of welded wire fabric.
7. All dimensions are for both precast and cast-in-place inlets unless otherwise noted.
8. For supplemental details see Index Nos. 200 and 201.
9. Inlets to be paid for under the contract unit for Inlets (Barrier Wall), Each.



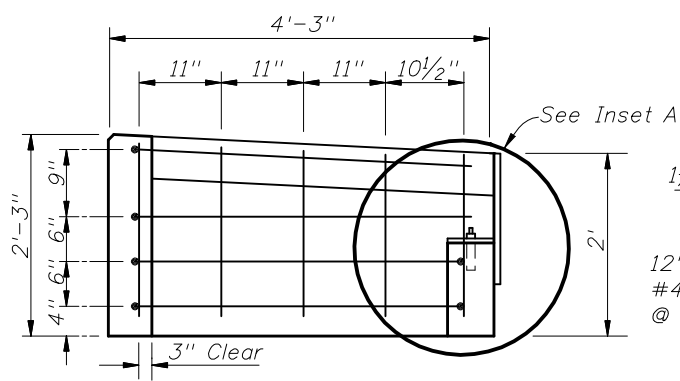
HORIZONTAL WALL REINFORCING SCHEDULE (TABLE 1)

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0'-5'	A12	0.20	12"	8"
5'-10'	A6	0.20	6"	5"
10'-15'	A4	0.20	4"	3"
10'-15'	B5.5	0.24	5 1/2"	5"

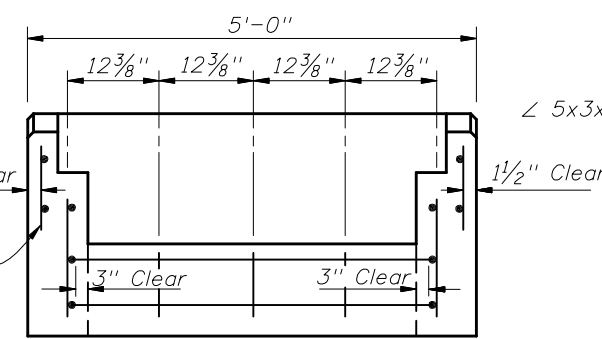




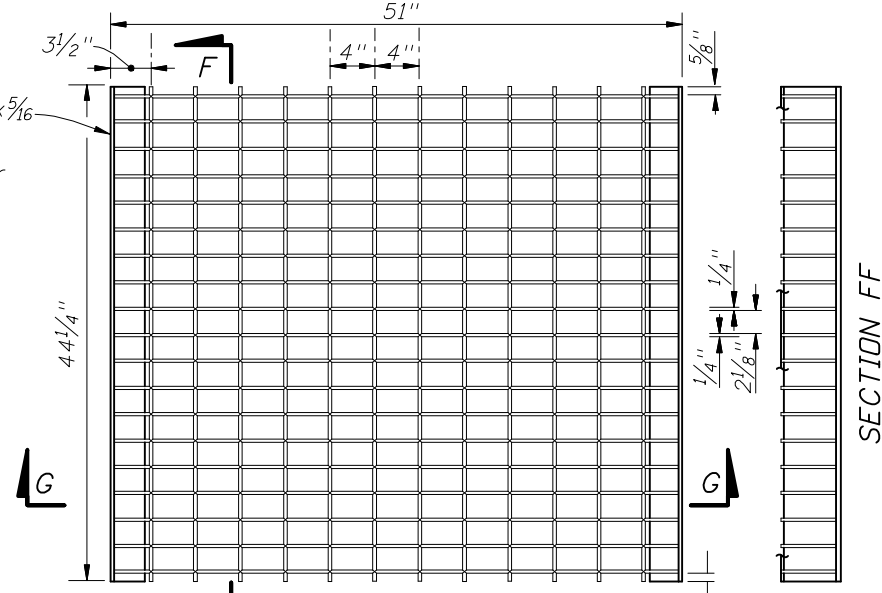
SECTION CC



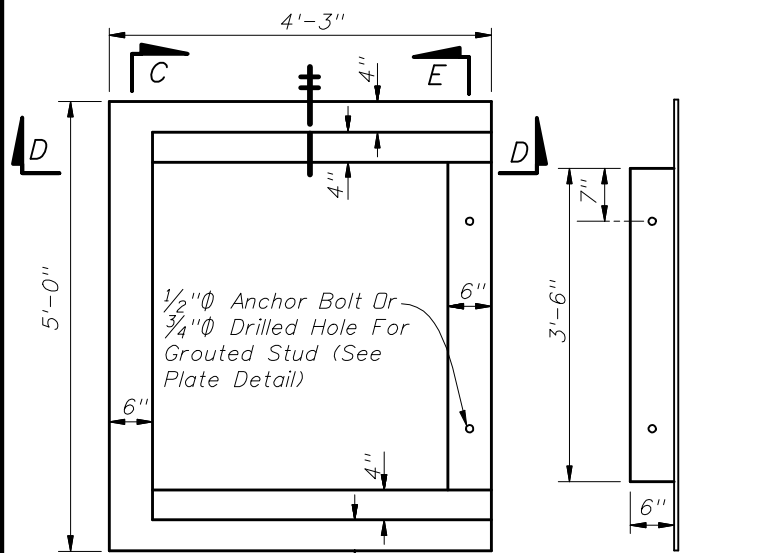
SECTION DD



SECTION EE

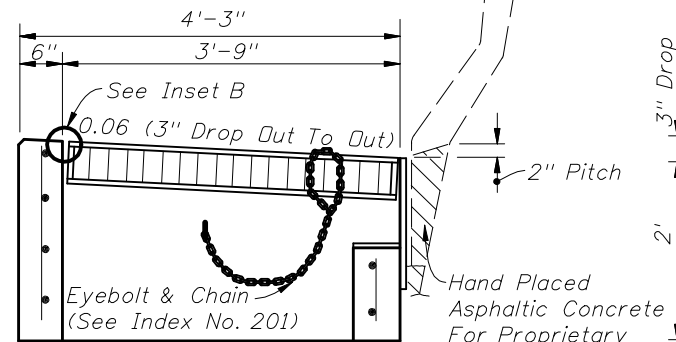


SECTION FF

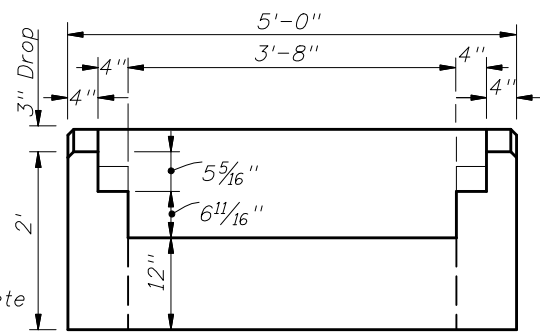


TOP VIEW OF INLET WITHOUT GRATE

TOP VIEW OF METAL PLATE

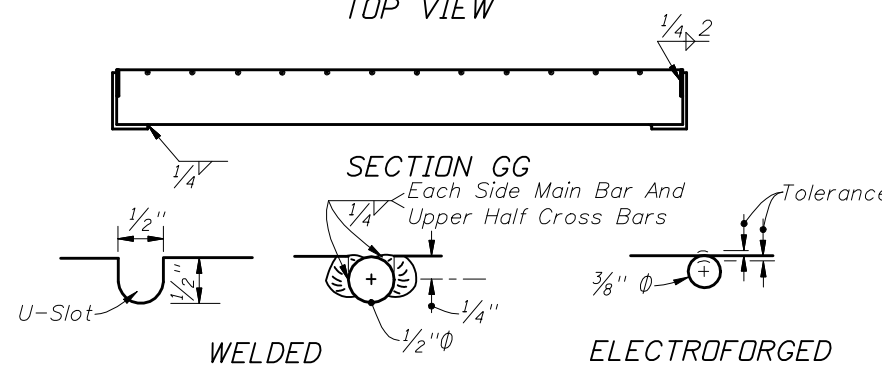


TRANSVERSE SECTION WITH GRATE & PLATE

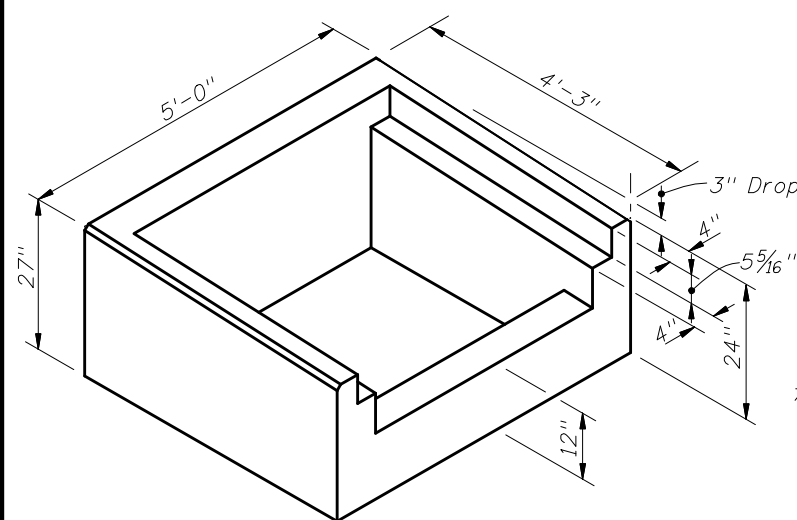


BACK VIEW WITHOUT BACK PLATE

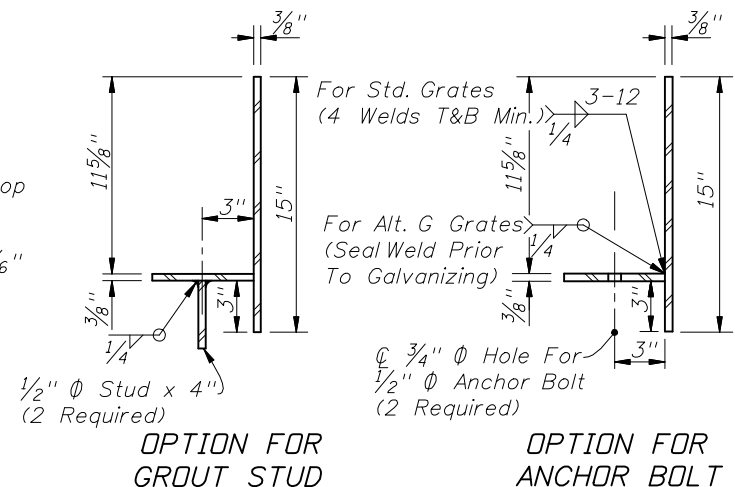
TOP VIEW
Main Bars 5"x1/4"
Cross Bars: Either 3/8"Ø Electroforged Or 1/2"Ø Welded



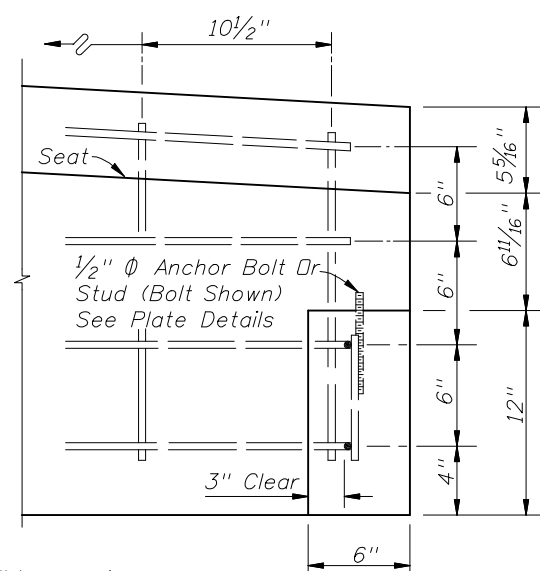
CROSS BAR OPTIONS STEEL GRATE



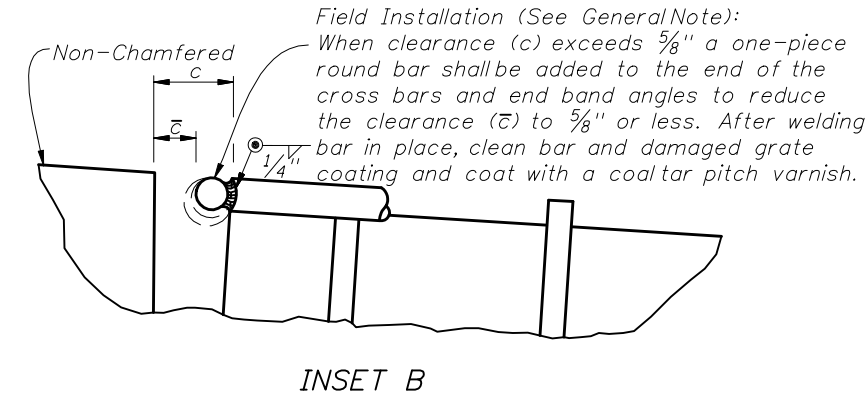
PICTORIAL VIEW OF INLET COLLAR



TRANSVERSE SECTIONS THRU BACKWALL PLATE



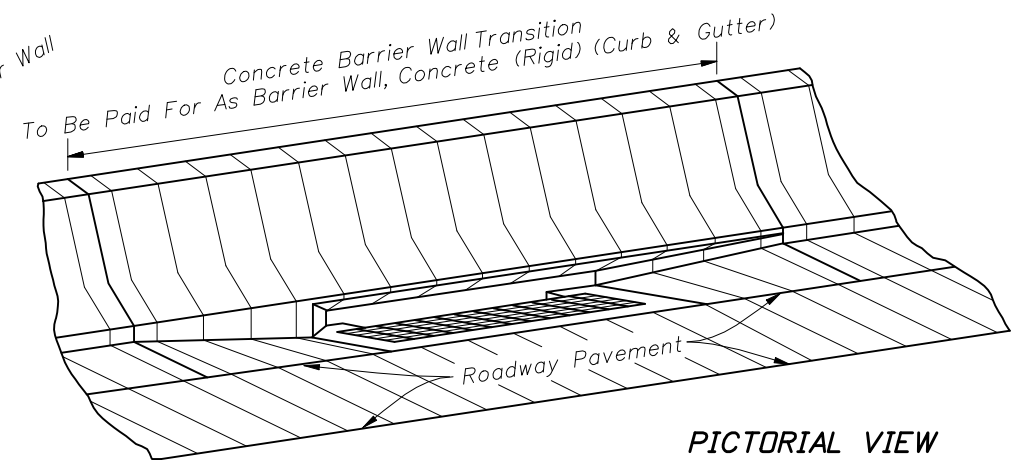
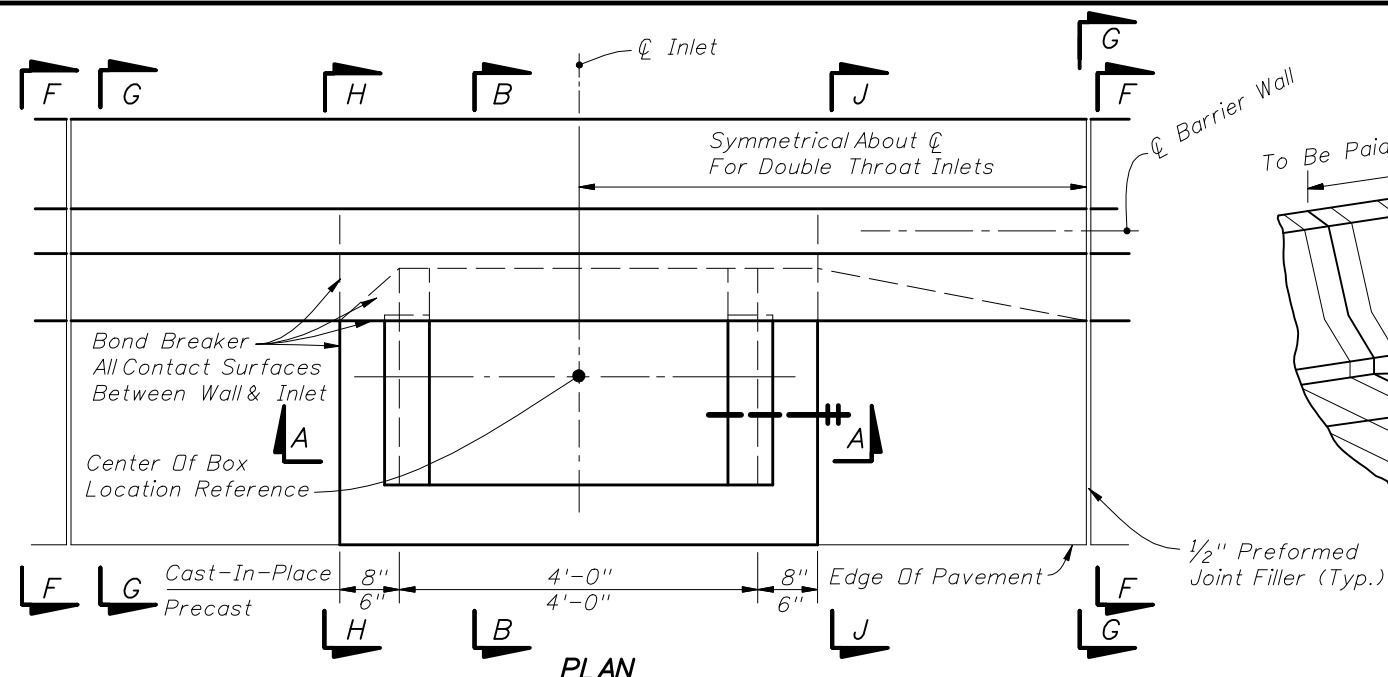
INSET A



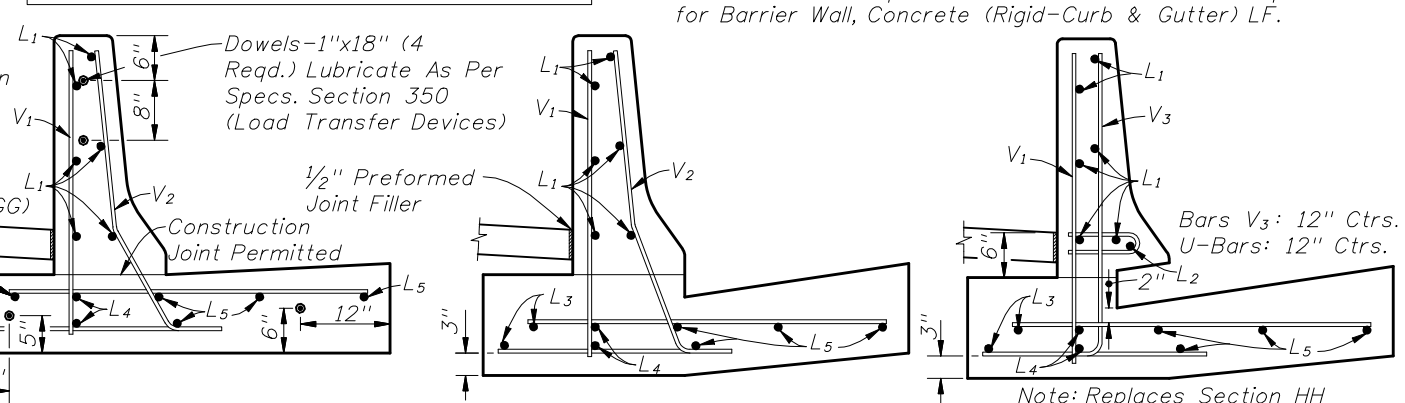
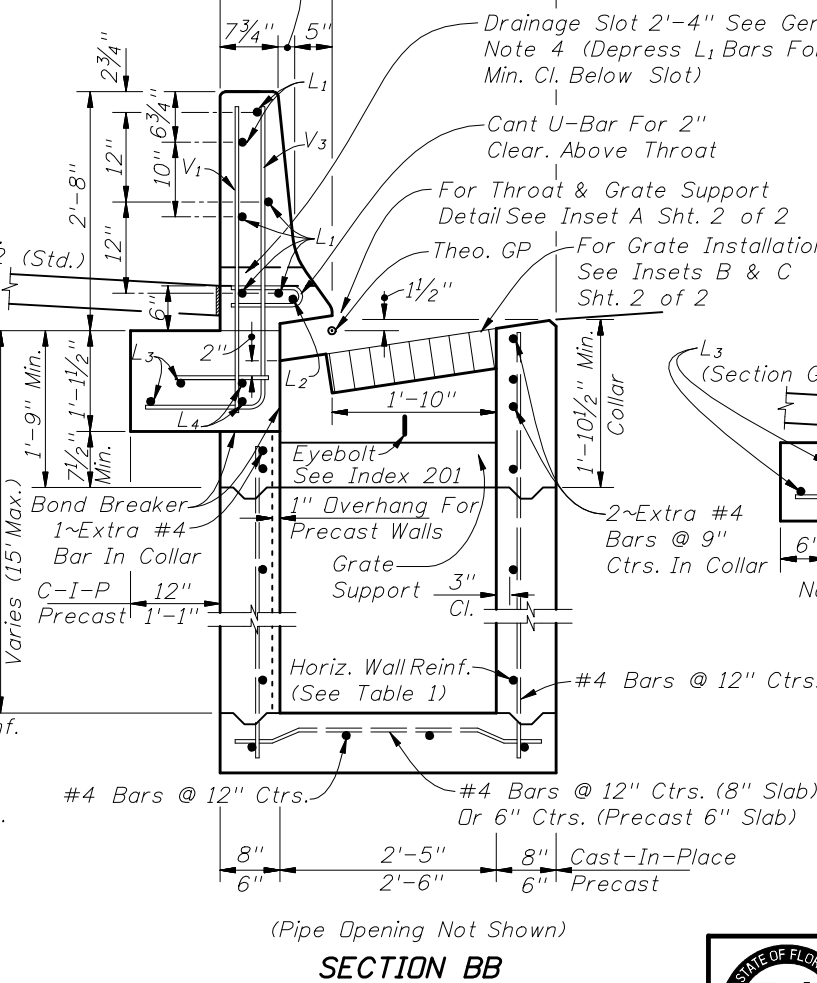
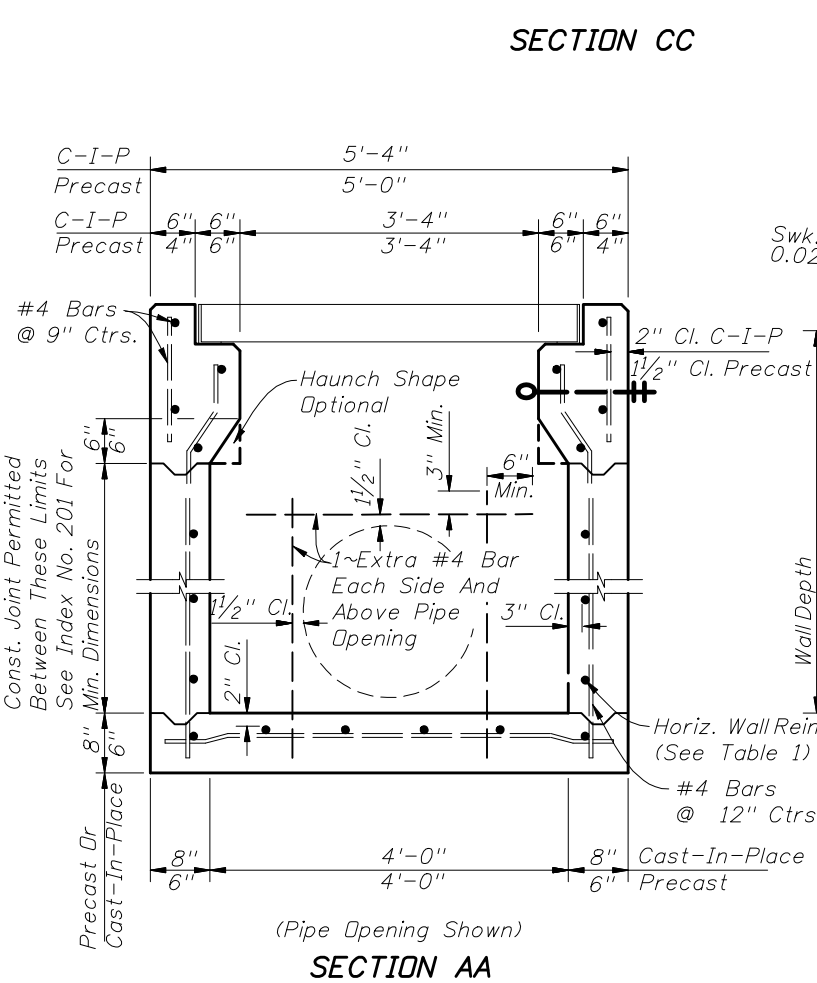
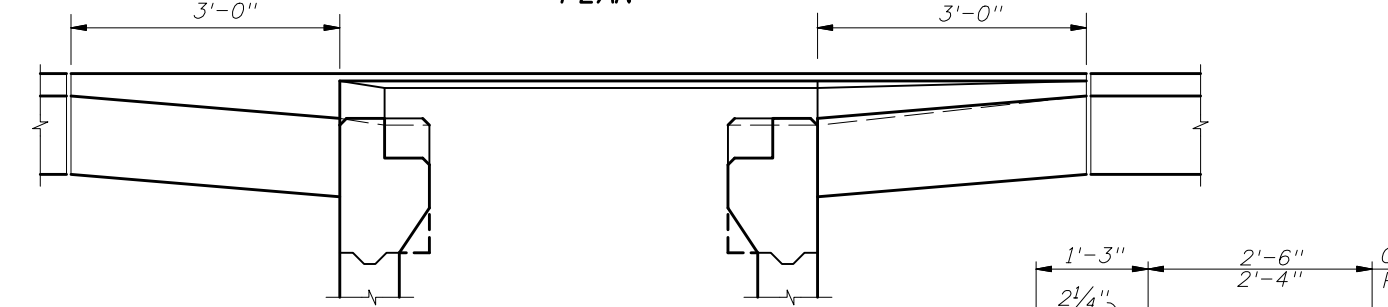
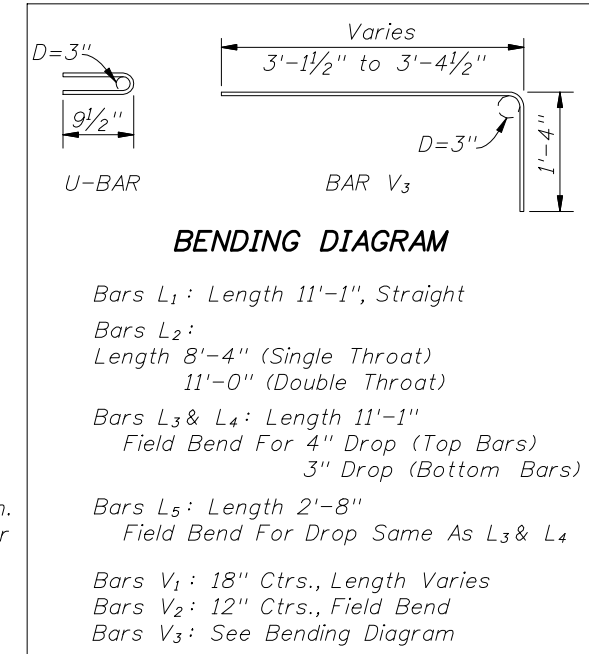
INSET B

- NOTES:
- All bars #4.
 - Anchor bolts shall be either ASTM A307 hex head bolts cast-in-place, or ASTM A36 or F1554 (Grade 36) galvanized fully threaded rod, adhesive bonded anchors installed in accordance with Specification Section 416. Bolts or rods shall be 6" long (4" min. embedment) with one heavy hex head nut (ASTM 194 or A563) and one flat washer (ASTM F436) each. All anchor bolts, nuts and washers shall be hot-dip galvanized.





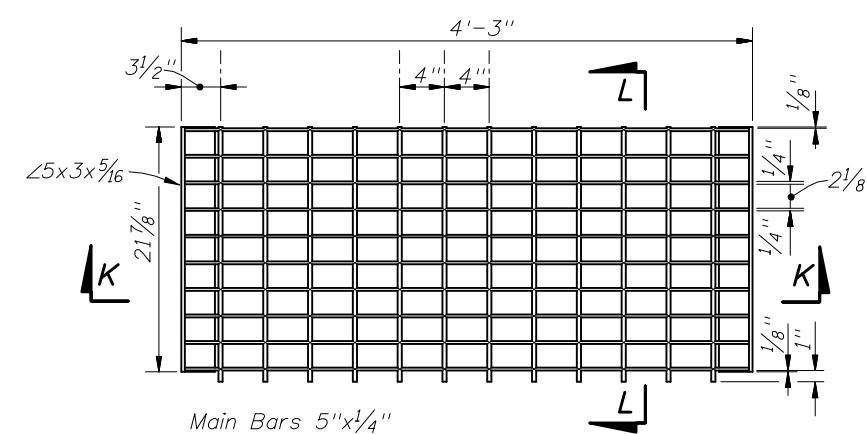
- GENERAL NOTES**
1. This inlet to be used in conjunction with Barrier Wall, Concrete (Rigid) (Curb & Gutter), Index No. 410.
 2. All reinforcing is Grade 60 bars. See Index No. 201 for equivalent area of welded wire fabric for inlet. Reinforcing shall have 2" min. cover unless otherwise shown. Bars to be cut or bent to provide 1 1/2" clearance around pipe opening. Cost of additional reinforcing in barrier wall to be included in cost for concrete barrier wall.
 3. Barrier wall shall be Class II concrete, finished in accordance with Index No. 410.
 4. All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
 5. A flat 18"x2 1/2" drainage slot shall be constructed at the inlet centerline when the inlet is located in a curb sag. No more than one V₁ bar, one V₃ bar and one U-bar are to be deleted for construction of the drainage slot.
 6. For supplemental details see Index Nos. 201 and 410.
 7. Recommended maximum pipe sizes are 18" longitudinal and 30" transverse. For larger pipe, use Alt. B bottoms, Index No. 200.
 8. Grates can be fabricated with reticuline bars or with either 3/8" electroforged or 1/2" welded cross bars and full depth bars as detailed.
 9. When Alternate G grate is specified in plans, the grate is to be hot-dip galvanized after fabrication.
 10. For pay item purposes the height of the structure shall be computed using the theoretical gutter elevation, less the flow line elevation of the lowest pipe or to top of sump floor.
 11. All dimensions are for both precast and cast-in-place inlets unless otherwise noted.
 12. Inlets to be paid for under the contract unit price for Inlets (Barrier Wall) (Rigid) (Curb & Gutter), Each.
 13. Barrier wall to be paid for under the contract unit price for Barrier Wall, Concrete (Rigid-Curb & Gutter) LF.



SCHEDULE (TABLE 1)

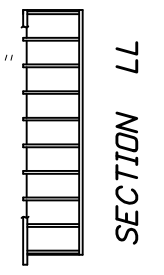
WALL DEPTH	SCHEDULE		AREA (in. ² /ft.)	MAX. SPACING	
	CIPL	PRECAST		BARS	WWF
0'-4'	0'-3'	A12	0.20	12"	8"
4'-9'	3'-6'	A6	0.20	6"	5"
9'-15'	6'-10'	B5.5	0.24	5 1/2"	5"
		C6.5		6 1/2"	6"



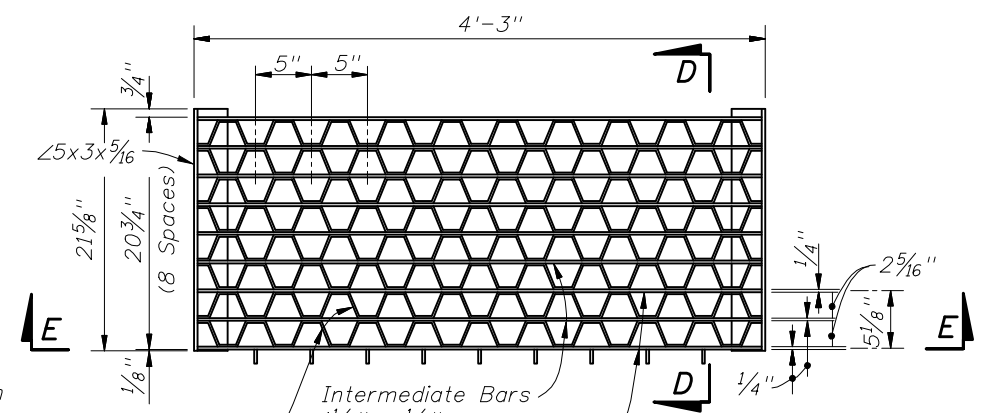


Main Bars 5"x1/4"
 Cross Bars: Either 3/8" Ø Electroforged Dr 1/2" Ø Welded

PLAN

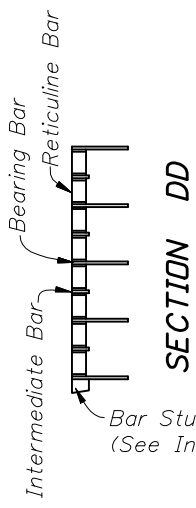


SECTION LL

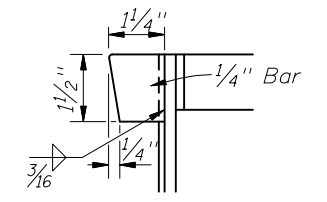


Intermediate Bars 1/2" x 1/4"
 Bearing Bars 5" x 1/4"
 Reticuline Bars 1/4" x 3/16"

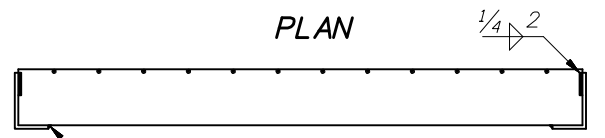
PLAN



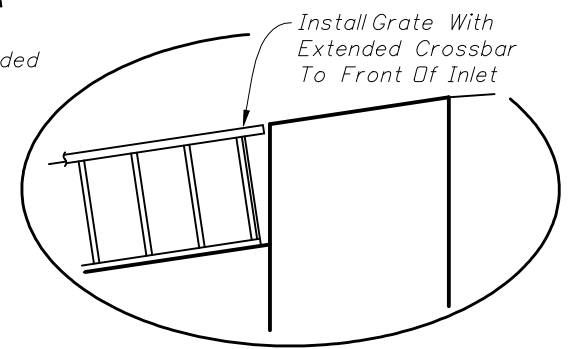
SECTION DD



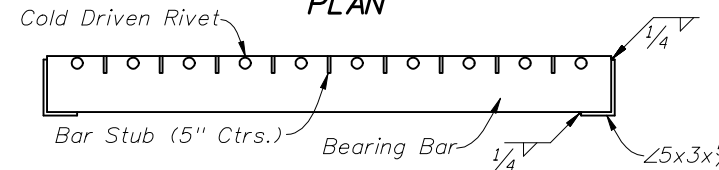
BAR STUB



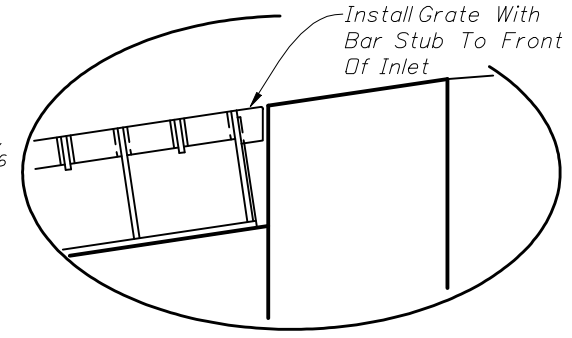
SECTION KK



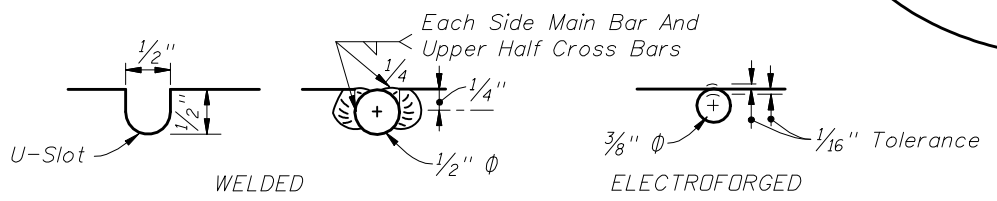
INSET B



SECTION EE



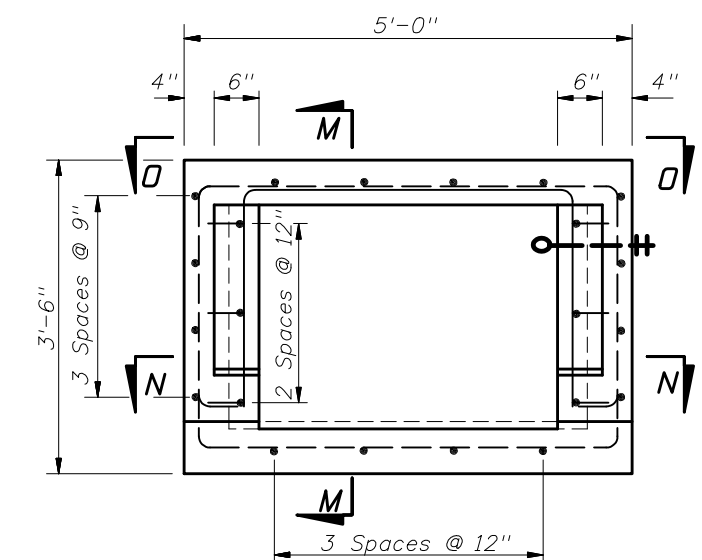
INSET C



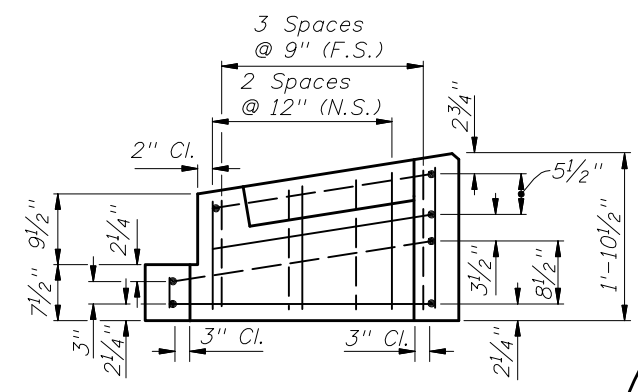
CROSS BAR OPTIONS

CROSS BAR

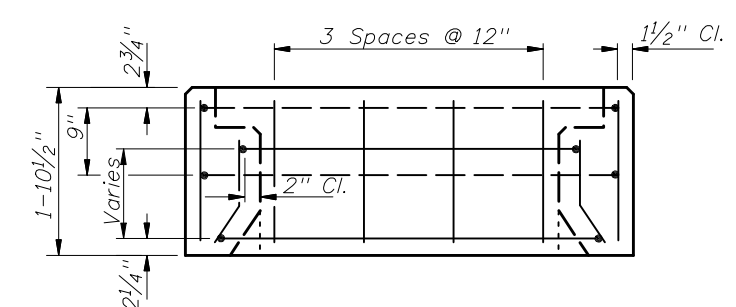
OPTIONAL STEEL GRATES



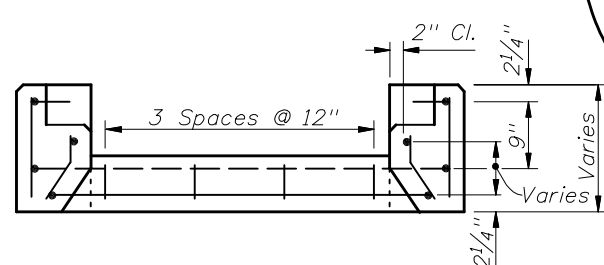
TOP VIEW OF INLET COLLAR WITHOUT GRATE



SECTION MM



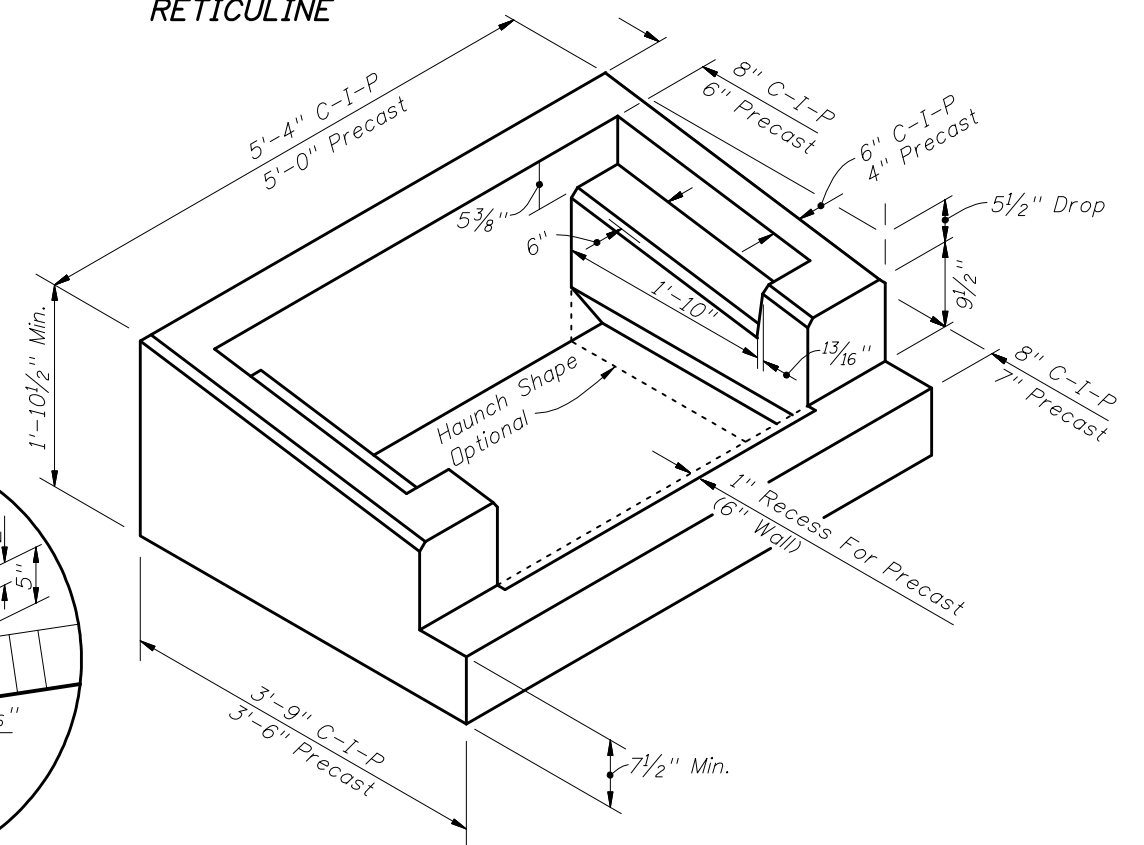
VIEW 00



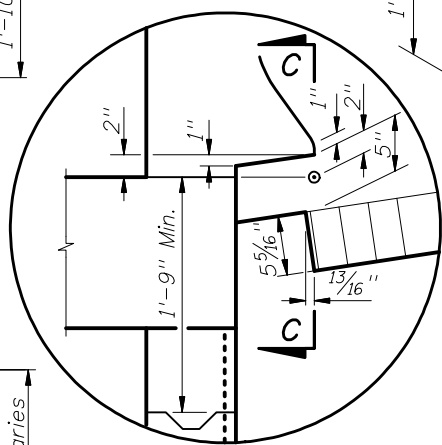
SECTION NN

PRECAST COLLAR REINFORCING DETAILS
 (CAST-IN-PLACE COLLAR REINFORCING SIMILAR)

RETICULINE

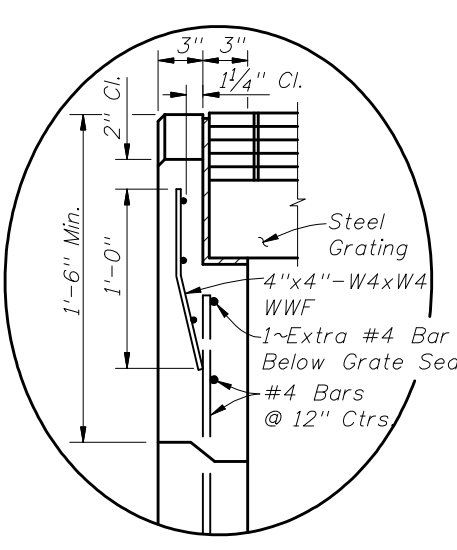
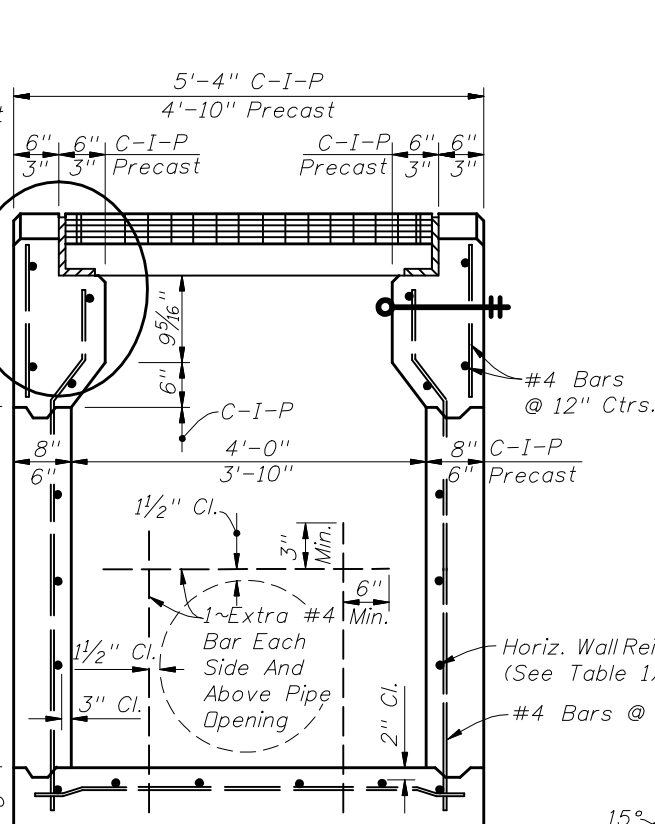
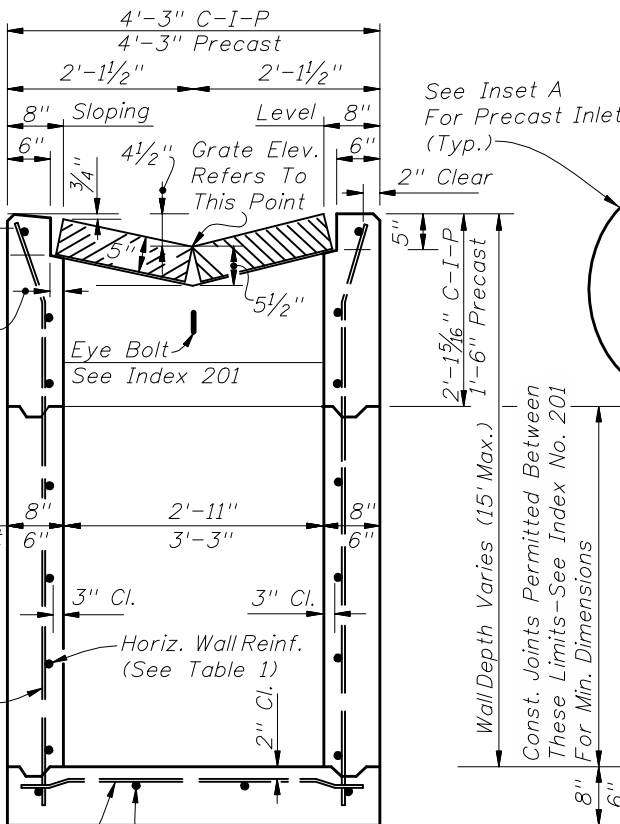
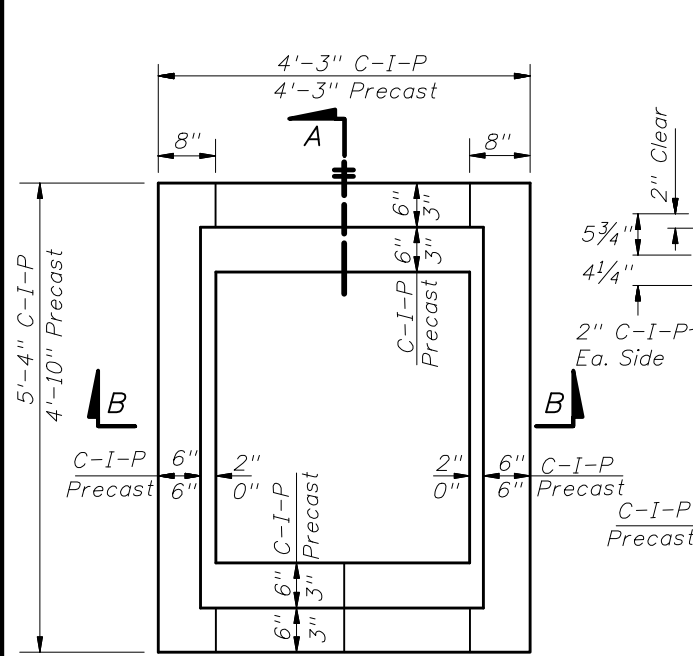


PICTORIAL VIEW OF INLET COLLAR



INSET A

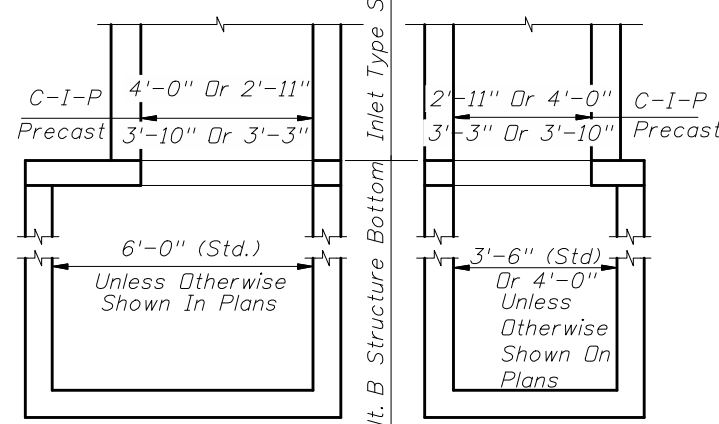
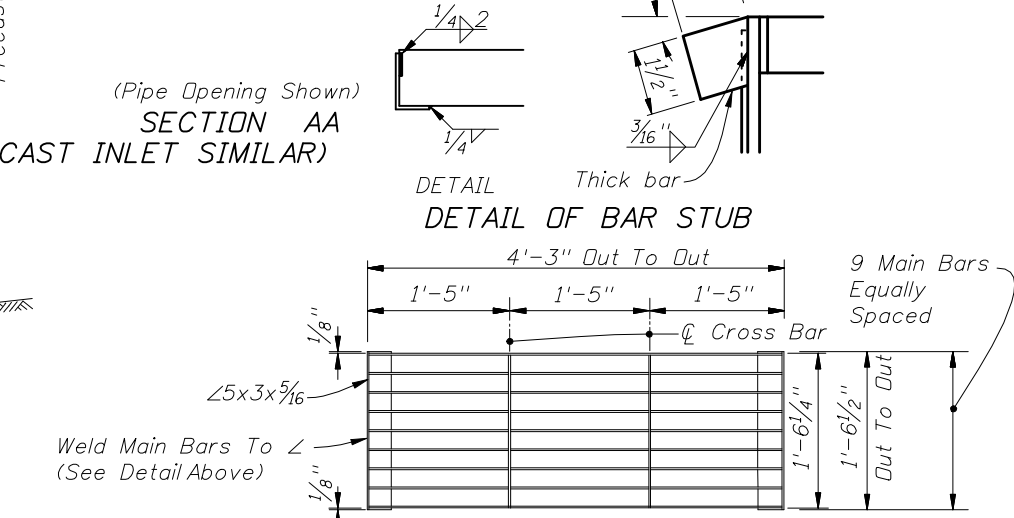
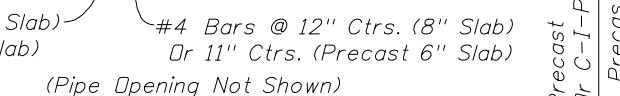




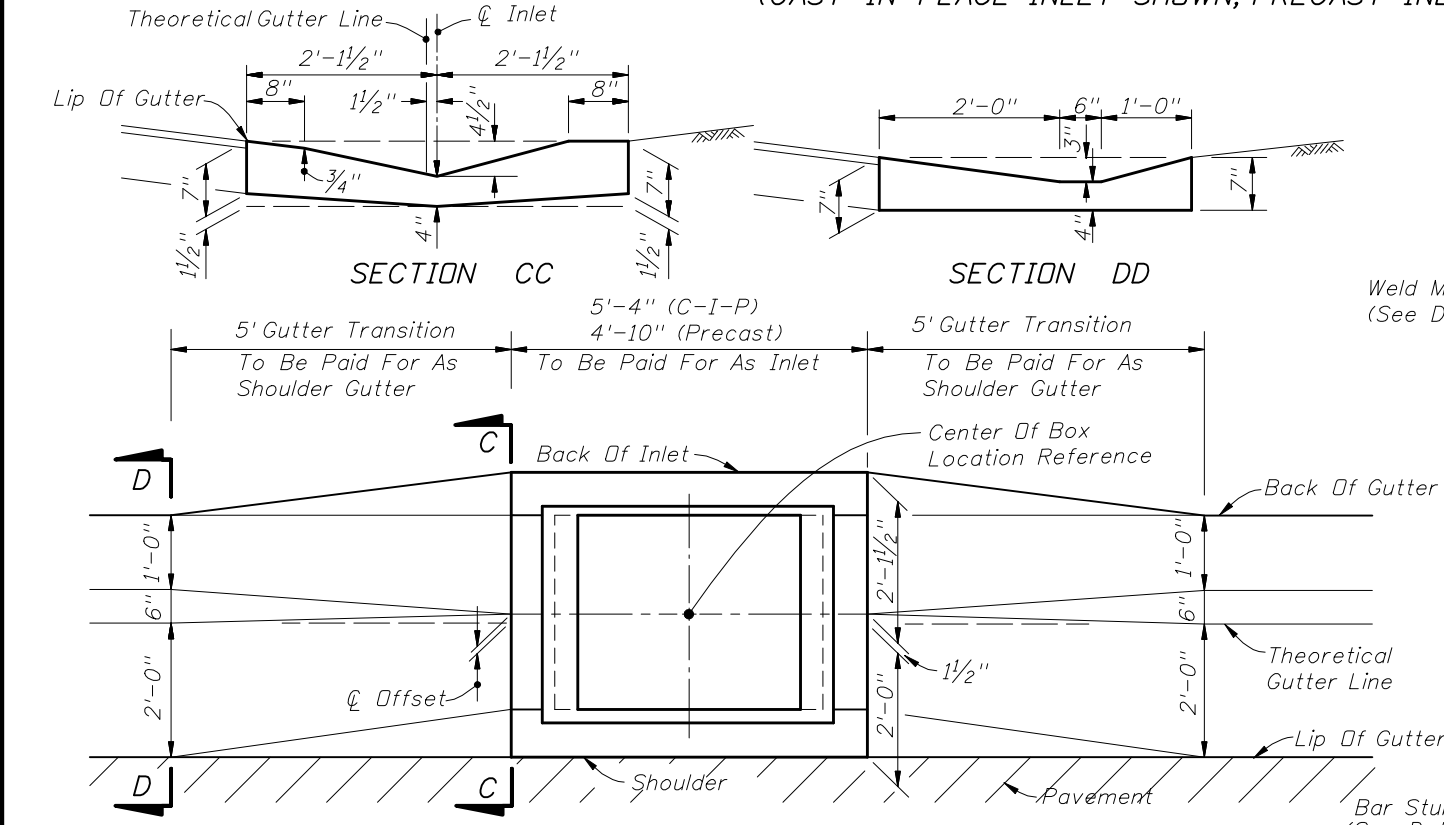
RECOMMENDED MAXIMUM PIPE SIZES	
INLET INSIDE WIDTH	PIPE SIZE
2'-11" or 3'-3"	24"
4'-0" or 3'-10"	30"

Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 201. For larger pipe see bottom detail below and Index No. 200.

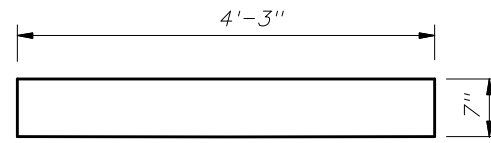
HORIZONTAL WALL REINFORCING SCHEDULE (TABLE 1)				
WALL DEPTH	SCHEDULE	AREA (in ² /ft)	MAX. SPACING BARS	WWF
0'-5'	A12	0.20	12"	8"
5'-9'	A6	0.20	6"	5"
9'-12'	A4	0.20	4"	3"
9'-15'	B5.5	0.24	5 1/2"	5"



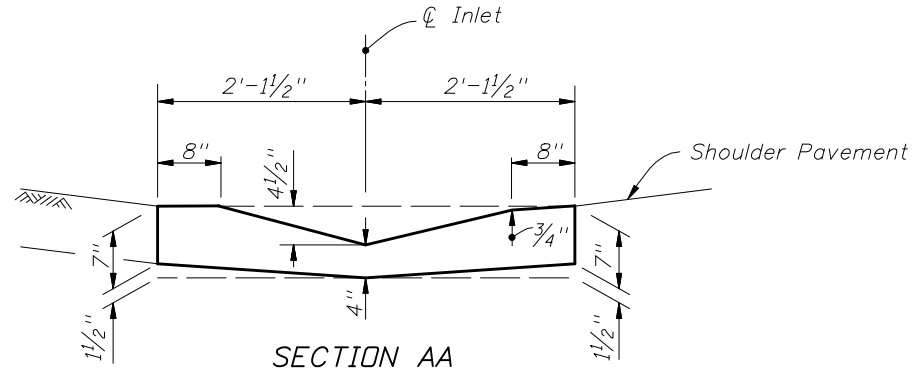
NOTE: Alt. B Structure Bottom Only. See Index No. 200 for structure bottom details and hole reinforcement.



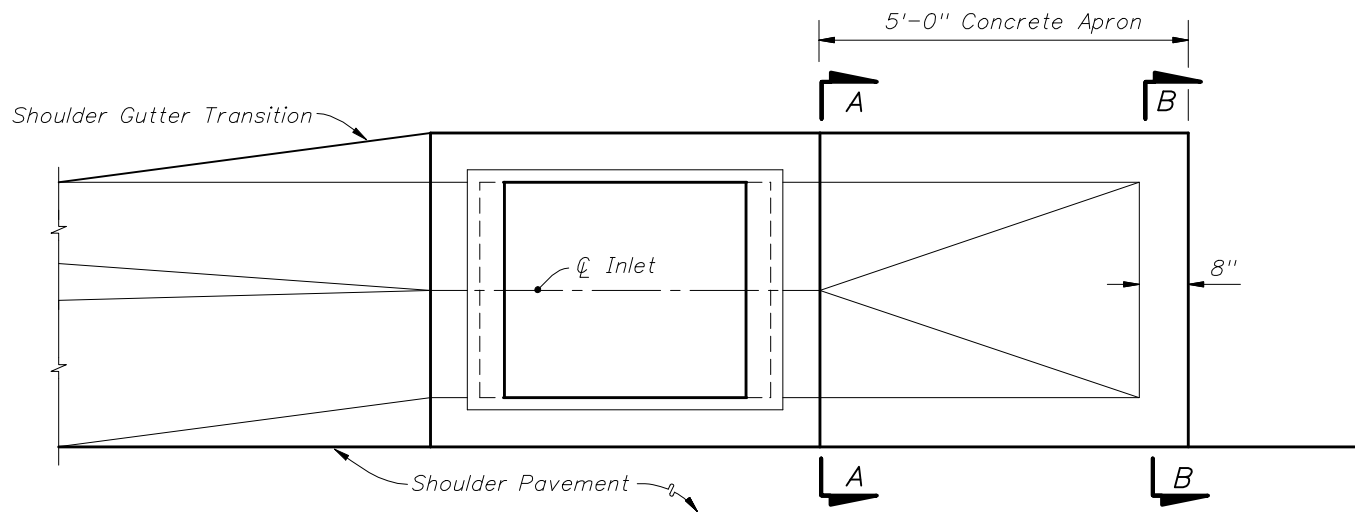
- GENERAL NOTES**
1. This inlet is intended for use in shoulder gutter on facilities subject to heavy wheelloads. The parallel bar grate shall be used on limited access facilities. On other facilities the reticulate grate shall be used. Locate inlet outside of designated pedestrian travel way.
 2. All reinforcing is Grade 60 bars with 2" min. cover unless otherwise noted. See Index No. 201 for equivalent area of welded wire fabric. Bars to be cut or bent for 1 1/2" minimum clearance around pipe.
 3. All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
 4. When Alternate G grate is specified in plans, the grate is to be hot-dip galvanized after fabrication.
 5. For supplementary details see Index Nos. 200 and 201.
 6. All dimensions are for both precast and cast-in-place inlets unless otherwise noted.
 7. Inlets to be paid for under the contract unit price for inlets (Gutter Type S), EA. Cost of concrete apron at terminal inlets to be included in the cost of the inlet.



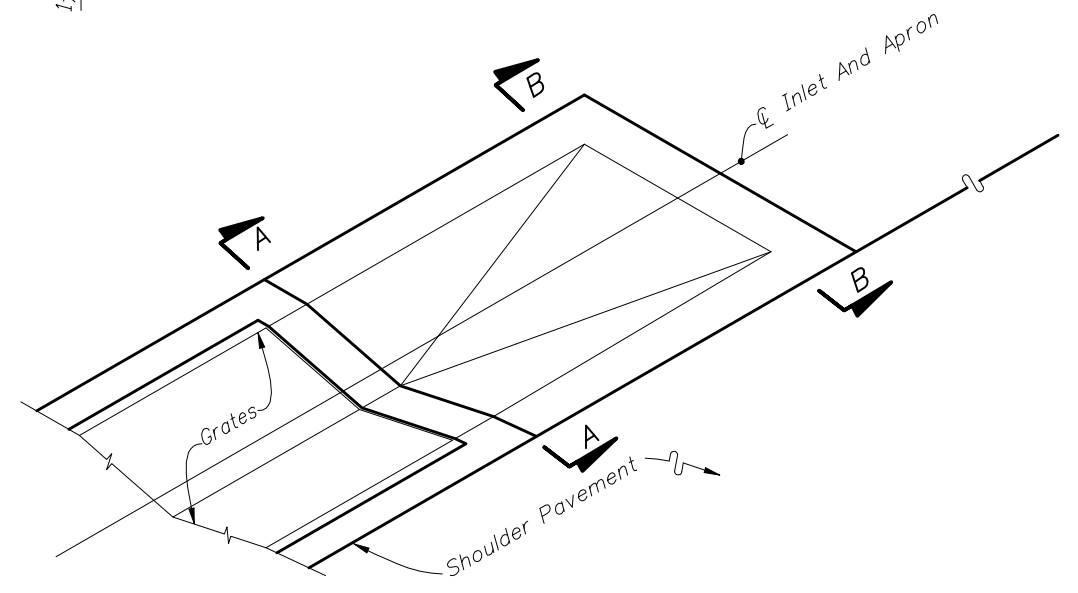
SECTION BB
(Enlarged)



SECTION AA
(Enlarged)



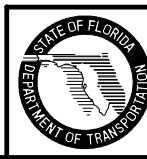
Top View



PICTORIAL VIEW

Apron To be Constructed At The Most Downstream Inlet In A Run Of Shoulder Gutter

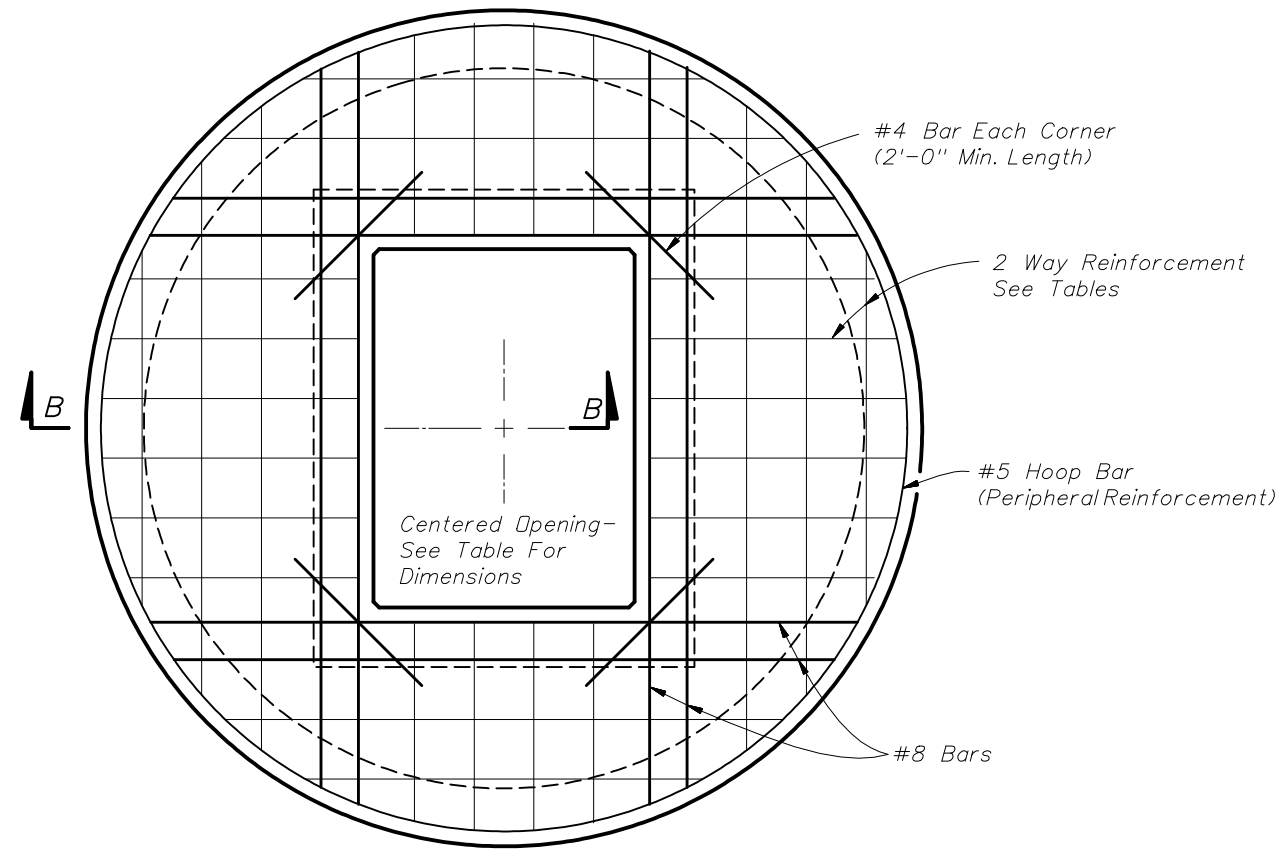
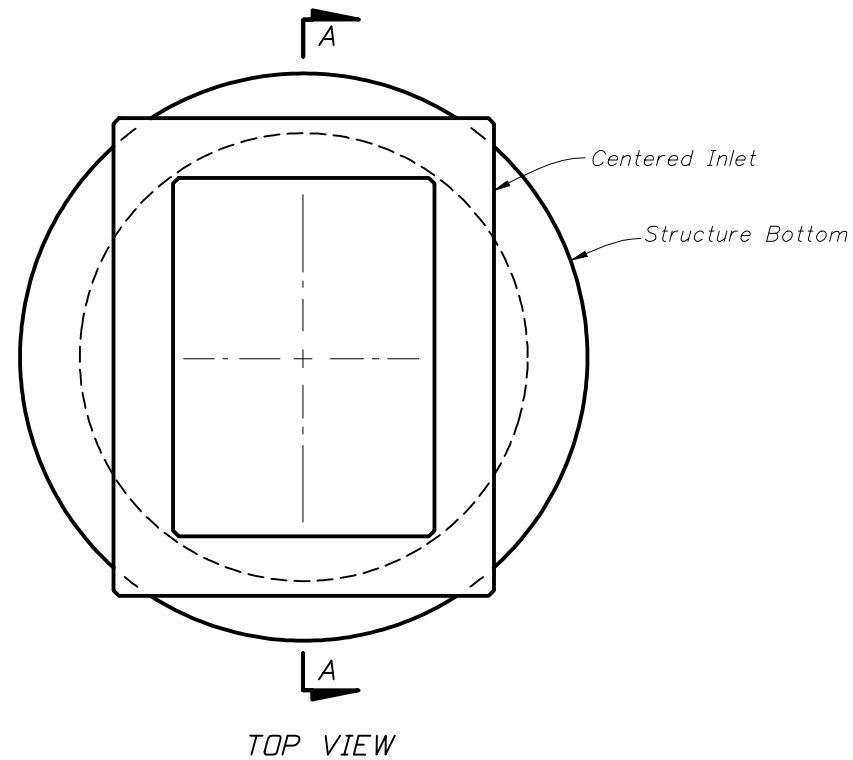
CONCRETE APRON AT TERMINAL INLETS



2010 FDOT Design Standards

GUTTER INLET TYPE S

Last Revision	Sheet No.
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Index No.	
220	

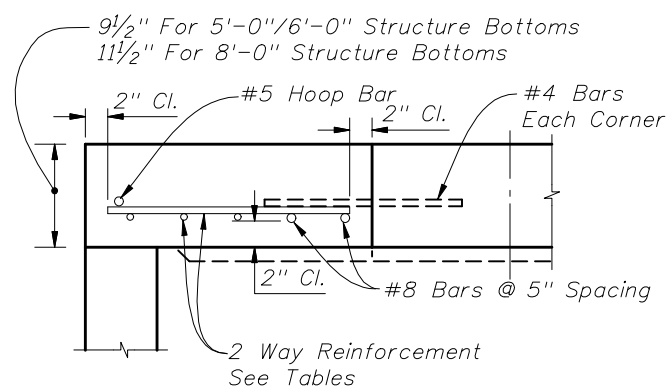
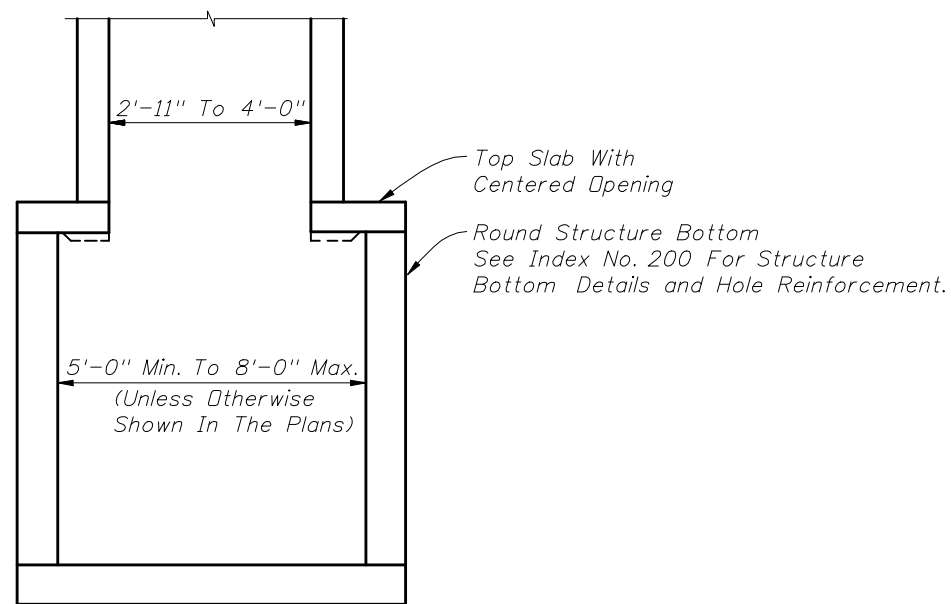


TOP SLAB REINFORCING SCHEDULE	
GRADE 60 (BAR) OR 65 KSI & 70 KSI (WIRE FABRIC) In ² /ft.	
SCHEDULE	
A	0.20
B	0.24
C	0.37
D	0.53
E	0.73
F	1.06
G	1.45

TOP SLAB OPENINGS		
DIAMETER	OPENING SIZE	
	MIN.	MAX.
5'-0" To 8'-0"	2'-11" x 4'-0"	3'-3" x 3'-10"

TOP SLAB REINFORCING DIAGRAM

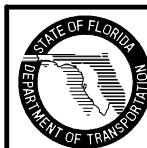
TOP SLAB WITH CENTERED OPENING		
SLAB DEPTH	SLAB THICKNESS	REINFORCING (2 WAYS) SCHEDULE
SIZE: 5'-0"		
≥0.5' < 30'	9 1/2"	C
30'-40'	9 1/2"	D
SIZE: 6'-0"		
≥0.5' < 8'	9 1/2"	B
8' < 18'	9 1/2"	C
18' < 30'	9 1/2"	D
30' < 37'	9 1/2"	E
37'-40'	9 1/2"	G
SIZE: 8'-0"		
≥0.5' < 9'	11 1/2"	C
9' < 15'	11 1/2"	D
15' < 23'	11 1/2"	E
23' < 33'	11 1/2"	E
33'-40'	11 1/2"	G

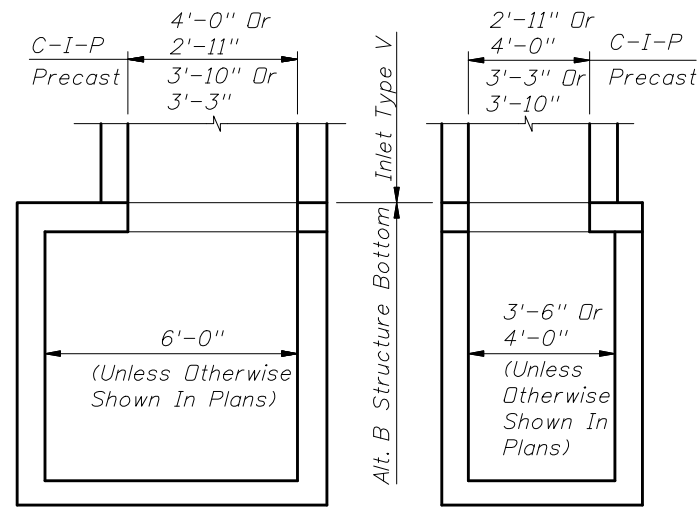


SECTION AA

SECTION BB

ALT. A STRUCTURE BOTTOM FOR INLET TYPE S



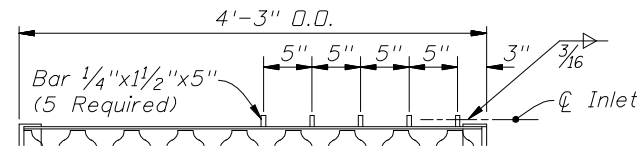


NOTE: Alt. B Structure Bottom Only. See Index No. 200 for structure bottom details and hole reinforcement. (For Pipes 30" Dia. And Larger)

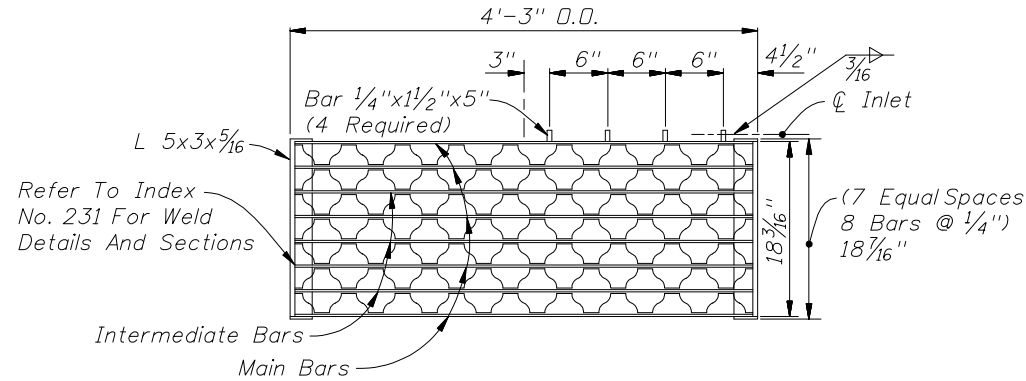
INLET WITH STRUCTURE BOTTOM

RECOMMENDED MAXIMUM PIPE SIZES	
Inlet Inside Width	Pipe Size
2'-11" Or 3'-3"	24"
4'-0" Or 3'-10"	30"

Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 201. For larger pipe see bottom detail above and Index No. 200.



OPTIONAL BAR SPACING



TWO REQUIRED PER INLET

5" Steel Grate:
Main Bars 5" x 1/4"
Intermediate Bars 1 1/2" x 1/4"
Reticuline Bars 1 1/4" x 3/16"

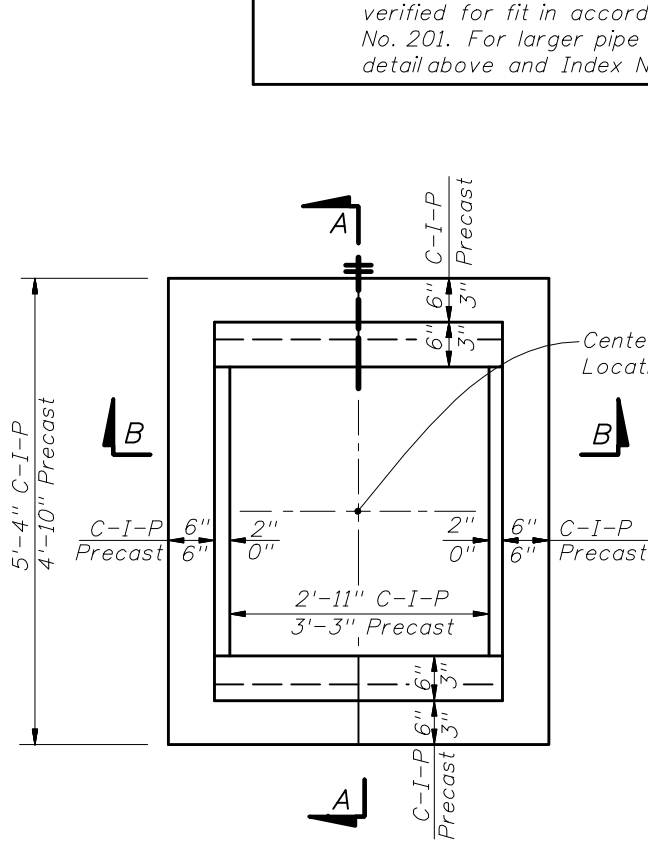
Steel Grate : Manufactured By Borden, Florida Steel, U.S. Foundry Irving, Reliance, Greulich (Or Equal).

STEEL GRATE

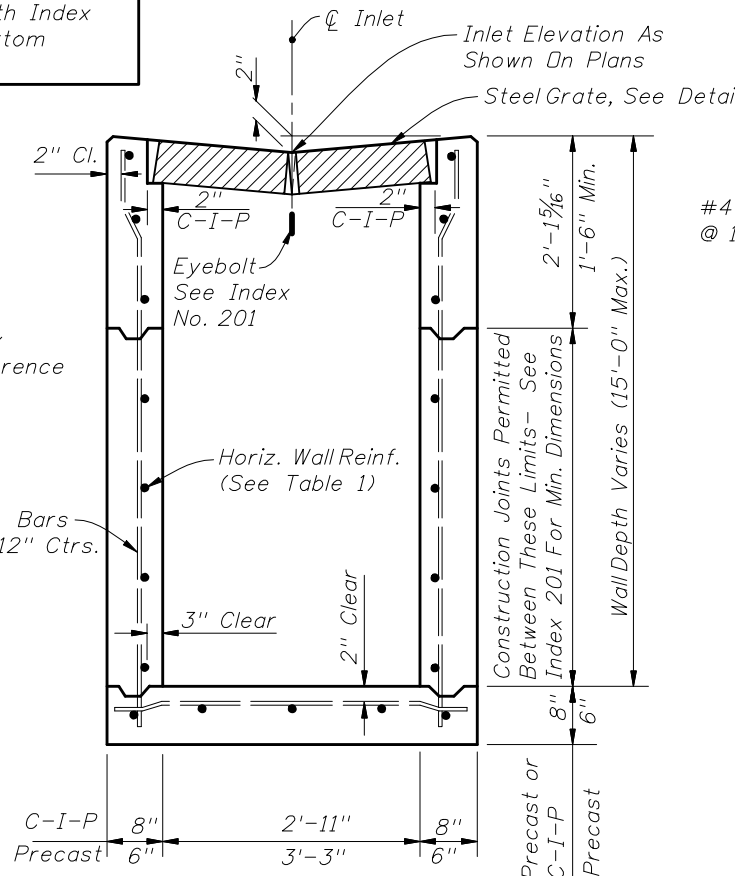
- GENERAL NOTES**
1. This inlet is suitable for village swales, ditches, or other areas subject to heavy wheelloads, minimum debris, and bicycle traffic. This inlet may be placed in areas subject to occasional pedestrian traffic such as landscaped areas and pavement areas where pedestrians can walk around the inlet.
 2. When alternate "G" grate is specified in plans, the grate is to be hot dip galvanized after fabrication.
 3. All reinforcing is Grade 60 bars with 2" min. cover unless otherwise noted. See Index No. 201 for equivalent area of welded wire fabric. Cut or bend bars out of way of pipe to clear pipe 1/2".
 4. All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
 5. All dimensions are for both precast and cast-in-place inlets unless otherwise noted.
 6. For supplementary details see Index No. 201.
 7. Inlet to be paid for under the contract unit price for Inlets (Gutter Type V), EA.

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0' - 5'	A12	0.20	12"	8"
5' - 9'	A6	0.20	6"	5"
9' - 12'	A4	0.20	4"	3"
9' - 15'	B5.5	0.24	5 1/2"	5"

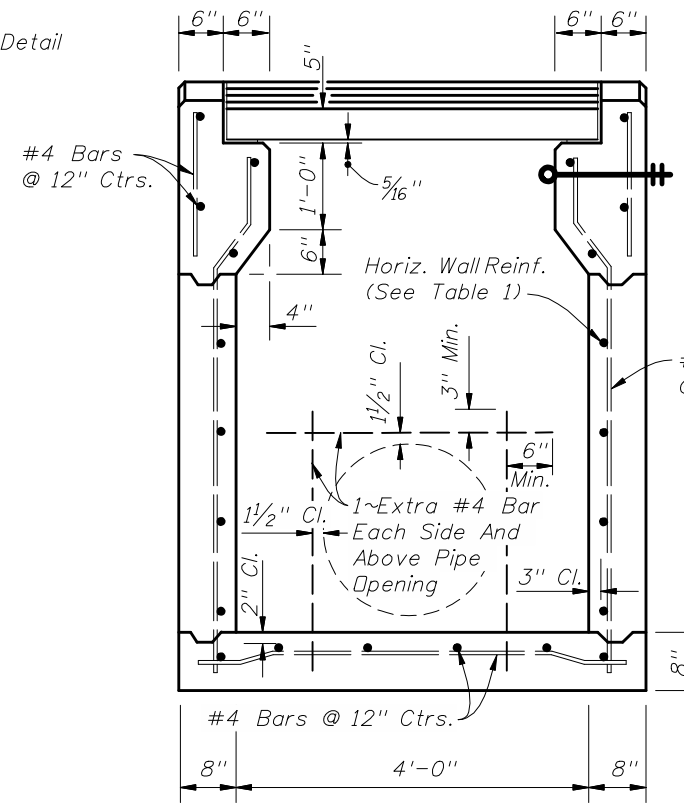
HORIZONTAL WALL REINFORCING SCHEDULE (TABLE 1)



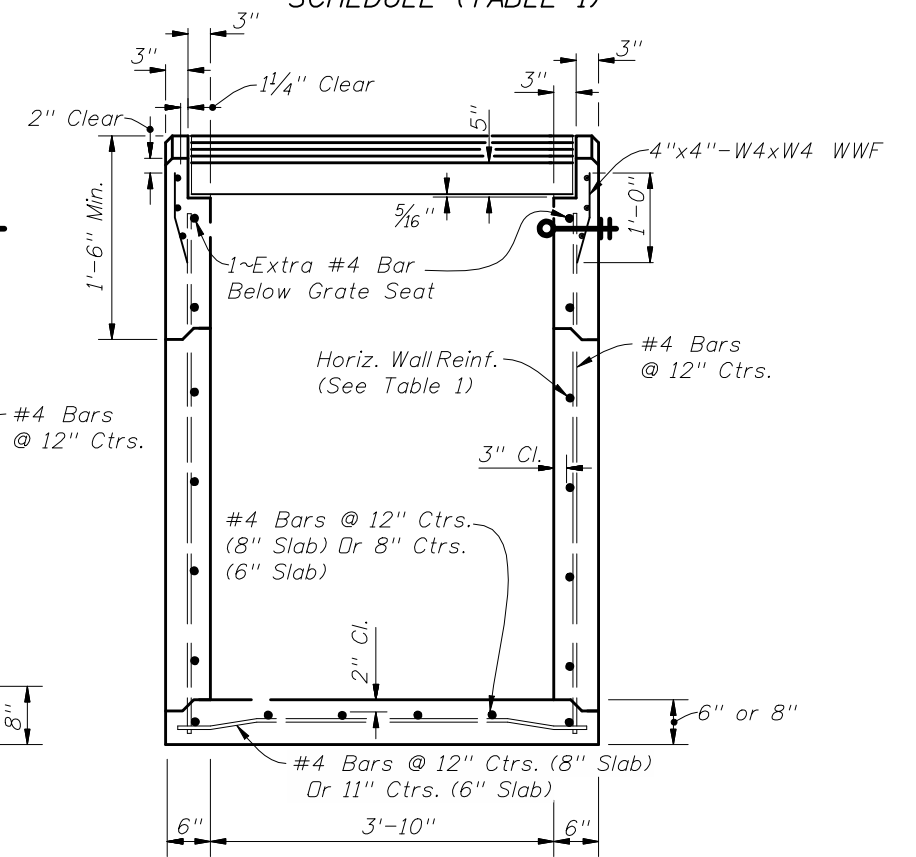
PLAN
(CAST-IN-PLACE INLET SHOWN WITHOUT GRATE; PRECAST INLET SIMILAR)



SECTION BB
(CAST-IN-PLACE INLET SHOWN PRECAST INLET SIMILAR)

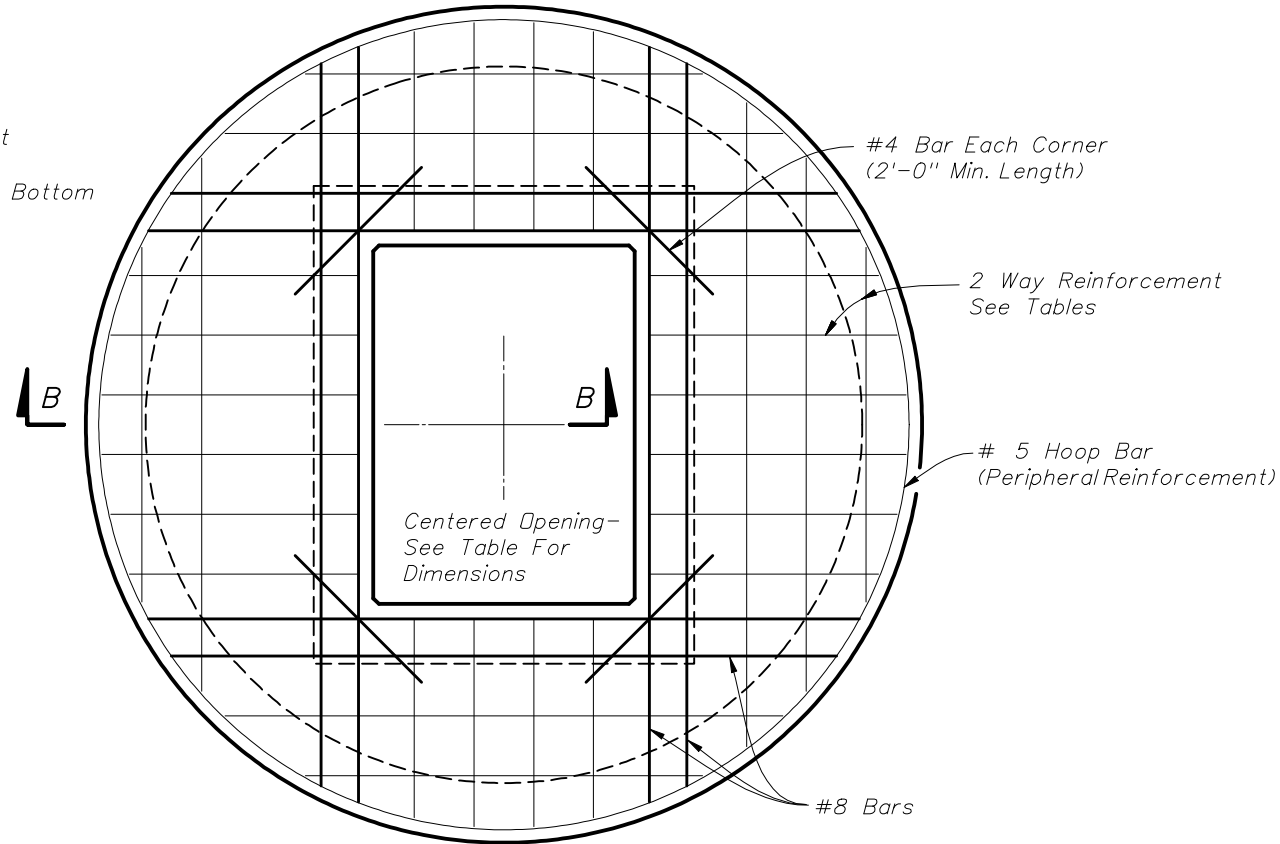
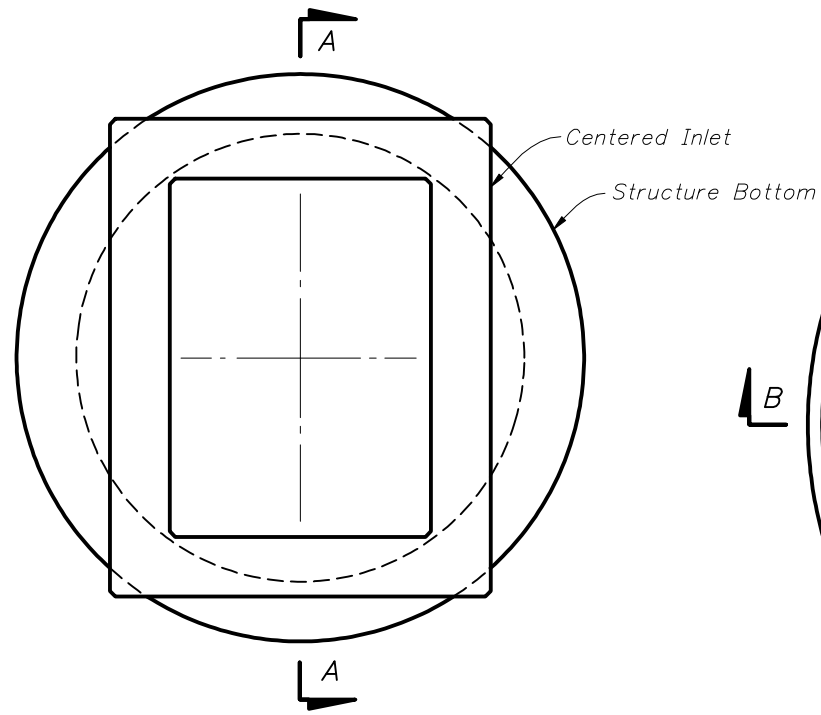


SECTION AA
(CAST-IN-PLACE INLET)



SECTION AA
(PRECAST INLET)



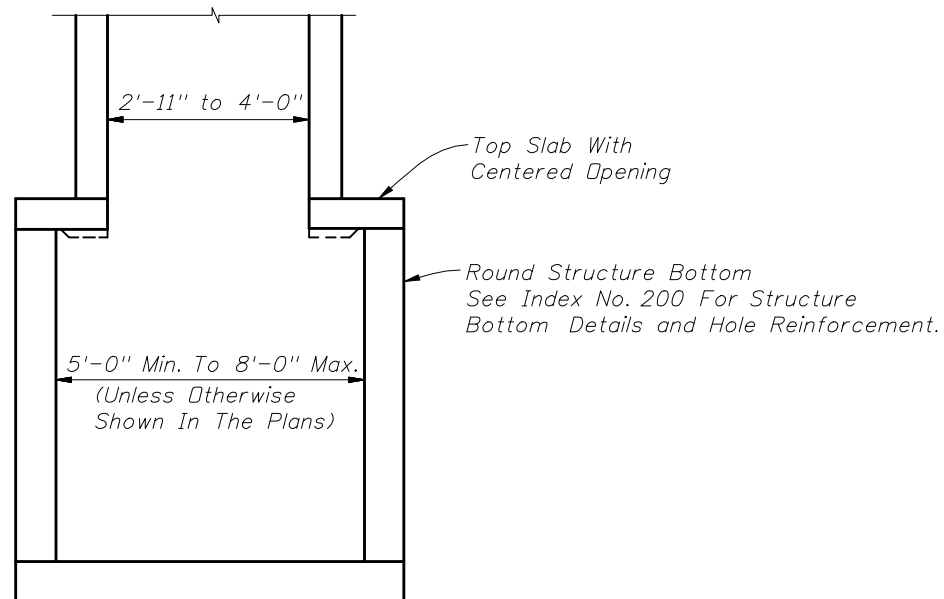


TOP SLAB OPENINGS		
DIAMETER	OPENING SIZE	
	MIN.	MAX.
5'-0" To 8'-0"	2'-11" x 4'-0"	3'-3" x 3'-10"

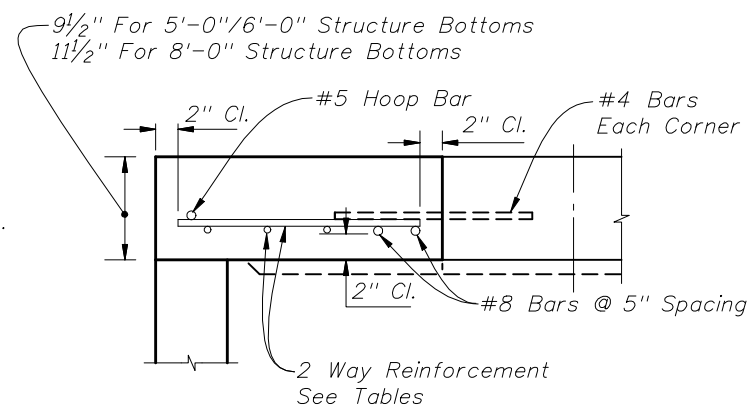
TOP SLAB REINFORCING SCHEDULE	
SCHEDULE	GRADE 60 (BAR) OR 65 KSI & 70 KSI (WIRE FABRIC) In. ² /ft.
A	0.20
B	0.24
C	0.37
D	0.53
E	0.73
F	1.06
G	1.45

TOP SLAB REINFORCING DIAGRAM

TOP SLAB WITH CENTERED OPENING		
SLAB DEPTH	SLAB THICKNESS	REINFORCING (2 WAYS) SCHEDULE
SIZE: 5'-0"		
≥0.5' < 30'	9 1/2"	C
30'-40'	9 1/2"	D
SIZE: 6'-0"		
0.5' < 8'	9 1/2"	B
8' < 18'	9 1/2"	C
18' < 30'	9 1/2"	D
30' < 37'	9 1/2"	E
37'-40'	9 1/2"	G
SIZE: 8'-0"		
≥0.5' < 9'	11 1/2"	C
9' < 15'	11 1/2"	D
15' < 23'	11 1/2"	E
23' < 33'	11 1/2"	E
33'-40'	11 1/2"	G



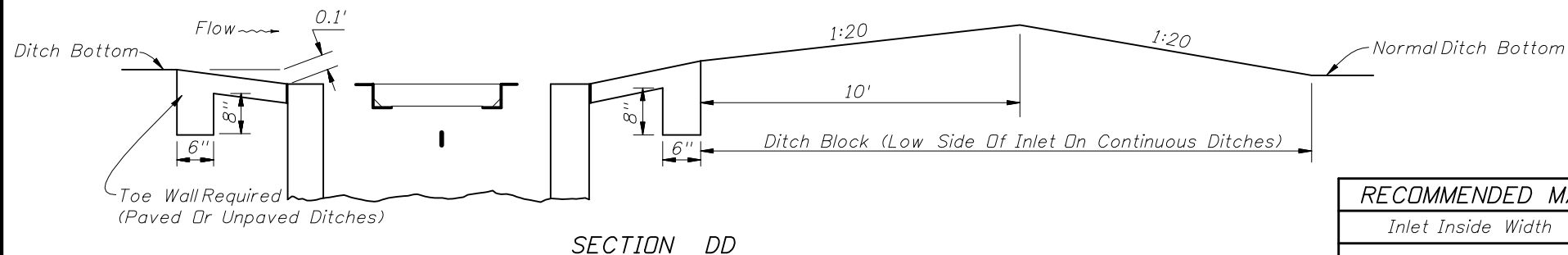
SECTION AA



SECTION BB

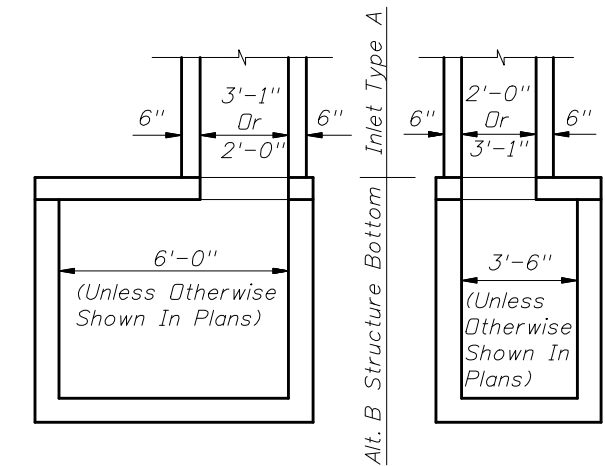
ALT. A STRUCTURE BOTTOM FOR INLET TYPE V





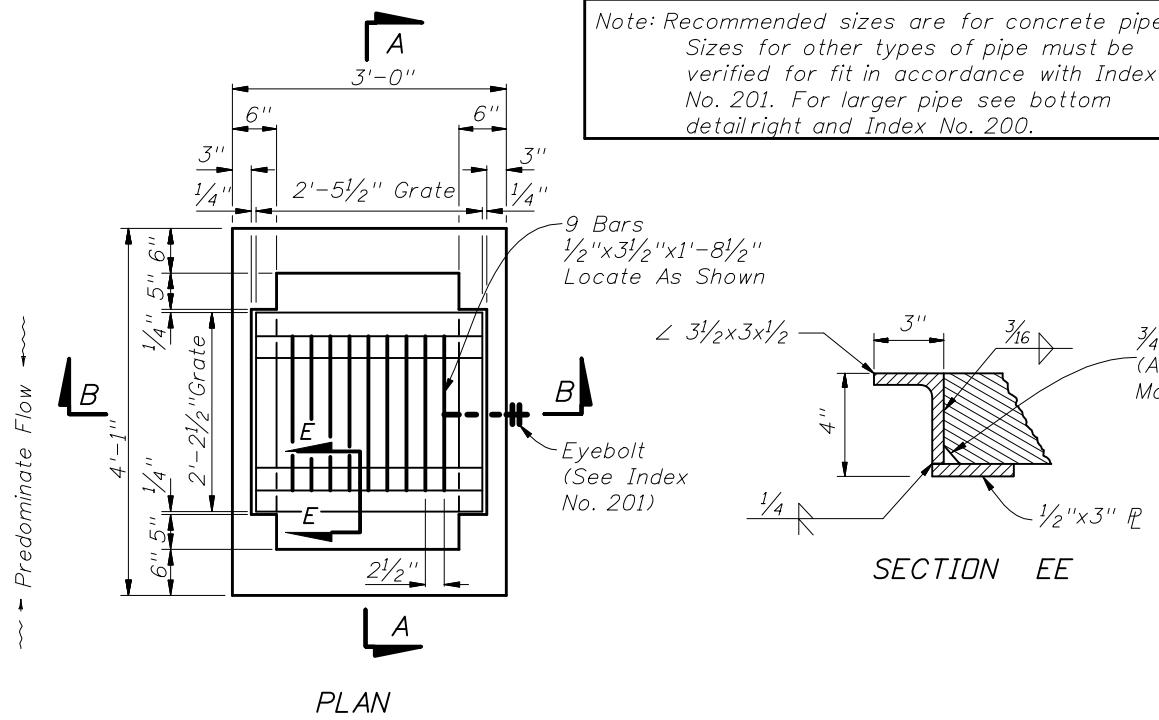
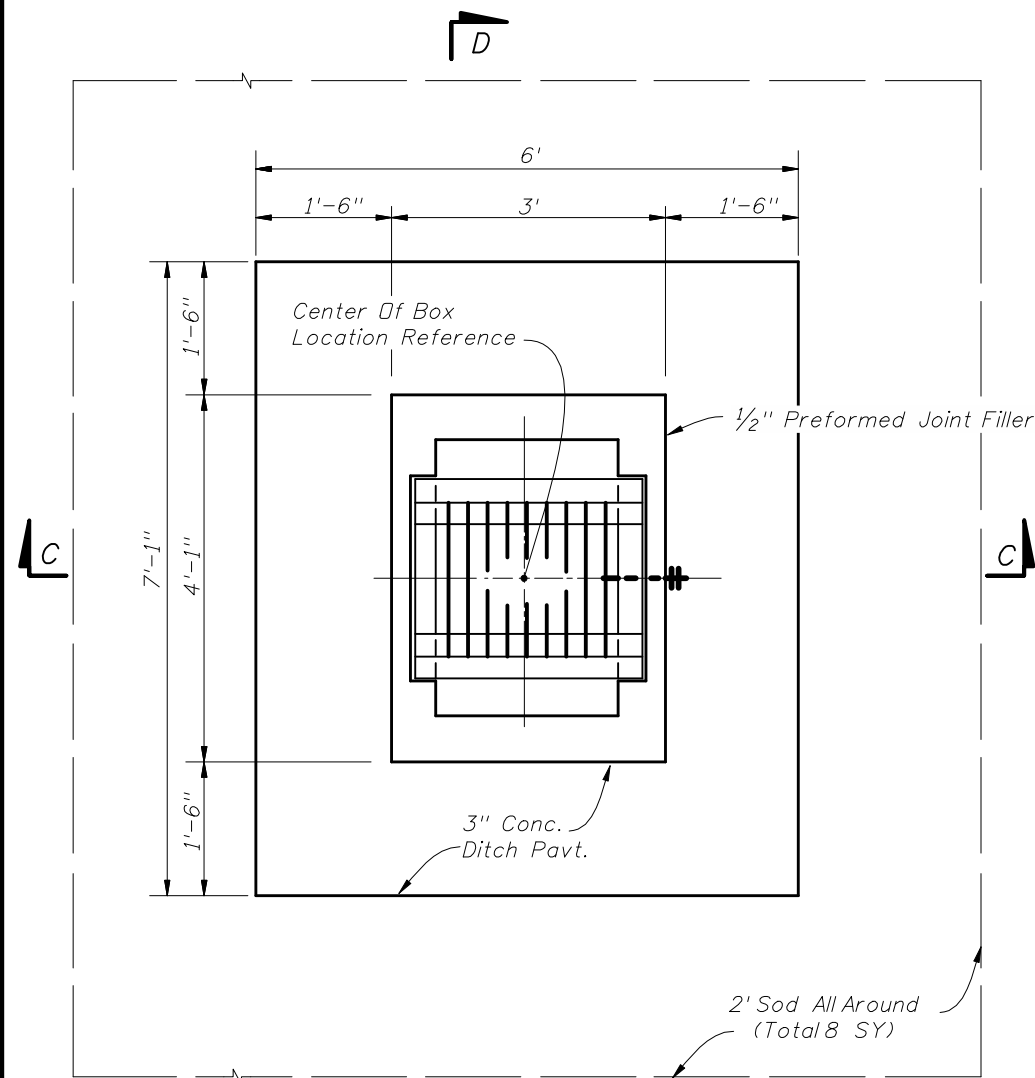
RECOMMENDED MAXIMUM PIPE SIZES	
Inlet Inside Width	Pipe Size
2'-0"	18"
3'-1"	24" 18" Where An 18" pipe Enters A 2'-0" Wall

Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 201. For larger pipe see bottom detail right and Index No. 200.

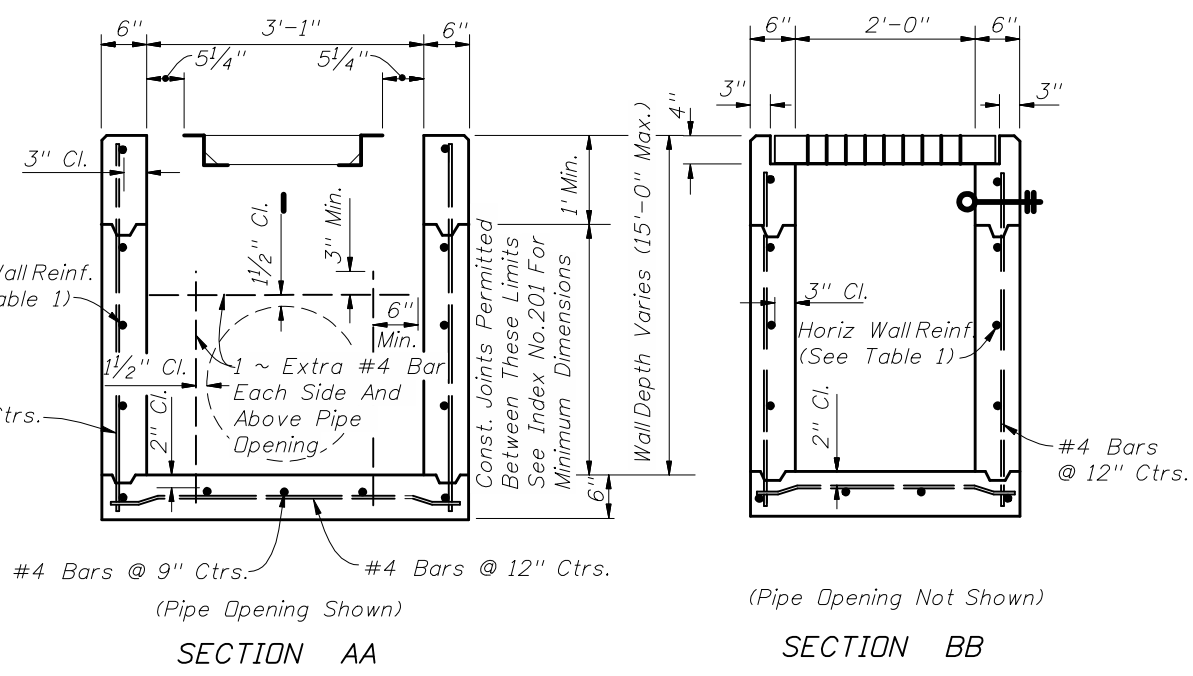
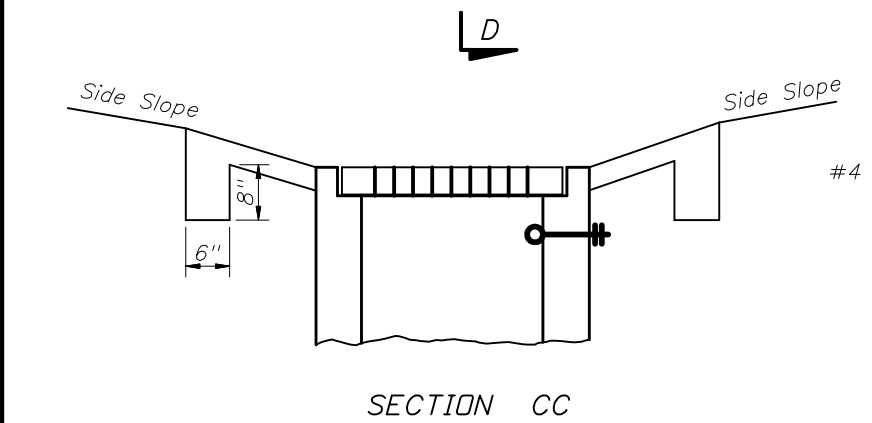


NOTE: Alt. B Structure Bottom Only. See Index No. 200 for Structure Bottom Details And Hole Reinforcement.

INLET WITH STRUCTURE BOTTOM



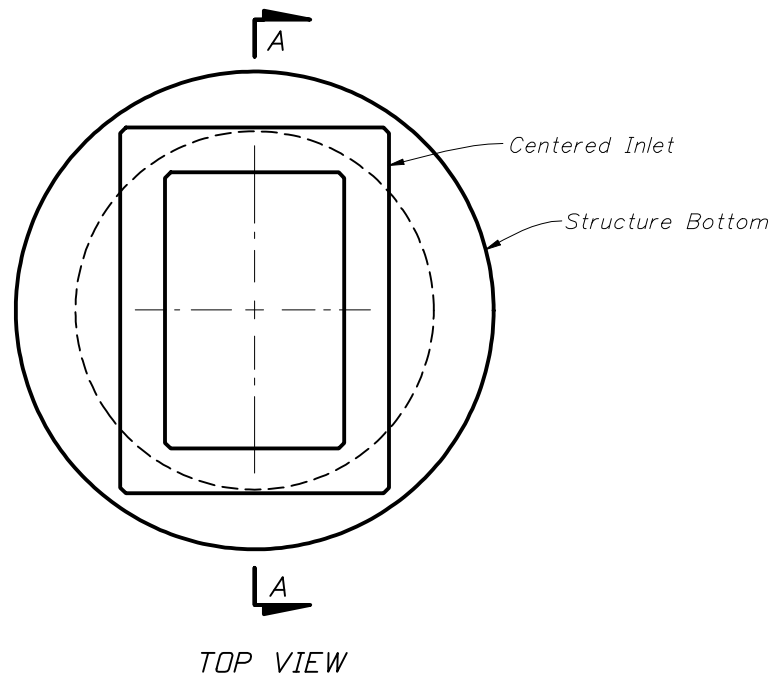
- GENERAL NOTES**
1. This inlet is designed for ditches, medians, or other area subject to heavy wheelloads on limited access facilities where debris may be a problem. This inlet is not for use in areas subject to pedestrian and/or bicycle traffic.
 2. All reinforcing is Grade 60 bars with 2" min. cover unless otherwise noted. Cut or bend bars out of way of pipe to clear pipe by 1 1/2". See Index 201 for equivalent area of welded wire fabric.
 3. All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
 4. When alternate "G" grate is specified in plans, the grate is to be hot-dip galvanized after fabrication.
 5. Cost of ditch paving to be included in the cost of Inlet. Sodding to be paid for under contract unit price for Performance Turf, SY.
 6. For supplemental details see Index No. 201.
 7. All dimensions are for both precast and cast-in-place inlets unless otherwise noted.
 8. Inlet to be paid for under the contract unit price for inlets (Dt Bot Type A), EA.



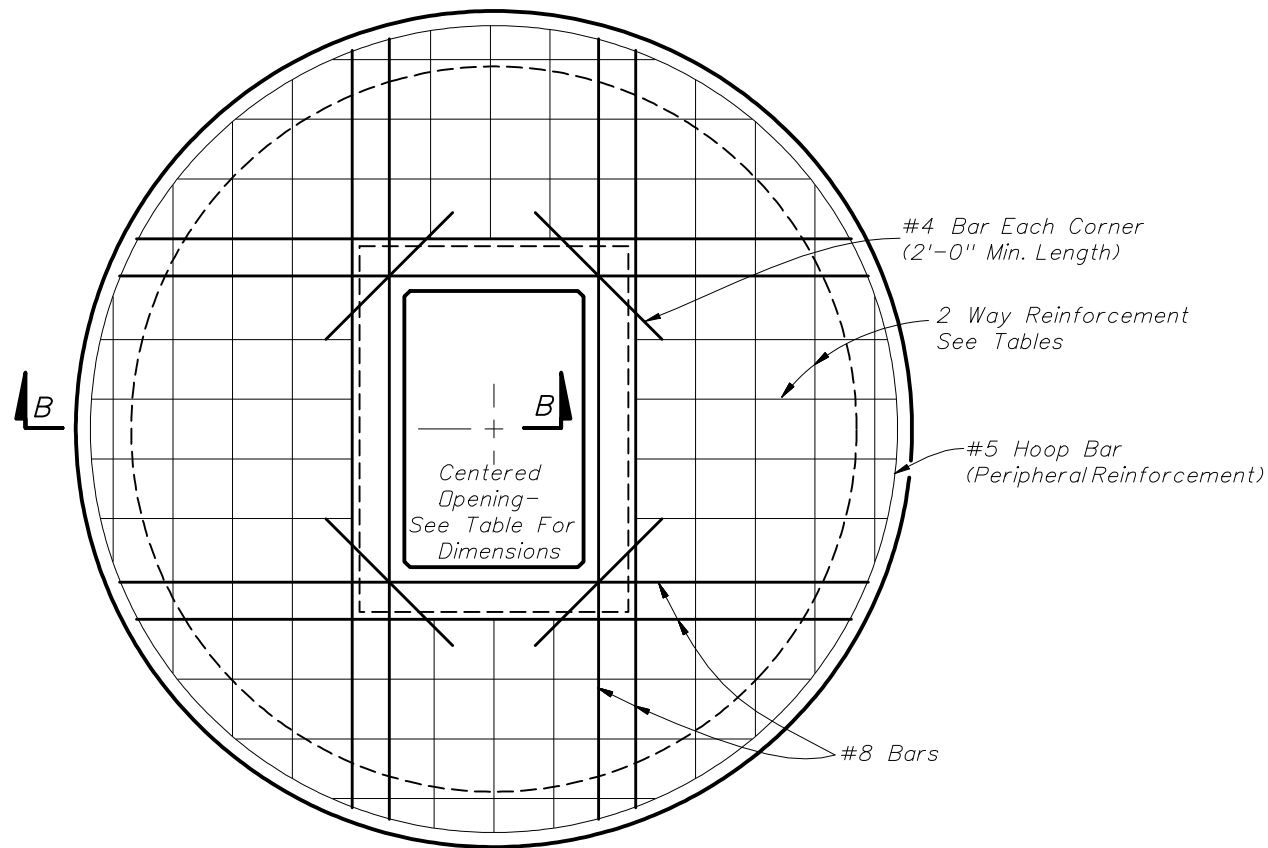
HORIZONTAL WALL REINFORCING SCHEDULE (TABLE 1)

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0' - 10'	A12	0.20	12"	8"
10' - 15'	A6	0.20	6"	5"



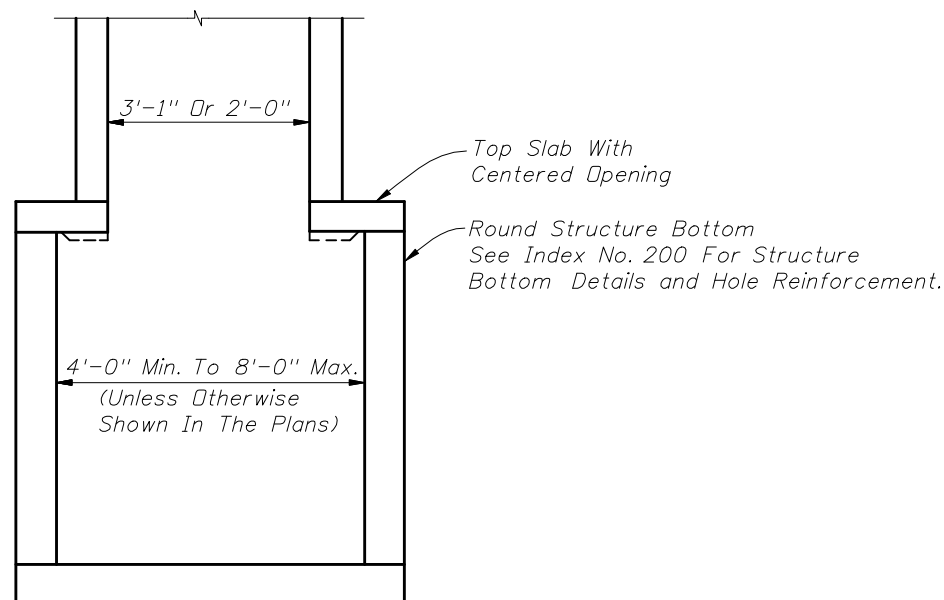


TOP SLAB OPENINGS	
DIAMETER	OPENING SIZE
	MIN.
4'-0" To 8'-0"	2'-0" x 3'-1"

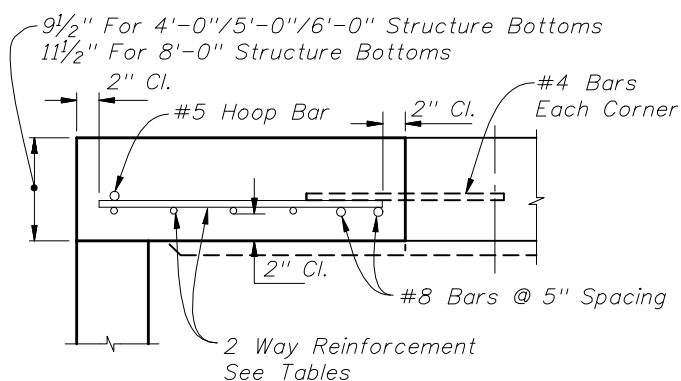


TOP SLAB REINFORCING SCHEDULE	
SCHEDULE	GRADE 60 (BAR) OR 65 KSI & 70 KSI (WIRE FABRIC) In. ² /ft.
A	0.20
B	0.24
C	0.37
D	0.53
E	0.73
F	1.06
G	1.45

TOP SLAB REINFORCING DIAGRAM



SECTION AA

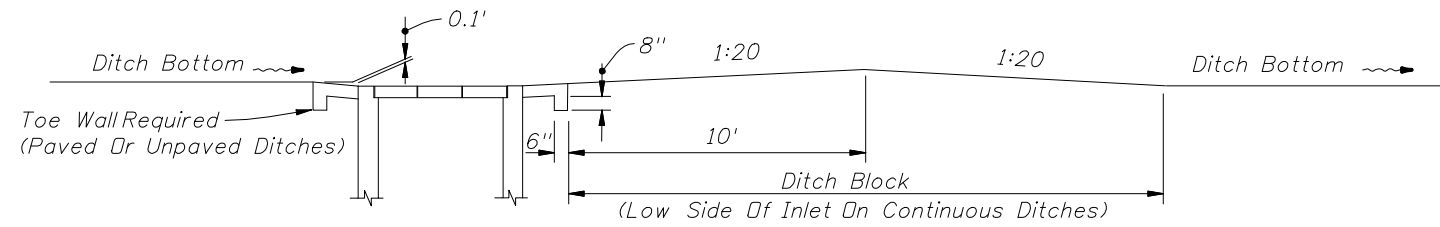
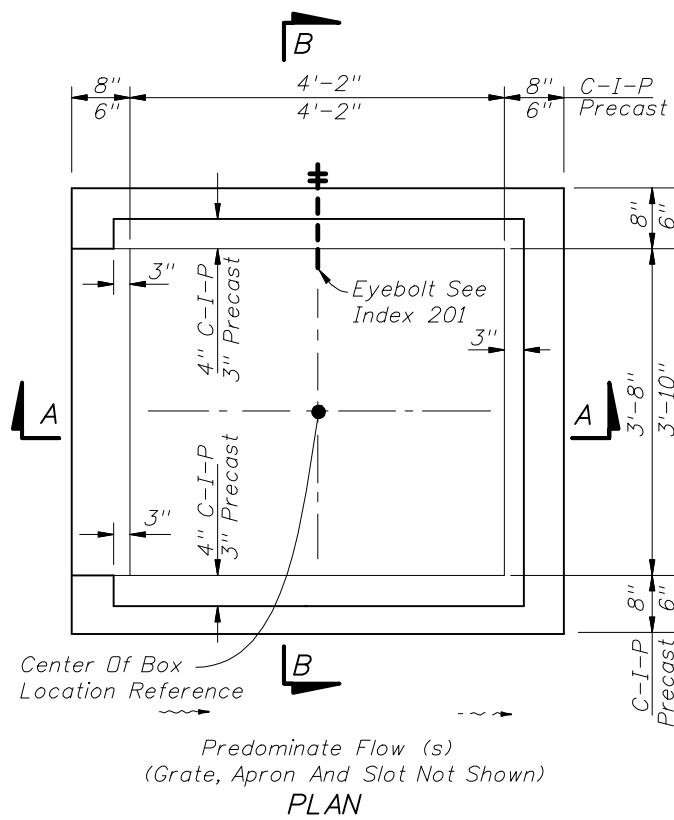


SECTION BB

TOP SLAB WITH CENTERED OPENING		
SLAB DEPTH	SLAB THICKNESS	REINFORCING (2 WAYS) SCHEDULE
SIZE: 4'-0"		
≥0.5'-40'	9 1/2"	C
SIZE: 5'-0"		
≥0.5'<30'	9 1/2"	C
30'-40'	9 1/2"	D
SIZE: 6'-0"		
0.5'<8'	9 1/2"	B
8'<18'	9 1/2"	C
18'<30'	9 1/2"	D
30'<37'	9 1/2"	E
37'-40'	9 1/2"	G
SIZE: 8'-0"		
≥0.5'<9'	11 1/2"	C
9'<15'	11 1/2"	D
15'<23'	11 1/2"	E
23'<33'	11 1/2"	E
33'-40'	11 1/2"	G

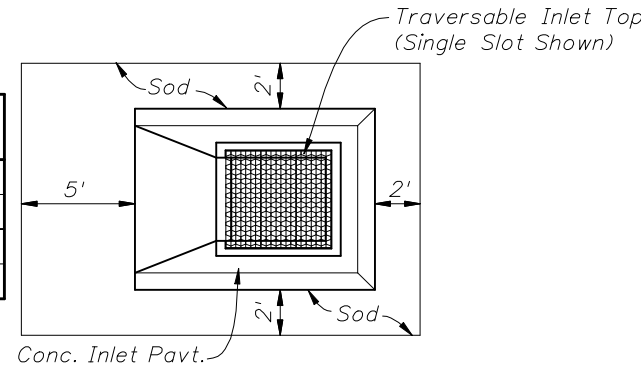
ALT. A STRUCTURE BOTTOM FOR INLET TYPE A



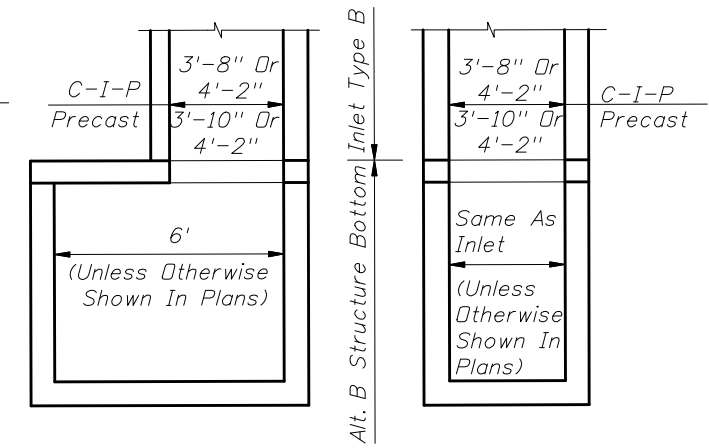


ESTIMATED QUANTITIES
For Informational Purposes Only

SLOT TYPE	PAVEMENT		SOD
	SY	CY	SY
Single Slot	6.2	0.9	14
Double Slot	8.1	1.1	19



CONCRETE INLET PAVEMENT AND SODDING

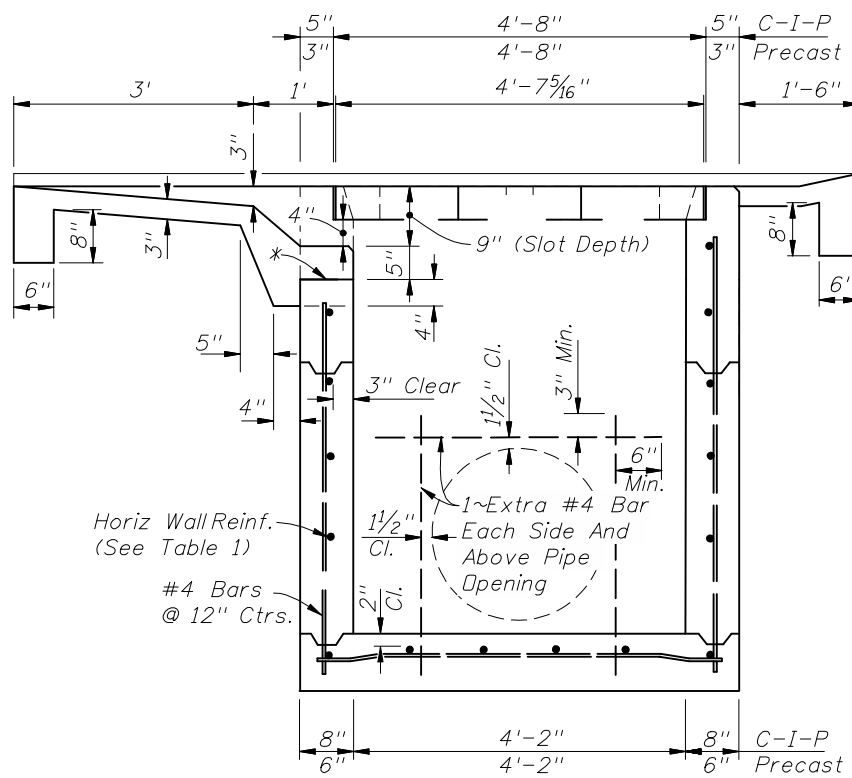


NOTE: Alt. B Structure Bottom Only. See Index No. 200 for structure bottom details and pipe opening reinforcement.
INLET WITH STRUCTURE BOTTOM

RECOMMENDED MAXIMUM PIPE SIZES

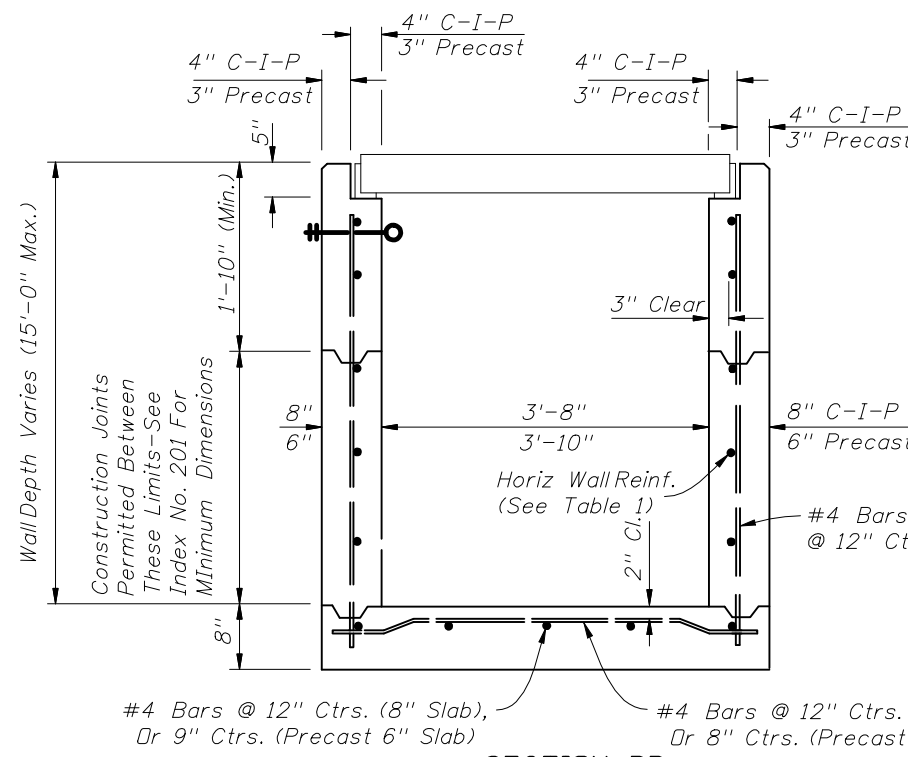
INLET INSIDE WIDTH	PIPE SIZE
3'-8"	30"
4'-2"	36"

Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 201. For larger pipe see bottom detail above and Index No. 200.

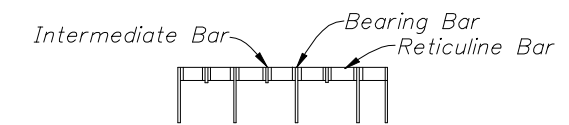
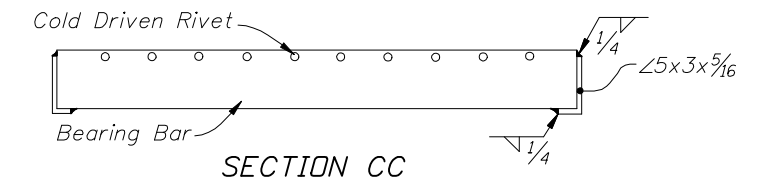
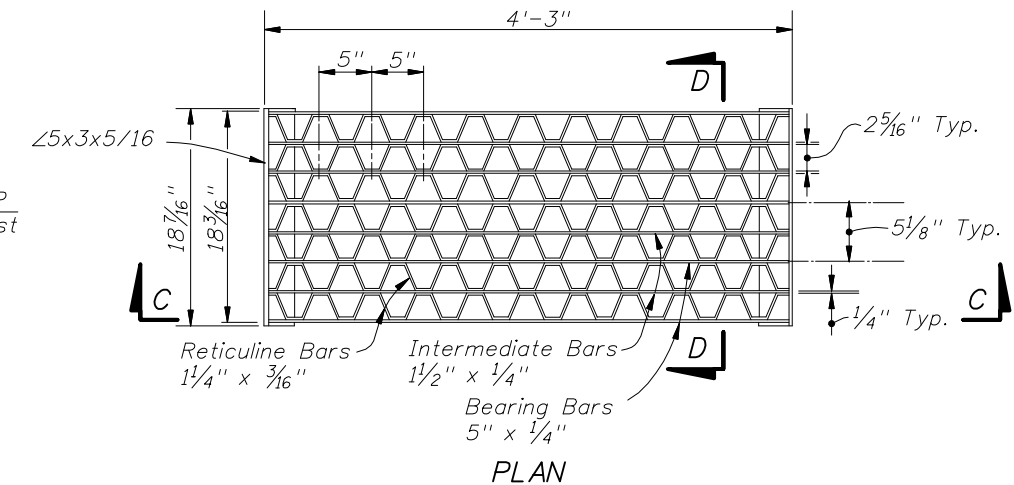


SECTION AA

*See Sheet 2 of 3



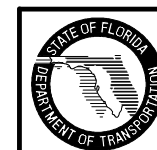
SECTION BB



SECTION DD

STEEL GRATE

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BAR	WWF
0' - 5'	A12	0.20	12"	8"
5' - 9'	A6	0.20	6"	5"
9' - 13'	B5.5	0.24	5 1/2"	5"
13' - 15'	Special	0.267	5"	4"



2010 FDOT Design Standards

DITCH BOTTOM INLET TYPE B

Last Revision
07/01/09

Sheet No.
1 of 3

Index No.
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GENERAL NOTES

- The general purpose of the inlet top designs are:
 - For ditches, medians or other areas subject to heavy wheel loads. This inlet may be placed in areas subject to occasional pedestrian traffic such as landscaped areas and pavement areas where pedestrians can walk around the inlet.
 - Provide full grate and horizontal slot designs for new construction.
 - Provide full grate and horizontal slot designs for replacing the vertical slot tops on existing Inlets Type B and Type X that are in locations subject to occasional pedestrian traffic.
- All reinforcing is Grade 60 bars with 2" min. cover unless otherwise noted. See Index No. 201 for equivalent area of welded wire fabric. Bars to be cut or bent for min. 1 1/2" clearance around pipe.
- All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
- When Alternate G grates are specified in the plans, the grates are to be hot-dip galvanized after fabrication.
- Cost for constructing traversable tops on new inlet boxes shall be included in the contract unit price for Inlets (DT BDT) (Type B), EA., and shall include the cost for surrounding concrete inlet pavement. Existing Inlets Type B and Inlets Type X that are converted to traversable inlet tops shall be paid for under the contract unit price for Inlets (DT BDT) (Type B) (Partial), EA. Unit price and payment shall be full compensation for inlet conversion and shall include the removal and disposal of any existing concrete inlet pavement; the removal and stockpiling or disposal of sufficient material from the existing inlet box to facilitate construction of the required inlet top; construction of the required inlet conversion; backfill construction; construction of concrete inlet pavement; reusing, supplementing, transferring or replacing grates as required by plans or as directed by the Engineer; any required earthwork for ditch restoration within 30' of the inlet; and, restoration of disturbed turf.
- Ditch pavement shall be paid for, separate from the inlet and concrete inlet pavement, by pavement types and units as called for in the plans.
- Sod will be paid for under the contract unit price for Performance Turf, SY.
- For supplementary details see Index No. 201.
- All dimensions are for both precast and cast-in-place inlets unless otherwise noted.

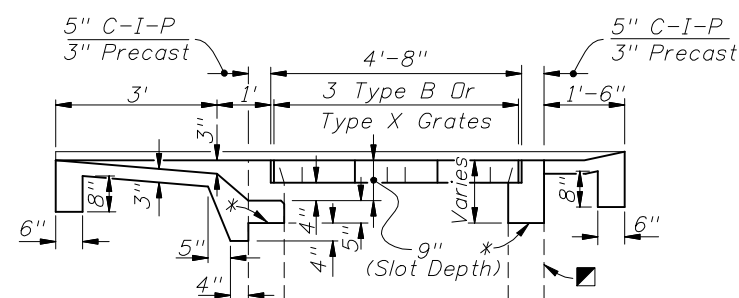
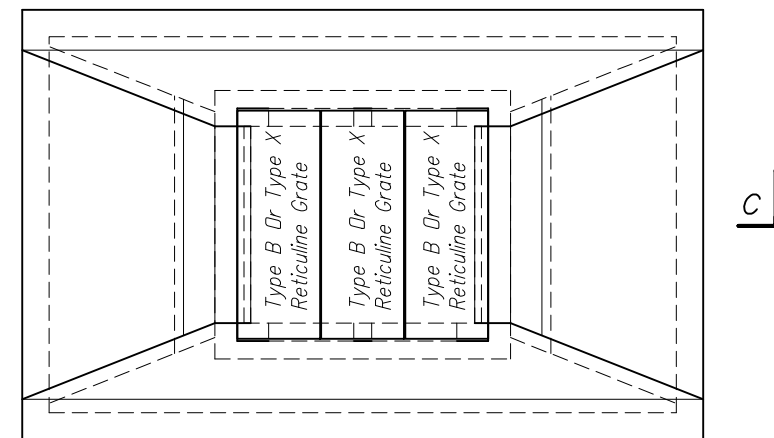
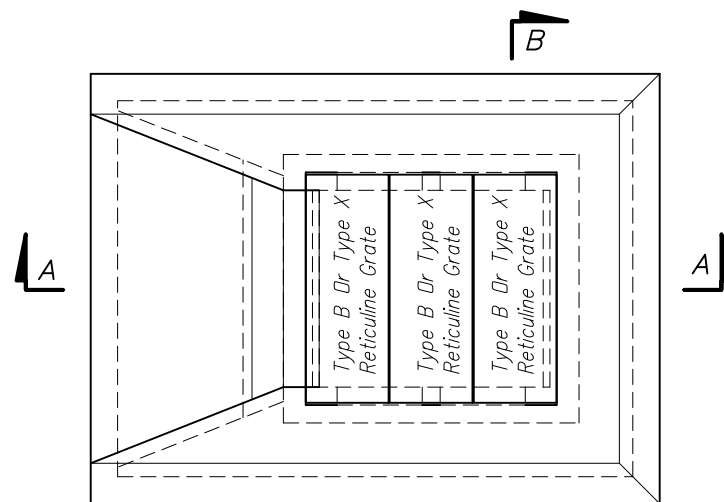
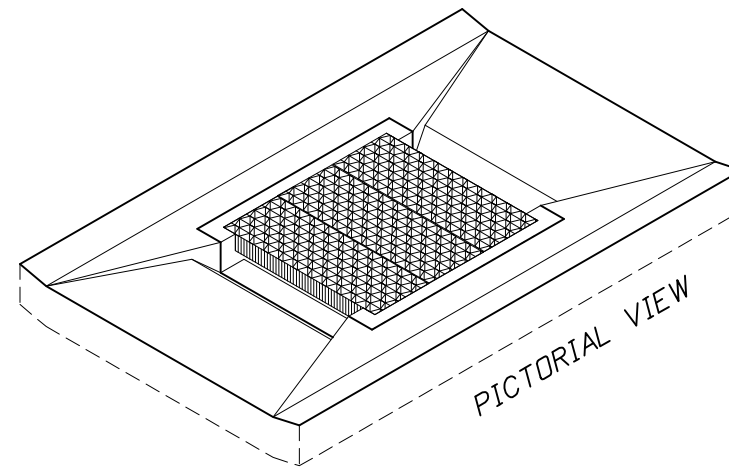
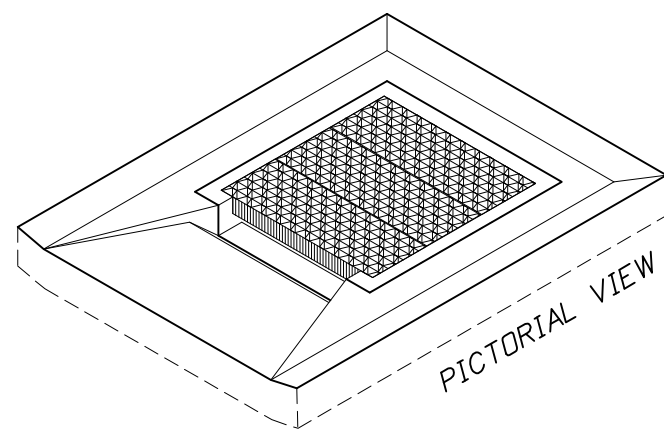
DESIGN NOTES

- The type of top (single or double slots) depends on the approach ditch configuration and the hydraulic requirements of the site. The designer will stipulate in the plans the type of top to be constructed at each individual inlet location.

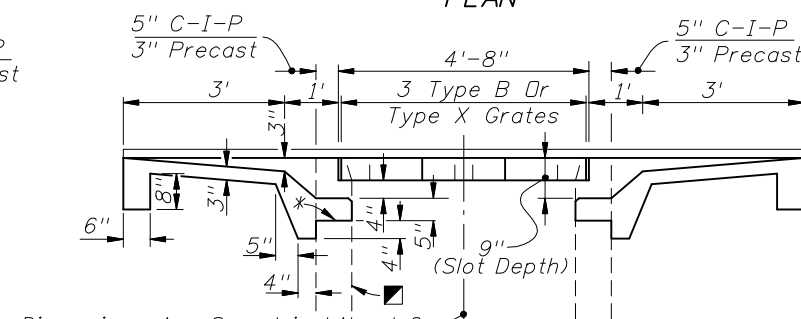
On existing inlets, conversion grates shall be constructed at the original grate elevations unless other elevations are called for in the plans. When plans call for the inlet top to be constructed to support storm water detention, details for ditch modifications and underdrains shall be shown in the plans.

MAINTENANCE NOTES

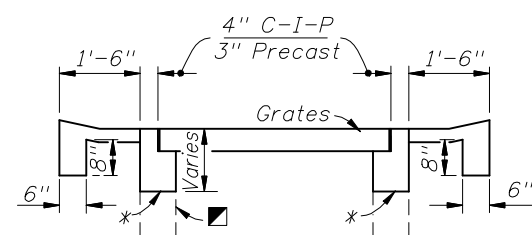
- Traversable inlet tops that are constructed by maintenance contract or by maintenance forces may reuse the existing grates that are determined by the Maintenance Engineer to be functionally sound, and their reuse is so directed by the Maintenance Engineer. Existing grates approved for reuse and new grates may be mixed, matched or replaced as directed by the Maintenance Engineer.



**SECTION AA
SINGLE SLOT**



**SECTION CC
DOUBLE SLOT**

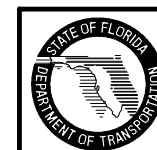


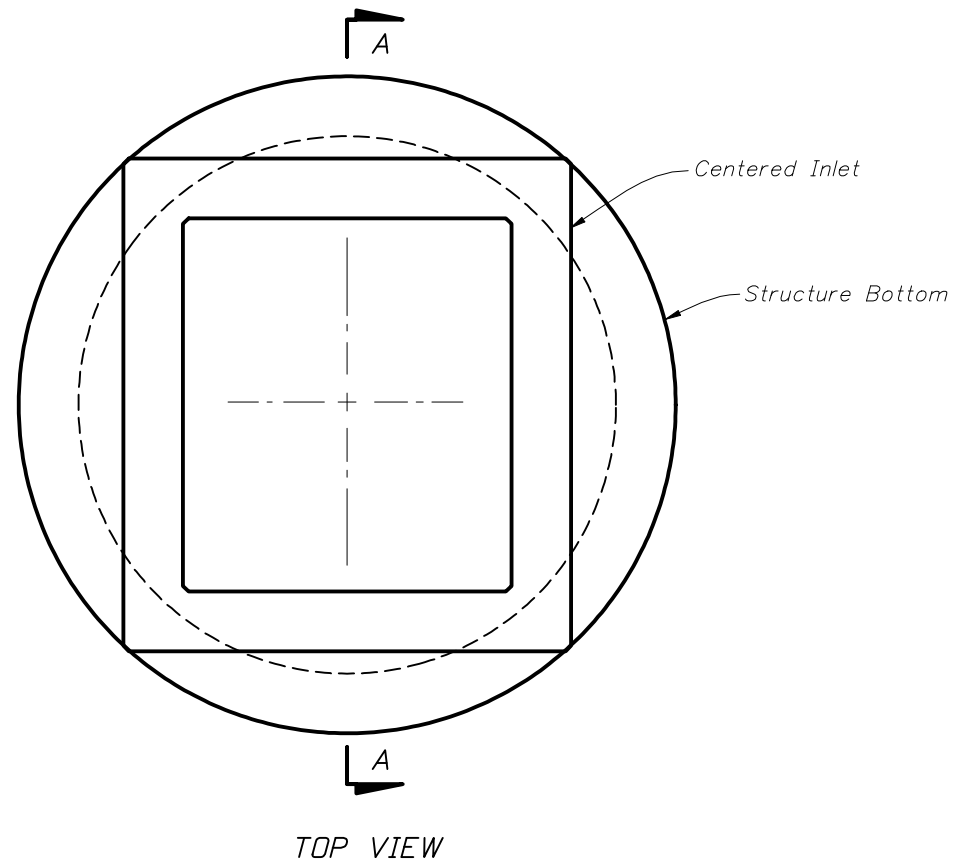
SECTION BB

■ Inlet Box (Line Type Indicates Existing Box To Facilitate Depiction Of Partial Construction On Existing Inlets)

* On new boxes the traversable top may be cast as a monolithic unit or cast in segments, and the location of this line may be lower to facilitate handling and placement; however, the slot depth is to remain at 9 inches. See Index No. 201 for top to wall connection. For converting to traversable tops on existing inlets remove concrete to this line and expose the existing reinforcement. Reshape or splice in reinforcement to penetrate the rim and returns of the grate seat, and bend the reinforcement into the slot shelf to extend into the abutting throat pavement.

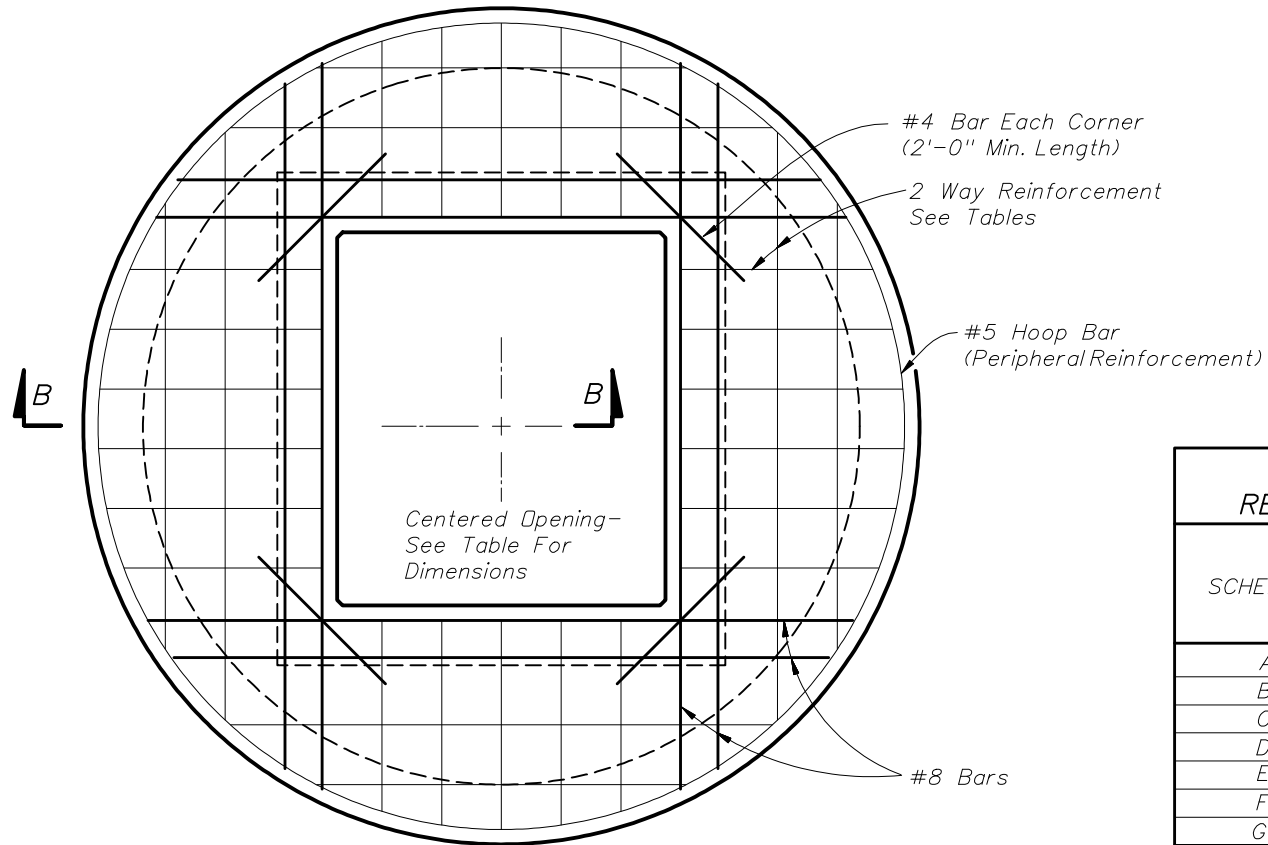
**TRAVERSABLE TOPS FOR INLETS TYPE B AND
FOR CONVERSIONS OF EXISTING INLETS TYPE B AND TYPE X**





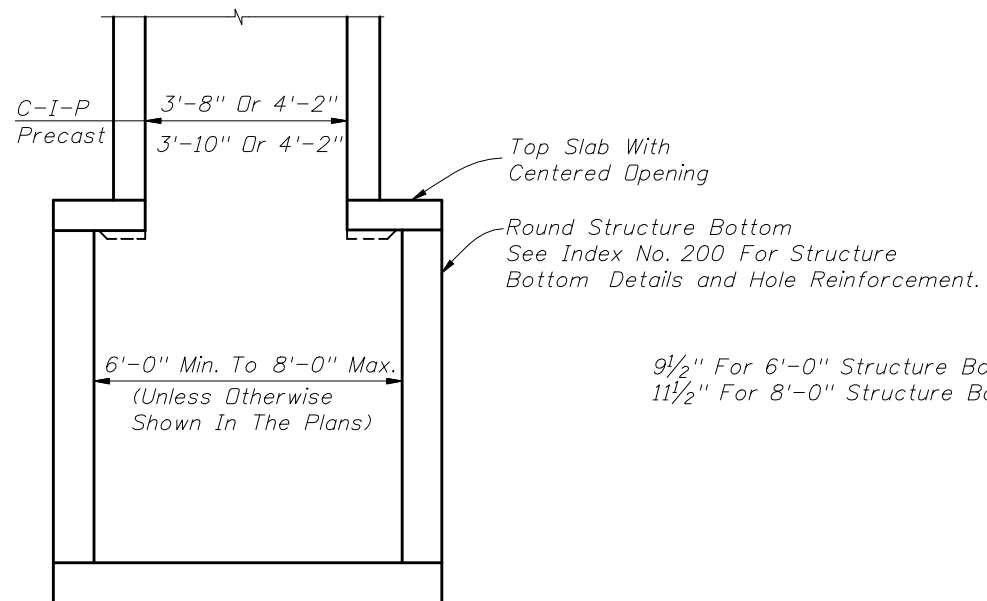
TOP VIEW

TOP SLAB OPENINGS		
DIAMETER	OPENING SIZE	
	MIN.	MAX.
6'-0" to 8'-0"	3'-8" x 4'-2"	3'-10" x 4'-2"

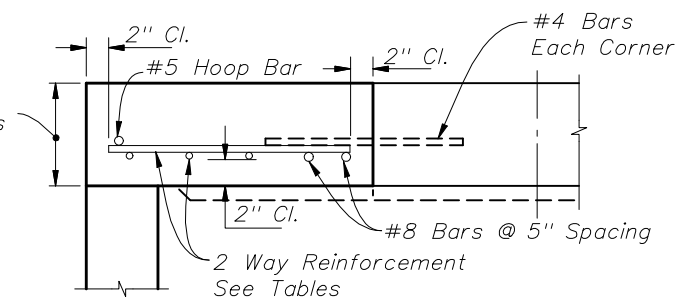


TOP SLAB REINFORCING DIAGRAM

TOP SLAB REINFORCING SCHEDULE	
SCHEDULE	GRADE 60 (BAR) OR 65 KSI & 70 KSI (WIRE FABRIC) $In^2/ft.$
A	0.20
B	0.24
C	0.37
D	0.53
E	0.73
F	1.06
G	1.45



SECTION AA

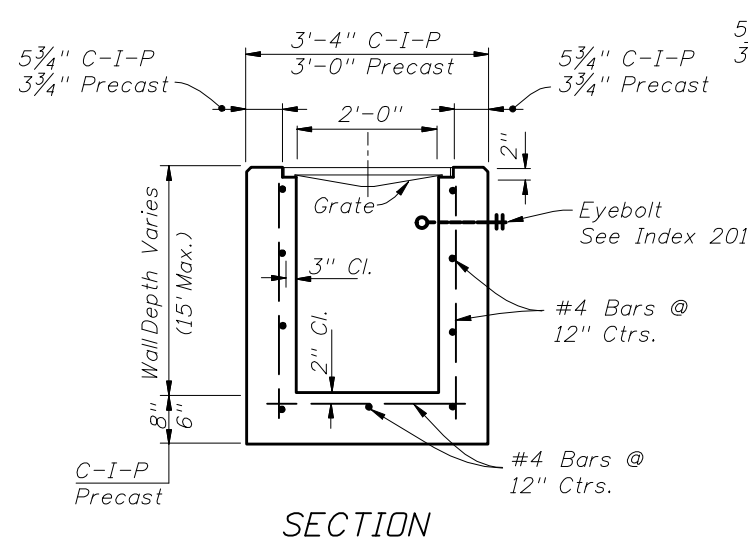
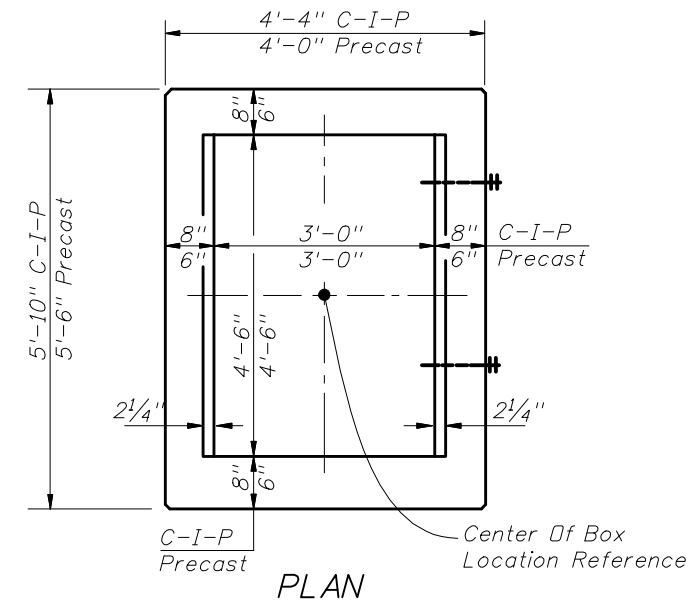
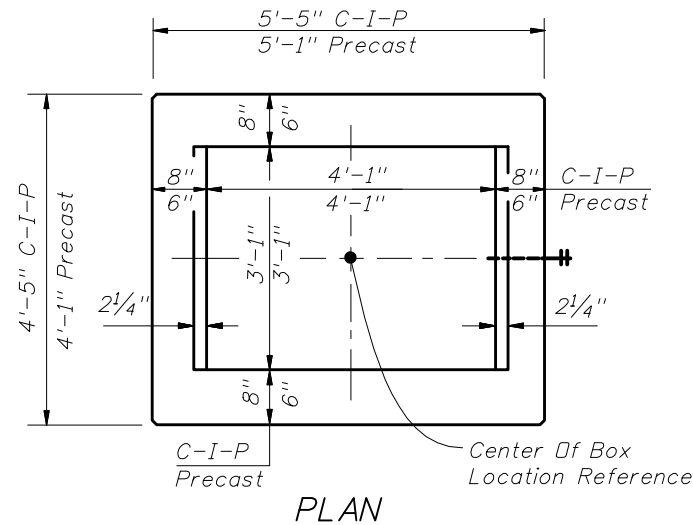
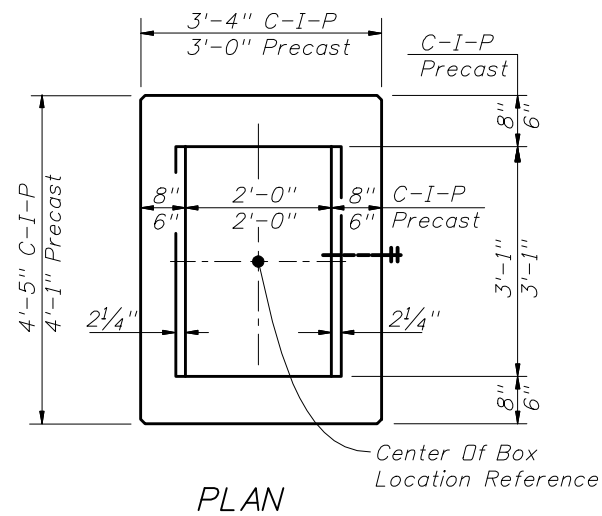


SECTION BB

TOP SLAB WITH CENTERED OPENING		
SLAB DEPTH	SLAB THICKNESS	REINFORCING (2 WAYS) SCHEDULE
SIZE: 6'-0"		
0.5' < 8'	9 1/2"	B
8' < 18"	9 1/2"	C
18' < 30'	9 1/2"	D
30' < 37'	9 1/2"	E
37'-40'	9 1/2"	G
SIZE: 8'-0"		
≥ 0.5' < 9'	11 1/2"	C
9' < 15'	11 1/2"	D
15' < 23'	11 1/2"	E
23' < 33'	11 1/2"	E
33'-40'	11 1/2"	G

ALT. A STRUCTURE BOTTOM FOR INLET TYPE B



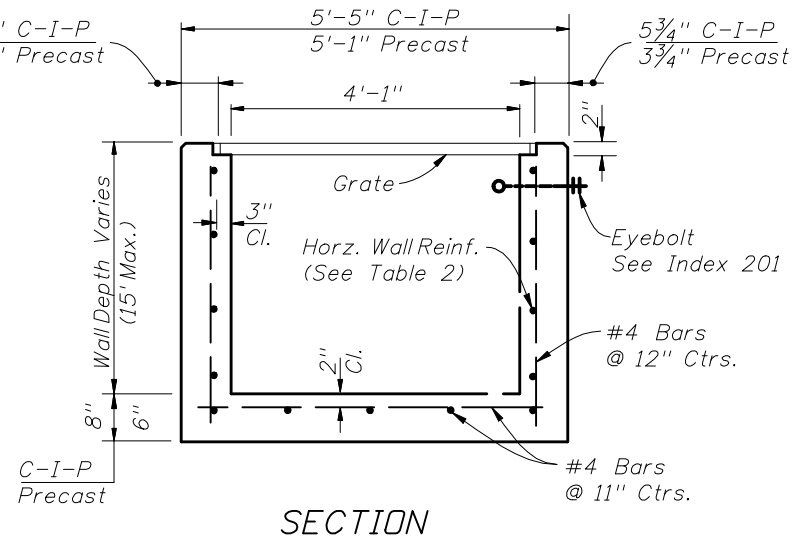


HORIZONTAL WALL REINFORCING SCHEDULES (TABLE 1)

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0'-15'	A12	0.20	12"	8"

TYPE C

Recommended Maximum Pipe Size:
 2'-0" Wall - 18" Pipe
 3'-1" Wall - 24" Pipe (18" where an 18" pipe enters a 2'-0" wall)

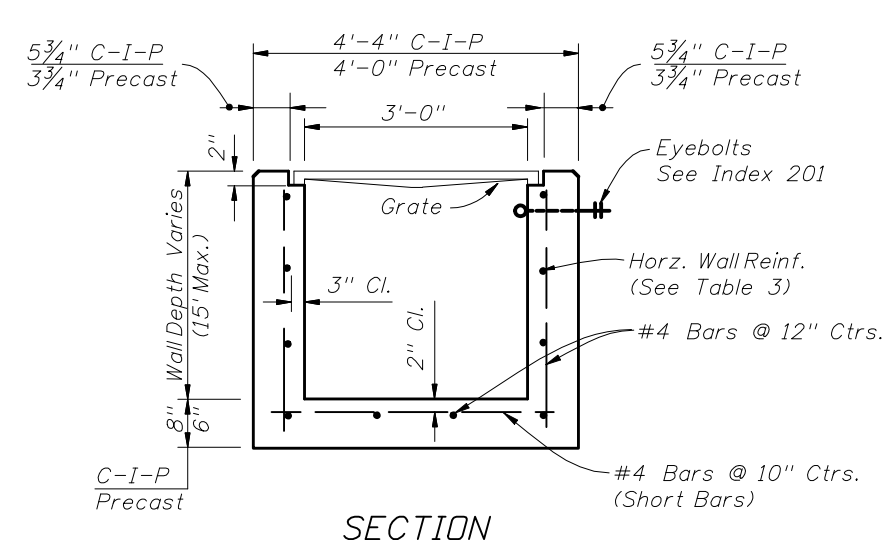


HORIZONTAL WALL REINFORCING SCHEDULES (TABLE 2)

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0'-6'	A12	0.20	12"	8"
6'-10'	A6	0.20	6"	5"
10'-13'	A4	0.20	4"	3"
10'-15'	B5.5	0.24	5½"	5"

TYPE D

Recommended Maximum Pipe Size:
 3'-1" Wall - 24" Pipe
 4'-1" Wall - 36" Pipe



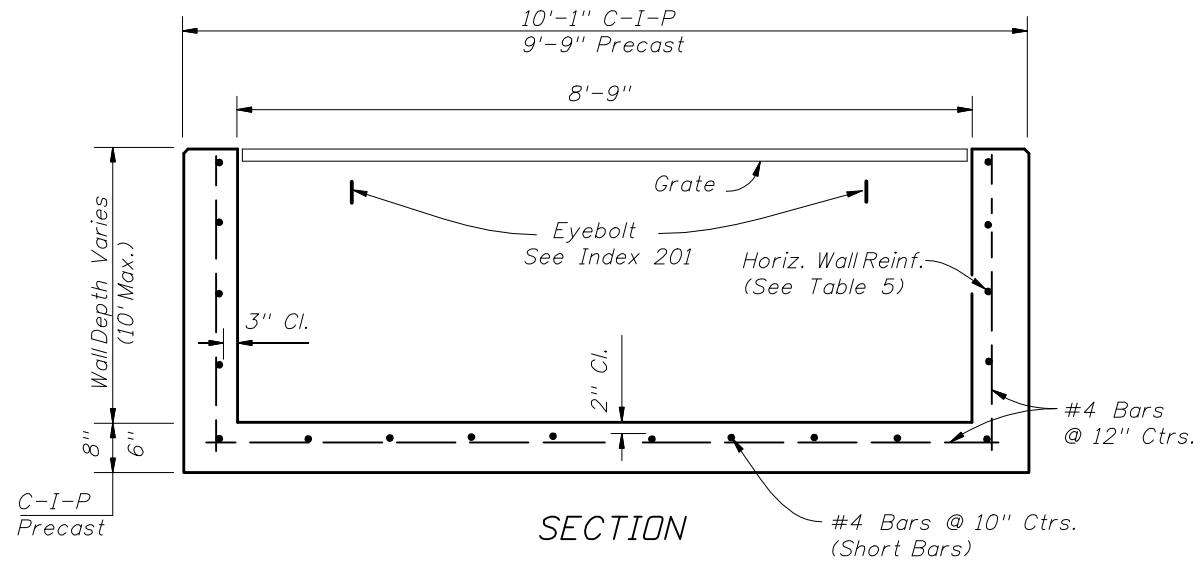
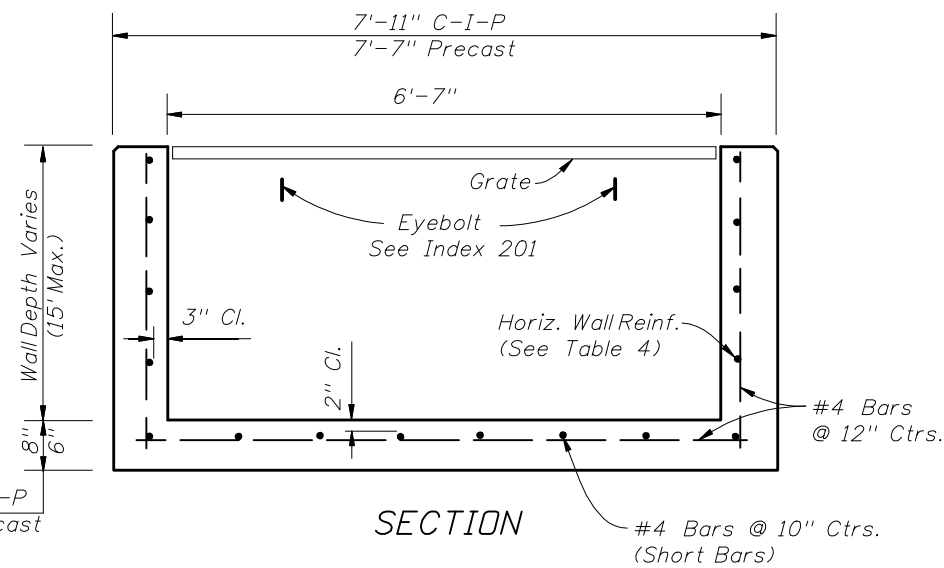
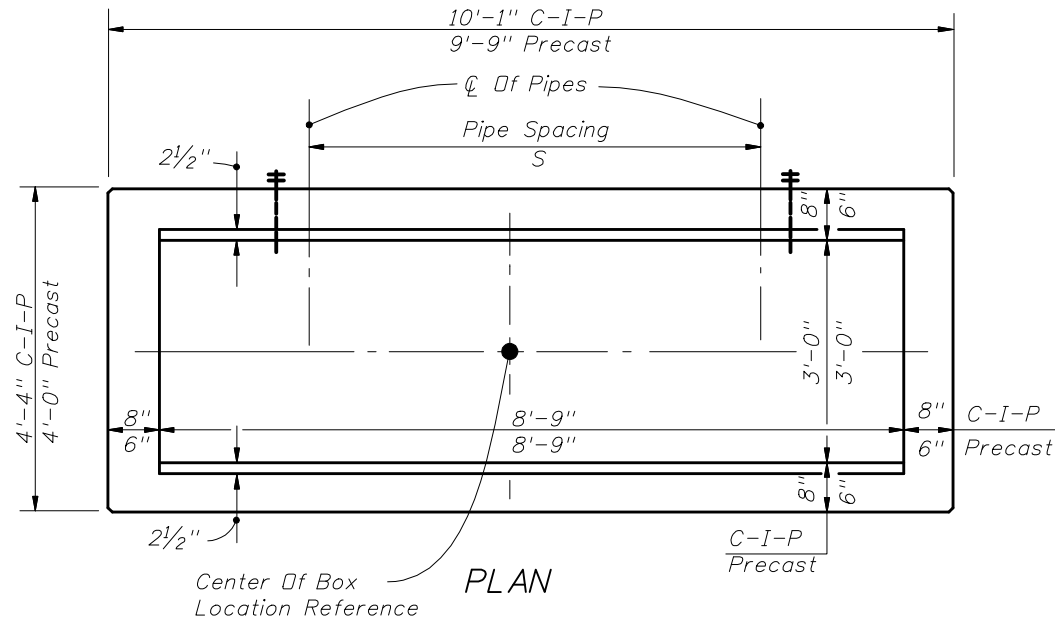
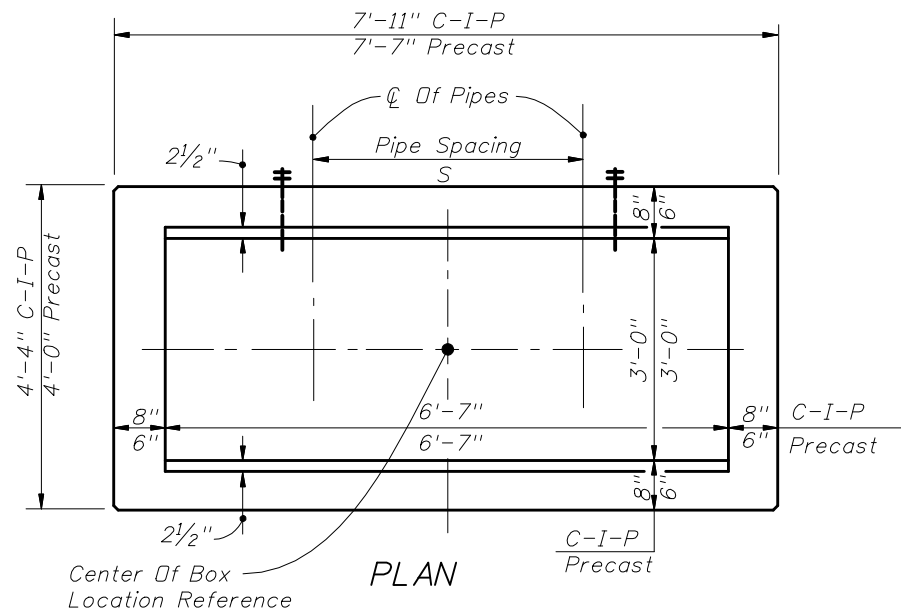
HORIZONTAL WALL REINFORCING SCHEDULES (TABLE 3)

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0'-5'	A12	0.20	12"	8"
0'-7.5'	A6	0.20	6"	5"
7.5'-10'	B5.5	0.24	5½"	5"
10'-15'	C6.5	0.37	6½"	6"

TYPE E

Recommended Maximum Pipe Size:
 3'-0" Wall - 24" Pipe
 4'-6" Wall - 36" Pipe





HORIZONTAL WALL REINFORCING SCHEDULES (TABLE 4)

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0'-5'	B5.5	0.24	5 1/2"	5"
5'-7'	C6.5	0.37	6 1/2"	6"
7'-15'	D4.5	0.53	4 1/2"	4"

TYPE H (2 & 3-GRATE INLET)

Recommended Maximum Pipe Size:
 3'-0" Wall - 24" Pipe
 6'-7" Wall - 1-60" Pipe
 Or 2-24" Pipe (S=3'-5")

HORIZONTAL WALL REINFORCING SCHEDULES (TABLE 5)

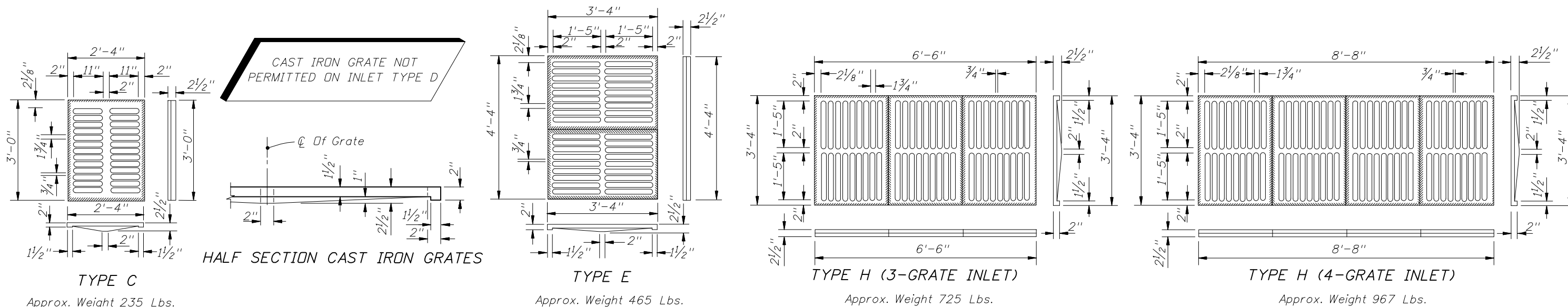
WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0'-5'	C3.5	0.37	3 1/2"	3"
5'-10'	D4.5	0.53	4 1/2"	4"

TYPE H (4-GRATE INLET)

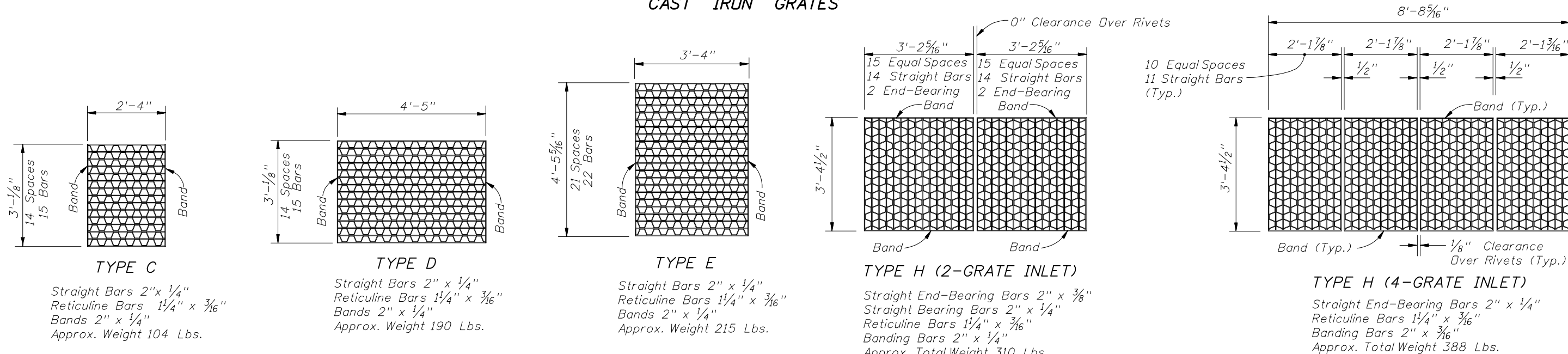
Recommended Maximum Pipe Size:
 3'-0" Wall - 24" Pipe
 8'-9" Wall - 1-78" Pipe
 Or 2-30" Pipe (S=4'-3")

GENERAL NOTES
 See Sheet 3 of 7.





CAST IRON GRATES

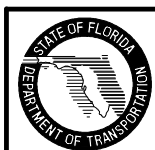


STEEL GRATES

NOTE: Steel Grates Are Required On Inlets With Traversable Slots And On Inlets where Bicycle Traffic Is Anticipated.

GENERAL NOTES

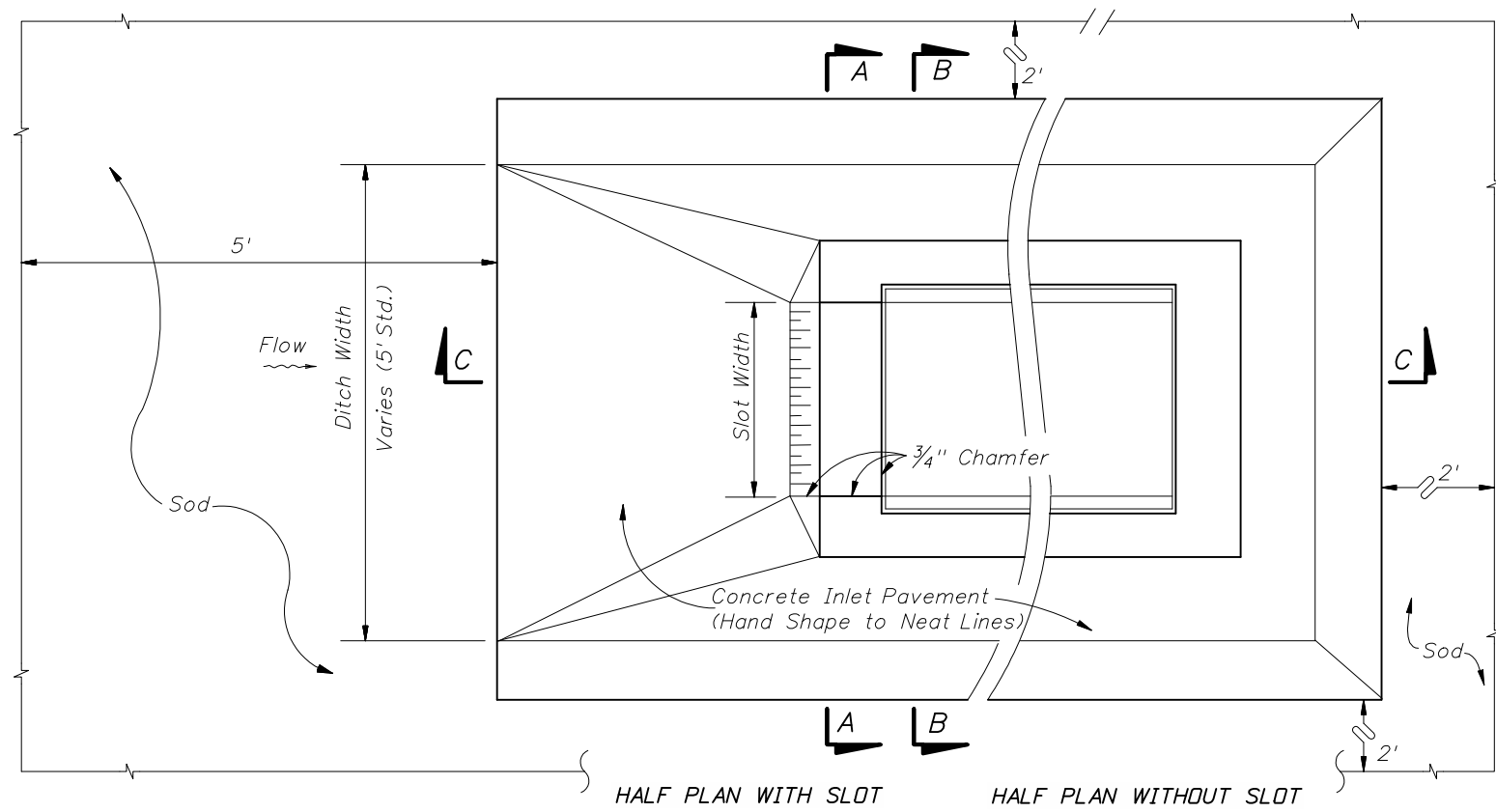
- These inlets are suitable for bicycle traffic and are to be used in ditches, medians and other areas subject to infrequent traffic loadings but are not to be placed in areas subject to any heavy wheelloads. These inlets may be placed in areas subject to occasional pedestrian traffic such as landscaped areas and pavement areas where pedestrians can walk around the inlet.
- Inlets subject to minimal debris should be constructed without slots. Where debris is a problem inlets should be constructed with slots. Slotted inlets located within roadway clear zones and areas subject to bicycles and/or pedestrians shall have traversable slots. The traversable slot modification is not adaptable to inlet Type H. Slots may be constructed at either or both ends as shown on plans.
- Steel grates are to be used on all inlets where bicycle traffic is anticipated. Steel grates are to be used on all inlets with traversable slots. Either cast iron or steel grates may be used on inlets without slots where bicycle traffic is not anticipated. Either cast iron or steel grates may be used on all inlets with non-traversable slots. Subject to the selection described above, when Alternate G grate is specified in the plans, either the steel grate, hot dip galvanized after fabrication, or the cast iron grate may be used, unless the plans stipulate the particular type.
- Recommended maximum pipe sizes shown are for concrete pipe. Size for other types of pipe must be checked for fit.
- All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
- Concrete inlet pavement to be used on inlets without slots and inlets with nontraversable slots only when called for in the plans; but required on all traversable slot inlets. Cost to be included in contract unit price for inlets. Quantities shown are for information only.
- Traversable slots constructed in existing inlets shall be paid for as inlets partial. For conversion work and method of payment see 'TRAVERSABLE SLOT INLETS (PARTIAL) FOR EXISTING INLETS'.
- Sodding to be used on all inlets not located in paved areas and paid for under contract unit price for Performance Turf, SY.
- For supplementary details see Index No. 201.
- All reinforcing is Grade 60 bars with 2" min. cover unless otherwise noted. Bars to be cut or bent for 1/2" clearance around pipe opening. Provide one additional #4 bar above and at each side of pipe opening.



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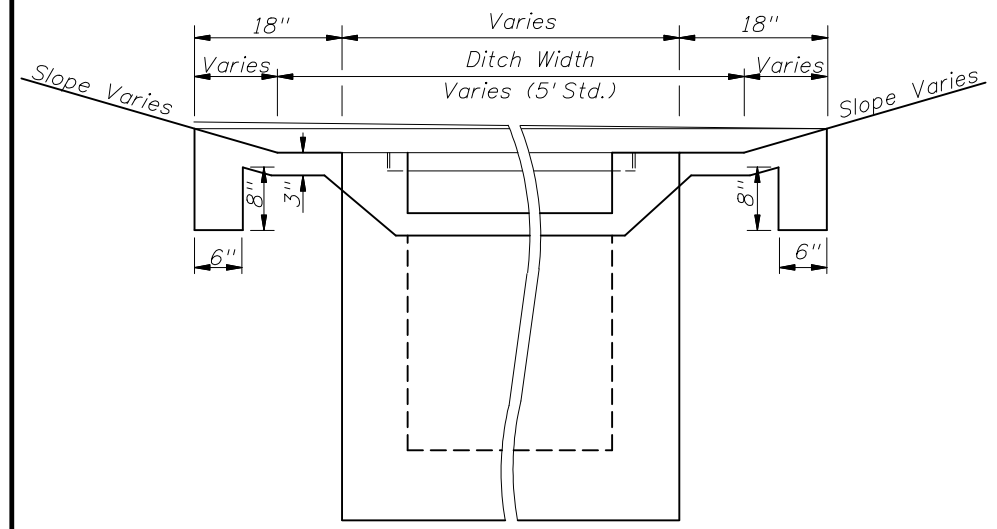
**DITCH BOTTOM INLET
TYPES C, D, E & H**

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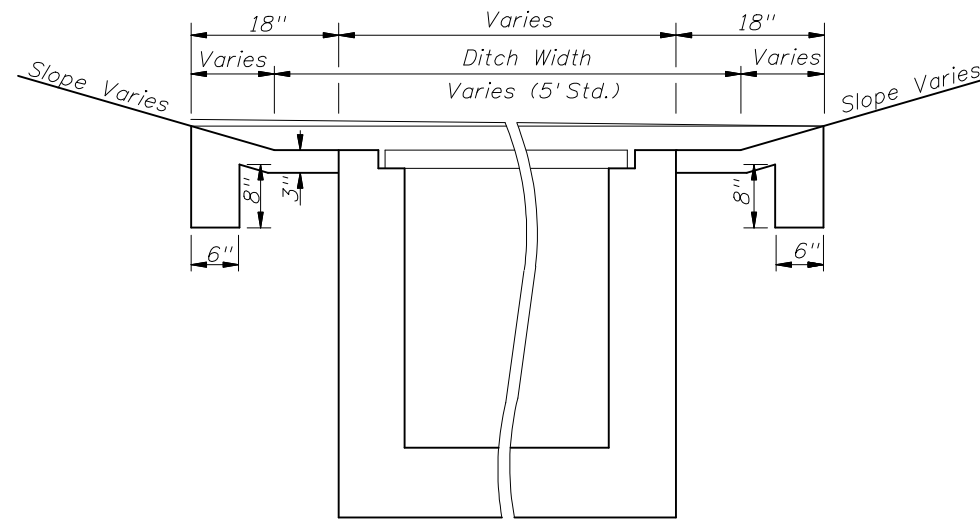


HALF PLAN WITH SLOT HALF PLAN WITHOUT SLOT

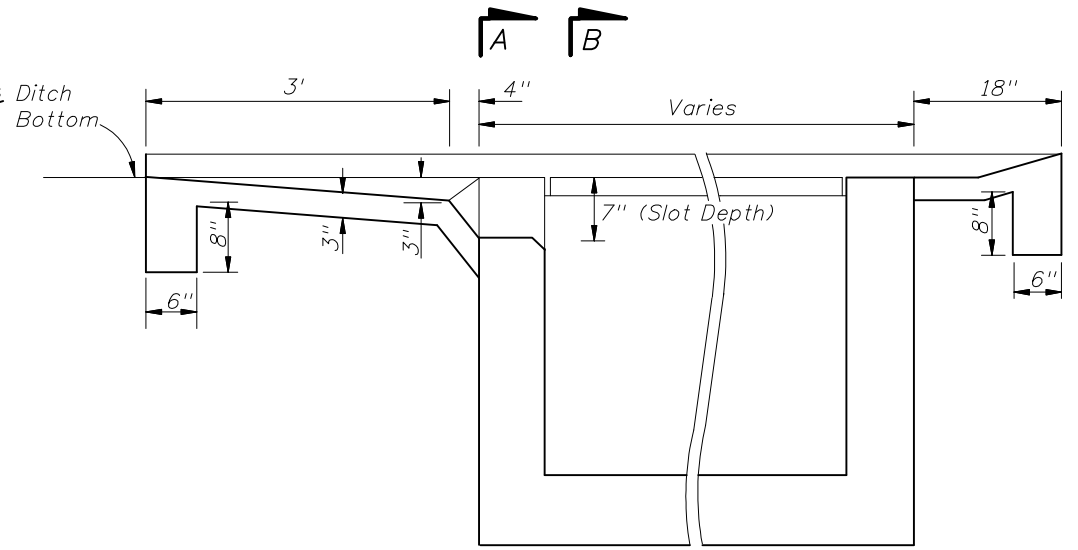
PLAN VIEW



SECTION AA



SECTION BB

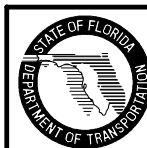


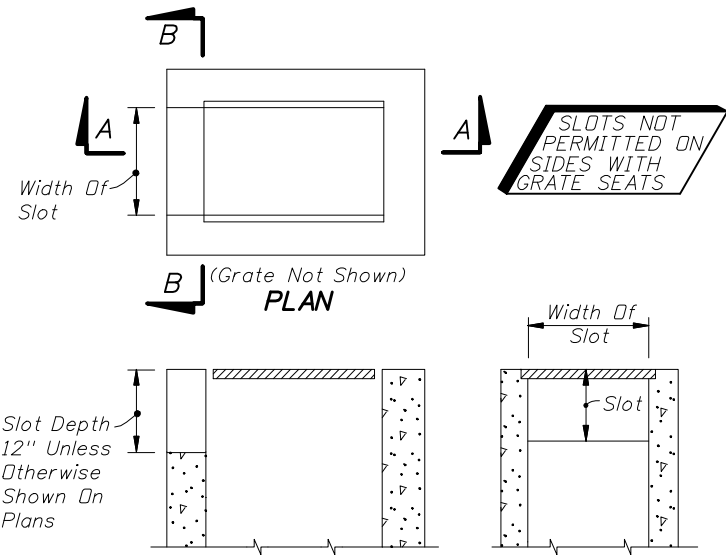
HALF PLAN WITH SLOT HALF PLAN WITHOUT SLOT

SECTION CC

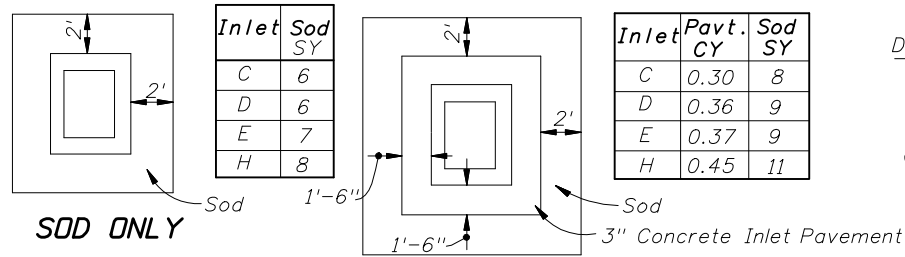
PAVEMENT AND SODDING QUANTITIES FOR TRAVERSABLE SLOTS						
Inlet	Pavement				Sod	
	Single Slot		Double Slot		Single Slot	Double Slot
	SY	CY	SY	CY	SY	SY
C	4.87	0.77	6.16	0.93	12	16
D	5.99	0.91	7.70	1.10	14	19
E	5.88	0.91	7.37	1.08	14	18

TRAVERSABLE SLOTS

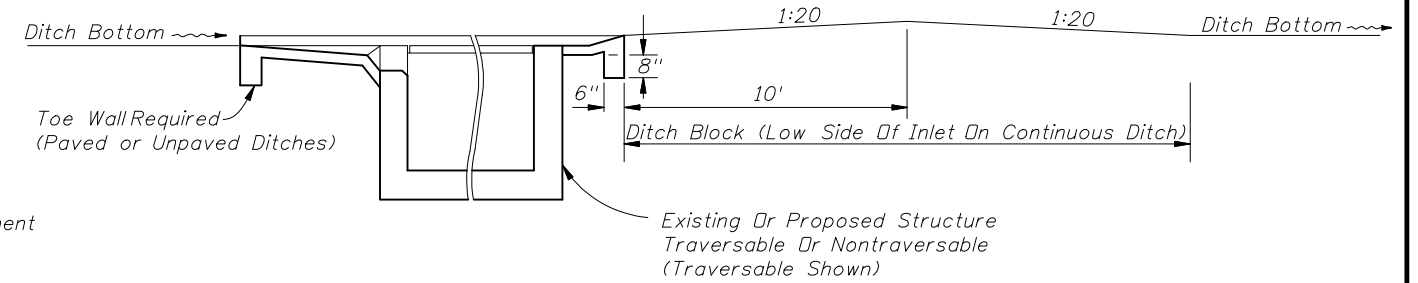




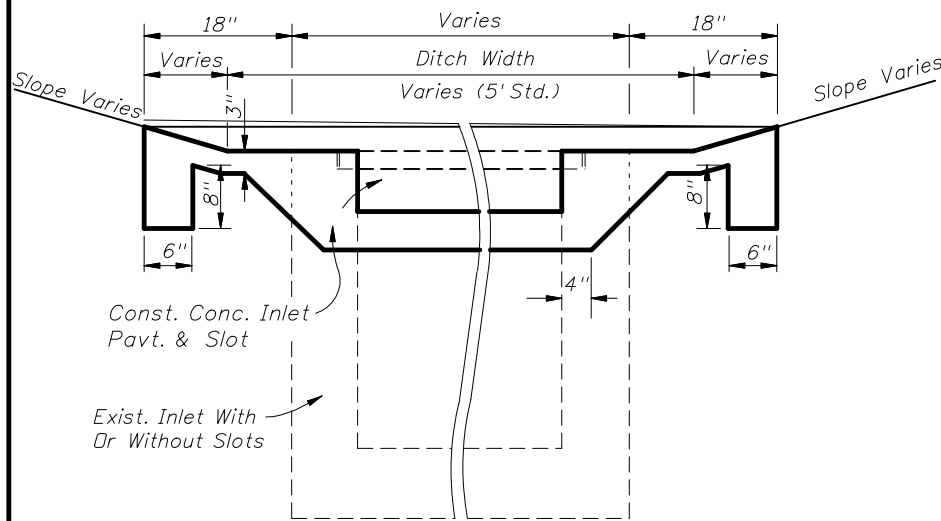
SECTION AA SECTION BB
NONTRAVERSABLE SLOTS



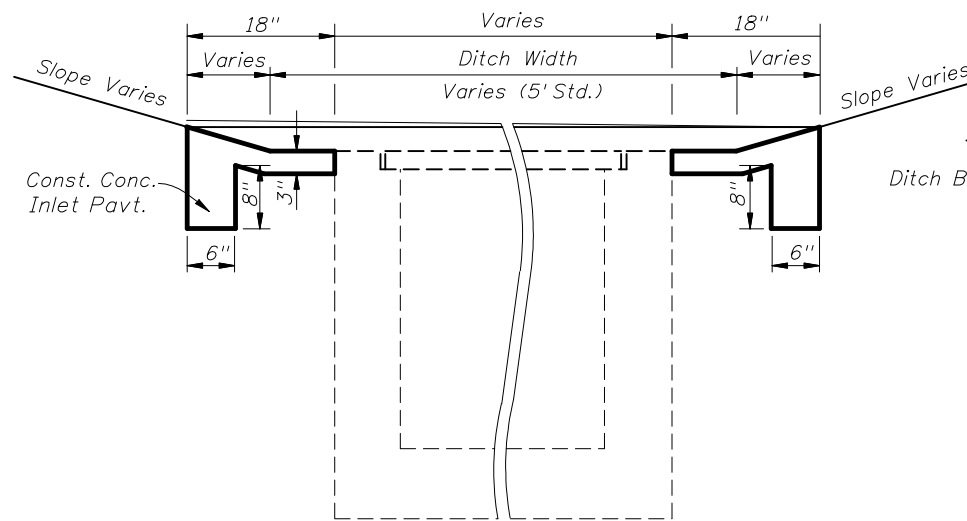
NOTE: See General Notes Nos. 6 and 7, Sheet 3 of 7.
SODDING AND PAVEMENT FOR INLETS WITHOUT SLOTS AND INLETS WITH NONTRAVERSABLE SLOTS



DITCH BLOCK FOR INLETS WITH OR WITHOUT SLOTS

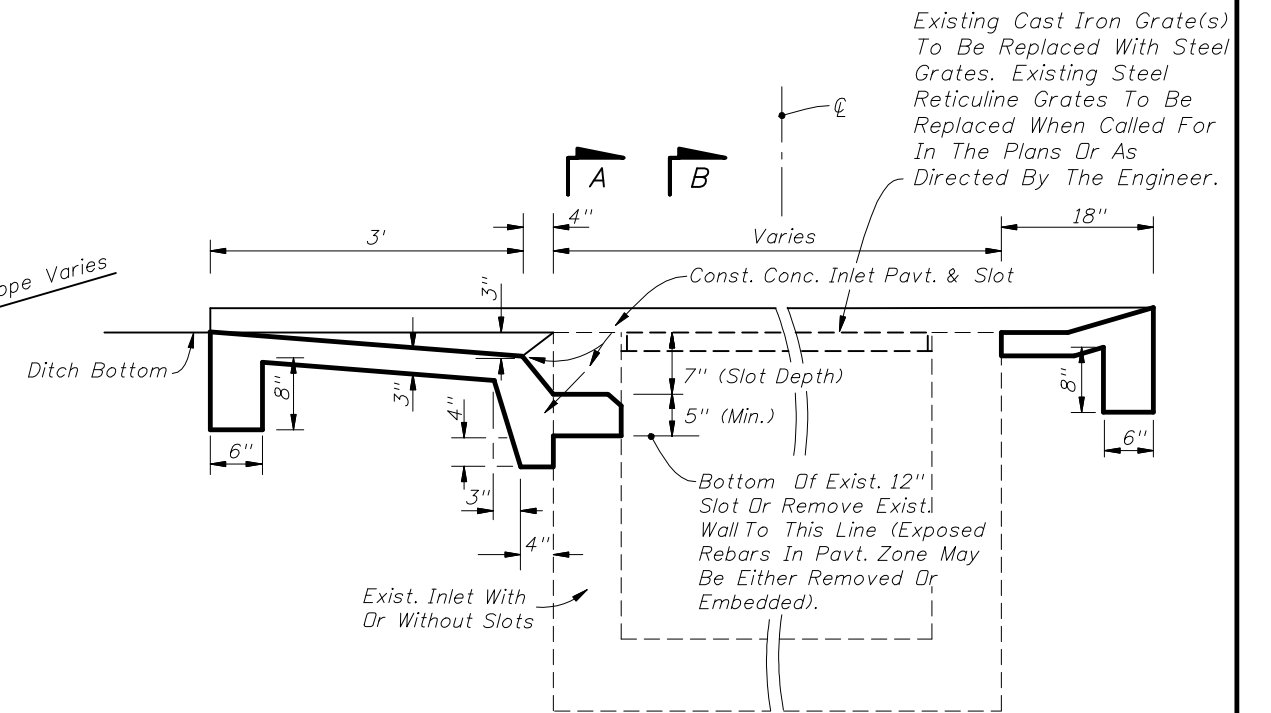


SECTION AA



SECTION BB

Inlet	PAVEMENT AND SODDING QUANTITIES FOR TRAVERSABLE SLOTS					
	Pavement				Sod	
	Single Slot SY	Double Slot CY	Single Slot SY	Double Slot CY	Single Slot SY	Double Slot SY
C	4.87	0.83	6.16	1.05	12	16
D	5.99	1.01	7.70	1.30	14	19
E	5.88	0.99	7.37	1.24	14	18



SINGLE SLOT SHOWN (DOUBLE SLOTS SYMMETRICAL ABOUT CENTERLINE)
SECTION CC (CASE I)

NOTE: For plan view and additional details see Sheet 4 of 7.
For payment see General Notes Nos. 6 and 7, Sheet 3 of 7.

TRAVERSABLE SLOTS FOR EXISTING INLETS



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DITCH BOTTOM INLET
TYPES C, D, E & H

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DESIGN NOTES FOR TRAVERSABLE SLOT INLETS (PARTIAL) FOR EXISTING INLETS

1. The general purpose of these conversions is to remove the hazard of the protruding inlet top, while not creating a hazard by depressing the top too deeply.
2. The corrective procedure depends on the approach ditch grade and hydraulic requirements of the site. The selection of the appropriate case depends on the relationship between inlet top and ditch elevation, and, on the vertical clearance between the top of the uppermost pipe(s) and the grate. The purpose for the Case 1 conversion is to add the traversable slot to an existing inlet where top removal, change in grate elevation and ditch transitions are not required. Case 2 will normally be applicable to ditches with flatter grades adjoining the inlet. Case 3 will normally be applicable to ditches with steeper grades adjoining the inlet where build up of the existing ditch is acceptable.
3. The designer shall stipulate in the plans which case is to be constructed at each individual inlet location.

Where the existing inlet top is above the existing ditch (Case 2) but borrow material will be required to adjust the ditch (Case 3), and vertical clearance or other conditions do not prevent removal of the inlet top, the designer should call for Case 2. The designer shall determine if ditch reconstruction is required more than 35 feet beyond any traversable slot side and shall include separate pay items in the plans to cover the cost for that portion of required ditch reconstruction exceeding the 35 foot limit. The designer shall also determine whether ditch pavement is required for ditch restoration within the 35 foot limit and include that pavement under a pay item separate from the inlets partial.

When the detention ditch concept is to be used with Case 3, the designer shall stipulate 'Case 3 (Detention)' in the plans.

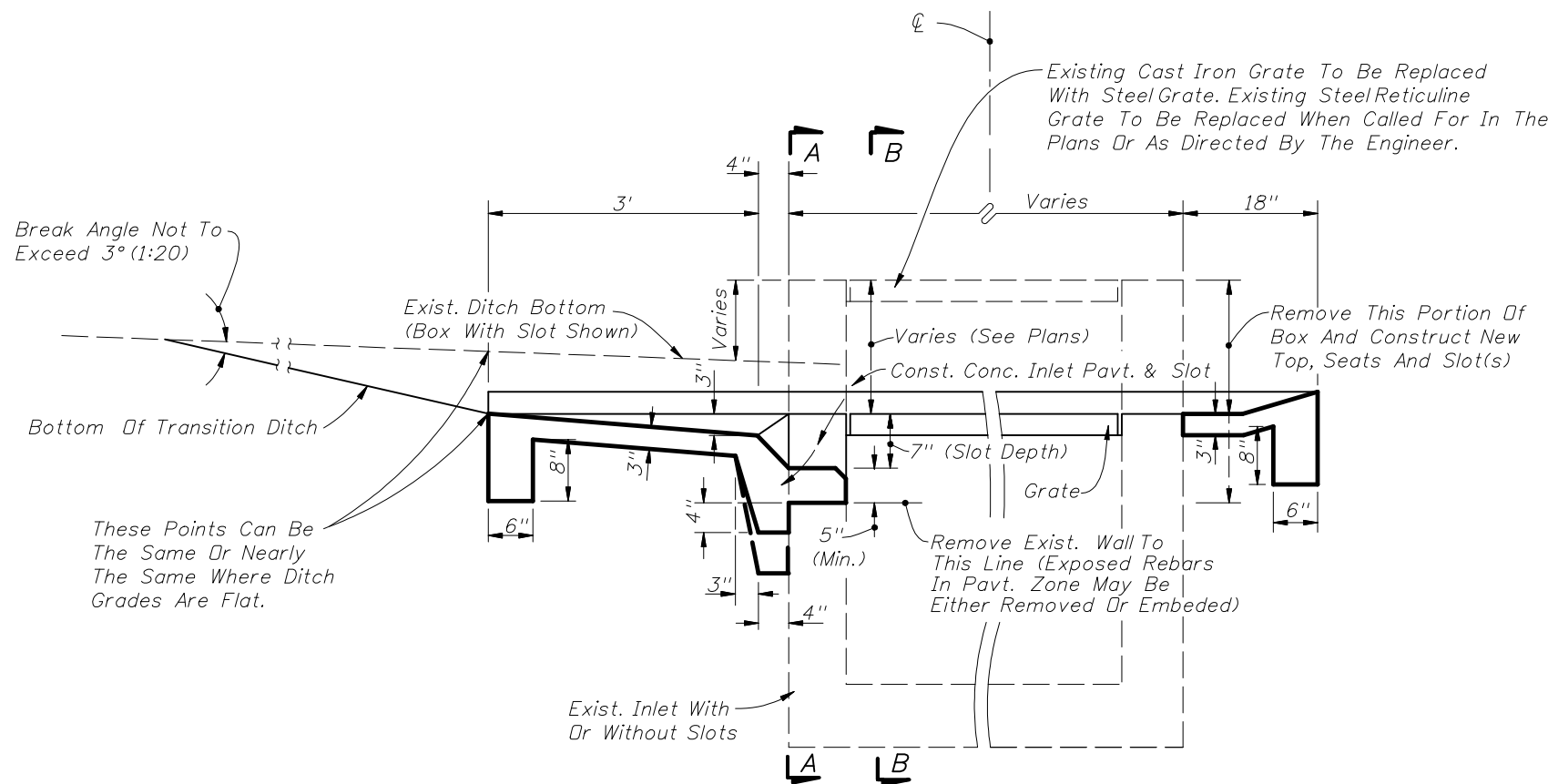
The designer shall determine whether tight soil or other conditions at each individual inlet indicates the need for underdrain in Case 3 conversions and shall call for Underdrain, Type I in the plans.

METHOD OF PAYMENT FOR TRAVERSABLE SLOT INLETS (PARTIAL) FOR EXISTING INLETS

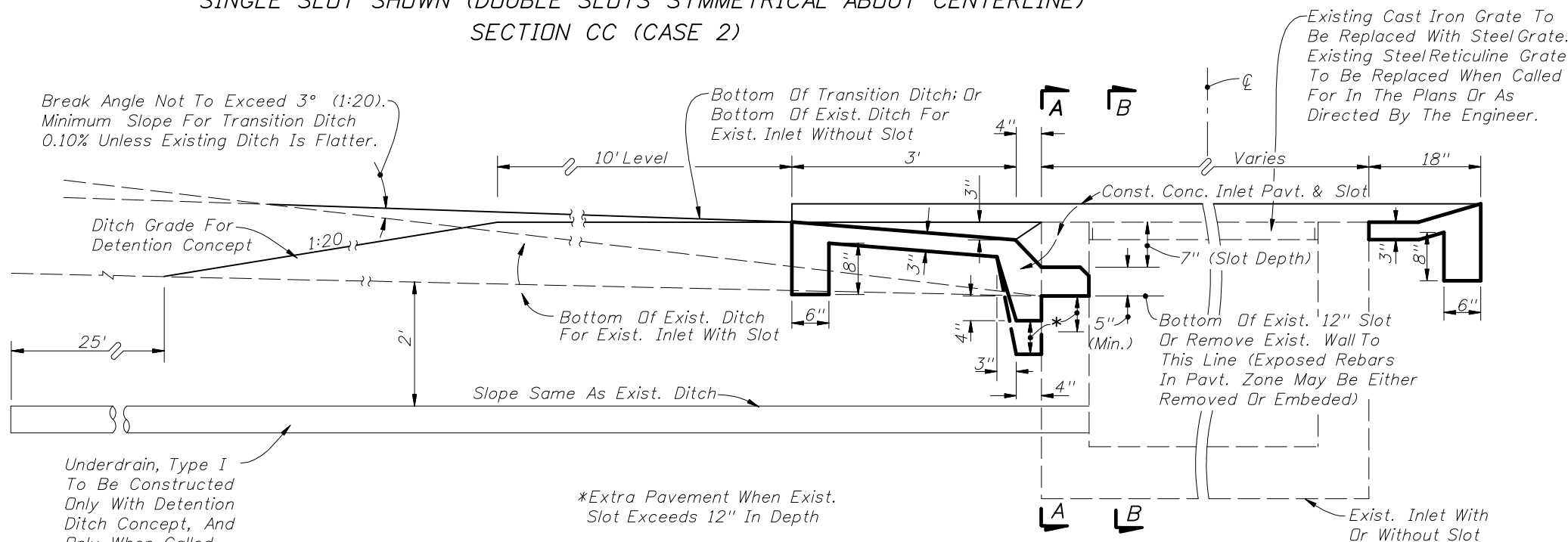
1. Existing inlets converted to traversable slot tops under Cases 1, 2 and 3 shall be paid for as inlets partial, each. Case shall not be included in the pay item description.
2. All ditch reconstruction work within 35 feet of each traversable slot conversion, whether required by these details or as a direct result of the conversion, shall be included as a part of the partial cost. Reconstruction work shall include excavation and removal of surplus materials or borrow materials in place, grading, compaction, shaping and restoration of disturbed turf. Sodding, ditch pavement and underdrain are not included as part of the inlet partial cost and are to be paid for separately.
3. Concrete inlet pavement and sodding shall be in accordance with the sections on this detail and with the Plan on Sheet 4 and Sections AA, BB and CC (as Case 1) and tabular quantities on Sheet 5.
4. Unit price and payment shall constitute full compensation for inlet conversion (including concrete inlet paving and replacement grate(s)), ditch reconstruction, restoration of disturbed turf, and shall be paid for under the contract price for Inlets (DT Bot) (Type --) (Partial), each.

Sodding shall be paid for under the contract unit price for Performance Turf, SY.

Ditch pavement shall be paid for separate from the inlet by pavement type(s) and unit(s) as called for in the plans.



SINGLE SLOT SHOWN (DOUBLE SLOTS SYMMETRICAL ABOUT CENTERLINE) SECTION CC (CASE 2)



SINGLE SLOT SHOWN (DOUBLE SLOTS SYMMETRICAL ABOUT CENTERLINE) SECTION CC (CASE 3)

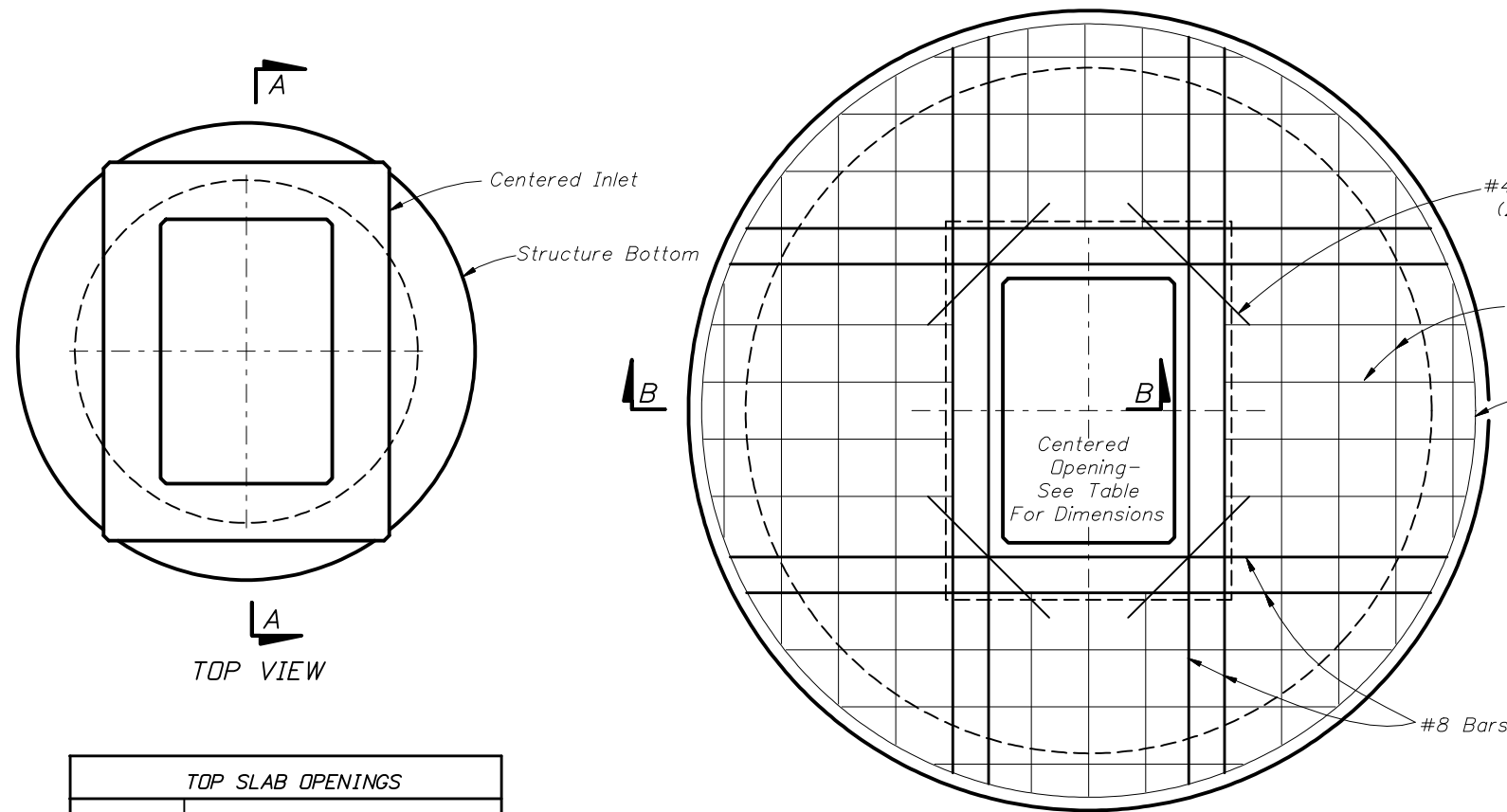
TRAVERSABLE SLOT INLETS (PARTIAL) FOR EXISTING INLETS



2010 FDOT Design Standards

**DITCH BOTTOM INLET
TYPES C, D, E & H**

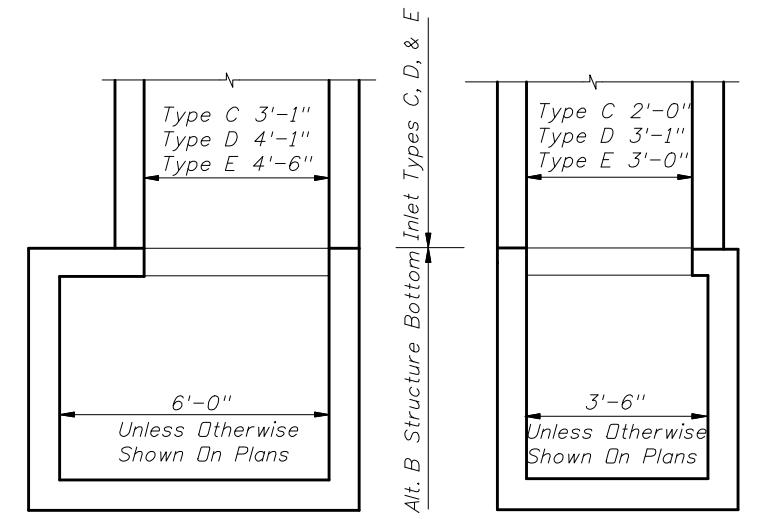
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TOP SLAB REINFORCING SCHEDULE	
SCHEDULE	GRADE 60 (BAR) OR 65 KSI & 70 KSI (WIRE FABRIC) In. ² /ft.
A	0.20
B	0.24
C	0.37
D	0.53
E	0.73
F	1.06
G	1.45

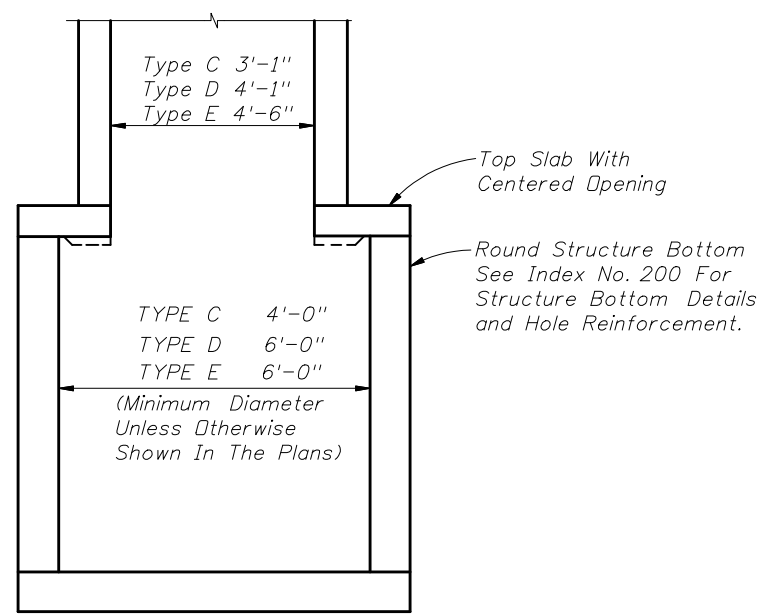
TOP SLAB OPENINGS		
DIAMETER	OPENING SIZE	
	MIN.	MAX.
4'-0"	2'-0" x 3'-1"	2'-0" x 3'-1"
5'-0"	2'-0" x 3'-1"	3'-1" x 4'-1"
6'-0"	2'-0" x 3'-1"	3'-0" x 4'-6"
8'-0"	2'-0" x 3'-1"	3'-0" x 4'-6"

TOP SLAB WITH CENTERED OPENING		
SLAB DEPTH	SLAB THICKNESS	REINFORCING (2 WAYS) SCHEDULE
SIZE: 4'-0"		
≥ 0.5'-40'	9 1/2"	C
SIZE: 5'-0"		
≥ 0.5' < 30'	9 1/2"	C
30'-40'	9 1/2"	D
SIZE: 6'-0"		
0.5' < 8'	9 1/2"	B
8' < 18'	9 1/2"	C
18' < 30'	9 1/2"	D
30' < 37'	9 1/2"	E
37'-40'	9 1/2"	G
SIZE: 8'-0"		
≥ 0.5' < 9'	11 1/2"	C
9' < 15'	11 1/2"	D
15' < 23'	11 1/2"	E
23' < 33'	11 1/2"	E
33'-40'	11 1/2"	G

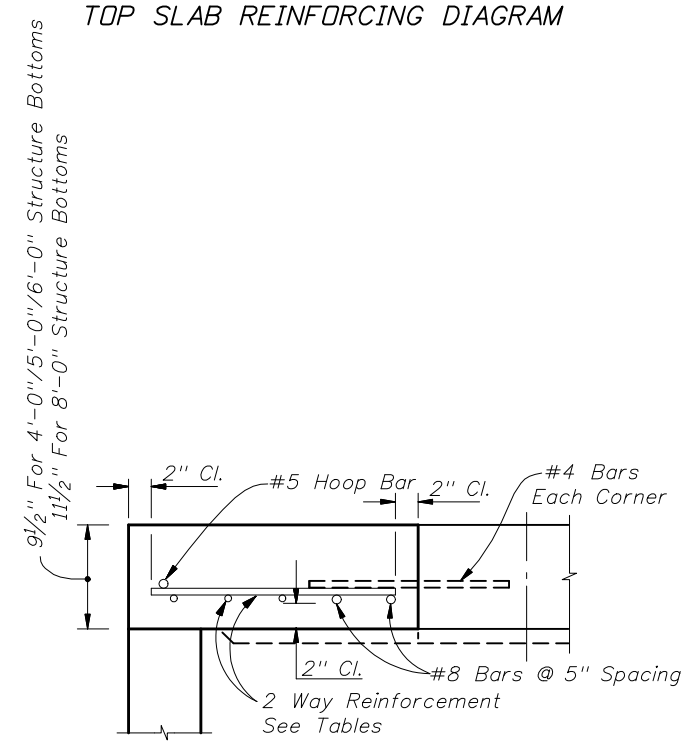


See Index No. 200 for structure bottom details and hole reinforcement.

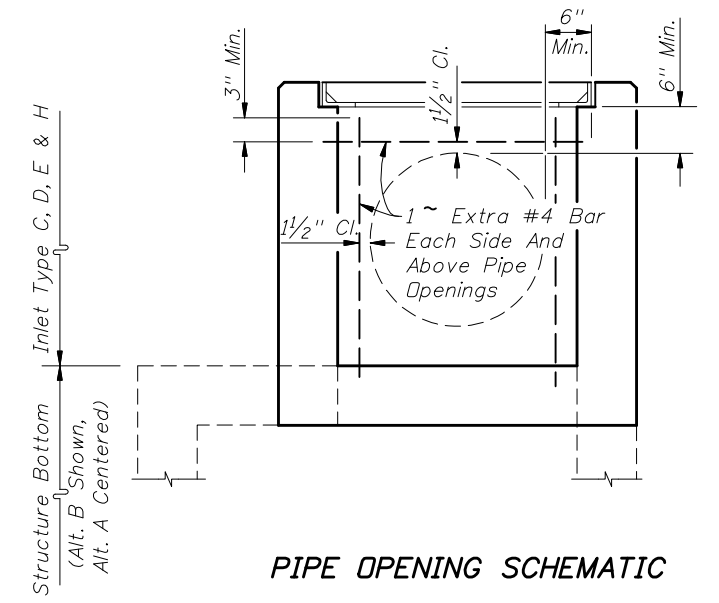
ALT. B STRUCTURE BOTTOM FOR INLETS TYPE C, D & E



SECTION AA

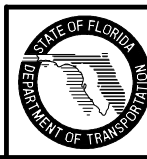


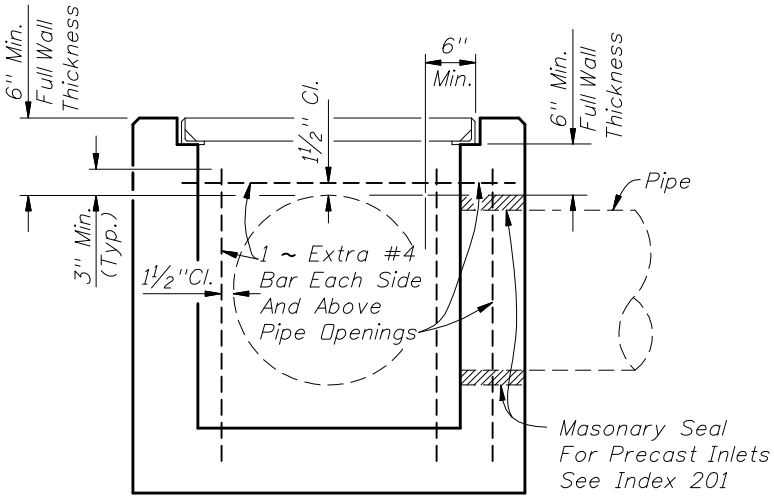
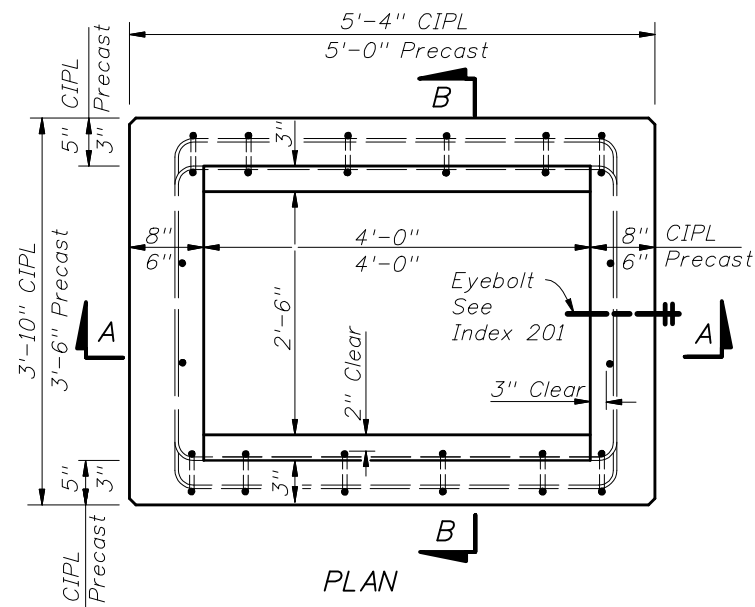
SECTION BB



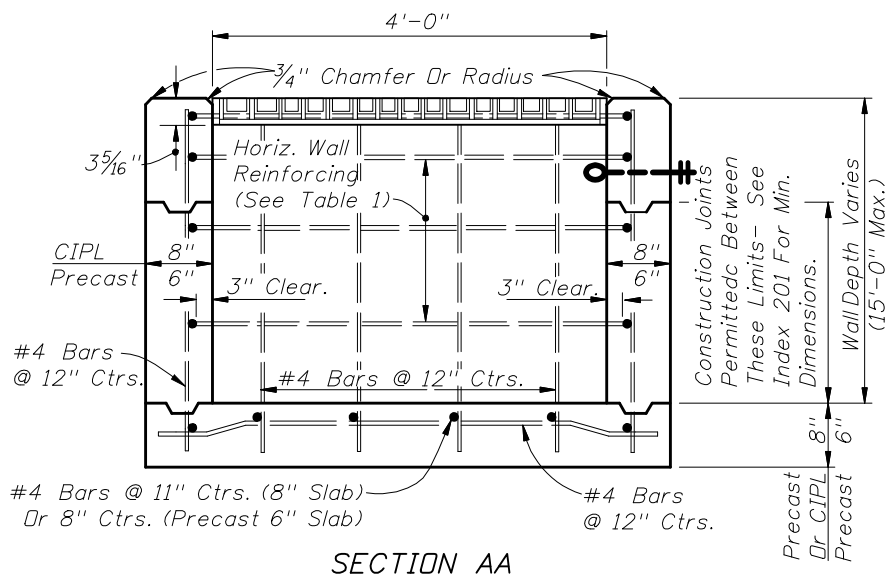
PIPE OPENING SCHEMATIC

ALT. A STRUCTURE BOTTOM FOR INLETS TYPE C, D AND E

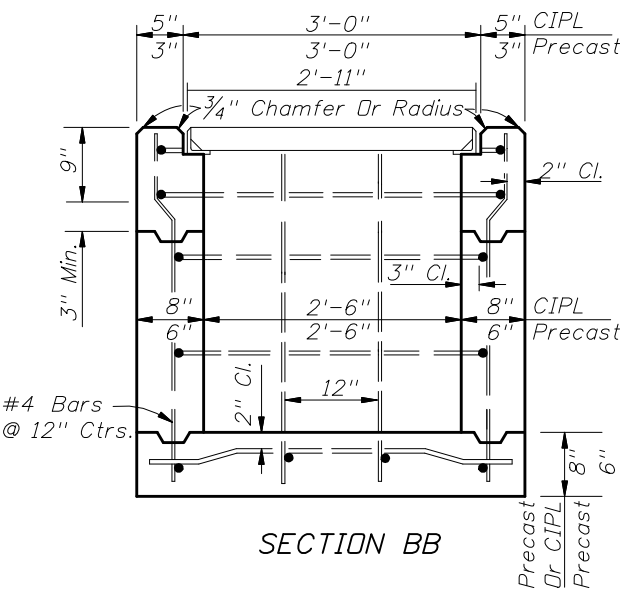




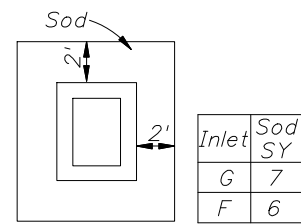
(TYPE F SHOWN, TYPE G SIMILAR)
PIPE OPENING SCHEMATIC



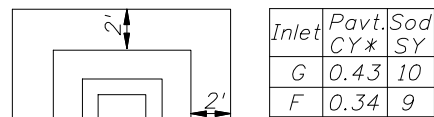
SECTION AA



SECTION BB

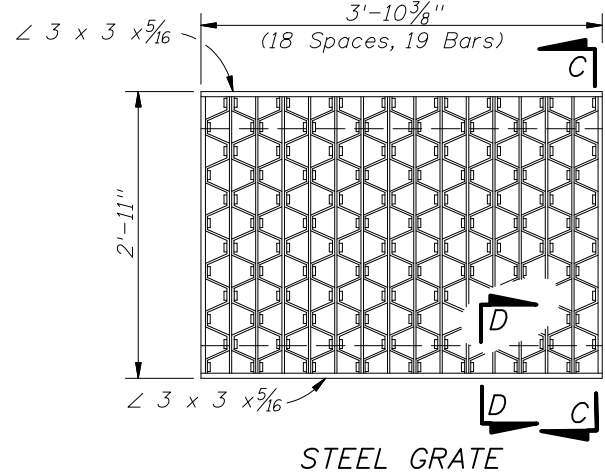


SOD ONLY



PAVT. AND SOD

*For Estimating Purposes Only



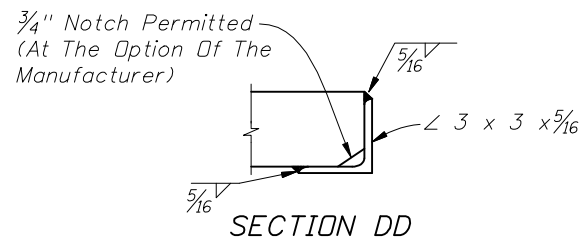
STEEL GRATE

Steel Grating, Straight Bars 3"x 1/4"
Reticuline Bars 2"x 3/16"

TYPE F



SECTION CC



SECTION DD

HORIZONTAL WALL REINF. SCHEDULES
TYPE F INLET (TABLE 1)

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0' - 4'	A12	0.20	12"	8"
4' - 7'	A6	0.20	6"	5"
7' - 12'	B5.5	0.24	5 1/2"	5"
12' - 15'	Special 1	0.267	5"	4"

GENERAL NOTES

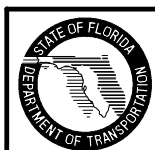
- These inlets are designed for use in ditches, medians, pavement areas, or other areas subject to heavy wheel loads, minimal debris, and bicycle traffic. This inlet may be placed in areas subject to occasional pedestrian traffic such as landscaped areas and pavement areas where pedestrians can walk around the inlet. When inlet is placed in areas subject to bicycle traffic, install filler bar when clearance or gap is greater than 1" as shown in Index 218 Inset B.
- When Alternate G grate is specified in plans, the grate is to be hot dip galvanized after fabrication.
- These inlets may be used with Alternate B structure bottoms, Index 200. The inlet and bottom combinations are to be paid for under the contract unit price for inlets (DT Bot) (Type F (or G)) (J Bot, Depth), Ea.
- All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
- For supplemental details, see Index 201.
- All reinforcing is Grade 60 bars with 2" min. cover unless otherwise noted. Bars to be cut or bent for 1 1/2" clearance around pipe opening. Provide one additional #4 bar above and at each side of pipe opening, as shown.
- All dimensions are for both precast and cast-in-place inlets unless otherwise noted.

RECOMMENDED MAXIMUM PIPE SIZES	
INLET INSIDE WIDTH	PIPE SIZE
2'-6" (Type F)	18"
4'-0" (Type F)	30"
4'-10" / 5'-0" (Type G)	42"

Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 201. For larger pipe sizes see Note 3.

- Notes:
- Pavement and/or sod to be used only where called for in the plans.
 - Cost of paving to be included in cost of inlet.

PAVEMENT AND SODDING

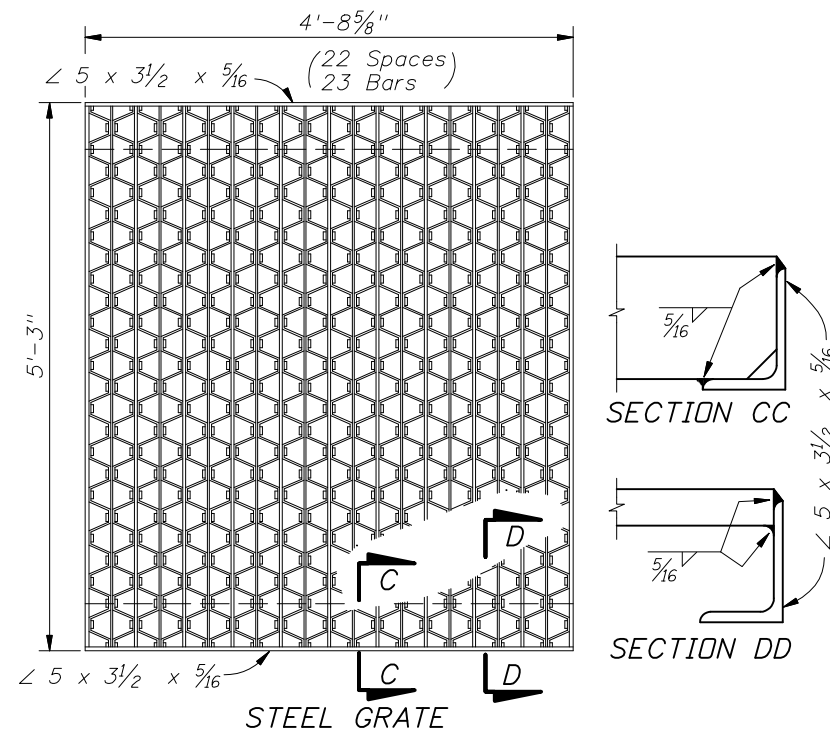
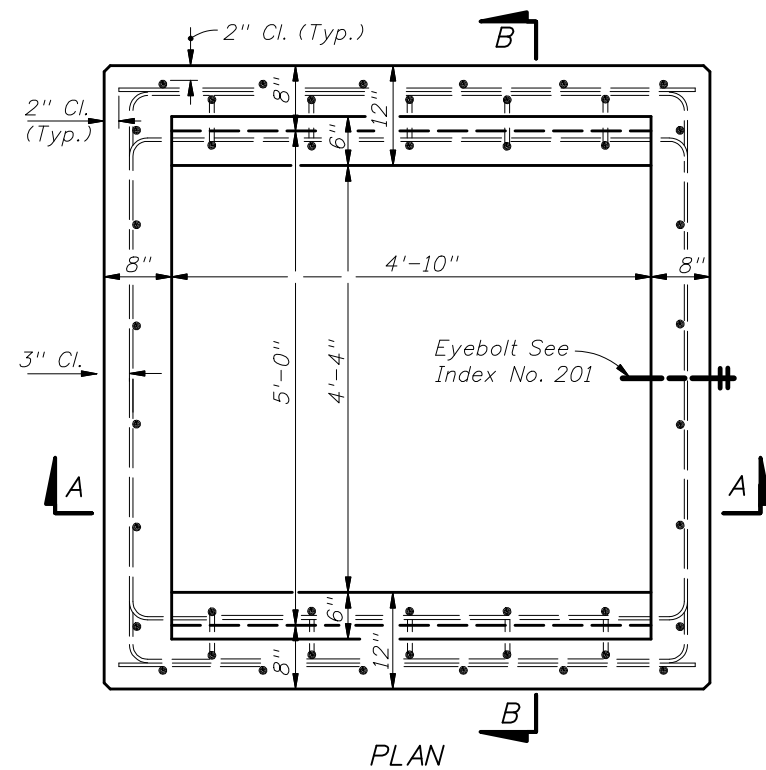


2010 FDOT Design Standards

DITCH BOTTOM INLET
TYPE F & G

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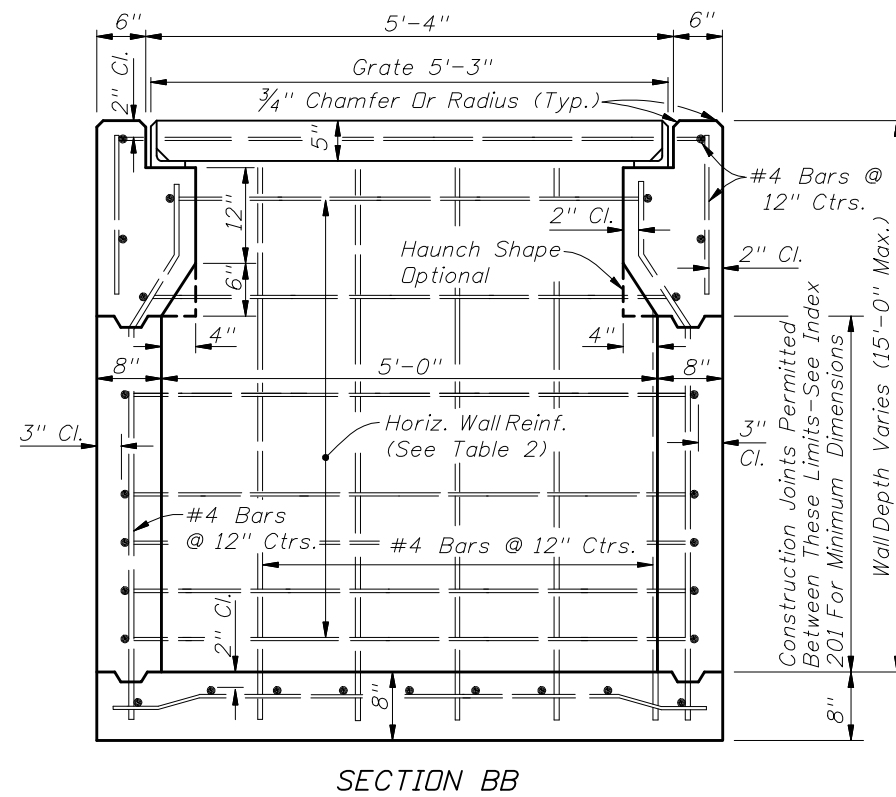
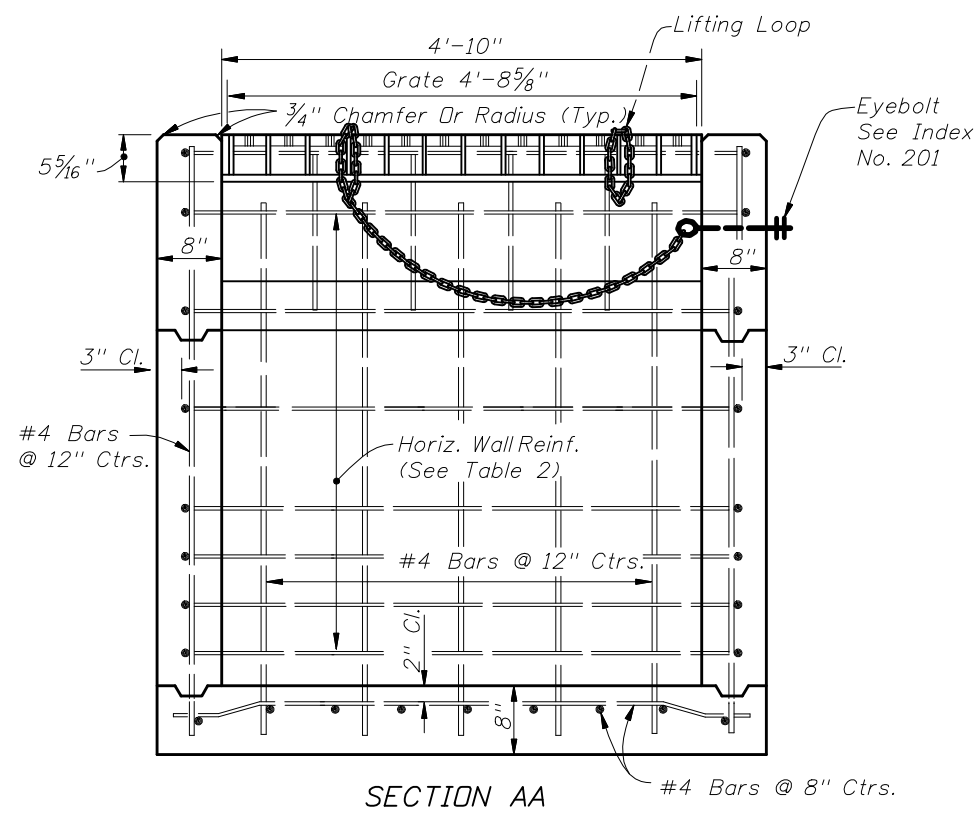
Index No. 233



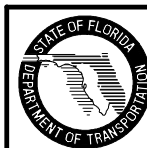
5" Steel Decking, Weight 630 Lbs. Main Bars 5" x 1/4"
Intermediate Bars 1 1/2" x 1/4", Reticuline Bars 1 1/4" x 3/16"

TYPE G INLET (TABLE 2)

WALL DEPTH	SCHEDULE	AREA (in. ² /ft.)	MAX. SPACING	
			BARS	WWF
0' - 3'	A12	0.20	12"	8"
3' - 7'	A6	0.20	6"	5"
7' - 10'	B5.5	0.24	5 1/2"	5"
10' - 15'	C6.5	0.37	6 1/2"	6"



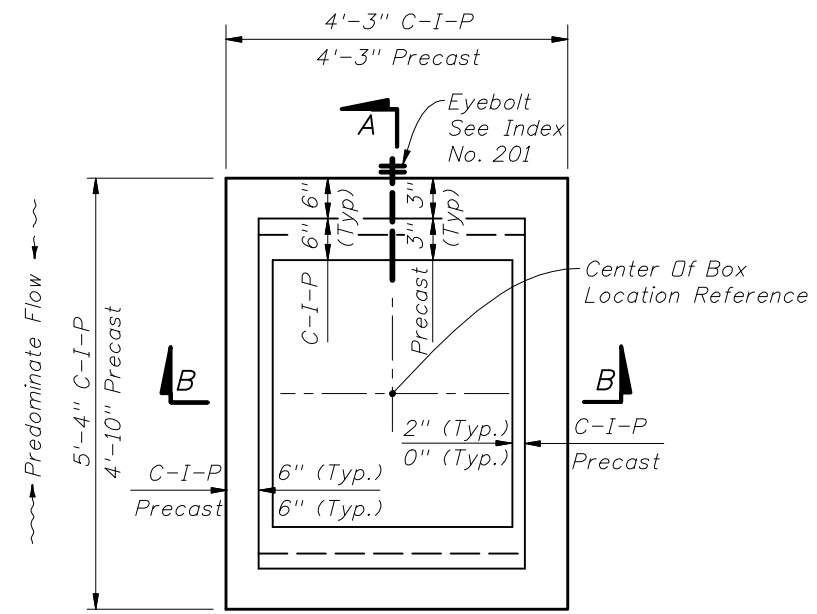
TYPE G



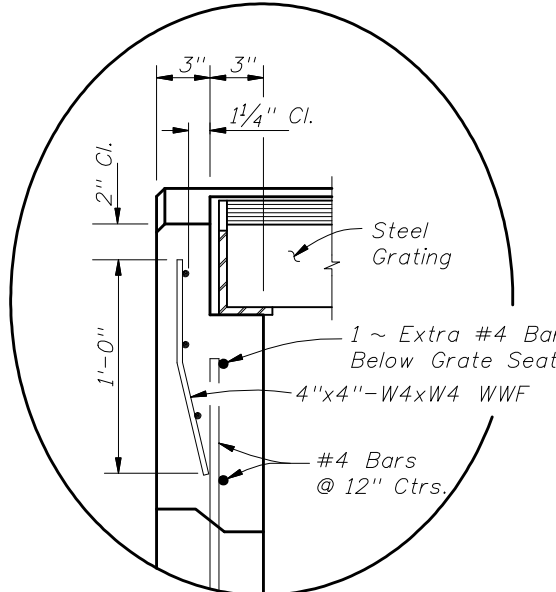
2010 FDOT Design Standards

DITCH BOTTOM INLET
TYPES F & G

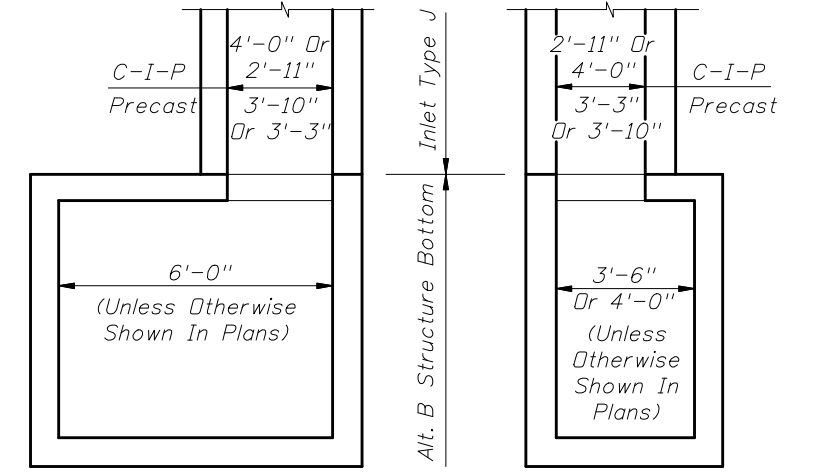
Last Revision	Sheet No.
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Index No.	
233	



PLAN
(CAST-IN-PLACE INLET SHOWN, WITHOUT GRATE, PRECAST INLET SIMILAR)



INSET A
(PRECAST OPTION)



NOTE: Alt. B Structure Bottom Only. See Index No. 200 for structure bottom details and hole reinforcement.
INLET WITH STRUCTURE BOTTOM

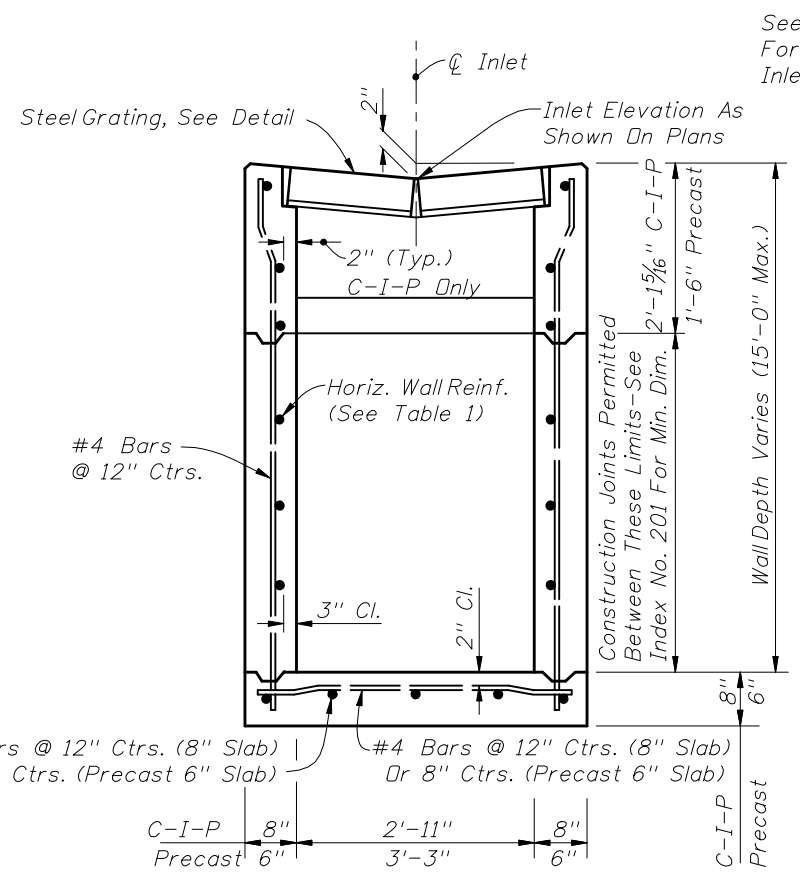
HORIZONTAL WALL REINFORCING SCHEDULE (TABLE 1)

WALL DEPTH	SCHEDULE	AREA (In ² /ft)	MAX. SPACING	
			BARS	WWF
0' - 4'	A12	0.20	12"	8"
4' - 9'	A6	0.20	6"	5"
9' - 12'	A4	0.20	4"	3"
9' - 15'	B5.5	0.24	5 1/2"	5"

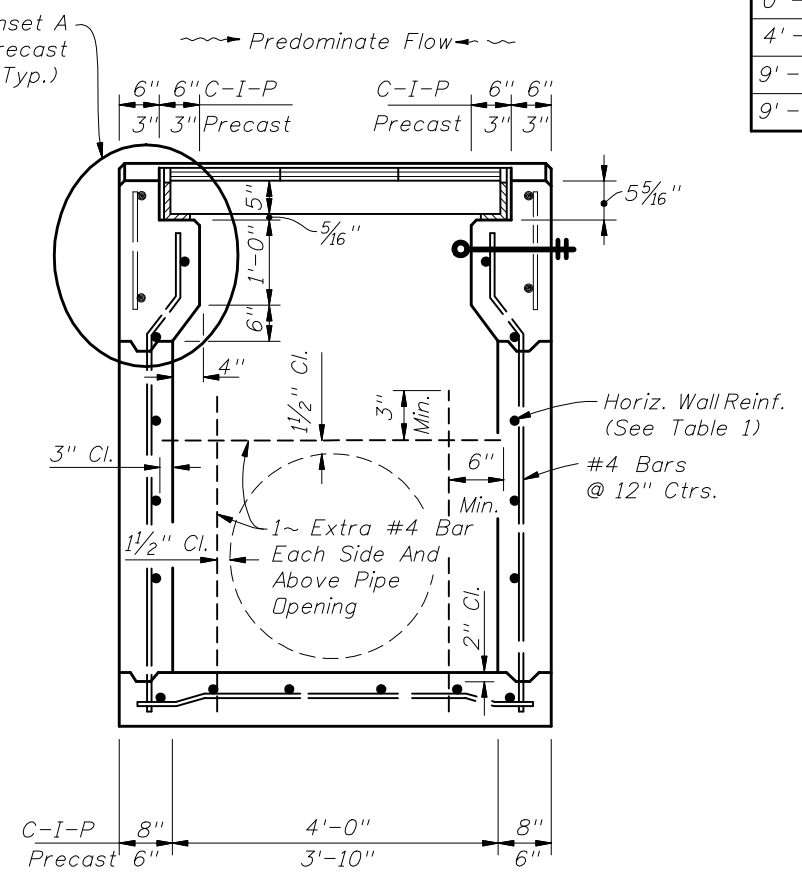
RECOMMENDED MAXIMUM PIPE SIZES

INLET INSIDE WIDTH	PIPE SIZE
2'-11" or 3'-3"	24"
3'-10" or 4'-0"	30"

Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 201. For larger pipe, see Structure Bottom detail above and Index No. 200.



(Pipe Opening Not Shown)
SECTION BB

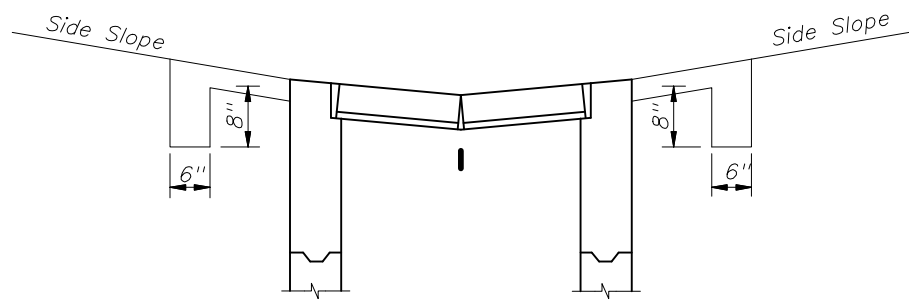


(Pipe Opening Shown)
SECTION AA

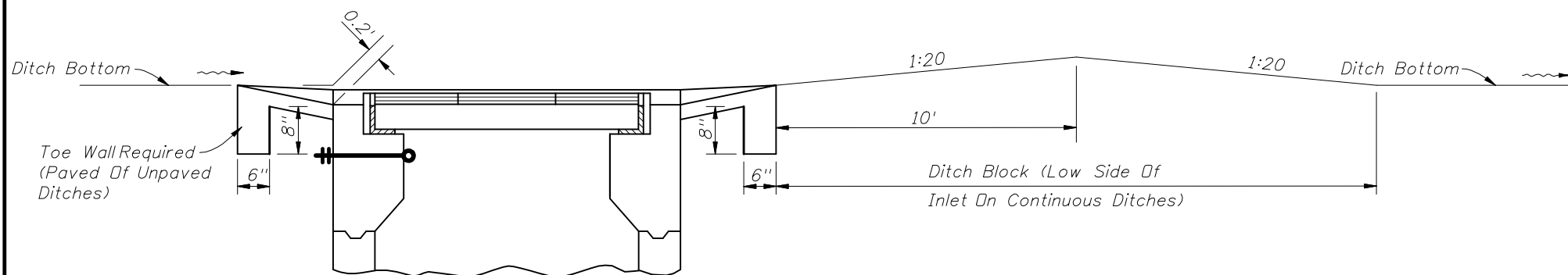
GENERAL NOTES

1. This inlet is designed for use in ditches, medians, pavement areas or other areas subject to heavy wheelloads with minimal debris. This inlet is not for use in areas subject to bicycle traffic. This inlet may be placed in areas subject to occasional pedestrian traffic such as landscaped areas and pavement areas where pedestrians can walk around the inlet.
2. All reinforcing Grade 60 bars with 2" min. cover unless otherwise noted. See Index No. 201 for equivalent area of welded wire fabric. Cut or bend bars out of way of pipe when necessary; bars to clear pipe by 1 1/2".
3. All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
4. When alternate G grate is specified in plans the grate is to be hot dip galvanized after fabrication.
5. For supplemental details, see Index No. 201.
6. All dimensions are for both precast and cast-in-place inlets unless otherwise noted.
7. Cost of ditch paving to be included in cost of inlet. Sodding to be paid for under contract unit price for Performance Turf, SY.

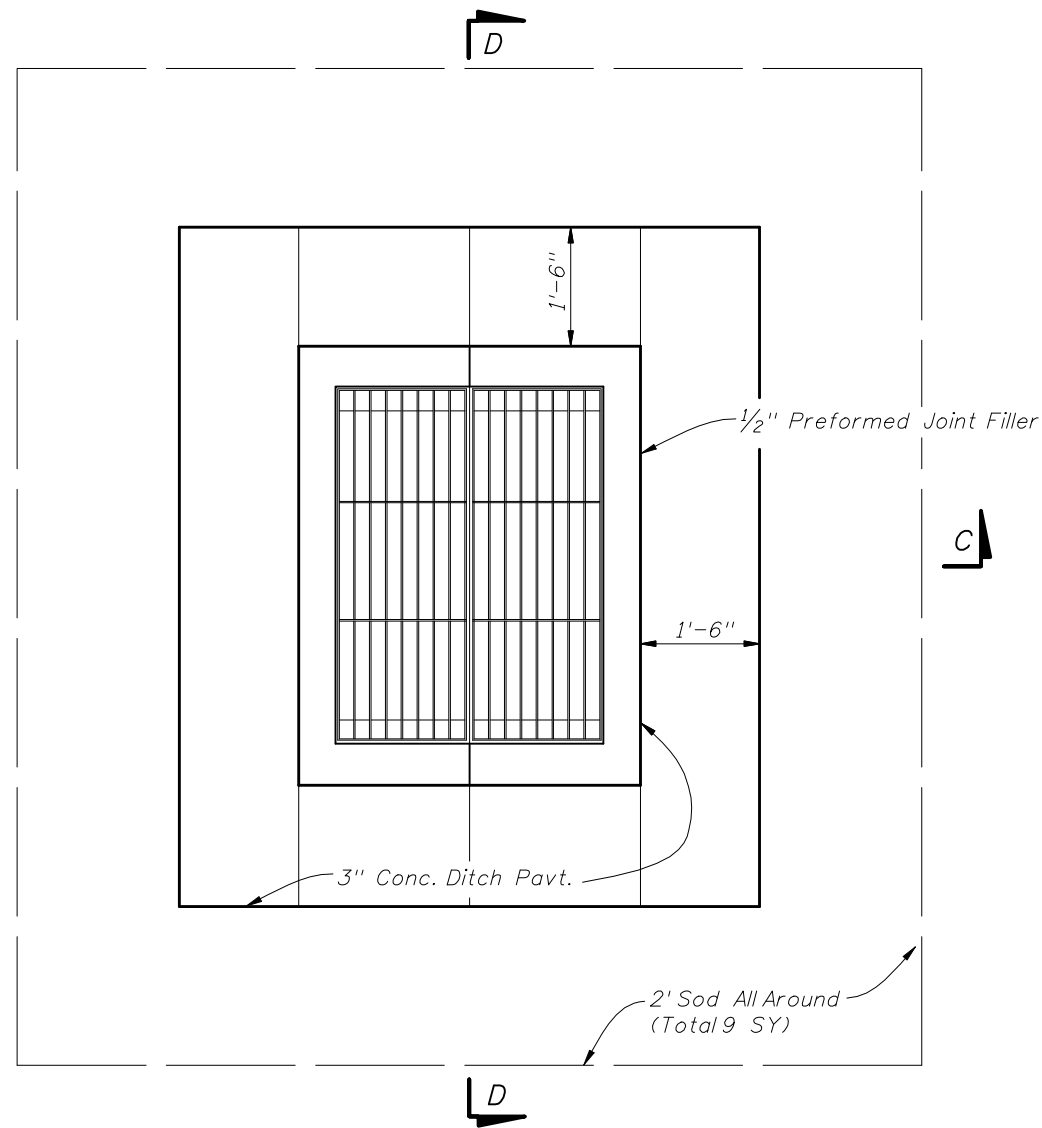




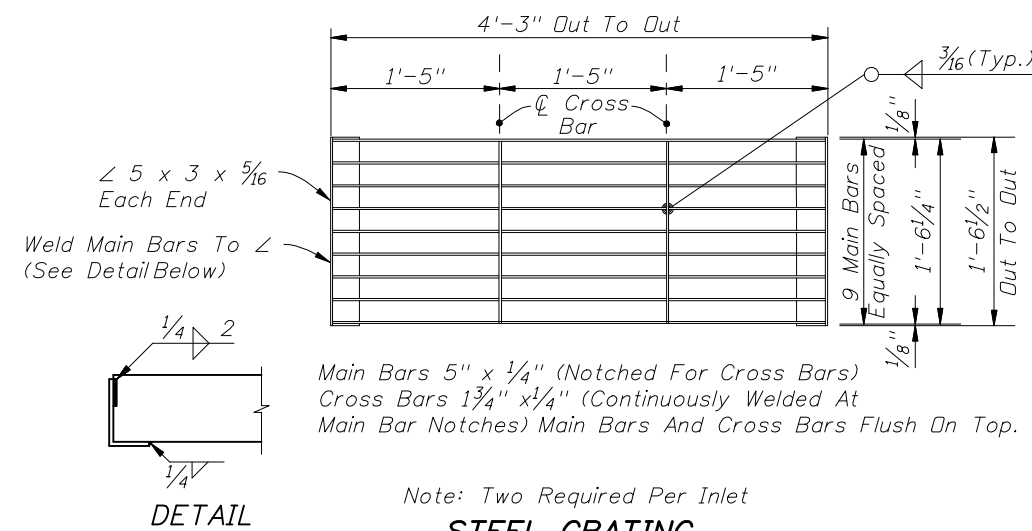
SECTION CC



SECTION DD

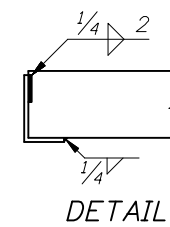


PAVEMENT & SODDING



Main Bars 5" x 1/4" (Notched For Cross Bars)
 Cross Bars 1 3/4" x 1/4" (Continuously Welded At
 Main Bar Notches) Main Bars And Cross Bars Flush On Top.

Note: Two Required Per Inlet
STEEL GRATING



DETAIL



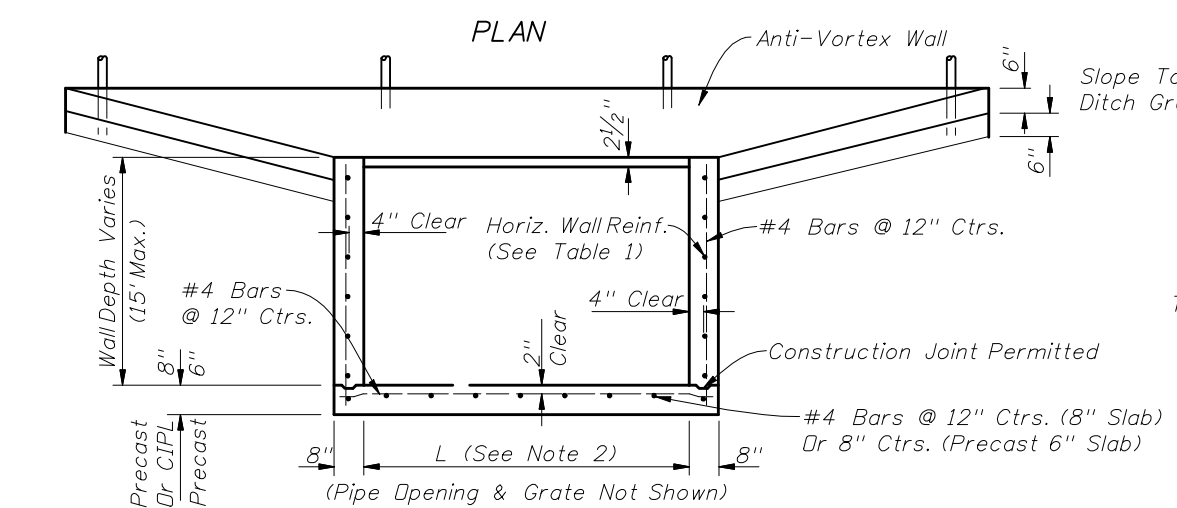
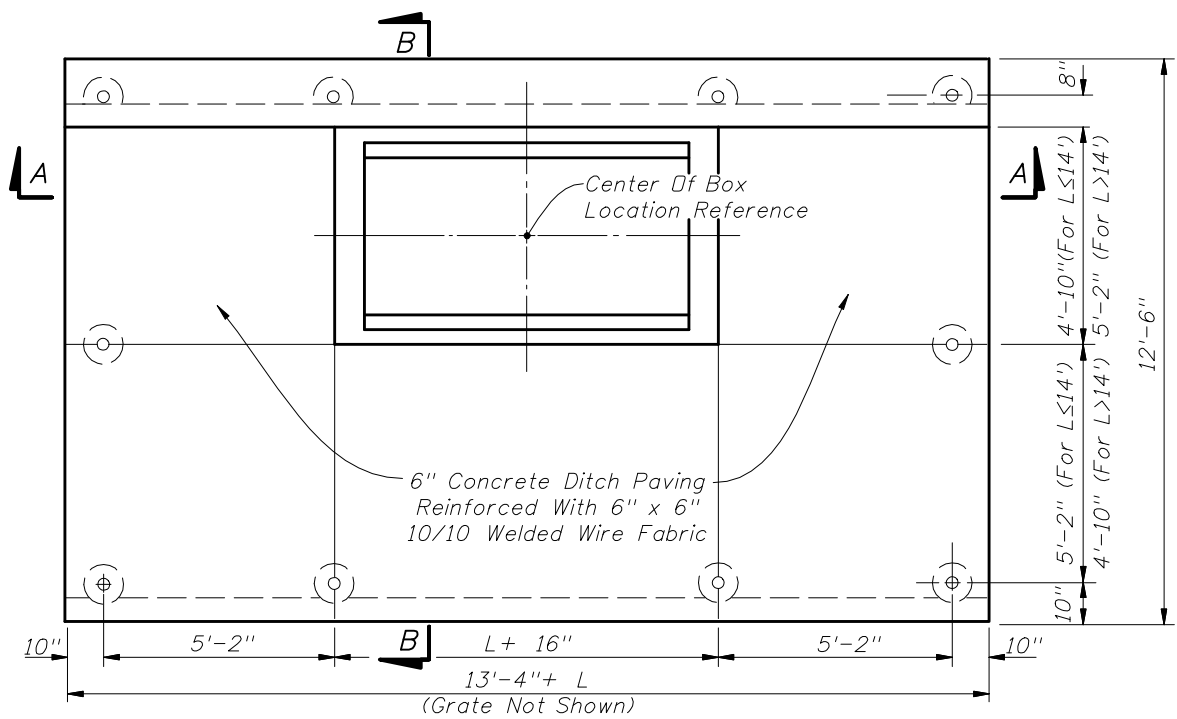
2010 FDOT Design Standards

**DITCH BOTTOM INLET
 TYPE J**

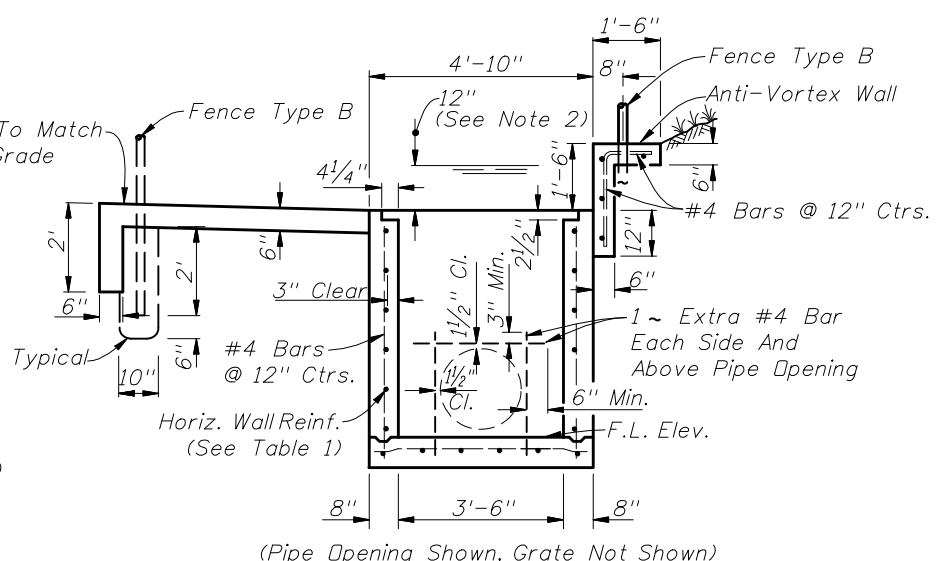
Last
 Revision
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 2 of 2

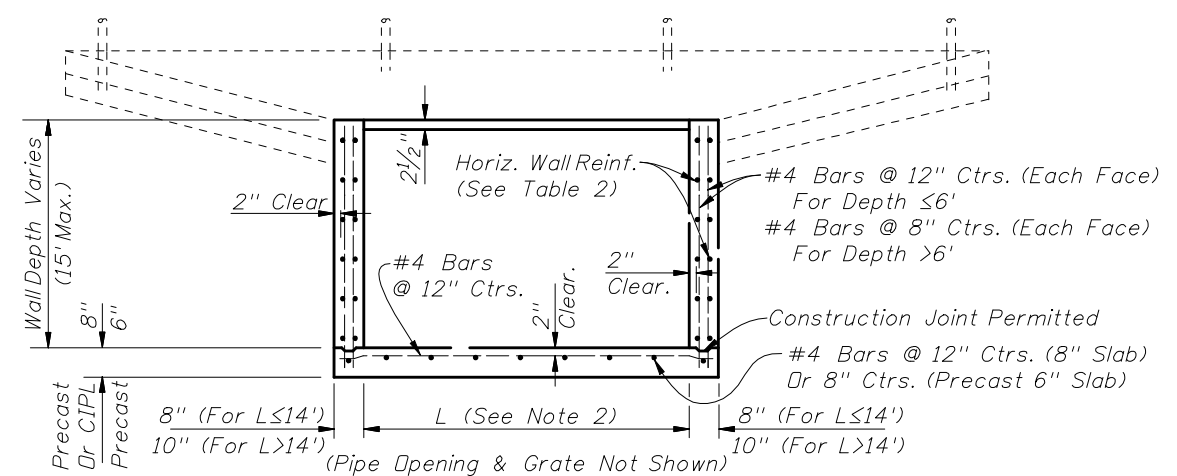
Index No.
234



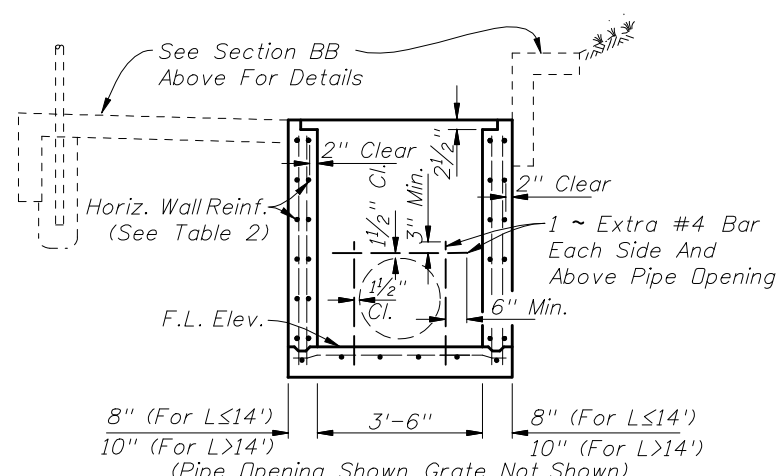
SECTION AA
INLET LENGTHS (L) LESS THAN OR EQUAL TO 9' (SINGLE LAYER WALL REINFORCING)



SECTION BB
(Pipe Opening Shown, Grate Not Shown)



SECTION AA
INLET LENGTHS (L) GREATER THAN OR EQUAL TO 9' (DOUBLE LAYER WALL REINFORCING)



SECTION BB
(Pipe Opening Shown, Grate Not Shown)

GENERAL NOTES

1. This inlet is to be used at locations having high flow rates, usually where an endwall could not be utilized without hazardous intake.
2. Inlet length (L) shall be set by the designer for the greater of either culvert requirement or inlet pool not to exceed 12' depth. Structures over 6 feet in depth are to be checked for flotation by the designer of project drainage.
3. This inlet is not intended for use with Index 200 structure bottoms.
4. All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
5. Inlet and anti-vortex wall to be Class II Concrete.
6. All reinforcing is Grade 60 with 2" min. cover unless otherwise noted. See Index No. 201 for equivalent area of welded wire fabric (WWF). Bars to be cut or bent for 1/2" clearance around pipe opening. Bend top and corner bars to clear anchor holes.
7. Channel section C 3x6 at 14" max. bar spacing may be used as an alternate for the C 4x5.4 channel at 15" bar spacing.
8. Channels and bars for grate shall be ASTM A242/A242M, A572/A572M or A588/A588M, Grade 50 steel, and galvanized in accordance with Specification Section 975.
9. Fence enclosure shall be Fence Type B (Index No. 802). All posts to be set in concrete. A minimum of 10 posts required. Corner and approach side posts to be 3" nominal diameter.
10. Cost of ditch paving, anti-vortex wall, grate, concrete, reinforcing steel and fence enclosure to be included in the cost of inlet. Inlet to be paid for under the contract unit price for Inlets (DT Bot) (Type K), Each.
11. Anchor Bolts shall be ASTM F1554 Grade 36 fully threaded headless bolts, installed in accordance with Specification Sections 416 and 937. Nuts shall be ASTM A563 or A194 and washers shall be ASTM F436 or Type A plain washers. All nuts, bolts and washers shall be galvanized.

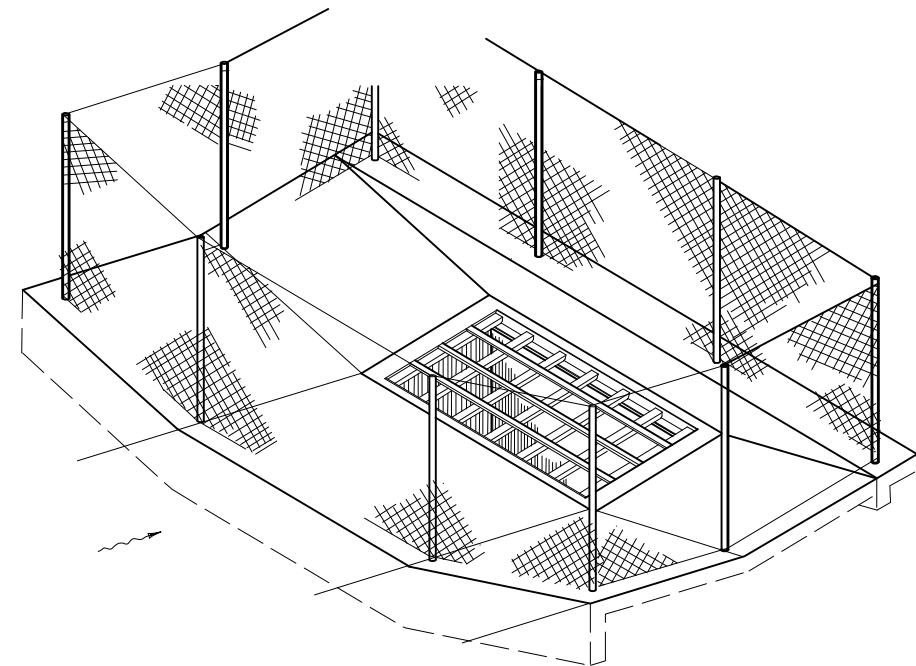


HORIZONTAL WALL REINFORCING SCHEDULES

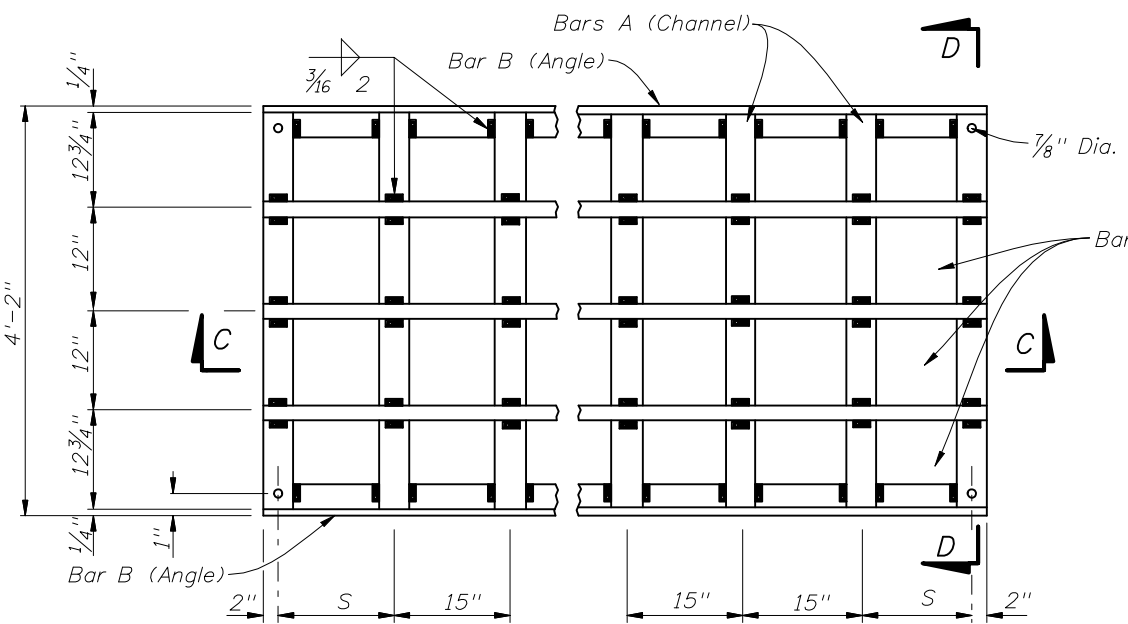
WALL DEPTH	SCH.	AREA (in. ² /ft.)	MAX. SPACING BARS	WMF
SIZE: L=5'-0"				
0'-5'	A12	0.20	12"	8"
5'-8'	A6	0.20	6"	5"
8'-15'	B5.5	0.24	5½"	5"
SIZE: L=6'-0"				
0'-4'	A12	0.20	12"	8"
4'-6'	B5.5	0.24	5½"	5"
6'-9'	C6.5	0.37	6½"	6"
9'-15'	C3.5	0.37	3½"	3"
SIZE: L=7'-0"				
0'-4'	B5.5	0.24	5½"	5"
4'-7'	C6.5	0.37	6½"	6"
7'-15'	D4.5	0.53	4½"	4"
SIZE: L=8'-0"				
0'-3'	B5.5	0.24	5½"	5"
3'-5'	C6.5	0.37	6½"	6"
5'-9'	D4.5	0.53	4½"	4"
9'-15'	E5	0.73	5"	4"
SIZE: L=9'-0"				
0'-4'	C6.5	0.37	6½"	6"
4'-7'	D4.5	0.53	4½"	4"
7'-15'	E3	0.73	3"	3"
SIZE: L=10'-0"				
0'-3'	A12	0.20	12"	8"
3'-5'	A6	0.20	6"	5"
5'-8'	C6.5	0.37	6½"	6"
8'-15'	C3.5	0.37	3½"	3"
SIZE: L=12'-0"				
0'-4'	B5.5	0.24	5½"	5"
4'-6'	C6.5	0.37	6½"	6"
6'-15'	D4.5	0.53	4½"	4"
SIZE: L=14'-0"				
0'-4'	C6.5	0.37	6½"	6"
4'-7'	D4.5	0.53	4½"	4"
7'-15'	E5	0.73	5"	4"
SIZE: L=16'-0" x 10" WALL THICK				
0'-4'	C6.5	0.37	6½"	6"
4'-8'	D4.5	0.53	4½"	4"
8'-15'	E5	0.73	5"	4"
SIZE: L=18'-0" x 10" WALL THICK				
0'-3'	C6.5	0.37	6½"	6"
3'-5'	D4.5	0.53	4½"	4"
5'-8'	E5	0.73	5"	4"
8'-15'	F5	1.06	5"	4"

GRATE QUANTITIES								
PIPE SIZE	L	S	BILL OF STEEL			STEEL WEIGHT		
			BAR	No. REQD.	LENGTH	CHANNEL 3"x 2½"x ¼" (4.5#/FT.)	ANGLE 3"x 2½"x ¼" (4.5#/FT.)	FLAT 2" x ½" (3.4#/FT.)
30" & 36"	5'-0"	12¾"	A	5	4'-1½"	111	45	
			B	2	4'-11½"			51
			C	3	4'-11½"			
42" & 48"	6'-0"	11¼"	A	6	4'-1½"	134	54	
			B	2	5'-11½"			61
			C	3	5'-11½"			
54" & 60"	7'-0"	9¾"	A	7	4'-1½"	156	63	
			B	2	6'-11½"			71
			C	3	6'-11½"			
66" & 72"	8'-0"	8¼"	A	8	4'-1½"	178	72	
			B	2	7'-11½"			81
			C	3	7'-11½"			
84"	9'-0"	14¼"	A	8	4'-1½"	178	81	
			B	2	8'-11½"			91
			C	3	8'-11½"			
SPECIAL	10'-0"	12¾"	A	9	4'-1½"	201	90	
			B	2	9'-11½"			102
			C	3	9'-11½"			
SPECIAL	12'-0"	9¾"	A	11	4'-1½"	245	108	
			B	2	11'-11½"			122
			C	3	11'-11½"			
SPECIAL	14'-0"	14¼"	A	12	4'-1½"	267	126	
			B	2	13'-11½"			142
			C	3	13'-11½"			
SPECIAL	16'-0"	11¼"	A	14	4'-1½"	312	144	
			B	2	15'-11½"			163
			C	3	15'-11½"			
SPECIAL	18'-0"	8¼"	A	16	4'-1½"	356	162	
			B	2	17'-11½"			183
			C	3	17'-11½"			

Table Notes:
See Sheet No. 1 of 2 for dimension "L" location.
See steel grate Plan View for dimension "S" location.

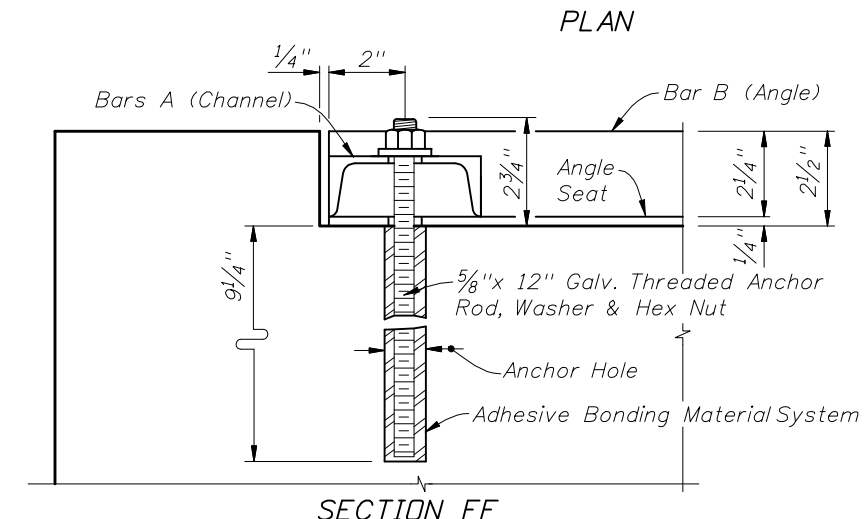


ISOMETRIC OF INLET FENCE ENCLOSURE

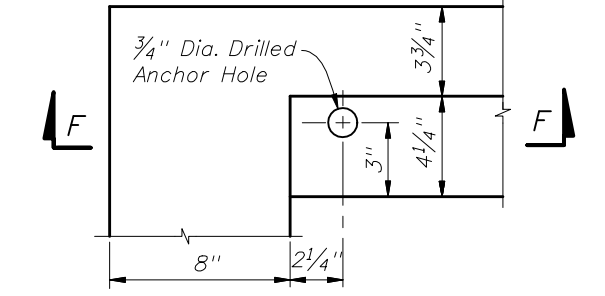


SINGLE LAYER REINFORCING (TABLE 1)

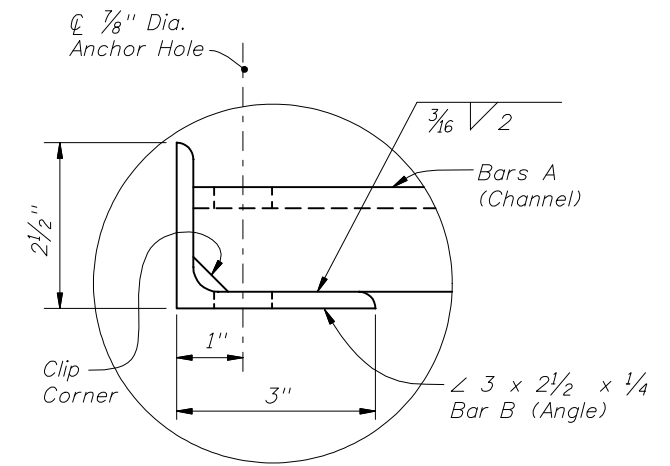
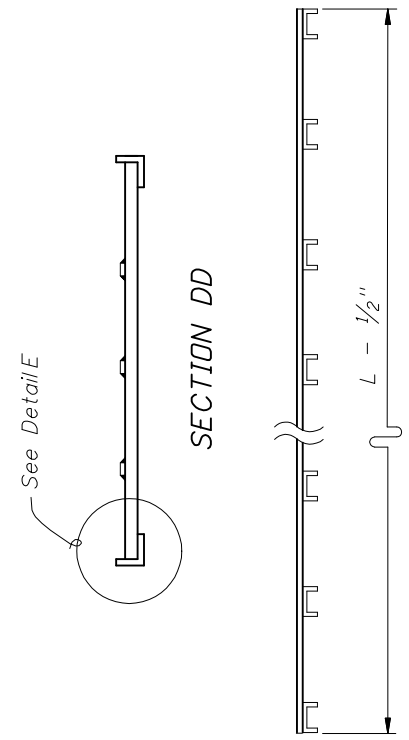
DOUBLE LAYER REINFORCING (TABLE 2)



STEEL GRATE

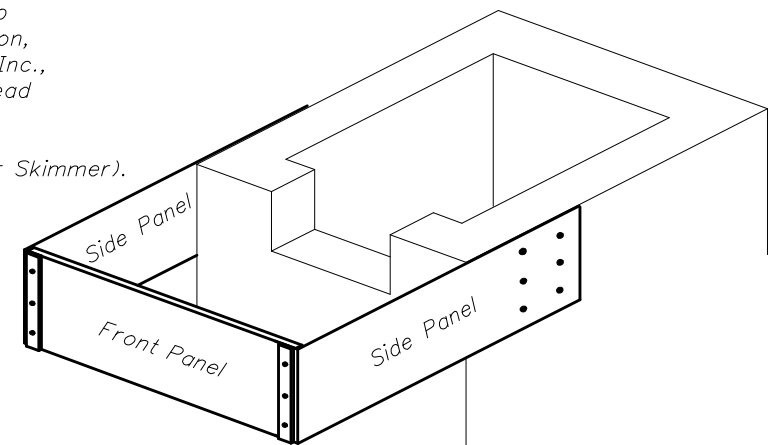
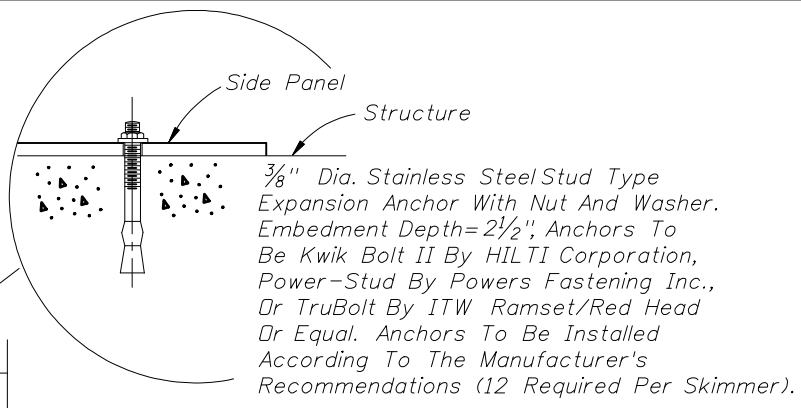
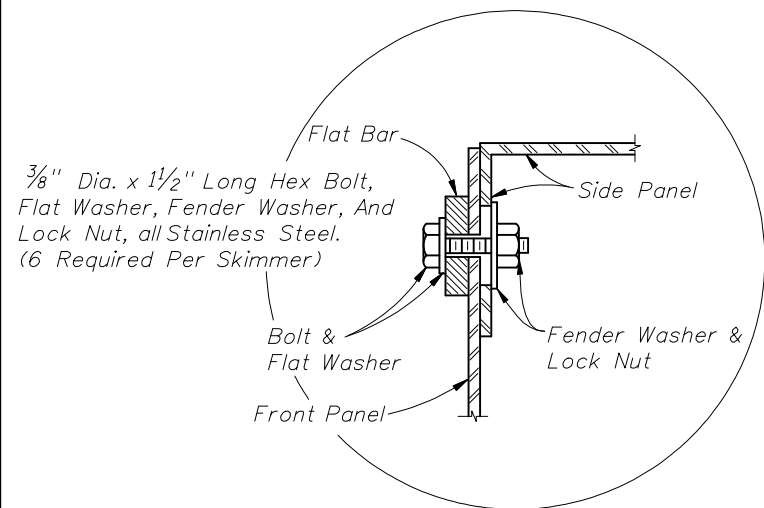


GRATE SEAT AND ANCHOR HOLE PLAN

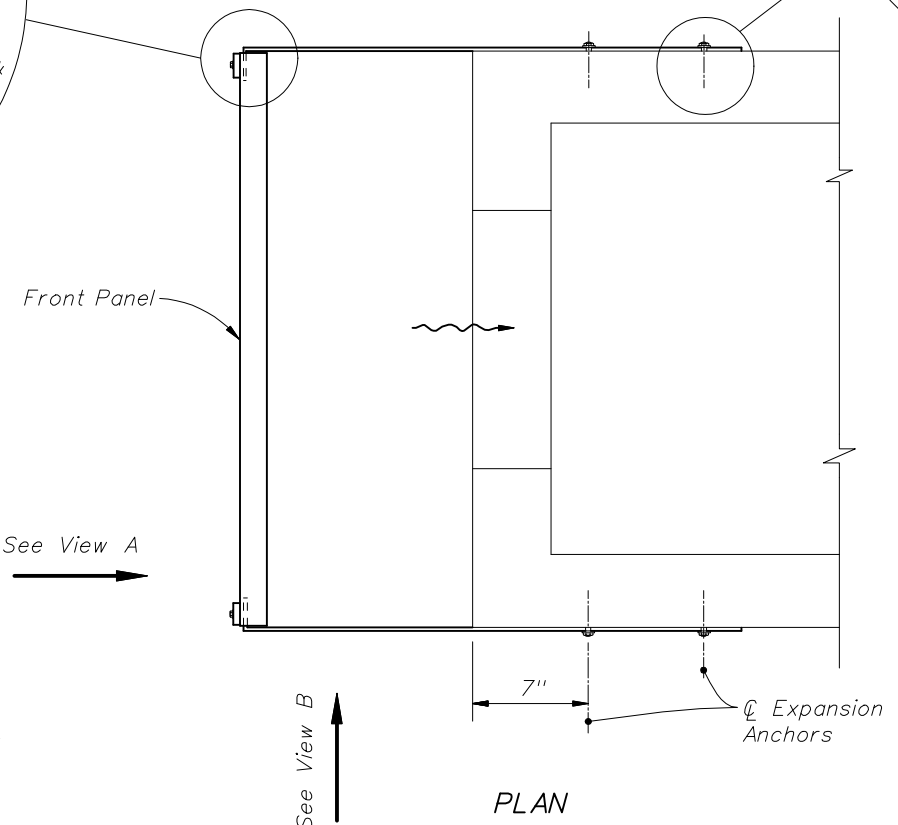


DETAIL E





PICTORIAL VIEW

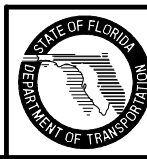
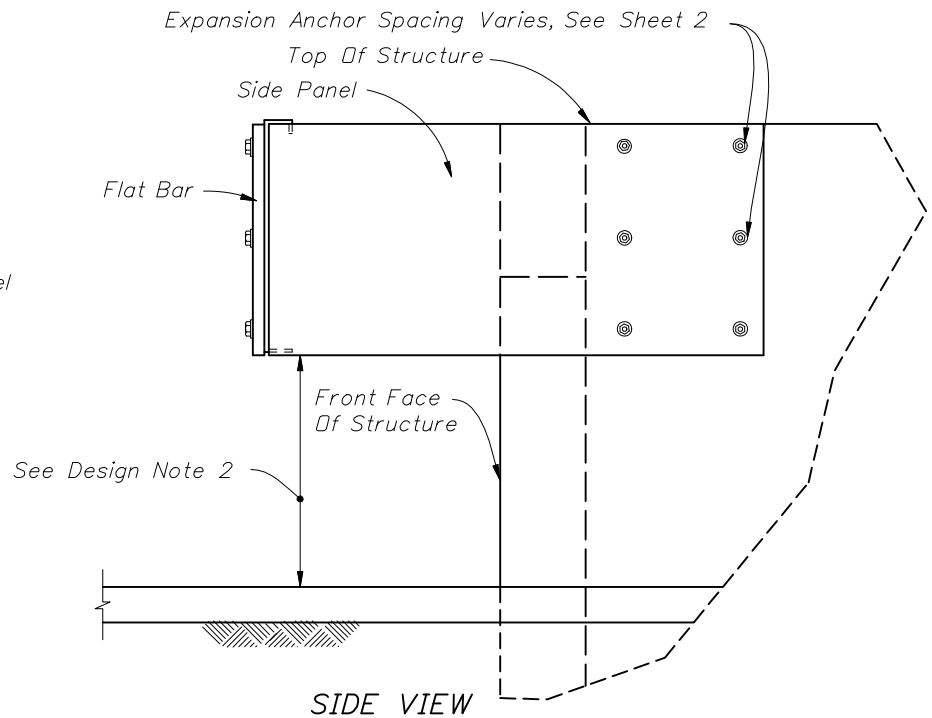
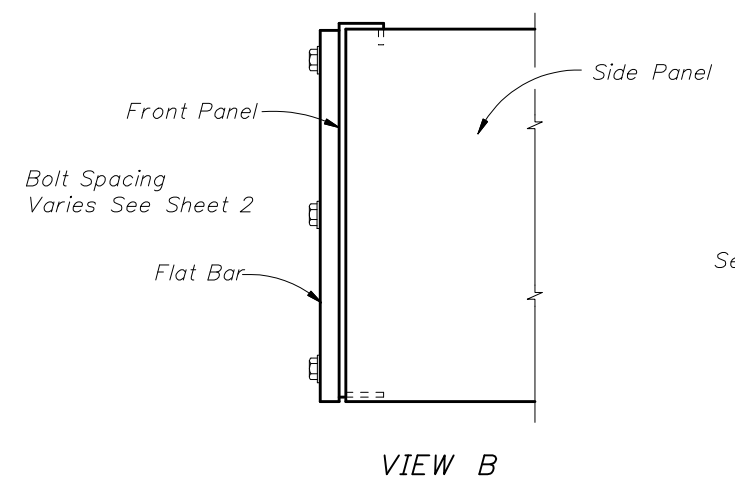
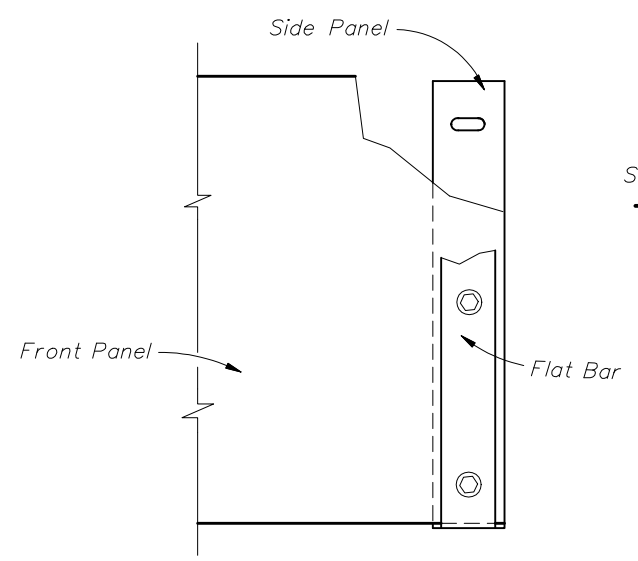


GENERAL NOTES

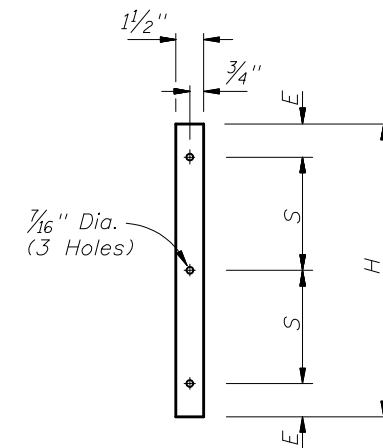
1. This skimmer is intended for use on Type C, D, or E Ditch Bottom Inlets that are used as outlet control structures of stormwater management facilities.
2. The side panels are dimensionally symmetric, therefore they may be used on either side of the structure.
3. Two (2) skimmers may be constructed on one structure provided they are on opposite ends.
4. The width of the front panel (dimension W) shall be the same as the outside dimension across the front of the structure.
5. The front panel, side panels, and flat bars are to be hot dip galvanized after fabrication.
6. The location of the reinforcing steel in these structures must conform to the applicable standards to avoid conflict with the expansion anchors used to attach the skimmer.
7. Grates to be used on the inlets unless otherwise specified in the plans.
8. A skimmer consists of two (2) side panels, one front panel, two (2) flat bars, and accessory hardware. The cost of skimmers is to be included in the cost of the inlet.

DESIGN NOTES

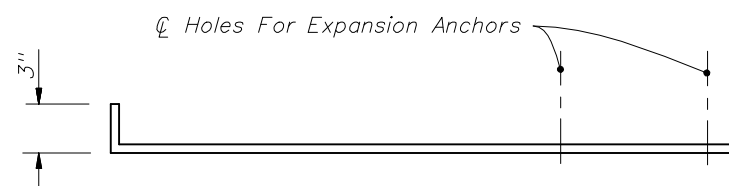
1. The designer must specify, in the plans, the skimmer height (dimension H) and the sides where the weir slots and skimmers are located. The skimmer height must be one of the dimensions shown in the table on Sheet 2. The skimmer should not be used on structure sides with outside dimensions greater than 6'-4".
2. To minimize hydraulic losses across the skimmer, the flow area under the skimmer should be three times larger than the flow area of the weir slot. The distance between the pond bottom at the structure and the skimmer shall be not less than 1 foot.
3. The configuration of skimmers may be subject to regulatory requirements. The designer should coordinate the outlet control structure details with the permitting agencies.
4. Where this skimmer is used, the designer should reference this index with the outlet control structure details. Where a different skimmer design is needed, the designer should provide skimmer details in the plans.
5. The designer shall evaluate if a grate is needed for safety reasons. Where a grate is not needed for safety reasons and is not desirable for hydraulic or other reasons, the designer may omit the grate by stating so in the outlet control structure details.
6. The designer must show the configuration of the weir slots in the outlet control structure detail.



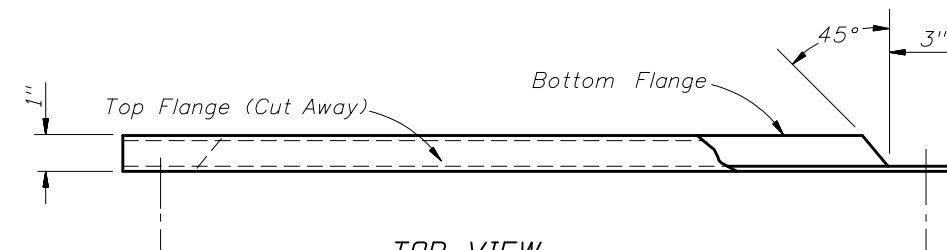
DIMENSIONS				
Skimmer Height As Specified In The Plans H	D	E	L	Bolt Spacing S
Inches				
12	3	3 ³ / ₁₆	28	3
14	3	3 ³ / ₁₆	28	4
16	3	3 ³ / ₁₆	28	5
18	3	3 ³ / ₁₆	28	6
20	4	4 ³ / ₁₆	31	6
22	4	4 ³ / ₁₆	31	7
24	4	4 ³ / ₁₆	31	8
26	4	4 ³ / ₁₆	31	9
28	4	4 ³ / ₁₆	31	10
30	5	5 ³ / ₁₆	31	10
32	5	5 ³ / ₁₆	31	11
34	5	5 ³ / ₁₆	31	12
36	6	6 ³ / ₁₆	31	12
38	6	6 ³ / ₁₆	31	13
40	6	6 ³ / ₁₆	31	14



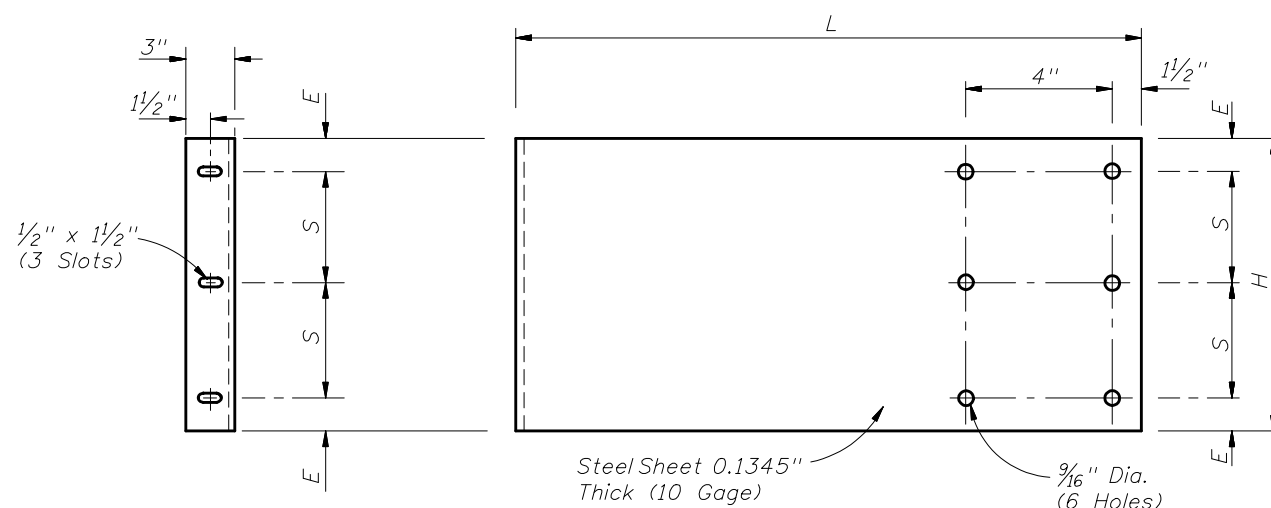
1/4" Thick x 1/2" Wide
FLAT BAR



TOP VIEW



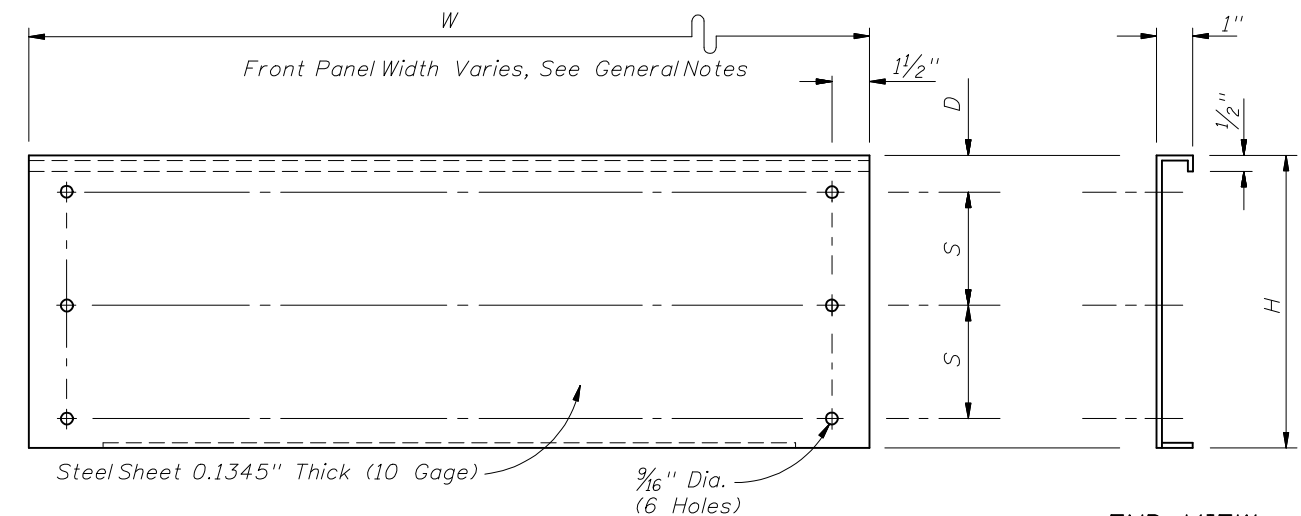
TOP VIEW



END VIEW (FRONT)

SIDE VIEW

SIDE PANEL

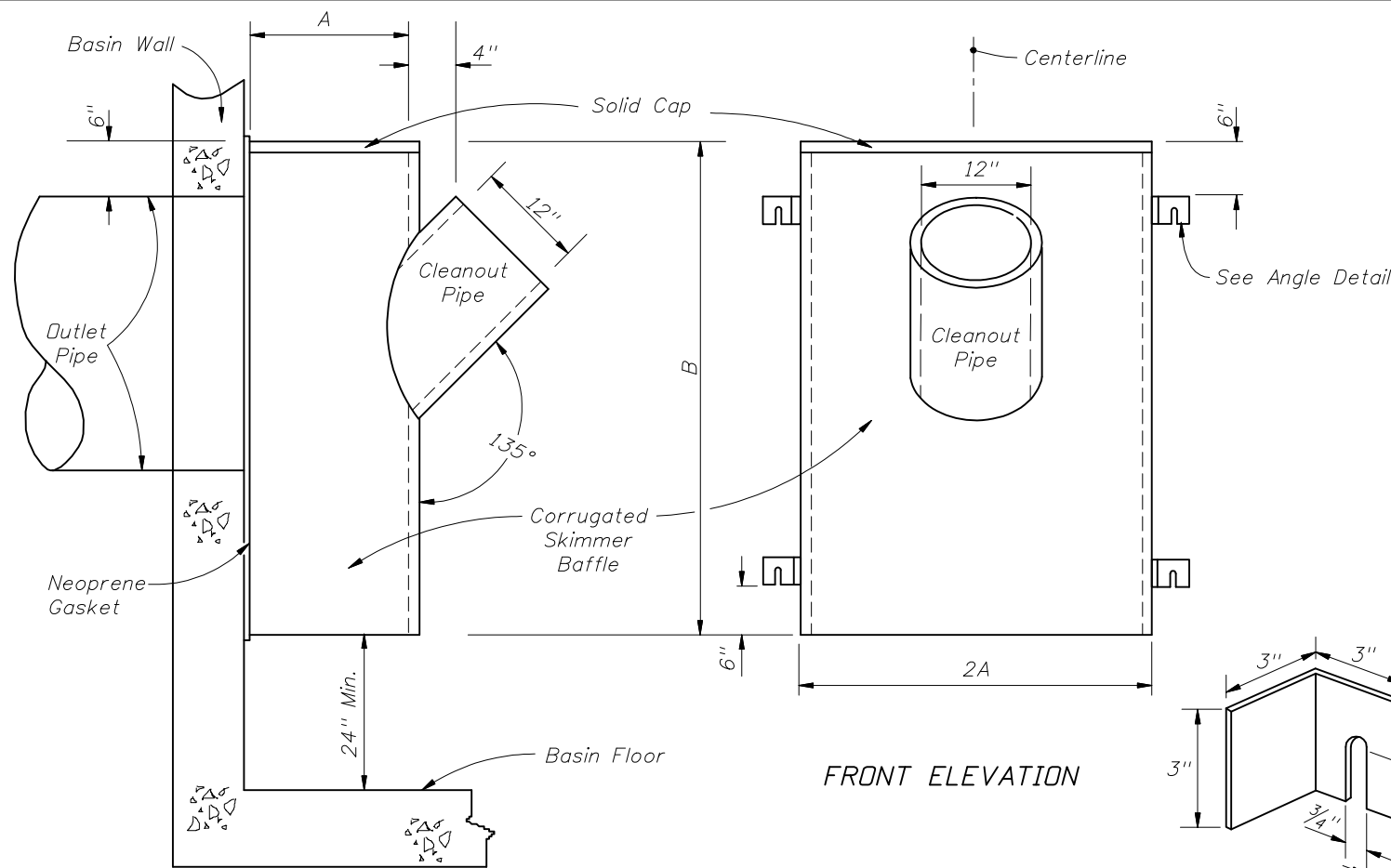


FRONT VIEW

END VIEW

FRONT PANEL

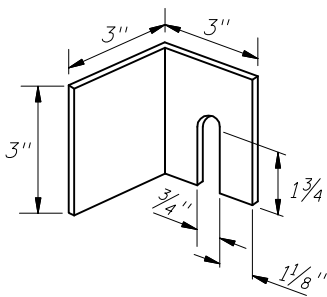




SIDE ELEVATION

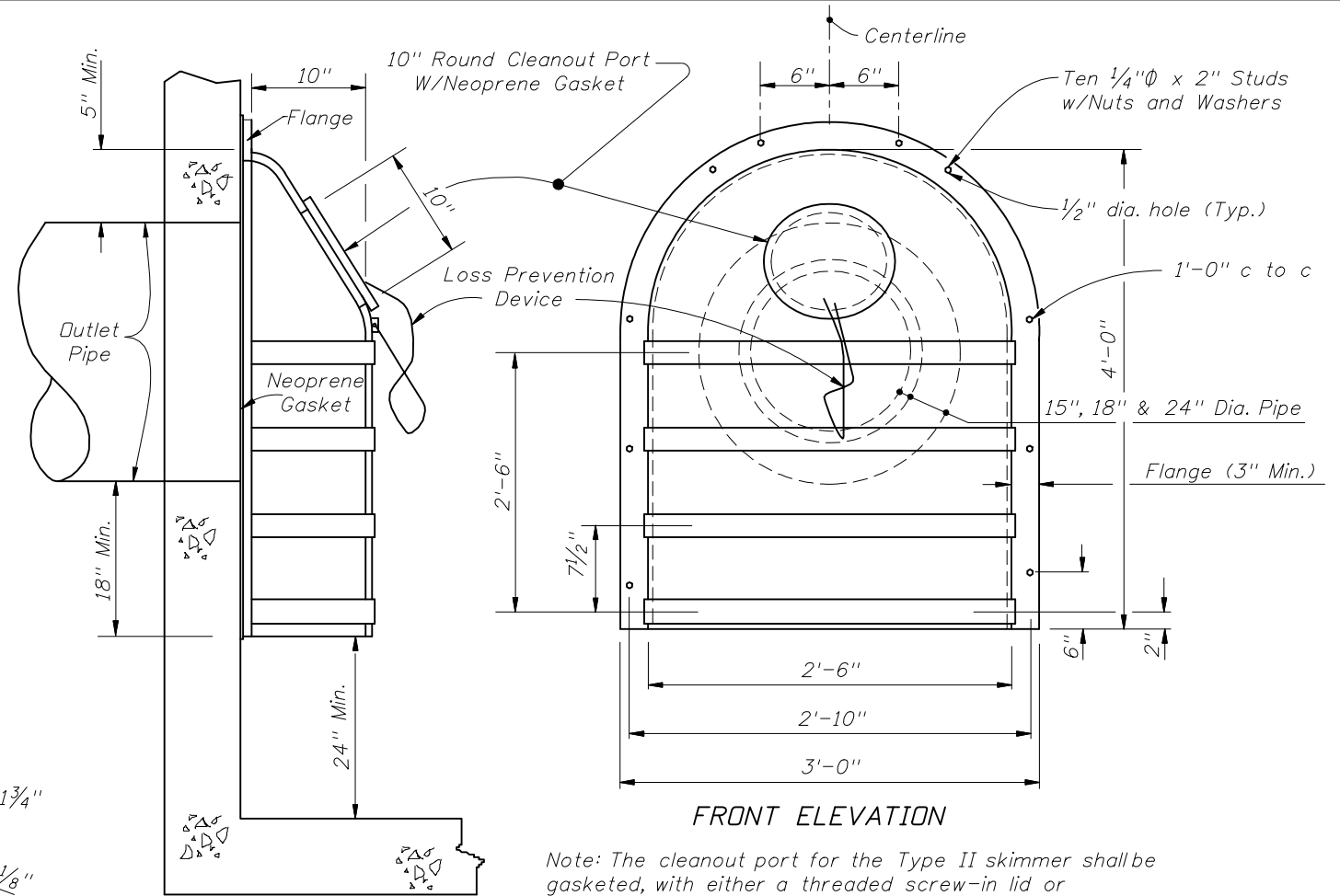
TYPE I SKIMMER

FRONT ELEVATION



ANGLE DETAIL

Angles on other side of skimmer are mirror image.

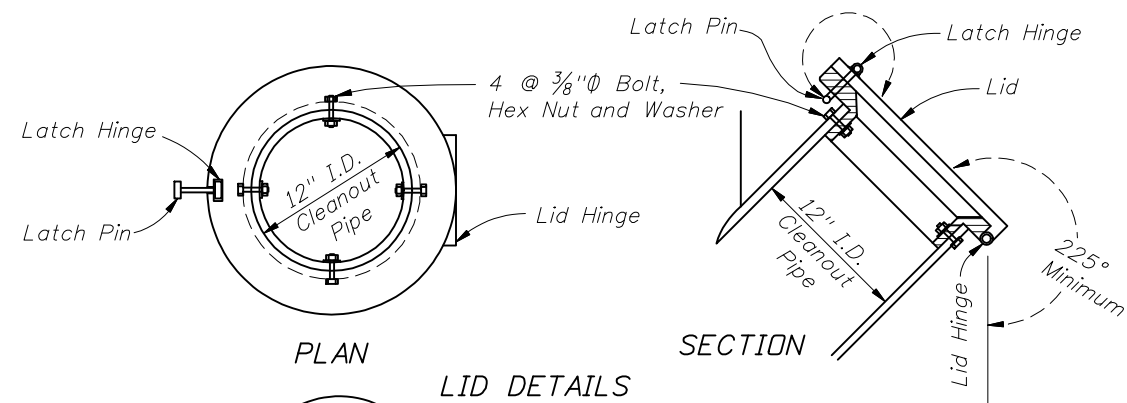


SIDE ELEVATION

TYPE II SKIMMER
GENERAL NOTES

FRONT ELEVATION

Note: The cleanout port for the Type II skimmer shall be gasketed, with either a threaded screw-in lid or a lid secured by four stainless steel quick-release latches.

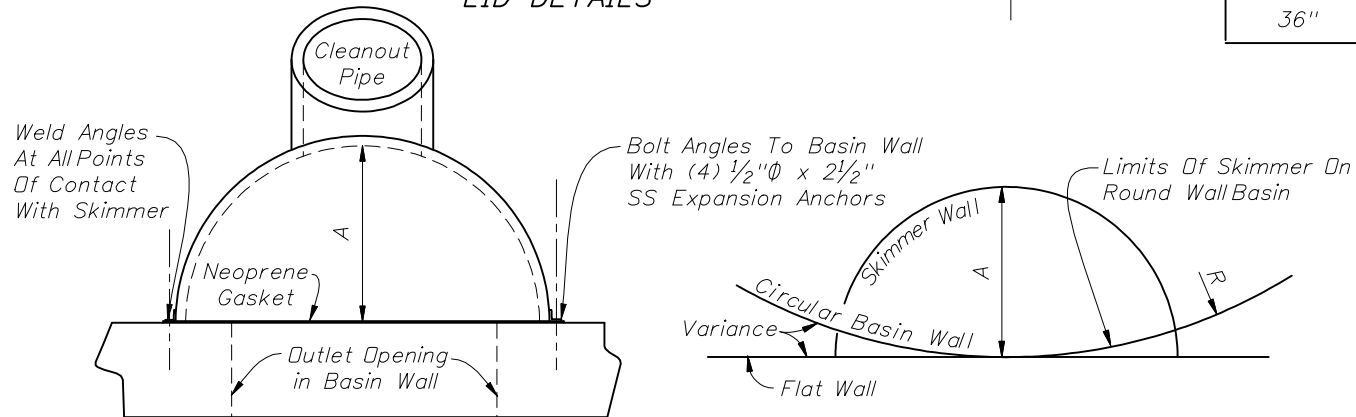


PLAN

LID DETAILS

SECTION

TYPE I SKIMMER DIMENSION TABLE		
OUTLET PIPE	A	B
18"	12"	42"
24"	15"	48"
30"	18"	54"
36"	21"	60"



TOP VIEW

TOP VIEW SCHEMATIC

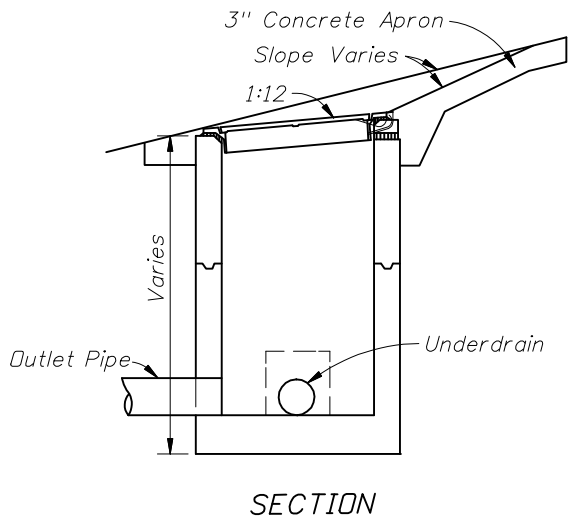
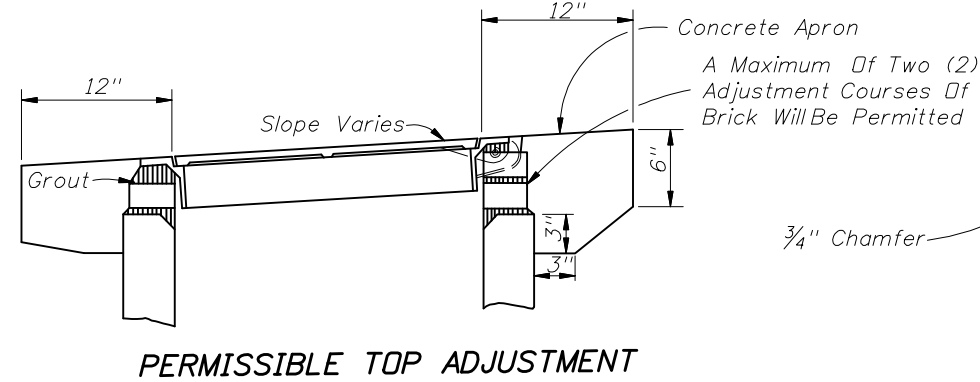
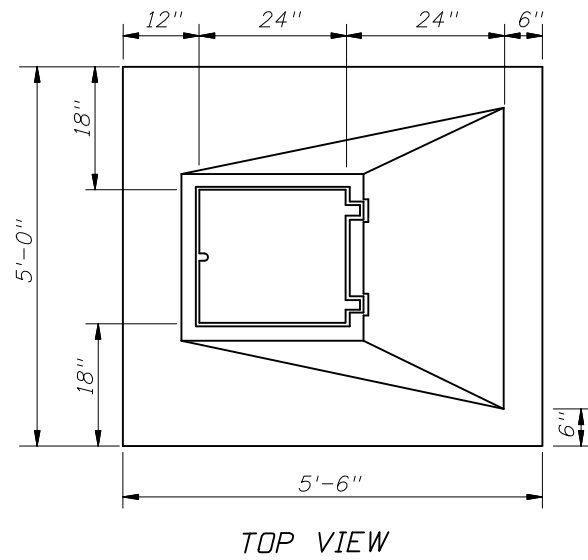
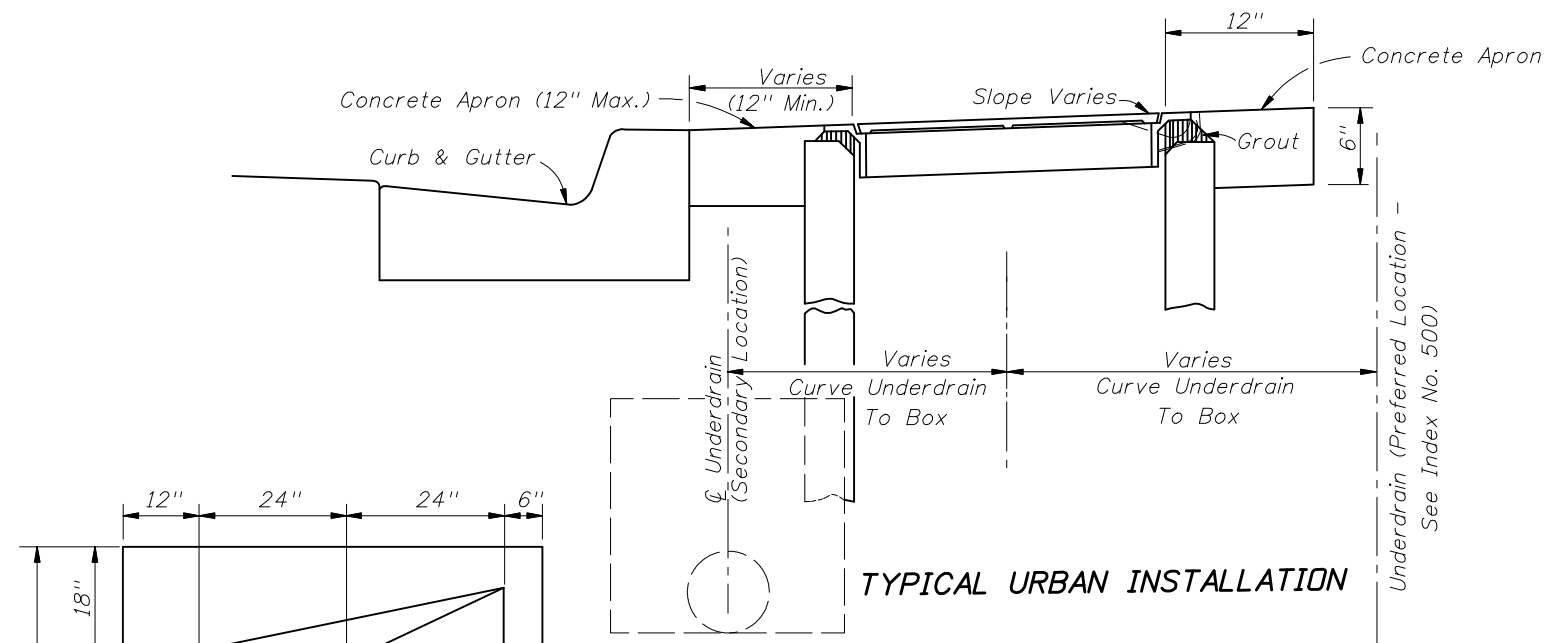
The backs of skimmers must conform to the shape of the basin walls on which they are mounted. Show, in the plans, the radii required for curved-back skimmers. Applies to both skimmer types.

- The Frenchdrain Skimmer is a hooded cover, mounted over an outlet in a catchbasin, that prevents oil and floating debris from exiting the basin. Use this skimmer in Frenchdrain Catchbasins and in other locations where there is a need to prevent oil, debris or other floating contaminants from exiting Catchbasins through outlet pipes.
- Place neoprene gasket material between the skimmer and the catchbasin at all points of contact. Trim the gasket neatly to extend 1/2 inch beyond the joint on all sides.
- Skimmer baffle, cleanout pipe and angles shall be primarily constructed of either galvanized steel, aluminum, polyvinyl chloride, polyethylene, fiberglass or acrylonitrile butadiene styrene. All steel components, other than stainless, shall be hot-dip galvanized.
- Mounting hardware, hinges and latches shall all be stainless steel. Loss prevention device shall be either stainless steel chain or riveted nylon strap.
- Material used in construction of skimmer bodies (baffles) and cleanout pipe shall comply with Standard Specification 943 for steel, 945 for aluminum or 948 for plastics.
- All costs for furnishing and installing a frenchdrain skimmer shall be included in the cost of the basin in which it is installed. Retrofit skimmers shall be paid for as 'modify existing structure'.
- Plastic Skimmers shall contain a minimum of 1.5% by weight of carbon black for UV protection.

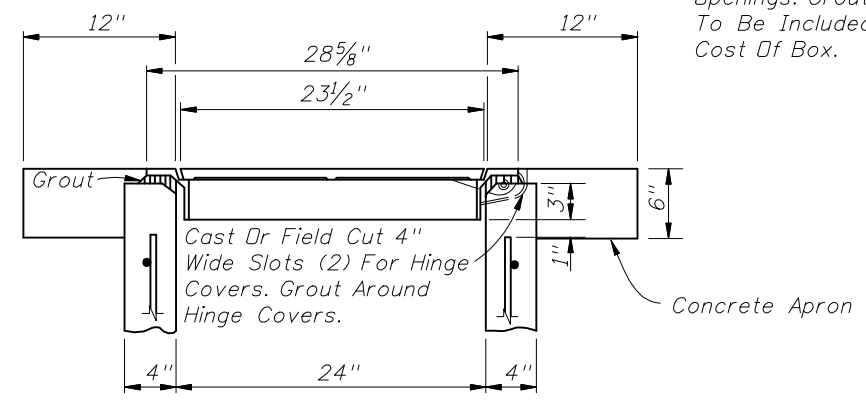
DESIGN NOTES

- The contractor may submit an alternative design prefabricated Frenchdrain Skimmer for approval by the Engineer.
- Show, in the plans, the location of the basin and indicate the interior side(s) of the basin on which a skimmer will be installed.
- Type I Skimmer dimensions shall be based on the outlet pipe diameter as shown in the dimension table.
- Type II Skimmers are to be used only with outlet pipe diameters of 15", 18", and 24".

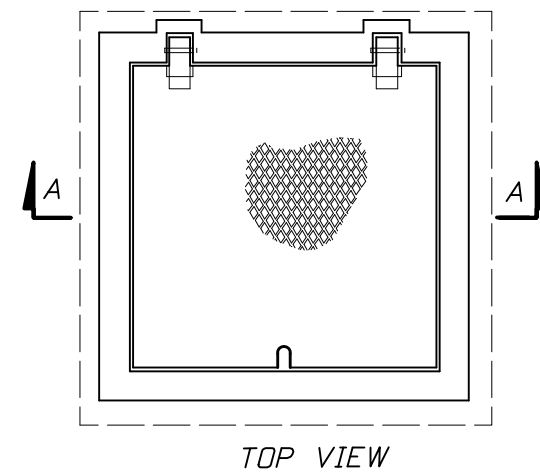




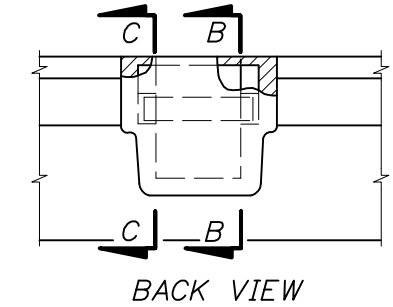
TYPICAL INSTALLATION ON SLOPES



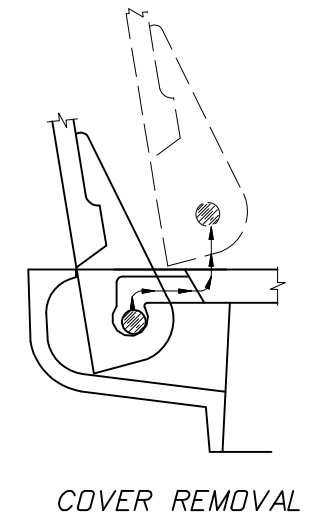
TYPICAL TOP AND APRON



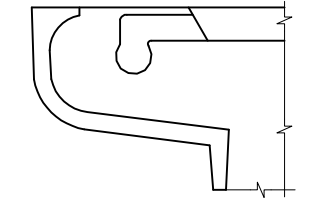
TOP VIEW



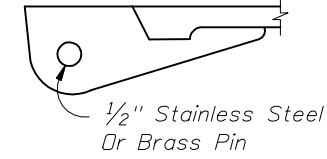
BACK VIEW



COVER REMOVAL

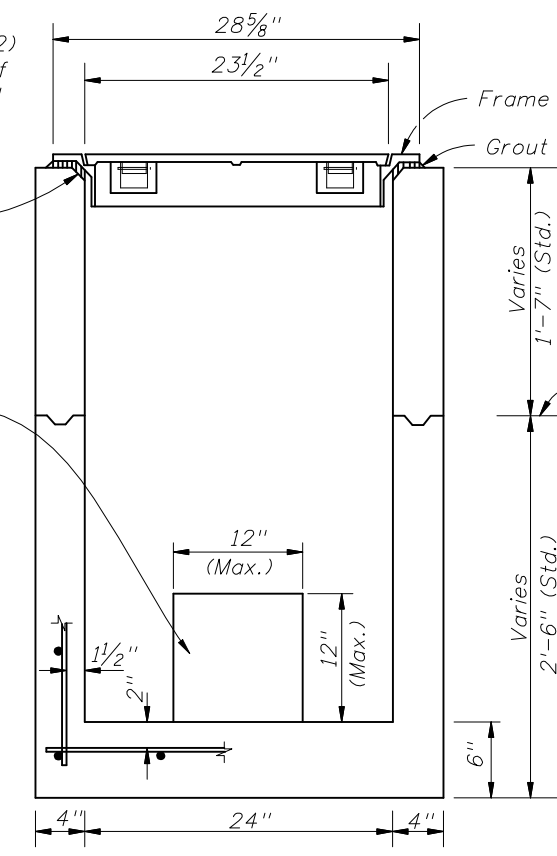


SECTION CC



SECTION BB

HINGE DETAIL



SECTION AA

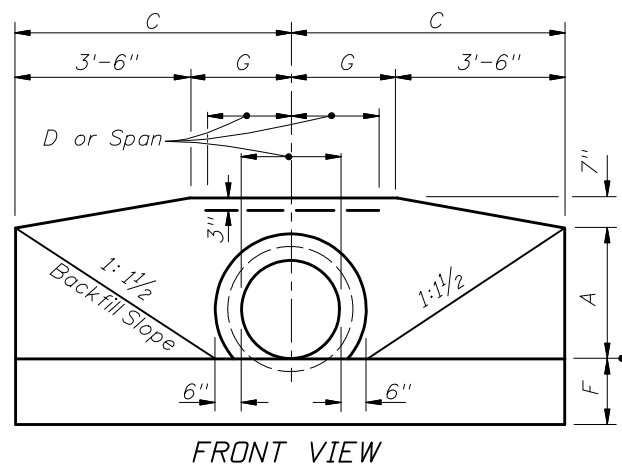
BOX AND TOP

Typical Opening, One Or More Sides. See Plans For Required Openings. Grout Fill To Be Included In Cost Of Box.

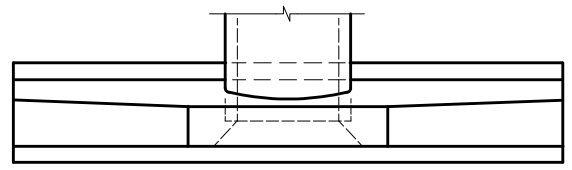
GENERAL NOTES

1. Cast iron cover and frame to be Neenah Foundry Company R-6660-JH, U.S. Foundry & Manufacturing Corporation No. 7640-JK or equal. Neenah R-6660-JH detailed this index.
2. Concrete shall be Class I, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications. Box shall be reinforced with No. 3 bars (Grade 60) on 8" centers both ways, sides and bottom.
3. Concrete apron to be included in the contract unit price for Underdrain Inspection Box.
4. All covers shall be furnished with pick holes. Fitted lifts or handles are not permitted.
5. Manhole Type P Alternate A, Index No. 200, with Type I Frame and Cover, Index No. 201, may be used in lieu of the box detailed on this sheet, and is recommended when high ADT increases chance of the repeated vehicle loadings.



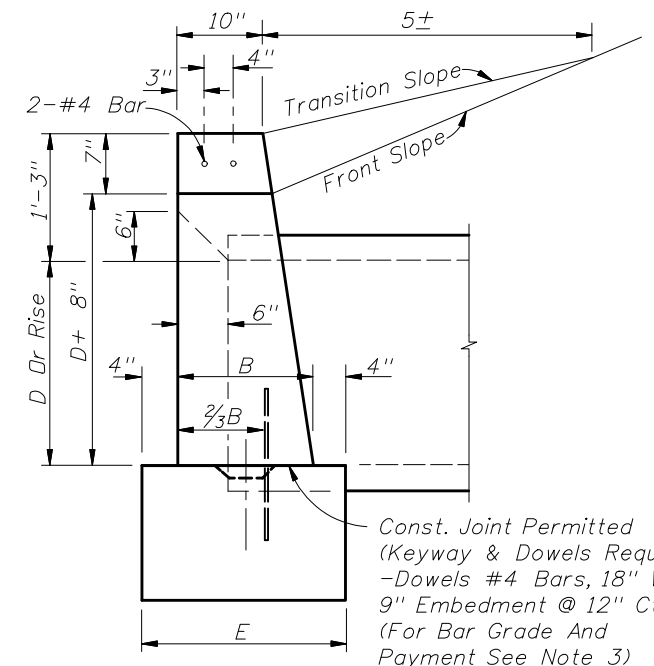


FRONT VIEW



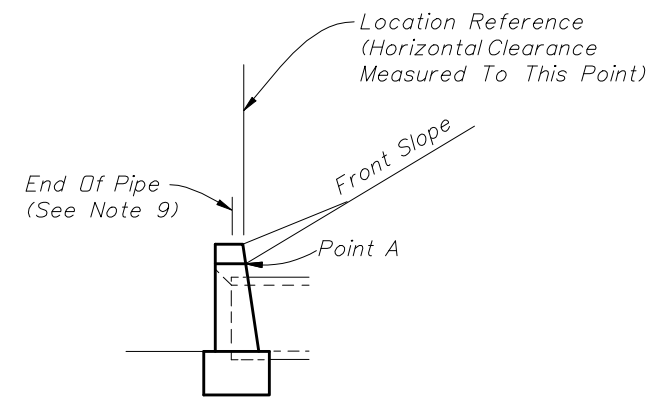
TOP VIEW

Const. Joint Permitted See End View (Enlarged)



END VIEW (ENLARGED)

Const. Joint Permitted (Keyway & Dowels Required -Dowels #4 Bars, 18" With 9" Embedment @ 12" Ctrs (For Bar Grade And Payment See Note 3)



END VIEW

1. Position is set by the intersection of the front slope and Point A where this intersection falls outside the clear zone.
2. Where the front slope and Point A intersects inside the clear zone, the endwall is positioned so the location reference point is at the clear zone limit. The front slope is transitioned to the endwall as shown in Index No. 280.

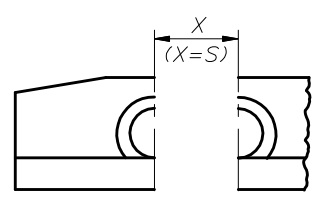
STANDARD LOCATION CONTROL

GENERAL NOTES

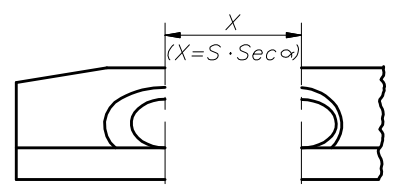
1. Endwall dimensions, locations and positions are for round and elliptical concrete pipe and for round and pipe-arch corrugated metal pipe. Round concrete pipe shown.
2. Front slope and ditch transitions shall be in accordance with Index No. 280.
3. Endwalls may be cast in place or precast concrete. Reinforcing steel shall be Grades 40 or 60. Additional reinforcement necessary for handling precast units shall be determined by the Contractor or the supplier. Cost of reinforcement shall be included in the contract unit price for Concrete, (Endwalls).
4. All exposed corners and edges of concrete are to be chamfered $\frac{3}{4}$ ".
5. Concrete shall be Class I, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications.
6. On outfall ditches with side slopes flatter than 1:1 1/2 provide 20' transitions from the endwall to the flatter side slopes, right of way permitting.
7. For sodding around endwalls see Index No. 281.
8. Payment for concrete quantities for endwalls skewed to the pipe shall be made on the following basis:

Endwall Skew to Pipe	Use Tabulated Value
0° to 5°	0°
6°	15°
16°	30°
31° or over	45°
9. Pipe length plan quantities shall be based on the pipe end locations shown in the standard location control end view, or lengths based on special endwall locations called for in the plans.
10. Payment for pipe in pipe culverts shall be based on plan quantities, adjusted for endwall locations subsequently established by the Engineer.
11. Endwalls to be paid for under the contract unit price for Class I Concrete (Endwalls), C.Y.

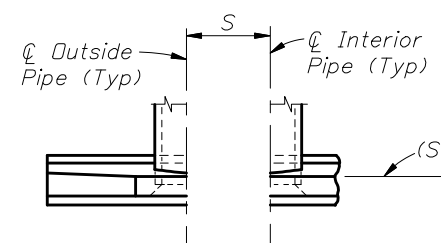
ENDWALL DIMENSIONS (EXCLUSIVE OF MULTIPLE PIPE SPACING)



FRONT VIEW



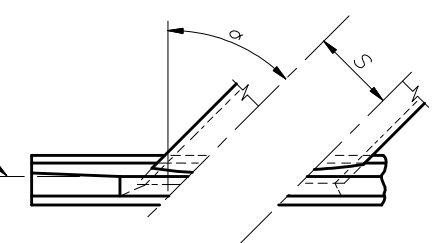
FRONT VIEW



TOP VIEW

NORMAL PIPE

Location Reference Line (See Location Control Above)



TOP VIEW

SKewed PIPE

- LEGEND**
- α Pipe Skew
 - S Center To Center Pipe Spacing
 - X Centerline To Centerline Dimension At Face Of Headwall

ENDWALL POSITIONS FOR SINGLE AND MULTIPLE PIPE AND SPACING FOR MULTIPLE PIPE



DATA AND ESTIMATED QUANTITIES FOR ONE ENDWALL

ROUND CONCRETE AND CORRUGATED METAL PIPE

D	Opening Area (SF)				Dimensions										Class I Concrete (CY)																				D								
															Number And Type Of Pipe And Skew Angle Of Pipe																												
	Number Of Pipes 1 2 3 4				X 0° 15° 30° 45°										Single					Double					Triple					Quadruple													
															Concrete		Metal			Concrete		Metal			Concrete		Metal			Concrete		Metal											
15"	1.23	2.46	3.69	4.92	1'-11"	1'-2"	4'-0"	1'-10"	1'-2"	0'-6"	2'-7"	2'-7"	2'-8"	3'-0"	3'-8"	1.23	1.24	1.59	1.60	1.65	1.74	1.62	1.63	1.68	1.78	1.94	1.96	2.05	2.23	1.99	2.02	2.11	2.30	2.30	2.34	2.47	2.74	2.37	2.41	2.75	2.84	15"	
18"	1.77	3.54	5.31	7.08	2'-2"	1'-3"	4'-6"	1'-11"	1'-3"	1'-0"	2'-10"	2'-10"	2'-11"	3'-3"	4'-0"	1.56	1.59	1.99	2.01	2.06	2.17	2.04	2.06	2.11	2.23	2.43	2.46	2.56	2.79	2.51	2.54	2.65	2.89	2.86	2.91	3.06	3.40	2.96	3.01	3.17	3.53	18"	
21"	2.41	4.82	7.23	9.64	2'-5"	1'-4"	5'-0"	2'-0"	1'-4"	1'-6"	3'-2"	3'-2"	3'-3"	3'-8"	4'-6"	1.97																											21"
24"	3.14	6.28	9.42	12.56	2'-8"	1'-4"	5'-6"	2'-0"	1'-4"	2'-0"	3'-5"	3'-5"	3'-6"	3'-11"	4'-10"	2.24	2.29	2.82	2.84	2.91	3.06	2.91	2.93	3.01	3.17	3.39	3.43	3.57	3.87	3.52	3.56	3.71	4.03	3.97	4.03	4.24	4.69	4.14	4.20	4.43	4.91	24"	
27"	3.98	7.96	11.94	15.92	2'-11"	1'-5"	6'-0"	2'-1"	1'-5"	2'-6"	3'-10"	3'-10"	4'-0"	4'-5"	5'-5"	2.73																											27"
30"	4.91	9.82	14.73	19.64	3'-2"	1'-6"	6'-6"	2'-2"	1'-6"	3'-0"	4'-3"	4'-3"	4'-5"	4'-11"	6'-0"	3.26	3.34	4.13	4.16	4.26	4.49	4.28	4.31	4.43	4.67	4.98	5.04	5.25	5.69	5.20	5.27	5.49	5.97	5.84	5.93	6.24	6.91	6.13	6.23	6.56	7.29	30"	
36"	7.07	14.14	21.21	28.28	3'-8"	1'-8"	7'-6"	2'-4"	1'-8"	4'-0"	5'-1"	5'-1"	5'-3"	5'-10"	7'-2"	4.53	4.64	5.73	5.77	5.92	6.23	5.95	6.00	6.15	6.49	6.92	7.00	7.29	7.91	7.25	7.34	7.65	8.33	8.13	8.26	8.69	9.62	8.57	8.71	9.18	10.20	36"	
42"	9.62	19.24	28.86	38.48	4'-2"	1'-10"	8'-6"	2'-6"	2'-0"	5'-0"	6'-0"	6'-0"	6'-3"	6'-11"	8'-6"	6.33	6.49	8.11	8.17	8.39	8.85	8.43	8.50	8.73	9.23	9.90	10.02	10.45	11.38	10.38	10.52	10.98	11.99	11.68	11.87	12.51	13.89	12.32	12.52	13.22	14.73	42"	
48"	12.57	25.14	37.71	50.28	4'-8"	2'-1"	9'-6"	2'-9"	2'-0"	6'-0"	6'-9"	6'-9"	7'-0"	7'-10"	9'-7"	8.15	8.38	10.40	10.48	10.75	11.33	10.85	10.94	11.23	11.87	12.64	12.80	13.34	14.50	13.34	13.51	14.11	15.39	14.89	15.13	15.93	17.68	15.82	16.08	16.97	18.90	48"	
54"	15.90	31.80	47.70	63.60	5'-2"	2'-6"	10'-6"	3'-2"	2'-3"	7'-0"	7'-8"	7'-8"	7'-11"	8'-10"	10'-10"	11.71	11.77	15.23	15.35	15.78	16.69	15.35	15.48	15.90	16.83	18.77	19.02	19.86	21.69	18.93	19.18	20.04	21.89	22.29	22.66	23.93	26.67	22.51	22.89	24.17	26.96	54"	

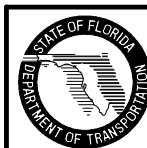
CORRUGATED METAL PIPE ARCH

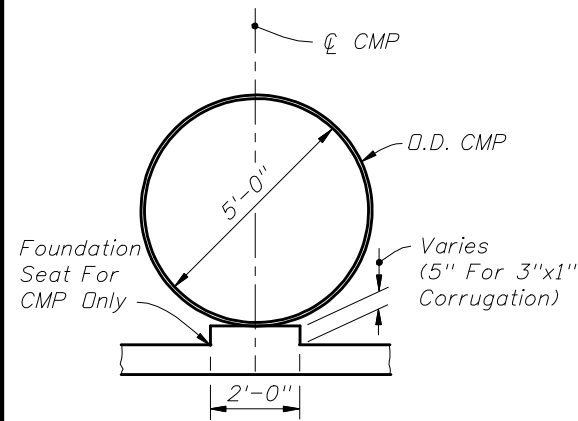
Span	Rise	Opening Area (SF)				Dimensions										Class I Concrete (CY)																Span	Rise	Approx. Equiv. Round Pipe
																Number Of Pipe And Skew Angle Of Pipe																		
		Number Of Pipes 1 2 3 4				X 0° 15° 30° 45°										Single				Double				Triple				Quadruple						
																Concrete		Metal		Concrete		Metal		Concrete		Metal		Concrete		Metal				
17"	13"	1.1	2.2	3.3	4.4	1'-9"	1'-2"	3'-10"	1'-10"	1'-2"	0'-4"	2'-6"	2'-6"	2'-7"	2'-11"	3'-6"	1.16	1.47	1.48	1.52	1.60	1.78	1.80	1.88	2.04	2.09	2.12	2.23	2.48	17"	13"	15"		
21"	15"	1.6	3.2	4.8	6.4	1'-11"	1'-2"	4'-3"	1'-10"	1'-2"	0'-9"	2'-10"	2'-10"	2'-11"	3'-3"	4'-0"	1.33	1.69	1.70	1.75	1.84	2.04	2.06	2.15	2.33	2.40	2.44	2.57	2.84	21"	15"	18"		
28"	20"	2.8	5.6	8.4	11.2	2'-4"	1'-3"	5'-2"	1'-11"	1'-3"	1'-8"	3'-5"	3'-5"	3'-6"	3'-11"	4'-10"	1.78	2.31	2.33	2.39	2.53	2.83	2.87	2.99	3.26	3.36	3.42	3.60	4.01	28"	20"	24"		
35"	24"	4.3	8.6	12.9	17.2	2'-8"	1'-4"	5'-11½"	2'-0"	1'-4"	2'-5½"	4'-0"	4'-0"	4'-2"	4'-7"	5'-8"	2.34	3.03	3.05	3.14	3.32	3.72	3.77	3.93	4.29	4.40	4.47	4.72	5.25	35"	24"	30"		
42"	29"	5.9	11.8	17.7	23.6	3'-1"	1'-5"	6'-10½"	2'-1"	1'-5"	3'-4½"	4'-9"	4'-9"	4'-11"	5'-6"	6'-9"	3.13	4.06	4.09	4.20	4.45	4.99	5.06	5.28	5.76	5.93	6.03	6.36	7.09	42"	29"	36"		
49"	33"	8.4	16.8	25.2	33.6	3'-5"	1'-6"	7'-8"	2'-2"	1'-6"	4'-2"	5'-6"	5'-6"	5'-8"	6'-4"	7'-9"	3.83	5.00	5.04	5.18	5.48	6.16	6.24	6.52	7.12	7.32	7.44	7.86	8.76	49"	33"	42"		
57"	38"	10.6	21.2	31.8	42.4	3'-10"	1'-7"	8'-7½"	2'-3"	1'-7"	5'-1½"	6'-4"	6'-4"	6'-7"	7'-4"	8'-11"	4.87	6.31	6.36	6.53	6.91	7.74	7.84	8.18	8.93	9.18	9.33	9.85	10.96	57"	38"	48"		
64"	43"	13.2	26.4	39.6	52.8	4'-3"	1'-8"	9'-6½"	2'-4"	1'-8"	6'-0½"	7'-1"	7'-1"	7'-4"	8'-2"	10'-0"	5.88	7.64	7.70	7.91	8.37	9.40	9.52	9.94	10.86	11.15	11.33	11.97	13.33	64"	43"	54"		
71"	47"	16.9	33.8	50.7	67.6	4'-7"	1'-10"	10'-4"	2'-6"	2'-0"	6'-10"	7'-10"	7'-10"	8'-1"	9'-1"	11'-1"	7.80	10.15	10.23	10.51	11.12	12.49	12.65	13.22	14.43	14.85	15.10	15.94	17.77	71"	47"			

Note: Use the guidelines of General Note No. 8 for selecting tabular quantities.

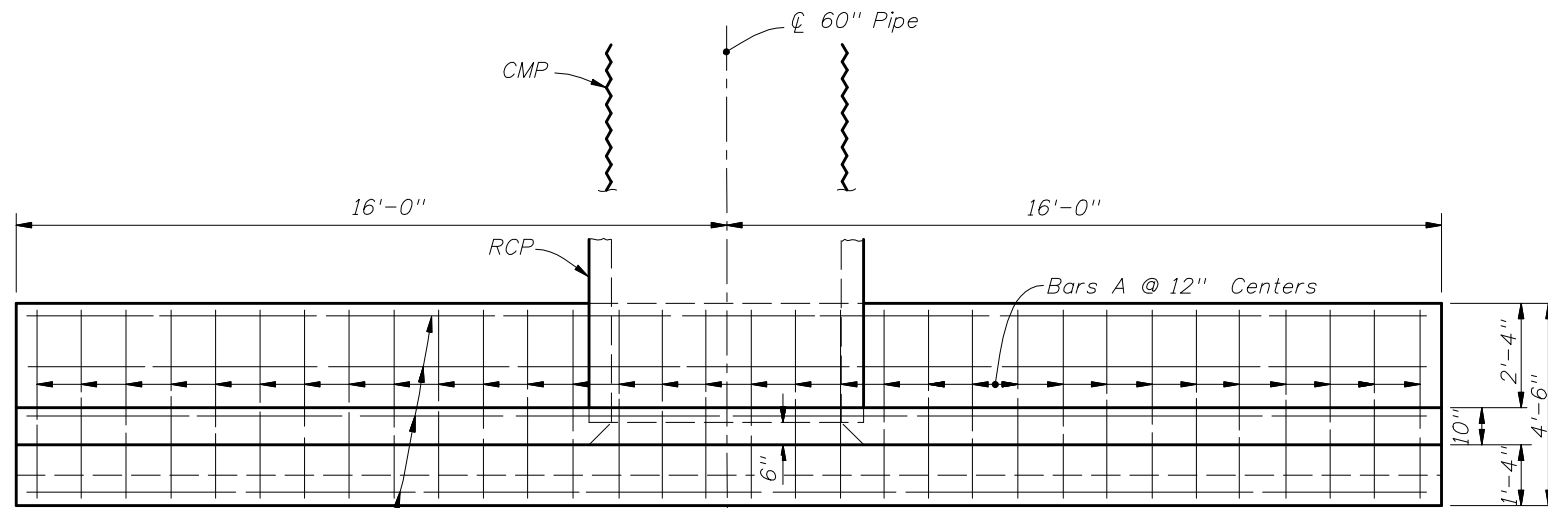
CONCRETE ELLIPTICAL PIPE

Rise	Span	Opening Area (SF)				Dimensions										Class I Concrete (CY)																Rise	Span	Approx. Equiv. Round Pipe
																Number Of Pipe And Skew Angle Of Pipe																		
		Number Of Pipes 1 2 3 4				X 0° 15° 30° 45°										Single				Double				Triple				Quadruple						
																Concrete		Metal		Concrete		Metal		Concrete		Metal		Concrete		Metal				
12"	18"	1.3	2.6	3.9	5.2	1'-8"	1'-2"	3'-9"	1'-10"	1'-2"	0'-3"	2'-10"	2'-10"	2'-11"	3'-3"	4'-0"	1.09	1.45	1.46	1.51	1.60	1.80	1.82	1.91	2.09	2.16	2.20	2.33	2.60	12"	18"	15"		
14"	23"	1.8	3.6	5.4	7.2	1'-10"	1'-3"	4'-2½"	1'-11"	1'-3"	8½"	3'-5"	3'-5"	3'-6"	3'-11"	4'-10"	1.36	1.82	1.84	1.89	2.01	2.29	2.32	2.43	2.68	2.75	2.80	2.97	3.33	14"	23"	18"		
19"	30"	3.3	6.6	9.9	13.2	2'-3"	1'-4"	5'-1½"	2'-0"	1'-4"	1'-7½"	4'-2"	4'-2"	4'-4"	4'-10"	5'-11"	1.89	2.55	2.57	2.65	2.82	3.22	3.27	3.43	3.77	3.88	3.95	4.19	4.70	19"	30"	24"		
24"	38"	5.1	10.2	15.3	20.4	2'-8"	1'-5"	6'-3"	2'-1"	1'-5"	2'-9"	5'-2"	5'-2"	5'-4"	6'-0"	7'-4"	2.64	3.55	3.58	3.69	3.93	4.48	4.54	4.77	5.24	5.39	5.49	5.82	6.53	24"	38"	30"		
29"	45"	7.4	14.8	22.2	29.6	3'-1"	1'-6"	7'-0"	2'-2"	1'-6"	3'-6"	6'-0"	6'-0"	6'-3"	6'-11"	8'-6"	3.32	4.48	4.52	4.66	4.96	5.64	5.72	6.00	6.60	6.80	6.92	7.34	8.24	29"	45"	36"		
34"	53"	10.2	20.4	30.6	40.8	3'-6"	1'-7"	7'-11½"	2'-3"	1'-7"	4'-5½"	7'-1"	7'-1"	7'-4"	8'-2"	10'-0"	4.24	5.76	5.81	6.00	6.39	7.29	7.40	7.76	8.55	8.81	8.97	9.52	10.70	34"	53"	42"		
38"	60"	12.9	25.8	38.7	51.6	3'-10"	1'-8"	8'-9"	2'-4"	1'-8"	5'-3"	7'-11"	7'-11"	8'-2"	9'-2"	11'-2"	5.22	7.16	7.23	7.46	7.96	9.10	9.24	9.70	10.71	11.05	11.25	11.95	13.46	38"	60"	48"		
43"	68"	16.6	33.2	49.8	66.4	4'-3"	1'-10"	9'-8½"	2'-6"	1'-10"	6'-2½"	8'-10"	8'-10"	9'-2"	10'-2"	12'-6"	6.63	9.01	9.09	9.38	10.00	11.39	11.56	12.13	13.36	13.77	14.02	14.88	16.73	43"	68"	54"		
48"	76"	20.5	41.0	61.5	82.0	4'-8"	2'-1"	10'-8"	2'-9"	2'-0"	7'-2"	9'-9"	9'-9"	10'-1"	11'-3"	13'-9"	8.66	11.74	11.85	12.22	13.02	14.82	15.04	15.77	17.37	17.91	18.23	19.34	21.74	48"	76"	60"		
53"	83"	24.8	49.6	74.4	99.2	5'-1"	2'-6"	11'-7"	3'-2"	2'-6"	8'-1"	10'-7"	10'-7"	10'-11"	12'-3"	15'-0"	12.50	16.98	16.98	17.67	18.83	21.47	21.78	22.86	25.18	25.97	26.44	28.06	31.55	53"	83"	66"		
58"	91"	29.5	59.0	88.5	118.0	5'-6"	2'-10"	12'-6½"	3'-6"	2'-10"	9'-0½"	11'-4"	11'-4"	11'-9"	13'-1"	16'-0"	16.46	22.26	22.46	23.16	24.66	28.05	28.46	29.85	32.85	33.85	34.46	36.55	41.05	58"	91"	72"		

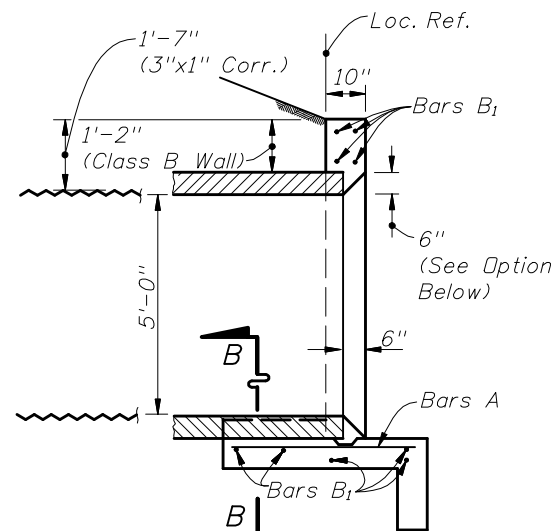




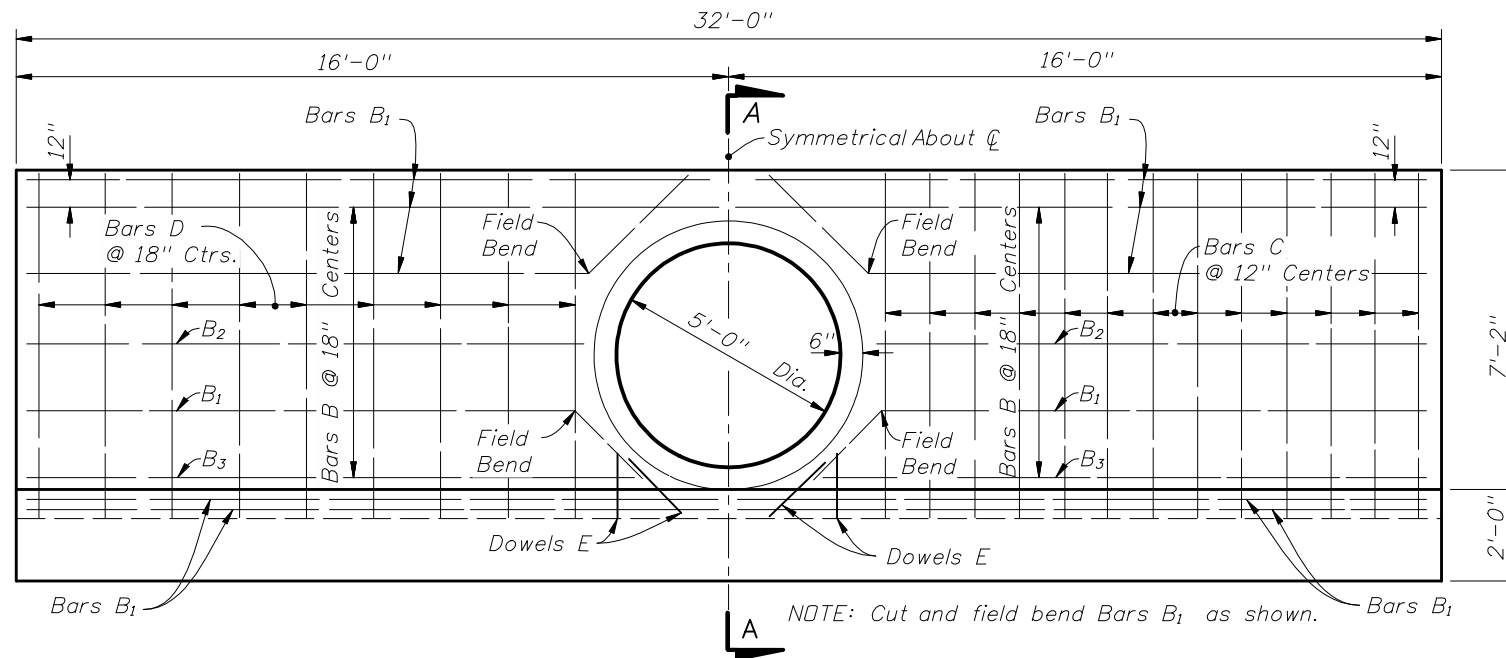
SECTION BB



PLAN
(Showing Bar In Footing)



SECTION AA



HALF ELEVATION
(Showing Bars In Front Face Of Wall)

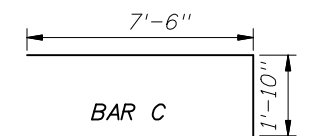
HALF ELEVATION
(Showing Bars In Back Face Of Wall)

GENERAL NOTES

1. Straight concrete endwalls are intended for use outside the clear zone.
2. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this index, design specifications AASHTO 1989. Precast construction which adheres to this Index, including any additional reinforcement required for handling which shall be determined by the Contractor or supplier, does not require additional approvals. Deviations from this Index, for precast units, shall require the approval of the State Drainage Engineer prior to construction. For precast construction, see Index No. 201 for opening and grouting details.
3. Reinforcing steel shall be either Grade 40 or 60.
4. Concrete shall be Class II, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications.
5. Chamfer: All exposed edges and corners to be chamfered $\frac{3}{4}$ " unless otherwise shown.
6. That portion of corrugated metal pipe in direct contact with the concrete slab and extending 12" beyond shall have a continuous bituminous coating of .004" minimum thickness applied prior to placing of the concrete.
7. Sodding shall be in accordance with Index No. 281 and paid for under the contract unit price for Performance Turf, SY.
8. Basis of payment for either cast-in-place or precast construction shall be the estimated quantities tabulated on the Index. Concrete and reinforcing steel shall be paid for under the contract unit prices for Class II Concrete (Endwalls), CY and Reinforcing Steel (Roadway), LB.

BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REQD.	LENGTH	LOCATION	BENDING
A	#4	32	4'-2"	Footing	Straight
B ₁	#4	13	31'-8"	Footing & Wall	Straight
B ₂	#4	4	12'-4"	Wall	Straight
B ₃	#4	4	13'-9"	Wall	Straight
C	#4	26	9'-4"	Wall	Bend
D	#4	18	7'-6"	Wall	Straight
E	#4	8	1'-8"	Footing & Wall	Straight

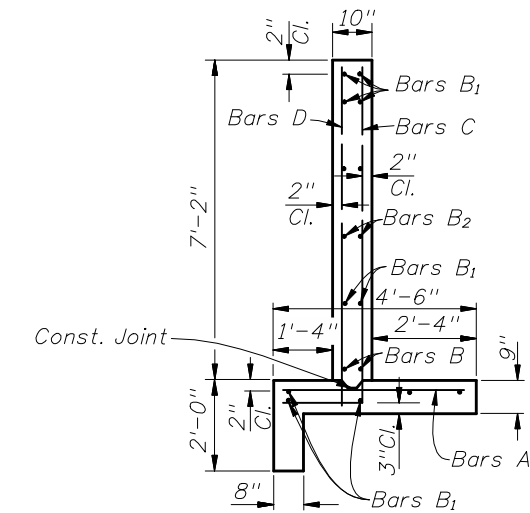
BENDING DIAGRAM



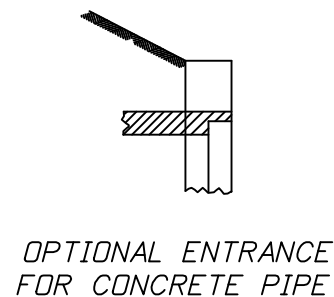
NOTE: All bar dimensions are out to out

ESTIMATED QUANTITIES

ITEM	UNIT	RCP	CMP
Class II Concrete	Cu. Yd.	11.3	11.4
Reinforcing Steel	Lb.	695	695



TYPICAL SECTION
THRU ENDWALL



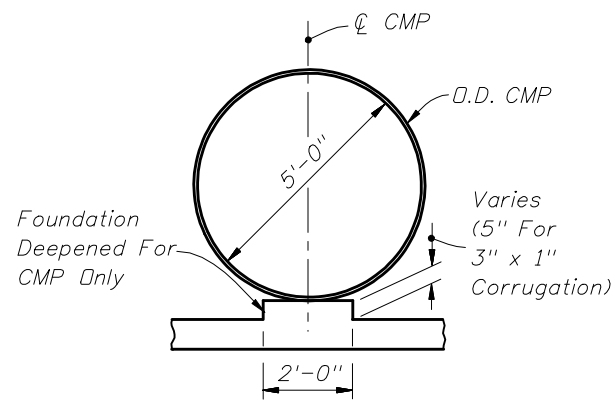
OPTIONAL ENTRANCE
FOR CONCRETE PIPE



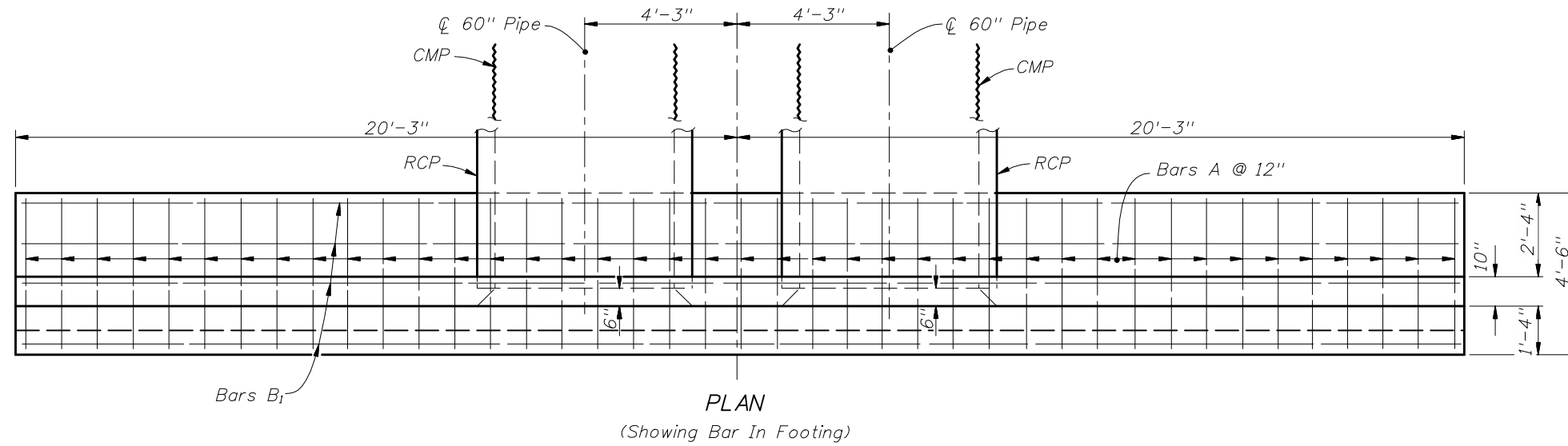
2010 FDOT Design Standards

STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 60" PIPE

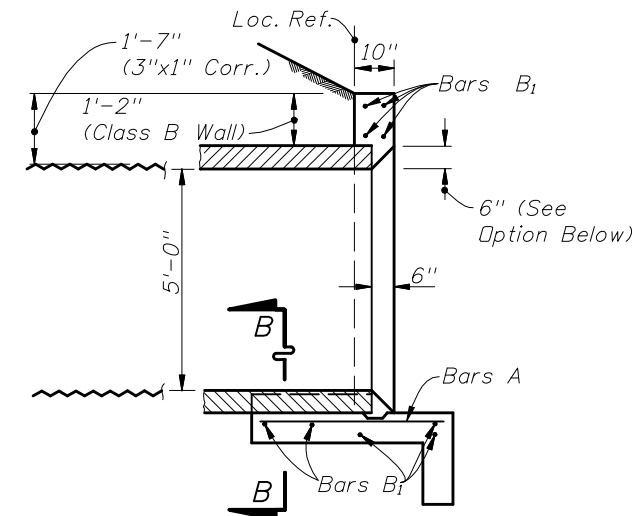
Last Revision 07/01/09
Sheet No. 1 of 2
Index No. 251



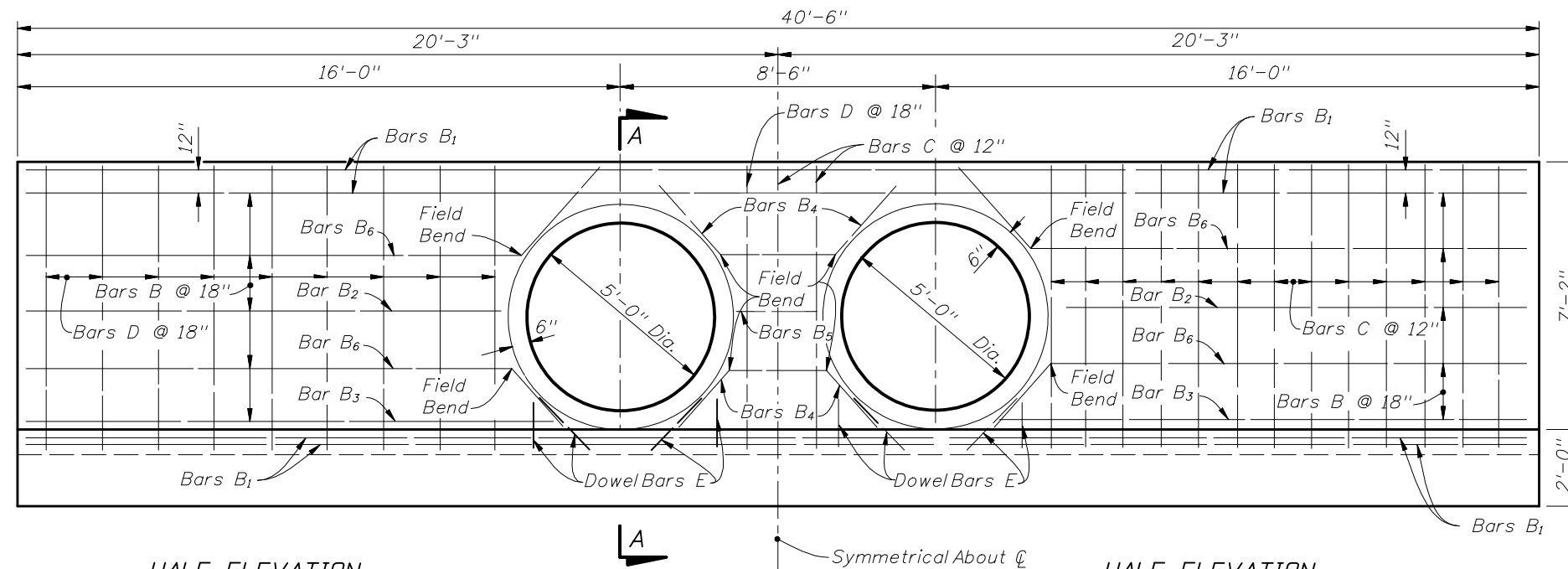
SECTION BB



PLAN
(Showing Bar In Footing)

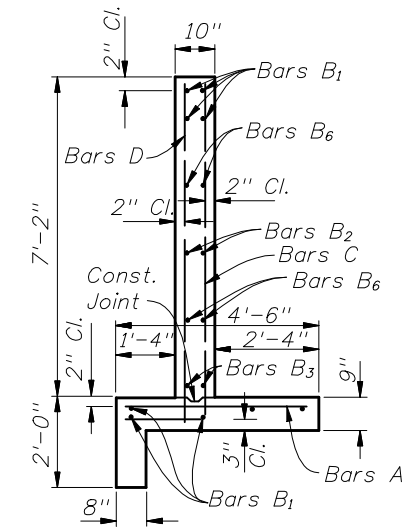


SECTION AA

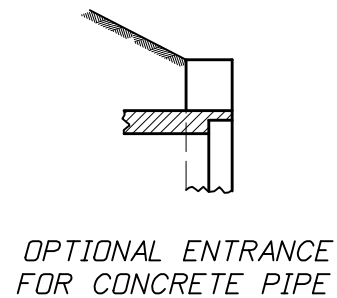


HALF ELEVATION
(Showing Bars In Front Face Of Wall)

HALF ELEVATION
(Showing Bars In Back Face Of Wall)



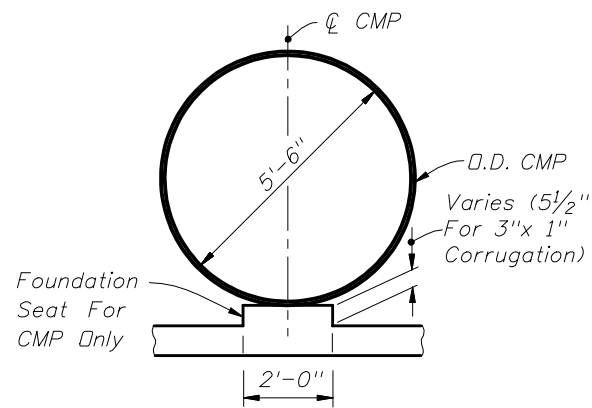
TYPICAL SECTION
THRU ENDWALL



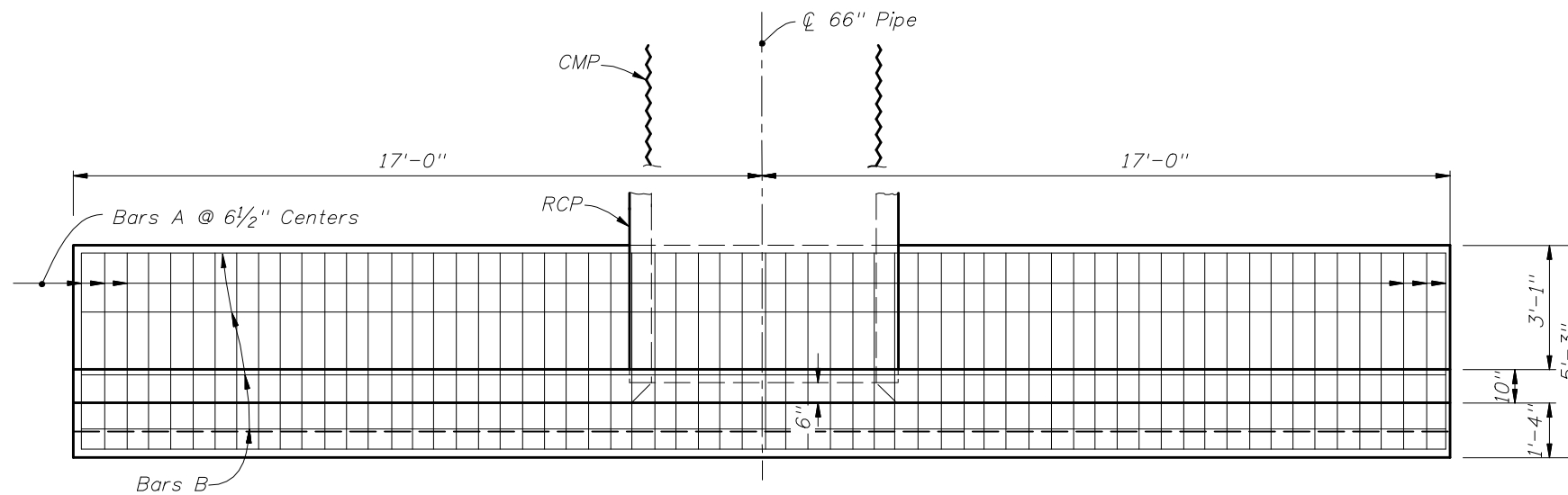
OPTIONAL ENTRANCE
FOR CONCRETE PIPE

BILL OF REINFORCING STEEL						BENDING DIAGRAM															
MARK	SIZE	NO. REQD.	LENGTH	LOCATION	BENDING																
A	#4	41	4'-2"	Footing	Straight																
B ₁	#4	9	40'-2"	Footing & Wall	Straight	NOTE: All bar dimensions are out to out															
B ₂	#4	4	12'-6"	Wall	Straight	ESTIMATED QUANTITIES															
B ₃	#4	4	13'-9"	Wall	Straight	<table border="1"> <thead> <tr> <th>ITEM</th> <th>UNIT</th> <th>RCP</th> <th>CMP</th> </tr> </thead> <tbody> <tr> <td>Class II Concrete</td> <td>Cu. Yd.</td> <td>13.7</td> <td>13.8</td> </tr> <tr> <td>Reinforcing Steel</td> <td>Lb.</td> <td>824</td> <td>824</td> </tr> </tbody> </table>				ITEM	UNIT	RCP	CMP	Class II Concrete	Cu. Yd.	13.7	13.8	Reinforcing Steel	Lb.	824	824
ITEM	UNIT	RCP	CMP																		
Class II Concrete	Cu. Yd.	13.7	13.8																		
Reinforcing Steel	Lb.	824	824																		
B ₄	#4	4	6'-0"	Wall	Field Bend	NOTE: See Sheet 1 of 2 For General Notes.															
B ₅	#4	2	2'-2"	Wall	Straight																
B ₆	#4	8	15'-0"	Wall	Field Bend																
C	#4	29	9'-4"	Footing & Wall	Bend																
D	#4	20	7'-6"	Footing & Wall	Straight																
E	#4	16	1'-8"	Footing & Wall	Straight																





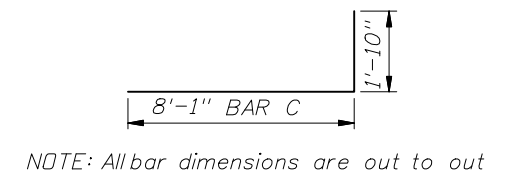
SECTION BB



PLAN
(Showing Bars In Footing)

BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REQD.	LENGTH	LOCATION	BENDING
A	5	63	4'-11"	Footing	Straight
B	4	17	33'-8"	Footing & Wall	Straight
C	5	34	9'-11"	Wall	Bend
D	4	20	8'-1"	Wall	Straight
E	4	4	1'-8"	Wall	Straight

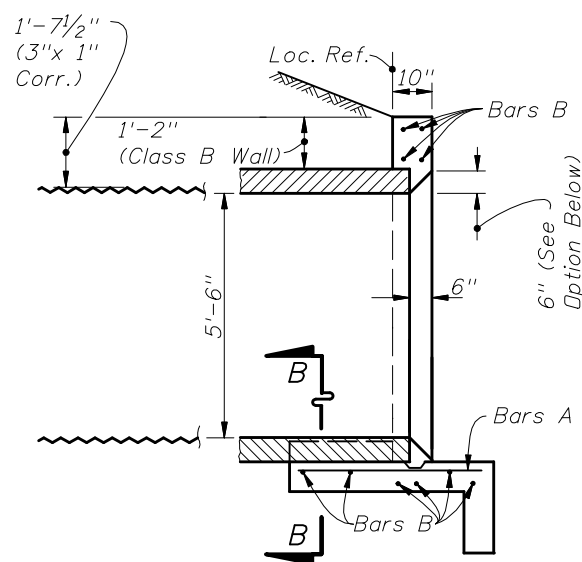
BENDING DIAGRAM



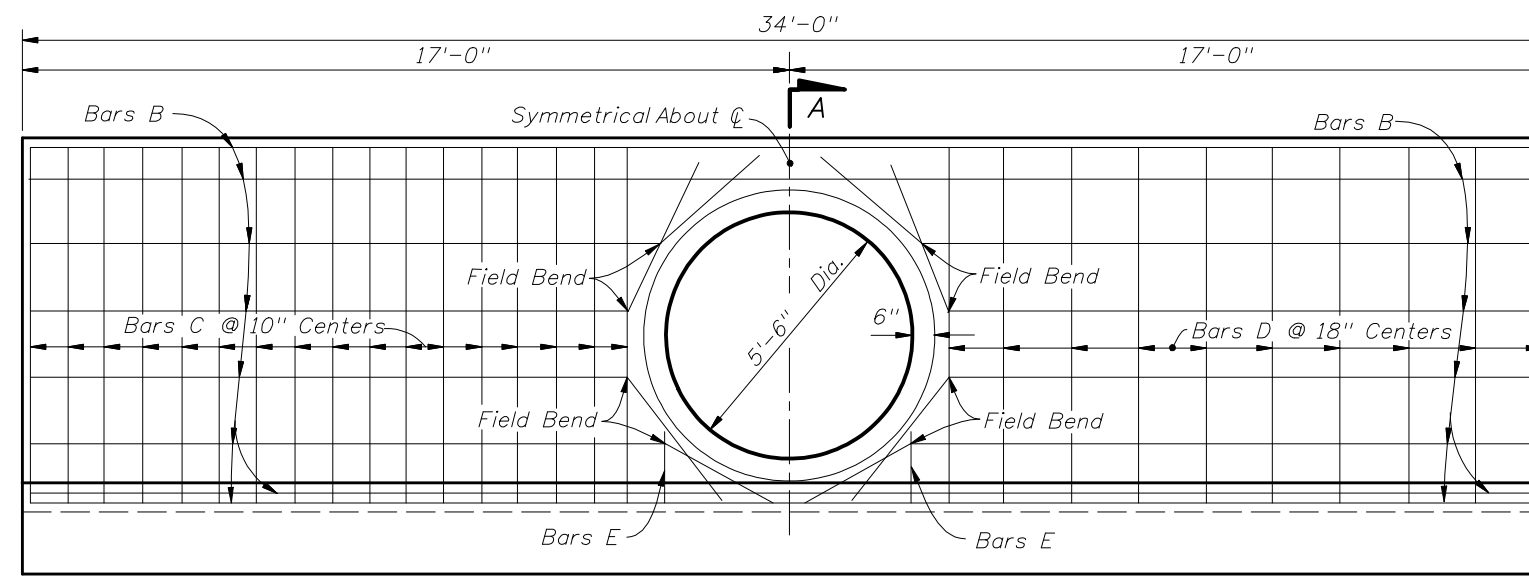
NOTE: All bar dimensions are out to out

ESTIMATED QUANTITIES

ITEM	UNIT	RCP	CMP
Class II Concrete	Cu. Yd.	13.2	13.3
Reinforcing Steel	Lb.	1170	1170



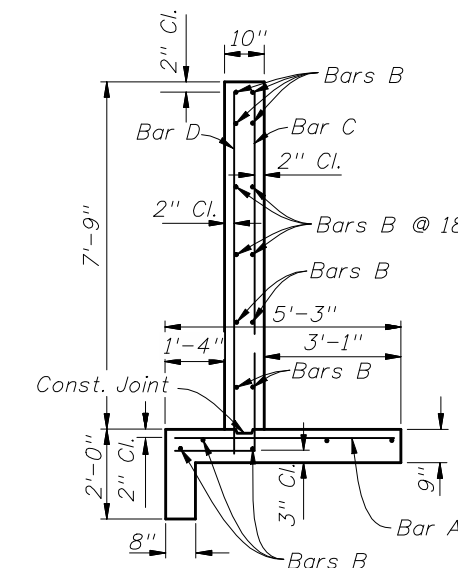
SECTION AA



HALF ELEVATION
(Showing Bars In Back Face Of Wall)

NOTE:
Cut and Field Bend Bars B As Shown

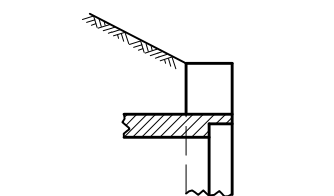
HALF ELEVATION
(Showing Bars In Front Face Of Wall)



TYPICAL SECTION
THRU ENDWALL

GENERAL NOTES

1. Straight concrete endwalls are intended for use outside the clear zone.
2. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this index, design specifications AASHTO 1989. Precast construction which adheres to this Index, including any additional reinforcement required for handling which shall be determined by the Contractor or supplier, does not require additional approvals. Deviations from this Index, for precast units, shall require the approval of the State Drainage Engineer prior to construction. For precast construction, see Index No. 201 for opening and grouting details.
3. Reinforcing steel shall be either Grade 40 or 60.
4. Concrete shall be Class II except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications.
5. Chamfer: All exposed edges and corners to be chamfered $\frac{3}{4}$ " unless otherwise shown.
6. That portion of corrugated Metalpipe in direct contact with the concrete slab and extending 12" beyond shall have a continuous bituminous coating of 0.004" minimum thickness applied prior to placing of the concrete.
7. Sodding shall be in accordance with Index No. 281 and paid for under the contract unit price for Performance Turf, SY.
8. Basis of payment for either cast-in-place or precast construction shall be the estimated quantities tabulated on the Index. Concrete and reinforcing steel shall be paid for under the contract unit prices for Class II Concrete (Endwalls), CY and Reinforcing Steel (Roadway), LB.



OPTIONAL ENTRANCE
FOR CONCRETE PIPE



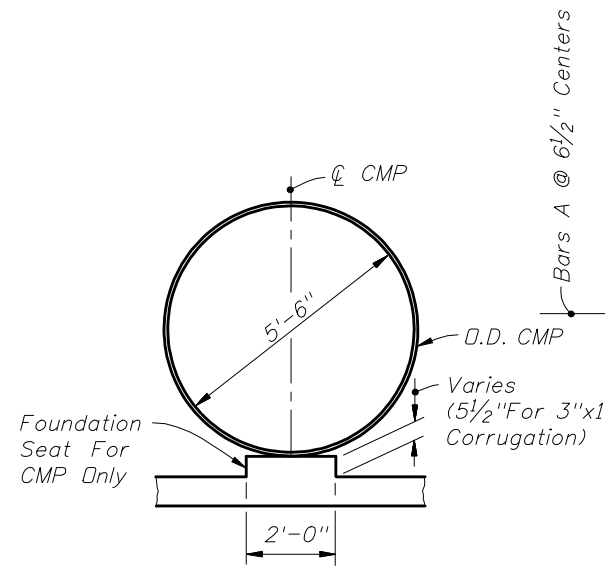
2010 FDOT Design Standards

STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 66" PIPE

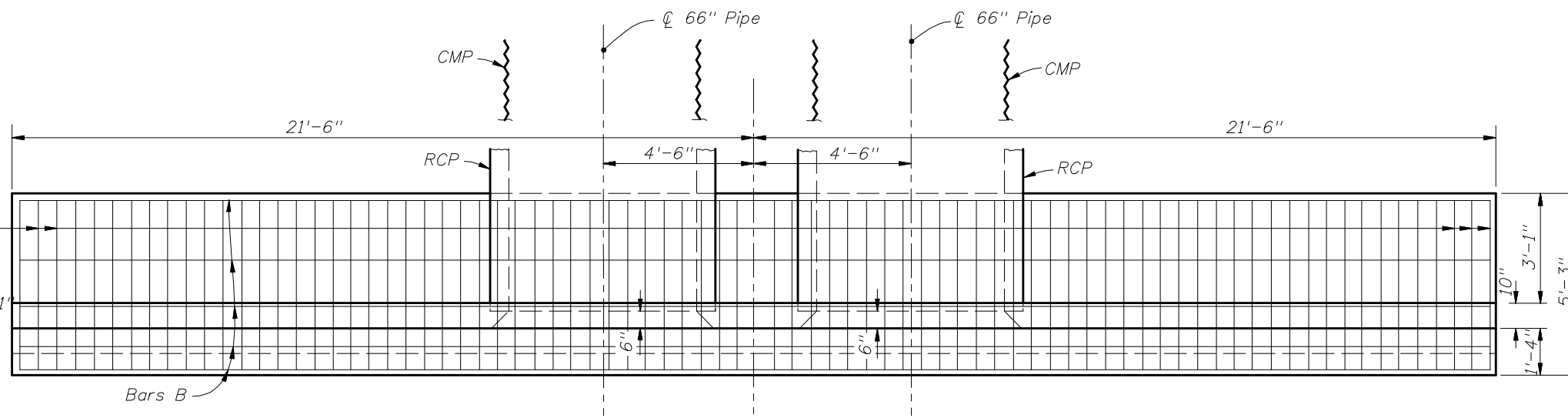
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1 of 2

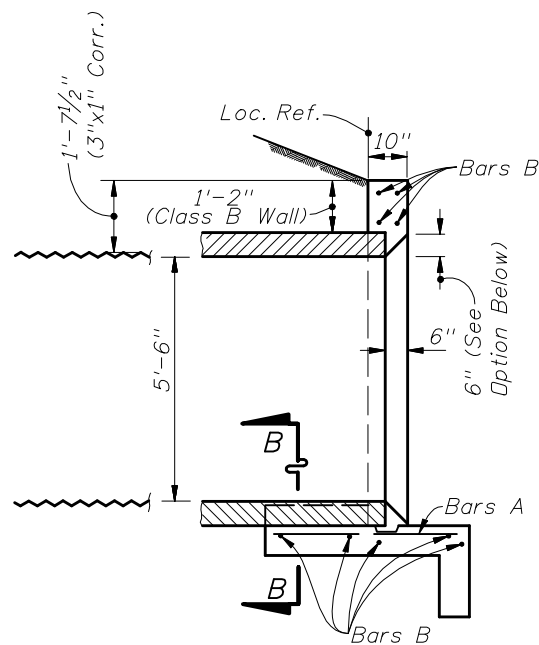
Index No.
252



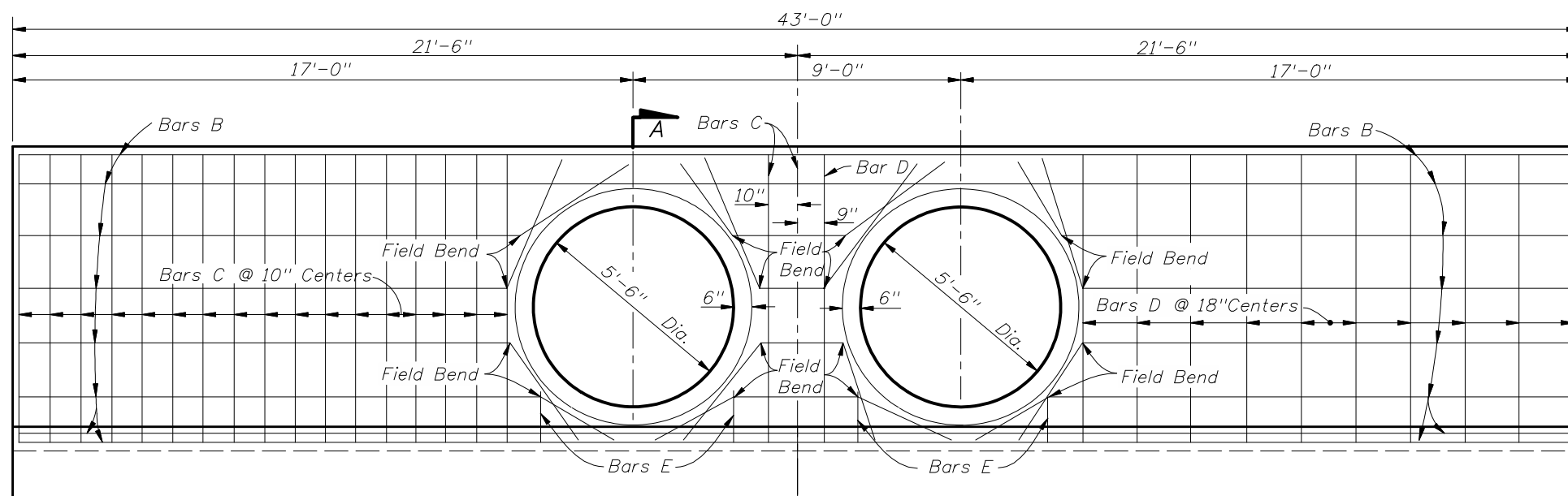
SECTION BB



PLAN
(Showing Bars In Footing)

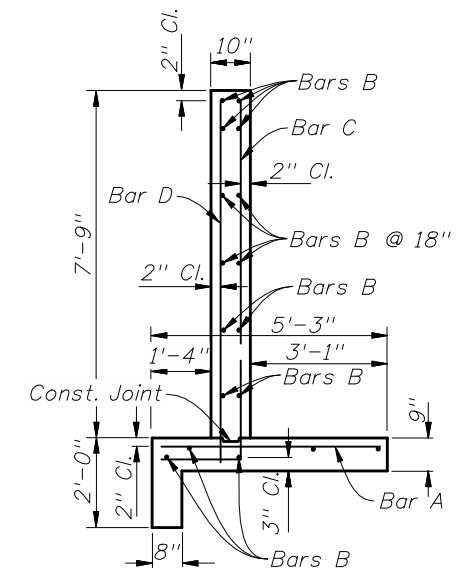


SECTION AA

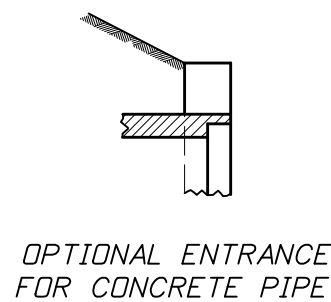


HALF ELEVATION
(Showing Bars In Back Face Of Wall)

NOTE:
Cut and Field Bend Bars B As Shown
HALF ELEVATION
(Showing Bars In Front Face Of Wall)



TYPICAL SECTION
THRU ENDWALL



OPTIONAL ENTRANCE
FOR CONCRETE PIPE

BILL OF REINFORCING STEEL						BENDING DIAGRAMS		ESTIMATED QUANTITIES			
MARK	SIZE	NO. REQD.	LENGTH	LOCATION	BENDING			ITEM	UNIT	RCP	CMP
A	5	80	4'-11"	Footing	Straight			Class II Concrete	Cu. Yd.	16.0	16.2
B	4	17	42'-8"	Footing & Wall	Straight			Reinforcing Steel	Lb.	1,406	1,406
C	5	37	9'-11"	Wall	Bend						
D	4	22	8'-1"	Wall	Straight						
E	4	8	1'-8"	Wall	Straight						
						Note: All bar dimensions are out to out		NOTE: See Sheet 1 of 2 for General Notes.			

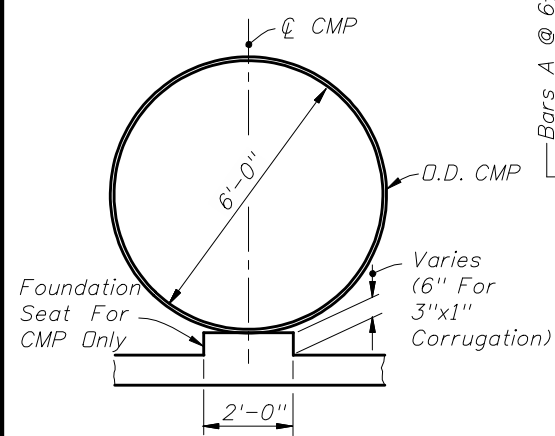


2010 FDOT Design Standards

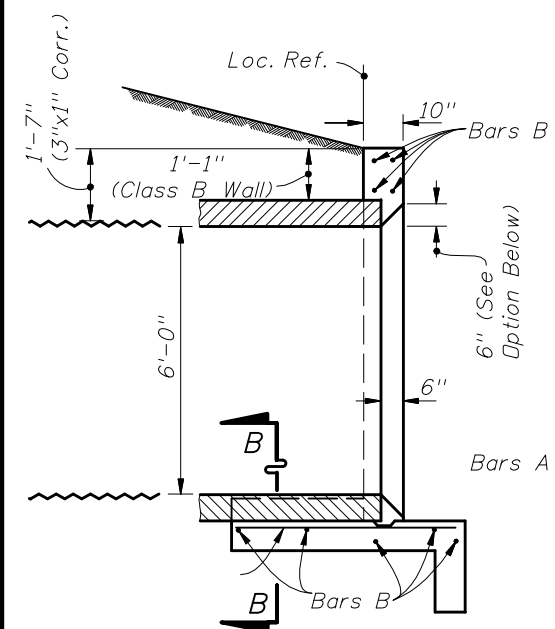
**STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 66" PIPE**

Last Revision
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Sheet No.
2 of 2

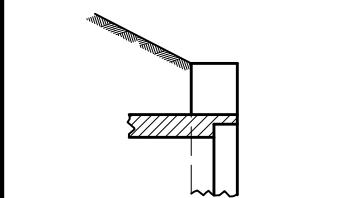
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SECTION BB

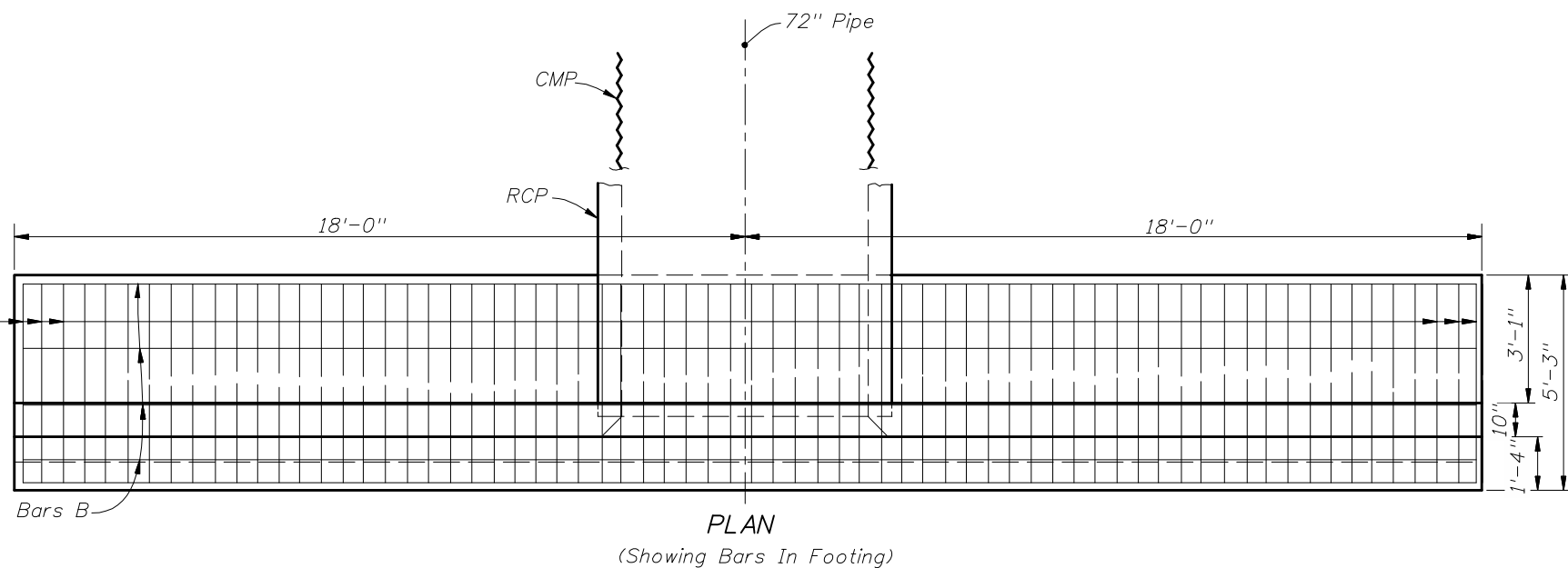


SECTION AA

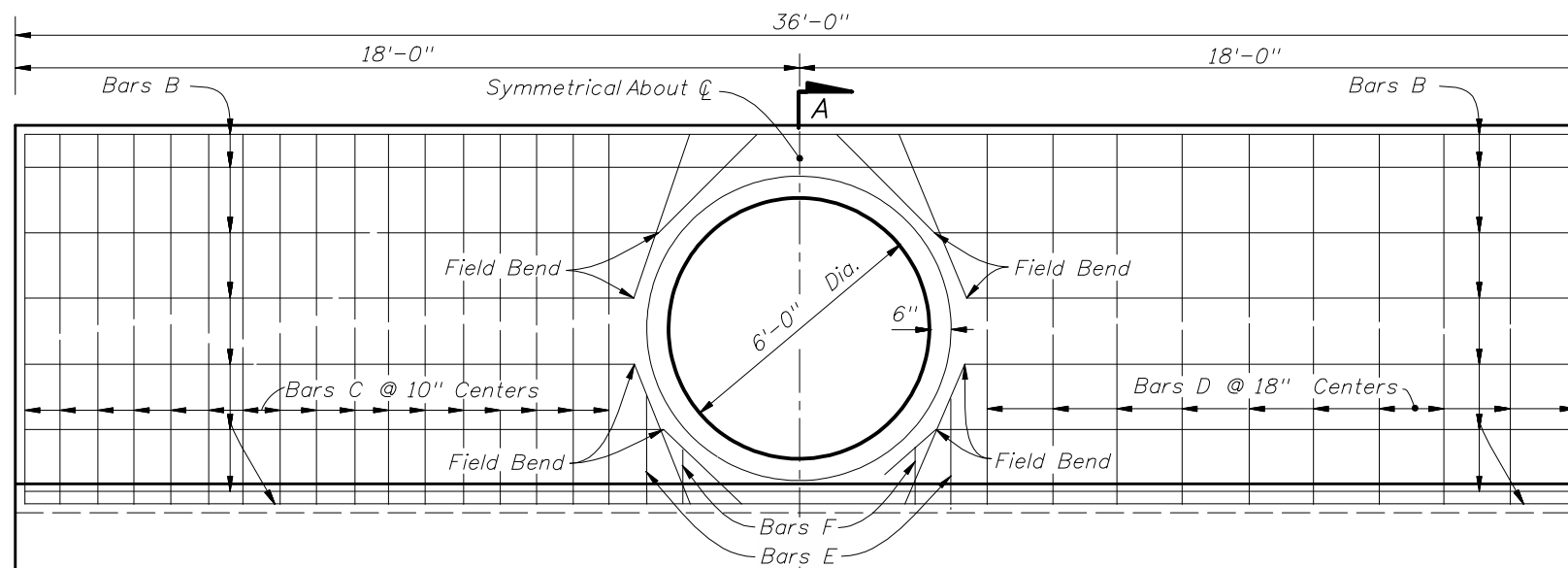


OPTIONAL ENTRANCE FOR CONCRETE PIPE

1. Straight concrete endwalls are intended for use outside the clear zone.
2. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this index, design specifications AASHTO 1989. Precast construction which adheres to this Index, including any additional reinforcement required for handling which shall be determined by the Contractor or supplier, does not require additional approvals. Deviations from this Index, for precast units, shall require the approval of the State Drainage Engineer prior to construction. For precast construction, see Index No. 201 for opening and grouting details.
3. Reinforcing steel shall be either Grade 40 or 60.
4. Concrete shall be Class II, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications.



PLAN
(Showing Bars In Footing)



HALF ELEVATION
(Showing Bars In Back Face Of Wall)



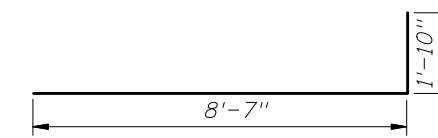
HALF ELEVATION
(Showing Bars In Front Face Of Wall)

GENERAL NOTES

5. Chamfer: All exposed edges and corners to be chamfered $\frac{3}{4}$ " unless otherwise shown.
6. That portion of corrugated Metal pipe in direct contact with the concrete slab and extending 12" beyond shall have a continuous bituminous coating of 0.004" minimum thickness coated applied prior to placing of the concrete.
7. Sodding shall be in accordance with Index No. 281 and paid for under the contract unit price for Performance Turf, SY.
8. Basis of payment for either cast-in-place or precast construction shall be the estimated quantities tabulated on the Index. Concrete and reinforcing steel shall be paid for under the contract unit prices for Class II Concrete (Endwalls), CY and Reinforcing Steel (Roadway), LB.

BILL OF REINFORCING STEEL					
MARK	SIZE	NO. REQD.	LENGTH	LOCATION	BENDING
A	5	68	4'-11"	Footing	Straight
B	4	17	35'-8"	Footing & Wall	Straight
C	5	34	10'-5"	Wall	Bend
D	4	20	8'-7"	Wall	Straight
E	4	4	2'-6"	Wall	Straight
F	4	4	1'-6"	Wall	Straight

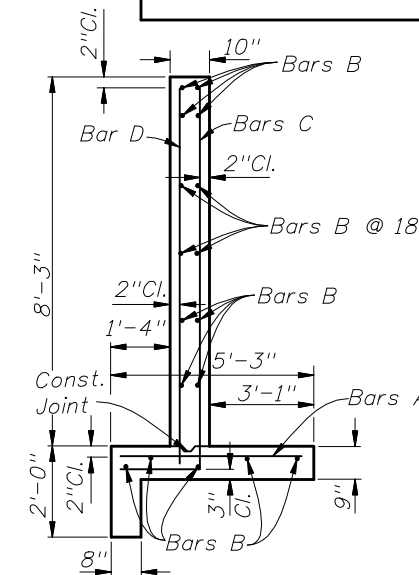
BENDING DIAGRAM



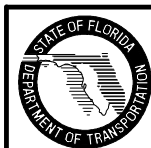
BAR C
NOTE: All bar dimensions are out to out

ESTIMATED QUANTITIES

ITEM	UNIT	RCP	CMP
Class II Concrete	Cu. Yd.	14.4	14.5
Reinforcing Steel	Lb.	1249	1249



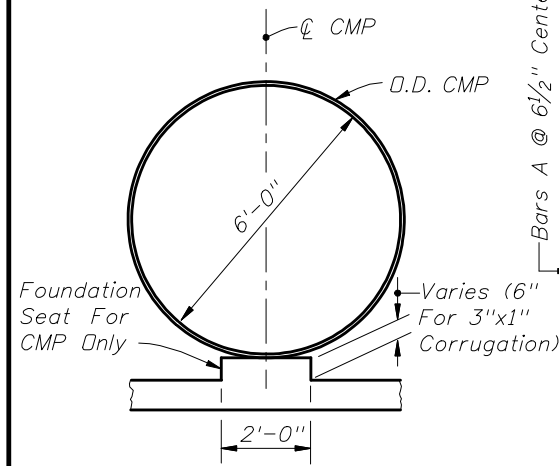
TYPICAL SECTION THRU ENDWALL



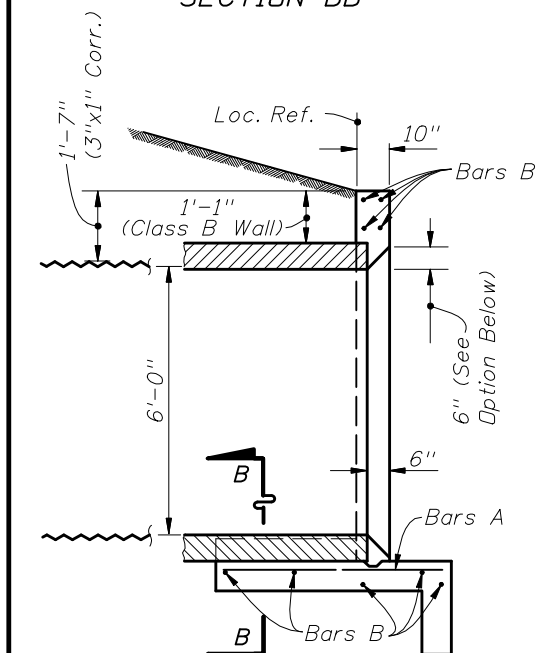
2010 FDOT Design Standards

STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 72" PIPE

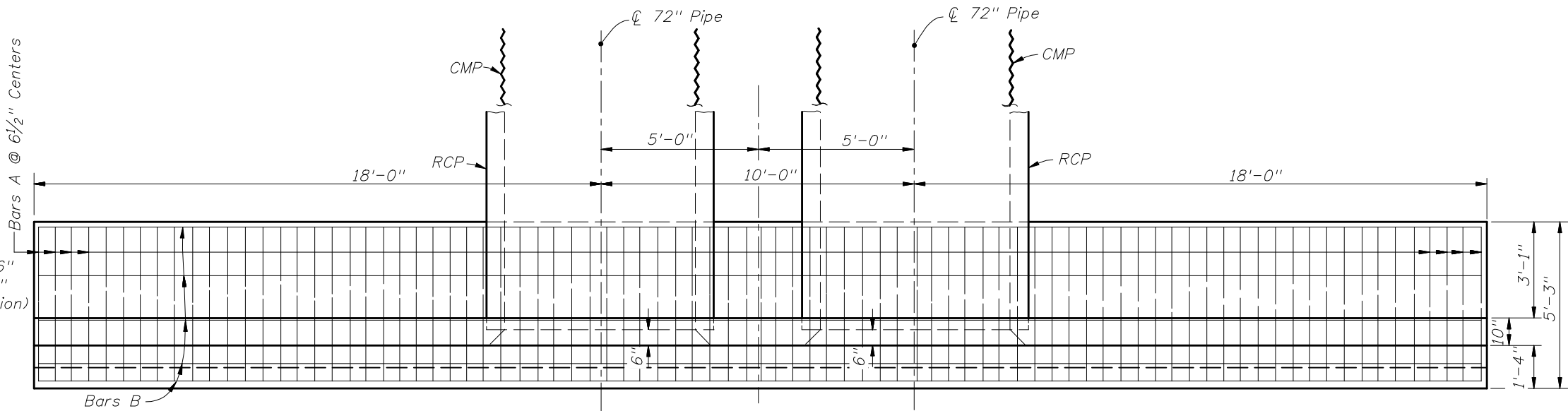
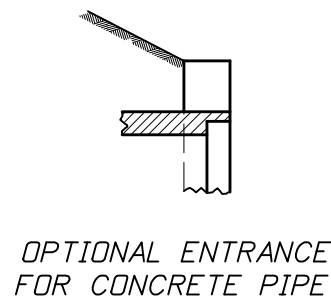
Last Revision	Sheet No.
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253	



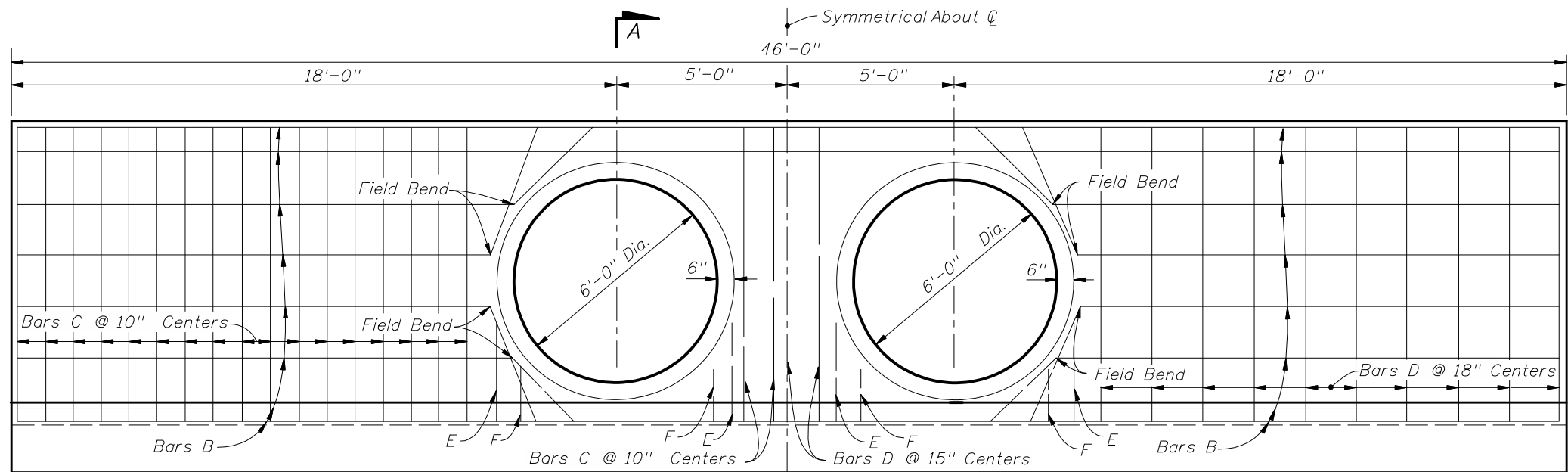
SECTION BB



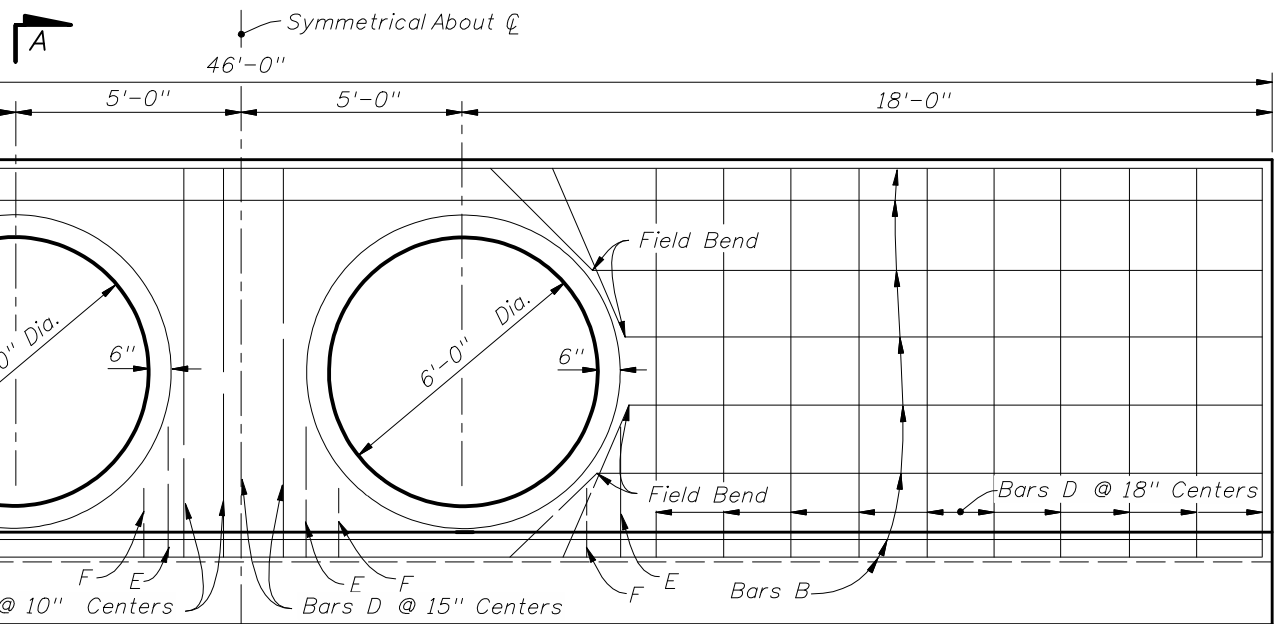
SECTION AA



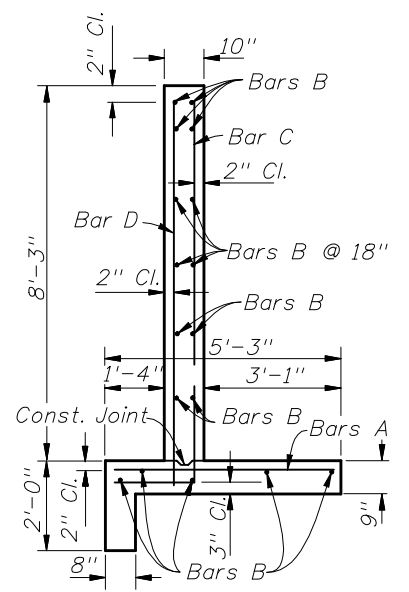
PLAN
(Showing Bars In Footing)



HALF ELEVATION
(Showing Bars In Back Face Of Wall)



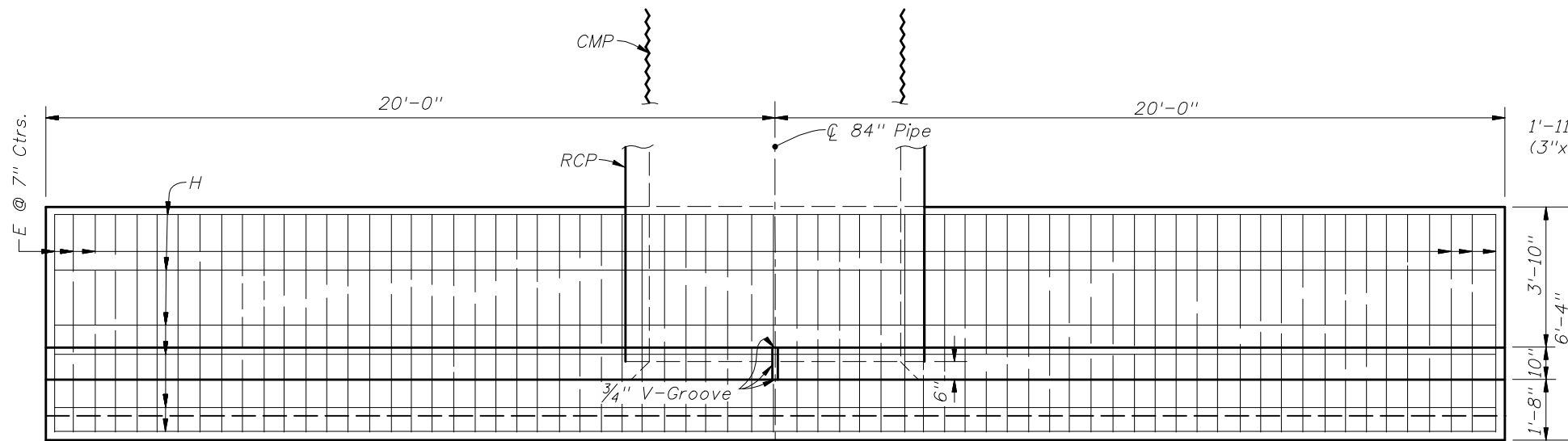
HALF ELEVATION
(Showing Bars In Front Face Of Wall)



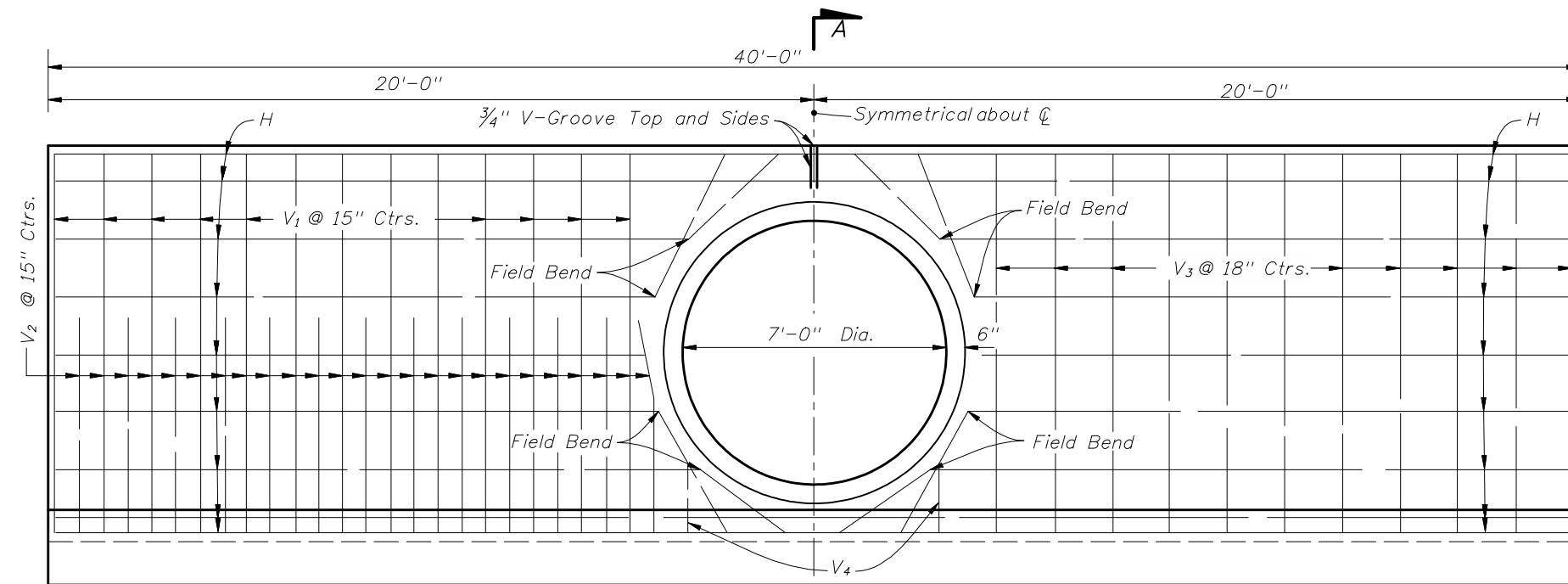
TYPICAL SECTION THRU ENDWALL

BILL OF REINFORCING STEEL						BENDING DIAGRAM		ESTIMATED QUANTITIES				
MARK	SIZE	NO. REQD.	LENGTH	LOCATION	BENDING			ITEM	UNIT	RCP	CMP	
A	5	85	4'-11"	Footing	Straight			Concrete Class II	Cu. Yd.	17.5	17.8	
B	4	17	45'-8"	Footing & Wall	Straight			Reinforcing Steel	Lb.	1519	1519	
C	5	38	10'-5"	Wall	Bend			<p>NOTE: All bar dimensions are out to out</p> <p>NOTE: See Sheet 1 of 2 for General Notes.</p>				
D	4	23	8'-7"	Wall	Straight							
E	4	8	2'-6"	Wall	Straight							
F	4	8	1'-6"	Wall	Straight							





PLAN
(Showing Bars In Footing)



HALF ELEVATION

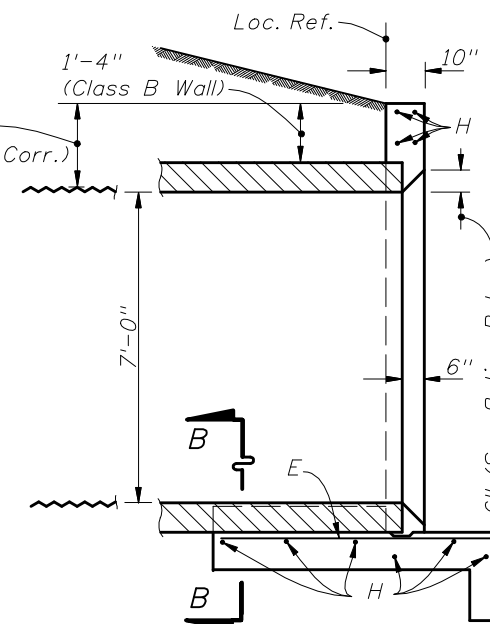
(Showing Bars In Back Face Of Wall)

GENERAL NOTES

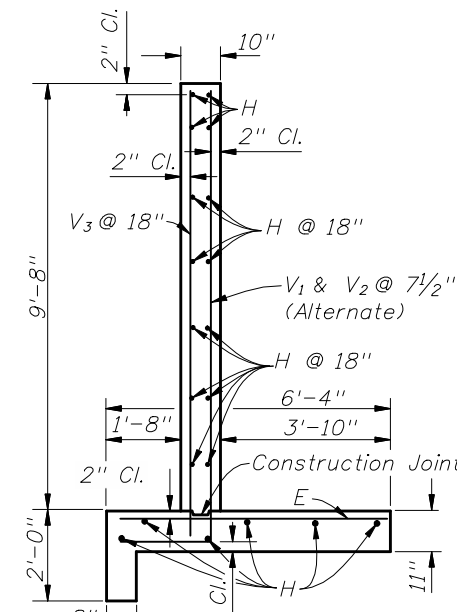
HALF ELEVATION
(Showing Bars In Front Face Of Wall)

1. Straight concrete endwalls are intended for use outside the clear zone.
2. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this index, design specifications AASHTO 1989. Precast construction which adheres to this Index, including any additional reinforcement required for handling which shall be determined by the Contractor or supplier, does not require additional approvals. Deviations from this Index, for precast units, shall require the approval of the State Drainage Engineer prior to construction. For precast construction, see Index No. 201 for opening and grouting details.
3. Reinforcing steel shall be either Grade 40 or 60.
4. Concrete shall be Class II, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications.

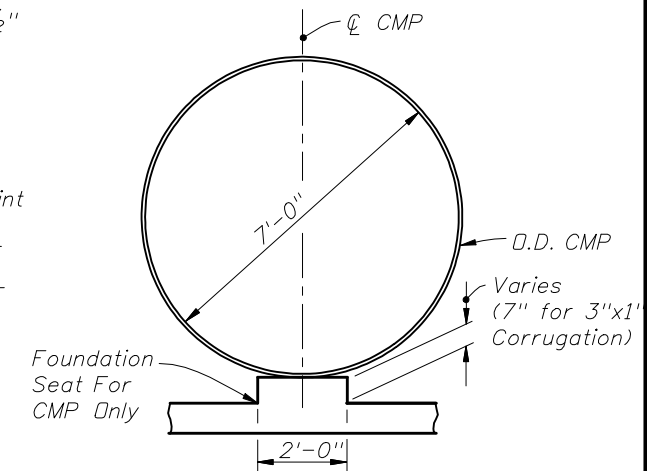
5. Chamfer: All exposed edges and corners to be chamfered $\frac{3}{4}$ " unless otherwise shown.
6. That portion of corrugated metal pipe in direct contact with the concrete slab and extending 12" beyond shall have a continuous bituminous coating of 0.004" minimum thickness applied prior to placing of the concrete.
7. Sodding shall be in accordance with Index No. 281 and paid for under the contract unit price for Performance Turf, SY.
8. Basis of payment for either cast-in-place or precast construction shall be the estimated quantities tabulated on the Index. Concrete and reinforcing steel shall be paid for under the contract unit prices for Class II Concrete (Endwalls), CY and Reinforcing Steel (Roadway), LB.



SECTION AA



TYPICAL SECTION THRU ENDWALL

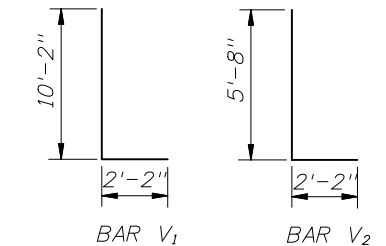


SECTION BB

OPTIONAL ENTRANCE FOR CONCRETE PIPE

BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQD.	LENGTH
E	6	69	6'-0"
H	4	20	39'-8"
V ₁	6	26	12'-4"
V ₂	6	26	7'-10"
V ₃	4	22	10'-2"
V ₄	4	4	2'-0"

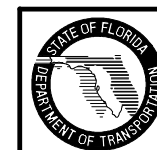
BENDING DIAGRAM



NOTE:
All bar dimensions are out to out

ESTIMATED QUANTITIES

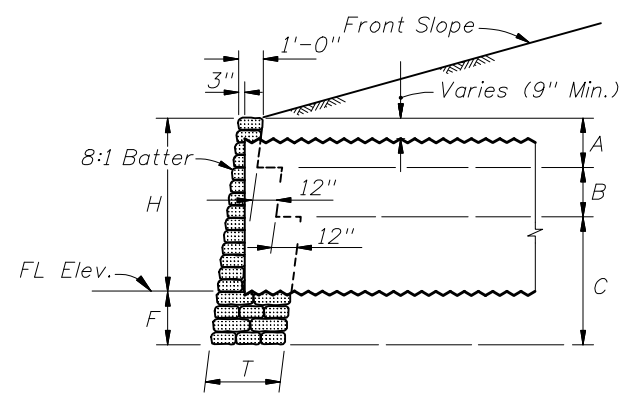
ITEM	UNIT	RCP	CMP
Class II Concrete	Cu. Yd.	20.0	20.2
Reinforcing Steel	Lb.	2,095	2,095



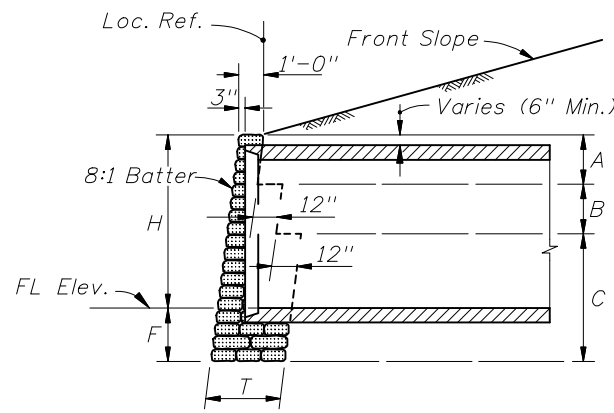
2010 FDOT Design Standards

**STRAIGHT CONCRETE ENDWALL
SINGLE 84" PIPE**

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Index No. 255

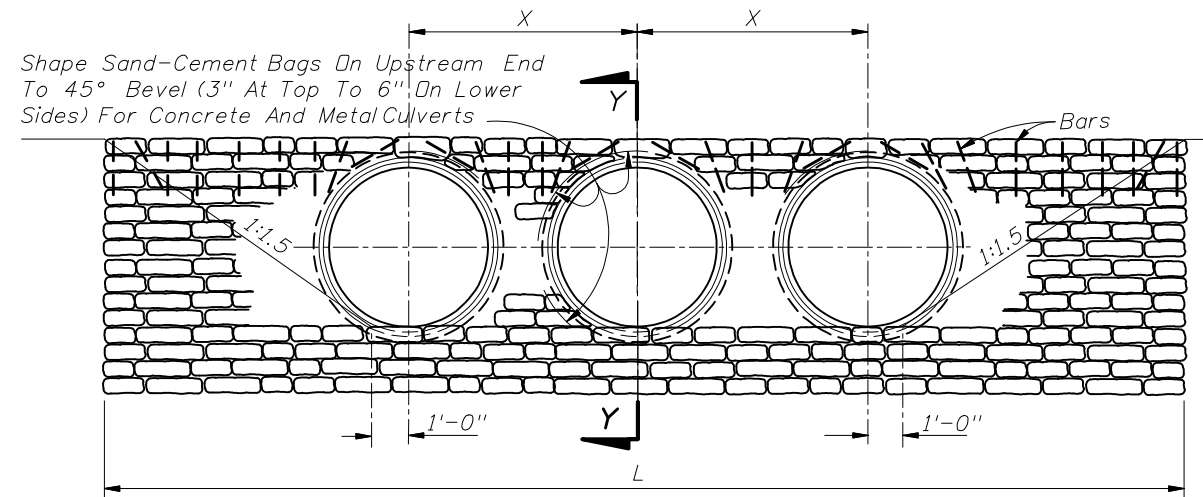


CORRUGATED METAL PIPE



CONCRETE PIPE

SECTION YY



Note:

- (1) For concrete and corrugated metal pipes. Concrete pipe shown.
- (2) The top row of riprap bags shall be secured by pinning, using #4 reinforcing bars 18 inches in length, as follows:
 - (a) The end bags shall be secured using two bars per bag, one vertical and one diagonal as shown.
 - (b) The next to last bag on each end shall be secured with two bars vertically.
 - (c) Bags located over the pipe shall be secured by a bar which is driven diagonally except that for concrete pipe two bars shall be used for single bags above the pipe.
 - (d) Intermediate bags shall be secured with a single bar.

Bars shall be driven to one inch below the surface of the bag.
The cost of furnishing and installing the bars shall be included in the cost of the riprap.

FRONT ELEVATION

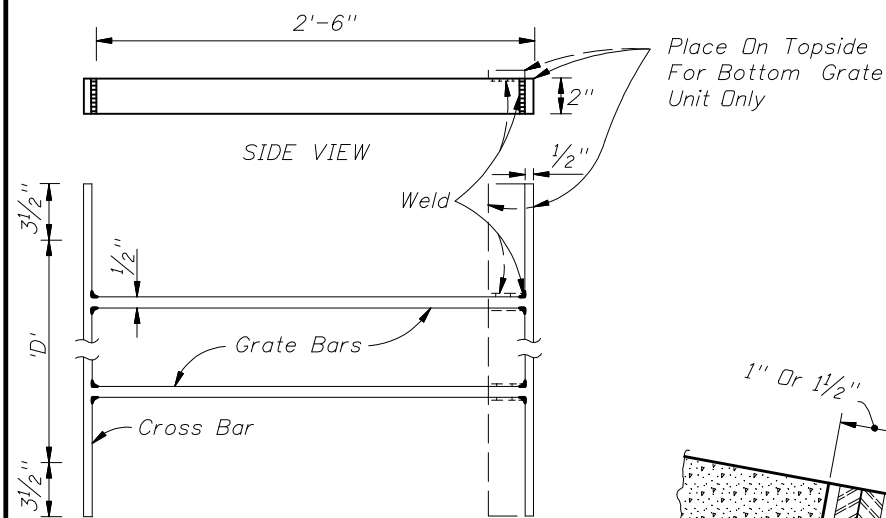
TABLE OF DIMENSIONS AND QUANTITIES FOR ONE ENDWALL

SIZE OF PIPE	H	T	A	B	C	F	X	ONE PIPE CULVERTS		TWO PIPE CULVERTS		THREE PIPE CULVERTS		FOUR PIPE CULVERTS					
								L	RIPRAP CY		L	RIPRAP CY		L	RIPRAP CY		L	RIPRAP CY	
									CP	CMP		CP	CMP		CP	CMP		CP	CMP
18"	2'-3"	1'-0"	4'-0"	0'-0"	0'-0"	1'-9"	2'-10"	8'-9"	1.2	1.2	11'-7"	1.5	1.6	14'-5"	1.8	1.9	17'-3"	2.1	2.3
24"	2'-9"	2'-0"	2'-0"	2'-6"	0'-0"	1'-9"	3'-5"	10'-3"	2.4	2.5	13'-8"	3.0	3.2	17'-1"	3.7	4.0	20'-6"	4.3	4.7
30"	3'-4"	2'-0"	2'-0"	3'-2"	0'-0"	1'-10"	4'-3"	12'-0"	3.3	3.4	16'-3"	4.2	4.5	20'-6"	5.1	5.5	24'-9"	6.0	6.5
36"	3'-10"	2'-0"	2'-0"	3'-8"	0'-0"	1'-10"	5'-1"	13'-6"	4.0	4.2	18'-7"	5.2	5.7	23'-8"	6.3	6.9	28'-9"	7.4	8.2
42"	4'-5"	3'-0"	2'-0"	2'-0"	2'-4"	1'-11"	6'-0"	15'-3"	6.4	6.7	21'-3"	8.3	8.9	27'-3"	10.2	11.2	33'-3"	12.3	13.4
48"	4'-11"	3'-0"	2'-0"	2'-0"	2'-10"	1'-11"	6'-9"	16'-9"	7.7	8.1	23'-6"	10.0	10.8	30'-3"	12.3	13.5	37'-0"	14.5	16.2
54"	5'-6"	3'-0"	2'-0"	2'-0"	3'-6"	2'-0"	7'-8"	18'-6"	9.5	10.1	26'-2"	12.4	13.5	33'-10"	15.3	17.0	41'-6"	18.2	20.4
60"	6'-0"	3'-0"	2'-0"	2'-0"	4'-0"	2'-0"	8'-6"	20'-0"	11.0	11.7	28'-6"	14.4	15.8	37'-0"	17.8	19.8	45'-6"	21.1	23.8
66"	6'-7"	3'-0"	2'-0"	2'-0"	4'-8"	2'-1"	9'-3"	21'-9"	13.2	14.1	31'-0"	17.2	18.9	40'-3"	21.2	23.7	49'-6"	25.1	28.5
72"	7'-1"	3'-0"	2'-0"	2'-0"	5'-2"	2'-1"	10'-0"	23'-3"	15.0	16.0	33'-3"	19.4	21.4	43'-3"	23.9	26.8	53'-3"	28.3	32.3
78"	7'-8"	3'-0"	2'-0"	2'-0"	5'-10"	2'-2"	10'-9"	25'-0"	17.5	18.7	35'-9"	22.6	25.0	46'-6"	27.8	31.3	57'-3"	32.9	37.6
84"	8'-2"	3'-0"	2'-0"	2'-0"	6'-4"	2'-2"	11'-8"	26'-6"	19.5	20.9	38'-2"	25.3	28.1	49'-10"	31.1	35.2	61'-6"	36.9	42.4

GENERAL NOTES

- 1. Straight sand-cement endwalls are intended for use outside the clear zone.

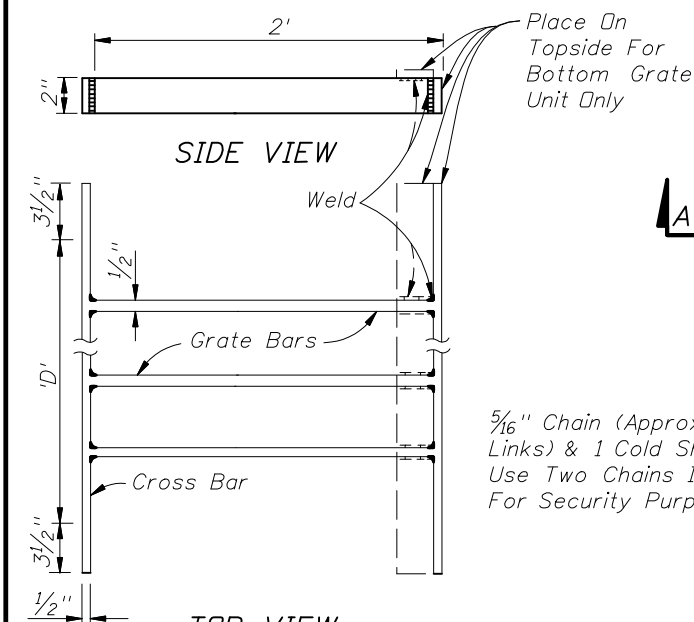




TOP VIEW
GRATE TYPE NO. 1

Pipe Size	Grate Bars Req'd.	Grate LB.
15"	2	28.93

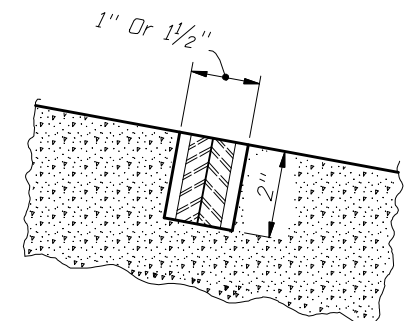
Bars to be evenly spaced across dimension 'D'
All bars 1/2" x 2"



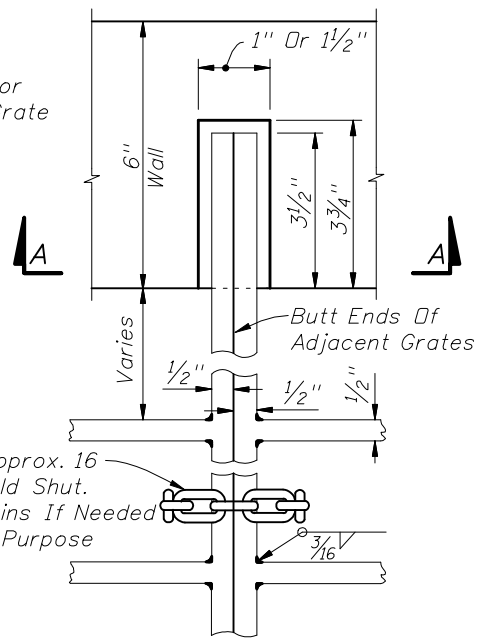
TOP VIEW
GRATE TYPE NO. 2

Pipe Size	Grate Bars Req'd.	Grate LB.
18"	3	33.69
24"	4	43.63
30"	5	53.55

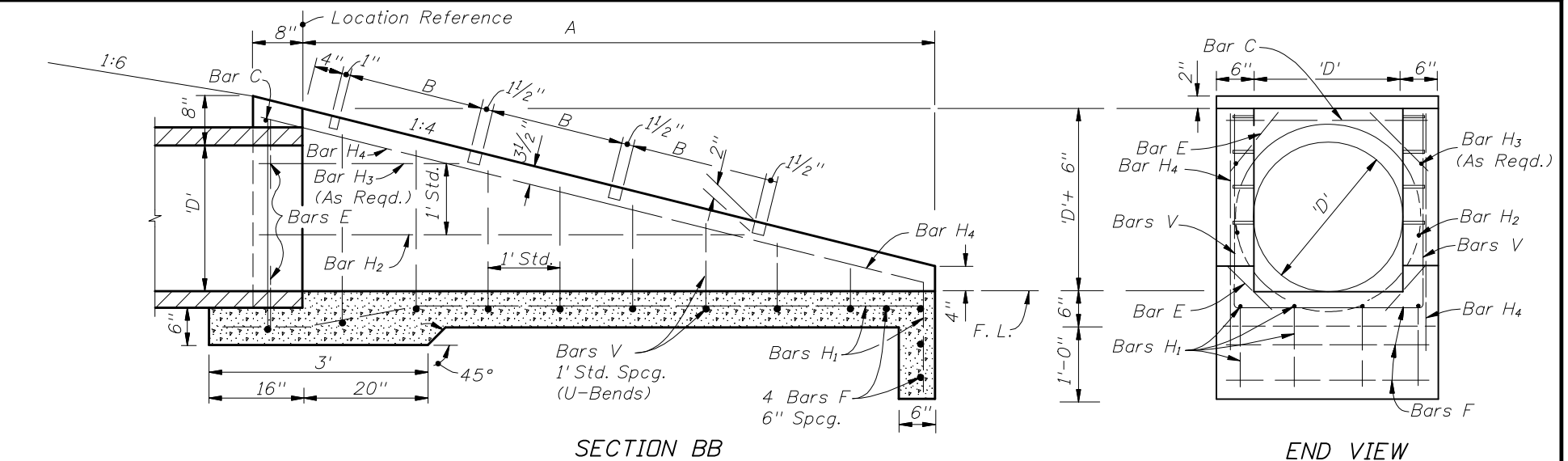
Bars to be evenly spaced across dimension 'D'.
All bars 1/2" x 2".



SECTION AA

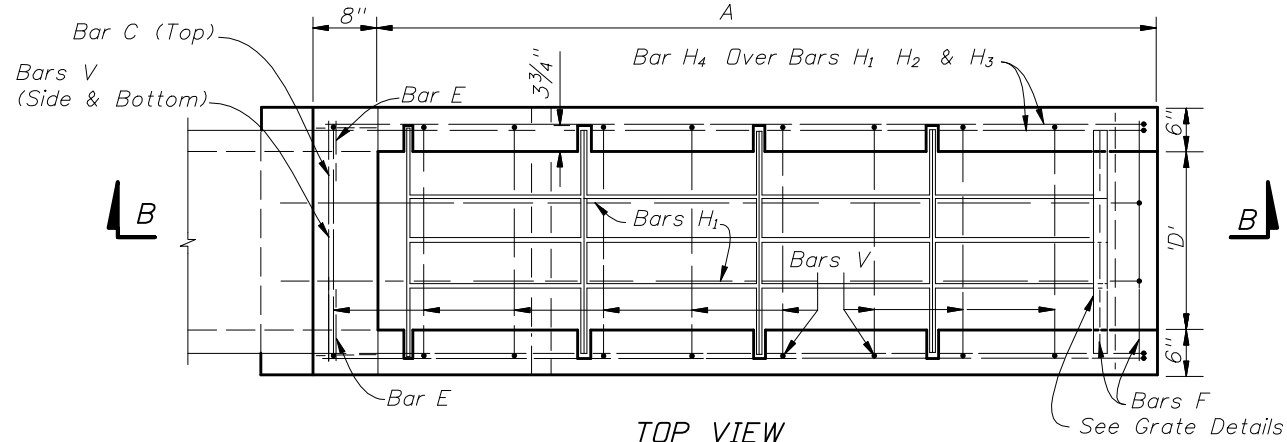


TOP VIEW
GRATE, SEAT,
WELD & CHAIN DETAIL



SECTION BB

END VIEW

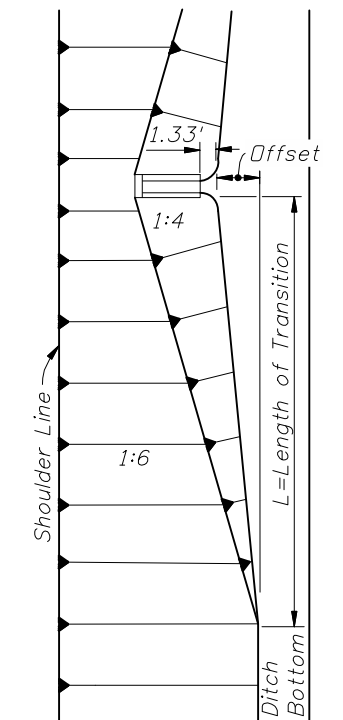


TOP VIEW

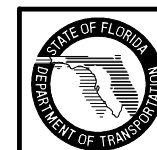
Slope	Pipe Size D	TABLE OF DIMENSIONS AND QUANTITIES									
		A	B	Class I Conc. (CY)	Reinf. Steel (Lbs.)	Number Of Grates Req'd.		Total Grate Wt. (Lbs.)	Sodding (SY)	Slope Transition	
						Type No. 1	Type No. 2			Offset	L
1:4	15"	5.67'	2.38'	0.85	56	2	0	57.86	15	4.2'	42'
	18"	6.67'	1.875'	1.01	73	0	3	101.08	16	4.8'	48'
	24"	8.67'	1.875'	1.65	97	0	4	174.52	19	5.8'	58'
	30"	10.67'	1.875'	2.33	129	0	5	267.75	21	6.9'	69'

GENERAL NOTES

- This endwall is to be used only in the clear zone for the drainage of medians and other areas having low design velocities and negligible debris.
- Reinforcing steel: All bars are size #4. Spacings shown are center to center. Laps to be 12" minimum. Clearance is 2" except as noted. Square welded wire fabric (two cages max.) having an equivalent cross sectional area (0.20 sq. in.) may be substituted for bar reinforcement.
- Grates shall be ASTM A242/A242M, A572/A572M or ASTM A5888/A588M, Grade 50 steel. When "Alt. G" grates are specified in the plans, grates shall be galvanized in accordance with Section 975 and 425.3.2 of the Standard Specifications.
- Endwall to be paid for under the contract unit price for U-Endwall, Each. Payment shall include cost of concrete, reinforcing steel, grate, and accessories. Quantities shown are for estimating purposes only.
- Sod slopes 5' each side and above endwall. Sodding to be paid for under contract unit price for Performance Turf, SY.
- Precasting of this endwall will be permitted. Precast units shall conform to the dimensions shown or in accordance with approved shop drawings. Request for shop drawing approval shall be directed to the State Drainage Engineer. Use Index No. 201 for opening and grouting details.
- Concrete shall be Class I except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications.



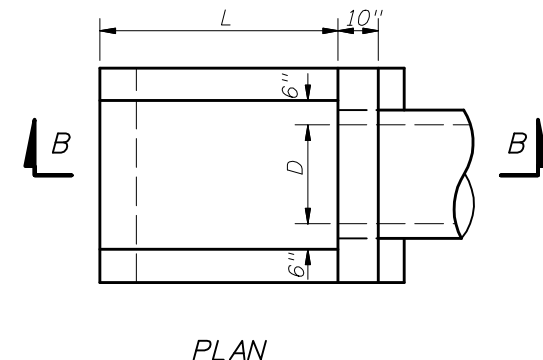
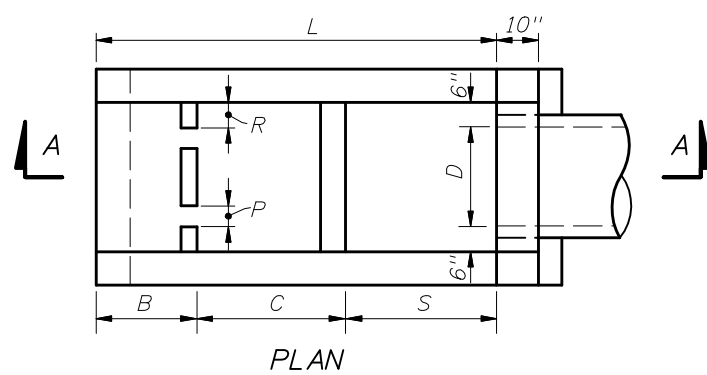
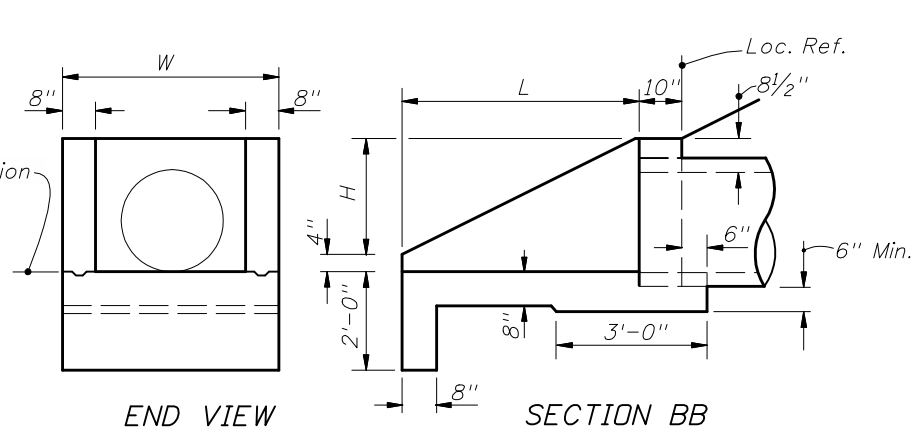
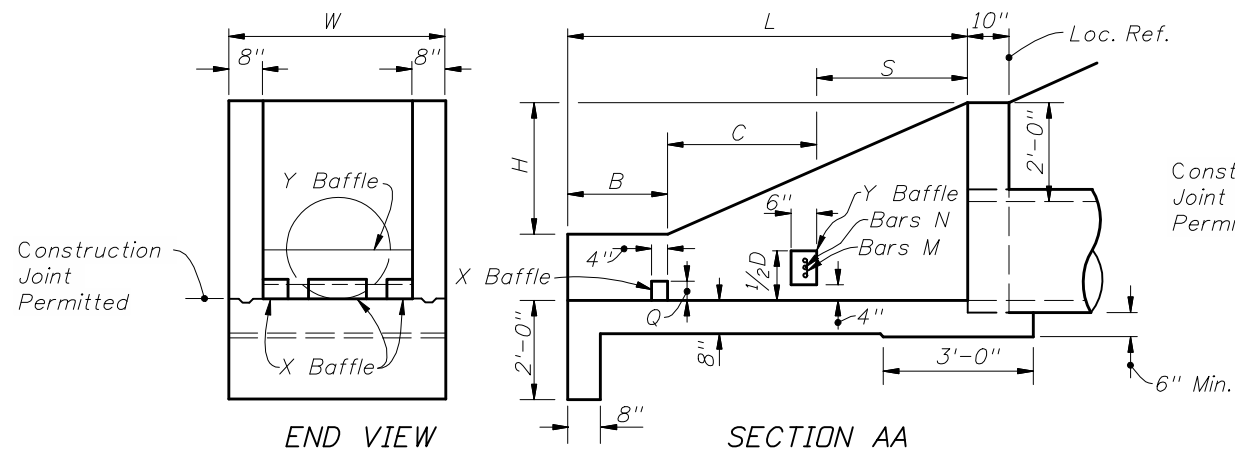
FRONT SLOPE
TRANSITION AT ENDWALL



2010 FDOT Design Standards

U-TYPE CONCRETE ENDWALLS WITH GRATES
15" TO 30" PIPE

Last Revision 07/01/09
Sheet No. 1 of 1
Index No. 260

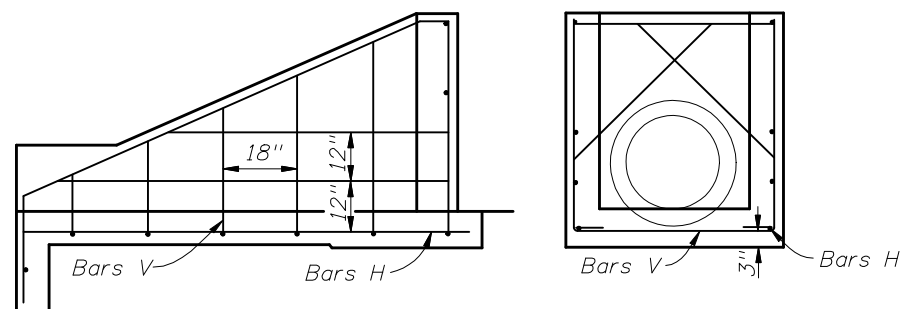


DIMENSIONAL DETAILS

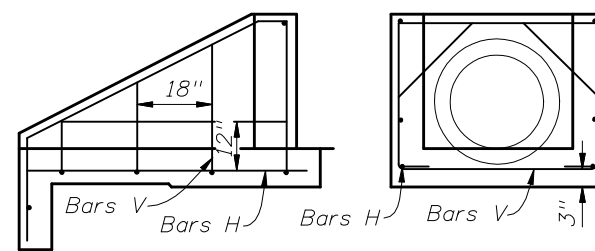
DIMENSIONAL DETAILS

GENERAL NOTES

1. Baffles to be constructed only when called for in plans.
2. When steelgrating is required on endwall see Sheet 3 of 3 for details.
3. All reinforcing No. 4 bars with 2" clearance except as noted.
4. All angles, channels and bars shall be ASTM A242/A242M, A572/A572M or A588/A588M Grade 50 steel. When designated Alternate G in the plans galvanize in accordance with Section 975 and 425-3.2 of the Standard Specifications.
5. Channel section C 3x6 may be substituted for C 4x5.4 channel.
6. Precasting of this endwall will be permitted. Precast units shall conform to the dimensions shown or in accordance with approved shop drawings. Request for shop drawing approval shall be directed to the State Drainage Engineer. Use Index No. 201 for opening and grouting details.
7. Concrete shall be Class I, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications.
8. Sodding shall be in accordance with Index No. 281, and paid for under the contract unit price for Performance Turf, SY.
9. Endwall to be paid for under the contract unit price for U-Endwall, Each. Payment shall include cost of concrete, reinforcing steel, and when called for in the plans, steelgrating, baffles and accessories. Quantities shown are for estimating purposes only.



ALL PIPE SIZES
SIDE VIEW AND BACKWALL SECTION
REINFORCING DETAIL



ALL PIPE SIZES
SIDE VIEW AND BACKWALL SECTION
REINFORCING DETAIL

DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL														
Pipe Size		L	H	W	S	B	C	X Baffle			Y Baffle Reinf. Steel		Class I Conc. Cu. Yd.	Reinf. Steel Lbs.
D	Area Sq. Ft.							P	Q	R	Bar M	Bar N		
15"	1.23	5'-9"	2'-3 1/2"	3'-7"	2'-3"	1'-3"	2'-3"	4"	4"	4"	2 #4	1 #4	1.61	72
18"	1.77	6'-6"	2'-5"	3'-10"	2'-6"	1'-6"	2'-6"	4"	4"	5"	3 #4	2 #4	1.89	86
24"	3.14	8'-0"	2'-8"	4'-4"	3'-0"	2'-0"	3'-0"	5"	5"	6"	4 #4	3 #4	2.52	108
30"	4.91	9'-6"	2'-11"	4'-10"	3'-6"	2'-6"	3'-6"	5"	5"	7"	4 #4	4 #4	3.34	131

WITH BAFFLES

DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL						
Pipe Size		L	H	W	Class I Conc. Cu. Yd.	Reinf. Steel Lbs.
D	Area Sq. Ft.					
15"	1.23	3'-3"	1'-7 1/2"	3'-7"	0.89	39
18"	1.77	3'-9"	1'-10 1/2"	3'-10"	1.05	43
24"	3.14	4'-9"	2'-4 1/2"	4'-4"	1.40	55
30"	4.91	5'-9"	2'-10 1/2"	4'-10"	1.88	64

WITHOUT BAFFLES

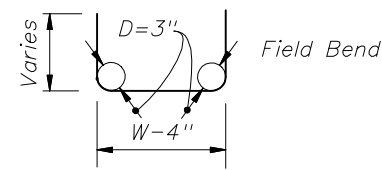
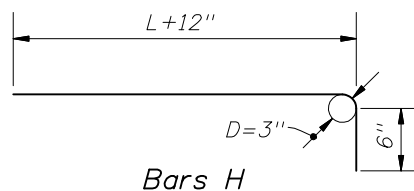
ENDWALLS FOR 1:2 SLOPES



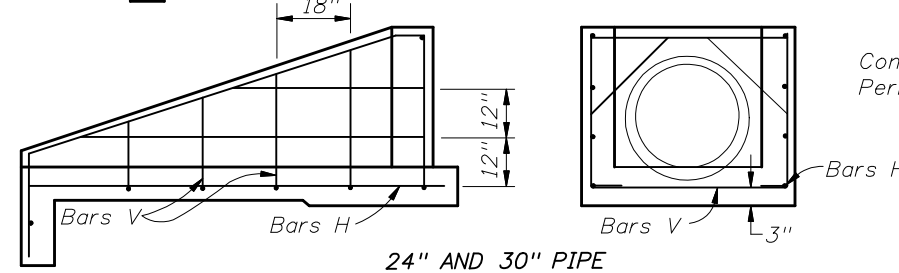
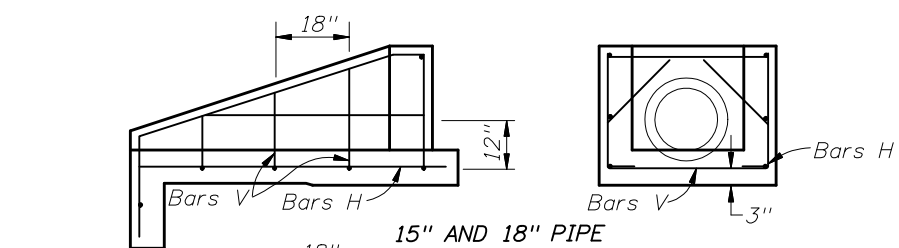
2010 FDOT Design Standards

U-TYPE CONCRETE ENDWALLS
BAFFLES AND GRATE OPTIONAL - 15" TO 30" PIPE

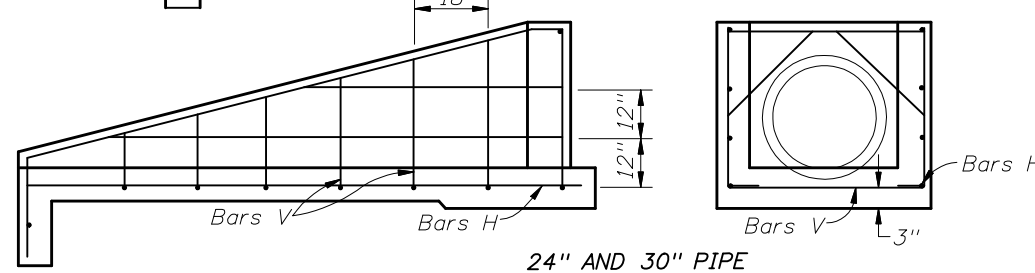
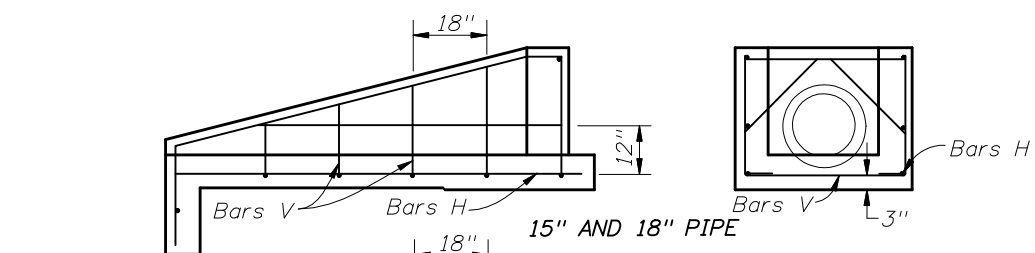
Last Revision 07/01/09
Sheet No. 1 of 3
Index No. 261



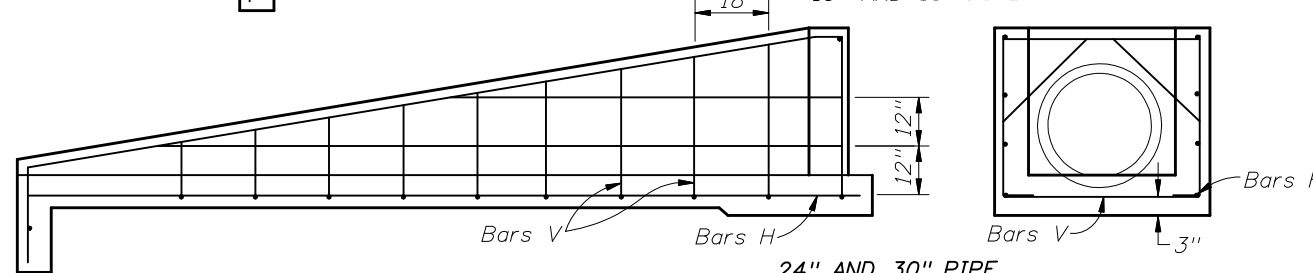
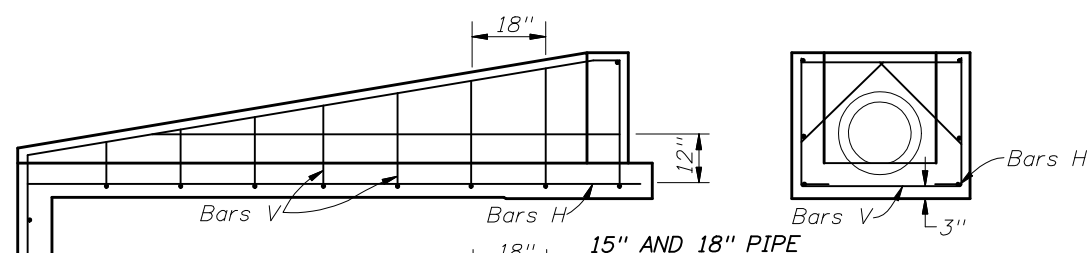
BENDING DIAGRAM



1:3 SLOPES



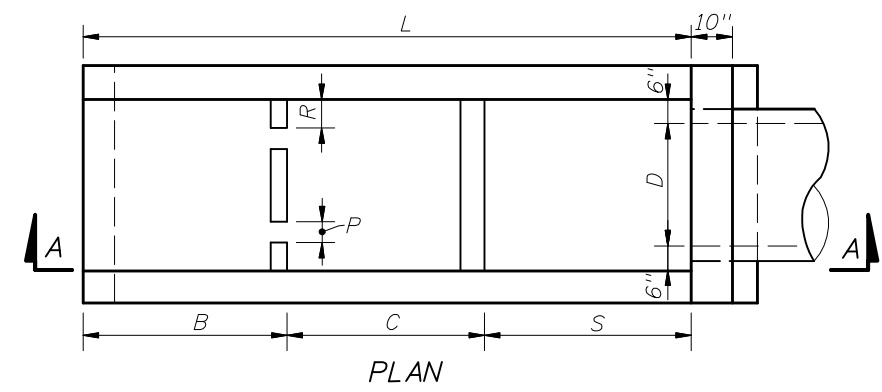
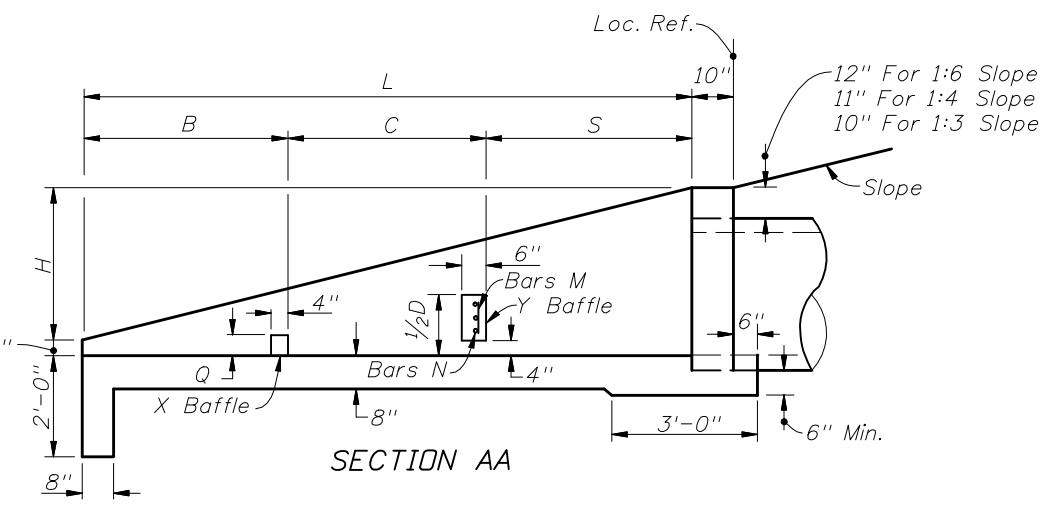
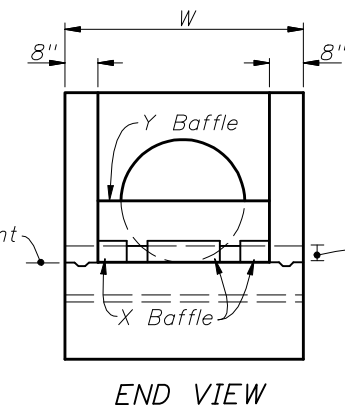
1:4 SLOPES



1:6 SLOPES

SIDE VIEWS AND BACKWALL SECTIONS
REINFORCING DETAILS

Construction Joint Permitted



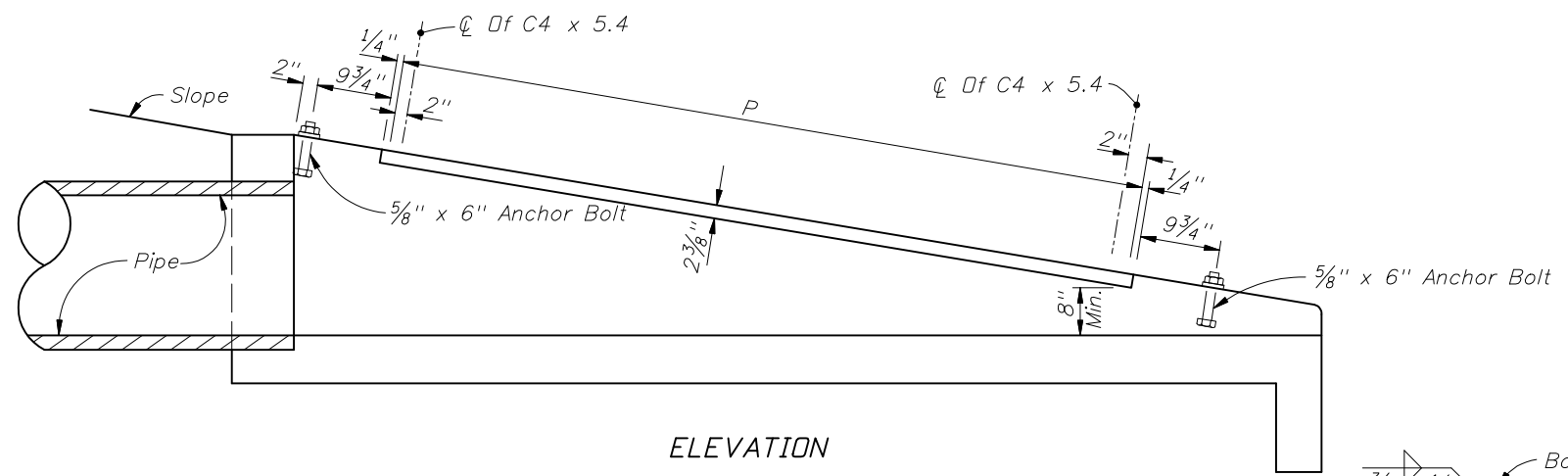
DIMENSIONAL DETAILS

DIMENSIONS AND QUANTITIES FOR BAFFLES							
Pipe Size D	X Baffle			Y Baffle Reinf. Steel		Class I Concrete Cu. Yd.	Reinf. Steel Lbs.
	P Width	Q Height	R Length	Bar M	Bar N		
15"	4"	4"	4"	2-#4	1-#4	0.10	4
18"	4"	4"	5"	3-#4	2-#4		8
24"	5"	5"	6"	4-#4	3-#4		12
30"	5"	5"	7"	4-#4	4-#4		16

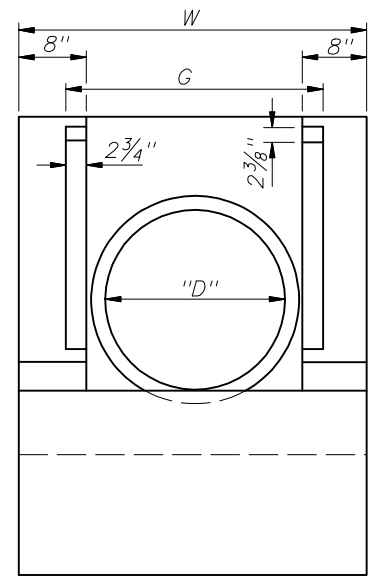
DIMENSIONS AND QUANTITIES FOR ONE U-ENDWALL										
Rate Of Slope	Pipe Size		L	H	W	Baffle Locations (When Required)			Conc. Class I Cu. Yd.	Reinf. Steel Lbs.
	D	Area Sq. Ft.				S	B	C		
1:3	15"	1.23	5'-3"	1'-9"	3'-7"	1'-9"	1'-9"	1'-9"	1.19	51
	18"	1.77	6'-0"	2'-0"	3'-10"	2'-0"	2'-0"	2'-0"	1.42	56
	24"	3.14	7'-6"	2'-6"	4'-4"	2'-6"	2'-6"	2'-6"	1.94	77
	30"	4.91	9'-0"	3'-0"	4'-10"	3'-0"	3'-0"	3'-0"	2.54	96
1:4	15"	1.23	7'-4"	1'-10"	3'-7"	2'-6"	2'-6"	2'-4"	1.54	64
	18"	1.77	8'-4"	2'-1"	3'-10"	2'-10"	2'-10"	2'-8"	1.84	71
	24"	3.14	10'-4"	2'-7"	4'-4"	3'-6"	3'-6"	3'-4"	2.53	92
	30"	4.91	12'-4"	3'-1"	4'-10"	4'-2"	4'-2"	4'-0"	3.34	124
1:6	15"	1.23	11'-6"	1'-11"	3'-7"	3'-10"	3'-10"	3'-10"	2.19	89
	18"	1.77	13'-0"	2'-2"	3'-10"	4'-4"	4'-4"	4'-4"	2.63	103
	24"	3.14	16'-0"	2'-8"	4'-4"	5'-4"	5'-4"	5'-4"	3.59	143
	30"	4.91	19'-0"	3'-2"	4'-10"	6'-4"	6'-4"	6'-4"	4.81	180

ENDWALLS WITH AND WITHOUT BAFFLES FOR 1:3, 1:4 AND 1:6 SLOPES



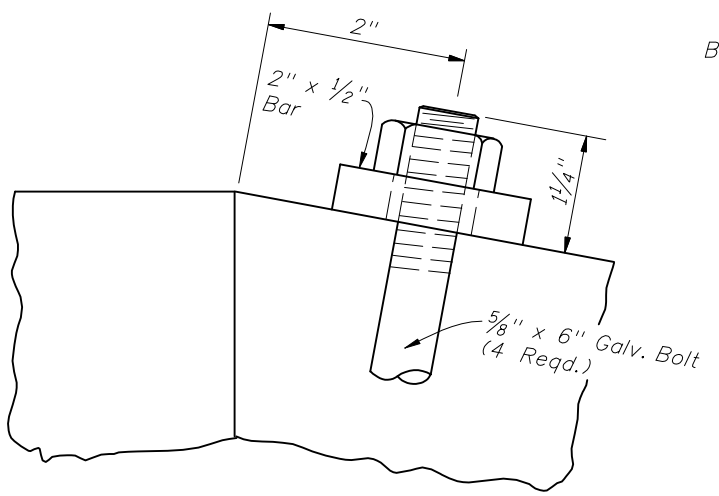


ELEVATION

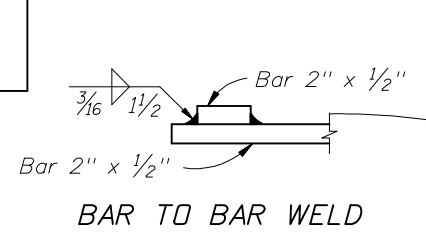


END VIEW

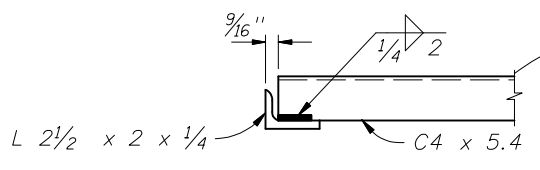
MOUNTING FOR STEEL GRATE



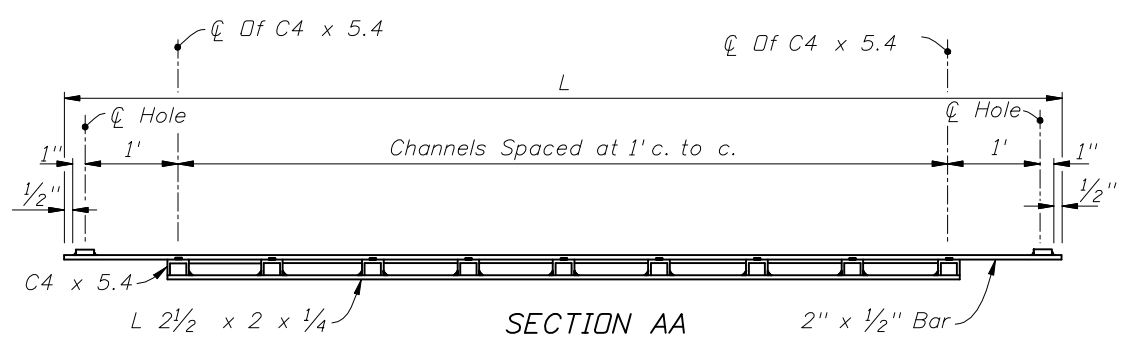
ANCHOR BOLT DETAIL



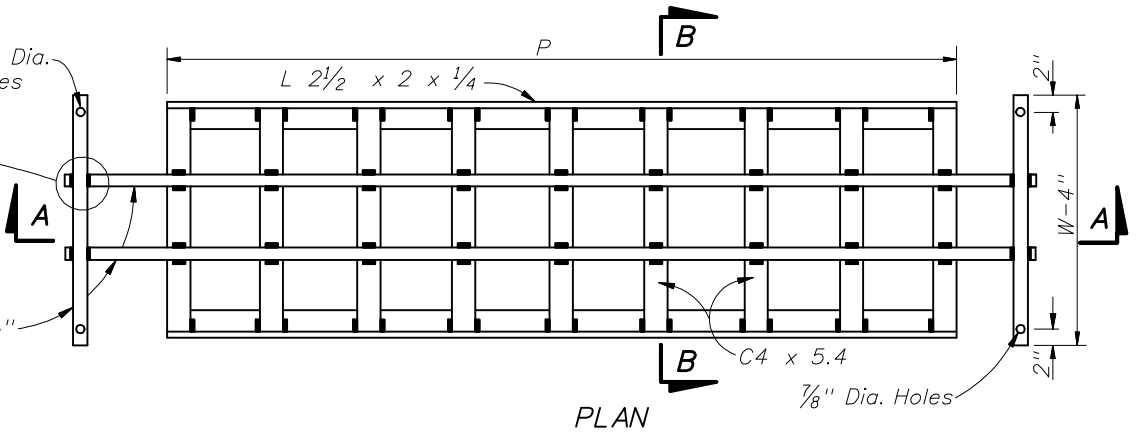
BAR TO BAR WELD



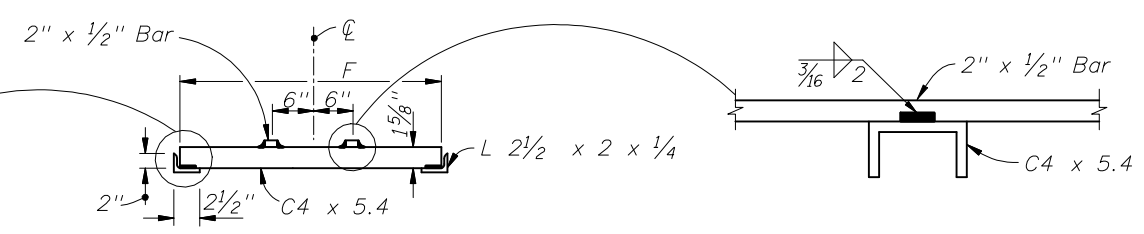
CHANNEL TO ANGLE WELD



SECTION AA



PLAN



SECTION BB

BAR TO CHANNEL WELD

STEEL GRATE

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE GRATE

Rate Of Slope	Size Pipe D	G	2 Each Bars @ 3.4 Lbs./L.F.			(X) Channels @ 5.4 Lbs./L.F.			2 Angles @ 3.62 Lbs./L.F.		Total Weight Lbs.
			L	W-4"	Lbs.	(X)	F	Lbs.	P	Lbs.	
1:6	15"	2'-8 1/2"	9'-3"	3'-3"	85	8	2'-6 7/8"	111	7'-4"	53	249
	18"	2'-11 1/2"	10'-3"	3'-6"	94	9	3'-9 7/8"	137	8'-4"	62	292
	24"	3'-5 1/2"	13'-3"	4'-0"	117	12	3'-3 3/8"	215	11'-4"	82	414
	30"	3'-11 1/2"	16'-3"	4'-6"	141	15	3'-9 7/8"	310	14'-4"	104	555
1:4	15"	2'-8 1/2"	6'-3"	3'-3"	65	5	2'-6 7/8"	70	4'-4"	32	167
	18"	2'-11 1/2"	7'-3"	3'-6"	73	6	2'-9 7/8"	92	5'-4"	39	204
	24"	3'-5 1/2"	9'-3"	4'-0"	90	8	3'-3 3/8"	144	7'-4"	53	287
	30"	3'-11 1/2"	11'-3"	4'-6"	107	10	3'-9 7/8"	206	9'-4"	68	381
1:3	15"	2'-8 1/2"	4'-3"	3'-3"	51	3	2'-6 7/8"	42	2'-4"	17	110
	18"	2'-11 1/2"	5'-3"	3'-6"	60	4	2'-9 7/8"	61	3'-4"	24	145
	24"	3'-5 1/2"	6'-3"	4'-0"	70	5	3'-3 3/8"	90	4'-4"	31	191
	30"	3'-11 1/2"	8'-3"	4'-6"	87	7	3'-9 7/8"	145	6'-4"	46	278

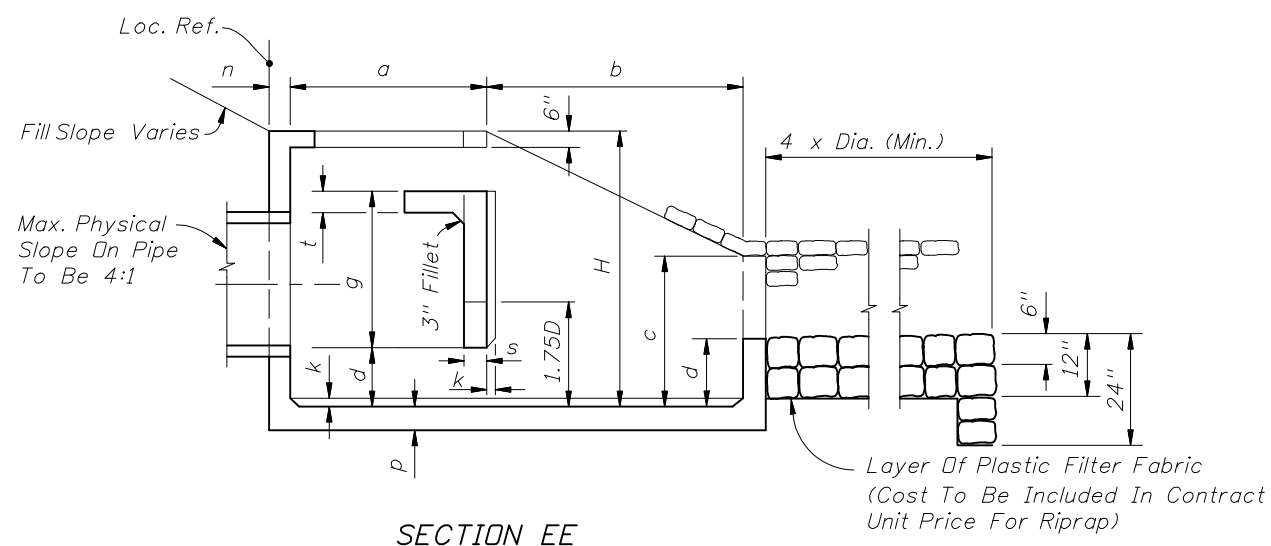
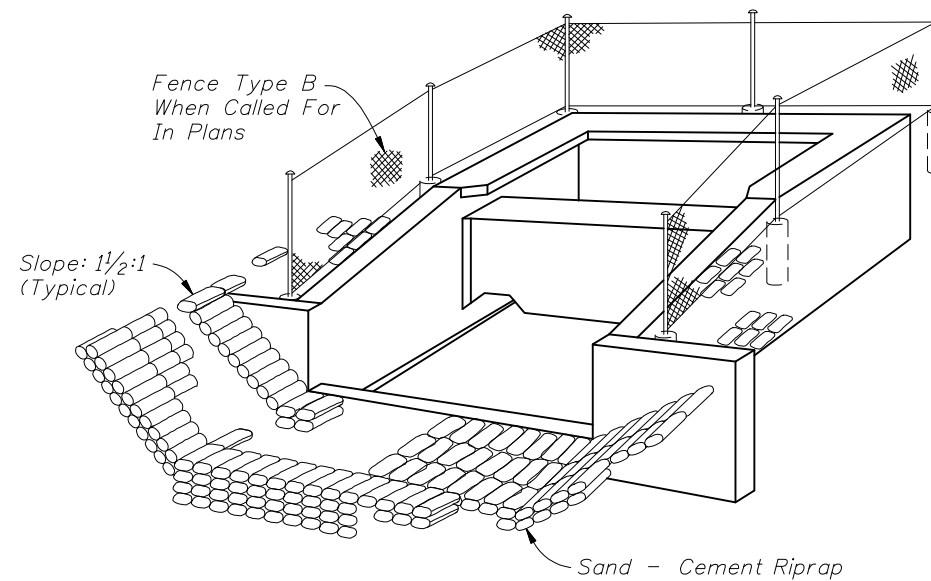
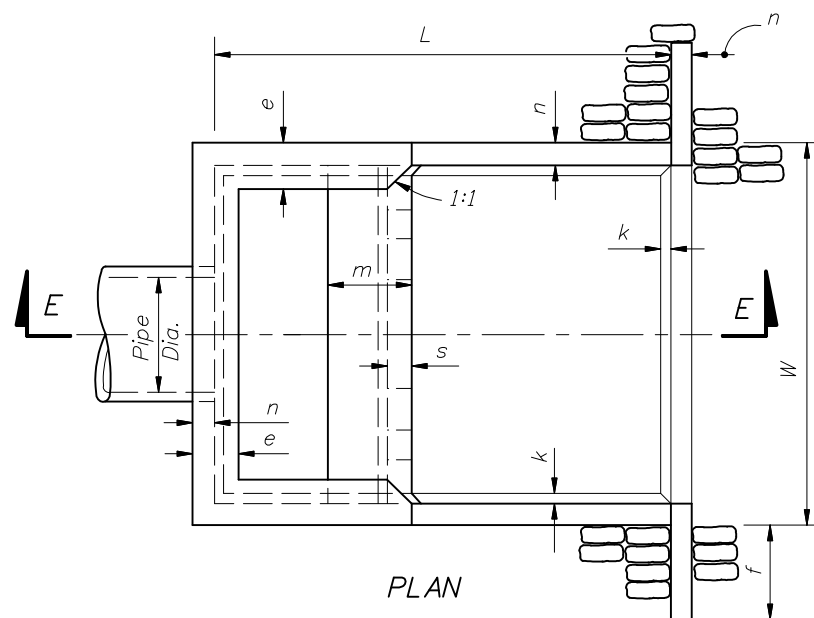
STEEL GRATING USE CRITERIA

1. Grates to be used on pipe culvert endwalls located within the designated clear zone. Positive debris control shall be provided at all upgradient openings. Grates shall not be used unless one or more of the following conditions exist:

- A. Drainage area to culvert consists of median or infield areas or areas where debris and/or drift is negligible.
- B. Runoff to culvert is by sheet flow or in such ill defined channels that debris transport is not considered a major problem.
- C. Runoff to culvert is minor except on an infrequent basis (10 to 15 year frequency); for example a drainage basin in flat sandy terrain with normally low ground water table.
- D. Areas where culvert blockage with resultant backwater would not seriously affect roadway embankment, traffic operation or upland property.

2. Steel grating to be used only where called for in plans.



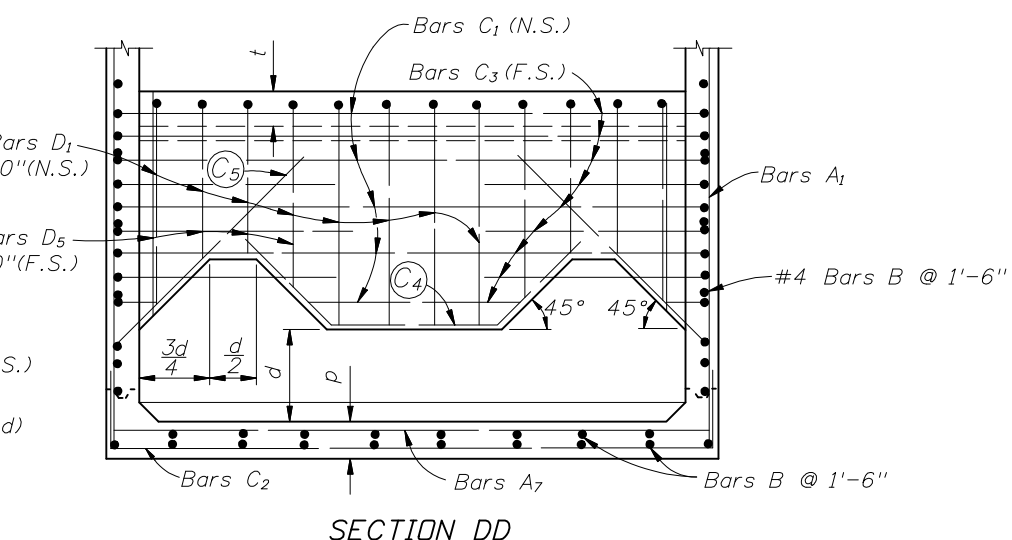
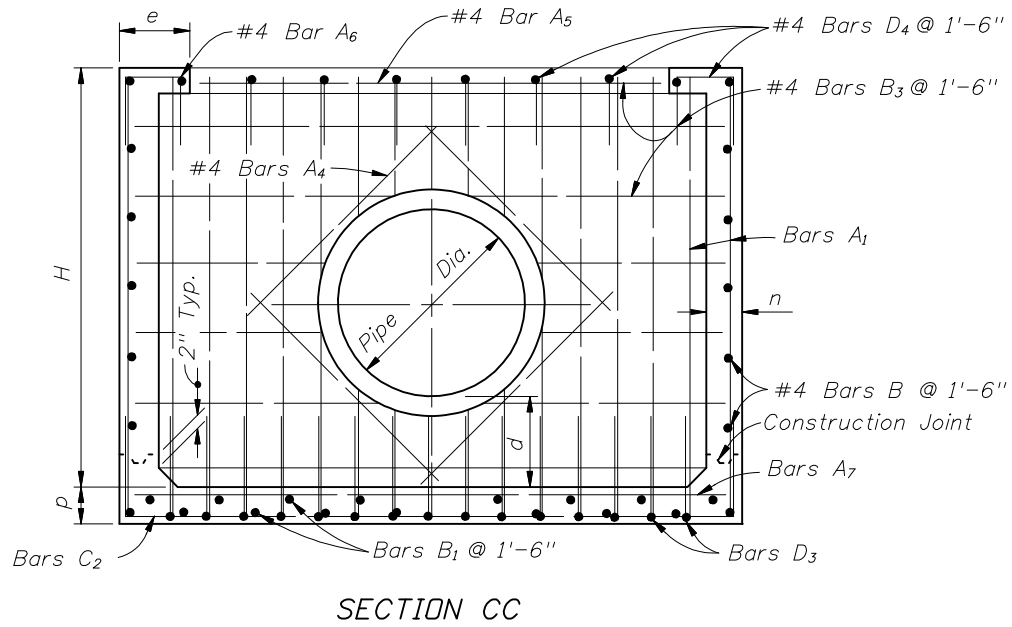
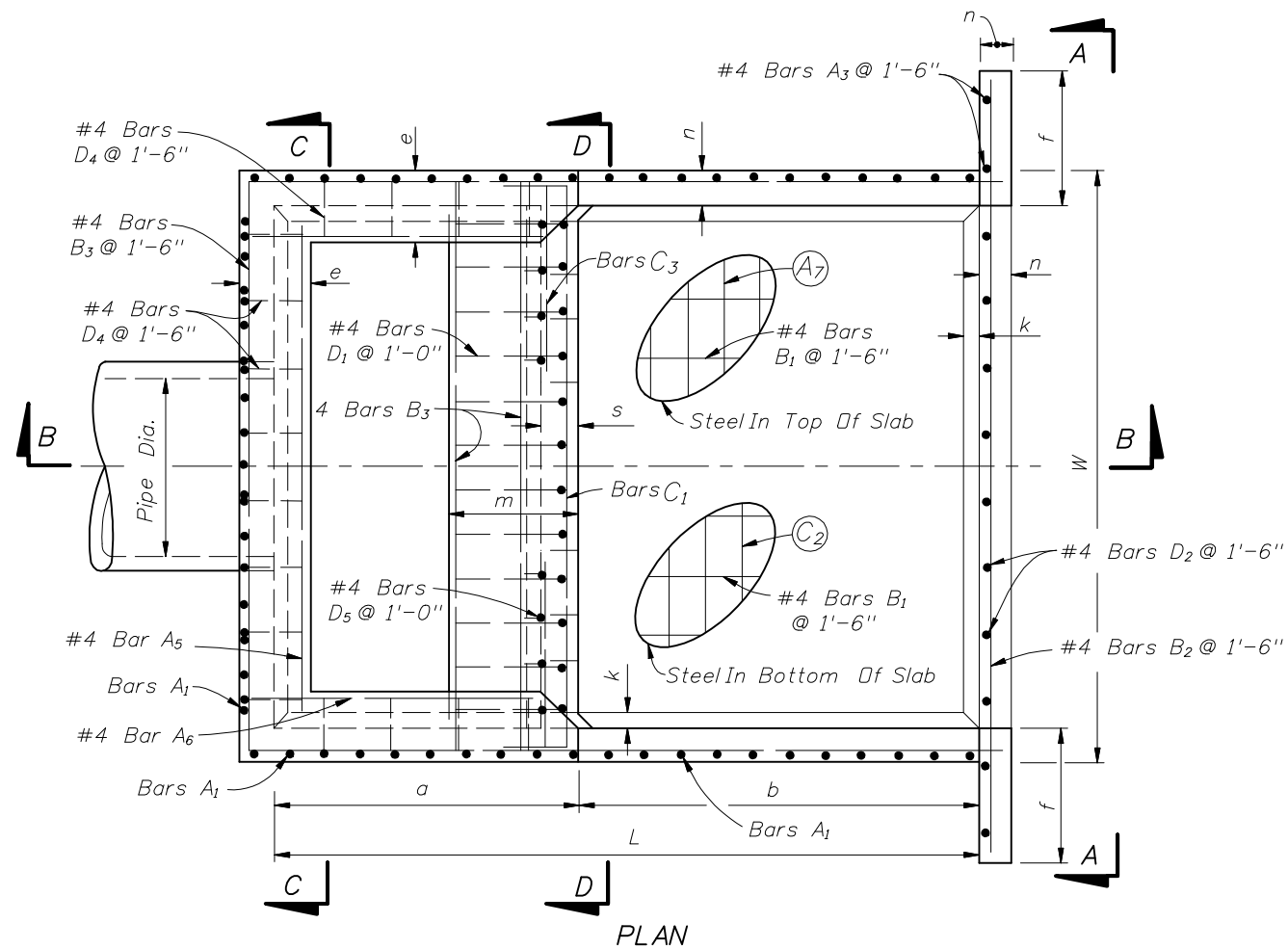


GENERAL NOTES

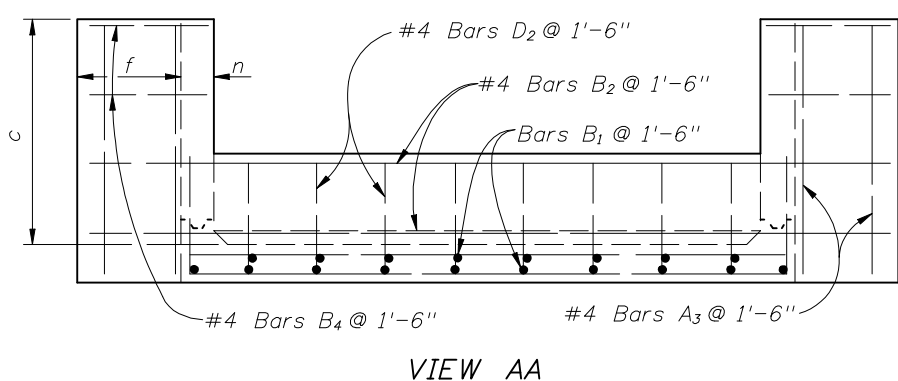
1. U-type concrete endwall energy dissipators are intended for use outside the clear zone.
2. Chamfer all exposed edges $\frac{3}{4}$ ".
3. Concrete shall be Class I, except ASTM C478 (4000 psi) concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications.
4. Reinforcing steel shall have 2" min. cover.
5. Endwall to be paid for under the contract unit price for Class I Concrete (Endwalls), CY and Reinforcing Steel (Roadway), LB. Riprap to be paid for under the contract unit price for Riprap (Sand-Cement) (Roadway), CY. Cost of plastic filter fabric to be included in the contract unit price for riprap.
6. Fencing, when called for in the plans, to be paid for under the contract unit price for Fencing, Type B, LF. See Index No. 802 for details of Type B fencing.

Pipe Size		Q (Max) (cfs)	Dimensions															Concrete Class I (C.Y.)	Reinf. Steel (Lbs.)	Sand Cement Riprap C.Y. (Nom.)	
Dia. (In.)	Area (S.F.)		Ft. - In.												Inches						
			W	H	L	a	b	c	d	e	f	g	m	n	p	s	t				k
30	4.91	59	9-0	6-3	10-8	4-7	6-1	3-4	1-4	1-2	2-6	3-0	1-11	6	6 1/2	7	7	3	6.72	736	10.6
36	7.07	85	10-5	7-3	12-4	5-3	7-1	3-10	1-7	1-3	3-0	3-6	2-3	7	7 1/2	8	8	3	10.34	1,072	13.6
42	9.62	115	11-10	8-0	14-0	6-0	8-0	4-5	1-9	1-6	3-0	3-11	2-6	8	8 1/2	9	8	4	14.82	1,429	17.5
48	12.57	151	13-3	9-0	15-8	6-9	8-11	4-11	2-0	1-7	3-0	4-5	2-10	9	9 1/2	10	8	4	20.36	2,000	22.1
54	15.90	191	14-8	9-9	17-4	7-4	10-0	5-5	2-2	1-10	3-0	4-11	3-0	10	10 1/2	10	8	4	27.19	2,659	27.2
60	13.63	236	16-1	10-9	19-0	8-0	11-0	5-11	2-5	1-11	3-0	5-4	3-4	11	11 1/2	11	8	6	34.49	3,552	32.5
66	23.76	285	17-3	11-6	20-6	8-8	11-10	6-5	2-7	2-1	3-0	5-9	3-7	12	12 1/2	12	8	6	42.82	4,472	38.3
72	28.27	339	18-6	12-3	22-0	9-3	12-9	6-11	2-9	2-3	3-0	6-2	3-9	12	12 1/2	12	8	6	50.68	5,426	44.5

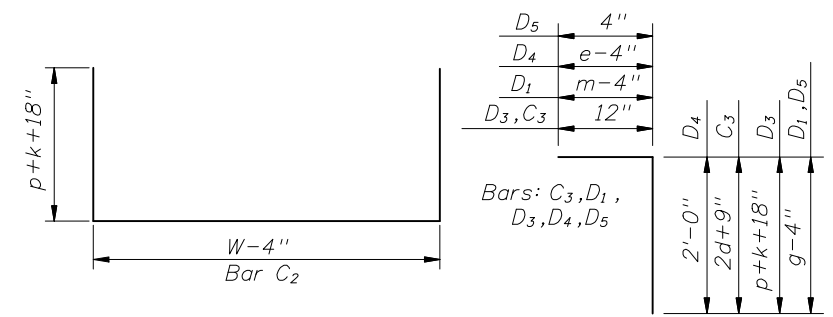
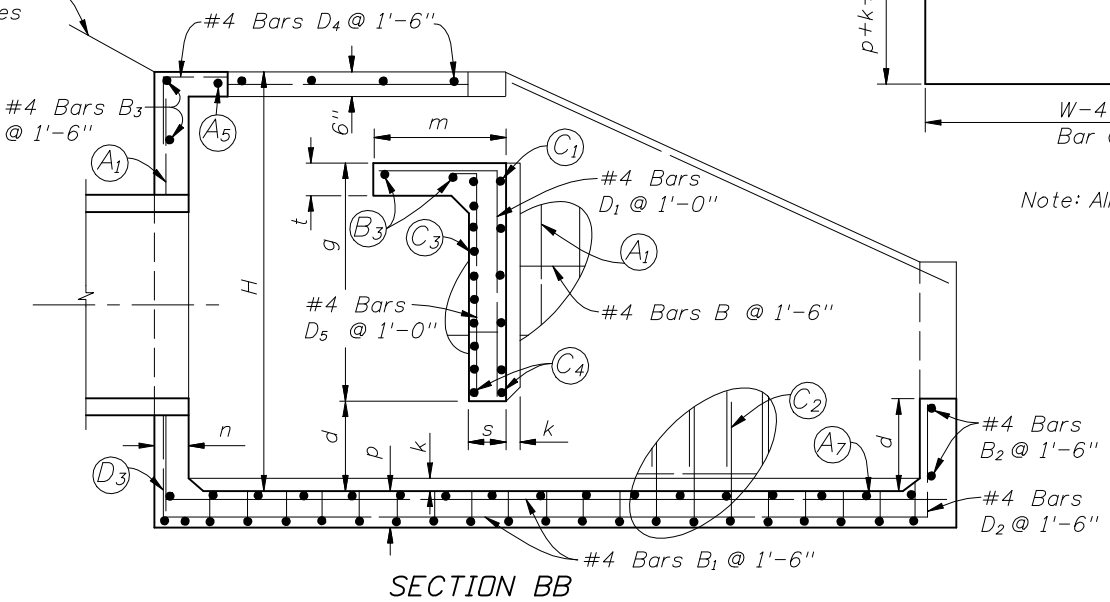




Note: Bars C₄ & C₅ (N.S. & F.S.) equivalent in size to C₃ (cut and bend as required)

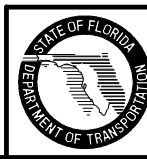


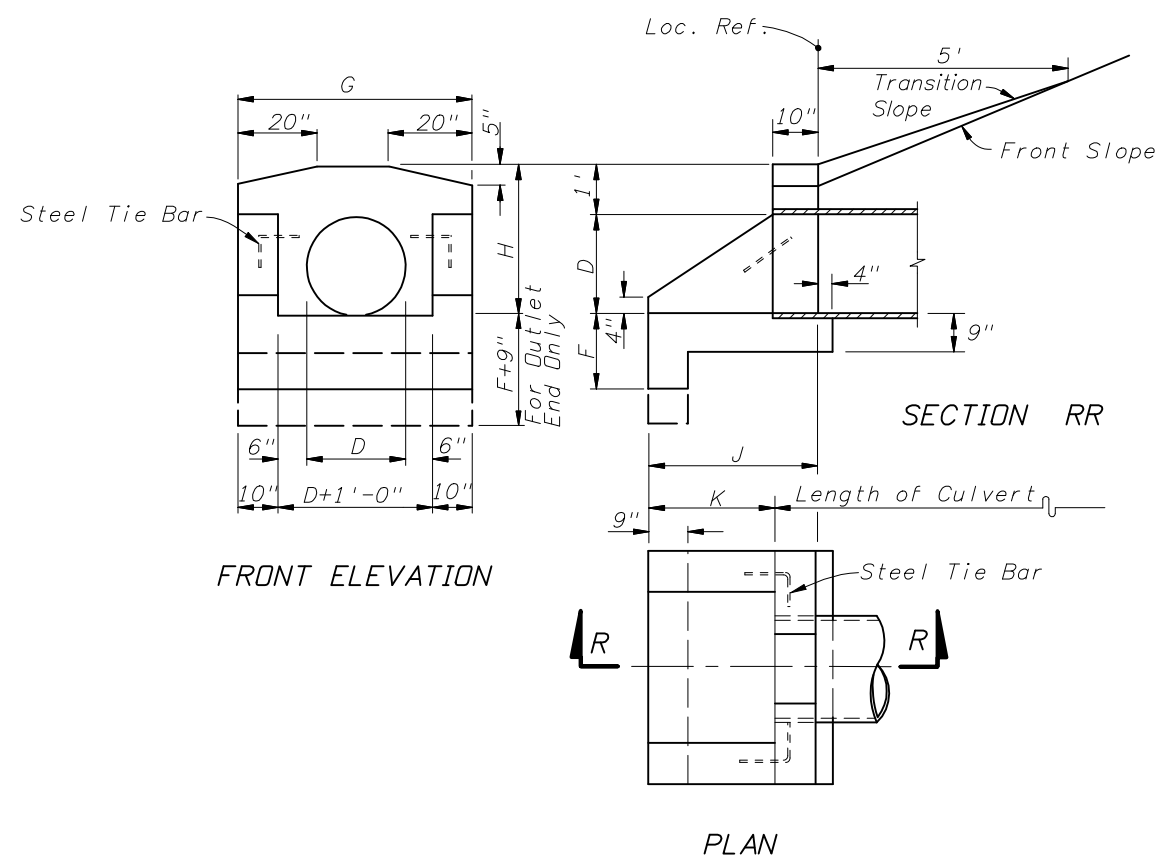
Fill Slope Varies



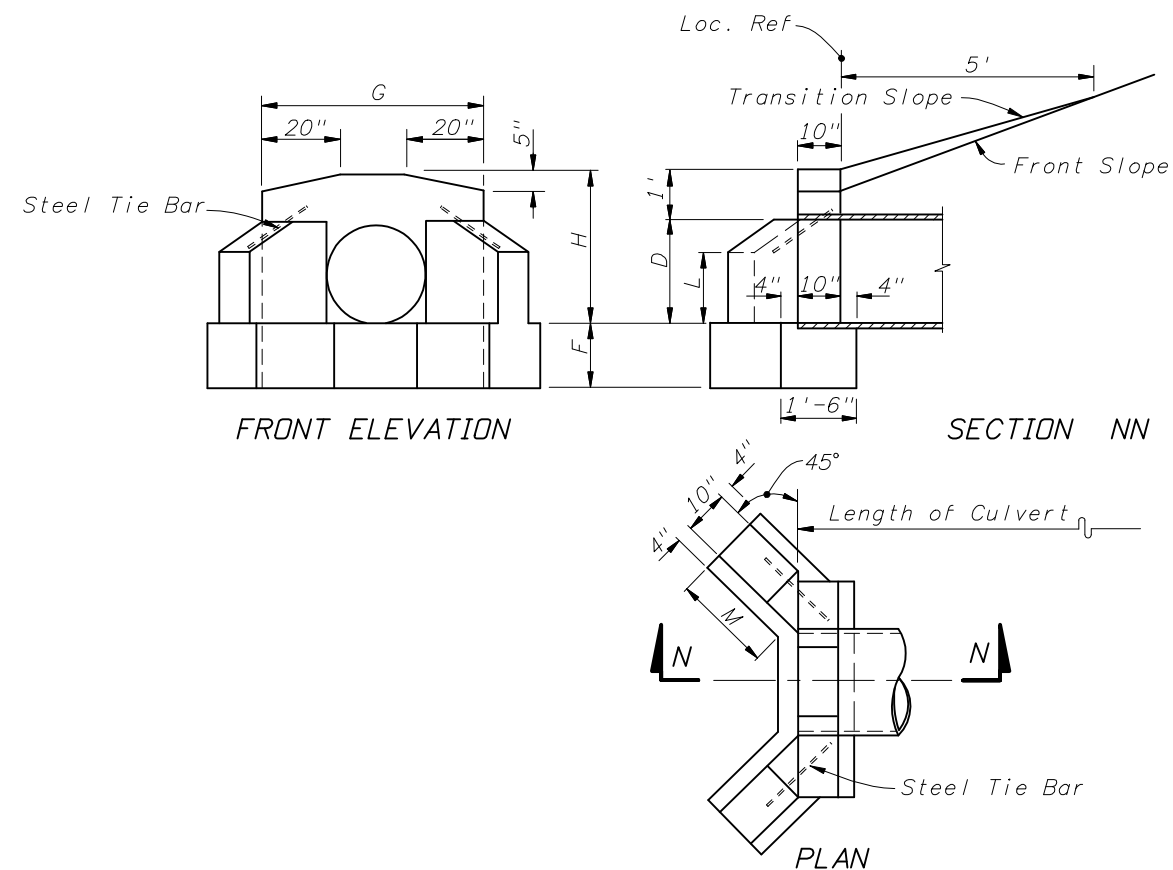
Note: All bar dimensions are out to out.

BARS												
Pipe Size	A ₁		A ₇		C ₁		C ₂		C ₃		D ₃	
	Size (No.)	Spacing (Ft.-In.)	Size (No.)	Spacing (Ft.-In.)	Size (No.)	Spacing (Ft.-In.)	Size (No.)	Spacing (Ft.-In.)	Size (No.)	Spacing (Ft.-In.)	Size (No.)	Spacing (Ft.-In.)
30"	4	0-9½	4	1-6	5	0-11	4	0-9½	5	0-5½	4	0-9½
36"	5	1-0	4	1-6	5	0-10	5	1-0	5	0-5	5	1-0
42"	5	0-11	4	1-6	6	1-1	5	0-11	6	0-6½	5	0-11
48"	5	0-9½	4	1-0	6	1-0	5	0-9½	6	0-6	5	0-9½
54"	5	0-8½	4	0-10	7	1-1	5	0-8½	7	0-6½	5	0-8½
60"	6	0-10	5	1-1	7	1-0	6	0-10	7	0-6	6	0-10
66"	6	0-8½	5	0-11½	7	0-11	6	0-8½	7	0-5½	6	0-8½
72"	6	0-7½	5	0-10	7	0-10	6	0-7½	7	0-5	6	0-7½





CONCRETE ENDWALL WITH U-TYPE WINGS FOR PIPE CULVERTS



CONCRETE ENDWALL WITH 45° WINGS FOR PIPE CULVERTS

TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE CULVERT ENDWALLS WITH U-TYPE WINGS

DIMENSIONS							QUANTITIES IN ONE ENDWALL						
Opening		Wall			Footing		Total Cu. Yds. Concrete, Class I						Steel Tie Bars
D	Area Ft ²	G	H	K	F	J	Conc. Pipe		C.M. Pipe		C.I. Pipe		
							Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	
12"	0.8	3'-8"	2'-0"	1'-0"	1'-3"	2'-2"	0.48	0.55	0.49	0.57	0.49	0.57	none
15"	1.2	3'-11"	2'-3"	1'-5"	1'-3"	2'-7"	0.59	0.67	0.62	0.70	0.61	0.70	none
18"	1.8	4'-2"	2'-6"	1'-9"	1'-3"	2'-11"	0.70	0.79	0.74	0.82	0.74	0.82	none
24"	3.1	4'-8"	3'-0"	2'-6"	1'-6"	3'-8"	1.01	1.11	1.06	1.16	1.06	1.16	2-#6 Bars x 2'-0"
30"	4.9	5'-2"	3'-6"	3'-3"	1'-6"	4'-5"	1.33	1.44	1.41	1.51	1.40	1.51	2-#6 Bars x 2'-0"
36"	7.1	5'-8"	4'-0"	4'-0"	1'-9"	5'-2"	1.73	1.85	1.84	1.96	1.82	1.94	2-#6 Bars x 2'-6"
42"	9.6	6'-2"	4'-6"	4'-9"	2'-0"	5'-11"	2.19	2.32	2.32	2.45			2-#6 Bars x 2'-6"
48"	12.6	6'-8"	5'-0"	5'-6"	2'-0"	6'-8"	2.64	2.78	2.81	2.95			2-#6 Bars x 3'-0"

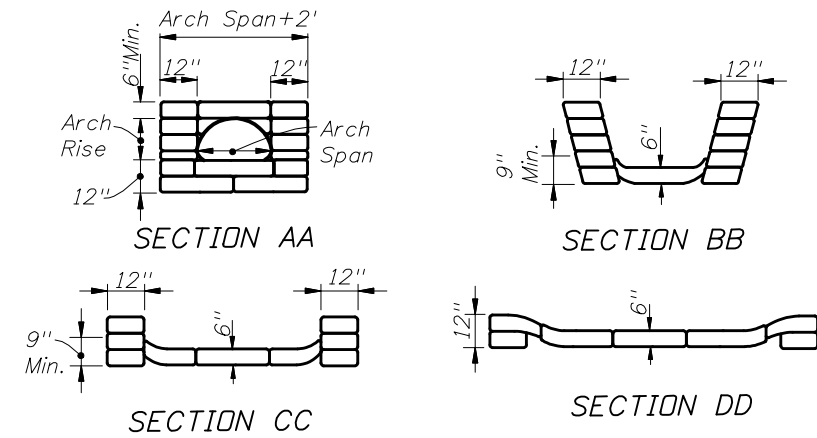
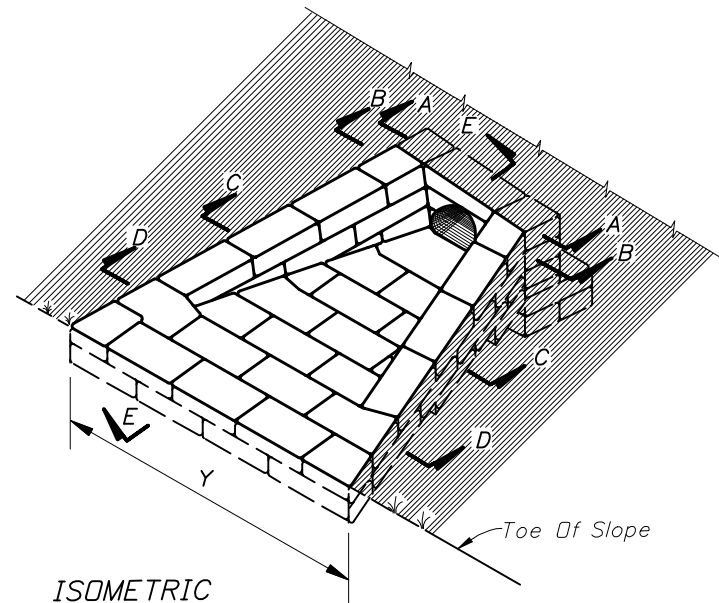
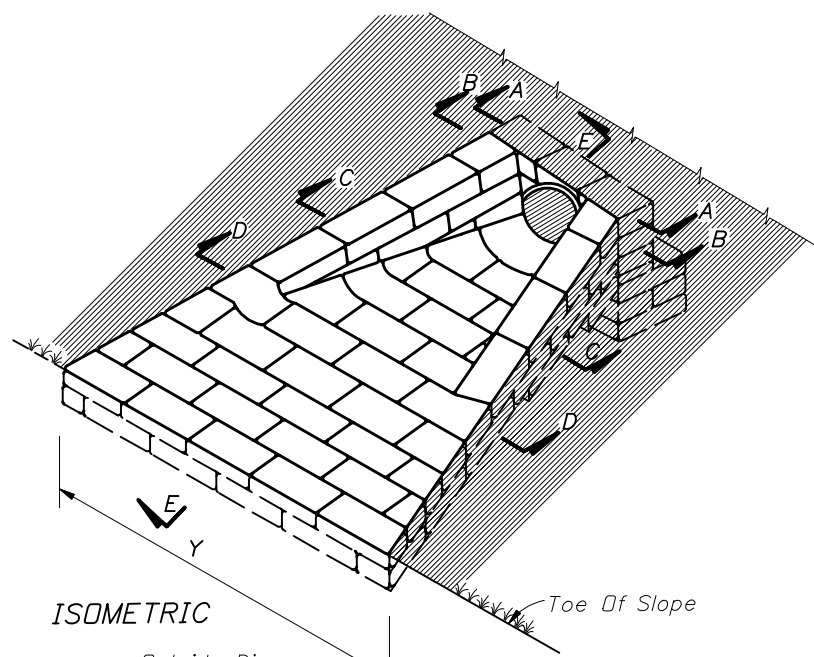
TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE CULVERT ENDWALLS WITH 45° WINGS

DIMENSIONS							QUANTITIES IN ONE ENDWALL				
Opening		Wall			Footing	Concrete, Class I			Steel Tie Bars		
D	Area Ft ²	H	G	L	M	F	Total Cu. Yds.				
							Conc. Pipe	C.M.P		C.I.P.	
15"	1.2	2'-3"	3'-7"	1'-0"	1'-3"	1'-3"	0.56	0.59	0.59	none	
18"	1.8	2'-6"	3'-10"	1'-2"	1'-7"	1'-3"	0.74	0.77	0.77	none	
24"	3.1	3'-0"	4'-4"	1'-5"	2'-1"	1'-4"	1.01	1.06	1.06	2-#6 Bars x 2'-0"	
30"	4.9	3'-6"	4'-10"	1'-9"	2'-5"	1'-6"	1.32	1.40	1.39	2-#6 Bars x 2'-0"	
36"	7.1	4'-0"	5'-4"	2'-0"	2'-11"	1'-8"	1.72	1.83	1.82	2-#6 Bars x 2'-6"	
42"	9.6	4'-6"	5'-10"	2'-3"	3'-6"	2'-0"	2.34	2.47		2-#6 Bars x 2'-6"	
48"	12.6	5'-0"	6'-4"	2'-6"	4'-0"	2'-0"	2.74	2.90		2-#6 Bars x 2'-6"	

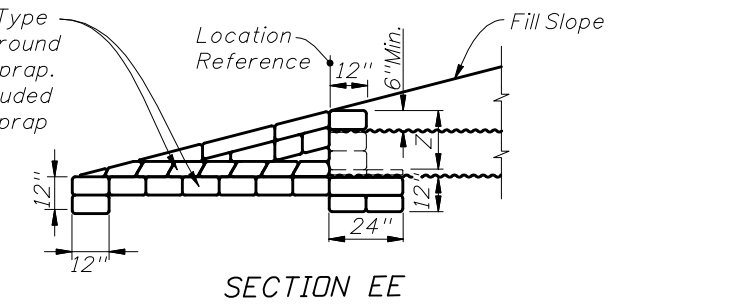
GENERAL NOTES

1. Winged concrete endwalls are intended for use outside the clear zone.
2. Chamfer all exposed edges $\frac{3}{4}$ ".
3. Concrete shall be Class I, except ASTM C478 (4000 psi) Concrete may be substituted for precast items manufactured in plants meeting the requirements of Section 449 of the Specifications.
4. Endwall to be paid for under the contract unit price for Class I Concrete.
5. Sodding to be in accordance with Index No. 281, and paid for under the contract unit price for Performance Turf, SY.





Place Plastic Filter Fabric Type D-4 (See Index No. 199) Around And Below Sand-Cement Riprap. Cost Of Fabric To Be Included In Cost Of Sand-Cement Riprap



GENERAL NOTES

- U-Type Sand-Cement Endwalls Are Intended For Use Outside The Clear Zone.

DETAILS FOR SINGLE METAL PIPE ARCH CULVERTS

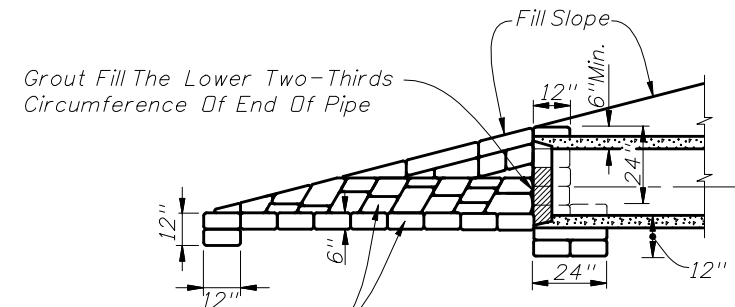
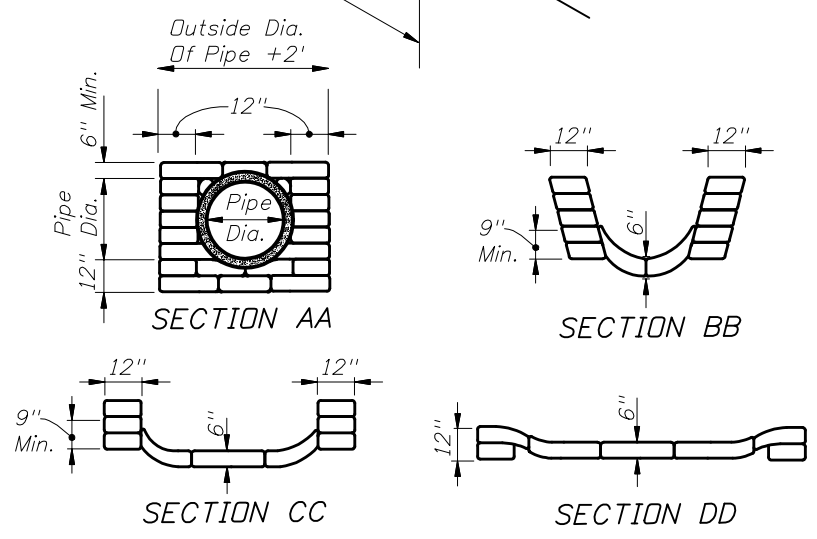
NOTE: For multiple metal pipe arch culvert spacing between arch centers=X

DIMENSIONS AND QUANTITIES FOR METAL PIPE ARCH CULVERTS

Span	Rise	Dimensions						Quantity Of Sand-Cement Riprap In Cu. Yds. For One Endwall							
		X	Y				Z	For 1:2 Slopes				For 1:4 Slopes			
			1-Arch	2-Arch	3-Arch	4-Arch		1-Arch	2-Arch	3-Arch	4-Arch	1-Arch	2-Arch	3-Arch	4-Arch
17"	13"	2'-6"	6'-6"	9'-0"	11'-6"	14'-0"	1'-7"	1.0	1.5	2.0	2.5	1.5	2.2	2.9	3.6
21"	15"	2'-10"	7'-6"	10'-4"	13'-2"	16'-0"	1'-9"	1.2	1.8	2.4	3.0	1.9	2.7	3.5	4.3
28"	20"	3'-5"	9'-3"	12'-8"	16'-1"	19'-6"	2'-0"	1.7	2.5	3.3	4.1	2.6	3.7	4.8	5.9
35"	24"	4'-0"	11'-0"	15'-0"	19'-0"	23'-0"	2'-0"	2.2	3.1	4.0	4.9	3.4	4.7	6.0	7.3
42"	29"	4'-9"	12'-9"	17'-6"	22'-3"	27'-0"	2'-0"	2.9	4.1	5.3	6.5	4.5	6.1	7.7	9.3
49"	33"	5'-6"	14'-6"	20'-0"	25'-6"	31'-0"	2'-0"	3.5	4.9	6.3	7.7	5.5	7.4	9.3	11.2
57"	38"	6'-4"	16'-6"	22'-10"	29'-2"	35'-6"	2'-0"	4.4	6.1	7.8	9.5	6.9	9.2	11.5	13.8
64"	43"	7'-1"	18'-3"	25'-4"	32'-5"	39'-6"	2'-0"	5.1	7.0	8.9	10.8	8.1	10.7	13.3	15.9
71"	47"	7'-10"	20'-0"	27'-10"	35'-8"	43'-6"	2'-0"	5.9	8.1	10.3	12.5	9.5	12.4	15.3	18.2

DIMENSIONS AND QUANTITIES FOR ROUND PIPE CULVERTS

Pipe Dia.	Dimensions						Quantity Of Sand-Cement Riprap In Cu. Yds. For One Endwall							
	X	Y				For 1:2 Slopes				For 1:4 Slopes				
		1-Pipe	2-Pipes	3-Pipes	4-Pipes	1-Pipe	2-Pipes	3-Pipes	4-Pipes	1-Pipe	2-Pipes	3-Pipes	4-Pipes	
15"	2'-7"	7'-0"	9'-7"	12'-2"	14'-9"	1.2	1.6	2.1	2.6	1.7	2.4	3.0	3.6	
18"	2'-10"	8'-0"	10'-10"	13'-8"	16'-6"	1.4	2.0	2.6	3.1	2.1	2.9	3.7	4.4	
24"	3'-5"	10'-0"	13'-5"	16'-10"	20'-3"	1.9	2.7	3.5	4.3	2.9	4.0	5.1	6.3	
30"	4'-3"	12'-0"	16'-3"	20'-6"	24'-9"	2.5	3.6	4.8	5.9	3.8	5.4	7.0	8.6	
36"	5'-1"	14'-0"	19'-1"	24'-2"	29'-3"	3.1	4.6	6.2	7.7	4.8	7.0	9.2	11.4	
42"	6'-0"	16'-0"	22'-0"	28'-0"	34'-0"	3.8	5.8	7.7	9.7	6.0	8.8	11.7	14.5	
48"	6'-9"	18'-0"	24'-9"	31'-6"	38'-3"	4.5	7.0	9.4	11.8	7.2	10.8	14.3	17.9	
54"	7'-8"	20'-0"	27'-8"	35'-4"	43'-0"	5.3	8.3	11.3	14.2	8.5	12.9	17.3	21.7	
60"	8'-6"	22'-0"	30'-6"	39'-0"	47'-6"	6.2	9.7	13.3	16.9	10.0	15.3	20.6	25.9	

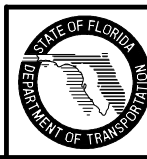


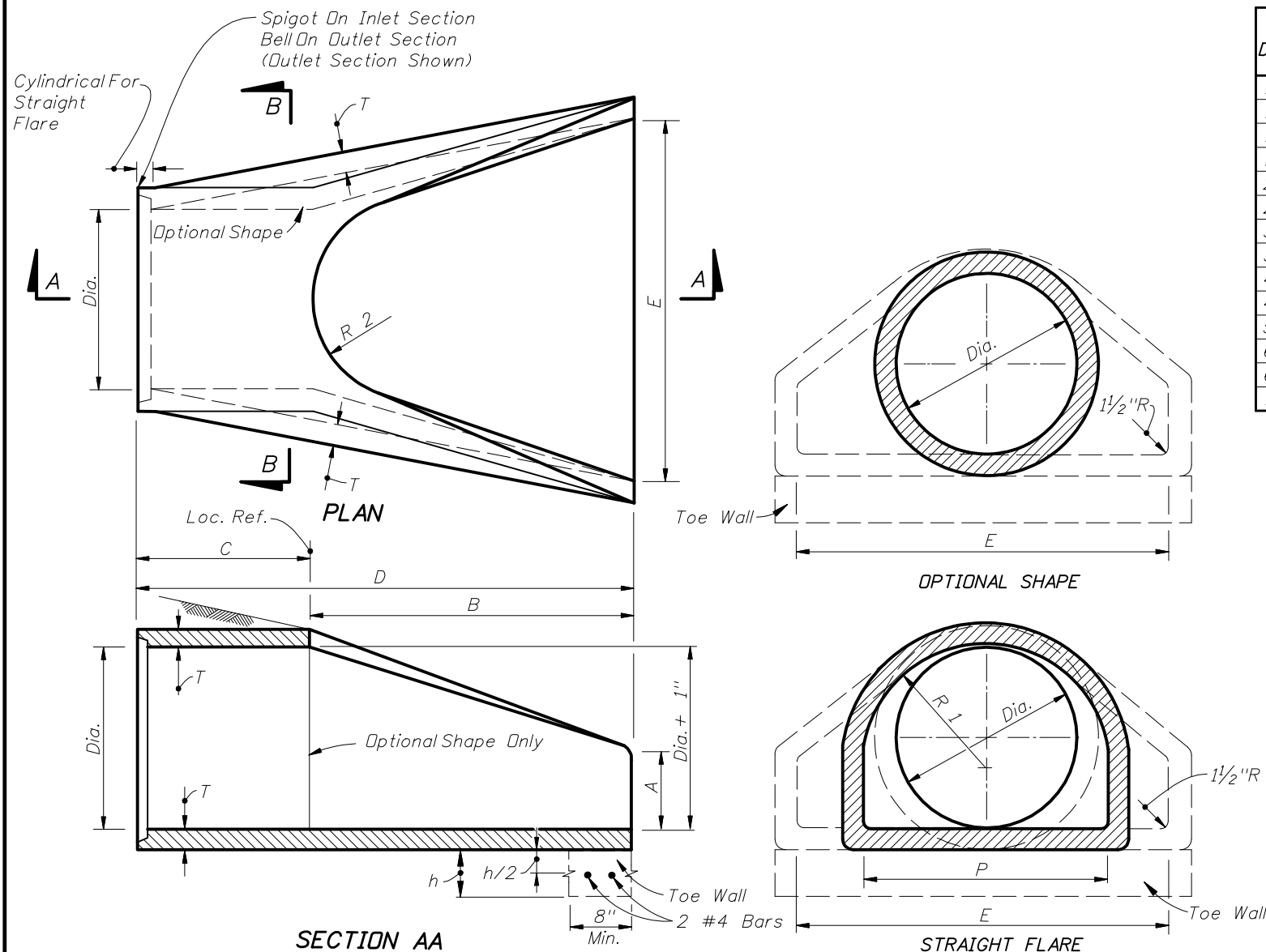
Place Plastic Filter Fabric Type D-4 (See Index No. 199) Around And Below Sand-Cement Riprap. Cost Of Fabric To Be Included In Cost Of Sand-Cement Riprap

SECTION EE

DETAIL FOR SINGLE PIPE CULVERT

Note: For multiple pipe culvert spacing between pipe centers=X





DIA.	T	REINF. SQIN/LF	BELL Or Spigot	A	B	C	D	E	P	R 1	R 2	FLAT	WEIGHT (LBS.)	h	TOE WALL CLASS I CONC (Misc.) Cy
12"	2"	0.07	1 1/2"	4"	2'-0"	4'-0 7/8"	6'-0 7/8"	2'-0"	19 15/16"	10 1/8"	9"	3 1/2"	530	12"	.06
15"	2 1/4"	0.07	2"	6"	2'-3"	3'-10"	6'-1"	2'-6"	24 5/16"	12 1/2"	11"	3 1/2"	740	12"	.07
18"	2 1/2"	0.07	2 1/2"	9"	2'-3"	3'-10"	6'-1"	3'-0"	29"	15 1/2"	12"	4"	990	15"	.11
21"	2 3/4"	0.07	2 1/4"	9"	2'-11"	3'-2"	6'-1"	3'-6"	31 5/8"	16 1/8"	13"	4"	1280	15"	.12
24"	3"	0.07	2 1/2"	9 1/2"	3'-7 1/2"	2'-6"	6'-1 1/2"	4'-0"	33 3/16"	16 13/16"	14"	4 1/2"	1520	18"	.17
27"	3 1/4"	0.148	2 1/2"	10 1/2"	4'-0"	2'-1 1/2"	6'-1 1/2"	4'-6"	36"	18 3/16"	14 1/2"	4 1/2"	1930	18"	.19
30"	3 1/2"	0.148	3"	1'-0"	4'-6"	1'-7 3/4"	6'-1 3/4"	5'-0"	37"	18 1/2"	15"	5"	2190	21"	.24
36"	4"	0.148	3 1/2"	1'-3"	5'-3"	2'-10 3/4"	8'-1 3/4"	6'-0"	47 13/16"	24 3/16"	20"	5 1/2"	4100	21"	.29
42"	4 1/2"	0.148	3 3/4"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	53 7/8"	27 1/2"	22"	5 1/2"	5380	24"	.36
48"	5"	0.148	4 1/4"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	56 1/2"	28 1/2"	22"	5 3/4"	6550	24"	.39
54"	5 1/2"	0.174	4 3/4"	2'-3"	5'-5"	2'-11"	8'-4"	7'-6"	65 1/2"	33 3/8"	24"	6 1/4"	8040	24"	.42
60"	6"	0.174	5"	2'-6"	5'-0"	3'-3"	8'-3"	8'-0"	72 1/2"	36 1/16"	24"	6 3/4"	8750	24"	.44
66"	6 1/2"	0.174	5 1/2"	2'-0"	6'-6"	1'-9"	8'-3"	8'-6"	72"	36 3/8"	24"	7 1/4"	10630	24"	.47
72"	7"	0.174	6"	2'-0"	6'-6"	1'-9"	8'-3"	9'-0"	77 13/16"	38 15/16"	24"	7 3/4"	12520	24"	.50

GENERAL NOTES

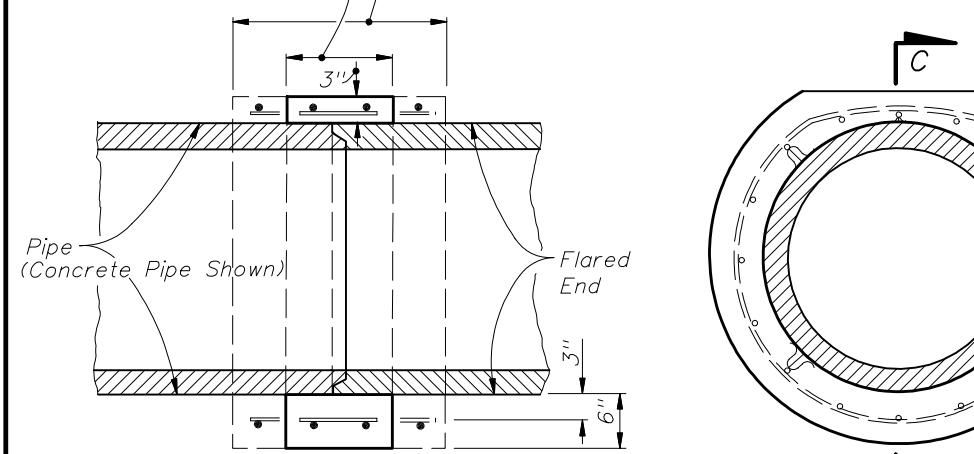
- Flared end sections shall conform to the requirements of ASTM C76 with the exception that dimensions and reinforcement shall be as prescribed in the table above. Circumferential reinforcement may consist of either one cage or two cages of steel. Compressive strength of concrete shall be 4000 psi. Shop drawings for flared end sections having dimensions other than above must be submitted for approval to the State Drainage Engineer.
- Connections between the flared end section and the pipe culvert may be any of the following types unless otherwise shown on the plans.
 - Joints meeting the requirements of Section 449 of the Standard Specifications (O-Ring Gasket). Flared end section joint dimensions and tolerances shall be identical or compatible to those used in the pipe culvert joint. When pipe culvert and flared end section manufacturers are different, the compatibility of joint designs shall be certified to by the manufacturer of the flared end sections.
 - Joints sealed with preformed plastic gaskets. The gaskets shall meet the requirements of Section 942-2 of the Standard Specifications and the minimum sizes for gaskets shall be as that specified for equivalent sizes of elliptical pipe.
 - Reinforced concrete jackets, as detailed on this drawing. Cost of the reinforced concrete jacket to be included in the contract unit price for the flared end section. When non-coated corrugated metal pipe is called for in the plans, the pipe shall be bituminous coated in the jacketed area as specified on Index No. 280. Bituminous coating to be included in the contract unit price for the pipe culvert. Concrete jacket shall be as specified on Index No. 280. Cost of concrete and reinforcement shall be included in the contract unit price for the pipe culvert.

- Toe walls shall be constructed when shown on the plans or at locations designated by the Engineer. Toe walls are to be cast-in-place with Class I Concrete and paid for under the contract unit price for Flared End Section (Concrete), EA. Reinforcing steel shall also be included in the cost of the Flared End Section (Concrete), EA.
- On skewed pipe culverts the flared end sections shall be placed in line with the pipe culvert. Side slopes shall be warped as required to fit the flared end sections.
- Flared End Section to be paid for under the contract unit price for Flared End Section (Concrete), EA. Sodding shall be in accordance with Index No. 281, and paid for under the contract unit price for Performance Turf, SY.

DESIGN NOTES

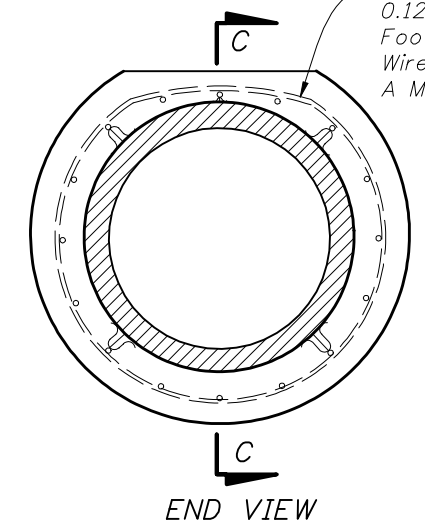
- Flared end sections are intended for use outside the clear zone on median drain and cross drain installation, except that flared end sections for pipe sizes 12" and 15" are permitted within the clear zone. When the slope intersection permits, 12" and 15" flared end sections may be located with the culvert opening as close as 8' beyond the outside edge of the shoulder. Flared end sections are not intended for side drain installations.
- Reinforced concrete jackets shall be used at all locations where high velocities and/or highly erosive soils may cause disjoints. These locations are to be shown on the plans.
- Toe walls shall be used whenever the anticipated velocity of discharge and soil type are such that erosive action would occur. Toe walls are not required where ditch pavement is provided, except when disjoints would occur if the ditch pavement should fail.

24" For 30" To 72" Pipe
12" For 15" To 24" Pipe



SECTION CC
REINFORCED CONCRETE JACKET DETAIL

Any Wire Mesh Arrangement Which Provides 0.126 Square Inches Of Steel Area Per Linear Foot Both Ways May Be Used; Provided The Wires Are Spaced A Minimum Of 2" And/Or A Maximum Of 6" On Centers.



END VIEW



DIMENSIONS AND QUANTITIES

	D	X	A	B	C	E	F	G	H ■	M				N	5 1/2" CONCRETE SLAB (CY) ■				SODDING (SQ. YDS.)			
										Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	15"	2'-7"	1.92'	2.18'	4.10'	2.06'	5'	1.22'	2.9'	4.63'	7.21'	9.79'	12.37'	1.19'	0.38	0.58	0.77	0.96	21	24	27	30
	18"	2'-10"	1.97'	2.74'	4.71'	2.56'	6'	1.41'	3.4'	4.92'	7.75'	10.58'	13.42'	1.21'	0.44	0.65	0.87	1.09	22	25	28	31
	24"	3'-5"	2.06'	3.85'	5.91'	3.56'	7'	1.73'	3.4'	5.50'	8.92'	12.33'	15.75'	1.25'	0.54	0.83	1.12	1.42	24	28	32	35
	30"	4'-3"	2.15'	4.95'	7.10'	4.56'	8'	2.00'	3.4'	6.08'	10.33'	14.58'	18.83'	1.29'	0.66	1.09	1.50	1.91	26	31	35	40
	36"	5'-1"	2.25'	6.08'	8.33'	5.56'	9'	2.24'	3.4'	6.67'	11.75'	16.83'	21.92'	1.33'	0.81	1.38	1.95	2.51	28	34	39	45
	42"	6'-0"	2.34'	7.21'	9.55'	6.56'	10'	2.45'	3.4'	7.25'	13.25'	19.25'	25.25'	1.38'	0.97	1.70	2.45	3.19	30	37	43	50
	48"	6'-9"	2.43'	8.33'	10.76'	7.56'	11'	2.65'	3.4'	7.83'	14.58'	21.33'	28.08'	1.42'	1.13	2.04	2.93	3.84	32	39	47	54
	54"	7'-8"	2.52'	9.44'	11.96'	8.56'	12'	2.83'	3.4'	8.42'	16.08'	23.75'	31.42'	1.46'	1.31	2.44	3.58	4.72	34	42	51	59
	60"	8'-6"	2.62'	10.56'	13.18'	9.56'	14'	3.00'	4.4'	9.00'	17.50'	26.00'	34.50'	1.50'	1.51	2.89	4.28	5.68	36	45	55	64
	66"	9'-2"	2.71'	11.68'	14.39'	10.56'	15'	3.18'	4.4'	9.58'	18.75'	27.92'	37.08'	1.54'	1.68	3.25	4.84	6.43	38	48	58	68
72"	10'-0"	2.80'	12.80'	15.60'	11.56'	16'	3.30'	4.4'	10.16'	20.16'	30.16'	40.16'	1.58'	1.89	3.74	5.59	7.45	40	51	62	73	
1:4 Slope	15"	2'-7"	2.27'	4.09'	6.36'	4.03'	8'	1.22'	4.0'	4.63'	7.21'	9.79'	12.37'	1.19'	0.57	0.87	1.15	1.44	23	26	29	32
	18"	2'-10"	2.36'	5.12'	7.48'	5.03'	9'	1.41'	4.0'	4.92'	7.75'	10.58'	13.42'	1.21'	0.66	0.99	1.31	1.65	25	28	31	35
	24"	3'-5"	2.53'	7.18' Δ	9.71'	7.03' Δ	11'	1.73'	4.0'	5.50'	8.92'	12.33'	15.75'	1.25'	0.85	1.30	1.75	2.20	28	32	36	40
	30"	4'-3"	2.70'	9.25'	11.95'	9.03'	13'	2.00'	4.0'	6.08'	10.33'	14.58'	18.83'	1.29'	1.10	1.74	2.39	3.05	31	36	41	46
	36"	5'-1"	2.87'	11.31' ◇	14.18'	11.03' ◇	15'	2.24'	4.0'	6.67'	11.75'	16.83'	21.92'	1.33'	1.32	2.21	3.08	3.96	34	40	46	52
	42"	6'-0"	3.05'	13.37'	16.42'	13.03'	17'	2.45'	4.0'	7.25'	13.25'	19.25'	25.25'	1.38'	1.58	2.76	3.91	5.09	38	44	51	58
	48"	6'-9"	3.22'	15.43'	18.65'	15.03'	19'	2.65'	4.0'	7.83'	14.58'	21.33'	28.08'	1.42'	1.85	3.30	4.73	6.17	41	48	56	63
	54"	7'-8"	3.39'	17.49'	20.88'	17.03'	21'	2.83'	4.0'	8.42'	16.08'	23.75'	31.42'	1.46'	2.14	3.95	5.77	7.58	44	52	61	69
	60"	8'-6"	3.56'	19.55'	23.11'	19.03'	23'	3.00'	4.0'	9.00'	17.50'	26.00'	34.50'	1.50'	2.45	4.66	6.87	9.07	47	56	66	75
	66"	9'-2"	3.73'	21.62'	25.35'	21.03'	25'	3.18'	4.0'	9.58'	18.75'	27.92'	37.08'	1.54'	2.88	5.54	8.18	10.84	49	59	69	80
72"	10'-0"	3.91'	23.68'	27.59'	23.03'	27'	3.30'	4.0'	10.16'	20.16'	30.16'	40.16'	1.58'	3.54	6.61	9.87	13.13	52	63	74	85	

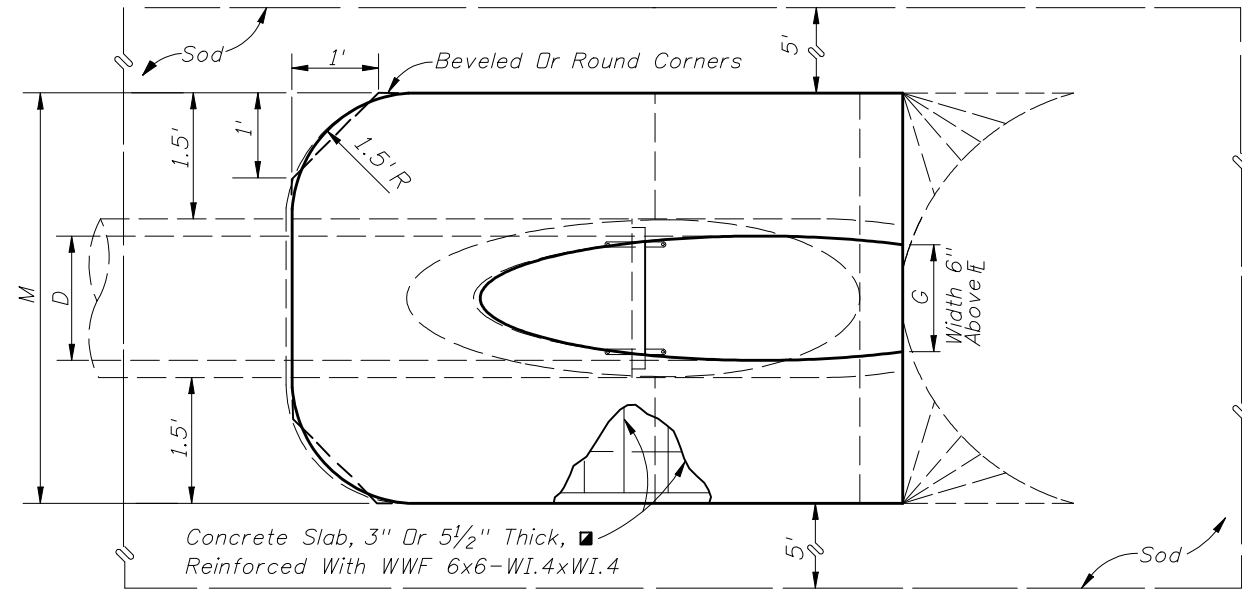
■ See General Note No. 3.
See Sheet 5 Of 6 For 3" Slab Quantities

■ Values shown for estimating pipe quantities and are for information only.

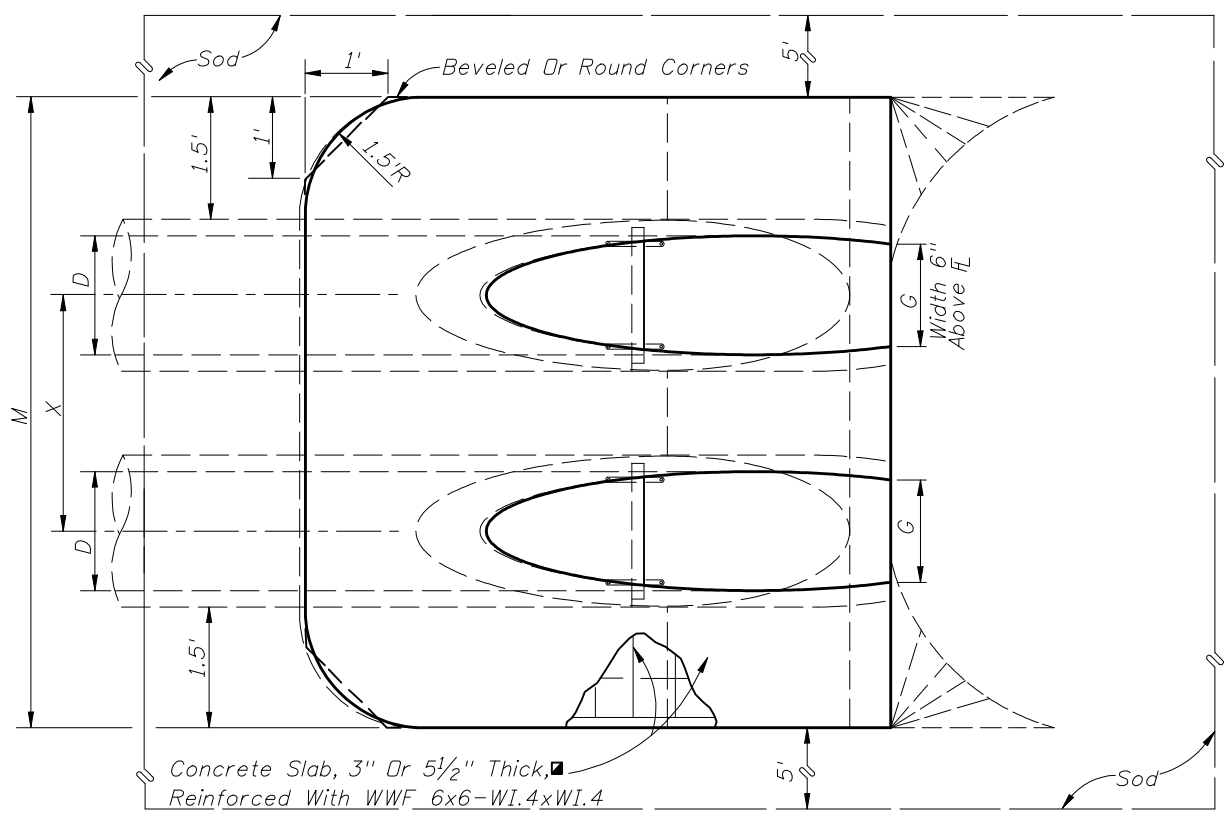
B E
Δ 6.42' Δ 6.25' Dimensions permitted to allow use of 8' standard pipe lengths.

◇ 10.40' ◇ 10.10' Dimensions permitted to allow use of 12' standard pipe lengths.

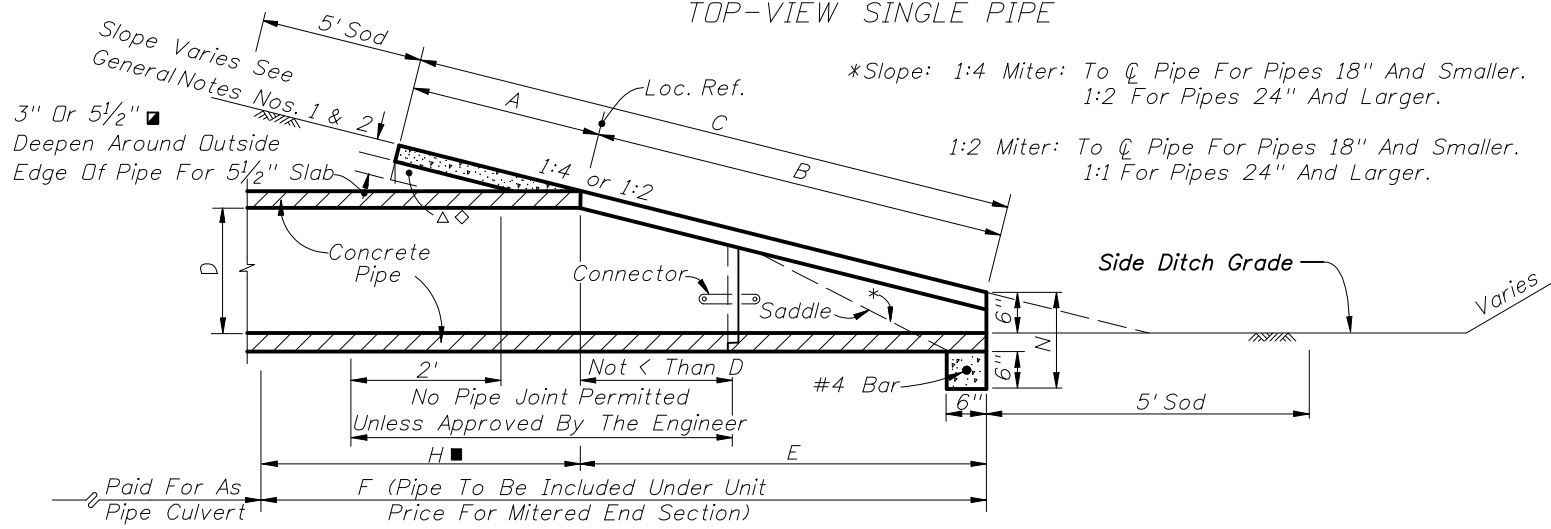
Δ◇ Concrete slab shall be deepened to form bridge across crown of pipe. See section below.



TOP-VIEW SINGLE PIPE



TOP-VIEW MULTIPLE PIPE



SECTION

NOTE: See sheet 6 for details and notes.

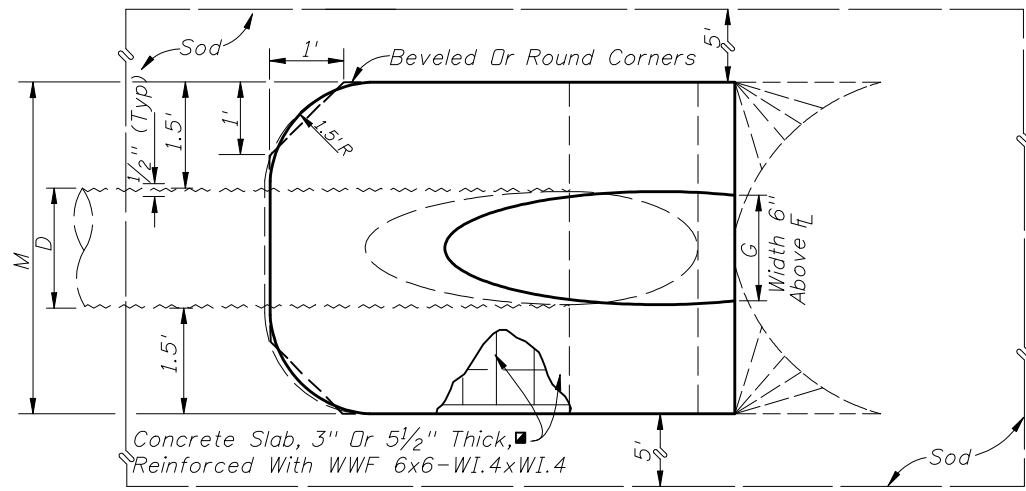
SINGLE AND MULTIPLE ROUND CONCRETE PIPE

DIMENSIONS AND QUANTITIES

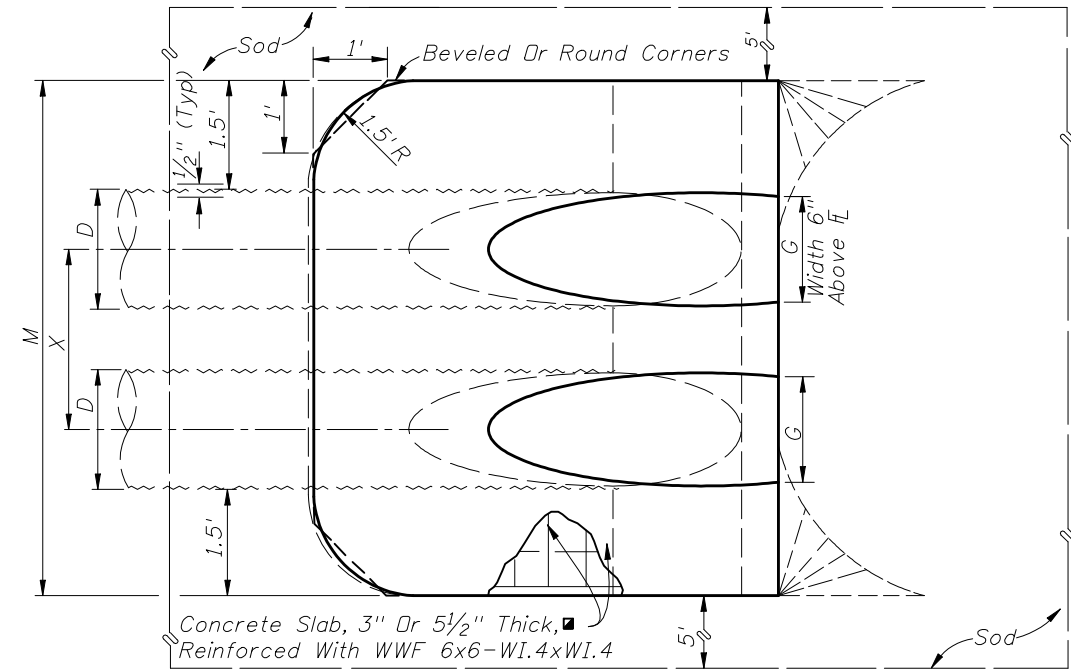
	D	X	A	B	C	E	F	G	H ■	M				N	5½" CONCRETE SLAB (CY) ■				SODDING (SQ. YDS.)			
										Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	15"	2'-7"	2.5'	1.68'	4.18'	1.5'	5.0'	1.23'	3.5'	4.33'	6.92'	9.50'	12.08'	1.04'	0.35	0.54	0.74	0.94	21	24	27	29
	18"	2'-10"	2.5'	2.24'	4.74'	2.0'	6.0'	1.41'	4'	4.58'	7.42'	10.25'	13.08'	1.04'	0.38	0.62	0.87	1.12	22	25	28	31
	24"	3'-5"	2.5'	3.35'	5.85'	3.0'	7.0'	1.73'	4'	5.08'	8.50'	11.92'	15.33'	1.04'	0.47	0.76	1.05	1.34	23	27	31	35
	30"	4'-3"	2.5'	4.47'	6.97'	4.0'	8.0'	2.00'	4'	5.58'	9.83'	14.08'	18.33'	1.04'	0.57	0.96	1.37	1.77	25	30	35	39
	36"	5'-1"	2.5'	5.59'	8.09'	5.0'	9.0'	2.24'	4'	6.08'	11.17'	16.25'	21.33'	1.04'	0.67	1.19	1.72	2.26	27	33	38	44
	42"	6'-0"	2.5'	6.71'	9.21'	6.0'	10.0'	2.45'	4'	6.58'	12.58'	18.58'	24.58'	1.04'	0.78	1.48	2.17	2.87	29	36	42	49
	48"	6'-9"	2.5'	7.83'	10.33'	7.0'	11.0'	2.65'	4'	7.08'	13.83'	20.58'	27.33'	1.04'	0.89	1.71	2.54	3.36	31	38	46	53
	54"	7'-8"	2.5'	8.94'	11.44'	8.0'	12.0'	2.83'	4'	7.58'	15.25'	22.92'	30.58'	1.04'	1.02	2.06	3.10	4.14	33	41	50	58
60"	8'-6"	2.5'	10.06'	12.56'	9.0'	13.0'	3.00'	4'	8.08'	16.58'	25.08'	33.58'	1.04'	1.14	2.38	3.63	4.89	34	44	53	63	
1:4 Slope	15"	2'-7"	2.5'	3.09'	5.59'	3.0'	7.0'	1.23'	4'	4.33'	6.92'	9.50'	12.08'	1.04'	0.44	0.68	0.91	1.15	22	25	28	31
	18"	2'-10"	2.5'	4.12'	6.62'	4.0'	8.0'	1.41'	4'	4.58'	7.42'	10.25'	13.08'	1.04'	0.49	0.77	1.03	1.31	24	27	30	33
	24"	3'-5"	2.5'	6.18'	8.68'	6.0'	10.0'	1.73'	4'	5.08'	8.50'	11.92'	15.33'	1.04'	0.65	1.09	1.38	1.77	27	30	34	38
	30"	4'-3"	2.5'	8.25'	10.75'	8.0'	12.0'	2.00'	4'	5.58'	9.83'	14.08'	18.33'	1.04'	0.81	1.34	1.90	2.44	29	34	39	44
	36"	5'-1"	2.5'	10.31'	12.81'	10.0'	14.0'	2.24'	4'	6.08'	11.17'	16.25'	21.33'	1.04'	0.97	1.68	2.41	3.14	32	38	44	49
	42"	6'-0"	2.5'	12.37'	14.87'	12.0'	16.0'	2.45'	4'	6.58'	12.58'	18.58'	24.58'	1.04'	1.13	2.08	3.06	4.02	35	42	48	55
	48"	6'-9"	2.5'	14.43'	16.93'	14.0'	18.0'	2.65'	4'	7.08'	13.83'	20.58'	27.33'	1.04'	1.29	2.49	3.69	4.88	38	46	53	60
	54"	7'-8"	2.5'	16.49'	18.99'	16.0'	20.0'	2.83'	4'	7.58'	15.25'	22.92'	30.58'	1.04'	1.48	2.98	4.47	5.98	41	49	58	66
60"	8'-6"	2.5'	18.55'	21.05'	18.0'	22.0'	3.00'	4'	8.08'	16.58'	25.08'	33.58'	1.04'	1.66	3.49	5.31	7.13	44	53	63	72	

■ See General Note No. 3.
See Sheet 5 Df 6
For 3" Slab Quantities

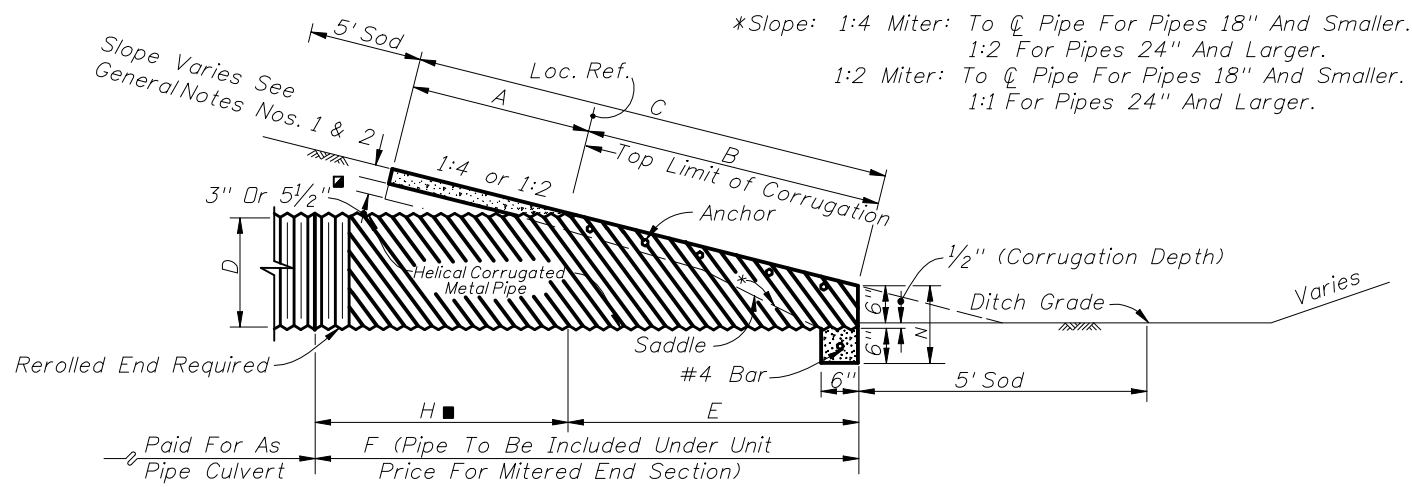
■ Values shown for estimating pipe quantities and are for information only



TOP VIEW-SINGLE PIPE



TOP VIEW-MULTIPLE PIPE



SECTION

*Slope: 1:4 Miter: To C Pipe For Pipes 18" And Smaller.
1:2 For Pipes 24" And Larger.
1:2 Miter: To C Pipe For Pipes 18" And Smaller.
1:1 For Pipes 24" And Larger.

NOTE: See Sheet 6 For Details And Notes.

SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE



2010 FDOT Design Standards

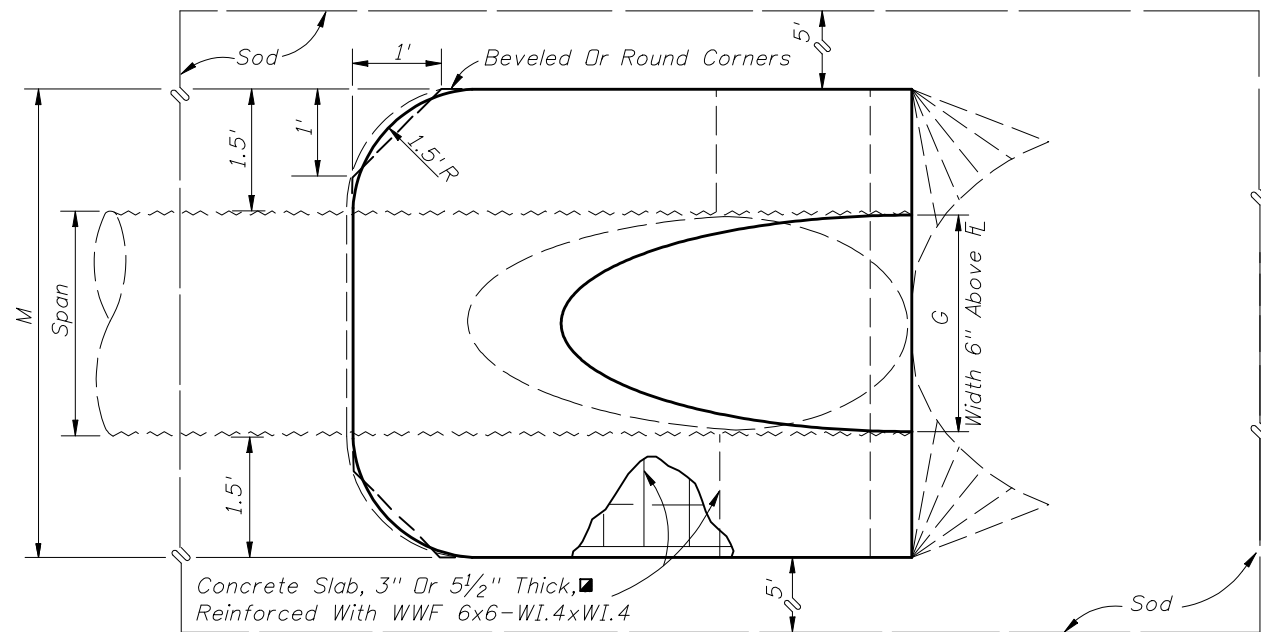
CROSS DRAIN MITERED END SECTION

Last Revision 02	Sheet No. 2 of 6
Index No. 272	

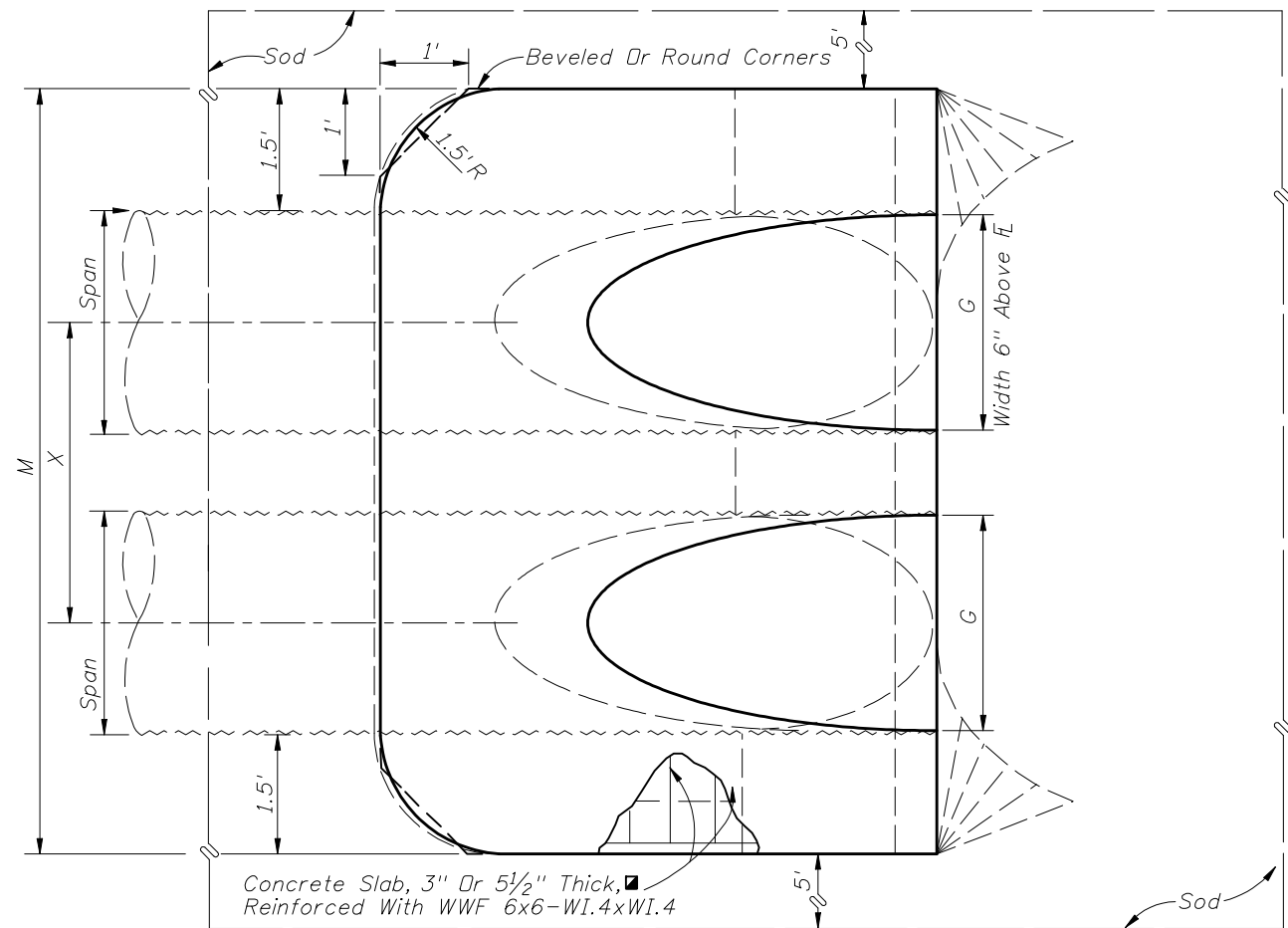
1974 AASHTO		DIMENSIONS AND QUANTITIES																					
SLOPE	SPAN	RISE	X	A	B	C	E	F	G	H	M				N	5 1/2" CONCRETE SLAB (CY) ■				SODDING (SQ. YDS.)			
											Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	17"	13"	2'-6"	2.5'	1.30'	3.80'	1.17'	4'	1.39'	2.8'	4.50'	7.00'	9.50'	12.00'	1.04'	0.41	0.61	0.81	1.02	21	23	26	29
	21"	15"	2'-10"	2.5'	1.68'	4.17'	1.50'	5'	1.76'	3.5'	4.83'	7.67'	10.50'	13.33'	1.04'	0.43	0.66	0.88	1.10	22	25	28	31
	28"	20"	3'-5"	2.5'	2.61'	5.11'	2.33'	6'	2.22'	3.7'	5.42'	8.83'	12.25'	15.67'	1.04'	0.51	0.78	1.06	1.33	23	27	30	34
	35"	24"	4'-0"	2.5'	3.35'	5.85'	3.00'	7'	2.55'	4.0'	6.00'	10.00'	14.00'	18.00'	1.04'	0.57	0.90	1.22	1.55	24	29	33	38
	42"	29"	4'-9"	2.5'	4.29'	6.79'	3.83'	8'	2.97'	4.2'	6.58'	11.33'	16.08'	20.83'	1.04'	0.64	1.04	1.46	1.87	26	31	37	42
	49"	33"	5'-6"	2.5'	5.03'	7.53'	4.50'	9'	3.34'	4.5'	7.17'	12.67'	18.17'	23.67'	1.04'	0.73	1.23	1.72	2.22	28	34	40	46
	57"	38"	6'-4"	2.5'	5.96'	8.46'	5.33'	10'	3.65'	4.7'	7.83'	14.17'	20.50'	26.83'	1.04'	0.83	1.44	2.04	2.64	29	36	44	51
1:4 Slope	17"	13"	2'-6"	2.5'	2.41'	4.91'	2.33'	7'	1.39'	4.7'	4.50'	7.00'	9.50'	12.00'	1.04'	0.48	0.71	0.95	1.18	22	25	27	30
	21"	15"	2'-10"	2.5'	3.09'	5.59'	3.00'	8'	1.76'	5.0'	4.83'	7.67'	10.50'	13.33'	1.04'	0.52	0.80	1.09	1.31	23	26	29	32
	28"	20"	3'-5"	2.5'	4.81'	7.31'	4.67'	9'	2.22'	4.3'	5.42'	8.83'	12.25'	15.67'	1.04'	0.61	0.92	1.27	1.59	25	29	33	37
	35"	24"	4'-0"	2.5'	6.18'	8.68'	6.00'	11'	2.55'	5.0'	6.00'	10.00'	14.00'	18.00'	1.04'	0.73	1.14	1.55	1.97	28	32	37	41
	42"	29"	4'-9"	2.5'	7.90'	10.40'	7.67'	12'	2.97'	4.3'	6.58'	11.33'	16.08'	20.83'	1.04'	0.87	1.39	1.92	2.45	30	35	41	46
	49"	33"	5'-6"	2.5'	9.28'	11.78'	9.00'	14'	3.34'	5.0'	7.17'	12.67'	18.17'	23.67'	1.04'	1.00	1.66	2.30	2.96	32	38	45	51
	57"	38"	6'-4"	2.5'	11.00'	13.50'	10.67'	16'	3.65'	5.3'	7.83'	14.17'	20.50'	26.83'	1.04'	1.18	2.00	2.82	3.64	35	42	49	56
	64"	43"	7'-1"	2.5'	12.71'	15.21'	12.33'	17'	3.89'	4.7'	8.42'	15.50'	22.58'	29.67'	1.04'	1.36	2.39	3.38	4.38	38	45	53	61
	71"	47"	7'-10"	2.5'	14.09'	16.59'	13.67'	19'	4.14'	5.3'	9.00'	16.83'	24.67'	32.50'	1.04'	1.50	2.65	3.81	4.97	40	48	57	66

■ See General Note No. 3.
See Sheet 5 Of 6 For 3" Slab Quantities

■ Values shown for estimating pipe quantities and are for information.

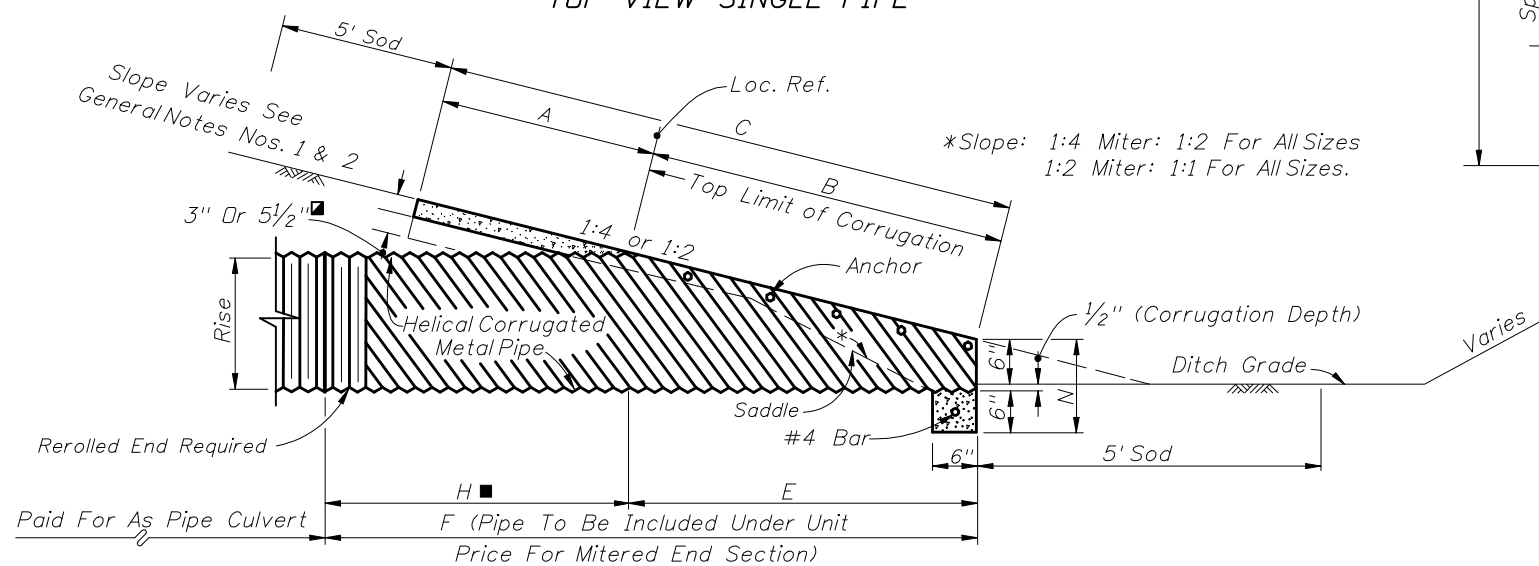


TOP VIEW-SINGLE PIPE



TOP VIEW-MULTIPLE PIPE

NOTE: See Sheet 6 For Details And Notes.



SECTION

SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH



2010 FDOT Design Standards

CROSS DRAIN MITERED END SECTION

Last Revision 02

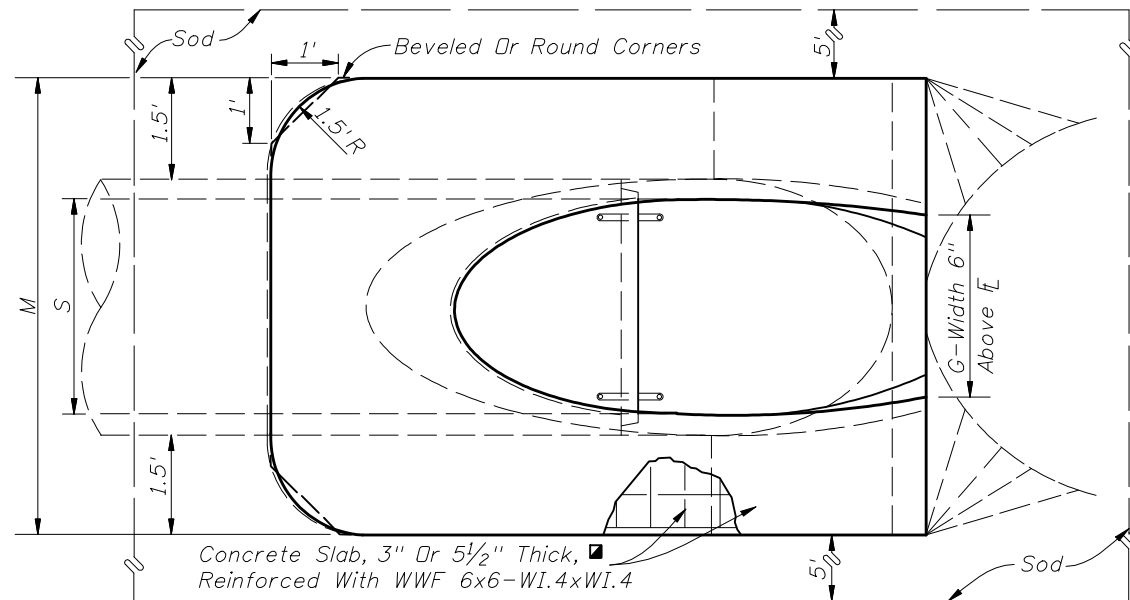
Sheet No. 3 of 6

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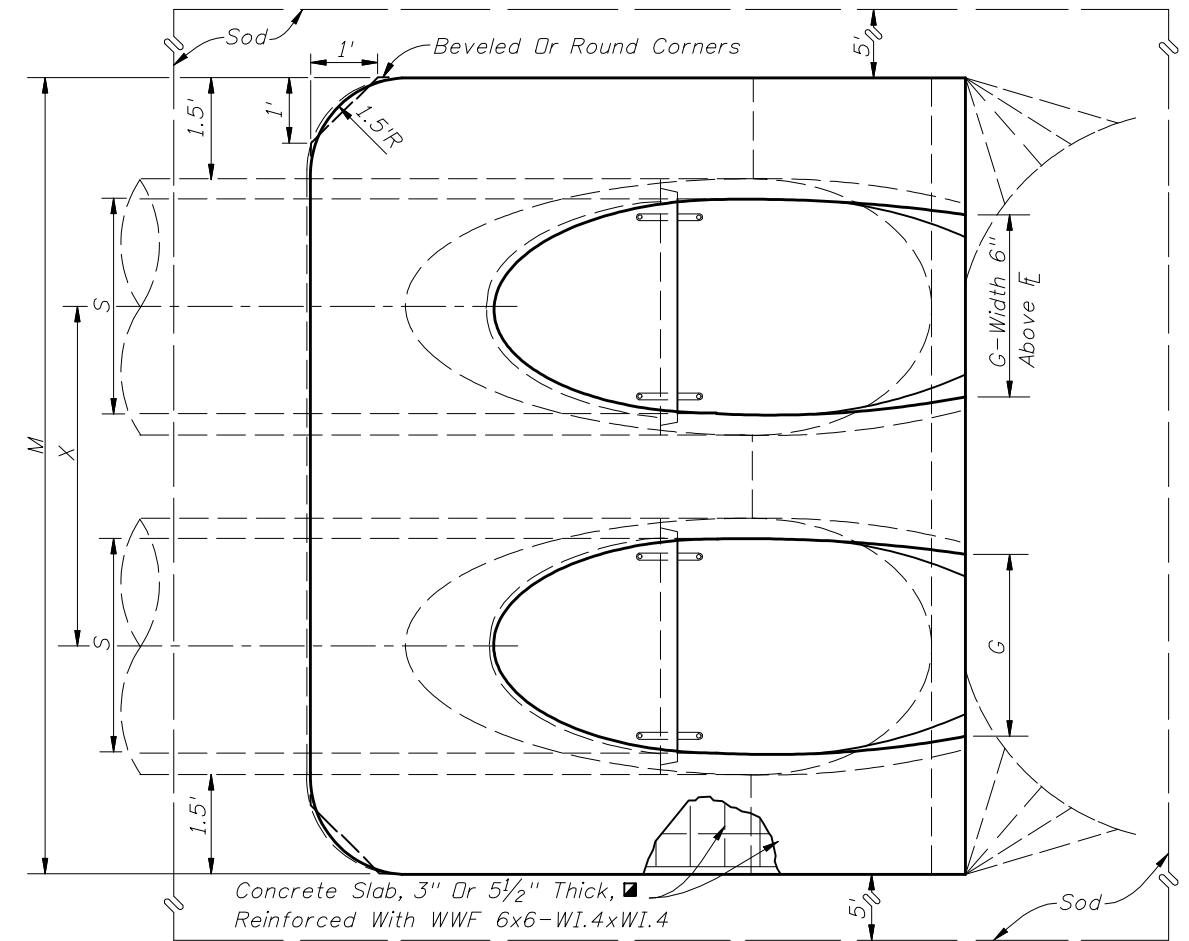
DIMENSIONS & QUANTITIES

	Rise R	Span S	X	A	B	C	E	F	G	H	M				N	5 1/2" CONC. SLAB (CY)				SODDING (SQ. YDS.)			
											Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	12"	18"	2'-10"	1.97'	1.62'	3.59'	1.56'	4'	1.50'	2.4'	4.92'	7.75'	10.58'	13.42'	1.21'	0.30	0.49	0.67	0.85	21	24	27	30
	14"	23"	3'-4"	2.01'	1.99'	4.00'	1.89'	5'	1.90'	3.1'	5.38'	8.71'	12.04'	15.38'	1.23'	0.37	0.59	0.81	1.02	22	26	29	33
	19"	30"	4'-0"	2.11'	2.92'	5.03'	2.73'	6'	2.37'	3.3'	6.04'	10.04'	14.04'	18.04'	1.27'	0.50	0.80	1.09	1.39	24	28	33	37
	24"	38"	5'-0"	2.20'	3.85'	6.05'	3.56'	7'	2.85'	3.4'	6.79'	11.79'	16.79'	21.79'	1.31'	0.62	1.03	1.45	1.86	26	31	37	42
	29"	45"	5'-11"	2.34'	4.79'	7.13'	4.39'	8'	3.19'	3.6'	7.50'	13.42'	19.33'	25.25'	1.38'	0.75	1.30	1.84	2.39	28	34	41	47
	34"	53"	7'-0"	2.43'	5.72'	8.15'	5.23'	9'	3.57'	3.8'	8.25'	15.25'	22.25'	29.25'	1.42'	0.90	1.61	2.32	3.03	30	37	45	53
	38"	60"	7'-10"	2.52'	6.46'	8.98'	5.89'	9'	3.95'	3.1'	8.92'	16.75'	24.58'	32.42'	1.46'	1.03	1.89	2.74	3.60	31	40	49	57
	43"	68"	8'-11"	2.62'	7.39'	10.01'	6.73'	10'	4.28'	3.3'	9.67'	18.58'	27.50'	36.42'	1.50'	1.19	2.26	3.33	4.40	33	43	53	63
	48"	76"	9'-11"	2.71'	8.33'	11.04'	7.56'	11'	4.59'	3.4'	10.42'	20.33'	30.25'	40.17'	1.54'	1.38	2.65	3.93	5.21	35	46	57	68
53"	83"	10'-8"	2.80'	9.26'	12.06'	8.39'	12'	4.77'	3.6'	11.08'	21.75'	32.42'	43.08'	1.58'	1.55	3.03	4.50	5.96	37	49	61	73	
58"	91"	11'-8"	2.90'	10.19'	13.09'	9.23'	13'	5.01'	3.8'	11.83'	23.50'	35.17'	46.83'	1.63'	1.75	3.47	5.20	6.93	39	52	65	78	
1:4 Slope	12"	18"	2'-10"	2.36'	3.06'	5.42'	3.03'	5'	1.50'	2.0'	4.92'	7.75'	10.58'	13.42'	1.21'	0.45	0.68	0.92	1.14	23	26	29	32
	14"	23"	3'-4"	2.44'	3.75'	6.19'	3.70'	6'	1.90'	2.3'	5.38'	8.71'	12.04'	15.38'	1.23'	0.53	0.83	1.13	1.42	24	28	32	35
	19"	30"	4'-0"	2.62'	5.47'	8.09'	5.36'	8'	2.37'	2.6'	6.04'	10.04'	14.04'	18.04'	1.27'	0.74	1.15	1.57	1.98	27	32	36	40
	24"	38"	5'-0"	2.79'	7.18'	9.97'	7.03'	10'	2.85'	3.0'	6.79'	11.79'	16.79'	21.79'	1.31'	0.97	1.57	2.19	2.81	30	36	41	47
	29"	45"	5'-11"	3.05'	8.90'	11.95'	8.70'	12'	3.19'	3.3'	7.50'	13.42'	19.33'	25.25'	1.38'	1.22	2.07	2.92	3.77	33	40	46	53
	34"	53"	7'-0"	3.22'	10.62'	13.84'	10.36'	13'	3.57'	2.6'	8.25'	15.25'	22.25'	29.25'	1.42'	1.48	2.62	3.77	4.92	36	44	52	59
	38"	60"	7'-10"	3.39'	11.99'	15.38'	11.70'	15'	3.95'	3.3'	8.92'	16.75'	24.58'	32.42'	1.46'	1.72	3.12	4.53	5.92	38	47	56	65
	43"	68"	8'-11"	3.56'	13.71'	17.27'	13.36'	17'	4.28'	3.6'	9.67'	18.58'	27.50'	36.42'	1.50'	2.02	3.78	5.56	7.32	41	51	61	71
	48"	76"	9'-11"	3.73'	15.43'	19.16'	15.03'	19'	4.59'	4.0'	10.42'	20.33'	30.25'	40.17'	1.54'	2.34	4.49	6.64	8.79	44	55	66	77
53"	83"	10'-8"	3.91'	17.15'	21.06'	16.70'	20'	4.77'	3.3'	11.08'	21.75'	32.42'	43.08'	1.58'	2.66	5.17	7.66	10.16	47	59	71	83	
58"	91"	11'-8"	4.08'	18.87'	22.95'	18.36'	22'	5.01'	3.6'	11.83'	23.50'	35.17'	46.83'	1.63'	3.02	5.98	8.95	11.90	50	63	76	89	

- See General Note No. 3.
See Sheet 5 Of 6 For 3" Slab Quantities
- Values shown for estimating pipe quantities and are for information only.

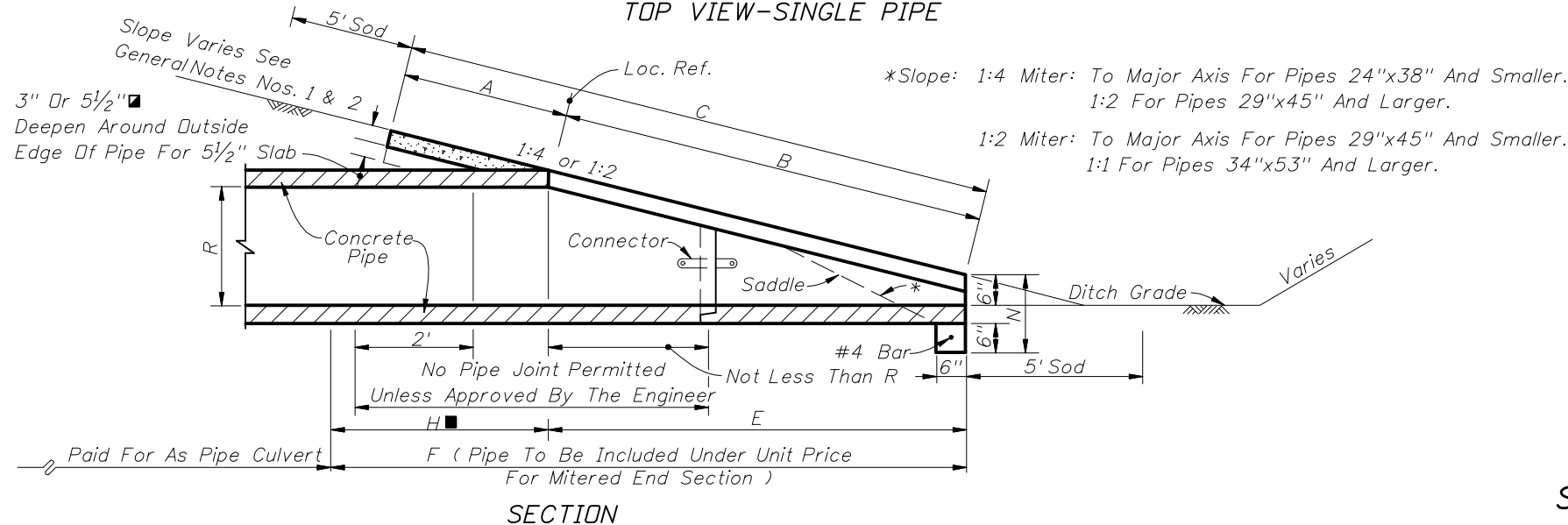


TOP VIEW-SINGLE PIPE



NOTE: See Sheet 6 For Details And Notes.

TOP VIEW - MULTIPLE PIPE



SECTION

SINGLE AND MULTIPLE ELLIPTICAL CONCRETE PIPE

QUANTITIES FOR 3" THICK CONCRETE SLABS (CY)

	D	ROUND-CONCRETE			
		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	15"	0.27	0.41	0.54	0.67
	18"	0.31	0.45	0.60	0.75
	24"	0.39	0.59	0.79	1.00
	30"	0.46	0.76	1.04	1.32
	36"	0.55	0.94	1.33	1.71
	42"	0.66	1.15	1.66	2.15
	48"	0.76	1.37	1.96	2.57
	54"	0.87	1.62	2.38	3.14
	60"	0.99	1.90	2.81	3.73
	66"	1.11	2.15	3.21	4.27
	72"	1.24	2.46	3.68	4.90
1:4 Slope	15"	0.40	0.61	0.80	1.00
	18"	0.47	0.69	0.91	1.14
	24"	0.60	0.90	1.21	1.52
	30"	0.76	1.19	1.63	2.07
	36"	0.89	1.48	2.05	2.63
	42"	1.05	1.82	2.57	3.34
	48"	1.21	2.15	3.07	4.00
	54"	1.39	2.55	3.72	4.88
	60"	1.59	3.02	4.44	5.86
	66"	1.91	3.66	5.40	7.15
	72"	2.12	4.18	6.24	8.30

	D	ROUND-CMP			
		Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	15"	0.24	0.37	0.51	0.64
	18"	0.26	0.43	0.61	0.78
	24"	0.32	0.52	0.72	0.91
	30"	0.38	0.64	0.91	1.18
	36"	0.44	0.78	1.13	1.48
	42"	0.51	0.96	1.41	1.87
	48"	0.57	1.09	1.63	2.15
	54"	0.65	1.32	1.99	2.66
	60"	0.71	1.49	2.28	3.07
1:4 Slope	15"	0.31	0.47	0.63	0.79
	18"	0.34	0.53	0.71	0.90
	24"	0.44	0.69	0.92	1.18
	30"	0.53	0.88	1.25	1.60
	36"	0.62	1.07	1.53	2.00
	42"	0.71	1.30	1.92	2.52
	48"	0.80	1.54	2.29	3.02
	54"	0.91	1.83	2.74	3.67
	60"	1.02	2.15	3.27	4.39

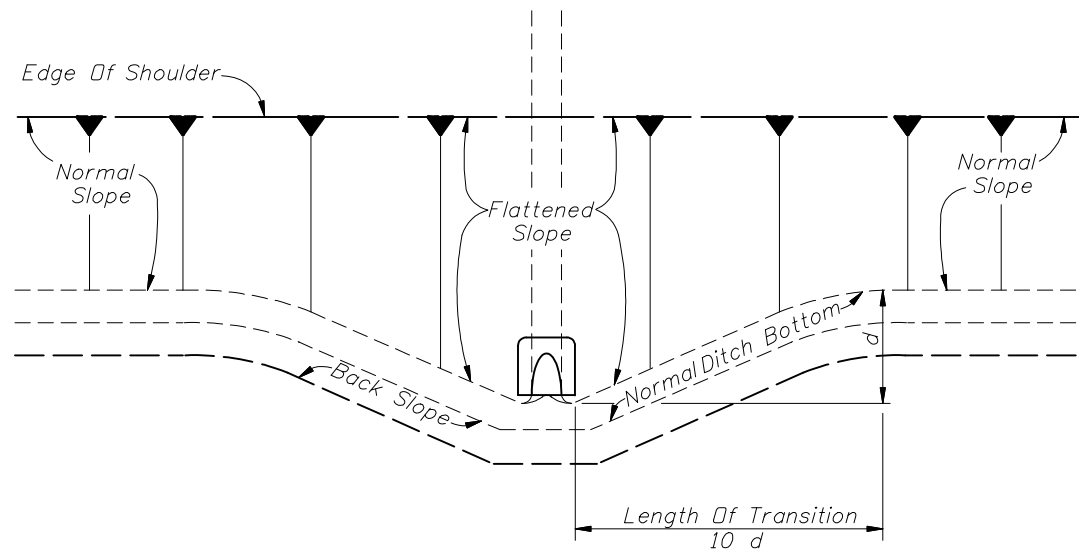
	Span	Rise	CMP-ARCH			
			Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	17"	13"	0.33	0.49	0.65	0.81
	21"	15"	0.33	0.50	0.67	0.83
	28"	20"	0.37	0.56	0.76	0.95
	35"	24"	0.40	0.62	0.84	1.07
	42"	29"	0.43	0.70	0.98	1.25
	49"	33"	0.49	0.82	1.15	1.48
	57"	38"	0.55	0.95	1.35	1.75
	64"	43"	0.62	1.10	1.57	2.05
	71"	47"	0.69	1.24	1.80	2.35
1:4 Slope	17"	13"	0.38	0.56	0.74	0.92
	21"	15"	0.39	0.59	0.80	0.95
	28"	20"	0.43	0.64	0.88	1.10
	35"	24"	0.49	0.77	1.05	1.33
	42"	29"	0.57	0.92	1.27	1.62
	49"	33"	0.65	1.08	1.50	1.93
	57"	38"	0.76	1.30	1.83	2.37
	64"	43"	0.87	1.55	2.18	2.83
	71"	47"	0.95	1.68	2.43	3.17

	Rise	Span	ELLIPTICAL-CONCRETE			
			Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
1:2 Slope	12"	18"	0.19	0.33	0.45	0.57
	14"	23"	0.25	0.40	0.55	0.69
	19"	30"	0.34	0.55	0.75	0.95
	24"	38"	0.43	0.71	1.00	1.28
	29"	45"	0.52	0.90	1.27	1.65
	34"	53"	0.62	1.11	1.60	2.09
	38"	60"	0.70	1.29	1.87	2.46
	43"	68"	0.81	1.54	2.26	2.99
	48"	76"	0.93	1.79	2.66	3.53
	53"	83"	1.04	2.04	3.03	4.02
	58"	91"	1.17	2.33	3.49	4.66
1:4 Slope	12"	18"	0.30	0.45	0.61	0.76
	14"	23"	0.36	0.56	0.76	0.95
	19"	30"	0.51	0.79	1.08	1.36
	24"	38"	0.68	1.10	1.53	1.96
	29"	45"	0.86	1.45	2.04	2.63
	34"	53"	1.02	1.81	2.60	3.39
	38"	60"	1.18	2.14	3.10	4.05
	43"	68"	1.38	2.58	3.79	4.99
	48"	76"	1.59	3.05	4.51	5.97
	53"	83"	1.80	3.50	5.19	6.88
	58"	91"	2.04	4.04	6.05	8.05



GENERAL NOTES

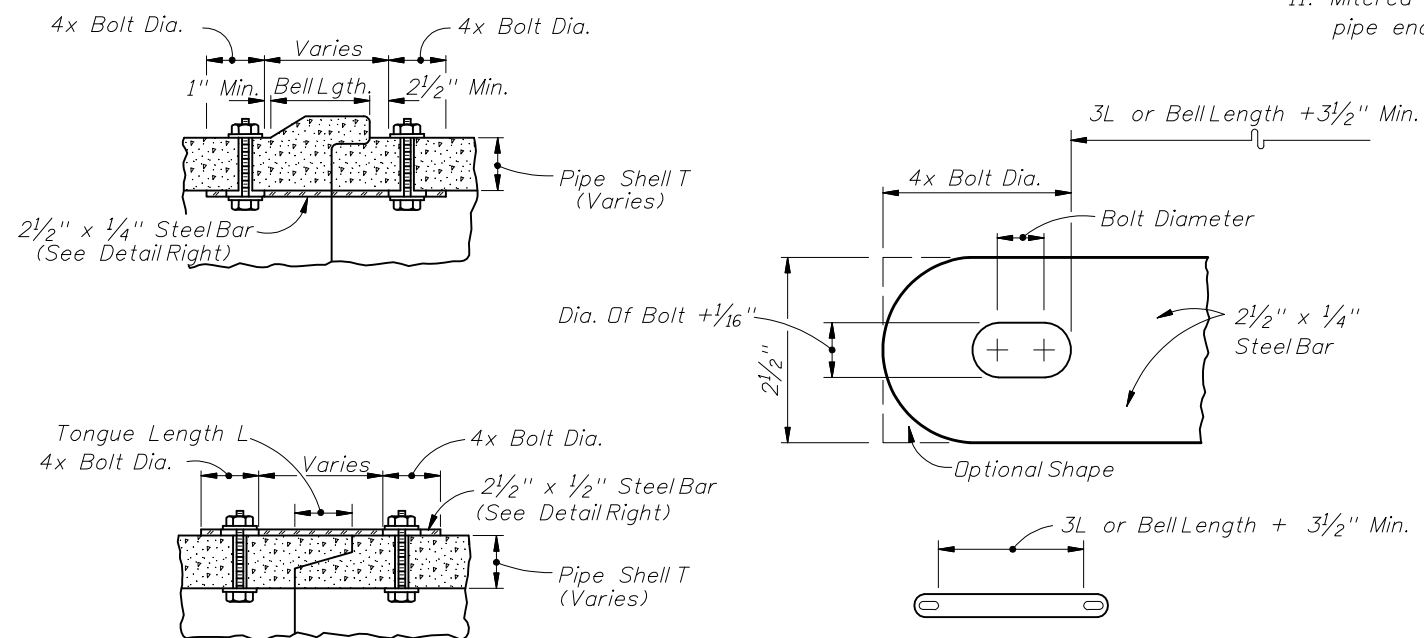
1. Unless otherwise designated in the plans, concrete pipe mitered end sections may be used with any type of cross drain pipe; corrugated steel pipe mitered end sections may be used with any type of cross drain pipe except aluminum pipe; and, corrugated aluminum mitered end sections may be used with any type of cross drain pipe except steel pipe. When bituminous coated metal pipe is specified for cross drain pipe, mitered end sections shall be constructed with like pipe or concrete pipe.
2. When the mitered end section pipe is dissimilar to the cross drain pipe, a concrete jacket shall be constructed in accordance with Standard Index 280.
3. Mitered end sections for pipe sizes 15", 18" and 24" round or equivalent pipe arch or elliptical pipe are permitted within the clear zone. When the slope intersection permits, the mitered end section may be located with the culvert opening as close as 8' beyond the outside edge of the shoulder.
4. Slope and ditch transitions shall be used when the normal roadway slope must be flattened to place end section outside clear zone. See detail left.
5. The reinforced concrete slab shall be constructed for all sizes of cross drain pipe and cast in place with Class NS concrete. Slabs shall be 5 1/2" thick unless 3" thickness called for in plans.
6. Concrete pipe used in the assembly of mitered end sections shall be selective lengths to avoid excessive connections.
7. Corrugated metal pipe galvanizing that is damaged during beveling and perforating for mitered end section shall be repaired.
8. That portion of corrugated metal pipe in direct contact with the concrete slab and extending 12" beyond shall be bituminous coated prior to placing of the concrete.
9. When existing multiple cross drain pipes are spaced other than the dimensions shown in this detail, or have non-parallel axes, or have non-uniform sections, the mitered end sections will be constructed either separately as single pipe mitered end sections or collectively as multiple pipe end sections as directed by the Engineer; however, mitered end sections will be paid for each based on each independent pipe end.
10. The cost of all pipe(s), fasteners, reinforcing, connectors, anchors, concrete, sealants, jackets, and coupling bands shall be included in the cost for the mitered end section. Sodding shall be paid for separately under the contract unit price of Performance Turf, SY.
11. Mitered end sections shall be paid for under the contract unit price for Mitered End Section (CD), Each, based on each independent pipe end.



PLAN

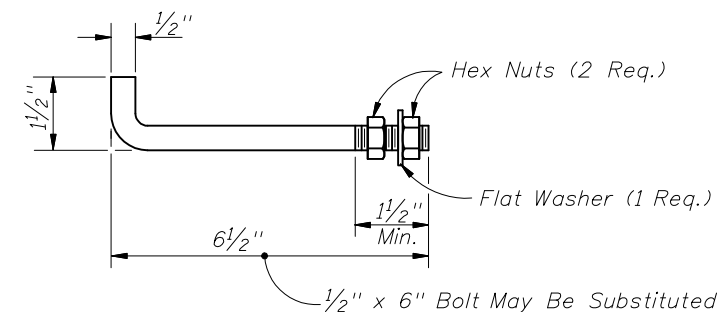
NOTE: See General Note 2

SLOPE AND DITCH TRANSITIONS



All bars, bolts, nuts and washers are to be galvanized steel.
 Bolt diameters shall be 3/8" for 15" to 36" pipe and 5/8" for 42" to 72" pipe.
 Two connectors required per joint, located 60° right and left of bottom center of pipe.
 Bolt holes in pipe shell are to be drilled.

CONCRETE PIPE CONNECTOR



Anchors required for CMP only.

Anchor, washer and nuts to be galvanized steel.

Bend anchor where required to center in concrete slab. Damaged surfaces to be repaired after bending. Anchors are to be spaced a distance equal to four (4) corrugations. Place the anchors in the outside crest of corrugation.

Flat washers to be placed on inside wall of pipe.

Holes in the mitered end pipe are to be drilled or punched; burning not permitted.

ANCHOR DETAIL

SPECIAL DETAILS AND NOTES



2010 FDOT Design Standards

CROSS DRAIN MITERED END SECTION

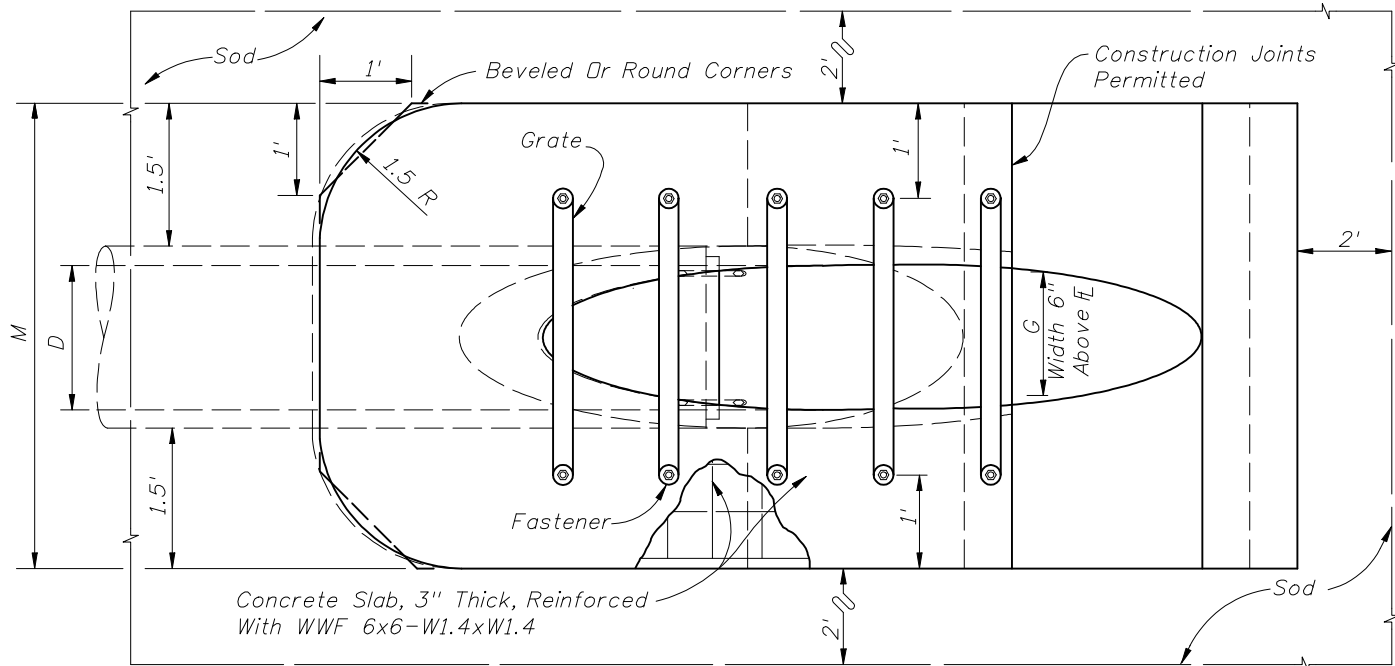
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DIMENSIONS & QUANTITIES

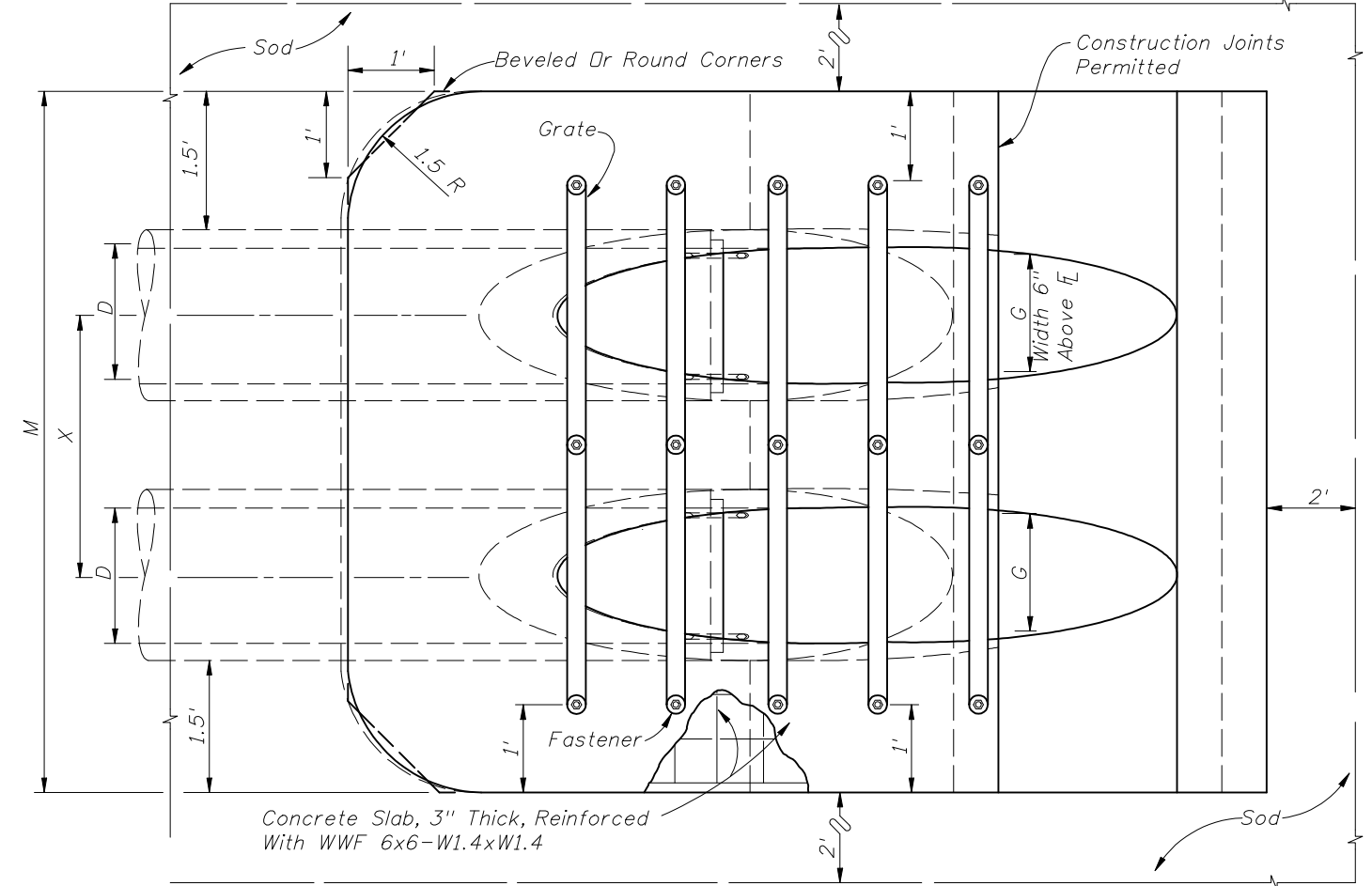
D	X	A	B	C	E	F	G	H	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
									Single Pipe	Double Pipe	Triple Pipe	Quad Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad Pipe
15"	2'-7"	2.27'	4.09'	6.36'	4.03'	8'	1.22'	4.0'	4.63'	7.21'	9.79'	12.37'	1.19'			0.76	1.16	1.54	1.94	8	10	11	12
18"	2'-10"	2.36'	5.12'	7.48'	5.03'	9'	1.41'	4.0'	4.92'	7.75'	10.58'	13.42'	1.21'			0.85	1.28	1.71	2.17	9	10	12	13
24"	3'-5"	2.53'	7.18' Δ	9.71'	7.03' Δ	11'	1.73'	4.0'	5.50'	8.92'	12.33'	15.75'	1.25'			1.02	1.58	2.15	2.75	10	12	13	15
30"	4'-3"	2.70'	9.25'	11.95'	9.03'	13'	2.00'	4.0'	6.08'	10.33'	14.58'	18.83'	1.29'	2 1/2"	3"	1.23	1.98	2.74	3.50	12	14	15	17
36"	5'-1"	2.87'	11.31' \diamond	14.18'	11.03' \diamond	15'	2.24'	4.0'	6.67'	11.75'	16.83'	21.92'	1.33'	2 1/2"	3"	1.40	2.38	3.33	4.24	13	15	17	20
42"	6'-0"	3.05'	13.37'	16.42'	13.03'	17'	2.45'	4.0'	7.25'	13.25'	19.25'	25.25'	1.38'	2 1/2"	3 1/2"	1.60	2.83	4.04	5.26	14	17	19	22
48"	6'-9"	3.22'	15.43'	18.65'	15.03'	19'	2.65'	4.0'	7.83'	14.58'	21.33'	28.08'	1.42'	2 1/2"	3 1/2"	1.81	3.26	4.70	6.14	15	18	21	24
54"	7'-8"	3.39'	17.49'	20.88'	17.03'	21'	2.83'	4.0'	8.42'	16.08'	23.75'	31.42'	1.46'	3"	4"	2.03	3.78	5.54	7.28	17	20	23	27
60"	8'-6"	3.56'	19.55'	23.11'	19.03'	23'	3.00'	4.0'	9.00'	17.50'	26.00'	34.50'	1.50'	3"	4"	2.28	4.36	6.43	8.50	18	22	25	29

Δ 6.42' Δ 6.25' Dimensions permitted to allow use of 8' standard pipe lengths.
 \diamond 10.40' \diamond 10.10' Dimensions permitted to allow use of 12' standard pipe lengths.
 $\Delta \diamond$ Concrete slab shall be deepened to form bridge across crown of pipe. See section below.

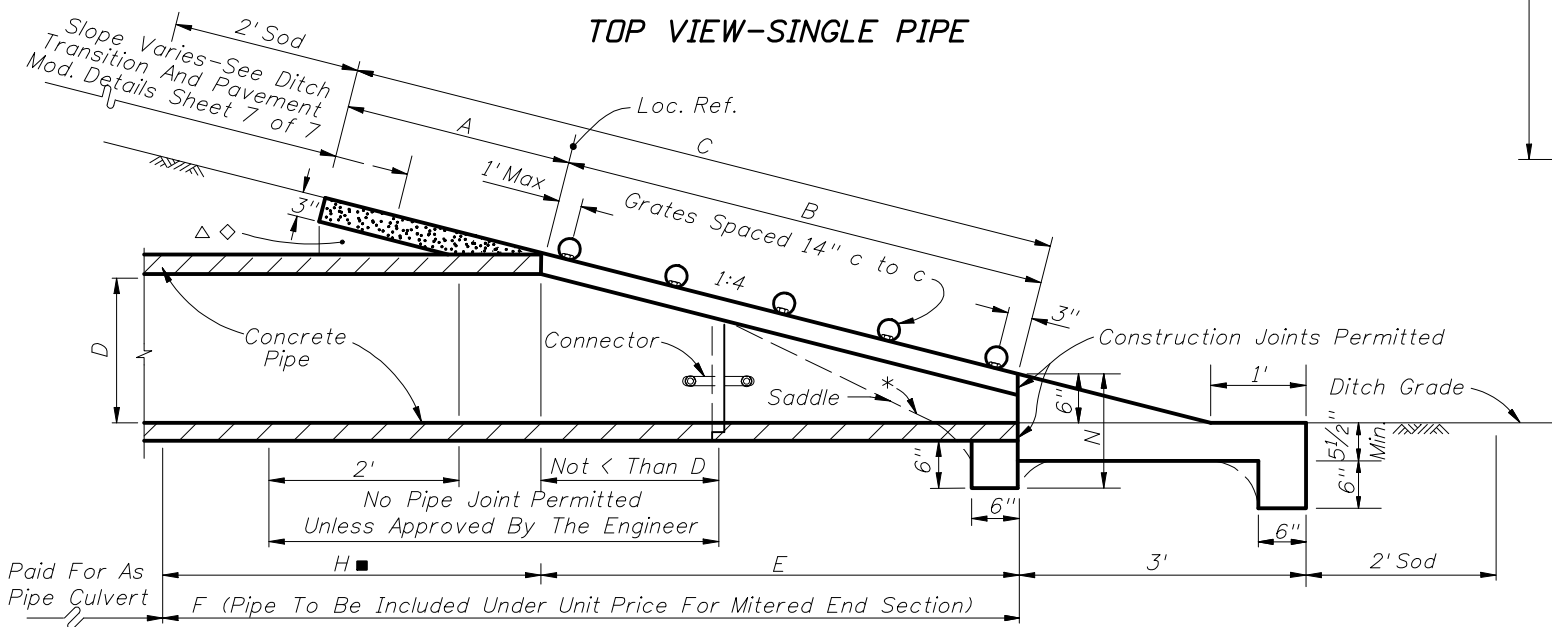
■ Values shown for estimating pipe quantities and are for information only.



TOP VIEW-SINGLE PIPE



TOP VIEW-MULTIPLE PIPE



SECTION

Note: See Sheets 6 and 7 for details and general notes.

*Slope:
 To \odot Pipe For Pipes 18" And Smaller
 1:2 For Pipes 24" And Larger.

SINGLE AND MULTIPLE ROUND CONCRETE PIPE



2010 FDOT Design Standards

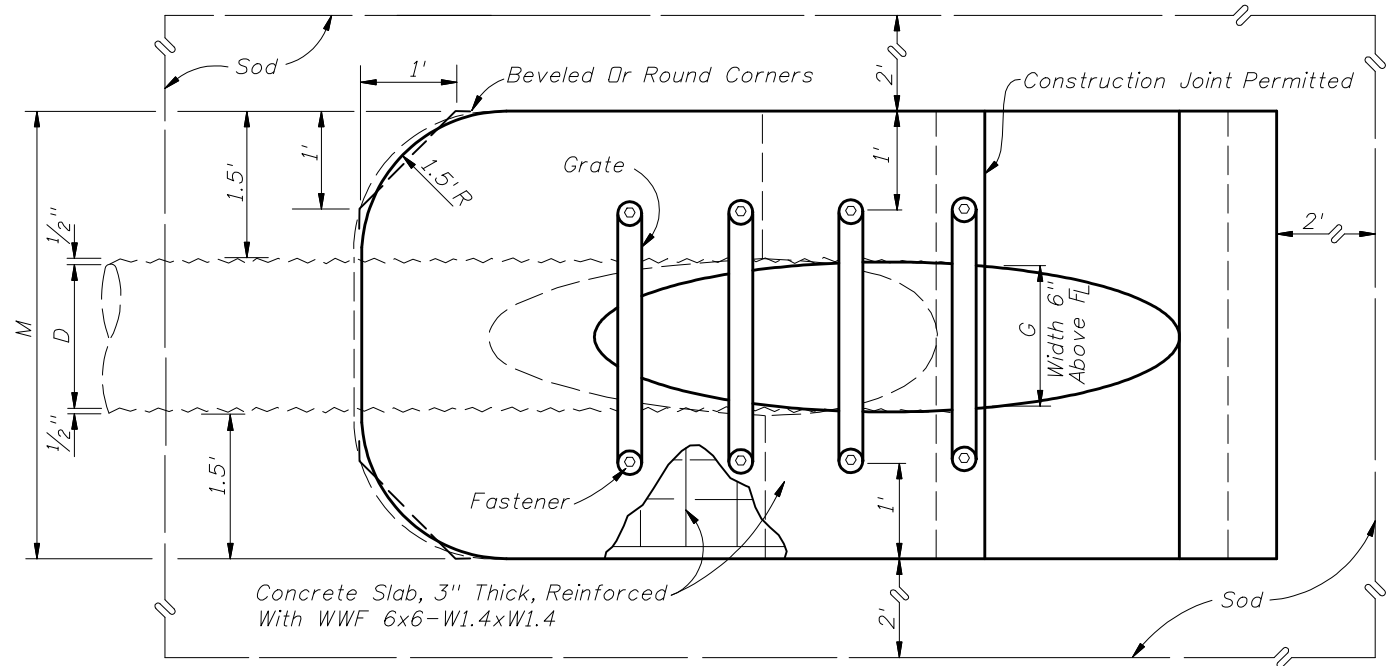
SIDE DRAIN MITERED END SECTION

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02 Sheet No.
1 of 7

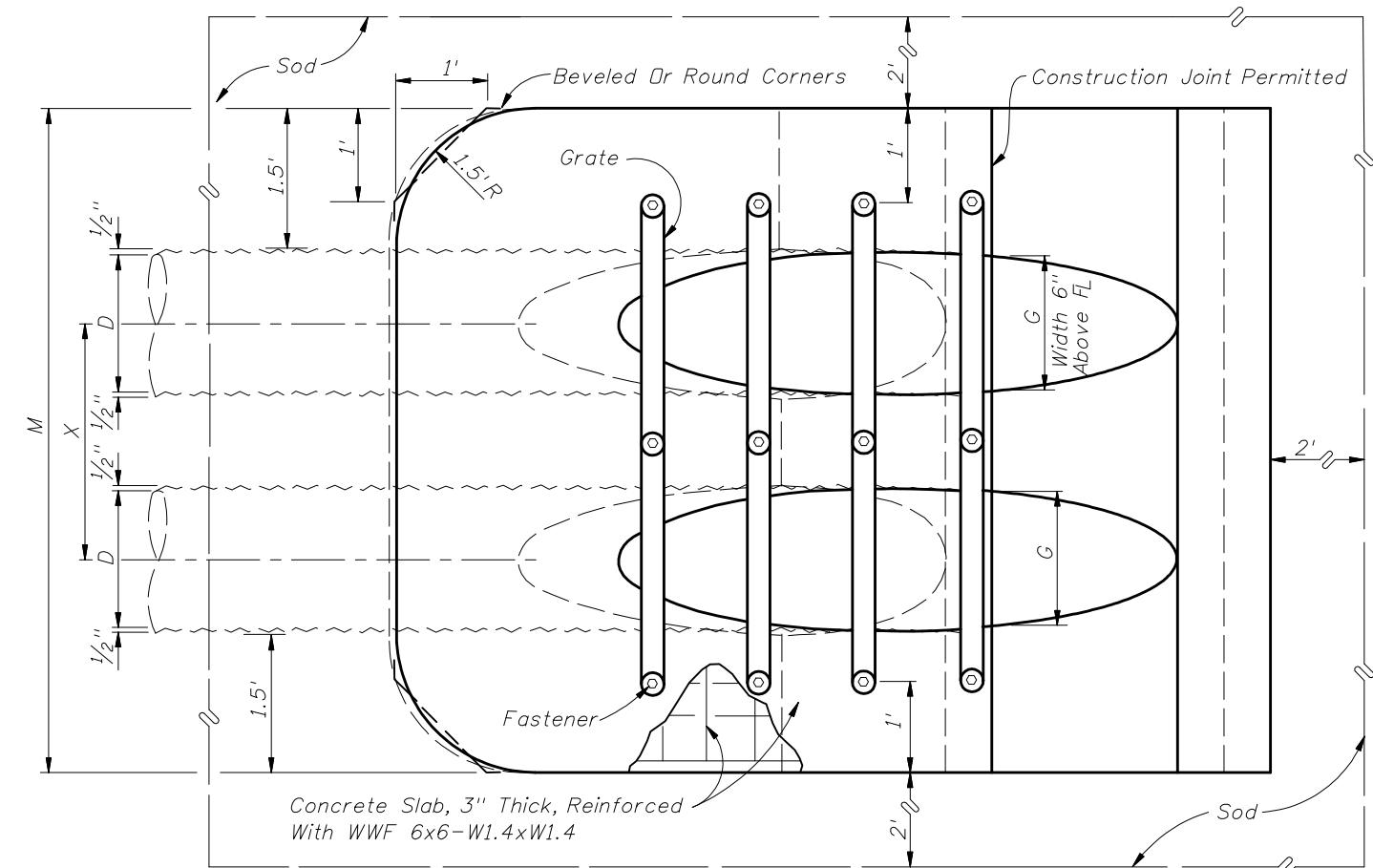
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DIMENSIONS & QUANTITIES

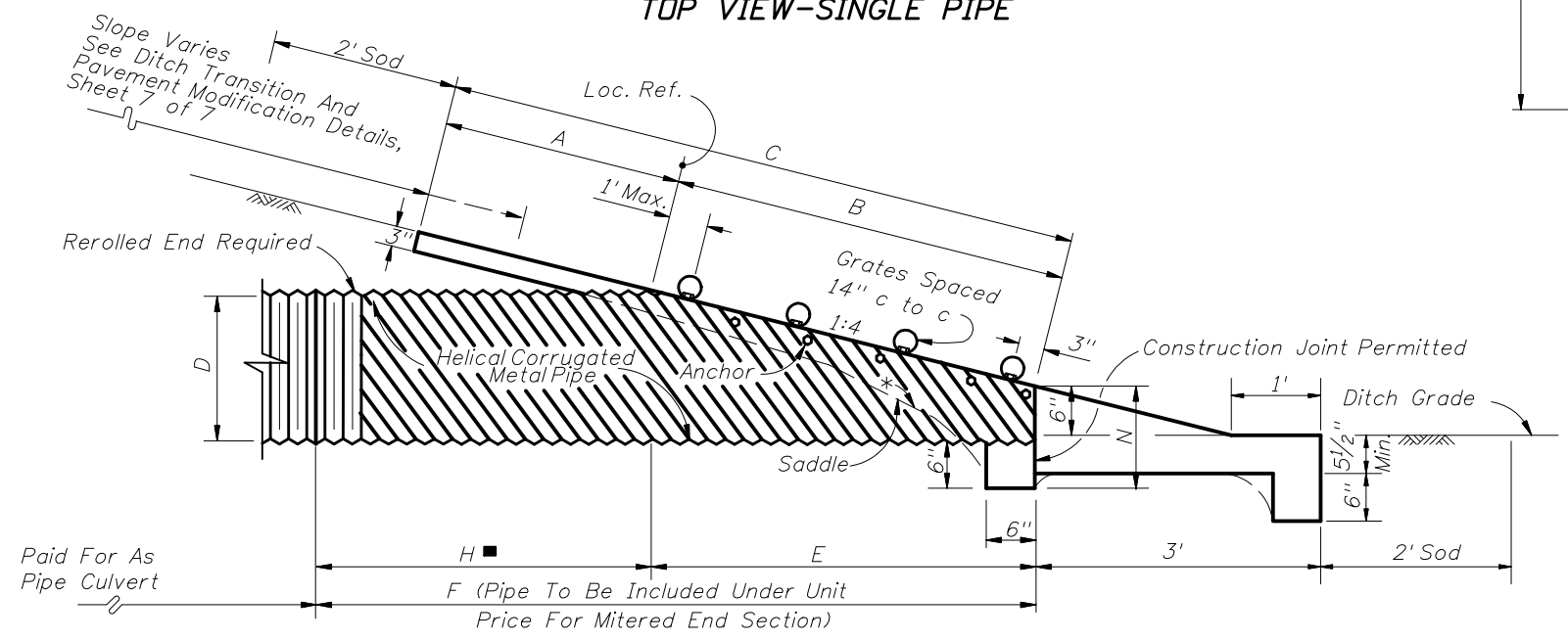
D	X	A	B	C	E	F	G	H ■	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)				REMARKS
									Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	
8"	2'-0"	2.5'	0.72'	3.22'	0.7'	4.0'	0.58'	3.3'	3.75'	5.75'	7.75'	9.75'	1.04'			0.52	0.90	1.22	1.54	7	8	8	9	These sizes are restricted to inlet and outlet treatment for water management systems or similar applications. ■ Values shown for estimating pipe quantities and are for information only.
10"	2'-2"	2.5'	1.34'	3.84'	1.3'	5.0'	0.81'	3.7'	3.92'	6.08'	8.25'	10.41'	1.04'			0.64	0.99	1.34	1.70	7	8	9	10	
12"	2'-4"	2.5'	2.06'	4.56'	2.0'	6.0'	1.00'	4.0'	4.08'	6.42'	8.75'	11.08'	1.04'			0.68	1.09	1.48	1.88	7	8	10	11	
15"	2'-7"	2.5'	3.09'	5.59'	3.0'	7.0'	1.23'	4.0'	4.33'	6.92'	9.50'	12.08'	1.04'			0.64	1.00	1.35	1.71	8	9	10	11	
18"	2'-10"	2.5'	4.12'	6.62'	4.0'	8.0'	1.41'	4.0'	4.58'	7.42'	10.25'	13.08'	1.04'			0.69	1.09	1.49	1.89	9	10	11	12	
24"	3'-5"	2.5'	6.18'	8.68'	6.0'	10.0'	1.73'	4.0'	5.08'	8.50'	11.92'	15.33'	1.04'			0.83	1.34	1.82	2.34	10	11	13	14	
30"	4'-3"	2.5'	8.25'	10.75'	8.0'	12.0'	2.00'	4.0'	5.58'	9.83'	14.08'	18.33'	1.04'	2 1/2"	3"	0.96	1.63	2.32	2.99	11	13	15	17	
36"	5'-1"	2.5'	10.31'	12.81'	10.0'	14.0'	2.24'	4.0'	6.08'	11.17'	16.25'	21.33'	1.04'	2 1/2"	3"	1.08	1.92	2.77	3.62	12	14	17	19	
42"	6'-0"	2.5'	12.37'	14.87'	12.0'	16.0'	2.45'	4.0'	6.58'	12.58'	18.58'	24.58'	1.04'	2 1/2"	3 1/2"	1.20	2.26	3.34	4.61	13	16	18	21	
48"	6'-9"	2.5'	14.43'	16.93'	14.0'	18.0'	2.65'	4.0'	7.08'	13.83'	20.58'	27.33'	1.04'	2 1/2"	3 1/2"	1.60	3.11	4.62	6.12	14	17	20	23	
54"	7'-8"	2.5'	16.49'	18.99'	16.0'	20.0'	2.83'	4.0'	7.58'	15.25'	22.92'	30.58'	1.04'	3"	4"	1.76	3.56	5.34	7.14	15	19	22	26	
60"	8'-6"	2.5'	18.55'	21.05'	18.0'	22.0'	3.00'	4.0'	8.08'	16.58'	25.08'	33.58'	1.04'	3"	4"	1.94	4.03	6.12	8.20	17	20	24	28	



TOP VIEW-SINGLE PIPE



TOP VIEW-MULTIPLE PIPE



SECTION

NOTE: See Sheets 6 and 7 for details and general notes.

*Slope:
To ϕ Pipe For Pipe 18" And Smaller
1:2 For Pipe 24" And Larger

SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE



2010 FDOT Design Standards

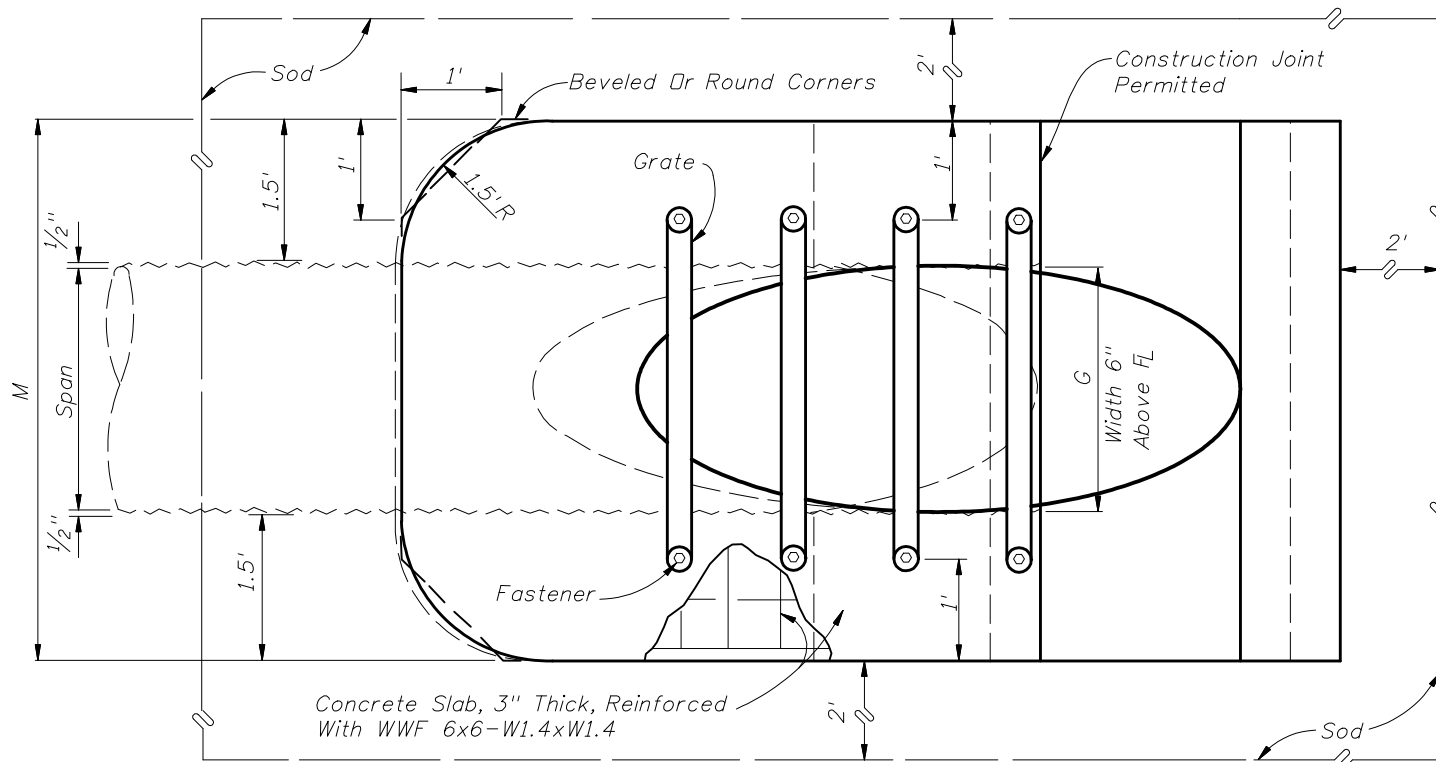
SIDE DRAIN MITERED END SECTION

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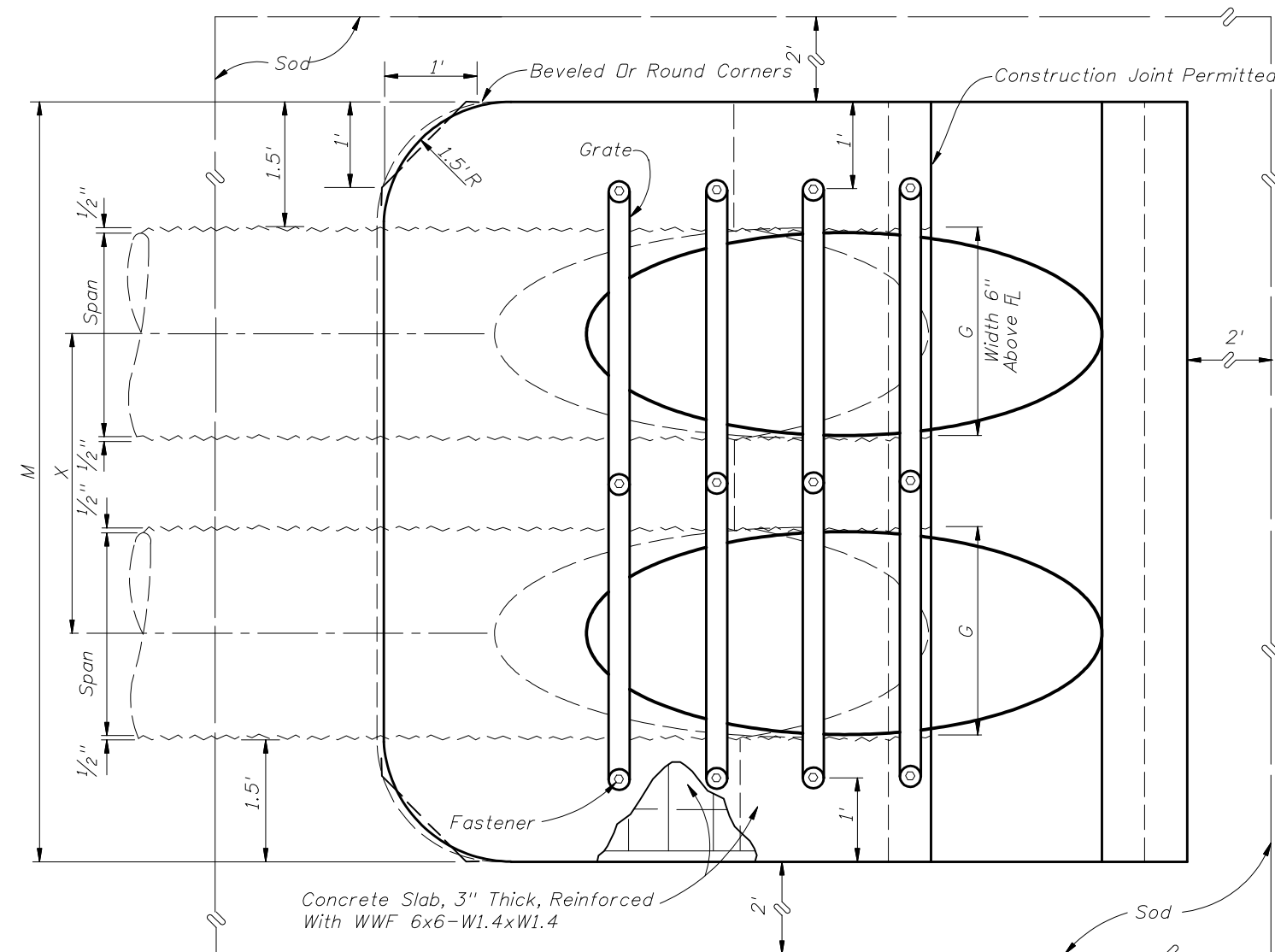
DIMENSIONS & QUANTITIES

1974 AASHTO		X	A	B	C	E	F	G	H	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
Span	Rise									Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Standard Weight	Extra Strong	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
17"	13"	2'-6"	2.5'	2.41'	4.91'	2.33'	7'	1.39'	4.7'	4.50'	7.00'	9.50'	12.00'	1.04'			0.62	0.95	1.27	1.60	8	9	10	11
21"	15"	2'-10"	2.5'	3.09'	5.59'	3.00'	8'	1.76'	5.0'	4.83'	7.67'	10.50'	13.33'	1.04'			0.69	1.06	1.44	1.77	8	9	11	12
28"	20"	3'-5"	2.5'	4.81'	7.31'	4.67'	9'	2.22'	4.3'	5.42'	8.83'	12.25'	15.67'	1.04'			0.81	1.26	1.73	2.19	9	11	12	14
35"	24"	4'-0"	2.5'	6.18'	8.68'	6.00'	11'	2.55'	5.0'	6.00'	10.00'	14.00'	18.00'	1.04'	2 1/2"	3"	0.94	1.51	2.09	2.66	10	12	14	15
42"	29"	4'-9"	2.5'	7.90'	10.40'	7.67'	12'	2.97'	4.3'	6.58'	11.33'	16.08'	20.83'	1.04'	2 1/2"	3 1/2"	1.06	1.76	2.46	3.16	11	13	15	17
49"	33"	5'-6"	2.5'	9.28'	11.78'	9.00'	14'	3.34'	5.0'	7.17'	12.67'	18.17'	23.67'	1.04'	2 1/2"	3 1/2"	1.19	2.02	2.84	3.68	12	14	17	19
57"	38"	6'-4"	2.5'	11.00'	13.50'	10.67'	16'	3.65'	5.3'	7.83'	14.17'	20.50'	26.83'	1.04'	3"	4"	1.35	2.35	3.35	4.36	13	16	19	22
64"	43"	7'-1"	2.5'	12.71'	15.21'	12.33'	17'	3.89'	4.7'	8.42'	15.50'	22.58'	29.67'	1.04'	3"	4"	1.50	2.70	3.86	5.03	14	17	20	24
71"	47"	7'-10"	2.5'	14.09'	16.59'	13.67'	19'	4.14'	5.3'	9.00'	16.83'	24.67'	32.50'	1.04'	3"	4"	1.62	2.94	4.27	5.59	15	18	22	25

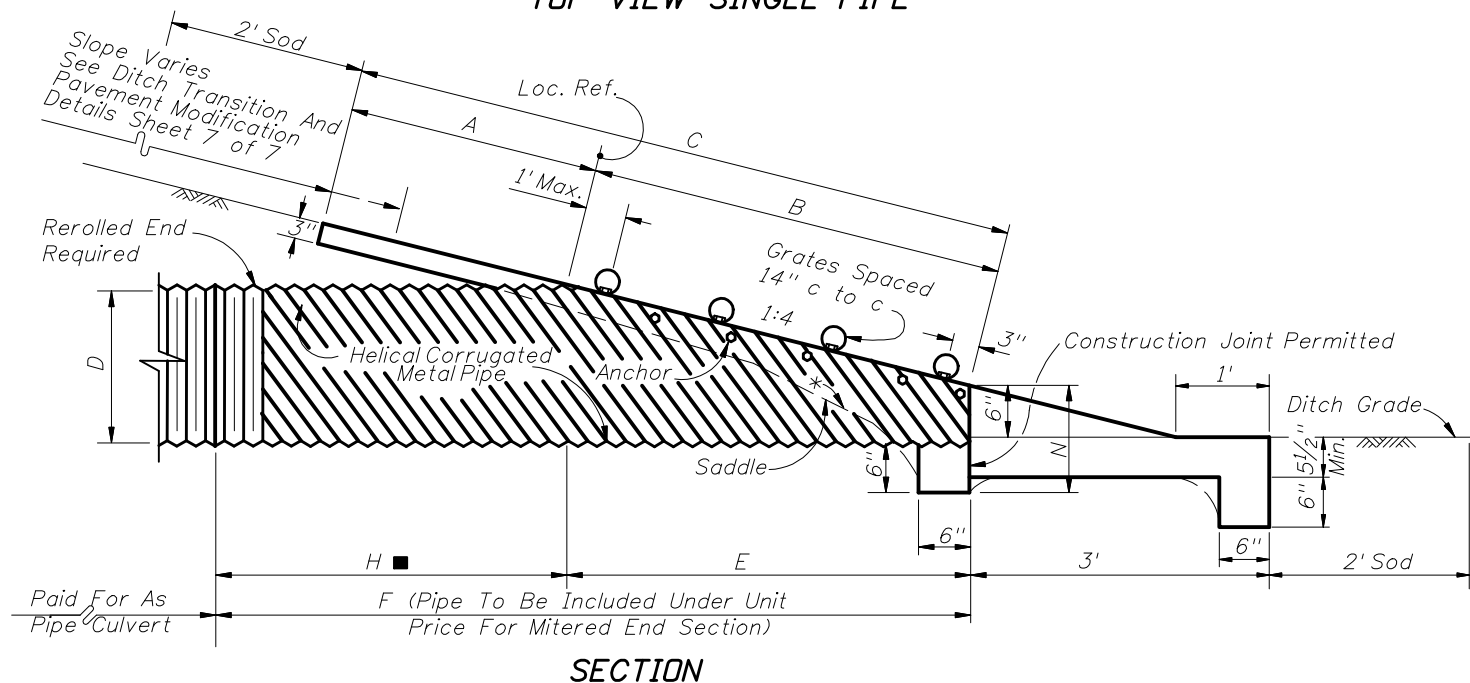
■ Values shown for estimating pipe quantities and are for information only.



TOP VIEW-SINGLE PIPE



TOP VIEW-MULTIPLE PIPE



SECTION

NOTE: See Sheets 6 and 7 for details and general notes.

*Slope:

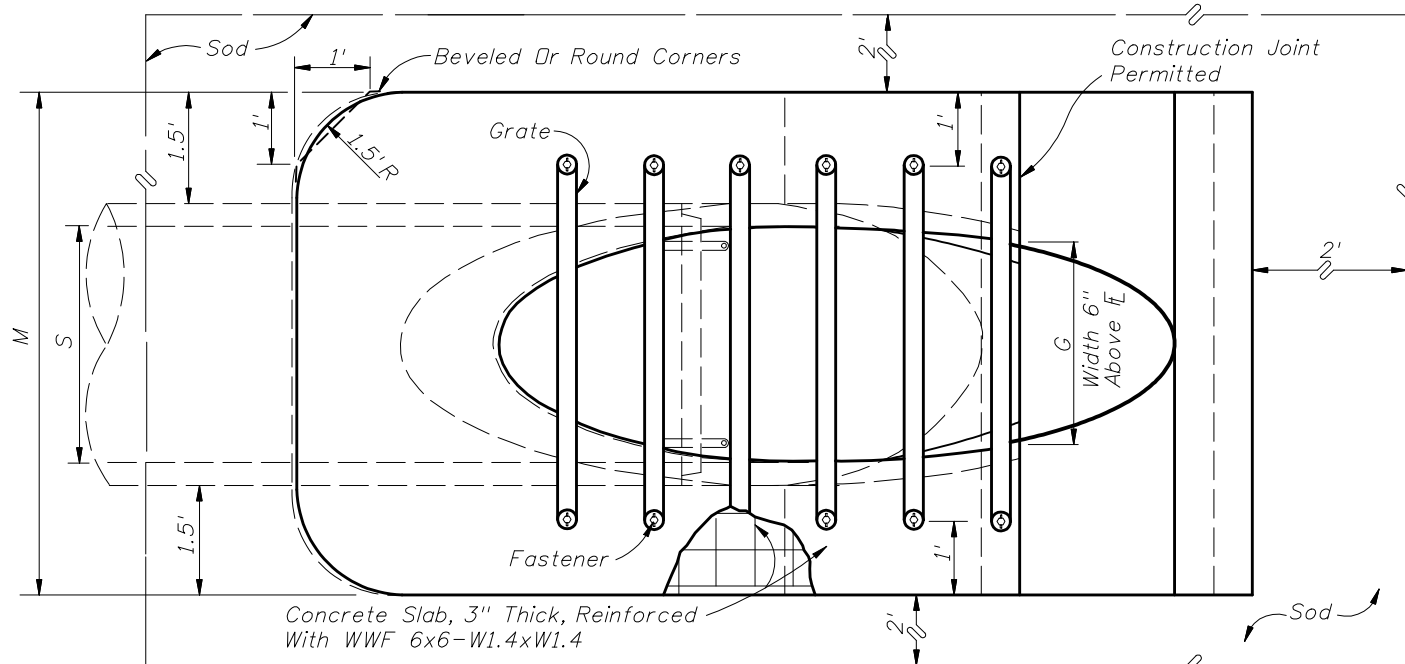
To Span Line For Pipe Arch 28"x20" And Smaller
1:2 For Pipe Arch 35"x24" And Larger

SINGLE AND MULTIPLE CORRUGATED METAL PIPE-ARCH

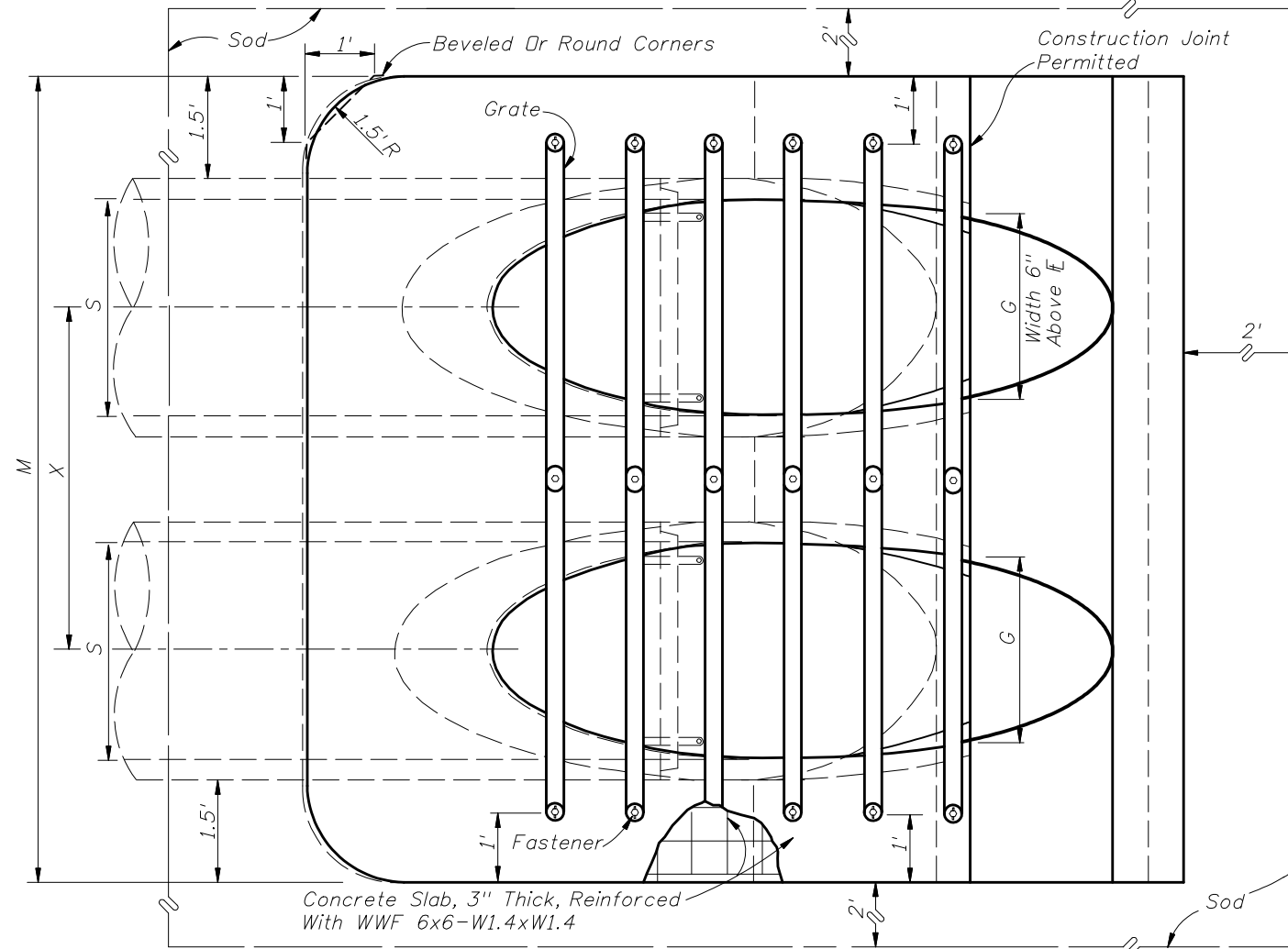
DIMENSIONS & QUANTITIES

Rise R	Span S	X	A	B	C	E	F	G	H	M				N	GRATE SIZES		CONCRETE (Cu. Yds.)				SODDING (Sq. Yds.)			
										Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe		Standard Weight Pipe	Extra Strong Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe	Single Pipe	Double Pipe	Triple Pipe	Quad. Pipe
12"	18"	2'-10"	2.36'	3.06'	5.42'	3.03'	5'	1.50'	2.0'	4.92'	7.75'	10.58'	13.42'	1.21'			0.68	1.04	1.41	1.77	8	9	11	12
14"	23"	3'-4"	2.44'	3.75'	6.19'	3.70'	6'	1.90'	2.3'	5.38'	8.71'	12.04'	15.38'	1.23'			0.76	1.19	1.63	2.05	9	10	12	13
19"	30"	4'-0"	2.62'	5.47'	8.09'	5.36'	8'	2.37'	2.6'	6.04'	10.04'	14.04'	18.04'	1.27'	2 1/2"	3"	0.95	1.52	2.09	2.65	10	12	13	15
24"	38"	5'-0"	2.79'	7.18'	9.97'	7.03'	10'	2.85'	3.0'	6.79'	11.79'	16.79'	21.79'	1.31'	2 1/2"	3"	1.18	1.95	2.74	3.53	11	13	15	18
29"	45"	5'-11"	3.05'	8.90'	11.95'	8.70'	12'	3.19'	3.3'	7.50'	13.42'	19.33'	25.25'	1.38'	2 1/2"	3 1/2"	1.41	2.42	3.44	4.45	12	15	18	20
34"	53"	7'-0"	3.22'	10.62'	13.84'	10.36'	13'	3.57'	2.6'	8.25'	15.25'	22.25'	29.25'	1.42'	3"	3 1/2"	1.63	2.92	4.22	5.52	13	17	20	23
38"	60"	7'-10"	3.39'	11.99'	15.38'	11.70'	15'	3.95'	3.3'	8.92'	16.75'	24.58'	32.42'	1.46'	3"	4"	1.83	3.36	4.89	6.41	14	18	21	25
43"	68"	8'-11"	3.56'	13.71'	17.27'	13.36'	17'	4.28'	3.6'	9.67'	18.58'	27.50'	36.42'	1.50'	3"	4"	2.09	3.95	5.80	7.65	16	20	23	27
48"	76"	9'-11"	3.73'	15.43'	19.16'	15.03'	19'	4.59'	4.0'	10.42'	20.33'	30.25'	40.17'	1.54'	Special	Special	2.37	4.54	6.73	8.92	17	21	26	30
53"	83"	10'-8"	3.91'	17.15'	21.06'	16.70'	20'	4.77'	3.3'	11.08'	21.75'	32.42'	43.08'	1.58'	Special	Special	2.61	5.09	7.56	10.03	18	23	27	32
58"	91"	11'-8"	4.08'	18.87'	22.95'	18.36'	22'	5.01'	3.6'	11.83'	23.50'	35.17'	46.83'	1.63'	Special	Special	2.91	5.77	8.64	11.50	19	24	29	35

■ Values shown for estimating pipe quantities and are for information only.



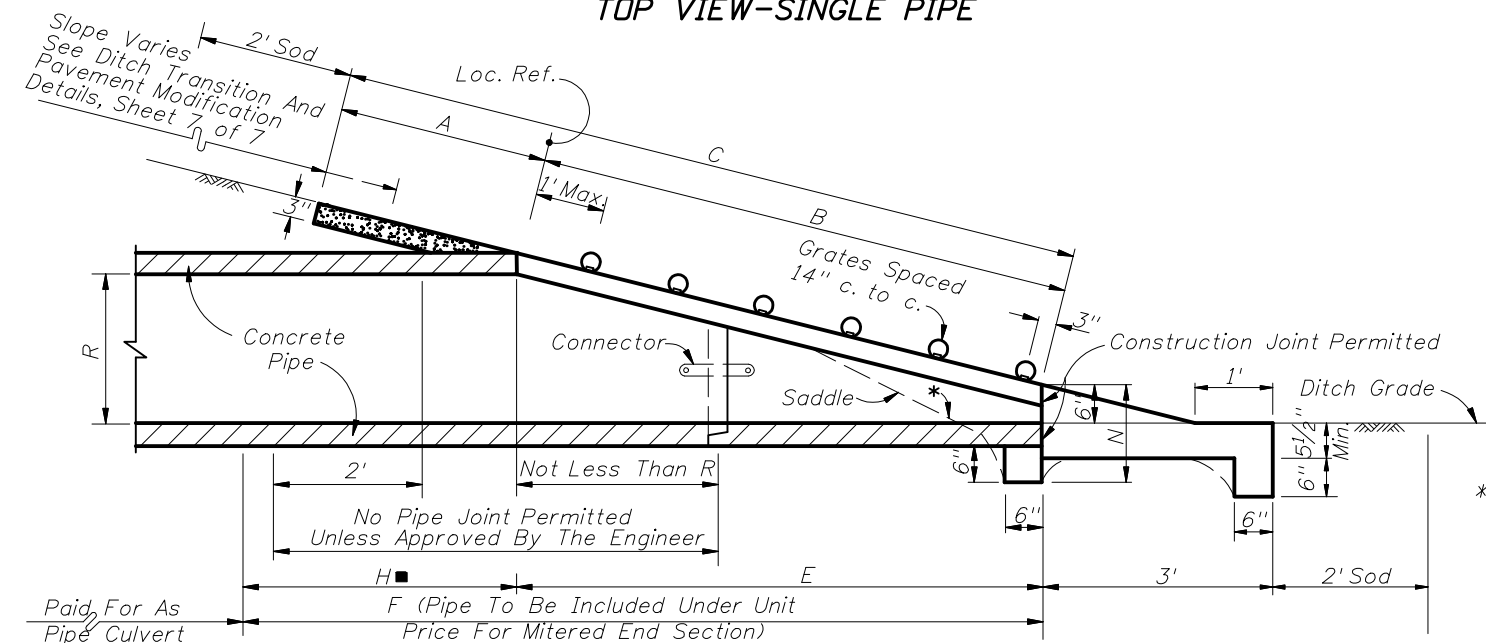
TOP VIEW-SINGLE PIPE



TOP VIEW-MULTIPLE PIPE

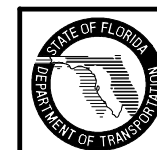
NOTE: See Sheets 6 and 7 for details and general notes.

*Slope:
To Major Axis For Pipes 24"x38" And Smaller.
1:2 For Pipes 29"x45" And Larger.



SECTION

SINGLE AND MULTIPLE ELLIPTICAL CONCRETE PIPE



2010 FDOT Design Standards

SIDE DRAIN MITERED END SECTION

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Drain Size	s	n	L	La
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CONCRETE PIPE (ROUND)

15"	3	4	4'-0"	4'-11"
18"	4	5	5'-2"	6'-1"
24"	6	7	7'-6"	8'-5"
30"	7	8	8'-8"	9'-7"
36"	9	10	11'-0"	11'-11"
42"	11	12	13'-4"	14'-3"
48"	13	14	15'-8"	16'-7"
54"	14	15	16'-10"	17'-9"
60"	16	17	19'-2"	20'-1"

CORRUGATED METAL PIPE (ROUND)

15"	2	3	2'-10"	3'-9"
18"	3	4	4'-0"	4'-11"
24"	5	6	6'-4"	7'-3"
30"	7	8	8'-8"	9'-7"
36"	8	9	9'-10"	10'-9"
42"	10	11	12'-2"	13'-1"
48"	12	13	14'-6"	15'-5"
54"	14	15	16'-10"	17'-9"
60"	15	16	18'-0"	18'-11"

Drain Size	s	n	L	La
------------	---	---	---	----

ELLIPTICAL CONCRETE PIPE

12"x18"	2	3	2'-10"	3'-9"
14"x23"	3	4	4'-0"	4'-11"
19"x30"	4	5	5'-2"	6'-1"
24"x38"	5	6	6'-4"	7'-3"
29"x45"	7	8	8'-8"	9'-7"
34"x53"	8	9	9'-10"	10'-9"
38"x60"	10	11	12'-2"	13'-1"
43"x68"	11	12	13'-4"	14'-3"
48"x76"	13	14	15'-8"	16'-7"
53"x83"	14	15	16'-10"	17'-9"
58"x91"	15	16	18'-0"	18'-11"

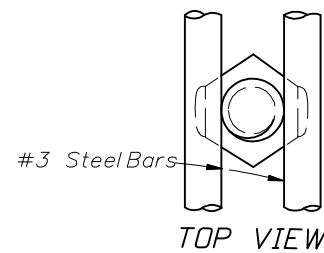
CORRUGATED METAL PIPE (ARCH) ***

17"x13"	1	2	1'-8"	2'-7"
21"x15"	2	3	2'-10"	3'-9"
28"x20"	4	5	5'-2"	6'-1"
35"x24"	5	6	6'-4"	7'-3"
42"x29"	6	7	7'-6"	8'-5"
49"x33"	7	8	8'-8"	9'-7"
57"x38"	9	10	11'-0"	11'-11"
64"x43"	10	11	12'-2"	13'-1"
71"x47"	12	13	14'-6"	15'-5"

Note: 5/8" x 3" bolts are standard for all grate fasteners, except when the contractor elects to use the slotted upper holes for the intermediate fasteners on multiple drain pipes, which will require the following bolt lengths:

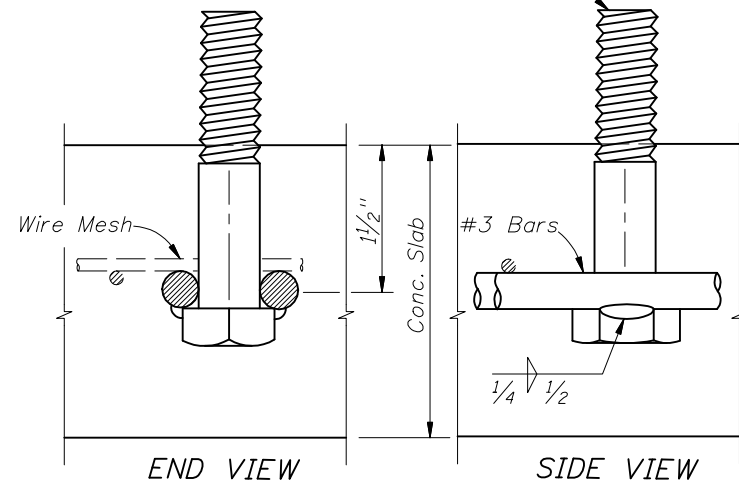
Grate Size (Std. & X-Stg.)	Bolt Length
2 1/2"	5 1/2"
3"	6"
3 1/2"	6 1/2"
4"	7"

** To be used only when grates are called for in the plans.
 *** 1974 AASHTO Pipe Arch Sizes.



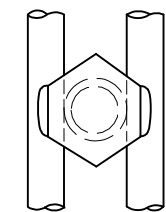
TOP VIEW

5/8" Galvanized Bolt
 Hex Head Bolt Shown; Either
 Hex Head Or Square Head Bolt
 May Be Used. Only Hex Nut To
 Be Used.



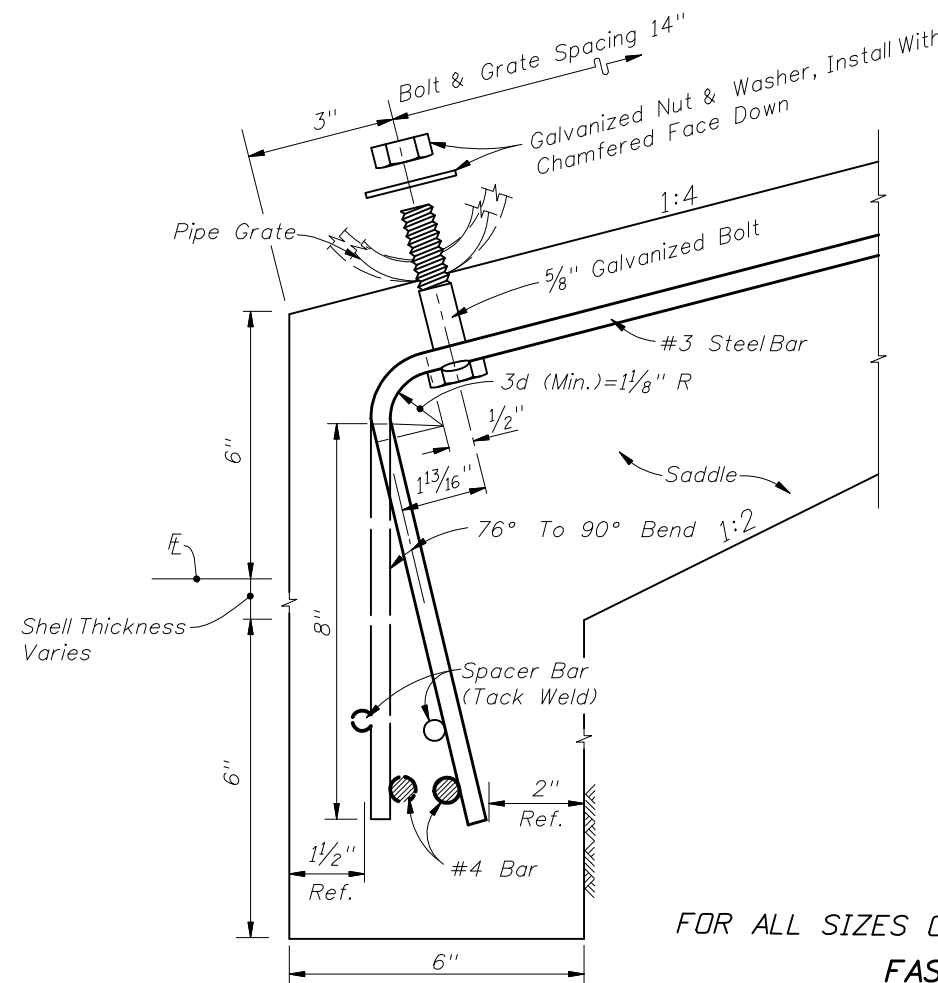
END VIEW

SIDE VIEW

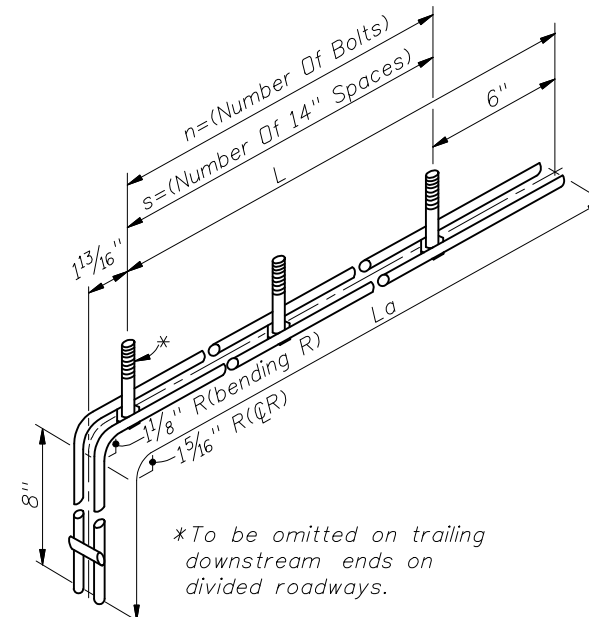


BOTTOM VIEW

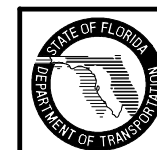
The specified weld shall be made when the fabricated unit is subject to hazardous hauls and repeated handling. Tack welds are permitted for local or job site fabrication. Galvanizing over welded surface not required.



FOR ALL SIZES OF SINGLE AND MULTIPLE DRAIN PIPE FASTENER UNIT



DETAILS FOR CONCRETE & CORRUGATED METAL PIPE

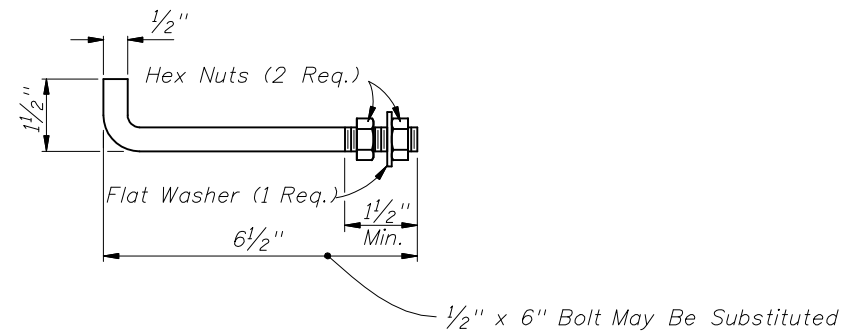


2010 FDOT Design Standards

SIDE DRAIN MITERED END SECTION

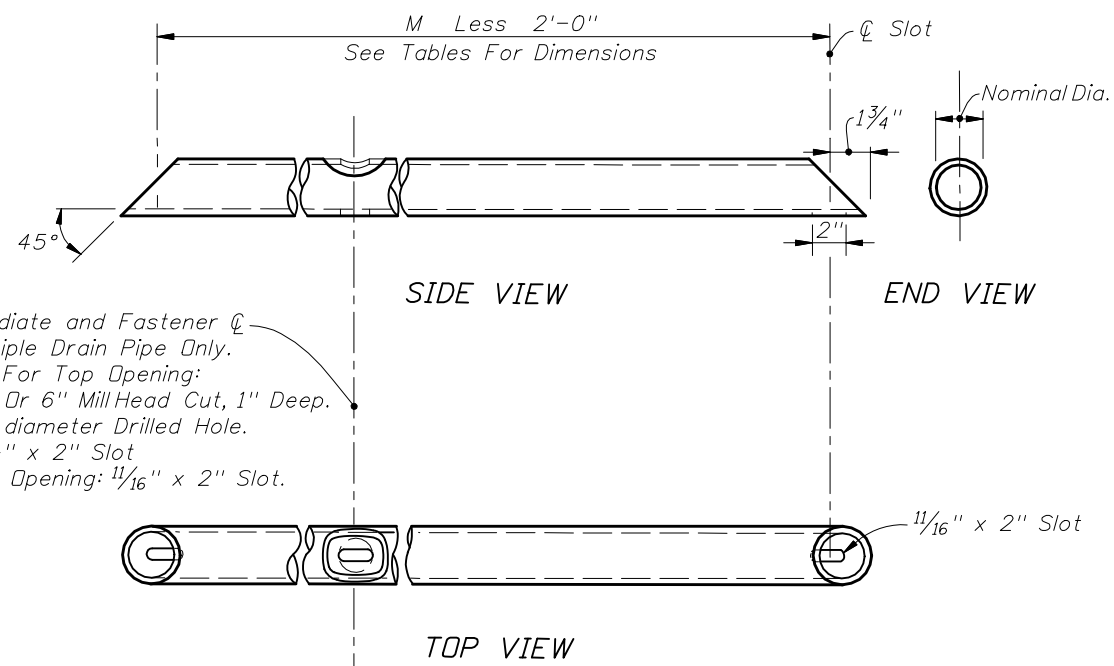
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Notes:
 Anchors required for CMP only.
 Anchor, washer and nuts to be galvanized steel.
 Bend anchor where required to center in concrete slab.
 Damaged surfaces to be repaired after bending.
 Anchors are to be spaced a distance equal to four (4) corrugations.
 Place the anchors in the outside crest of corrugation.
 Flat washer to be placed on inside wall of pipe.
 Holes in the mitered end pipe are to be drilled or punched; burning not permitted.

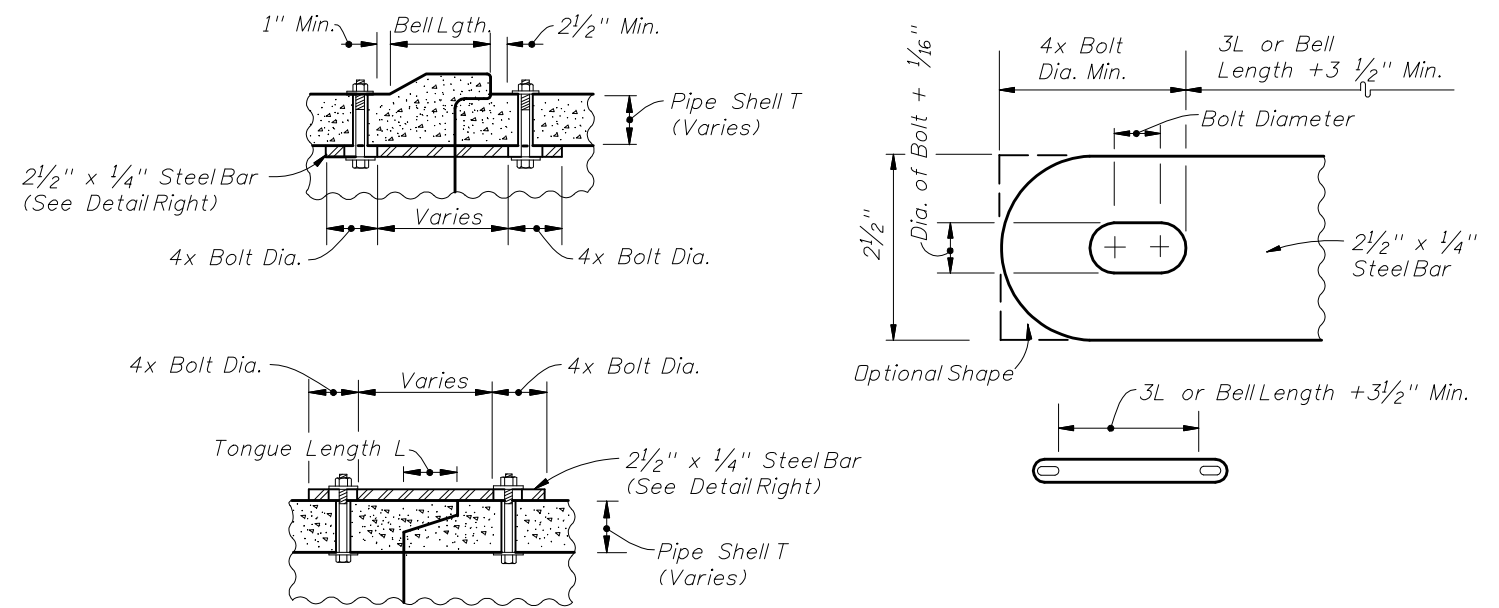
ANCHOR DETAIL



Intermediate and Fastener \varnothing
 For Multiple Drain Pipe Only.
 Options For Top Opening:
 a. 4" Or 6" Mill Head Cut, 1" Deep.
 b. 2" diameter Drilled Hole.
 c. $\frac{1}{16}$ " x 2" Slot
 Bottom Opening: $\frac{1}{16}$ " x 2" Slot.

**FOR SINGLE & MULTIPLE DRAIN PIPE
 GRATE DETAIL**

See General Notes, Sheet 7.



All bars, bolts, nuts and washers are to be galvanized steel.
 Bolt diameters shall be $\frac{3}{8}$ " for 15" to 36" pipe and $\frac{5}{8}$ " for 42" to 60" pipe.
 Two connectors required per joint, located 60° right and left of bottom center of pipe.
 Bolt holes in pipe shell are to be drilled.

CONCRETE PIPE CONNECTOR DETAIL

DETAILS FOR CONCRETE & CORRUGATED METAL PIPE



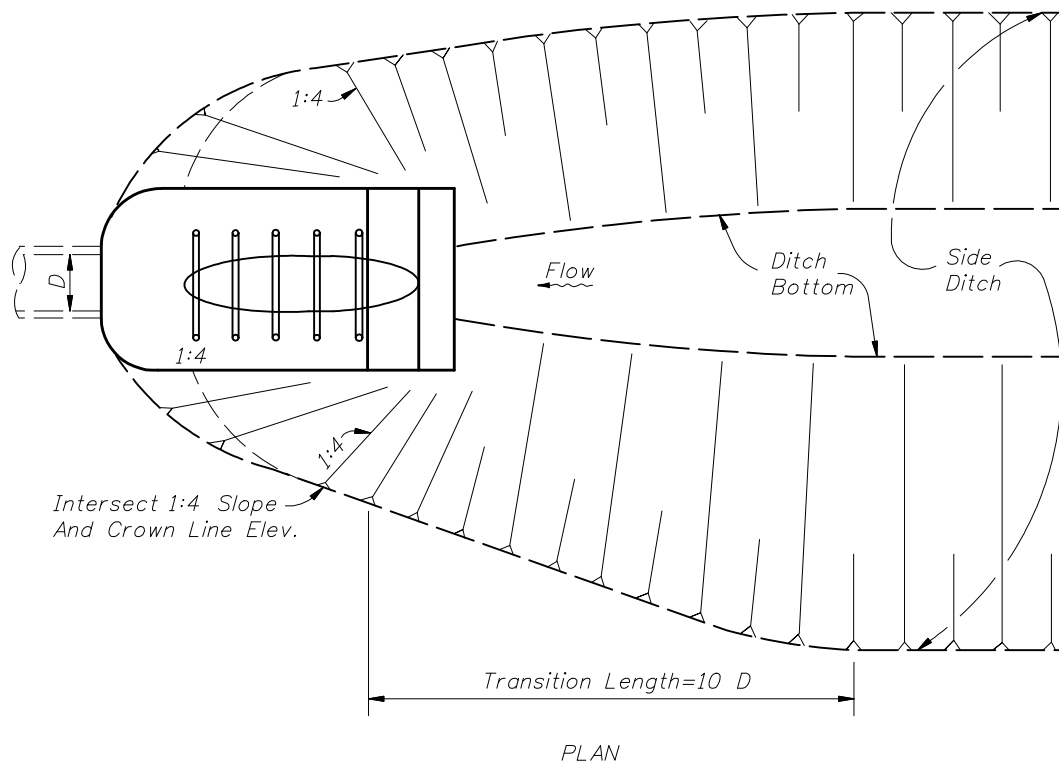
2010 FDOT Design Standards

SIDE DRAIN MITERED END SECTION

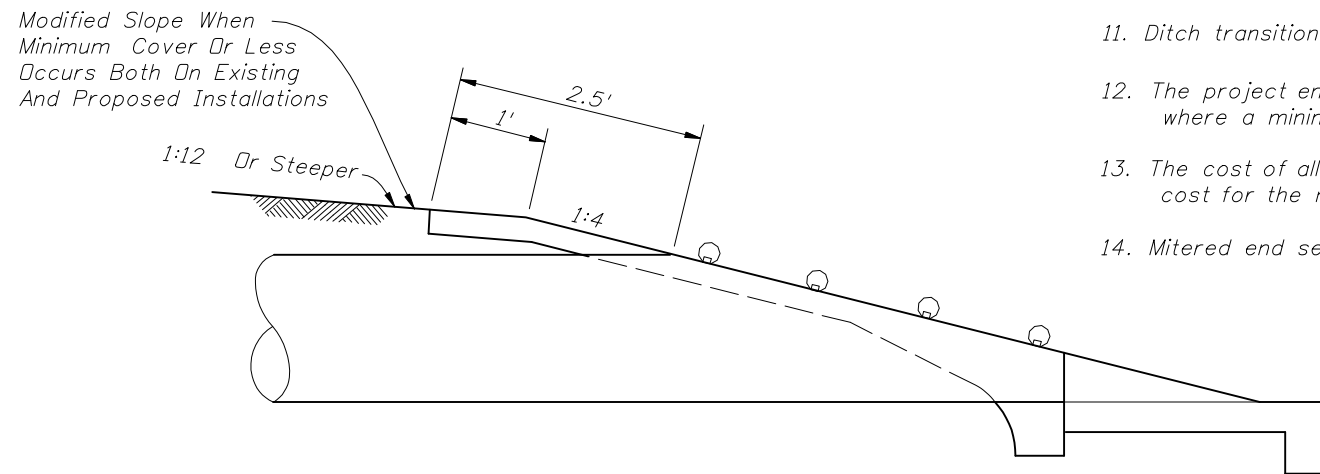
Last Revision 00 Sheet No. 6 of 7

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GENERAL NOTES



DITCH TRANSITION



PERMISSIBLE PAVEMENT MODIFICATION

1. Unless otherwise designated in the plans, concrete pipe mitered end sections may be used with any type of side drain pipe; corrugated steel pipe mitered end sections may be used with any type of side drain pipe except aluminum pipe; and, corrugated aluminum mitered end sections may be used with any type of side drain pipe except steel pipe. When bituminous coated metal pipe is specified for side drain pipe, mitered end sections shall be constructed with like pipe or concrete pipe. When the mitered end section pipe is dissimilar to the side drain pipe, a concrete jacket shall be constructed in accordance with Index No. 280.
2. Corrugated polyethylene pipe (HDPE) and polyvinyl-chloride pipe (PVC) for side drain applications shall utilize either corrugated metal or concrete mitered end sections (MES). When used in conjunction with corrugated (MES), connection shall be by either a formed metal band specifically designated to join HDPE or PVC pipe, with metal pipe or other coupler approved by the State Drainage Engineer. When used in conjunction with a concrete (MES), connection shall be by concrete jacket constructed in accordance with Index No. 280.
3. Concrete pipe used in the assembly of mitered end sections shall be of selective lengths to avoid excessive connections.
4. Corrugated metal pipe galvanizing that is damaged during beveling and perforating for mitered end section shall be repaired.
5. That portion of corrugated metal pipe in direct contact with the concrete slab and extending 12" beyond shall be bituminous coated prior to placing of the concrete.
6. When existing multiple side drain pipes are spaced other than the dimensions shown in this detail, or have nonparallel axes, or have non-uniform sections, The mitered end sections will be constructed either separately as single pipe mitered end sections or collectively as multiple pipe end sections as directed by the Engineer; however, mitered end sections will be paid for each, based on each independent pipe end.
7. In addition to the requirements of Section 430-4, side drain culverts shall comply with the cover requirements shown on Index No. 205.
8. The reinforced concrete slab shall be constructed for all sizes of side drain pipe and cast in place with Class NS concrete.
9. Round pipe size 30" or greater, pipe-arch size 35"x24" or greater and elliptical pipe 19"x30" or greater shall be grated unless excepted in the plans. Smaller sizes of pipe shall be grated only when called for in plans. The lower grate on trailing downstream ends on divided highways shall be omitted.
10. Grates are to be fabricated from steel ASTM A53, Grade B, pipe. The lower grate on all traffic approach ends shall be Schedule 80 and all remaining grates shall be Schedule 40. Grates subject to salt free and corrosive free environment may be fabricated from galvanized pipe, with base metal exposed during fabrication repaired as specified in Section 562, Standard Specifications; or, fabricated from black pipe and hot dip galvanized after fabrication in accordance with ASTM A123. Grates subject to salt water or highly corrosive environment shall be hot dip galvanized after fabrication in accordance with ASTM A123.
11. Ditch transitions shall be used on all grades in excess of 3% as directed by the Engineer.
12. The project engineer shall contact the District Drainage Engineer for possible alternate treatment prior to constructing side drain mitered end sections where a minimum spacing of 30' will not result between the toe points of the mitered end sections.
13. The cost of all pipe(s), grates, fasteners, reinforcing, connectors, anchors, concrete, sealants, jackets and coupling bands shall be included in the cost for the mitered end section. Sodding shall be paid for separately under the contract unit price for Performance Turf, SY.
14. Mitered end sections shall be paid for under the contract unit price for Mitered End Section (SD), Ea., based on each independent pipe end.

DESIGN NOTES

1. In critical hydraulic locations, grates shall not be used until potential debris transport has been evaluated by the drainage engineer and appropriate adjustments made. Ditch grades in excess of 3% or pipe with less than 1.5' of cover and grades in excess of 1% will require such an evaluation (General Note 9).
2. The design engineer shall determine highly corrosive locations and specify in the plans when the grates shall be hot-dip galvanized after fabrication (General Note 10).
3. The design engineer shall determine and designate in the plans which alternate types of mitered end section will not be permitted. The restriction shall be based on corrosive or structural requirements.

NOTES & INFORMATION

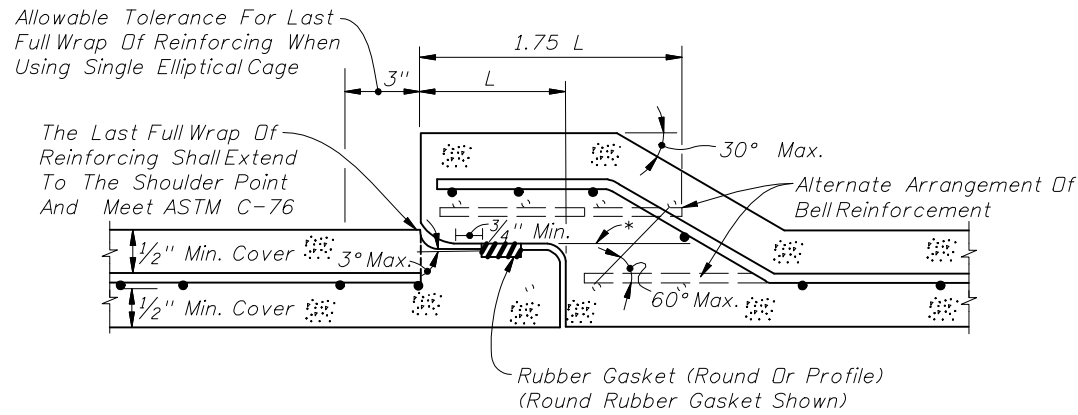


2010 FDOT Design Standards

SIDE DRAIN MITERED END SECTION

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SCHEDULE OF BELL REINFORCEMENT Classes II, III, IV, V; Wall A, B, C		
Nominal Pipe Diameter	Design Bell Reinforcement in ² per foot	Maximum Reinforcement Under Tolerance in ² per foot
15"	0.07	0.010
18"	0.07	0.010
24"	0.09	0.010
30"	0.12	0.010
36"	0.14	0.010
42"	0.16	0.010
48"	0.19	0.011
54"	0.21	0.012
60"	0.23	0.0135
66"	0.26	0.015
72"	0.28	0.0165
78"	0.30	0.018
84"	0.33	0.0195
90"	0.35	0.021
96"	0.37	0.0225
102"	0.40	0.024
108"	0.42	0.0255

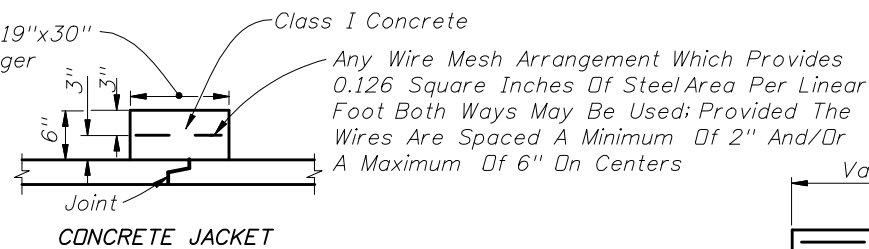


*All circumferential steel located above this line within 1.75 L is defined as bell reinforcement.

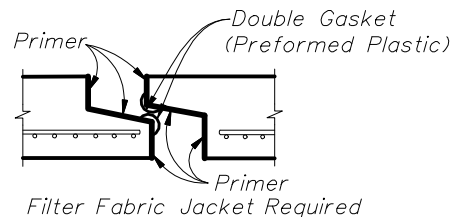
ROUND RUBBER GASKET SHOWN

DETAIL OF BELL & SPIGOT CONCRETE PIPE JOINT USING ROUND OR PROFILE RUBBER GASKET

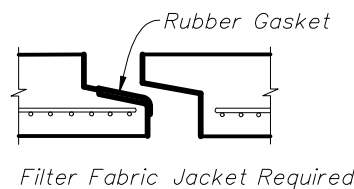
12" For Pipes 14"x23" Through 19"x30"
24" For Pipes 24"x38" And Larger



CONCRETE JACKET

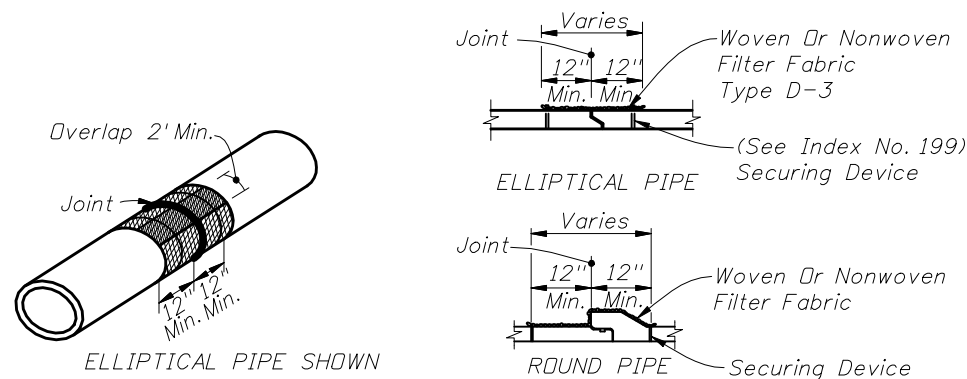


PREFORMED PLASTIC JOINT (BEFORE PULL-UP)



PROFILE RUBBER GASKET (BEFORE PULL-UP)

Cost of concrete jacket or filter fabric jacket to be included in cost of elliptical concrete pipe culverts.
ELLIPTICAL CONCRETE PIPE JOINTS



ELLIPTICAL PIPE SHOWN

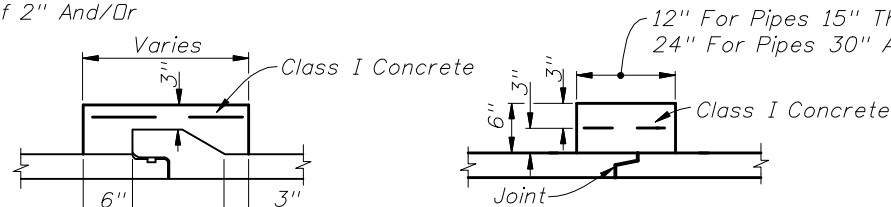
ISOMETRIC VIEW

PIPE SECTIONS

Cost of filter fabric jacket to be included in cost of pipe culverts.

FOR ALL PIPE TYPES - CONCRETE PIPE SHOWN

FILTER FABRIC JACKET



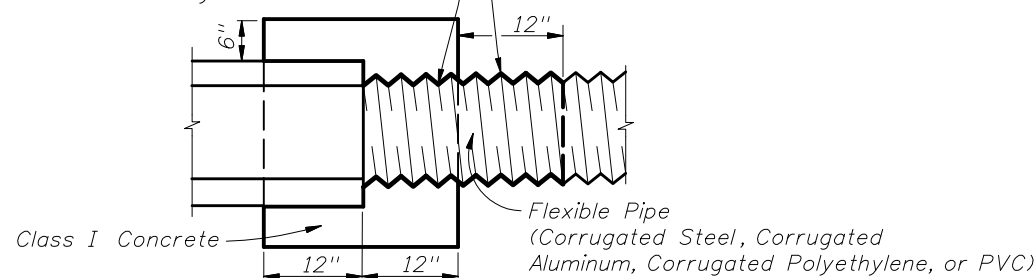
Note: For reinforcement see elliptical pipe concrete jacket. (All Pipe Sizes)

BELL AND SPIGOT

TONGUE & GROOVE

DISSIMILAR JOINTS

Bituminous Coating Required For CMP (Any Suitable Bituminous Material May Be Field Applied) Bituminous Coating To Extend 12" Beyond Concrete Collar



Note: Cost of concrete and bituminous coating to be included in contract unit price for either new pipe or Mitered End Section.

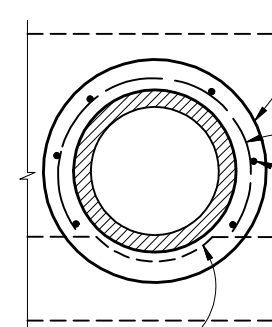
Alternate connection must be approved by the State Drainage Engineer.

- A concrete jacket shall not be used to join:
- metal pipe of dissimilar materials
 - flexible pipe when the minimum cover required in accordance with Index No. 205 cannot be obtained

DISSIMILAR TYPES

CONCRETE JACKET FOR CONNECTING DISSIMILAR TYPES OF PIPE AND CONCRETE PIPES WITH DISSIMILAR JOINTS

Collar Of Class I Concrete (May Be Formed By Any Method Approved By The Engineer)



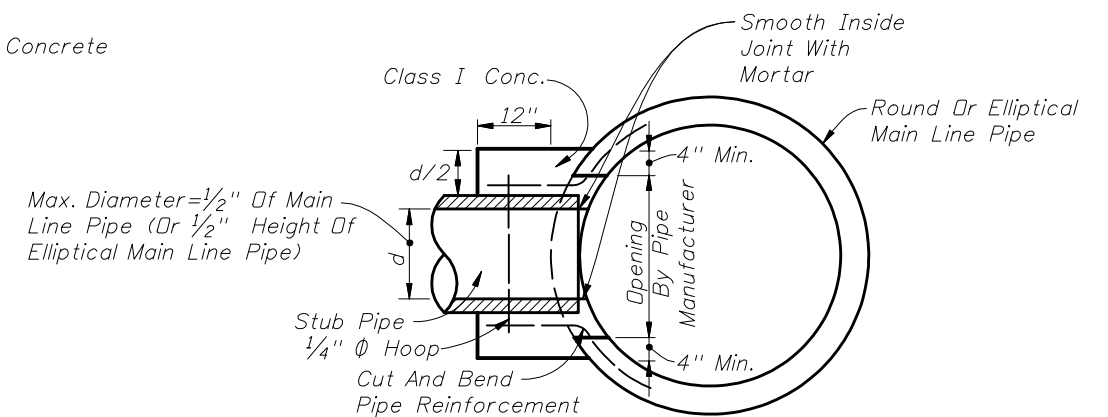
Cut Toe Of Existing Endwall To Contour Of Pipe

SECTION AA

LONGITUDINAL SECTION

Note: Cost for removal and disposal of portions of top and toe of existing endwall and cost of concrete, reinforcing steel and construction of collar to be included in the contract unit price for pipe culvert.

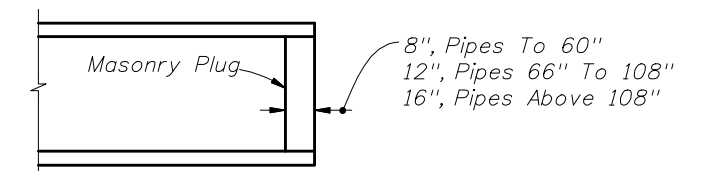
CONCRETE COLLAR FOR EXTENSION OF EXISTING PIPE CULVERTS



Max. Diameter = 1/2" Of Main Line Pipe (Or 1/2" Height Of Elliptical Main Line Pipe)

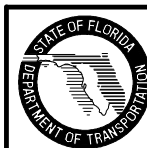
Cost of concrete and steel to be included in contract unit price for pipe culvert.

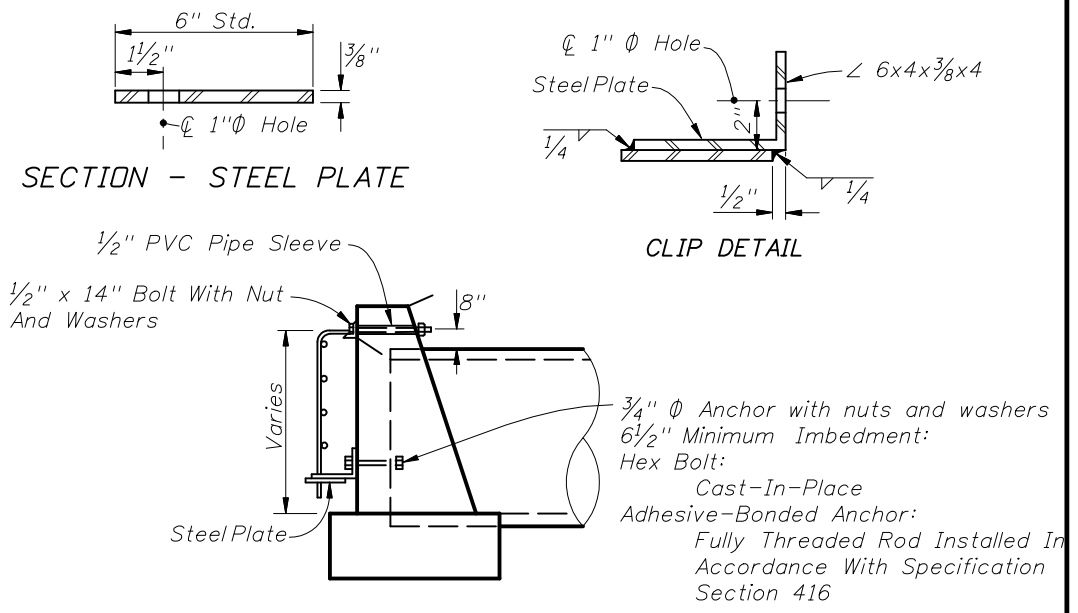
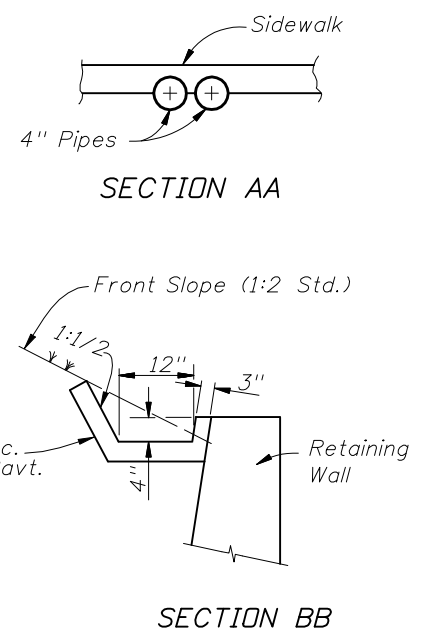
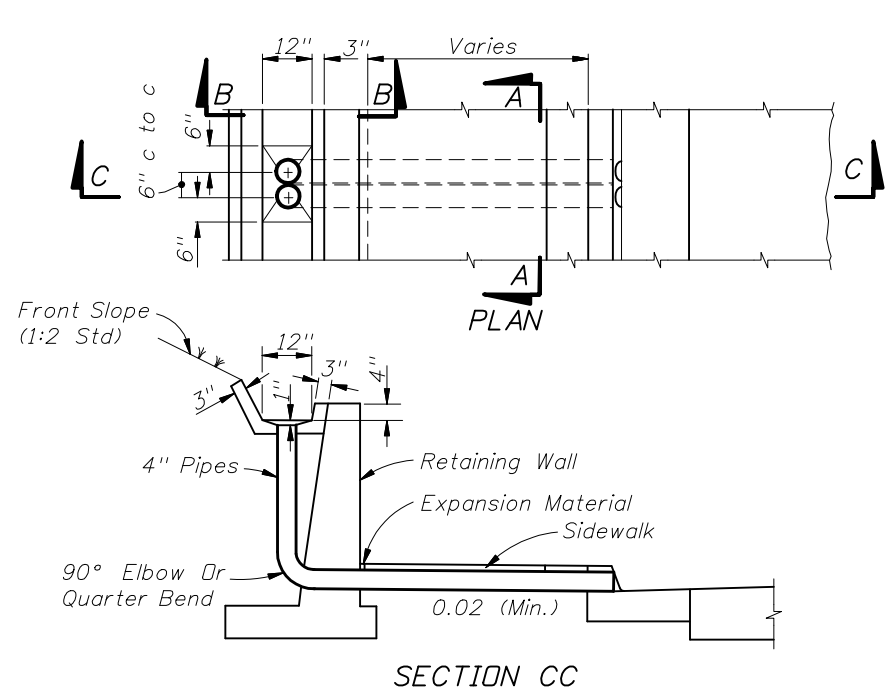
CONCRETE COLLAR FOR JOINING MAINLINE PIPE AND STUB PIPE



Note: Unless otherwise called for in the plans, the cost of plugging pipes to be included in contract unit price for new pipe.

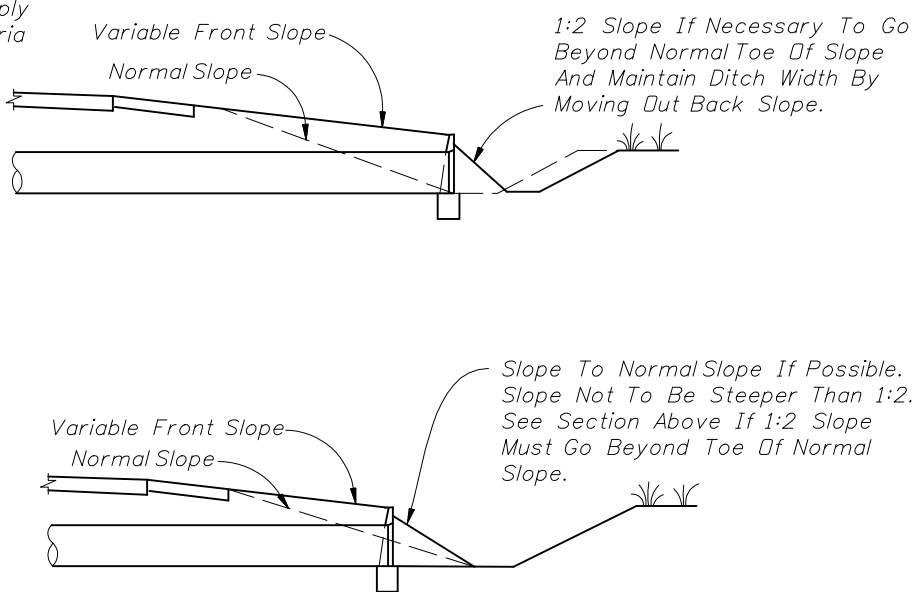
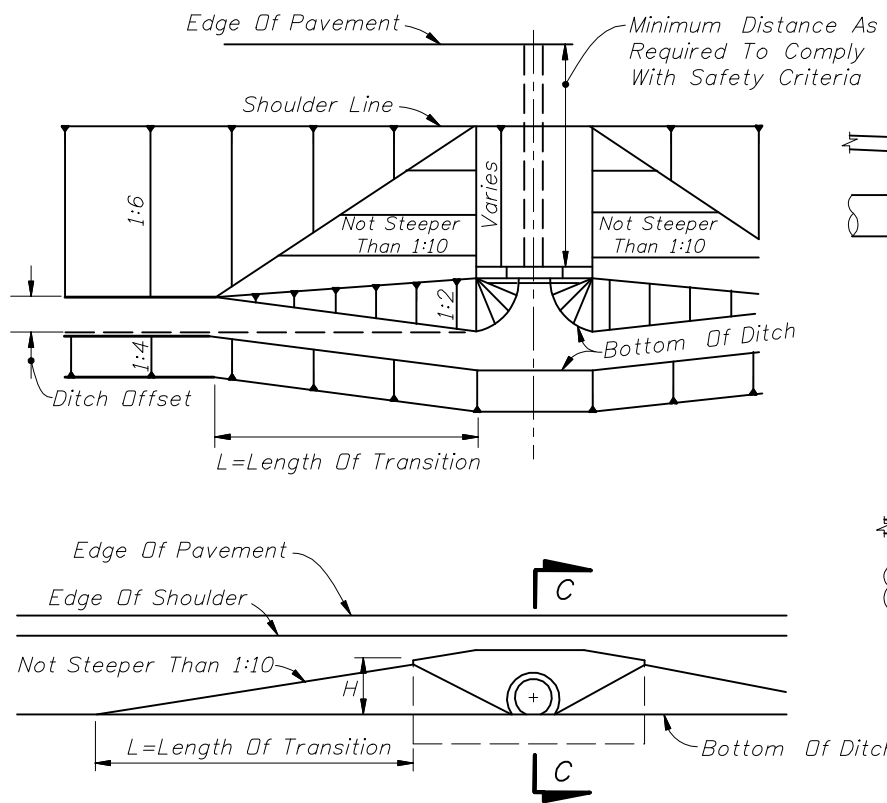
PIPE PLUG





Note: PVC pipe, Schedule 40, to be paid for under the contract unit price for Polyvinyl Chloride Pipe Culvert (4"), LF.

CONCRETE GUTTER AND DRAINS AT RETAINING WALLS

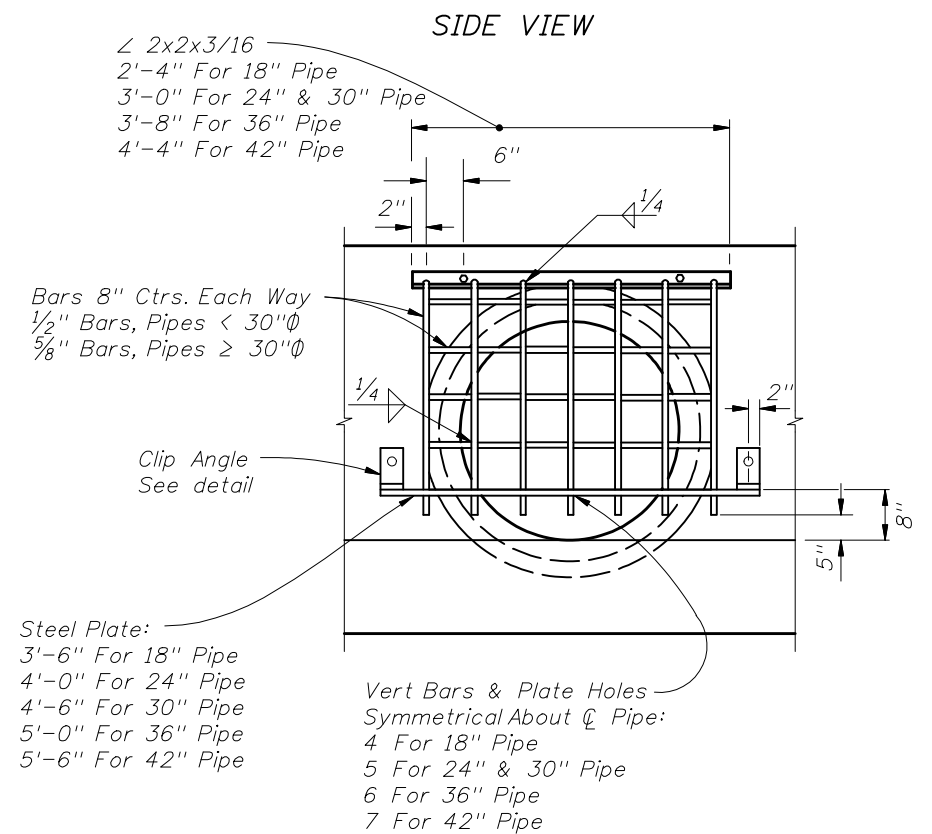


NOTE: Filling or excavation of variable slopes to be done during normal grading operations.

SECTION CC

Use Larger Value Of Either:
 1. $L=10 \times H$ (No Maximum)
 2. $L=10 \times \text{Ditch Offset}$ (Maximum $L=100'$)

METHOD FOR SETTING LIMITS OF VARIABLE FRONT SLOPES AT DRAINAGE STRUCTURES



Pipe Dia.	18"	24"	30"	36"	42"
Grate (Lbs.)	48	58	74	90	111

FRONT VIEW

Note: Guards to be constructed only at locations specifically called for in plans. Guard, plate & clips, bolts, nuts and sleeves to be included in the contract unit price for Reinforcing Steel (Miscellaneous).

GUARD AT PIPE ENDS



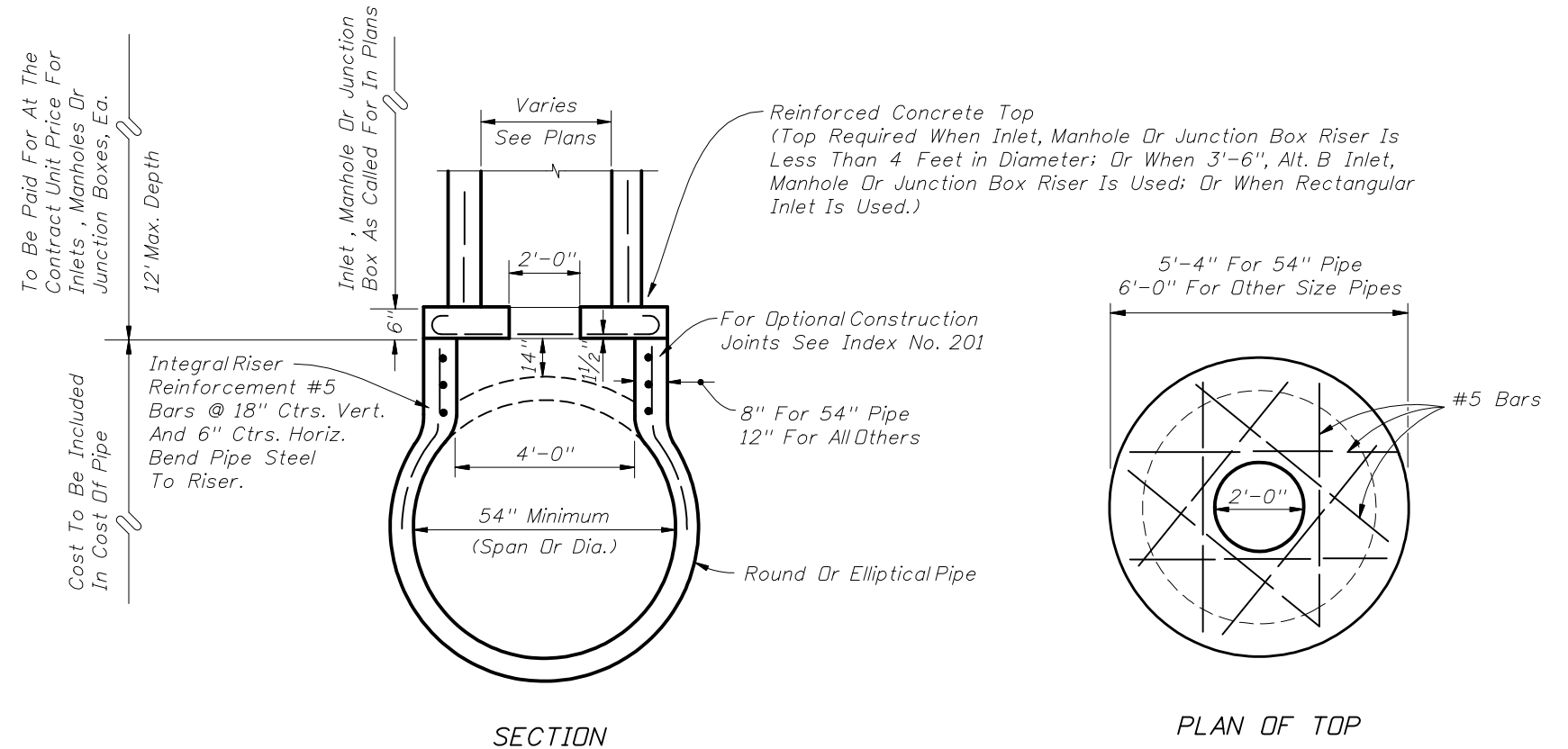
2010 FDOT Design Standards

MISCELLANEOUS DRAINAGE DETAILS

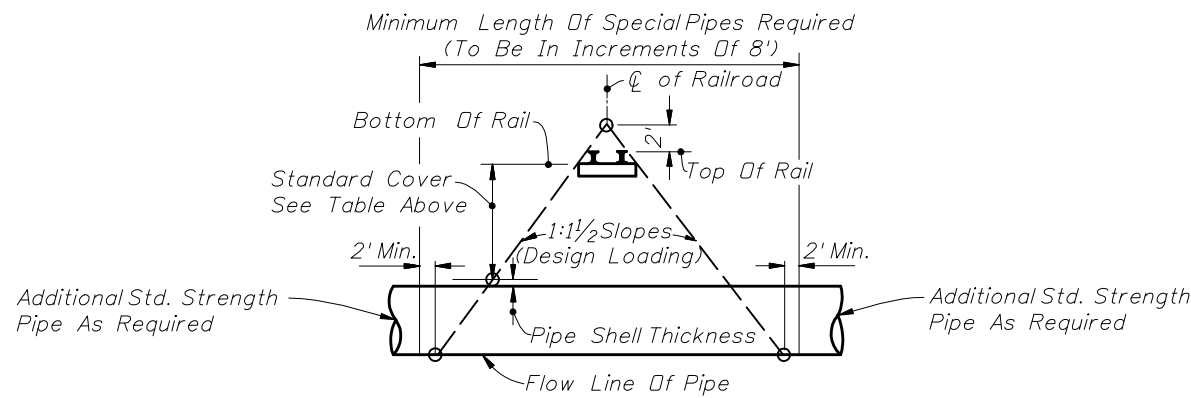
Last Revision: 07/01/07
 Sheet No.: 2 of 3
 Index No.: 280

RAILROAD COMPANY	CLEARANCE BELOW BOTTOM OF RAIL (FEET)	STRENGTH
		ASTM (C76) CLASS
Apalachicola Northern	4.0	IV
Atlanta And St. Andrews Bay	4.0	IV
Florida East Coast	5.5*	IV
Burlington Northern Railroad	S-TRK M/L	IV
	4.5 5.5	
CSX Transportation, Inc.	5.5	IV
Southern Railway System		
Georgia Southern And Florida	5.5	V
Live Oak Perry And South Georgia	5.5	V
St. Johns River Terminal	5.5	V

*Clearance is for casing pipe. All subgrade carrier pipelines and wirelines will be installed within a casing pipe which will extend from Right-of-Way line to Right-of-Way line.

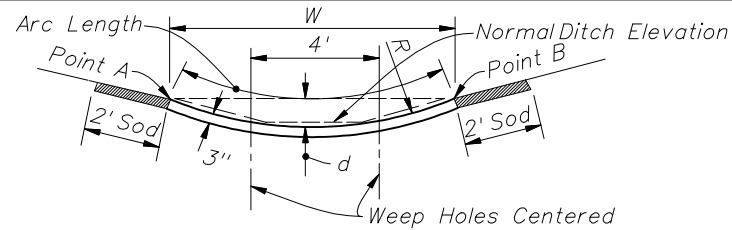


INLETS, MANHOLES OR JUNCTION BOXES
ON INTEGRAL PRECAST CONCRETE RISER FOR CONCRETE PIPE



METHOD FOR DETERMINING THE LENGTH OF
SPECIAL PIPE REQUIRED UNDER RAILROADS

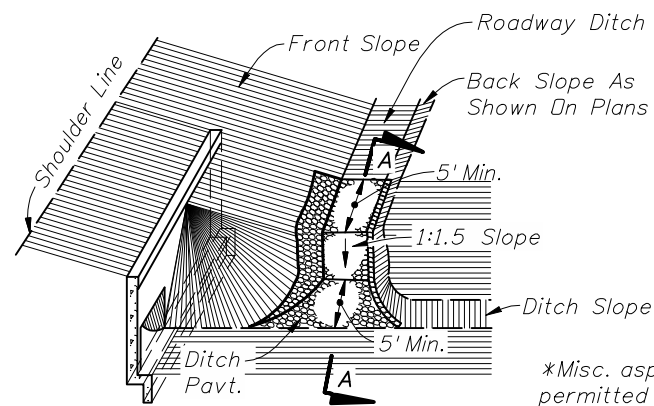




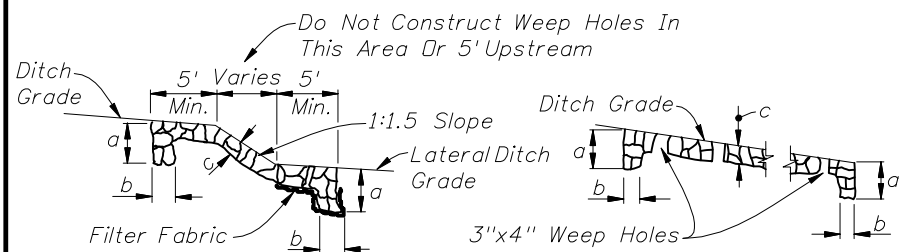
TO REPLACE:	W	d	R	Rows Of Weep Holes	Arc Length
6' Median Swale	6'	0.24'	19'	0	6.0'
1:6 Front Slopes; 1:4 Back Slope					
5' BW Ditch	10'	0.67'	19'	2	10.1'
4' BW Ditch	9'	0.54'	19'	2	9.1'
1:4 Front Slopes & Back Slope					
5' BW Ditch	9'	0.74'	14'	2	9.2'
4' BW Ditch	8'	0.58'	14'	1 (in center)	8.1'

For use only where side slopes are 1:4 or flatter. Point "A" and "B" are to be the same elevation and should be used to locate the paved section.

ALTERNATE DITCH PAVEMENT

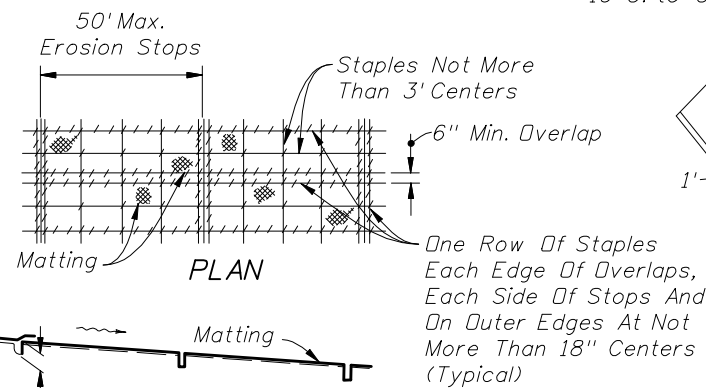


JUNCTION OF ROADWAY DITCH* AND LATERAL DITCH

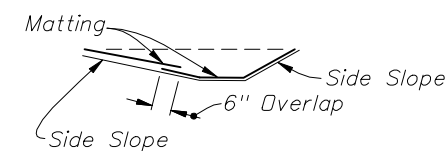


SECTION AA

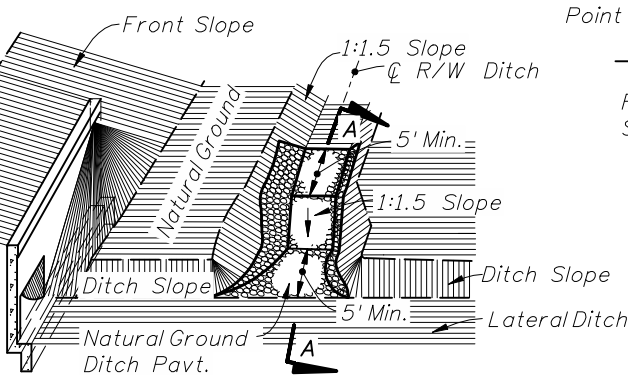
PROFILE OF DITCH PAV'T AT LOCATIONS OTHER THAN JUNCTION WITH LATERAL DITCH



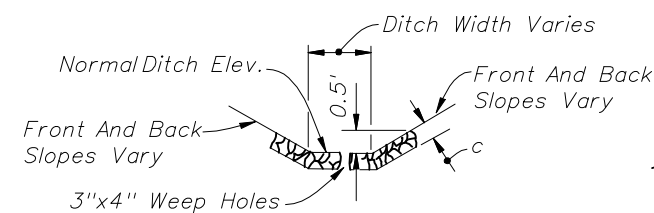
LONGITUDINAL SECTION



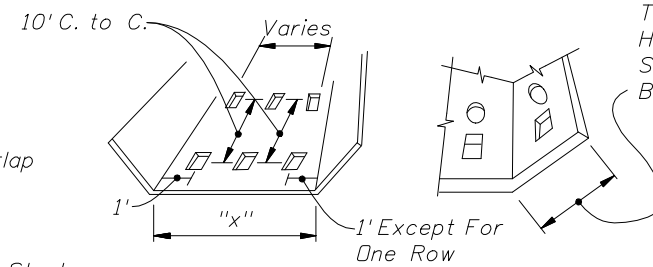
SECTION MATTING FOR DITCH



JUNCTION OF R/W DITCH* AND LATERAL DITCH



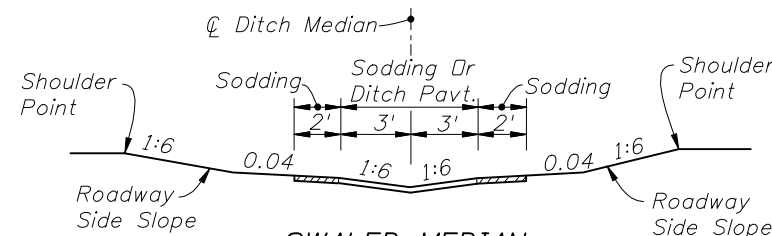
TYPICAL SECTION



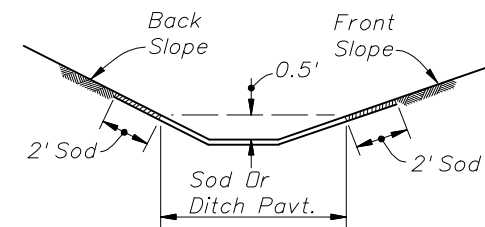
When "x" = 1' To 4' Const. 1 Row (Centered)
 "x" = 5' To 7' Const. 2 Rows
 "x" = 8' To 12' Const. 3 Rows
 "x" = 13' To 17' Const. 4 Rows
 "x" = 18' To 22' Const. 5 Rows

Note: All weep holes to be 3"x4" rectangle or 4" or 5" dia. circle hole. 1/2 cu. ft. (12" x 12" x 6") of No. 6 aggregate to be placed under each hole. 1 sq. ft. of galv. wire mesh (1/4" openings) shall be placed between the aggregate and the concrete. Cost of holes, aggregate and wire mesh to be included in the cost of ditch pavement.

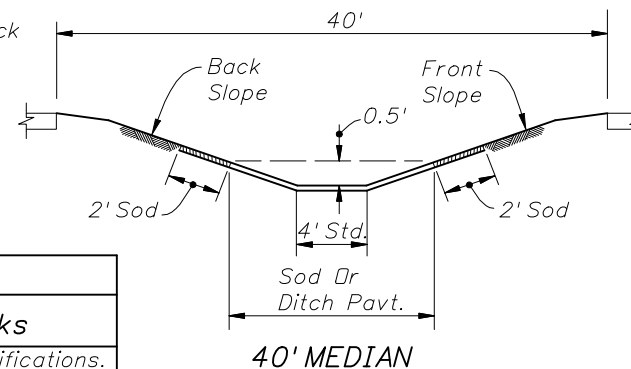
WEEP HOLE ARRANGEMENT



SWALED MEDIAN (No Weep Holes)

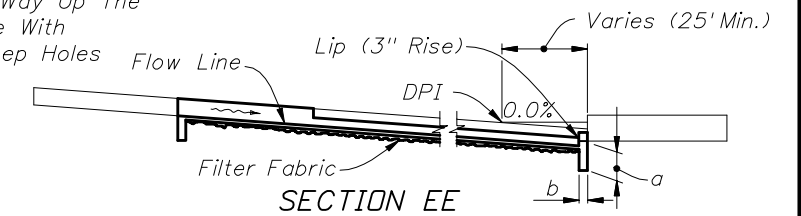


ROADWAY SIDE DITCH

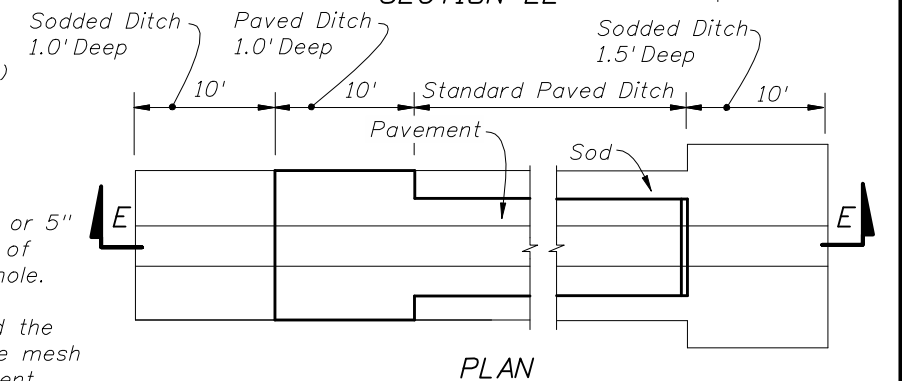


40' MEDIAN

When Width Is Greater Than 4', Const. Weep Holes Half-Way Up The Side In Line With Bottom Weep Holes



SECTION EE



PLAN

PAVED DITCH END TREATMENT

GENERAL NOTES

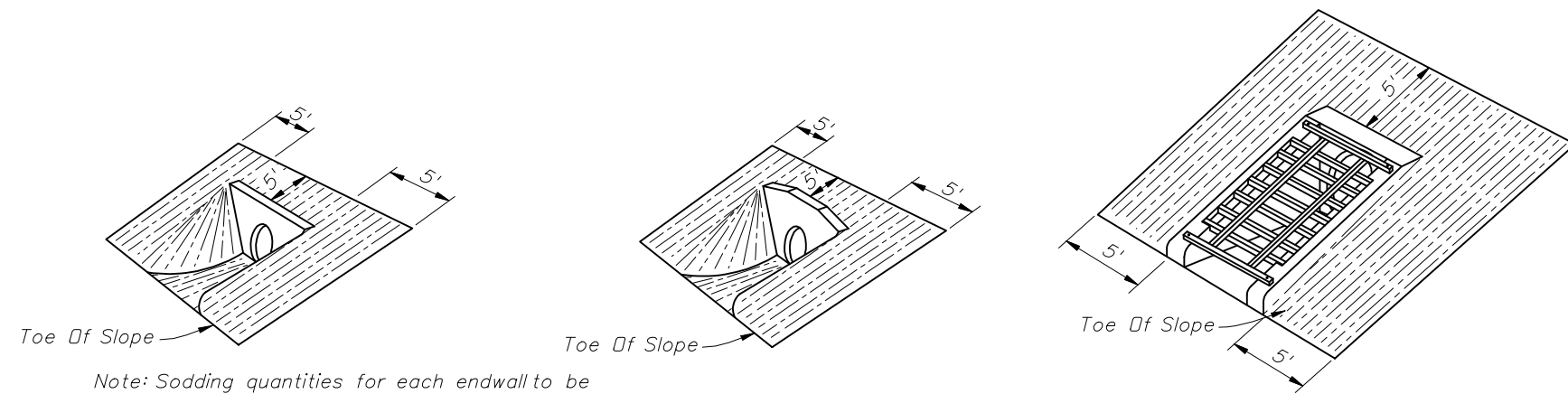
- Type of ditch pavement shall be as shown on plans.
- In concrete ditch pavement, contraction joints are to be spaced at 25' maximum intervals, or as directed by the Engineer. Contraction joints may be either formed (construction joint) or tooled. No open joints will be permitted in concrete ditch pavement.

Expansion joints with 1/2" preformed joint filler shall be constructed at all inlets, endwalls, and at intervals of not more than 200'.
- Lip at end of ditch pavement shall normally be located downstream of DPI or on flatter grades where there is a decrease in ditch velocity.
- Toewalls are to be used with all ditch paving. A toewall is not required adjacent to drainage structures.
- When directed by the Engineer, weep hole spacing may be reduced to 5' minimum.
- For junction of R/W ditch spillway and lateral ditch, sides of paving to be 1' high minimum.
- For ditch pavements requiring filter fabric, the fabric shall be placed directly beneath the pavement for the entire length and width of the pavement. When weep holes with aggregate are used, the filter fabric shall be placed below the aggregate to form a mat continuous with or underlapping the pavement fabric. (See Index No. 199 for fabric type and application).
- Ditch pavement requiring reinforcement shall be detailed in the plan.
- Cost of plastic filter fabric to be included in the contract unit price for ditch pavement.
- Sodding to be paid for under contract unit price for Performance Turf, SY

DITCH PAVEMENT

Pavement Type	Dimensions			Payment Unit	Basis Of Estimate	Filter Fabric Type	Velocity Range	References & Remarks
	a	b	c					
Concrete	24"	6"	3"	SY	SY	D-6	Low-High	Section 524 of the Standard Specifications.
Miscellaneous Asphalt	24"	12"	4"	TN	0.2 TN/SY	None	Low-Moderate	Section 339.
Riprap (Sand-Cement)	24"	12"	4"	CY	0.11 CY/SY	D-4	Low-Moderate	Section 530. Grouting of joints required.
Riprap (Ditch Lining)				TN	TN	D-2	Moderate-High	Section 530.



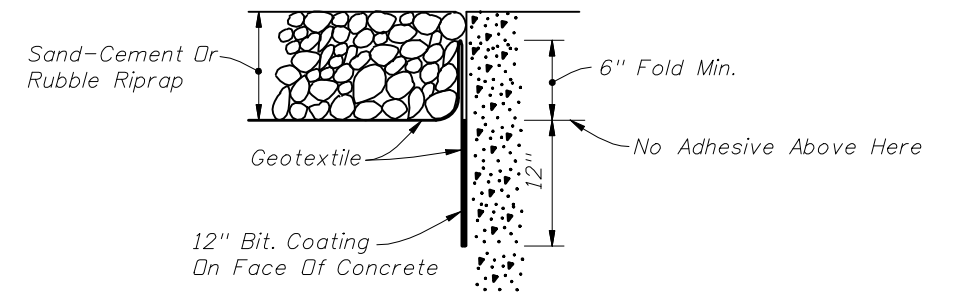


Note: Sodding quantities for each endwall to be determined by the designer from this detail.

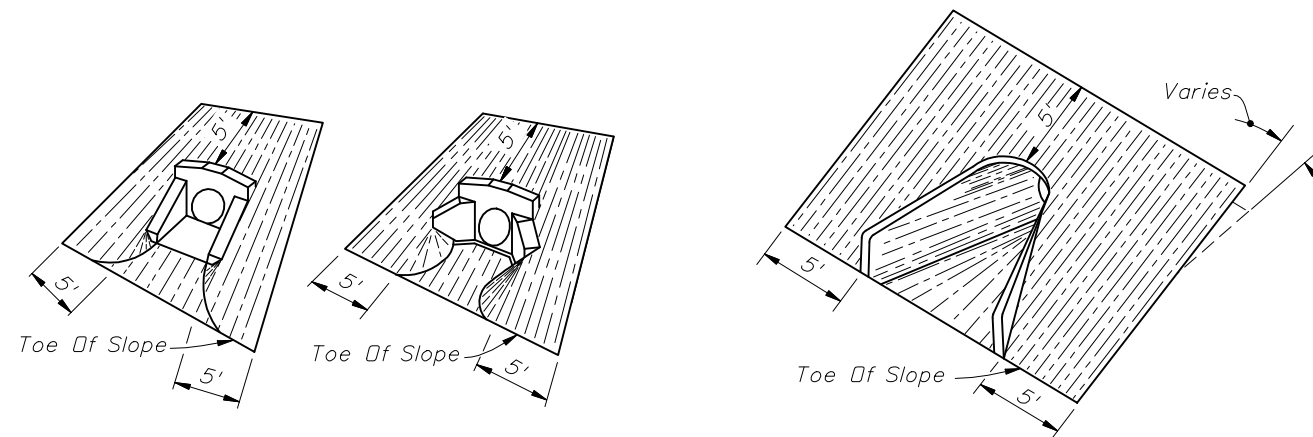
(EXCEPT INDEX NO. 250)
STRAIGHT ENDWALL

STRAIGHT ENDWALL
INDEX NO. 250

U-TYPE ENDWALL
INDEX NO. 261

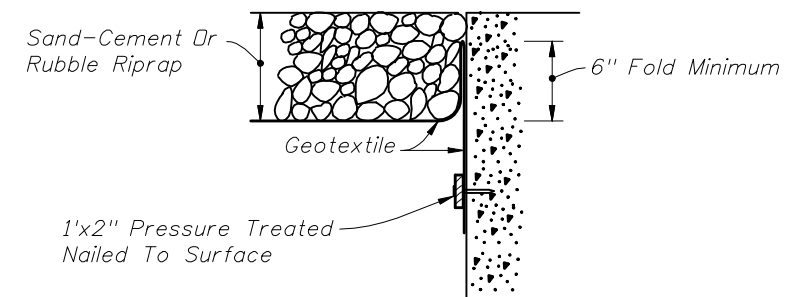


BONDED OPTION



U-TYPE WINGS
45° WINGS
WINGED ENDWALLS
INDEX NO. 266

FLARED END SECTION
INDEX NO. 270



NAILED OPTION

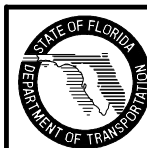
Note: Either option may be used unless otherwise called for in the plans.

GEOTEXTILE PLACEMENT AT CONCRETE STRUCTURE

SOD QUANTITIES (SY)																					
PIPE SIZE	INDEX NO. 250									INDEX NO. 261				INDEX NO. 266				INDEX NO. 270			
	SLOPE									SLOPE				SLOPE				ALL SLOPES			
	1:2			1:3			1:4			1:6	1:2	1:3	1:4	1:6	1:2	1:3	1:4	1:6	PIPES		
	1	2	3	1	2	3	1	2	3	1	2	3	1	1	1	1	1	1	1	1	PIPES
12"																				1	
15"	19	21	24	22	26	29	26	30	33	34	38	43	13 (15)	16	17	23	15	17	20	25	10
18"	21	24	27	25	29	33	30	34	38	39	44	50	14 (16)	17	19	25	16	18	22	28	11
21"																				12	
24"	26	30	34	32	37	42	38	44	50	50	58	66	15 (17)	19	21	28	19	22	26	34	14
27"																				15	
30"	31	37	42	39	46	53	46	55	63	62	74	85	17 (18)	21	24	32	21	25	30	40	16
36"	37	44	52	46	56	65	56	67	79	76	91	107					24	29	35	47	18
42"	43	53	62	55	67	79	67	82	96	91	111	132					27	32	39	54	19
48"	50	62	73	64	79	93	78	97	115	108	133	158					30	36	44	61	21
54"	57	71	85	74	92	110	91	113	136	126	157	188									21
60"																					22
66"																					25
72"																					26

() Endwall With Baffles

SOD

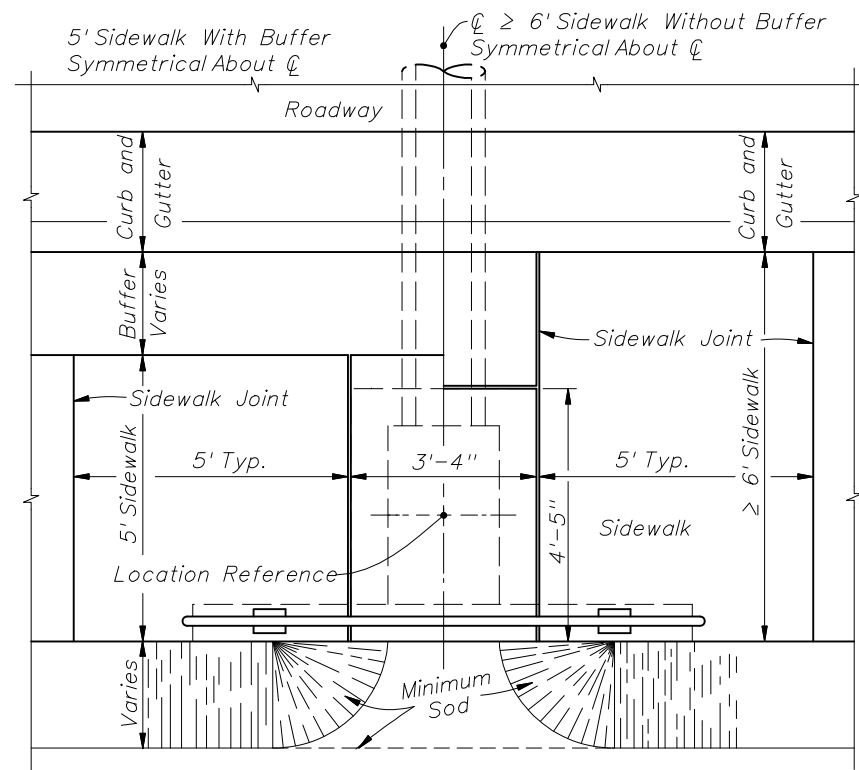


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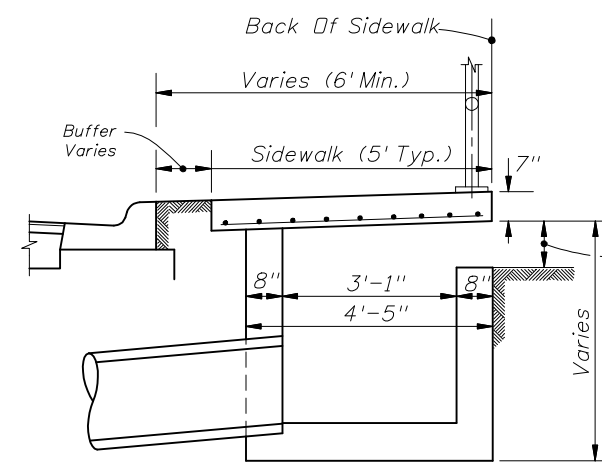
DITCH PAVEMENT & SODDING

Last Revision 00 Sheet No. 2 of 2

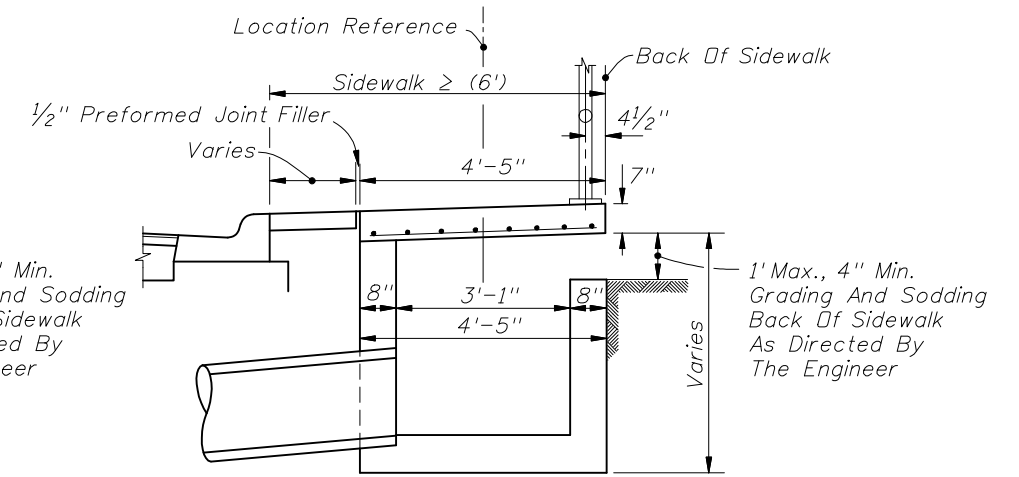
Index No. 281



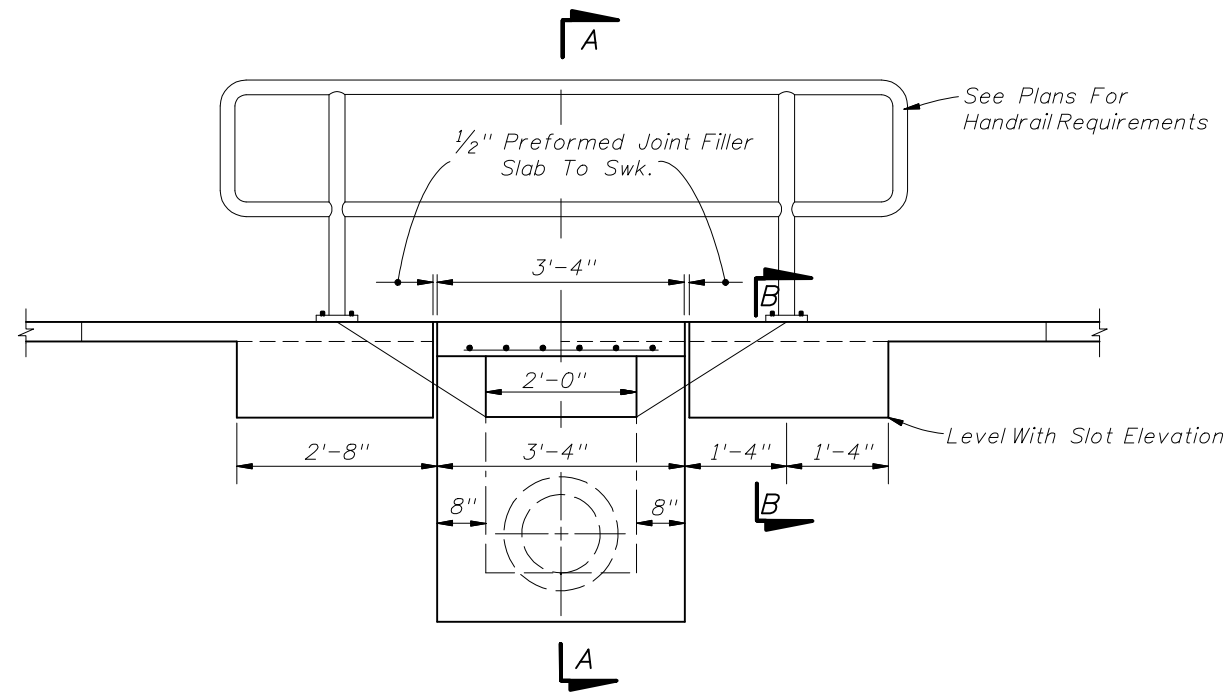
PLAN



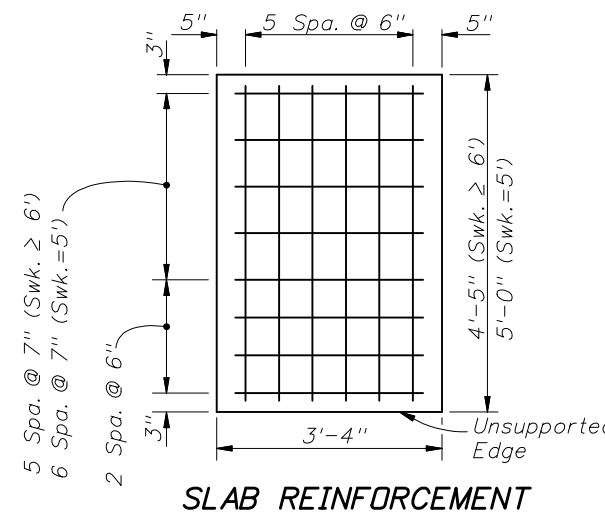
5' SIDEWALK SECTION AA



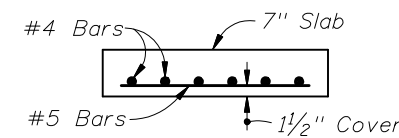
$\geq 6'$ SIDEWALK SECTION AA



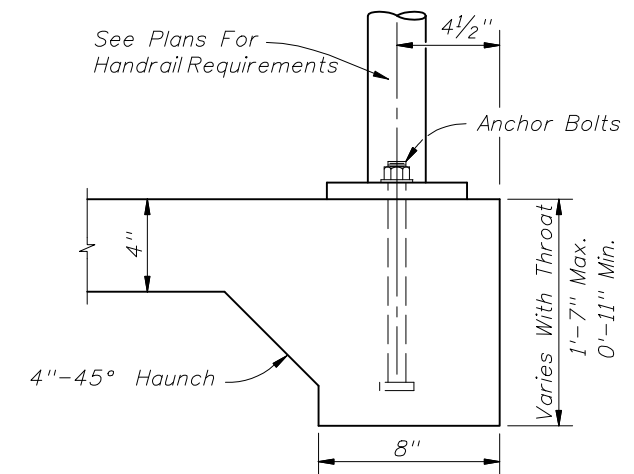
FRONT ELEVATION



SLAB REINFORCEMENT



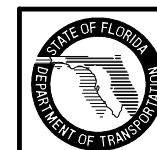
SLAB SECTION



SECTION BB

- Notes:
1. For additional details see Index No. 232.
 2. Inlet to be paid for under the contract unit price for Inlets (Ditch Bottom Type C Modified), EA. Handrail to be paid for under the contract unit price for Pipe Handrail, (Material), LF.

INLET TYPE C (MODIFIED)



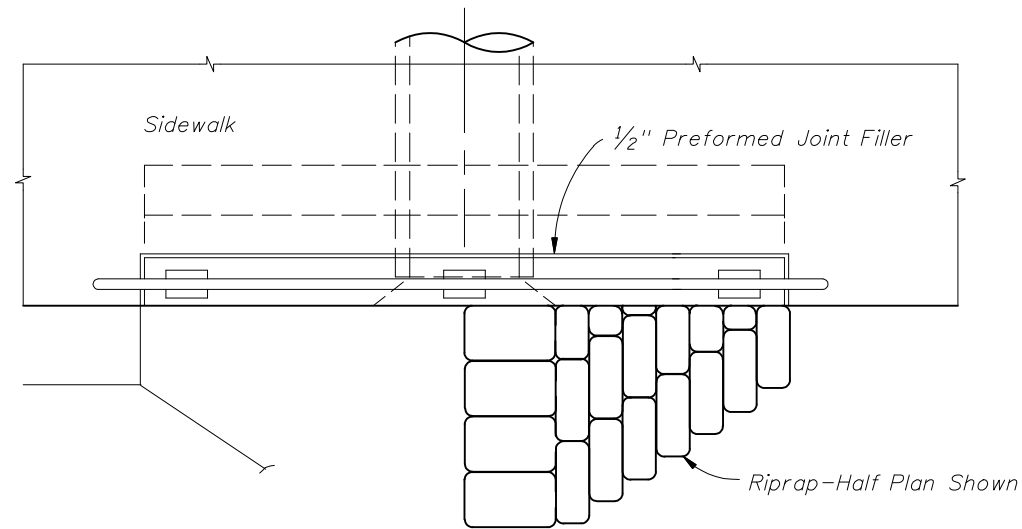
2010 FDOT Design Standards

BACK OF SIDEWALK DRAINAGE

Last Revision 07/01/09

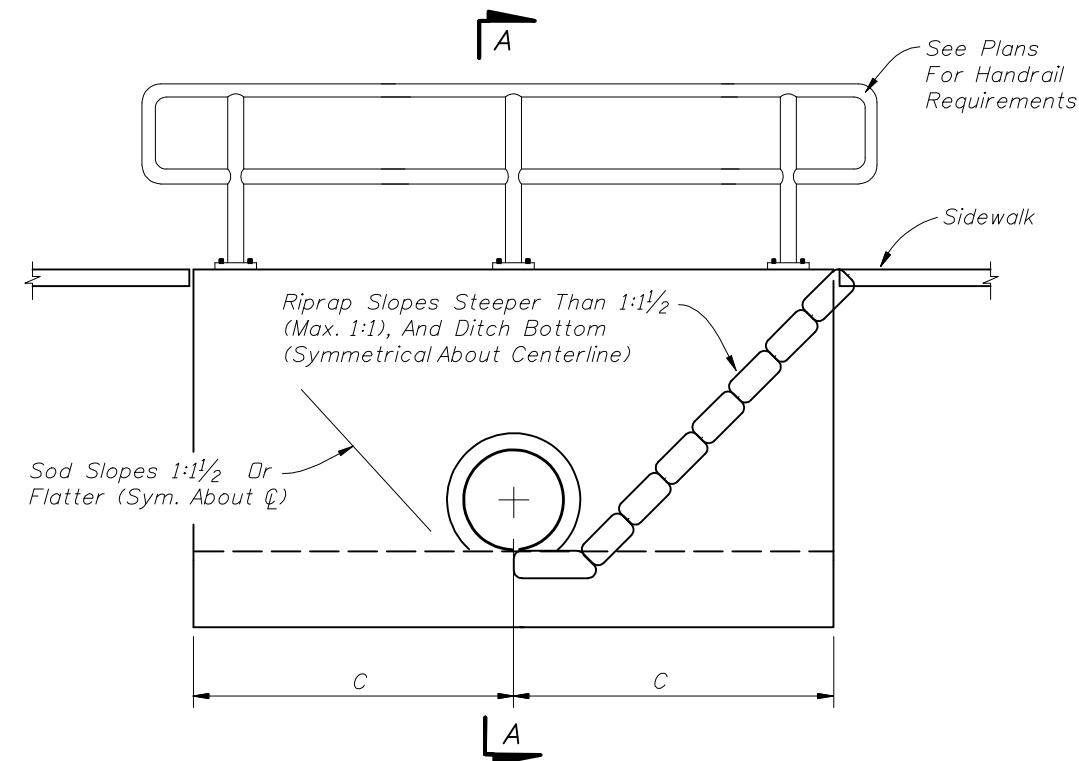
Sheet No. 1 of 3

Index No. 282

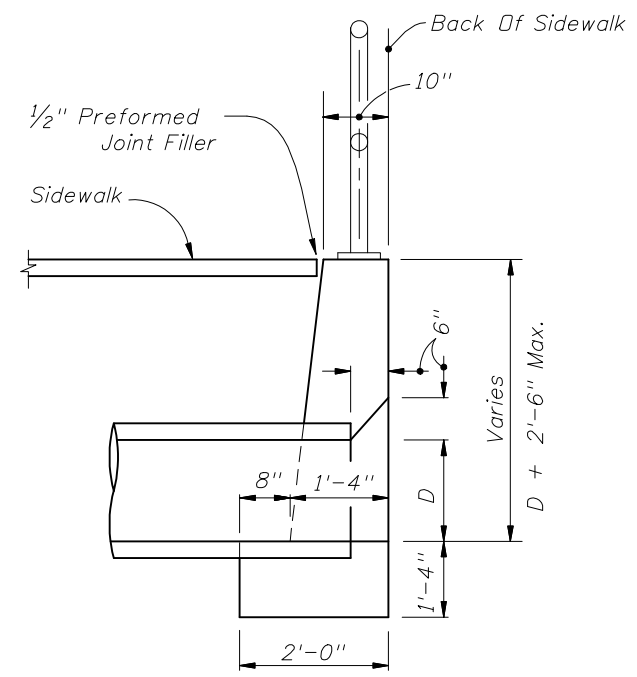


PLAN

Pipe Size	C	Conc. -CY	Riprap-CY (Sand-Cement)
15"	4'-9"	2.27	1.1
18"	5'-3"	2.59	1.3
24"	6'-3"	3.26	1.8



FRONT ELEVATION

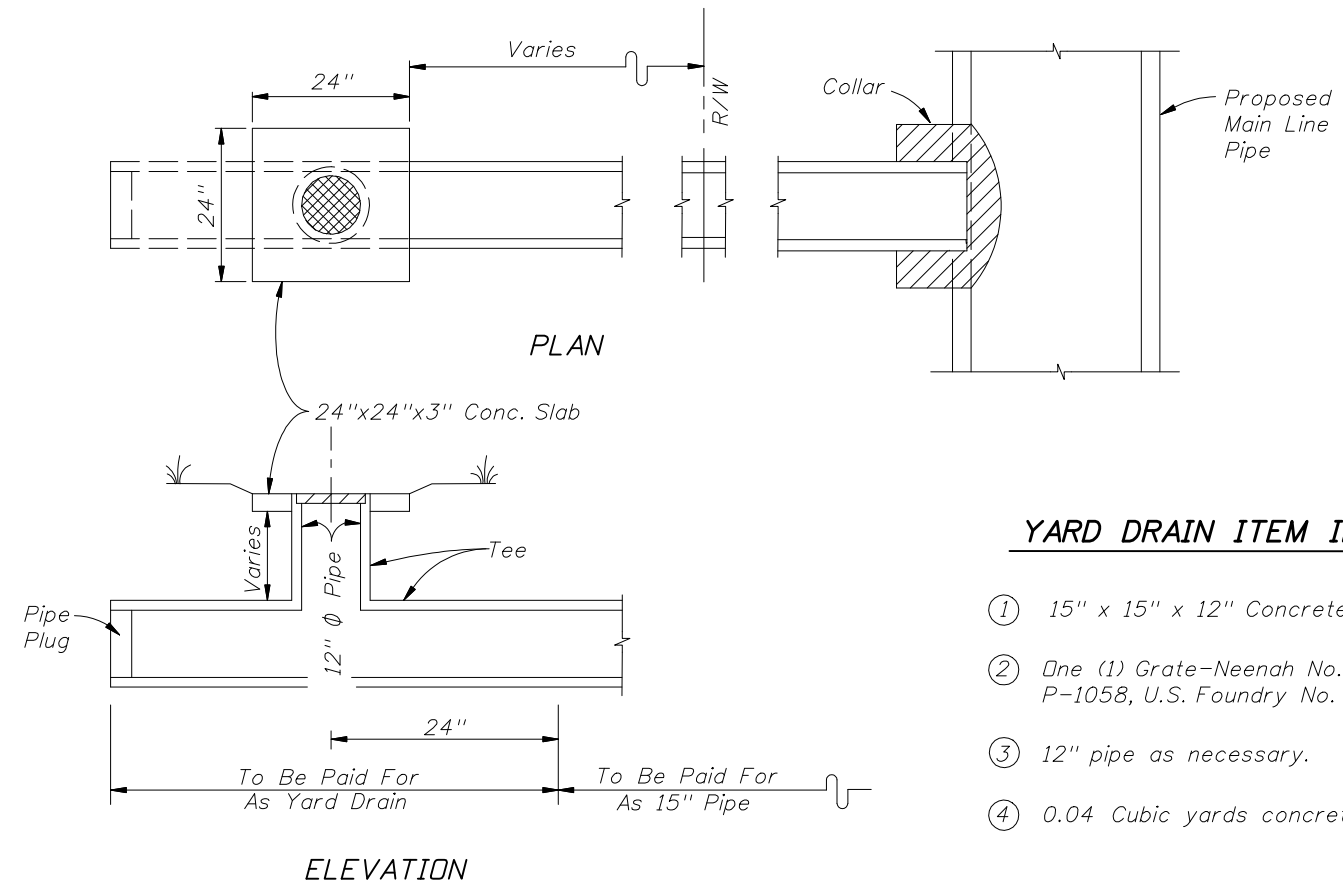


SECTION AA

- Notes:
1. Maximum pipe size shall be 24" diameter.
 2. Grading back of sidewalk varies and shall be done as directed by the Engineer.
 3. Concrete quantities shown are for maximum wall heights, and shall be basis for estimate and payment.
 4. Riprap quantities shown are for estimate purposes only. Cost of riprap to be included in cost of the endwall.
 5. Endwalls to be paid for under the contract unit price for Conc. Class I (Endwalls), CY. Handrail to be paid for under the contract unit price for Pipe Handrail, (Material), LF.

SPECIAL CONCRETE ENDWALL



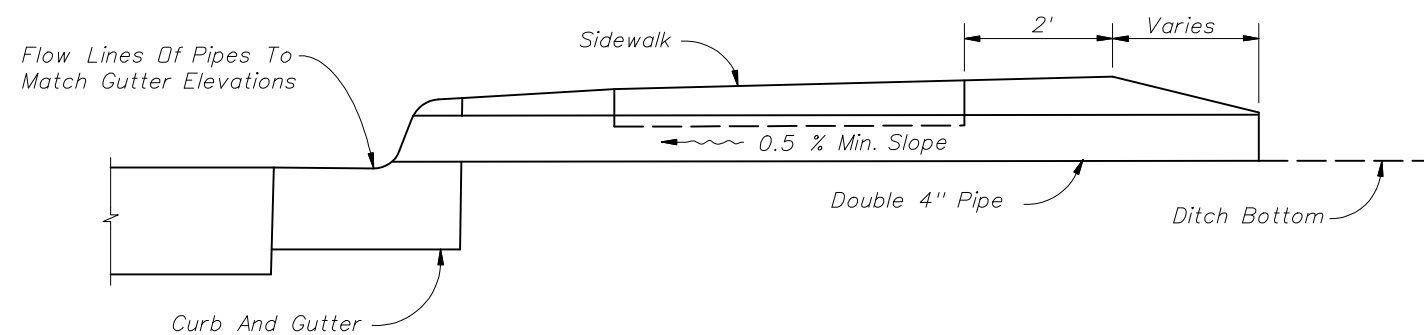


YARD DRAIN ITEM INCLUDES:

- ① 15" x 15" x 12" Concrete or PVC Tee 4' long.
- ② One (1) Grate-Neenah No. R-4030, Phoenix No. P-1058, U.S. Foundry No. 5605 or equivalent.
- ③ 12" pipe as necessary.
- ④ 0.04 Cubic yards concrete for slab.

- Notes:
- 1. Yard drains to be located outside the R/W. Drainage area should not exceed 750 SF (grate flow 0.1 Cfs).
 - 2. Yard drains may be constructed at the option of the property owner as shown on the plans.
 - 3. Cost of plugs and collars to be included in the cost for 15" pipe. For collar and plug details see Index No. 280.
 - 4. Yard drains to be paid for under the contract unit price for Yard Drains, EA.

YARD DRAINS

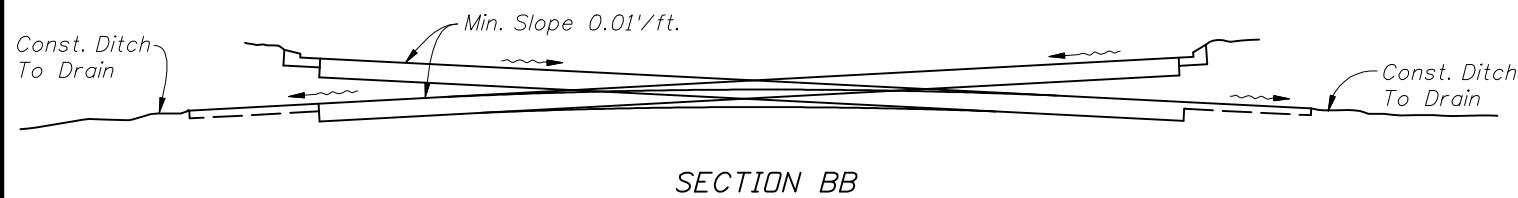
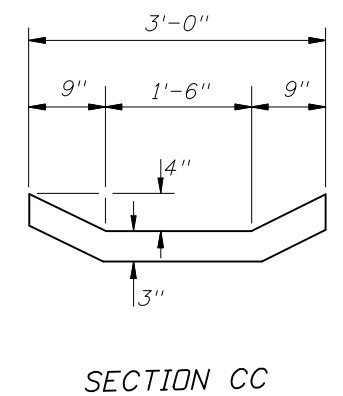
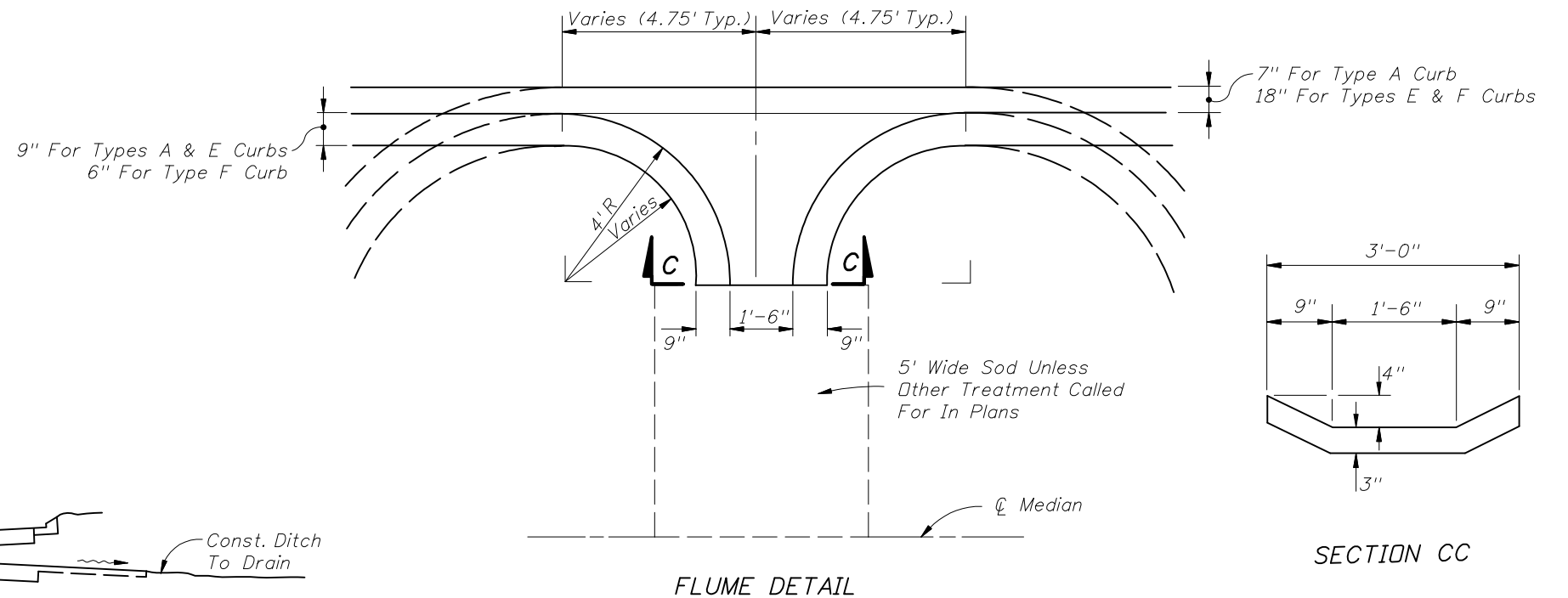
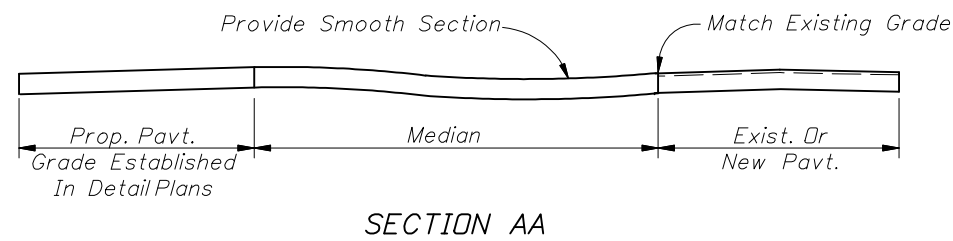
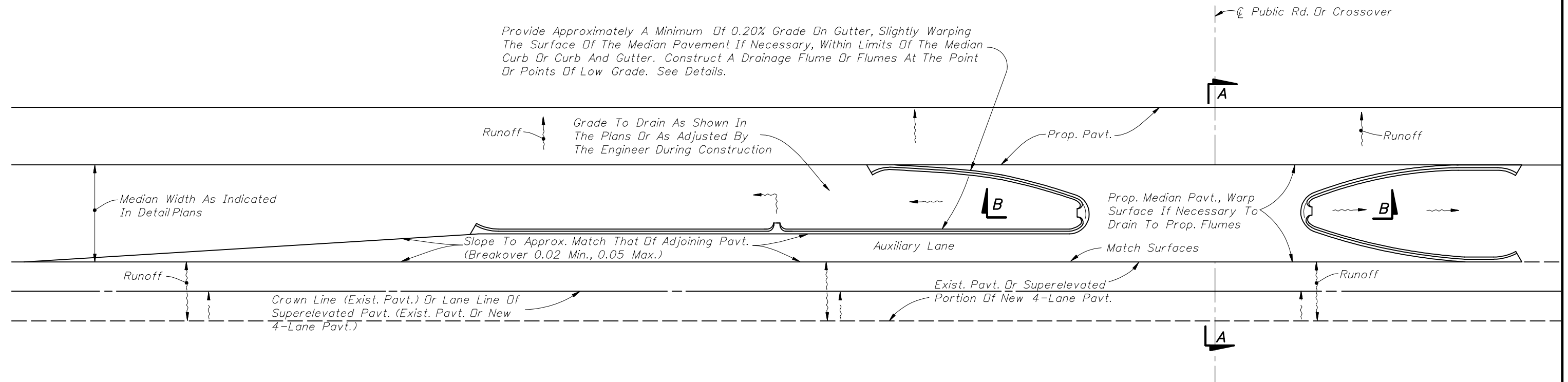


- Notes:
- 1. To be constructed at locations as directed by the Engineer.
 - 2. Either cast iron pipe or PVC rigid conduit, U.L. listed for direct sunlight exposure, Schedule 40, may be used.
 - 3. Pipe to be paid for under the contract unit price for either Cast Iron Soil Pipe (Standard) (4"), LF or Polyvinyl Chloride Pipe Culvert (4"), LF.

SHALLOW DITCHES



Provide Approximately A Minimum Of 0.20% Grade On Gutter, Slightly Warping The Surface Of The Median Pavement If Necessary, Within Limits Of The Median Curb Or Curb And Gutter. Construct A Drainage Flume Or Flumes At The Point Or Points Of Low Grade. See Details.



(May Drain From Any Point Designated In the Plans Or As Adjusted By The Engineer During Construction)

GENERAL NOTES

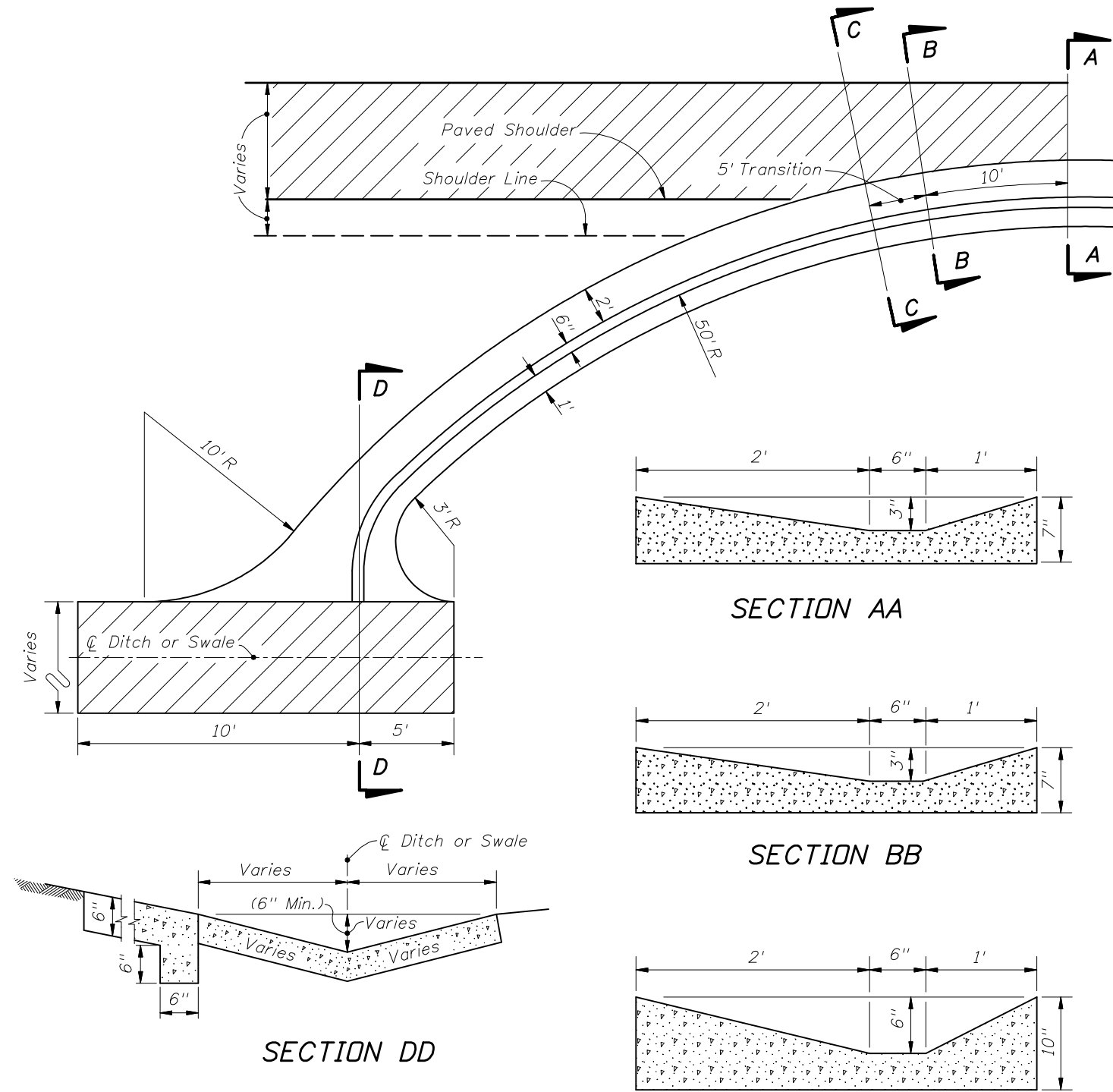
1. These details are to apply to projects which provide for the conversion of 2-lane sections to 4-lane divided highway sections and for superelevated sections of new 4-lane divided highways. Layout above is illustration only. Cost of flumes to be included in the contract price for Curb or Curb and Gutter. Sod to be paid for under the contract unit price for Performance Turf, SY.
2. Flumes to be located in low point of noses and at other points as designated in the plans. The locations may be adjusted by the Engineer during construction.



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MEDIAN OPENING FLUME

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1. Spillway to be paid for as Shoulder Gutter, L.F.
2. If spillway empties into an unpaved ditch, the detail should be modified as necessary.

DETAIL OF CONCRETE SPILLWAY AT END OF SHOULDER GUTTER
 (TO BE USED WHERE INLETS, PIPES & ENDWALLS ARE IMPRACTICAL)



GENERAL NOTES

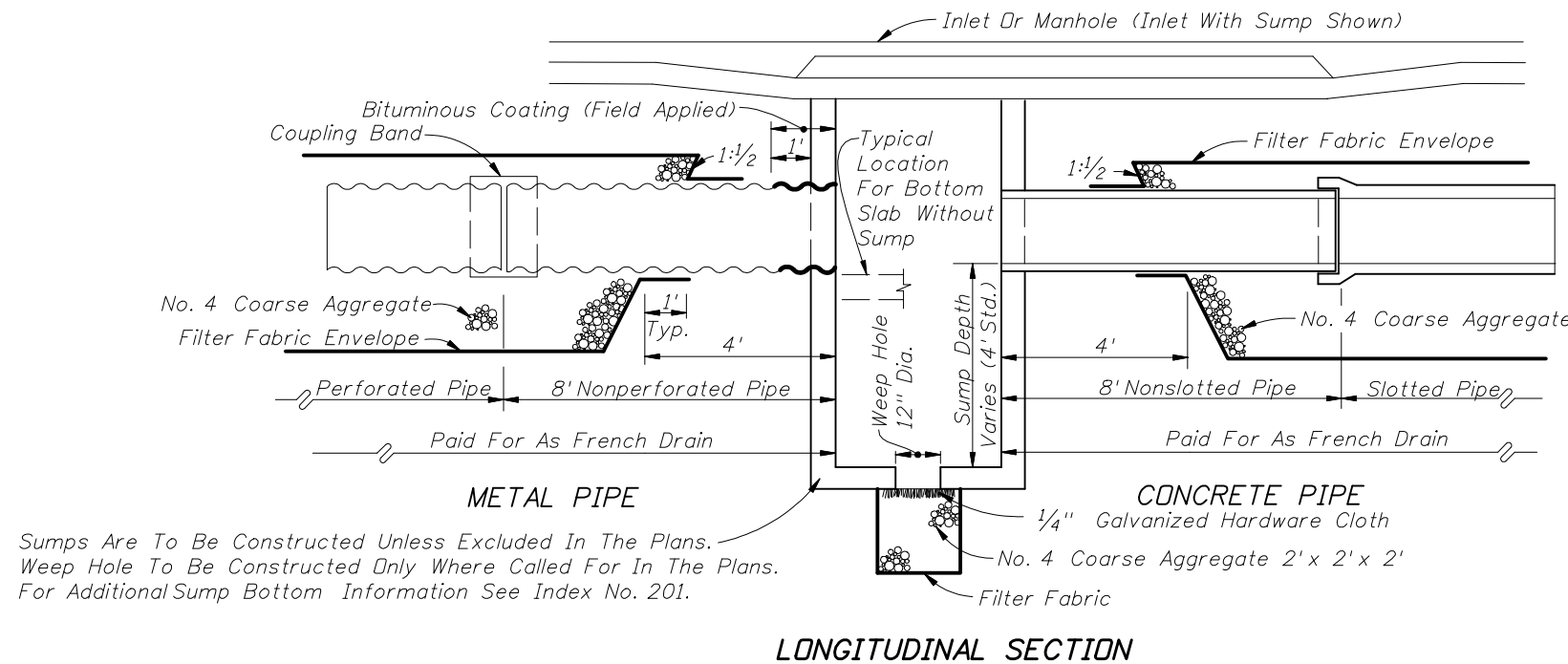
1. Pipe shall be any of the optional types permitted in Section 443 of the Specifications unless otherwise restricted in the plans. Dissimilar types of pipe will not be permitted in a continuous run of pipe.
2. Concrete pipe shall be placed with the slots positioned on sides.
3. Alignment joints are standard (gaskets not required). Recorrugation of metal pipe ends not required.
4. The contractor may submit other methods of providing slots having equal or greater area of opening, for approval by the Engineer.
5. Filter fabric shall be Type D-3 meeting the requirements of Section 985. All filter fabric joints shall lap a minimum of one (1) foot.
6. The standard cross section shall be constructed unless other section(s) described or detailed in the plans.
7. For supplemental details see Index No. 280.
8. The contractor shall take the necessary precautions to prevent contamination of the trench with sand, silt and foreign materials.
9. French drains following the typical cross section shall be paid for under the contract unit price for French Drains, LF. The unit price shall include the cost of pipe, pipe plugs, pipe fittings, coarse aggregate and filter fabric in place, and the cost for trench excavation, backfill and compaction. The unit price shall also include the cost for disposal of surplus excavated materials and cost for restoration of pavement removed or damaged by french drain construction, but shall not include payments for items paid for elsewhere.

French drains with a significantly different cross section shall be paid for under the contract unit prices for separate items as follows:

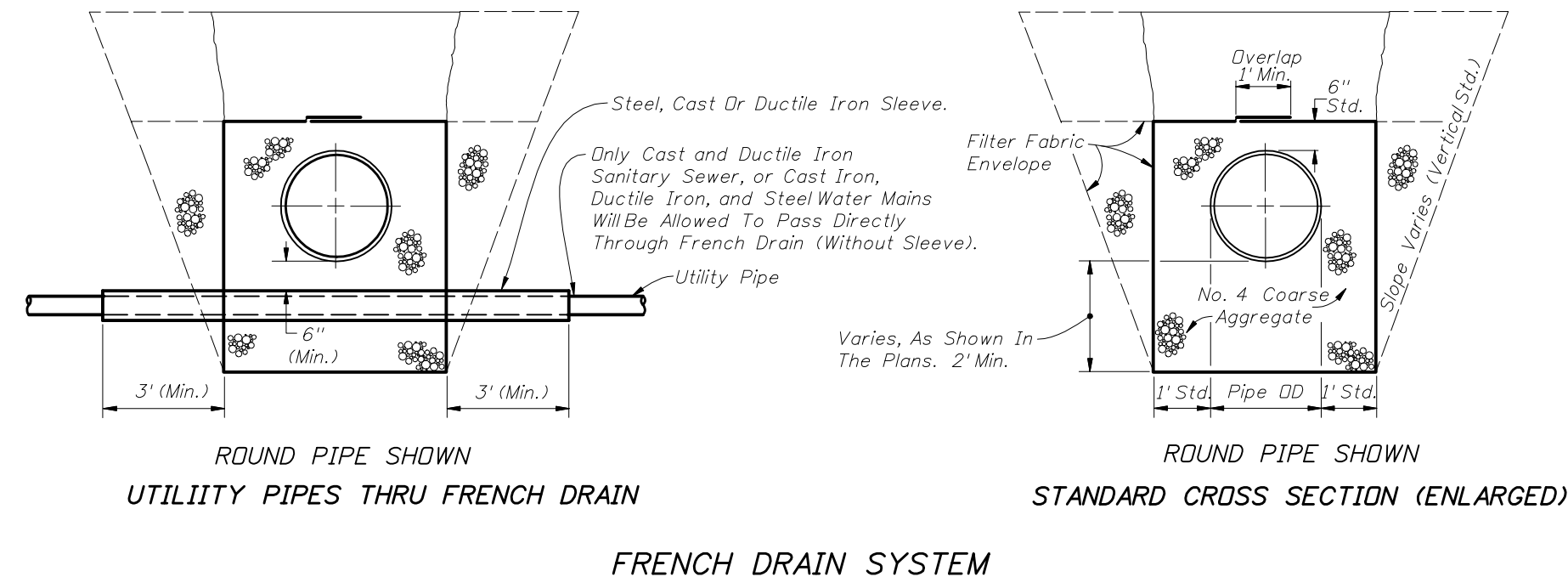
- (a) Slotted or Perforated Pipe Culvert, LF. Unit price shall include cost for pipe, pipe plugs and fittings in place.
- (b) Ballast Rock (French Drain Aggregate), CY. Unit price shall include cost for coarse aggregate in place, and cost for trench excavation, backfill and compaction. The unit price shall also include the cost for disposal of surplus excavated materials and cost for restoration of pavement removed or damaged by french drain construction, but shall not include payment for items paid for elsewhere.
- (c) Plastic Filter Fabric (Subsurface), SY. Unit price shall be for cost of fabric in place. Quantity shall be determined by plan neat dimensions of the fabric envelope.

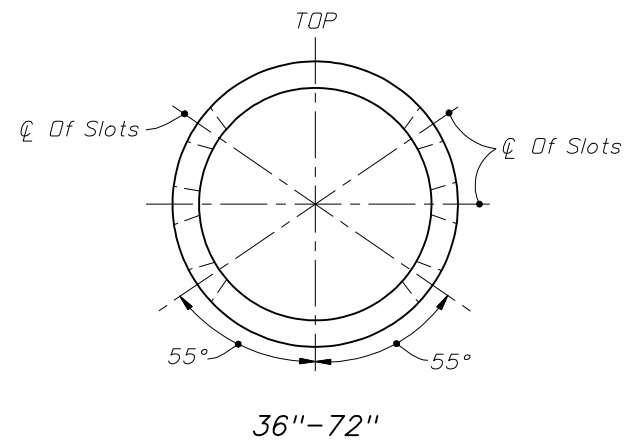
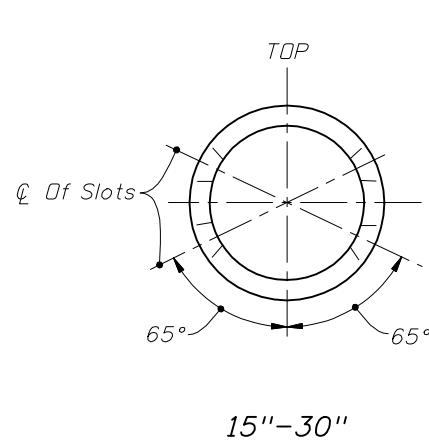
DESIGN NOTES

1. Pipe invert should be at or above the water table whenever possible.
2. French drains with minor dimensional changes or otherwise different from the standard cross-section shall be either described or detailed in the plans. French drains with significantly different cross-sections shall be detailed in the plans.



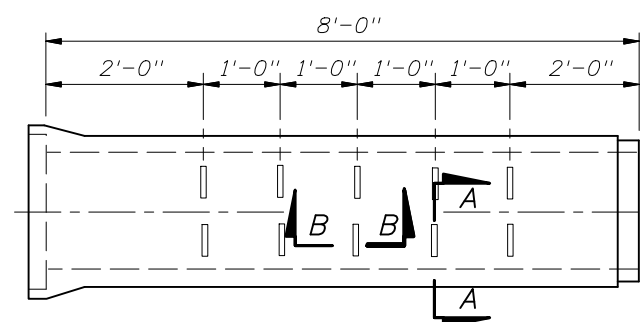
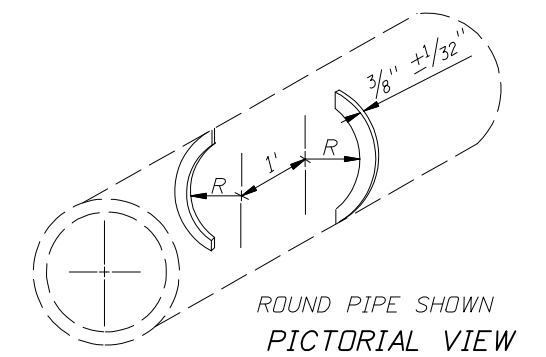
Sumps Are To Be Constructed Unless Excluded In The Plans.
Weep Hole To Be Constructed Only Where Called For In The Plans.
For Additional Sump Bottom Information See Index No. 201.





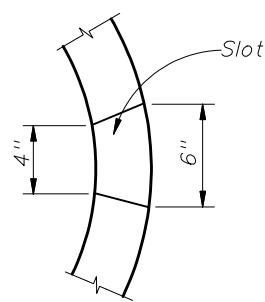
ELLIPTICAL PIPE		
Pipe Size	Slot Cut	
	Opening c	
	Min.	Max.
14"x23"	10"	12"
19"x30"	14"	16"
24"x38"	14"	16"
29"x45"	20"	22"
34"x53"	20"	22"
38"x60"	20"	22"

ROUND PIPE		
Pipe Size	Slot Cut	
	Opening c	
	Min.	Max.
15"	12"	14"
18"	12"	14"
24"	16"	18"
30"	16"	18"
36"	22"	24"
42"	22"	24"
48"	22"	24"
54"	24"	26"
60"	24"	26"
66"	24"	26"
72"	24"	26"

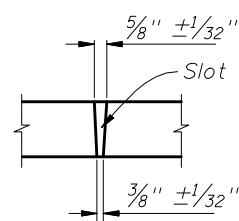


SIDE VIEW

OPTION A - ROUND PIPE

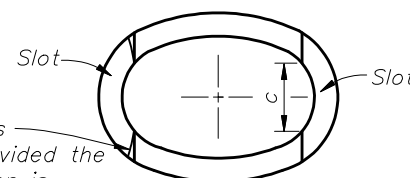


SECTION AA

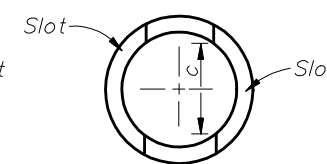


SECTION BB

A curved cut is acceptable provided the control dimension is maintained (Typical For Elliptical & Round Pipe)



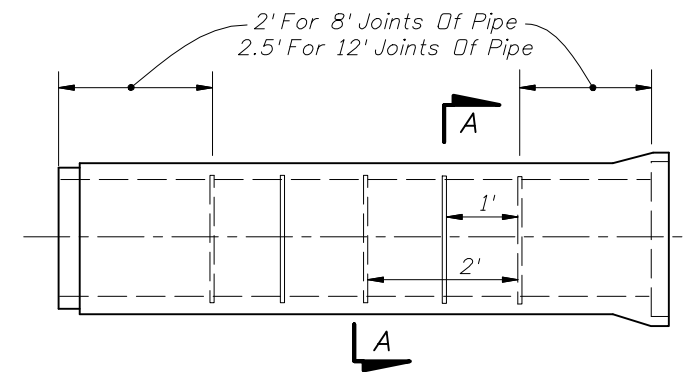
ELLIPTICAL PIPE



ROUND PIPE

SECTION AA

OPTION B - ROUND OR ELLIPTICAL PIPE



SIDE VIEW

SLOTTED PIPE OPTIONS



GENERAL NOTES

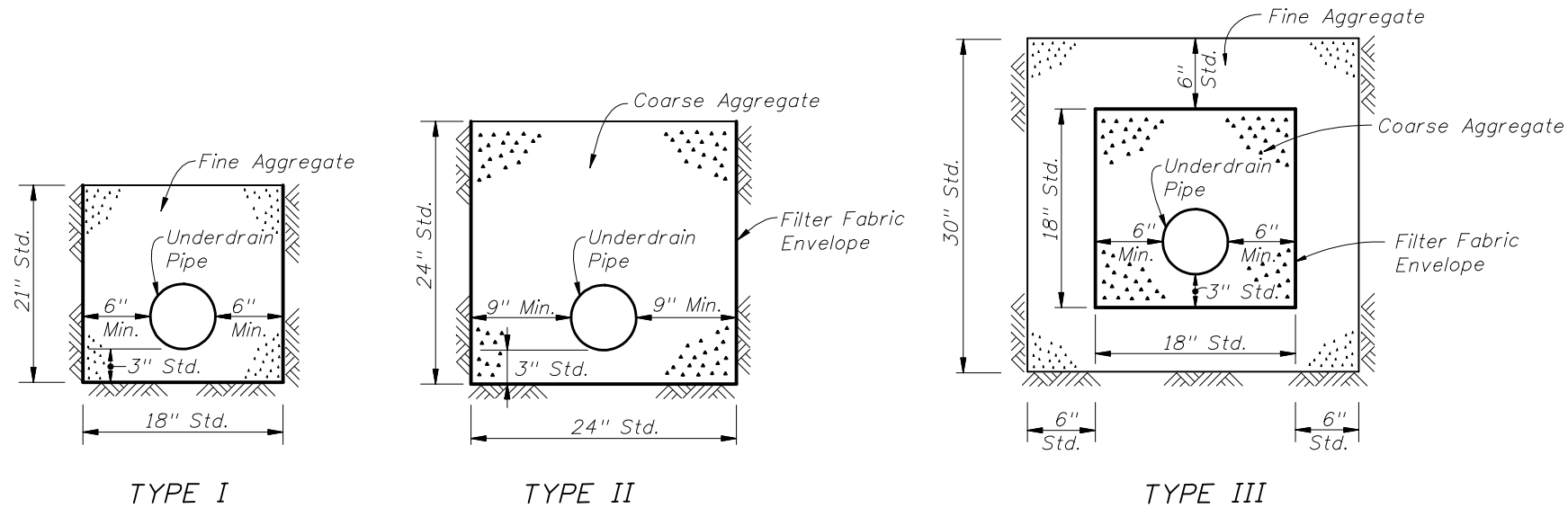
- The underdrain pipe shall be either 4" smooth or 5" corrugated tubing unless otherwise shown in the plans. The size to be furnished will be based on the nominal internal diameter of a pipe with a smooth interior wall. Except when prohibited by the plans, the special provisions or this standard, pipe with a corrugated interior wall may be provided based on the following size equivalency.

4" smooth interior equivalent to 5" corrugated interior
 5" smooth interior equivalent to 6" corrugated interior
 6" smooth interior equivalent to 8" corrugated interior
 8" smooth interior equivalent to 10" corrugated interior

- Fine aggregate shall be quartz sand meeting the requirements of Sections 902-4 of the Standard Specifications.
- Coarse aggregate shall be gravel or stone meeting the requirements of Sections 901-2 or 901-3. The gradation shall meet Section 901, Grades 4, 467, 5, 56 or 57 stone unless otherwise shown restricted in the plans.
- Underdrain Type I, II, III and V shall be in accordance with Section 440.
- Filter fabric shall be Type D-3 (See Index No. 199). The internal filter fabric of Type V underdrain shall have a permittivity of 0.7 /sec. and an ADS of #40 sieve.
- When Type I is used, a filter fabric sock meeting Section 948 is required.
- See Index No. 500 for the standard location of Type I, II, and III underdrain. The location of Type V underdrain and nonstandard locations of Type I, II, and III underdrain will be as detailed in the plans.
- All filter fabric joints shall overlap a minimum of 1'. The internal filter fabric of Type V underdrain shall overlap into the coarse aggregate or the fine aggregate a minimum of 1'.
- Underdrain outlet pipes shall be nonperforated and all bends shall be made using $\frac{1}{8}$ (45 deg.) elbows. 90 deg. bends shall be constructed with two $\frac{1}{8}$ elbows separated by at least 1' of straight pipe. Outlet pipes stubbed into inlets or other drainage structures shall be not less than 6" above the structure flow line. Outlet pipes discharging to grassed areas shall have concrete aprons, hardware cloth, and bordering sod as shown in Index No. 287 for Edgedrain outlets.
- Pay Item shall be based on the size of the smooth interior products. The contract unit price for Underdrain, LF, shall include the cost of pipe, fittings, aggregate, sock, filter fabric, underdrain cleanouts, and concrete aprons.

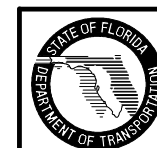
The contract unit price for Underdrain Outlet Pipe, LF, shall be full compensation for trench excavation, pipe and fittings, concrete aprons, hardware cloth for concrete aprons, stubbing into drainage structures, backfill in place, and disposal of excess materials.

The contract unit price for Underdrain Inspection Box, EA, shall be for the number completed and accepted.



DESIGN NOTES

- The type of underdrain should be selected to meet design water removal rate and soil conditions. Caution is prescribed in the use of these typical sections since special designs may be required to satisfy project conditions.
- Type I underdrain is intended for minimum water removal conditions.
- Type II underdrain is intended for moderate water removal conditions. Where reactive conditions may create chemical clogging, the use of an inert material and/or elimination of the filter fabric may be necessary.
- Type III underdrain is intended for maximum water removal conditions. Filter fabric is required between the coarse aggregate or fine aggregate including those described in general notes 2 and 3. Design note 3 applies for reactive conditions.
- Type V underdrain is intended for use in detention basins and other locations which require a filtration system. The standard fine aggregate specified for Type V underdrain conforms to filtration gradation requirements of Chapter 62-25 FAC.
- The designer should detail in the plans, the location of: (a) Type V underdrain, (b) nonstandard locations of Type I, II, and III underdrain, (c) underdrain inspection boxes, (d) cleanouts for Type V underdrain, and (e) underdrain outlet pipes.
- The designer should specify the flow line elevations at the beginning, bends, junctions and ends of underdrain pipes and outlet pipes.
- The designer should evaluate whether an external filter fabric envelope is required around underdrain Types I and III. When required, fabric shall be specified in the plans.



2010 FDOT Design Standards

UNDERDRAIN

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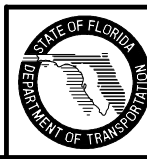
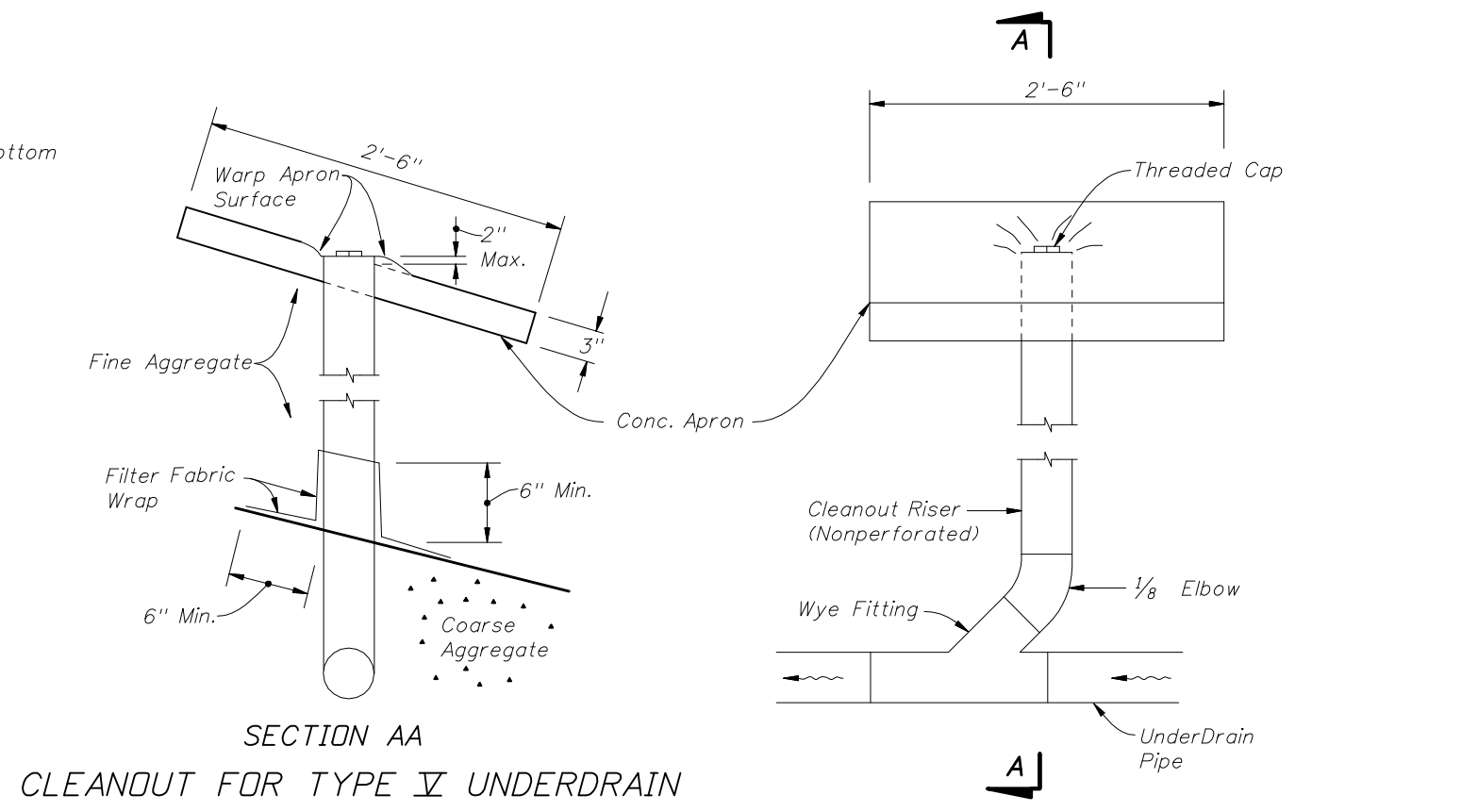
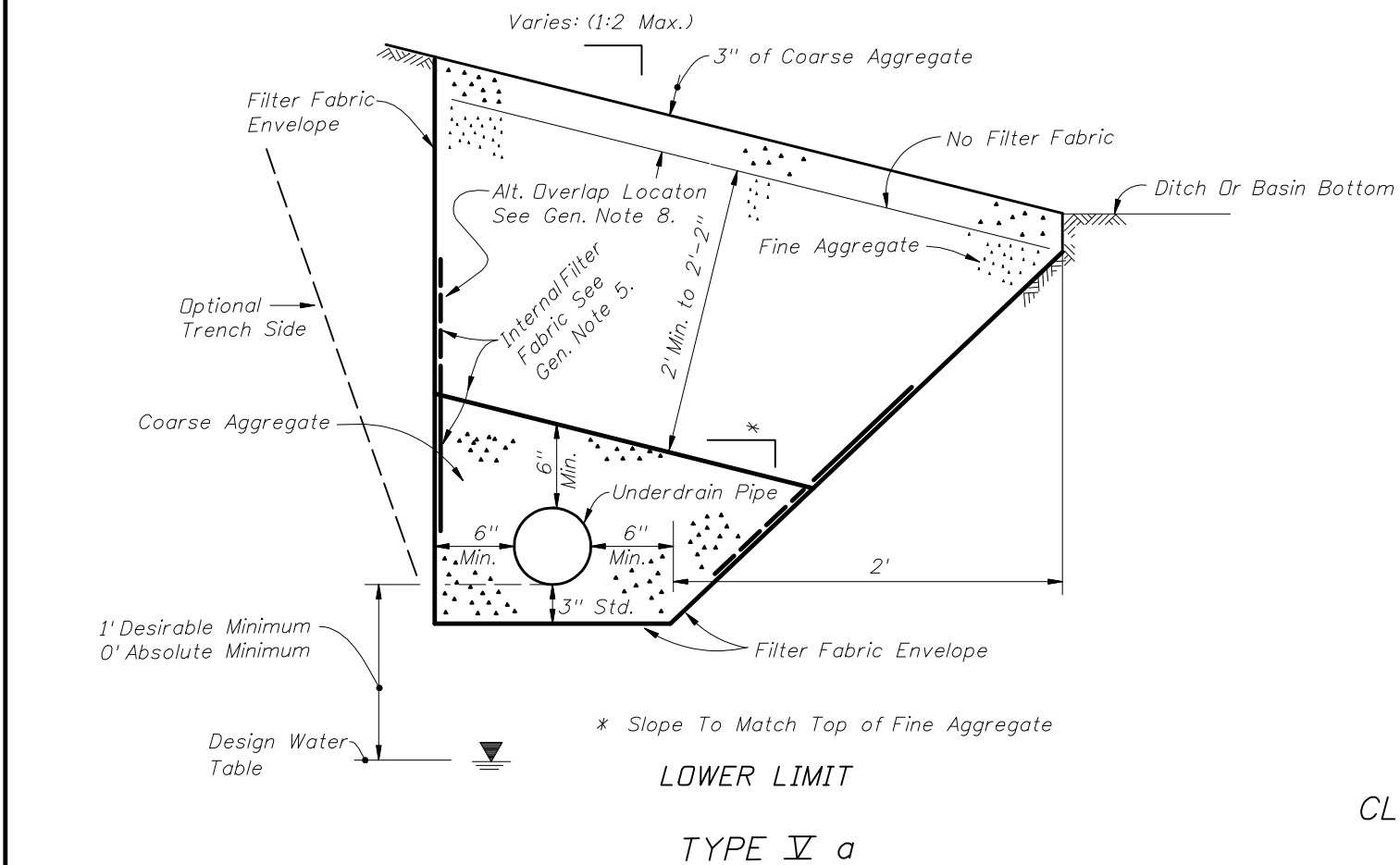
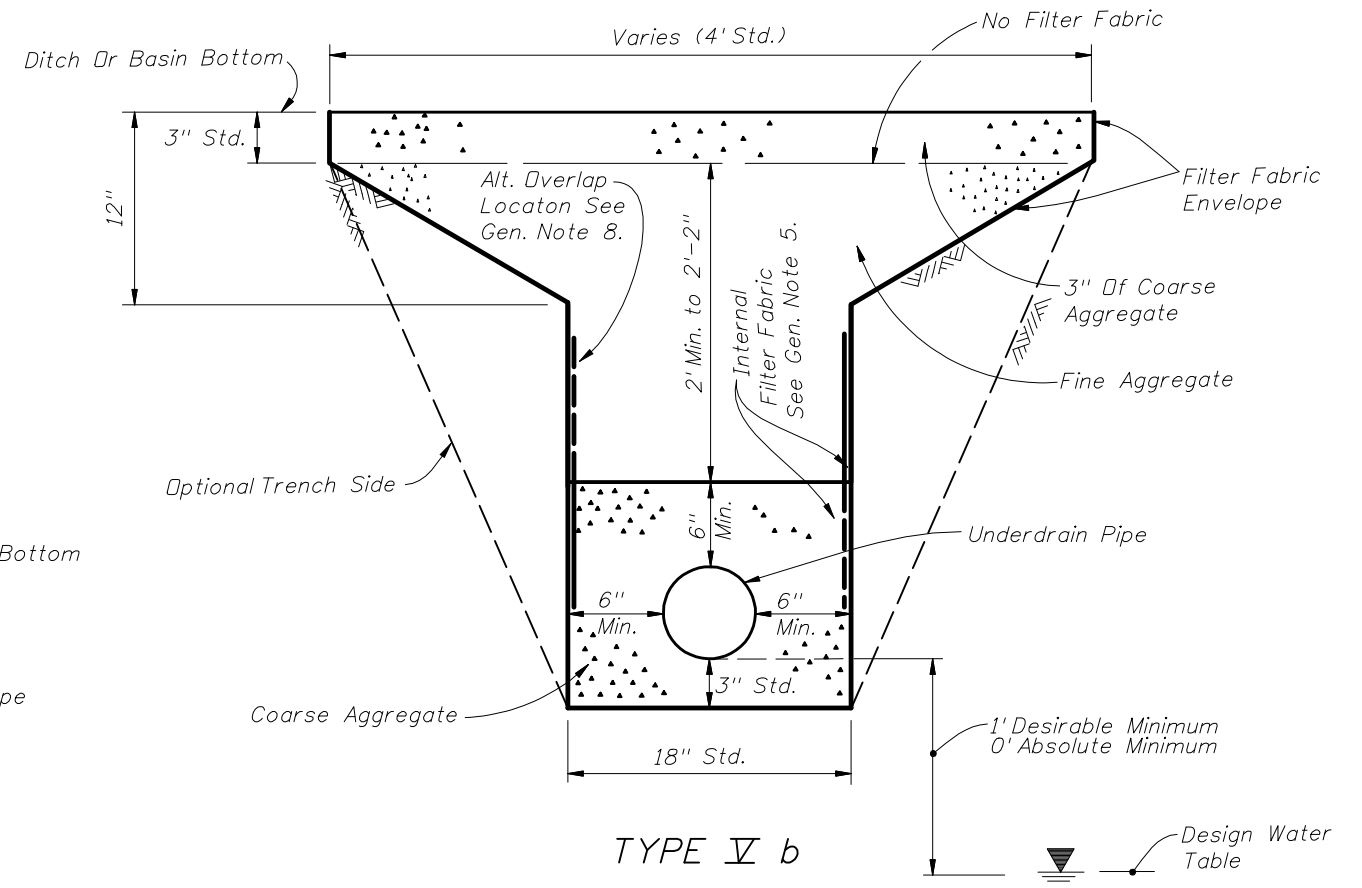
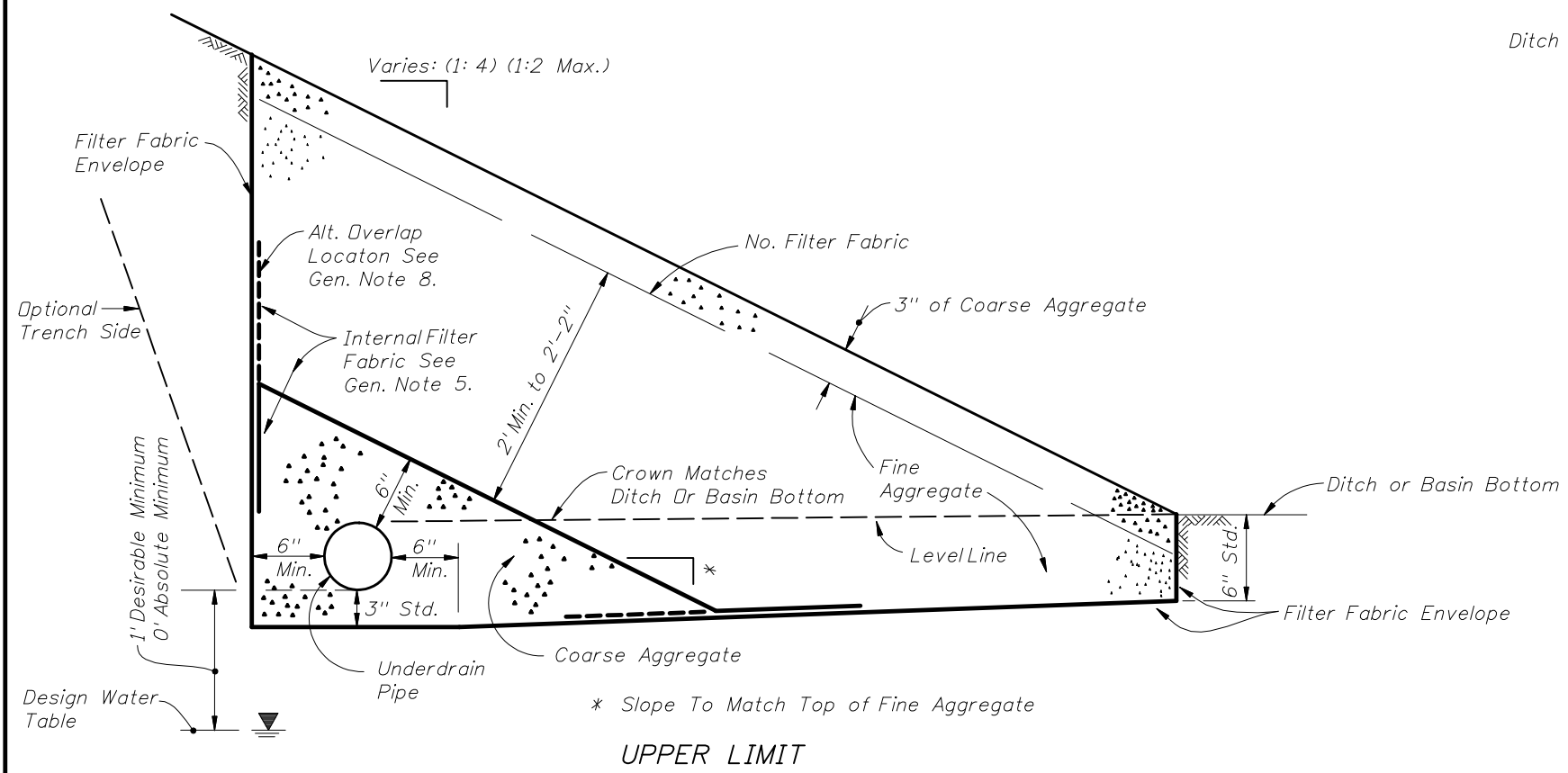
07/01/07

Sheet No.

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Index No.

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**GENERAL NOTES FOR
CONCRETE PAVEMENT SUBDRAINAGE**

1. No trench greater than 2' in depth will be allowed overnight. Trenches shall be barricaded at all times.
2. Concrete pavement subdrainage shall be constructed adjacent to the low edge of the roadway pavement and under travellanes, auxiliary pavement and shoulders, as called for in the plans. When the low edge shifts between outside and inside edges of pavement the concrete pavement subdrainage shall extend 50' beyond and begin 50' before the flat point (100' overlap).

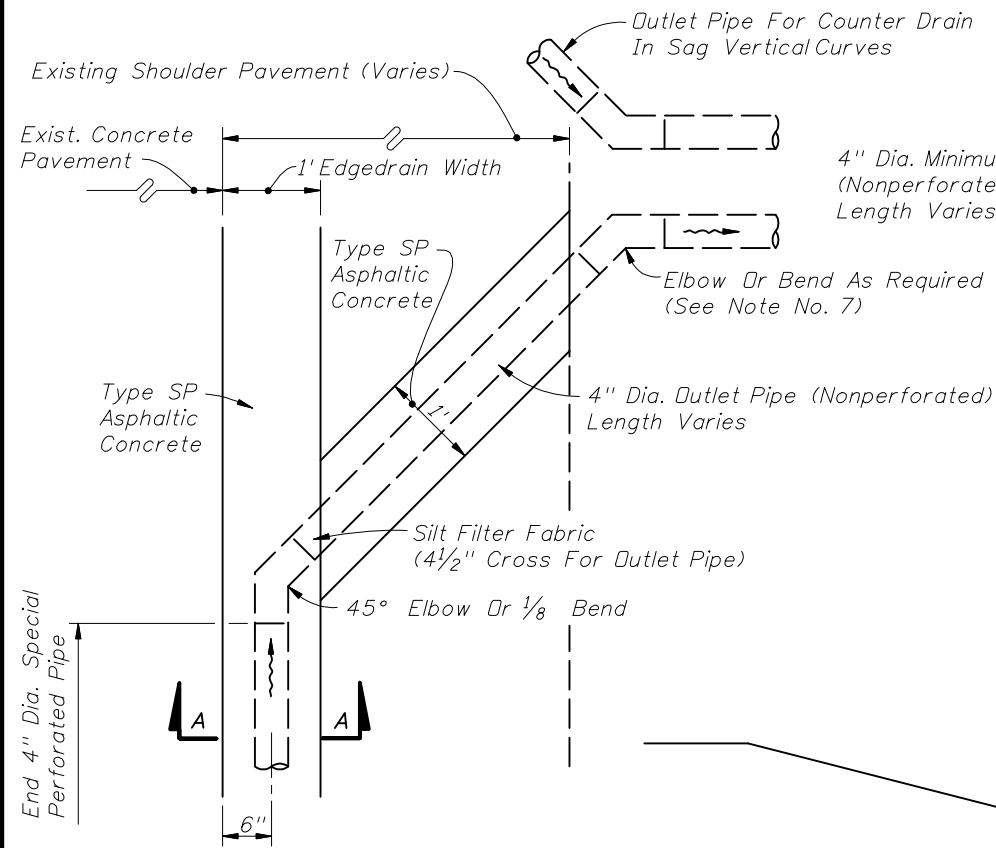
Concrete pavement subdrainage shall be placed on the low side of ramps of crossroad terminals.
3. Concrete pavement subdrainage shall be constructed on a grade parallel with the edge of pavement profile, except on profiles flatter than one-tenth percent (0.10%) the concrete pavement subdrainage shall be constructed on a grade of one-tenth percent (0.10%).
4. Immediately prior to placing the filter fabric the entire vertical face of the concrete pavement shall be cleaned to remove adhering base material and soil.
5. The Contractor shall devise a procedure for holding the filter fabric in position on the vertical face of the trench. The procedure must be approved by the Engineer prior to placement of the draincrete.
6. The upper end of each separate run of the concrete pavement subdrainage pipe shall be capped.
7. Outlet pipes shall be constructed at a maximum of 500' intervals. Elbows or $\frac{1}{8}$ bends shall be used to connect the outlet pipe to the concrete pavement subdrain pipe. The elbows or bends shall be of the same material as the outlet pipe but compatible with the pipe.

When directed by the Engineer, outlet pipes shall be stubbed into existing inlets or into existing ditch pavements at an elevation 6" above the inlet flowline or ditch bottom. Concrete apron and bordering sod are not required for stubbed outlets, but replacement sodding will be required at trenches for pipes stubbed into paved ditches.

In sag vertical curves separate outlet pipes for concrete pavement subdrains from opposite directions shall use a single apron unless otherwise shown in the plans or otherwise directed by the Engineer.

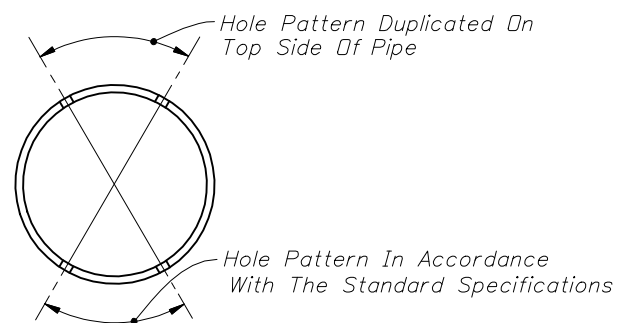
Backfill around outlet pipes shall be of cohesive soils, draincrete will not be permitted.

8. Existing paved shoulder that is removed for the construction of outlet pipes shall be replaced with Type SP asphaltic concrete at the rate of 500 LB per SY.
9. The contract unit price for Edgedrain Outlet Pipe (4") LF, shall be full compensation for removal of existing shoulder pavement, trench excavation, pipe and fitting, concrete apron, hardware cloth, sod, stubbing into existing inlets and paved ditches, restoration of ditch pavement, backfill in place, and disposal of excess materials.

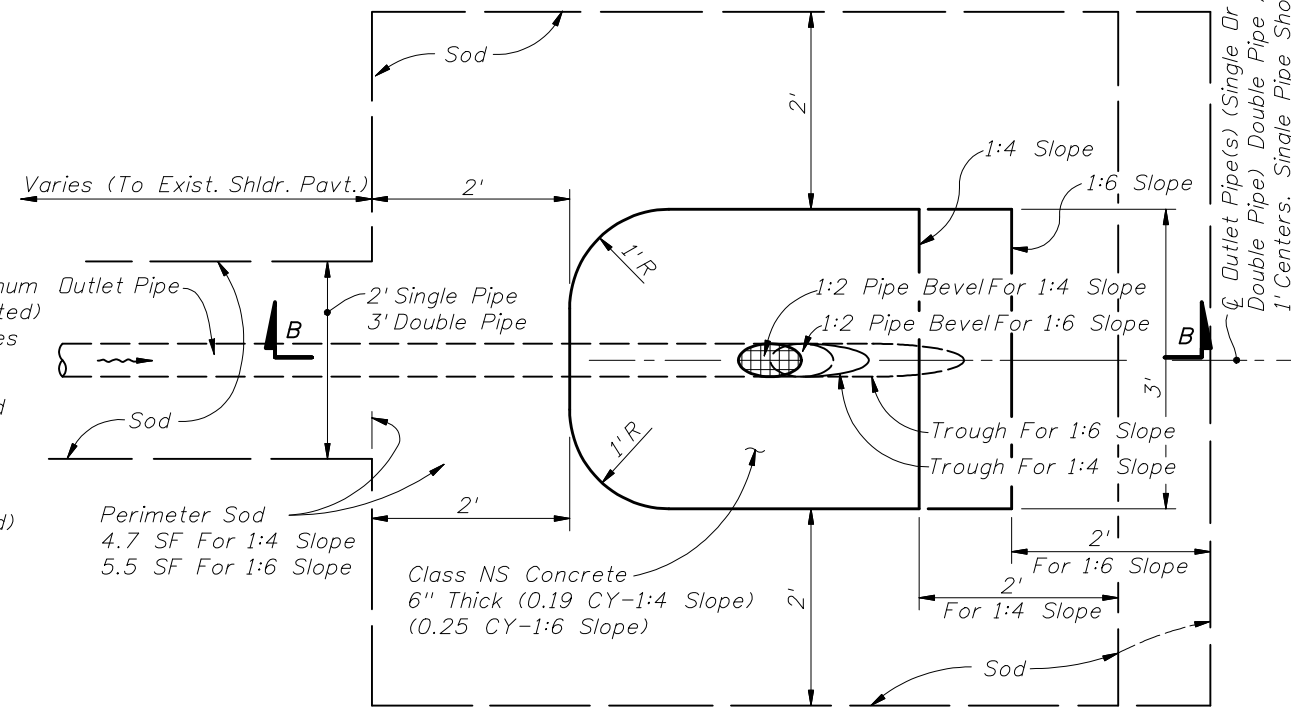


ALIGNMENT OF OUTLET PIPE

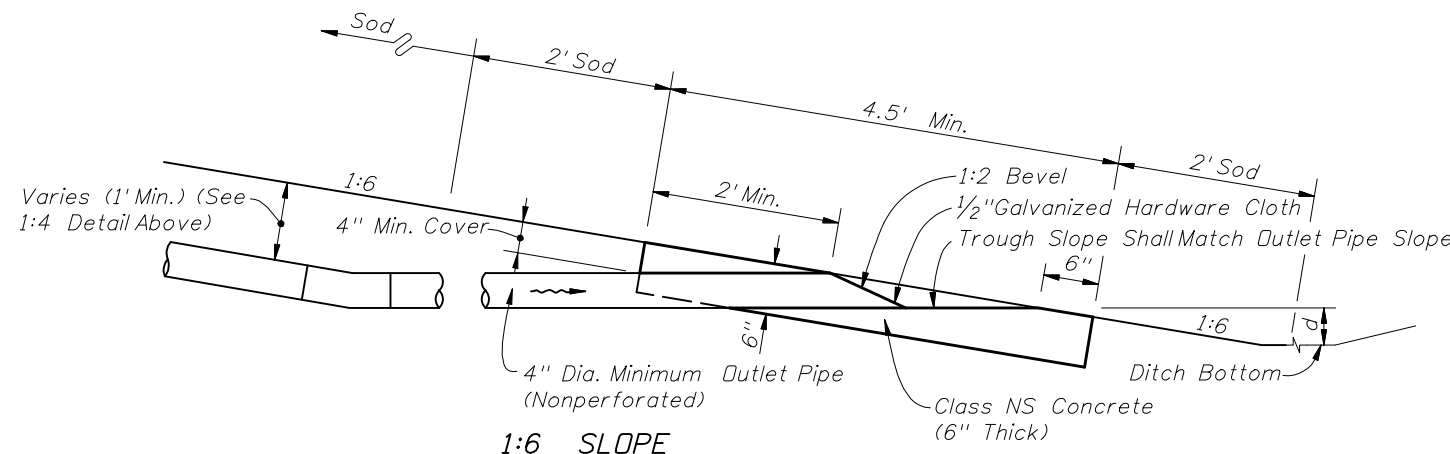
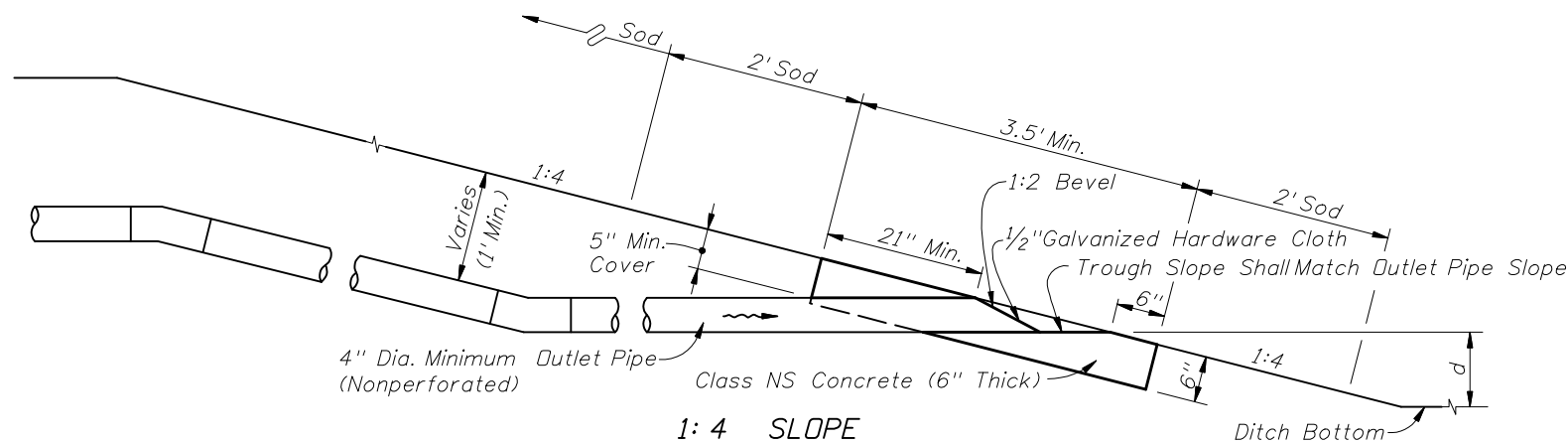
NOTE:
For Section AA see following Sheets.



SUBDRAINAGE PIPE

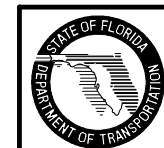


PLAN - OUTLET PIPE APRON



**SECTIONS BB
4" EDGEDRAIN
EDGEDRAIN OUTLET**

$$d = 1.75' \text{ std. for grassed ditches [less is acceptable to provide]} \\ 0.5' \text{ std. for paved ditches [minimum 0.1\% outlet pipe slope]}$$

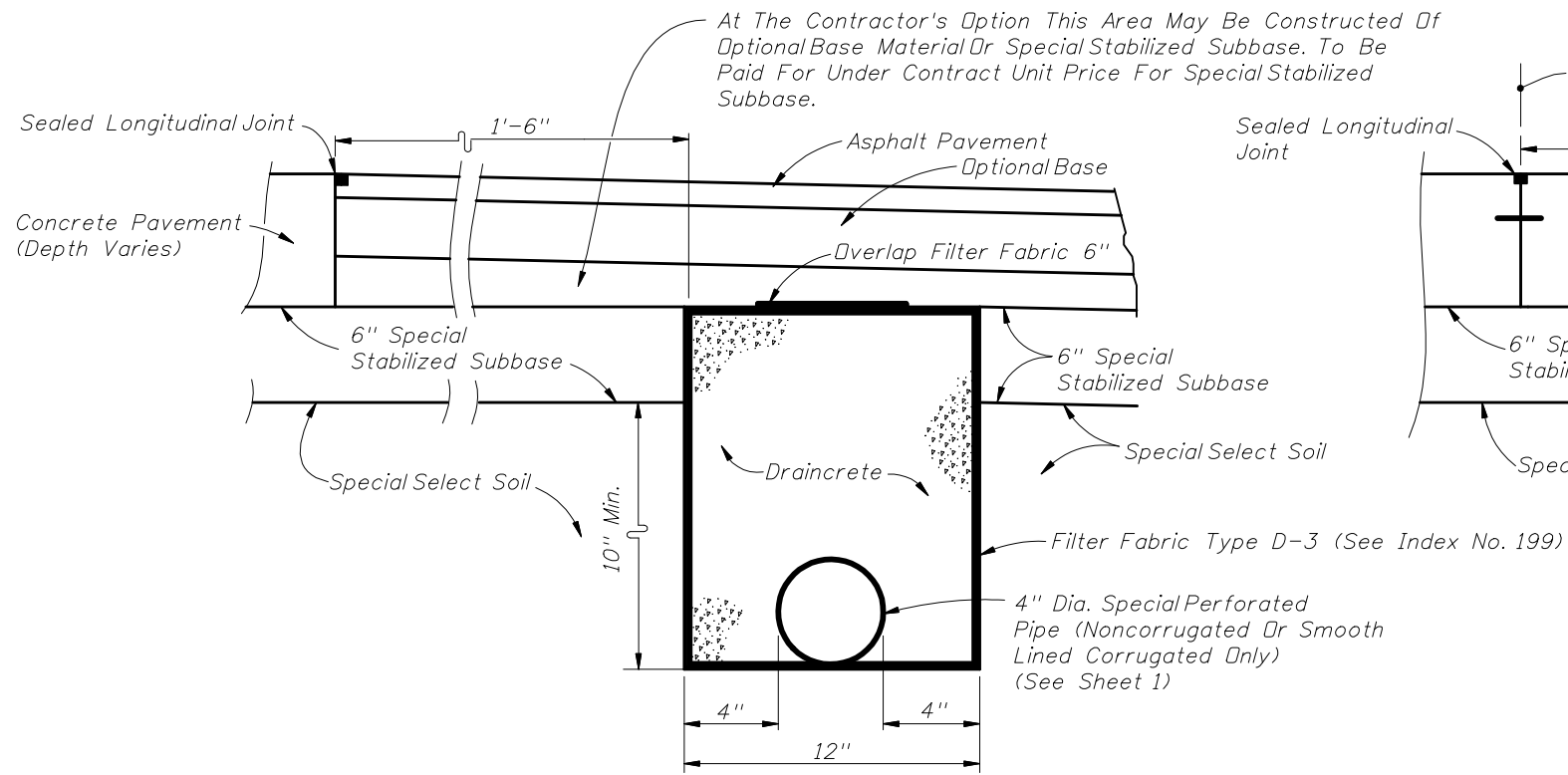


2010 FDOT Design Standards

CONCRETE PAVEMENT SUBDRAINAGE

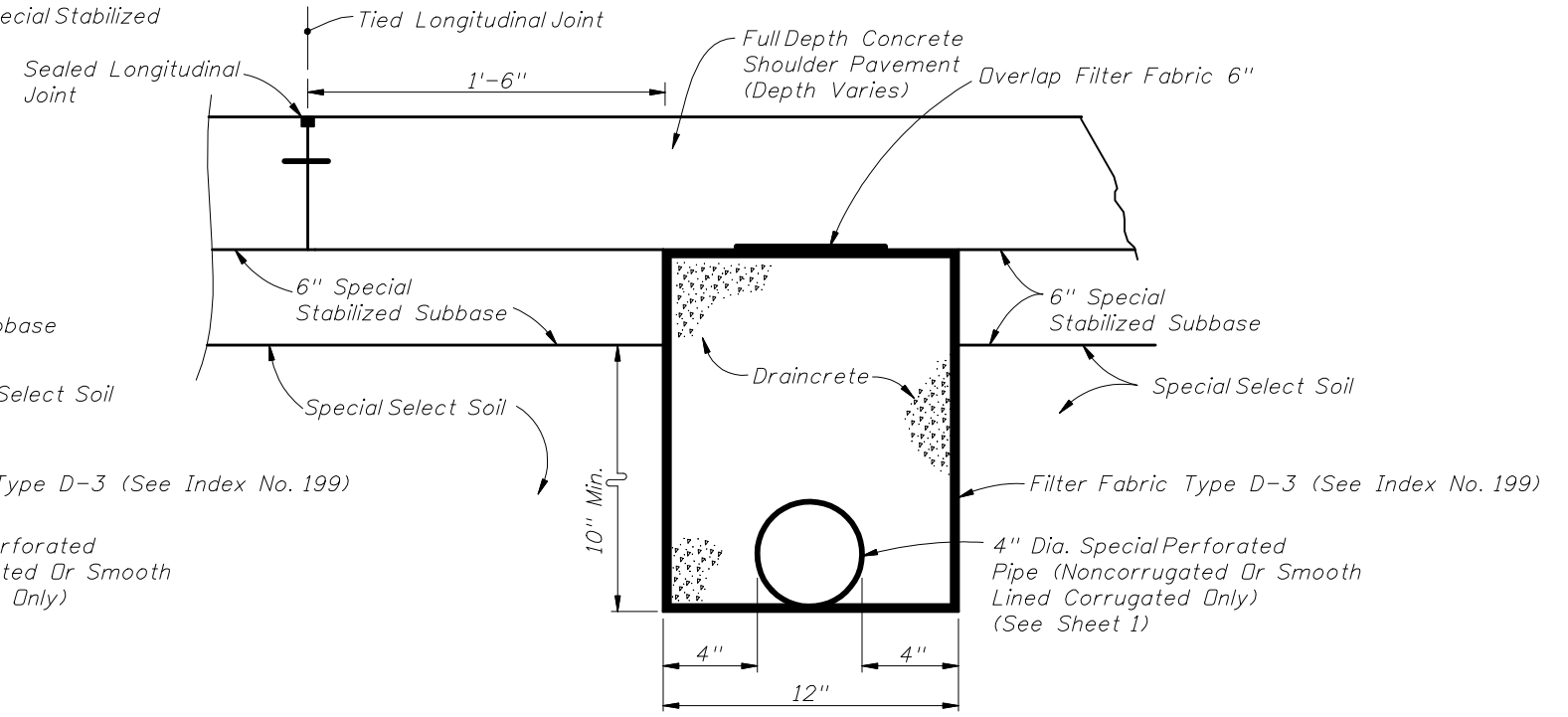
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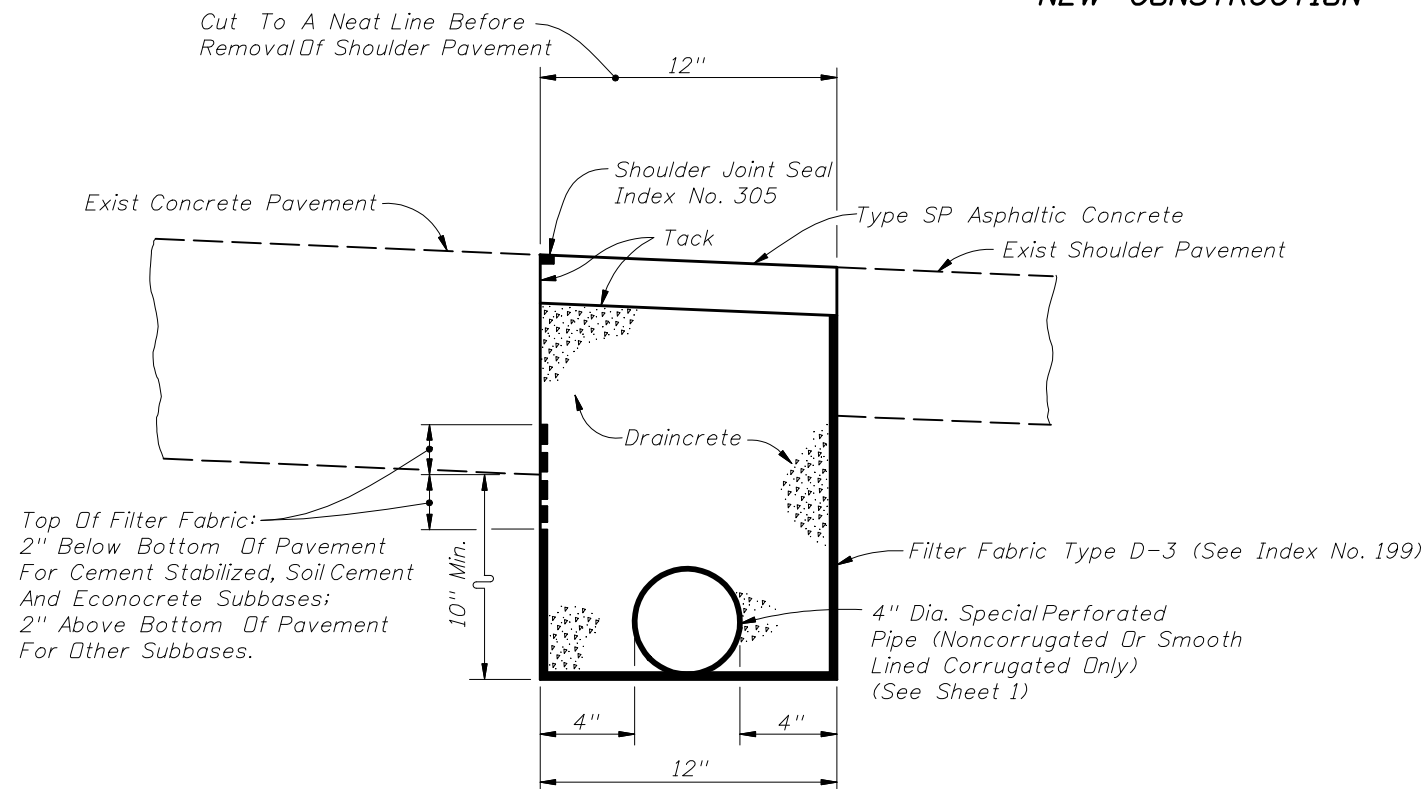


ASPHALT SHOULDERS

NEW CONSTRUCTION



CONCRETE TRAVEL LANES, SHOULDERS, AND AUXILIARY PAVEMENT



REHABILITATION

DRAINCRETE SUBDRAINAGE

NOTES FOR DRAINCRETE PAVEMENT SUBDRAINAGE

1. The edgedrain sections for DRAINCRETE SUBDRAINAGE are applicable to pavement construction identified as RIGID PAVEMENT on Index No. 505, Sheet 2 and 4.
2. The contractor shall confine the construction of draincrete edgedrain to an area in which the entire operation can be carried out in five (5) work days, unless another construction period is called for in the plans, with sufficient time allowed for the draincrete to set before placement of pavement.

METHOD OF PAYMENT

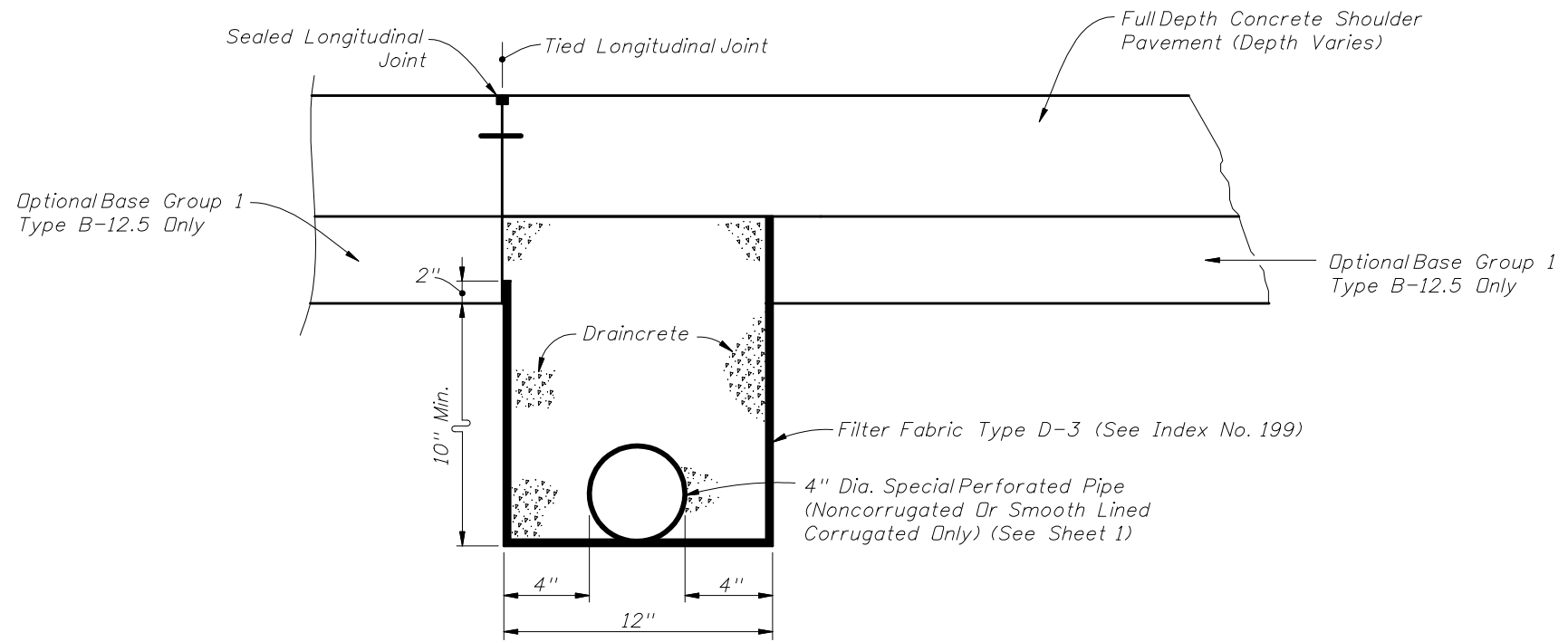
NEW CONSTRUCTION:

1. The contract unit price for Edgedrain (Draincrete) LF shall be full compensation for trench excavation, disposal of excess material, filter fabric, draincrete edgedrain pipe and fittings and draincrete. Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 4.

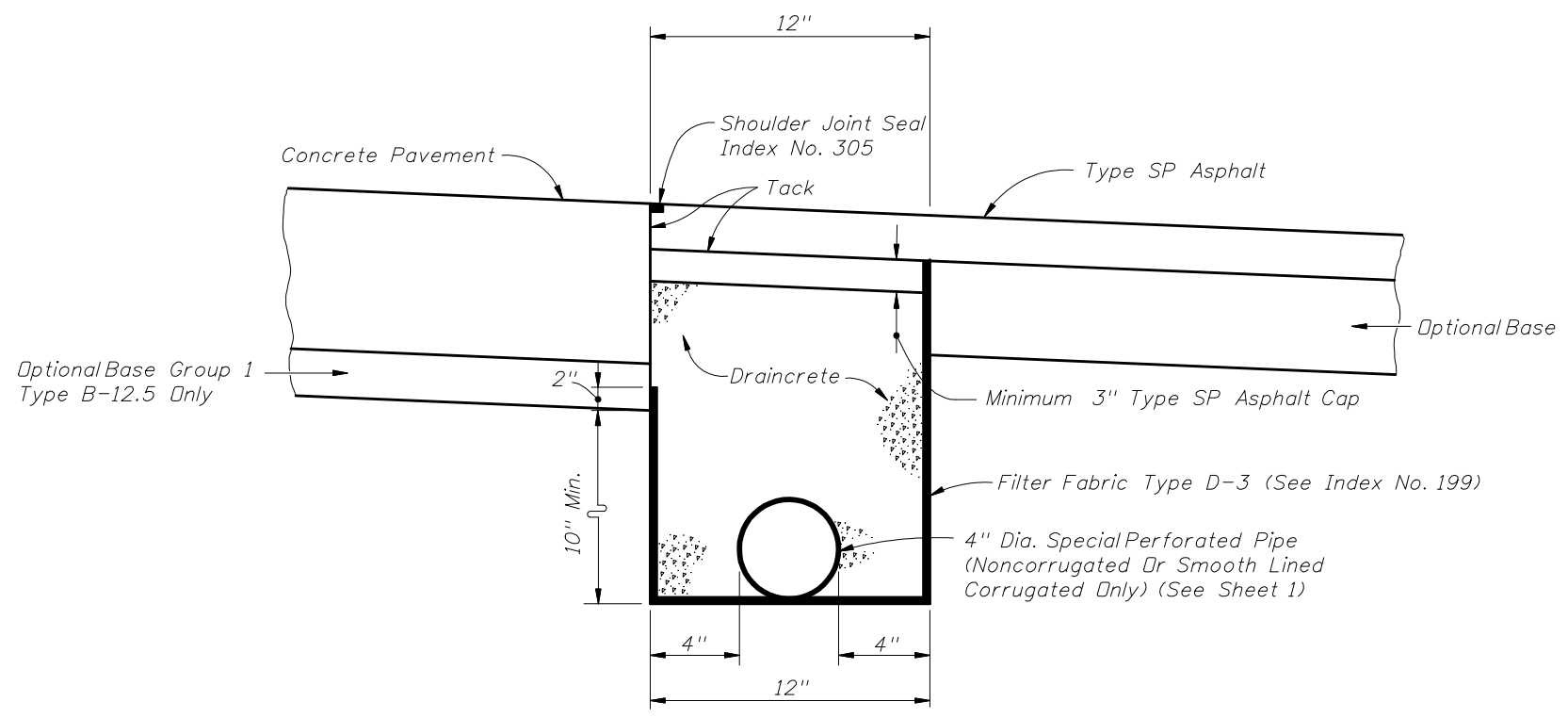
FOR REHABILITATION:

1. The contract unit price for Edgedrain (Draincrete) LF, shall be full compensation for removal of existing shoulder pavement, trench excavation, disposal of excess materials, filter fabric, draincrete edgedrain pipe and fittings, and draincrete, necessary for edgedrain construction. Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 4. Shoulder pavement shall be paid for under the contract unit price for Type SP, Asphaltic Concrete. Shoulder joint seal shall be paid for under the contract unit price for Pavement Joint, LF.





CONCRETE TRAVEL LANES,
SHOULDERS, AND AUXILIARY PAVEMENT



ASPHALT SHOULDERS

ASPHALT BASE SUBDRAINAGE

NOTES FOR DRAINCRETE
PAVEMENT SUBDRAINAGE

1. The edgedrain sections for DRAINCRETE SUBDRAINAGE are applicable to pavement construction identified as RIGID PAVEMENT on Index No. 505, Sheet 2 and 3.
2. The contractor shall confine the construction of draincrete edgedrain to an area in which the entire operation can be carried out in five (5) work days, unless another construction period is called for in the plans, with sufficient time allowed for the draincrete to set before placement of pavement.

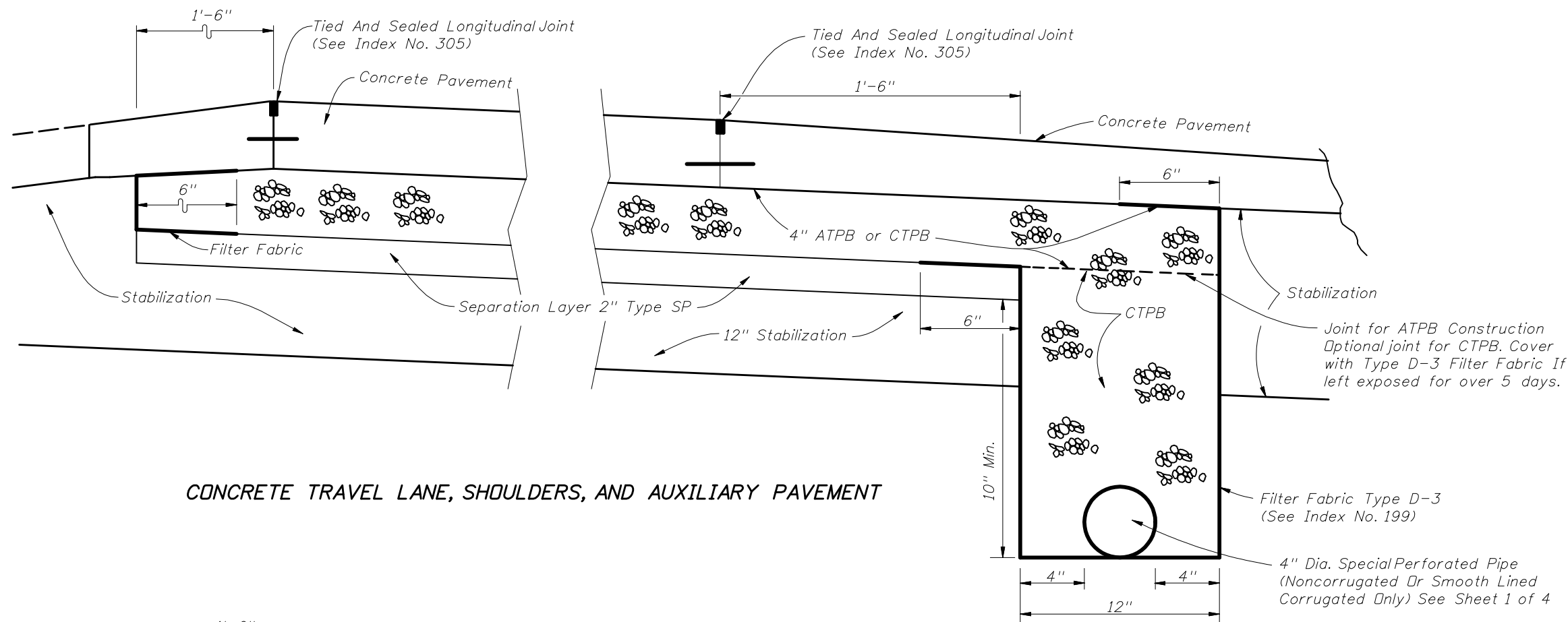
METHOD OF PAYMENT

NEW CONSTRUCTION:

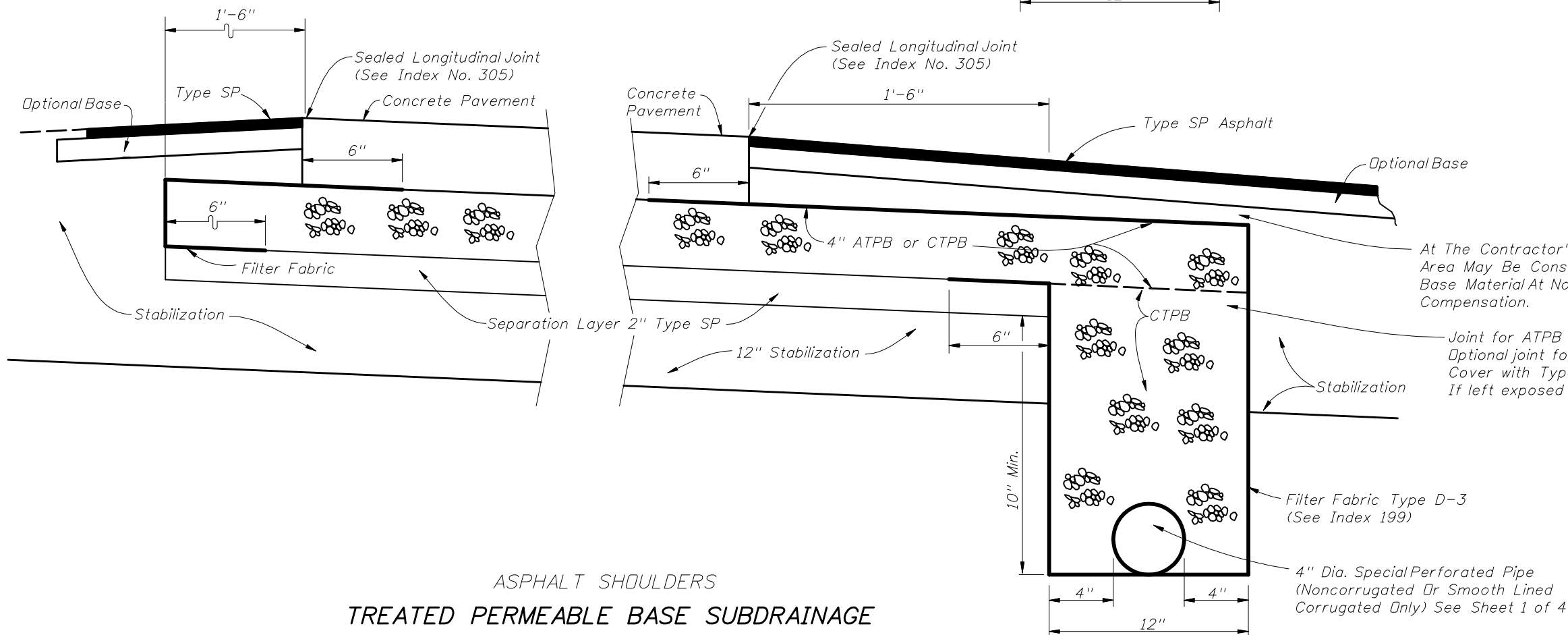
1. The contract unit price for Edgedrain (Draincrete) LF shall be full compensation for trench excavation, disposal of excess material, filter fabric, draincrete edgedrain pipe and fittings and draincrete.

Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 4.
2. Type B-12.5 shall be paid for under the contract unit price for Optional Base.
3. Shoulder pavement shall be paid for under the contract unit price for Type SP, Asphaltic Concrete.





CONCRETE TRAVEL LANE, SHOULDERS, AND AUXILIARY PAVEMENT



ASPHALT SHOULDERS
TREATED PERMEABLE BASE SUBDRAINAGE

GENERAL NOTES FOR TREATED PERMEABLE BASE EDGEDRAIN NEW CONSTRUCTION

1. The contractor shall confine the construction of edgedrain to an area in which the entire operation can be carried out in (5) work days, unless another construction period is called for the plans.

METHOD OF PAYMENT

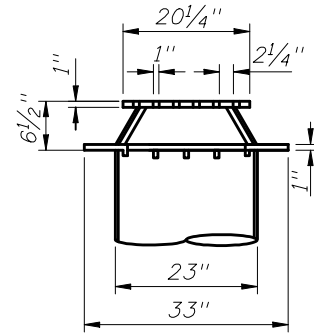
NEW CONSTRUCTION

1. Payment shall be full compensation for trench excavation, disposal of excess materials, filter fabric, pipe and fittings, necessary for concrete pavement subdrainage construction. Payment shall be included in the cost for Asphalt Treated Permeable Base, CY or Cement Treated Permeable Base, CY.

Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 4.

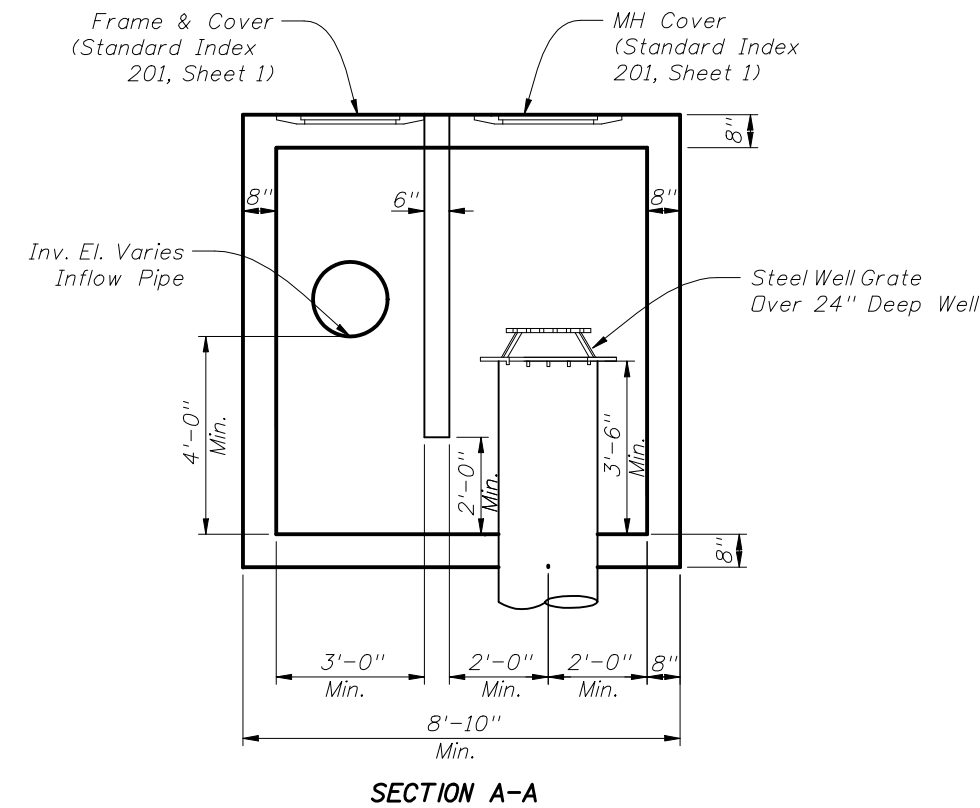
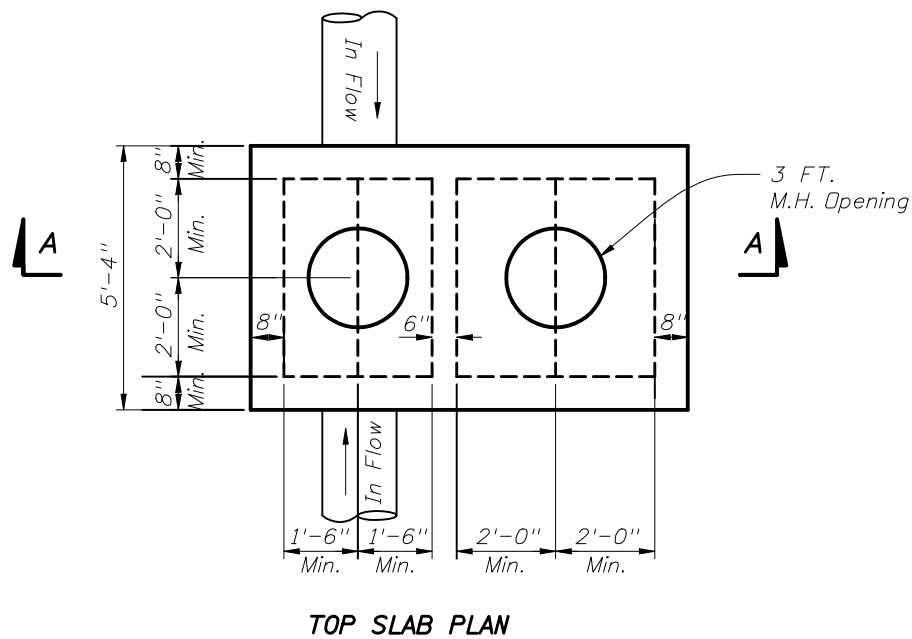
2. Shoulder pavement and separation layer shall be paid for under the contract unit price for Type SP, Asphaltic Concrete.



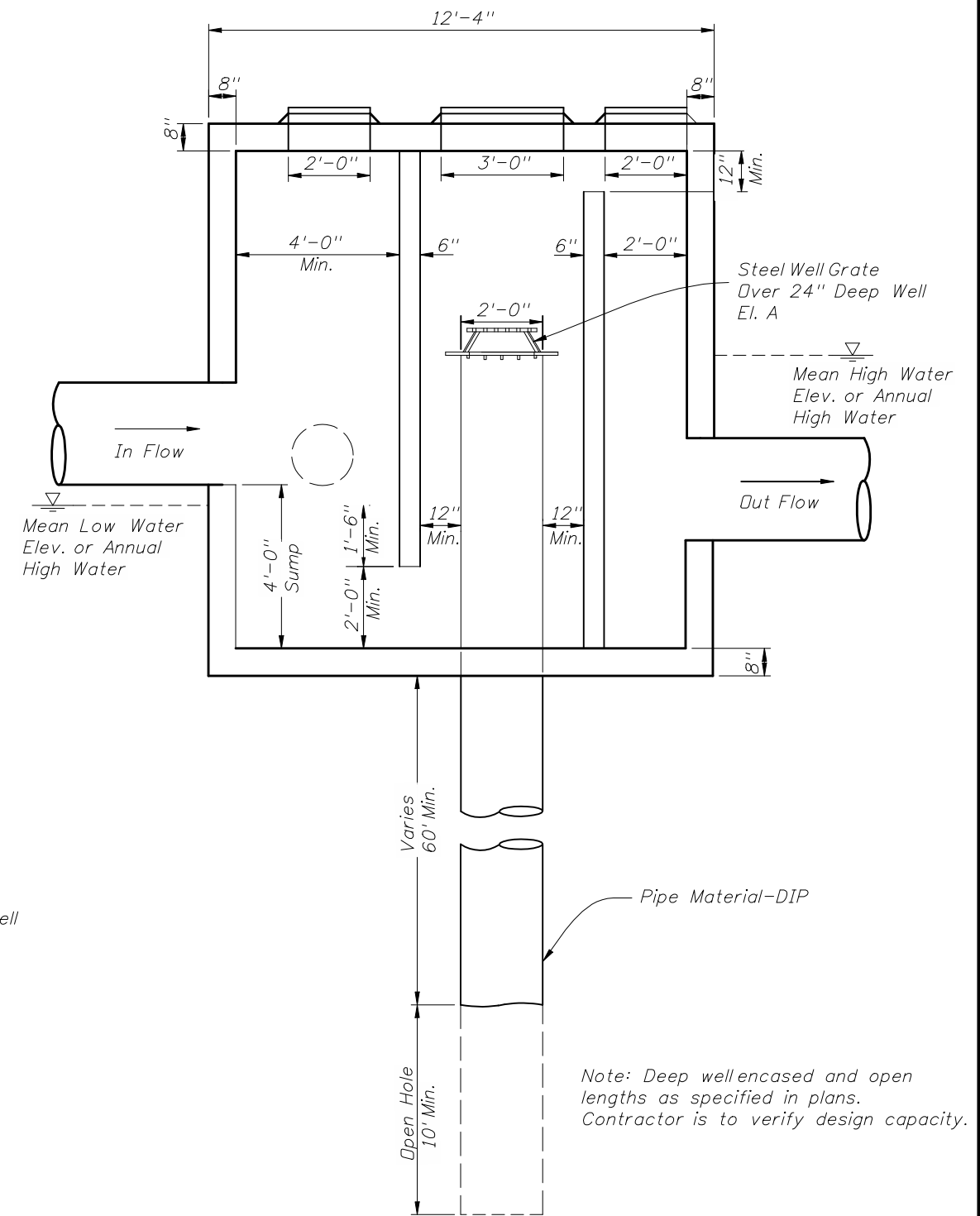


STEEL WELL GRATE DETAIL
NEENAH GRATE CATALOG NO. R-4341-A
OR EQUIVALENT

Note: Steel well grate to be installed over 24" deep well.
Steel grate to be hot dipped galvanized after fabrication.
Cost to be included in the price of casing.



STRUCTURE WITH NO OUTFLOW



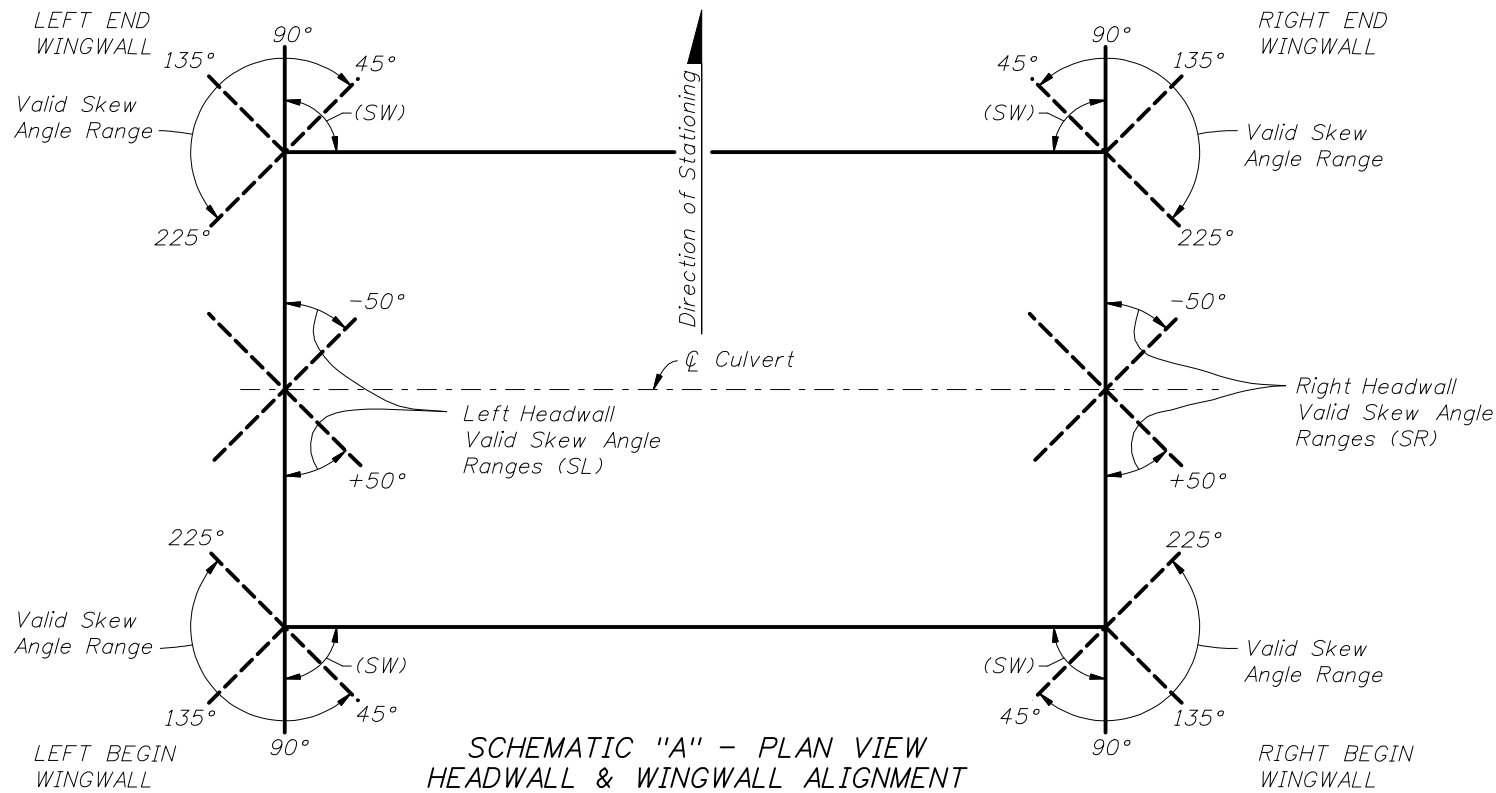
**SPECIAL MANHOLE STRUCTURE
DETAIL WITH OUTFALL**

Design Notes

1. Depth of Casing Varies, 60' min.
2. Depth of Open Hole, 10'-20'.
3. Actual Size Of The Inflow And Outflow Chambers Will Be Determined By The Size Of The Pipes (Refer To Table 3 Of Index 200.) The Width Of The Box Shall Be Constant Based On The Largest Pipe. The Length Is To Be Adjusted Based On Size and Orientation Of The Pipes.

Note: Deep well encased and open lengths as specified in plans.
Contractor is to verify design capacity.





SCHEMATIC "A" - PLAN VIEW HEADWALL & WINGWALL ALIGNMENT

NOTE: All headwall and culvert skew angles are measured in degrees from a line perpendicular to the centerline of culvert (counter-clockwise positive), see Schematic "B".

GENERAL NOTES:

DESIGN SPECIFICATIONS: AASHTO LRFD Bridge Design Specifications, 3rd Edition.

LIVE LOAD: HL-93.

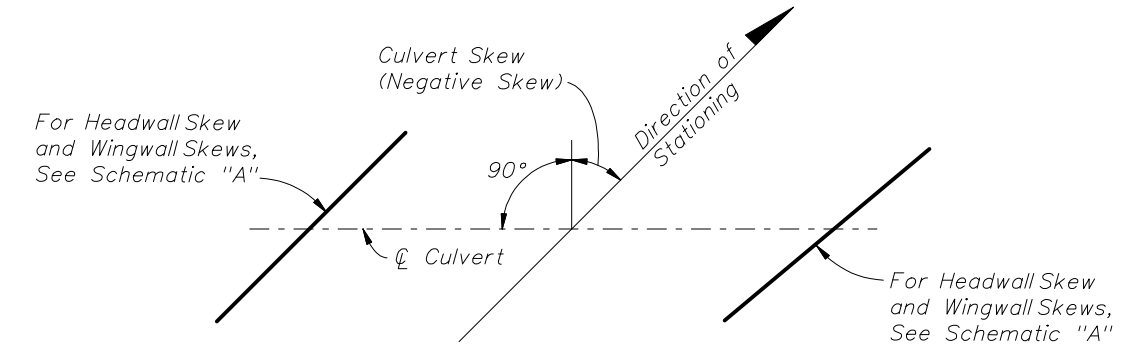
CONSTRUCTION LOADING: It is the construction Contractor's responsibility to provide for supporting construction loads that exceed AASHTO HL-93, and any construction load applied prior to 2 feet of compacted fill placed above the top slab.

SURFACE FINISH: All concrete surfaces shall receive a general surface finish.

SKEWED CONSTRUCTION JOINTS: Construction joints in barrels of culverts with skewed wingwalls may be placed parallel to the headwalls and the reinforcing steel, and the slabs may be cut provided that the cut reinforcing steel extends beyond the construction joint enough for splices to be made in accordance with Table 1 on this sheet. The cost of construction joints and additional reinforcing shall be at the expense of the Contractor.

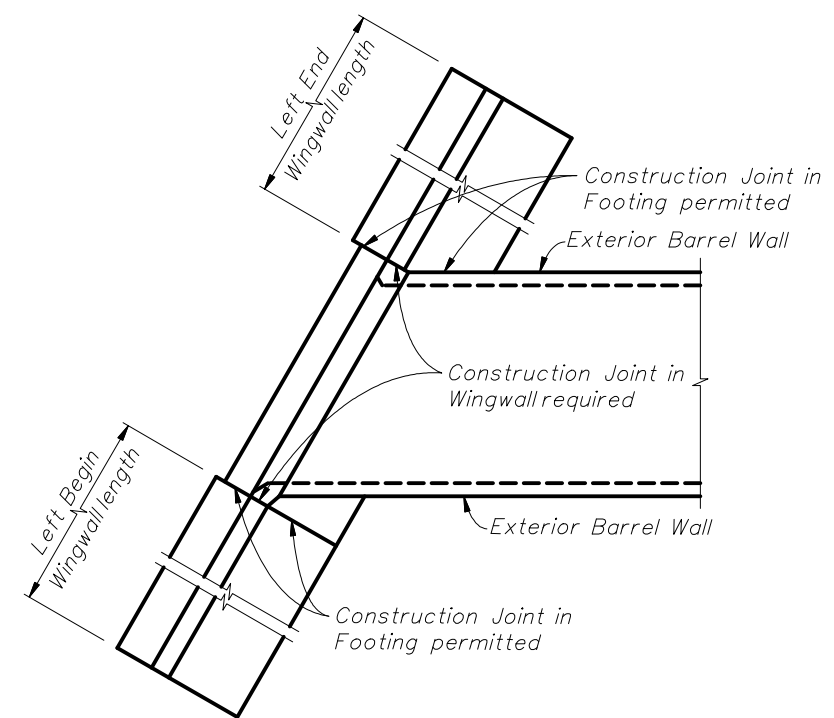
CULVERT EXTENSIONS: For cut backs and ties into existing concrete box culverts see Sheet 6 of 7.

REINFORCING STEEL: ASTM A615, see the "Box Culvert Data Tables" in the Contract Plans for grade and bar spacing. See the Reinforcing Bar List in the Contract Plans for bar sizes and bar bending details.



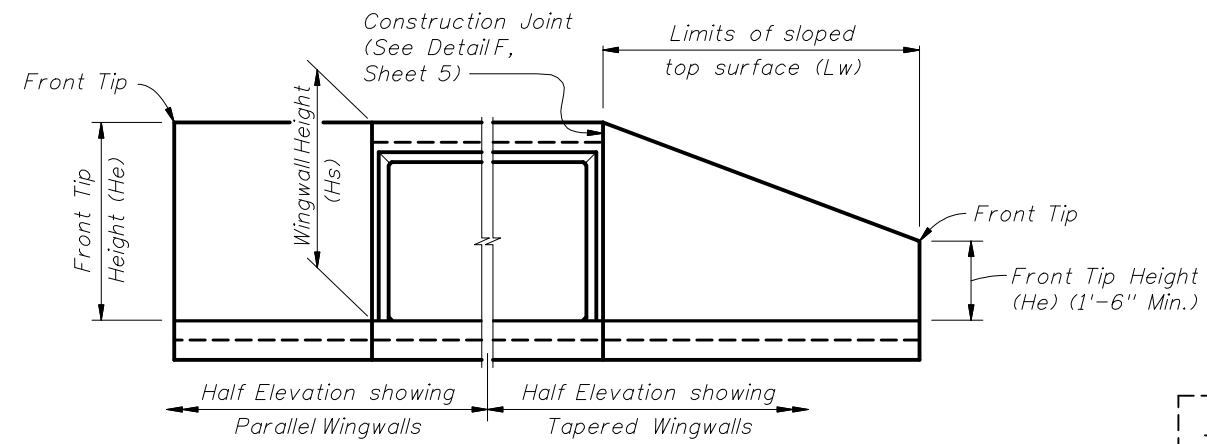
SCHEMATIC "B" - PLAN VIEW CULVERT ALIGNMENT

NOTE: For Culvert Skew see Contract Plans.



PART PLAN SHOWING PARALLEL WINGWALLS AND LOCATION OF CONSTRUCTION JOINTS

NOTE: Construction Joints in wingwalls and footings are located as follows: For non-skewed wingwalls they are located adjacent to the exterior face of the exterior barrel wall; when the centerline of wingwall and centerline of exterior barrel wall results in an acute angle see Left End Wingwall above, and when the angle is obtuse see Left Begin Wingwall above and Detail C (Sheet 5).



END ELEVATION OF CULVERT

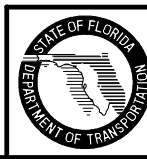
TABLE 1 - MINIMUM BAR SPLICE LENGTHS FOR LONGITUDINAL REINFORCING

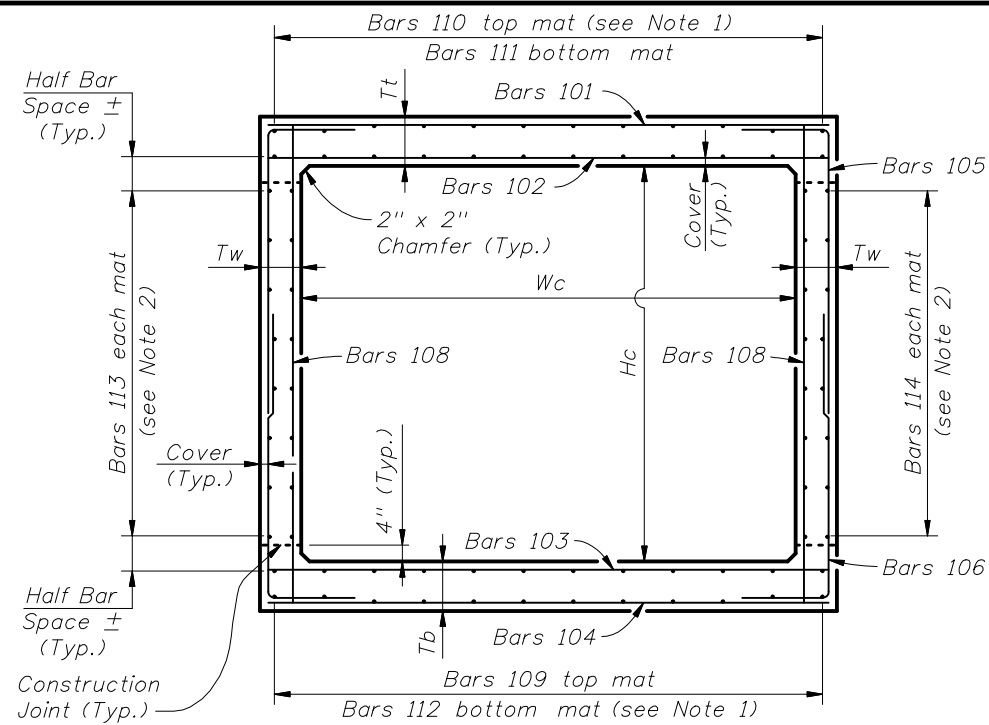
BAR SIZE	SPLICE (CLASS B)		BAR SIZE	SPLICE (CLASS B)	
	CLASS II (3400 psi)	CLASS IV (5500 psi)		CLASS II (3400 psi)	CLASS IV (5500 psi)
#3	1'-0"	1'-0"	#8	3'-6"	2'-9"
#4	1'-4"	1'-4"	#9	4'-5"	3'-6"
#5	1'-8"	1'-8"	#10	6'-7"	4'-5"
#6	1'-11"	1'-11"	#11	7'-10"	6'-5"
#7	2'-8"	2'-3"			

TABLE 1 NOTE: Splice lengths are based on an AASHTO Class B tension lap splice for the Specification Section 346 concrete class shown.

INSTRUCTIONS TO DESIGNER

1. Designs for box culverts shown in this Index are to be produced only by computer analysis, utilizing the Department's LRFD Box Culvert Program. Designs are to be limited to the live loads and dimensional restraints shown in the General Notes of this Index and to the fill on the barrel(s), as shown in the Contract Plans.
2. Headwalls with skew angles less than -50° or greater than +50° require special design authorization. Other design options should be considered. Contact the District Drainage Engineer to obtain authorization.

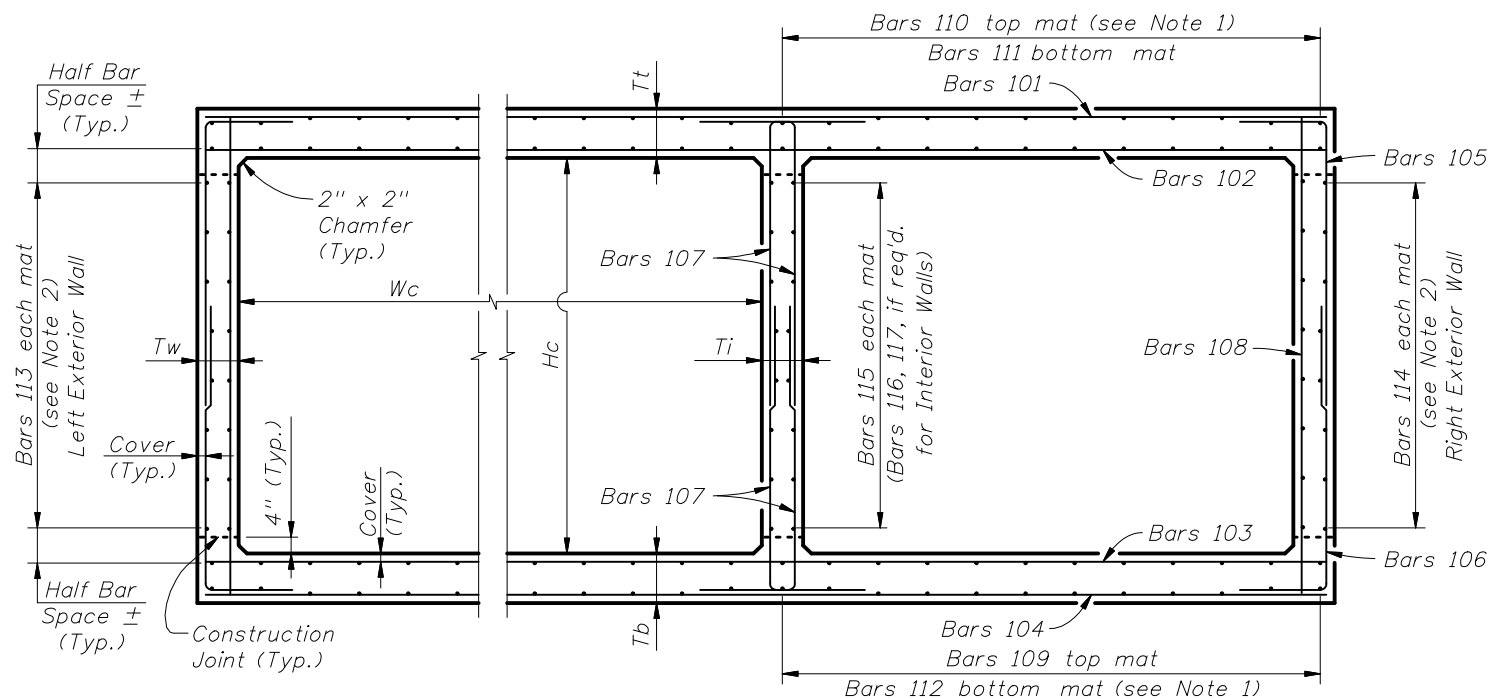




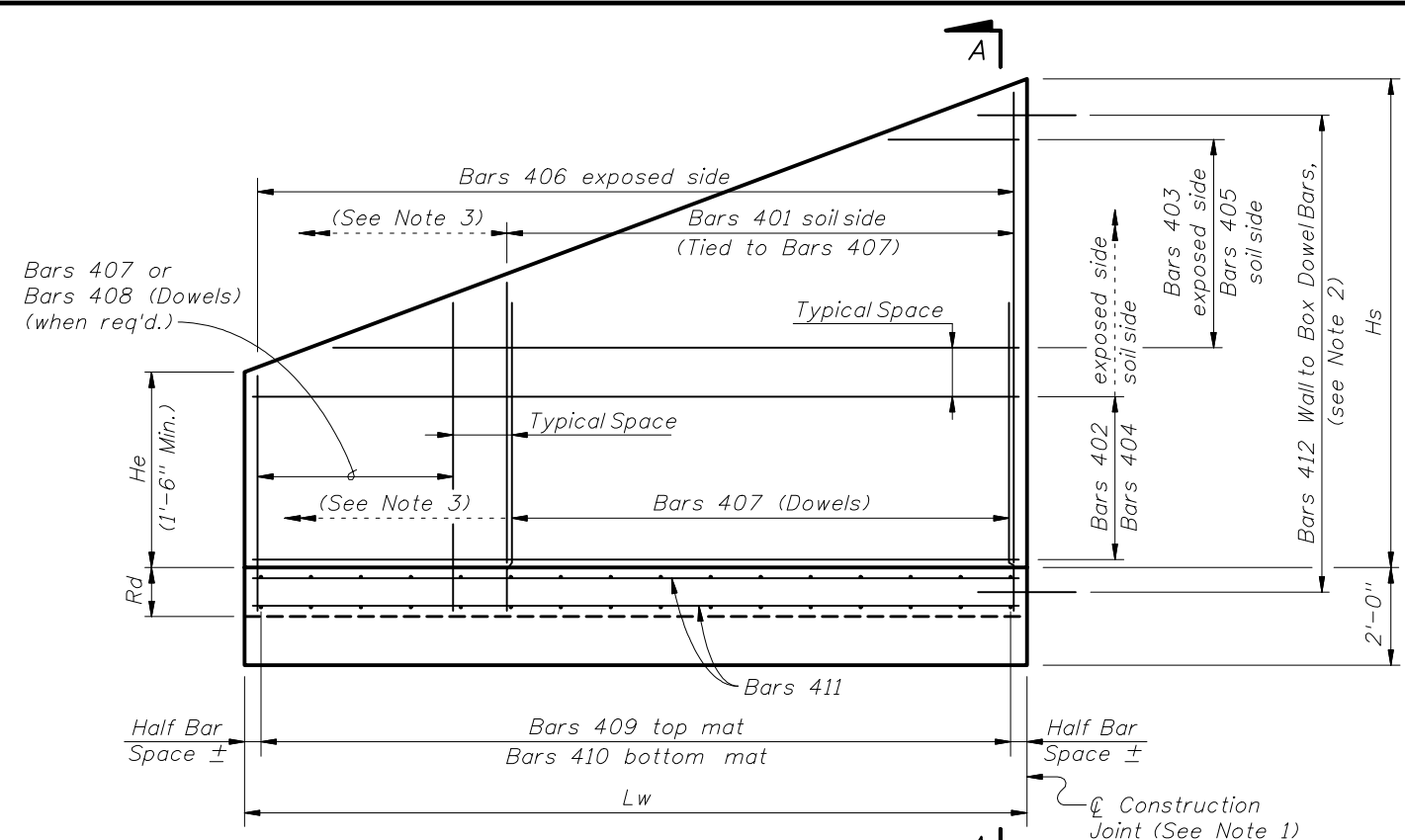
TYPICAL SECTION THRU SINGLE BARREL CULVERT

CULVERT BARREL NOTES:

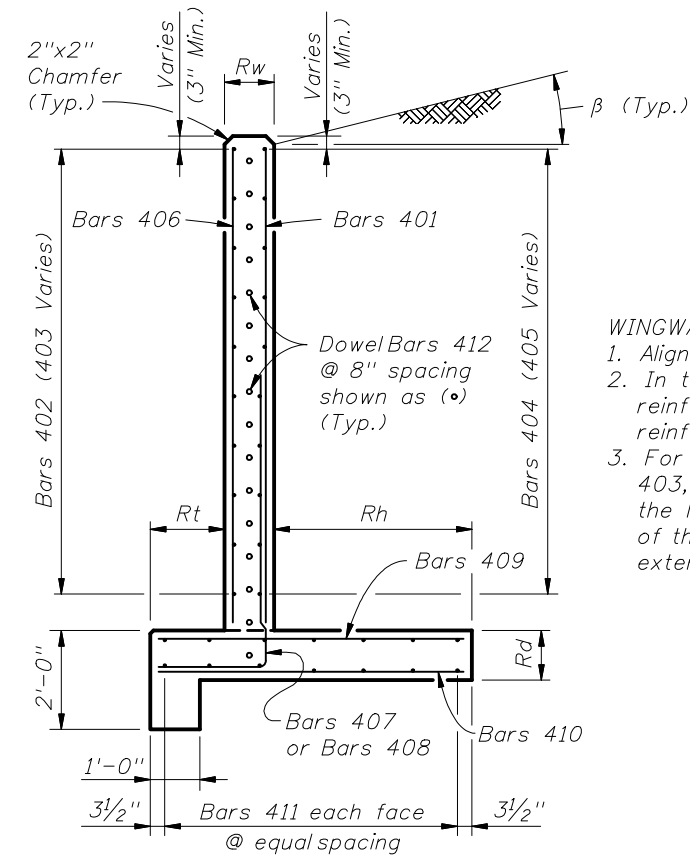
1. Space Bars 110 and 112 with a bar in each corner, and at the C of interior walls (for multiple barrel culverts only), and the remaining bars placed at equal spacing shown in the Contract Plans. Adjust last bar spacing when required.
2. Place Bars 113 and 114 at spacing shown in the Contract Plans evenly between Bars 109 and 111.
3. Locate the first transverse bar from the ends of the culvert at one half the bar spacing, but provide the minimum reinforcement cover and not greater than 4" clear.



TYPICAL SECTION THRU MULTIPLE BARREL CULVERT



WINGWALL ELEVATION - Variable Height
(Left End shown - other corners similar)

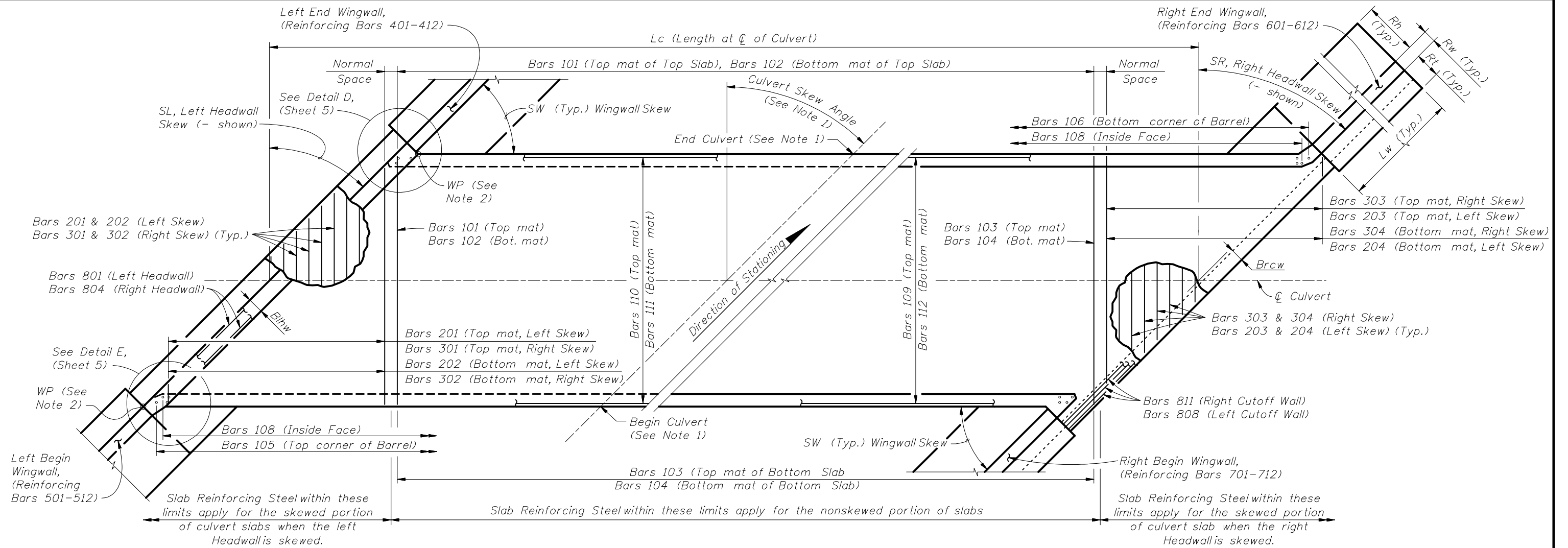


WINGWALL SECTION A-A

WINGWALL NOTES:

1. Align construction joint perpendicular to wingwall.
2. In the vicinity of the construction joint, field bend reinforcement as necessary to maintain minimum reinforcement cover.
3. For constant height wingwalls, variable length Bars 403, 405 & 408 are not required, and as such the limits of Bars 401 & 407 extend the full length of the wingwall, and the limits of Bars 402 & 404 extend to the full height of the wingwall.



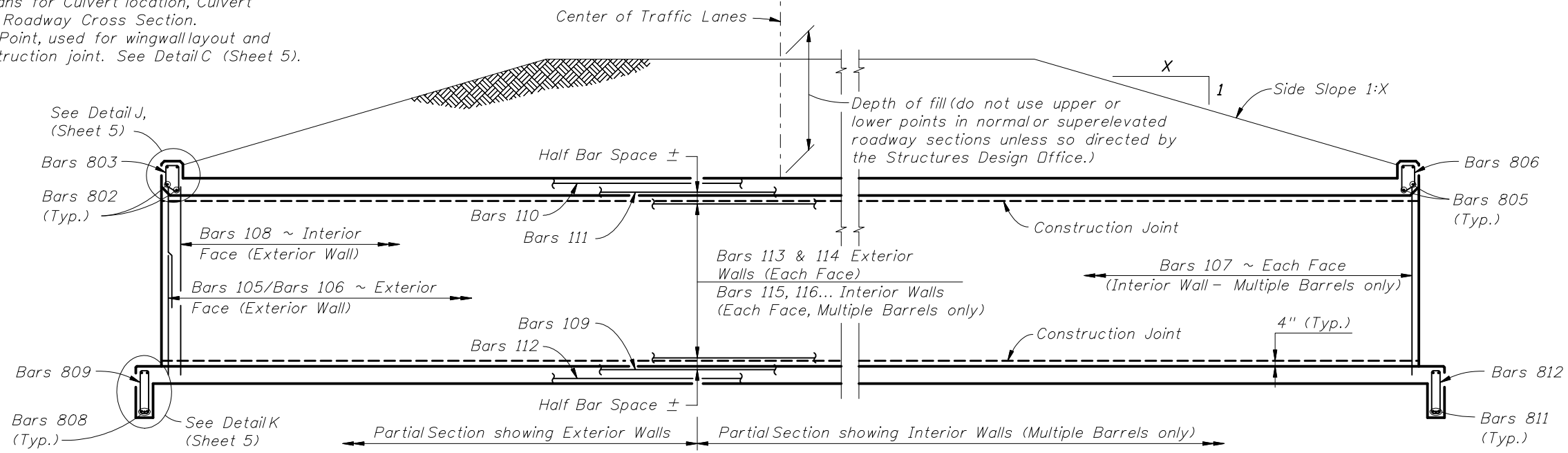


PARTIAL PLAN TOP SLAB
(Left Side, Left Skew)

PARTIAL PLAN BOTTOM SLAB
(Right Side, Right Skew)

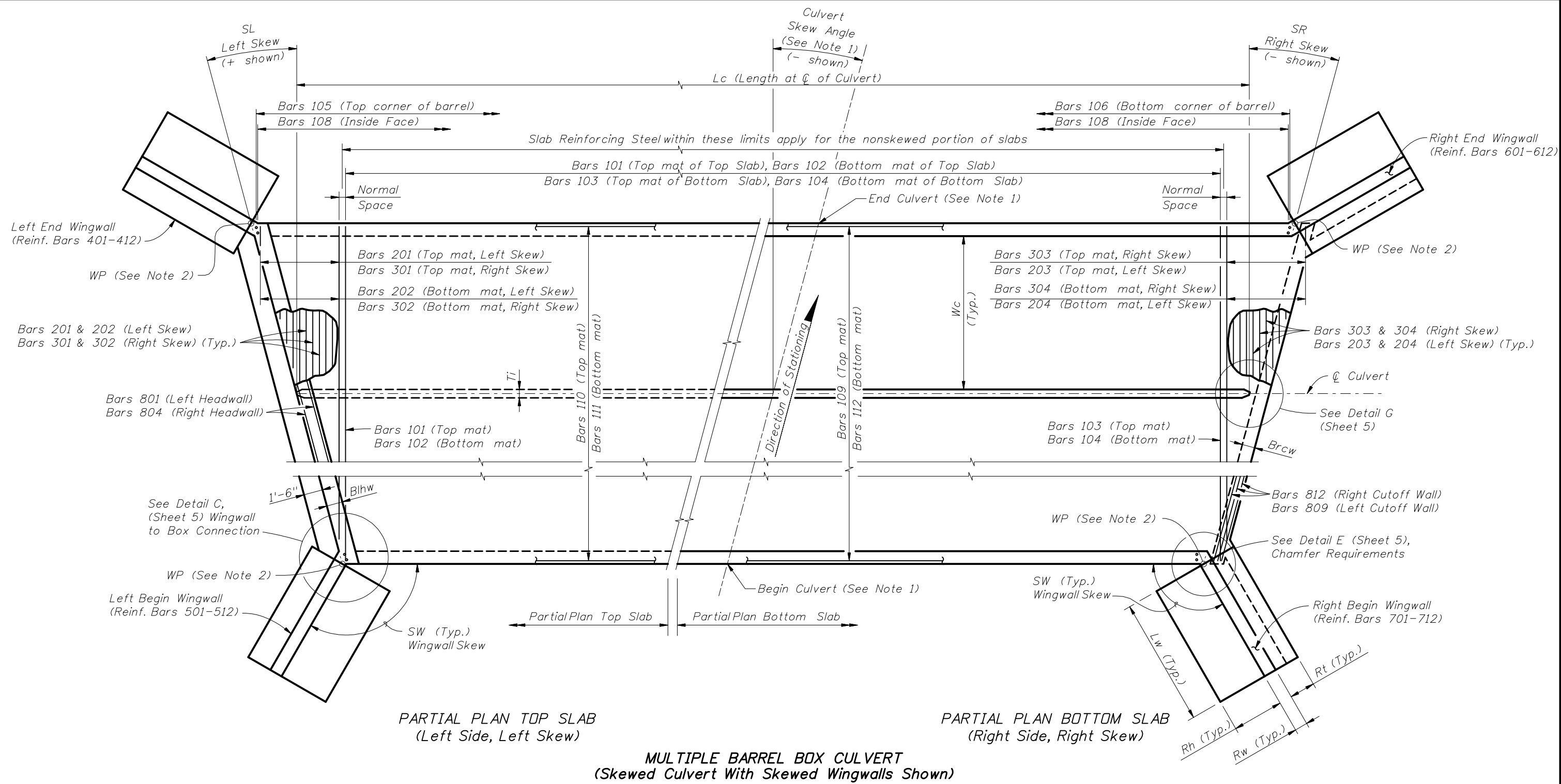
SINGLE BARREL BOX CULVERT
(Skewed Culvert With Parallel Wingwalls Shown)

- NOTES:**
1. See Contract Plans for Culvert location, Culvert Skew Angle and Roadway Cross Section.
 2. WP = Working Point, used for wingwall layout and location of construction joint. See Detail C (Sheet 5).



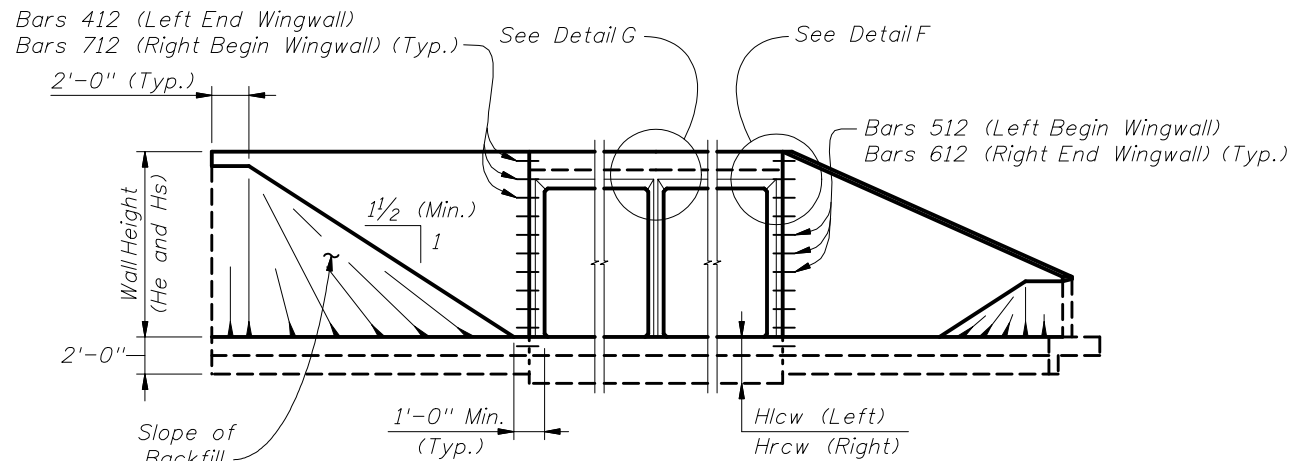
LONGITUDINAL SECTION THRU CULVERT
(Transverse Top & Bottom Slab Reinforcing Not Shown For Clarity)



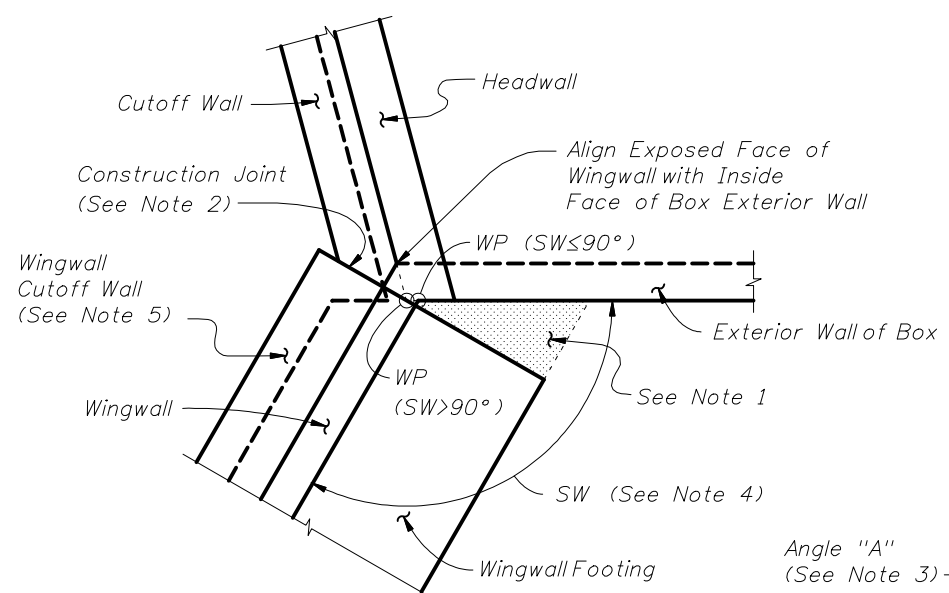


- NOTES:
1. See Contract Plans for Culvert Location, Culvert Skew Angle and Roadway Cross Section.
 2. WP = Working Point, used for wingwall layout and location of construction joint. See Detail C (Sheet 5).

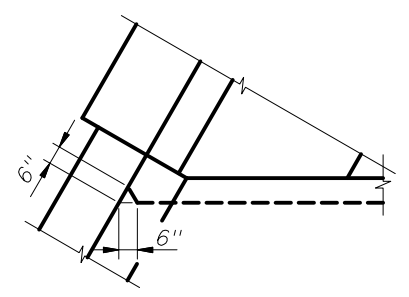




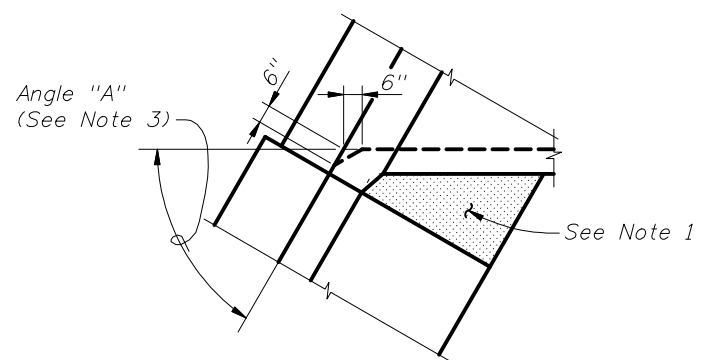
END ELEVATION
 (Showing Constant Height And Variable Height Wingwalls)



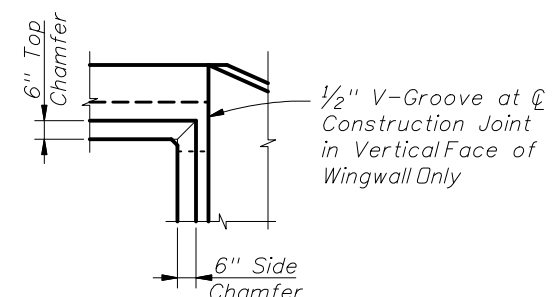
DETAIL C - PLAN VIEW
 WINGWALL TO BOX CONNECTION
 (Left Begin Corner Shown, Other Corners Similar)



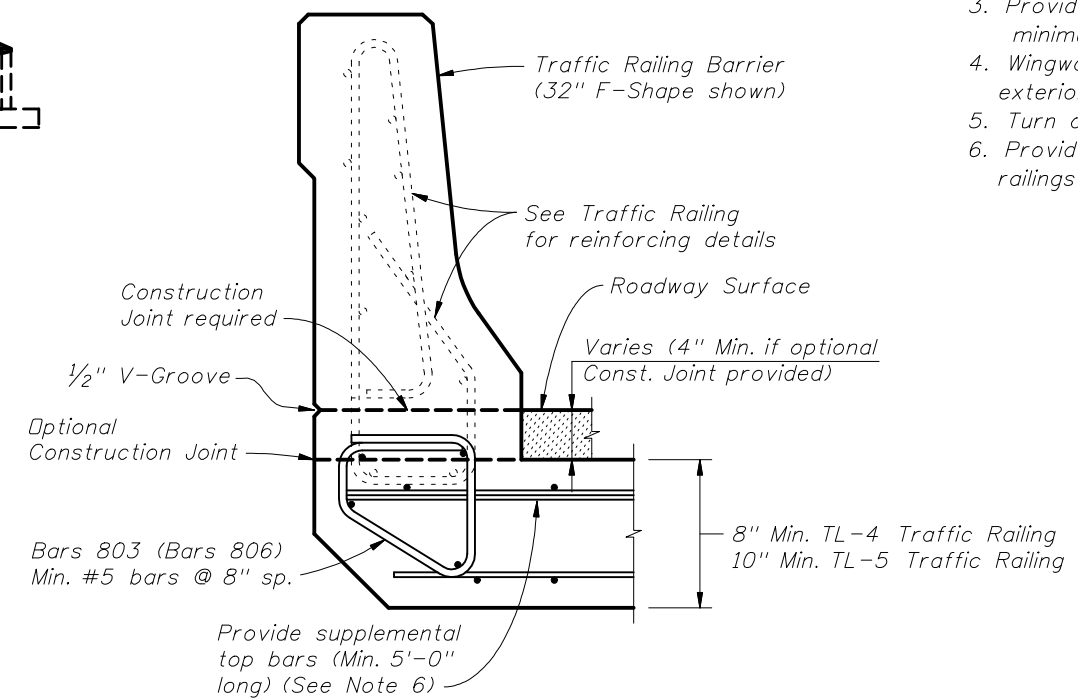
DETAIL D



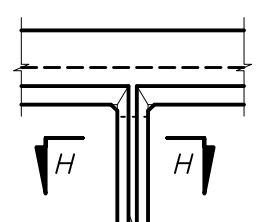
DETAIL E



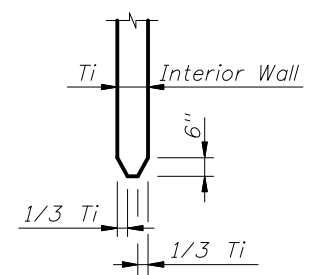
DETAIL F



DETAIL I
 TRAFFIC RAILING
 ATTACHMENT TO HEADWALL



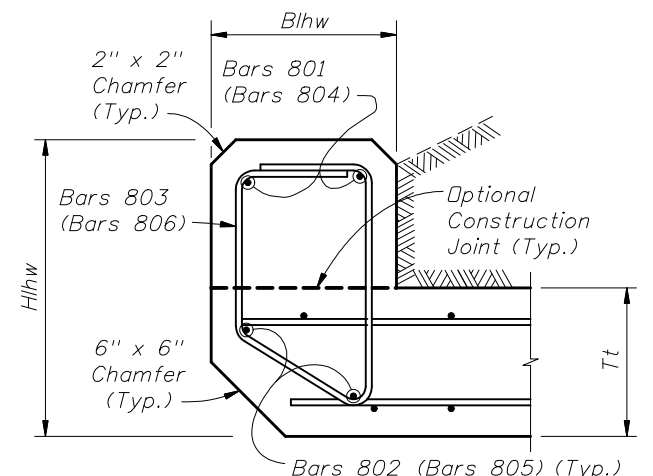
DETAIL G



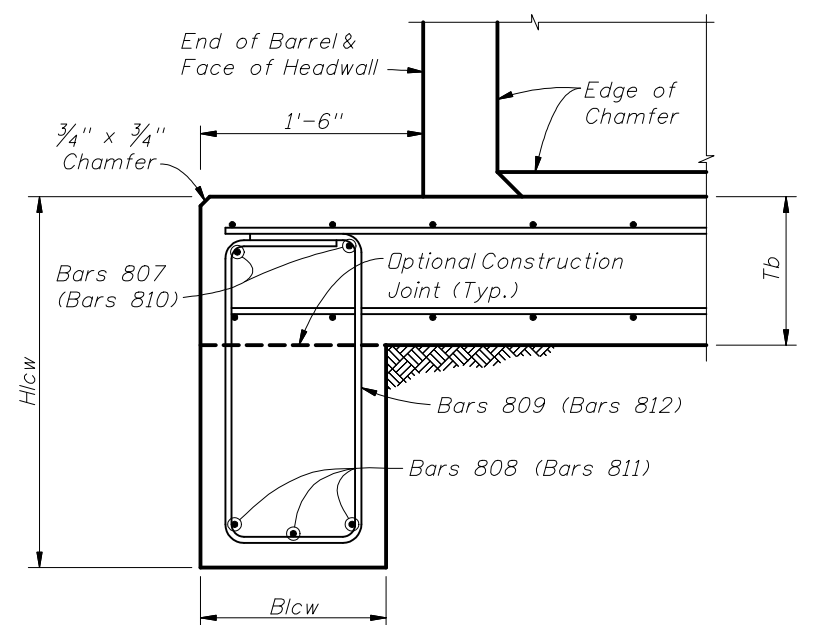
SECTION H-H

NOTES:

1. For small angles, the Contractor may elect to fill the area between the box and the wingwall footing with unreinforced concrete. For wingwall skew angles less than 90 degrees, field bend wingwall reinforcement as necessary while maintaining cover. No additional payment will be made for this work.
2. Location of Construction Joint determined by WP at theoretical intersection of:
 - Soil side face of Headwall and outside face of Box Exterior Wall, for SW ≤ 90°;
 - Outside face of Wingwall and outside face of Box Exterior Wall, for SW > 90°.
3. Provide 6" chamfer when angle "A" is greater than 45°. Maintain minimum wall thickness. Field adjust reinforcing to maintain cover.
4. Wingwall Skew Angles (SW) are measured from the adjacent box exterior wall to the wingwall.
5. Turn or extend Wingwall Cutoff Wall as necessary to meet Box Cutoff Wall.
6. Provide additional reinforcement in the top of the top slab below traffic railings to ensure a minimum area of 0.80 sq. in./ft. transverse reinforcing.



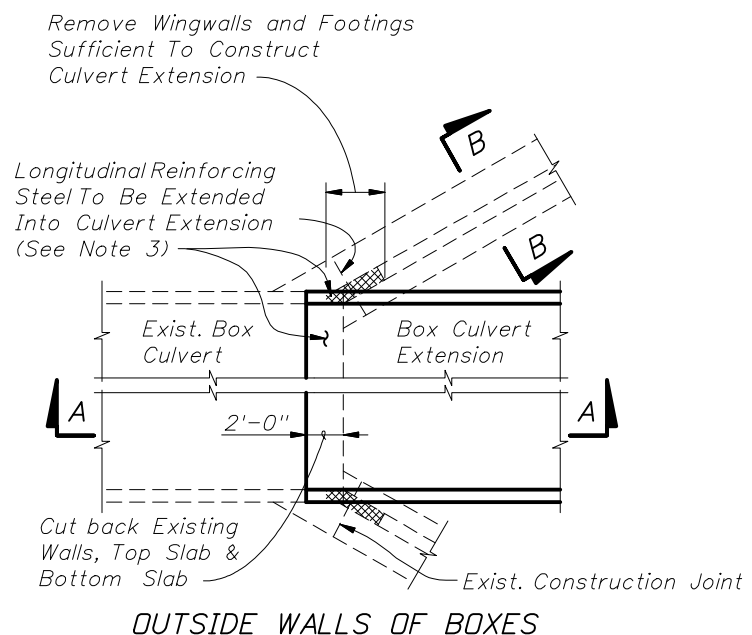
DETAIL J
 LEFT HEADWALL SECTION
 (Right Headwall similar)



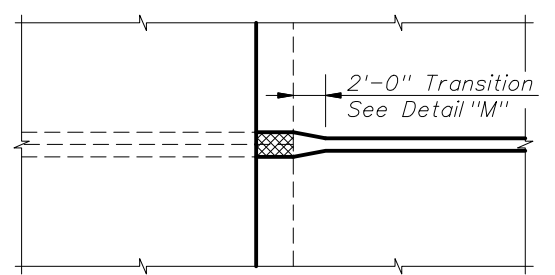
DETAIL K
 LEFT CUTOFF WALL SECTION
 (Right Cutoff Wall similar)

CROSS REFERENCE:
 See Sheet 3 for locations of Details D, E, J & K.
 See Sheet 4 for locations of Detail C.

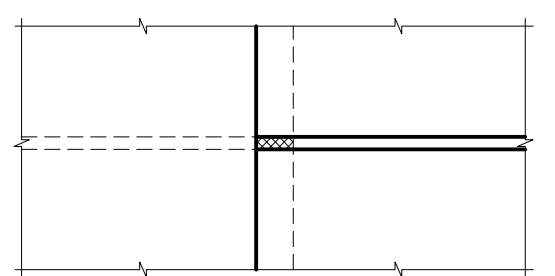




OUTSIDE WALLS OF BOXES

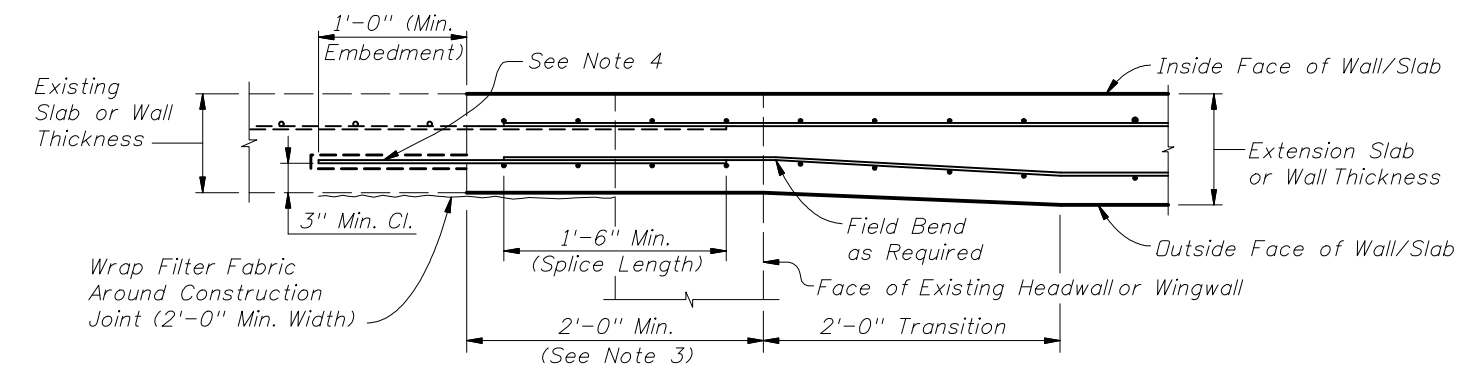


INTERIOR DOUBLE WALLS OF BOXES

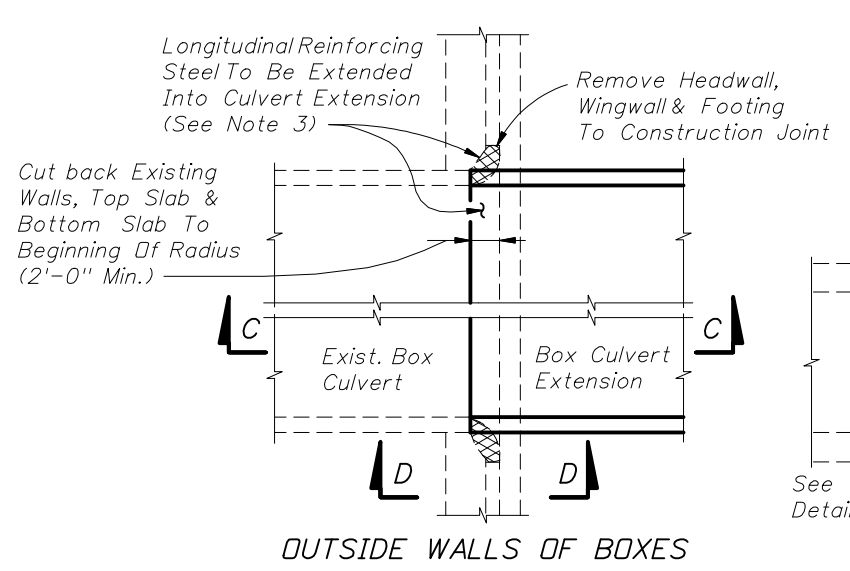


INTERIOR SINGLE WALLS OF BOXES

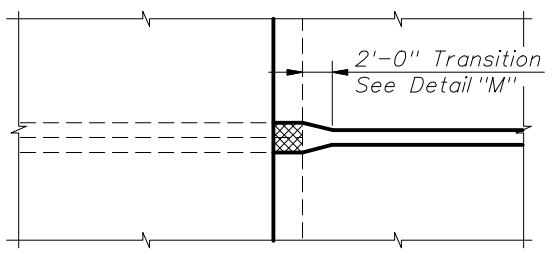
PLAN VIEWS



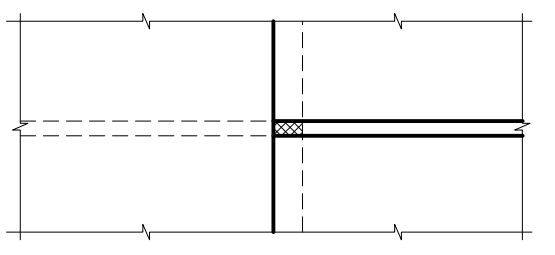
DETAIL "L" - TRANSITION FOR EXTERIOR WALL/SLAB EXTENSION



OUTSIDE WALLS OF BOXES

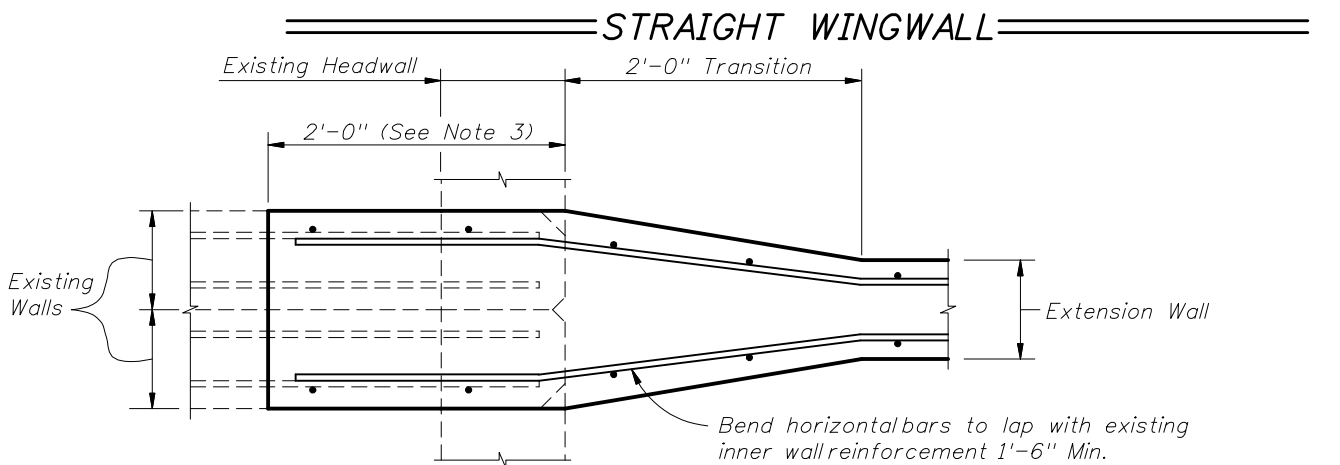


INTERIOR DOUBLE WALLS OF BOXES

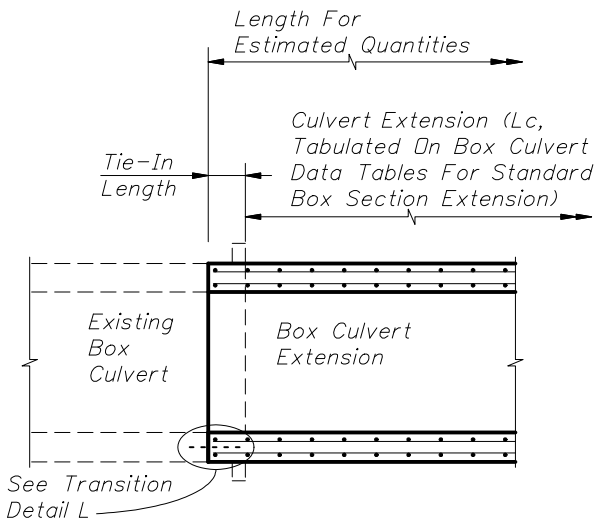


INTERIOR SINGLE WALLS OF BOXES

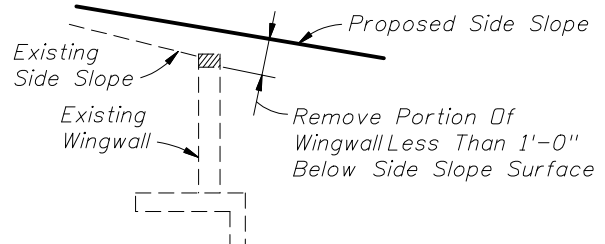
PLAN VIEWS



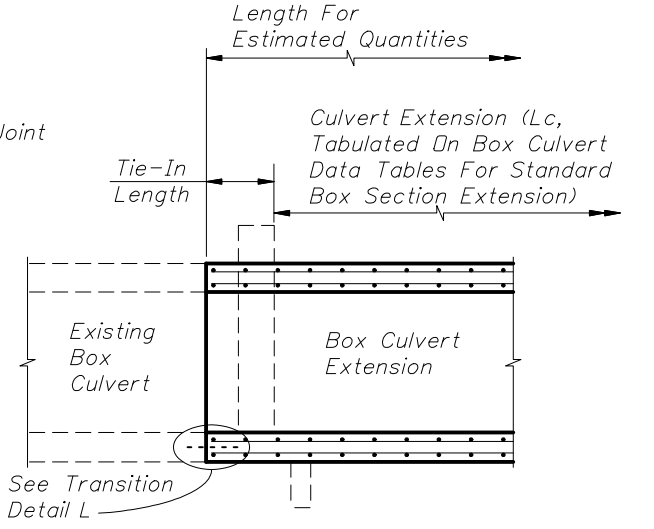
DETAIL "M" - TRANSITION FOR INTERIOR DOUBLE WALLS OF BOX CULVERTS



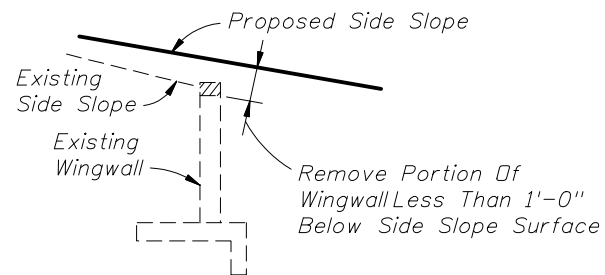
SECTION A-A



SECTION B-B



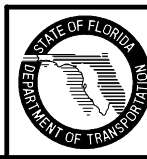
SECTION C-C

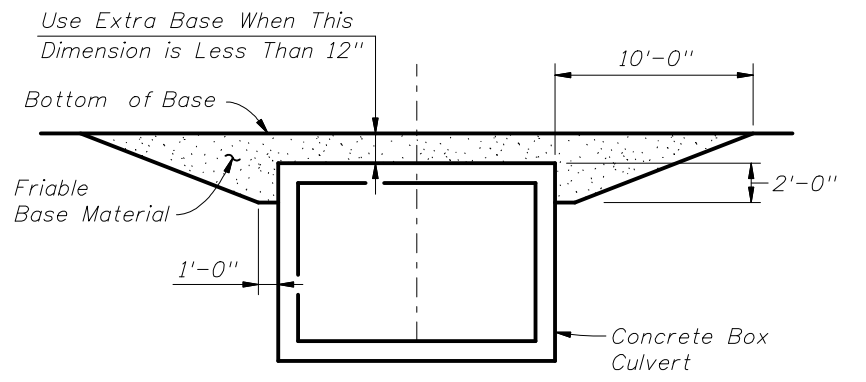
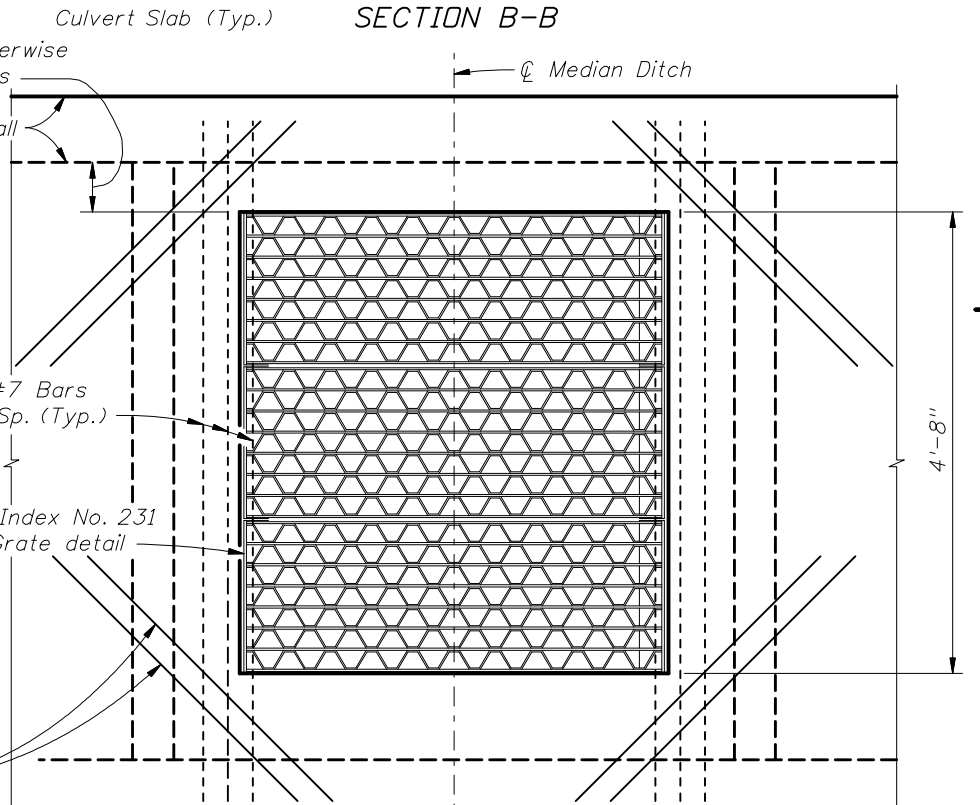
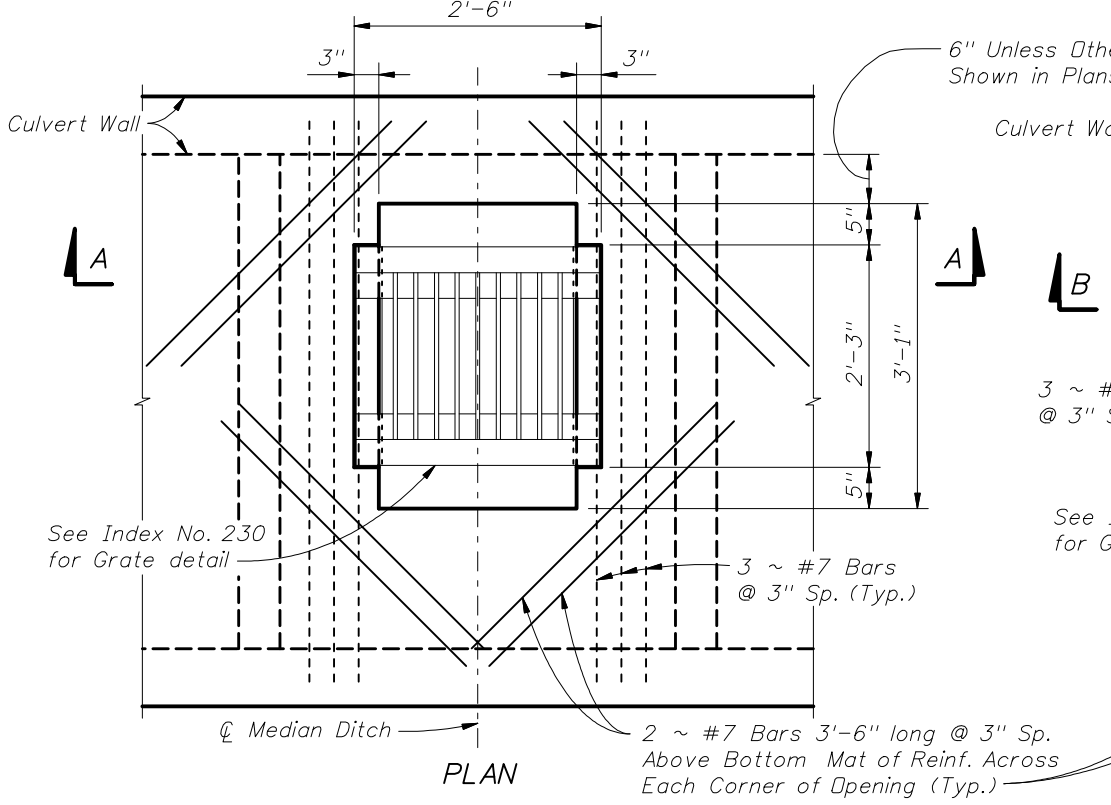
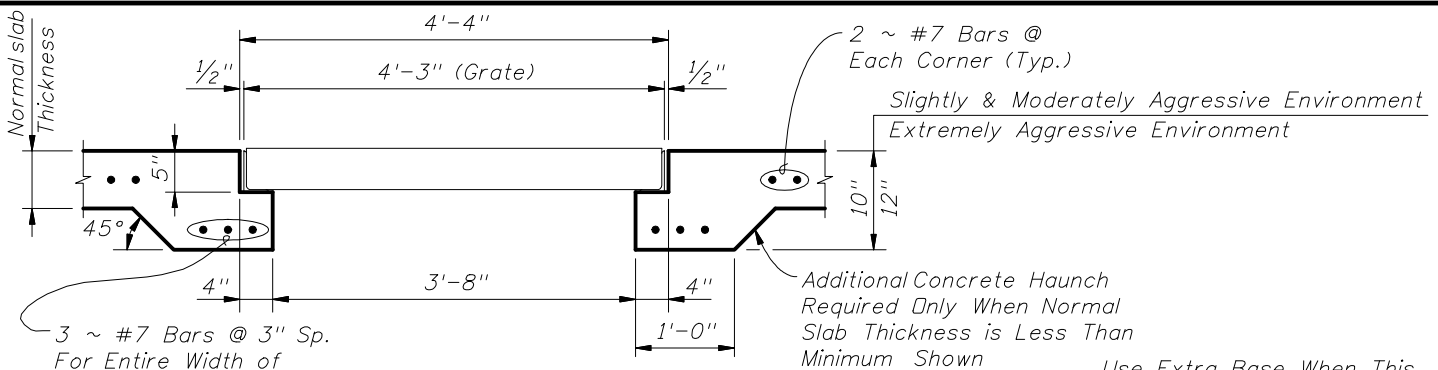
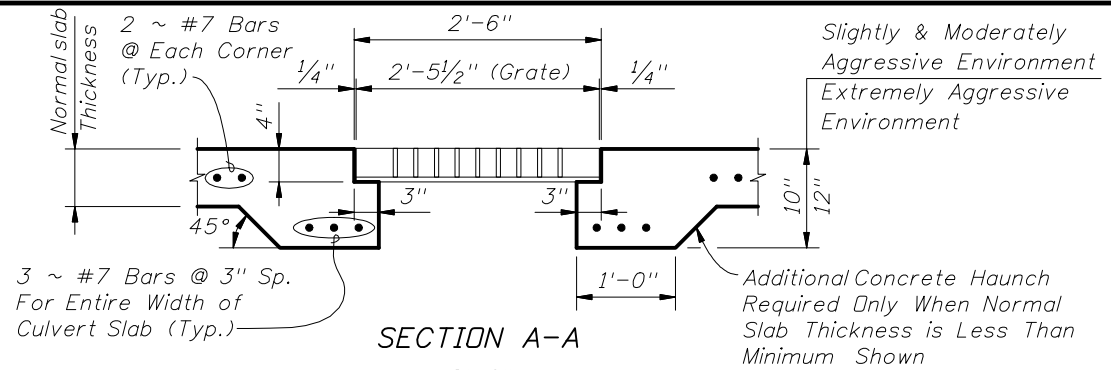


SECTION D-D

- NOTES:
1. The Box Culvert Data Tables and Reinforcing Bar List do not include the additional quantities needed for dowel connections or transitions from double walls of existing concrete box culverts; the cost for additional reinforcement and the thickened concrete wall in the transitional area shall be included in the costs for concrete and steel in the culvert extension.
 2. Cost for removal and disposal of material from existing headwalls, wingwalls and box, and cost of cleaning, straightening and extending or doweling longitudinal reinforcing steel shall be included in the cost for concrete and steel of the culvert extension.
 3. Remove existing concrete while avoiding damage to existing reinforcement. Clean and straighten existing reinforcement, lap and tie onto extension reinforcement.
 4. Dowel in #4 Bars @ 1'-0" max. spacing into center of wall/slab when there is a single mat of existing reinforcing steel, otherwise splice 1'-6" as shown for inside reinforcement. Use an Adhesive Bonding Material System in accordance with Specifications Section 416 & 937.

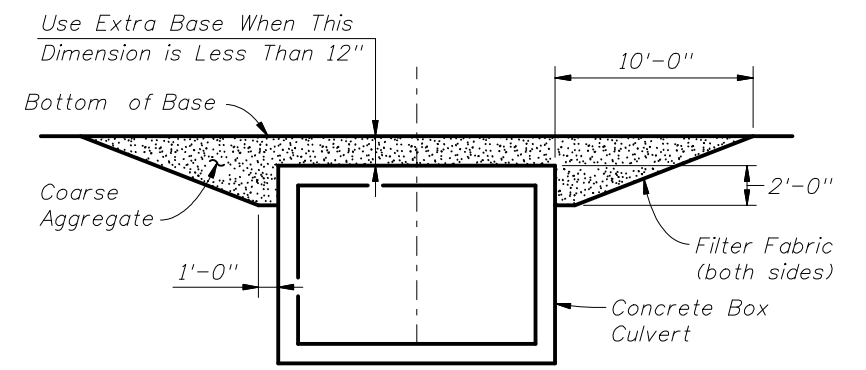
CONNECTION DETAILS FOR CONCRETE BOX CULVERT EXTENSIONS





The cost of furnishing and installing extra friable base material shall be included in the cost of the Box Culvert.

FRIBLE BASE



Place coarse aggregate in 6 inch lifts and compact sufficiently as to be firm and unyielding. Provide coarse aggregate gravel or stone meeting the requirements of Section 901-2 or 901-3 respectively. Meet the gradation requirements of Section 901-6, Grades 4, 467, 5, 56 or 57 unless restricted in the plans. Provide Type D-3 filter fabric (see Index No. 199). The cost of furnishing and installing the coarse aggregate and filter fabric shall be included in the cost of the Box Culvert.

ASPHALTIC CONCRETE BASE

NOTE: Extra base is required when cross box culverts are located on facilities subject to high speed traffic (>45 mph) or high traffic volumes (>1600 ADT) and the cover is within the range specified in the notation above.

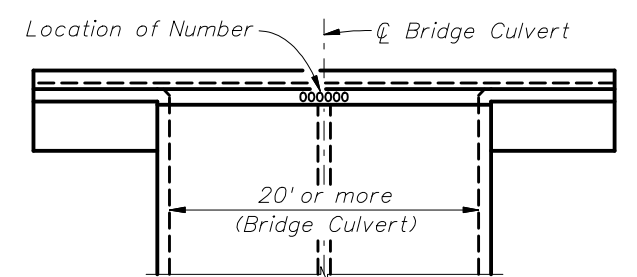
EXTRA BASE FOR BOX CULVERTS CROSSING UNDER FLEXIBLE PAVEMENT

INLET TYPE A GRATE

INLET TYPE B GRATE

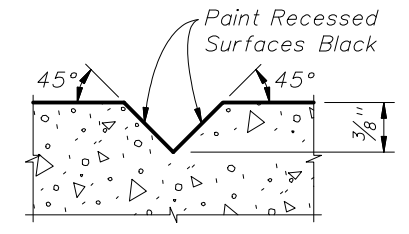
- NOTES:
1. Cost of Steel Grating to be included in cost of Box Culvert.
 2. All reinforcing shall be 2" clear for Slightly and Moderately Aggressive Environments, and 3" clear for Extremely Aggressive Environments.

INLET IN TOP OF BOX CULVERT



The number is to be placed in the center of the top surface of all bridge culvert headwalls. For Bridge Number see Plan-Profile sheet(s).

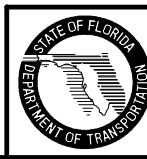
TOP VIEW OF HEADWALL

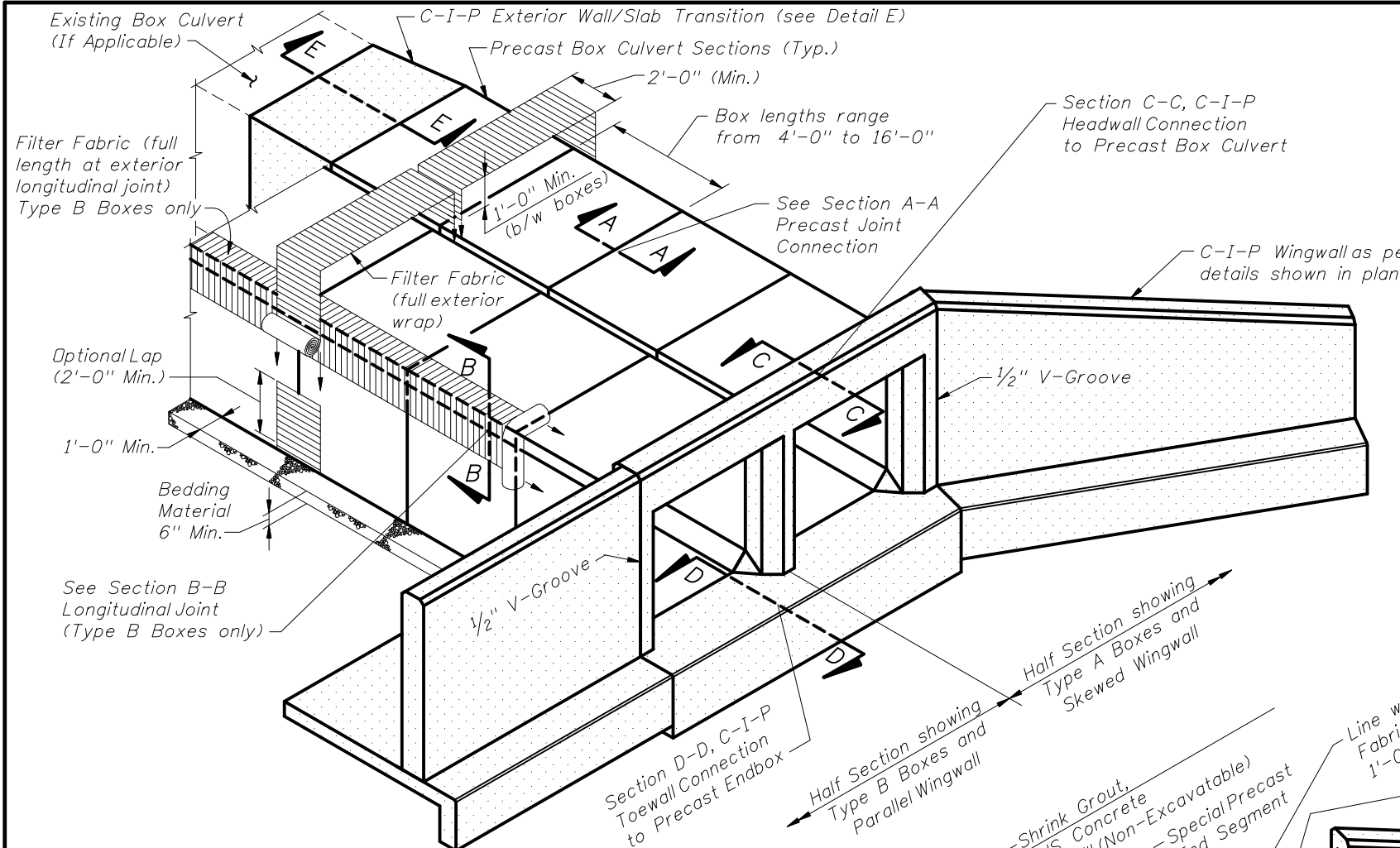


SECTION THRU RECESSED V-GROOVE TO FORM INSCRIBED FIGURES

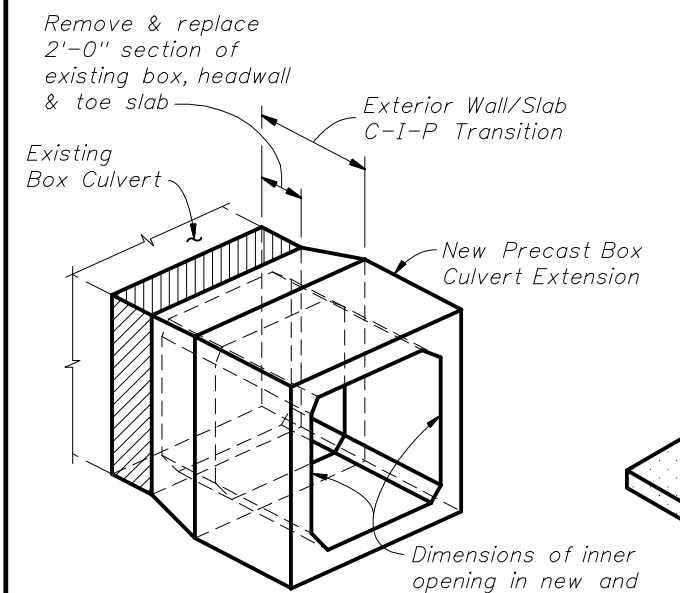
Black Plastic Figures 3" in height as approved by the Engineer may be used in lieu of numbers formed by 3/8" V-Grooves. V-Grooves shall be formed by preformed figures.

BRIDGE CULVERT NUMBER LOCATION

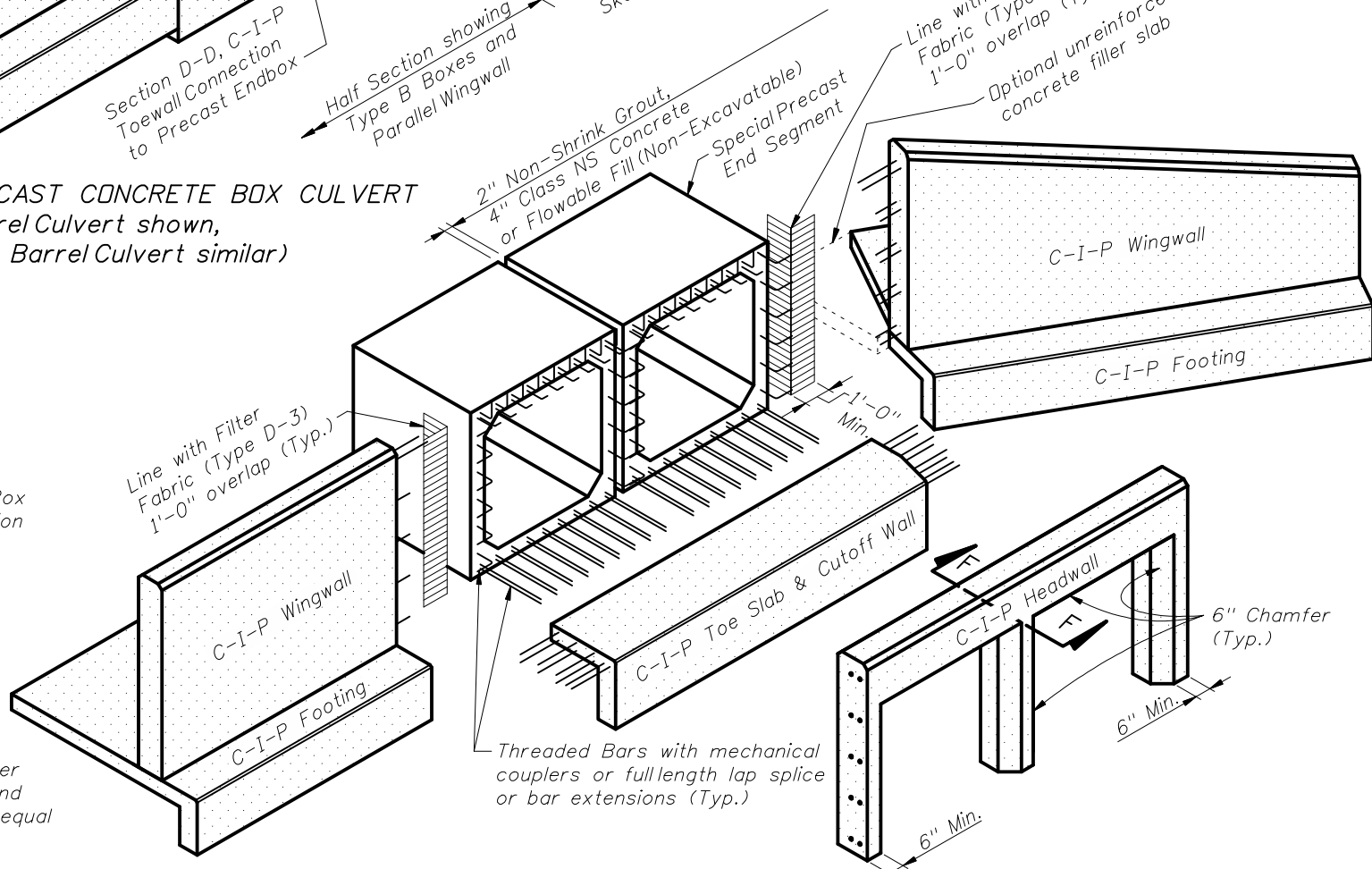




ISOMETRIC VIEW OF PRECAST CONCRETE BOX CULVERT
(Double Barrel Culvert shown,
Single or Multiple Barrel Culvert similar)



DETAIL E
PICTORIAL VIEW OF EXTERIOR
WALL/SLAB TRANSITION



EXPLODED VIEW OF CONNECTIONS AT END OF CULVERT
(Double Barrel Culvert shown, Single or Multiple Barrel Culvert similar)

PERMITTED PRECAST ALTERNATE BOX SECTIONS				
TYPE	DESCRIPTION	SINGLE BARREL	MULTIPLE BARRELS	DESIGN NOTES
A	Single Cell Monolithic (Four Sided)			Index No. 292 or Contractor Design
B	Single Cell Two-Piece (Four Sided)			Contractor Design
C	Multicell Monolithic	Not Applicable		Contractor Design

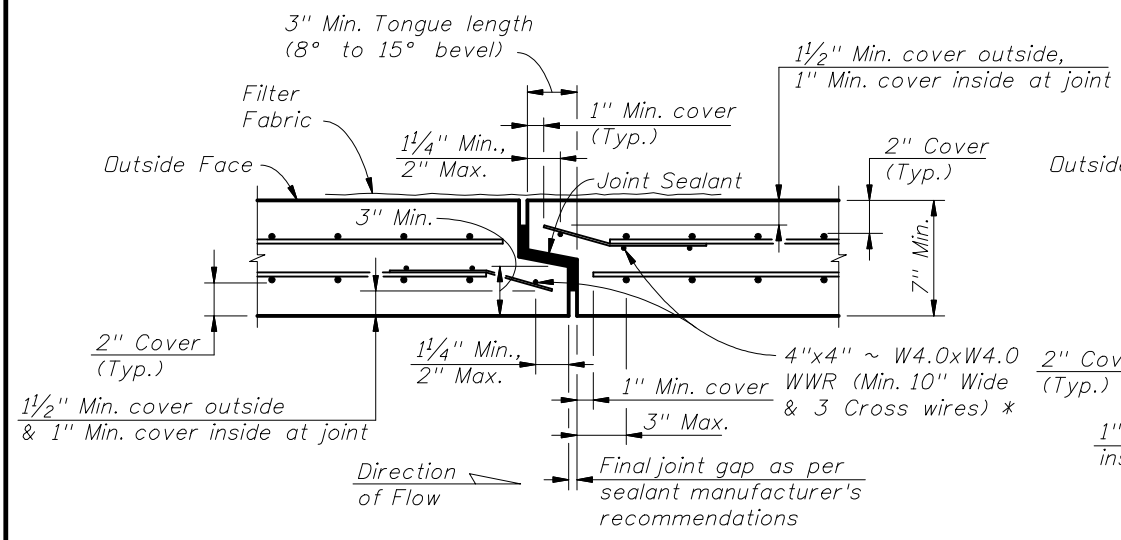
GENERAL NOTES:

- Specifications:
 - General:
 - FDDT Standard Specifications for Road and Bridge Construction, Section 410 (current edition, and supplements thereto).
 - Concrete (Precast):
 - Class III or Class II Modified (5,000 psi) for slightly aggressive environments.
 - Class IV (5,500 psi) for moderately to extremely aggressive environments.
 - Concrete (Cast-In-Place):
 - Class II (3,400 psi) for slightly aggressive environments.
 - Class IV (5,500 psi) for moderately to extremely aggressive environments.
 - Reinforcing Steel:
 - ASTM A615 Grade 60 deformed bar unless otherwise noted, with a minimum clearance of 2" for slightly and moderately aggressive environments or 3" for extremely aggressive environments, unless otherwise shown. Equal area substitution of welded wire (WWR) reinforcement is permitted.
- Work this Index with the Cast-In-Place Concrete Box Culvert Details and Data Tables shown in the plans, Index No. 289 and the Precast Concrete Box Culverts shown in the shop drawings.
- All joints between precast sections must be tongue & groove with joint sealant. Joints between cast-in-place & precast sections shall have longitudinal reinforcing extending from top, bottom & both side slabs of the precast box tied to the cast-in-place reinforcement. Single barrel culverts may have precast headwalls cast integrally with the end segment when approved by the Engineer.
- Extension of existing multiple barrel box culverts with multiple single cell precast box culverts is not permitted unless approved by the District Structures Engineer. Full transition details must be shown in the shop drawings when approved.
- Culverts larger than the specified size may be substituted with no additional payment to the Contractor. Substitution must be approved by the Engineer, minimum earth cover and invert elevations shown in the Contract Documents must be maintained.

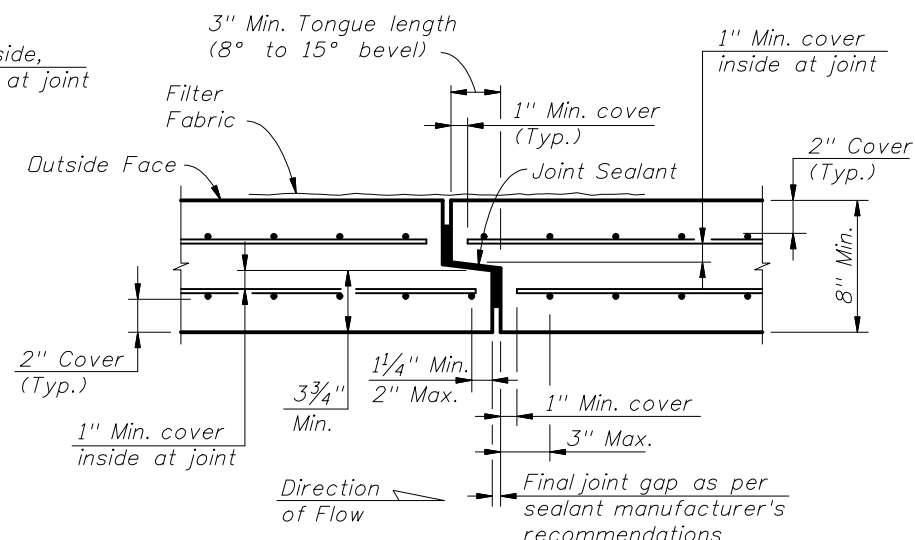
INSTRUCTIONS TO DESIGNER:

- Show Differential Settlement (ΔY) and Effective Length (L) for single curvature deflection in the Contract Plans where significant long-term settlement is anticipated. See Sheet 5 of 5 for details.

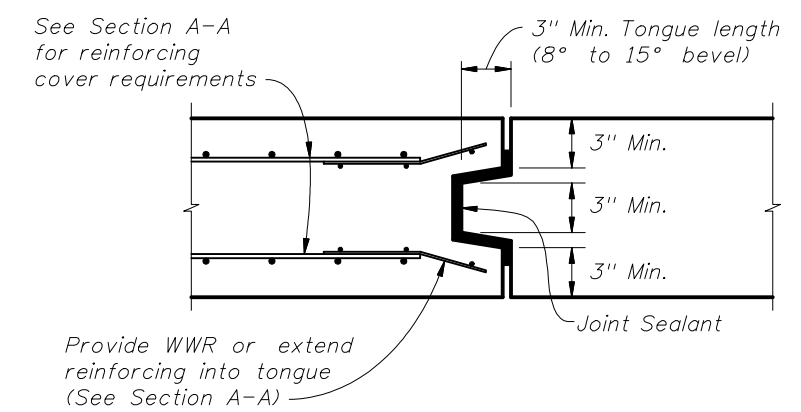




SECTION A-A
(2" Cover - Thin Wall Detail)

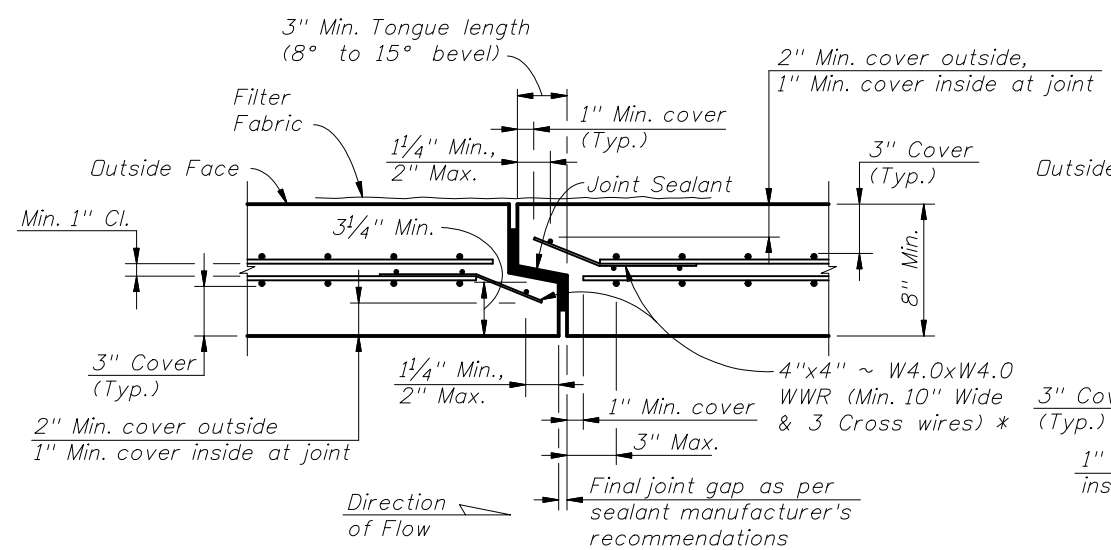


SECTION A-A
(2" Cover - Thick Wall Detail)



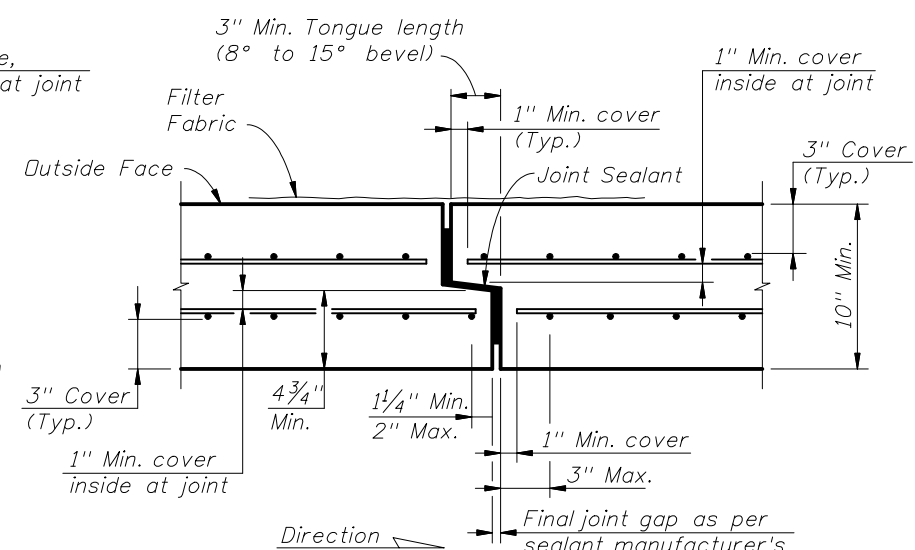
ALTERNATE BOTTOM SLAB TRANSVERSE JOINT
TYPICAL SECTION
(DOUBLE-SIDED TONGUE & GROOVE JOINT)
(All reinforcing not shown for clarity)

NOTE:
Bottom Slab Joints in Type B Boxes may be single tongue & groove joints as shown in Section A-A when the Top Slab Joints are oriented as shown in Schematic A.

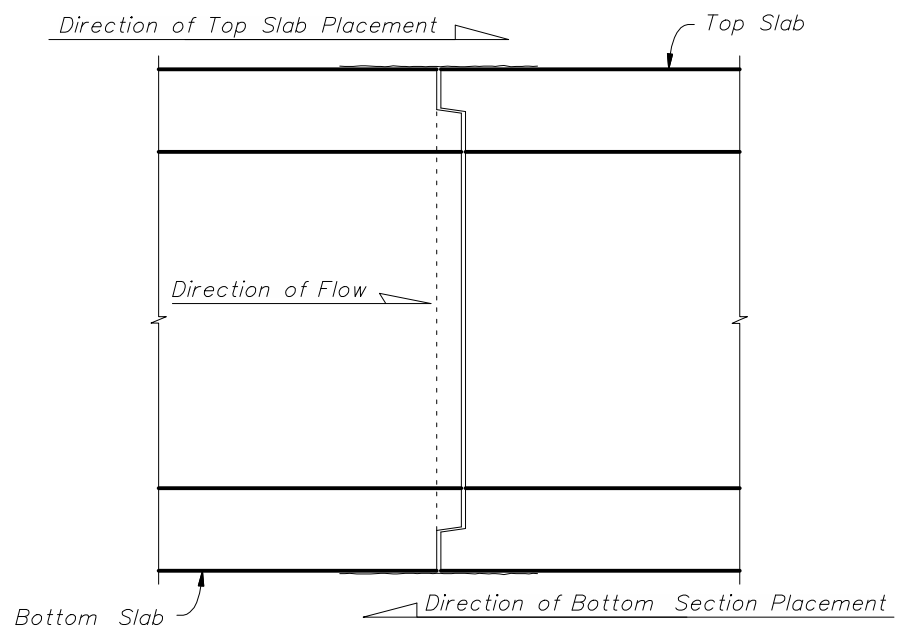


SECTION A-A
(3" Cover - Thin Wall Detail)

* At the Contractor's option when the box culvert reinforcing utilizes WWR, extend wall and slab reinforcing into the joint and bend to maintain cover in lieu of 4"x4" ~ W4.0xW4.0 WWR at joint. Transverse wire in tongue may be cut at corners of box to allow bending of the WWR.



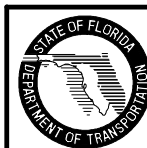
SECTION A-A
(3" Cover - Thick Wall Detail)

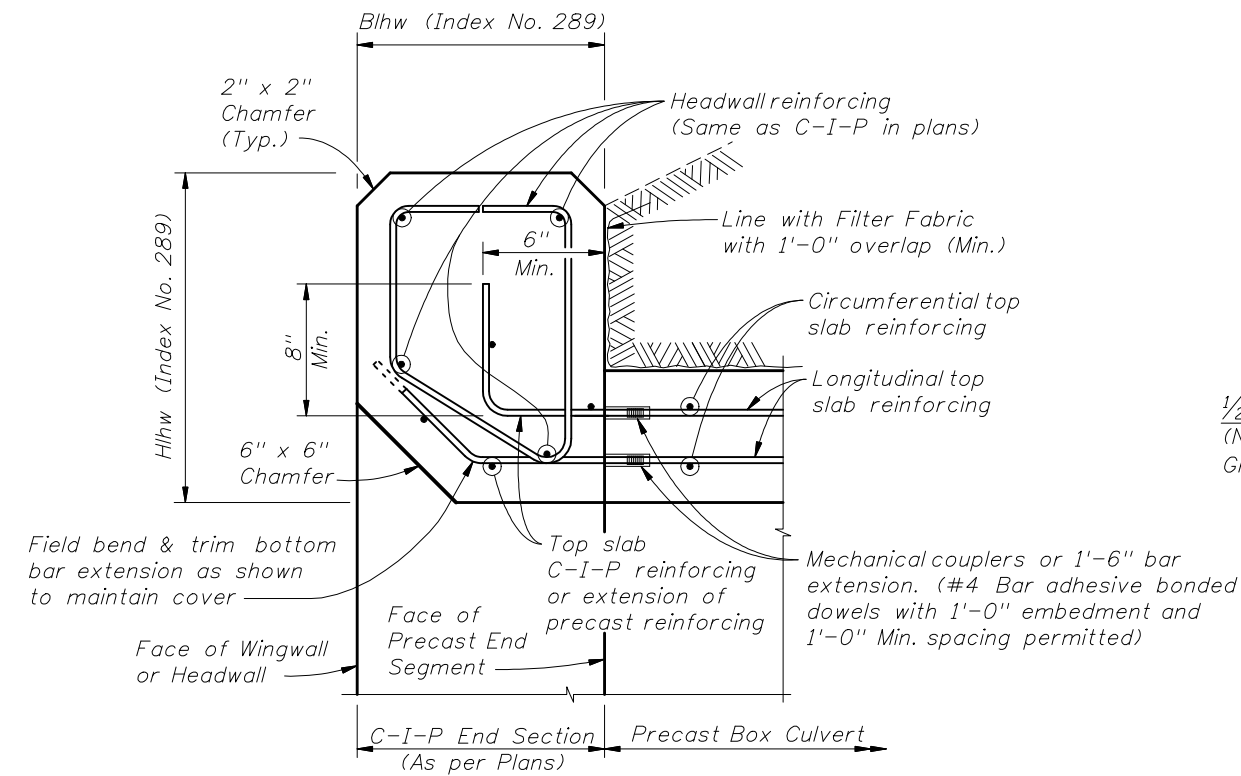


SCHEMATIC A
TYPE B BOX SECTION PLACEMENT
FOR SINGLE TONGUE & GROOVE JOINTS

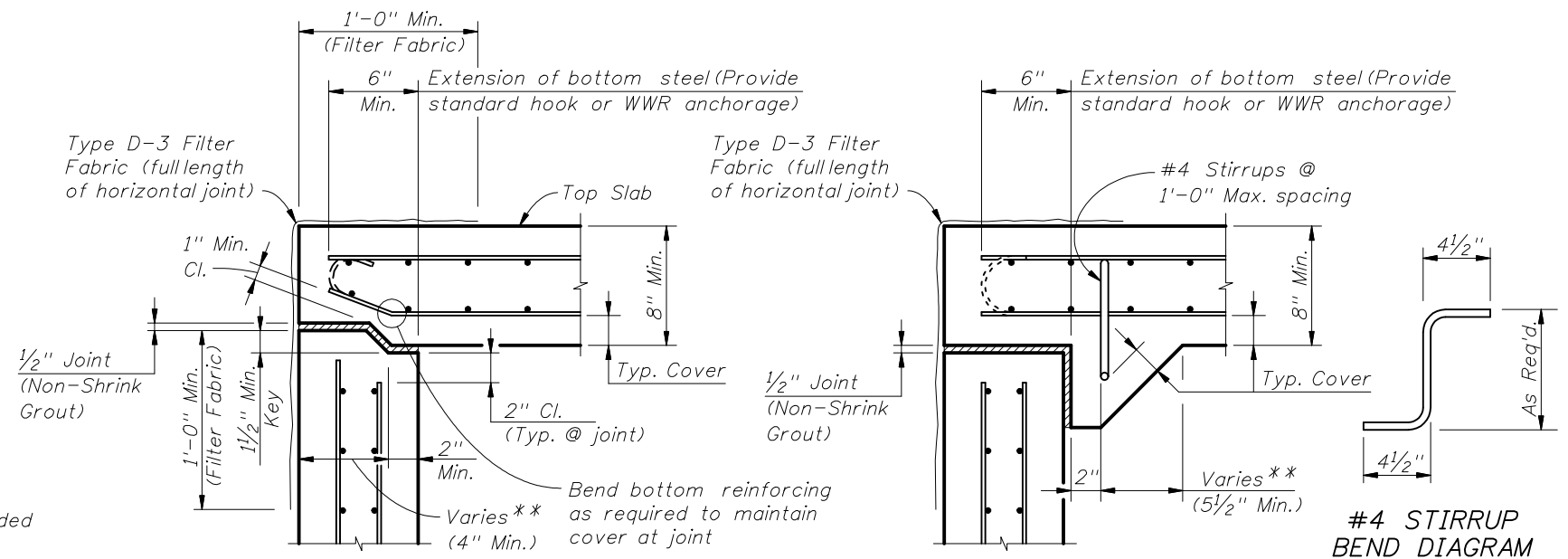
PRECAST SEGMENT TO SEGMENT TONGUE & GROOVE TRANSVERSE JOINTS

TWO-PIECE PRECAST SEGMENT
ADDITIONAL JOINT DETAILS
(TYPE B BOX)





SECTION C-C
C-I-P HEADWALL DETAILS AND CONNECTION TO PRECAST BOX

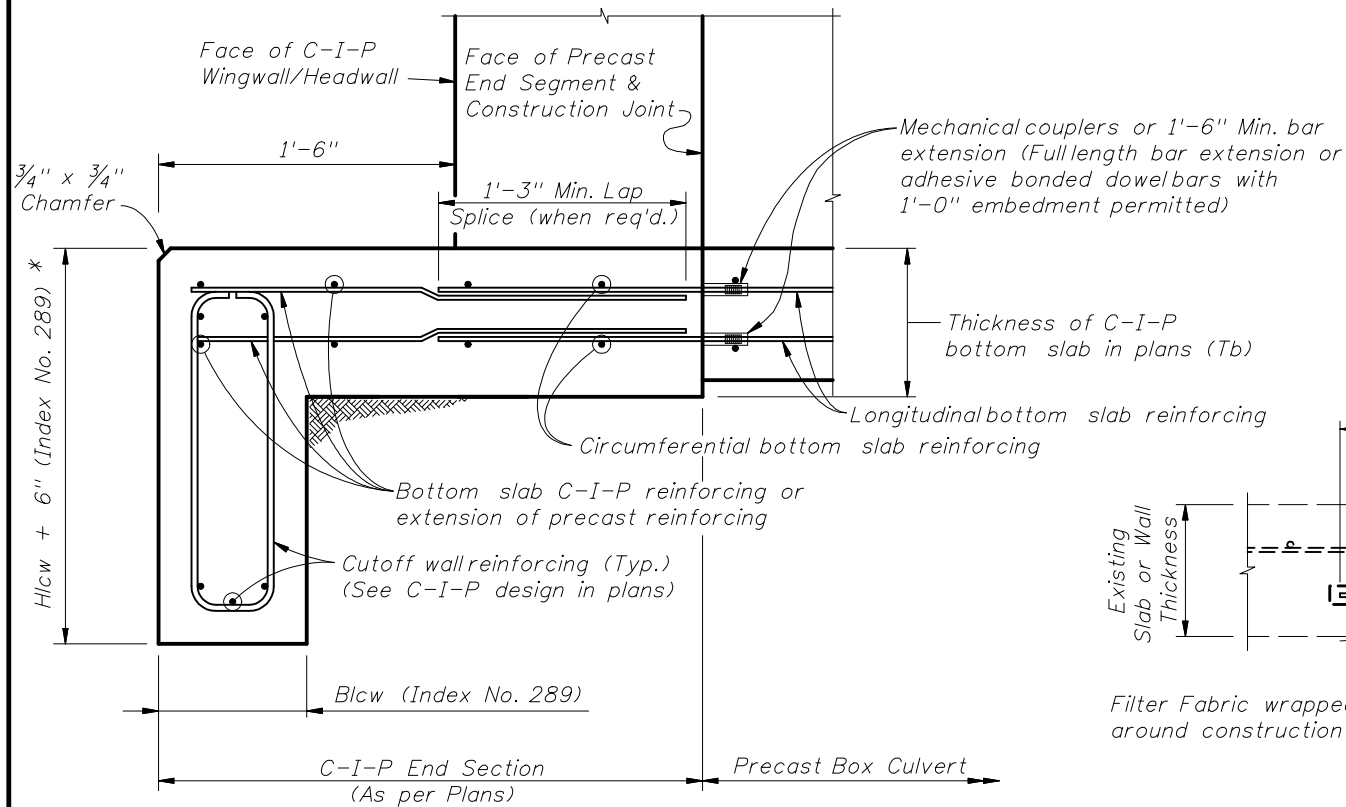


SECTION B-B
TOP SLAB TO WALL JOINT (KEYED JOINT)

SECTION B-B
TOP SLAB TO WALL JOINT (HAUNCHED JOINT)

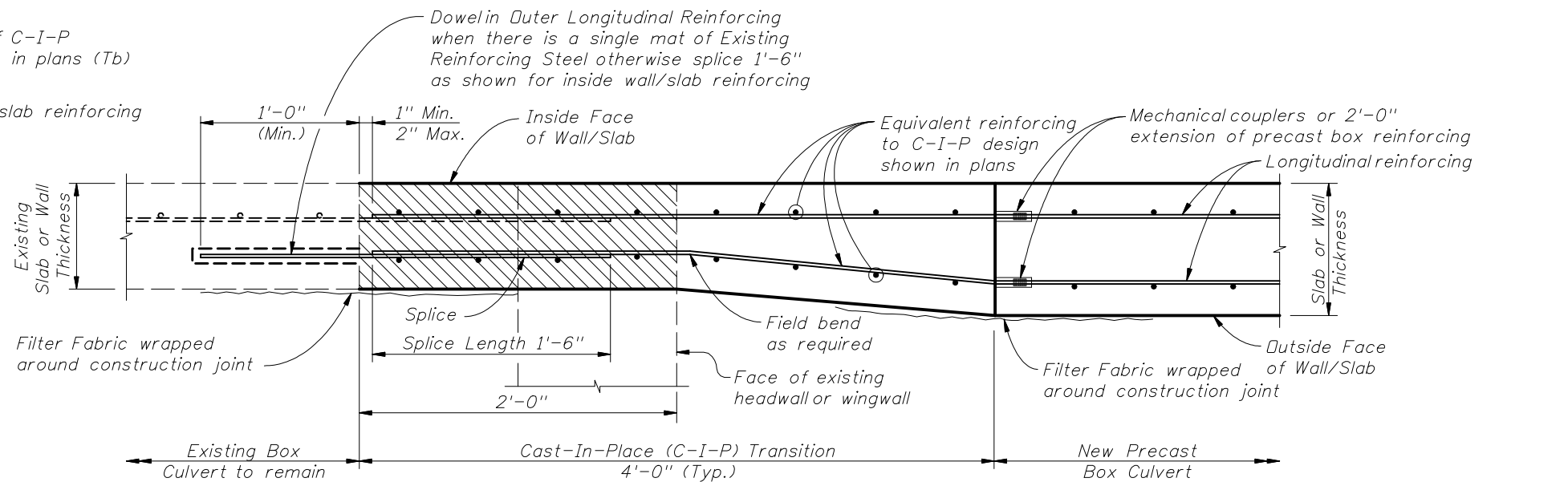
** Provide adequate width to satisfy shear strength requirements at joint

#4 STIRRUP BEND DIAGRAM



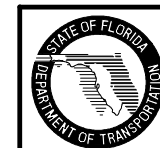
SECTION D-D
C-I-P TOE SLAB & CUTOFF WALL DETAILS AND CONNECTION TO PRECAST BOX

* Provide additional 6" depth of cutoff wall at no additional cost.



SECTION E-E
EXTERIOR WALL/SLAB TRANSITION DETAIL FOR PRECAST EXTENSION

▨ Section of Existing Box Culvert to be removed and replaced.

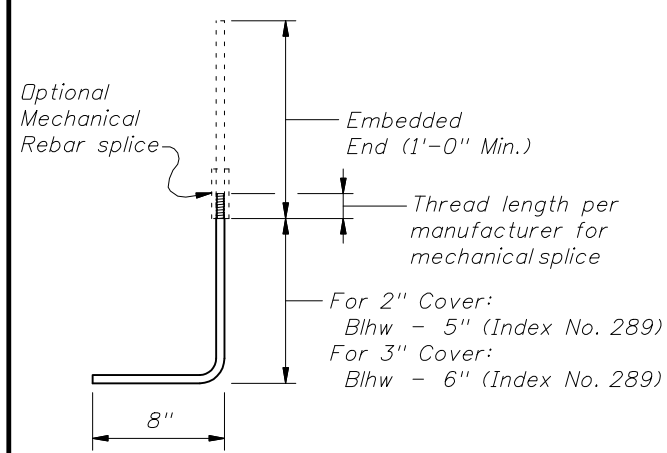


2010 FDOT Design Standards

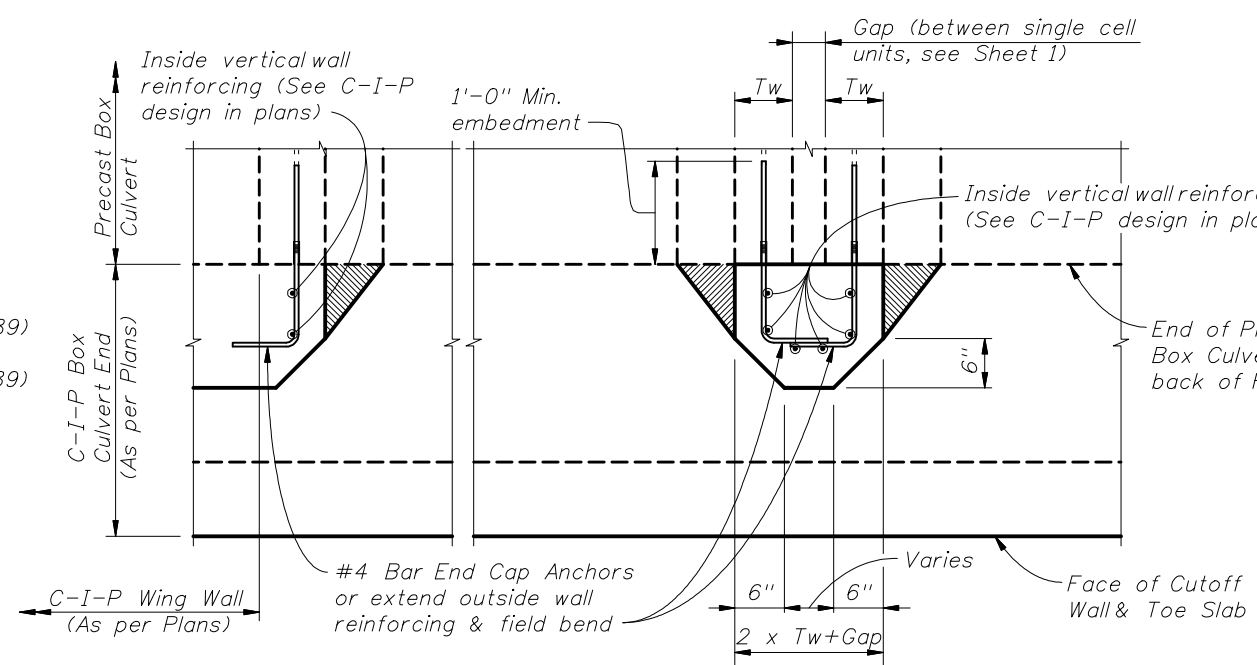
SUPPLEMENTAL DETAILS FOR PRECAST CONCRETE BOX CULVERTS

Last Revision 07/01/07
Sheet No. 3 of 5

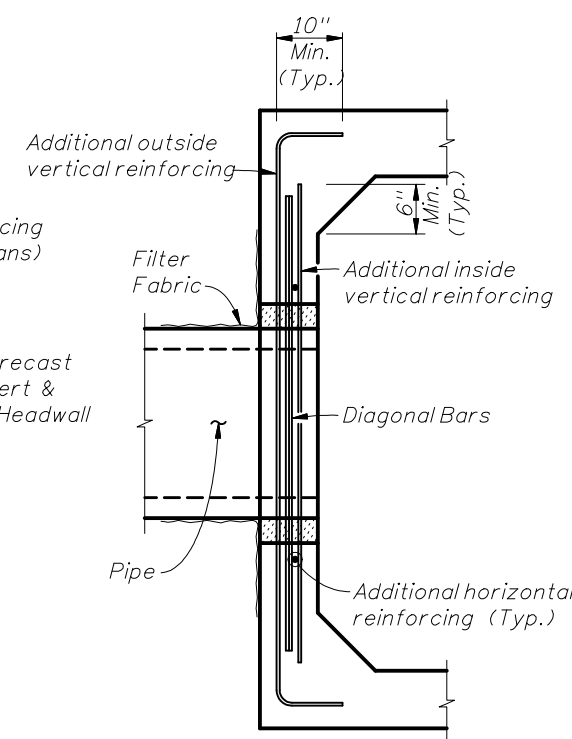
Index No. 291



#4 BAR END CAP ANCHOR BAR BEND DIAGRAM

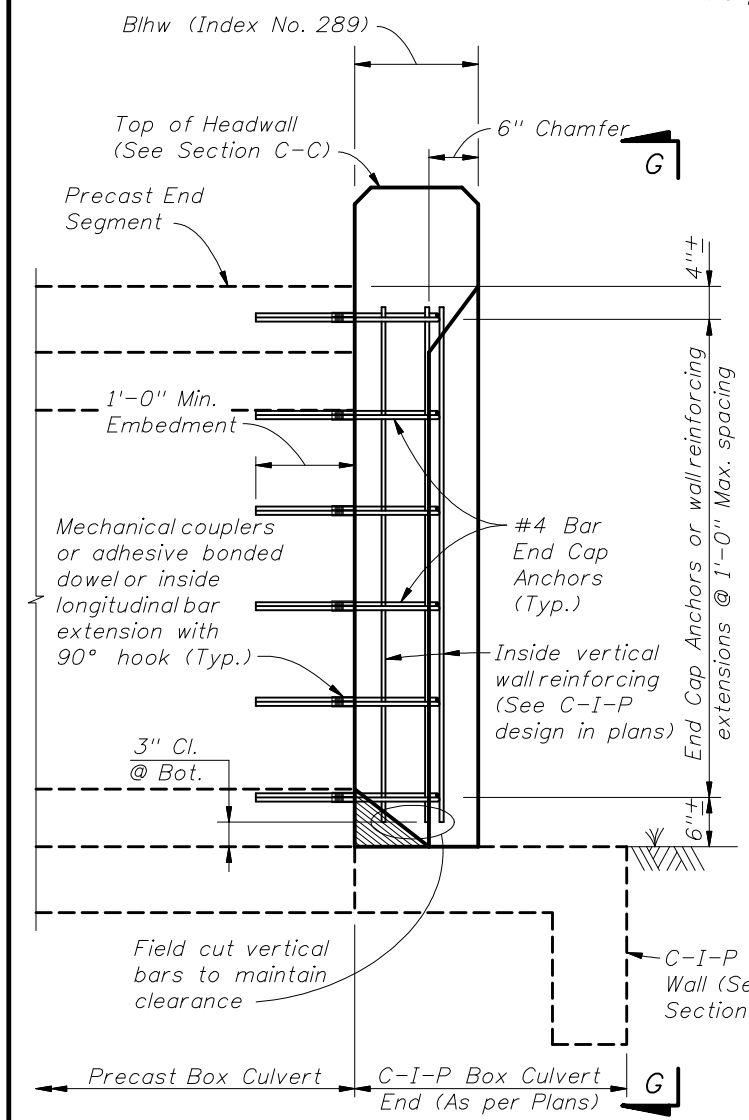


SECTION H-H

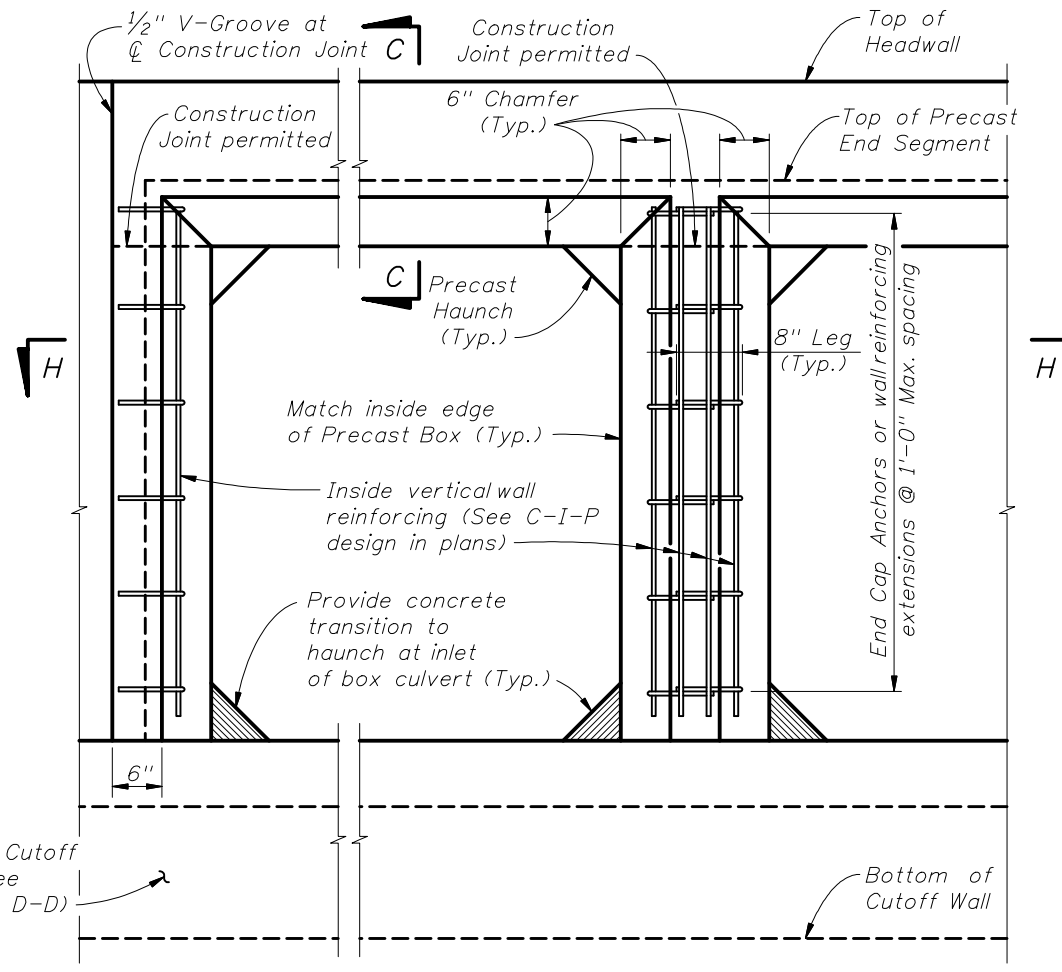


SECTION I-I (Showing additional blackout reinforcing only)

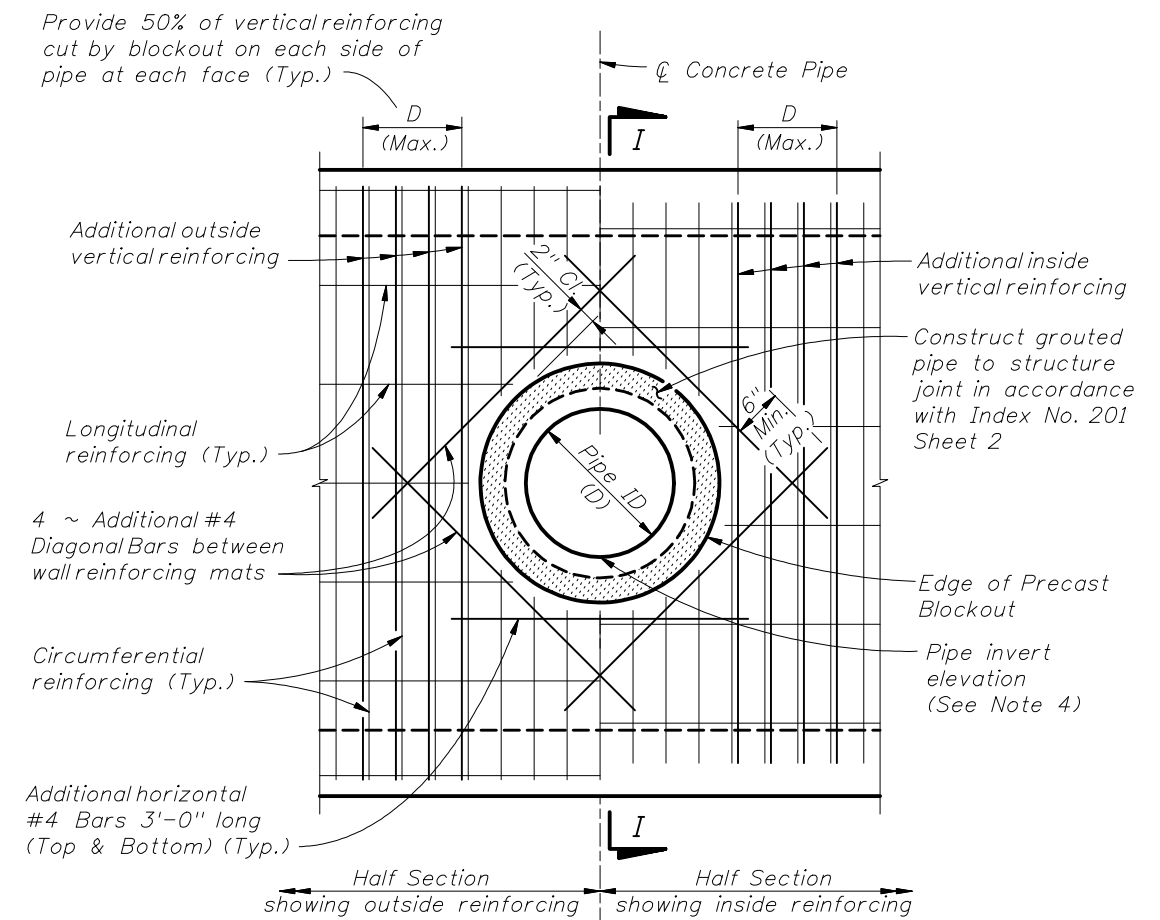
- PIPE BLOCKOUT NOTES:**
1. Cut box culvert reinforcement as required to maintain 2" cover.
 2. For Precast Sections construct opening a minimum of 1'-6" away from any box to box joint, except opening may be a minimum of 1'-0" away from joint when at least 2'-0" of clearance to the box to box joint is provided on the opposite side of the pipe opening.
 3. Pipe blackout diameter to be 6" greater than pipe outside diameter.
 4. See Drainage Plans for size, placement, and invert elevation.



SECTION F-F

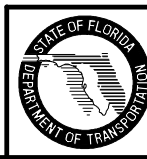


VIEW G-G (Headwall, Toe Slab and Cutoff Wall Reinforcing not shown for clarity)



ELEVATION VIEW PIPE BLOCKOUT DETAILS

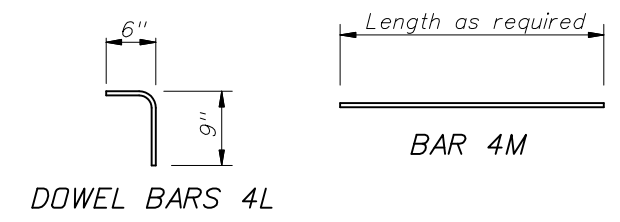
C-I-P END CAP DETAILS AND CONNECTION TO PRECAST BOX



BILL OF REINFORCING STEEL

MARK	SIZE	NO. REQ'D	LENGTH
L	4	2 per Barrel/Ft.	1'-3"
M	4	As reqd.	As reqd.

REINFORCING STEEL BENDING DIAGRAMS



NOTES:
 1. All bar dimensions are out to out.
 2. Lap splice length for Bars 4M is 1'-4" minimum.

DESIGN NOTE:

1. Link Slab required when joint openings from differential settlement exceed 1/8" as determined in Link Slab Note 1.

LINK SLAB NOTES:

1. Provide a Cast-In-Place Link Slab to ensure uniform joint opening of precast box culverts when the differential settlement shown in the plans exceeds the following limits, except that a Link Slab is not required for differential settlements less than 1/2".

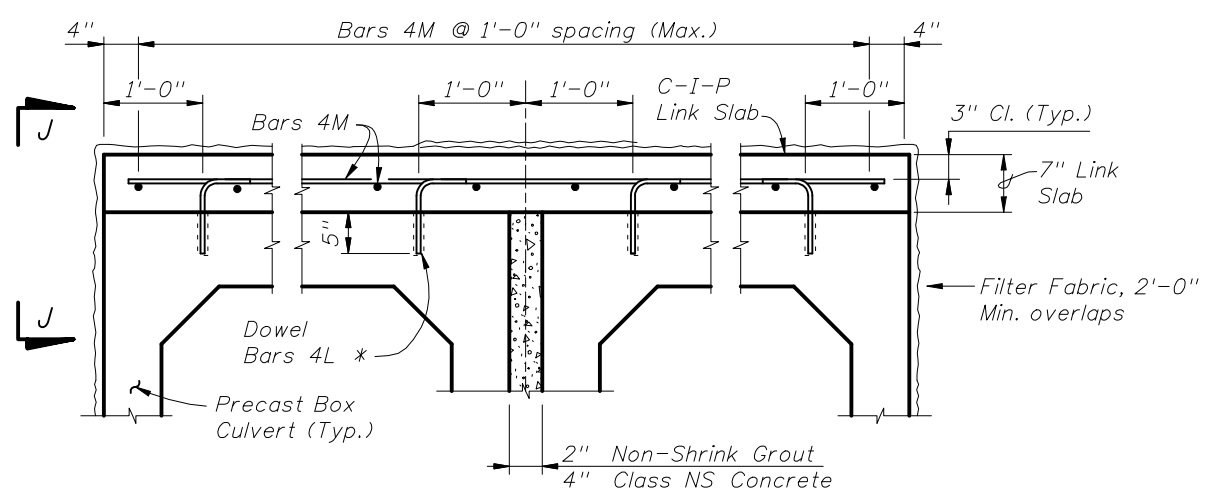
$$\Delta Y \leq \frac{(L)^2}{760 \times R \times W}$$

Where:
 ΔY = Maximum Long-Term Differential Settlement (ft.)
 R = Exterior height of Box Culvert (ft.)
 W = Length of Box Culvert Segments (ft.)
 L = Effective length for single curvature deflection (ft.)

2. Extend Link Slab to back face of headwalls and to limits of existing box culverts for extensions.

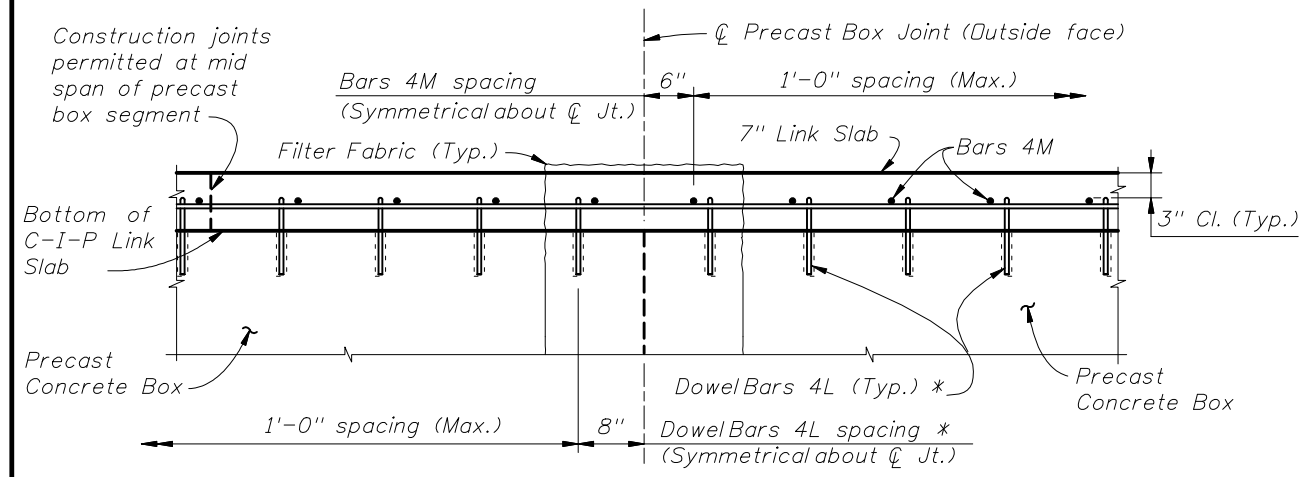
ESTIMATED LINK SLAB QUANTITIES		
ITEM	UNIT	QUANTITY
Class II or IV Concrete (Culvert)	CY/SF	0.0216
Reinforcing Steel (Roadway)	Lb./SF	1.52

NOTE: Estimated quantities are based the plan area of precast box slabs, and are provided for information only. No additional payment will be made for Link Slabs where these are required for the precast box culverts.

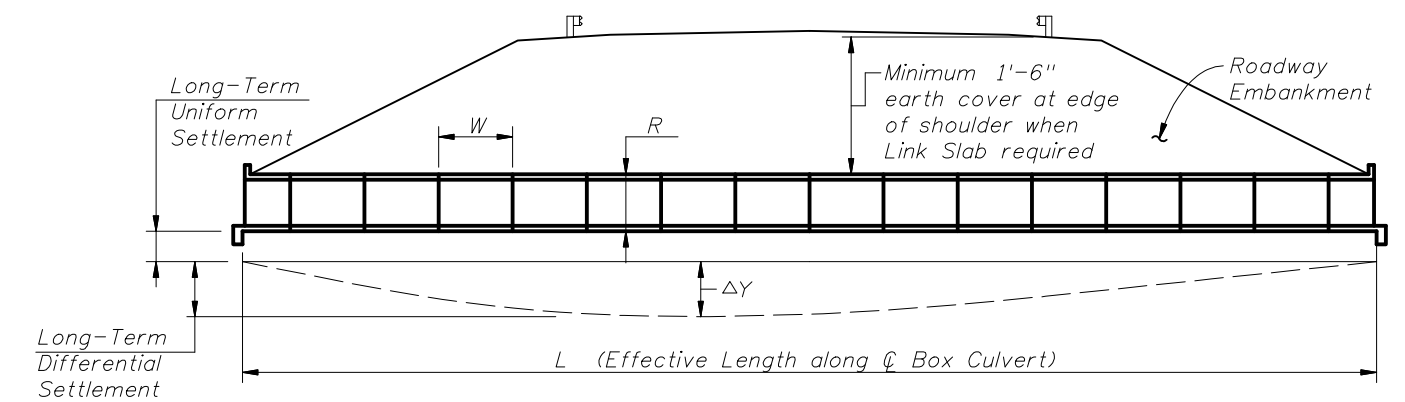


LINK SLAB TYPICAL SECTION
 (Multiple Barrel Culvert shown, Single Barrel Culvert similar)

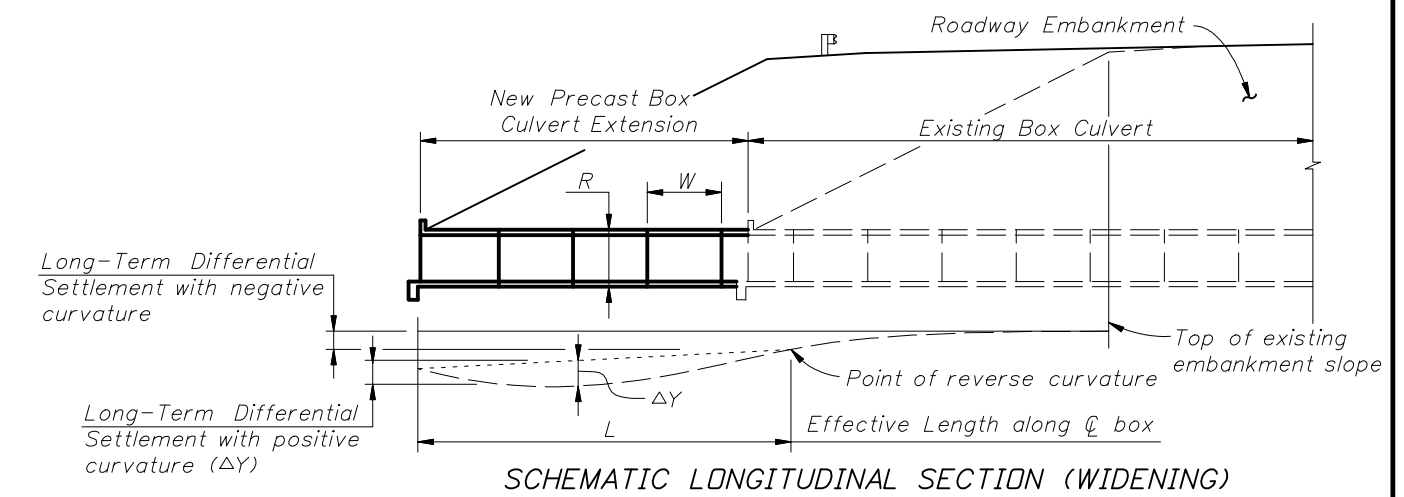
* Install dowels with an Adhesive Bonding Material System in accordance with Specification Section 416. The Contractor may substitute mechanical couplers in lieu of adhesive bonded dowels. Shift dowels to clear box culvert reinforcing.



VIEW J-J



SCHEMATIC LONGITUDINAL SECTION (NEW CONSTRUCTION)



SCHEMATIC LONGITUDINAL SECTION (WIDENING)

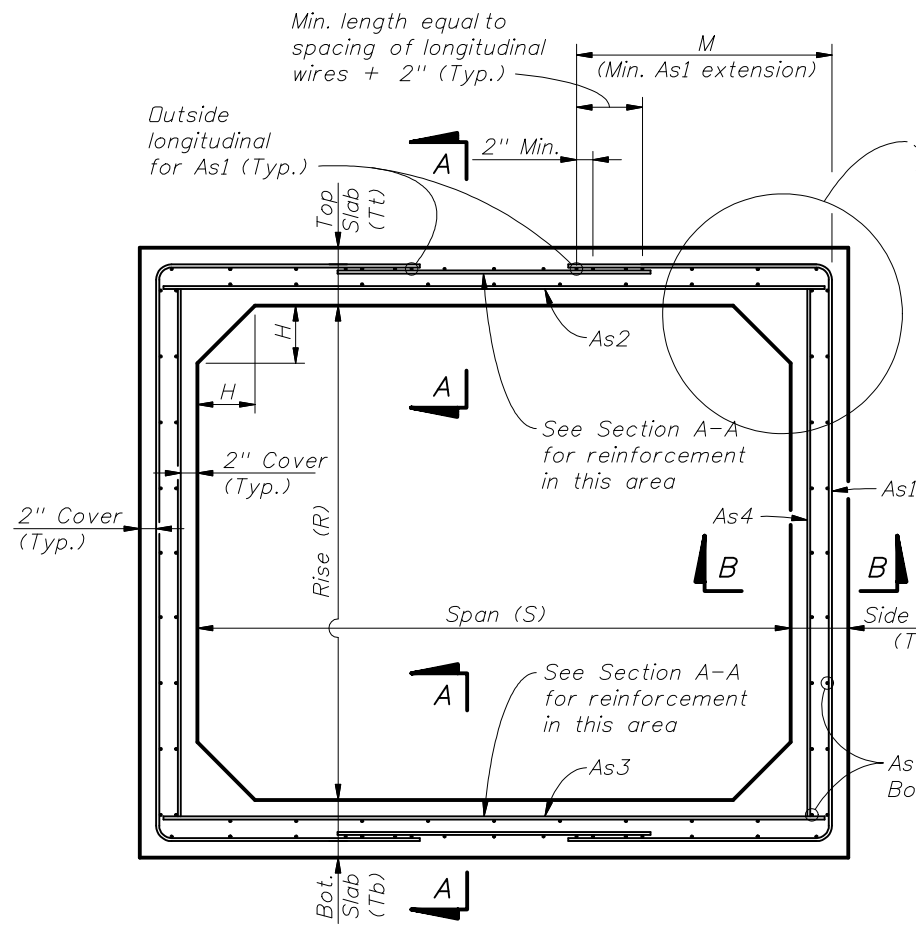
DIFFERENTIAL SETTLEMENT COUNTERMEASURES FOR PRECAST BOX CULVERTS



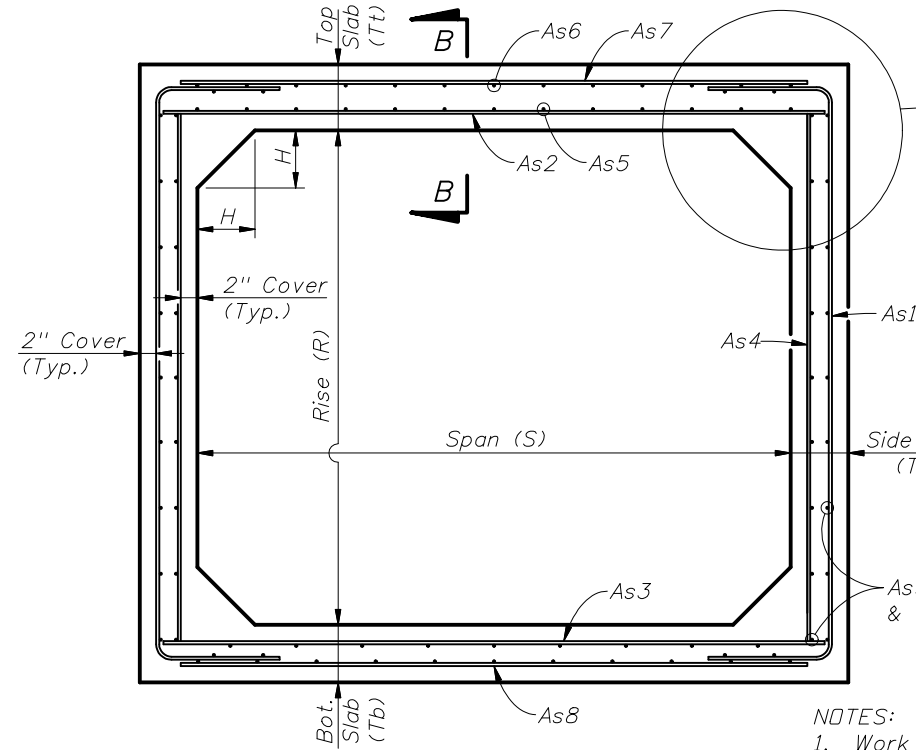
2010 FDOT Design Standards

SUPPLEMENTAL DETAILS FOR PRECAST CONCRETE BOX CULVERTS

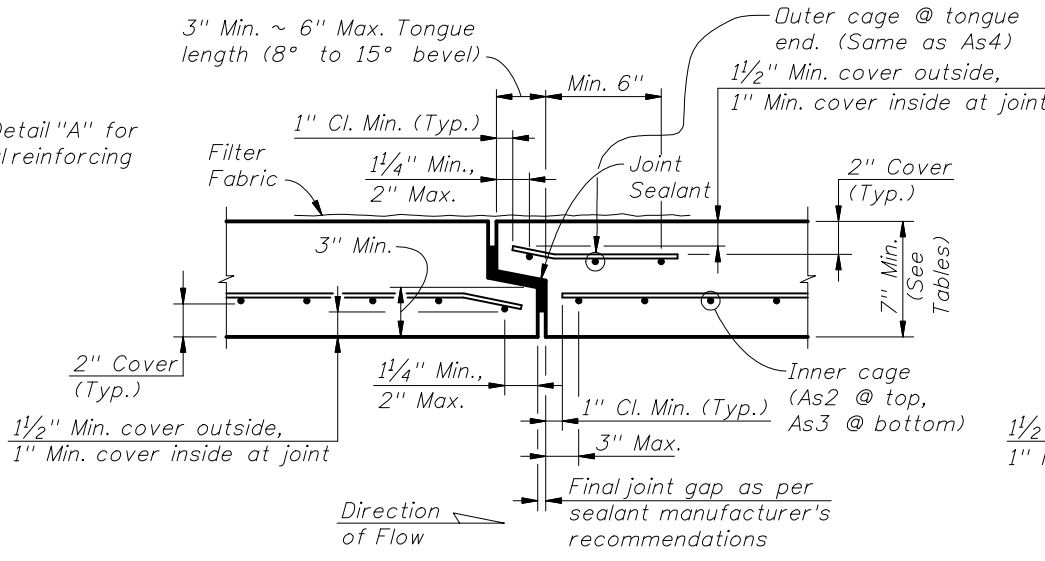
Last Revision 01/01/09
 Sheet No. 5 of 5
 Index No. 291



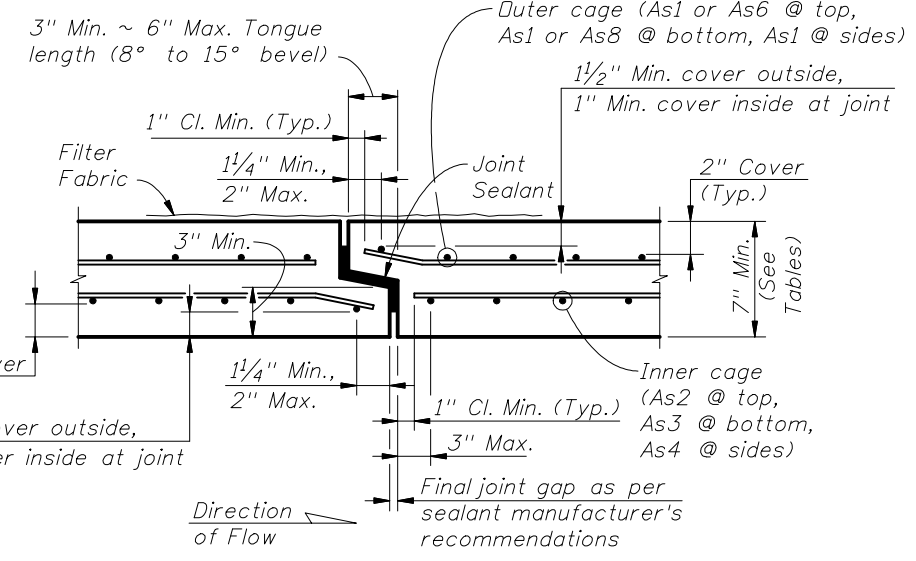
TYPICAL BOX SECTION (TYPE 2)
DESIGN EARTH COVER 2' OR GREATER



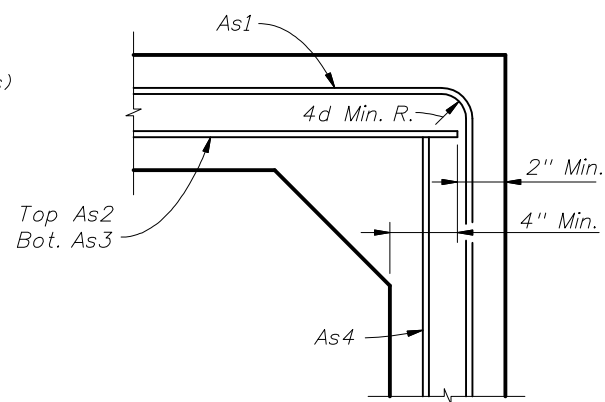
TYPICAL BOX SECTION (TYPE 1)
DESIGN EARTH COVER LESS THAN 2'



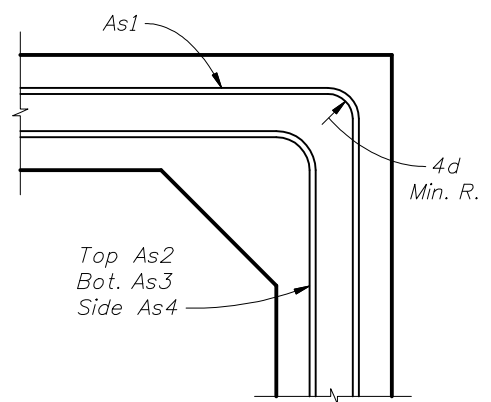
SECTION A-A



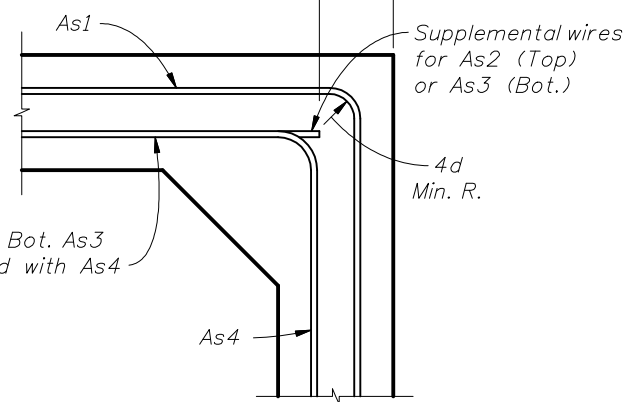
SECTION B-B
TYPICAL SECTION THRU JOINT



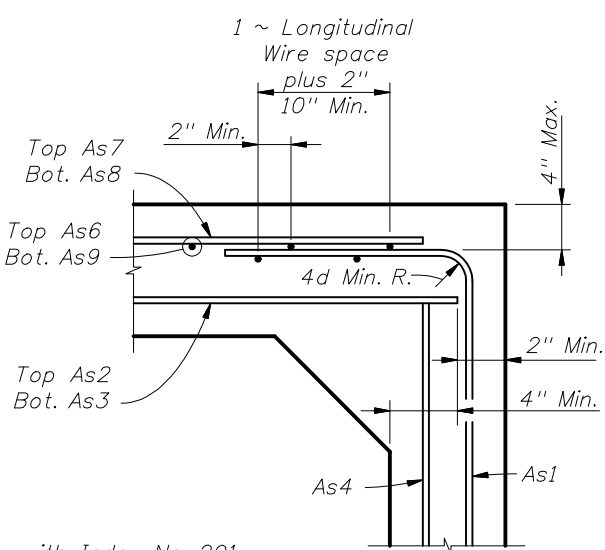
DETAIL "A"
(OPTION 1)



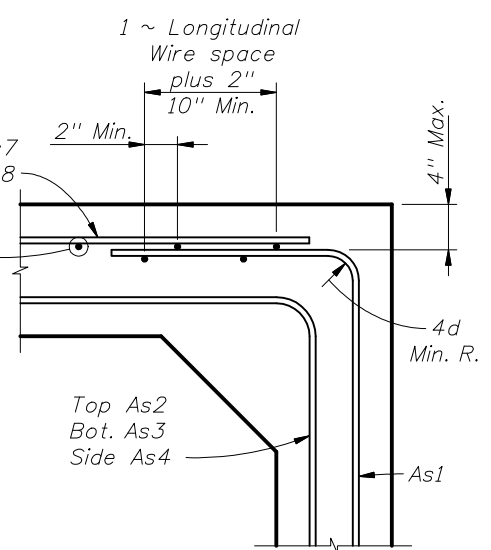
DETAIL "A"
(OPTION 2)



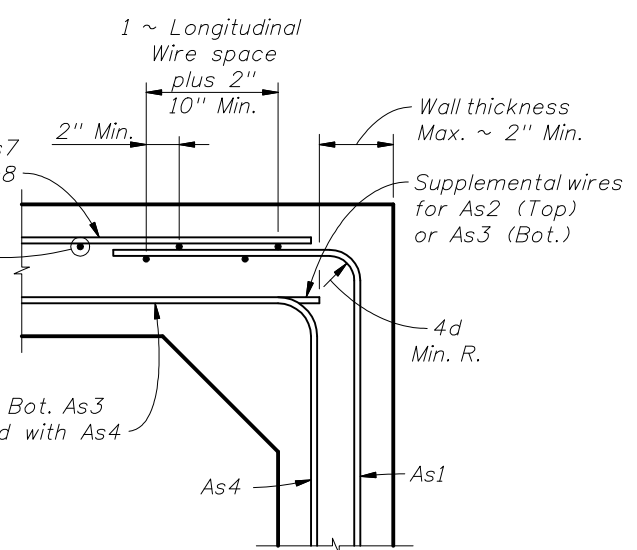
DETAIL "A"
(OPTION 3)



DETAIL "B"
(OPTION 1)



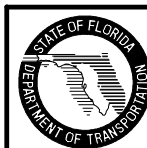
DETAIL "B"
(OPTION 2)



DETAIL "B"
(OPTION 3)

NOTES:
1. Work this Index with Index No. 291.
2. See sheets 2 thru 5 for dimensions and areas of reinforcement.

STANDARD PRECAST BOX CULVERT WITH 2" CONCRETE COVER



GENERAL NOTES:

1. These precast designs may be substituted for cast-in-place box culverts designed to AASHTO LRFD Bridge Design Specifications, 4th Edition. Designs are based on the design criteria shown in FDOT Structures Design Guidelines.
2. Loading: HL-93 & any fill heights between the minimum & maximum shown.
3. Only one design of precast box culvert is to be used for any installation.
4. Reinforcing steel must consist of smooth or deformed welded wire reinforcement (WWR) conforming to ASTM A185 or A497. Longitudinal reinforcement may consist of ASTM A615 Grade 60 bars. Minimum cover must be 2" unless otherwise shown. The spacing of circumferential wires must not be less than 2" nor more than 4". The spacing of longitudinal wires or bars must not be more than 8".
5. As9 longitudinal wires must have a minimum cross-sectional area of 40% of the circumferential wires, but not less than a W2.5 or D2.5 for WWR, or #3 bars for ASTM A615 deformed bars.
6. Welding of reinforcement must be limited to the locations shown in ASTM C1577 and in accordance with ANSI/AWS D1.4 "Structural Welding Code - Reinforcing Steel".

7. Haunch dimensions may vary between the minimum and maximum dimensions shown in the Design Tables but only one haunch dimension must be used within the full length of the box culvert installation.
8. Submittal of redesign calculations are not required for any increase to the slab and/or wall thickness when the minimum reinforcement areas shown in the Design Tables are provided.
9. For Design Earth Cover greater than 10 feet, the Contractor may interpolate the required areas of reinforcement and slab or wall thickness. Interpolated areas of reinforcement, slab or wall thickness must be approved by the Engineer.
10. See Index No. 291 for connections to wingwalls, headwalls and other general details.

TABLE 1A - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 3' & 4' SPANS

SPAN x RISE (S) (R) (ft.)	SLAB / WALL THICKNESS				DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./ft.)									As1 EXT. LENGTH (M) (in.)				
	TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)		As1	As2	As3	As4	As5	As6	As7	As8	As9					
3' x 3'	7	7	7	4 to 8	0.33' - <2'	0.17	0.29	0.21	0.17	0.17	0.17	0.17	0.17	-					
					2' - <3'	0.13	0.28	0.21	0.09	-	-	-	-	31					
					3' - <5'	0.09	0.17	0.17	0.09	-	-	-	-	31					
					5' - 10'	0.09	0.17	0.17	0.09	-	-	-	-	31					
					15'	0.09	0.17	0.17	0.09	-	-	-	-	31					
					20'	0.12	0.17	0.17	0.09	-	-	-	-	31					
					25'	0.14	0.18	0.18	0.09	-	-	-	-	31					
					30'	0.17	0.21	0.22	0.09	-	-	-	-	31					
					35'	0.19	0.25	0.25	0.09	-	-	-	-	31					
					4' x 3'	7	7	7	4 to 8	0.33' - <2'	0.19	0.38	0.26	0.17	0.19	0.17	0.17	0.19	-
2' - <3'	0.19	0.38	0.26	0.09						-	-	-	-	38					
3' - <5'	0.14	0.20	0.22	0.09						-	-	-	-	38					
5' - 10'	0.11	0.17	0.17	0.09						-	-	-	-	38					
15'	0.15	0.17	0.18	0.09						-	-	-	-	38					
20'	0.20	0.23	0.23	0.09						-	-	-	-	38					
25'	0.24	0.28	0.29	0.09						-	-	-	-	38					
30'	0.29	0.34	0.35	0.09						-	-	-	-	38					
4' x 4'	7	7	7	4 to 8						0.33' - <2'	0.19	0.41	0.28	0.17	0.21	0.17	0.17	0.19	-
										2' - <3'	0.19	0.41	0.28	0.09	-	-	-	-	38
					3' - <5'	0.14	0.21	0.24	0.09	-	-	-	-	38					
					5' - 10'	0.12	0.17	0.17	0.09	-	-	-	-	38					
					15'	0.16	0.19	0.20	0.09	-	-	-	-	38					
					20'	0.21	0.25	0.25	0.09	-	-	-	-	38					
					25'	0.26	0.31	0.32	0.09	-	-	-	-	38					
					30'	0.31	0.37	0.38	0.09	-	-	-	-	38					

See General Note 5

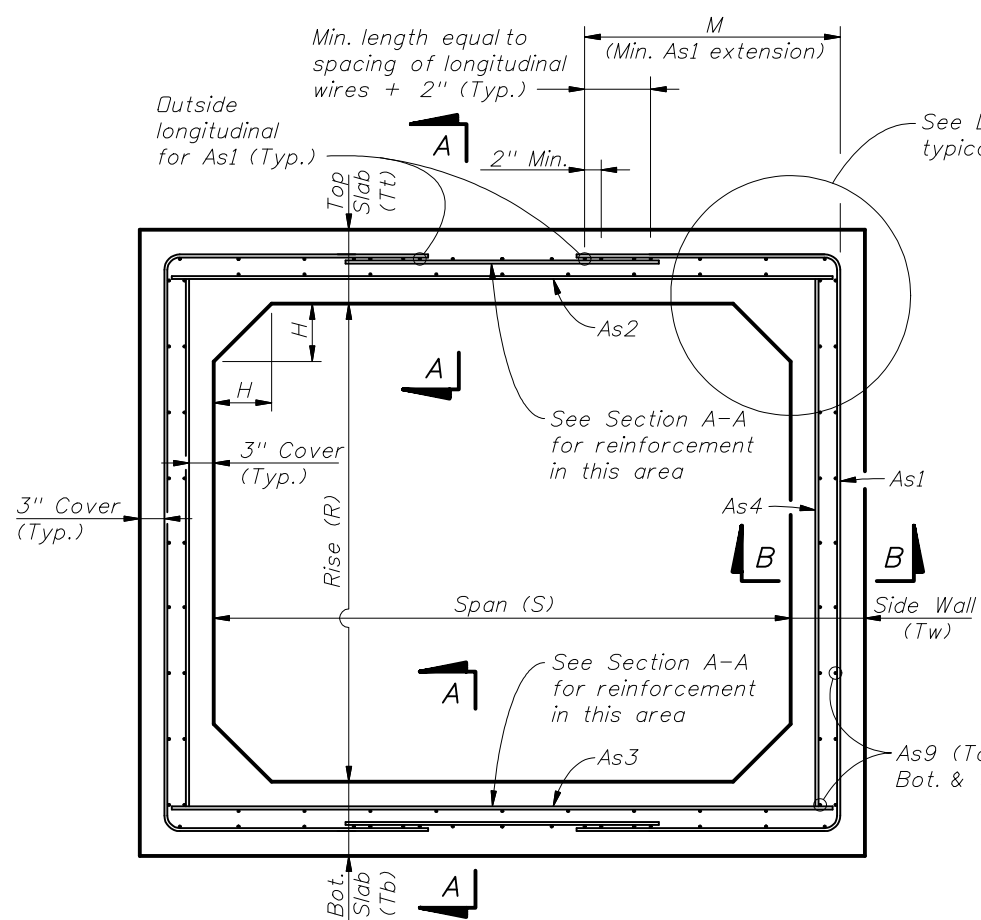
TABLE 1B - STANDARD PRECAST BOX CULVERT DESIGNS (2" COVER) - 3' & 4' SPANS

SPAN x RISE (S) (R) (ft.)	SLAB / WALL THICKNESS				DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./ft.)									As1 EXT. LENGTH (M) (in.)				
	TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)		As1	As2	As3	As4	As5	As6	As7	As8	As9					
3' x 3'	8	8	8	4 to 8	0.33' - <2'	0.20	0.26	0.32	0.20	0.20	0.20	0.20	0.20	-					
					2' - <3'	0.16	0.25	0.31	0.10	-	-	-	-	31					
					3' - <5'	0.10	0.20	0.20	0.10	-	-	-	-	31					
					5' - 10'	0.10	0.20	0.20	0.10	-	-	-	-	31					
					15'	0.10	0.20	0.20	0.10	-	-	-	-	31					
					20'	0.10	0.20	0.20	0.10	-	-	-	-	31					
					25'	0.11	0.20	0.20	0.10	-	-	-	-	31					
					30'	0.13	0.20	0.20	0.10	-	-	-	-	31					
					35'	0.15	0.21	0.21	0.10	-	-	-	-	31					
					4' x 3'	8	8	8	4 to 8	0.33' - <2'	0.20	0.31	0.22	0.20	0.20	0.20	0.20	0.20	-
2' - <3'	0.12	0.31	0.22	0.10						-	-	-	-	38					
3' - <5'	0.12	0.20	0.20	0.10						-	-	-	-	38					
5' - 10'	0.10	0.20	0.20	0.10						-	-	-	-	38					
15'	0.12	0.20	0.20	0.10						-	-	-	-	38					
20'	0.16	0.20	0.20	0.10						-	-	-	-	38					
25'	0.19	0.24	0.24	0.10						-	-	-	-	38					
30'	0.22	0.28	0.29	0.10						-	-	-	-	38					
4' x 4'	8	8	8	4 to 8						0.33' - <2'	0.20	0.33	0.24	0.20	0.20	0.20	0.20	0.20	-
										2' - <3'	0.17	0.33	0.24	0.10	-	-	-	-	38
					3' - <5'	0.12	0.20	0.20	0.10	-	-	-	-	38					
					5' - 10'	0.10	0.20	0.20	0.10	-	-	-	-	38					
					15'	0.13	0.20	0.20	0.10	-	-	-	-	38					
					20'	0.16	0.21	0.22	0.10	-	-	-	-	38					
					25'	0.20	0.26	0.27	0.10	-	-	-	-	38					
					30'	0.23	0.31	0.32	0.10	-	-	-	-	38					

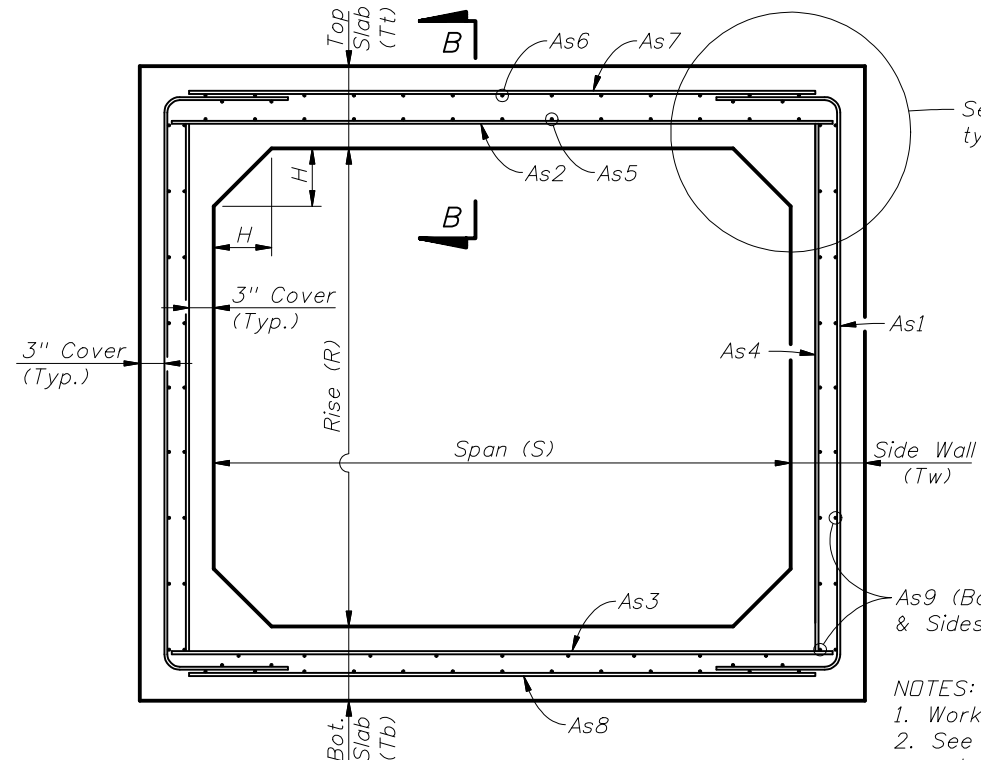
See General Note 5

NOTES: 1. See Sheet 1 for Reinforcing Details and dimension locations.
2. See Sheet 14 for WWR Bending Diagram.

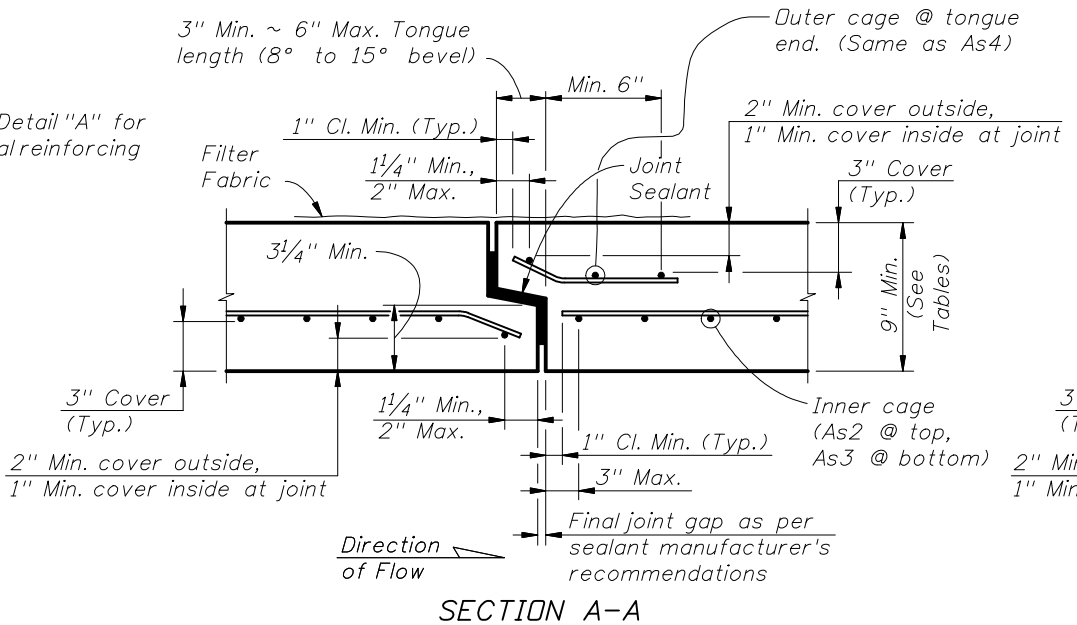




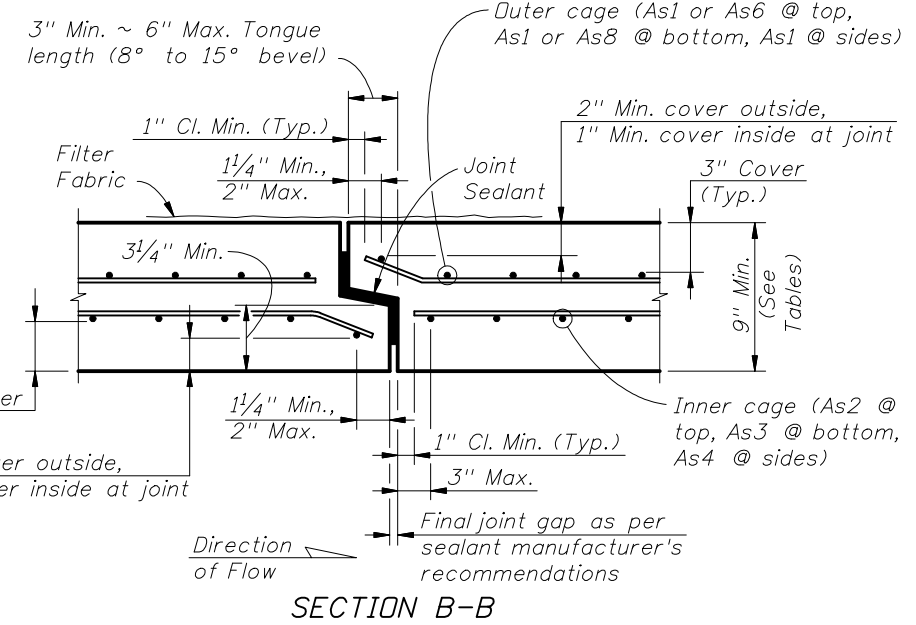
TYPICAL BOX SECTION (TYPE 2)
DESIGN EARTH COVER 2' OR GREATER



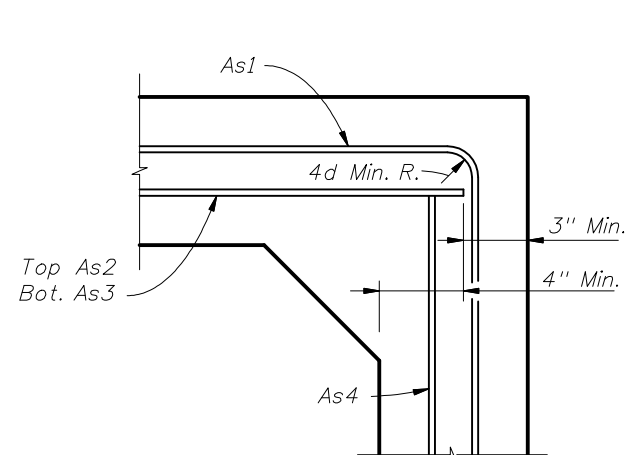
TYPICAL BOX SECTION (TYPE 1)
DESIGN EARTH COVER LESS THAN 2'



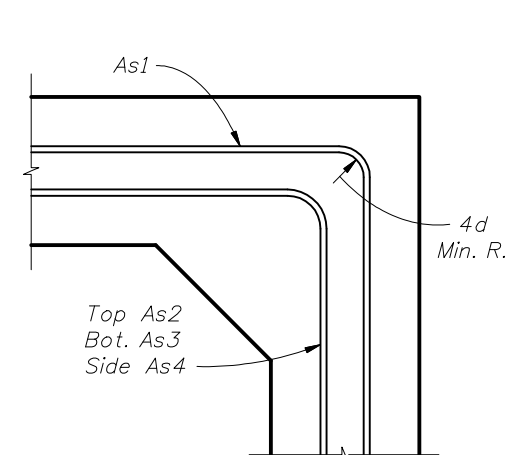
SECTION A-A



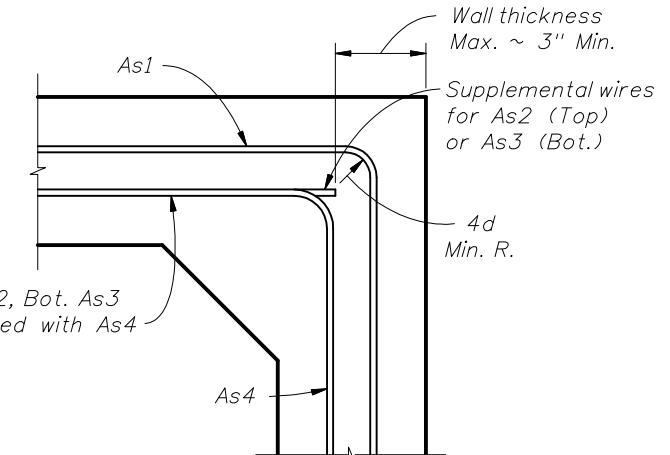
SECTION B-B
TYPICAL SECTION THRU JOINT



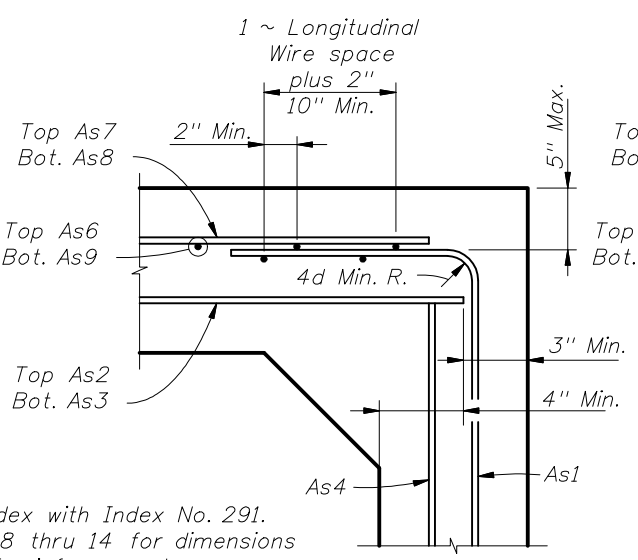
DETAIL "A"
(OPTION 1)



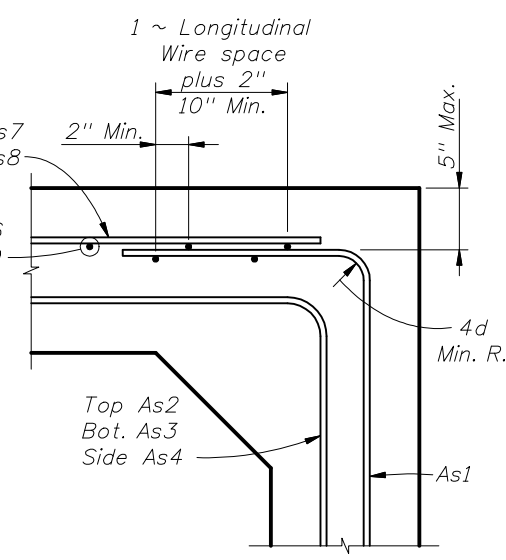
DETAIL "A"
(OPTION 2)



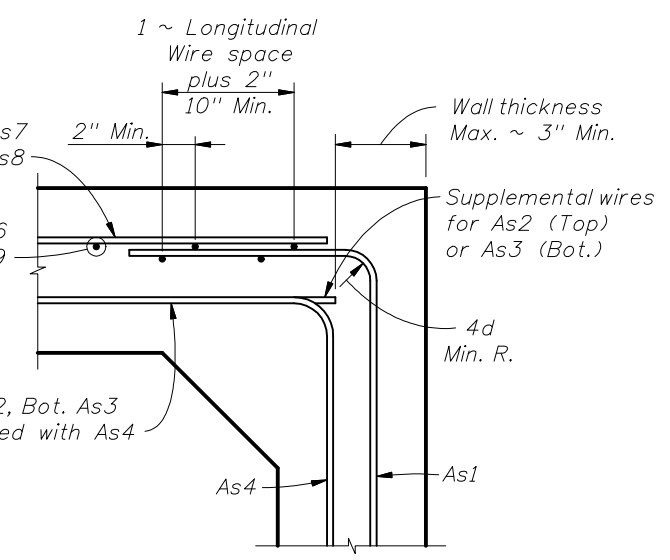
DETAIL "A"
(OPTION 3)



DETAIL "B"
(OPTION 1)



DETAIL "B"
(OPTION 2)



DETAIL "B"
(OPTION 3)

- NOTES:
1. Work this Index with Index No. 291.
2. See Sheets 8 thru 14 for dimensions and areas of reinforcement.

STANDARD PRECAST BOX CULVERT WITH 3" CONCRETE COVER



2010 FDOT Design Standards

STANDARD PRECAST CONCRETE BOX CULVERTS

Last Revision 01/01/07 Sheet No. 7 of 14

Index No. 292

TABLE 9A - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 3' & 4' SPANS

SPAN x RISE (S) (R) (ft.)	SLAB / WALL THICKNESS				DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./ft.)									As1 EXT. LENGTH (M) (in.)
	TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)		As1	As2	As3	As4	As5	As6	As7	As8	As9	
3' x 3'	9	9	9	4	0.33' - <2'	0.22	0.24	0.22	0.22	0.22	0.22	0.22	0.22	0.22	-
					2' - <3'	0.11	0.23	0.22	0.11	-	-	-	-	31	
					3' - <5'	0.11	0.22	0.22	0.11	-	-	-	-	31	
					5' - 10'	0.11	0.22	0.22	0.11	-	-	-	-	31	
				8	15'	0.11	0.22	0.22	0.11	-	-	-	-	31	
					20'	0.13	0.22	0.22	0.11	-	-	-	-	31	
					25'	0.16	0.22	0.22	0.11	-	-	-	-	31	
					30'	0.19	0.24	0.25	0.11	-	-	-	-	31	
35'	0.22	0.28	0.29	0.11	-	-	-	-	31						
4' x 3'	9	9	9	4	0.33' - <2'	0.22	0.32	0.24	0.22	0.22	0.22	0.22	0.22	-	
					2' - <3'	0.17	0.31	0.24	0.11	-	-	-	-	38	
					3' - <5'	0.13	0.22	0.22	0.11	-	-	-	-	38	
					5' - 10'	0.13	0.22	0.22	0.11	-	-	-	-	38	
				8	15'	0.17	0.22	0.22	0.11	-	-	-	-	38	
					20'	0.23	0.26	0.27	0.11	-	-	-	-	38	
					25'	0.28	0.32	0.34	0.11	-	-	-	-	38	
					30'	0.33	0.39	0.40	0.11	-	-	-	-	38	
4' x 4'	9	9	9	4	0.33' - <2'	0.22	0.34	0.26	0.22	0.22	0.22	0.22	0.22	-	
					2' - <3'	0.17	0.33	0.26	0.11	-	-	-	-	38	
					3' - <5'	0.13	0.22	0.22	0.11	-	-	-	-	38	
					5' - 10'	0.14	0.22	0.22	0.11	-	-	-	-	38	
				8	15'	0.19	0.22	0.23	0.11	-	-	-	-	38	
					20'	0.24	0.28	0.30	0.11	-	-	-	-	38	
					25'	0.29	0.36	0.37	0.11	-	-	-	-	38	
					30'	0.34	0.43	0.45	0.11	-	-	-	-	38	

See General Note 5

TABLE 9B - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 3' & 4' SPANS

SPAN x RISE (S) (R) (ft.)	SLAB / WALL THICKNESS				DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./ft.)									As1 EXT. LENGTH (M) (in.)
	TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)		As1	As2	As3	As4	As5	As6	As7	As8	As9	
3' x 3'	10	10	10	4	0.33' - <2'	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	-
					2' - <3'	0.12	0.24	0.24	0.24	-	-	-	-	31	
					3' - <5'	0.12	0.24	0.24	0.24	-	-	-	-	31	
					5' - 10'	0.12	0.24	0.24	0.24	-	-	-	-	31	
				8	15'	0.12	0.24	0.24	0.24	-	-	-	-	31	
					20'	0.12	0.24	0.24	0.24	-	-	-	-	31	
					25'	0.13	0.24	0.24	0.24	-	-	-	-	31	
					30'	0.15	0.24	0.24	0.12	-	-	-	-	31	
35'	0.18	0.24	0.24	0.12	-	-	-	-	31						
4' x 3'	10	10	10	4	0.33' - <2'	0.24	0.26	0.24	0.24	0.24	0.24	0.24	0.24	-	
					2' - <3'	0.14	0.26	0.24	0.12	-	-	-	-	38	
					3' - <5'	0.12	0.24	0.24	0.12	-	-	-	-	38	
					5' - 10'	0.12	0.24	0.24	0.12	-	-	-	-	38	
				8	15'	0.14	0.24	0.24	0.12	-	-	-	-	38	
					20'	0.18	0.24	0.24	0.12	-	-	-	-	38	
					25'	0.22	0.26	0.27	0.12	-	-	-	-	38	
					30'	0.26	0.31	0.32	0.12	-	-	-	-	38	
4' x 4'	10	10	10	4	0.33' - <2'	0.24	0.28	0.24	0.24	0.24	0.24	0.24	0.24	-	
					2' - <3'	0.14	0.28	0.24	0.12	-	-	-	-	38	
					3' - <5'	0.12	0.24	0.24	0.12	-	-	-	-	38	
					5' - 10'	0.12	0.24	0.24	0.12	-	-	-	-	38	
				8	15'	0.15	0.24	0.24	0.12	-	-	-	-	38	
					20'	0.19	0.24	0.24	0.12	-	-	-	-	38	
					25'	0.23	0.28	0.30	0.12	-	-	-	-	38	
					30'	0.27	0.34	0.35	0.12	-	-	-	-	38	

See General Note 5

NOTES:

1. See Sheet 2 for General Notes.
2. See Sheet 7 for Reinforcing Details and dimension locations.
3. See Sheet 14 for WWR Bending Diagrams.



SPAN x RISE (S) (R) (ft.)	SLAB / WALL THICKNESS				DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./ft.)									As1 EXT. LENGTH (M) (in.)
	TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)		As1	As2	As3	As4	As5	As6	As7	As8	As9	
7' x 4'	9	9	9	4 to 12	0.33' - <2'	0.42	0.58	0.52	0.22	0.22	0.22	0.31	0.42	-	
					2' - <3'	0.42	0.58	0.51	0.11	-	-	-	-	43	
					3' - <5'	0.36	0.41	0.44	0.11	-	-	-	-	43	
					5' - 10'	0.39	0.40	0.39	0.11	-	-	-	-	43	
					15'	0.56	0.56	0.58	0.11	-	-	-	-	41	
	9	9.5	9	7 to 12	20'	0.74	0.76	0.77	0.11	-	-	-	-	41	
					25'	0.92	0.97	0.97	0.11	-	-	-	-	41	
					30'	1.09	1.18	1.10	0.11	-	-	-	-	41	
					0.33' - <2'	0.41	0.61	0.55	0.22	0.23	0.22	0.30	0.41	-	
					2' - <3'	0.41	0.61	0.55	0.11	-	-	-	-	47	
7' x 5'	9	9	9	4 to 12	3' - <5'	0.37	0.43	0.47	0.11	-	-	-	-	43	
					5' - 10'	0.39	0.41	0.43	0.11	-	-	-	-	43	
					15'	0.56	0.61	0.63	0.11	-	-	-	-	41	
					20'	0.73	0.82	0.83	0.11	-	-	-	-	41	
					25'	0.90	1.04	1.06	0.11	-	-	-	-	41	
	9	9.5	9	7 to 12	30'	1.06	1.26	1.19	0.11	-	-	-	-	41	
					0.33' - <2'	0.42	0.63	0.58	0.22	0.24	0.22	0.30	0.42	-	
					2' - <3'	0.42	0.63	0.58	0.11	-	-	-	-	59	
					3' - <5'	0.38	0.45	0.50	0.11	-	-	-	-	47	
					5' - 10'	0.41	0.44	0.47	0.11	-	-	-	-	43	
7' x 6'	9	9	9	4 to 12	15'	0.57	0.65	0.68	0.11	-	-	-	-	41	
					20'	0.75	0.87	0.90	0.11	-	-	-	-	41	
					25'	0.93	1.11	1.13	0.11	-	-	-	-	41	
					30'	1.07	1.35	1.27	0.11	-	-	-	-	41	
					0.33' - <2'	0.44	0.66	0.61	0.22	0.25	0.22	0.31	0.44	-	
	7' x 7'	9	9	9	4 to 12	2' - <3'	0.44	0.65	0.61	0.11	-	-	-	-	59
						3' - <5'	0.41	0.47	0.52	0.11	-	-	-	-	59
						5' - 10'	0.44	0.47	0.52	0.11	-	-	-	-	47
						15'	0.62	0.69	0.74	0.11	-	-	-	-	43
						20'	0.80	0.93	0.97	0.11	-	-	-	-	43
9		9.5	9	7 to 12	25'	0.99	1.18	1.22	0.11	-	-	-	-	43	
					30'	1.12	1.43	1.36	0.11	-	-	-	-	41	

See General Note 5

See General Note 5

SPAN x RISE (S) (R) (ft.)	SLAB / WALL THICKNESS				DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./ft.)									As1 EXT. LENGTH (M) (in.)
	TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)		As1	As2	As3	As4	As5	As6	As7	As8	As9	
7' x 4'	10	10	10	4 to 12	0.33' - <2'	0.33	0.49	0.44	0.24	0.24	0.24	0.24	0.33	-	
					2' - <3'	0.33	0.49	0.44	0.12	-	-	-	-	43	
					3' - <5'	0.29	0.35	0.38	0.12	-	-	-	-	43	
					5' - 10'	0.31	0.30	0.31	0.12	-	-	-	-	43	
					15'	0.44	0.44	0.45	0.12	-	-	-	-	41	
	10	10	10	7 to 12	20'	0.58	0.59	0.60	0.12	-	-	-	-	41	
					25'	0.71	0.74	0.75	0.12	-	-	-	-	41	
					30'	0.85	0.91	0.91	0.12	-	-	-	-	41	
					0.33' - <2'	0.32	0.51	0.47	0.24	0.24	0.24	0.24	0.32	-	
					2' - <3'	0.32	0.51	0.47	0.12	-	-	-	-	47	
7' x 5'	10	10	10	4 to 12	3' - <5'	0.29	0.37	0.41	0.12	-	-	-	-	43	
					5' - 10'	0.31	0.32	0.35	0.12	-	-	-	-	43	
					15'	0.44	0.47	0.50	0.12	-	-	-	-	41	
					20'	0.57	0.63	0.65	0.12	-	-	-	-	41	
					25'	0.70	0.80	0.82	0.12	-	-	-	-	41	
	10	10	10	7 to 12	30'	0.84	0.97	0.99	0.12	-	-	-	-	41	
					0.33' - <2'	0.33	0.53	0.50	0.24	0.24	0.24	0.24	0.33	-	
					2' - <3'	0.33	0.53	0.50	0.12	-	-	-	-	59	
					3' - <5'	0.30	0.38	0.43	0.12	-	-	-	-	47	
					5' - 10'	0.33	0.35	0.38	0.12	-	-	-	-	43	
7' x 6'	10	10	10	4 to 12	15'	0.45	0.51	0.54	0.12	-	-	-	-	41	
					20'	0.58	0.68	0.70	0.12	-	-	-	-	41	
					25'	0.72	0.85	0.88	0.12	-	-	-	-	41	
					30'	0.85	1.04	1.06	0.12	-	-	-	-	41	
					0.33' - <2'	0.35	0.55	0.52	0.24	0.24	0.24	0.24	0.35	-	
	7' x 7'	10	10	10	4 to 12	2' - <3'	0.35	0.55	0.52	0.12	-	-	-	-	59
						3' - <5'	0.32	0.40	0.46	0.12	-	-	-	-	59
						5' - 10'	0.35	0.37	0.41	0.12	-	-	-	-	47
						15'	0.48	0.54	0.58	0.12	-	-	-	-	43
						20'	0.62	0.72	0.76	0.12	-	-	-	-	43
10		10	10	7 to 12	25'	0.76	0.90	0.94	0.12	-	-	-	-	43	
					30'	0.90	1.10	1.13	0.12	-	-	-	-	41	

NOTES:

1. See Sheet 2 for General Notes.
2. See Sheet 7 for Reinforcing Details and dimension locations.
3. See Sheet 14 for WWR Bending Diagrams.

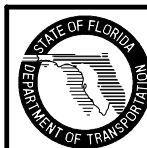


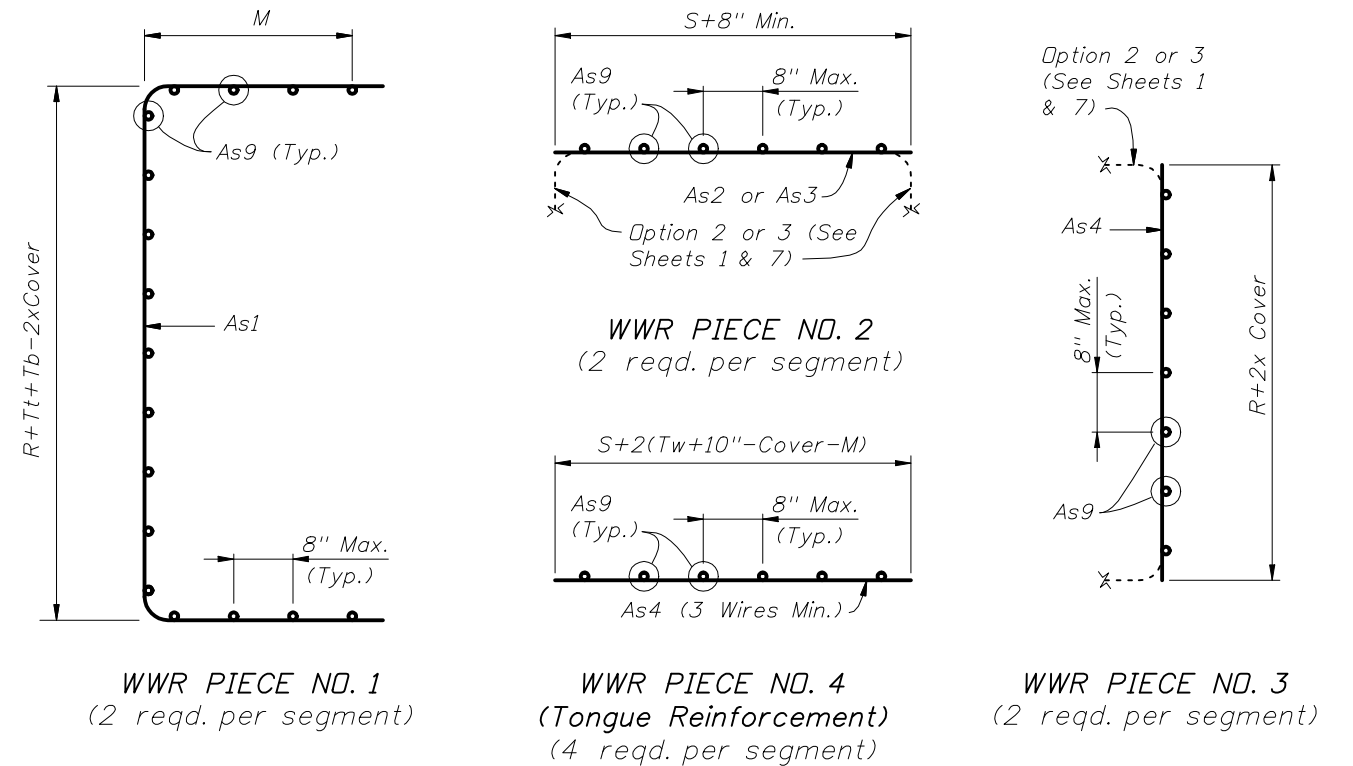
TABLE 16 - STANDARD PRECAST BOX CULVERT DESIGNS (3" COVER) - 12' SPANS

SPAN x RISE (S) (R) (ft.)	SLAB / WALL THICKNESS				DESIGN EARTH COVER ABOVE TOP SLAB	REINFORCEMENT AREAS (sq. in./ft.)									As1 EXT. LENGTH (M) (in.)
	TOP (Tt) (in.)	BOT. (Tb) (in.)	SIDE (Tw) (in.)	HAUNCH (H) (in.)		As1	As2	As3	As4	As5	As6	As7	As8	As9	
12' x 4'	12	12	12	4	0.33' - <2'	0.59	0.64	0.51	0.29	0.29	0.29	0.52	0.55	-	
				to	2' - <3'	0.60	0.64	0.51	0.15	-	-	-	-	73	
				12	3' - <5'	0.60	0.61	0.51	0.15	-	-	-	-	66	
				12	5' - 10'	0.81	0.61	0.61	0.15	-	-	-	-	66	
				12	15'	1.04	0.80	0.77	0.15	-	-	-	-	59	
				12	20'	1.37	1.08	1.03	0.15	-	-	-	-	59	
12' x 6'	12	12	12	4	0.33' - <2'	0.56	0.70	0.57	0.29	0.29	0.29	0.47	0.52	-	
				to	2' - <3'	0.56	0.70	0.57	0.15	-	-	-	-	66	
				12	3' - <5'	0.56	0.67	0.57	0.15	-	-	-	-	59	
				12	5' - 10'	0.74	0.69	0.70	0.15	-	-	-	-	59	
				12	15'	0.94	0.90	0.88	0.15	-	-	-	-	53	
				12	20'	1.23	1.22	1.17	0.15	-	-	-	-	53	
12' x 8'	12	12	12	4	0.33' - <2'	0.55	0.75	0.63	0.29	0.29	0.29	0.45	0.53	-	
				to	2' - <3'	0.55	0.75	0.63	0.15	-	-	-	-	66	
				12	3' - <5'	0.55	0.73	0.63	0.15	-	-	-	-	59	
				12	5' - 10'	0.73	0.77	0.79	0.15	-	-	-	-	59	
				12	15'	0.93	1.00	0.99	0.15	-	-	-	-	53	
				12	20'	1.21	1.35	1.31	0.15	-	-	-	-	53	
12' x 10'	12	12	12	4	0.33' - <2'	0.57	0.80	0.68	0.29	0.29	0.29	0.46	0.57	-	
				to	2' - <3'	0.57	0.80	0.68	0.15	-	-	-	-	73	
				12	3' - <5'	0.59	0.77	0.68	0.15	-	-	-	-	66	
				12	5' - 10'	0.78	0.85	0.89	0.15	-	-	-	-	59	
				12	15'	0.98	1.10	1.11	0.15	-	-	-	-	53	
				12	20'	1.26	1.47	1.45	0.15	-	-	-	-	53	
12' x 12'	12	12	12	4	0.33' - <2'	0.65	0.84	0.73	0.29	0.29	0.29	0.50	0.65	-	
				to	2' - <3'	0.65	0.84	0.73	0.23	-	-	-	-	93	
				12	3' - <5'	0.68	0.81	0.75	0.22	-	-	-	-	80	
				12	5' - 10'	0.90	0.94	1.01	0.21	-	-	-	-	73	
				12	15'	1.12	1.20	1.24	0.18	-	-	-	-	59	
				12	20'	1.42	1.60	1.61	0.16	-	-	-	-	59	
12' x 12'	14.5	15	12.5	8	25'	1.57	1.81	1.78	0.16	-	-	-	-	53	
				12	30'	1.63	1.86	1.85	0.15	-	-	-	-	53	

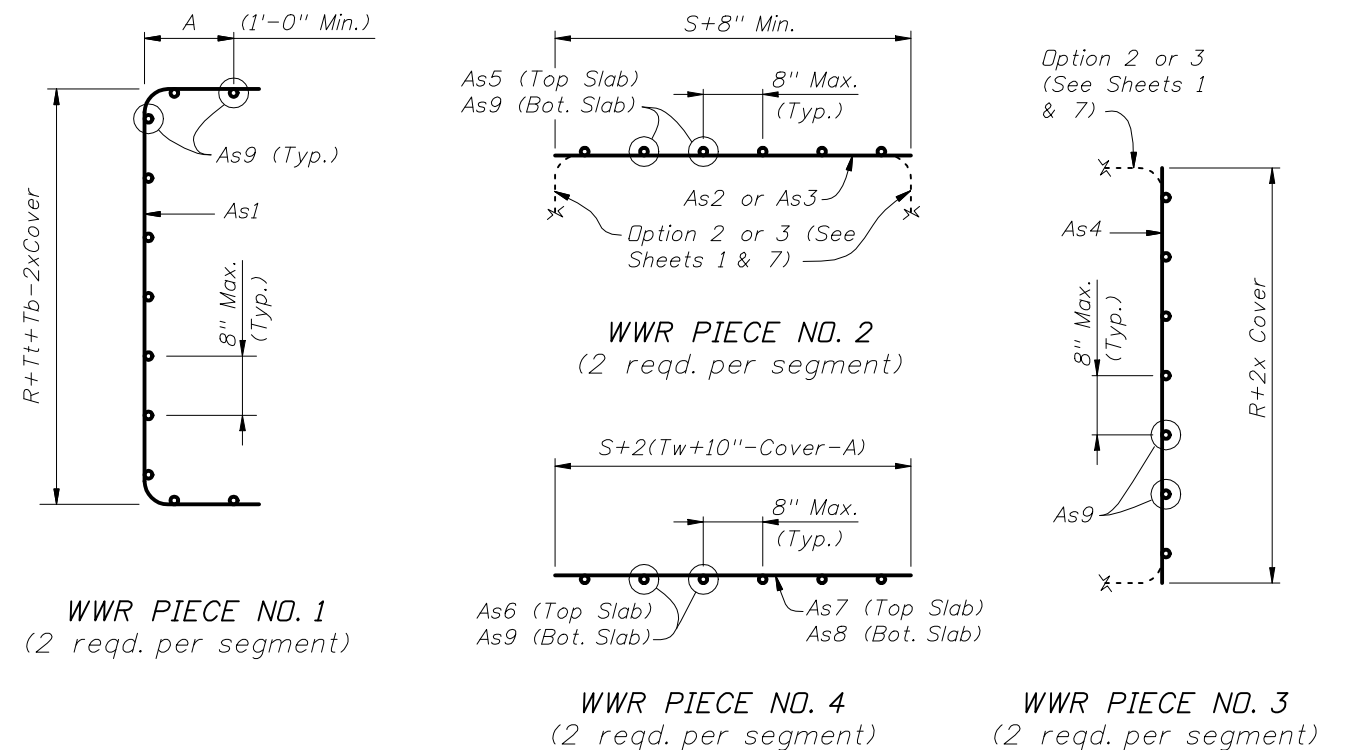
See General Note 5

NOTES:

1. See Sheet 2 of 14 for General Notes.
2. See Sheet 7 of 14 for Reinforcing Details and dimension locations.



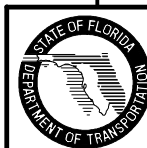
TYPE 2 BOX SECTION (DESIGN EARTH COVER 2' OR GREATER)

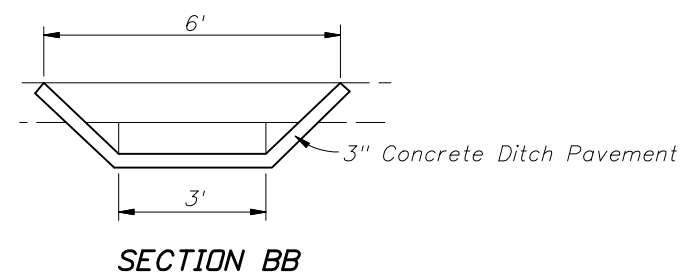
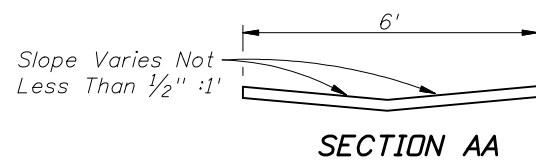
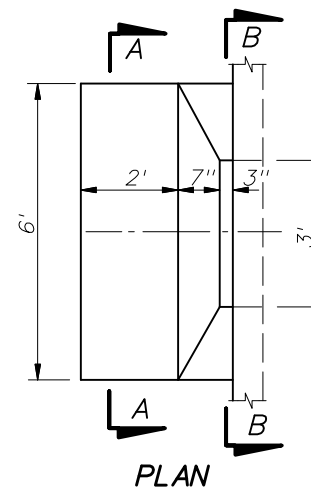
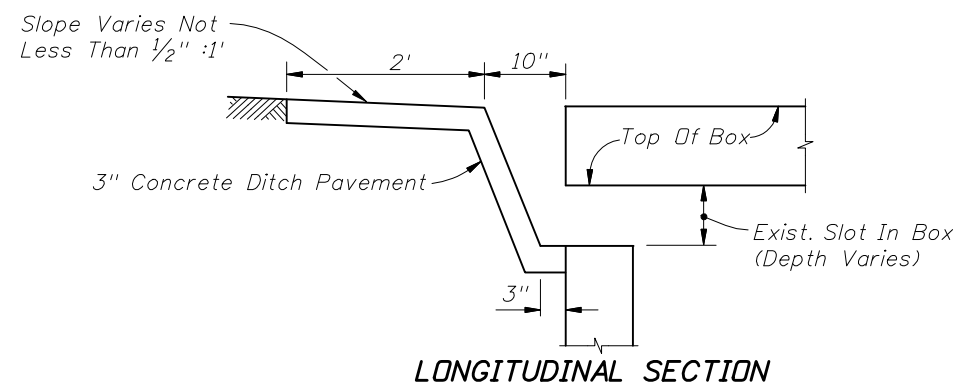


TYPE 1 BOX SECTION (DESIGN EARTH COVER LESS THAN 2')

REINFORCEMENT NOTES:

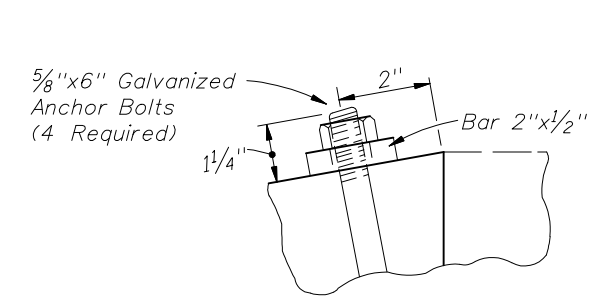
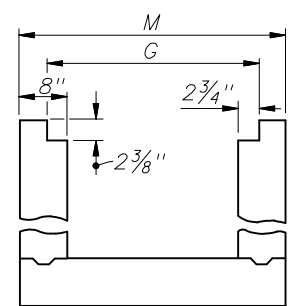
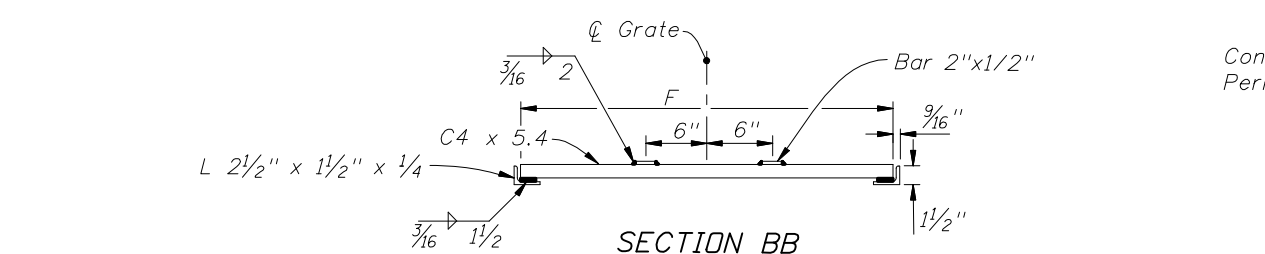
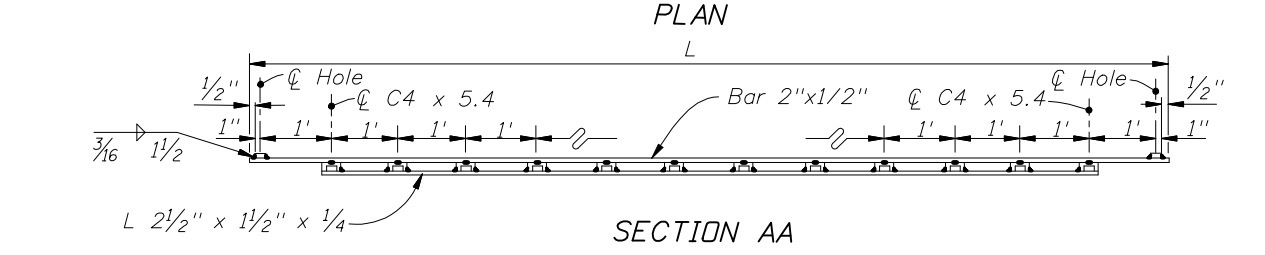
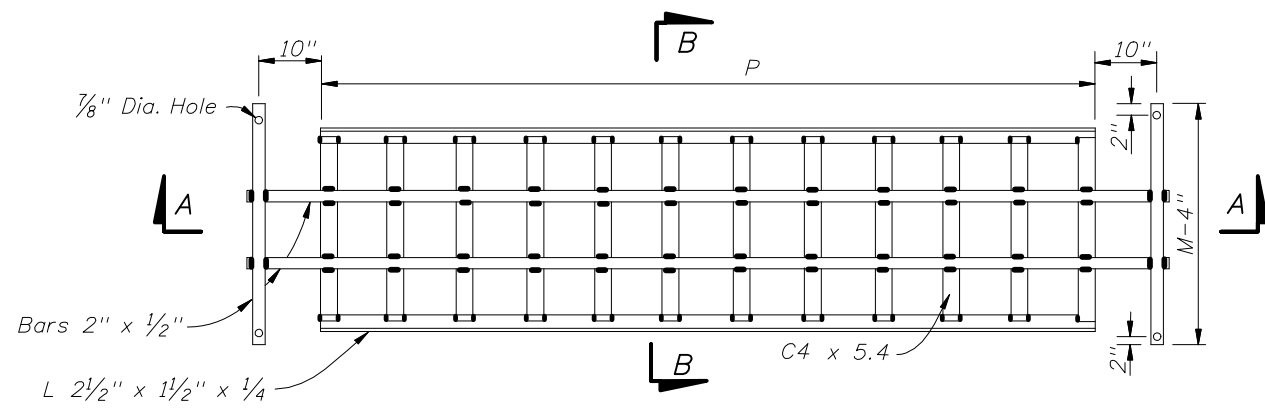
1. Reinforcement bending dimensions are out-to-out.
2. See General Notes 4, 5 and 6 on Sheet 2.
3. See Tables 1 thru 16 for dimensions M, R, S, Tb, Tt and Tw.
4. Dimension "A" is determined by the Manufacturer in accordance with the requirements of Detail "B" on Sheets 1 and 7.





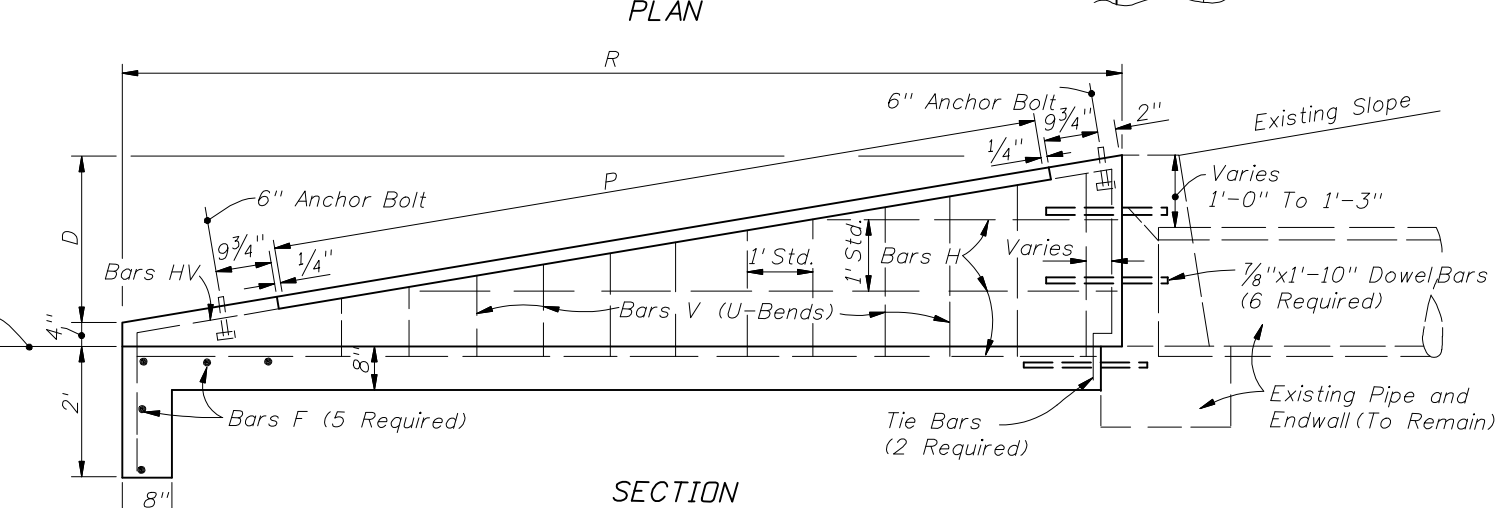
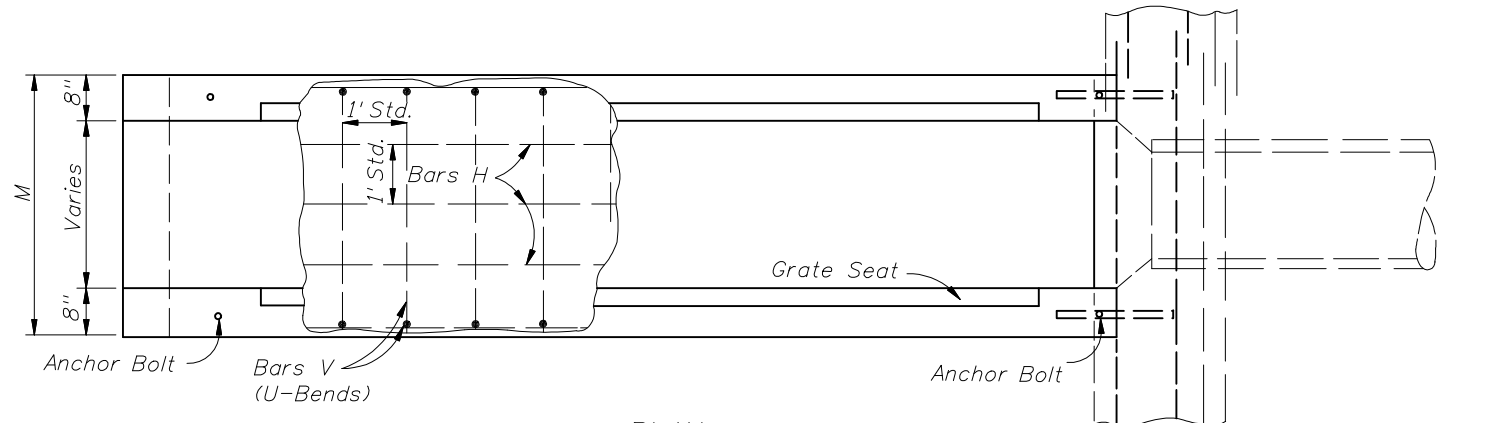
SAFETY MODIFICATION FOR INLETS IN BOX CULVERTS





GRATE SEAT DETAIL

ANCHOR BOLT DETAIL



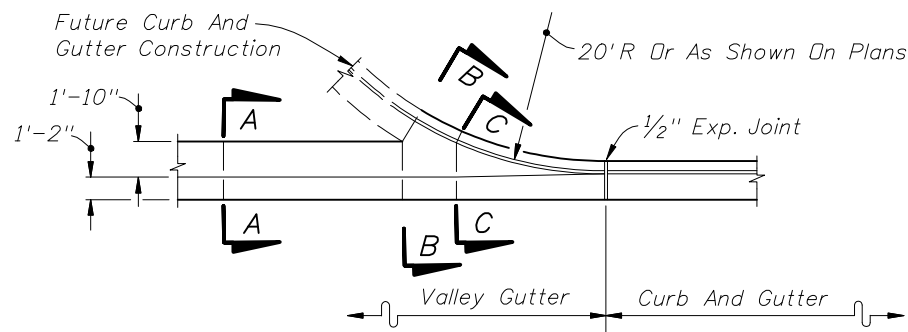
GENERAL NOTES

1. For use criteria see "Steel Grating Use Criteria" Index No. 261.
2. Grates shall be ASTM A242, A572 or A588, Grade 50 steel, and galvanized in accordance with Section 975 and 425-3.2 of the Standard Specifications.
3. Channel section C3 x 6.0 may be substituted for the C4 x 5.4 channel.
4. All reinforcing No. 4 bars with 2" clearance except as noted. Spacings shown are center to center. Laps to be 12" minimum. Welded wire fabric (two cages max.) having an equivalent cross section area (0.20 sq. in.) may be substituted for bar reinforcement.
5. Drill 1 1/4" holes 8" deep with a rotary drill in existing endwall for dowel bars. Holes shall be thoroughly cleaned prior to installing Adhesive-Bonded Dowels.
6. Endwall to be paid for under the contract unit price for Class I Concrete (Endwalls), CY and Reinforcing Steel (Roadway), LB. Cost of Adhesive-Bonded Dowels to be included in the contract unit price for reinforcing steel. Cost of grates to be paid for under the contract unit price for Endwall Grate, LB., plan quantity. Cost of galvanized bolts and nuts to be included in the contract unit price for the grate.
7. Sod slopes 5' each side and above endwall. Sodding to be paid for under the contract unit price for Performance Turf, SY.

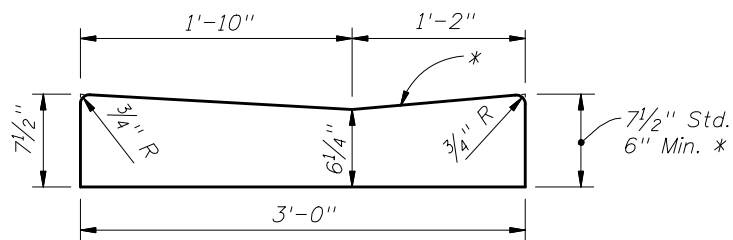
DIMENSIONS AND QUANTITIES PER GRATE										
Slope	Pipe Size	Channels @ 5.4 Lbs./LF			Bars @ 3.4 lbs/LF (2 ea.)			Angles @ 3.2 Lbs./LF		(2) Total Weight-Lbs
		Quantity	F	Lbs.	L	M-4"	Lbs.	P	Lbs.	
1:6	15"	10	2'-6 7/8"	139	11'-3"	3'-3"	99	9'-4"	60	298
	18"	12	2'-9 7/8"	183	13'-3"	3'-6"	114	11'-4"	73	370
	24"	15	3'-3 7/8"	269	16'-3"	4'-0"	138	14'-4"	92	499
	30"	18	3'-9 7/8"	372	19'-3"	4'-6"	162	17'-4"	111	645
1:4	15"	6	2'-6 7/8"	83	7'-3"	3'-3"	71	5'-4"	34	188
	18"	7	2'-9 7/8"	107	8'-3"	3'-6"	80	6'-4"	41	228
	24"	9	3'-3 7/8"	161	10'-3"	4'-0"	97	8'-4"	53	311
	30"	11	3'-9 7/8"	227	12'-3"	4'-6"	114	10'-4"	66	407

DIMENSIONS AND QUANTITIES PER U-ENDWALL									
Pipe Size	G	M	D	R	P	Class I Concrete-CY	Reinforcing Steel-Lbs.	Sod SY	
15"	2'-8 1/2"	3'-7"	2'-2"	13'-0"	9'-4"	2.12	167	23	
18"	2'-11 1/2"	3'-10"	2'-5"	14'-6"	11'-4"	2.53	173	25	
24"	3'-5 1/2"	4'-4"	2'-11"	17'-6"	14'-4"	3.48	238	29	
30"	3'-11 1/2"	4'-10"	3'-5"	20'-6"	17'-4"	4.57	315	32	
15"	2'-8 1/2"	3'-7"	2'-2"	8'-8"	5'-4"	1.44	120	19	
18"	2'-11 1/2"	3'-10"	2'-5"	9'-8"	6'-4"	1.72	130	20	
24"	3'-5 1/2"	4'-4"	2'-11"	11'-8"	8'-4"	2.36	167	22	
30"	3'-11 1/2"	4'-10"	3'-5"	13'-8"	10'-4"	3.09	225	25	

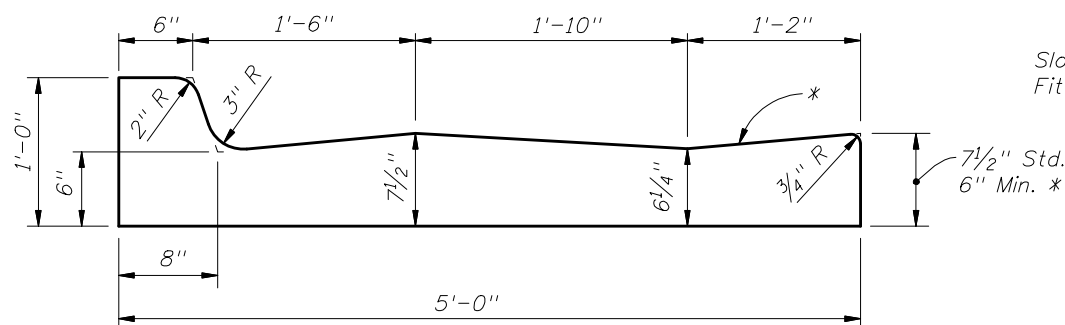




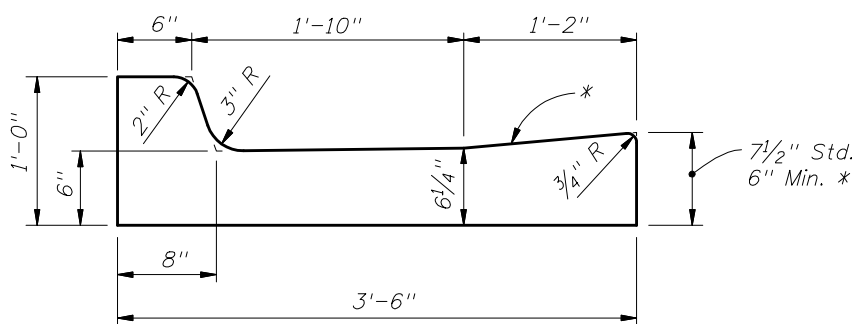
PLAN



SECTION AA



SECTION BB

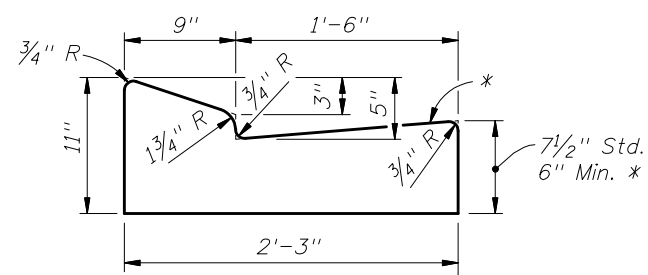


SECTION CC
VALLEY GUTTER

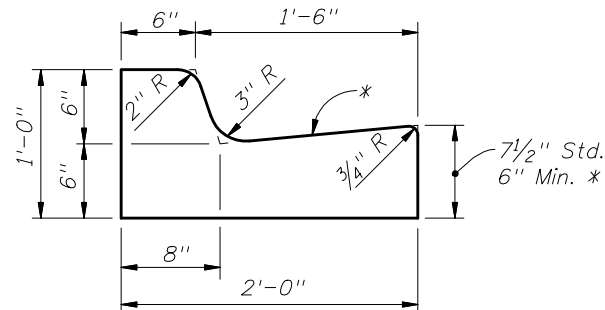
* When used on high side of roadways, the cross slope of the gutter shall match the cross slope of the adjacent pavement. The thickness of the lip shall be 6", unless otherwise shown on plans.

■ Rotate entire section so that gutter cross slope matches slope of adjacent circulating roadway pavement.

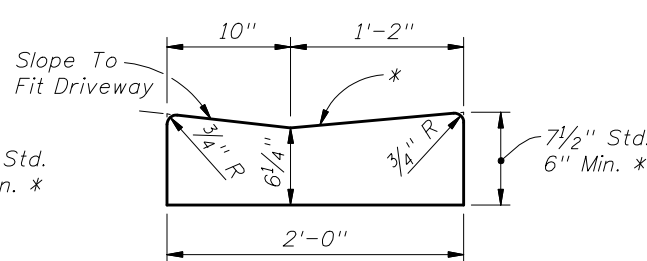
For use adjacent to concrete or flexible pavement. For details depicting usage adjacent to flexible pavement, see Sheet 2. Expansion joint, preformed joint filler and joint seal are required between curb & gutter and concrete pavement only, see Sheet 2.



TYPE E

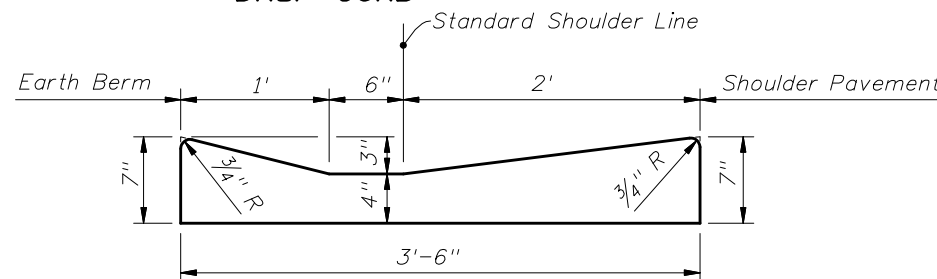


TYPE F

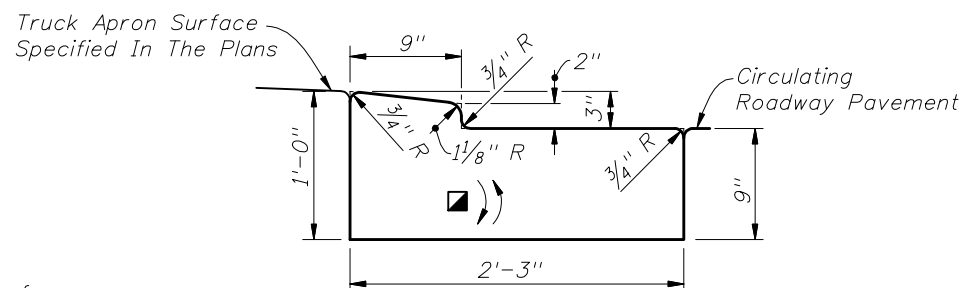


DROP CURB

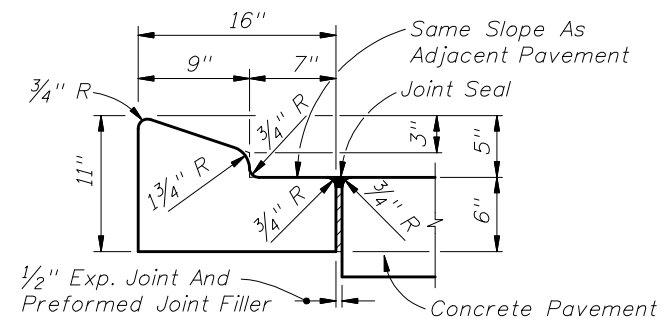
Note: To be paid for as parent curb.



SHOULDER GUTTER

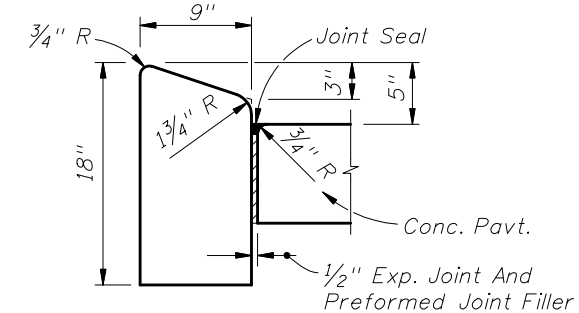


TRAFFIC BEARING SECTION FOR USE IN
ROUNDABOUT CENTRAL ISLAND CONSTRUCTION
TYPE RA

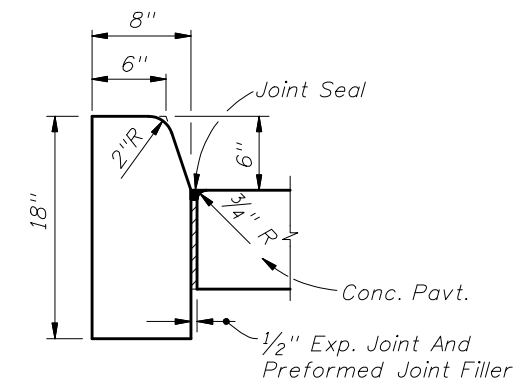


TYPE A

For details depicting usage adjacent to flexible pavement, see diagram right.



TYPE B

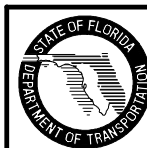


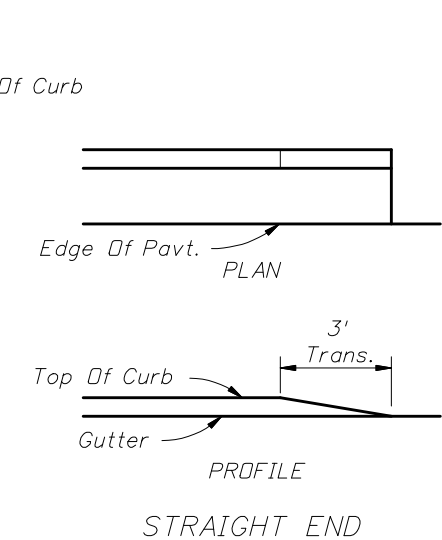
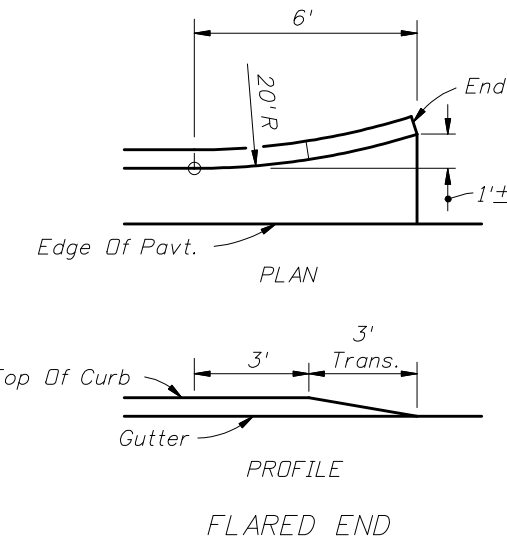
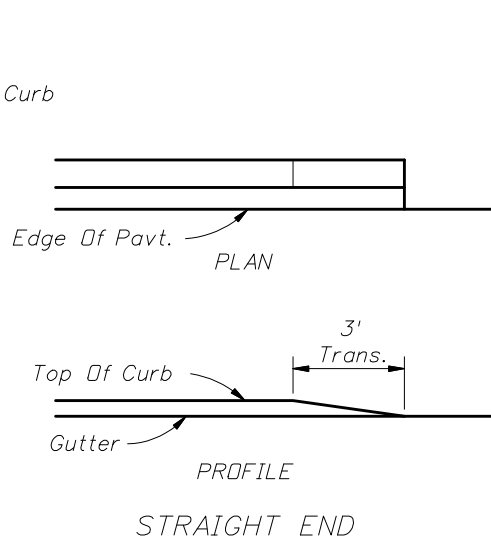
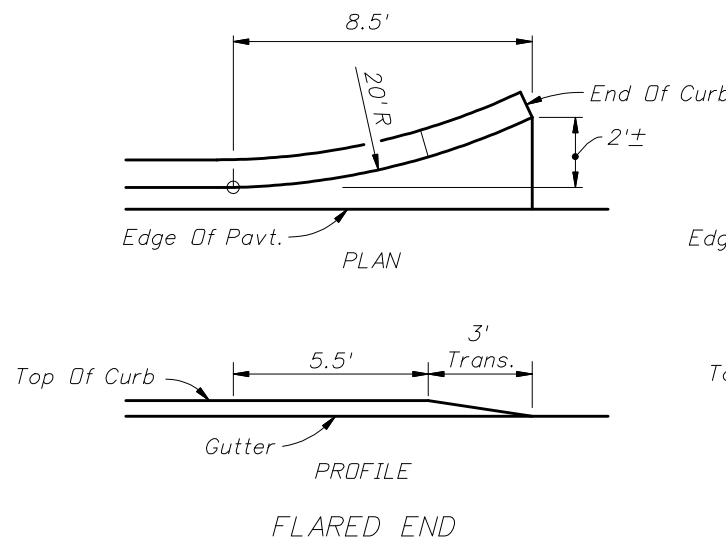
TYPE D

Note:

For use adjacent to concrete or flexible pavement, concrete shown. Expansion joint, preformed joint filler and joint seal are required between curbs and concrete pavement only, see Sheet 2.

CONCRETE CURB

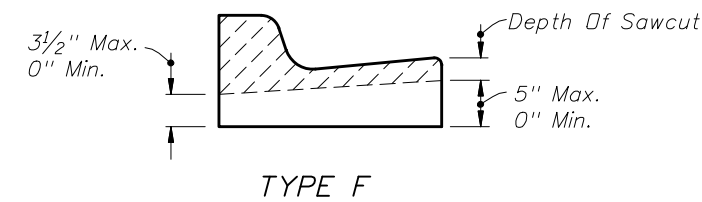
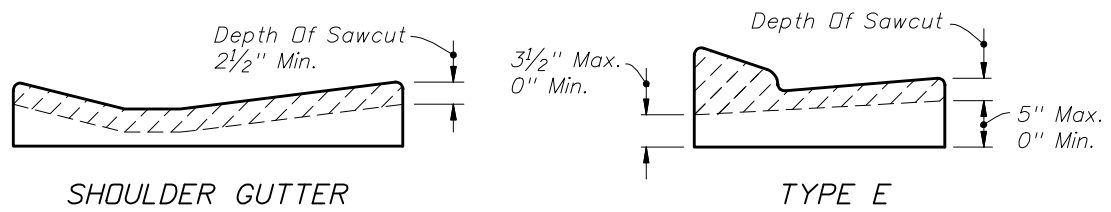




CURB TYPE A

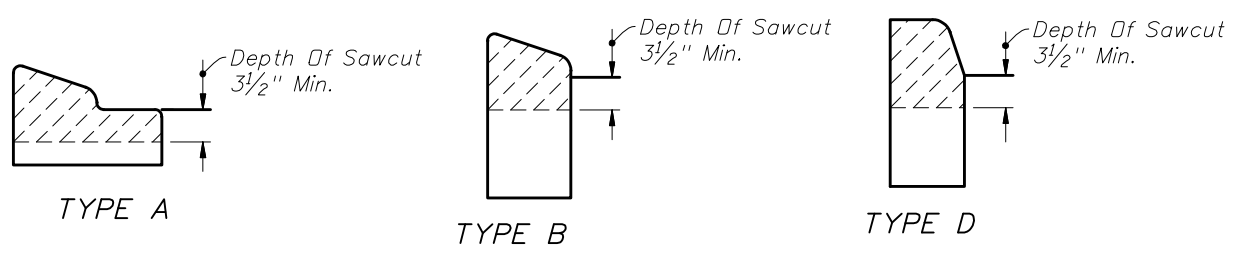
CURB AND GUTTER ENDINGS

CURB AND GUTTER TYPES E & F



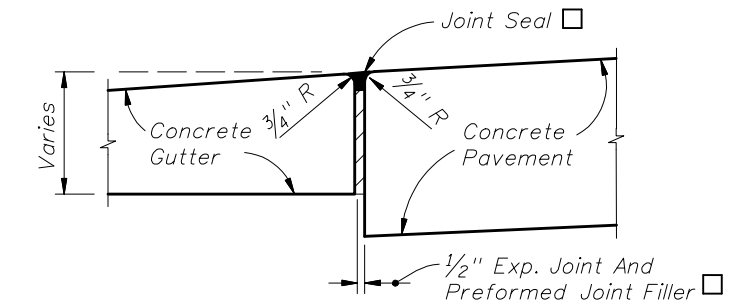
Sawcuts should be avoided within valley gutter and within curb and gutter endings.

CONTRACTION JOINT IN CURB AND GUTTER



△ Applies to both high and low sides of pavement, low side shown. Applies to shoulder gutter only where adjoining traffic lanes.

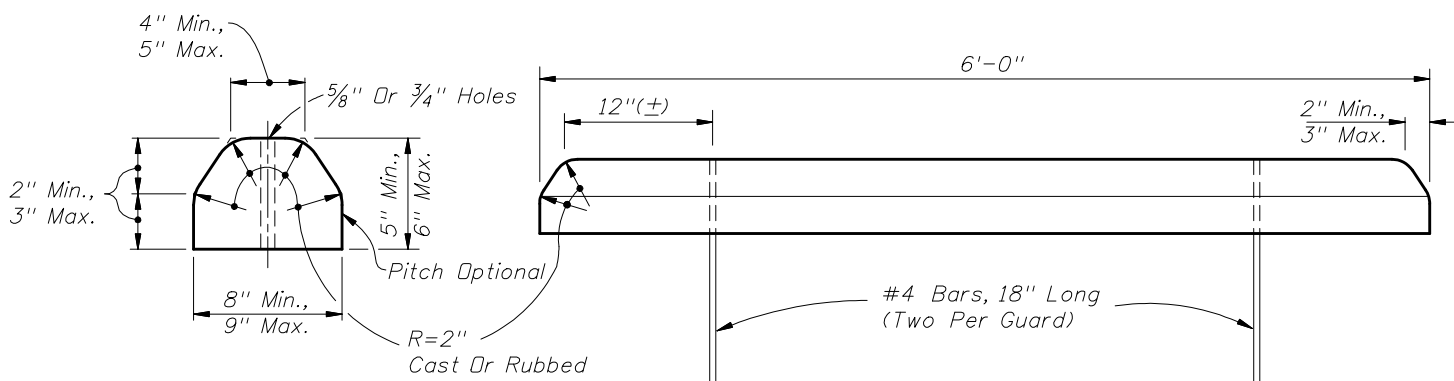
CURB AND GUTTER AND TYPE A CURB ADJACENT TO FLEXIBLE PAVEMENT



□ Applies to both high and low sides of pavement, low side shown.

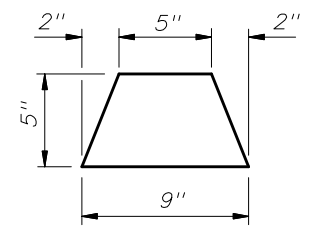
EXPANSION JOINT BETWEEN GUTTER AND CONCRETE PAVEMENT

CONTRACTION JOINT IN CURB



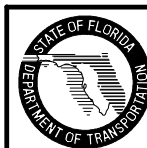
CONCRETE BUMPER GUARD

ASPHALTIC CONCRETE CURB



GENERAL NOTES

1. For curb, gutter and curb & gutter provide 1/8" - 1/4" contraction joints at 10' centers (max.). Contraction joints adjacent to concrete pavement on tangents and flat curves are to match the pavement joints, with intermediate joints not to exceed 10' centers. Curb, gutter and curb & gutter expansion joints shall be located in accordance with Section 520 of the Standard Specifications.
2. Ends of Curbs Types B and D shall transition from full to zero heights in 3'.



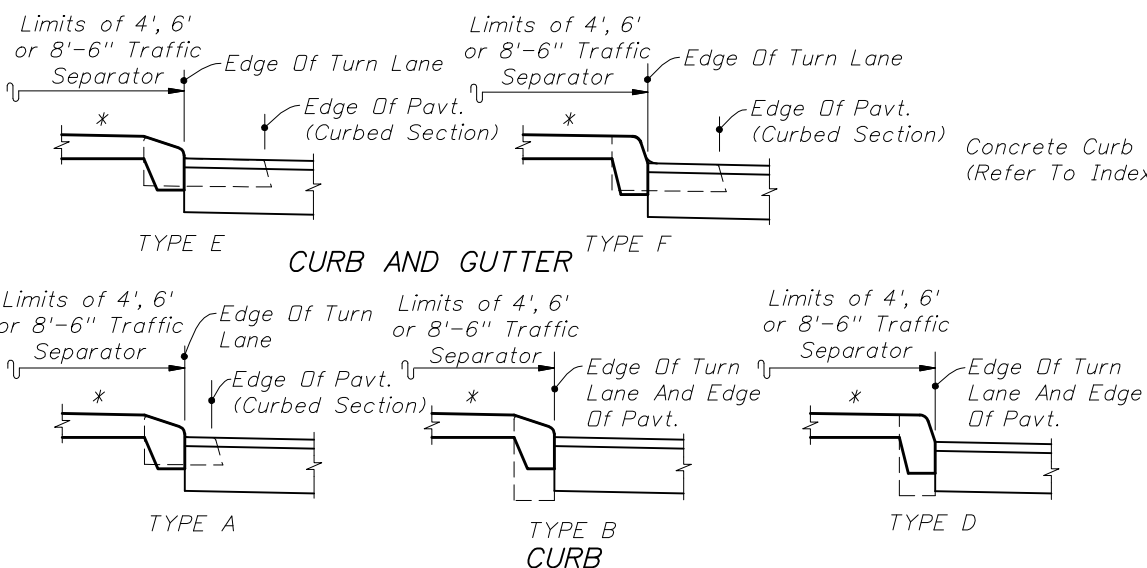
TURN LANES • CURBED AND UNCURBED MEDIANS								
Design Speed (mph)	Entry Speed (mph)	Clearance Distance L ₁	URBAN CONDITIONS			RURAL CONDITIONS		
			Brake To Stop Distance L ₂	Total Decel. Distance L	Clearance Distance L ₃	Brake To Stop Distance L ₂	Total Decel. Distance L	Clearance Distance L ₃
35	25	70'	75'	145'	110'	---	---	---
40	30	80'	75'	155'	120'	---	---	---
45	35	85'	100'	185'	135'	---	---	---
50	40/44	105'	135'	240'	160'	185'	290'	160'
55	48	125'	---	---	---	225'	350'	195'
60	52	145'	---	---	---	260'	405'	230'
65	55	170'	---	---	---	290'	460'	270'

DESIGN NOTES

- Basis for turn lane configurations:
 - Informed Driver.
 - Stop condition (With Or Without Stop Control).
 - Wet Pavement.
 - Reaction preceding entry point.
 - Minimum braking distance for urban conditions.
 - 75' min. for L₂.
 - Comfortable deceleration rates for rural conditions (AASHTO 2001 threshold rate of 11.2 ft./s²).

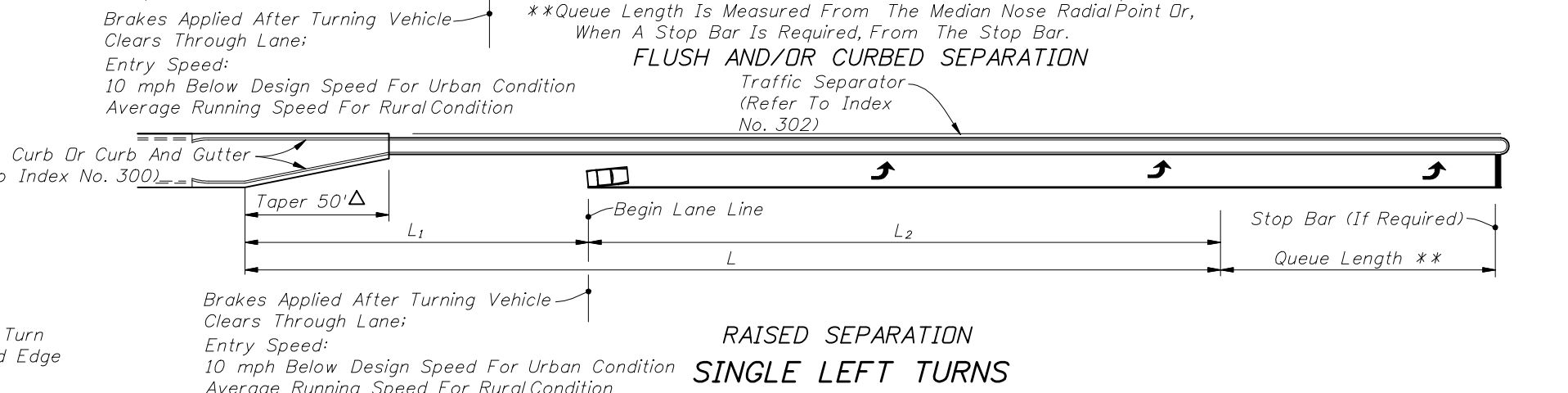
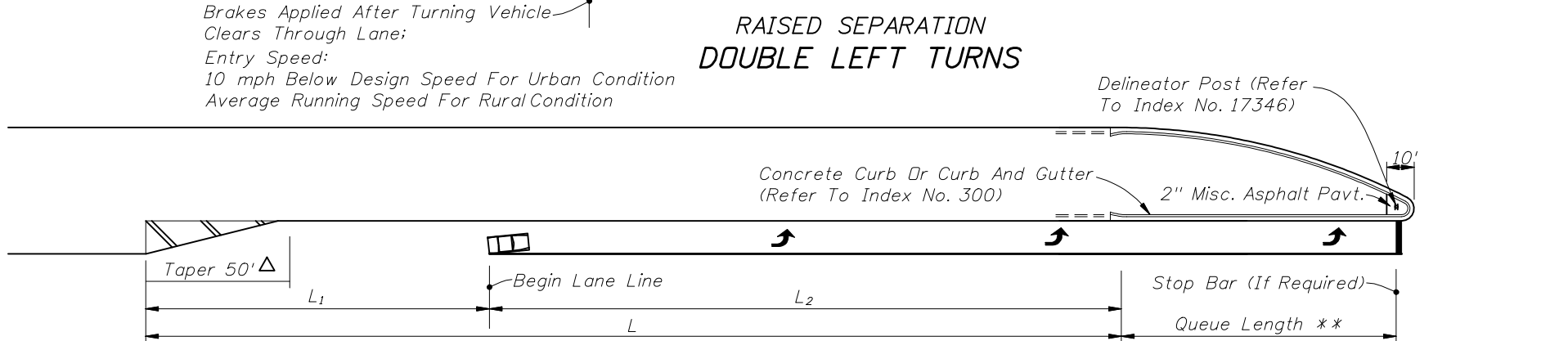
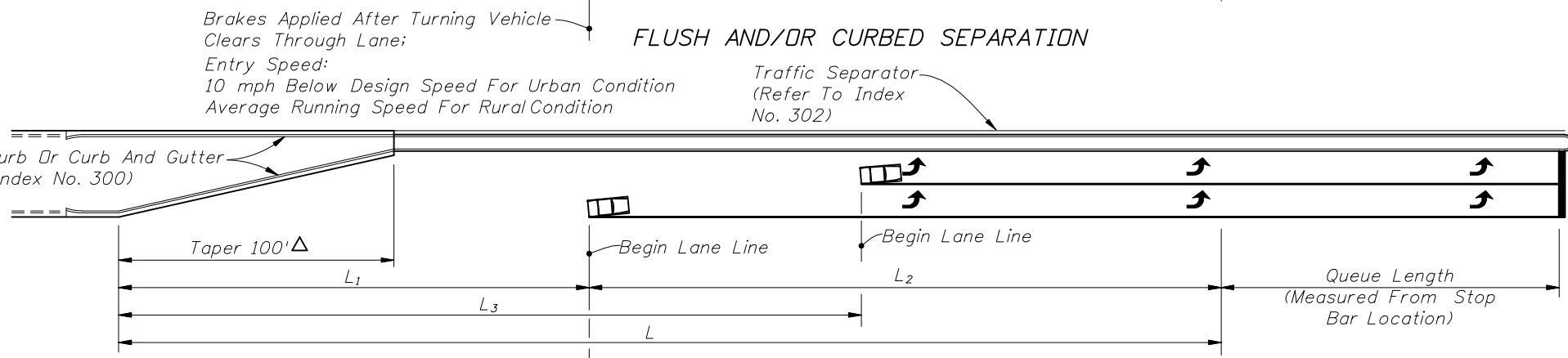
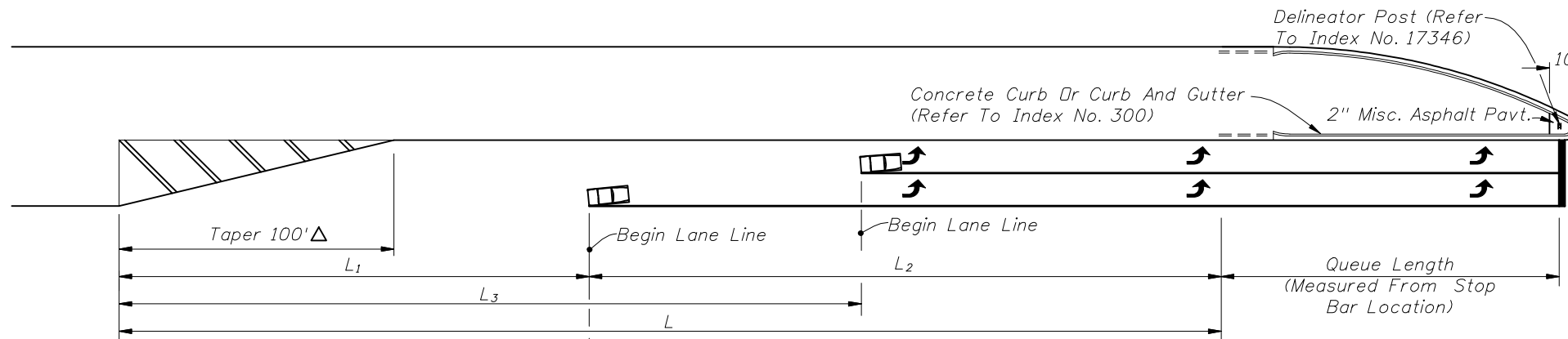
GENERAL NOTES

- The plan views shown are for turn lane taper shapes and dimensional purposes only, they do not prescribe the use of curb, curb and gutter, shoulders nor separators specifically to either rural or urban conditions.
- Total deceleration distances must not be reduced except where lesser values are imposed by unrelocatable control points.
- Right turn lane tapers and distances identical to left turn lanes under stop control conditions. Right turn lane tapers and/or distances are site specific under free flow or yield conditions.
- These left turn configurations apply to continuous left turn lanes only where specifically called for in the plans.
- For pavement markings see Index No. 17346.



For Curb And Curb & Gutter Types, See Index No. 300
 * Option I Separators Shown (Refer To Index No. 302)

MEDIAN CURB AND TRAFFIC SEPARATOR JUNCTURE DETAILS



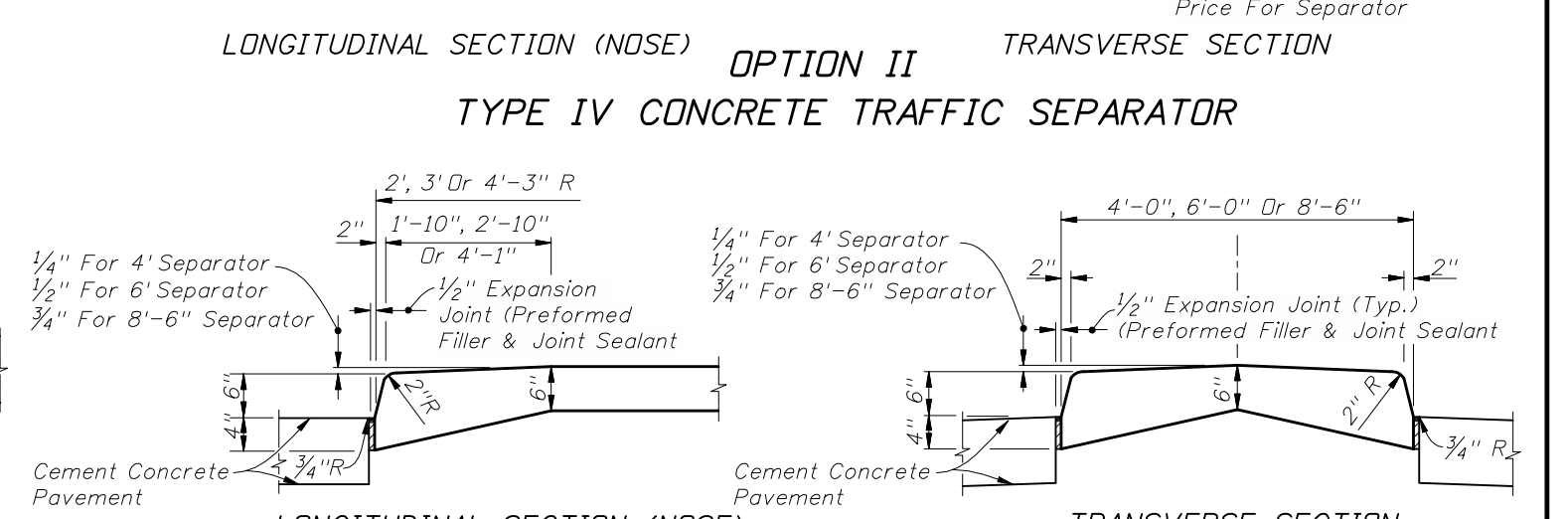
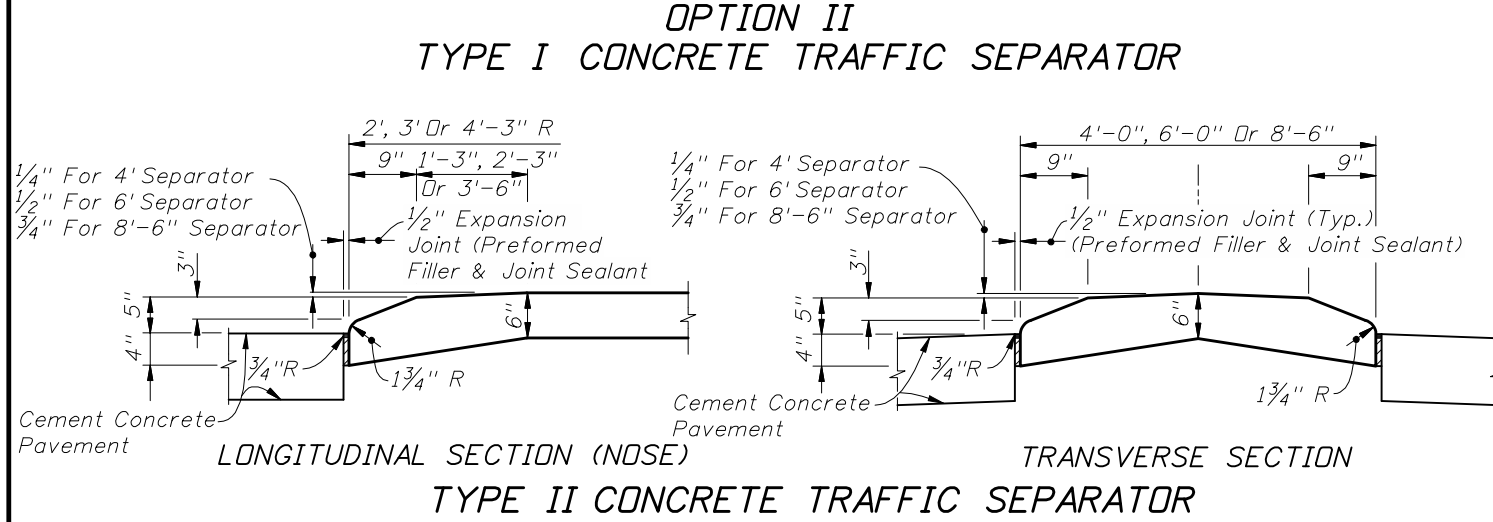
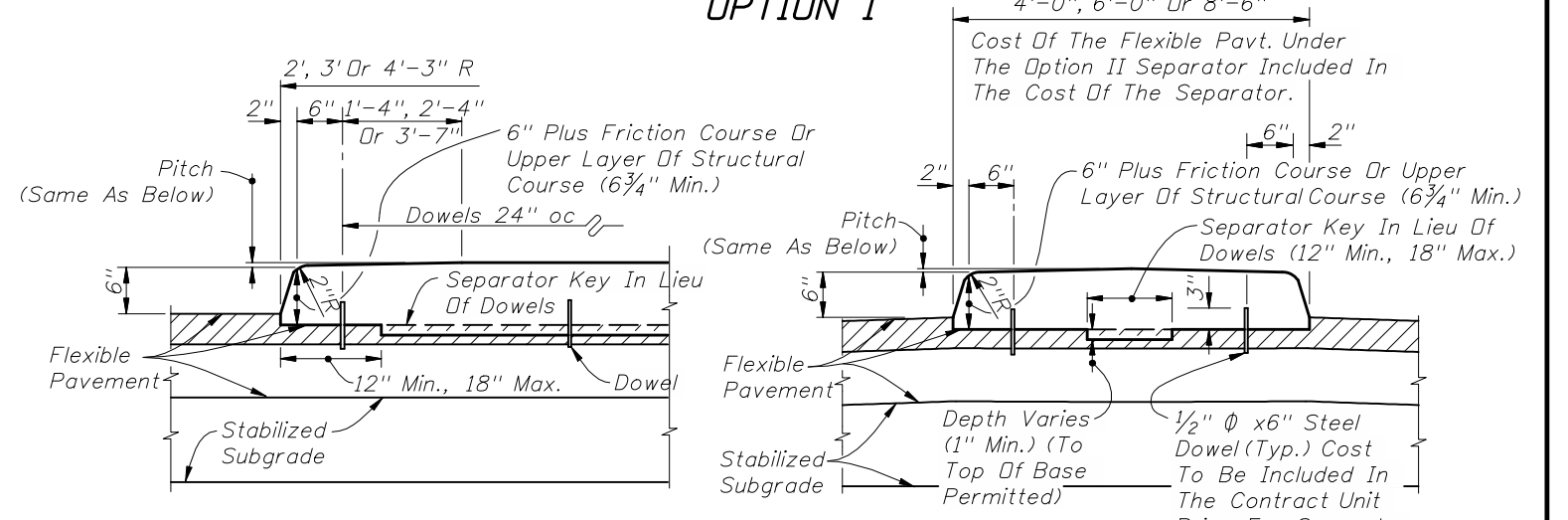
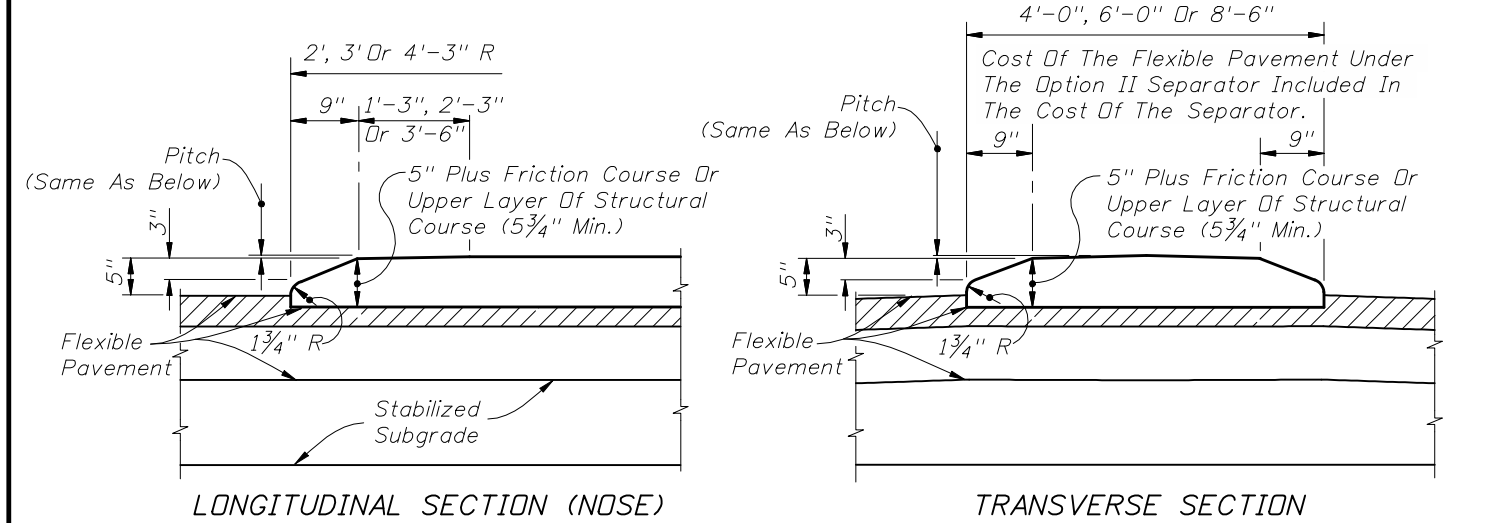
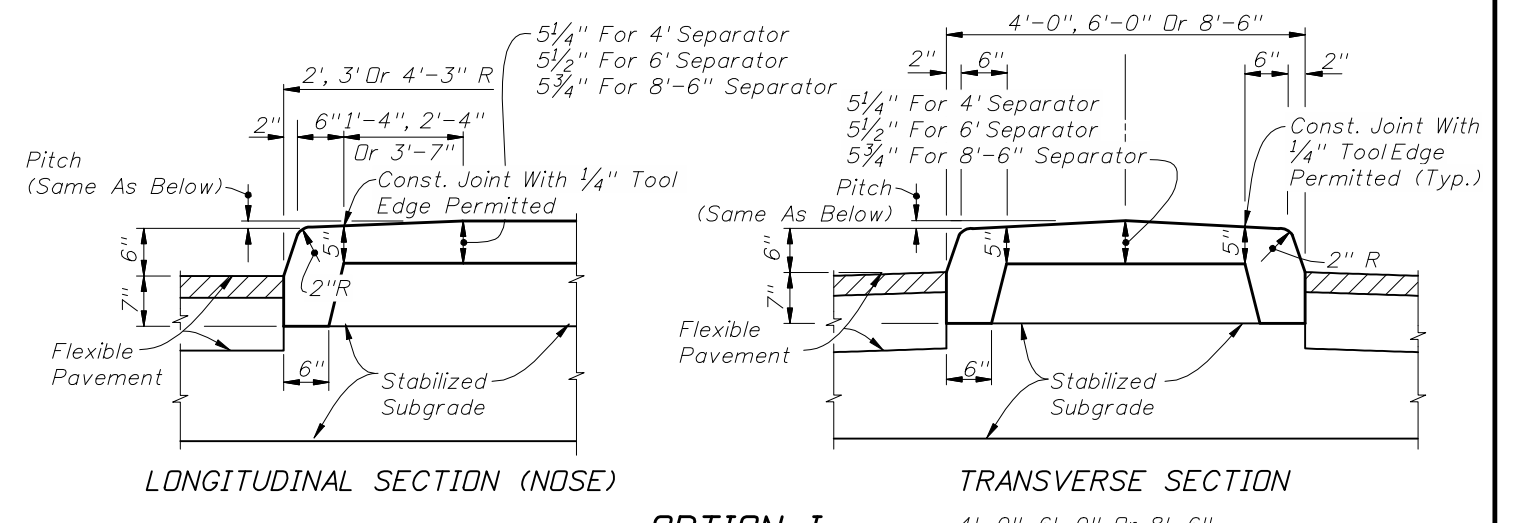
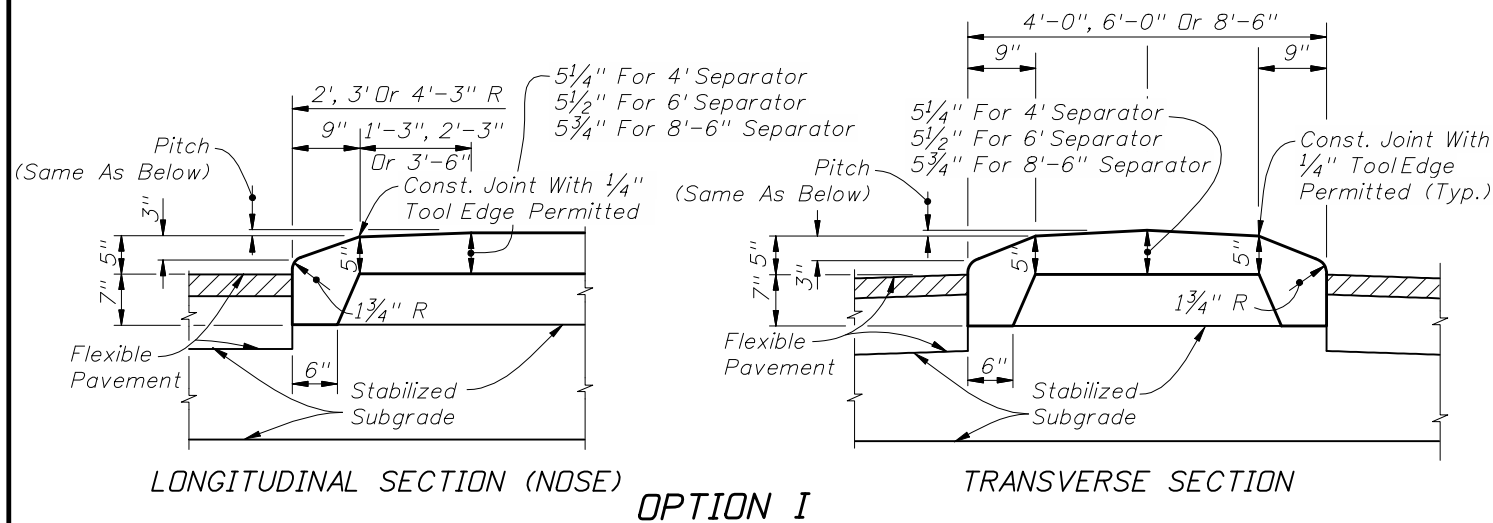
- △ The length of taper may be increased to L₁ for single left turns and L₃ for double left turns when:
- Left turn queue vehicles are adequately provided for within the design queue length.
 - Through vehicle queues will not block access to left turn lane.
 - Approved by District Design Engineer.



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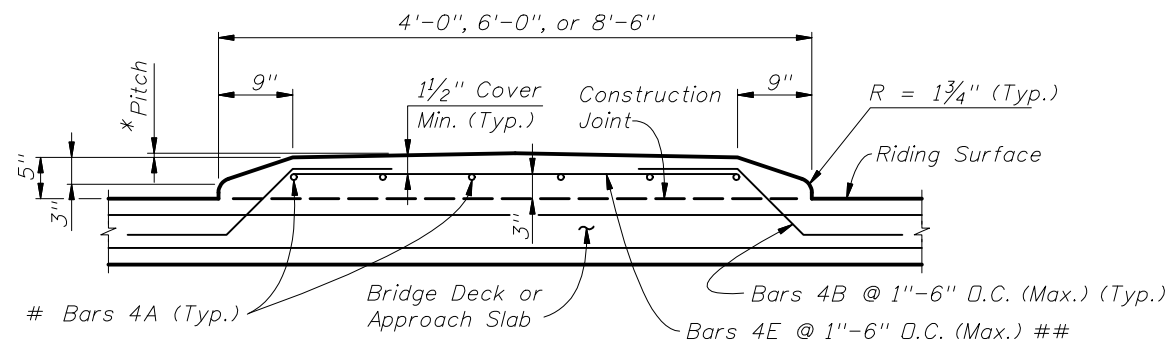
TURN LANES

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Index No.	
301	

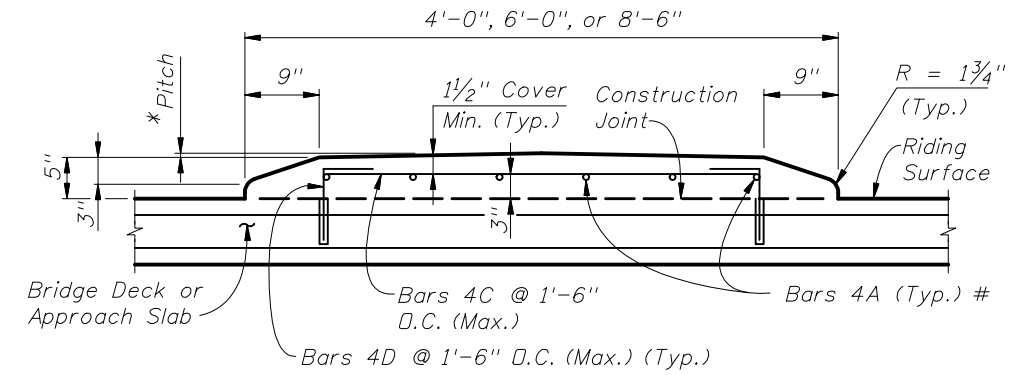


- NOTES**
- Separators Type I and IV are to be used with flexible pavement. Separators Types II and V are to be used with rigid pavement.
 - Either Option I or Option II may be used for Types I and IV separators except when a specific option is called for in the plans.
 - For all separators provide 1/8"- 1/4" contraction joints at 10' centers (max.). Contraction joints adjacent to concrete pavement on tangents and flat curves are to match the pavement joints, with intermediate joints not to exceed 10' centers.
 - Separators having widths of 4', 6' or 8'-6" shall be paid for under the contract unit price for Concrete Traffic Separator (Type...) (' Wide) LF. Separators having widths other than 4', 6' or 8'-6" shall be detailed in the plans as special separators and paid for under the contract unit price for Concrete Traffic Separator (Special) SY.

ROADWAY INSTALLATIONS



TYPICAL SECTION THRU TRAFFIC SEPARATOR
(Bridge Deck Shown, Approach Slab Similar)

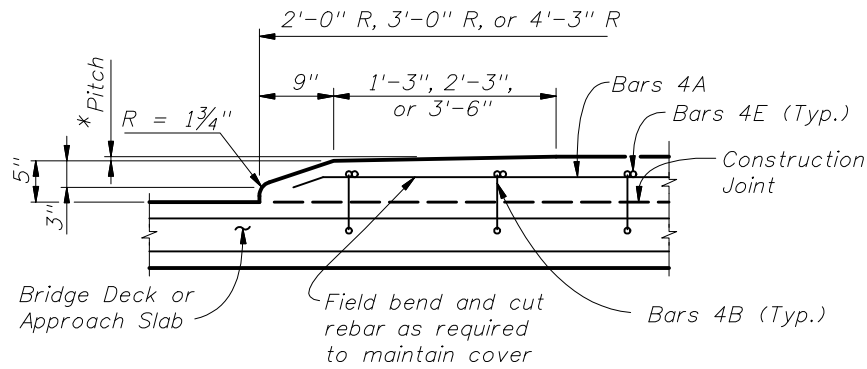


TYPICAL SECTION THRU TRAFFIC SEPARATOR
(Bridge Deck Shown, Approach Slab Similar)

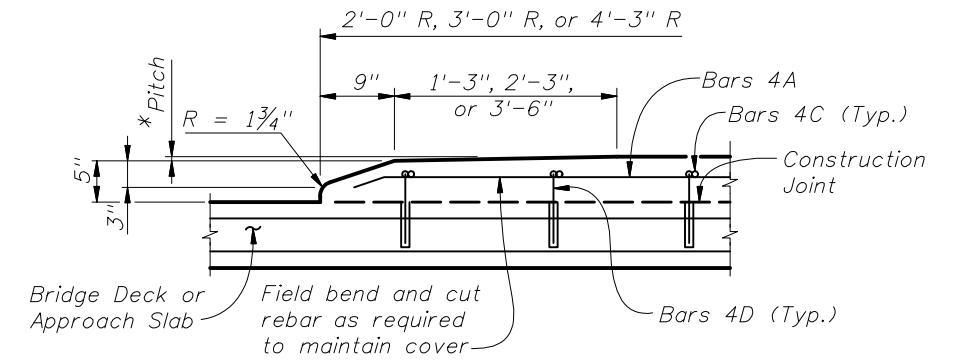
For 4'-0" width : Bars 4A @ 3 equal spaces (continuous).
 For 6'-0" width : Bars 4A @ 5 equal spaces (continuous).
 For 8'-6" width : Bars 4A @ 7 equal spaces (continuous).

At the Contractor's option
 a one piece bar may be
 substituted for Bars 4B
 and 4E.

* Pitch:
 1/4" For 4'-0" Separator
 1/2" For 6'-0" Separator
 3/4" For 8'-6" Separator

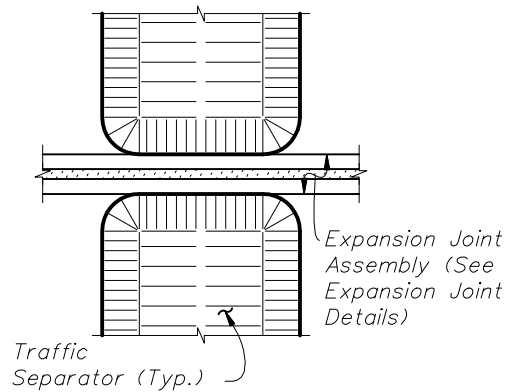


LONGITUDINAL SECTION THRU TRAFFIC
SEPARATOR AT NOSE
(Bridge Deck Shown, Approach Slab Similar)

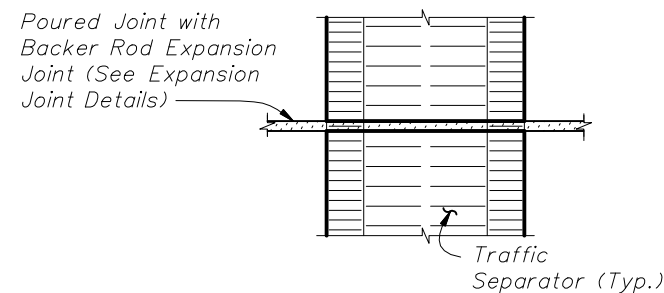


LONGITUDINAL SECTION THRU TRAFFIC
SEPARATOR AT NOSE
(Bridge Deck Shown, Approach Slab Similar)

REINFORCING STEEL OPTION A



DETAIL AT EXPANSION JOINTS
(Strip Seal Shown,
Other Armored Joint Types Similar)

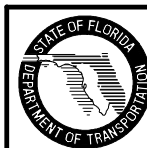


DETAIL AT Poured JOINT WITH
BACKER ROD EXPANSION JOINTS

REINFORCING STEEL OPTION B (NOT PERMITTED
ON BRIDGE DECKS WITH PRESTRESSING STEEL)

Note:
 See Structures Plans, Superstructure Sheets for actual
 dimensions and joint orientation. Treatment of separators
 on straight bridges shown. For treatment of separators
 on skewed bridges see Index No. 490.

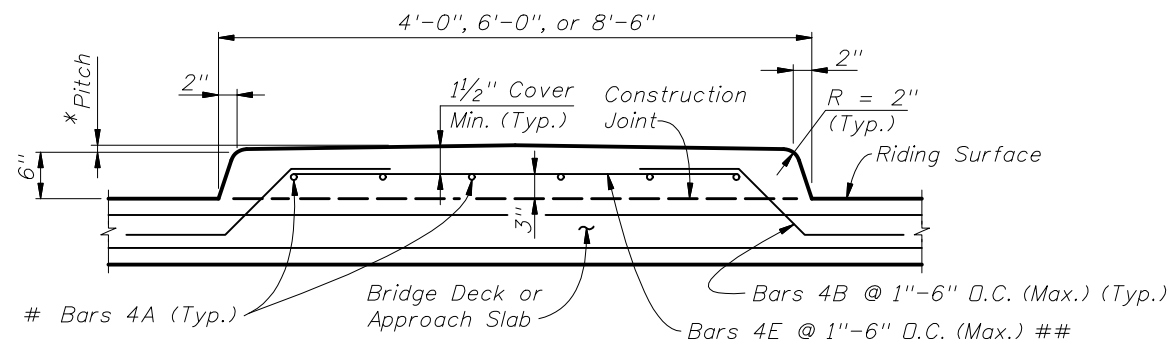
BRIDGE INSTALLATIONS - TYPE "E" CURB



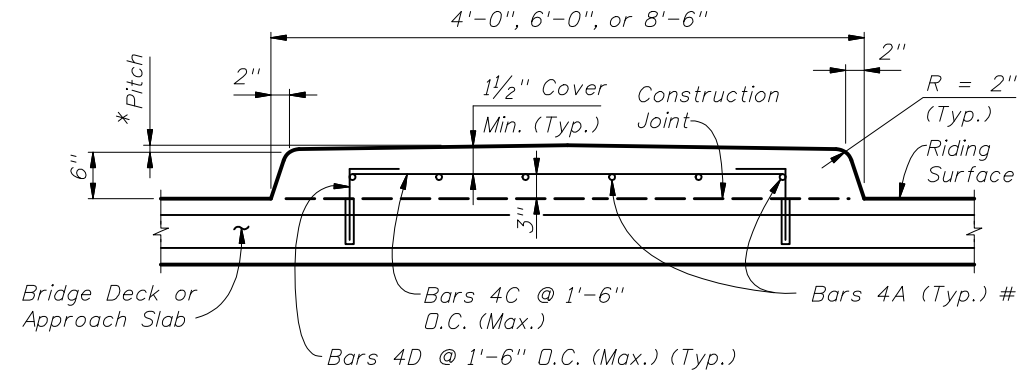
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TRAFFIC SEPARATORS

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Index No. 302	



TYPICAL SECTION THRU TRAFFIC SEPARATOR
(Bridge Deck Shown, Approach Slab Similar)

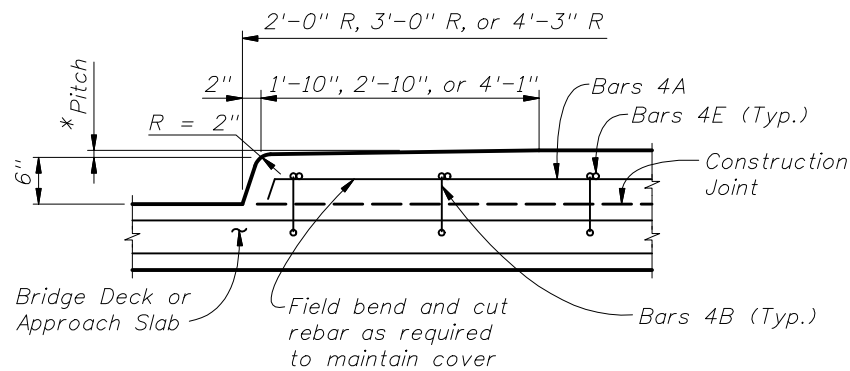


TYPICAL SECTION THRU TRAFFIC SEPARATOR
(Bridge Deck Shown, Approach Slab Similar)

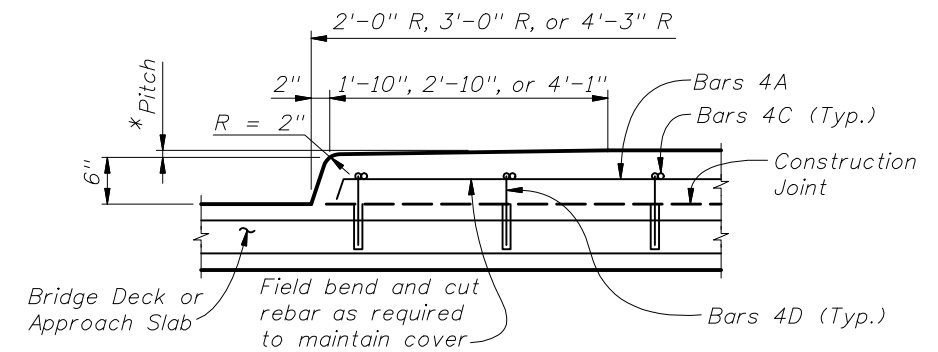
For 4'-0" width : Bars 4A @ 3 equal spaces (continuous).
 For 6'-0" width : Bars 4A @ 5 equal spaces (continuous).
 For 8'-6" width : Bars 4A @ 7 equal spaces (continuous).

At the Contractor's option
 a one piece bar may be
 substituted for Bars 4B
 and 4E.

* Pitch:
 1/4" For 4'-0" Separator
 1/2" For 6'-0" Separator
 3/4" For 8'-6" Separator



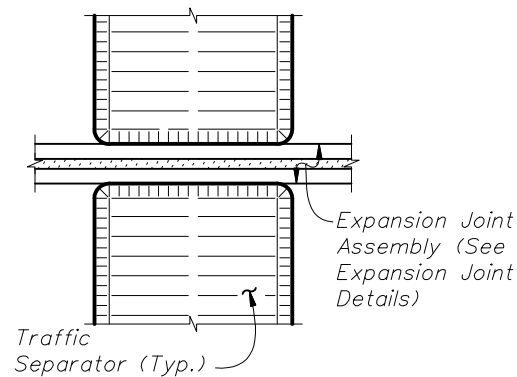
LONGITUDINAL SECTION THRU TRAFFIC SEPARATOR AT NOSE
(Bridge Deck Shown, Approach Slab Similar)



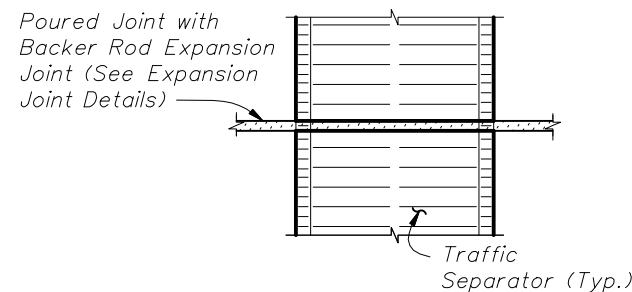
LONGITUDINAL SECTION THRU TRAFFIC SEPARATOR AT NOSE
(Bridge Deck Shown, Approach Slab Similar)

REINFORCING STEEL OPTION A

REINFORCING STEEL OPTION B (NOT PERMITTED ON BRIDGE DECKS WITH PRESTRESSING STEEL)



DETAIL AT EXPANSION JOINTS
(Strip Seal Shown,
Other Armored Joint Types Similar)



DETAIL AT Poured JOINT WITH
BACKER ROD EXPANSION JOINTS

Note:
 See Structures Plans, Superstructure Sheets
 for actual dimensions and joint orientation.
 Treatment of separators on straight bridges
 shown. For treatment of separators on skewed
 bridges see Index No. 490.

BRIDGE INSTALLATIONS - TYPE "F" CURB



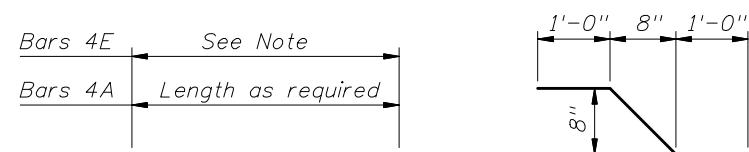
2010 FDOT Design Standards

TRAFFIC SEPARATORS

Last Revision 07/01/07 Sheet No. 3 of 4

Index No. 302

CONVENTIONAL REINFORCING
STEEL BENDING DIAGRAMS

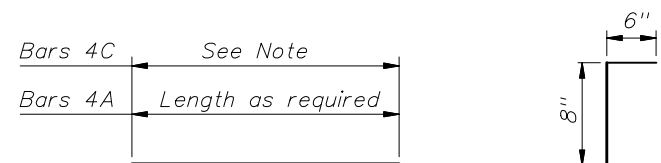


Bars 4A & 4E

Bar 4B

Note:
Length of Bars 4E is 2'-5" for 4'-0" Separator.
Length of Bars 4E is 4'-5" for 6'-0" Separator.
Length of Bars 4E is 6'-11" for 8'-6" Separator.

REINFORCING STEEL OPTION A



Bars 4A & 4C

Bar 4D

Note:
Length of Bars 4C is 2'-4 1/2" for 4'-0" Separator.
Length of Bars 4C is 4'-4 1/2" for 6'-0" Separator.
Length of Bars 4C is 6'-10 1/2" for 8'-6" Separator.

REINFORCING STEEL OPTION B

REINFORCING STEEL NOTES:

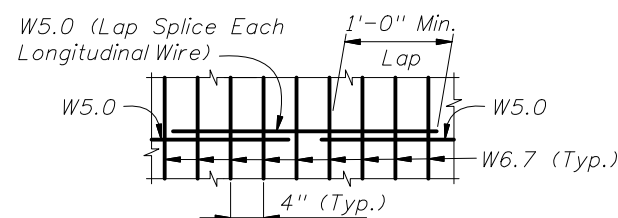
- All dimensions are out to out.
- The 8" vertical dimension shown for Bars 4B and 4D are based on a slab 8 1/2" thick or greater without a wearing surface. If slab thickness is less than 8 1/2", decrease this dimension by an amount equal to the difference in thickness. If a wearing surface is to be provided, increase this dimension by an amount equal to the wearing surface thickness.

ALTERNATE REINFORCING STEEL
DETAILS (WELDED WIRE REINFORCEMENT)

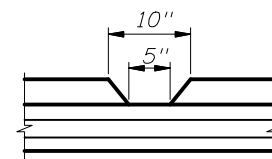
OPTION A : Use Welded Wire Reinforcement 3 x 4 - W5.0 x W6.7 as required by plans in place of Bars 4A, 4B and 4E. Bend the Welded Wire Reinforcement to the dimensions of Bar 4B shown in the Bending Diagram for Reinforcing Steel Option A.

OPTION B : Use Welded Wire Reinforcement 3 x 4 - W5.0 x W6.7 as required by plans in place of Bars 4A and 4C shown in Reinforcing Steel Option B.

Note: Welded Wire Reinforcement shall conform to ASTM A185.



SPLICE DETAIL
(Between WWR 3 x 4 - W5.0 x W6.7 Sections)



DRAINAGE JOINT DETAIL
FOR 5" OPENING OR LESS

See Structures Plans, Superstructure Sheets for location(s) of drainage joints. Locations for drainage joints shall be limited to the constant width section of separator.

NOTES:

- CONCRETE: See General Notes in Structures Plans.
REINFORCING STEEL: Reinforcing Steel shall be ASTM A615 Grade 60.
PAYMENT: Separators having widths of 4'-0", 6'-0", and 8'-6" shall be paid under the contract unit price for Traffic Separator Concrete (Type II or V) (---' Wide), LF. Separators having widths other than 4'-0", 6'-0", or 8'-6" shall be detailed in the plans as special separators and paid under the contract unit price for Traffic Separator Concrete (Special), S.Y.
TRAFFIC SEPARATOR CONSTRUCTION: The Contractor may construct the separator by the use of stationary removable forms or by the use of slip forms without altering the separator dimensions shown.
1/2" V-GROOVES: For all separators provide 1/2" V-Grooves at 30'-0" centers (max.) equally spaced between expansion joints, and/or drainage joints.

ESTIMATED TRAFFIC SEPARATOR QUANTITIES

CONCRETE:

CONSTANT WIDTH OF SEPARATOR:

	TYPE "E"	TYPE "F"
4'-0" Width	= 0.056 CY per Ft.	= 0.072 CY per Ft.
6'-0" Width	= 0.089 CY per Ft.	= 0.112 CY per Ft.
8'-6" Width	= 0.132 CY per Ft.	= 0.164 CY per Ft.

NOSE:

	TYPE "E"	TYPE "F"
4'-0" Width	= 0.080 CY	= 0.109 CY
6'-0" Width	= 0.193 CY	= 0.257 CY
8'-6" Width	= 0.403 CY	= 0.536 CY

REINFORCING STEEL:

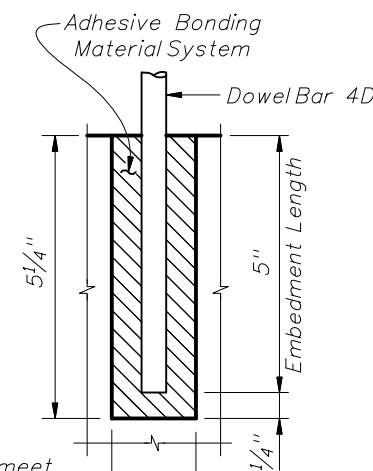
(All quantities are based on an 8 1/2" slab.)

OPTION A:

4'-0" Width	= 6.37 Lbs. per Ft.
6'-0" Width	= 8.60 Lbs. per Ft.
8'-6" Width	= 11.05 Lbs. per Ft.

OPTION B:

4'-0" Width	= 4.77 Lbs. per Ft.
6'-0" Width	= 7.00 Lbs. per Ft.
8'-6" Width	= 9.45 Lbs. per Ft.



Hole diameter to meet adhesive bonding material system manufacturer's requirements

DOWEL DETAIL

Dowel Notes:

- Shift Dowel Holes to clear if existing reinforcement is encountered.
- Provide and install an adhesive bonding material system in accordance with Sections 416 and 937 of the Specifications.

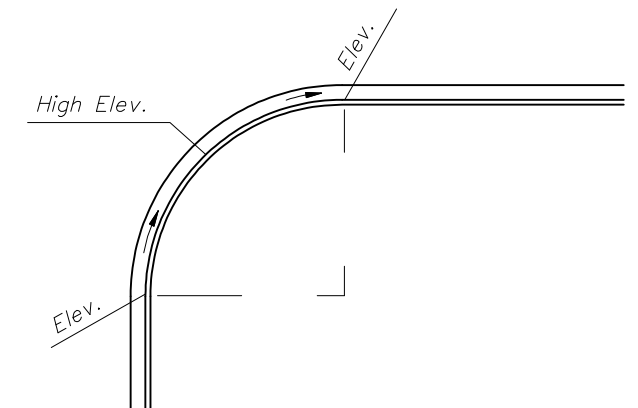
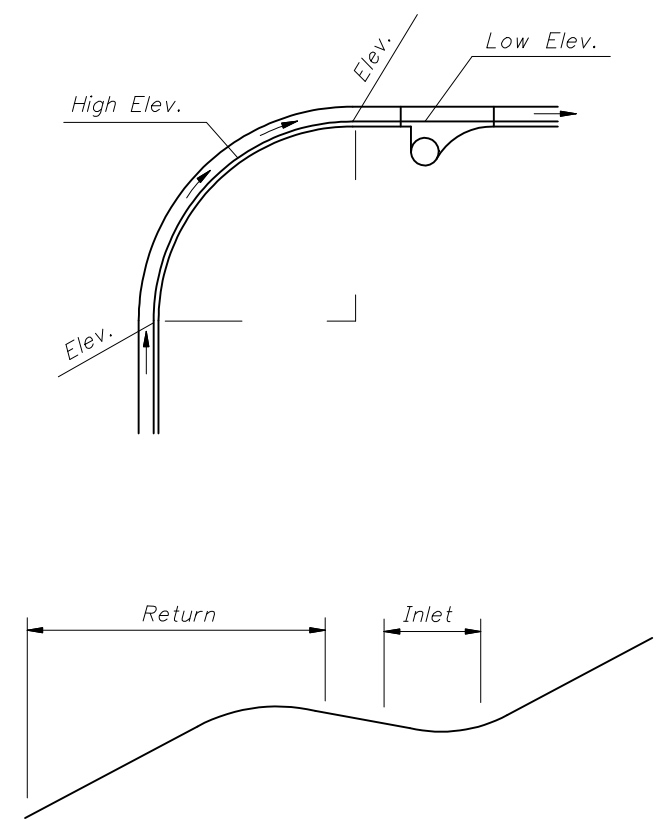
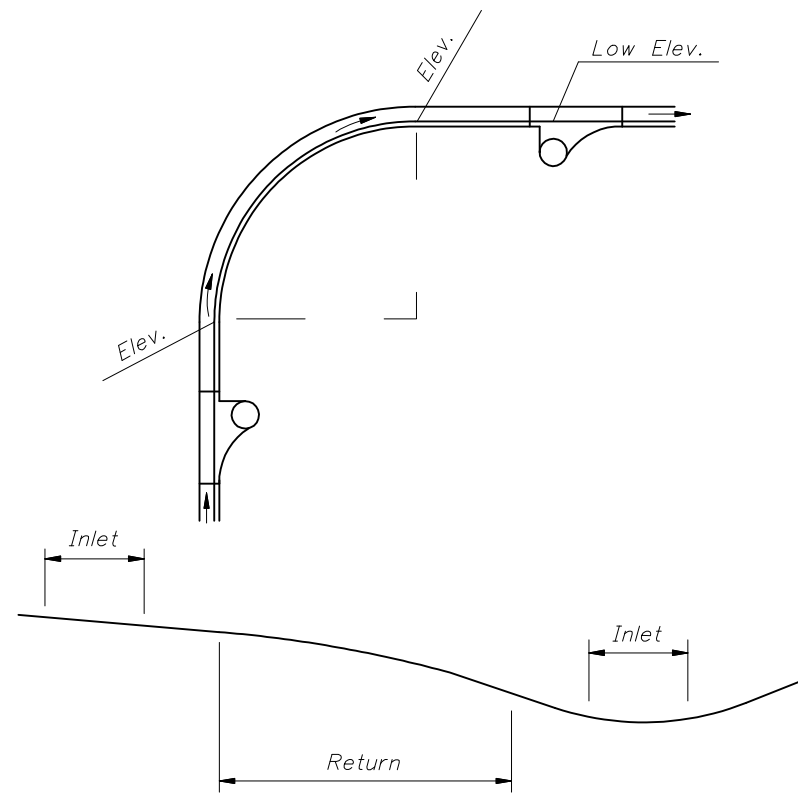
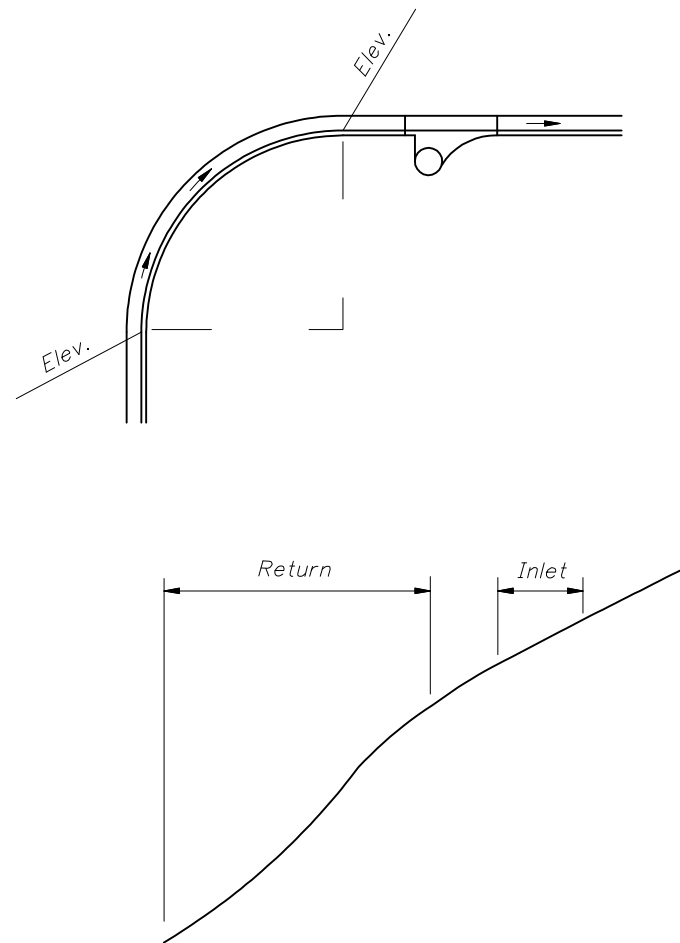
BRIDGE INSTALLATIONS - TYPE "E" AND "F" CURBS



2010 FDOT Design Standards

TRAFFIC SEPARATORS

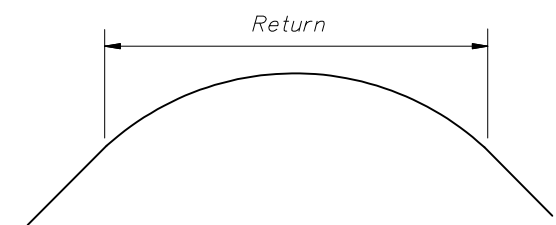
Last Revision	Sheet No.
07/01/07	4 of 4
Index No.	
302	



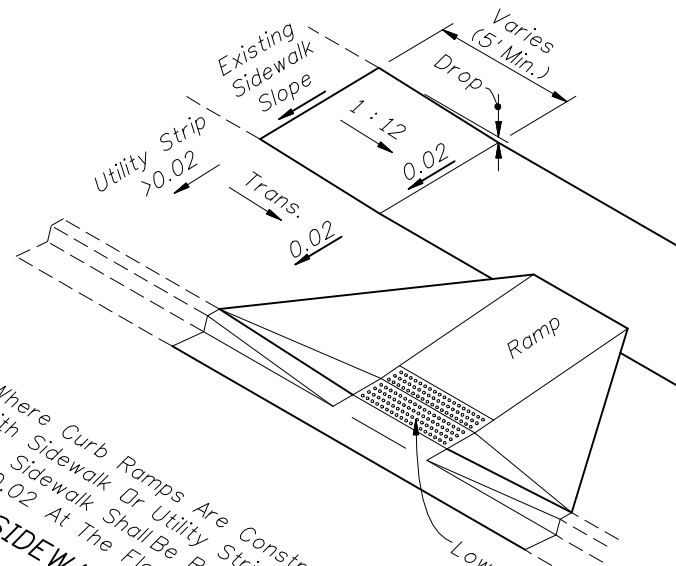
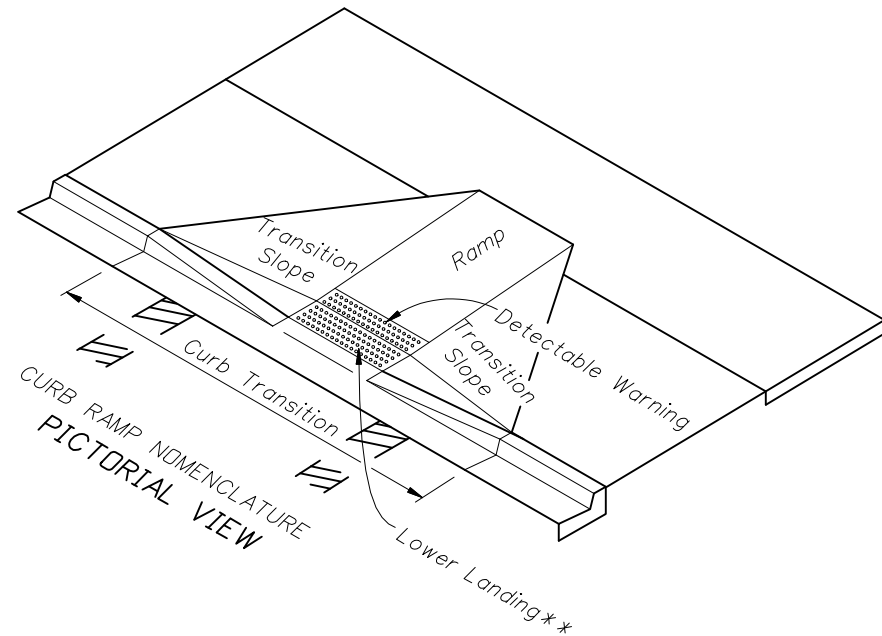
Note:
 Profile grades should be established that will allow inlets to be located outside the return whenever practical. Inlets should be located to avoid conflict with pedestrian movement. Special care must be exercised to prevent conflict with public sidewalk curb ramps for the disabled. For information on public sidewalk curb ramps refer to Index No. 304.

SHOWING LOCATION OF INLETS ON RETURN

TYPICAL RETURN PROFILES



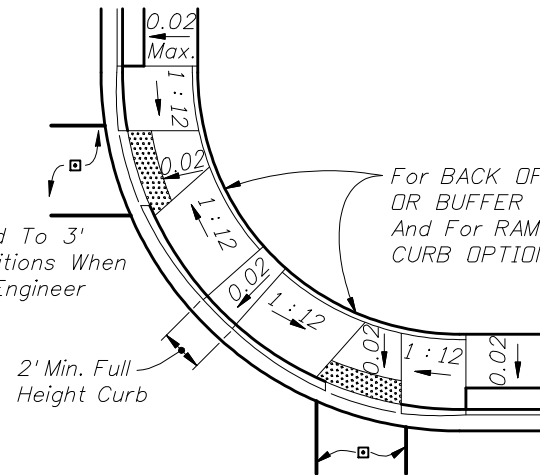
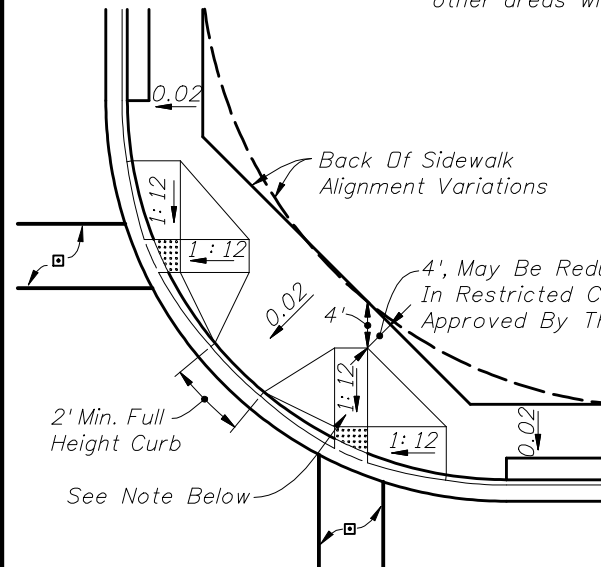
GENERAL NOTES



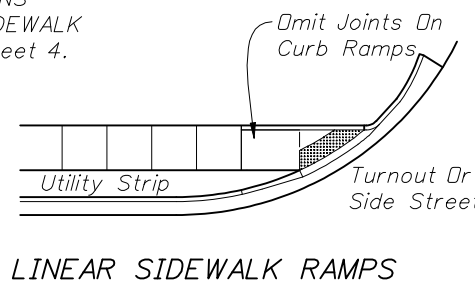
Where Curb Ramps Are Constructed In Existing Sidewalks With Sidewalk Or Utility Strip Slopes Greater Than 0.02, The Sidewalk Shall Be Reconstructed To Reduce The Slopes To 0.02 At The Flare Point.

**SIDEWALK / UTILITY STRIP
TRANSITION**

**Lower landing not required at driveways, parking lots, or other areas with pavement cross-slopes less than 2% (0.02).



For BACK OF SIDEWALK CURB OR BUFFER TRANSITIONS And For RAMP AND SIDEWALK CURB OPTIONS See Sheet 4.



Note: A portion of one or both ramps may extend outside the return.

Note:
When crosswalk markings are required, ramp runs must fall within crosswalk limits and where practical, be parallel with the projected crosswalk alignment. The bottom of the ramp beyond the curb line shall have a clear space 48" minimum within the markings of a marked crosswalk. If no crosswalk markings are present, the bottom of the ramp beyond the curb ramp shall have a clear space 48" minimum outside active traffic lanes.

▣ Crosswalk widths and configuration vary; must conform to Index No. 17344 and 17346.

1. Public sidewalk curb ramps shall be constructed in the public right of way at locations that will provide continuous unobstructed pedestrian circulation paths to pedestrian areas, elements and facilities in the public right of way and to accessible pedestrian routes on adjacent sites. Curbed facilities with sidewalks and those without sidewalks are to have curb ramps constructed at all street intersections and at turnouts that have curbed returns. Partial curb returns shall extend to the limit prescribed by Index No. 515 to accommodate curb ramps. Ramps constructed at locations without sidewalks shall have a landing constructed at the top of each ramp, see Sheet 5.

2. The location and orientation of curb ramps shall be as shown in the plans.

3. Curb ramp running slopes at unrestrained sites shall not be steeper than 1:12 and cross slope shall be 0.02 or flatter. Transition slopes shall not be steeper than 1:12.

When altering existing pedestrian facilities where existing site development precludes the accommodation of a ramp slope of 1:12, a running slope between 1:12 and 1:10 is permitted for a rise of 6" maximum and a running slope of between 1:10 and 1:8 is permitted for a rise of 3" maximum. Where compliance with the requirements for cross slope cannot be fully met, the minimum feasible cross slope shall be provided.

Ramp running slope is not required to exceed 8' in length, except at sites where the plans specify a greater length.

4. If a curb ramp is located where pedestrians must walk across the ramp, then the walk shall have transition slopes to the ramp; the maximum slope of the transitions shall be 1:12. Ramps with curb returns may be used at locations where other improvements provide guidance away from that portion of curb perpendicular to the sidewalk; improvements for guidance are not required at curb ramps for linear pedestrian traffic.

5. Curb ramp detectable warning surfaces shall extend the full width of the ramp and 24" deep. Detectable warning surfaces shall be constructed in accordance with Specification 527. See Sheet 6 of 6 for detectable warning layouts. Transition slopes are not to have detectable warnings.

6. Where a curb ramp is constructed within existing curb, curb and gutter and/or sidewalk, the existing curb or curb and gutter shall be removed to the nearest joint beyond the curb transitions or to the extent that no remaining section of curb or curb and gutter is less than 5' long. The existing sidewalk shall be removed to the nearest joint beyond the transition slope or walk around or to the extent that no remaining section of sidewalk is less than 5' long. For details of Concrete Sidewalk See Index 310.

7. Alpha-numeric identifications are for reference (plans, permits, etc.).

8. Public sidewalk curb ramps are to be paid for as follows:
Ramps, reconstructed sidewalks, walk around sidewalks, sidewalk landings and sidewalk curbs are to be paid for under the contract unit price for Sidewalk Concrete, (___" Thick), SY. Curb transitions and reconstructed curbs are to be paid for under the contract unit price for the parent curb, i.e., Curb Conc., (Type __), LF or Curb and Gutter Conc., (Type __), LF.

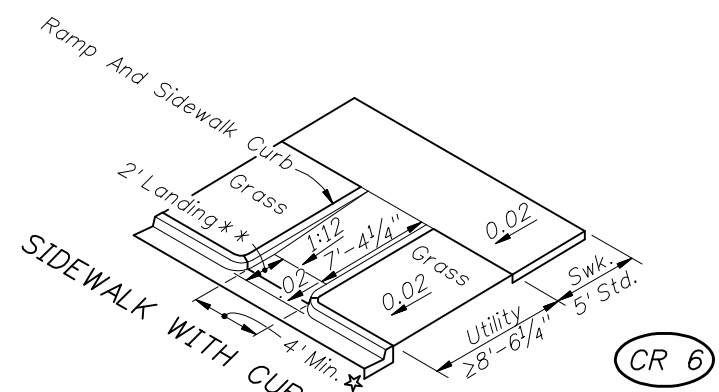
When a separate pay item for the removal and disposal of existing curb, curb and gutter, and/or sidewalk is not provided in the plans, the cost of removal and disposal of these features shall be included in the contract unit price for new curb, curb and gutter and/or sidewalk respectively.

9. Acceptance Criteria for Detectable Warnings:
(a) The ramp detectable warning surface shall be complete and uniform in color and texture
(b) 90% of the individual truncated domes must comply with the design criteria
(c) There may be no more than 4 non-complying domes in any one square foot of surface
(d) No two adjacent domes may be non-compliant
(e) Surface may not deviate more than 0.10" from a true plane

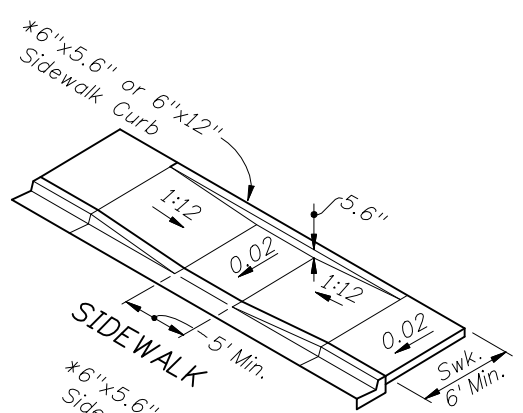
10. All sidewalk surfaces, ramp surfaces, and landings with a cross slope shown in this Index to be 0.02 shall be 0.02 maximum. All ramp surfaces and ramp transition slopes with a slope shown in this Index to be 1:12 shall be 1:12 maximum.

TYPICAL PLACEMENT OF PUBLIC SIDEWALK CURB RAMPS AT CURBED RETURNS

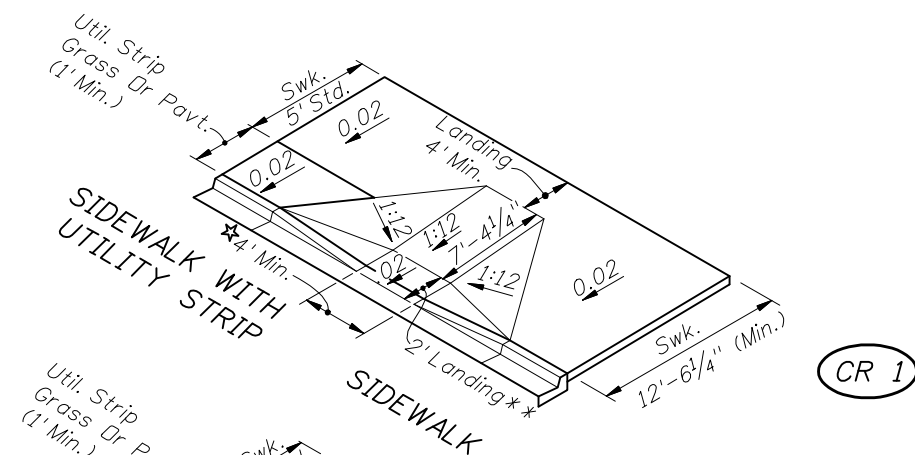




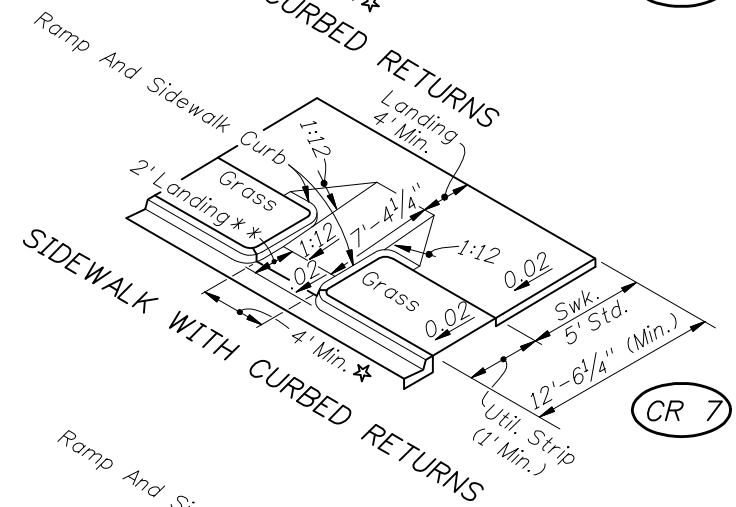
CR 6



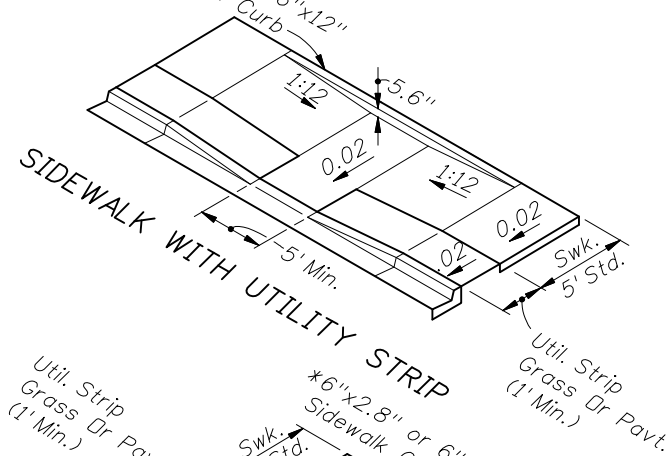
CR 3



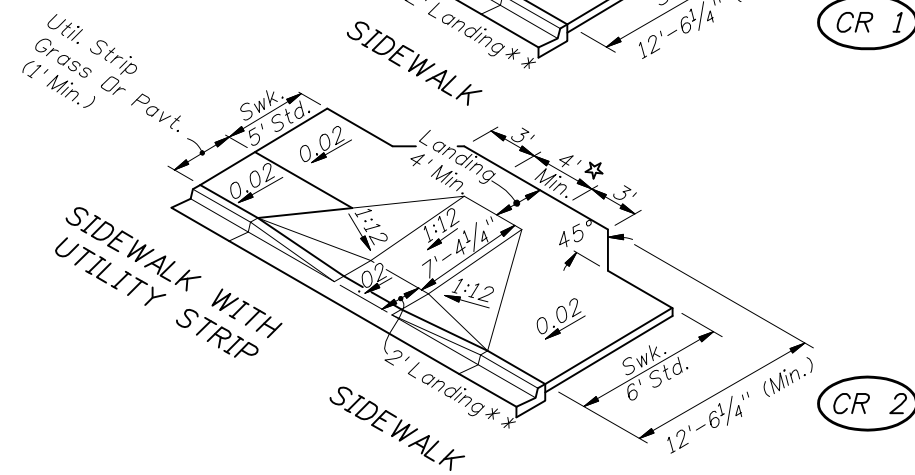
CR 1



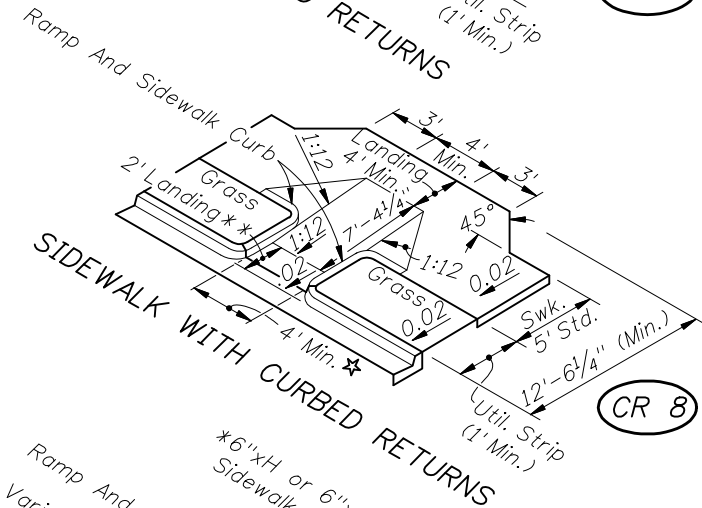
CR 7



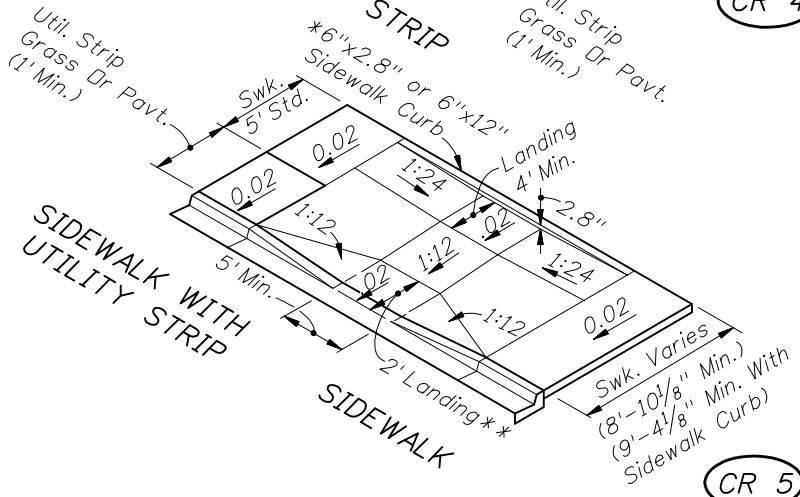
CR 4



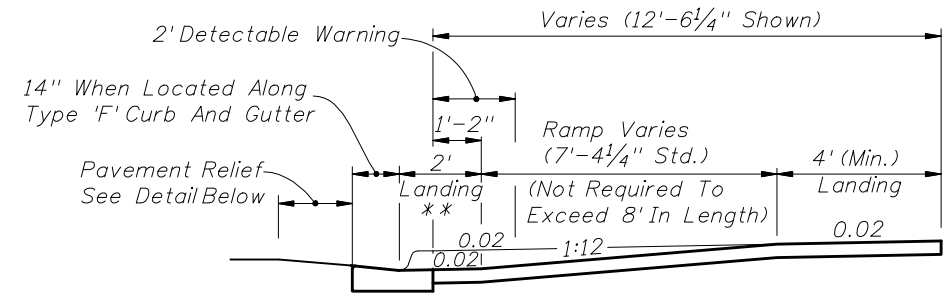
CR 2



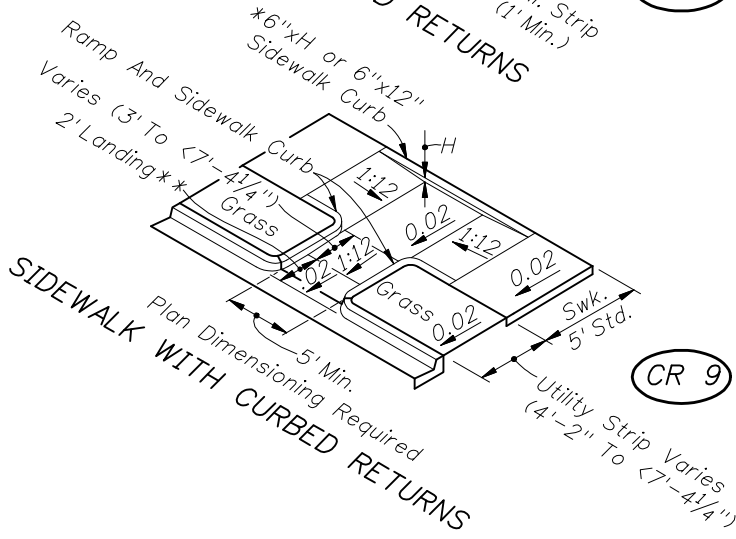
CR 8



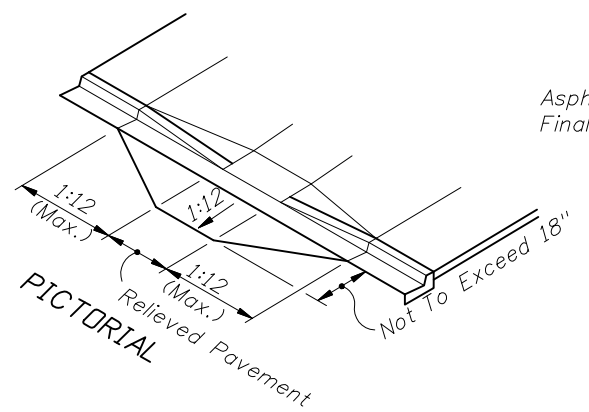
CR 5



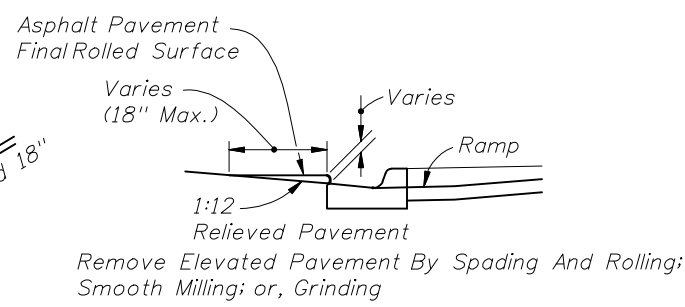
SECTION THROUGH RAMP RUN AND LANDINGS WITH UPPER LANDING AT NORMAL SIDEWALK ELEVATION



CR 9



PICTORIAL PAVEMENT RELIEF AT LIP OF CURB

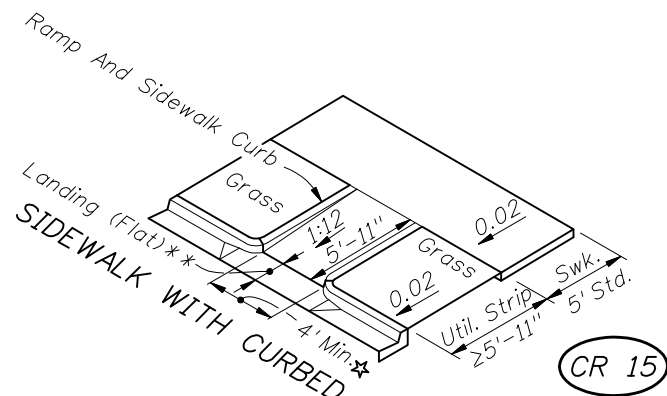


SECTION

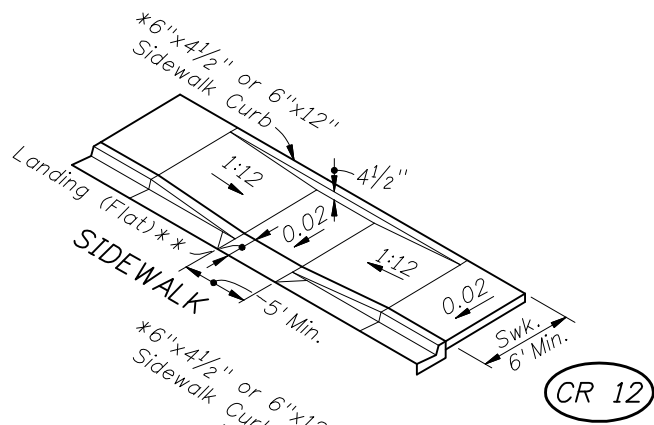
DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS WHERE RAMP AND LANDING DEPTH ARE NOT RESTRICTED BY RIGHT OF WAY

- * For BACK OF SIDEWALK CURB OR BUFFER TRANSITION And For RAMP AND SIDEWALK CURB OPTIONS See Sheet 4.
- ** Lower landing not required at driveways, parking lots, or other areas with pavement cross-slopes less than 2% (0.02).
- ★ Ramp Widths For Curb Ramps CR 1, CR 2, CR 6, CR 7, And CR 8 May Be Reduced To 3' Min. In Restricted Conditions When Approved By The Engineer.

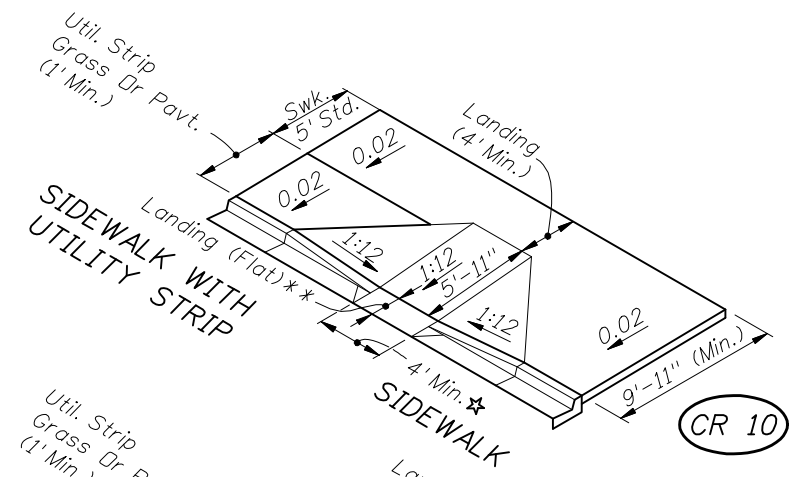




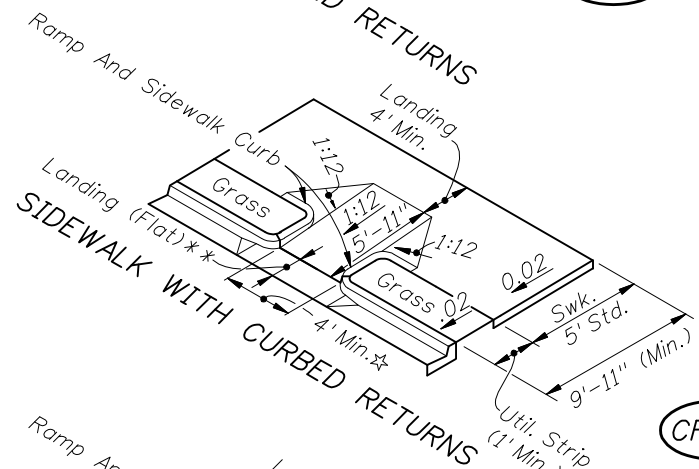
CR 15



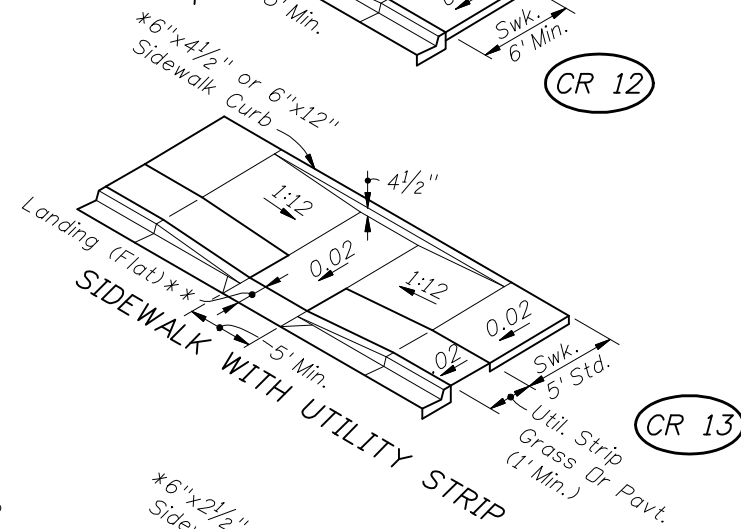
CR 12



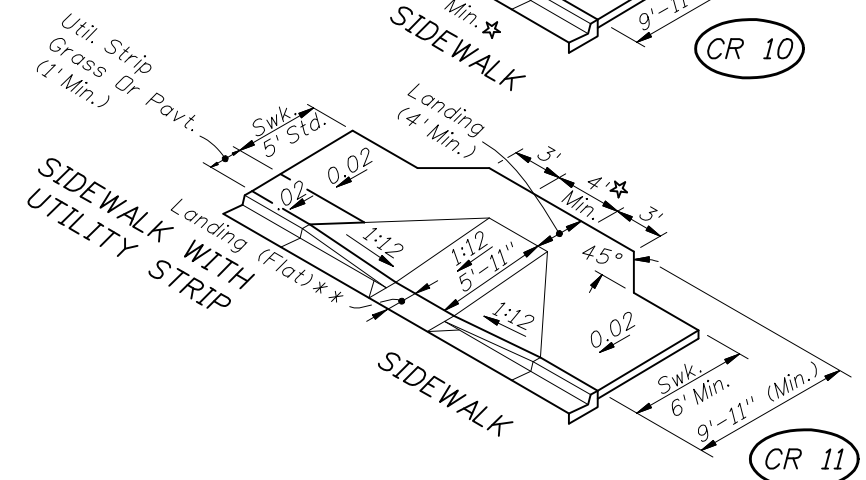
CR 10



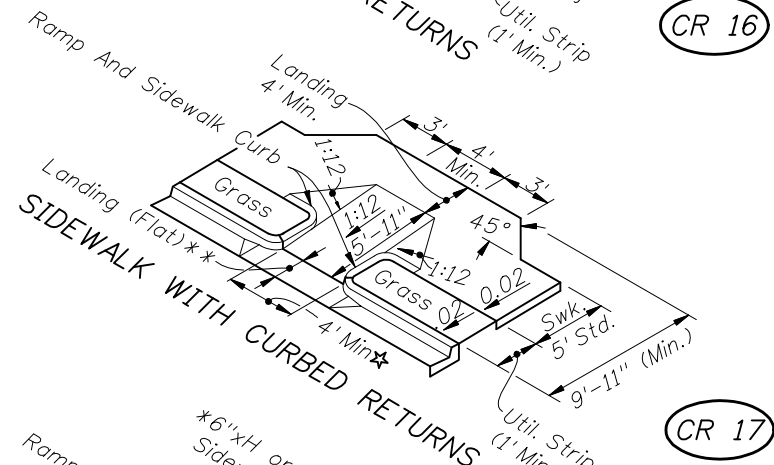
CR 16



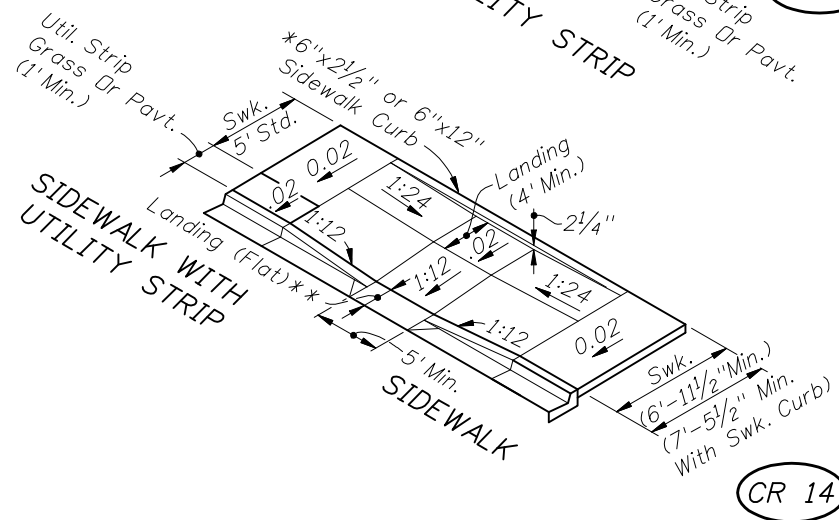
CR 13



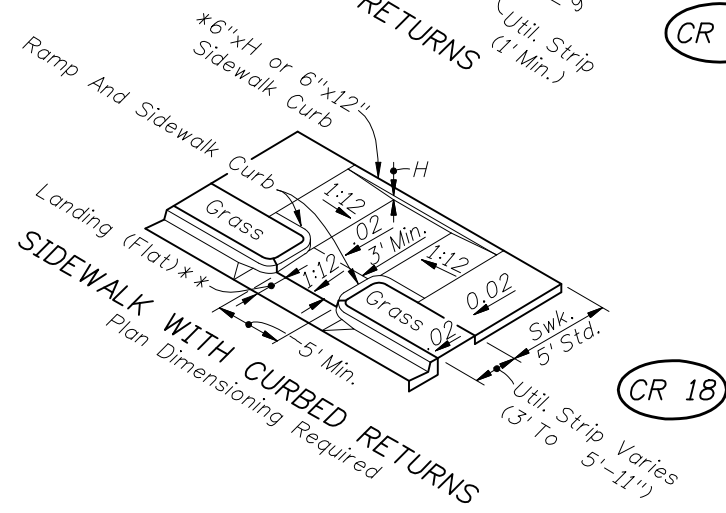
CR 11



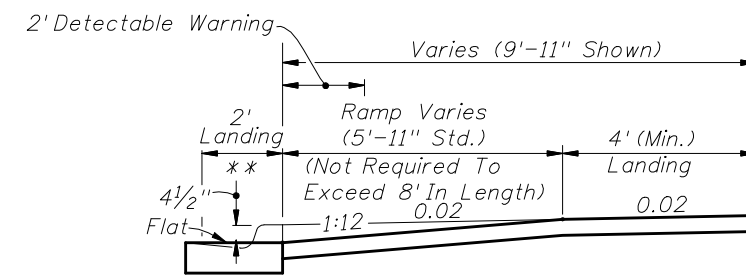
CR 17



CR 14



CR 18

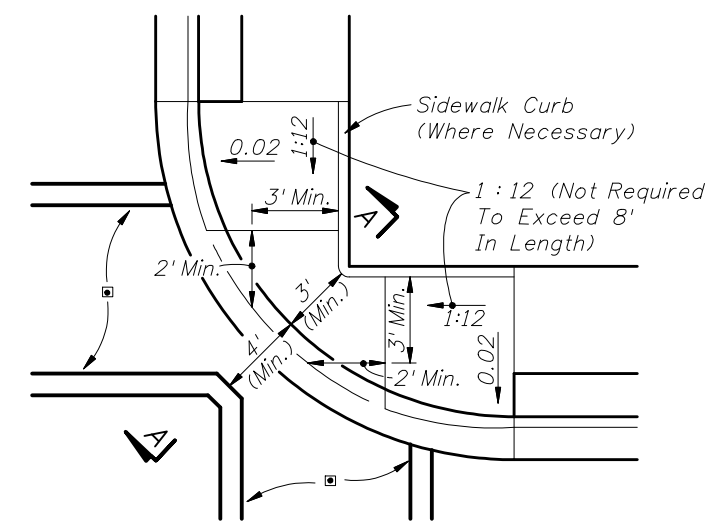
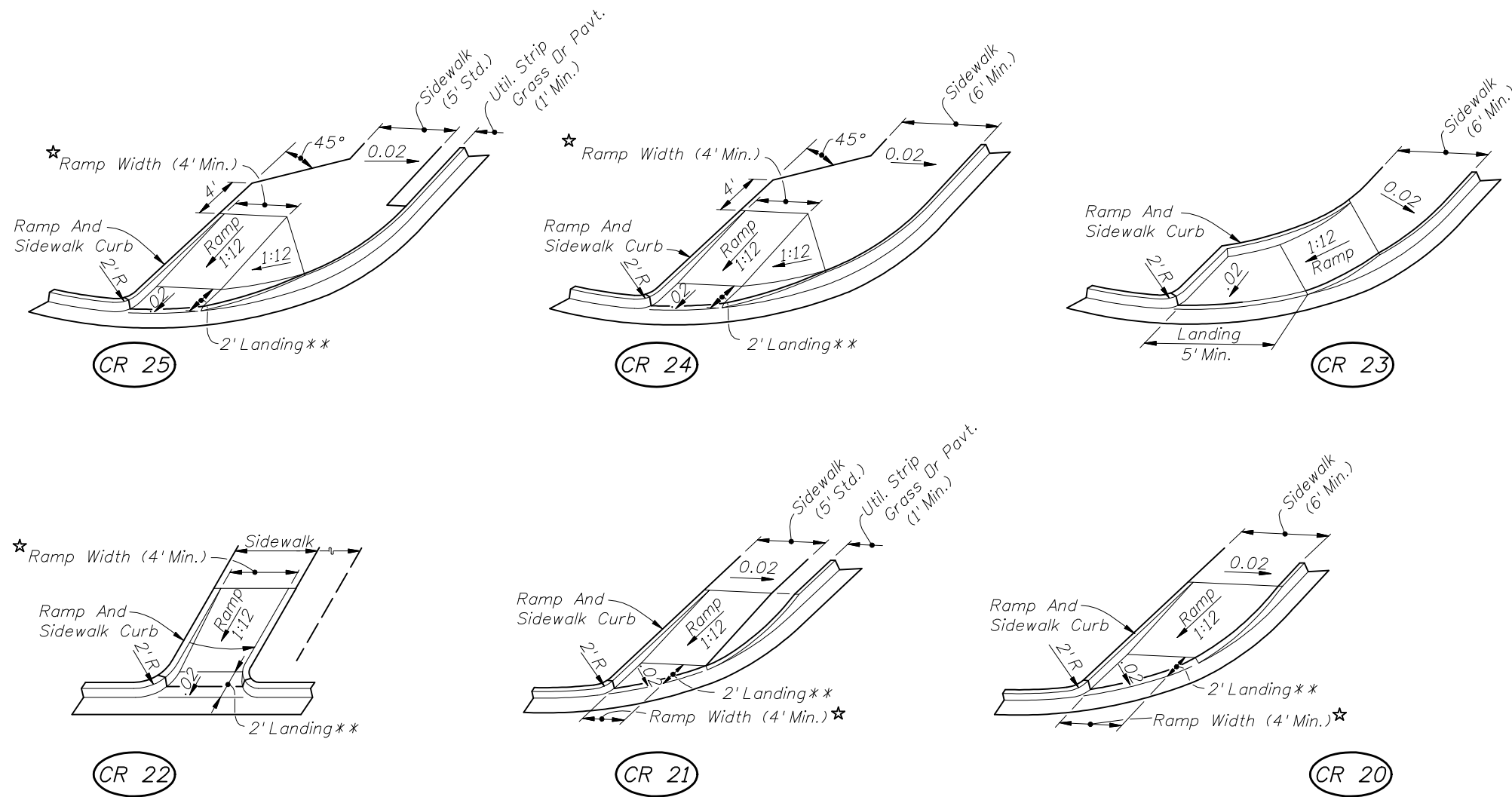


SECTION THROUGH RAMP RUN AND LANDINGS WITH UPPER LANDING AT NORMAL SIDEWALK ELEVATION

- ☆ Ramp Widths For Curb Ramps CR 10, CR 11, CR 15, CR 16, And CR 17 May Be Reduced To 3' Min. In Restricted Conditions When Approved By The Engineer.
- * For BACK OF SIDEWALK CURB OR BUFFER TRANSITION And For RAMP AND SIDEWALK CURB OPTIONS See Sheet 4.
- ** Lower landing not required at driveways, parking lots, or other areas with pavement cross-slopes less than 2% (0.02).

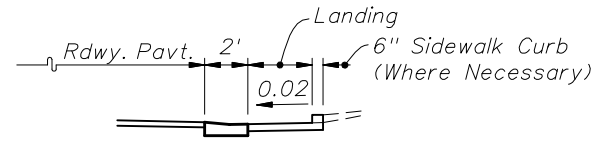
DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS WHERE RAMP AND LANDING DEPTH ARE RESTRICTED BY RIGHT OF WAY





□ Crosswalk width and configuration vary; must conform to Index No. 17344 and 17346.

PLAN

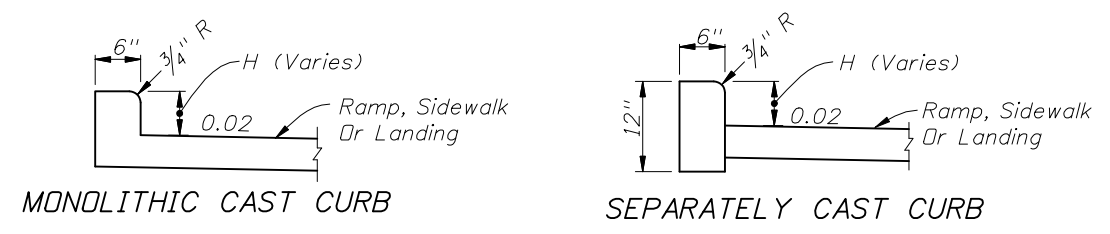


SECTION AA

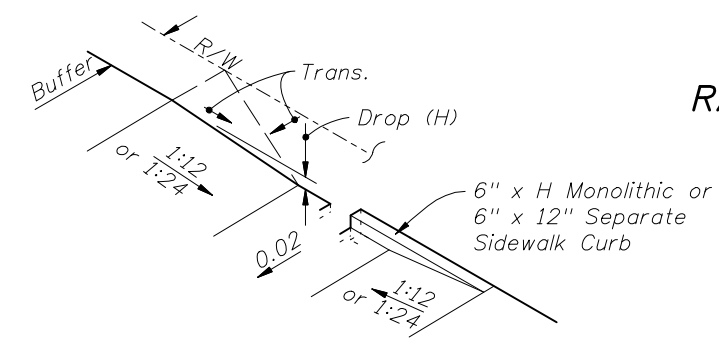
CR 26

DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK CURB RAMPS FOR LINEAR PEDESTRIAN TRAFFIC

DIMENSIONAL FEATURES FOR PUBLIC SIDEWALK COMBINED CORNER RAMPS UNDER CONDITIONS OF INFEASIBILITY



RAMP AND SIDEWALK CURB OPTIONS

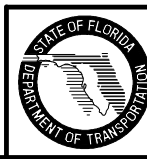


Construct Sidewalk Curb In Absence Of Adequate Buffer, Maintainable Surface Contour, Abutting Structure, Or When Called For In The Plans Or Standards

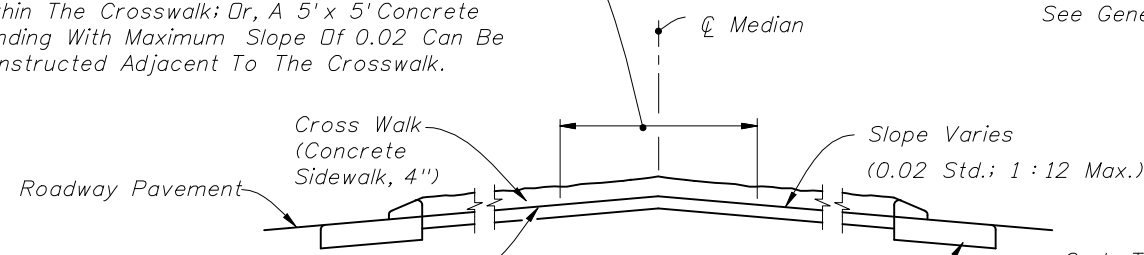
BACK OF SIDEWALK CURB OR BUFFER TRANSITION

★ Ramp Widths For Curb Ramps CR 20, CR 21, CR 22, CR 24, and CR 25 May Be Reduced To 3' Min. In Restricted Conditions When Approved By The Engineer.

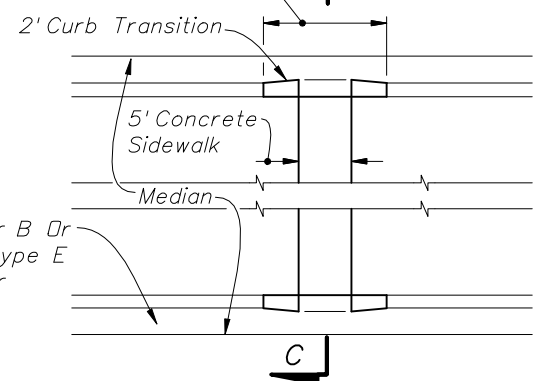
**Lower landing not required at driveways, parking lots, or other areas with pavement cross-slopes less than 2% (0.02).



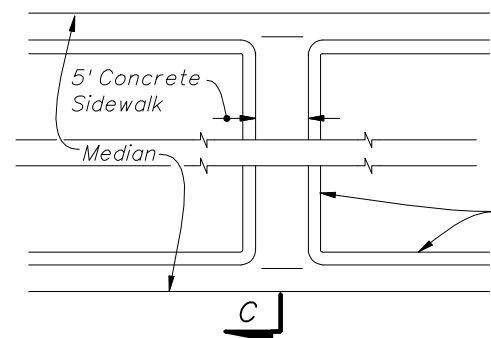
5' Refuge With Maximum Slope Of 0.02 Must Be Provided When Slopes Of 0.05 Or Flatter And 5' In Length Are Not Available On Crosswalk; The Refuge Can Be Constructed At Any Location Within The Crosswalk; Or, A 5' x 5' Concrete Landing With Maximum Slope Of 0.02 Can Be Constructed Adjacent To The Crosswalk.



Curb Transition (On Existing Facilities Remove And Reconstruct Curb Or Curb And Gutter) For Payment See General Note 8.



PLAN



PLAN - (ALTERNATE DETAIL)

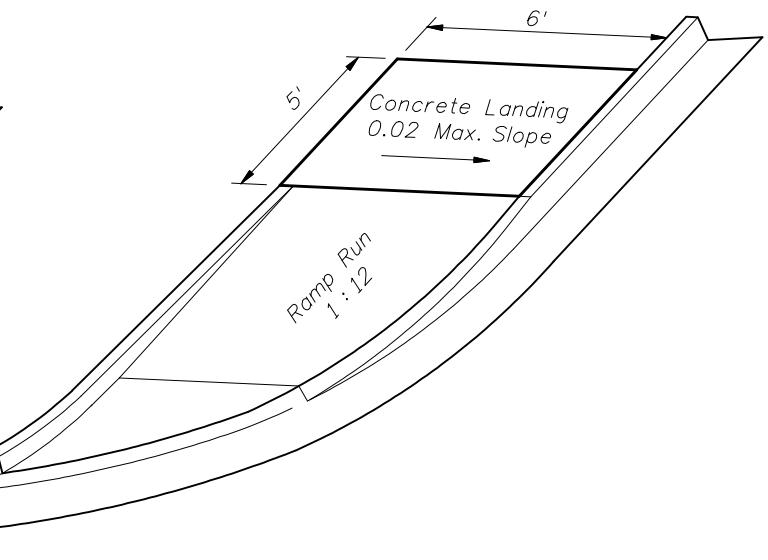
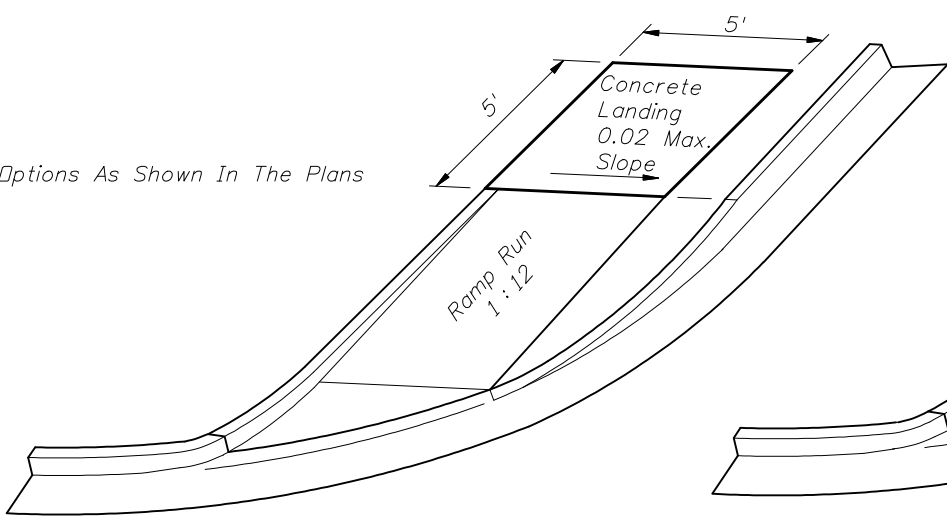
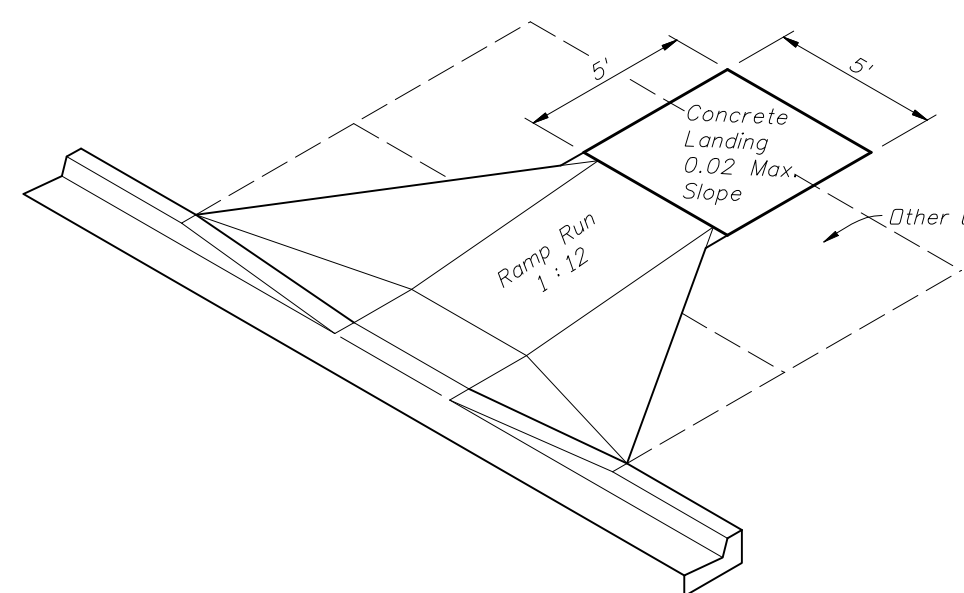
Slopes Shall Intersect At Centerline Of Median On The 0.02 Rate When The Edge Of Pavement Elevations Are Equal. The Slopes May Intersect Off The Centerline For Variable Edge Of Pavement Elevations Or To Accommodate Other Construction In The Median; However, Slopes Shall Not Be Steeper Than 1 : 12.

SECTION CC

Curb Types A Or B Or Curb & Gutter Type E (Curb And Gutter Type E Shown)

Curb Types A Or B Or Curb & Gutter Type E (Curb And Gutter Type E Shown)

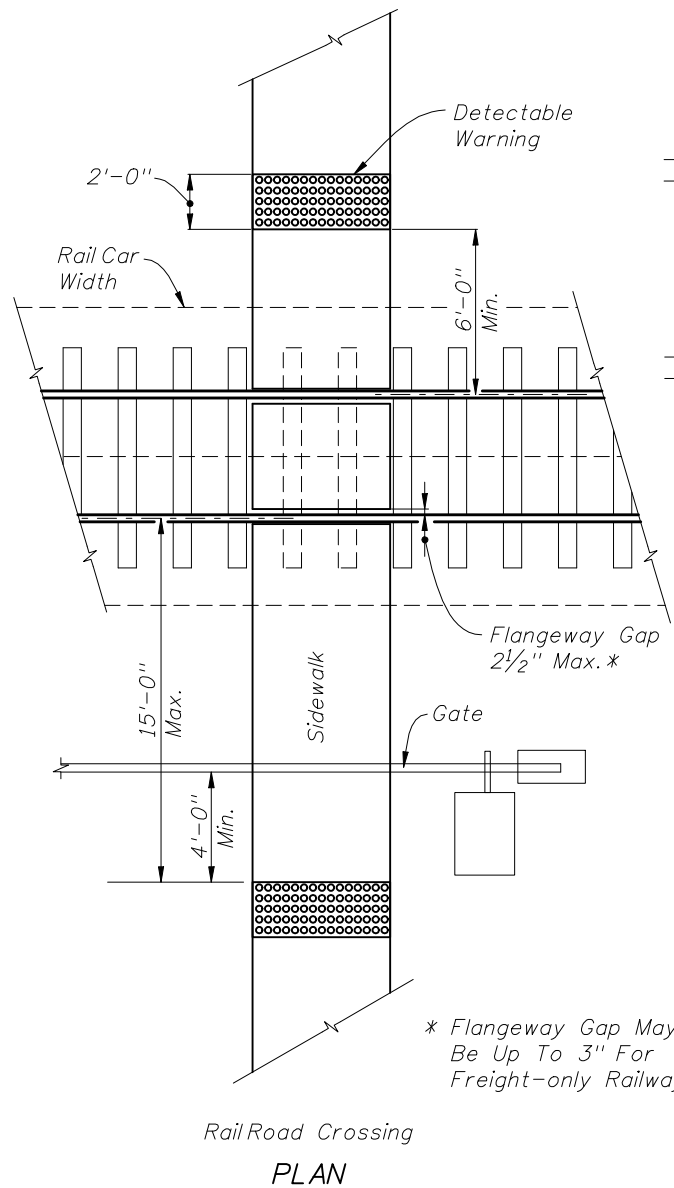
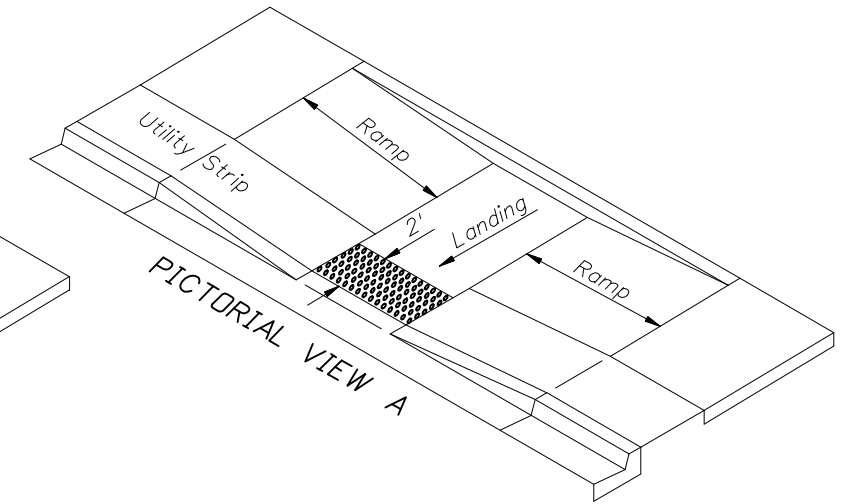
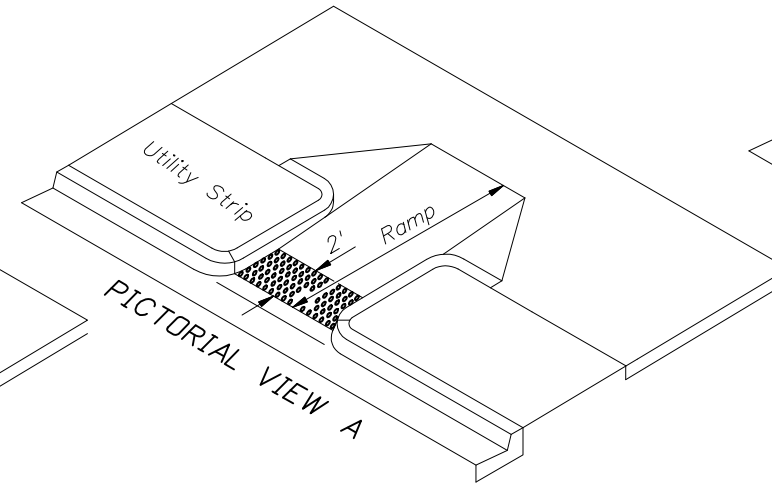
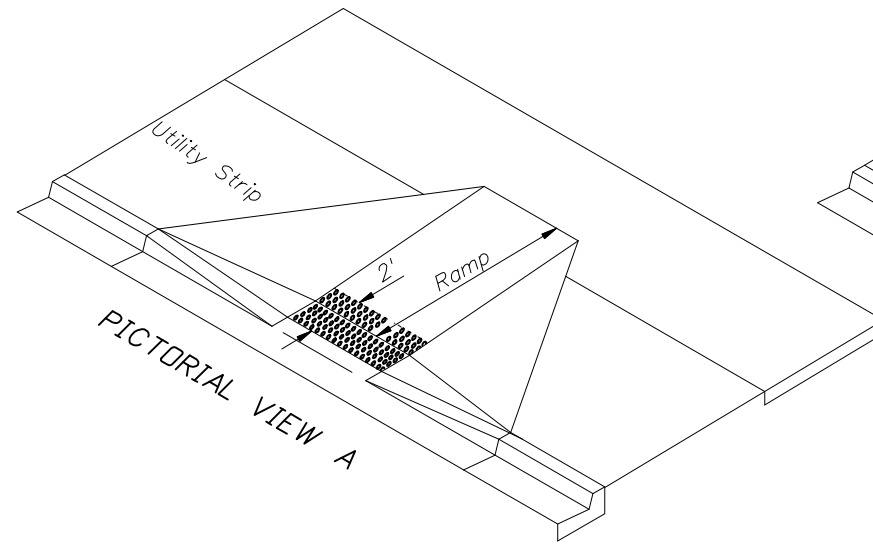
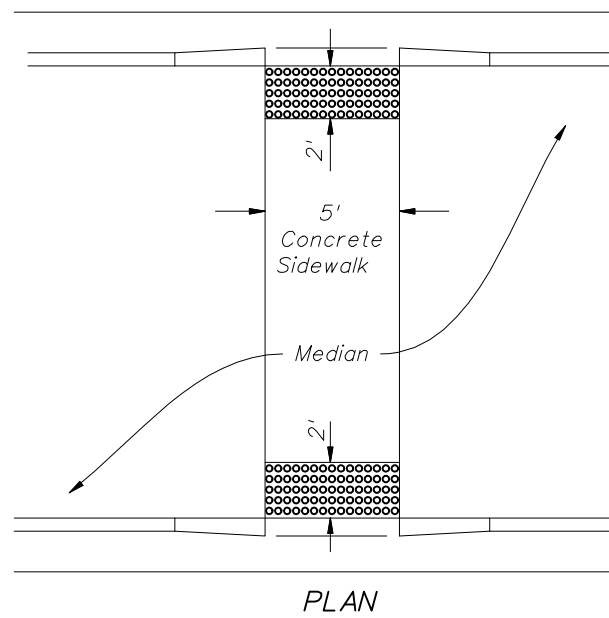
MEDIAN CROSSWALKS



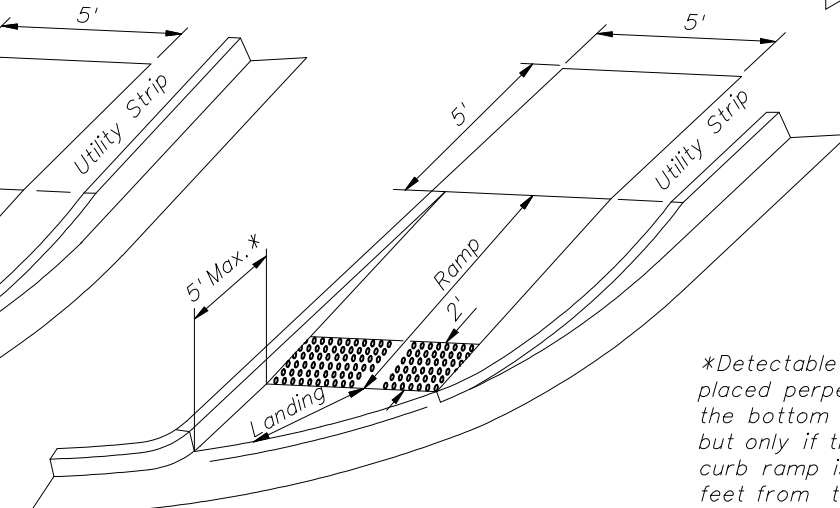
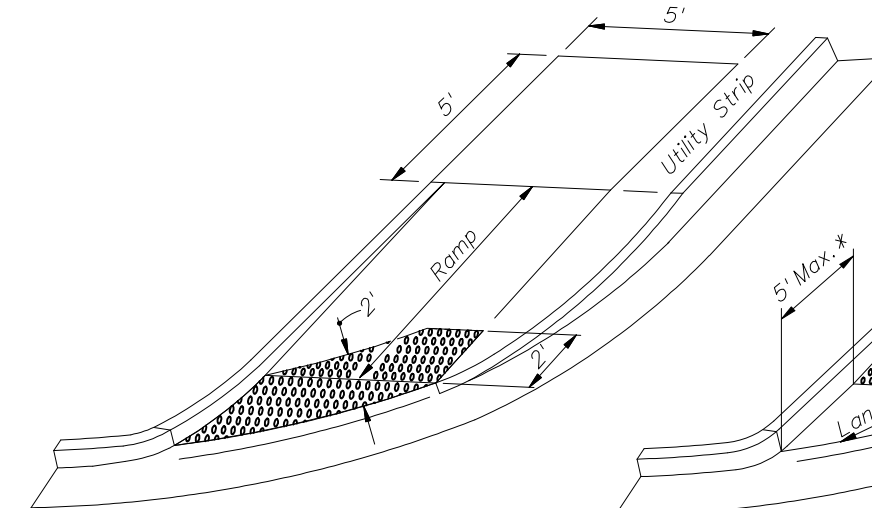
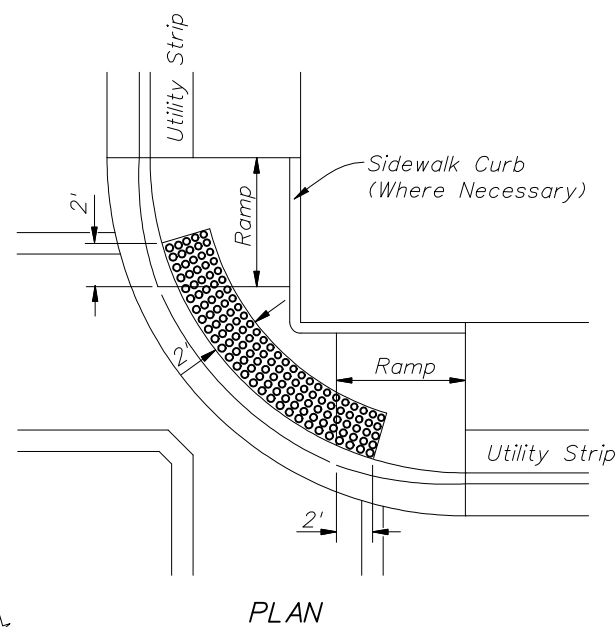
LANDINGS FOR RAMPS WITHIN PUBLIC RIGHT OF WAY CONSTRUCTED AT LOCATIONS WHERE FUTURE SIDEWALKS ARE PROPOSED, WHERE STABLE SURFACES OTHER THAN SIDEWALKS ARE PART OF A CONTINUOUS PASSAGE OR WHERE A CURB FALLS ALONG THE CIRCULATION PATH TO PEDESTRIAN ROUTES ON ADJACENT SITES



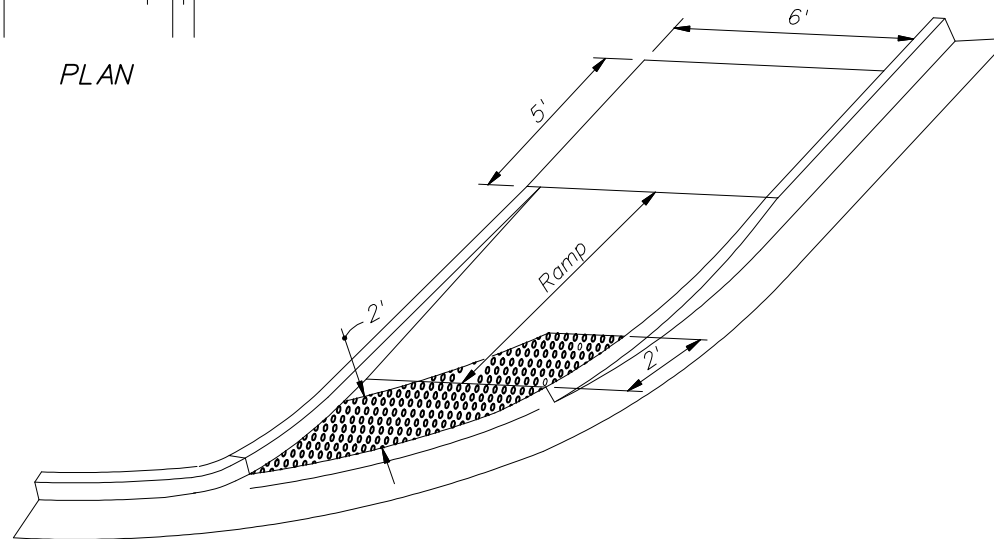
On curb ramps, landings and flush transitions perpendicular to the curb line: Rows of domes shall be aligned with the centerline of the ramp. (See Pictorial View A)



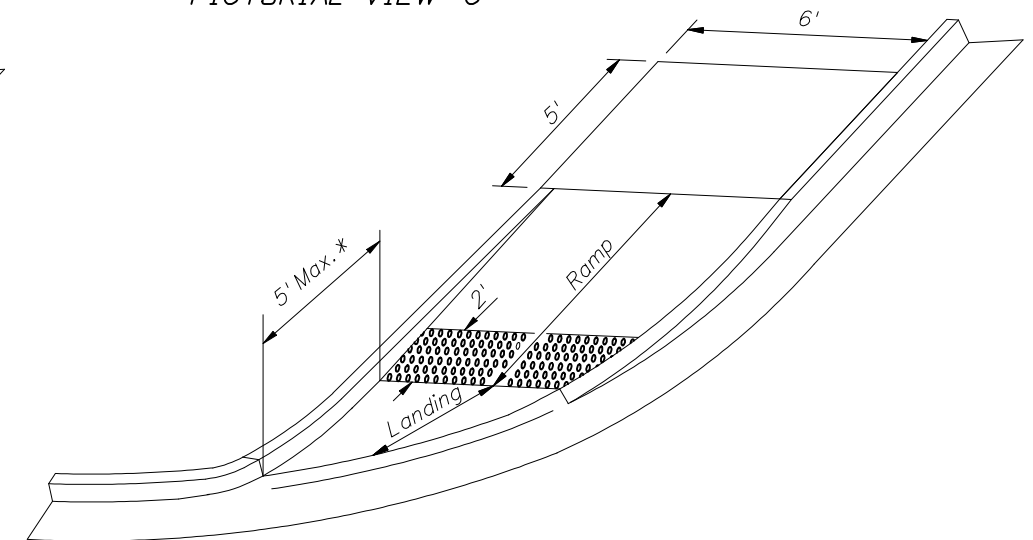
* Flangeway Gap May Be Up To 3" For Freight-only Railways



*Detectable warnings may be placed perpendicular across the bottom of the curb ramp, but only if the bottom of the curb ramp is no more than 5 feet from the back-of-curb.



On landings and flush transitions at radius returns: Rows of domes are not required to be aligned with the centerline of the ramp. (See Pictorial View B)



On curb ramps at radius returns: Rows of domes shall be aligned with the centerline of the ramp. (See Pictorial View C)

TYPICAL PLACEMENT OF DETECTABLE WARNING AT CURB RAMPS



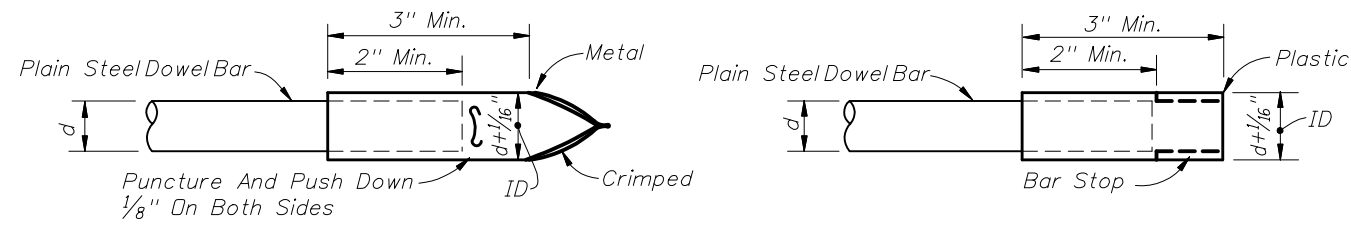
2010 FDOT Design Standards

PUBLIC SIDEWALK CURB RAMPS

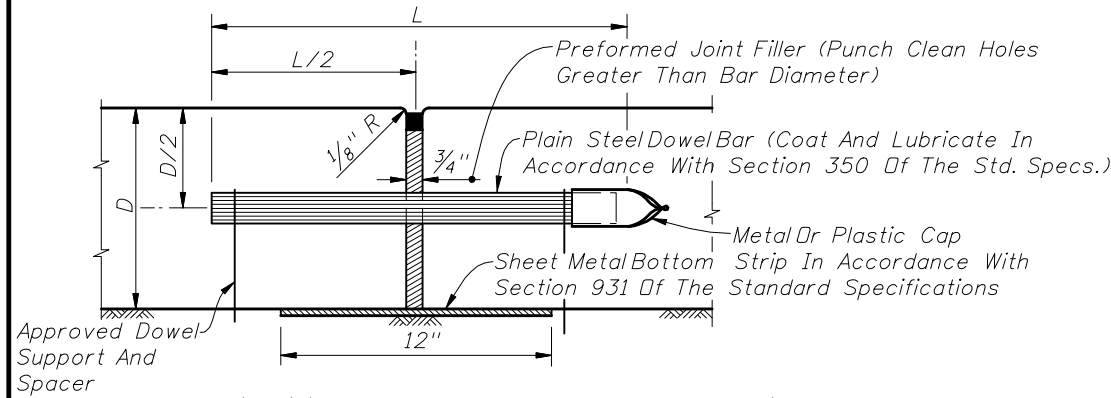
Last Revision 01/01/09

Sheet No. 6 of 6

Index No. 304

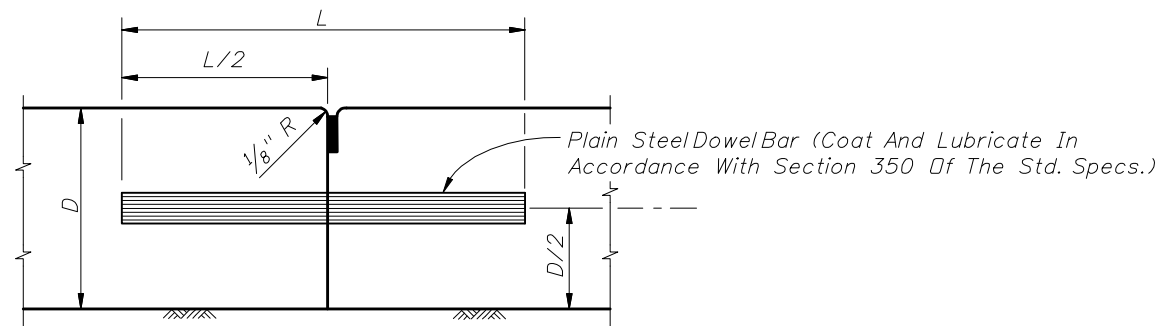


METAL OR PLASTIC CAPS FOR DOWEL BARS

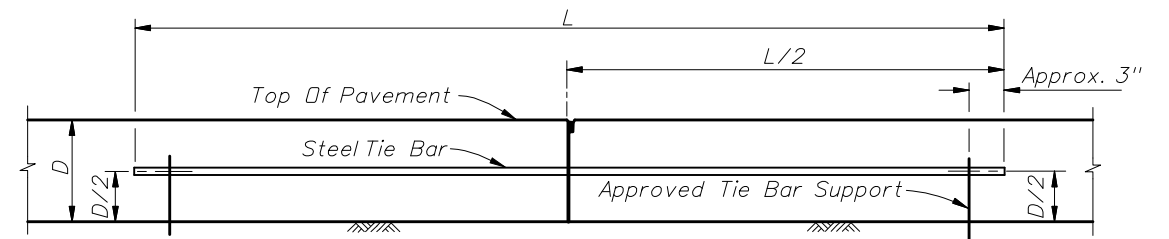


Note: Expansion joints to be placed on approaches to bridges, at street intersections and other locations indicated in detail plans.

TRANSVERSE EXPANSION JOINT

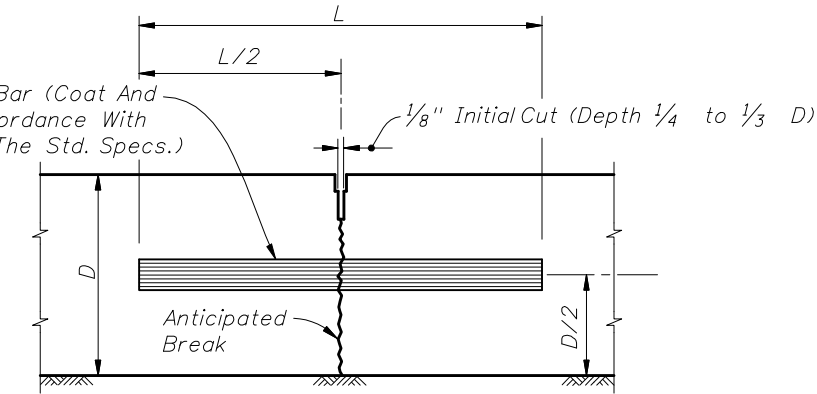
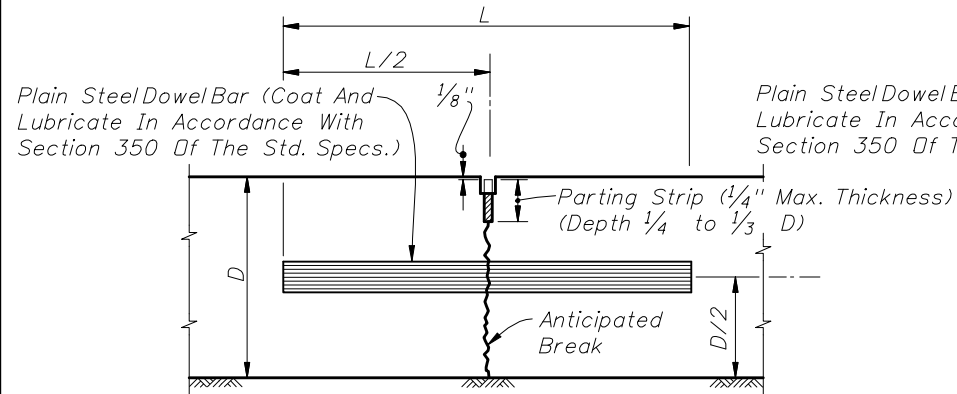


BUTT CONSTRUCTION JOINT TO BE USED AT DISCONTINUANCES OF WORK



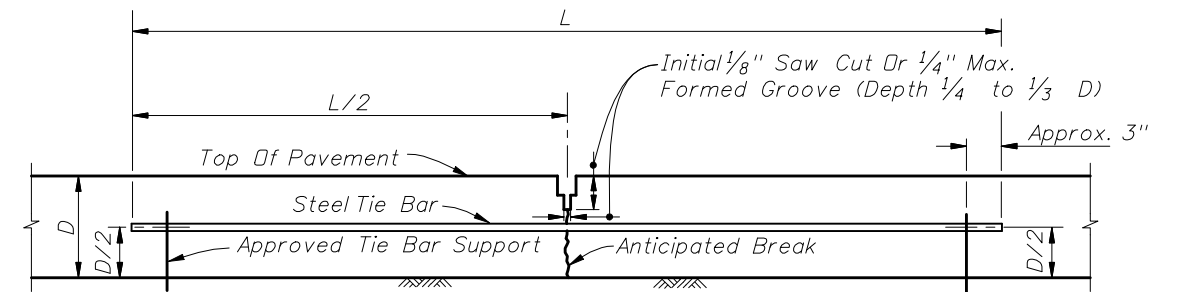
Note: Tie bar spacing shall not exceed 24" at these joints.

LONGITUDINAL BUTT CONSTRUCTION JOINT



TRANSVERSE CONTRACTION JOINT, VIBRO CAST METHOD

TRANSVERSE CONTRACTION JOINT, SAWED METHOD



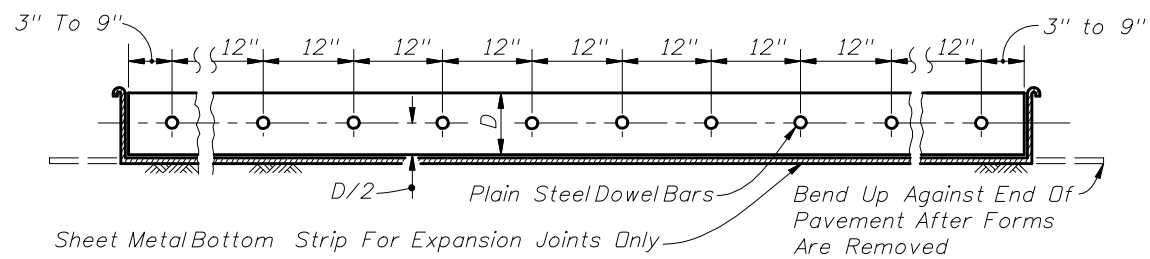
Note: Slabs poured simultaneously. Tie bars may be inserted in the plastic concrete by means approved by the Engineer.

LONGITUDINAL LANE-TIE JOINT

Tie bars are deformed #4 or #5 reinforcing steel bars meeting the requirements of Section 931 of the Standard Specifications.

Provide a standard load transfer tied joint with #4 bars 25" in length at 24" or #5 bars 30" in length at 38" spacing.

LONGITUDINAL JOINTS



DOWEL BAR LAYOUT

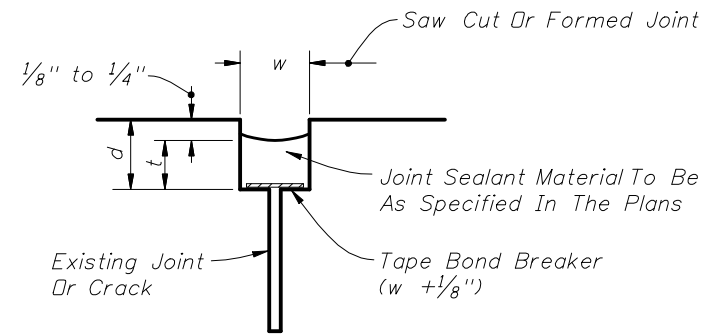
DOWELS (LENGTH 18")	
Pavement Thickness "D"	Diameter
6"-6 1/2"	3/4"
7"-8 1/2"	1"
9"-10 1/2"	1 1/4"
≥11"	1 1/2"

TRANSVERSE JOINTS ARE TO BE SPACED AT A MAXIMUM OF 15'. DOWELS ARE REQUIRED AT ALL TRANSVERSE JOINTS UNLESS OTHERWISE NOTED IN PLANS.

TRANSVERSE JOINTS

Note: For joint seal dimensions see Sheet 2.

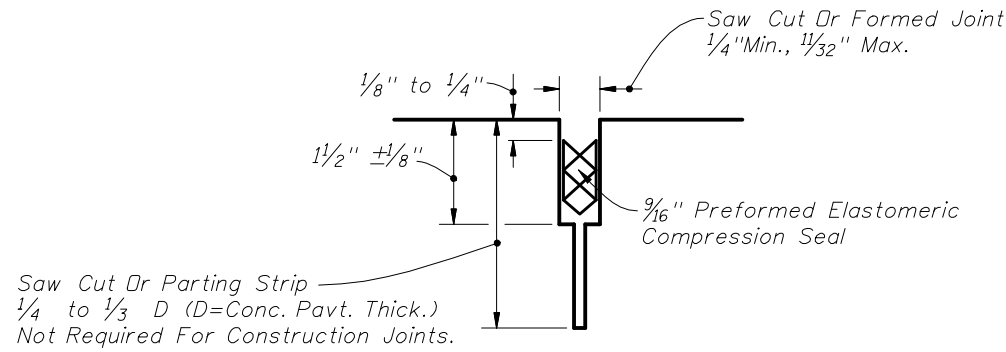




Note: Dimension *w* will be shown in the plans or established by the Engineer based on field conditions. Dimension *d* will be constructed so that the shape factor *w/t* has a maximum value of 2.0 and a minimum value of 1.0.

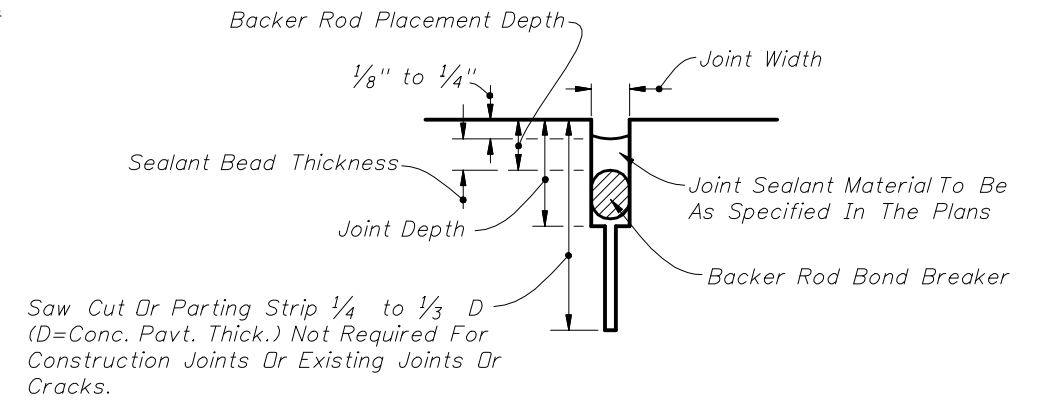
FOR REHABILITATION PROJECTS

TAPE BOND BREAKER



FOR NEW PROJECTS

PREFORMED ELASTOMERIC COMPRESSION SEAL

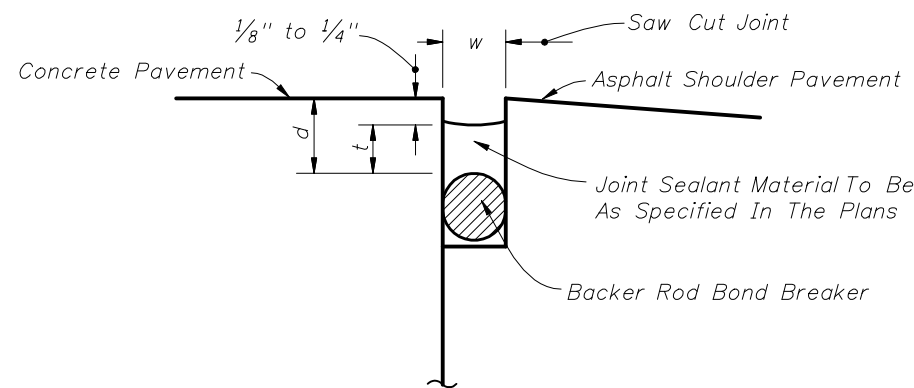


FOR NEW AND REHABILITATION PROJECTS

BACKER ROD BOND BREAKER

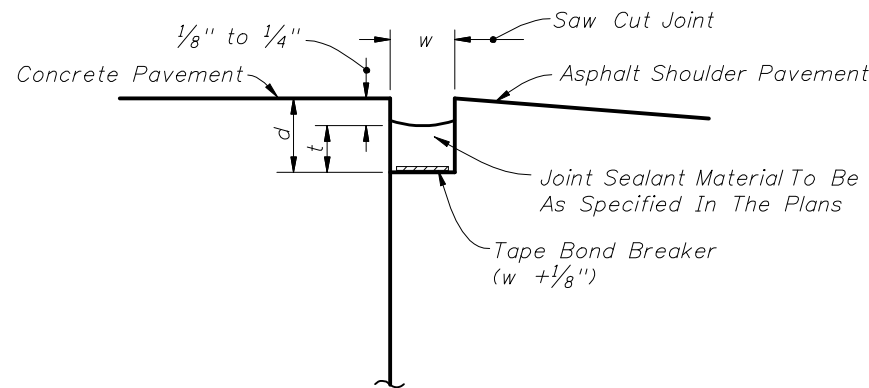
CONCRETE-CONCRETE JOINTS

$d = w = 3/4$ " Unless Specified Otherwise In The Plans



BACKER ROD BOND BREAKER

$d = w = 3/4$ " Unless Specified Otherwise In The Plans



TAPE BOND BREAKER

FOR NEW AND REHABILITATION PROJECTS;
EITHER TAPE OR BACKER ROD BOND BREAKER REQUIRED;
SHOULDER MUST BE REPAIRED IF PROPER JOINT SHAPE
CAN NOT BE ATTAINED

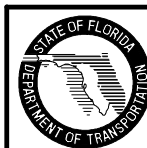
CONCRETE-ASPHALT SHOULDER JOINTS

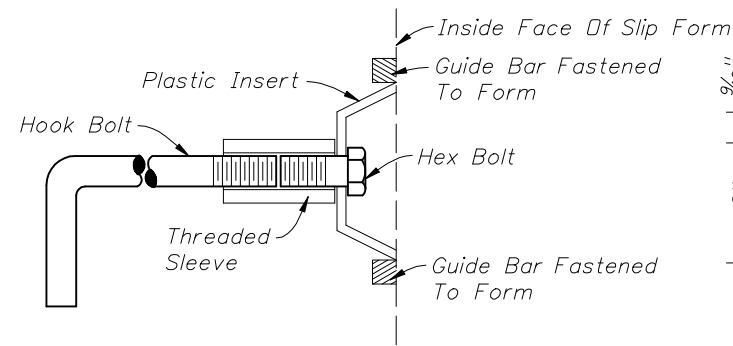
JOINT SEAL DIMENSIONS

BACKER ROD BOND BREAKER (CONCRETE-CONCRETE JOINTS)				
JOINT DIMENSIONS (INCHES)				
JOINT WIDTH	SEALANT BEAD THICKNESS	BACKER ROD DIA.	MINIMUM JOINT DEPTH	BACKER ROD PLACEMENT DEPTH
1/4	1/4	3/8	1	1/2
3/8	1/4	1/2	1 1/4	1/2
1/2	1/4	5/8	1 1/4	1/2
5/8	5/16		1 1/2	
	3/8	1	1 3/4	5/8
		1 1/8	1 3/4	
1	1/2	1 1/4	2	
>1	1/2	1 1/4+	2+	

Unless otherwise indicated on the plans the joint width for new construction will be 1/4" for construction joints, 3/8" for all other joints.

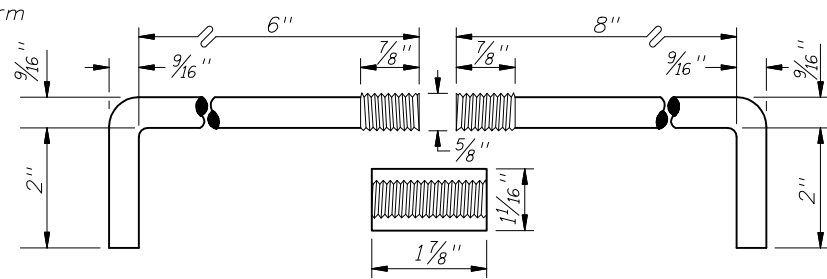
For rehabilitation projects the joint width will be shown on the plans or established by the Engineer based on field conditions.





NOTE: After the concrete has set to the extent that the Keyway will retain its shape, the hex bolt and plastic insert shall be removed. The remaining portion of the hook bolt assembly shall be installed immediately prior to placing of concrete in the adjacent lane.

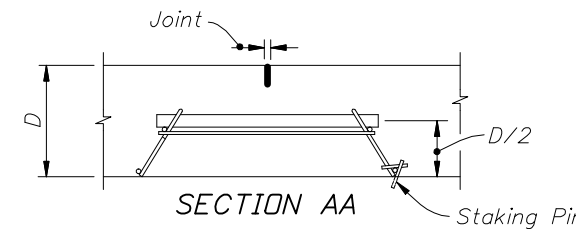
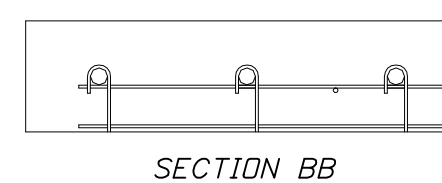
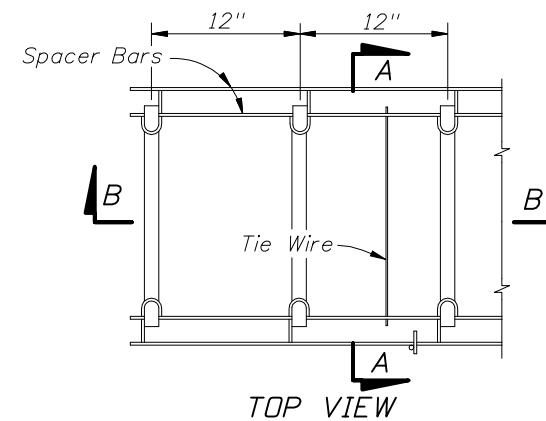
ALTERNATE KEYWAY AND HOOK BOLT



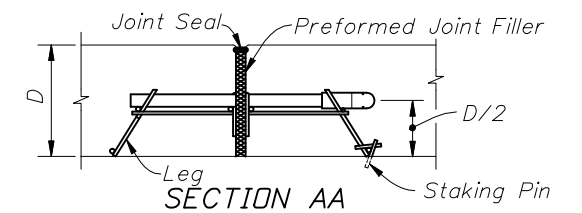
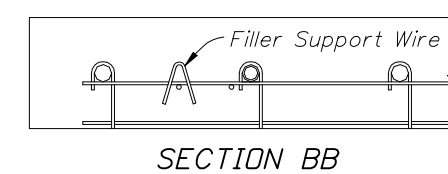
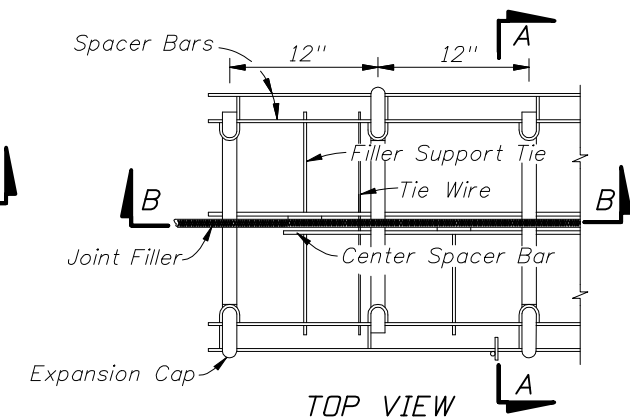
Anchor bolts shall be Grade C in accordance with ASTM A 307.

Threaded sleeves shall develop the full strength of the bolt and meet the material and thread requirements of ASTM A 563.

STEEL HOOK BOLT ASSEMBLY

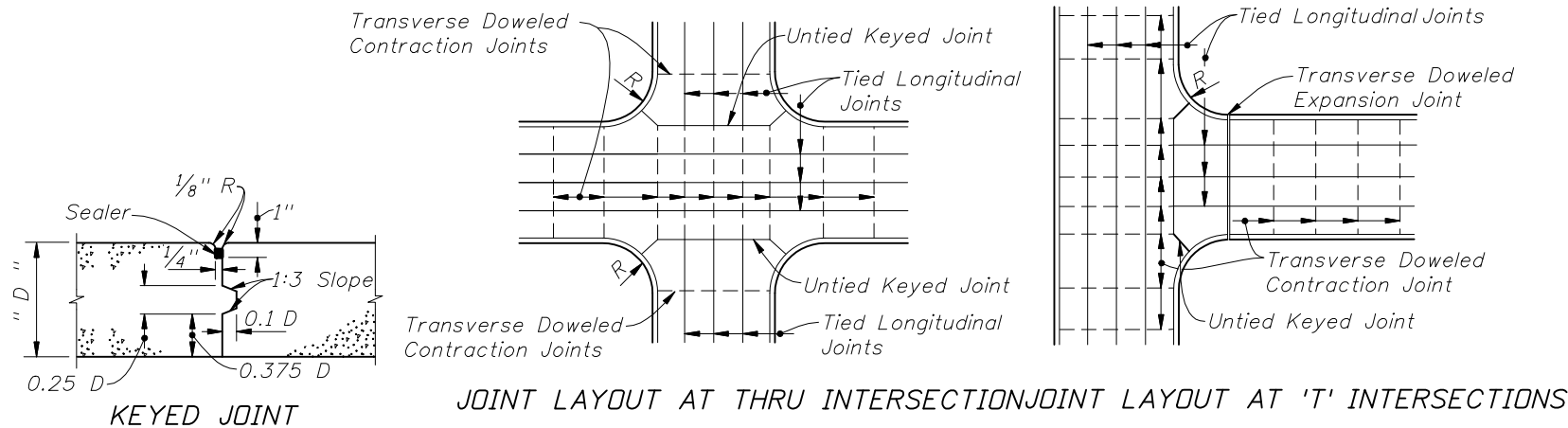


CONTRACTION ASSEMBLY



EXPANSION ASSEMBLY

Note:
Proprietary contraction and expansion assemblies may be used. Products shall be introduced to the State Construction Office in accordance with section (C) of the Product Evaluation Procedure.

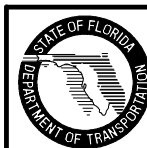


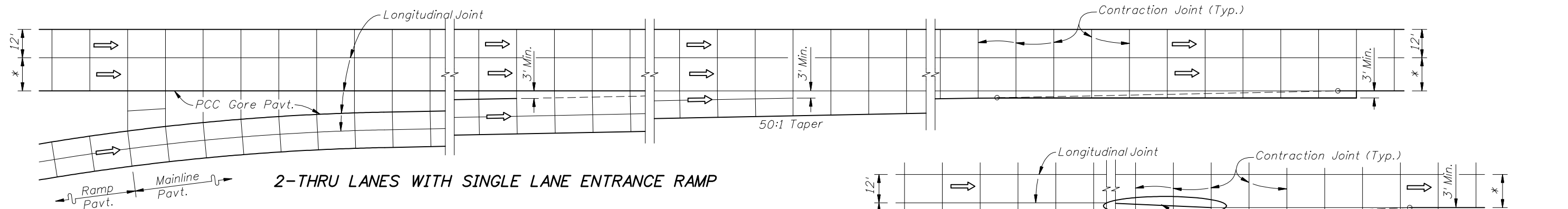
JOINT LAYOUT AT THRU INTERSECTION JOINT LAYOUT AT 'T' INTERSECTIONS

NOTES

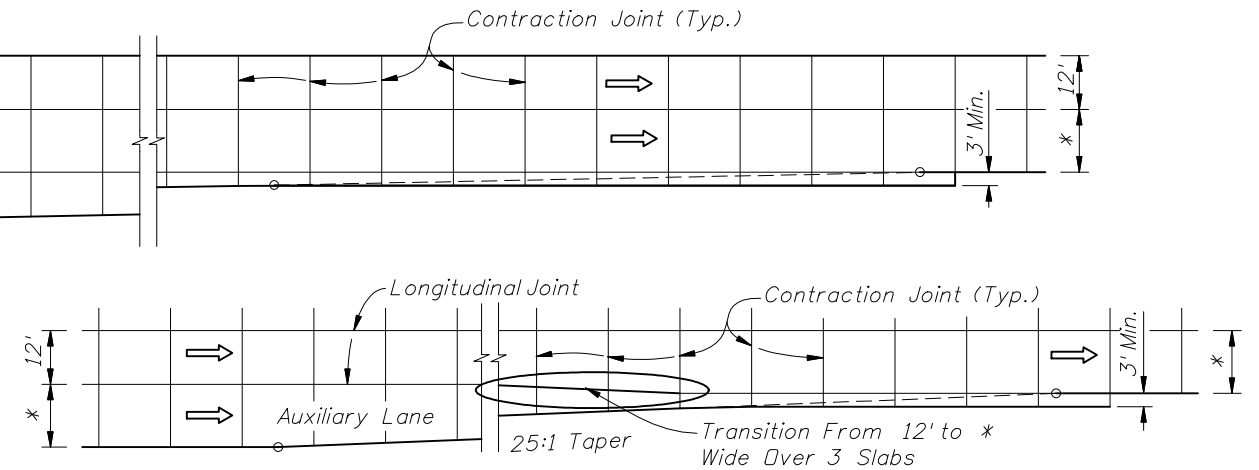
1. Longitudinal joints will not be required for single lane pavement 14' or less in width. For entrance and exit ramp joint details, see Sheet 4 of 4.
2. Arrangement of longitudinal joints are to be as directed by the Engineer.
3. All manholes, meter boxes and other projections into the pavement shall be boxed-in with 1/2" preformed expansion joint material.

JOINT ARRANGEMENT

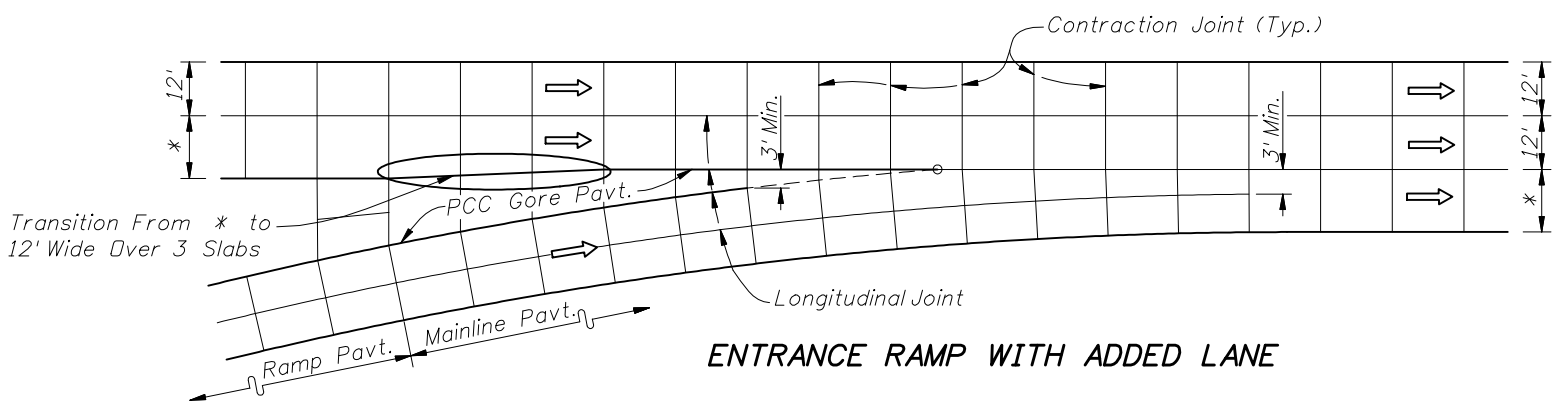




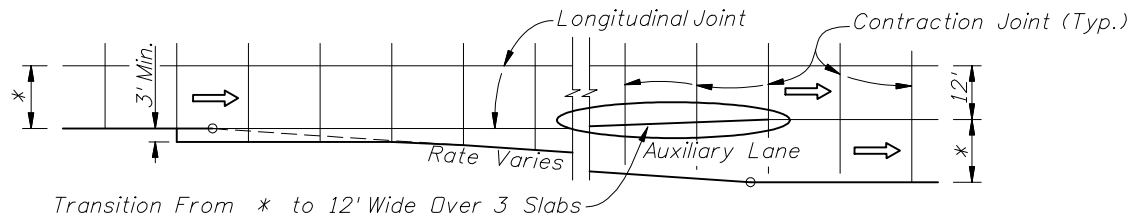
2-THRU LANES WITH SINGLE LANE ENTRANCE RAMP



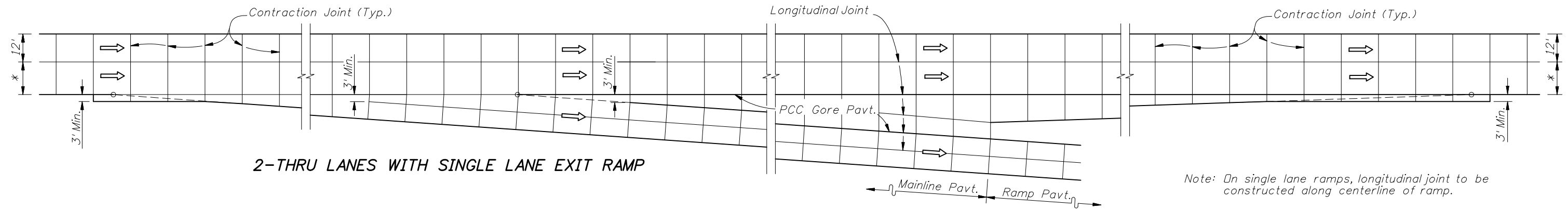
ENTRANCE TAPER WITH AUXILIARY LANE



ENTRANCE RAMP WITH ADDED LANE

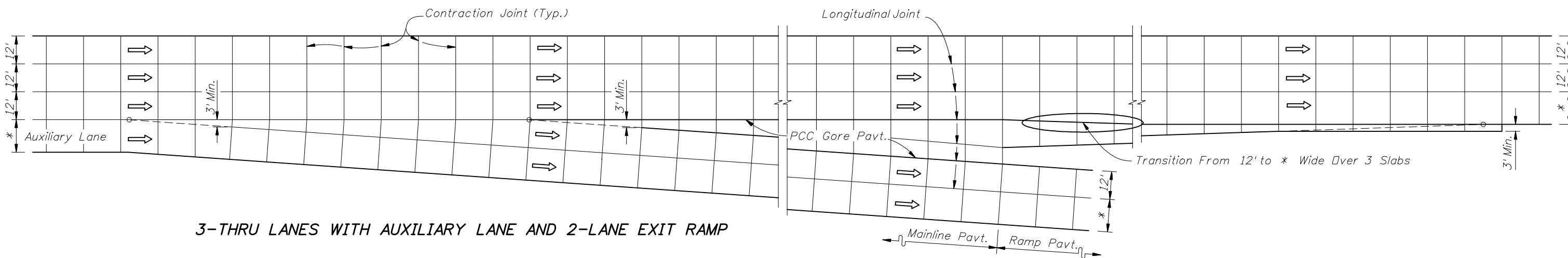


EXIT TAPER WITH AUXILIARY LANE



2-THRU LANES WITH SINGLE LANE EXIT RAMP

Note: On single lane ramps, longitudinal joint to be constructed along centerline of ramp.



3-THRU LANES WITH AUXILIARY LANE AND 2-LANE EXIT RAMP

JOINT LAYOUT AT ENTRANCE AND EXIT RAMP TERMINALS

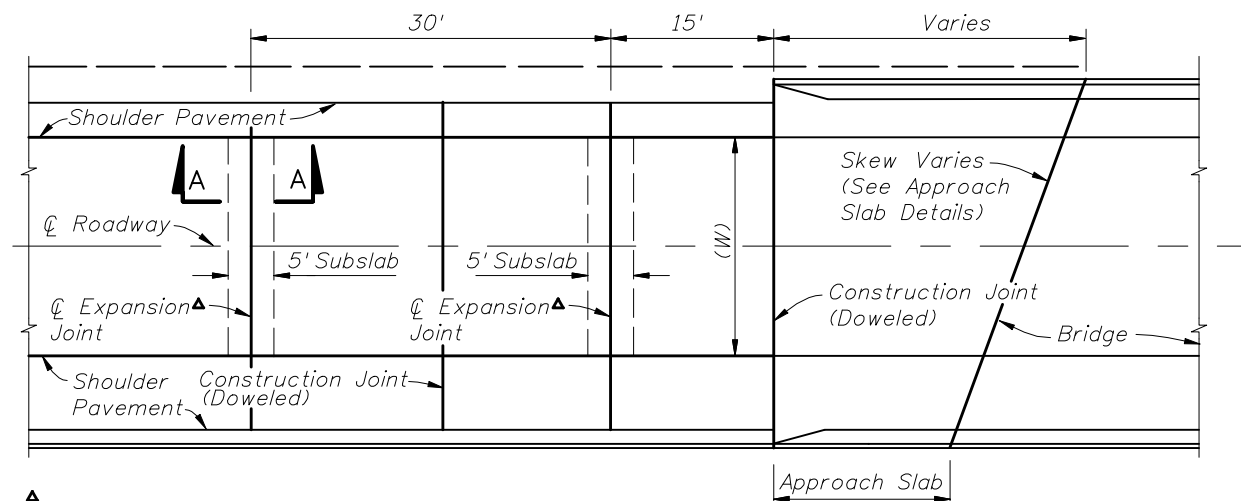
* 13' with tied Concrete Shoulders or 14' with Asphalt Shoulders.



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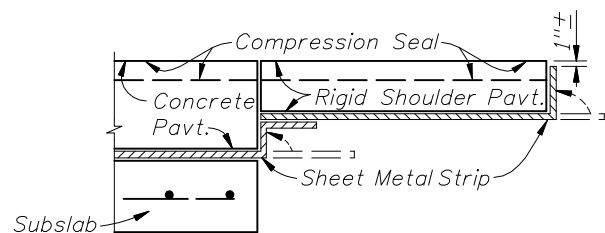
CONCRETE PAVEMENT JOINTS

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Index No. 305	

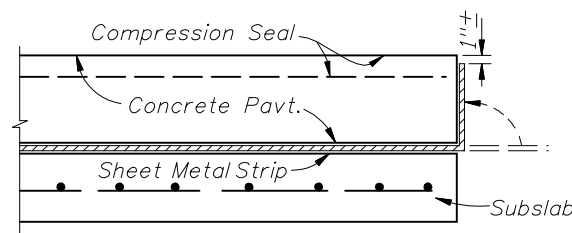


▲ Expansion Joints Shall Be Constructed Parallel To The Existing Transverse Pavement Joints On Rehabilitation Projects, And Parallel To The Standard Transverse Pavement Joints Shown In The Plans For New Construction.

PLAN



WITH RIGID SHOULDER PAVEMENT

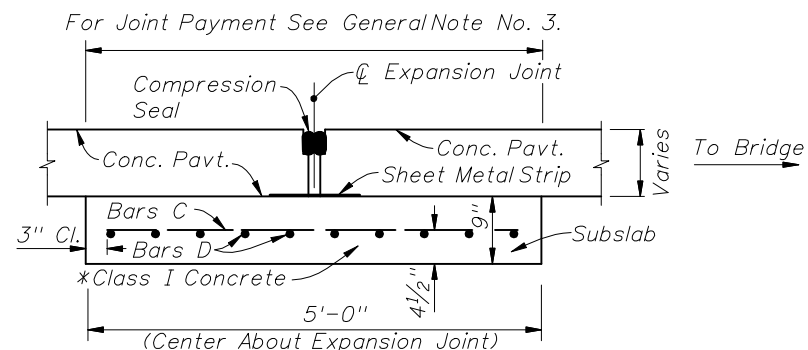


WITH GRASSED SHOULDER OR FLEXIBLE SHOULDER PAVEMENT

Note:
Immediately prior to placing the seal, the joint shall be thoroughly cleaned of all foreign material. Immediately after the seal is placed, sheet metal strip shall be bent up against the pavement edge.

The sheet metal strip shall be a minimum 16 gage steel, 12" wide and shall be galvanized in accordance with ASTM A-526, Coating Designation G90.

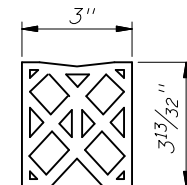
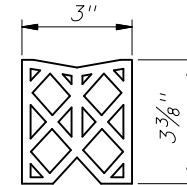
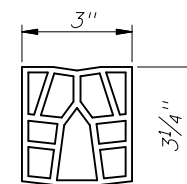
DETAIL SHOWING SHEET METAL STRIP



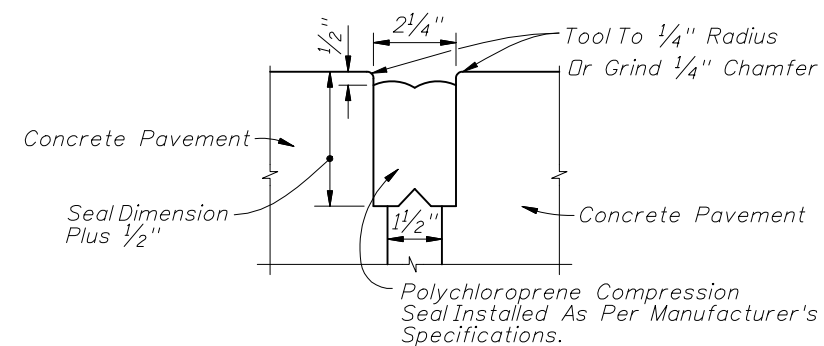
REINFORCING STEEL				
Mark	Size	Spac.	No. Req.	Lgth.
C	5	6"	Varies	4'-6"
D	5	6"	10	W Minus 6"

*Finish surface smooth. Cure with heavy coating of wax base white pigmented curing compound. Apply second application immediately prior to placing pavement.

SECTION AA
EXPANSION JOINT



OPTIONAL SEALS



Note: All contacting surfaces between the compression seal and concrete shall be thoroughly coated with a lubricant-adhesive.

JOINT DIMENSIONS
COMPRESSION SEAL DETAIL

DESIGN NOTES

1. For rehabilitation projects, the designer must indicate in the plans the number of slabs to be removed, the number of subslabs to be constructed/reconstructed, and the location of expansion joints.
2. Pay quantity of expansion joint to be calculated across pavement at right angles to the centerline of the roadway pavement. Shoulder pavement joint included.

GENERAL NOTES

1. The centerline of roadway and the centerline of bridge do not necessarily coincide. Prior to the placement of the expansion joint, the centerline of the roadway pavement shall be determined.
2. For information on other types of concrete pavement joints see Index No. 305.
3. Pay quantity for expansion joint is the length of joint to be constructed across the roadway and shoulder pavements, measured at right angles to the centerline of the roadway. Payment for expansion joint shall be full compensation for joint construction, including reinforced concrete subslab, sheet metal strip and compression seal, but, not including roadway pavement reconstruction associated with joint replacement or reconstruction. Expansion joint to be paid for under the contract unit price for Bridge Approach Expansion Joint, LF.



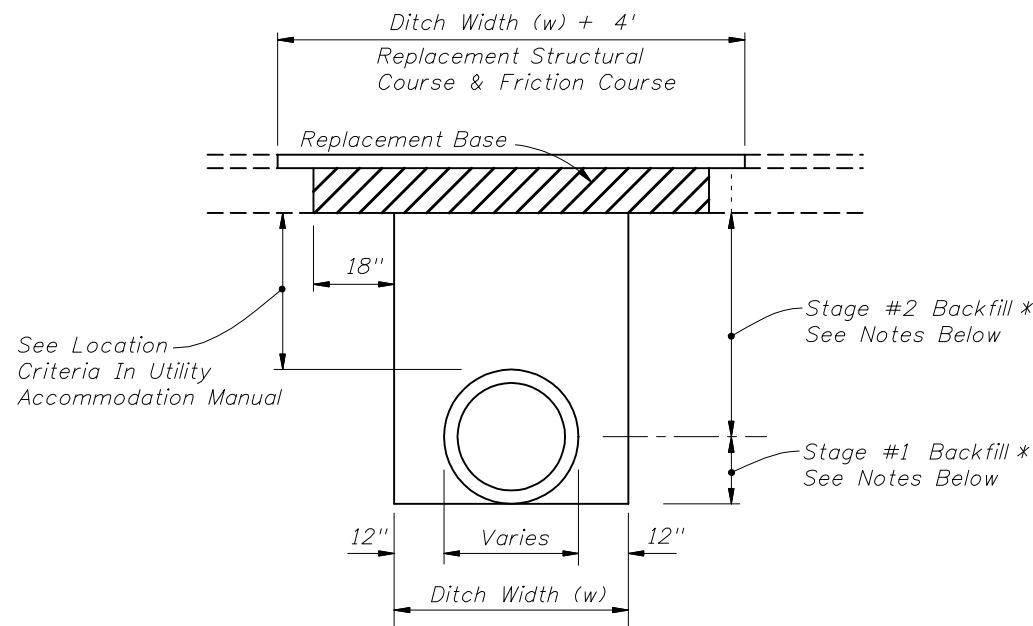
2010 FDOT Design Standards

BRIDGE APPROACH EXPANSION JOINT
CONCRETE PAVEMENT

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04

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1 of 1

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306



FLEXIBLE PAVEMENT NOTES

PAVEMENT REMOVAL AND REPLACEMENT

Pavement shall be mechanically sawed.

The replacement asphalt shall match the existing structural and friction courses for type and thickness.

The new base materials shall be either of the same type and composition as the materials removed or of equal or greater structural adequacy (See Index No. 514).

BACKFILL

COMPACTED AND STABILIZED FILL OPTION

Backfill material shall be placed in accordance with Section 125 of the Standard Specifications.

In Stage #1, construct compacted fill beneath the haunches of the pipe, using mechanical tamps suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe and above any bedding.

In Stage #2, construct compacted fill along the sides of the pipe and up to the bottom of the base, with the upper 12" receiving Type B Stabilization. In lieu of Type B Stabilization, the Contractor may construct using Optional Base Group 3.

*** FLOWABLE FILL OPTION**

If compaction can not be achieved through normal mechanical methods then flowable fill may be used.

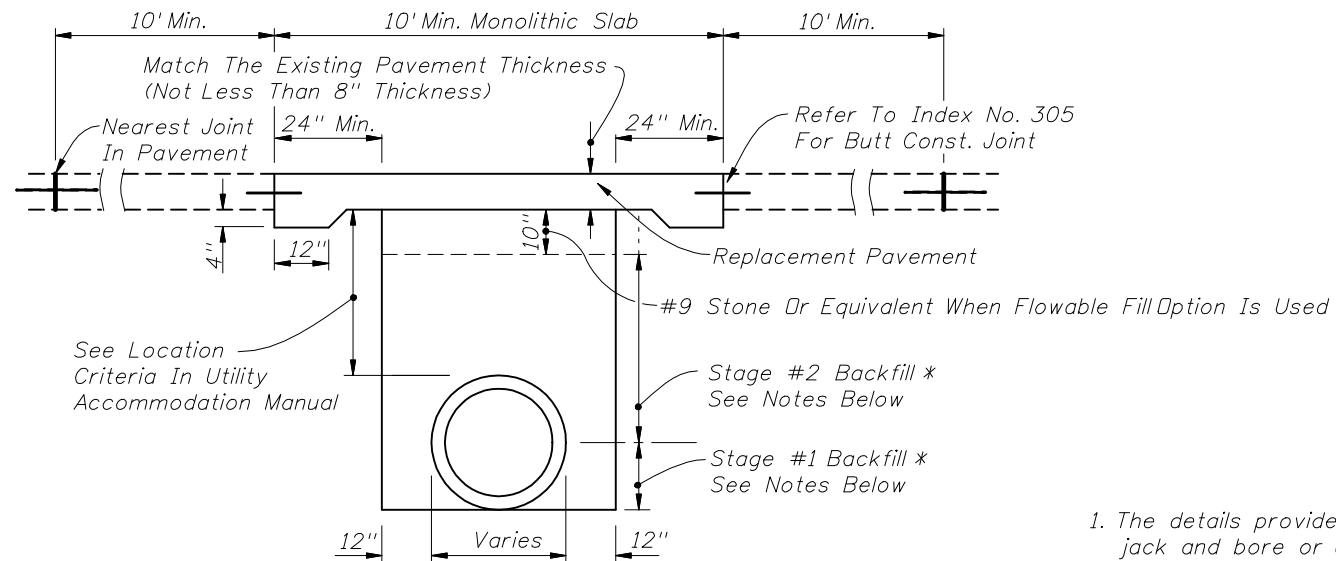
Flowable fill is to be placed in accordance with Section 121 of the Specifications, as approved by the Engineer.

Do not allow the utility being installed to float. If a method is provided to prevent flotation from occurring, Stages #1 and #2 can be combined, if approved by the Engineer.

In Stage #1, place flowable fill midway up on both sides of the utility. Allow to harden before placing Stage #2.

In Stage #2, place flowable fill to the bottom of the existing base course.

FLEXIBLE PAVEMENT CUT



RIGID PAVEMENT NOTES

PAVEMENT REMOVAL AND REPLACEMENT

High early strength cement concrete (3000 psi) meeting the requirements of Standard Specification 346 shall be used for rigid pavement replacement.

Pavement shall be mechanically sawed and restored to conform with existing pavement joints within 12 hours. (See Index No. 305)

GRANULAR BACKFILL

Any edg drain system that is removed shall be replaced with the same type materials. Any edg drain system that is damaged shall be repaired with methods approved by the Engineer.

Fill material shall be placed in accordance with the Standard Specifications. Fill material shall be special select soil in accordance with Index No. 505.

In Stage #1, construct compacted fill beneath the haunches of the pipe, using mechanical tamps suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe and above any bedding.

In Stage #2, construct fill along the sides of the pipe and up to the bottom of replacement pavement.

*** FLOWABLE FILL OPTION**

If mechanical compaction can not be achieved through normal mechanical methods then flowable fill may be used.

Flowable fill is to be placed in accordance with Section 121 of the Specifications, as approved by the Engineer.

Do not allow the utility being installed to float. If a method is provided to prevent flotation from occurring, Stages #1 and #2 can be combined, if approved by the Engineer.

In Stage #1, place flowable fill midway up on both sides of the utility. Allow to harden before placing Stage #2.

In Stage #2, place flowable fill to the bottom of the stone layer.

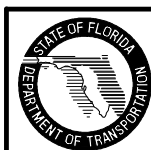
RIGID PAVEMENT CUT

TRENCH CUTS AND RESTORATIONS ACROSS ROADWAYS

GENERAL NOTES

1. The details provided in this standard index apply to cases in which jack and bore or directional boring methods are not required by the Engineer.
2. Flowable fill shall not be placed directly over loose, or high plastic, or muck material (see Index 505) which will cause settlement due to fill weight. Where highly compressible material exists, the amount, shape and depth of flowable fill must be engineered to prevent pavement settlement.
3. These details do not apply to utility cuts longitudinal to the centerline of the roadway which may require the additional use of geotextiles, special bedding and backfill, or other special requirements.
4. Method of construction must be approved by the Engineer.
5. Some pipe may require special granular backfill up to 6" above top of pipe. Geotextiles may be required to encapsulate the special granular material.
6. Where asphalt concrete overlays exist over full slab concrete pavement, the replacement pavement shall have an overlay constructed over the replacement slab. The overlay shall match the existing asphalt pavement thickness. The replacement friction course shall match the existing friction course, except structural course may be used in lieu of dense graded friction course.

Existing broken and seated pavements shall be treated as flexible pavements.
7. All shoulder pavement, curb, curb and gutter, and their substructure disturbed by utility trench cut construction shall be restored in kind.
8. The use of flowable fill to reduce the time traffic is taken off a facility is acceptable but must have prior approval by the Engineer. Flowable fill use is allowed only when properly engineered for pavement crossings, whether straight or diagonal, and shall not be installed for significant depths or lengths. The maximum length shall be fifty (50) feet and a maximum depth of six (6) feet unless supported by an engineering document prepared by a registered professional engineer that specializes in soils engineering. The engineering document shall address the evaluation of local groundwater flow interruption and settlement potential.
9. Excavatable flowable fill is to be used when the flowable fill option is selected.
10. When approved by the Engineer, in lieu of the pavement and base, non-excavatable flowable fill may be used for manhole stabilization and ring and cover adjustments. Excavatable flowable fill shall not be used within the limits of the pavement and base.



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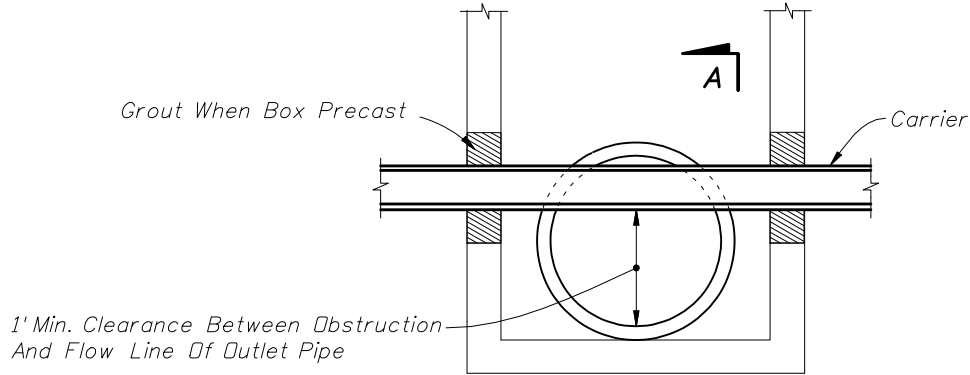
MISCELLANEOUS UTILITY DETAILS

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Index No. 307

NOTES FOR UTILITY CONFLICT PIPE

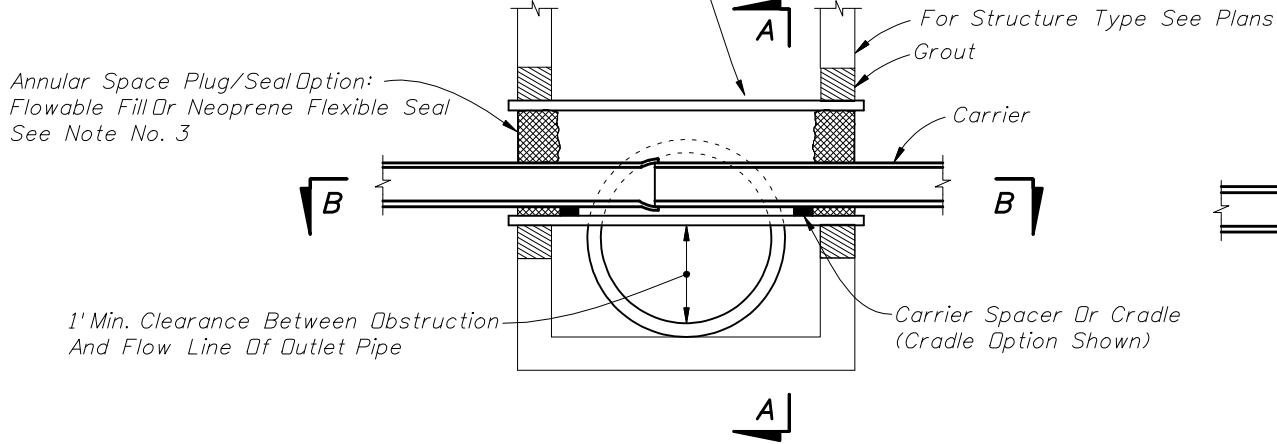
1. These details are for construction field expediency to resolve utility conflicts that cannot be remedied by relocation. For conflicts determined during design, use the construction shop drawings for structure details.
2. Concrete used in conflict structures shall be as specified in ASTM C478. 4000 psi may be used in lieu of Class I concrete.
3. Maximum opening for pipe shall be the pipe OD plus 6". Mortar used to seal the pipe into the opening will be of such mix that shrinkage will not cause leakage into or out of the structure.
4. If the conflict structure is round or there are multiple inlet or outlet pipes, then the wall section should be reviewed for strength.
5. If during the plans design or construction process it is determined that a domestic water supply line must pass through a storm drain structure, it must be shown on the design or construction plans and submitted to the Florida Department of Environmental Protection (FDEP) Administrator For Drinking Water in Tallahassee for review and comment. This index provides accepted methods for addressing conflicts when and where they cannot be reasonably avoided. To be submitted along with the plans shall be a justification describing inordinate cost and the impracticality of avoidance. If identified, properly justified, and accomplished in accordance with this index, approval is granted. Upon request, the Utility Agency Owner (UAO) must provide support data on the cost of relocation or adjustment to the FDOT for submittal to the FDEP.



SECTION LONGITUDINAL TO CARRIER PIPE
(Nonpressure Or Nonfluid Carrier Installations)
No Joints Allowed Within Structure

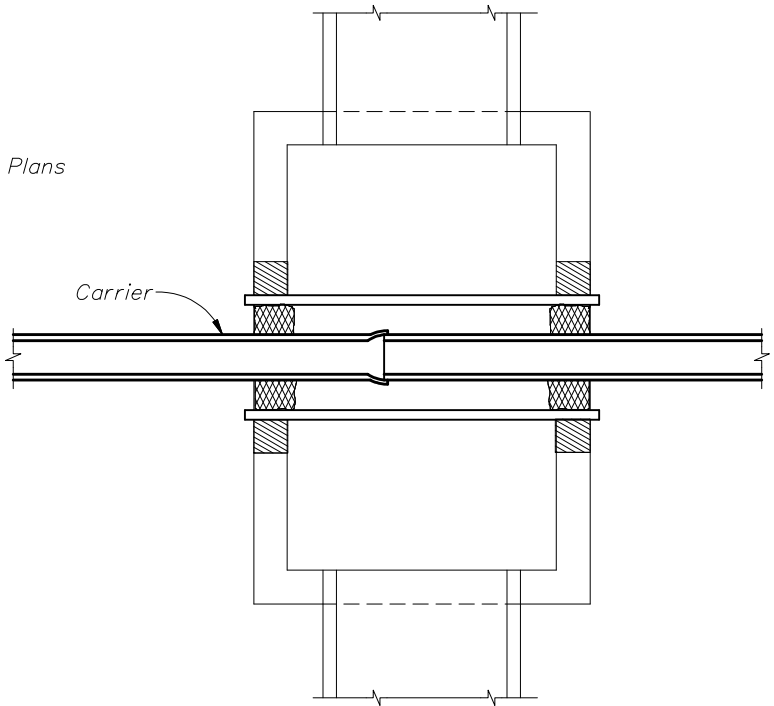
UTILITY CONFLICT CONDITION I

Carrier Casing: The Casing Shall Be Rated To The Greatest Pressure Of Either The Carrier That's Called For By Design Or That's Required By Construction. The Casing May Be Steel, Cast Iron, Ductile Iron Or Plastic. The Casing Can Be Seamless Or Sealed Half Sleeves.

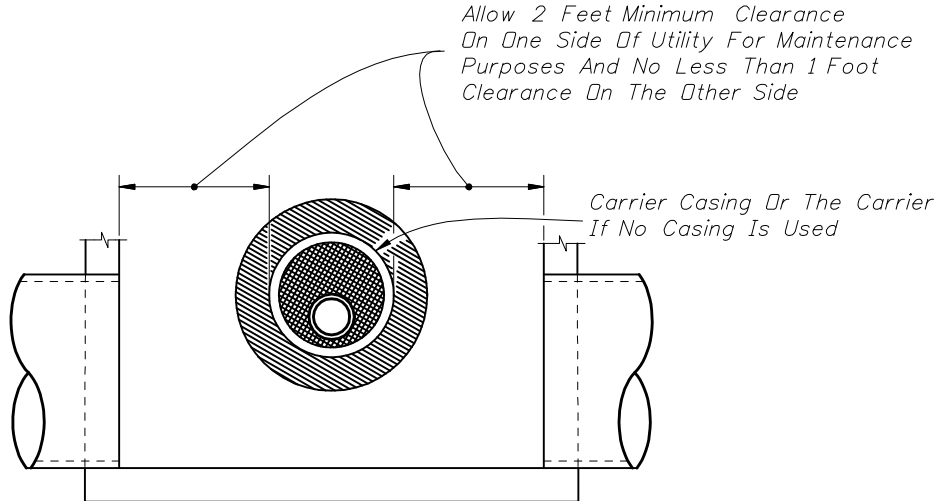


SECTION LONGITUDINAL TO CARRIER PIPE
(Pressure Or Fluid Carrier Installations)

UTILITY CONFLICT CONDITION II



SECTION BB



DESIGNER'S NOTE

"Sumped" Conflict Manholes Shall Not Be Used Unless The System Is Hydraulically Designed To Account For The Headloss Generated If The Sump Is Completely Blocked

SECTION AA

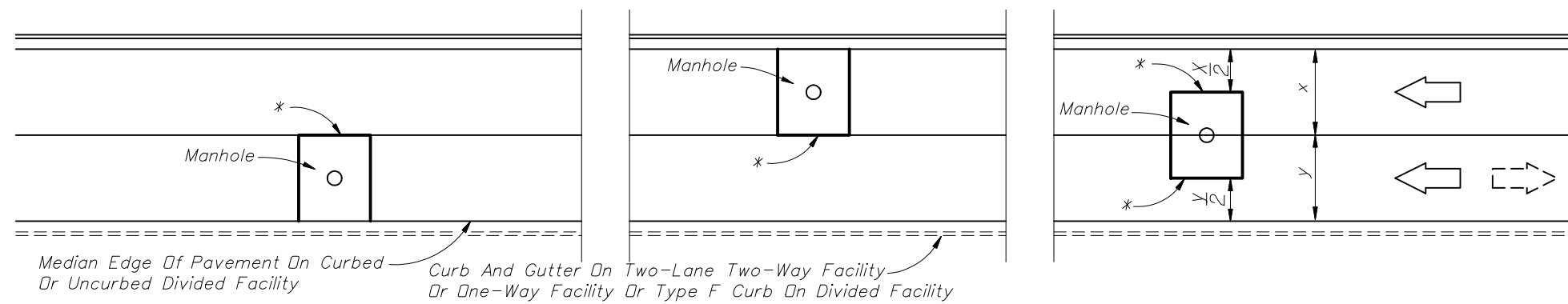
UTILITY CONFLICT PIPES THRU STORM DRAIN STRUCTURES



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MISCELLANEOUS UTILITY DETAILS

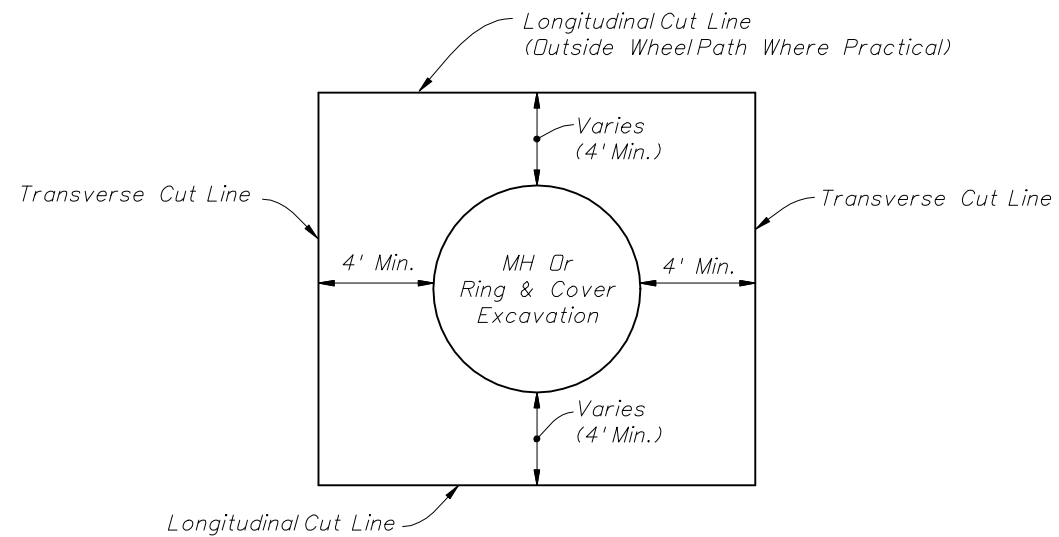
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*Longitudinal Cut Lines For Both Curbed And Uncurbed Facilities Must Coincide With A Regular Seam Or Midlane Point In Order To Be Outside The WheelPath

PLAN VIEW

FOR TWO OR MORE LANES (TWO LANES SHOWN)



PARTIAL CUTS FOR RING AND COVER ADJUSTMENTS

NOTES

1. No irregular seams are permitted. All seams must be clean sawed.
2. Pavement cut seams for underground utility structures in rigid pavement are the same longitudinally, but the transverse seams shall extend to the nearest existing joint.
3. See Sheet 1 for replacement pavement.

NONTRENCH PAVEMENT CUTS FOR UNDERGROUND UTILITY STRUCTURES IN PAVEMENT



2010 FDOT Design Standards

MISCELLANEOUS UTILITY DETAILS

Last Revision 04 Sheet No. 3 of 3

Index No. 307

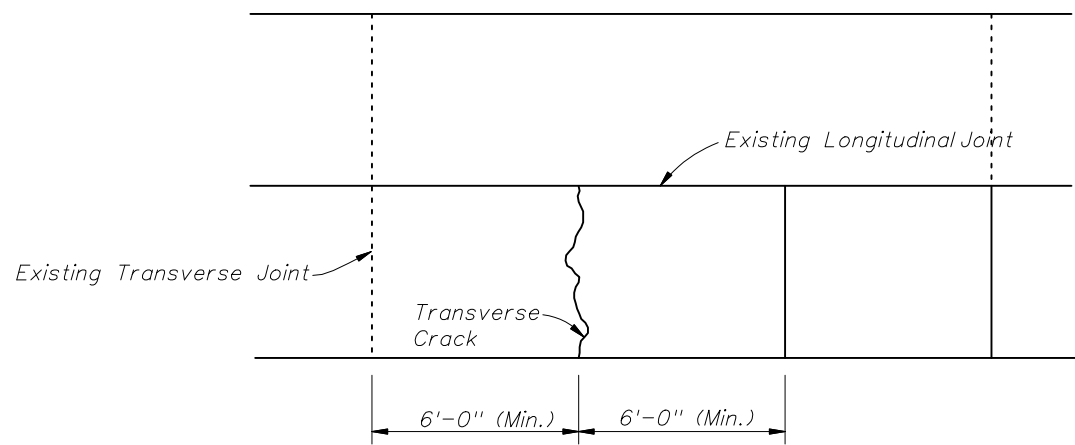


FIGURE 10.2 - REPAIR METHOD: NONE OR CLEAN AND SEAL

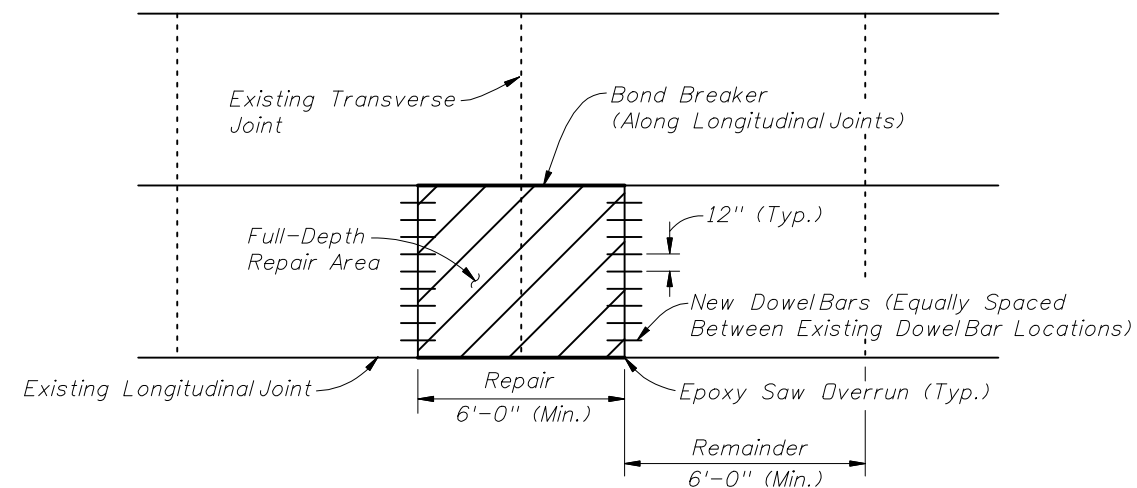


FIGURE 10.5 - FULL-DEPTH REPAIR ON BOTH SIDES OF THE JOINT

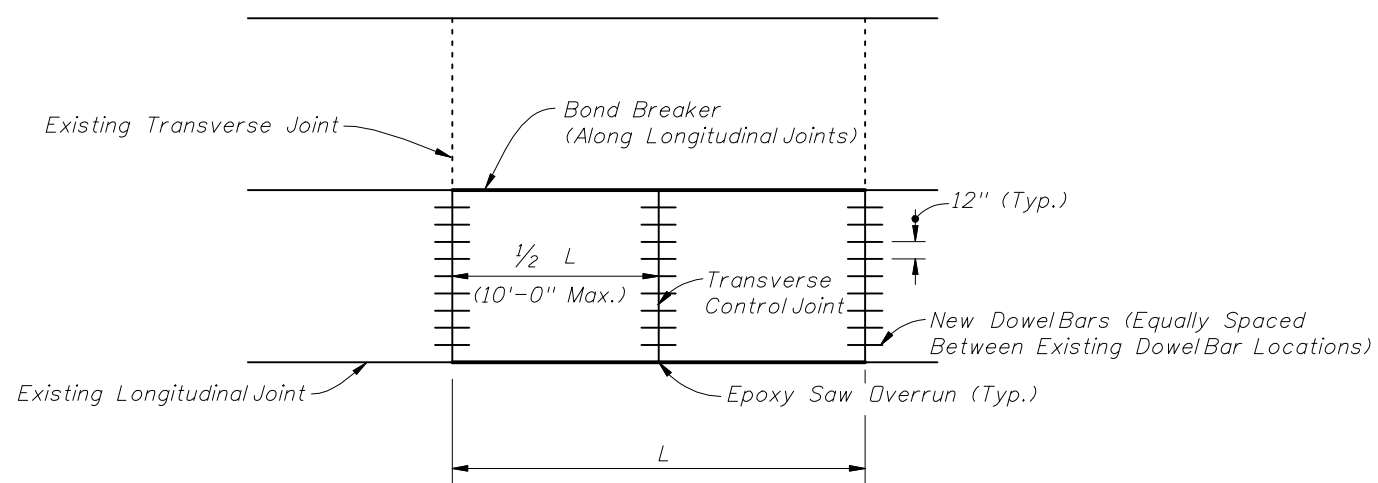


FIGURE 10.3 - FULL SLAB FULL DEPTH REPLACEMENT

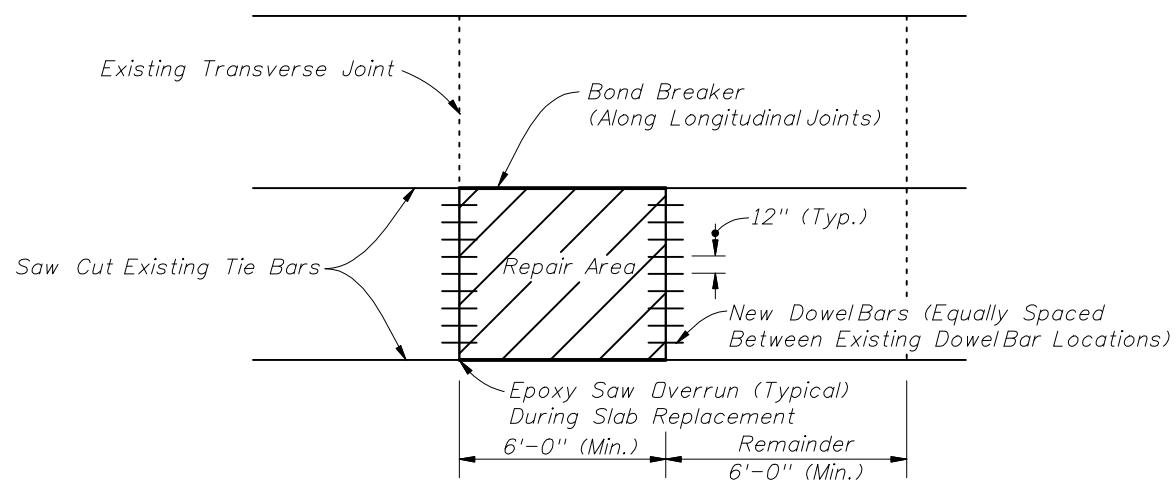


FIGURE 10.4 - PARTIAL SLAB FULL DEPTH REPLACEMENT

GENERAL NOTES

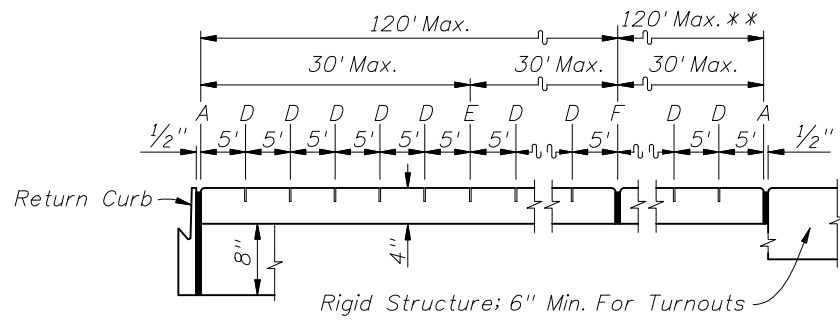
1. For Repair and Replacement Criteria see Sheet 2 of 2.
2. Full depth repairs consist of removing and replacing at least a portion of the existing slab to the bottom of the concrete.
3. Repair boundaries shall be sawed full-depth with diamond saw blades. On hot days, it may not be possible to make this cut without first making a wide, pressure relief cut within the repair boundaries. A carbide-tipped wheelsaw may be used for this purpose, but the wheelsaw must not intrude on the adjacent lane, unless the lane is slated for repair. The wheelsaw cuts produce a ragged edge that promotes excessive spalling along joints. Hence, if wheelsaw cuts are made, diamond saw cuts must be made 18 in. outside the wheelsaw cuts. To prevent damage to the base, the wheelsaw must not be allowed to penetrate more than 0.5 in. into the base.
4. No additional base or subgrade material shall be added and all loose base or subgrade material shall be removed prior to placement of the new concrete slab. The concrete slab shall be placed to the full depth of the material removed. No additional compensation will be allowed for additional concrete required to bring proposed concrete slab up to finished grade.
5. Removal of the damaged concrete pavement shall be by lifting. Any good concrete pavement which is damaged during removal of damaged areas shall be removed and replaced by the contractor at his expense.
6. If the roadway contract includes grinding, then the slab replacement shall be performed first.
7. During slab replacement operations, fill any saw cut over runs into adjacent slabs with epoxy.



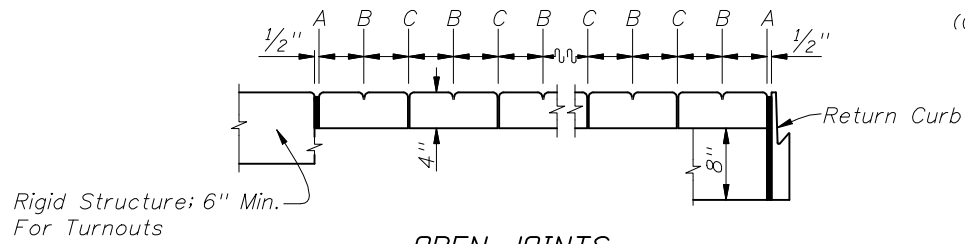
SLAB REPAIR AND REPLACEMENT CRITERIA

DISTRESS PATTERN	SEVERITY/DESCRIPTION		REPAIR METHOD	REFERENCE
CRACKING				
Longitudinal	Light	<1/8", no faulting, spalling <1/2" wide	None	Figure 10.2
	Moderate	1/8" < width <1/2", spalling <3" wide	Clean and Seal	Figure 10.2
	Severe	width >1/2", spalling >3" faulting >1/2"	Replace	Figure 10.3
Transverse	Light	<1/8", no faulting, spalling <1/2" wide	None	Figure 10.2
	Moderate	1/8" < width <1/2", spalling <3" wide	Clean and Seal	
	Severe	width >1/2", spalling >3" faulting >1/2"	Replace	Figure 10.3, 10.4 and 10.5
Corner Breaks	A corner of the slab is separated by a crack that intersects the adjacent longitudinal and transverse joint, describing an approximate 45° angle with the direction of traffic.		Full Depth	Figure 10.4 and 10.5
Intersecting Random Cracks (Shattered Slab)	Cracking patterns that divide the slab into three or more segments.		Full Depth	Figure 10.3 and 10.4
JOINT DEFICIENCIES				
Spall Nonwheel Path	Light	spall width <1 1/2", < 1/3 slab depth, <12" in length	None	Figure 10.4 and 10.5
	Moderate	1 1/2" < spall width <3", 1/3 slab depth, <12" in length	None	Figure 10.4 and 10.5
	Severe	spall width >3" or length >12"	Full Depth	Figure 10.4 and 10.5
Spall Wheel Path	Light	spall width <1 1/2", < than 1/3 slab depth, <12" in length	None	Figure 10.4 and 10.5
	Moderate	1 1/2" < spall width <3", 1/3 slab depth, <12" in length	Full Depth	Figure 10.4 and 10.5
	Severe	spall width >3" or length >12"	Full Depth	Figure 10.4 and 10.5
SURFACE DETERIORATION				
Pop Outs Nonwheel Path	Small pieces of surface pavement broken loose, normally ranging from 1 to 4 in. diameter and 1/2 to 2 in. in depth.			
	Light	Not deemed to be a traffic hazard	Keep under observation	
	Severe	Flying debris deemed a traffic hazard	Full Depth	Figure 10.4
Pop Outs Wheel Path	Small pieces of surface pavement broken loose, normally >3" diameter and 2" in depth.			
	Light	Deemed to be a traffic hazard	Full Depth	Figure 10.4
	Severe	Flying debris deemed a traffic hazard	Full Depth	Figure 10.4
MISCELLANEOUS DISTRESS				
Faulting	Elevation differences across joints or cracks.			
	Light	Faulting <4/32"	None	
	Moderate	4 < Faulting <16/32"	Grind	
	Severe	Faulting >16/32"	Grind	
Lane To Shoulder Drop-Off	Light	0 < drop-off <1"	None	N/A
	Moderate	1" < drop-off <3"	Build Up	
	Severe	drop-off >3 "	Build Up	
Water Bleeding Or Pumping	Seeping or ejection of water through joints or cracks.		Install appropriate drainage, edge drain, permeable subbase, reseal joints, etc.	N/A
Blowups	Upward movement at transverse joints or cracks often accompanied by shattering of the concrete.		Full Depth	Figure 10.3 and 10.4





120' Max. 30' Max. 30' Max. 30' Max. **
 Rigid Structure; 6" Min. For Turnouts
 ** "E" Joint(s) Required When Length Exceeds 30'
SAWED JOINTS



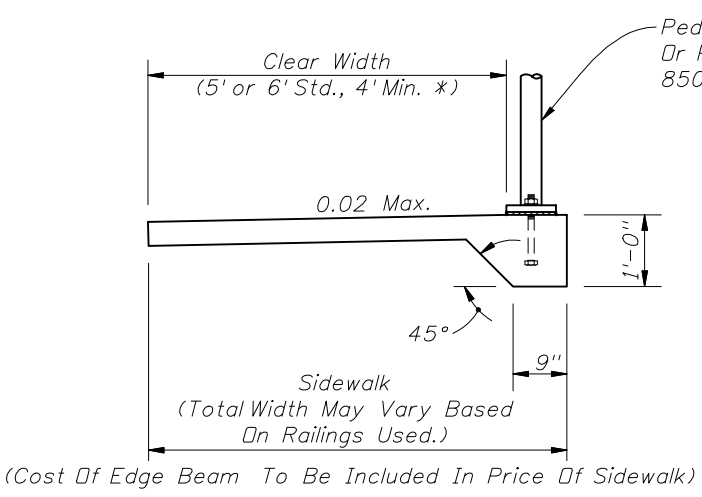
Rigid Structure; 6" Min. For Turnouts
OPEN JOINTS
 EXAGGERATED SCALE
 LONGITUDINAL SECTION
 SIDEWALK JOINTS

JOINT LEGEND

- A- 1/2" Expansion Joints (Preformed Joint Filler)
- B- 1/8" Dummy Joints, Tooled
- C- 1/8" Formed Open Joints
- D- 3/16" Saw Cut Joints, 1 1/2" Deep (within 96 hours) Max. 5' Centers
- E- 3/16" Saw Cut Joints, 1 1/2" Deep (within 12 hours) Max. 30' Centers
- F- 1/2" Expansion Joint When Run Of Sidewalk Exceeds 120'. Intermediate locations when called for in the plans or at locations as directed by the Engineer.
- G- Cold Joint With Bond Breaker, Tooled

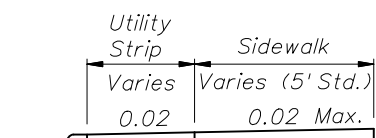
NOTES FOR CONCRETE SIDEWALK ON CURBED ROADWAYS

1. Sidewalks shall be constructed in accordance with Section 522 of the FDOT Standard Specifications. Public sidewalk curb ramps shall include detectable warnings and be constructed in accordance with Index No. 304. Detectable warnings are not required where sidewalks intersect urban flared turnouts.
2. Bond breaker material can be any impermeable coated or sheet membrane or preformed material having a thickness of not less than 6 mils nor more than 1/2".
3. For turnouts see Index No. 515.
4. Construct sidewalks with 1' thick Edge Beam through the limits of any surface mounted Pedestrian/Bicycle Picket Railing or Pipe Guiderail shown in the plans.
5. Sidewalk shall be paid for under the contract unit price for Sidewalk Concrete (___ Thick), S.Y.

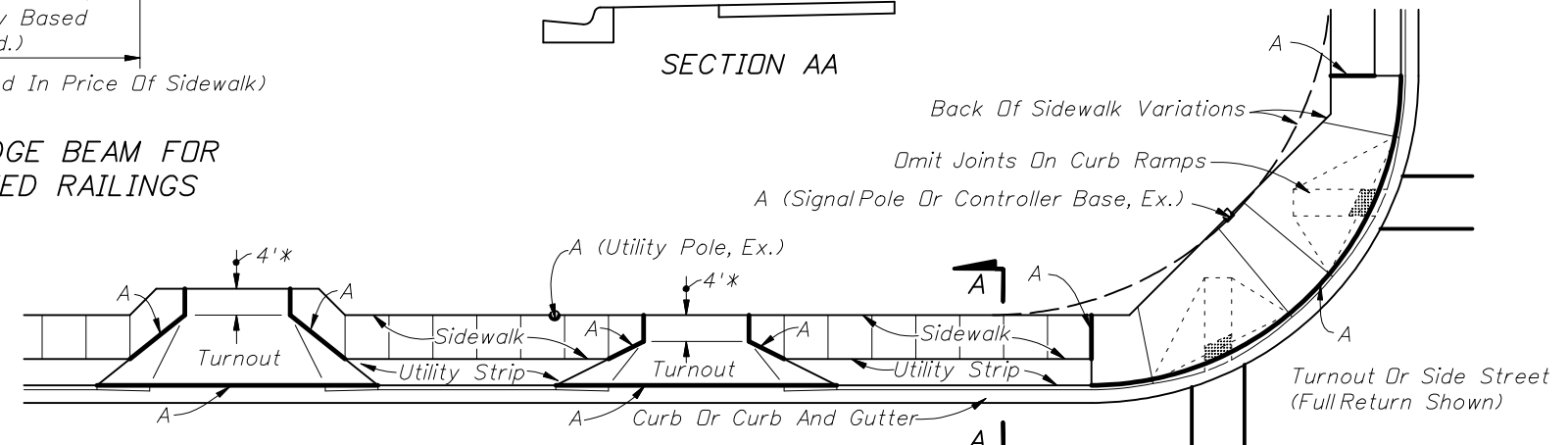


Clear Width (5' or 6' Std., 4' Min. *)
 0.02 Max.
 45°
 Sidewalk (Total Width May Vary Based On Railings Used.)
 9"
 1'-0"
 Pedestrian/Bicycle Picket Railing Or Pipe Guiderail See Index Nos. 850, 860, 870 & 880
 (Cost Of Edge Beam To Be Included In Price Of Sidewalk)

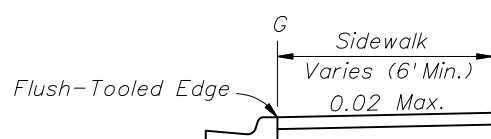
SIDEWALK WITH EDGE BEAM FOR SURFACE MOUNTED RAILINGS



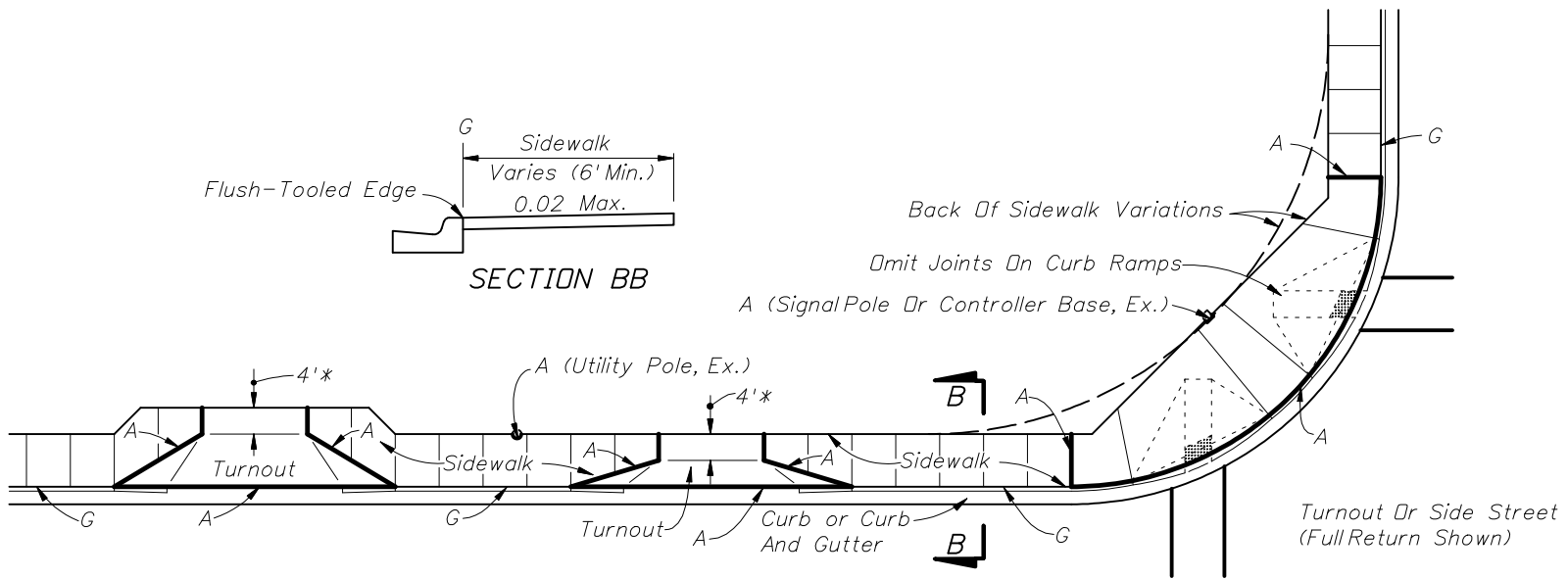
SECTION AA



SIDEWALK WITH UTILITY STRIP



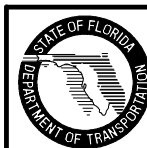
SECTION BB



SIDEWALK WITHOUT UTILITY STRIP

* 4', May Be Reduced To 3' In Restricted Conditions When Approved By The Engineer

CONCRETE SIDEWALK FOR CURBED ROADWAYS



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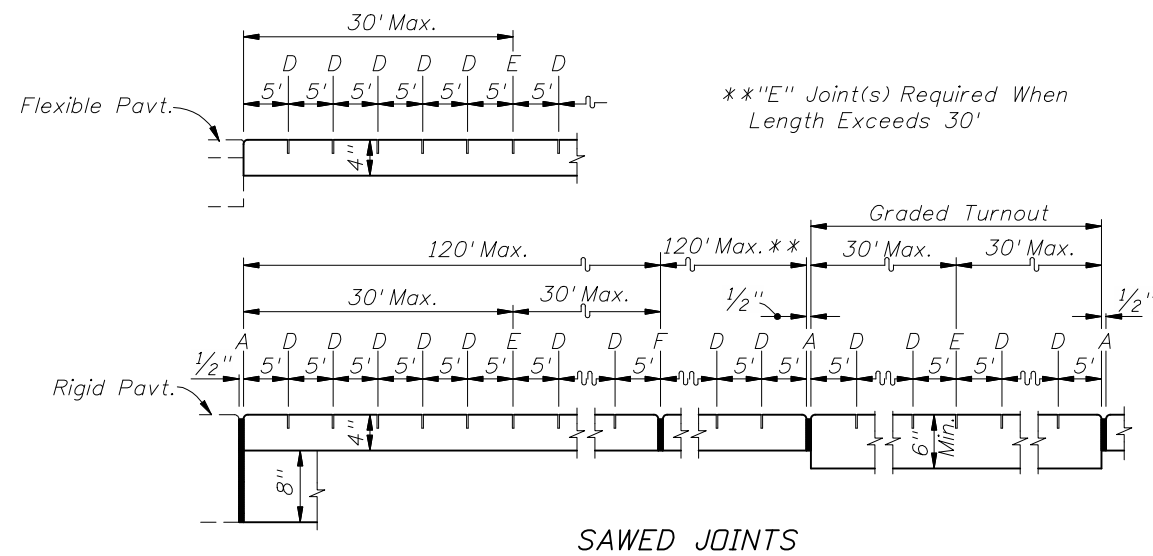
CONCRETE SIDEWALK

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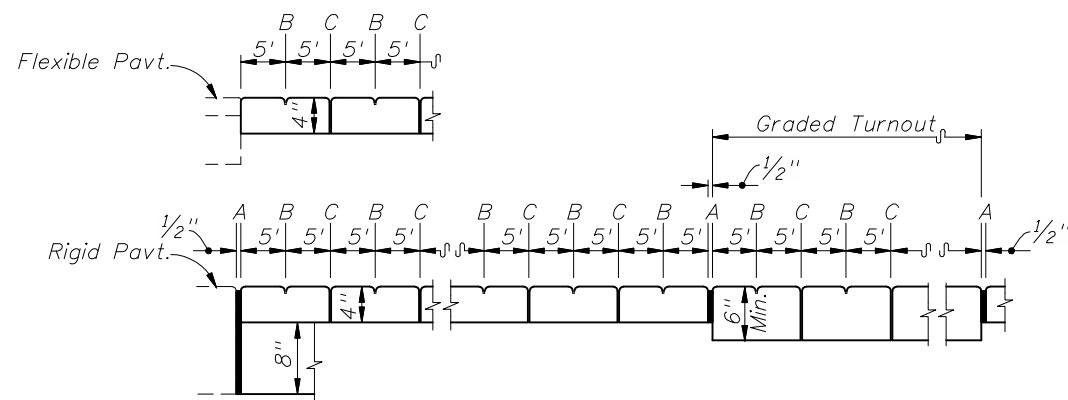
NOTES FOR CONCRETE SIDEWALKS ON UNCURBED ROADWAYS

- Sidewalks shall be constructed in accordance with Section 522 of the FDOT Standard Specifications.
- Provide detectable warnings that extend the fullwidth of the sidewalk and 24" deep from the edge of pavement where sidewalks adjoin the following vehicular ways:
 - side roads and streets
 - driveways with signalized entrances
 - driveways with entrance volumes greater than 600vpd
 - driveways with entrance speeds of 25 mph or greater
 - right in-right out composite driveways
 Detectable warning surfaces shall conform to the requirements described in the General Notes of Index 304. To the extent practical, the rows of truncated domes in a detectable warning surface should be aligned to be perpendicular or radial to the street, roadway, or driveway, as applicable.

For sidewalks continuous through driveways, detectable warning surfaces are not required.
- For turnouts see Index No. 515.
- Construct sidewalks with 1" thick Edge Beam through the limits of any surface mounted Pedestrian/Bicycle Picket Railing or Pipe Guiderail shown in the plans. See Sheet 1 for details.
- Sidewalk shall be paid for under the contract unit price for Sidewalk Concrete (___ Thick), SY.



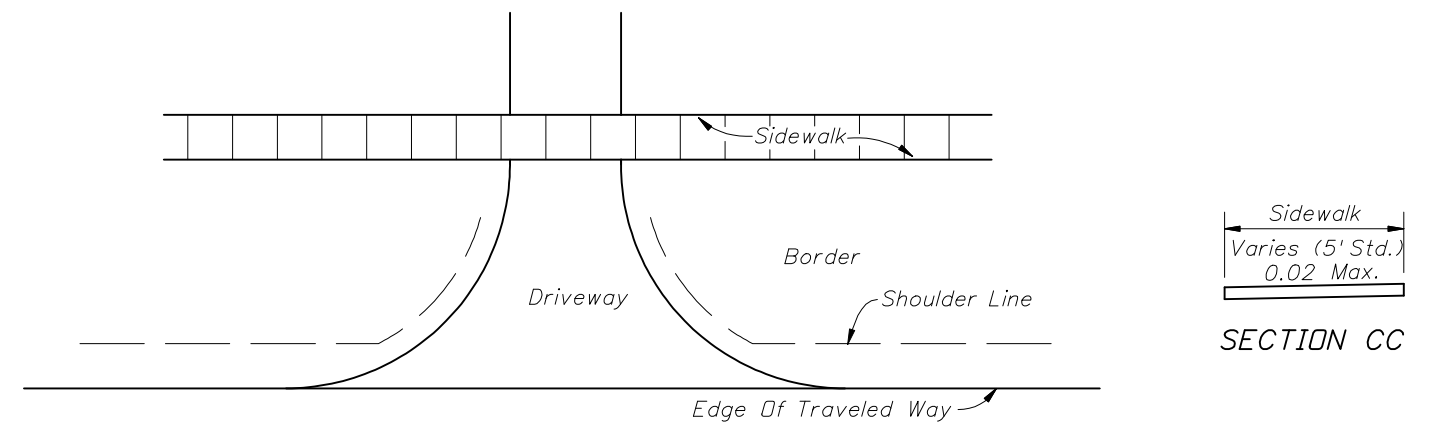
SAWED JOINTS



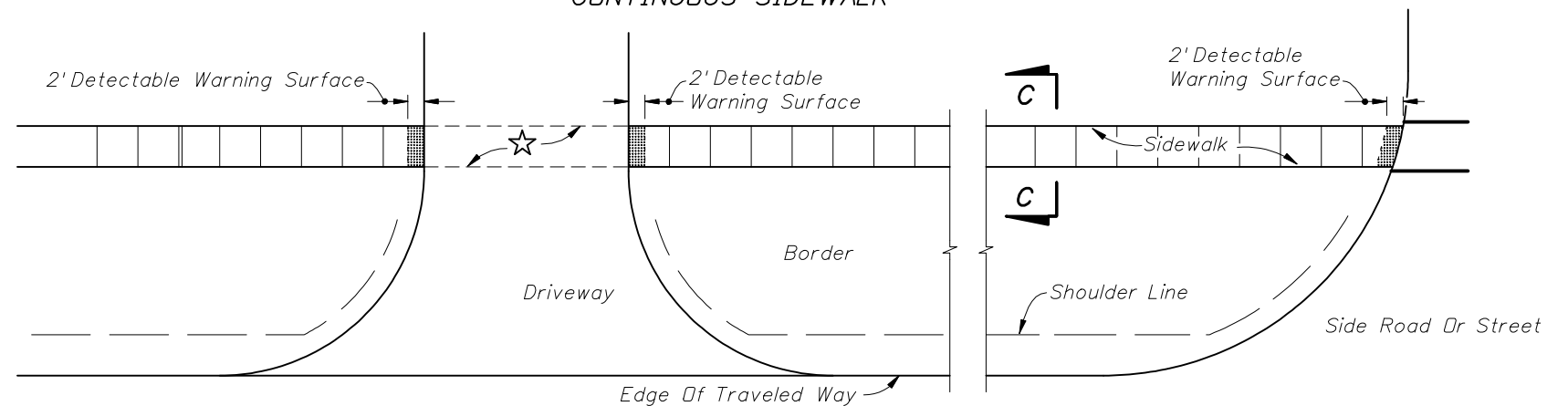
**OPEN JOINTS
EXAGGERATED SCALE
LONGITUDINAL SECTIONS
SIDEWALK JOINTS**

JOINT LEGEND

- A- 1/2" Expansion Joints (Preformed Joint Filler)
- B- 1/8" Dummy Joints, Tooled
- C- 3/16" Formed Open Joints
- D- 3/16" Saw Cut Joints, 1 1/2" Deep (96 Hour) Max. 5' Centers
- E- 1/2" Saw Cut Joints, 1 1/2" Deep (12 Hour) Max. 30' Centers
- F- 1/2" Expansion Joint When Run Of Sidewalk Exceeds 120'. Intermediate locations when called for in the plans or at locations as directed by the Engineer.



CONTINUOUS SIDEWALK



DISCONTINUOUS SIDEWALK

PLAN

☆ When driveway is new construction, reconstruction, or altered, cross slope within this area shall not exceed 0.02. Existing driveways that are not being altered may be left as they are.

CONCRETE SIDEWALK FOR UNCURBED ROADWAYS



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CONCRETE SIDEWALK

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GENERAL NOTES

1. The illustrations for guardrail applications are standard configurations; adjustments are to be made as required by site specific conditions to attain optimum design for function, economy and serviceability.
2. The beginning of guardrail need shall be at the greatest of the upstream distances from the hazard, as determined from Figures 1 and 2, and other application details of this Index.
3. One Panel (i.e., panel length) equals 12'-6". Guardrail shall be constructed with rail elements 12'-6" in length except where 25'-0" elements are called for by this and other standards (indexes) or specifically called for in the plans.

Post spacing shall be 6'-3" except that reduced spacing shall be used for (a) transitions to anchorages at rigid structures such as bridges (See Detail J and Index No. 402) and transitions to redirective crash cushions, (b) the conditions in Note No. 7 below, (c) special post applications, (d) reduced post spacing required for specific end anchorage assemblies, and, (e) specific spacing called for in the plans.

4. Guardrail mounting height for the W-beam without rubrail and for thrie-beam is 1'-9" to the center of beam, and for W-beam with rubrail 2'-0" to center of beam. Modified thrie-beam shall be mounted at a height of 2'-0" to center of beam. The height is critical and shall be attained in all cases; a tolerance of 3" above and 1" below the standard mounting heights is permissible over necessary surface irregularities (e.g., across shoulder gutters, inlets and roadway surface break lines).
5. All guardrail panels, end sections and special end shoes shall be lapped in the direction of adjacent traffic.
6. Flared end anchorage assemblies providing 4' offset are the standard end treatments for single face free standing guardrail approach ends. Parallel end anchorage assemblies for guardrail approach end treatments will be constructed only when restraints prevent construction of flared end anchorages.

Guardrail end anchorage assemblies shall be of the type called for in the plans. If the plans call for end anchorage assembly "flared" and does not identify the specific system(s) to be used, the contractor has the option to construct any FDOT approved flared assembly provided in this Index or identified on the Qualified Products List (QPL), subject to the conditions identified in the approved Index drawings, or QPL drawings if applicable.

If the plans call for end anchorage assembly "parallel" and does not identify the specific system(s) to be used, the contractor has the option to construct any FDOT approved parallel assembly provided in this Index or identified on the QPL, subject to the conditions identified in the approved Index drawings, or QPL drawings if applicable.

If the plans call for a specific end anchorage assembly, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. Approved substitutions will not be eligible for VECP consideration.

When an end treatment is attached to guardrail with Pedestrian Safety Treatment, only end treatment systems with timber posts are to be used.

Proprietary end anchorage systems must be identified on the QPL. Manufacturers seeking approval of proprietary end anchorage systems for inclusion on the QPL must submit application along with design documentation showing the end anchorage system is crash tested to NCHRP Report 350 Test Level 3 criteria, is accepted by FHWA for use as a guardrail end anchorage system, and is compatible with FDOT guardrail systems. System approvals will be contingent on FDOT's evaluation of crash test performance results for consistency with FDOT guardrail application and use. If approved, installation drawings signed and sealed by a professional engineer licensed in the State of Florida will be required.

7. At above ground rigid hazards where the face of guardrail is offset from the hazard less than the 4' minimum for standard W-beam, other guardrail configurations may be applicable; see General Note No. 11 and the minimum offset table on Sheet 19. For guardrail with post spacing less than 6'-3" the reduced spacing should extend a minimum of one panel in advance of the hazard. When minimum offset cannot be attained safety shape concrete barrier shall be used unless other shielding is approved by the Engineer of Record. See Index No. 410 for safety shape concrete barriers and typical applications, and the plans for special barrier shapes and applications.
8. In addition to use at roadside hazards or other areas where the Engineer has deemed guardrail necessary, guardrail should be considered on flush shoulder sections where fill slopes are steeper than 1:3 within the clear zone and fill heights are 6' or greater. Curbed sections where fill slopes are steeper than 1:3 and fill heights are 6' or greater within 22' of the traveled way should be evaluated for installation of guardrail. Additional guidance for evaluating the need for guardrail can be found in the Plans Preparation Manual.
9. The guardrail to bridge connections contained in this Index are for bridges with Test Level 4 traffic railing barriers. For guardrail to concrete barrier wall connections see Index No. 410. For existing bridges receiving retrofit traffic railing barriers see Index No. 402.
10. The W-beam guardrail system in this index is the standard system to be used on the State Highway System where a Test Level 3 semi-rigid barrier is required.

11. Thrie-beam guardrail panels shall be used in guardrail transitions to bridge traffic railing barriers, to concrete and certain water filled safety shaped barriers, certain crash cushions and as a continuous barrier when called for in the plans. For additional information on rail attachment, post spacings, nested rails, location of thrie-beam transition panels and offset block configurations see details elsewhere in this Index, and Index Nos. 402, 410 and 414. The use of thrie-beam guardrail with standard offset blocks (Test Level 3 semi-rigid system) may be considered where one or more of the conditions listed below or similar conditions are anticipated or exist:
 - a. W-beam deflection is marginal,
 - b. W-beam with rubrail considered functionally deficient, continued ...

continued ...

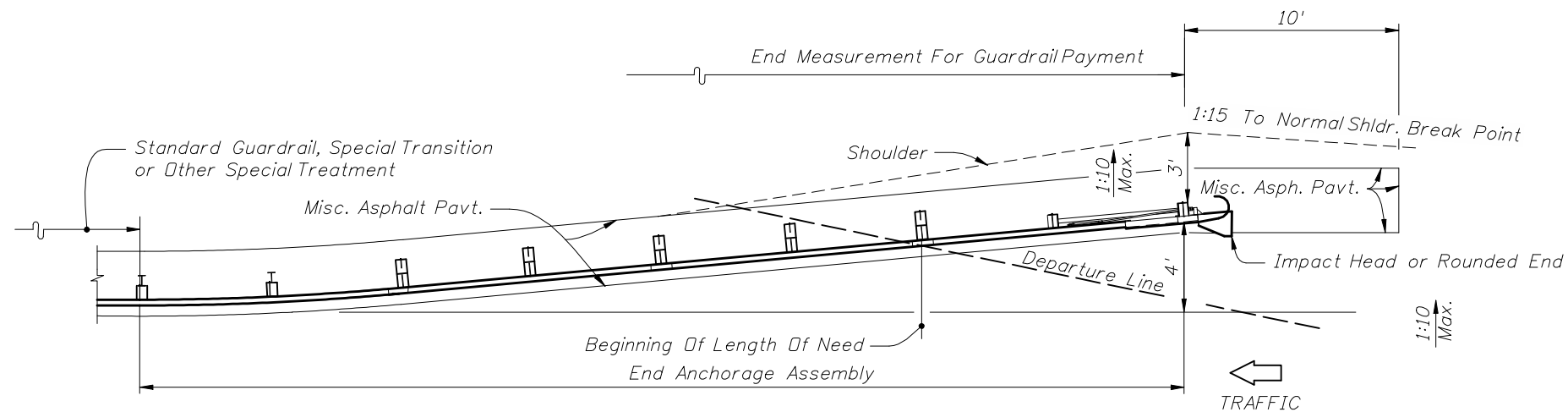
- (c) Vehicle overriding W-beam is probable,
- (d) Drainage will be impeded or blocked by the use of concrete barrier wall (subject to deflection space requirements),
- (e) High frequency of repairs to W-beam,
- (f) Spandrel beam with low deflection needed around unrelocatable structure,
- (g) Accommodating passenger vehicles heavier or larger than the standard passenger car (e.g., passenger vans and small buses).

The modified thrie-beam guardrail is a Test Level 4 semi-rigid system and may be used where a Test Level 4 guardrail is required.

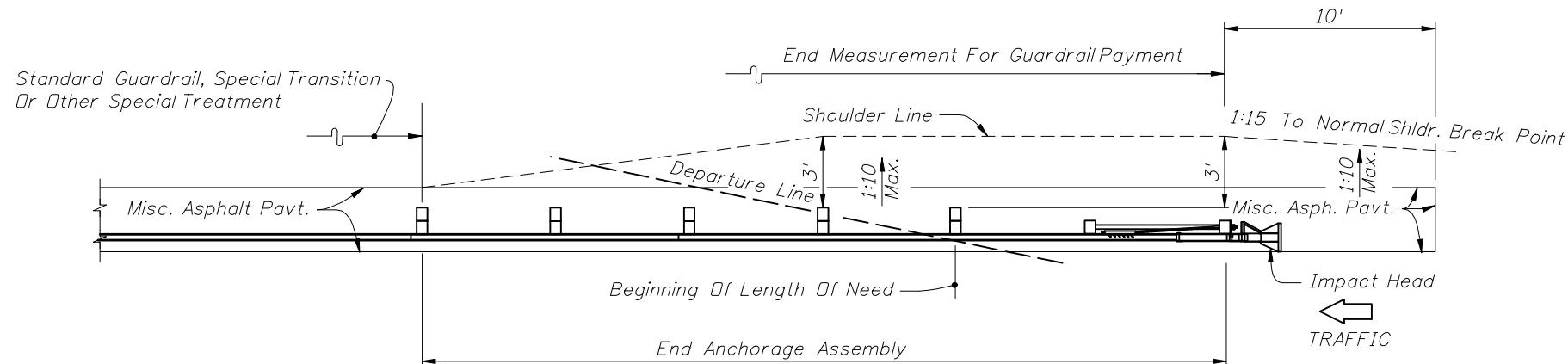
12. Single face median guardrail for bridges located on divided roadways shall be constructed the same as outer roadway guardrail under the following conditions:
 - (a) Wide medians where approach end anchor is located outside of opposing roadway clear zone,
 - (b) Medians of uniform width that are occupied by other transportation and joint use facilities,
 - (c) Medians of uniform or variable widths with independent vertical alignments not suited to normal median guardrail installations,
 - (d) Medians of bifurcated roadways.
13. Straight rail sections may be used to construct radii of 125' or greater. For radii less than 125' the rail must be fabricated (shop-bent) to fit.
14. Crash cushions may be required in lieu of or in conjunction with guardrail at locations where space does not permit development of sufficient guardrail length, offset or crashworthiness at terminals. Crash cushions shall be constructed at or in lieu of Type II assemblies located in the approach clear zones.
15. Corrugated sheet steel beams, end shoes, end sections and back-up plates shall conform to the current requirements of AASHTO M180, Class A, Type II (zinc) coating. All other metallic components, hardware and accessories shall be in conformance with the appropriate current AASHTO requirements.

Recycled beams: Used Class A guardrail beams that have been refurbished to condition new (AASHTO M180) may be used for both construction of new guardrail and maintenance of existing guardrail. Refurbishing shall include stripping of the existing galvanizing, restoration of the base metal in section and straightness free of warp and deformation, and, regalvanizing to AASHTO Type II specifications. Refurbished beams that retain ruptured holes, gashes or tears will not be accepted.
16. Steel offset blocks other than modified thrie-beam offset blocks are not permitted for new guardrail construction. Existing steel offset blocks may remain throughout the service life of the existing guardrail. Permissible post and offset block combinations are tabulated on Sheet 16.
17. Where necessary to enlarge or add holes to galvanized guardrail, the work will be done by drilling or reaming. Damaged galvanized guardrail will be metalized in accordance with Sections 562 and 975 of the Standard Specifications. No burning of holes will be permitted.
18. For guardrail reflector details see Sheet 17.
19. Any run of guardrail with existing concrete posts that is being reset under a construction or maintenance contract shall be reset using timber or steel posts. Repair within a run of guardrail with existing concrete posts can be made with either steel, timber, sound salvaged concrete posts; replacement in kind of damaged posts is to be made when like posts are on hand at time of repair.
20. Substitutions between thrie-beam guardrail and concrete barrier wall are not eligible for VECP consideration.
21. On roadways designated for reverse laning, all downstream ends of guardrail that are not shielded or that are not designed as approach end terminals shall be marked with post-mounted Type 3 Object Markers. Trailing bridge ends and trailing shoulder concrete barrier wall ends shall be marked with Type 3 Object Markers except where there is trailing end guardrail. Object markers to be installed facing reverse laning traffic. The cost of the object marker shall be included in the cost of the guardrail.

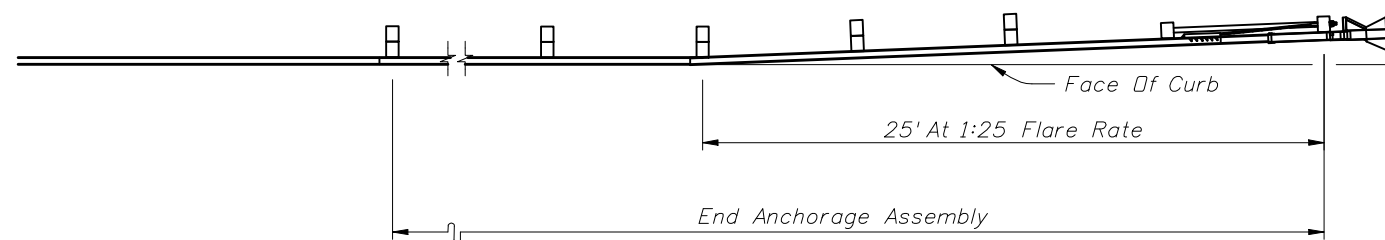




FLARED OPTION



PARALLEL OPTION



PLACEMENT OF PARALLEL OPTION AT CURBED LOCATIONS

GENERAL NOTES

1. These drawings are representative of the various proprietary guardrail end anchorage assemblies listed on the Department's Qualified Products List (QPL). For specific details and requirements see the vendor drawings on the QPL at www.dot.state.fl.us/specificationsoffice/
2. These drawings present the general graphics to show the limits of payment for guardrail and end anchorage assemblies, modifications to the shoulder and placement of the miscellaneous asphalt mow strips.
3. These drawings, along with the various vendor drawings on the QPL, are intended to show sufficient details for installation of the end anchorage assemblies and their connection to shoulder guardrail. This precludes the requirement for shop drawing submittals unless otherwise called for in the plans. The various end anchorage assemblies shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.
4. The various proprietary end treatments listed on the QPL are intended for use as approach end guardrail anchorages for shoulder guardrail. The effective length of the end treatments vary—refer to the vendor drawings on the QPL for the length and the use of special panels and details. Standard guardrail, guardrail transitions or other special treatments shall not be included within the limits of the end anchorage assembly. See the vendor drawings for the alignment of the end treatment with respect to the normal guardrail alignment.
5. Flared or parallel end anchorage assemblies shall not be used in medians where horizontal clearance requires use of a back rail.
6. Each of the various end anchorage assemblies have unique features. Careful attention should be given to the types and orientation of the posts and other components. Refer to the vendor drawings on the QPL for the specific requirements of each system.
7. For galvanizing requirements of the metallic components see Standard Specifications Section 967.
8. The end anchorage assemblies shown on the QPL are suitable for all design speeds.
9. Flared end anchorage assemblies shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Flared), EA.
Parallel end anchorage assemblies shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Parallel), EA.
The unit price for end anchorage assemblies shall be full compensation for furnishing and installing all components in accordance with the plans, the manufacturer's detail drawings, procedures and specifications and these drawings.

APPROACH END ANCHORAGE DETAILS

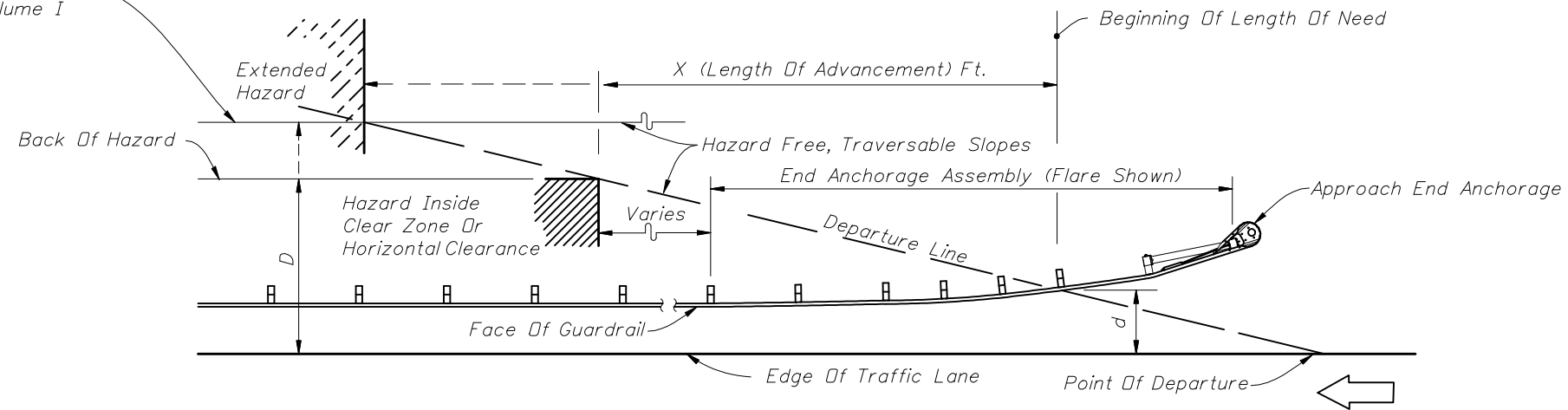


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GUARDRAIL

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Clear Zone Limit Or Horizontal Clearance Limit
In Accordance With The Criteria In Volume I
Chapters 2, 4 And 25 Of The "Plans
Preparation Manual" and Index No. 700.



Design Speed mph	X (Length Of Advancement) Ft. <input checked="" type="checkbox"/>
≤45	= 16 (D-d)
≥50	= 13 (D-d)

Length of advancement determined from the diagram and equations above establishes the location of the upstream beginning length of need for guardrail, however, the length of advancement can be no less than that required by other details of this index.

The flared end anchorage with 4' nose offset is shown in the diagram above, however, the diagram applies to other configurations that may occur at the beginning of length of need, such as, other flare designs; upstream returns; and, other upstream deflected, tangent and curvilinear conditions.

Equation Variables:

D=Distance in feet from near edge of the near approach traffic lane to either (a) the back of hazard, when the hazard is located inside the clear zone or horizontal clearance or (b) the clear zone or horizontal clearance outer limit, when the hazard extends to or goes beyond the clear zone or horizontal clearance limit. For left side hazards on two-way undivided facilities, D is measured from the inside edge of the near approach traffic lane (see Figure 2).

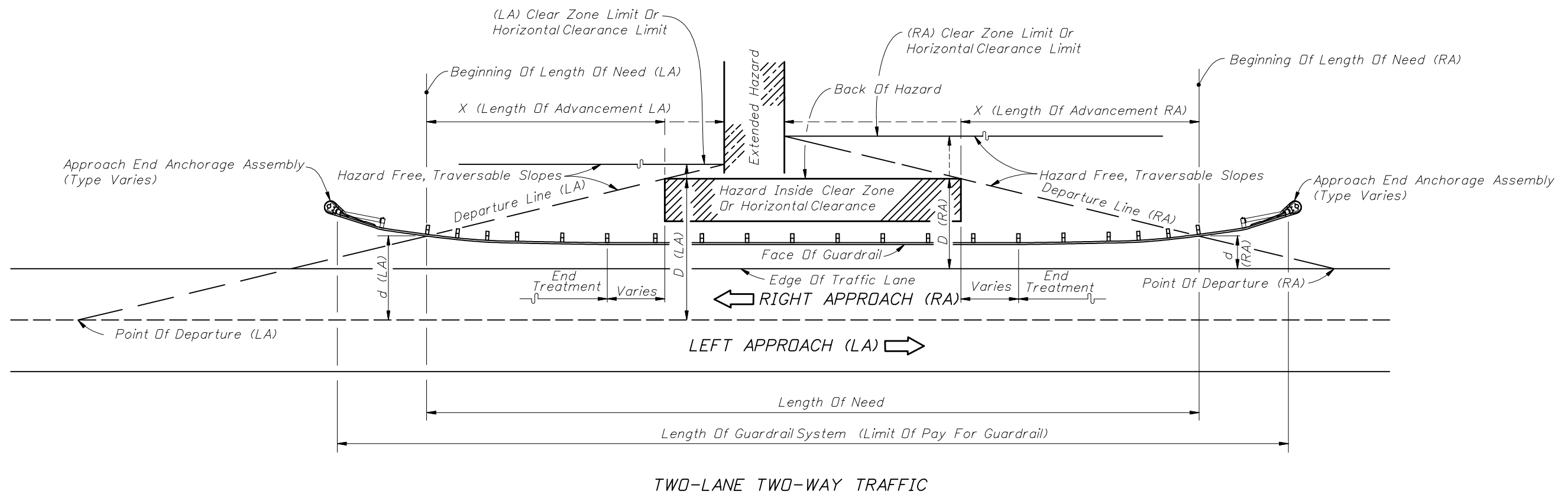
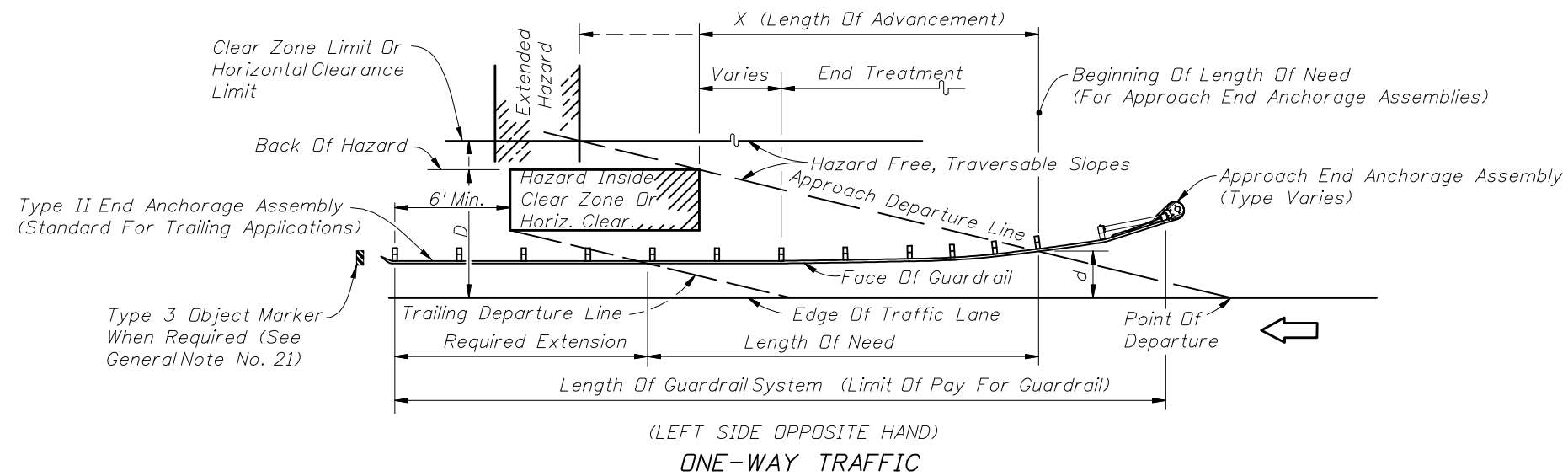
d=Distance in feet from the near edge of the near approach traffic lane to the face of guardrail at its intersection with the departure line. For left side hazards on two-way undivided facilities, d is measured from the inside edge of the near approach traffic lane (see Figure 2).

For flared and parallel end anchorage assemblies the beginning length of need is to be set at the center of post #3. That is, the departure line must intersect the face of the rail at post #3.

For flared end anchorage assemblies the offset distance "d" will equal the normal guardrail offset measured from the face of the guardrail to the edge of the near approach travel lane plus 1'-2" for 45 mph or less and 1'-9 1/4" for greater than 45 mph.

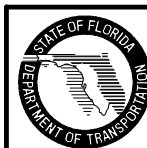
LENGTH OF ADVANCEMENT - FIGURE 1

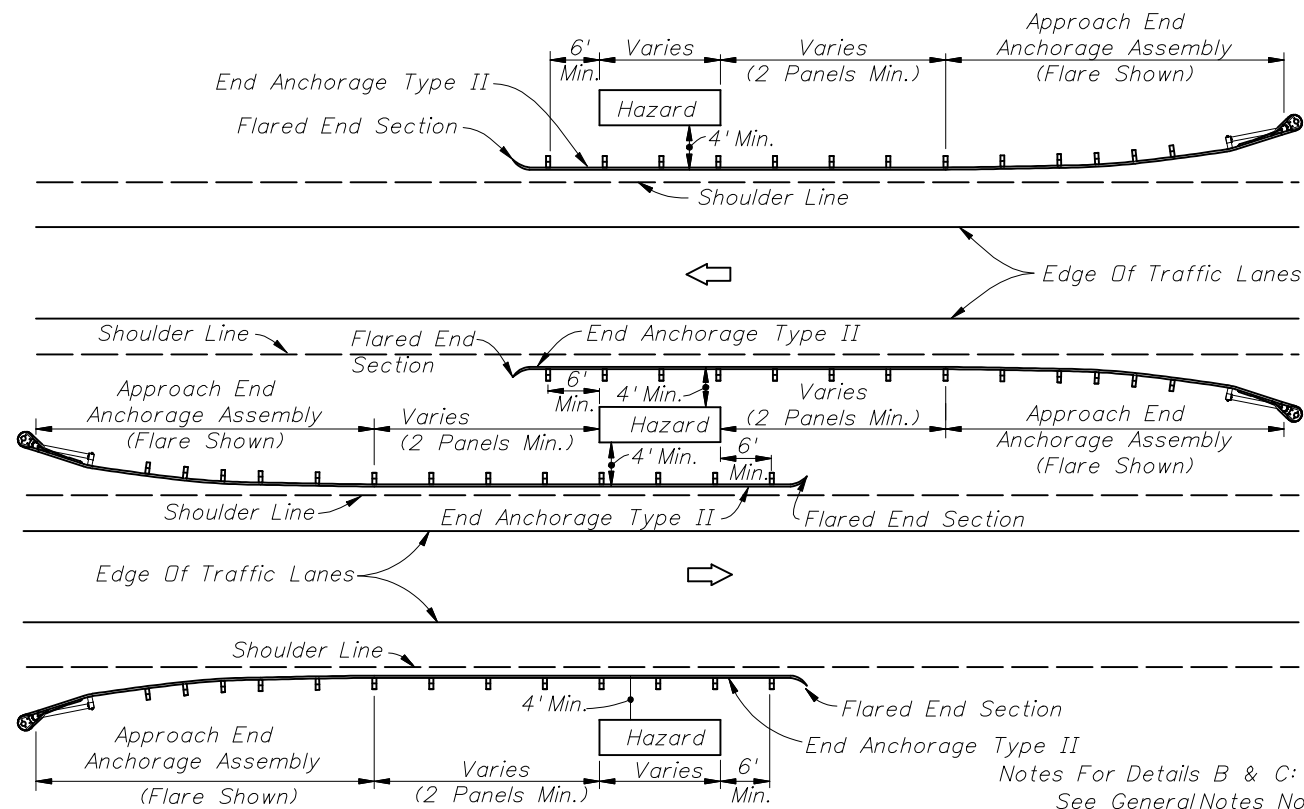




For description of the dimensions D , d and X , see Length of Advancement - Figure 1.
For additional shoulder guardrail information, see Details B and C.

LOCATING TERMINALS ON SHOULDER GUARDRAILS - FIGURE 2





Median Guardrail Applications Shown Are For Locations Where Approach End Anchorage Assemblies Are Outside Of The Opposing Roadway Clear Zone.

DIVIDED ROADWAY- DETAIL B

GUARDRAIL APPLICATION FOR ROADSIDE HAZARDS

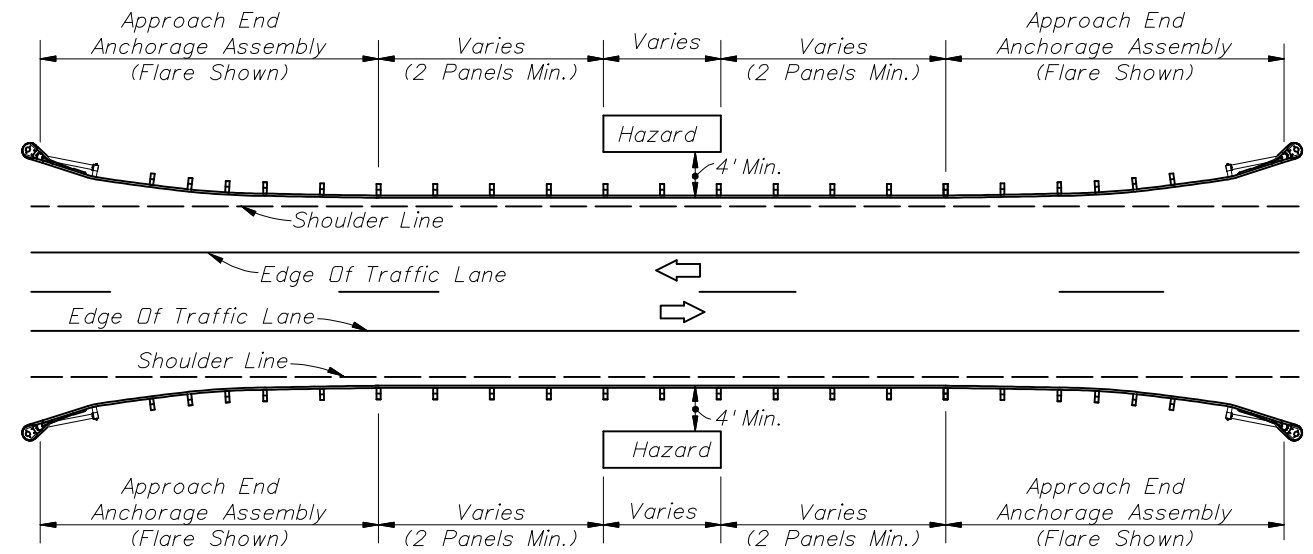
Notes For Details B & C:

See General Notes Nos. 1, 2, 3, 4, 5, 6, 7 and 8.

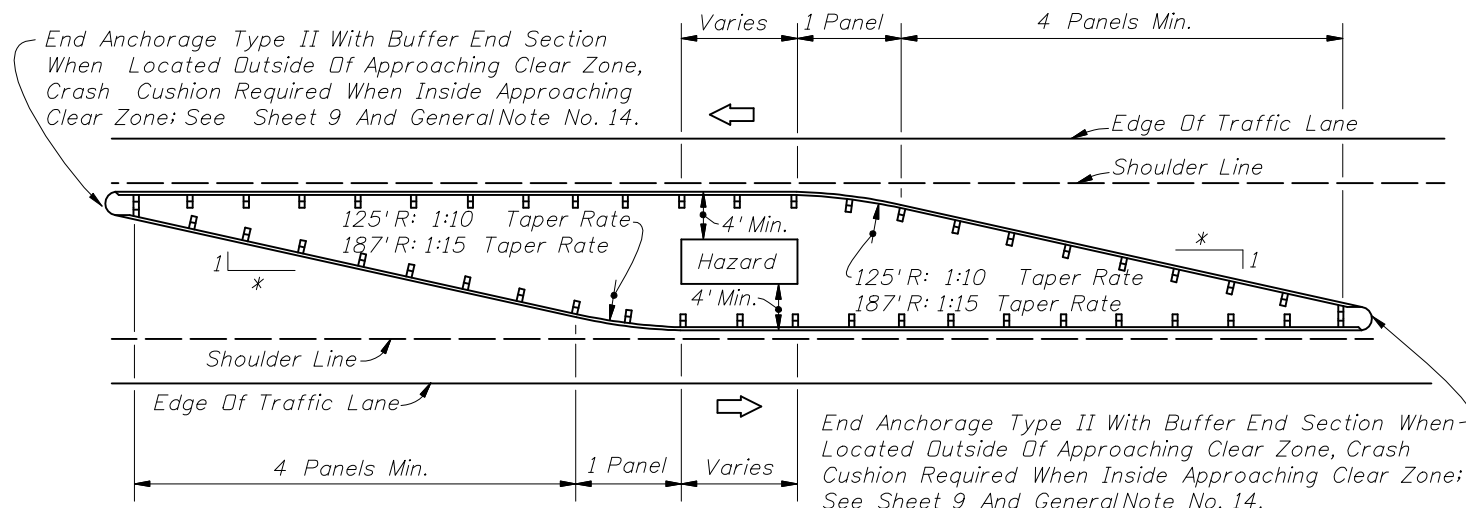
See Details K and L for guardrail offsets.

For end anchorage assemblies see sheets elsewhere in this Index and the plans.

For hazards that require shielding and are located back of curb see other sheets of this index, and where rigid barrier is required see Index No. 410.



UNDIVIDED ROADWAY- DETAIL C



This Guardrail Configuration Applies Where Approach End Anchorage Assemblies Cannot be Located Outside Of The Opposing Roadway Clear Zone.

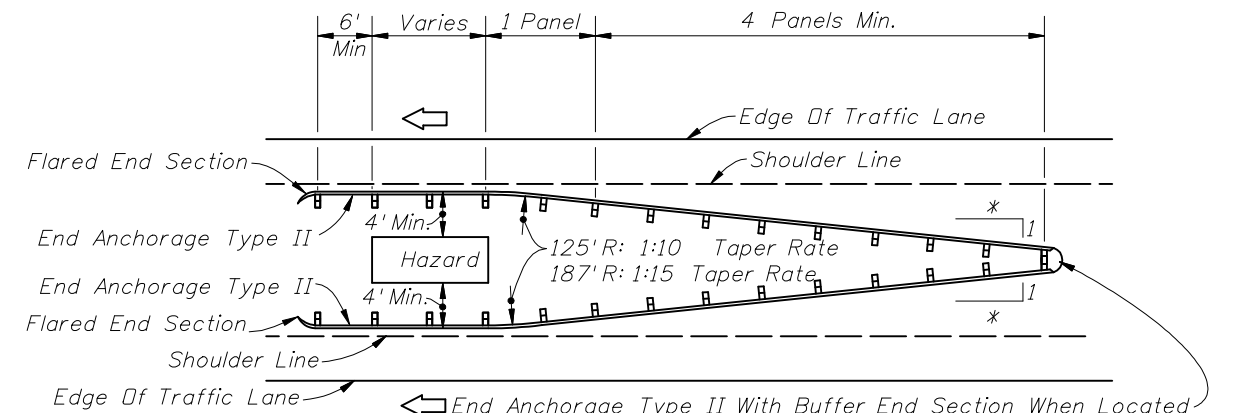
OPPOSING TRAFFIC- DETAIL D

Notes For Details D & G:

See General Notes Nos. 1, 2, 3, 4, 5, 7, and 14.

See Details K and L for guardrail offsets.

For hazards that require shielding and are located back of curb see other sheets of this index, and where rigid barrier is required see Index No. 410.



ONE-WAY TRAFFIC- DETAIL G

*1:10 Taper Rate For Design Speeds ≤45 mph

1:15 Taper Rate For Design Speeds ≥50 mph

GUARDRAIL APPLICATION FOR NARROW MEDIAN AND GORE HAZARDS

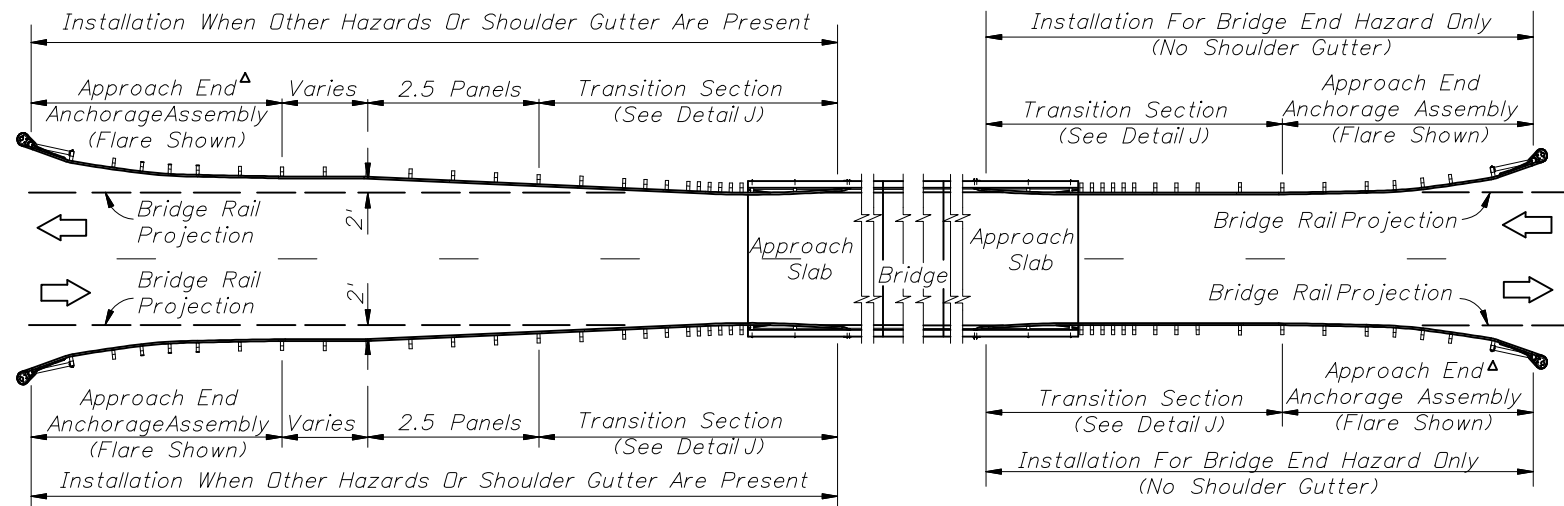


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GUARDRAIL

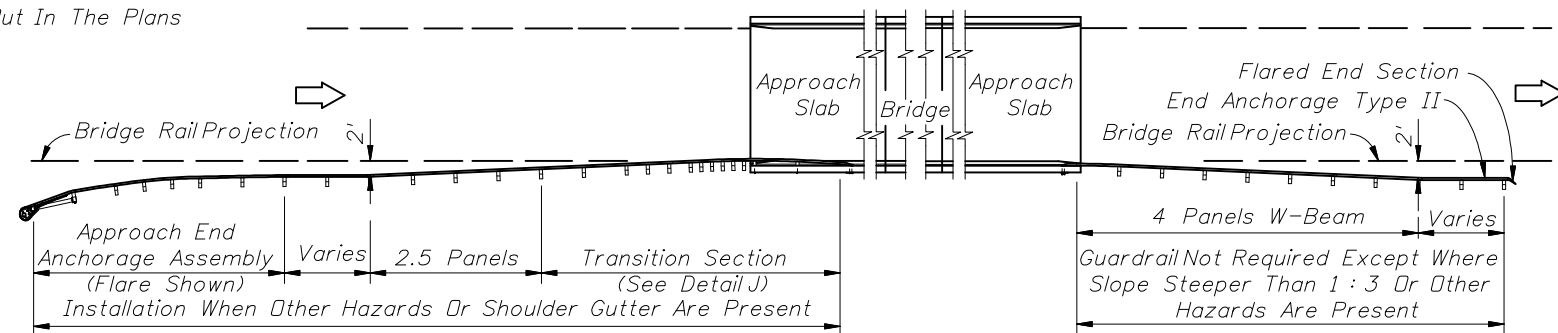
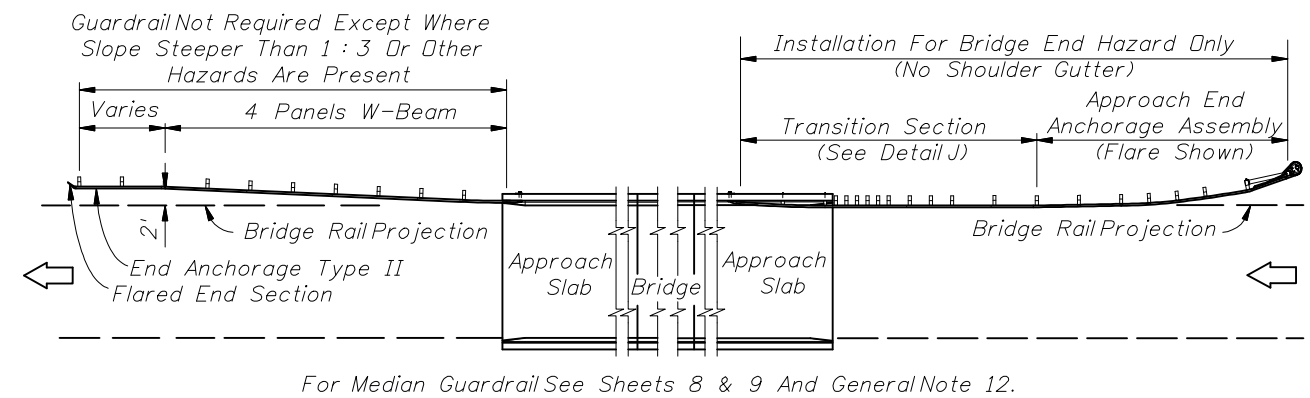
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^ΔWith Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail P Unless Other Anchorage Called Out In The Plans

UNDIVIDED ROADWAY - DETAIL D



DIVIDED ROADWAY - DETAIL P

Notes For Details D & P:

See General Notes Nos. 1, 2, 3, 4, 5, 6, 8 and 9. See Detail J for approach connections to bridges.
 For end anchorage assemblies see sheets elsewhere in this Index and the plans.
 Shoulder gutter in itself does not require the installation of guardrail.

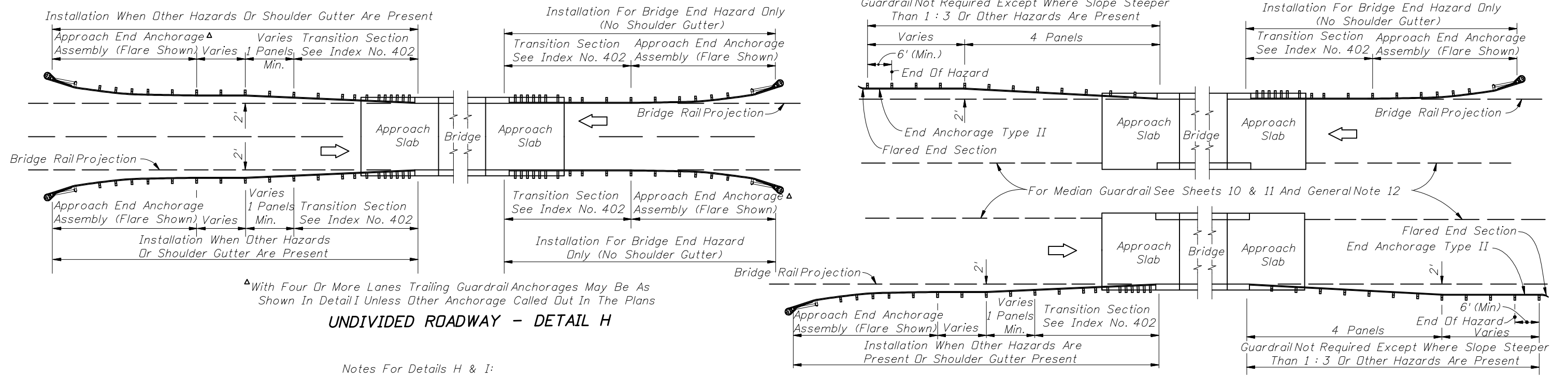
GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING FULL LENGTH OF APPROACH SLAB



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GUARDRAIL

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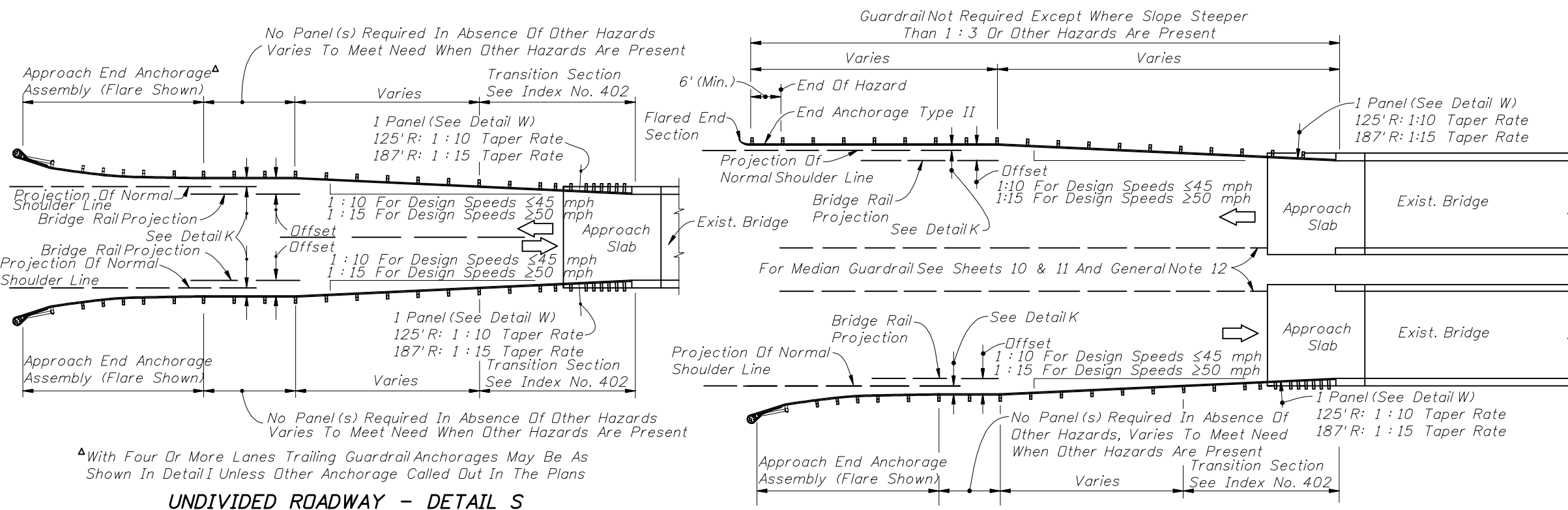


UNDIVIDED ROADWAY - DETAIL H

DIVIDED ROADWAY - DETAIL I

Notes For Details H & I:
 See General Notes Nos. 1, 2, 3, 4, 5, 6, 8, and 9. See Index No. 402 for approach connections to bridges.
 For end anchorage assemblies see sheets elsewhere in this Index and in the plans.
 Shoulder gutter in itself does not require the installation of guardrail.

GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

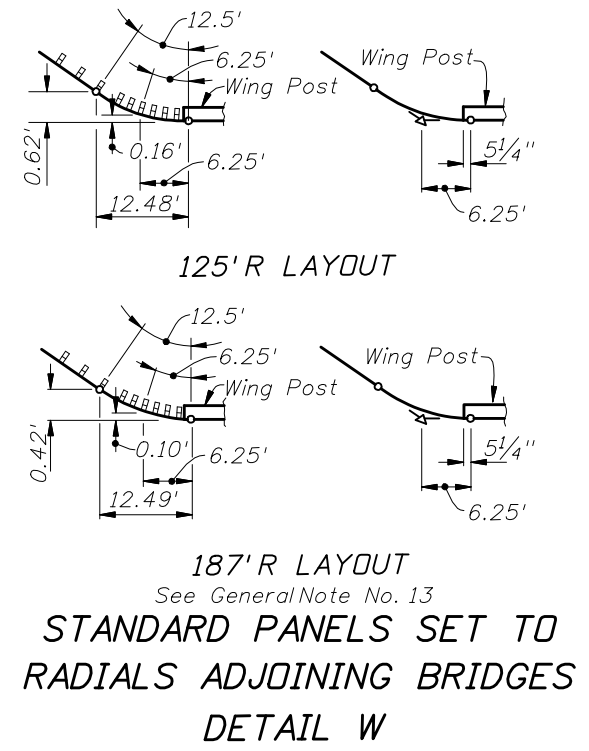


UNDIVIDED ROADWAY - DETAIL S

DIVIDED ROADWAY - DETAIL T

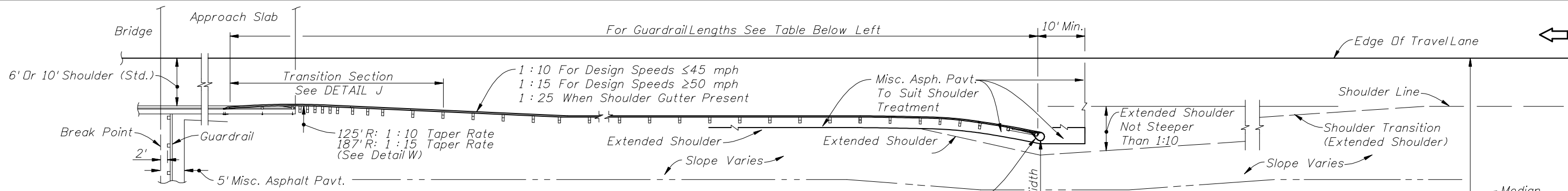
Notes For Details S & T:
 See General Notes Nos. 1, 2, 3, 4, 5, 6, 8 and 9. See Index No. 402 for approach connections to bridges.
 For end anchorage assemblies see sheets elsewhere in this Index and the plans.

GUARDRAIL APPLICATIONS FOR BRIDGES WITH LESS THAN FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH



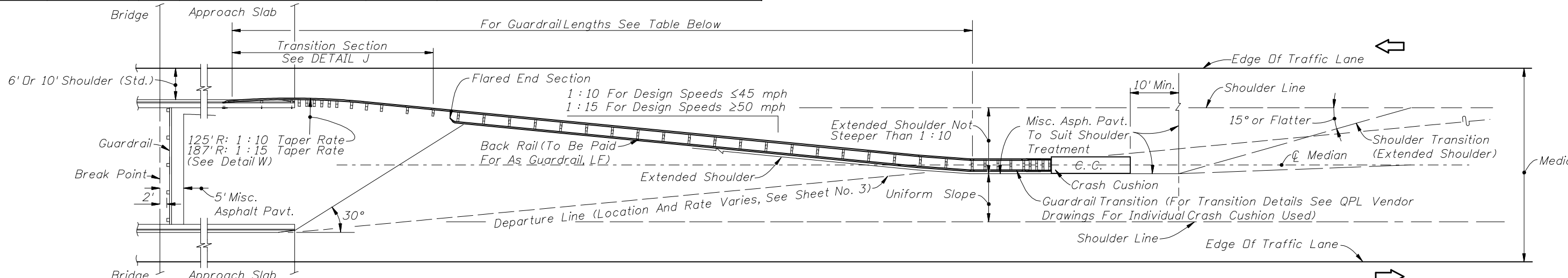
**STANDARD PANELS SET TO RADIALS ADJOINING BRIDGES
 DETAIL W**





GUARDRAIL LENGTH (Ft.)							
Design Speed (mph)	Projected ADT	CZ (Ft.)	6' & 8' Rdwy. Shldr. 10' & 12' Rdwy. Shldr.		Remarks		
			Min. Median Width	Guardrail Length	Min. Median Width	Guardrail Length	
60-70	≥1500	36	50	356.5	54	306.5	Lengths are based on minimum median widths and on standard clear zone widths for travel lanes on tangent roadways, and the length of advancement needed for flared end anchorage assemblies to shield normal transverse underslope and bridge end hazards. Lengths may need to be adjusted for auxiliary lanes, curved roadways, parallel end anchorage assemblies, skewed crossings and other hazards present.
60-70	<1500	30	44	281.5	48	219.0	
55	≥1500	30	44	281.5	48	219.0	
55	<1500	24	38	194.0	42	144.0	
45-50	≥1500	24	38	194.0	42	144.0	
45-50	<1500	20	34	144.0	38	94.0	
45-50	Urban % Curb	24	38	194.0	42	144.0	
35-40	Urban % Curb	18	32	144.0	36	81.5	

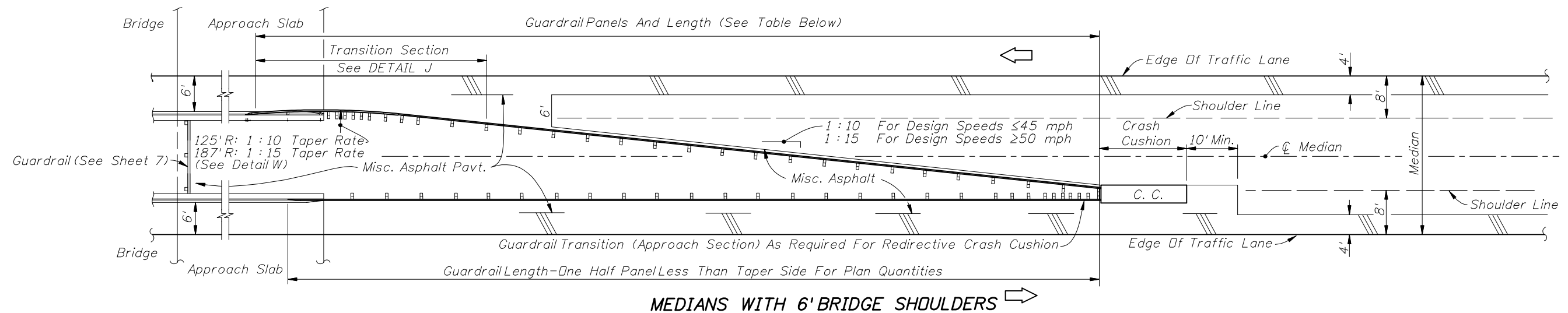
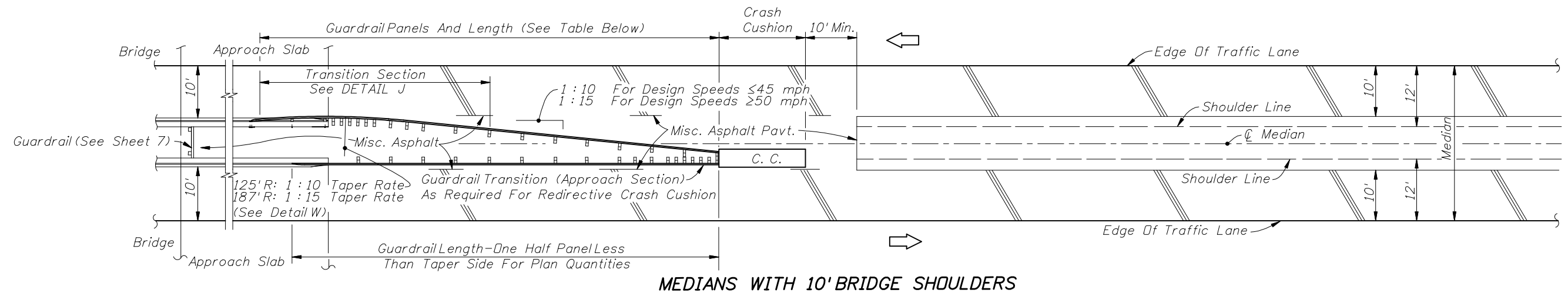
Note: For approach end anchorage assemblies see sheets elsewhere in this Index and the plans.
WHEN END TERMINAL IS OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE



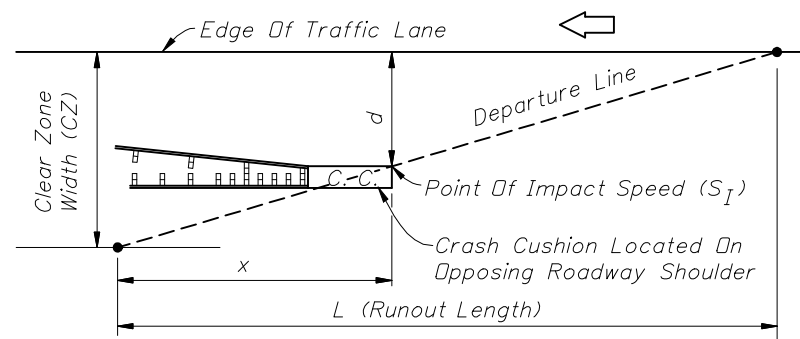
GUARDRAIL LENGTHS																
Median Width (Ft.)	1:10 TAPER RATE								1:15 TAPER RATE							
	6' Bridge Shoulder				10' Bridge Shoulder				6' Bridge Shoulder			10' Bridge Shoulder				
	Front	Back	Total	Total	Front	Back	Total	Total	Front	Back	Total	Front	Back	Total		
32	9.5	6	15.5	193.75	6.5	4	10.5	131.25	13.5	10	23.5	293.75	8.5	6	14.5	181.25
34	10.5	7	17.5	218.75	7.5	5	12.5	156.25	14.5	11	25.5	318.75	9.5	7	16.5	206.25
36	10.5	7	17.5	218.75	7.5	5	12.5	156.25	15.5	12	27.5	343.75	10.5	8	18.5	231.25
38	11.5	8	19.5	243.75	8.5	6	14.5	181.25	16.5	13	29.5	368.75	11.5	9	20.5	256.25
40	12.5	9	21.5	268.75	9.5	6	15.5	193.75	17.5	13	30.5	381.25	13.5	11	24.5	306.25
42	13.5	9	22.5	281.25	10.5	7	17.5	218.75	19.5	15	34.5	431.25	14.5	11	25.5	318.75
44	14.5	10	24.5	306.25	10.5	7	17.5	218.75	20.5	16	36.5	456.25	15.5	12	27.5	343.75
46	14.5	10	24.5	306.25	11.5	8	19.5	243.75	21.5	17	38.5	481.25	16.5	13	29.5	368.75
48	15.5	11	26.5	331.25	12.5	9	21.5	268.75	22.5	17	39.5	493.75	17.5	13	30.5	381.25

The lengths shown on this table are typical for roadways with standard width shoulders. Length requirements shall be determined on a site specific basis for both standard width and narrow bridge shoulders and end anchorage or end shielding use.

WHEN END TERMINAL CANNOT BE LOCATED OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE
APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING
EXTENDING FULL APPROACH SLAB LENGTH IN WIDE MEDIANS WITH FLUSH SHOULDERS



Note: The guardrail configurations shown apply only to parallel or near parallel bridges with open medians.



Speed (S_I) For Determining Crash Cushion Size:

$$S_I = \frac{x}{L} (\text{Design Speed}) = \left[\frac{(CZ-d)}{CZ} \right] \text{Design Speed}$$

SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS

GUARDRAIL LENGTHS								
MEDIAN WIDTH (Ft.)	6' BRIDGE SHOULDERS				10' BRIDGE SHOULDERS			
	1:10 TAPER RATE	1:15 TAPER RATE	1:10 TAPER RATE	1:15 TAPER RATE	1:10 TAPER RATE	1:15 TAPER RATE	1:15 TAPER RATE	
	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)
30	14.5	181.25	20.5	256.25	7.5	93.75	10.5	131.25
28	12.5	156.25	18.5	231.25	6.5	81.25	8.5	106.25
26	11.5	143.75	15.5	193.75	5.5*	68.75	6.5	81.25
24	9.5	118.75	13.5	168.75	5.5*	68.75	5.5*	68.75

The lengths shown in this table are based on standard widths for roadway and bridge median shoulders. Length requirements for both standard width and narrow bridge shoulders and end anchorage or end shielding requirements shall be determined on a site specific basis. When crash cushions are required on opposing roadway shoulders, their sizes may be determined by the residual speeds (S_I 's) along the runouts from the approach roadways; however, when calculated speeds (S_I 's) are less than 30 mph; crash cushions shall be no less in size than for 30 mph, see speed diagram left. The number of panels may be reduced when installing a crash cushion more than 2.5' in width, see * below.

* Number shown is the minimum number of panels plus a W-Three beam transition panel; single faced guardrail must have a length of five (5) or more panels.

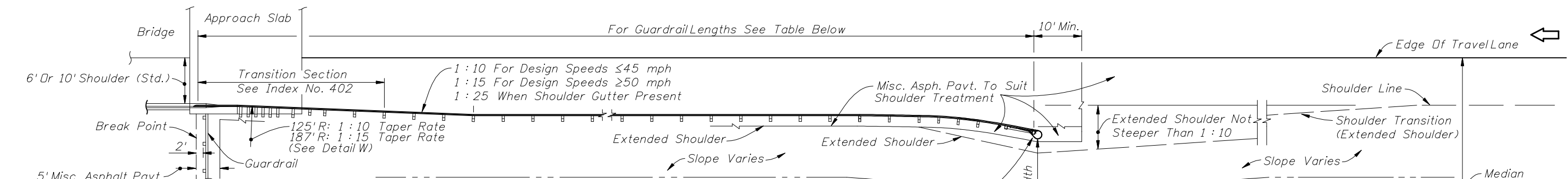
**APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING
EXTENDING FULL APPROACH SLAB LENGTH IN NARROW MEDIANS WITH FLUSH SHOULDERS**



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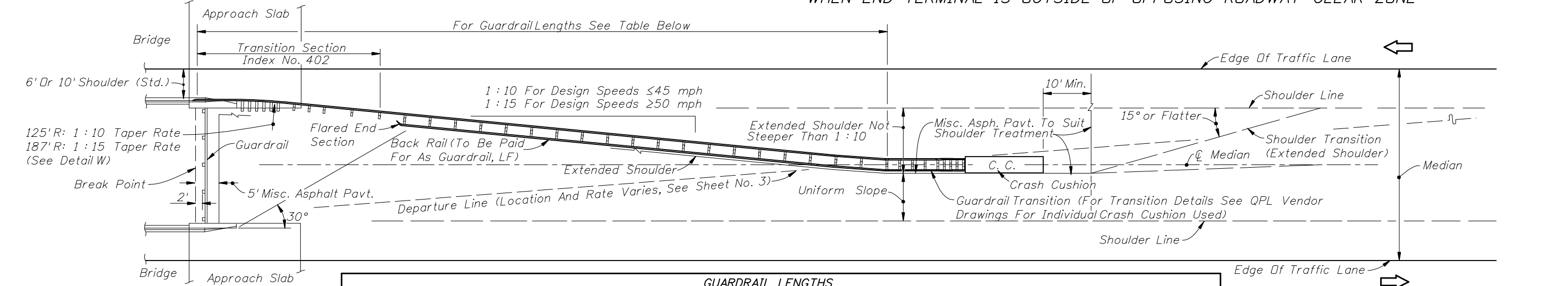
GUARDRAIL

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Design Speed (mph)	Projected ADT	CZ (Ft.)	6' & 8' Rdwy. Shldr.		10' & 12' Rdwy. Shldr.		Remarks
			Min. Median Width	Guardrail Length	Min. Median Width	Guardrail Length	
60-70	≥1500	36	50	362.5	54	312.5	Lengths are based on minimum median widths and on standard clear zone widths for travel lanes on tangent roadways, and the length of advancement needed for flared end anchorage assemblies to shield normal transverse underslope and bridge end hazards. Lengths may need to be adjusted for connection location on wing post or bridge traffic railing barrier (see Index No. 402), auxiliary lanes, curved roadways, parallel end anchorage assemblies, skewed crossings and other hazards present. When the wing post is replaced by bridge traffic railing barrier, reference Detail J and see Index No. 402.
60-70	<1500	30	44	287.5	48	237.5	
55	≥1500	30	44	287.5	48	237.5	
55	<1500	24	38	212.5	42	162.5	
45-50	≥1500	24	38	212.5	42	162.5	
45-50	<1500	20	34	162.5	38	112.5	
45-50	Urban % Curb	24	38	212.5	42	162.5	
35-40	Urban % Curb	18	32	162.5	36	100.0	

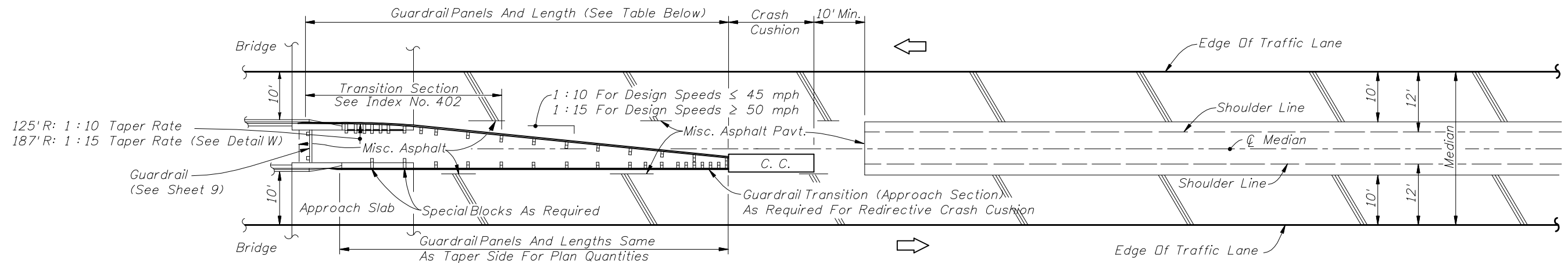
Note: For approach end anchorage assemblies see sheets elsewhere in this Index and the plans.
WHEN END TERMINAL IS OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE



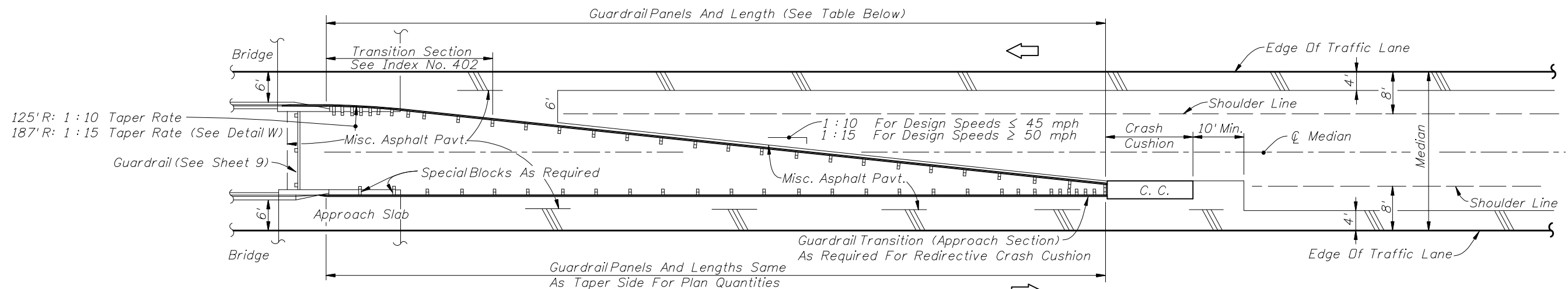
Median Width (ft.)	GUARDRAIL LENGTHS															
	1:10 TAPER RATE						1:15 TAPER RATE									
	6' Bridge Shoulder			10' Bridge Shoulder			6' Bridge Shoulder			10' Bridge Shoulder						
	Front	Back	Total	Front	Back	Total	Front	Back	Total	Front	Back	Total				
32	7.5	6	13.5	168.75	4.5	3	7.5	93.75	11.5	9	20.5	256.25	7.5	6	13.5	168.75
34	8.5	6	14.5	181.25	5.5	4	9.5	118.75	12.5	10	22.5	281.25	7.5	6	13.5	168.75
36	9.5	7	16.5	206.25	6.5	5	11.5	143.75	13.5	11	24.5	306.25	8.5	7	15.5	193.75
38	10.5	8	18.5	231.25	7.5	6	13.5	168.75	14.5	12	26.5	331.25	10.5	9	19.5	243.75
40	10.5	8	18.5	231.25	7.5	6	13.5	168.75	16.5	13	29.5	368.75	11.5	9	20.5	256.25
42	11.5	8	19.5	243.75	8.5	6	14.5	181.25	17.5	14	31.5	393.75	12.5	10	22.5	281.25
44	12.5	9	21.5	268.75	9.5	7	16.5	206.25	18.5	15	33.5	418.75	13.5	11	24.5	306.25
46	12.5	9	21.5	268.75	10.5	8	18.5	231.25	19.5	16	35.5	443.75	14.5	12	26.5	331.25
48	14.5	11	25.5	318.75	11.5	9	20.5	256.25	20.5	16	36.5	456.25	16.5	13	29.5	368.75

The lengths shown on this table are typical for roadways with standard width shoulders and a relocated connection to the existing wing post. When the wing post is replaced by bridge traffic railing barrier, reference Detail J and see Index No. 402. Length requirements shall be determined on a site specific basis for both standard width and narrow bridge shoulders and for end anchorage or end shielding use.

WHEN END TERMINAL CANNOT BE LOCATED OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE
APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING
EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN WIDE MEDIANS WITH FLUSH SHOULDERS

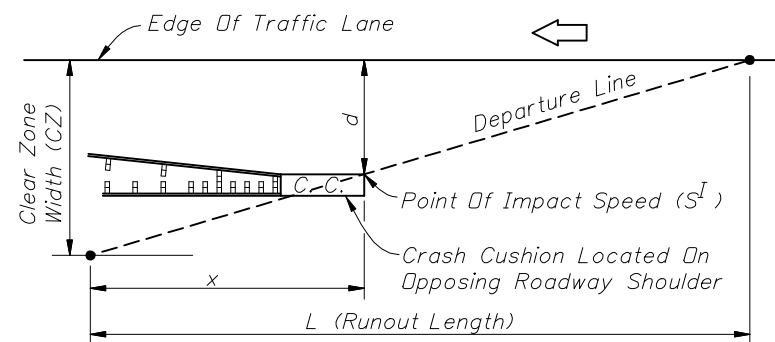


MEDIANS WITH 10' BRIDGE SHOULDERS



MEDIANS WITH 6' BRIDGE SHOULDERS

Note: The guardrail configurations shown apply only to parallel or near parallel bridges with open medians.



Speed (S_I) For Determining Crash Cushion Size:

$$S_I = \frac{x}{L} (\text{Design Speed}) = \left[\frac{(CZ-d)}{CZ} \right] \text{Design Speed}$$

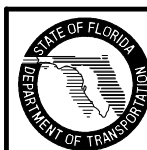
SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS

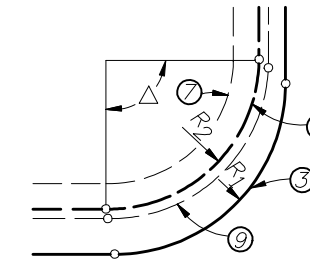
GUARDRAIL LENGTHS								
MEDIAN WIDTH (Ft.)	6' BRIDGE SHOULDERS				10' BRIDGE SHOULDERS			
	1 : 10 TAPER RATE		1 : 15 TAPER RATE		1 : 10 TAPER RATE		1 : 15 TAPER RATE	
	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)
30	12.5	156.25	18.5	231.25	6.5	81.25	9.5	118.75
28	11.5	143.75	16.5	206.25	5.5	68.75	7.5	93.75
26	9.5	118.75	14.5	181.25	5.5*	68.75	5.5*	68.75
24	8.5	106.25	11.5	143.75	5.5*	68.75	5.5*	68.75

The lengths shown in this table are based on standard widths for roadway and bridge median shoulders. Length requirements for both standard width and narrow bridge shoulders and end anchorage or end shielding requirements shall be determined on a site specific basis. When crash cushions are required on opposing roadway shoulders, their sizes may be determined by the residual speeds (S_I 's) along the runouts from the approach roadways; however, when calculated speeds (S_I 's) are less than 30 mph crash cushions shall be no less in size than for 30 mph; see speed diagram left. The number of panels may be reduced when installing a crash cushion more than 2.5' in width; see * below.

*Number shown is the minimum number of panels plus a W-Three beam transition panel; single faced guardrail must have a length of five (5) or more panels.

APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN NARROW MEDIANS WITH FLUSH SHOULDERS





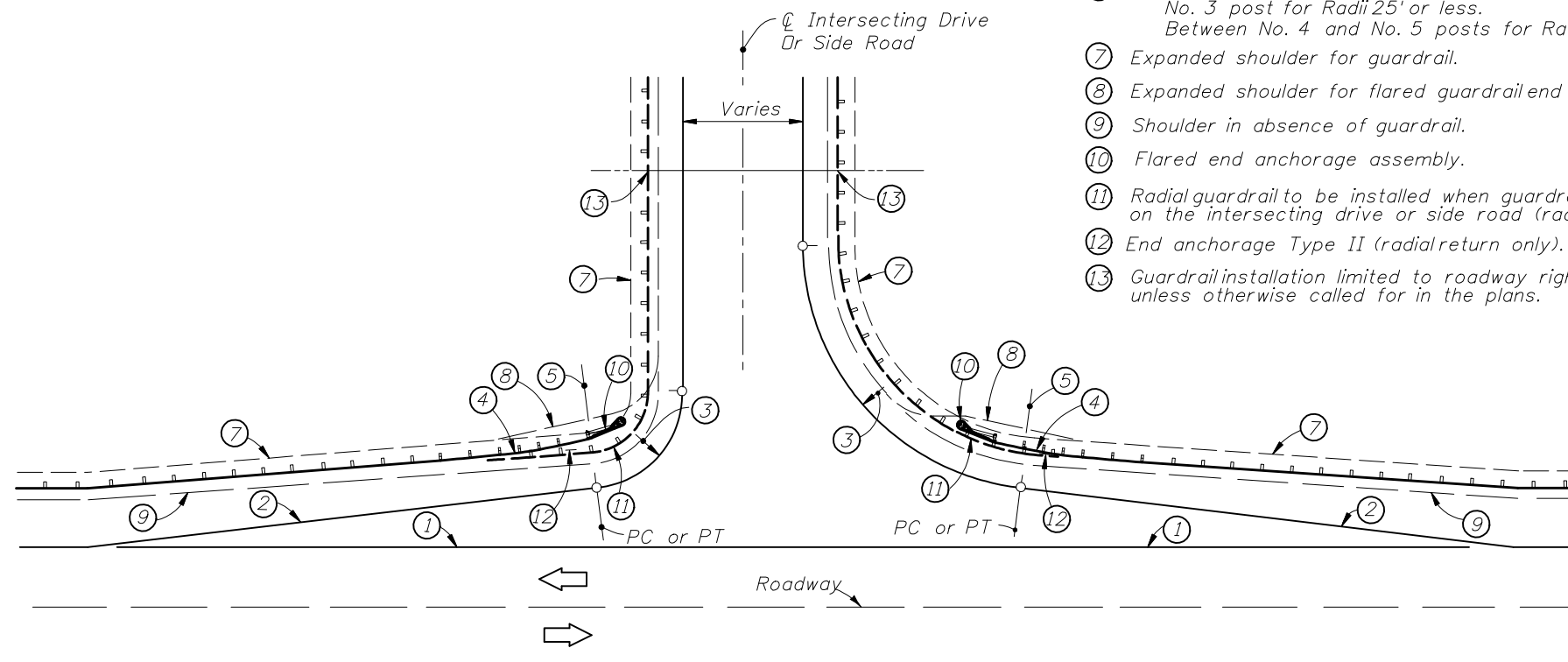
RADIAL GUARDRAIL

LEGEND

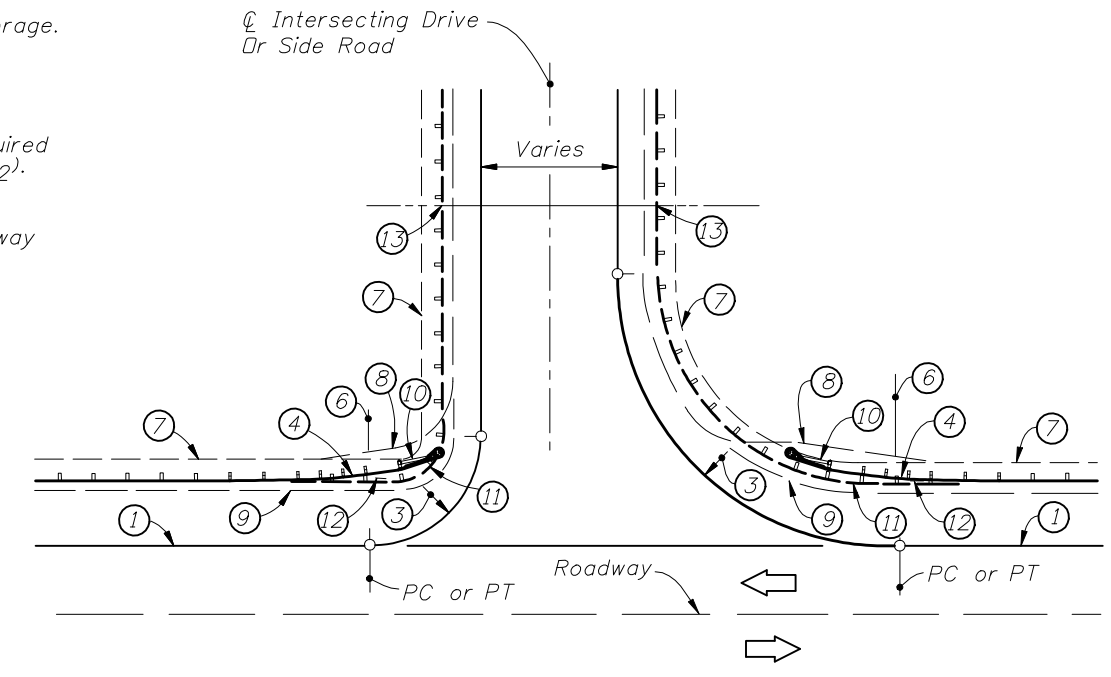
- ① Edge of traffic lane for simple curve turnouts.
Edge of travel lane for taper turnouts.
- ② Taper.
- ③ Pavement return (radius R_1).
- ④ Flared end anchorage to be installed except when existing guardrail on intersecting drive or side road adjoins the project.
- ⑤ Post for locating flare, proximate to PC or PT:
No. 2 post for Radii 25' or less.
No. 3 post for Radii > 25' and < 50'.
Between No. 4 and No. 5 posts for Radii 50' or greater.
- ⑥ Post for locating flare, proximate to PC or PT:
No. 3 post for Radii 25' or less.
Between No. 4 and No. 5 posts for Radii greater than 25'.
- ⑦ Expanded shoulder for guardrail.
- ⑧ Expanded shoulder for flared guardrail end anchorage.
- ⑨ Shoulder in absence of guardrail.
- ⑩ Flared end anchorage assembly.
- ⑪ Radial guardrail to be installed when guardrail required on the intersecting drive or side road (radius R_2).
- ⑫ End anchorage Type II (radial return only).
- ⑬ Guardrail installation limited to roadway right of way unless otherwise called for in the plans.

RADIAL GUARDRAIL						
Normal Turnouts						
		Taper		Simple Curve		
R_1	R_2	Panels Required	Δ	R_2	Panels Required	Δ
15'	25'	3	85° 56'	25'	3	85° 56'
20'	25'	3	85° 56'	25'	3	85° 56'
25'	25'	3	85° 56'	25'	3	85° 56'
30'	25'	3	85° 56'	25'	3	85° 56'
35'	25'	3	85° 56'	25'	3	85° 56'
40'	40'	5	89° 31'	40'	5	89° 31'
45'	40'	5	89° 31'	40'	5	89° 31'
50'	40'	5	89° 31'	40'	5	89° 31'

Note: Only 25' and 40' radius panels are to be used for return guardrail on normal turnouts. On skewed turnouts the number of panels used and their arrangement with straight panels will be as shown in the plans or as directed by the Engineer.



TAPER TURNOUTS



SIMPLE CURVE TURNOUTS

Note: The guardrail application shown on this sheet are for highways with flush shoulders and no restraints for constructing flared end anchorages and minimum lengths of guardrail. For highways with flush shoulders and restraints to constructing flared anchorages, see General Note No. 6.

Where openings in guardrail are required in close proximity to bridge traffic rails or ends of concrete barrier walls, and minimum length guardrail with flared end anchorages can not be applied, either controlled release returns or energy absorbing terminals are to be applied.

GUARDRAIL APPLICATIONS FOR INTERSECTING DRIVES AND SIDE ROADS ON RURAL FACILITIES

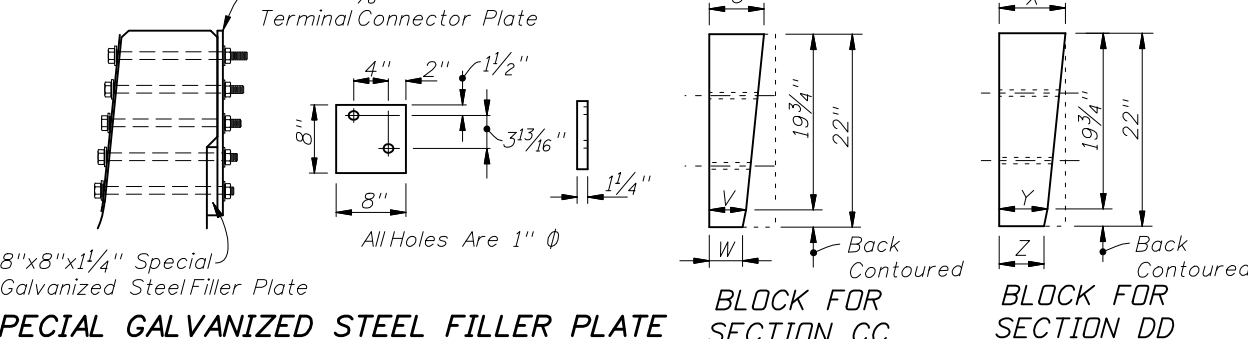
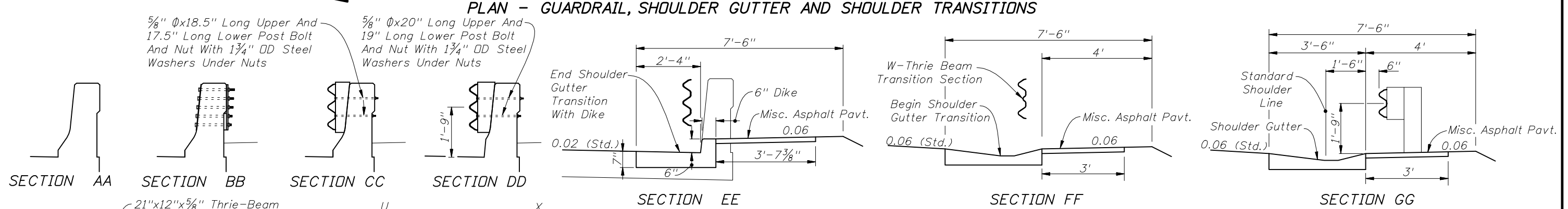
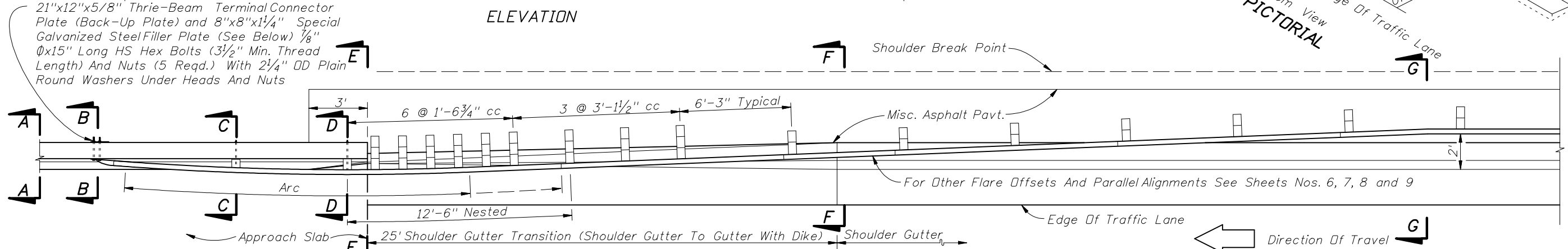
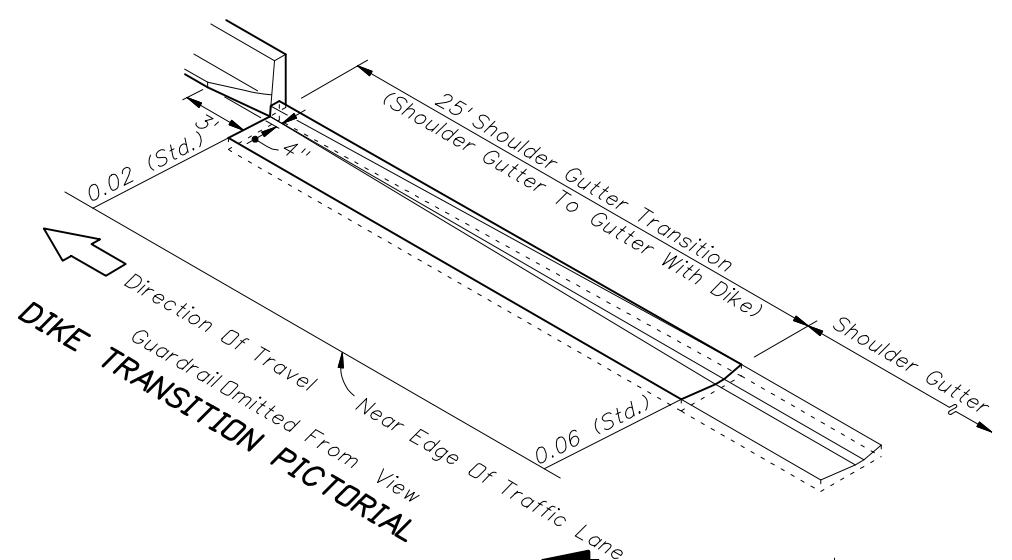
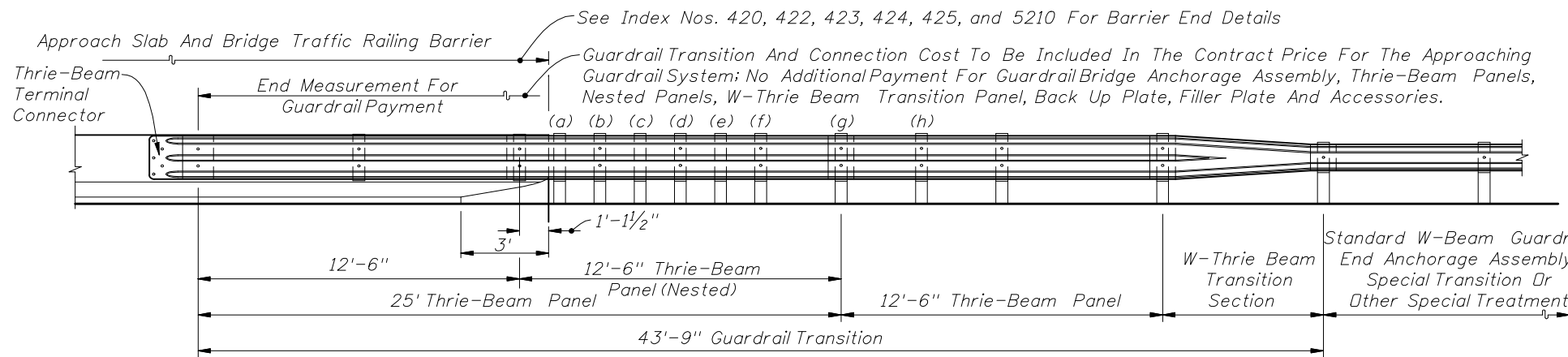


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GUARDRAIL

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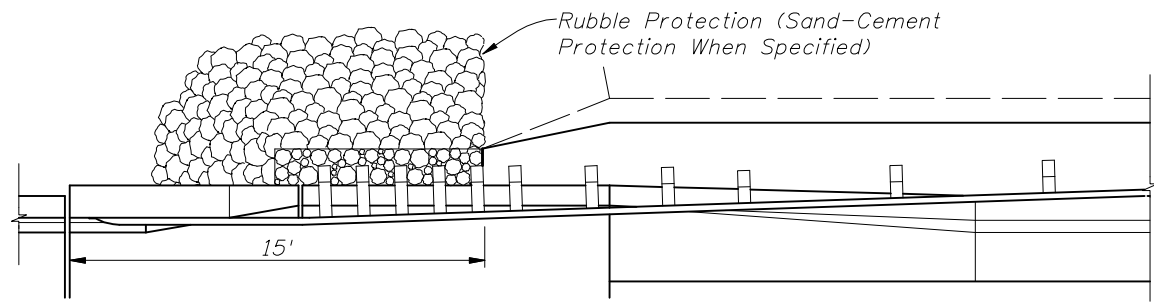


APPLICATIONS	SECTION CC			SECTION DD		
	U	V	W	X	Y	Z
Single Face Guardrail	6 1/8"	4 1/8"	3 5/8"	7 1/2" nom.	5 1/2" nom.	5" nom.
Double Face Guardrail With Timber Posts	5 1/8"	3 1/8"	2 5/8"	6 1/2" nom.	4 1/2" nom.	4" nom.
Double Face Guardrail With Steel Posts	4 3/8"	2 3/8"	1 7/8"	5 3/4"	3 3/4"	3 1/4"

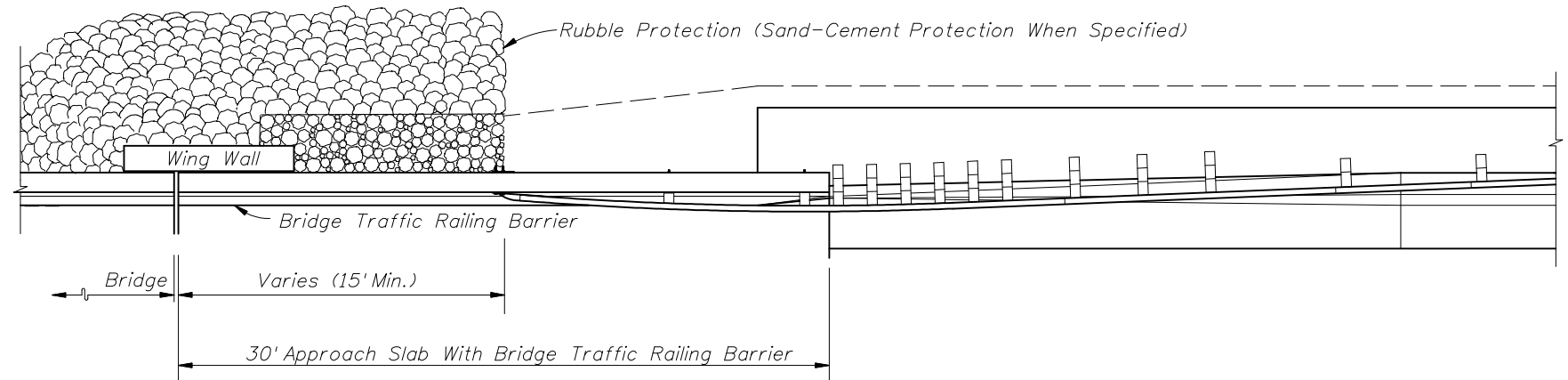
For Double Face Guardrail Connections To Median Bridge Traffic Railing Barrier, See Index No. 410 'Guardrail Connection To Concrete Barrier Wall Approach Ends'.

GUARDRAIL TRANSITION NOTE
 When shoulder gutter is required, the 25' long dike transition, shown in the 'PLAN' and 'PICTORIAL' above, is required. Double offset blocks are shown for guardrail installations adjacent to shoulder gutter/dike transitions; single offset blocks shall be installed in absence of shoulder gutter. Nested rails shall not be bolted to the blocks and posts at posts (a), (c), and (e). One 16d galvanized nail shall be driven between each post and block, and between double blocks, in order to prevent block rotation, see '16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION', this Index.

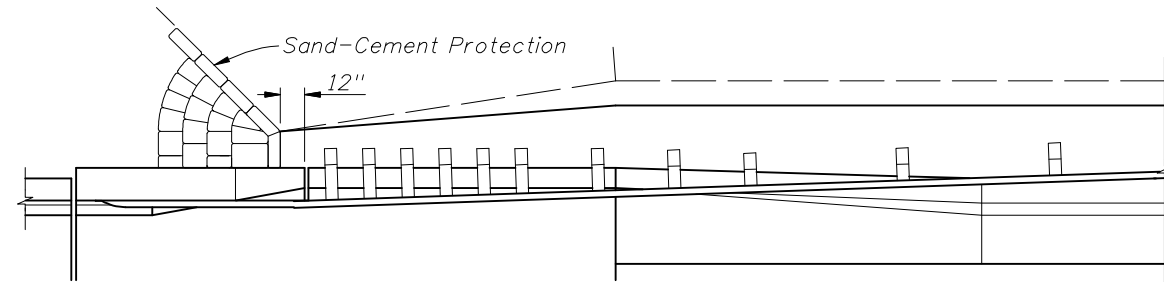
THRIE-BEAM OFFSET BLOCKS FIELD TRIMMED FOR USE AT SECTIONS CC & DD
GUARDRAIL APPROACH TRANSITION AND CONNECTION FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIERS EXTENDING FULL LENGTH OF APPROACH SLAB
 DETAIL J



BRIDGES OVER STREAMS

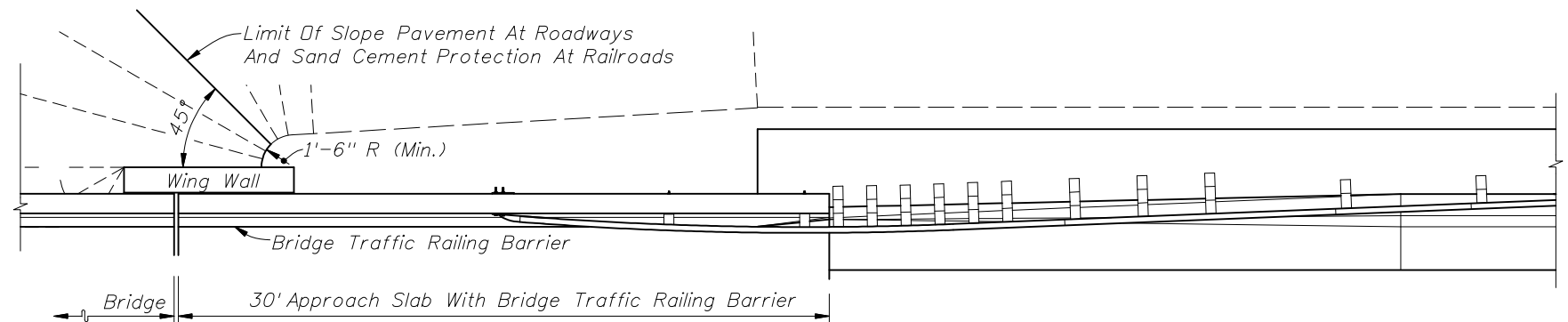


BRIDGES OVER STREAMS



BRIDGES OVER RAILROADS

For Additional Information See Index No. 402



BRIDGES OVER ROADWAYS OR RAILROADS

For Additional Guardrail Information See Sheet 13

SKETCHES - BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIER
EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

SKETCHES - BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING
BARRIER EXTENDING FULL APPROACH SLAB LENGTH

SKETCH NOTES

1. These sketches are for showing shoulder interface between roadways and bridges where crossings are normal to other roadways, railroads and streams. For site specific applications and details see the plans and the FDOT Structures Design Office "Detailing Manual" and "Design Guidelines".
2. Shoulder treatments shown in these sketches are for locations with shoulder gutter; shoulder hinge location will vary for facilities without shoulder gutter.

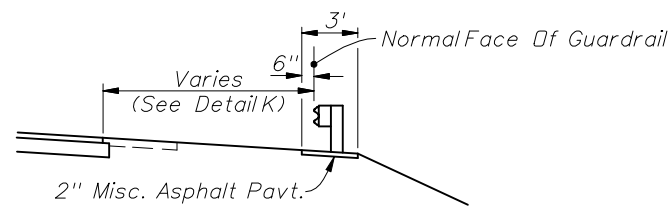
SHOULDER INTERFACE BETWEEN ROADWAYS AND BRIDGES



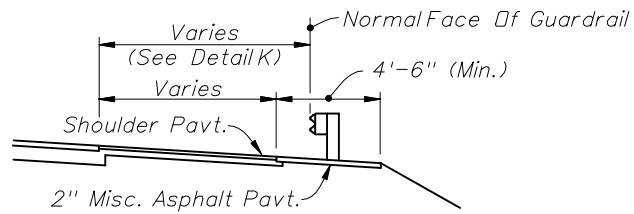
2010 FDOT Design Standards

GUARDRAIL

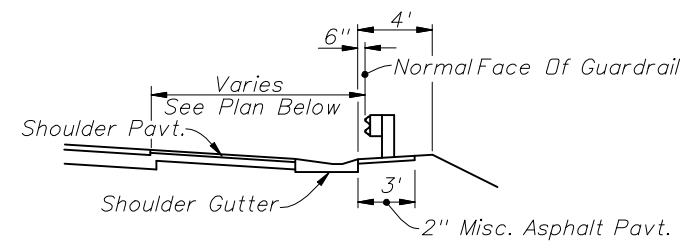
Last Revision 04	Sheet No. 14 of 26
Index No. 400	



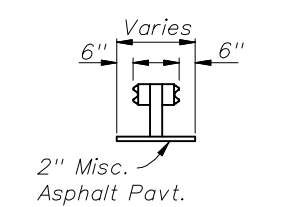
SHOULDER WITH OR WITHOUT 5' PAVEMENT



PAVED SHOULDERS

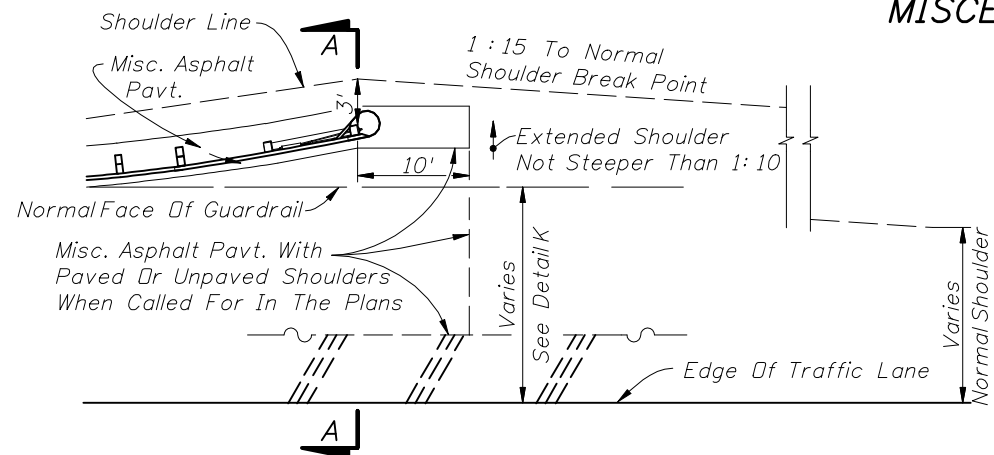


SHOULDER GUTTER

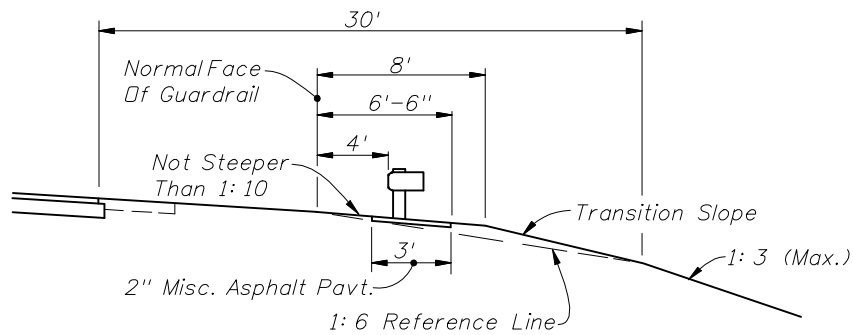


DOUBLE FACE RAIL

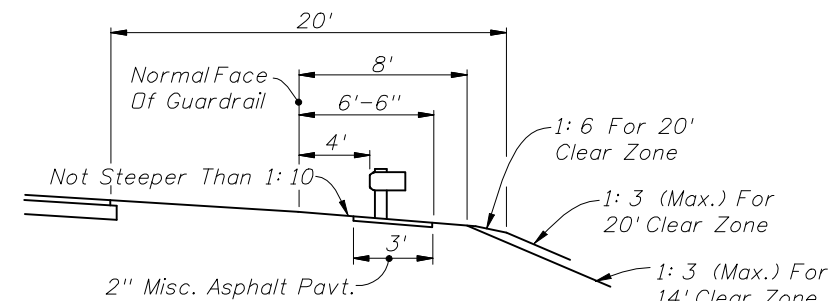
MISCELLANEOUS PAVING FOR STANDARD GUARDRAIL SECTIONS



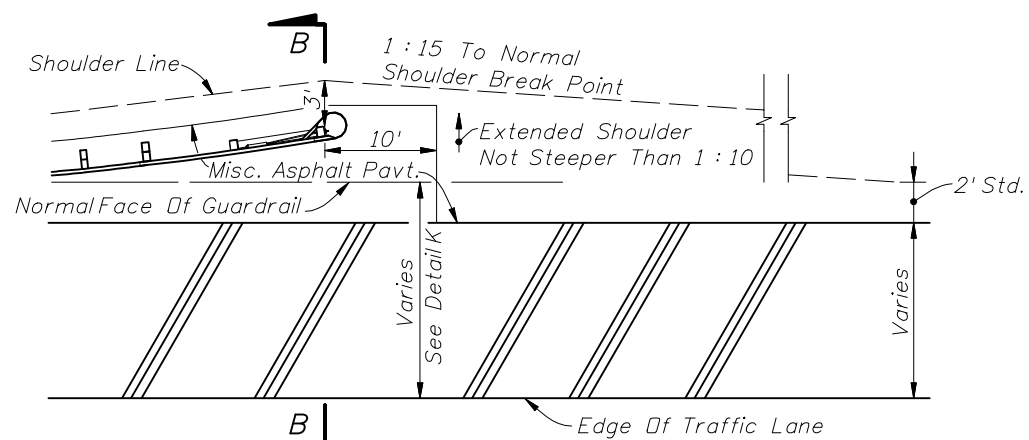
SHOULDER WITH OR WITHOUT 5' PAVEMENT



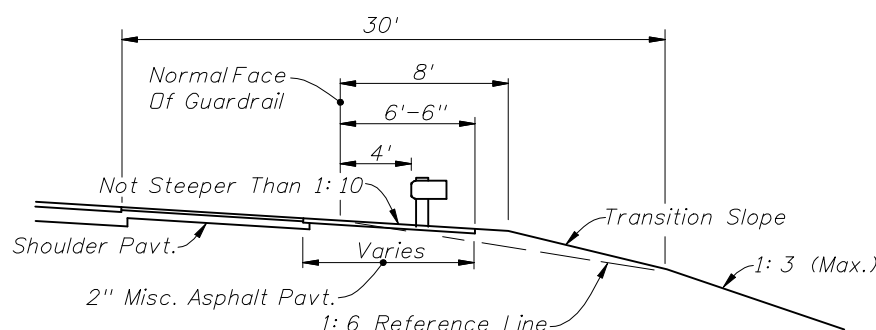
SECTION AA (EXAMPLE FOR 30' CLEAR ZONE)



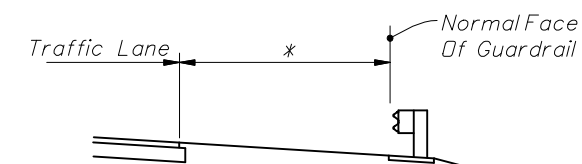
SECTION AA (EXAMPLE FOR 20' CLEAR ZONE)



PAVED SHOULDERS



SECTION BB (EXAMPLE FOR 30' CLEAR ZONE)

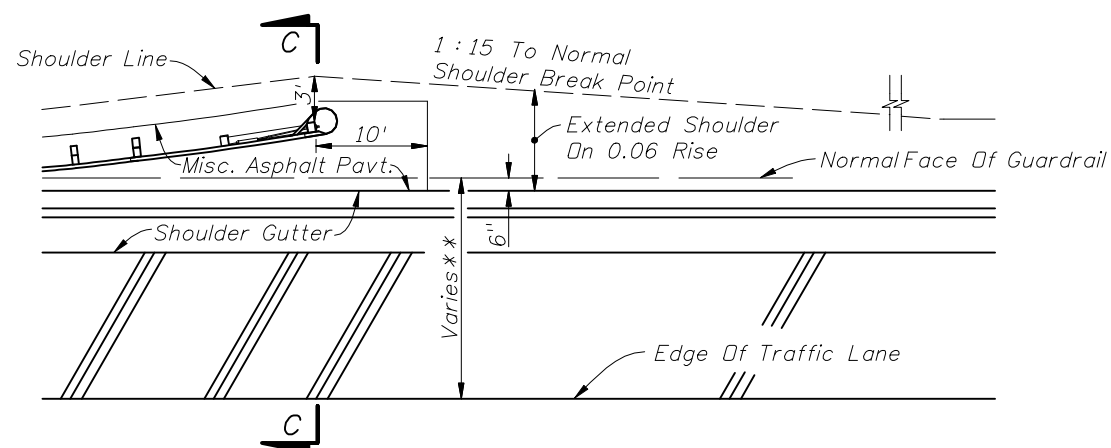


* 12' For Shoulders 10' And Wider; 8' For Median Shoulders 8' Or Less In Width; and, Shoulder Width Plus 2' For All Others Shoulders.

STANDARD LOCATIONS

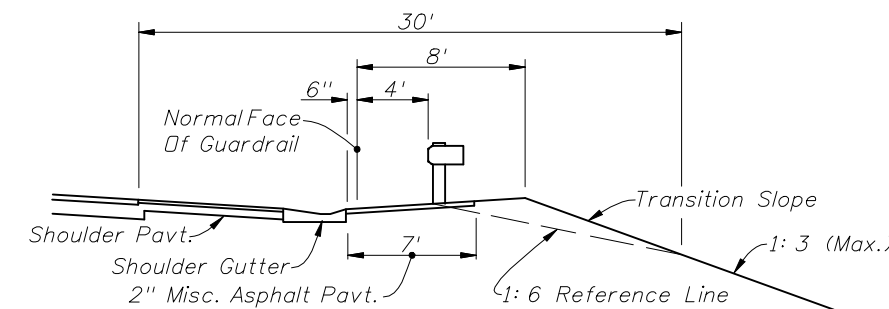
For Guardrail on slopes see Sheet 26.

GUARDRAIL LOCATION-DETAIL K



SHOULDER GUTTER

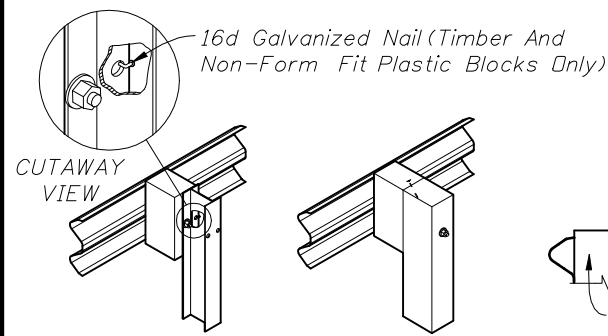
** 8' For 6' Shoulders 10' For 8' Shoulders 12' For 10' And 12' Shoulders Applies To Left And Right Side Shoulders. (See Index No. 525 For Shoulder Widths And Shoulder Gutter Locations On Ramps And Auxiliary Lanes)



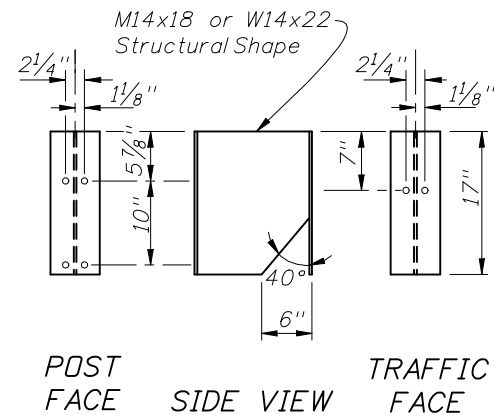
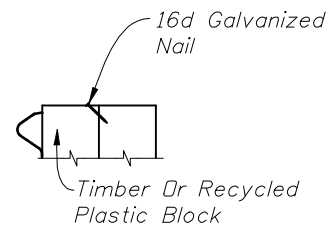
SECTION CC (EXAMPLE FOR 30' CLEAR ZONE)

SHOULDERS, SLOPES AND MISCELLANEOUS PAVING FOR FLARED END ANCHORAGE ASSEMBLIES





16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION



STEEL MODIFIED THRIE-BEAM OFFSET BLOCK

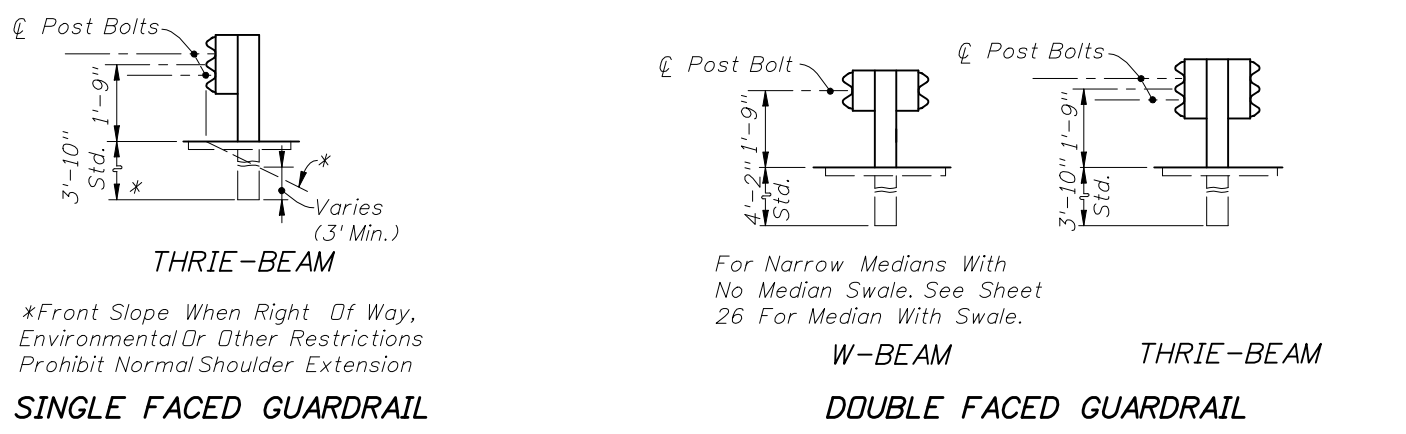
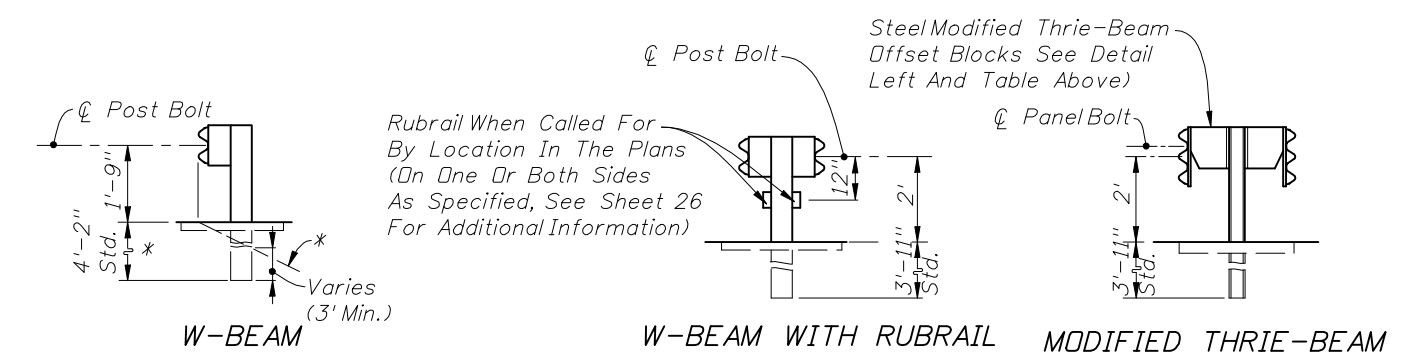
All Holes Are 1 3/16" Ø

POSTS	OFFSET BLOCKS	REMARKS
Timber	Timber 6"x8"x14" (Nominal) For W-Beam And 6"x8"x22" (Nominal) For Thrie-Beam Recycled Plastic (See Notes)	Post bolt hole in timber and plastic blocks to be centered ± 1/4". All timber offset blocks shall be dressed on all four sides (S4S). One 16d galvanized nail per block is to be used to prevent rotation of block (see detail left).
Steel W6x8.5, W6x9 Or 6" C	Timber 6"x8"x14" (Nominal) For W-Beam And 6"x8"x22" (Nominal) For Thrie-Beam Recycled Plastic (See Notes)	Same as above for timber and plastic blocks except that form fit plastic block holes align with holes in steel posts and do not require nails.
Steel W6x8.5, W6x9 Or 6" C	W14x22x17" (M14x18x17") (Steel Modified Thrie-Beam)	5/8" Ø x 1 1/2" long hex head bolts with full length thread and nuts (2 Reqd.) and 5/8" plain round washers (4 Reqd.) for mounting steel block to post. Bolts are to be installed in opposite holes, top and bottom.

Notes: 1. Timber and recycled plastic offset blocks of identical size and shape can be intermixed within a run of rail.

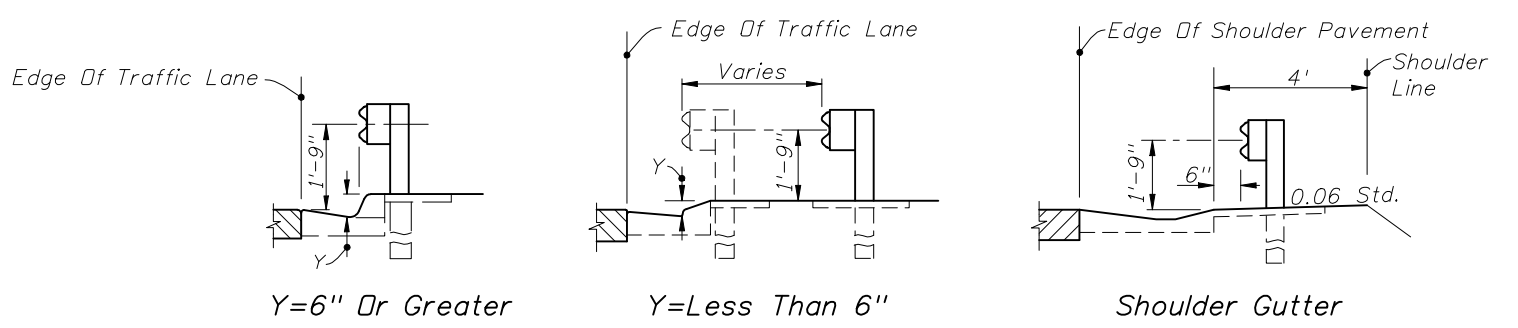
2. Recycled plastic offset blocks shall meet the passing evaluation criteria for Test Level 3 of NCHRP 350. The blocks shall be tested as a component in a semi-rigid guardrail test article under full scale crash test conditions. The blocks shall be in conformance with Sections 536 and 972 of the Specifications and be included on the Qualified Products List. W-Beam blocks shall be 14" in height and thrie-beam blocks shall be 22" in height. The blocks shall be capable of providing a 7 1/2" (Min.) offset.

PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS



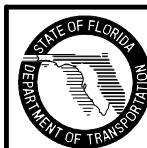
*Front Slope When Right Of Way, Environmental Or Other Restrictions Prohibit Normal Shoulder Extension

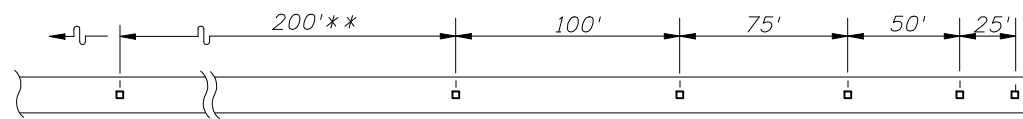
MOUNTING HEIGHTS ON SHOULDERS AND IN MEDIANS



NOTE:
For location of guardrail with offset behind curb and gutter refer to the Plans Preparation Manual, Volume 1, Section 4.3.5.

LOCATION AT CURB & GUTTER SECTIONS-DETAIL L

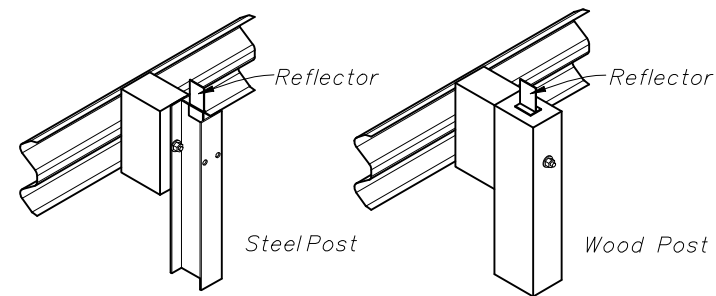




Note: Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer. For minimum installations (length 62.5') provide one reflector at each end and one at the approximate center.

**For curves greater than 2° the spacing shall be reduced to 100' through the curve.

REFLECTOR SPACING



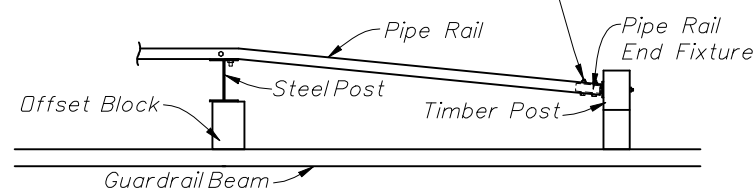
PICTORIAL VIEW REFLECTOR MOUNTING

REFLECTOR NOTES

1. Reflectors shall conform to Section 993 of the Standard Specifications.
2. Reflector color (white or yellow) shall conform to the color of the near lane edgeline.
3. Reflectors installed on median guardrail shall have retro-reflective sheeting on both sides of the reflector.
4. The cost for reflectors shall be included in the contract unit price for Guardrail.

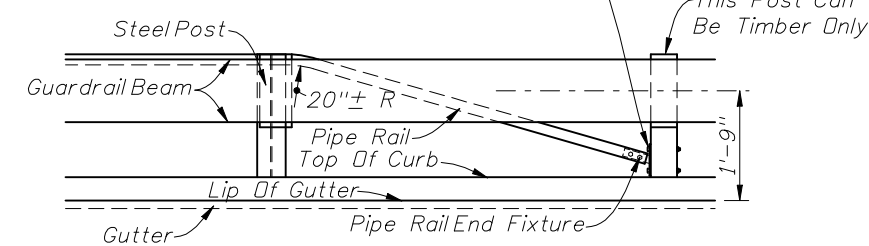
REFLECTORS-DETAIL M

Install Pipe Rail Over Pipe Rail End Fixture And Thru-bolt With $\frac{1}{2}$ "x $3\frac{1}{2}$ " Long Hex Bolts And Nuts With $\frac{1}{2}$ " Plain Round Washers Under Heads And Nuts (2 Req'd.) (Upset Threads After Tightening)

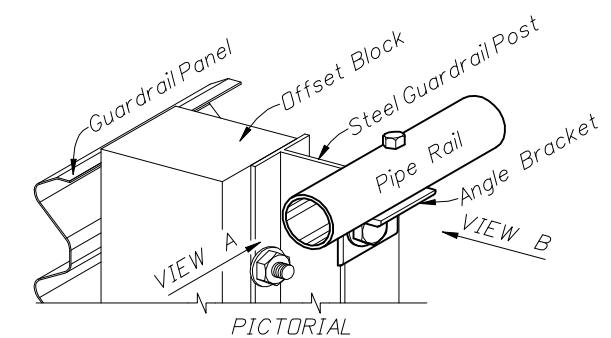


PLAN

Attach Pipe Rail End Fixture To Post With $\frac{1}{2}$ "x7" Long Hex Bolts And Nuts With $\frac{1}{2}$ " Plain Round Washers Under Heads And Nuts (2 Req'd.) (Upset Threads After Tightening)



ELEVATION



PICTORIAL

NOTES

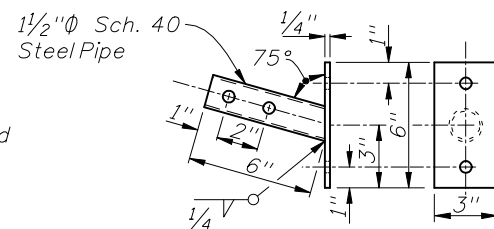
1. Pipe Rail required on steel guardrail posts when pedestrian ways and bikeways are located 4' or less from back of the posts. Pipe rail shall not extend beyond the last post of the approach end anchorage assemblies. Begin and end the pipe rail in accordance with the Pipe Rail End detail.

Refer to Sheet 1, Note 6 for guardrail end treatment requirements.

2. When guardrails with timber posts are located with the back of posts 4' or less from the near edge of the pedestrian way or bikeway, the bolt ends will require one of the following treatments:

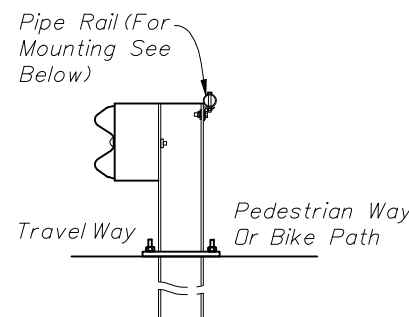
- (a) Trimming back flush with the face of nut and metalizing or
- (b) Use of post bolts 15" in length with the washers and nuts counter sunk into sinks 1" to $1\frac{1}{2}$ " deep or
- (c) Use of post bolts 15" in length with sleeve nuts and washers.

3. The cost for Pipe Rail, mounting components and installation shall be included in the contract unit price for guardrail. Bolt end treatment for timber post shall be included in the contract unit price for guardrail.



All Holes Shall Be $\frac{5}{8}$ " ϕ Galvanize After Drilling And Welding

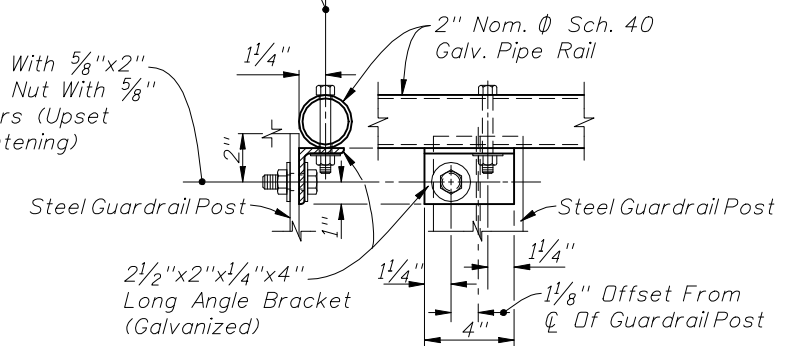
PIPE RAIL END FIXTURE



STEEL POST SECTION

$\frac{5}{8}$ " ϕ Bracket And Pipe Holes With $\frac{1}{2}$ "x $3\frac{1}{2}$ " Long Hex Bolt And Nut With $\frac{1}{2}$ " Plain Round Washer (Upset Threads After Tightening)

$\frac{3}{4}$ " ϕ Bracket Hole With $\frac{5}{8}$ "x2" Long Hex Bolt And Nut With $\frac{5}{8}$ " Plain Round Washers (Upset Threads After Tightening)



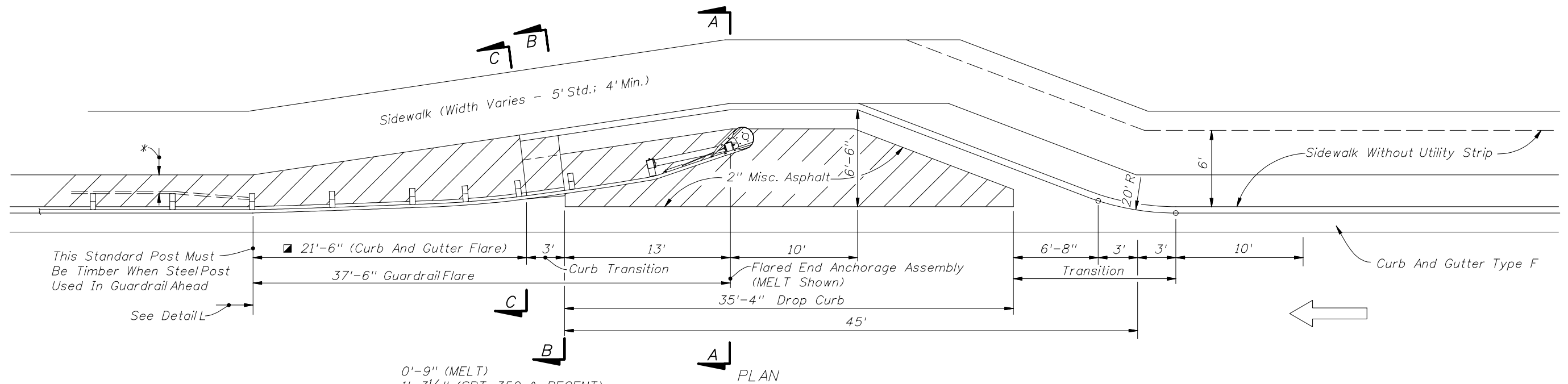
VIEW A

VIEW B

PIPE RAIL MOUNTING

FOR LOCATIONS USED BY PEDESTRIANS OR CYCLISTS PEDESTRIAN SAFETY TREATMENTS





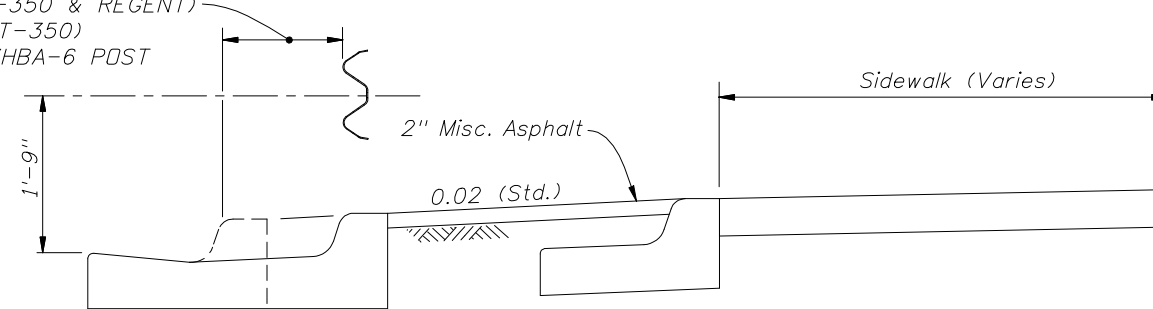
This Standard Post Must Be Timber When Steel Post Used In Guardrail Ahead
See Detail L

*Safety pipe rail is required when the back of steel guardrail posts are 4' or less from the near edge of a pedestrian way or bikeway and post bolt treatment is required when the back of timber posts are 4' or less from the near edge of a pedestrian way or bikeway; see 'PEDESTRIAN SAFETY TREATMENTS'.

Curb flare shall follow guardrail flare, see elsewhere in this Index for additional guardrail flare information.

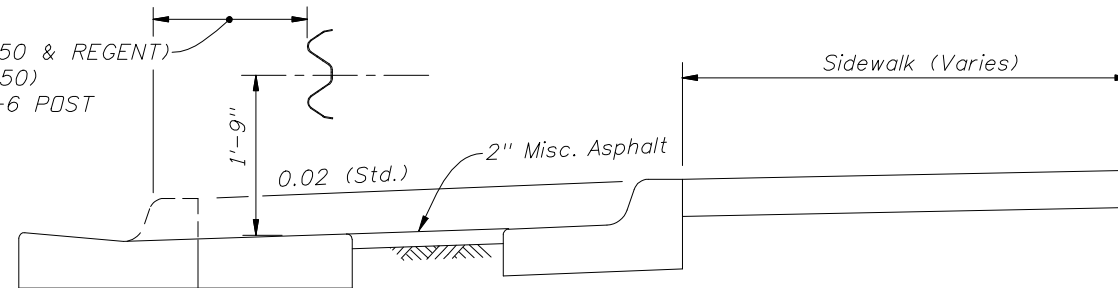
Note: For Proprietary End Treatments See the Qualified Products List.

- 0'-9" (MELT)
- 1'-3 1/2" (SRT-350 & REGENT)
- 2'-3 1/2" (FLEAT-350)
- 2'-3 1/2" SRT/HBA-6 POST

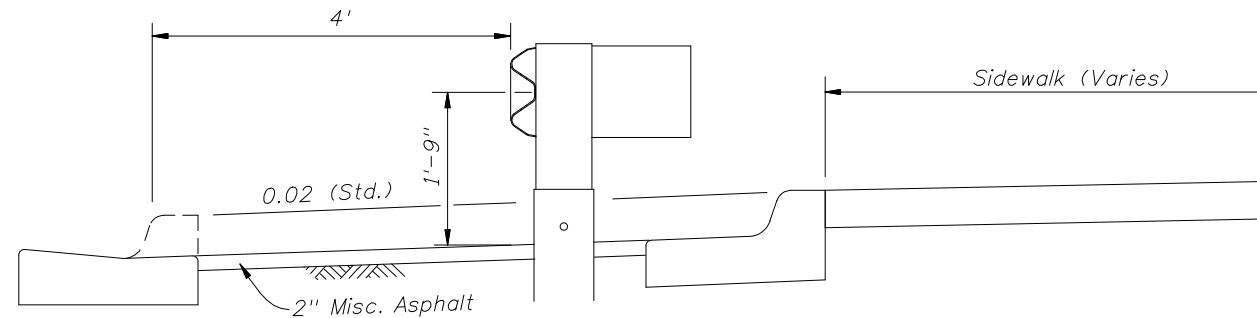


SECTION CC

- 1'-1" (MELT)
- 1'-8 1/2" (SRT-350 & REGENT)
- 1'-7" (FLEAT-350)
- 1'-7" SRT/HBA-6 POST



SECTION BB



SECTION AA

APPROACH TREATMENT FOR CURB AND GUTTER
DETAIL Q

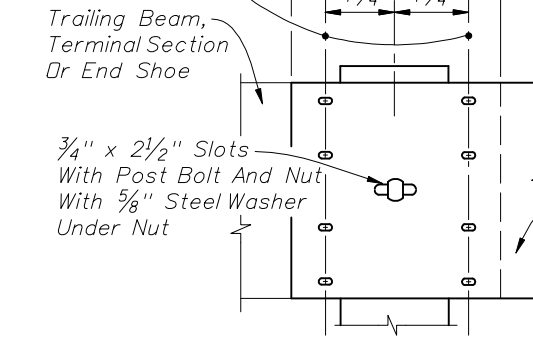


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GUARDRAIL

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$29/32$ " x $1/8$ " Slots
(8 Per Beam)
With $5/8$ " x $1/4$ " Long
Button Head Bolts
And Nuts (8 Reqd.)



W-BEAM RAIL SPLICE

$25 1/2 \pm$ For End
Anchorage Type
MELT and CRT.
Field Bend With
Metalizing Permitted

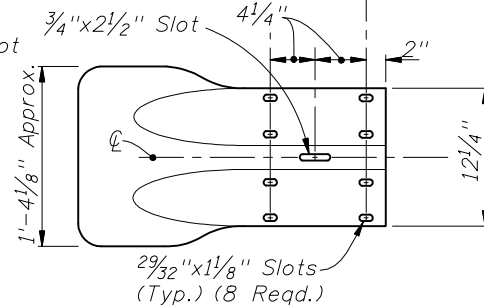
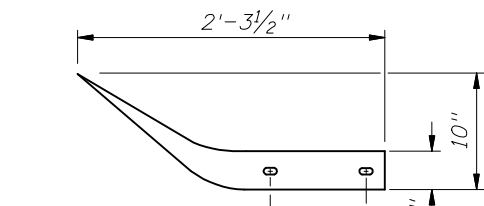
$3/4$ " Φ Hole For Use
With End Anchorage
Type MELT

$15/16$ " Φ Hole (Typ.)
(4 Reqd.)

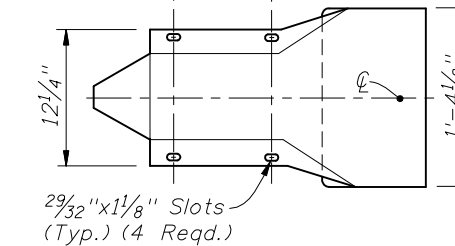
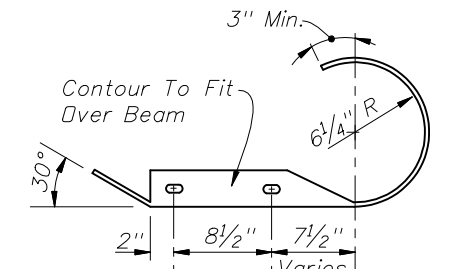
$29/32$ " x $1/8$ " Slots
(Typ.) (8 Reqd.)

Note: $5/8$ " Φ Steel washer required with splice bolts

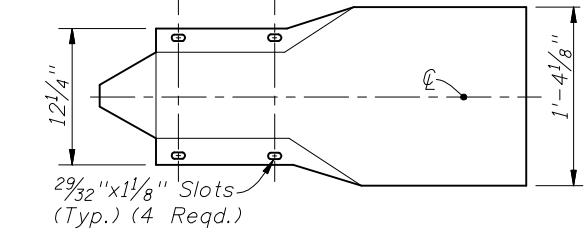
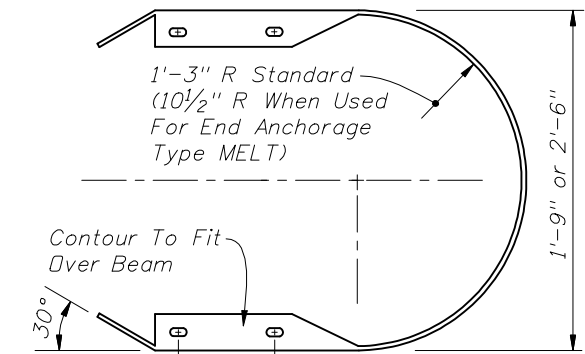
SPECIAL END SHOE



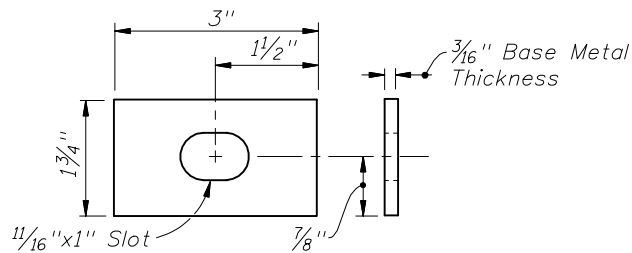
FLARED END SECTION



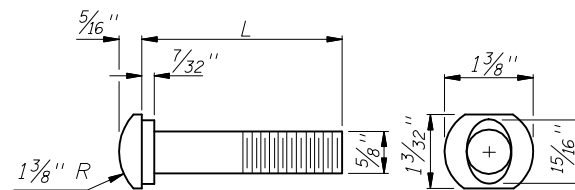
ROUNDED END SECTION



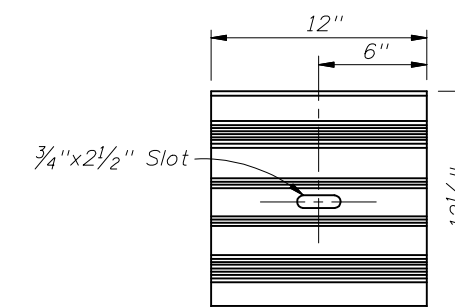
BUFFER END SECTION



**(RECTANGULAR PLATE WASHER)
BEAM WASHER**



**5/8" MODIFIED HEAVY
HEX NUT (RECESSED NUT)**



W-BEAM BACK-UP PLATE

Note:
For beam washer requirements on end terminals, see individual end anchorage assembly details. Washers are to be used where necessary to accomplish alignment or where the posts bolt head shows tendency to pull through the rail slot. Washers installed on guardrail, between end anchorages, prior to July 1, 1990 may remain in place until the guardrail is relocated or until repairs require removal and reinstallation of a post bolt.

Note: For application information see individual end anchorage assembly details.

L (In.)	THREAD LENGTH (Min.) (In.)	APPLICATION
1 1/4"	Full Length	Rail Splice Bolt
10"	4"	Single Or Double Faced Guardrail Timber Or Recycled Plastic Offset Block(s) On Steel Post As An Option, A Single 25" x Long Post Bolt May Be Used
18"	4"	Post Bolt - Single Faced Guardrail Timber Posts
25" x	4"	Post Bolt - Double Faced Guardrail Timber Posts Double Faced Guardrail Steel Posts

Special bolts having lengths of 10" or greater shall have a thread length of not less than 4". For applications where special bolts having lengths greater than 25" are required, the Contractor may use a $5/8$ " Φ threaded rod (field cut to length). A hex nut and beam washer shall be used at the guardrail face with no more than $3/4$ " of the threaded rod projecting beyond the top of the nut. The projecting thread on both ends shall be distorted to secure the nuts, and both ends of the threaded rod metalized with organic zinc-rich coating. *Use of the 25" AASHTO-AGC-ARTBA standard length post bolt on double faced guardrail that results in the bolt projecting more than $3/4$ " beyond the face of the nut after pull-up shall be trimmed to $3/4$ " reveal and metalized with organic zinc-rich coating.

5/8" OVAL SHOULDER BUTTON HEAD BOLT

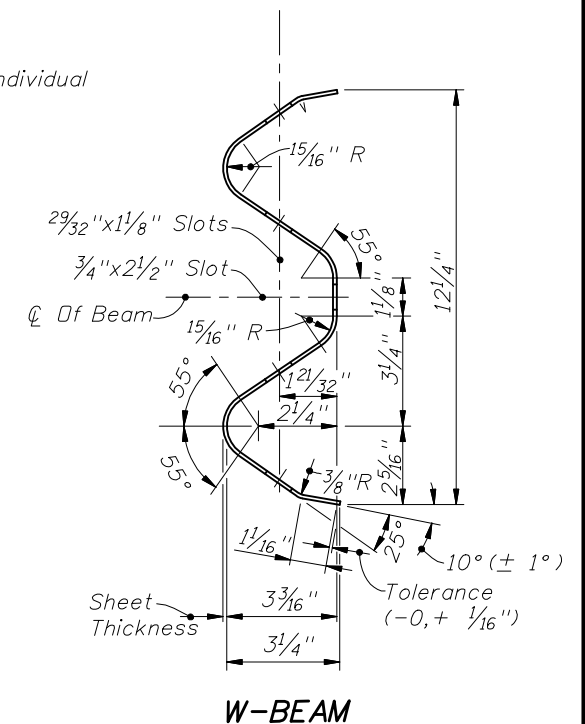
OFFSETS (Ft.) Measured From Face Of Guardrail To Front Of Above Ground Rigid Hazard				
POST SPACING (Ft.)	SINGLE BEAM		NESTED BEAMS	
	W-Beam	Thrie-Beam	W-Beam	Thrie-Beam
6'-3"	4'	3'-3"	N/A	N/A
3'-1 1/2"	3'	2'-8"	2'-8"	2'-4"
1'-6 3/4"	N/A	N/A	2'-4"	2'

Note:
The values shown should be utilized unless changes are supported by imperial validation. Those desiring to develop offset values from the simulated deflection values shown in Table 5.4 of the AASHTO Roadside Design Guide are cautioned to proceed only if back-ground in the table development is understood.

**MINIMUM OFFSET FOR
SINGLE FACED GUARDRAIL (Ft.)**

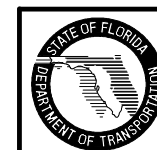
HS Hex bolts for THRIE-BEAM TERMINAL CONNECTORS shall conform to the requirements of ASTM A449 (Type 1) with heavy hex nuts and washers. All other hex bolts shall conform to the requirements of ASTM A563. Bolts, nuts and washers shall be hot dip galvanized. Heavy hex nut may be used in lieu of hex nuts and hex nuts used for jam nuts.

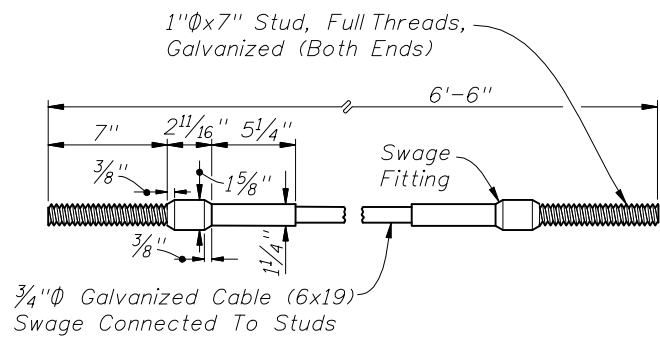
HEX BOLTS AND NUTS



W-BEAM

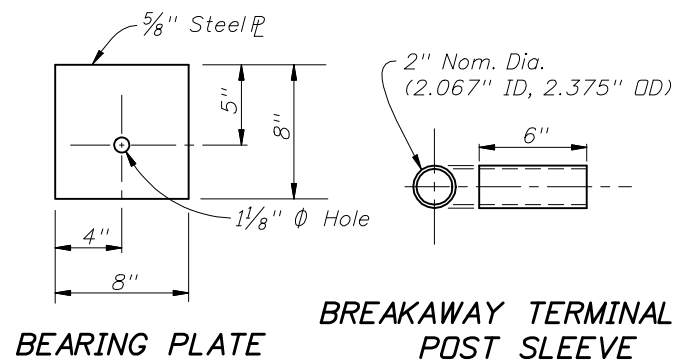
5/8" STEEL WASHER





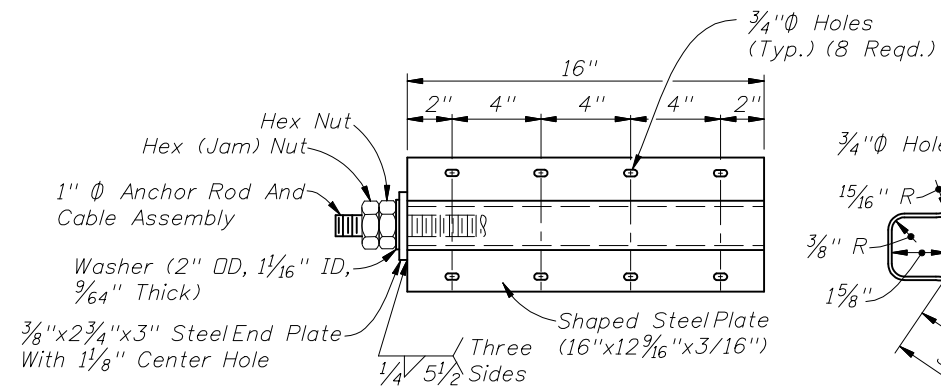
Note:
Cable assemblies shall be in accordance with the specifications of AASHTO-AGC-ARTBA 'A Guide To Standardized Highway Barrier Hardware' Cable Anchor Assembly FCA01. An additional cable assembly 9' in length with a swaged fitting on one (1) end is required for each end anchorage assembly Type CRT.

CABLE ASSEMBLY



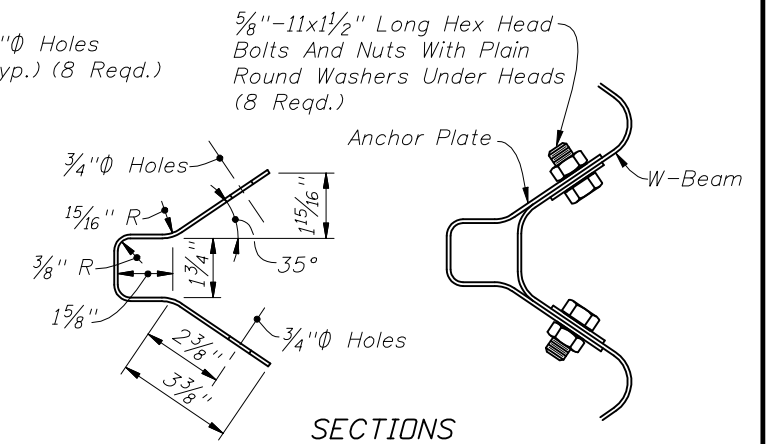
BEARING PLATE

BREAKAWAY TERMINAL POST SLEEVE

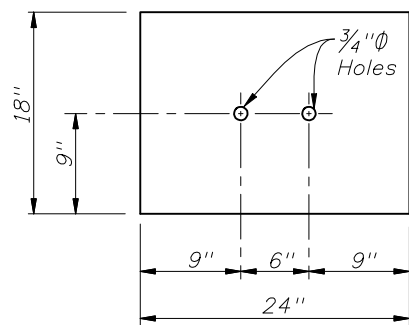


BACK VIEW

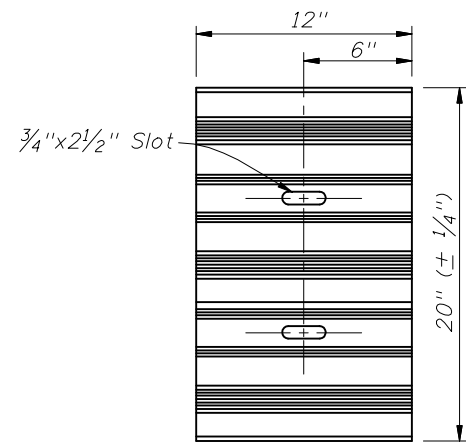
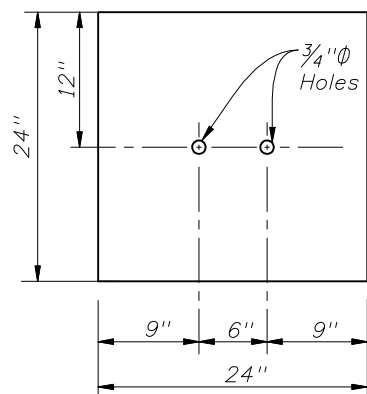
BEAM ANCHOR PLATE



SECTIONS

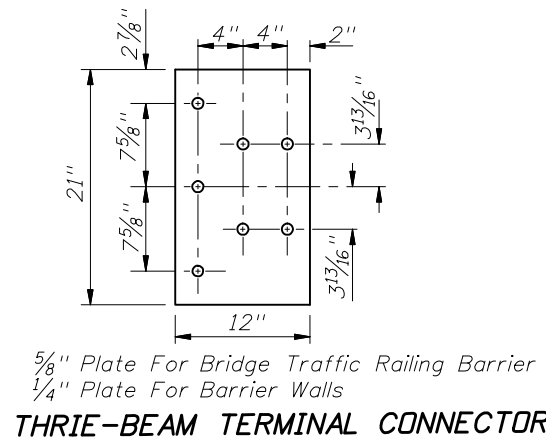


SOIL PLATES

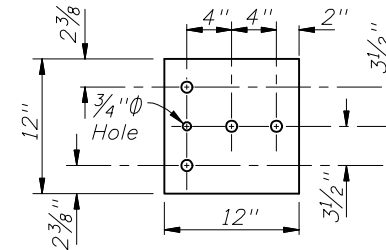


THRIE-BEAM BACK-UP PLATE

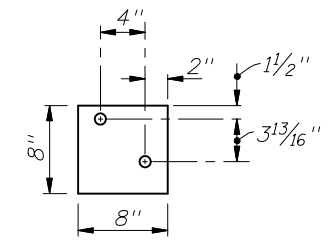
Back-up plate required behind rail elements at intermediate (non-splice) posts when steel offset block used.



THRIE-BEAM TERMINAL CONNECTOR

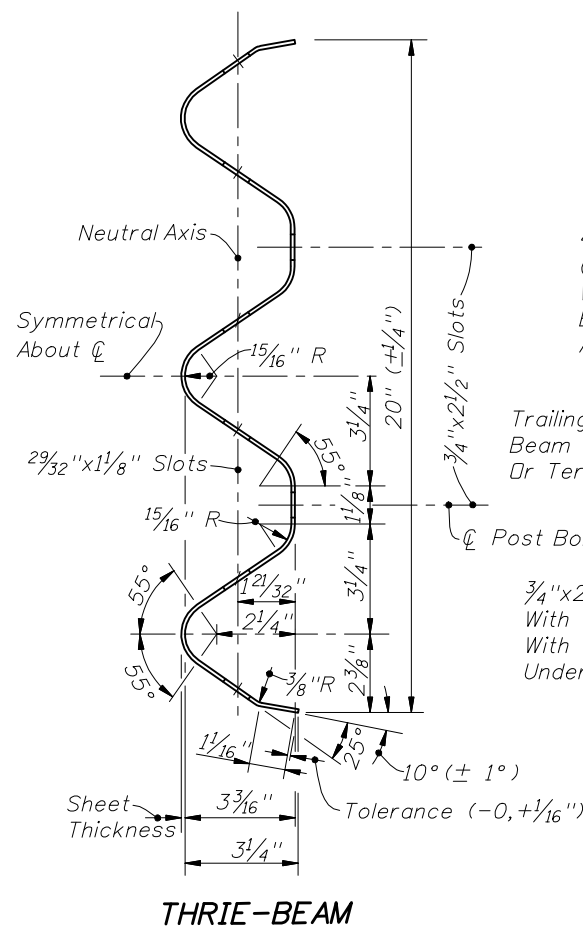


SPECIAL END SHOE

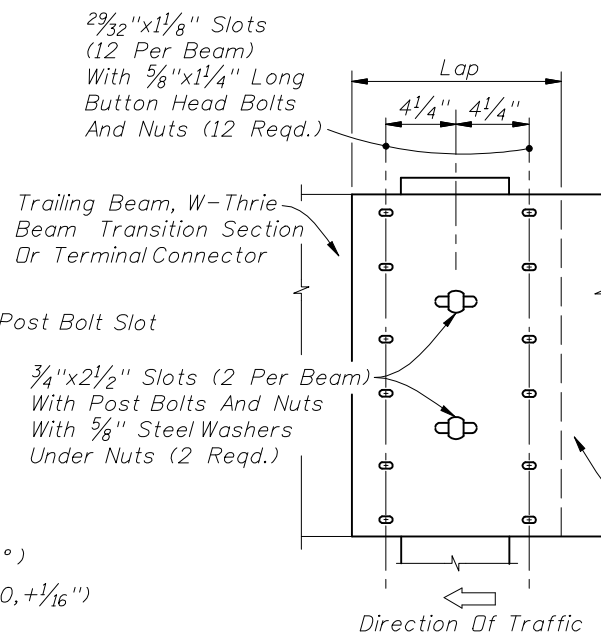


FILLER PLATE

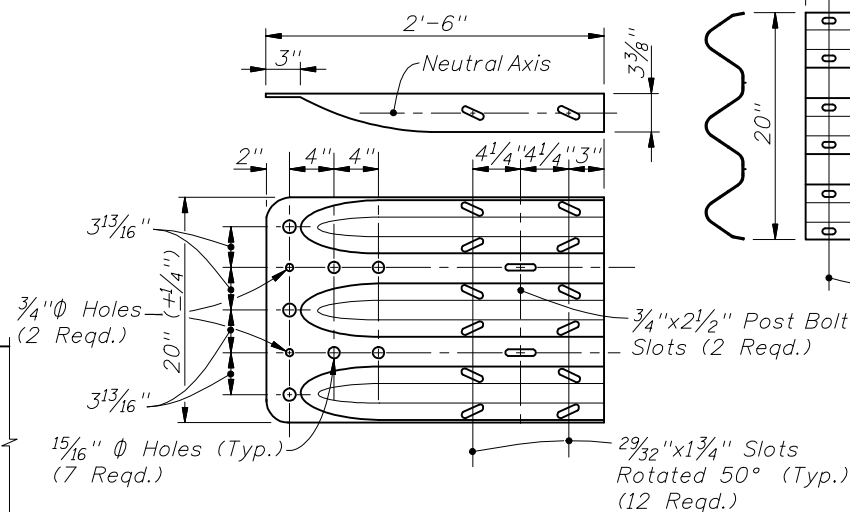
All Holes 1" Φ Except As Shown
GALVANIZED STEEL BACK-UP PLATES FOR CONNECTING SPECIAL END SHOES AND TERMINAL CONNECTORS TO CONCRETE BRIDGE TRAFFIC RAILING BARRIERS AND CONCRETE BARRIER WALLS



THRIE-BEAM

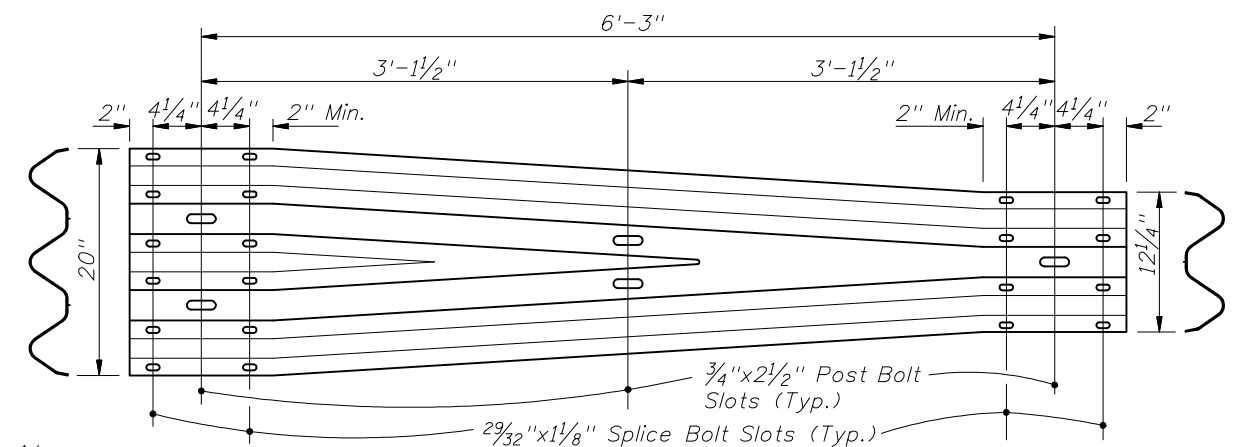


THRIE-BEAM RAIL SPLICE

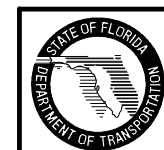


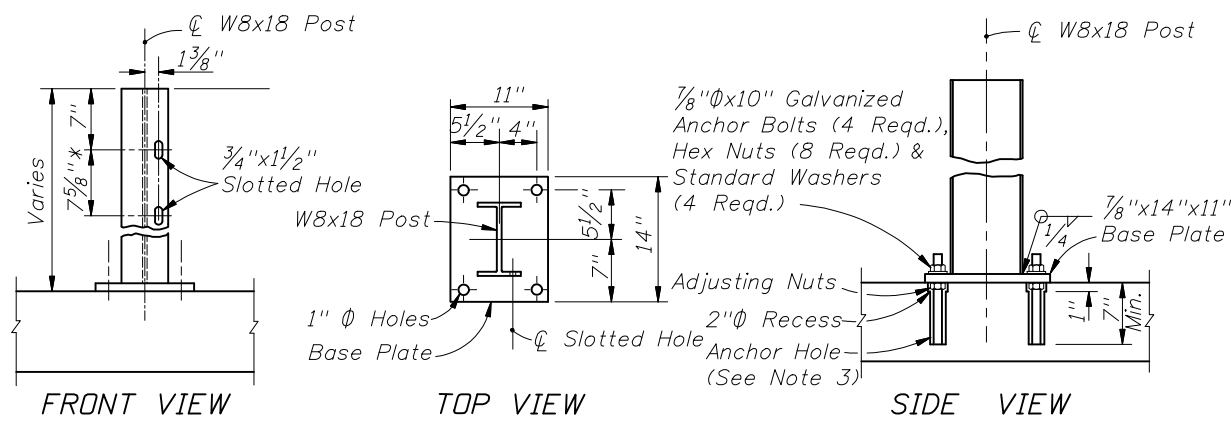
THRIE-BEAM TERMINAL CONNECTOR

Note: 5/8 inch Φ steel washer required with splice bolts



W-THRIE BEAM TRANSITION SECTION



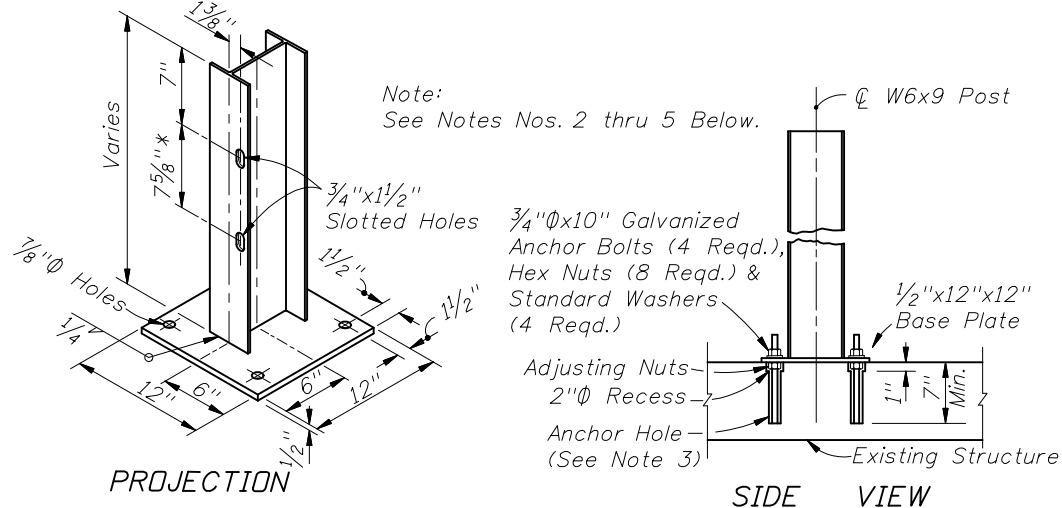


FOR REPLACEMENT OF EXISTING W8x18 GUARDRAIL POSTS ON APPROACH SLABS AND BRIDGES

* Additional slotted hole required when mounting thrie-beam guardrail

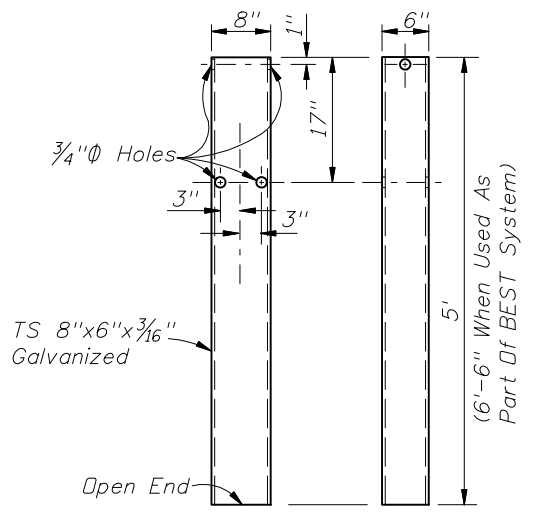
NOTES: (SPECIAL STEEL POST)

1. See Index No. 402 for special steel posts required for construction and repair of guardrail transitions to bridge traffic railing barrier retrofits on existing bridges. See Structures Index Nos. 470 through 476 for steel posts required to construct traffic railing barrier retrofits on existing bridges.
2. Either anchor bolts, concrete wedge anchors or approved Adhesive-Bonded Anchors for Structural Applications may be used. Anchor bolts, wedge anchors and adhesive anchors shall have a minimum tensile strength of 60,000 psi and galvanized in accordance with ASTM A153 (stainless steel components may be substituted but components plated in accordance with ASTM B-633 are not acceptable). Adhesive anchor rods shall be equal in diameter to that detailed for anchor bolts. Wedge anchors are to be installed in accordance with the manufacturer's recommendations, assuming 3,000 psi compressive strength for concrete. Wedge anchors shall also meet the following requirements:
 (a) tensile load each anchor: approach slabs 14,000 lbs.; other structures 8,000 lbs.
 (b) shear load each anchor: approach slabs 15,000 lbs.; other structures 7,800 lbs.

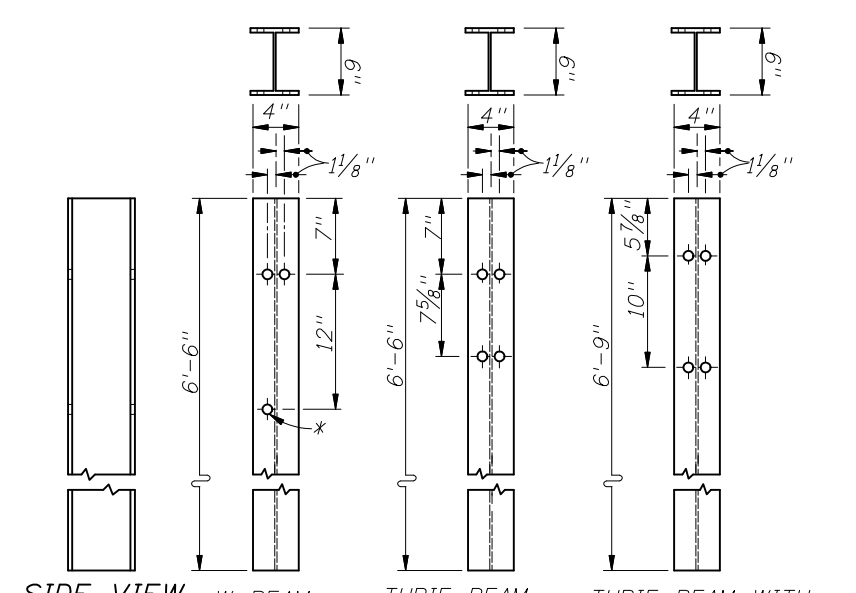


FOR CONSTRUCTION OF GUARDRAIL WHERE CULVERT, PIER FOOTING OR OTHER STRUCTURE PRECLUDES DRIVEN POST INSTALLATION

3. Posts are to be plumbed by adjusting nuts or mortar seating. Posts installed using anchor bolts and adhesive anchors are to be set with adjusting nuts as detailed, unless the Engineer approves the use of mortar seating in lieu of adjusting nuts. Posts installed using wedge anchors are to be set with mortar seating. Base plates shall be grouted with neat finish.
4. Adhesive-Bonded Anchors for Structural Applications shall comply with Section 937 and be installed in accordance with Section 416. Drilled hole diameter shall be in accordance with the manufacturer's instructions.
5. Anchor holes and recesses shall be drilled; wedge anchor holes are to be drilled in accordance with the manufacturer's specifications. Encountered reinforcing steel shall be drilled through. Holes shall be thoroughly cleaned when setting bolts and anchors and dry when setting wedge anchors.
6. Steel post and base units shall be galvanized in accordance with ASTM A123. Any damaged galvanized areas are to be metalized in accordance with Section 562 of the Standard Specifications.
7. Special steel posts are not to be substituted for any post in a guardrail approach end treatment system.



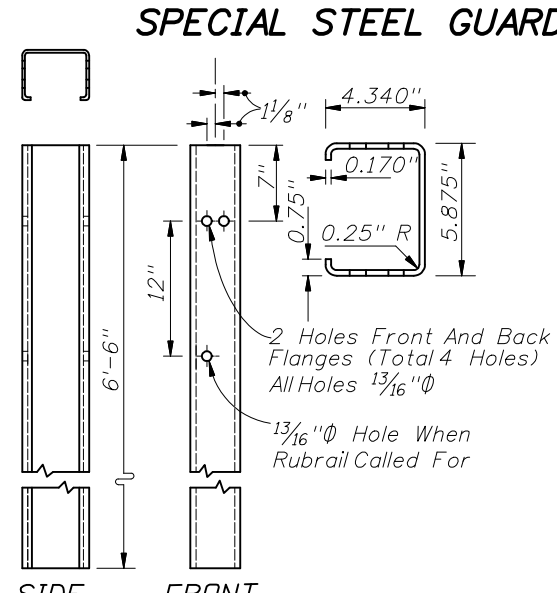
STEEL TUBE
For Use In Combination With Short Timber Breakaway Post



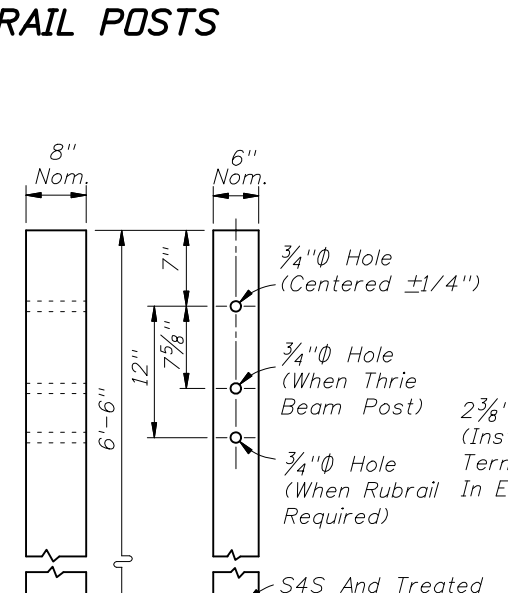
W-BEAM
* 1 3/16 inch diameter hole when rubrail called for

THRIE-BEAM WITH STANDARD OFFSET BLOCKS

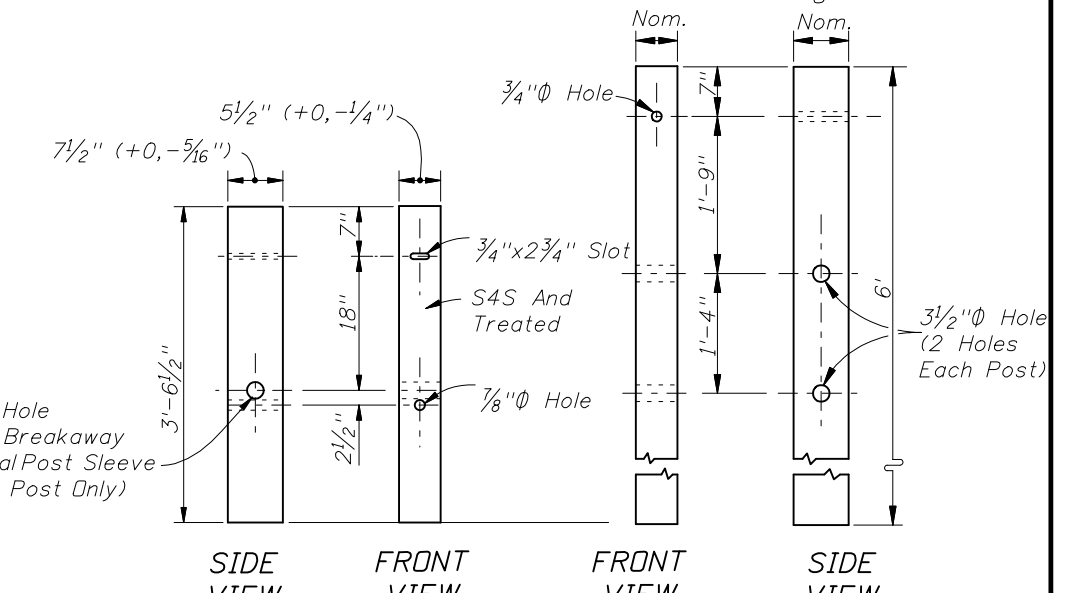
THRIE-BEAM WITH STEEL MODIFIED THRIE-BEAM OFFSET BLOCKS



6'-C STEEL POST
Note: 6'-C steel posts are to face the same direction in any continuous run of guardrail. Posts to be galvanized in accordance with ASTM A123.



TIMBER POST

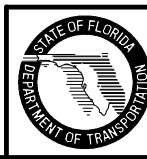


SHORT TIMBER BREAKAWAY POST CRT TIMBER POST

SPECIAL TIMBER GUARDRAIL POSTS

Note: W6x8.5 or W6x9 steel posts may be either rolled or welded structural shapes conforming to or exceeding the design properties of ASTM A6/A6M. Welding shall be in accordance with the requirements of ASTM A769/A769M. Posts shall be cut to length and the ends seal welded between web and flange before galvanizing. Posts to be galvanized in accordance with ASTM A123.

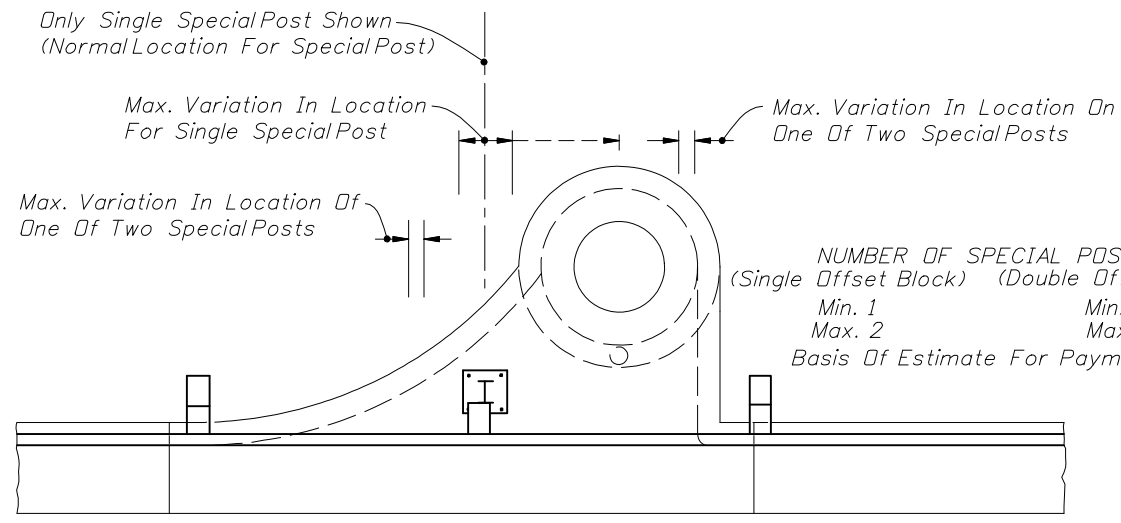
STANDARD W6x8.5 OR W6x9 STEEL POST
TIMBER AND STEEL GUARDRAIL POSTS



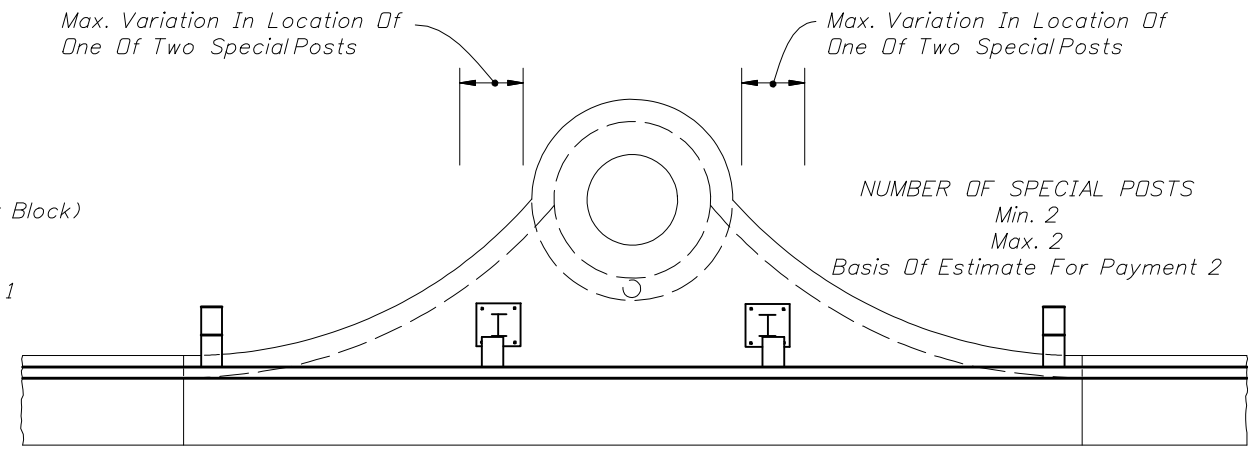
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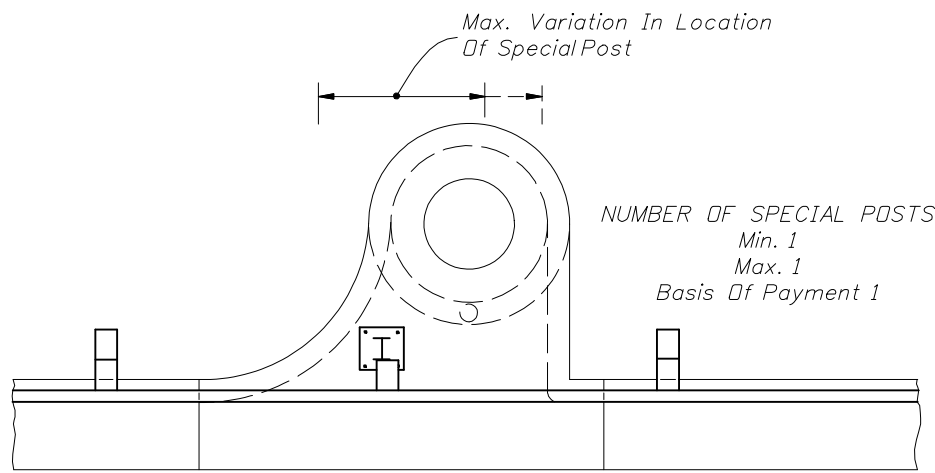
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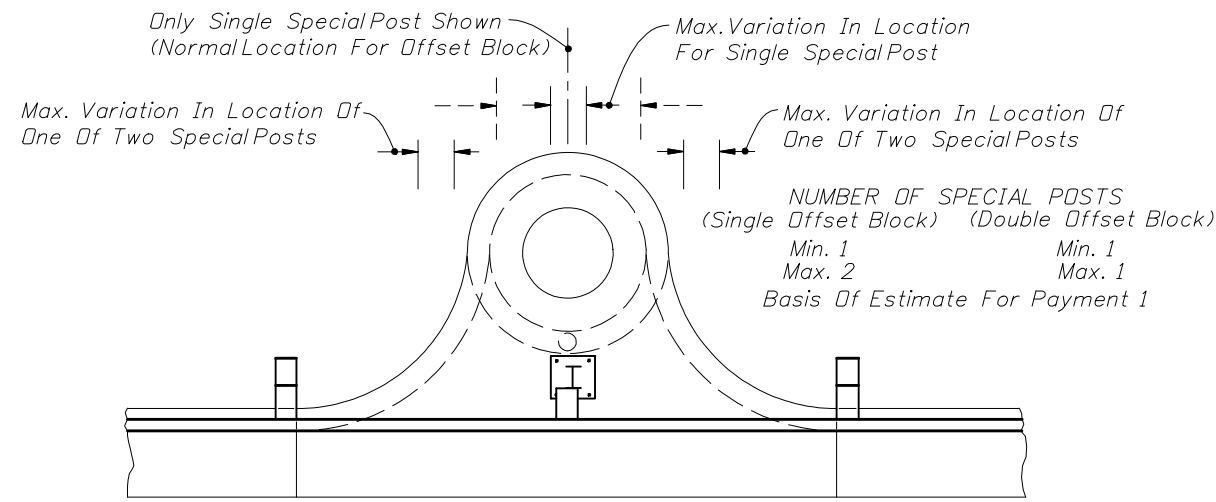
CURB INLET TYPE 1



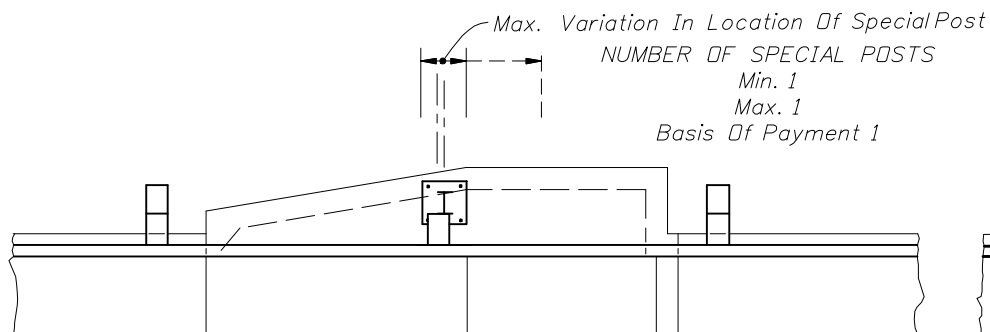
CURB INLET TYPE 2



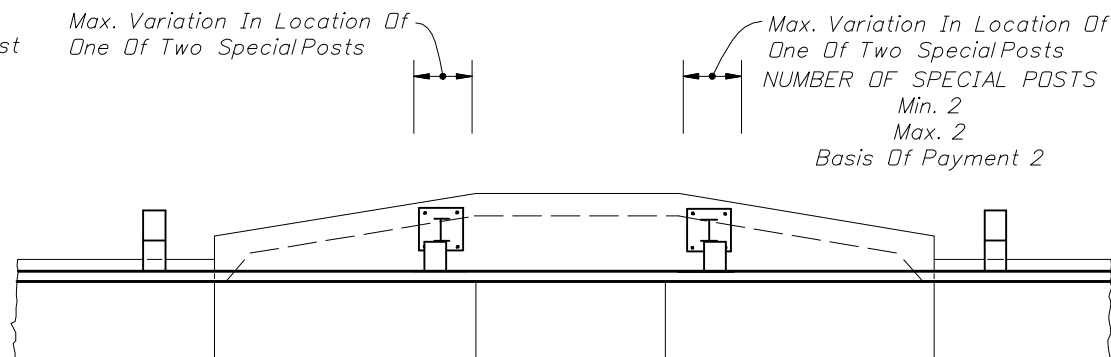
CURB INLET TYPE 3



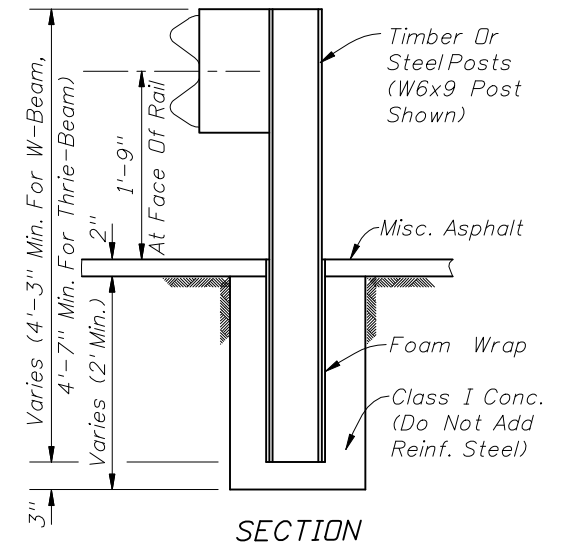
CURB INLET TYPE 4



CURB INLET TYPE 5



CURB INLET TYPE 6



SECTION

15" For Steel Post Or
17" For Timber Post

To Facilitate Post Replacement Install With $\frac{3}{16}$ " Plastic Foam Sheet On All Sides, Below The Surface Of The Miscellaneous Asphalt Pavement.

Foam Or Timber Block-Out For W6x9 Or 6" C Posts

PLAN (SQUARE OPTION)

15" For Steel Post Or
17" For Timber Post

Foam Wrap And Foam Or Timber Block-Outs Same As For Square Option Above.

PLAN (ROUND OPTION)

Note: For line post applications only, i.e., not to be used with breakaway post applications nor be used to modify End Anchorage Assemblies Type II.

TO BE USED PRINCIPALLY OVER SHALLOW UTILITIES

ENCASED GUARDRAIL POST

LEGEND

Variation In Location Of Special Post:



Notes:

1. The locations shown for specialposts mounted on inlets are to be used as guidelines for positioning the posts and for estimating the number of required posts.

2. Specialposts and their anchorages mounted on curb inlets shall be in accordance with special steel guardrail posts Sheet 23, and paid for under the contract unit price for Special Guardrail Post, EA.

3. Variations shown for the locations of specialposts mounted on inlets are established from standard post spacing (6'-3"); clearance of standard posts from inlets (4" min.); use of single and double offset blocks on standard posts adjacent to the inlets; optional flange mountings; and, concrete anchor edge distances (2" for grouted and $3\frac{3}{4}$ " for expansion anchors). The number of posts and their locations may vary by reducing post spacing and adjusting the length of rail panel (s).

4. Encased guardrailposts shall conform in section to standard timber and steelposts, and be paid for under the contract unit price for Special Guardrail Post, EA. Payment shall include cost of foam wrap and concrete encasement.

SPECIAL POST LOCATIONS ON CURB INLETS

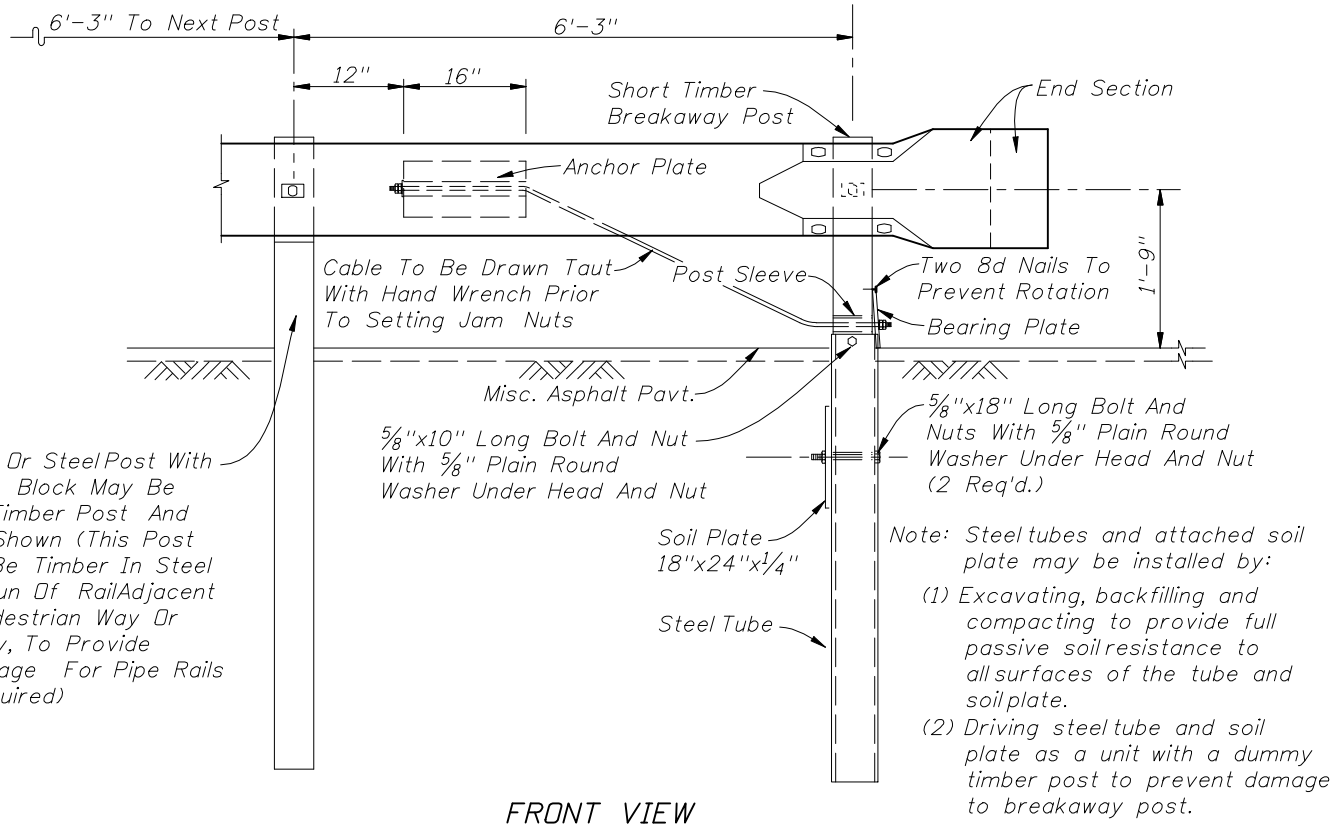
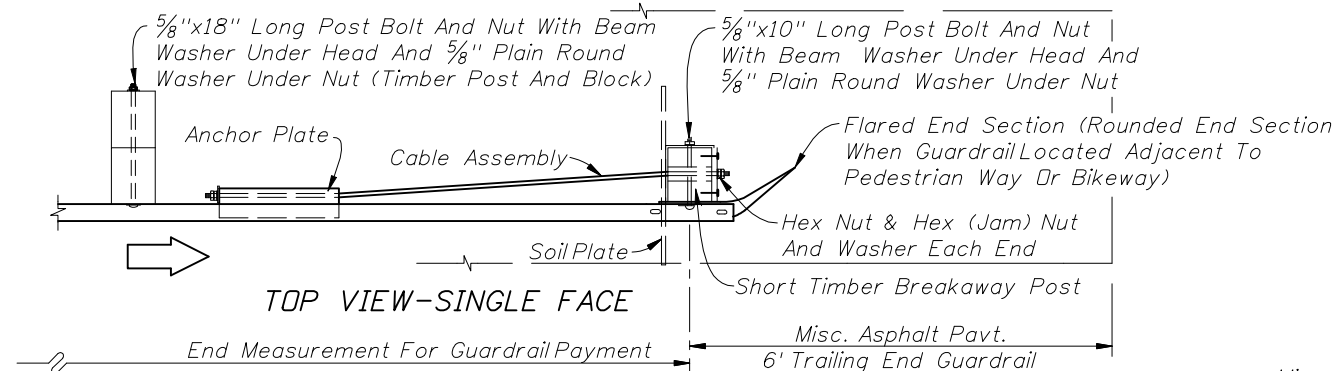
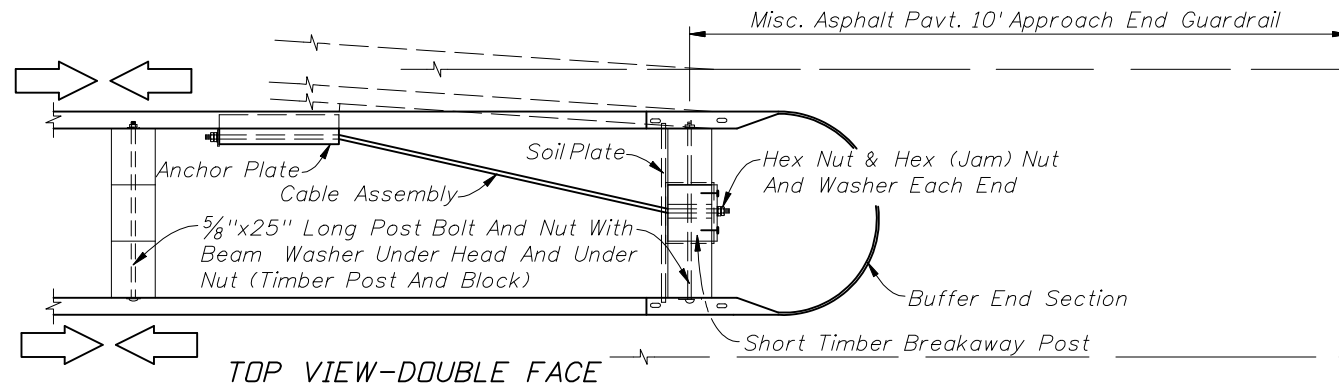


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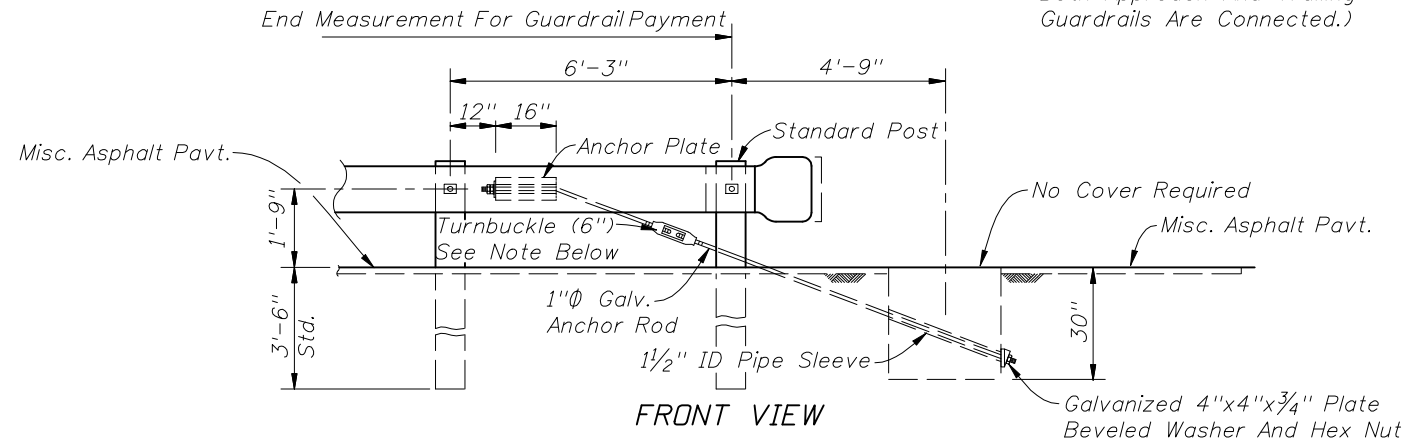
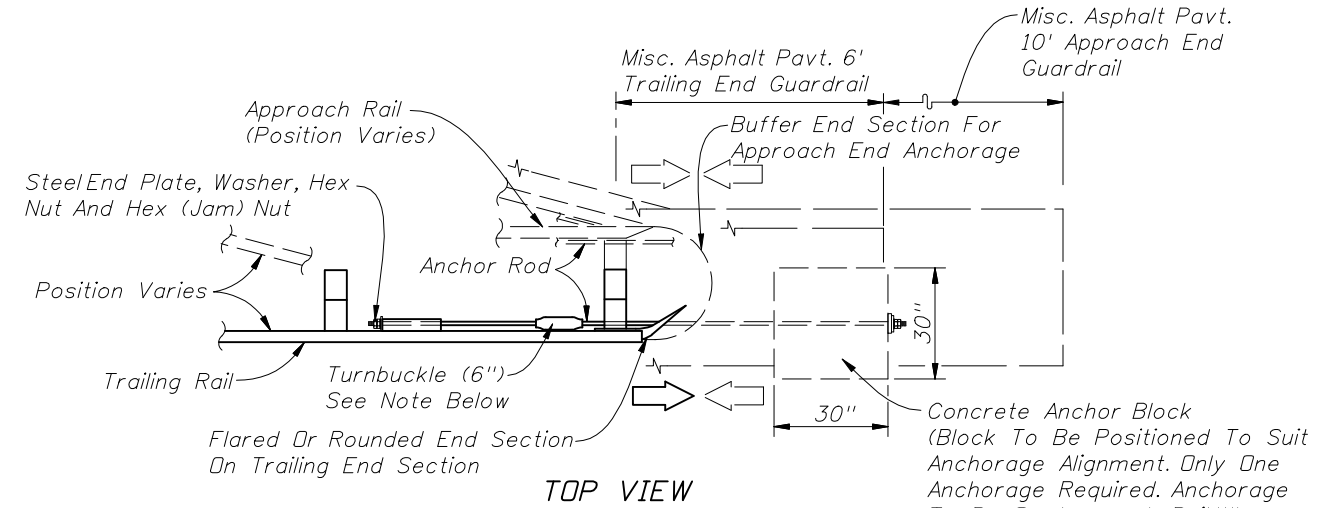


Timber Or Steel Post With Timber Block May Be Used, Timber Post And Block Shown (This Post Must Be Timber In Steel Post Run Of Rail Adjacent To Pedestrian Way Or Bikeway, To Provide Anchorage For Pipe Rails As Required)

Note: Steel tubes and attached soil plate may be installed by:
 (1) Excavating, backfilling and compacting to provide full passive soil resistance to all surfaces of the tube and soil plate.
 (2) Driving steel tube and soil plate as a unit with a dummy timber post to prevent damage to breakaway post.

The payment for the items of End Anchorage Assembly Type II shall be full compensation for furnishing and installing either the Round or the Buffer End Section, the Beam Anchor Plate, Cable Assembly, Pipe Sleeve, Soil Plate, Steel Tube, Bearing Plate, Short Timber Breakaway Post, Offset Blocks and the necessary hardware.

**CABLE ANCHOR OPTION
 END ANCHORAGE ASSEMBLY TYPE II**



Turnbuckle to be used only for guardrail that is reset vertically. The existing anchor rod (1" or 1 1/4" Dia.) shall be field cut, threaded 4" on each end, and metalized in accordance with Sections 562 and 975 of the Standard Specifications. The cost for cutting, threading, metalizing and the turnbuckle shall be included in the contract unit price for Reset Guardrail, LF.

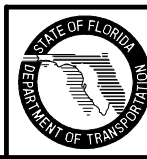
The payment for the items of End Anchorage Assembly Type II shall be full compensation for furnishing and installing the Beam Anchor Plate, Anchor Rod, Pipe Sleeve, Anchor Block, either Flared, Rounded or Buffer End Section, and the necessary hardware.

**CONCRETE ANCHOR BLOCK OPTION
 TYPE II NOTES**

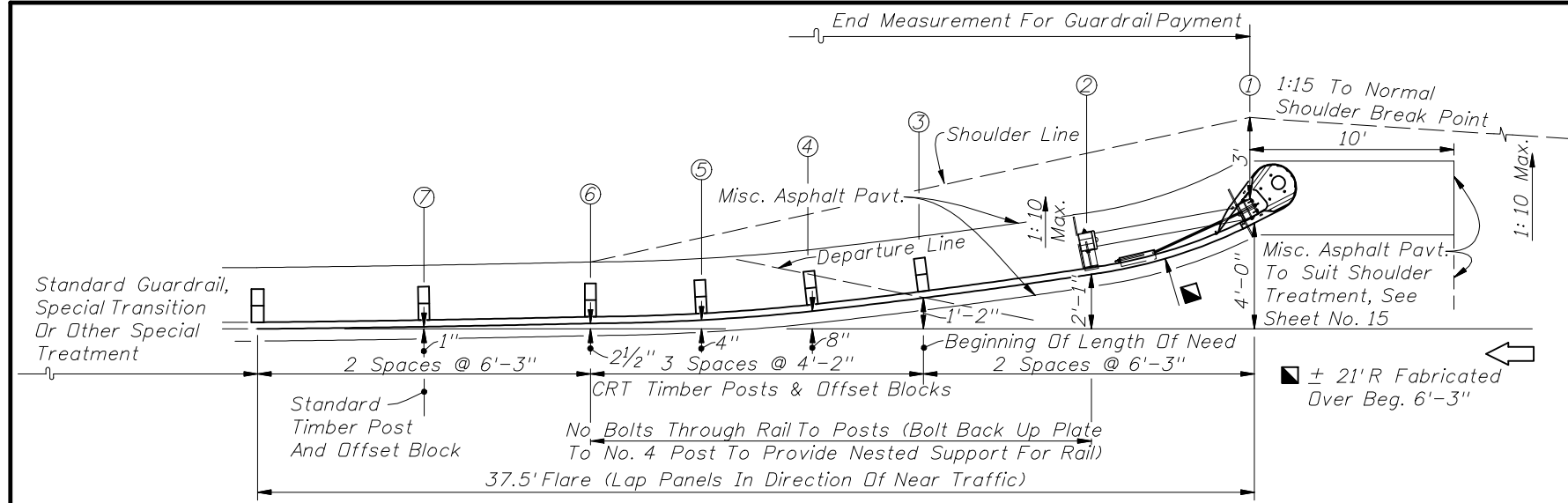
1. Unless specified in the plans, the contractor can supply either the cable anchor option or the concrete anchor block option.
2. Type II end anchorage assemblies are approved for all speeds and are intended for use as:
 - (a) trailing end anchorages for single face free standing guardrail systems;
 - (b) approach end anchorages for single face free standing guardrail systems when end anchorage is located outside of the clear zone; and,
 - (c) both approach and trailing ends of double face guardrail systems.
 Crash cushions shall be constructed at or in lieu of approach Type II end anchorages located inside the clear zone.

End anchorage for thrie beam guardrail shall be constructed the same as detailed for W-beam, except use thrie beam rail and end section; and the Anchor Plate is to be attached to the bottom corrugation of the thrie beam.

3. These end anchors are to be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Type II), EA as called for in the plans or by permit.



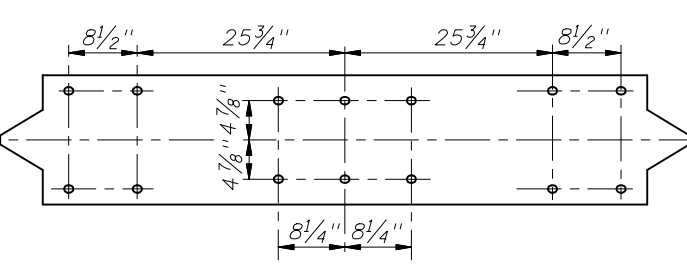
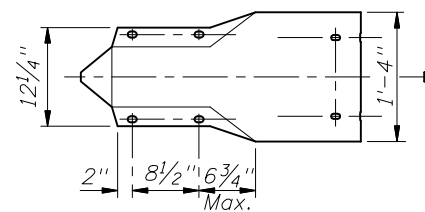
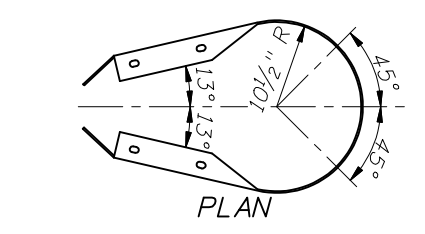
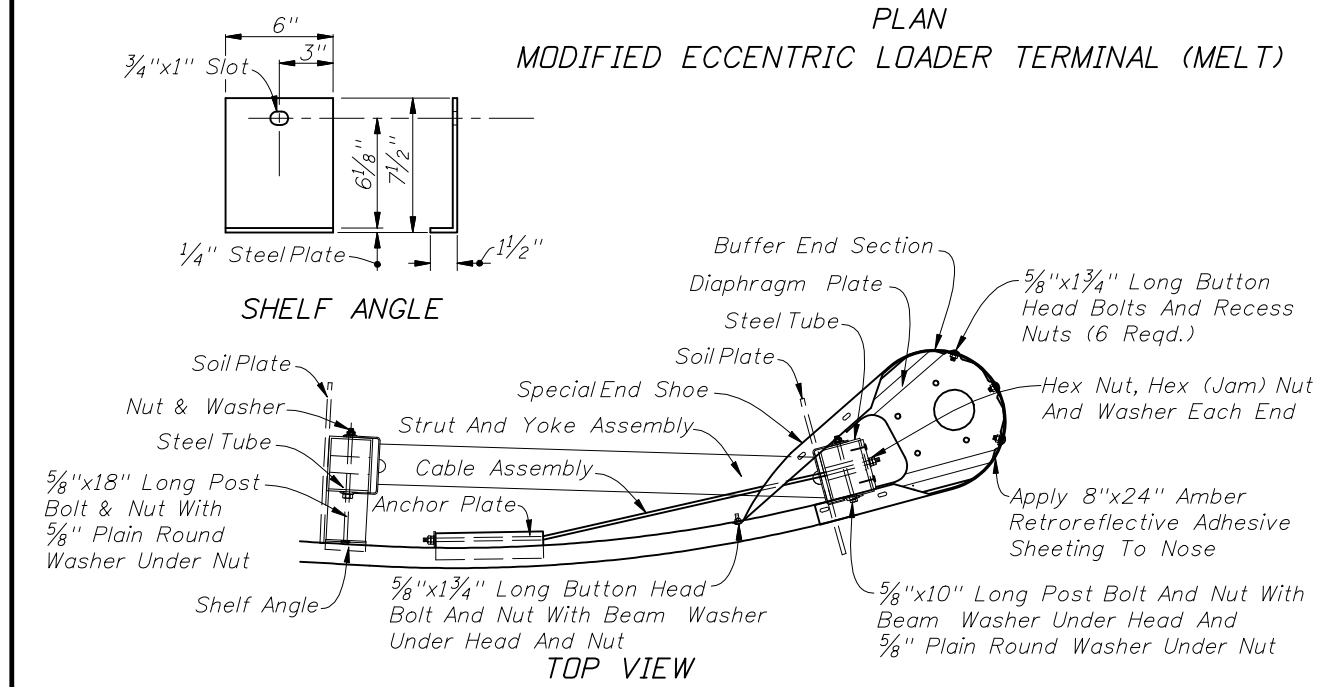
End Measurement For Guardrail Payment



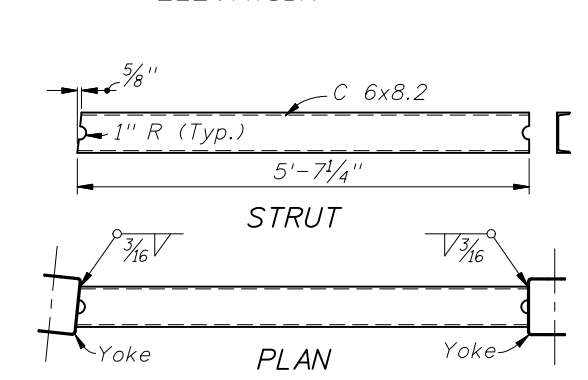
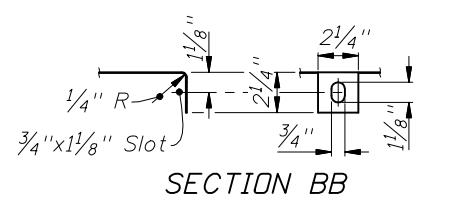
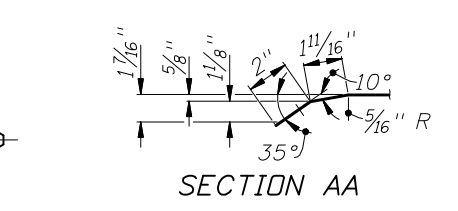
MODIFIED ECCENTRIC LOADER TERMINAL NOTES

1. The MELT is applicable for design speeds up to 45 mph. The MELT is intended for use as an approach end guardrail anchorage for shoulder guardrail. Its alignment is a flare from the normal guardrail alignment with an effective length of 37.5' including three standard W-beam panel outside of any standard guardrail, guardrail transitions or other special treatments.
2. This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the MELT and their incorporation into a whole system.
3. This standard drawing is sufficient for plan details for the MELT when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals. The MELT shall be assembled in accordance with the distributor's detailed drawings, procedures and specifications.
4. The first two post must be short timber breakaway posts with steel foundation tubes and soil plates, post Nos. 3 thru 6 must be CRT timber posts and post No. 7 must be a standard timber post.
5. The MELT can not be used in medians where horizontal clearance requires the use of a backrail.
6. See the General Notes for galvanizing requirements of metallic components.
7. If the plans call for the MELT at a specific location, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'flared' at a specific location, the contractor has the option to construct any FDOT approved flared assembly that meet the applications for that location. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchorage will not be eligible for VECF consideration.
8. The MELT shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Flared), EA and shall be full compensation for furnishing and installing all components in accordance with the plans; the distributor's detailed drawings, procedures and specifications and this Index.

PLAN
MODIFIED ECCENTRIC LOADER TERMINAL (MELT)

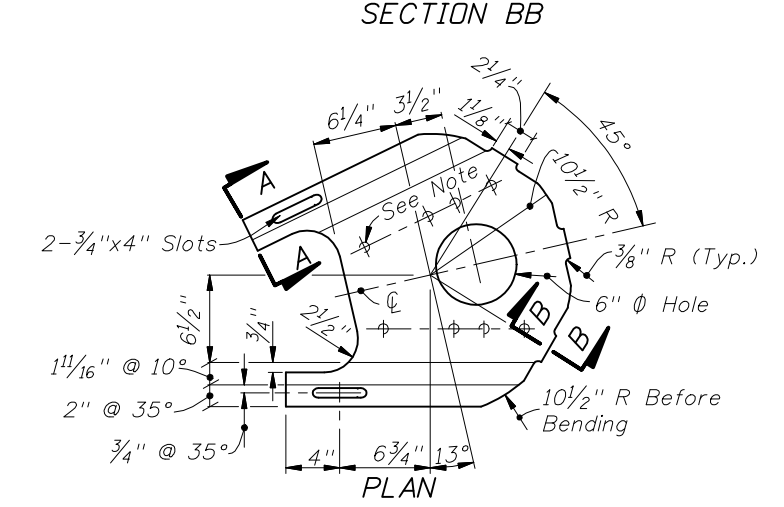


FLAT PLATE LAYOUT
All Slots Shall Be 29/32"x1/8"



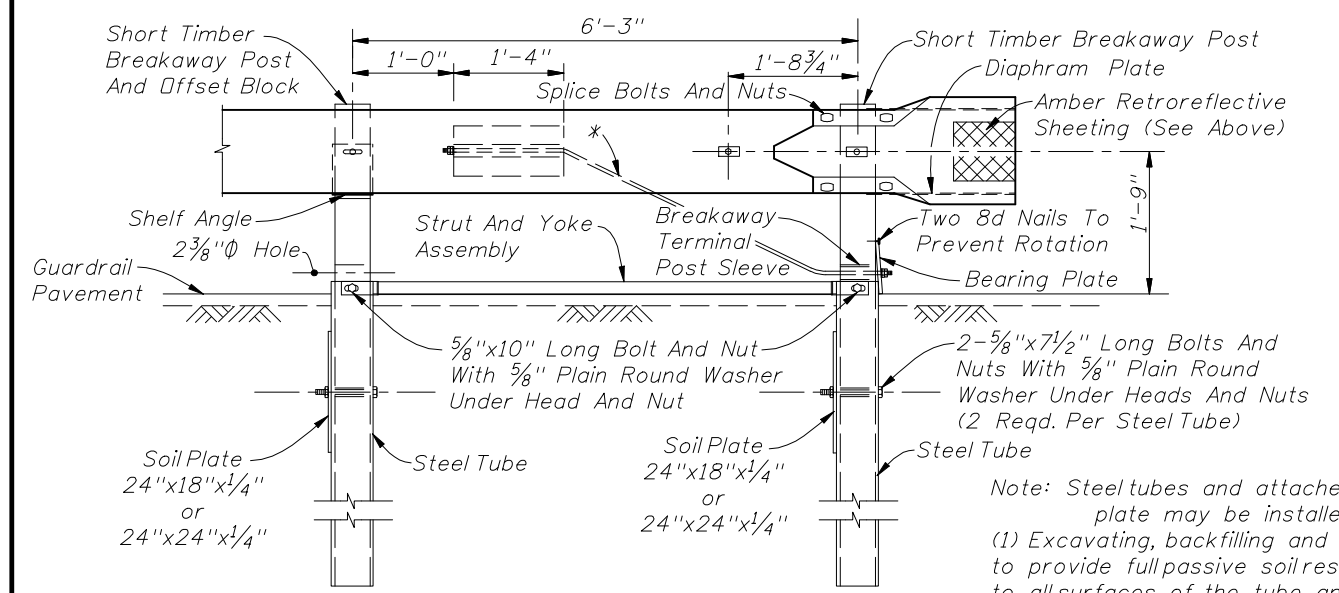
STEEL STRUT AND YOKE ASSEMBLY

Note: Assembly installed with channel turned down for right side guardrail and turned up for left side guardrail.



Note: Bolt holes are not required, but, diaphragms with either manufacturer produced two or three hole in line patterns are acceptable.

DIAPHRAGM PLATE (2 Reqd.)



Note: Steel tubes and attached soil plate may be installed by:
(1) Excavating, backfilling and compacting to provide full passive soil resistance to all surfaces of the tube and soil plate.
(2) Driving steel tube and soil plate as a unit with a dummy timber post to prevent damage to breakaway post.

* Cable To Be Drawn Taut With Hand Wrench Prior To Setting Jam Nuts

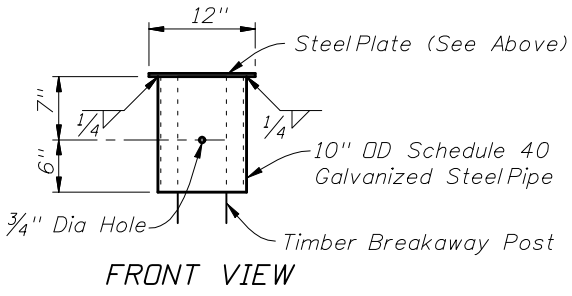
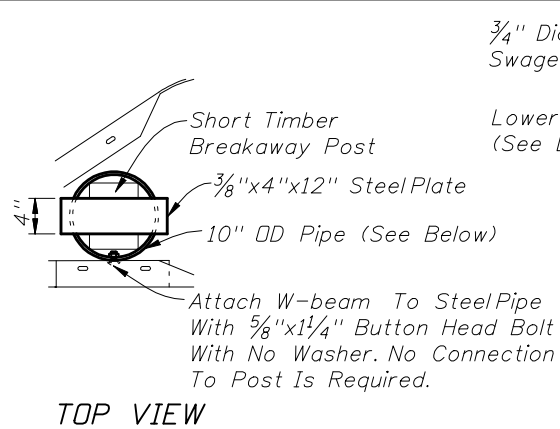
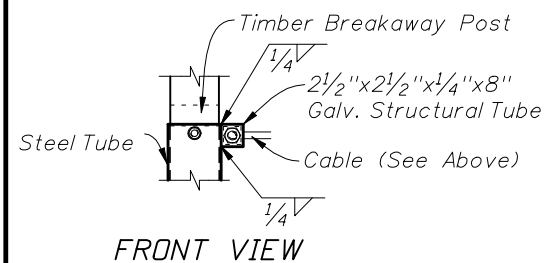
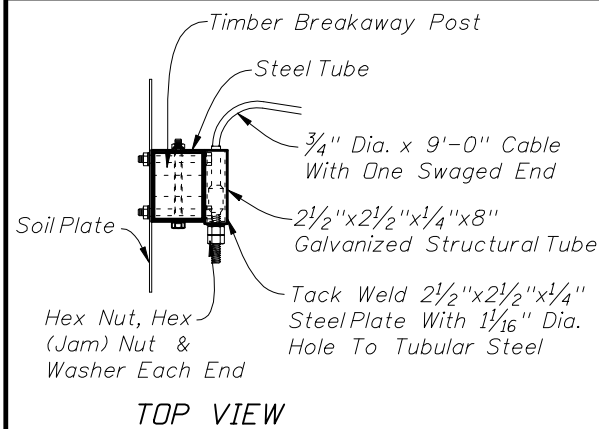
END ANCHORAGE ASSEMBLY TYPE MELT



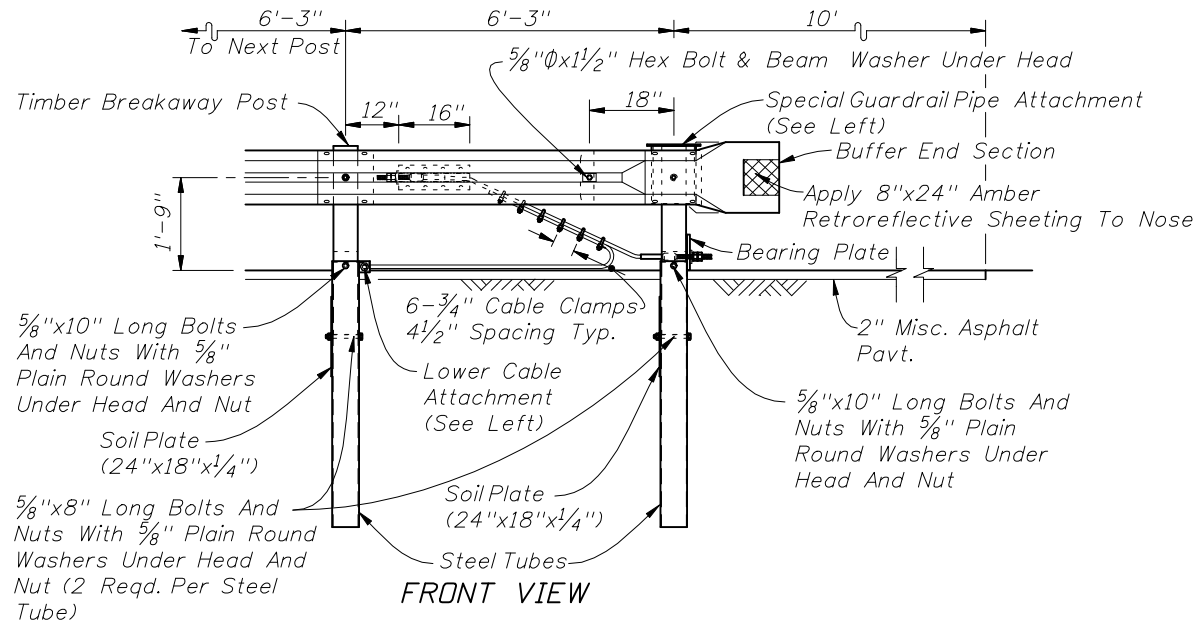
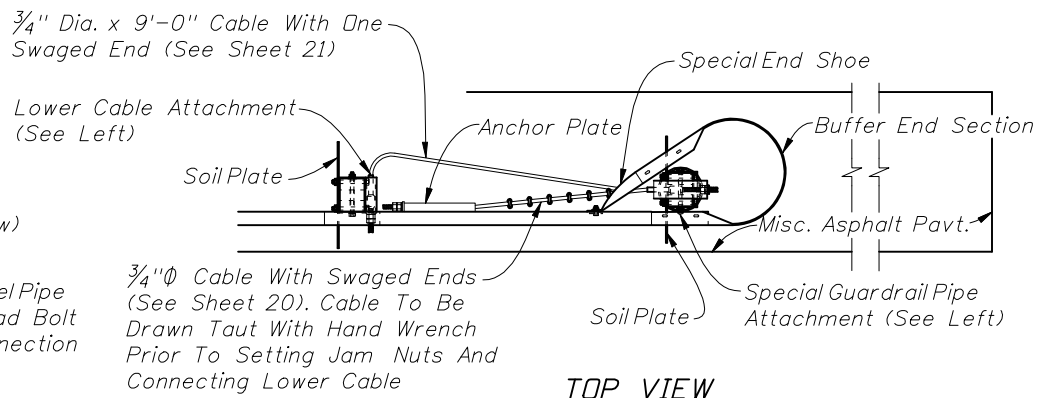
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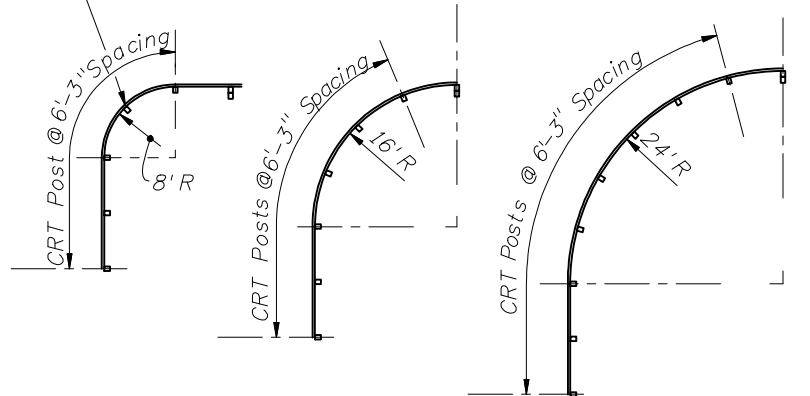


LOWER CABLE ATTACHMENT SPECIAL GUARDRAIL PIPE ATTACHMENT

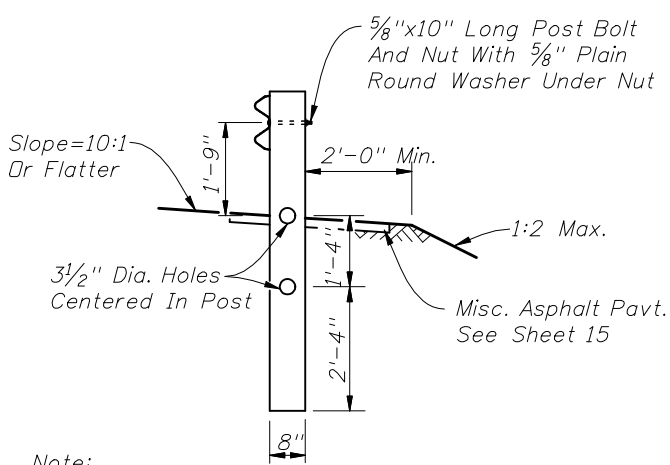
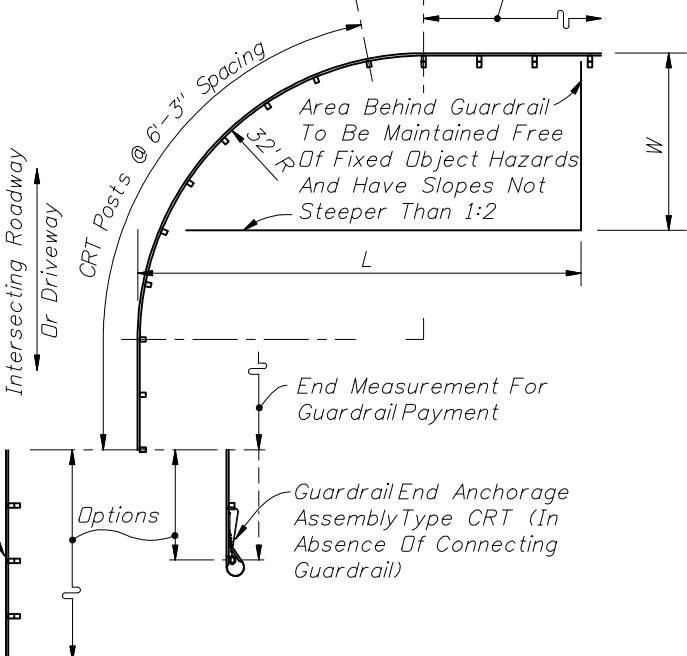


GUARDRAIL END ANCHORAGE ASSEMBLY TYPE CRT

Do NOT Bolt Rail To Post At The Center Of The Nose. (See 'CONTROLLED RELEASE RETURN NOTES' No. 10)



Principle Highway
Standard Wood Or Steel Posts Guardrail Section (As Shown) Or Guardrail Transition To Bridge Rail (See Detail J and Index No. 402) Or To Barriers Wall (Index No. 410)



Note: To be constructed when flares and transitions or standard radial returns can not be applied. See Sheet 12.

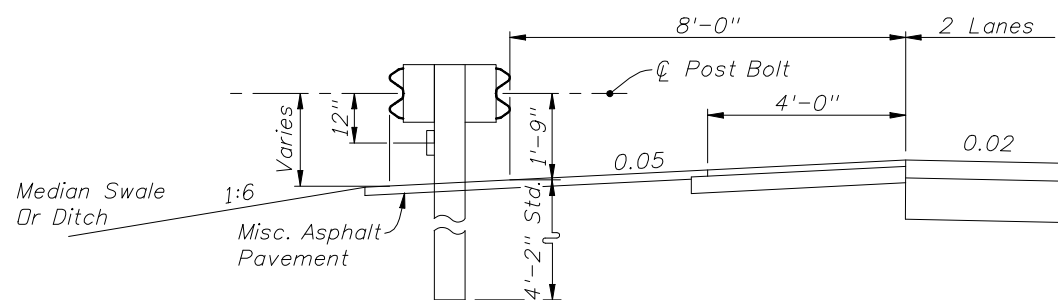
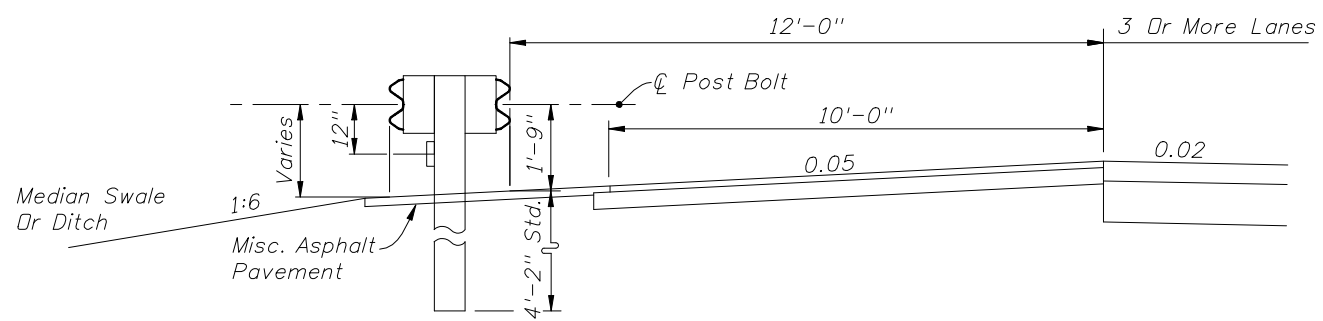
CRT TIMBER POST

Return Nom. R	Length Of Shop Bent Panels	No. Of CRT Posts	Required Area Free Of Hazards L W
8'	12.5'	5	25' x 15'
16'	25'	6	30' x 15'
24'	37.5'	8	40' x 20'
32'	50'	11	50' x 20'

CONTROLLED RELEASE RETURN NOTES

- Controlled release returns are intended for use (a) in openings in continuous guardrail for driveway and side road access when flares and transitions or standard radial returns can not be applied (Sheet 12); and, (b) for shielding the ends of bridge traffic rails and barrier walls where the driveway and side road access is in close proximity to the structure and space does not permit the proper use of approved flared and parallel types of Guardrail End Anchorage Assemblies.
- Controlled release returns are not intended as a substitute or replacement for the appropriate use of approved vehicle impact attenuators.
- Controlled release returns with either 8', 16' or 24' radii are designed for highway speeds of 60 mph or less; the 32' radius return is to be used only highway speeds of 60 mph or less; the 32' radius return is to be used only for highway speeds of 45 mph or less.
- The controlled release returns shown are designed as full returns based on an intersection angle of 90°. The return can be terminated with the Guardrail End Anchorage Assembly Type CRT or connected to standard guardrail as shown or as otherwise detailed in the plans.
- The Guardrail End Anchorage Assembly Type CRT is to be used only for the controlled release returns with 8', 16', 24' and 32' radii as shown; the assembly is not to be used in any tangent rail or flared rail applications. Other types of end anchorage assemblies are not to be used in the controlled release returns.
- The area immediately behind the control release return shall have slopes not steeper than 1:2 and be maintained free of fixed objects in accordance with the area limits tabulated in the plan below.
- The surface approaching the controlled release return shall have a transverse slope not exceeding 1:10. The effective width of the transverse surface is to be based on standard vehicle departure, return radii and preceding shielding; the width (beyond shoulder) shall be not greater than the corresponding 15' and 20', 'W' values tabulated below.
- The curved guardrail portion of the controlled release return shall be full section shop bent panels (12.5' or 25' panels).
- Washers are not to be used between the guardrail beam and the head of the button head post bolts at any controlled release terminal (CRT) post or at any Guardrail End Anchorage Assembly Type CRT breakaway timber post.
- The guardrail beam of the 8' radius return is not bolted to the center control release post.
- See the General Notes for galvanizing requirements of metallic components.
- Controlled release return systems shall be paid for under the contract unit prices for Guardrail (Roadway), LF, Guardrail (Shop-bent Panels), LF, and Guardrail, End Anchorage Assembly (Type CRT), EA as called for in the plans or by permit and shall be full compensation for furnishing and installing all components in accordance with the plans and with this index. CRT posts are included in the cost for guardrail.





Notes:

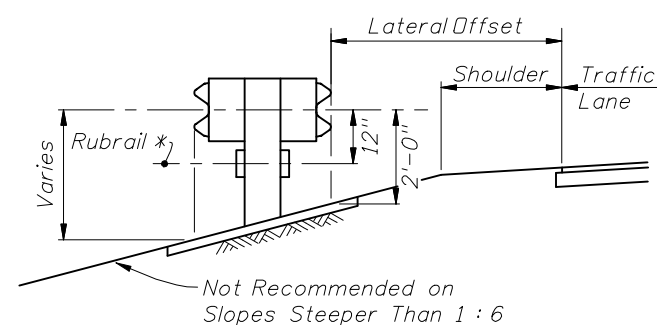
1. Typical placement shown. May be constructed at other locations as called for in the plans.
2. Rubrail required on median side or ditch side of barrier.

MOUNTING HEIGHT FOR DOUBLE FACED GUARDRAIL ON MEDIAN SHOULDERS (FREEWAYS)

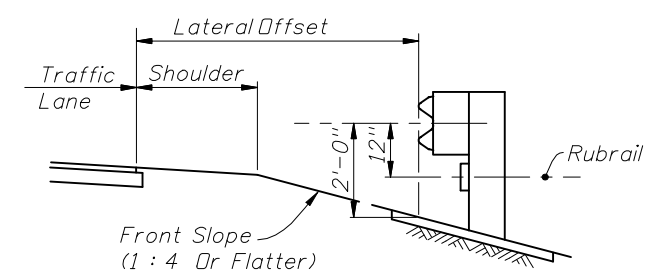
LATERAL PLACEMENT ON SLOPES (FROM EDGE OF NEAR TRAFFIC LANE) ⁽¹⁾			
Slope	Standard Guardrail ⁽²⁾	Guardrail Not Recommended	Guardrail With Rubrail ⁽³⁾
1:4	to 13'	14' to 27'	28' to 45'
1:5	to 14'	15' to 25'	26' to 45'
1:6	to 16'	17' to 22'	23' to 45'
1:7	to 20'	21' to 24'	25' to 45'
1:8	to 25'		26' to 45'
1:9	to 26'		27' to 45'
1:10	to 27'		28' to 45'

Notes:

- (1) For shoulders less than 12' in width the tabulated values will be reduced by the difference between 12' and the shoulder width. Placement of guardrail on front slopes steeper than 1:4 not recommended. Cost of rubrail to be included in the contract unit price for guardrail.
- (2) Standard guardrail: 1'-9" to center of post bolt. Rubrail required on median side when double face guardrail is used.
- (3) Guardrail with rubrail: 2'-0" to center of post bolt.



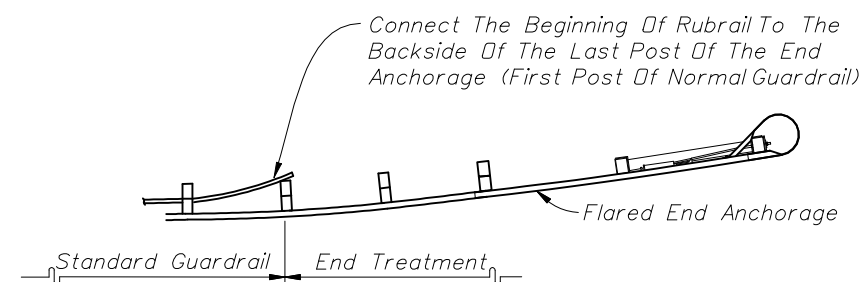
GUARDRAIL ON MEDIAN SLOPES



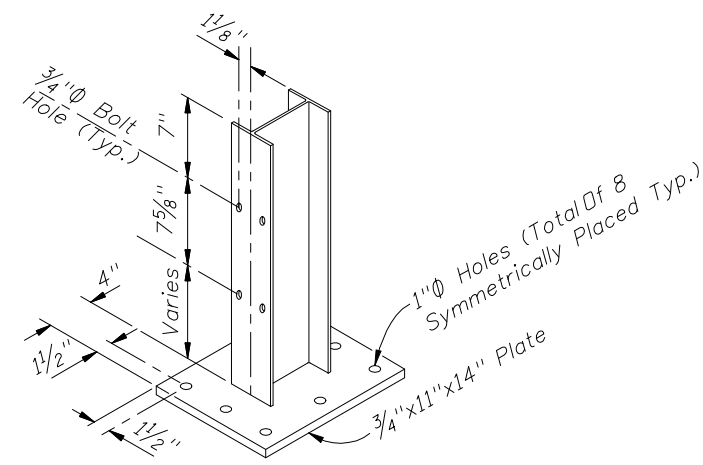
GUARDRAIL ON OUTSIDE SLOPES

* C6x8.2, Plates And Fastners or Bent Plate And Fastners In Accordance With Standards RLR01 And RER01 Of AASHTO-AGC-ARTBA "A Guide To Standardized Highway Barrier Hardware"

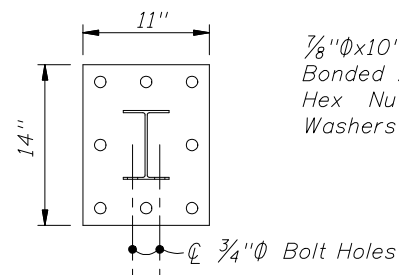
GUARDRAIL ON SLOPES



RUBRAIL TERMINATION

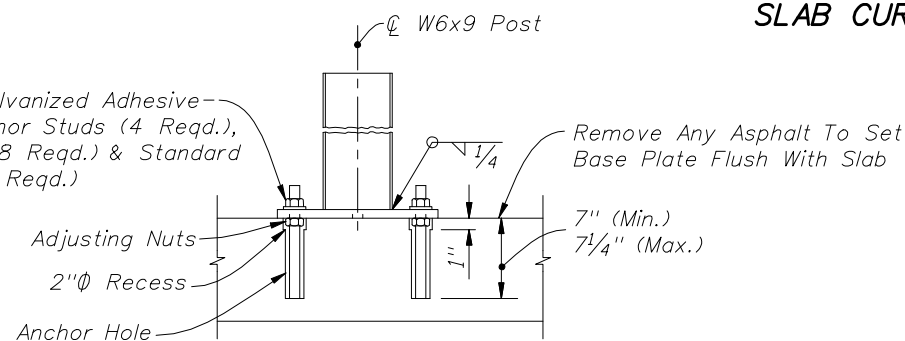


PICTORIAL



TOP VIEW

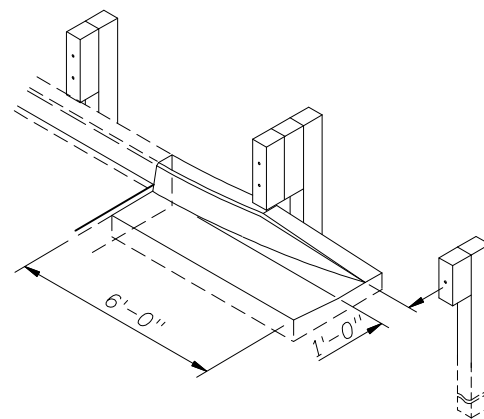
7/8"Øx10" Galvanized Adhesive-Bonded Anchor Studs (4 Reqd.), Hex Nuts (8 Reqd.) & Standard Washers (4 Reqd.)



SIDE VIEW

SPECIAL STEEL POST FOR ROADWAY THRIE-BEAM TRANSITIONS TO BRIDGE TRAFFIC RAILING RETROFITS

CURB TYPE F FLARE WHEN END OF EXISTING APPROACH SLAB CURB EXPOSED



- GENERAL NOTES**
1. This index provides thrie-beam transition and connection details for approach end guardrail on existing bridges, and anchorage details for trailing end traffic railing retrofits and safety shapes on existing bridges. Sheets 1 through 23 apply to bridges with retrofitted traffic railings, (Sheet 23 shows the trailing end guardrail connections). Sheet 24 applies to bridges with safety shaped traffic railing.
 2. The schemes identified by Arabic numerals in this index are complementary to the bridge traffic railing barrier retrofit schemes with like numeral identification in Index Nos. 470, 471 through 476, 480 through 483. The schemes in this index identified by Roman numerals are complementary to bridge safety shaped traffic railing barrier where determined to be in accordance with applications of criteria specified in the Structures Manual.
 3. For guardrail applications and details of related hardware and accessories that are not provided on this index, refer to Index No. 400.

NOTES FOR GUARDRAIL TRANSITIONS CONNECTING TO TRAFFIC RAILING RETROFITS ON EXISTING BRIDGES

1. The transition detail shown on this sheet shows (a) the standard post spacings within the typical thrie-beam approach transitions connecting to existing bridges with retrofit traffic railings, and (b) depict the typical alignments of the approach transitions.
2. The curb and gutter flare shown on this sheet is typical of flares that are to be constructed when approach slab curbs extend to the beginning of the slab, and where other treatment to curb blunt ends are not in place.
3. The special steel post for roadway thrie-beam transitions detailed on this sheet is specific to all transition applications on this index that require one or more steel posts.

The special steel post and base plate assembly shall be fabricated using ASTM A36 or ASTM A709 Grade 36 steel. Welding shall conform to ANSI/AASHTO/AWS D1.5. The assembly shall be hot-dip zinc coated in accordance with Section 536 of the Specifications.

Anchor studs shall be fully threaded rods in accordance with ASTM F1554 Grade 36 or ASTM A193 Grade B7. All nuts shall be heavy hex in accordance with ASTM A563 or ASTM A194. Anchor studs and nuts shall be hot-dip zinc coated in accordance with the Specifications. After the nuts have been snug tightened, the anchor stud threads shall be single punch distorted immediately above the top nuts to prevent loosening of the nuts. Distorted threads shall be coated with a galvanizing compound in accordance with the Specifications.

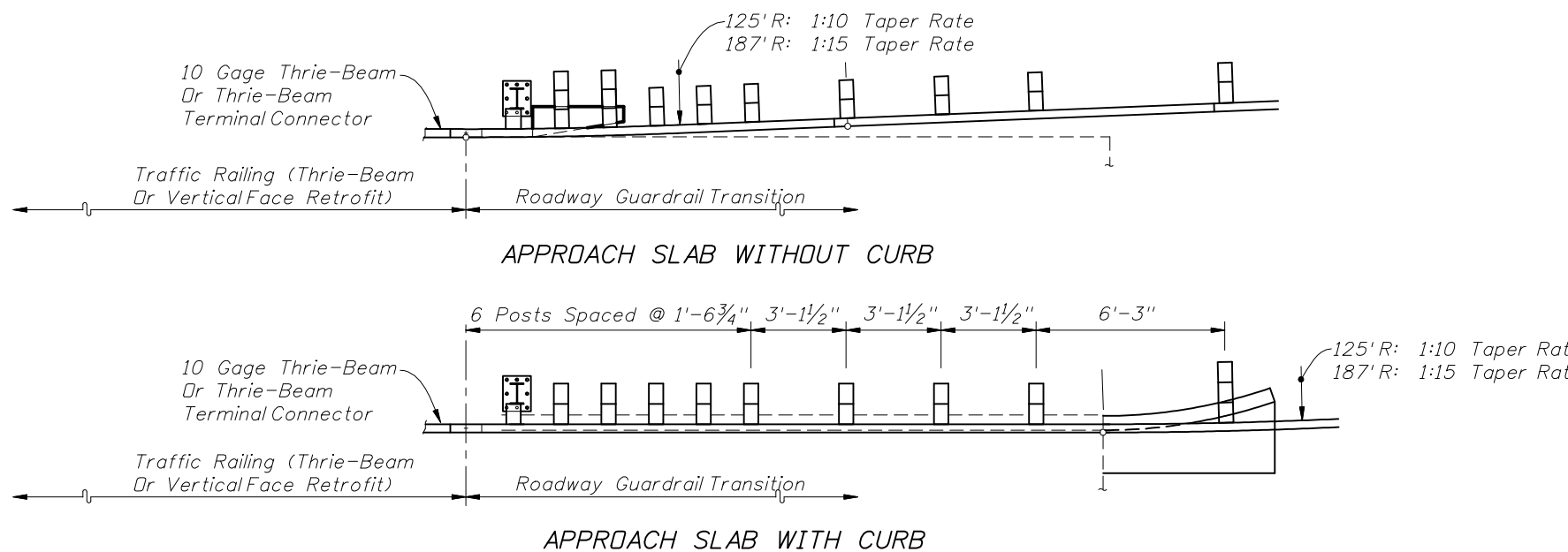
Adhesive bonding material systems for anchors shall comply with Specification Section 937 and be installed in accordance with Specification Section 416.4. Nested beam extensions and points for terminal connector attachments will vary for traffic railing barrier vertical face retrofits. The plan views for the vertical face retrofit barriers show the primary configurations for each particular scheme. The associated pictorial views show the variations.

5. For installing thrie-beam terminal connector to traffic railing vertical face retrofits, see notations on Sheets 12 through 15 and the flag notation on Sheet 23.

6. Payment for connections to traffic railing vertical face retrofits are to be made under the contract unit price for Bridge Anchorage Assembly, EA, and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate and bolts, nuts and washers.

DESIGN NOTES FOR GUARDRAIL TRANSITIONS CONNECTING TO TRAFFIC RAILING RETROFITS ON EXISTING BRIDGES

1. For selection of an appropriate transition scheme, see the Structures Manual for instructions to the Structures and Roadway engineers.



Longitudinal Location Of Transition Blocks And Curb End Flares Will Vary With Scheme Type

PARTIAL PLAN VIEWS

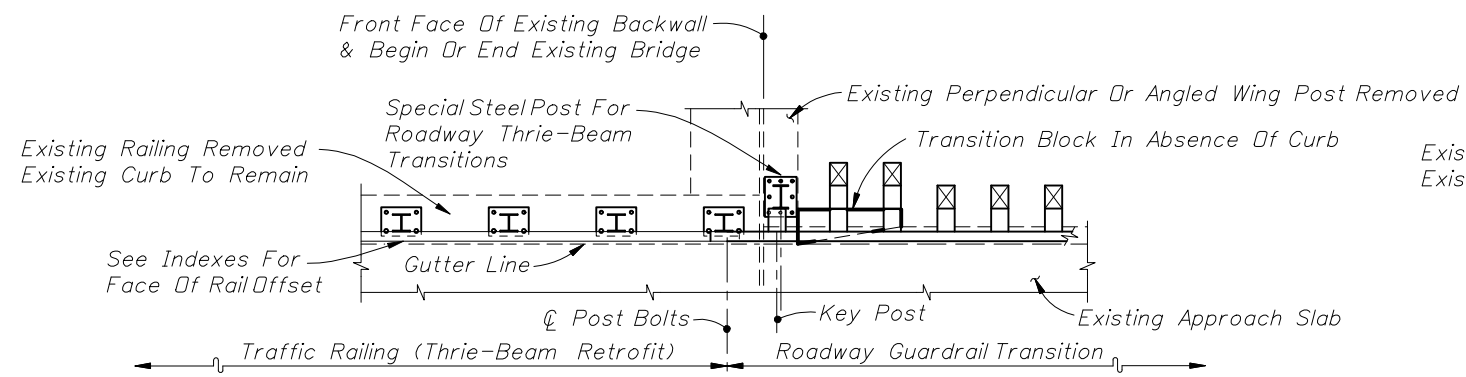
GUARDRAIL TRANSITION ALIGNMENTS FOR BRIDGE THRIE-BEAM AND VERTICAL FACE TRAFFIC RAILING RETROFIT



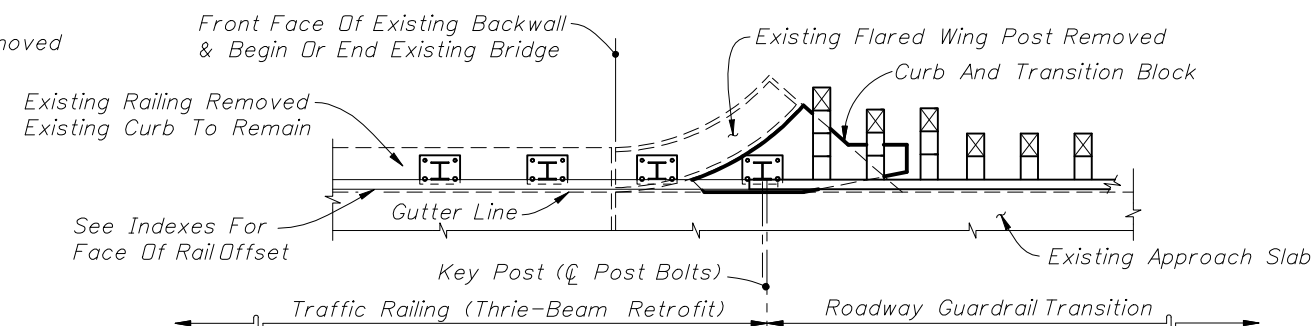
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GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

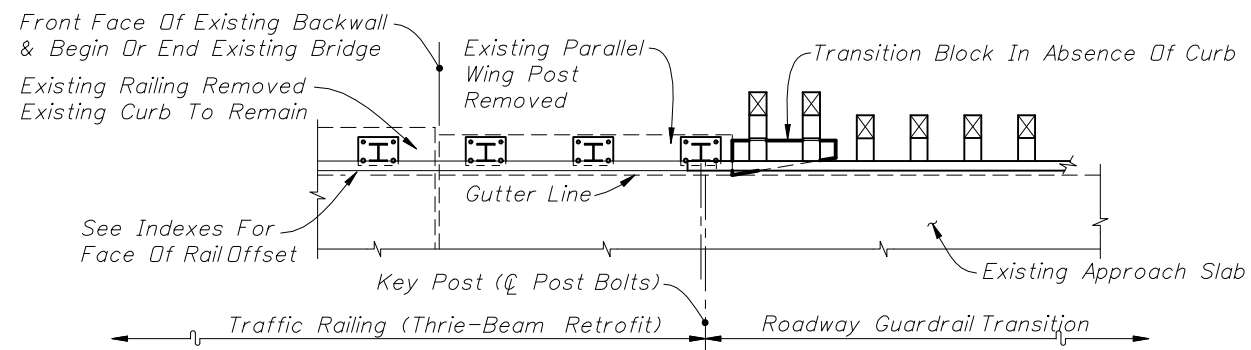
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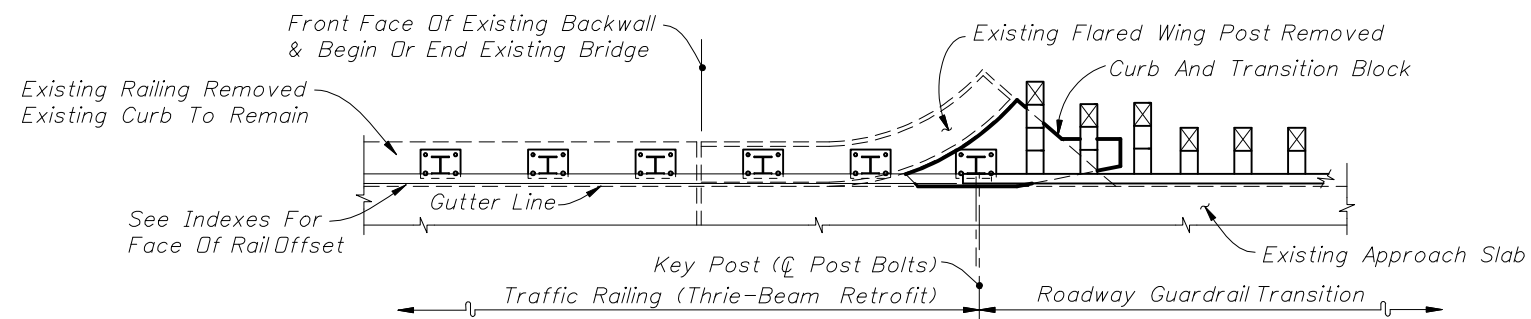
SEE INDEX NO. 471 - SCHEME 1



SEE INDEX NO. 471 - SCHEME 3



SEE INDEX NO. 471 - SCHEME 2



SEE INDEX NO. 471 - SCHEME 3

PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS
FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)



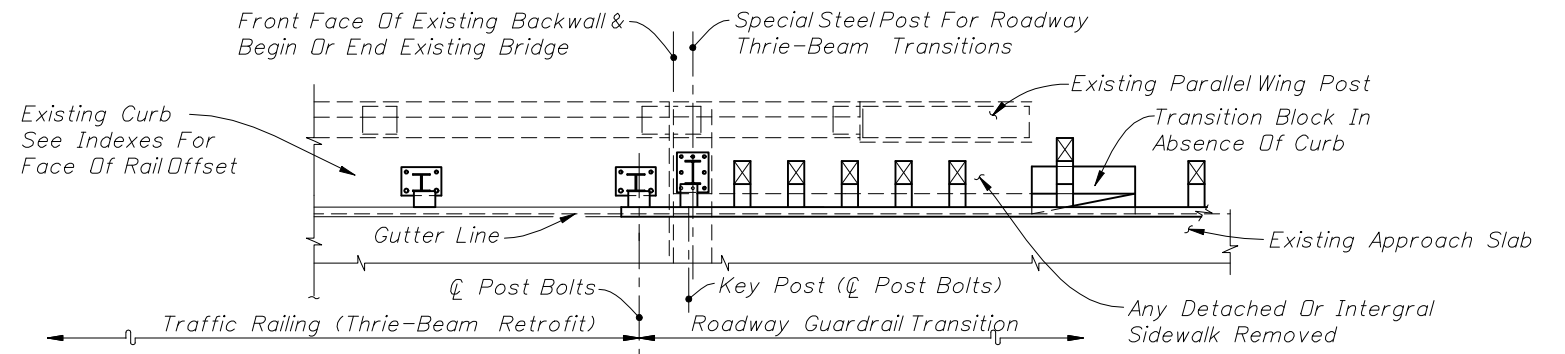
2010 FDOT Design Standards

GUARDRAIL TRANSITIONS AND
CONNECTIONS FOR EXISTING BRIDGES

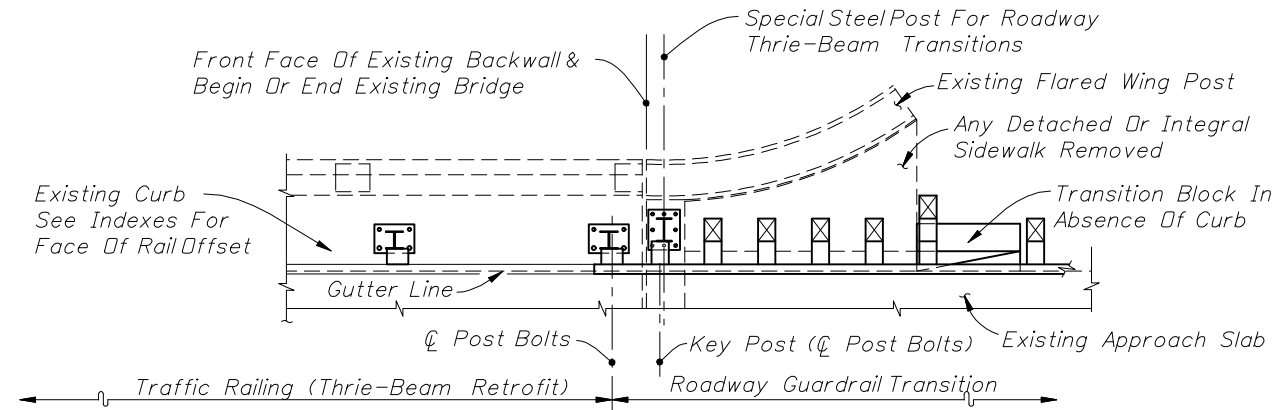
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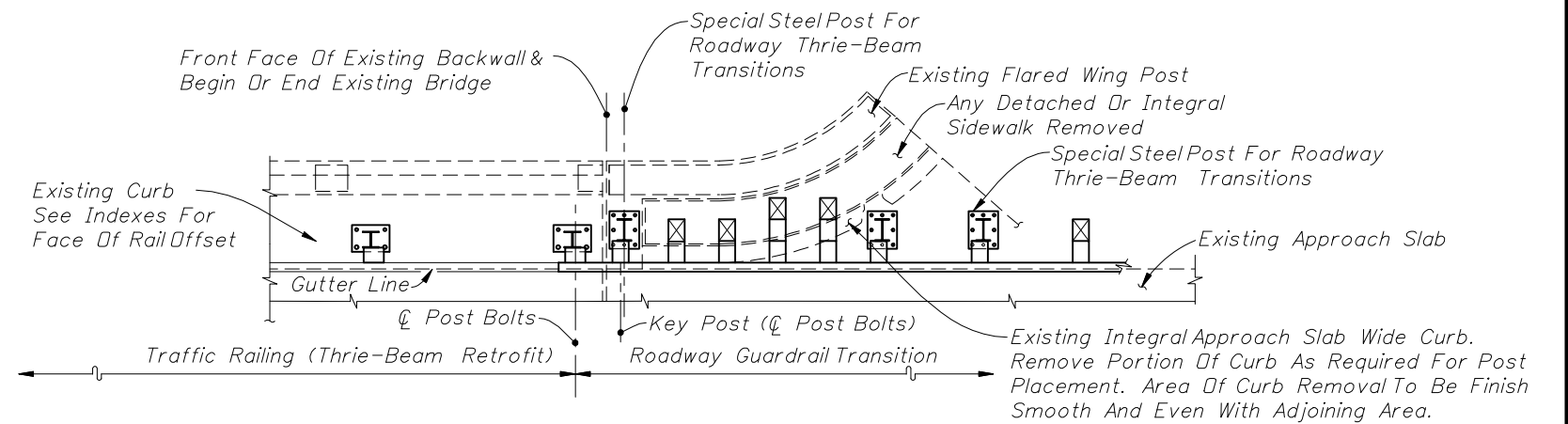
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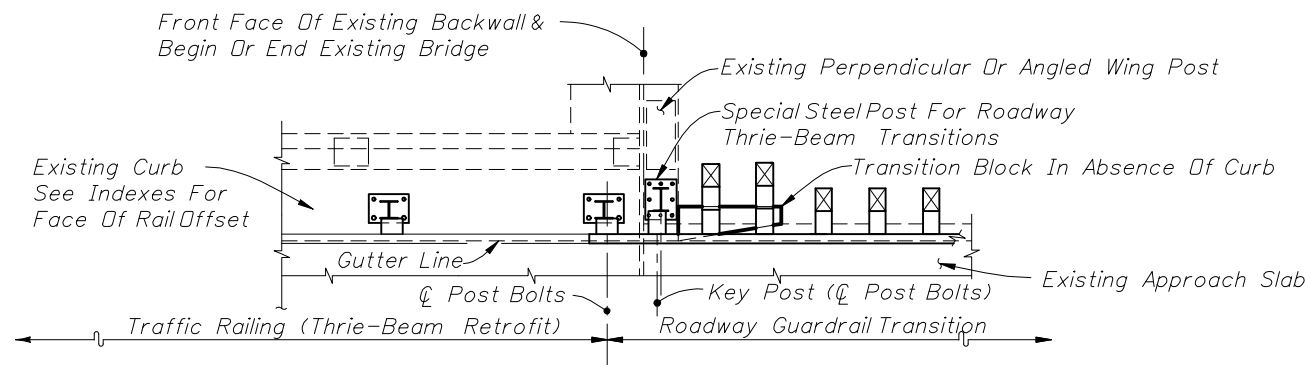
SEE INDEX NOS. 472 & 475 - SCHEME 2



SEE INDEX NOS. 472 & 475 - SCHEME 2

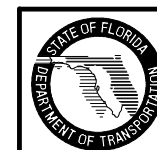


SEE INDEX NOS. 472 & 475 - SCHEME 2



SEE INDEX NOS. 472 & 475 - SCHEME 1

PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS
FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)



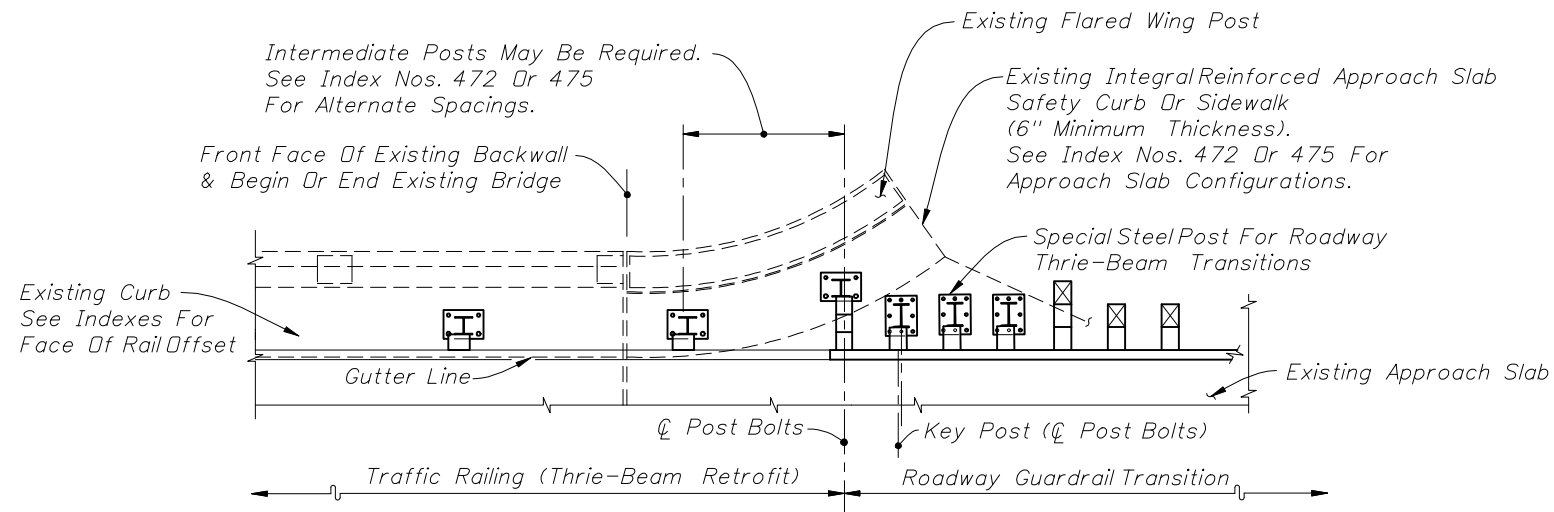
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GUARDRAIL TRANSITIONS AND
CONNECTIONS FOR EXISTING BRIDGES

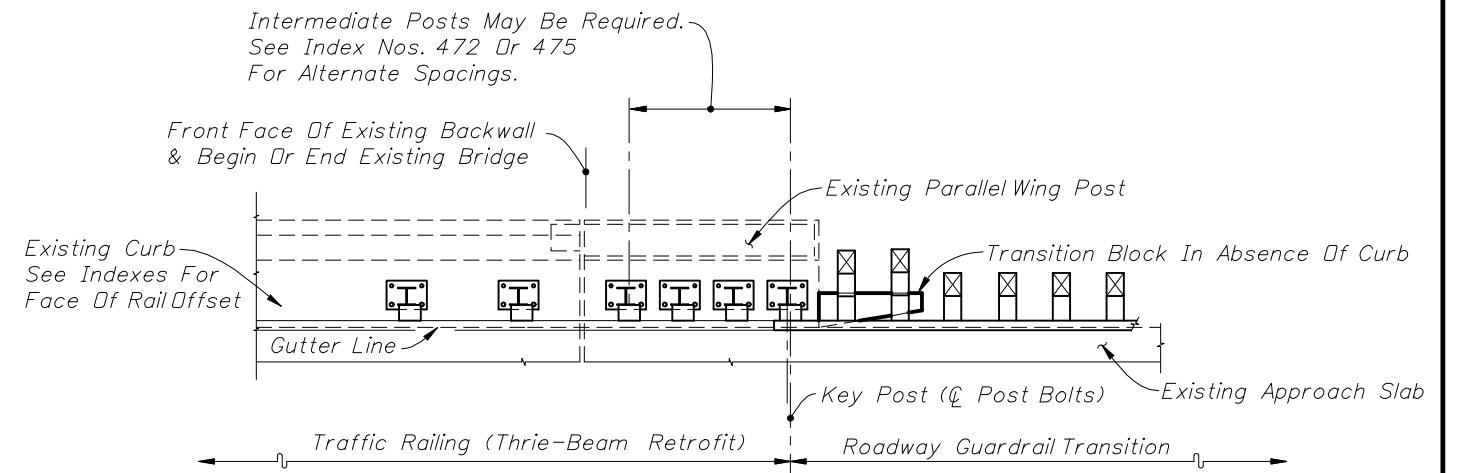
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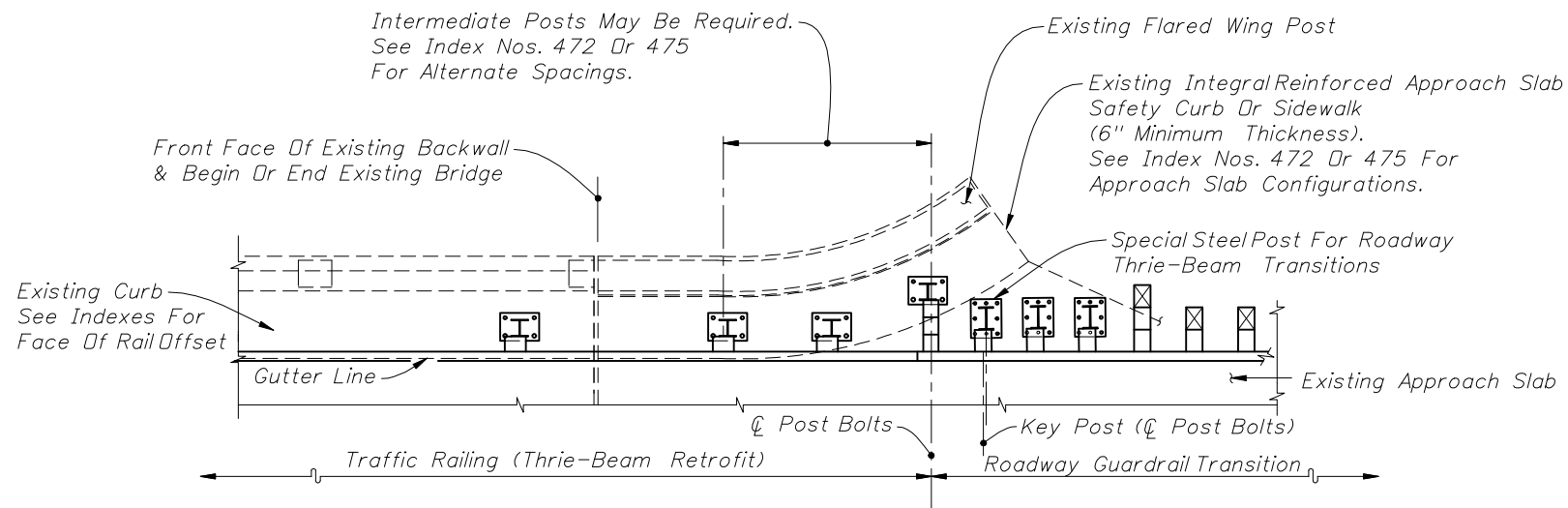
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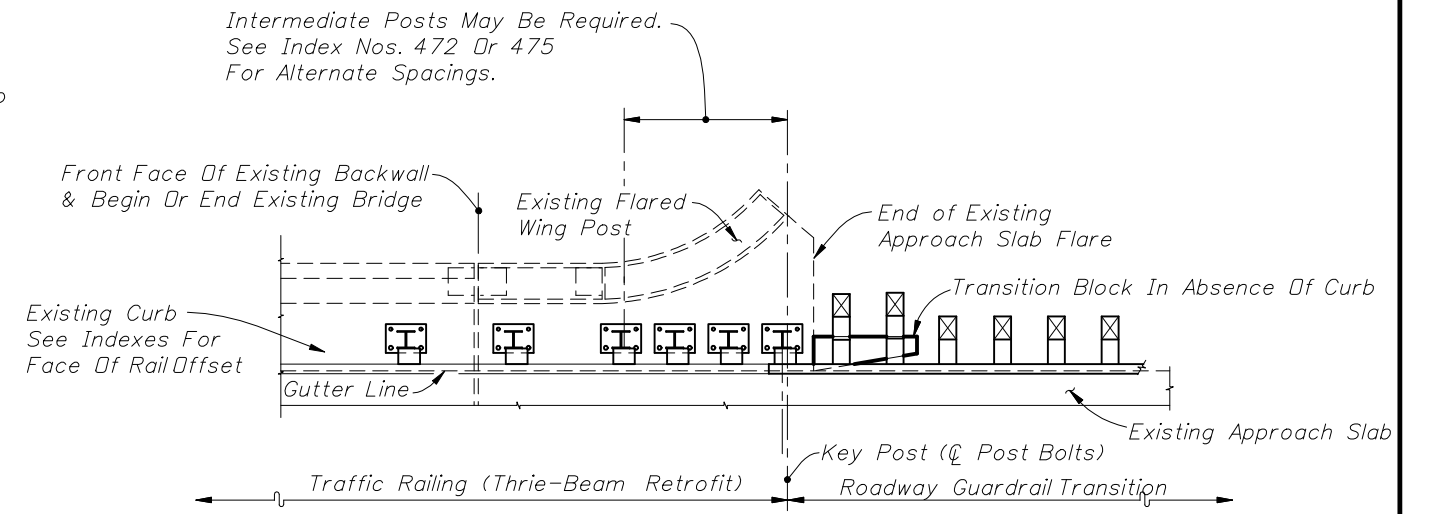
SEE INDEX NOS. 472 & 475 - SCHEMES 3 & 4



SEE INDEX NOS. 472 & 475 - SCHEMES 5 & 6



SEE INDEX NOS. 472 & 475 - SCHEMES 3 & 4



SEE INDEX NOS. 472 & 475 - SCHEMES 5 & 6

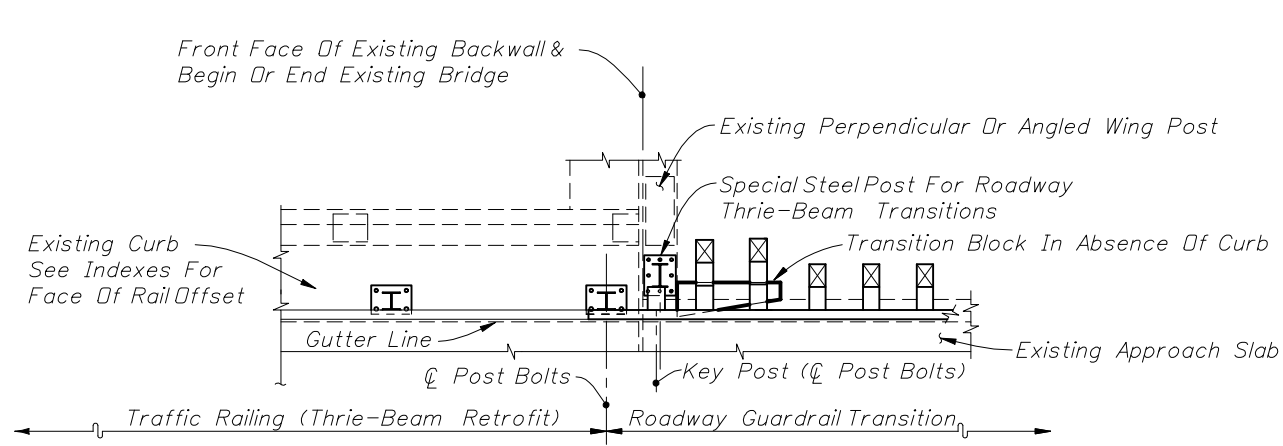
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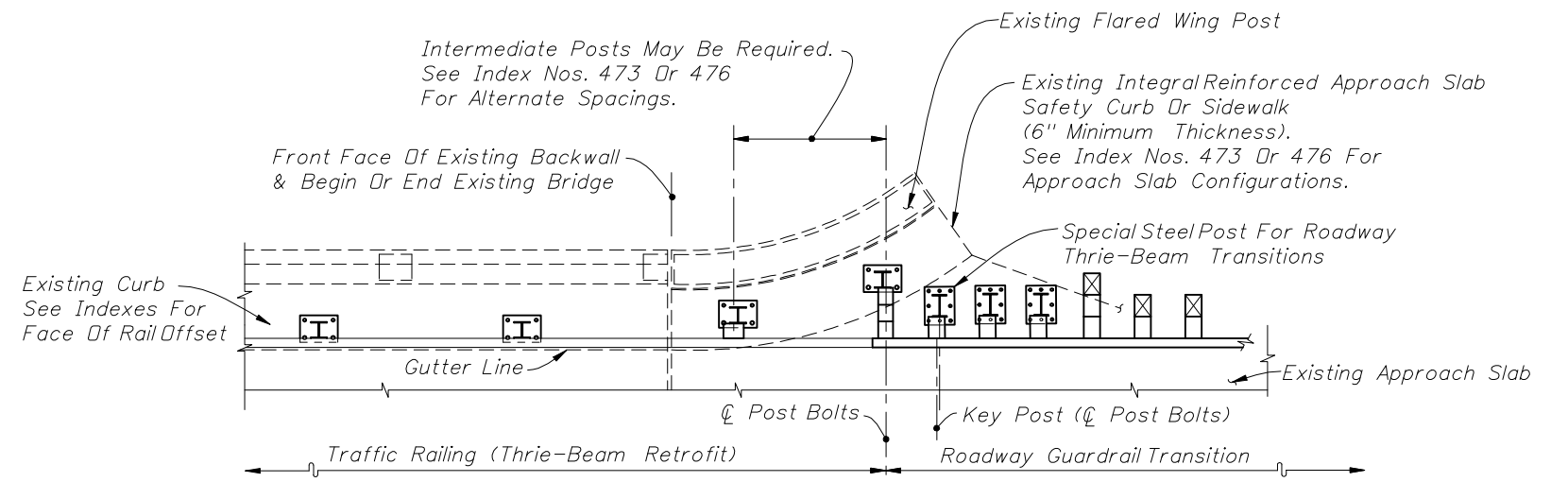
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GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

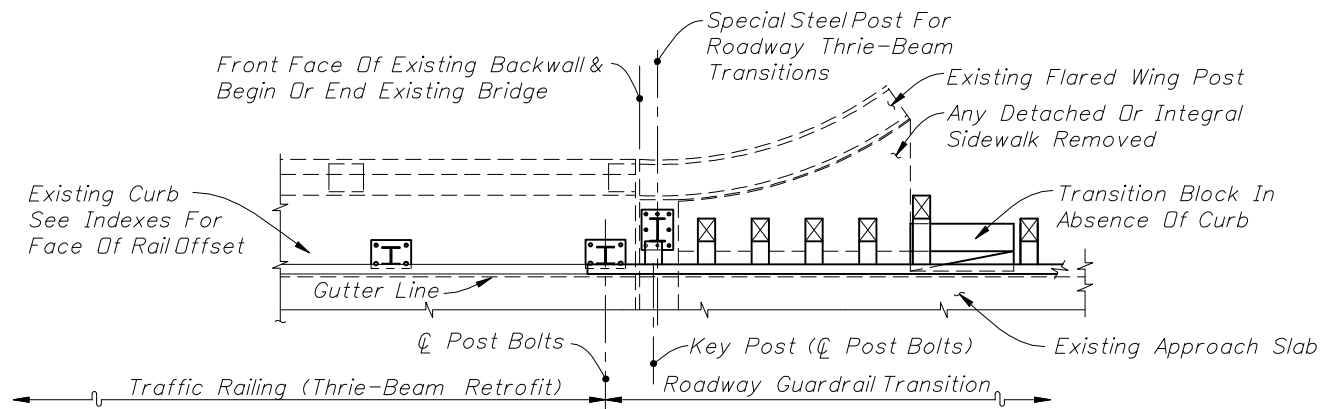
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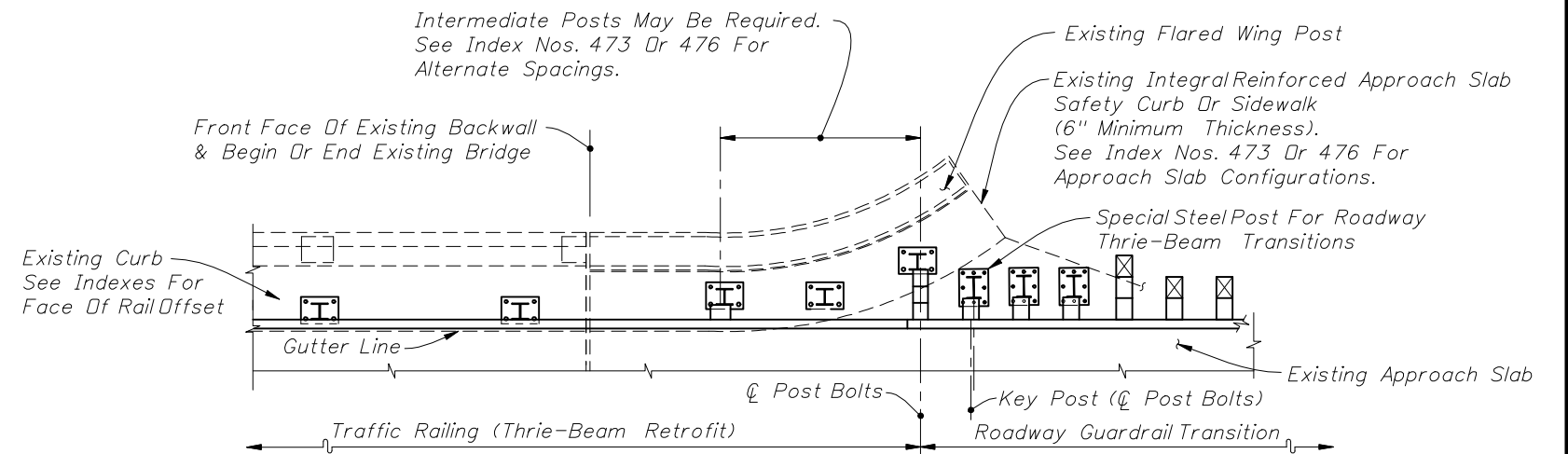
SEE INDEX NOS. 473 & 476 - SCHEME 1



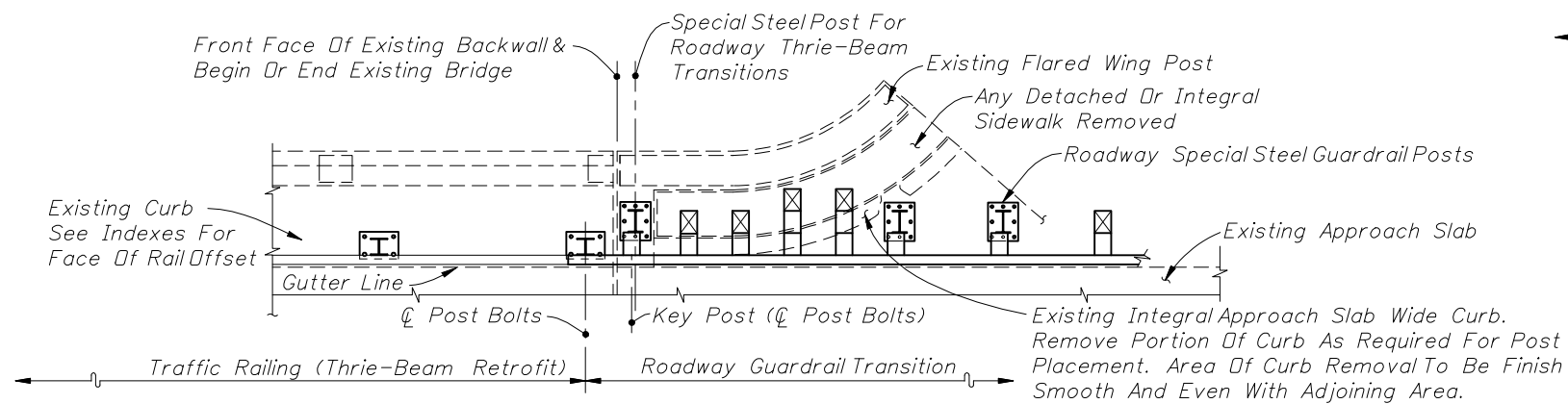
SEE INDEX NOS. 473 & 476 - SCHEMES 3 & 4



SEE INDEX NOS. 473 & 476 - SCHEME 2



SEE INDEX NOS. 473 & 476 - SCHEMES 3 & 4



SEE INDEX NOS. 473 & 476 - SCHEME 2

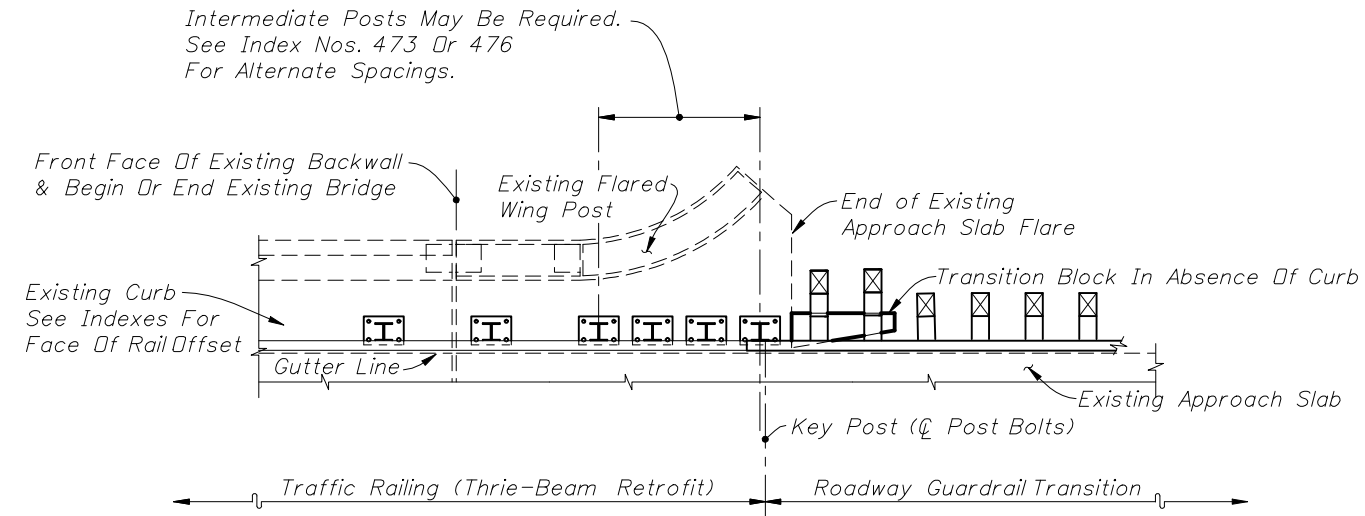
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)



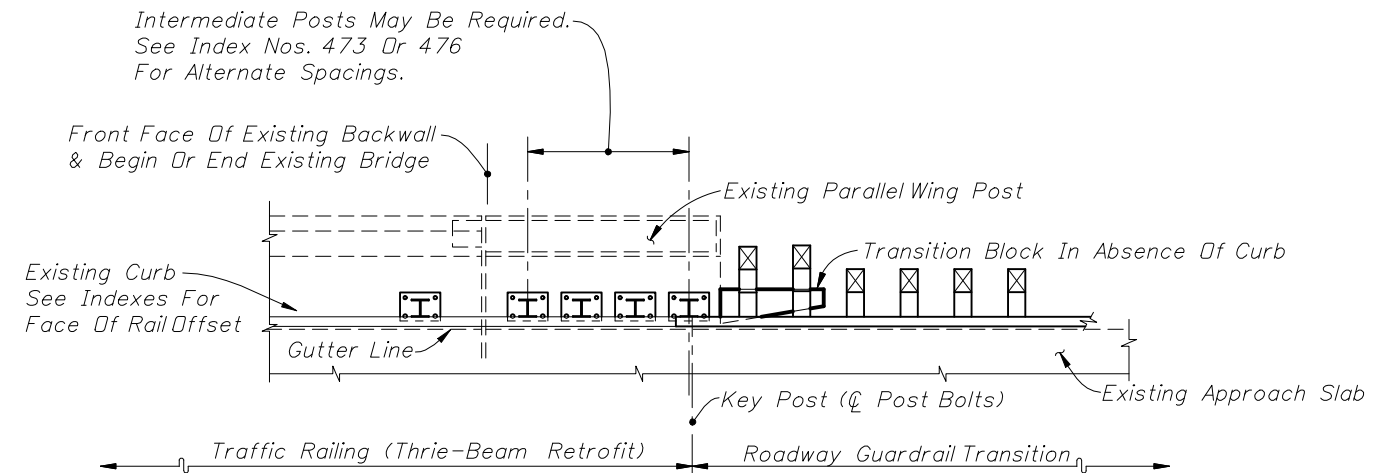
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GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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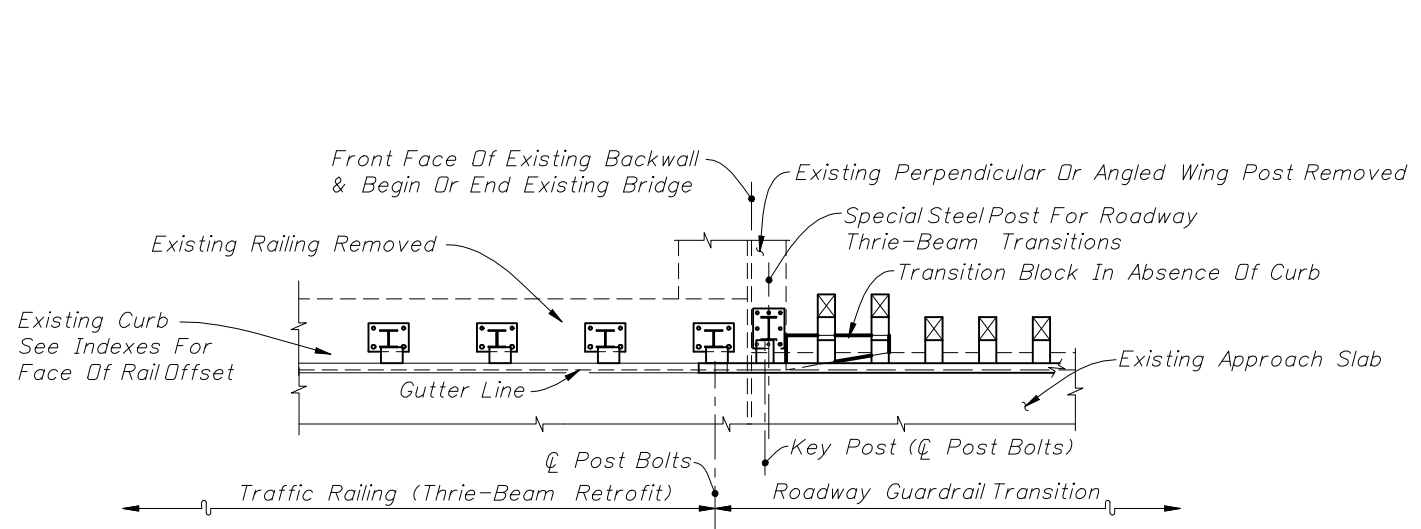
SEE INDEX NOS. 473 & 476 - SCHEMES 5 & 6



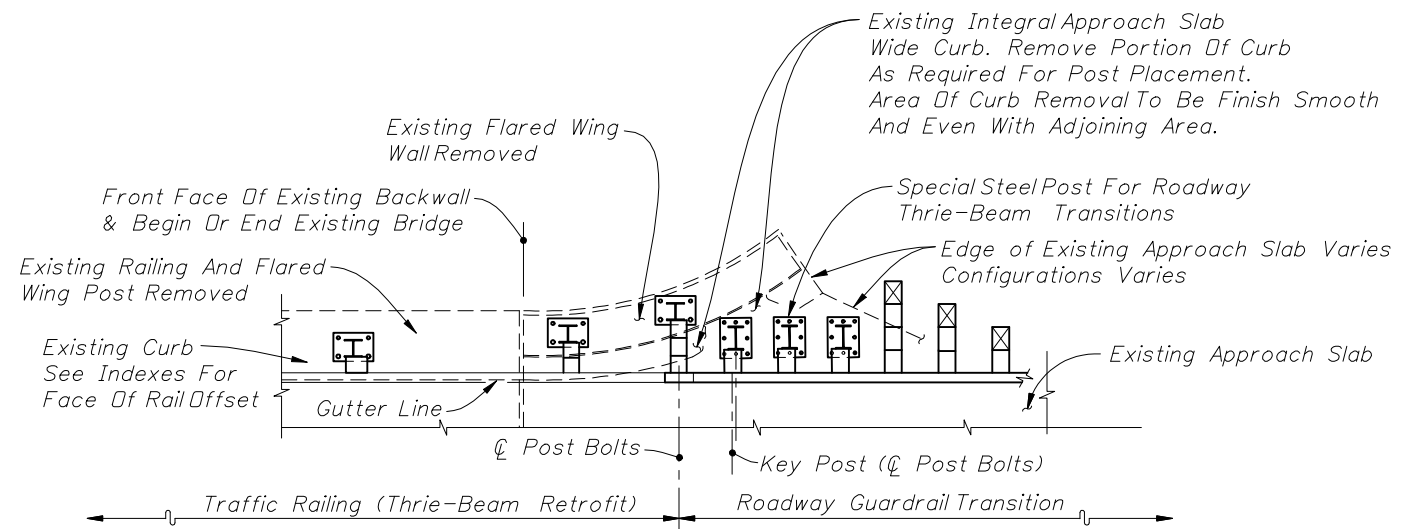
SEE INDEX NOS. 473 & 476 - SCHEMES 5 & 6

PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS
FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

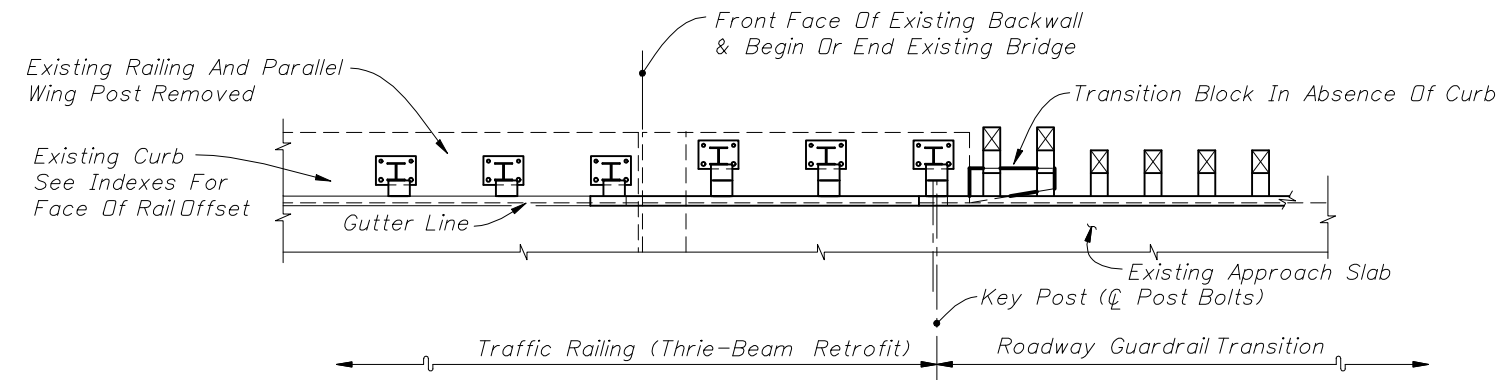




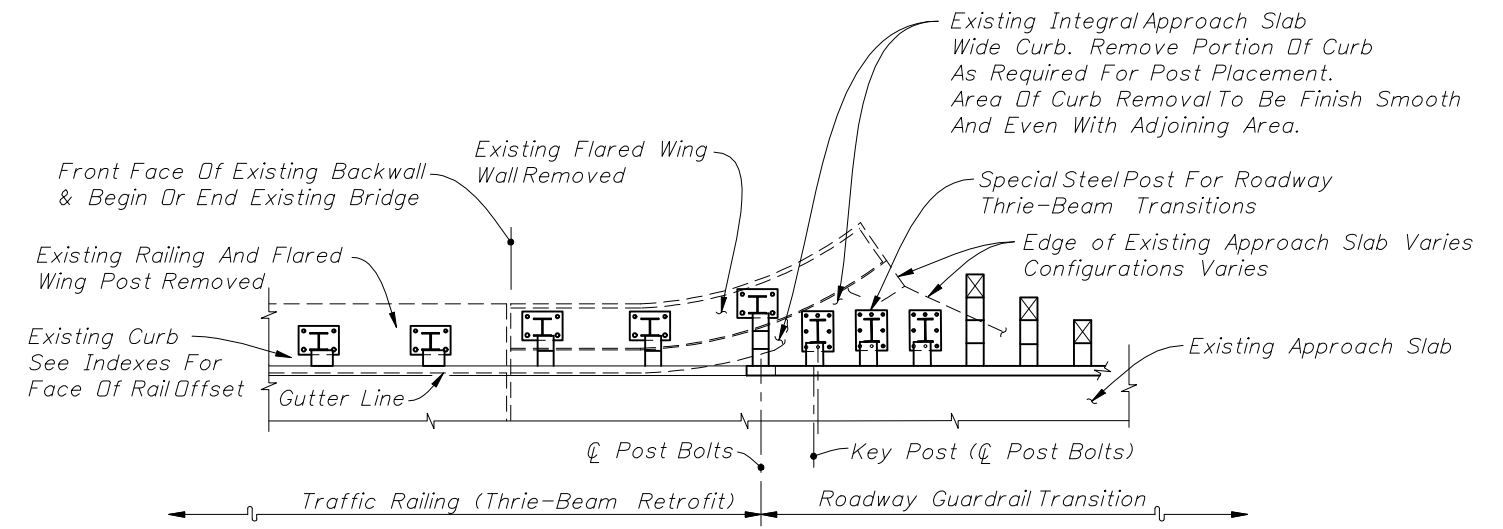
SEE INDEX NO. 474 - SCHEME 1



SEE INDEX NO. 474 - SCHEME 3



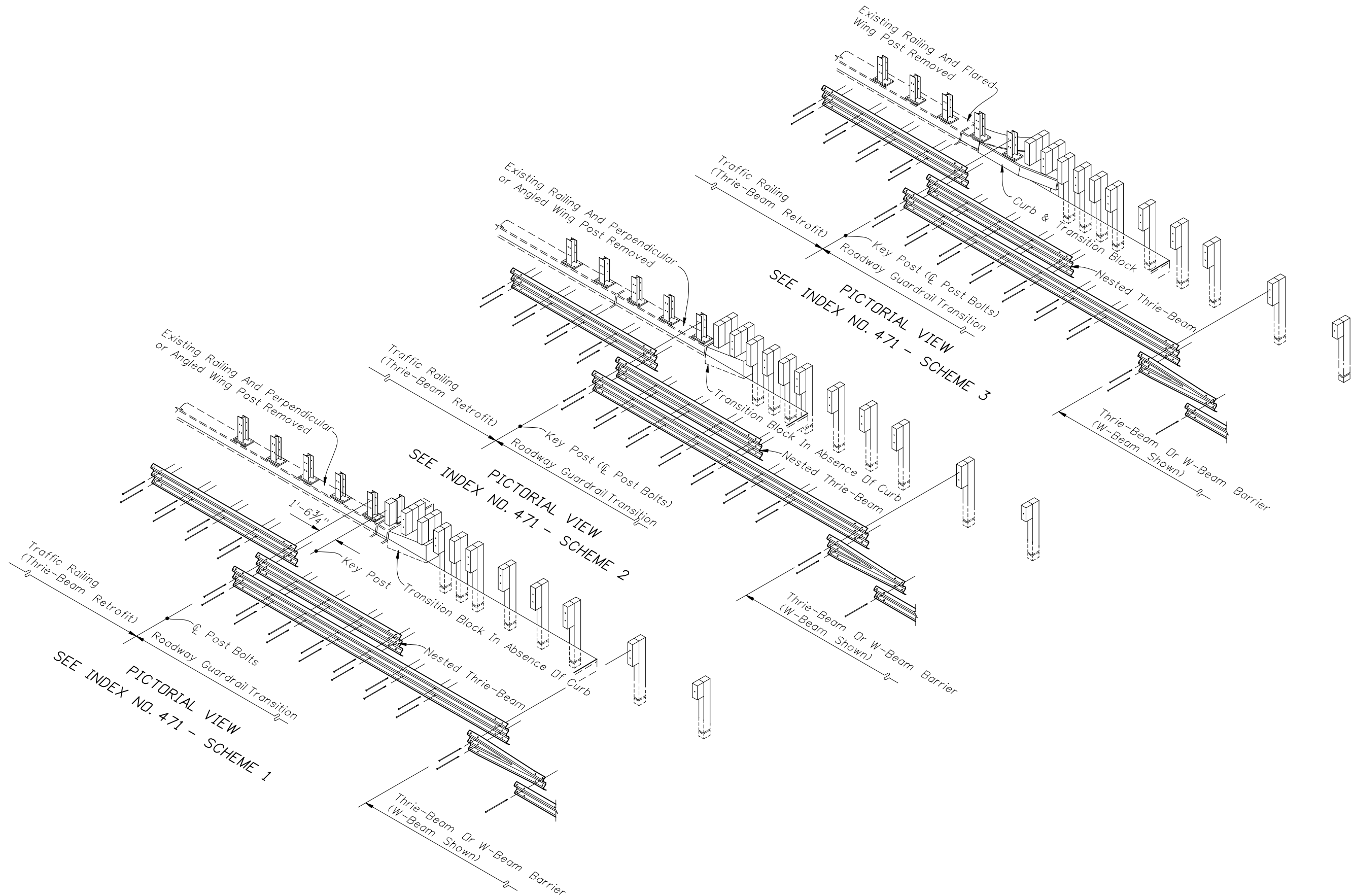
SEE INDEX NO. 474 - SCHEME 2



SEE INDEX NO. 474 - SCHEME 3

PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS
FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)





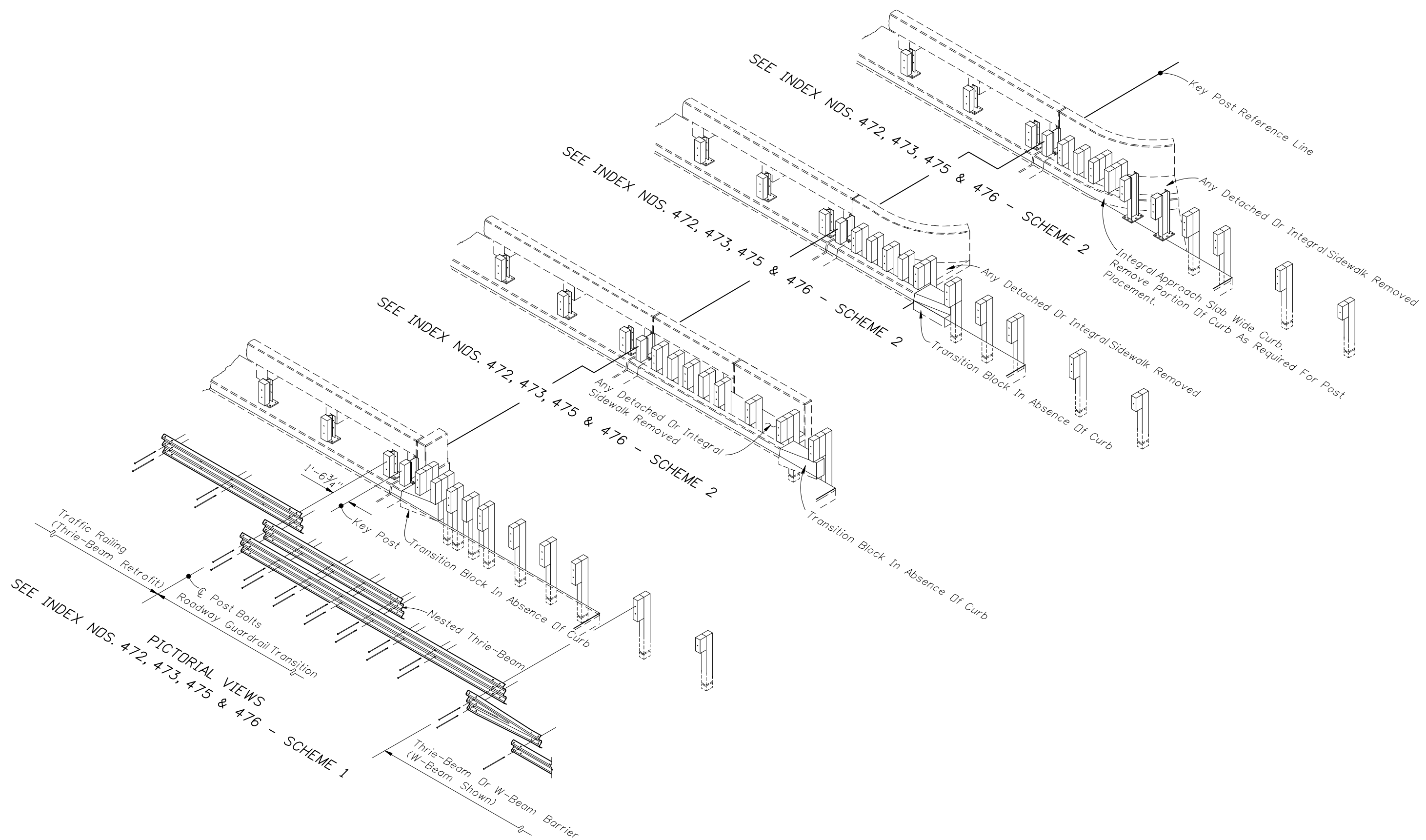
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)



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GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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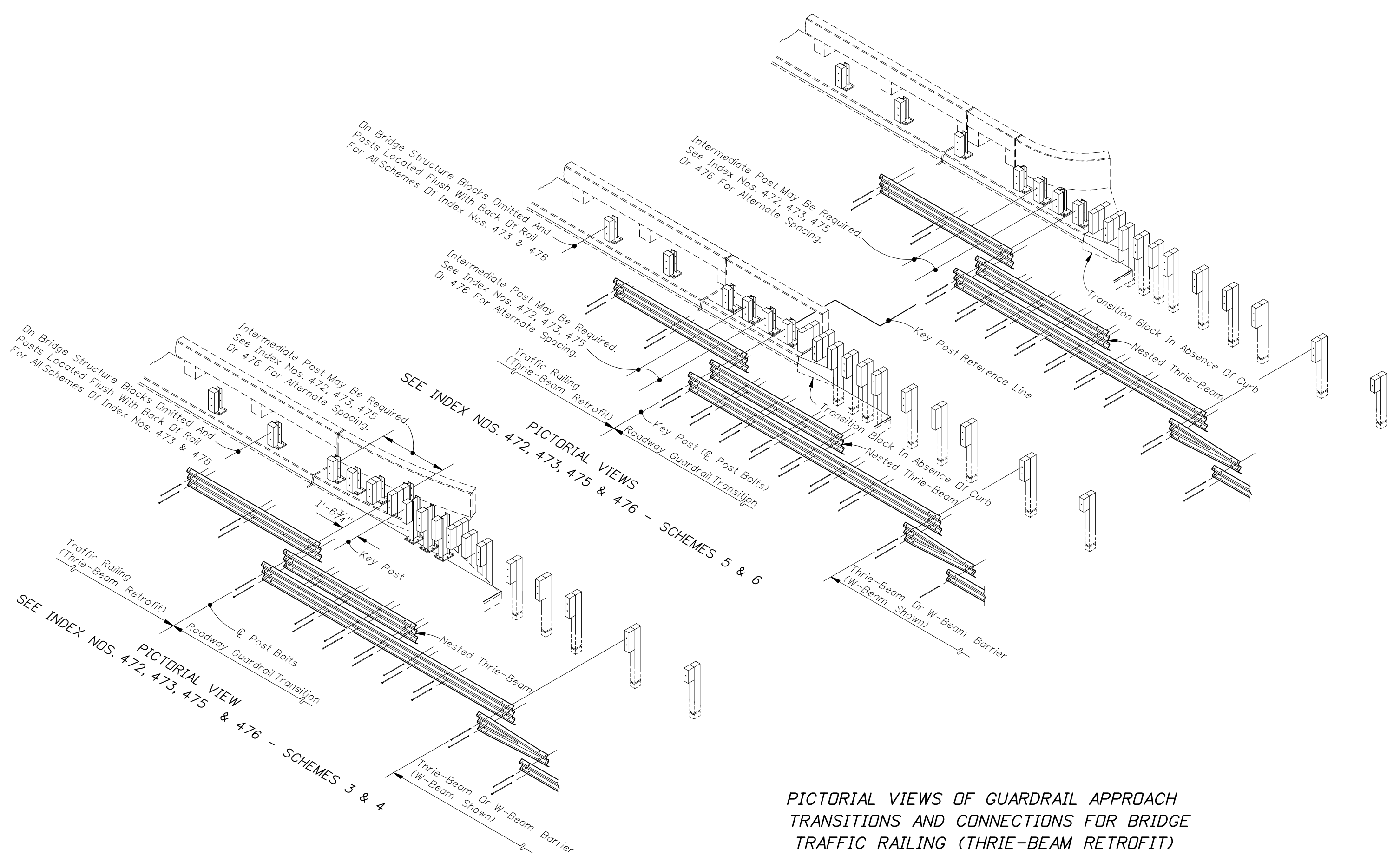
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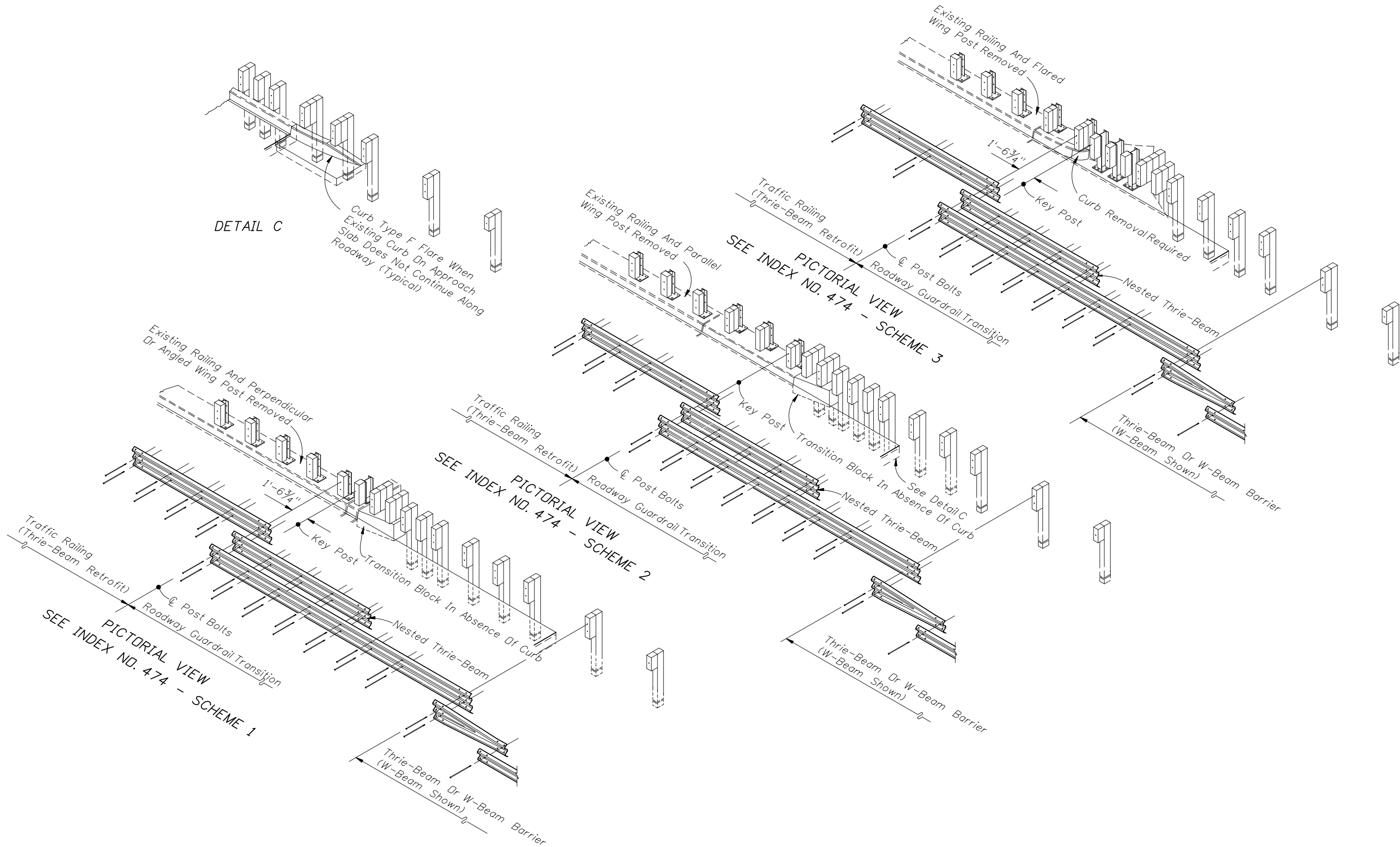
GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)





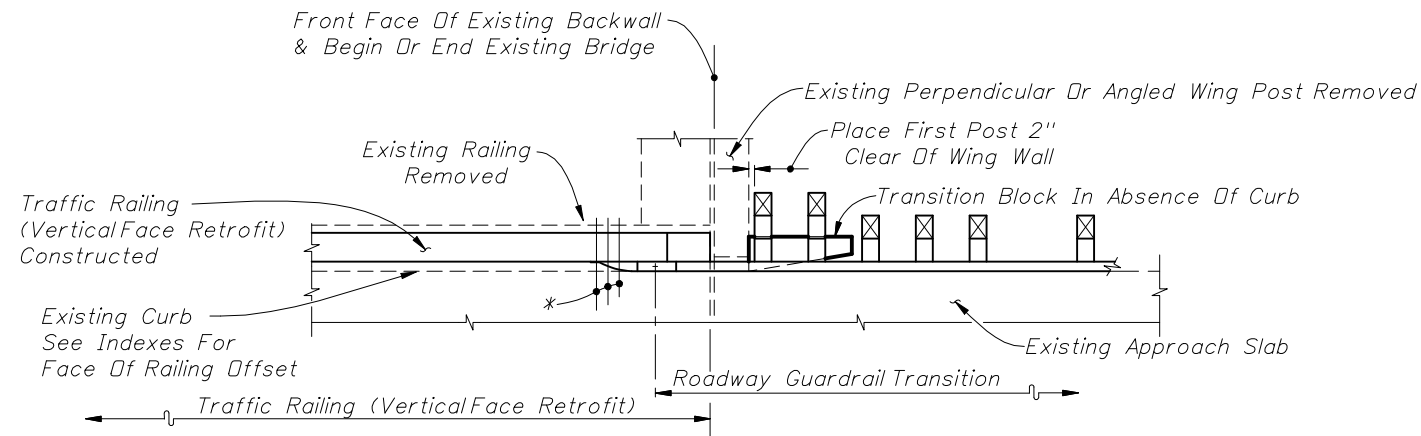
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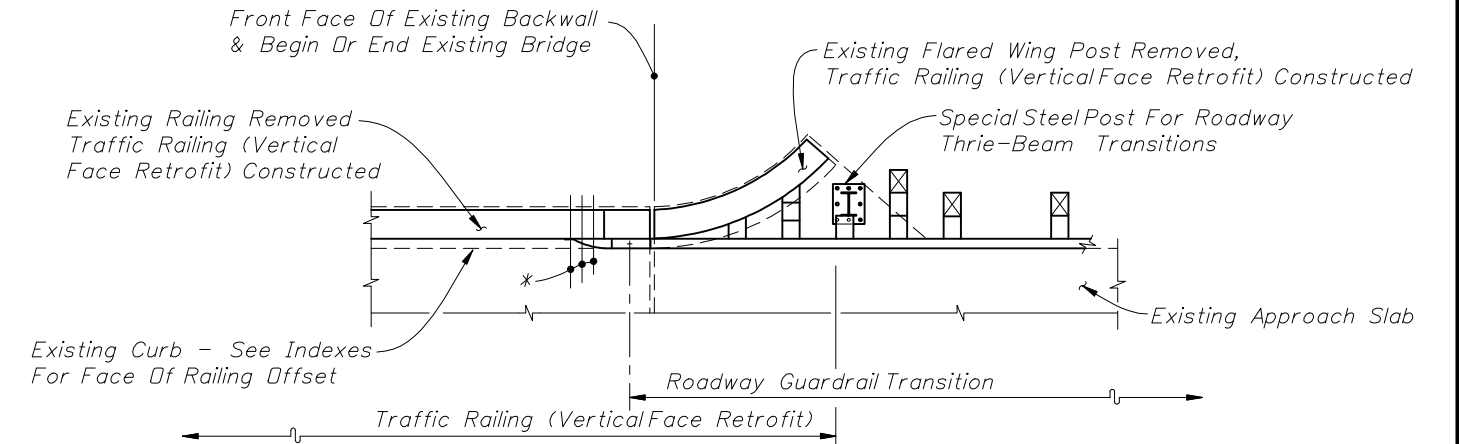
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GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

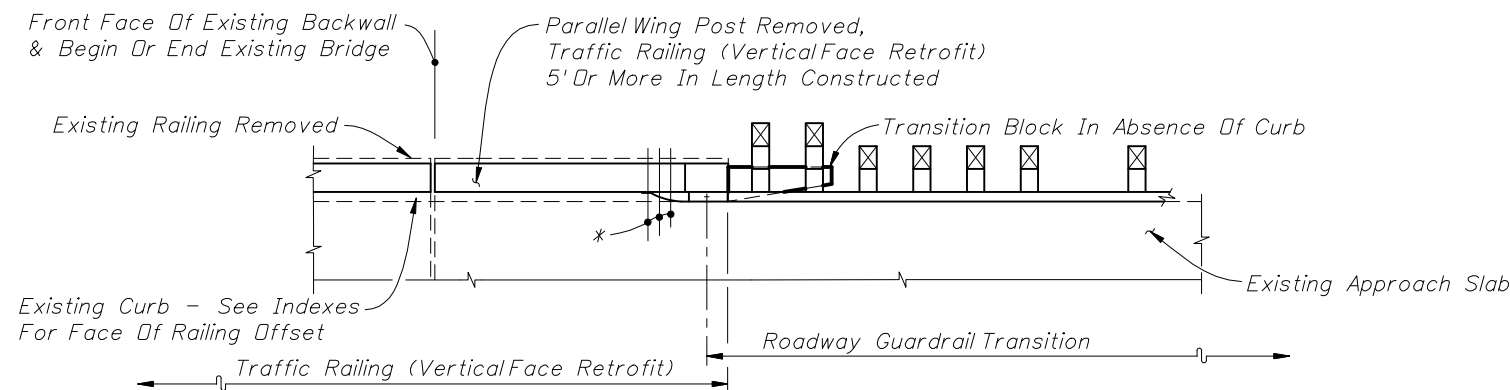
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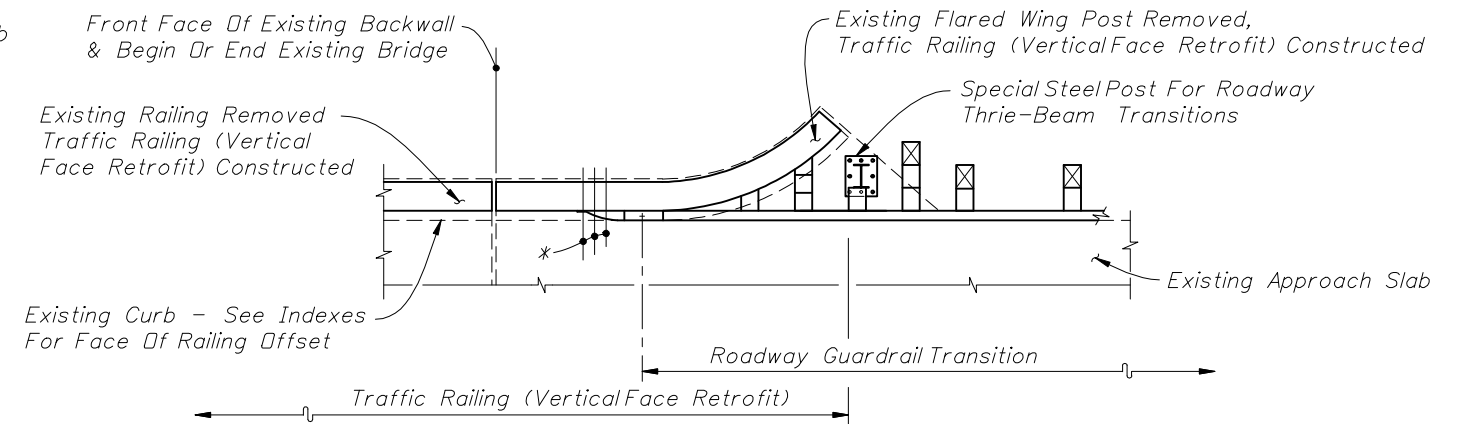
SEE INDEX NO. 481 - SCHEME 1



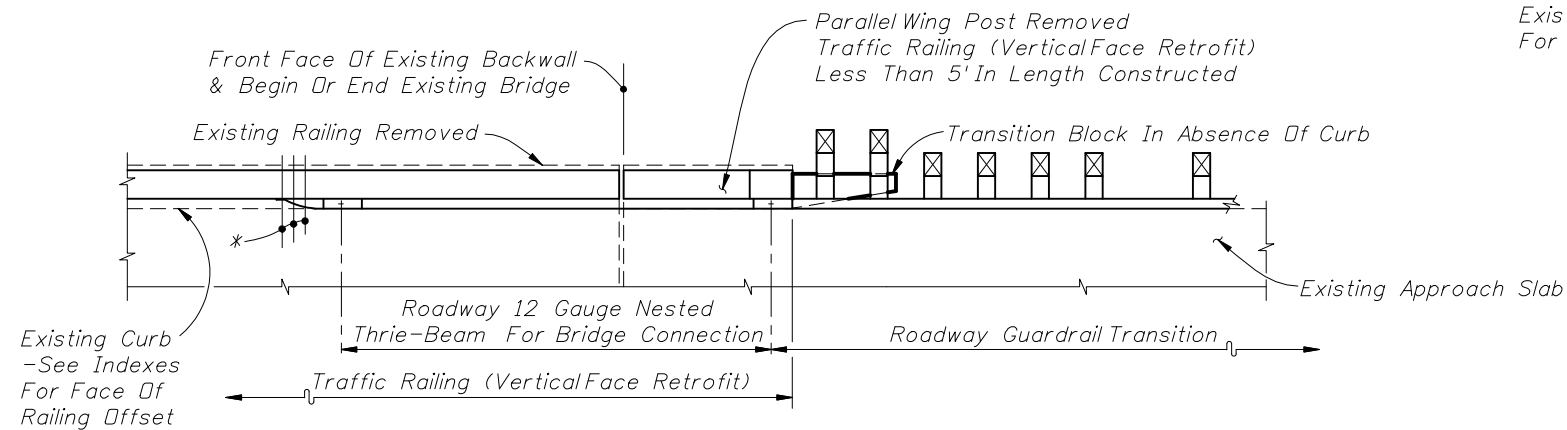
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SEE INDEX NO. 481 - SCHEME 2



SEE INDEX NO. 481 - SCHEME 3



SEE INDEX NO. 481 - SCHEME 2

Note:

*21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8" Ø x 12" Long HS Hex Bolts And Nuts (5 Req'd.) With 2 1/4" DD Plain Round Washers Under Heads And Nuts

PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)

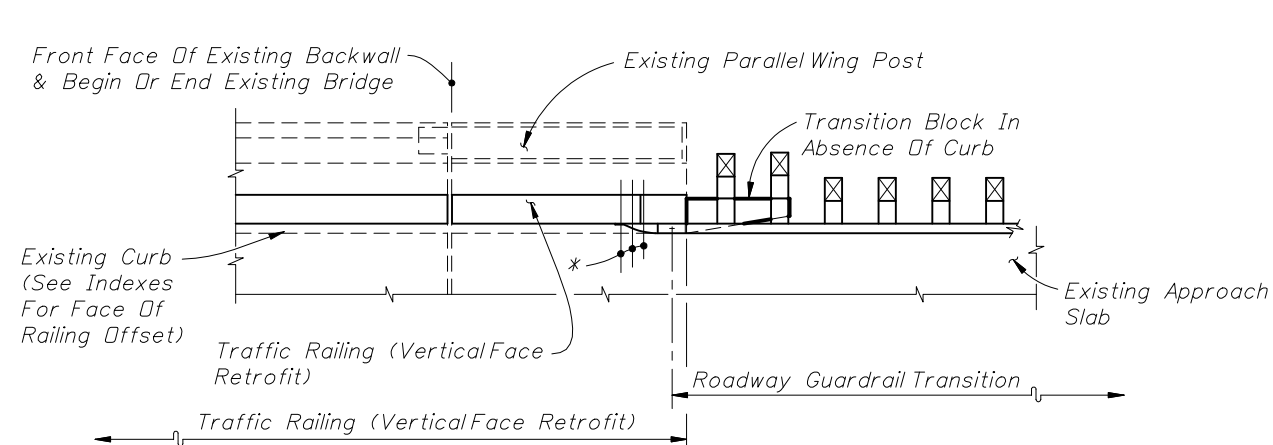


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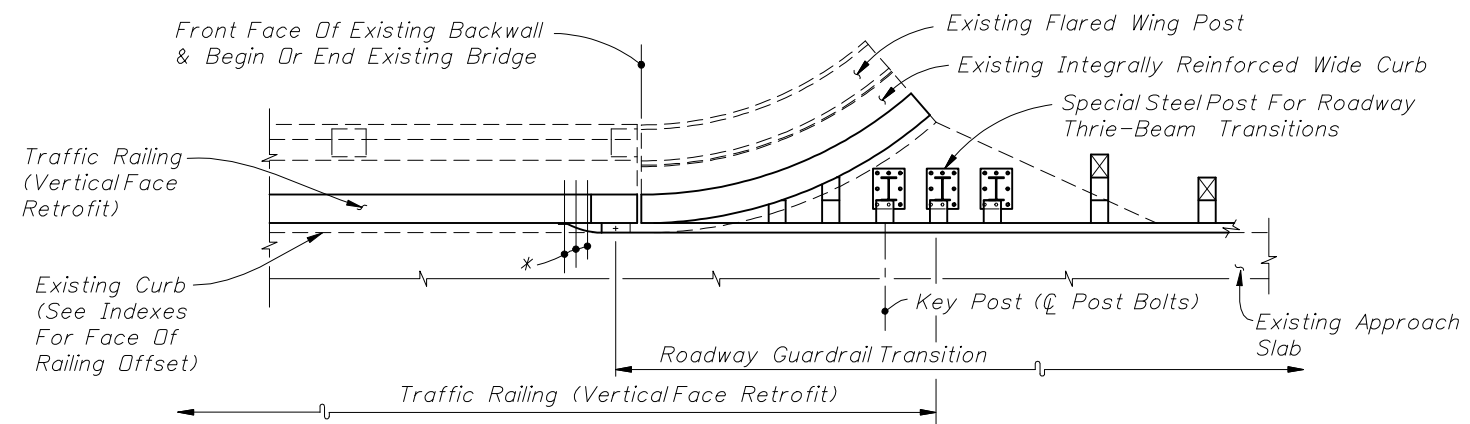
GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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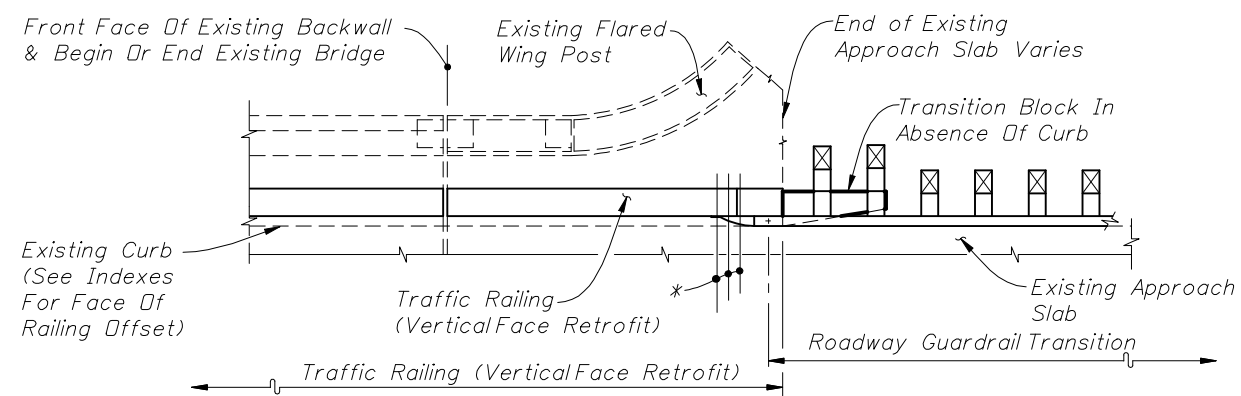
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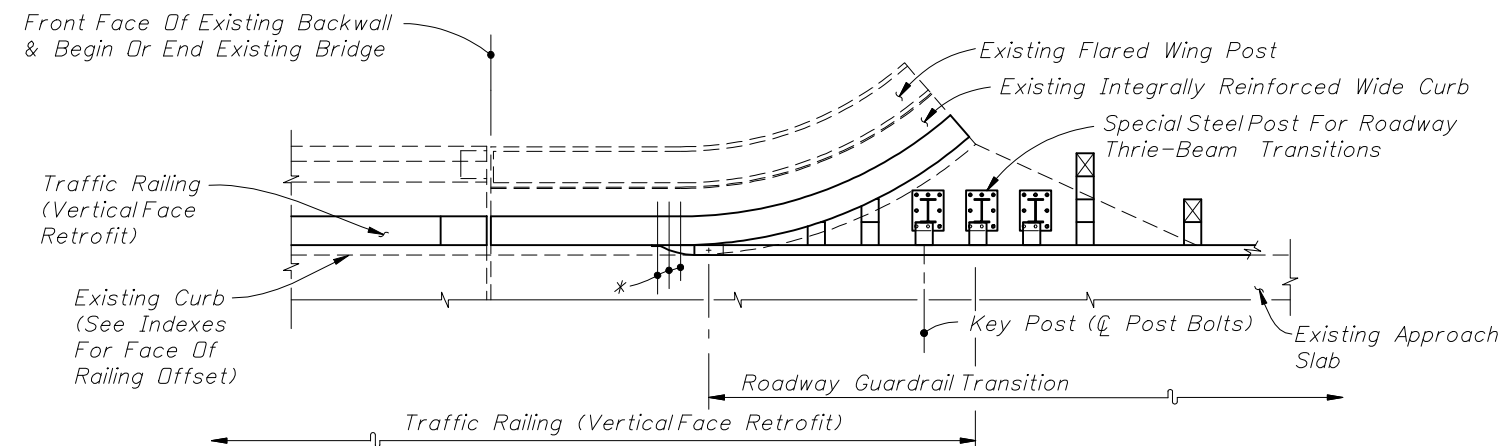
SEE INDEX NO. 482 - SCHEME 2



SEE INDEX NO. 482- SCHEME 3



SEE INDEX NO. 482 - SCHEME 2



SEE INDEX NO. 482- SCHEME 3

Note:
 *21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8" Ø x 12" Long
 HS Hex Bolts And Nuts (5 Reqd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts

PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)

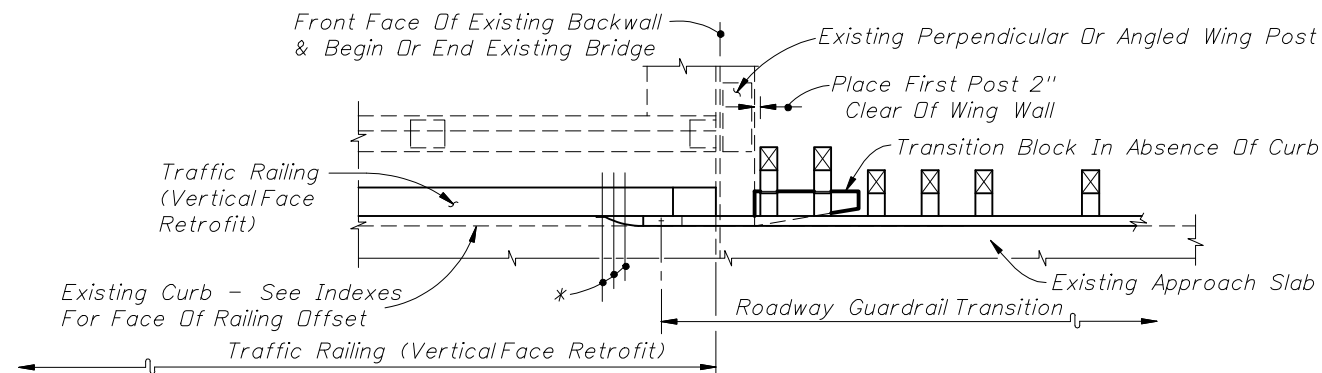


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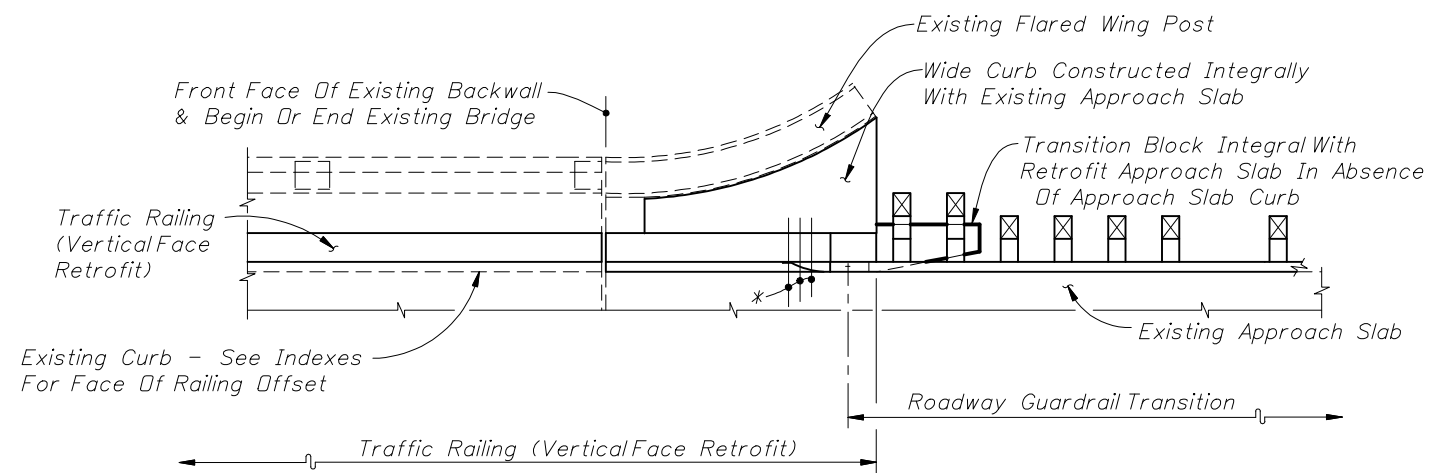
GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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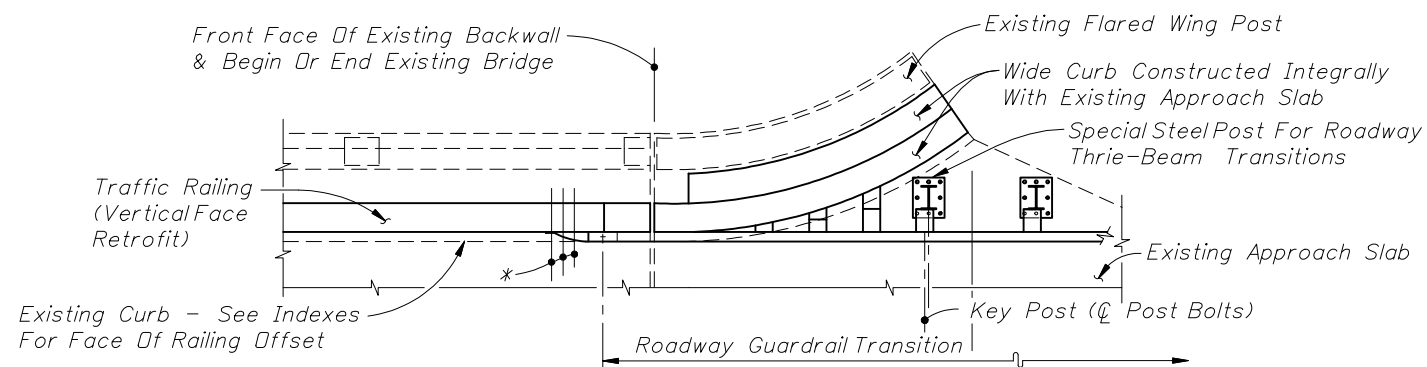
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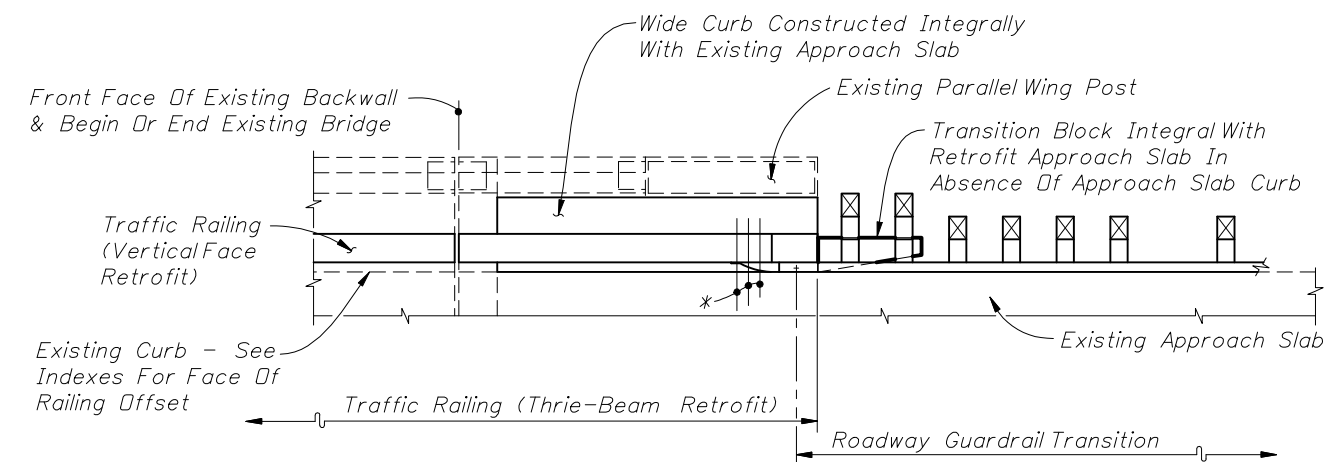
SEE INDEX NO. 482 - SCHEME 1



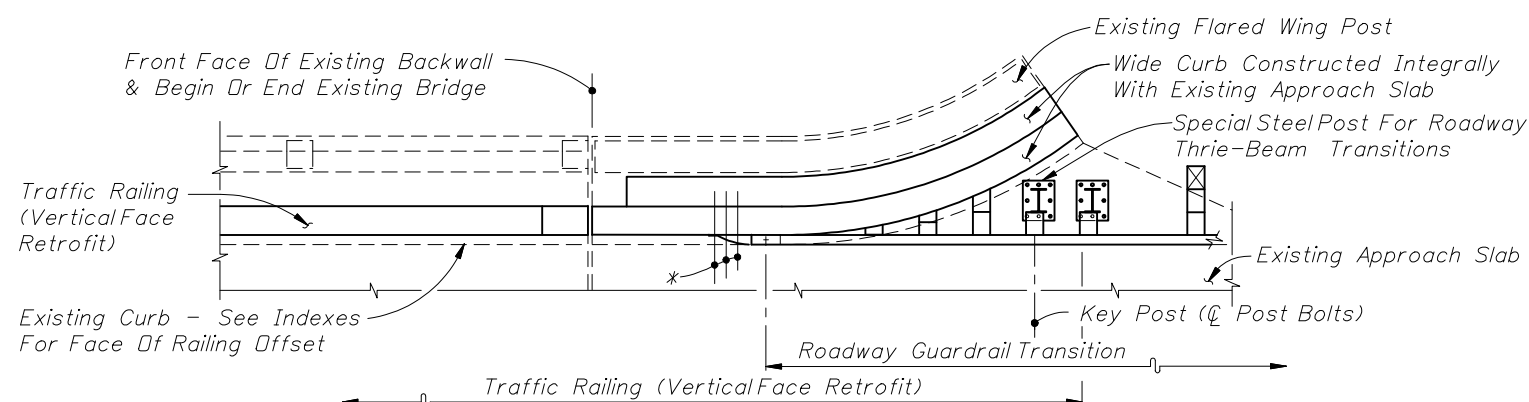
SEE INDEX NO. 482 - SCHEME 5



SEE INDEX NO. 482 - SCHEME 4



SEE INDEX NO. 482 - SCHEME 5



SEE INDEX NO. 482 - SCHEME 4

Note:
 *21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8" Φ x 12" Long
 HS Hex Bolts And Nuts (5 Req'd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts

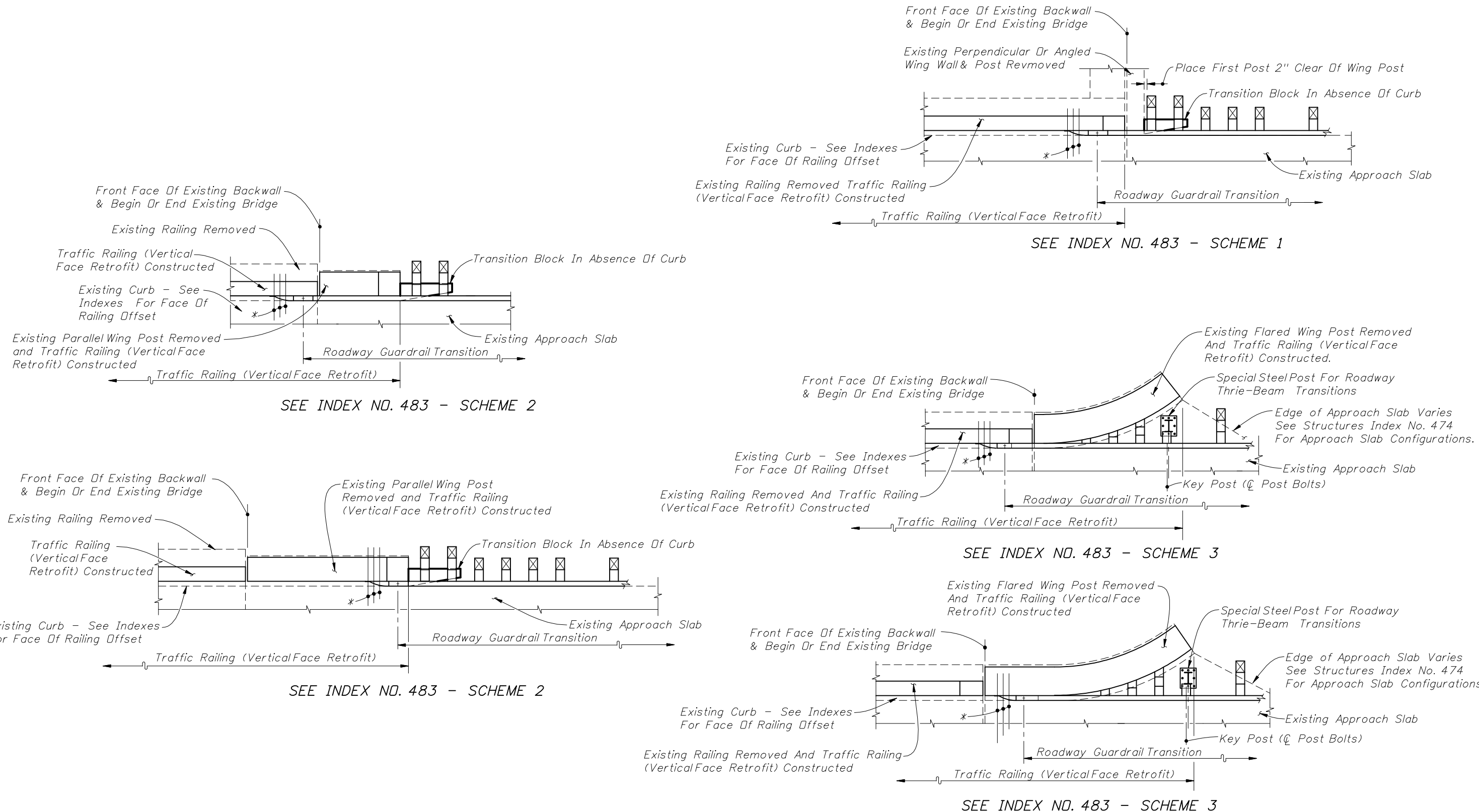
PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)



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GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

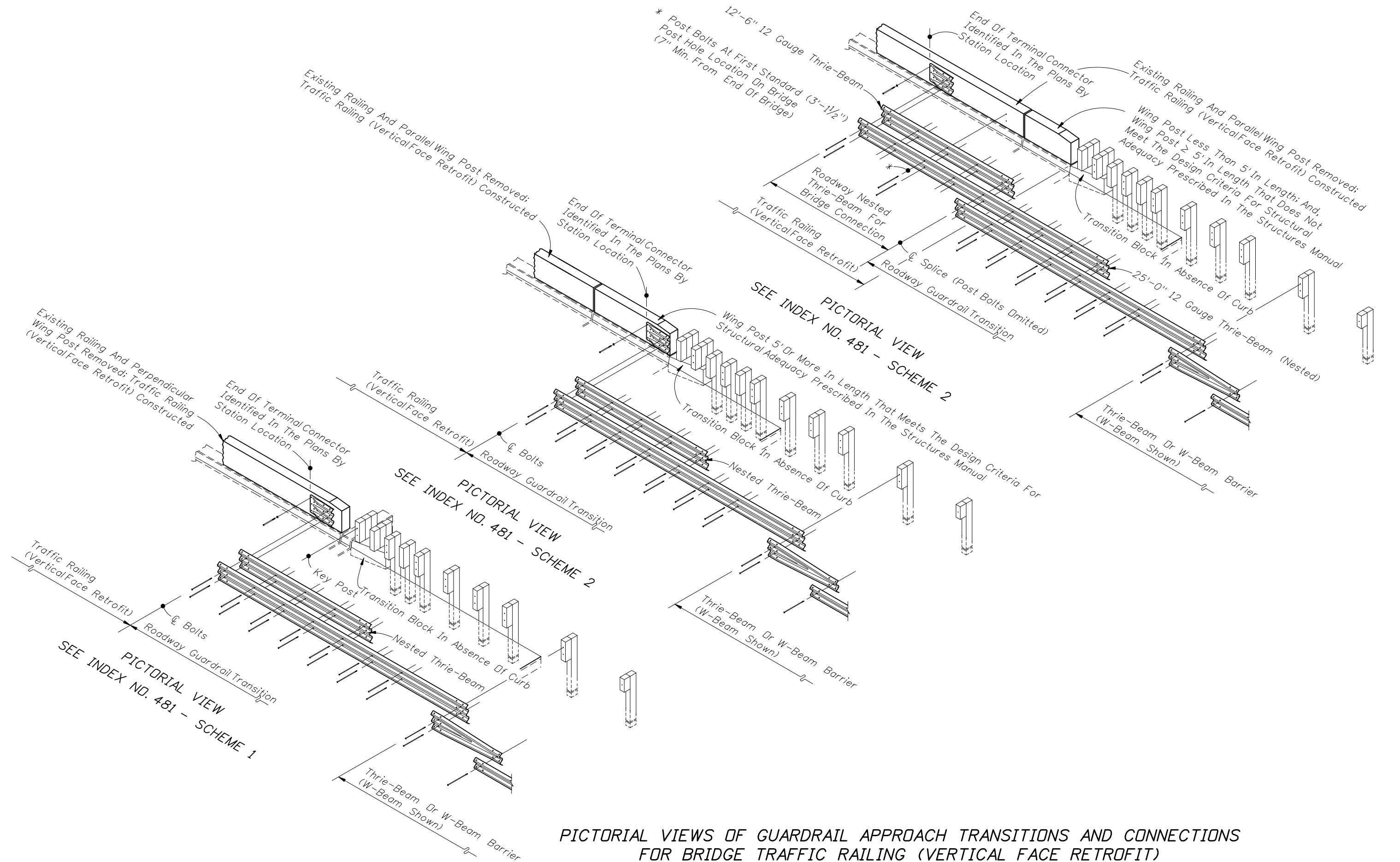
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Note:
 *21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8" Ø HS Hex Bolts And Nuts (12" Long For Scheme 1 And Length To Fit For Schemes 2 And 3) (5 Req'd.) With 2 1/4" DD Plain Round Washers Under Heads And Nuts

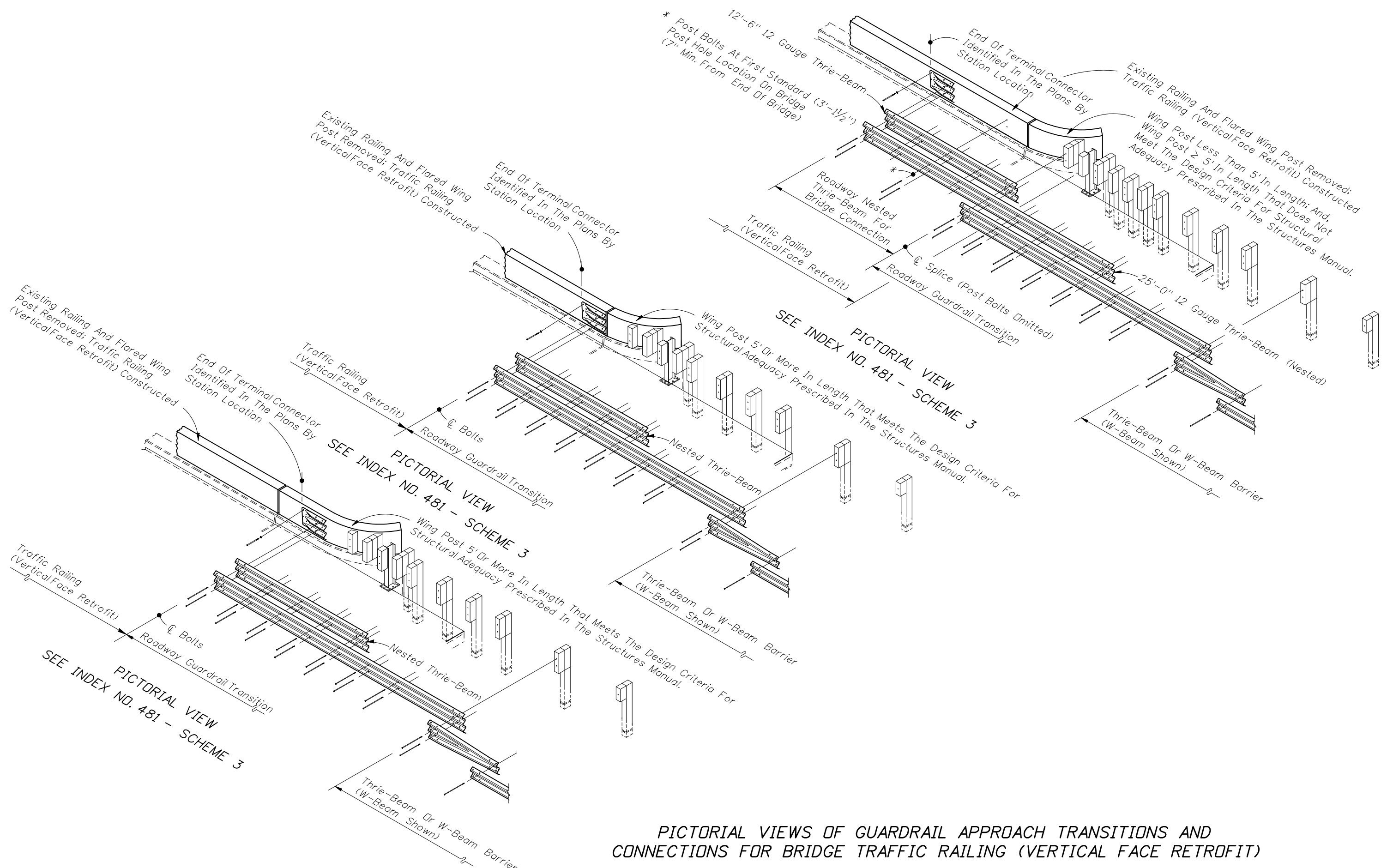
PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)



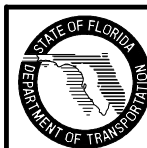


PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)





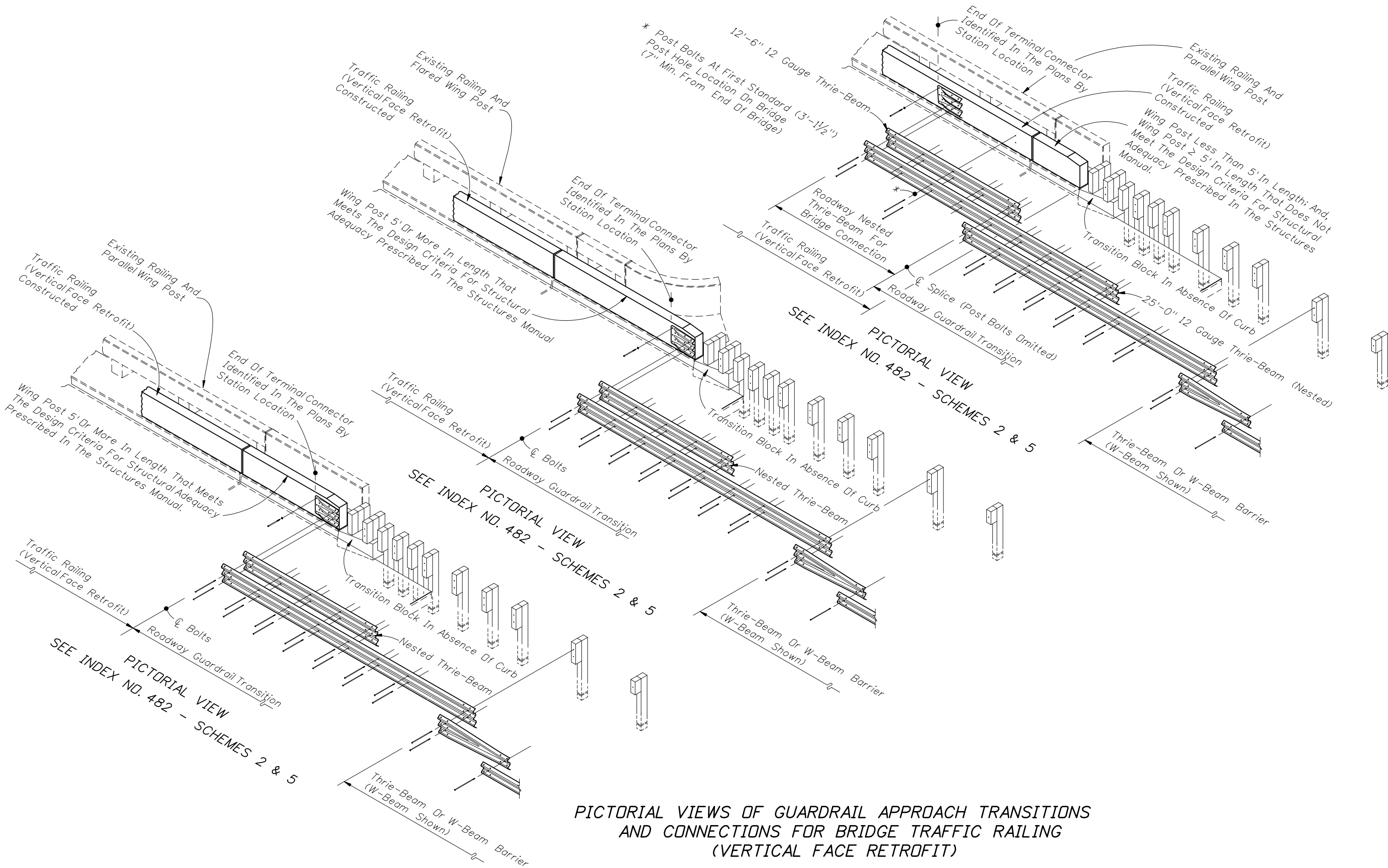
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)



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GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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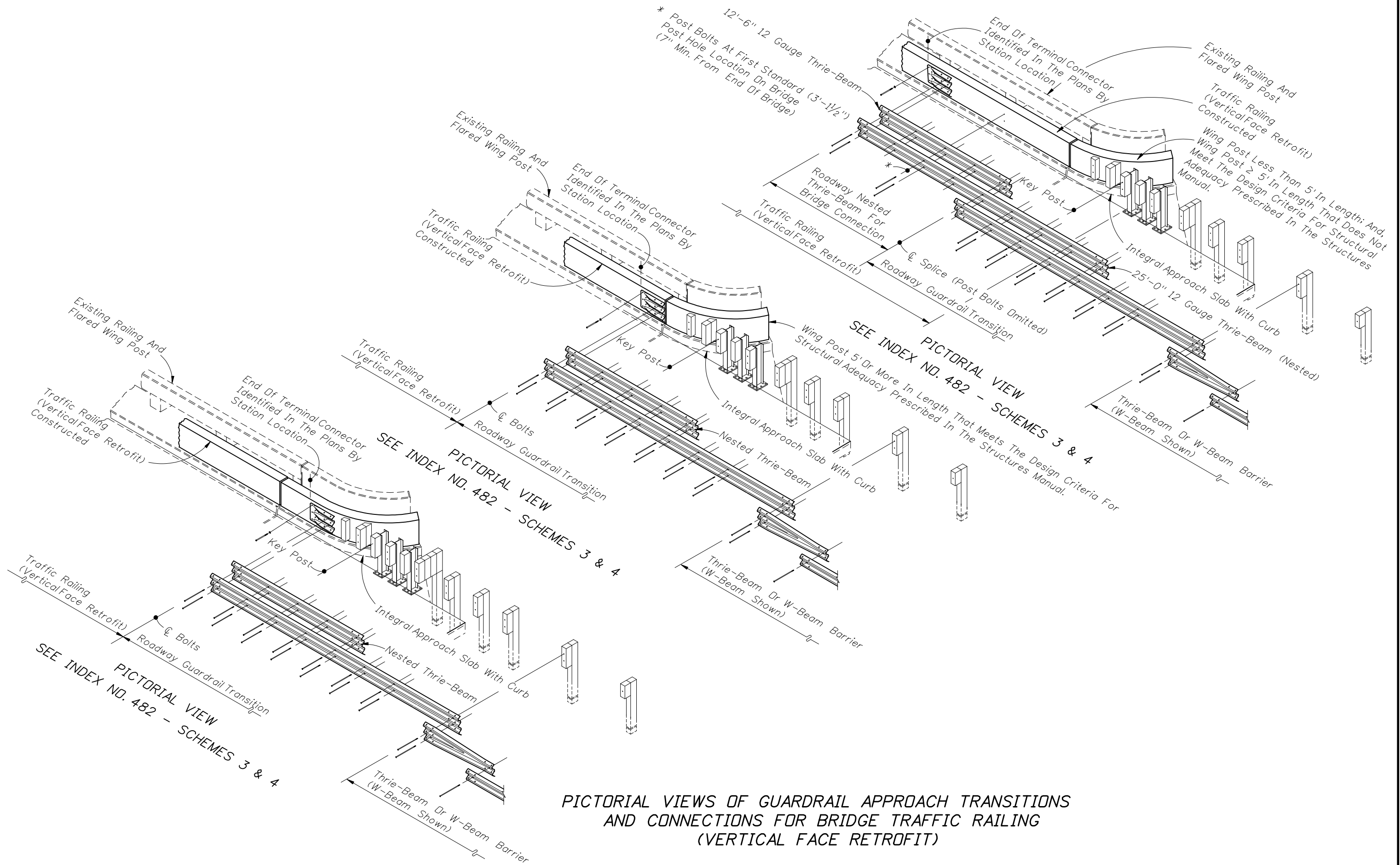
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)



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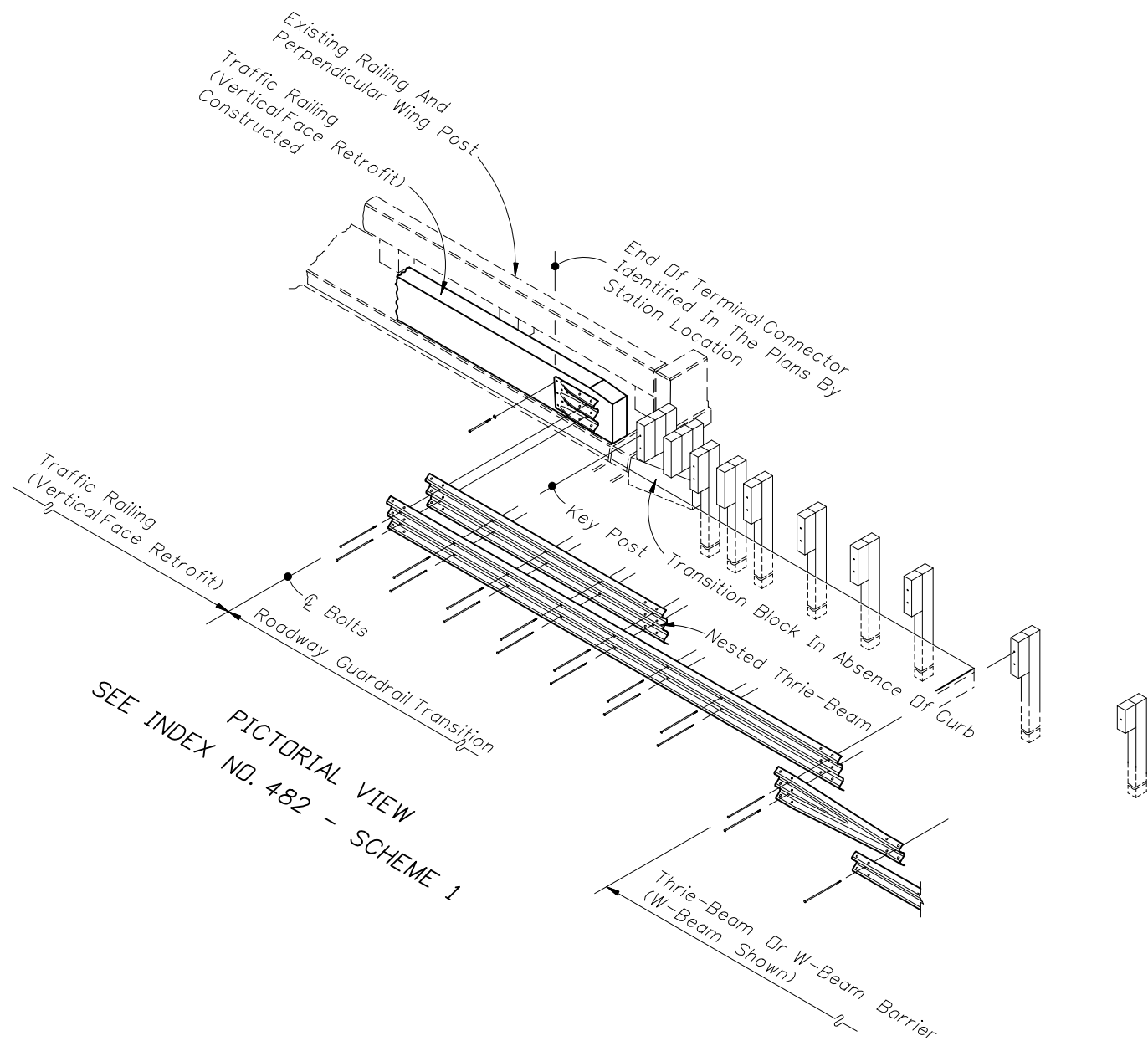
GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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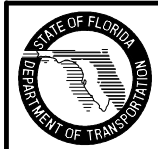
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

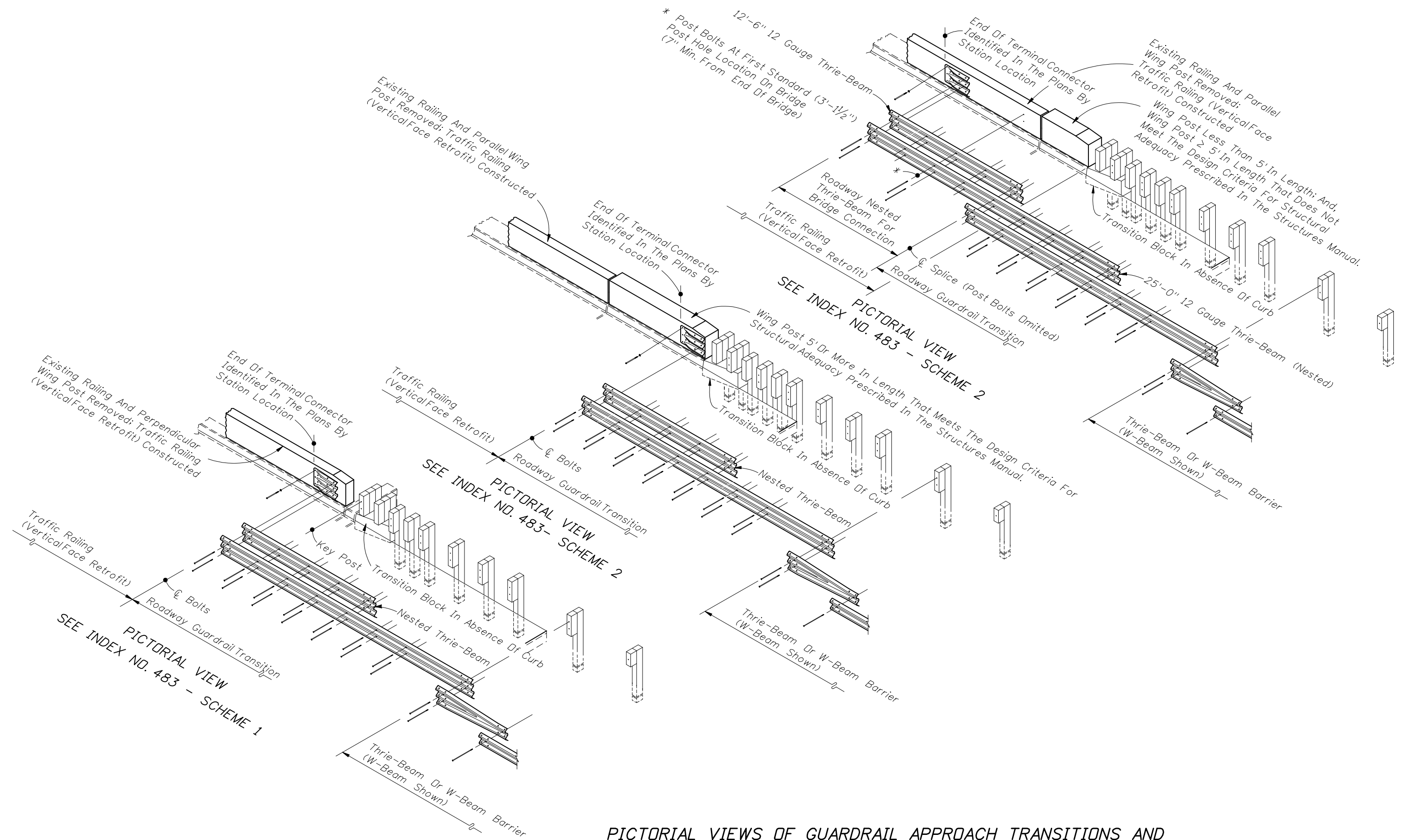




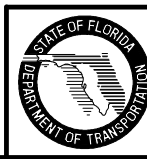
PICTORIAL VIEW
 SEE INDEX NO. 482 - SCHEME 1

PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)





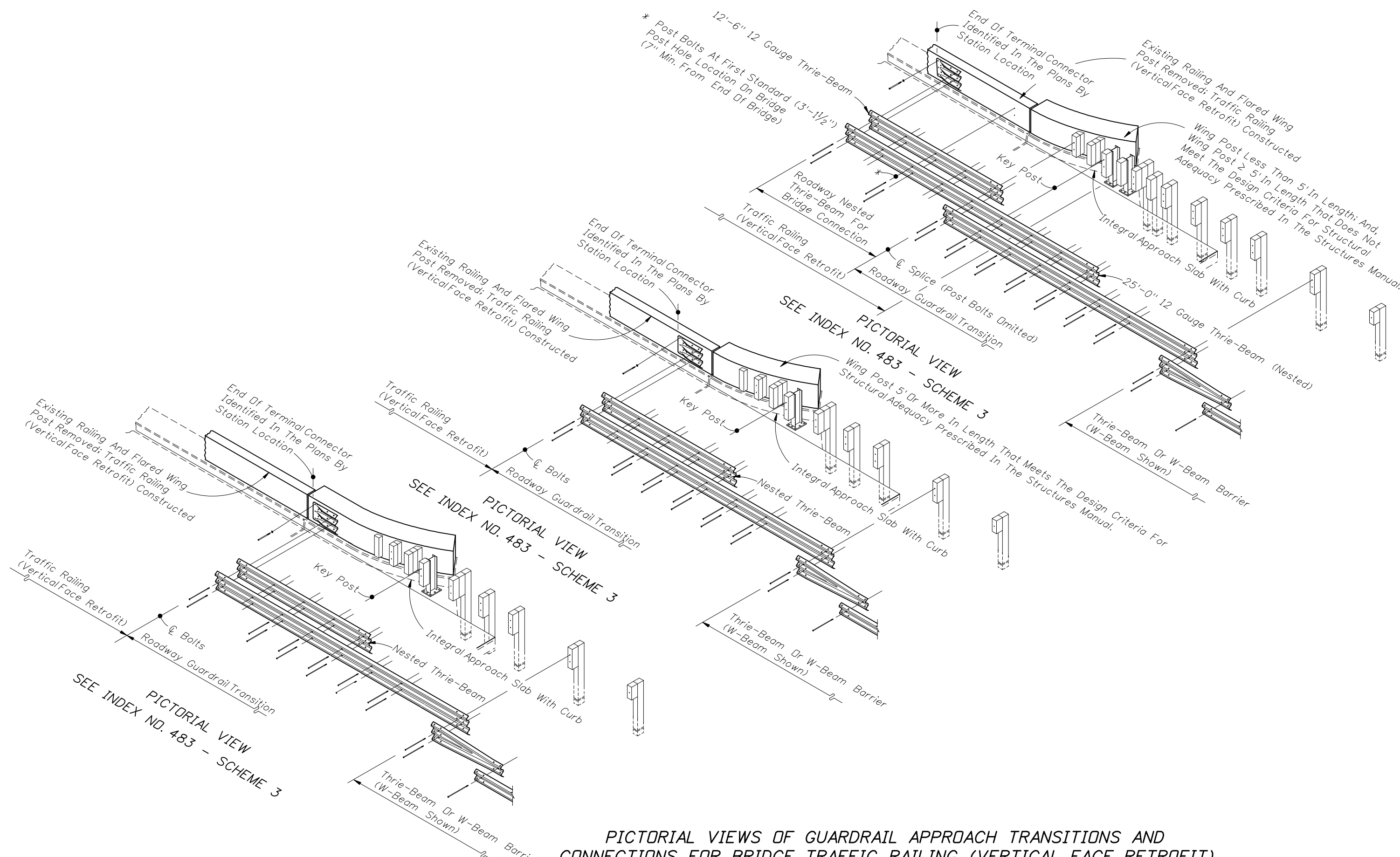
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)



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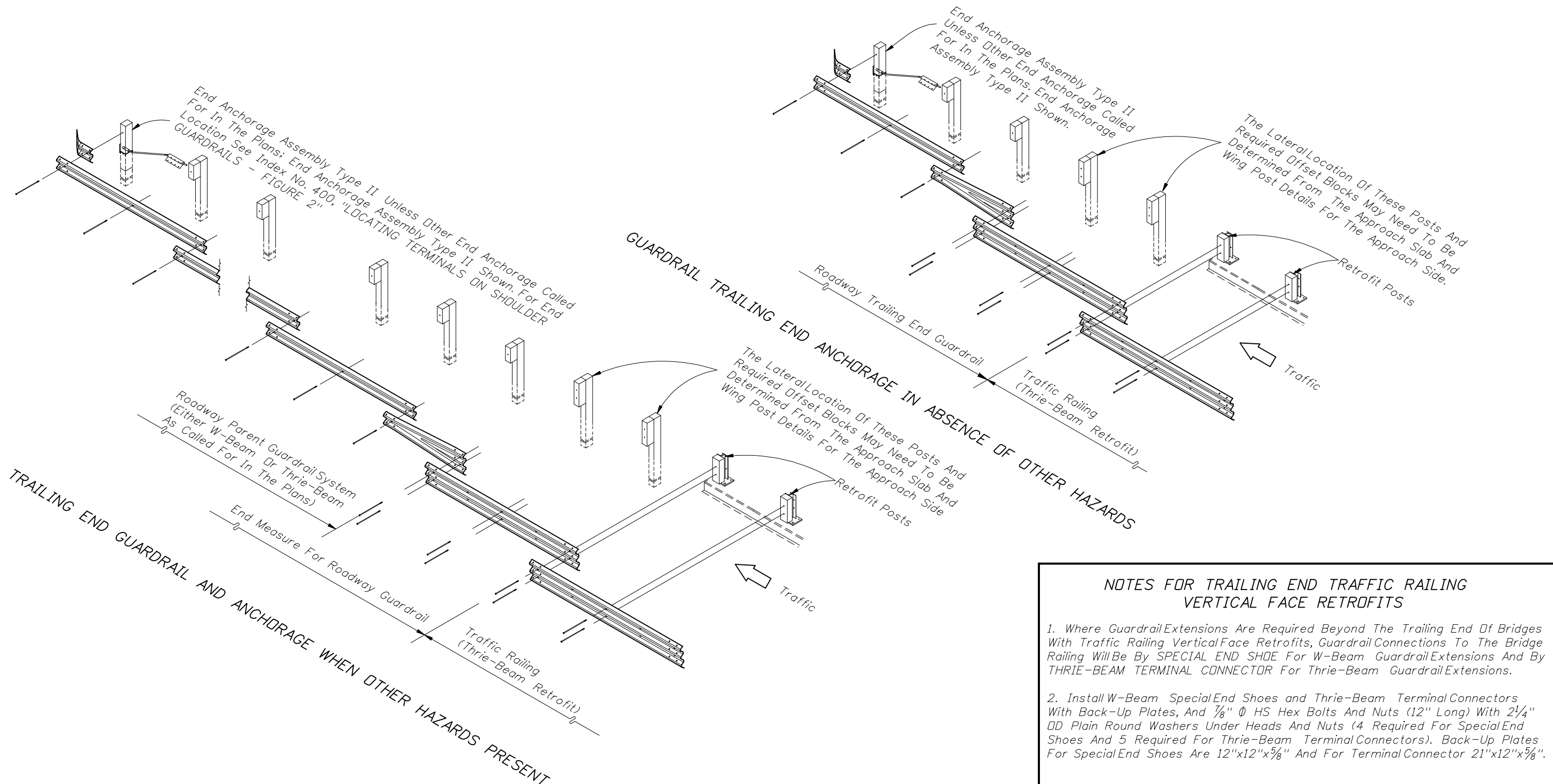
GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

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PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)





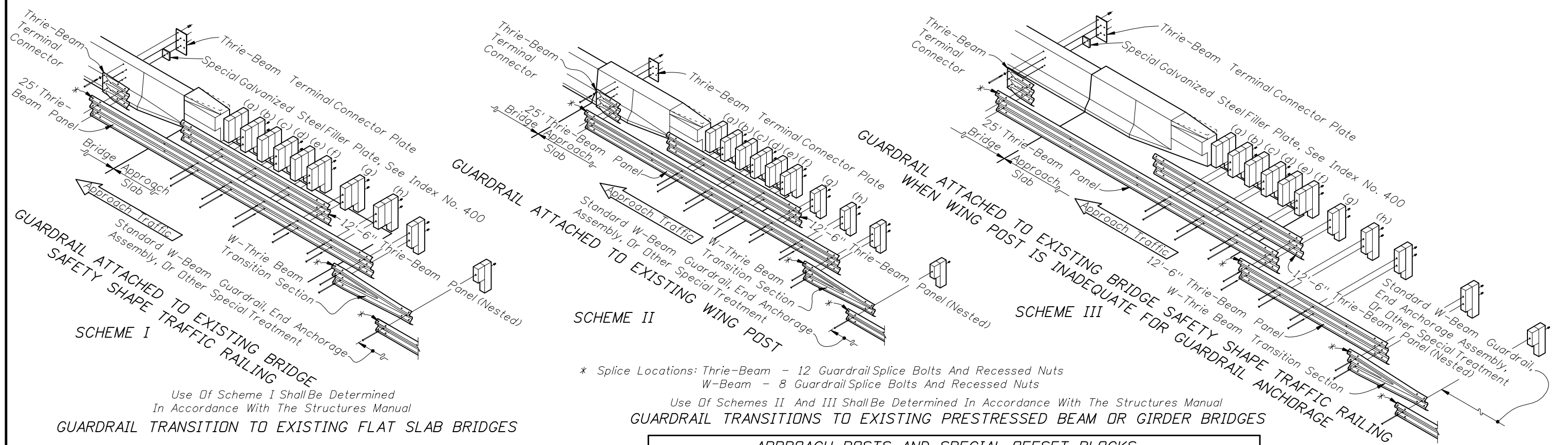
THRIE-BEAM RETROFIT NOTES

1. See indexes for bridge thrie-beam traffic railing retrofits.
2. Trailing end guardrail to be paid for under the contract unit price for the parent roadway guardrail; end measure includes length of end anchorage assembly; additional payment made for end anchorage assembly. No additional payment for connecting roadway thrie-beam to bridge thrie-beam retrofit.

NOTES FOR TRAILING END TRAFFIC RAILING VERTICAL FACE RETROFITS

1. Where Guardrail Extensions Are Required Beyond The Trailing End Of Bridges With Traffic Railing Vertical Face Retrofits, Guardrail Connections To The Bridge Railing Will Be By SPECIAL END SHOE For W-Beam Guardrail Extensions And By THRIE-BEAM TERMINAL CONNECTOR For Thrie-Beam Guardrail Extensions.
2. Install W-Beam Special End Shoes and Thrie-Beam Terminal Connectors With Back-Up Plates, And $\frac{7}{8}$ " ϕ HS Hex Bolts And Nuts (12" Long) With $2\frac{1}{4}$ " OD Plain Round Washers Under Heads And Nuts (4 Required For Special End Shoes And 5 Required For Thrie-Beam Terminal Connectors). Back-Up Plates For Special End Shoes Are 12"x12"x $\frac{5}{8}$ " And For Terminal Connector 21"x12"x $\frac{5}{8}$ ".
3. Payment For Connecting Trailing End Special End Shoes And Thrie-Beam Terminal Connectors To Traffic Railing Vertical Face Retrofits Will Be Made Under The Contract Unit Price For Guardrail Bridge Anchorage Assembly, EA..

TRAILING END GUARDRAIL AND ANCHORAGE FOR BRIDGE TRAFFIC RAILING (THRIE BEAM RETROFITS)



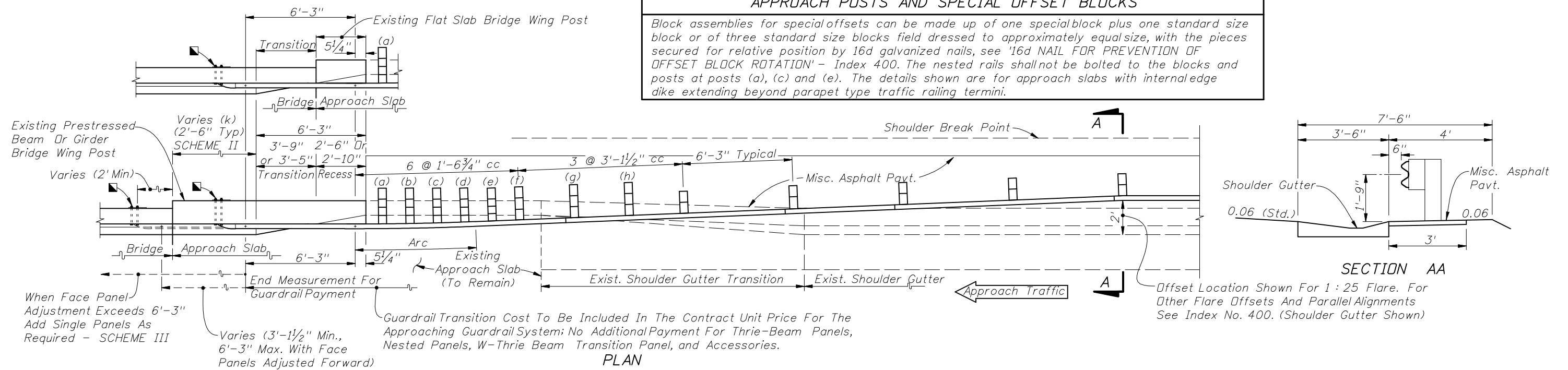
Use Of Scheme I Shall Be Determined In Accordance With The Structures Manual
GUARDRAIL TRANSITION TO EXISTING FLAT SLAB BRIDGES

Use Of Schemes II And III Shall Be Determined In Accordance With The Structures Manual
GUARDRAIL TRANSITIONS TO EXISTING PRESTRESSED BEAM OR GIRDER BRIDGES

* Splice Locations: Thrie-Beam - 12 Guardrail Splice Bolts And Recessed Nuts
 W-Beam - 8 Guardrail Splice Bolts And Recessed Nuts

APPROACH POSTS AND SPECIAL OFFSET BLOCKS

Block assemblies for special offsets can be made up of one special block plus one standard size block or of three standard size blocks field dressed to approximately equal size, with the pieces secured for relative position by 16d galvanized nails, see '16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION' - Index 400. The nested rails shall not be bolted to the blocks and posts at posts (a), (c) and (e). The details shown are for approach slabs with internal edge dike extending beyond parapet type traffic railing termini.



When Face Panel Adjustment Exceeds 6'-3" Add Single Panels As Required - SCHEME III

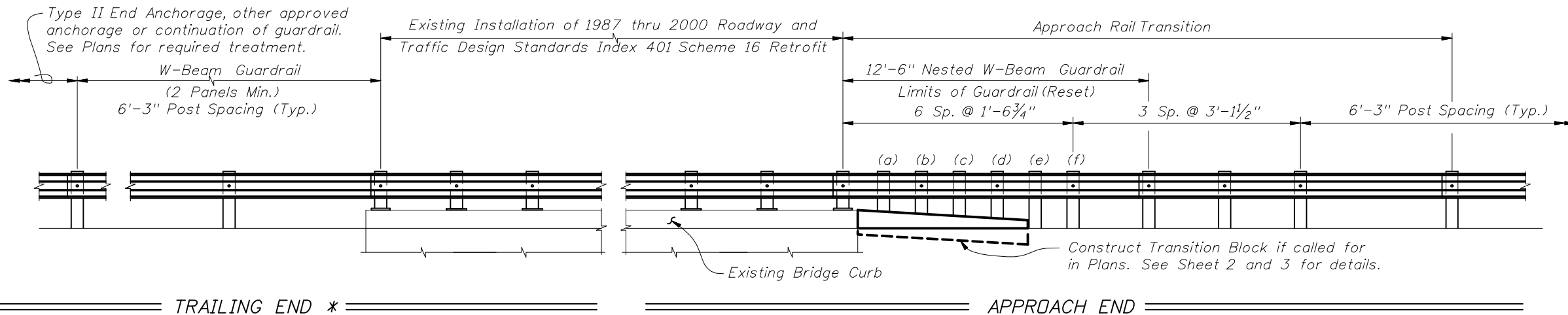
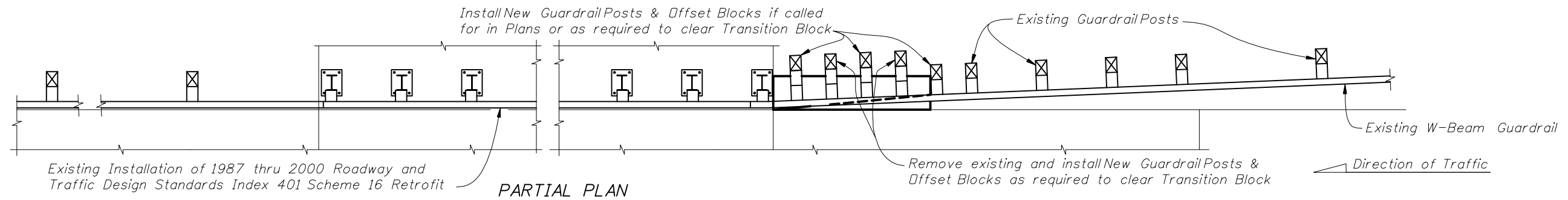
Varies (3'-1/2" Min., 6'-3" Max. With Face Panels Adjusted Forward) SCHEME III

Guardrail Transition Cost To Be Included In The Contract Unit Price For The Approaching Guardrail System; No Additional Payment For Thrie-Beam Panels, Nested Panels, W-Thrie Beam Transition Panel, and Accessories.

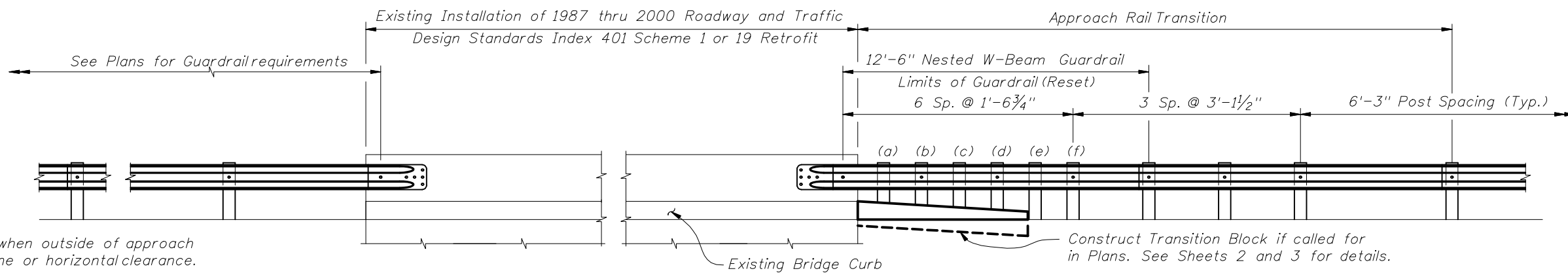
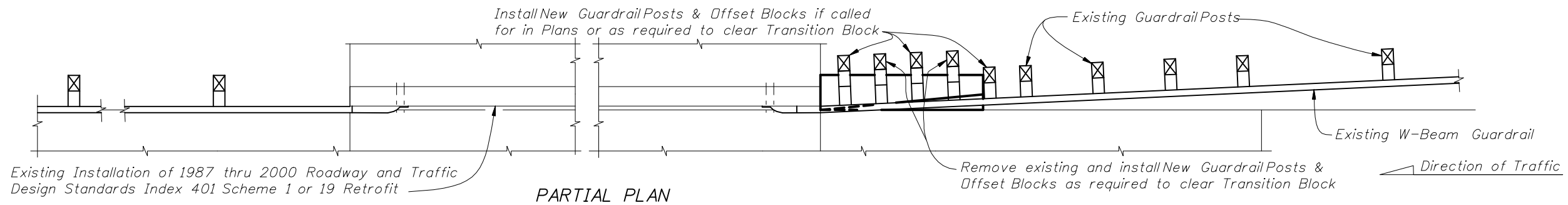
PLAN

- NOTES FOR GUARDRAIL TRANSITIONS TO SAFETY SHAPE TRAFFIC RAILINGS ON EXISTING BRIDGES**
1. When the existing wing post is to be replaced with a bridge traffic railing in accordance with the Structures Manual, the thrie-beam guardrail connection shall be in accordance with Detail J of Index No. 400.
 2. When retrofitting thrie-beam guardrail to existing wing posts or existing bridge safety shape traffic railing, attachment construction to be paid for under the contract unit price for Guardrail Bridge Anchorage Assembly, EA., and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate(s) and bolts, nuts and washers.

GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR EXISTING FLAT SLAB, PRESTRESSED BEAM AND GIRDER BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH



**PARTIAL ELEVATION
W-BEAM BRIDGE TRAFFIC RAILING RETROFITS**



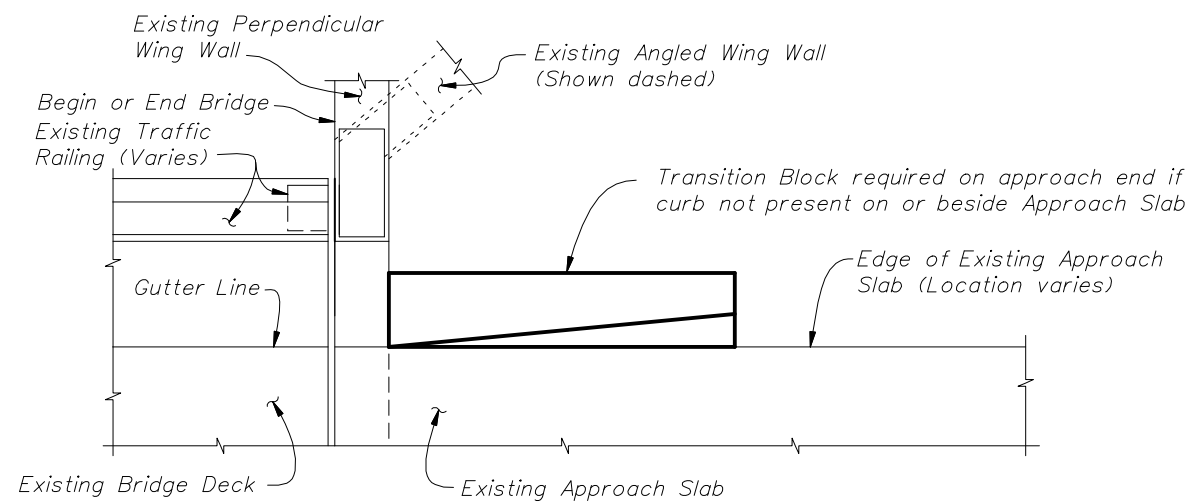
**PARTIAL ELEVATION
VERTICAL FACE BRIDGE TRAFFIC RAILING RETROFITS**



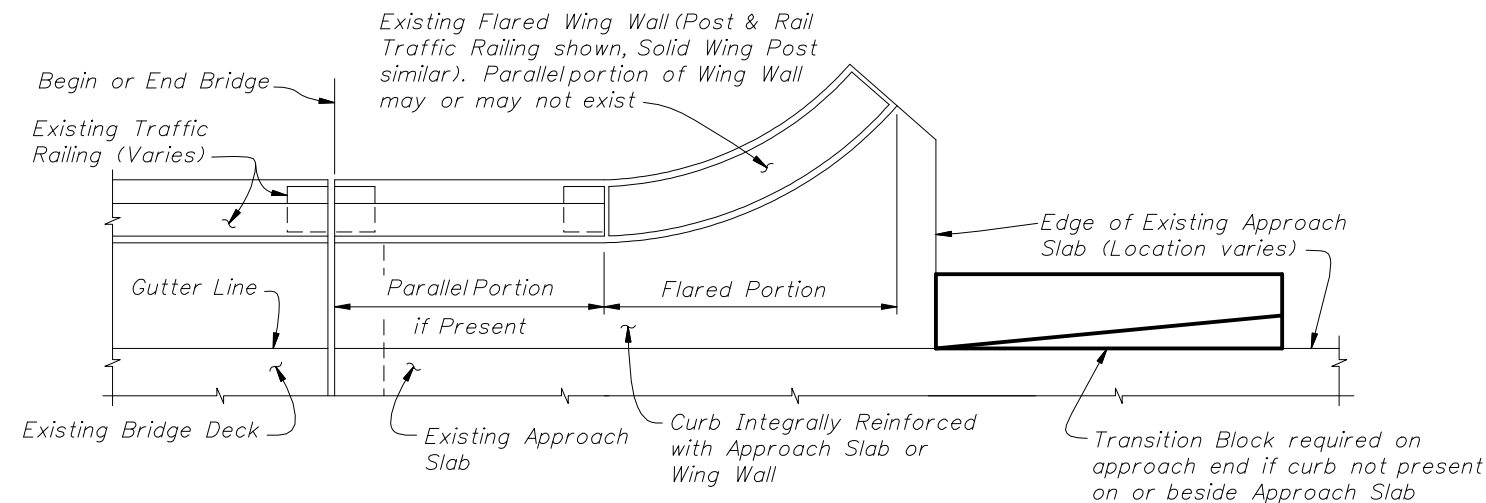
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**GUARDRAIL TRANSITIONS FOR EXISTING
BRIDGE TRAFFIC RAILING RETROFITS**

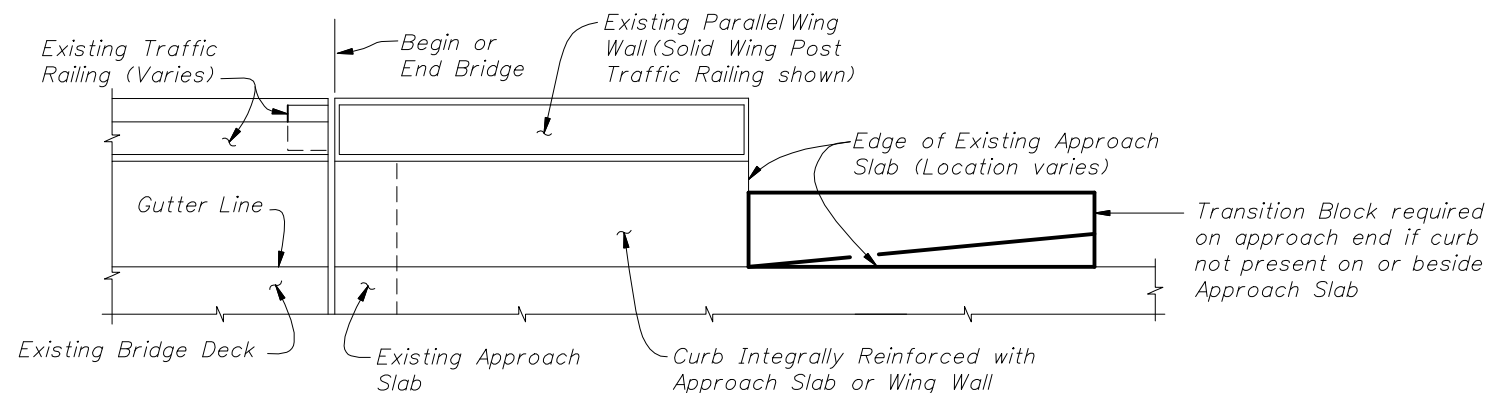
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PARTIAL PLAN VIEW OF EXISTING BRIDGE WITH PERPENDICULAR OR ANGLED WING WALLS



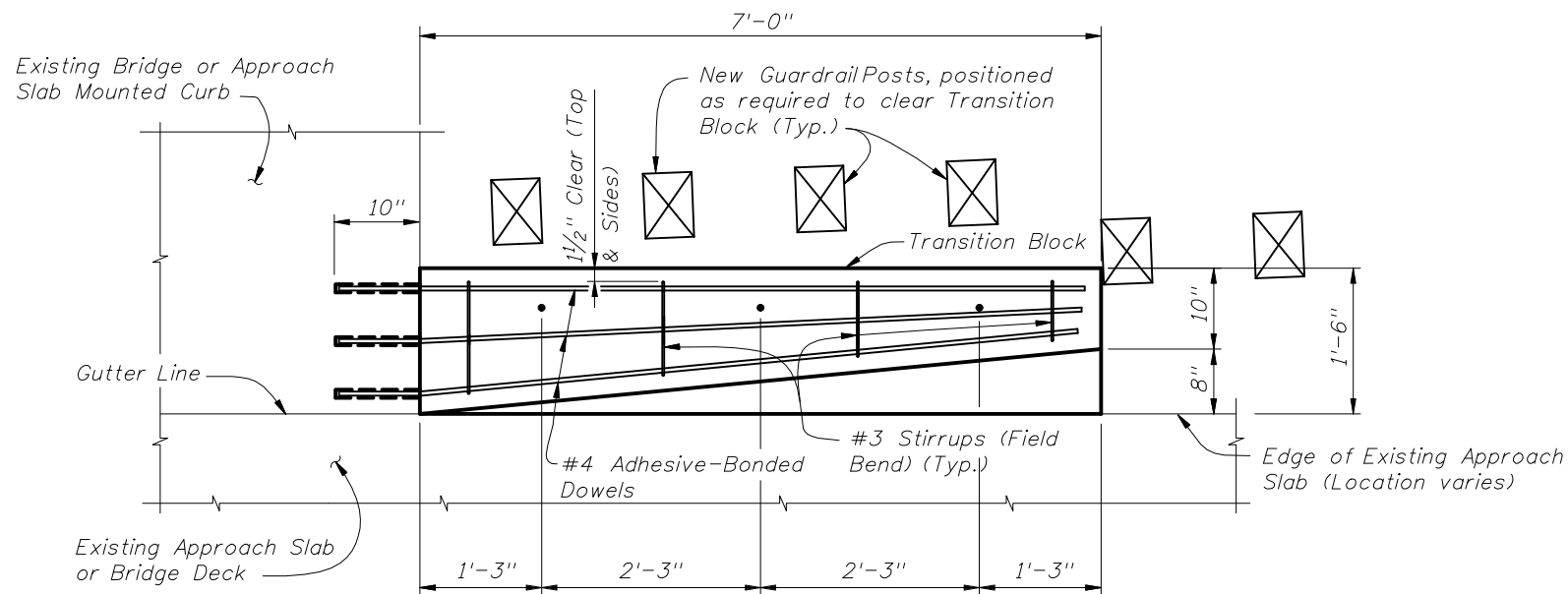
PARTIAL PLAN VIEW OF EXISTING BRIDGE WITH FLARED WING WALLS AND PARALLEL INTEGRALLY REINFORCED APPROACH SLAB CURBS (APPROACH SLAB WITH DETACHED CURBS OR SIDEWALK SIMILAR)



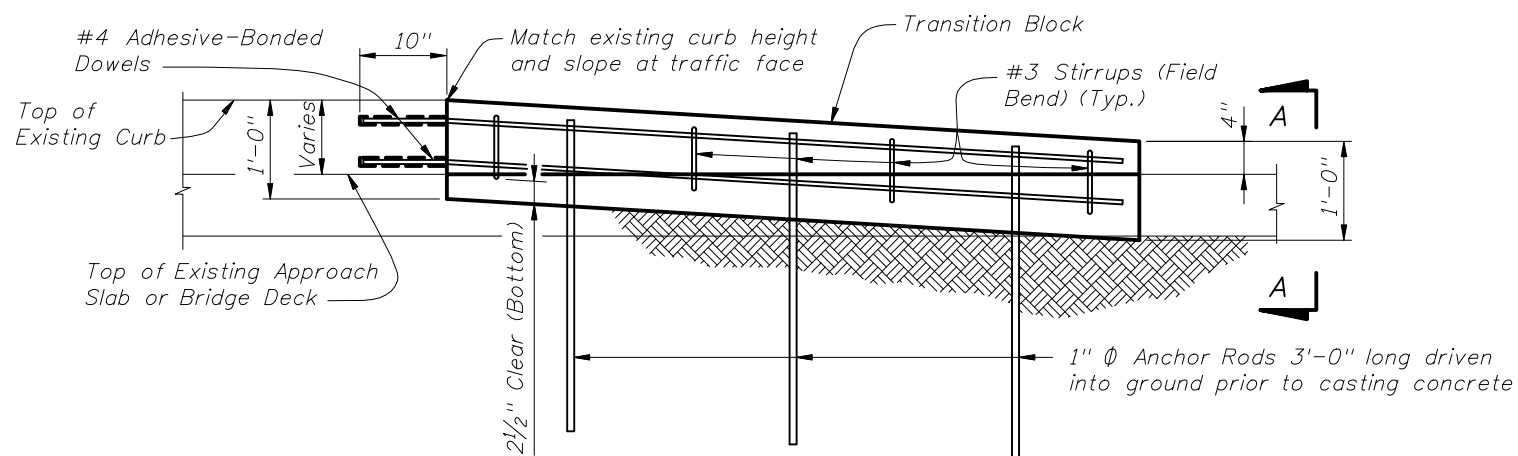
PARTIAL PLAN VIEW OF EXISTING BRIDGE WITH PARALLEL WING WALLS AND INTEGRALLY REINFORCED APPROACH SLAB CURBS (APPROACH SLAB WITH DETACHED CURBS OR SIDEWALK SIMILAR)

CROSS REFERENCE:
For Transition Block Details,
Quantities and reinforcement
see Sheet 3.



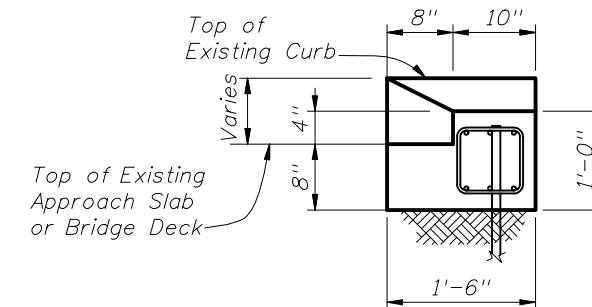


PLAN VIEW OF TRANSITION BLOCK
(GUARDRAIL NOT SHOWN FOR CLARITY)

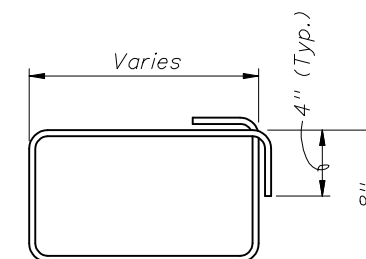


ELEVATION OF TRANSITION BLOCK
(GUARDRAIL AND POSTS NOT SHOWN FOR CLARITY)

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete Class II (Miscellaneous)	CY	0.4
Reinforcing Steel (Roadway)	LB	61
Guardrail (Reset)	LF	12.5



END VIEW A-A



#3 STIRRUP (FIELD BEND)

NOTES:

CONCRETE: Concrete for Transition Blocks shall be Class II (Miscellaneous).

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60.

ANCHOR RODS: Steel Anchor Rods shall be ASTM A36, ASTM A709 Grade 36 or ASTM A615 Grade 60 hot-dip galvanized in accordance with Specification Section 962.

W BEAM GUARDRAIL: Guardrail components and installation shall be in accordance with Design Standards Index 400.

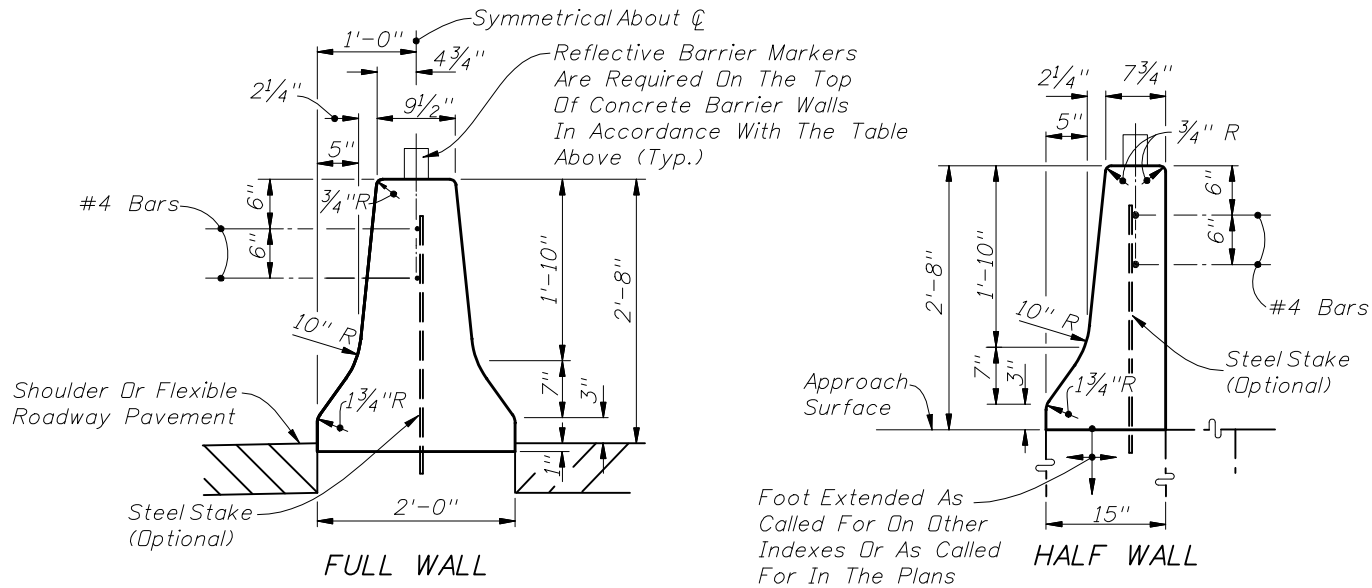
ADHESIVE-BONDED DOWELS: Adhesive Bonding Material Systems for Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416.

Adhesive Bonded Dowels are shown installed in an existing curb or sidewalk integrally reinforced with Approach Slab, Wingwall or Bridge Deck. For installations in existing detached curbs or sidewalks, install dowels in available sound concrete.

PAYMENT: Payment for Guardrail work will be made under Pay Item Guardrail (Reset) (LF). Payment for Transition Block will be made under Pay Items Concrete Class II (Miscellaneous) (CY) and Reinforcing Steel (Roadway) (LB).

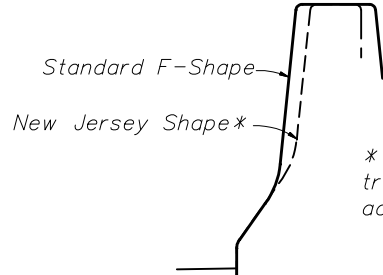


REFLECTIVE BARRIER MARKER SPACING ON WALL		
Distance-Edge of Travel Lane to Barrier Wall (ft)	Spacing (Ft.)	REMARKS
< 4'	40'	1. Reflectors shall conform to Section 993 of the Standard Specifications. 2. Reflector color (white or yellow) shall conform to the color of the near edgeline. 3. The cost for reflectors shall be included in the contract unit price for barrier wall.
4' to 8'	80'	
> than 8'	none required	



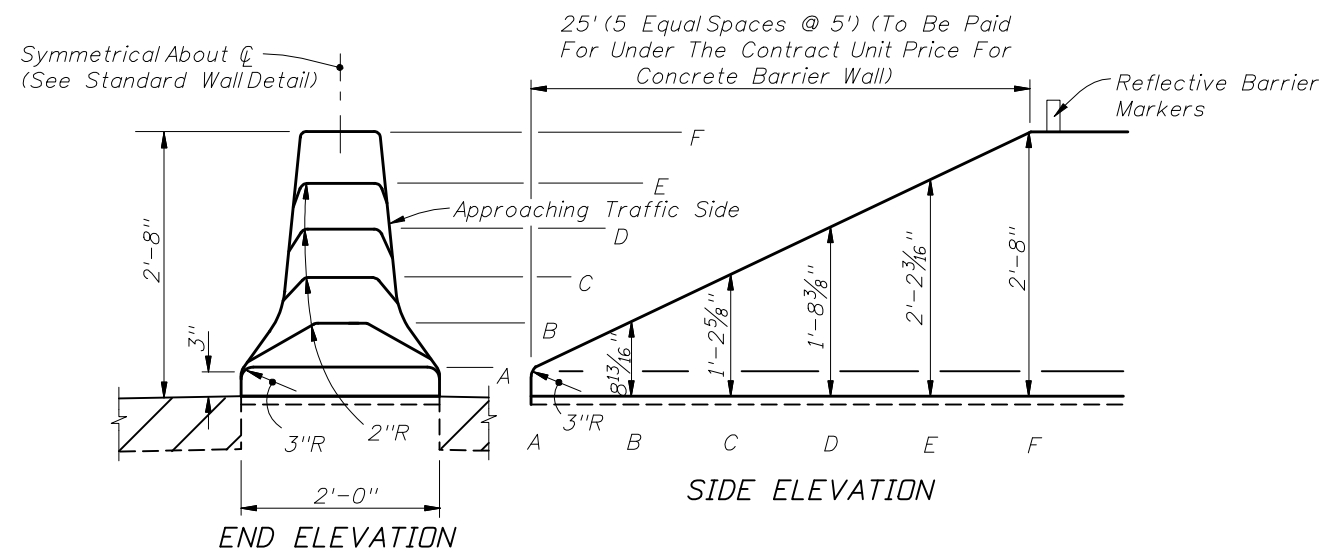
For concrete barrier wall details at piers, highway lighting and guardrail connections, see other sheets of this Index. Standard barrier to be paid for under the contract unit price for Median Concrete Barrier Wall, LF.

STANDARD BARRIER WALL SECTIONS



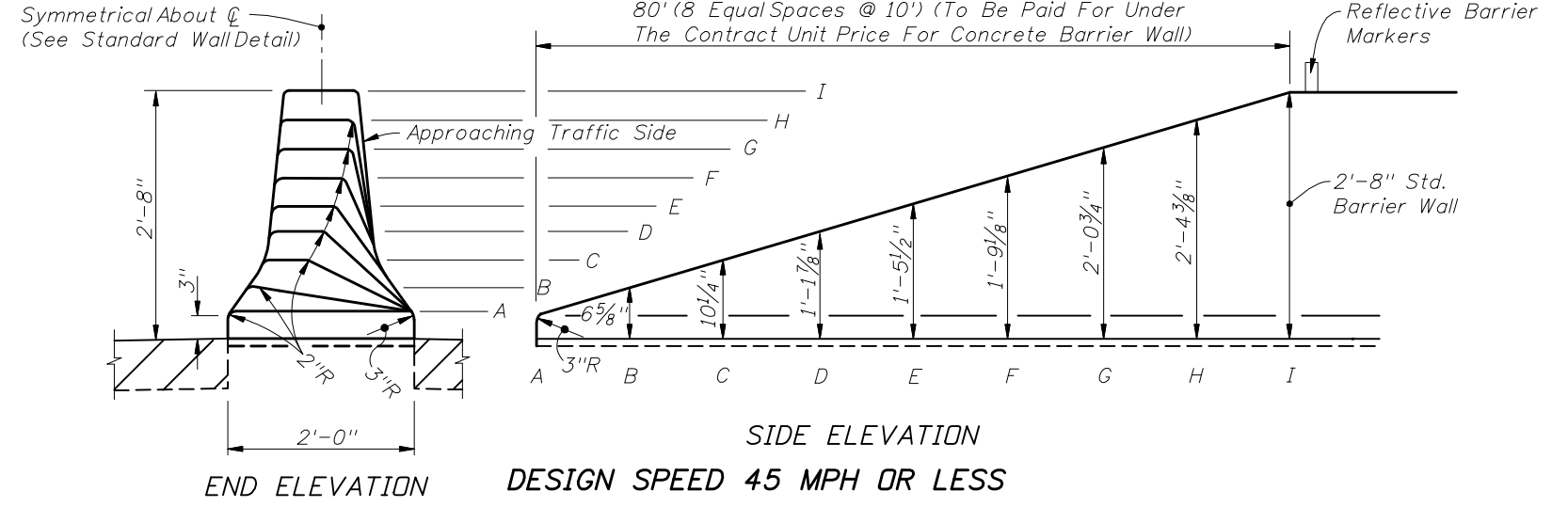
* Where standard F-Shape walls abut existing NJ Shape walls, face transitions of not less than 5' in length shall be constructed at the adjoining end of the F-Shape wall.

WALL FACE SAFETY SHAPES



TO BE USED ONLY WHERE TERMINAL LOCATED CLEAR ZONE WIDTH FROM EDGE OF THE NEAR APPROACH TRAFFIC LANE.

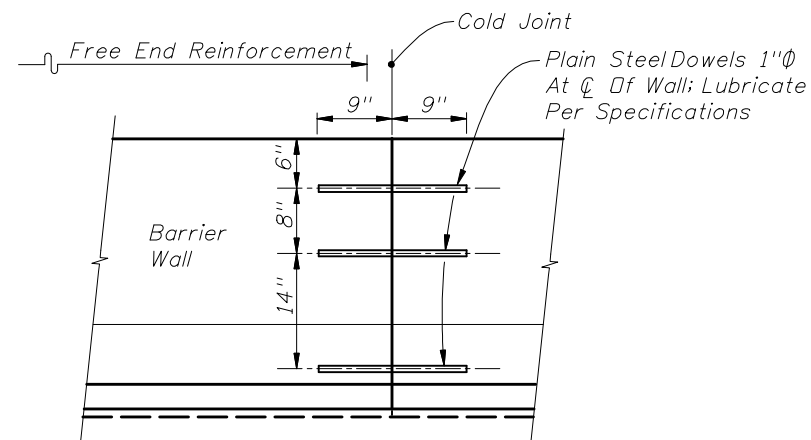
CONCRETE BARRIER WALL TERMINAL DETAIL II



DESIGN SPEED 45 MPH OR LESS CONCRETE BARRIER WALL TERMINAL FOR NARROW MEDIAN DETAIL III

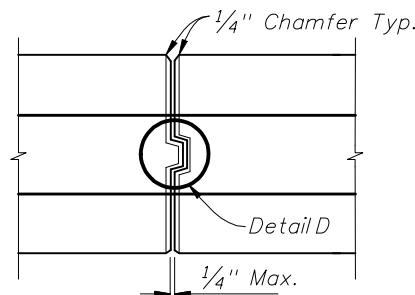
GENERAL NOTES

- Class II concrete shall be used for all reinforced and plain (nonreinforced) concrete barrier walls; except, in moderately and extremely aggressive environments, Class IV concrete shall be used. All reinforcing steel with undesignated size shall be #4 bars. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Standard Specifications, unless other finish called for in plans. The surfaces shall have a Class 5 Applied Finished Coating in accordance with Section 400 only when called for in the plans.
- Concrete barrier wall terminal notes for design speeds ≥ 50 mph.
 - Terminated outside clear zone of the approach traffic with 'Detail II' end treatment.
 - Terminated within a shielded location.
 - Terminal protection by the use of a crash cushion system.
 - Terminated in conjunction with a suitably designed transition to another barrier.
- Expansion joints in wall required only at bridge ends and/or at locations where wall is an integral part of existing or proposed concrete slab; wall joints are to match an existing or proposed expansion joint.
- When the barrier is installed adjacent to the pavement the top 12" of the subgrade shall be compacted to at least 100% of the density as defined in the AASHTO T-99 specifications.
- Cast-in place barrier wall normally will be a continuous pour without transverse contraction joints. Cast-in-place segments with a length < 40' shall be joined to adjacent sections by doweling. See Detail B on Sheet 2.
- Precast construction is allowed as an alternate to cast-in-place construction.
 - Wall segments < 40' in length shall be joined by a transverse joint in accordance with Details C & D on Sheet 2. The minimum segment length is 20'.
 - Bedding of the precast sections shall be facilitated by the use of sand-cement grout or equal method to assure uniform bearing.
 - Reinforcement may be required for handling stresses.
- On roadways designated for reverse laning all downstream, ends that are not shielded or outside the clear zone shall be marked by Type 3 Object Markers.
- Cost of reinforcing steel and reflective barrier markers shall be included in the contract unit price for concrete barrier wall. See individual details for pay item information.
- For barrier wall inlet details see Indexes Nos. 217, 218 and 219.
- Concrete barrier wall with New Jersey Safety Shape may not be substituted for the Standard F Shape Barrier.

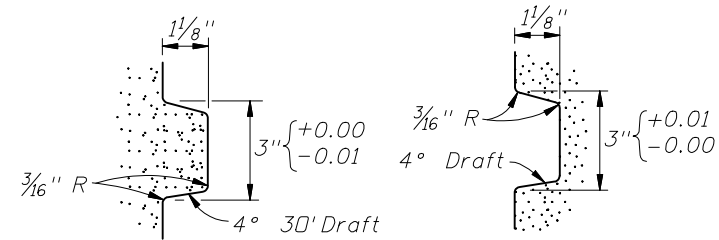


DOWELED TRANSVERSE CONSTRUCTION JOINT WHEN ABUTTING SEGMENT(S) LESS THAN 40' IN LENGTH

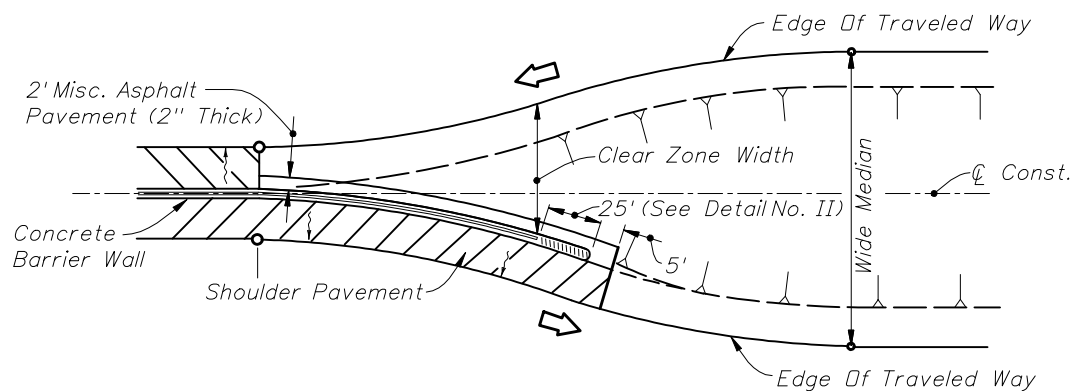
DETAIL B



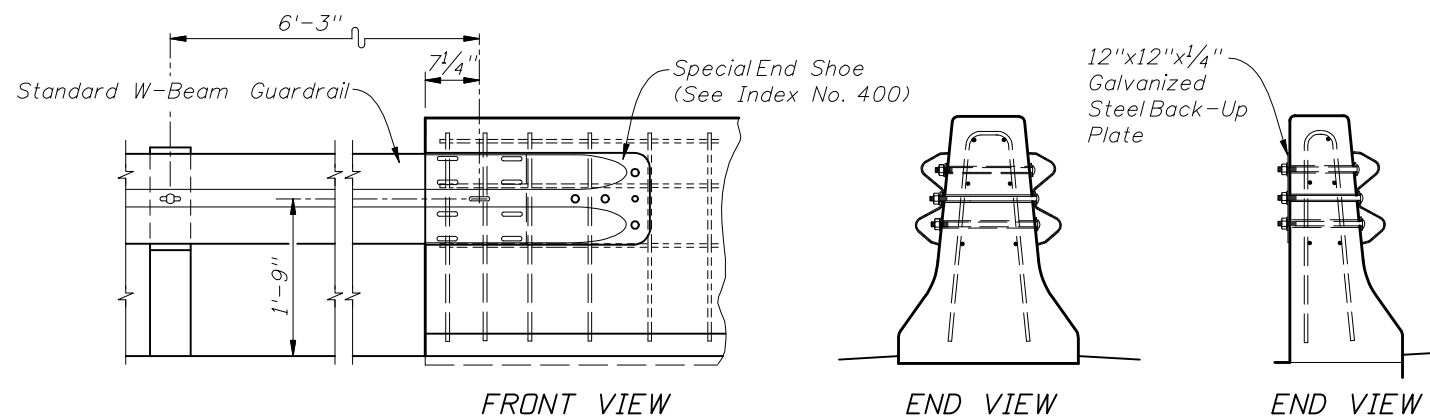
**TOP VIEW
PRECAST BARRIER TRANSVERSE JOINTS
DETAIL C**



**TOP VIEW
STRAIGHT TONGUE AND GROOVE
DETAIL D**

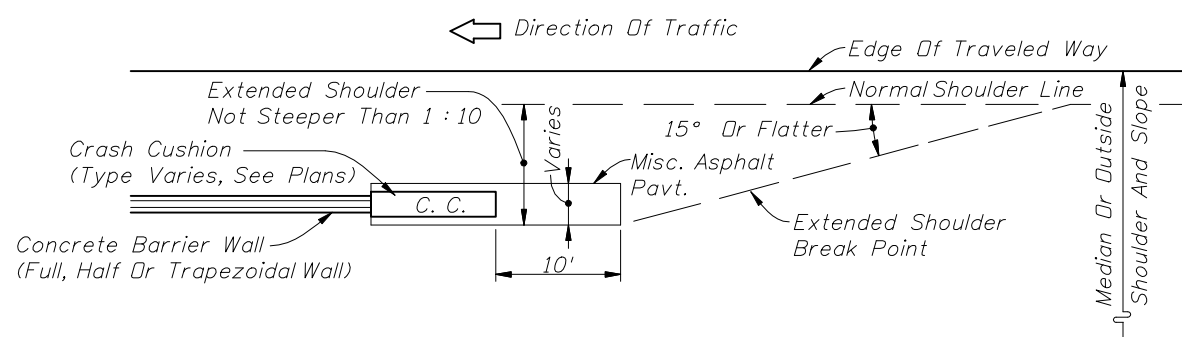


CONCRETE BARRIER WALL TRANSITION BETWEEN WIDE AND NARROW MEDIANS WHEN BARRIER WALL END LOCATED OUTSIDE APPROACH CLEAR ZONE OR HORIZONTAL CLEARANCE



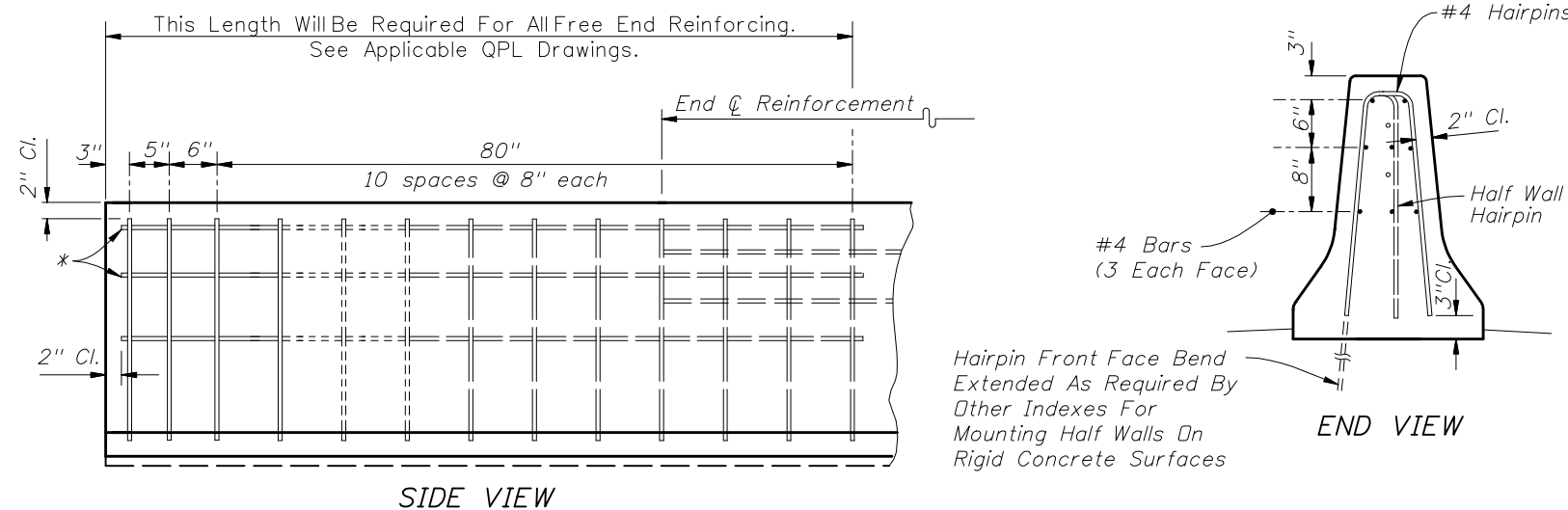
- NOTES**
- End of wall flush mounted connections are not applicable to two-lane two-way facilities. See Sheets 20, 24, and 25 for trailing end connections on two-lane two-way facilities and for approach guardrail connections.
 - Trailing guardrail connections to double face safety shaped walls will be under one of the following traffic conditions and mounting methods:
 - One-way traffic trailing condition one side only - flush mount with flat steel back-up plate on back side.
 - One-way traffic trailing condition both sides - flush mount both sides.
 - For trailing condition one side and approach traffic condition opposite side - see "Median Barrier Wall" mounting, Sheet 25.

W-BEAM GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL TRAILING ENDS



SHOULDER TREATMENT WHEN CRASH CUSHIONS SHIELDING CONCRETE BARRIER WALL END LOCATED INSIDE APPROACH CLEAR ZONE OR HORIZONTAL CLEARANCE

DETAIL A



* Note: Free end reinforcement required for nonreinforced walls at the following locations: All exposed ends; abutting ends of true joints; ends with guardrail connections; ends with redirective crash cushion connections; and, ends connecting to bridge traffic rails or other rigid barrier walls.

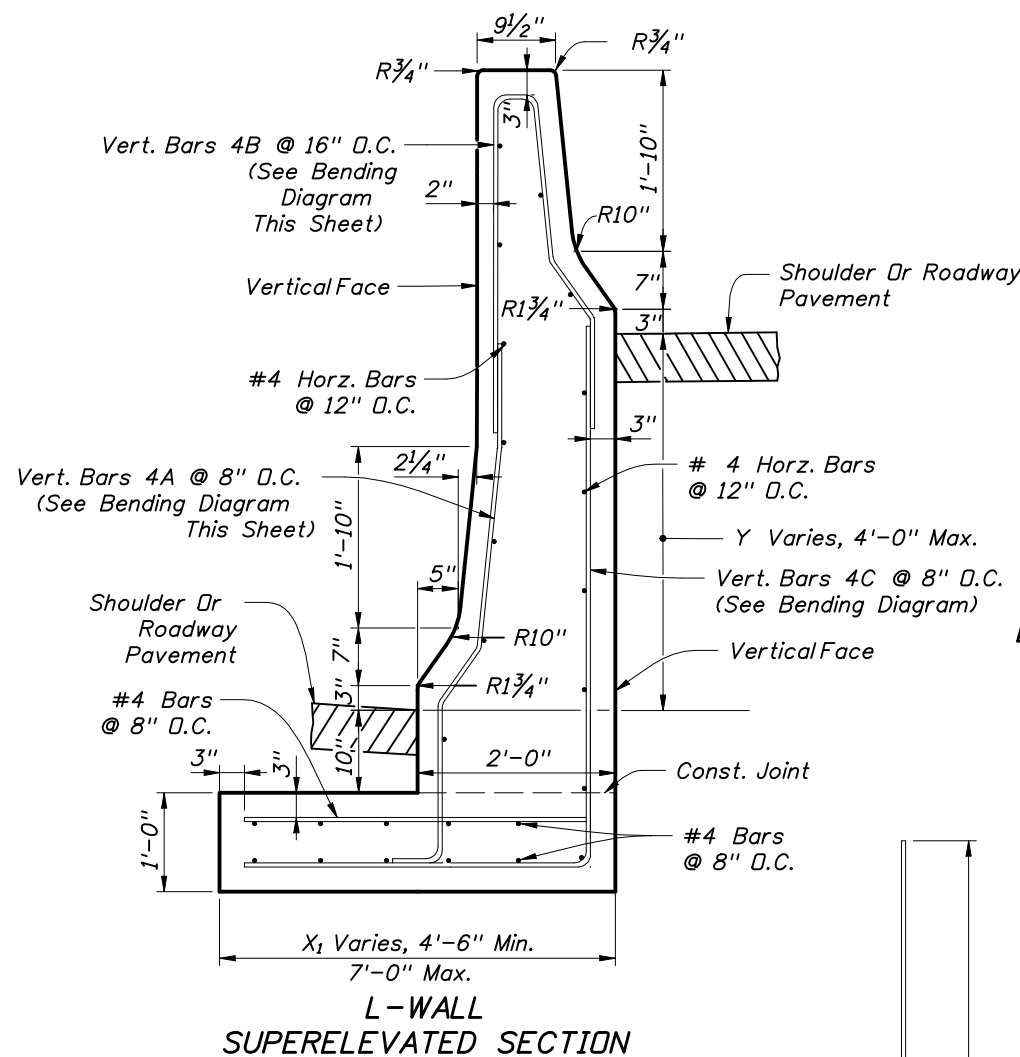
FREE END REINFORCEMENT



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CONCRETE BARRIER WALL

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Design Criteria:
NCHRP report 350 Test Level (TL-4) Vehicle:
8000S, 50 mph, 25°, Avg. Lat. Impact.

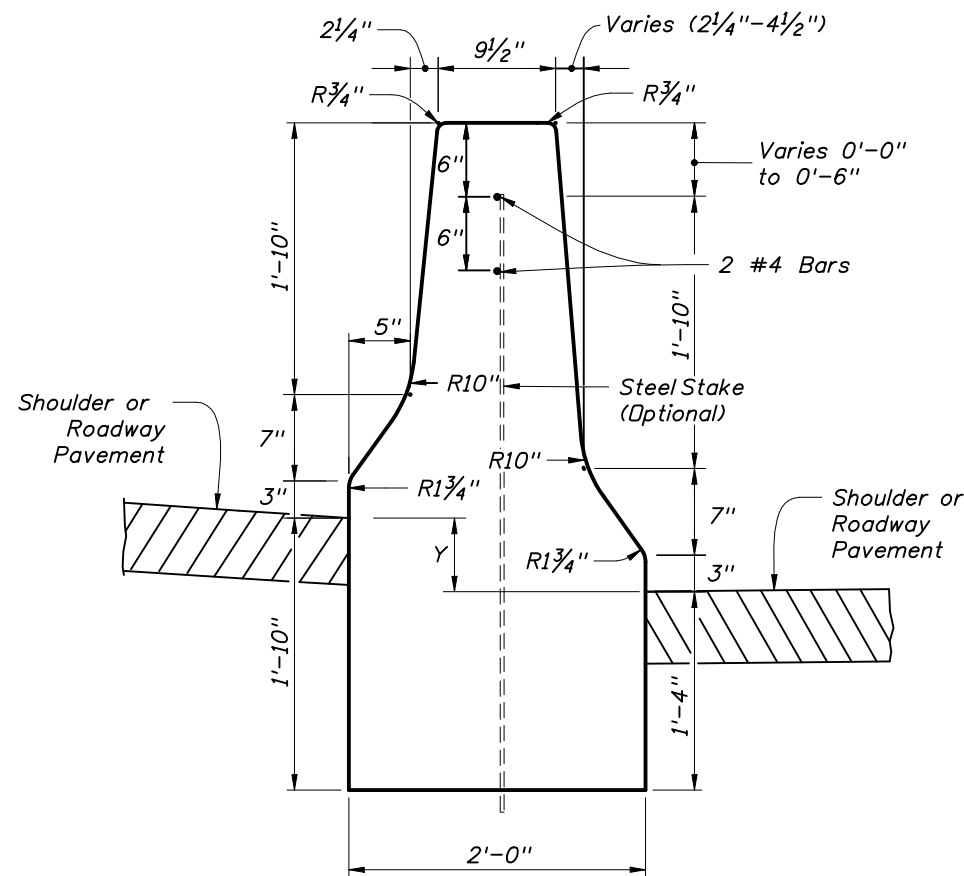
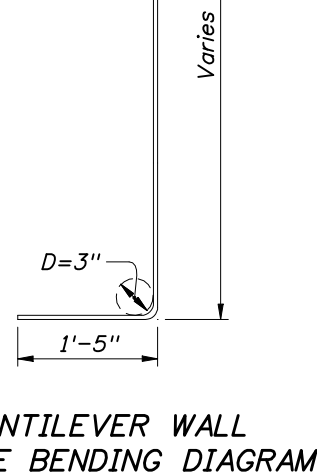
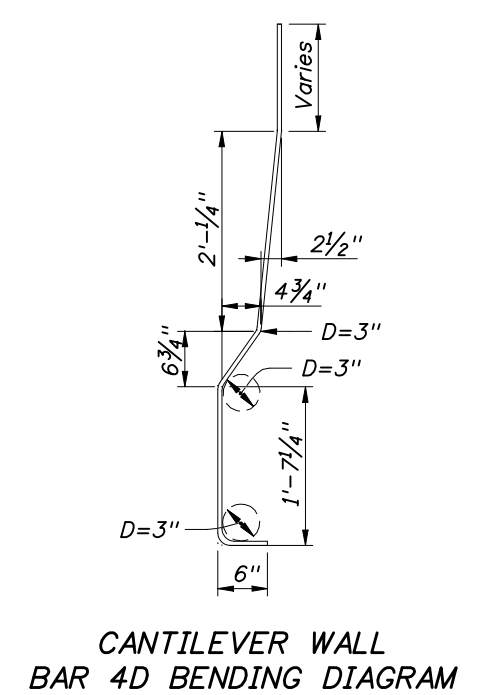
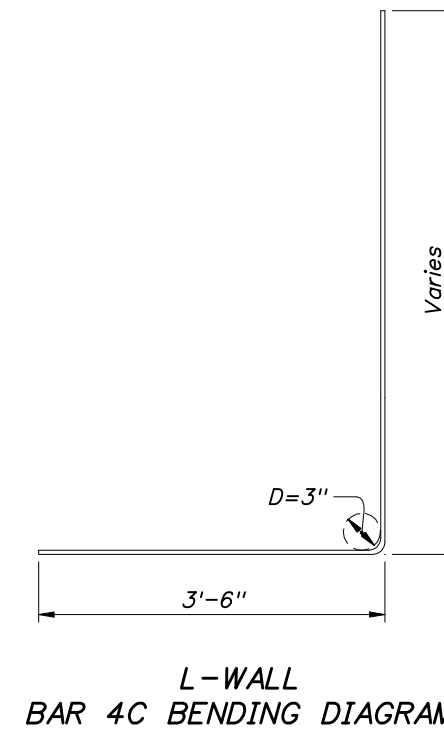
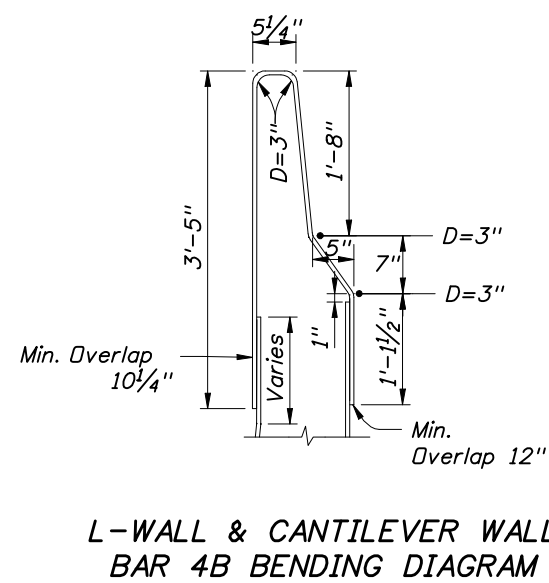
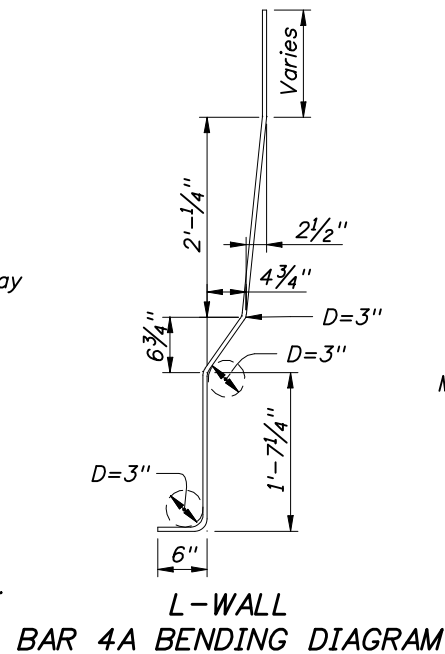
Vehicle force: 54 kips Horiz.; 18 kips Vert.
at 32" above pavement.

Unless the plans stipulate a specific wall type, either the cantilever wall or the "L" wall may be constructed at the Contractor's option.

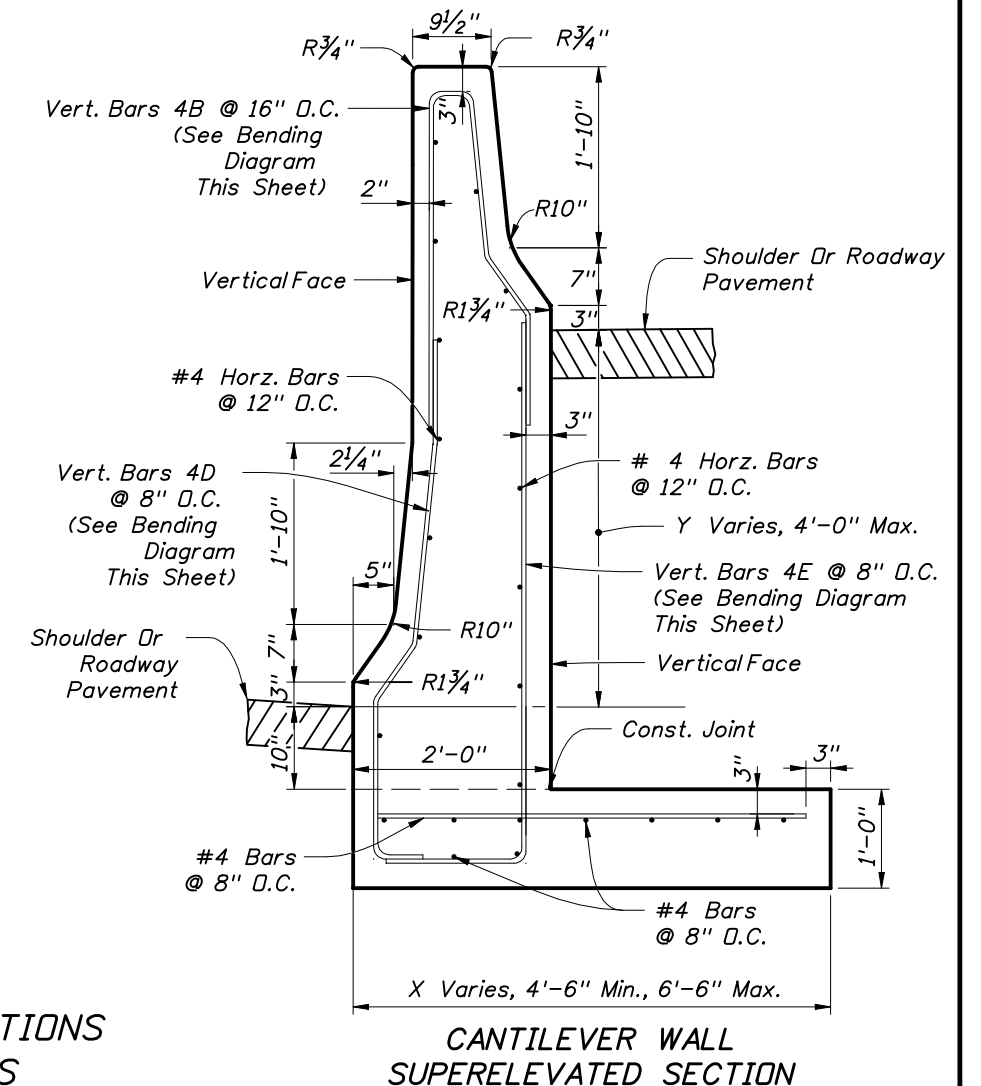
Cost of the footing to be included in the contract unit price for Median Concrete Barrier Wall, LF.

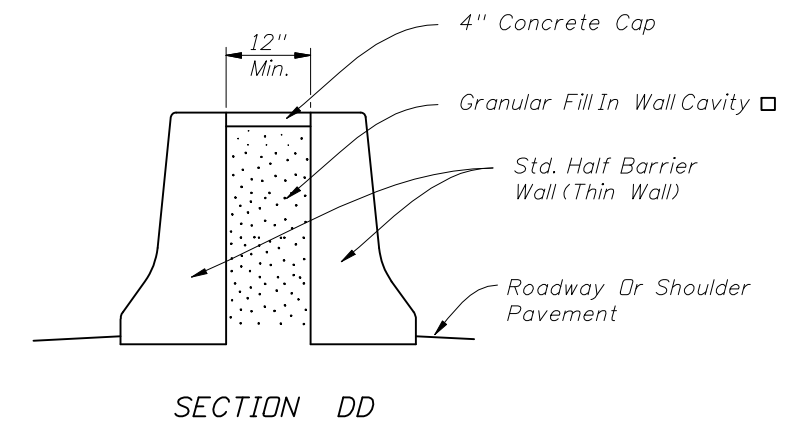
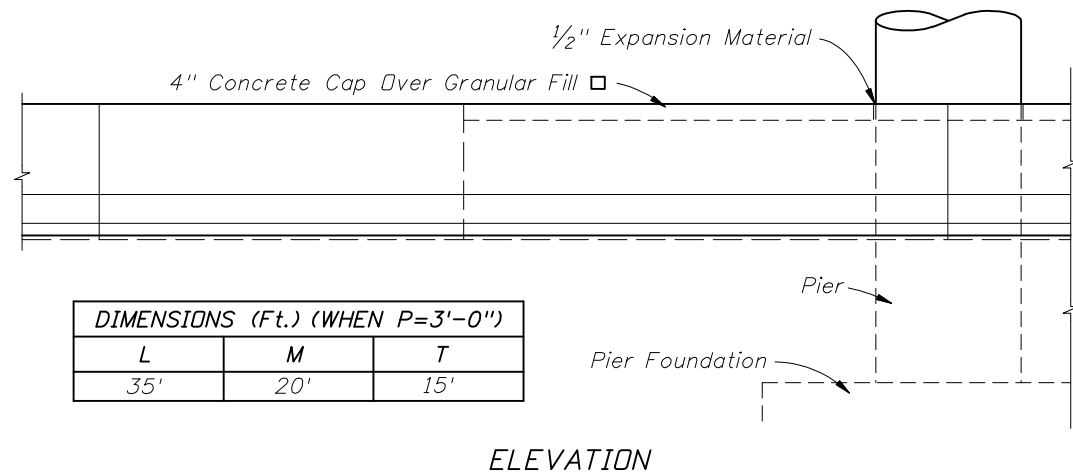
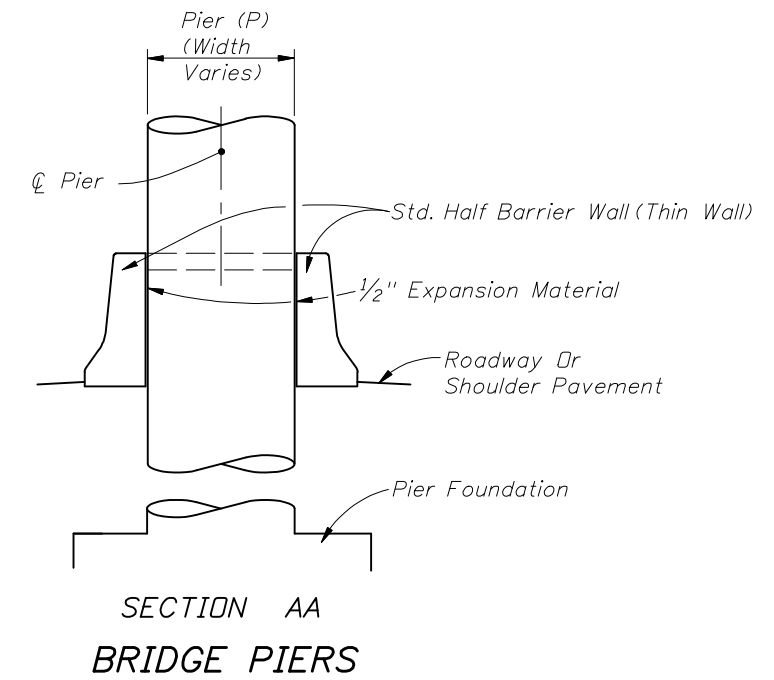
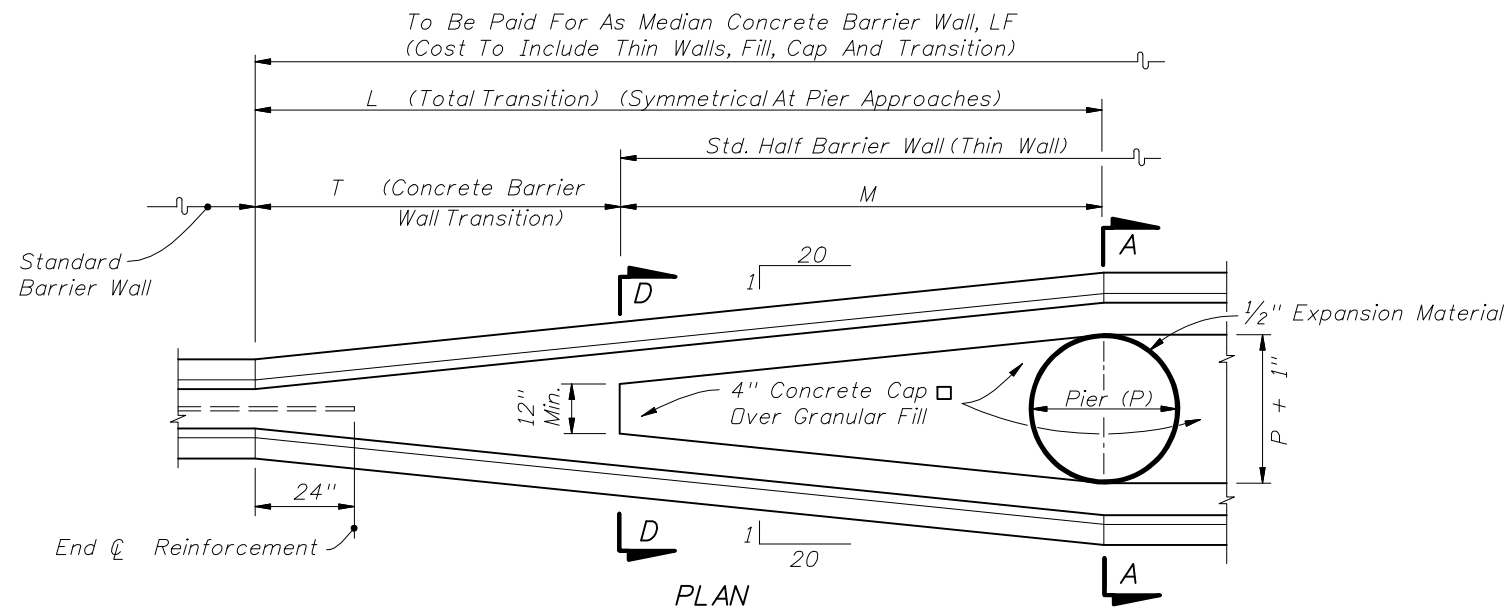
"L" Wall	Height Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width X ₁	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-6"	7'-0"
Min. Segment Wall Length		46'	44'	42'	41'	39'	36'	33'

Cantilever Wall	Height Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width X	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-3"	6'-6"
Min. Segment Wall Length		39'	35'	32'	29'	26'	24'	22'



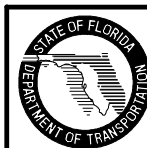
MEDIAN BARRIER WALL FOR SUPERELEVATED SECTIONS OR FOR VARIABLE ROADWAY PROFILE GRADES





□ Fill To Be Free Of Deleterious And Cementitious Material

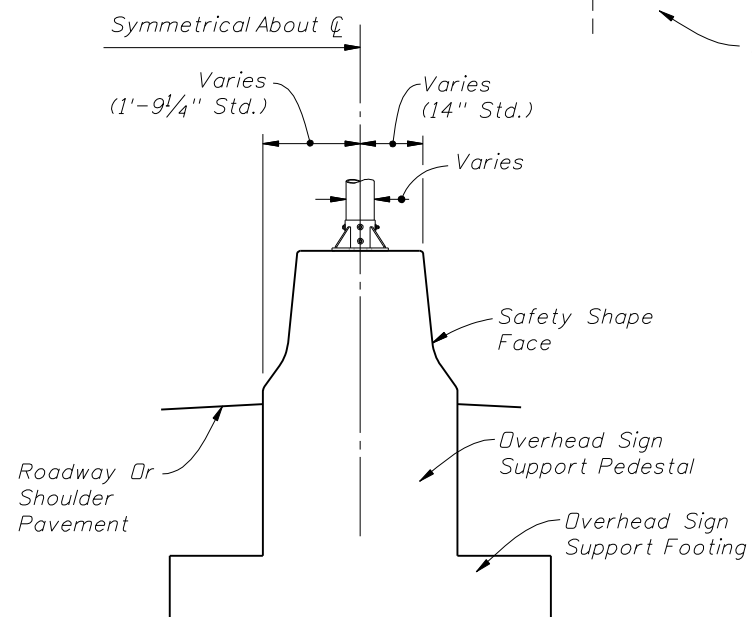
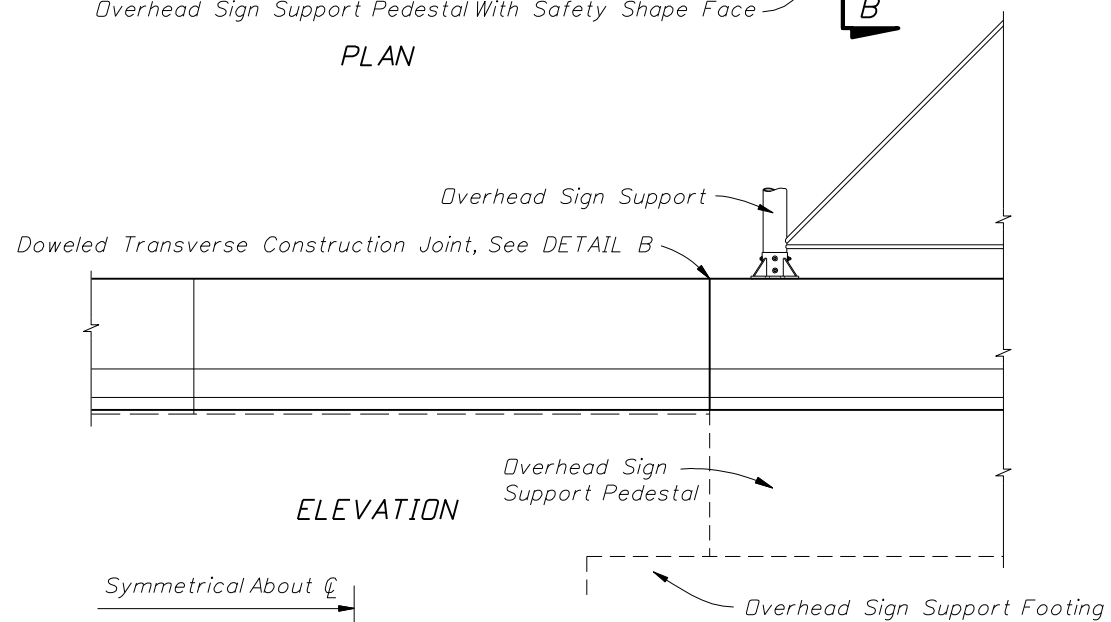
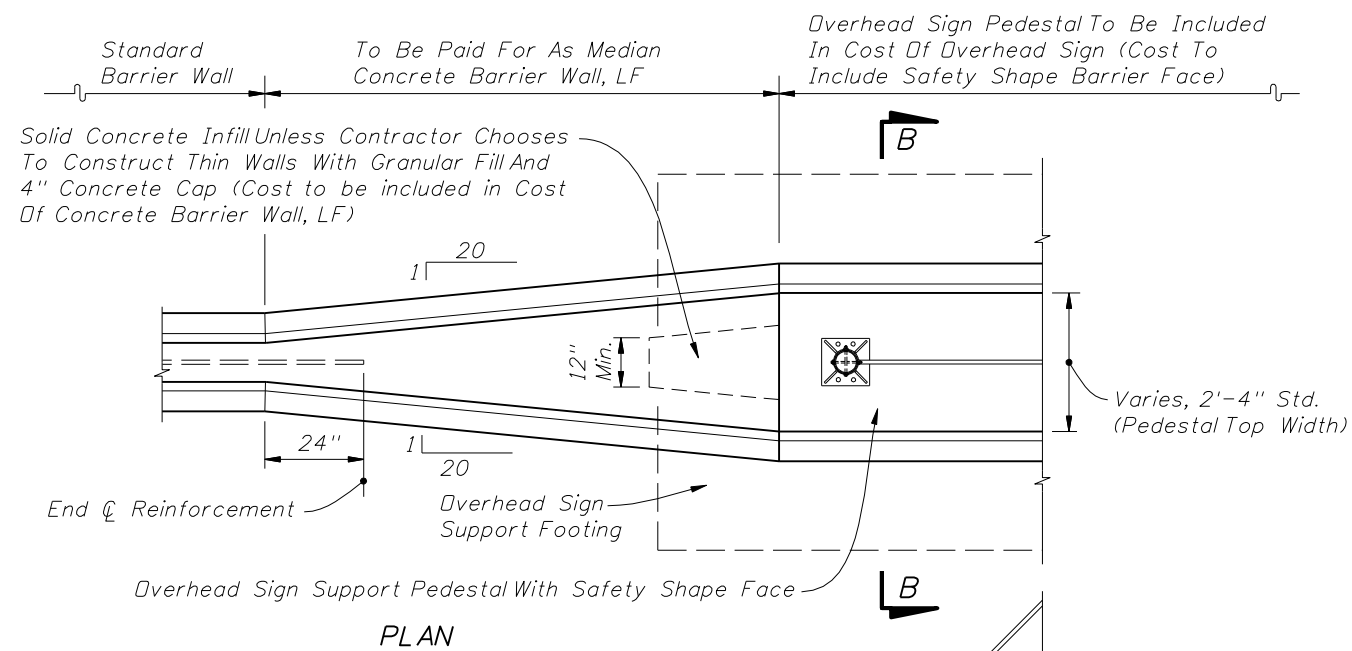
CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT BRIDGE PIERS



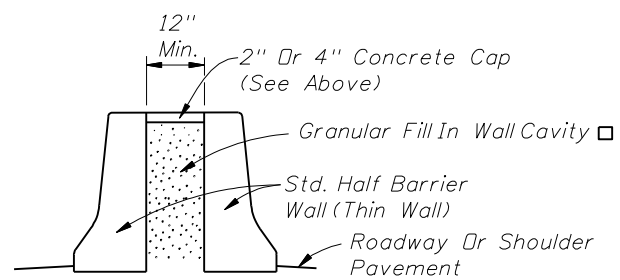
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CONCRETE BARRIER WALL

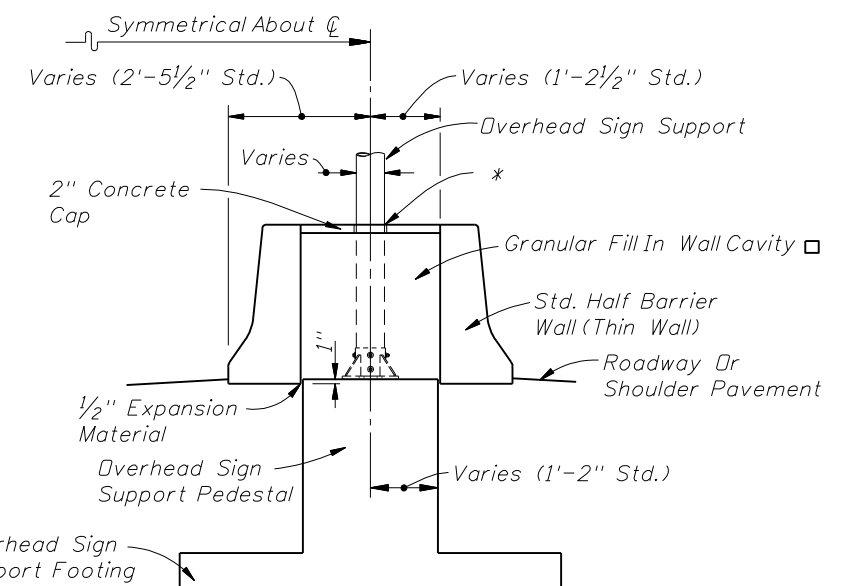
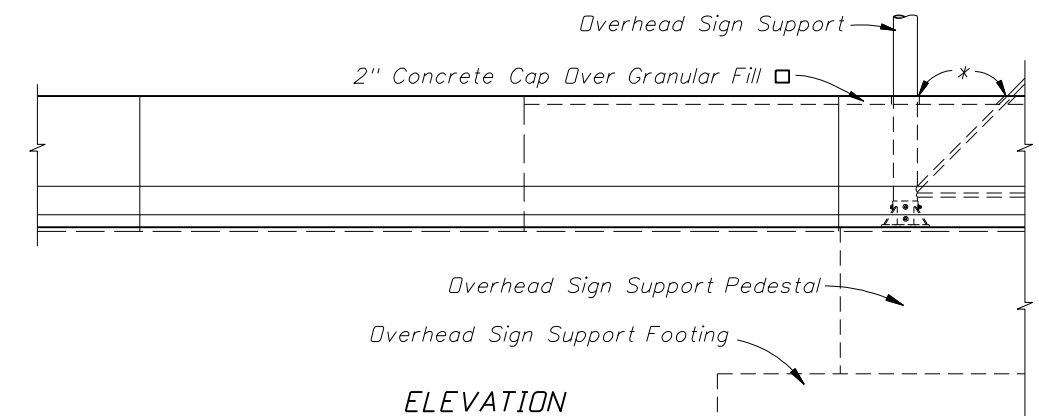
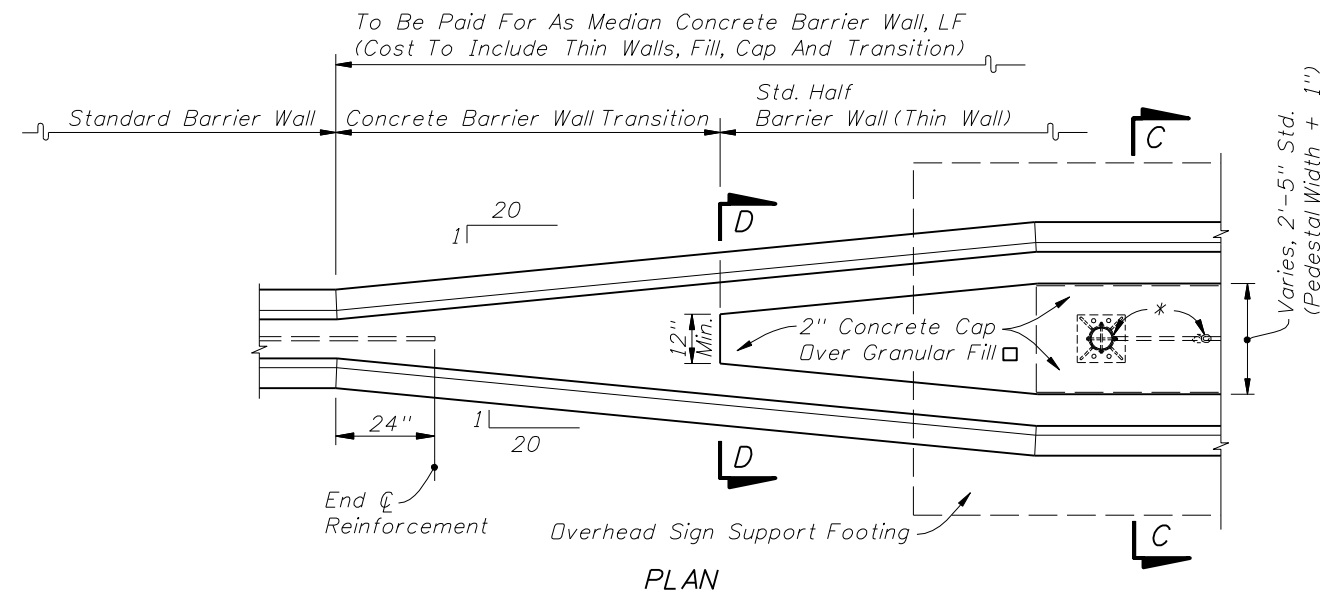
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SECTION BB
COMBINATION BARRIER AND SIGN PEDESTAL



- Fill To Be Free Of Deleterious And Cementitious Materials
- * 1/2" Expansion Material Wrap Around Column(s) And Strut(s) At Concrete Cap



Note: This detail to be used only when installing barriers around existing sign supports that are to remain. It shall not be used for new sign support installations. For new installations use combination barrier and sign pedestal (Section BB).

SECTION CC
INDEPENDENT BARRIER AND SIGN PEDESTAL

CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT OVERHEAD SIGN SUPPORTS



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CONCRETE BARRIER WALL

Last Revision

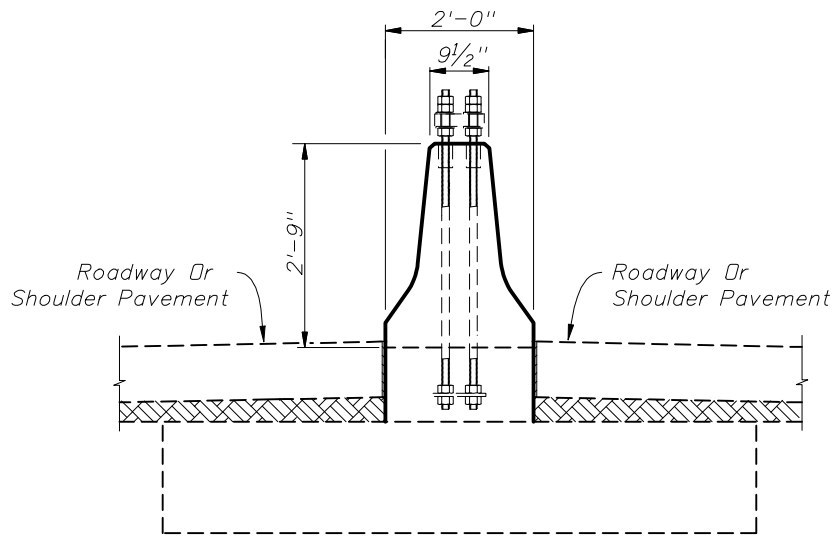
07/01/09

Sheet No.

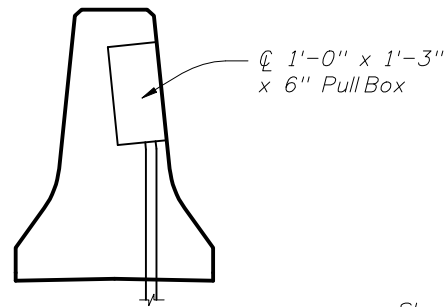
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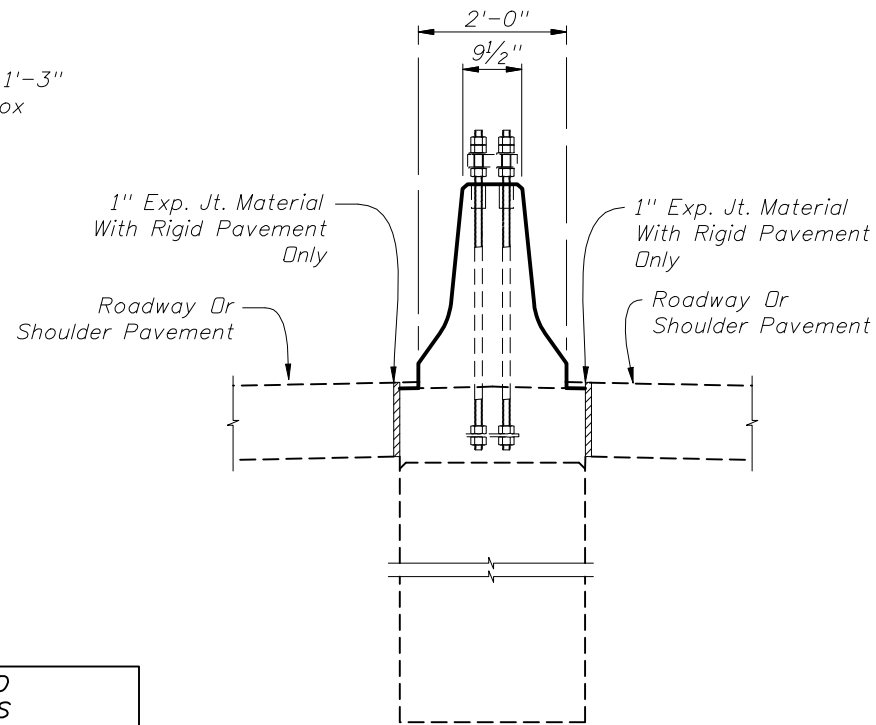
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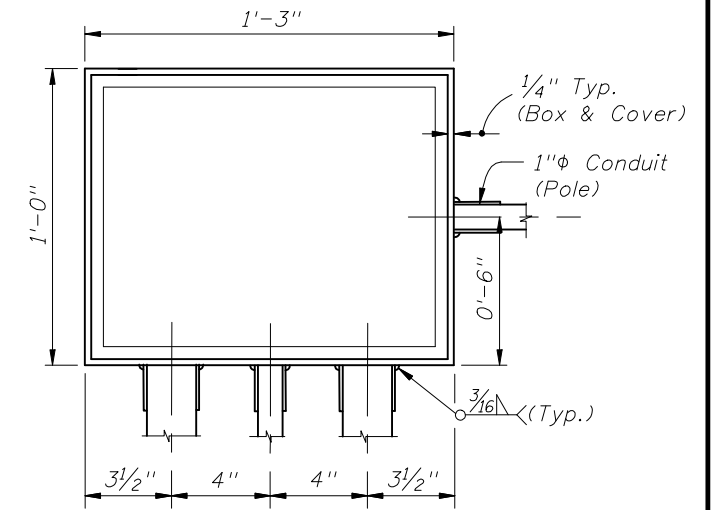
END VIEW
SPREAD FOOTING OPTION



TRANSVERSE SECTION
INSTALLATION

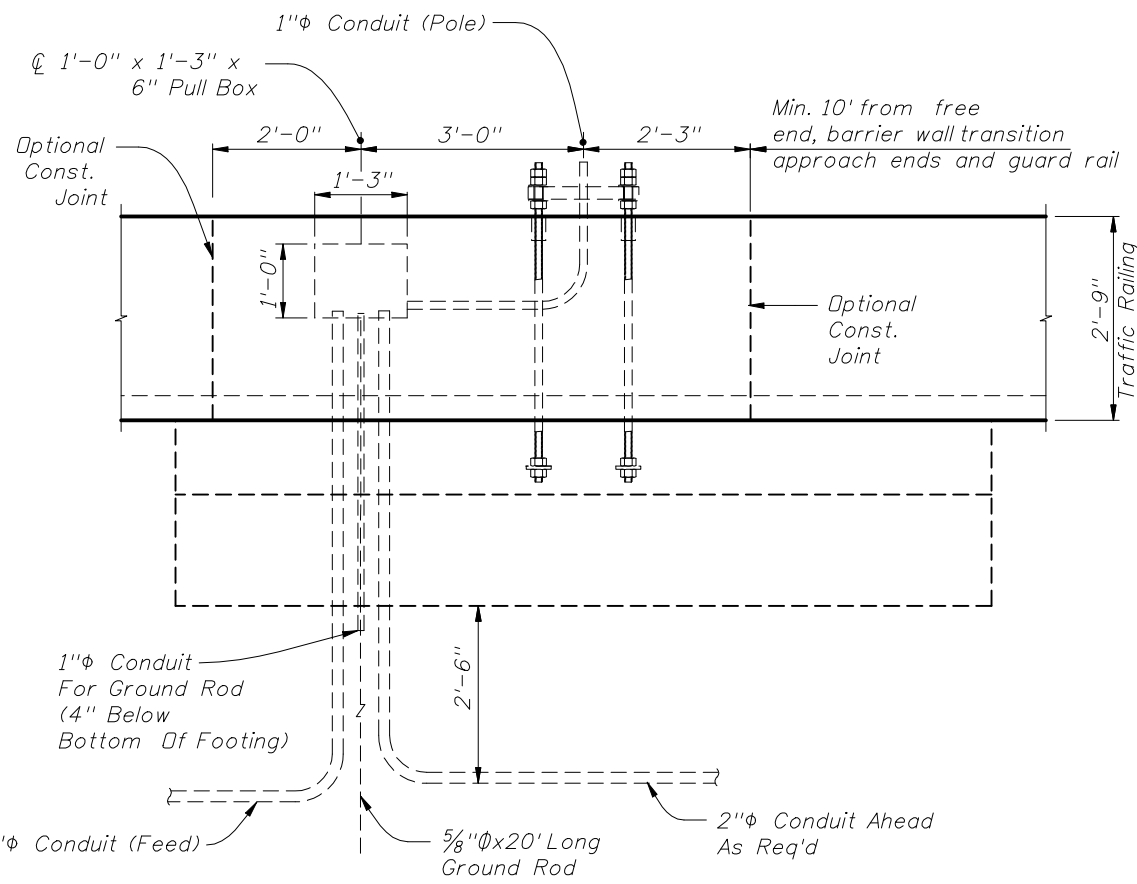


END VIEW
CYLINDRICAL OPTION

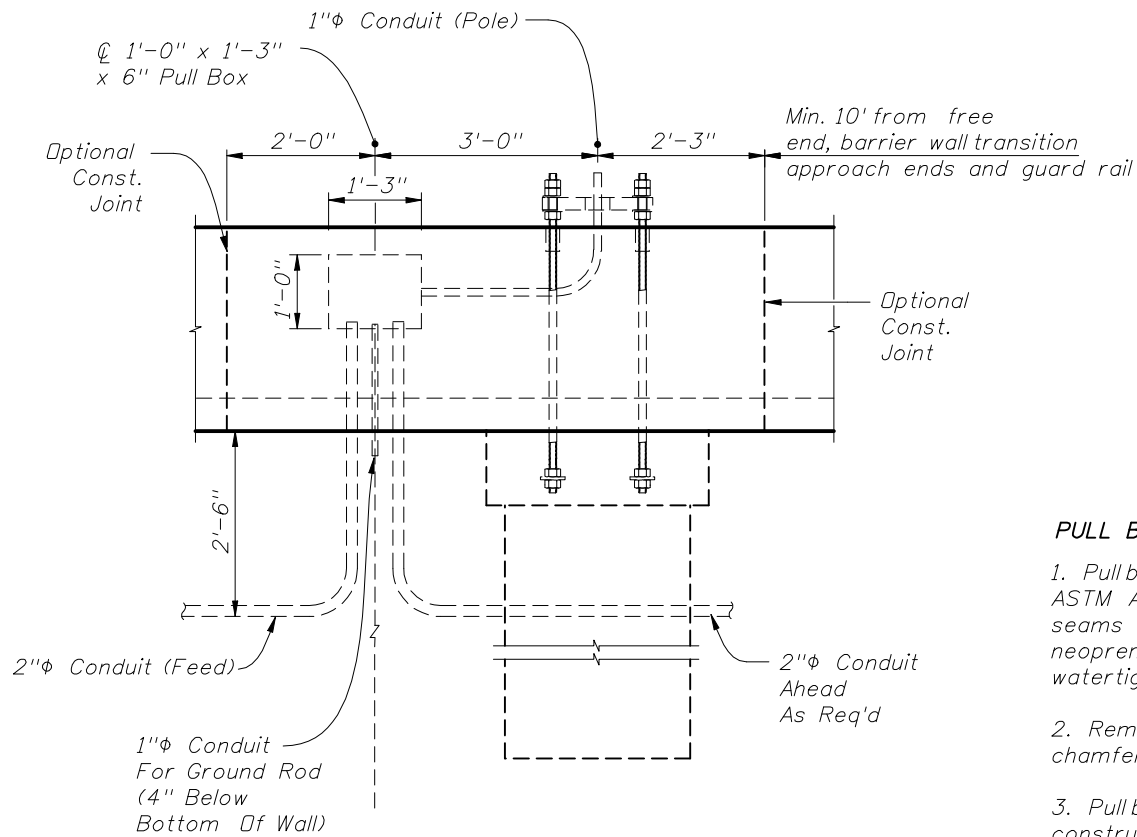


FRONT VIEW
PULL BOX

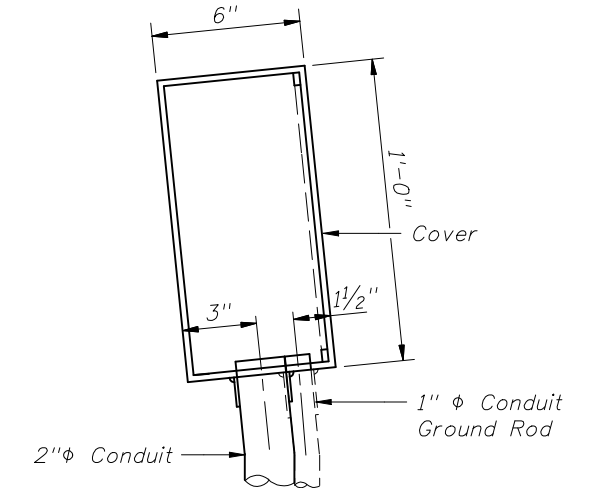
**SPREAD FOOTING AND
CYLINDRICAL NOTES**
The Reinforcement Details And
Dimensions For Both The Spread
Footing And Cylindrical Foundations
Can Be Found In Index 17515.



ELEVATION
SPREAD FOOTING OPTION



ELEVATION
CYLINDRICAL OPTION



SIDE VIEW
PULL BOX

LIGHT POLE MOUNTING IN MEDIAN BARRIER WALL

PULL BOX NOTES

1. Pullboxes are to be fabricated from steel conforming to ASTM A36 and be hot-dip galvanized after fabrication. All seams shall be continuously welded and ground smooth. A neoprene gasket shall be attached to the box to provide a watertight cover. The cover screws shall be fully galvanized.
2. Remove excess concrete while green and hand form chamfers.
3. Pullbox complete and conduit risers are incidental to the construction and cost of the barrier wall; there is to be no separate compensation for the box, risers or installation unless specifically called for in the plans.

PULL BOX - ELECTRICAL



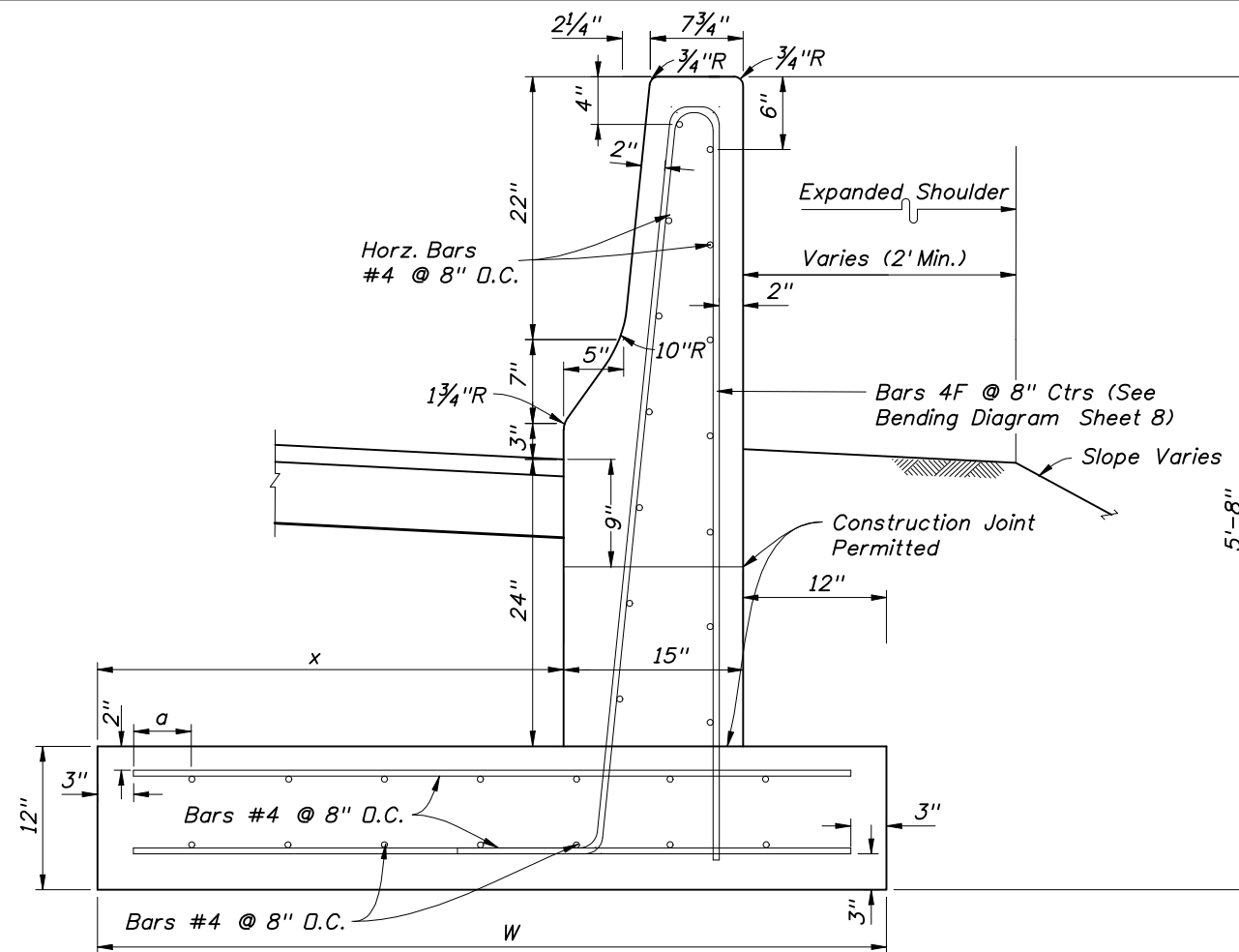
2010 FDOT Design Standards

CONCRETE BARRIER WALL

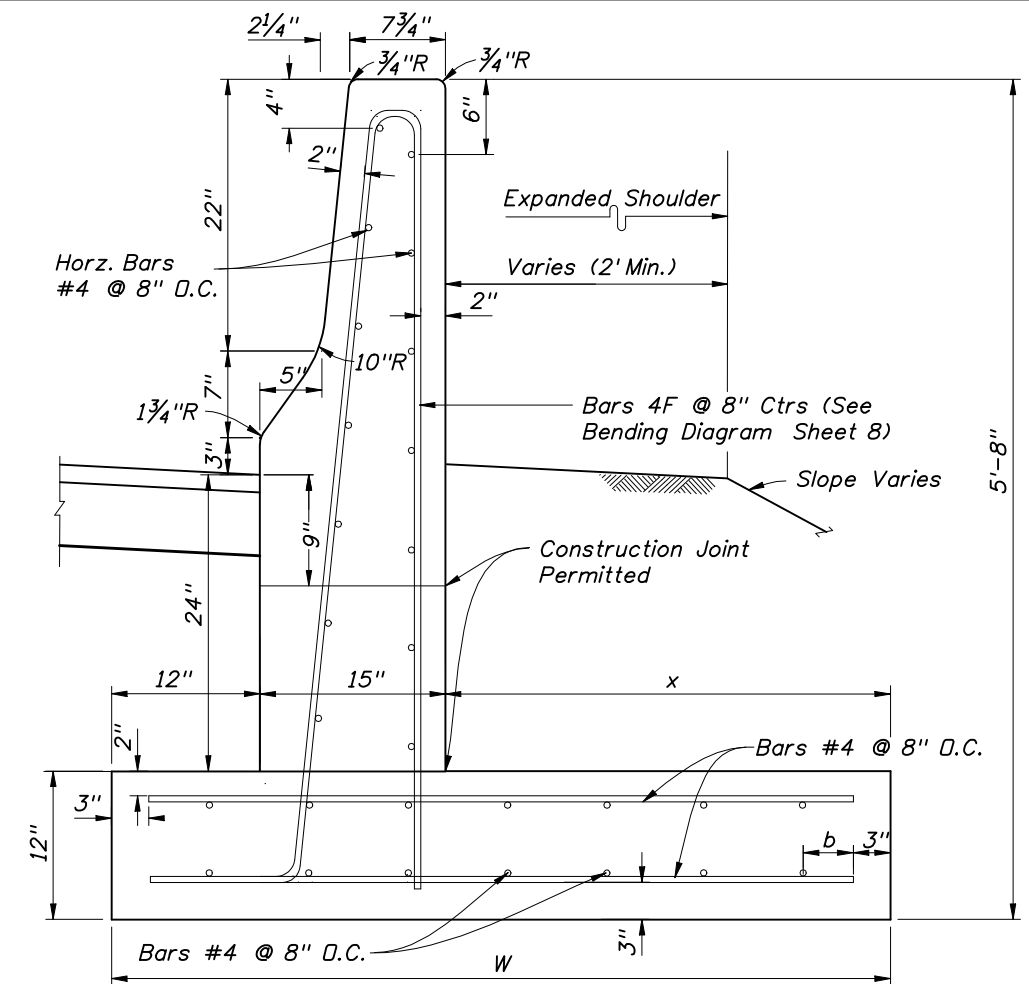
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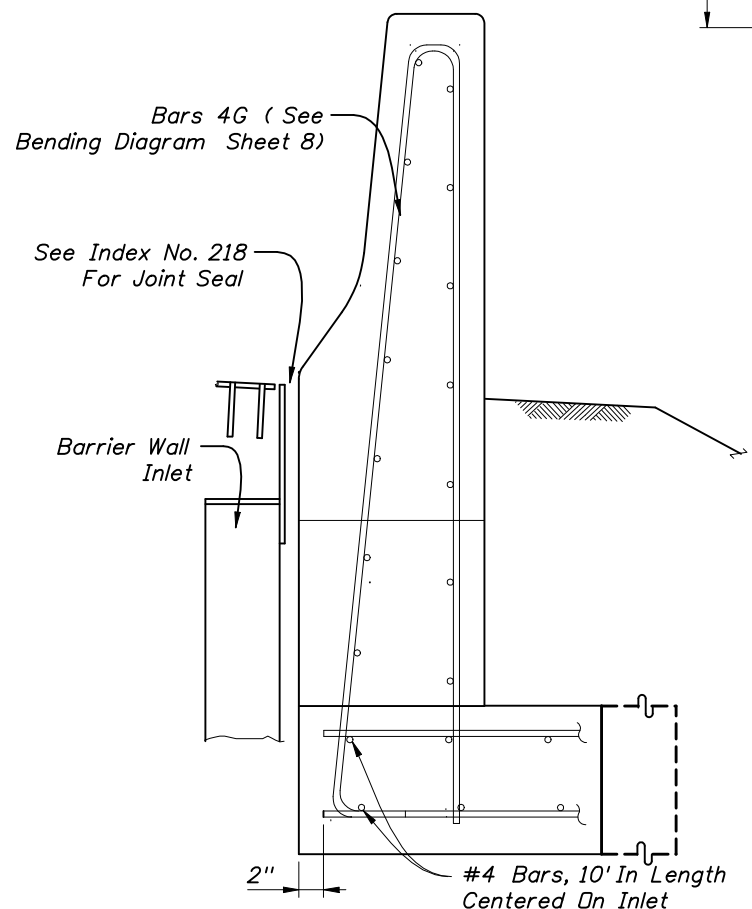
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NOTE: All longitudinal reinforcement #4 bars.
CANTILEVER WALL



NOTE: All longitudinal reinforcement #4 bars.
L-WALL



REINFORCING STEEL MODIFICATIONS AT BARRIER WALL INLETS (INDEX NO. 218)

DIMENSIONS AND QUANTITIES											
CANTILEVER WALL						L-WALL					
Length* Of Barrier Wall	W	x	a	Class II Conc. CY Per Lin. Ft.	Rein. Steel Lbs. Per Lin. Ft.	Length* Of Barrier Wall	W	x	b	Class II Conc. CY Per Lin. Ft.	Rein. Steel Lbs. Per Lin. Ft.
≥ 65'	3'-3"	1'-0"	5"	0.30	31	≥ 60'	3'-6"	1'-3"	7"	0.31	32
57' to 64'	3'-9"	1'-6"	3"	0.32	34	50' to 59'	4'-0"	1'-9"	5"	0.33	34
50' to 56'	4'-3"	2'-0"	3"	0.33	36	40' to 49'	4'-9"	2'-6"	6"	0.35	37
41' to 49'	5'-0"	2'-9"	7"	0.36	38	35' to 39'	5'-3"	3'-0"	4"	0.37	39
36' to 40'	5'-6"	3'-3"	5"	0.38	40	30' to 34'	5'-9"	3'-6"	2"	0.39	42
28' to 35'	6'-6"	4'-3"	3"	0.42	45	25' to 29'	6'-6"	4'-3"	3"	0.42	45
25' to 27'	7'-0"	4'-9"	7"	0.44	46	20' to 24'	7'-6"	5'-3"	2"	0.45	49

Quantities shown are for information only. For method of payment see payment note. Barrier wall inlets (Index 218) shall be isolated from the barrier wall stem and footing by 1" expansion material. * All walls may be made up of segments of 20' or more in length provided the segments are joined by a transverse joint in accordance with Detail B, Sheet 2. Segments shall have dimensions same as walls above.

REINFORCED CONCRETE BARRIER WALL (SHOULDER)

PAYMENT:

Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Shoulder), LF.

DESIGN NOTES:

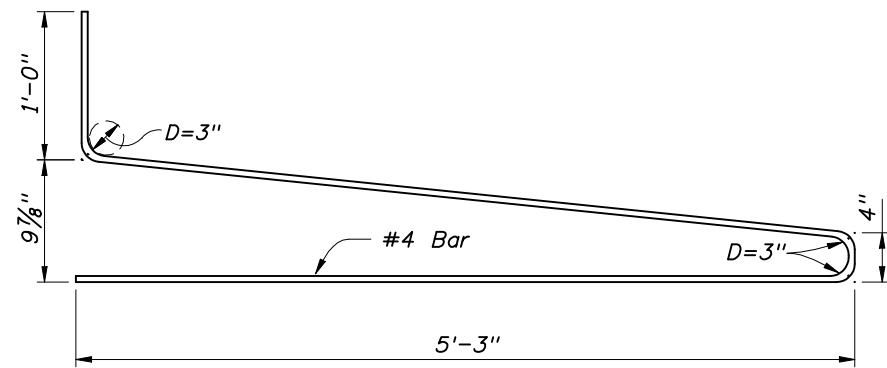
Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet each side of all cold joints.

Use of this barrier wall should be limited to special applications such as hazard encroachment into the clear zone where barrier wall deflection, rotation or translation cannot be tolerated; example hazards to consider are as follows:

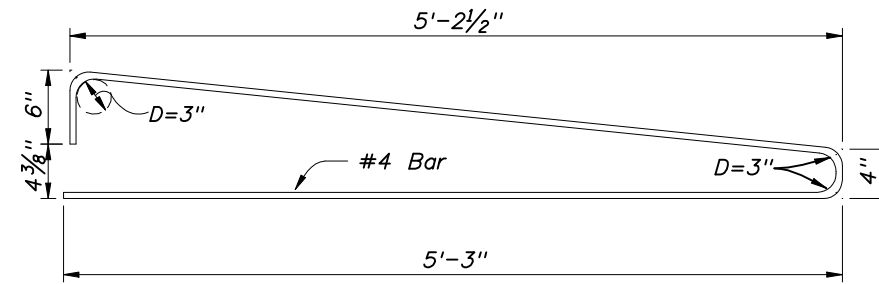
- (a) Structure supporting piers, bents and pylons
- (b) Pumping, metering, control or other similar critical stations
- (c) Quarries
- (d) Intolerable vertical drops
- (e) Historic structures or monuments
- (f) Rail transit travelway or passenger station
- (g) Other similar occupancies

NCHRP report 350 Test Level (TL-4) Vehicle: 8000S, 50 mph, 25°. Vehicle force applications: 18 kips Vert. at top of railing; 54 kips Horiz. at 32" above pavement.

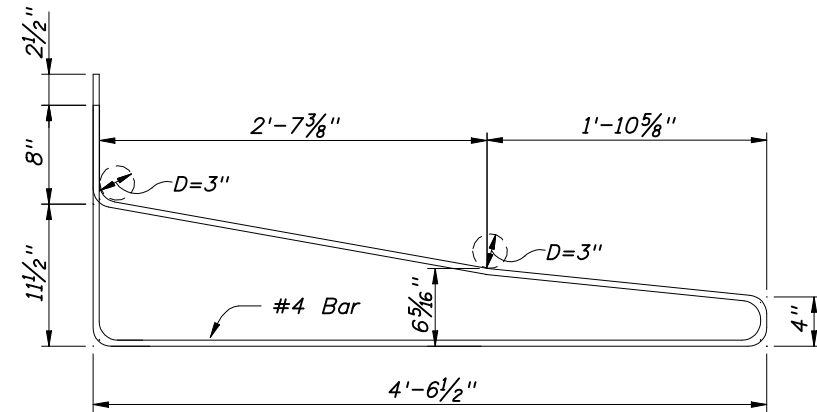




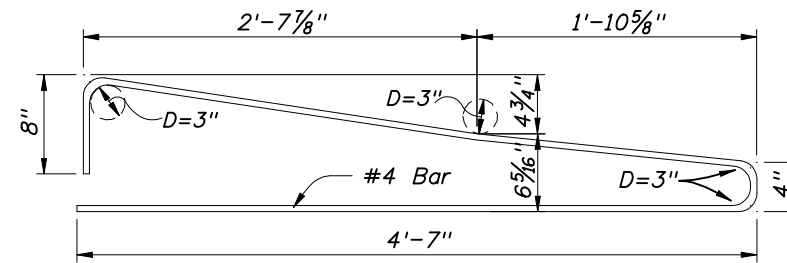
BAR 4F



BAR 4G



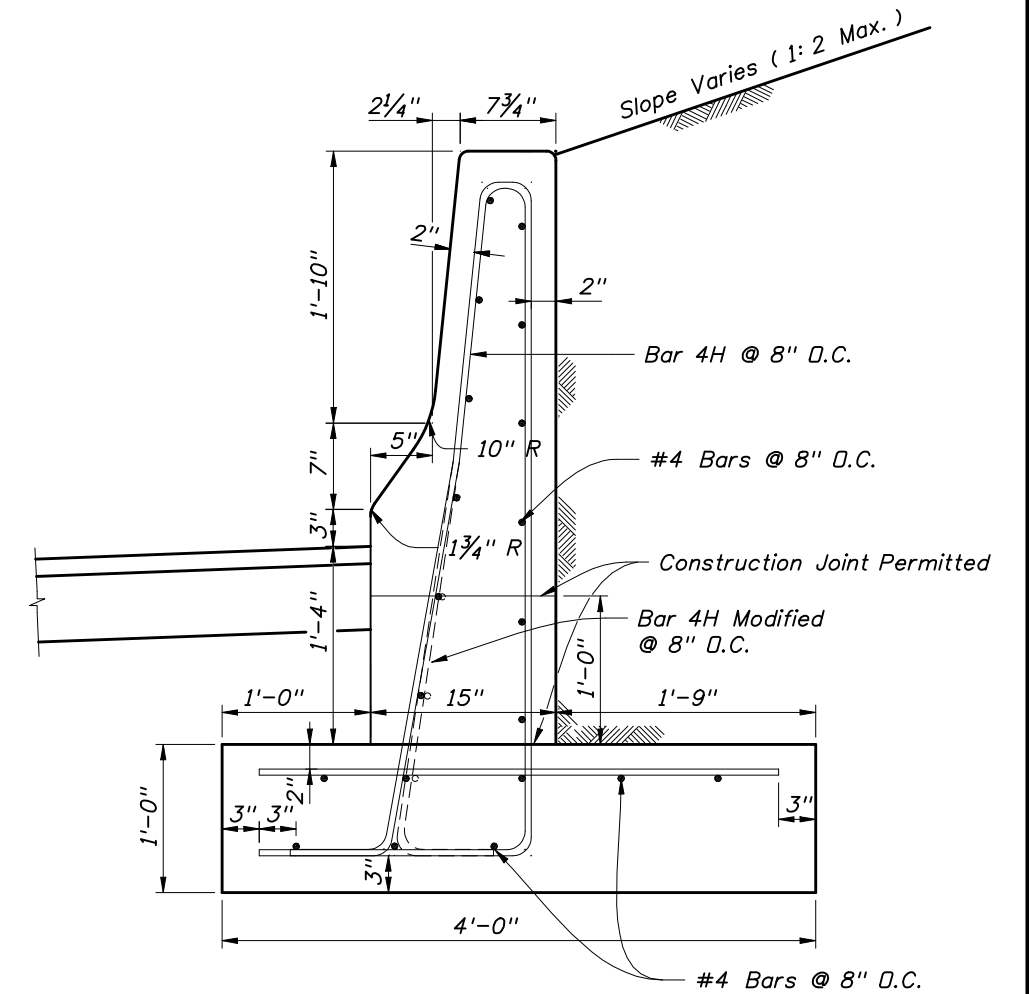
BAR 4H



For Use In Areas Where Obstructions Require Localized Omission Of Toe

BAR 4H MODIFIED

BENDING DIAGRAMS



Note: All longitudinal reinforcement #4 bars.
 Minimum segment length for this wall is 20 feet.
 Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Retaining), LF.

QUANTITIES: Class II Concrete 0.29 CY/LF
 Reinforcing Steel 28.6 LBS/LF

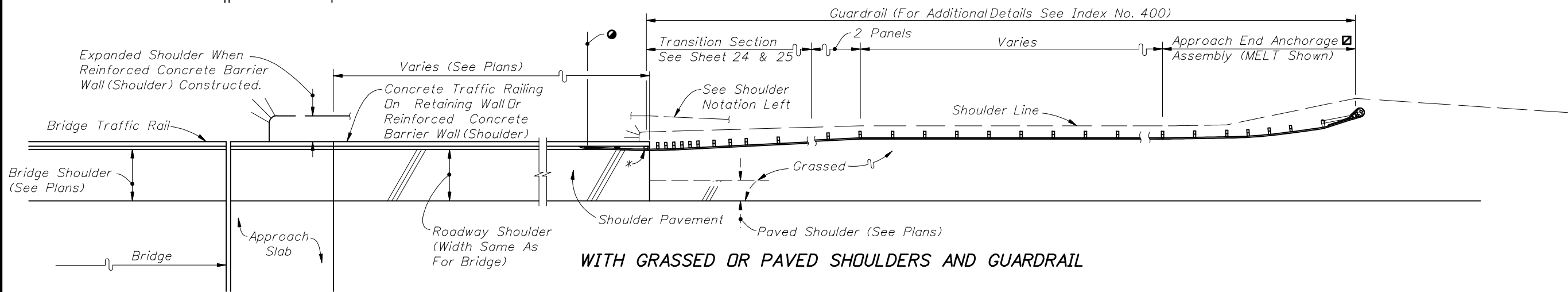
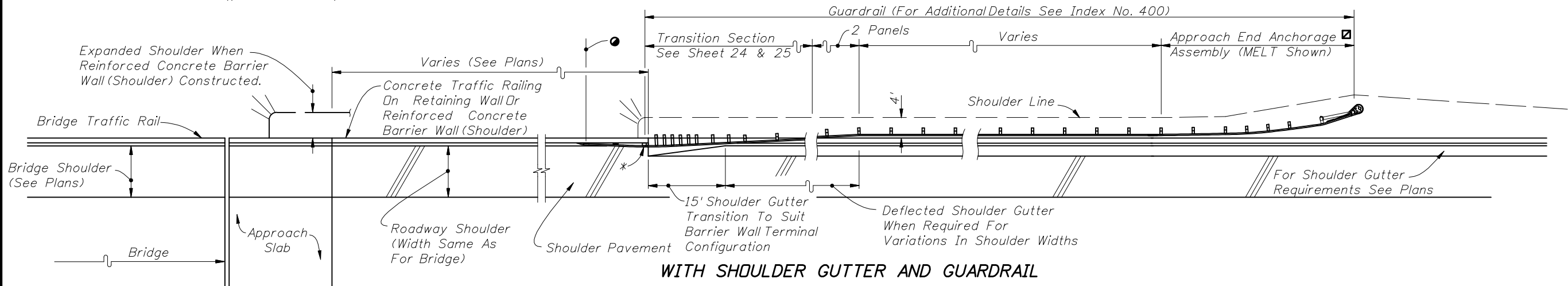
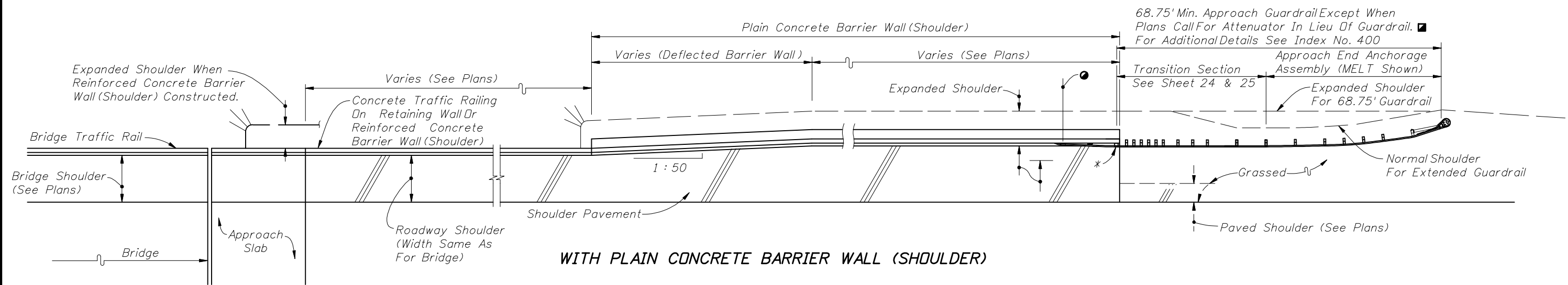
REINFORCED CONCRETE BARRIER WALL (RETAINING)



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CONCRETE BARRIER WALL

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- \square To be deleted on trailing ends except for 2-lane 2-way facilities. The tangent guardrail shall be anchored by End Anchorage Type II, Index No. 400.
- \square To be deleted on trailing ends except for 2-lane 2-way facilities.
- \bullet End measurement for guardrail payment when guardrail connected to shoulder barrier walls. See Index No. 400, Detail J for end measurement when guardrail connected to concrete traffic rails constructed with approach slab or on retaining walls.

Δ Views show approach roadside barriers when length of need exceeds the length of either retaining walls with concrete traffic railings* or Reinforced Concrete Barrier Wall (Shoulder) on shoulders. When either of these rigid barriers alone satisfies the approach length of need, the wall ends shall be shielded by crash cushions, or, by guardrail the same as for bridge traffic rails, as detailed in Index No. 400. See other flagged notes for trailing end treatments. Miscellaneous asphalt paving under guardrail not shown.

* Guardrail connection to concrete traffic railings on retaining walls shall be in accordance with the Structures Design Office Standard Drawings and the plans. Approach guardrail connections to shoulder concrete barrier walls shall be in accordance with the details shown on Sheets 2, 24 and 25 of this Index and Index No. 400, Detail J.

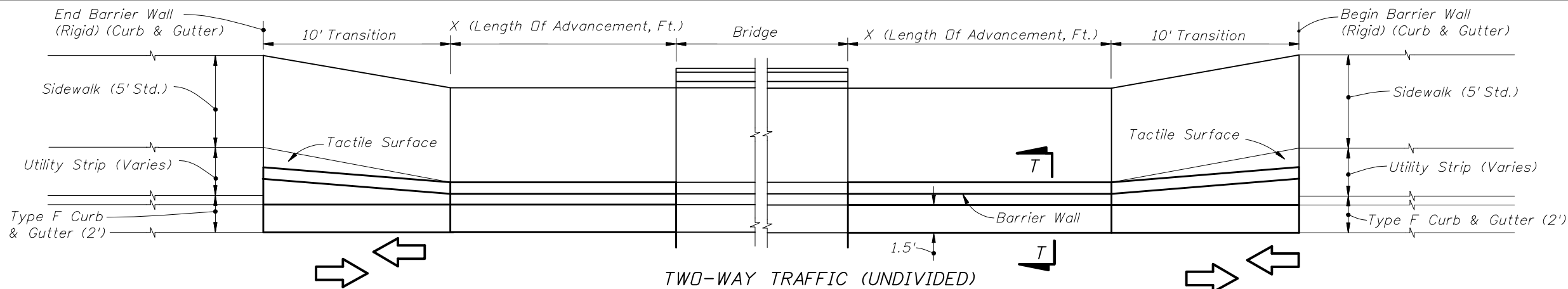
EITHER REINFORCED CONCRETE BARRIER WALL (SHOULDER) OR RETAINING WALL WITH CONCRETE TRAFFIC RAILING Δ CONCRETE BARRIER WALLS ON APPROACHES TO BRIDGES



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CONCRETE BARRIER WALL

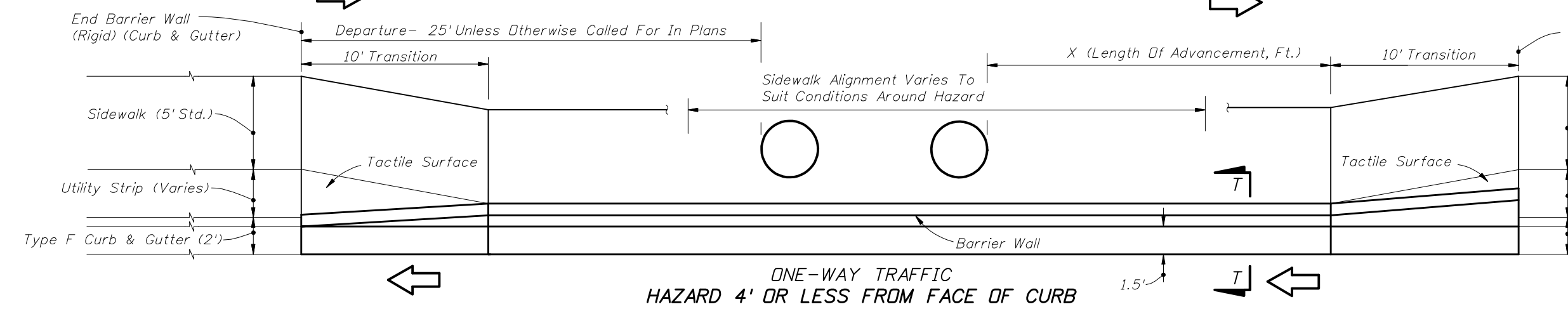
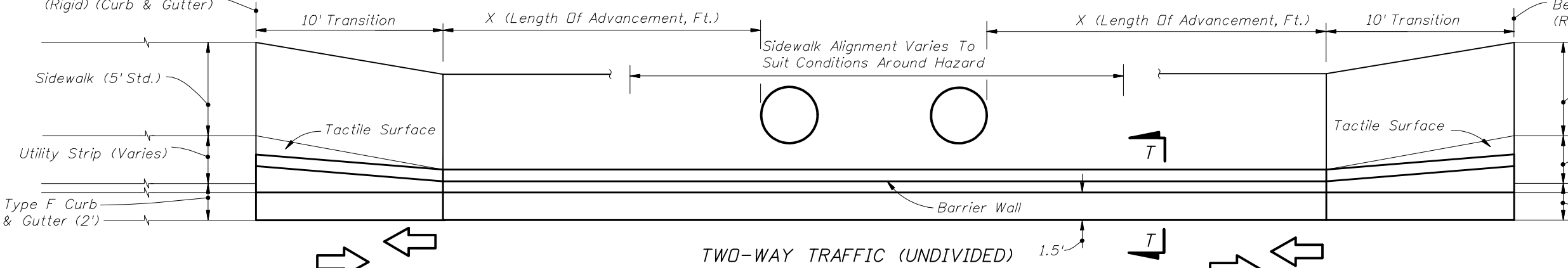
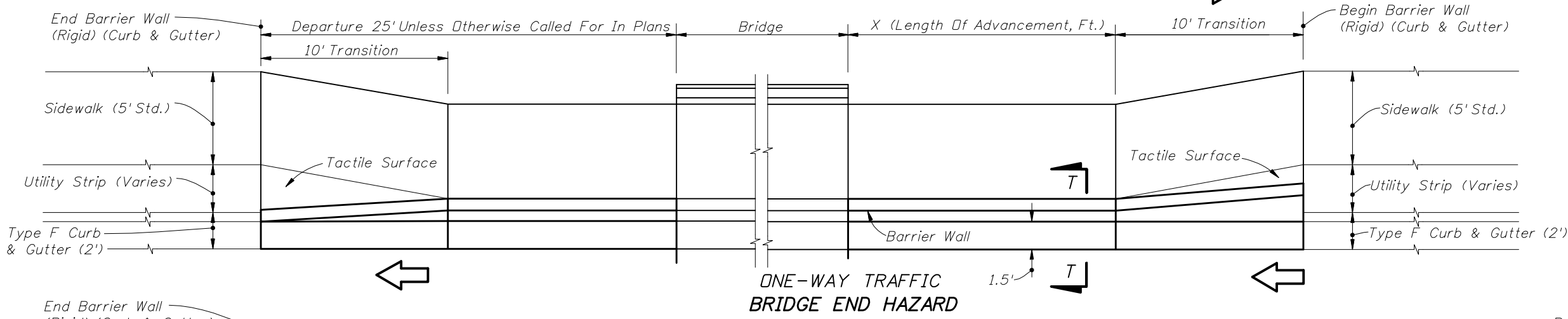
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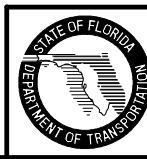
NOTE:
 X=Length of advancement in feet for near and opposing approach lanes. See Sheet 14.

For locations without utility strips see Sheet 11.
 For transition and sidewalk details see Sheets 12 & 13 and for sectional details see Sheet 14.

The 1.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the details on Sheets 22 & 23.



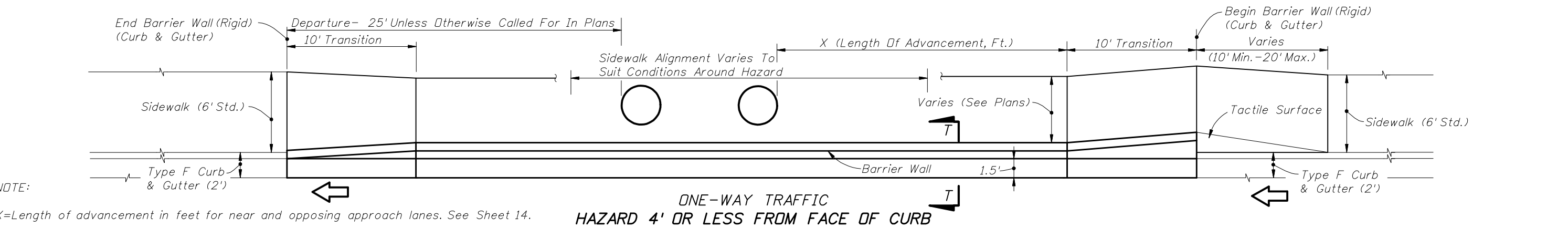
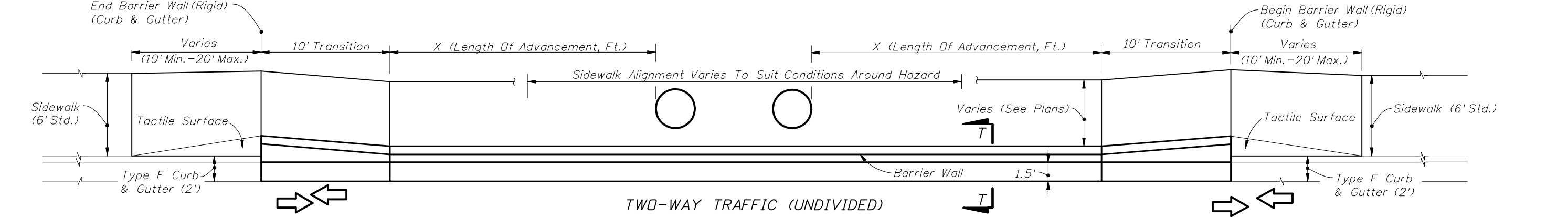
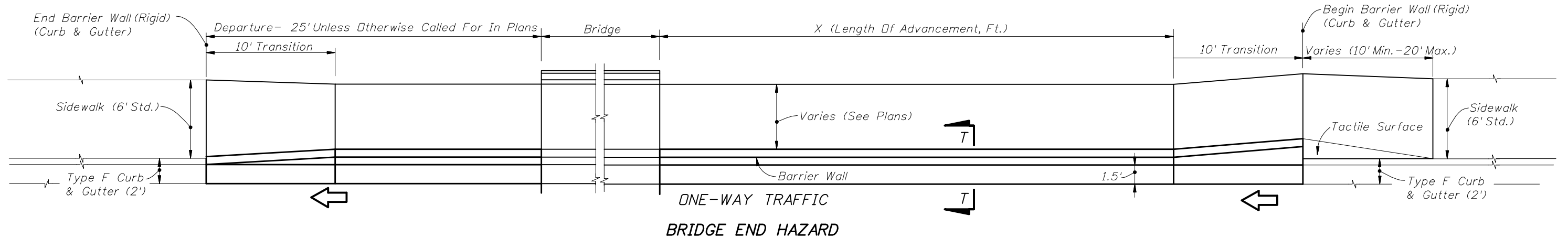
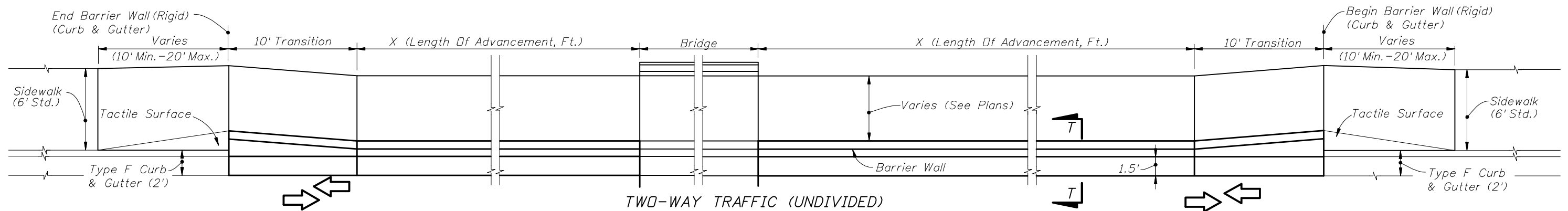
CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • CURB AND GUTTER WITH UTILITY STRIP AND WITH ADJACENT BICYCLE LANE



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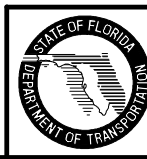
NOTE:

X=Length of advancement in feet for near and opposing approach lanes. See Sheet 14.

For locations with utility strips see Sheet 10. For transition and sidewalk see Sheets 12 & 13, for sectional details see Sheet 14.

The 1.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the detail on Sheets 22 & 23.

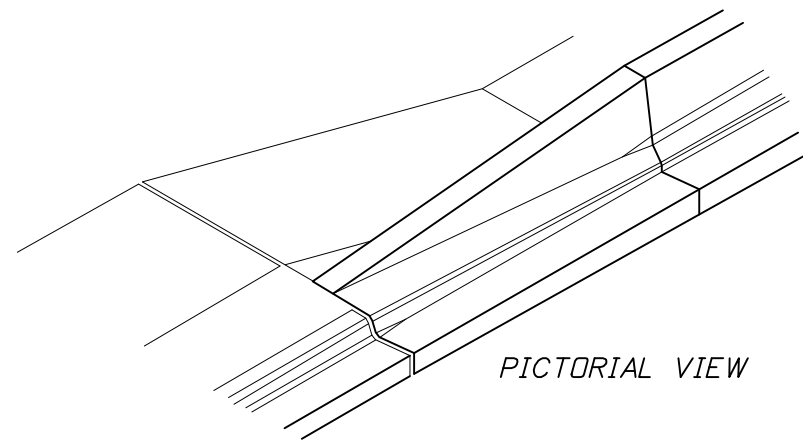
**CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)
CURB AND GUTTER WITHOUT UTILITY STRIP AND WITH ADJACENT BICYCLE LANE**



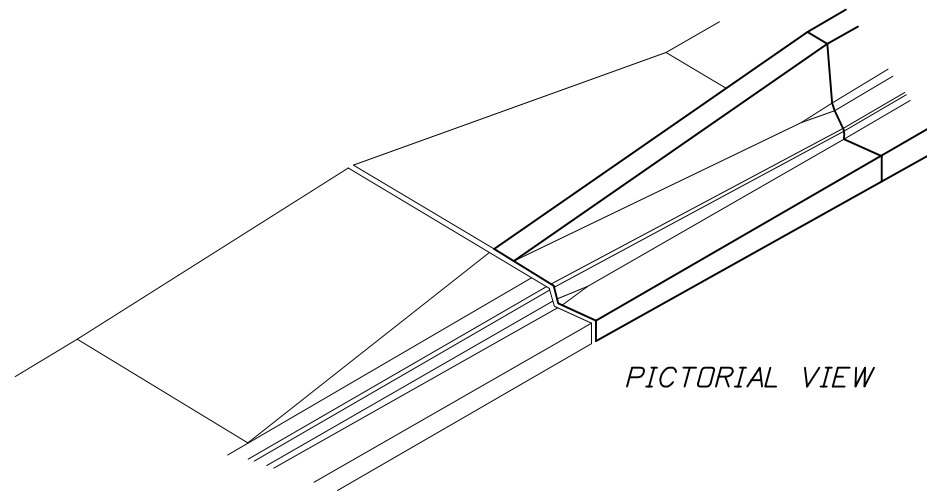
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CONCRETE BARRIER WALL

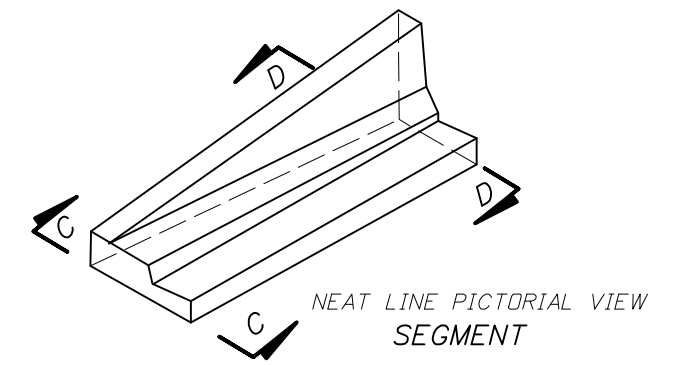
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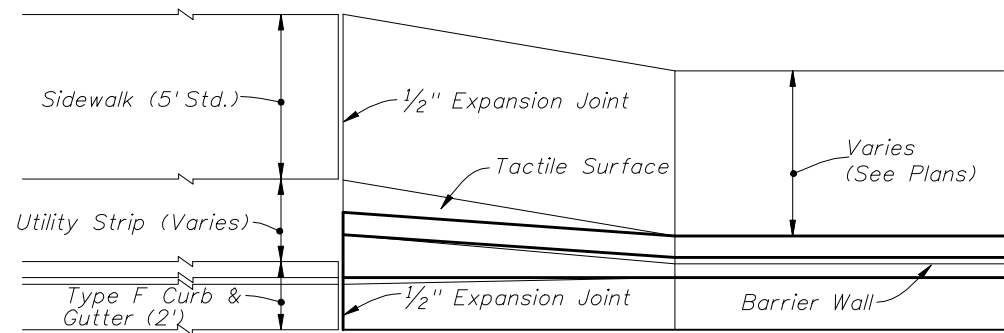
PICTORIAL VIEW



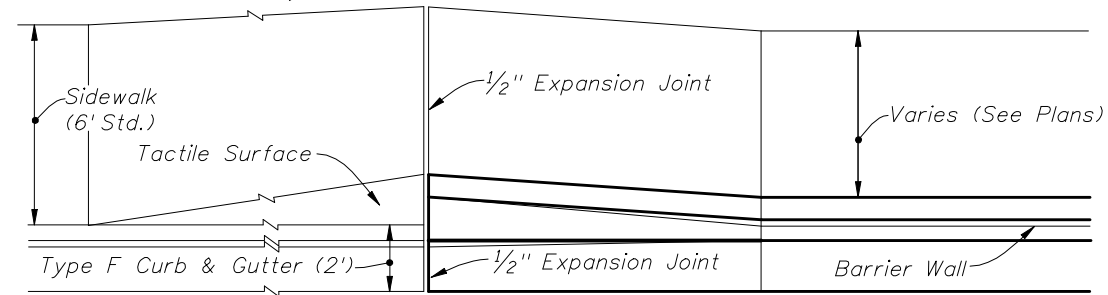
PICTORIAL VIEW



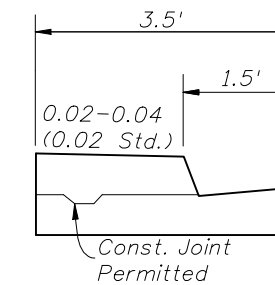
NEAT LINE PICTORIAL VIEW SEGMENT



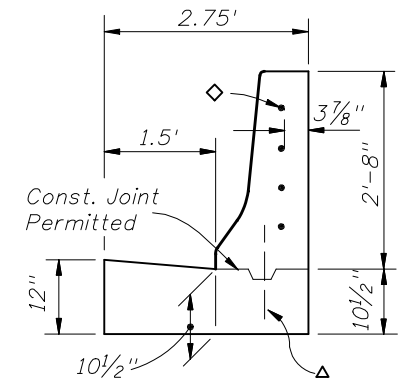
PLAN WITH UTILITY STRIP



PLAN WITHOUT UTILITY STRIP

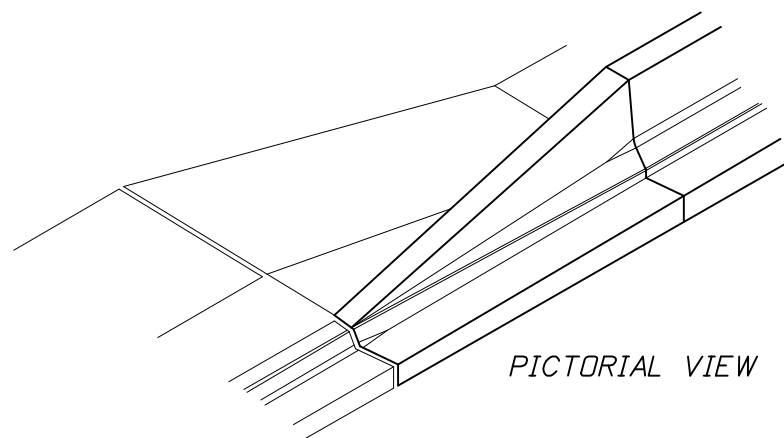


SECTION CC

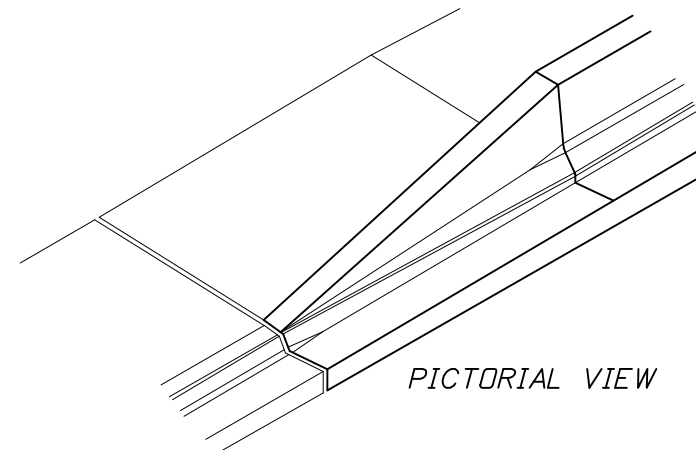


SECTION DD

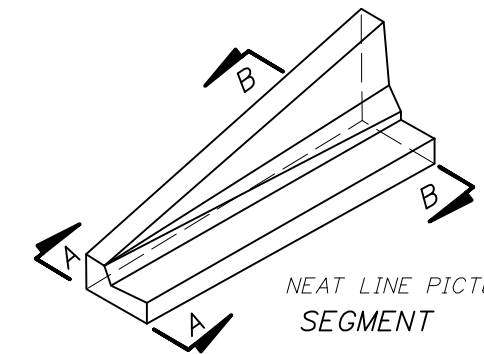
TWO-WAY TRAFFIC (OPPOSING LANE APPROACH)



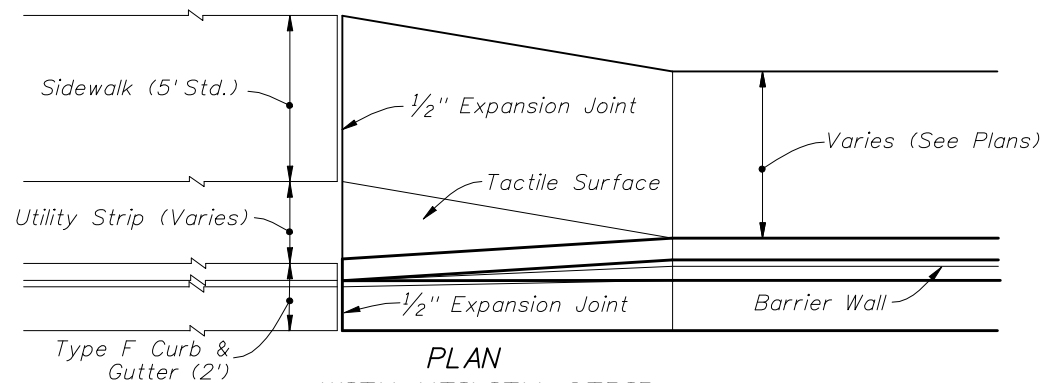
PICTORIAL VIEW



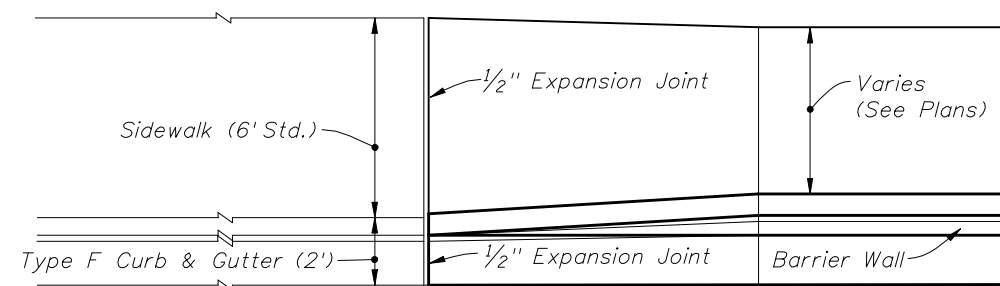
PICTORIAL VIEW



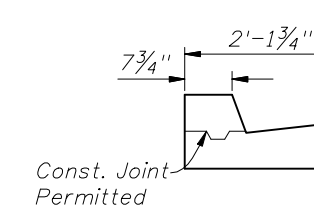
NEAT LINE PICTORIAL VIEW SEGMENT



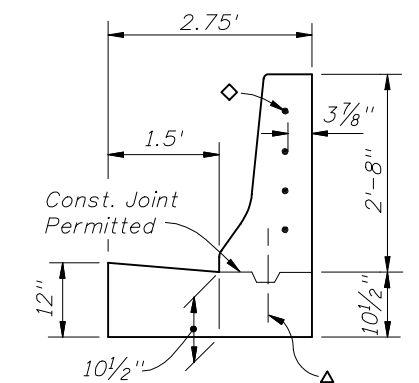
PLAN WITH UTILITY STRIP



PLAN WITHOUT UTILITY STRIP



SECTION AA



SECTION BB

ONE-WAY TRAFFIC (TRAILING END)

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • TRANSITION SEGMENTS • WITH ADJACENT BICYCLE LANE

◇ See Notes Sheet 13
 △ See Notes Sheet 13

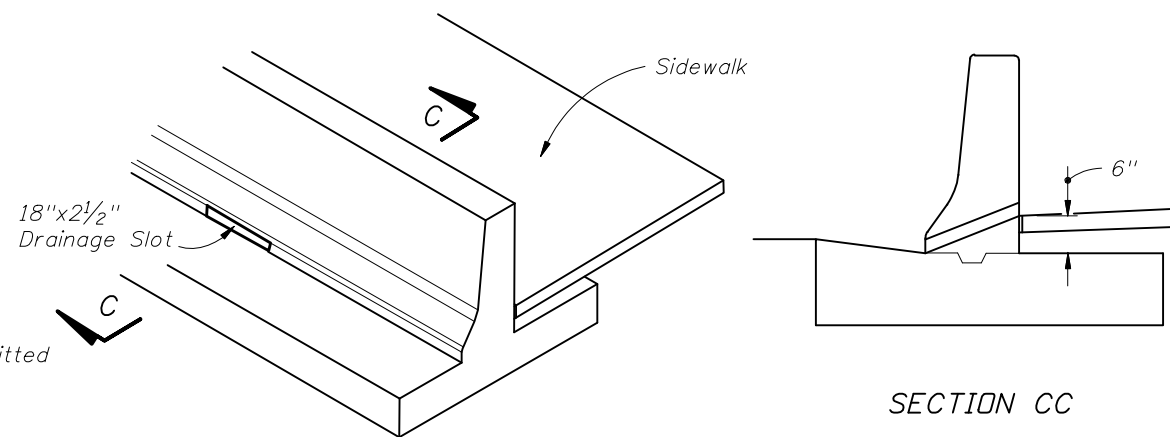
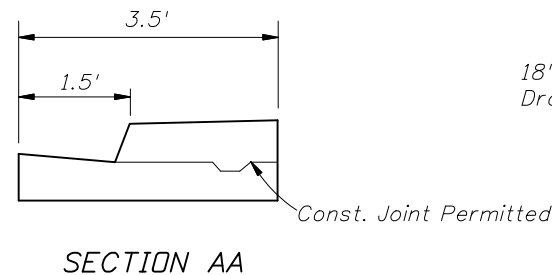
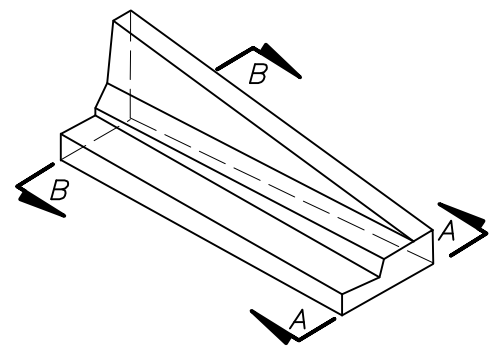
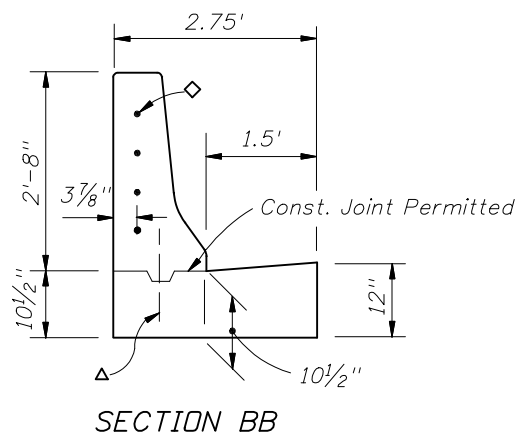


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CONCRETE BARRIER WALL

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WITH OR WITHOUT UTILITY STRIP
NEAT LINE PICTORIAL VIEW

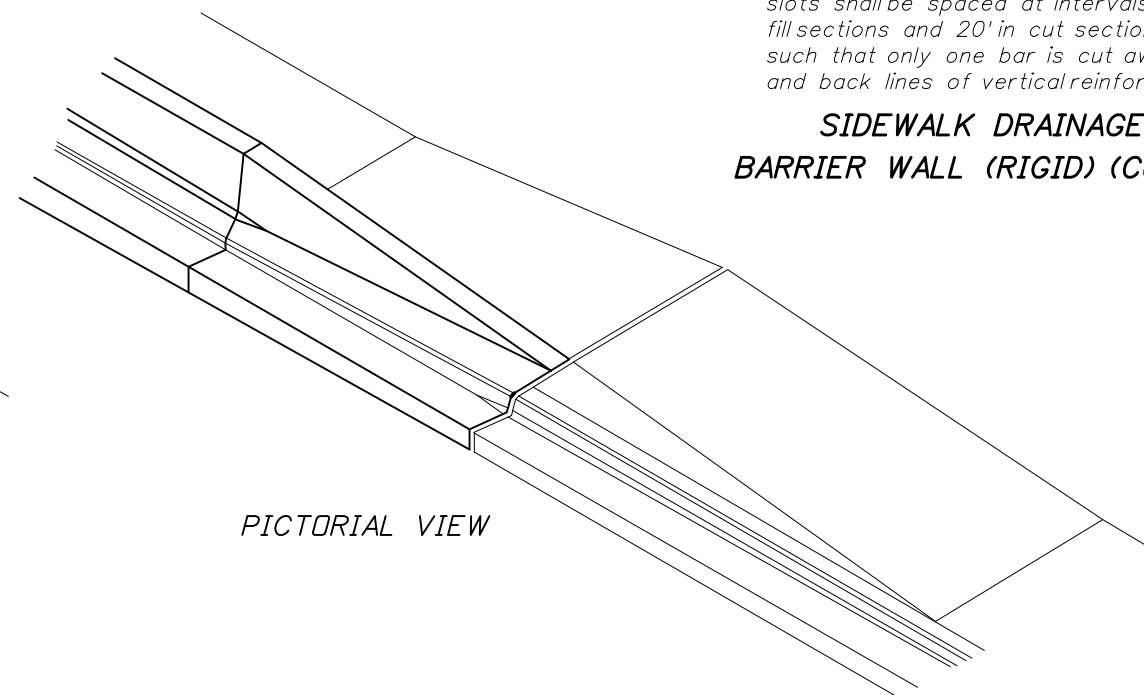
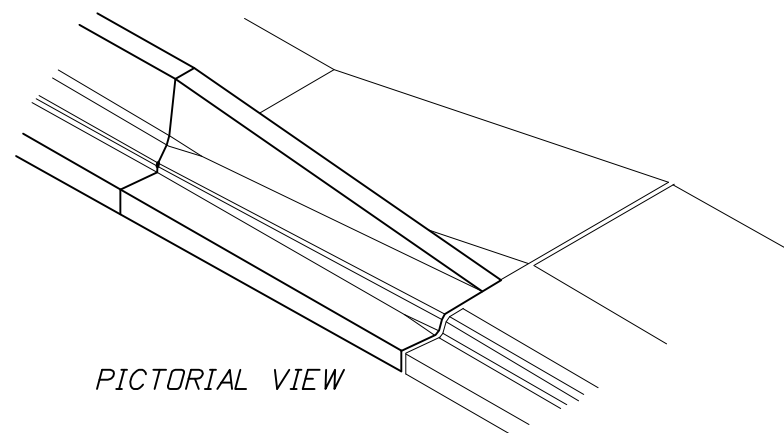
NEAT LINE PICTORIAL VIEW

NOTE: Drainage slots shall be located at all low points along the sidewalk, and, unless otherwise shown in the plans, slots shall be spaced at intervals not exceeding 50' in fill sections and 20' in cut sections. Slots shall be located such that only one bar is cut away or deleted in front and back lines of vertical reinforcement.

SIDEWALK DRAINAGE SLOT FOR
BARRIER WALL (RIGID) (CURB & GUTTER)

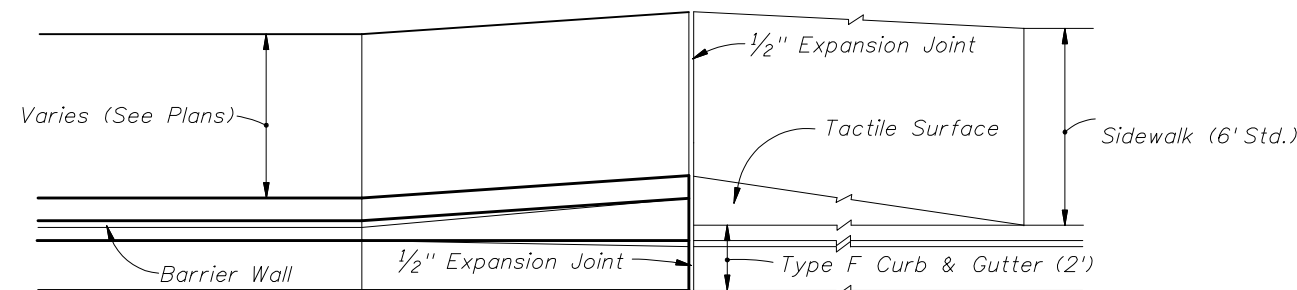
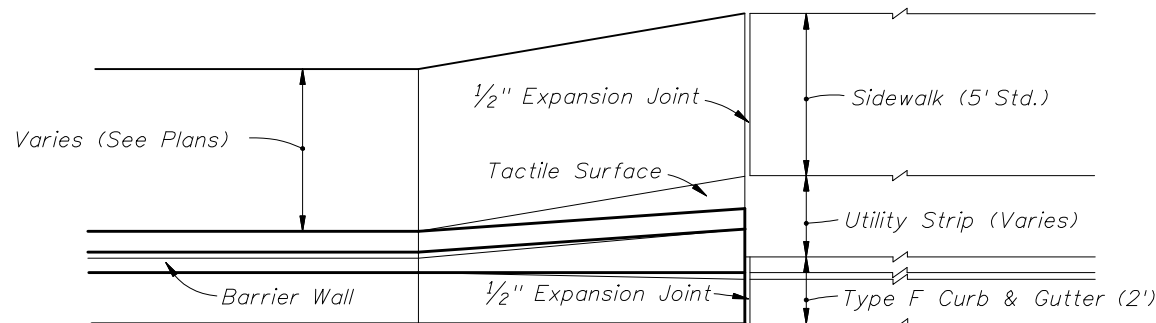
◇ Transition Segments Shall Be Doweled Into The End Of The Barrier Wall In The Following Manner: Four 1" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and #6 bars 15" long set in an Adhesive Bonded Material System. The ends of the dowels extending into the transition segment shall be wrapped with one layer of 15 lb. Type I asphalt-saturated roofing felt with the ends crimped.

△ When Construction Joints Are Utilized For Transition Segment Construction The Stem Shall Be Doweled To The Footing In The Following Manner: Five #5 bars 15" long shall be embedded 7" into the footing. The dowels shall be spaced 15" on centers with the first dowel located 12" from the barrier wall. Dowels may be placed within or adjacent to the keyway.



PICTORIAL VIEW

PICTORIAL VIEW



PLAN
WITH UTILITY STRIP

PLAN
WITHOUT UTILITY STRIP

RIGHT SIDE SHOWN, LEFT SIDE OPPOSITE HAND
ONE-WAY AND TWO-WAY TRAFFIC (NEAR LANE APPROACH)

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) ● TRANSITION SEGMENT ● WITH ADJACENT BICYCLE LANE

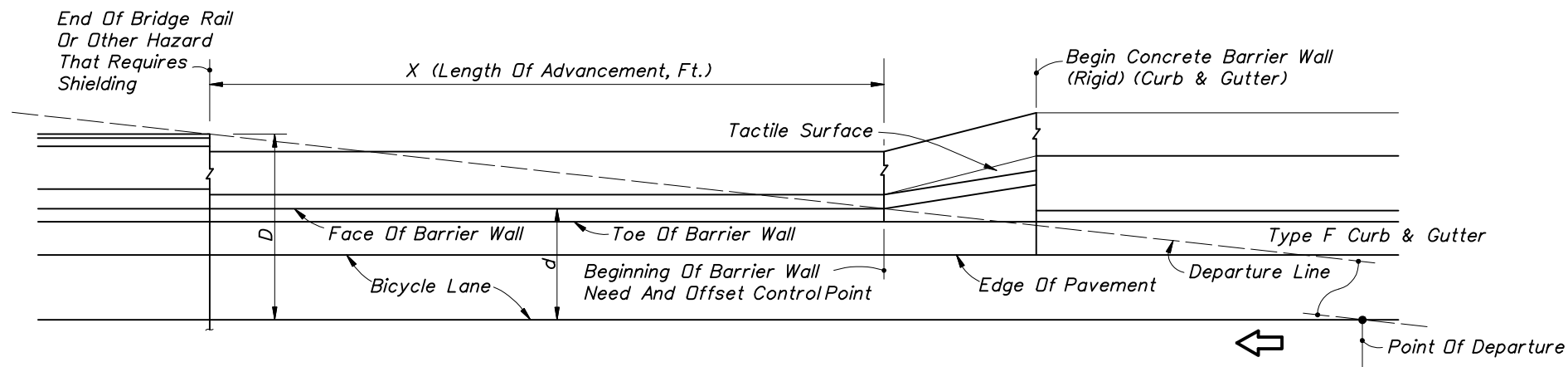


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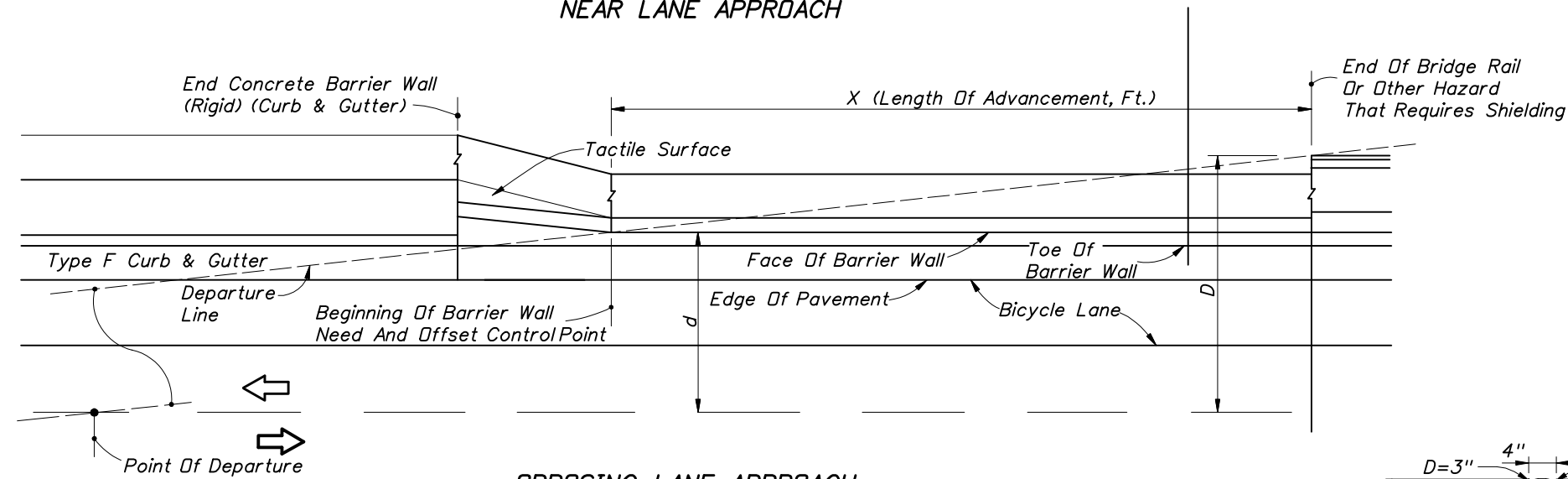
CONCRETE BARRIER WALL

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RIGHT SIDE APPROACH SHOWN - LEFT SIDE OPPOSITE HAND
NEAR LANE APPROACH



OPPOSING LANE APPROACH
WITH OR WITHOUT UTILITY STRIP - UTILITY STRIP SHOWN
- SEE SHEET 10 & 11 FOR APPLICATIONS

Design Speed mph	Length Of Advancement, Ft. (X)
≤45	=16 (D-d)

Note: The minimum length of advancement for both near and opposing lane approaches is 40'.

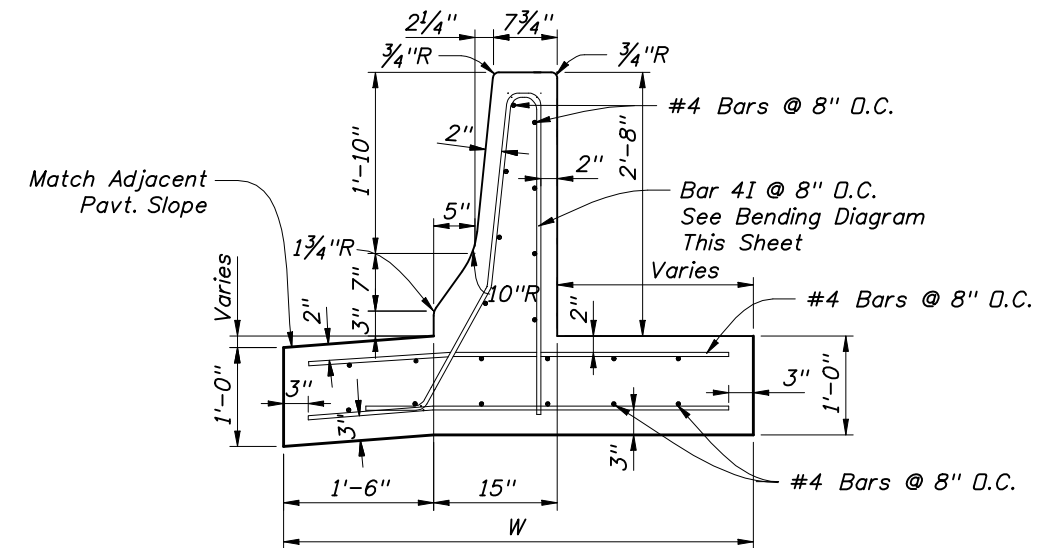
Equation Variables:

D= Distance in feet from near edge of the near approach traffic lane to back of hazard or clear zone width whichever is lesser. For left side hazards and clear zones on two-way undivided facilities D is measured from the inside edge of the near approach traffic lane.

d= Distance in feet from near edge of the near approach traffic lane to the face of barrier (at offset control point). For left side hazards on two-way undivided facilities d is measured from the inside edge of the nearest opposing traffic lane.

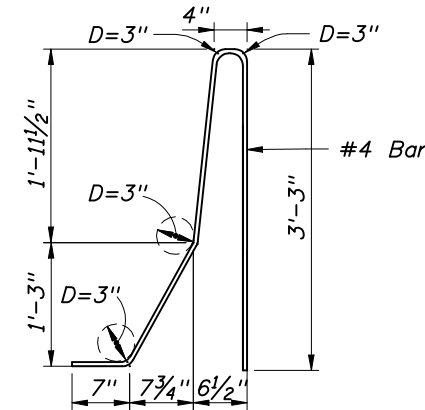
LENGTH OF ADVANCEMENT

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) WITH ADJACENT BICYCLE LANE

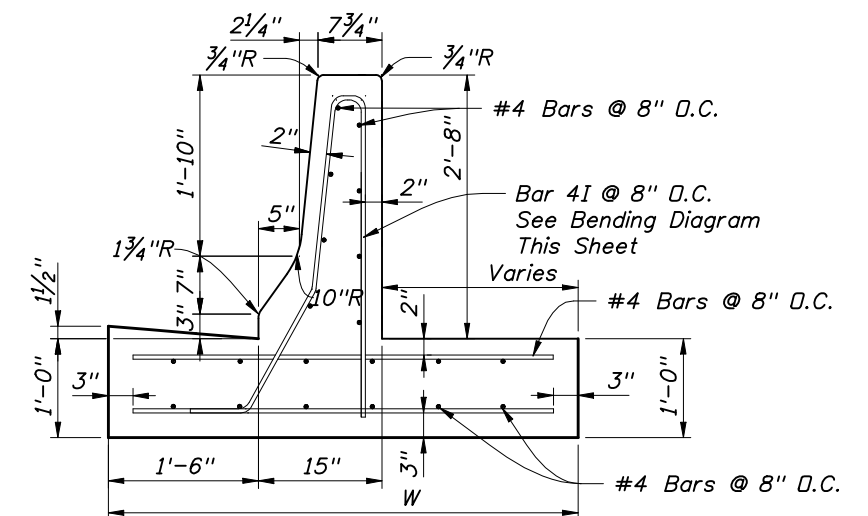


FOR HIGH SIDE SECTION TT

QUANTITIES			
Length* Of Barrier Wall	W	Class II Conc. CY Per Lin. Ft.	Rein. Steel Lbs. Per Lin. Ft.
>73'	4'-9"	0.26	29
56' to 73'	5'-6"	0.29	32
48' to 55'	6'-0"	0.31	34
41' to 47'	6'-6"	0.33	37
36' to 41'	7'-0"	0.35	39
29' to 35'	8'-0"	0.38	42



BAR 4I BENDING DIAGRAM



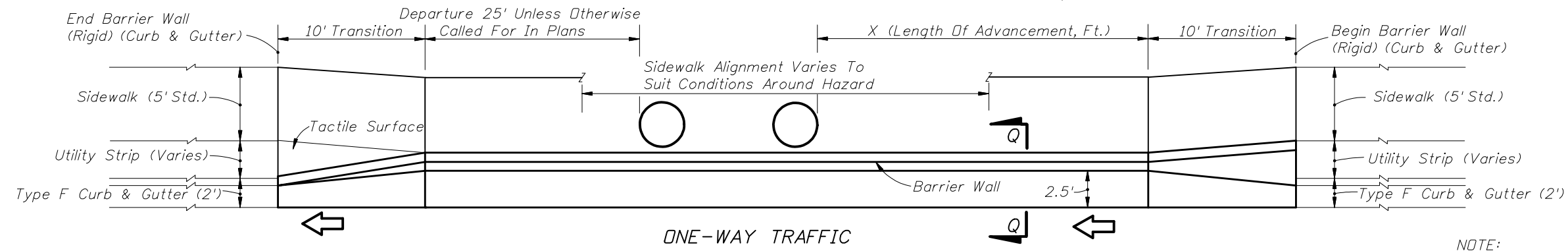
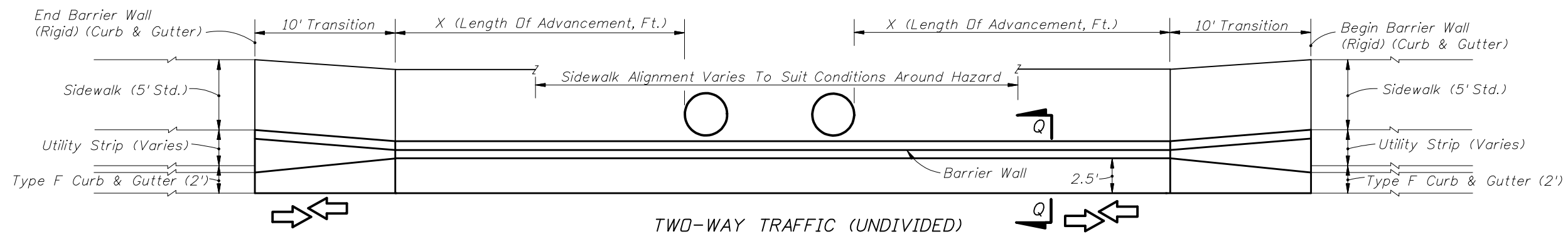
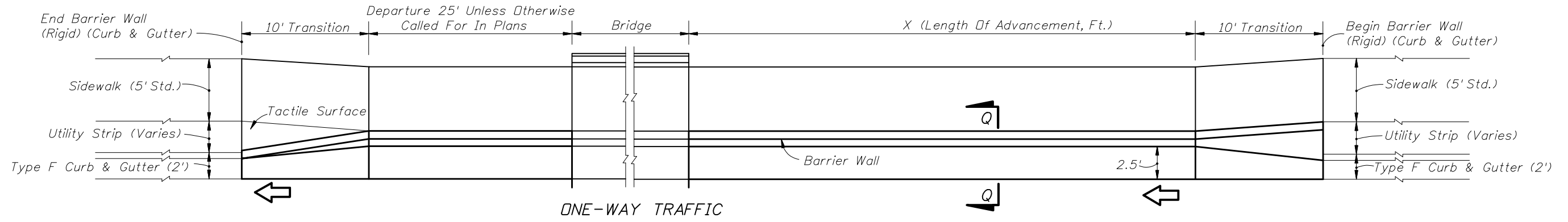
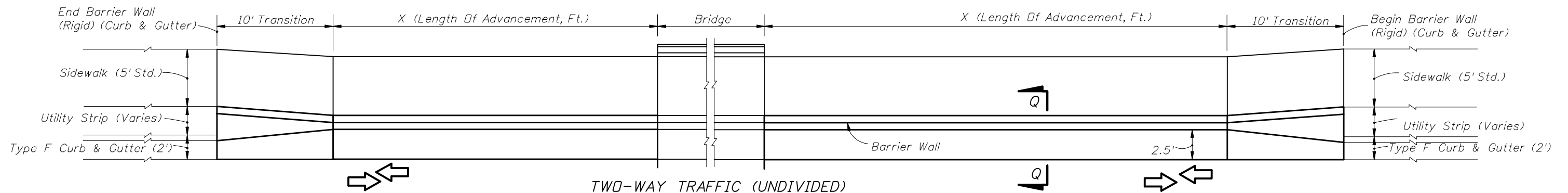
FOR LOW SIDE SECTION TT

Note: All longitudinal reinforcement #4 bars. Shorter segments due to construction or expansion joint shall be doweled in the manner described for 'Transition Segments' on Sheet 13.

Transverse expansion joints are to be constructed at the juncture of wall transitions and curb and gutter, and at intervals so that spacing will not exceed 100'.

For barrier wall inlet details see Index No. 219. Inlet extends into bicycle lane 12". Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Curb & Gutter), LF.

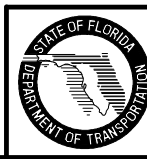


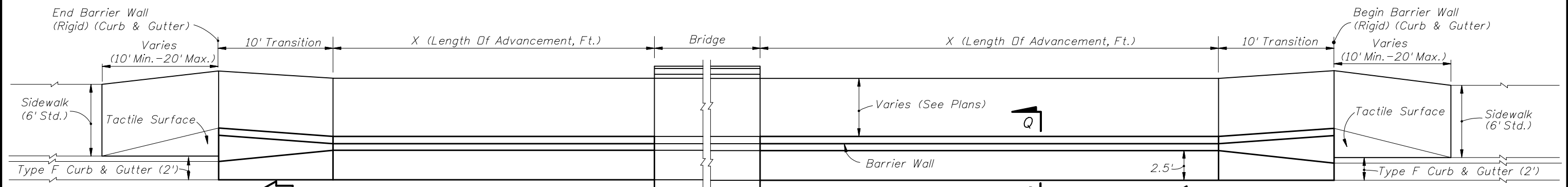


HAZARD 4' OR LESS FROM FACE OF CURB

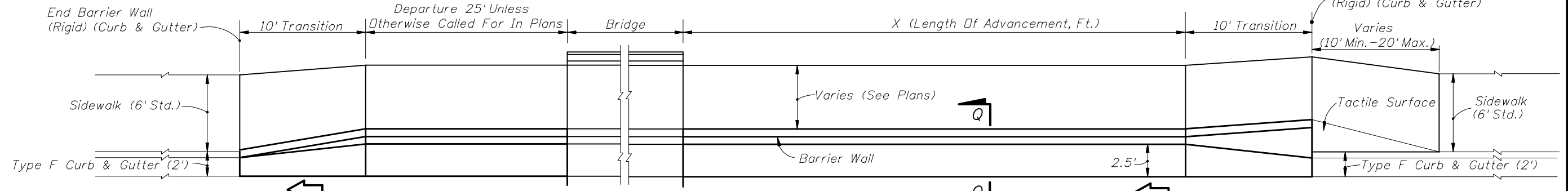
CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)
 CURB AND GUTTER WITH UTILITY STRIP AND WITHOUT ADJACENT BICYCLE LANE

NOTE:
 X=Length of advancement in feet for near and opposing approach lanes. See Sheet 19.
 For locations without utility strips see Sheet 16.
 For transition and sidewalk see Sheets 17 & 18 and for sectional details see Sheet 19.
 The 2.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the details on Sheets 22 & 23.



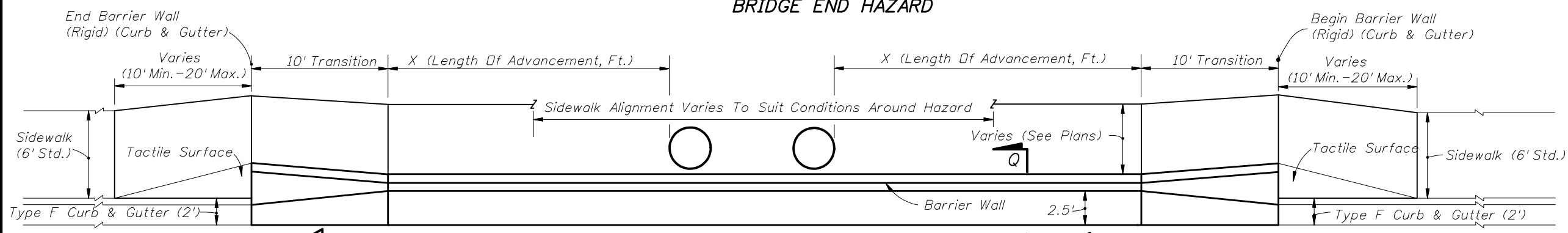


TWO-WAY TRAFFIC (UNDIVIDED)

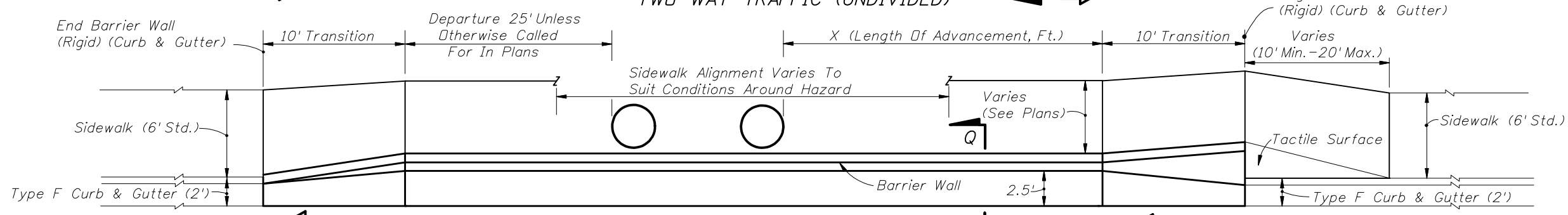


ONE-WAY TRAFFIC

BRIDGE END HAZARD



TWO-WAY TRAFFIC (UNDIVIDED)



ONE-WAY TRAFFIC

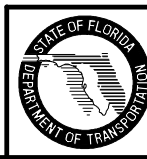
HAZARD 4' OR LESS FROM FACE OF CURB

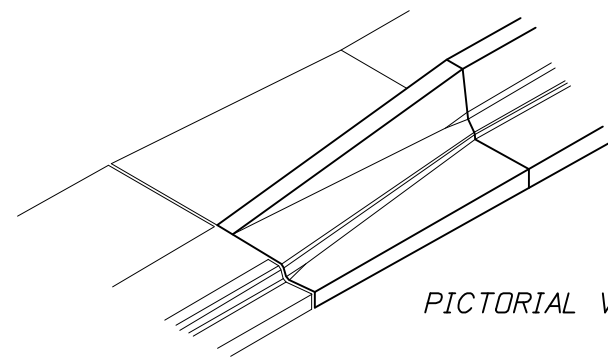
CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)
CURB AND GUTTER WITHOUT UTILITY STRIP AND WITHOUT ADJACENT BICYCLE LANE

NOTE:
X=Length of advancement in feet for near and opposing approach lanes. See Sheet 19.

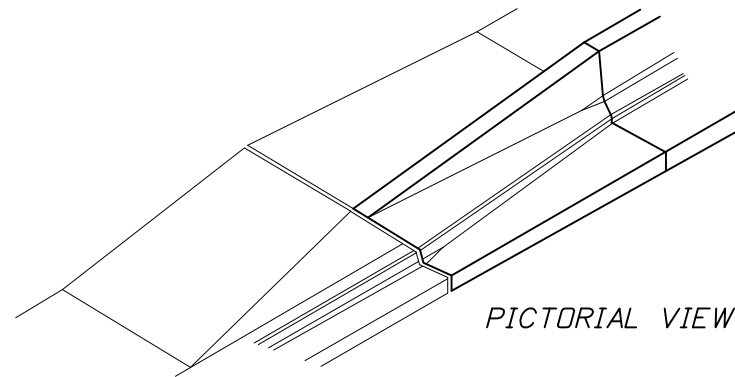
For locations with utility strips see Sheet 15. For transition and sidewalk see Sheets 17 & 18 and for sectional details see Sheet 19.

The 2.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the detail on Sheets 22 & 23.

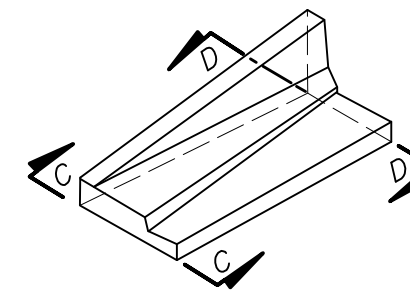




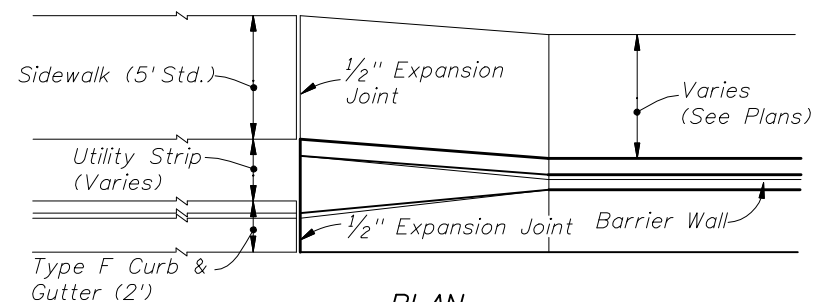
PICTORIAL VIEW



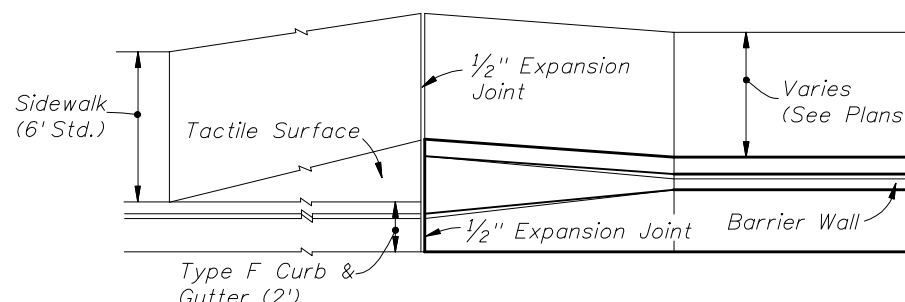
PICTORIAL VIEW



NEAT LINE PICTORIAL VIEW
SEGMENT

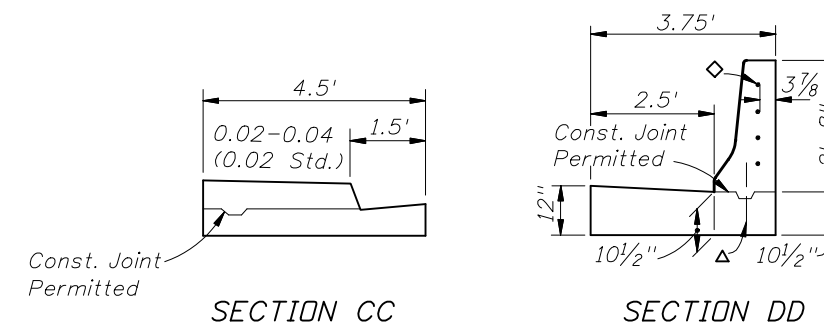


PLAN
WITH UTILITY STRIP



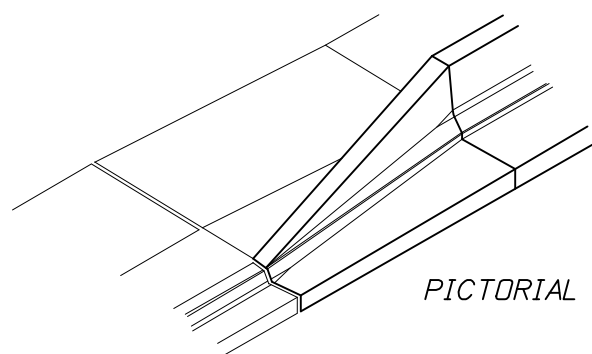
PLAN
WITHOUT UTILITY STRIP

TWO-WAY TRAFFIC (OPPOSING LANE APPROACH)

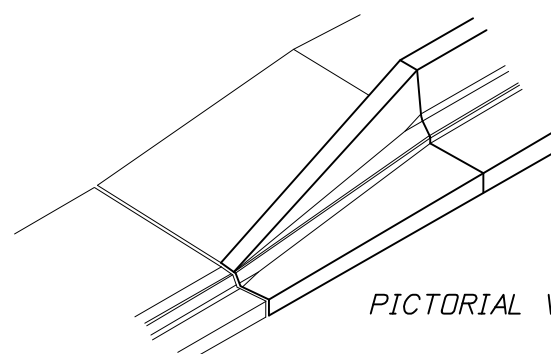


SECTION CC

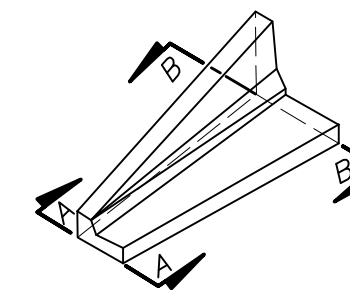
SECTION DD



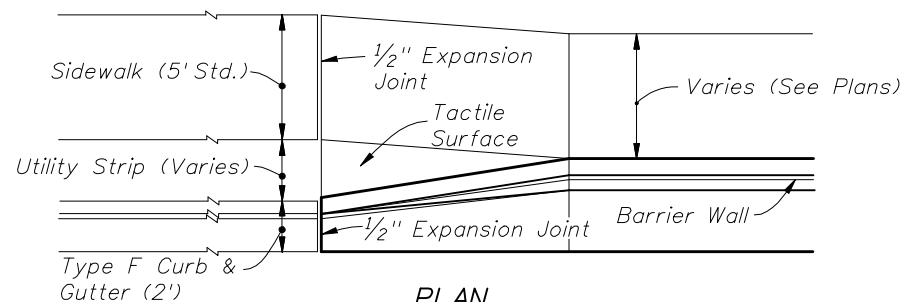
PICTORIAL VIEW



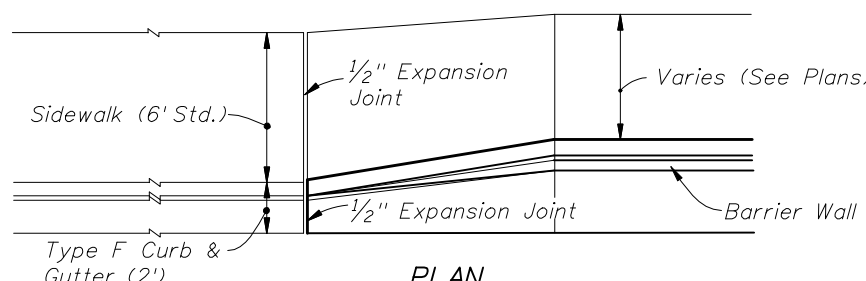
PICTORIAL VIEW



NEAT LINE PICTORIAL VIEW
SEGMENT

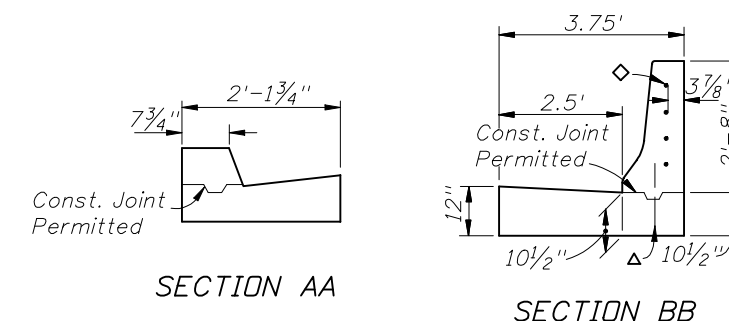


PLAN
WITH UTILITY STRIP



PLAN
WITHOUT UTILITY STRIP

ONE-WAY TRAFFIC (TRAILING END)



SECTION AA

SECTION BB

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • TRANSITION SEGMENTS • WITHOUT ADJACENT BICYCLE LANE

◇ See Sheet 19
△ See Sheet 19

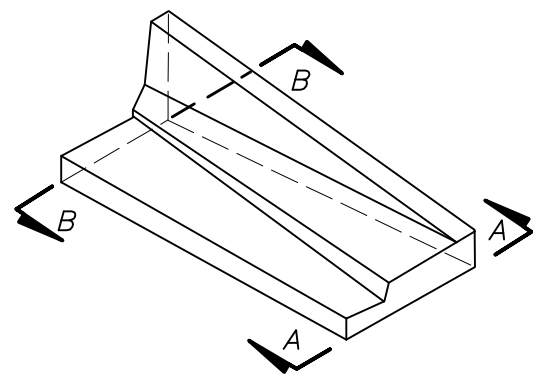
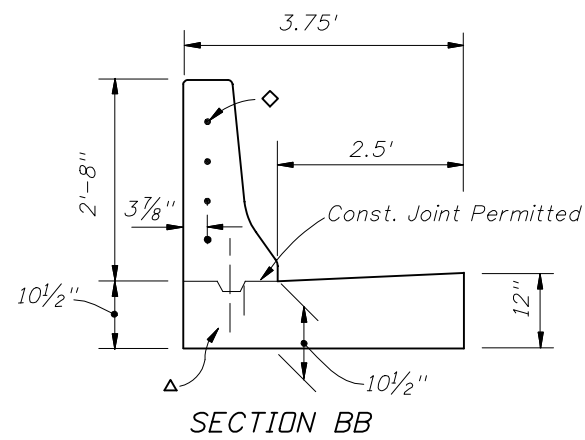


2010 FDOT Design Standards

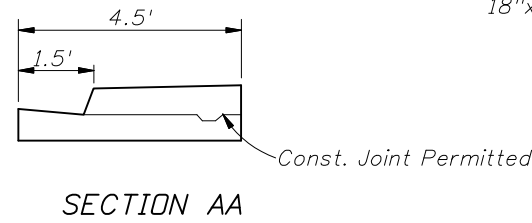
CONCRETE BARRIER WALL

Last Revision 07/01/07 Sheet No. 17 of 25

Index No. 410

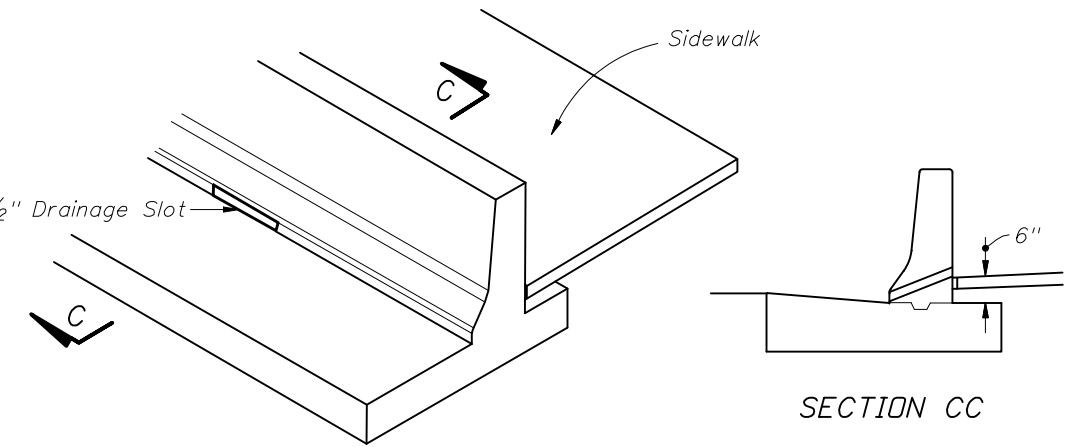


WITH OR WITHOUT UTILITY STRIP
NEAT LINE PICTORIAL VIEW



SECTION AA

18"x2 1/2" Drainage Slot



SECTION CC

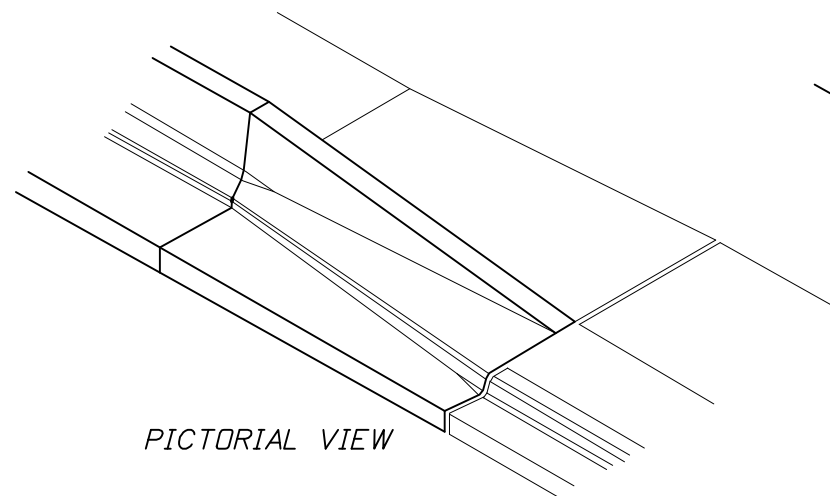
NEAT LINE PICTORIAL VIEW

NOTE: Drainage slots shall be located at all low points along the sidewalk, and, unless otherwise shown in the plans, slots shall be spaced at intervals not exceeding 50' in fill sections and 20' in cut sections. Slots shall be located such that only one bar is cut away or deleted in front and back lines of vertical reinforcement.

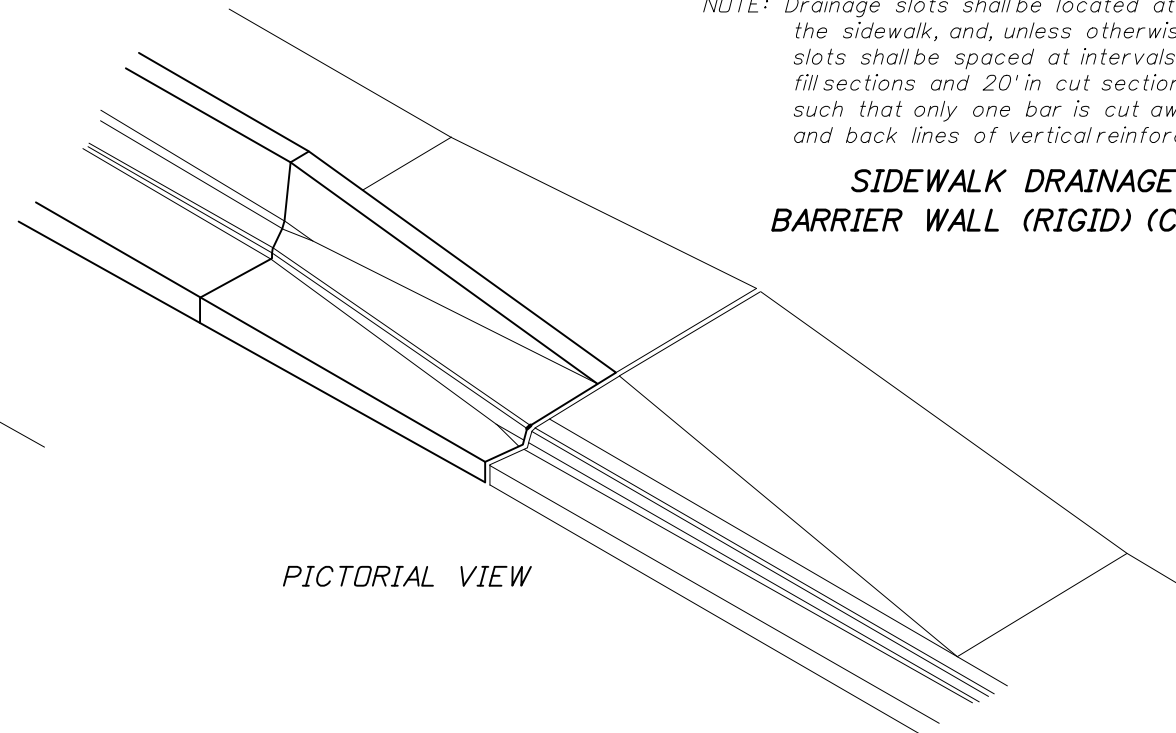
SIDEWALK DRAINAGE SLOT FOR
BARRIER WALL (RIGID) (CURB & GUTTER)

◇ Transition Segments Shall Be Doweled Into The End Of The Barrier Wall In The Following Manner: Four 1" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and #6 bars 15" long set in an Adhesive Bonded Material System. The ends of the dowels extending into the transition segment shall be wrapped with one layer of 15 lb. Type I asphalt-saturated roofing felt with the ends crimped.

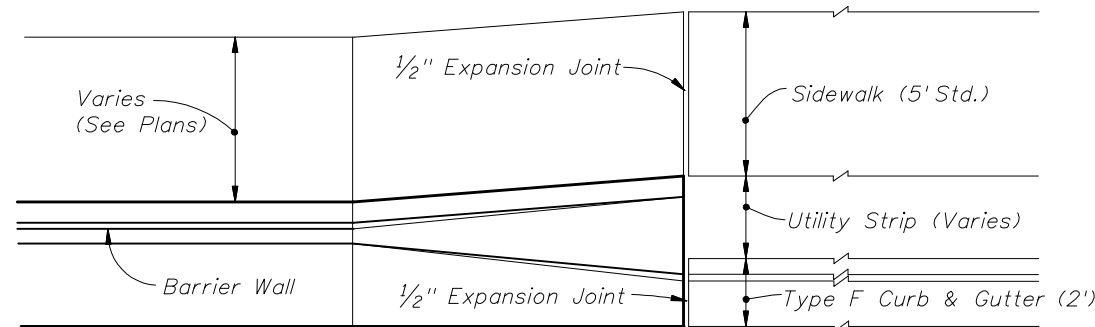
△ When Construction Joints Are Utilized For Transition Segment Construction The Stem Shall Be Doweled To The Footing In The Following Manner: Five #5 bars 15" long shall be embedded 7" into the footing. The dowels shall be spaced 15" on centers with the first dowel located 12" from the barrier wall. Dowels may be placed within or adjacent to the keyway.



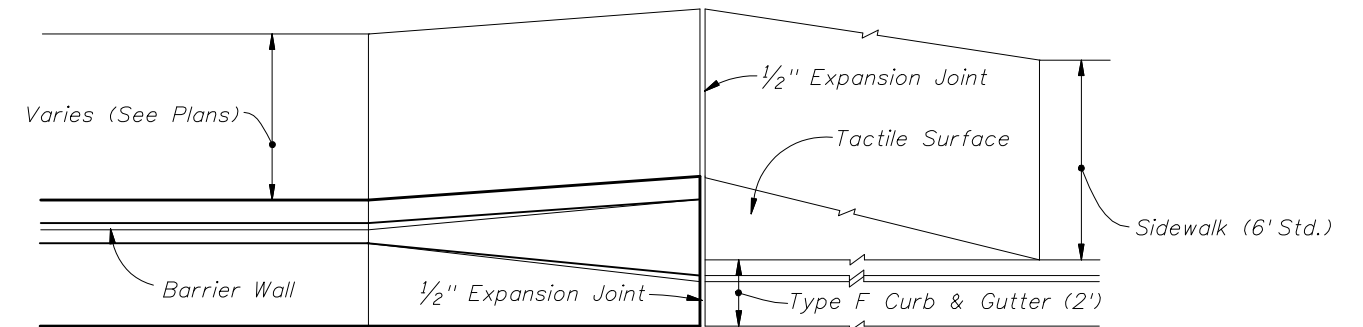
PICTORIAL VIEW



PICTORIAL VIEW



PLAN
WITH UTILITY STRIP



PLAN
WITHOUT UTILITY STRIP

RIGHT SIDE SHOWN, LEFT SIDE OPPOSITE HAND
ONE-WAY AND TWO-WAY TRAFFIC (NEAR LANE APPROACH)

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) ● TRANSITION SEGMENT ● WITHOUT ADJACENT BICYCLE LANE

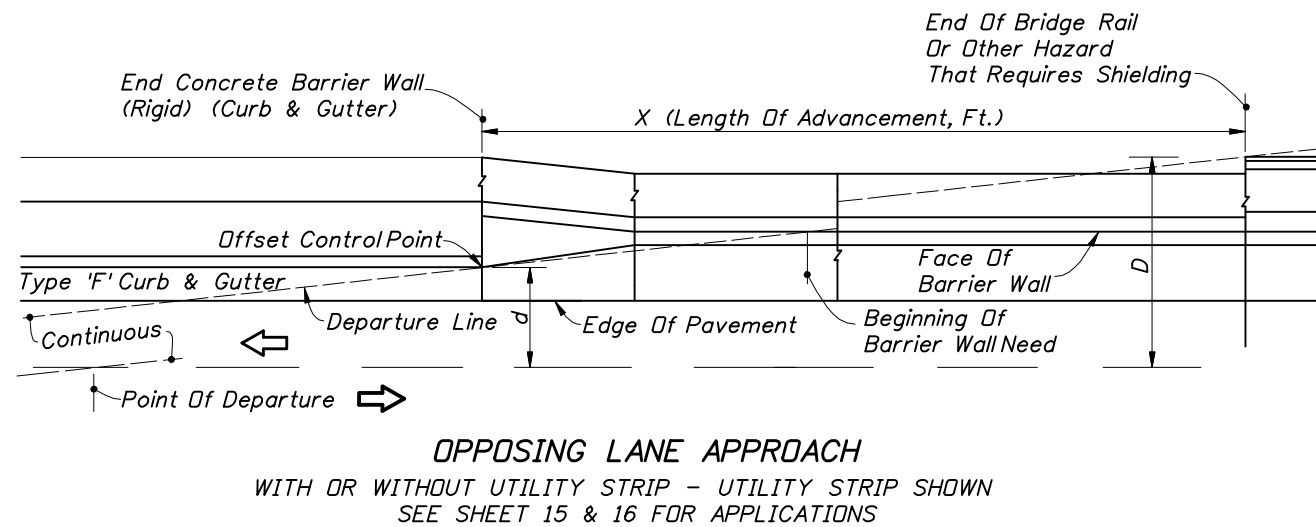
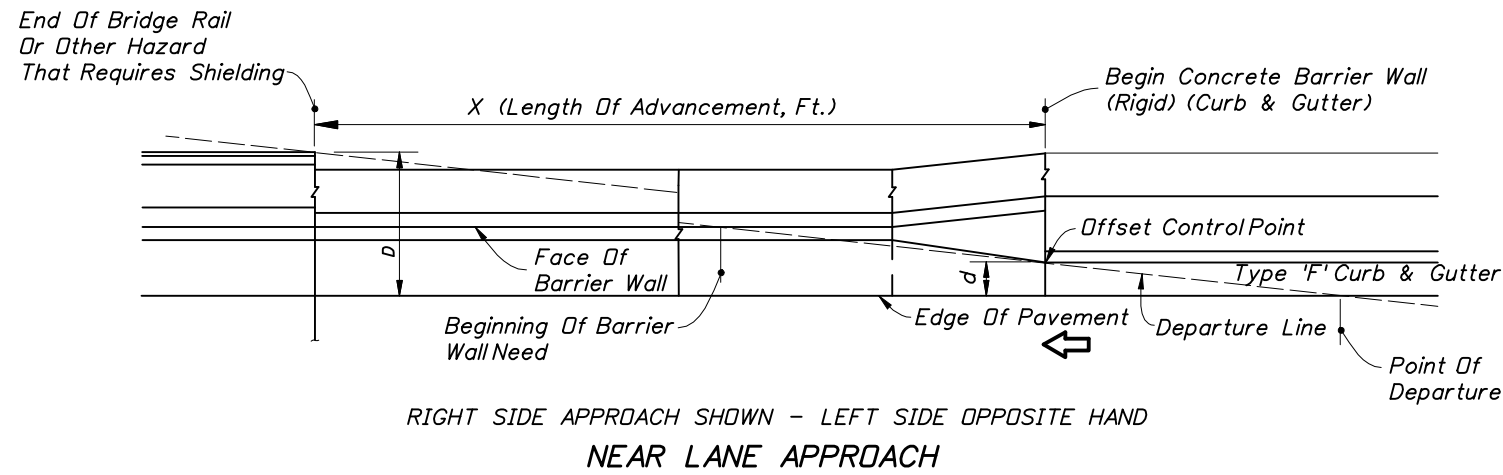


2010 FDOT Design Standards

CONCRETE BARRIER WALL

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Index No. 410



Design Speed mph	Length Of Advancement, Ft. (X)
≤ 45	16 (D-d)

Note: The minimum length of advancement for both near and opposing lane approaches is 40'.

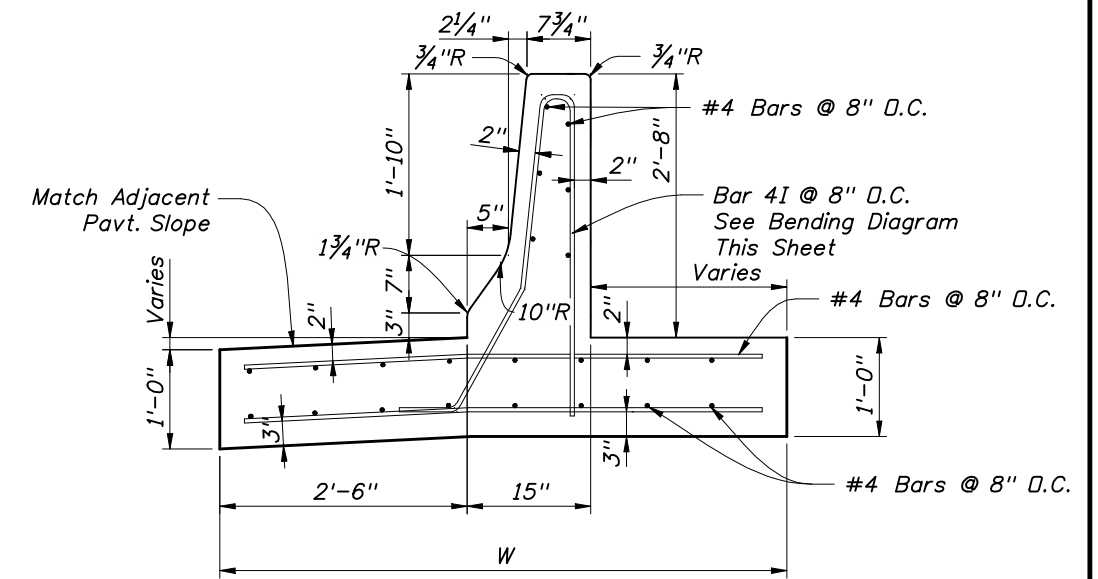
Equation Variables:

D= Distance in feet from near edge of the near approach traffic lane to back of hazard or clear zone width whichever is lesser. For left side hazards and clear zones on two-way undivided facilities D is measured from the inside edge of the near approach traffic lane.

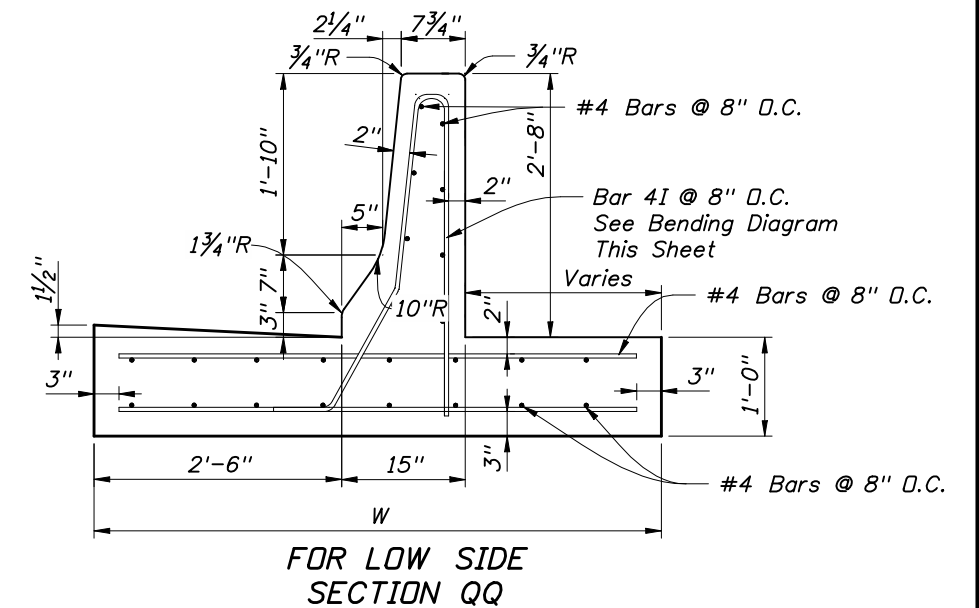
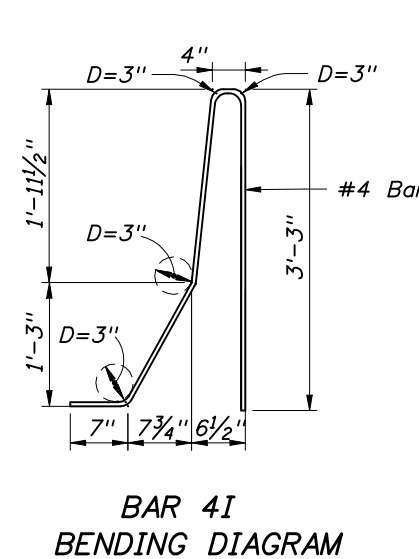
d= Distance in feet from near edge of the near approach traffic lane to the face of curb (at offset control point). For left side hazards on two-way undivided facilities d is measured from the inside edge of the nearest opposing traffic lane.

LENGTH OF ADVANCEMENT

QUANTITIES			
Length* Of Barrier Wall	W	Class II Conc. CY Per Lin. Ft.	Rein. Steel Lbs. Per Lin. Ft.
>73'	4'-9"	0.26	29
56' to 73'	5'-6"	0.29	32
48' to 55'	6'-0"	0.31	34
41' to 47'	6'-6"	0.33	37
36' to 41'	7'-0"	0.35	39
29' to 35'	8'-0"	0.38	42



FOR HIGH SIDE SECTION QQ



Note: All longitudinal reinforcement #4 bars. Shorter segments due to construction or expansion joint shall be doweled in the manner described for 'Transition Segments' on Sheet 18.

Transverse expansion joints are to be constructed at the juncture of wall transitions and curb and gutter, and at intervals so that spacing will not exceed 100'.

For barrier wall inlet details see Index No. 219. Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Curb & Gutter), LF.

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) ● WITHOUT ADJACENT BICYCLE LANE

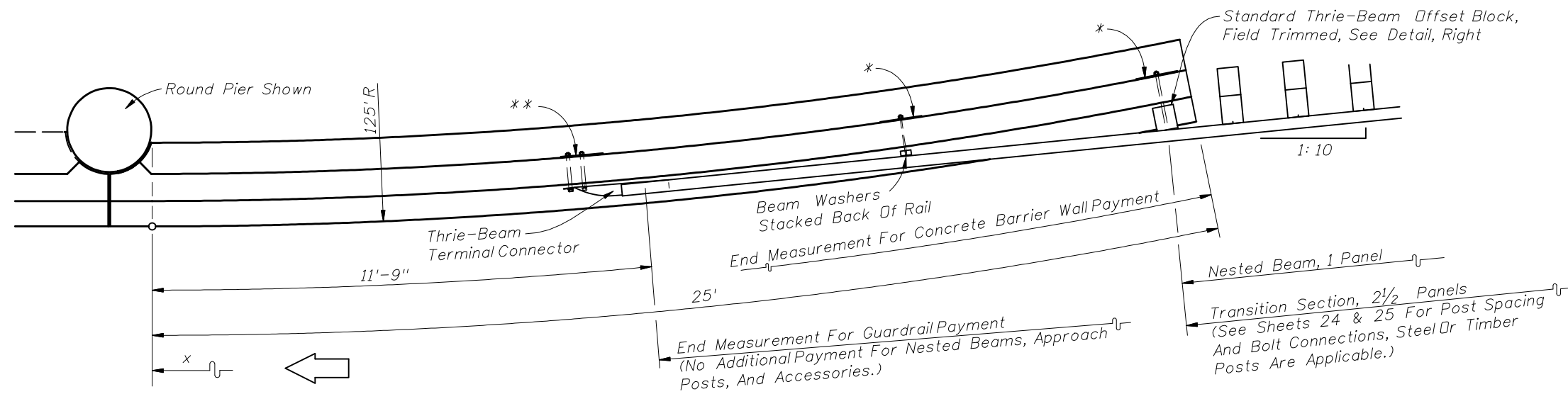


2010 FDOT Design Standards

CONCRETE BARRIER WALL

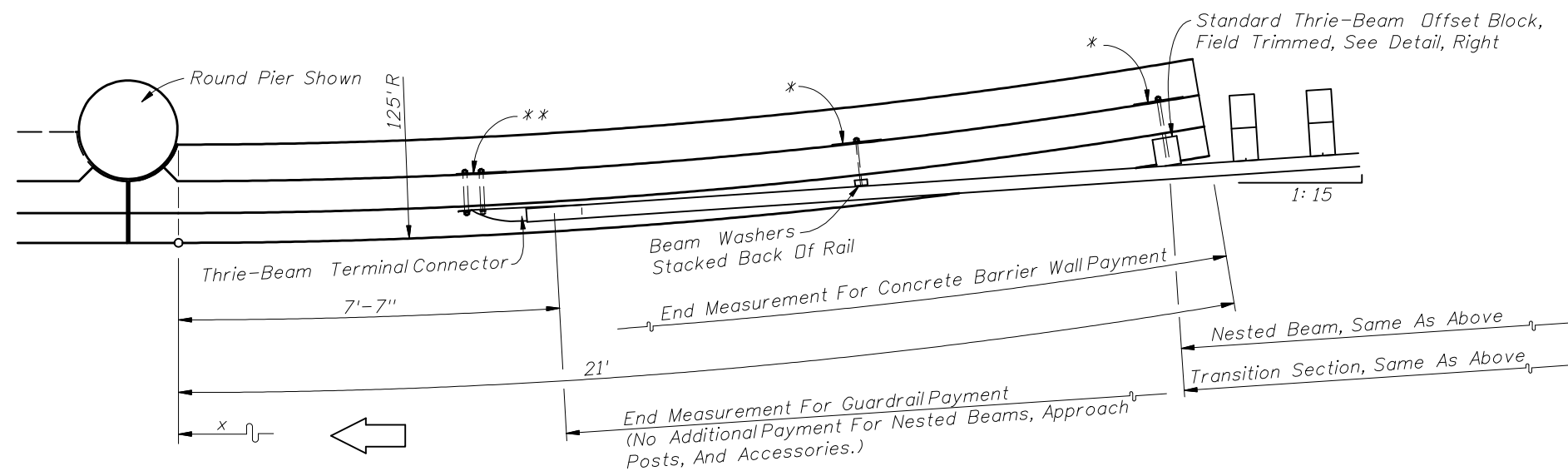
Last Revision 07/01/09 Sheet No. 19 of 25

Index No. 410



PLAN FOR DESIGN SPEED ≤ 45 MPH

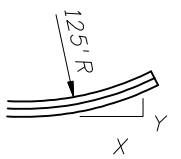
NOTE:
For details at Rigid Hazard see Sheet 21.



PLAN FOR DESIGN SPEED ≥ 50 MPH

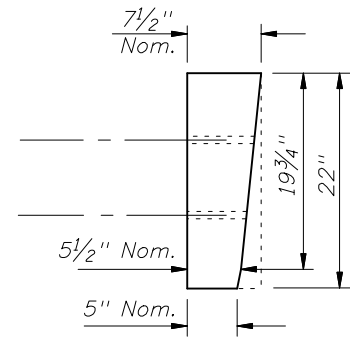
Note: For continuous barrier between independent bents or single pier columns see Sheets 21-23.

ARC LENGTH (FT)	DISTANCE "x" (FT)	OFFSETS "y" (FT)
4	4.00	0.06
8	7.99	0.26
12	11.98	0.58
16	15.96	1.02
20	19.91	1.60
21	20.91	1.76
24	23.85	2.30
25	24.83	2.49



Note:
Wall may be constructed in chords having lengths ≤ 4 feet.

SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS
WHEN GUARDRAIL OFFSET FROM HAZARD LESS THAN 3'



FOR USE WITH EITHER
1:10 OR 1:15
GUARDRAIL TRANSITIONS

STANDARD THRIE-BEAM
OFFSET BLOCK
(FIELD TRIMMED)

NOTES

- This wall is intended for use where the wall has bearing against the hazard; when the length between bent supports or pier columns exceeds 13', the affected segments shall be constructed in accordance with the detail for 'Reinforced Concrete Barrier Wall (Shoulder)', 'Section TT' or 'Section QQ', this index. In cases where the barrier wall and slope pavement or other structure would occupy the same location, the wall and structure are to be modified as detailed in the plans.
- The barrier wall radial segments are intended for use on approach and trailing ends of both one-way and two-way facilities. The guardrail connections shown on this sheet apply to one-way approaches and to the approaching and trailing ends of two-lane two-way facilities. On trailing ends of two-way multilane and one-way facilities the end connection on Sheet 1 may be used. For walls with normal offsets from hazards and their guardrail connections, see Sheet 24 & 25.
- Refer to Index No. 400 for additional guardrail information.
- Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Shoulder), LF.

* 12"x12"x1/4" galvanized steel back-up plate with 5/8" post bolts (either 14" or 18" long) and nuts with 5/8" plain round washers under nuts.

** Attach thrie-beam terminal connector to shoulder barrier wall with a 21"x12"x5/8" thrie beam terminal connector plate and 5-7/8"x12" long HS hex bolts and nuts with 7/8" plain round washers under heads and nuts.



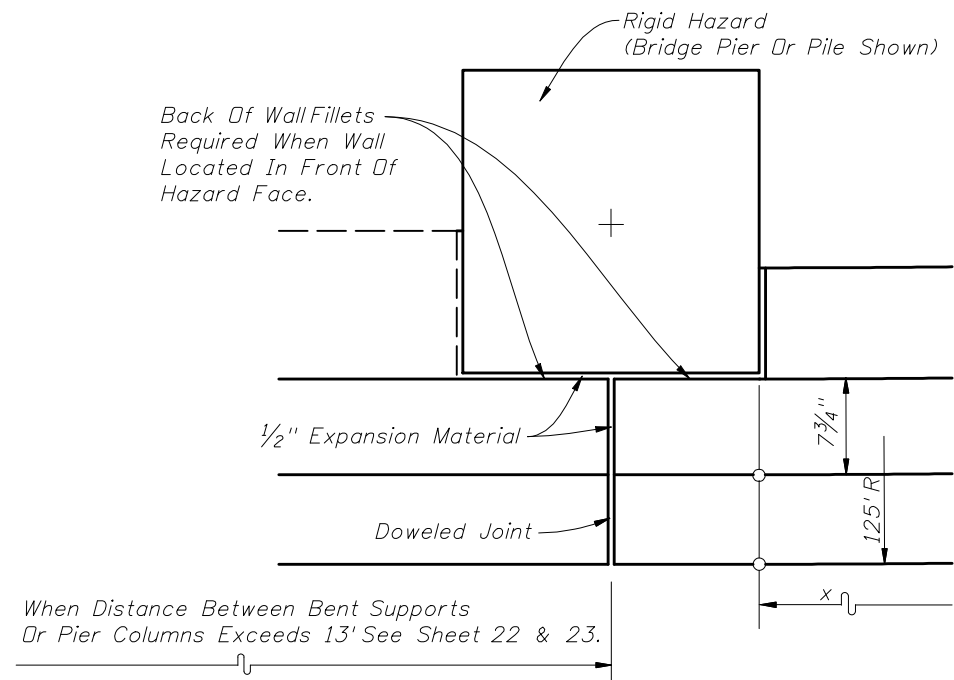
2010 FDOT Design Standards

CONCRETE BARRIER WALL

Last Revision 07/01/05

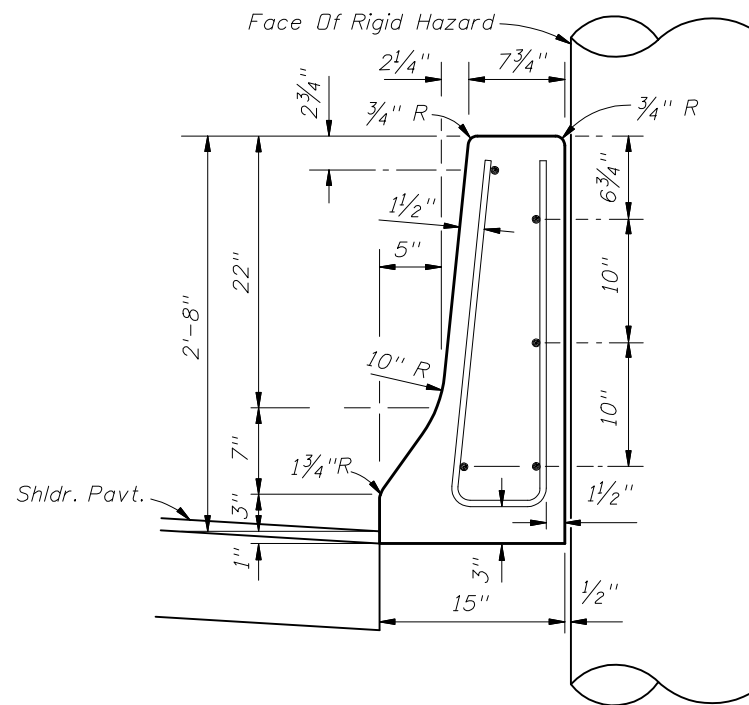
Sheet No. 20 of 25

Index No. 410

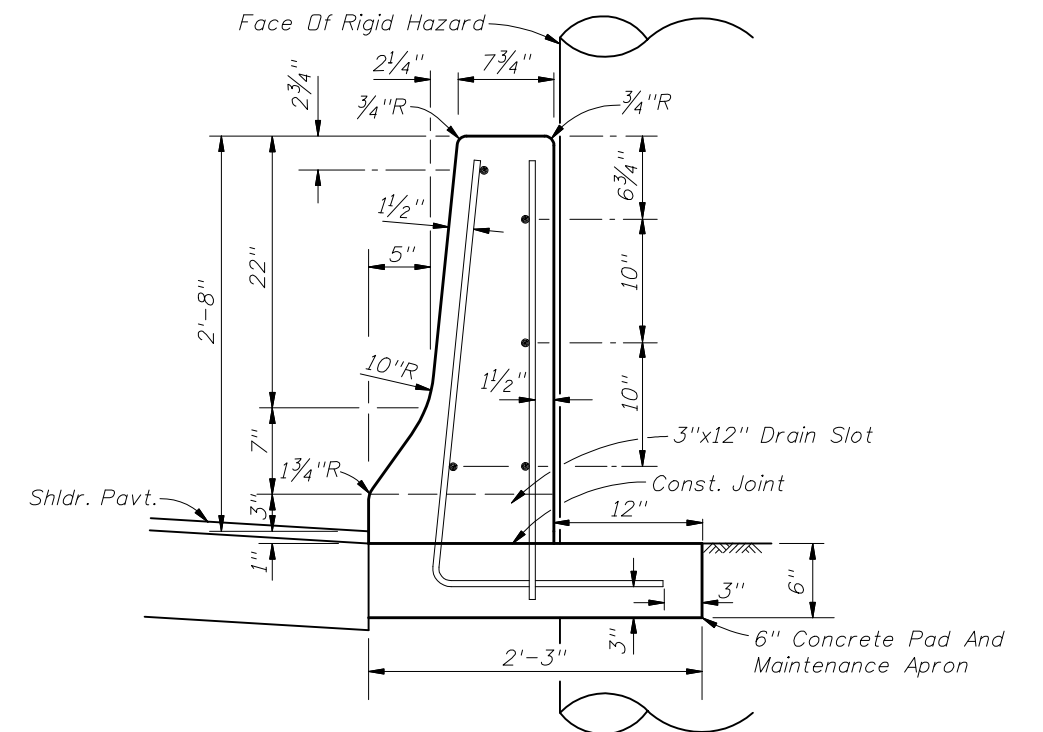


BARRIER WALL AT SQUARE OR RECTANGULAR SHAPED HAZARD

PARTIAL PLAN

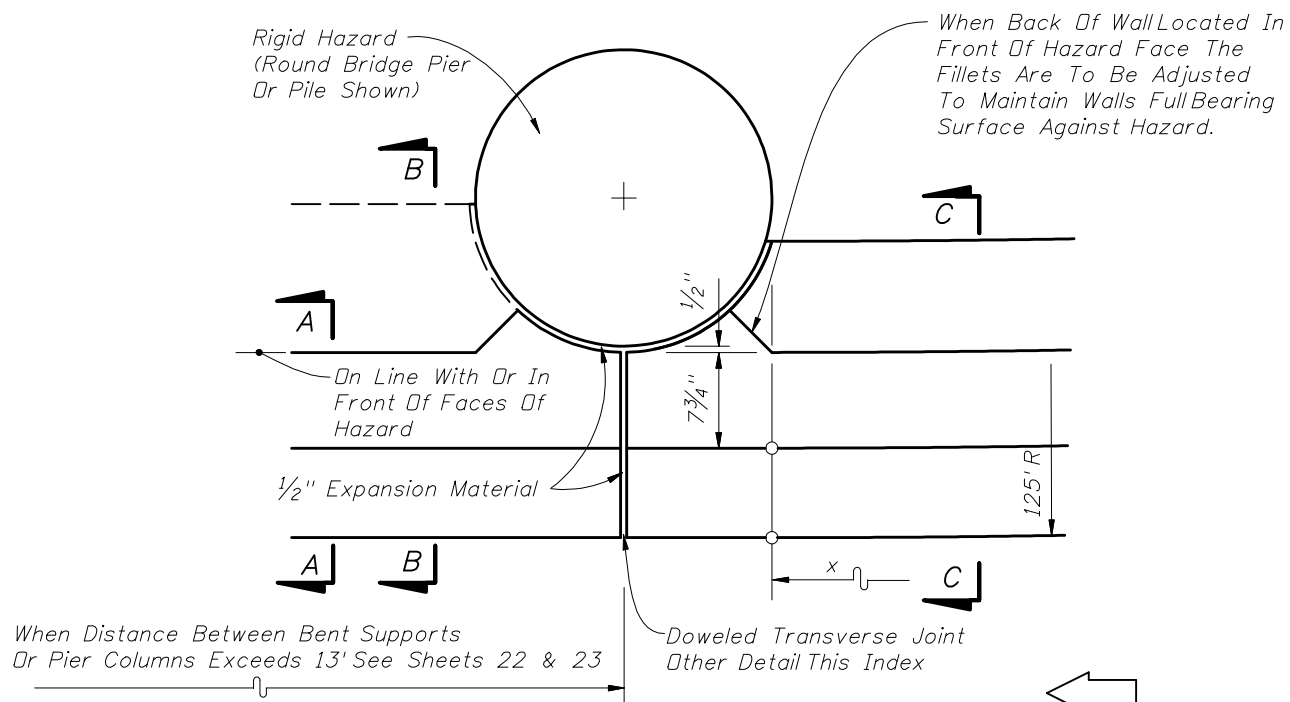


SECTION AA



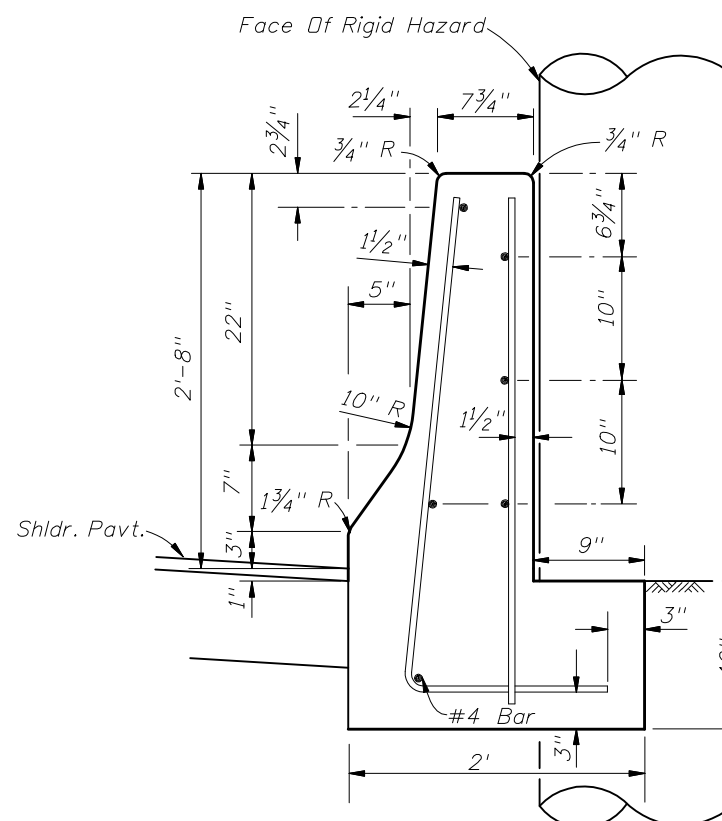
TO BE CONST. IN LIEU OF SECTION AA WHEN THRU DRAINAGE REQUIRED

SECTION BB



BARRIER WALL AT ROUND HAZARD

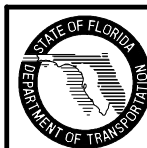
PARTIAL PLAN

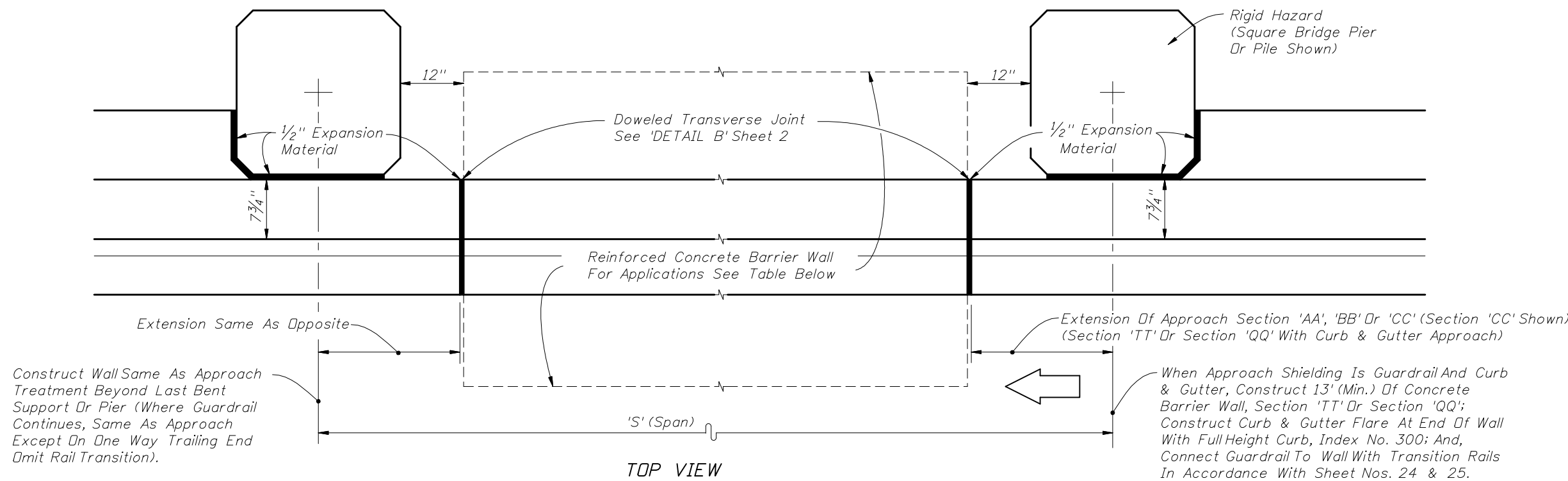


SECTION CC

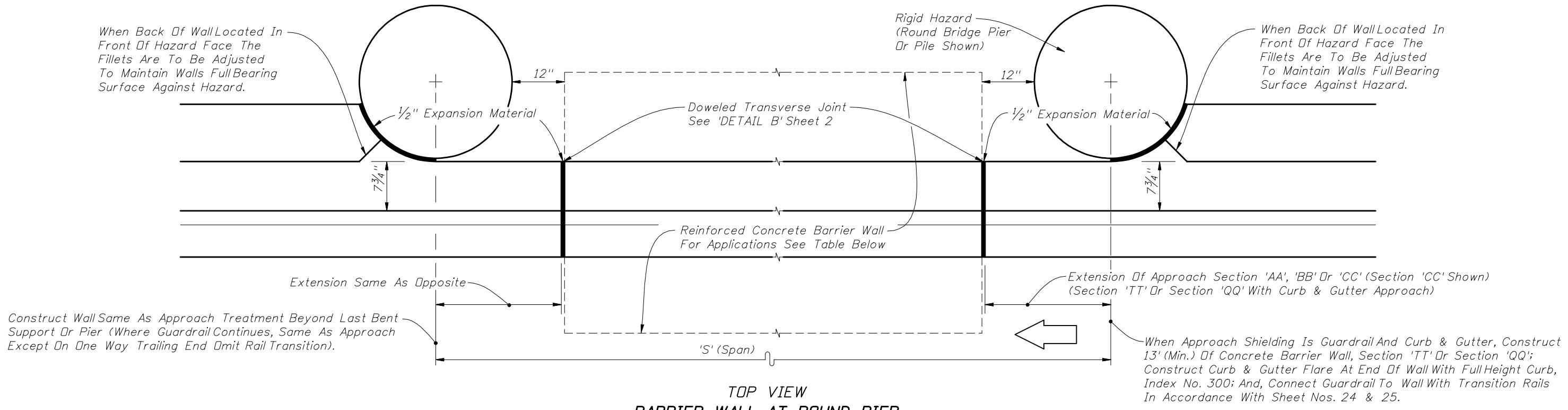
SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS
WHEN GUARDRAIL OFFSET FROM HAZARD LESS THAN 3'

NOTE:
All vertical reinforcement #4 bars at 12" centers.
All horizontal reinforcement #5 bars.





TOP VIEW
BARRIER WALL AT SQUARE PIER

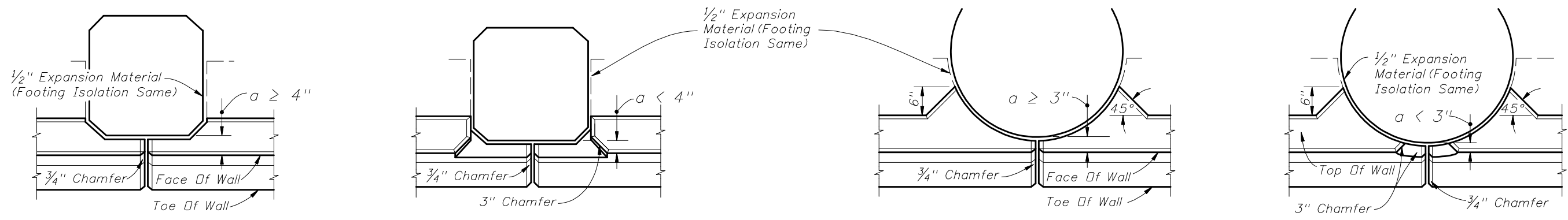


TOP VIEW
BARRIER WALL AT ROUND PIER
CONCRETE BARRIER WALL WHEN SPAN BETWEEN BENT SUPPORTS OR PIER COLUMNS EXCEEDS 13'

'S' Feet	REINFORCED CONCRETE BARRIER WALL APPLICATIONS
>13'	'Reinforced Concrete Barrier Wall (Shoulder)' With Flush Shoulders; Or, Section 'TT' Or Section 'QQ' With Curb & Gutter
Barrier wall footings that conflict with bent or pier foundations shall be modified as described in the plans.	

CONCRETE BARRIER WALL WHEN GUARDRAIL OFFSET FROM BENT OR PIER LESS THAN 3 FEET OR WHERE WALL STEM ABUTS SUPPORTS OR PIER COLUMN





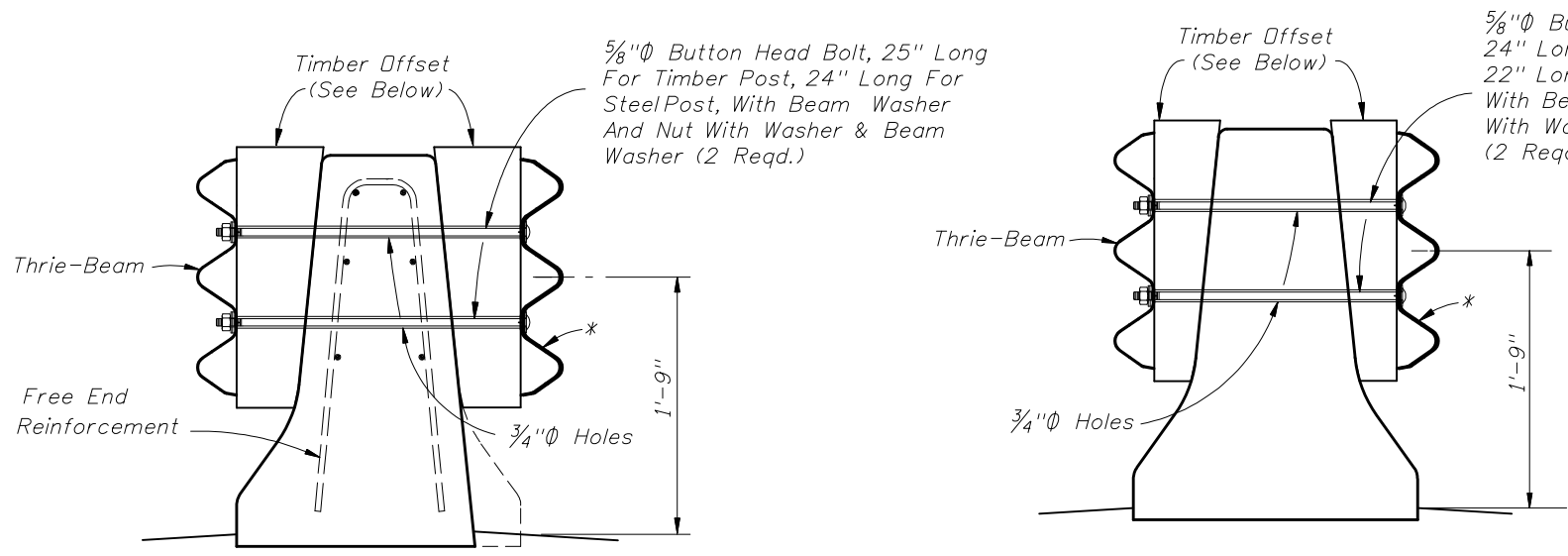
TOP VIEWS

'a' Varies (Circular Or Octagonal Hazard Not More Than 2" In Front Of Face Of Wall).
 Applicable To Sections 'AA' And 'BB' With Spans Of $\leq 13'$, And To Section 'CC', Sheet No. 21.
 Applicable To Other Rigid Walls Of This Index For Spans $> 13'$ Unless Otherwise Shown In The Plans.

HAZARD PENETRATING STEM OF RIGID CONCRETE BARRIER WALLS

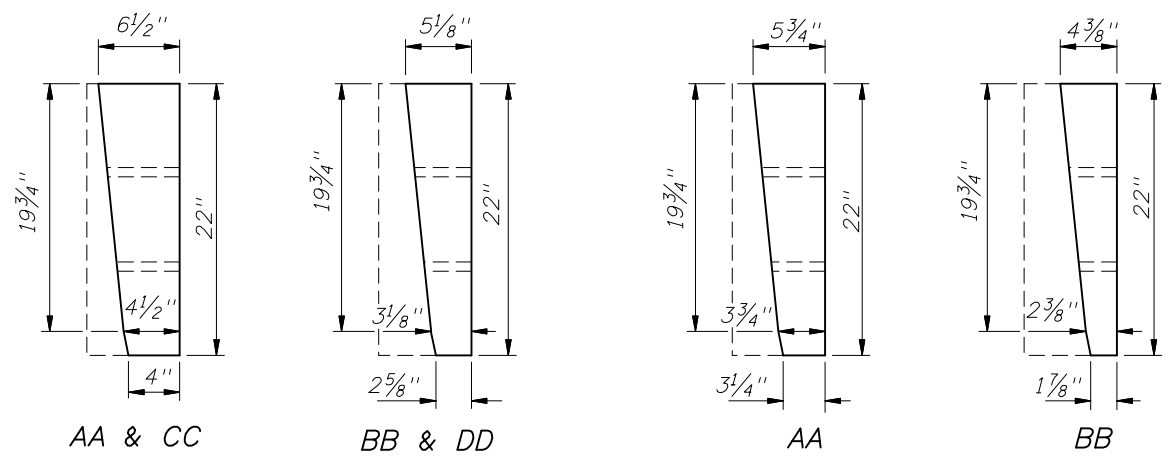
The details on sheets 22 & 23 are treatments to the F-shape concrete barrier walls depicted on Sheet Nos. 9 through 19, where site conditions impose reduced clearances between above ground hazards and the walls. Bridge bent supports and piers are shown. These treatments are not applicable to hazards that cannot provide lateral support for the walls. See the plans for limits of wall sections applied and other associated wall treatments.





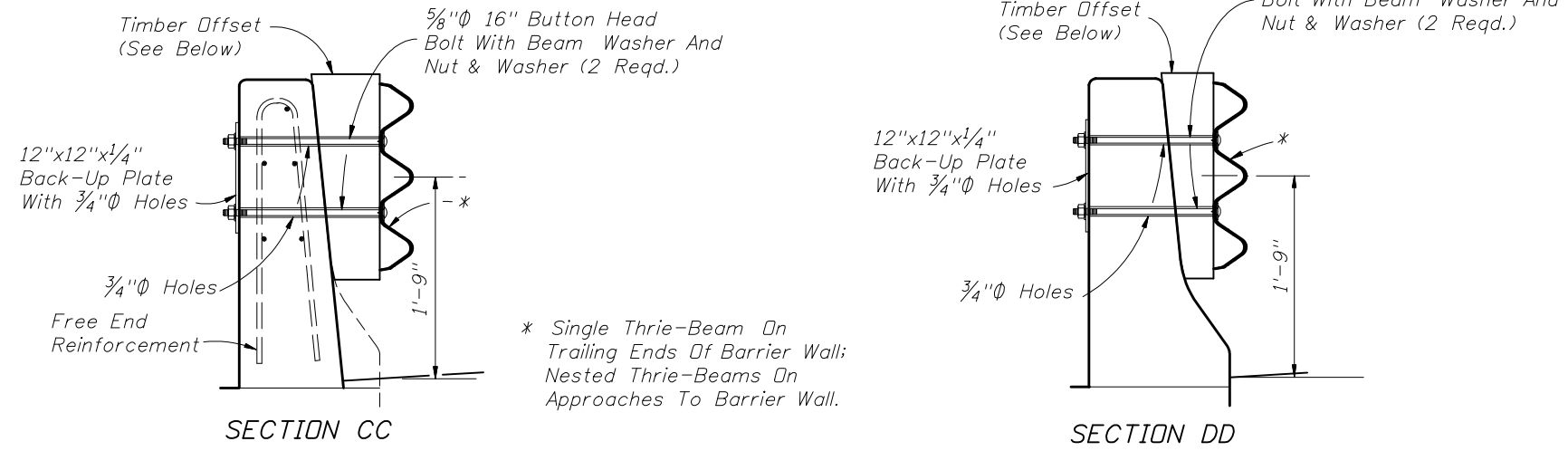
5/8"Ø Button Head Bolt, 25" Long For Timber Post, 24" Long For Steel Post, With Beam Washer And Nut With Washer & Beam Washer (2 Reqd.)

NOTE: See Sheet 25 For Locations Of Sections.

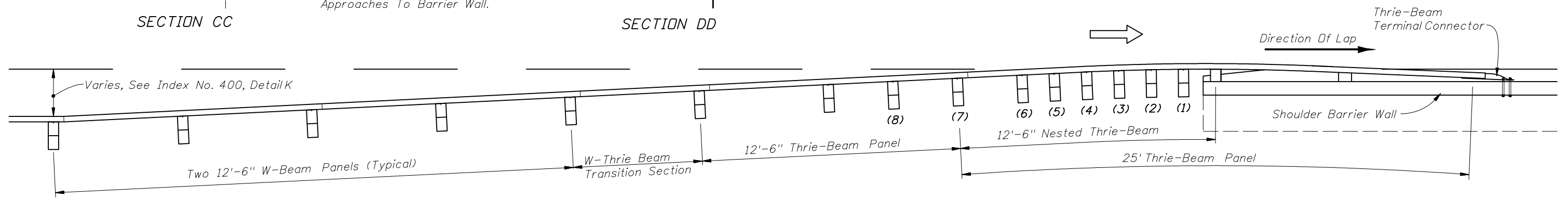


FOR DOUBLE FACED GUARDRAIL USING TIMBER POSTS AND FOR SINGLE FACED GUARDRAIL USING EITHER TIMBER OR STEEL POSTS

STANDARD TIMBER OR PLASTIC OFFSET BLOCKS • FIELD TRIMMED FOR USE AT SECTIONS AA, BB, CC & DD



* Single Thrie-Beam On Trailing Ends Of Barrier Wall; Nested Thrie-Beams On Approaches To Barrier Wall.

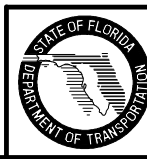


STANDARD GUARDRAIL APPROACH TO SHOULDER BARRIER

NOTES

1. The longitudinal dimensions and payment limits shown for median concrete barrier wall also apply to shoulder concrete barrier walls.
2. W-beam elements do not apply to these transition schemes. For barrier wall trailing end guardrail connections for one-way lanes, see Sheet 2.
3. Where reaming is necessary to fit nested beams the reamed surfaces shall be metalized in accordance with Index No. 400.
4. Either steel or timber guardrail post may be used, timber posts shown.
5. The nested beams shall not be bolted to blocks and posts at posts numbers (1), (3) and (5).
6. On the trailing side of MEDIAN BARRIER WALL, offset blocks may be omitted at posts numbers (1), (2), (3), (5), (6) and (8). (See Sheet 25)
7. For additional guardrail information refer to Index No. 400.

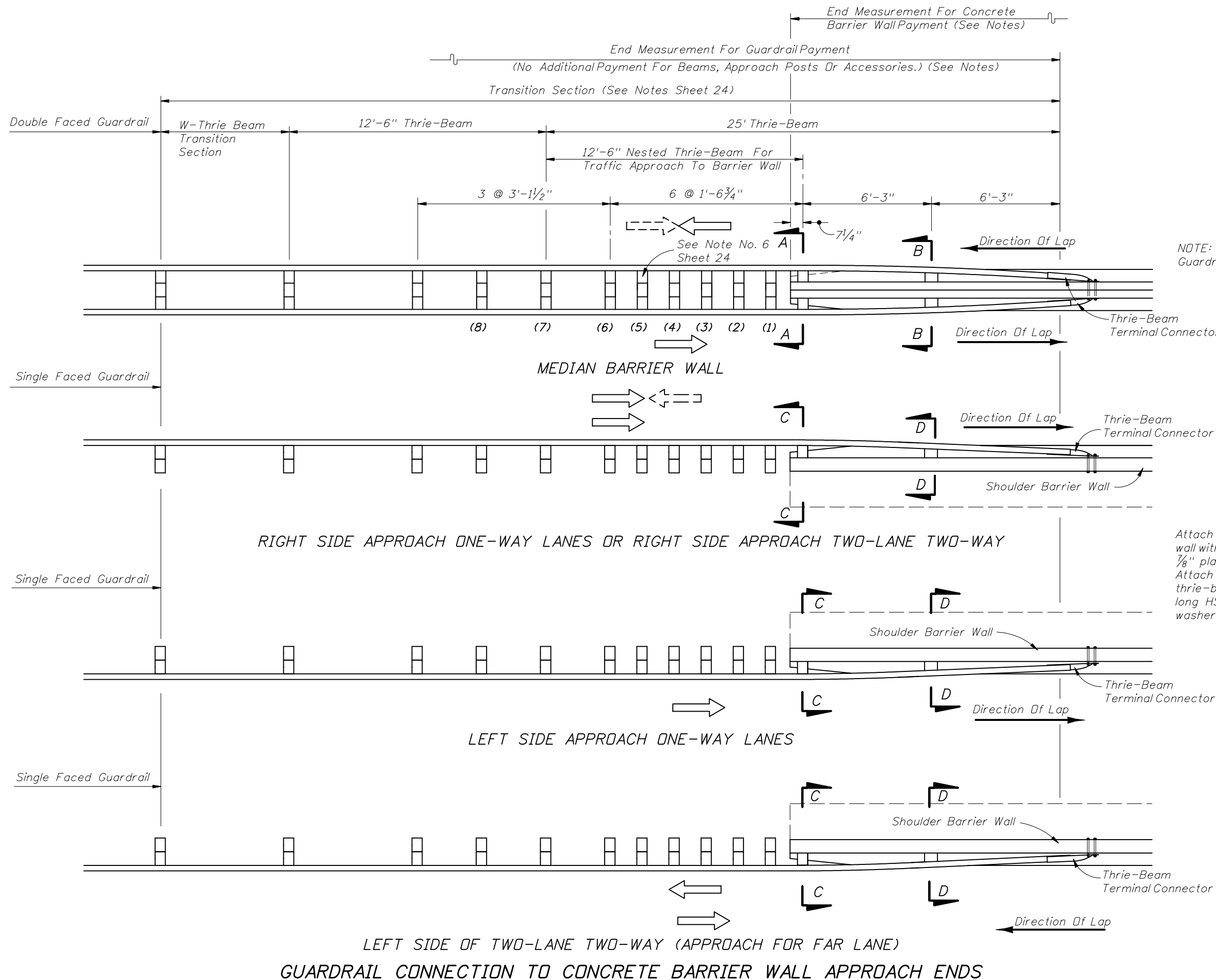
GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS



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CONCRETE BARRIER WALL

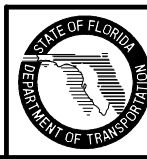
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NOTE: See Sheet 24 For Section AA, BB, CC and DD Guardrail and Offset Block Views

Attach thrie-beam terminal connector to median barrier wall with 5- $\frac{7}{8}$ "x15" long HS hex bolts and nuts with $\frac{7}{8}$ " plain round washers under heads and nuts. Attach to shoulder barrier wall with a 21"x12"x $\frac{5}{8}$ " thrie-beam terminal connector plate and 5- $\frac{7}{8}$ "x12" long HS hex bolts and nuts with $\frac{7}{8}$ " plain round washers under heads and nuts.

GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS



2010 FDOT Design Standards

CONCRETE BARRIER WALL

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This Pier Protection Barrier has been structurally evaluated to be equivalent or greater in strength to other safety shape traffic barriers which have been crash tested to NCHRP Report 350 TL-5 criteria. This barrier meets the requirements of the AASHTO LRFD Bridge Design Specifications for a barrier used for bridge pier protection.

GENERAL NOTES:

- Concrete shall be Class III or IV unless otherwise called for in the plans. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Specifications, unless another finish is called for in the plans. The surfaces shall have a Class 5 Applied Finished Coating in accordance with Section 400 only when called for in the plans.
- Construct Pier Protection Barrier continuous without transverse contraction or expansion joints. Transverse construction joints may be used at a spacing greater than or equal to 40'. Provide longitudinal reinforcing steel continuous across construction joints.
- When the Pier Protection Barrier is installed adjacent to Roadway or Shoulder pavement, compact the top 12" of the subgrade to at least 100% of the density as defined in the AASHTO T-99 specifications.
- Isolate Barrier Wall Inlets, Index 218, from Pier Protection Barriers and Footings with 1" expansion material.
- On roadways designated for reverse laning, mark all downstream barrier ends that are not shielded or outside the clear zone with Type 3 Object Markers. Include the cost of the Object Marker in the cost of the Pier Protection Barrier.
- Payment: Pier Protection Barrier and Crash Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Shoulder 42"), LF, or Shoulder Concrete Barrier Wall (Rigid-Shoulder 54"), LF.

INSTRUCTIONS TO DESIGNER:

As used in this standard, setback distance is as defined by LRFD. See PPM and Index 700 for minimum recoverable terrain and horizontal clearance requirements.

Establish the offset from the Pier Protection Barrier to the bridge pier, column or pile bent based on project constraints.

Determine the required Pier Protection Barrier height, i.e. 42" or 54", in accordance with the requirements of the LRFD Bridge Design Specifications and the Structures Design Guidelines.

Determine the appropriate limiting stations of the Pier Protection Barrier and its end treatment(s) using the Pier Protection Barrier Length of Advancement diagrams provided.

- Select Pier Protection Barrier terminal treatment for design speeds greater than or equal to 50 mph:
- Terminated outside of the clear zone of any approach traffic;
 - Terminated within a shielded location;
 - Terminal protection by the use of a crash cushion system; or,
 - Terminated in conjunction with a suitably designed transition to another barrier.

Determine the appropriate footing configuration(s) (T, Front Cantilever or Back Cantilever) for a continuous run of Pier Protection Barrier using the Pier Protection Barrier Footing Layout Schematics. Select the footing configuration(s) based on traffic control needs and locations of piers, pier footings, utilities, drainage structures, etc. as shown. Footing configurations along a continuous run of Pier Protection Barrier may be intermixed as shown.

Designate the Pier Protection Barrier height, footing configuration(s) and limiting stations on the Plan-Profile sheets, e.g.:

Begin 42" Pier Protection Barrier with Front Cantilever Footing, Sta. 100+00.00

Indicate Crash Wall locations (when required) and lengths on the Plan-Profile sheets. Designate Crash Wall height to match height of adjacent Pier Protection Barrier.

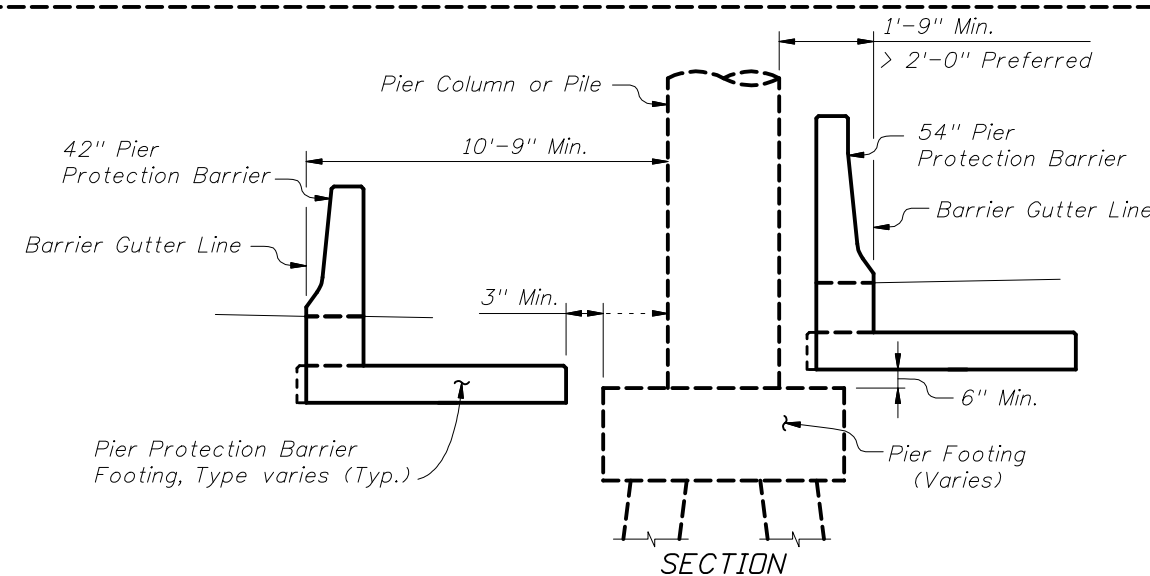
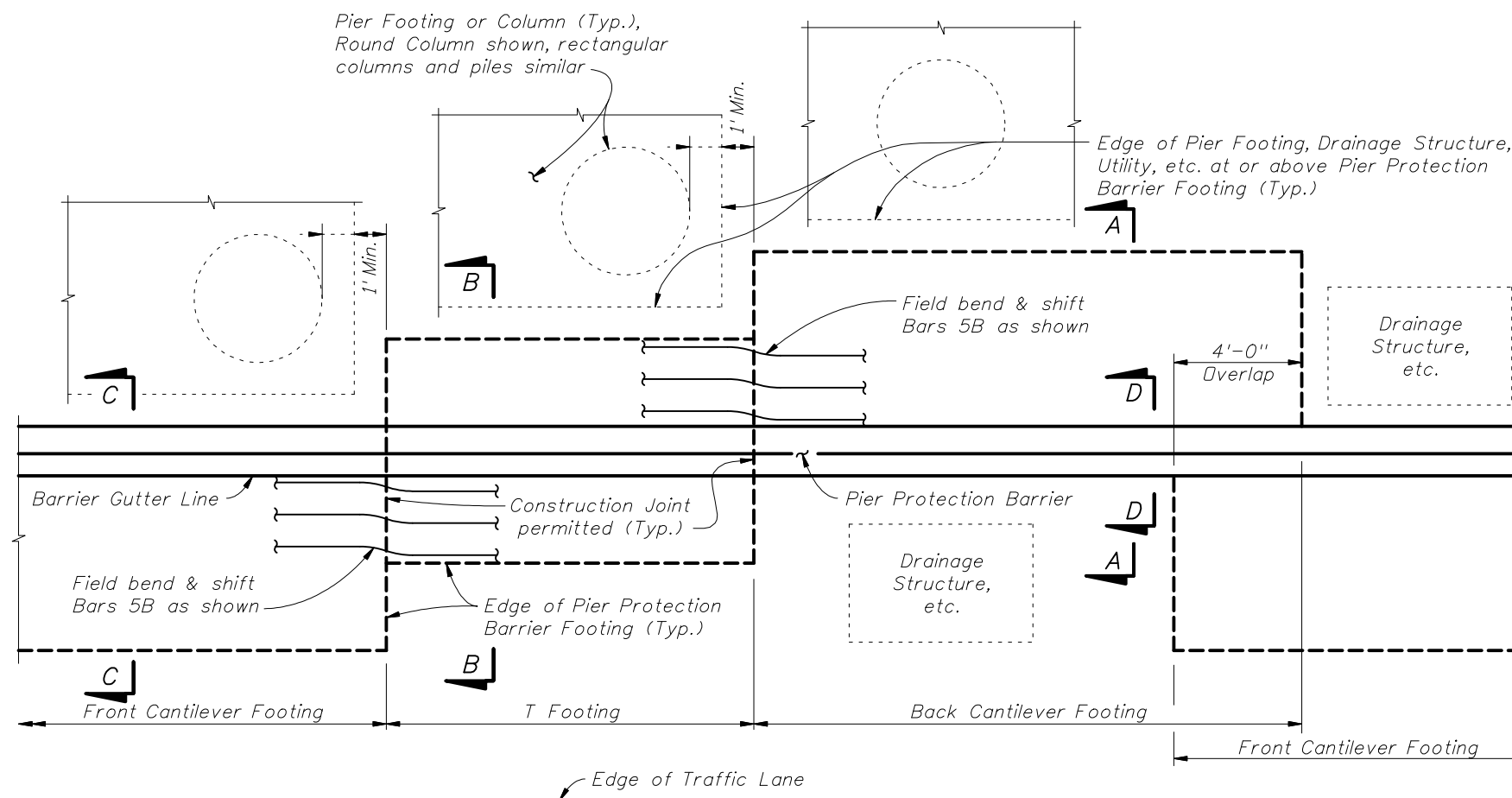
In absence of continuous concrete barrier, determine guardrail requirements in accordance with Indexes 400 and 410.

Show Cross Sections as required to locate Pier Protection Barrier, Crash Wall (when required) and footings adjacent to bridge piers, columns or footings, drainage structures, utilities, etc.

Prepare Traffic Control Plans to accommodate Pier Protection Barrier, Crash Wall (when required) and footing construction.

Include length(s) of Crash Walls (measured along front face) in length of Pier Protection Barrier for payment.

Although intended for shielding bridge piers, the Pier Protection Barrier can be used on a project specific basis to shield other critical roadside objects when deemed necessary or appropriate.



PLAN VIEW

SECTION

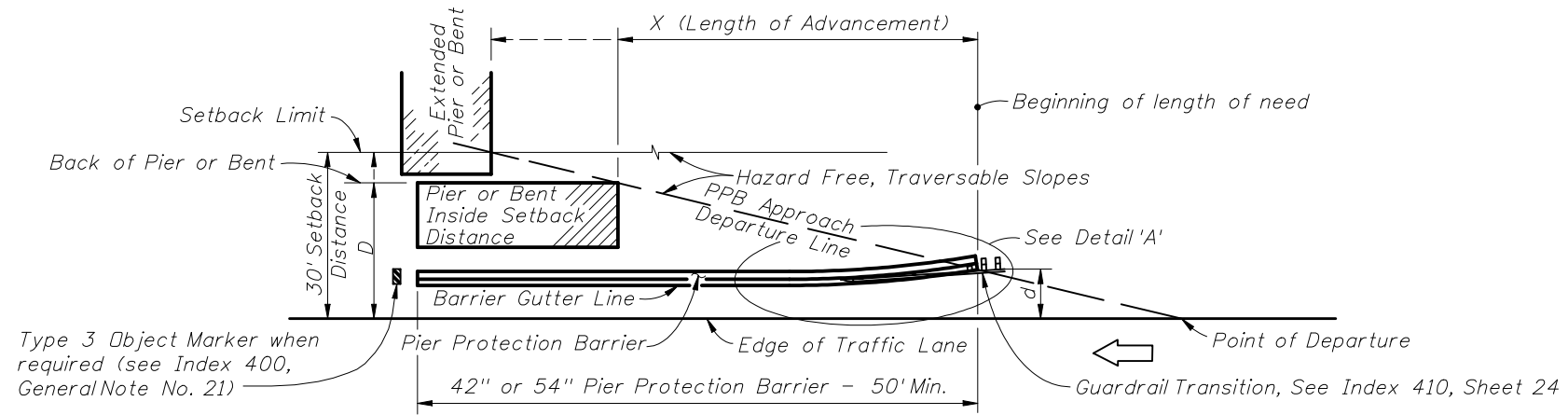
PIER PROTECTION BARRIER FOOTING LAYOUT SCHEMATICS



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PIER PROTECTION BARRIER

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(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC

Design Speed mph	X (Length of Advancement) Ft.
≤45	= 16 (D-d)
≥50	= 13 (D-d)

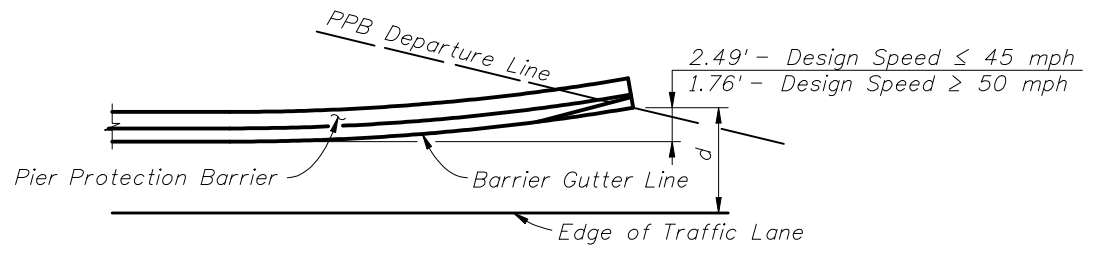
NOTE:

Length of Advancement determined from the diagrams and equations shown establishes the location of the upstream beginning length of need for a Pier Protection Barrier, however, the Length of Advancement for the combination of Pier Protection Barrier and required guardrail can be no less than that required by other details of Index 400.

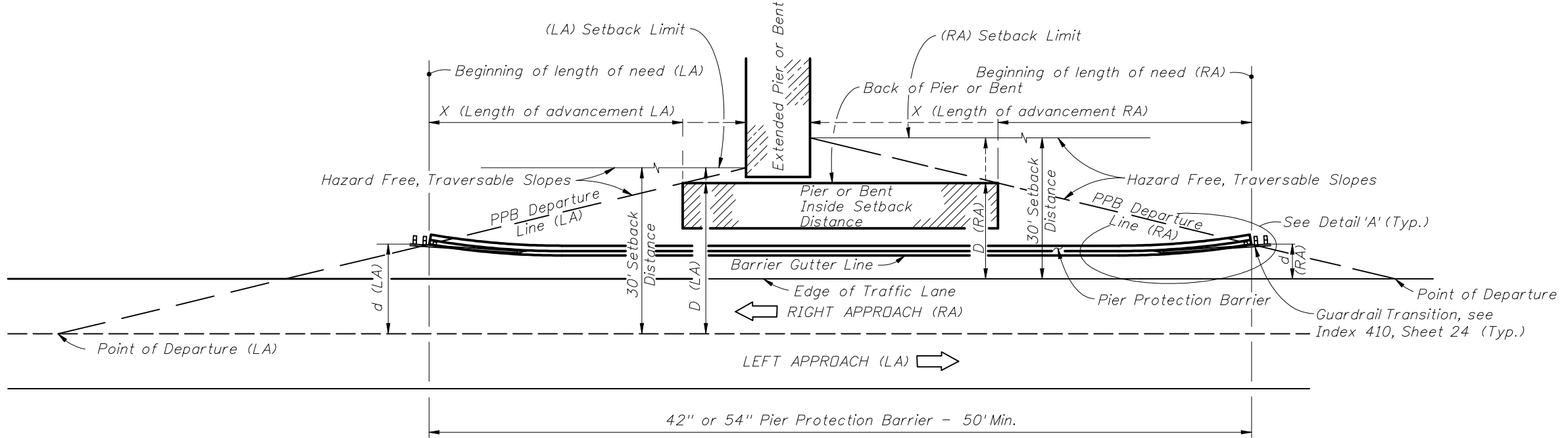
Equation Variables:

D = Distance in feet from the near edge of the near approach traffic lane to either (a) the back of pier, when the pier is located inside the Setback Distance or (b) the Setback Distance, when the pier extends to or goes beyond the Setback Distance. For left side piers on two-way undivided facilities, D is measured from the inside edge of the near approach traffic lane.

d = Distance in feet from the near edge of the near approach traffic lane to the Pier Protection Barrier gutter line at its intersection with the departure line or the face of guardrail at its intersection with the departure line. For left side hazards on two-way undivided facilities, d is measured from the inside edge of the near approach traffic lane.



DETAIL 'A'
(Guardrail not shown for clarity)



TWO-LANE TWO-WAY TRAFFIC

NOTE:
See Index 400 for Clear Zone and Horizontal Clearance Length of Advancement Diagrams.

PPB = Pier Protection Barrier

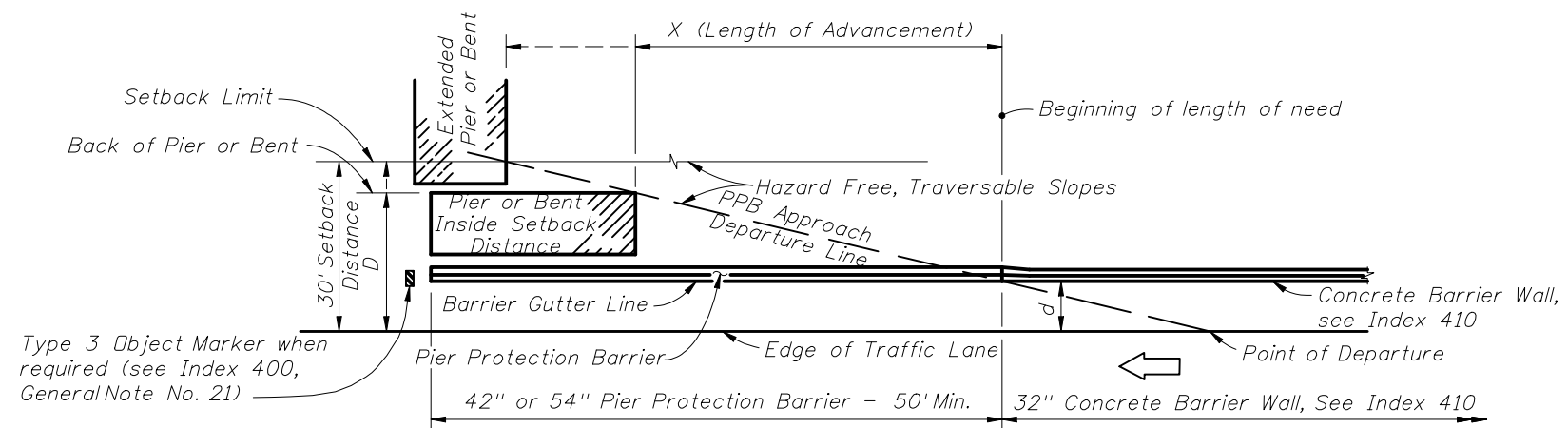
LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH GUARDRAIL CONTINUATION



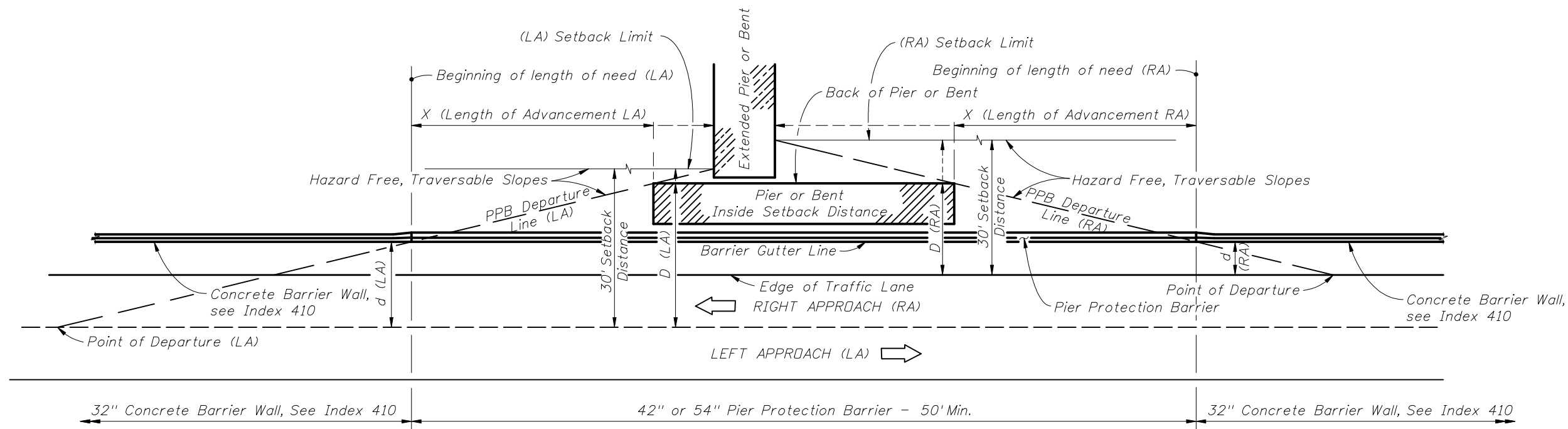
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(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC



TWO-LANE TWO-WAY TRAFFIC

NOTES:
See Index 400 for Clear
Zone and Horizontal Clearance
Length of Advancement Diagrams.
PPB = Pier Protection Barrier

See Notes on Sheet 2.

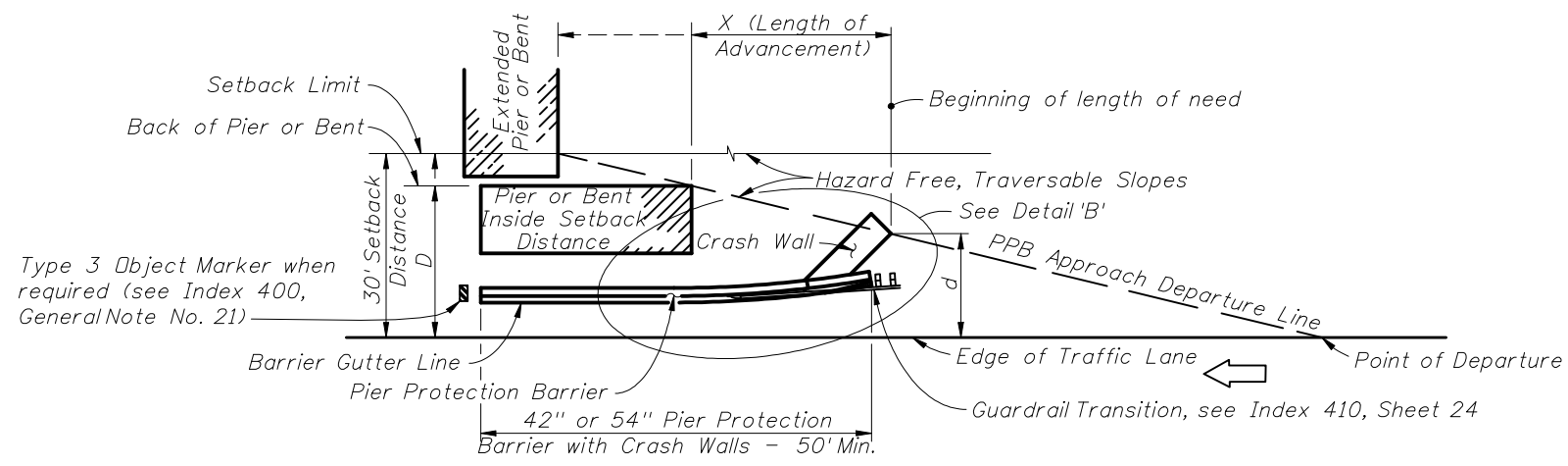
LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH CONCRETE BARRIER WALL CONTINUATION



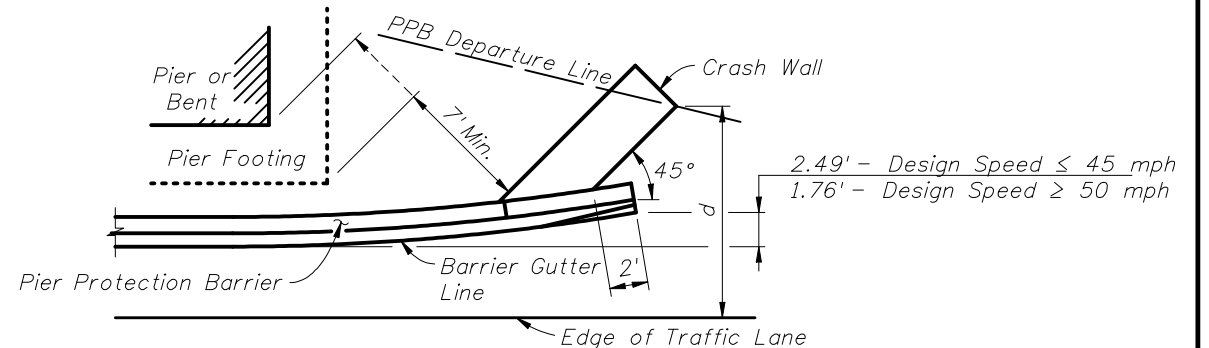
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PIER PROTECTION BARRIER

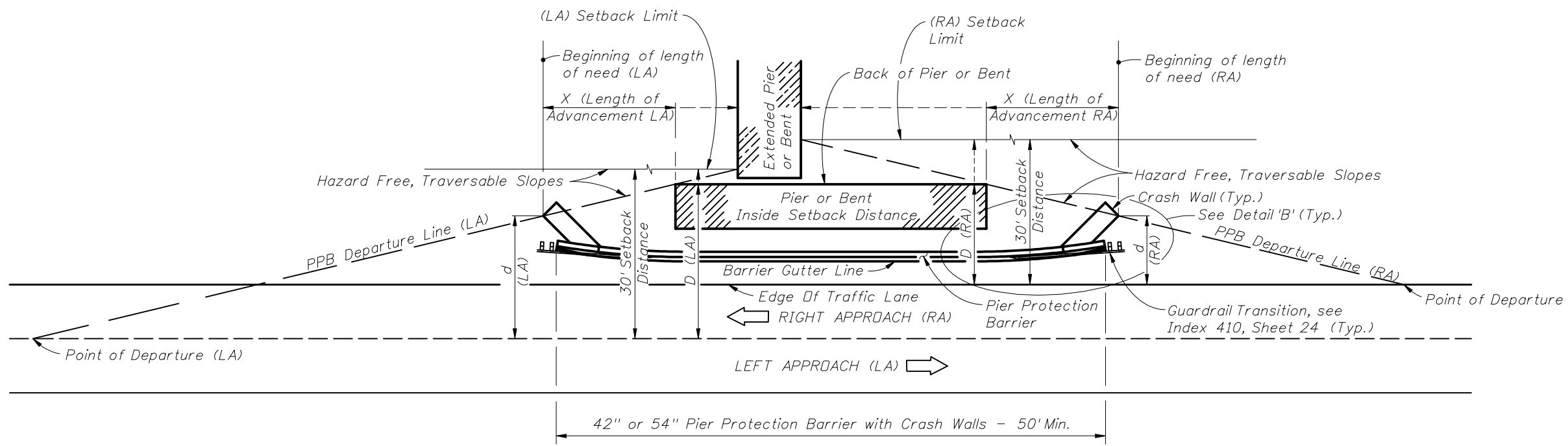
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(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC



DETAIL 'B'
(Guardrail not shown for clarity)

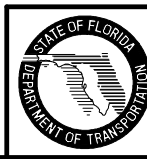


TWO-LANE TWO-WAY TRAFFIC

NOTES:
See Index 400 for Clear Zone and Horizontal Clearance Length of Advancement Diagrams.
PPB = Pier Protection Barrier

See Notes on Sheet 2.

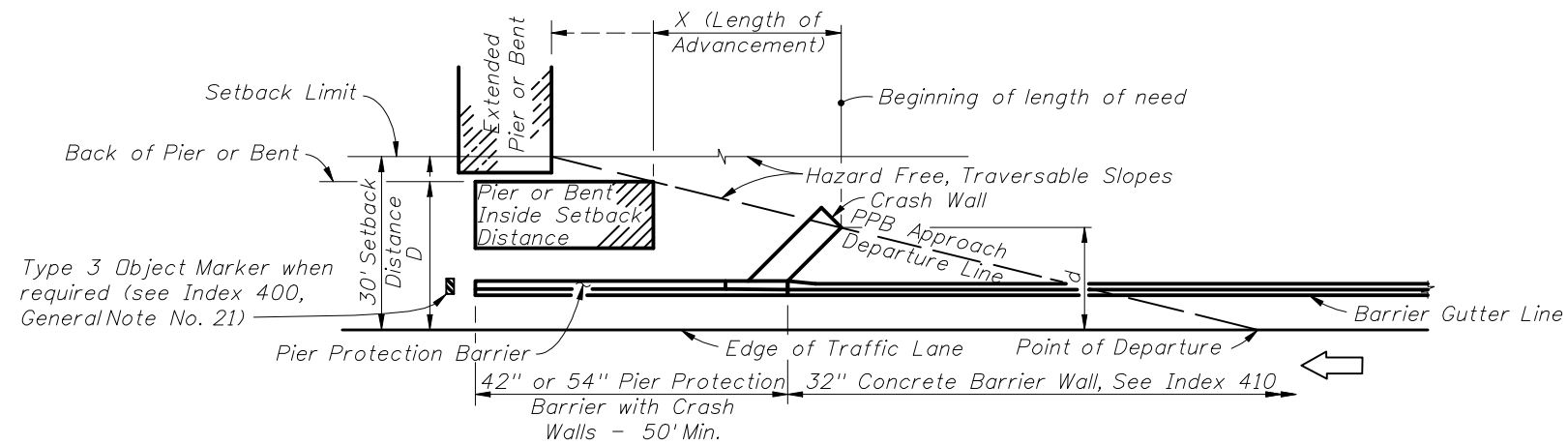
LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH CRASH WALL AND GUARDRAIL CONTINUATION



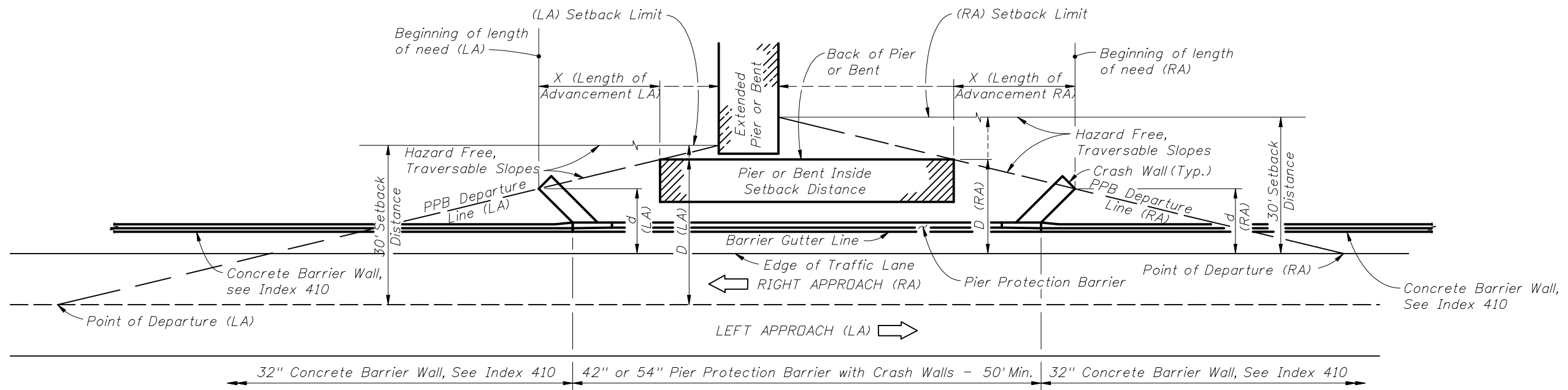
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(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC



TWO-LANE TWO-WAY TRAFFIC

NOTES:
See Index 400 for Clear Zone and Horizontal Clearance Length of Advancement Diagrams.
PPB = Pier Protection Barrier

See Notes on Sheet 2.

LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH CRASH WALL AND CONCRETE BARRIER WALL CONTINUATION

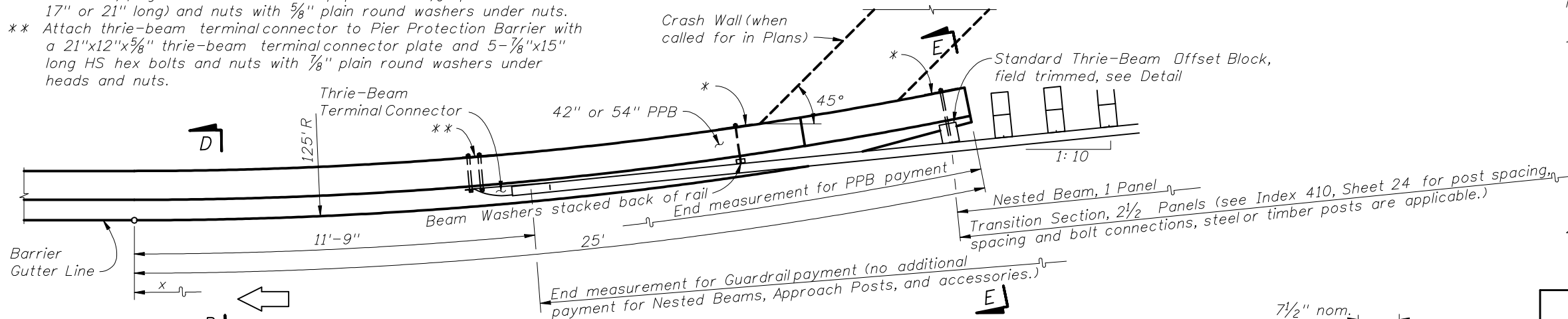


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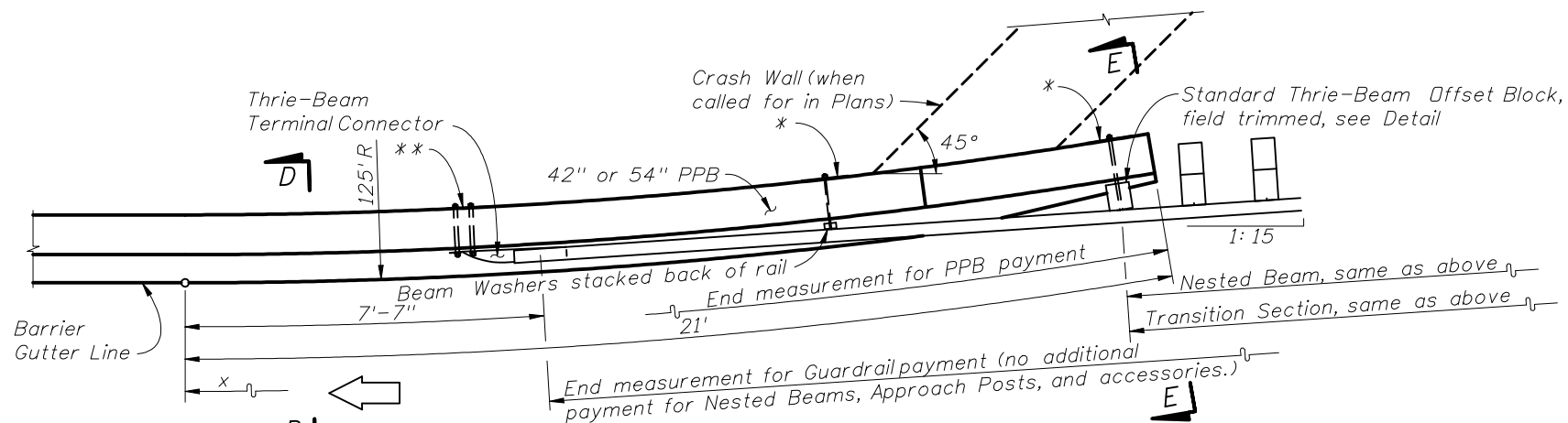
PIER PROTECTION BARRIER

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- * 12"x12"x1/4" galvanized steel back-up plate with 5/8" post bolts (either 17" or 21" long) and nuts with 5/8" plain round washers under nuts.
- ** Attach thrie-beam terminal connector to Pier Protection Barrier with a 21"x12"x5/8" thrie-beam terminal connector plate and 5-7/8"x15" long HS hex bolts and nuts with 7/8" plain round washers under heads and nuts.

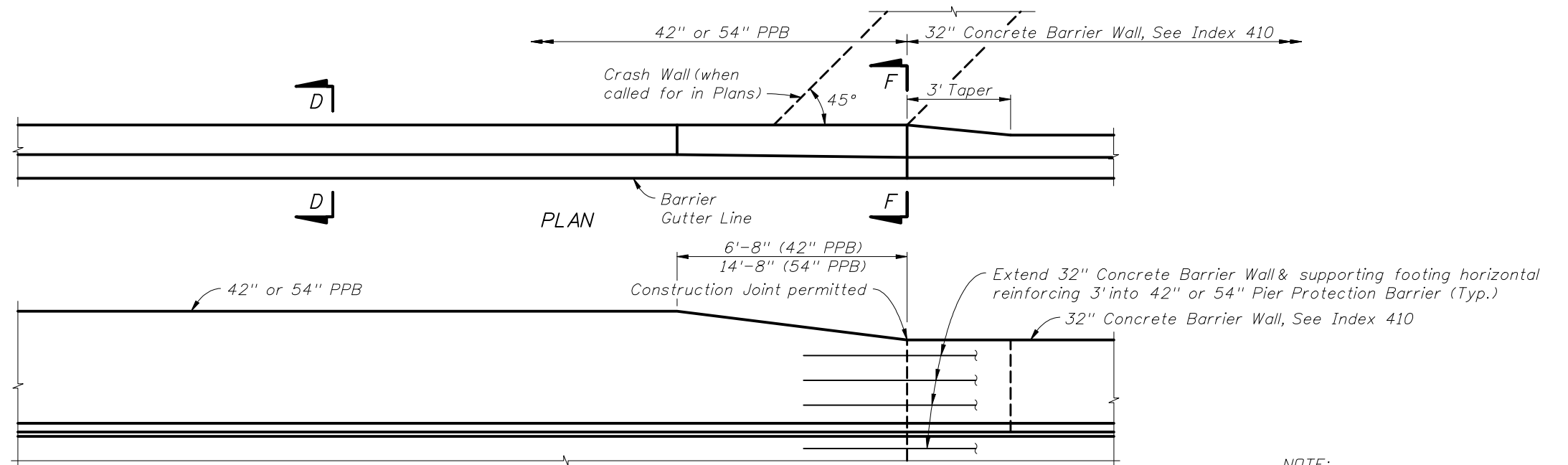


PLAN FOR DESIGN SPEED ≤ 45 MPH



PLAN FOR DESIGN SPEED ≤ 50 MPH

FLARED END TREATMENT - PIER PROTECTION BARRIER WITH GUARDRAIL CONTINUATION



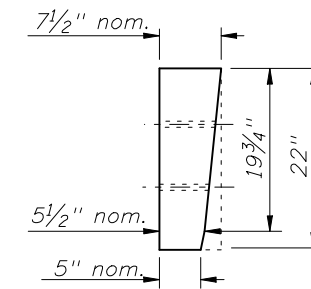
ELEVATION

END TREATMENT - PIER PROTECTION BARRIER WITH CONCRETE BARRIER WALL CONTINUATION

NOTE:
PPB = Pier Protection Barrier.

NOTES

- The Pier Protection Barrier radial segments are intended for use on approach and trailing ends of both one-way and two-way facilities. The guardrail connections shown on this sheet apply to one-way approaches and to the approaching and trailing ends of two-lane two-way facilities. On trailing ends of two-way multilane and one-way facilities the end connection on Index 410, Sheet 2 may be used. For guardrail connections, see Index 410, Sheet 24.
- Refer to Index No. 400 Detail J for additional guardrail information.



FOR USE WITH EITHER 1:10 OR 1:15 GUARDRAIL TRANSITIONS
STANDARD THRIE-BEAM OFFSET BLOCK (FIELD TRIMMED)

ARC LENGTH (Ft.)	DISTANCE "x" (Ft.)	OFFSETS "y" "y" (Ft.)
4	4.00	0.06
8	7.99	0.26
12	11.98	0.58
16	15.96	1.02
20	19.91	1.60
21	20.91	1.76
24	23.85	2.30
25	24.83	2.49

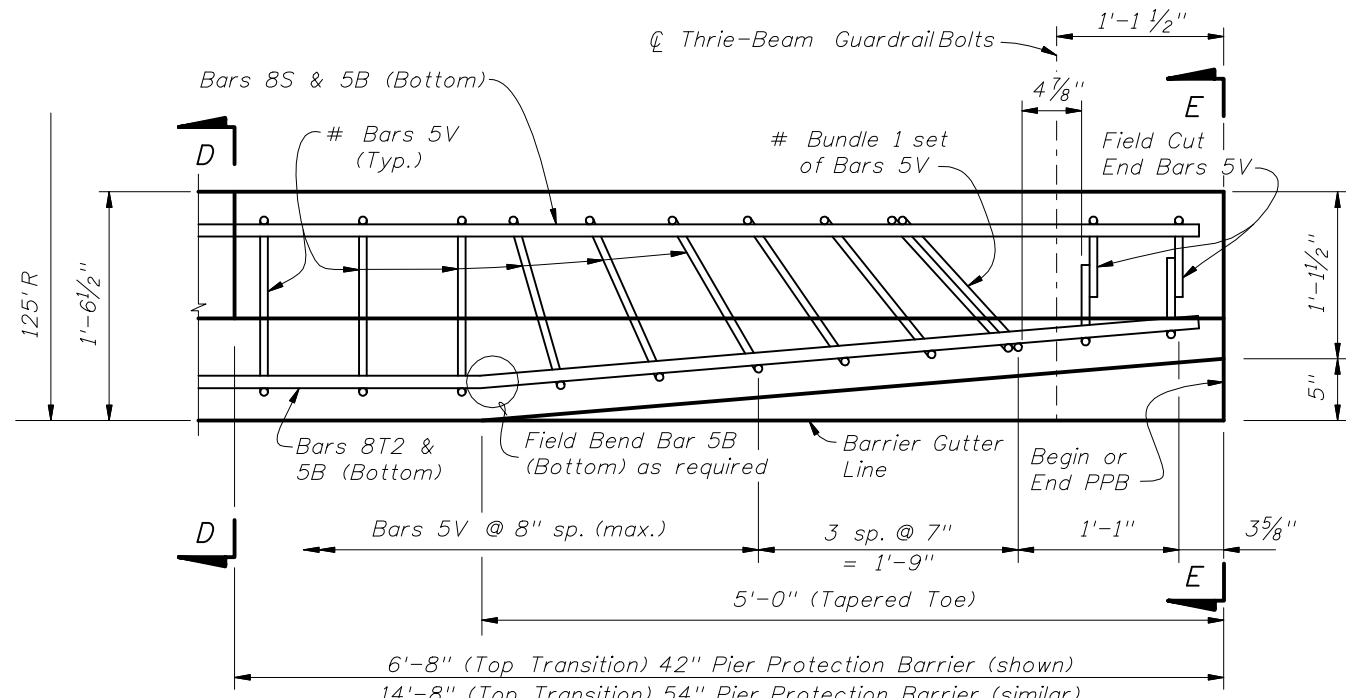
Note:
Barrier may be constructed in chords having lengths ≤ 4 feet.



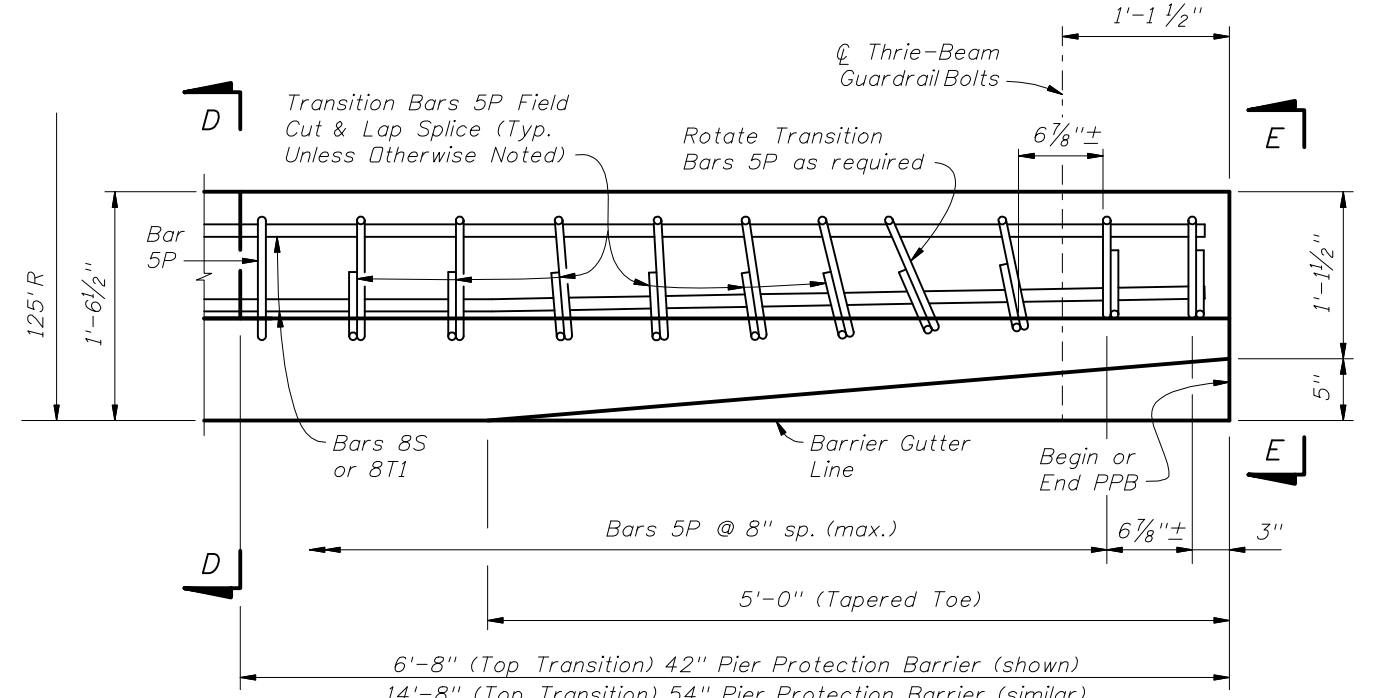
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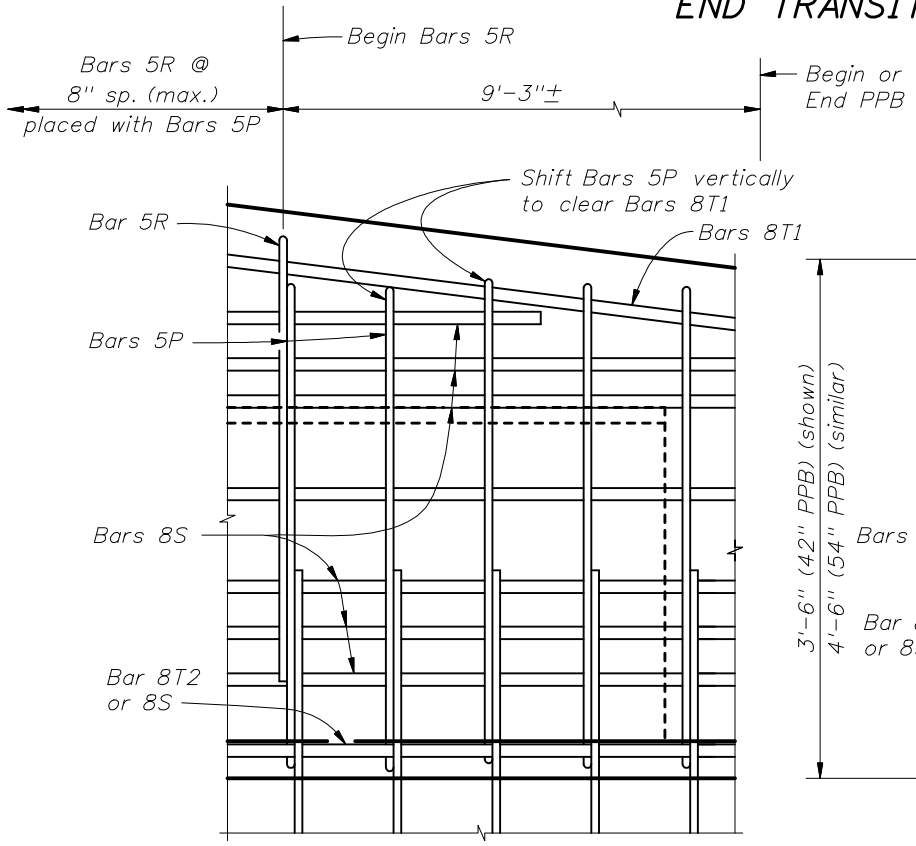


PLAN
(Showing Bars 5V, 8S, 5B & 8T2) # Rotate Bars 5V as shown to maintain clearance.

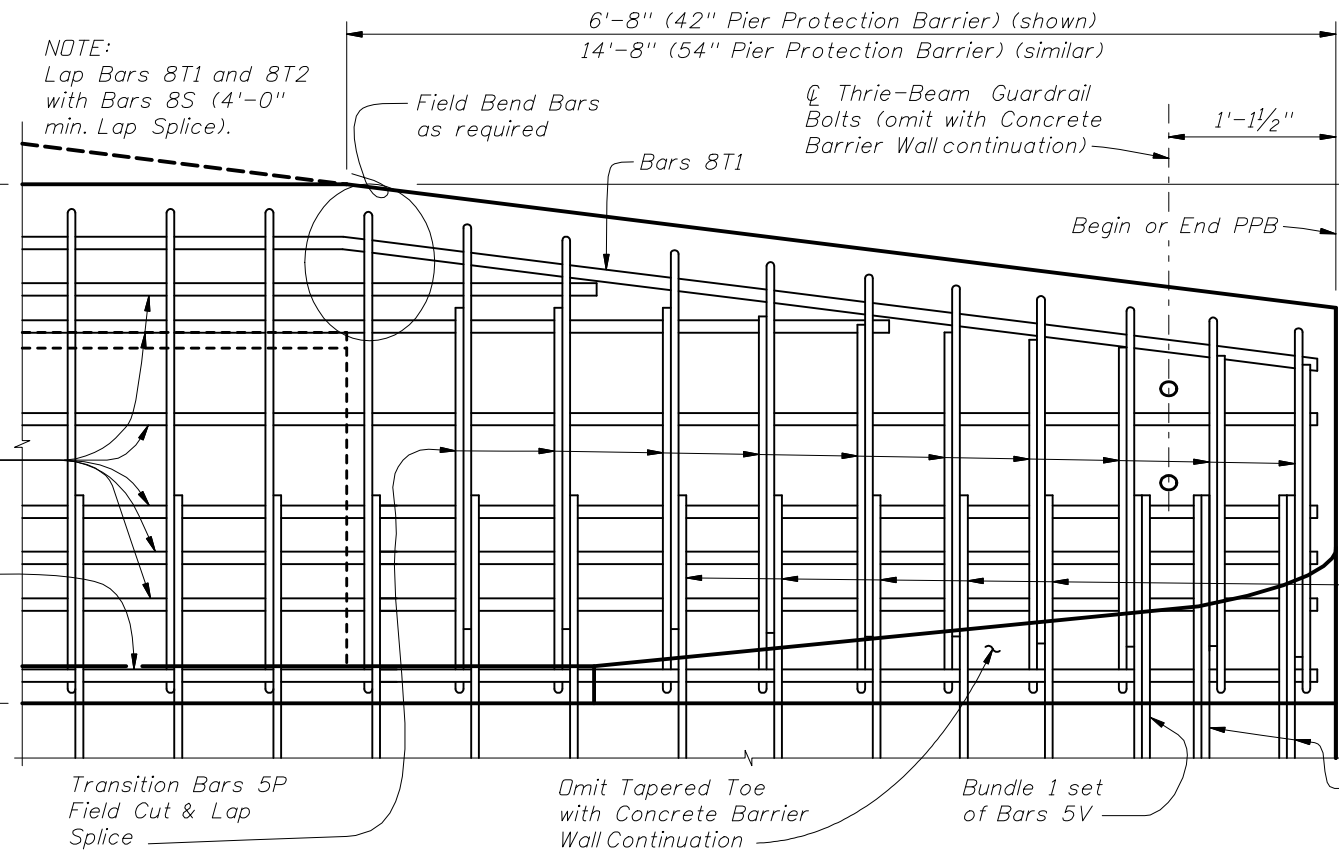


PLAN
(Showing Transition Bars 5P and Bars 8S & 8T1)

END TRANSITION AND TAPERED TOE DETAILS - PIER PROTECTION BARRIER WITH GUARDRAIL CONTINUATION



PARTIAL ELEVATION - 54" PPB DETAIL



ELEVATION - BARRIER END TRANSITION - 42" PPB (shown); 54" PPB (similar)
(Guardrail and back leg of Stirrups not shown for clarity)

NOTE:
Lap Bars 8T1 and 8T2 with Bars 8S (4'-0" min. Lap Splice).
Field Bend Bars as required
Thrie-Beam Guardrail Bolts (omit with Concrete Barrier Wall continuation)
Begin or End PPB

42" PPB (shown)
54" PPB (similar)

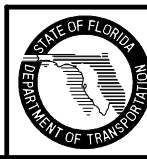
10"
1'-10"
2'-8"
E or F

NOTES:
1. See Sheet 9 for Footing Details.
2. See Sheet 8 for Cross Sections.

ESTIMATED 42" PPB QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.141
Reinforcing Steel (w/out Bars 5V)	LB/LF	33.10

ESTIMATED 54" PPB QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.172
Reinforcing Steel (w/out Bars 5V)	LB/LF	48.74

END TRANSITION DETAILS - PIER PROTECTION BARRIER WITH GUARDRAIL OR CONCRETE BARRIER WALL CONTINUATION



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PIER PROTECTION BARRIER

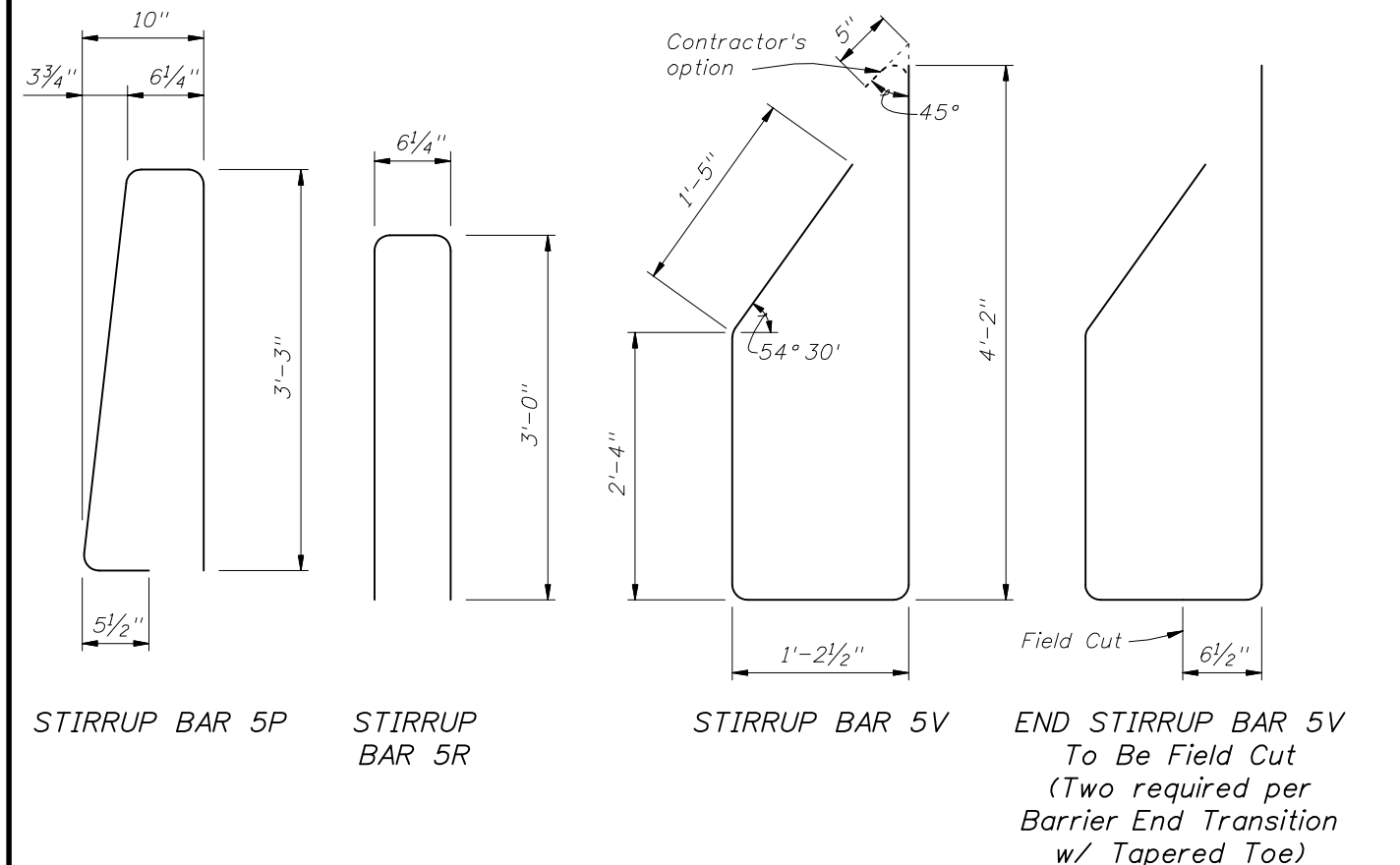
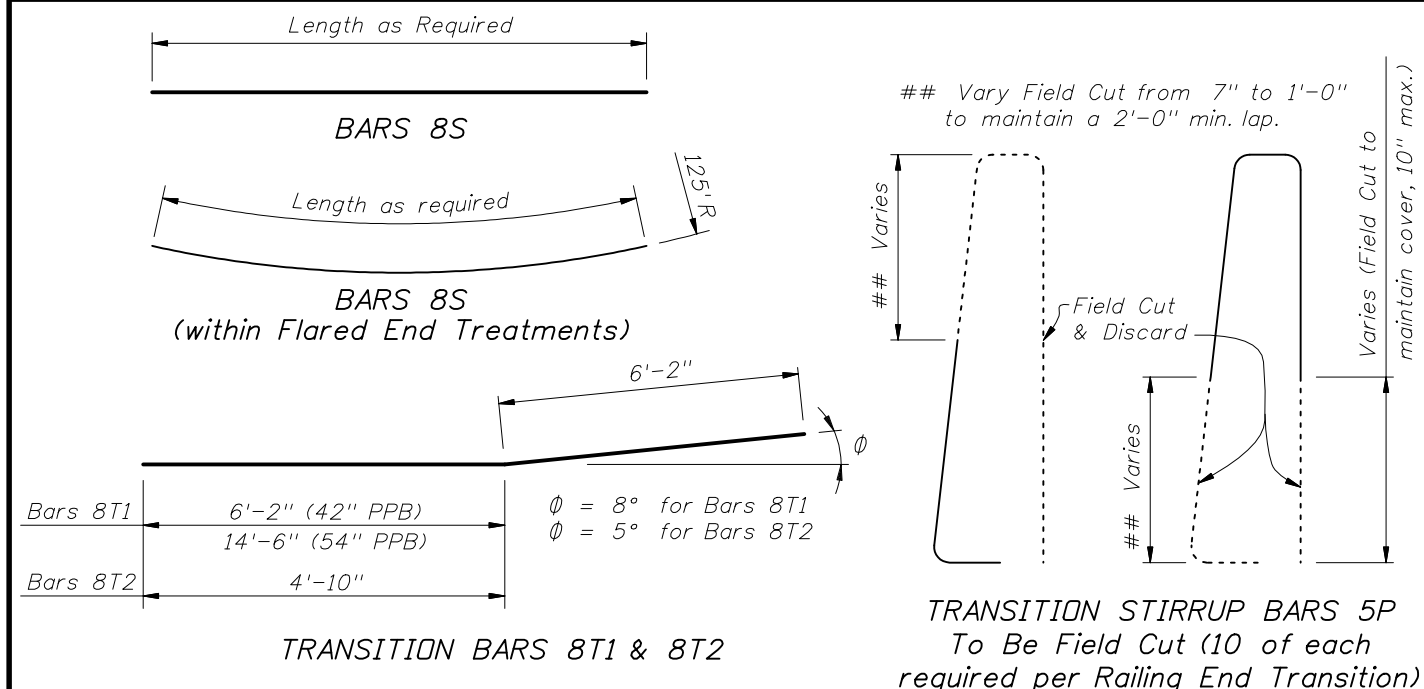
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BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
P	5	7'-6"
R	5	6'-7"
S	8	As Req'd.
42" PPB T1 & T2	8	13'-0"
54" PPB T1 & T2	8	21'-0"
V	5	9'-2"

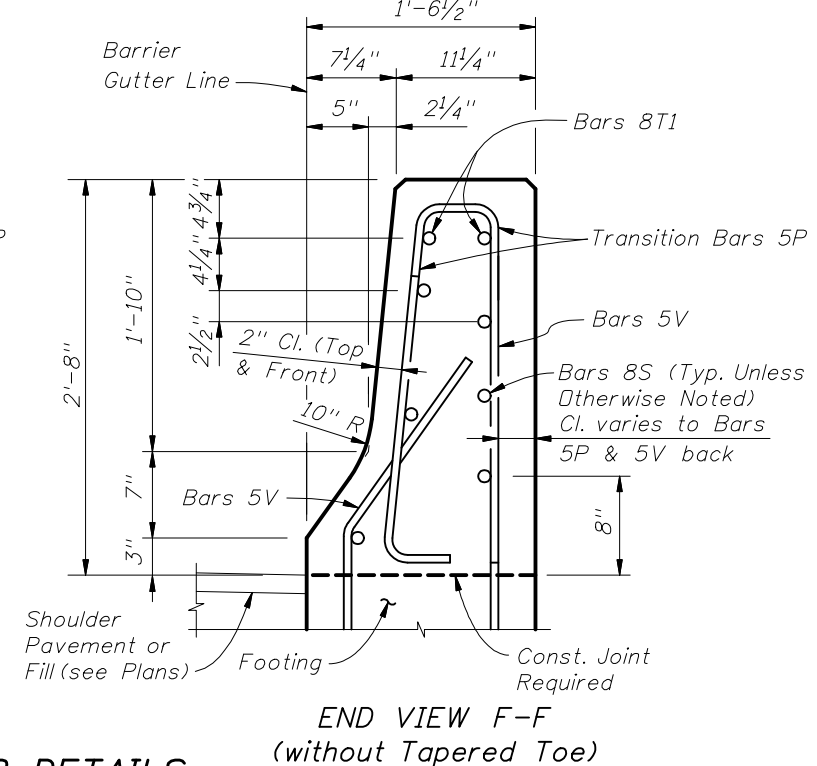
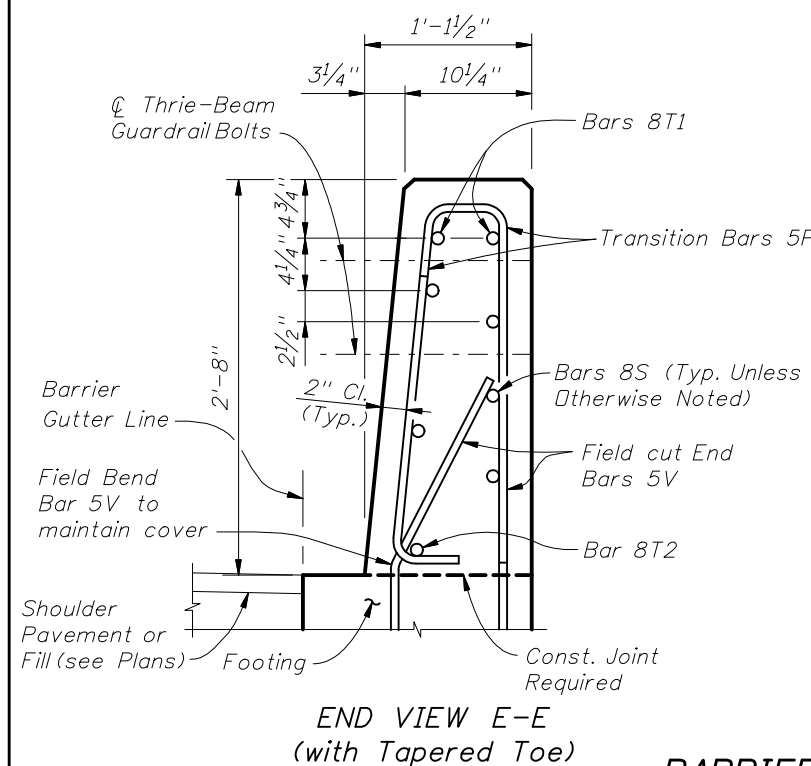
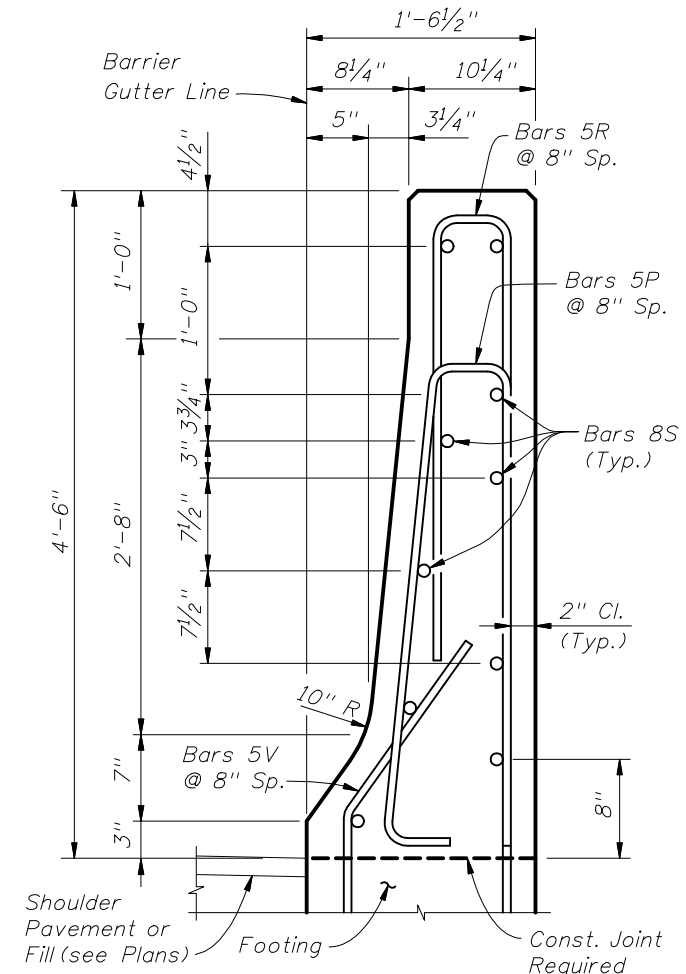
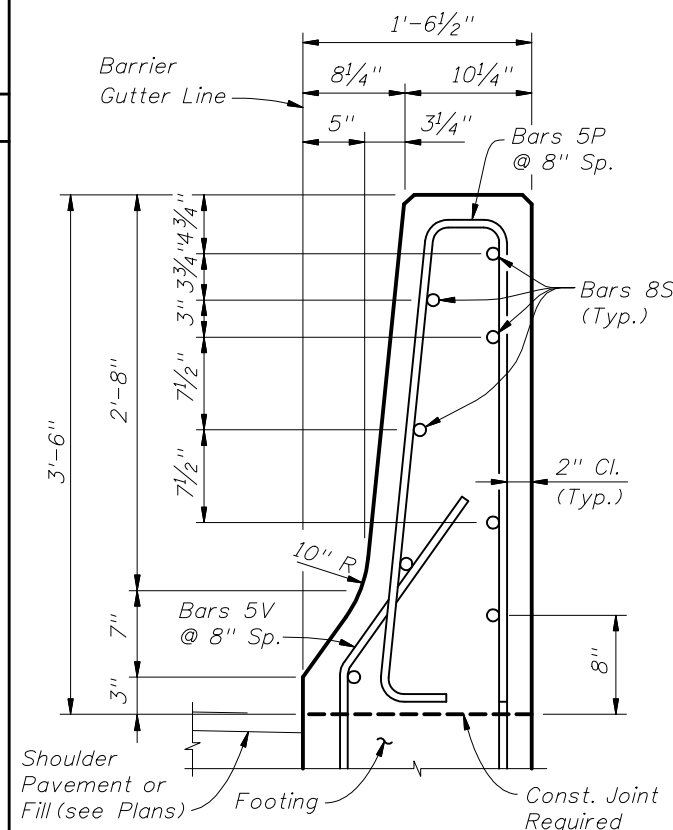
REINFORCING STEEL NOTES:
 1. All bar dimensions in the bending diagrams are out to out.
 2. Bars 8S may be continuous or spliced at the construction joints. Lap splices for Bars 8S shall be a minimum of 4'-0".
 3. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.

NOTE: PPB = Pier Protection Barrier

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS



NOTES:
 1. See Sheet 9 for Footing Details.
 2. See Sheet 7 for bar spacings and details within End Transitions.



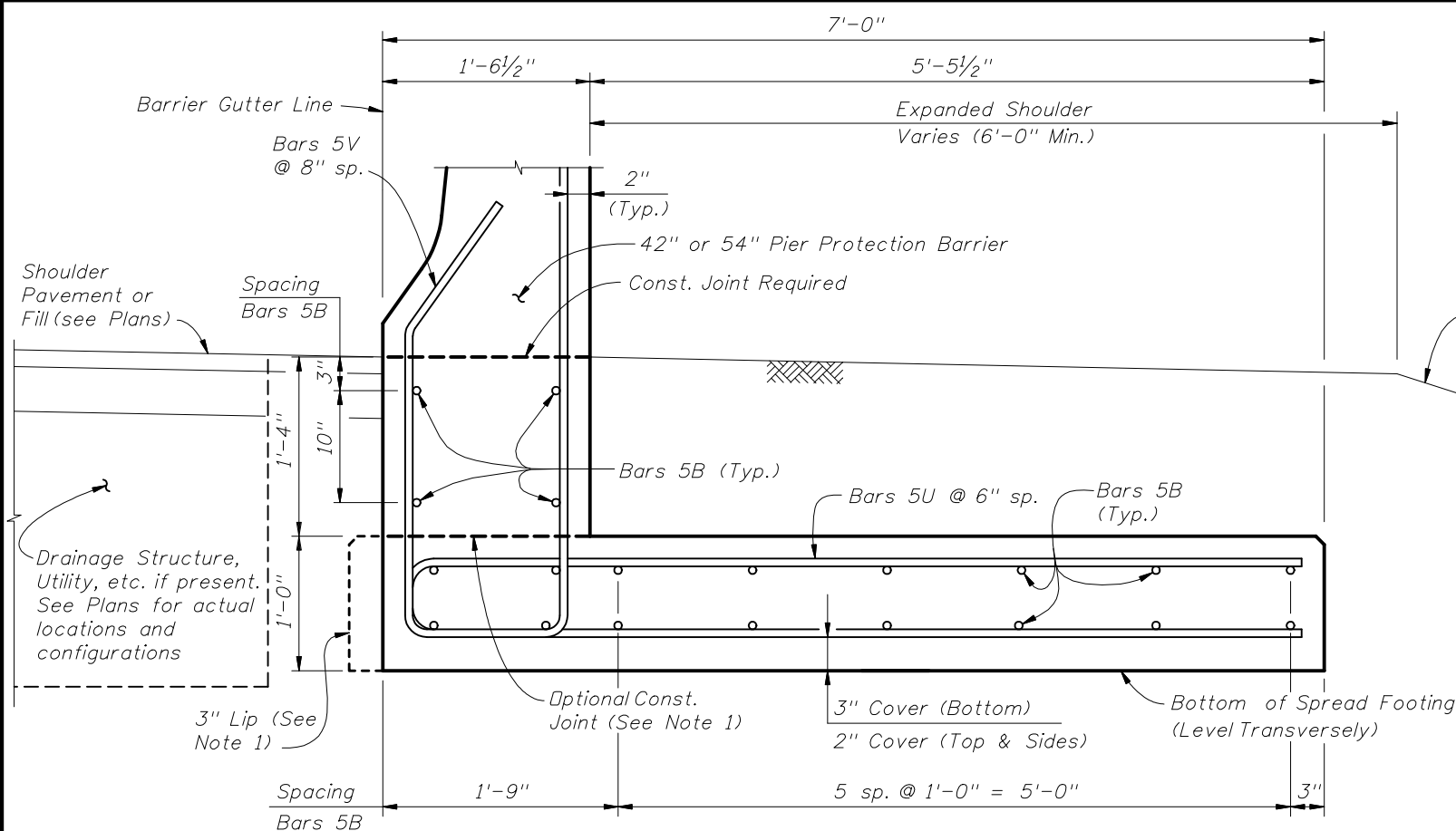
BARRIER DETAILS



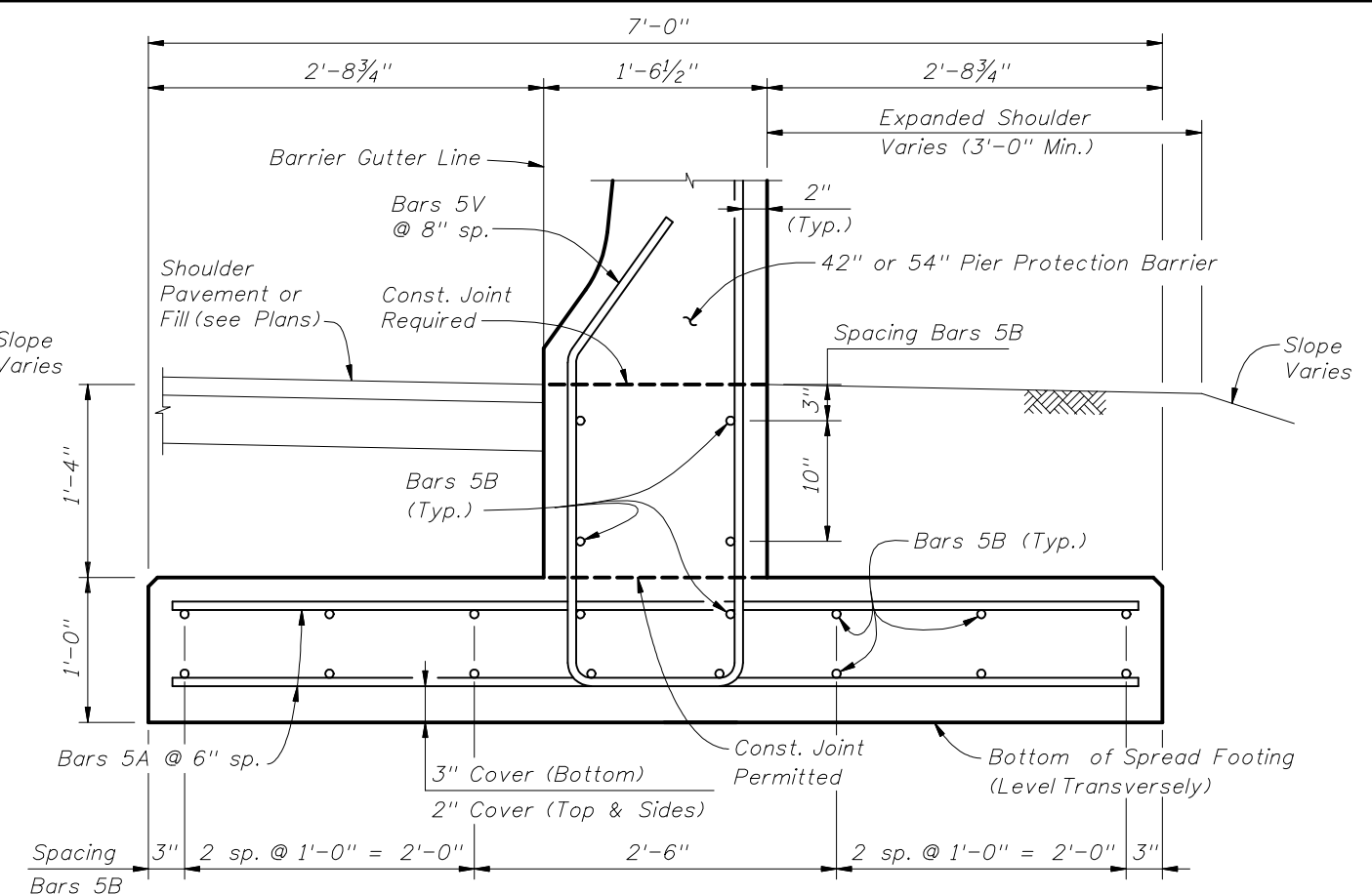
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PIER PROTECTION BARRIER

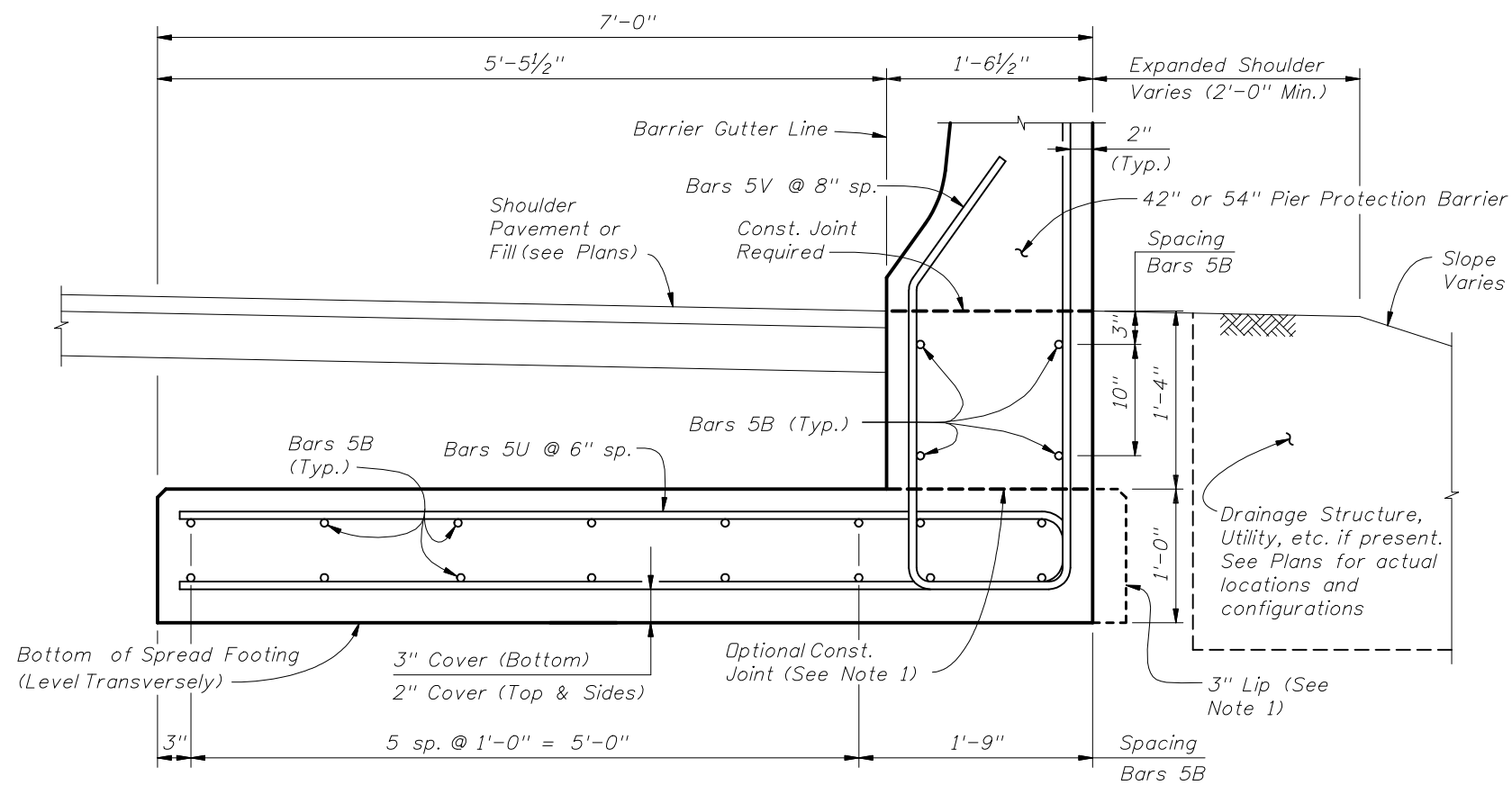
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SECTION A-A TYPICAL SECTION THRU BACK CANTILEVER FOOTING

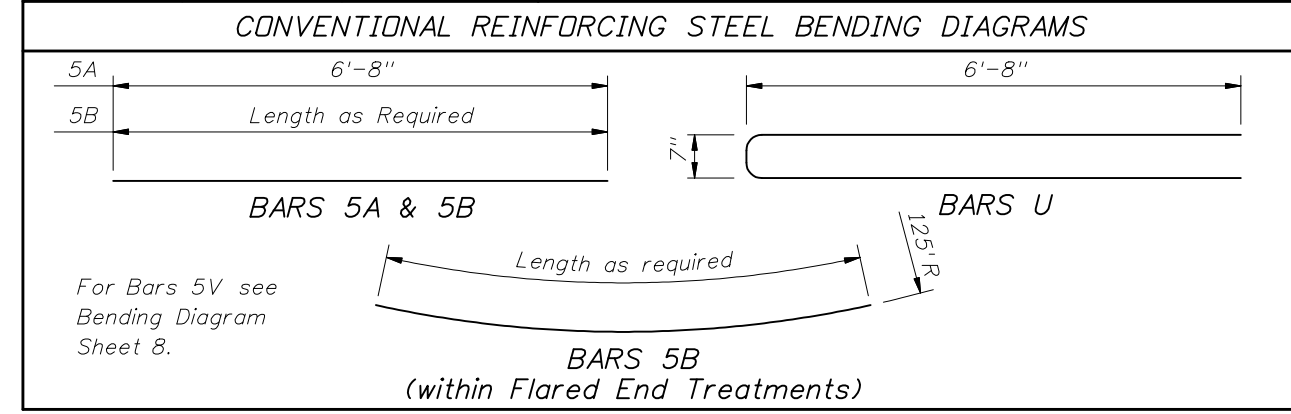


SECTION B-B TYPICAL SECTION THRU T FOOTING



SECTION C-C TYPICAL SECTION THRU FRONT CANTILEVER FOOTING

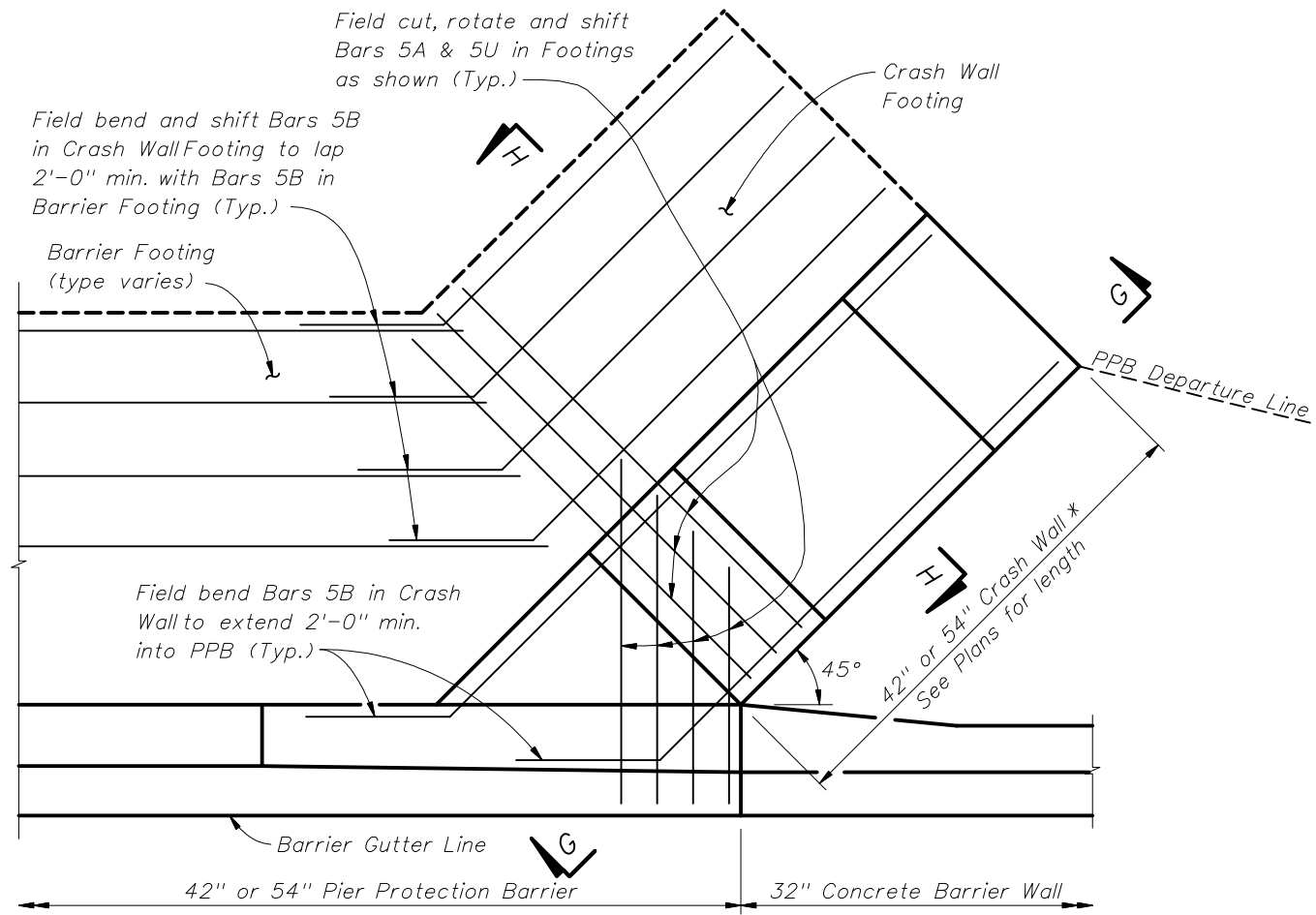
BILL OF REINFORCING STEEL			REINFORCING STEEL NOTES: 1. All bar dimensions in the bending diagrams are out to out. 2. Lap splices for Bars 5B shall be a minimum of 2'-2". 3. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A 497.
MARK	SIZE	LENGTH	
A	5	6'-8"	
B	5	As Reqd.	
U	5	14'-0"	



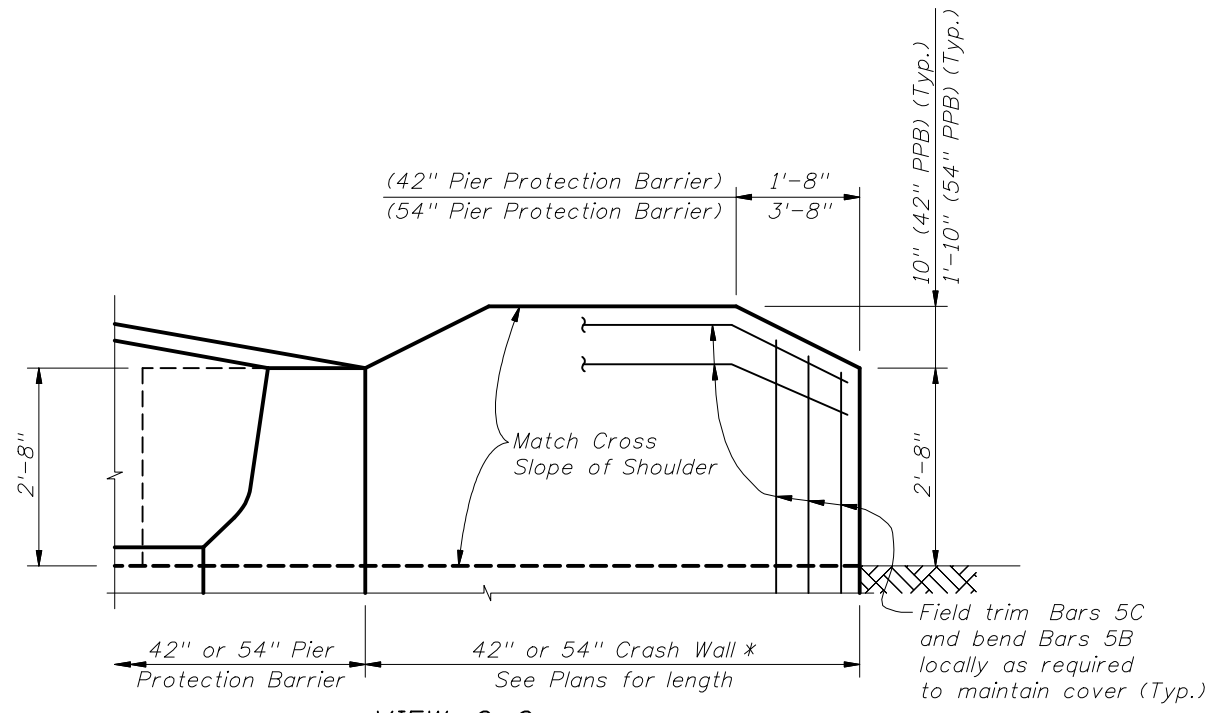
ESTIMATED BARRIER FOOTING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.335
Reinforcing Steel (w/ Bars 5V) Cantilever Footing	LB/LF	64.32
Reinforcing Steel (w/ Bars 5V) T Footing	LB/LF	63.01

- NOTES:
1. Provide 3" lip when optional construction joint is used. Omit 3" lip adjacent to Barrier Wall Inlets and as required to provide 2" min. clear between Cantilever Footing and adjacent Pier Footing or Column.
2. See Sheets 7 & 8 for Barrier Details.

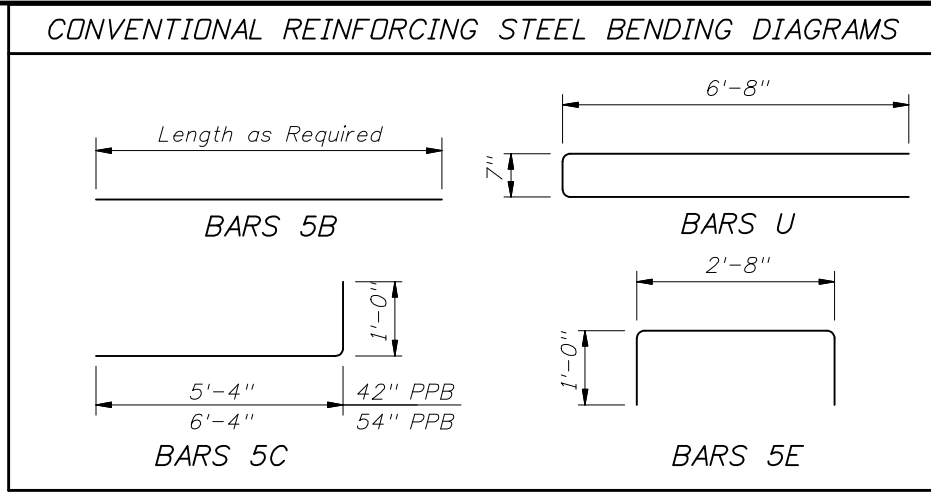
BARRIER FOOTING DETAILS



PLAN VIEW
(Concrete Barrier Wall Continuation shown, Guardrail Continuation similar)



VIEW G-G
* Match height of adjacent Pier Protection Barrier



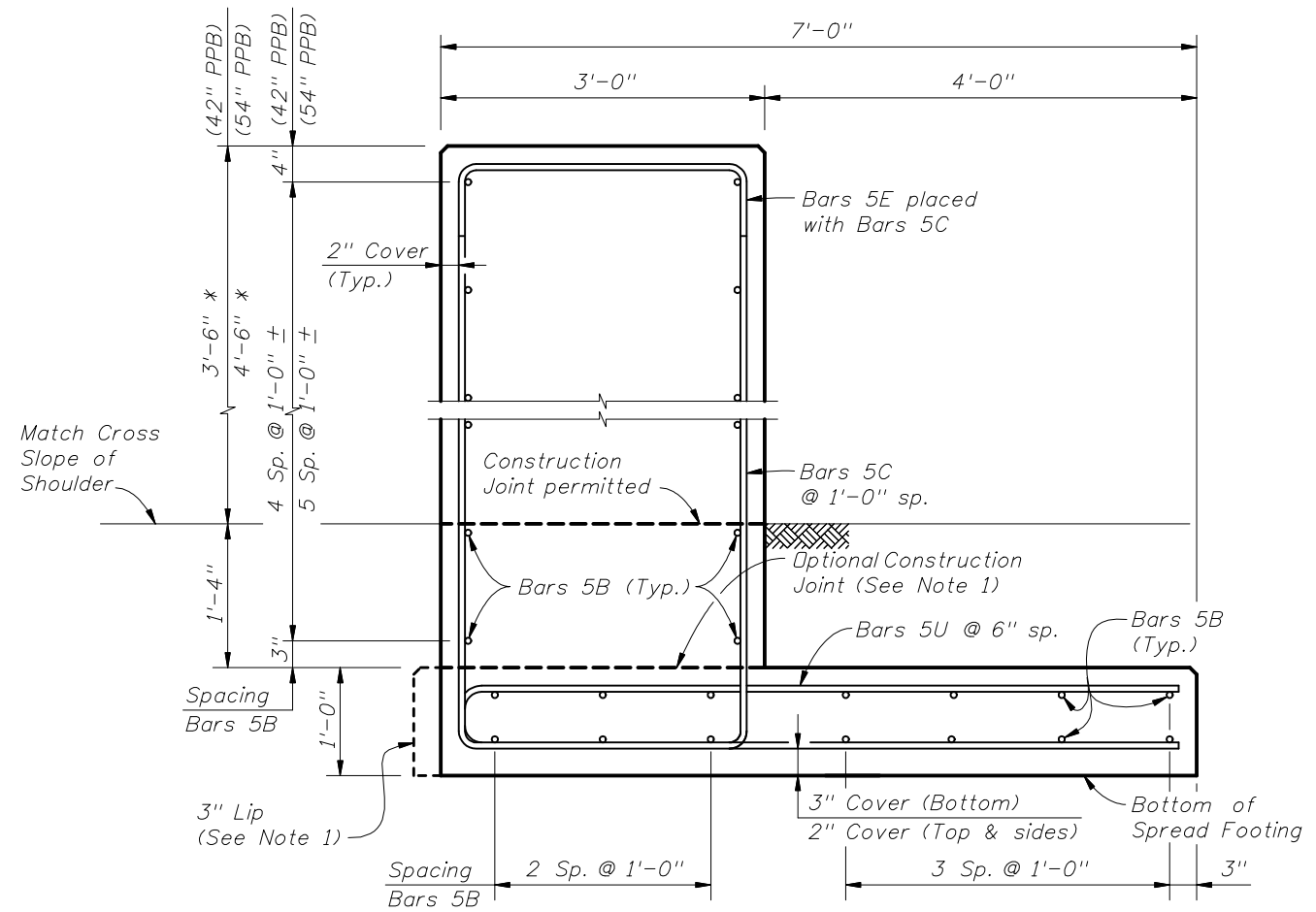
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
B	5	As Reqd.
C	5	6'-4" / 7'-4"
E	5	4'-8"
U	5	11'-0"

REINFORCING STEEL NOTES:
 1. All bar dimensions in the bending diagrams are out to out.
 2. Lap splices for Bars 5B shall be a minimum of 2'-2".
 3. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A 497.

ESTIMATED CRASH WALL & FOOTING QUANTITIES

ITEM	UNIT	QUANTITY
Concrete (Footing)	CY/LF	0.260
Concrete (42" Crash Wall)	CY/LF	0.389
Concrete (54" Crash Wall)	CY/LF	0.500
Reinforcing Steel (42" Crash Wall)	LB/LF	66.06
Reinforcing Steel (54" Crash Wall)	LB/LF	70.23

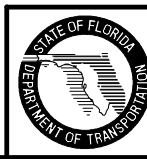
NOTES:
 1. Provide 3" lip when optional construction joint is used.
 2. See Sheet 8 for Barrier Details and Sheet 9 for Barrier Footing details.



SECTION H-H

CRASH WALL & FOOTING DETAILS

NOTE:
PPB = Pier Protection Barrier

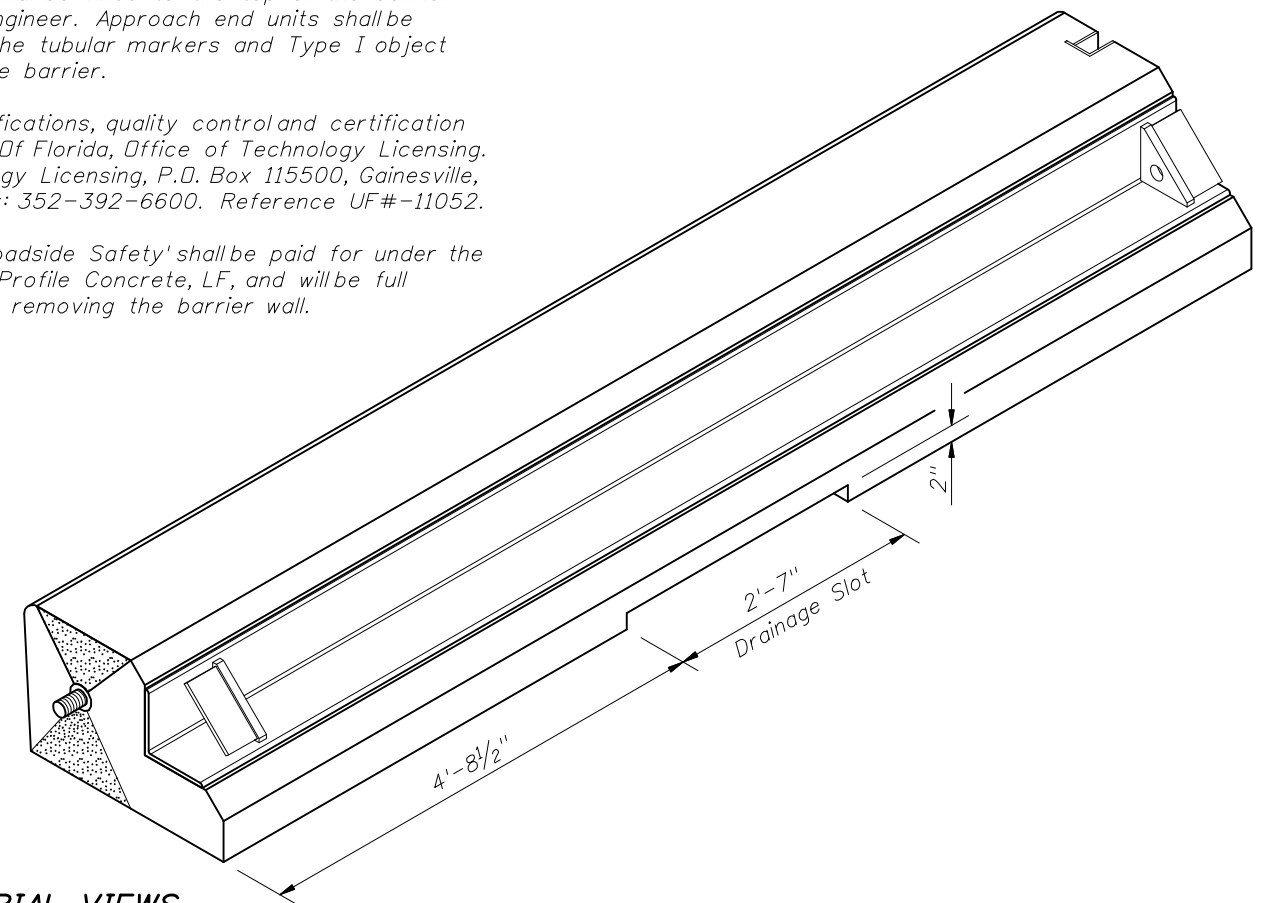
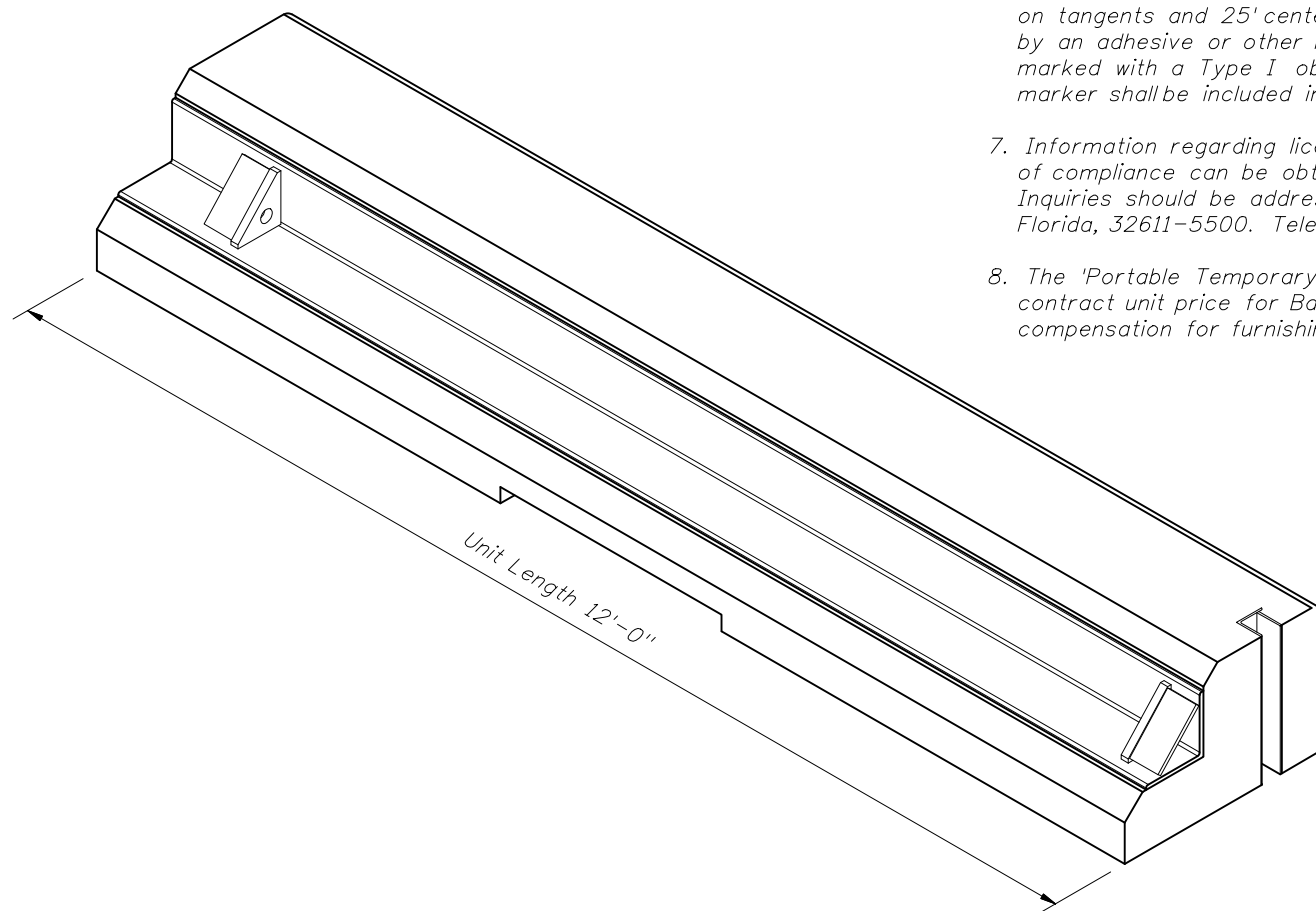


GENERAL NOTES

1. The 'Portable Temporary Low Profile Barrier For Roadside Safety' is a licensed design by the University Of Florida. Any infringement on the rights of the designer shall be the sole responsibility of the user.
2. This standard drawing (Index No. 412) is provided by the Florida Department Of Transportation solely for use by the Department and its assignees. The purpose for this standard drawing is to indicate the approval of use of the barrier on the State Highway System; to provide sufficient pictorials for identifying the barrier unit; and, to provide general installation geometry for the barrier.
3. Only those barrier units cast by producers licensed by the University Of Florida will be allowed for installation on the State Highway System in Florida.

Barrier wall units shall conform to Section 521 of the Standard Specification and shall be produced in Department approved plants with quality control plans for precasting concrete barrier walls. Each barrier wall unit shall be permanently marked with an identification that is traceable to the manufacturer, the producing precast concrete plant and the date of production. This permanent identification mark will serve as certification that the unit has been manufactured in accordance with University of Florida drawings and specifications, and the approved quality control program.

4. The low profile barrier is to be installed only with hardware and accessories furnished by the licensed barrier producer. Units shall be used for no purpose other than as interconnected segments in a run of barrier.
Low profile barrier wall units shall be installed so as to be in firm contact with adjoining units. Nuts on tensioning rods shall be installed snug tight.
5. The low profile barrier is applicable for design speeds of 45 mph or less.
6. Tubular markers shall be installed along the run of barrier at the ends and at 50' centers on tangents and 25' centers on radii. The markers shall be fixed to the top of the barrier by an adhesive or other method approved by the engineer. Approach end units shall be marked with a Type I object marker. The cost of the tubular markers and Type I object marker shall be included in the cost of the low profile barrier.
7. Information regarding licensing, shop drawings, specifications, quality control and certification of compliance can be obtained from the University Of Florida, Office of Technology Licensing. Inquiries should be addressed to: Office of Technology Licensing, P.O. Box 115500, Gainesville, Florida, 32611-5500. Telephone: 352-392-8929, Fax: 352-392-6600. Reference UF#-11052.
8. The 'Portable Temporary Low Profile Barrier For Roadside Safety' shall be paid for under the contract unit price for Barrier Wall (Temporary) Low Profile Concrete, LF, and will be full compensation for furnishing, installing, maintaining and removing the barrier wall.



BACKSIDE AND END PICTORIAL VIEWS
PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY



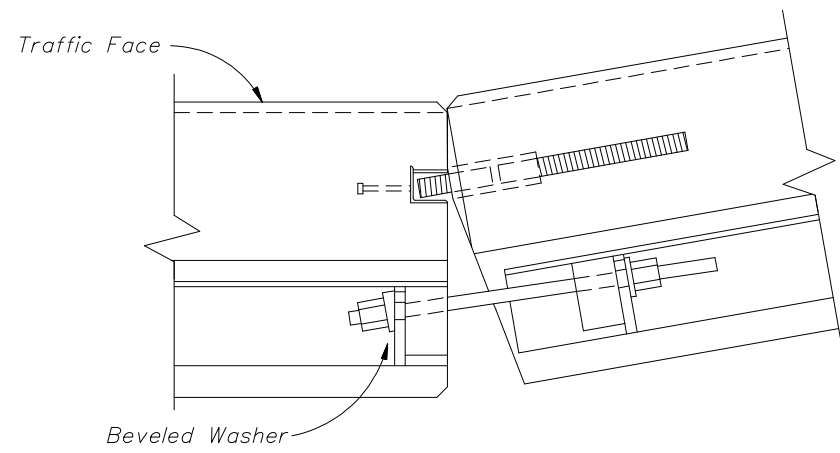
2010 FDOT Design Standards

LOW PROFILE BARRIER

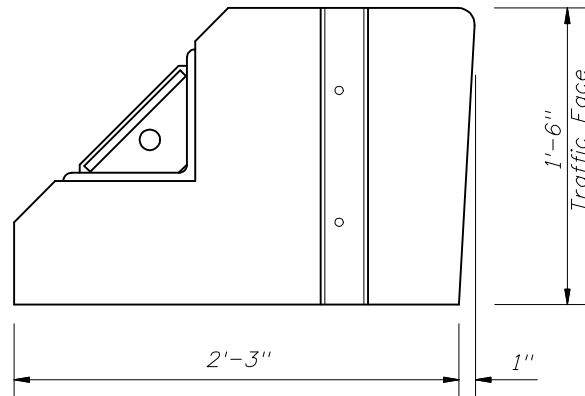
Last Revision
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1 of 5

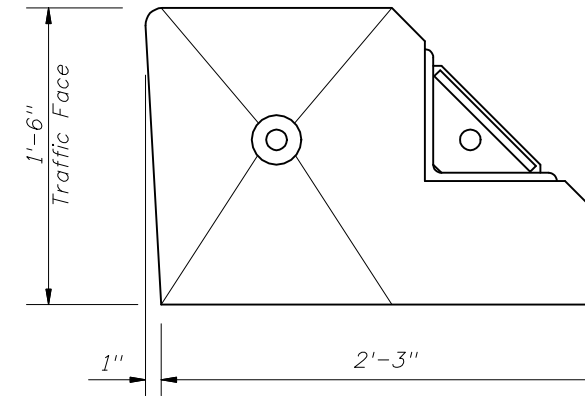
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CONCAVE CONNECTION

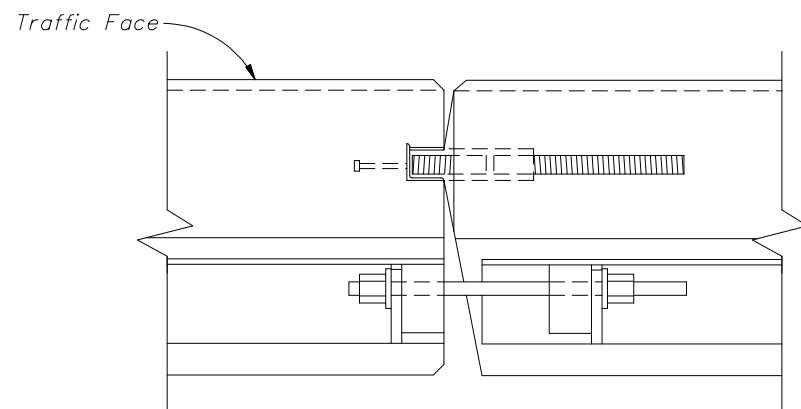


FLAT FACE FEMALE END

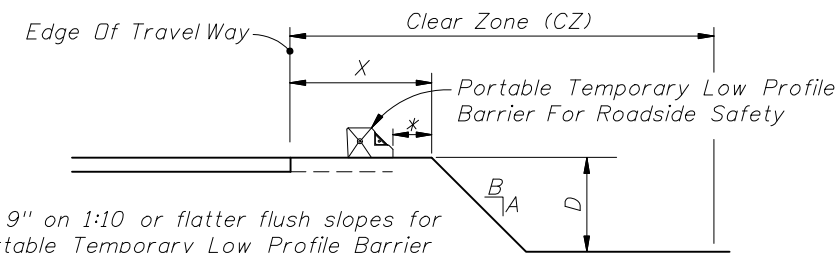


BEVELED FACE MALE END

END VIEWS

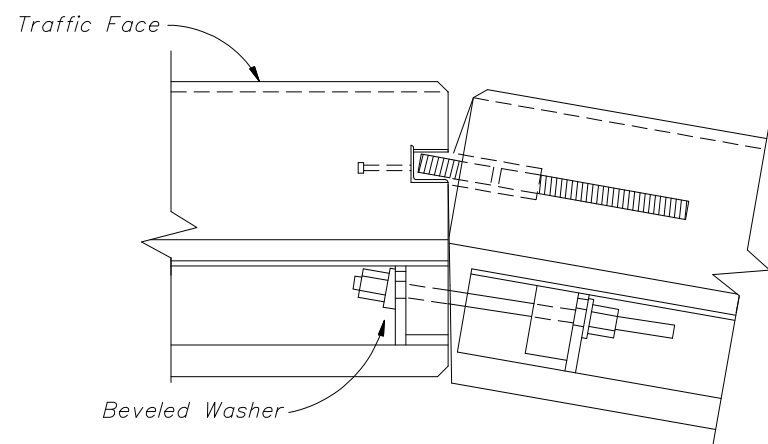


PARALLEL CONNECTION

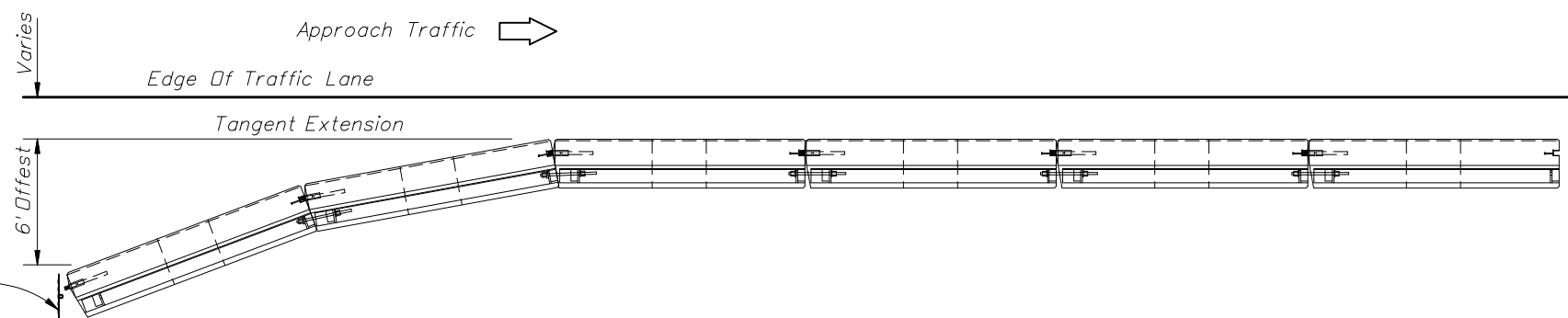


* Min. 9" on 1:10 or flatter flush slopes for 'Portable Temporary Low Profile Barrier For Roadside Safety' on roadways. For values X, (A:B) and D see Index No. 600.

DEFLECTION SPACE AT DROPOFFS



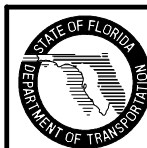
CONVEX CONNECTION



PLAN VIEW OF APPROACH END OFFSET

PLAN VIEWS OF CONNECTIONS

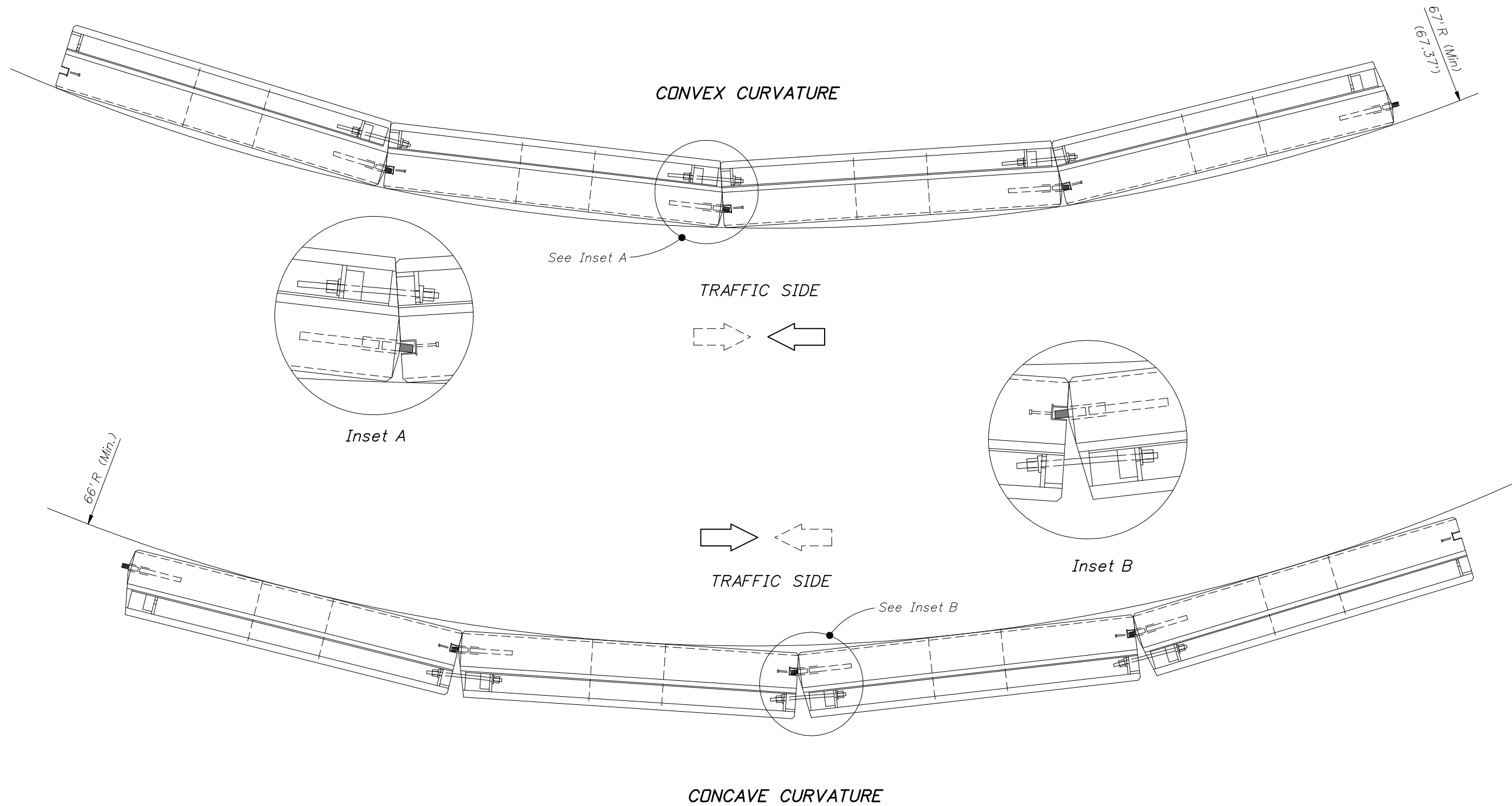
PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY



2010 FDOT Design Standards

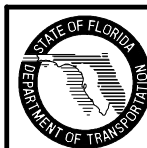
LOW PROFILE BARRIER

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MAXIMUM CURVATURE ● MINIMUM RADIUS

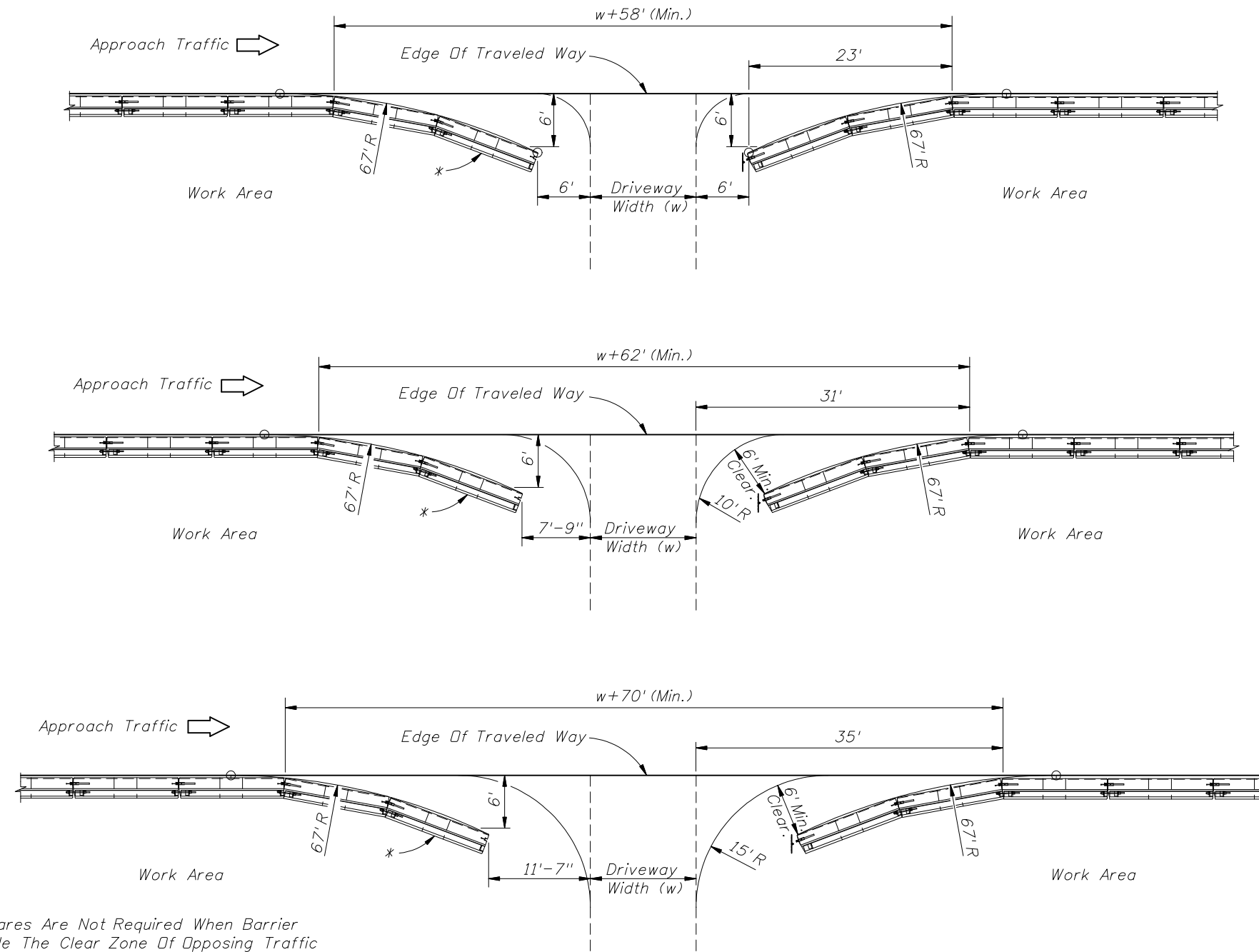
PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY



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LOW PROFILE BARRIER

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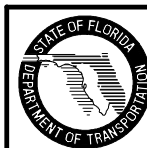
* Trailing End Flares Are Not Required When Barrier Located Outside The Clear Zone Of Opposing Traffic
 Type I Object Marker To Be Installed When Trailing End Flare Falls Within The Clear Zone Of Opposing Traffic

LEGEND

| Type I Object Marker

BARRIER OPENINGS AT DRIVEWAYS

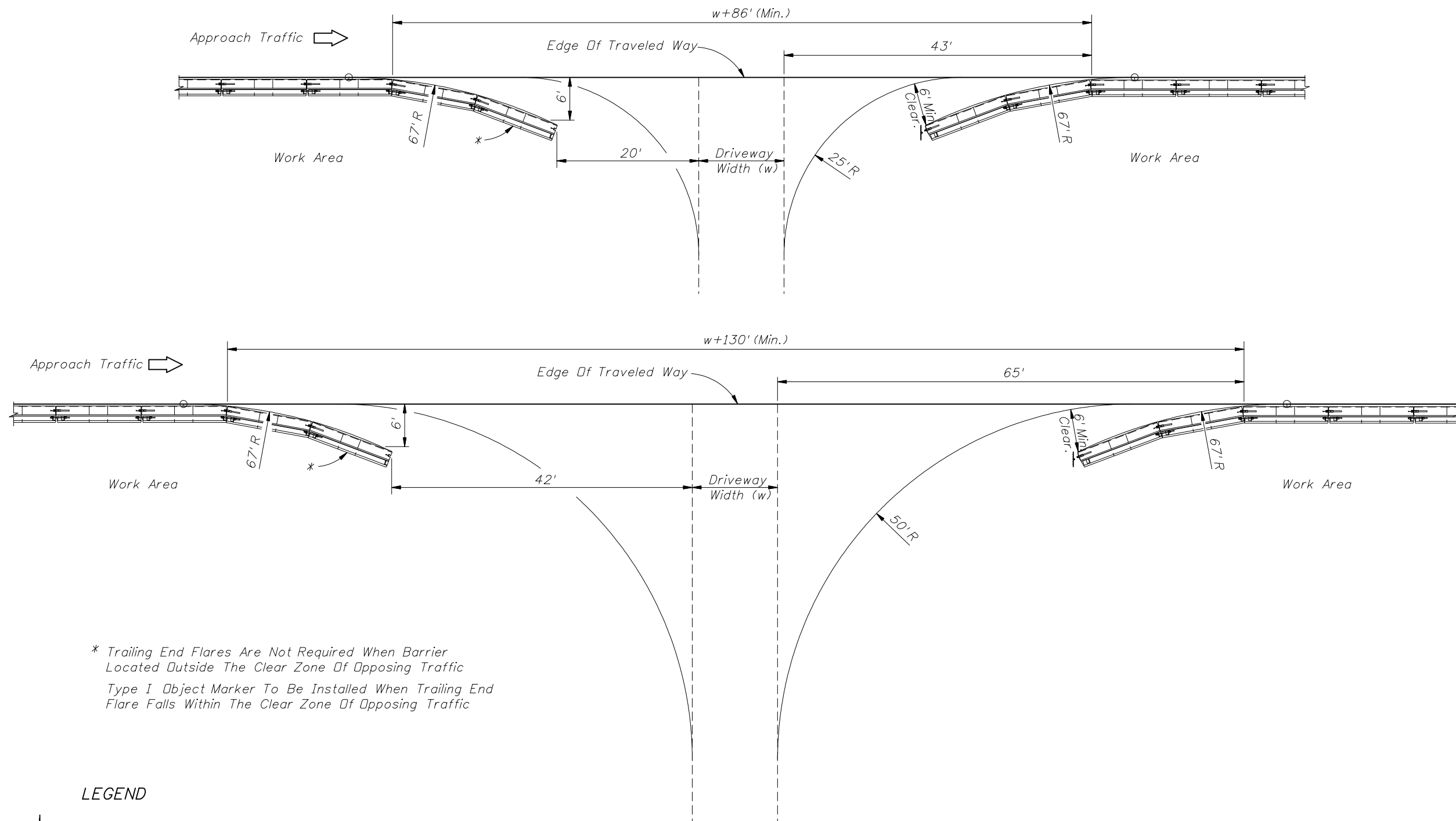
PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY



2010 FDOT Design Standards

LOW PROFILE BARRIER

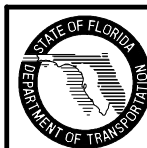
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* Trailing End Flares Are Not Required When Barrier Located Outside The Clear Zone Of Opposing Traffic
 Type I Object Marker To Be Installed When Trailing End Flare Falls Within The Clear Zone Of Opposing Traffic

LEGEND
 | Type I Object Marker

BARRIER OPENINGS AT DRIVEWAYS
 PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY



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LOW PROFILE BARRIER

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The Type K Temporary Concrete Barrier System has been crash tested to NCHRP Report 350 TL-3 criteria or structurally evaluated to meet the requirements of NCHRP Report 350 TL-3 criteria for the installation configurations as shown utilizing the types, sizes, lengths, shapes, strengths and grades of the fabrication and installation materials as shown.

In order to maintain crashworthiness of the system, do not substitute different grades, sizes, shapes or types of reinforcing steel for those shown for constructing Type K Barrier Units. Also, do not substitute different type, size, length or material grade anchor bolts, nuts, washers, adhesives, connector pins, stakes, keeper pins, or guardrail components for installing Type K Barrier Units.

FABRICATION NOTES:

FABRICATOR PREQUALIFICATION: The Barrier Units shall be made in a prestressed concrete plant that meets the requirements of Specification Section 450 or in a precast plant meeting the requirements of Specification Section 6-8.

CONCRETE: Concrete shall be Class IV in accordance with Specification Section 346. Specification Sections 346-10.2 through 346-10.4 are not applicable. Barrier Units represented by concrete acceptance strength tests which fall below 5000 psi will be rejected.

REINFORCING STEEL: All reinforcing steel shall be ASTM A 615, Grade 60 except for Bars 6D1, 6D2 and 6D3. Bars 6D1, 6D2 and 6D3 shall be ASTM A 706 except that a 2 $\frac{3}{4}$ " diameter pin must be used for the 180 degree bend test. After fabrication, all or part of Bars 6D shall be hot dip galvanized in accordance with Specification Section 962 or coated with a cold galvanizing compound in accordance with Specification Section 975. The minimum limit of galvanizing or coating is shown in the Bending Diagrams. At the Fabricator's option, the entire length of Bars 6D may be galvanized or coated. Install Bars 6D within $\frac{1}{8}$ " of the plan dimensions. Correct placement of Bars 6D is critical for proper fit up and performance of individual Barrier Units.

At the option of the Fabricator, Deformed Welded Wire Fabric in accordance with ASTM A 497 and the details shown on Sheet 2 may be utilized in lieu of Bars 4A and 5B.

All dimensions in the Bending Diagrams are out to out. All reinforcing steel shall have a 2" minimum cover except as noted.

LIFTING SLEEVE ASSEMBLY: Inclusion of the Lifting Sleeve Assemblies is optional. Steel for Pipe Sleeve shall be in accordance with ASTM A 53. Hot-dip galvanize the Lifting Sleeve Assemblies after their fabrication in accordance with the Specifications.

SURFACE FINISH: Construct Barrier Units in accordance with Specification Sections 400 and 521. Finish the top and sides of the Barrier Units with a General Surface Finish. Finish the bottom of the Barrier Units to a dense uniform surface by floating in lieu of the General Surface Finish. Use stationary metal forms or stationary timber forms with a form liner.

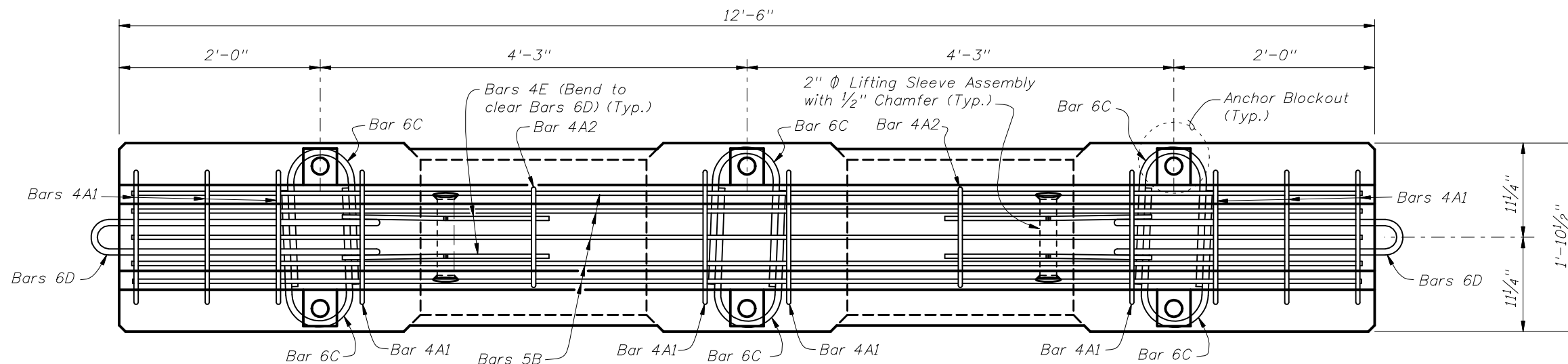
MARKING: Permanently mark the top left end of each Barrier Unit by the use of an embedded and anchored metallic plate with letters and figures a minimum of 0.5" tall. Ink stamps are not allowed. Permanently mark with the following information:

- Type K1
- Fabricator's name or symbol
- Date of manufacture (day, month and year)

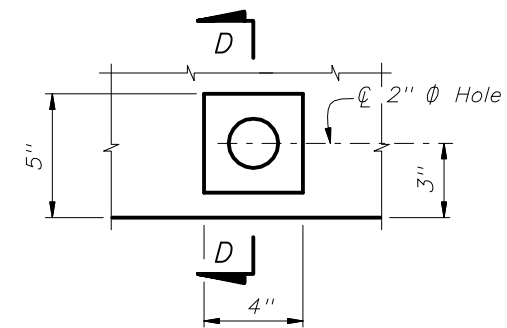
HANDLING: At no time shall the Barrier Units be lifted or moved by use of Bars 6D that extend from the ends of the units. Approximate weight of one unit equals 2.7 tons.

ALTERNATE DESIGN: Manufacturers seeking approval of proprietary concrete or steel barrier systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the barrier system is crash tested to NCHRP Report 350 Test Level 3 criteria, is accepted by FHWA for use as a temporary concrete or steel barrier in the configurations shown herein, is a minimum of 2'-8" tall, has transitions and connections comparable to the standard design and has permanent deflections due to TL-3 crash test impacts not to exceed 3'-9" in freestanding configuration, 3.5" in bolted down configuration and 1'-0" in staked down configuration.

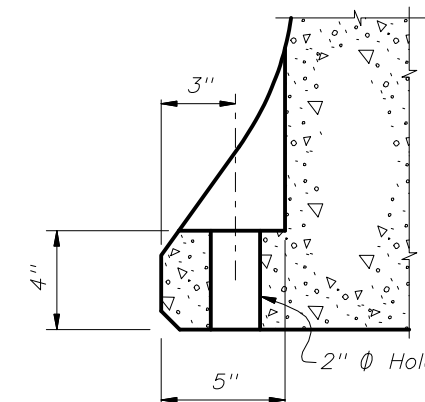




PLAN VIEW

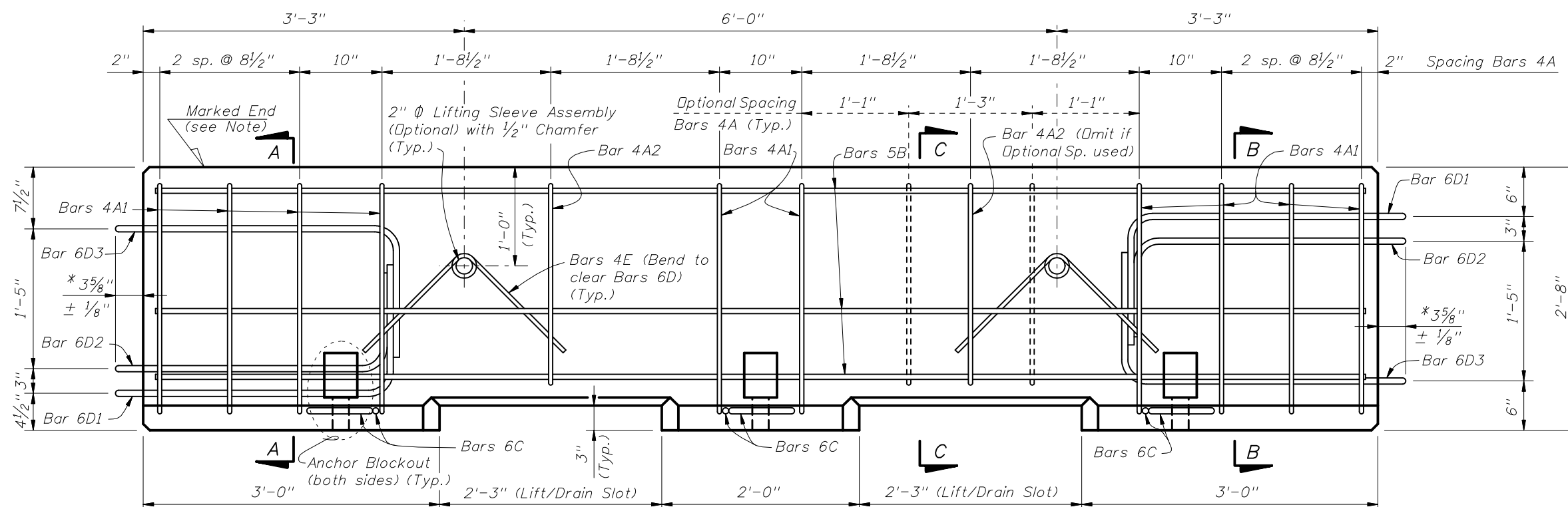


ANCHOR BLOCKOUT DETAIL

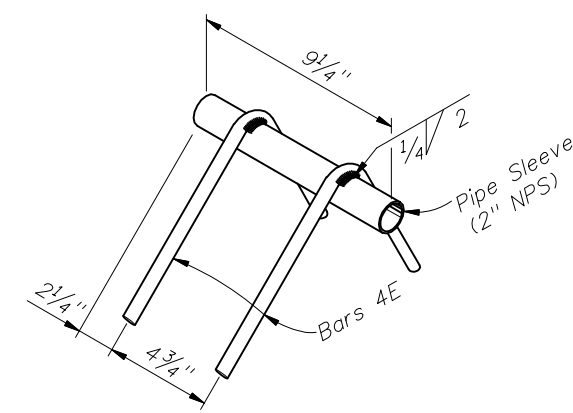


SECTION D-D
(Reinforcement not shown for clarity)

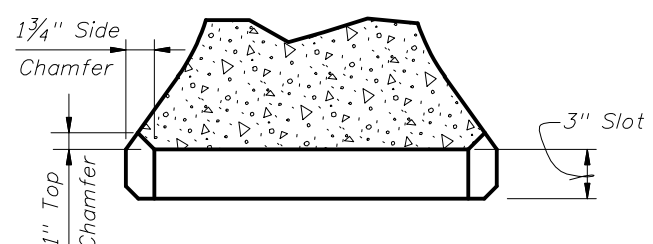
* Measured from end of Barrier Unit to outside edge of Bars 6D.



ELEVATION VIEW



LIFTING SLEEVE ASSEMBLY DETAIL (OPTIONAL)

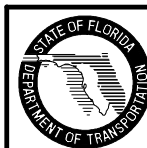


SECTION THRU LIFT/DRAIN SLOT

ESTIMATED TEMPORARY CONCRETE BARRIER QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY	1.29
Reinforcing Steel	LB	218

The above quantities are for one Barrier Unit.

Cross References:
For Section A-A, Section B-B and Section C-C see Sheet 3.

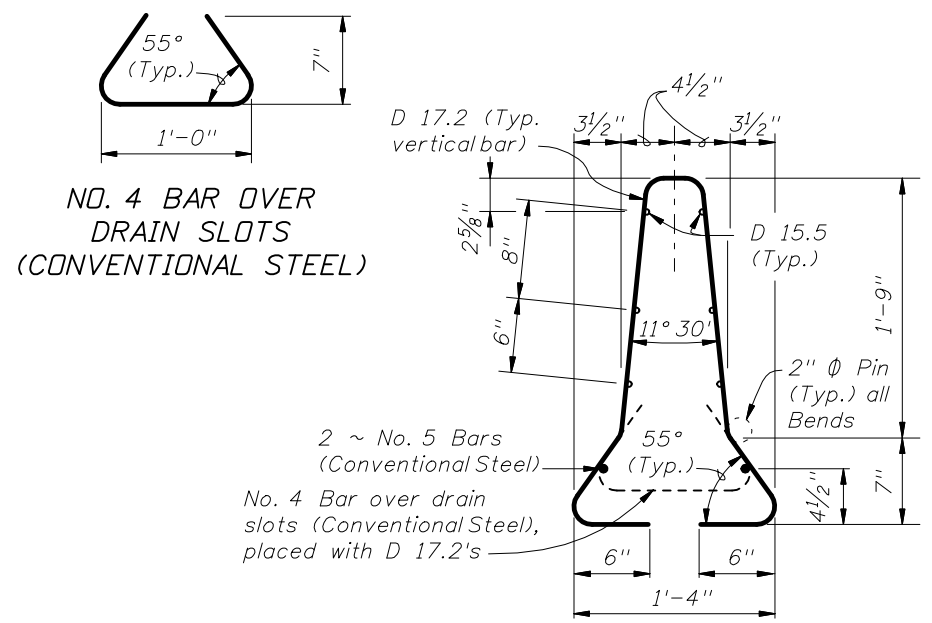


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TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

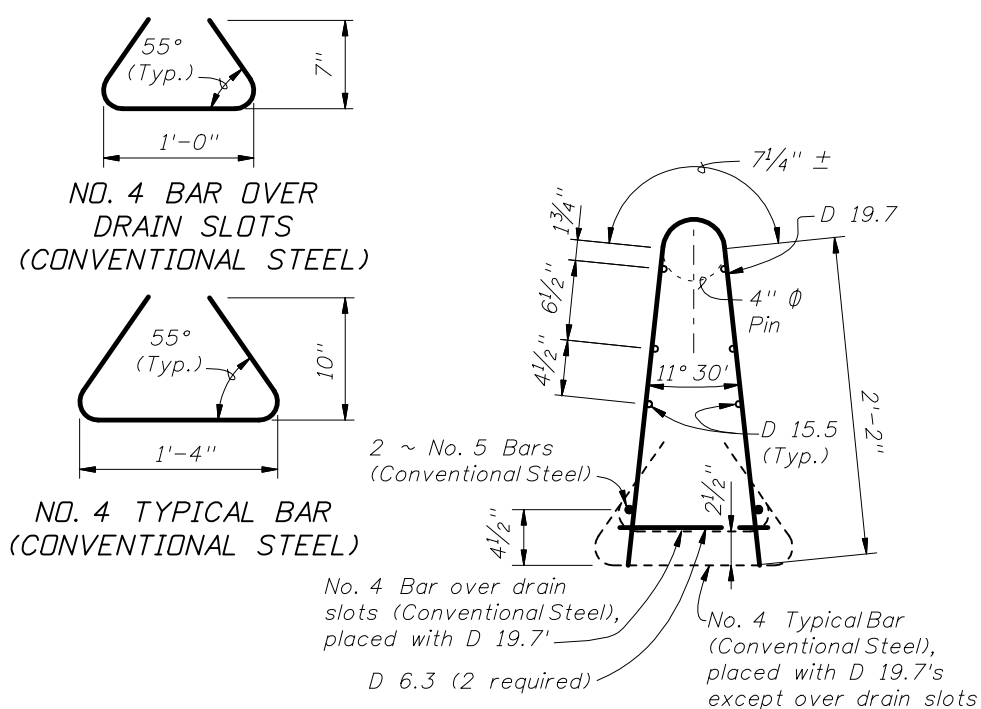
Last Revision: 07/01/07
Sheet No. 2 of 15
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ALTERNATE REINFORCING STEEL DETAIL
WELDED WIRE REINFORCEMENT



NOTES:
Place 2 ~ No. 5 Bars (12'-3" long) in bottom of Welded Wire Reinforcement cage as shown.
D 17.2 spacing shall match spacings for Bars 4A shown in Elevation View, Sheet 2. Field trim D 17.2's to clear drain slots by 2".

CONFIGURATION ONE

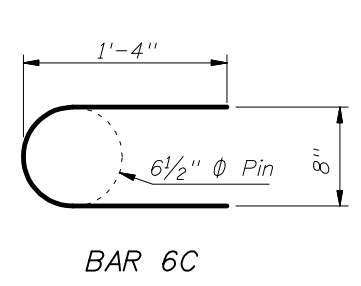


NOTES:
Place 2 ~ No. 5 Bars (12'-3" long) in bottom of Welded Wire Reinforcement cage as shown.
D 19.7 spacing shall match spacings for Bars 4A shown in Elevation View, Sheet 2. Field trim D 19.7's to clear drain slots by 2".

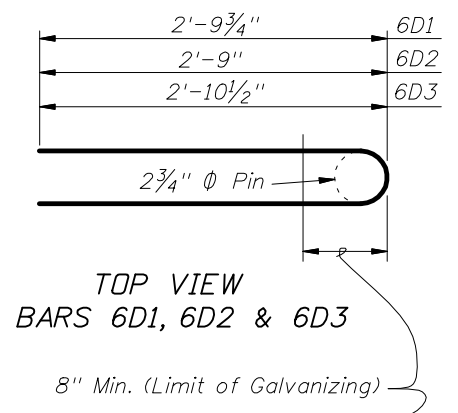
CONFIGURATION TWO

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

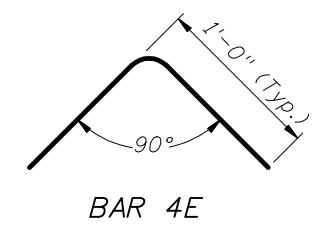
BILL OF REINFORCING STEEL			
MARK	SIZE	NUMBER	LENGTH
A1	4	10	6'-1"
A2	4	2	5'-5"
B	5	5	12'-3" (Straight)
C	6	6	3'-1"
D1	6	2	8'-4"
D2	6	2	7'-6"
D3	6	2	8'-6"
E	4	4	2'-0"



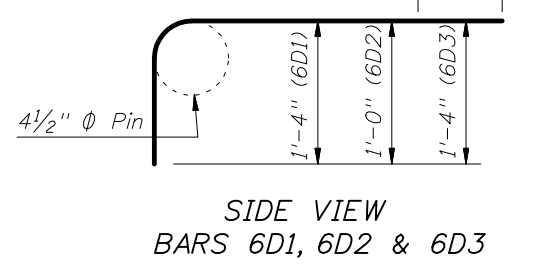
BAR 6C



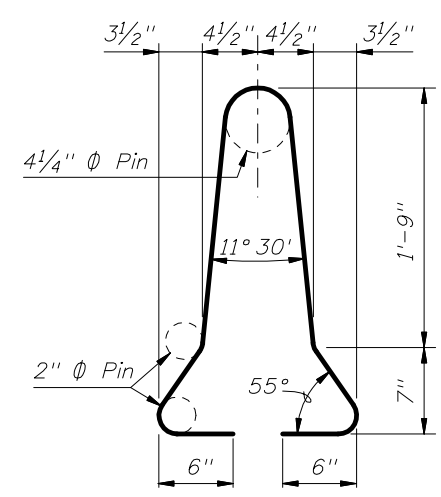
TOP VIEW
BARS 6D1, 6D2 & 6D3



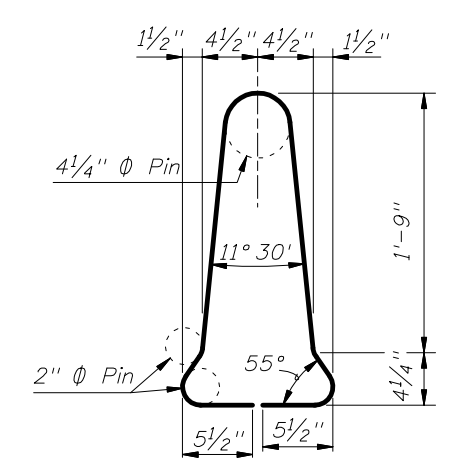
BAR 4E



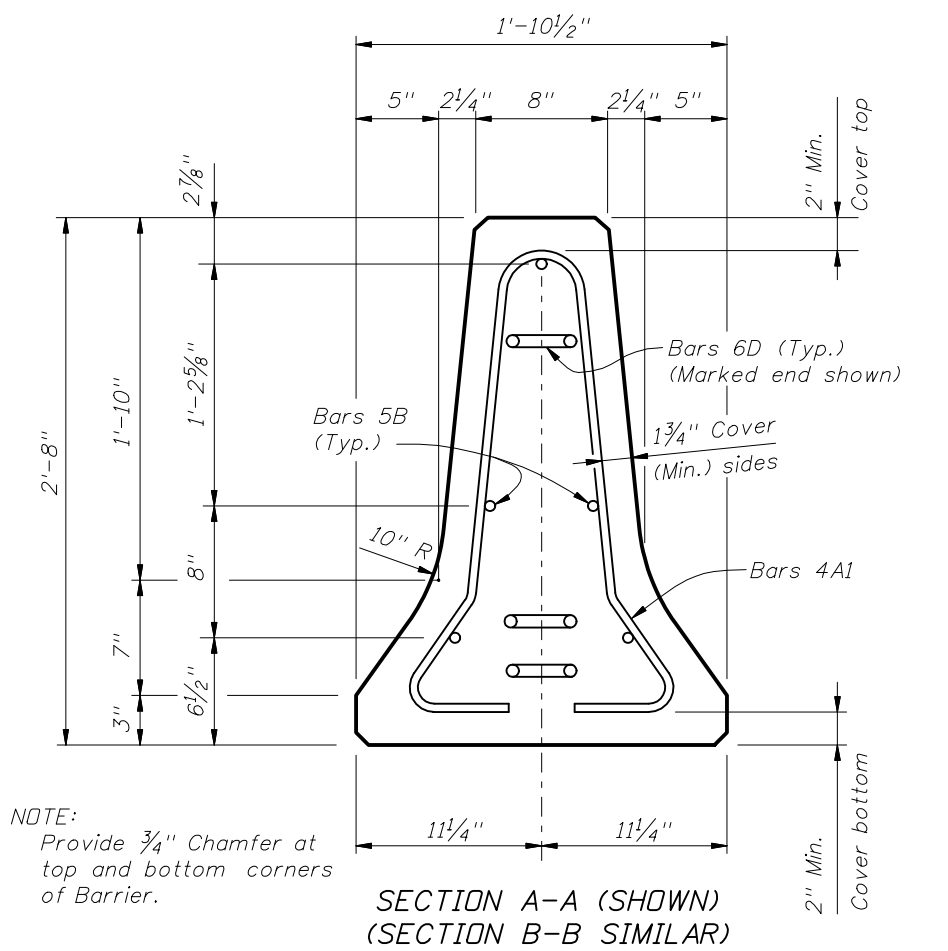
SIDE VIEW
BARS 6D1, 6D2 & 6D3



STIRRUP BAR 4A1

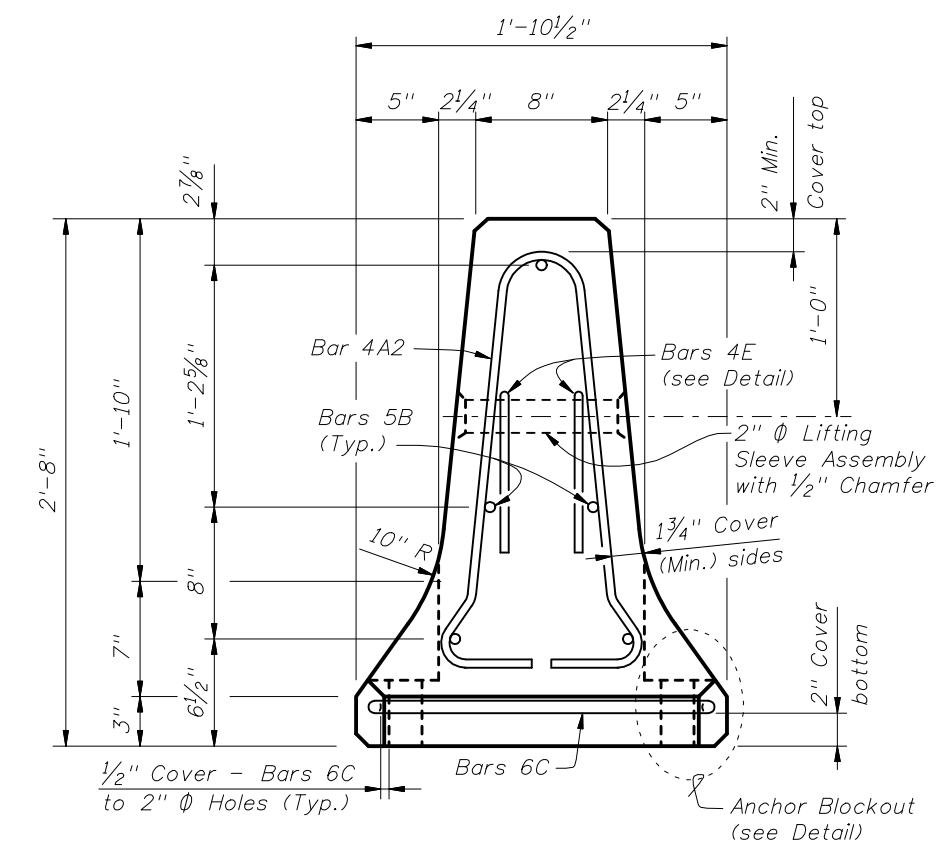


STIRRUP BAR 4A2

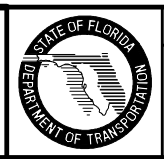


NOTE:
Provide 3/4" Chamfer at top and bottom corners of Barrier.

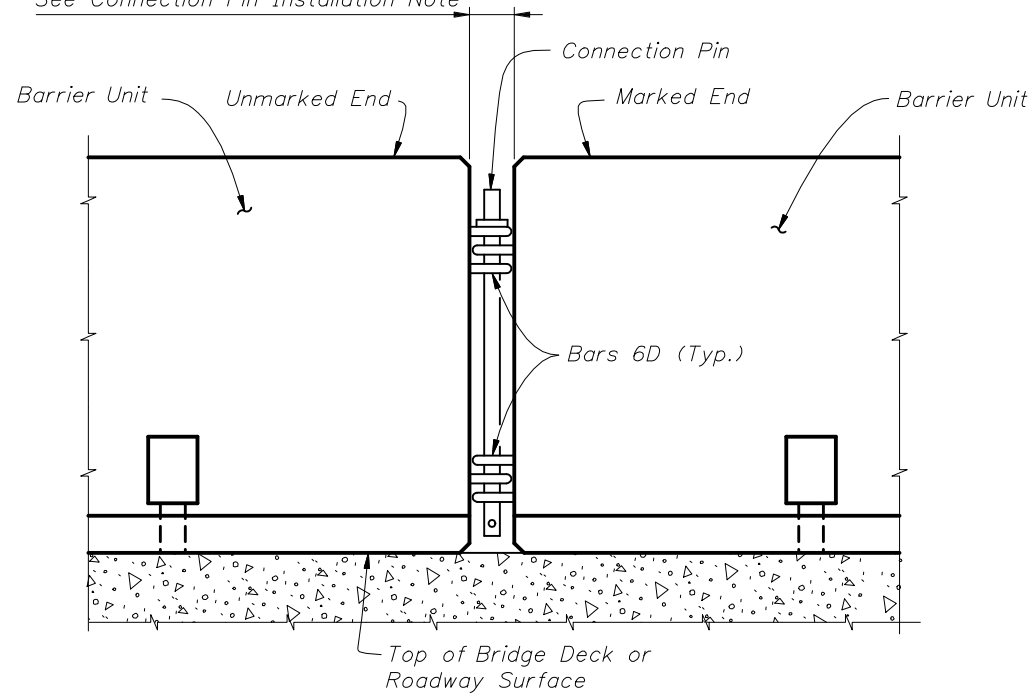
SECTION A-A (SHOWN)
(SECTION B-B SIMILAR)



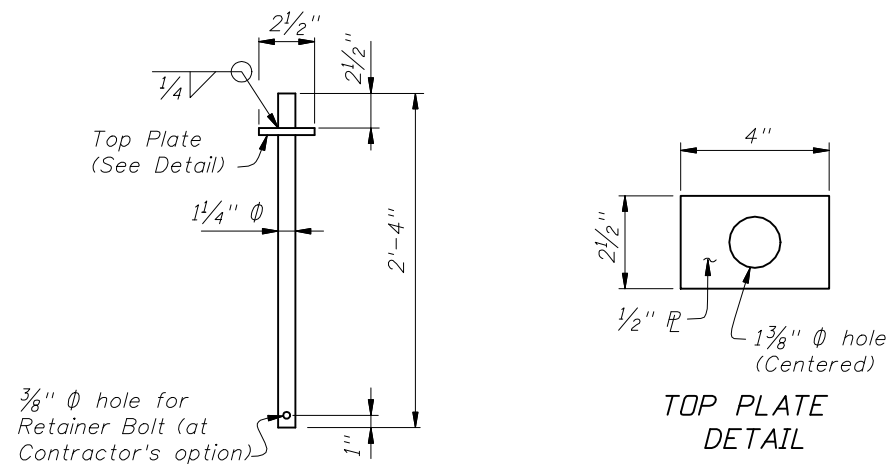
SECTION C-C
(Bars 6D not shown for clarity)



See Connection Pin Installation Note



DETAIL OF CONNECTION BETWEEN BARRIER UNITS



CONNECTION PIN DETAIL

NOTES FOR ALL INSTALLATIONS:

LIMITATION OF USE: This Temporary Concrete Barrier System is intended for work zone traffic control and other temporary applications. It shall not be used for permanent traffic railing construction unless specifically permitted by the Plans. Except as shown for the Back Filled Roadway Installations, the Barrier Units must be installed on a flexible pavement (asphalt) or rigid pavement (concrete) surface as shown with a cross slope of 1:10 or flatter. Except as shown for transition installations, Type K Barrier Units are not intended to be bolted down or staked down in locations where they can be impacted from the back side.

HANDLING: At no time shall the Barrier Units be lifted or moved by use of Bars 6D that extend from the ends of the units. Approximate weight of one unit equals 2.7 tons.

SURFACE PREPARATION: Except as shown for the Back Filled Roadway Installations, remove all debris, loose dirt and sand from the pavement, bridge deck or Asphalt Pad surface within the barrier footprint just prior to placement of the Barrier Units.

CONNECTION PIN ASSEMBLY: Steel for Connection Pin and Top Plate assemblies shall be in accordance with ASTM A36 or ASTM A709 Grade 36. Nondestructive testing of welds shall not be required. At the Contractor's option, a 3/8" diameter hole may be provided at the bottom of the Connection Pin, as shown, for the installation of a vandal resistance bolt.

CONNECTION PIN INSTALLATION: Initially set Barrier Units by using a 3 5/8" wooden block between ends of adjacent units. Install Connection Pin between adjacent Barrier Units as shown, then pull newly placed Barrier Unit away from adjacent Barrier Unit to remove slack between Connection Pin and Bars 6D (except as shown on Sheet 5). Barrier Units shall not be used unconnected.

DELINEATION: Mount Type C Steady-Burn Lights on top of Barrier Units that are used as traffic barriers along travelways in work zones. Space the lights at 50' centers in transitions, 100' centers on curves and 200' centers on tangent alignments. Refer to "Warning Lights" on Index No. 600 for additional information.

REUSE OF UNITS: Barrier Units may be reused provided they have the structural integrity and surface qualities of new units. Do not use Barrier Units without Marking Plates.

REUSE OF CONNECTION PINS: Connection pins may be reused if they have the structural integrity of new pins.

INSTALLATIONS ON CURVED ALIGNMENTS: The details presented in these Standards are shown for installations on tangent alignments. Details for horizontally curved alignments are similar.

TRANSITIONS: Transitions are required between freestanding, bolted down, staked down and back filled Type K Barrier installations, see Sheet 8 for transition requirements and details. Transitions are also required between installations of Type K Barrier and other types of temporary barrier, see Index No. 415 for transition requirements and details. Splices and transitions are required between installations of Type K Barrier and permanent Bridge or Roadway Traffic Railings, see Sheets 9 through 13 for transition requirements and details.

PAYMENT: Barrier Units for work zone traffic control and other temporary applications shall be paid for under the contract unit price for Barrier Wall (Temporary) (F&I) (Type K), LF. Any relocation of the Barrier Units required for the project shall be paid for under the contract unit price for Barrier Wall (Temporary) (Relocate) (Type K), LF. Type C Steady-Burn Lights shall be paid for under the contract unit price for Lights (Temp. Barrier Wall Mount) (Type C, Steady Burn), ED. The Contractor shall furnish Barrier Units except when the Plans stipulate the availability of Department owned units. Regardless of unit source the Contractor shall furnish all hardware and shall be responsible for all handling including loading, transport, unloading, stockpiling, installation, removal and return. Unless otherwise noted on the Plans, the Barrier Units shall become the property of the Contractor and shall be removed from the site prior to acceptance of the completed project.

NOTES FOR THRIE BEAM GUARDRAIL SPLICE INSTALLATIONS:

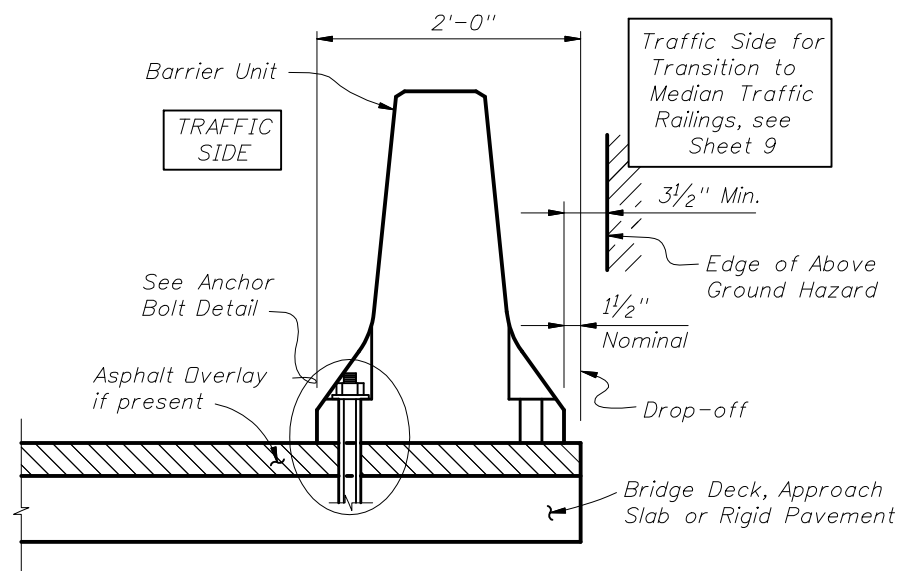
THRIE-BEAM GUARDRAIL: Provide Thrie-Beam Guardrail for splices in accordance with AASHTO M 180, Type II (Zinc coated) and as follows:

Two panels per splice (One panel per side) of Class B (10 Gauge), or
 Four panels per splice (Two nested panels per side) of Class A (12 Gauge).
 Guardrail panel length shall be 12'-6". Provide and install all other associated metallic guardrail components (Terminal Connectors, Shoulder Bolts, Hex Bolts and Nuts, Filler Plates, etc.) in accordance with Index No. 400.
 Install five Guardrail Anchor Bolts at each end of each splice in any of the standard seven anchor bolt holes in the Thrie-Beam Terminal Connector. If reinforcing steel is encountered when drilling holes for Guardrail Anchor Bolts in Type K Barrier Units, shift Thrie-Beam Terminal Connector so as to clear reinforcing steel within the given tolerances or select a different bolt hole to use. Do not drill or cut through reinforcing steel within Type K Barrier Units. Drilling or cutting through reinforcing steel within permanent concrete traffic railings is permitted. Do not drill or cut through utilities or conduits within permanent concrete traffic railings.

GUARDRAIL OFFSET BLOCKS: Provide and install timber Offset Blocks meeting the material requirements of Index No. 400. Field trim Offset Blocks as required for proper fit. Utilize Offset Blocks as shown and required in order to prevent bending or kinking of Thrie-Beam Guardrail panels.

CONCRETE FOR FILLING TAPERED TRAFFIC RAILING TOES: Provide concrete for filling tapered toes of Traffic Railings as shown meeting the material requirements of Specification Section 346, any Class, or a commercially available prebagged concrete mix (3000 psi minimum compressive strength). Sampling, testing, evaluation and certification of the concrete in accordance with Specification Section 346 is not required. Saturate with water the surfaces upon and against which the concrete fill will be placed prior to placing concrete. Place and finish concrete fill using forms or by hand methods to the general configurations shown so as to provide a smooth shape transition between the Type K Barrier and the adjacent traffic railing. A low slump is desirable if placing and finishing concrete by hand methods. Cure the concrete fill by application of a curing compound, or by covering with a wet tarp or burlap for a minimum of 24 hours. Completely remove the concrete fill upon relocation or removal of the Type K Temporary Concrete Barrier.





TYPICAL SECTION (BRIDGE DECK SHOWN, APPROACH SLAB OR RIGID PAVEMENT SIMILAR; INSTALLATION ADJACENT TO DROP-OFF SHOWN, MEDIAN TRANSITION INSTALLATION SIMILAR)

NOTES FOR BOLTED DOWN BRIDGE, APPROACH SLAB, ROADWAY AND TRANSITION INSTALLATIONS:

LIMITATION OF USE: This installation technique can only be used on rigid pavement and concrete bridge decks as shown. Barrier Units shall not be bolted down on bridge superstructures that contain post-tensioned tendons within the concrete deck (top flange of concrete box girders) or on bridge superstructures consisting of longitudinally prestressed, transversely post-tensioned, solid or voided concrete slab units. Anchor Bolts must not be installed on both sides of the Barrier Units. Do not bolt down Barrier Units across bridge finger or modular expansion joints.

ANCHOR BOLTS, NUTS AND WASHERS: Adhesive-Bonded Anchor Bolts shall be fully threaded rods in accordance with ASTM F 1554 Grade 36. Anchor Bolts for through bolting shall be in accordance with ASTM A 307 or ASTM F 1554 Grade 36. Nuts shall be in accordance with ASTM A 563 or ASTM A 194. Flat Washers shall be in accordance with ASTM F 436 and Plate Washers shall be in accordance with ASTM A 36 or ASTM A 709 Grade 36.

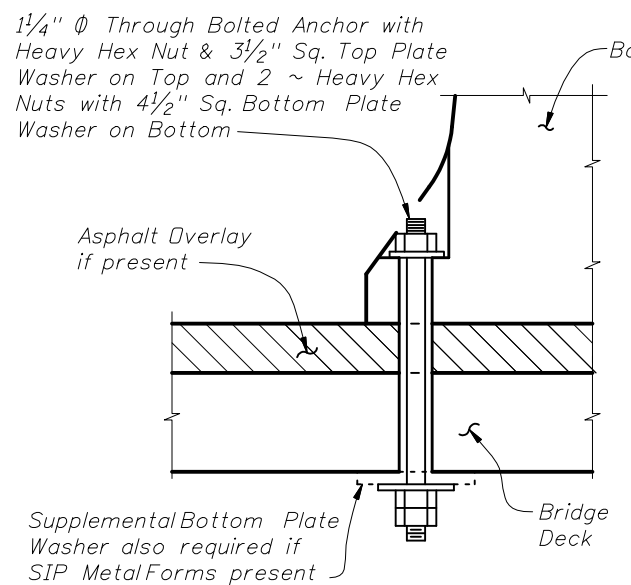
Install three (3) Anchor Bolts per Barrier Unit on the traffic side of the Barrier Units as shown, except for Transition Installations. For the number and positions of Anchor Bolts required in Transition Installations see Sheets 8 and 9 and Index No. 415. Drilling through deck reinforcing steel to install Anchor Bolts is permitted. Unless otherwise shown in the Plans, at the Contractor's option Barrier Units may be installed by through bolting (where geometrically possible) or by the use of Adhesive-Bonded Anchor Bolts. Do not drill into or otherwise damage the tops of supporting beams or girders, bridge deck expansion joints or drains. Install Anchor Bolts and Nuts so that the maximum extension beyond the face of the Barrier Units is 1/2". Snug tighten the Nuts on the Anchor Bolts. For through bolted installations, snug tighten the double Nuts on the underside of the deck against each other to minimize the potential for loosening.

Omit one (1) Anchor Bolt within a single Barrier Unit if a conflict exists between the Anchor Bolt location and a bridge deck expansion joint or drain. The adjacent Barrier Units must each be installed with the standard three (3) Anchor Bolts.

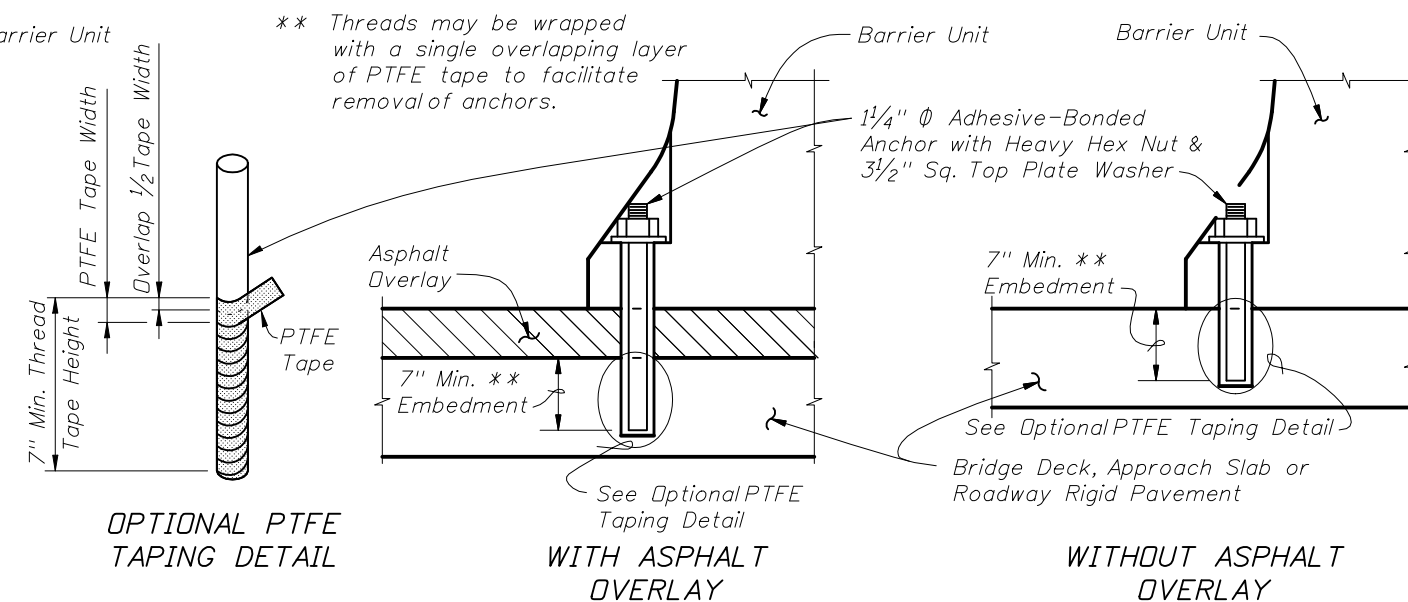
Omit one (1) Anchor Bolt within a single Barrier Unit as shown in the Treatment at Bridge Deck Expansion Joint Schematic if the Barrier Unit straddles a bridge deck expansion joint. The adjacent Barrier Units must each be installed with the standard three (3) Anchor Bolts.

ADHESIVE-BONDING MATERIAL SYSTEMS: Adhesive Bonding Material Systems for Anchor Bolts shall be Type HSHV in accordance with Specification Section 937 and shall be installed in accordance with Specification Section 416. Prior to installation of the Barrier Units in the Plan location(s), install a demonstration Barrier Unit using the proposed production installation method, at a location approved by the Engineer. In lieu of the production test requirements of Specification Section 416-6, install six (6) Adhesive-Bonded Anchor Bolts in the demonstration Barrier Unit and test each Anchor Bolt with a 29,800 pound tensile proof load. Install and test additional demonstration Barrier Units when requested by the Engineer. Remove the demonstration Barrier Unit prior to testing the Anchor Bolts. Remove the test Anchor Bolts after testing as directed by the Engineer.

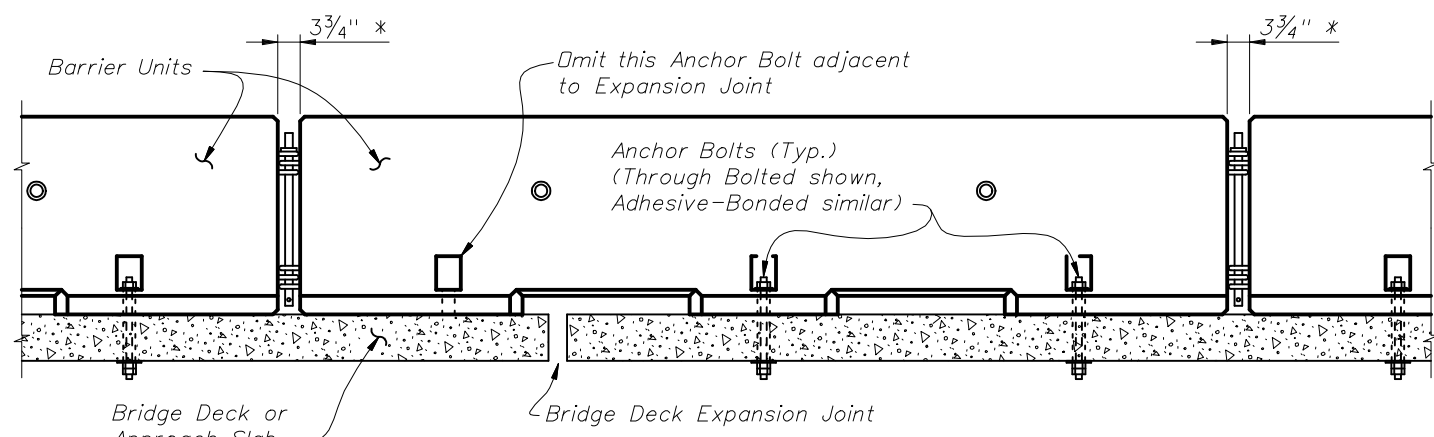
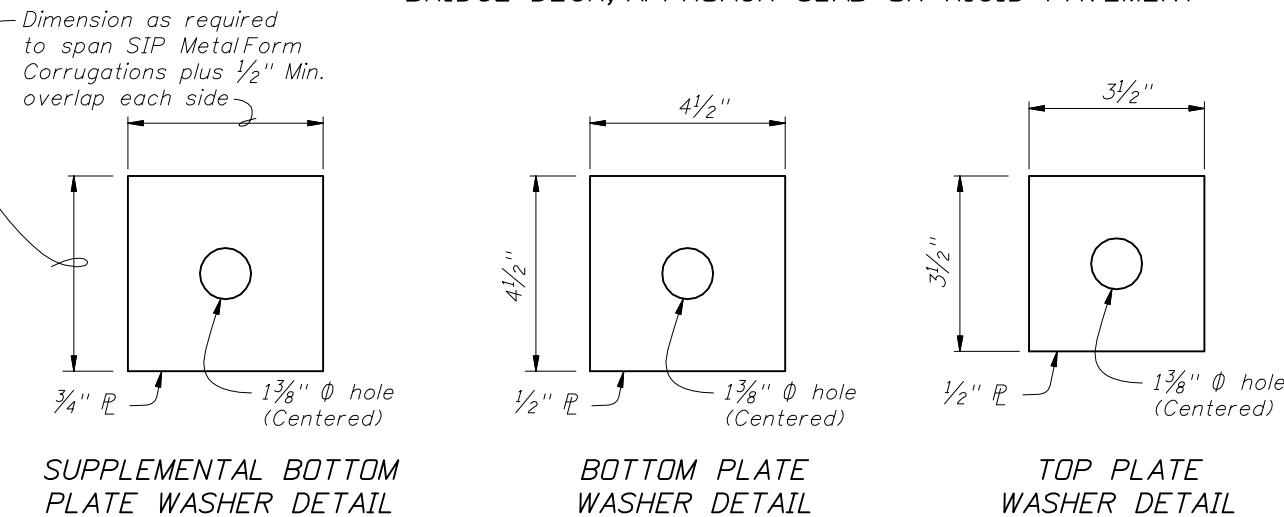
REMOVAL OF ANCHOR BOLTS: Upon removal or relocation of Barrier Units, remove all Anchor Bolts and completely fill the remaining holes in bridge decks, approach slabs and roadway rigid pavements that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930 or with an Epoxy Resin Compound, Type I or Q, in accordance with Specification Section 926. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.



THROUGH BOLTED ANCHOR INSTALLATION ON BRIDGE DECK



ADHESIVE BONDED ANCHOR INSTALLATION ON BRIDGE DECK, APPROACH SLAB OR RIGID PAVEMENT



TREATMENT AT BRIDGE DECK EXPANSION JOINT SCHEMATIC

* To accommodate movement at Expansion Joint, set Barrier Units with 3 3/4" gap at locations shown.

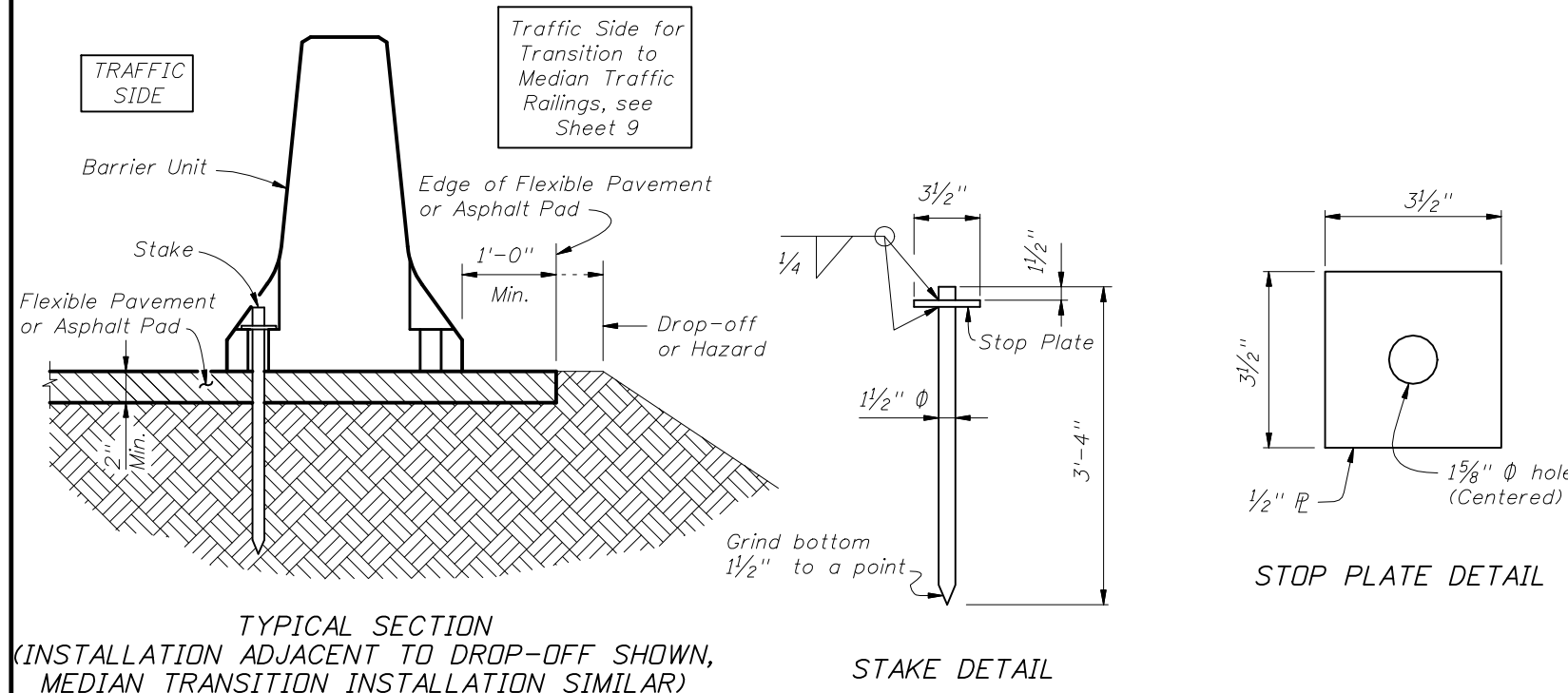
BOLTED DOWN BRIDGE, APPROACH SLAB, ROADWAY AND TRANSITION INSTALLATIONS



2010 FDOT Design Standards

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

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NOTES FOR STAKED DOWN ROADWAY AND TRANSITION INSTALLATIONS:

LIMITATION OF USE: This installation technique can only be used on flexible pavement or an Asphalt Pad as shown. Stakes must not be installed on both sides of the Barrier Units.

ASPHALT PAD: Where existing flexible pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

STAKES: Provide steel for Stake assemblies in accordance with ASTM A 36 or ASTM A 709 Grade 36. All welding shall be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required.

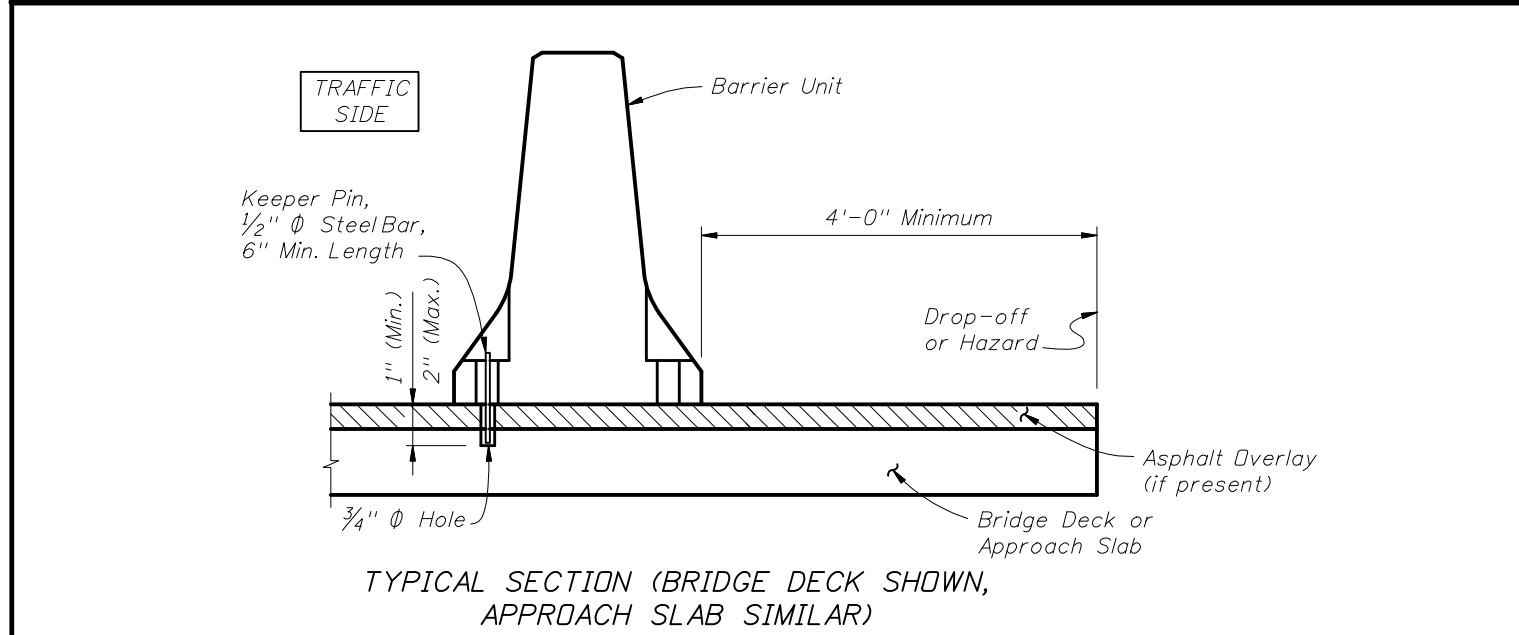
Install three (3) Stakes on the traffic side of the Barrier Units as shown, except for Transition Installations. For the number and positions of stakes required in Transition Installations see Sheets 8 and 9 and Index No. 415. Install Stakes so that the Stop Plate is snug against the bottom of the Anchor Blockout.

BURIED UTILITIES: Prior to installation of Stakes verify locations of all adjacent buried utilities, drainage structures, pipes, etc. If conflicts between Stake locations and buried elements exist, a maximum of two (2) Stakes within a single Barrier Unit may be omitted if the adjacent Barrier Units are installed with the standard three (3) Stakes.

REMOVAL OF STAKES: Upon removal or relocation of Barrier Units, completely remove all Stakes and completely fill the remaining holes in flexible pavement that is to remain with hot or cold patch asphalt material.

REUSE OF STAKES: Stakes may be reused if they have the structural integrity of new stakes.

STAKED DOWN ROADWAY AND TRANSITION INSTALLATIONS

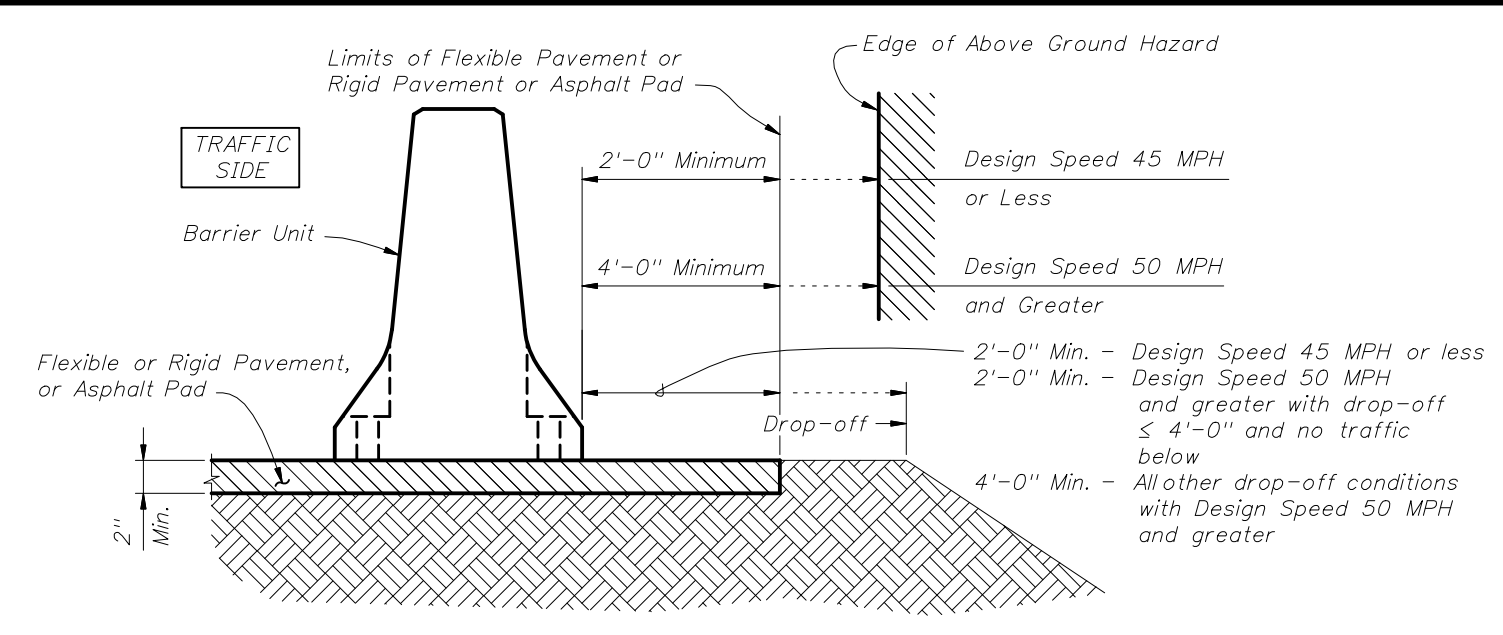


NOTES FOR FREE STANDING BRIDGE OR APPROACH SLAB INSTALLATIONS:

KEEPER PINS: Keeper Pins shall be 1/2" diameter, smooth steelbar in accordance with ASTM A 36 or ASTM A 709 Grade 36. As directed by the Engineer in order to limit vibration induced translation of the Barrier Units, install one (1) Keeper Pin per Barrier Unit on the traffic side of the Barrier Units as shown. Do not drill into or otherwise damage bridge deck expansion joints or drains.

REMOVAL OF KEEPER PINS: Upon removal or relocation of Barrier Units, remove all Keeper Pins and completely fill the remaining holes in bridge decks and approach slabs that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930 or with an Epoxy Resin Compound, Type I or Q, in accordance with Specification Section 926. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.

FREESTANDING BRIDGE OR APPROACH SLAB INSTALLATIONS

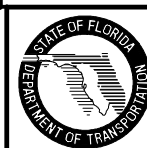


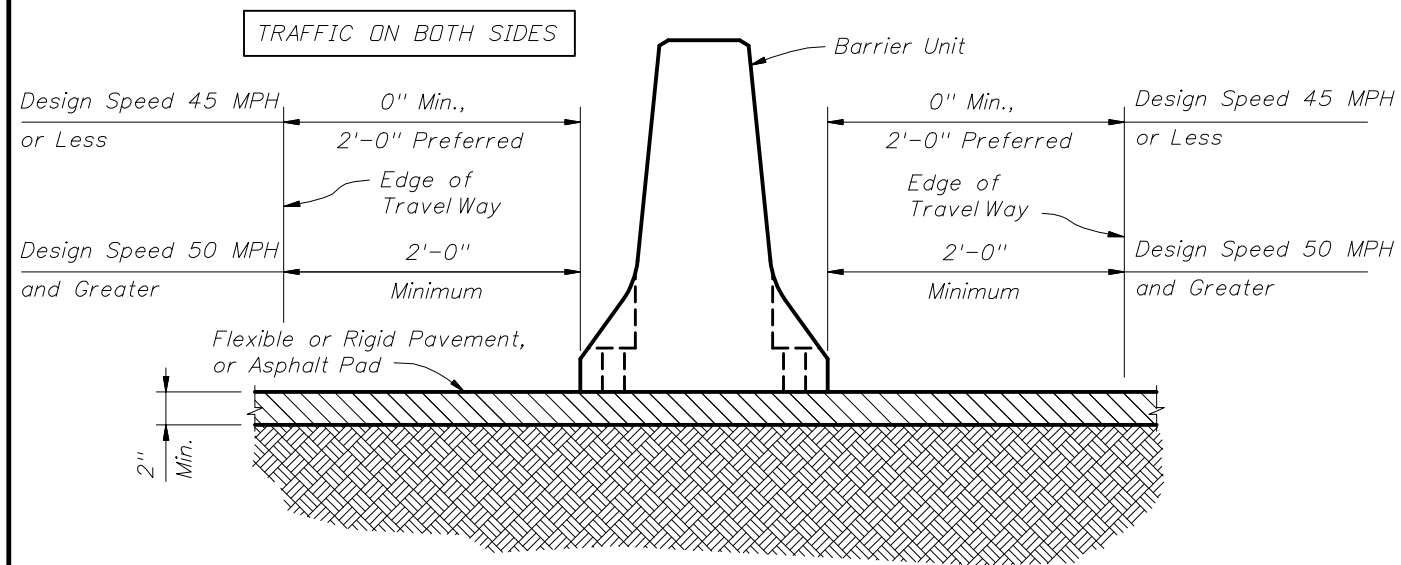
NOTES FOR FREE STANDING ROADWAY INSTALLATION:

LIMITATION OF USE: This installation technique can only be used on flexible or rigid pavement or on an Asphalt Pad as shown.

ASPHALT PAD: Where existing pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

FREESTANDING ROADWAY INSTALLATION





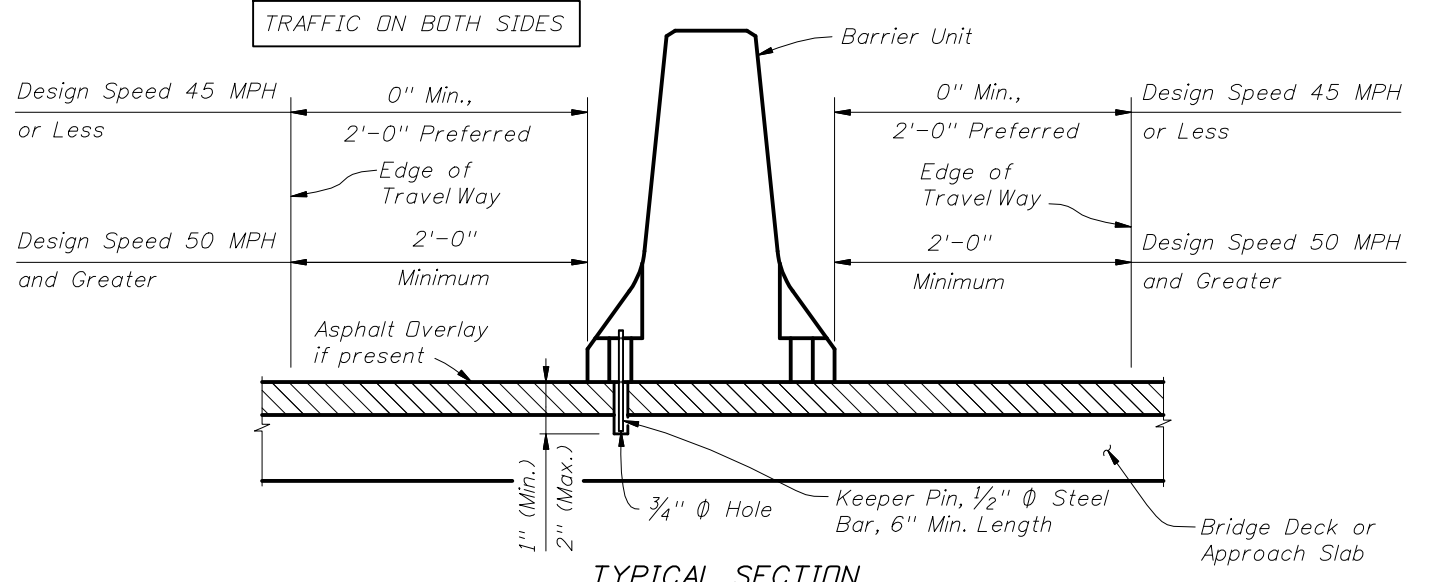
TYPICAL SECTION

NOTES FOR FREE STANDING ROADWAY MEDIAN INSTALLATION:

LIMITATION OF USE: This installation technique can only be used on flexible or rigid pavement or on an Asphalt Pad as shown.

ASPHALT PAD: Where existing pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

===== FREESTANDING ROADWAY MEDIAN INSTALLATION =====



TYPICAL SECTION

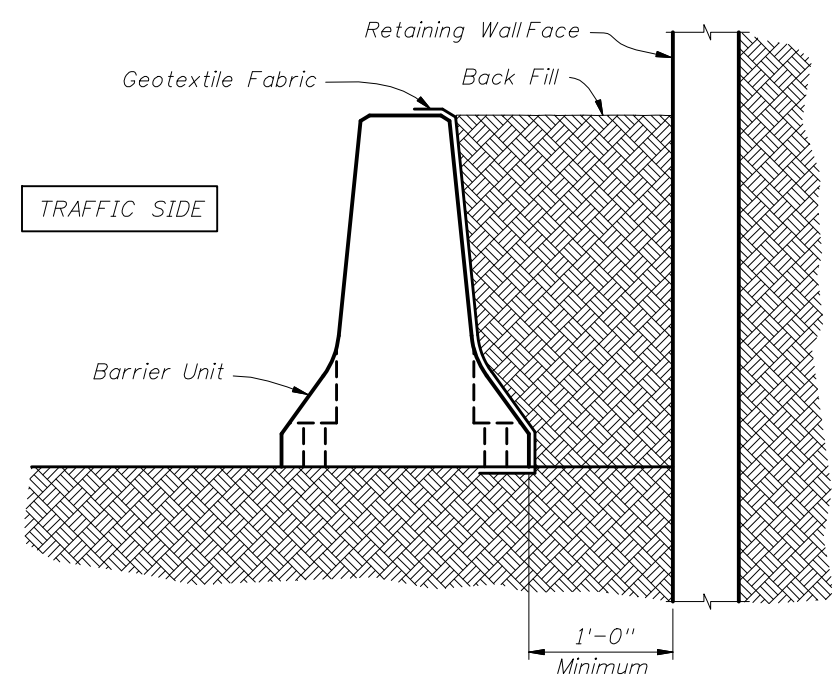
NOTES FOR FREE STANDING BRIDGE OR APPROACH SLAB MEDIAN INSTALLATION:

KEEPER PINS: Keeper Pins shall be 1/2" diameter, smooth steelbar in accordance with ASTM A 36 or ASTM A 709 Grade 36.

As directed by the Engineer in order to limit vibration induced translation of the Barrier Units, install one (1) Keeper Pin per Barrier Unit as shown. Alternate Keeper Pin locations from side to side of Barrier Units along the length of the installation. Do not drill into or otherwise damage bridge deck expansion joints or drains.

REMOVAL OF KEEPER PINS: Upon removal or relocation of Barrier Units, remove all Keeper Pins and completely fill the remaining holes in bridge decks and approach slabs that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930 or with an Epoxy Resin Compound, Type I or Q, in accordance with Specification Section 926. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.

===== FREESTANDING BRIDGE OR APPROACH SLAB MEDIAN INSTALLATION =====



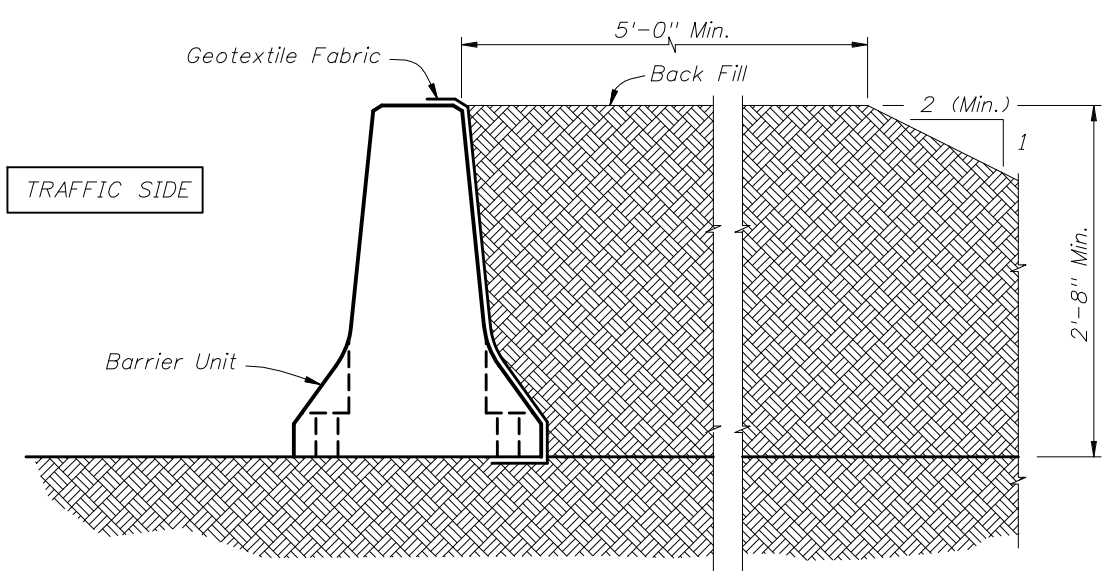
TYPICAL SECTION ADJACENT TO RETAINING WALL

NOTES FOR BACK FILLED ROADWAY INSTALLATIONS:

BACK FILL MATERIAL: Provide Back Fill Material consisting of any available clean soil. Compact Back Fill Material until the soil mass is firm and unyielding. Provide erosion control as specified in the Plans. If none is specified in the Plans, provide erosion control as required to maintain the integrity of the Back Fill embankment.

GEOTEXTILE FABRIC: Provide Type D-5 Geotextile Fabric in accordance with Index No. 199 to contain Back Fill Material behind Barrier Units. Geotextile Fabric may be continuous over the length and height of the installation or may be individual pieces as required to cover the Lift / Drain Slots and open vertical joints between Barrier Units.

===== BACK FILLED ROADWAY INSTALLATIONS =====



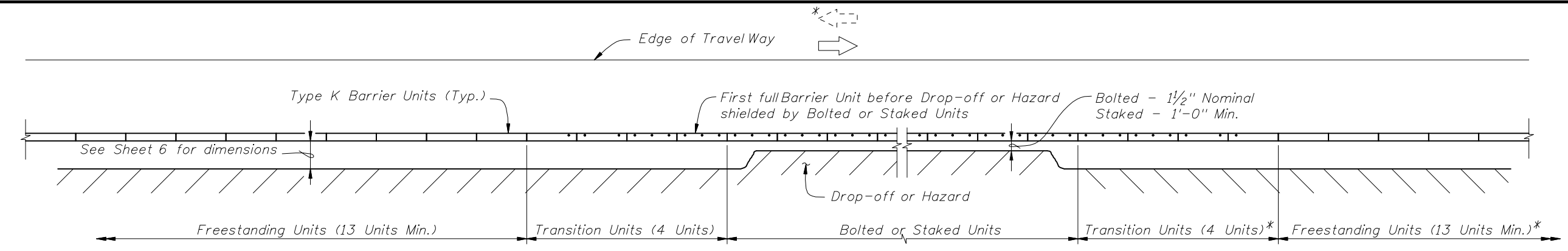
TYPICAL SECTION



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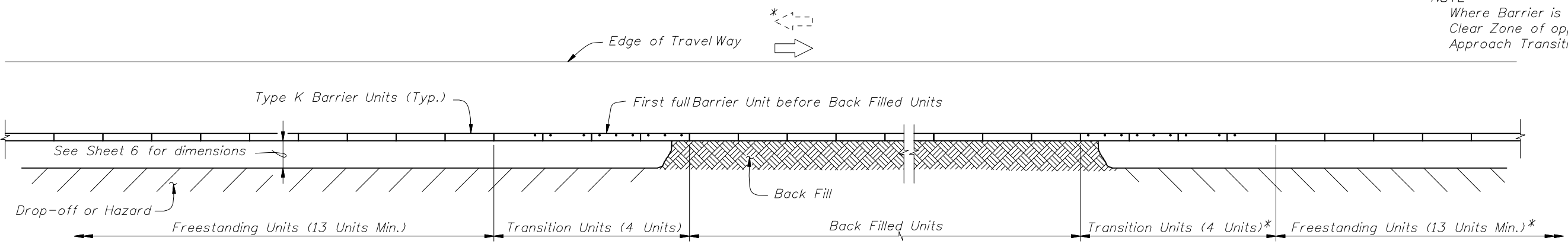
TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

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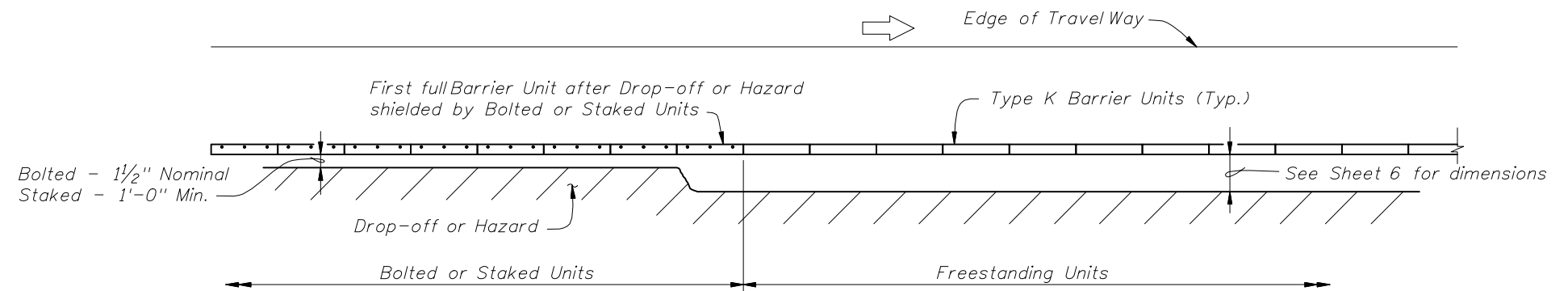


APPROACH TRANSITION FROM FREESTANDING TO BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS

* NOTE:
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.

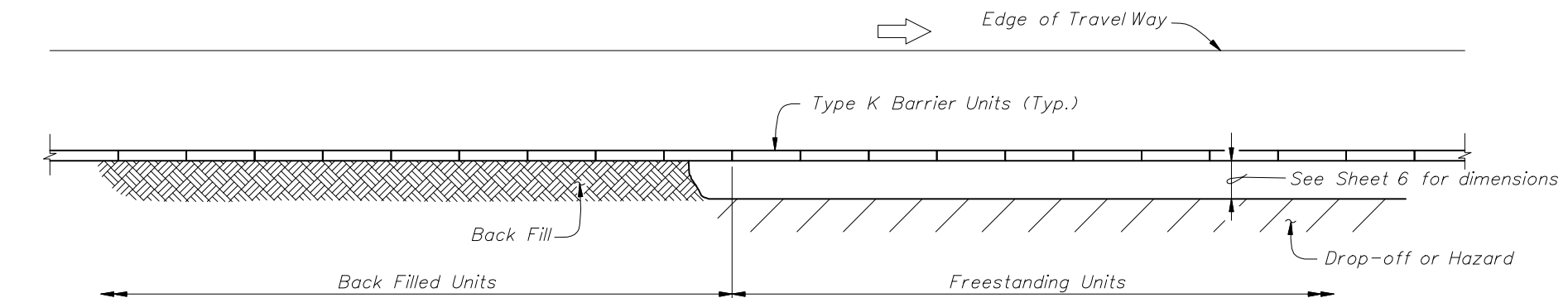


APPROACH TRANSITION FROM FREESTANDING TO BACK FILLED TYPE K TEMPORARY CONCRETE BARRIERS



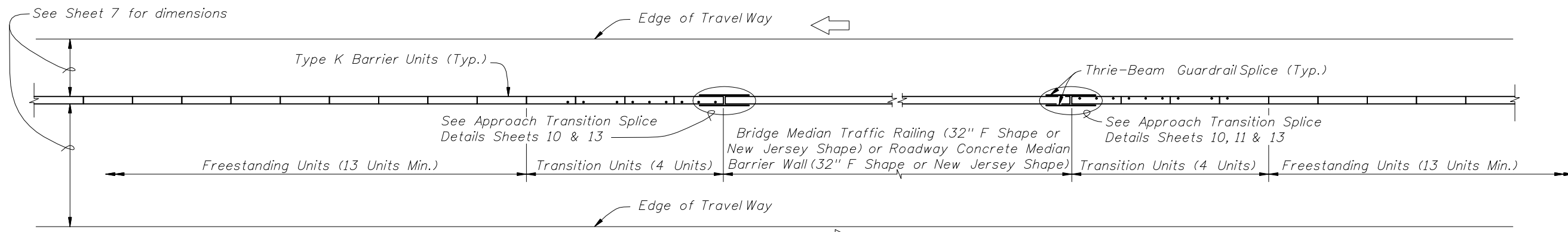
TRAILING END TRANSITION FROM BOLTED OR STAKED DOWN TO FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS

LEGEND:
Dot indicates number and position of Bolts or Stakes



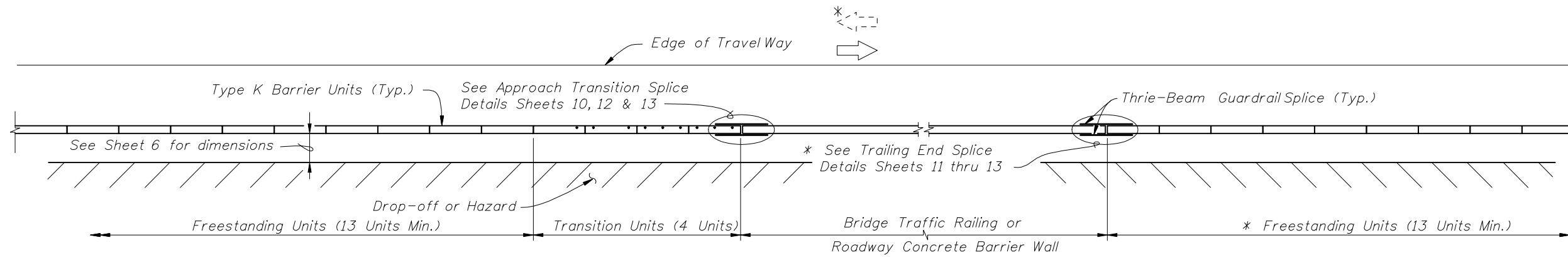
TRAILING END TRANSITION FROM BACK FILLED TO FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS



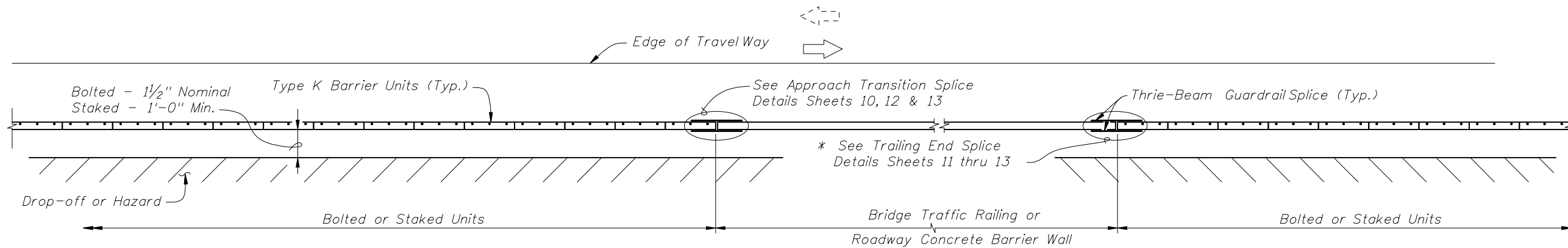


TRANSITION FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE MEDIAN TRAFFIC RAILING OR ROADWAY MEDIAN CONCRETE BARRIER WALL

* NOTE:
Where Barrier is located within
Clear Zone of opposing traffic,
Approach Transition is required.



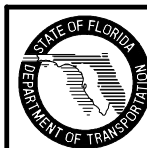
TRANSITION FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE TRAFFIC RAILING OR ROADWAY CONCRETE BARRIER WALL



TRANSITION FROM BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE TRAFFIC RAILING OR ROADWAY CONCRETE BARRIER WALL

LEGEND:

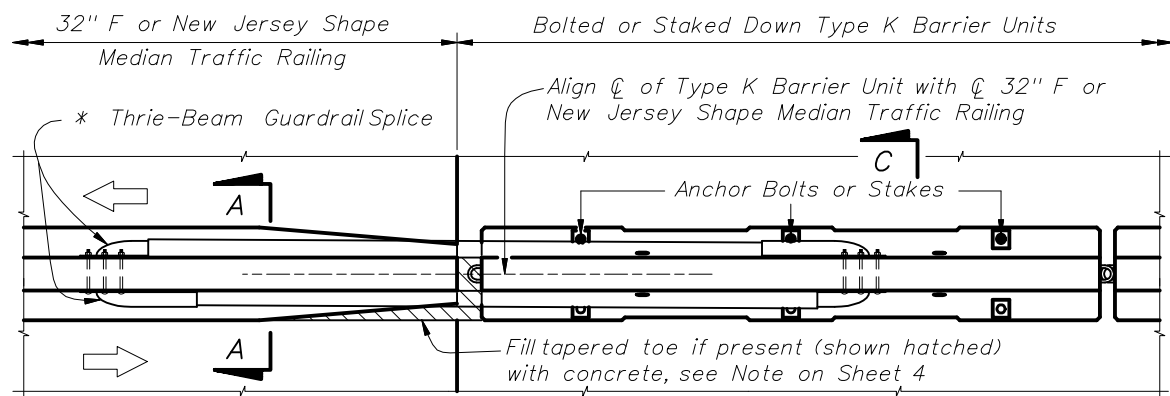
Dot indicates number and
position of Bolts or Stakes



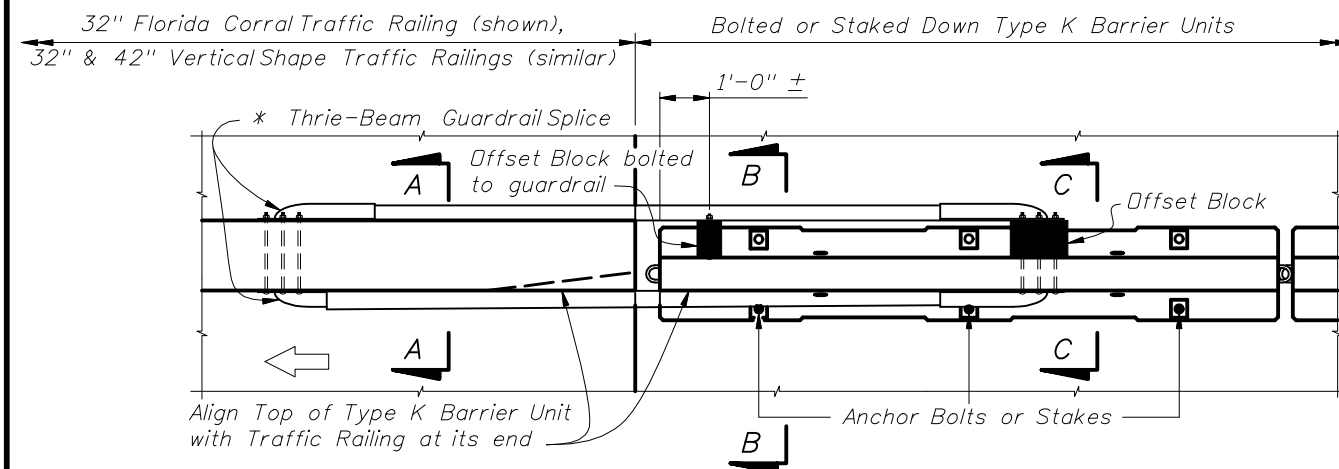
2010 FDOT Design Standards

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

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PARTIAL PLAN VIEW AT MEDIAN TRAFFIC RAILING

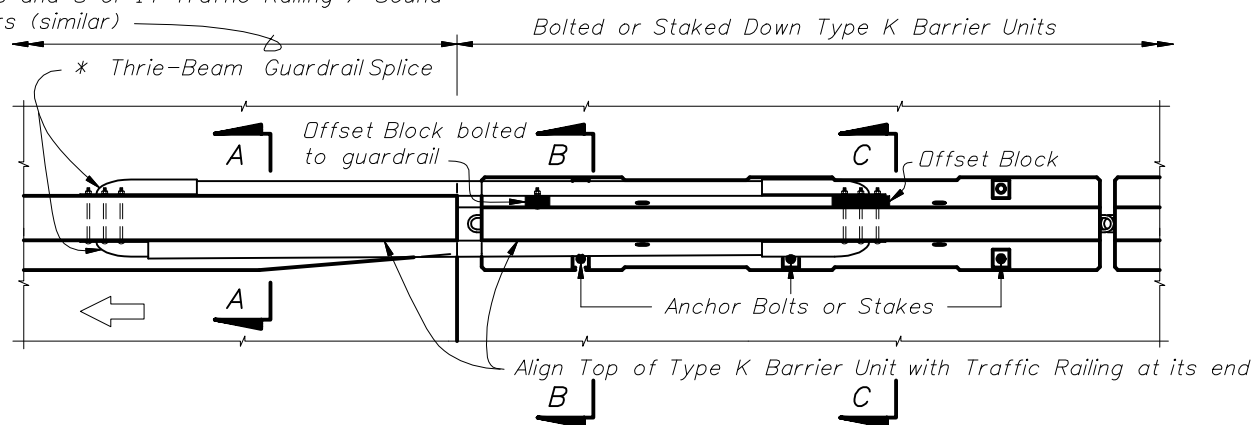


PARTIAL PLAN VIEW

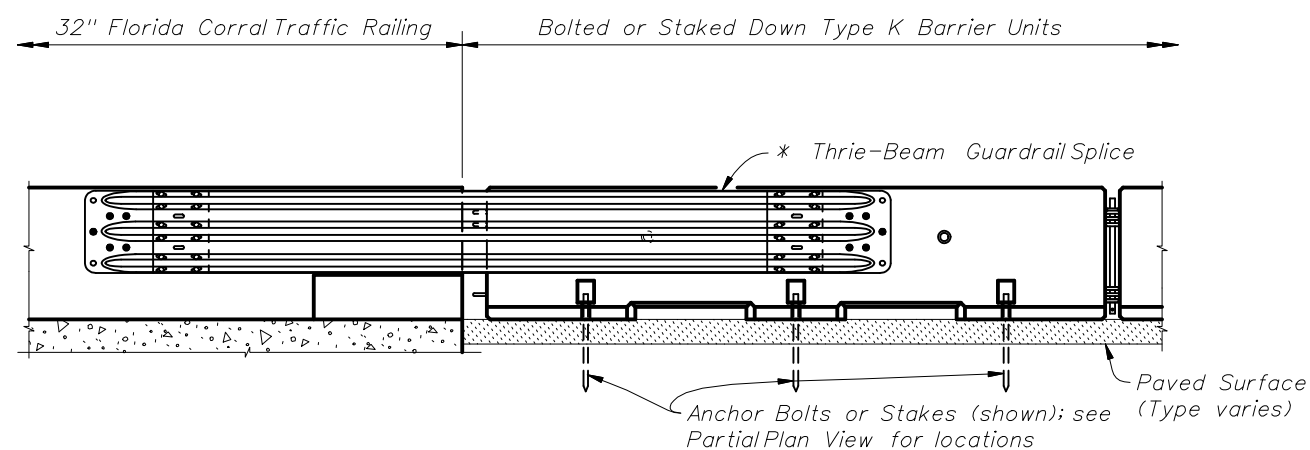
Cross References:
See Sheet 13 for Section A-A,
Section B-B and Section C-C.

32" F Shape Traffic Railing (shown); 32" New Jersey Shape and 42" F Shape Traffic Railings and 8' or 14' Traffic Railing / Sound Barriers (similar)

Cross References:
See Sheet 13 for Section A-A,
Section B-B and Section C-C.



PARTIAL PLAN VIEW AT SHOULDER TRAFFIC RAILING

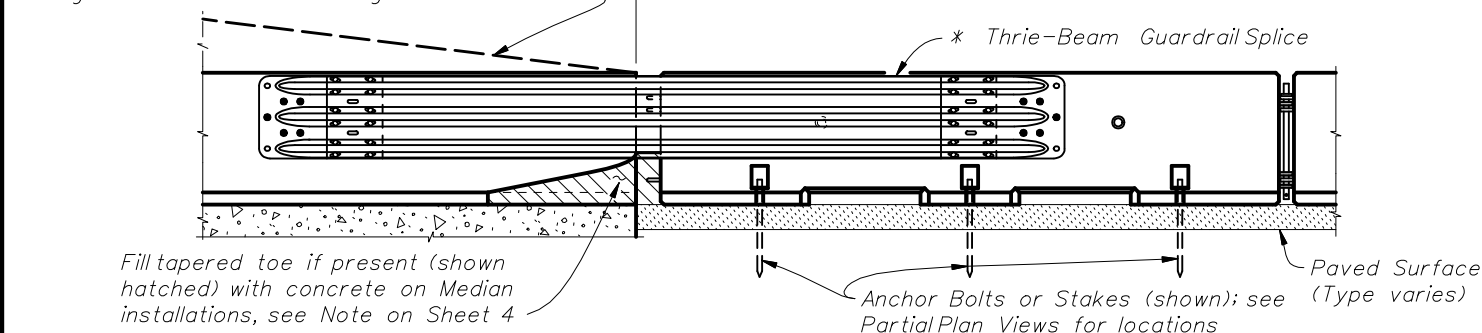


PARTIAL ELEVATION VIEW - FLORIDA CORRAL TRAFFIC RAILING

32" F Shape Traffic Railing (shown); 32" New Jersey Shape and 42" F Shape Traffic Railings and 8' or 14' Traffic Railing / Sound Barriers (similar)

* See Thrie-Beam Guardrail Positioning Detail, Sheet 13 and Notes for Thrie-Beam Guardrail Splice Installations, Sheet 4.

Vertical End Taper required for 42" F Shape Traffic Railing & 8' & 14' Traffic Railing / Sound Barrier

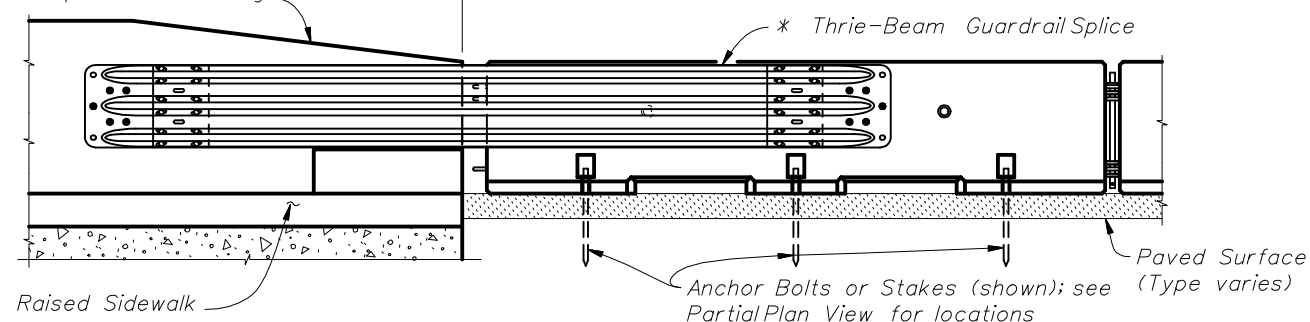


PARTIAL ELEVATION VIEW

APPROACH TRANSITION SPLICE DETAIL
FOR F AND NEW JERSEY SHAPE TRAFFIC RAILINGS AND 8' & 14' TRAFFIC RAILING / SOUND BARRIERS (CONCRETE BARRIER WALL SIMILAR)

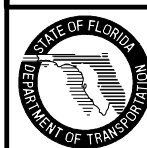
42" Vertical Shape Traffic Railing (shown), 32" Vertical Shape Traffic Railing (similar)

Vertical End Taper required for 42" Vertical Shape Traffic Railing



PARTIAL ELEVATION VIEW - VERTICAL SHAPE TRAFFIC RAILINGS

APPROACH TRANSITION SPLICE DETAIL
FOR FLORIDA CORRAL AND VERTICAL SHAPE TRAFFIC RAILINGS



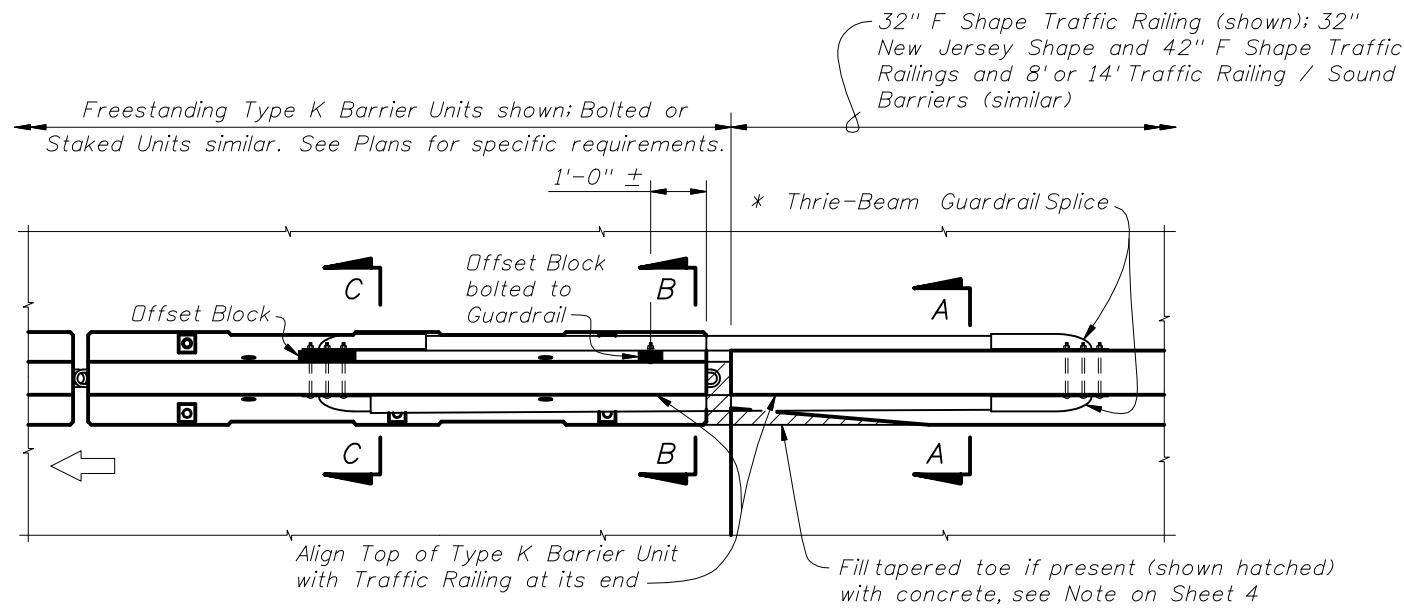
2010 FDOT Design Standards

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

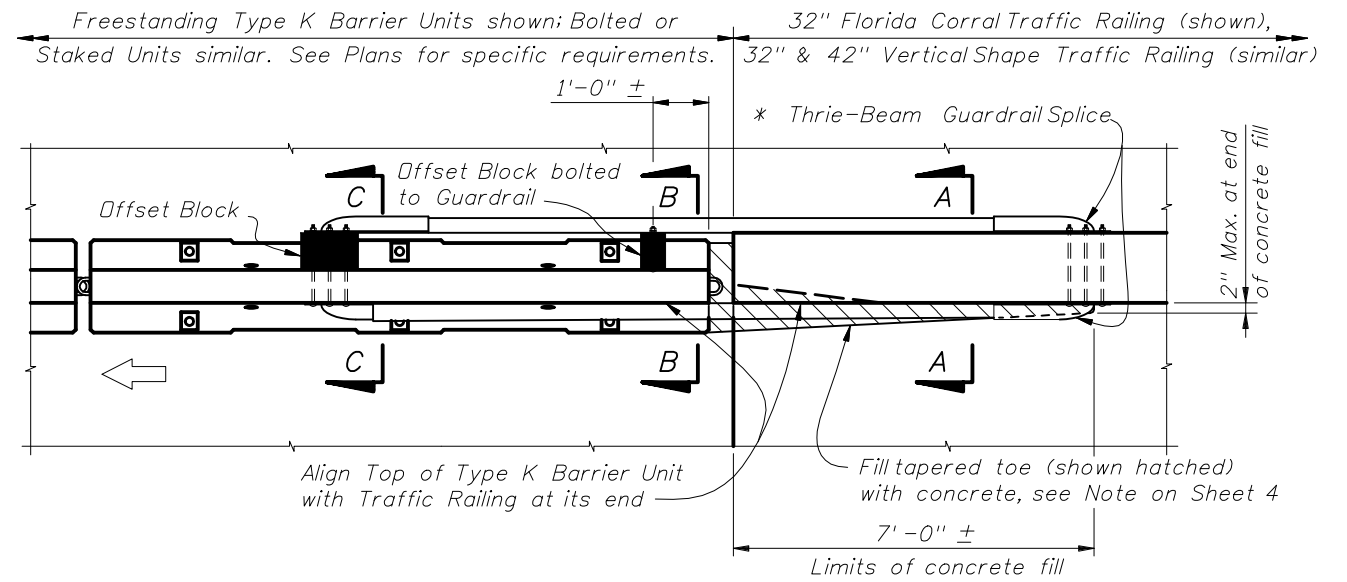
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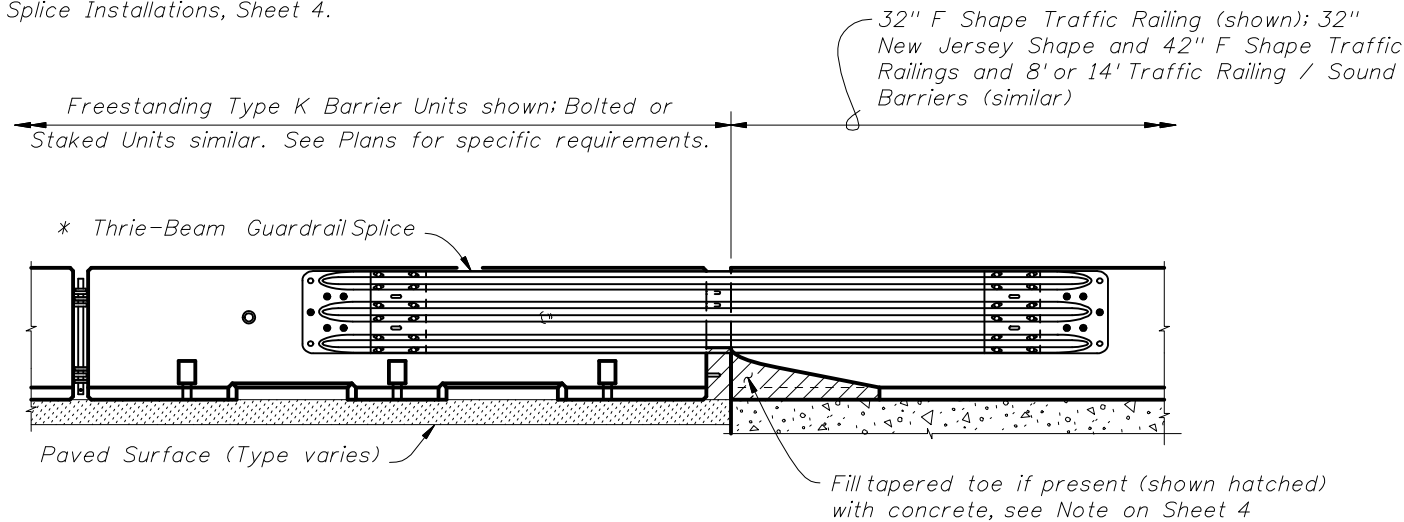


PARTIAL PLAN VIEW



PARTIAL PLAN VIEW

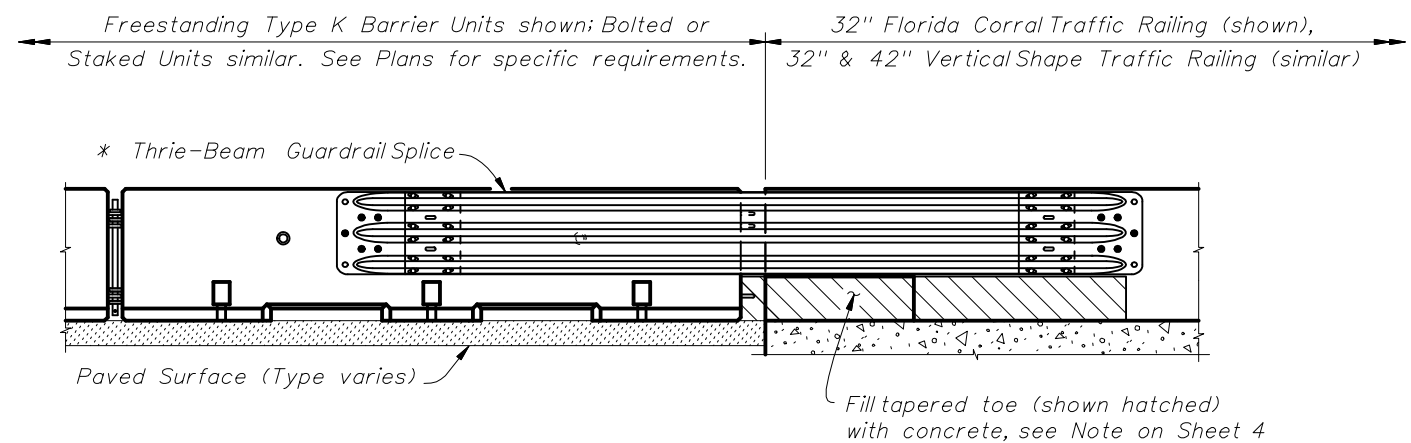
* See Thrie-Beam Guardrail Positioning Detail, Sheet 13 and Notes for Thrie-Beam Guardrail Splice Installations, Sheet 4.



PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section A-A,
Section B-B and Section C-C.

TRAILING END SPLICE DETAIL
FOR F AND NEW JERSEY SHAPE TRAFFIC RAILINGS
AND 8' & 14' TRAFFIC RAILING / SOUND BARRIERS



PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section A-A,
Section B-B and Section C-C.

TRAILING END SPLICE DETAIL
FOR FLORIDA CORRAL AND VERTICAL
SHAPE TRAFFIC RAILINGS



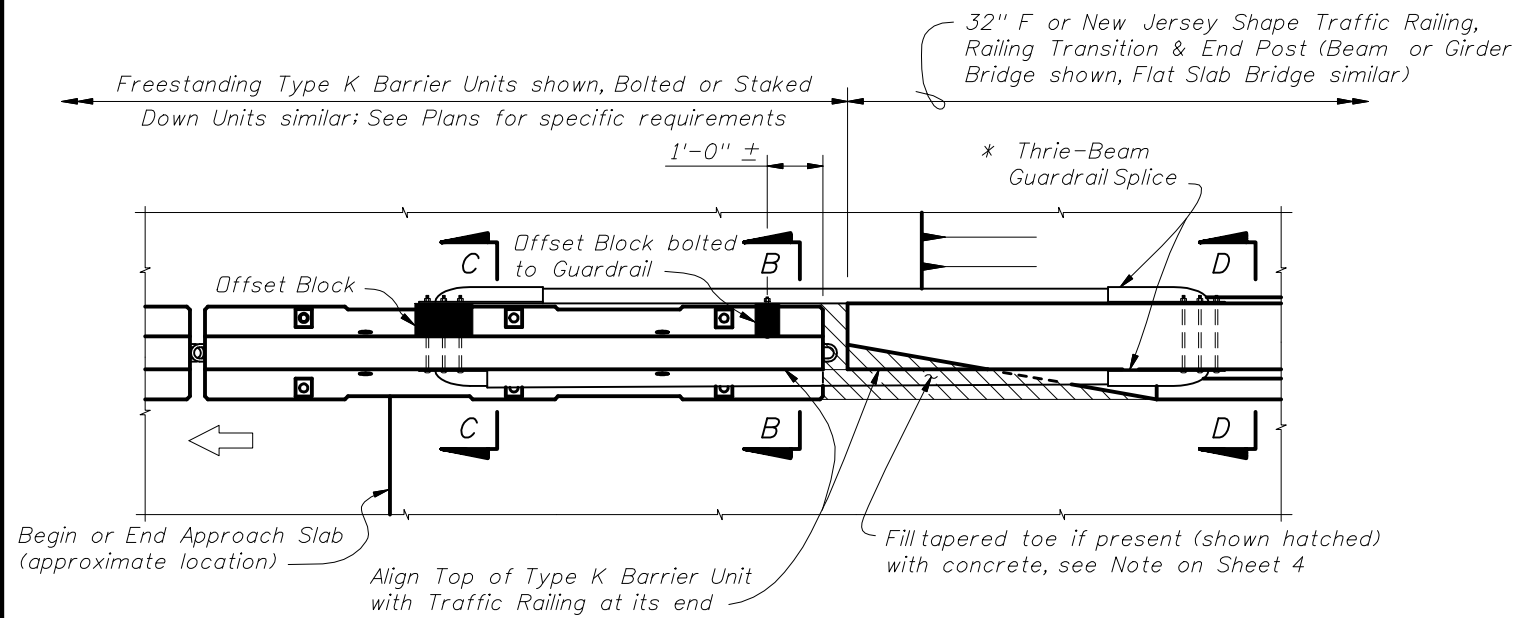
2010 FDOT Design Standards

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

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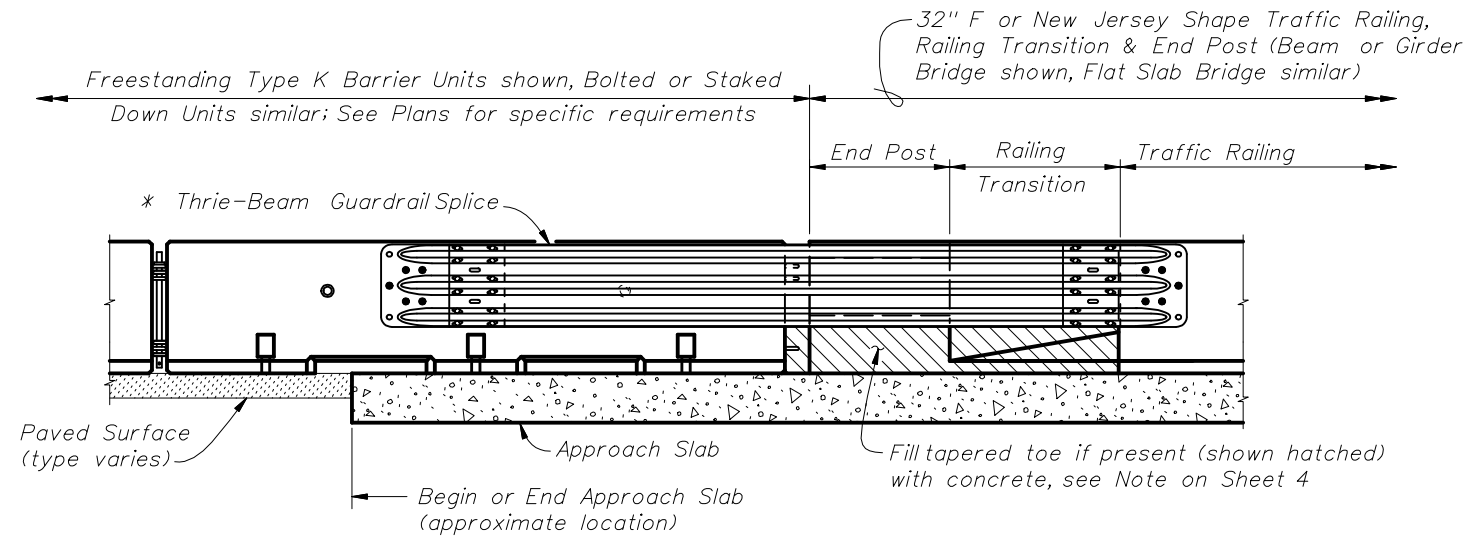
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PARTIAL PLAN VIEW

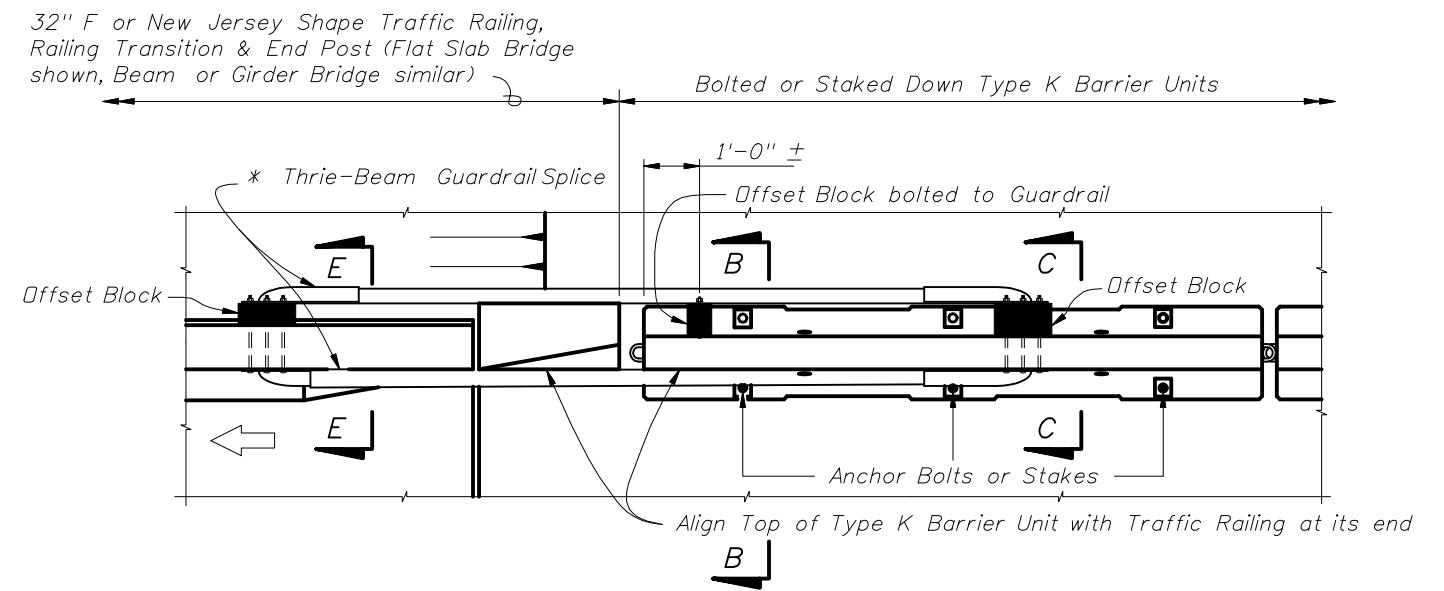
* See Thrie-Beam Guardrail Positioning Detail, Sheet 13 and Notes for Thrie-Beam Guardrail Splice Installations, Sheet 4.



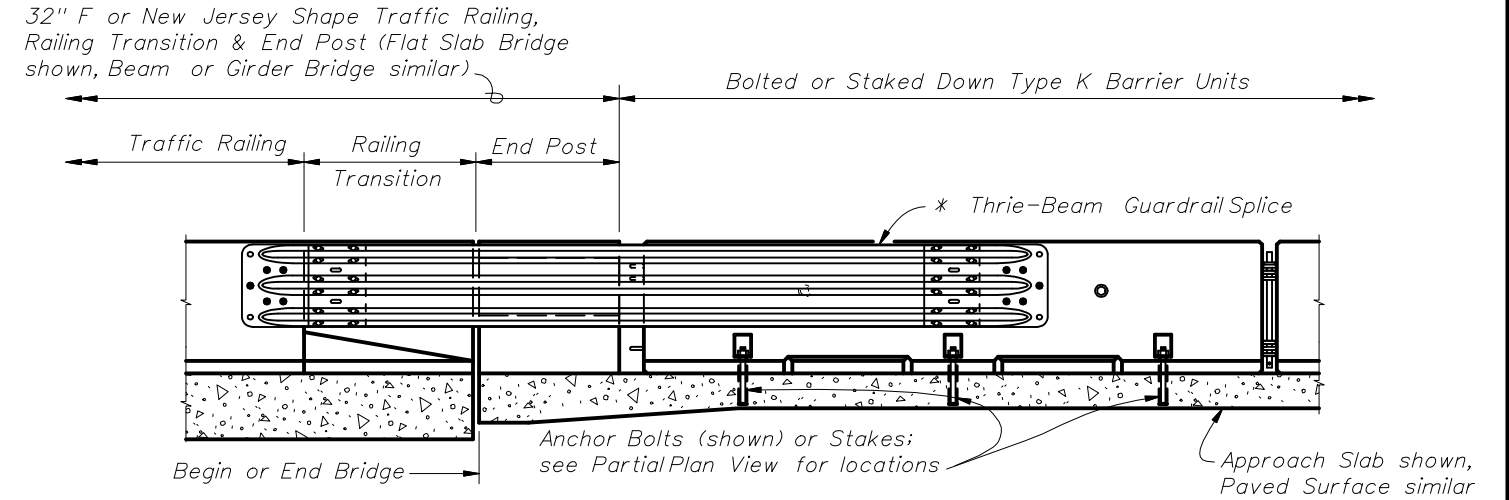
PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section B-B,
Section C-C and Section D-D.

TRAILING END SPLICE DETAIL
FOR 32" F AND NEW JERSEY SHAPE TRAFFIC RAILINGS
WITH RAILING TRANSITION AND END POST



PARTIAL PLAN VIEW



PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section B-B,
Section C-C and Section E-E.

APPROACH TRANSITION SPLICE DETAIL
FOR 32" F AND NEW JERSEY SHAPE TRAFFIC RAILINGS
WITH RAILING TRANSITION AND END POST

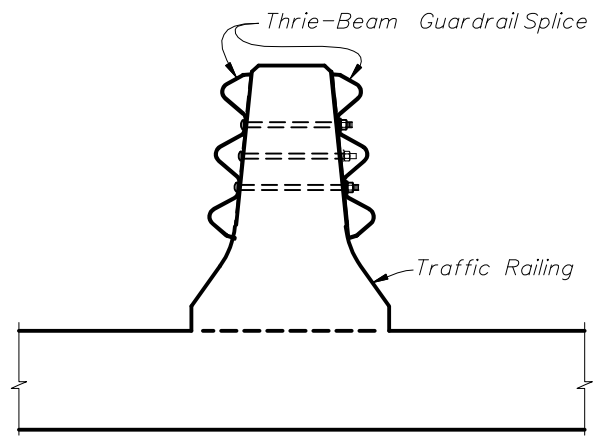


2010 FDOT Design Standards

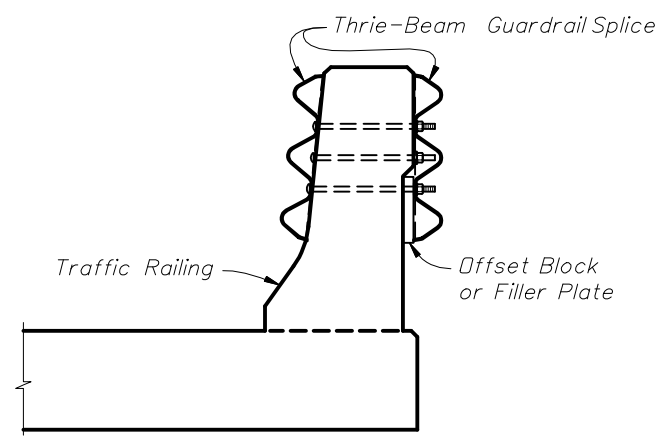
TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

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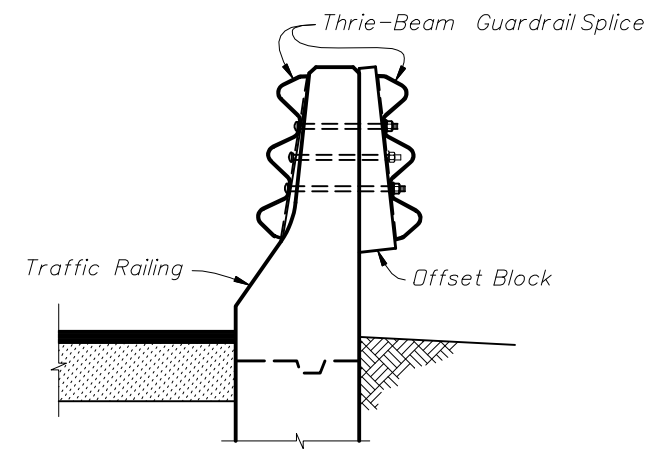
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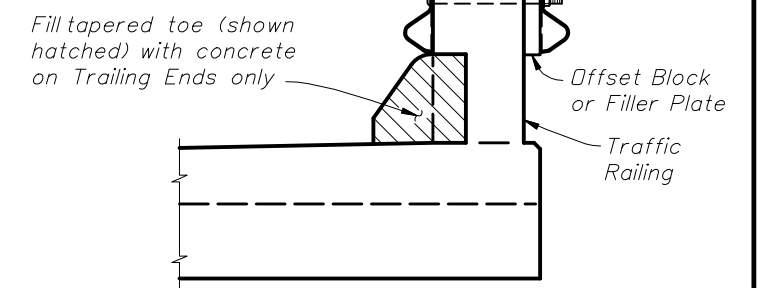
SECTION A-A
32" F Shape Median Traffic Railing (shown),
Median Concrete Barrier Wall (similar)



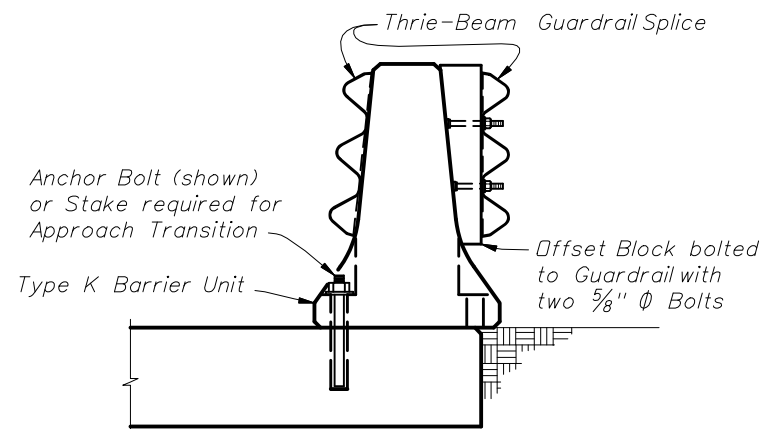
SECTION A-A
32" F Shape Traffic Railing (shown),
42" Traffic Railing and 8' & 14' Traffic
Railing / Sound Barriers (similar)



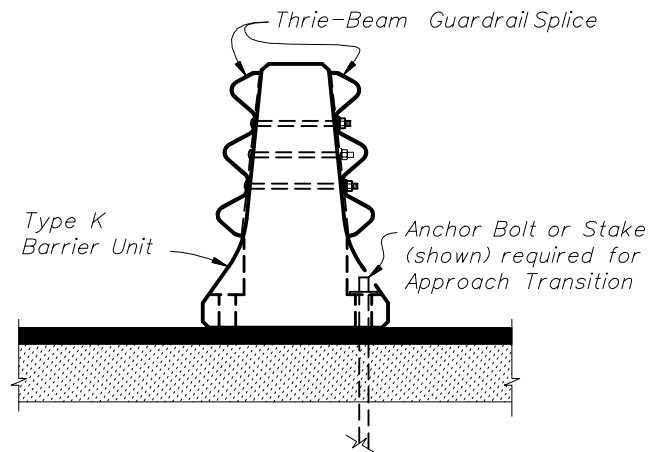
SECTION A-A
32" New Jersey Shape Concrete Barrier
Wall (shown), 32" New Jersey Shape Traffic
Railing & other Narrow Traffic Railings (similar)



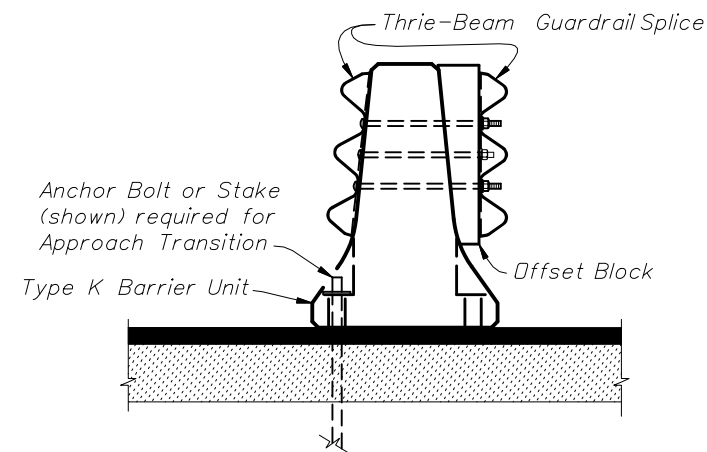
SECTION A-A
32" & 42" Vertical Shape Traffic
Railing (shown), Florida Corral
Traffic Railing (similar)



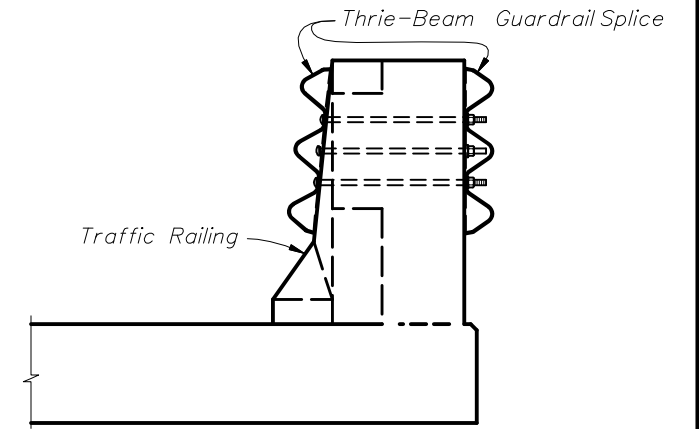
SECTION B-B
Adjacent to Shoulder Traffic Railings



SECTION C-C
Adjacent to 32" F or New Jersey Shape
Median Traffic Railing or
Median Concrete Barrier Wall

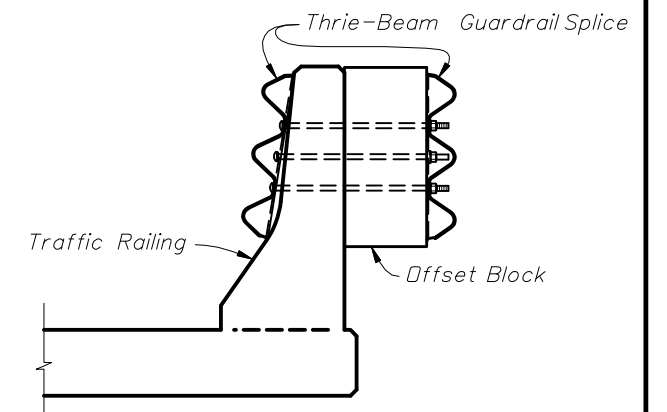
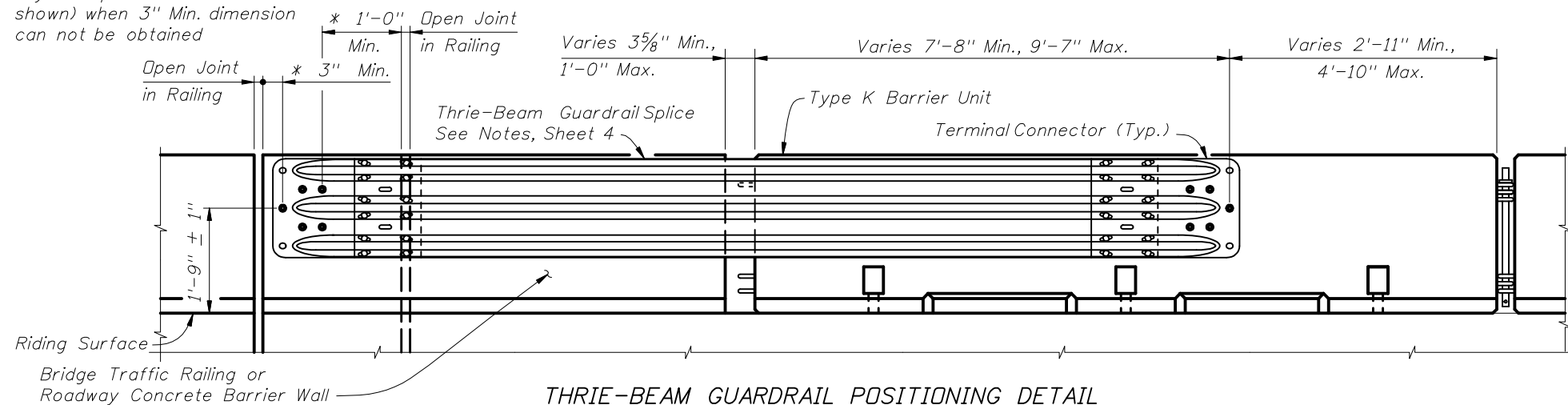


SECTION C-C
Adjacent to Shoulder Traffic Railings

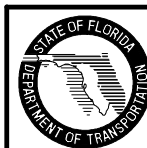


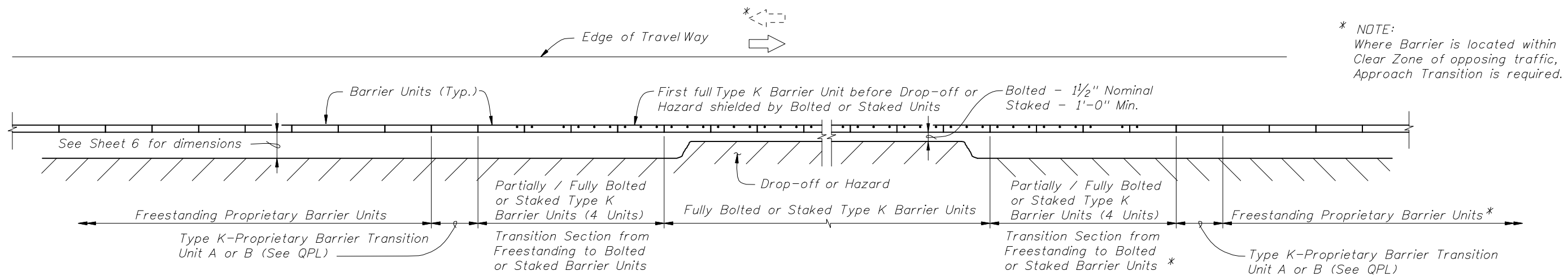
SECTION D-D
32" F or New Jersey Shape Traffic
Railing, Railing Transition & End Post

* Shift Thrie-Beam Guardrail Splice
beyond Open Joint 1'-0" Min. (as
shown) when 3" Min. dimension
can not be obtained

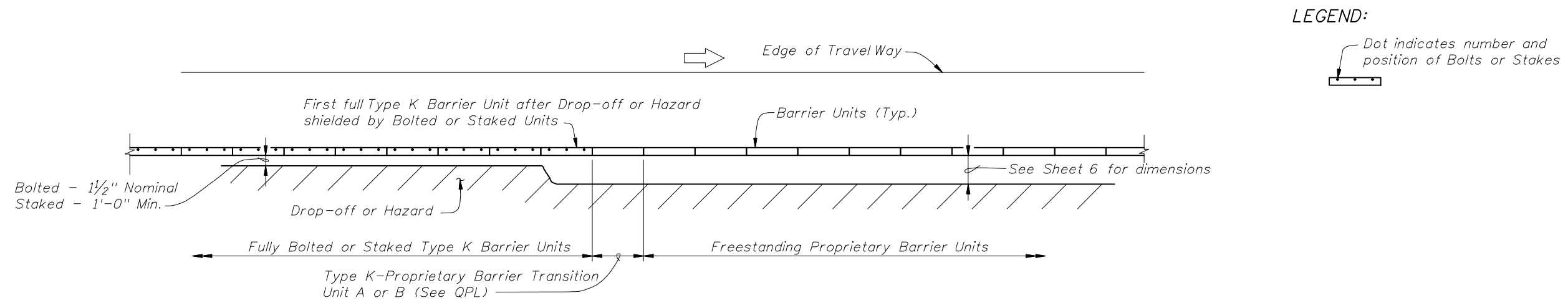


SECTION E-E
32" New Jersey Shape Traffic Railing
(shown), 32" F Shape Traffic
Railing (similar)

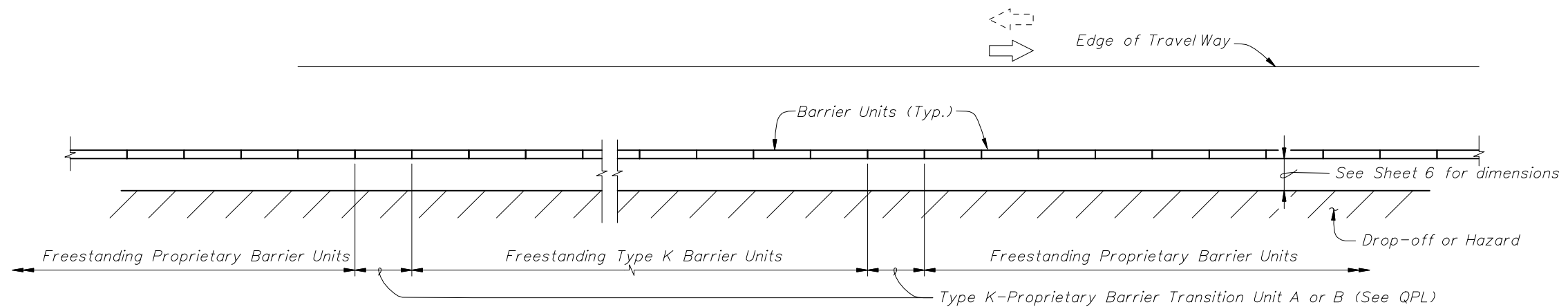




APPROACH TRANSITION FROM FREESTANDING PROPRIETARY TEMPORARY BARRIERS TO BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS



TRAILING END TRANSITION FROM BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY TEMPORARY BARRIERS

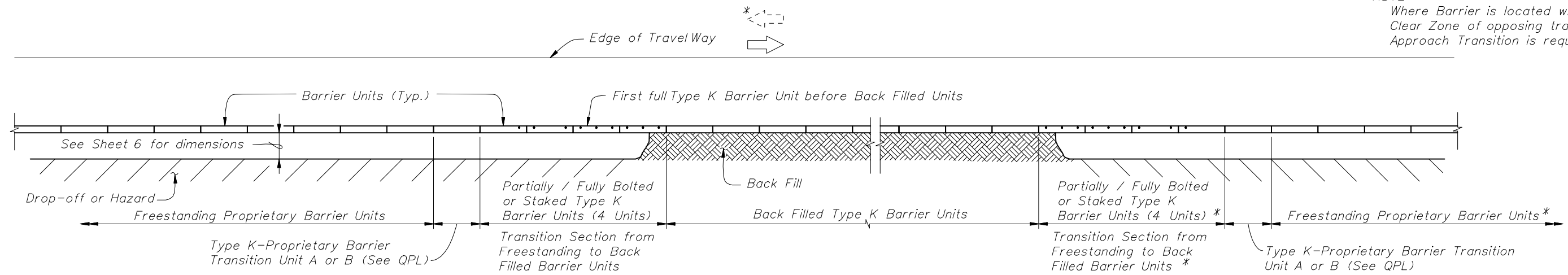


APPROACH AND TRAILING END TRANSITIONS FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY TEMPORARY BARRIERS

TYPE K-PROPRIETARY TEMPORARY CONCRETE BARRIER TRANSITIONS

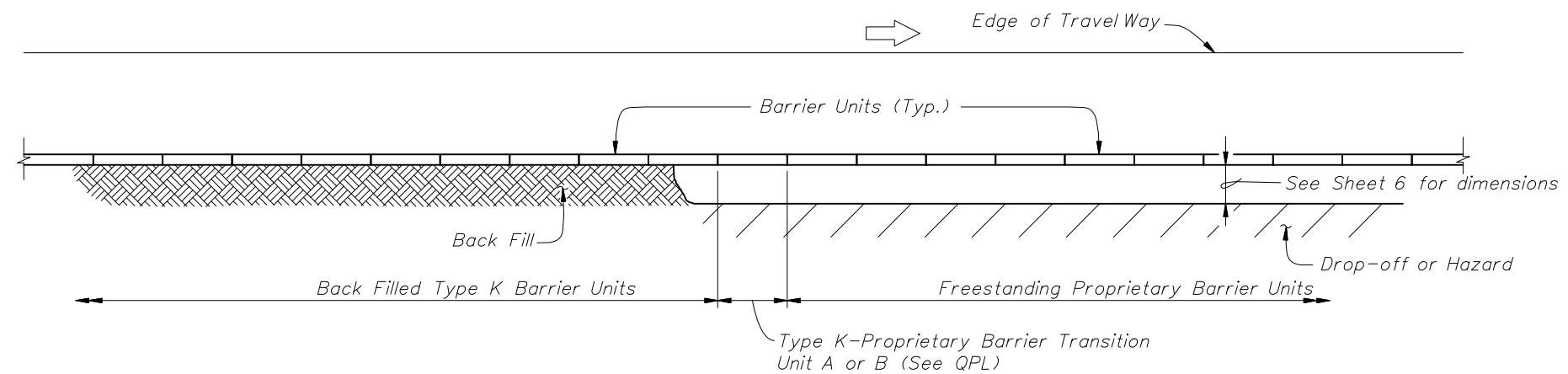


* NOTE:
Where Barrier is located within
Clear Zone of opposing traffic,
Approach Transition is required.

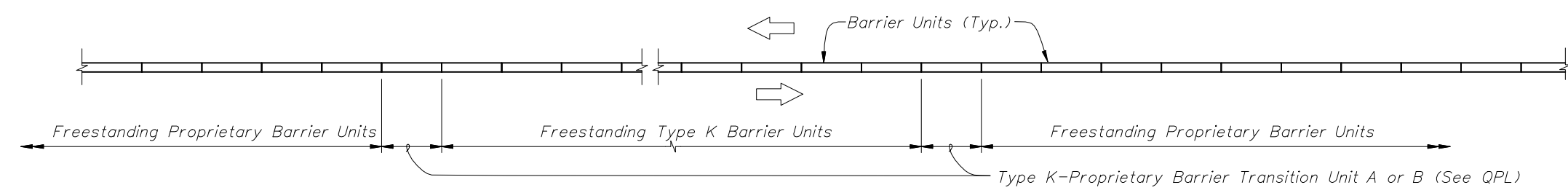


APPROACH TRANSITION FROM FREESTANDING PROPRIETARY TEMPORARY BARRIERS TO BACK FILLED TYPE K TEMPORARY CONCRETE BARRIERS

LEGEND:
Dot indicates number and
position of Bolts or Stakes

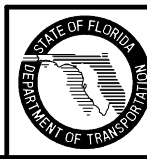


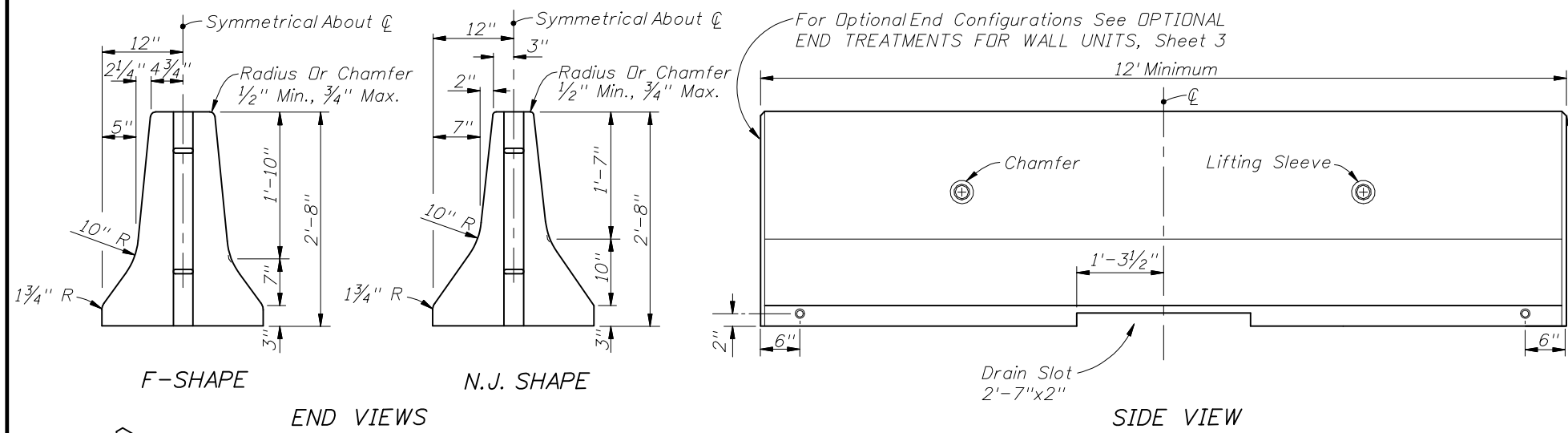
TRAILING END TRANSITION FROM BACK FILLED TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY BARRIERS



MEDIAN APPROACH AND TRAILING END TRANSITIONS FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY TEMPORARY BARRIERS

TYPE K-PROPRIETARY TEMPORARY CONCRETE BARRIER TRANSITIONS





Chamfer Top & Sides, Both Ends, 1/2" Min., 3/4" Max.

GENERAL NOTES

- Temporary Concrete Barrier walls on roadways may be any of the following:
 - The FDOT Type K Temporary Concrete Barrier Wall (Design Standard Index 414), F-Shape Units only.
 - The FDOT 415 Temporary Concrete Barrier wall unit shown on Sheets 1 and 3 of this index, if manufactured prior to October 1, 2002, in good condition, and installed in accordance with this Index. Units may be either F-Shape or New Jersey Shape. The FDOT 415 unit shown in this Index is the design provided in Index No. 415 in prior editions of the Design Standards. See "NOTICE" below. Since units produced after October 1, 2002 cannot be used, complete fabrication details are omitted in this edition of the Design Standards.
 - Temporary concrete barrier wall systems meeting NCHRP 350 Test Level 3 criteria and included on the Qualified Products List. Units may be either F-Shape or New Jersey Shape unless otherwise noted in the plans. For temporary concrete barrier walls on bridges see Design Standard Index No. 414.

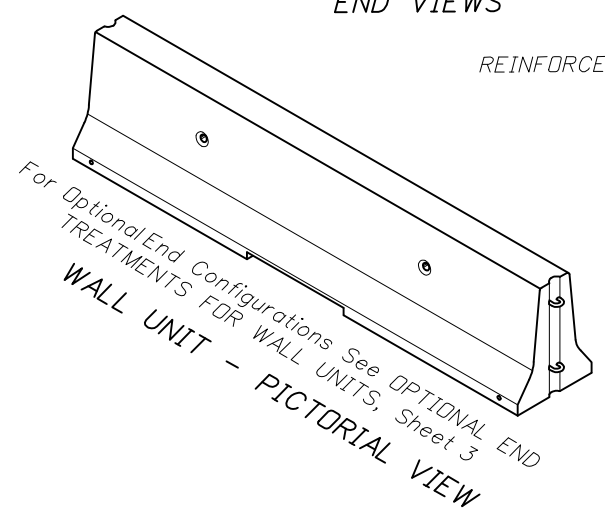
- The FDOT 415 units with the optional end connections shown in this index may be interconnected within a run of wall. However, intermixing units with different shapes (F-Shape, New Jersey Shape) and units with dissimilar end connections (415, Type K, or other) within a continuous run of wall is not permitted. See Sheets 6 through 8 for required treatment for continuation of runs of barrier with different shapes or dissimilar connectors.
- Alignment, length of need, anchorage and end treatment shall be in accordance with this index.
- Wall units shall not be used for permanent barrier wall construction regardless of unit length, unless specifically permitted by the plans.
- If the plans specify Barrier Wall (Temporary) (Type K), substitution with other barrier types is not permitted.
- If the plans specify temporary concrete barrier wall, substitution with water filled barriers is not permitted.
- Type C Steady-Burn Lights are to be mounted on top of temporary concrete barrier walls that are used as barriers along traveled ways in work zones. The lights are to be spaced at 50' centers in transitions, 100' centers on curves and 200' centers on tangent roadways. For additional information refer to Index 600.
- Wall units used for work zone traffic control and other temporary applications shall be paid for under the contract unit price for Barrier Wall (Temporary), LF. Type C Steady-Burn Lights shall be paid for under the contract unit price for Lights, Temporary, Barrier Wall Mount (Steady-Burn), ED.

REINFORCEMENT AND OTHER UNIT FABRICATION DETAILS NOT SHOWN. SEE 'NOTICE' BELOW.

WALL UNIT

NOTICE

THE TEMPORARY CONCRETE BARRIER WALL UNIT SHOWN ON THIS INDEX THAT WAS PRODUCED PRIOR TO OCTOBER 1, 2002, AND THAT IS IN GOOD CONDITION, CAN BE USED ON STATE HIGHWAY PROJECTS THROUGH SEPTEMBER 30, 2012. TEMPORARY CONCRETE BARRIER UNITS PRODUCED ON AND AFTER OCTOBER 1, 2002 FOR USE ON STATE HIGHWAY PROJECTS MUST MEET NCHRP 350 CRITERIA, AND MUST BE INCLUDED ON THE QUALIFIED PRODUCTS LIST. IF AND WHEN A GENERIC TEMPORARY CONCRETE BARRIER WALL UNIT IS APPROVED FOR USE ON STATE HIGHWAY PROJECTS, THE UNIT DESIGN WILL BE POSTED ON THE ROADWAY DESIGN WEB SITE.



FDOT 415 TEMPORARY CONCRETE BARRIER WALL UNIT AND GENERAL NOTES

When Shielding Above Ground Hazards:

Design Speed	Deflection Space
45 mph or Less	2'
50 mph and Greater	4'

When Shielding Dropoffs:

Design Speed	Deflection Space
45 mph or Less	2'
50 mph and Greater	2'
a. Dropoffs 4' or Less and No Traffic Below	2'
b. All dropoff conditions other than 'a'.	4'

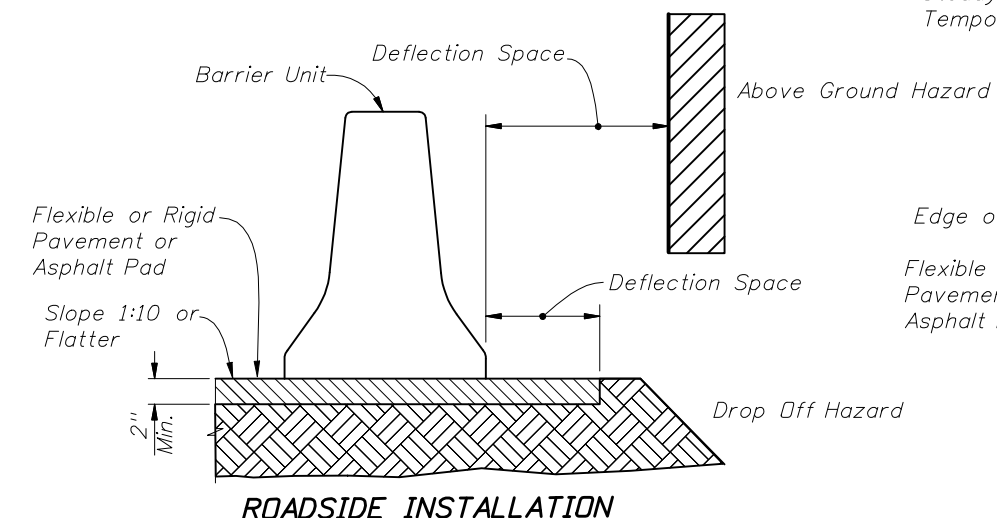
When used as a Temporary Median Barrier separating opposing traffic lanes:

Design Speed	Offset To Travelway
45 mph or Less	0' min., 2' preferred
50 mph and Greater	2'

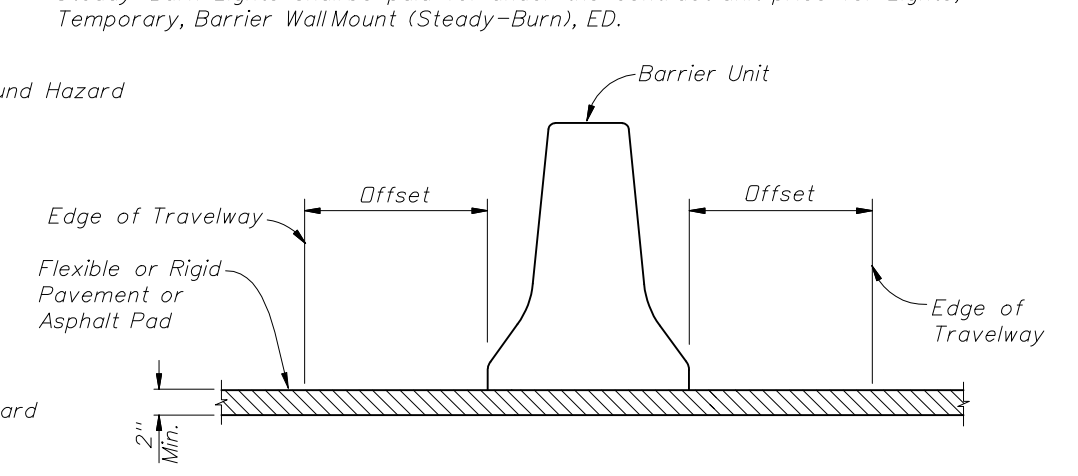
Note: These deflection space requirements also apply to approved options identified in General Note 1.

DEFLECTION SPACE REQUIREMENTS

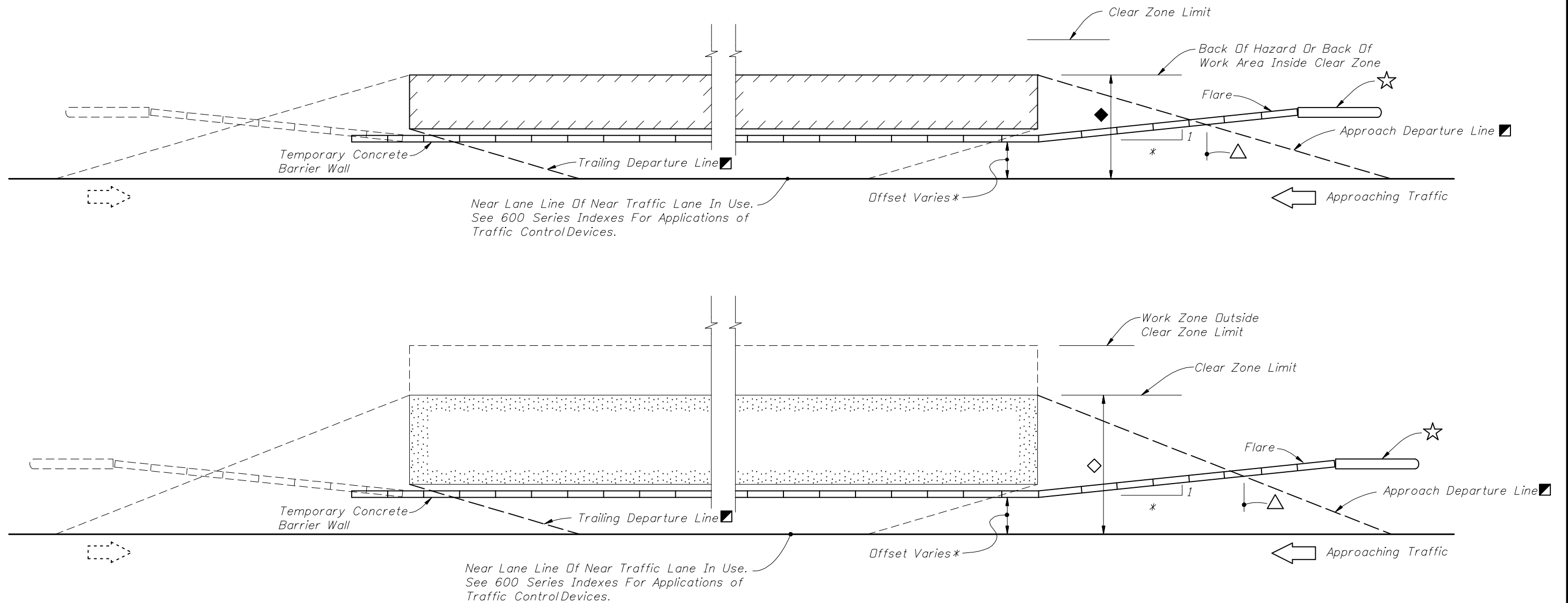
Note: Where existing pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement. Cost of the Asphalt Pad to be included in the cost of the Barrier.



ROADSIDE INSTALLATION



MEDIAN INSTALLATION



△ The approach departure line location is determined by the line intersect with the back of the hazard or the area to be shielded, however the intersect offset distance is not to be beyond the clear zone limit. The trailing departure line is determined by the line intersect with the front of the downstream end of the hazard or the area to be shielded.

The length of barrier wall need is the distance from the approach departure line intersect with the upstream toe of the temporary concrete barrier wall to the trailing departure line intersect with the downstream toe of the temporary concrete barrier wall.

Where temporary concrete barrier wall end units are not anchored, two and one-half (2½) wall units (min.) are required beyond the length of barrier need for wall end anchorage. Temporary concrete barrier wall end units shall be located at or outside the clear zone or shielded by other structure, earth embedment or a crash cushion.

Proprietary redirective crash cushions designed for use with temporary concrete barriers have the beginning length of need and departure line intersect point indicated on the respective QPL drawing for each proprietary crash cushion. Where redirective crash cushions are located on the departure line by their length of need reference point, the wall upstream end unit must be aligned with the crash cushion, and the wall's end unit secured with the anchor plates shown on Sheet 4 of this index. See Sheets 5 through 8 for configurations requiring end unit anchorage.

* The wall offset from the near traffic lane, wall flare rate and wall flare length are to be in conformance with the alignment called for in the plans and the alignments called for by Department Design Standards specified in the plans; in absence of either plan requirement, the offset shall be as determined by the Engineer, and, unless other flare rates are approved by the Engineer the flare rates to be applied are 1:10 or flatter for speeds ≤ 45 mph and 1:15 or flatter for speeds ≥ 50 mph; see Index No. 642 for other flare rates on freeway facilities.

The surface cross slope approaching the barrier wall and continuing across the required deflection space shall not exceed a rate of 1 vertical:10 horizontal.

- Departure Rates
1:16 For Speeds ≤ 45 mph
1:13 For Speeds ≥ 50 mph
- ◆ Area Shielded When Work Zone Hazards Or The Work Area Occupy Space Less Than Clear Zone Width
- ◇ Area Shielded When Work Zone Hazards Or The Work Area Extend To Or Beyond Clear Zone Limit
- ☆ Crash Cushion In Absence Of Other Wall End Shielding. See △ Notations And Sheet 5 Through 8 For Varied Locations For Wall End Units And Crash Cushions.

ALIGNMENT AND LENGTH OF NEED

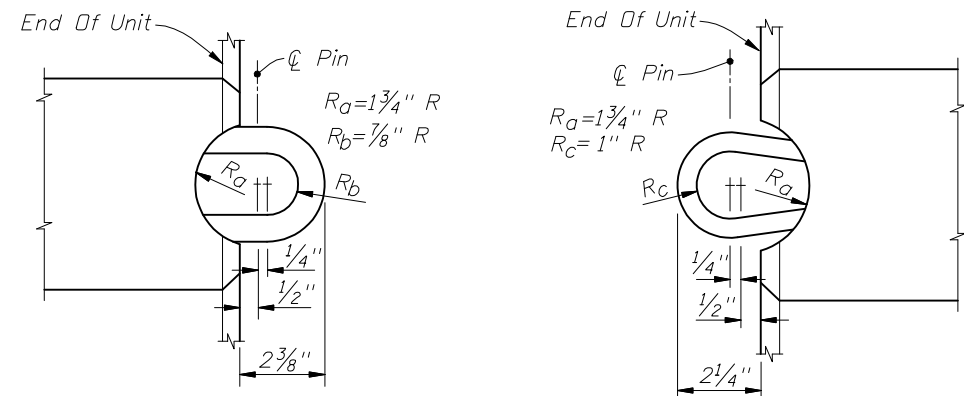


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TEMPORARY CONCRETE BARRIER

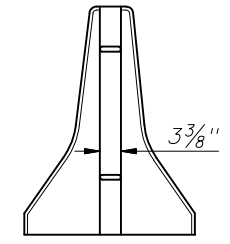
Last Revision 07/01/05 Sheet No. 2 of 10

Index No. 415

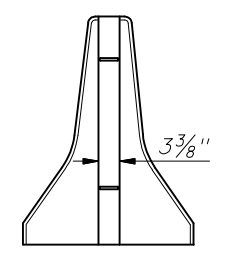


TOP VIEW

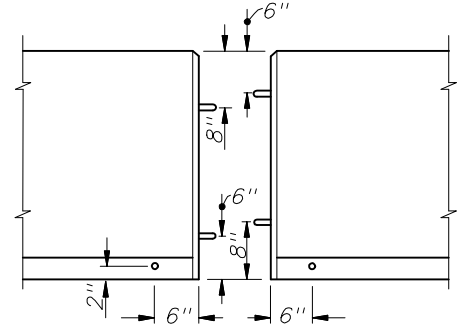
TOP VIEW



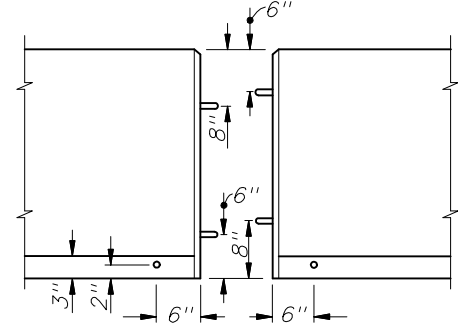
END VIEW



END VIEW

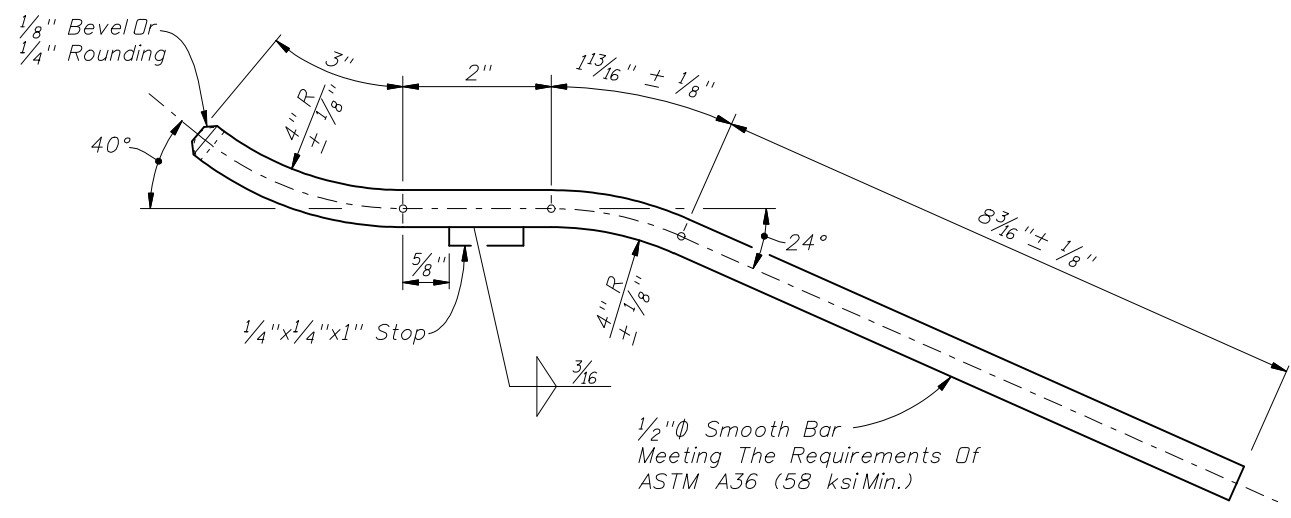


SIDE VIEW
ROUND BAR CONNECTOR

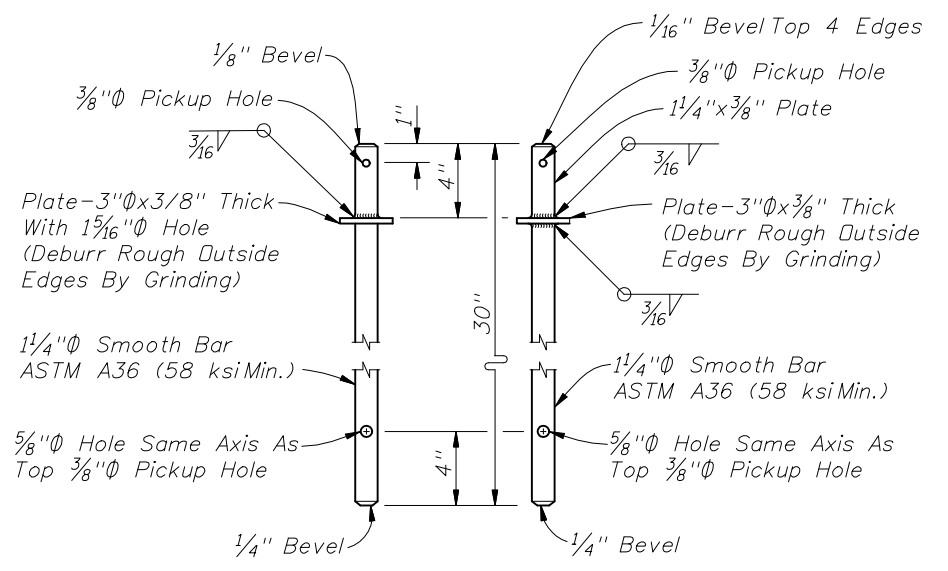


SIDE VIEW
WIRE ROPE CONNECTOR

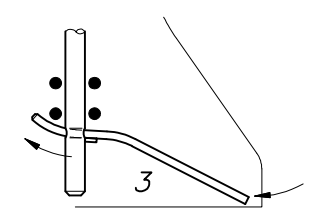
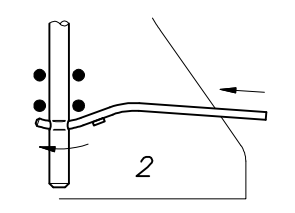
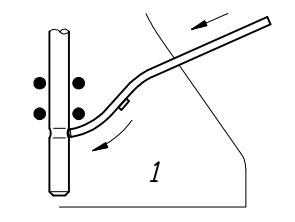
OPTIONAL END TREATMENTS FOR WALL UNITS



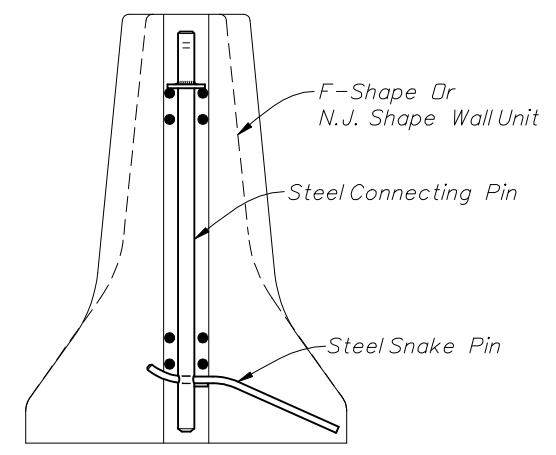
FDOT SNAKE PIN



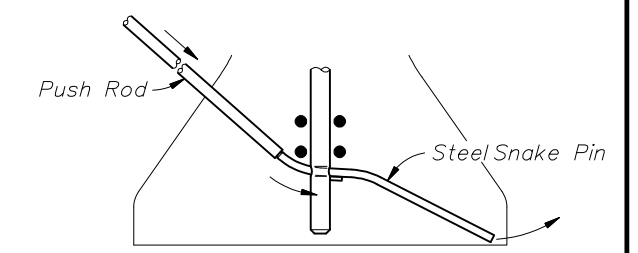
OPTIONAL PINS
STEEL CONNECTING PIN



INSERTING FDOT SNAKE PIN

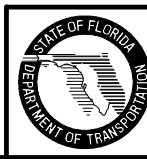


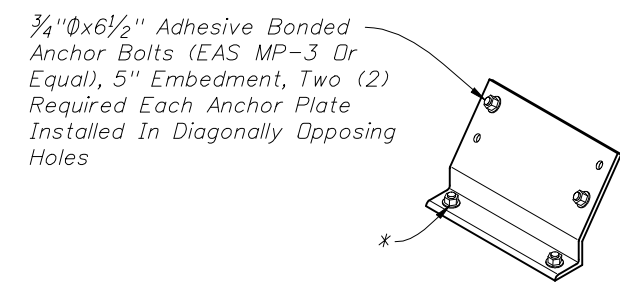
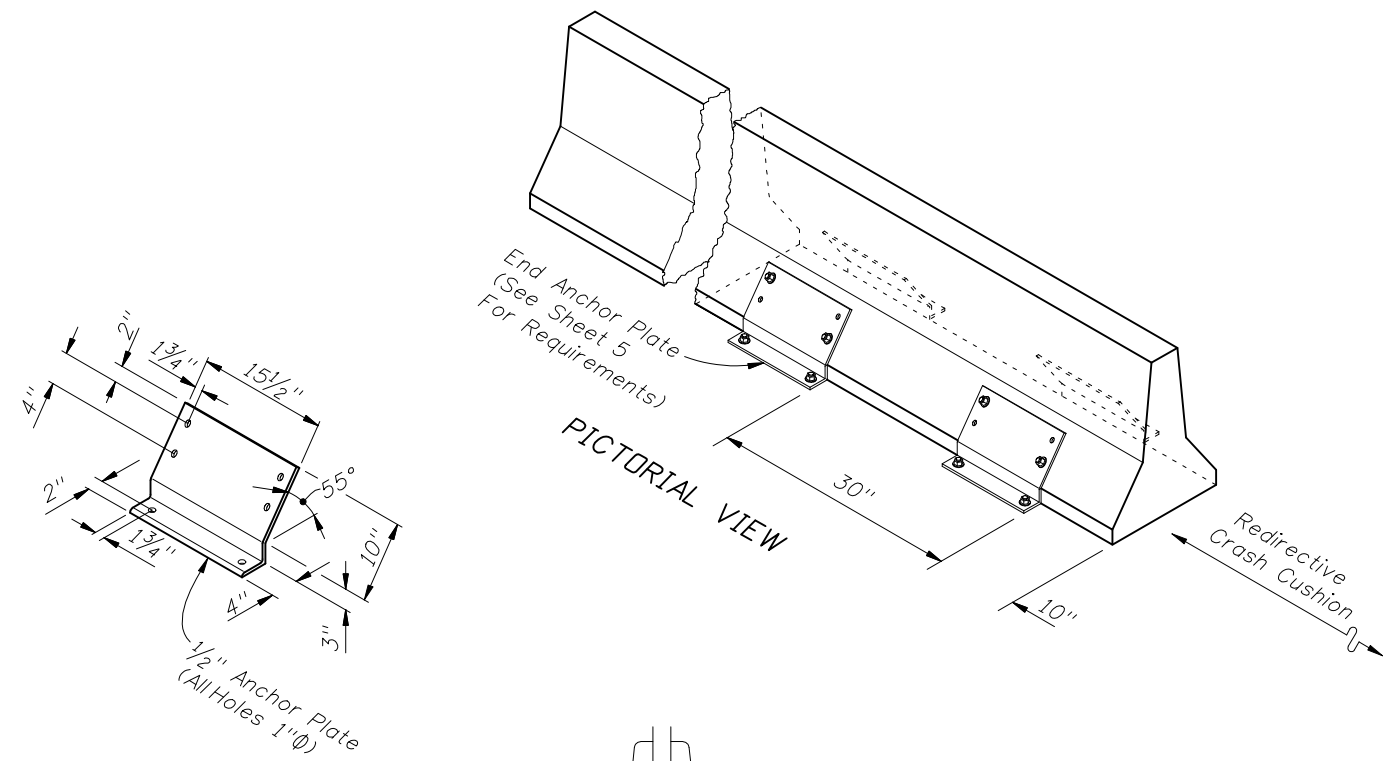
ASSEMBLED UNIT



REMOVING FDOT SNAKE PIN

CONNECTING PIN ASSEMBLY



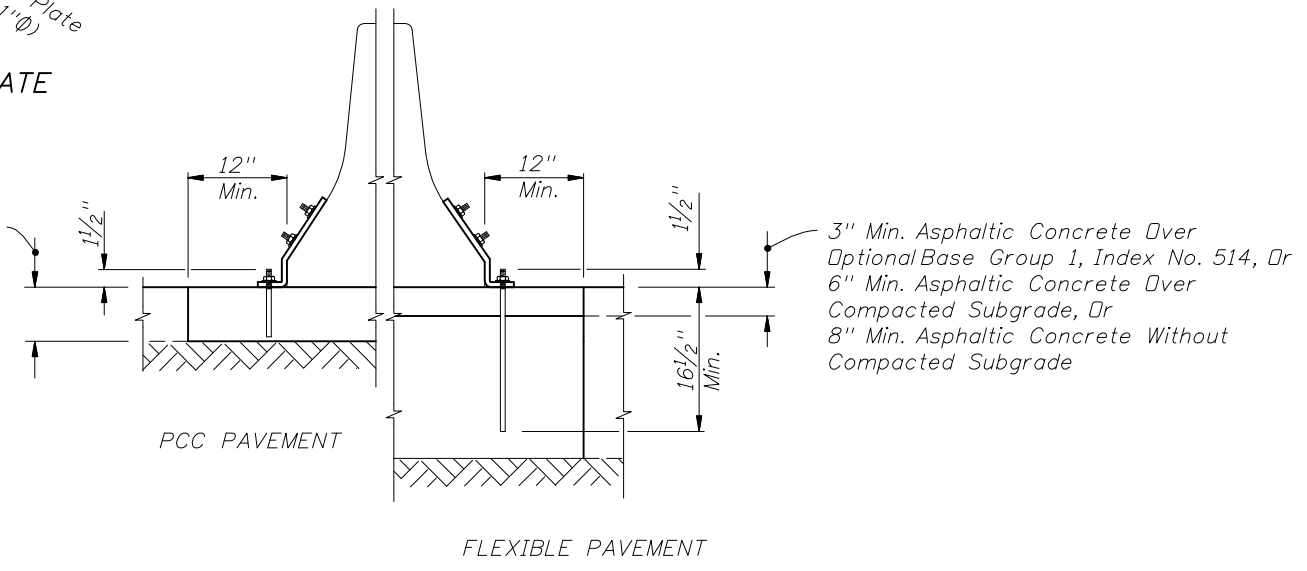


* $\frac{3}{4}$ " Φ x $6\frac{1}{2}$ " Adhesive Bonded Anchor Bolts (EAS MP-3 Or Equal), 5" Embedment Where Installed On Concrete Pavement Or Decking, Two (2) Required Each Anchor Plate. $\frac{3}{4}$ " Φ x18" MP-3 Threaded Rod Longbolt System Or Other Approved $\frac{3}{4}$ " Φ x18" Threaded Rod With Chemical Anchorage Full Embedment Depth Where Installed On Asphaltic Concrete Pavement Prescribed Below, Two (2) Required Each Anchor Plate.

ANCHOR PLATE BOLTS

ANCHOR PLATE

6" Thick 4000 psi Compressive Strength PCC Pavement (Min.) or 7" Deck Structure (Min.)



SURFACE ANCHORAGE REQUIREMENTS

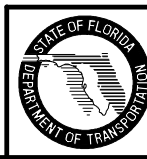
ANCHOR PLATE NOTES

1. For temporary barrier wall end units requiring anchor plates, see sheets 5 through 8.
2. The temporary concrete barrier wall anchor plate depicted above is a proprietary design by Energy Absorption Systems, Inc. Other temporary anchorage methods can be substituted when wall rigidity is assured by any of the following:
 - (a) proven by associated crash test of redirective crash cushions, or
 - (b) meet anchorage prescribed in 'A Guide To Standardized Highway Barrier Hardware', or
 - (c) crash cushion manufacturer's engineered design, or
 - (d) approved shop drawings on a case by case basis.
3. The cost for anchoring the wall segment will be included in the cost for the adjoining redirective crash cushion.

NOTES FOR WALL END SHIELDING

1. Redirective crash cushions are the principal (standard) device to be used for shielding approach ends of temporary concrete barrier walls. Except where the plans designate a particular type crash cushion for a specific location, the contractor has the option to construct any of the redirective crash cushions listed on the Qualified Products List, subject to the uses and limitations described on their respective drawings. The barrier wall end unit must be anchored to a paved surface using anchor plates in accordance with "Anchor Plate Notes" and the details on this sheet.
2. Temporary redirective crash cushions shall be installed in accordance with the manufacturer's specifications and recommendations. Temporary crash cushions can be either new or functionally sound used devices. Performance of intended function is the only condition for acceptance, whether the crash cushion is new, used, refurbished, purchased, leased, rented, on loan, shared between projects, or made up of mixed new and used components.
3. Inertial crash cushions are not optional systems for locations designated for redirective crash cushions by the plans; can not be substituted for redirective crash cushions, and are not eligible for VECP consideration.
4. A yellow post mounted Type 1 Object Marker shall be centered 3' in front of the nose of all temporary crash cushions. Mounting hardware shall be in accordance with Index Nos. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the crash cushion.
5. Optional temporary redirective crash cushions are to be paid for per location under the contract unit price for Vehicular Impact Attenuator (Temporary) (Redirective Option), LO.

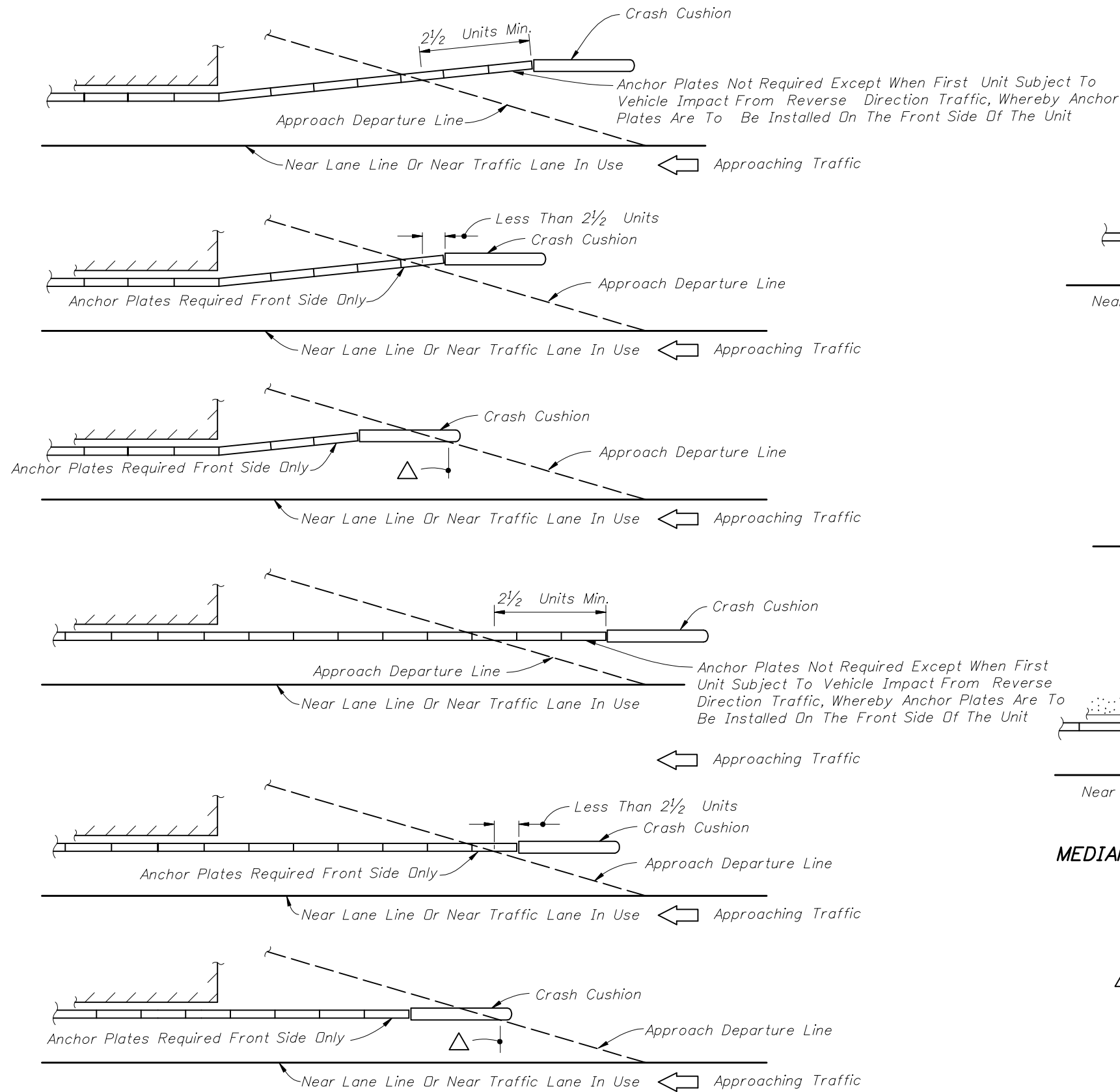
ANCHOR PLATE REQUIREMENTS FOR BARRIER WALL END UNITS ABUTTING CRASH CUSHIONS



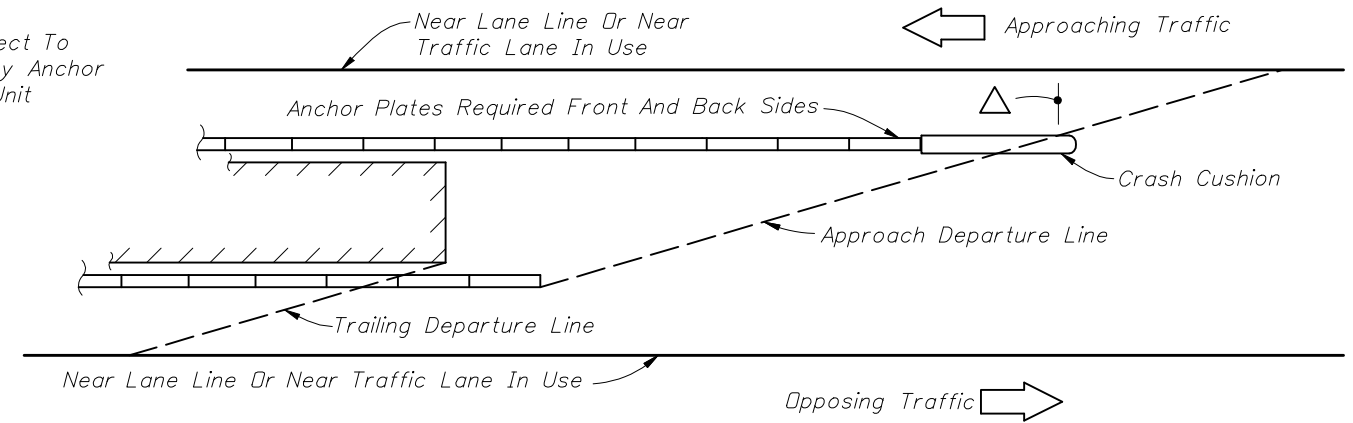
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TEMPORARY CONCRETE BARRIER

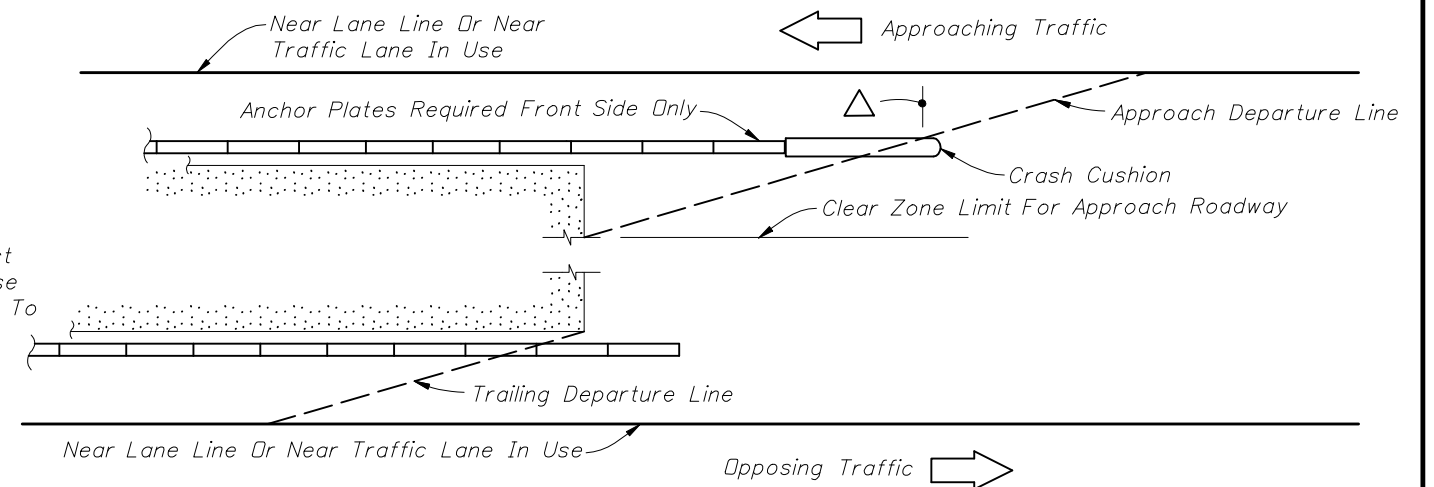
Last Revision	Sheet No.
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BARRIER WALL END UNIT ANCHORAGE



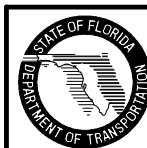
MEDIAN HAZARDS WITHIN CLEAR ZONES BOTH ROADWAYS

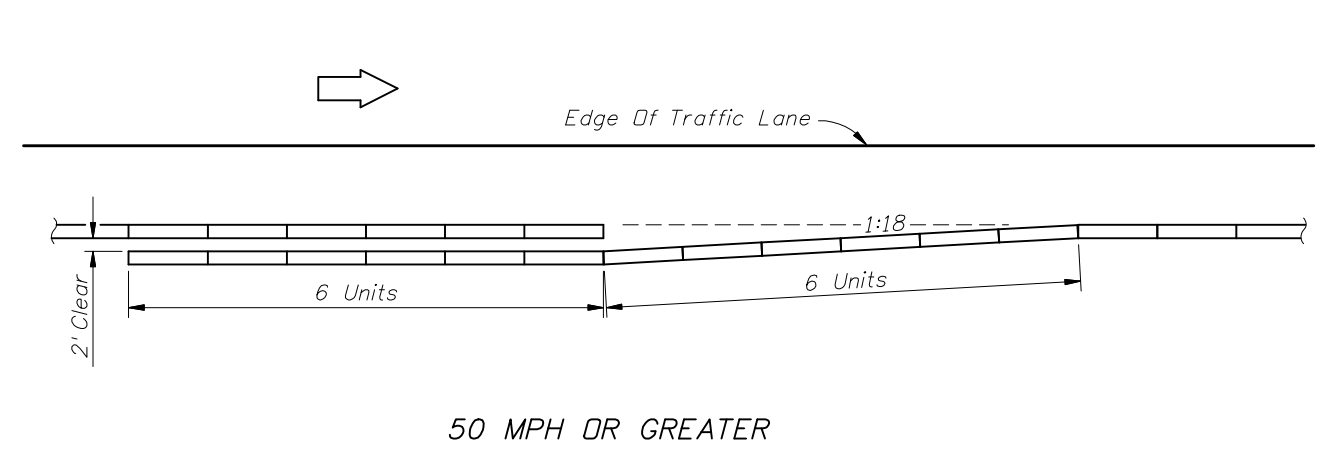
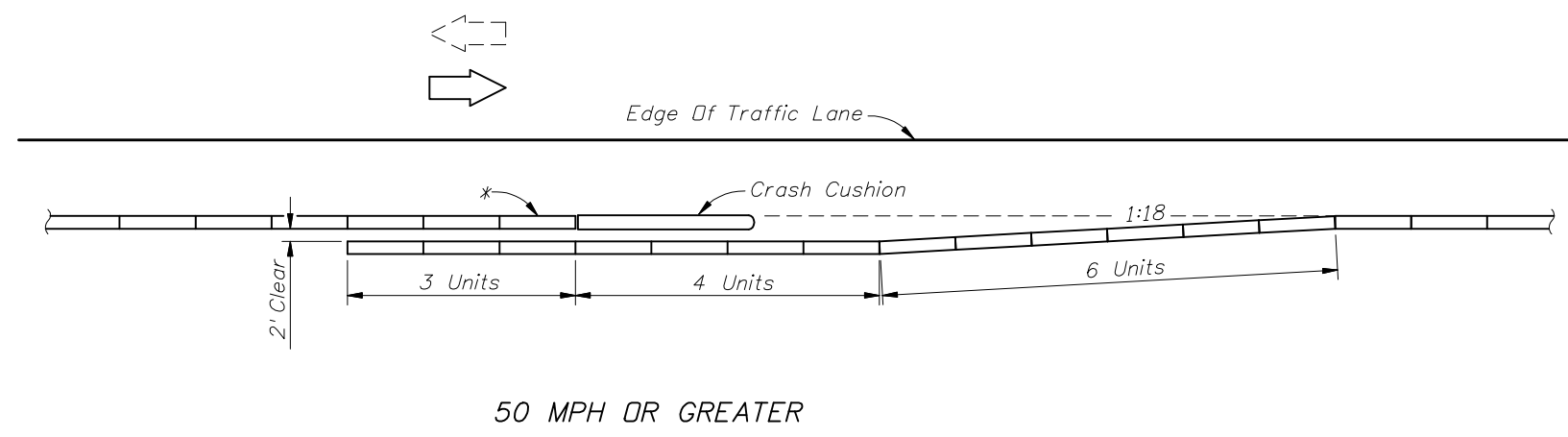
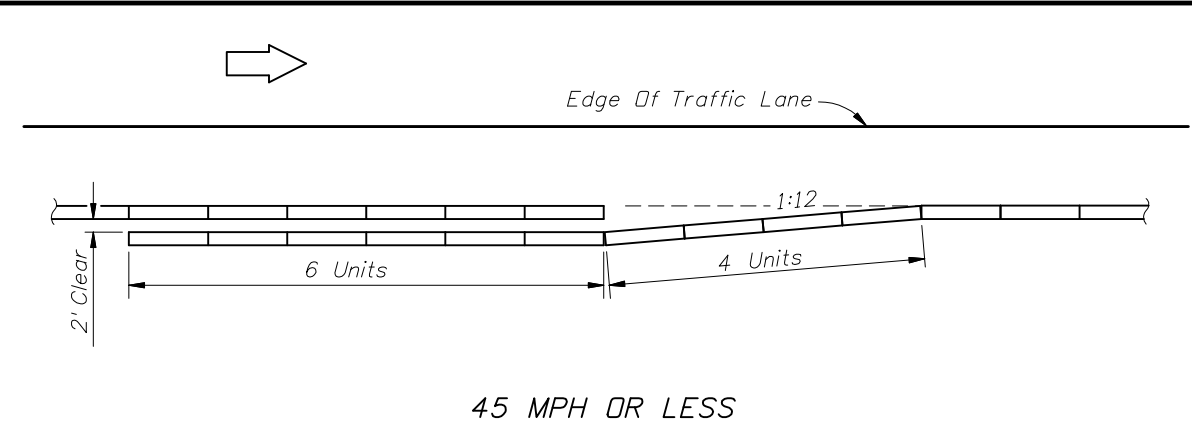
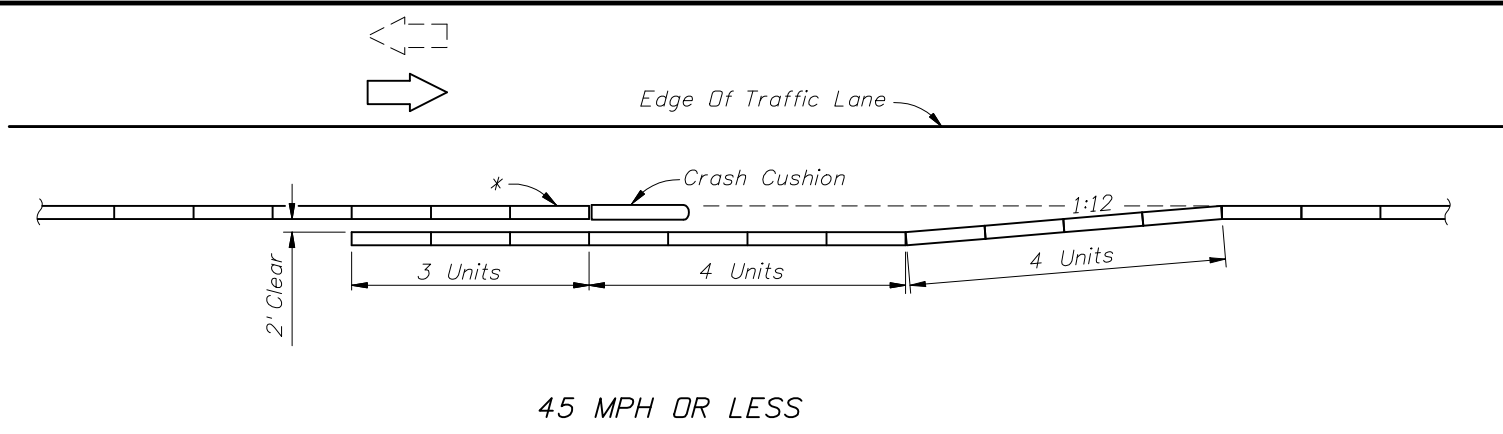


MEDIAN HAZARDS EXTENDS TO OR BEYOND CLEAR ZONES BOTH ROADWAYS

△ See Sheet 2

Note: Anchor Plates Required Only On End Units Abutting Crash Cushions. Schemes on this sheet based on 12' units.

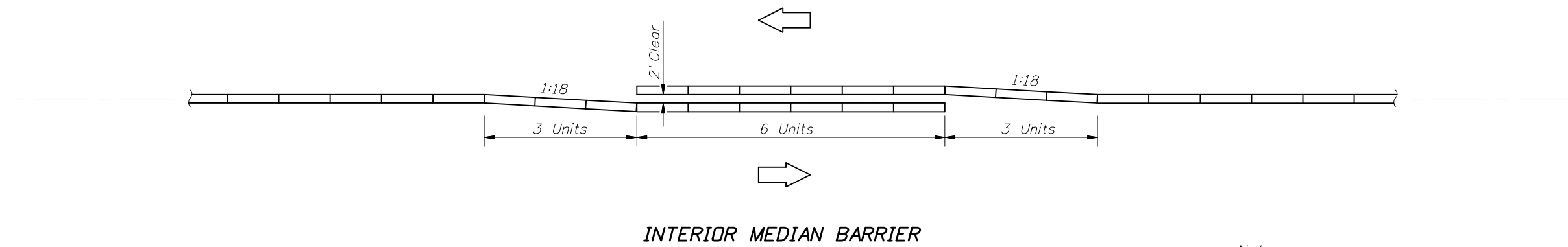




* Anchor Plates Required Front Side Only On Unit Abutting Crash Cushion (See Sheet 4).

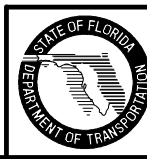
SHOULDER BARRIER ON UNDIVIDED FACILITIES

SHOULDER BARRIER ON DIVIDED FACILITIES



Note:
Schemes On This Sheet Based On 12' Units.
See Sheet Nos. 7 & 8 For Bridge Applications With Barrier Type K.

CONTINUATION OF RUNS OF BARRIER WITH DISSIMILAR CONNECTORS



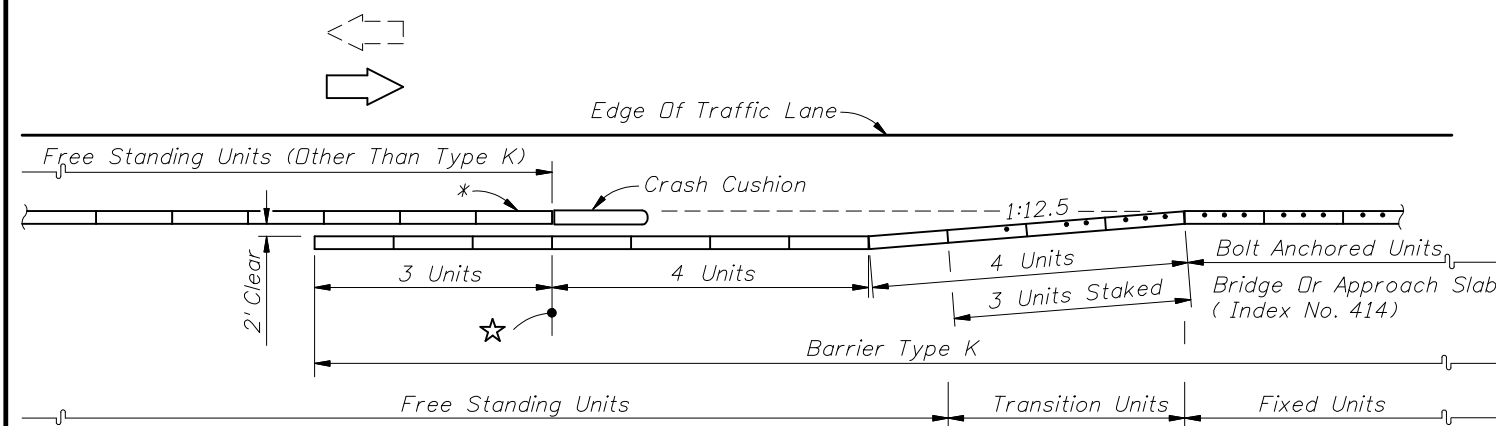
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TEMPORARY CONCRETE BARRIER

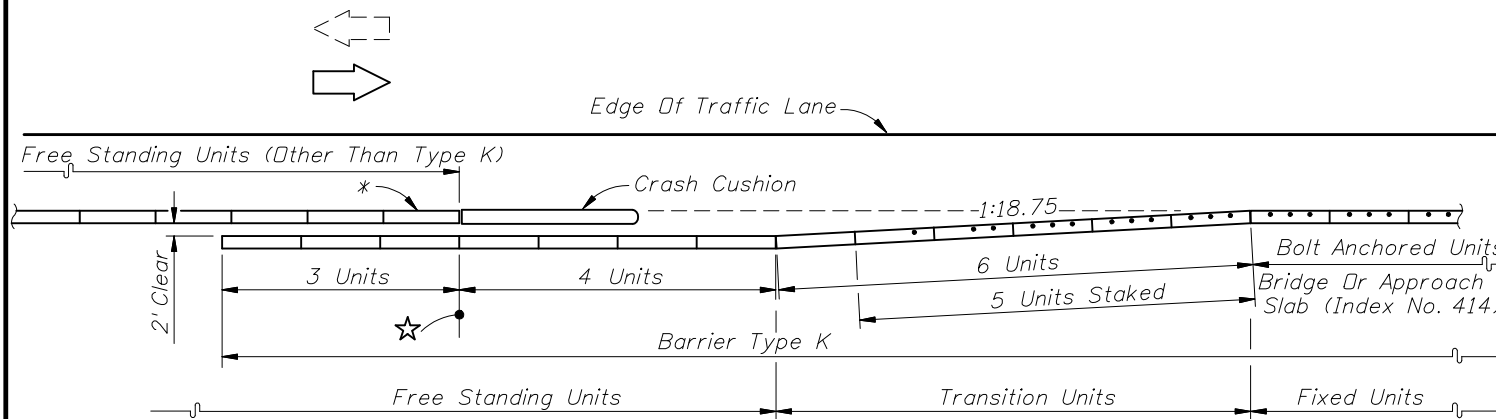
Last Revision
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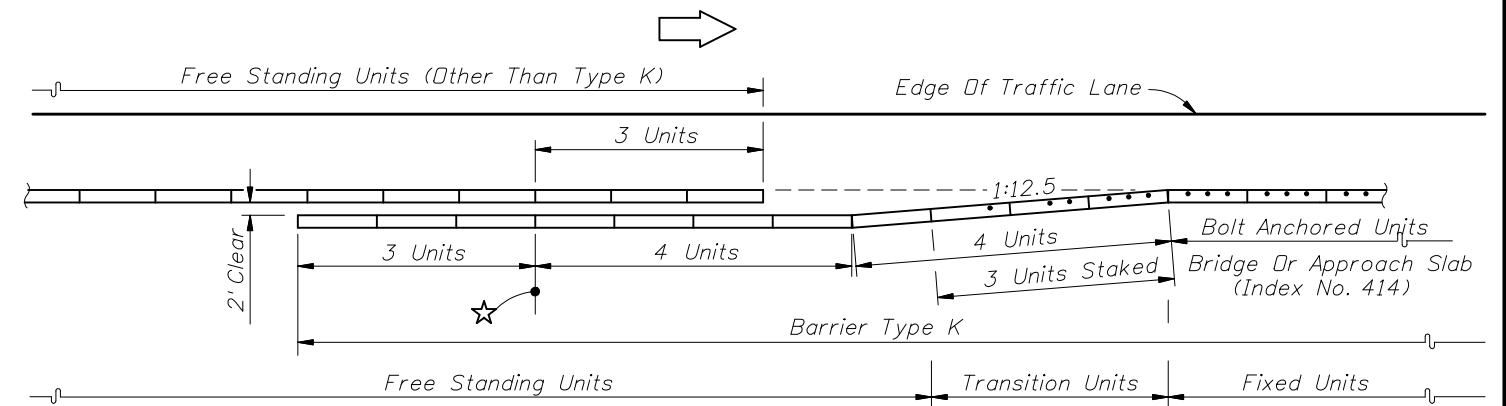
45 MPH OR LESS



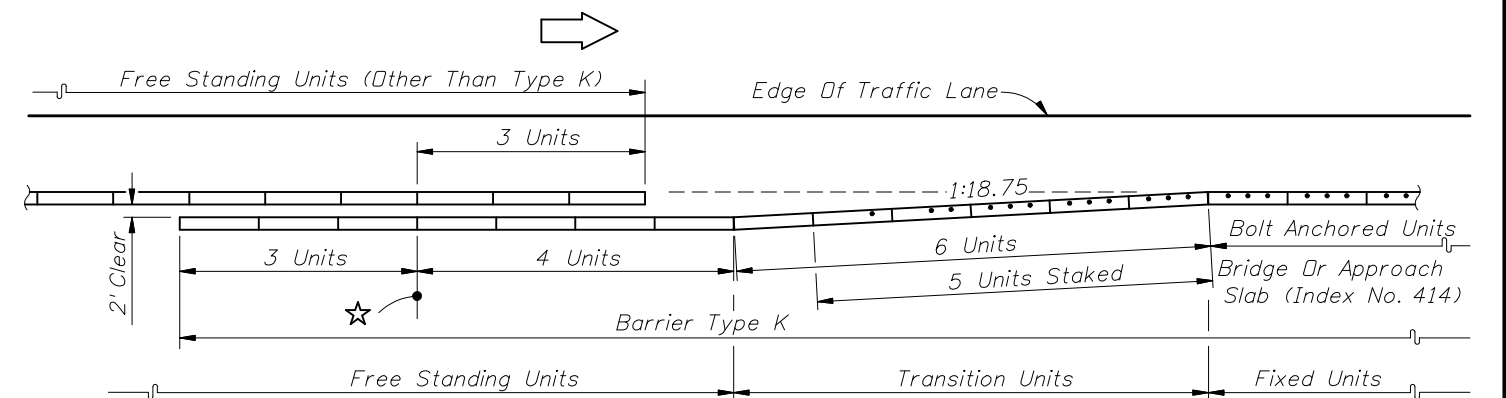
50 MPH OR GREATER

* Anchor Plates Required Front Side Only On Unit Abutting Crash Cushion (See Sheet 4).
 ☆ Overlap Reference Line

APPROACH SHOULDER BARRIER ON UNDIVIDED FACILITIES

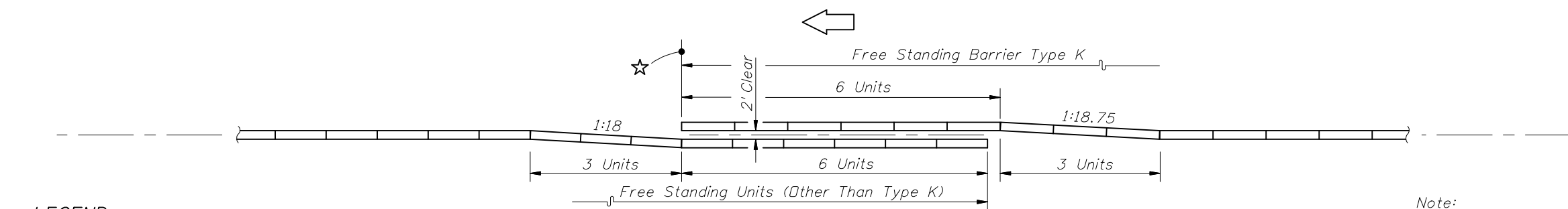


45 MPH OR LESS



50 MPH OR GREATER

APPROACH SHOULDER BARRIER ON DIVIDED FACILITIES



LEGEND

Dot Indicates Number Of Bolt Anchors Or Stakes

Note: See Sheet No. 8 For Departure Shoulder Applications.

INTERIOR MEDIAN BARRIER

CONTINUATION OF BARRIER • FROM OTHER TYPE BARRIERS TO BARRIER TYPE K
 BARRIER TYPE K ON BRIDGES AND APPROACH SLABS

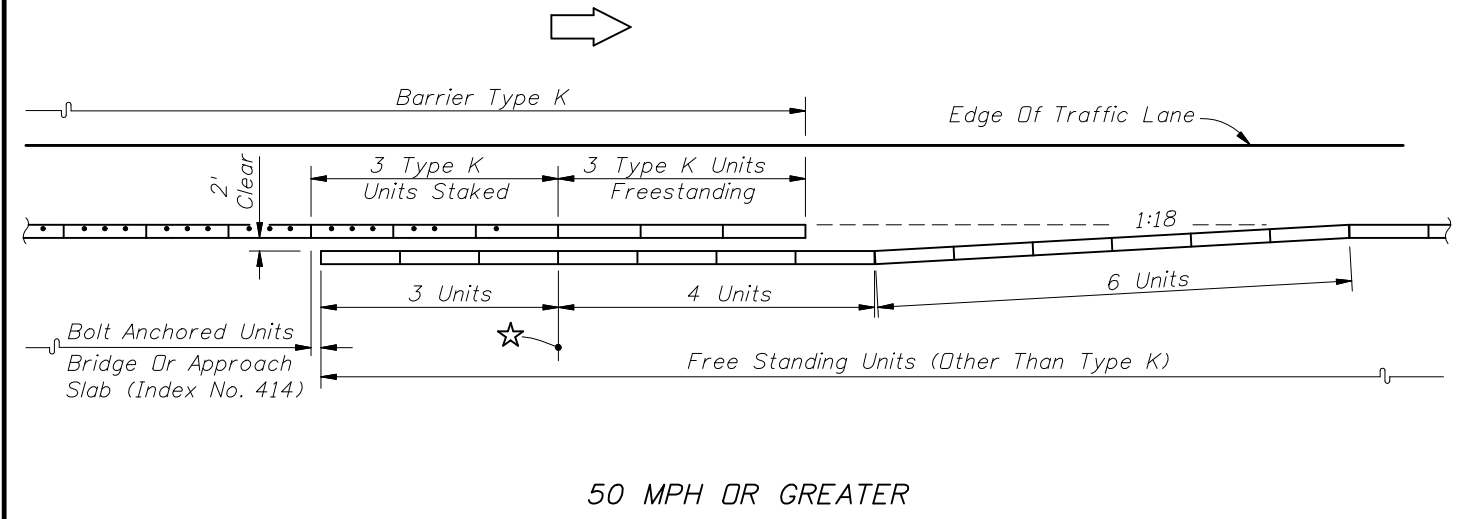
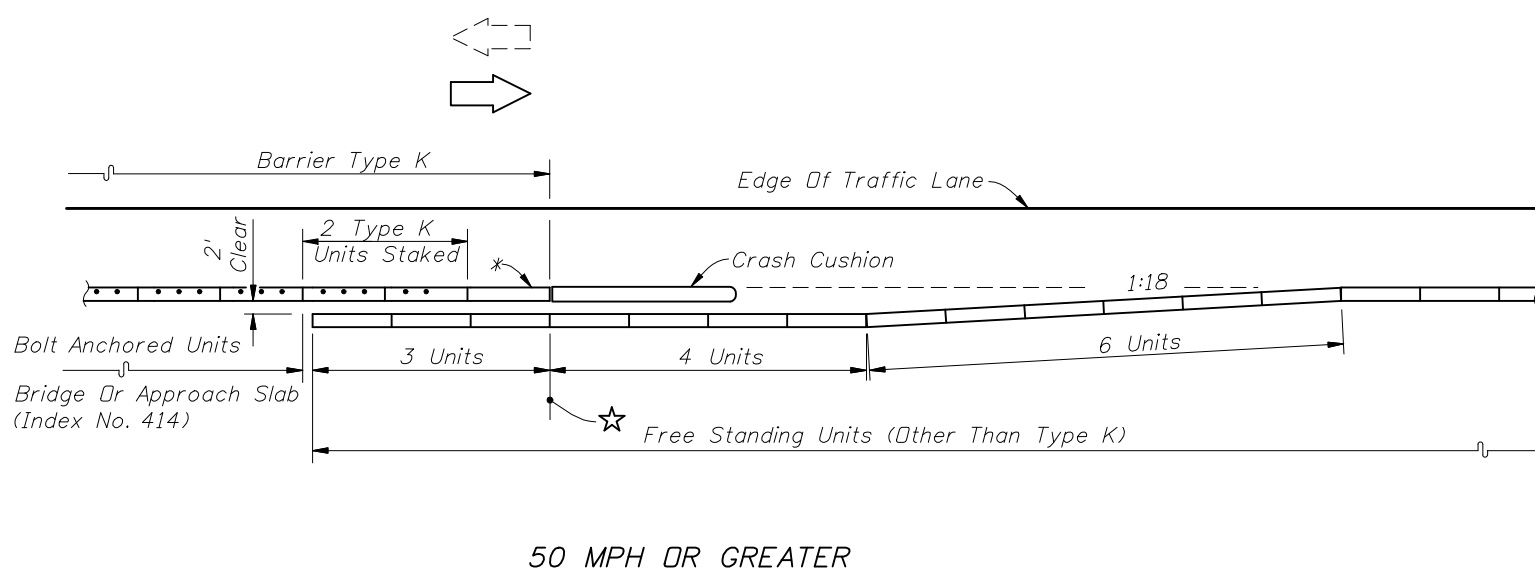
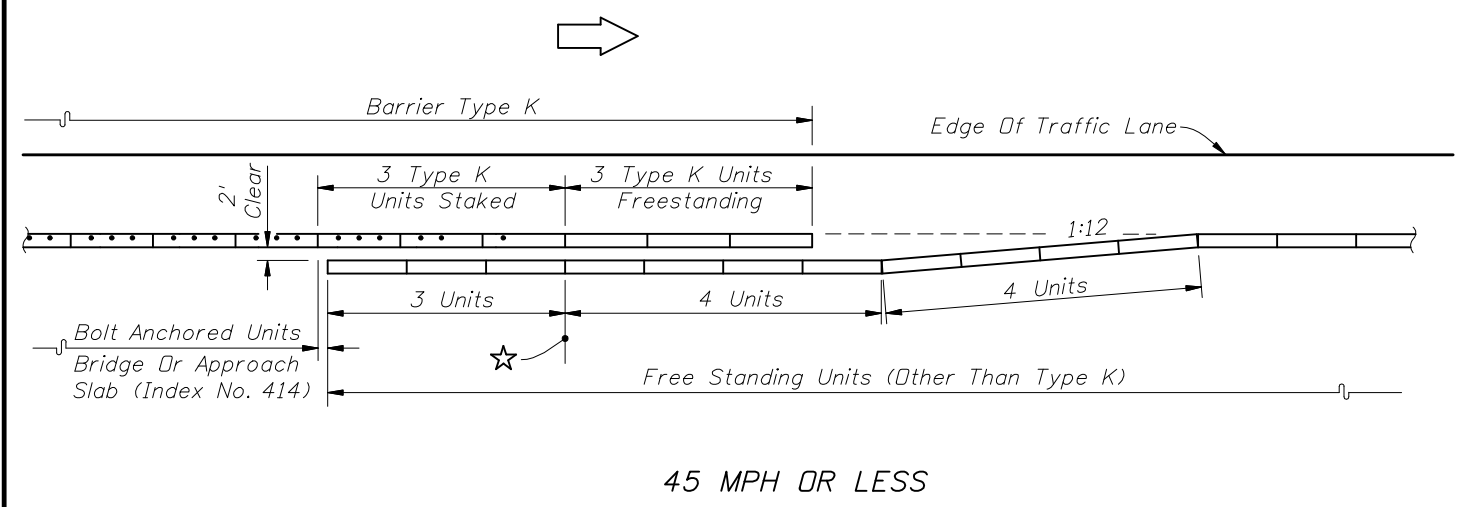
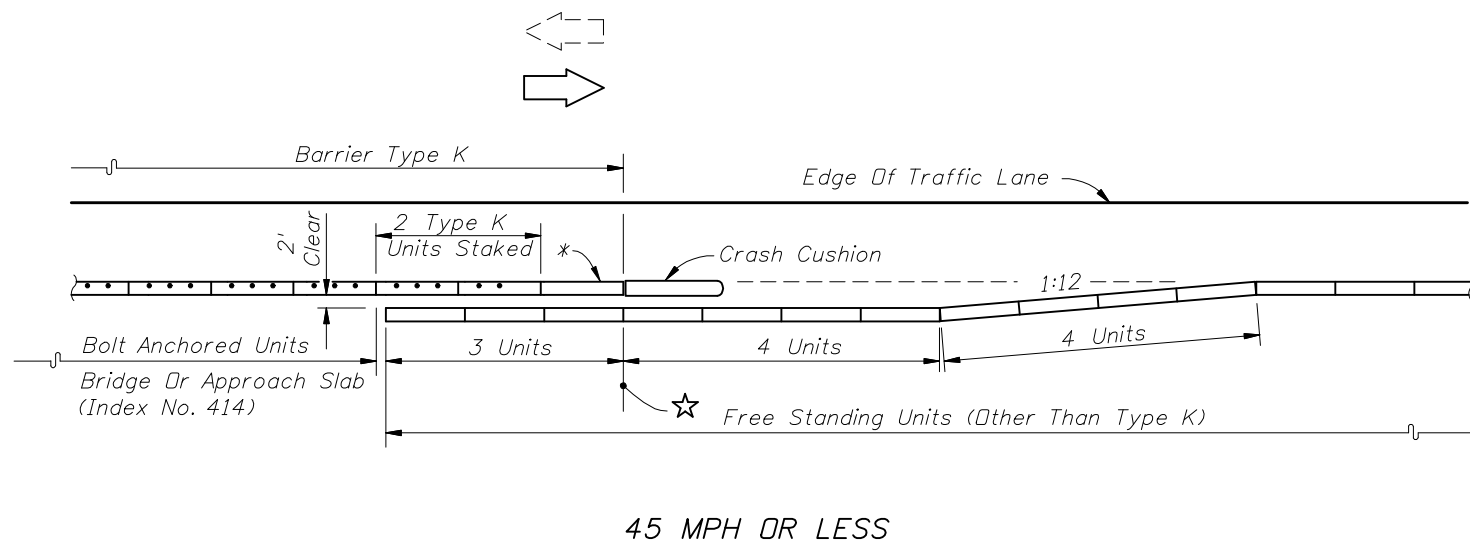


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TEMPORARY CONCRETE BARRIER

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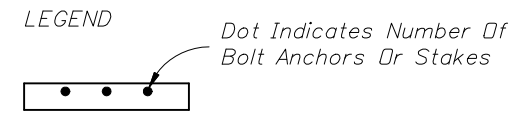


* Anchor Plates Required Front Side Only On Unit Abutting Crash Cushion (See Sheet 4).
 ☆ Overlap Reference Line

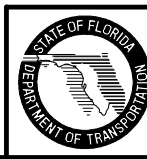
DEPARTURE (TRAILING) SHOULDER BARRIER ON UNDIVIDED FACILITIES

DEPARTURE (TRAILING) SHOULDER BARRIER ON DIVIDED FACILITIES

Note:
 See Sheet No. 7 For Approach Shoulder Applications.
 See Sheet No. 7 For Interior Median Applications.



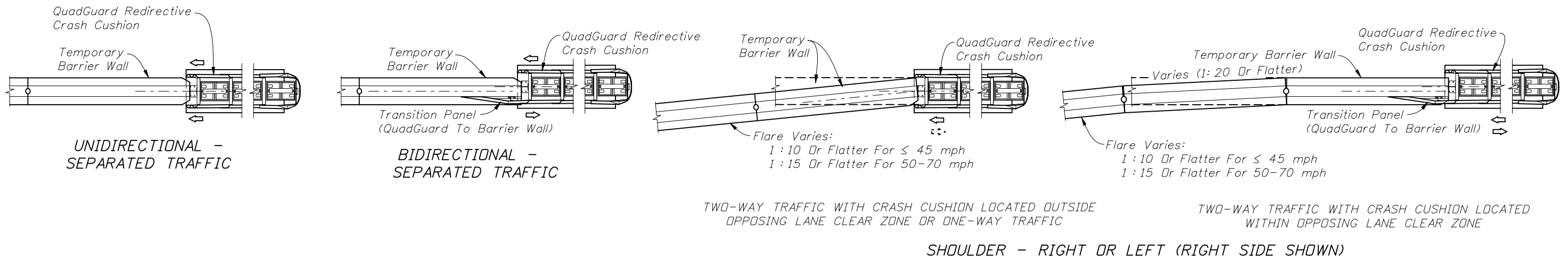
CONTINUATION OF BARRIER • FROM BARRIER TYPE K TO OTHER TYPE BARRIERS
 BARRIER TYPE K ON BRIDGES AND APPROACH SLABS



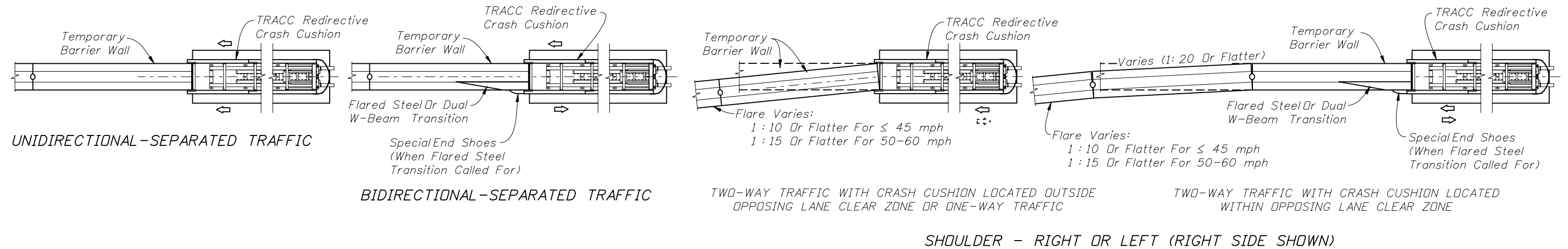
2010 FDOT Design Standards

TEMPORARY CONCRETE BARRIER

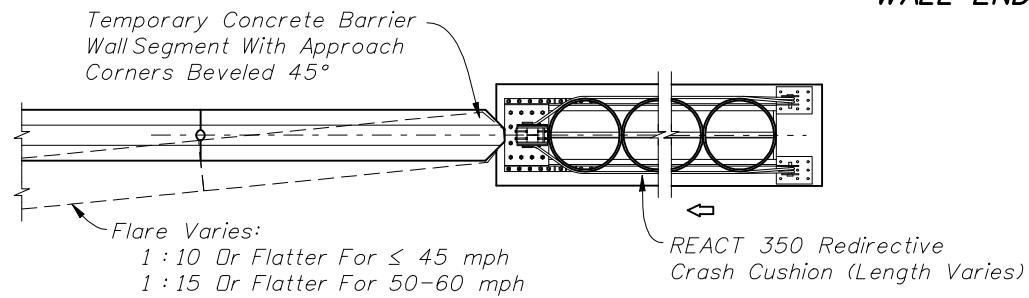
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WALL END TREATMENT WHEN SHIELDED BY A QuadGuard CRASH CUSHION



WALL END TREATMENT WHEN SHIELDED BY A TRACC CRASH CUSHION



FOR ANY APPROACH CONDITION IT SHALL BE IN ACCORDANCE WITH THE DRAWINGS POSTED ON THE QUALIFIED PRODUCTS LIST

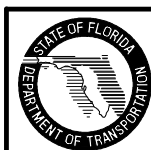
WALL END TREATMENT WHEN SHIELDED BY A REACT 350 CRASH CUSHION

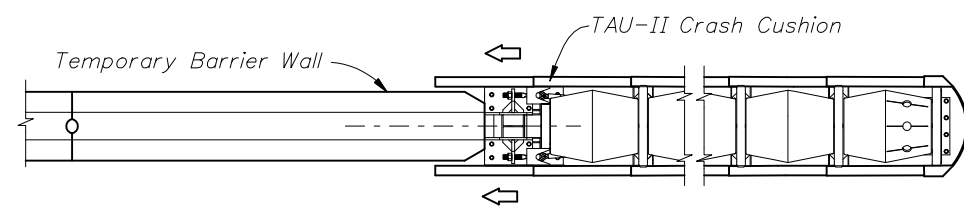
NOTES

1. For alignment and length of need see Sheets 2 and 5 through 8.
2. Anchor plates required only on units abutting crash cushions.
3. For crash cushion details see drawings posted on the Qualified Products List at "544 Vehicle Impact Attenuators".

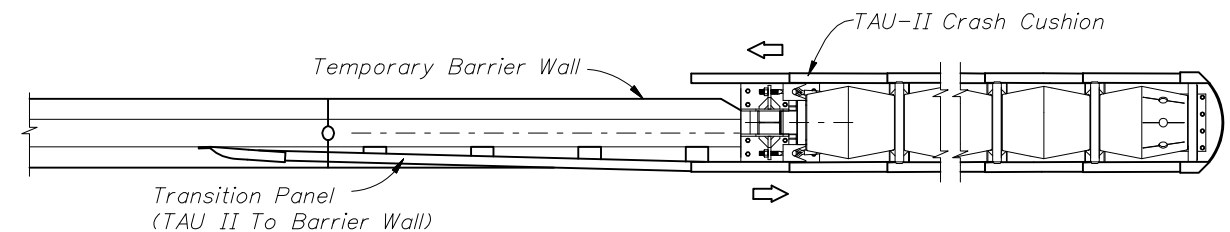
SHIELDING WALL ENDS WITH REDIRECTIVE CRASH CUSHIONS (REDIRECTIVE OPTION)

(CONTINUATION ON SHEET 10)

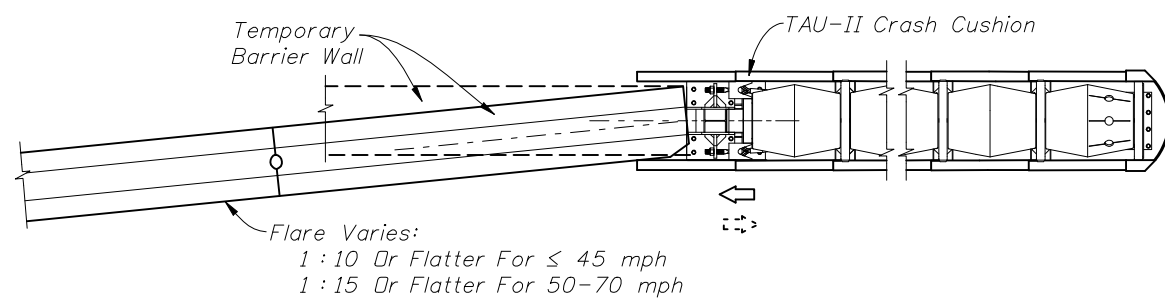




UNIDIRECTIONAL - SEPARATED TRAFFIC

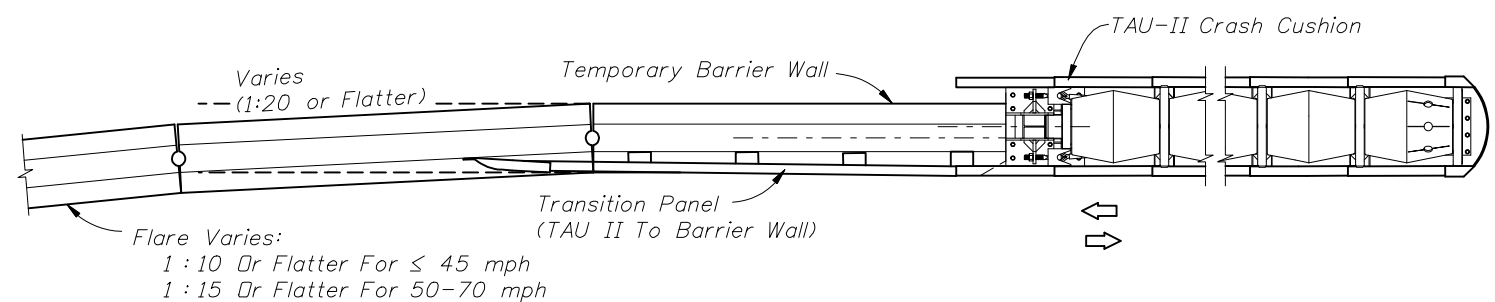


BIDIRECTIONAL - SEPARATED TRAFFIC



TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED OUTSIDE
OPPOSING LANE CLEAR ZONE OR ONE-WAY TRAFFIC

SHOULDER - RIGHT OR LEFT (RIGHT SIDE SHOWN)



TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED
WITHIN OPPOSING LANE CLEAR ZONE

SHOULDER - RIGHT OR LEFT (RIGHT SIDE SHOWN)

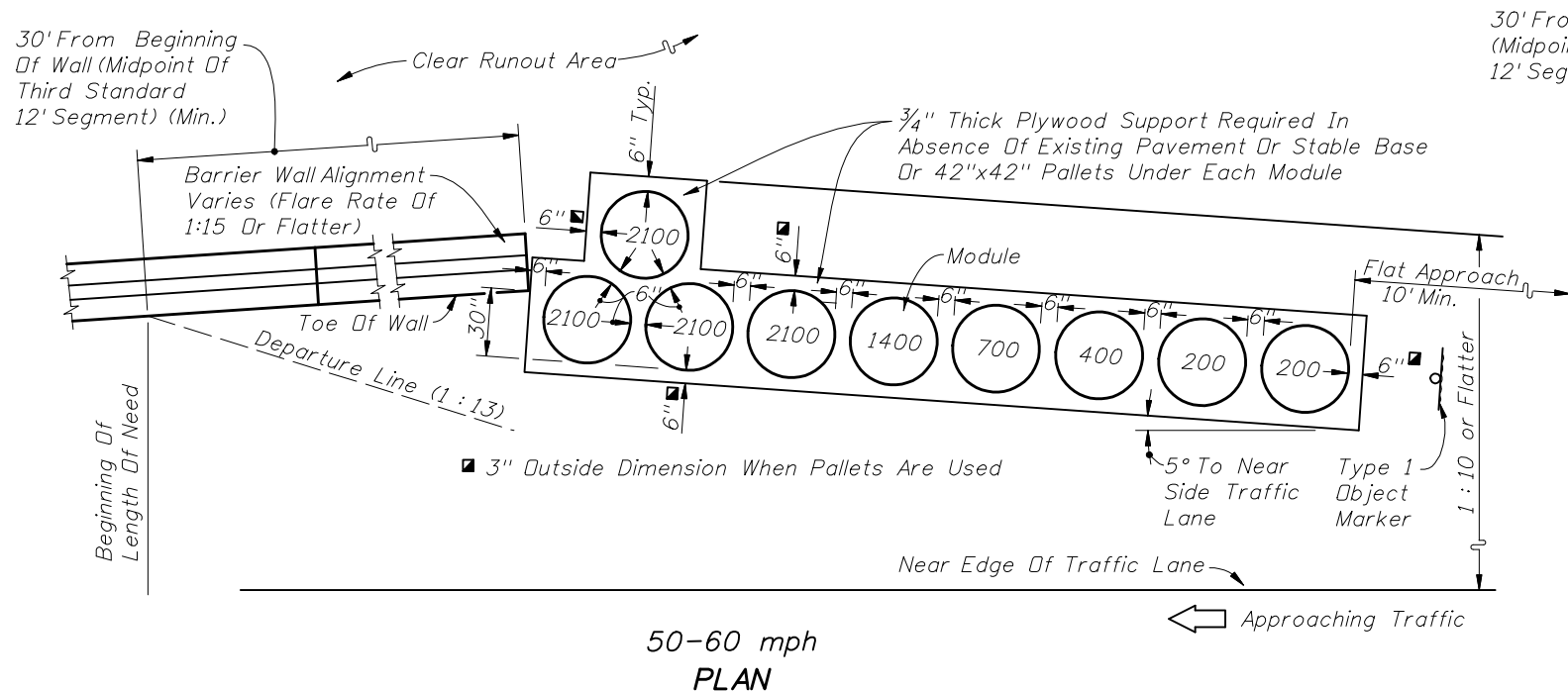
WALL END TREATMENT WHEN SHIELDED BY TAU II CRASH CUSHION

NOTES

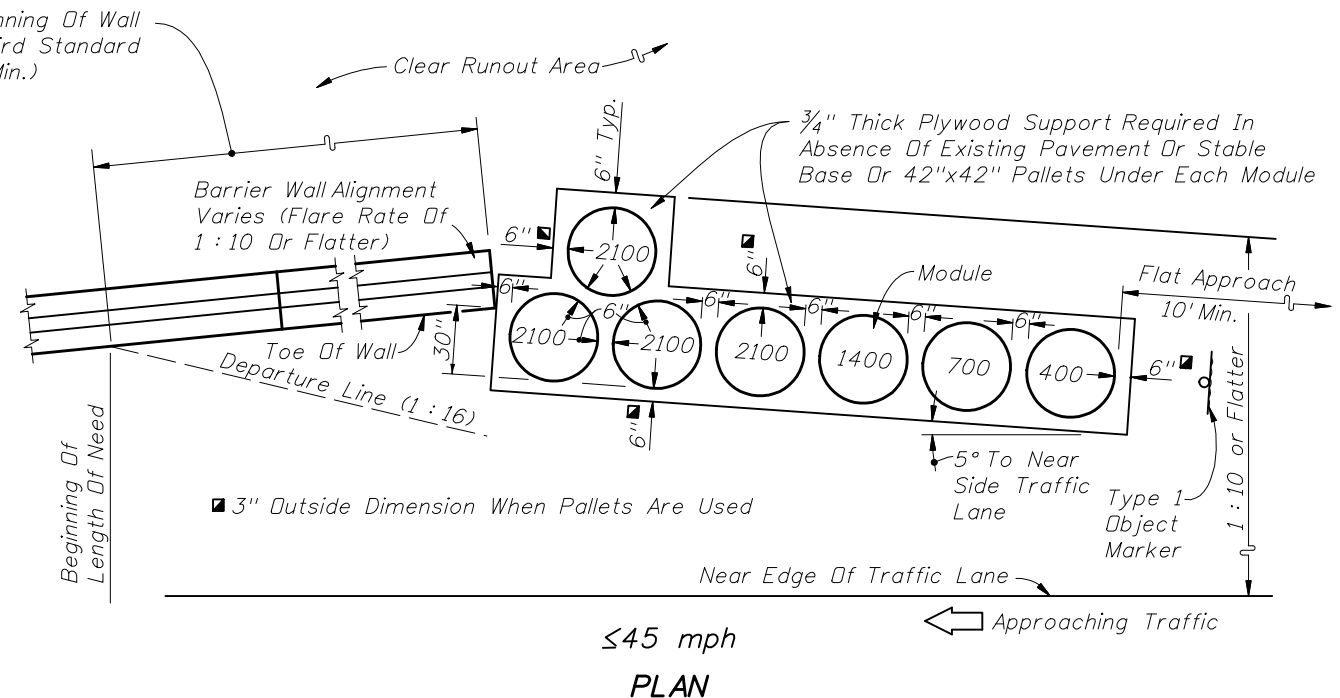
1. For alignment and length of need see Sheets 2 and 5 through 8.
2. Anchor plates required only on units abutting crash cushions.
3. For crash cushion details see drawings posted on the Qualified Products List.

SHIELDING WALL ENDS WITH REDIRECTIVE CRASH CUSHIONS (REDIRECTIVE OPTION)





50-60 mph
PLAN



<=45 mph
PLAN

Note: Numbers shown inside modules indicate mass in pounds of sand. All modules are approximately 3' in diameter with heights ranging from 3' to 3'-9".

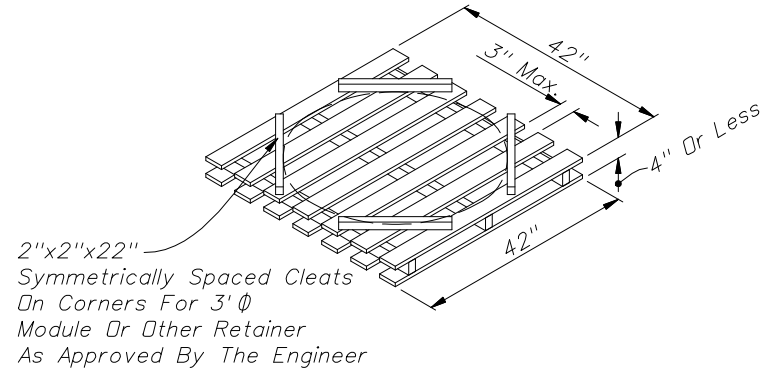
INERTIAL CRASH CUSHION ARRAYS

NOTES FOR TEMPORARY GATING CRASH CUSHIONS

- The crash cushion arrays shown on this Index can be used on the State Highway System only when all of the following conditions are met:
 - Use is limited to shielding temporary concrete barrier wall approach ends.
 - Used only when a temporary gating crash cushion or inertial crash cushion is specifically called for in the plans.
 - Use is limited to installations that will not exceed 30 calendar days in duration, unless otherwise called for in the plans.

When the plans do not specifically call for a temporary gating crash cushion, and/or when the installation will exceed 30 days in duration, a redirective crash cushion system in accordance with Index No. 415 is required.

- Inertial crash cushions are gating type crash cushions, and a clear runout area back of the array must be provided. The arrays shown can be used for outer roadway applications, exclusive of gore areas, and for median applications where the median width is sufficient to provide clear zone width between the back side module and the near lane of the opposing traffic.
- Inertial crash cushion modules shall be installed in accordance with the manufacturer's specifications and recommendations, and can be constructed of either new or functionally sound used modules.
- Anchorage of barrier wall end segment is not required.
- A yellow post mounted Type I Object Marker shall be centered 3' in front of the nose of all crash cushion arrays. Mounting hardware shall be in accordance with Index Nos. 11860 and 11865. The cost of the Object Marker shall be included in the cost of the crash cushion.
- Temporary gating crash cushion systems listed on the Department's Qualified Products List (QPL) may be substituted for the crash cushion arrays shown in this Index, provided a configuration using the system for this substitution has been detailed in the approved QPL drawings. Manufacturers seeking approval of temporary gating crash cushions for inclusion on the QPL must submit application along with design documentation showing the crash cushion system is crash tested to NCHRP Report 350 Test Level 3 criteria, is accepted by FHWA and is compatible with FDOT temporary barrier wall systems. System approvals will be contingent on FDOT's evaluation of crash test performance results for consistency with FDOT temporary barrier wall end shielding applications and uses. If approved, installation drawings signed and sealed by a professional engineer licensed in the State of Florida will be required.
- Temporary crash cushions (gating) are to be paid for, per array, under the contract unit price for Vehicular Impact Attenuator/Crash Cushion (Gating) (Temporary), LD.

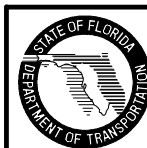


2"x2"x22"
Symmetrically Spaced Cleats
On Corners For 3' Ø
Module Or Other Retainer
As Approved By The Engineer

Pallet Shall Be Constructed Of Wood Or Other Frangible Or Resilient Materials Other Than Metals, And, Shall Be Sufficiently Durable To Support Modules For Their Expected Period Of Use; Wood Pallet Detail Shown.

INERTIAL MODULE PALLET

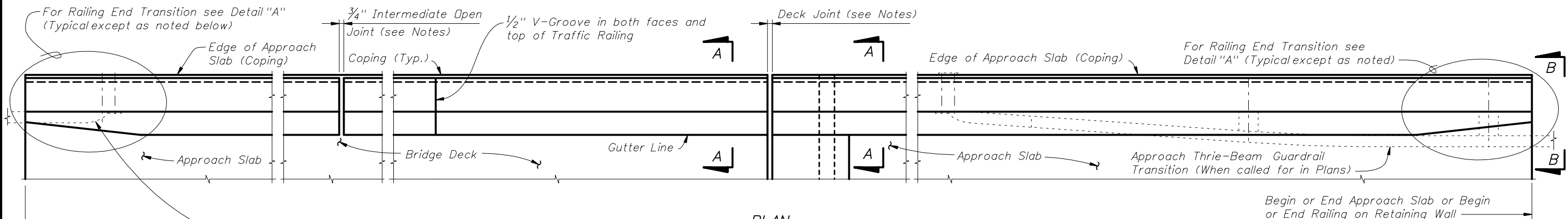
TEMPORARY INERTIAL CRASH CUSHIONS FOR SHIELDING ENDS OF TEMPORARY CONCRETE BARRIER WALL



2010 FDOT Design Standards

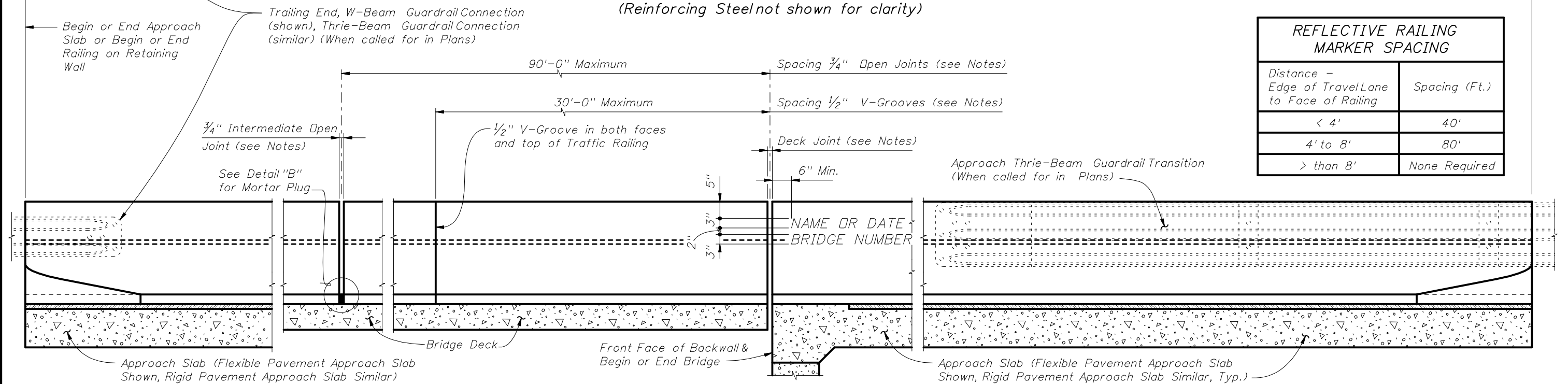
INERTIAL CRASH CUSHION

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PLAN
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required



ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)
(Railing on Bridge Deck and Approach Slab shown, Railing on Retaining Wall similar)

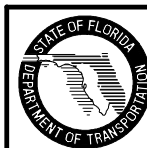
CROSS REFERENCE:
For Section A-A, View B-B and Detail "A", see Sheet 2.
For Detail "B", see Sheet 3.

TRAFFIC RAILING NOTES

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 STEEL : See Structures Plans General Notes.
- MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing.
- GUARDRAIL : For Guardrail connection details see Index Nos. 400 and 410.
- 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 Nos. 821 and 822 for Notes, Details and post spacings for Traffic Railings with Aluminum Pedestrian /Bicycle Bullet Railings.
- V-GROOVES : Construct 1/2" V-Grooves plumb. Space V-Grooves equally between 3/4" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

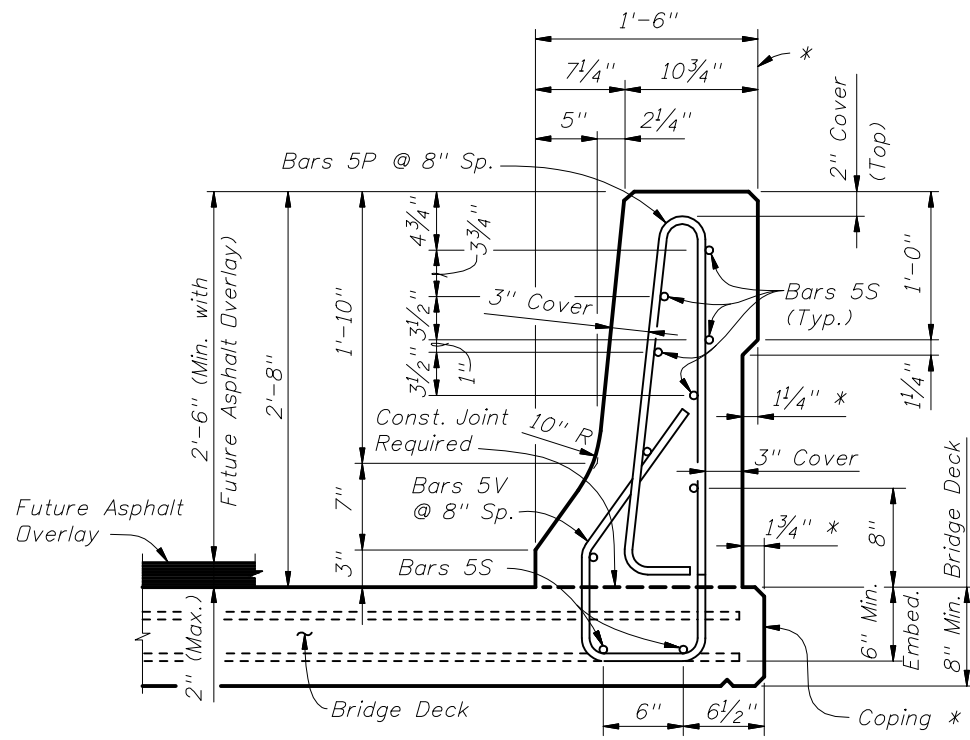
- NAME, DATE AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in 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 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.
- REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.
- JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at \odot Pier or Intermediate Bent similar. Provide 3/4" Intermediate Open Joints at :
 - (1) - Substructure supports where superstructure slab is continuous.
 - (2) - Midspan where span length exceeds 90 ft.
 - (3) - Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.
 - (4) - At ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.



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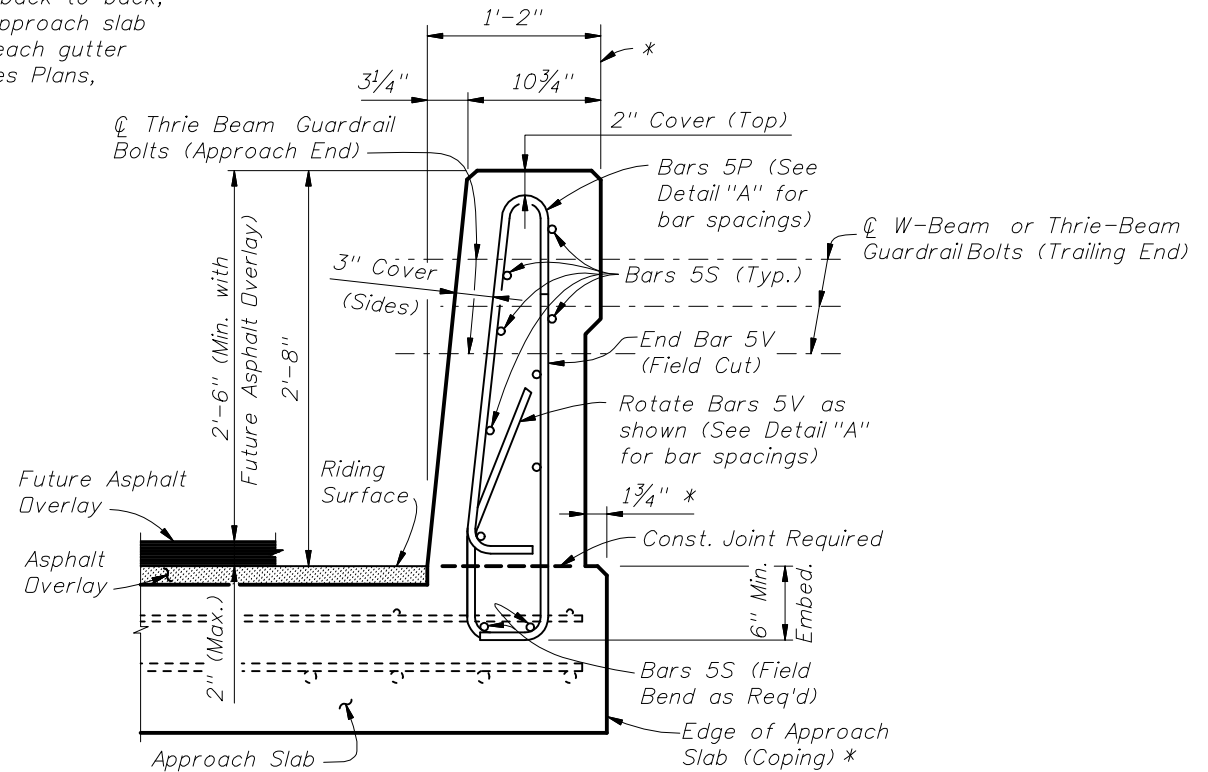
TRAFFIC RAILING - (32" F SHAPE)

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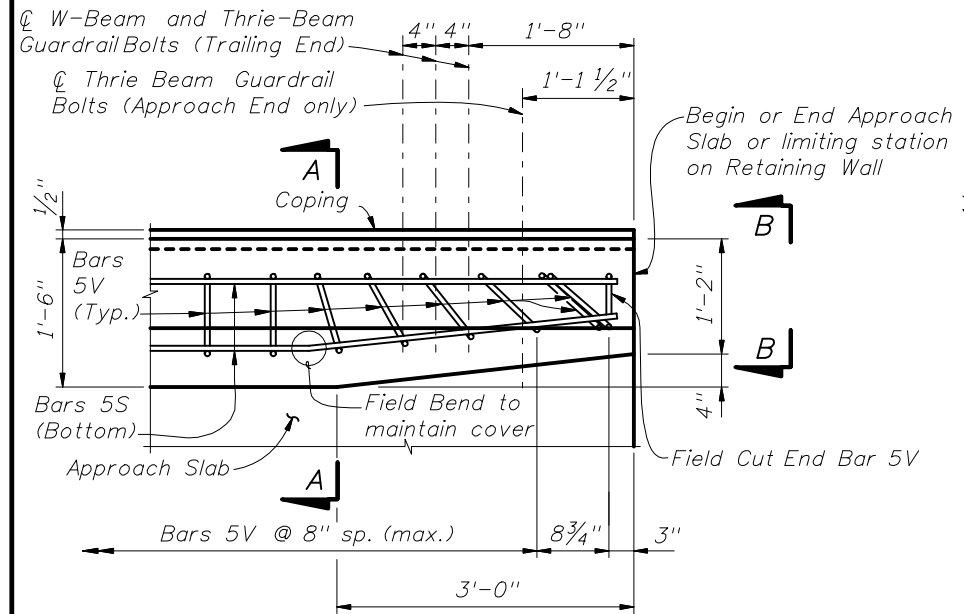


SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(Section thru Bridge Deck shown, Section thru Approach Slab
and Retaining Walls similar)

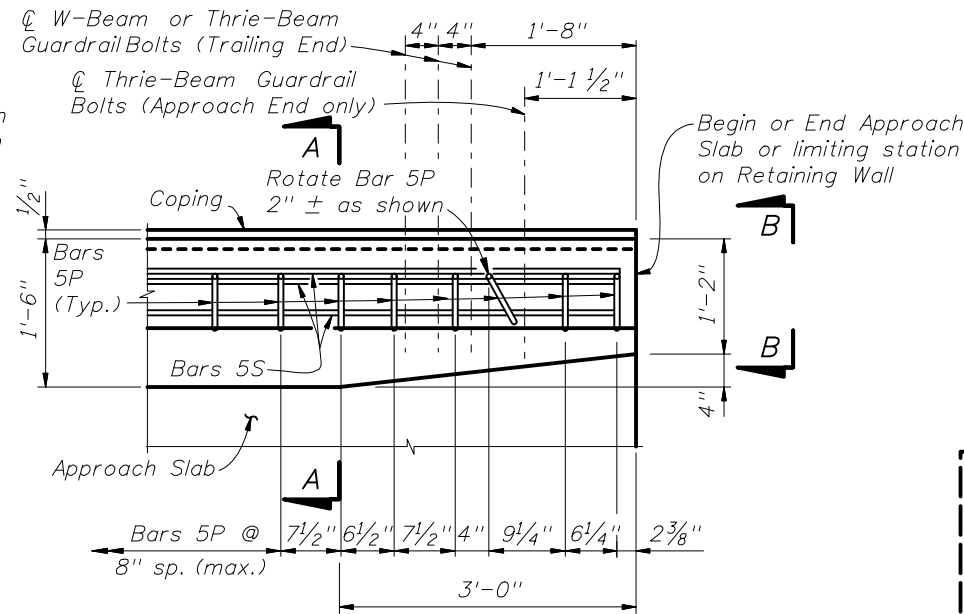
* Where railings of adjacent bridges are to be built back to back, the outside vertical plane of the railing and deck/approach slab may coincide along a plane centered 1'-6" from each gutter line. A bond breaker will be required. See Structures Plans, Superstructure Sheets for Details.



VIEW B-B
(Section thru Approach Slab shown,
Section thru Retaining Walls similar)



PLAN - Railing End Transition
(Showing Bars 5V and 5S)



PLAN - Railing End Transition
(Showing Bars 5P and 5S)

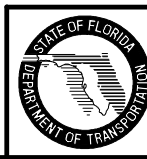
NOTES:
Rotate Bars 5V in Railing End Transition to maintain cover. Begin placing Railing Bars 5P and 5V on Approach Slab at the barrier end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made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

CROSS REFERENCE:
For locations of Section A-A and View B-B see Sheet 1.

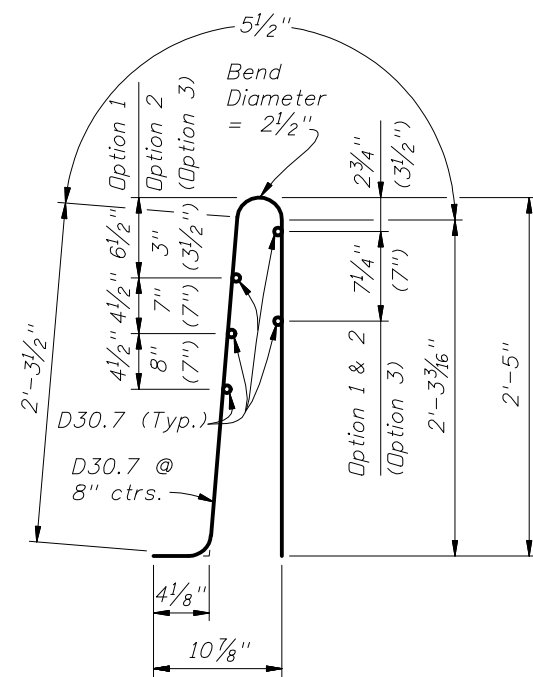
INSTRUCTIONS TO DESIGNER:
For Bridge Decks up to a maximum thickness of 9", the two Bars 5S placed in the Bridge Deck may substitute for the longitudinal deck steel located within the limits of Bars 5V, provided that the total area of longitudinal deck steel beneath the railing, as required by calculation, is not reduced. Show these bars on the Structures Plans, Superstructure Sheets with the deck steel.
All Bars 5P, 5S and 5V as shown are included in the Estimated Traffic Railing Quantities. Do not include Bars 5P, 5S and 5V in the reinforcing bar lists and estimated quantities for supporting bridge decks, approach slabs or retaining walls.

DETAIL "A"
(Railing on Approach Slab shown, Railing on Retaining Wall similar)

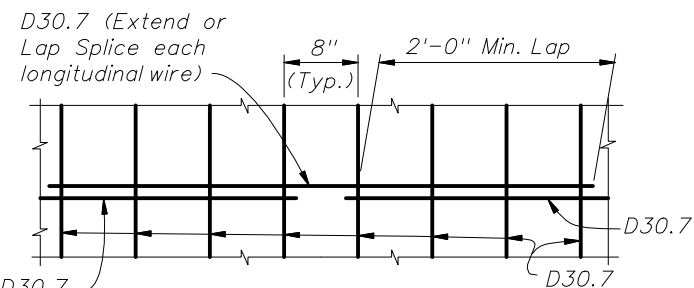
NOTE: Omit Railing End Transition and Guardrail if Index 410 Concrete Barrier Wall is used beyond the Approach Slab or Retaining Wall. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Transition is omitted, extend Typical Section to end of the Approach Slab or limiting station on Retaining Wall, and space Bars 5P and 5V at 8" (Typ.).



ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



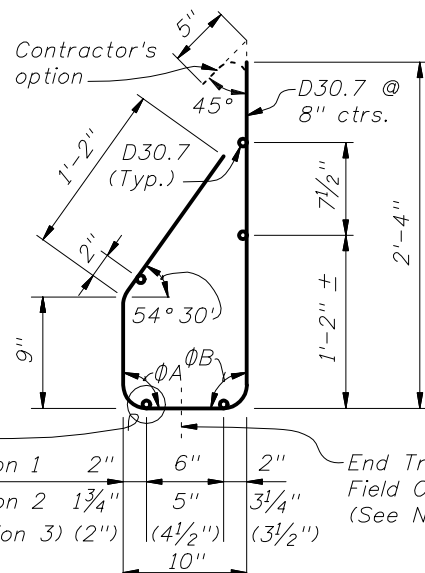
Welded Wire Reinforcement (WWR) Piece No. 2



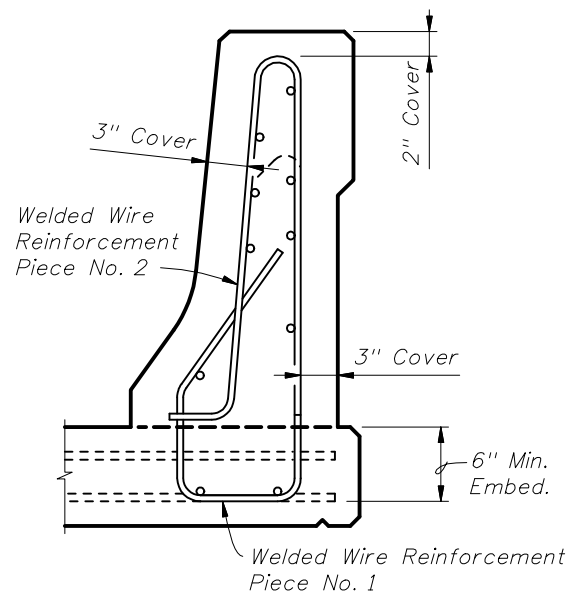
SPLICE DETAIL (Between WWR Sections)

WELDED WIRE REINFORCEMENT NOTES:

1. At the option of the Contractor Welded Wire Reinforcement (WWR) may be utilized in lieu of all Bars 5P, 5S and 5V. Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded Wire Reinforcement at Railing End Transition shall be field bent inward as required (Pieces 1 & 2) to maintain cover. The vertical wires (D30.7) in Piece 1 shall be cut as shown and the gutter side portion bent inward as required to allow placement.



Welded Wire Reinforcement (WWR) Piece No. 1

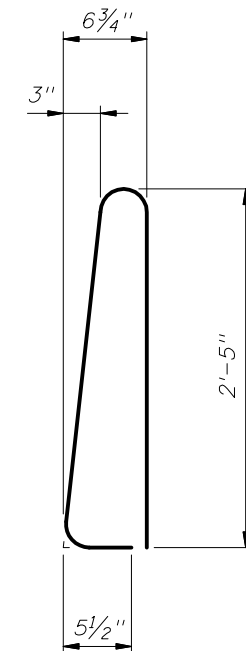
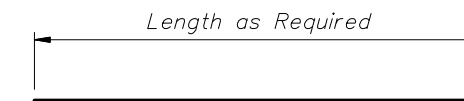


CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

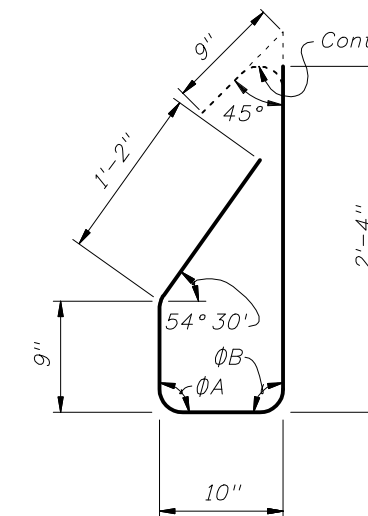
ROADWAY CROSS-SLOPE	LOW GUTTER		HIGH GUTTER	
	∅A	∅B	∅A	∅B
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	87°	93°
6% to 10%	96°	84°	84°	96°

∅A and ∅B shall be 90° if Contractor elects to place railing perpendicular to the deck and approach slabs.

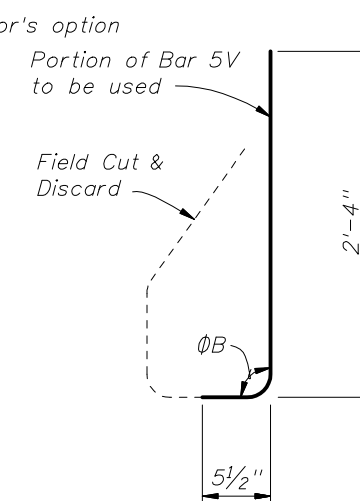
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
P	5	5'-7"
S	5	As Req'd.
V	5	5'-1"



STIRRUP BAR 5P



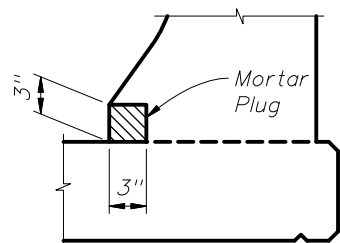
STIRRUP BAR 5V



END STIRRUP BAR 5V To Be Field Cut (One Required per Railing End Transition)

REINFORCING STEEL NOTES:

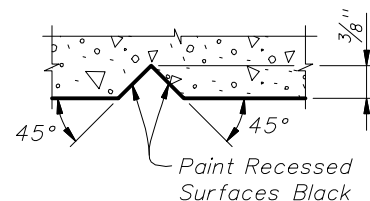
1. All bar dimensions in the bending diagrams are out to out.
2. The 9" and the 2'-4" vertical dimensions shown for Bar 5V are based on a bridge deck without a raised sidewalk. If a raised sidewalk is to be provided, increase these dimensions to achieve a 6" minimum embedment into the bridge deck. See 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 ∅A = ∅B = 90°.
4. All reinforcing steel 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'-0".



DETAIL "B" - SECTION AT INTERMEDIATE OPEN JOINT

NOTE:

At Intermediate Open Joints, plug the lower 3" portion of the open joint by filling it with mortar in accordance with Section 400 of the Specifications.



SECTION THRU RECESSED "V" GROOVE TO FORM INSCRIBED LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.104
Reinforcing Steel	LB/LF	27.12

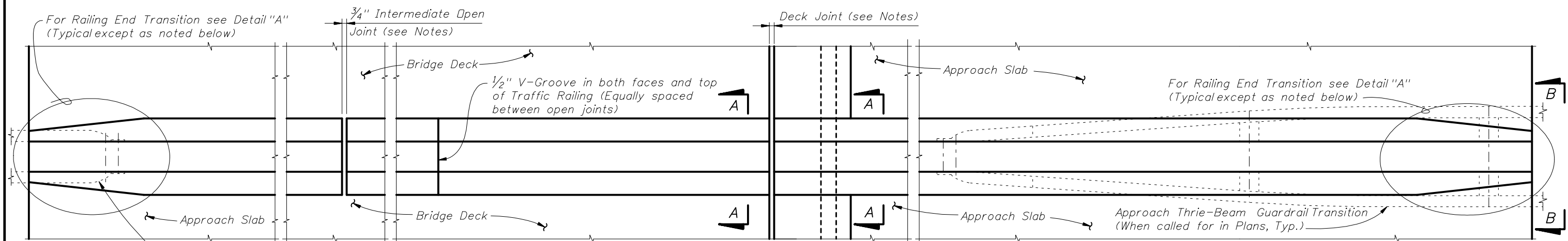
(The above quantities are based on a 2% deck cross slope; railing on low side of deck.)



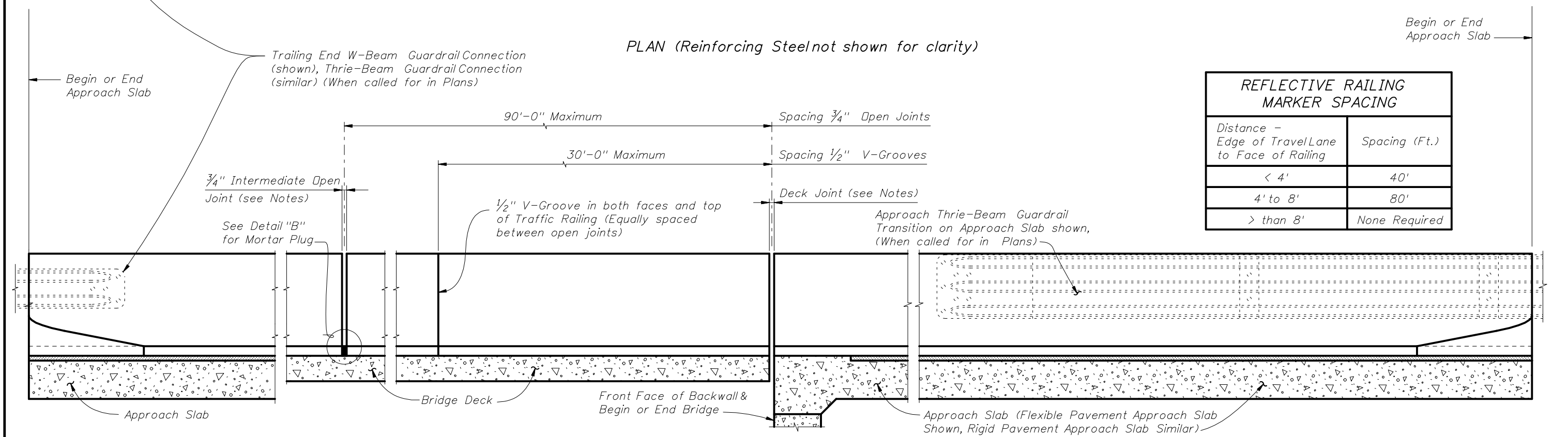
2010 FDOT Design Standards

TRAFFIC RAILING - (32" F SHAPE)

Last Revision: 07/01/07
Sheet No. 3 of 3
Index No. 420



PLAN (Reinforcing Steel not shown for clarity)



ELEVATION
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

CROSS REFERENCE:
For Section A-A, View B-B and Detail "A" see Sheet 2.
For Detail "B" see Sheet 3.

TRAFFIC RAILING NOTES

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 STEEL : See Structures Plans, General Notes.

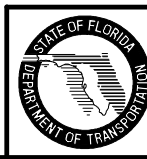
GUARDRAIL : For Guardrail connection details see Index No. 400.

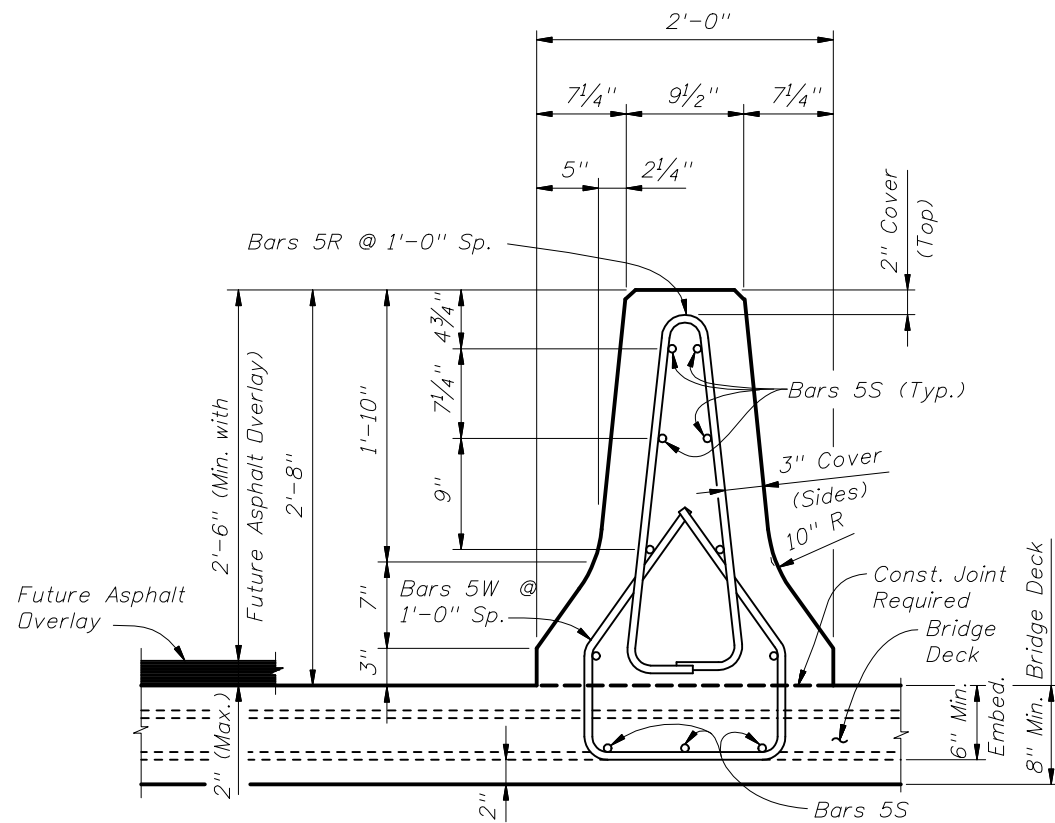
SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. The cost of all modifications will be at the Contractor's expense.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing along the centerline at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

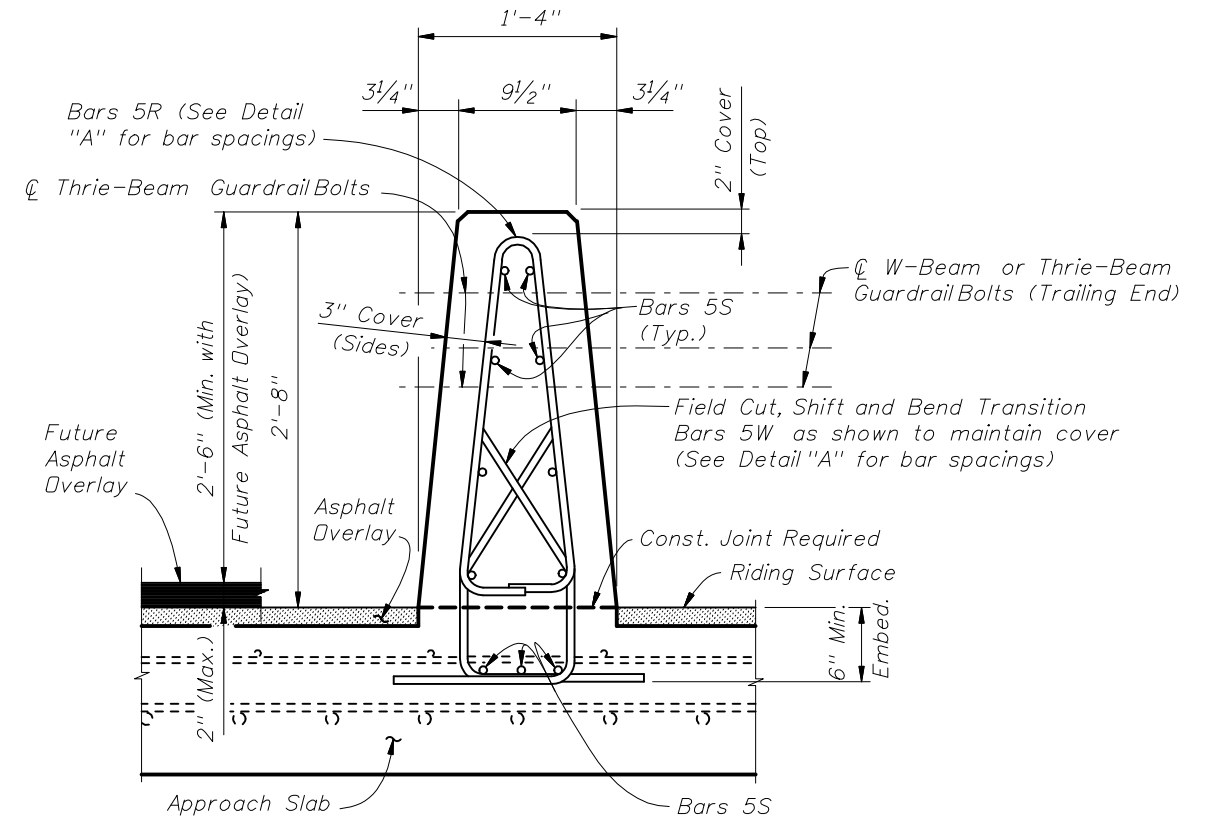
JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at $\text{\textcircled{C}}$ Pier or Intermediate Bent similar. Provide $\frac{3}{4}$ " Intermediate Open Joints at :

- (1) - Substructure supports where superstructure slab is continuous.
- (2) - Midspan where span length exceeds 90 ft.
- (3) - Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.





SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(SECTION THRU BRIDGE DECK SHOWN -
SECTION THRU APPROACH SLAB SIMILAR)

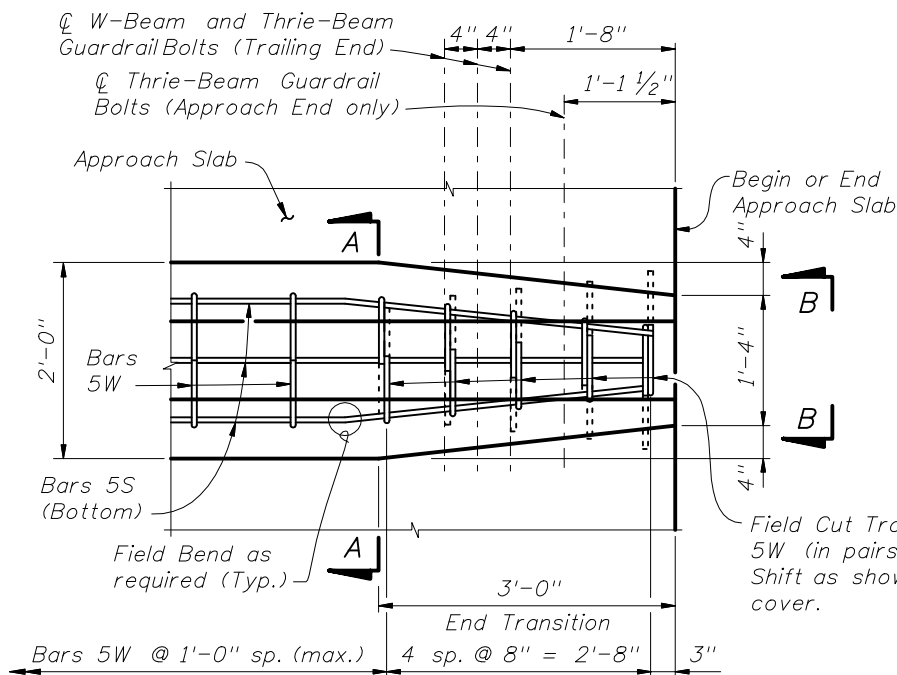


VIEW B-B

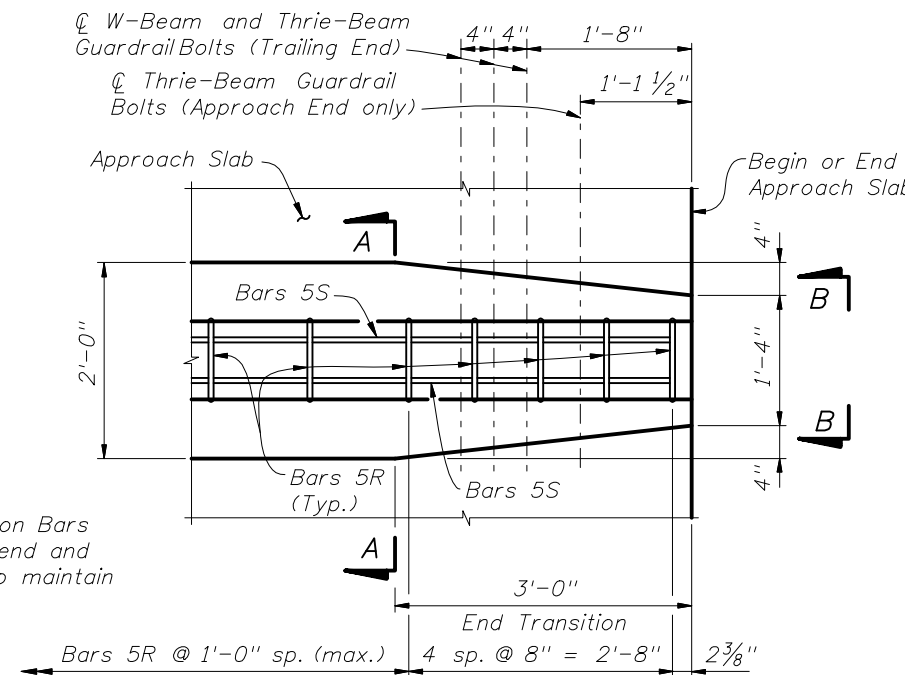
NOTE:

Begin placing Railing Bars 5R and 5W 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 5R and 5W shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5R and 5W as required to maintain cover in Railing End Transition.

Omit Railing End Transition and Guardrail if Index 410 Concrete Barrier Wall is used beyond the Approach Slab. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Transition is omitted, extend Typical Section to the end of Approach Slab and space Bars 5R and 5W at 1'-0" (Typ.)



PLAN - Railing End Transition
(Showing Bars 5W and 5S)



PLAN - Railing End Transition
(Showing Bars 5R and 5S)

INSTRUCTIONS TO DESIGNER:

For Bridge Decks up to a maximum thickness of 9", the three Bars 5S placed in the deck may substitute for the longitudinal deck steel located within the limits of Bars 5W, provided that the total area of longitudinal deck steel beneath the railing, as required by calculation, is not reduced. Show these bars on the Structures Plans, Superstructure Sheets with the deck steel.

All Bars 5R, 5S and 5W as shown are included in the Estimated Traffic Railing Quantities. Do not include Bars 5R, 5S and 5W in the reinforcing bar lists and estimated quantities for supporting bridge decks or approach slabs.

DETAIL "A"



2010 FDOT Design Standards

TRAFFIC RAILING - (MEDIAN 32" F SHAPE)

Last Revision

07/01/07

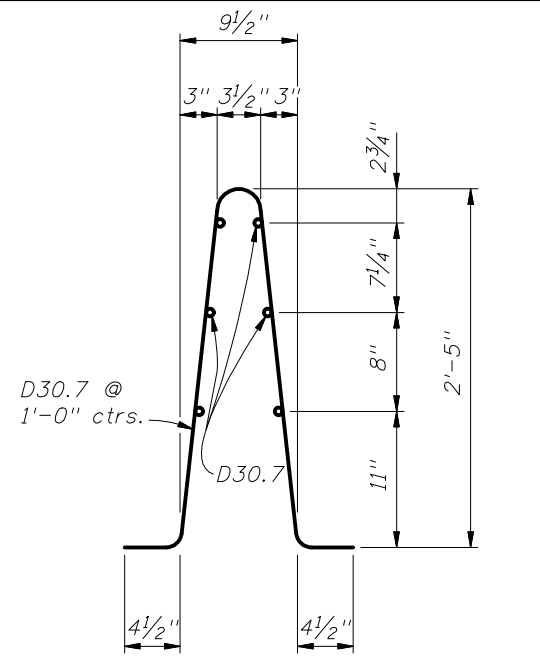
Sheet No.

2 of 3

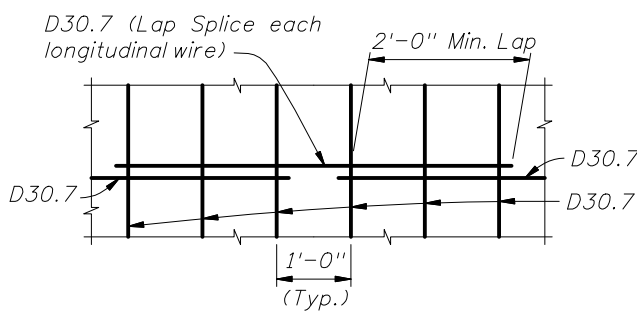
Index No.

421

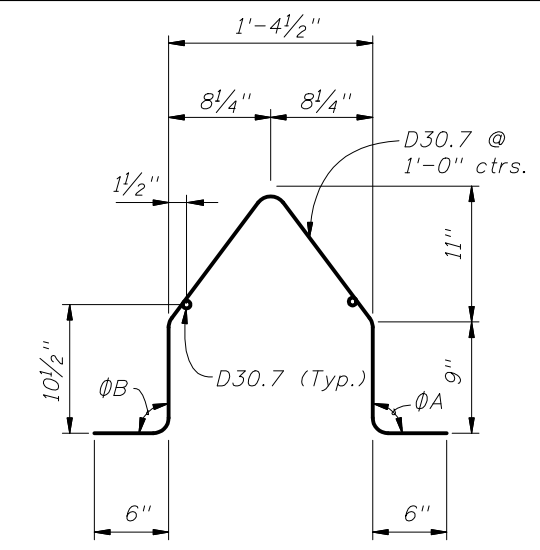
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



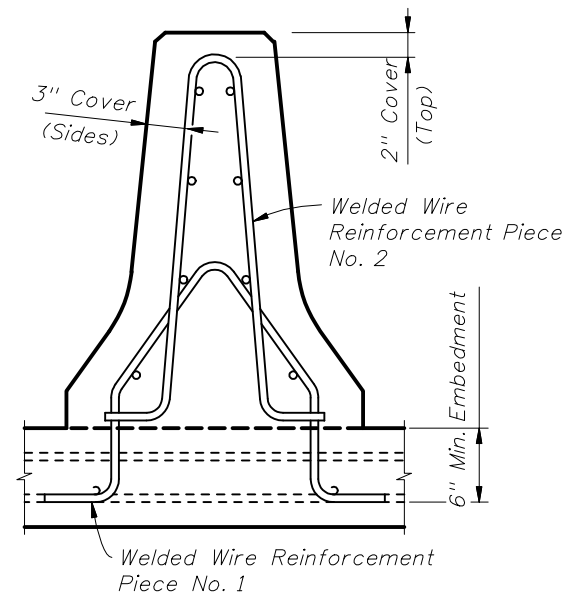
Welded Wire Reinforcement (WWR) Piece No. 2



SPLICE DETAIL (Between WWR Sections)



Welded Wire Reinforcement (WWR) Piece No. 1



WELDED WIRE REINFORCEMENT NOTES:

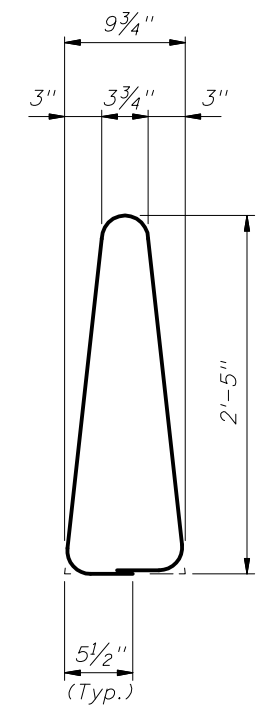
1. At the option of the Contractor Welded Wire Reinforcement may be utilized in lieu of all Bars 5R, 5S and 5W. Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded Wire Reinforcement at Railing End Transition shall be field bent inward as required (Pieces 1 & 2) to maintain cover. The top of Piece 1 shall be cut to allow overlap.
3. Place WWR panels so as to minimize the end overhang of longitudinal wires at Railing Ends and Open Joints. Overhangs greater than 6" are not permitted.

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

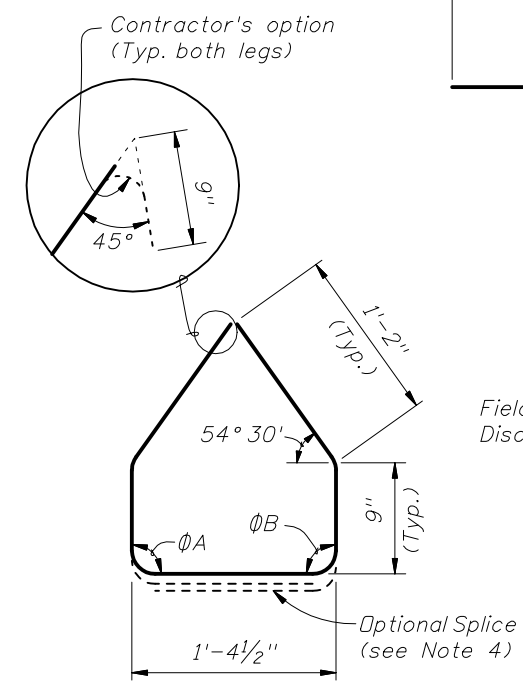
ROADWAY CROSS-SLOPE	ON SLOPE		AT CROWN	
	∅A	∅B	∅A	∅B
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	90°	90°
6% to 10%	96°	84°	90°	90°

∅A and ∅B shall be 90° if Contractor elects to place railing perpendicular to the deck, and approach slabs.

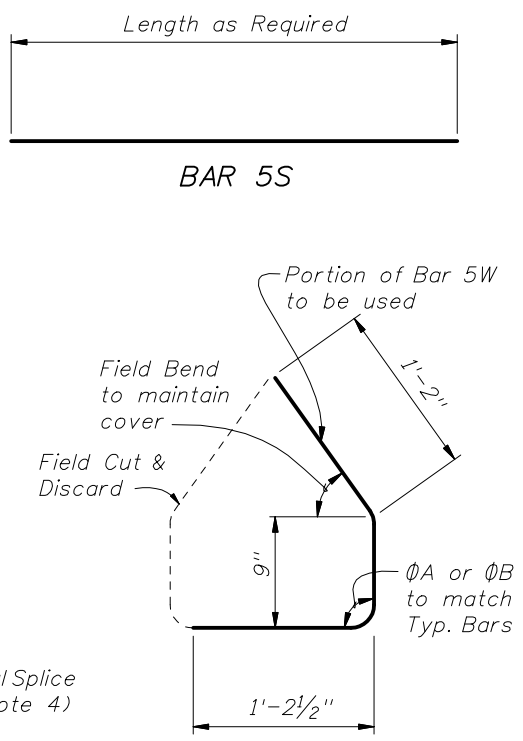
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
R	5	6'-1"
S	5	As Req'd.
W	5	5'-3"



STIRRUP BAR 5R



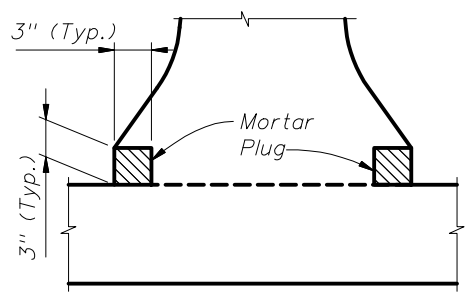
STIRRUP BAR 5W



TRANSITION STIRRUP BAR 5W To Be Field Cut and Bent (10 required per Railing End Transition)

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints shall have a 2" minimum cover.
3. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".
4. At the Contractor's option, Bars 5W may be fabricated as a two piece bar with a 1'-2" lap splice of the bottom legs.



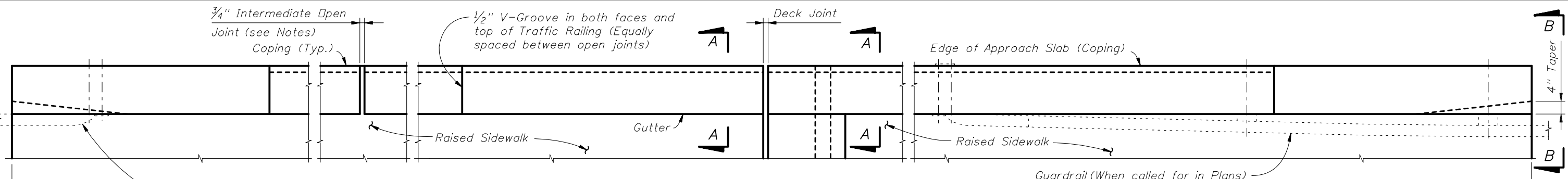
DETAIL "B" - SECTION AT INTERMEDIATE OPEN JOINT

NOTE: At Intermediate Open Joints, plug the lower 3" portion of the open joint by filling it with mortar in accordance with Section 400 of the Specifications.

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.120
Reinforcing Steel	LB/LF	23.29

(The above quantities are based on a crowned roadway, with a 2% cross slope)



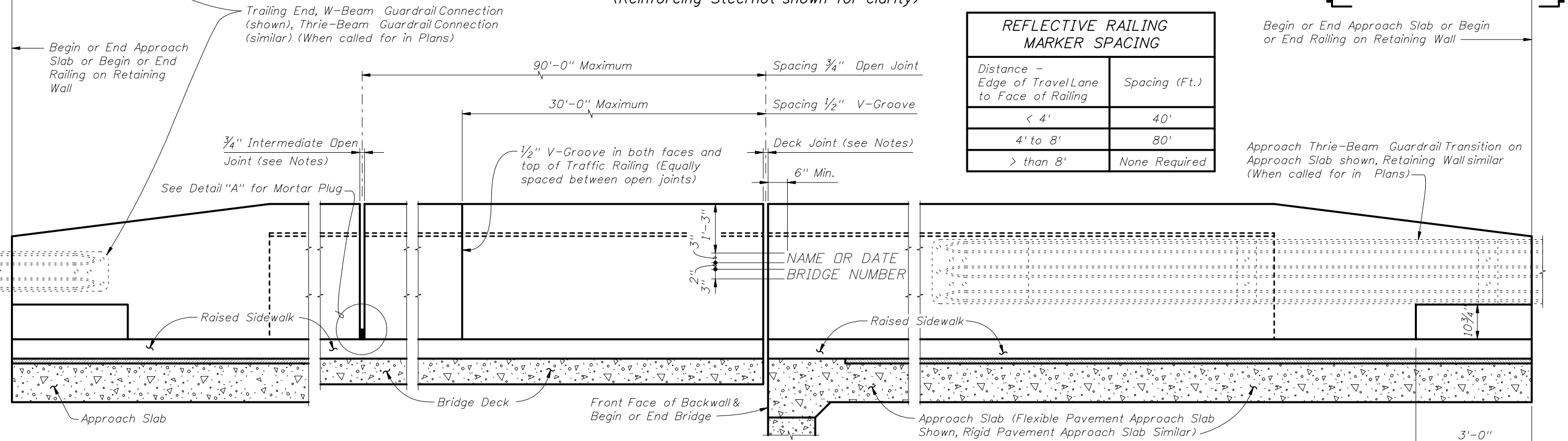


PLAN
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

Begin or End Approach Slab or Begin or End Railing on Retaining Wall

Approach Thrie-Beam Guardrail Transition on Approach Slab shown, Retaining Wall similar (When called for in Plans)



ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)

CROSS REFERENCE:
For Section A-A, Detail "A", View B-B and View C-C, see Sheet 2.

TRAFFIC RAILING NOTES

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 STEEL : See Structures Plans, General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing.

GUARDRAIL : For Guardrail connection details, see Index No. 400.

RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Index No. 422, Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the 3/4" open joints and 1/2" V-Groove shall apply.

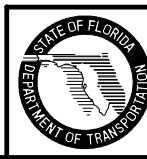
REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

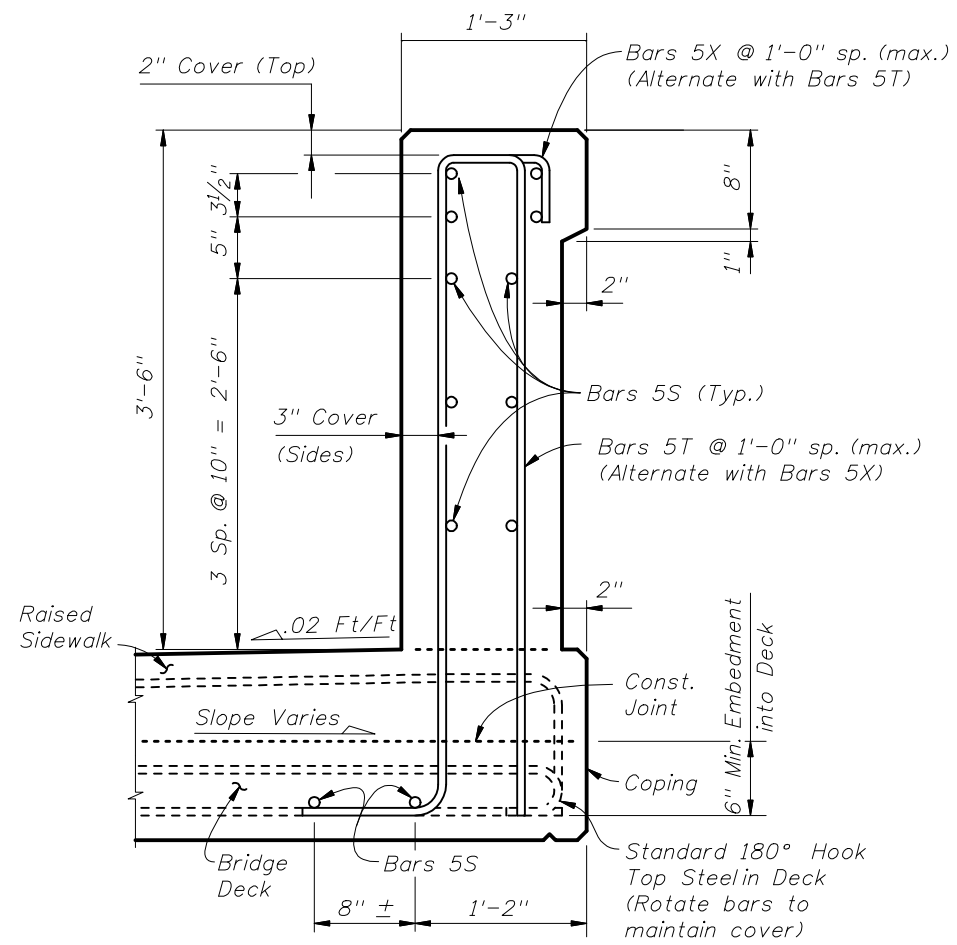
V-GROOVES : Construct 1/2" V-Grooves plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between 3/4" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

NAME, DATE, AND 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 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

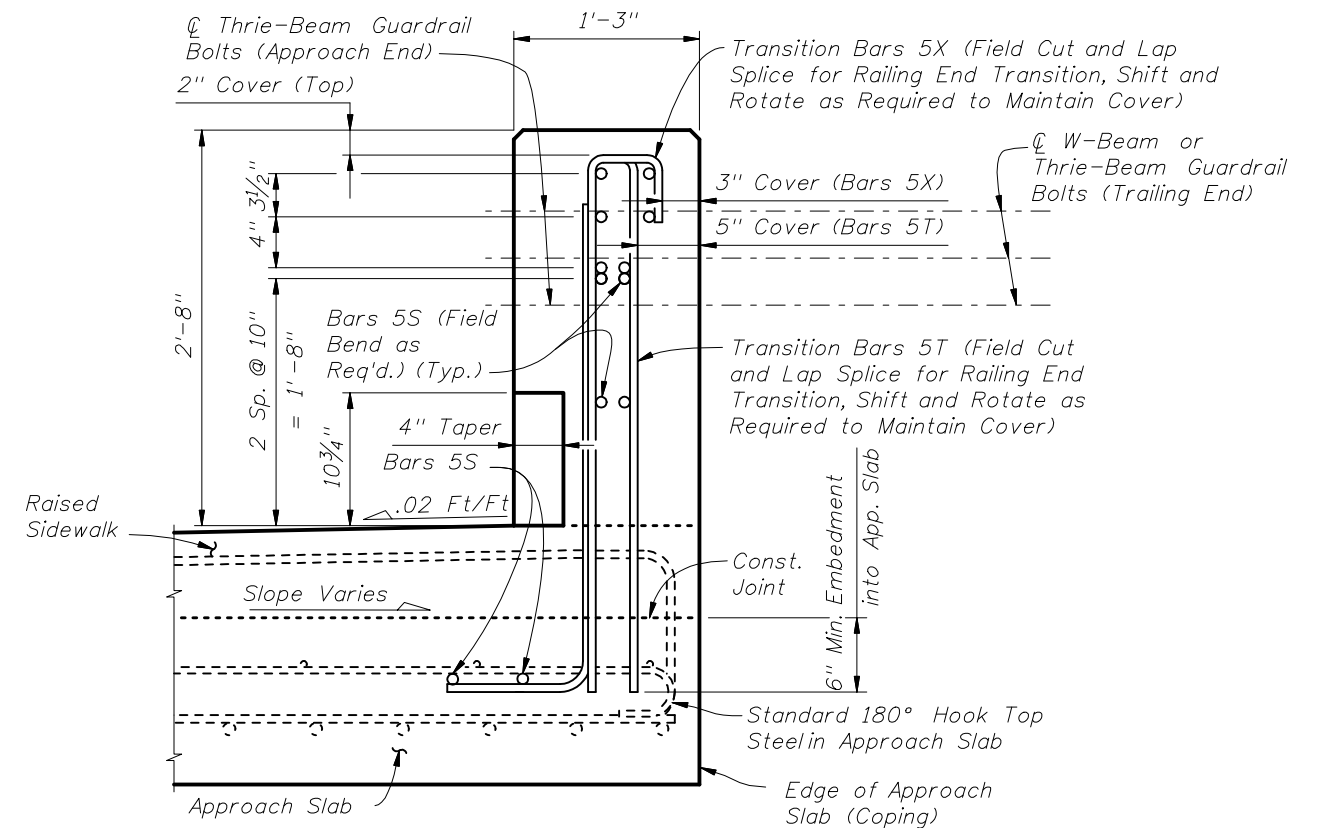
JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at Pier or Intermediate Bent similar. Provide 3/4" Intermediate Open Joints at :

- (1) - Substructure supports where superstructure slab is continuous.
- (2) - Midspan where span length exceeds 90 ft.
- (3) - Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.
- (4) - At ends of approach slabs when adjacent to Retaining Walls and at expansion joints on Retaining Wall junction slabs.

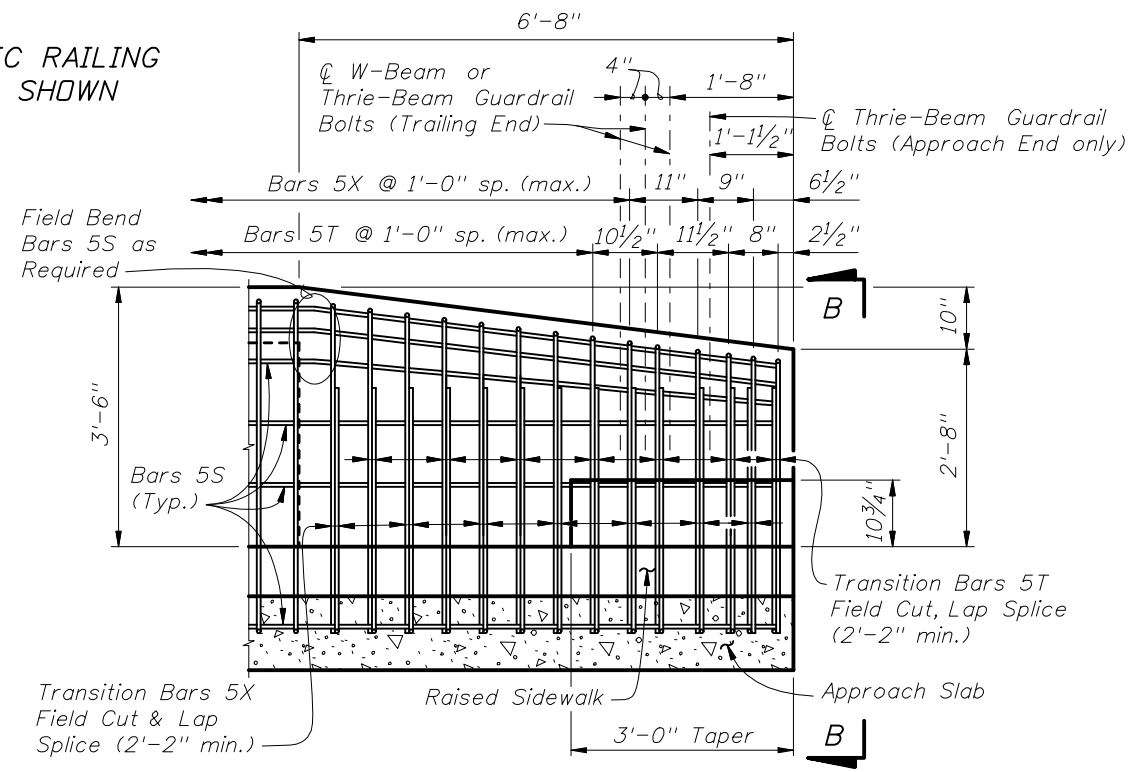




SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
SECTION THRU BRIDGE DECK SHOWN



VIEW B-B
(End View of Traffic Railing, Approach Slab shown,
Retaining Wall Junction Slab similar)



VIEW C-C
RAILING END TRANSITION
(Guardrail Not Shown For Clarity)

NOTES:
Begin placing Railing Bars 5T and 5X 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 5T and 5X shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5T and 5X as required to maintain cover in Railing End Transition.

Omit Railing Taper, End Transition and Guardrail if Concrete Barrier Wall is used beyond the Approach Slab or Retaining Wall. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Taper and Railing End Transition is omitted, extend Typical Section to end of the Approach Slab or limiting station on Retaining Wall, and space Bars 5T and 5X at 1'-0" (Typ.)

CROSS REFERENCE:
For location of Section A-A, Detail "A" and View B-B, see Sheet 1.

INSTRUCTIONS TO DESIGNER:

For Bridge Decks up to a maximum thickness of 9", the two Bars 5S placed in the Bridge Deck may substitute for the longitudinal deck steel located within the limits of Bars 5T, provided that the total area of longitudinal steel beneath the railing as required by calculation is not reduced. Show these bars on the Structures Plans, Superstructure Sheets with the deck steel.

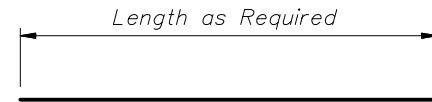
All Bars 5S, 5T and 5X as shown are included in the Estimated Traffic Railing Quantities. Do not include Bars 5S, 5T and 5X in the reinforcing bar lists and estimated quantities for supporting bridge decks, approach slabs or retaining walls.



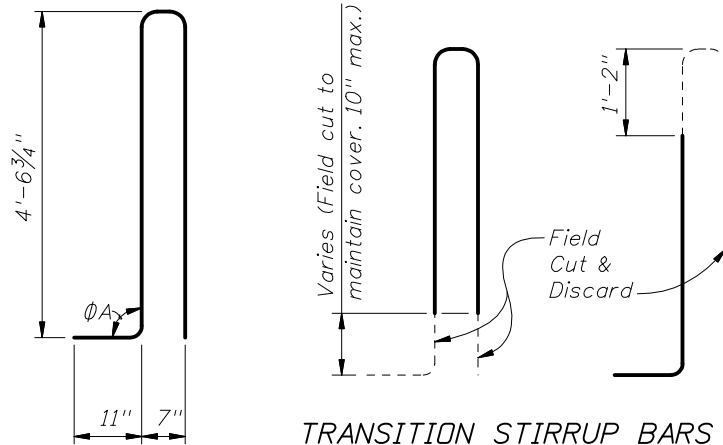
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
S	5	As Req'd.
T	5	10'-8"
X	5	6'-9"

ROADWAY CROSS-SLOPE	∅A	
	LOW GUTTER	HIGH GUTTER
0% to 2%	90°	90°
2% to 6%	87°	83°
6% to 10%	84°	96°

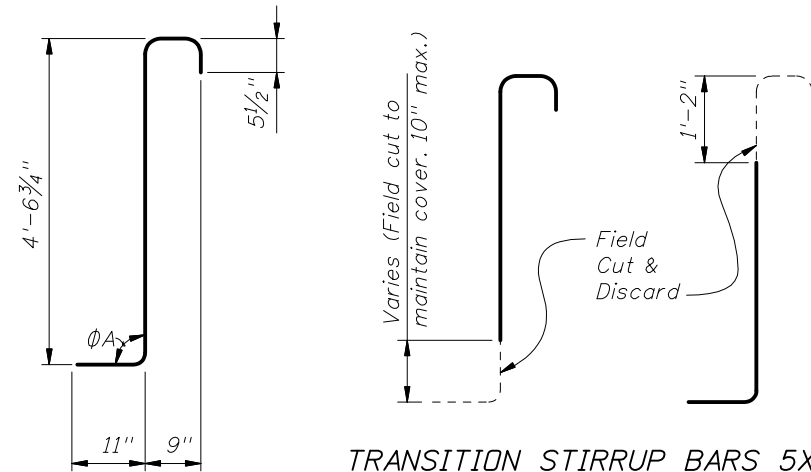


BAR 5S



STIRRUP BAR 5T

TRANSITION STIRRUP BARS 5T
To Be Field Cut (7 of each required per Railing End Transition)

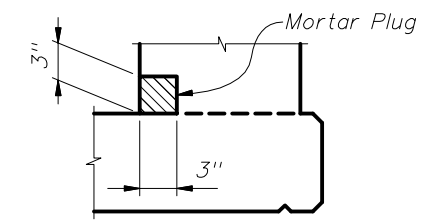


STIRRUP BAR 5X

TRANSITION STIRRUP BARS 5X
To Be Field Cut (7 of each required per Railing End Transition)

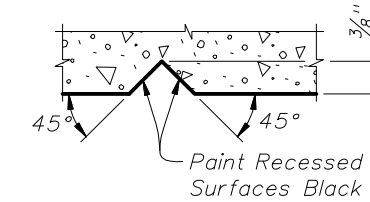
REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- The 4'-6 3/4" vertical dimension shown for Bars 5T and 5X is based on a bridge deck with a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and a counter 2% raised sidewalk cross slope. If the raised sidewalk thickness, width or cross slope vary from the above amounts, adjust this dimension accordingly to achieve a 6" minimum embedment into the bridge deck. See Structures Plans, Superstructure and Approach Slab Sheets.
- The reinforcement for the railing on a retaining wall shall be the same as detailed above with ∅A = 90°.
- All reinforcing steel at the open joints shall have a 2" minimum cover.
- Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-2".
- The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT

NOTE:
At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.

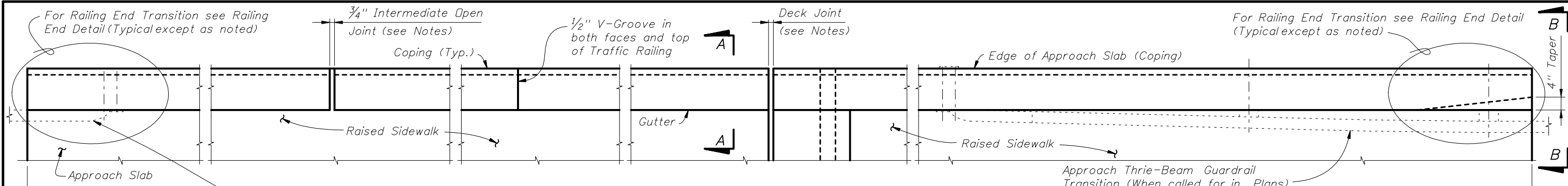


SECTION THRU RECESSED "V" GROOVE TO FORM INSCRIBED LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.145
Reinforcing Steel	LB/LF	30.68

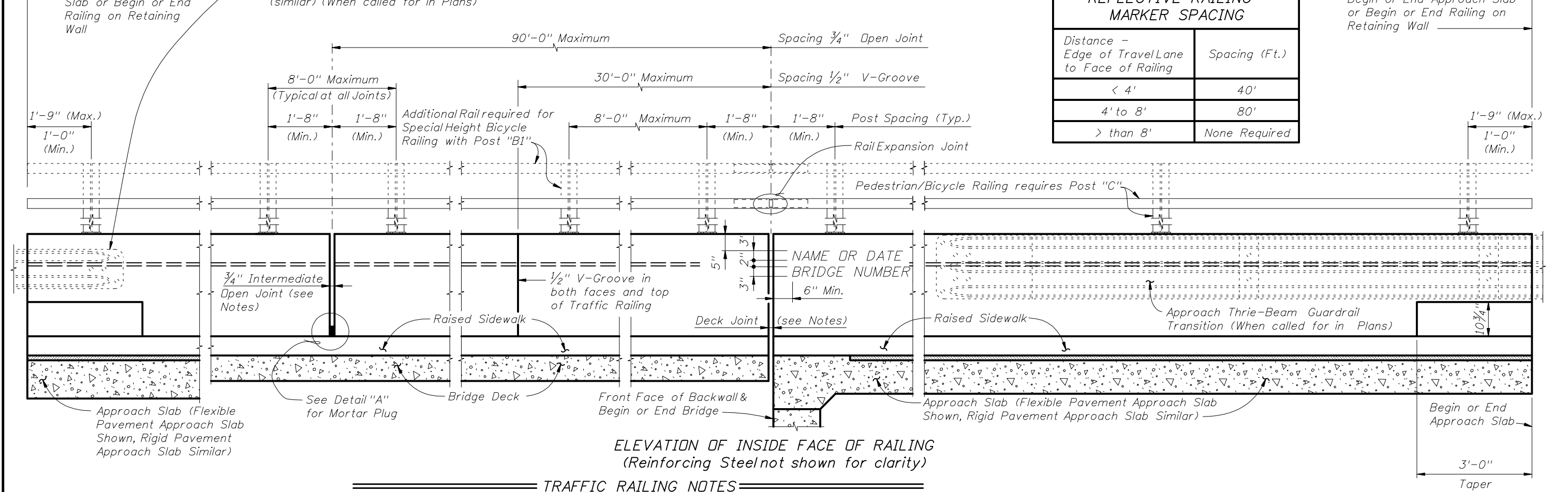
(The above quantities are based on a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and counter 2% sidewalk cross slope)





PLAN
(Rails, Posts and Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required



ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)

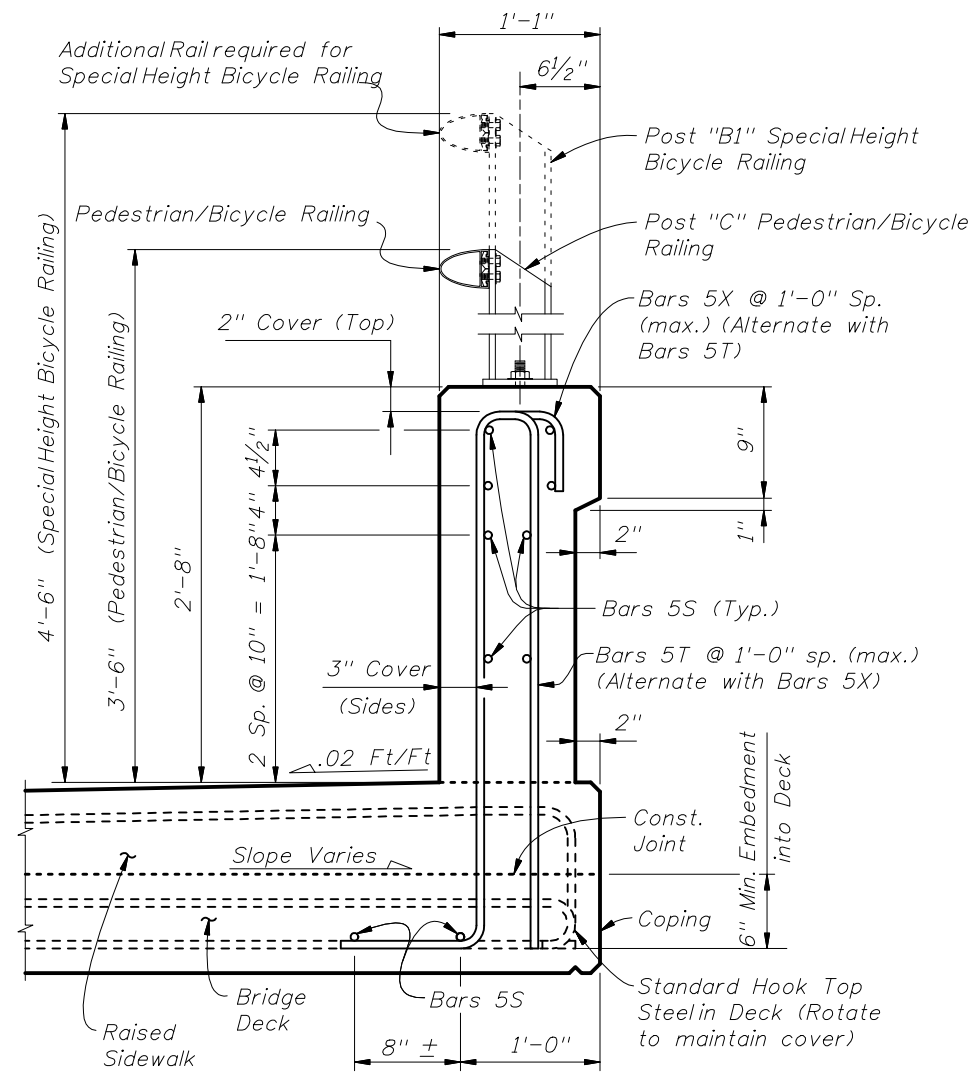
TRAFFIC RAILING NOTES

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.

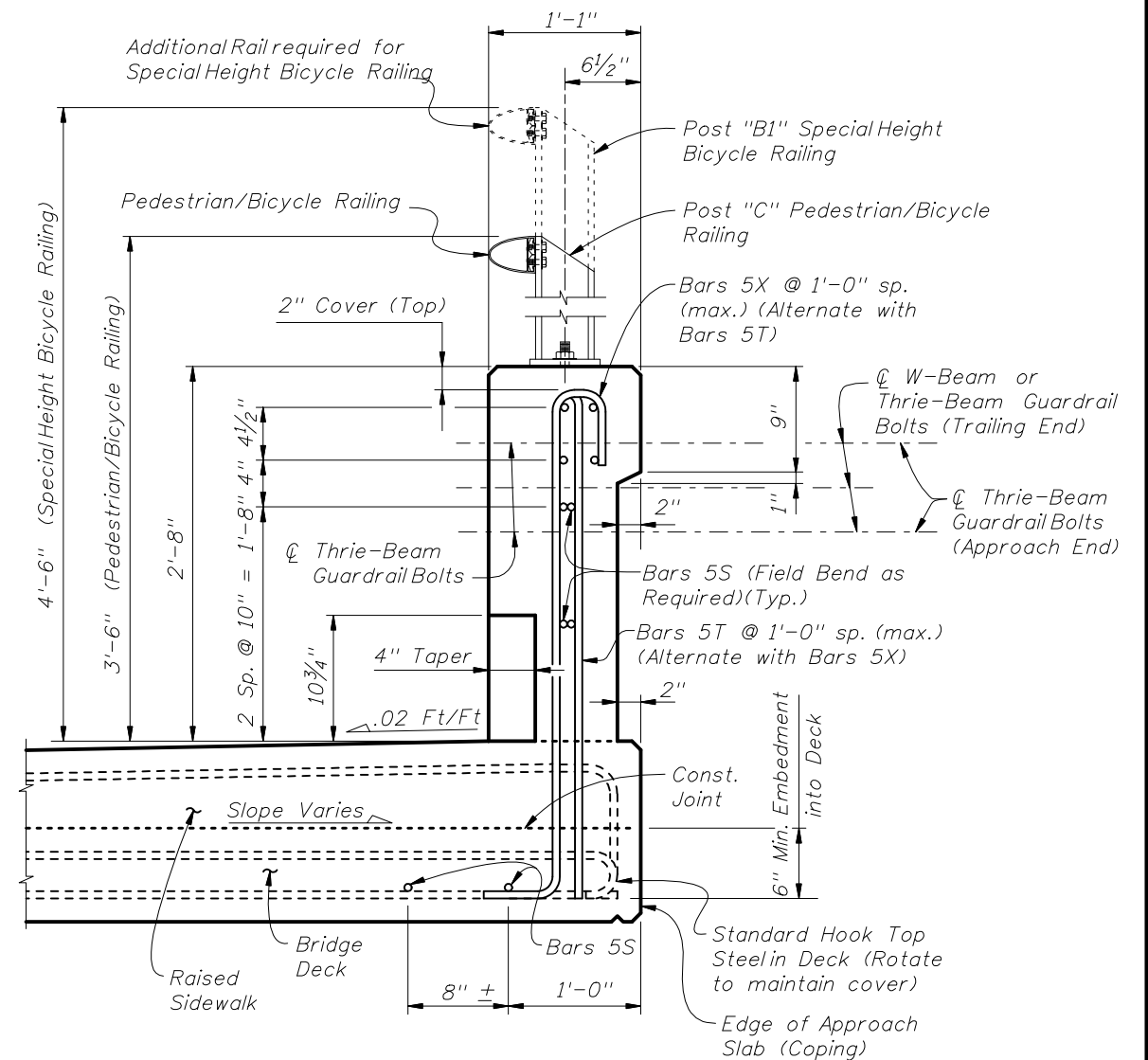
- CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.
- MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing.
- GUARDRAIL : For Guardrail connection details, see Index No. 400.
- PEDESTRIAN/BICYCLE RAILING AND SPECIAL HEIGHT BICYCLE RAILING DETAILS : See Index No. 822 for Post, Rail and Rail Expansion Joint fabrication and installation Details and Notes.
- V-GROOVES : Construct 1/2" V-Grooves plumb. Space V-Grooves equally between 3/4" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.
- REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

- RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the 3/4" open joints and 1/2" V-Groove shall apply.
- NAME, DATE, AND 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 of 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 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.
- OPEN JOINTS : See Structures Plans, Superstructure, Approach Slab Sheets and Retaining Walls for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin or End Bridge Shown. Deck Joint at Pier or Intermediate Bent Similar.
- Provide 3/4" Intermediate Open Joints at :
 - (1) - Substructure supports where superstructure slab is continuous.
 - (2) - Midspan where span length exceeds 90 ft.
 - (3) - Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.
 - (4) - At ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

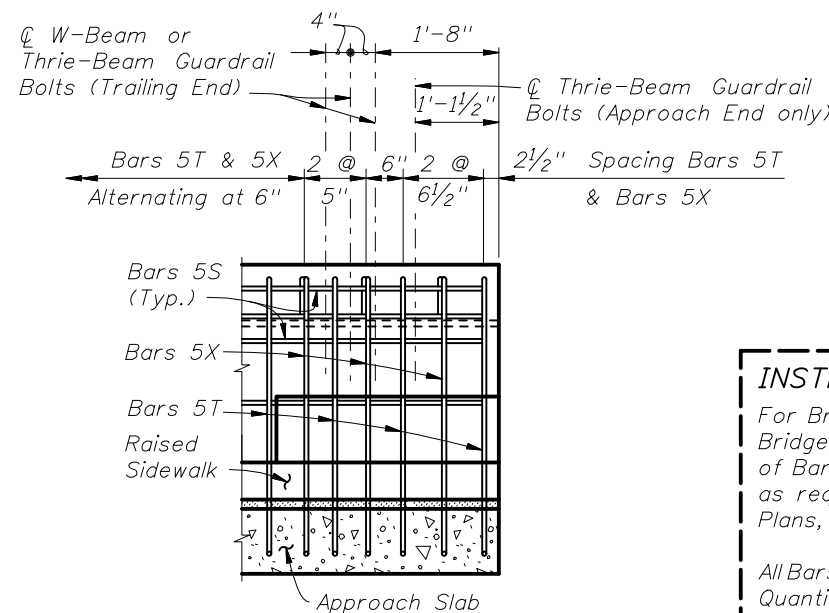
CROSS REFERENCE:
For Section A-A and View B-B, see Sheet 2.



SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
SECTION THRU BRIDGE DECK SHOWN



VIEW B-B
APPROACH SLAB END VIEW
OF TRAFFIC RAILING



RAILING END DETAIL

CROSS REFERENCE:
For location of Section A-A and View B-B
see Sheet 1.

NOTE: For Post "B1", Post "C" and Rail Details,
see Index No. 822.

NOTES:

Omit Railing End Taper and Guardrail if Concrete Barrier Wall is used beyond the Approach Slab. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Taper is omitted, extend Typical Section to the end of the Approach Slab. Begin placing Railing Bars 5T and 5X 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 5T and 5X shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5T and 5X on Approach Slab in end taper section as required to maintain cover.

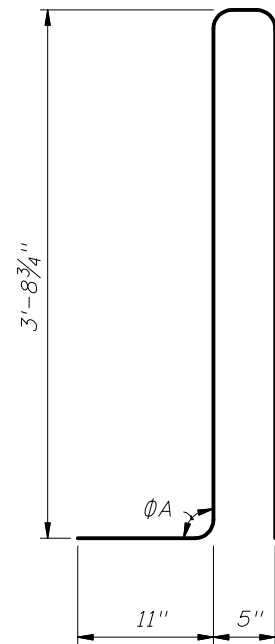
INSTRUCTIONS TO DESIGNER:
For Bridge Decks up to a maximum thickness of 9", the two Bars 5S placed in the Bridge Deck may substitute for the longitudinal deck steel located within the limits of Bars 5T, provided that the total area of longitudinal steel beneath the railing, as required by calculation, is not reduced. Show these bars on the Structures Plans, Superstructure Sheets with the deck steel.
All Bars 5S, 5T and 5X as shown are included in the Estimated Traffic Railing Quantities. Do not include Bars 5S, 5T and 5X in the reinforcing bar lists and estimated quantities for supporting bridge decks, approach slabs or retaining walls.



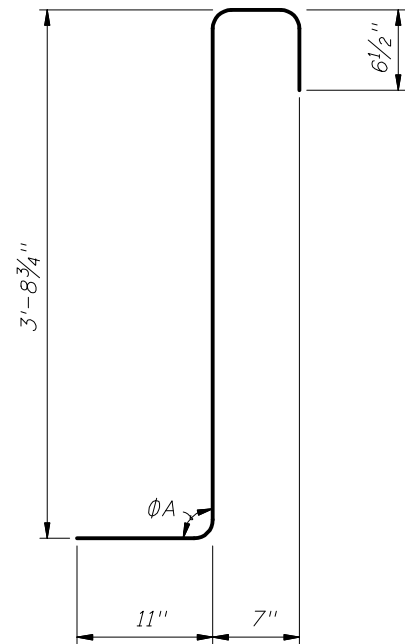
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
S	5	As Reqd.
T	5	9'-0"
X	5	5'-10"

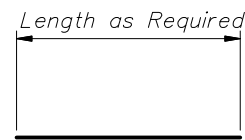
ROADWAY CROSS-SLOPE	∅A	
	LOW GUTTER	HIGH GUTTER
0% to 2%	90°	90°
2% to 6%	87°	93°
6% to 10%	84°	96°



STIRRUP BAR 5T



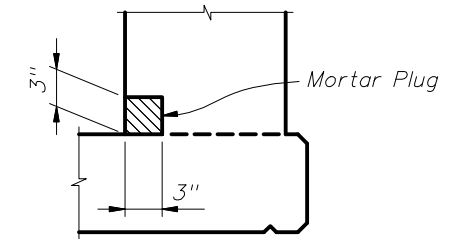
STIRRUP BAR 5X



BAR 5S

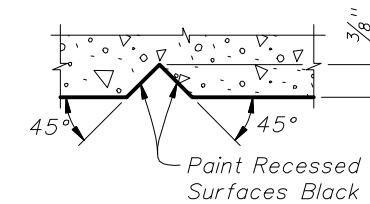
REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- The 3'-8 3/4" vertical dimensions shown for Bars 5T and 5X are based on a bridge deck with a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and a counter 2% raised sidewalk cross slope. If the raised sidewalk thickness, width or cross slopes vary from the above amounts, adjust these vertical dimensions accordingly to achieve a 6" minimum embedment into the bridge deck.
- The reinforcement for the railing on a Retaining Wall shall be the same as detailed with ∅A = 90°.
- All reinforcing steel at the open joints shall have a 2" minimum cover.
- Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-2".
- The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT

NOTE:
At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.



SECTION THRU RECESSED "V" GROOVE TO FORM INSCRIBED LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.095
Reinforcing Steel	LB/LF	25.90

(The above quantities are based on a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and counter 2% sidewalk cross slope.)

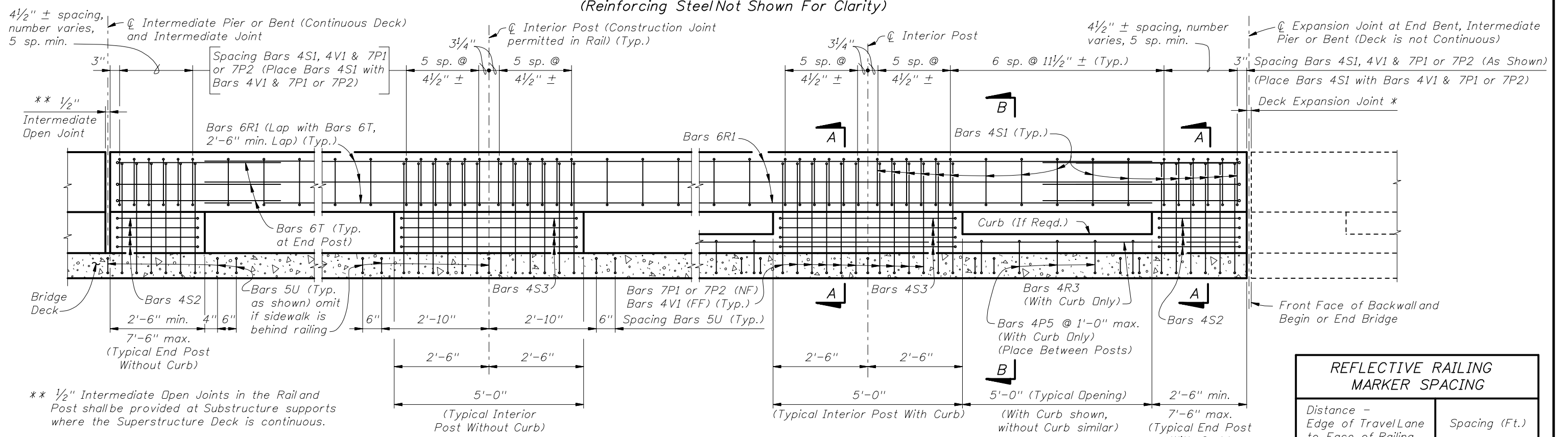
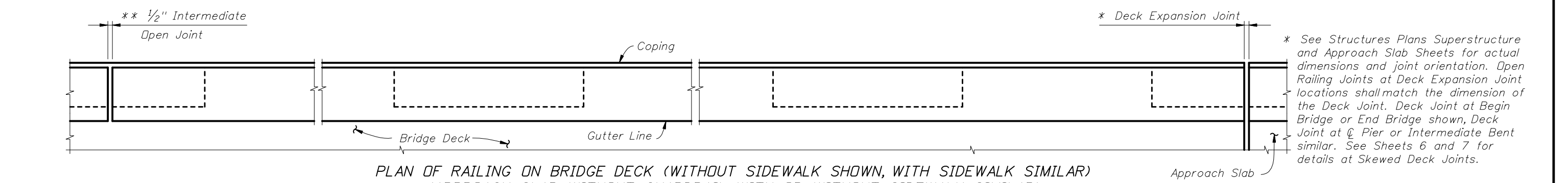


2010 FDOT Design Standards

TRAFFIC RAILING - (32" VERTICAL SHAPE)

Last Revision 01/01/08 Sheet No. 3 of 3

Index No. 423



REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

ELEVATION OF INSIDE FACE OF RAILING (BRIDGE DECK SHOWN, APPROACH SLAB WITHOUT GUARDRAIL OR ADJACENT TO ROADWAY BARRIER SIMILAR)

TRAFFIC RAILING NOTES

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

CONCRETE AND REINFORCING STEEL : See Structures Plans General Notes.

AGGREGATE LIMITATION: The aggregate used in the concrete mix shall be a #67 aggregate.

MARKERS : Elevation markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing.

GUARDRAIL : For Guardrail connection details see Index No. 400.

SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. The cost of all modifications will be at the Contractor's expense.

RETAINING WALL : If the Traffic Railing Barrier is to be provided on a retaining wall, the railing sections will be the same as on Sheets 3 and 4. See Retaining Wall Plans for payment.

NAME, DATE AND 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 Name shall be as shown in the General Notes in the Structures Plans. The Date shall be placed on the driver's left side when approaching the bridge. 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 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

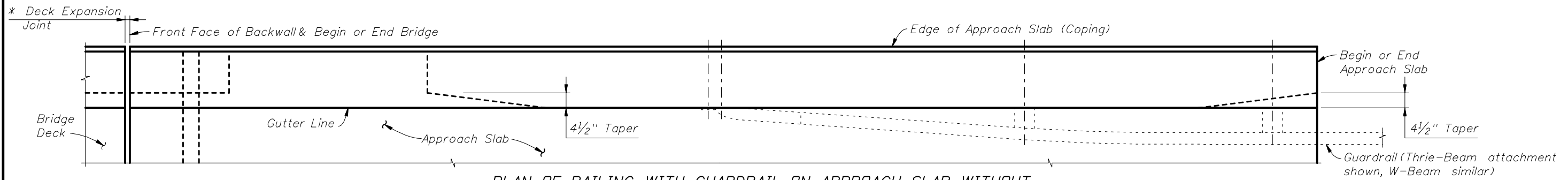
REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

NOTES:
(NF) means Near Face, (FF) means Far Face.

CROSS REFERENCES:
For Sections see Sheets 3 and 4.
For Quantities and Quantity Breakdown see Sheet 5.

INSTRUCTION TO DESIGNER

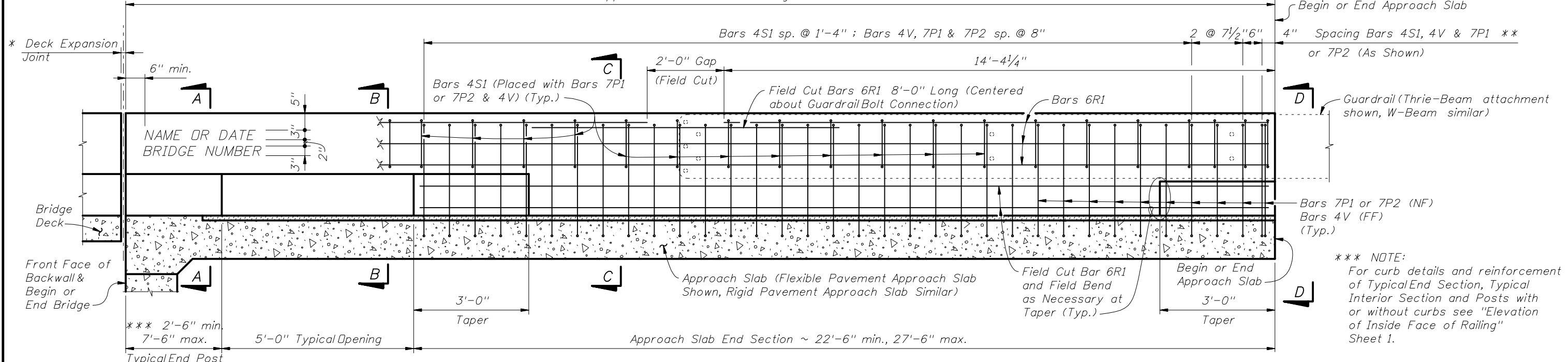
1. Indicate use of Curb beneath railing on low side of deck without sidewalks and other locations where required to contain bridge deck runoff. Define Curb location in Structures Plans Superstructure Sheets by Stationing limits or other appropriate methods.
2. Define lengths of End Posts in Structures Plans Superstructure Sheets.



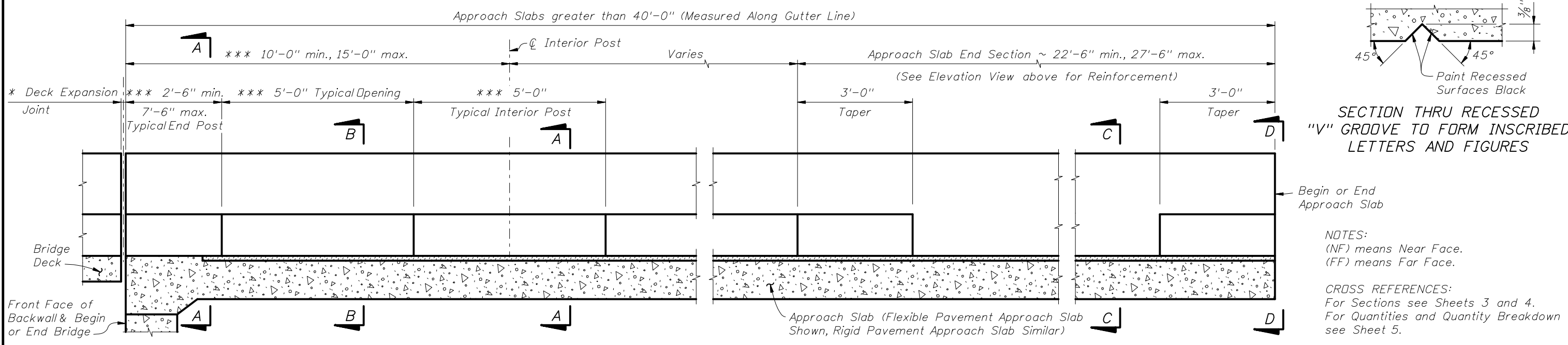
PLAN OF RAILING WITH GUARDRAIL ON APPROACH SLAB WITHOUT SIDEWALK (APPROACH SLAB WITH ADJACENT SIDEWALK SIMILAR)
 (Reinforcing Steel Not Shown For Clarity)

* See Structures Plans, Superstructure and Approach Slab Sheets for actual dimensions and joint orientation. Open railing Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Barriers on skewed bridges see Sheets 6 and 7.

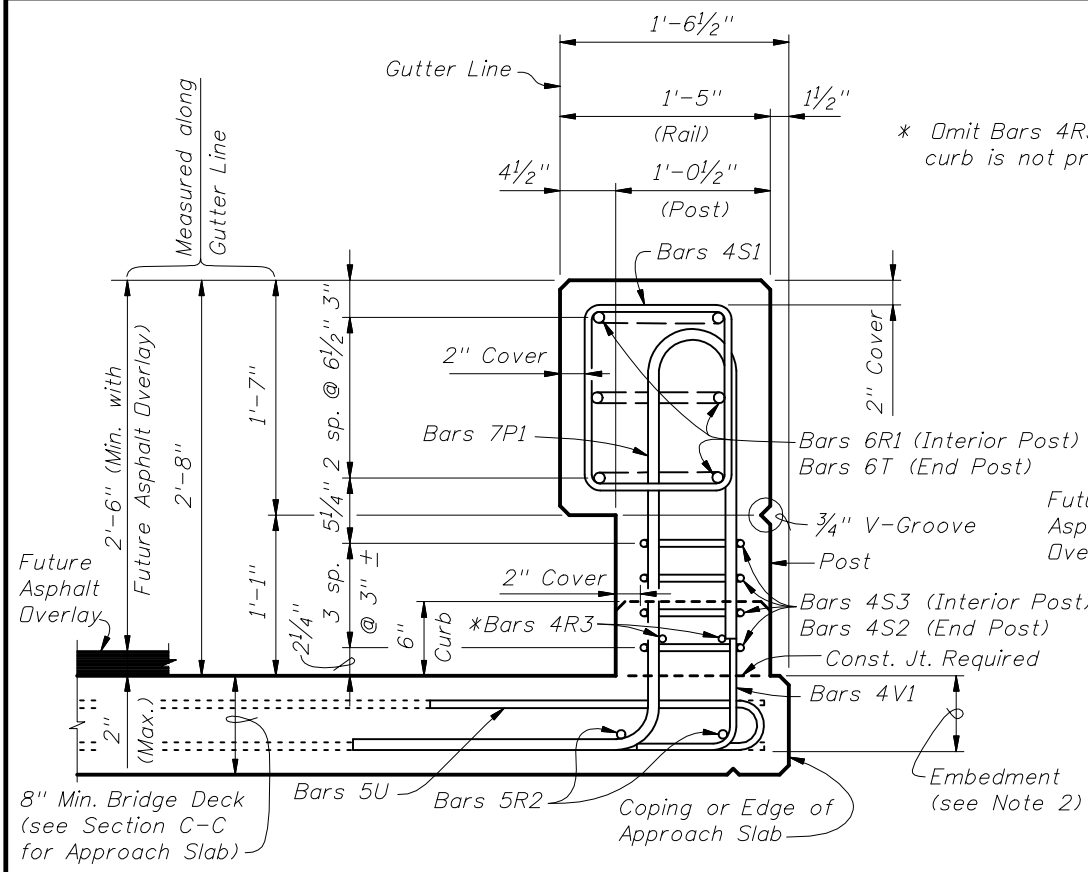
** Begin placing Railing Bars 7P1 or 7P2 and 4V on Approach Slab at the barrier end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 7P1 or 7P2 and 4V shall be made immediately adjacent to Begin or End Bridge.



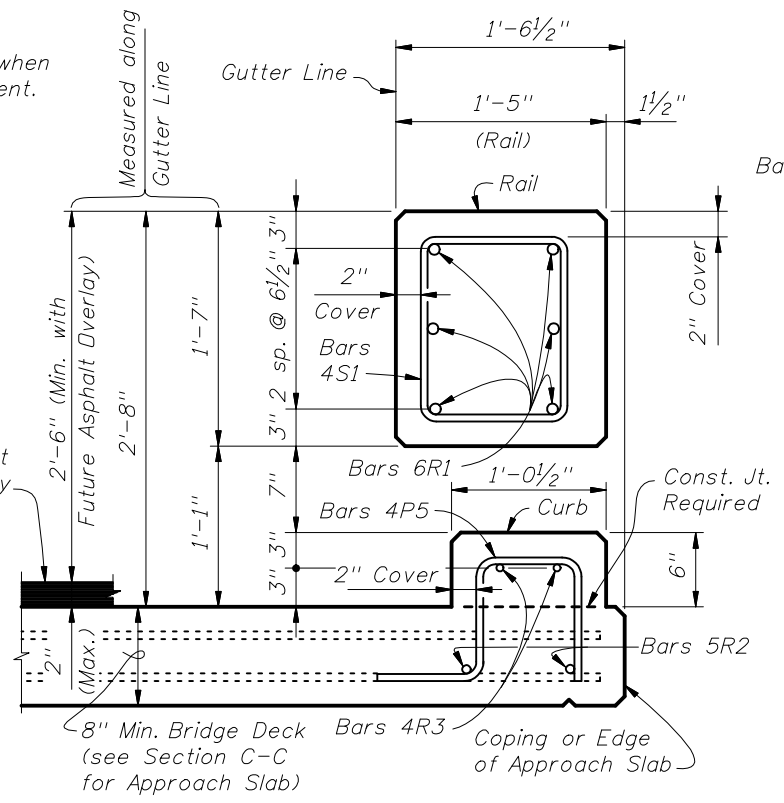
ELEVATION OF INSIDE FACE OF RAILING WITH GUARDRAIL ON APPROACH SLABS 40'-0" OR LESS ALONG GUTTER (WITHOUT CURB SHOWN, WITH CURB SIMILAR)



ELEVATION OF INSIDE FACE OF RAILING WITH GUARDRAIL ON APPROACH SLABS GREATER THAN 40'-0" ALONG GUTTER (WITHOUT CURB SHOWN, WITH CURB SIMILAR)

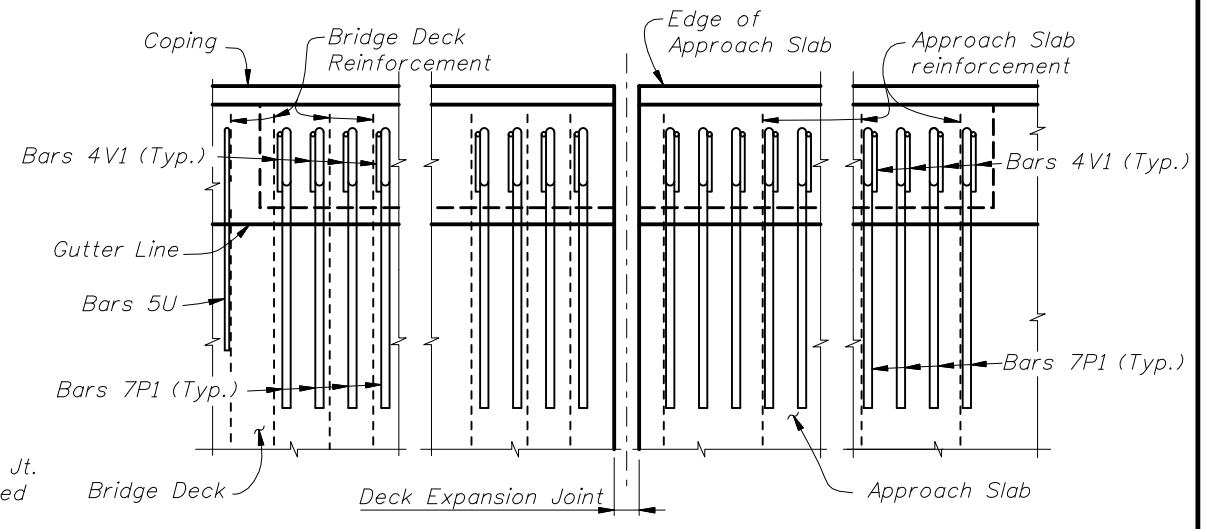


SECTION A-A (WITH CURB SHOWN, WITHOUT CURB SIMILAR)



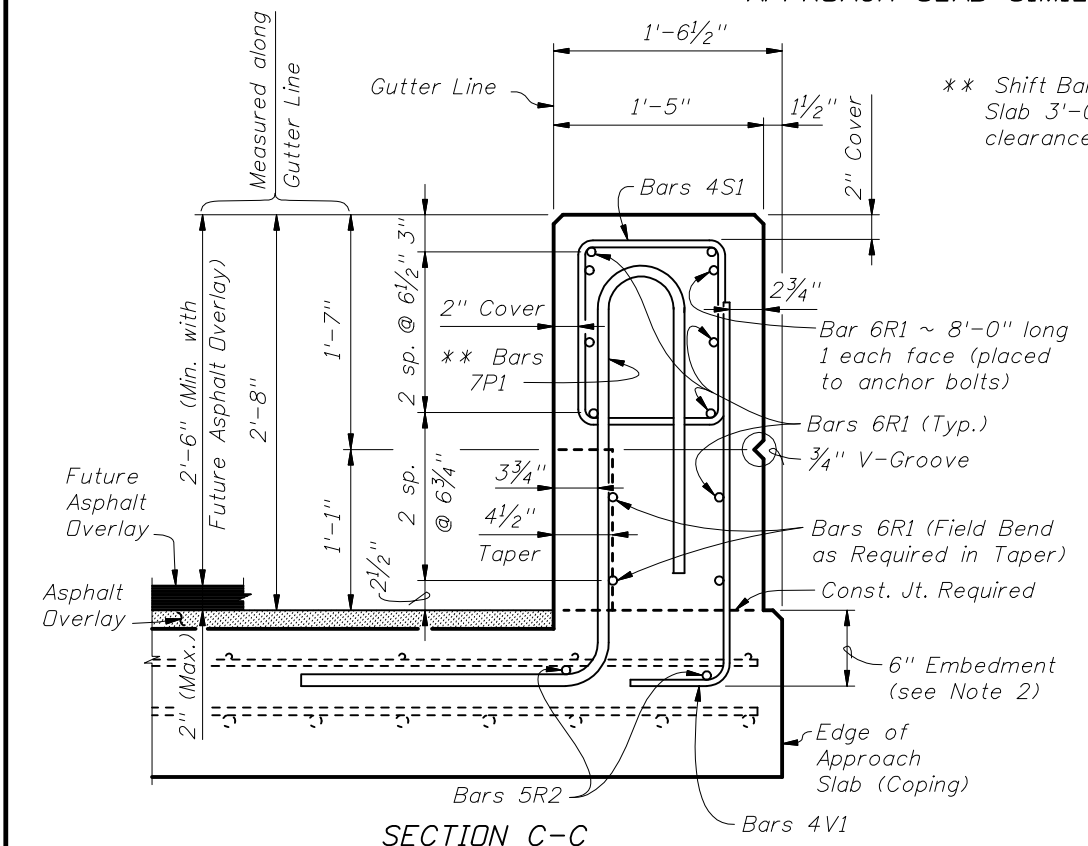
SECTION B-B (WITH CURB SHOWN, WITHOUT CURB SIMILAR)

TYPICAL SECTIONS THRU RAILING (BRIDGE DECK SHOWN, APPROACH SLAB SIMILAR)

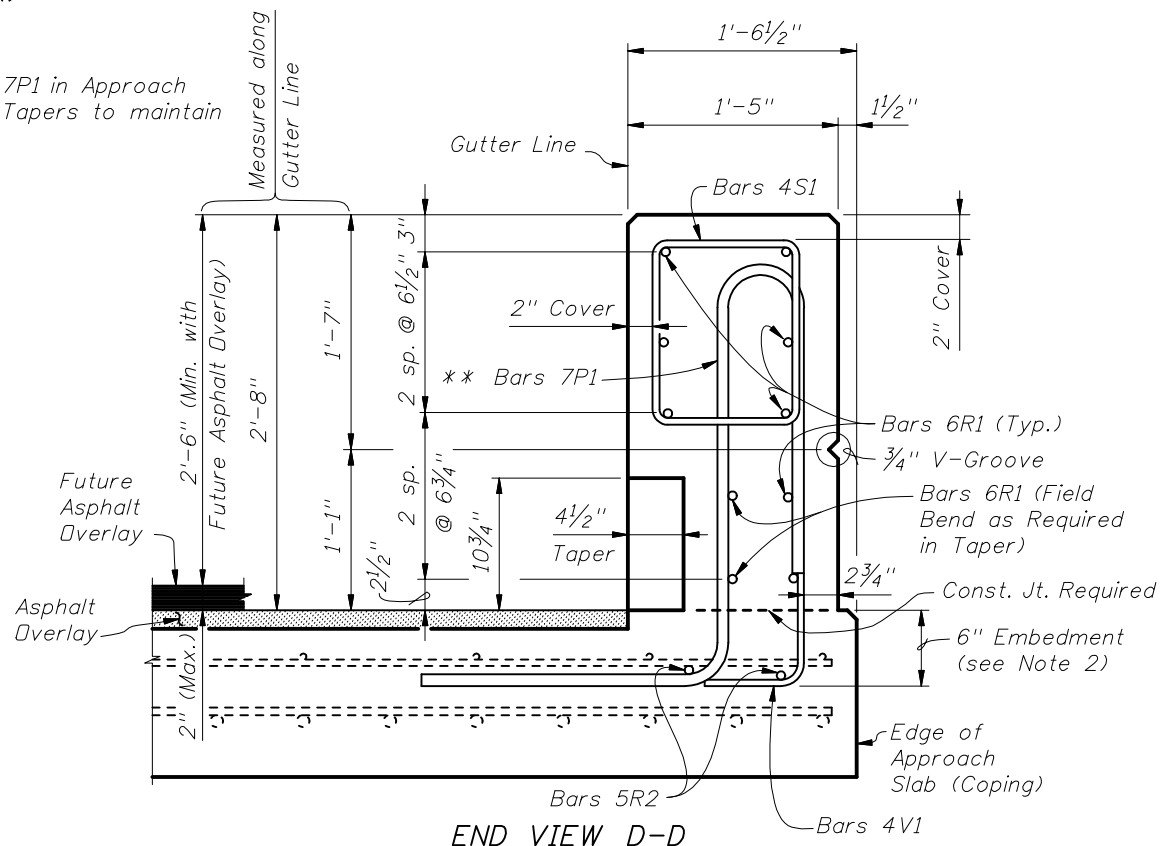


PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB (END POST SHOWN, INTERIOR POST SIMILAR) (Bars R, S and T not shown for clarity)

- NOTES:
- 1) Shift deck and approach slab transverse reinforcement minimally to allow placement of Bars 7P & 4V.
 - 2) For decks to 8 1/2" place Bars 7P1 & 4V with the bottom mat of reinforcement as shown in Section A-A. For decks and slabs thicker than 8 1/2" place Bars 7P1 and 4V with 6" embedment. At skewed joints, place Bars 7P3 and 4V with 5" embedment.



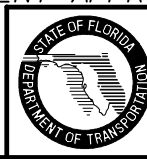
SECTION C-C

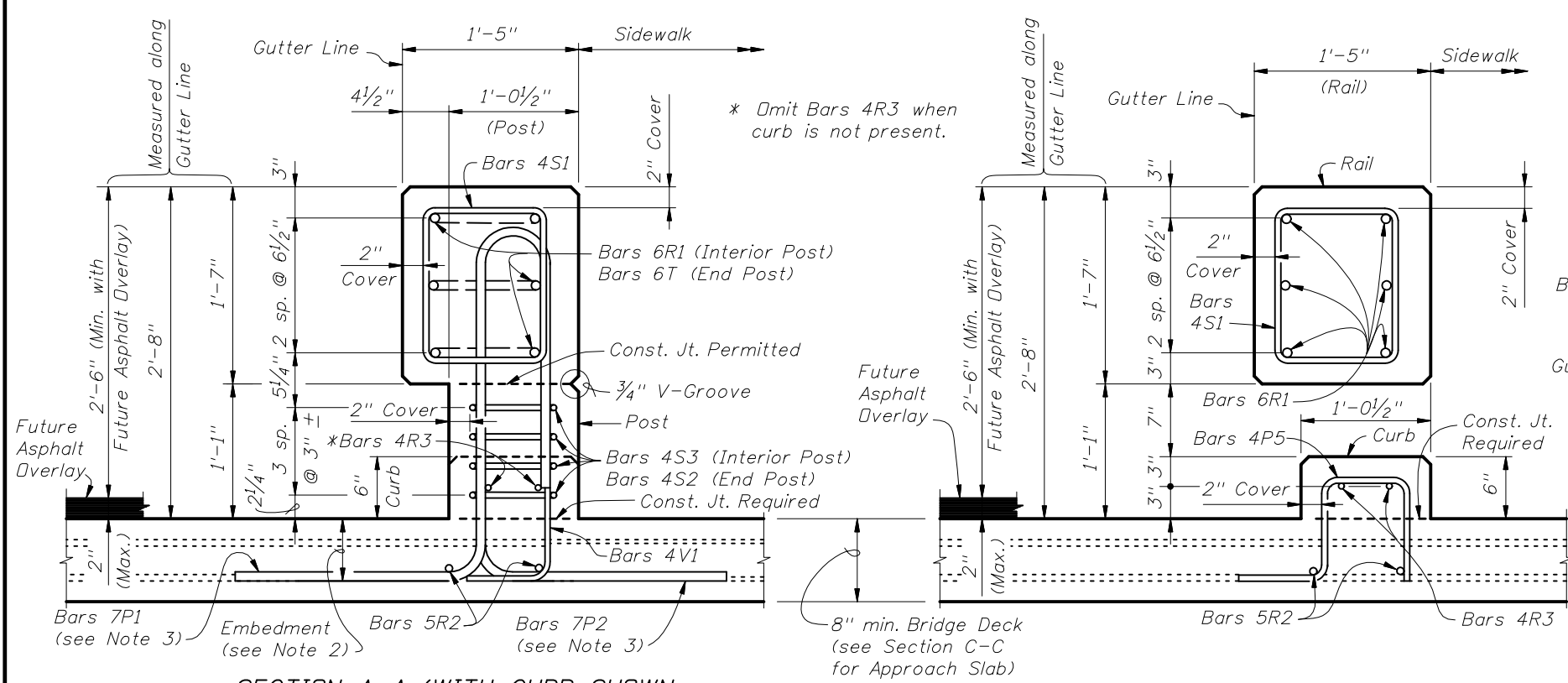


END VIEW D-D

TYPICAL SECTIONS THRU RAILING END SECTIONS ON APPROACH SLAB WITH GUARDRAIL (APPROACH SLAB (FLEXIBLE PAVEMENT APPROACHES) SHOWN, APPROACH SLAB (RIGID PAVEMENT APPROACHES) SIMILAR)

CROSS REFERENCES:
For Locations of Sections see Sheets 1 and 2.
For Quantities and Rebar Details see Sheet 5.

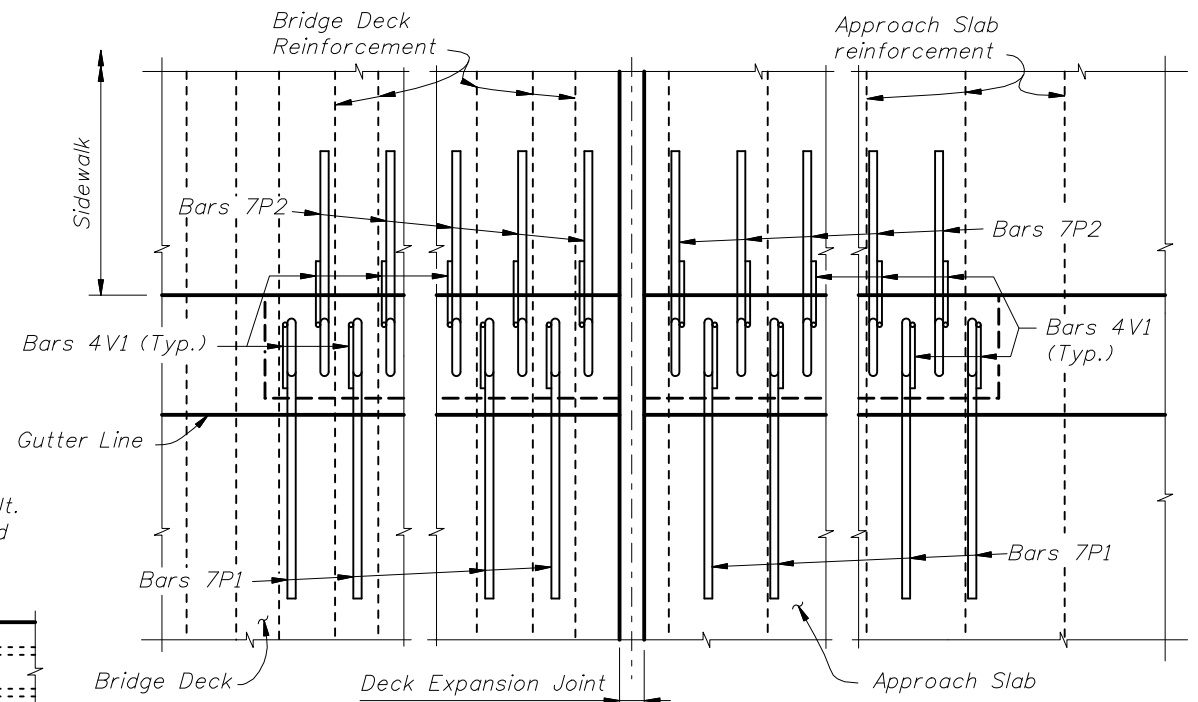




SECTION A-A (WITH CURB SHOWN, WITHOUT CURB SIMILAR)

SECTION B-B

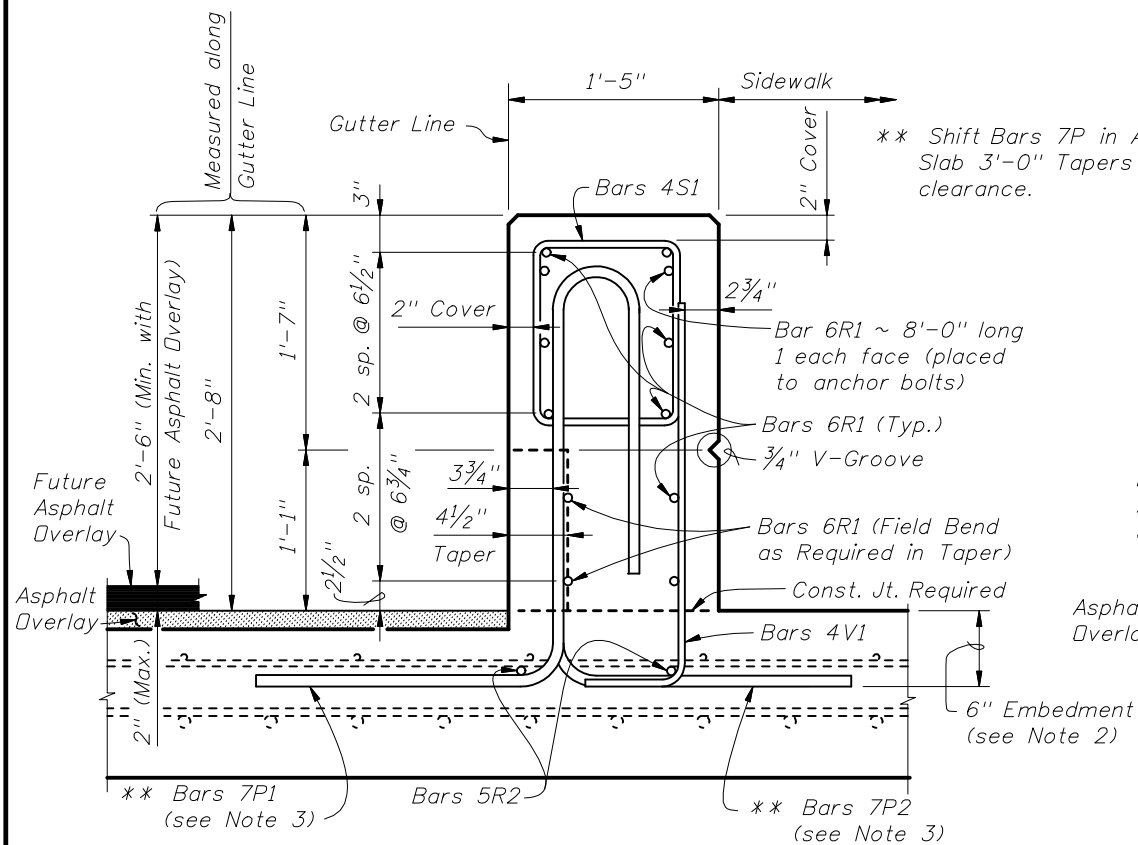
TYPICAL SECTIONS THRU RAILING ON BRIDGE DECK WITH SIDEWALK (SHOWN) (RAILING ON APPROACH SLAB SIMILAR)



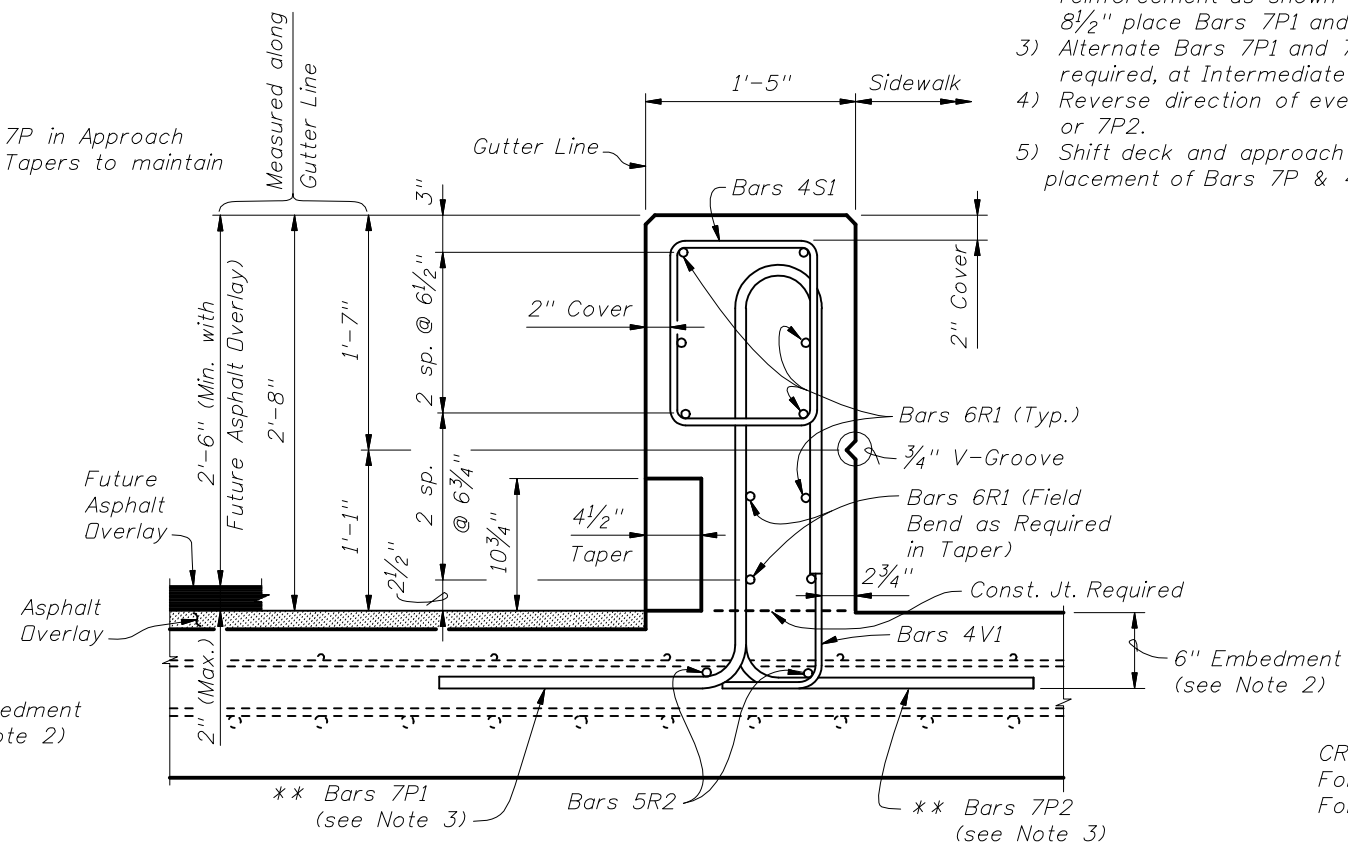
PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK (Bars R, S and T not shown for clarity)

RAILING ADJACENT TO SIDEWALK NOTES:

- 1) End Post detailed above, Interior Post and Approach Slab End Section similar.
- 2) For decks to 8 1/2" place Bars 7P1 and 7P2 and 4V with the bottom mat of reinforcement as shown in Section A-A. For decks and slabs thicker than 8 1/2" place Bars 7P1 and 7P2 and 4V with 6" embedment.
- 3) Alternate Bars 7P1 and 7P2 at each post. At End Posts 3 each (min.) required, at Intermediate Post 6 each required.
- 4) Reverse direction of every other Bar 4V1 to match direction of Bars 7P1 or 7P2.
- 5) Shift deck and approach slab transverse reinforcement minimally to allow placement of Bars 7P & 4V.



SECTION C-C

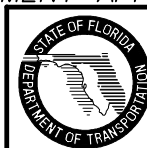


END VIEW D-D

TYPICAL SECTIONS THRU RAILING END SECTION ON APPROACH SLAB WITH SIDEWALK AND GUARDRAIL (APPROACH SLAB (FLEXIBLE PAVEMENT APPROACHES) SHOWN, APPROACH SLAB (RIGID PAVEMENT APPROACHES) SIMILAR)

CROSS REFERENCES:

For Locations of Sections see Sheets 1 and 2. For Quantities and Rebar Details see Sheet 5.



2010 FDOT Design Standards

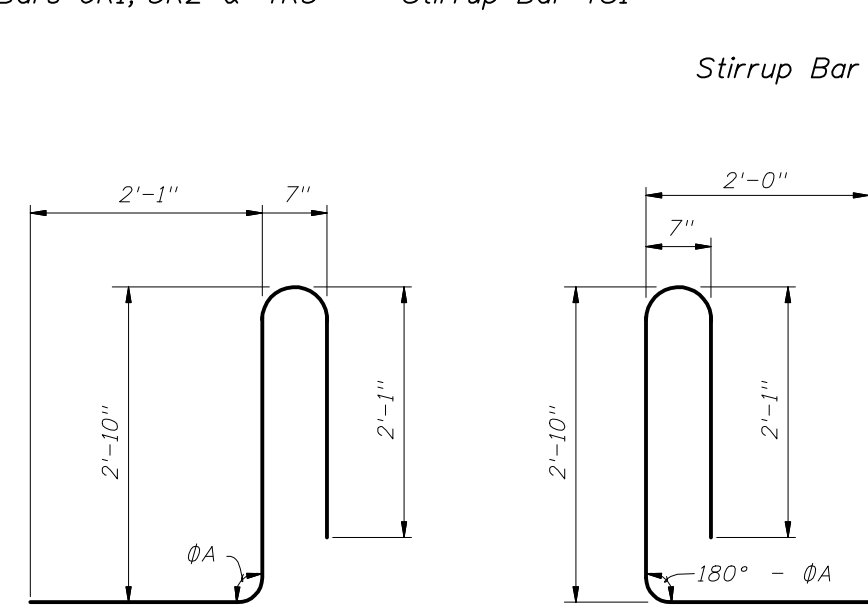
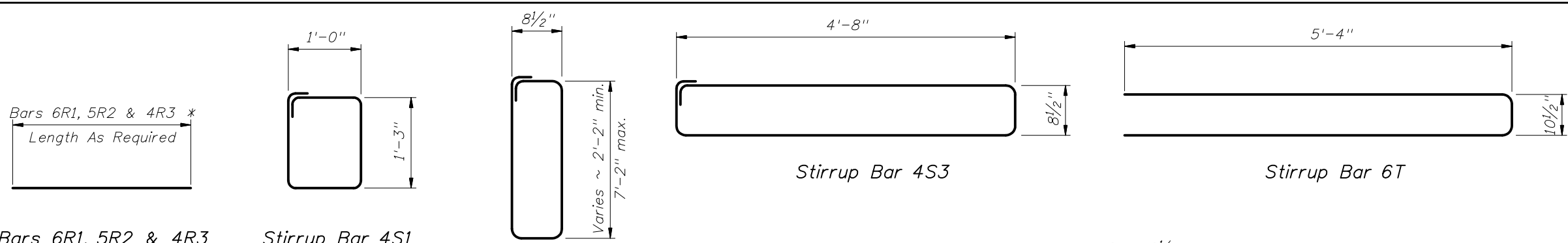
TRAFFIC RAILING - (CORRAL SHAPE)

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CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

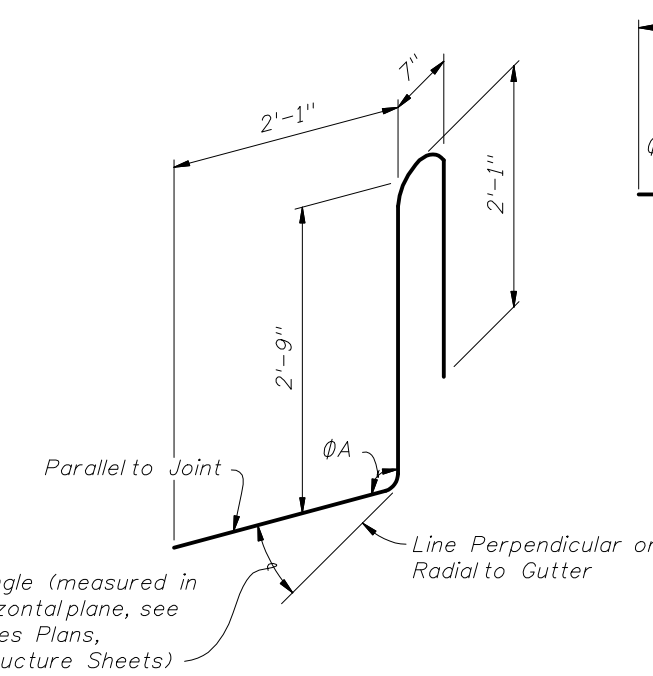
BILL OF REINFORCING STEEL			
MARK	SIZE	LENGTH	LB/BAR
P1	7	7'-4"	15.00
P2	7	7'-3"	14.82
P3	7	7'-2"	14.65
*** P4	7	7'-3"	14.82
* P5	4	2'-11"	1.94
R1	6	As Req'd.	1.5 (LB/LF)
R2	5	As Req'd.	1.04 (LB/LF)
* R3	4	As Req'd.	0.67 (LB/LF)
** S1	4	5'-0"	3.34
** S2	4	Varies 6'-3" min. 16'-3" max.	Varies 4.18 min. 10.86 max.
** S3	4	11'-3"	7.52
T	6	11'-4"	17.02
U	5	4'-8"	4.87
V1	4	3'-2"	2.12
*** V2	4	3'-6"	2.34

* Bars 4P5 and 4R3 are to be used with a curb only.
 ** Bend Bars 4S1, 4S2 & 4S3 around a #3 Stirrup Pin.
 *** Bars 7P4 & 4V2 are to be used on CIP Concrete Retaining Walls.

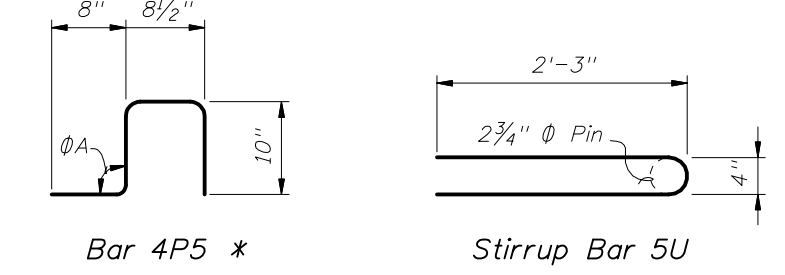


Bar 7P1

Bar 7P2

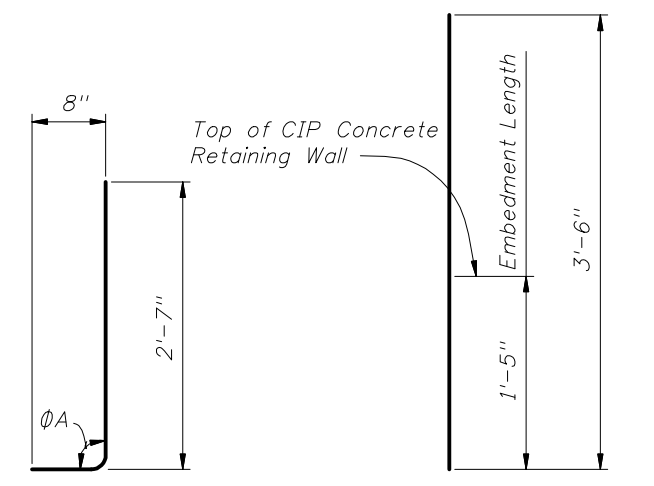


Bar 7P3 (Requires 3 Dimensional Bend)



Bar 4P5 *

Stirrup Bar 5U

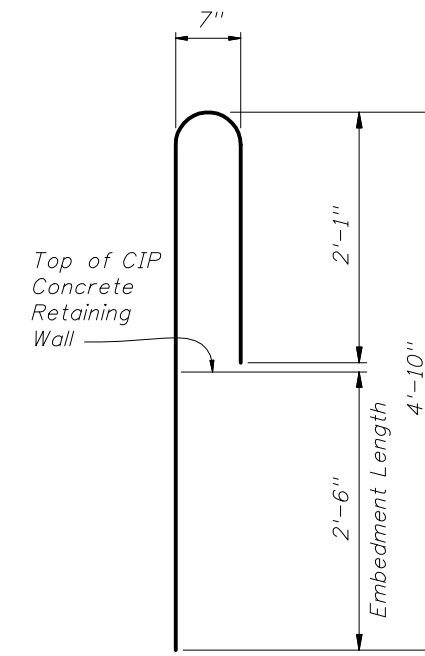


Bar 4V1

Bar 4V2 ***

ROADWAY OR SIDEWALK CROSS-SLOPE	HIGH SIDE	LOW SIDE
	ΦA	ΦA
0% to 2%	90°	90°
2% to 6%	93°	87°
6% to 10%	96°	84°

ΦA shall be 90° if Contractor elects to place Railing Perpendicular to the Deck.

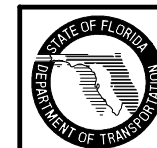


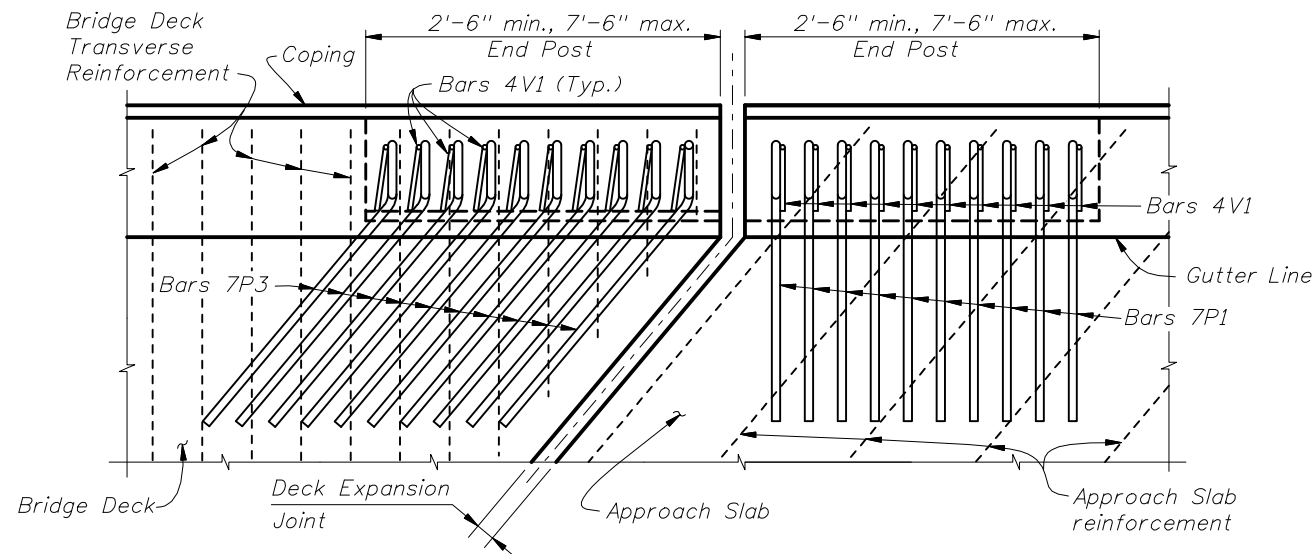
Bar 7P4 ***

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	CONCRETE QUANTITY (CY)	REBAR QUANTITY (LB)
Typical 10'-0" Section w/Curb	1.13	451
Typical 10'-0" Section w/o Curb	1.03	428
Approach Slab with Guardrail End Section	0.14 (per LF)	44 (per LF)

REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- The reinforcement for the railing on a CIP Concrete Retaining Wall shall be the same as detailed above for a 8" deck with ΦA = 90°, where applicable. If bottom horizontal legs of Bars 7P1, 7P3 and 4V1 prohibit placement, Bars 7P4 and 4V2 may be substituted for Bars 7P1, 7P3 and 4V1 as shown.
- All reinforcing steel at the open joints shall have a 2" minimum cover unless otherwise noted.
- At Construction Joints Bars 6R1, 5R2 and 4R3 may be continuous or spliced. Where bars are spliced provide a 2'-6" min. lap length for Bar 6R1, a 2'-0" min. lap length for Bars 5R2 and a 1'-3" min. lap length for Bars 4R3.
- The skew angle for Bars 7P3 may vary from joint to joint and side to side, see Structures Plans, Superstructure Sheets for details.

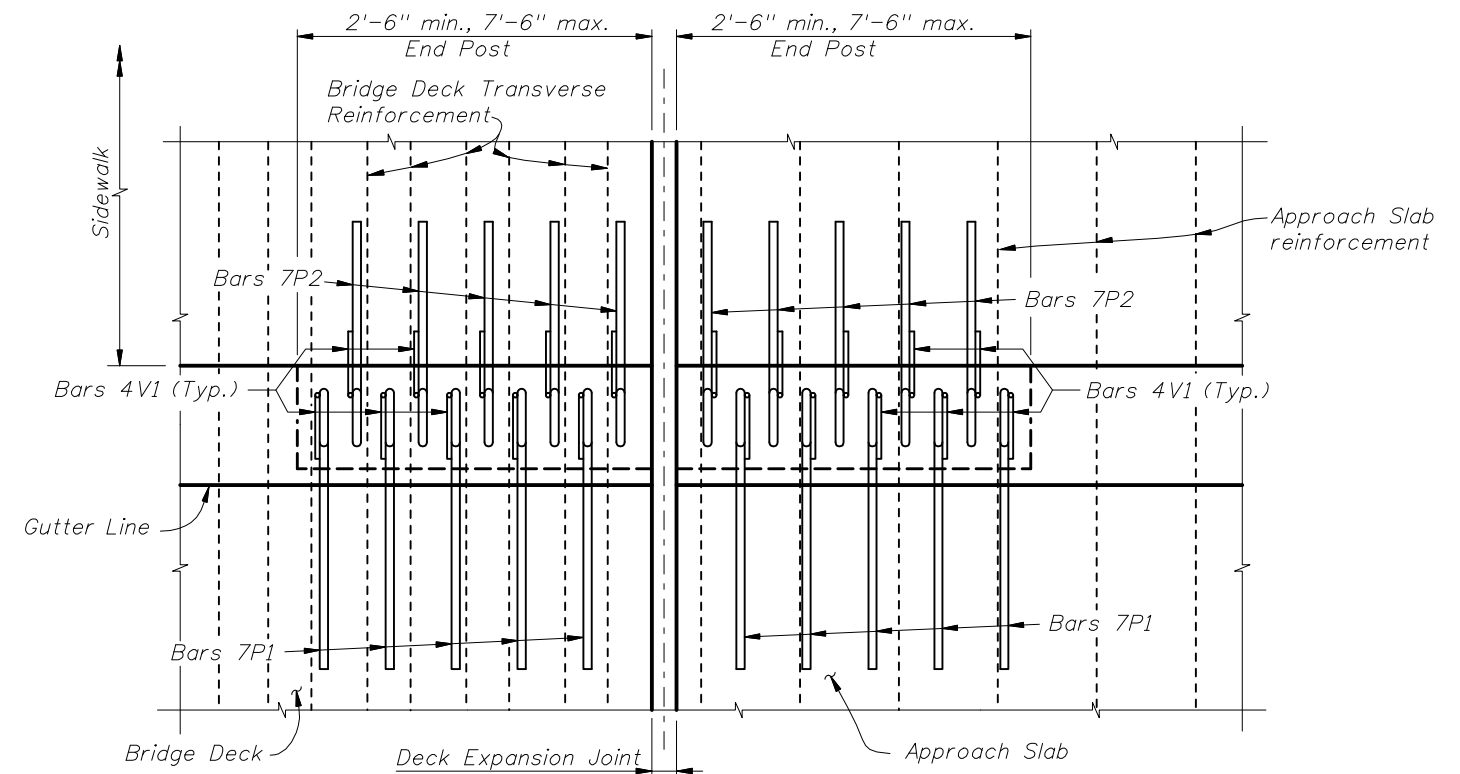




PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB
- SKEW ANGLE GREATER THAN 15 DEGREES

NOTES:

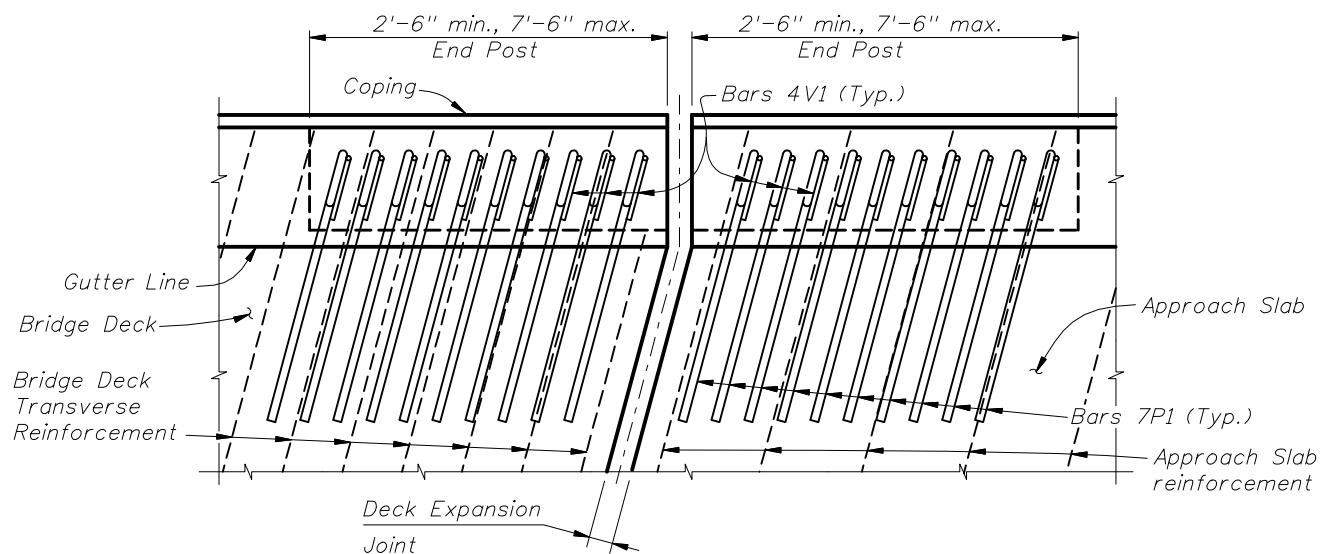
- 1) Railing expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
 - 2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.
- BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (SHOWN):
- 3) End Post & Approach Slab End Section - Place Bars 7P1 & 4V1 in obtuse corners of intersection of deck joint and gutter line. Place Bars 7P3 & 4V1 in acute corners of intersection of deck joint and gutter line as required. Interior Post - use Bars 7P1 and 4V1 placed with bottom mat of reinforcement. Shift deck or slab reinforcement minimally to allow proper placement of Bars 7P and 4V and to facilitate placement of concrete.
- APPROACH SLAB WITH GUARDRAIL ATTACHED (NOT SHOWN):
- 4) Place Bars 7P1 & 4V1 in obtuse corners of intersection of deck joint and gutter line and Bars 7P3 & 4V1 in acute corners of intersection of deck joint and gutter line as required. Shift deck or slab reinforcement minimally to allow proper placement of Bars 7P & 4V and to facilitate placement of concrete.
 - 5) Begin placing Railing Bars 7P & 4V 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 7P & 4V shall be made immediately adjacent to Begin or End Bridge.



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK
- 0 DEGREE SKEW ANGLE

NOTES:

- 1) Alternate Bars 7P1 with Bars 7P2 and reverse direction of every other Bar 4V1 as detailed above to facilitate placement of concrete.
- 2) Shift deck transverse reinforcement minimally to allow placement of Bars 7P & 4V.



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB
- SKEW ANGLE 15 DEGREES OR LESS

NOTES:

- 1) Railing expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
 - 2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.
 - 3) Bars 7P & 4V in the Approach Slab may be rotated to match Approach Slab reinforcement or placed perpendicular or radial to the gutter line.
- BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (SHOWN):
- 4) Rotate vertical Bars 7P & 4V to match bridge deck reinforcement. Shift deck & slab transverse reinforcement to allow proper placement of Bars 7P & 4V and to facilitate placement of concrete.
- APPROACH SLAB WITH GUARDRAIL ATTACHED (NOT SHOWN):
- 5) Begin placing Railing Bars 7P & 4V 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 7P & 4V shall be made immediately adjacent to Begin or End Bridge.
 - 6) Bars 7P at end of the railing shall be field cut and shifted to maintain clearance, see Railing End Taper Detail Sheet 2 for similar details.

GENERAL NOTES:

- 1) Deck Expansion Joint at begin or end bridge shown. Deck Expansion Joints at @ Pier or Intermediate Bents are similar.
- 2) 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.



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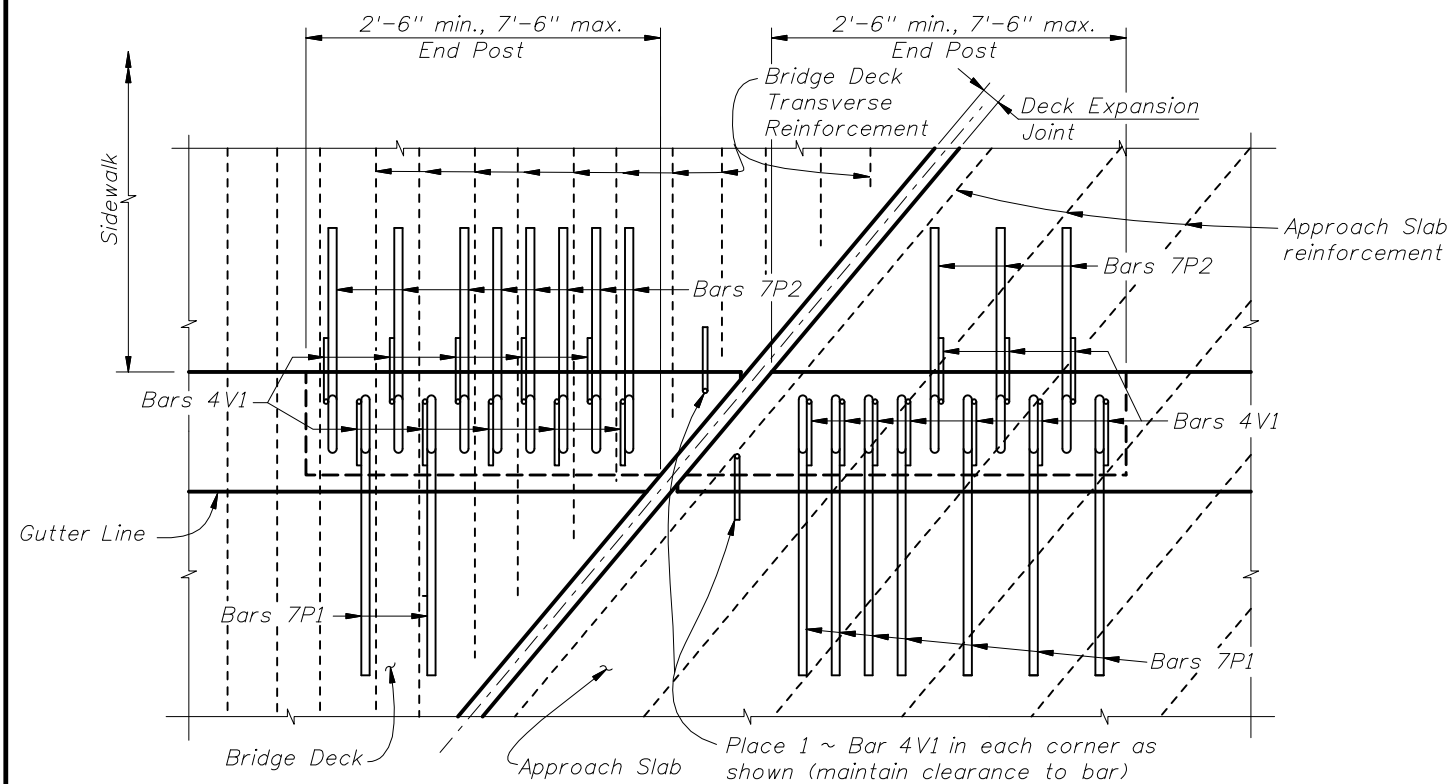
TRAFFIC RAILING - (CORRAL SHAPE)

Last Revision 07/01/05

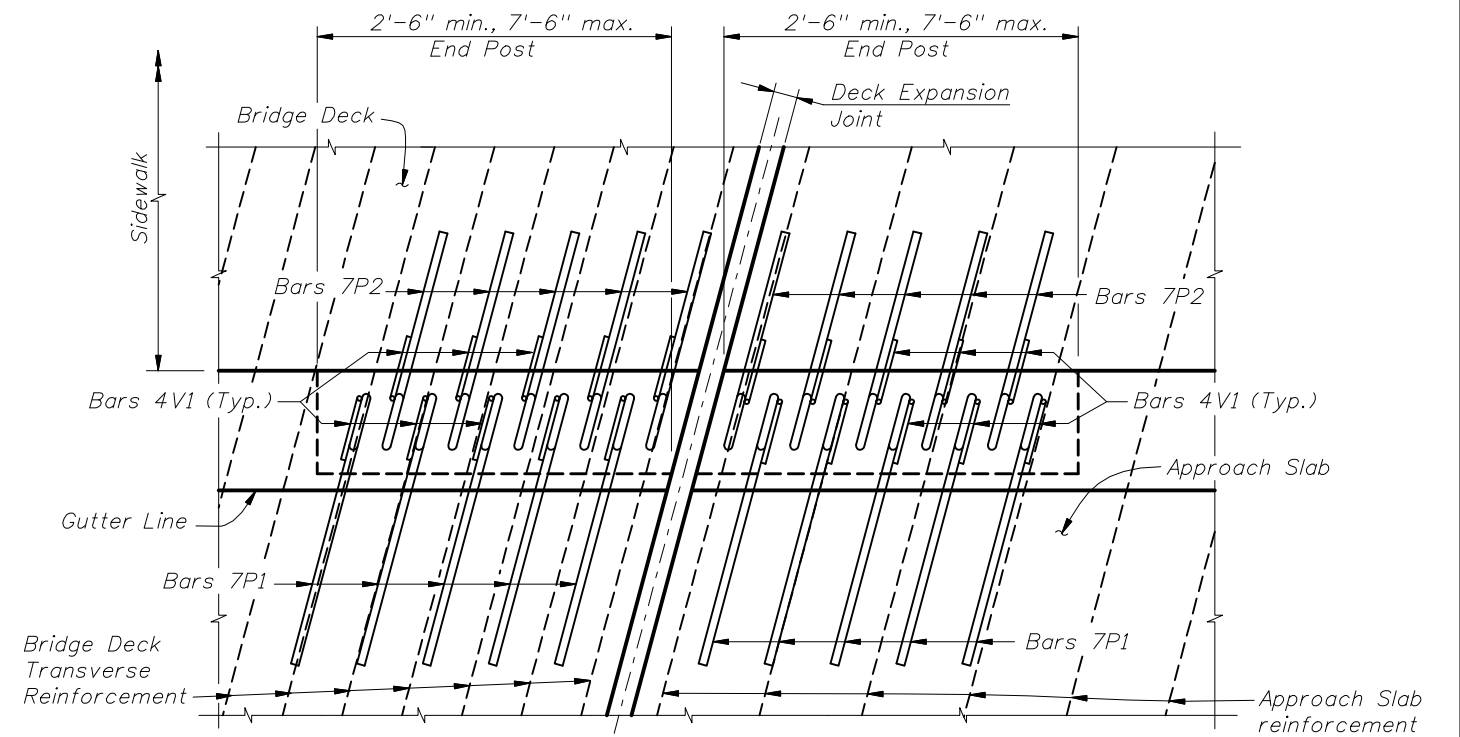
Sheet No. 6 of 7

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PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK
- SKEW ANGLE GREATER THAN 15 DEGREES



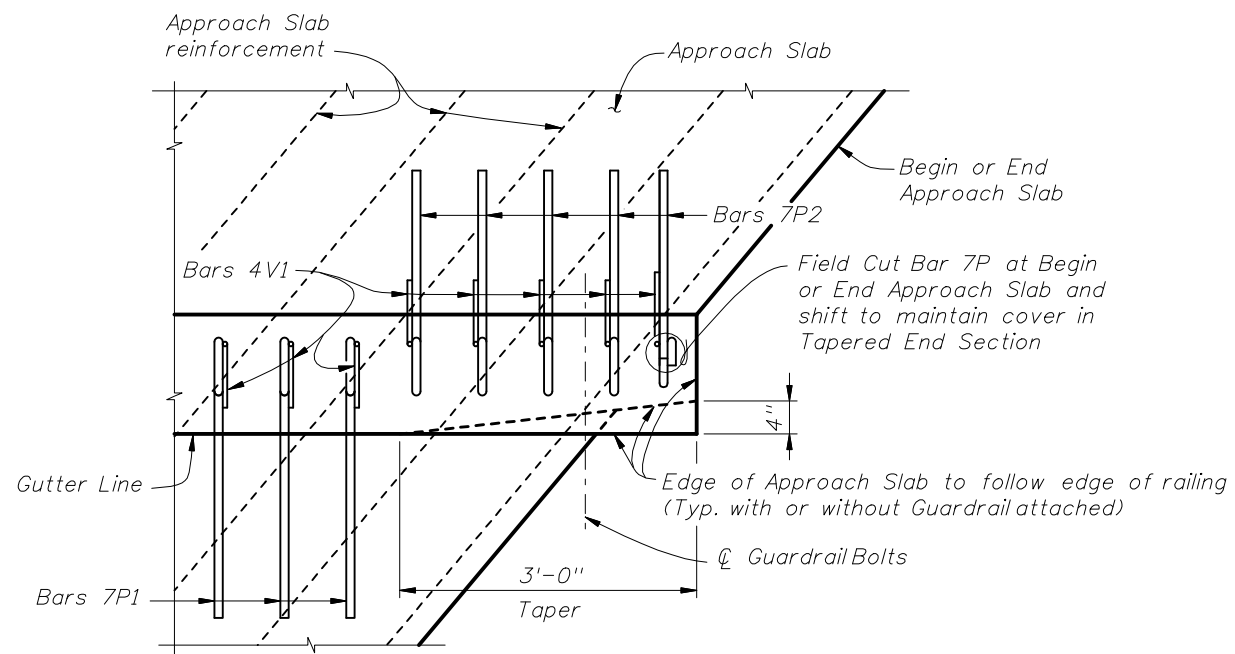
PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK
- SKEW ANGLE 15 DEGREES OR LESS

NOTES:

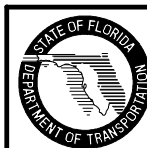
- 1) Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. Expansion joint at the inside face of parapet shall be turned perpendicular or radial to this line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
 - 2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.
 - 3) Edge of Approach Slab adjacent to the roadway shall follow end of railing, Bars 7P at end of the railing shall be field cut and shifted to maintain clearance, see detail bottom left this sheet for similar details.
- BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (SHOWN):
- 4) Alternate Bars 7P1 with Bars 7P2 and reverse direction of every other Bar 4V1 to facilitate placement of concrete.
 - 5) Bars 7P & 4V shall be rotated to match bridge deck reinforcement. Shift deck transverse reinforcement minimally to allow placement of Bars 7P & 4V.
 - 6) Railing End Post and reinforcement detailed above. Railing Interior Post reinforcement similar.
- APPROACH SLAB WITH GUARDRAIL ATTACHED (NOT SHOWN):
- 7) Begin placing Railing Bars 7P & 4V 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 7P & 4V shall be made immediately adjacent to Begin or End Bridge.

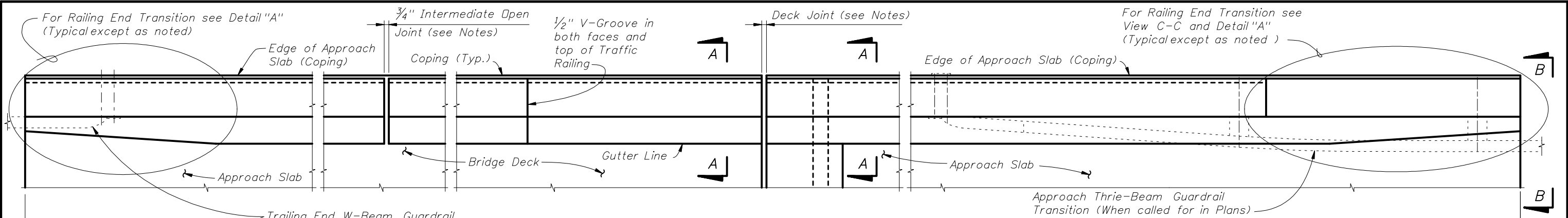
NOTES:

- 1) 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.
 - 2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.
- BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (NOT SHOWN):
- 3) Deck transverse reinforcement may be shifted minimally as required to allow proper placement of Bars 7P & 4V and to facilitate placement of concrete. Bars 7P1 & 4V1 or 7P2 & 4V1 shall be used on opposing sides of the joint depending on the direction of the skew, see Detail above. Approach Slab reinforcement may be shifted if conflicts occur.
 - 4) Interior Post - alternate Bars 7P1 with Bars 7P2 and reverse direction of every other Bar 4V1 to facilitate placement of concrete.
 - 5) End Post - alternate Bars 7P1 with Bars 7P2 and reverse direction of Bars 4V1 (as detailed) where possible.
- APPROACH SLAB WITH GUARDRAIL ATTACHED (SHOWN):
- 6) Use Bars 7P2 and reverse direction of Bars 4V1 where skew restricts use of Bars 7P1 & 4P1.
 - 7) Begin placing Railing Bars 7P & 4V 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 7P & 4V shall be made immediately adjacent to Begin or End Bridge.



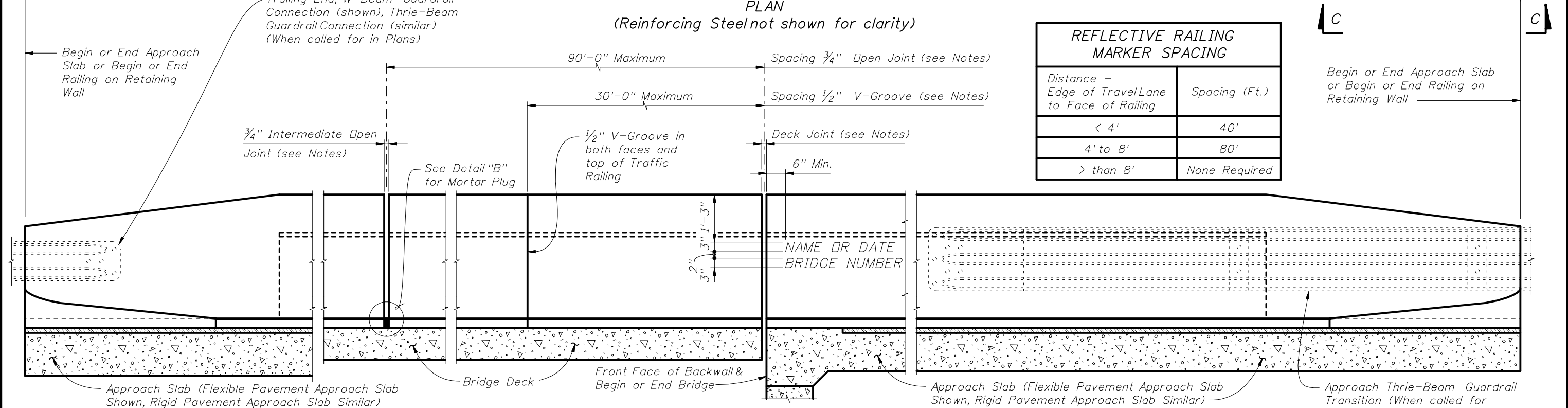
PARTIAL PLAN VIEW AT BEGIN OR END APPROACH SLAB WITH
SIDEWALK AND RAILING WITH GUARDRAIL ATTACHED
- SKEW ANGLE GREATER THAN 15 DEGREES SHOWN, 15 DEGREES OR LESS SIMILAR





PLAN
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required



ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)
(Railing on Bridge Deck and Approach Slab shown, Railing on Retaining Wall Similar)

CROSS REFERENCE:
For Section A-A, End View B-B and Detail "A" see Sheet 2.
For Detail "B" see Sheet 3.

TRAFFIC RAILING NOTES

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-5 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing.

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.

GUARDRAIL : For Guardrail connection details, see Index No. 400.

RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the 3/4" open joints and 1/2" V-groove shall apply.

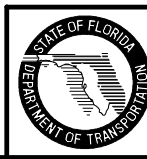
V-GROOVES : Construct 1/2" V-Grooves plumb. Space V-Grooves equally between 3/4" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

NAME, DATE, AND 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 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

JOINTS : See Structures Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin or End Bridge Shown. Deck Joint at Pier or Intermediate Bent Similar.

- Provide 3/4" Intermediate Open Joints shall be provided at :
- (1) - Substructure supports where superstructure slab is continuous.
 - (2) - Midspan where span length exceeds 90 ft.
 - (3) - Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.
 - (4) - At ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

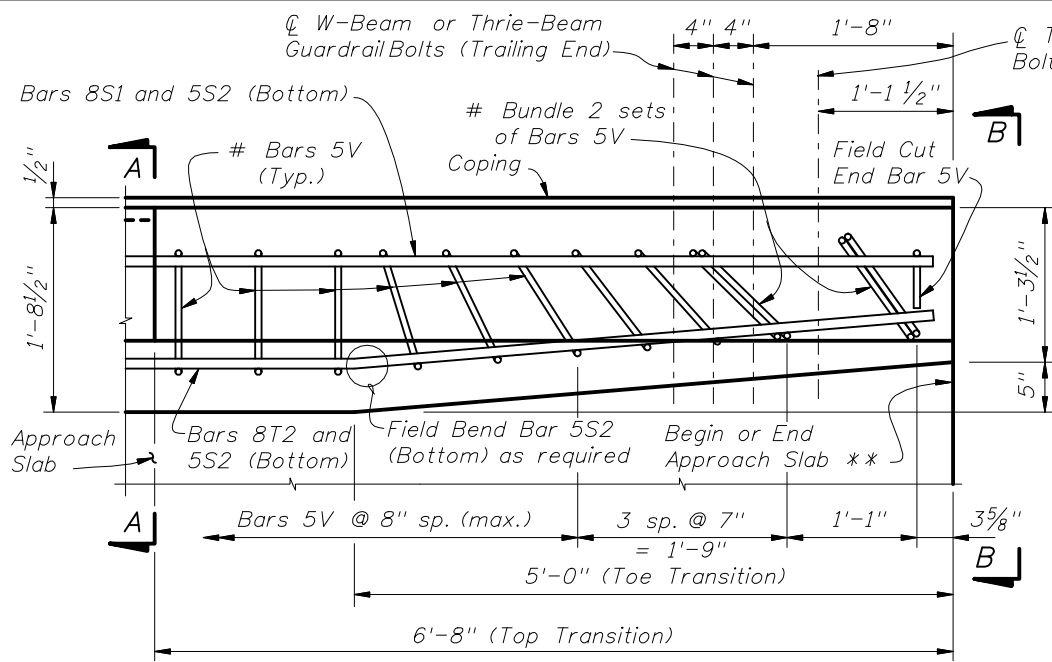
REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing



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TRAFFIC RAILING - (42" F SHAPE)

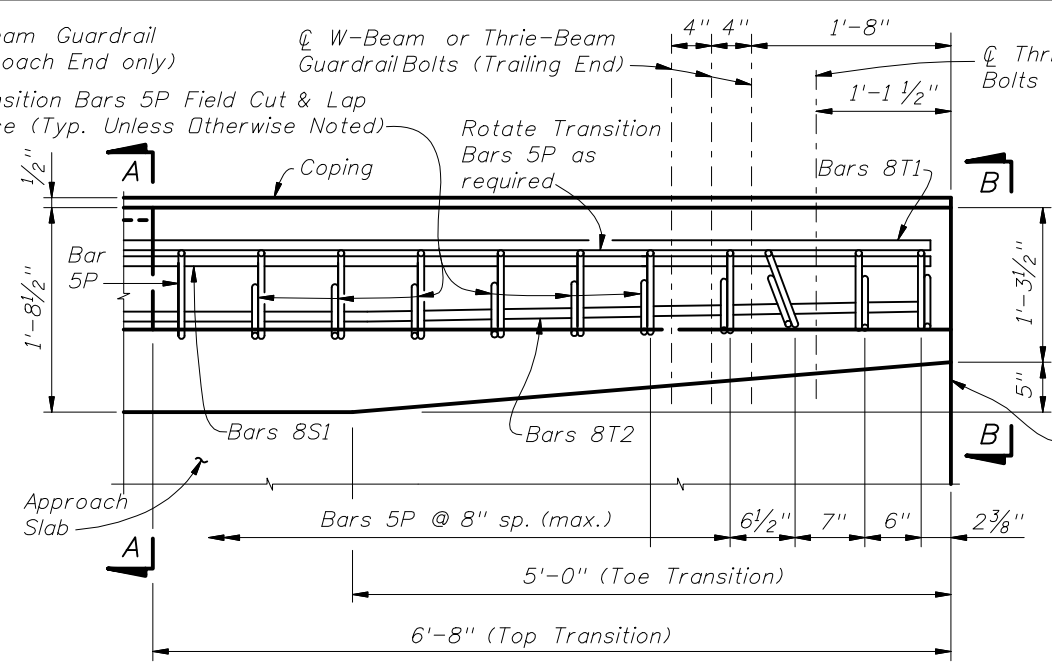
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PLAN - Railing End Transition
(Showing Bars 5V, 8S1, 5S2 and 8T2)

Rotate Bars 5V as shown to maintain clearance.

DETAIL "A"



PLAN - Railing End Transition
(Showing Transition Bars 5P and Bars 8S1, 8T1 & 8T2)

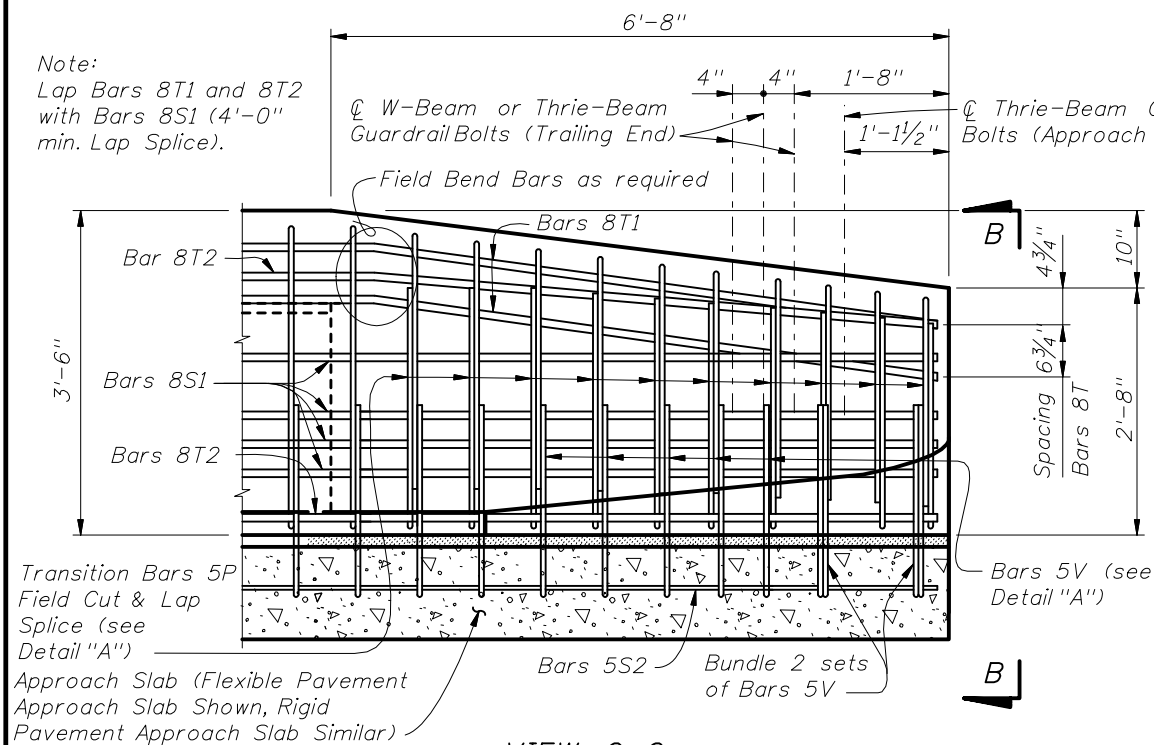
NOTE:
Begin placing Railing Bars 5P and 5V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5P and 5V (see Detail "A") as required to maintain cover in Railing End Transition.

** See joint orientation note on Sheet 1.

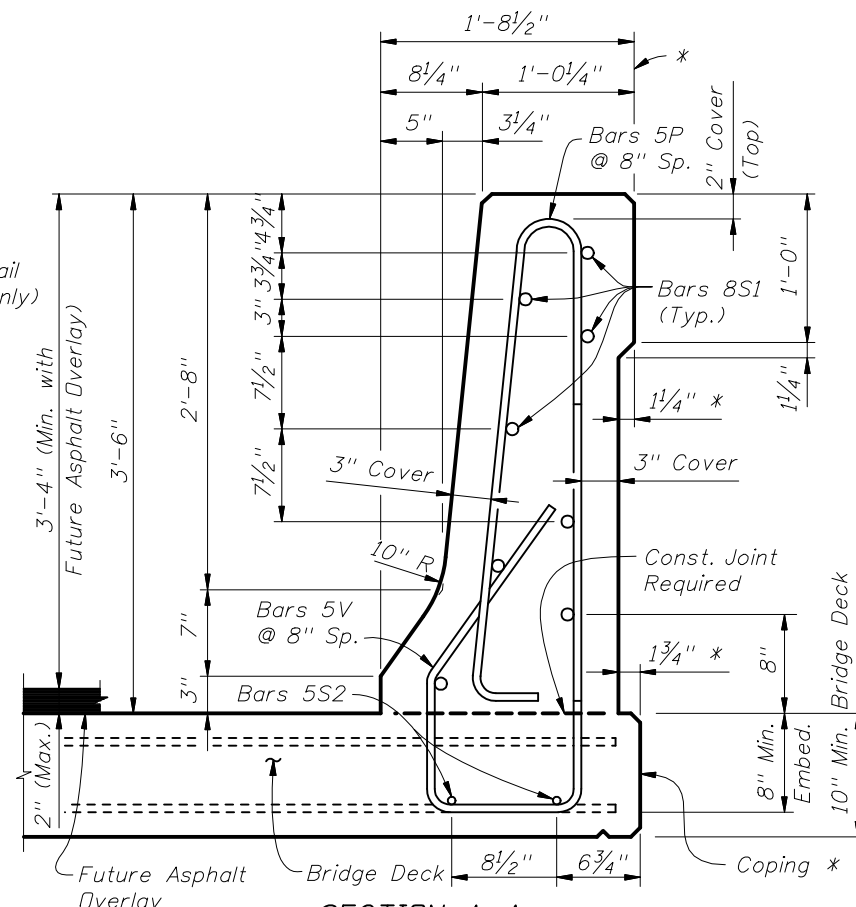
INSTRUCTION TO DESIGNER:
For Bridge Decks up to a maximum thickness of 11", the two Bars 5S2 placed in the Bridge Deck may substitute for the longitudinal deck steel located within the limits of Bars 5V, provided that the total area of longitudinal deck steel beneath the railing, as required by calculation, is not reduced. Show these bars on the Structures Plans, Superstructure Sheets with the deck steel.
All Bars 5P, 5S and 5V as shown are included in the Estimated Traffic Railing Quantities. Do not include Bars 5P, 5S and 5V in the reinforcing bar lists and estimated quantities for supporting bridge decks, approach slabs or retaining walls.

* Where railings of adjacent bridges are to be built back to back, the outside vertical plane of the railing and deck may coincide along a plane centered 1'-8 1/2" from each gutter line. A bond breaker will be required. See Structures Plans, Superstructure Sheets for Details.

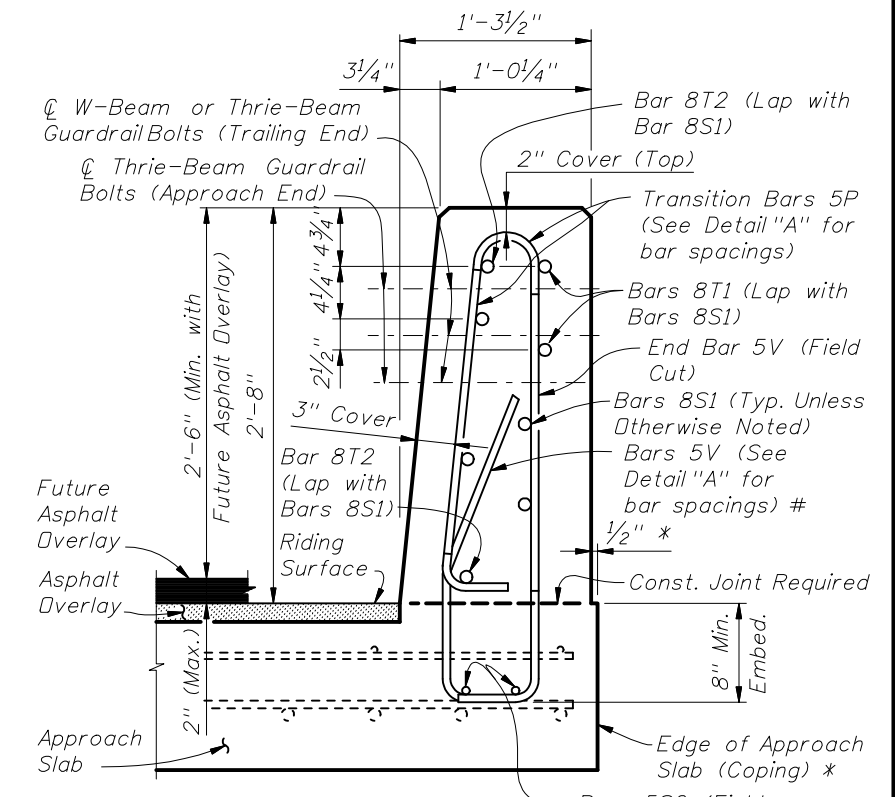
Note:
Lap Bars 8T1 and 8T2 with Bars 8S1 (4'-0" min. Lap Splice).



VIEW C-C
ELEVATION - RAILING END TRANSITION
(Guardrail and back leg of Stirrups not shown for clarity)



SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(SECTION THRU BRIDGE DECK SHOWN - SECTION THRU APPROACH SLAB SIMILAR)



VIEW B-B
(Section thru Approach Slab shown, Section thru Retaining Walls similar)

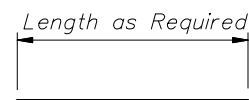


CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

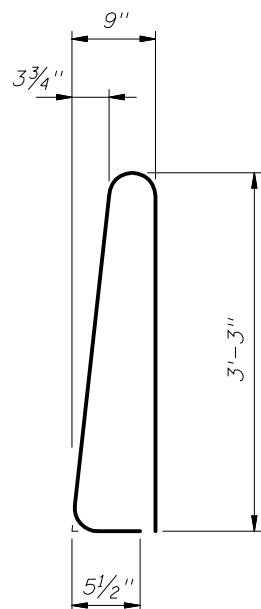
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
P	5	7'-5"
S1	8	As Reqd.
S2	5	As Reqd.
T1 & T2	8	13'-0"
V	5	6'-2"

ROADWAY CROSS-SLOPE	LOW GUTTER		HIGH GUTTER	
	∅A	∅B	∅A	∅B
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	87°	93°
6% to 10%	96°	84°	84°	96°

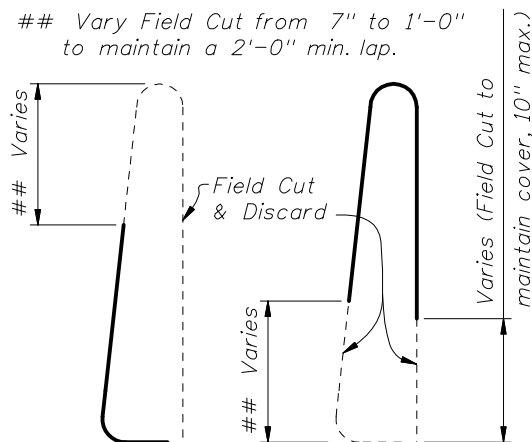
∅A and ∅B shall be 90° if Contractor elects to place Railing perpendicular to the Deck.



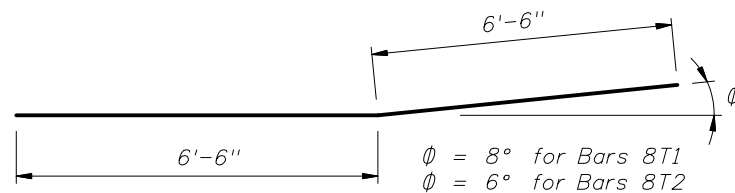
BARS 8S1 & 5S2



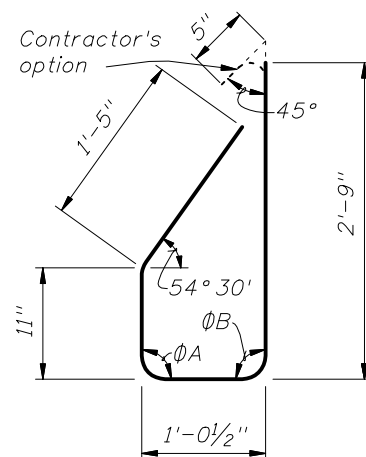
STIRRUP BAR 5P



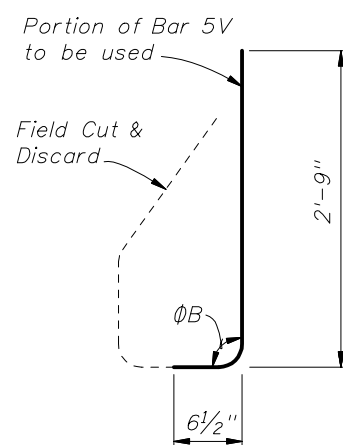
TRANSITION STIRRUP BARS 5P
To Be Field Cut (10 of each required per Railing End Transition)



TRANSITION BARS 8T1 & 8T2
(2 of each required per Railing End Transition)



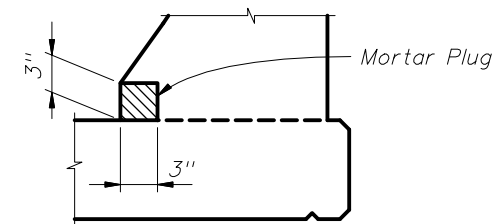
STIRRUP BAR 5V



END STIRRUP BAR 5V
To Be Field Cut
(One required per Railing End Transition)

REINFORCING STEEL NOTES:

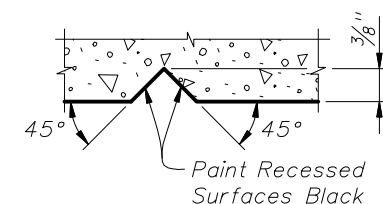
- All bar dimensions in the bending diagrams are out to out.
- The reinforcement for the railing on a retaining wall shall be the same as detailed above for a 10" deck with ∅A = ∅B = 90°.
- All reinforcing steel at the open joints shall have a 2" minimum cover.
- Bars 8S1 may be continuous or spliced at the construction joints. Lap splices for Bars 8S1 and 5S2 shall be a minimum of 4'-0" and 2'-0", respectively.
- The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "B" - SECTION
AT INTERMEDIATE OPEN JOINT

NOTE:

At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.



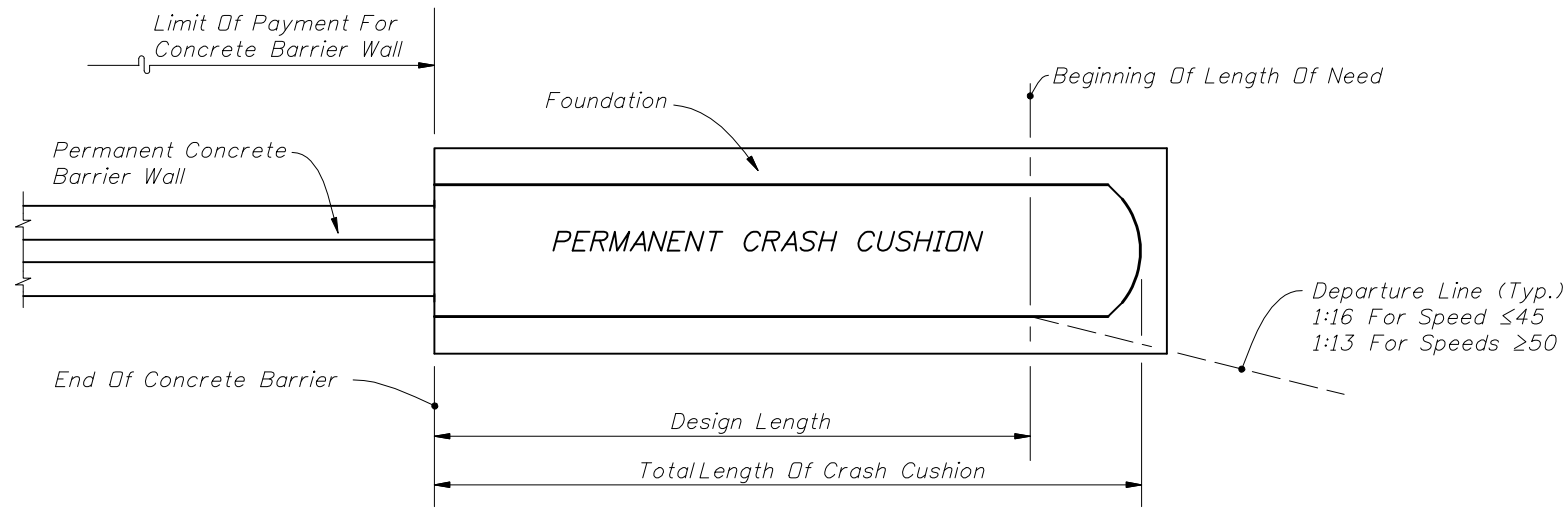
SECTION THRU RECESSED
"V" GROOVE TO FORM INSCRIBED
LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.154
Reinforcing Steel	LB/LF	44.71

Note:

The estimated railing quantities are based on a 2% deck cross slope; railing on low side of deck.





DESIGN NOTES – CONCRETE BARRIER WALL APPLICATION

1. Design length is the length from the beginning of length of need to the end of the crash cushion.
2. Determine length of need for barrier as detailed on Index 400.
3. Establish the end of barrier based on design length of shortest Crash Cushion option for given design speed.
4. Determine that adequate space is available for construction of all options for given design speed. If adequate space is not available, options must be limited to those that will fit. Tabulate selected options in the plans by location and design speed.

GENERAL NOTES FOR OPTIONAL CRASH CUSHIONS

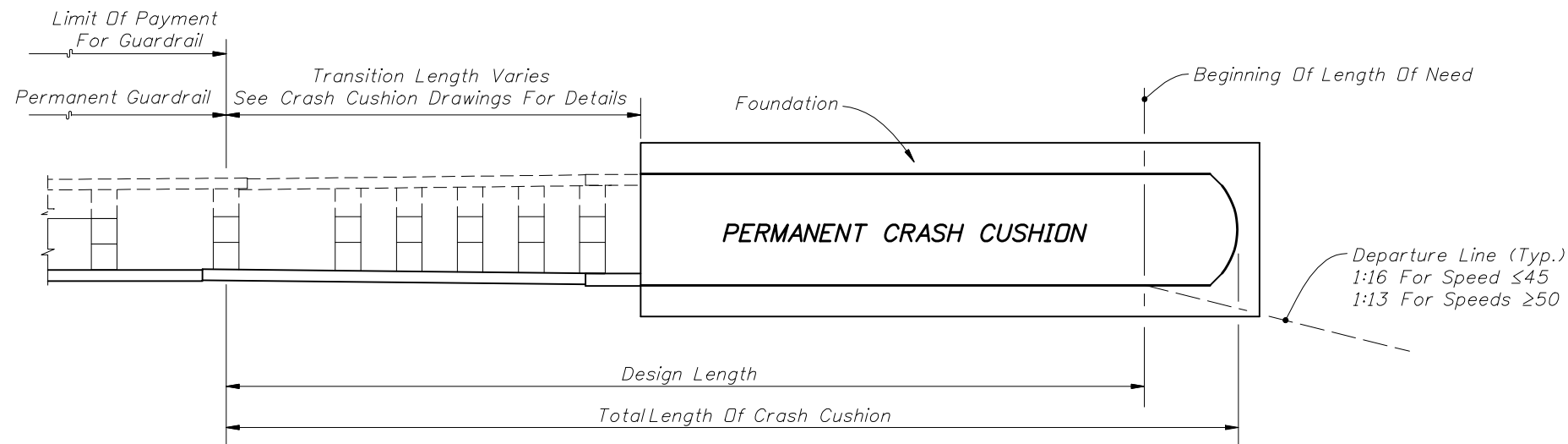
1. Crash Cushions for which the optional item may be used are limited to the systems identified on this index. The Contractor may only use the options identified in the plans.
2. This Index is applicable for permanent installations that shield the ends of Concrete Barrier Walls or Guardrails only.
3. For Crash Cushion details, see drawings posted on Qualified Products List (QPL) web page.
4. For other Crash Cushion applications, see the approved QPL drawings.
5. Crash Cushions shall be assembled and installed in accordance with the manufacturer's specifications and any limiting conditions noted on the approved QPL drawings.
6. Transition Panels may be required from Concrete Barriers to Crash Cushions subject to reverse direction hits; see the Crash Cushion drawings posted on the QPL for details. Transitions are required between the Crash Cushion and guardrail and vary in length depending on the Crash Cushion used; see the Crash Cushion drawings for details.

The cost of the transition(s) is to be included in the cost of the Crash Cushion.
7. Optional Crash Cushions will be paid for under the contract unit price for Vehicular Impact Attenuator/Crash Cushion (optional) EA, and shall be full compensation for furnishing and installing all components in accordance with the plans; the manufacturer's detail drawings, procedures and specifications; the drawings posted on the QPL and this Index.

CONCRETE BARRIER WALL APPLICATION			
Design Speed	System	Design Length (Ft.)	Total Length Of Crash Cushion (Ft.)
30	QuadGuard	6.71	9.98
	TAU 11	4.61	8.35
	SHORTRACC	14.11	15.06
35	QuadGuard	6.71	9.98
	TAU 11	7.45	11.19
	SHORTRACC	14.11	15.06
40	QuadGuard	6.71	9.98
	TAU 11	10.30	14.04
	SHORTRACC	14.11	15.06
45	QuadGuard	9.55	12.83
	TAU 11	10.30	14.04
	SHORTRACC	14.11	15.06
50	QuadGuard	12.55	15.83
	TAU 11	13.14	16.88
	TRACC	21.00	21.98
55	QuadGuard	15.65	18.93
	TAU 11	18.82	22.56
	TRACC	21.00	21.98
60	QuadGuard	18.62	21.90
	TAU 11	21.67	25.41
	TRACC	21.00	21.98
65	QuadGuard	21.60	24.87
	QuadGuard HS	24.58	29.16
	TAU 11	24.52	28.26
	FASTRACC	26.00	26.98
70	QuadGuard	27.55	30.83
	QuadGuard HS	24.58	29.16
	TAU 11	27.36	31.10
	FASTRACC	26.00	26.98

NOTE:
Total length of Crash Cushion for the TAU II units is based on use of the Compact Backstop. When the PCB Backstop is used, these lengths are reduced by 1.67 ft.



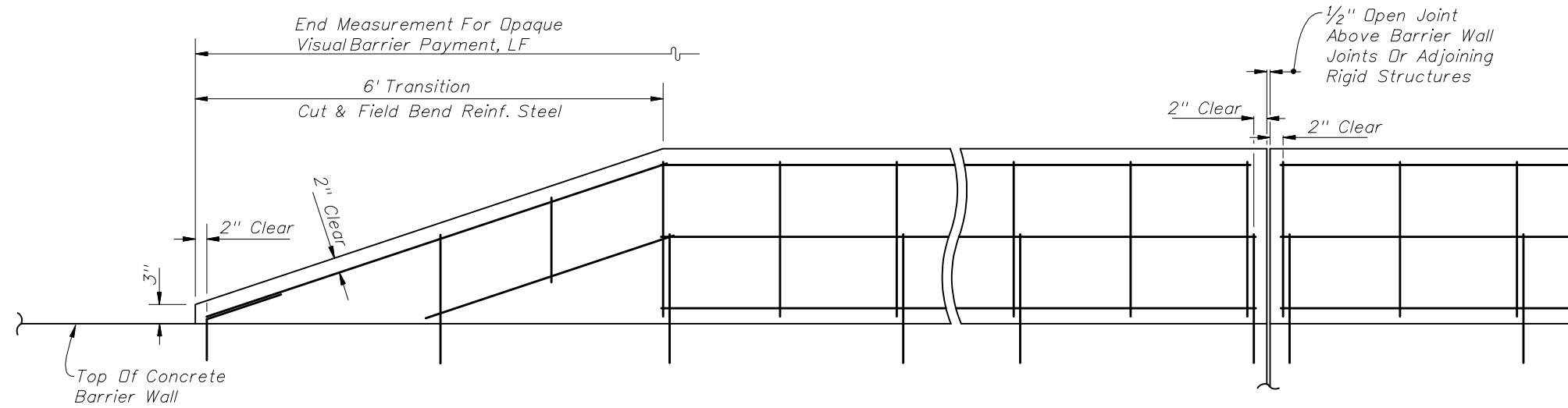


DESIGN NOTES – GUARDRAIL APPLICATION

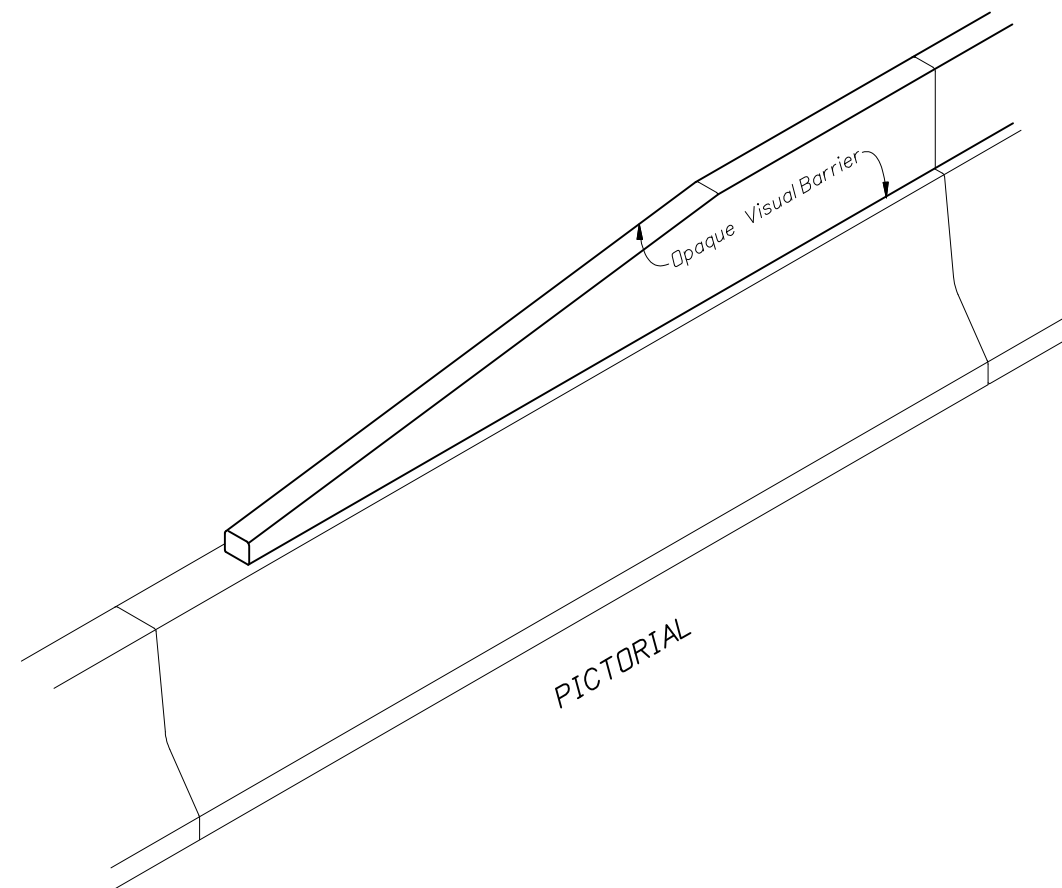
1. Design length is the length from the beginning of length of need to the end of the transition section.
2. Determine length of need for barrier as detailed on Index 400.
3. Establish the end of the guardrail based on design length of shortest Crash Cushion option for given design speed.
4. Determine that adequate space is available for construction of all options for given design speed. If adequate space is not available, options must be limited to those that will fit. Tabulate selected options in the plans by location and design speed.

GUARDRAIL APPLICATION			
Design Speed	System	Design Length (Ft.)	Total Length Of Crash Cushion (Ft.)
30	QuadGuard	26.29	29.56
	TAU 11	18.36	22.10
	SHORTRACC	26.70	27.65
35	QuadGuard	26.29	29.56
	TAU 11	21.20	24.94
	SHORTRACC	26.70	27.65
40	QuadGuard	26.29	29.56
	TAU 11	24.05	27.79
	SHORTRACC	26.70	27.65
45	QuadGuard	29.13	32.41
	TAU 11	24.05	27.79
	SHORTRACC	26.70	27.65
50	QuadGuard	32.13	35.41
	TAU 11	26.89	30.63
	TRACC	33.59	34.57
55	QuadGuard	35.23	38.51
	TAU 11	32.57	36.31
	TRACC	33.59	34.57
60	QuadGuard	38.20	41.48
	TAU 11	35.42	39.16
	TRACC	33.59	34.57
65	QuadGuard	41.18	44.45
	QuadGuard HS	44.16	48.74
	TAU 11	38.27	42.01
	FASTRACC	38.59	39.57
70	QuadGuard	47.13	50.41
	QuadGuard HS	44.16	48.74
	TAU 11	41.11	44.85
	FASTRACC	38.59	39.57

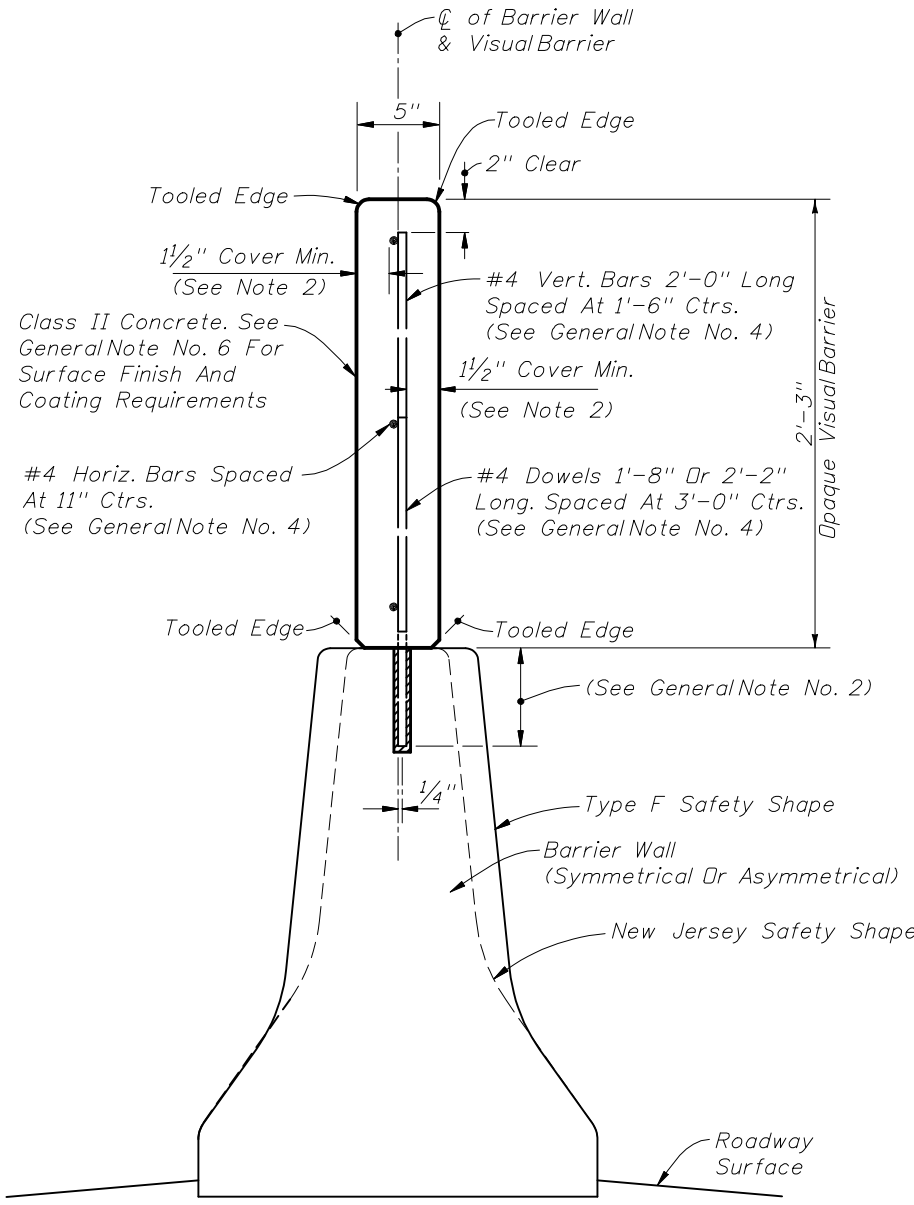




ELEVATION OF REINFORCEMENT AND DOWELING



ESTIMATED QUANTITIES, LF	
Concrete	0.042 CY
Reinforcing Steel	3.27 Lbs.*
*3.38 Lbs. With 2'-2" Dowels	



END VIEW

GENERAL NOTES

- The opaque visual barrier is intended to function as a visual screen, and is not intended to resist vehicle impact loads nor to restrain, contain or restrict vehicles or cargo. The barrier is designed to withstand zone wind loading and strikes by light debris; and, designed to yield to exceptional strikes by vehicles or cargo, and to contain ruptured segments of the screen when yielding to such strikes.
- When the opaque visual barrier is constructed on an existing barrier wall, dowels shall be 1'-8" in length, embedded 6" into the barrier wall and set with an approved chemical grout. Embedment holes shall be 5/8" diameter, drilled to a depth 1/4" below the tip of the dowel unless greater depth is required to accept manufactured grout capsules.

When the opaque visual barrier is constructed in conjunction with project concrete barrier walls, dowels may be set as described above, in either the drilled or preformed holes; or, placed when the barrier wall is cast. For dowels that are placed when the wall is cast, the dowel shall be 2'-2" in length and embedded to a depth of 12".

When longitudinal reinforcing bars are encountered in the stem of existing barrier, shift the dowels to clear, maintaining the 1/2" Cover Minimum to the face of the Opaque Visual Barrier.
- For both double and single faced concrete barrier walls the opaque visual barrier is to be located in the center of the top of the wall.

For single faced barrier walls that are constructed around other vertical structures, the opaque visual barrier shall follow the alignments of only one of the walls and be centered atop that wall.

For dual median barrier walls that follow differential profiles, the opaque visual barrier shall be constructed atop the wall with the higher elevation, unless conditions dictate otherwise. Lateral transitions or end overlaps for opaque visual barriers that alternate between dual walls shall be detailed in the plans.

For median barrier walls that are divided when connecting to separated bridges, the opaque visual barrier shall be constructed atop the approach side barrier wall, unless differential profiles dictate locating the opaque visual barrier on the departure side barrier wall.

Opaque visual barriers to be located on capped fills between dual barrier walls shall be detailed in the plans.
- In lieu of the reinforcement shown, the Contractor may substitute welded wire fabric equal to or better than that shown, when approved by the Engineer. Details shall be submitted with requests for substitution.
- The Contractor may construct contiguous precast concrete panels in lieu of the cast-in-place opaque screen when approved by the Engineer. Panel design and method for anchorage to the barrier wall shall be detailed by shop drawings when requesting the Engineer's approval.

The Contractor may construct the opaque screen monolithically with the barrier wall; however, the screen design shall not be modified so as to cause the wall to be dynamically active from strikes on the screen; see design considerations in Note No. 1 above.
- Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Standard Specification, unless another finish is called for in the plans. The surfaces shall have a Class 5 Applied Finish Coating in accordance with Section 400 only when called for in the plans.
- Payment for opaque visual barrier shall be full compensation for concrete, reinforcement, dowels, casting, placement, drilling, grouting, tooling, finishing and work incidental thereto, and shall be paid for under the contract unit price for Opaque Visual Barrier (Concrete) (2'-3" Height), LF.



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OPAQUE VISUAL BARRIER

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TRAFFIC RAILING NOTES

This Traffic Railing Retrofit has been structurally evaluated to be equivalent or greater in strength to a design which has been successfully crash tested in accordance with NCHRP Report 350 TL-4 criteria.

CONCRETE: Concrete for Transition Blocks and Curbs shall be Class II (Bridge Deck).

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60.

THRIE-BEAM GUARDRAIL: Steel Thrie-Beam Elements shall meet the requirements for Class B (10 Gauge) Guardrail of AASHTO M 180, Type II (Zinc coated). The minimum panel length for Thrie-Beam Elements shall be 12'-6". Field drilled holes for Post connections shall be 3/4" by 2 1/2" slotted holes.

GUARDRAIL BOLTS: Guardrail bolts, nuts and washers shall be in accordance with AASHTO M180.

GUARDRAIL POSTS AND BASE PLATES: Posts and Base Plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

ANCHOR BOLTS, NUTS AND WASHERS: Adhesive-Bonded Anchors and Anchor Bolts shall be fully threaded rods in accordance with ASTM F1554 Grade 105 or ASTM A193 Grade B7. At the Contractor's option, Anchor Bolts for through bolting may be in accordance with ASTM 449. All Nuts shall be single self-locking hex nuts and 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 the exposed trimmed ends of anchors shall be coated with a galvanizing compound in accordance with the Specifications.

COATINGS: All Nuts, Bolts, Anchors, Washers, Guardrail Posts, Anchor Plates and Base Plates shall be hot-dip galvanized in accordance with the Specifications. Guardrail Post Assemblies shall be hot-dip galvanized after fabrication.

ADHESIVE-BONDED ANCHORS AND DOWELS: Adhesive Bonding Material Systems for Anchors and Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416. The field testing proof loads required by Specification Section 416 shall be 15,000 lbs. for 7/8" Ø anchor bolts; 55,000 lbs. for the 1 1/4" anchor bolts with 13" embedment; and 30,500 lbs. for the 1 1/4" Ø anchor bolts with 5" embedment.

BRIDGES ON CURVED ALIGNMENTS: The details presented in these Standards are shown for bridges on tangent alignments. Details for bridges on horizontally curved alignments are similar.

POST SPACING: Posts shall be located along the length of the bridge at typical 6'-3" or 3'-1 1/2" spaces. Utilize the Modified Post Spacing at Intermediate Deck Joints Details as required to clear deck joints. Establish post spacing along the bridge and Roadway Guardrail Transition beginning with the Key Post. The variable post spacings located near begin and end bridge may be utilized to optimize the typical post spacing. Variable lengths of guardrail overlap are also permitted to optimize the typical post spacing. Symmetry of post spacing is not necessary.

THRIE-BEAM EXPANSION SECTION: Thrie-Beam Expansion Sections shall be installed at locations shown in the Plans. Install nuts for splice bolts finger-tight at 2 1/2" slots in thrie beam expansion sections. Nuts shall fully engage bolts with a minimum of one bolt thread extending beyond the nuts. Distort the first thread on the outside of the nut to prevent loosening. Tighten guardrail bolts in 3 3/4" slots at guardrail post(s) that lie between the slotted expansion splice and bridge deck joint so that the bolt heads are in full contact with thrie-beam elements, but not so tight as to impede movement due to expansion.

NEOPRENE PADS: Neoprene pads must be plain pads with a durometer hardness of 60 or 70 and meet the requirements of Specification Section 932, except that testing of the finished pad will not be required.

ELEVATION MARKERS: Elevation Markers shall be placed on the top surface of the end bents as directed by the Engineer when portions of the existing traffic railing carrying existing elevation markers are removed. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor.

REFLECTIVE RAILING MARKERS: Reflective Railing Markers shall conform to Section 993 of the Specifications. Install markers in the upper groove of the Thrie Beam Guardrail at the spacings shown in the table below. Reflector color (white or yellow) shall conform to the color of the near edgeline.

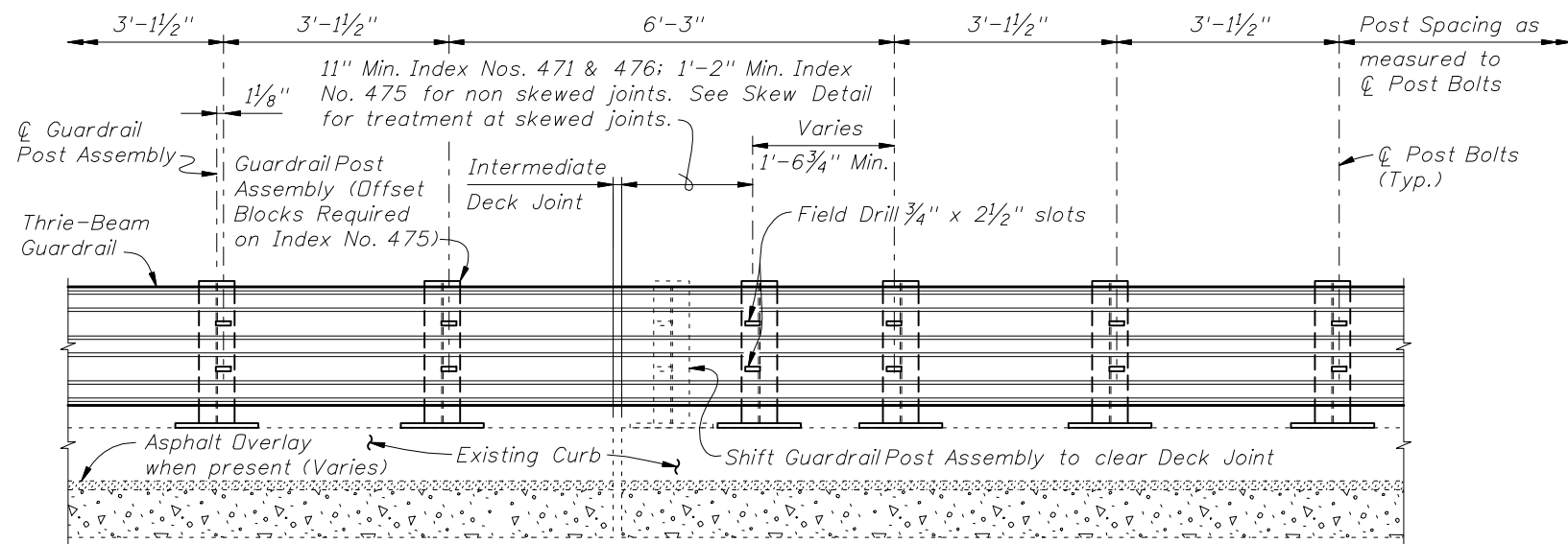
PEDESTRIAN SAFETY PIPE RAIL: Pedestrian Safety Pipe Rail is required when called for in the Plans. See Index No. 400 for details.

BRIDGE NAME PLATE: If a portion of the existing Traffic Railing is to be removed that carries the bridge name, number and or date, or if the installation of the Traffic Railing (Thrie Beam Retrofit) will obscure the bridge name, number and or date, then replace the information that has been removed or obscured, with 3" tall black lettering on white nonreflective sheeting applied to the top of the adjacent guardrail. The information must be clearly visible from the right side of the approaching travel lane. The sheeting and adhesive backing shall comply with Specification Section 994 and may comprise of individual decals of letters and numbers.

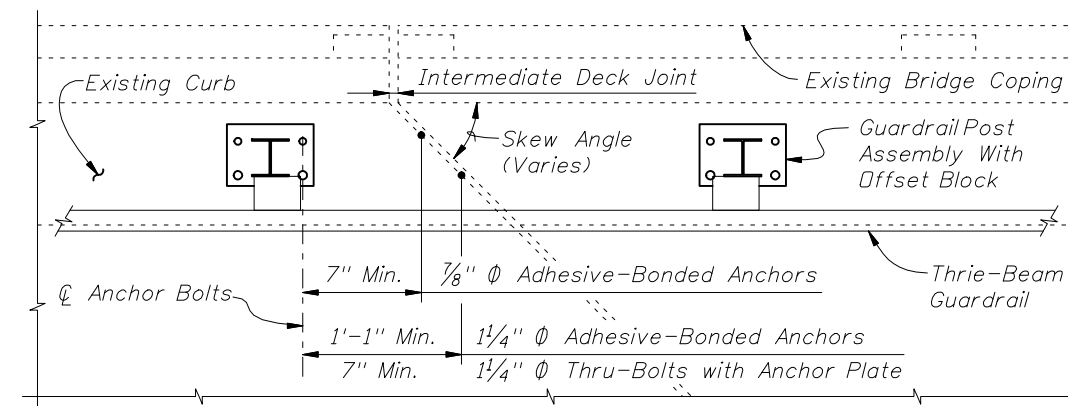
PAYMENT: Payment will be made under Metal Traffic Railing (Thrie-Beam Retrofit) which shall include all materials and labor required to fabricate and install the barrier and lapped guardrail where necessary to maintain post spacing. The Pedestrian Safety Pipe Rail, Transition Blocks and Curbs, Bridge Name Plate, Reflective Railing Markers and installation of Elevation Markers, where required, will not be paid for directly but shall be considered as incidental work.

REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

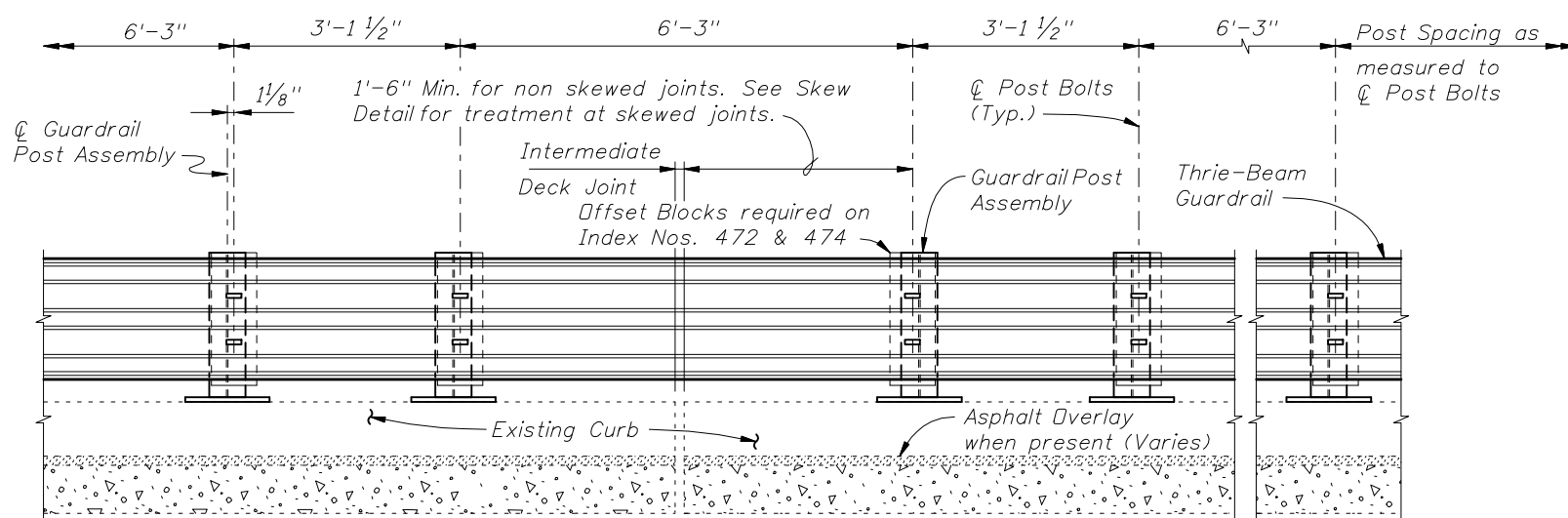




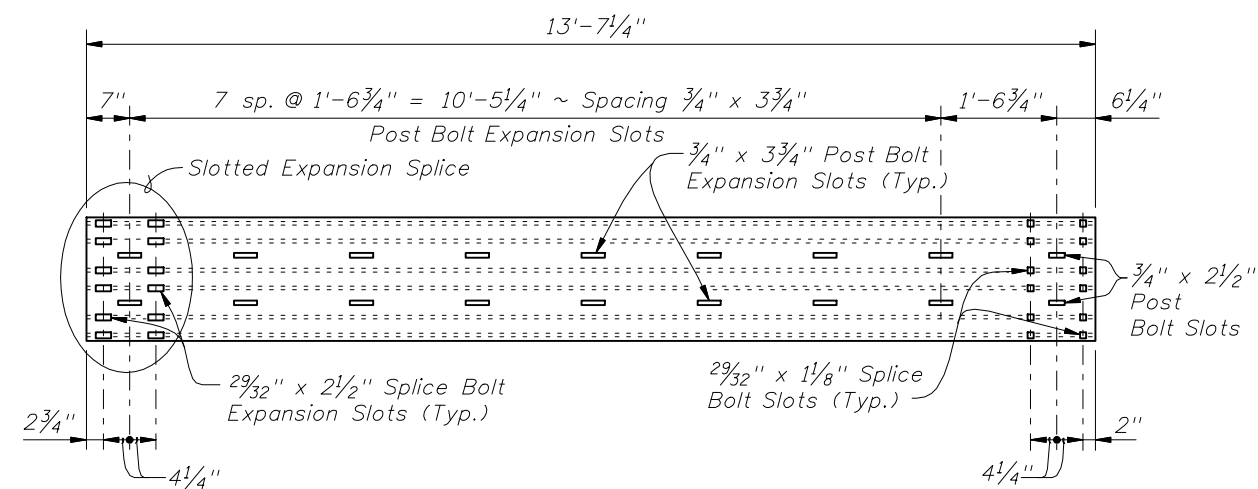
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
 MODIFIED POST SPACING AT INTERMEDIATE DECK JOINTS DETAIL FOR INDEX NOS. 471, 475 & 476



PARTIAL PLAN
 INTERMEDIATE JOINT SKEW DETAIL

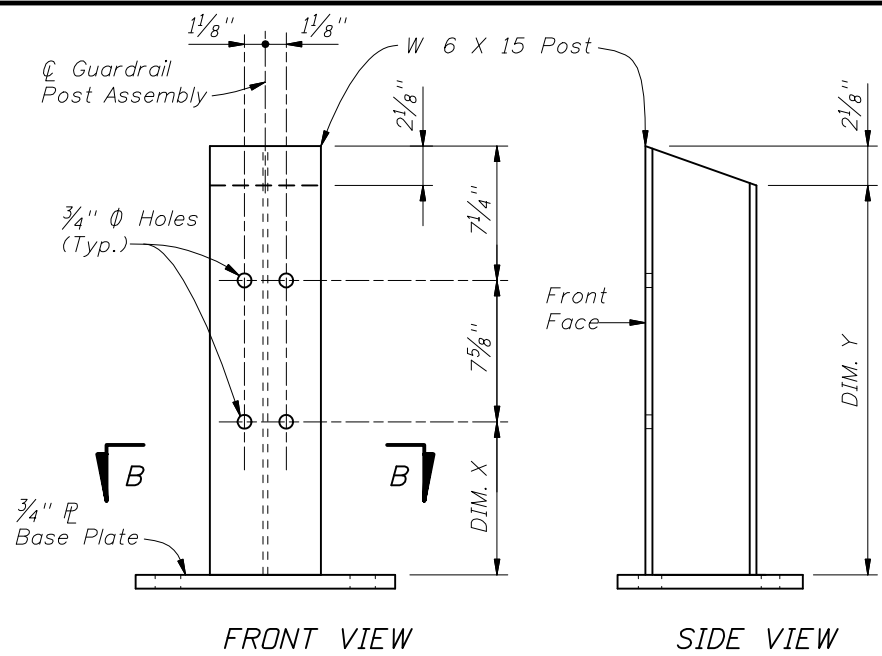


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
 MODIFIED POST SPACING AT INTERMEDIATE DECK JOINTS DETAIL FOR INDEX NOS. 472, 473 & 474



THRIE-BEAM EXPANSION SECTION

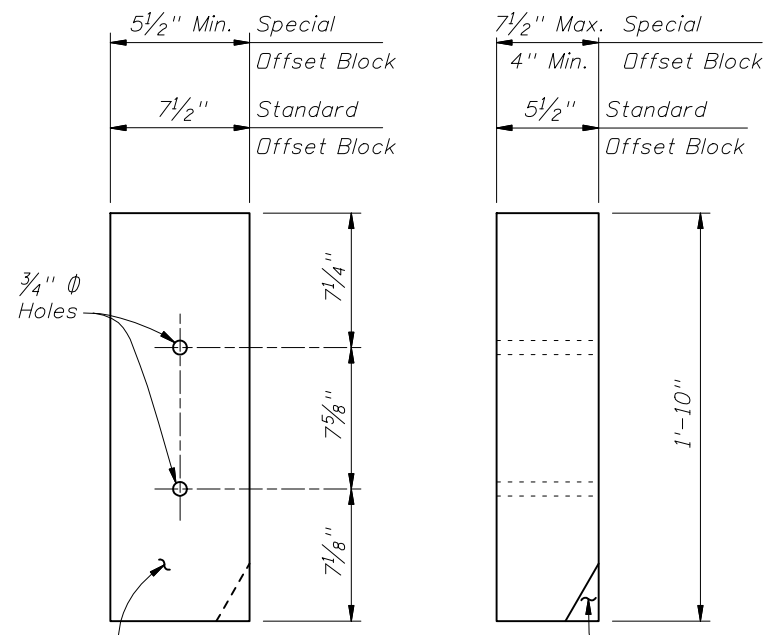




POST DIMENSION TABLE			
POST	CURB HEIGHT (DIM. A)	DIM. X	DIM. Y
Post "A"	5" to 7"	11 1/4"	2'-0"
Post "B"	> 7" to 10"	9 1/4"	1'-10"
Post "C"	> 10" to 1'-0"	7 1/4"	1'-8"

Note: DIM. A is equal to the exposed curb height. For location of DIM. A see Index Nos. 471 thru 476, Sheet 1.

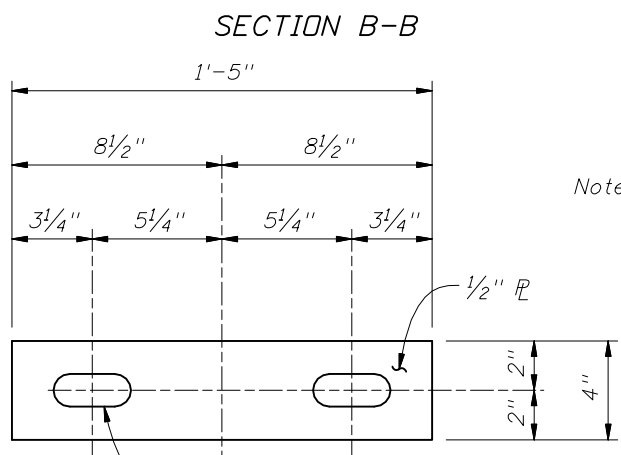
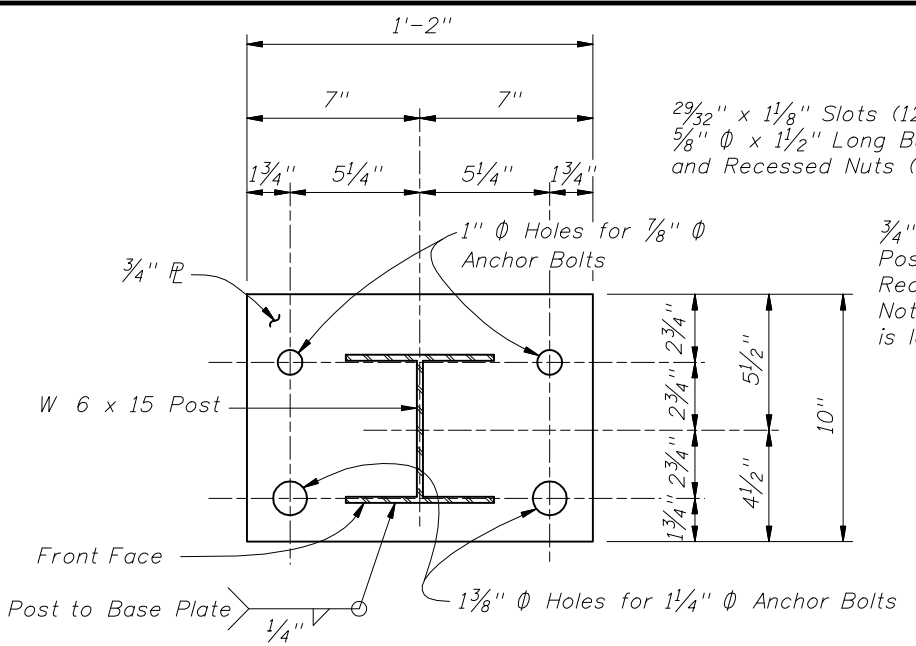
GUARDRAIL POST ASSEMBLY DETAIL



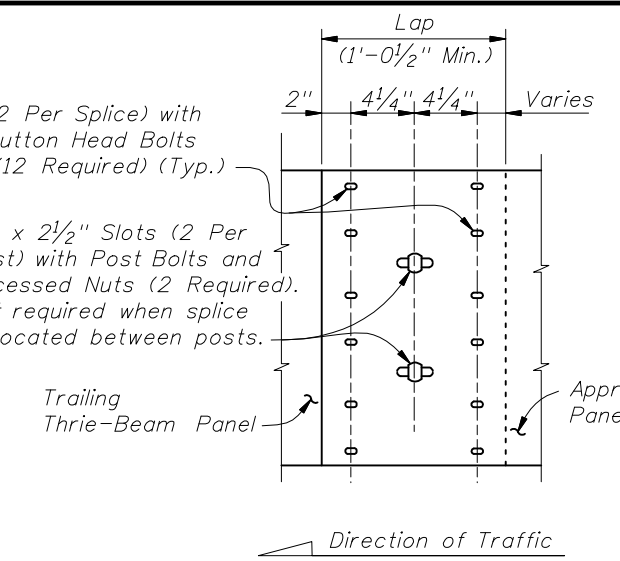
8" x 6" x 1'-10" (Nominal) Timber Offset Block (7 1/2" x 5 1/2" x 1'-10" Dressed Dimensions)
 Pare corner of offset block as required to clear anchor bolt

FRONT VIEW SIDE VIEW

OFFSET BLOCK DETAIL



ANCHOR PLATE DETAIL



THRIE-BEAM GUARDRAIL SPLICE

Note: All Thrie Beam Panels shall be lapped in the direction of adjacent traffic. At the Contractor's option, laps may be extended. Field drillholes in Trailing Thrie Beam Guardrail Panel as required.

Note: The Anchor Plate and Plate Washer are applicable only to 1 1/4 inch diameter anchor bolts that are to be thru-bolted for Index Nos. 471 & 476.

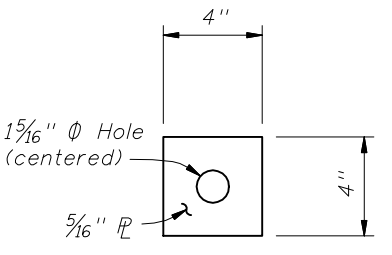
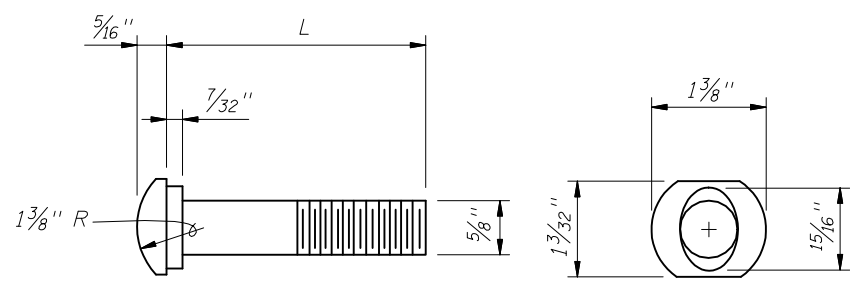
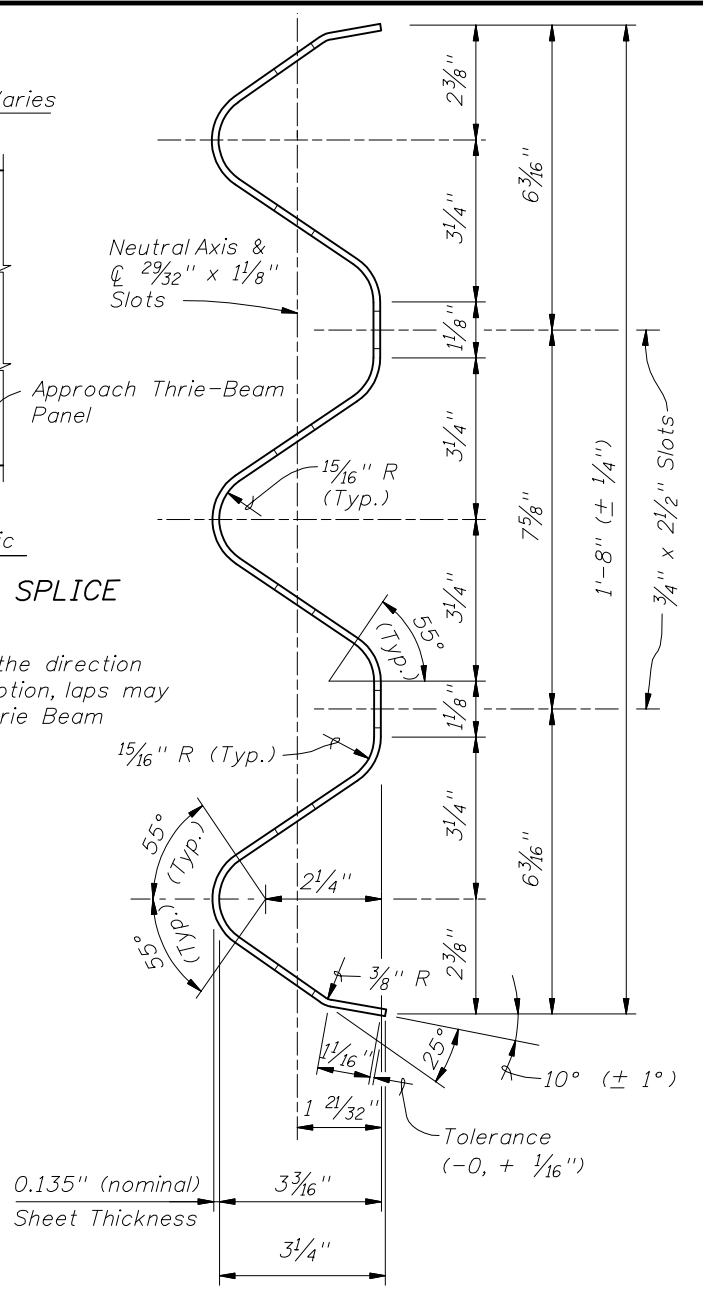


PLATE WASHER DETAIL

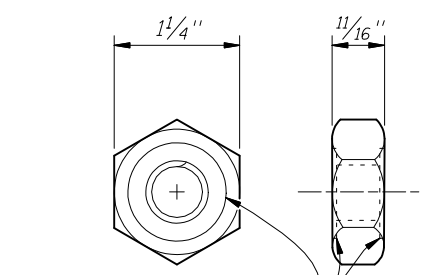


5/8" OVAL SHOULDER BUTTON HEAD BOLT

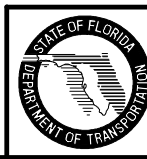
L	THREAD LENGTH	APPLICATION
1 1/2"	Full Length	Rail Splice Bolt, Post Bolt for Index Nos. 471, 473 & 476
Varies (8" Min.)	4" Min.	Post Bolt for Index Nos. 472, 473, 474, 475 & 476

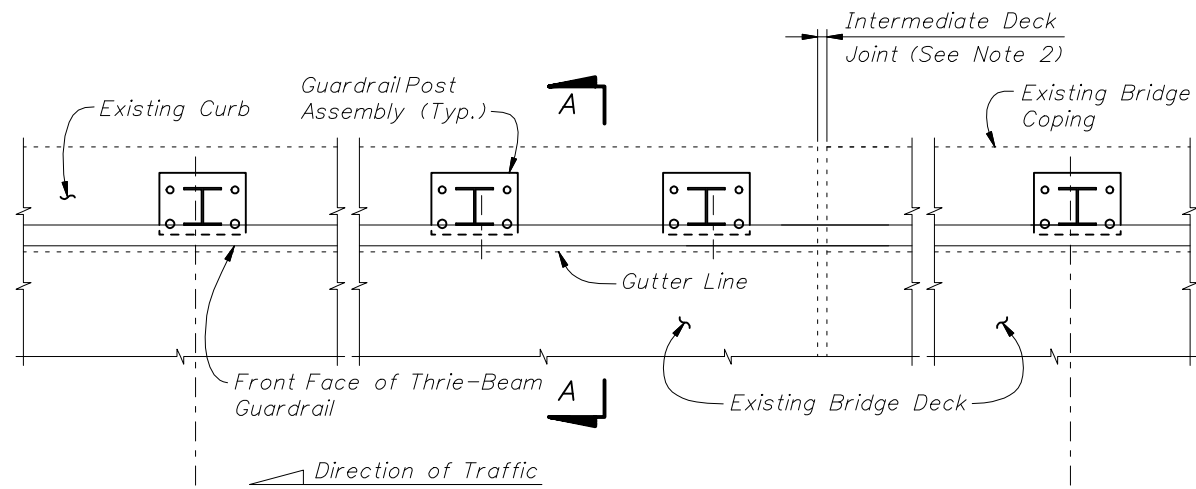


TYPICAL SECTION THRU THRIE-BEAM GUARDRAIL (EXPANSION SECTION SIMILAR)



5/8" MODIFIED HEAVY HEX NUT (RECESSED NUT)



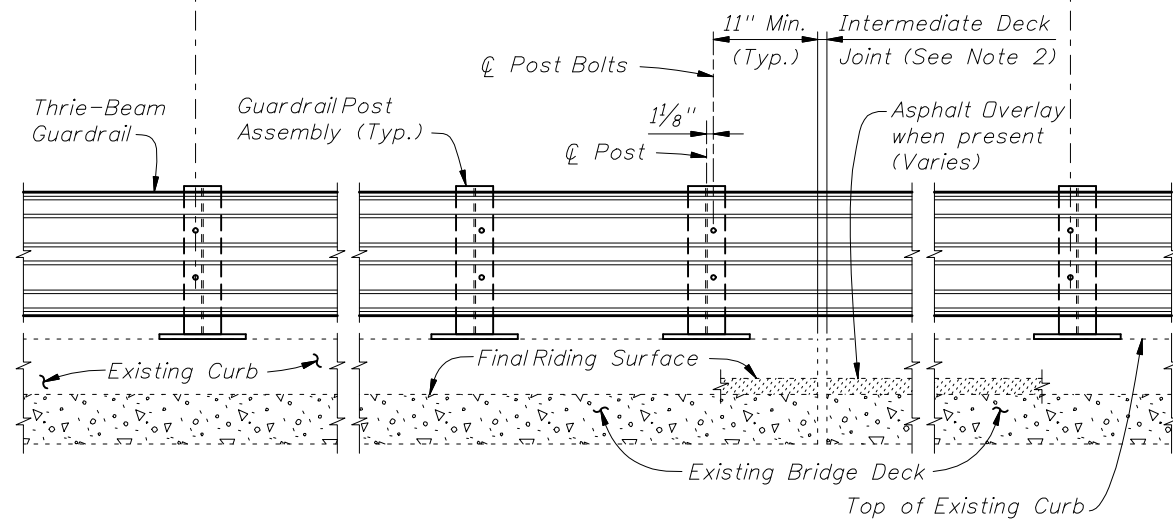


PARTIAL PLAN OF RAILING

⊘ Post Bolts and Match Line (Trailing End) (See Sheets 3 and 4)

⊘ Post Bolts and Match Line (Approach End) (See Sheets 3 and 4)

3'-1/2" spacing (Typ. except as noted along bridge, see Note 2)



PARTIAL ELEVATION OF INSIDE FACE OF RAILING

==== TYPICAL TREATMENT OF RAILING ALONG BRIDGE ====

NOTES:

1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be removed off 1" below existing concrete and grouted over.

CROSS REFERENCES:

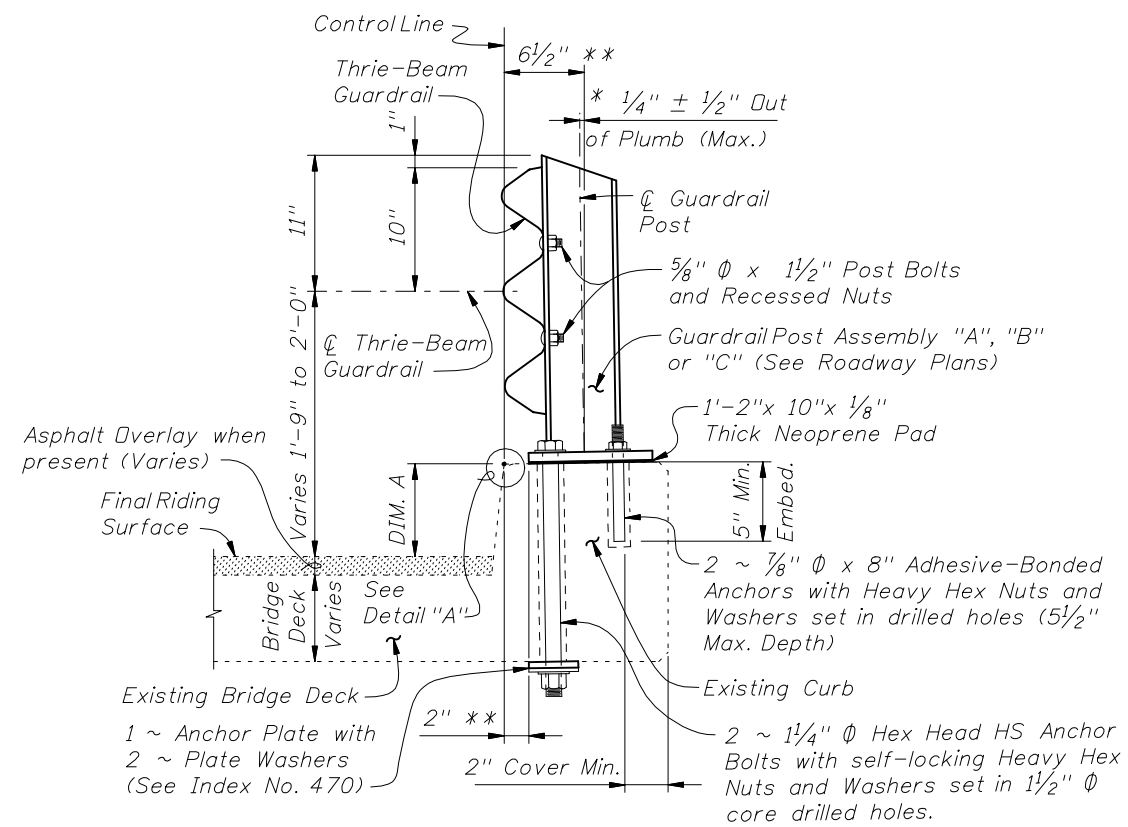
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.



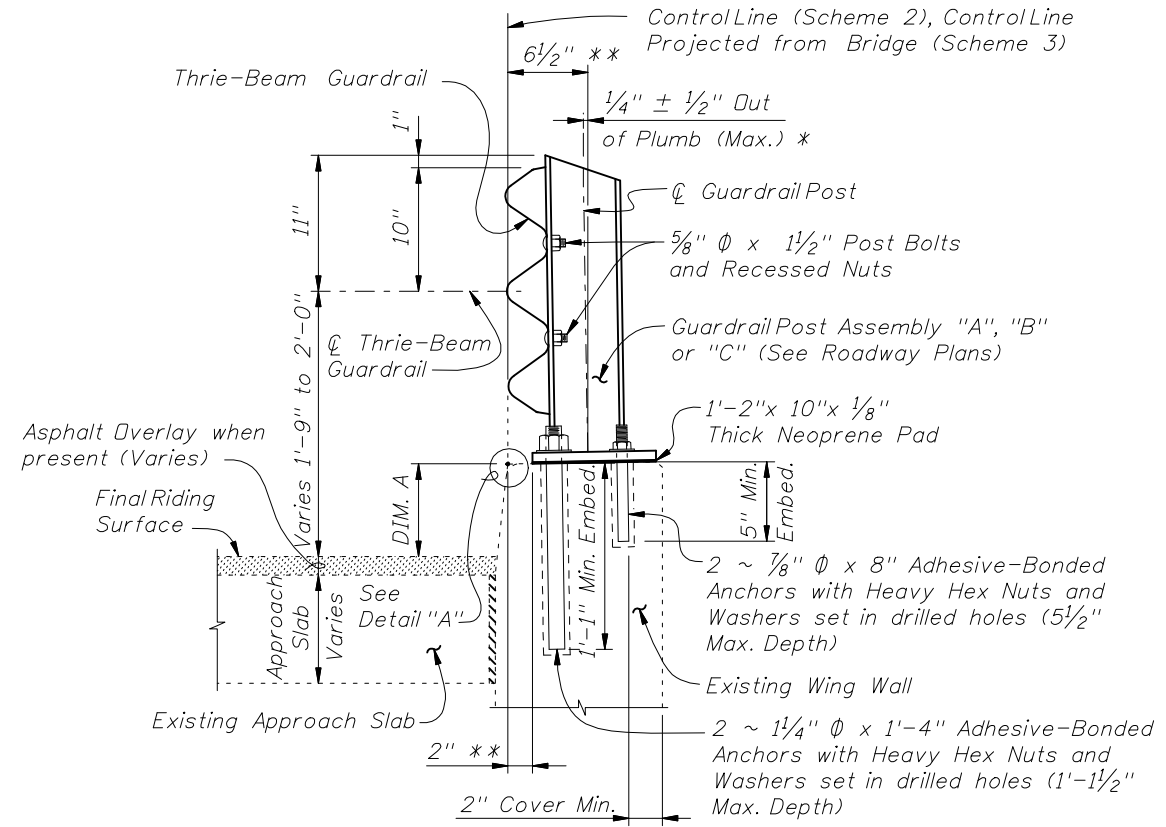
2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
NARROW CURB

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SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



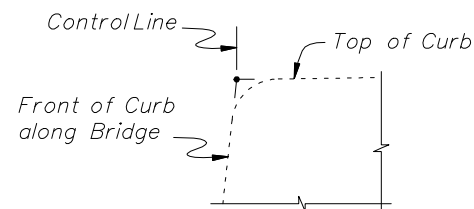
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEME 2 SHOWN, SCHEME 3 SIMILAR)

* Shim with washers around Anchors as required to maintain tolerance.

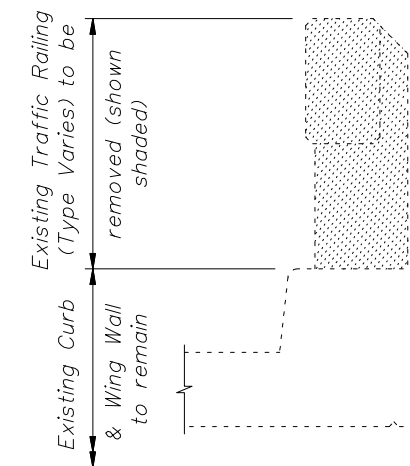
* * * Offset may vary ± 1 " for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

BILL OF REINFORCING STEEL			BAR BENDING DIAGRAMS	
MARK	SIZE	LENGTH		
A	4	AS REQUIRED		
D	4	1'-11"		
L	4	4'-1"		

<p>Length as Required</p> <p>BAR 4A</p>	<p>1'-2" (See Note 2)</p> <p>4"</p> <p>4 1/2"</p> <p>Dowel Bar 4D (Standard 180° Hook)</p>
<p>NOTES:</p> <p>1. All bar dimensions are out to out.</p> <p>2. The 1'-2" vertical dimension shown for Bar 4D is based on a curb height of 9". If curb height is less or more than 9", decrease or increase this dimension by an amount equal to the difference in curb height.</p>	<p>3'-8"</p> <p>4 1/2"</p> <p>DOWEL BAR 4L</p>



DETAIL "A"



TYPICAL SECTION THRU EXISTING TRAFFIC RAILING SHOWING LIMITS OF REMOVAL
(BRIDGE DECK SHOWN, WING WALL SIMILAR)

CROSS REFERENCES:

For location of Section A-A see Sheets 1, 3 & 4.
For location of Section B-B see Sheets 3 & 4.
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



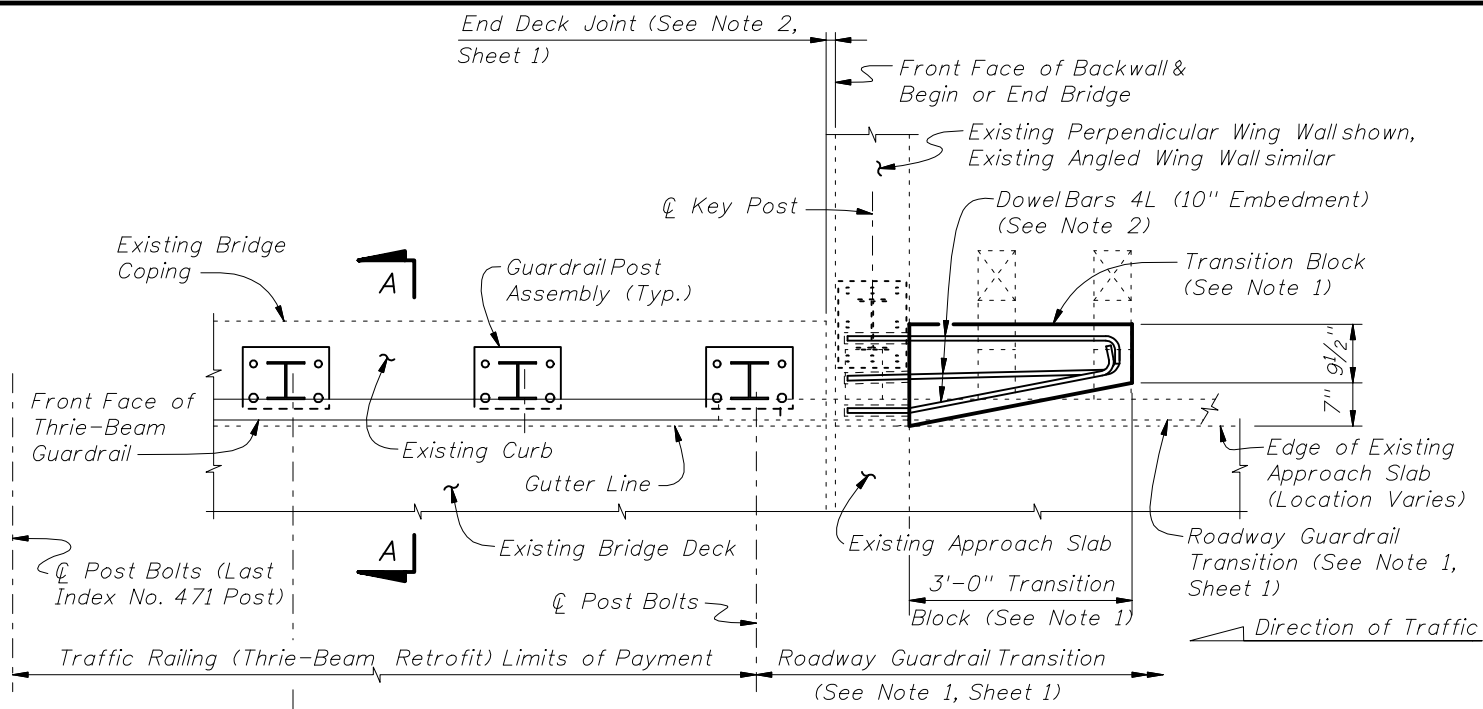
2010 FDOT Design Standards

**TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
NARROW CURB**

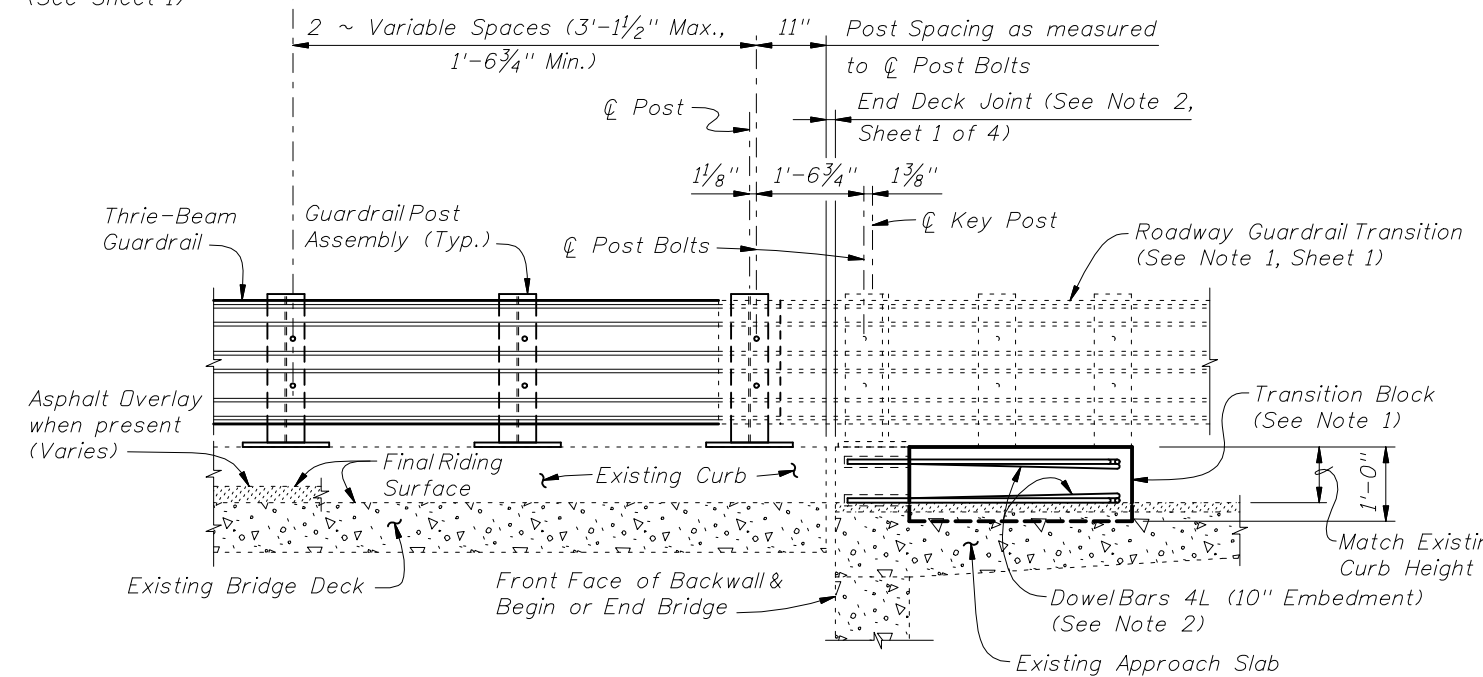
Last Revision
01/01/08

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2 of 4

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PARTIAL PLAN OF RAILING

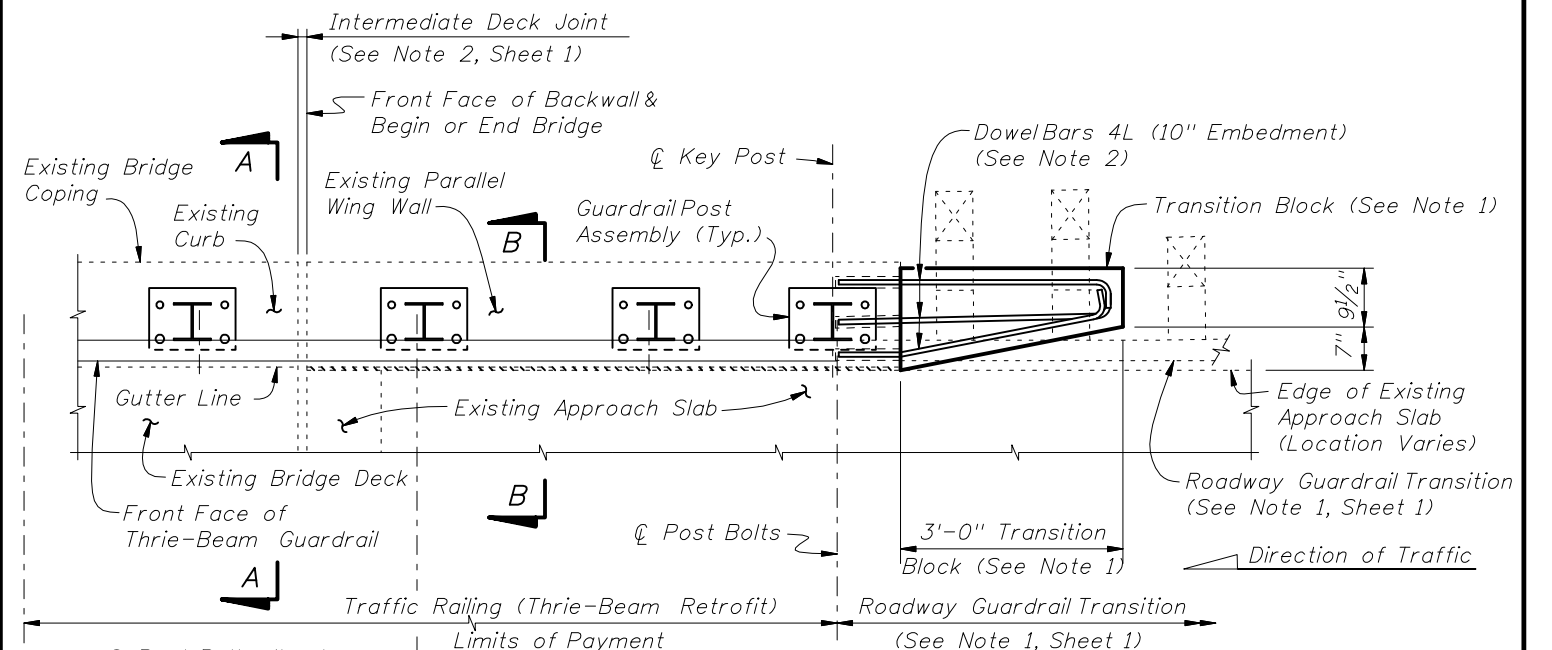


PARTIAL ELEVATION OF INSIDE FACE OF RAILING

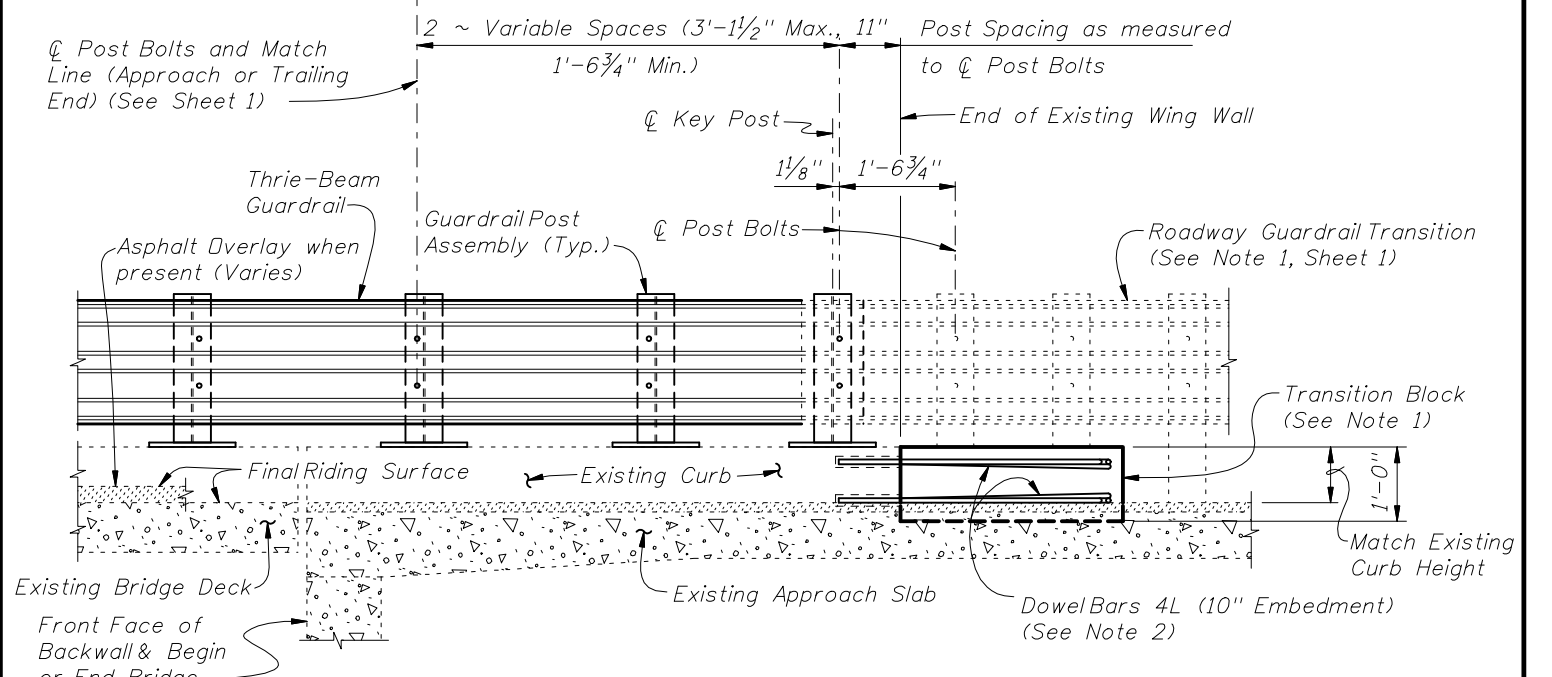
SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field bend DowelBars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING

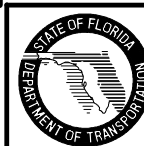


PARTIAL ELEVATION OF INSIDE FACE OF RAILING

SCHEME 2
RAILING END TREATMENT FOR PARALLEL WING WALLS

SCHEME 2 NOTES:

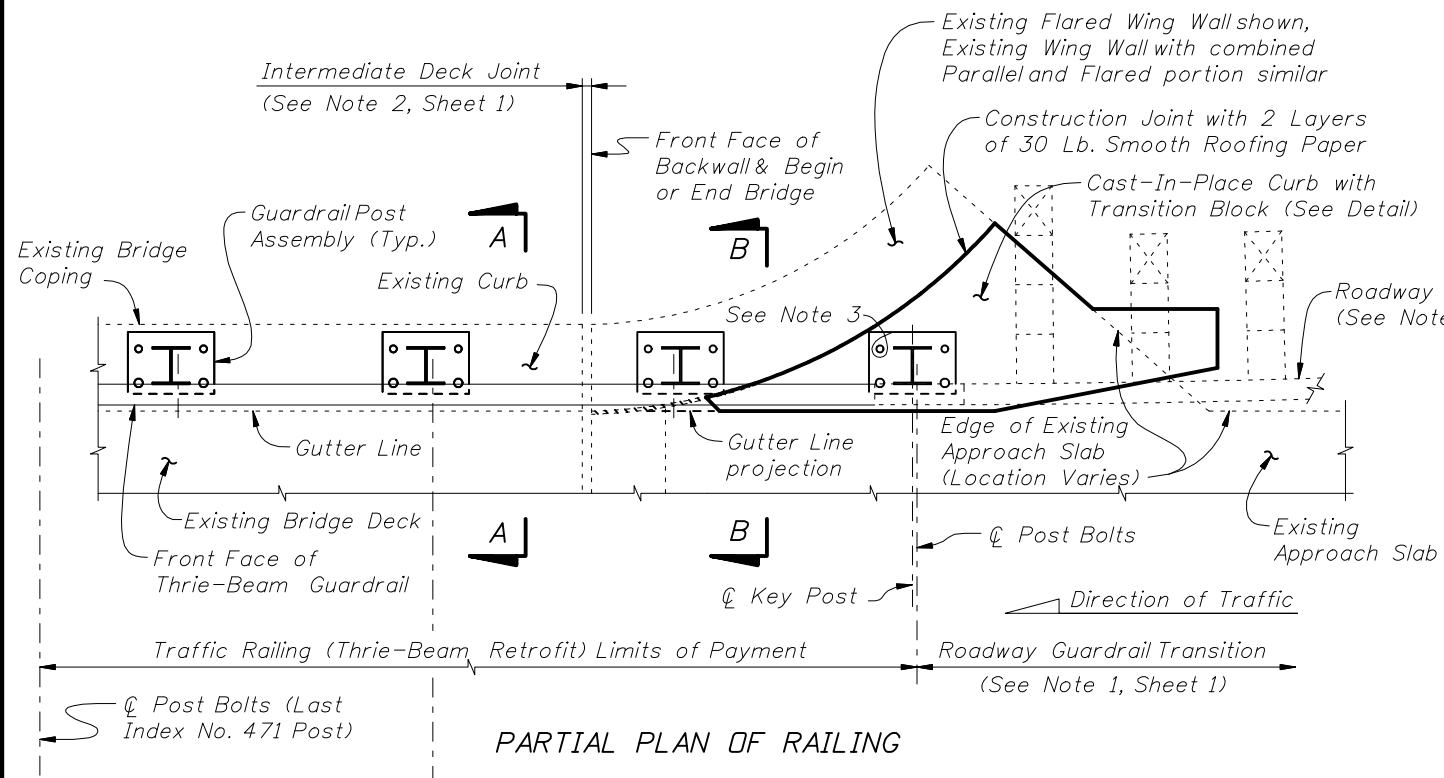
1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field bend DowelBars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



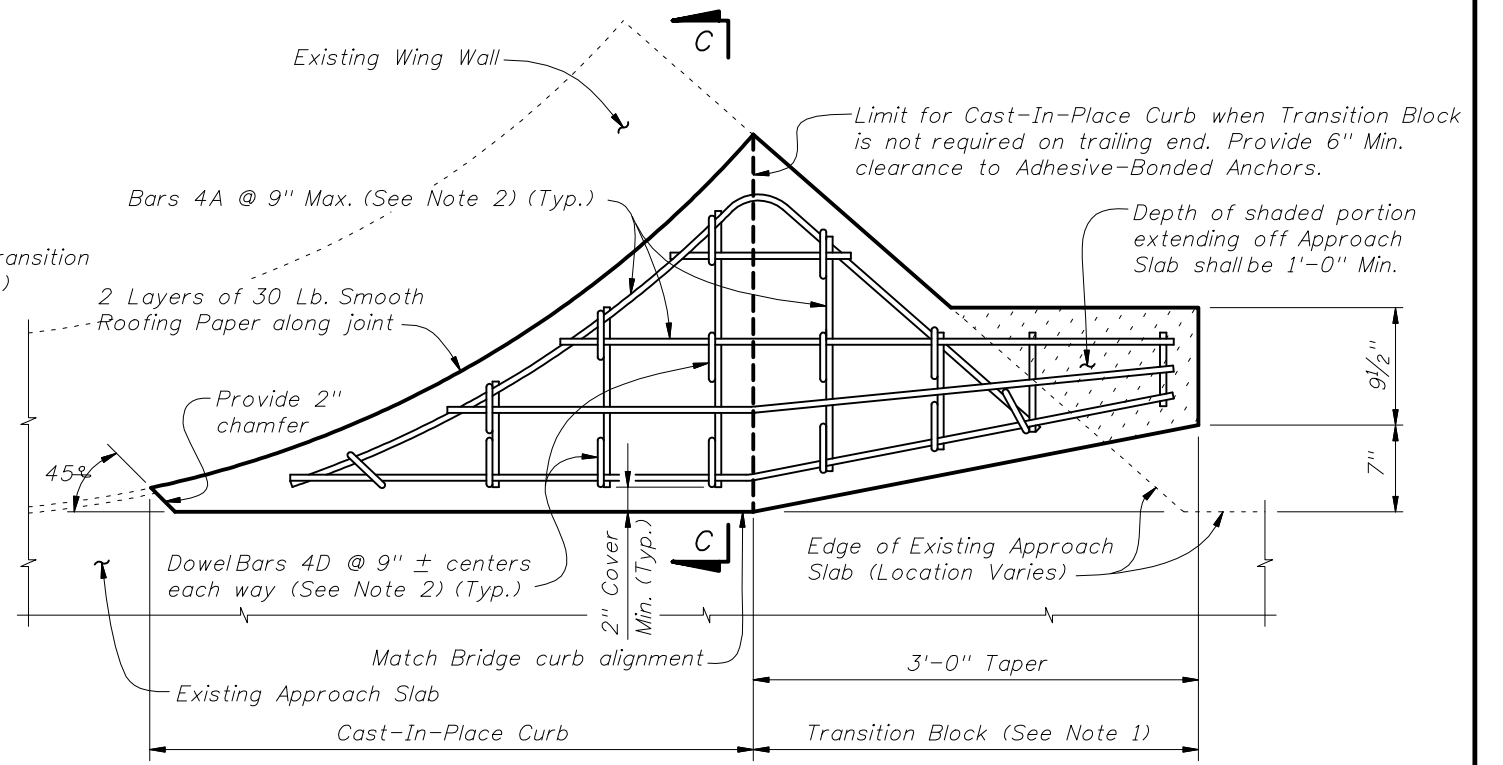
2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
NARROW CURB

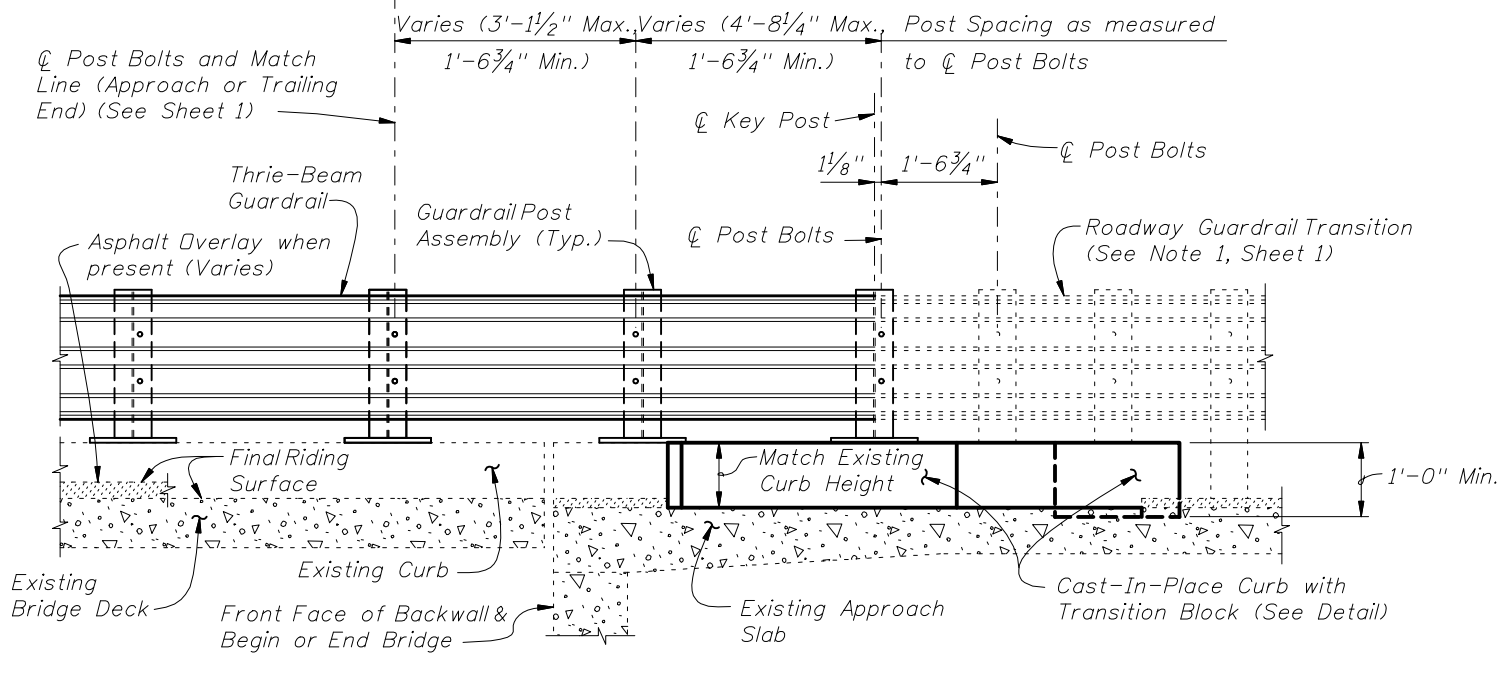
Last Revision	Sheet No.
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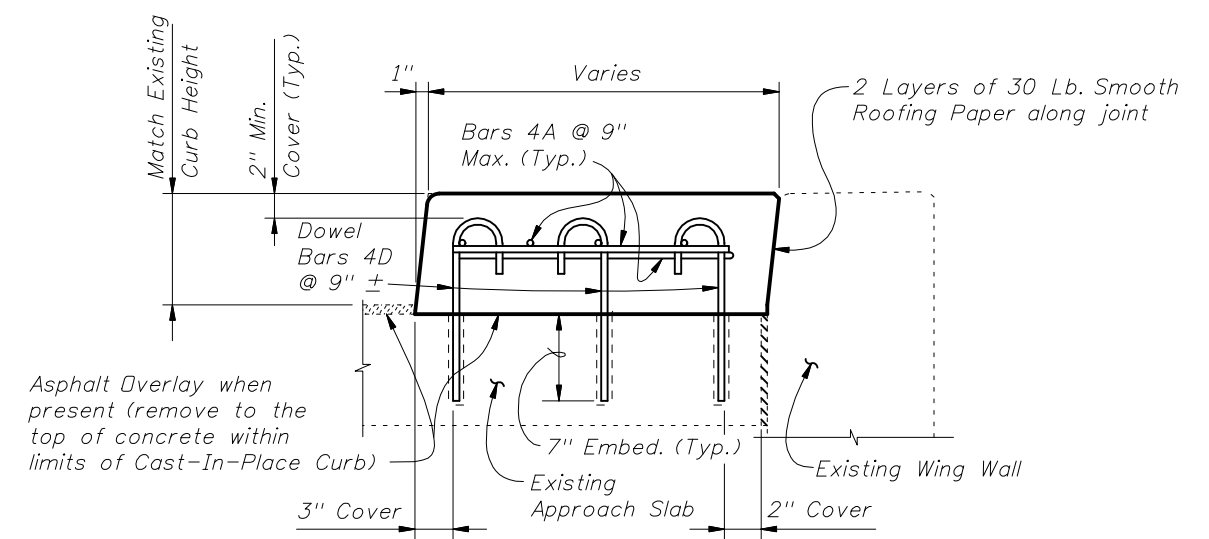
PARTIAL PLAN OF RAILING



PLAN OF CAST-IN-PLACE CURB & TRANSITION BLOCK DETAIL
(Approach End with Transition Block Shown, Trailing End without Transition Block Similar)



PARTIAL ELEVATION OF INSIDE FACE OF RAILING

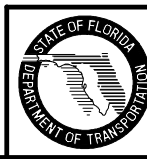


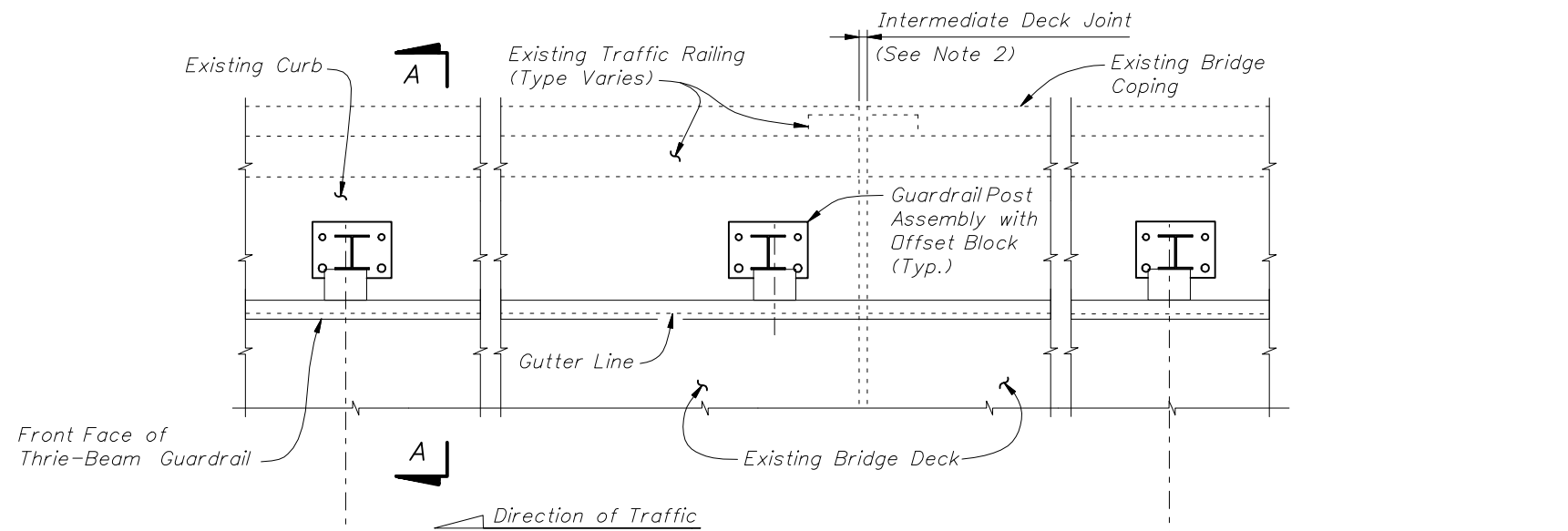
SECTION C-C

SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS

SCHEME 3 NOTES:

1. Provide Cast-In-Place Curb as shown. Shape and height of Transition Block and Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field cut and bend Bars 4A and rotate Dowel Bars 4B within Curb and Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.
3. A single 7/8" Ø x 8" Adhesive-Bonded Anchor may be omitted as shown when 2" clear cover cannot be provided.





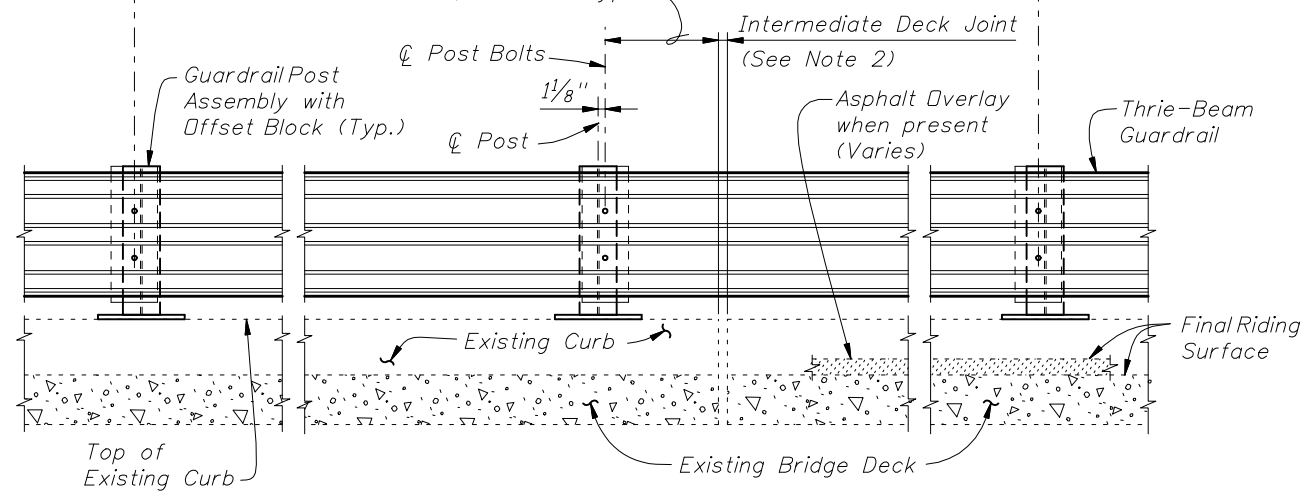
PARTIAL PLAN OF RAILING

⊘ Post Bolts and Match Line (Trailing End) (See Sheets 3 and 4)

⊘ Post Bolts and Match Line (Approach End) (See Sheets 3 and 4)

6'-3" spacing (Typ. except as noted along Bridge, see Note 2)

1'-6" Min. for non skewed joints. For treatment of skewed Intermediate Deck Joints see Skew Detail Index No. 470, Sheet 2 (Typ.)



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

==== TYPICAL TREATMENT OF RAILING ALONG BRIDGE ====

NOTES:

1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:

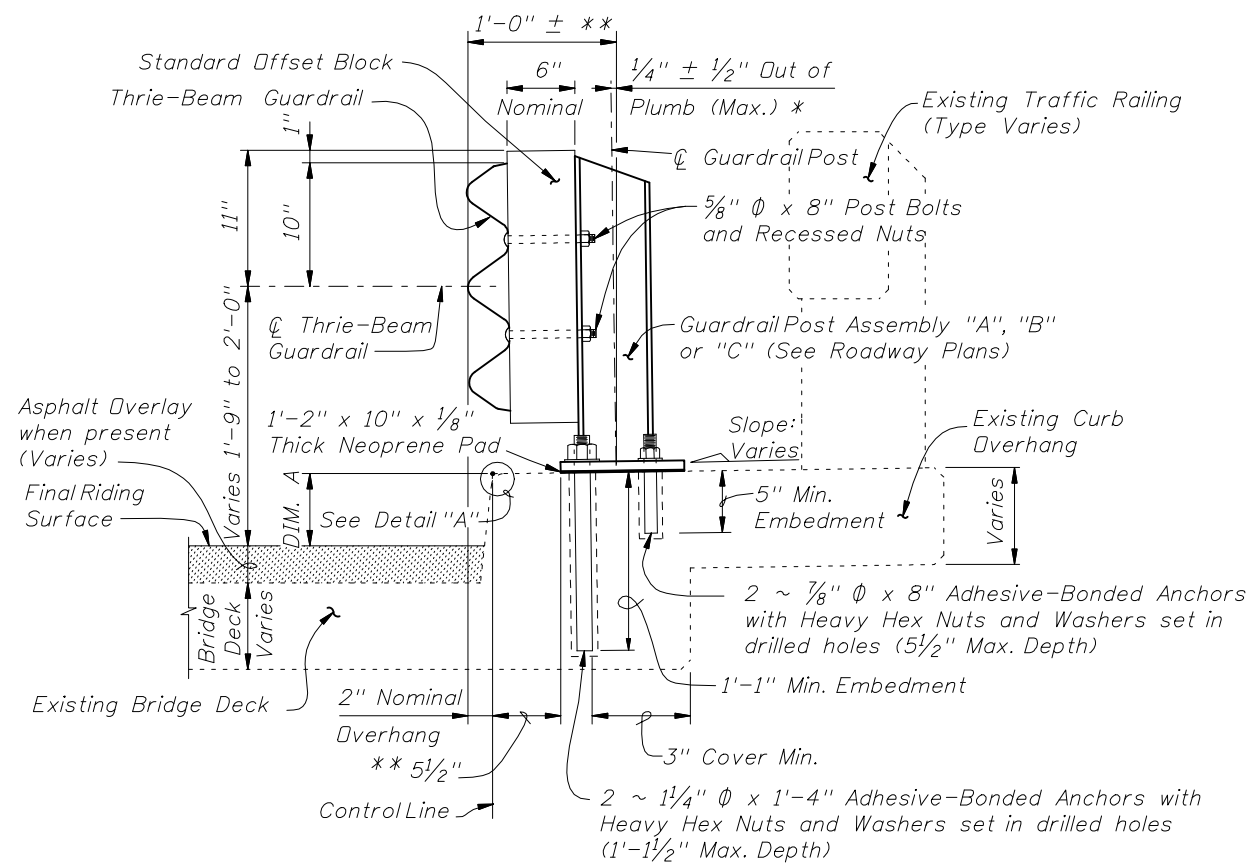
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.



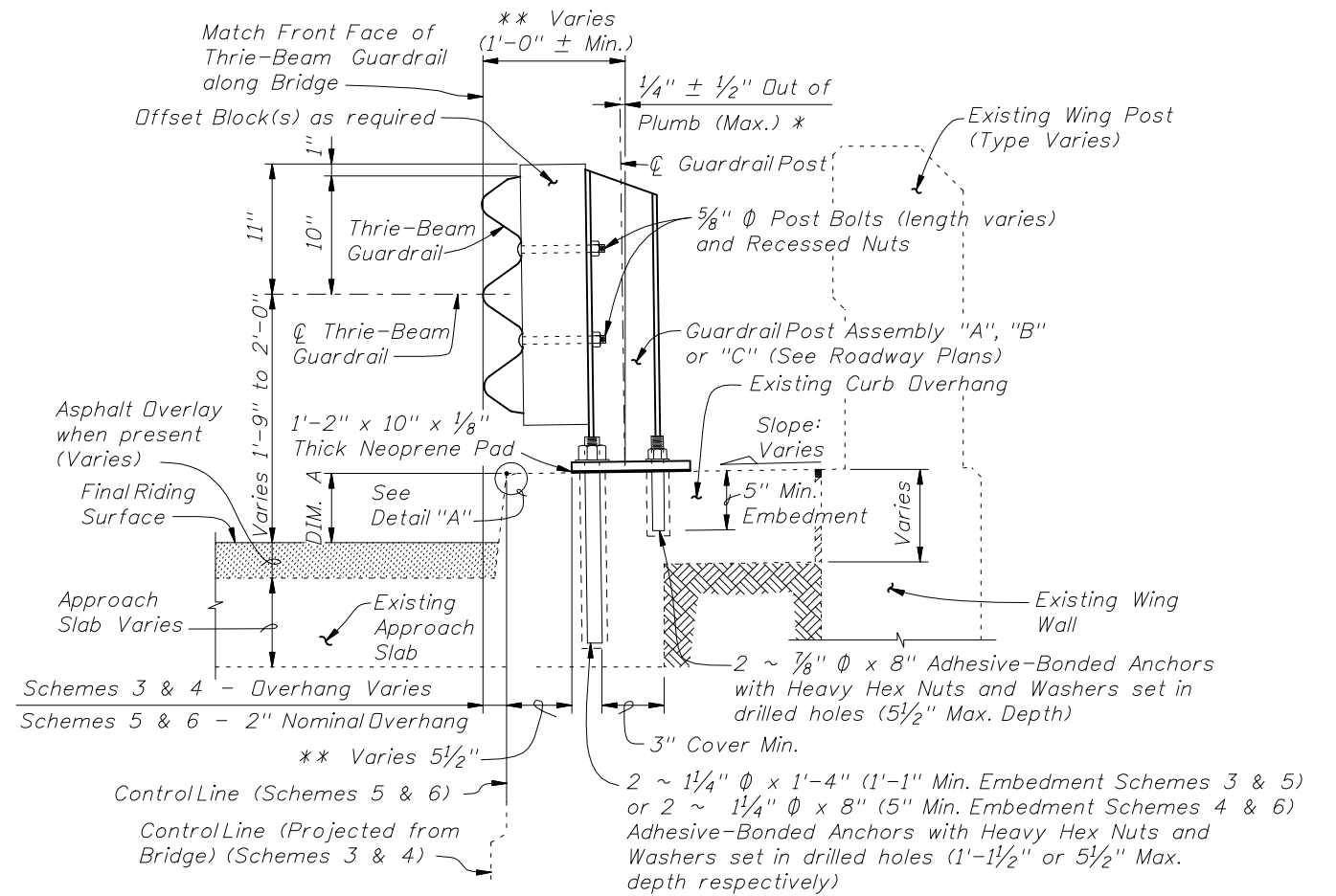
2010 FDOT Design Standards

**TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
WIDE STRONG CURB TYPE 1**

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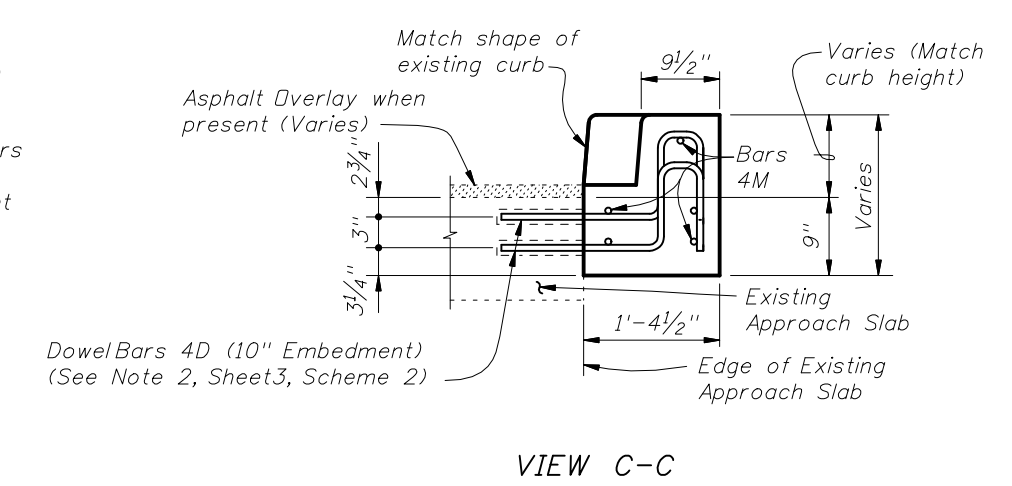
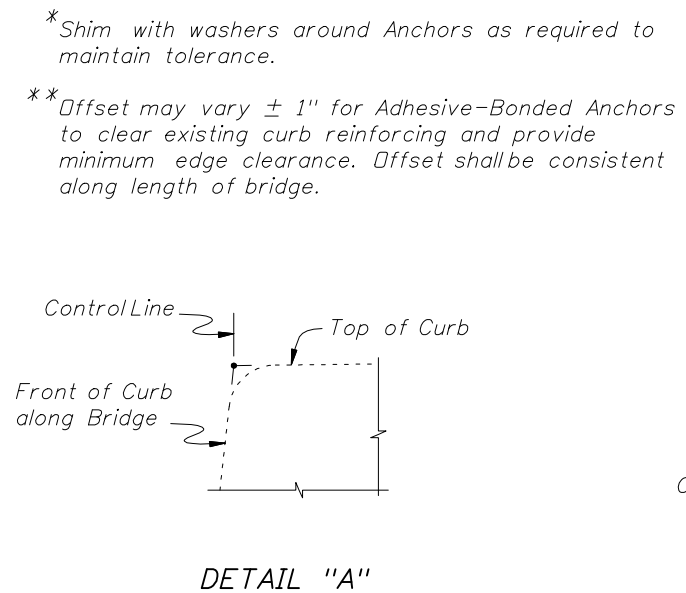
SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



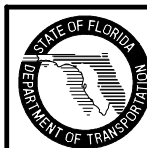
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

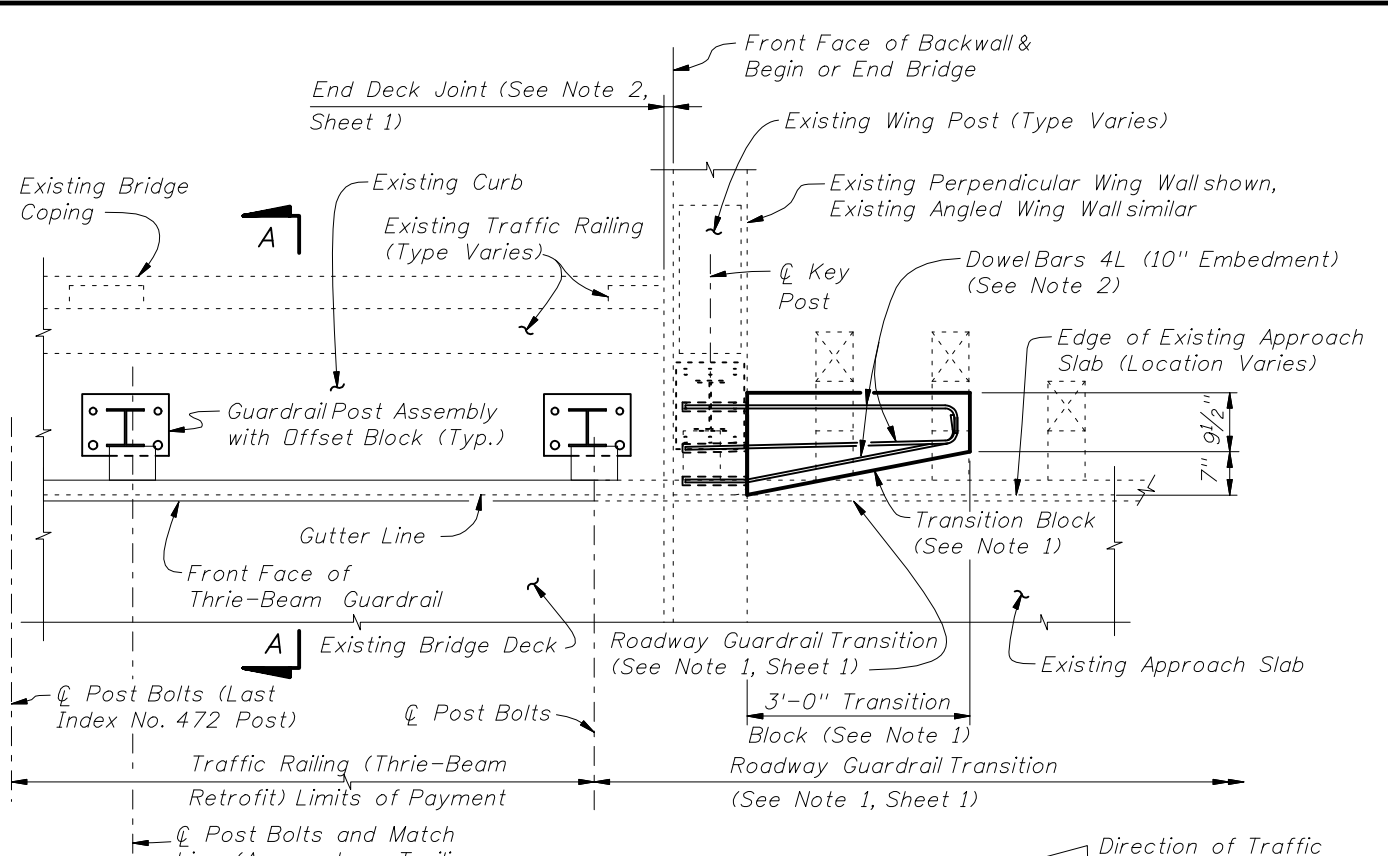
BILL OF REINFORCING STEEL			BAR BENDING DIAGRAMS	
MARK	SIZE	LENGTH		
D	4	3'-7"		DOWEL BAR 4D
L	4	4'-1"		DOWEL BAR 4L
M	4	2'-8"		BAR 4M

NOTE: All bar dimensions are out to out.

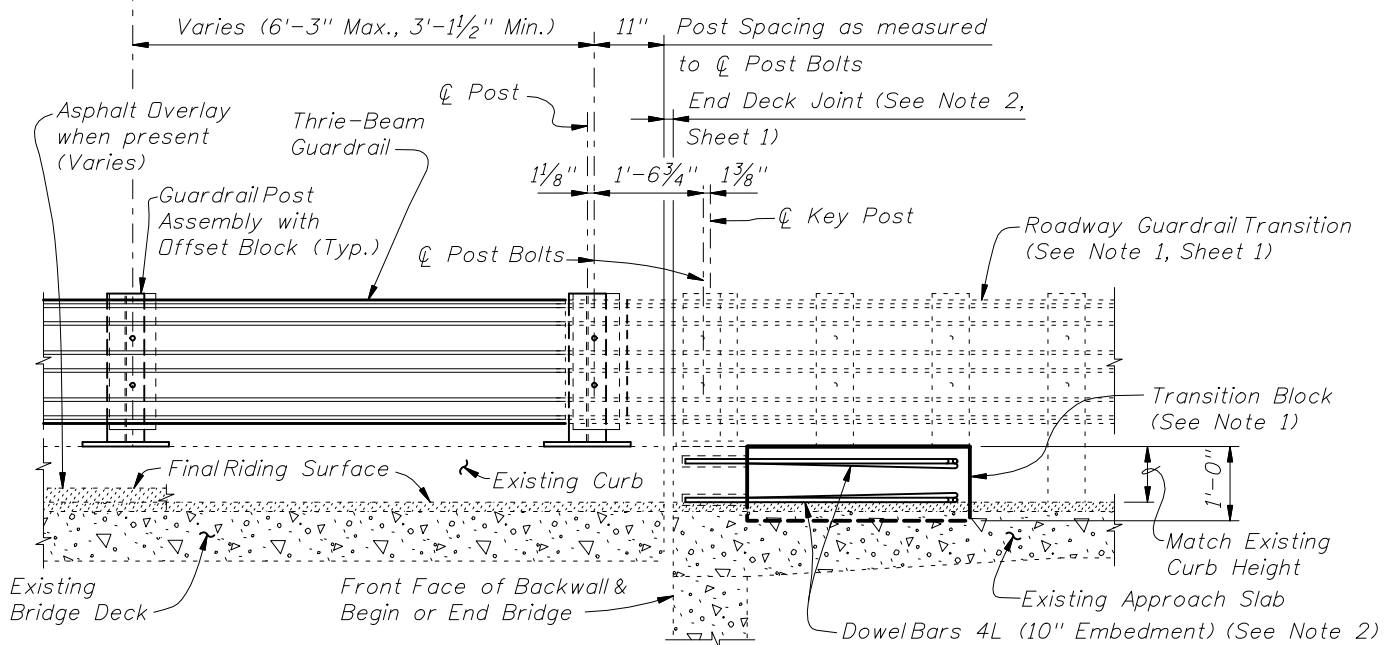


CROSS REFERENCES:
 For location of Section A-A see Sheets 1, 3 & 4.
 For location of Section B-B see Sheet 4.
 For location of View C-C see Sheet 3.
 For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.





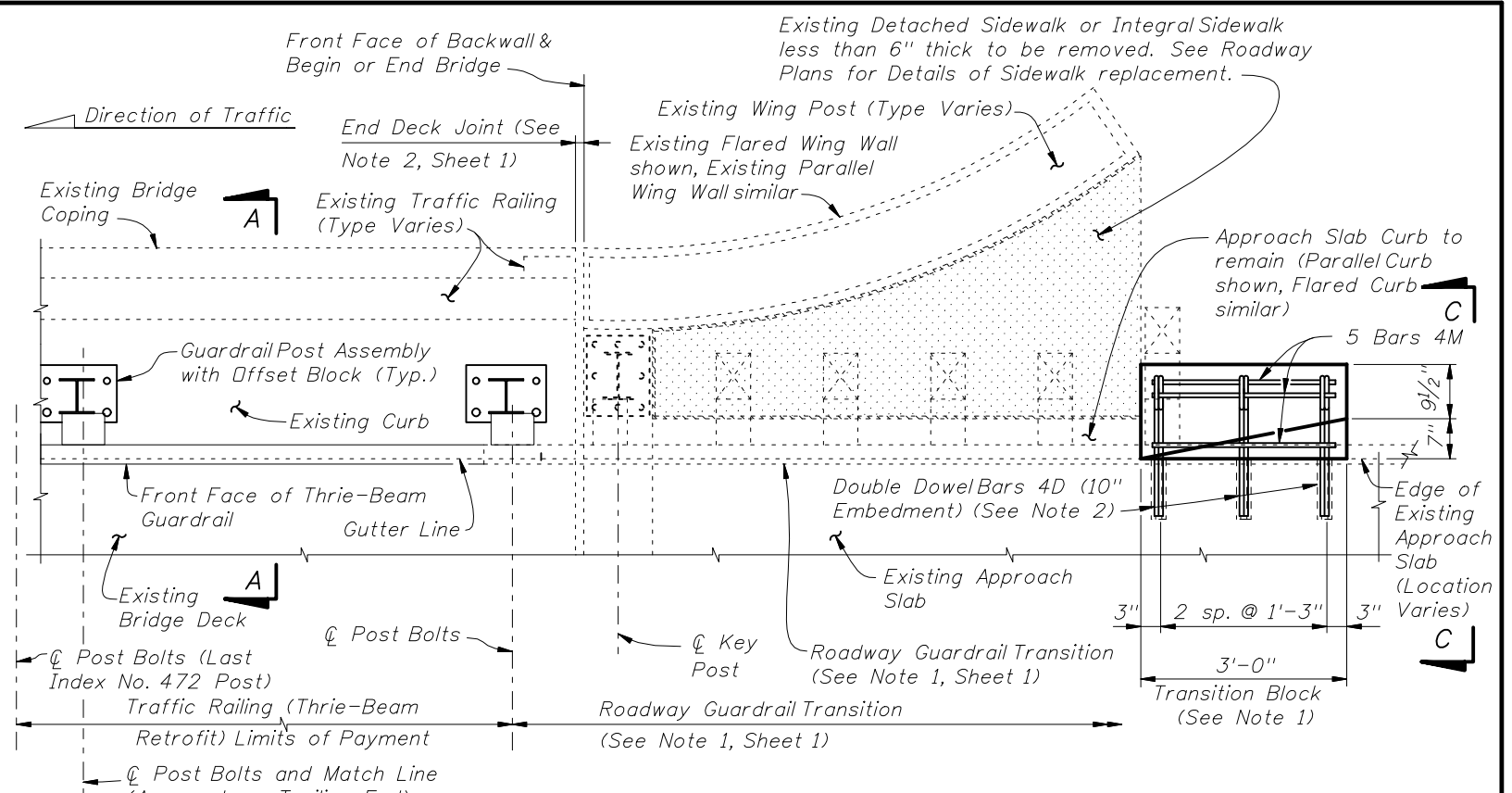
PARTIAL PLAN OF RAILING



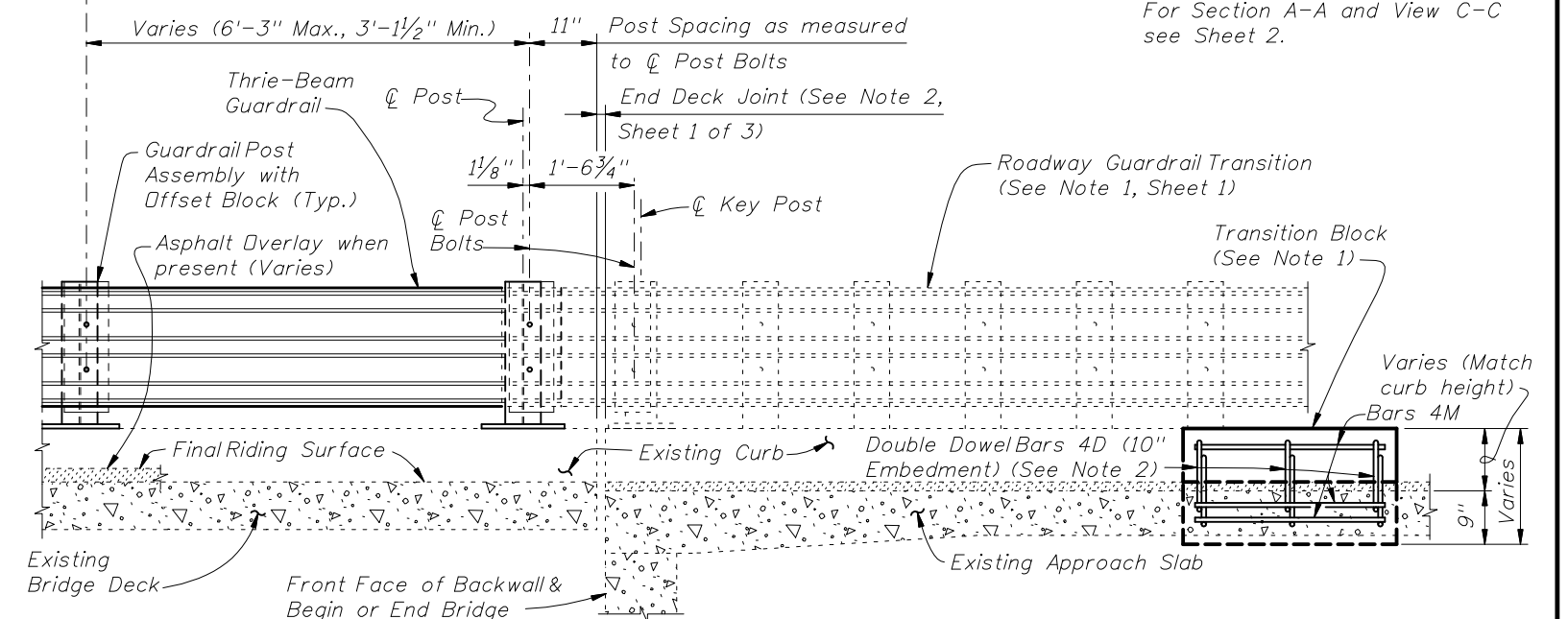
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

- SCHEME 1 NOTES:**
1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
 2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING



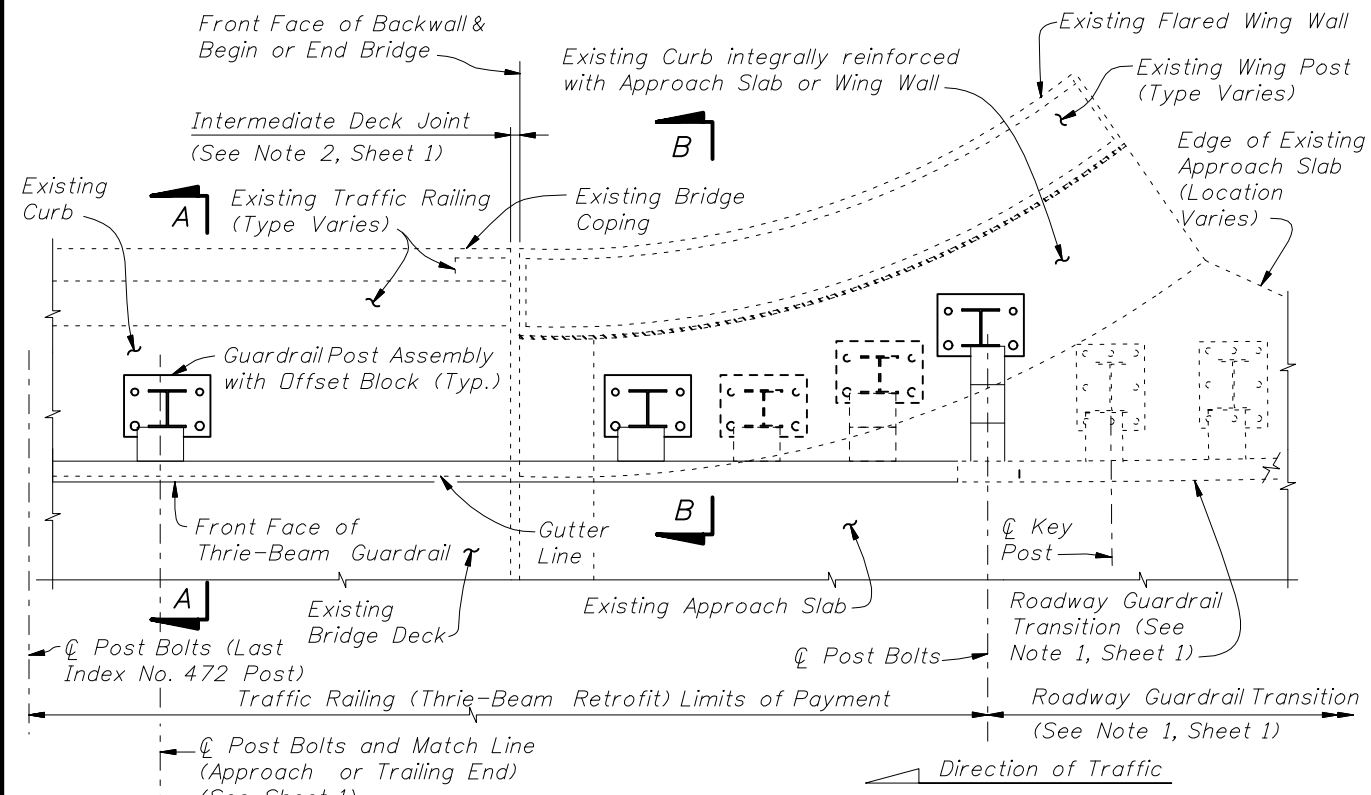
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEME 2
RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALKS LESS THAN 6" THICK

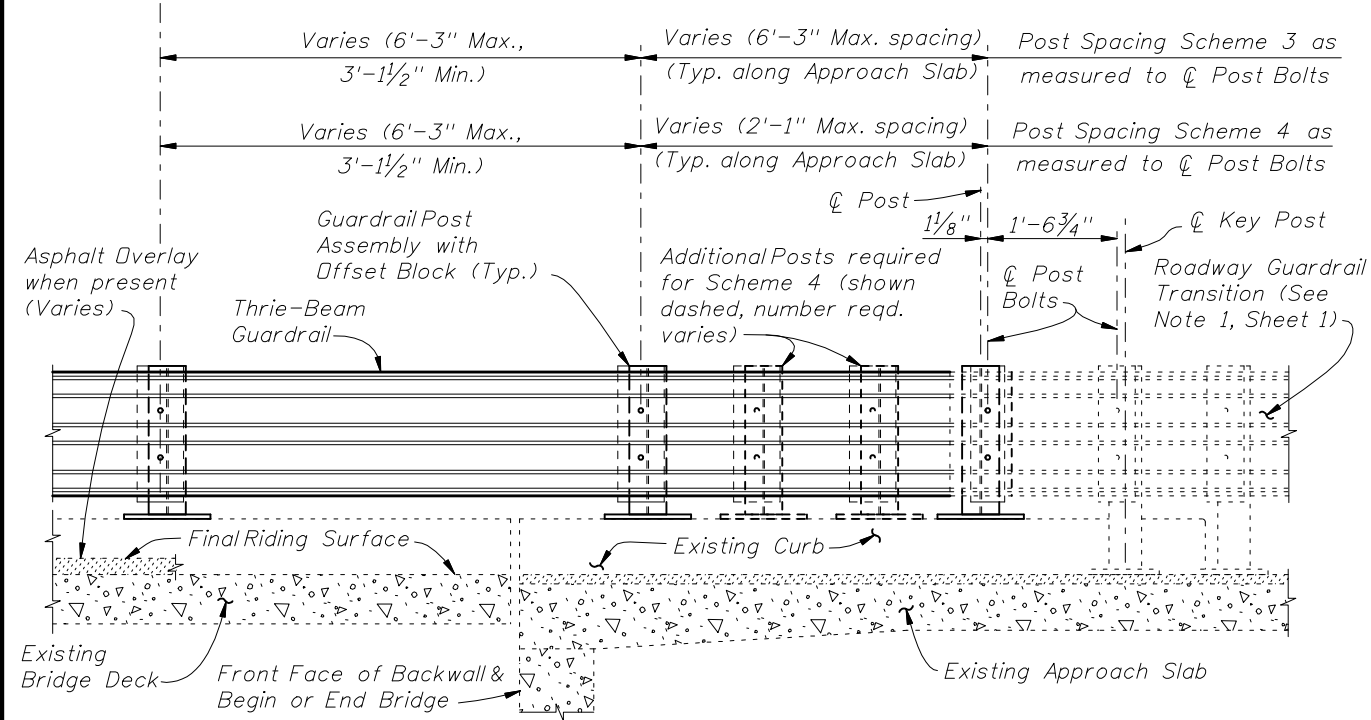
- SCHEME 2 NOTES:**
1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.
 2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

CROSS REFERENCES:
For Section A-A and View C-C see Sheet 2.



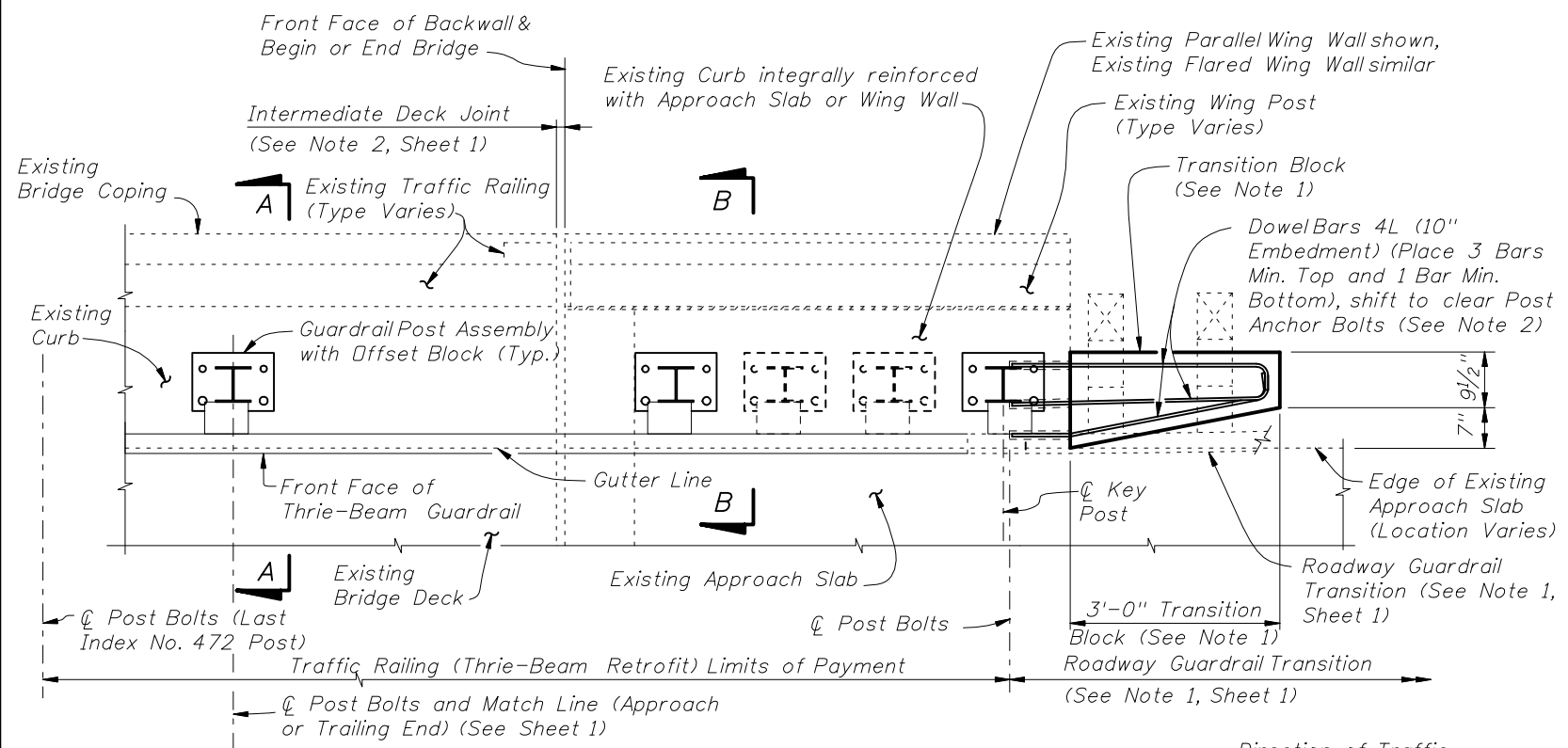


PARTIAL PLAN OF RAILING

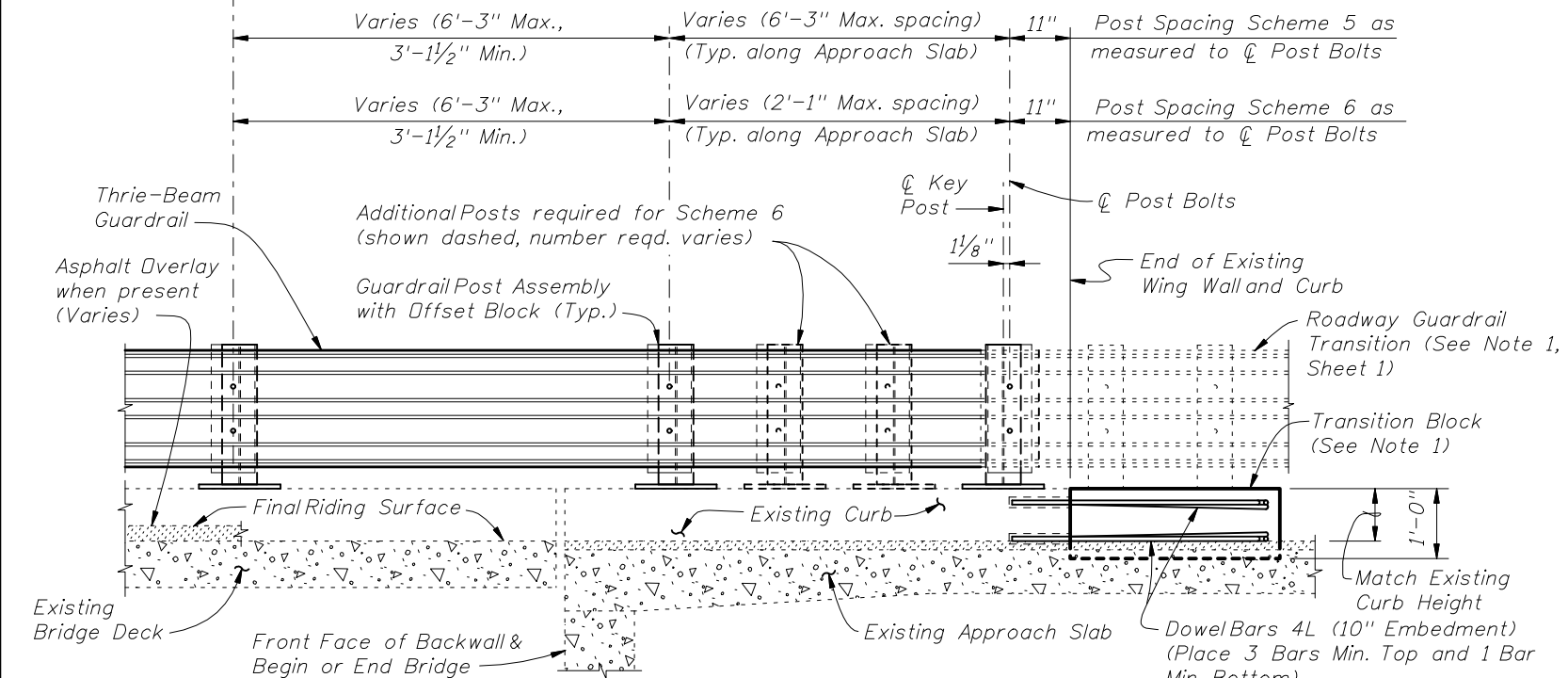


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



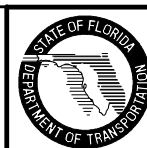
PARTIAL PLAN OF RAILING

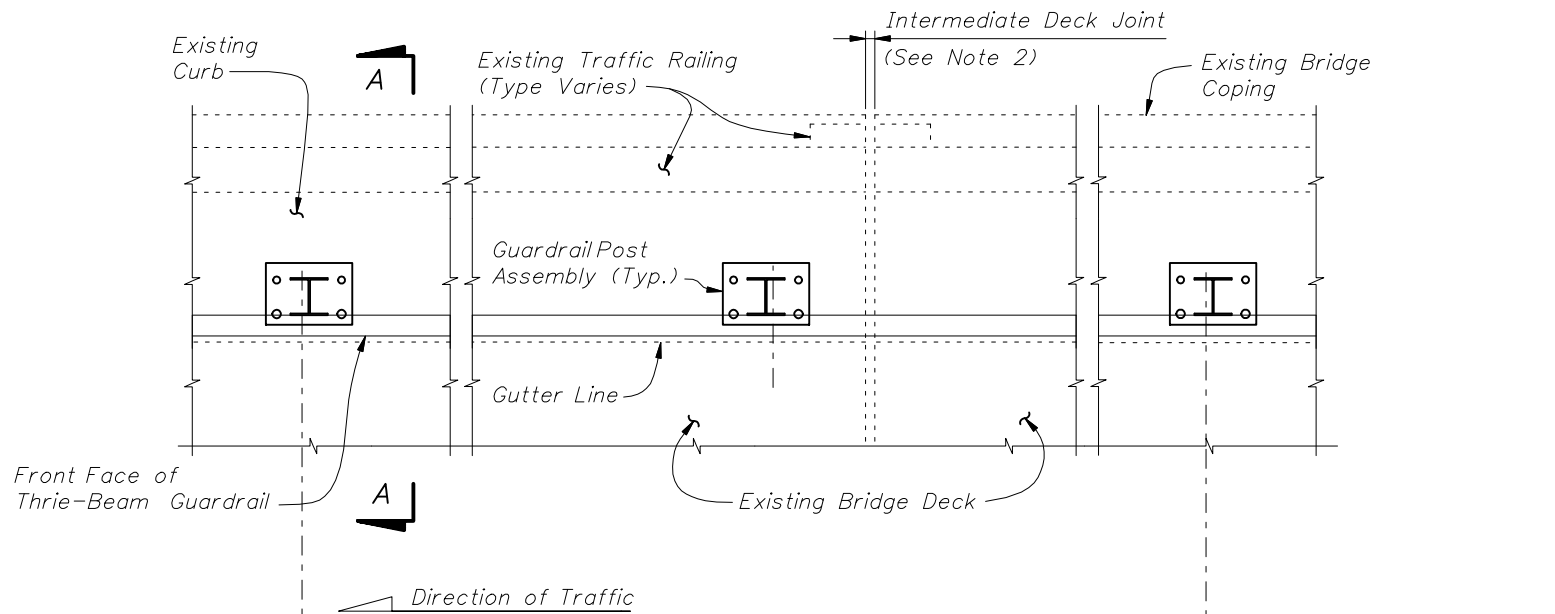


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

- SCHEMES 5 AND 6 NOTES:**
- Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
 - Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.





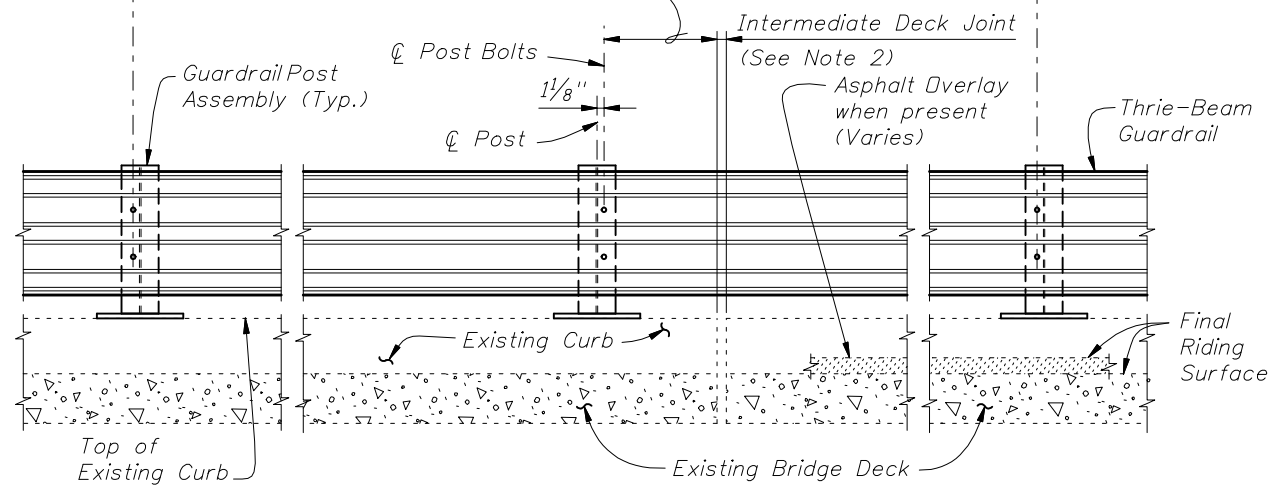
PARTIAL PLAN OF RAILING

⊘ Post Bolts and Match Line (Trailing End) (See Sheets 3 and 4)

⊘ Post Bolts and Match Line (Approach End) (See Sheets 3 and 4)

6'-3" spacing (Typ. except as noted along Bridge, see Note 2)

1'-6" Min. for non skewed joints. For treatment of skewed Intermediate Deck Joints see Skew Detail Index No. 470, Sheet 2 (Typ.)



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

==== TYPICAL TREATMENT OF RAILING ALONG BRIDGE ====

NOTES:

1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:

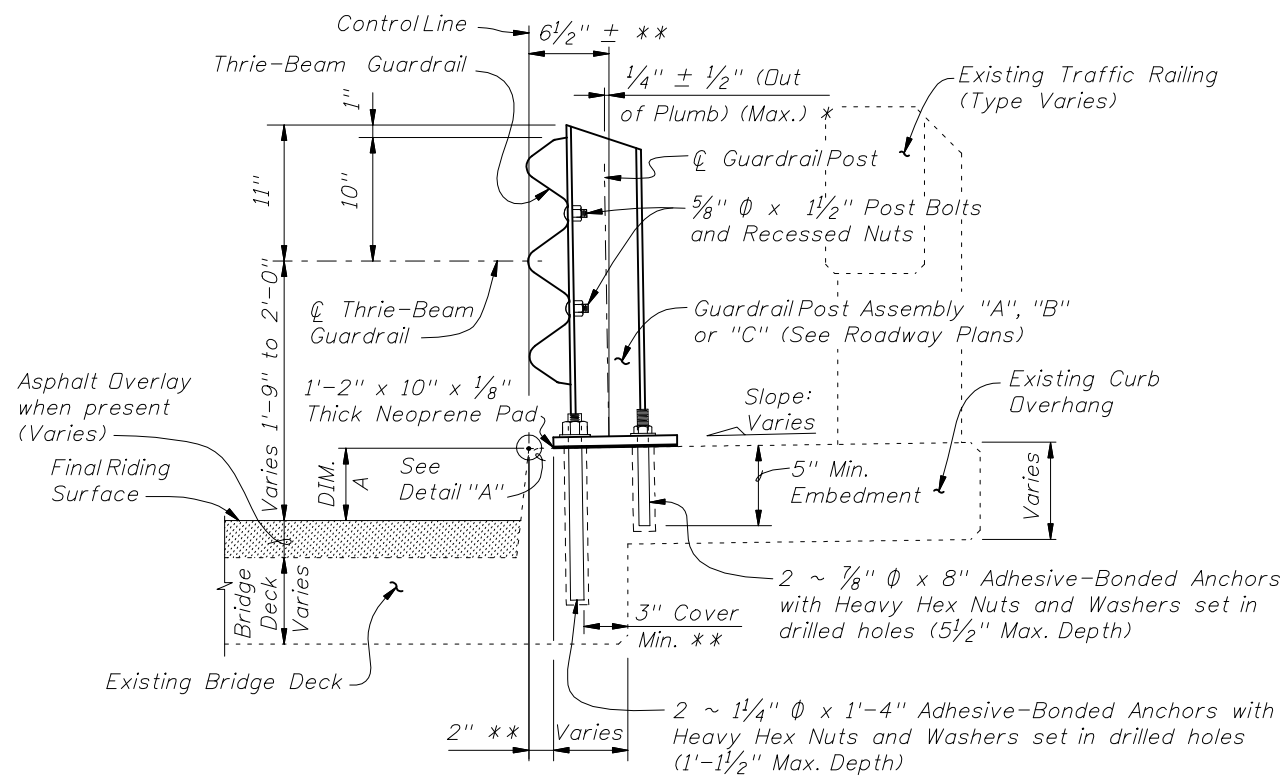
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.



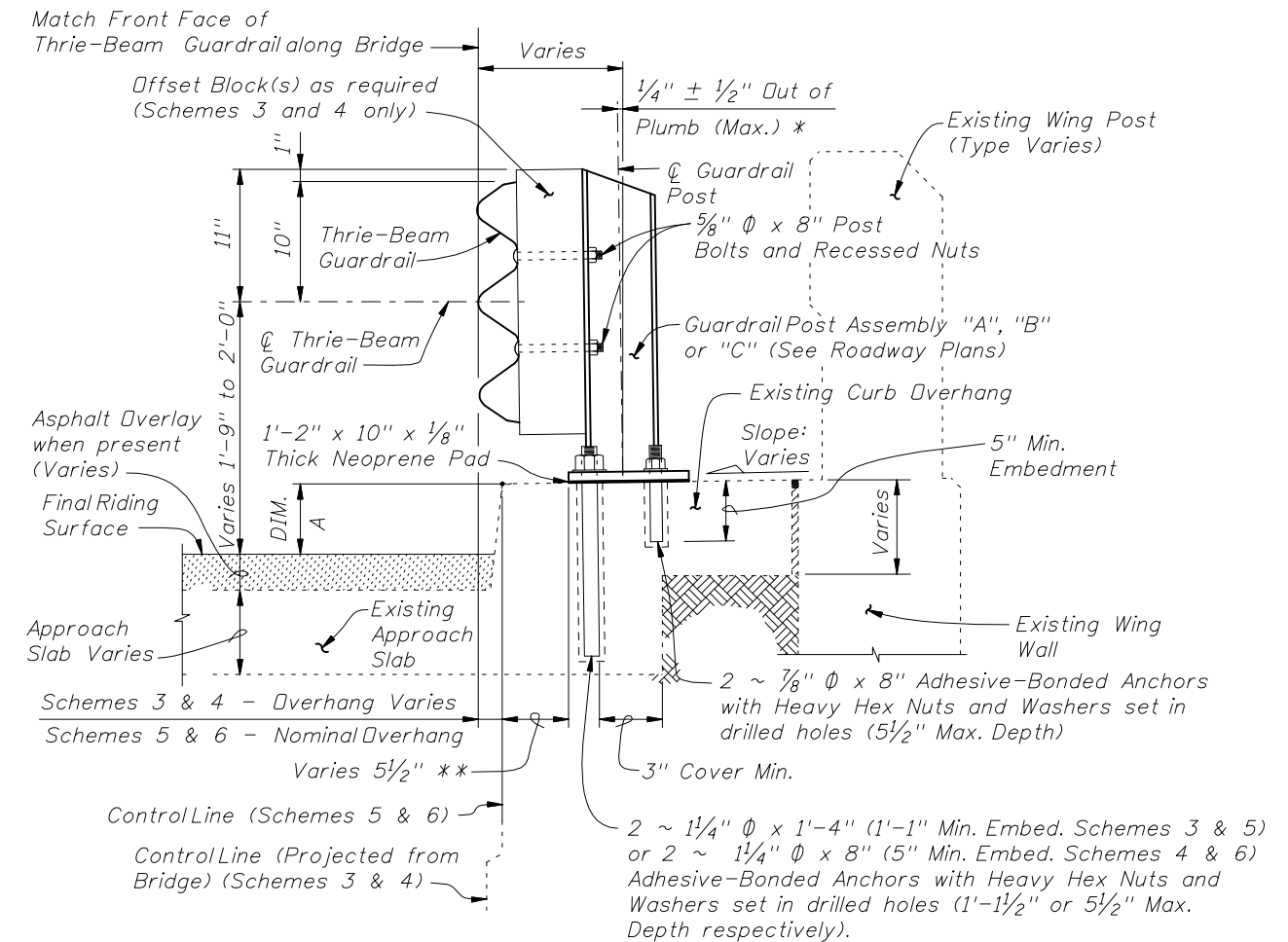
2010 FDOT Design Standards

**TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
WIDE STRONG CURB TYPE 2**

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SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



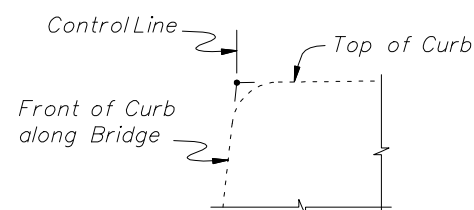
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

BILL OF REINFORCING STEEL			BAR BENDING DIAGRAMS	
MARK	SIZE	LENGTH		
D	4	3'-7"		
L	4	4'-1"		
M	4	2'-8"		

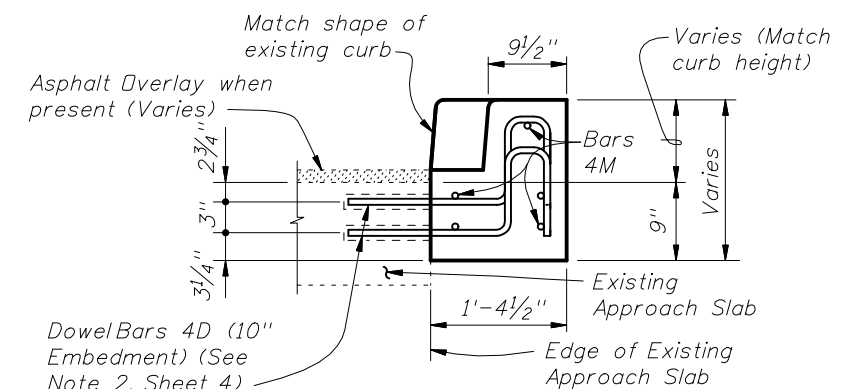
DOWEL BAR 4L		BAR 4M	

NOTE: All bar dimensions are out to out.

* Shim with washers around Anchor Bolts and Anchors as required to maintain tolerance.
 ** Offset may vary $\pm 1"$ for Adhesive-Bonded Anchors and Anchor Bolts to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.



DETAIL "A"



VIEW C-C

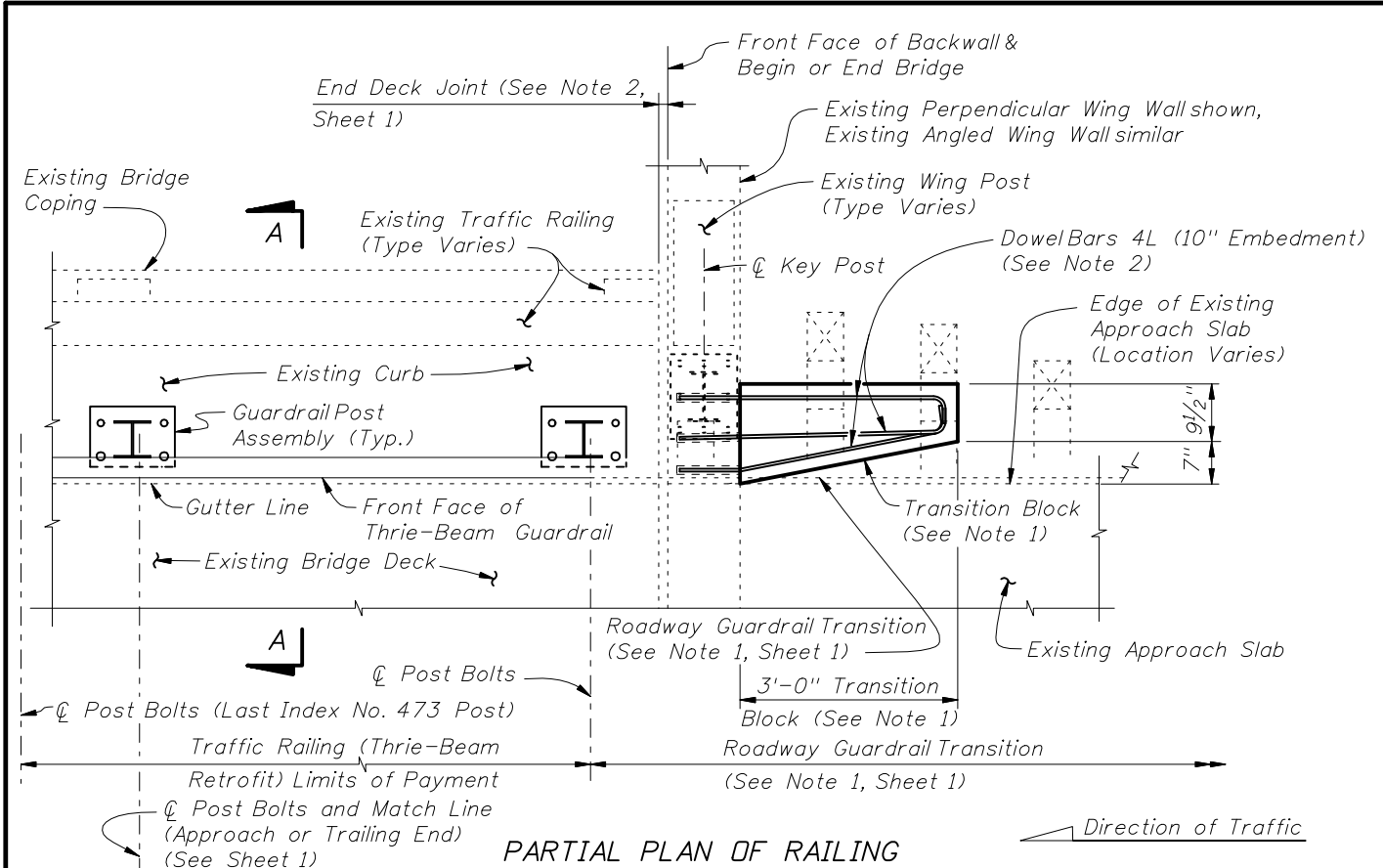
CROSS REFERENCES:
 For location of Section A-A see Sheet 1, 3 and 4.
 For location of Section B-B see Sheet 4.
 For location of View C-C see Sheet 3.
 For Traffic Railing Notes and Details see Index No. 470.
 For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



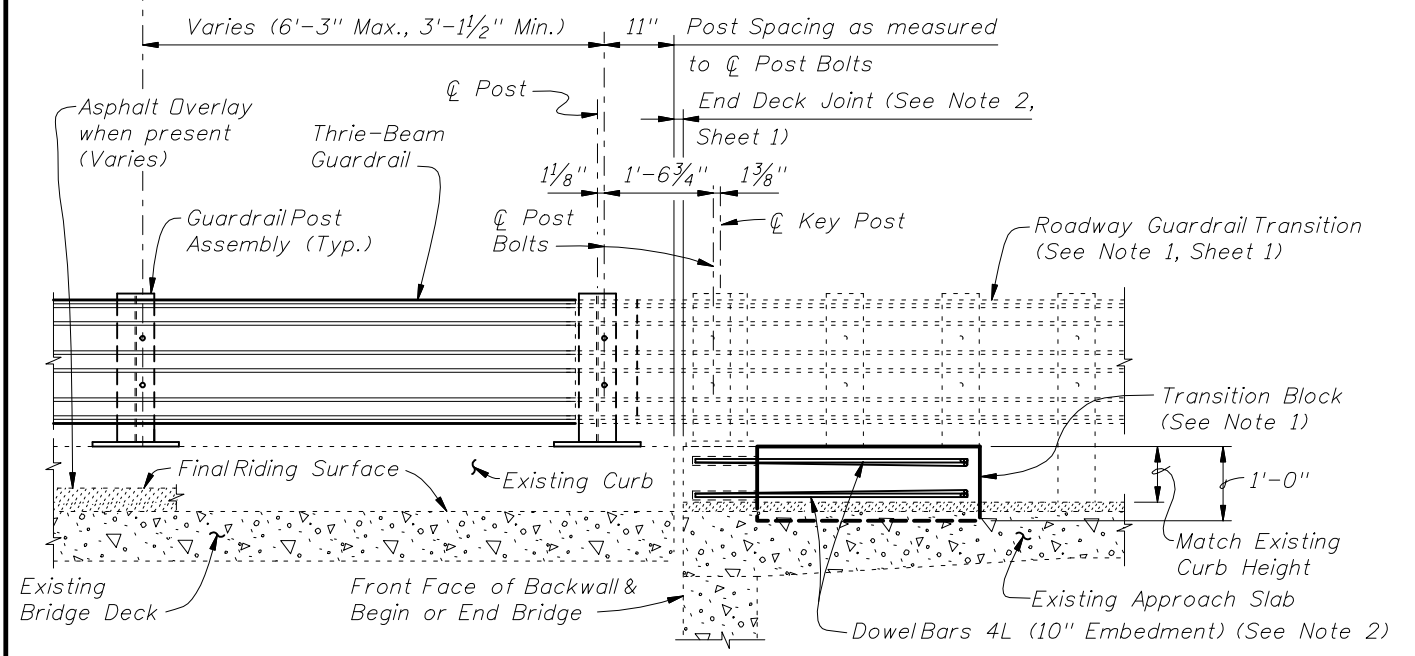
2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
WIDE STRONG CURB TYPE 2

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 Sheet No. 2 of 4
 Index No. 473



PARTIAL PLAN OF RAILING

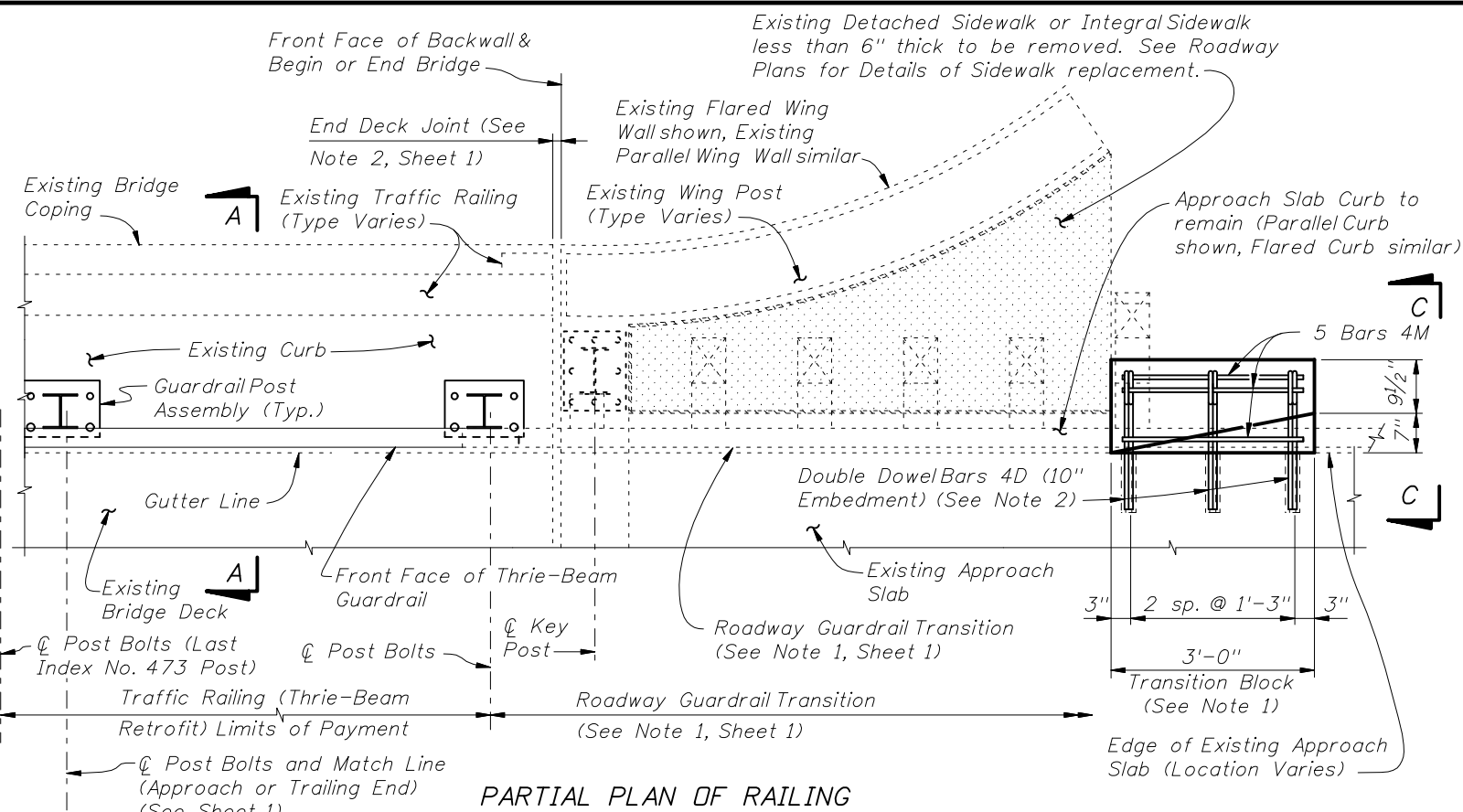


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

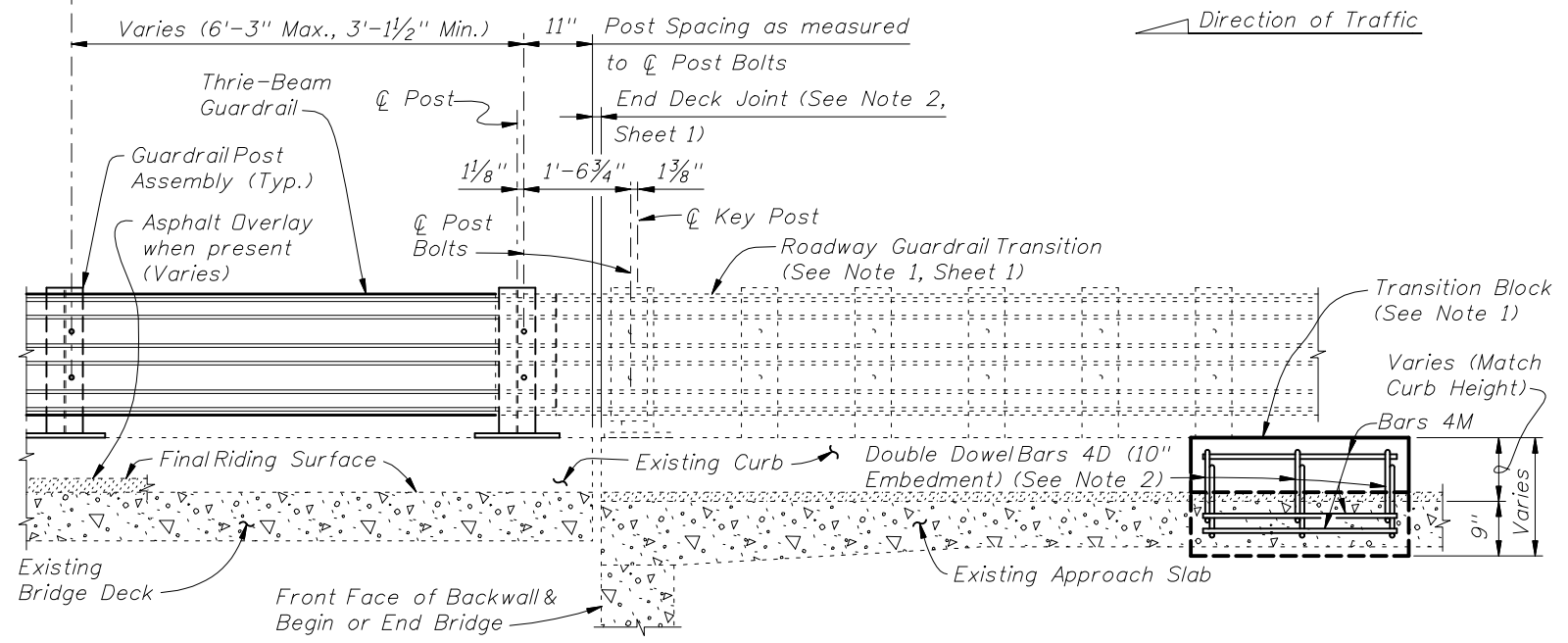
SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEME 2
RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALK LESS THAN 6" THICK

SCHEME 2 NOTES:

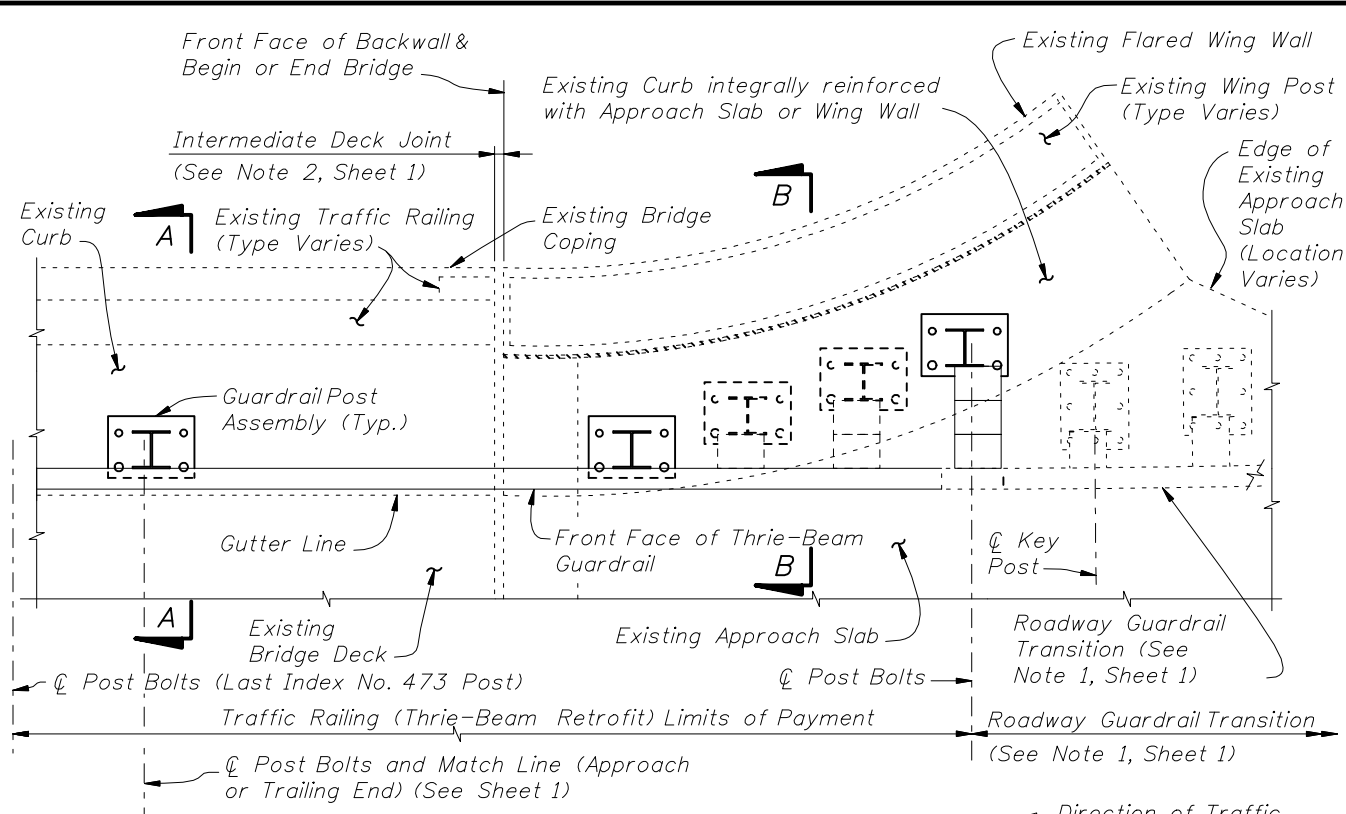
1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.
2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



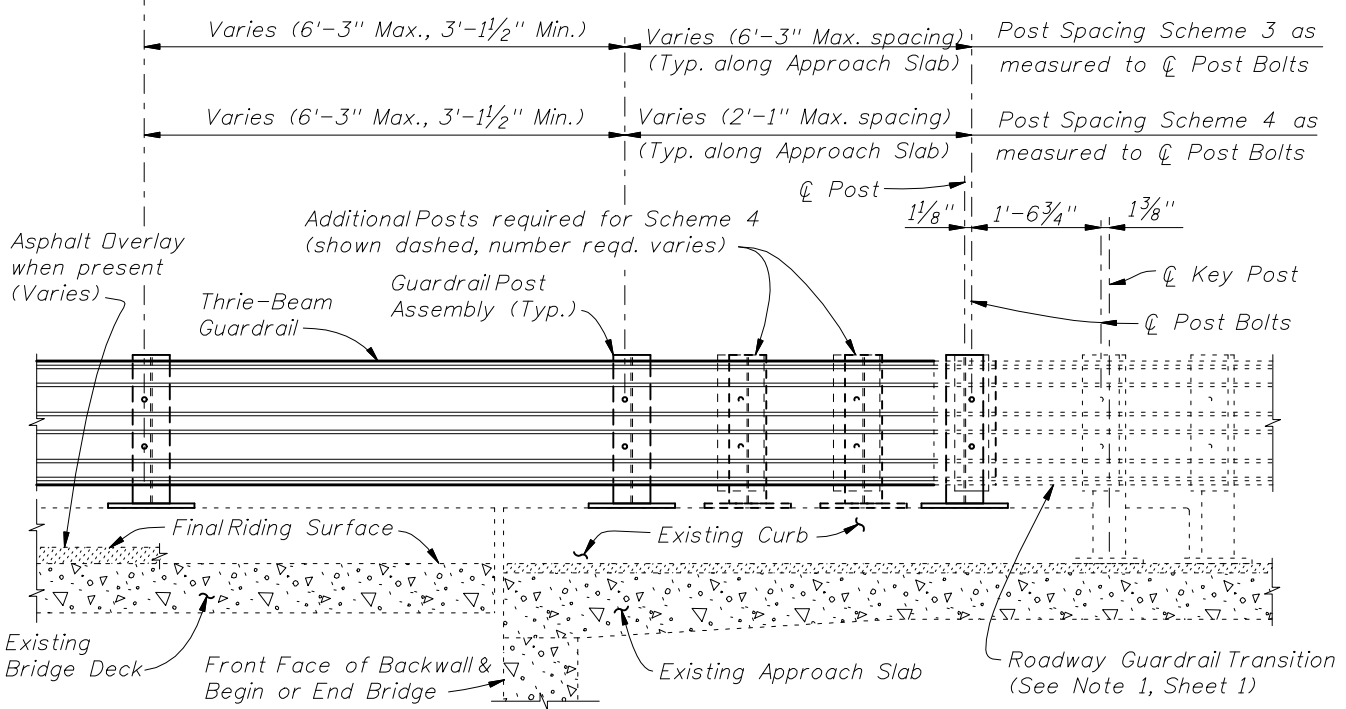
2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
WIDE STRONG CURB TYPE 2

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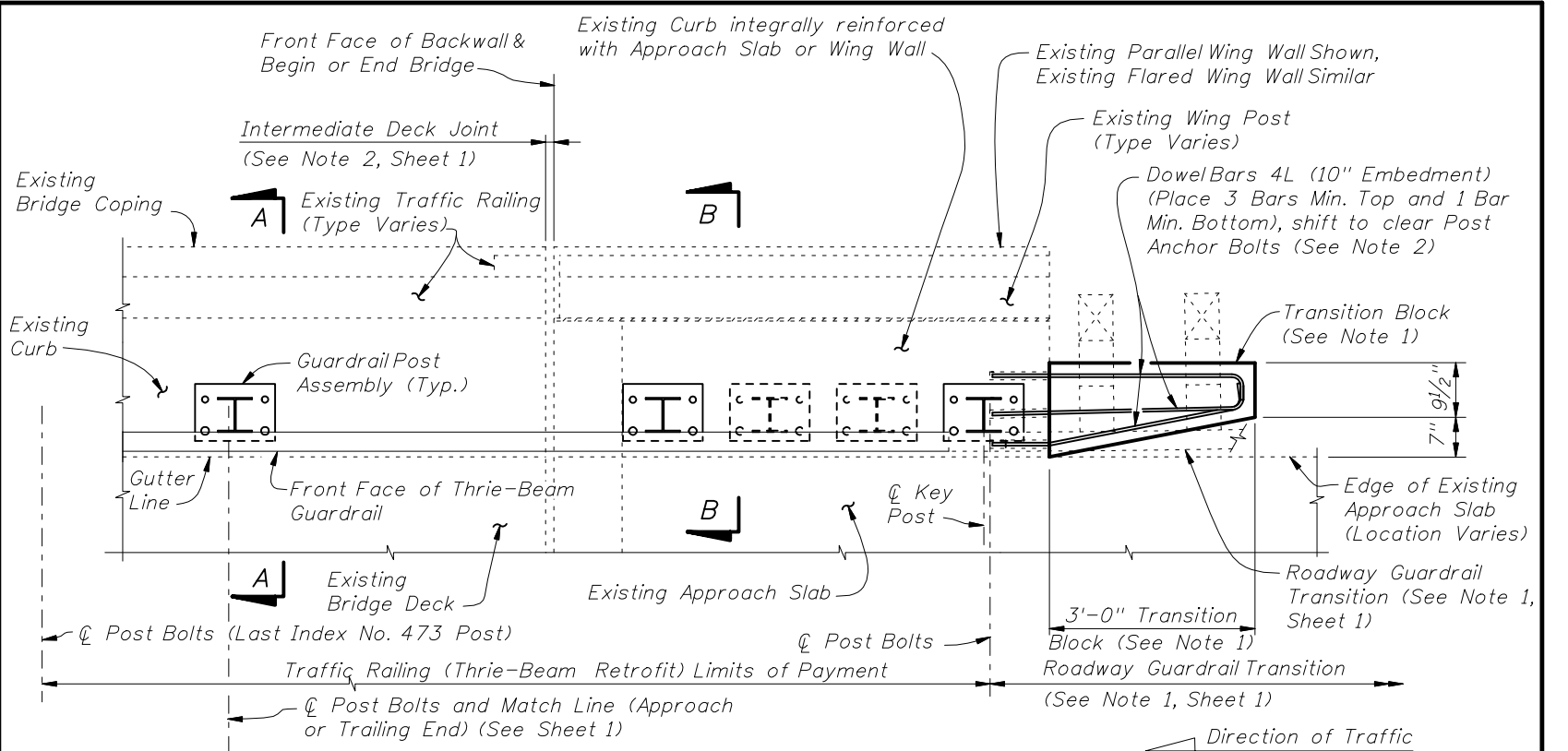


PARTIAL PLAN OF RAILING

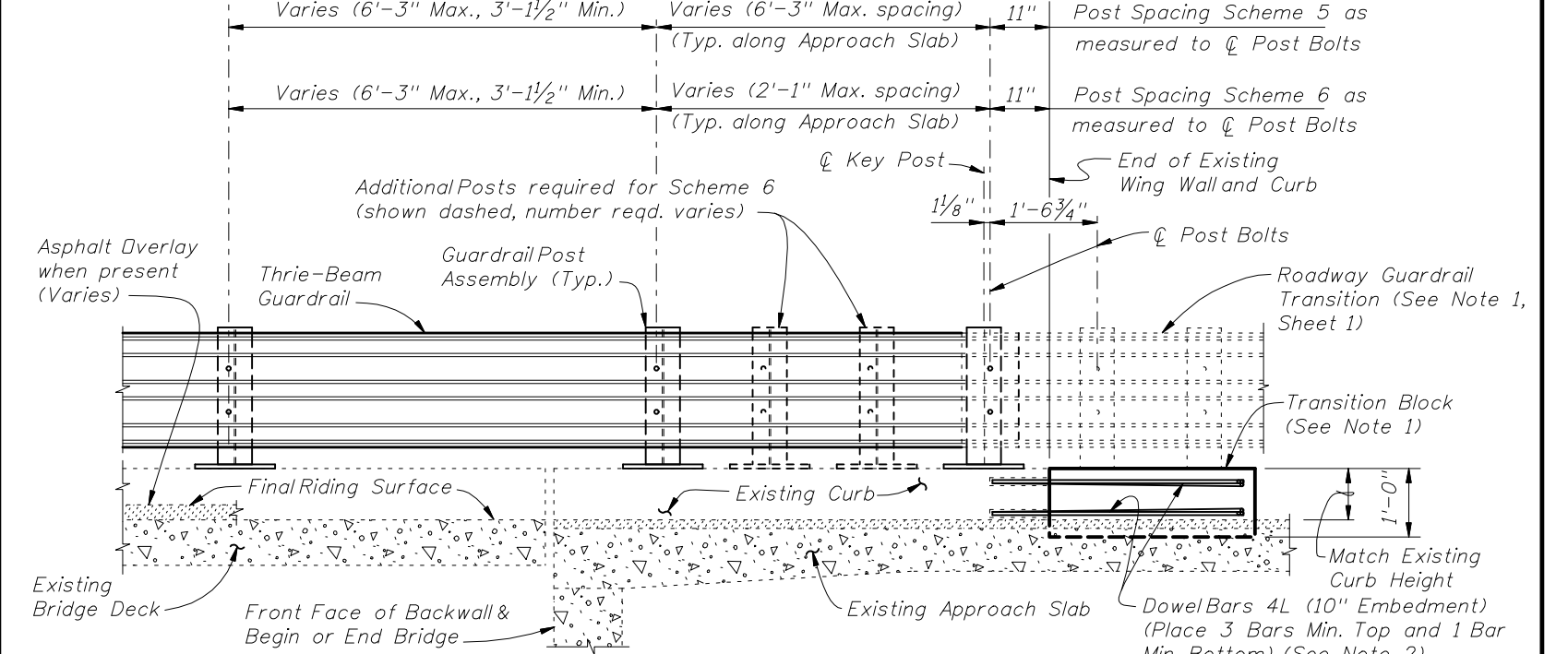


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



PARTIAL PLAN OF RAILING

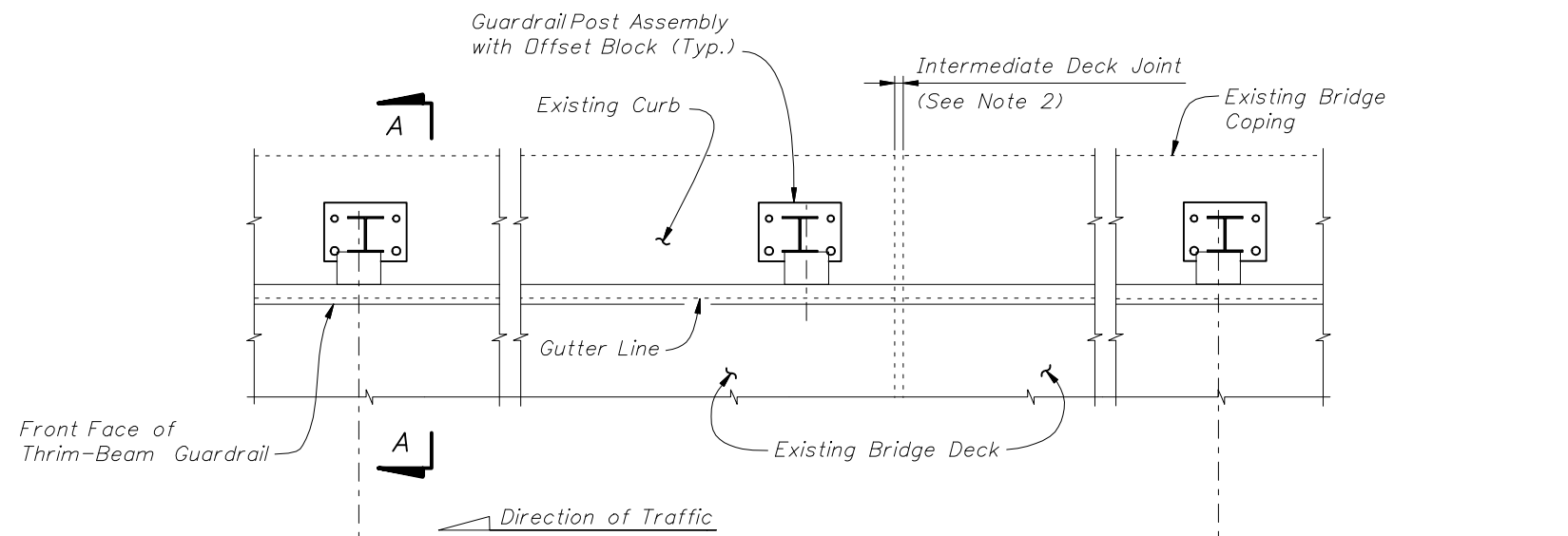


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

- SCHEMES 5 AND 6 NOTES:**
1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
 2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.





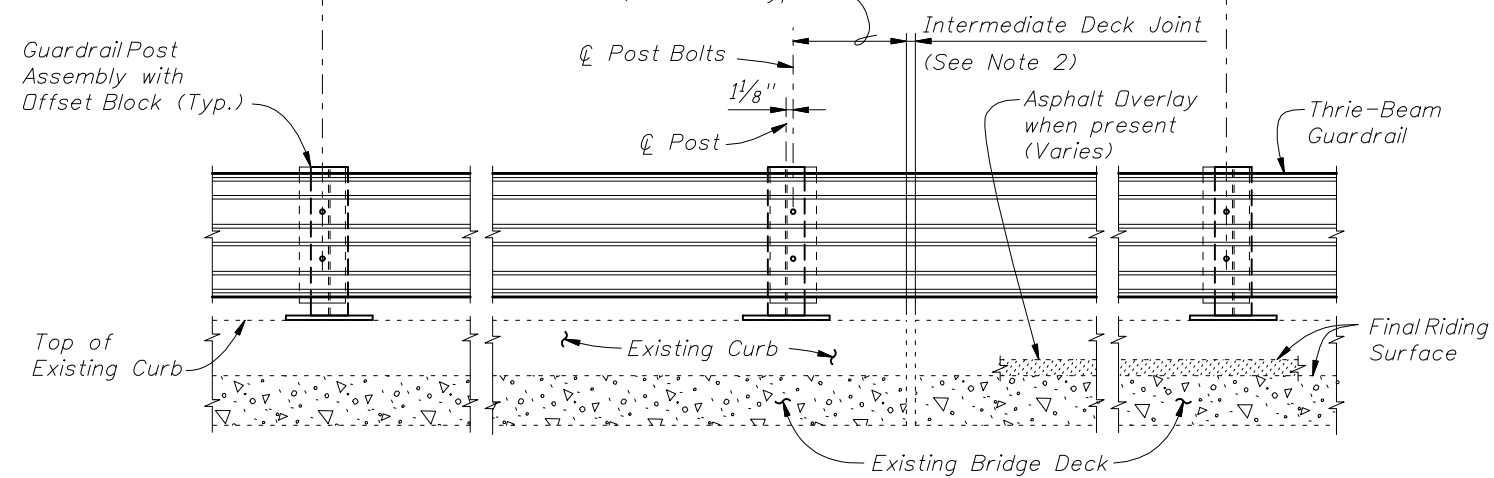
PARTIAL PLAN OF RAILING

☉ Post Bolts and Match Line (Trailing End) (See Sheets 3 and 4)

☉ Post Bolts and Match Line (Approach End) (See Sheets 3 and 4)

6'-3" spacing (Typ. except as noted along Bridge, see Note 2)

1'-6" Min. for non skewed joints. For treatment of skewed Intermediate Deck Joints see Skew Detail Index No. 470, Sheet 2 (Typ.)



PARTIAL ELEVATION OF INSIDE FACE OF RAILING

==== TYPICAL TREATMENT OF RAILING ALONG BRIDGE ====

NOTES:

1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:

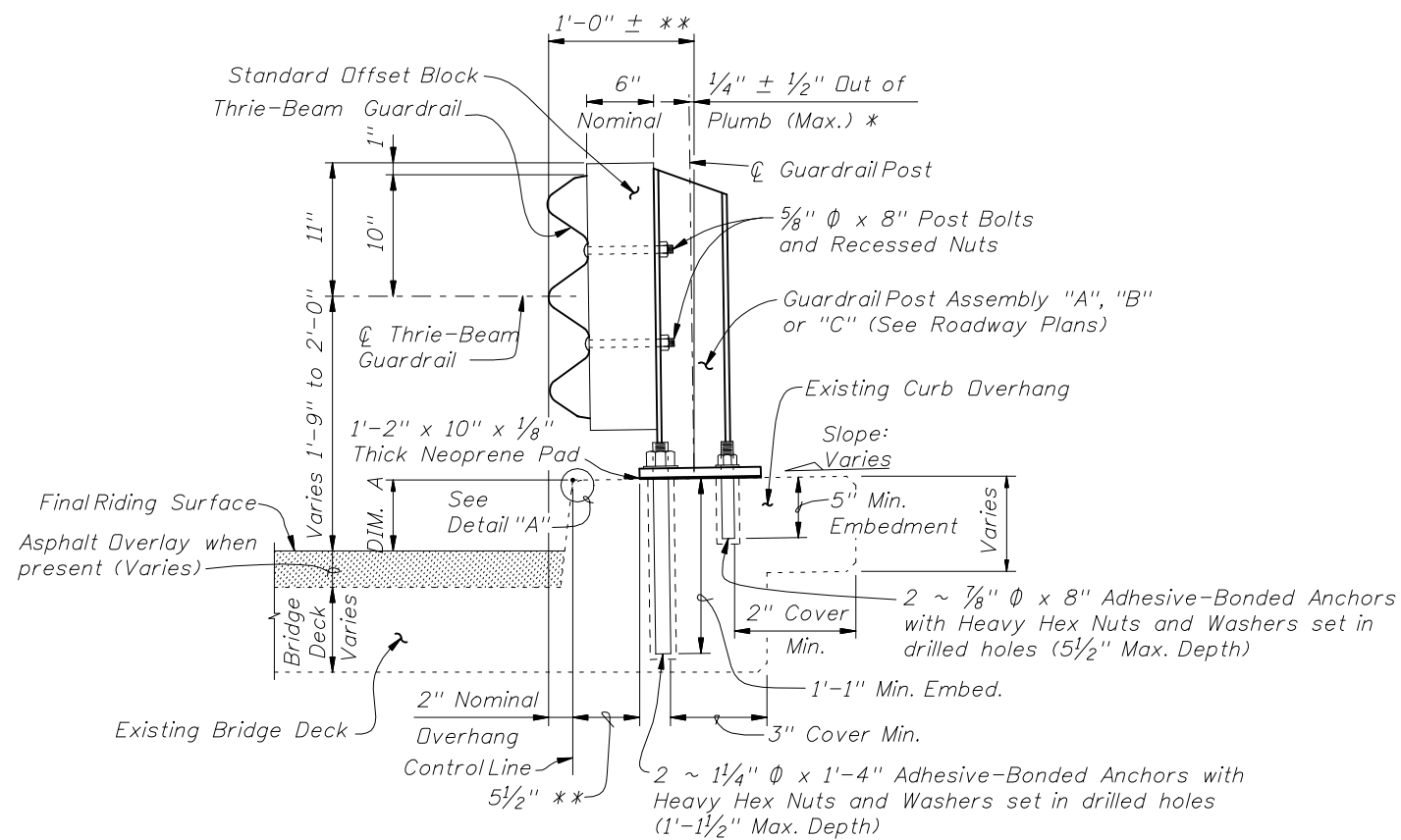
- For Match Line see Sheets 3 & 4.
- For Section A-A see Sheet 2.
- For Traffic Railing Notes and Details see Index No. 470.



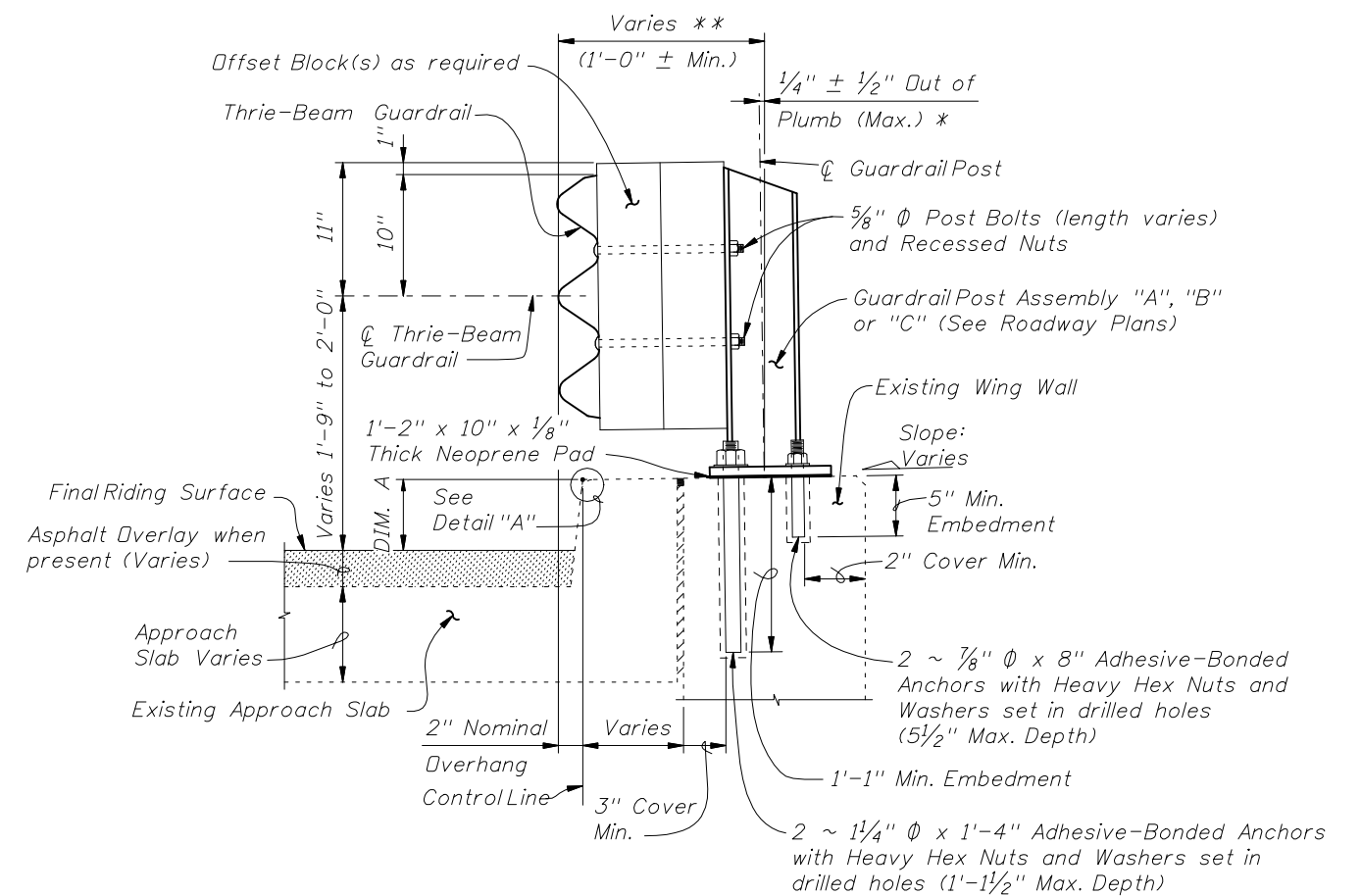
2010 FDOT Design Standards

**TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
INTERMEDIATE CURB**

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SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK

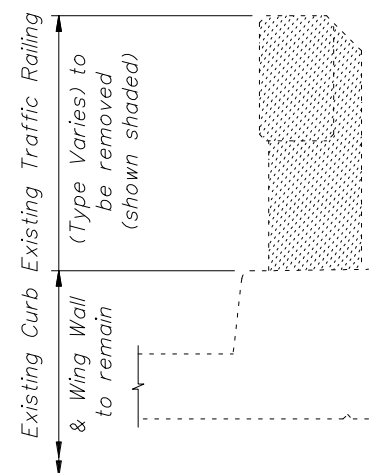


SECTION B-B (SCHEME 2)
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB

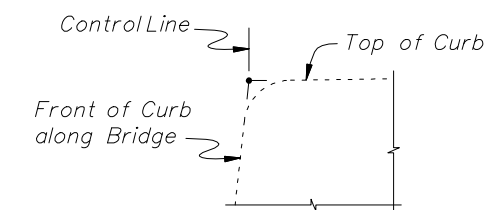
*Shim with washers around Anchor Bolts and Anchors as required to maintain tolerance.

**Offset may vary ± 1 " for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
L	4	4'-1"
BAR BENDING DIAGRAM		
DOWEL BAR 4L		
NOTE: All bar dimensions are out to out.		



TYPICAL SECTION THRU EXISTING TRAFFIC RAILING SHOWING LIMITS OF REMOVAL (BRIDGE DECK SHOWN, WING WALL SIMILAR)



DETAIL "A"

CROSS REFERENCES:

For location of Section A-A see Sheet 1 and 3.
For location of Section B-B see Sheet 3
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.

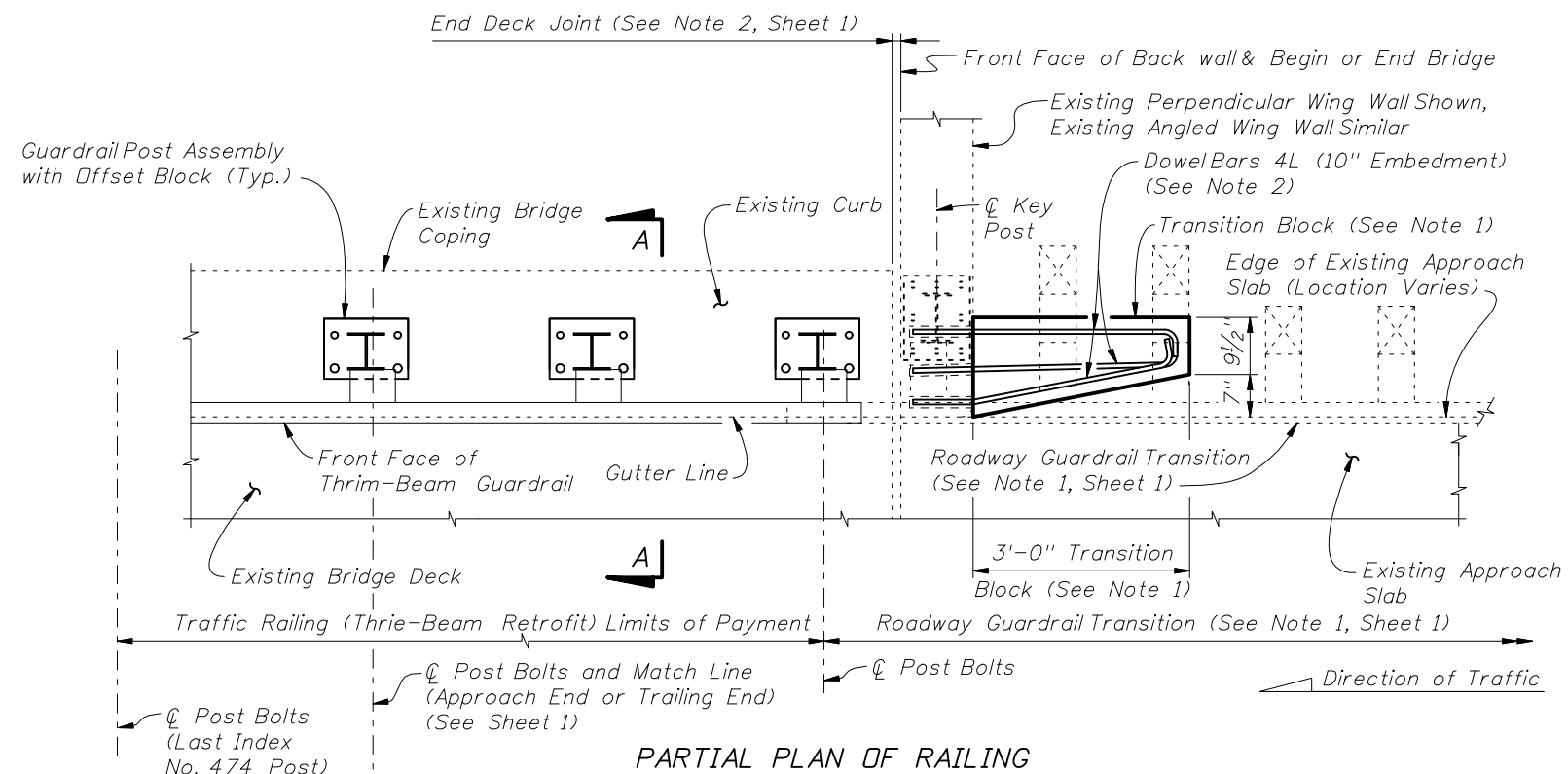


2010 FDOT Design Standards

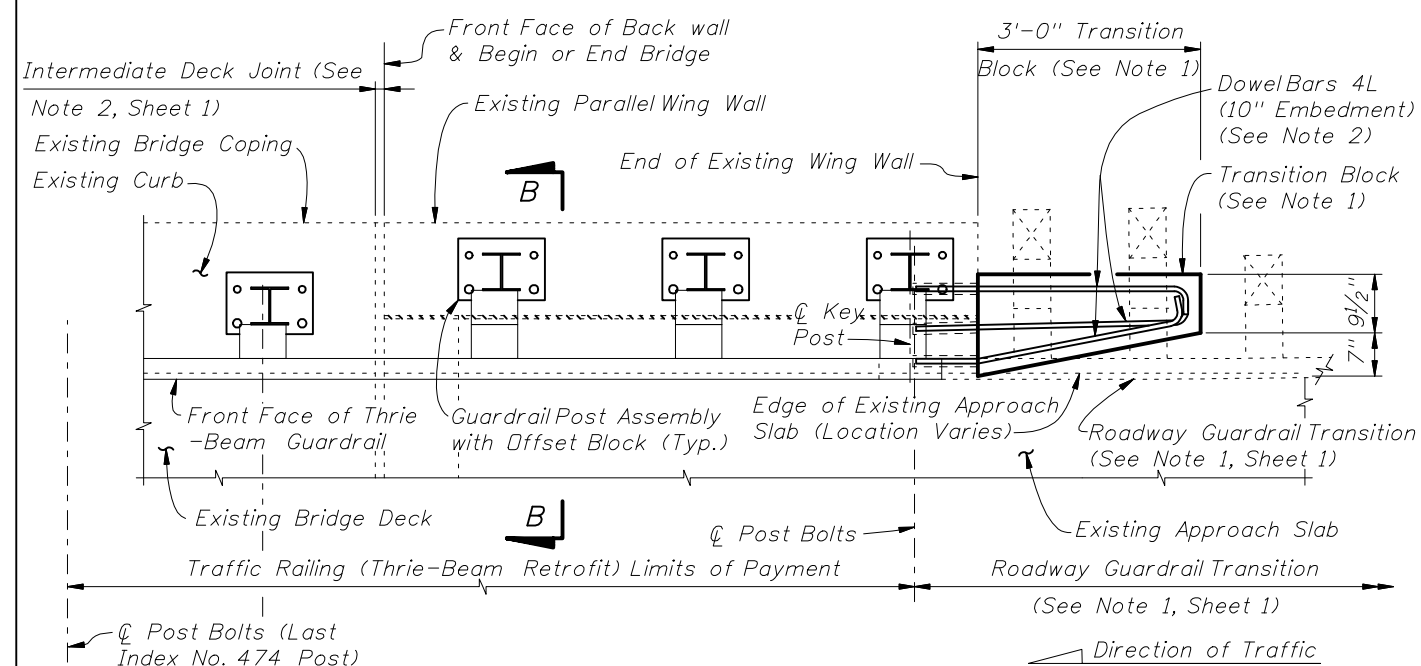
TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
INTERMEDIATE CURB

Last Revision 07/01/08 Sheet No. 2 of 4

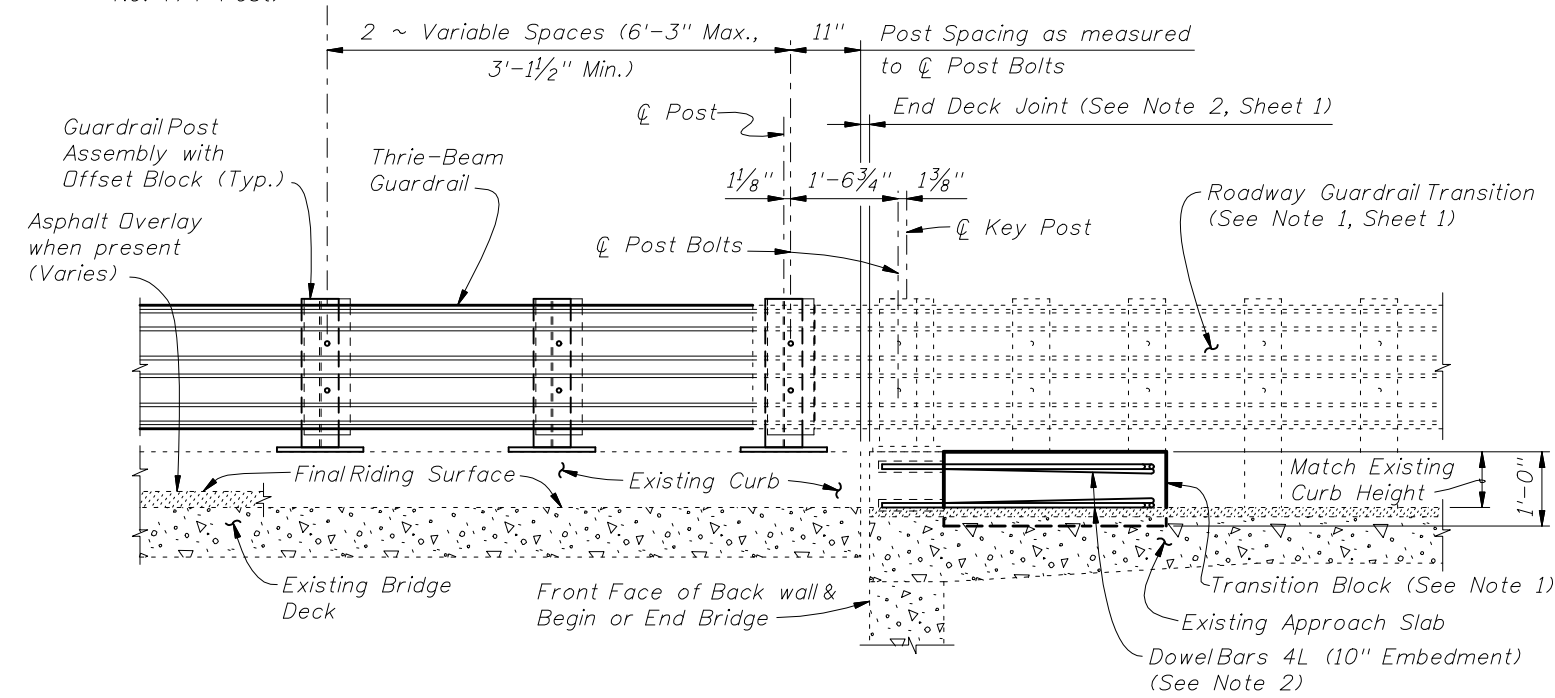
Index No. 474



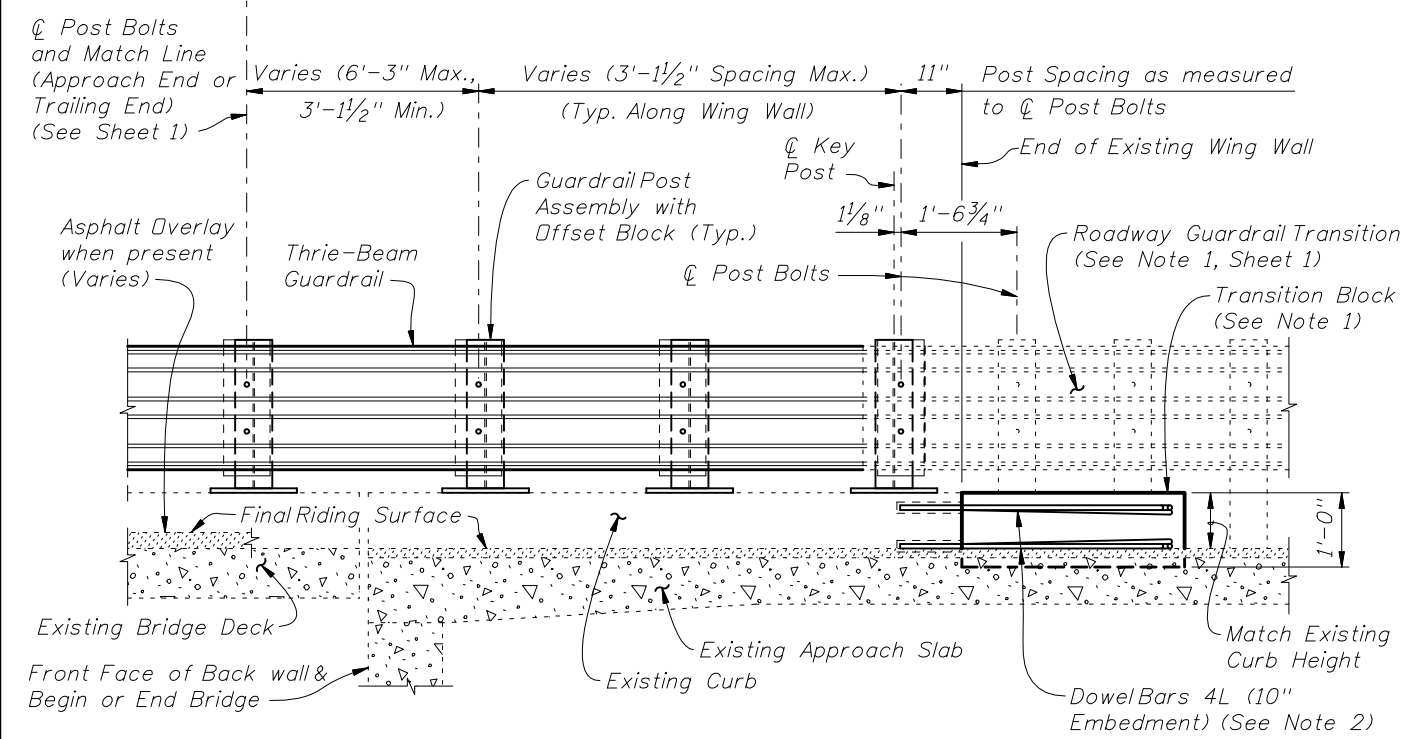
PARTIAL PLAN OF RAILING



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING

SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

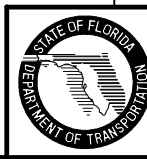
SCHEME 2
RAILING END TREATMENT FOR PARALLEL WING WALLS

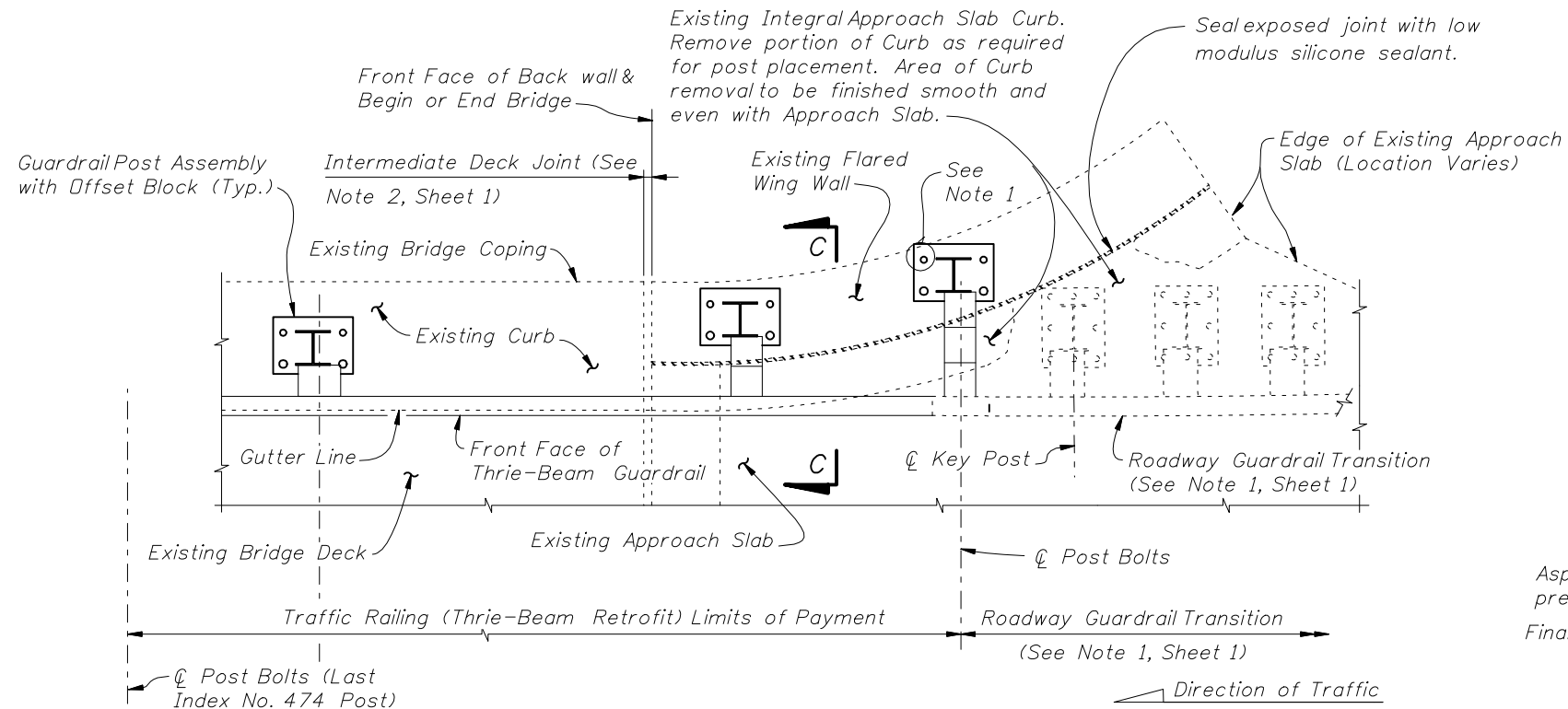
SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

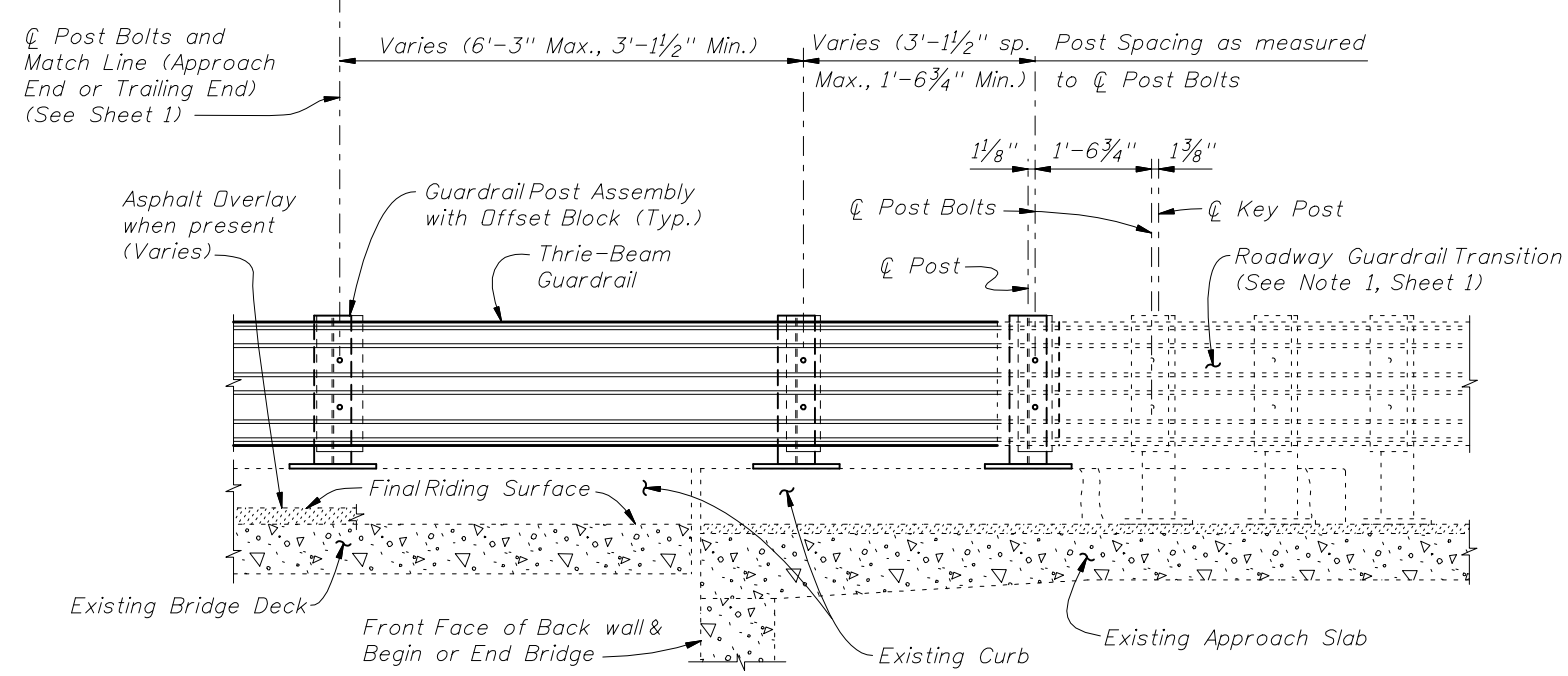
SCHEME 2 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



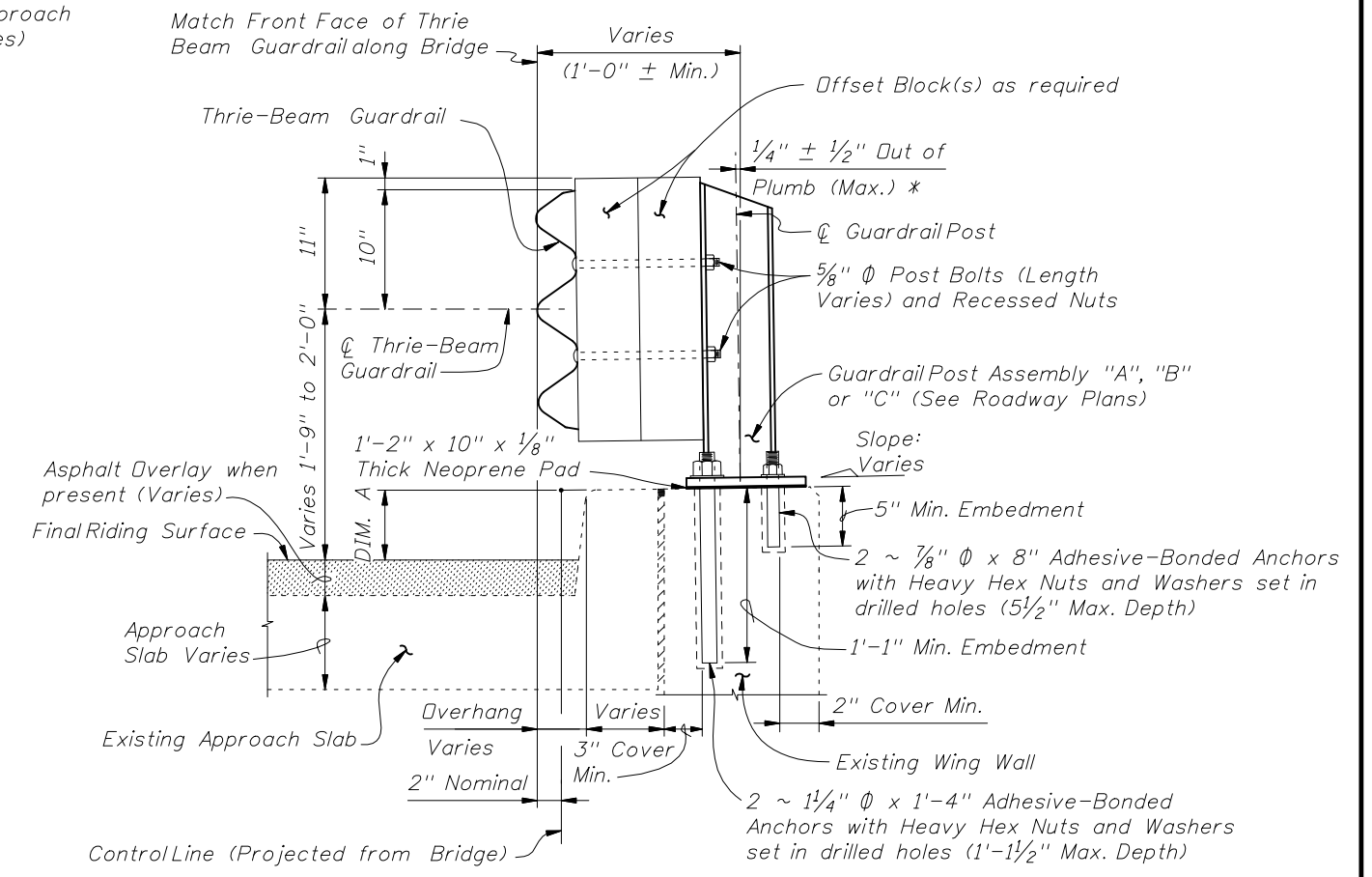


PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING

SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS



SECTION C-C (SCHEME 3)
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB

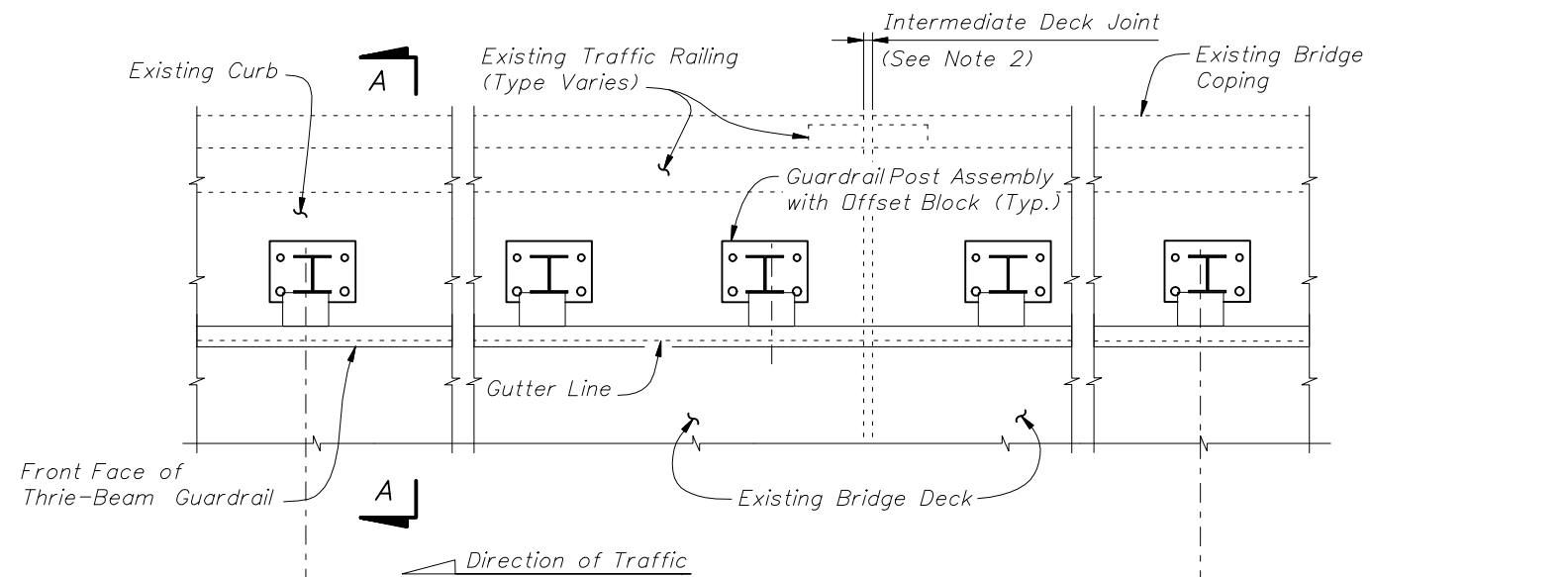
SCHEME 3 NOTE:

1. A single $\frac{7}{8}$ " Φ x 8" Adhesive-Bonded Anchor may be omitted as shown when 2" clear cover cannot be provided (see Section C-C).

CROSS REFERENCE:

For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.





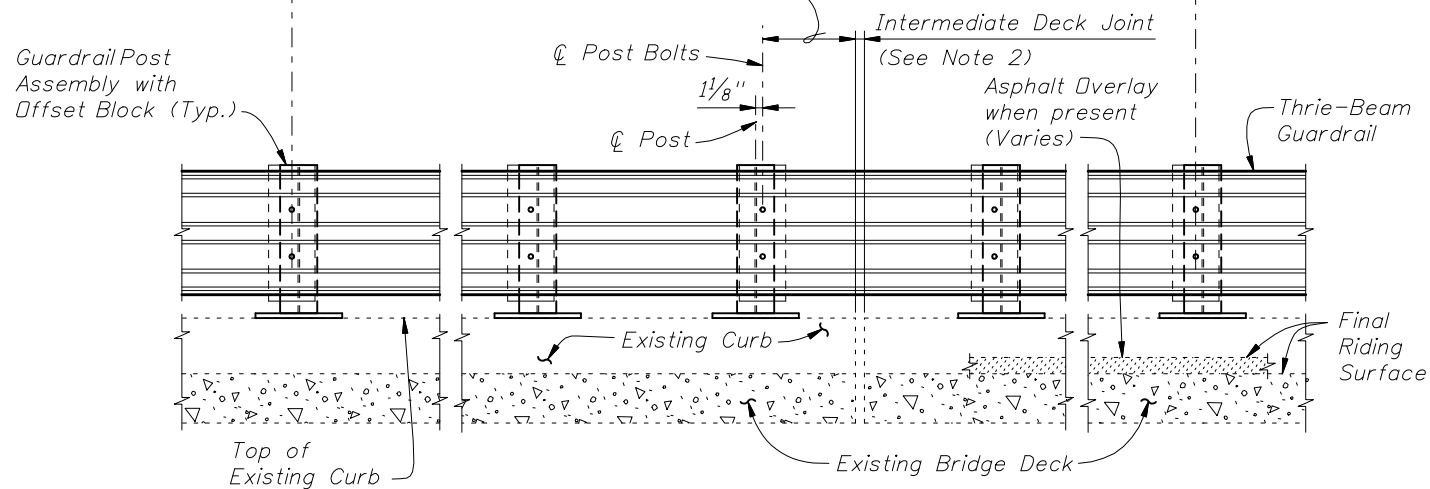
PARTIAL PLAN OF RAILING

⊘ Post Bolts and Match Line (Trailing End) (See Sheets 3 and 4)

⊘ Post Bolts and Match Line (Approach End) (See Sheets 3 and 4)

3'-1 1/2" spacing (Typ. except as noted along Bridge, see Note 2)

1'-2" Min. for non skewed joints. For treatment of skewed Intermediate Deck Joints (see Skew Detail Index No. 470, Sheet 2) (Typ.)



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

==== TYPICAL TREATMENT OF RAILING ALONG BRIDGE ====

NOTES:

1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:

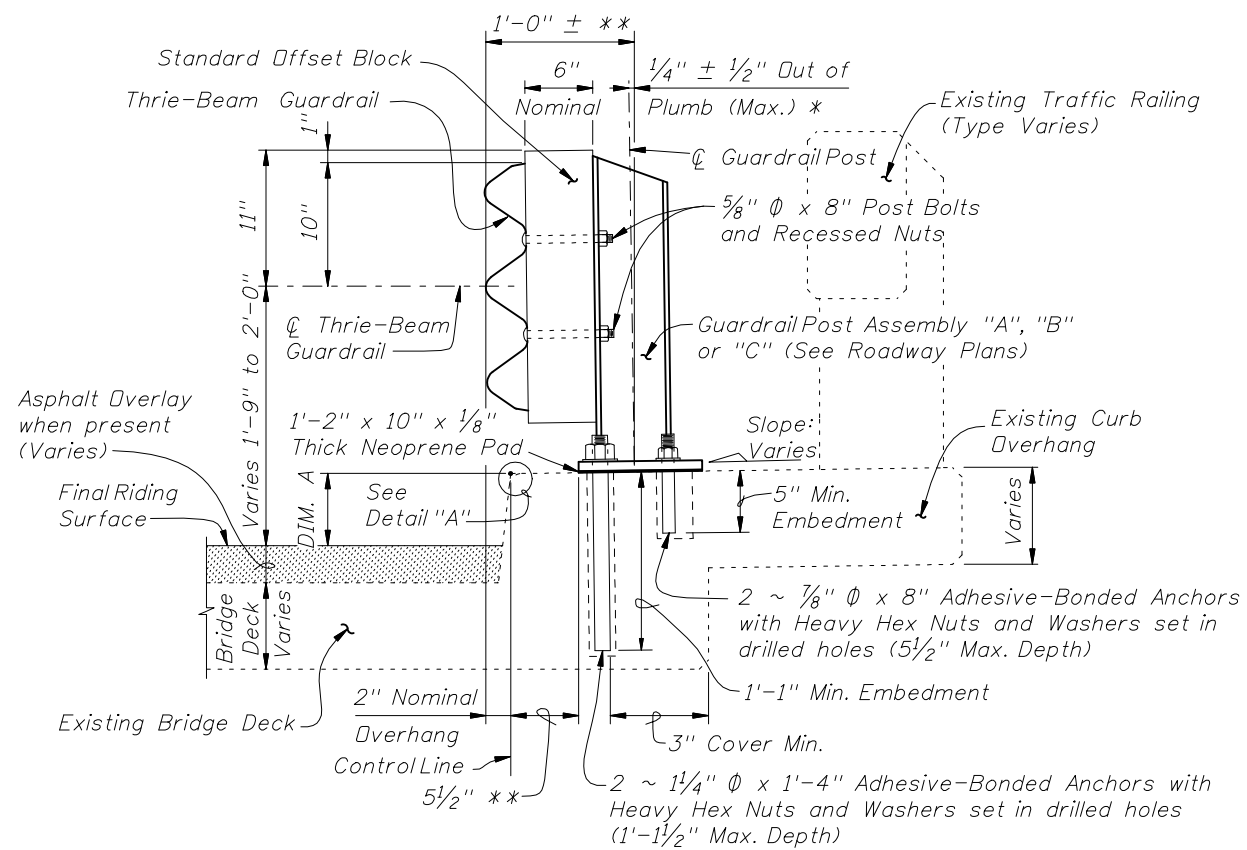
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.



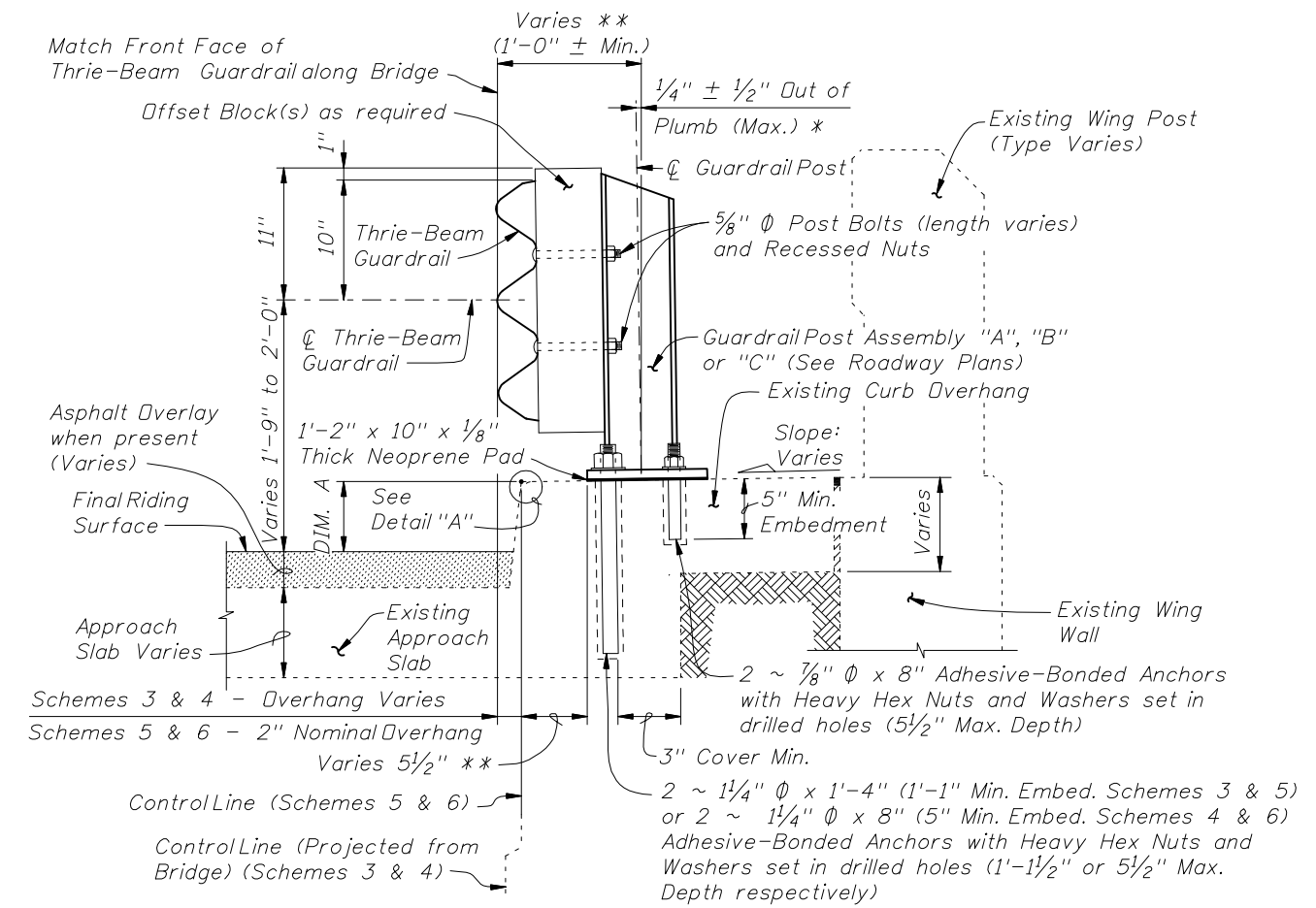
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TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
WIDE CURB TYPE 1

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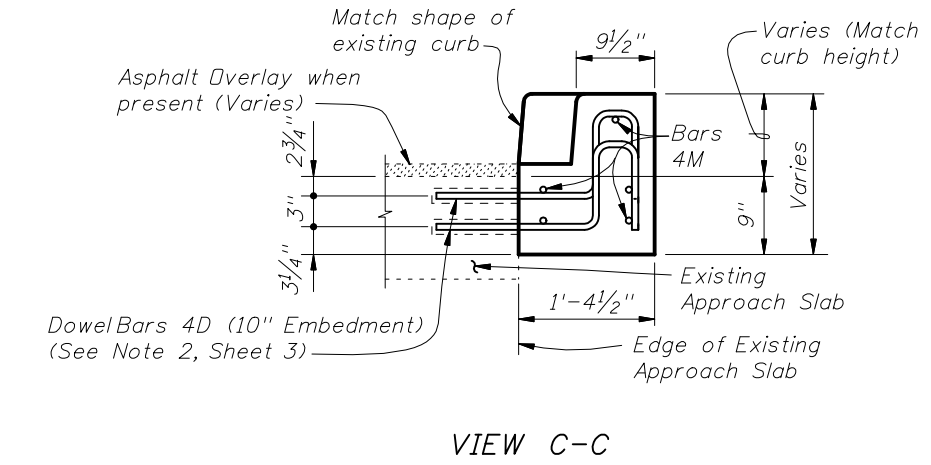
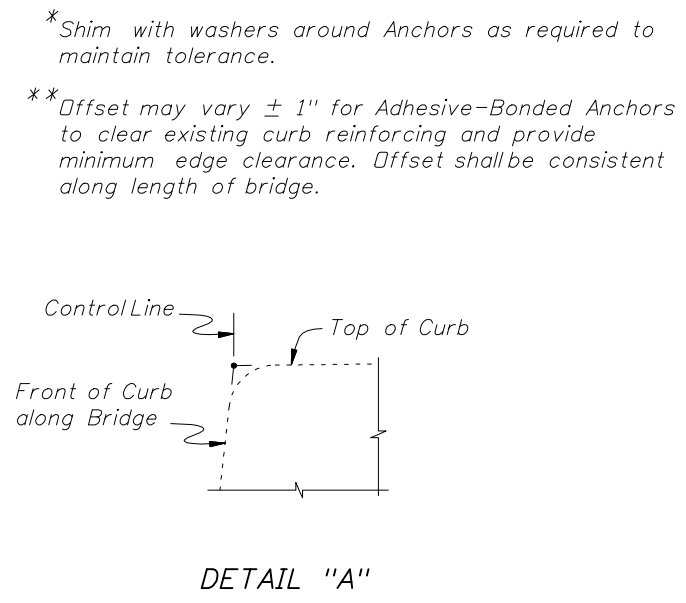
SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

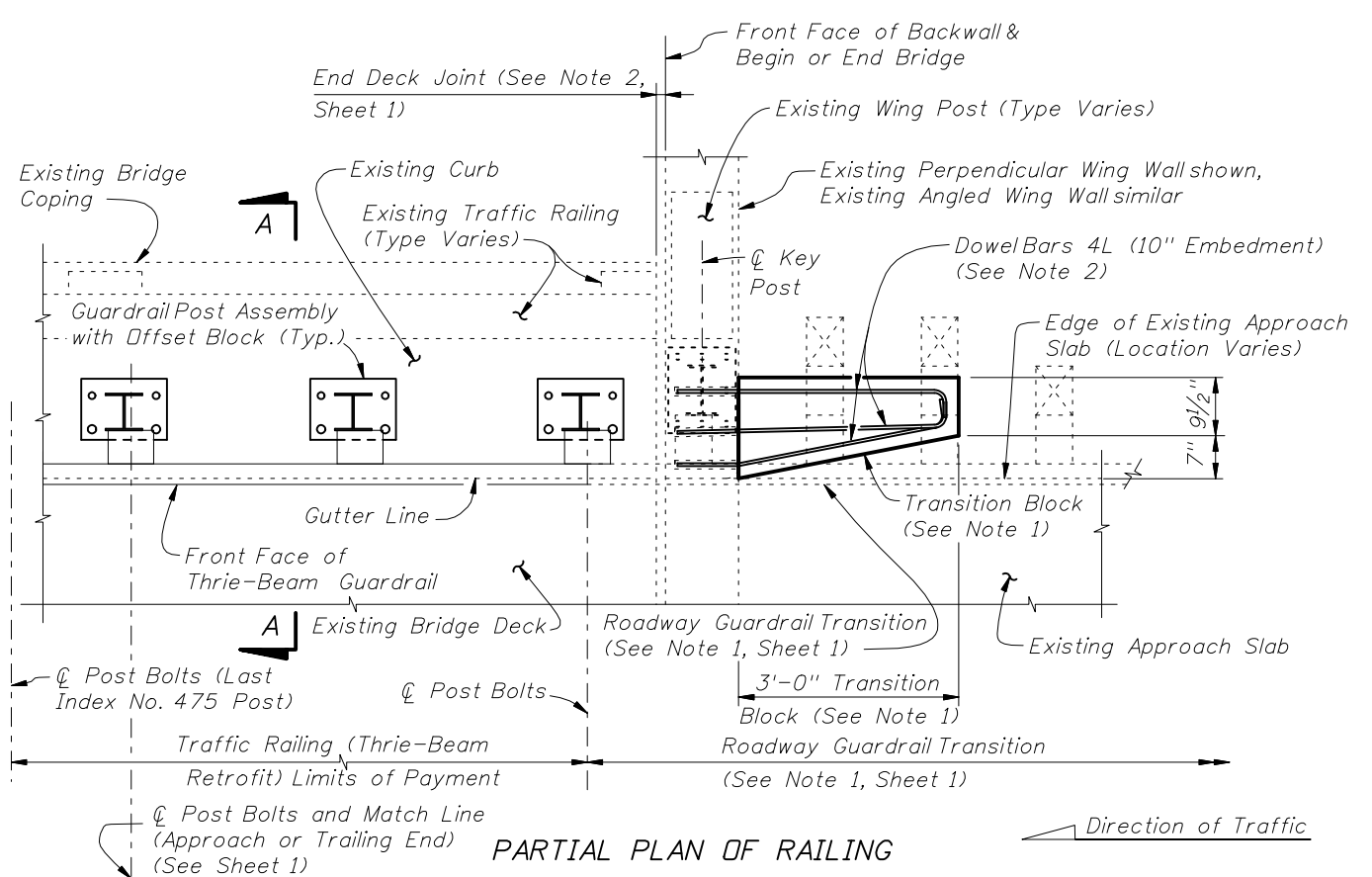
BILL OF REINFORCING STEEL			BAR BENDING DIAGRAMS	
MARK	SIZE	LENGTH		
D	4	3'-7"		
L	4	4'-1"		
M	4	2'-8"		

NOTE: All bar dimensions are out to out.

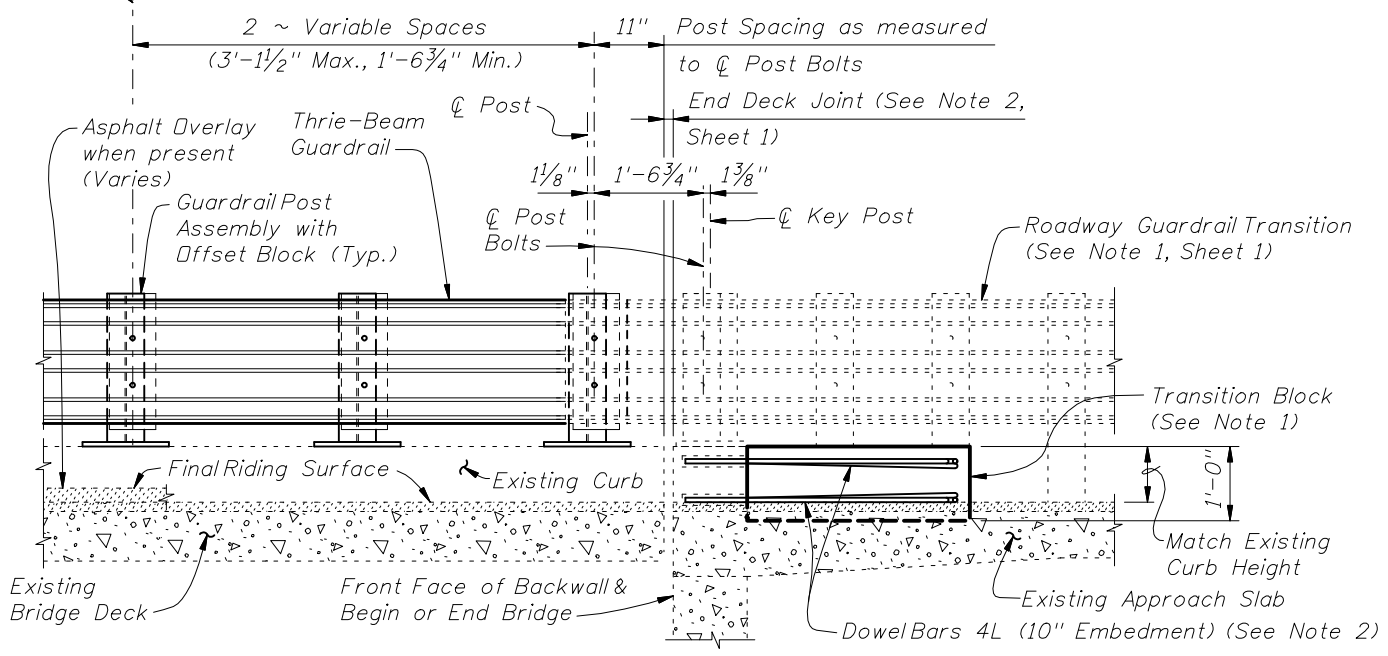


CROSS REFERENCES:
 For location of Section A-A see Sheet 1, 3 & 4.
 For location of Section B-B see Sheet 4.
 For location of View C-C see Sheet 3.
 For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.





PARTIAL PLAN OF RAILING

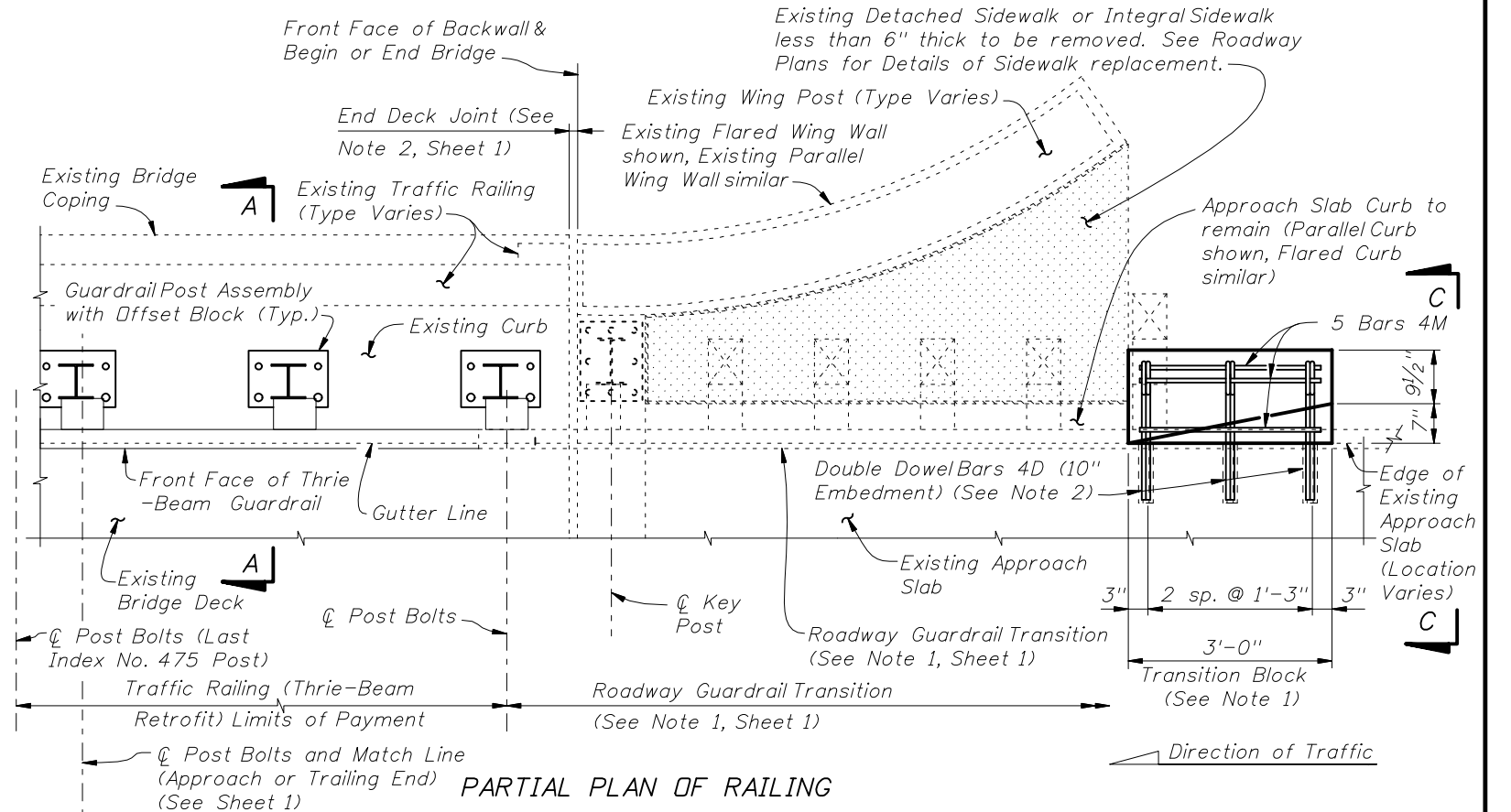


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

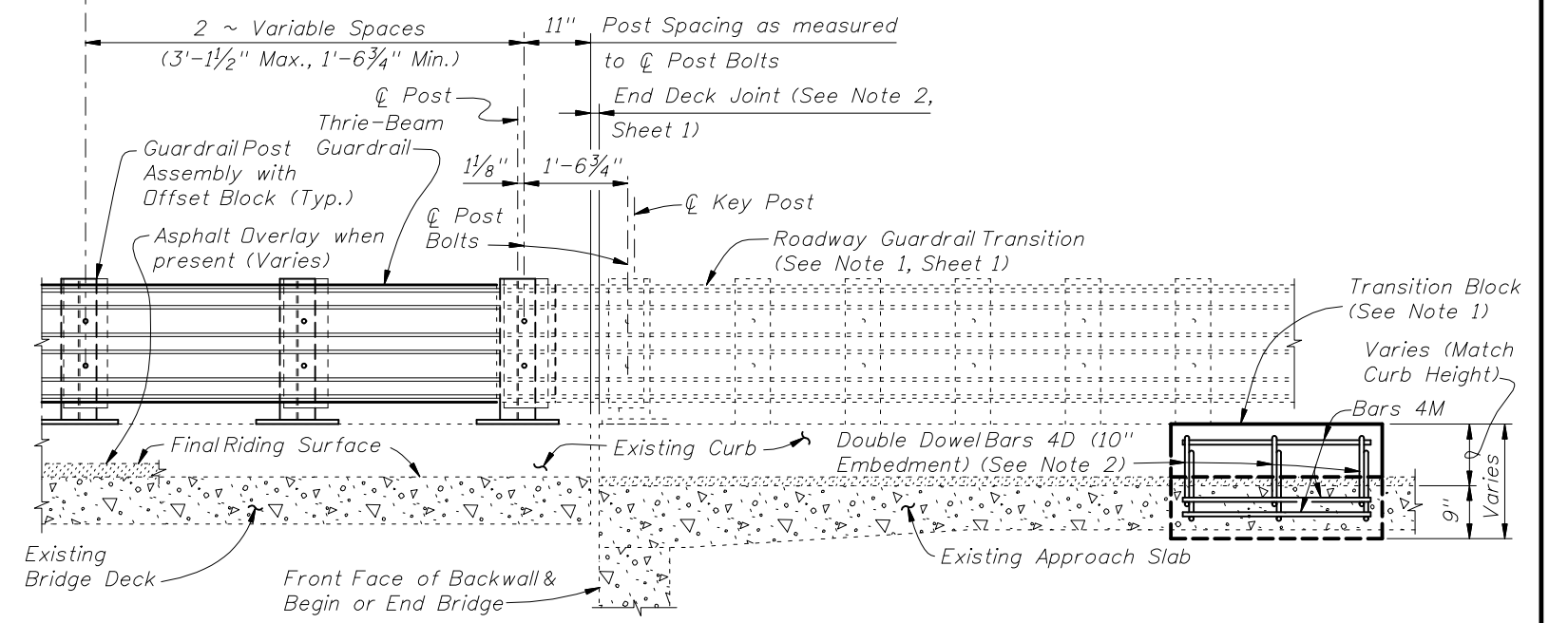
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING

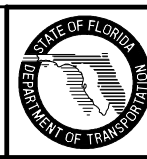


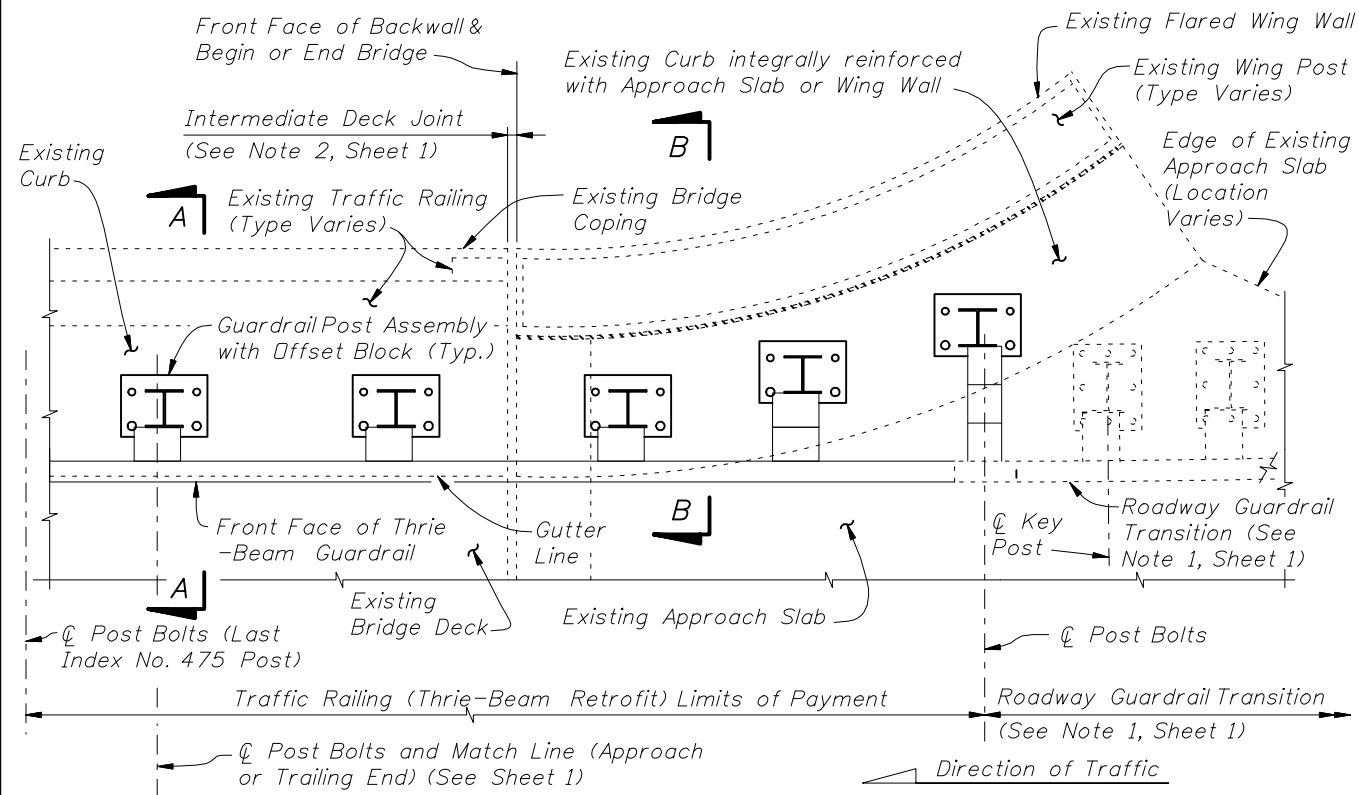
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALKS LESS THAN 6" THICK

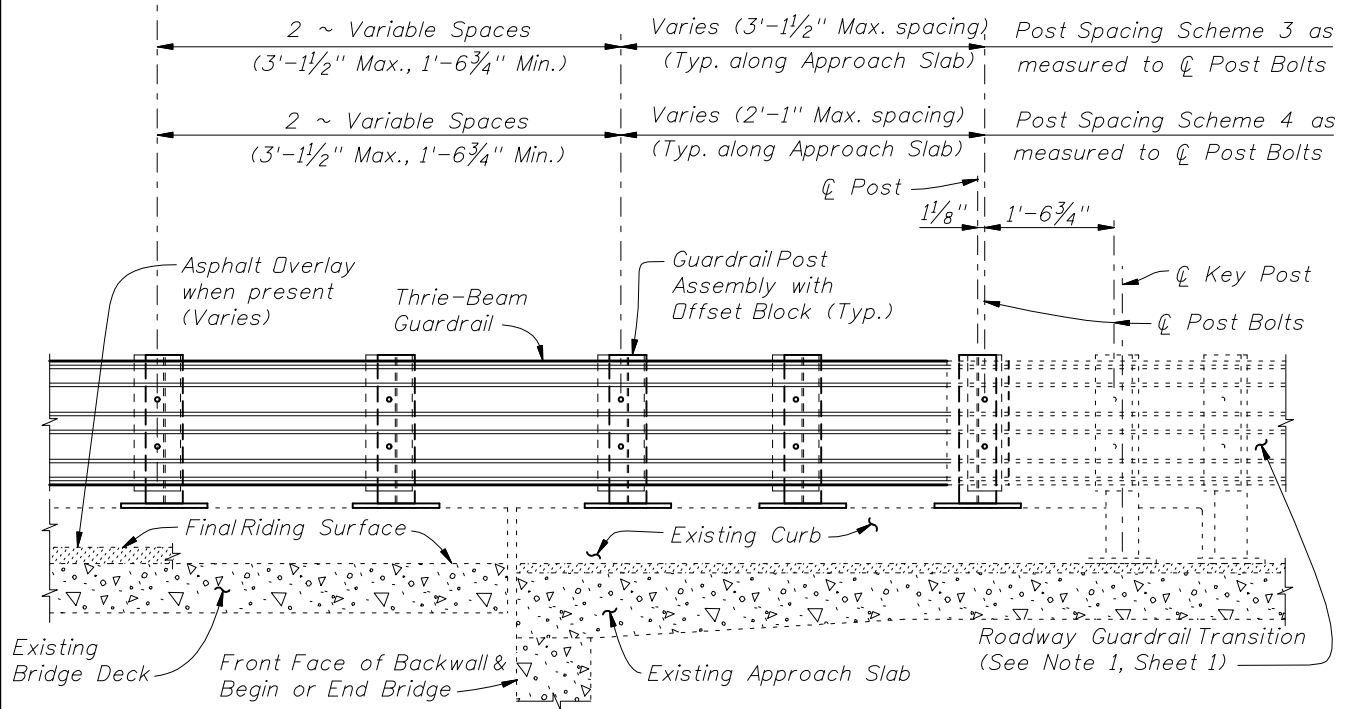
SCHEME 2 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.
2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



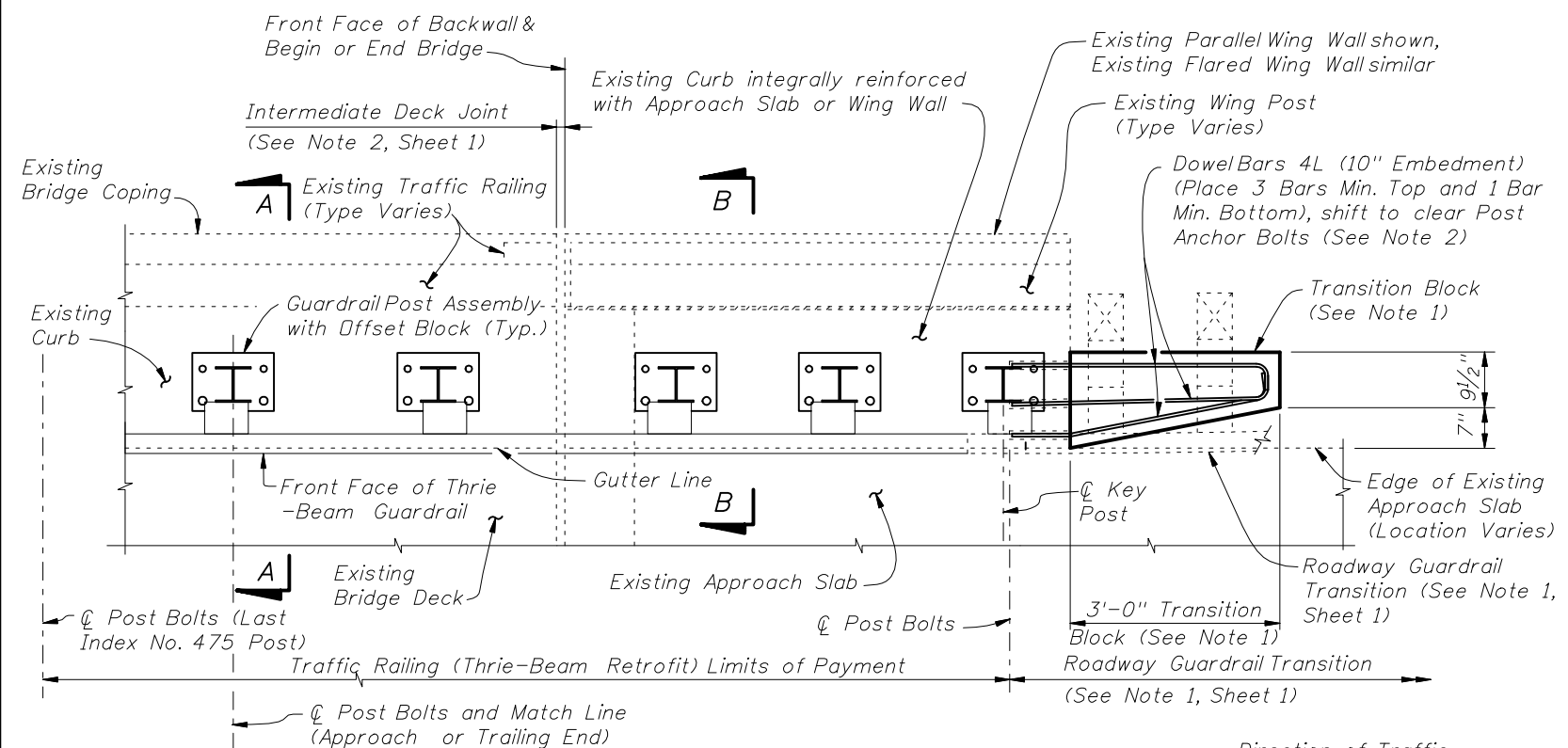


PARTIAL PLAN OF RAILING

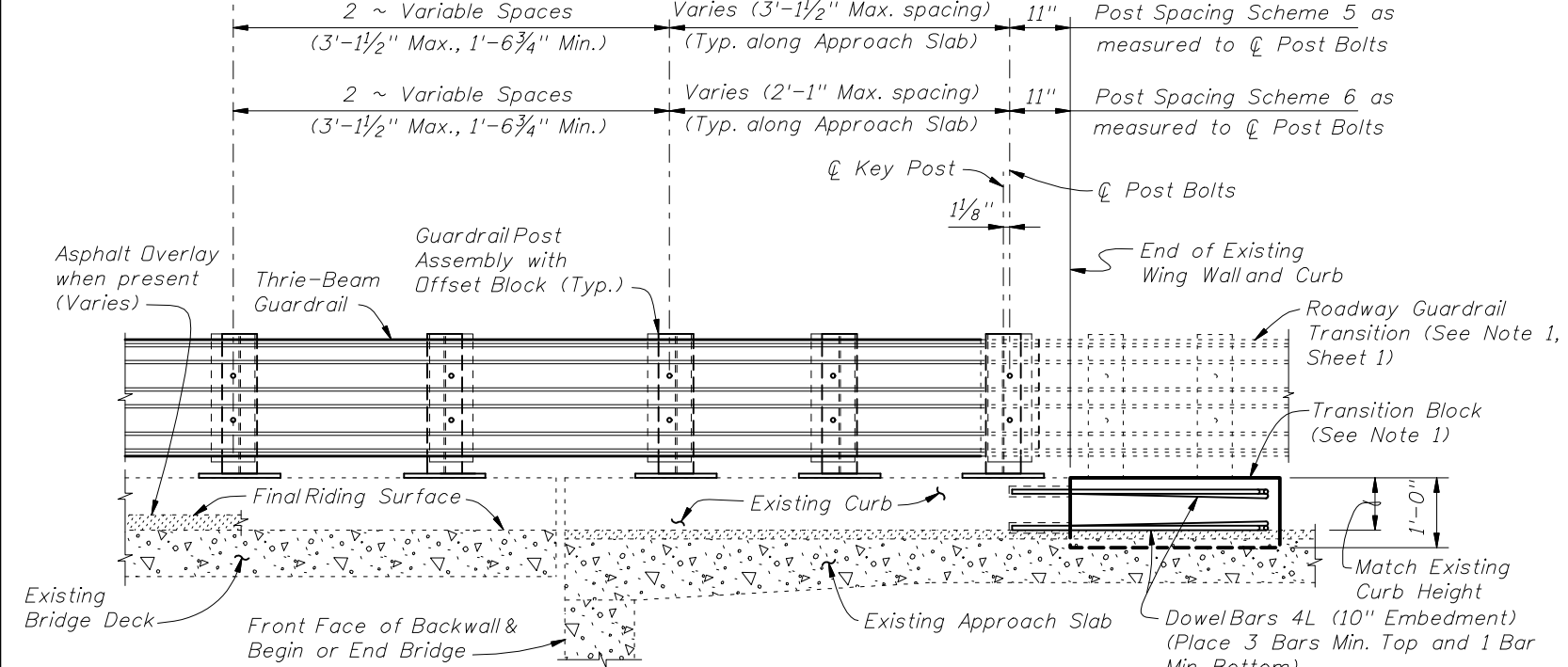


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



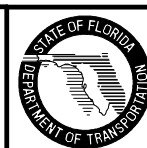
PARTIAL PLAN OF RAILING

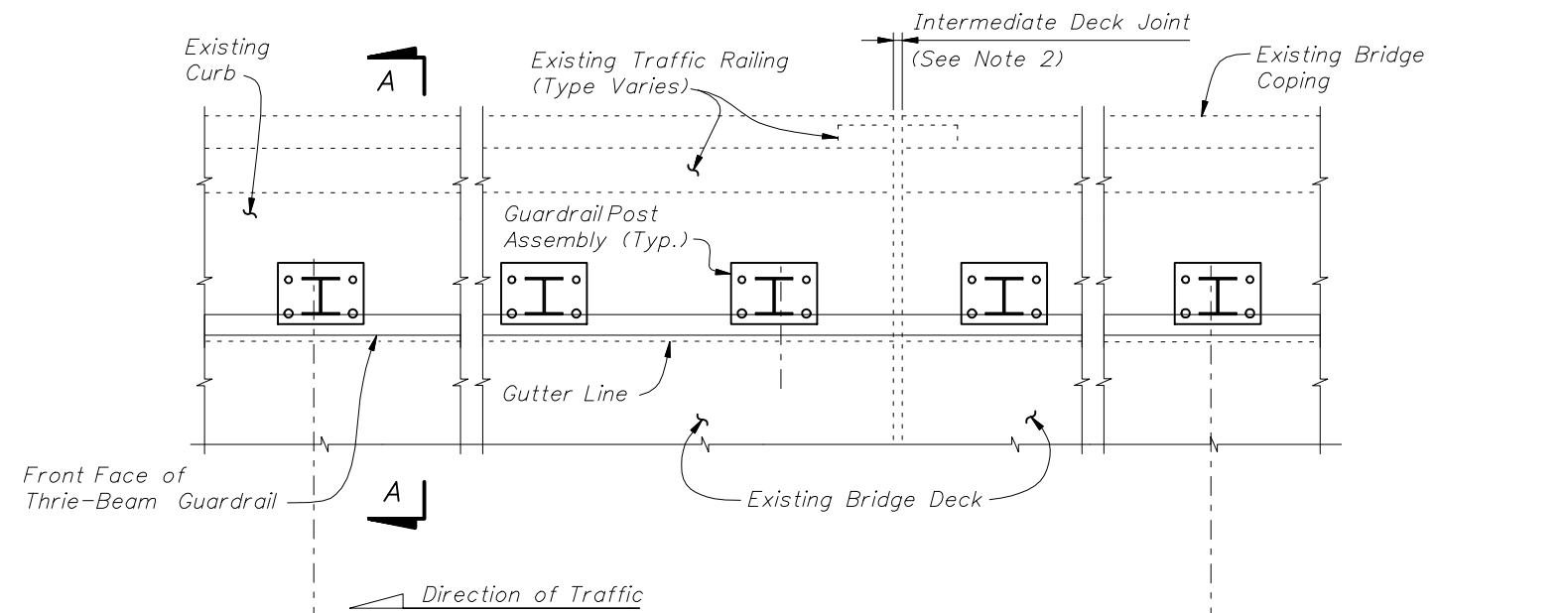


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

- SCHEMES 5 AND 6 NOTES:**
1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
 2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.





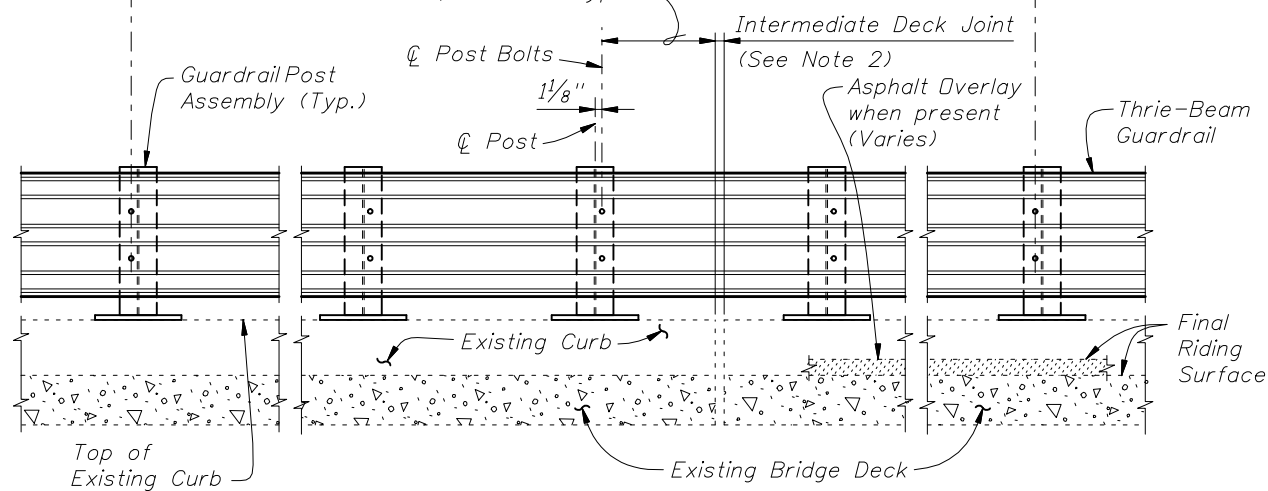
PARTIAL PLAN OF RAILING

☉ Post Bolts and Match Line (Trailing End) (See Sheets 3 and 4)

☉ Post Bolts and Match Line (Approach End) (See Sheets 3 and 4)

3'-1 1/2" spacing (Typ. except as noted along Bridge, see Note 2)

11" Min. for non skewed joints. For treatment of skewed Intermediate Deck Joints (see Skew Detail Index No. 470, Sheet 2) (Typ.)



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

==== TYPICAL TREATMENT OF RAILING ALONG BRIDGE ====

NOTES:

1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:

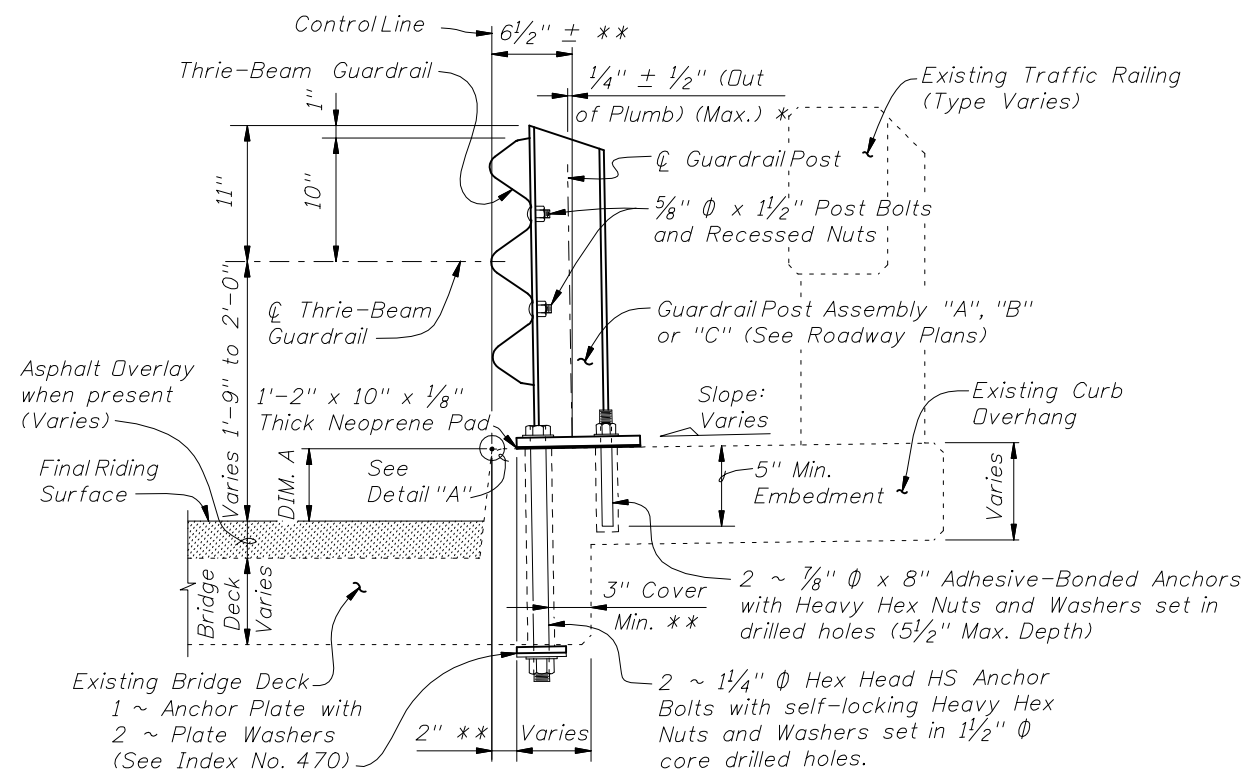
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.



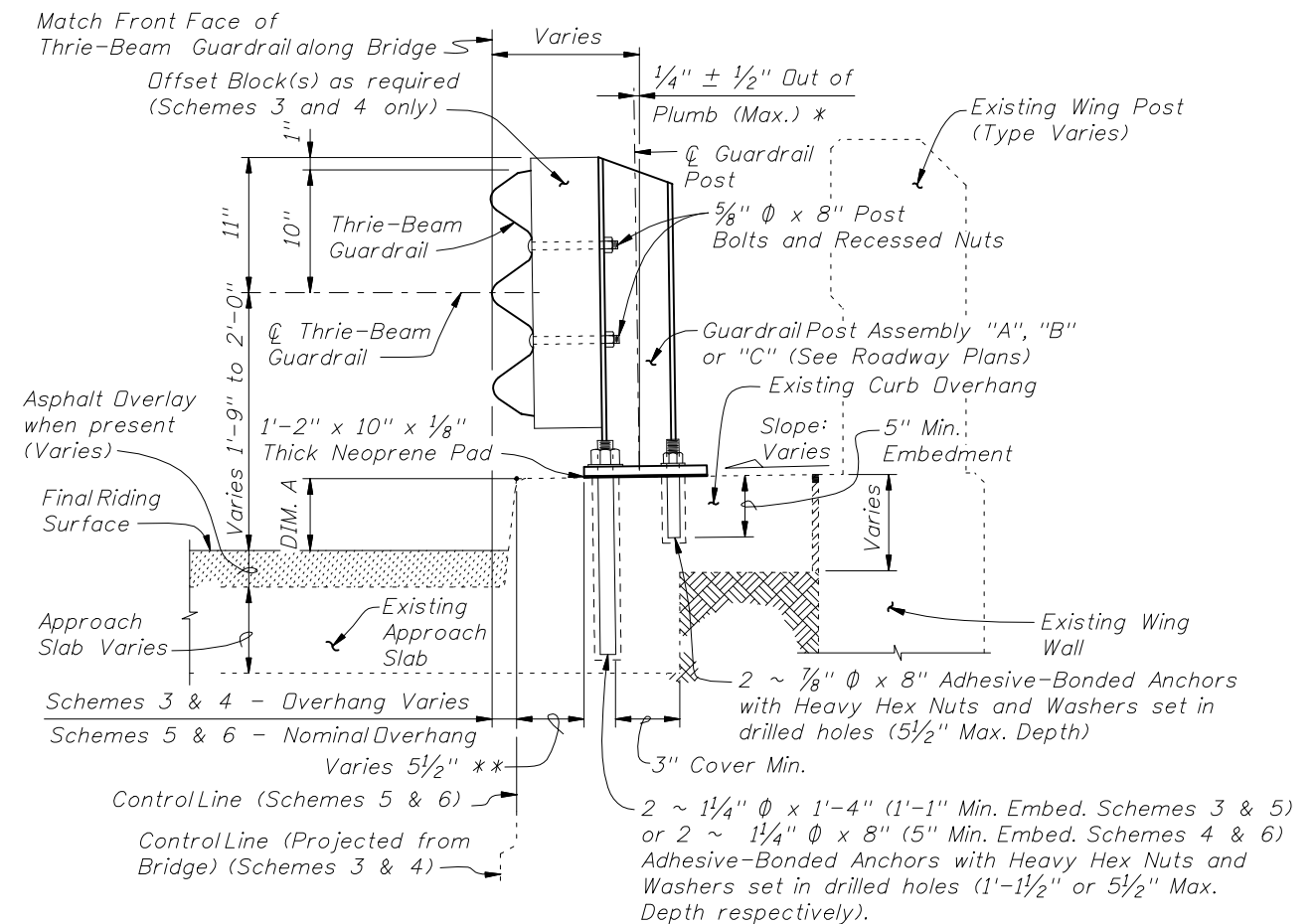
2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
WIDE CURB TYPE 2

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SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK

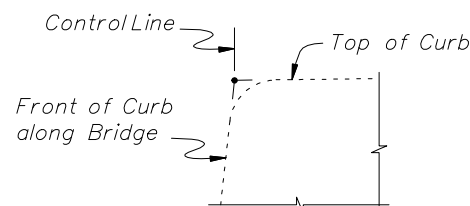


SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

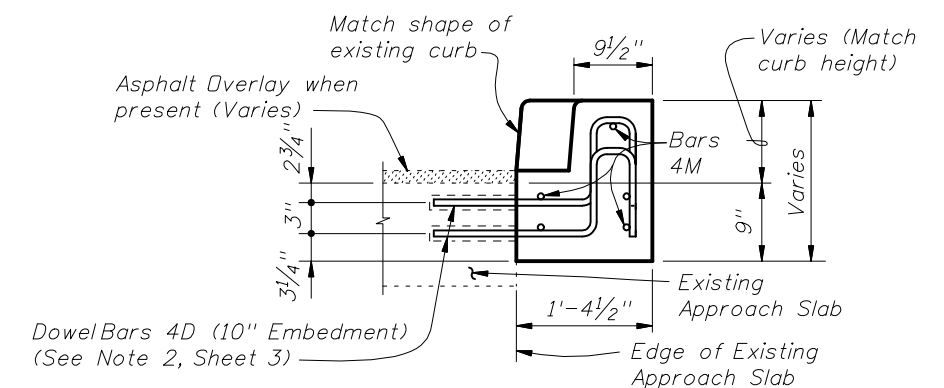
BILL OF REINFORCING STEEL			BAR BENDING DIAGRAMS	
MARK	SIZE	LENGTH		
D	4	3'-7"		DOWEL BAR 4D
L	4	4'-1"		DOWEL BAR 4L
M	4	2'-8"		BAR 4M

NOTE: All bar dimensions are out to out.

* Shim with washers around Anchors as required to maintain tolerance.
 ** Offset may vary ± 1 " for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.



DETAIL "A"



VIEW C-C

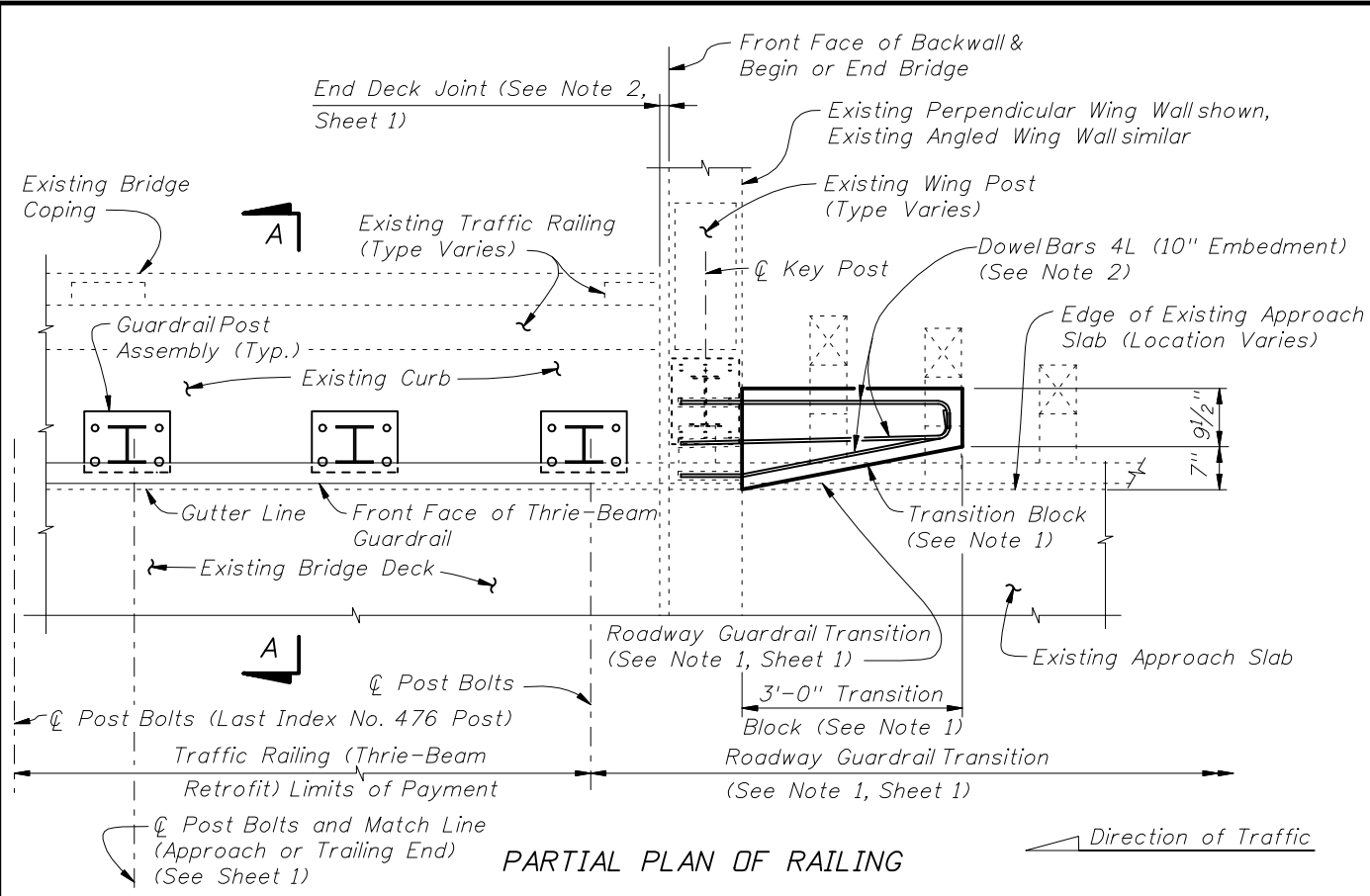
CROSS REFERENCES:
 For location of Section A-A see Sheet 1, 3 & 4.
 For location of Section B-B see Sheet 4.
 For location of Section C-C see Sheet 3.
 For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



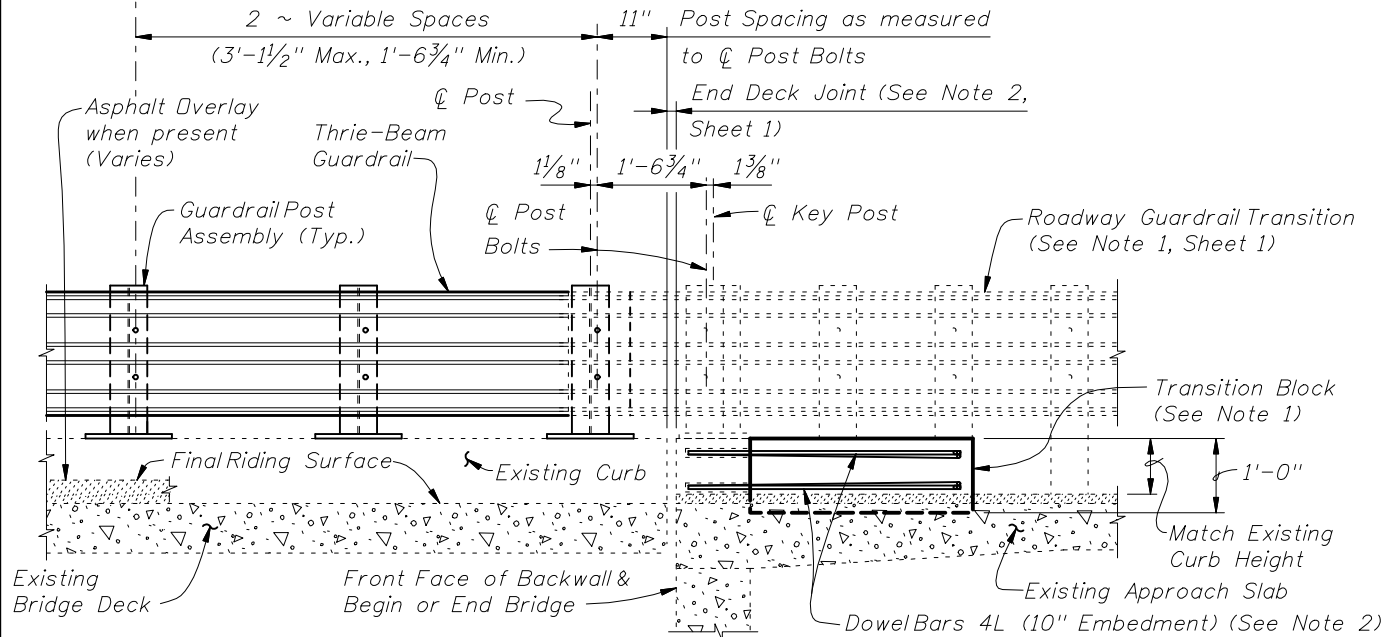
2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
WIDE CURB TYPE 2

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PARTIAL PLAN OF RAILING

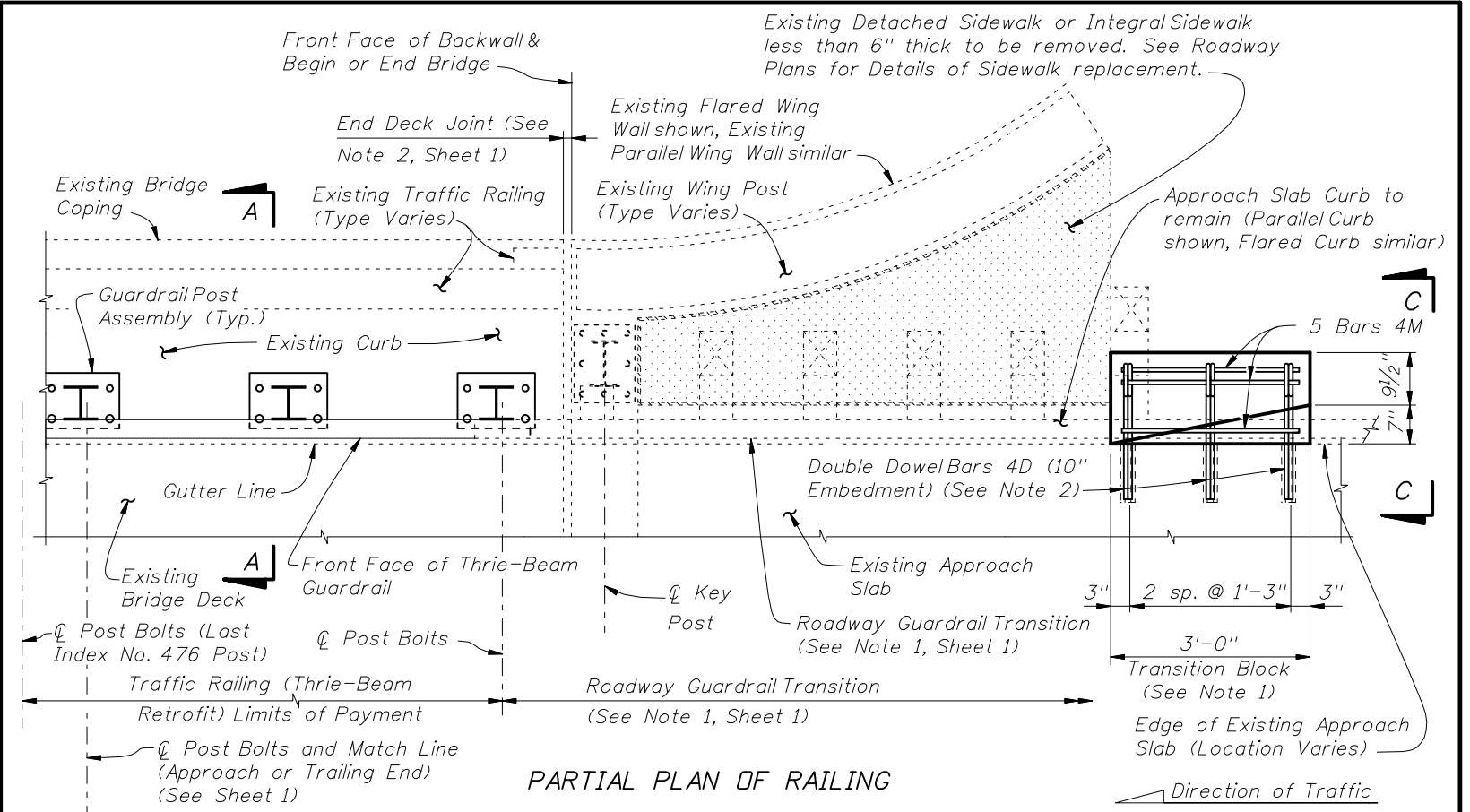


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

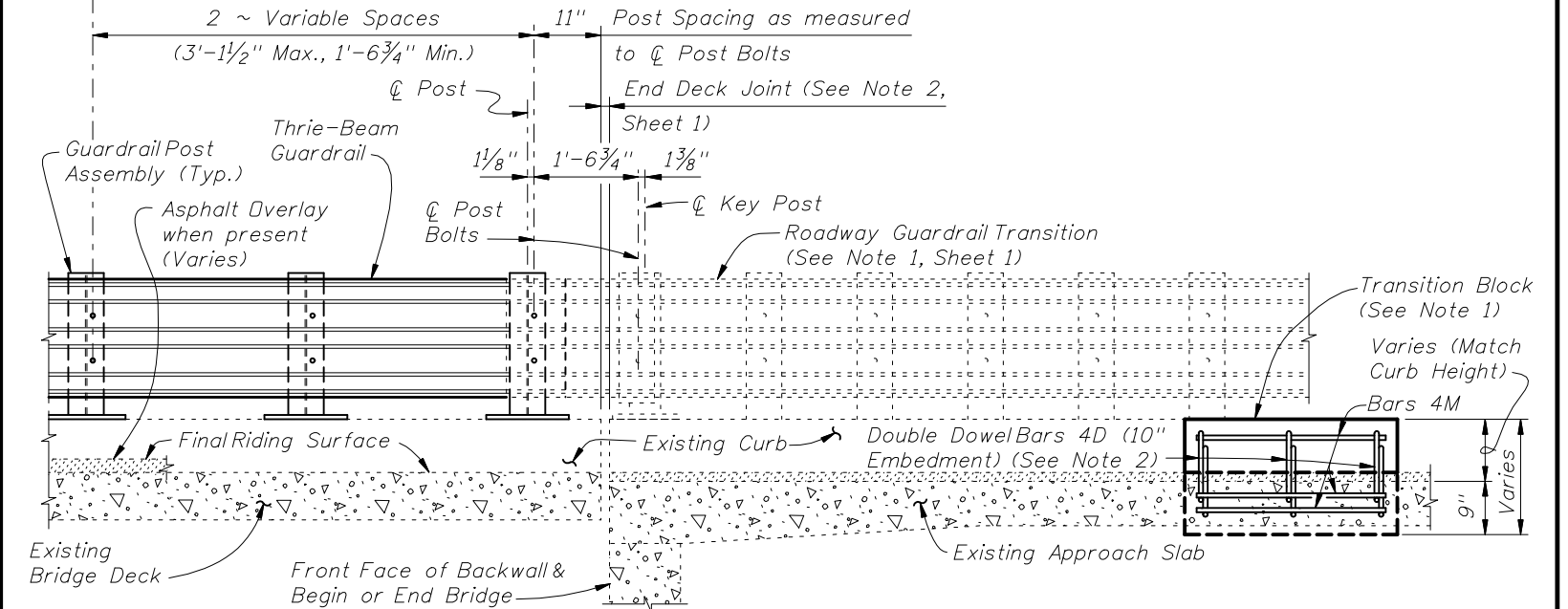
SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING

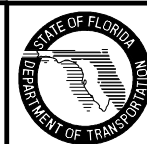


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEME 2
RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALK LESS THAN 6" THICK

SCHEME 2 NOTES:

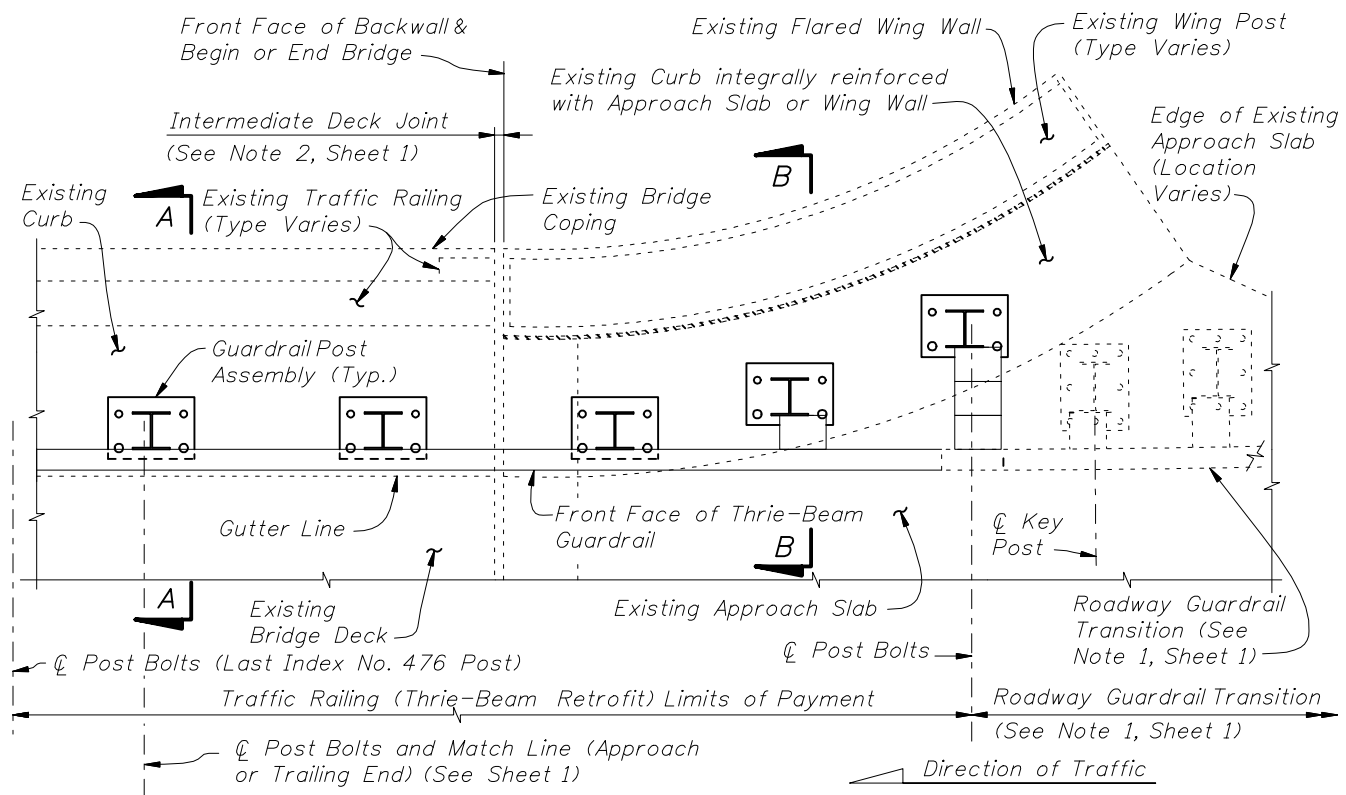
1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.
2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



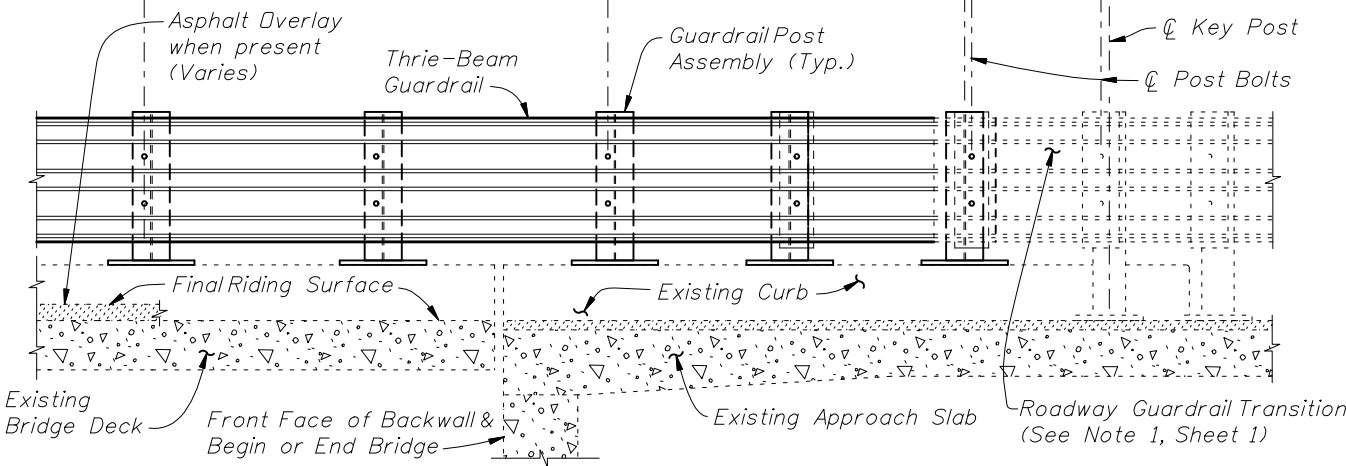
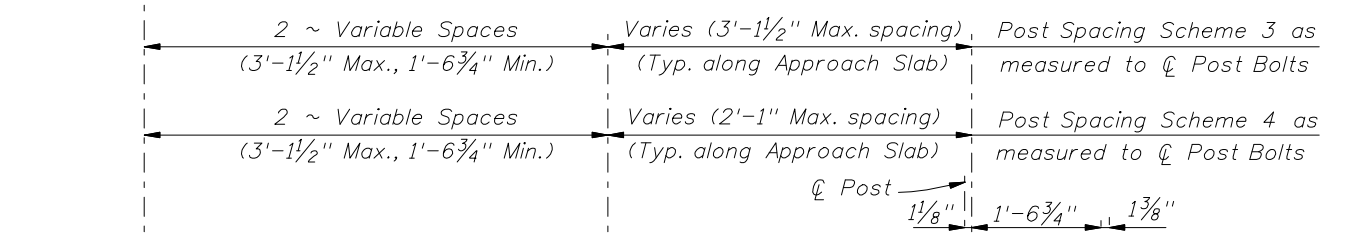
2010 FDOT Design Standards

TRAFFIC RAILING - (THRIE-BEAM RETROFIT)
WIDE CURB TYPE 2

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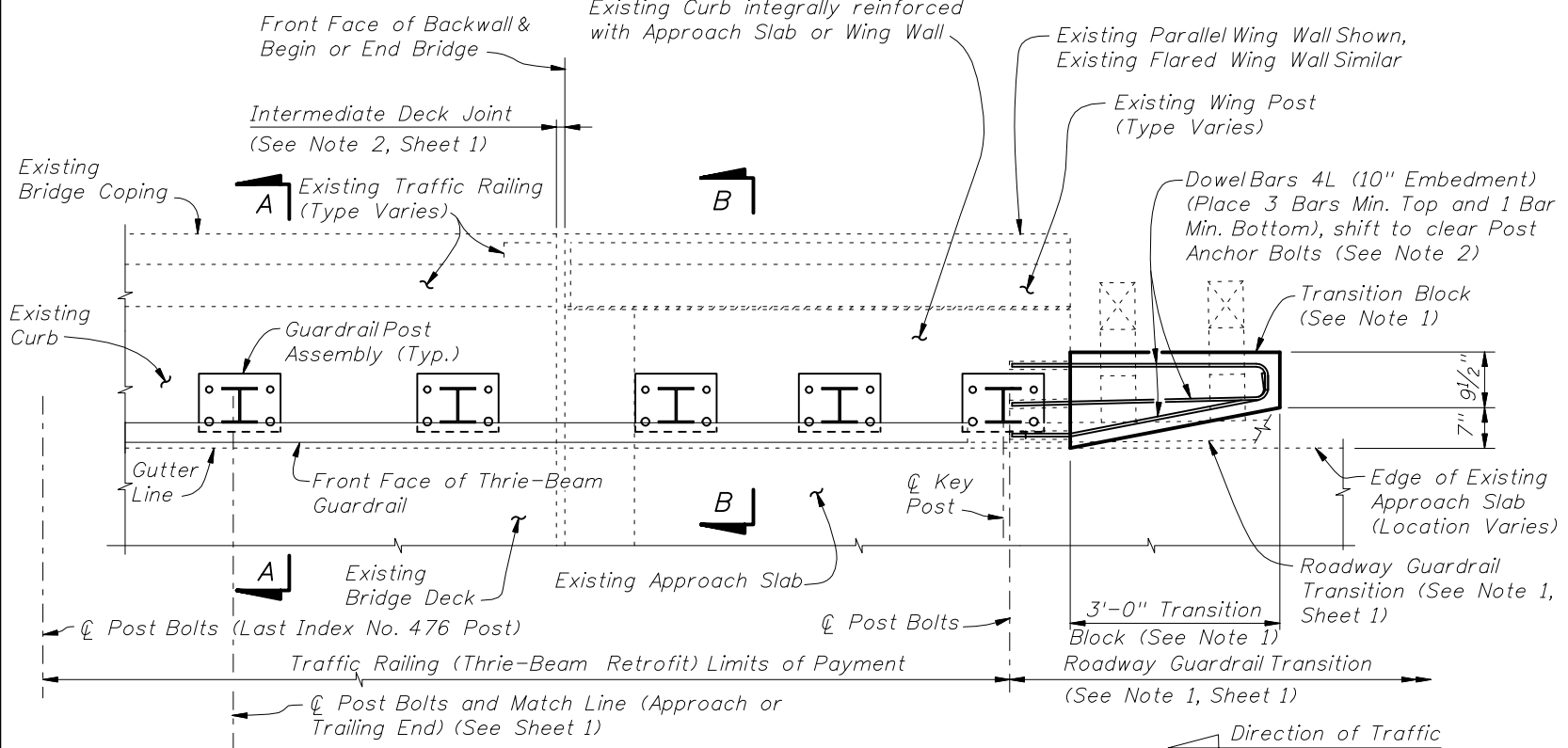


PARTIAL PLAN OF RAILING

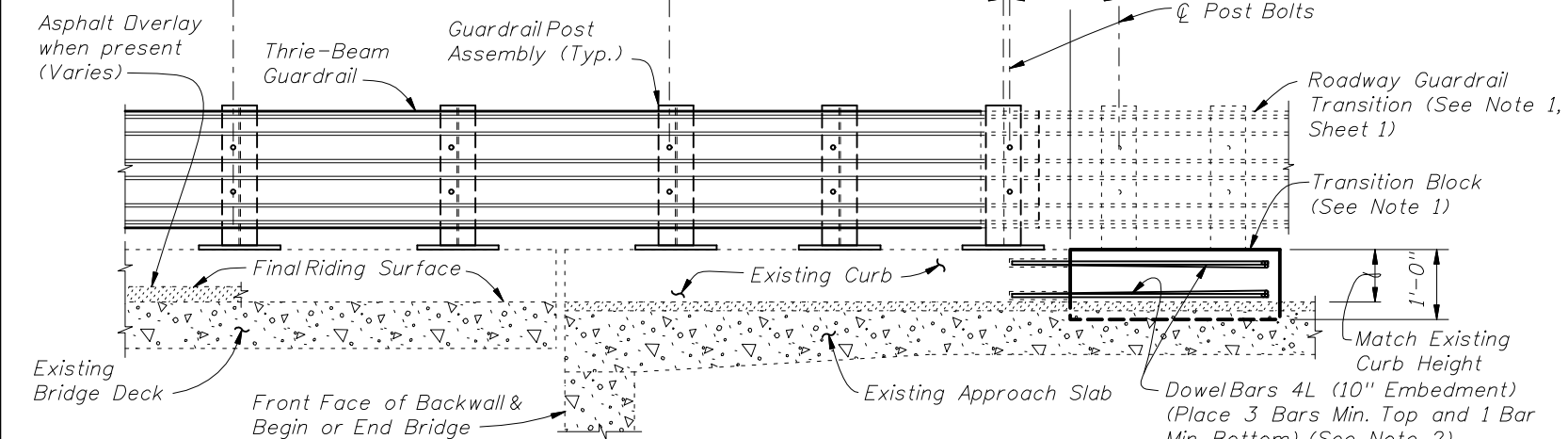
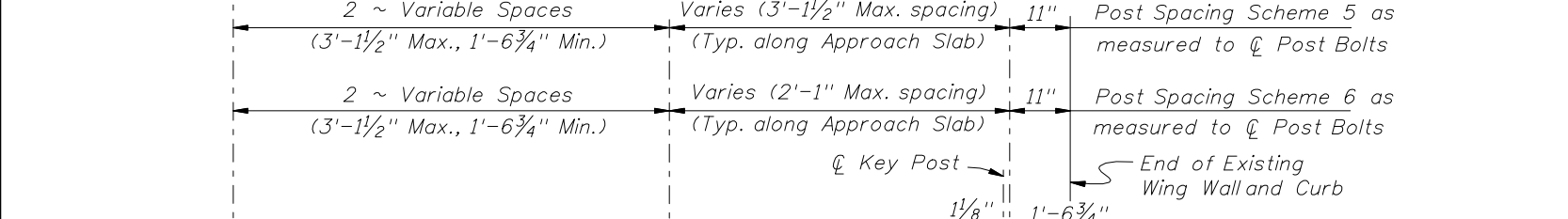


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

- SCHEMES 5 AND 6 NOTES:**
1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.
 2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



TRAFFIC RAILING NOTES

This Traffic Railing Retrofit has been structurally evaluated to be equivalent or greater in strength to a design which has been successfully crash tested previously and approved for a NCHRP Report 350 Test Level 4 rating, except for the Tapered End Transition on Index No. 484.

CONCRETE: Concrete for the Traffic Railing (Vertical Face Retrofit), Spread Footing Approaches and replacement curb sections shall be Class IV. Concrete for Curb Transition Blocks shall be Class II (Bridge Deck).

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60, except Expansion Dowel Bar B which shall be ASTM A36 smooth round bar hot-dip galvanized in accordance with the Specifications.

EXPANSION SLEEVE ASSEMBLY: Pipe sleeve shall be ASTM D2241 PVC pipe, SDR13.5. End Cap shall be ASTM D2466 PVC socket fitting, Schedule 40. End of Sleeve assembly at railing open joint shall be sealed with silicone to prevent concrete intrusion during railing casting. A compressible expanded polystyrene plug is required in the opposite end of the assembly for correct dowel positioning during railing casting. Correct dowel positioning is required in order to provide for thermal movement of the deck.

ADHESIVE-BONDED ANCHORS AND DOWELS: Adhesive Bonding Material Systems for Anchors and Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416. The field testing proof loads required by Specification Section 416 shall be 23,800 lbs. for Dowel Bars 6D on the inside face (traffic side) of the railing (1'-0" embedment) and 18,500 lbs for Dowel Bars 6D along the outside face of the traffic railing (5" min. embedment).

BRIDGES ON CURVED ALIGNMENTS: The details presented in these Standards are shown for bridges on tangent alignments. Details for bridges on horizontally curved alignments are similar.

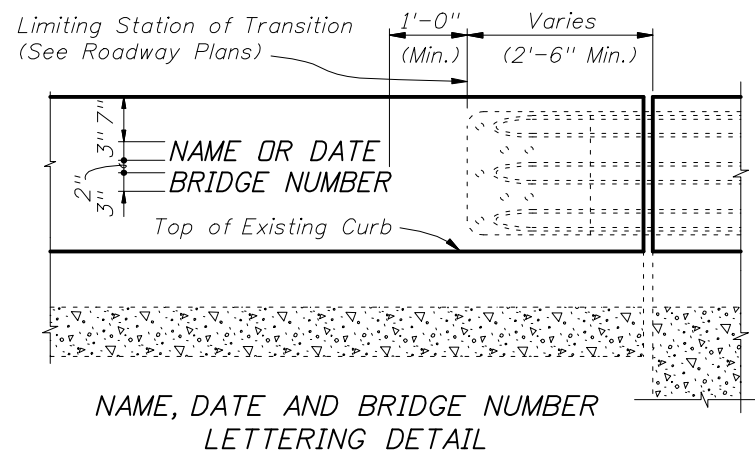
NAME, DATE AND BRIDGE NUMBER: The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Date shall be the year the bridge was constructed. Letters and figures may be 3" tall black plastic as approved by the Engineer or 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

ELEVATION MARKERS: Elevation Markers shall be placed on the top surface of the end bents as directed by the Engineer when portions of the existing traffic railing carrying existing elevation markers are removed. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor.

SURFACE FINISH: Unless otherwise shown in the Plans, place a Class 5 Applied Finish Coating on the top and sides of the Traffic Railing (Vertical Face Retrofit).

REFLECTIVE RAILING MARKERS: Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table below. Reflector color (white or yellow) shall match the color of the near edgeline.

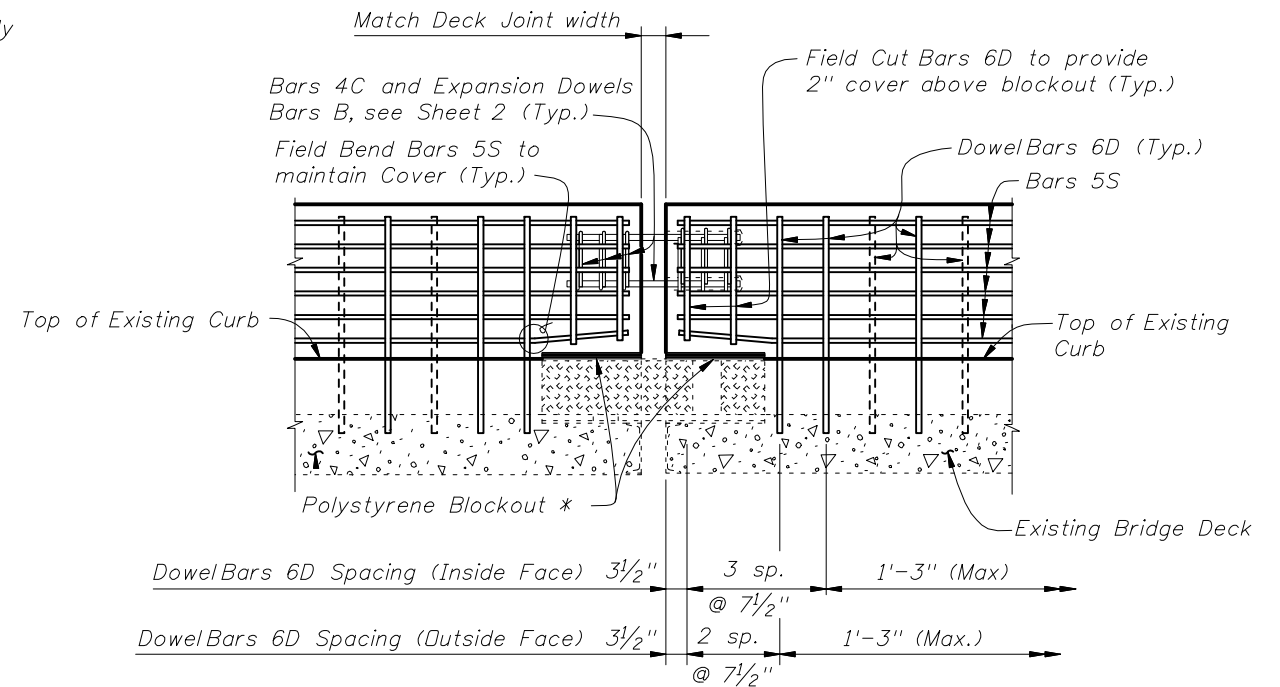
PAYMENT: Payment under Traffic Railing (Vertical Face Retrofit) include all materials and labor required to construct the railing. Incidental work as required for transition blocks, curbs, spread footings approaches, reflective railing markers (including installation) shall also be included under Traffic Railing (Vertical Face Retrofit).



REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

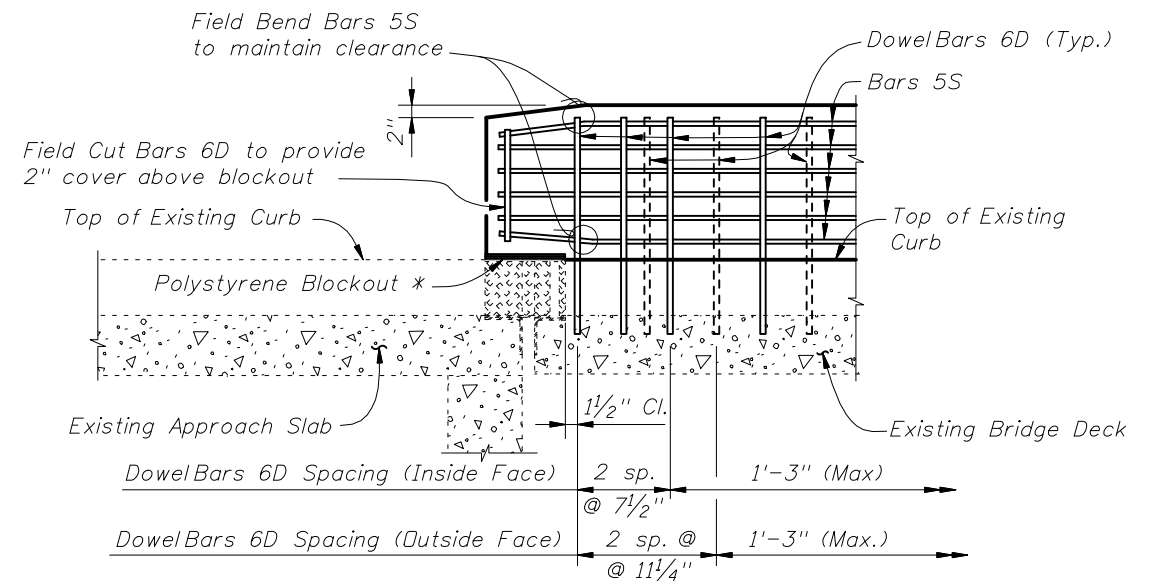
ESTIMATED TRAFFIC RAILING QUANTITIES			
ITEM	UNIT	QUANTITY	
		9" Curb	Increment
Concrete	CY/Ft.	0.064	0.003 per in. height
Reinforcing Steel	Lb./Ft.	13.27	0.10 per in. length

(Quantities are based on a 9" curb, no curb cross slope and 1'-0" embedment length of Bars 6D. If the curb height or embedment length differs from that shown, increase or decrease quantity by the given per inch increment.) See Index No. 484, Sheet 4 for Spread Footing Approach Quantities.



PARTIAL ELEVATION OF RAILING SHOWING INTERIOR FINGER/SLIDING PLATE JOINT (Beam/Girder, Intermediate Bent or Pier not shown for clarity)

* Place 1" thick polystyrene blackout over limits of bridge deck expansion joint full width to the end of the Traffic Railing to allow for thermal movement. Seal Forms to prevent mortar leakage into the expansion joint.



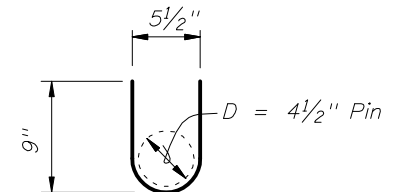
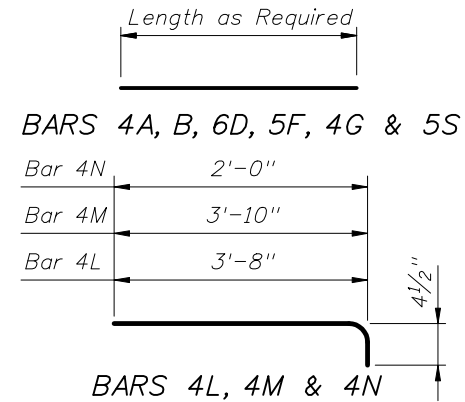
PARTIAL ELEVATION OF RAILING SHOWING SLIDING PLATE JOINT AT BEGIN OR END BRIDGE (Scheme 1 shown, Schemes 2, 3 and 4 similar) (Guardrail Transition or continuation of Traffic Railing not show for clarity)



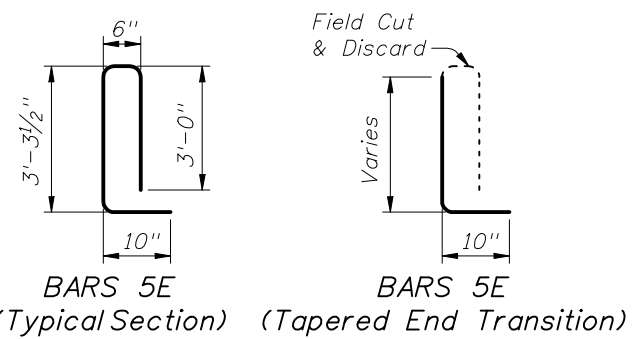
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM

BILL OF REINFORCING STEEL

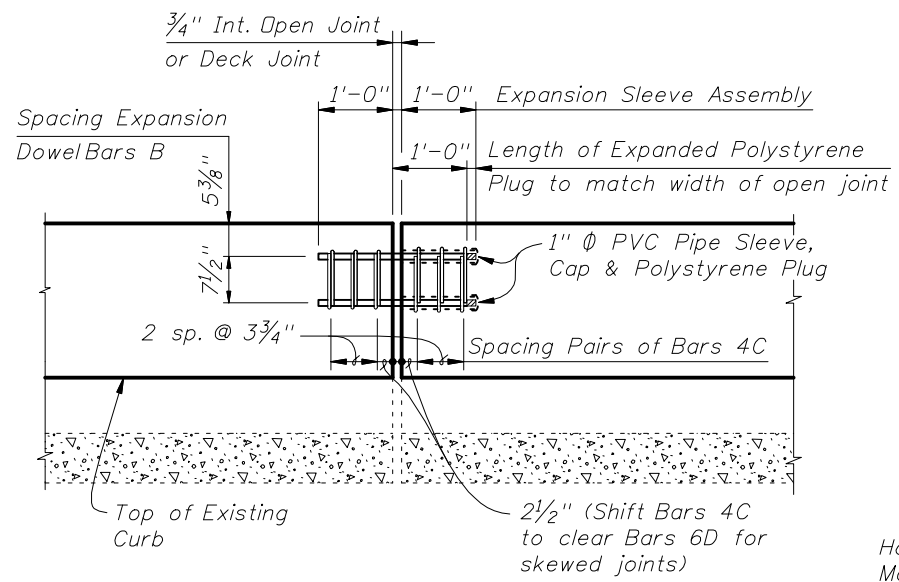
MARK	SIZE	LENGTH	INDEX NO.	NOTE NOS.
A	4	AS REQD.	482 ONLY	3
B	1" Ø	2'-0"	481 THRU 483	2 & 5
C	4	2'-0"	481 THRU 484	1, 2 & 3
D	6	AS REQD.	481 THRU 484	2 & 3
E	5	7'-4"	484 ONLY	1 & 3
F	5	4'-3"	484 ONLY	3
G	4	AS REQD.	484 ONLY	3
L	4	4'-1"	481 THRU 483	1 & 3
M	4	4'-3"	482 ONLY	1 & 3
N	4	2'-5"	482 ONLY	1 & 3
S	5	AS REQD.	481 THRU 484	2, 3 & 4



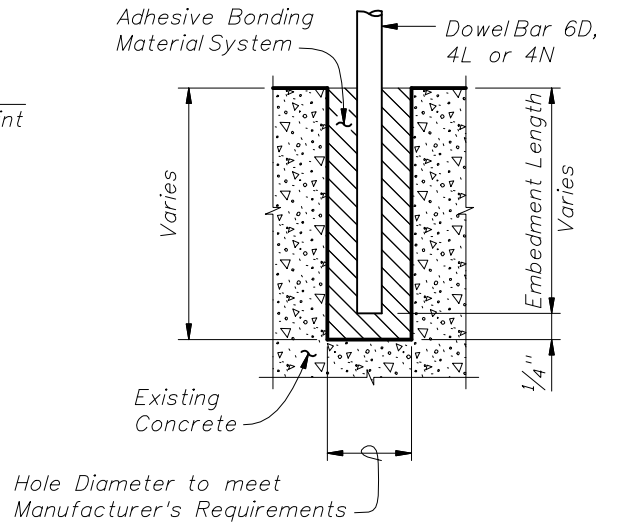
BARS 4C
(12 required per open joint)



- REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
 2. The reinforcement for the railing on a retaining wall shall be the same as detailed for a bridge deck.
 3. All reinforcing steel in the Vertical Face Retrofit Railing shall have a 2" minimum cover.
 4. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".
 5. Expansion Dowel Bars B shall be ASTM A36 smooth round bar and hot-dip galvanized in accordance with the Specifications.



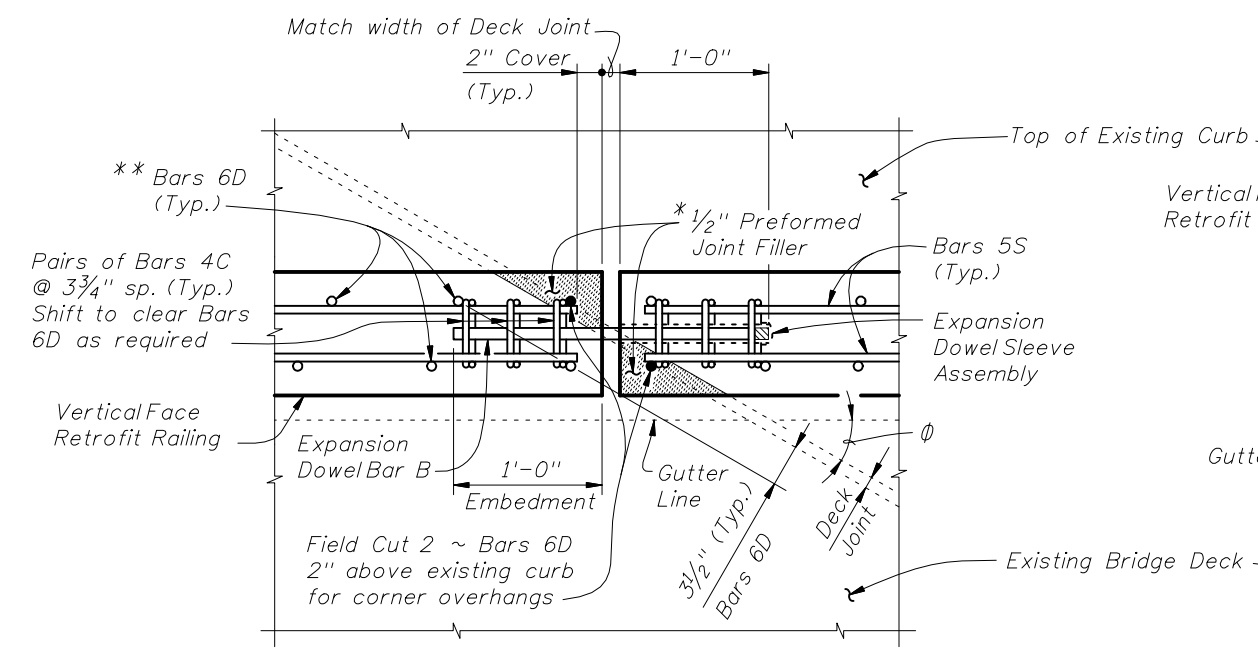
OPEN JOINT EXPANSION DOWEL DETAIL
(Railing Reinforcing Not Shown For Clarity)



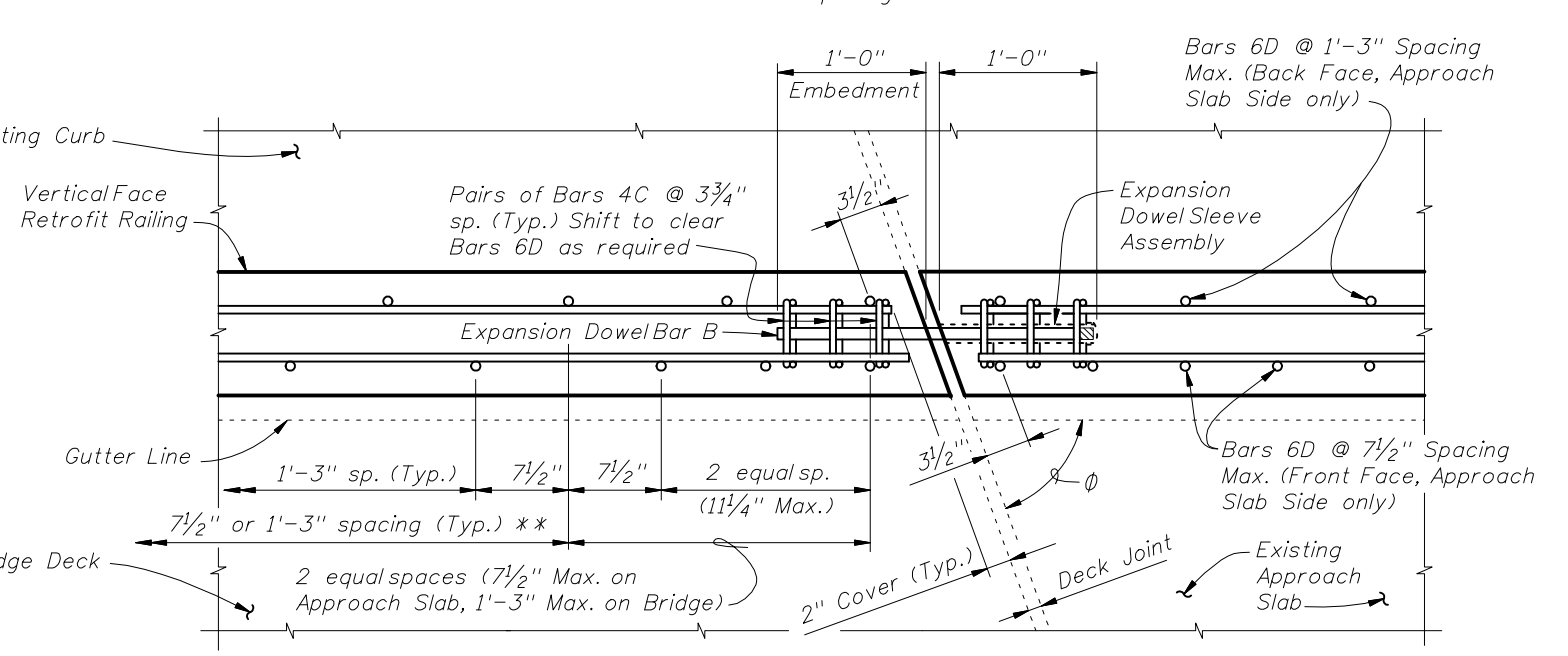
DOWEL DETAIL

- Dowel Installation Notes:
1. Shift dowelholes to clear if the existing reinforcement is encountered.
 2. See individual Standards Index Nos. 481 thru 484 for required embedment length of Bars 6D, 4L or 4N.

- * 1/2" Preformed Joint Filler at top of Existing Curb shall extend beyond the joint material (Silicone, poured rubber, armored neoprene seal or sliding plates) as shown to prevent concrete intrusion during railing casting and shall be placed so as not to restrict in any way normal joint movement.
- ** See individual Standard Index Nos. 481 thru 484 for spacing of Bars 6D.

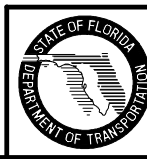


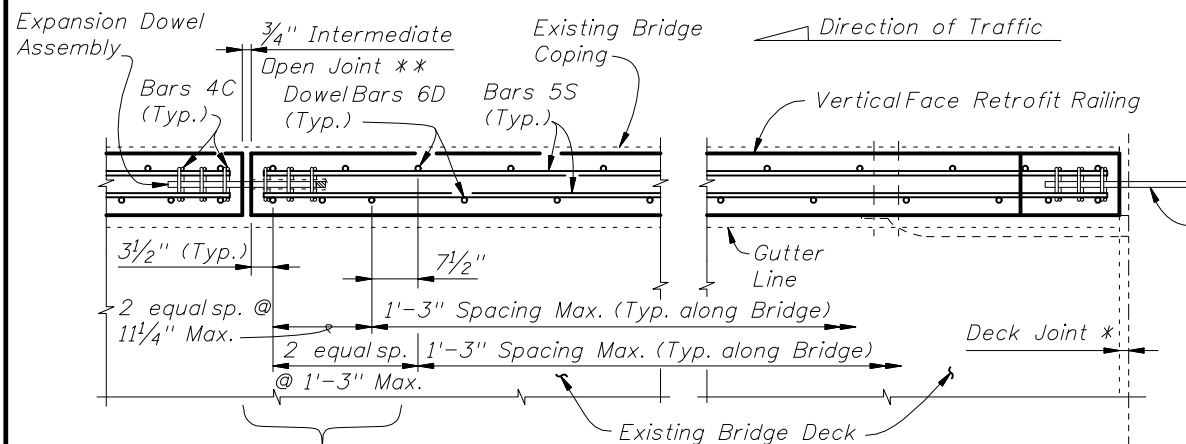
PARTIAL PLAN OF RAILING (SKEW ANGLE ϕ LESS THAN 70°)
(Skewed Deck Joint at Begin or End Bridge Shown, Skewed Deck Joint at Intermediate Pier or Bent Similar)



PARTIAL PLAN OF RAILING (SKEW ANGLE ϕ = 70° OR GREATER)
(Skewed Deck Joint at Begin or End Bridge Shown, Skewed Deck Joint at Intermediate Pier or Bent Similar)

SKEW DETAIL





Bars 6D spacing at Railing Joints (Typ. on bridge except as noted for skewed deck joints)

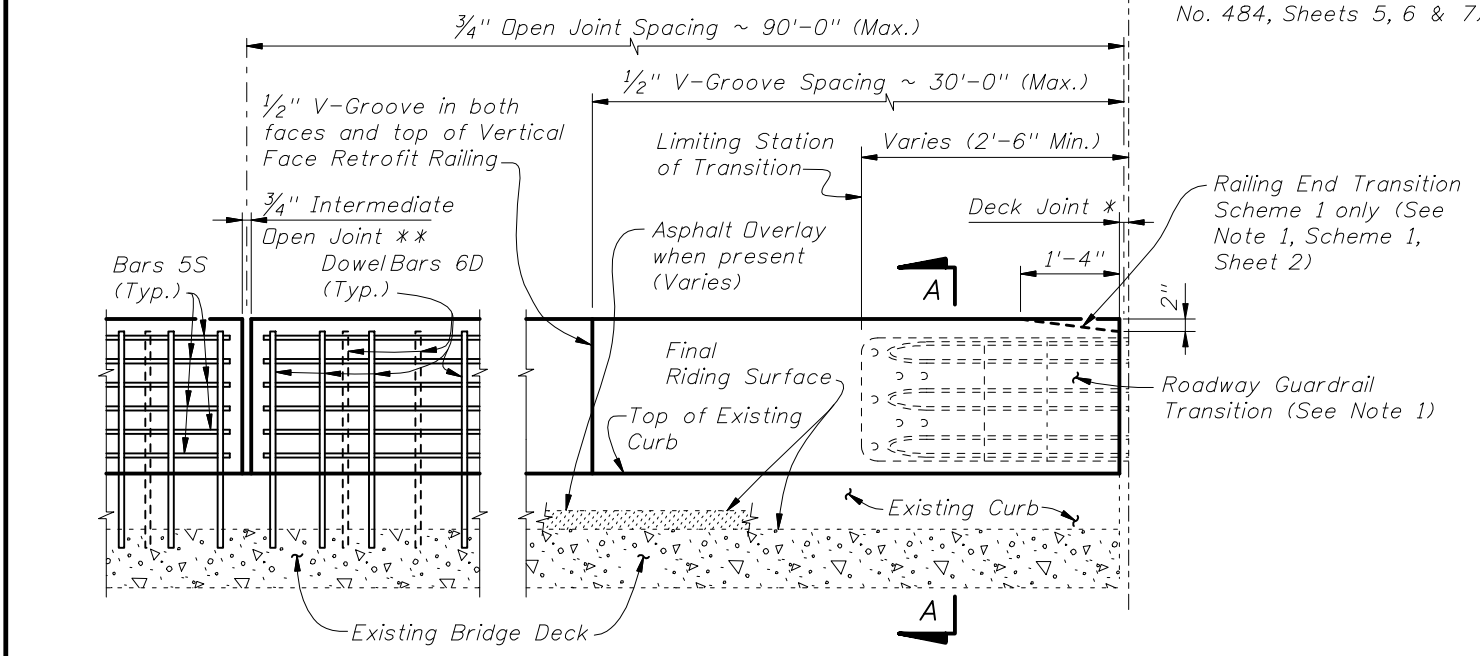
PARTIAL PLAN OF RAILING

Expansion Dowel & Bars 4C not required at end of railing for Scheme 1, except where traffic railing retrofit extends beyond ends of bridge, see Index No. 484

Front Face of Backwall, Begin or End Bridge & Match Line (See Sheet 2 & 3 & Index No. 484, Sheets 5, 6 & 7)

* Non skewed deck joint shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Open Railing Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at \varnothing Pier or Intermediate Bent similar.

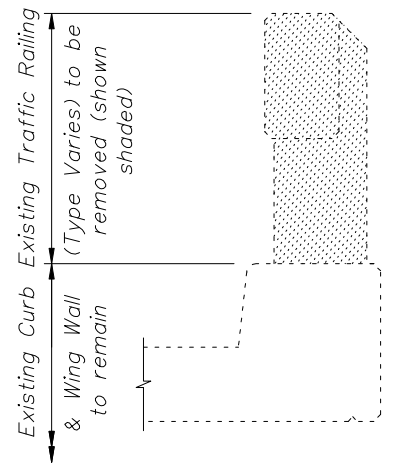
- ** $\frac{3}{4}$ " Intermediate Open Joints shall be provided at:
- (1) - Substructure supports where existing bridge deck is continuous.
 - (2) - Midspan where span length exceeds 90 ft.
 - (3) - Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.



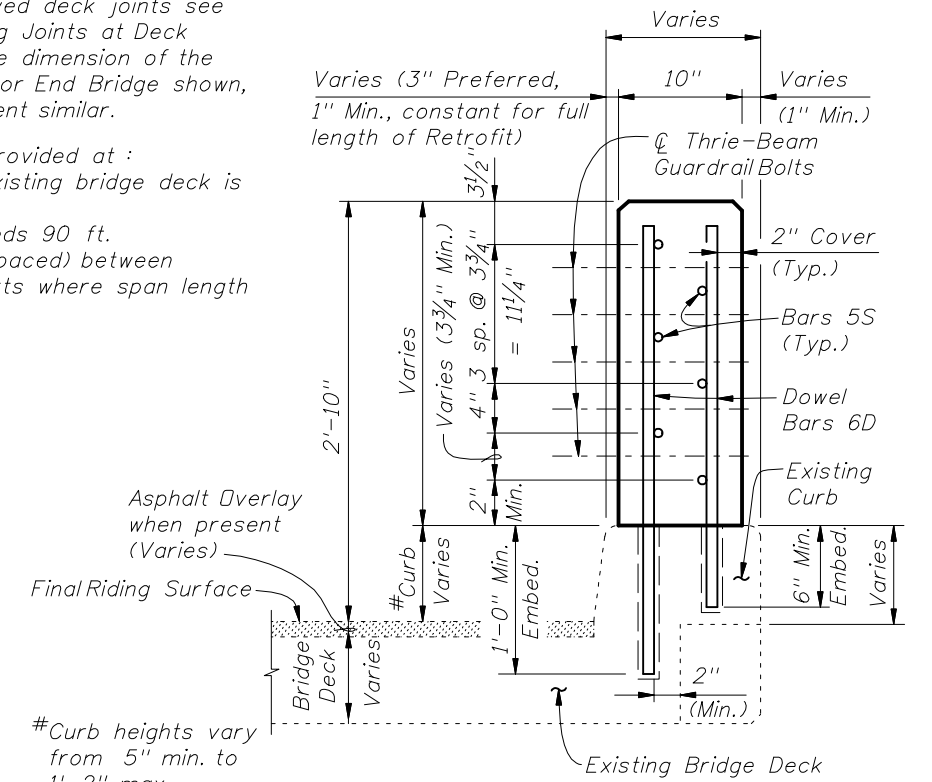
PARTIAL ELEVATION OF INSIDE FACE OF RAILING (Expansion Dowel Assemblies & Bars 4C not shown for clarity)

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

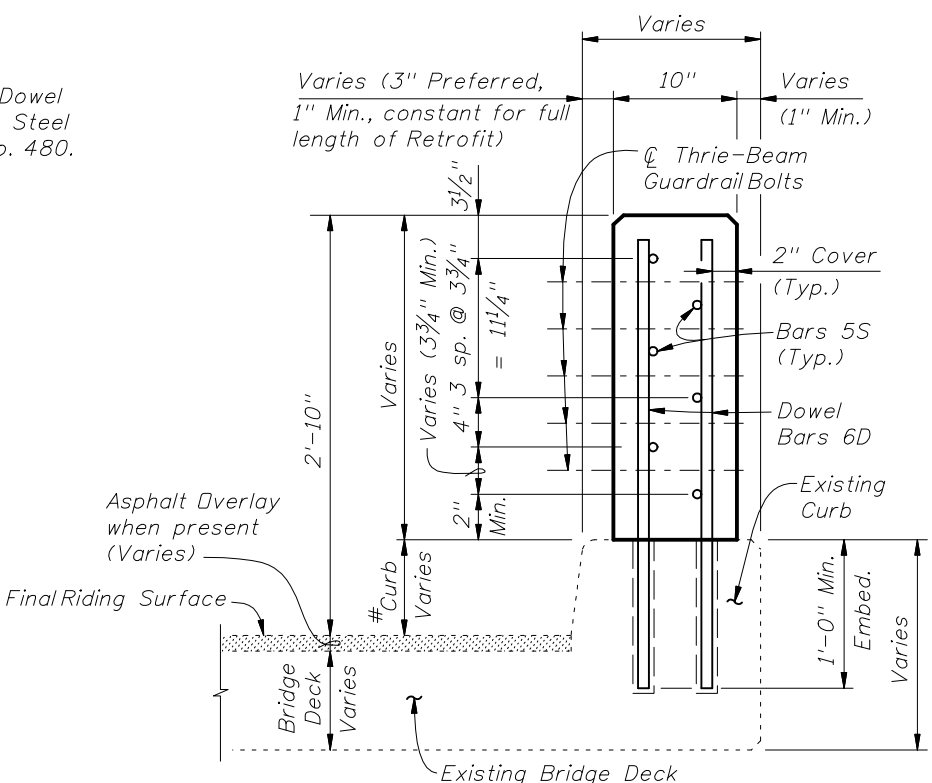
- NOTES:
1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2 or 3, Index No. 481, Sheet 2 and 3. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.
 2. Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.
 3. Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.



TYPICAL SECTION THRU EXISTING TRAFFIC RAILING SHOWING LIMITS OF REMOVAL (BRIDGE DECK SHOWN, WING WALL SIMILAR)



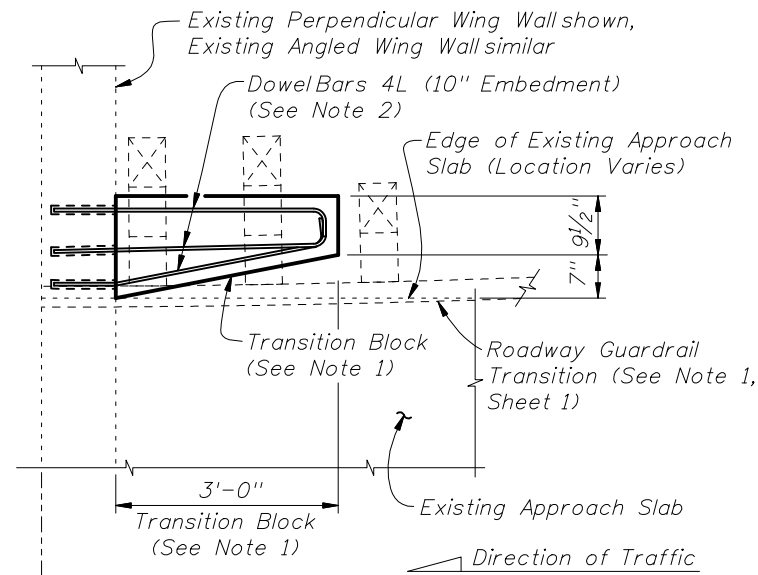
SECTION A-A TYPICAL SECTION THRU RAILING ON CURB WITH CORBELS



SECTION A-A TYPICAL SECTION THRU RAILING ON FULL DEPTH CURB (BRIDGE SHOWN, WING WALL SIMILAR)

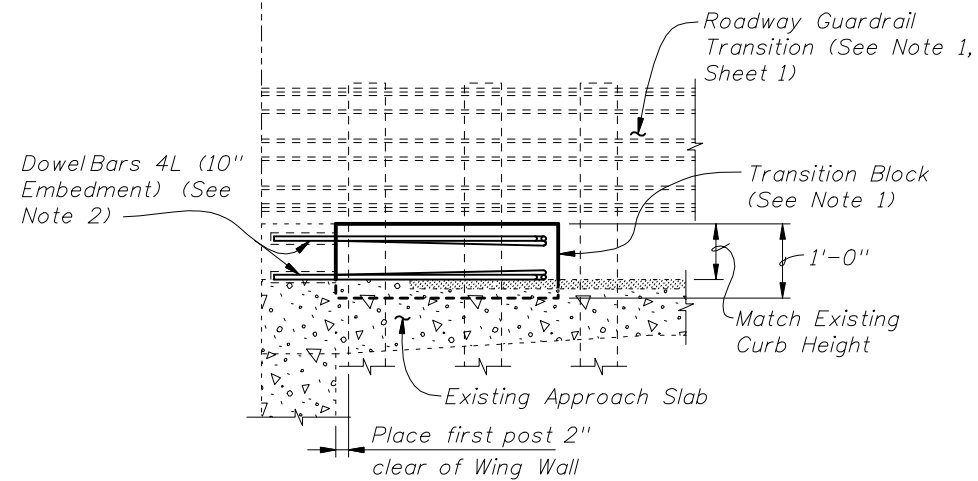
CROSS REFERENCE:
For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagrams see Index No. 480.





Front Face of Backwall, Begin or End Bridge & Match Line (See Sheet 1)

PARTIAL PLAN OF GUARDRAIL

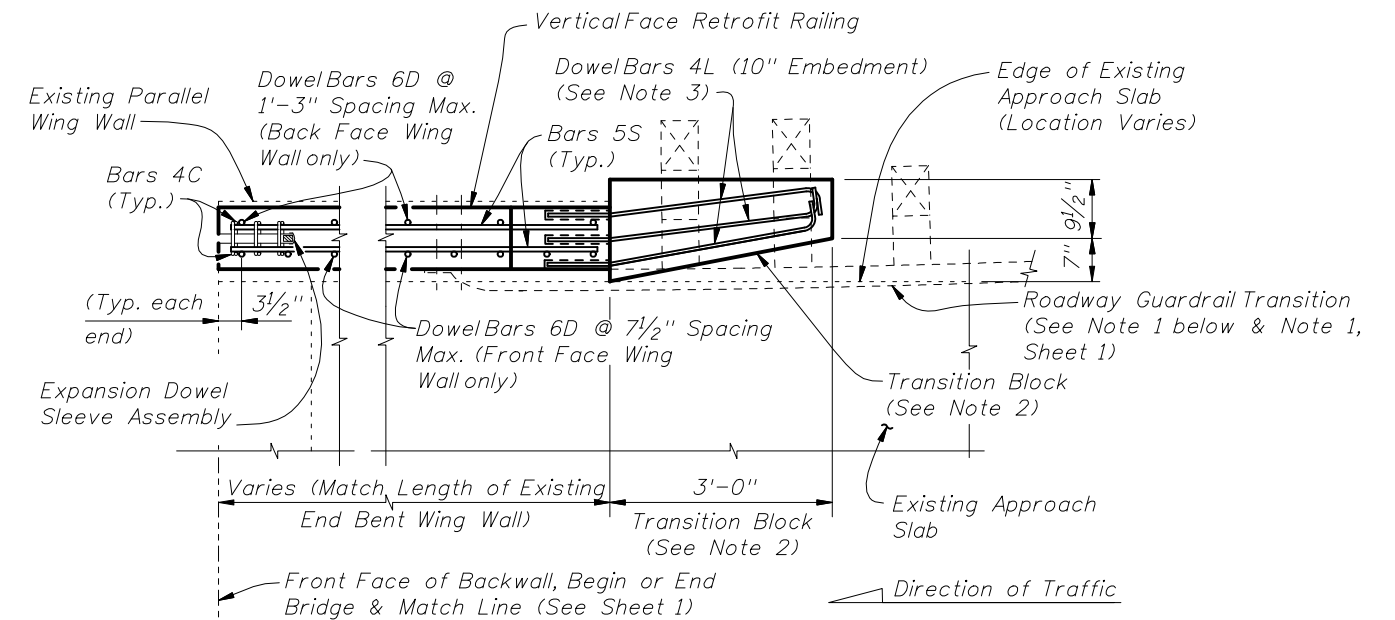


PARTIAL ELEVATION OF INSIDE FACE OF GUARDRAIL

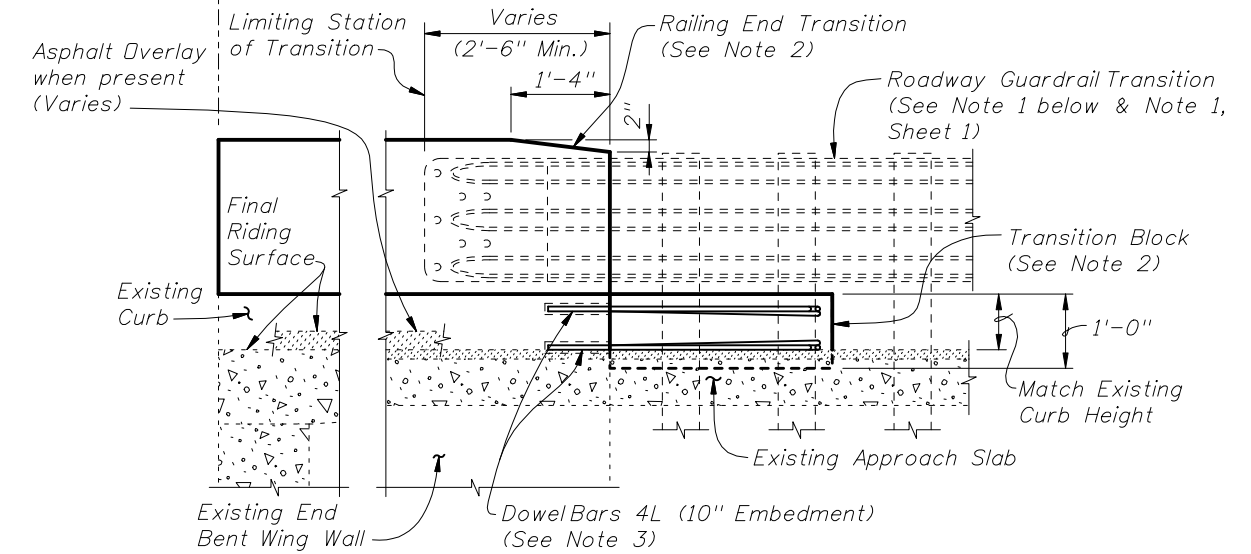
SCHEME 1
RAILING END TREATMENT FOR
PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING

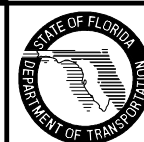


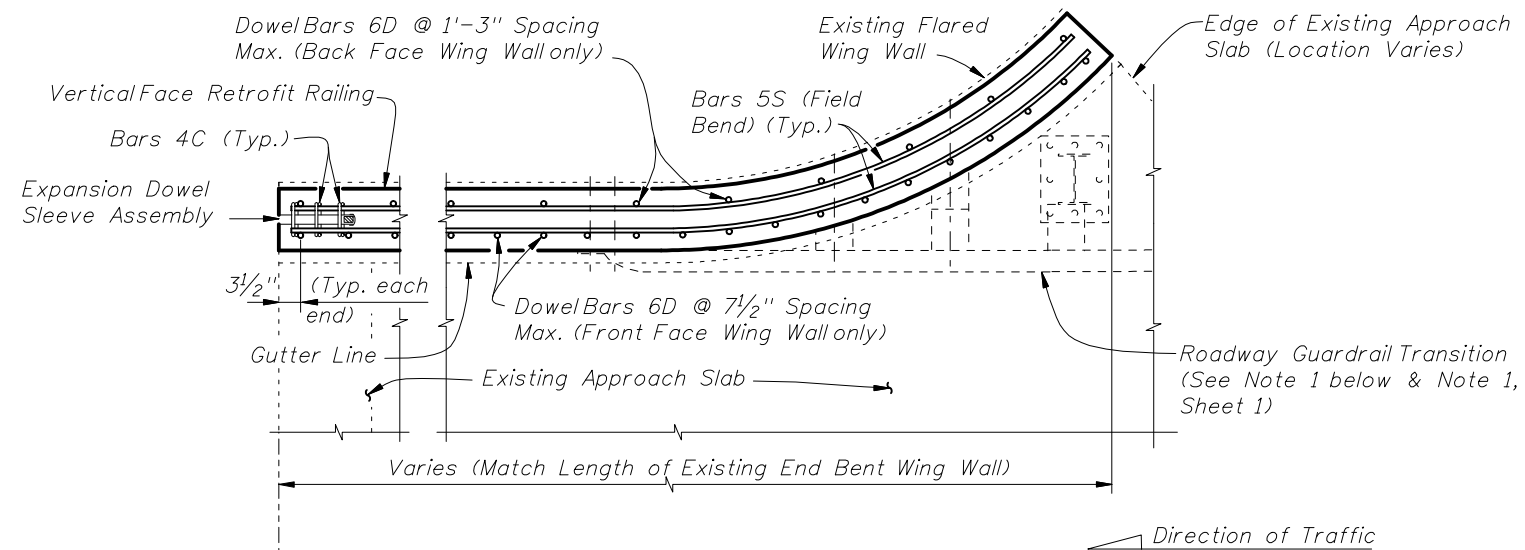
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
 (Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 2
RAILING END TREATMENT FOR
PARALLEL WING WALLS

SCHEME 2 NOTES:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Index No. 481, Sheet 1. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing.
2. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.
3. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

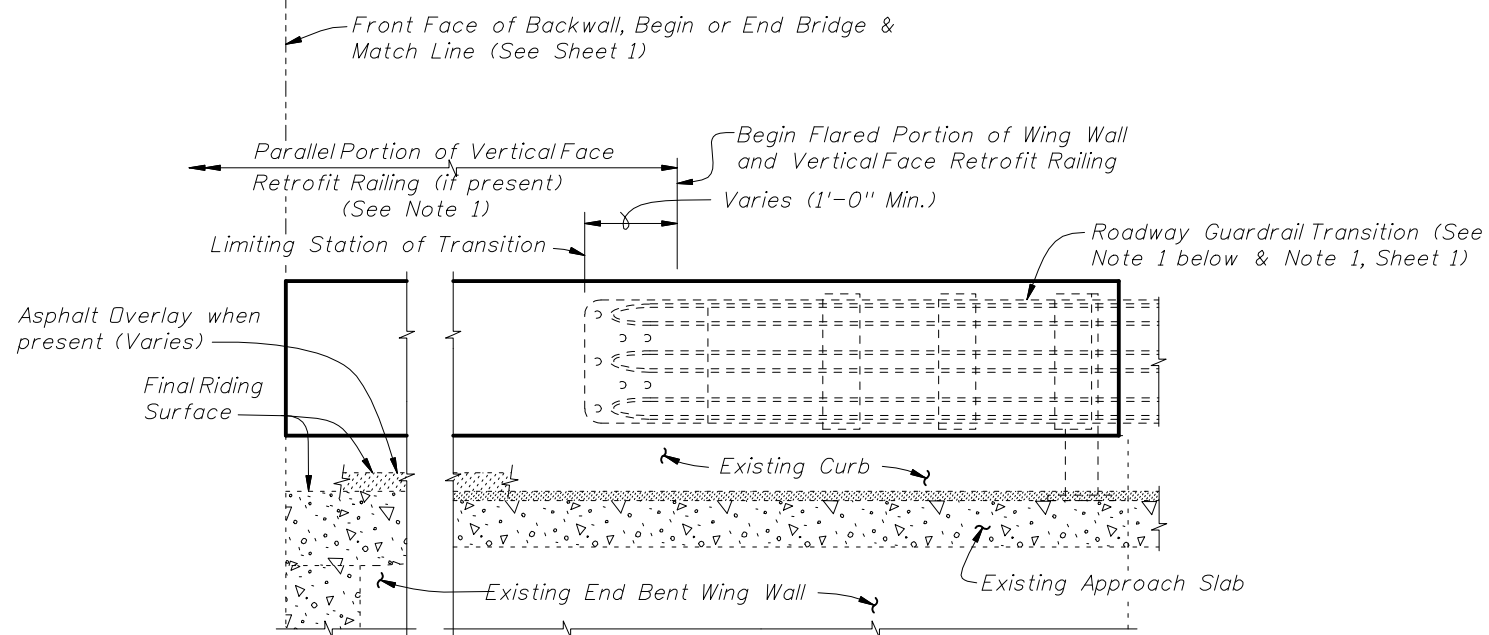




PARTIAL PLAN OF RAILING

SCHEME 3 NOTE:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 3
RAILING END TREATMENT FOR
FLARED WING WALLS



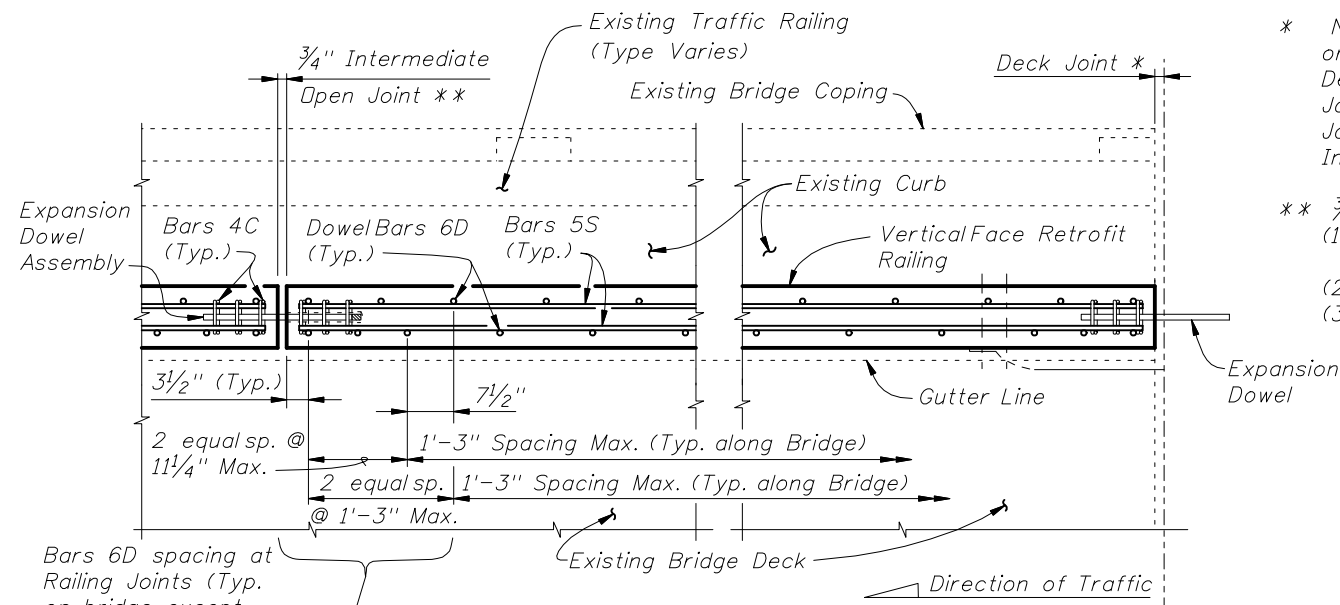
2010 FDOT Design Standards

TRAFFIC RAILING - (VERTICAL FACE RETROFIT)
NARROW CURB

Last Revision
07/01/07

Sheet No.
3 of 3

Index No.
481



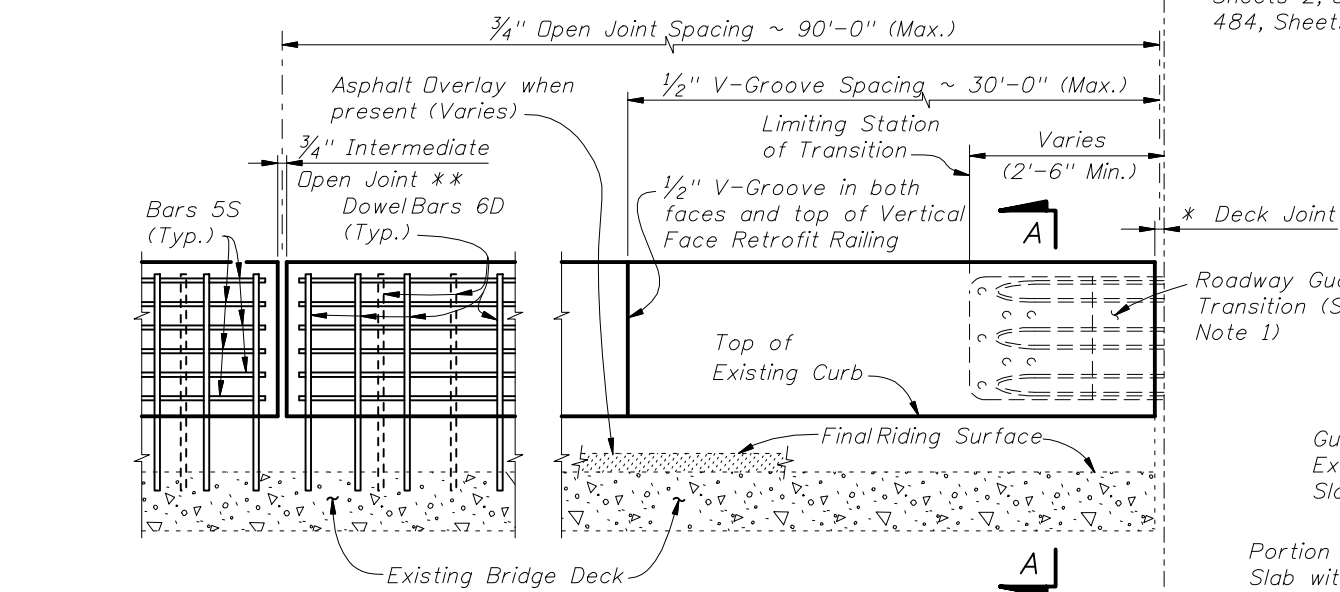
PARTIAL PLAN OF RAILING

* Non skewed deck joint shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Open Railing Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at C Pier or Intermediate Bent similar.

** $\frac{3}{4}$ " Intermediate Open Joints shall be provided at:
 (1) - Substructure supports where existing bridge deck is continuous.
 (2) - Midspan where span length exceeds 90 ft.
 (3) - Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.

CROSS REFERENCE:

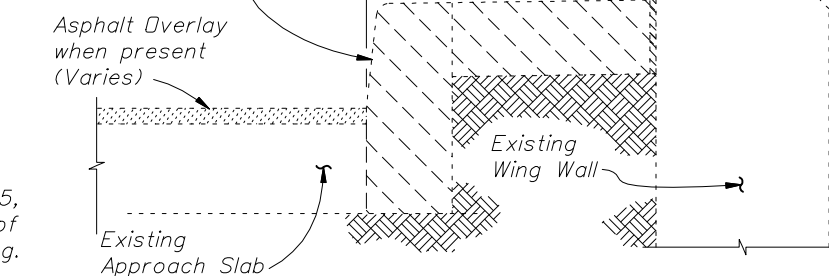
For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagrams see Index No. 480.



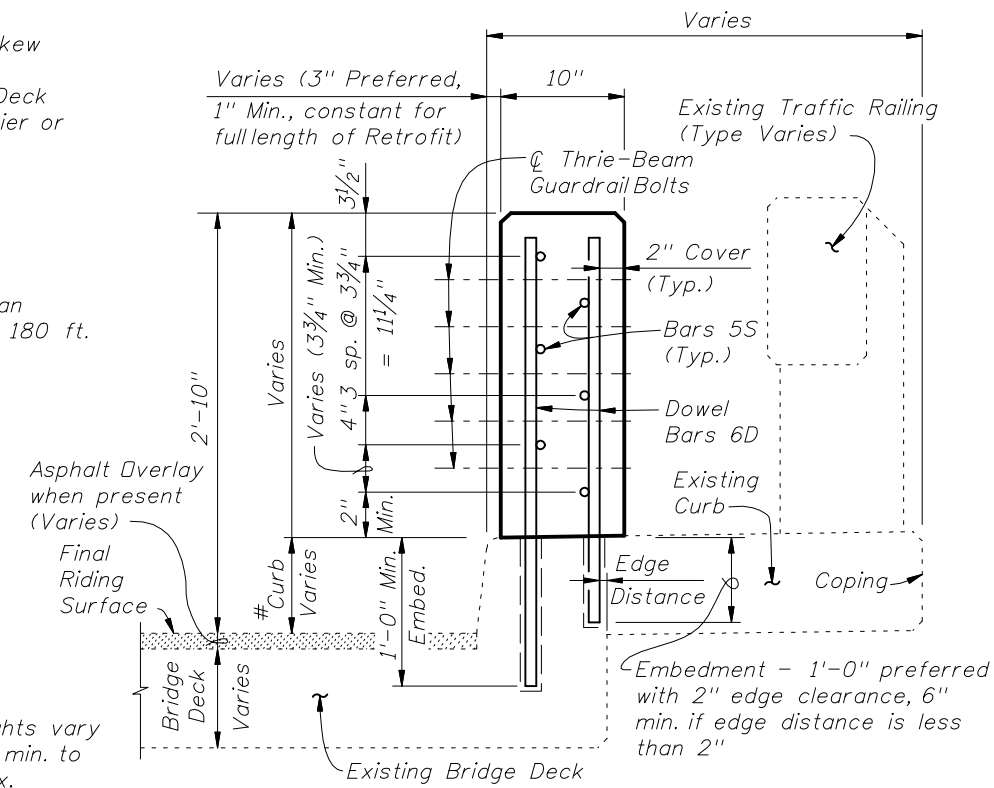
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
 (Existing Traffic Railing, Expansion Dowel Assemblies & Bars 4C not shown for clarity)

Front Face of Backwall, Begin or End Bridge & Match Line (See Sheets 2, 3 or 4, & Index No. 484, Sheets 5 & 8)

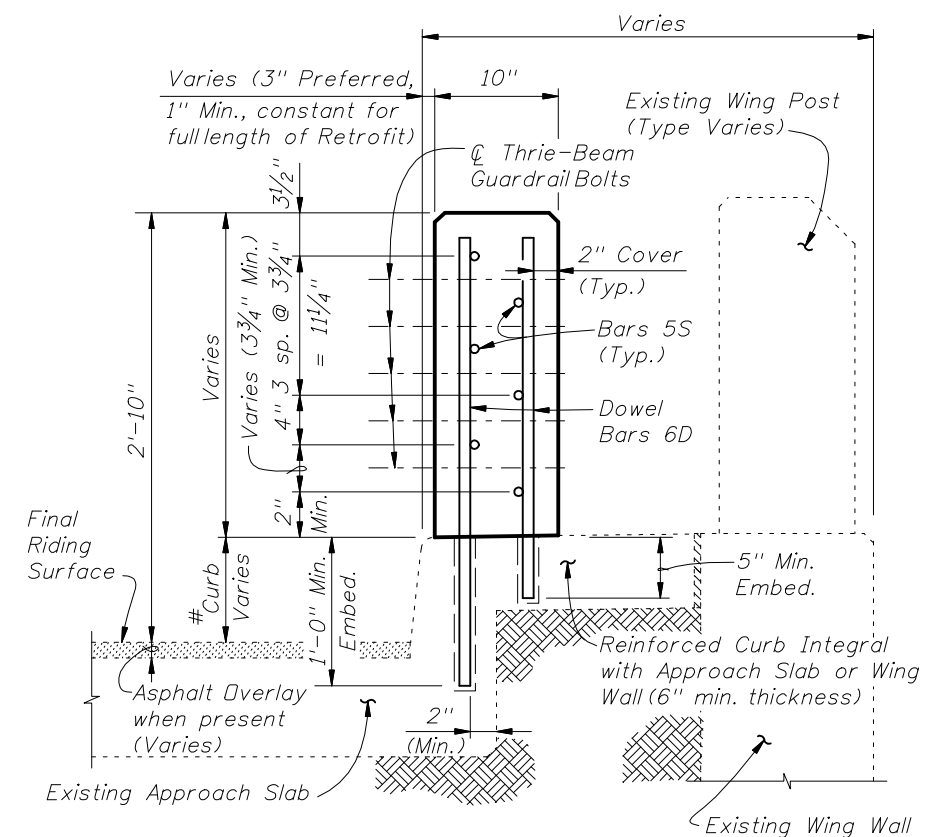
Gutter Line (Cut Existing Approach Slab along this line)
 Portion of Existing Approach Slab with Integral Curb less than 6" thick or portion of Existing Approach Slab and Curb with Floating Detached Sidewalk to be removed shown hatched.



TYPICAL SECTION THRU EXISTING APPROACH SLAB AND END BENT WING WALL SHOWING LIMITS OF REMOVAL (SCHEMES 4 AND 5 ONLY)



SECTION A-A TYPICAL SECTION THRU RAILING ON BRIDGE DECK

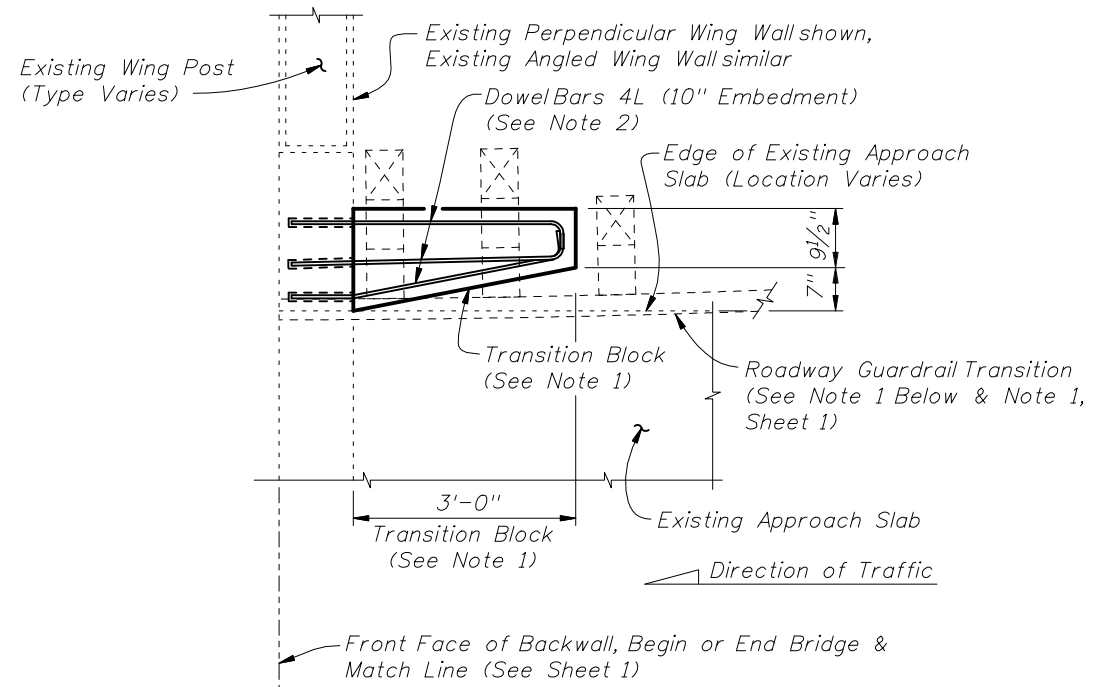


SECTION B-B TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB (SCHEMES 2 AND 3 ONLY)

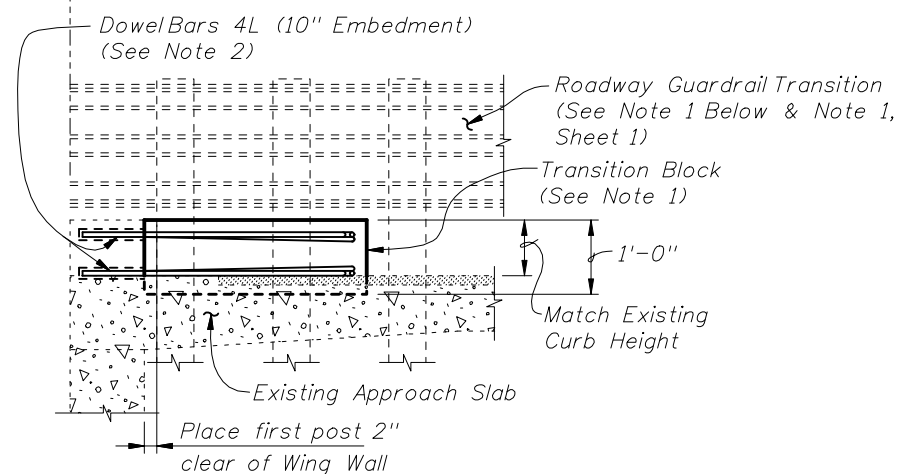
NOTES:

1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2, 3, 4 or 5, Sheets 3 and 4. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.
2. Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.
3. Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.





PARTIAL PLAN OF RAILING

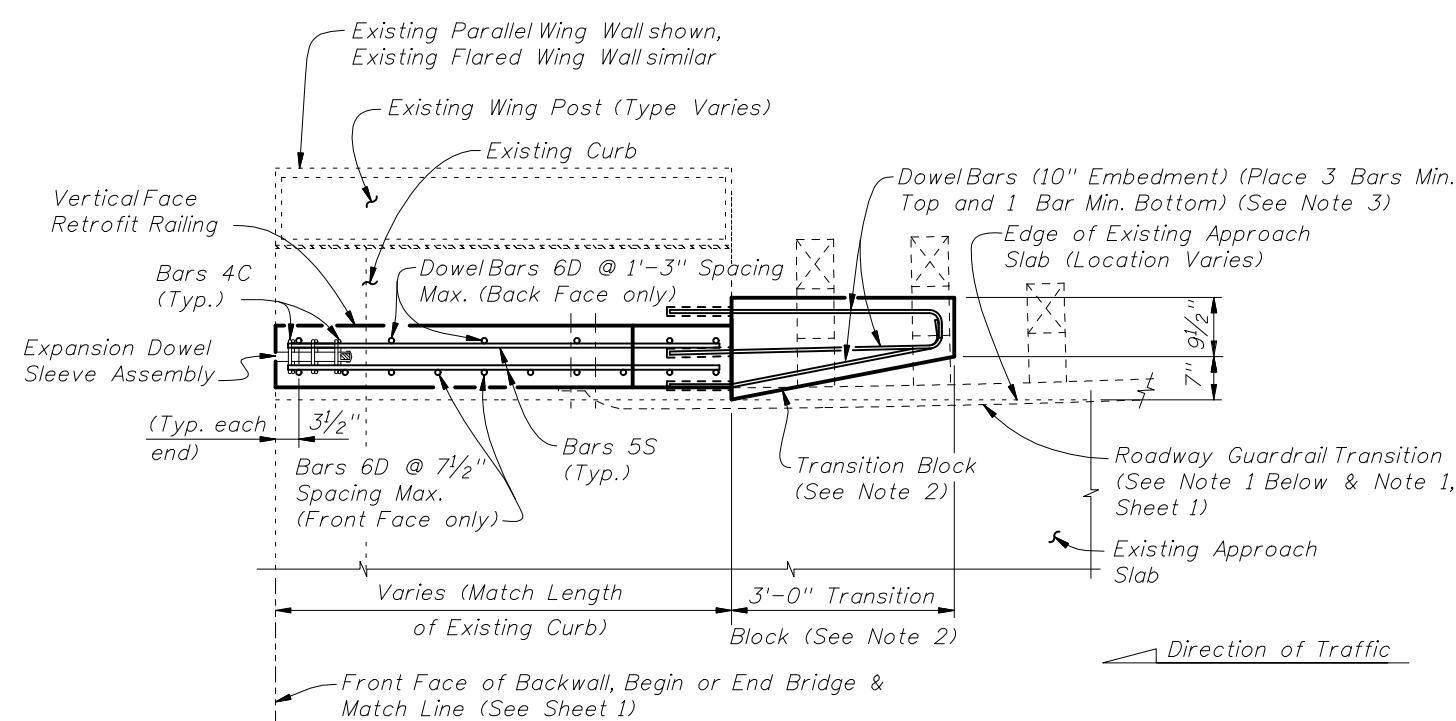


PARTIAL ELEVATION OF INSIDE FACE OF GUARDRAIL
(Existing Wing Post not shown for clarity)

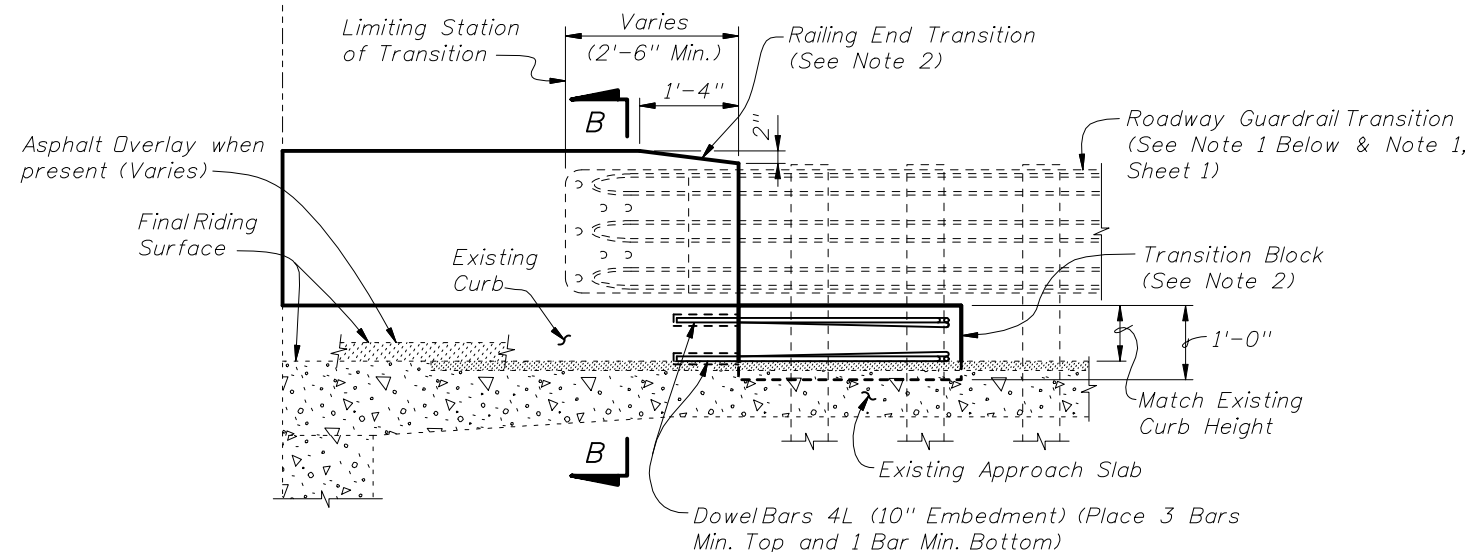
SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field bend DowelBars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.
3. If a Special Steel Guardrail Post is required for attachment to the top of a sloping Wing Wall, saw cut and remove a wedge shaped portion of the sloping Wing Wall as required to provide a level surface for post installation.



PARTIAL PLAN OF RAILING

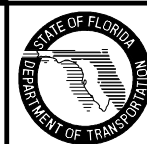


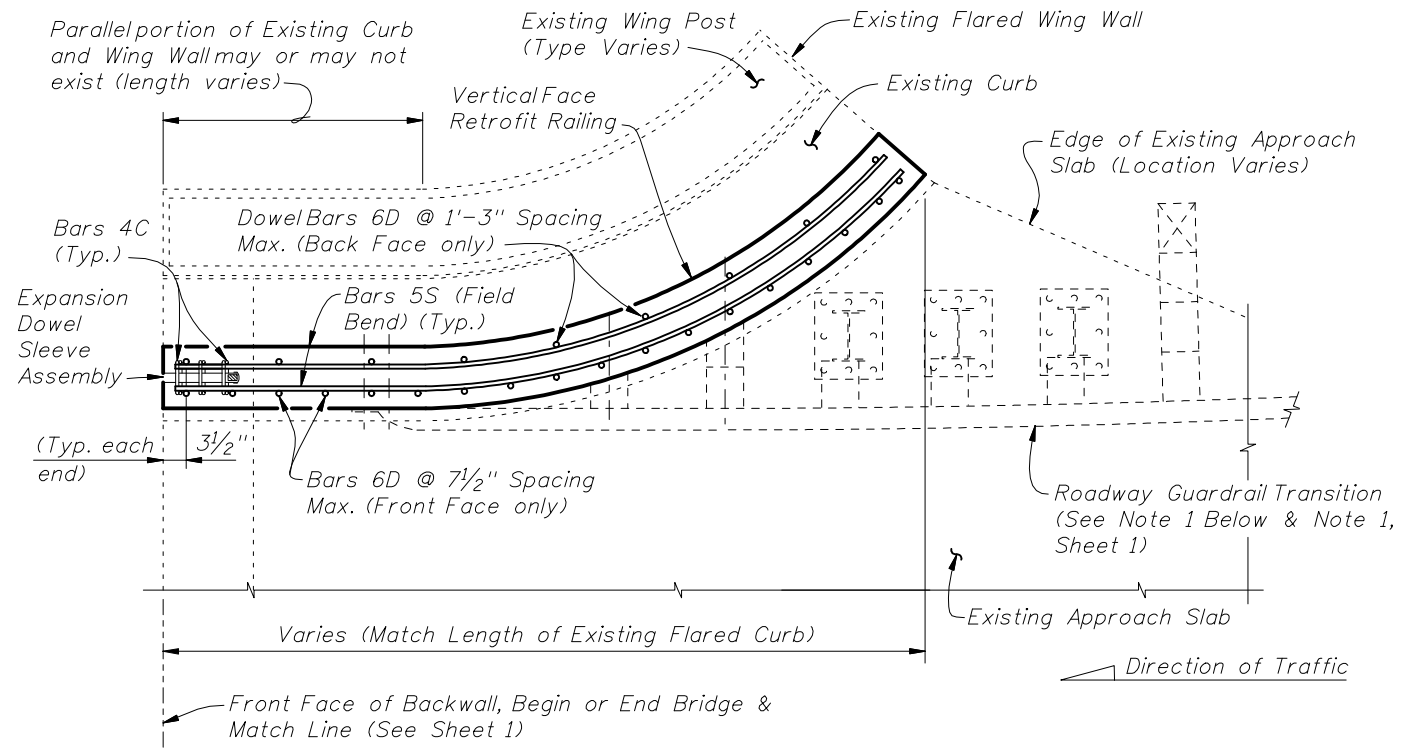
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 2
RAILING END TREATMENT FOR PARALLEL CURBS

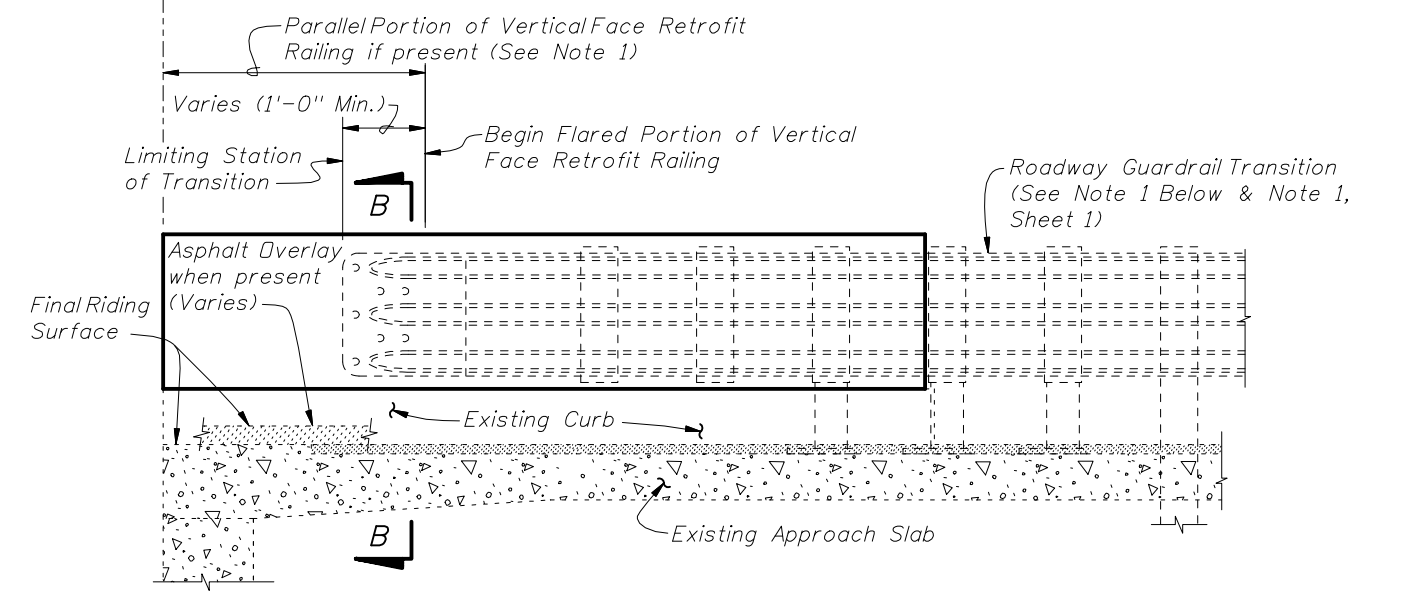
SCHEME 2 NOTES:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing.
2. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend beyond end of existing End Bent Wing Wall, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.
3. Field bend DowelBars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.





PARTIAL PLAN OF RAILING

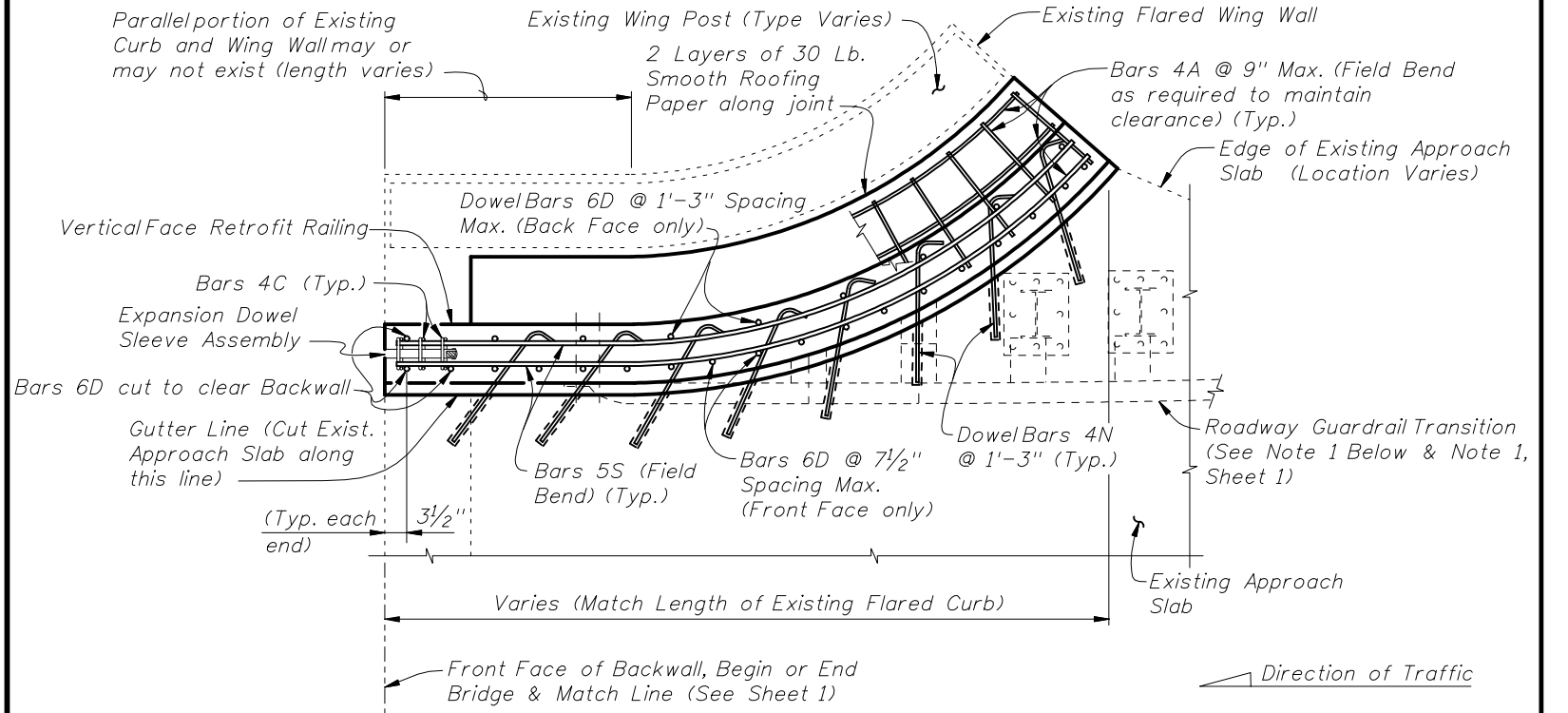


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

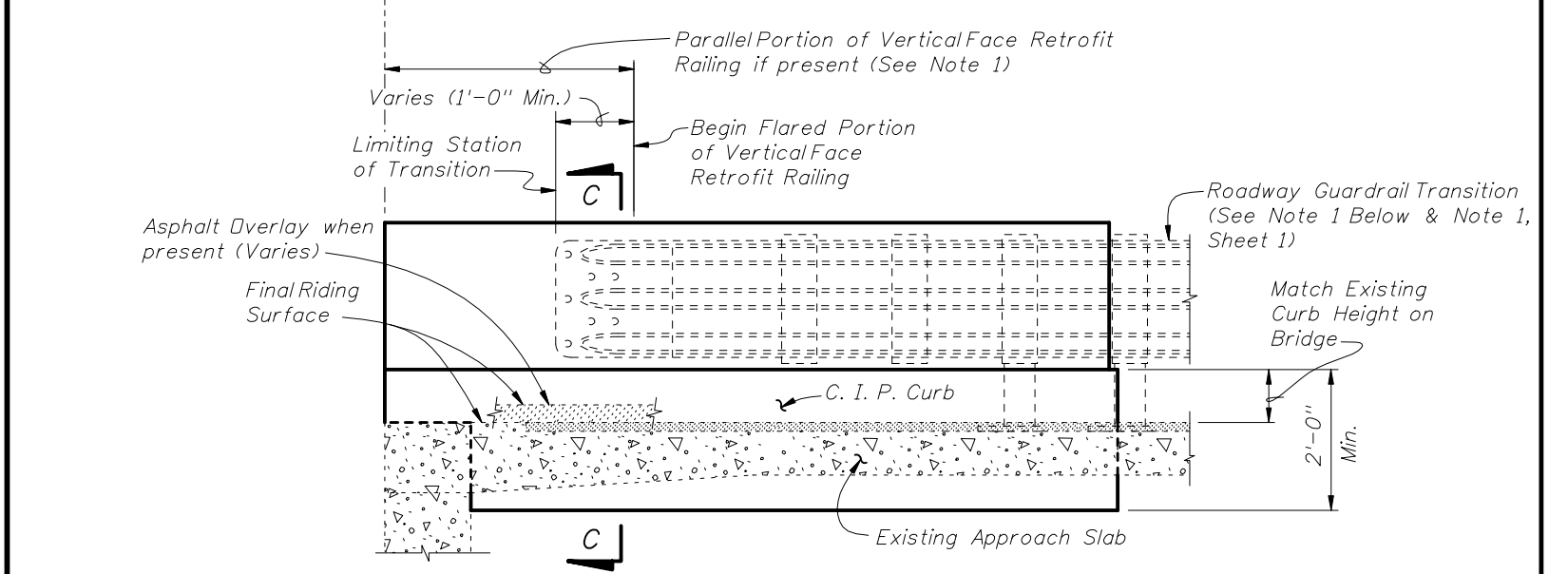
SCHEME 3
RAILING END TREATMENT FOR FLARED CURBS

SCHEME 3 NOTE:

- See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.



PARTIAL PLAN OF RAILING

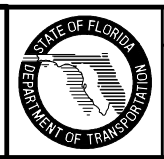


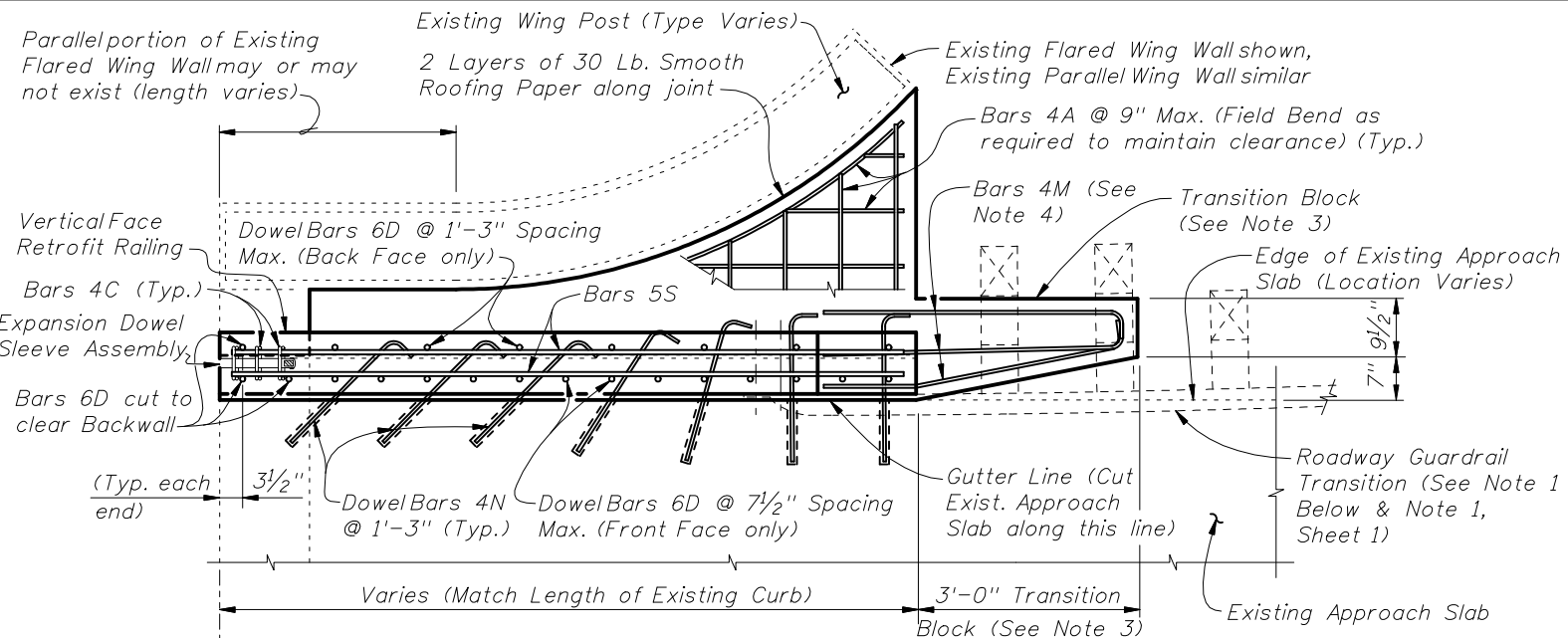
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 4
RAILING END TREATMENT FOR FLARED CURBS

SCHEME 4 NOTES:

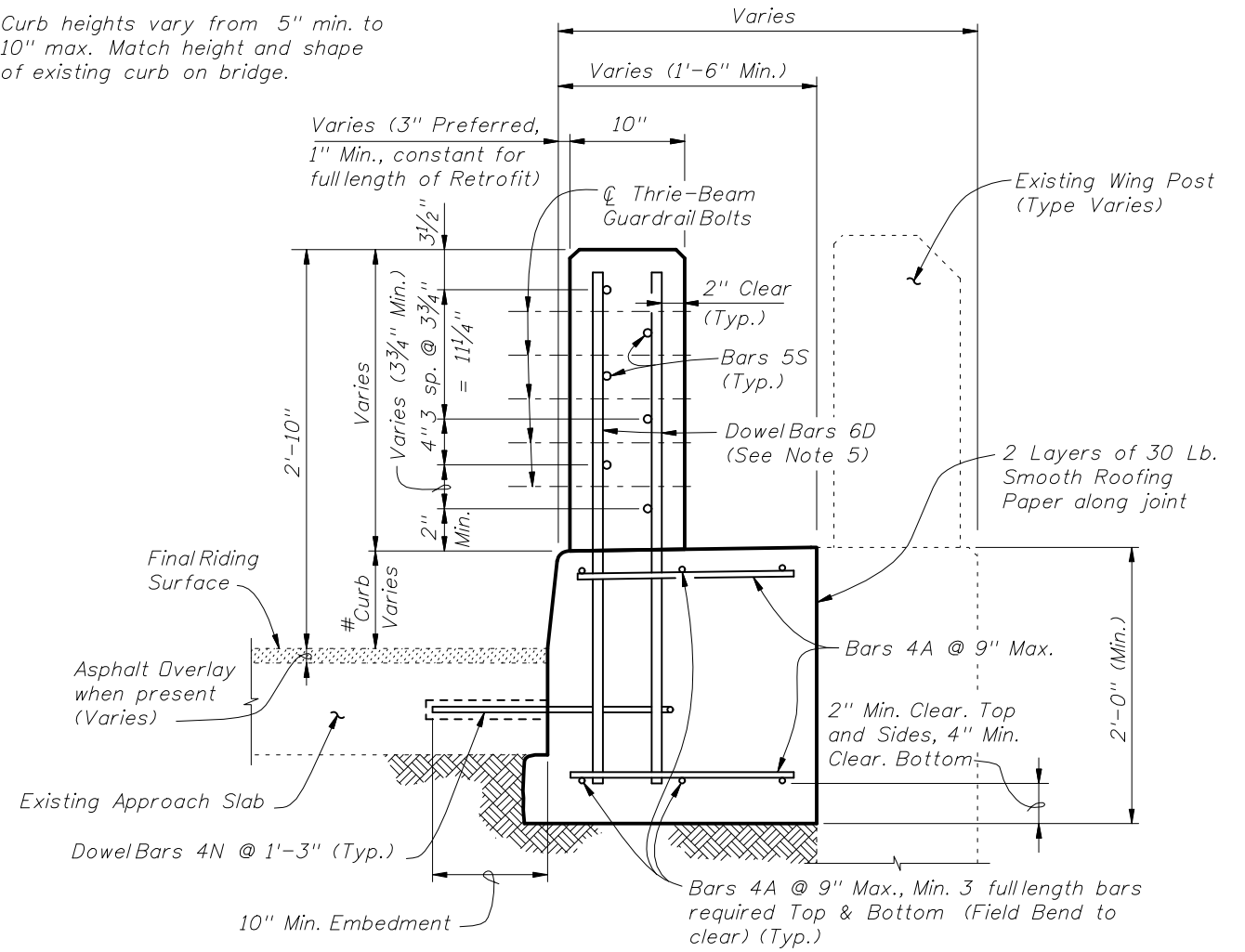
- See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.
- Dowel Bars 4N may be installed on a maximum angle of 45° to the cut edge of the Approach Slab as shown to facilitate drilling of holes and installation of bars.
- At the Contractor's option, along the length of the Approach Slab curb that is to be replaced, Dowel Bars 6D may be cast in with the new section of curb as shown or they may be installed in drilled holes in the new section of curb using an Adhesive Bonding Material System with a 1'-0" minimum embedment.





PARTIAL PLAN OF RAILING

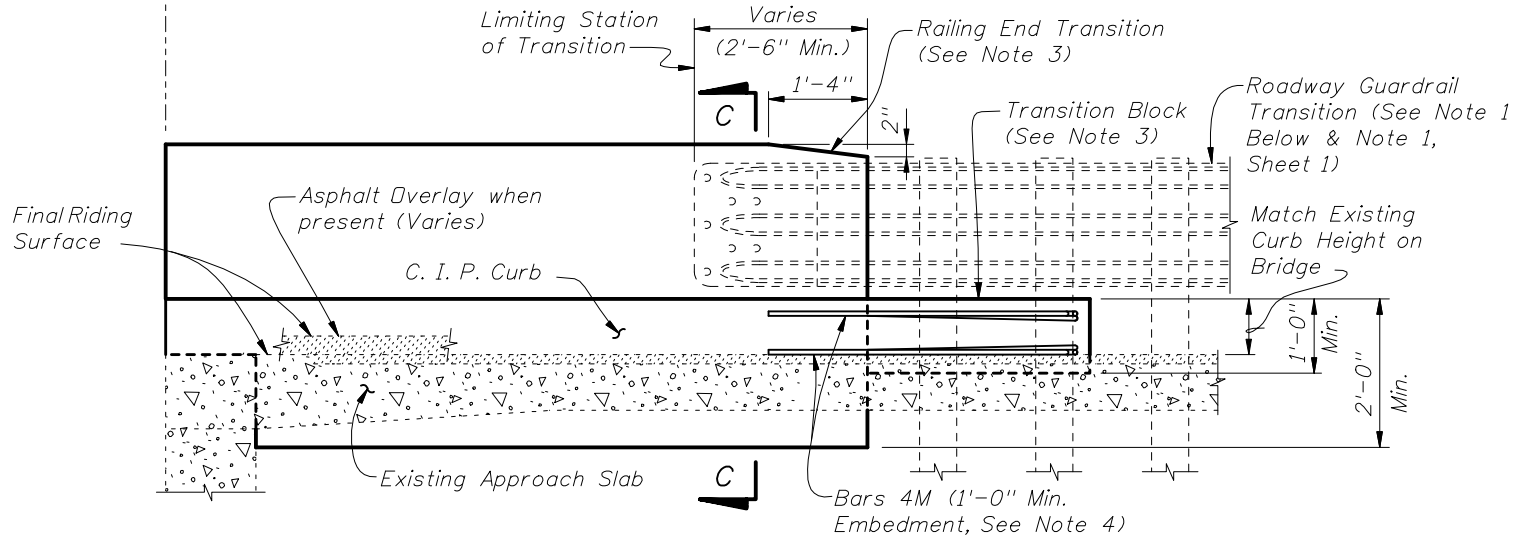
Curb heights vary from 5" min. to 10" max. Match height and shape of existing curb on bridge.



SECTION C-C
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEME 4 SHOWN, SCHEME 5 SIMILAR)

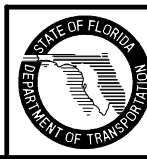
SCHEME 5 NOTES:

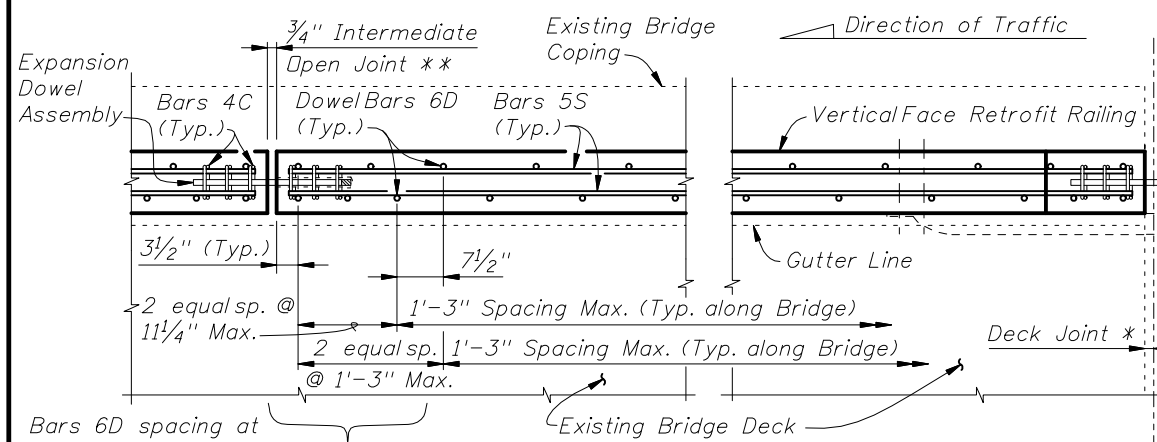
1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.
2. Dowel Bars 4N may be installed on a maximum angle of 45° to the cut edge of the Approach Slab as shown to facilitate drilling of holes and installation of bars.
3. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend beyond end of existing End Bent Wing Wall, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.
4. Field bend Dowel Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.
5. At the Contractor's option, along the length of the Approach Slab curb that is to be replaced, Dowel Bars 6D may be cast in with the new section of curb as shown or they may be installed in drilled holes in the new section of curb using an Adhesive Bonding Material System with a 1'-0" minimum embedment.



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

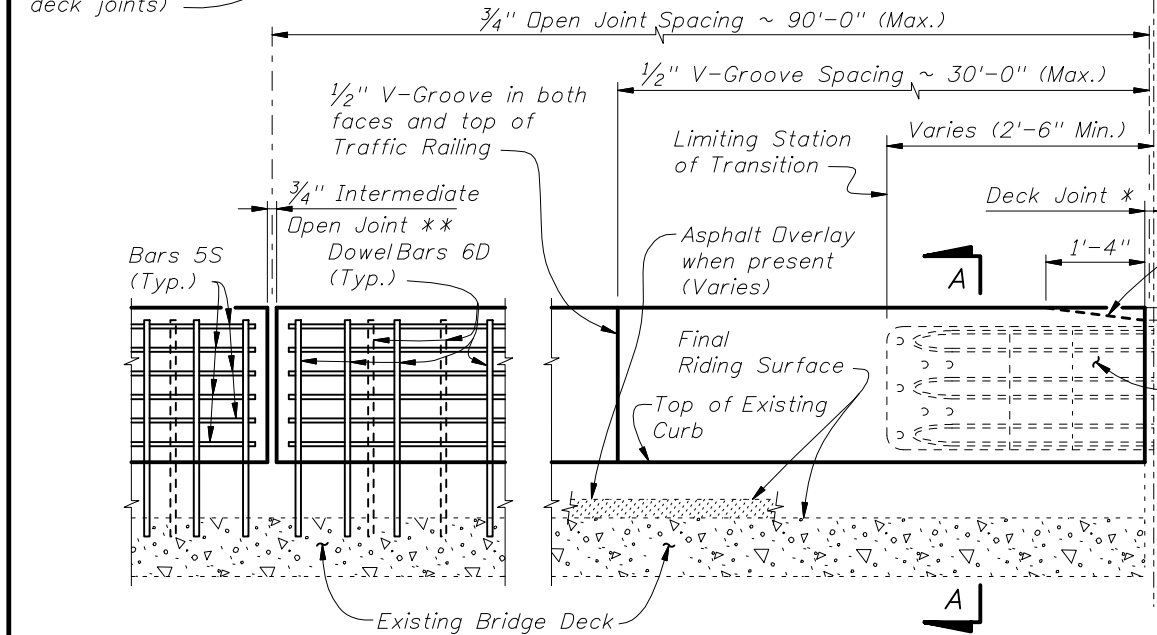
SCHEME 5
RAILING END TREATMENT FOR PARALLEL CURBS





PARTIAL PLAN OF RAILING

Expansion Dowel Assembly
Bars 4C (Typ.)
Dowel Bars 6D (Typ.)
Bars 5S (Typ.)
3 1/2" (Typ.)
7 1/2"
2 equal sp. @ 1 1/4" Max.
1'-3" Spacing Max. (Typ. along Bridge)
2 equal sp. @ 1'-3" Max.
1'-3" Spacing Max. (Typ. along Bridge)
Deck Joint *



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

- NOTES:**
1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2 or 3, Sheets 2 & 3. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.
 2. Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.
 3. Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.

* Non skewed deck shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Open Railing Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at \varnothing Pier or Intermediate Bent similar.

** 3/4" Intermediate Open Joints shall be provided at:

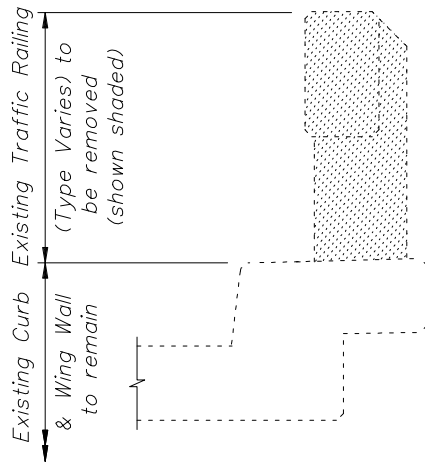
- (1) - Substructure supports where existing bridge deck is continuous.
- (2) - Midspan where span length exceeds 90 ft.
- (3) - Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.

Expansion Dowel & Bars 4C not required at end of railing for Scheme 1, except where traffic railing retrofit extends beyond ends of bridge, see Index No. 484

Front Face of Backwall, Begin or End Bridge & Match Line (See Sheet 2 and 3 and Index No. 484, Sheets 5, 9 & 10.)

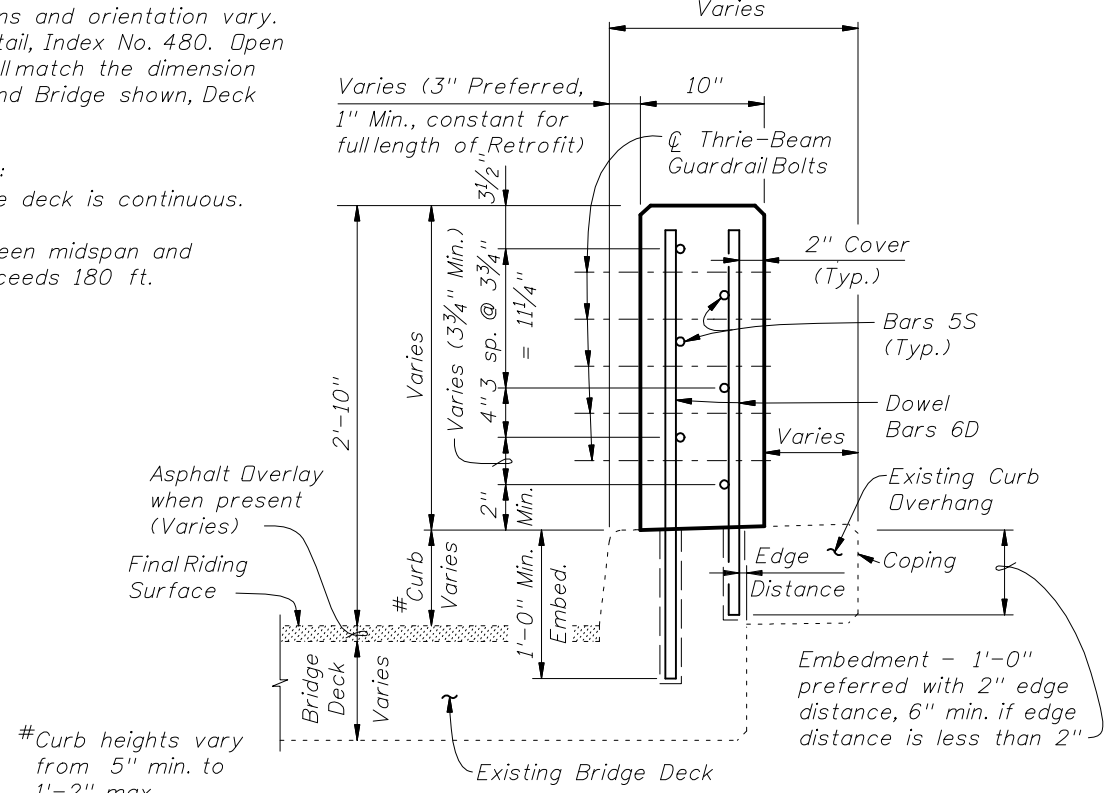
Railing End Transition Scheme 1 only (See Note 1, Scheme 1, Sheet 2, & Index No. 484, Sheet 5, 9 & 10)

Roadway Guardrail Transition (See Note 1)

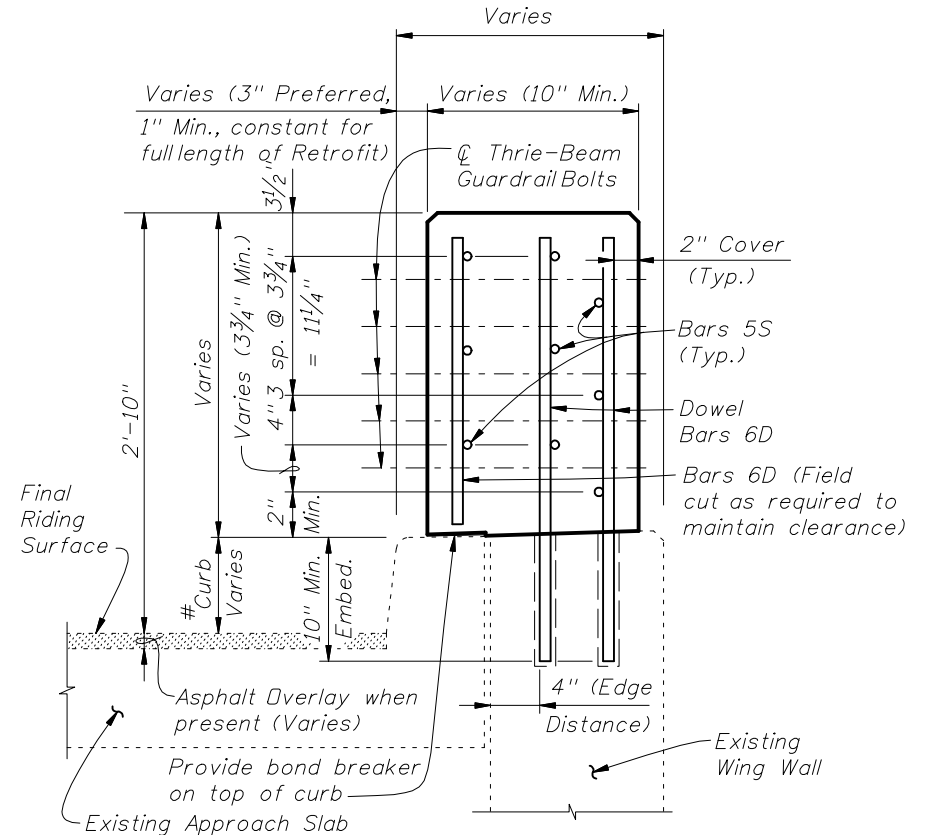


TYPICAL SECTION THRU EXISTING TRAFFIC RAILING
SHOWING LIMITS OF REMOVAL
(BRIDGE DECK SHOWN, WING WALL SIMILAR)

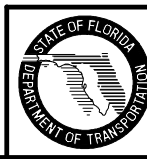
CROSS REFERENCE:
For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagram see Index No. 480.

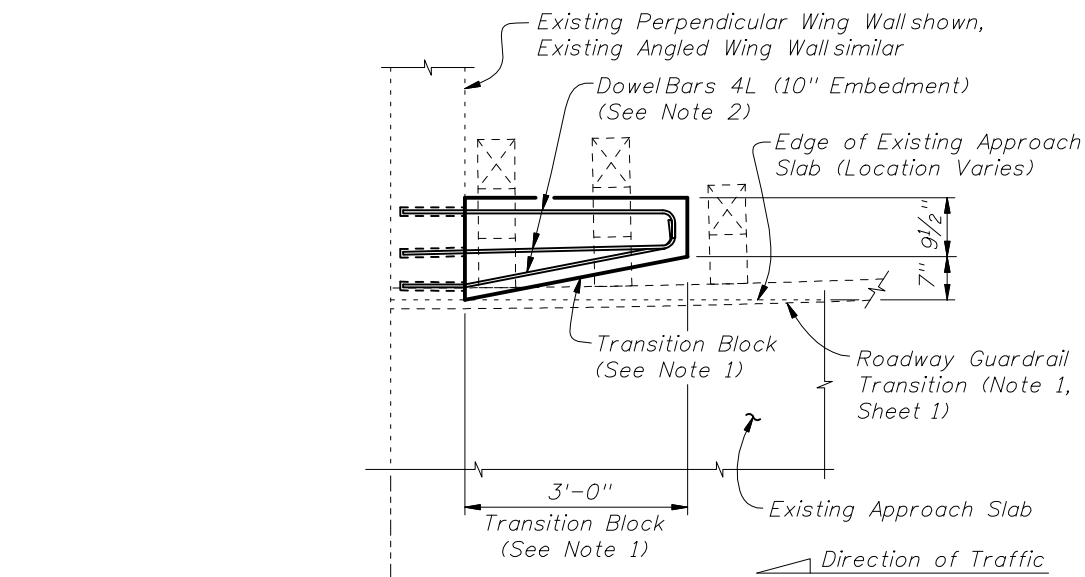


SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



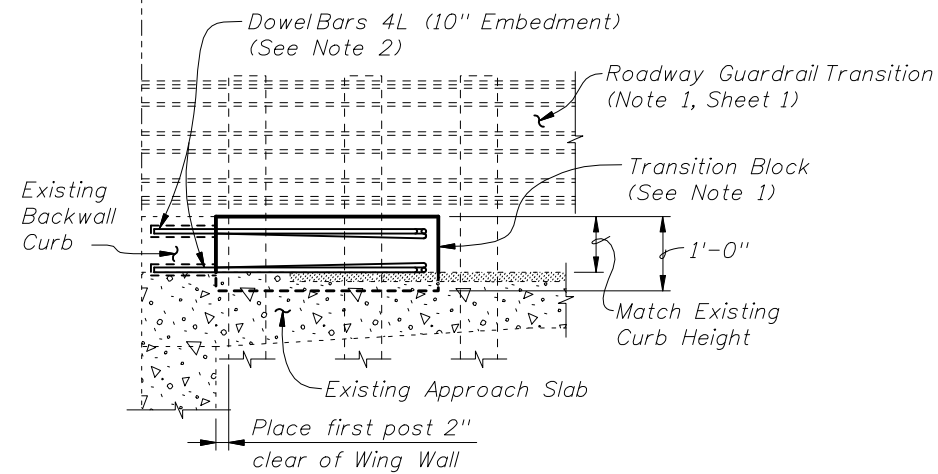
SECTION B-B
TYPICAL SECTION THRU RAILING ON WING WALL





Front Face of Backwall, Begin or End Bridge & Match Line (See Sheet 1)

PARTIAL PLAN OF GUARDRAIL

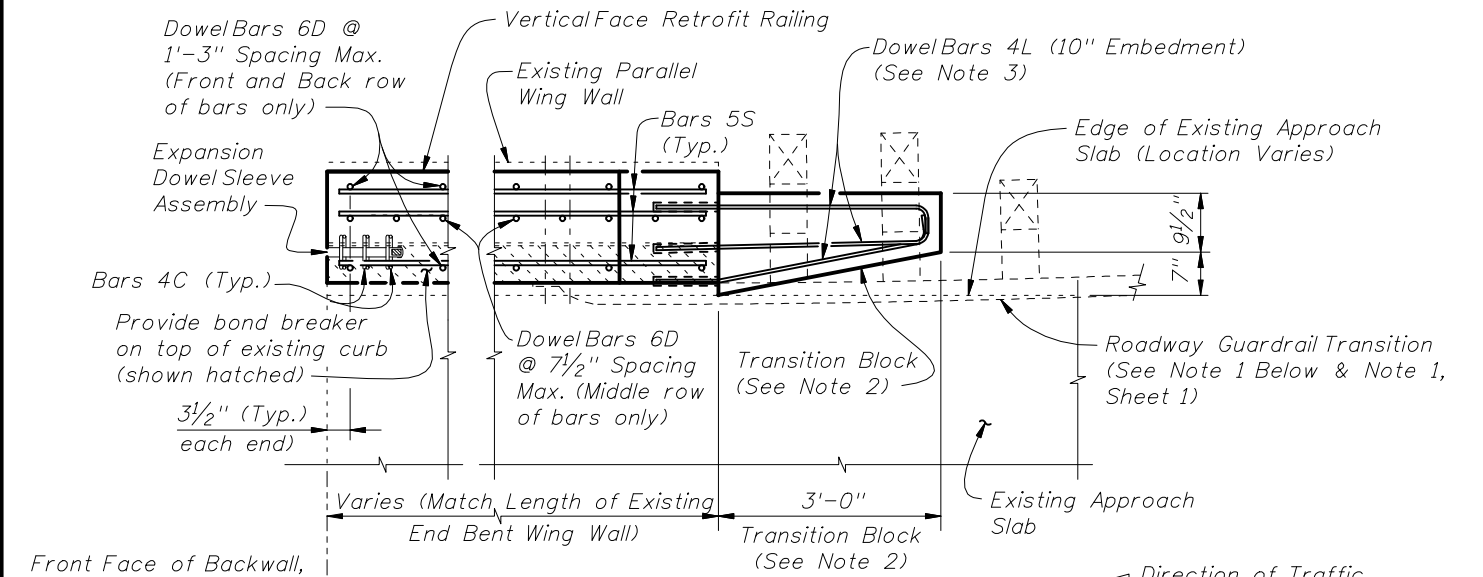


PARTIAL ELEVATION OF INSIDE FACE OF GUARDRAIL

SCHEME 1
RAILING END TREATMENT FOR
PERPENDICULAR OR ANGLED WING WALLS

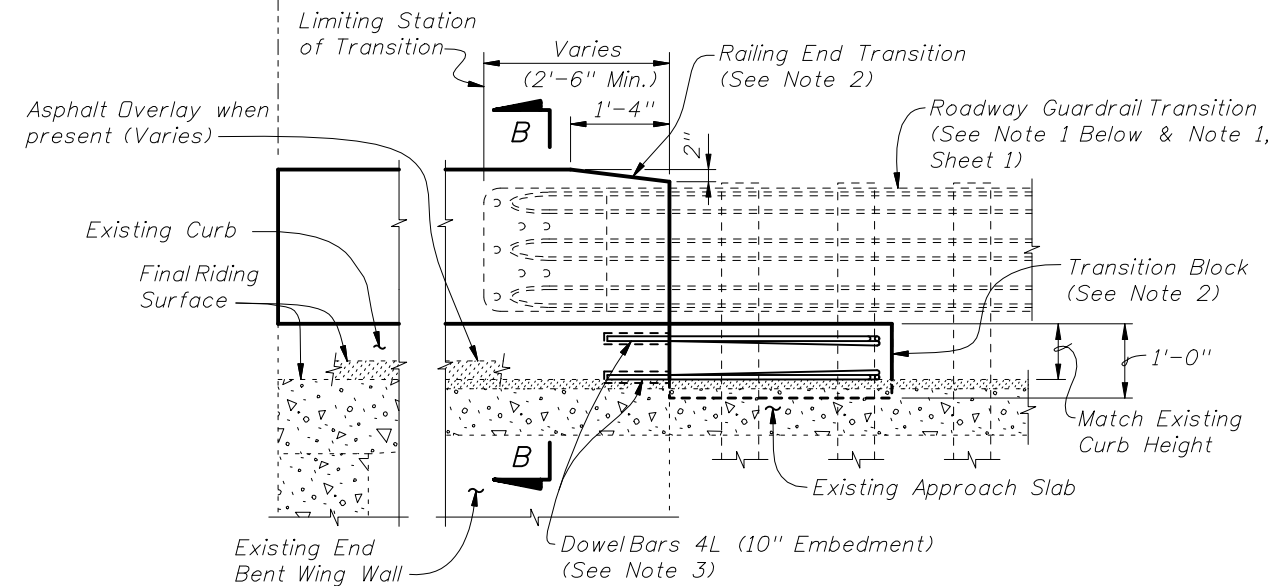
SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.
2. Field bend DowelBars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.
3. If a Special Steel Guardrail Post is required for attachment to the top of a sloping Wing Wall, saw cut and remove a wedge shaped portion of the sloping Wing Wall as required to provide a level surface for post installation.



Front Face of Backwall, Begin or End Bridge & Match Line (See Sheet 1)

PARTIAL PLAN OF RAILING

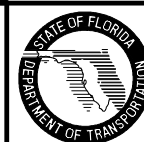


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 2
RAILING END TREATMENT FOR
PARALLEL WING WALLS

SCHEME 2 NOTES:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing.
2. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend beyond end of existing End Bent Wing Wall, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.
3. Field bend DowelBars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



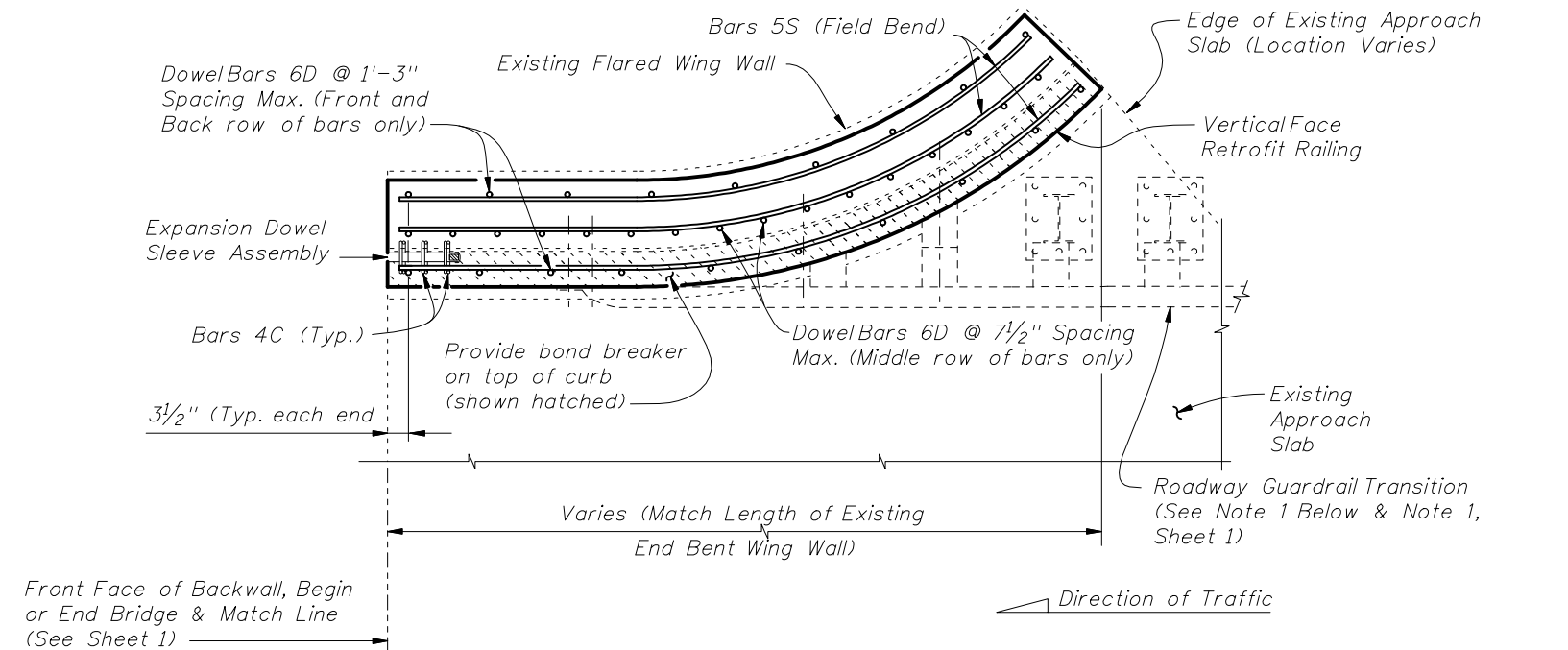
2010 FDOT Design Standards

TRAFFIC RAILING - (VERTICAL FACE RETROFIT)
INTERMEDIATE CURB

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2 of 3

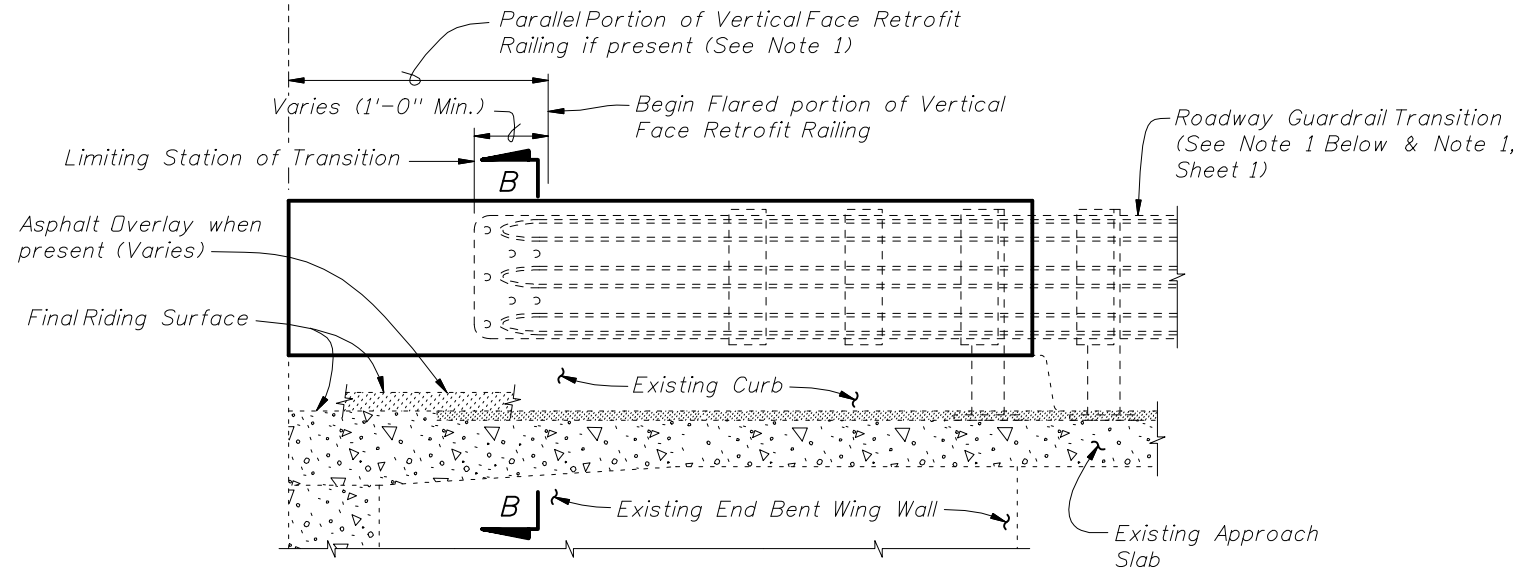
Index No.
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SCHEME 3 NOTE:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Three-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.

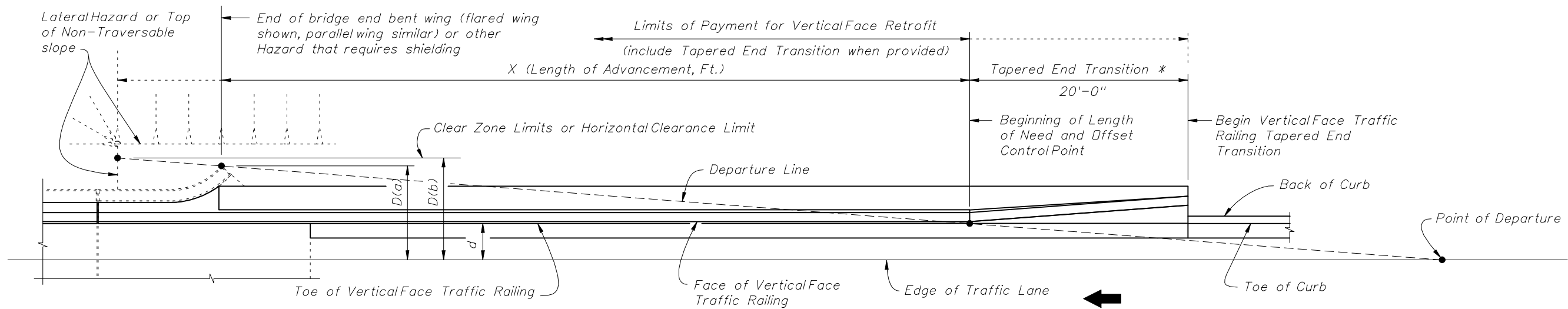
PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

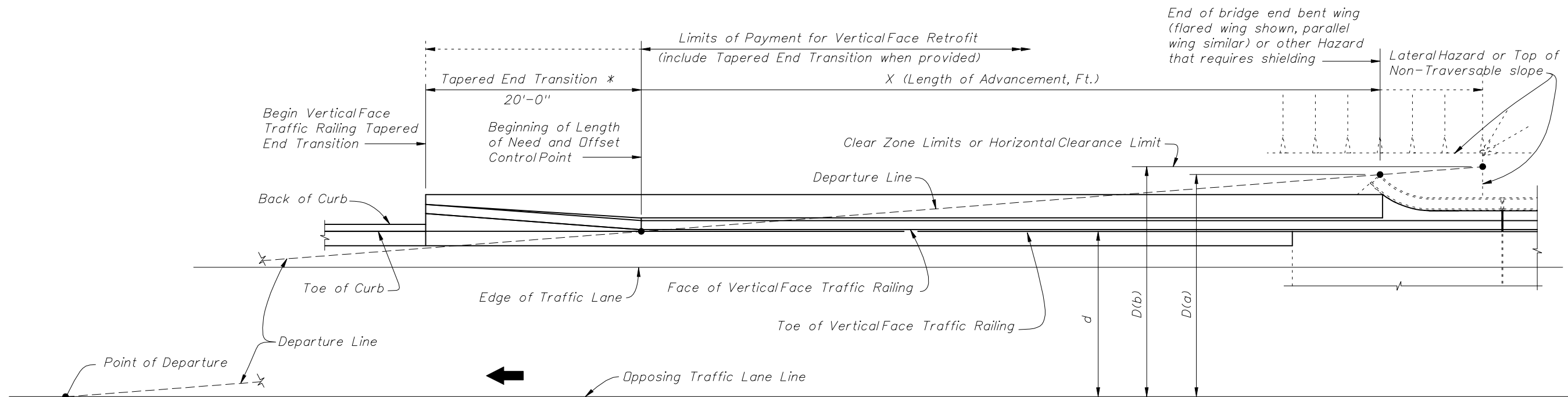
SCHEME 3
RAILING END TREATMENT FOR
FLARED WING WALLS





* Guardrail or Crash Cushion may also be shown in the Contract Plans, in lieu of the Tapered End Transition.

SCHEMATIC PLAN VIEW - NEAR LANE APPROACH



SCHEMATIC PLAN VIEW - OPPOSING LANE APPROACH

LENGTH OF ADVANCEMENT - TAPERED END TRANSITION (40 MPH OR LESS)

Design Speed (mph)	Length of Advancement, Ft. (X)
≤ 40	= 16 (D-d)

Notes:

- The minimum length of advancement for both near lane and opposing lane approaches is 20'.
- For Design Speeds greater than 40 mph the Tapered End Transition is not permitted. See Index No. 400 for length of Advancement of guardrail or other project specific end treatments.

DESIGN NOTES:

The Tapered End Transition should only be used when space is limited which precludes the use of a guardrail end treatment or crash cushion.

D = Distance in feet from near edge of near approach traffic lane to either:
 (a) the back of hazard, when the hazard is located inside the clear zone or horizontal clearance;
 (b) the clear zone or horizontal clearance outer limits, when hazard extends to, or goes beyond the clear zone or horizontal clearance limits.

For left side hazards on two way undivided facilities, "D" is measured from the inside edge of the near approach traffic lane as shown above.

d = Distance in feet from near edge of near approach traffic lane to face of traffic railing (at offset control point). For left side hazards on two-way undivided facilities "d" is measured from the inside edge of the nearest opposing traffic lane as shown above.

CROSS REFERENCES:

For General Notes, Dowel Details, Expansion Dowel Details, Reinforcing Steel Notes and Reinforcing Steel Bending Diagram see Index No. 480.



2010 FDOT Design Standards

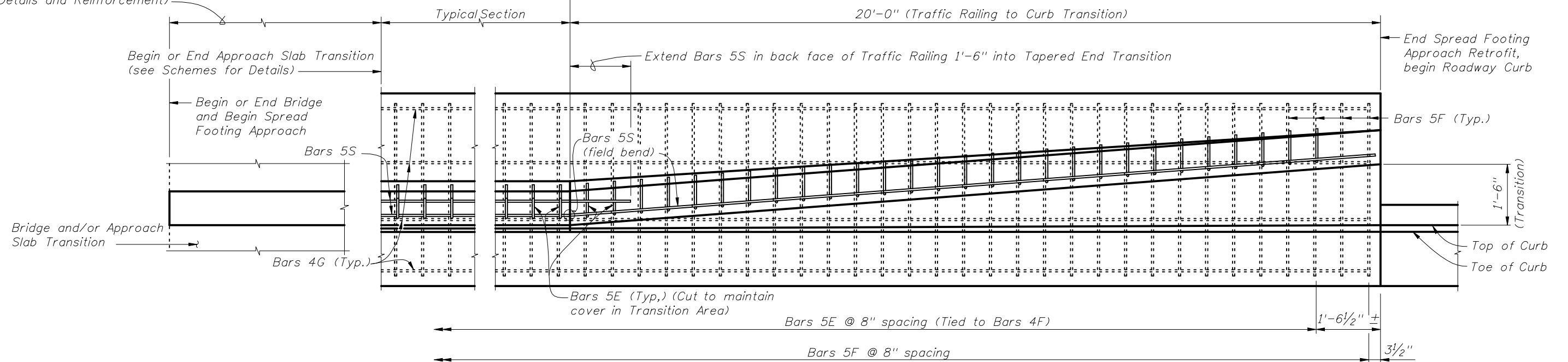
TRAFFIC RAILING - (VERTICAL FACE RETROFIT)
 SPREAD FOOTING APPROACH

Last Revision
 07/01/09

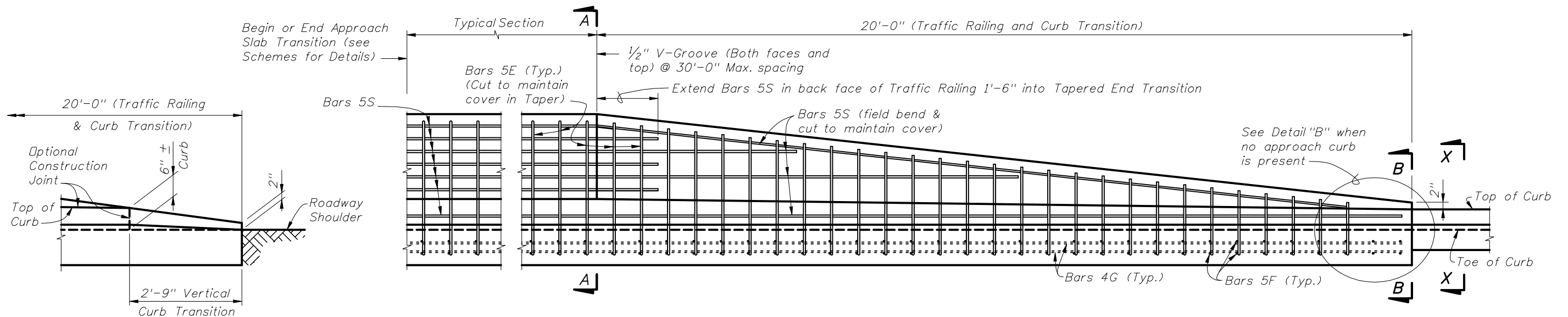
Sheet No.
 1 of 10

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 484

Approach Slab Transition
(See Schemes 1 thru 7 for
Details and Reinforcement)



PARTIAL PLAN VIEW

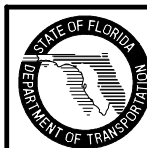


PARTIAL ELEVATION VIEW

DETAIL "B"
TRANSITION TO NON-CURB APPROACH
(Reinforcing Not Shown For Clarity)

TAPERED END TRANSITION

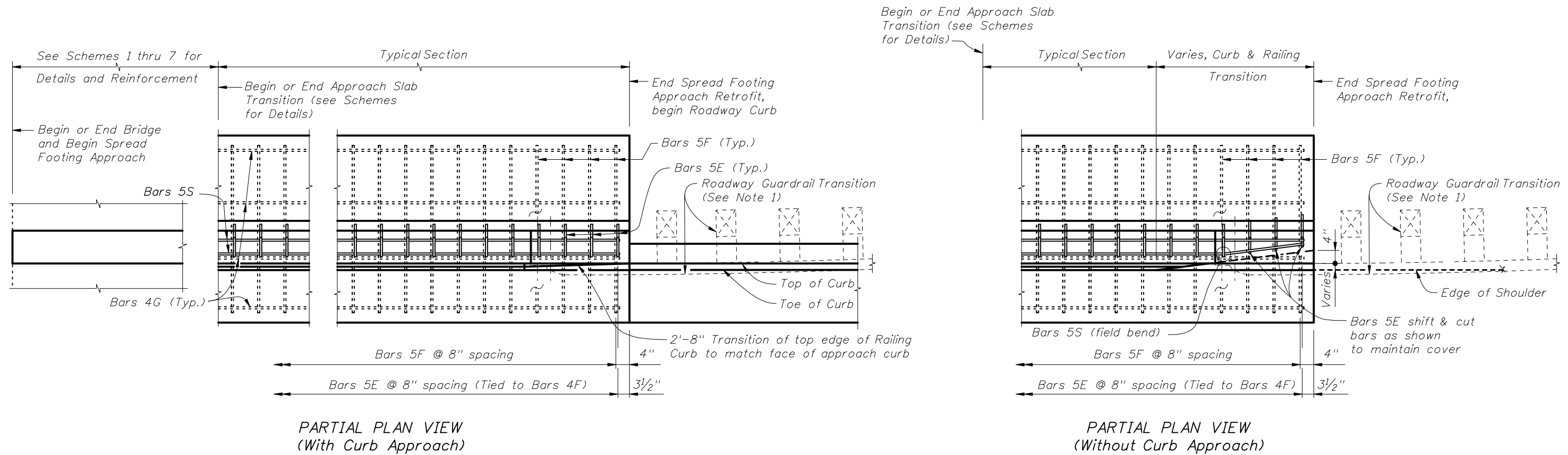
CROSS REFERENCES:
For Section A-A, B-B and X-X see Sheet 4.



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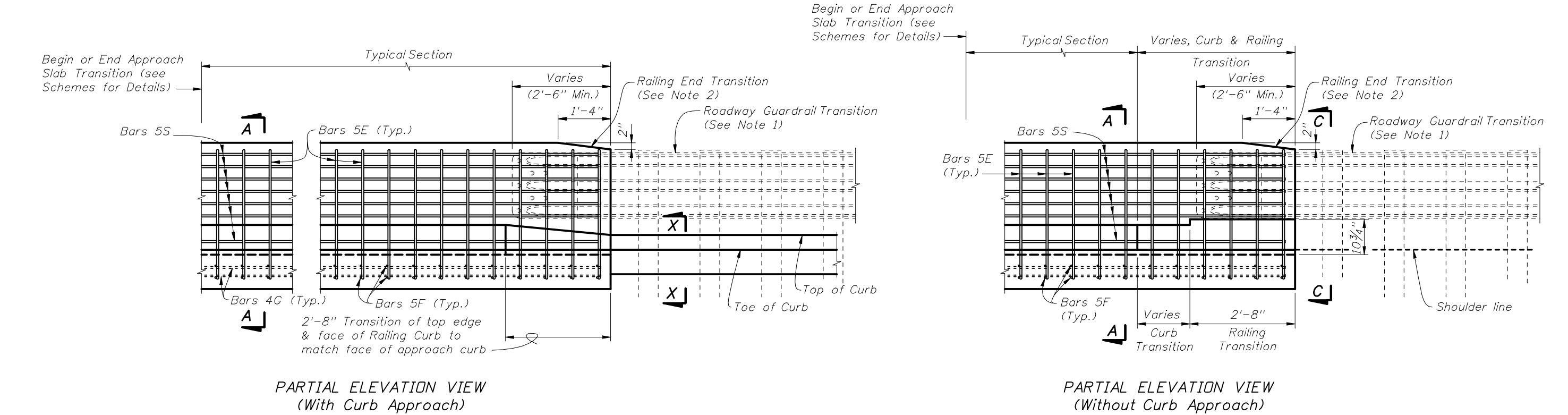
**TRAFFIC RAILING - (VERTICAL FACE RETROFIT)
SPREAD FOOTING APPROACH**

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PARTIAL PLAN VIEW
(With Curb Approach)

PARTIAL PLAN VIEW
(Without Curb Approach)



PARTIAL ELEVATION VIEW
(With Curb Approach)

PARTIAL ELEVATION VIEW
(Without Curb Approach)

GUARDRAIL END TRANSITION

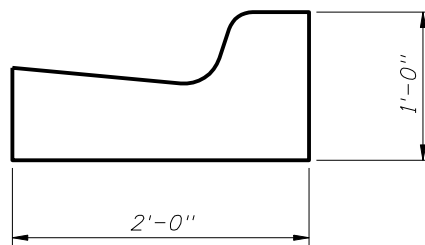
- NOTES:
1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (Sheet 16 - Scheme 1) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment.
 2. Provide Railing & Curb Base Transitions (as shown) if curb does not extend beyond end of Spread Footing Approach, see Roadway Plans. Railing End Transition & Railing & Curb Base Transitions may be omitted on trailing ends with no opposing traffic.

CROSS REFERENCES:
For Section A-A, C-C and X-X see Sheet 4.



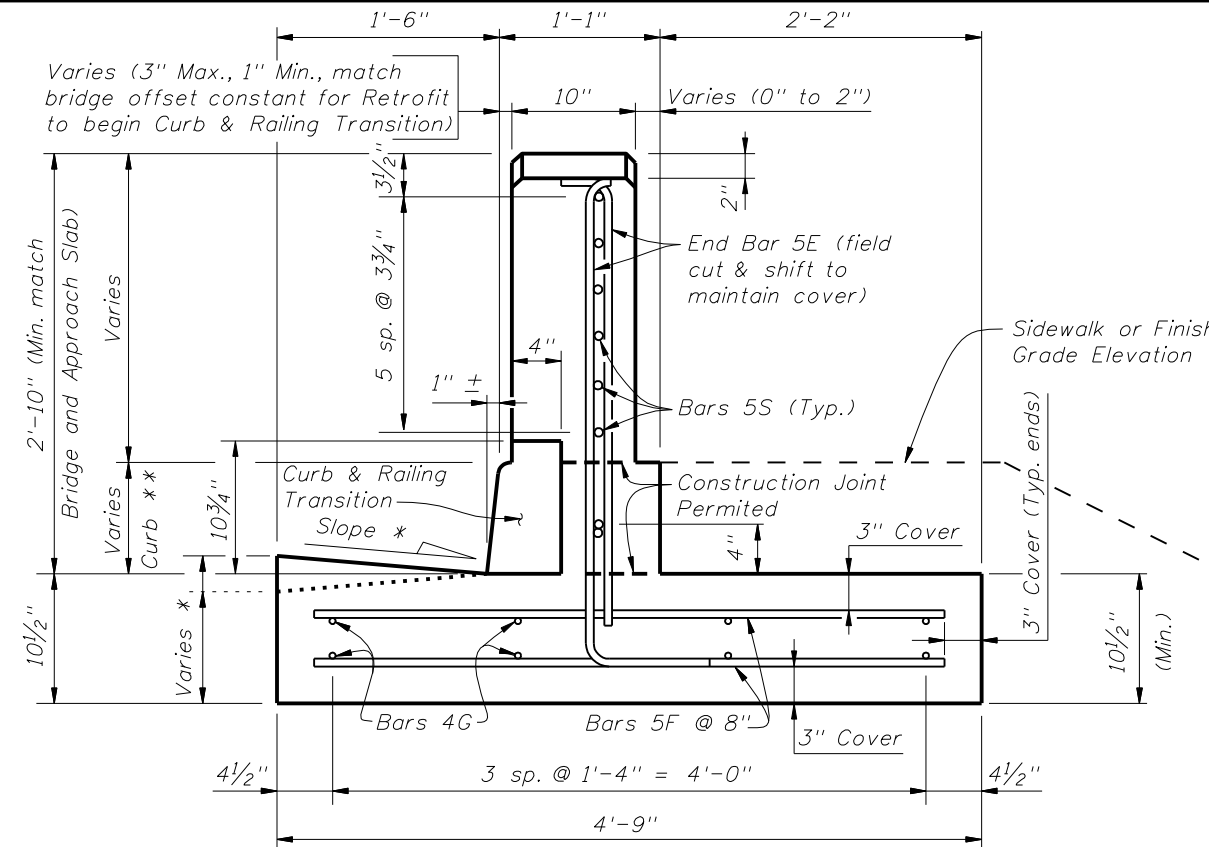
ESTIMATED TRAFFIC RAILING RETROFIT SPREAD FOOTING APPROACH QUANTITIES		
ITEM	UNIT	QUANTITY
		9" Curb
Concrete - Typical Section	CY/Ft.	0.25
Reinforcing Steel - Typical Section	Lb./Ft.	38
Concrete - 20'-0" Tapered End Transition plus Footing	CY	4.57 Total
Reinforcing Steel - 20'-0" Tapered End Transition plus Footing	Lb.	776 Total

NOTE: Quantities are based on a 9" curb, no curb cross slope.

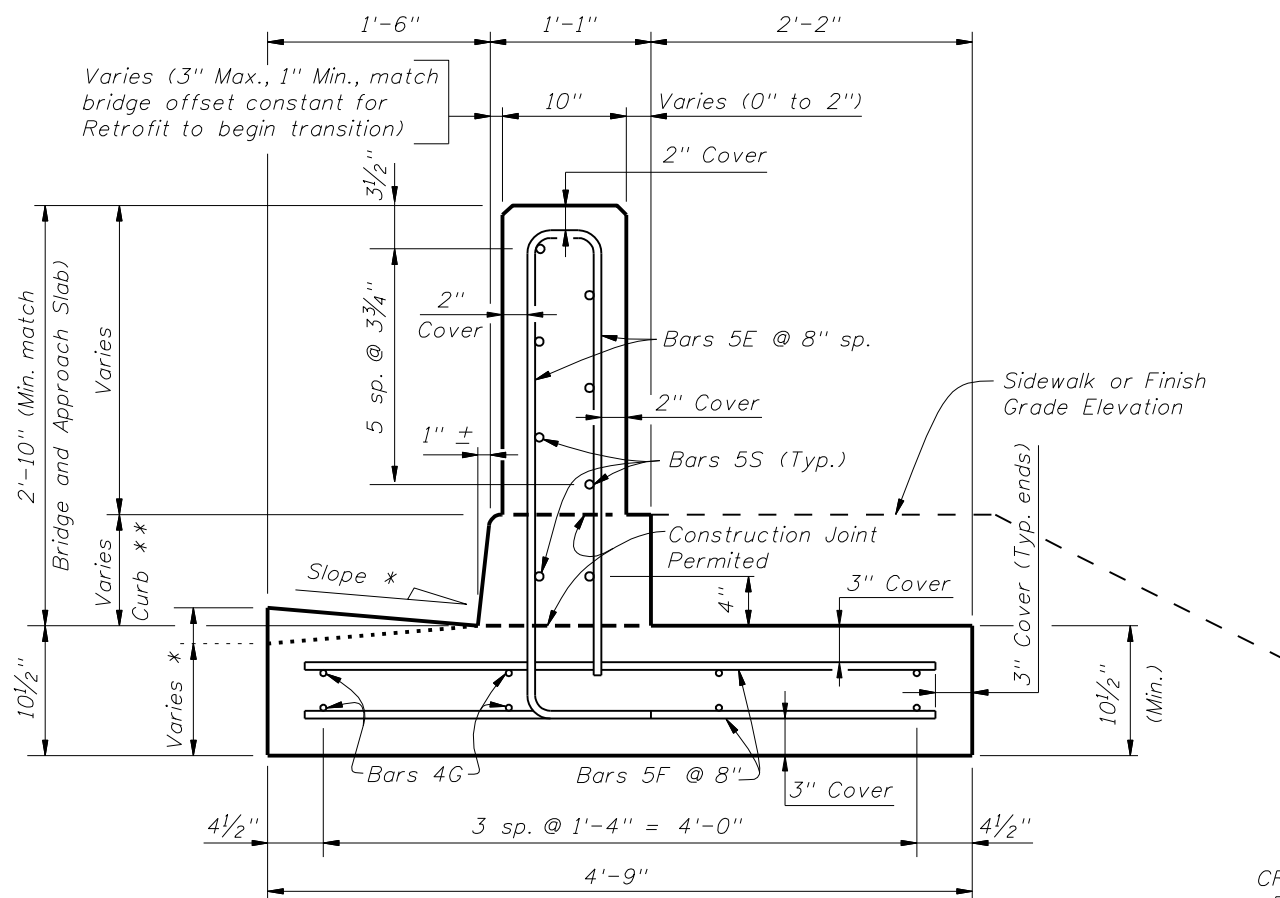


SECTION X-X (TYPICAL CURB, TYPE VARIES, TYPE F SHOWN)
(See Index No. 300 and Plans for Details)

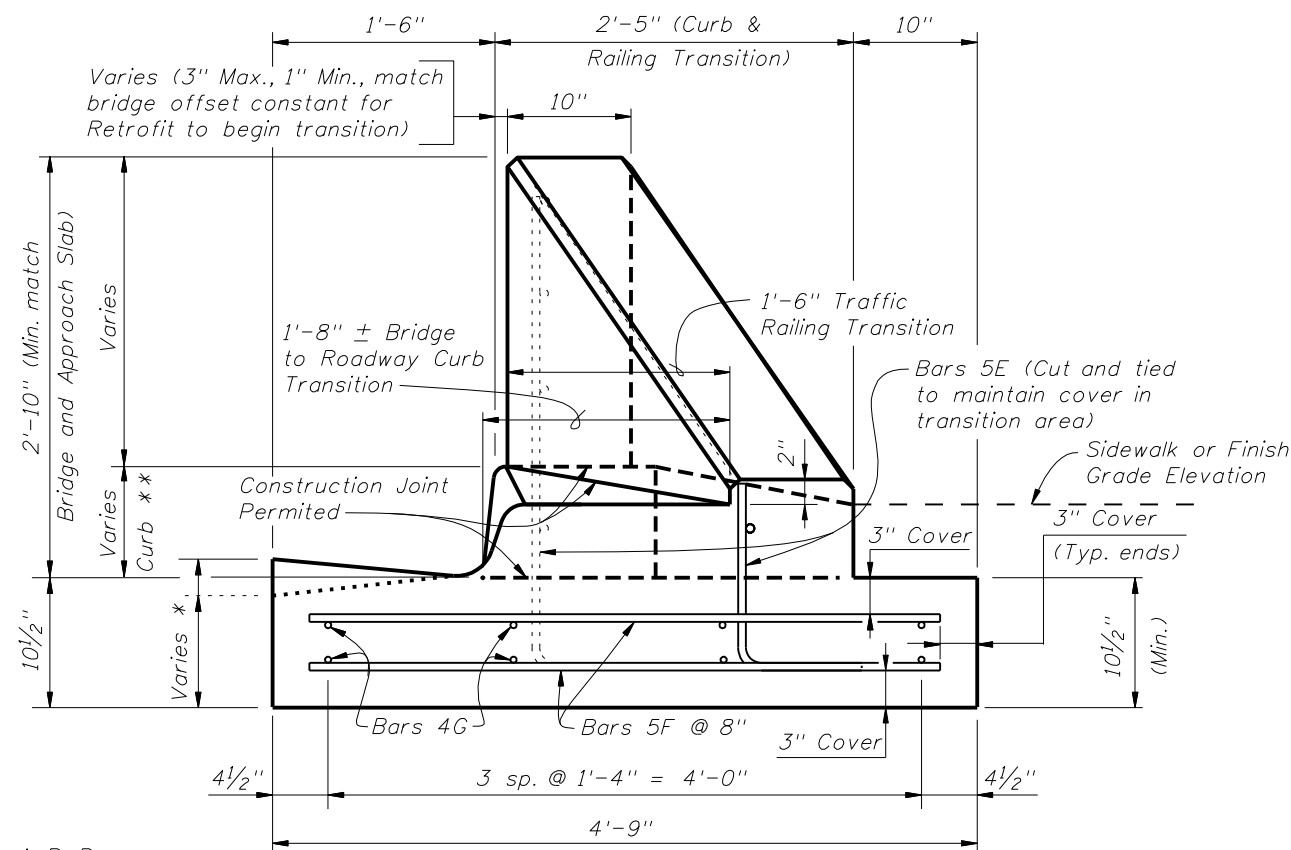
- * Match Cross Slope of high side and low side at begin or end bridge or approach slab.
- ** Match curb height of adjacent bridge and approach slab. Adjust height in Transition area to match adjoining Roadway curb.



SECTION C-C
(GUARDRAIL END TRANSITION)



SECTION A-A
TYPICAL SECTION
(9" Curb shown, 6" Curb similar)



SECTION B-B
TAPERED END TRANSITION
(Bars 5S not shown for clarity)

CROSS REFERENCES:
For location of Sections A-A, B-B and X-X see Sheet 2.
For location of Section C-C see Sheet 3.



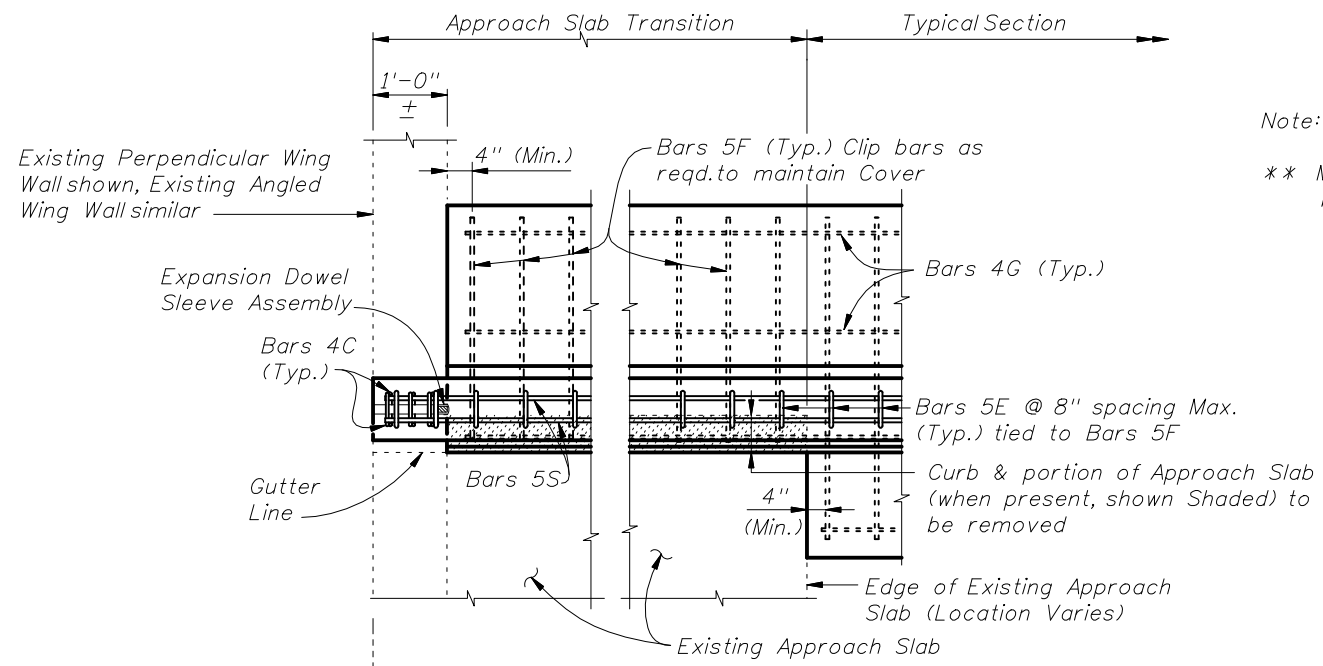
2010 FDOT Design Standards

TRAFFIC RAILING - (VERTICAL FACE RETROFIT)
SPREAD FOOTING APPROACH

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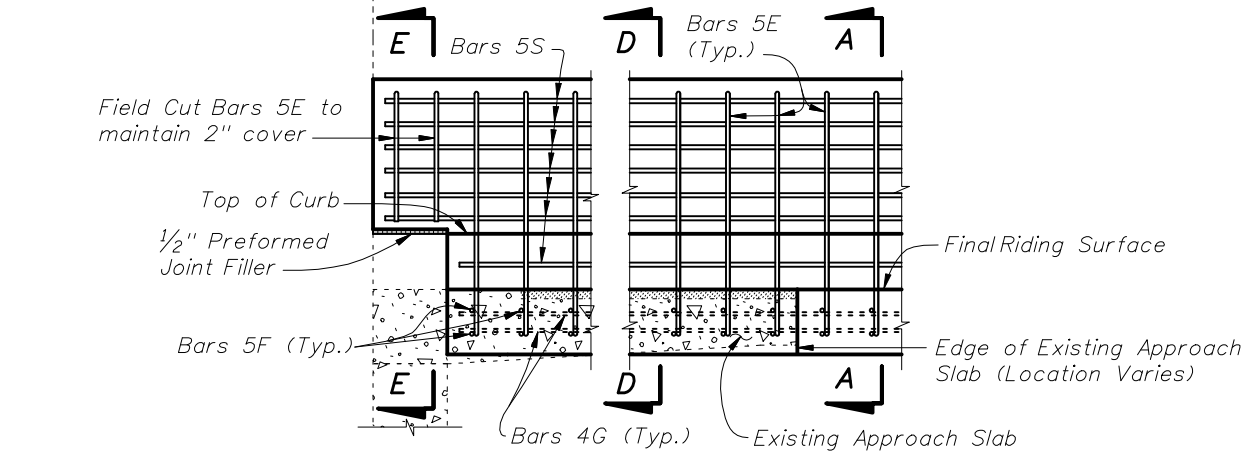
Index No.
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Note:
 ** Match curb height of adjacent bridge and approach slab.

Front Face of Backwall, Begin or End Bridge & Match Line (See Index No. 481, 482 & 483 Sheet 1)

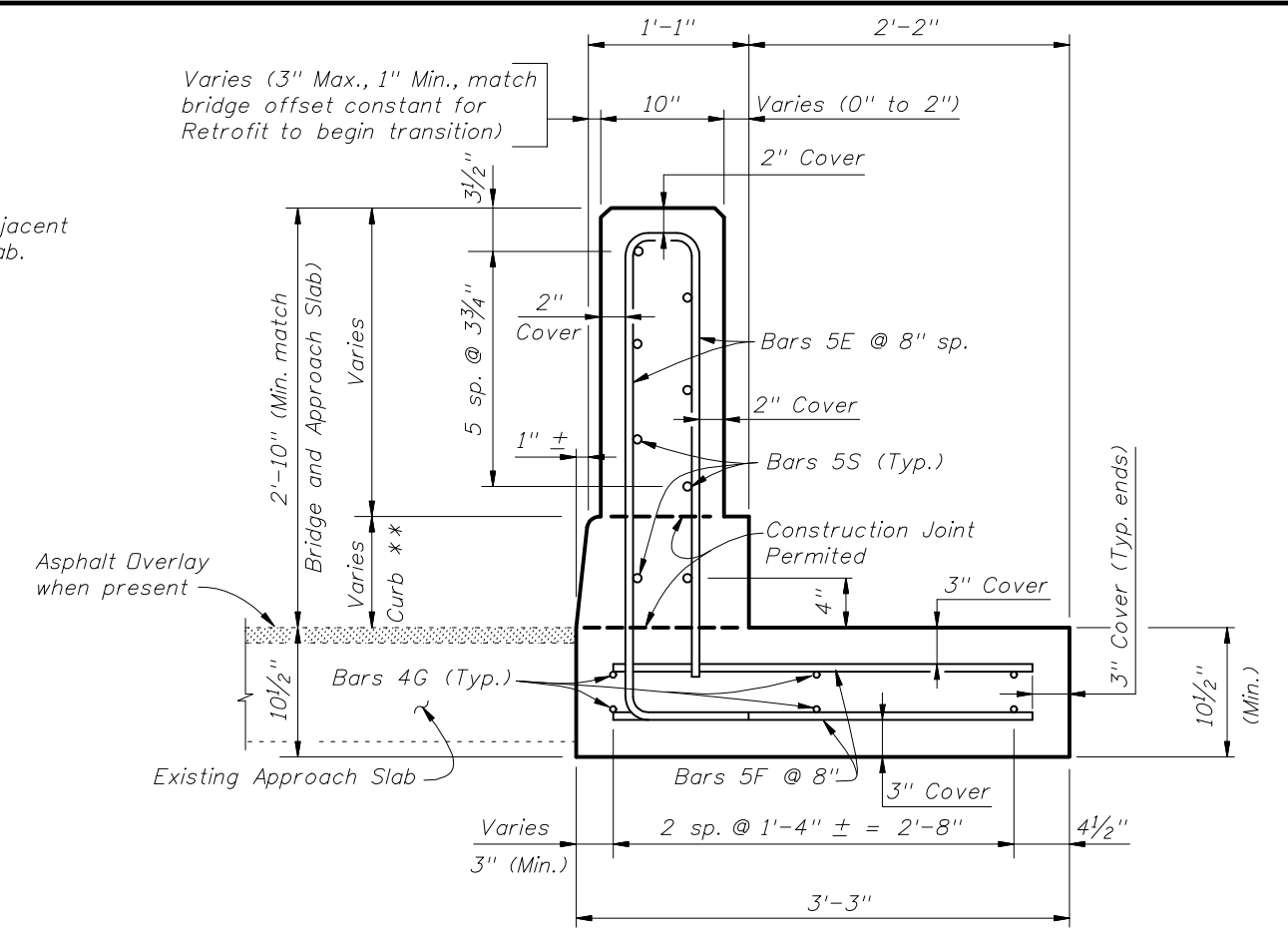
PARTIAL PLAN



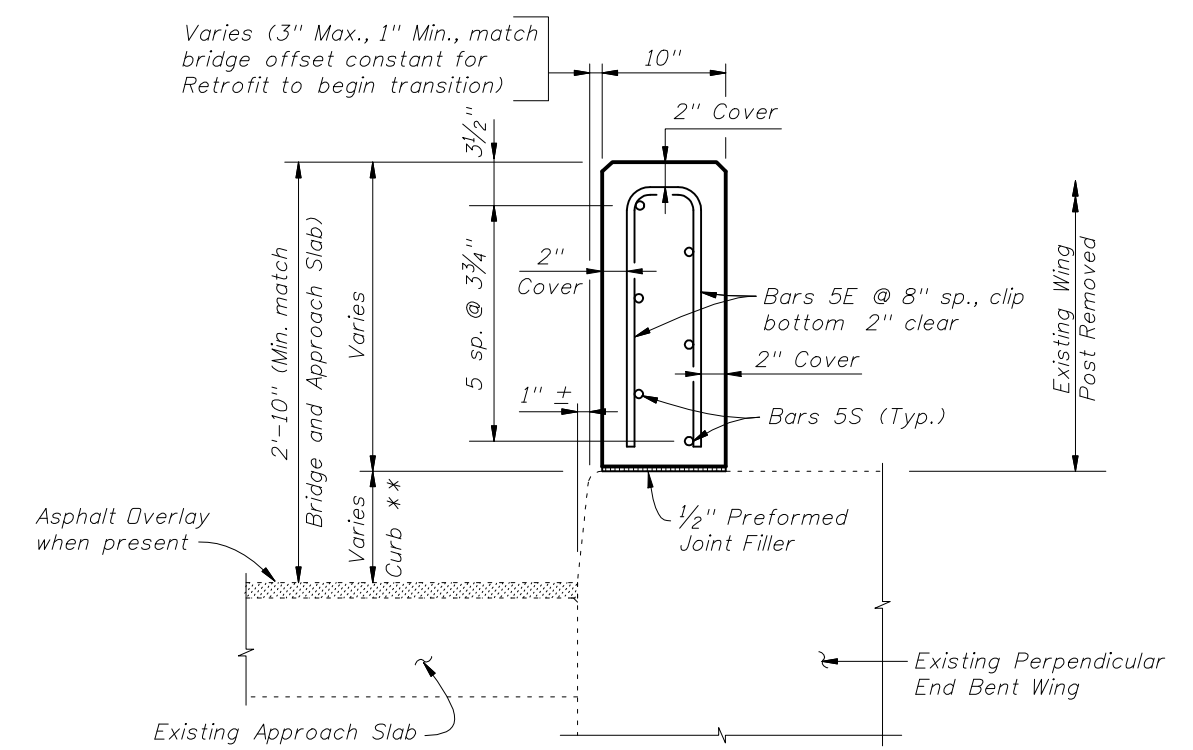
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
 (Expansion Dowel Assemblies and Bars 4C not shown for clarity)

SCHEME 1 ~ MODIFICATION FOR INDEX NO. 481, 482 AND 483 - SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS WITH NARROW CURBS (SHOWN), WIDE CURBS AND INTERMEDIATE CURBS (SIMILAR)

CROSS REFERENCE:
 For Section A-A see Sheet 4.
 For Expansion Dowel Assembly and placement of Dowel Bars 6D Details see Index 480.

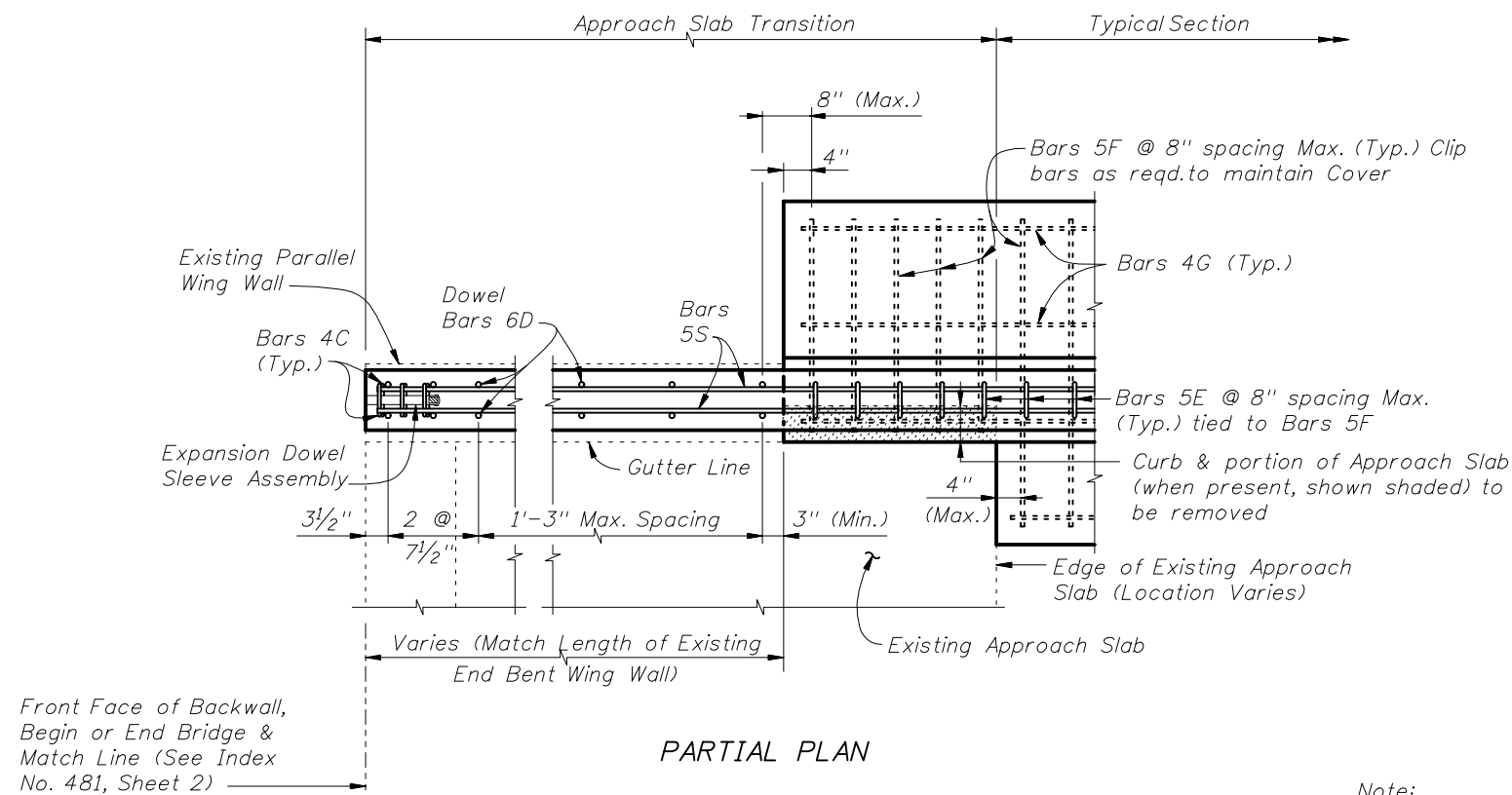


SECTION D-D



SECTION E-E (NARROW CURB SHOWN, WIDE AND INTERMEDIATE CURBS SIMILAR)

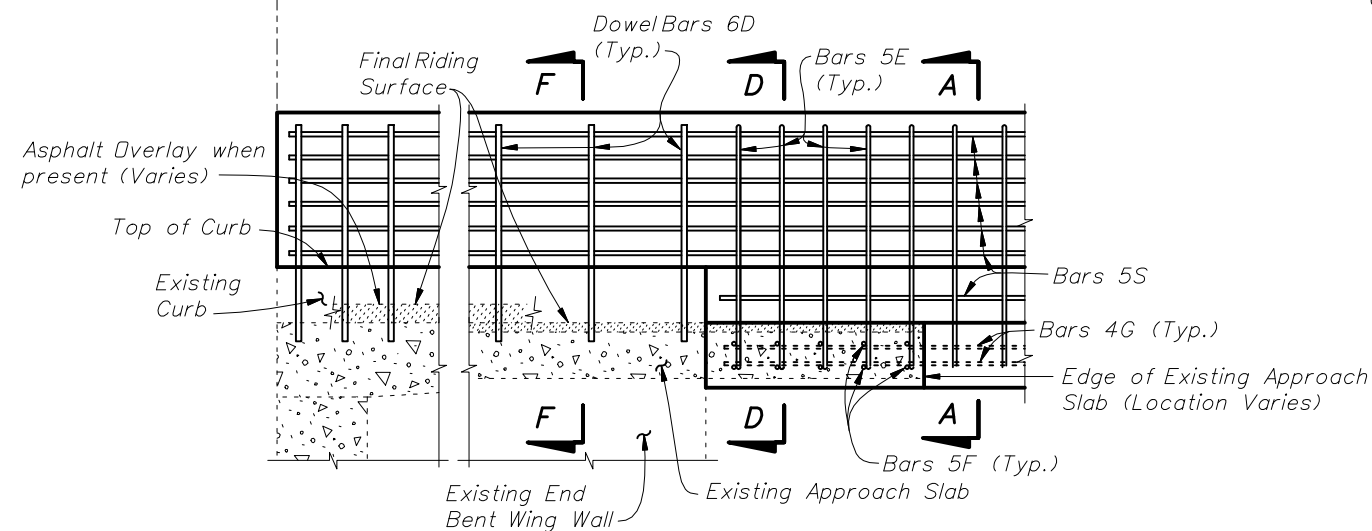




Front Face of Backwall, Begin or End Bridge & Match Line (See Index No. 481, Sheet 2)

PARTIAL PLAN

Note:
** Match curb height at adjoining existing end bent wing.

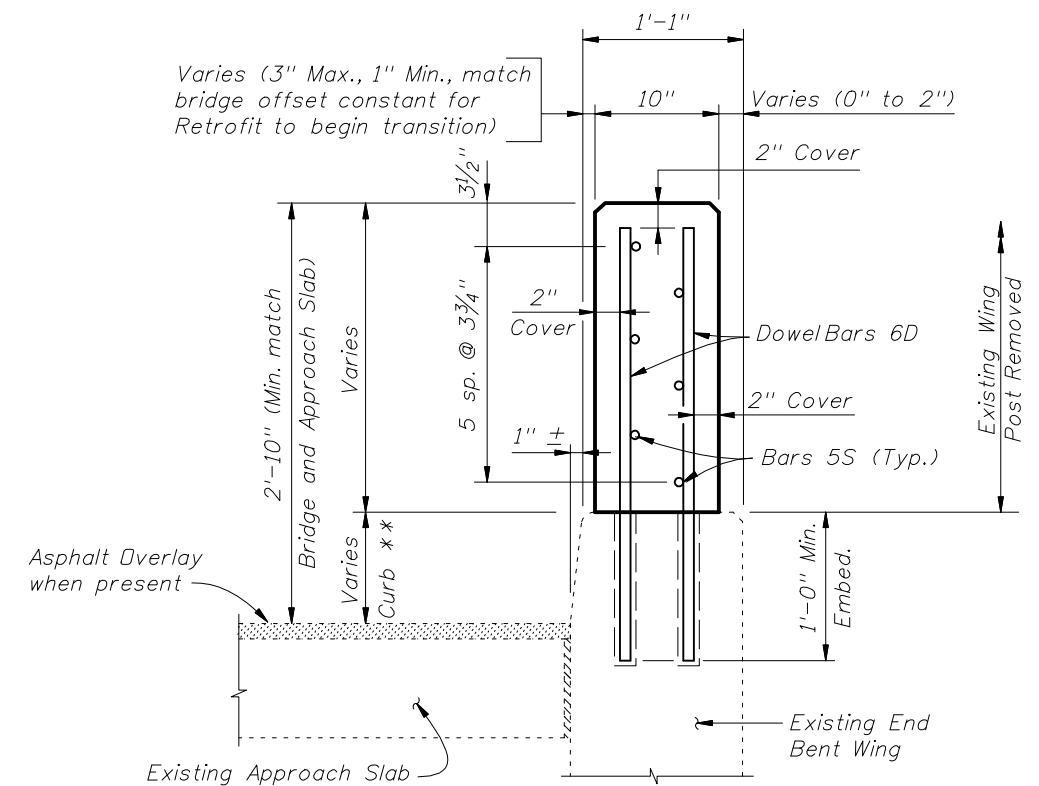


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)

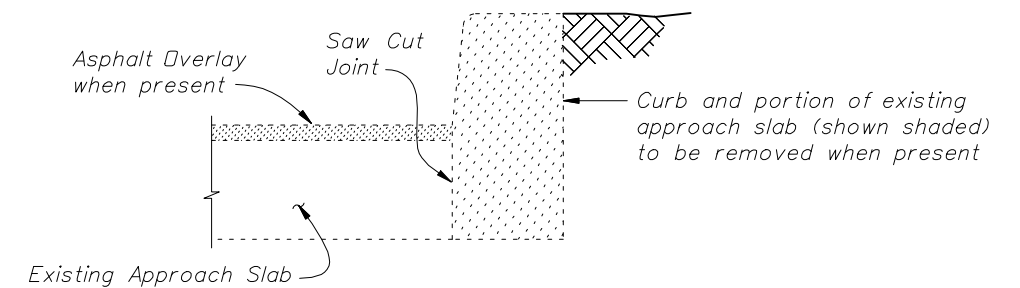
SCHEME 2 ~ MODIFICATION FOR INDEX NO. 481 - SCHEME 2
RAILING END TREATMENT FOR PARALLEL WING WALLS WITH NARROW CURBS

NOTES:

1. Remove existing concrete along saw cut joints. Existing reinforcing steel may be cut at joint or extended into new concrete. Exposed existing reinforcing not encased in new concrete shall be removed 1" below existing concrete surface and grouted over.



SECTION F-F



SECTION THRU EXISTING CURB AND APPROACH SLAB TO BE REMOVED
(Free Standing Curb Similar)

CROSS REFERENCES:

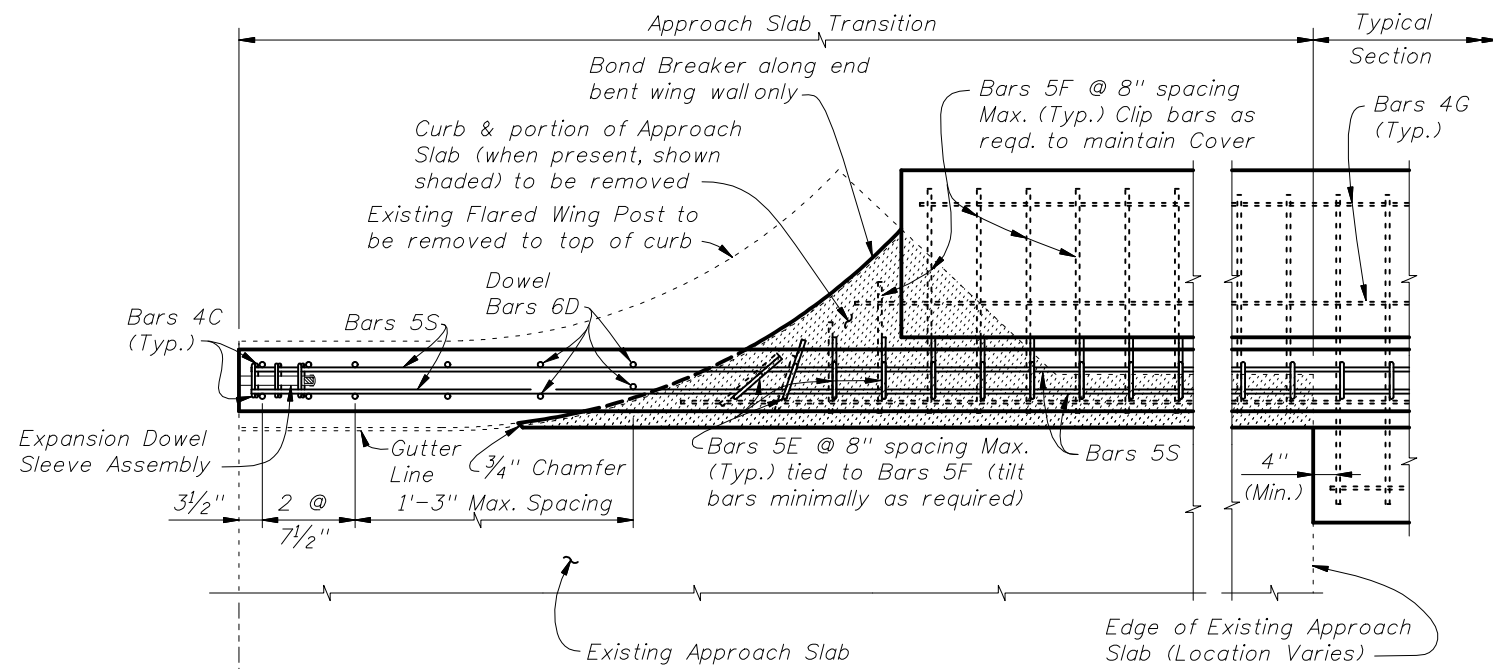
- For Section A-A see Sheet 4.
- For Section D-D see Sheet 5.
- For Expansion Dowel Assembly and placement of Dowel Bars 6D Details see Index 480.



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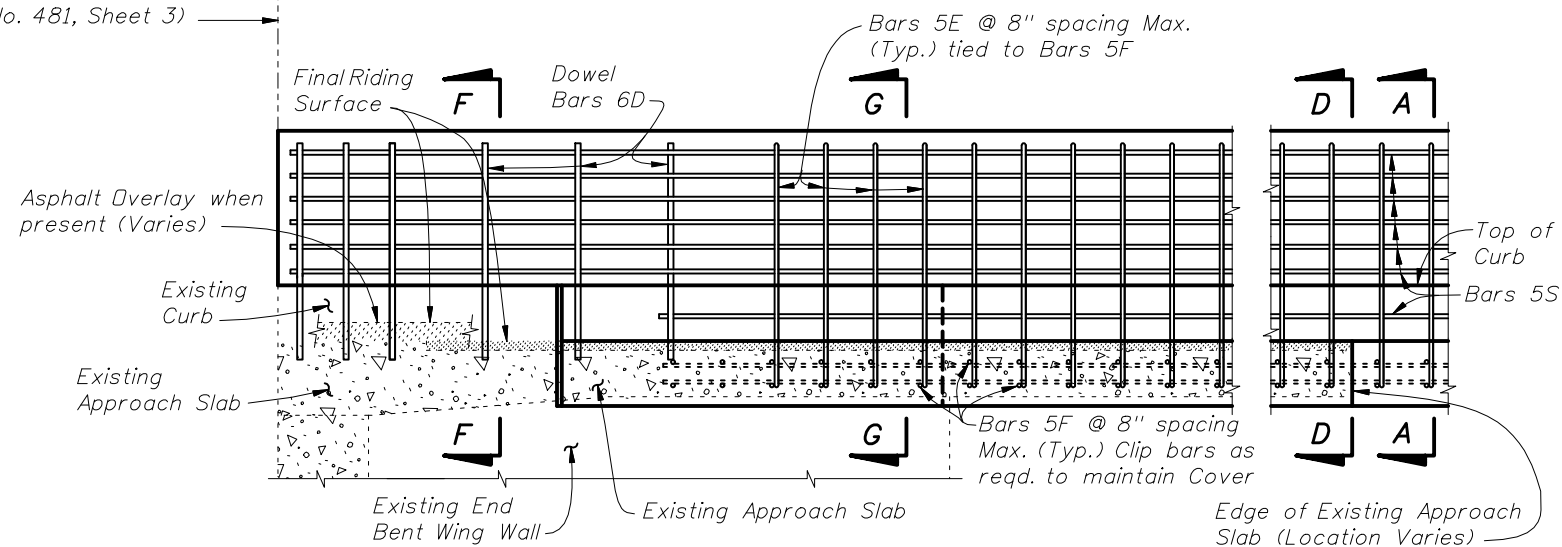
**TRAFFIC RAILING - (VERTICAL FACE RETROFIT)
SPREAD FOOTING APPROACH**

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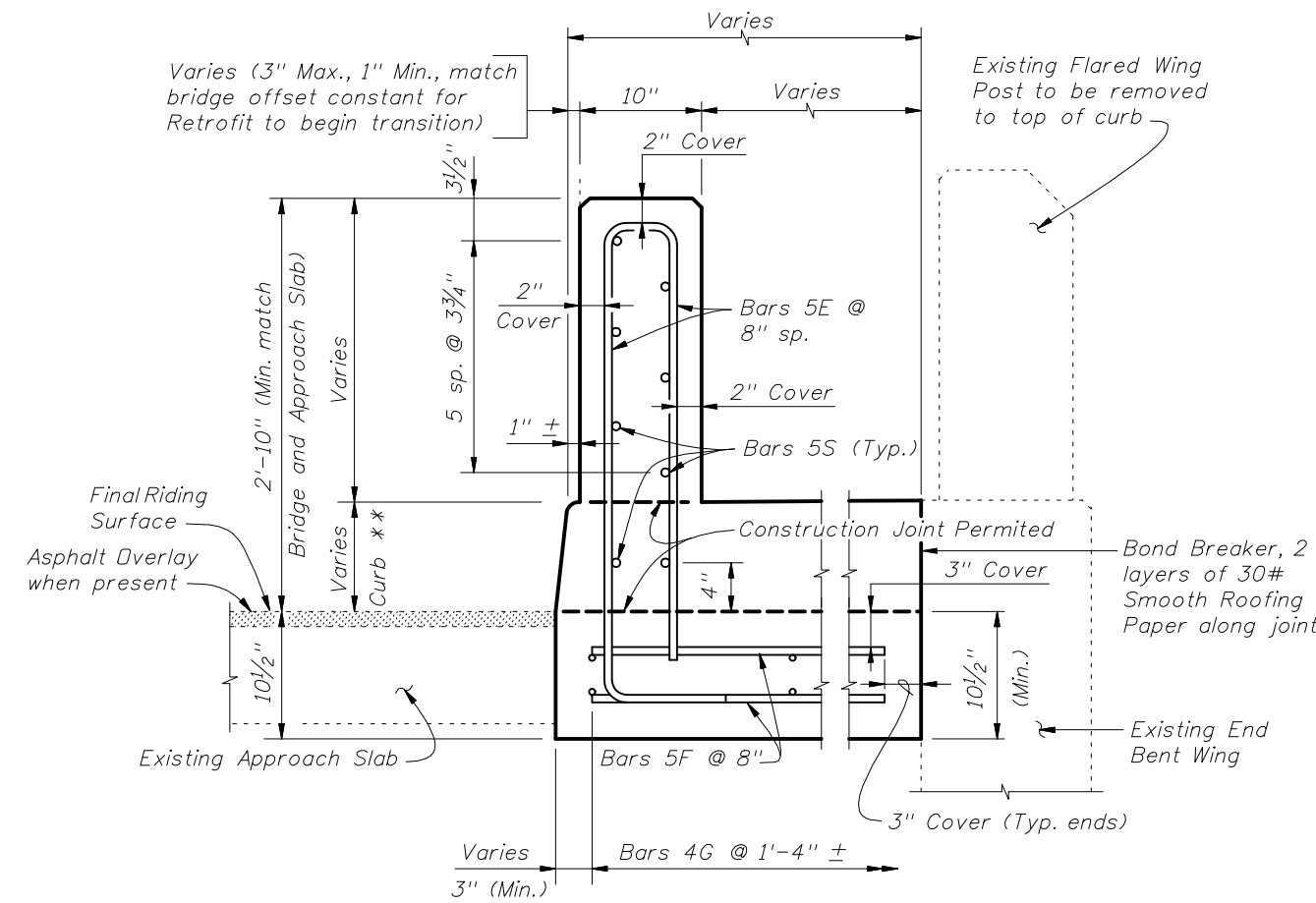
PARTIAL PLAN OF RAILING

Front Face of Backwall, Begin or End Bridge & Match Line (See Index No. 481, Sheet 3)



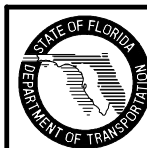
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)

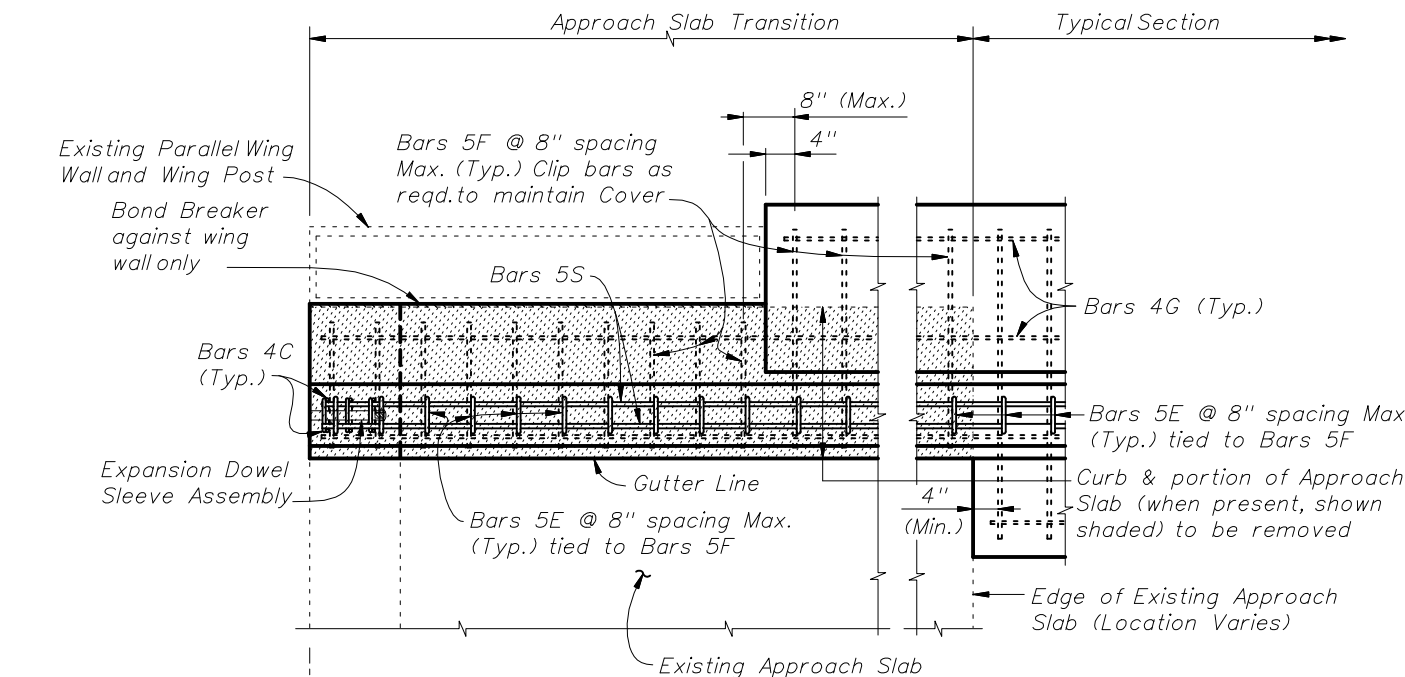
SCHEME 3 ~ MODIFICATION FOR INDEX NO. 481 SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS
WITH NARROW CURBS



Note:
** Match curb height at adjoining existing end bent wing.

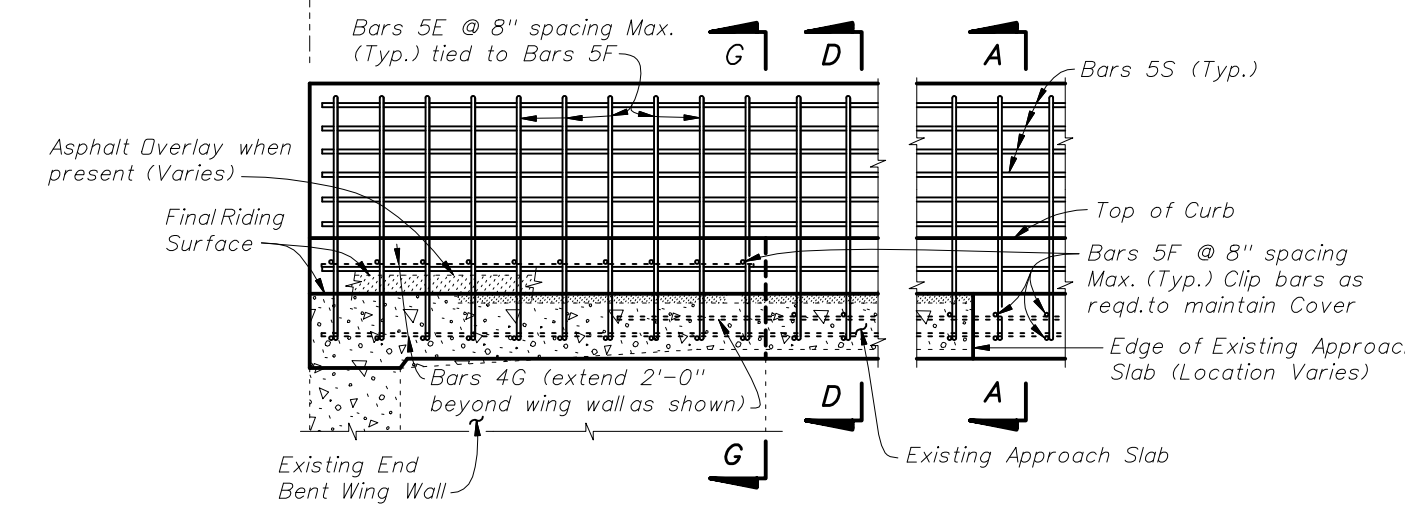
CROSS REFERENCES:
For Section A-A see Sheet 4.
For Section D-D see Sheet 5.
For Section F-F see Sheet 6.
For Expansion Dowel Assemblies Details and placement of Dowel Bars 6D see Index 480.





Front Face of Backwall, Begin or End Bridge & Match Line (See Index No. 482, Sheet 2)

PARTIAL PLAN OF RAILING

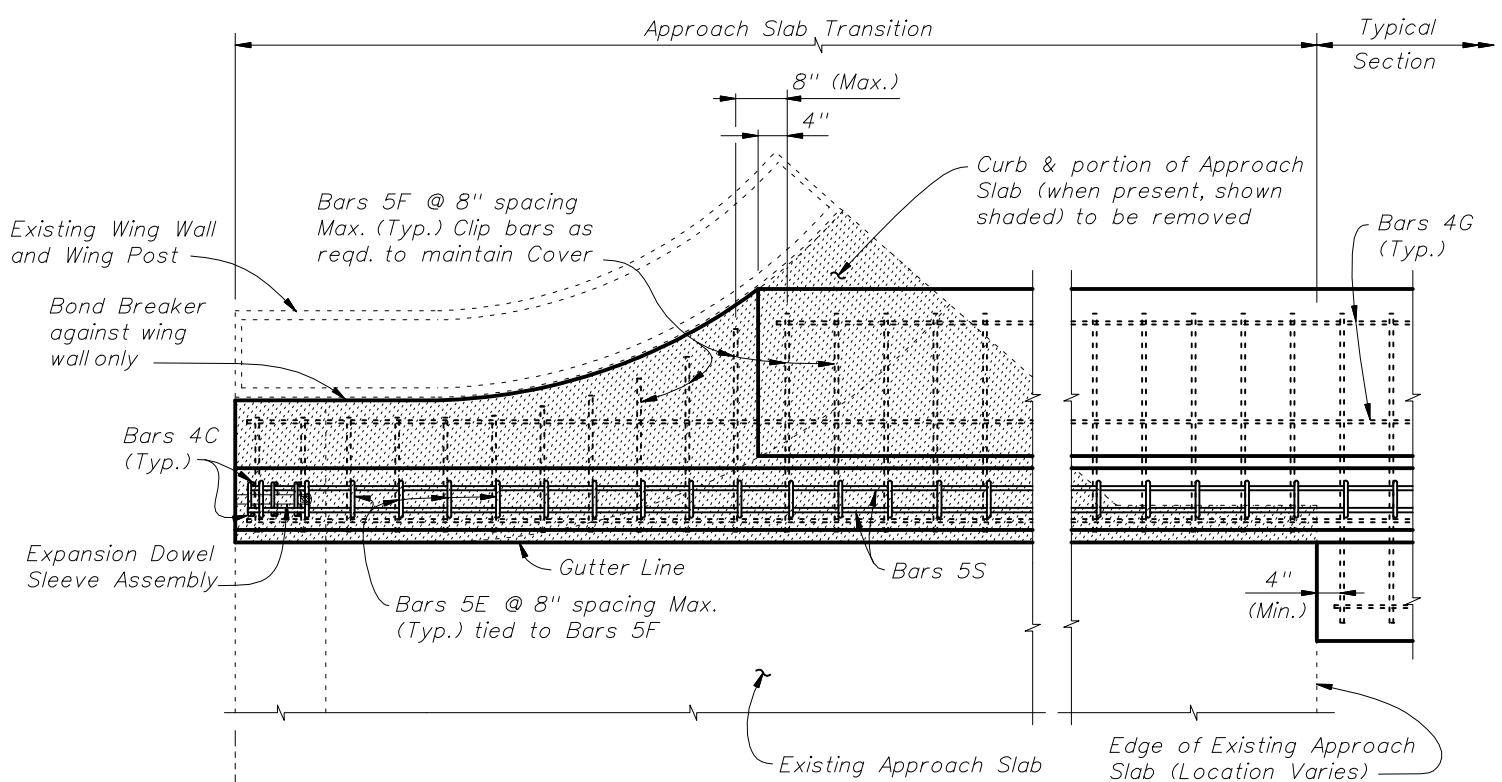


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Expansion Dowel Assemblies and Bars 4C not shown for clarity)

==== **SCHEME 4 ~ MODIFICATION FOR INDEX NO. 482 SCHEME 2** ====

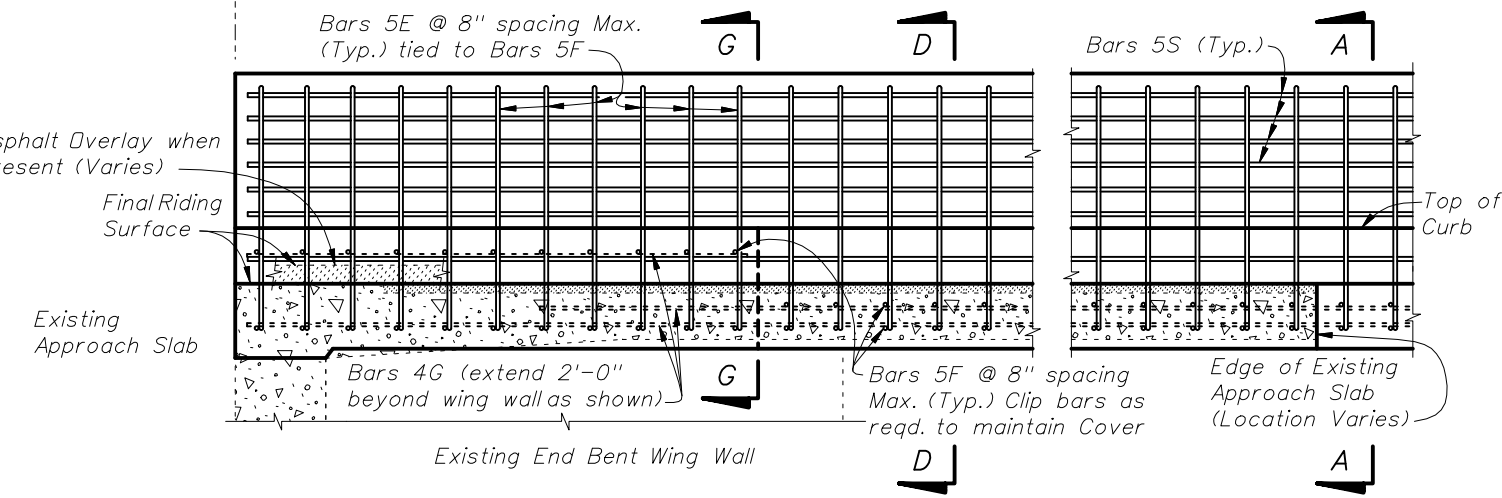
RAILING END TREATMENT FOR PARALLEL CURBS AND WING WALLS WITH WIDE CURBS

CROSS REFERENCES:
 For Section A-A see Sheet 4
 For Section D-D see Sheet 5.
 For Section G-G & H-H see Sheet 7.
 For Expansion Dowel Assemblies Details see Index 480.



Front Face of Backwall, Begin or End Bridge & Match Line (See Index No. 482, Sheet 3)

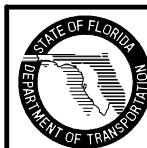
PARTIAL PLAN OF RAILING

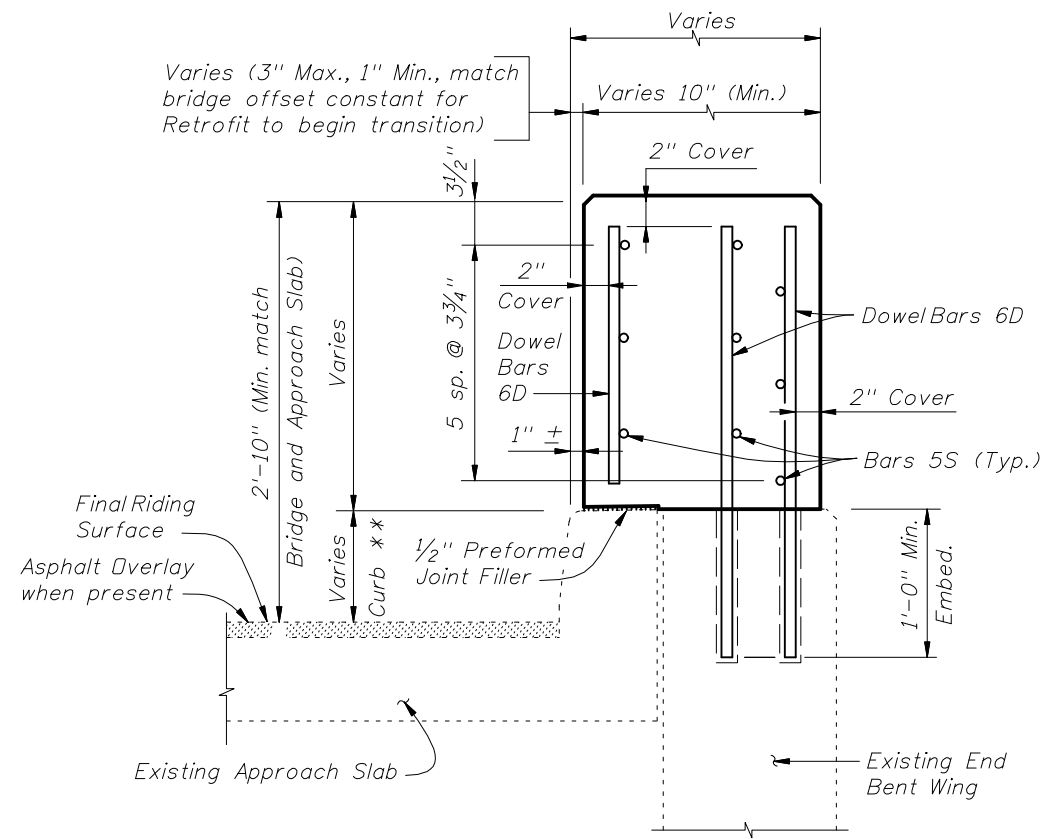
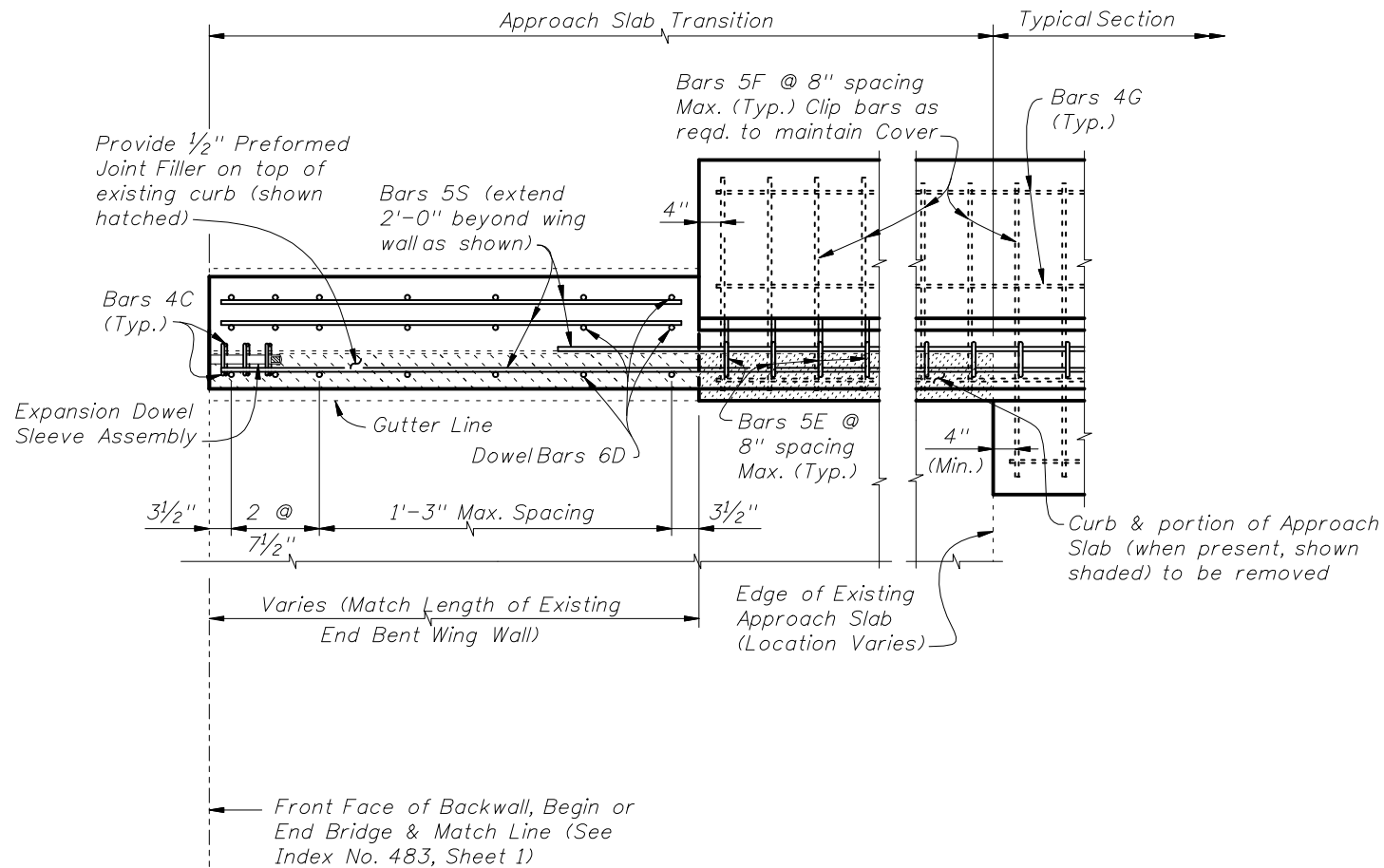


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Expansion Dowel Assemblies and Bars 4C not shown for clarity)

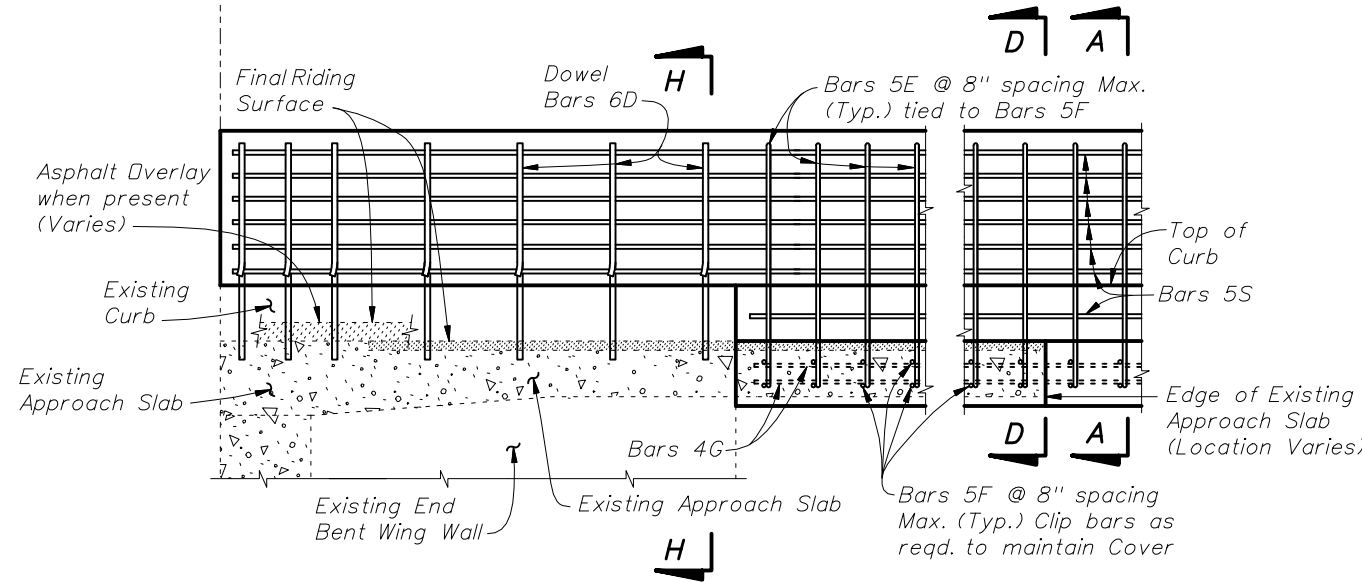
==== **SCHEME 5 ~ MODIFICATION FOR INDEX NO. 482 SCHEME 3 AND 4** ====

RAILING END TREATMENT FOR PARALLEL CURBS AND FLARED WING WALLS WITH WIDE CURBS





Note:
 ** Match curb height at adjoining existing end bent wing.

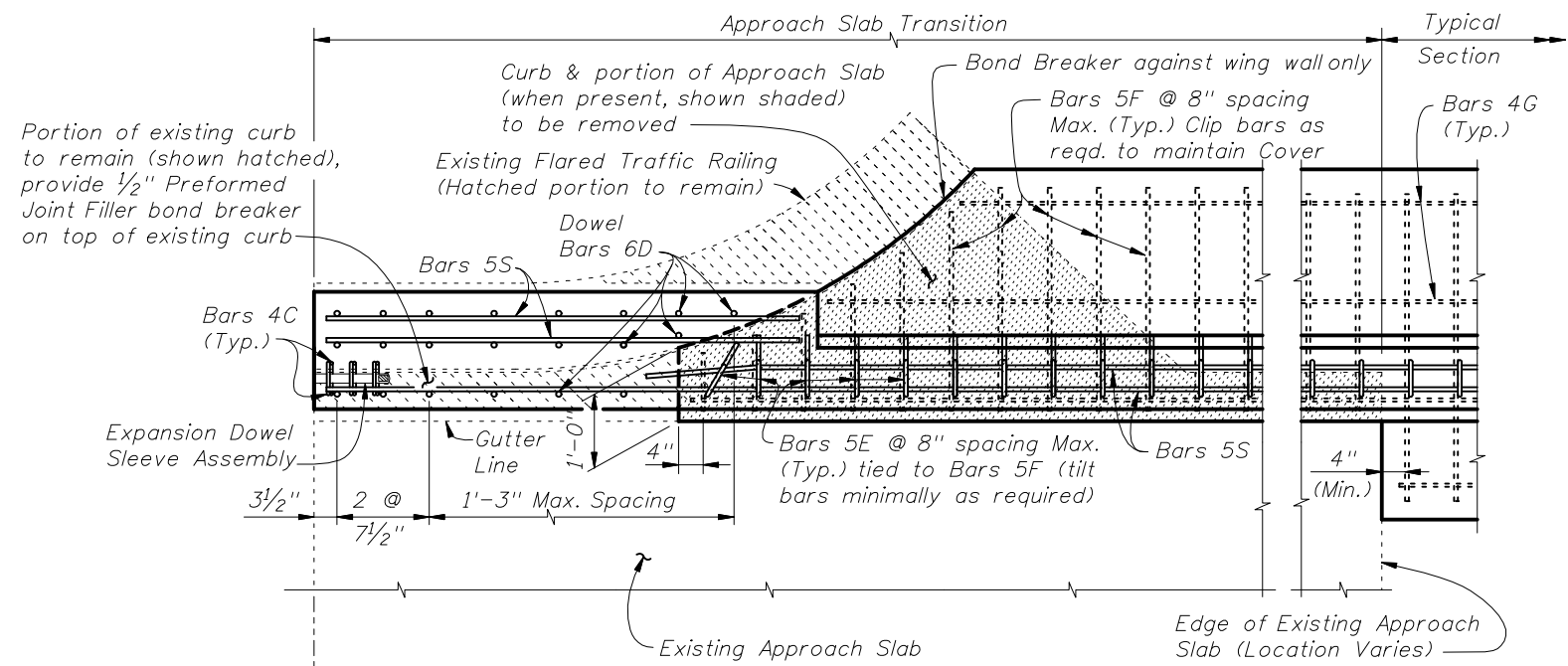


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
 (Expansion Dowel Assemblies and Bars 4C not shown for clarity)

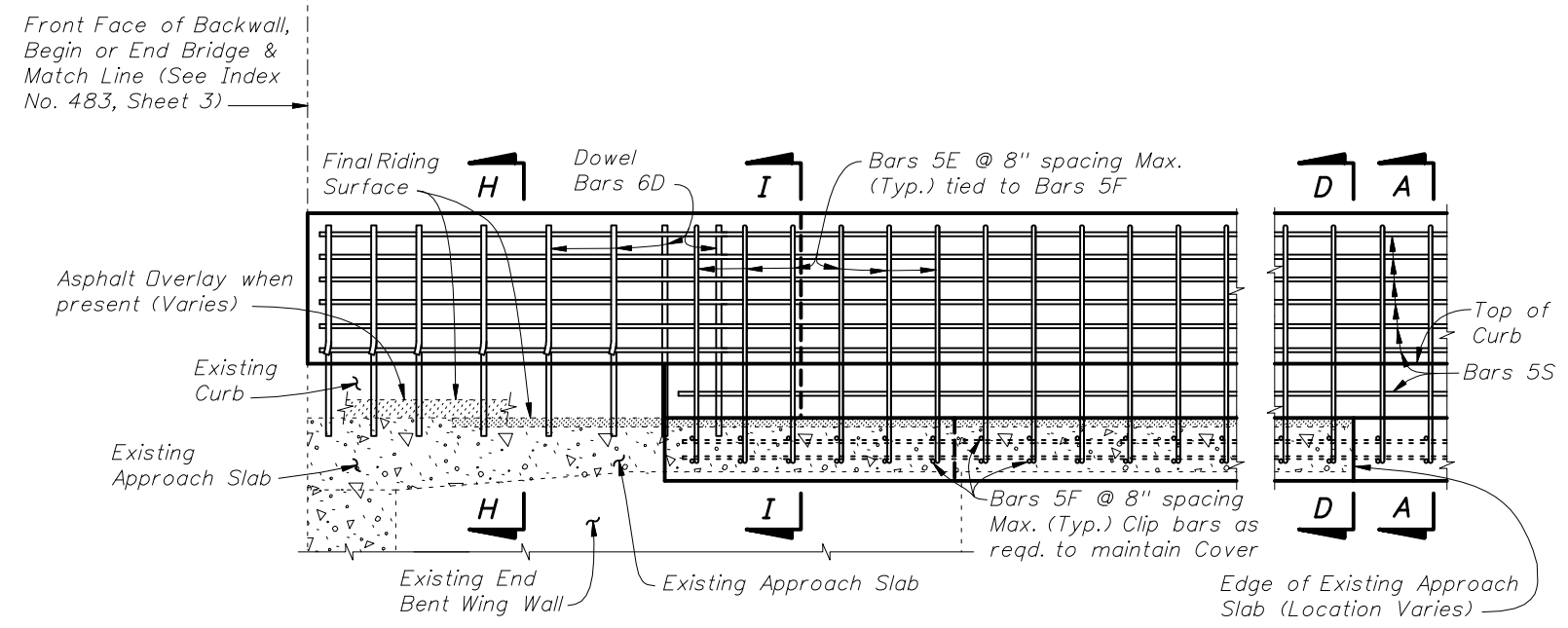
SCHEME 6 ~ MODIFICATION FOR INDEX NO. 483 SCHEME 2
RAILING END TREATMENT FOR PARALLEL CURBS AND WING WALLS WITH INTERMEDIATE CURBS

CROSS REFERENCES:
 For Section A-A see Sheet 4.
 For Section D-D see Sheet 5.
 For Expansion Dowel Assembly and placement of Dowel Bars 6D Details see Index 480.



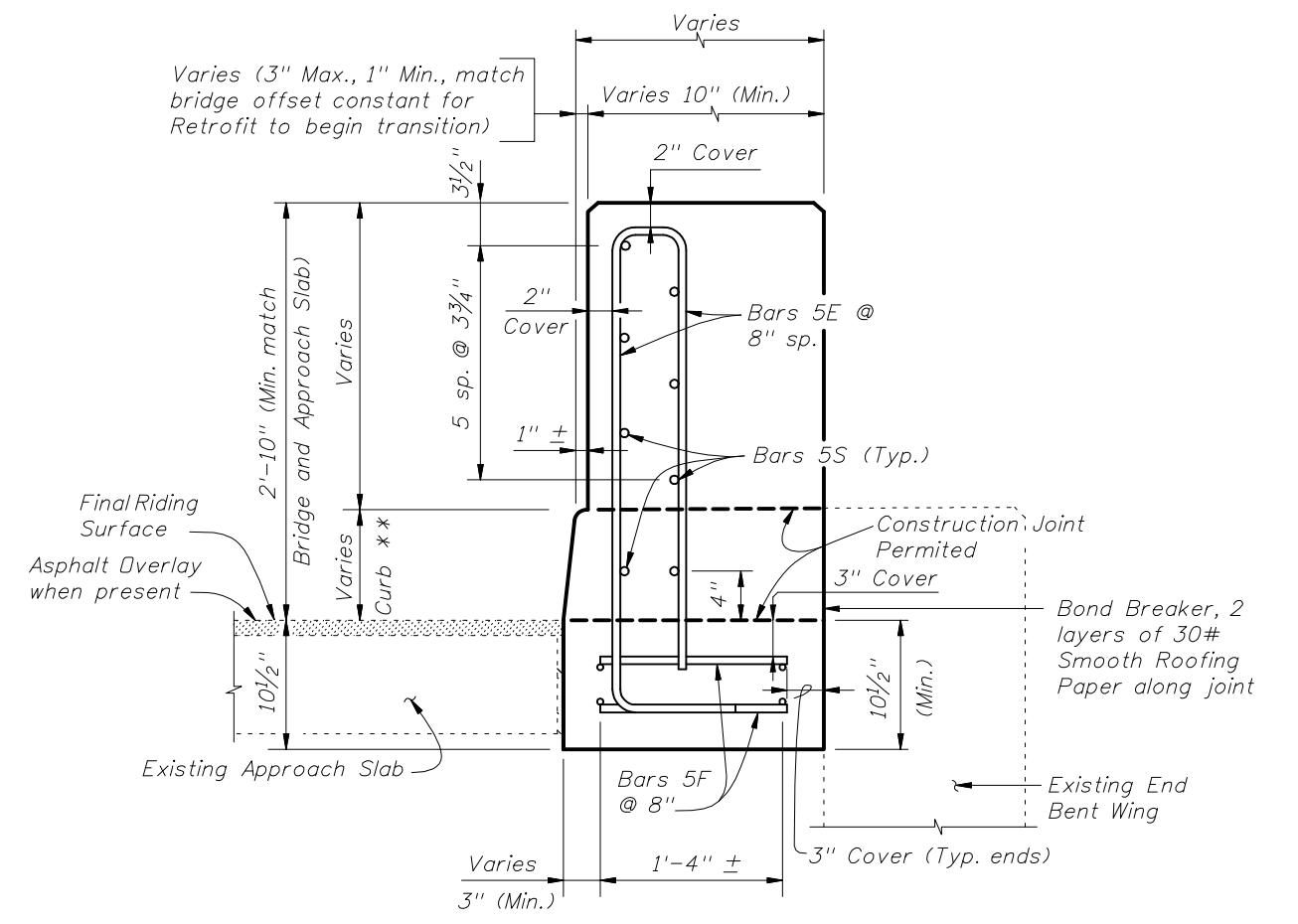


PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)

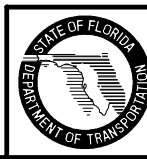
SCHEME 7 ~ MODIFICATION FOR INDEX NO. 483 SCHEME 3
RAILING END TREATMENT FOR PARALLEL CURBS AND
FLARED WING WALLS WITH INTERMEDIATE CURBS

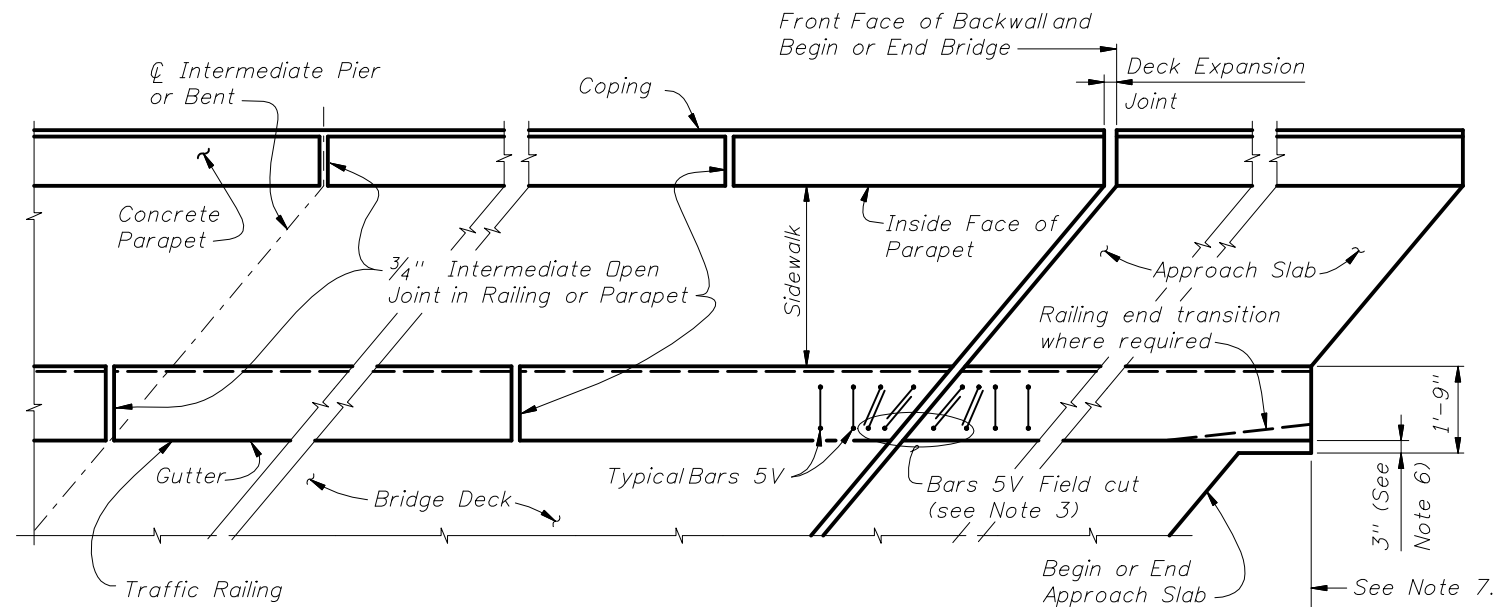


SECTION I-I

Note:
** Match curb height at adjoining existing end bent wing.

CROSS REFERENCES:
For Section A-A see Sheet 4.
For Section D-D see Sheet 5.
For Section H-H see Sheet 9.
For Expansion Dowel Assemblies and placement of Dowel Bars 6D Details see Index 480.

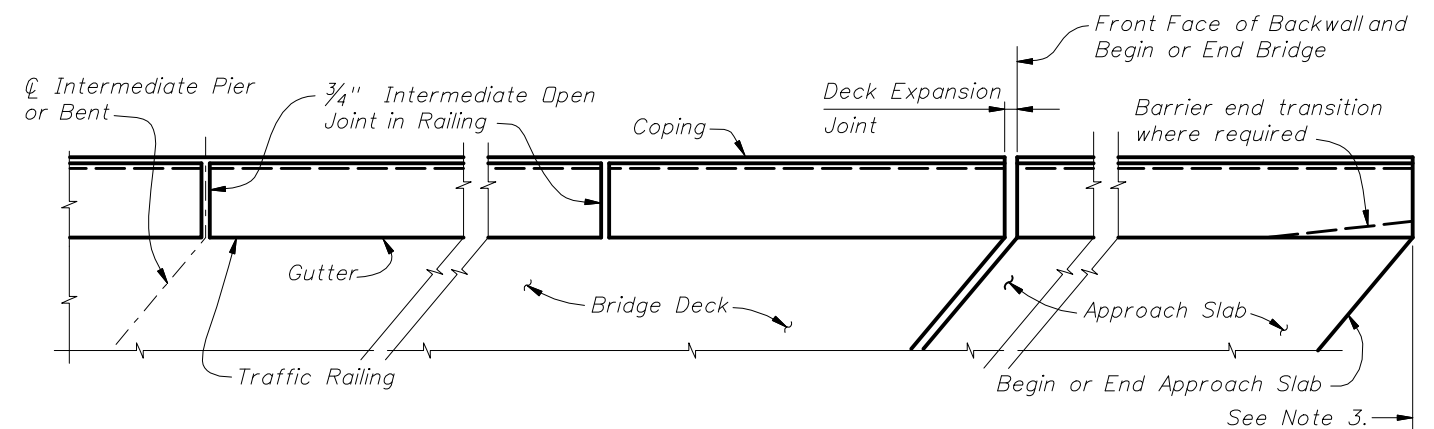




PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK, TRAFFIC RAILING INDEX NO. 420 AND PEDESTRIAN/BICYCLE RAILING INDEX NO. 820, OTHER TRAFFIC RAILINGS SIMILAR

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) 3/4" Intermediate Open Joints and V-Grooves in railing and parapet shall be placed perpendicular or radial to the gutter line or inside face of parapet line. See Structures Plans, Superstructure 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) as shown to provide a base for casting of the railing.
- 7) Begin placing Railing Bars 5P 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 5P and 5V shall be made immediately adjacent to Begin or End Bridge.



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH TRAFFIC RAILING INDEX NO. 420 SHOWN, OTHER TRAFFIC RAILINGS SIMILAR

NOTES:

- 1) Railing 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.
- 2) 3/4" Intermediate Open Joints and 1/2" V-Grooves in railing shall be placed perpendicular or radial to the gutter line. See Structures Plans, Superstructure and Approach Slab Sheets for locations.
- 3) Begin placing Railing Bars 5P 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 5P 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 Intermediate Piers 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 Index No. 420 Detail shown in the upper right corner of this sheet.
- 5) If Welded Wire Fabric is used in lieu of conventional reinforcement placement of the WWF vertical elements shall be similar to those shown above. Clipping of horizontal elements to facilitate placement shall be minimized where possible.



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SKIEW DETAILS FOR TRAFFIC RAILINGS, PARAPETS AND TRAFFIC SEPARATORS

Last Revision

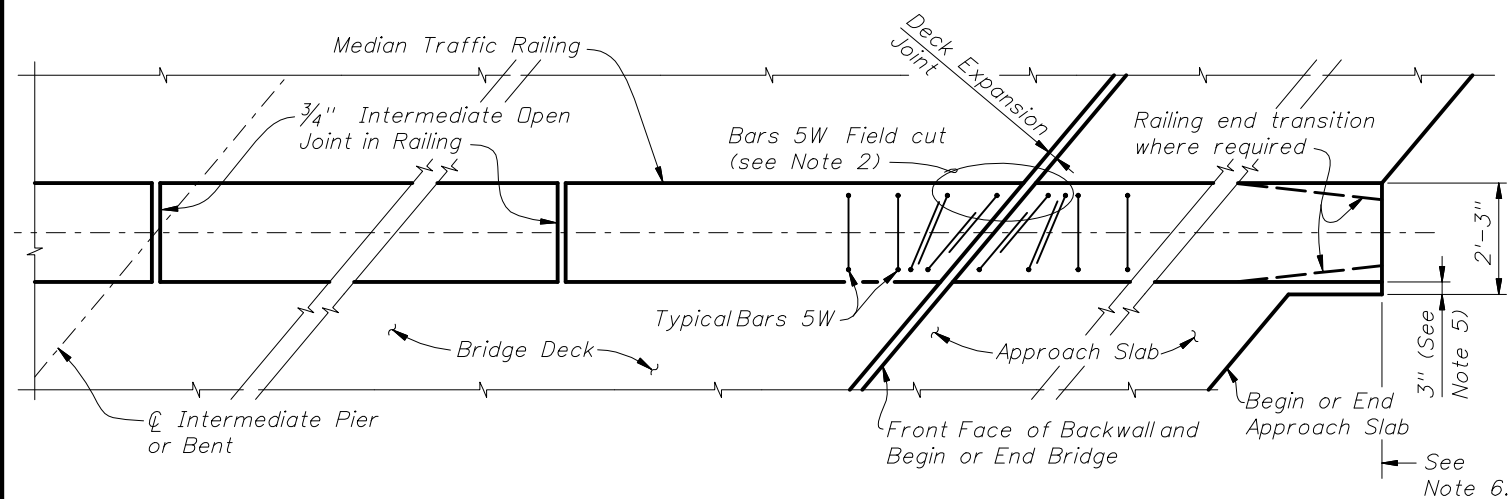
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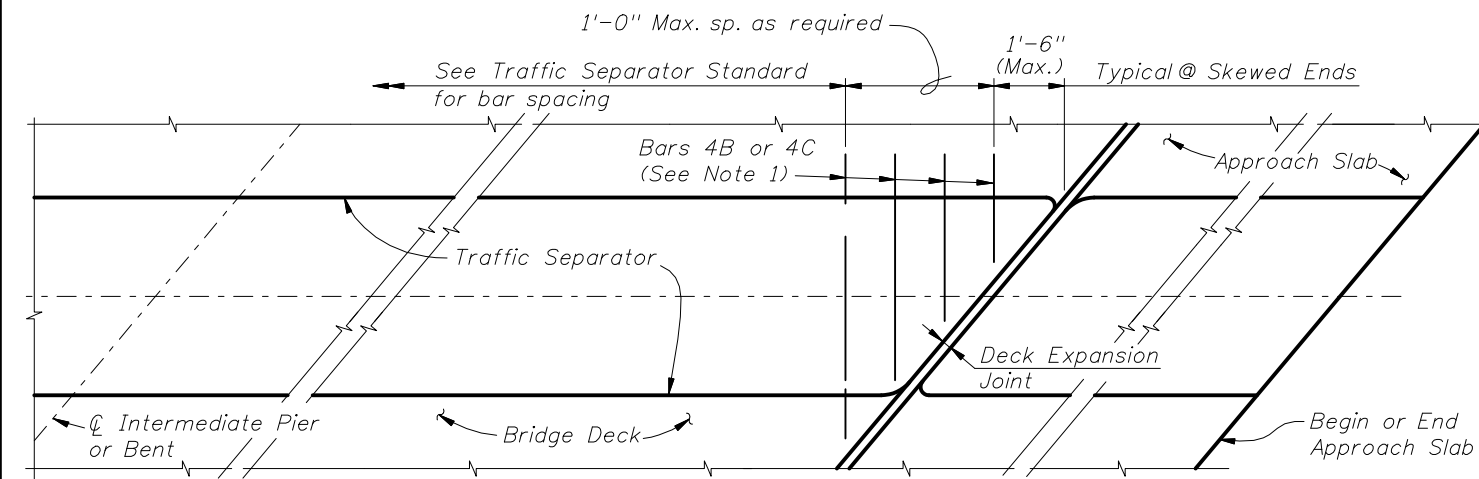
490



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH
MEDIAN TRAFFIC RAILING INDEX NO. 421

NOTES:

- 1) Median Traffic Railing reinforcement vertical Bars 5W may be shifted up to 1" (Max.) and rotated up to 10 degrees as required to allow proper placement.
- 2) Transition Stirrup Bars 5W shall be used as required at railing ends adjacent to expansion joints to facilitate placement of bars in acute corners. Place Transition Bars 5W in a fan pattern to maintain spacing. Rotate bars in 10° (Max.) increments as required.
- 3) Median Traffic Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. See Structures Plans, Superstructure and Approach Slab Sheets for Details.
- 4) 3/4" Intermediate Open Joints and 1/2" V-Grooves in railing shall be placed perpendicular or radial to the ϕ of the median railing. See Structures Plans, Superstructure and Approach Slab Sheets for locations.
- 5) At begin or end approach slab extend slab at the median railing ends 3" (open side) as shown to provide a base for casting of the railing.
- 6) Begin placing Railing Bars 5R and 5W 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 5R and 5W shall be made immediately adjacent to Begin or End Bridge.



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH
TRAFFIC SEPARATOR INDEX NO. 302

NOTES:

- 1) Traffic Separator transverse reinforcement adjacent to deck expansion joints shall be field adjusted to maintain clearance and spacing. Bars shall be field cut as shown, bars may be rotated to maintain clearance.
- 2) Traffic Separator ends at deck expansion joints shall follow the deck joint limits. Drainage joints and 1/2" V-Grooves shall be placed perpendicular or radial to the ϕ of the Traffic Separator. See Structures Plans, Superstructure and Approach Slab Sheets for details.

GENERAL NOTES:

- 1) Work this Sheet with Median Traffic Railing and Traffic Separator and Approach Slab Indexes as applicable.
- 2) Deck Expansion Joint at begin or end bridge shown. Deck Expansion Joints at ϕ 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) If Welded Wire Fabric is used in lieu of conventional reinforcement placement of the WWF vertical elements shall be similar to those shown above. Clipping of horizontal elements to facilitate placement shall be minimized where possible.



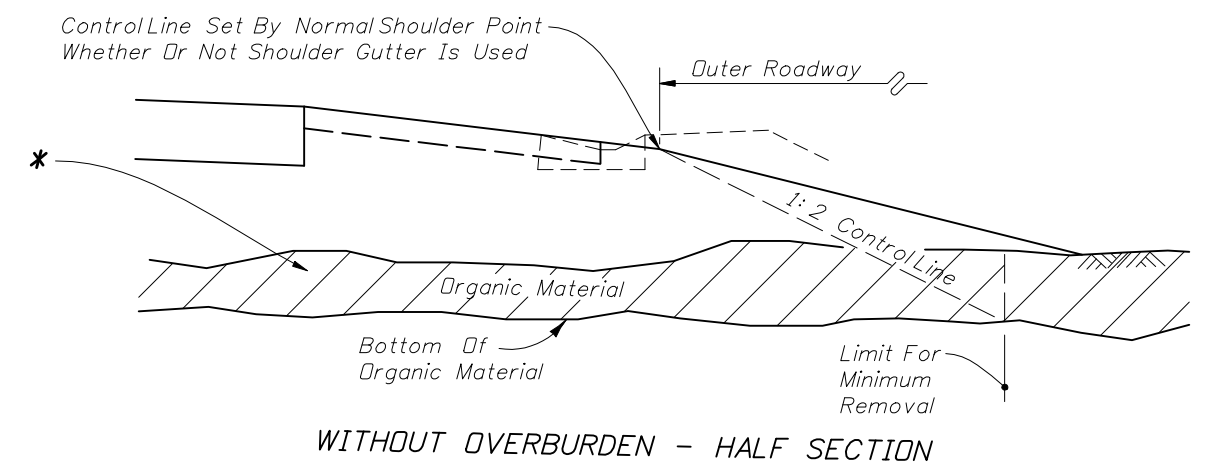
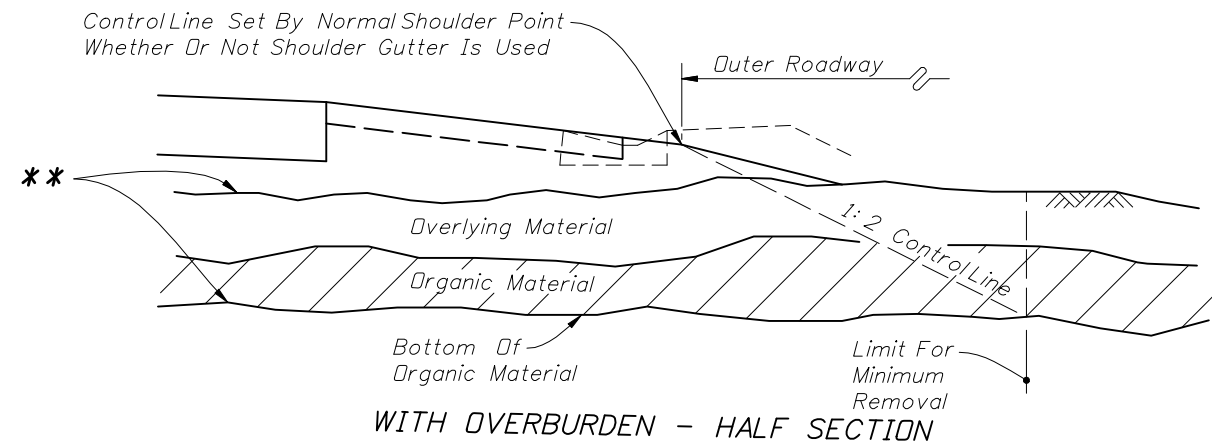
2010 FDOT Design Standards

**SKIEW DETAILS FOR TRAFFIC RAILINGS,
PARAPETS AND TRAFFIC SEPARATORS**

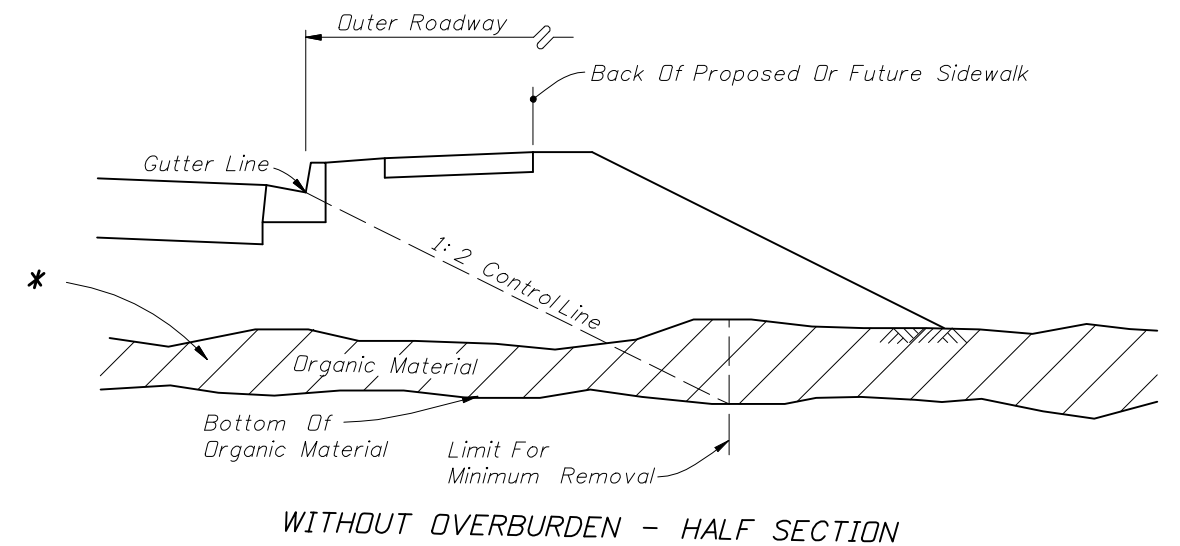
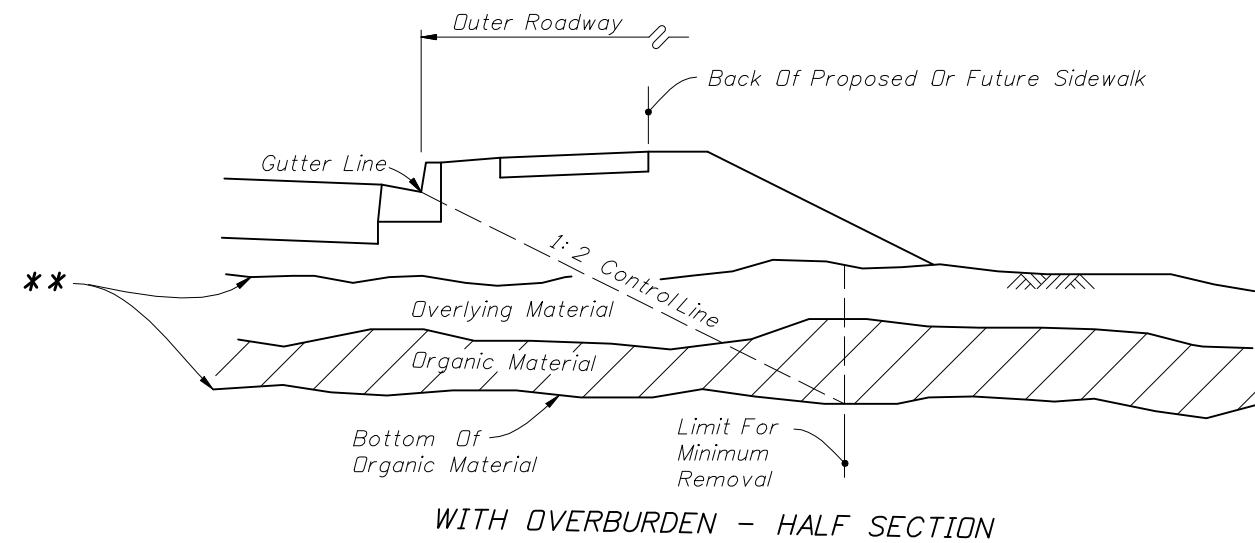
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2 of 2

Index No.
490



IN RURAL CONSTRUCTION



** Remove Overlying Material And Organic Material Within The Limits Shown And Backfill In Accordance With Index No. 505, Unless Otherwise Called For In The Plans Or Directed Otherwise By The District Geotechnical Engineer; The Limits Include Full Median Width When Applied To Divided Facilities With Median Widths Up To 64'; When Median Width Is Greater Than 64' And For Bifurcated Roadways The Organic Material Removal Limits Will Be Set By A 1:2 Control Line Complimentary To The Outer Roadway That Will Accommodate One Future Median Lane On Each Roadway Unless Specified Otherwise By The Plans.

IN URBAN CONSTRUCTION

* Remove Organic Material Within The Limits Shown And Backfill In Accordance With Index No. 505, Unless Otherwise Called For In The Plans Or Directed Otherwise By The District Geotechnical Engineer; The Limits Include Full Median Width When Applied To Divided Facilities With Median Widths Up To 64'; When Median Width Is Greater Than 64' And For Bifurcated Roadways The Organic Material Removal Limits Will Be Set By A 1:2 Control Line Complimentary To The Outer Roadway That Will Accommodate One Future Median Lane On Each Roadway Unless Specified Otherwise By The Plans.

GENERAL NOTES

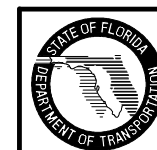
1. All details shown on this index for removal of organic and plastic materials apply unless otherwise shown on the plans.
2. Utilization of excavated materials shall be in accordance with Index No. 505.
3. Where organic or plastic material is undercut, backfill shall be made of suitable material in accordance with Index No. 505, unless otherwise shown on the plans.
4. The term "Plastic Material" used in this index in conjunction with removal of plastic soil is as defined under soil classifications for Plastic (P) and High Plastic (H) on Index No. 505.
5. The term "Organic Material" as used on this index is defined as any soil which has an average organic content greater than five (5.0) percent, or an individual organic content test result which exceeds seven (7.0) percent. Organic material shall be removed as shown on this index and the plans unless directed otherwise by the District Geotechnical Engineer.

REMOVAL OF ORGANIC MATERIAL

- Average organic content shall be determined from the test results from a minimum of three randomly selected samples from each stratum. Tests shall be performed in accordance with AASHTO T 267 on the portion of a sample passing the No. 4 sieve.
6. The normal depth of side ditches shall be 3.5' below the shoulder point except in special cases.
 7. In municipal areas, where underdrain is to be constructed beneath the proposed pavement, the grade of the underdrain filter material will not extend above the bottom of the stabilized section of the subgrade. Gradation of the filter material shall conform to FDOT specifications. Minimum grade on underdrain pipe shall be 0.2%.
 8. See Index No. 506 for miscellaneous earthwork details.

DESIGN NOTES

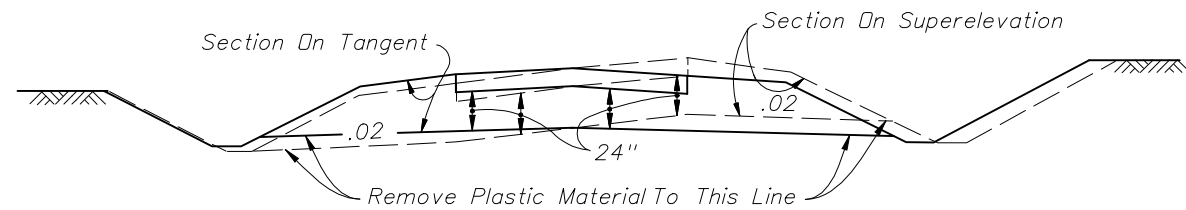
1. At locations where organic material or other soft soil deposits persists to such depth that removal is impractical, the construction of a geosynthetic foundation over those soils should be considered. The Engineer of Record should request guidance from the District Geotechnical Engineer and make a geosynthetic foundation design in accordance with Index No. 501 when pursuing geosynthetic alternates.
2. The designer shall take into consideration the expectancy of roadway widening to the outside, and where widening is anticipated specify in the plans the limits of removal of organic and plastic materials necessary to accommodate anticipated widening.



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REMOVAL OF ORGANIC AND PLASTIC MATERIAL

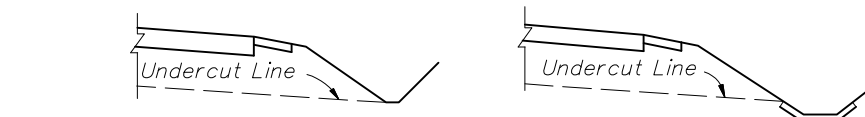
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Index No. 500	



TYPICAL CUT SECTION

Note: When this detail is applied to minor collectors and local facilities, the undercut may be reduced to 18".

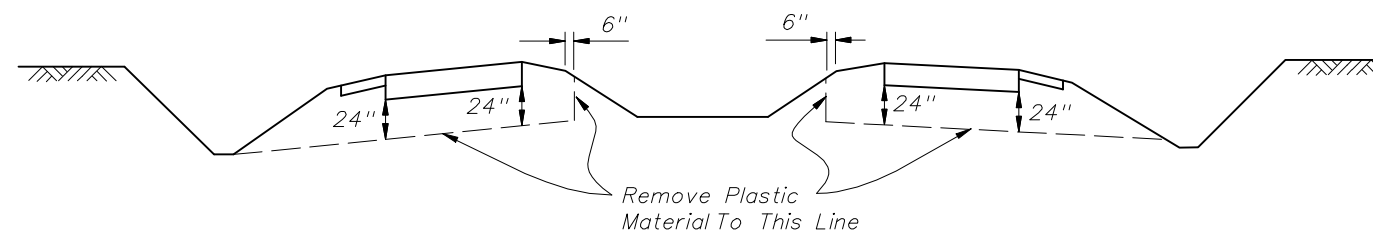
REMOVAL OF PLASTIC MATERIAL ON DIVIDED FREEWAYS, ARTERIALS AND MAJOR COLLECTORS HAVING FLUSH MEDIANS, AND, ON UNDIVIDED ARTERIALS AND MAJOR COLLECTORS



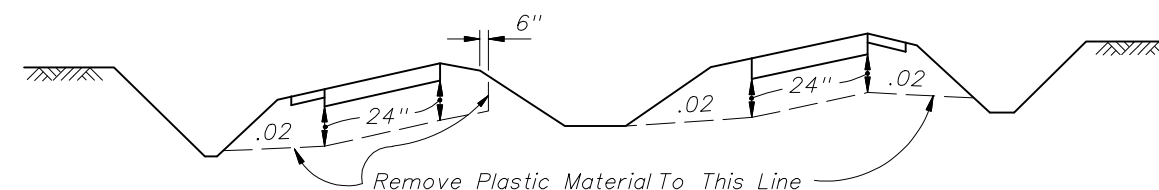
At locations where plastic material is being removed, the side ditches must be at least as deep as the undercut plane.

Where paved side ditches are used in areas of removal of plastic material, the top of the ditch pavement must be no higher than the undercut plane.

MISCELLANEOUS DETAILS

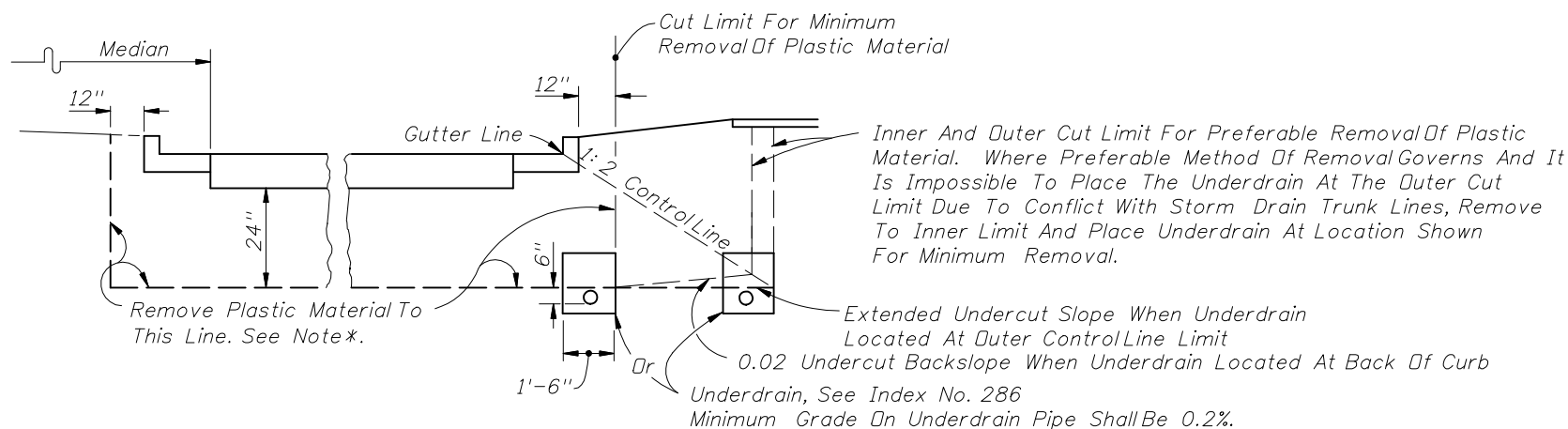


TYPICAL CUT SECTION ON TANGENT



TYPICAL CUT SECTION ON SUPERELEVATION

REMOVAL OF PLASTIC MATERIAL ON INTERSTATE FACILITIES, FREEWAYS, DIVIDED ARTERIALS AND MAJOR COLLECTORS HAVING DEPRESSED MEDIANS



HALF SECTION

NOTES: Refer to roadway cross sections to determine whether minimum or preferable removal is used.

*Where frequency of median breaks indicates that it is impractical to leave plastic material in the median, the designer may elect to indicate total removal of this material. If during construction it becomes apparent, due to normal required construction procedures, that it is impractical to leave the plastic material in the median, total removal of this material shall be approved by the Engineer.

REMOVAL OF PLASTIC MATERIAL AND LOCATION OF UNDERDRAIN IN URBAN CONSTRUCTION

REMOVAL OF PLASTIC MATERIAL

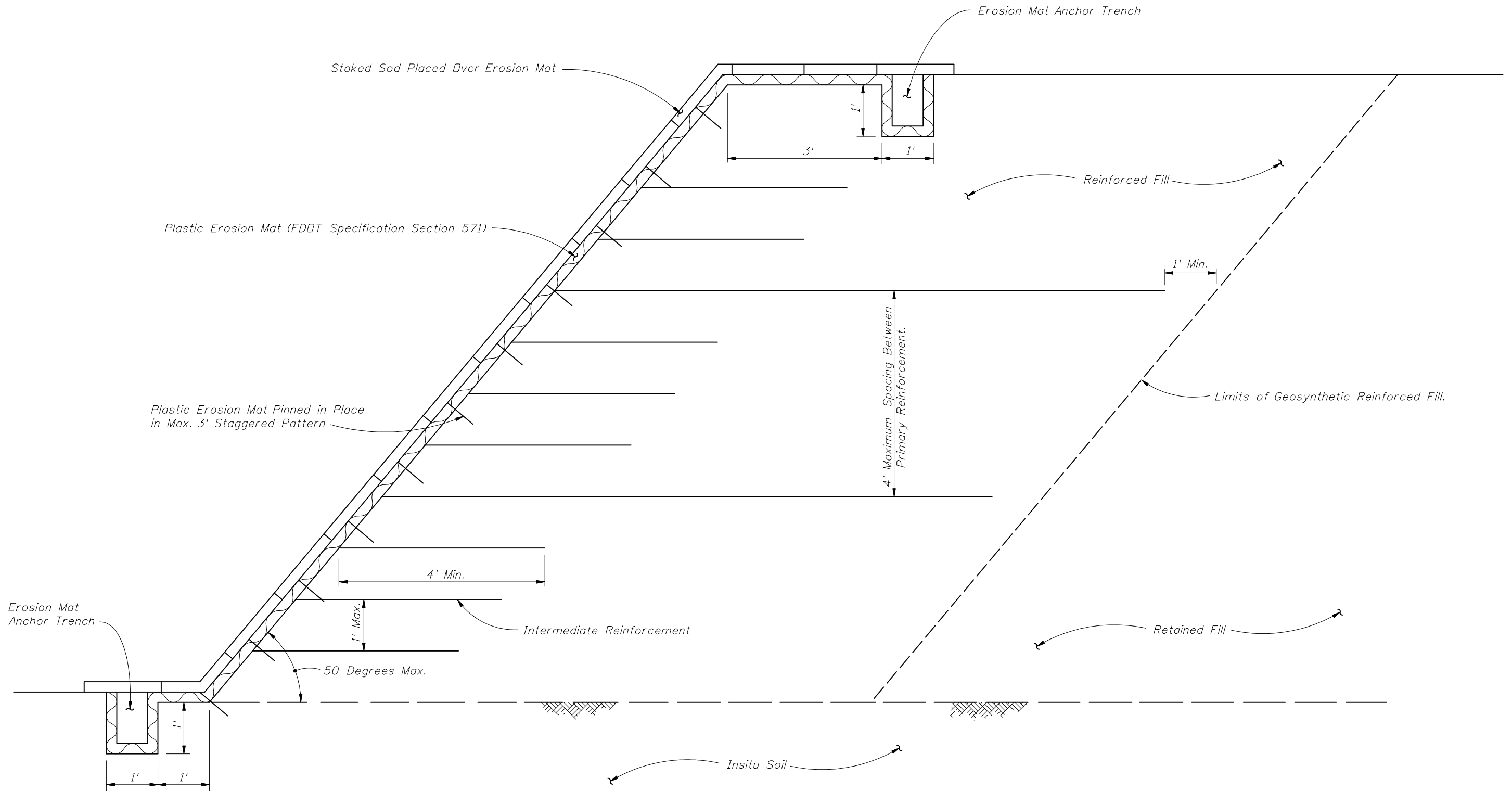
Note: For GENERAL NOTES see Sheet 1.



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REMOVAL OF ORGANIC AND PLASTIC MATERIAL

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GEOSYNTHETIC REINFORCED SOIL SLOPES

GENERAL NOTES

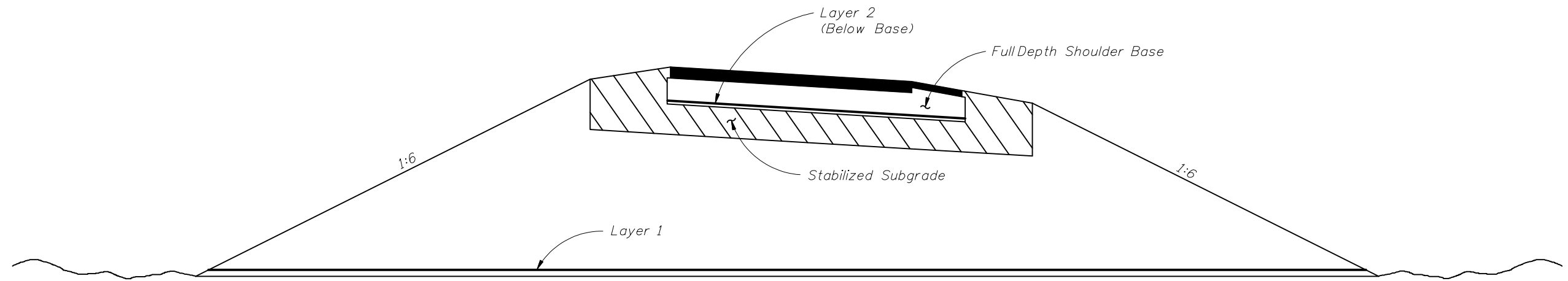
1. All Designs shall meet the requirements shown on this sheet and the contract documents.
2. $T_a = \frac{T_{ult}}{RF_c RF_d RF_j CRF}$
3. Intermediate reinforcement shall be rolled out parallel to slope face.



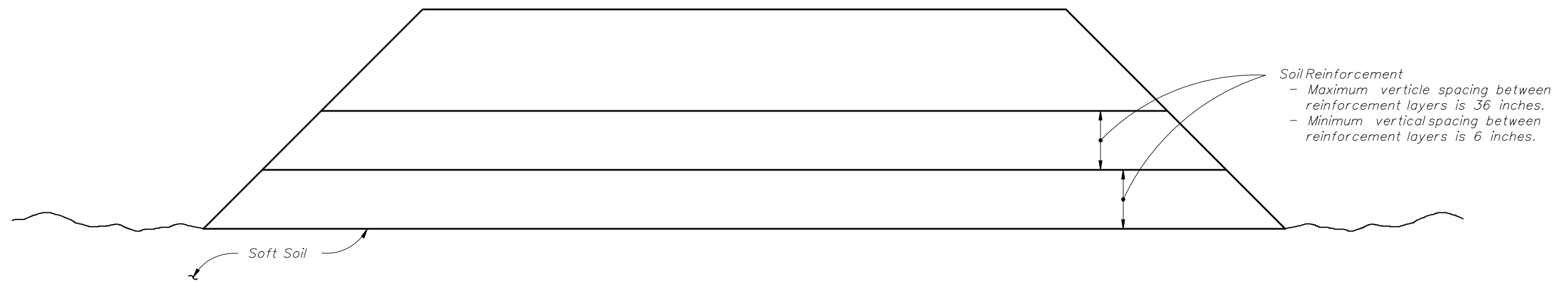
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GEOSYNTHETIC REINFORCED SOILS

Last Revision 04	Sheet No. 1 of 9
Index No. 501	



REINFORCED EMBANKMENT



GEOSYNTHETIC REINFORCED FOUNDATIONS CONSTRUCTED ON SOFT SOILS



TABLE OF WOVEN GEOTEXTILE VALUES

PROPERTY		REQUIRED TEST METHOD	MIRAFI GEOLON HP 370	MIRAFI GEOLON HP 570	MIRAFI GEOLON HP 665	MIRAFI GEOLON HP 770	MIRAFI GEOLON HS 400	MIRAFI GEOLON HS 600	MIRAFI GEOLON HS 800	MIRAFI GEOLON HS 1150	MIRAFI MIRAMESH GR	
Permittivity (0.05 sec ⁻¹ Min.)		ASTM D 4491	0.52	0.40	0.26	0.23	0.1	0.32	0.20	0.32	—	
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	50%	50%	50%	50%	90%	
Burst Strength (psi)		ASTM D 6241	800	1,200	1,200	1,200	—	—	—	—	—	
Grab Strength (lb.)		ASTM D 4632	400 x 250	475 x 440	600 x 700	550 x 450	—	—	—	—	—	
A.D.S. (in.)		ASTM D 4751	0.0236	0.0236	0.0167	0.0236	0.0167	0.0335	0.0335	0.0236	0.120 x 0.120	
Tensile Strength (lb./ft.)		ASTM D 4595										
Machine Direction	Ultimate (T _{ult})		3,240	4,800	4,800	7,200	4,800	7,200	9,600	13,800	1,440	
	2% Strain		540	960	—	780	—	—	—	—	—	
	5% Strain		1,356	2,400	1,200	3,600	1,080	2,400	3,600	4,800	—	
Cross Direction	Ultimate		2,700	4,800	6,600	4,800	4,800	3,600	3,600	3,600	1,733	
	2% Strain		540	1,320	—	1,320	—	—	—	—	—	
	5% Strain		1,560	2,604	4,200	3,600	2,400	—	—	—	—	
Strain @ Ultimate Tensile Strength				14%	10%	12%	12%	15%	15%	10%	12%	6%
Secant Modulus (lb./ft.)	2% Strain		27,000	48,000	—	39,000	—	—	—	—	—	—
	5% Strain	27,120	48,000	24,000	72,000	21,600	48,000	72,000	96,000	—		
	10% Strain	24,000	48,000	30,000	66,000	33,600	57,600	96,000	120,000	—		
Seam Breaking Strength (lb./ft.)		ASTM D 4884	1,688	3,000	3,600	3,000	2,400	2,400	2,400	2,400	—	
Puncture Resistance (lb.)		ASTM D 4833	180	195	280	160	—	—	—	—	—	
Tear Strength (lb.)	Machine Direction	ASTM D 4833	170	180	180	250	—	—	—	—	—	
	Cross Direction	ASTM D 4833	110	180	275	300	—	—	—	—	—	
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Creep Resistance-T _{creep} (lb./ft.)		ASTM D 5262	—	—	—	—	2,880	4,320	5,760	8,280	471 x 566	
Creep Reduction Factor (T _{ult} /T _{creep})			3.5	3.5	3.5	3.5	1.67	1.67	1.67	1.67	3.0	
Installation Damage (RF _C)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.15	1.15	1.10	1.10	1.05	
	Limestone		1.25	1.25	1.25	1.25	1.25	1.25	1.20	1.20	1.10	
Durability (RF _D)	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.10	
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Joint Strength (RF _J)	Mechanical	ASTM D 4595, GRI : GG4 & GT7	—	—	—	—	—	—	—	—	—	
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Approved Application Usage			3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	1, 4	

Approved Application Usage: 1 = Steepened Slopes
 2 = Reinforcement of Foundations over Soft Soils
 3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
 4 = Reinforced Embankment
 * Minimum 3' Overlap 5 = Construction Expedient

APPROVED GEOSYNTHETIC PRODUCTS
 (WOVEN GEOTEXTILE)
 APPLICATION AND PROPERTIES



2010 FDOT Design Standards

GEOSYNTHETIC REINFORCED SOILS

Last Revision 07/01/08
 Sheet No. 3 of 9
 Index No. 501

TABLE OF WOVEN GEOTEXTILE VALUES

PROPERTY		REQUIRED TEST METHOD	MIRAFI BXG11	MIRAFI BXG12	MIRAFI GEOLON HS 2400	MIRAFI GEOLON HS 3000	COMTRAC 70.70	GEOTEX 315ST	GEOTEX 2x2HF	GEOTEX 3x3HF	GEOTEX 4x4	GEOTEX 4x4HF	GEOTEX 4X6	
Permittivity (0.05 sec ⁻¹ Min.)		ASTM D 4491	—	—	0.02	0.02	0.20	0.04	0.65	0.18	0.15	0.40	0.26	
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	
Burst Strength (psi)		ASTM D 6241	—	—	—	—	—	1,000	1,100	1,000	1,500	1,200	1,500	
Grab Strength (lb.)		ASTM D 4632	—	—	—	—	—	315	315	450/350	600/500	475/440	600/700	
A.D.S. (in.)		ASTM D 4751	1.0 x 1.0	1.0 x 1.0	0.0118	0.0118	0.0181	0.0167	0.0167	0.0236	0.0236	0.533	0.312	
Tensile Strength (lb./ft.)		ASTM D 4595												
Machine Direction	Ultimate (T _{ult})		2,000	2,000	28,800	36,000	4,800	2,100	2,400	3,600	4,800	4,800	4,800	
	2% Strain		500	500	—	—	—	156	276	400	456	960	700	
	5% Strain		920	920	14,400	18,000	2,196	564	744	1,392	1,452	2,400	1,200	
Cross Direction	Ultimate		2,000	4,000	3,600	3,600	3,600	2,100	2,400	3,600	4,800	4,800	6,600	
	2% Strain		500	750	—	—	—	576	660	400	1,380	1,320	1,000	
	5% Strain		920	1,350	—	—	—	1,104	1,404	1,740	2,604	2,400	2,640	
Strain @ Ultimate Tensile Strength				12%	12%	10%	10%	9%	15%	10%	10%	10%	8%	8%
Secant Modulus @ (lb./ft.)	2% Strain		ASTM D 4595	25,000	25,000	—	—	—	7,800	13,800	27,000	22,800	48,000	48,000
	5% Strain		18,400	18,400	288,000	360,000	24,400	11,280	14,880	27,000	29,040	48,000	48,000	
	10% Strain		—	—	288,000	360,000	24,400	10,440	12,480	24,000	31,200	48,000	48,000	
Seam Breaking Strength (lb./ft.)		ASTM D 4884			3,600	3,600	2,400	—	—	—	—	—	—	
Puncture Resistance (lb.)		ASTM D 4833	—	—	—	—	—	120	120	180	170	190	280	
Tear Strength (lb.)	Machine Direction	ASTM D 4833	—	—	—	—	—	120	120	180	250	180	180	
	Cross Direction	ASTM D 4833	—	—	—	—	—	120	120	110	250	180	250	
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.9	0.65	0.65	0.65	0.65	0.65	0.65	
Creep Resistance-T _{creep} (lb./ft.)		ASTM D 5262	—	—	17,280	21,600	—	600	—	—	—	—	—	
Creep Reduction Factor (T _{ult} /T _{creep})			1.6	1.6	1.67	1.67	1.67	3.5	5.0	5.0	5.0	5.0	5.0	
Installation Damage (RF _c)	Sand	GRI : GG4 & GT7	1.05	1.05	1.1	1.1	1.2	1.4	1.4	1.4	1.4	1.4	1.4	
	Limestone		1.10	1.10	1.20	1.20	1.5	1.4	1.4	1.5	1.4	1.4	1.4	
Durability (RF _d)	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	
Joint Strength (RF _j)	Mechanical	ASTM D 4595, GRI : GG4 & GT7	—	—	—	—	—	—	—	—	—	—	—	
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.0	1.2	1.0	1.2	
Approved Application Usage			3, 4	3, 4	3, 4	3, 4	3	2	2	2	2	2	2	

Approved Application Usage: 1 = Steepened Slopes
 2 = Reinforcement of Foundations over Soft Soils
 3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
 4 = Reinforced Embankment
 5 = Construction Expedient
 * Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
 (WOVEN GEODGRID)
 APPLICATION AND PROPERTIES



2010 FDOT Design Standards

GEOSYNTHETIC REINFORCED SOILS

TABLE OF WOVEN GEODRID VALUES

PROPERTY		REQUIRED TEST METHOD	MARAFI MG 2XT	MARAFI MG 3XT	MARAFI MG 5XT (Matrex 30)	MARAFI MG 7XT	MARAFI MG 8XT	MARAFI MG 10XT (Matrex 60)	MARAFI MG 18XT (Matrex 90)	MARAFI MG 20XT (Matrex 120)	MARAFI MG 22XT (Matrex 180)	MARAFI MG 24XT (Matrex 240)
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Tensile Strength (lb./ft.)		ASTM D 6637										
Machine Direction	Ultimate (T_{ult})		2,000	3,150	4,300	5,700	7,000	9,500	9,360	12,420	17,760	25,380
	2% Strain		—	—	—	—	—	—	—	—	—	—
	5% Strain		1,000	1,056	1,740	2,160	2,520	3,120	3,250	5,340	6,700	7,000
Cross Direction	Ultimate		2,000	—	—	—	—	—	—	—	—	—
	2% Strain		—	—	—	—	—	—	—	—	—	—
	5% Strain	—	—	—	—	—	—	—	—	—	—	
Strain @ Ultimate Tensile Strength		ASTM D 6637	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Secant Modulus (lb./ft.)	2% Strain		—	—	—	—	—	—	—	—	—	—
	5% Strain		20,000	21,120	34,800	43,200	50,400	62,400	65,000	106,800	134,000	140,000
	10% Strain		—	—	—	—	—	—	—	—	—	—
Junction Strength (lb./ft.)		GRI : GG2	—	—	—	—	—	—	—	—	—	—
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Creep Resistance- T_{creep} (lb./ft.)		ASTM D 5262	1,250	1,969	2,688	3,563	4,375	5,938	5,850	7,221	10,326	14,756
Creep Reduction Factor (T_{ult}/T_{creep})			1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.72	1.72	1.72
Installation Damage (RF _C)	Sand	GRI : GG4 & GT7	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	Limestone		1.5	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Durability (RF _D)	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Joint Strength (RF _J)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	—	—	—	—	—	—	—	—	—	—
	Overlap *	ASTM D 6706	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Approved Application Usage			3	3	3	3	3	3	3	3	3	3

Approved Application Usage:

- 1 = Steepened Slopes
- 2 = Reinforcement of Foundations over Soft Soils
- 3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
- 4 = Reinforced Embankment
- 5 = Construction Expedient
- * Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEODRID)
APPLICATION AND PROPERTIES



2010 FDOT Design Standards

GEOSYNTHETIC REINFORCED SOILS

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TABLE OF WOVEN GEODRID VALUES

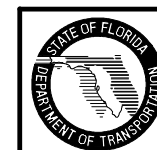
PROPERTY		REQUIRED TEST METHOD	SYNTEEN SF 11	SYNTEEN SF 12	SYNTEEN SF 20	SYNTEEN SF 35	SYNTEEN SF 40	SYNTEEN SF 50	SYNTEEN SF 55	SYNTEEN SF 80	SYNTEEN SF 110
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%
Tensile Strength (lb./ft.)		ASTM D 6637									
Machine Direction	Ultimate (T_{ult})		2,388	2,388	1,672	2,627	3,050	3,731	3,774	5,583	7,462
	2% Strain		526	526	370	462	488	791	736	1,016	1,186
	5% Strain		990	1,042	670	725	970	922	1,159	1,273	1,684
Cross Direction	Ultimate		3,870	5,268	1,630	2,556	3,050	3,933	2,499	2,206	2,179
	2% Strain		578	797	370	399	430	630	604	882	1,274
	5% Strain	792	1,129	670	583	765	815	796	1,563	1,581	
Strain @ Ultimate Tensile Strength		ASTM D 6637	12.6%	13.0%	9.4%	14.1%	9.9%	14.2%	11.5%	13.9%	18.8%
Secant Modulus (lb./ft.)	2% Strain		26,300	26,300	18,494	23,114	24,408	39,551	36,799	50,807	59,298
	5% Strain		15,840	20,840	13,397	14,499	19,404	18,432	23,174	25,459	33,712
	10% Strain		—	—	15,206	15,234	22,089	18,432	27,137	37,910	27,380
Junction Strength (lb./ft.)		GRI : GG2	354	320	—	—	—	—	—	—	—
Soil-Geosynthetic Friction		ASTM D 6706	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Creep Resistance- T_{creep} (lb./ft.)		ASTM D 5262	—	—	1,005	1,523	1,525	2,201	2,265	3,182	4,029
Creep Reduction Factor (T_{ult}/T_{creep})			—	—	1.66	1.73	2.00	1.70	1.67	1.75	2.02
Installation Damage (RF _C)	Sand	GRI : GG4 & GT7	1.18	1.06	1.05	1.15	1.15	1.08	1.08	1.08	1.08
	Limestone		1.31	1.20	1.75	1.70	1.60	1.55	1.55	1.55	1.35
Durability (RF _D)	Chemical	ASTM D 5322	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
	Biological	ASTM D1987, D3083, G21 & G22	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Joint Strength (RF _J)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	—	—	—	—	—	—	—	—	—
	Overlap *	ASTM D 6706	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Approved Application Usage			5	5	3	3	3	3	3	3	3

Approved Application Usage:

- 1 = Steepened Slopes
- 2 = Reinforcement of Foundations over Soft Soils
- 3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
- 4 = Reinforced Embankment
- 5 = Construction Expedient

* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEODRID)
APPLICATION AND PROPERTIES



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GEOSYNTHETIC REINFORCED SOILS

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TABLE OF WOVEN GEOTRIG VALUES								
PROPERTY		REQUIRED TEST METHOD	RAUGRID 3/3	RAUGRID 4/2	RAUGRID 6/3	RAUGRID 8/3	RAUGRID 10/3	FORNIT 20
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	95%	95%	95%	95%	95%	92%
Tensile Strength (lb./ft.)		ASTM D 6637						
Machine Direction	Ultimate (T_{ult})		2,233	2,843	4,350	5,288	6,590	1,159
	2% Strain		—	—	—	—	—	360
	5% Strain		712	767	1,144	1,165	1,582	774
Cross Direction	Ultimate		2,213	1,459	1,959	2,089	2,192	1,641
	2% Strain		—	—	—	—	—	543
	5% Strain	541	356	452	507	521	1,111	
Strain @ Ultimate Tensile Strength		ASTM D 6637	10.8%	11.8%	13.1%	12.2%	11.5%	6%
Secant Modulus (lb./ft.)	2% Strain		—	—	—	—	—	18,000
	5% Strain		—	—	—	—	—	15,480
	10% Strain		—	—	—	—	—	—
Junction Strength (lb./ft.)		GRI : GG2	N/A	100%	100%	100%	100%	480
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.9
Creep Resistance- T_{creep} (lb./ft.)		ASTM D 5262	1,466	1,870	2,862	3,479	4,335	—
Creep Reduction Factor (T_{ult}/T_{creep})			1.52	1.52	1.52	1.52	1.52	—
Installation Damage (RF _C)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.10	1.10
	Limestone		1.17	1.17	1.17	1.17	1.17	1.30
Durability (RF _D)	Chemical	ASTM D 5322	1.15	1.15	1.15	1.15	1.15	1.10
	Biological	ASTM D1987, D3083, G21 & G22	1.15	1.15	1.15	1.15	1.15	1.0
Joint Strength (RF _J)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	—	—	—	—	—	—
	Overlap *	ASTM D 6706	—	—	—	—	—	1.0
Approved Application Usage			2, 5	2, 5	2, 5	2, 5	2, 5	2, 5

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient
* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEOTRIG)
APPLICATION AND PROPERTIES



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GEOSYNTHETIC REINFORCED SOILS

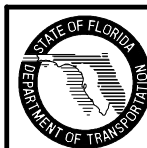
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TABLE OF EXTRUDED GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	TENSAR BX 4100	TENSAR BX 4200	TENSAR BX 1100	TENSAR BX 1120	TENSAR BX 1200	TENSAR BX 1220	TENSAR BX 1500
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	90%	90%	90%	100%	90%	100%	90%
Tensile Strength (lb./ft.)		ASTM D 6637							
Machine Direction	Ultimate (T_{ult})		860	1,270	850	850	1,315	1,315	1,790
	2% Strain		240	370	280	280	410	410	580
	5% Strain		480	705	580	580	810	810	1,200
Cross Direction	Ultimate		875	1,370	1,300	1,300	1,975	1,975	2,055
	2% Strain		300	500	450	450	670	670	685
	5% Strain	635	960	920	920	1,360	1,360	1,370	
Strain @ Ultimate Tensile Strength		ASTM D 6637	10%	10%	10%	10%	10%	10%	10%
Secant Modulus (lb./ft.)	2% Strain		11,995	18,506	14,000	14,000	20,500	20,500	29,000
	5% Strain		9,596	14,092	11,600	11,600	16,200	16,200	27,400
	10% Strain		—	—	—	—	—	—	—
Junction Strength (lb./ft.)		GRI : GG2	90%	90%	790/1,210	93%	93%	93%	93%
Soil-Geosynthetic Friction		ASTM D 6706	—	0.95	0.90	0.90	0.90	0.90	0.90
Creep Resistance- T_{creep} (lb./ft.)		ASTM D 5262	250	420	280	280	425	425	575
Creep Reduction Factor (T_{ult}/T_{creep})			3.5	3.27	3.1	3.1	3.1	3.1	3.1
Installation Damage (RF _C)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.10	1.10	1.10
	Limestone		1.43	1.35	1.35	1.35	1.35	1.35	1.35
Durability (RF _D)	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Joint Strength (RF _J)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	—	—	—	—	—	—	—
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Approved Application Usage			3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5

Approved Application Usage:
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 * Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
 (EXTRUDED GEOGRID)
 APPLICATION AND PROPERTIES



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GEOSYNTHETIC REINFORCED SOILS

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TABLE OF EXTRUDED GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	TENSAR UX 1400 HS UX 1400 MSE UX MESA 3	TENSAR UX 1500 HS UX 1500 MSE UX MESA 4	TENSAR UX 1600 HS UX 1600 MSE UX MESA 5	TENSAR UX 1700 HS UX 1700 MSE UX MESA 6	TENAX MS 220	TENAX MS 330	COMBIGRID 30/30 Q1 151 GRK 3	SECUGRID 20/20 Q1	SECUGRID 30/30 Q1
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	90%	90%	90%	90%	85%	85%	90%	90%	90%
Tensile Strength (lb./ft.)		ASTM D 6637									
Machine Direction	Ultimate (T_{ult})		4,790	7810	9,860	11,980	925	1,370	2,055	1,646	2,055
	2% Strain		1,100	1,850	2,330	2,740	300	418	686	549	686
	5% Strain		2,130	3,560	3,980	5,140	615	925	1,475	1,029	1,475
Cross Direction	Ultimate		—	—	—	—	1,400	2,100	2,055	1,646	2,055
	2% Strain		—	—	—	—	445	616	686	549	686
	5% Strain	—	—	—	—	890	1,340	1,475	1,029	1,475	
Strain @ Ultimate Tensile Strength		ASTM D 6637	10%	10%	10%	10%	12%	12%	8%	9%	7.5%
Secant Modulus (lb./ft.)	2% Strain		55,000	92,500	116,500	137,000	15,000	20,900	34,300	27,450	34,300
	5% Strain		42,600	71,200	79,600	102,800	12,330	18,500	29,500	20,580	29,500
	10% Strain		—	—	—	—	—	—	—	—	—
Junction Strength (lb./ft.)		GRI : GG2	90%	90%	90%	90%	835	1,230	337	549	617
Soil-Geosynthetic Friction		ASTM D 6706	0.462	0.462	0.462	0.462	—	—	0.65	0.93	0.93
Creep Resistance- T_{creep} (lb./ft.)		ASTM D 5262	1,970	3,000	3,960	4,975	—	—	726	581	726
Creep Reduction Factor (T_{ult}/T_{creep})			2.43	2.60	2.49	2.41	3.5	3.5	2.83	2.83	2.83
Installation Damage (RF _C)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.1	1.1	1.1	1.1	1.1
	Limestone		1.20	1.20	1.20	1.20	1.1	1.1	1.1	1.1	1.1
Durability (RF _d)	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Joint Strength (RF _j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	1.0	1.0	1.0	1.0	1.0	1.0	—	—	—
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Approved Application Usage			3	3	3	3	2, 5	2, 5	2, 5	2, 5	2, 5

Approved Application Usage:
 1 = Steepened Slopes
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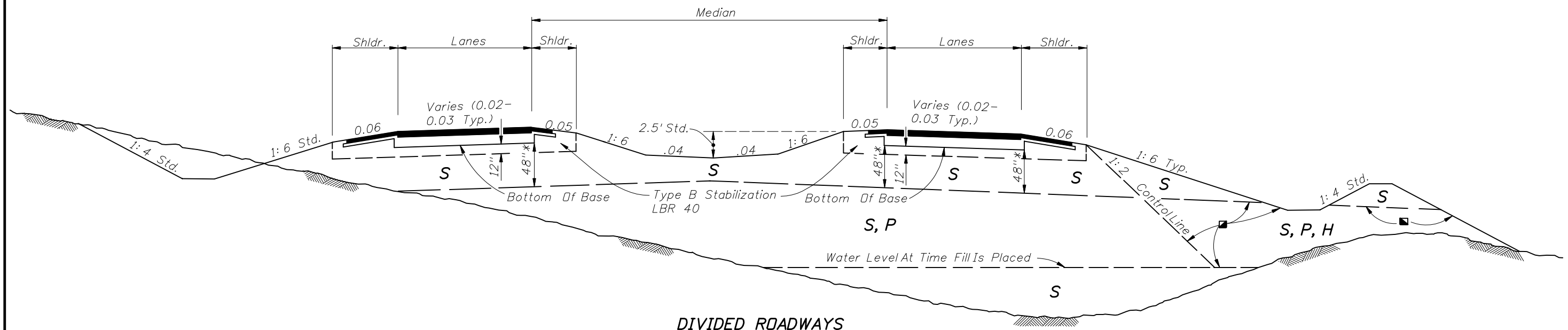
APPROVED GEOSYNTHETIC PRODUCTS
 (EXTRUDED GEOGRID)
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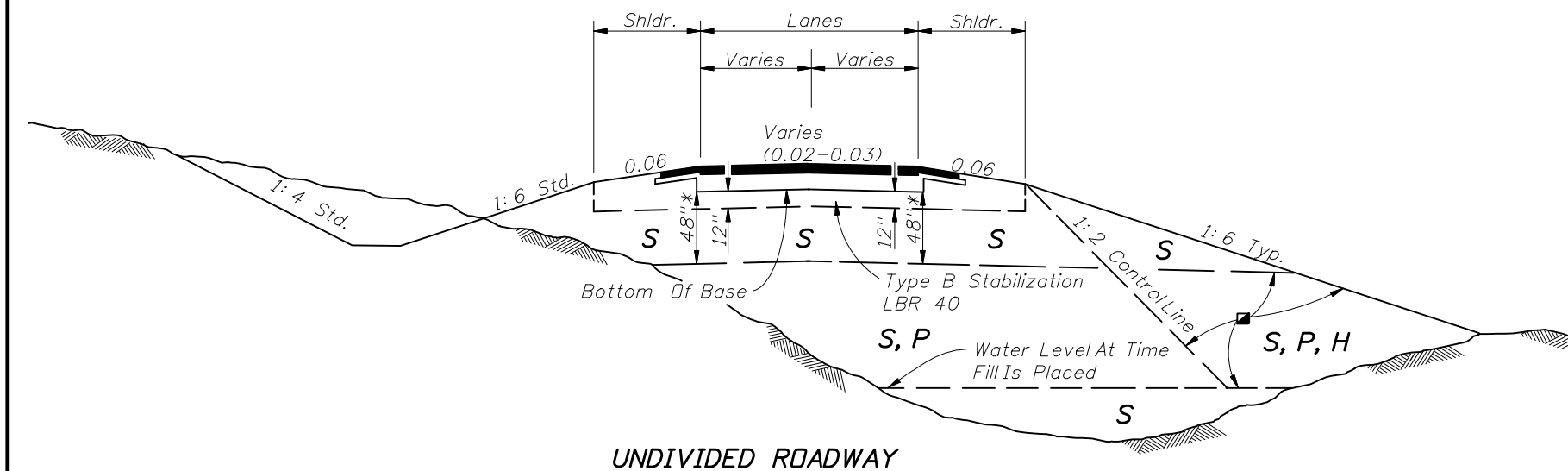
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GEOSYNTHETIC REINFORCED SOILS

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DIVIDED ROADWAYS



UNDIVIDED ROADWAY

GENERAL NOTES

1. Roadway dimensions are representative. Subgrade dimensions and control lines are standard. The details shown on this Index do not supersede the details shown in the plans or on Index Nos. 500 or 506.
2. Plastic (P) soils may be placed above the existing water level (at the time of construction) to within 4 feet of the proposed base. It should be placed uniformly in the lower portion of the embankment for some distance along the project rather than full depth for short distances.
3. High Plastic (H) soils excavated within the project limits may be used in embankment construction as indicated on this index. High Plastic soils are not to be used for embankment construction when obtained from outside the project limits.
4. Select (S) soils having an average organic content of more than two and one-half (2.5) percent, or having an individual test value which exceeds four (4) percent, shall not be used in the subgrade portion of the roadbed. Select (S), Plastic (P), or High Plastic (H) soils having an average organic content of more than five (5) percent, or an organic content individual test result which exceeds seven (7) percent, shall not be used in the portion of embankment inside the control line, unless written authorization is provided by the District Geotechnical Engineer; these soils may be used for embankment construction outside the control line, unless restricted by the plans or otherwise specified in the plans, provided they can be compacted sufficiently to sustain a drivable surface for operational vehicles as approved by the Engineer. Average organic content shall be determined from the test results from a minimum of three randomly selected samples from each stratum or stockpile of a particular material. Tests shall be performed in accordance with AASHTO T 267 on the portion of a sample passing the No. 4 sieve.
5. Highly organic soils, composed primarily of partially decayed organic matter, often dark brown or black in color with an odor of decay, and sometimes fibrous, shall be designated as muck. Further, any stratum or stockpile of soil which contains pockets of highly organic material may be designated as Muck (M). Highly organic soils shall not be used within the subgrade or embankment portion of the roadbed, with the exception of muck used as a supplement to construct a finish soil layer as described in Section 162 of the FDOT Standard Specifications.

<u>SYMBOL</u>	<u>SOIL</u>	<u>CLASSIFICATION (AASHTO M 145)</u>
S	Select	A-1, A-3, A-2-4**
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL < 50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL > 50)
M	Muck	A-8

Classification listed left to right in order of preference.

- See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.
- ** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadbed when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

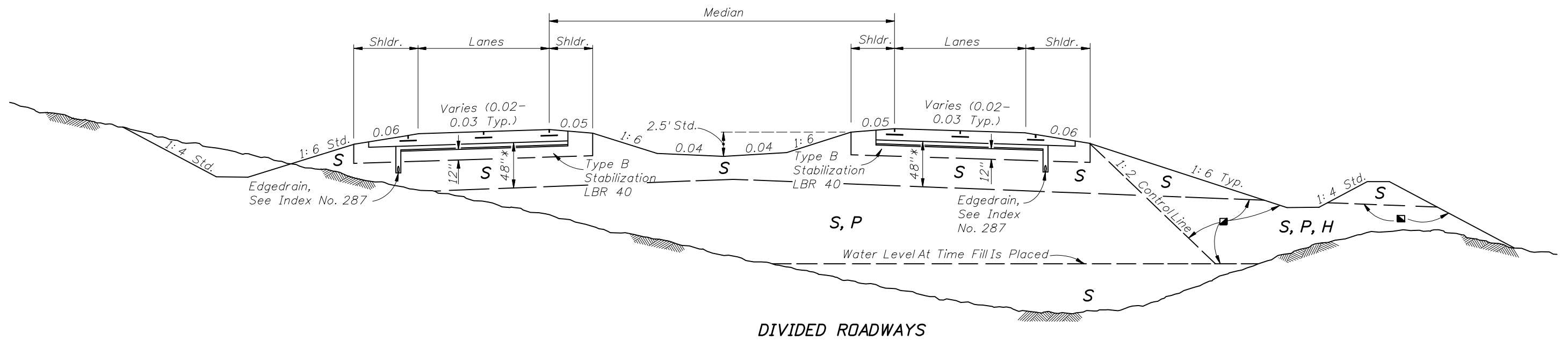
* For cut sections this dimension may be reduced to 24"; see Index No. 500.
For minor collectors and local facilities this dimension may be reduced to 18".

FLEXIBLE PAVEMENT

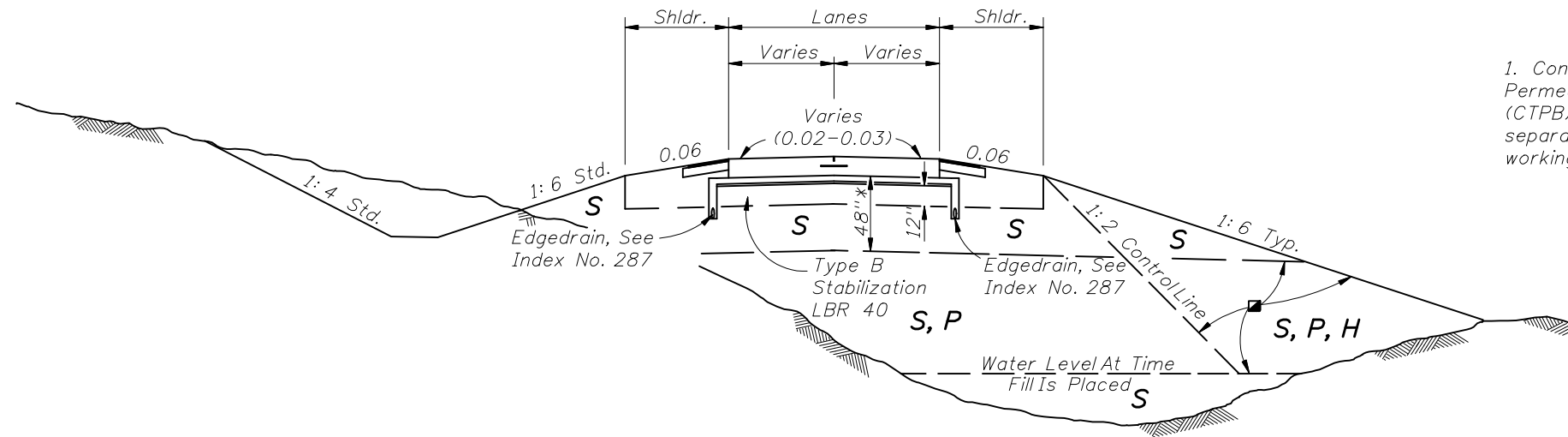
DESIGN NOTES

1. The designer shall take into consideration the expectancy of roadway widening to the outside, and where widening is anticipated, specify in the plans the location of the future widening control line for utilization of High Plastic (H) soils and/or soils classified as organic material in the embankment.
2. The designer shall take into consideration the position of the drainage swales in the portion of the embankment where Plastic (P) soils, High Plastic (H) soils, or soils classified as organic material would be allowed. The designer shall limit the use of Plastic (P) soils, High Plastic (H) soils, and/or soils classified as organic material to locations that will not inhibit the infiltration of stormwater from the swales.





DIVIDED ROADWAYS



UNDIVIDED ROADWAY

DESIGN NOTE

1. Concrete pavement is to be placed over 4" of Asphalt Treated Permeable Base (ATPB) or Cement Treated Permeable Base (CTPB) as identified in the plans. This will be placed on a separator layer using 2" Type SP. This will be placed on a working platform using 12" of Type B Stabilization.

<u>SYMBOL</u>	<u>SOIL</u>	<u>CLASSIFICATION (AASHTO M 145)</u>
S	Select	A-1, A-3, A-2-4**
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL < 50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL > 50)
M	Muck	A-8

Classification listed left to right in order of preference.

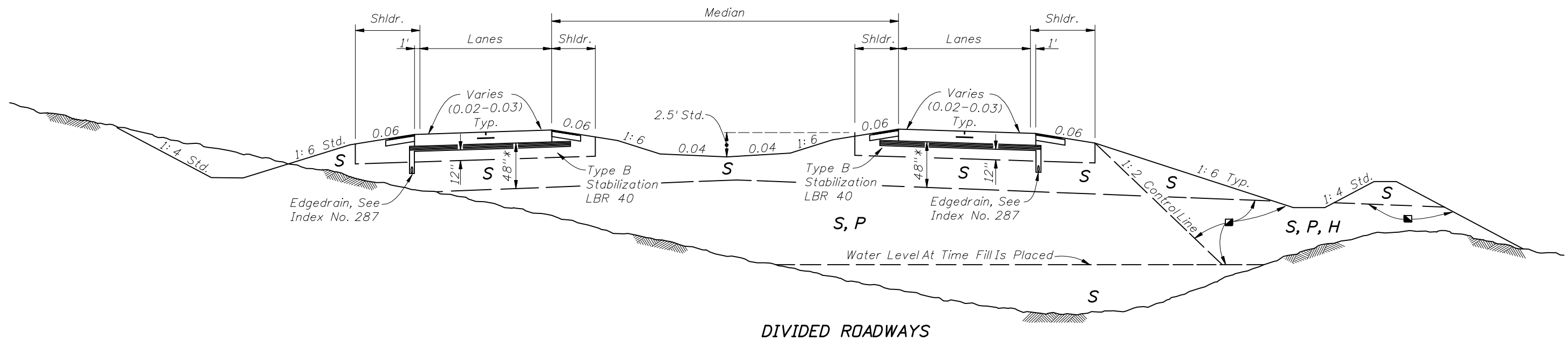
■ See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.

** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadbed when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

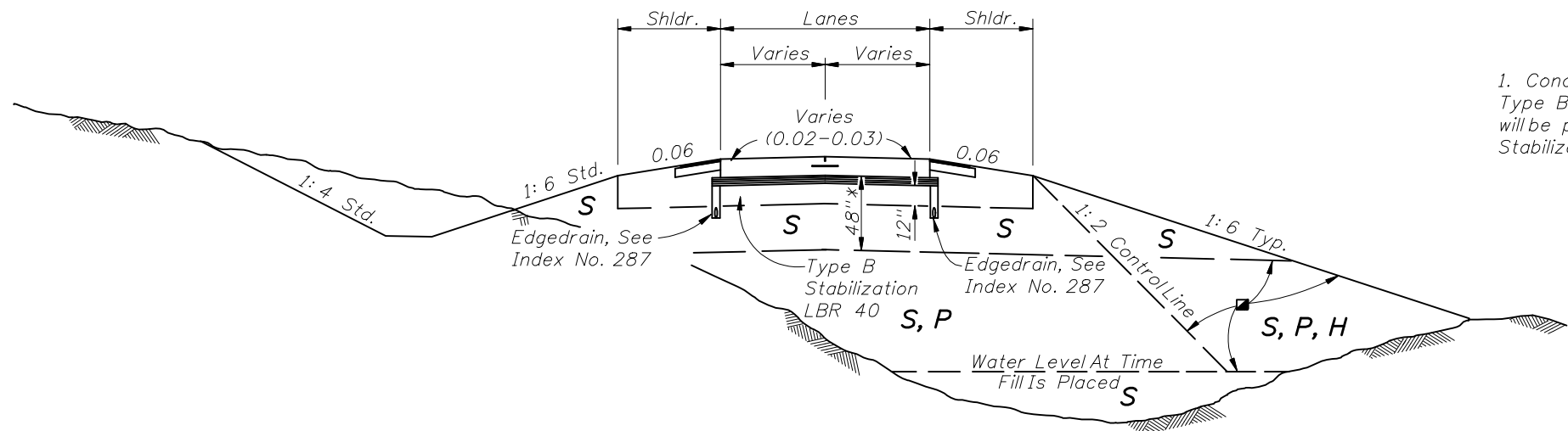
* For cut sections this dimension may be reduced to 24"; see Index No. 500. For minor collectors and local facilities this dimension may be reduced to 18".

RIGID PAVEMENT – TREATED PERMEABLE BASE OPTION





DIVIDED ROADWAYS



UNDIVIDED ROADWAY

DESIGN NOTE

1. Concrete pavement is to be placed over Optional Base Group 1 Type B-12.5 only Asphalt Base as identified in the plans. This will be placed on a working platform using 12" of Type B Stabilization.

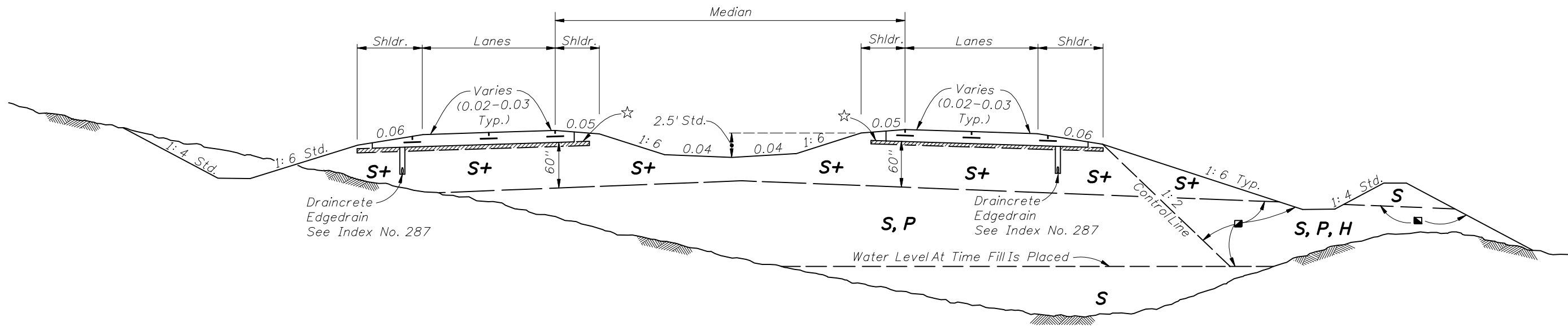
<u>SYMBOL</u>	<u>SOIL</u>	<u>CLASSIFICATION (AASHTO M 145)</u>
S	Select	A-1, A-3, A-2-4**
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL < 50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL > 50)
M	Muck	A-8

Classification listed left to right in order of preference.

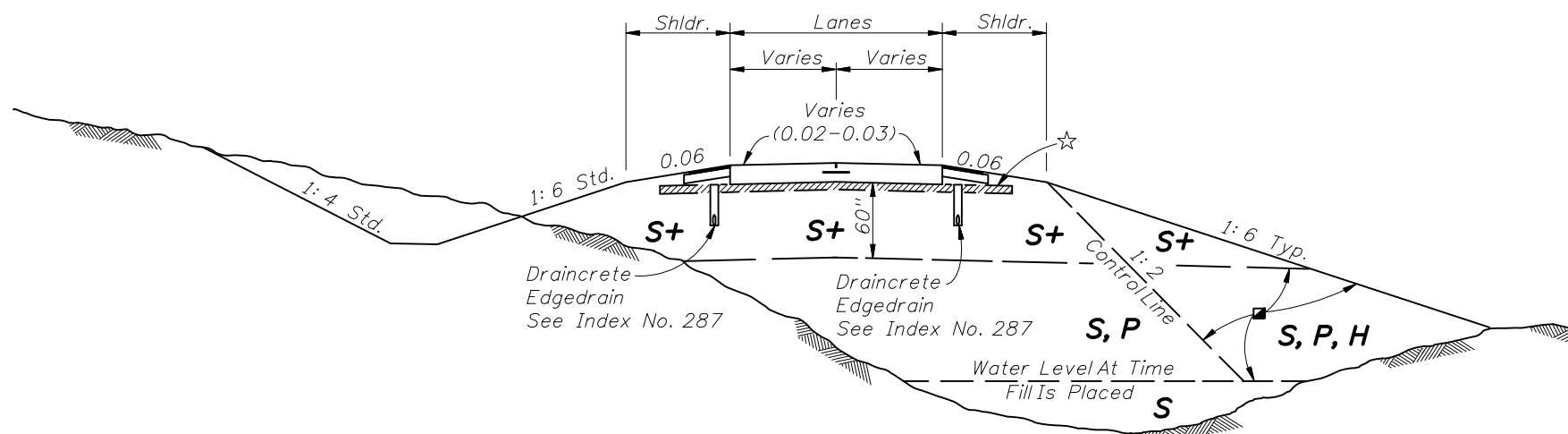
- See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.
- ** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadbed when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.
- * For cut sections this dimension may be reduced to 24"; see Index No. 500.
For minor collectors and local facilities this dimension may be reduced to 18".

RIGID PAVEMENT - ASPHALT BASE OPTION





DIVIDED ROADWAYS



UNDIVIDED ROADWAY

SYMBOL	SOIL	CLASSIFICATION (AASHTO M 145)
S	Select	A-1, A-3, A-2-4**
S+	Special Select	A-3 *** With Minimum Average Lab Permeability of 5×10^{-5} cm/sec. (0.14 ft./day) as per FM 1-T215
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL<50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL>50)
M	Muck	A-8

Classification listed left to right in order of preference.

■ See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.

*** When allowed by the plans, some types of A-2-4 material may be approved in writing by the District Materials Engineer. This material must meet the minimum lab permeability requirement, be nonplastic, and not exceed 12% passing the No. 200 U.S. Standard sieve.

** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

☆ 3" of #57 or #89 Coarse Aggregate Mixed Into Top 6".

Note: SPECIAL SELECT SOIL OPTION may be used only when approved in writing by the District Materials Engineer and shown in the plans.

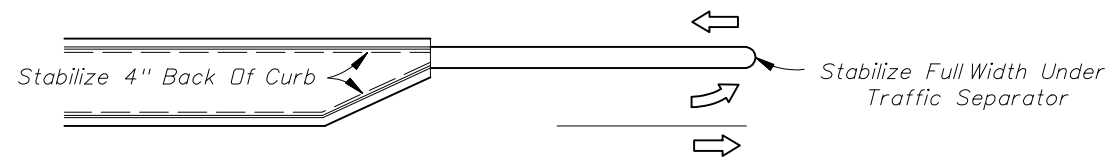
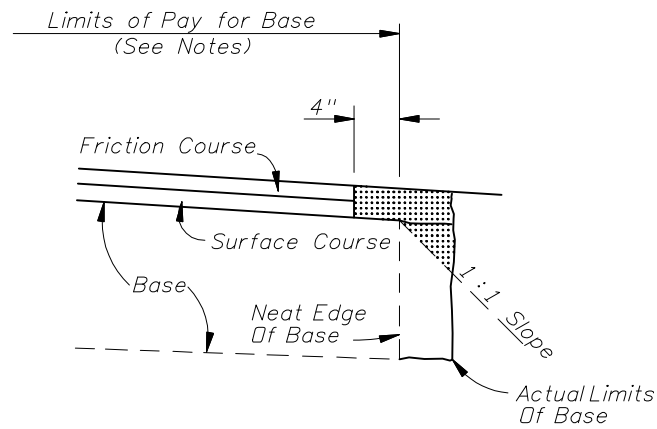
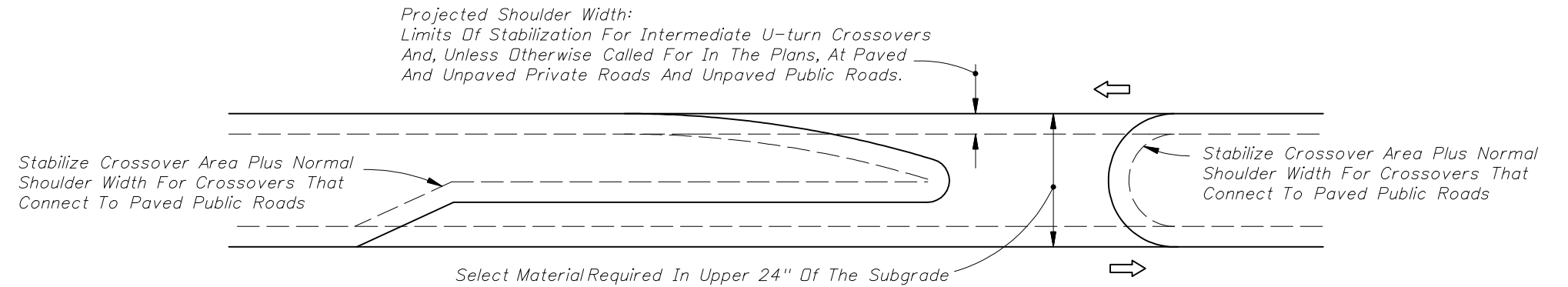
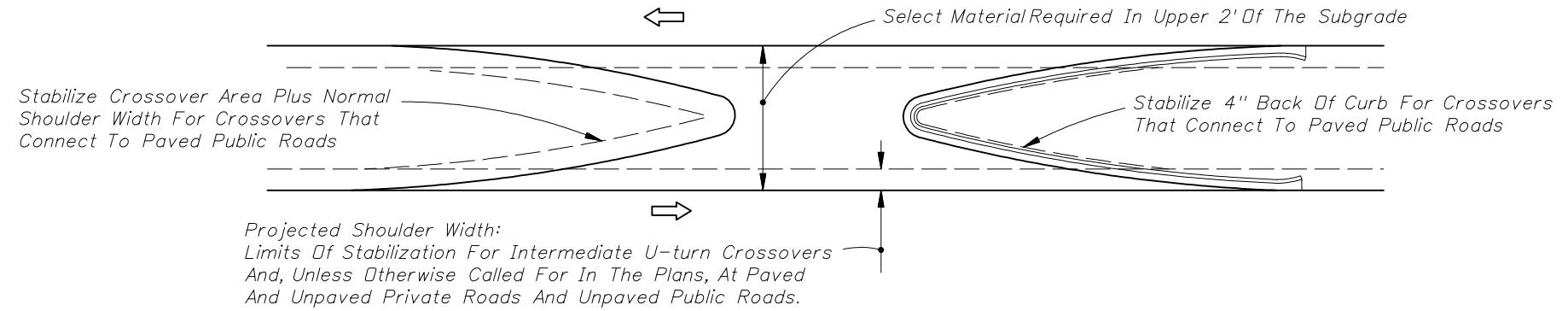
RIGID PAVEMENT – SPECIAL SELECT SOIL OPTION



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EMBANKMENT UTILIZATION

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NOTES

1. All material in the shaded area is excess base to be removed.
2. The cost for removal of excess base material shall be included in the contract unit price for base.
3. Payment for base shall be calculated using normal width.

REMOVAL OF EXCESS BASE MATERIAL

NOTES

1. When the median has curb or curb and gutter, stabilize 4" back of curb.
2. When the median has shoulder with no curb or curb and gutter, stabilize to normal shoulder width.
3. See the details above for stabilizing requirements at crossroads.
4. Stabilize entire area under all paved traffic islands.
5. Stabilize full width under all traffic separators.
6. Select material as defined on Index No. 505. For minor collectors and local facilities the depth of select material thickness may be reduced from 24" to 18".

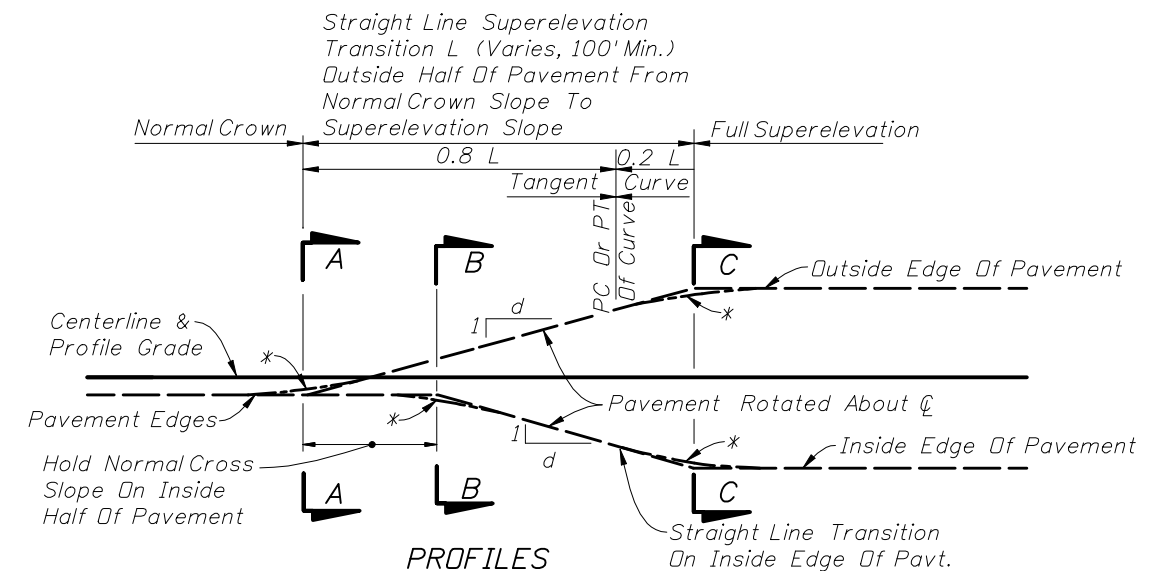
MEDIAN STABILIZING DETAILS



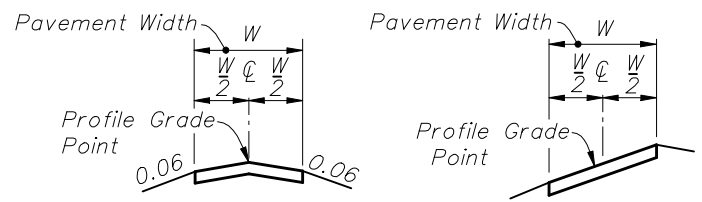
SLOPE RATIOS FOR SUPERELEVATION TRANSITIONS			
SECTION	DESIGN SPEED, MPH		
	45-50	55-60	65-70
	i: d		
2 Lane & 4 Lane	1: 200	1: 225	1: 250
6 Lane	1: 160	1: 180	1: 200
8 Lane	1: 150	1: 170	1: 190

The length of superlevation transition is to be determined by the relative slope between the travelway edge of pavement and the profile grade, except that the minimum length of transition shall be 100 ft.

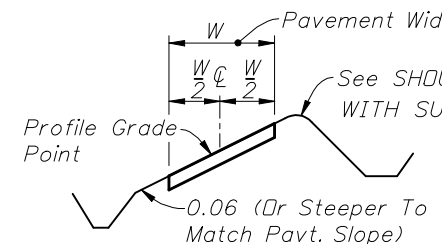
*Short Vertical Curves Are To Be Used On Construction To Avoid Angular Breaks In Edge Profiles



PROFILES



NORMAL CROWN SECTION AA
REVERSE CROWN SECTION BB
2-LANE, 4-LANE OR 6-LANE PAVEMENT, NO MEDIAN

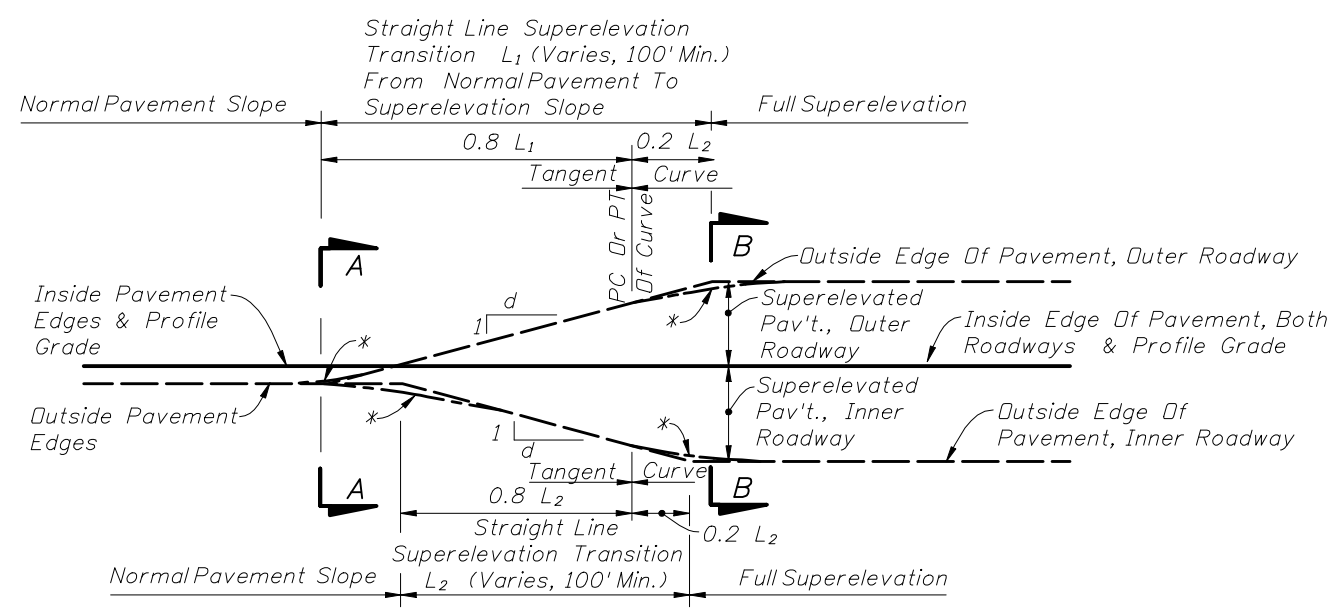


FULLY SUPERELEVATED SECTION CC

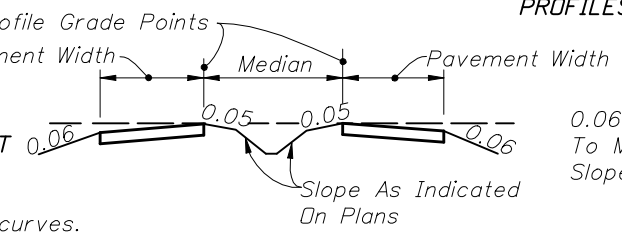
- THESE TRANSITION DETAILS ARE TO APPLY IN ALL IN ALL CASES, EXCEPT UNDER THE FOLLOWING CONDITIONS:
1. Curves of insufficient length.
 2. Insufficient tangent length between curves.
 3. Deficient transition distance between a curve and other control point(s).
 4. At PCC's or PRC's (Runoff rates are applicable).

Transitions for these exceptions are to be as detailed in the plans.

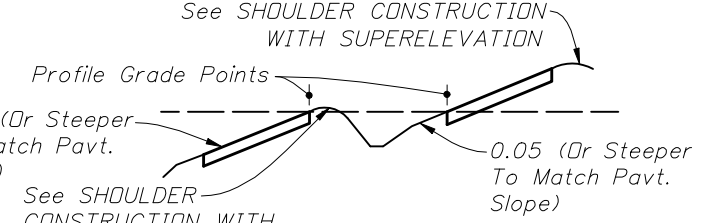
SUPERELEVATION TRANSITIONS



PROFILES



NORMAL SECTION AA



FULLY SUPERELEVATED SECTION BB

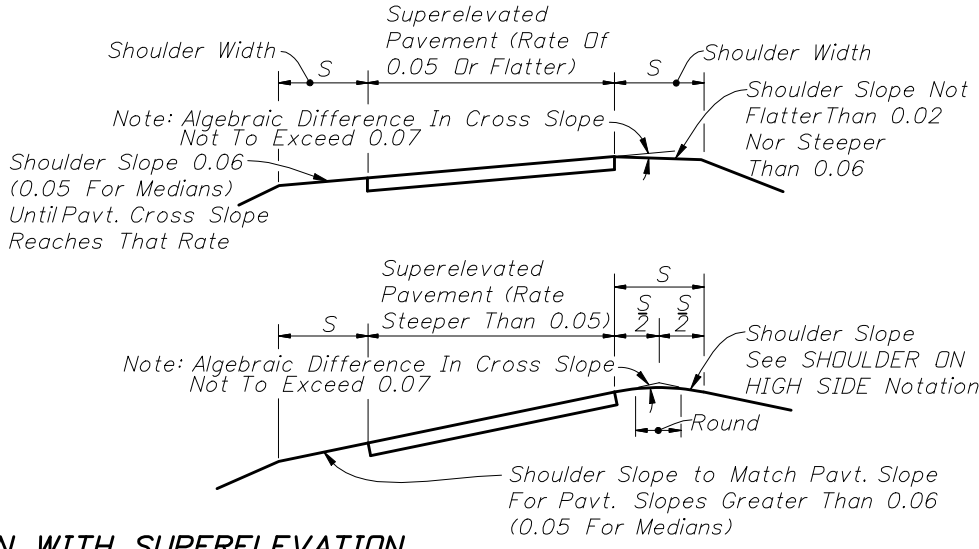
4-LANE OR 6-LANE PAVEMENT WITH MEDIAN

SHOULDER ON HIGH SIDE: A shoulder slope of 0.06 downward from the edge of pavement will be maintained until a 0.07 break in slope at the pavement edge is reached due to superlevation of the pavement. As the pavement superlevation increases, the 0.07 break in slope will be maintained and the shoulder flattened until the shoulder slope reaches the minimum of 0.02 downward from the edge of pavement. Any further increase in pavement superlevation will necessitate sloping the inside half of the shoulder toward the pavement and the outer half outward, both at 0.02 for superelevations 0.06-0.09 and both at 0.03 for superlevation 0.10.

SHOULDER ON LOW SIDE: Maintain 0.06 drop across inside shoulder until pavement cross slope reaches 0.06. For pavement cross slopes greater than 0.06, shoulder to have same slope as pavement.

These slopes are the same as those shown pictorially on sheet 2.

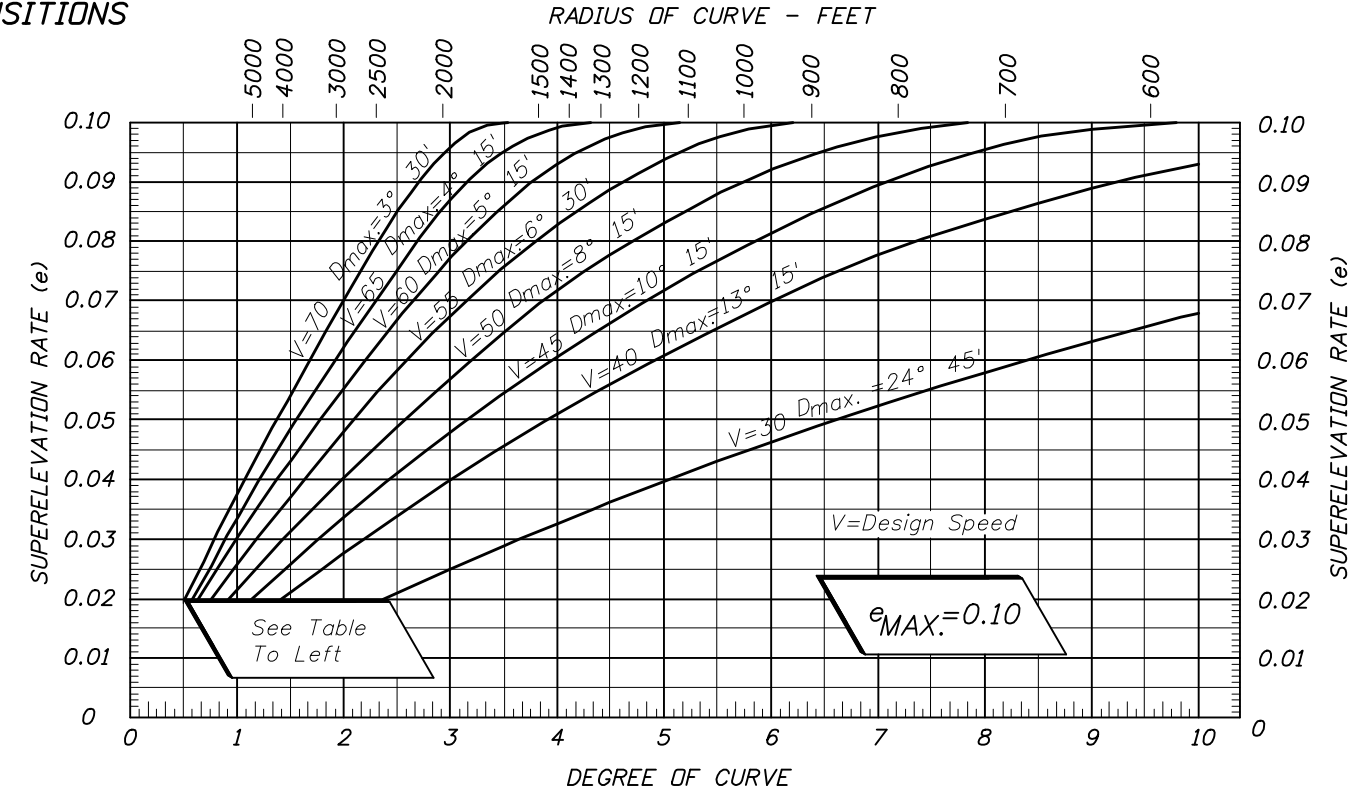
NOTE:
These details apply to both paved and grassed shoulders. For median shoulders use 0.05 in lieu of 0.06.



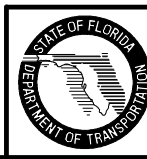
SHOULDER CONSTRUCTION WITH SUPERELEVATION

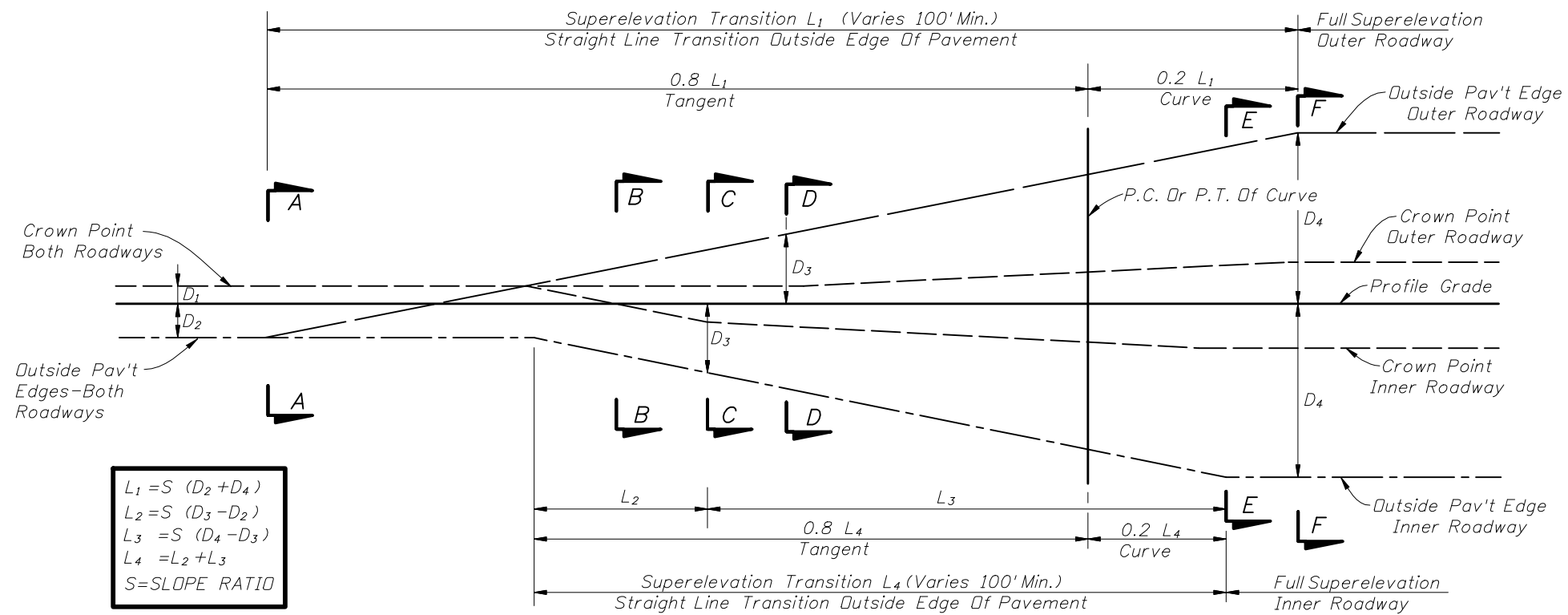
DESIGN SUPERELEVATION RATES FOR RURAL HIGHWAYS, URBAN FREEWAYS AND HIGH SPEED URBAN HIGHWAYS

DEGREE OF CURVE (D)	DESIGN SPEED, V MPH						
	30	40	45/50	55	60	65	70
0° 15'	NC	NC	NC	NC	NC	NC	NC
0° 30'	NC	NC	NC	NC	RC	RC	RC
0° 45'	NC	NC	RC	RC	0.023	0.025	0.028
1° 00'	NC	NC	0.021	0.025	See Table To Right		
1° 30'	NC	0.021					
2° 00'	RC						



GENERAL NOTES:
1. For curves in Urban Highways and high speed Urban Streets, see Index No. 511.





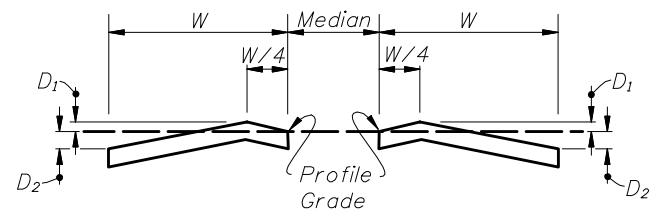
$$L_1 = S (D_2 + D_4)$$

$$L_2 = S (D_3 - D_2)$$

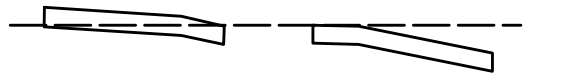
$$L_3 = S (D_4 - D_3)$$

$$L_4 = L_2 + L_3$$

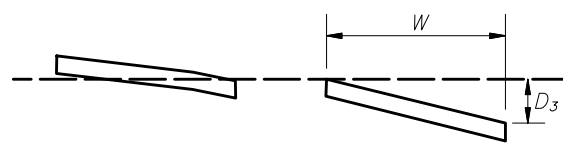
$$S = \text{SLOPE RATIO}$$



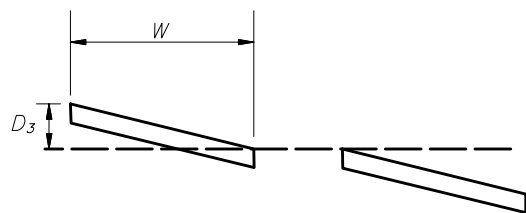
SECTION A-A
NORMAL CROWNED SECTION



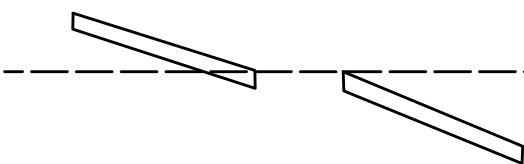
SECTION B-B
SUPERELEVATION SECTION LT. & RT.



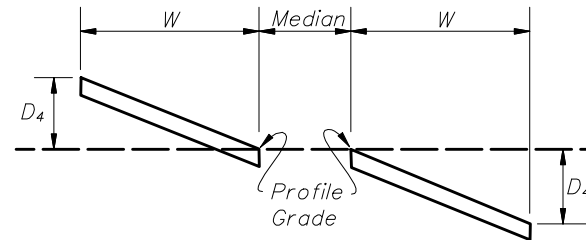
SECTION C-C
SUPERELEVATION SECTION LT.
PLANE INCLINED SECTION RT.



SECTION D-D
PLANE INCLINED SECTION LT.
SUPERELEVATION TRANSITION RT.

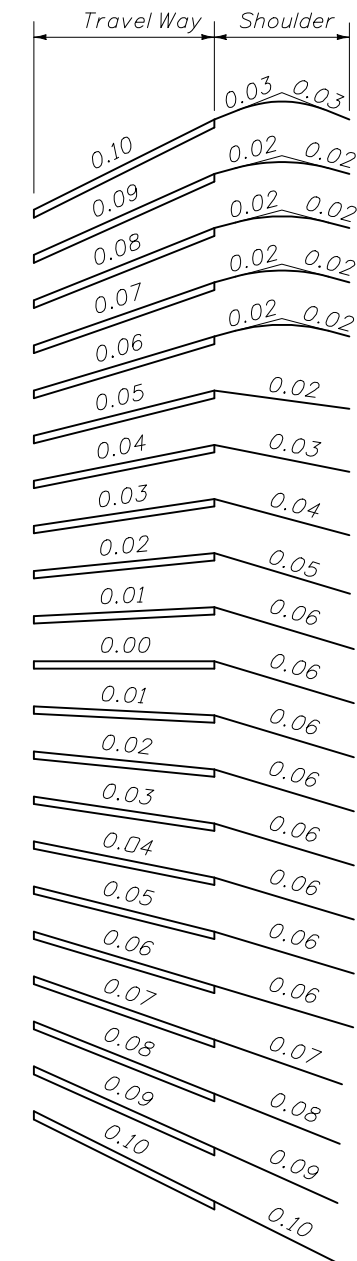


SECTION E-E
SUPERELEVATION TRANSITION LT.
FULL SUPERELEVATION RT.



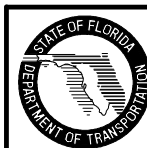
SECTION F-F
FULL SUPERELEVATION LT. & RT.

8-LANE PAVEMENT WITH ONE LANE SLOPED TO MEDIAN



SLOPES OF TRAVELED WAY
AND ABUTTING SHOULDERS

SHOULDER SLOPES ON
SUPERELEVATION SECTIONS



2010 FDOT Design Standards

SUPERELEVATION

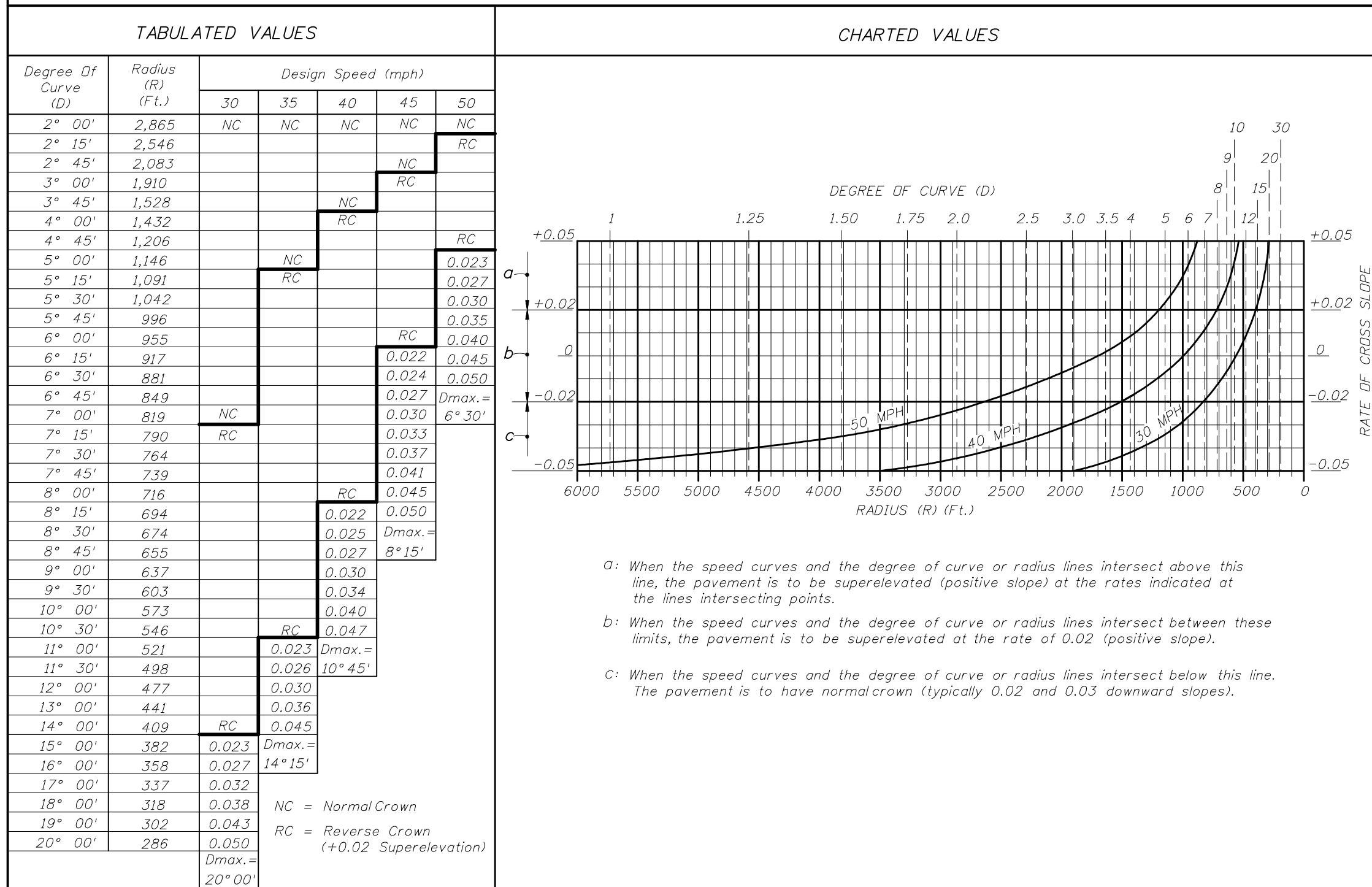
RURAL HIGHWAYS, URBAN FREEWAYS AND HIGH SPEED URBAN HIGHWAYS

Last Revision 00 Sheet No. 2 of 2

Index No. 510

SUPERELEVATION RATES (e) FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS

$e_{max}=0.05$



GENERAL NOTES

1. Maximum rate of superelevation for urban highways and high speed urban streets shall be 0.05.
2. Superelevation shall be obtained by rotating the plane successively about the break points of the section until the plane has attained a slope equal to that required by the chart. Should the rotation traverse the entire section and further superelevation be required, the remaining rotation of the plane shall be about the low edge of the inside travel lane. Crown is to be removed in the auxiliary lane to the outside of the curve only when the adjoining travel lanes require positive superelevation.
3. When positive superelevation is required, the slope of the gutter on the high side shall be a continuation of the slope of the superelevated pavement.
4. In construction, short vertical curves shall be placed at all angular profile breaks within the limits of the superelevation transition.
5. The variable superelevation transition length "L" shall have a minimum value of 50 feet for design speeds under 40 MPH and 75 feet for design speeds of 40 MPH or greater.
6. Roadway sections having lane arrangements different from those shown, but composed of a series of planes, shall be superelevated in a similar manner.
7. For superelevation of lower speed urban streets, see the FDOT 'Manual Of Uniform Minimum Standards For Design, Construction And Maintenance For Streets And Highways'. For superelevation of curves on rural highways, urban freeways and high speed urban highways, see Index No. 510.

$e_{max}= 0.05$

SUPERELEVATION FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS

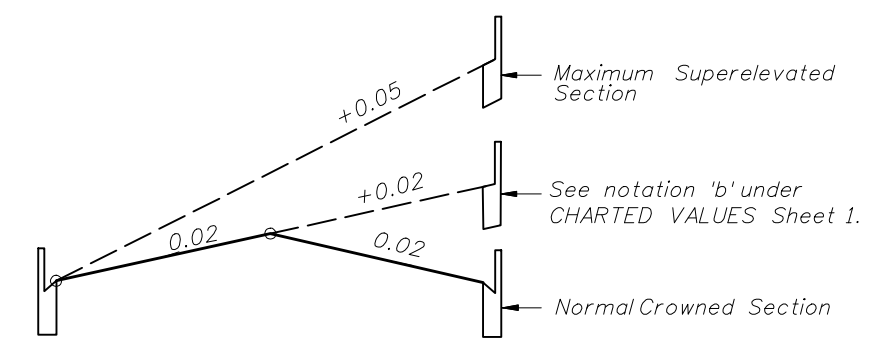


2010 FDOT Design Standards

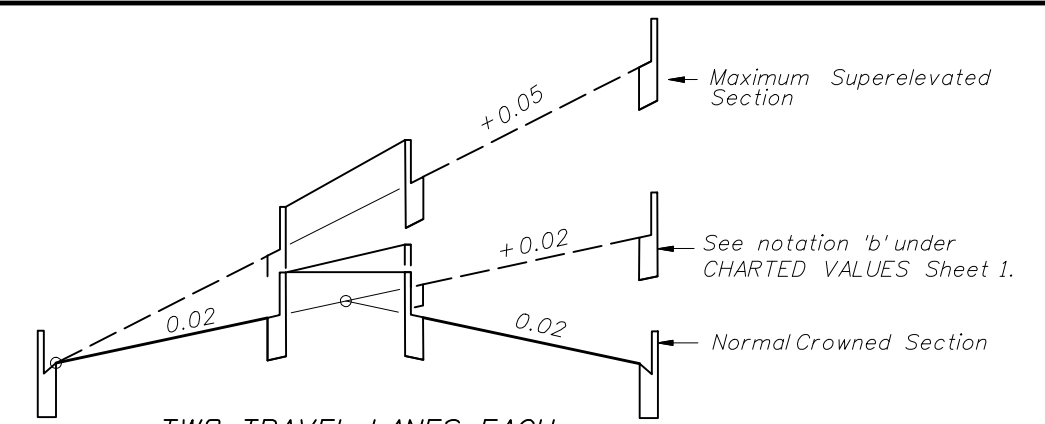
**SUPERELEVATION
URBAN HIGHWAYS AND STREETS**

Last Revision 00 Sheet No. 1 of 3

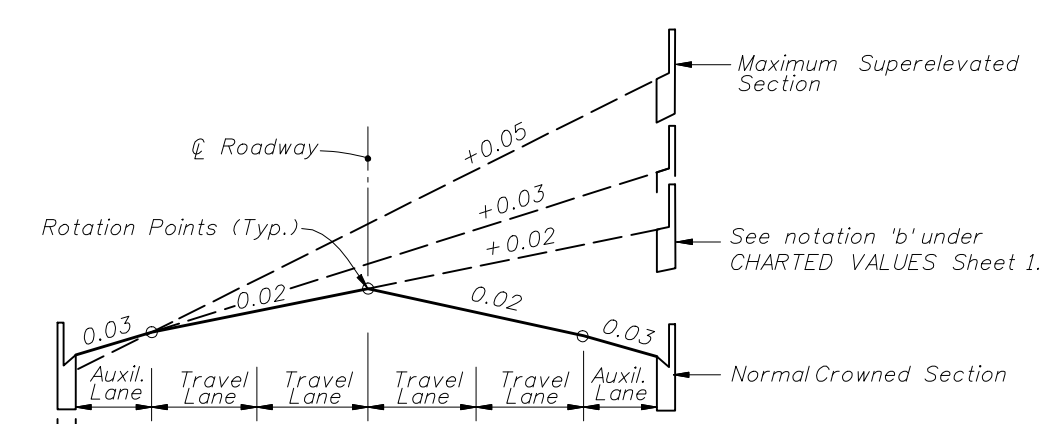
Index No.
511



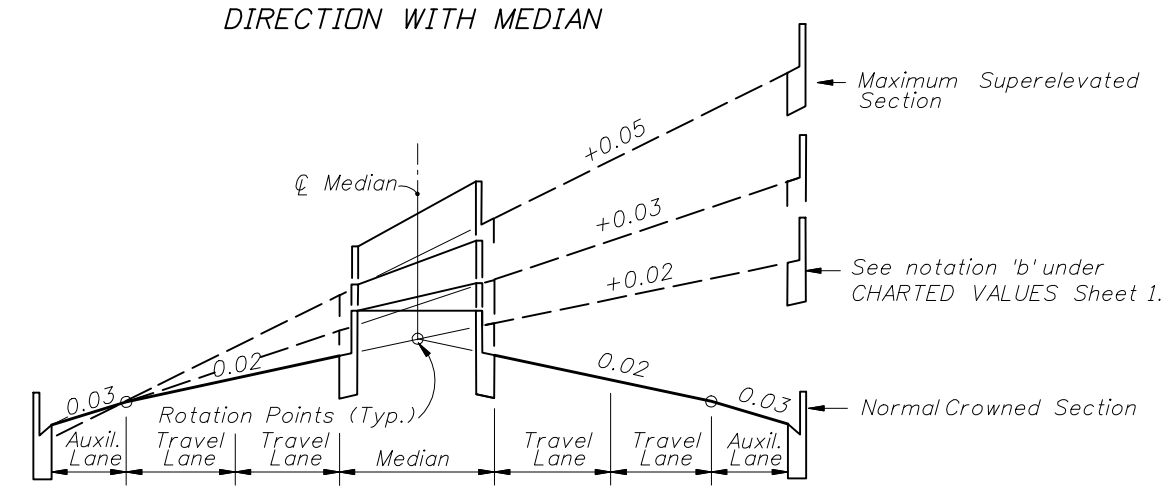
TWO TRAVEL LANES EACH DIRECTION



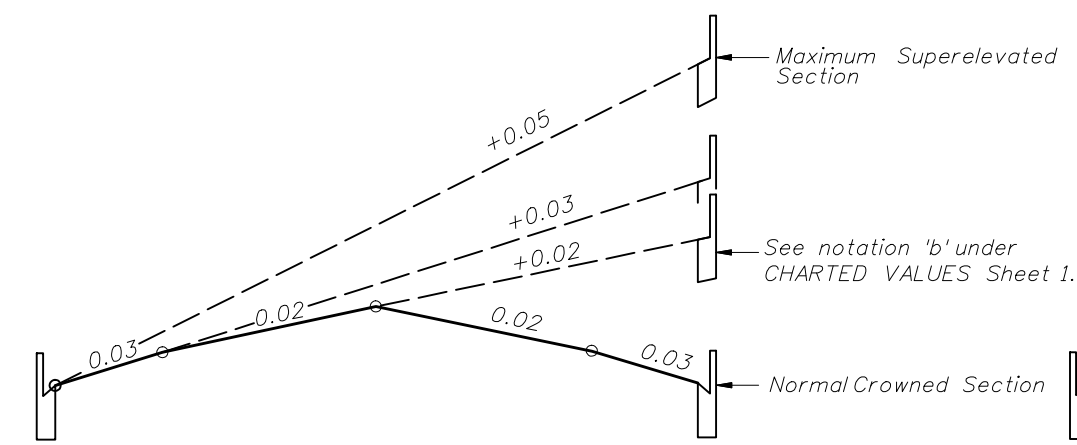
TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN



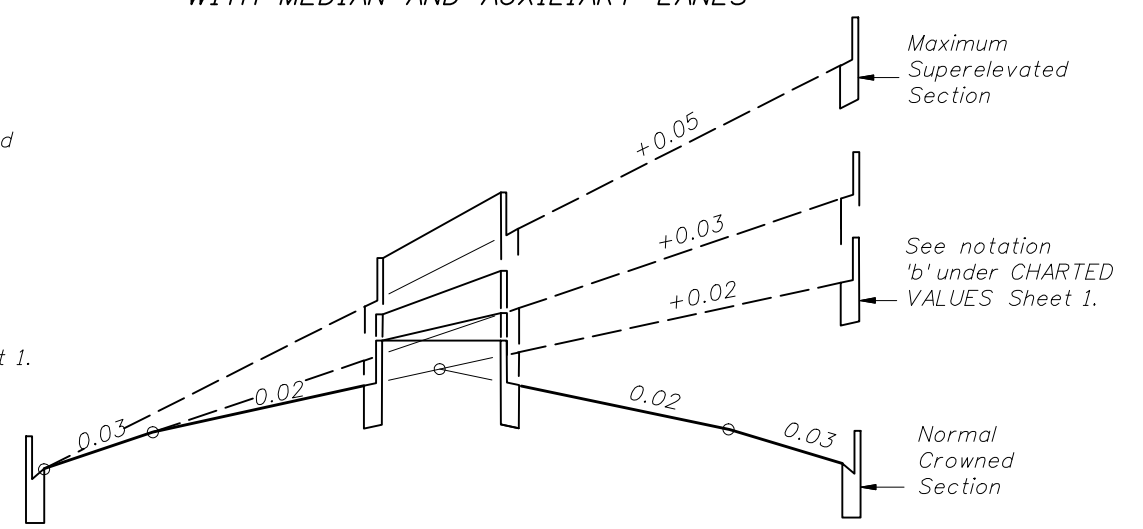
TWO TRAVEL LANES EACH DIRECTION WITH AUXILIARY LANES



TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANES

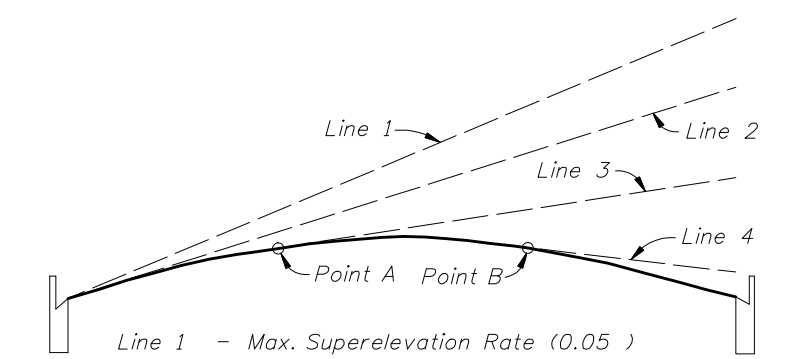


UNDIVIDED FACILITIES



THREE TRAVEL LANES EACH DIRECTION WITH MEDIAN

DIVIDED FACILITIES



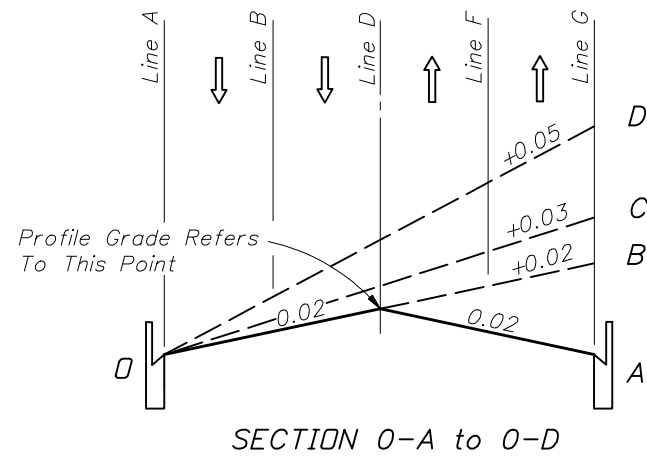
- Line 1 - Max. Superelevation Rate (0.05)
- Line 2 - Slope of Parabola at Inside Edge of Pavt.
- Line 3 - Positive Superelevation Rate Less Than Max. Slope of Parabola.
- Line 4 - Adverse Superelevation.

Superelevation rates obtained from the chart or table on Sheet 1 are also applicable to a parabolic crown section. When this section is used, superelevation is established by rotating a tangent about the arc of the parabolic crown until the desired slope is attained (points A & B on sketch). The normal parabolic crown will be maintained outside the limits of the plane thus formed.

PARABOLIC SECTION

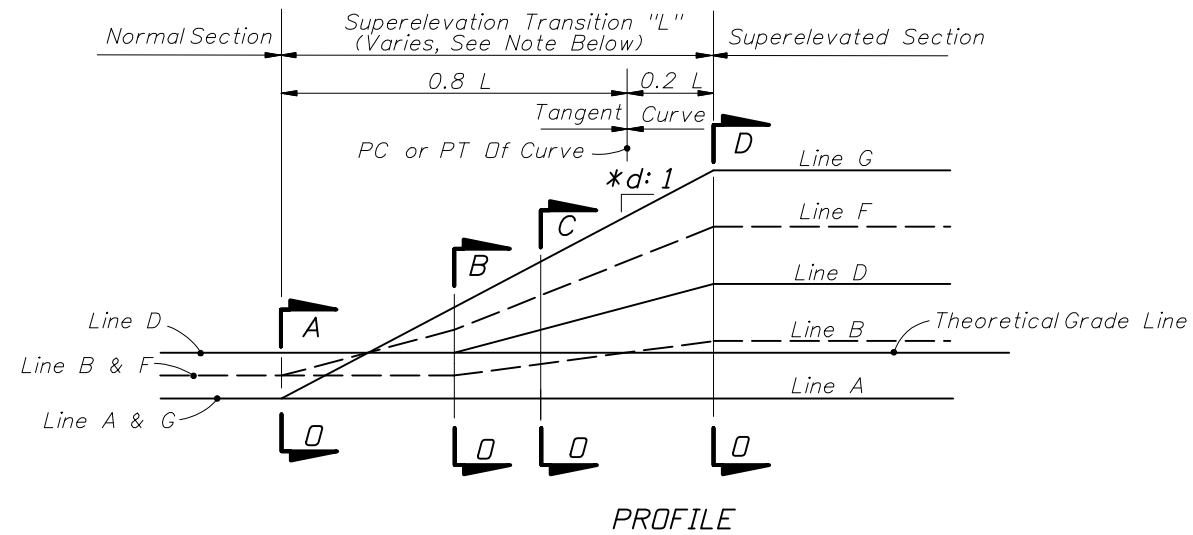
**SUPERELEVATION TRANSITION SECTIONS
FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS**





SECTION 0-A to 0-D

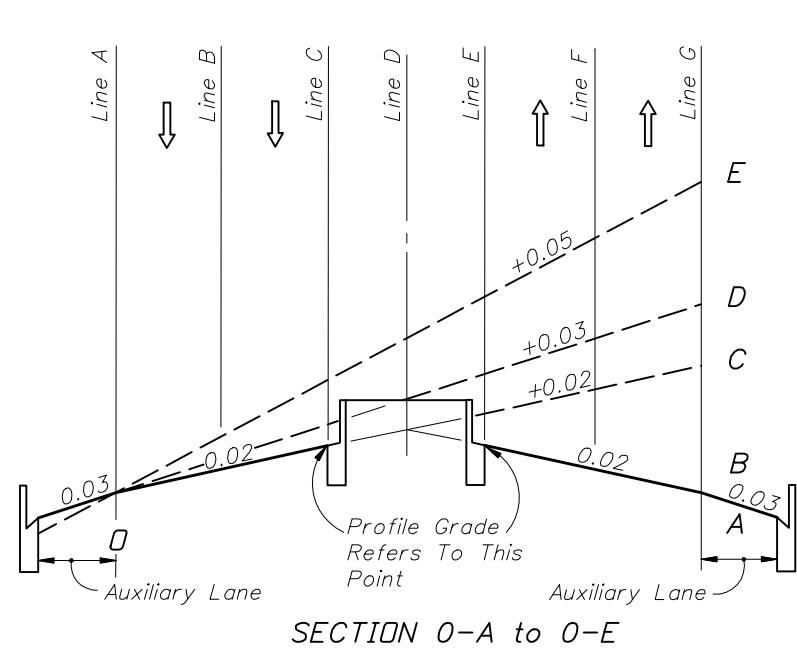
TWO LANES EACH DIRECTION



PROFILE

LINE	DESCRIPTION
A	Inside Travel Lane
B	Inside Lane Line
C	Inside Median Edge Pavement
D	Centerline Construction
E	Outside Median Edge Pavement
F	Outside Lane Line
G	Outside Travel Lane

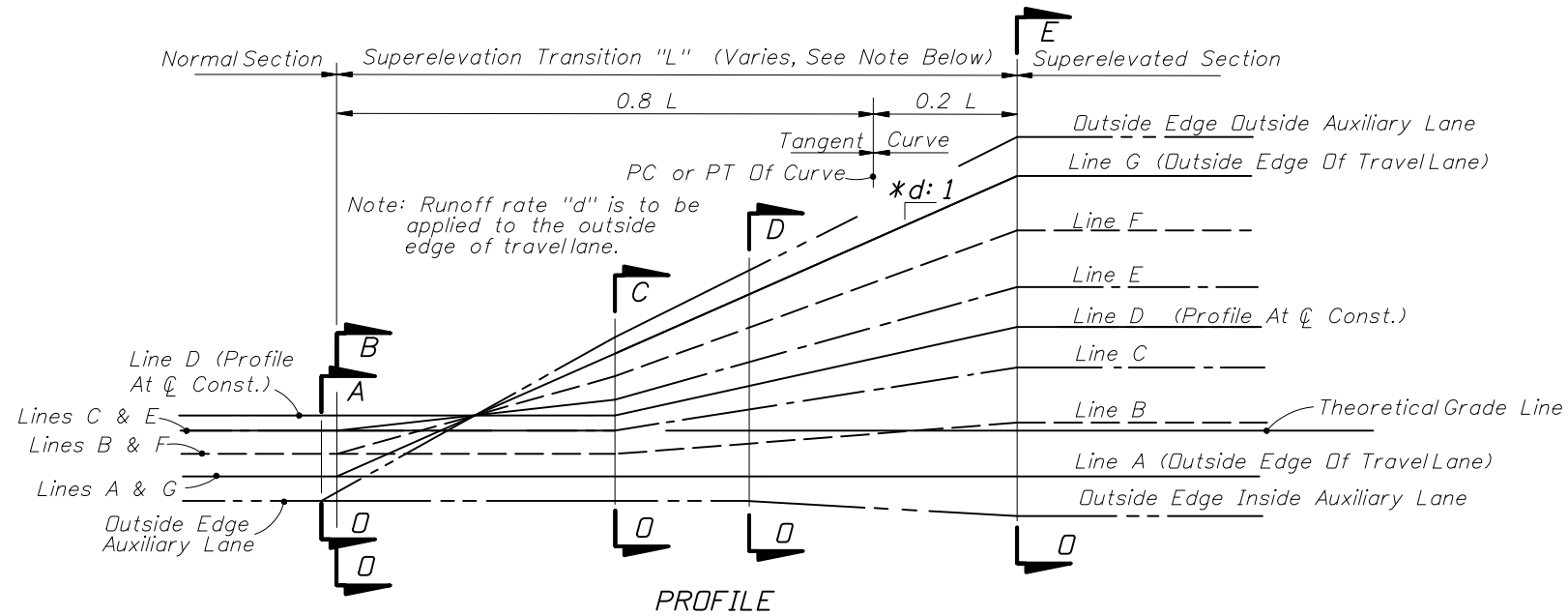
Inside And Outside Are Relative To Curve Center



SECTION 0-A to 0-E

TWO LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANE

Note:
The sections and profiles shown are examples of superelevation transitions.
Similar schemes should be used for roadways having other sections.



PROFILE

*d (Slope Ratio)	
30 MPH	1:100
40 MPH	1:125
45-50 MPH ^Δ	1:150

^Δ 1:125 May Be Used For 45 MPH Under Restricted Conditions.

EXAMPLE SUPERELEVATION SECTIONS AND PROFILES
FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS



BASE THICKNESS AND OPTION CODES										
Base Group	Structural Range	Base Group Pay Item Number	Base Options							RAP Base
			Limerock LBR 100	Cemented Coquina LBR 100	Shell Rock LBR 100	Bank Run Shell LBR 100	Graded Aggregate Base LBR 100	Type B-12.5	B-12.5 And 4" Granular Subbase, LBR 100 *	
			Structural Number (Per. in.)							
			(0.18)	(0.18)	(0.18)	(0.18)	(0.15)	(0.30)	(0.30 & 0.15)	(NA)
1	0.65-0.75	701	4"	4"	4"	4"	4½"	△ 4"		□ 5"
2	0.80-0.90	702	5"	5"	5"	5"	5½"	△ 4"		
3	0.95-1.05	703	5½"	5½"	5½"	5½"	6½"	△ 4"		
4	1.05-1.15	704	6"	6"	6"	6"	7½"	△ 4"		
5	1.25-1.35	705	7"	7"	7"	7"	8½"	4½"		
6	1.35-1.50	706	8"	8"	8"	8"	9"	5"		
7	1.50-1.65	707	8½"	8½"	8½"	8½"	10"	5½"		
8	1.65-1.75	708	9½"	9½"	9½"	9½"	11"	5½"		
9	1.75-1.85	709	10"	10"	10"	10"	12"	6"	4"	
10	1.90-2.00	710	11"	11"	11"	11"	∅ 13"	6½"	4½"	
11	2.05-2.15	711	12"	12"	12"	12"	∅ 14"	7"	5"	
12	2.20-2.30	712	12½"	12½"	12½"	12½"		7½"	5½"	
13	2.35-2.45	713	∅ 13½"	∅ 13½"	∅ 13½"	∅ 13½"		8"	6"	
14	2.45-2.55	714	∅ 14"	∅ 14"	∅ 14"	∅ 14"		8½"	6½"	
15	2.60-2.70	715						9"	7"	

GENERAL NOTES

1. On new construction and complete reconstruction projects where an entirely new base is to be built, the design engineer may specify just the Base Group and any of the unrestricted General Use Optional Bases shown in that base group may be used. Note, however, that some thick granular bases are limited to widening which prevents their general use.
2. Where base options are specified in the plans, only those options may be bid and used.
3. The designer may require the use of a single base option, for instance Type B-12.5 in a high water condition. This will still be bid as Optional Base.

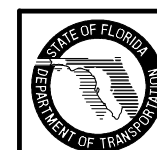
* For granular subbase, the construction of both the subbase and Type B-12.5 will be paid for under the contract unit price for Optional Base. Granular subbases include Limerock, Cemented Coquina, Shell Rock, Bank Run Shell and Graded Aggregate Base at LBR 100. The base thickness shown is Type B-12.5. All subbase thicknesses are 4".

∅ To be used for widening only, three feet or less.

△ Based on minimum practical thicknesses.

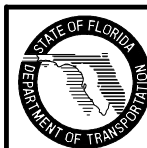
□ Restricted to nonlimited access shoulder base construction.

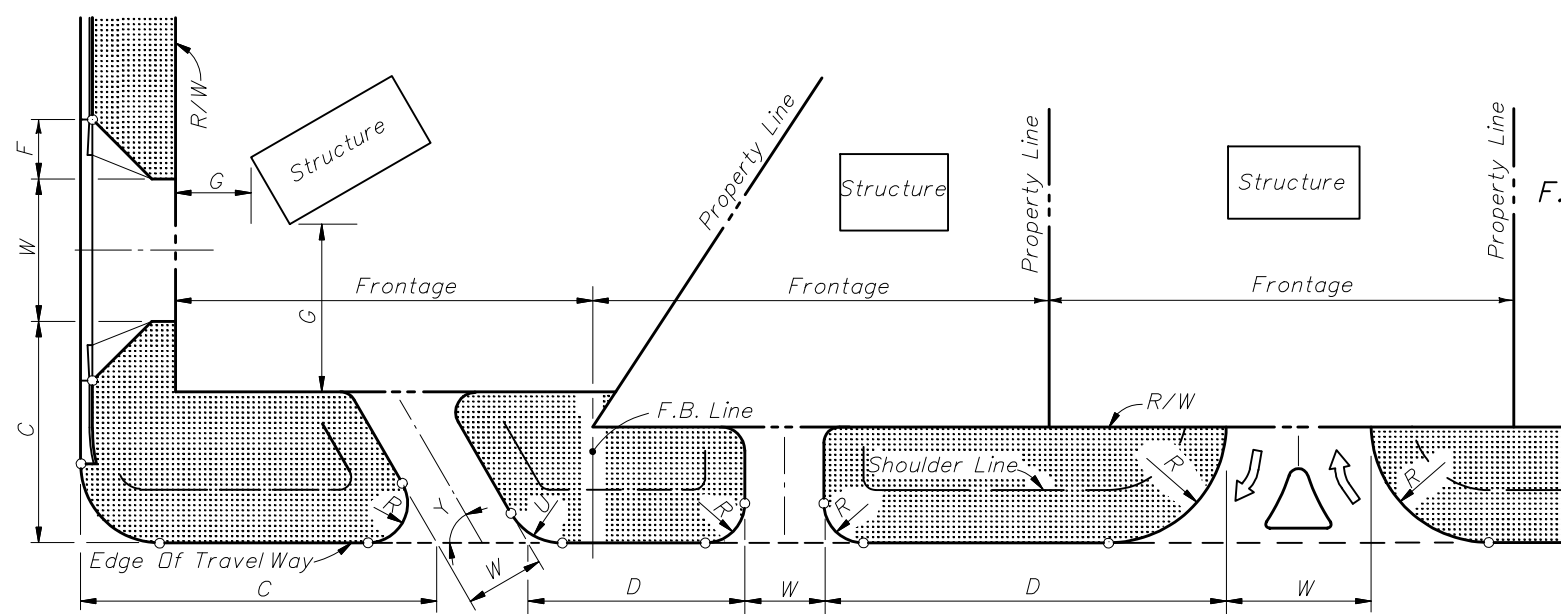
GENERAL USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS



BASE THICKNESS AND OPTION CODES									
Base Group	Structural Range	Base Group Pay Item Number	Base Options						
			Limerock Stabilized LBR 70	Shell LBR 70	Shell Stabilized LBR 70	Sand-Clay LBR 75	Soil Cement (300 psi) (Plant Mixed)	Soil Cement (300 psi) (Road Mixed)	Soil Cement (500 psi) (Plant Mixed)
			Structural Number (Per. in.)						
			(0.12)	(0.12)	(0.10)	(0.12)	(0.15)	(0.15)	(0.20)
1	0.60-0.75	701	5"	5"	7"	5"	5"	5"	4"*
2	0.75-0.90	702	6½"	6½"	8½"	6½"	5½"	5½"	4"
3	0.95-1.05	703	8"	8"	9½"	8"	6½"	6½"	5"
4	1.05-1.15	704	9"	9"	10½"	9"	7½"	7½"	5½"
5	1.20-1.35	705	10"	10"	12"	10"	8½"	8½"	6"
6	1.30-1.45	706	11"	11"		11"	9"		7"
7	1.45-1.60	707	12½"	12½"		12½"	10"		7½"
8	1.65-1.75	708					11"		8½"
<p>Not Recommended For 20 Year Design Accumulated 18 kip Equivalent Single Axle (ESAL) Loads Greater Than 1,000,000</p>									
<p>Note: These base materials may be used on FDDT projects when approved in writing by the District Materials Engineer and shown in the plans. * Based On Minimum Practical Thickness</p>									

LIMITED USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS





- LEGEND**
- Return Radius Point Or Flare Point
 - Buffer Areas
 - F.B. Line Frontage Boundary Line
 - W Driveway Width
 - Y Driveway Angle
 - C Corner Clearance
 - G Setback
 - R Outside Radius
 - U Inside Radius
 - D Distance Between Connections
 - F Flare

GENERAL NOTES

1. For definitions and descriptions of access connection "Categories" and access "Classifications" of highway segments, and for other detailed information on access to the State Highway System, refer to FDOT Rule Chapter 14-96, "State Highway Connection Permits Administrative Process" and Rule Chapter 14-97, "State Highway System Access Management Classification System And Standards."
2. For this index the term 'turnout' applies to that portion of driveways, roads or streets adjoining the outer roadway. For this index the term 'connection' encompasses a driveway, street or road and their appurtenant islands, separators, transition tapers, auxiliary lanes, travelway flares, drainage pipes and structures, crossovers, sidewalks, curb cut ramps, signing, pavement marking, required signalization, maintenance of traffic or other means of access to or from controlled access facilities. The turnout requirements set forth in this index do not provide complete intersection design, construction or maintenance requirements.
3. The location, positioning, orientation, spacing and number of connections and median openings shall be in conformance with FDOT Rule Chapter 14-97.
4. On Department construction projects all driveways not shown on the plans are to be reconstructed at their existing location in conformance to these standards, or, in conformance to permits issued during the construction project.
5. Driveways shall have sufficient length and size for all vehicular queuing, stacking, maneuvering, standing and parking to be carried out completely beyond the right of way line. Except for vehicles stopping to enter the highway, the turnout areas and drives within the right of way shall be used only for moving vehicles entering or leaving the highway.
6. Connections with expected daily traffic over 4000 vpd are to be constructed as intersecting streets or roads. The design requirement of this index and that of the local government will be used to select appropriate connection widths, radii and intersection design, subject to the approval of the Department. For connections with expected daily traffic less than 4000 vpd, the Department will determine if drop curbs or radius returns are required in accordance with existing or planned connections. Where radius returns apply, the design requirements of this index and that of the local government will be used to select appropriate connection widths, radii and intersection design, subject to the approval of the Department.

For Additional Information Refer To FDOT Rules Chapters 14-96 And 14-97.

SKETCH ILLUSTRATING DEFINITIONS

ELEMENT DESCRIPTION	URBAN (CURB & GUTTER)			RURAL		
	1-20 Trips/Day or 1-5 Trips/Hour	21-600 Trips/Day or 6-60 Trips/Hour	601-4000 Trips/Day [■] or 61-400 Trips/Hour	1-20 Trips/Day or 1-5 Trips/Hour	21-600 Trips/Day or 6-60 Trips/Hour	601-4000 Trips/Day [■] or 61-400 Trips/Hour
		2-Way □	2-Way □		2-Way □	2-Way □
CONNECTION WIDTH W	12' Min. 24' Max.	24' Min. 36' Max. ☆	24' Min. 36' Max. ☆	12' Min. 24' Max.	24' Min. 36' Max. ☆	24' Min. 36' Max. ☆
FLARE (Drop Curb) F	10' Min.	10' Min.	N/A	N/A	N/A	N/A
RETURNS (Radius) R & U	N/A	Δ	25' Min. 50' Std. 75' Max.	15' Min. 25' Std. 50' Max.	25' Min. 50' Std. 75' Max.	25' Min. 50' Std. (Or 3-Centered Curves)
ANGLE OF DRIVE Y		60° - 90°	60° - 90°		60° - 90°	60° - 90°
DIVISIONAL ISLAND (Throat Median)		4'-22' Wide	4'-22' Wide		4'-22' Wide	4'-22' Wide
SETBACK G	12' Min., All categories. See General Note No. 5.					
<p>■ Street or road intersection design, with possible auxiliary lanes and channelization, may be necessary. Intersection design, with possible auxiliary lanes and channelization, should be considered for connections with more than 4000 trips/days.</p> <p>□ "2-Way" refers to one "in" movement and one "out" movement i.e., not exclusive left or right turn lanes on the connection.</p> <p>☆ When more than 2 lanes in the turnout connection are required, the 36' max. width may be increased to relieve interference between entering and exiting traffic which adversely affects traffic flow. These cases require documented site specific study and design.</p> <p>Δ Small radii may be used in lieu of flares as approved by the Department.</p> <p>DESIGN NOTE: 1-Way connections will be designed to effectively eliminate unpermitted movements.</p>						

7. Any connection requiring or having a specified median opening with left turn storage and served directly by that opening shall have radial returns.
8. Where a connection is intended to align with a connection across the highway, the through lanes are to align directly with the corresponding through lanes.
9. For new connections and for connections on all new construction and reconstruction projects, pavement materials and thicknesses shall meet the requirements applicable to either that detailed for "Urban Flared Turnouts", or, that described in "Table 515-1" for connections with radial returns and/or auxiliary lanes.
10. The responsibility for the cost of construction or alteration to an access connection shall be in accordance with FDOT Rule Chapter 14-96.

DESIGN NOTES

1. Prior to the adoption of FDOT Rules Chapters 14-96 and 14-97, connections to the State Highway System were defined and permitted by Classes. Connections have been redefined by Categories under Rule 14-96; and, the term "Class" has been applied to highway segments of the State Highway System as defined under Rule 14-97.

NOT INTENDED FOR FULL INTERSECTION DESIGN
SUMMARY OF GEOMETRIC REQUIREMENTS FOR TURNOUTS



2010 FDOT Design Standards

TURNOUTS

Last Revision 07/19/07	Sheet No. 1 of 7
Index No. 515	

Footnotes:

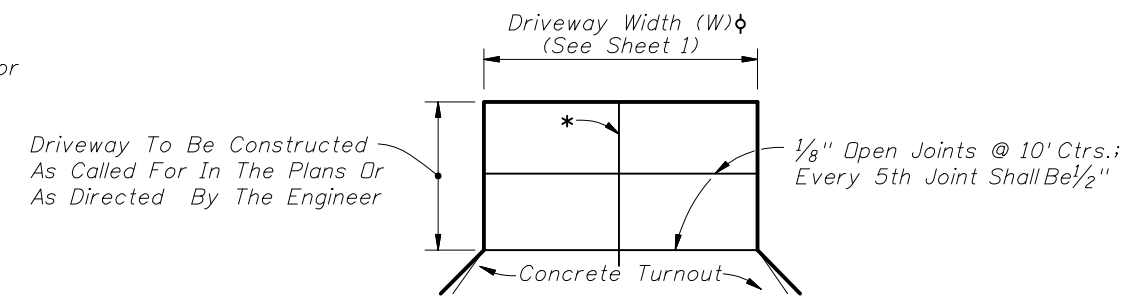
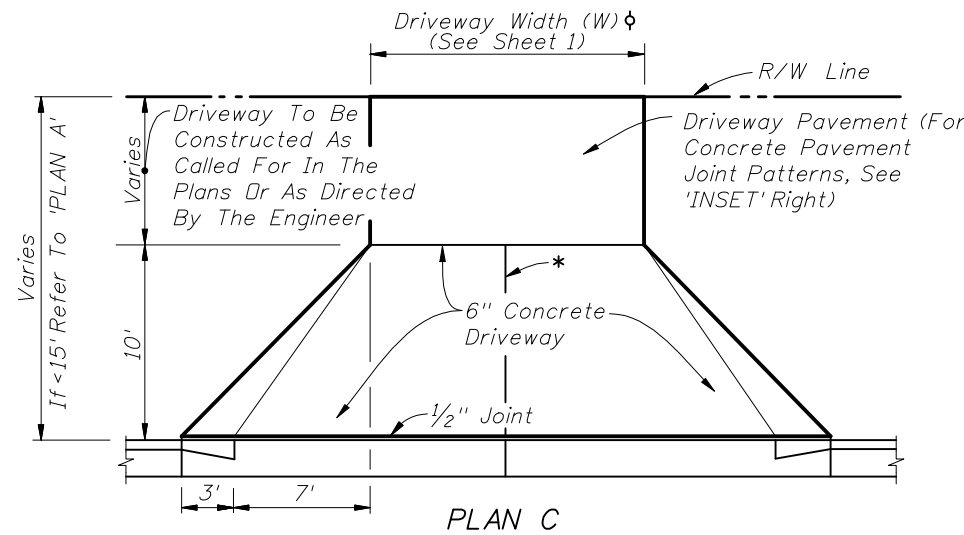
All 1/2" joints shall be constructed with preformed joint filler.

* 1/8" Open joints placed at equal (20' max.) intervals for driveways over 20' wide. Joints in curb and gutter to match joints in driveways.

Δ When connecting to sidestreet curb and gutter sections, the no drop curb limits should extend back to the sidestreet radius point. With or without curb and gutter, no driveway should encroach on the corner radius.

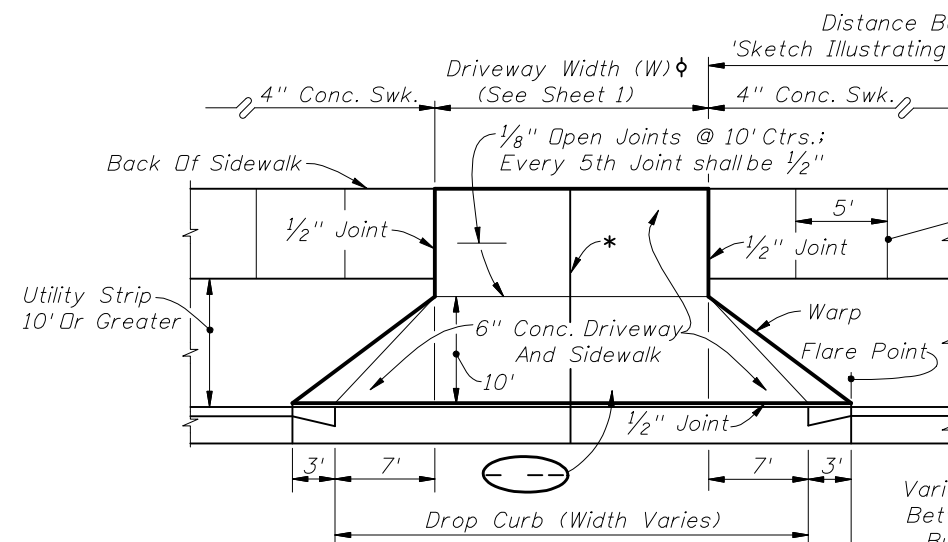
φ Driveways (6" concrete) shall be of a uniform width (W) to the right of way line.

☆ 4' Min., May be reduced to 3' Min. in restricted conditions when approved by the Engineer.

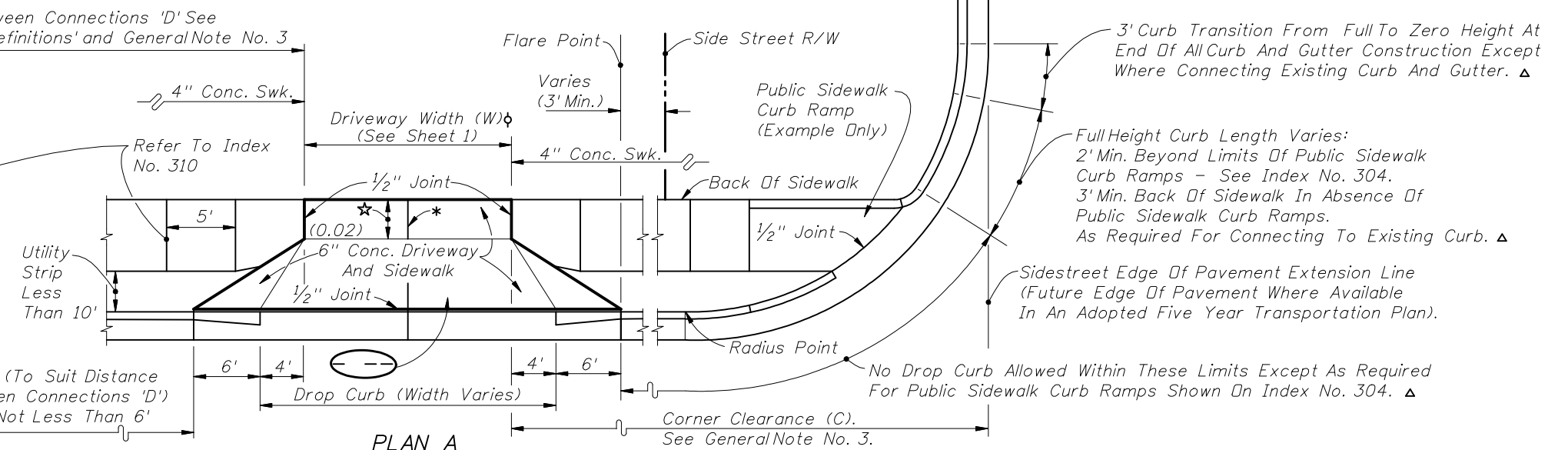


JOINT PATTERN WHEN CONCRETE DRIVE CONSTRUCTED INSET

⊖ Alpha-numeric identification of a flared driveway type specifically called for in the plans, see sheets 3 and 4.



**PLAN B
TURNOUT WITH SIDEWALK AND
UTILITY STRIP (10' OR GREATER)**



**PLAN A
TURNOUT WITH SIDEWALK AND
UTILITY STRIP (LESS THAN 10')**

DESIGN NOTES FOR URBAN FLARED TURNOUTS

SPECIAL NOTES FOR URBAN FLARED TURNOUTS

1. Driveway 6" concrete pavement and drop curb shall meet the material and construction requirements of Sections 522 and 520 respectively of the FDOT Standard Specifications. The driveway foundation shall meet the requirement of Subarticle 522-4.
2. For details of drop curb and public sidewalk curb ramps refer to Indexes Nos. 300 and 304 respectively.
3. Where turnouts are constructed within existing curb and gutter, the existing curb and gutter shall be removed either to the nearest joint beyond the flare point or to the extent that no remaining section is less than 5' long; and, drop curb constructed in accordance with Notes Nos. 1 and 2.
4. Cost for preformed joint filler shall be included in the cost for the concrete pavement (Concrete Sidewalk, 6" Thick).
5. For turnouts with radial returns see the requirements under the "Summary Of Geometric Requirements For Turnouts", the "General Notes", the details of "Rural Turnout Construction" and the detail of "Limits Of Clearing & Grubbing, Stabilization And Base At Intersections".

6. Department maintenance of pavement shall extend out to the right of way or 2' back of sidewalk, whichever distance is less.
7. The maintenance and operation of highway lighting, traffic signals, associated equipment, and other necessary devices shall be the responsibility of a public agency.
8. All pavement markings on the State highways, including acceleration and deceleration lane markings, and signing installed for the operation of the State highway shall be maintained by the Department.
9. All signing and marking installed for the operation of the connection (such as stop bars and stop signs for the connection) shall be the responsibility of the permittee.
10. Turnouts will be paid for under the contract unit price for Concrete Sidewalk (6" Thick), SY.
11. All sidewalk surfaces crossing driveways with a cross slope shown in this Index to be 0.02 shall be 0.02 Maximum.

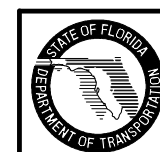
1. Driveways indicated as 'Adverse Applications' are those with slopes that can cause overhang drag for representative standard passenger vehicles under fully loaded conditions; or, those with slopes that can cause drivers who are leaving the roadway to slow or pause to the extent that traffic demand volumes will be impeded.

Driveways indicated as 'Marginal Applications' are those with slopes that can cause overhang drag for representative standard passenger vehicles under fully loaded conditions when the driveway is located on the low side of fully superelevated roadways.

Driveways indicated as 'General Applications' are those with slopes that can readily accommodate representative standard passenger vehicles and those that can accommodate representative standard trucks, vans, buses and recreational vehicles operating under normal crown and superelevation conditions.
2. The standard flared driveways on this index may not accommodate vehicles with low beds, low undercarriage or low appendage features. Where such vehicles are design vehicles driveways are to have site specific flare designs or Category III designs.
3. When specific flare type driveways are to be constructed, the type shall be designated in the plans using the assigned alpha-numeric designation.

Note: See sheet 1 for 'GENERAL NOTES'

URBAN FLARED TURNOUTS



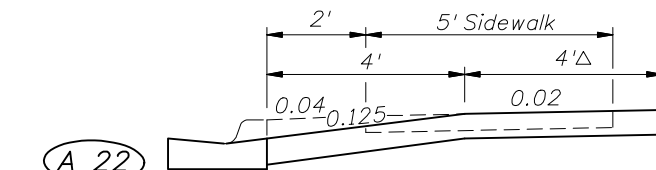
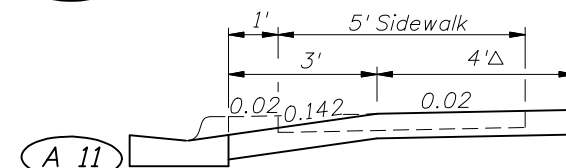
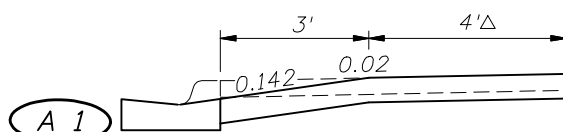
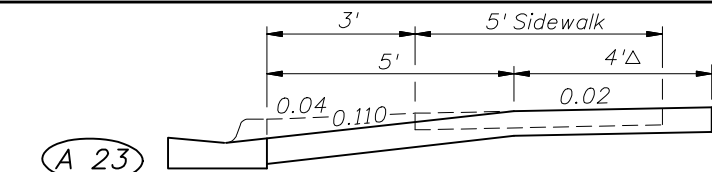
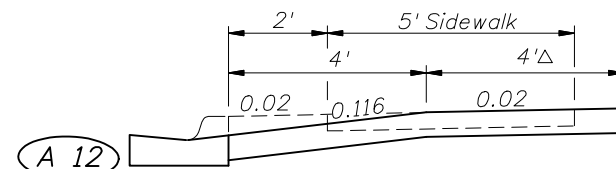
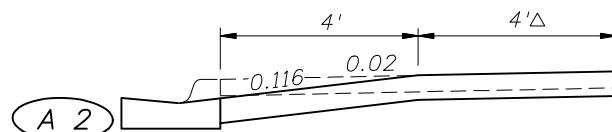
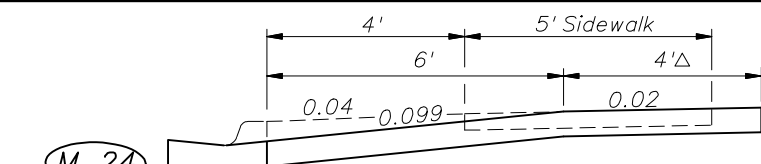
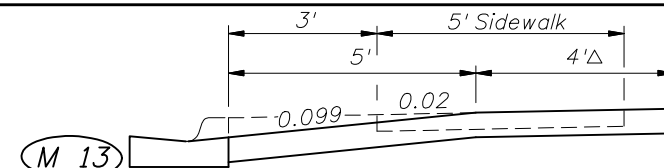
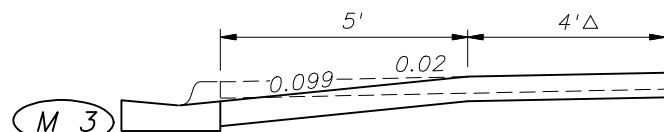
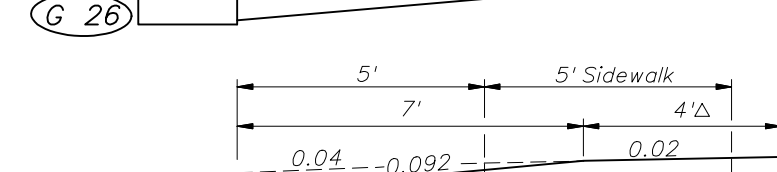
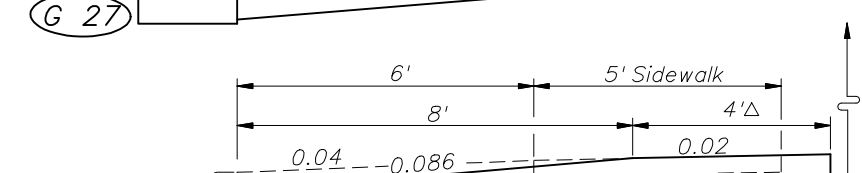
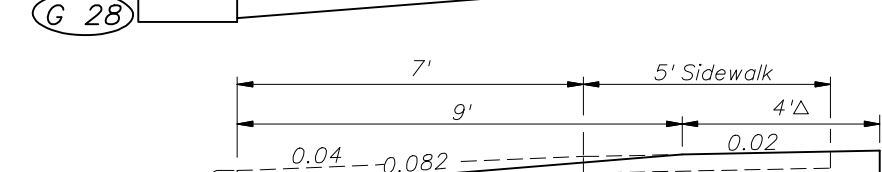
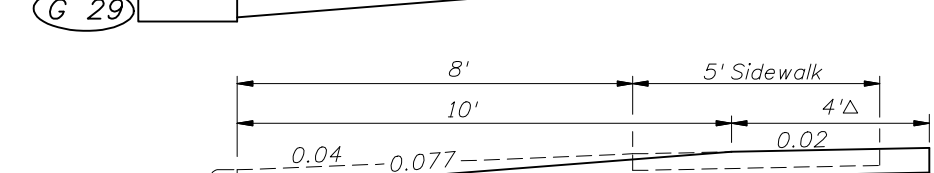
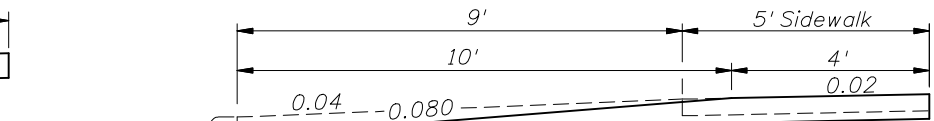
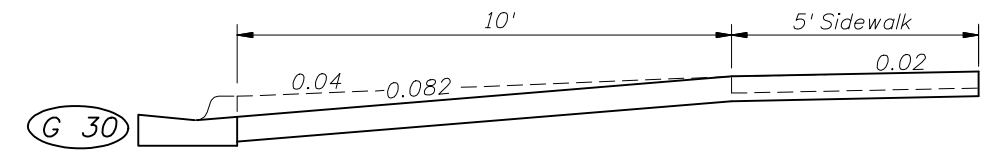
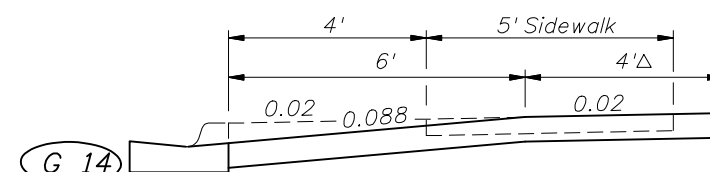
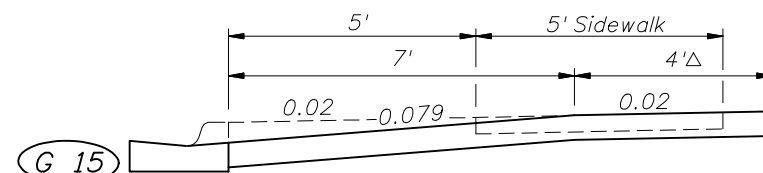
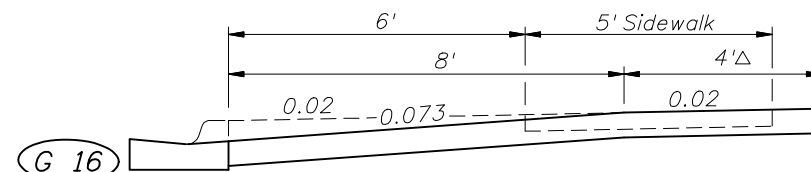
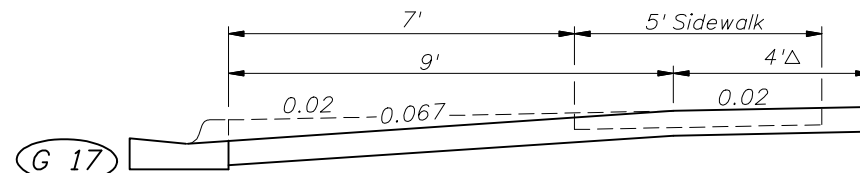
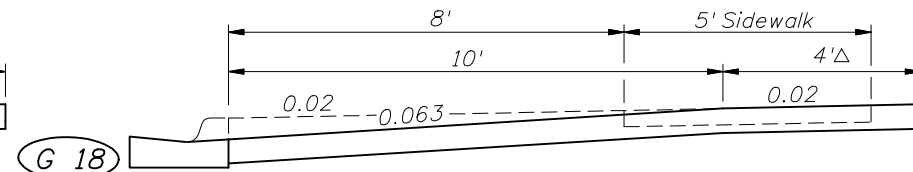
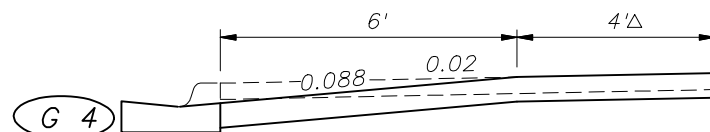
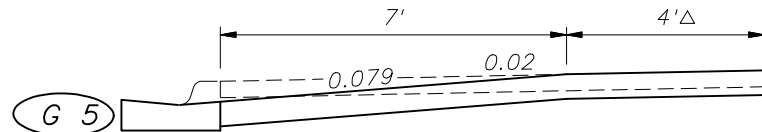
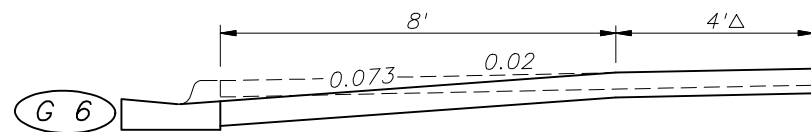
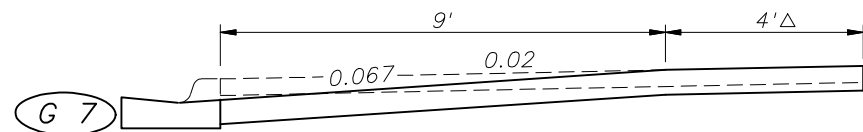
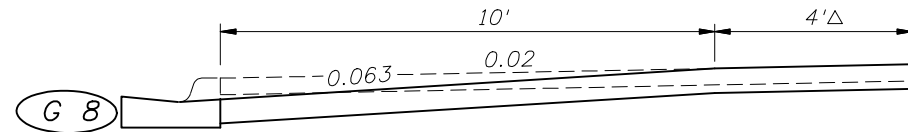
2010 FDOT Design Standards

TURNOUTS

Last Revision 07/01/05	Sheet No. 2 of 7
Index No. 515	

* See 'DESIGN NOTES FOR URBAN FLARED TURNOUTS' On Sheet 2.

△ May Be Reduced To 3' Min. In Restricted Conditions When Approved By The Engineer. Depth Less Than 3' Allowable Only Under Findings Of Infeasibility.



GENERAL * APPLICATIONS

MARGINAL * APPLICATIONS ON LOW SIDE OF FULLY SUPERELEVATED ROADWAY (REFER TO MODIFICATIONS ON SHEET 4)

ADVERSE * APPLICATIONS (REFER TO MODIFICATIONS ON SHEET 4)

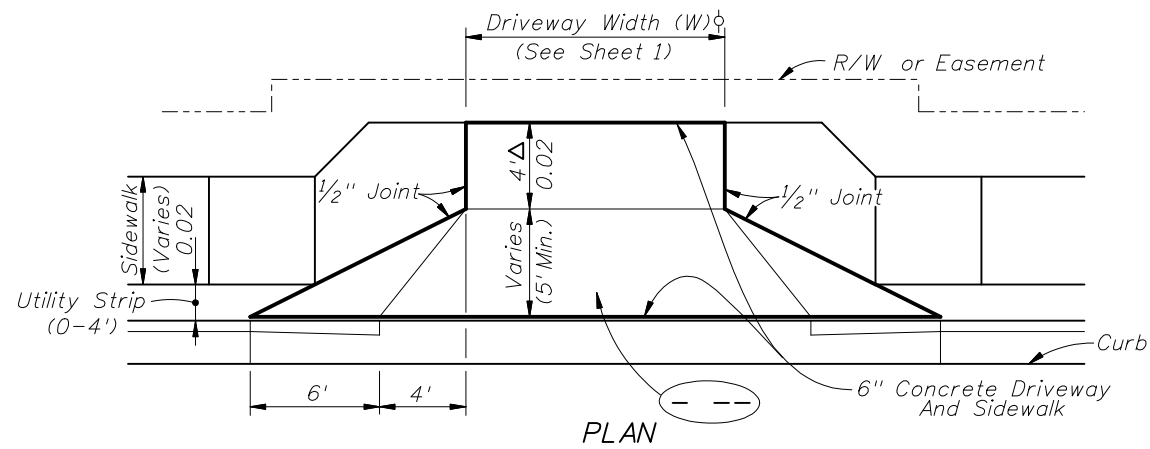
SIDEWALK ADJACENT TO CURB

SIDEWALK WITH UTILITY STRIP ON 0.02 SLOPE

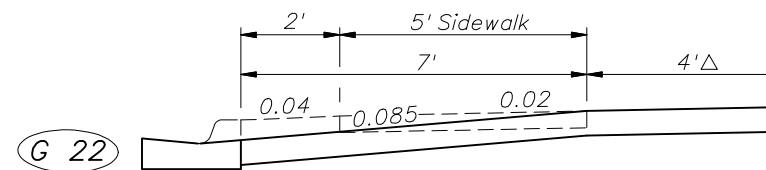
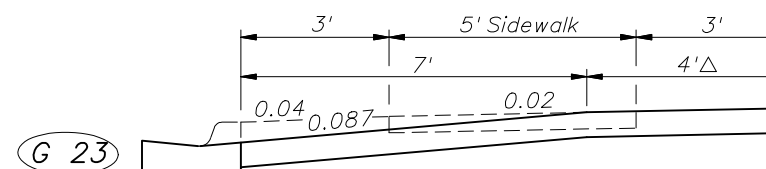
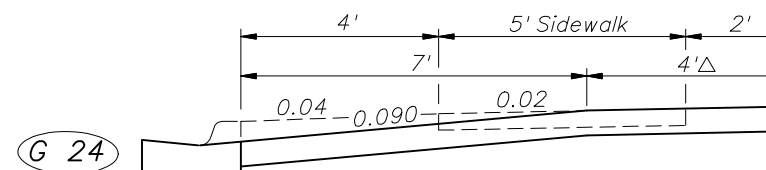
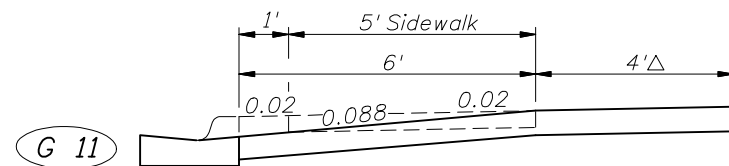
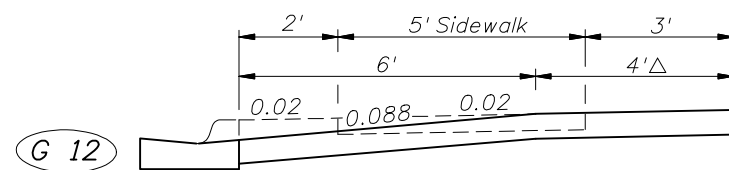
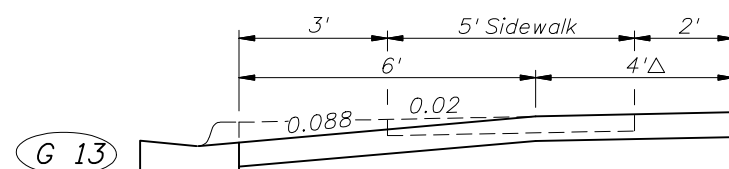
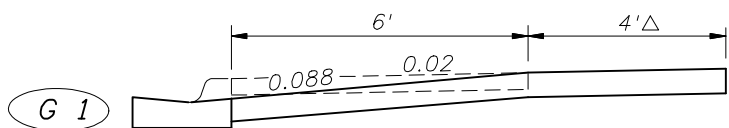
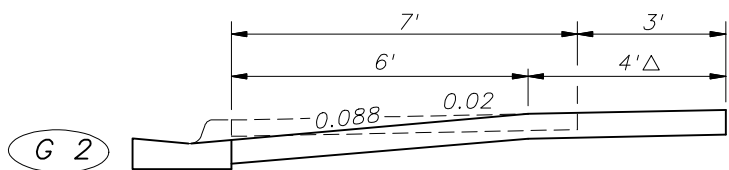
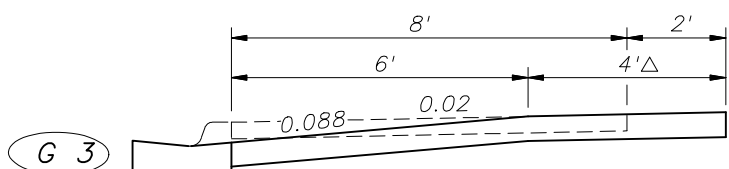
SIDEWALK WITH UTILITY STRIP ON 0.04 SLOPE

DRIVEWAY SECTIONS ON CURBED FACILITIES WITH SIDEWALKS

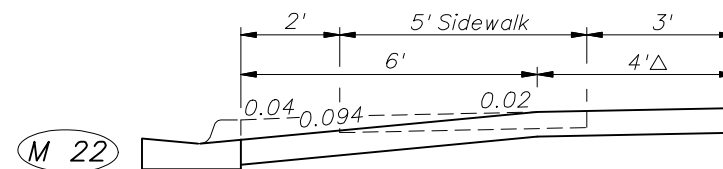
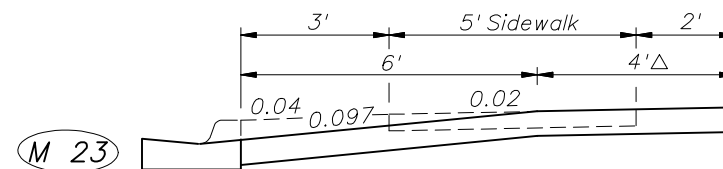
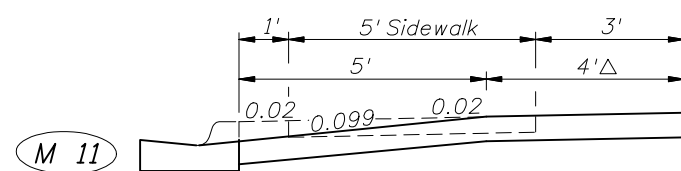
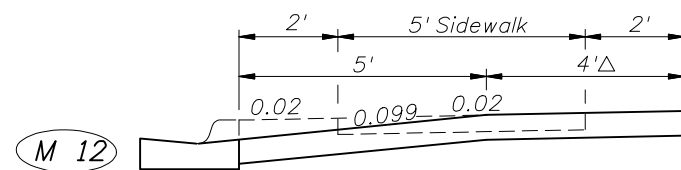
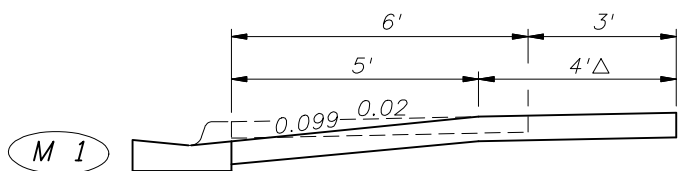
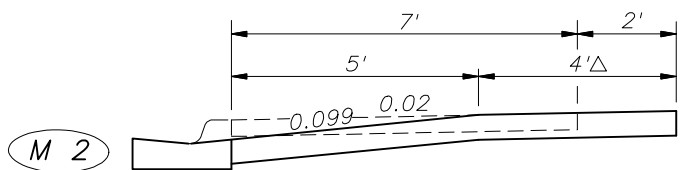




MODIFICATIONS OF 'ADVERSE' AND 'MARGINAL' APPLICATIONS



ADVERSE* AND MARGINAL* SECTIONS MODIFIED TO ACHIEVE GENERAL* APPLICATION



ADVERSE* SECTIONS MODIFIED TO ACHIEVE MARGINAL* APPLICATION

SIDEWALK ADJACENT TO CURB

SIDEWALK WITH UTILITY STRIP ON 0.02 SLOPE

SIDEWALK WITH UTILITY STRIP ON 0.04 SLOPE

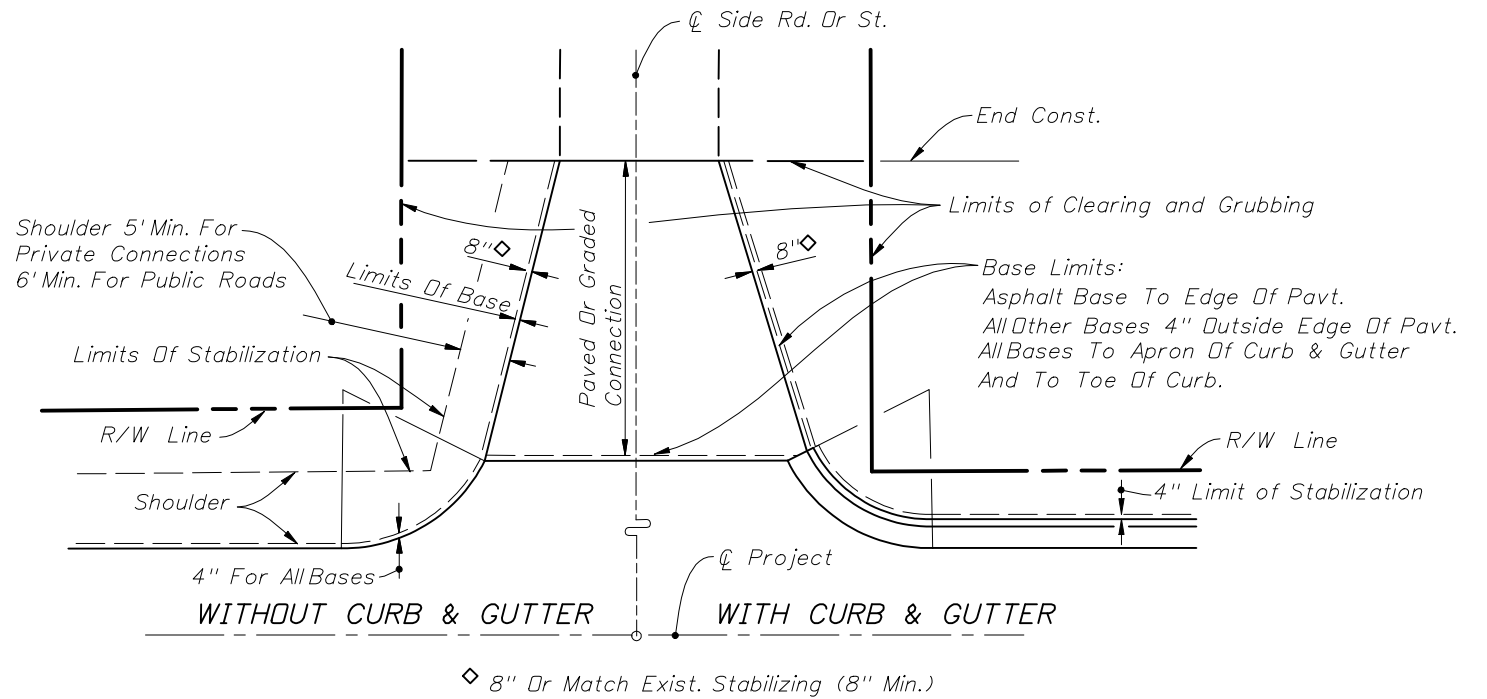
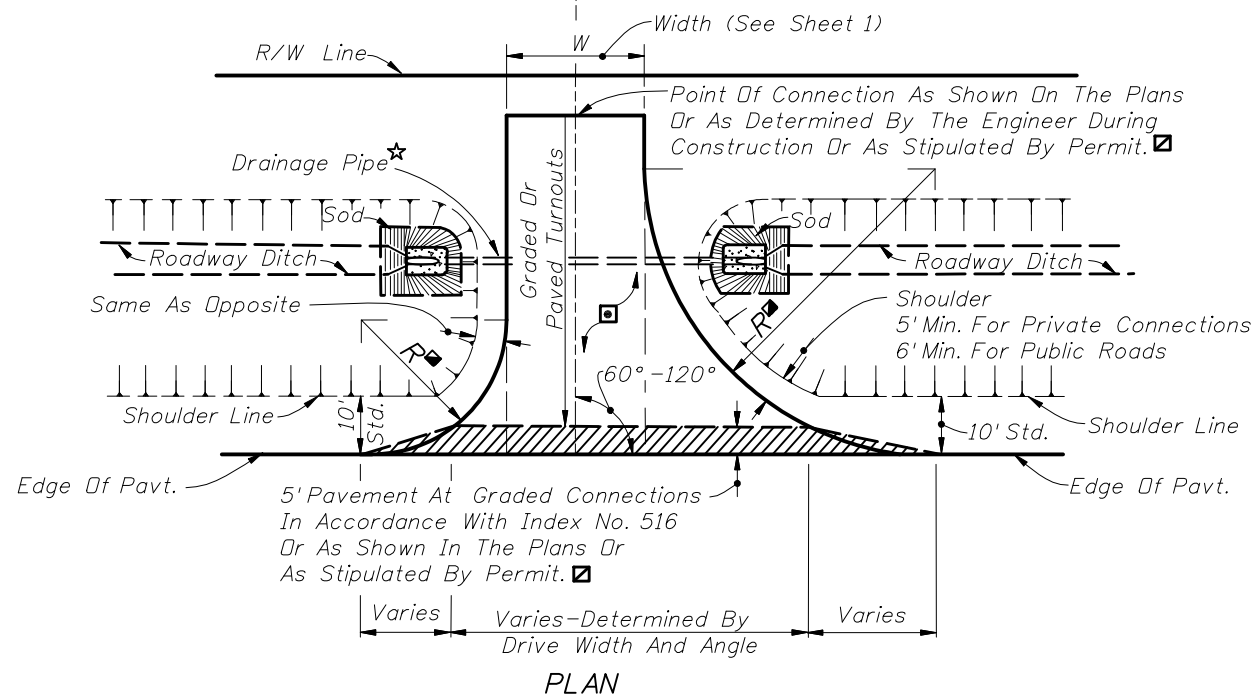
MODIFICATIONS TO ADVERSE AND MARGINAL SECTIONS

* See 'DESIGN NOTES FOR URBAN FLARED TURNOUTS' On Sheet 2.
 Δ May Be Reduced To 3' Min. In Restricted Conditions When Approved By The Engineer. Depth Less Than 3' Allowable Only Under Findings Of Infeasibility.

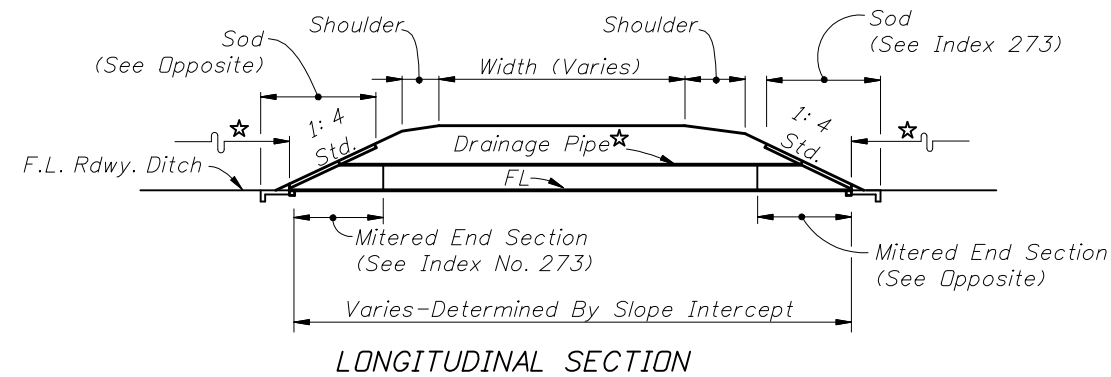


Typical Half Section For Low Volume/Residential Connections

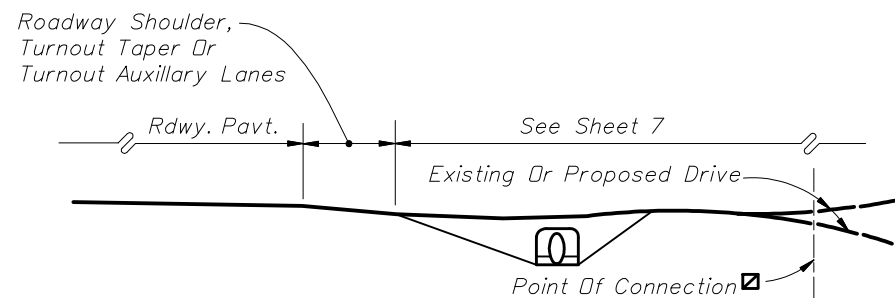
Typical Half Section For Higher Volume Connections



LIMITS OF CLEARING & GRUBBING, STABILIZING AND BASE AT INTERSECTIONS



LONGITUDINAL SECTION



PROFILE AND END VIEW

RURAL TURNOUT CONSTRUCTION

★ Drainage pipe size and length shall be that shown on the plans, or as stipulated by permit, or, as determined by the Engineer during construction. The size shall be at least that established by the FDOT District, but not less than 15" diameter or equivalent. For minimum cover over drainage pipe see Index No. 205. Pipe arch or elliptical pipe may be required to obtain necessary cover. At minimal cover applications a modified pavement apron is permitted. See 'PERMISSIBLE PAVEMENT MODIFICATION' Index No. 273. For spacing between adjacent pipe end treatments see Index No. 273.

▣ Stable material may be required for graded turnouts to private property as directed by the Engineer in accordance with Section 102-8 of the Standard Specifications.

▣ The 5' pavement at graded connections is not required where there is paved shoulder 4' or more in width. The 5' pavement requirement may be waived for connections serving one or two homes or field entrances with less than 20 trips per day, or 5 trips per hour as approved by permit or by the Engineer, or when not itemized in the plans.

Paved turnouts are to be constructed for all paved connecting facilities. The connecting point will be determined by the Engineer.

Paved turnouts are to be constructed for all business, commercial, industrial or high volume residential graded connecting facilities. The connecting point shall be 30' from edge of roadway pavement or at R/W line, whichever is less.

Paved turnouts are to be constructed for all connecting facilities over 4000 vehicles per day. The connecting point shall be at the R/W line.

▣ See "Summary Of Geometric Requirements For Turnouts" chart for return radii lengths and supplemental information.



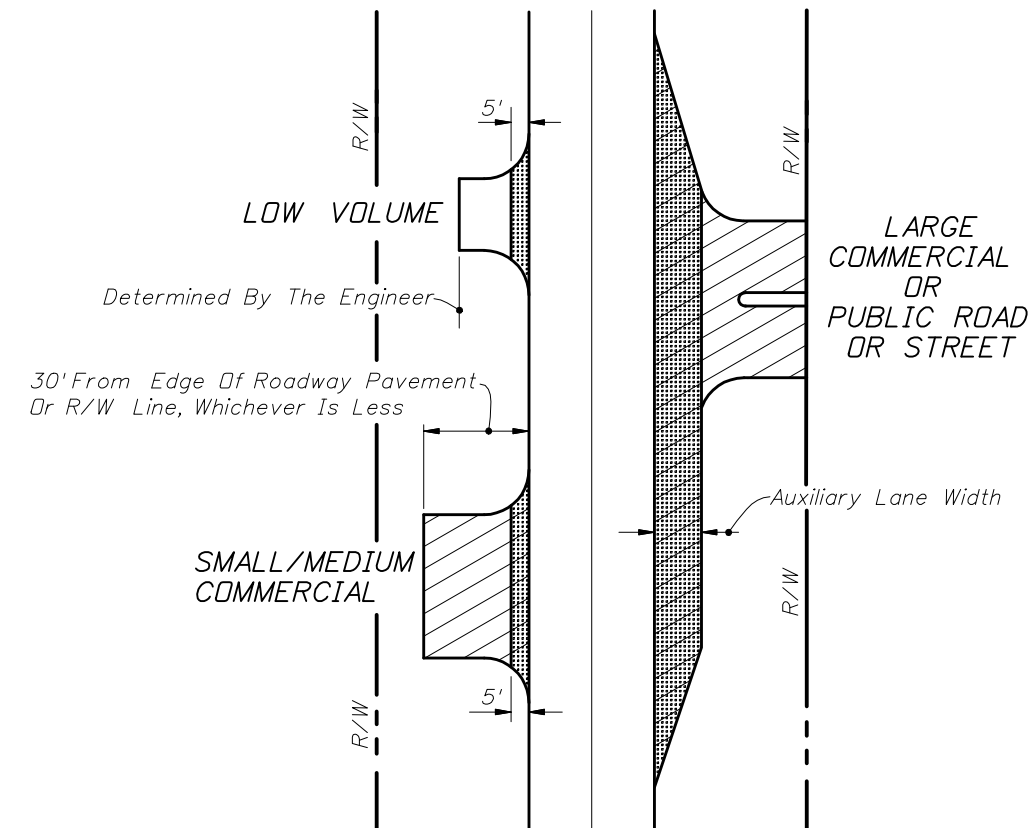
MATERIAL TYPES AND THICKNESSES IN DRIVING AREAS FOR RURAL AND URBAN CONNECTIONS			
Course	Materials ^②	Thickness (in.) ^①	
		Connections ^③	Roadway ^④
Structural	Asphaltic Concrete	1"	1½"
Bases	Optional Base (See Index No. 514)	O.B.G. 1	O.B.G. 3

① Minimum thickness.
 ② All materials shall be approved by the Department prior to being placed.
 ③ Connection structure other than traffic lanes. See Notes 1 and 2 below.
 ④ Travelway flares (bypass lanes), auxiliary lanes serving more than a single connection, and all median crossovers including their auxiliary lanes and/or transition tapers. See Notes 1 and 2 below.

NOTES

- The pavement should be structurally adequate to meet the expected traffic loads and should not be less than that shown above, except as approved by the Department for graded connections. Other Department approved pavement equivalences may be used at the discretion of the Engineer. For additional information see Index No. 514.
- Auxiliary lanes and their transition tapers shall be the same structure as the abutting roadway pavement or any of the roadway structures tabulated above, whichever is thicker.
- If an asphalt base course is used for a turnout, its thickness may be increased to match the edge of roadway pavement in lieu of a separate structural course. 6" of Portland cement concrete will be acceptable in lieu of the asphalt base and structural courses. See Notes 4 and 5 below.
- A structural course is required for flexible pavements when they are used for auxiliary lanes serving more than a single connection.
- Connections paved with Portland cement concrete shall be Class NS concrete at least 6" thick. The Department may require greater thickness when called for in the plans or stipulated by permit. Materials and construction are to conform with FDOT Standard Specifications Sections 347, 350 and 522.
- The Department may require other pavement criteria where local conditions warrant.

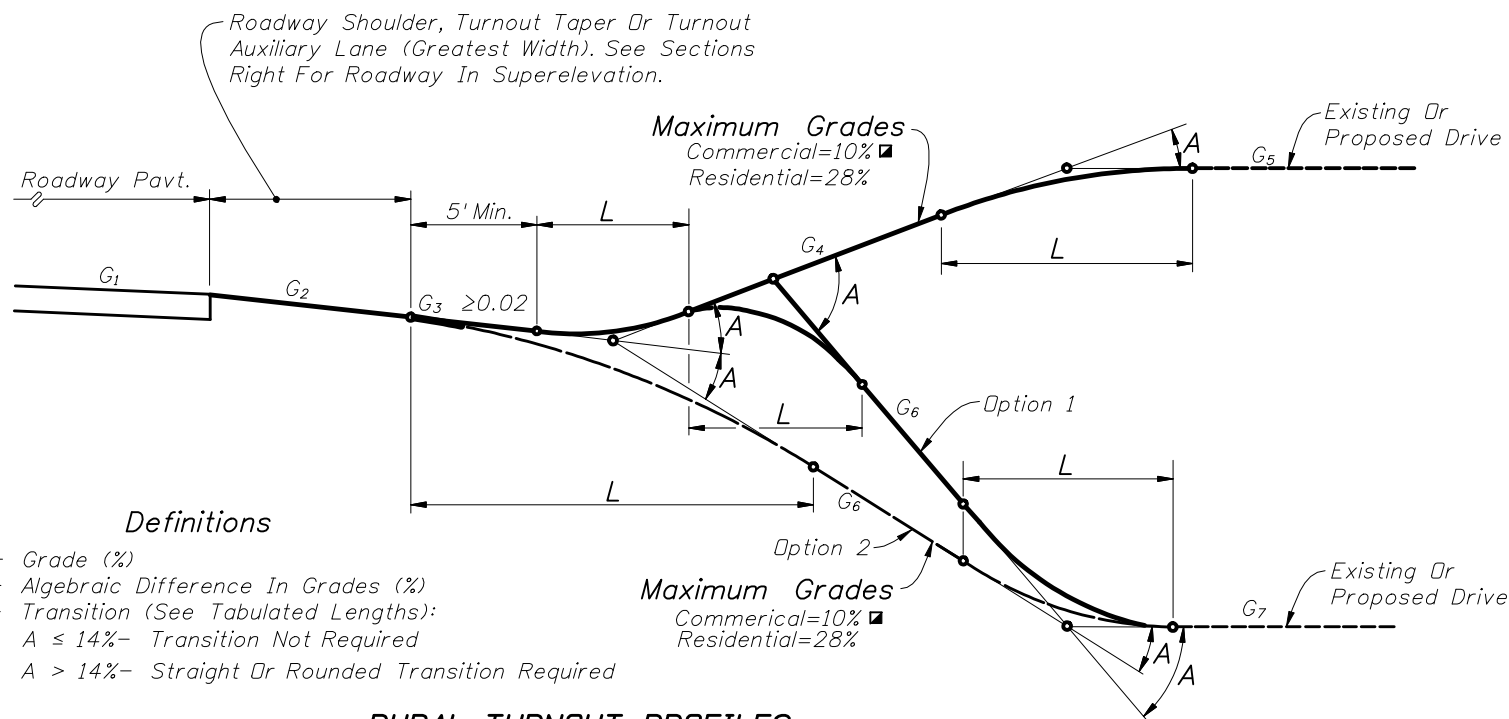
**PAVEMENT STRUCTURE FOR TURNOUTS AND AUXILIARY LANES
TABLE 515-1**



- NOTES**
- Auxiliary lane pavements and crossover pavements shall be maintained by the Department.
 - Department maintenance of turnout pavement shall extend out to 5' from edge of the travelway or limits of paved shoulders, and, extend to include auxiliary lanes. The remainder of any turnout paved area on the right of way shall be maintained by the owner or his authorized agent. As a function of routinely reworking shoulders, the Department may grade and shape existing material on nonpaved areas beyond the maintained pavement.
 - Control and maintenance of drainage facilities within the right of way shall be solely the responsibility of the Department, unless specified differently by Department permit.
 - The maintenance and operation of highway lighting, traffic signals, associated equipment, and other necessary devices shall be the responsibility of a public agency.
 - All pavement markings on the State highways, including acceleration and deceleration lane markings, and signing installed for the operation of the State highway shall be maintained by the Department.
 - All signing and marking installed for the operation of the connection (such as stop bars and stop signs for the connection) shall be the responsibility of the permittee.

**LIMITS OF
CONSTRUCTION AND MAINTENANCE
FOR RURAL CONNECTIONS**

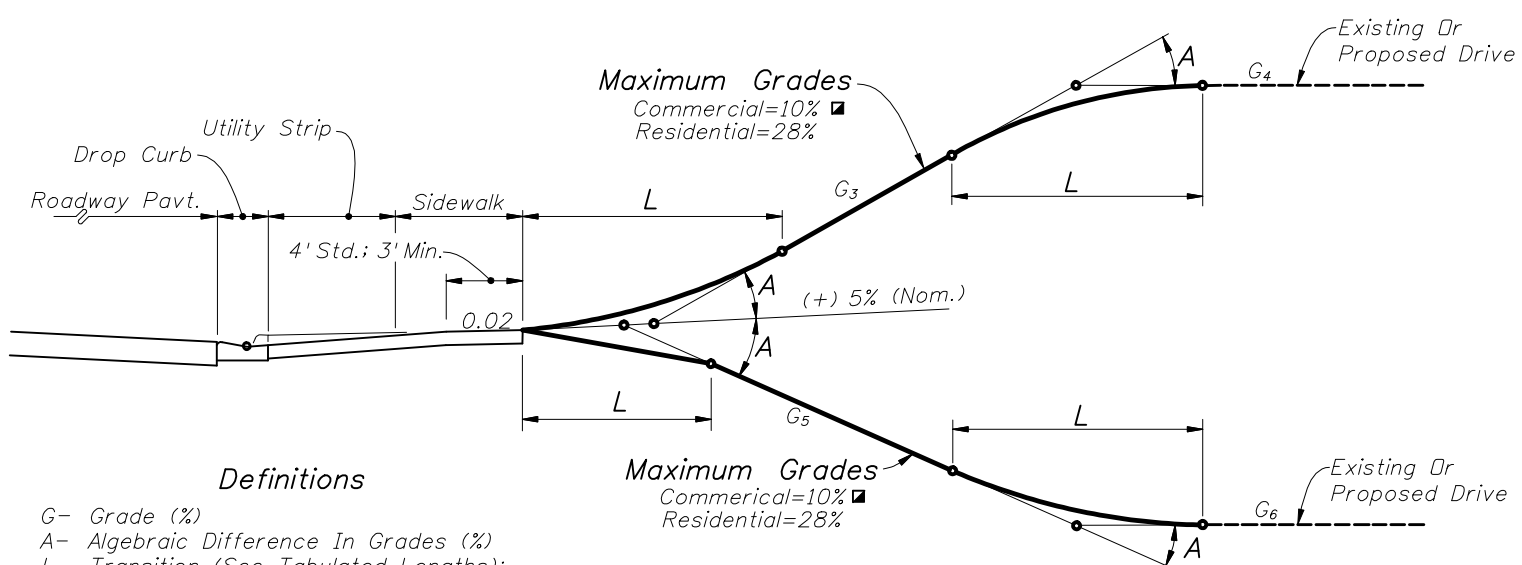




Definitions

- G- Grade (%)
- A- Algebraic Difference In Grades (%)
- L- Transition (See Tabulated Lengths):
 - A ≤ 14%- Transition Not Required
 - A > 14%- Straight Or Rounded Transition Required

RURAL TURNOUT PROFILES



Definitions

- G- Grade (%)
- A- Algebraic Difference In Grades (%)
- L- Transition (See Tabulated Lengths):
 - A ≤ 14%- Transition Not Required
 - A > 14%- Straight Or Rounded Transition Required

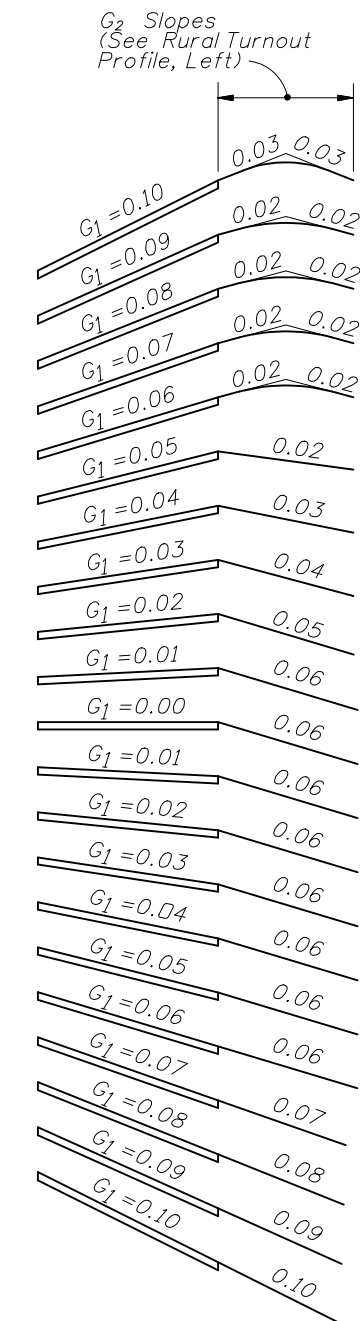
URBAN TURNOUT PROFILES

When restoring or reconstructing existing commercial turnout connections on new construction and reconstruction projects, the maximum 10% commercial grade may be exceeded provided this does not create any adverse roadway operational or safety impacts. This shall be approved by the District Design Engineer and be supported by documented site specific findings.

LENGTHS (L) (FT.)								
A	CRESTS				SAGS			
	STRAIGHT		ROUNDED		STRAIGHT		ROUNDED	
	Desirable	Minimum	Desirable	Minimum	Desirable	Minimum	Desirable	Minimum
6-13%	3	0	5	0	3	0	5	0
14%	3	0	10	0	3	0	10	0
15%	3	2.5	10	3	5	3	10	5
16%	5	3	10	4	6	4	10	6
17%	6	3.5	10	5	8	5	10	7
18%	6	4	10	6	9	6	10	8
19%	7	4.5	10	7	11	7	12	9
20%	8	5	11	8	12	8	13	10
21%	9	5.5	12	9	13	8.5	14	11
22%	10	6	13	10	14	9	16	12
23%	10	6.5	14	10.5	14	9.5	16	12.5
24%	11	7	15	11	15	10	17	13
25%	12	7.5	15	11.5	16	10.5	18	13.5
26%	12	8	16	12	17	11	18	14
27%	13	8.5	17	12.5	17	11.5	19	14.5
28%	14	9	17	13	18	12	20	15
29%	NA	NA	22	14	NA	NA	21	17
30-31%	NA	NA	23	15	NA	NA	22	18
32-33%	NA	NA	24	16	NA	NA	23	20
34-36%	NA	NA	26	17	NA	NA	25	21
37-38%	NA	NA	27	18	NA	NA	26	22
39-41%	NA	NA	29	19	NA	NA	28	24
42-43%	NA	NA	30	20	NA	NA	29	25
44-46%	NA	NA	32	21	NA	NA	31	26
47-48%	NA	NA	33	22	NA	NA	32	27
49-51%	NA	NA	34	23	NA	NA	34	28
52-54%	NA	NA	36	24	NA	NA	35	30
55-56%	NA	NA	37	25	NA	NA	36	31

Rounded: Either circular, parabolic or spline curvature. The plans or the Engineer may specify a particular type of curvature.

Desirable: Desirable minimum lengths. } Greater lengths than minimum and desirable
Minimum: Absolute minimum lengths. } are recommended where practical for flatter and smoother profile.



RECOMMENDED TURNOUT PROFILE TRANSITION LENGTHS (L) (FT.)

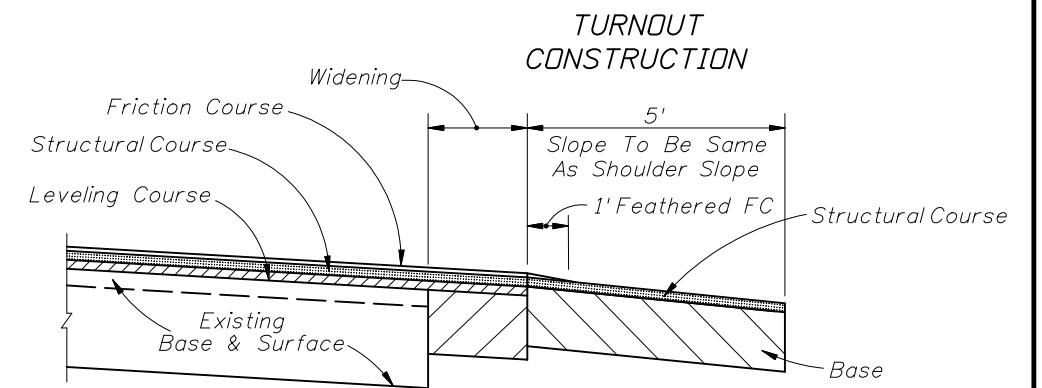
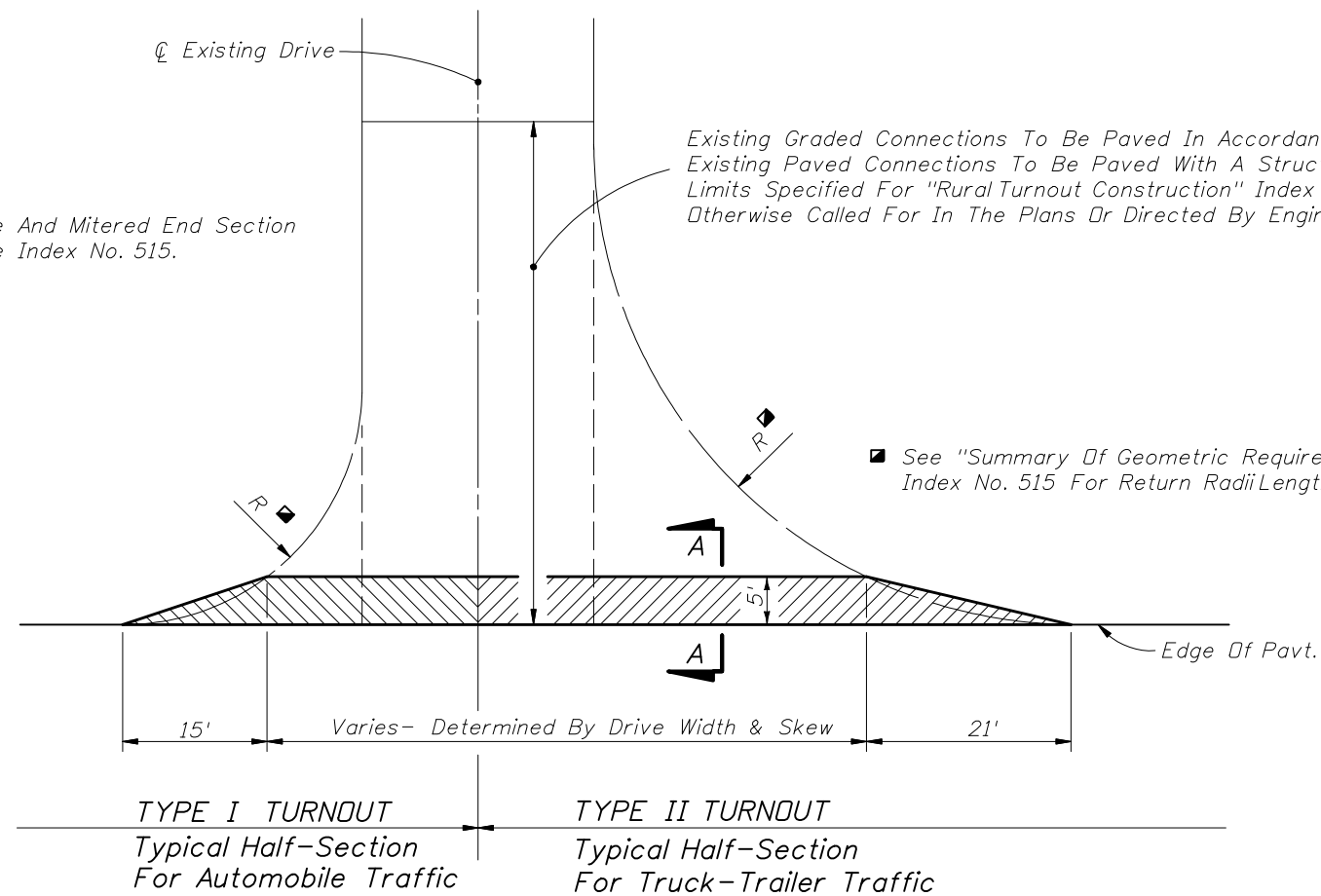
ROADWAY PAVEMENT SLOPES AND SLOPES OF ABUTTING RURAL TURNOUT SURFACES (G₂) SUPERELEVATION SECTIONS

STORMWATER RUNOFF AND PROFILE OPTION NOTES

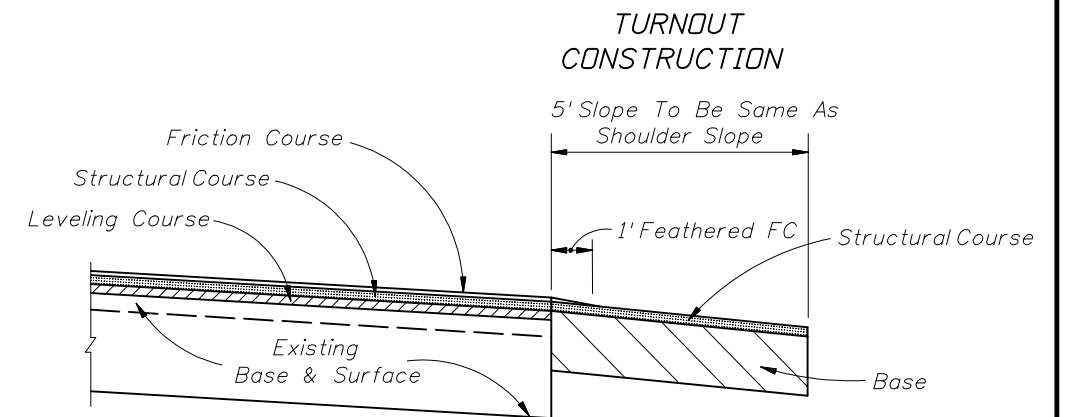
1. Turnouts shall neither cause water to flow on or across the roadway pavement, nor cause water ponding or erosion within the State right of way. On all rural turnouts the transition (L) nearest the roadway shall be sloped or crowned to direct stormwater runoff to the roadside ditch. Inlets, flumes or other appropriate runoff control devices shall be constructed when runoff volumes are sufficient to cause erosion of the shoulder. Similar runoff control devices shall be constructed as necessary to properly direct and control the stormwater runoff on urban turnouts.
2. The Option 1 profile is intended for locations where roadway, turnout taper and auxiliary lane stormwater runoff volumes are relatively large. The Option 2 profile is intended for locations where runoff volumes are relatively small and/or where there is no roadside ditch.

TURNOUT PROFILES

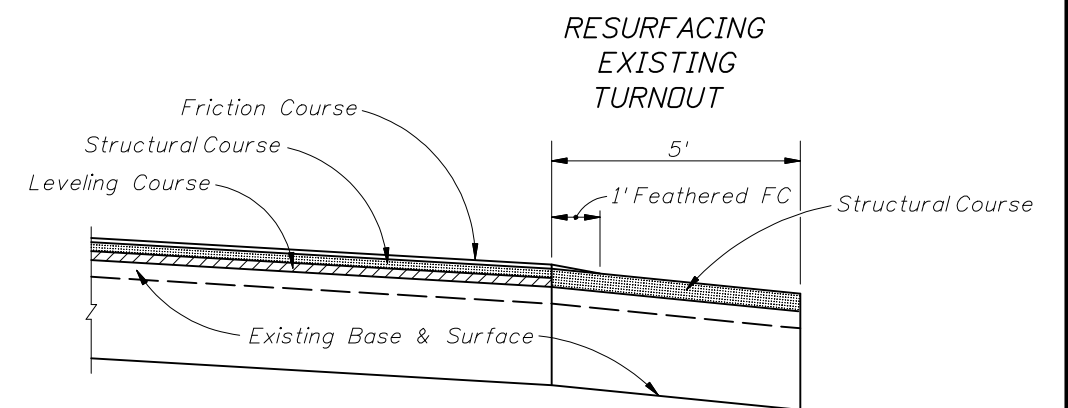
For Drainage Pipe And Mitered End Section Requirements See Index No. 515.



SECTION AA WITH WIDENING



SECTION AA



SECTION AA

GENERAL NOTES

1. Turnouts are to be constructed or resurfaced for low volume (single family, duplex, farm, etc.) residential connections as directed by the Engineer.
2. Turnout construction is not required for low volume residential connections where roadway shoulders are paved.
3. Connections outside the 5' limit are to be constructed as directed by the Engineer.
4. The contract unit price for Turnout Construction includes the cost for excavation and base.
5. Payment for structural course is to be included in roadway resurfacing pay item.
6. Payment for feathering friction course is to be included in the unit price for Asphaltic Concrete Friction Course placed on the roadway. Feathered areas will not be included in measured quantities. Feathering is not required for FC-5 friction course.

AREAS FOR ONE 5' DEEP TURNOUT (SY)

Drive Width (Ft.)	Intersection			
	Normal		Skewed	
	Type I	Type II	Type I	Type II
12	26	51	31	60
14	27	52	33	61
16	28	53	34	63
18	29	54	35	64
20	31	55	37	65
22	32	56	38	67
24	33	57	39	68
26	34	58	40	69
28	35	59	42	70
30	36	61	43	72
32	37	62	44	73
34	38	63	46	74
36	39	64	47	76
38	41	65	48	77
40	42	66	49	78
42	43	67	51	79
44	44	68	52	81
46	45	69	53	82
48	46	71	55	83
50	47	72	56	85
52	48	73	57	86
54	49	74	58	87
56	51	75	60	88
58	52	76	61	90
60	53	77	62	91

PAVEMENT STRUCTURE FOR 5' DEEP TURNOUTS

Course	Material	Minimum Thickness
Structural	Asphaltic Concrete	1"
Base	Optional Base (See Index No. 514)	D.B.G. 1

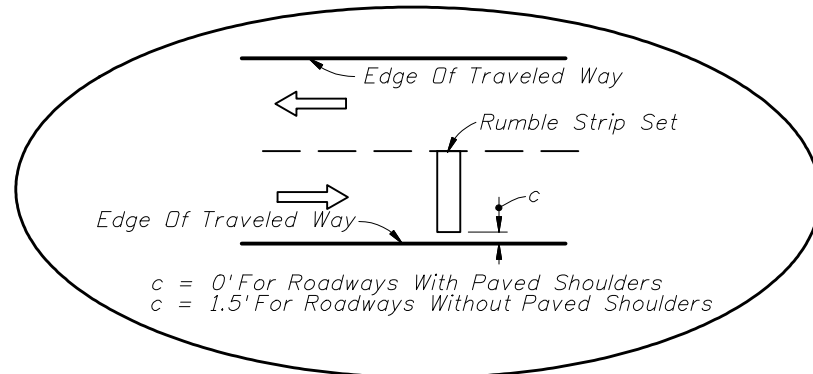
Notes:

1. Turnout structural course to be the same material as roadway leveling or structure course. Structural course not required if asphalt base course and its thickness increased to match edge of roadway pavement.
2. Any Department approved pavement structure equivalence may be used at the discretion of the Engineer.
3. Additional structural strength may be required if heavy truck loads are anticipated.



GENERAL NOTES FOR
RAISED RUMBLE STRIPS

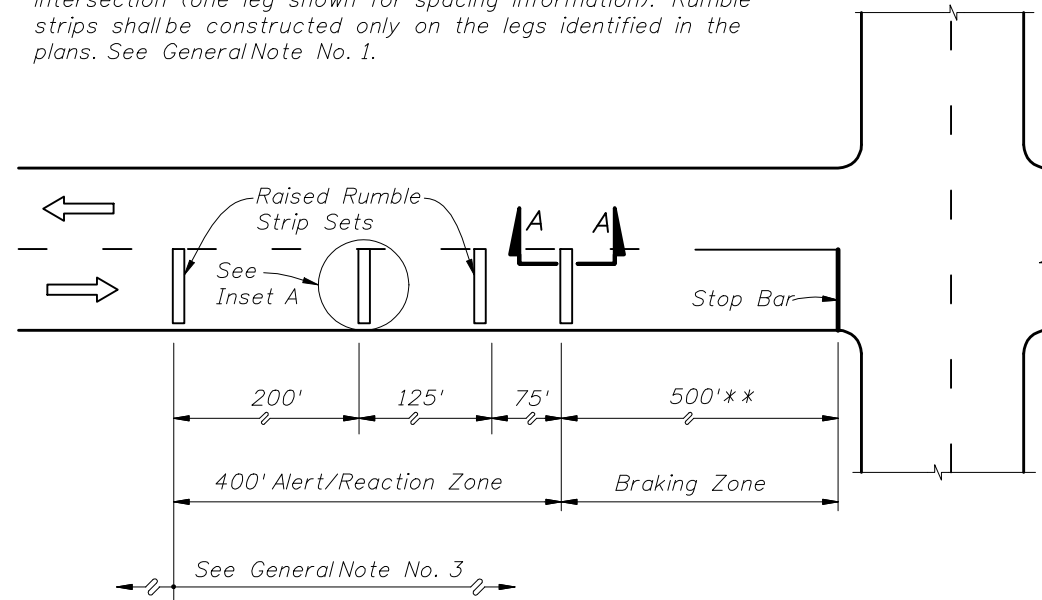
1. Raised rumble strips shall be constructed on all paved shoulders approaching structures, where the structure shoulder width is less than the usable shoulder width of the approach roadway. Raised rumble strips at intersections shall be constructed only when specified in the plans.
See Index 17359 for rumble strip placement on approaches to narrow bridges.
2. Raised rumble strips are to be constructed in accordance with Section 546 of the Specifications.
3. When any portion of a curve falls within the limit of rumble strips shown in these details, additional rumble strip sets spaced at 200' centers shall be constructed throughout the remainder of the approaching curve.
4. Raised rumble strips shall be paid for per set under the contract unit price for Rumble Strips Sets, PS. Such price and payment shall be full compensation for all work and materials required without adjustment due to width of pavement receiving the strips or length of strips.



$c = 0'$ For Roadways With Paved Shoulders
 $c = 1.5'$ For Roadways Without Paved Shoulders

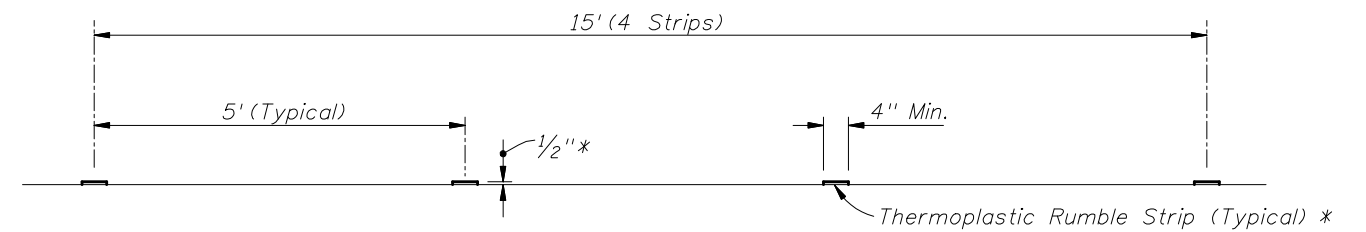
INSET A

Note: Rumble strips may be required for one or more legs of the intersection (one leg shown for spacing information). Rumble strips shall be constructed only on the legs identified in the plans. See General Note No. 1.



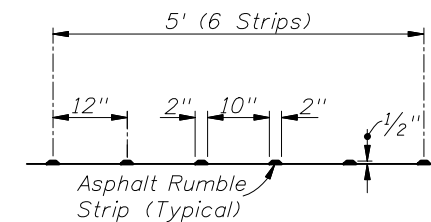
** May be decreased in urban areas with low operating speeds.

PLAN



* Use multiple applications to achieve desired 1/2" thickness
Note: Shoulder thermoplastic rumble strip sets shall match edgeline color.
Intersection thermoplastic rumble strip sets shall be white.

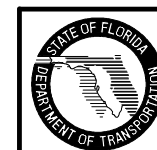
THERMOPLASTIC SET



ASPHALT SET

SECTION AA • FOR THERMOPLASTIC AND ASPHALT RUMBLE STRIP SETS

RAISED RUMBLE STRIPS AT INTERSECTIONS

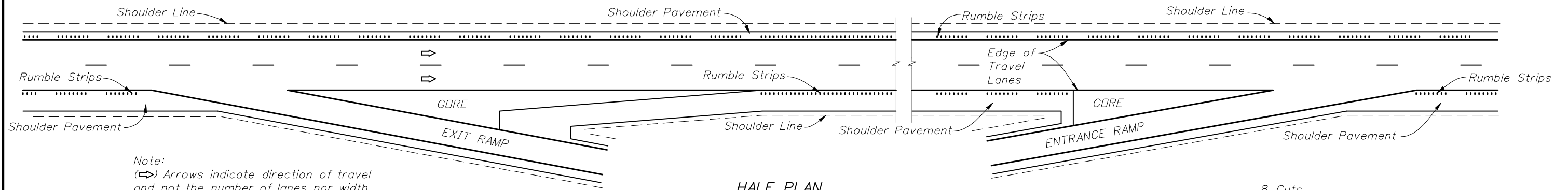


2010 FDOT Design Standards

RUMBLE STRIPS

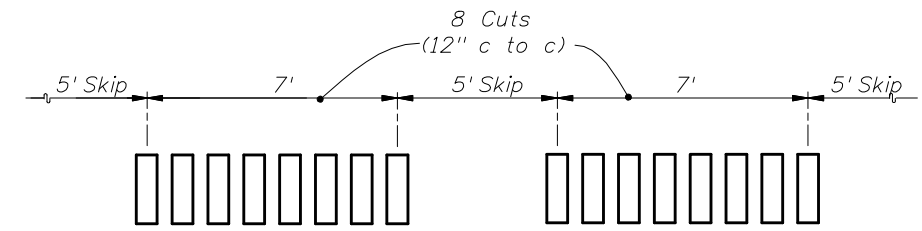
Last Revision 07/01/09 Sheet No. 1 of 3

Index No. 518

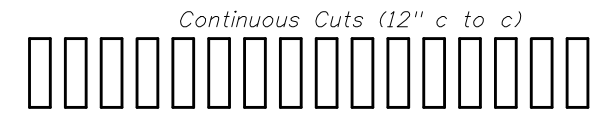


Note:
 (→) Arrows indicate direction of travel and not the number of lanes nor width of median shoulder pavement.

HALF PLAN
 LIMITED ACCESS FACILITIES
 SHOULDER GROUND-IN RUMBLE STRIP PLACEMENT



SKIP ARRAY



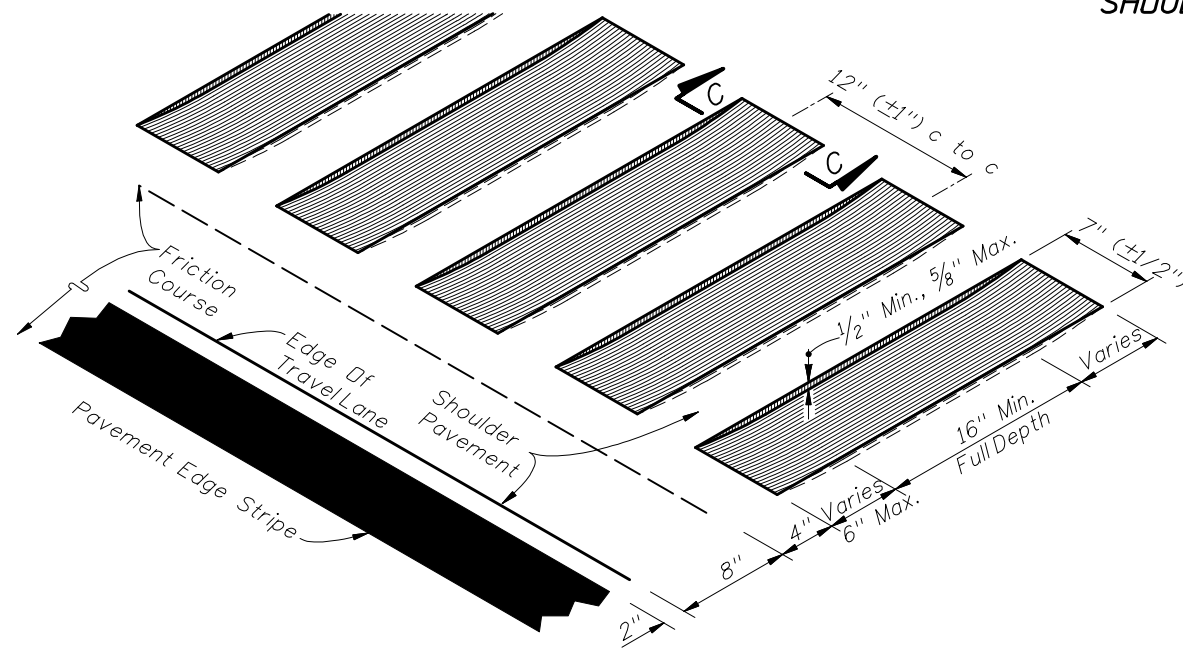
CONTINUOUS ARRAY
 ARRAYS

GENERAL NOTES FOR
 SHOULDER GROUND-IN RUMBLE STRIPS

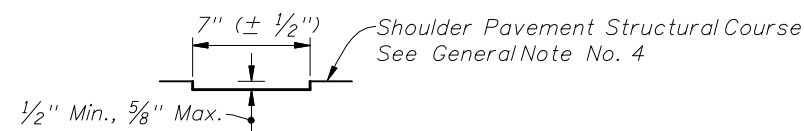
1. Ground-in rumble strips shall be constructed on limited access facilities.
2. The skip array is the standard array. The continuous array shall be constructed in advance of bridge ends for a distance of 1000', or back to the gore recovery area for mainline interchange bridges; and constructed at other specific locations as called for in the plans.
3. Ground-in rumble strips are to be constructed in accordance with Section 546 of the Specifications.
4. When friction course extends more than 8" beyond the edge of the travel lane, the extended friction course shall be bladed off back to the 8" line, prior to rumble strip grinding.
5. Both arrays shall be paid for under the contract unit price for Rumble Strips (Ground-In), PM. Such price and payment shall be full compensation for all work and materials required.

DESIGN NOTE

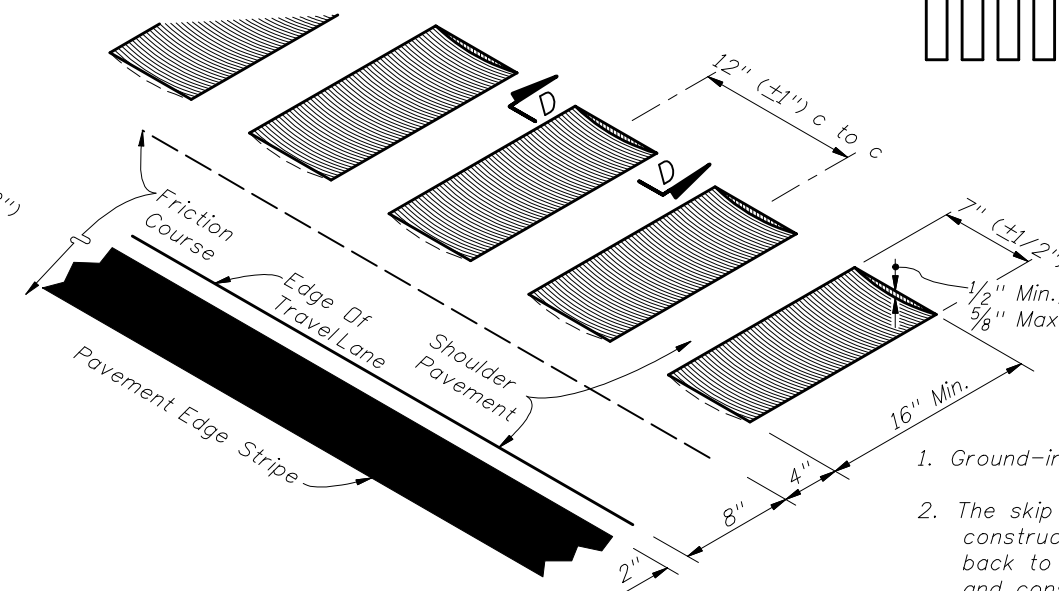
1. The rumble strips described on this sheet are intended for use on flexible pavement shoulders. When constructing ground-in rumble strips on existing rigid (concrete) shoulders, no rumble strips shall be located closer than 6" from any pavement joint. When specifying ground-in rumble strips on existing rigid shoulders their location and array shall be detailed in the plans.
2. Other methods and types of applications shall not be used unless approved in writing by the State Roadway Design Engineer. Approval will be considered only with sufficient documented justification for deviation from this standard.



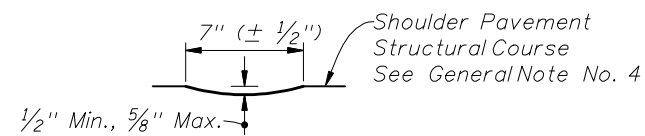
ISOMETRIC - TRANSVERSE CUT



SECTION CC
 TRANSVERSE CUT



ISOMETRIC - LONGITUDINAL CUT

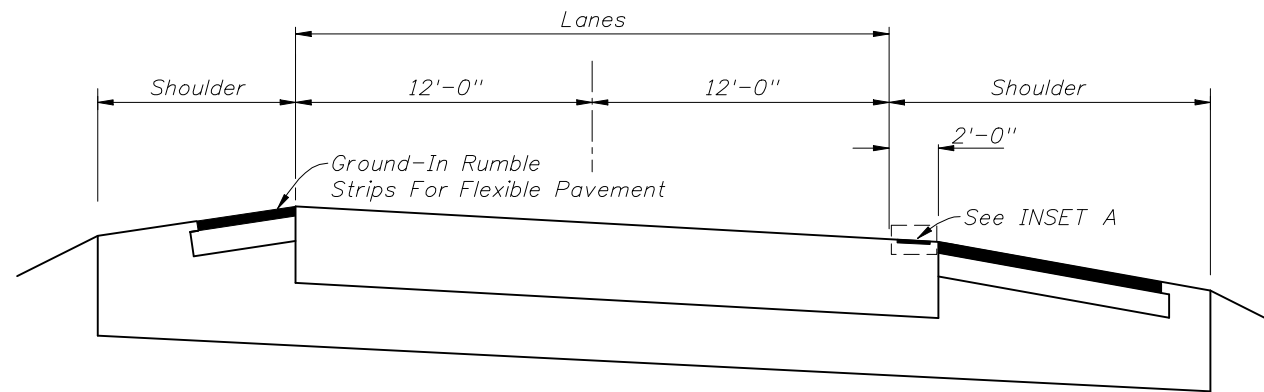


SECTION DD
 LONGITUDINAL CUT

LOCATION ALONG SHOULDER (FLEXIBLE PAVEMENT)

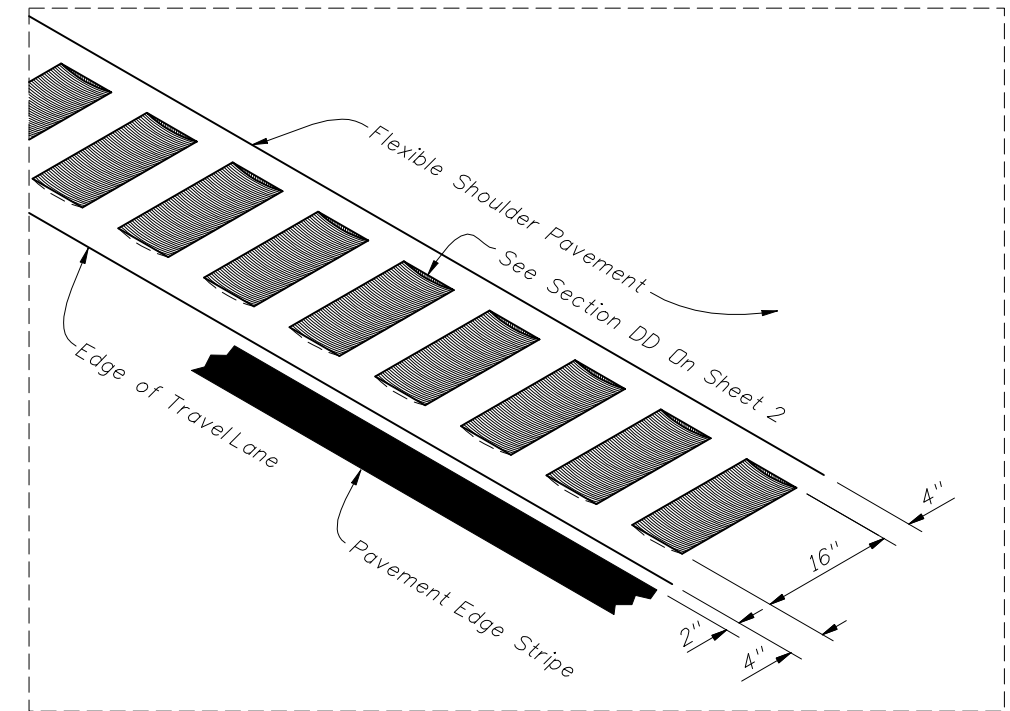
SHOULDER GROUND-IN RUMBLE STRIPS





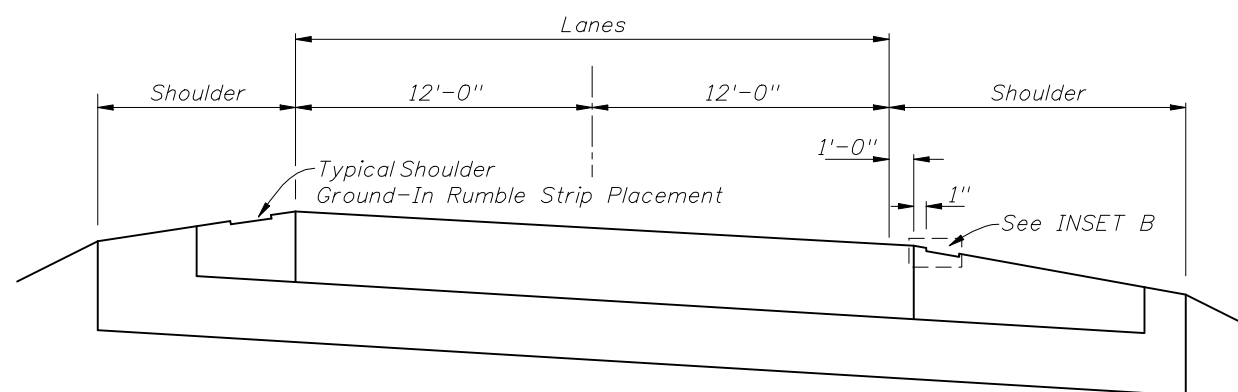
NTS

RIGID PAVEMENT WITH FLEXIBLE PAVEMENT SHOULDER



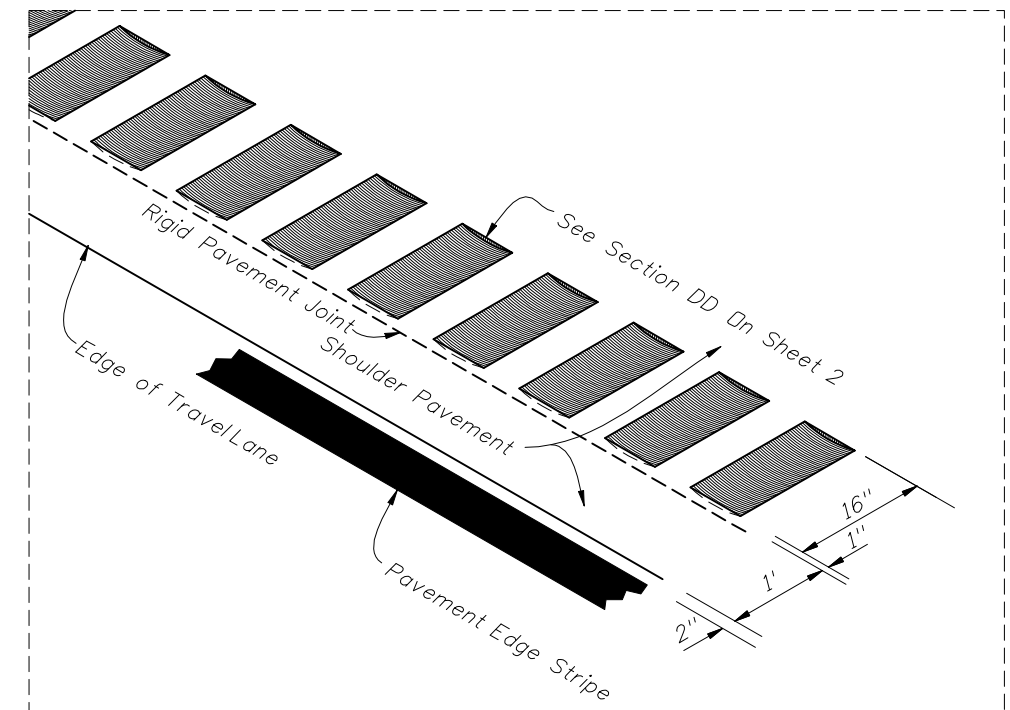
ISOMETRIC - LONGITUDINAL CUT

INSET A



NTS

RIGID PAVEMENT WITH RIGID PAVEMENT SHOULDER



ISOMETRIC - LONGITUDINAL CUT (RIGID PAVEMENT)

INSET B



DESIGN NOTES

- Gravity wall design is based on the following soil criteria which covers the majority of soil types found in Florida:
 - Classification = Cohesionless (Fine Sand)
 - Friction Angle = 30 Degrees
 - Moist Unit Weight of Backfill = 120 lbs./cu. ft.
 - Presumptive Allowable Bearing Pressure:
 - = 2,500 psf for slopes equal to or flatter than 1:1½
 - = 3,300 psf for slopes steeper than 1:1½
 - Corrected SPT Blow Count for foundation = 35 blows/ft. (average value within the range of depth from the base of wall to 2.0 x base width below wall).
 - Max. Seasonal High Water Table (SHWT) is one (1) foot below the horizontal ground surface at the toe of the wall, except as noted.
- In cases where the Designer considers the soil at the specific site location to be of lesser strength, an analysis is required to verify that sliding, bearing, overturning and stability requirements are satisfied.
- Overall stability of the wall shall be analyzed when the backfill slope exceeds 1:2 (vert. : horiz.) or the seasonal high water (SHW) is less than 2 ft. below the ground surface.
- Stability of the slope above the top of the gravity wall shall be analyzed for slopes steeper than 1:2 (vert. : horiz.) with a minimum Factor of Safety = 1.3.
- For Scheme 1 or Scheme 2, when a roadside barrier is required above the wall (guardrail, barrier wall, etc.) the deflection space required for the barrier must be considered. Locate the barrier so that there is no conflict between guardrail posts or barrier footing and the gravity wall or soil reinforcement. This may result in an offset greater than the minimum offset for the live load limit.

GENERAL NOTES

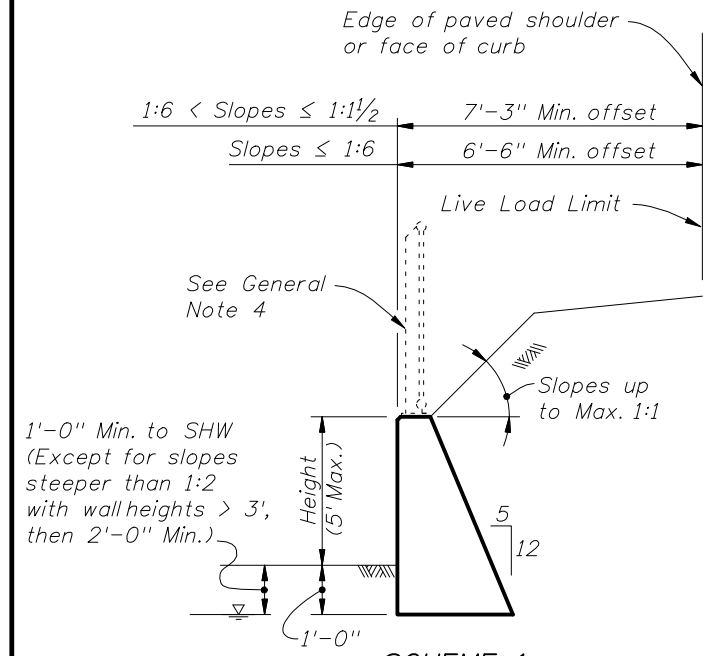
- Gravity walls constructed as extensions of reinforced concrete retaining walls, except walls of proprietary designs, shall have the same face texture and finish as the reinforced concrete retaining wall.
- Concrete for Gravity Wall shall be Class NS per Section 347. Concrete for Scheme 3 Junction Slab and Traffic Railing shall be Class II per Section 346, unless otherwise specified in the plans.
- Reinforcing steel shall be ASTM A615, Grade 40 or 60 provided at the max. spacings shown. ASTM A185 Smooth or ASTM A497 Deformed Welded Wire Fabric (WWF) may be substituted on an equal area basis. Do not increase bar/wire spacing for Grade 60 reinforcing steel or WWF.
- When required, for adjunct guiderail or pedestrian/bicycle railings see the plans, Index No. 850, 860 or 870 as appropriate. For adjunct Type B fence see Index No. 802.
- Joint seal to be two layers of 30# smooth roofing paper or Type D-5 geotextile fabric in accordance with Index No. 199. Mop all contact surfaces of concrete and roofing paper or geotextile fabric with cut-back asphalt. Stop roofing paper or geotextile fabric 6" below top of wall.
- Provide a continuous 1'x1' clean gravel or crushed rock drain for wall heights 3 ft. and higher. Wrap drainage layer as shown, with Type D-3 geotextile fabric in accordance with Index No. 199. Provide 8"x8" galvanized mesh with ¼" openings, at the inside end of the PVC Drain Pipe. Provide 2" Ø PVC Drain Pipe (Sch. 40) at 10 ft. max. spacing (When Drainage Layer required). Locate minimum 2'-0" clear of wall joints.
- Cost of reinforcing steel, face texture, finish, joint seal, drain pipes, drainage layer, galvanized mesh and geotextile fabric to be included in the Contract Unit Price for Class NS Concrete (Gravity Wall), CY. Cost of concrete for Junction Slab in Scheme 3, to be included in Contract Unit Price for Class II Concrete (Retaining Walls), CY. Adjunct traffic railings, pedestrian/bicycle railings or fences to be paid for separately.

HEIGHT (FT.)	PER LINEAR FOOT OF WALL			REINF. STEEL (LB.)	WEEP HOLES & DRAIN REQD.
	CLASS I CONCRETE (CY)				
	SCHEME 1	SCHEME 2	SCHEME 3		
1'	0.08	0.11 (0.20*)	0.03	3 (4*)	No
2'	0.14	0.20 (0.32*)	0.09	4 (5*)	No
3'	0.22	0.32 (0.47*)	0.29	5 (6*)	Yes
4'	0.32	0.47 (0.65*)	0.43	6 (7*)	Yes
5'	0.43	0.65 (0.85*)	0.60	7 (8*)	Yes

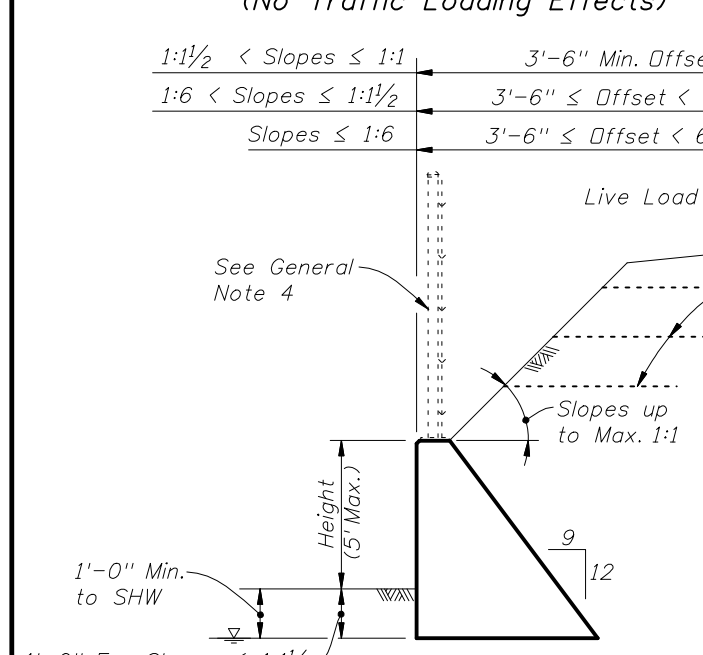
ESTIMATED QUANTITIES NOTES:

For Scheme 3 Junction Slab and Traffic Railing see the referenced Design Standards for estimated quantities.

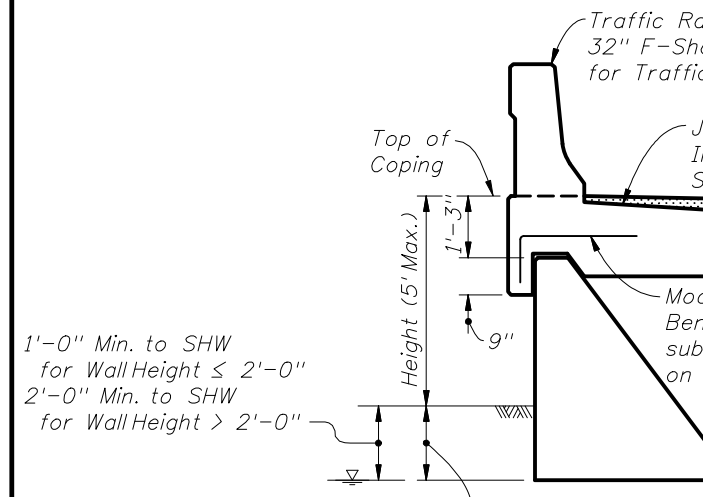
* For 2'-0" Toe Depth in Scheme 2.



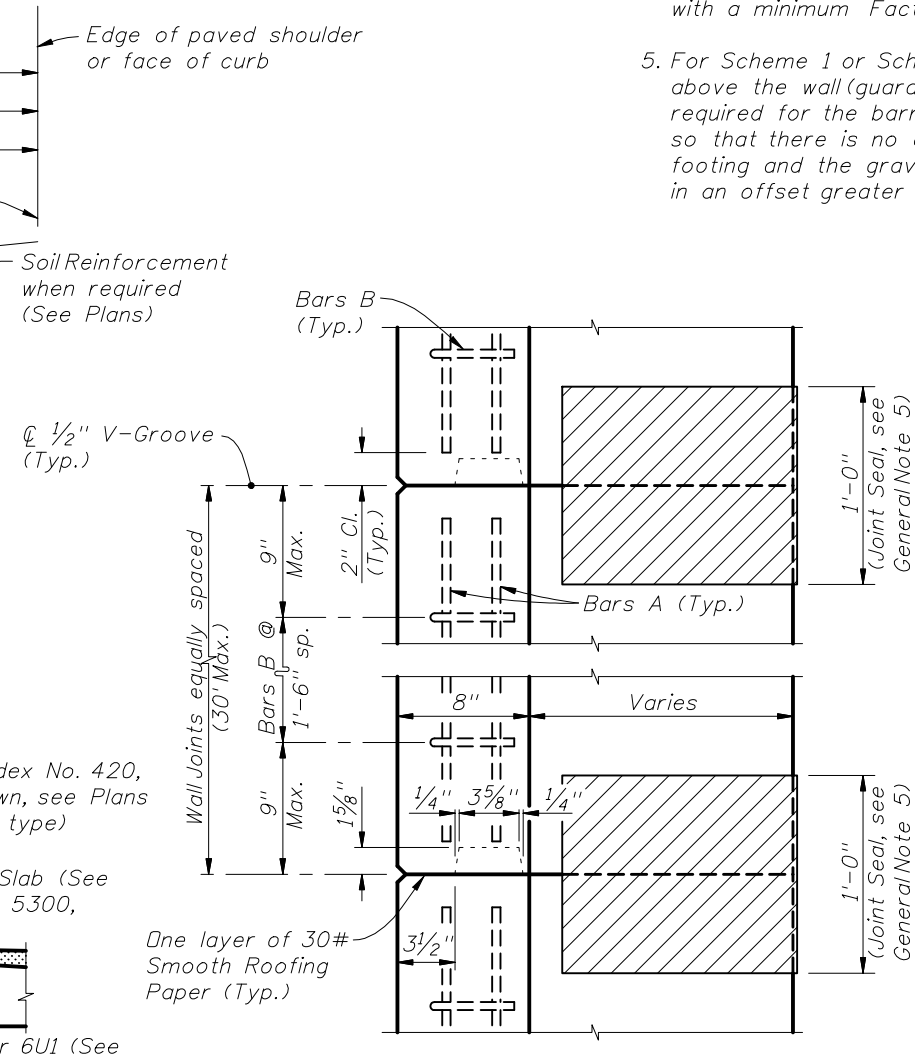
SCHEME 1
(No Traffic Loading Effects)



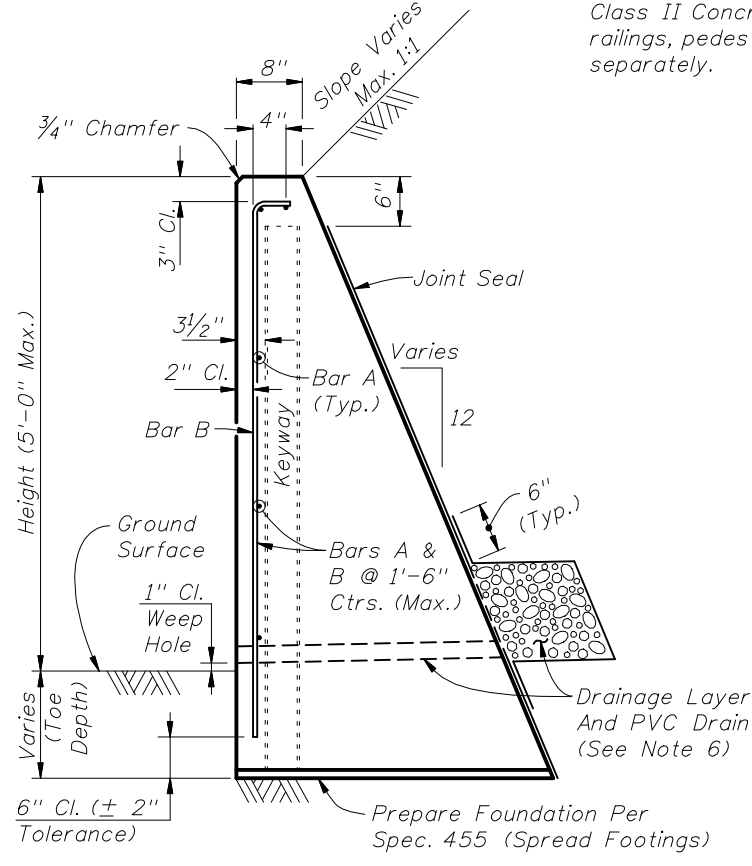
SCHEME 2
(With Traffic Loading or Slopes > 1:1½)



SCHEME 3
(With Traffic Railing)

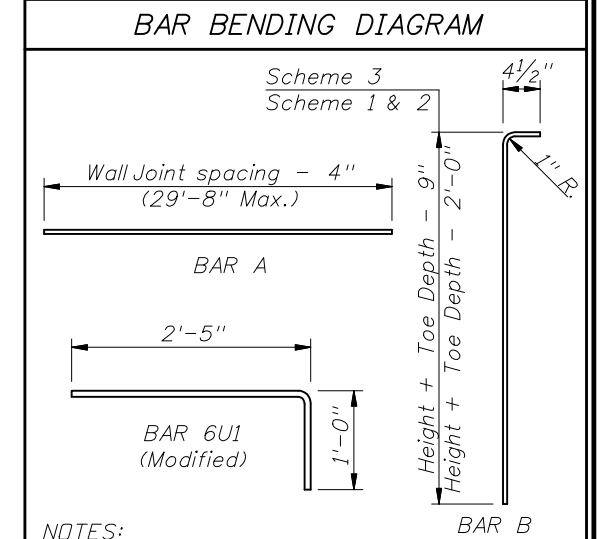


KEYWAY & WALL JOINT DETAIL
(TOP VIEW)



TYPICAL SECTION

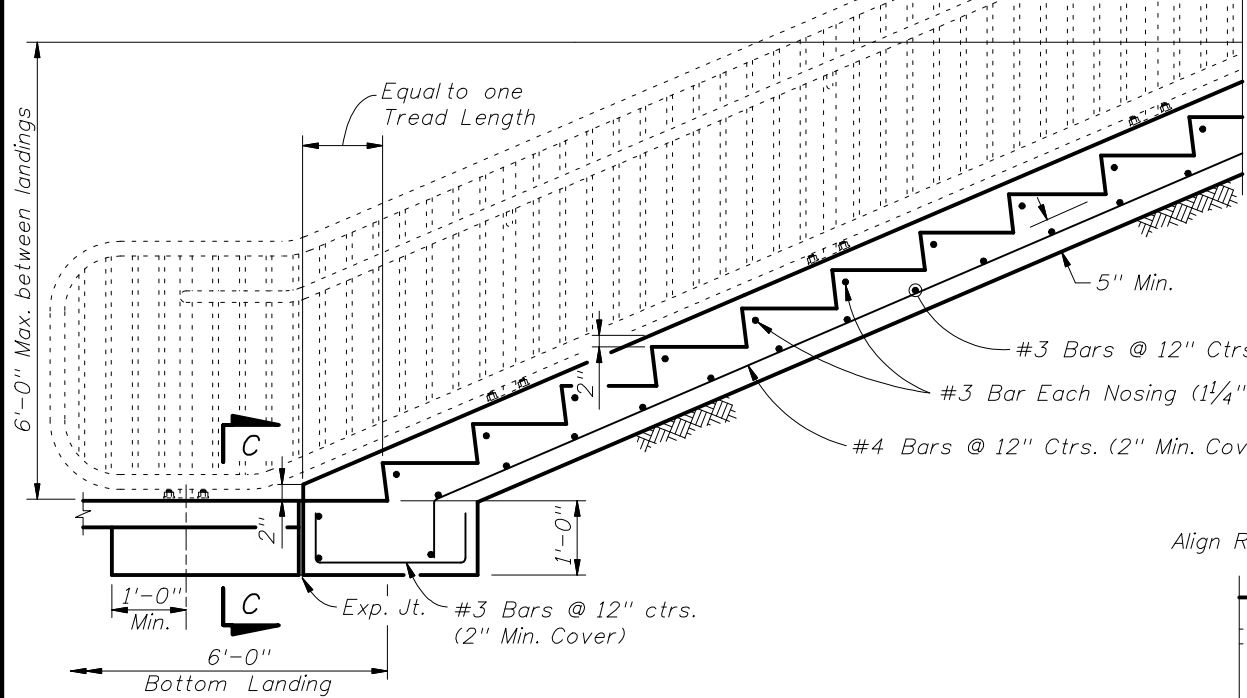
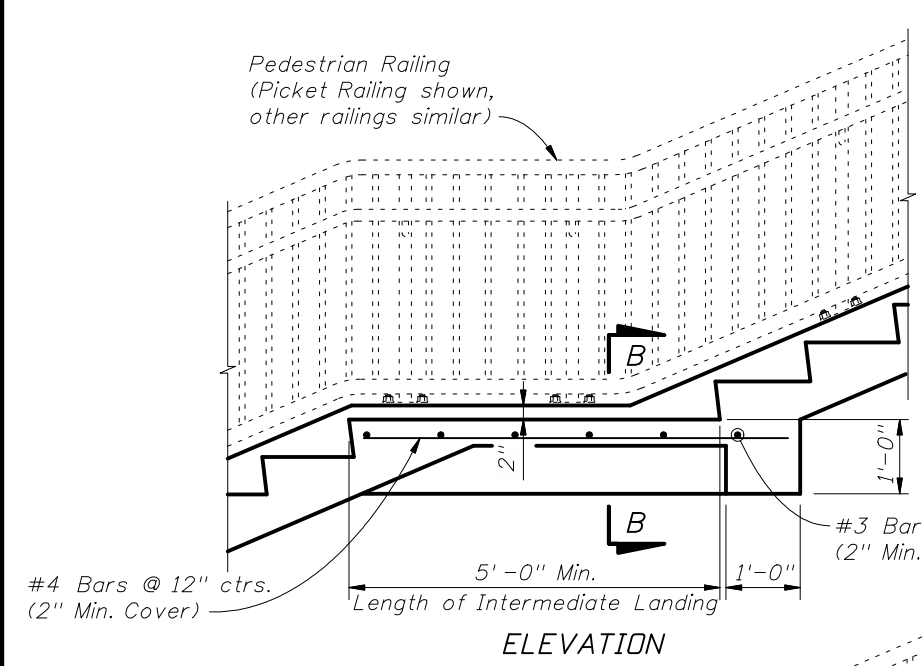
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
A	4	As Reqd.
B	4	As Reqd.
UI (Mod.)	6	3'-5"



NOTES:

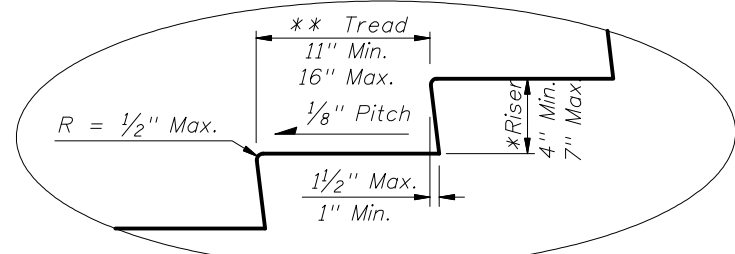
- All bar dimensions are out to out.
- Lap splices for Bars A must be a minimum of 1'-6".





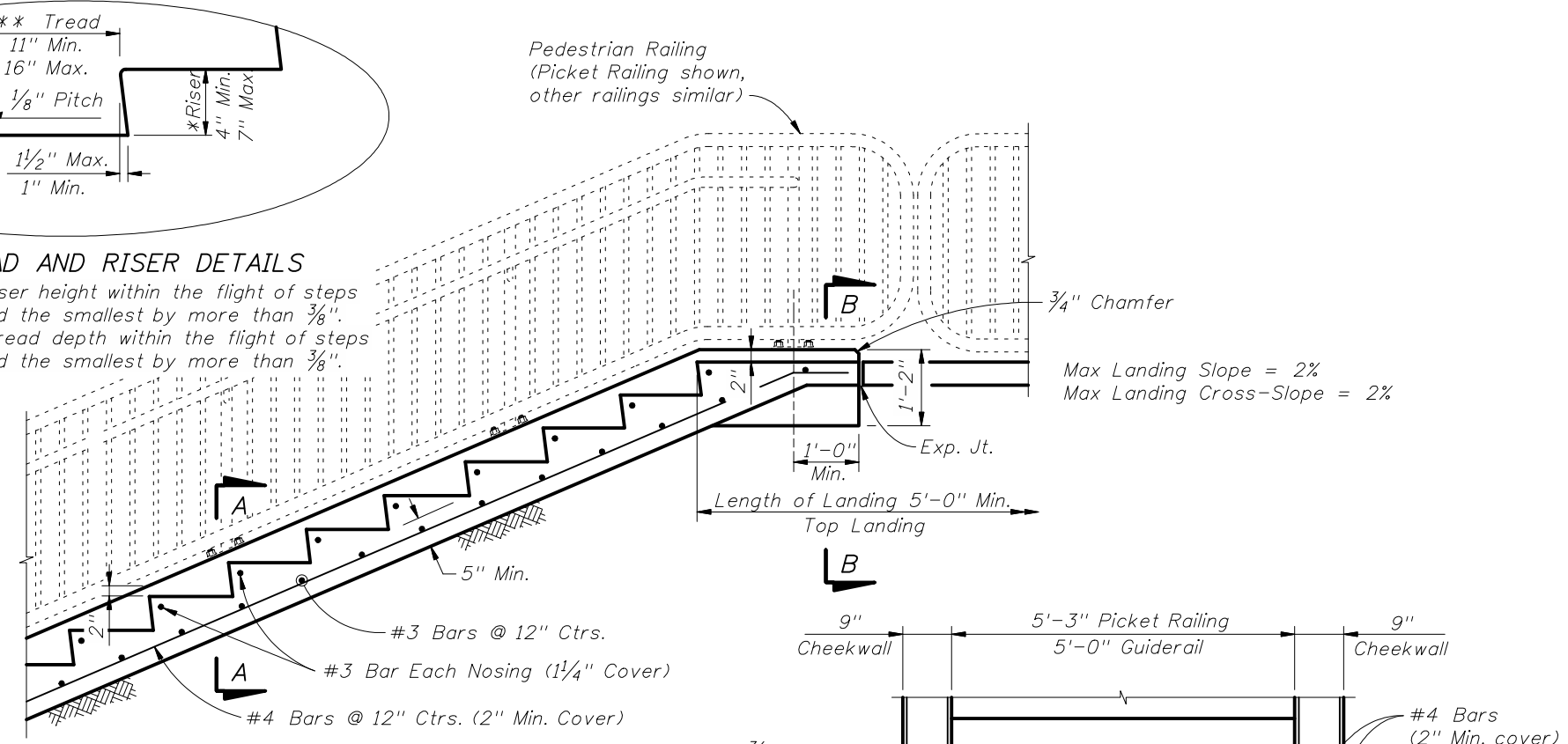
Max Landing Slope = 2%
Max Landing Cross-Slope = 2%

- NOTES:**
- Do not use this Index for suspended (structural) steps or stairways.
 - Construct steps in accordance with Section 522 of the FDOT Standard Specifications.
 - Concrete: Class NS, Specification 347.
 - Reinforcing Steel: Grade 60, ASTM A615.
 - Tread Finish: Broom finish parallel to steps unless otherwise shown in Plans.
 - Pedestrian Railing: See Index Nos. 850, 860, 870, 880 or Project Specific Design.
 - Cost of concrete steps, landings and cheekwalls shall be paid for under the contract unit price for Class NS Concrete (Concrete Steps), CY. Cost of reinforcing steel shall be paid for under the contract unit price for Reinforcing Steel (Miscellaneous), LB.

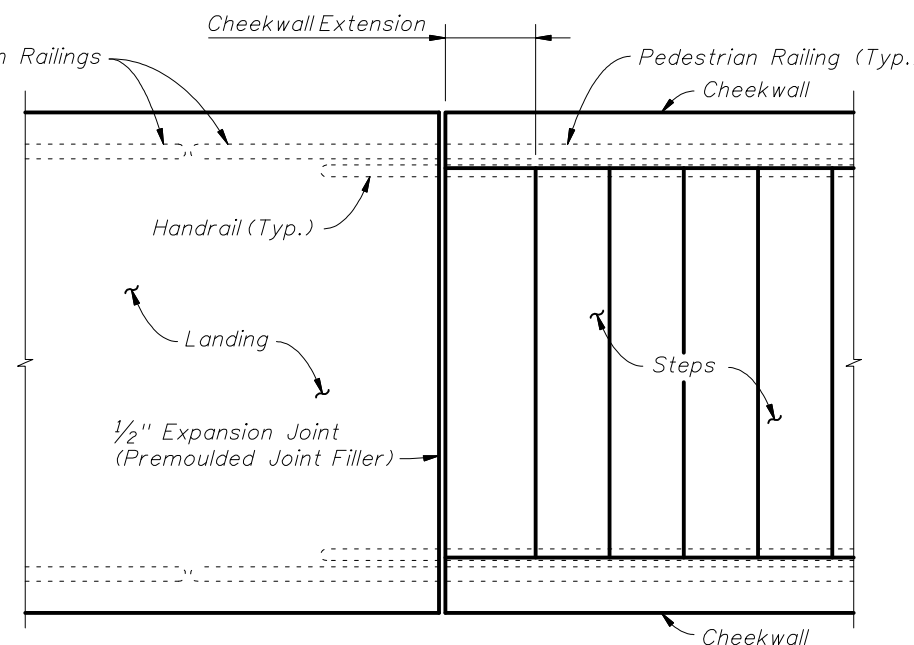


STAIR TREAD AND RISER DETAILS

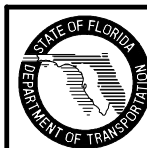
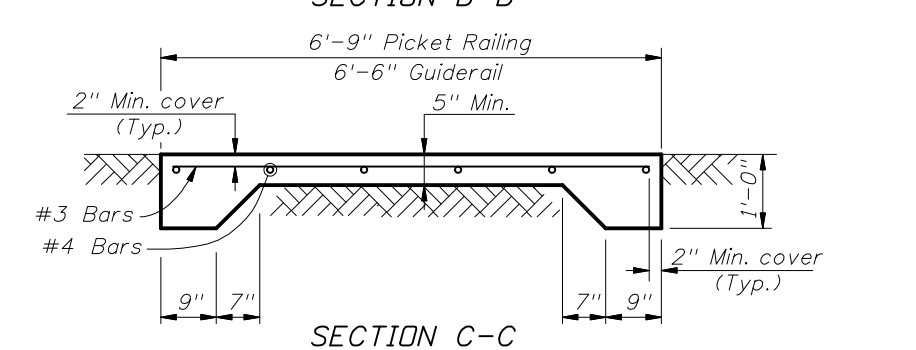
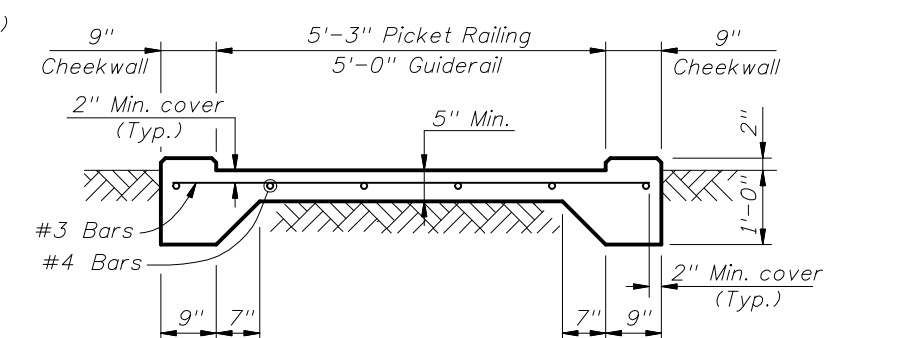
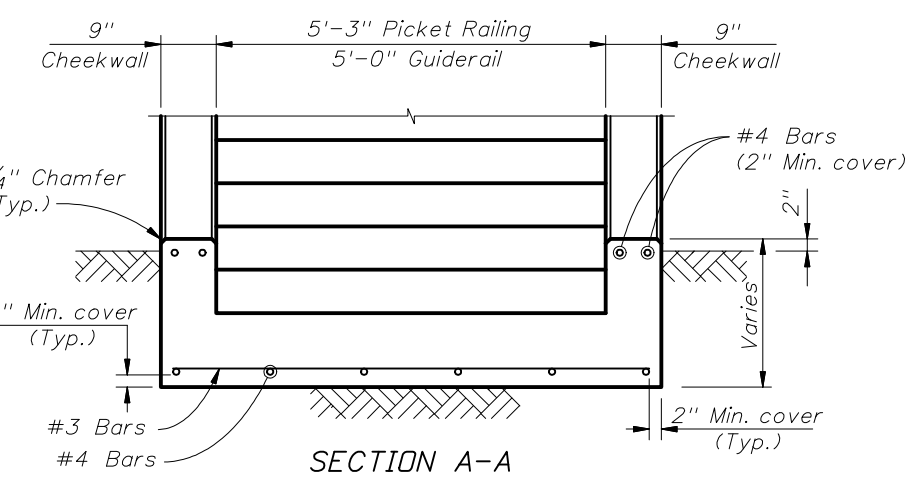
- * The greatest riser height within the flight of steps shall not exceed the smallest by more than 3/8".
- ** The greatest tread depth within the flight of steps shall not exceed the smallest by more than 3/8".



NOTE: Provide a maximum of 12 risers between landings.



PLAN AT JUNCTION OF STEPS & LANDING
(Bottom Landing shown, Top Landing similar)

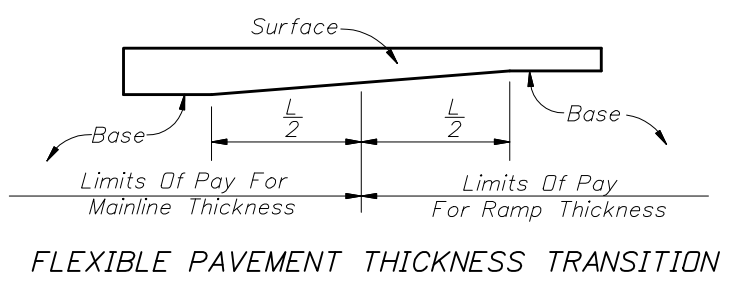
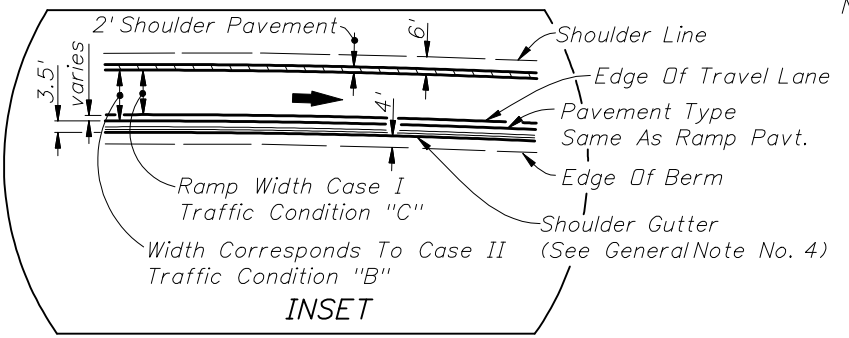
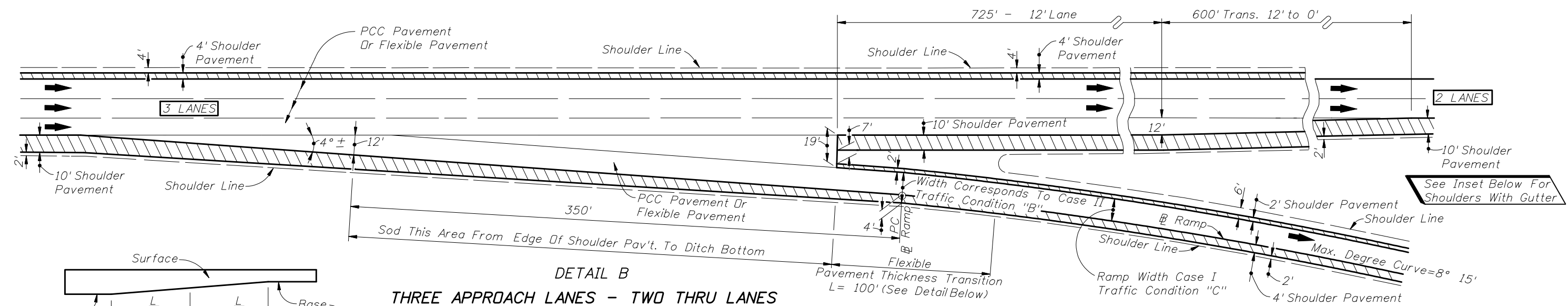
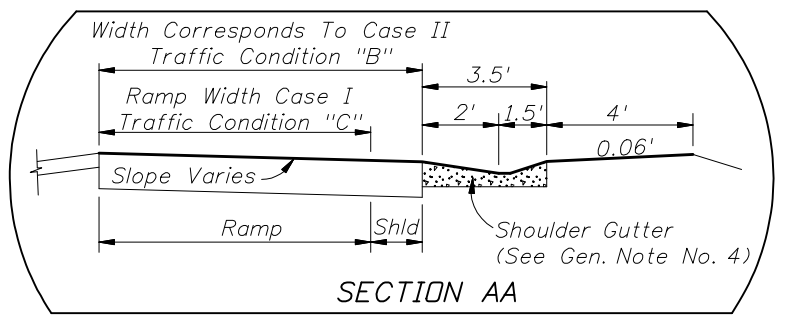
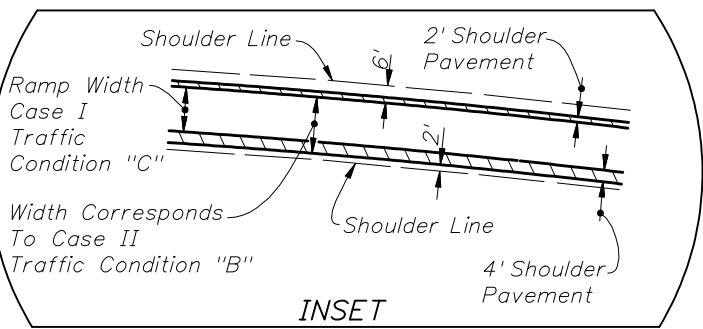
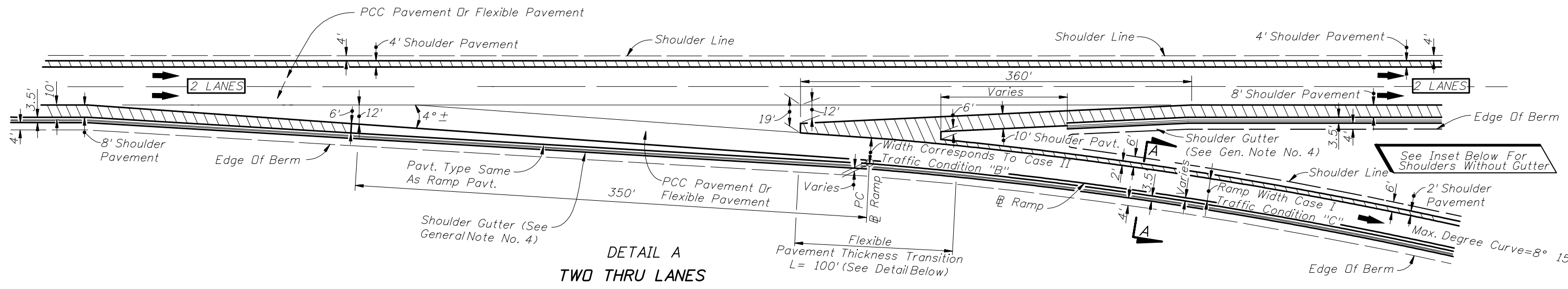


2010 FDOT Design Standards

CONCRETE STEPS

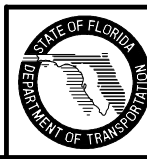
Last Revision 01/01/07
Sheet No. 1 of 1

Index No. 521



**EXIT TERMINALS
SINGLE - LANE RAMPS**

NOTE: For General Notes See Sheet No. 2

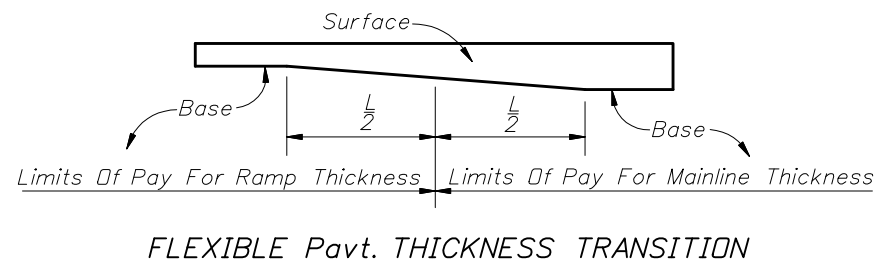
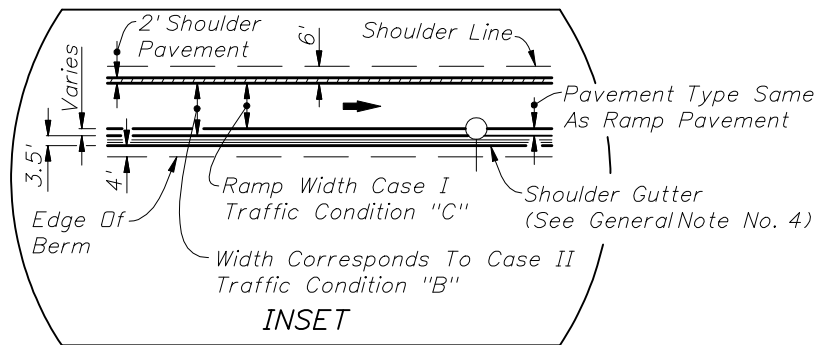
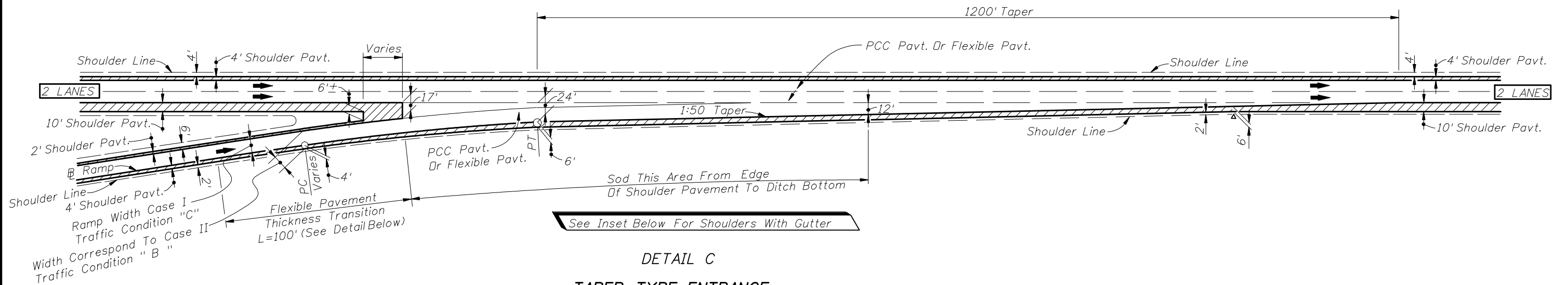


2010 FDOT Design Standards

RAMP TERMINALS

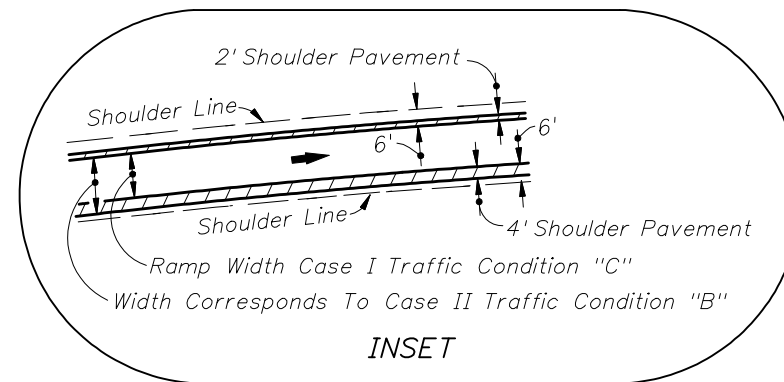
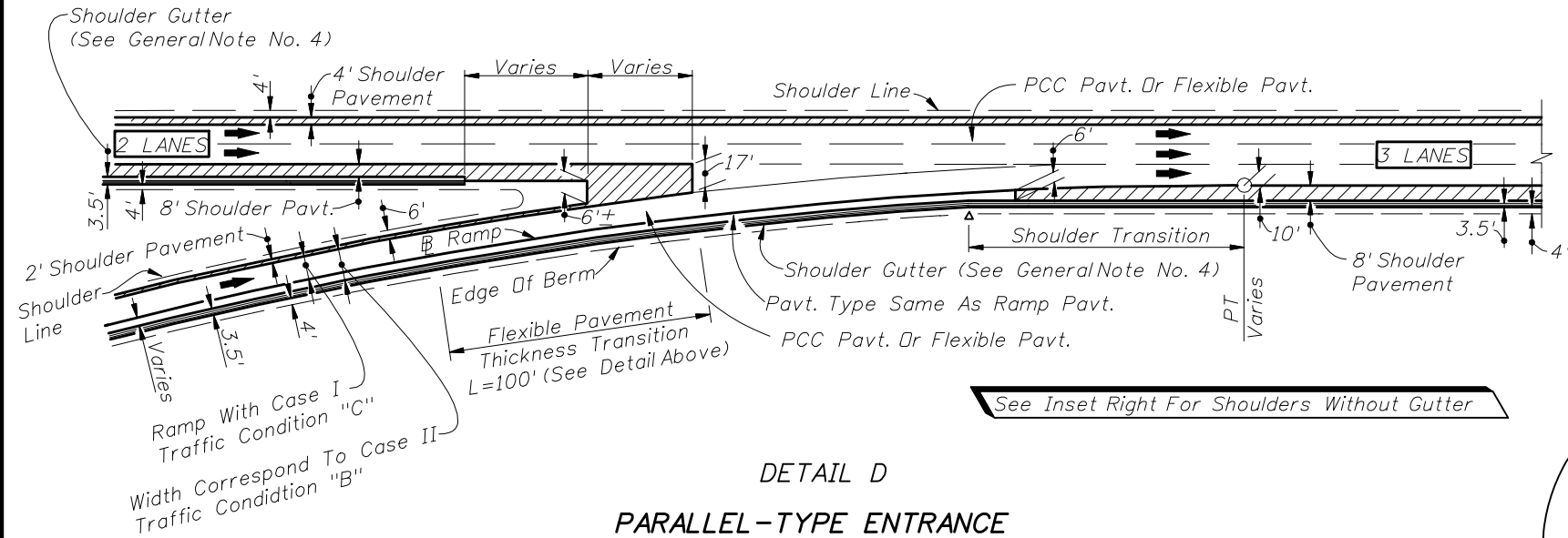
Last Revision 04
Sheet No. 1 of 5

Index No. 525

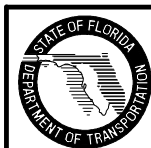


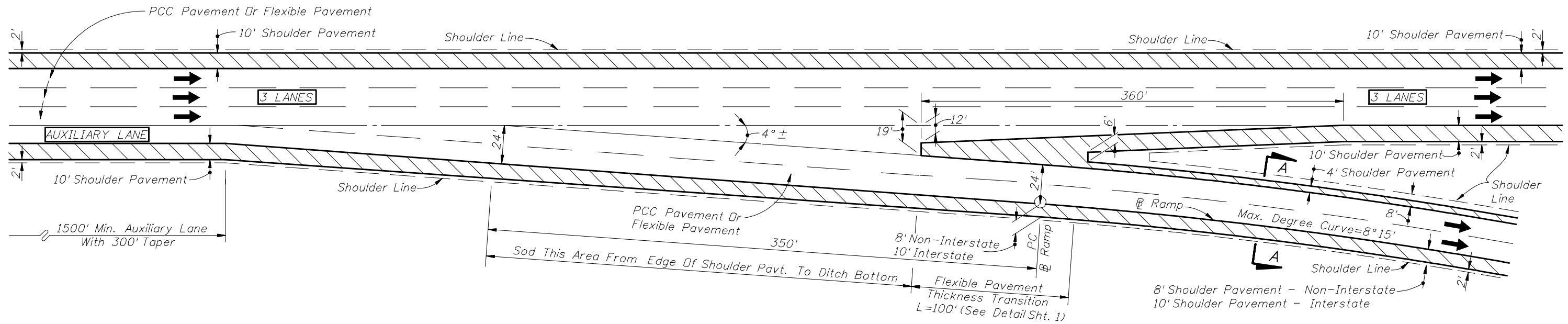
GENERAL NOTES

1. Taper-Type exit and entrance terminals as detailed shall not be used on ramps for which a speed of 50 MPH or greater cannot be maintained. For such ramps, parallel deceleration and acceleration lanes shall be used in place of tapers with lengths set according to AASHTO.
2. (a.) PCC Pavement Projects:
Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be identical to the adjacent roadway pavement, beginning with the transverse joint nearest the point of 6' width.
- (b.) Flexible Pavement Projects:
Where shoulder pavement used in conjunction with shoulder gutter is less than 6' uniform width, it shall be identical to the adjacent roadway pavement.
3. For concrete pavement joint details and layouts at entrance and exit ramp terminals see Index No. 305.
4. Shoulder gutter applications will be determined by drainage design.



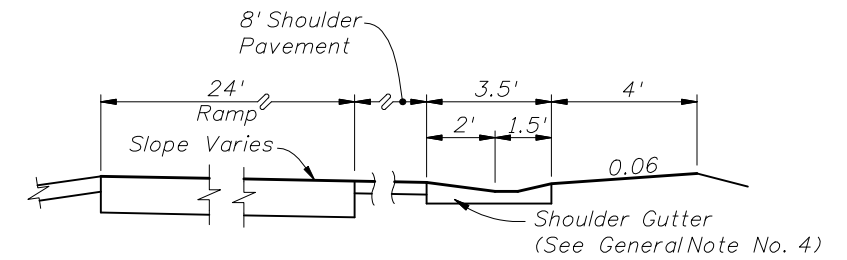
ENTRANCE TERMINALS
SINGLE-LANE RAMPS





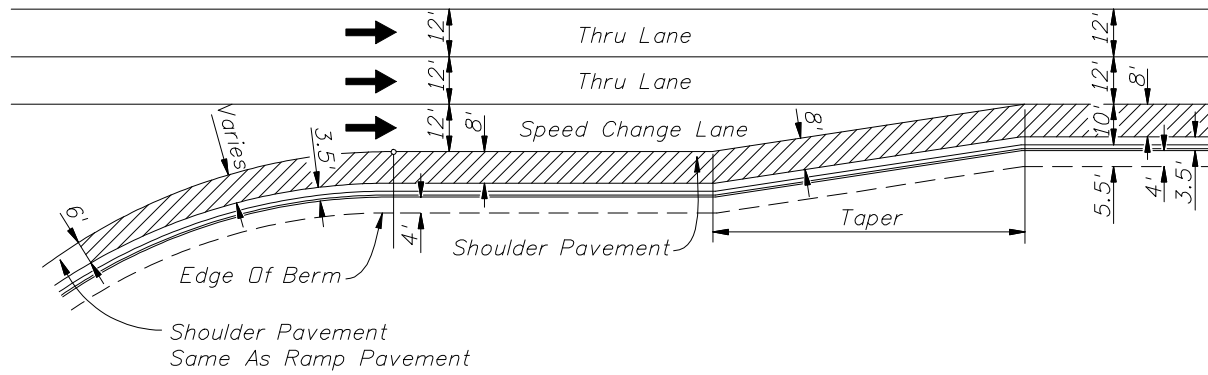
THREE THRU LANES - APPROACH AUXILIARY LANE

EXIT TERMINALS
TWO-LANE RAMPS

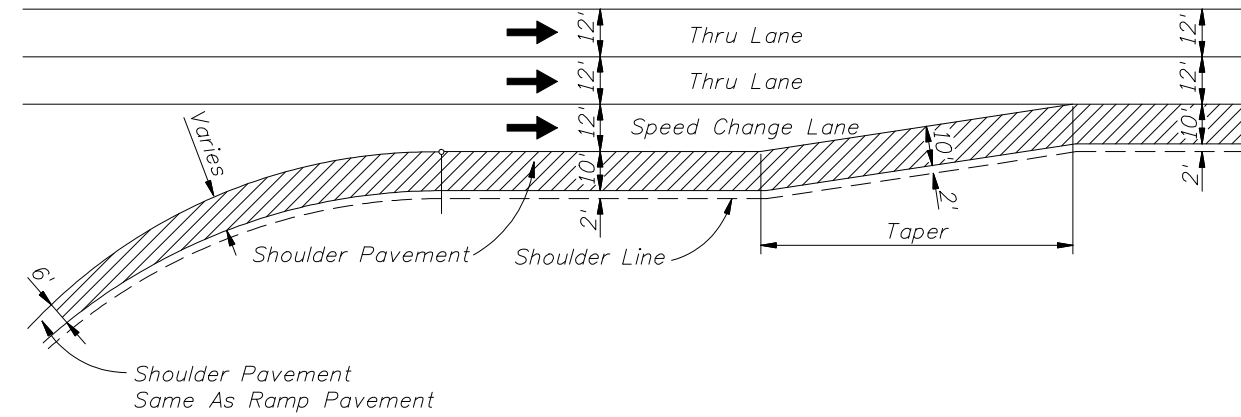


SECTION WHEN SHOULDER GUTTER USED
SECTION AA

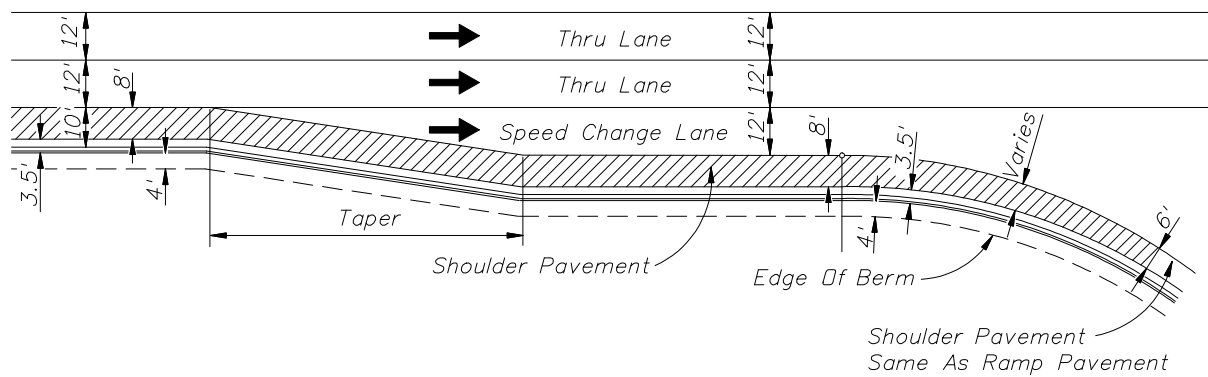




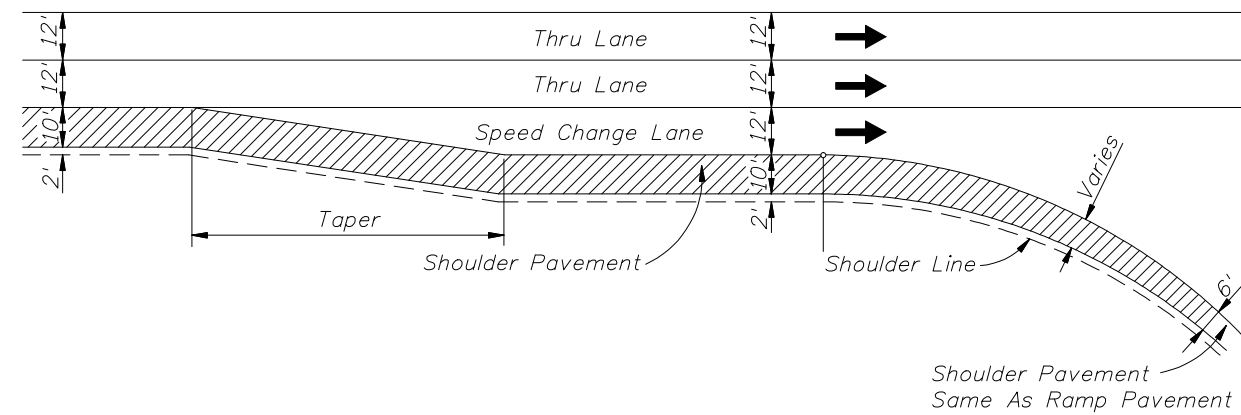
ACCELERATION LANE WITH SHOULDER GUTTER



ACCELERATION LANE WITHOUT SHOULDER GUTTER



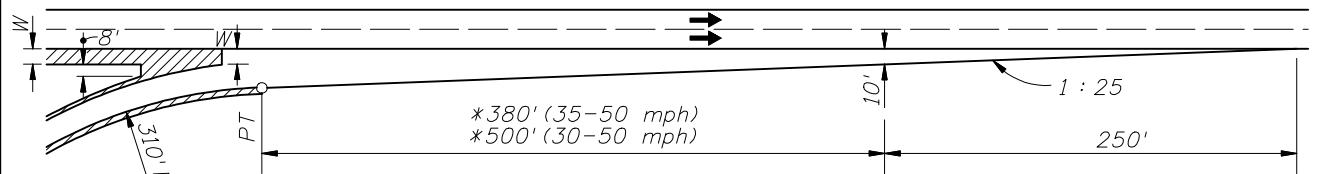
DECELERATION LANE WITH SHOULDER GUTTER



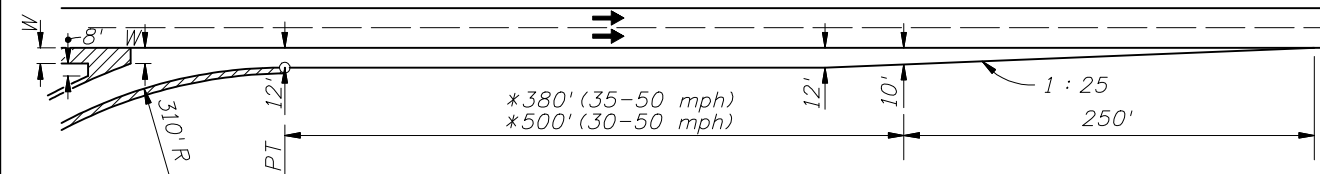
DECELERATION LANE WITHOUT SHOULDER GUTTER

SHOULDER TREATMENT
AT SPEED CHANGE LANES AT FREEWAY RAMP TERMINALS
FREEWAY RAMP TERMINALS



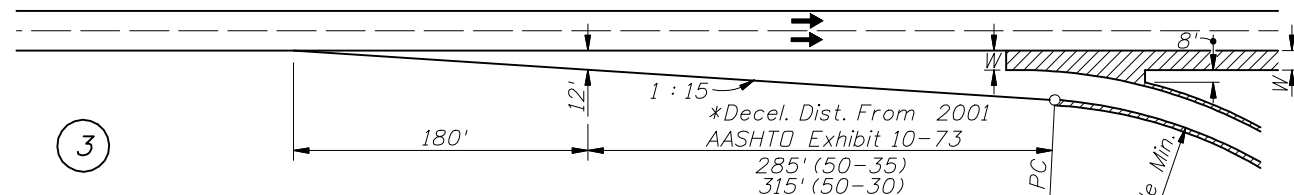


Standard cross road entrance terminals. To be used when roadway alignment is tangent and no bridges are located within the merging lane.

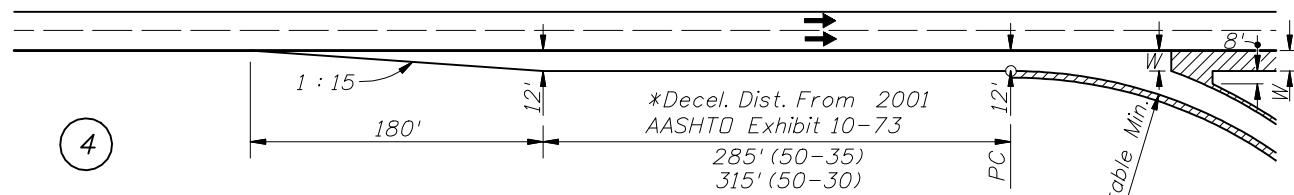


Parallel cross road entrance terminals. Recommended when a bridge is located within the merging lane, turning roadway speed is less than 60% of thru roadway speed or for the combinations of horizontal alignment shown elsewhere on this sheet.

UNSIGNALIZED ENTRANCES



Standard cross road exit terminal. To be used when roadway alignment is tangent.



Parallel cross road exit terminals. Recommended when exit is partially hidden over the crest of vertical curve or when turning roadway speed is less than 60% of the thru roadway speed, or for the combinations of horizontal alignment shown elsewhere on this sheet.

UNSIGNALIZED EXITS

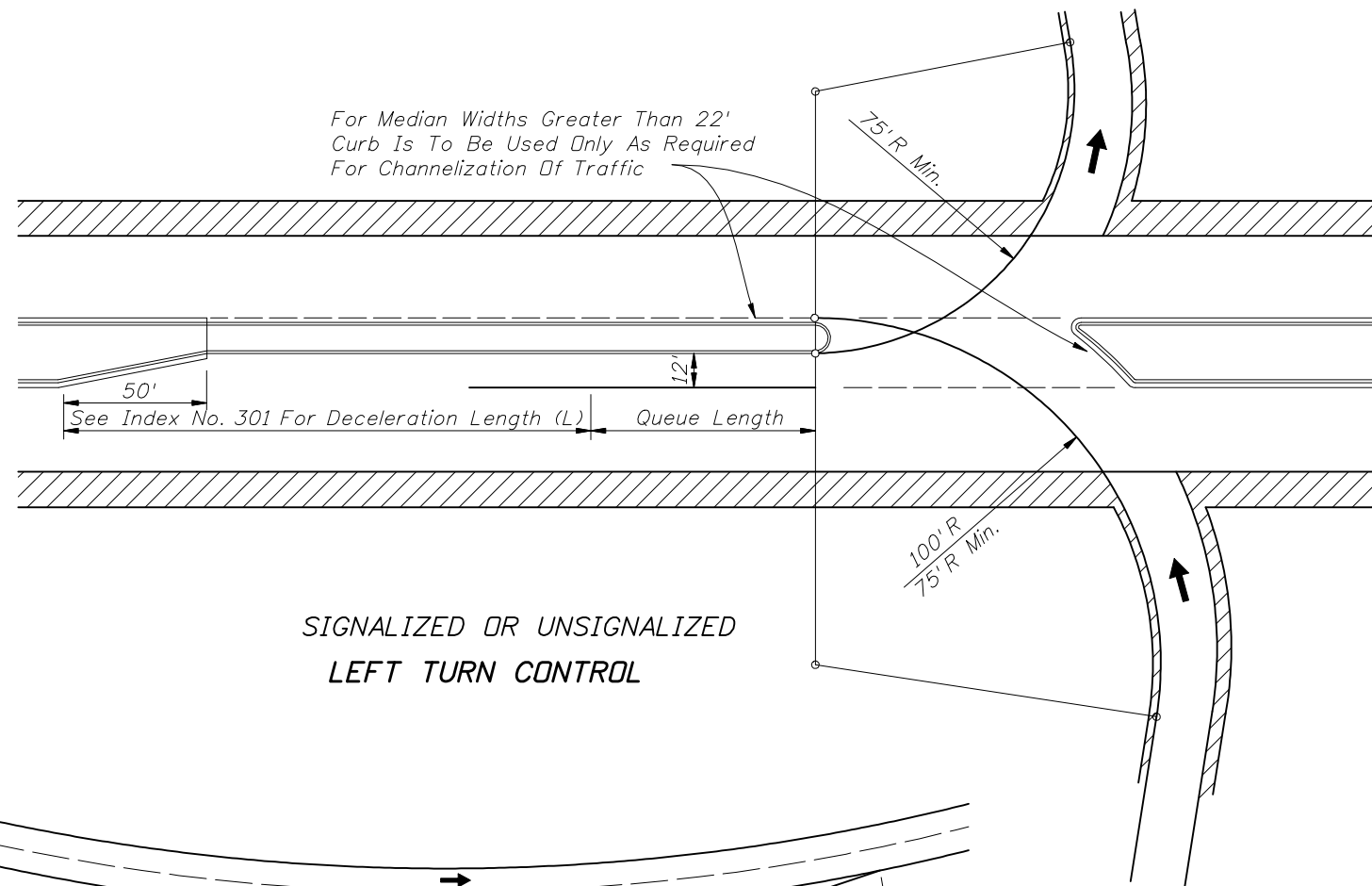
FOOTNOTES:

W Normal shoulder pavement width.

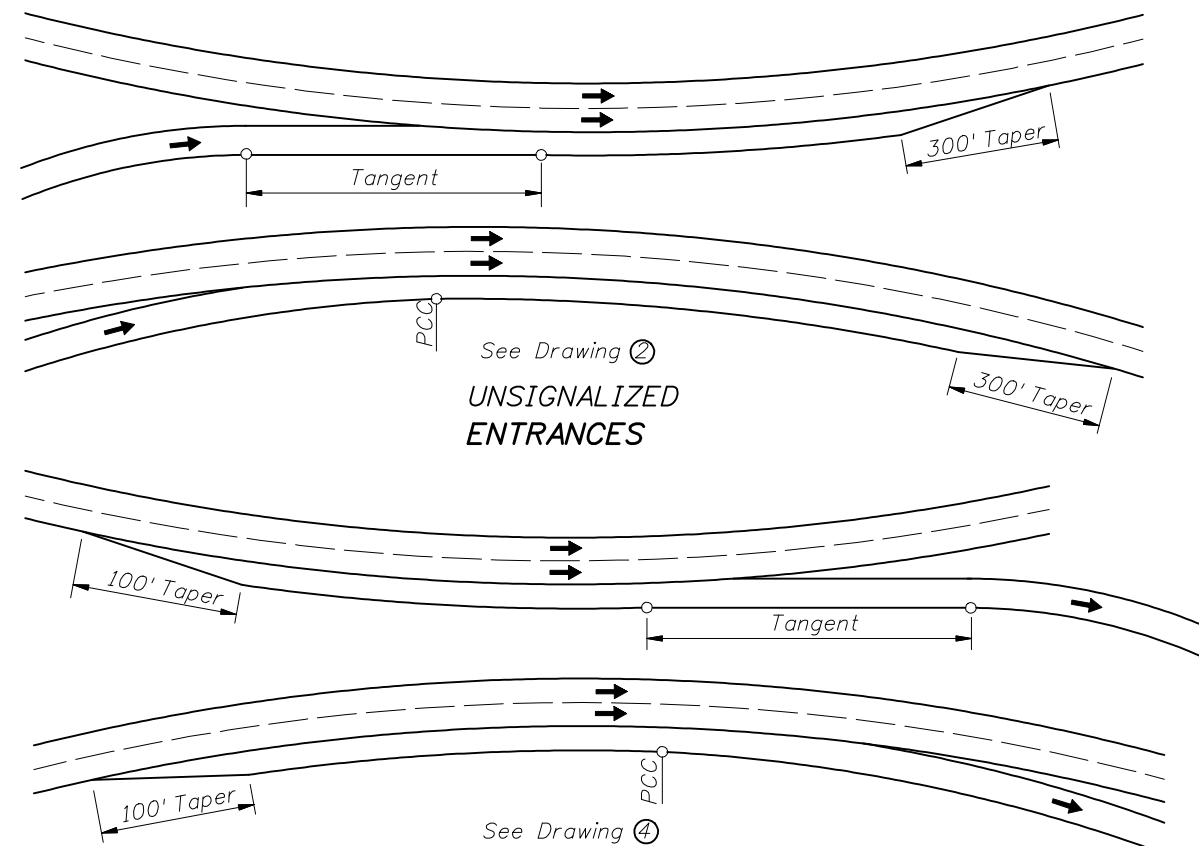
* Adjust for grades if greater than 2% (See Exhibit 10-71, AASHTO).

RAMP TERMINALS

CROSSROAD TERMINALS



SIGNALIZED OR UNSIGNALIZED LEFT TURN CONTROL

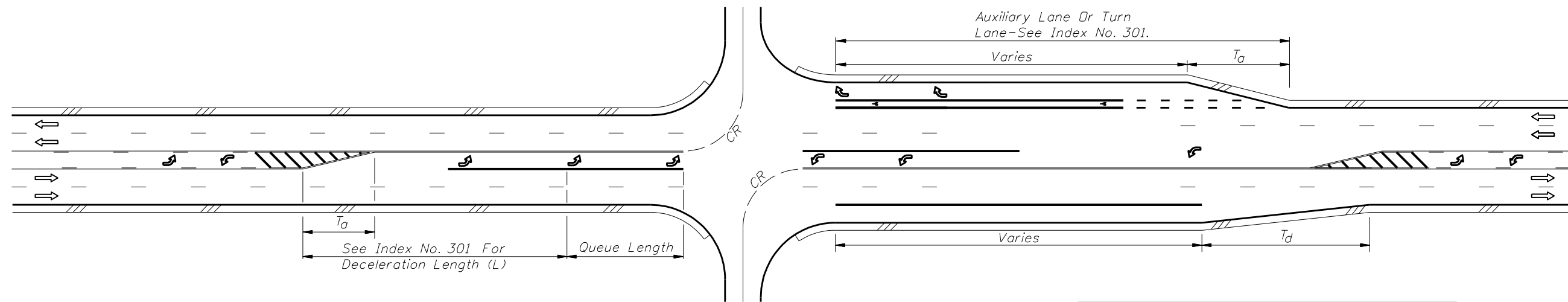


UNSIGNALIZED EXITS

NOTE: Ramp terminals on curves should be avoided when possible.

RAMP TERMINALS ON CURVES

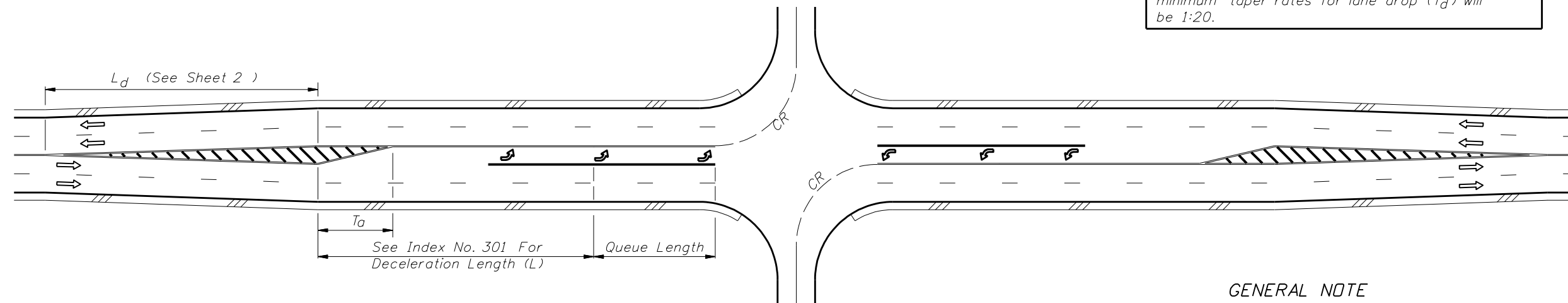




4-LANE WITH TWO-WAY LEFT-TURN LANES

DESIGN SPEED (mph)	T_a (FEET)	T_d
	ADD LANE	LANE DROP
<30	50' (\pm 1:4)	1:25
30-45		1:30
>45		1:40

Note: For locations with unrelocatable control points minimum taper rates for lane drop (T_d) will be 1:20.

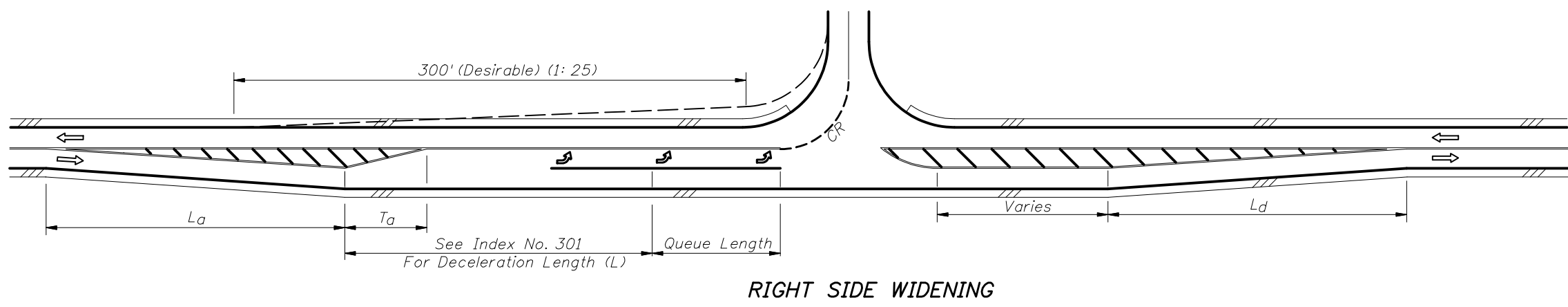
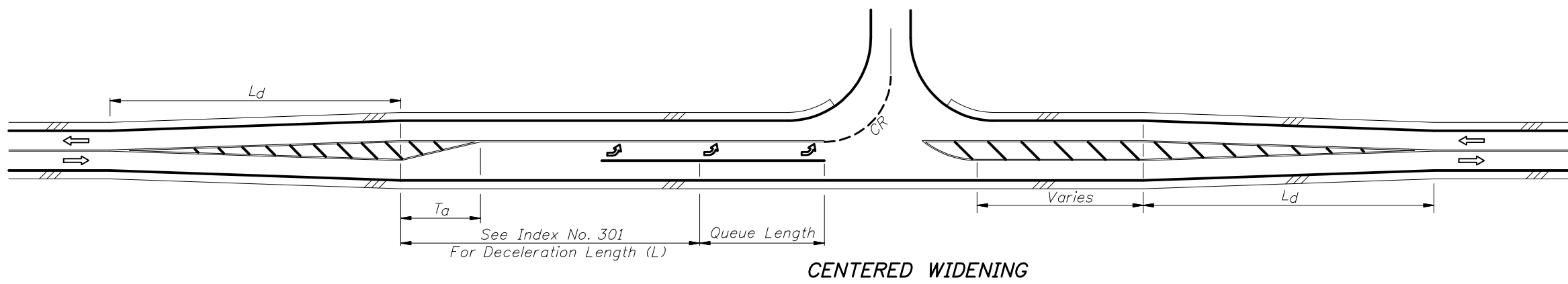
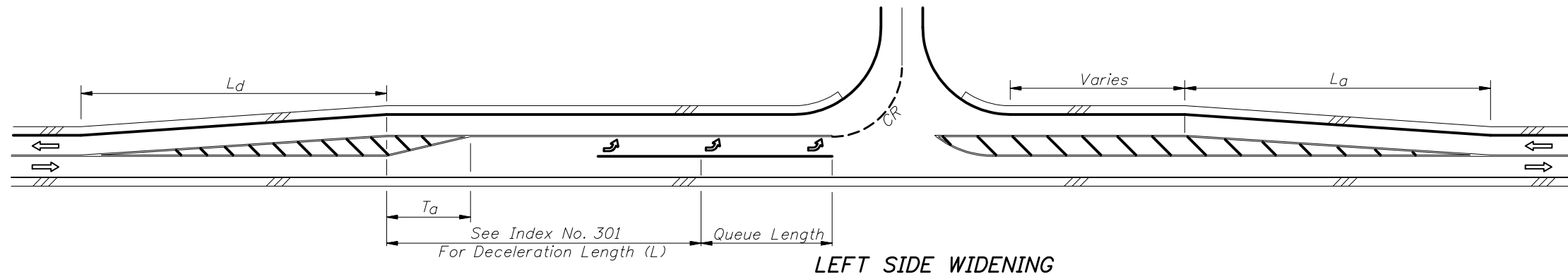


4-LANE UNDIVIDED FLARED - SYMMETRICAL

INTERSECTION TURNS AND STORAGE

GENERAL NOTE
1. For pavement markings refer to Index No. 17346.





FLARED & PAINTED LEFT TURNS FOR 2-LANE 2-WAY ROADWAYS

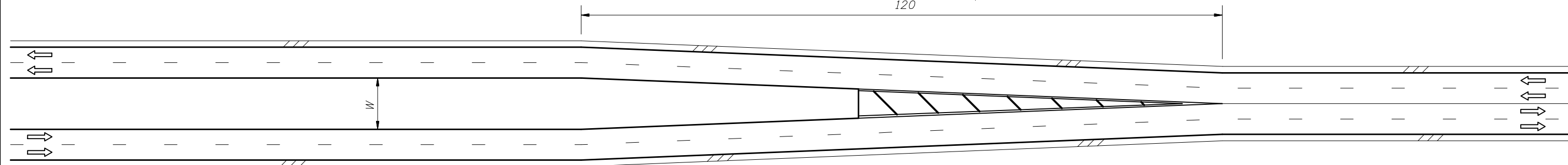
DESIGN SPEED (mph)	L_a (Ft.)	
	STANDARD	MINIMUM UNDER RESTRAINTS
30	180	120
40	320	150
50	500	180
60	720	240

(mph)	L_d (Ft.)	
30	180	120
40	240	150
50	360	180
60	480	240



$$L = \frac{WS}{2} \geq 45 \text{ mph}$$

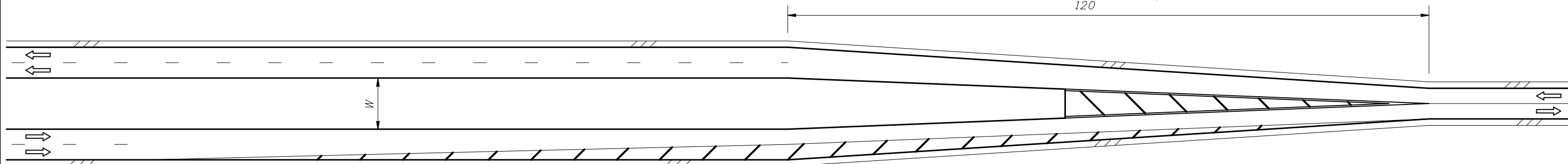
$$L = \frac{WS^2}{120} < 45 \text{ mph}$$



4-LANE DIVIDED TO 4-LANE UNDIVIDED

$$L = \frac{WS}{2} \geq 45 \text{ mph}$$

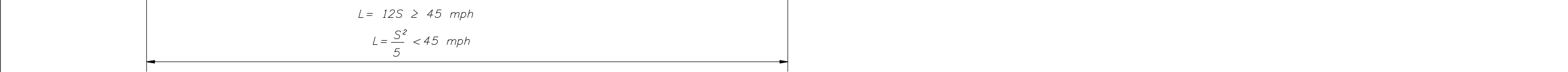
$$L = \frac{WS^2}{120} < 45 \text{ mph}$$



4-LANE DIVIDED TO 2-LANE UNDIVIDED

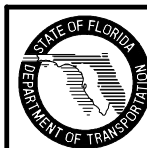
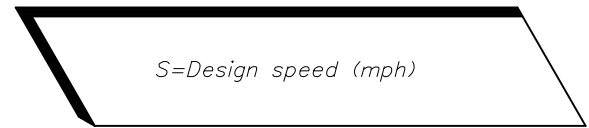
$$L = 12S \geq 45 \text{ mph}$$

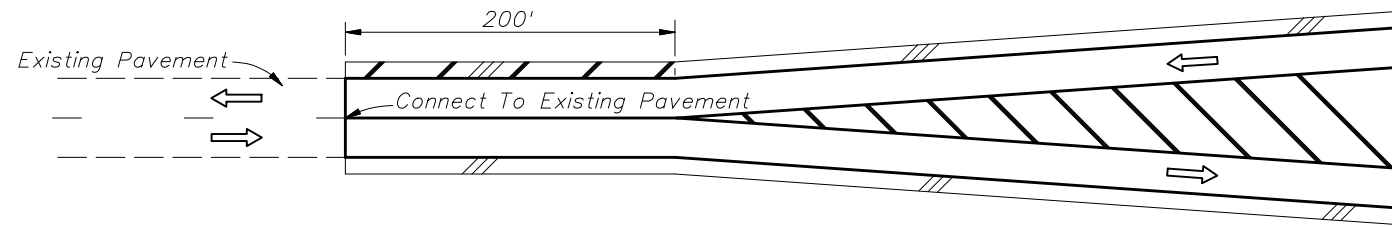
$$L = \frac{S^2}{5} < 45 \text{ mph}$$



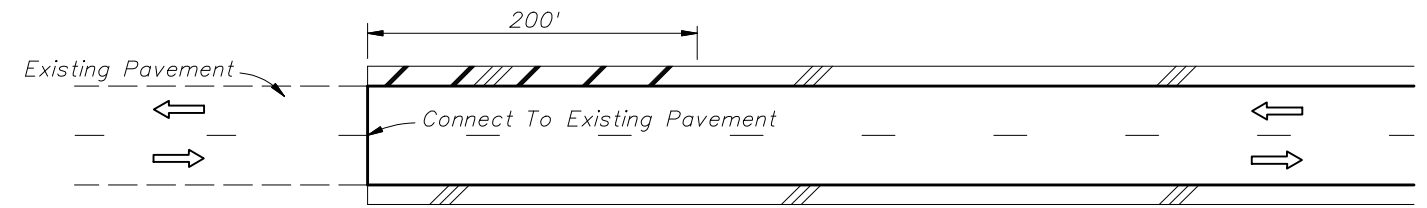
4-LANE UNDIVIDED TO 2-LANE UNDIVIDED

LANE DIVERGENCE AND CONVERGENCE FOR CENTERED ROADWAYS

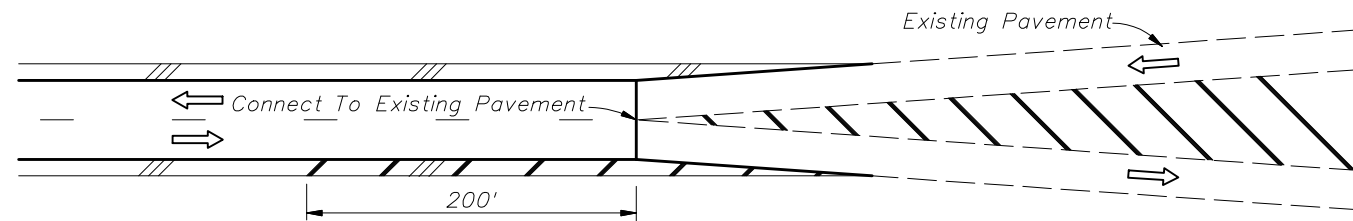




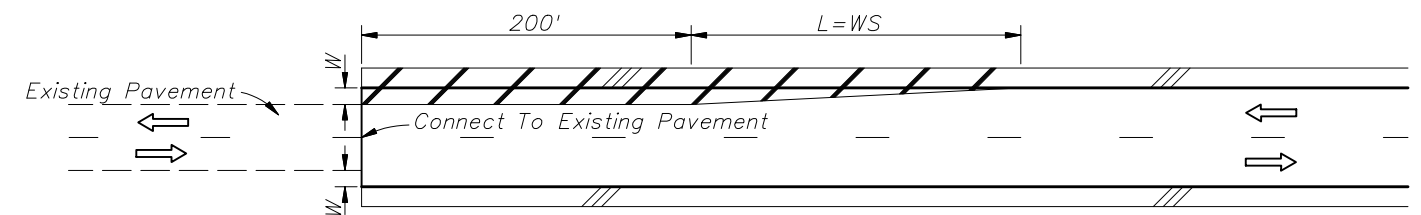
CONNECTING FLARE WITH PAVED SHOULDERS TO EXISTING ROADWAY WITHOUT PAVED SHOULDERS



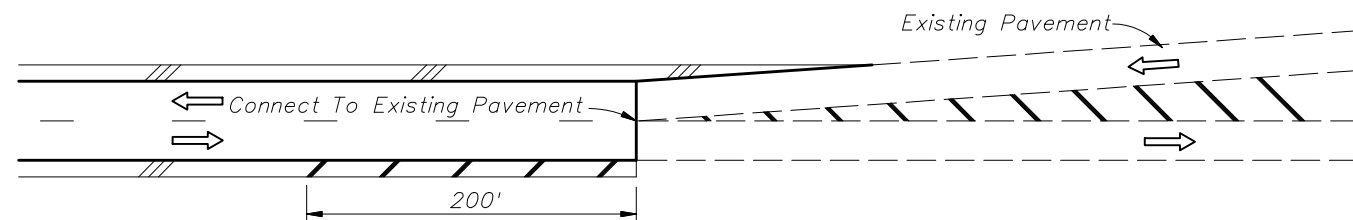
CONNECTING SIMILAR WIDTH PAVEMENTS



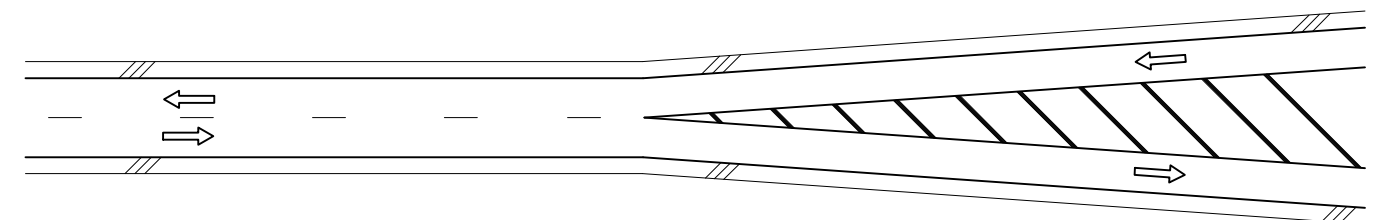
CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING SYMMETRICAL FLARE WITHOUT PAVED SHOULDERS



CONNECTING DIFFERENT WIDTH PAVEMENTS



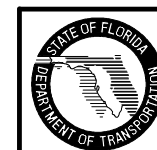
CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING ASYMMETRICAL FLARE WITHOUT PAVED SHOULDERS



FLARED - PAVED SHOULDERS

$S = \text{Design speed (mph)}$

PAVED SHOULDER TREATMENT AT TRANSITIONS AND CONNECTIONS

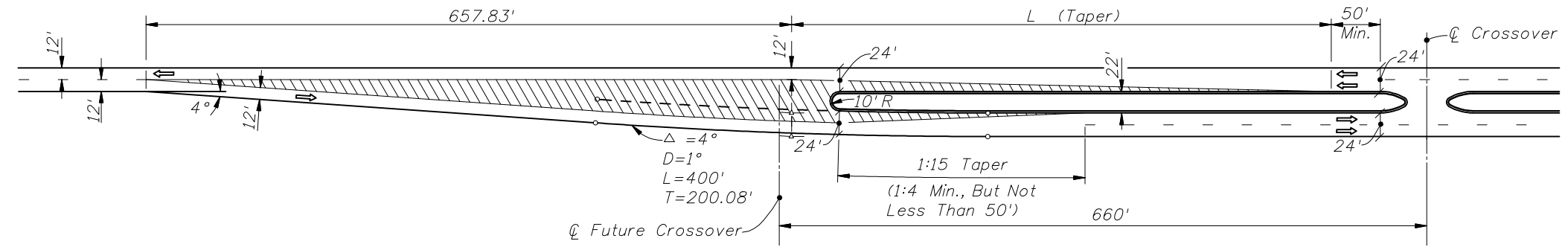


2010 FDOT Design Standards

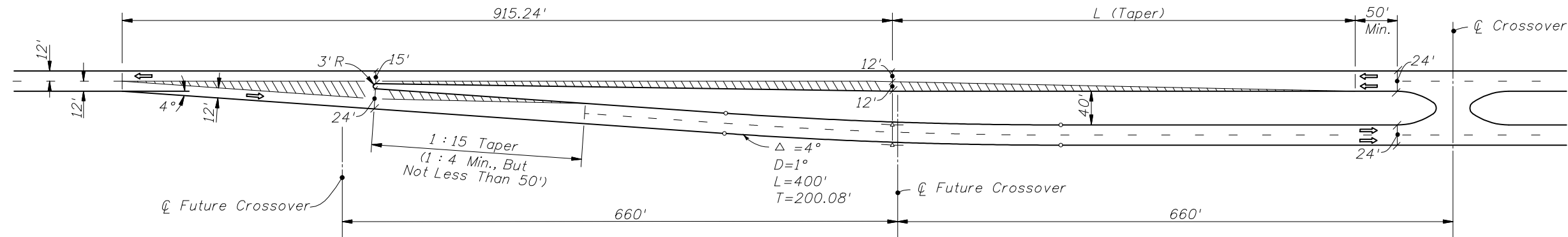
ROADWAY TRANSITIONS

Last Revision 00 Sheet No. 4 of 8

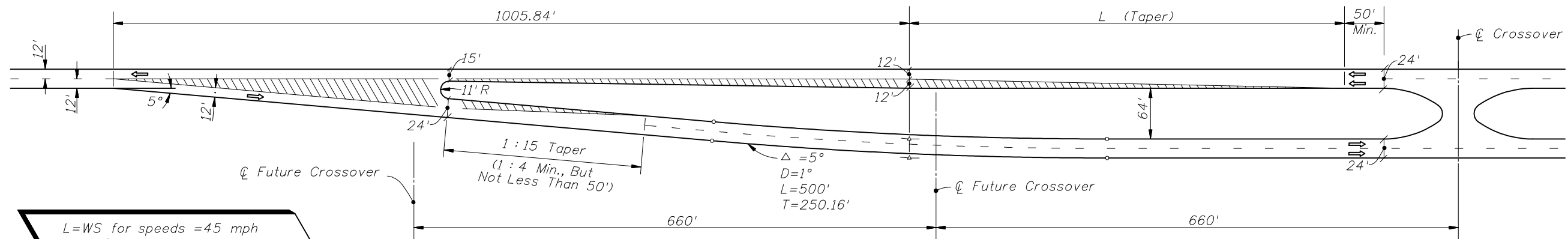
Index No. 526



22' MEDIAN



40' MEDIAN



64' MEDIAN

$L = WS$ for speeds = 45 mph
 $L = \frac{WS^2}{60}$ for speeds ≤ 40 mph
 Where:
 W = Width of lateral transition in feet.
 S = Design speed.

NOTES FOR SHEETS 5 THRU 8

- The transition details as represented on sheets 5 thru 8 are intended as guidelines only. The transition lengths, curve data, nose radii and offsets are valid only for tangent alignment, design speeds ≤ 45 mph, the median widths and lane widths shown.
- Approach lane departures ($\Delta = 5^\circ$) are suitable for design speeds up to 60 mph. Interior curves ($D = 1^\circ$) are suitable for normal crown for design speeds up to 50 mph. Merging curves ($D \geq 5^\circ$) will require superelevation.
- The geometrics of these schemes are associated with the standard subsectional spacing for sideroads, but in any case will require modification to accommodate sideroad location, multilane and/or divided sideroads, oblique sideroads, crossover widths, storage and speed change lane requirements, and, other related features.

LEFT ROADWAY CENTERED ON APPROACH ROADWAY

TWO LANE TO FOUR LANE TRANSITION



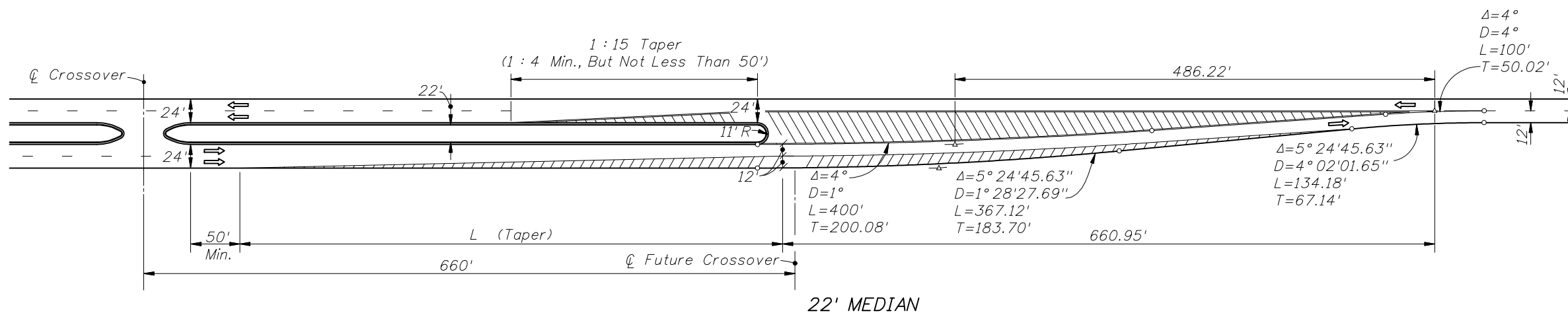
2010 FDOT Design Standards

ROADWAY TRANSITIONS

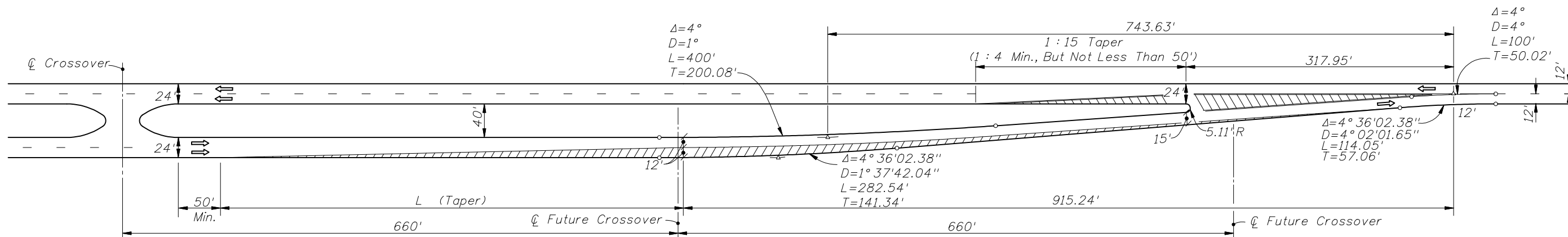
Last Revision 00

Sheet No. 5 of 8

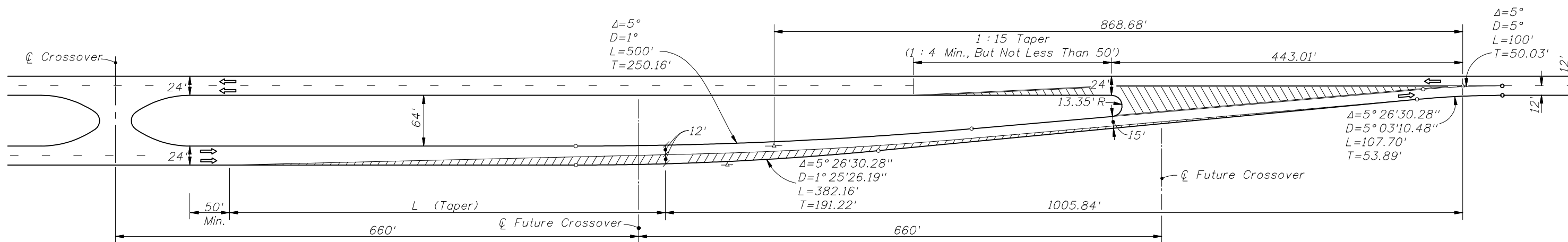
Index No. 526



22' MEDIAN



40' MEDIAN

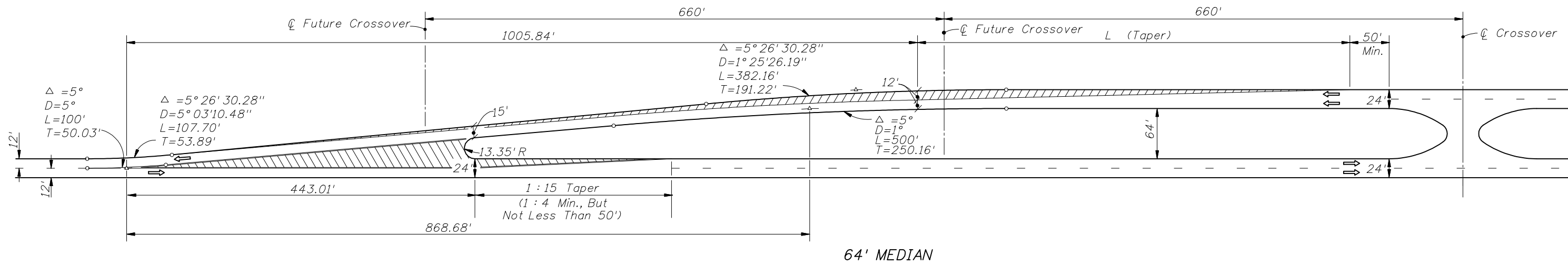
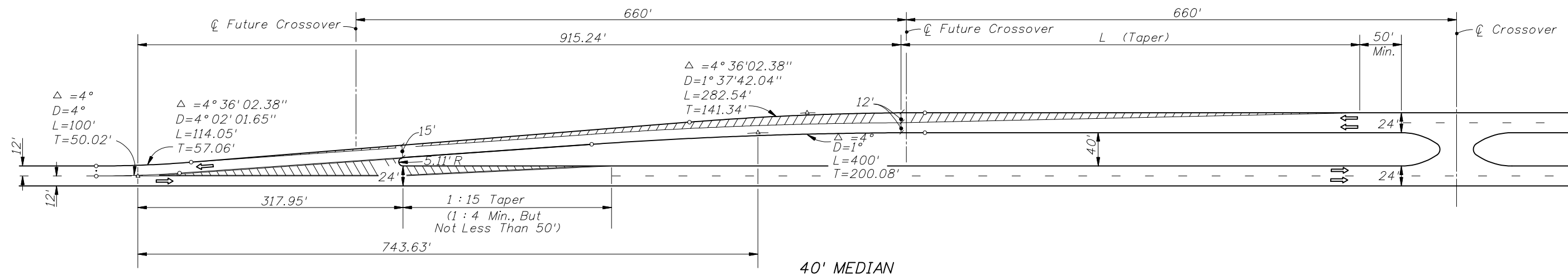
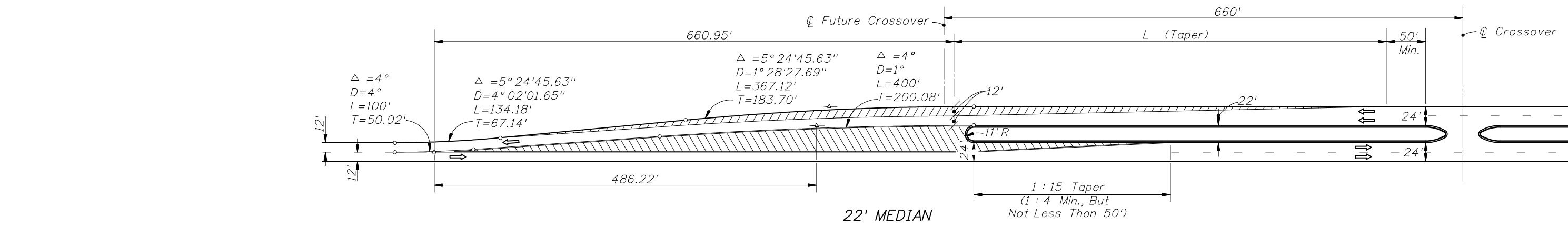


64' MEDIAN

LEFT ROADWAY CENTERED ON THRU ROADWAY
FOUR LANE TO TWO LANE TRANSITION

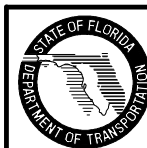
$L=WS$ for speeds = 45 mph
 $L=\frac{WS^2}{60}$ for speeds ≤ 40 mph
 Where:
 W=Width of lateral transition in feet.
 S=Design speed.





$L = WS$ for speeds = 45 mph
 $L = \frac{WS^2}{60}$ for speeds ≤ 40 mph
 Where:
 W = Width of lateral transition in feet.
 S = Design speed.

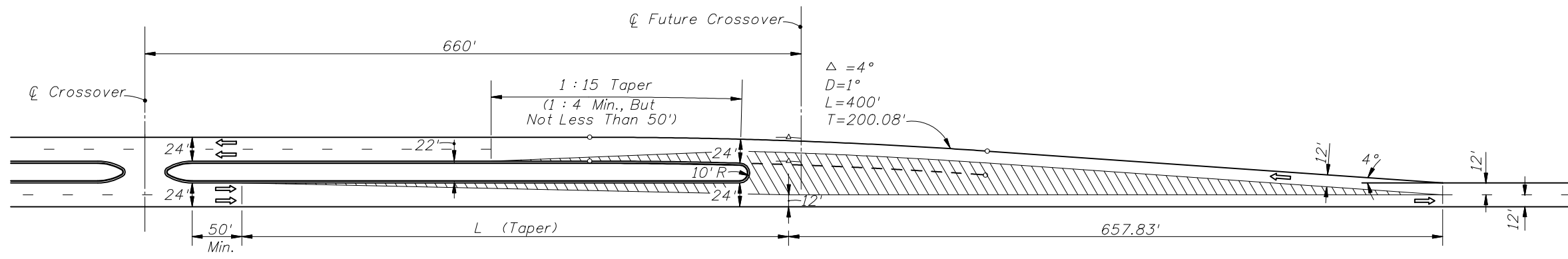
RIGHT ROADWAY CENTERED ON APPROACH ROADWAY
 TWO LANE TO FOUR LANE TRANSITION



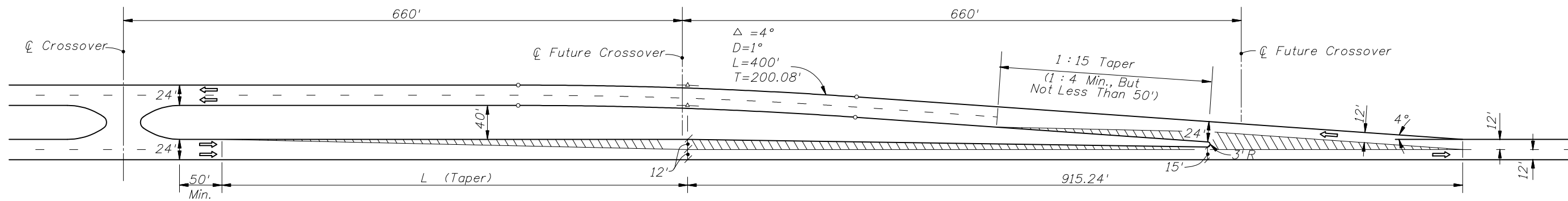
2010 FDOT Design Standards

ROADWAY TRANSITIONS

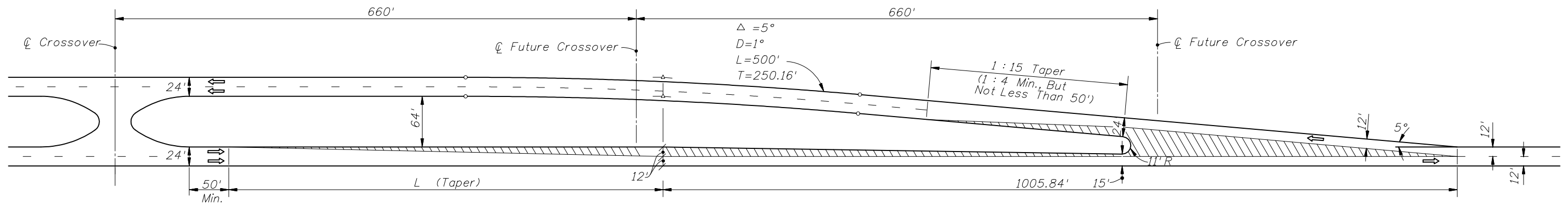
Last Revision	00	Sheet No.	7 of 8
Index No.		526	



22' MEDIAN



40' MEDIAN



64' MEDIAN

$L = WS$ for speeds = 45 mph
 $L = \frac{WS^2}{60}$ for speeds ≤ 40 mph
 Where:
 W=Width of lateral transition in feet.
 S=Design speed.

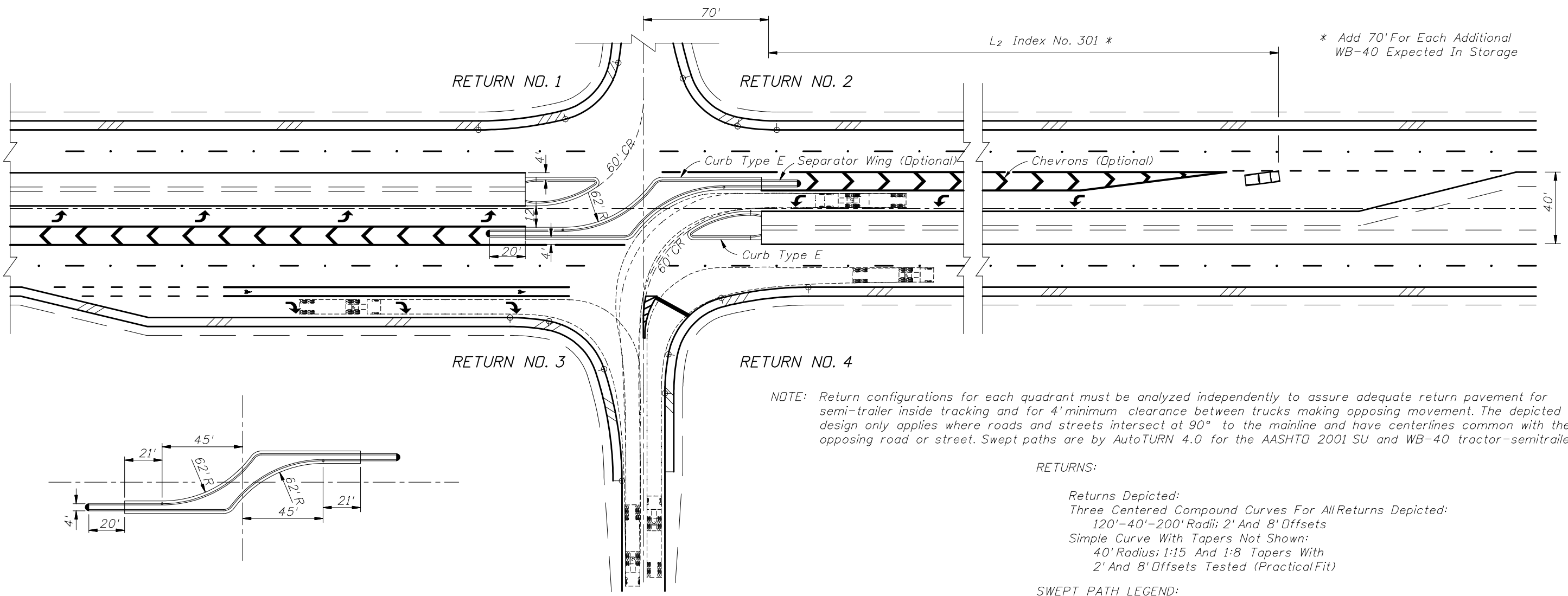
RIGHT ROADWAY CENTERED ON THRU ROADWAY
 FOUR LANE TO TWO LANE TRANSITION



2010 FDOT Design Standards

ROADWAY TRANSITIONS

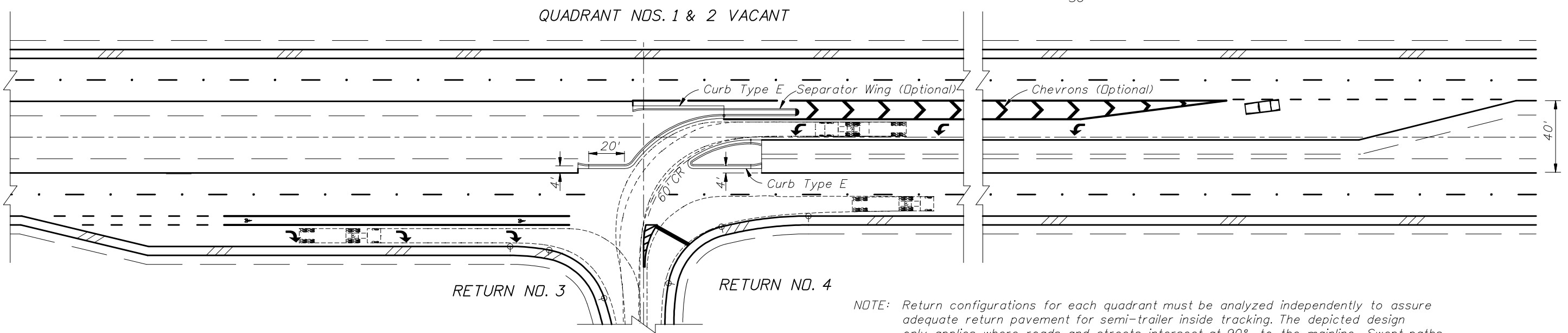
Last Revision 00	Sheet No. 8 of 8
Index No. 526	



NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking and for 4' minimum clearance between trucks making opposing movement. The depicted design only applies where roads and streets intersect at 90° to the mainline and have centerlines common with the opposing road or street. Swept paths are by AutoTURN 4.0 for the AASHTO 2001 SU and WB-40 tractor-semi-trailer.

RETURNS:
 Returns Depicted:
 Three Centered Compound Curves For All Returns Depicted:
 120'-40'-200' Radii; 2' And 8' Offsets
 Simple Curve With Tapers Not Shown:
 40' Radius; 1:15 And 1:8 Tapers With
 2' And 8' Offsets Tested (Practical Fit)

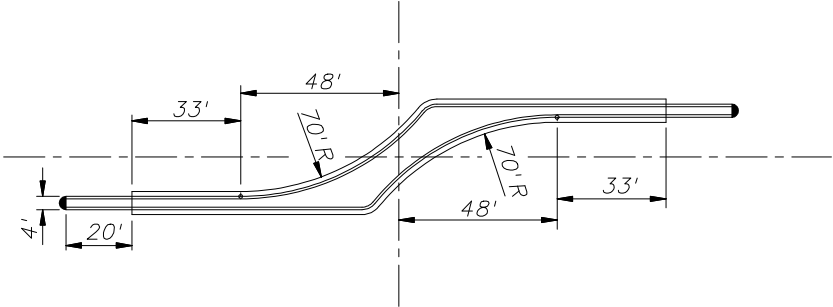
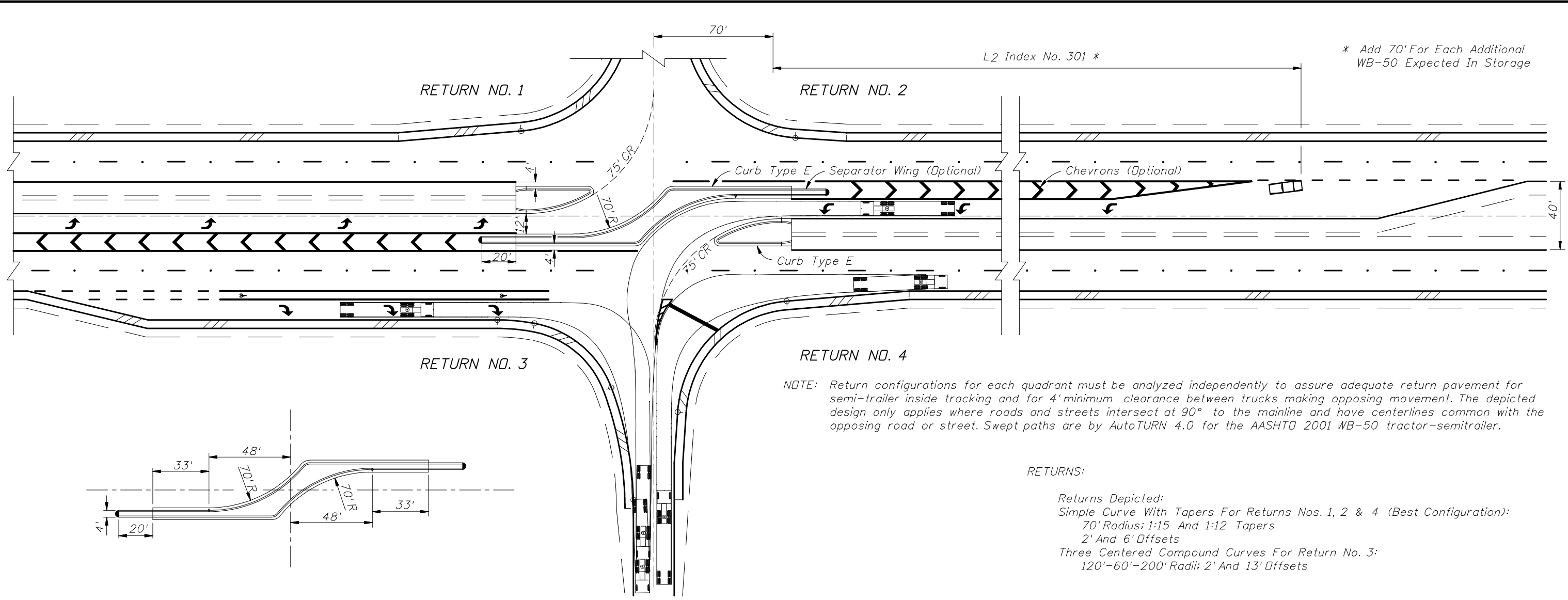
SWEPT PATH LEGEND:
 WB 40 -----
 SU -----



NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking. The depicted design only applies where roads and streets intersect at 90° to the mainline. Swept paths are by AutoTURN 4.0 for the AASHTO 2001 SU and WB-40 tractor-semi-trailer.

40' MEDIAN • 4-LANE DIVIDED • PARALLEL TURN BAY •
 2001 AASHTO SU & WB-40

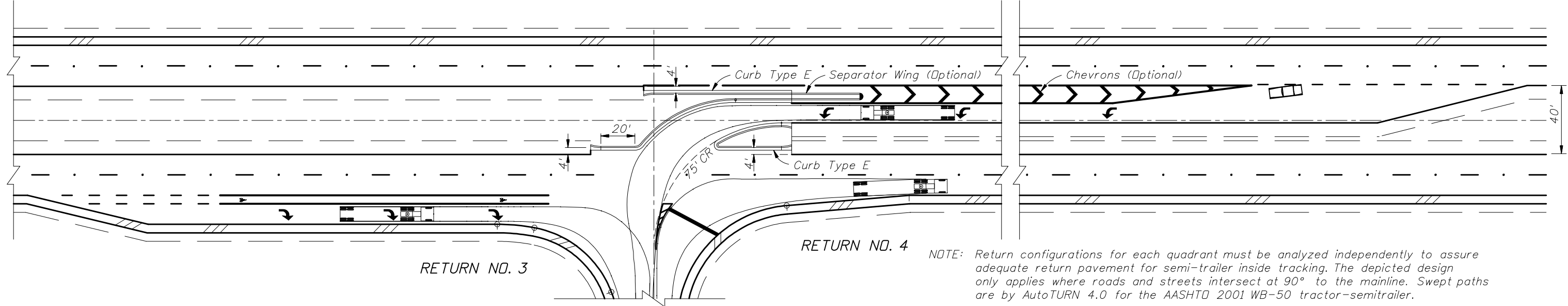




NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking and for 4' minimum clearance between trucks making opposing movement. The depicted design only applies where roads and streets intersect at 90° to the mainline and have centerlines common with the opposing road or street. Swept paths are by AutoTURN 4.0 for the AASHTD 2001 WB-50 tractor-semi-trailer.

RETURNS:
 Returns Depicted:
 Simple Curve With Tapers For Returns Nos. 1, 2 & 4 (Best Configuration):
 70' Radius; 1:15 And 1:12 Tapers
 2' And 6' Offsets
 Three Centered Compound Curves For Return No. 3:
 120'-60'-200' Radii; 2' And 13' Offsets

QUADRANT NOS. 1 & 2 VACANT



NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking. The depicted design only applies where roads and streets intersect at 90° to the mainline. Swept paths are by AutoTURN 4.0 for the AASHTD 2001 WB-50 tractor-semi-trailer.

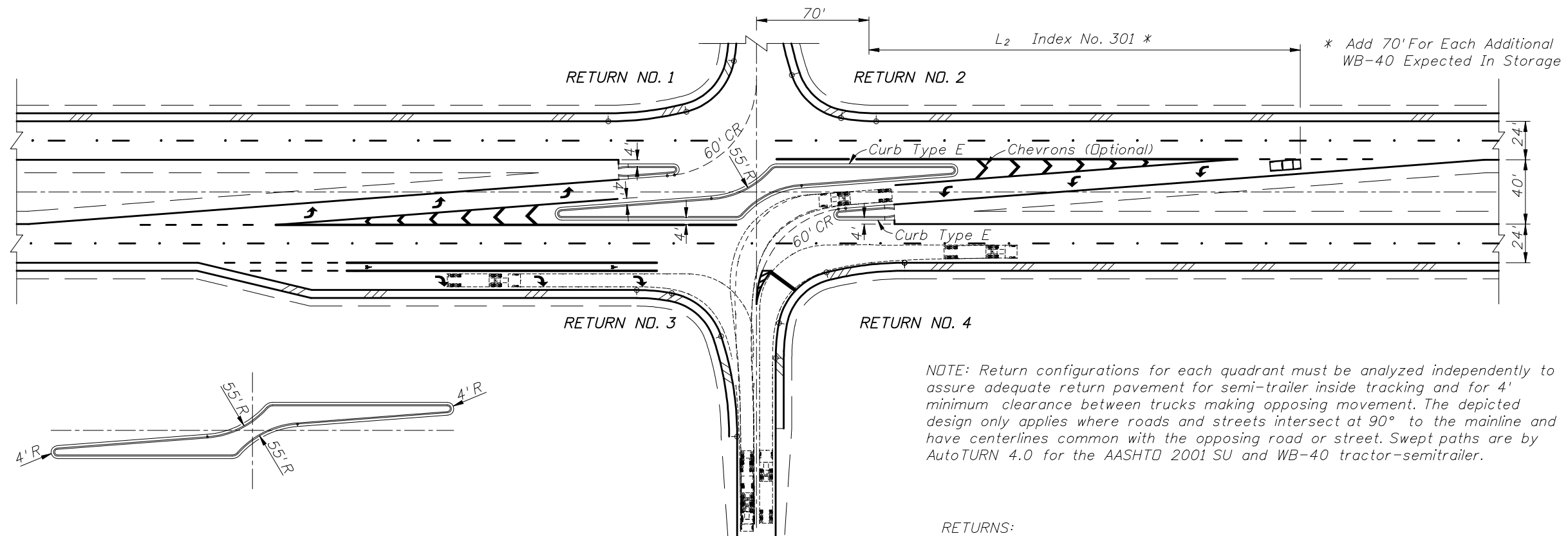
40' MEDIAN 4-LANE DIVIDED • PARALLEL TURN BAY • 2001 AASHTD WB-50



2010 FDOT Design Standards

DIRECTIONAL MEDIAN OPENINGS

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Index No. 527	

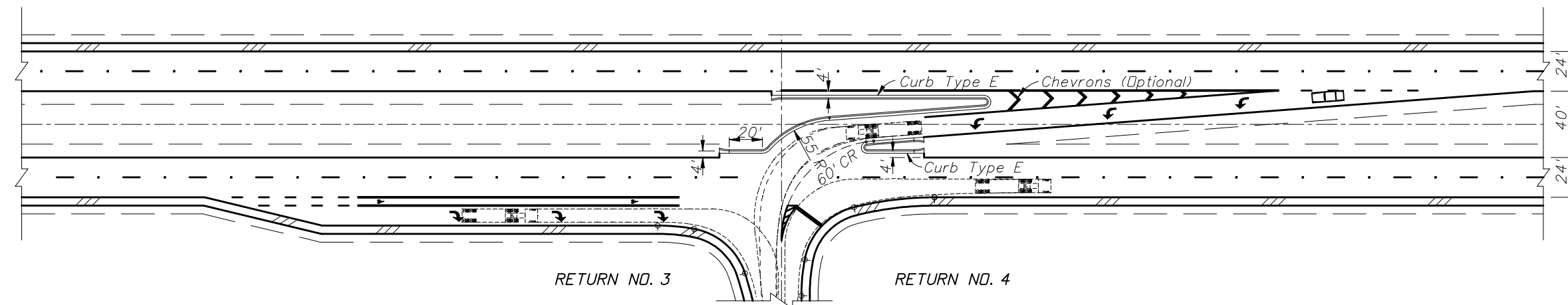


QUADRANT NOS. 1 & 2 VACANT

RETURNS:

Returns Depicted:
 Three Centered Compound Curves For All Returns Depicted:
 120'-40'-200' Radii; 2' And 8' Offsets
 Simple Curve With Tapers Not Shown:
 40' Radius; 1:15 And 1:8 Tapers With
 2' And 8' Offsets Tested (Practical Fit)

SWEPT PATH LEGEND:
 WB 40 -----
 SU - - - - -



NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking. The depicted design only applies where roads and streets intersect at 90° to the mainline. Swept paths are by AutoTURN 4.0 for the AASHTO 2001 SU and WB-40 tractor-semitrailer.

40' MEDIAN • 4-LANE DIVIDED • TAPERED TURN BAY • 2001 AASHTO SU & WB-40

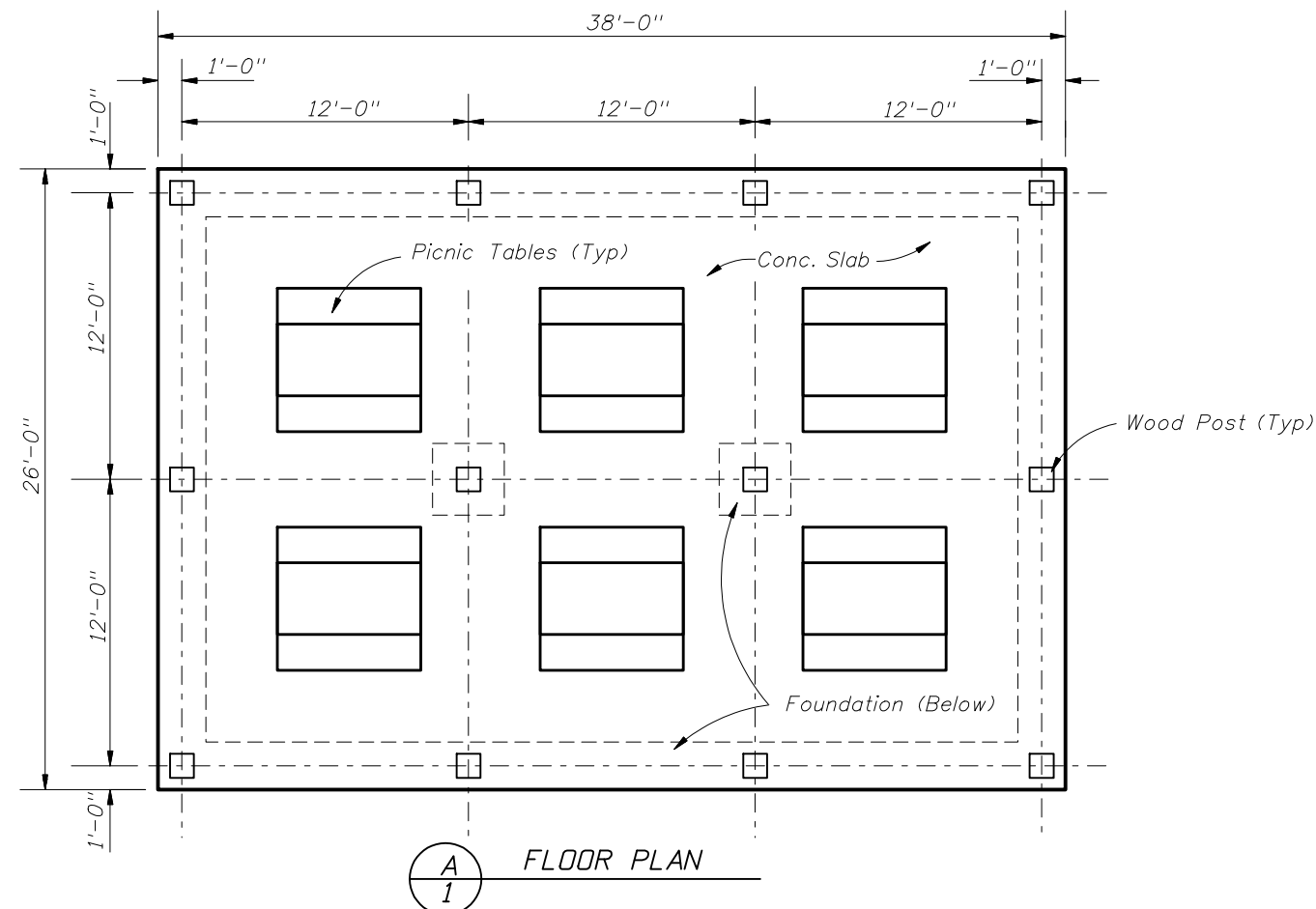


2010 FDOT Design Standards

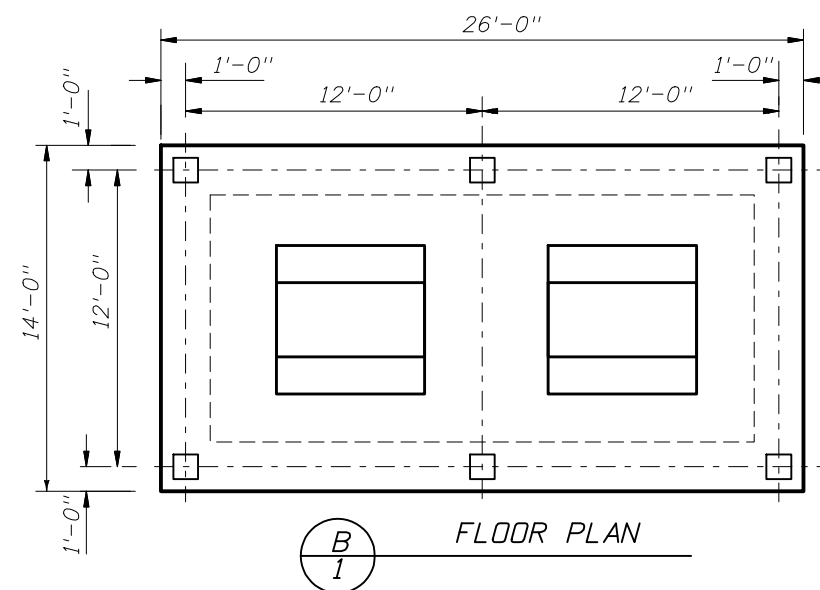
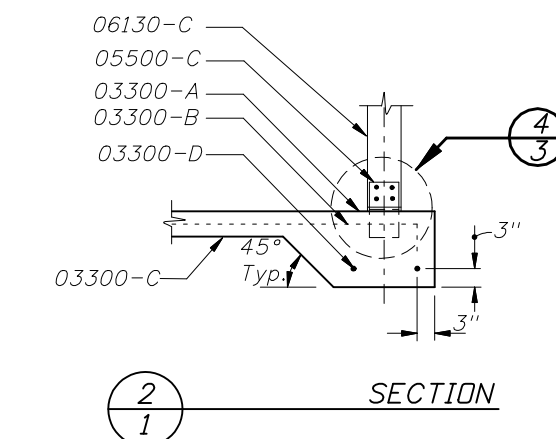
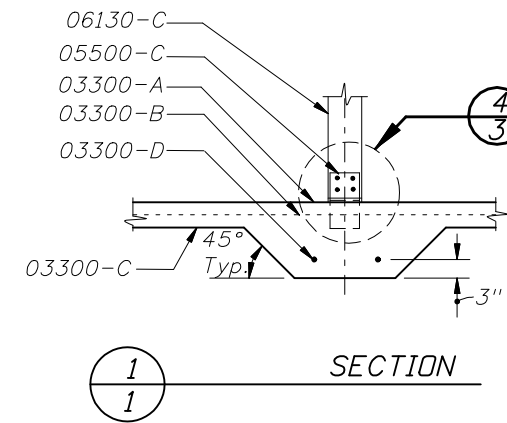
DIRECTIONAL MEDIAN OPENINGS

Last Revision 04 Sheet No. 3 of 3

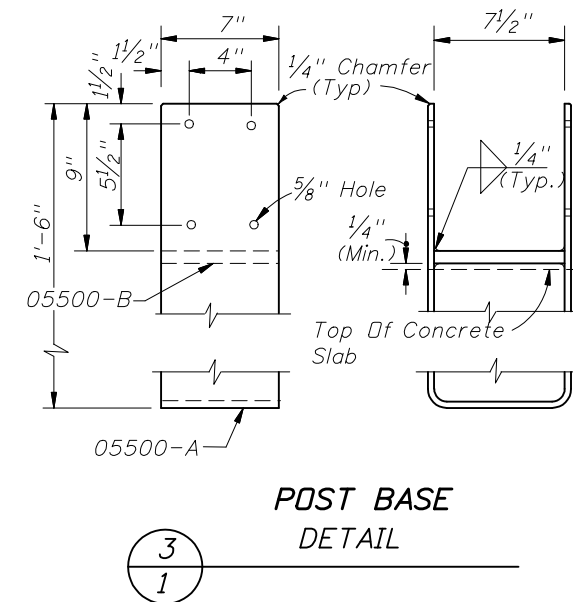
Index No. 527



LARGE PAVILION



SMALL PAVILION



NOTES

Keynotes On Sheet 2.

FLOOR

6" Reinf. Concrete Slab
w/WWF6x6-W1.4xW1.4

1'-6"x 1'-6" Drop Footing At Slab
Perimeter & Interior Posts.

Harden & Broom Finish Slab Surface.

STRUCTURE

Posts: 8 x 8 PT

Beams: 4 x 6 PT

Framing: 4x PT As Described.

Misc Members: 1x and 2x As Described.

ROOF

3"x6" T&G Wood Decking.

30# Asphalt Impregnated Fiberglass
Felt Underlayment.

Standing Seam Metal Roof (24 GA
Steel Or 0.032 Alum.) w/ Kynar 500
Finish.

Structure, Decking And Roofing Shall Be
Designed To Withstand 130 mph Wind
Load.

BUILDING CODE

Picnic Pavilions Shall Be Constructed
According To The Requirements Of The
Appropriate Sections Of Applicable
"Standard Building Code" or "South
Florida Building Code", Current, Adopted
Edition.

PICNIC PAVILIONS

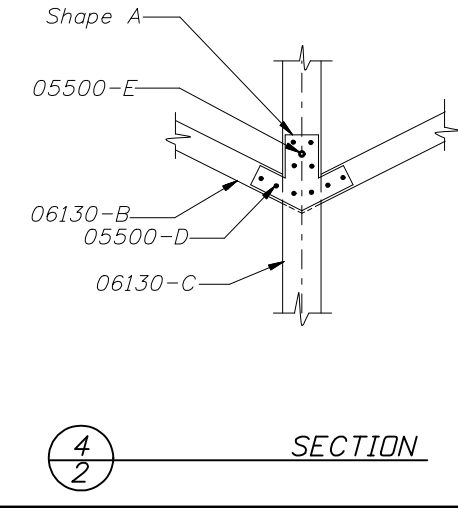
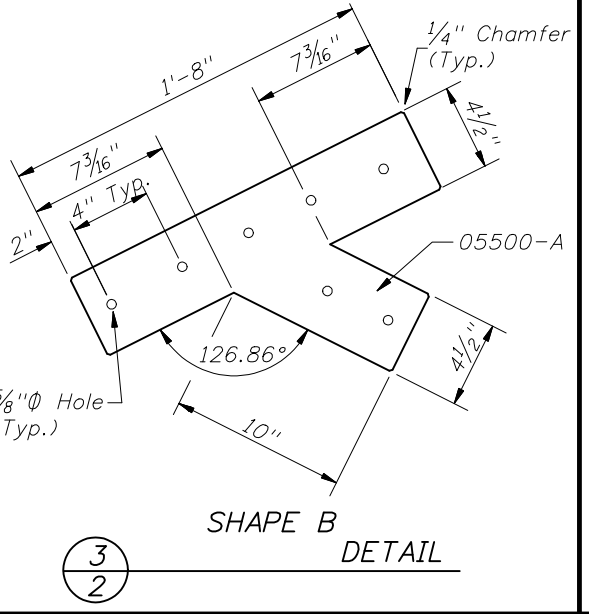
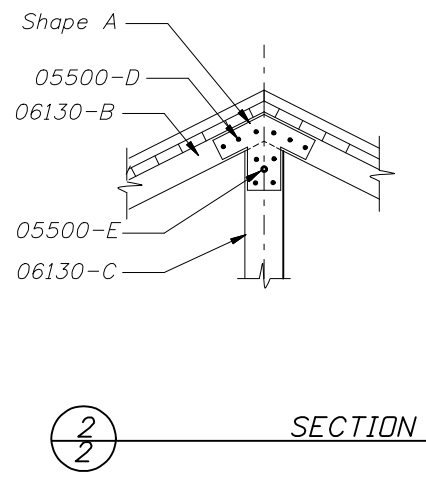
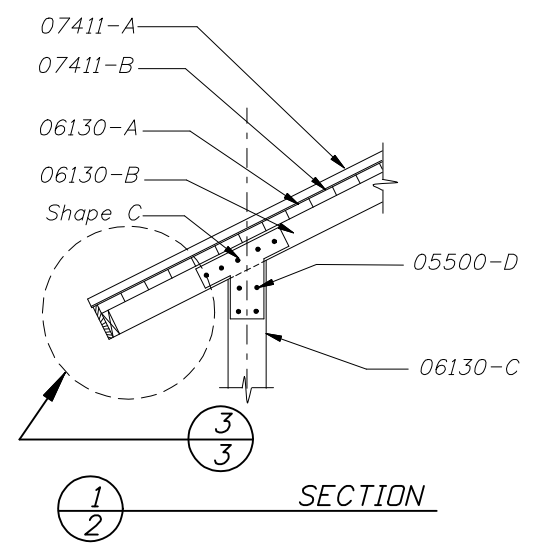
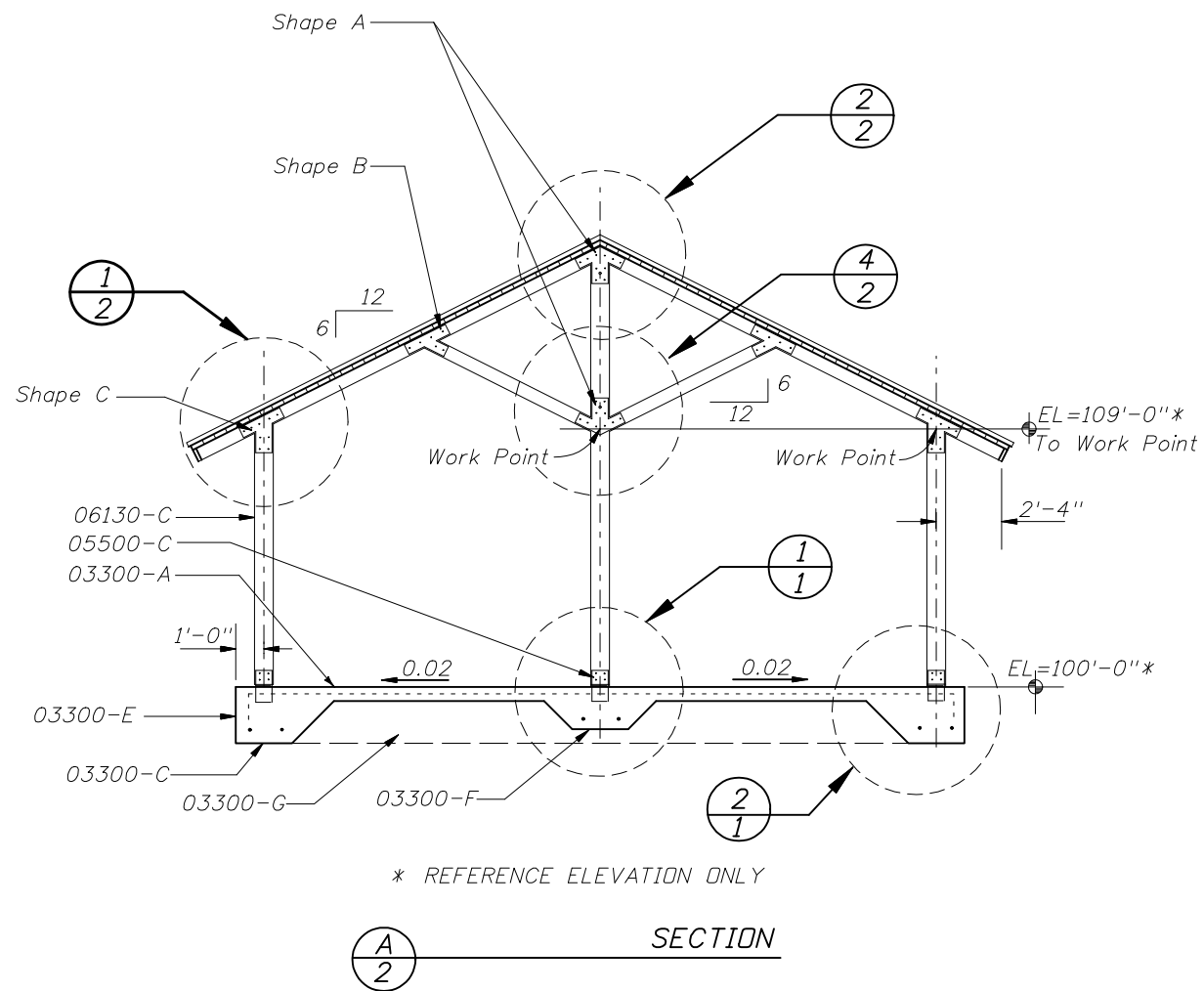


2010 FDOT Design Standards

REST AREA EQUIPMENT

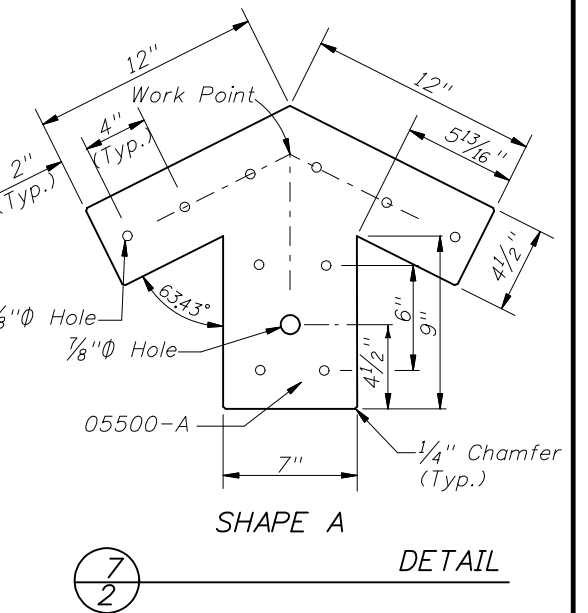
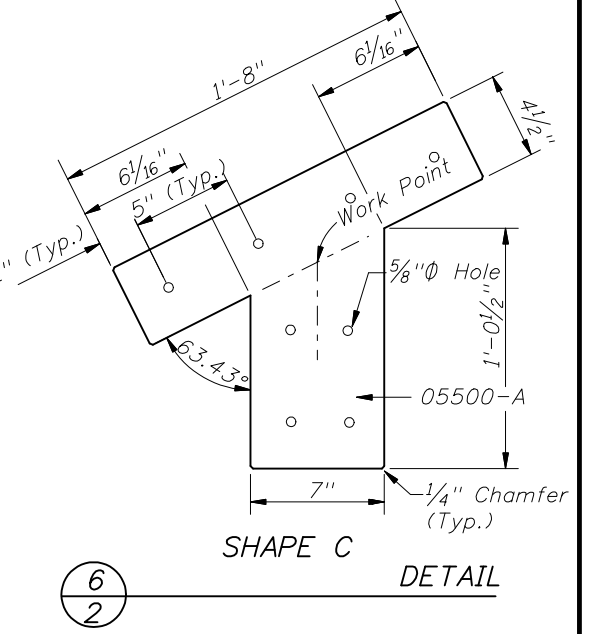
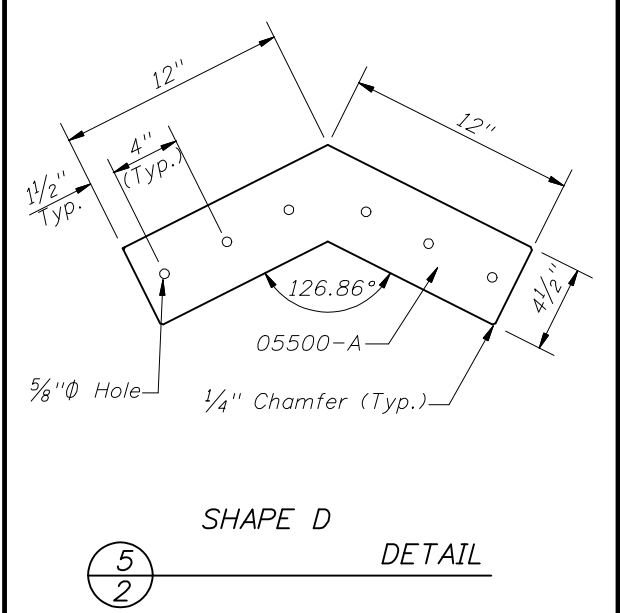
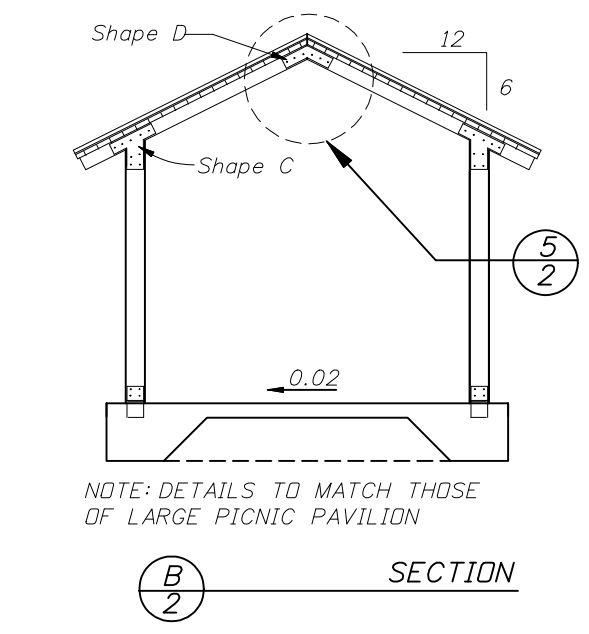
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- KEYNOTES**
- 03300-A Class II Conc Slab
 - 03300-B 6"x6"-W1.4xW1.4 @ \varnothing Of Slab
 - 03300-C 6 Mil Vapor Barrier
 - 03300-D #5 Rebar Cont. (2 Required)
 - 03300-E 24"x24" Drop Footing
 - 03300-F 18"x18" Drop Footing
 - 03300-G 6" Min Comp Sand Fill
 - 03300-H #5x18" Rebar (4 Required)
 - 05500-A 3/8" Galv. Steel Plate
 - 05500-B 1/2" Galv. Steel Plate
 - 05500-C Post Base
 - 05500-D 1/2" \varnothing Bolt, Washer & Nut (Typ.)
 - 05500-E 3/4" \varnothing Eyebolt, Washer & Nut For Cross Brace Bars
 - 05500-F 1/2" \varnothing Steel Rod w/Turnbuckle
 - 06130-A 3"x6" T&G Wood Decking
 - 06130-B 4"x6" PT Wood Frame
 - 06130-C 8"x8" PT Wood Post
 - 06130-D 2"x6" PT Wood Fascia
 - 06130-E 1"x10" PT Wood Fascia
 - 06130-F 3/4" \pm Wood Shim
 - 07411-A Standing Seam Metal Roof
 - 07411-B Felt Underlayment

Alternate Material Note: These structures are shown with timber frames and decking. Alternate materials (i.e., aluminum, steel, etc.) may be used when submittals are signed and sealed by a specialty engineer as per Section 5.1 of the Standard Specifications and when approved by the Engineer.



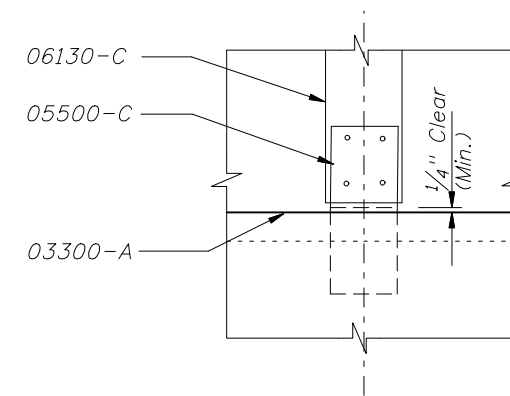
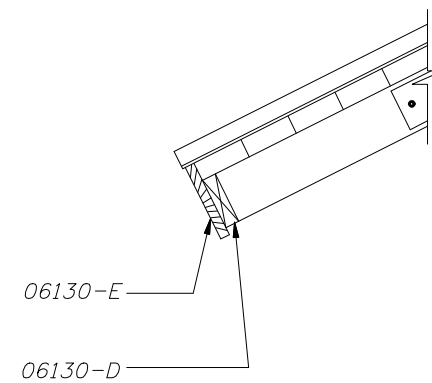
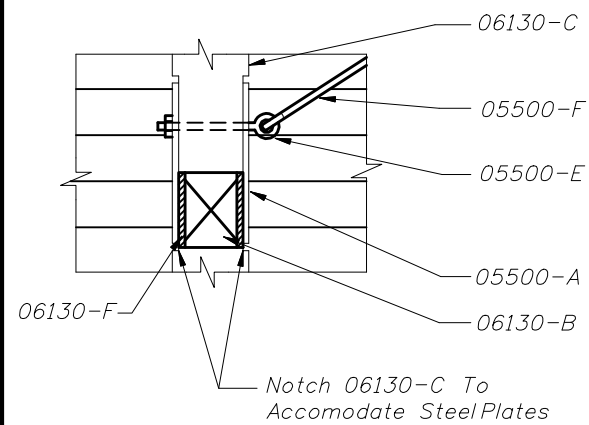
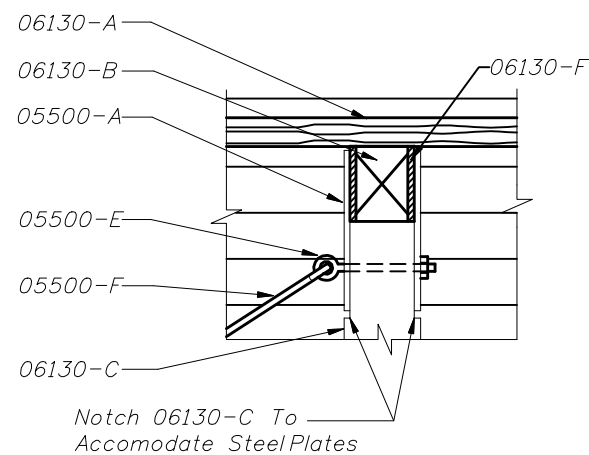
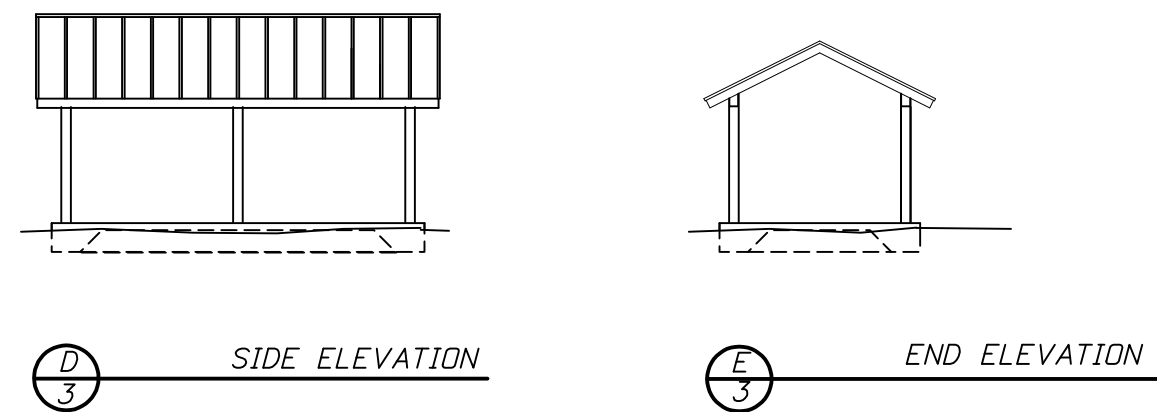
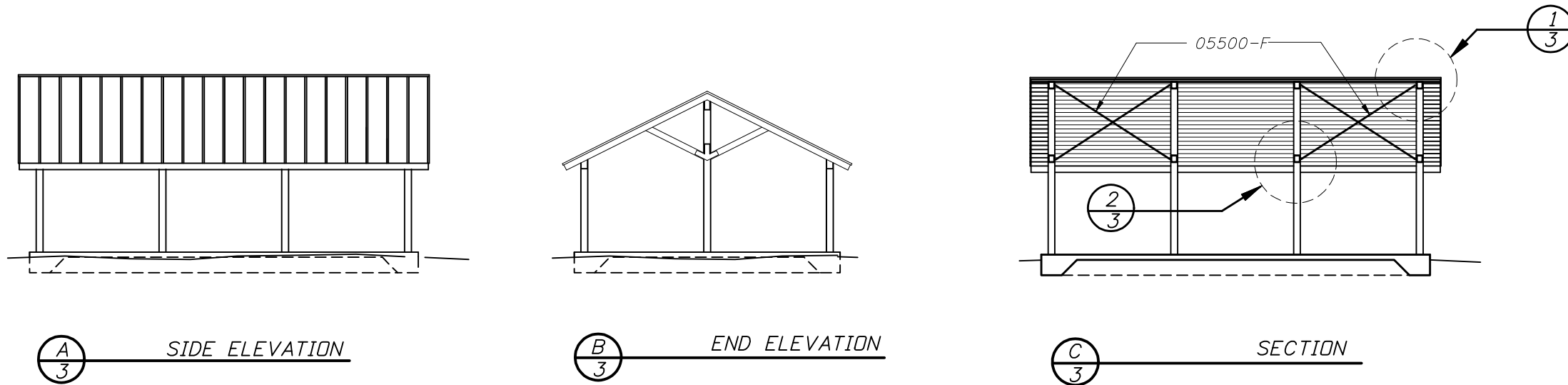
PICNIC PAVILIONS



2010 FDOT Design Standards

REST AREA EQUIPMENT

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SPECIFICATIONS

Keynotes On Sheet 2.

CONCRETE

Concrete: FDOT Class II.

Reinforcing Bars: ASTM A615/A615M, Grade 400.

Welded Wire Fabric: ASTM A-185.

Vapor Barrier: Black 6-Mil Polyethylene.

STEEL

Galvanized Steel Plate: Steel Plate ASTM A446 With G90 Zinc Coating.

Galvanized Fasteners: High-Strength Bolts And Nuts, ASTM A325 With G90 Zinc Coating.

Galvanize Shapes After Fabrication, Make Field Repairs To Galvanizing With High Zinc Dust Content Paint, Complying With SSPC-Paint-20.

WOOD

Comply With American Institute For Timber Construction AITC 108, "Standard For Heavy Timber Construction."

For Solid Wood Decking, Comply With AITC 112, "Standard For Tongue And Groove Heavy Timber Standard."

Species: Douglas Fir, Hem-fir, Or Southern Pine, At Fabricator's Option.

Preservative Treatment: Pressure Treat Fabricated Members With Waterborne Solution For Above Ground Use, Complying With AWPAC2.

Wood Decking: Pre-drill Decking At 30" Centers For Lateral Spiking To Adjacent Units. Spikes To Be 20d Galvanized Common.

PICNIC TABLES

Picnic Tables And Benches Shall Be 6'x6' w/Heavy Galvanized Pipe Frames And Recycled Plastic Wood Seats And Table Tops. All Tables Shall Be Of Walk Thru Design Suitable For Exterior Locations. Tables At Accessible Pavilions Shall Meet The Requirements Of The Americans With Disabilities Act (ADA) Accessibility Guidelines.

PICNIC PAVILIONS



2010 FDOT Design Standards

REST AREA EQUIPMENT

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GENERAL NOTES

1. The location and construction of mailboxes shall conform to the rules and regulations of the United States Postal Service as modified by this design standard.

2. Mailboxes will not be permitted on Interstate highways, freeways, or other highways where prohibited by law or regulation.

3. The contractor shall give the Postmaster of the delivery route(s) written notice of project construction 7 days prior to the beginning of work, with Saturdays, Sundays and Holidays excluded.

The Contractor shall furnish and install one mailbox in accordance with this design standard at each mailpatron delivery location and maintain the box throughout the contract period. The Contractor shall apply box numbers to each patron box in accordance with identification specifications of the Domestic Mail Manual of the U. S. Postal Service; where local street names and house numbers are authorized by the Postmaster as a postal address, the Contractor shall inscribe the house number on the box; if the box is located on a different street from the patrons residence, the Contractor shall inscribe the street name and house number on the box.

The Contractor shall coordinate removal of the patrons existing mailboxes. Immediately after installing the new mailboxes the Contractor must notify each "Mail Delivery Patron" by Certified Mail that removal of the existing mailboxes must be accomplished in 21 days after receipt of notices. Patrons shall have the option of removing their existing mailboxes or leaving the mailboxes in place for removal by the Contractor; removal by the Contractor shall be included in the contract unit price for Mailbox, Each. The Contractor shall dispose of mailboxes and supports in areas provided by him.

Reuse of existing mailboxes by the Contractor will not be a requirement under any construction project; however where an existing mailbox meets the design requirements of this standard and is structurally and functionally sound, the Contractor at his option may elect to reuse the existing mailbox in lieu of constructing a new mailbox. Any use of existing mailboxes must be approved by the Engineer.

4. Mailboxes shall be light sheet metal or plastic construction, in traditional style only, and only in Size 1 as prescribed by the Domestic Mail Manual of the U. S. Postal Service (DMM).

Mailbox production standards, lists of approved manufacturers and suppliers of mailboxes, design approval and guidance may be obtained by writing to the Rural Delivery Division, Delivery Service Department, Operations Group, USPS Headquarters, Washington, DC 20260.

5. Mailboxes shall be located on the right-hand side of the roadway in the direction of the delivery route, except on one-way roads and streets where they may be placed on the left-hand side.

Mailboxes on rural highways shall be set with the roadside face of the box offset from the edge of the traveled way a minimum distance of the greater of the following:

- (a) Shoulder width plus 8" to 12".
- (b) 10' for ADT over 10,000 vpd.
8' for ADT 100 to 10,000 vpd.
6' for ADT under 100 vpd
2'-6" for low speed and ADT under 100 vpd.

When a mailbox is installed within the limits of guardrail it should be placed behind the guardrail whenever practical.

Mailboxes on curbed highways, roads and streets shall be set with the face of the box between 6" and 12" back of the face of curb. If the sidewalk abuts the curb or if an unusual condition exists which makes it difficult or impractical to install or serve boxes at the curb, the Contractor with concurrence of the local postal authority may be permitted to install all mailboxes at the back edge of the sidewalk, where they can be served by the carrier from the sidewalk.

6. Mailboxes shall be set with the bottom of the box between 42" and 48" above the mailstop surface, unless the U.S. Postal Service establishes other height restrictions.

7. No more than two mailboxes may be mounted on a support structure unless the support structure and mailbox arrangements have been shown to be safe by crash testing in accordance with NCHRP Report 350 and listed on the Department's Qualified Products List (QPL).

Neighborhood Delivery and Collection Box Units (NDCBU) are a specialized multiple mailbox installation that must be located outside the highway and street clear zones. The location of NDCBUs is the sole responsibility of the Postmaster for the delivery route under consideration.

8. Lightweight newspaper receptacles may be mounted below the mailbox on the side of the support post in conformance with the USPS Domestic Mail Manual. The mailpatron shall be responsible for newspaper receptacle installation and maintenance.

9. Wood and steel support posts for both single and double mailbox mountings shall be embedded no more than 24" into the ground.

Concrete, block, brick, stone or other rigid foundation structure or encasement, either above or below the shoulder groundline, will not be permitted for mailboxes on rural highways. On urban roads and streets where mailbox support posts are set within rigid pavement back of curb, the support posts shall be separated from the pavement by a minimum of 1" of expansion material.

Support posts shall not be fitted nor installed with surface mount base plates.

10. At driveway entrances mailboxes shall be placed on the far side of the driveway in the direction of the delivery route.

At intersecting roads mailboxes shall be located 100' or more from the centerline of the intersecting road on the far side in the direction of the delivery route, with the distance increased to 200' when the route volume exceeds 400 vehicles per day.

11. Wood support posts shall be in conformance with the material and dimensional requirements of Section 952 and the treatment requirements of Section 955 of the Standard Specifications.

Steel support posts shall have an external finish equal to or better than two coats of weather resistant, air dried or baked, paint or enamel. Surface(s) shall be cleaned of all loose scale prior to finishing. The Postal Service prefers that posts be painted white, but other colors may be used when approved by the Engineer. When galvanized posts are used painting is not required.

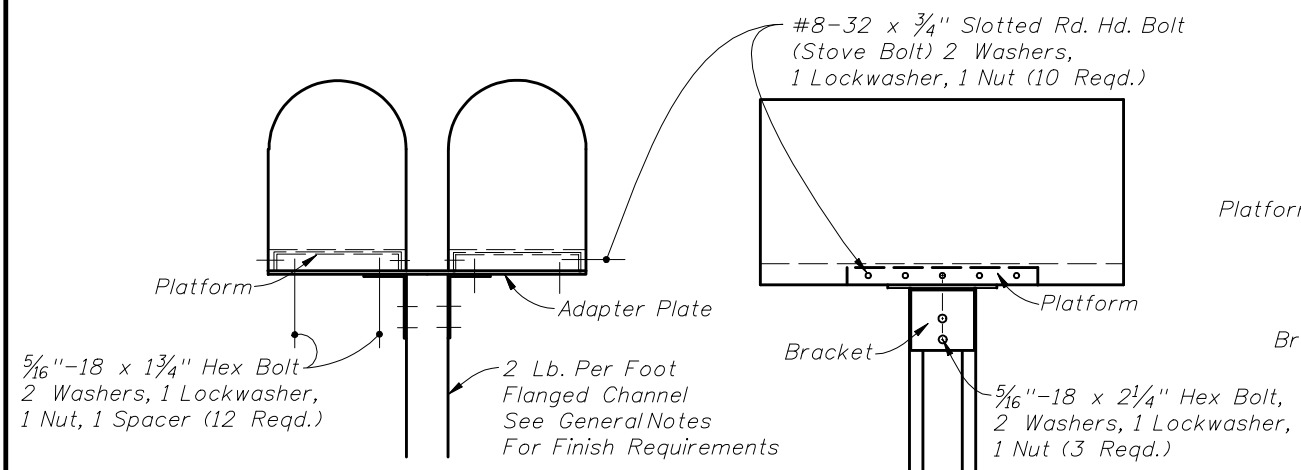
Mounting brackets, plates, platforms, shelves and accessory hardware surface finishes are to be suited to support post finish.

12. Mailboxes shall be paid for under the contract unit price for Mailboxes, Each. Payment shall be full compensation for boxes, posts and accessory items essential for installation in accordance with this standard; erection; adjustments to suit construction needs; and, for identification letters and numbers.

Payment shall be limited to one mailbox per patron address whether the mailbox is new, reused, salvaged, reset or relocated. Payment shall be per mailbox regardless of the number of mailboxes per support or grouping arrangement.

The above compensation shall include any work and cost incurred by the contractor for removal and disposal of existing mailboxes.

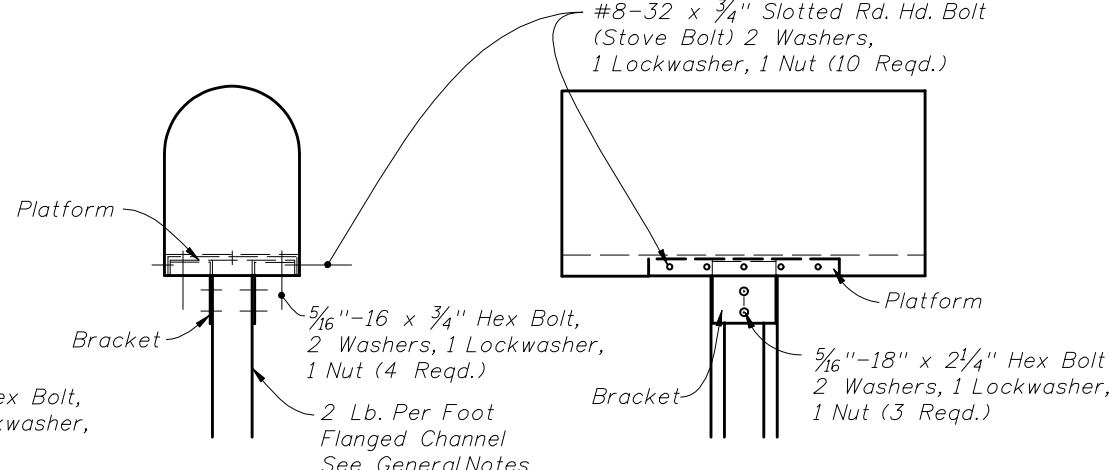
There shall be no payment participation for NDCBU furnishing, assembly, installation, resetting or relocation.



FRONT VIEW

SIDE VIEW

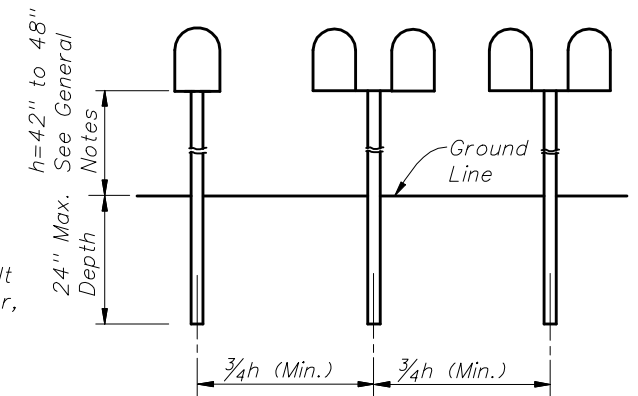
FLANGED CHANNEL



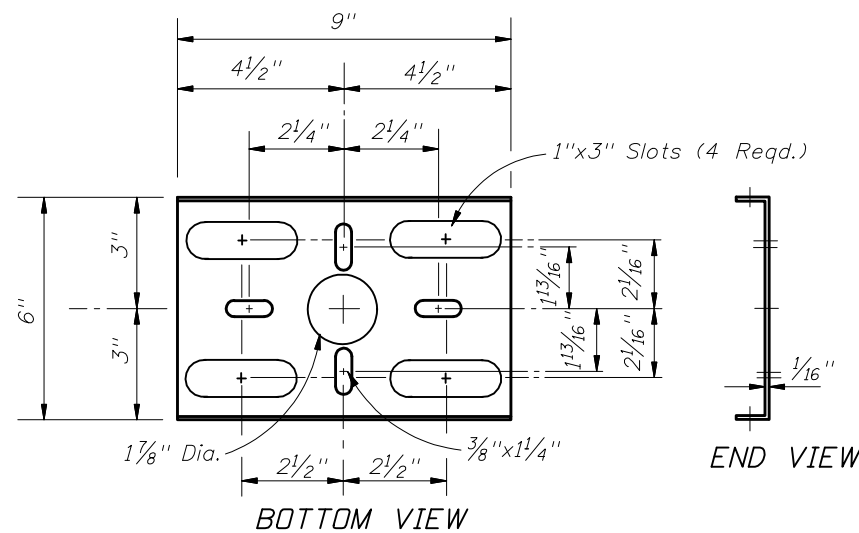
FRONT VIEW

SIDE VIEW

FLANGED CHANNEL

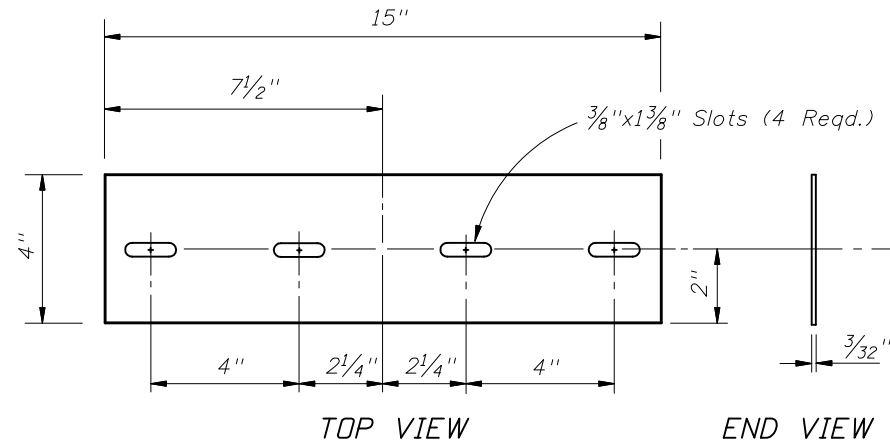


ELEVATION
SINGLE OR COMBINED WOOD, FLANGED CHANNEL
OR PIPE POST TYPES SHOWN ON THIS INDEX
POST SPACING



BOTTOM VIEW

END VIEW

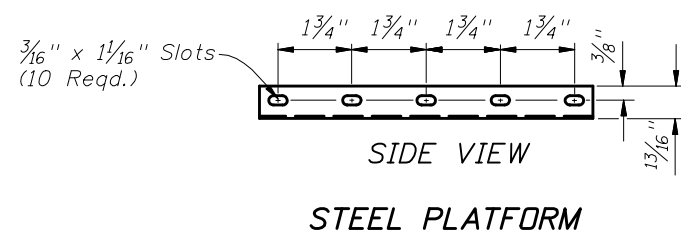


TOP VIEW

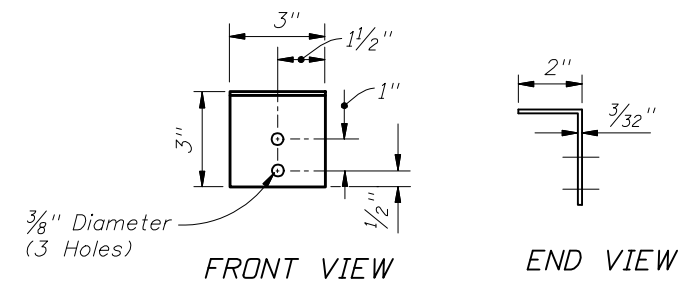
END VIEW

STEEL ADAPTER PLATE

Note: See General Notes for finish requirements.



STEEL PLATFORM

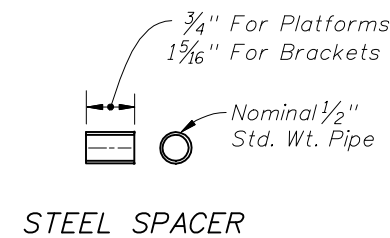


FRONT VIEW

END VIEW

TOP VIEW

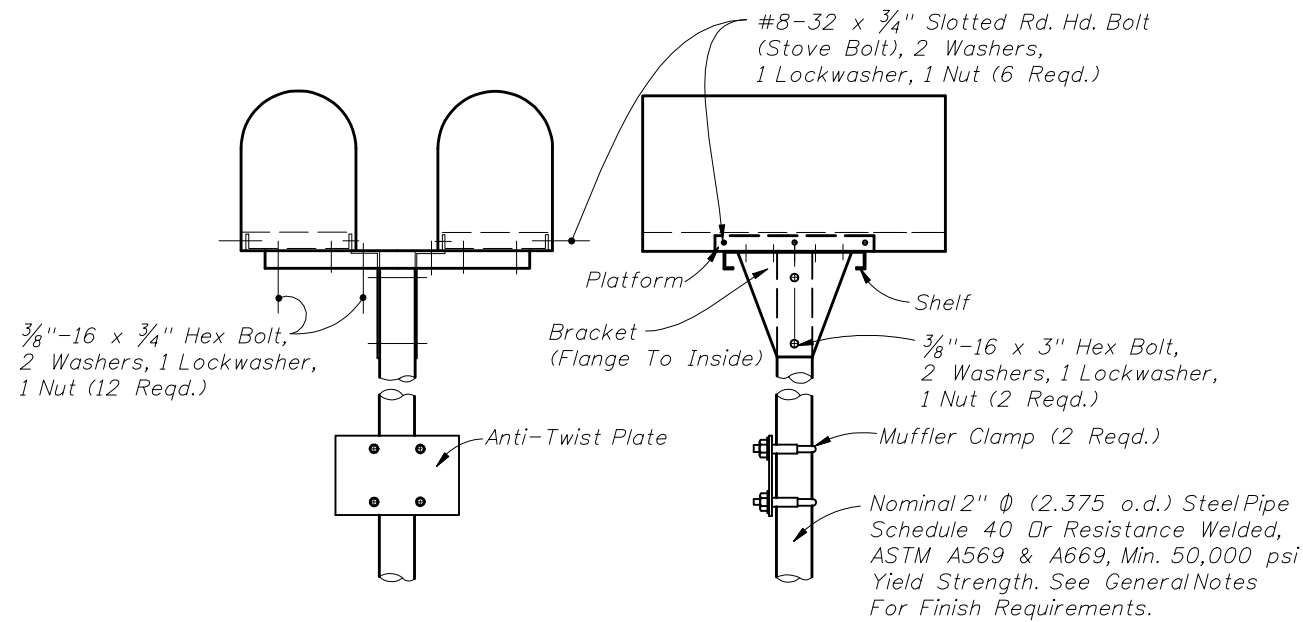
STEEL BRACKET



STEEL SPACER

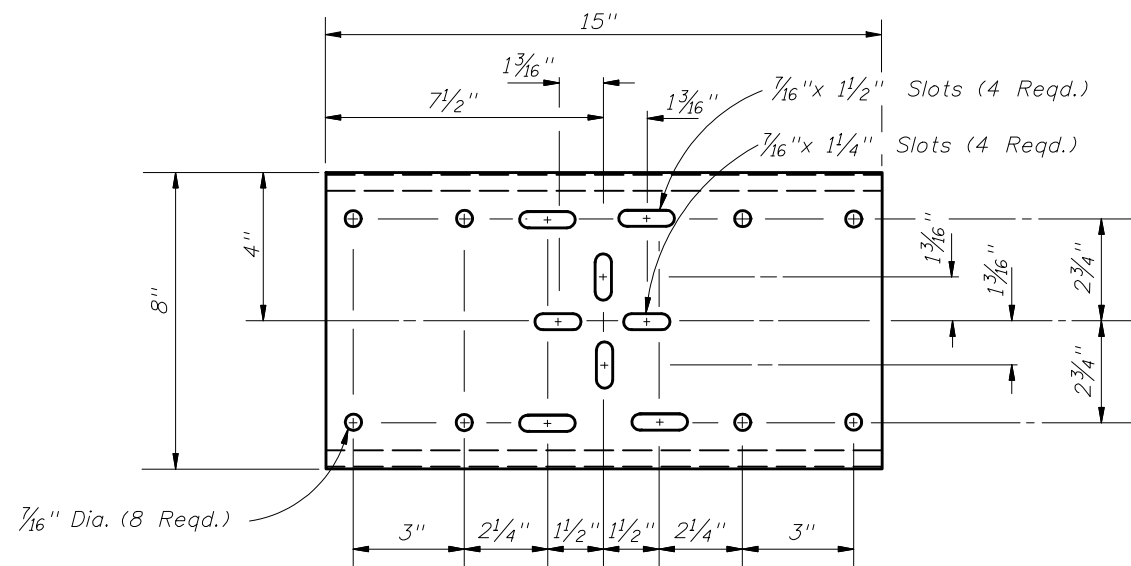
STEEL FLANGED CHANNEL SUPPORT POSTS



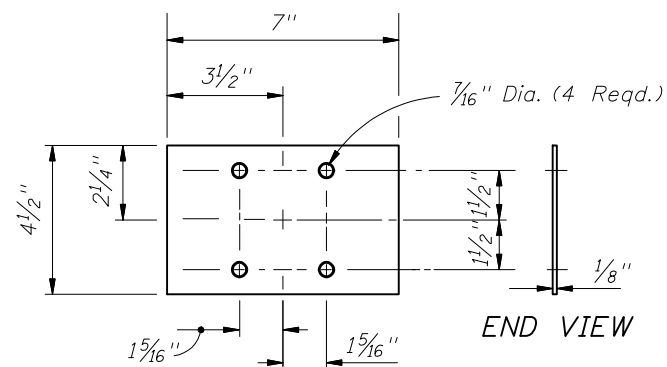


FRONT VIEW SIDE VIEW

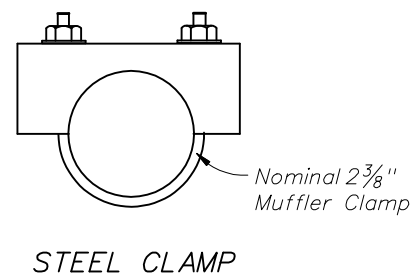
2" Ø PIPE POST



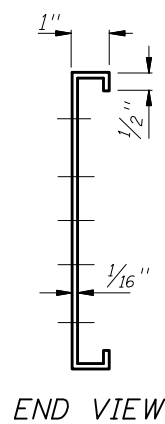
TOP VIEW
STEEL SHELF



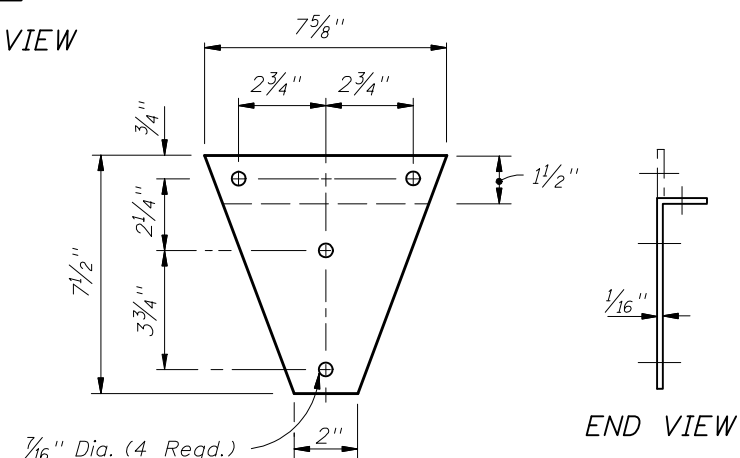
FRONT VIEW
STEEL ANTI-TWIST PLATE



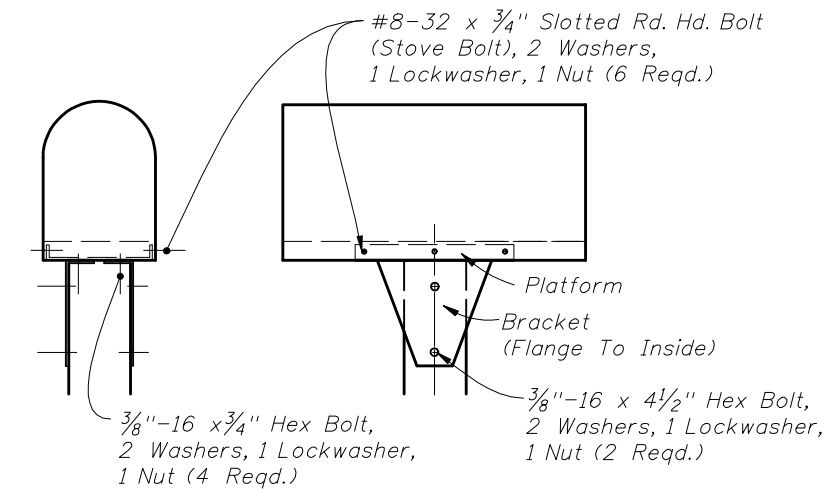
STEEL CLAMP



END VIEW

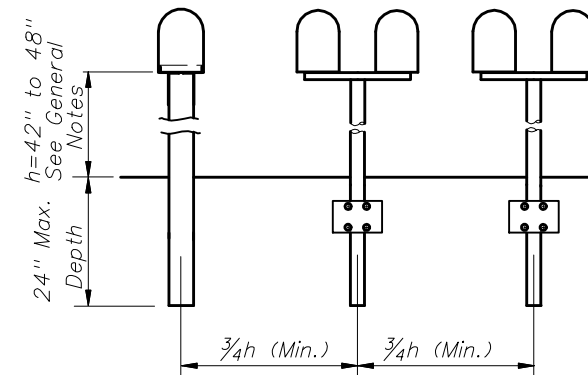


SIDE VIEW
STEEL BRACKET



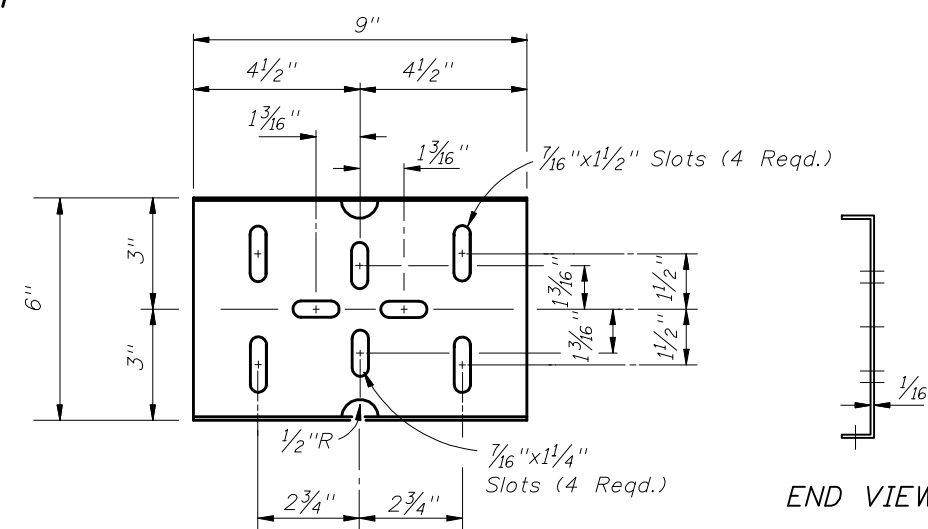
FRONT VIEW SIDE VIEW

4" X 4" WOOD POST

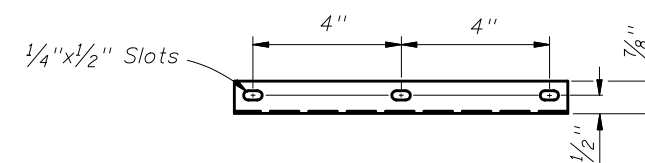


ELEVATION

SINGLE OR COMBINED WOOD, FLANGED CHANNEL OR PIPE POST TYPES SHOWN ON THIS INDEX
POST SPACING



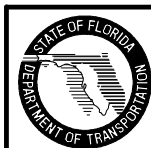
BOTTOM VIEW



SIDE VIEW
STEEL PLATFORM

STEEL PIPE AND WOOD SUPPORT POSTS

Note: See General Notes for finish requirements

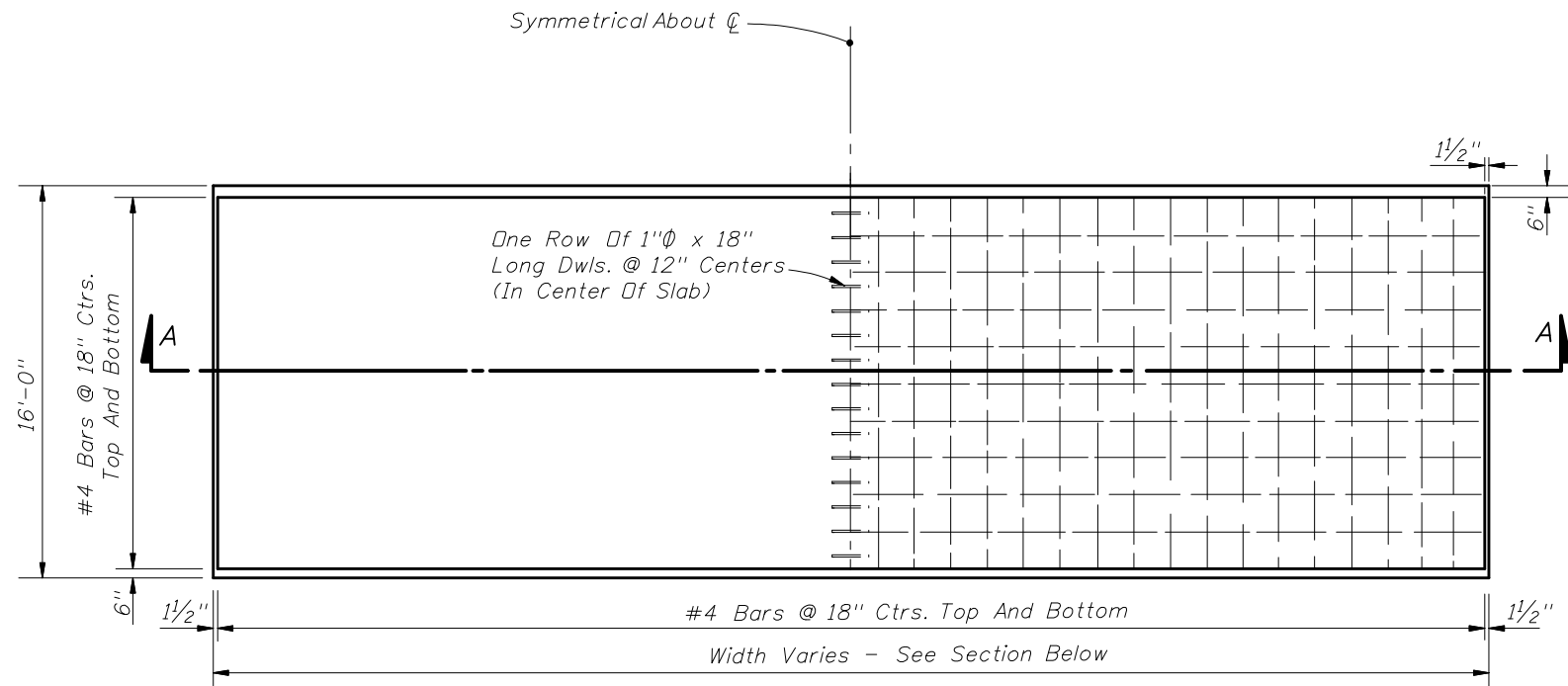


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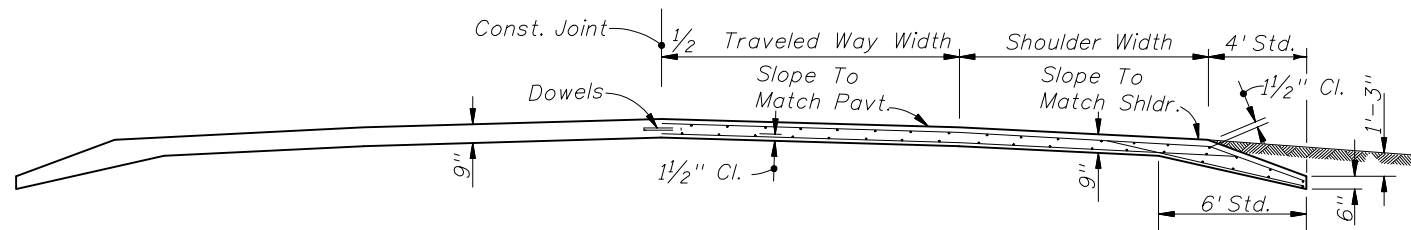
MAILBOXES

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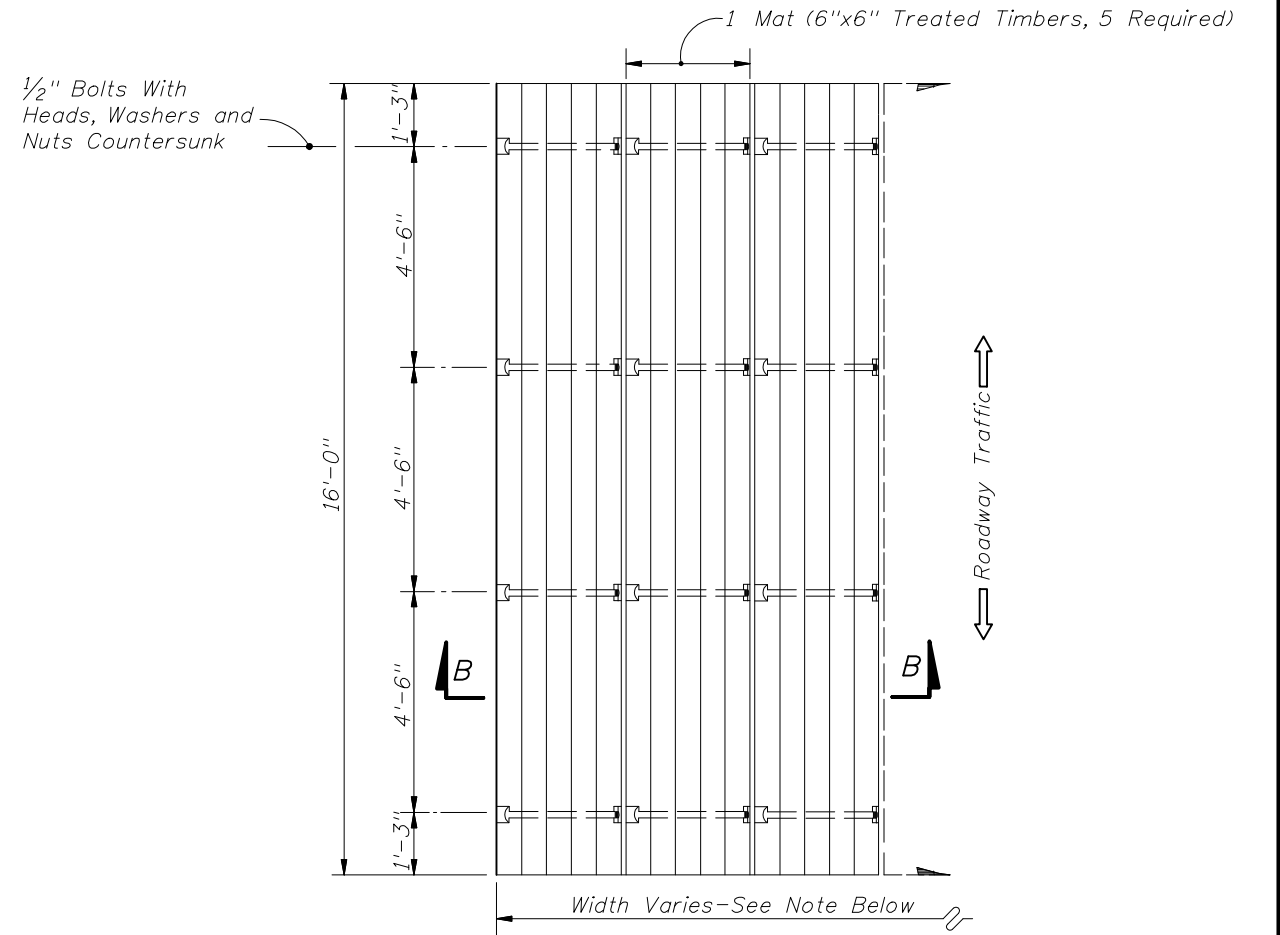
PLAN



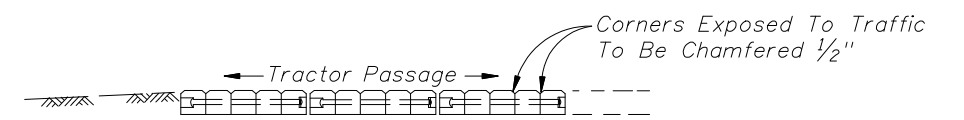
SECTION AA

Note: Class I concrete is to be used unless otherwise noted in plans or special provisions.

REINFORCED CONCRETE
TYPE A



PLAN



SECTION BB

Note: Tractor crossing to be constructed to match pavement cross slope.

The number of mats required will vary with the pavement width. A sufficient number of mats will be used so that the tractor crossing will extend a minimum of four feet (4') beyond roadway shoulders.

TREATED TIMBER
TYPE B

GENERAL NOTES

1. Tractor crossing shall be paid for under the contract unit price for Tractor Crossing, EA.

TRACTOR CROSSINGS



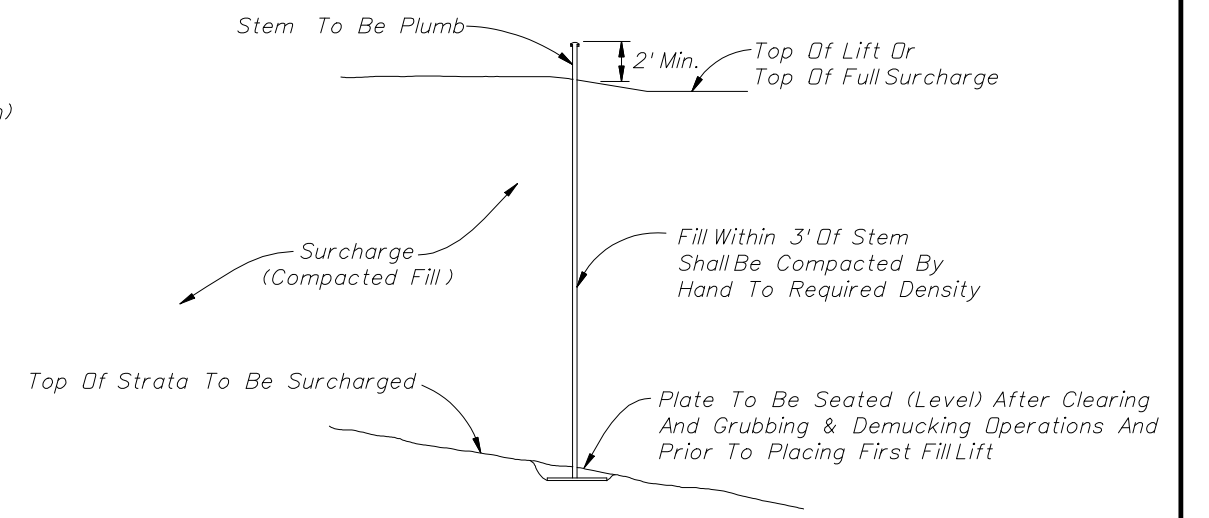
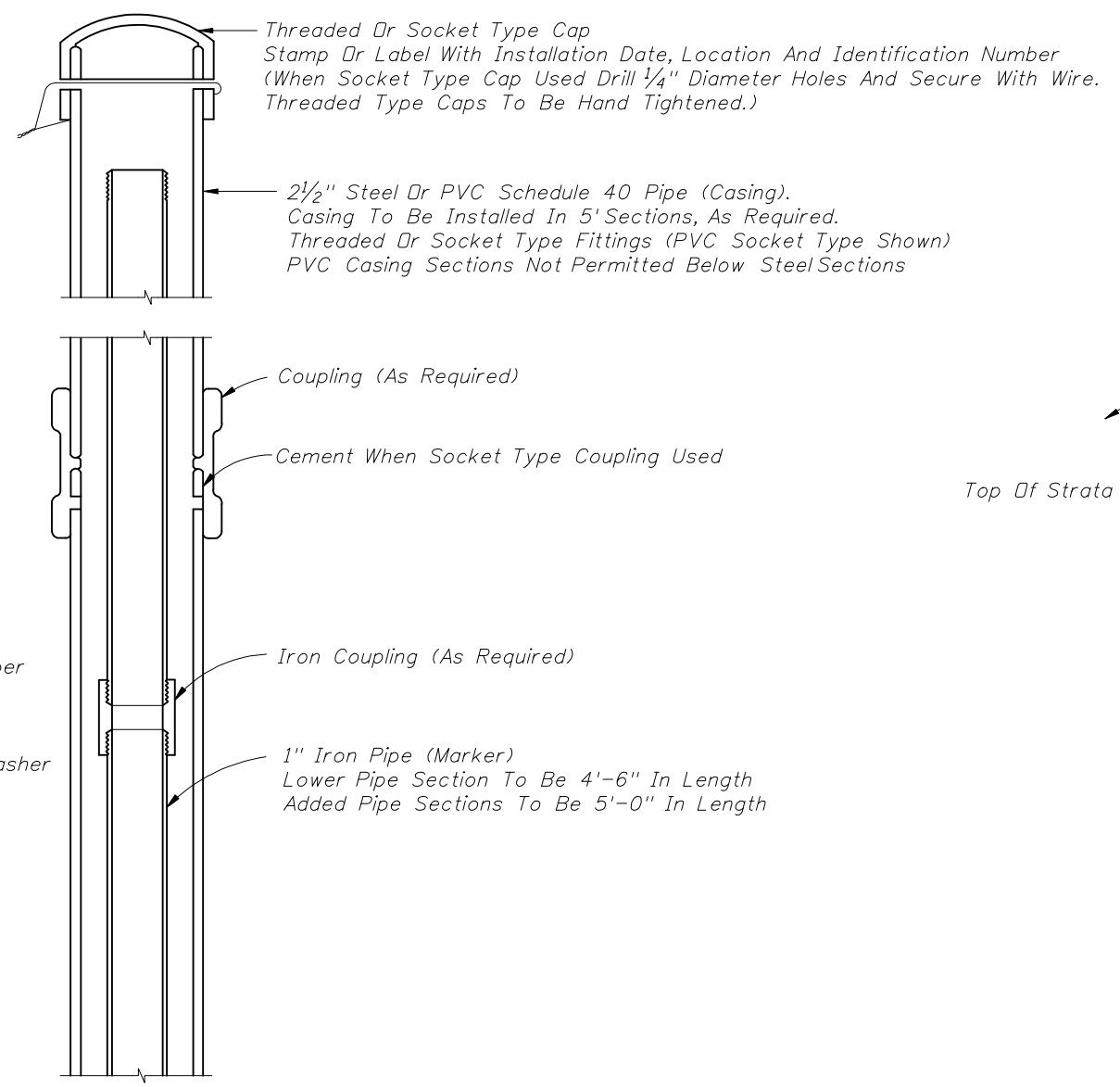
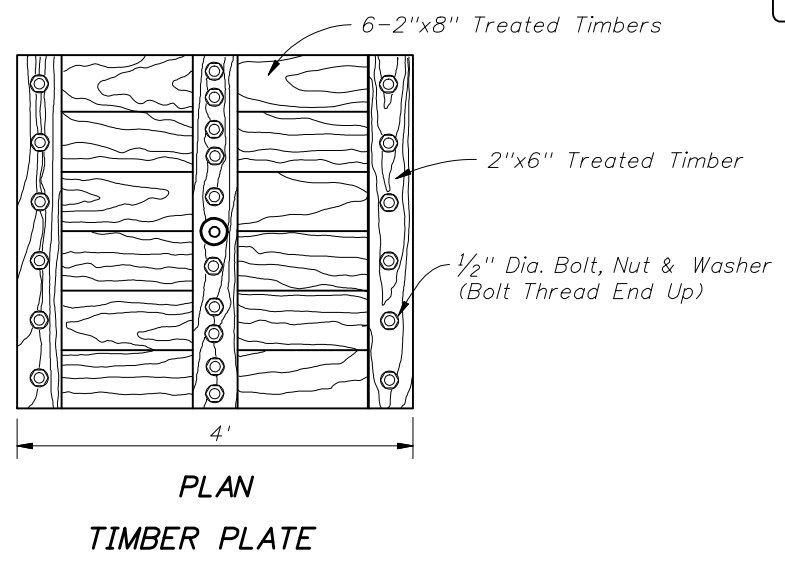
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TRACTOR CROSSINGS

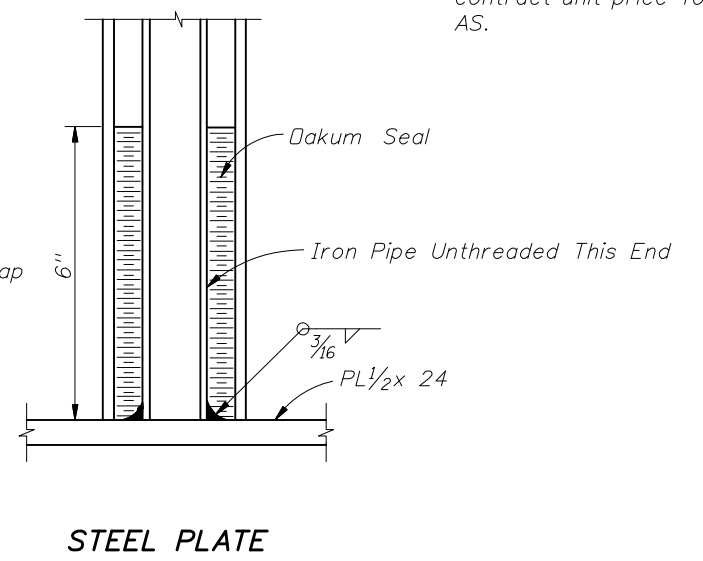
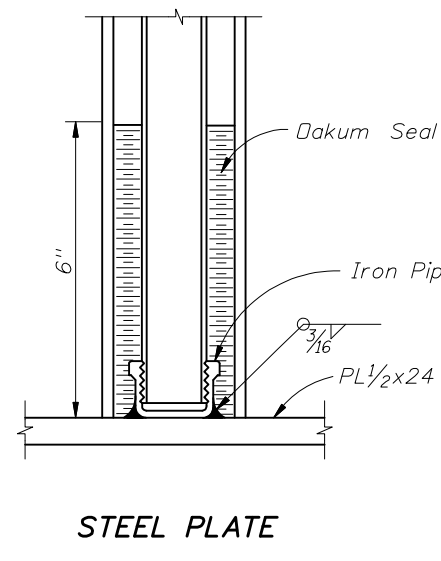
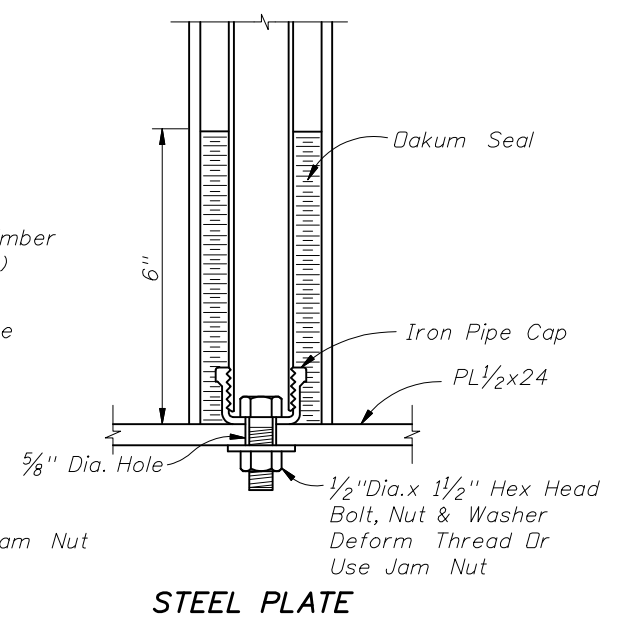
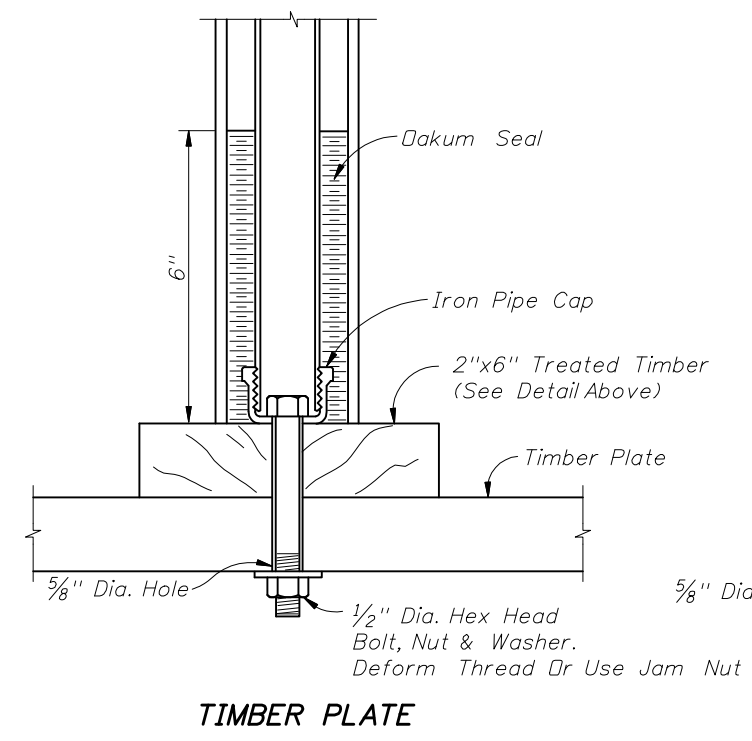
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- NOTES:
1. Elevation of the top of each length of marker pipe shall be determined as soon as it is installed and also immediately before the next length of marker pipe is added.
 2. Settlement plate locations shall be flagged and protected from construction vehicles and equipment. If settlement plates are disturbed, they shall be replaced in kind.
 3. Dakum used to construct seal should not have a mesh covering (plastic or other synthetic material).
 4. The settlement plates shall be paid for under the contract unit price for Settlement Plate Assembly, AS.



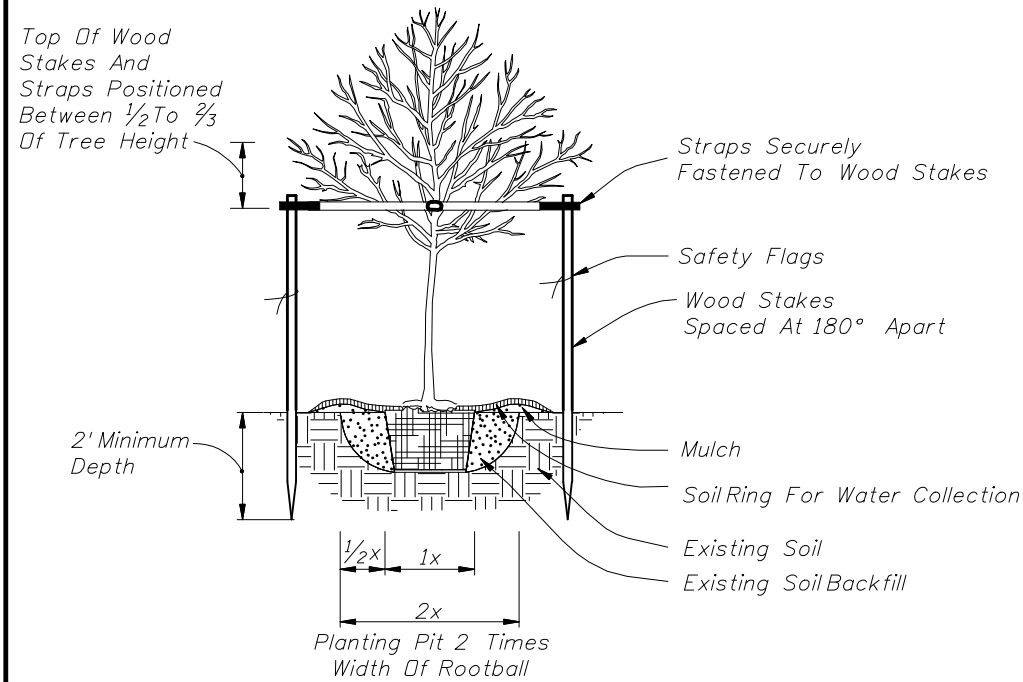
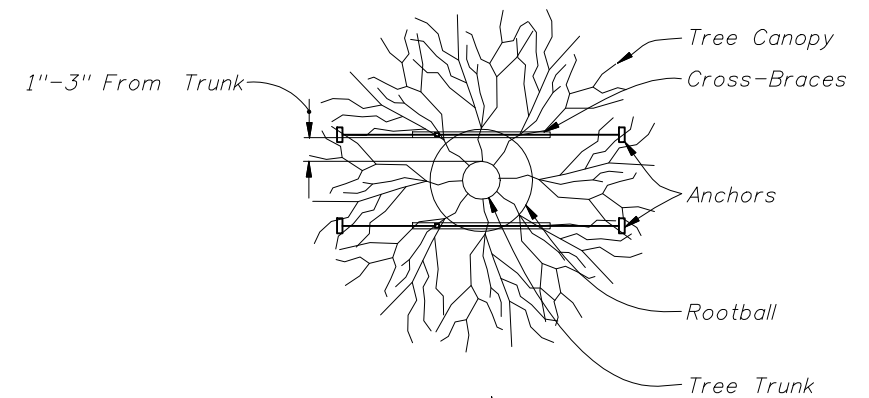
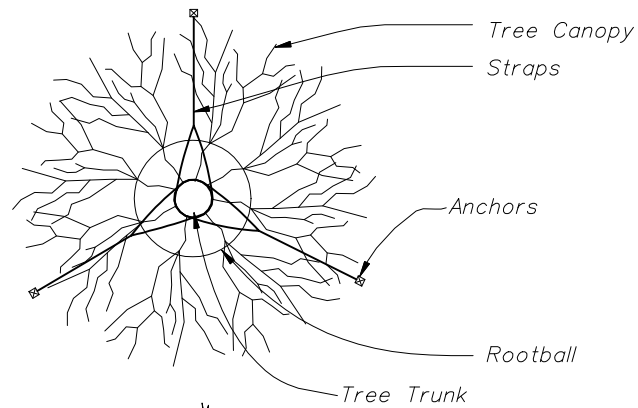
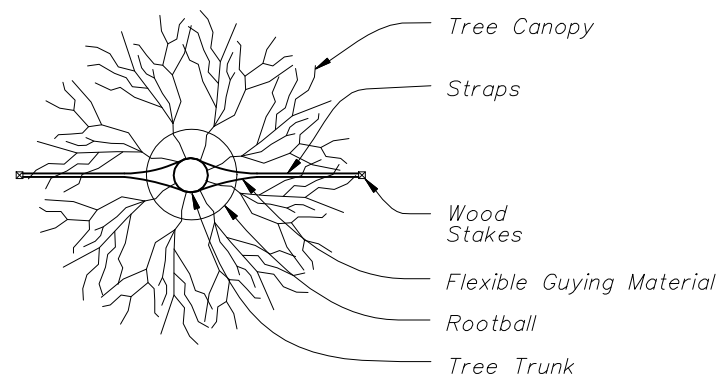
STEM AND PLATE OPTIONS



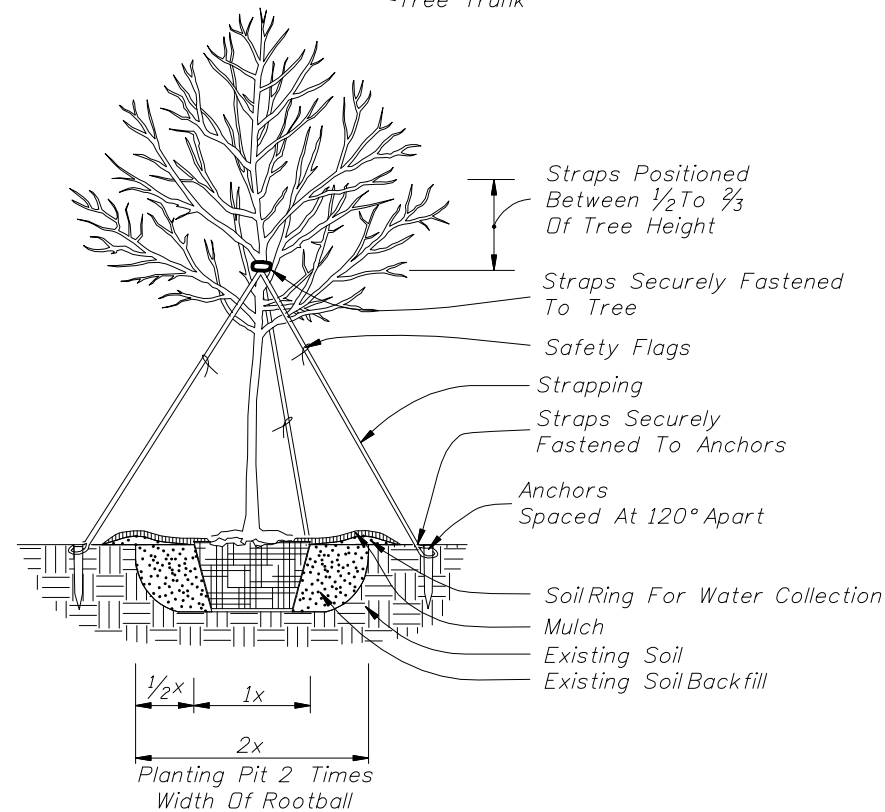
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SETTLEMENT PLATE

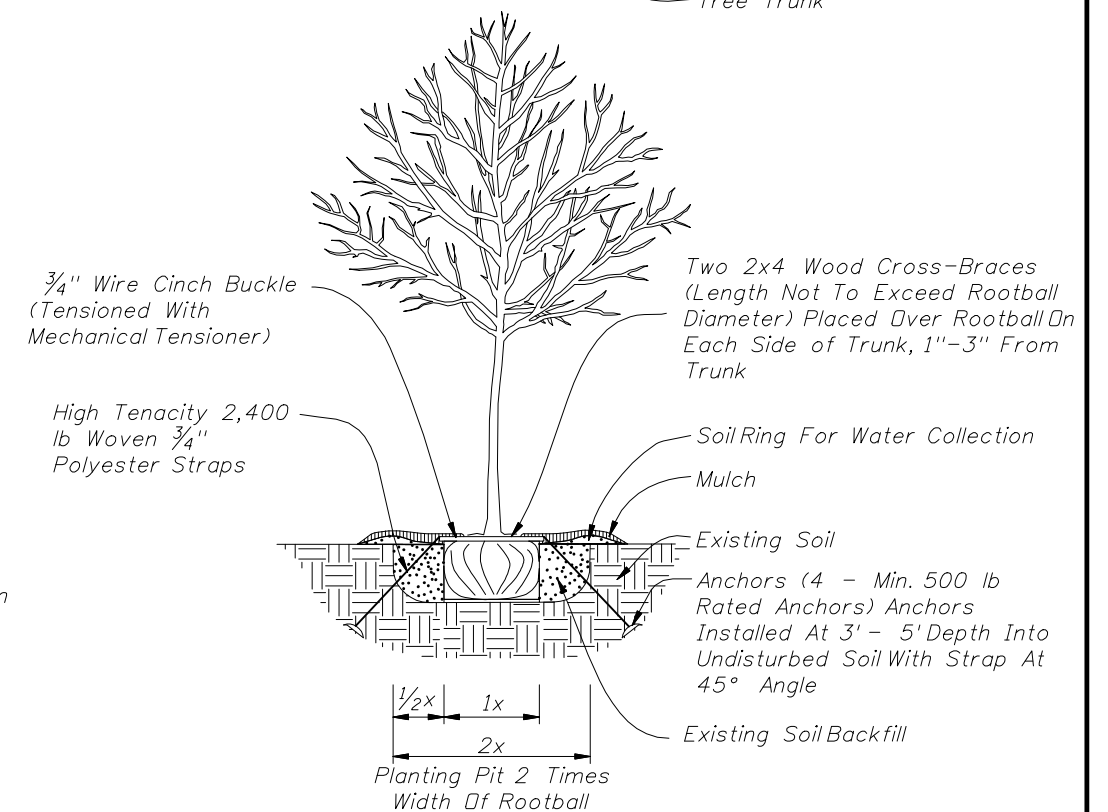
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1" - 3 1/2" CALIPER TREE PLANTING



4" AND LARGER CALIPER TREE PLANTING



1" - 3 1/2" CALIPER TREE PLANTING WITH UNDERGROUND BRACING

GENERAL NOTES:

1. All dimensions 6" and less are exaggerated for illustrative purposes only.
2. Plant containers shall be removed prior to planting. If plants are not container grown, remove a minimum of the top 1/3 of burlap, fabric, or wire mesh. Never lift or handle the tree by the trunk.
3. The uppermost root on all trees shall be covered by less than 1" of soil. Use hand tools to carefully remove all excess soil. The top of root ball shall be set 1"-2" above finish grade and set plumb to the horizon. If planting pit is too deep, remove the tree and firmly pack additional soil in the bottom of the planting pit to raise the rootball. After positioning the tree in the planting pit, slice through rootballs with 3 or 4 vertical slices (top to bottom) equally distributed around the tree.
4. Backfill shall be loosened existing soil. Remove rocks, sticks, or other deleterious material greater than 1" in any direction prior to backfilling. Water and tamp to remove air pockets. If existing soils contain excessive sand, clay, or other material not conducive to proper plant growth, contact Engineer prior to planting.
5. Soilrings shall be constructed of existing soil at the outer edge of the planting pit, with a height of 3" and gently sloping sides. Do not pile soil on top of rootball.
6. Mulch shall be a 3" deep layer placed to the edge of the trunk flare, around the base of shrub, or solidly around groundcover. Never pile mulch against the tree trunk.
7. Straps shall be minimum 1" wide nylon or polypropylene. All wood stakes or anchors shall be located beyond the edge of soilring and located below finished grade, unless otherwise specified.
8. Sabal Palms may be hurricane cut. All other palms must have fronds tied with biodegradable twine. Palm trunks shall have no burn marks, scars, or sanding.
9. All dimensions provided for wood materials are nominal.
10. When a permanent, subsurface, or drip irrigation system is provided, a soilring is not required. Mulch to edge of planting pit.
11. Alternate tree bracing and guying systems approved by the Engineer may be used in lieu of the tree bracing and guying methods detailed on the Index. Alternate tree protection systems approved by the Engineer may be used in lieu of the tree protection barricade detailed on the index.
12. Remove aboveground guying systems at the end of the establishment period.



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LANDSCAPE INSTALLATION

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07/01/07

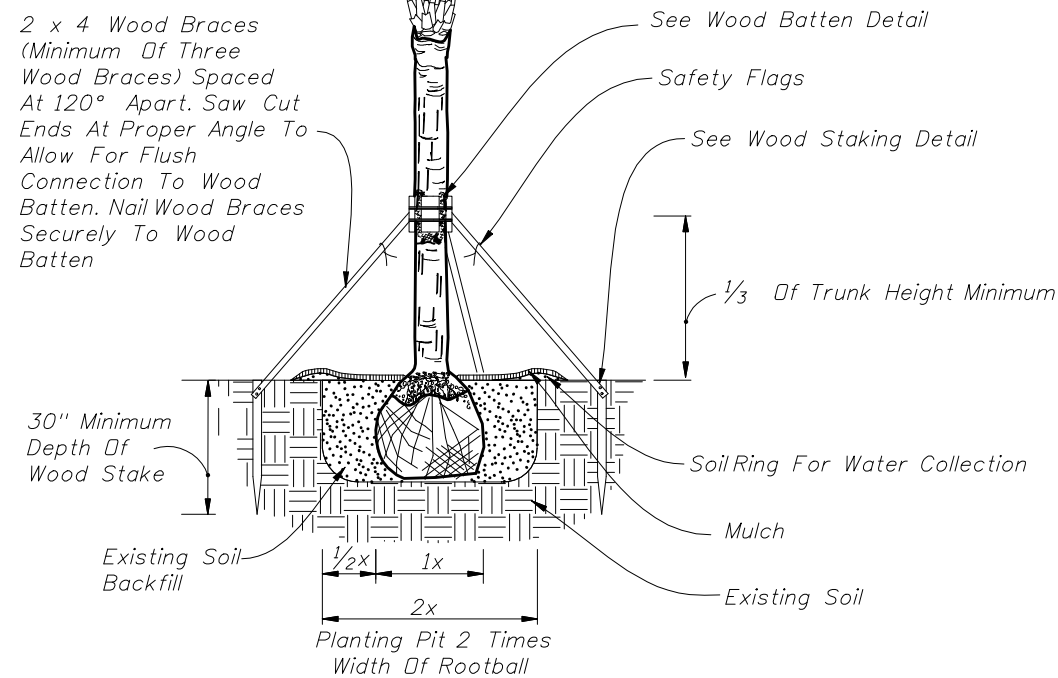
Sheet No.

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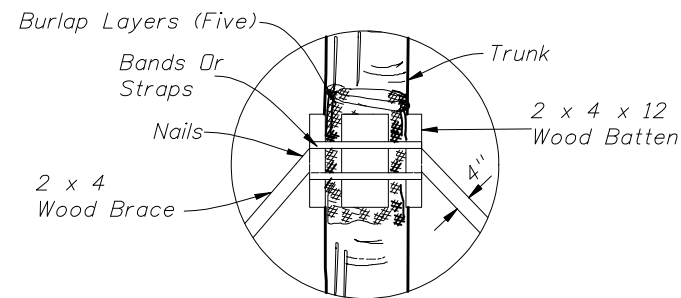
544

2 x 4 Wood Braces (Minimum Of Three Wood Braces) Spaced At 120° Apart. Saw Cut Ends At Proper Angle To Allow For Flush Connection To Wood Batten. Nail Wood Braces Securely To Wood Batten

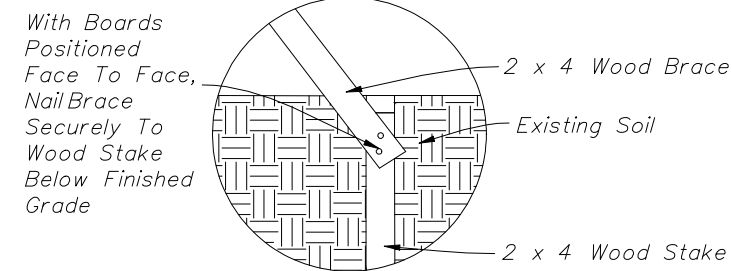


NOTE: For All Other Palms, Use Detail Provided By Landscape Architect In Contract Plans.

CABBAGE PALM PLANTING FOR UP TO 24' CLEAR TRUNK

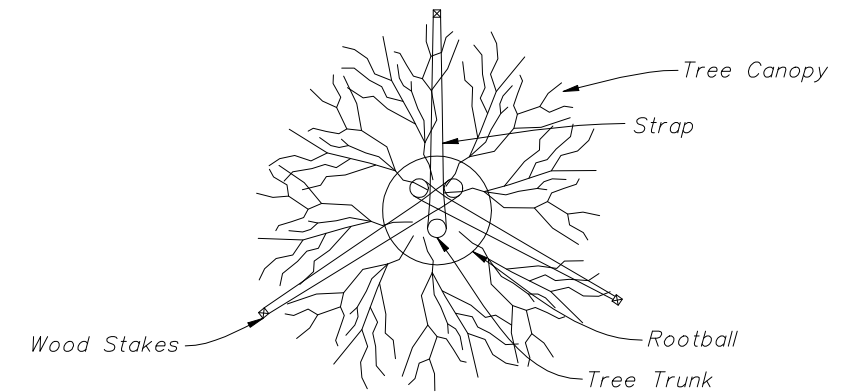


WOOD BATTEN DETAIL

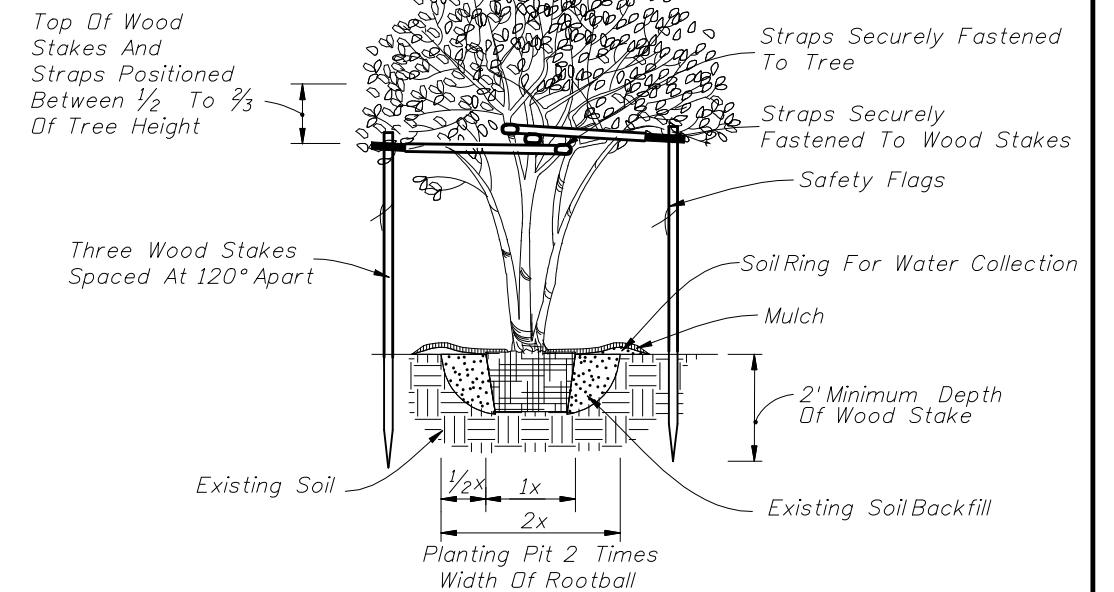


NOTE: Stake Into Firm, Existing Soil.

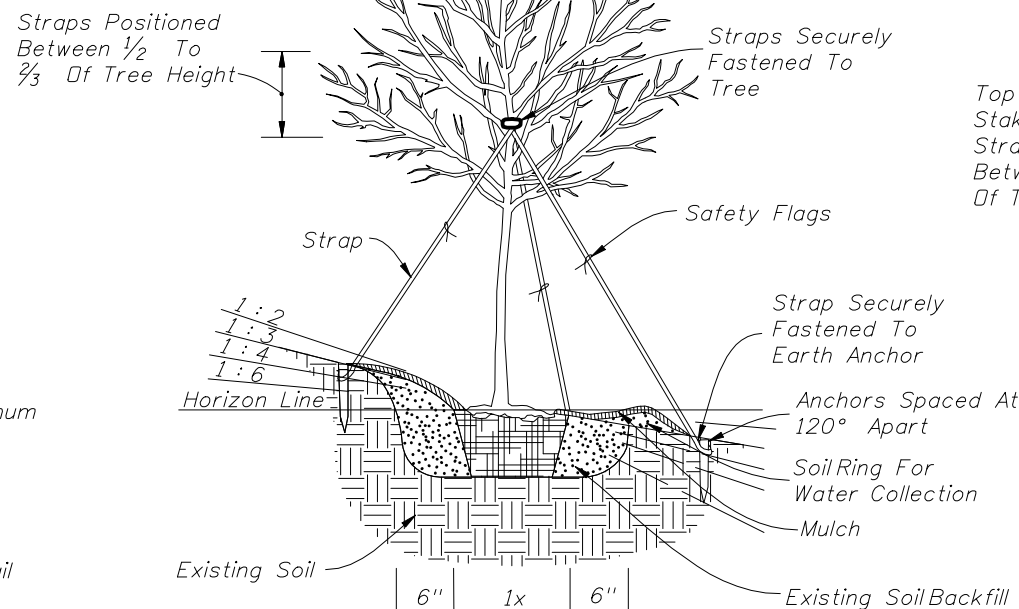
WOOD STAKING DETAIL



Top Of Wood Stakes And Straps Positioned Between 1/2 To 2/3 Of Tree Height



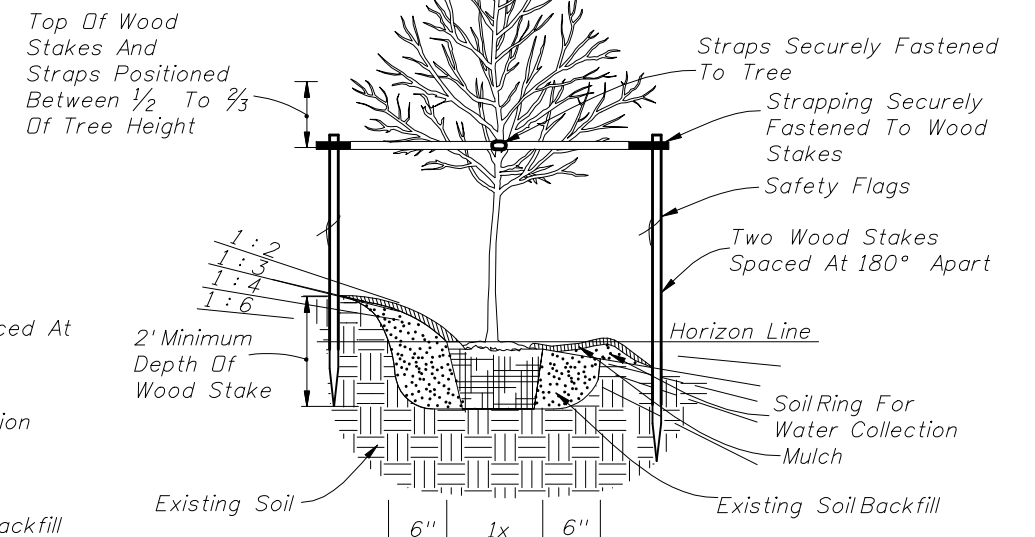
MULTI-TRUNK TREE PLANTING



NOTE: Slope Provided As Rise:Run.

4\"/>

Top Of Wood Stakes And Straps Positioned Between 1/2 To 2/3 Of Tree Height

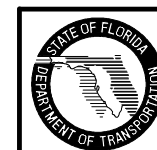


NOTE: Slope Provided As Rise:Run.

1\"/>

NOTES: Slope Provided As Rise:Run. For All Other Palms, Use Detail Provided By Landscape Architect In Contract Plans.

CABBAGE PALM PLANTING ON SLOPE FOR UP TO 24' CLEAR TRUNK

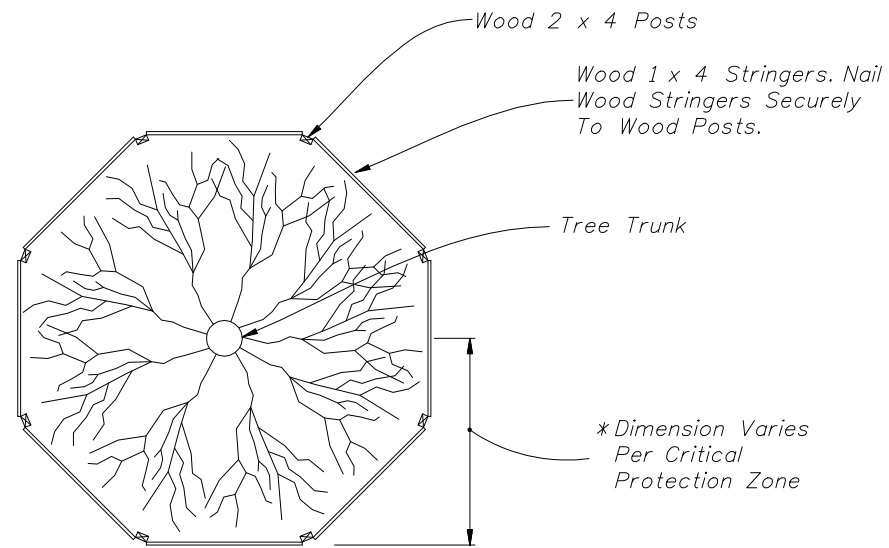


2010 FDOT Design Standards

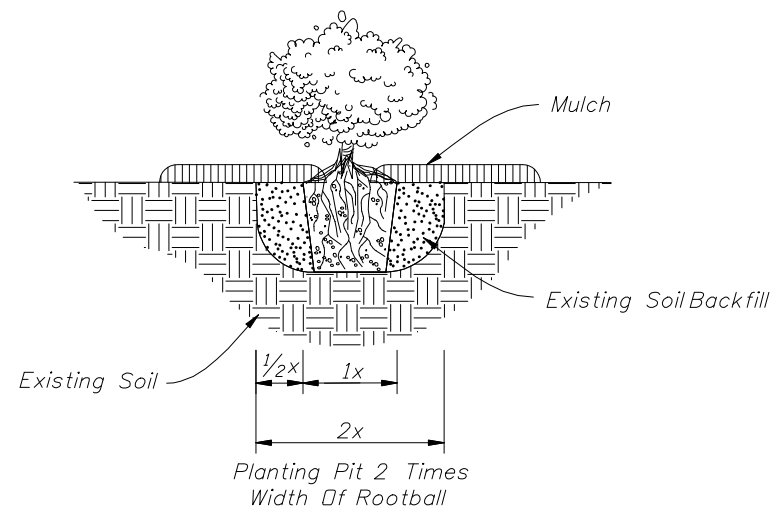
LANDSCAPE INSTALLATION

Last Revision 07/01/07 Sheet No. 2 of 3

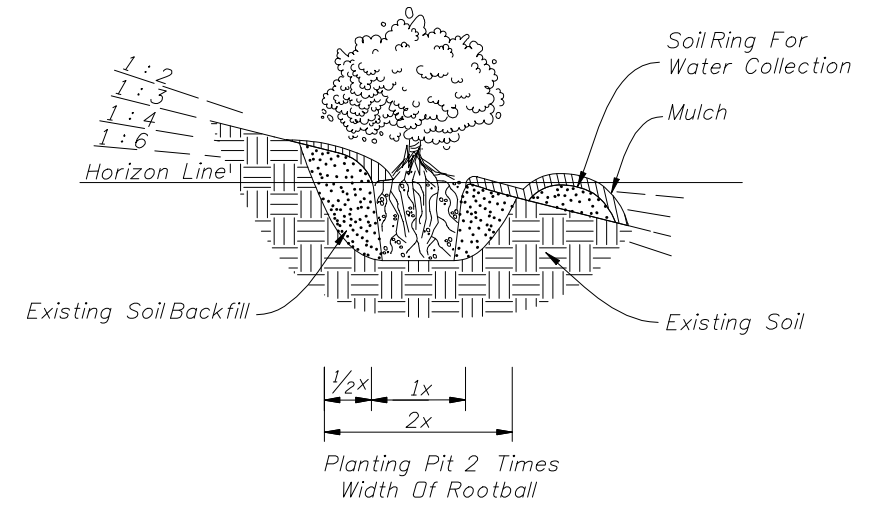
Index No. 544



NOTE: For Groups Of Trees, Place Barricades Between Trees And Construction Activity.

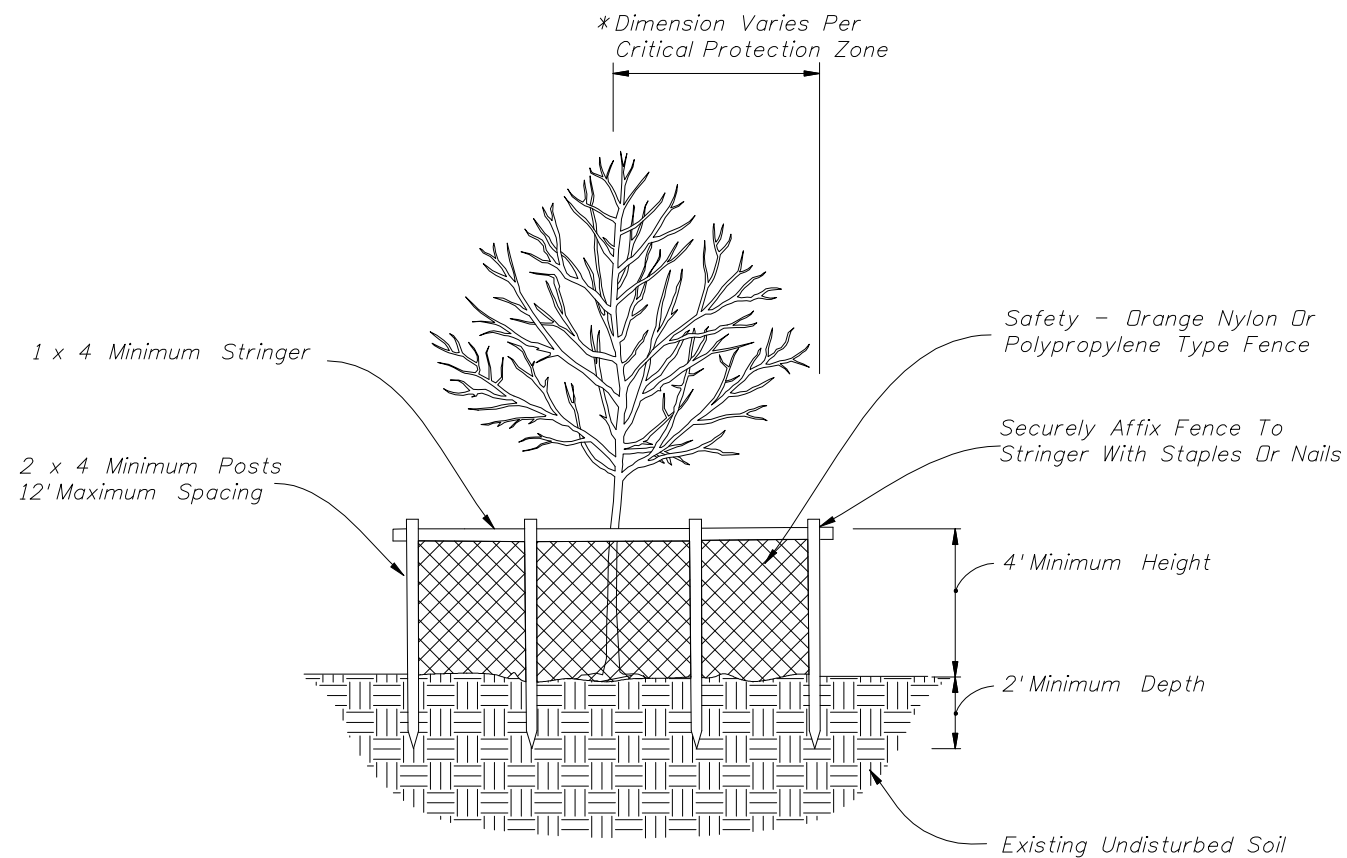


GROUND COVER/SHRUB PLANTING



NOTE: Slope Provided As Rise:Run.

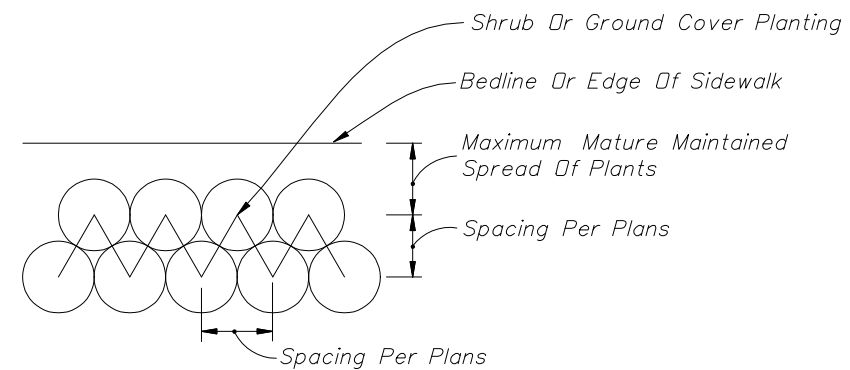
GROUND COVER/SHRUB PLANTING ON SLOPE



NOTES: Critical Protection Zone: The Area Surrounding A Tree Within A Circle Described By A Radius Of One Foot For Each Inch Of The Tree Trunk Diameter At 54" Above Finished Grade. For Groups Of Trees, Place Barricades Between Trees And Construction Activity.

* Tree Protection Barricades Shall Be Located To Protect A Minimum Of 75% Of The Critical Protection Zone.

TREE PROTECTION BARRICADE



GROUND COVER/SHRUB LAYOUT DETAIL



GENERAL NOTES

1. Details apply to both rural and urban intersections under stop sign control or flashing beacon control. For full signal controlled intersections see Design Note No. 4.
2. Sight distance (d) applies to normal and skewed intersections (intersecting angles between 60° and 120°), and where vertical and/or horizontal curves are not present. Sight distance (d) is measured along the major roadway from the center of the entrance lane of the minor roadway to the center of the near approach lane (right or left) of the major roadway. Distances d_L and d_R are measured from the centerline of the entrance lane of the minor roadway to a point on the edge of the near side outer traffic lane on the major roadway. Distance d_M is measured from the centerline of the entrance lane of the minor roadway to a point on the median clear zone limit or horizontal clearance limit for the far side roadway of the major roadway.
3. a. The limits of clear sight define a corridor throughout which a clear sight window must be preserved. See WINDOW DETAIL, Sheet 2.
b. Clear sight must be provided between vehicles at intersection stop locations, and vehicles on the major roadway within dimension 'd'.
c. Since observations are made in both directions along the line of sight, the reference datum between roadways is 3'-6" above respective pavements.
4. Barrier systems within intersection sight corridors, where penetration into the sight window might occur, shall be located to provide the least adverse affect practical.
5. The corridor defined by the limits of clear sight is a restricted planting area. Drivers of vehicles on the intersecting roadway and vehicles on the major roadway must be able to see each other clearly throughout the limits of 'd' and 'd_a'. If in the Engineers judgement, landscaping interferes with the line of sight corridor prescribed by these standards the Engineer may rearrange, relocate or eliminate plantings. Plants within the restricted areas are limited to selections as follows:

Ground Cover & Trunked Plants (Separate or Combined):

Ground Covers – Plant selection of low growing vegetation which at maturity does not attain a height greater than 18" below the sight line datum.

For ground cover in combination with trees and palms; the following heights below the sight line datum will apply: 24" for trees and palms ≤ 11" dia.; and, 18" for sabalpalms > 11" ≤ 18" dia. (dia. – within Sight Window).

Trunked Plants – Plant selection of a mature trunk diameter 4" or less measured at 6" above the ground. Canopy or high borne foliage shall never be lower than 5' above the sight line datum. These selections shall be spaced no closer than 20'.

Trees:

Trees can be used with lawn; pavers; pavement; gravel, bark or wood chip beds; ground covers or other Department approved material. The clear sight window must be in conformance with the 'WINDOW DETAIL' modified to attain the height requirements listed in 'Ground Covers' above. Tree size and spacing shall conform to the following tabular values:

Description	Speed (mph)													
	30		35		40		45		50		55		60	
	(Inches)													
Diameter (Within Limits Of Sight Window)	>4≤11	>11≤18	>4≤11	>11≤18	>4≤11	>11≤18	>4≤11	>11≤18	>4≤11	>11≤18	>4≤11	>11≤18	>4≤11	>11≤18
	(Feet)													
Minimum Spacing (c. to c. Of Trunk)	22	91	27	108	33	126	40	146	45	165	52	173	60	193

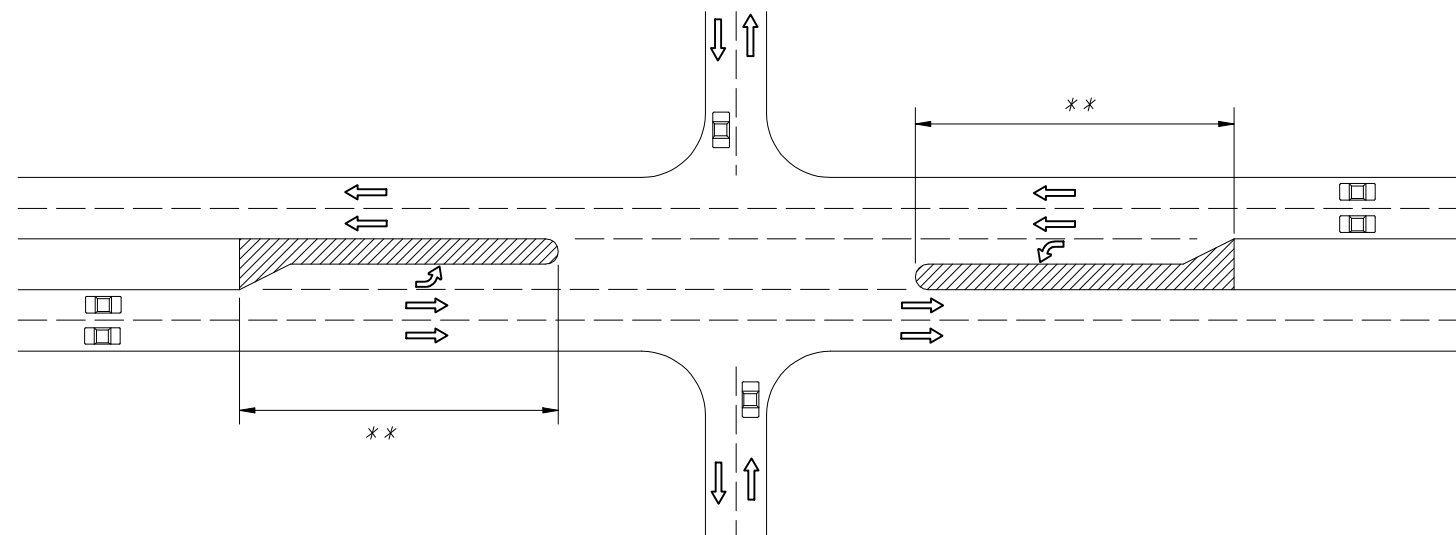
Sizes and spacings are based on the following conditions:

- (a) A single line of trees in the median parallel to but not necessarily colinear with the centerline,
- (b) A straight approaching mainline, within skew limits as described in No. 2 above.
- (c) 1. Trees and palms ≤ 11" in diameter casting a vertical 6' wide shadow band on a vehicle entering at stop bar location when viewed by mainline driver beginning at distance 'd'; see SHADOW DIAGRAM, Sheet 2.
2. Sabalpalms with diameters > 11" to ≤ 18" spaced at intervals providing a 2 second full view of entering vehicle at stop bar location when viewed by mainline driver beginning at distance 'd'; see PERCEPTION DIAGRAM, Sheet 2.
- (d) Trees with diameters ≤ 11" intermixed with trees with diameters > 11" ≤ 18" are to be spaced based on trees with diameters > 11" ≤ 18".

For any other conditions the tree sizes, spacings and locations shall be detailed in the plans; see Design Note No. 5.

DESIGN NOTES

1. The information shown on this index is intended solely for the purpose of clear sight development and maintenance at intersecting highways, roads and streets, and is not intended to be used to establish roadway and roadside safety except as related to clear sight corridors. An analysis of sight distance shall be documented for all intersections.
2. Details are based on the AASHTO 'A Policy On Geometric Design Of Highways And Streets, 2001', CHAPTER 9, INTERSECTION SIGHT DISTANCE, CASES B and F, and Department practices for channelized median openings (left turns from major roadways).
3. The minimum driver eye setback of 14.5' from the edge of the traveled way may be adjusted on any intersection leg only when justified by a documented, site specific field study of vehicle stopping position and driver eye position.
4. For SIGNALIZED INTERSECTIONS sight distances should be developed based on AASHTO 'Case D- Intersections With Traffic Signal Control'. 'At signalized intersections, the first vehicle stopped on one approach should be visible to the driver of the first vehicle stopped on each of the other approaches. Left-turning vehicles should have sufficient sight distance to select gaps in oncoming traffic and complete left turns. Apart from these sight conditions, there are generally no other approach or departure sight triangles needed for signalized intersections. However, if the traffic signal is to be placed on two-way flashing operation (i.e. flashing yellow on the major-road approaches and flashing red on the minor-road approaches) under off-peak or nighttime conditions, then the appropriate departure sight triangles for Case B, both to the left and to the right, should be provided for the minor-road approaches. In addition, if right turns on a red signal are to be permitted from any approach, then the appropriate departure sight triangle to the left for Case B2 should be provided to accommodate right turns from that approach.'
5. Where curvature, superelevation, adverse split profiles or other conditions preclude the use of standard tree sizes and spacing, proof of view and shadowing restraints must be documented and the size and location of trees in medians detailed in the plans.
6. Intersection sight distance values are provided for Passenger Vehicles, SU Vehicles and Combination Vehicles. Intersection sight distance based on the Passenger Vehicle is suitable for most intersections. Where substantial volumes of heavy vehicles enter the major-road, such as from ramp terminals with stop control or roadways serving truck terminals, the use of tabulated values for SU Vehicles or Combination Vehicles should be considered.

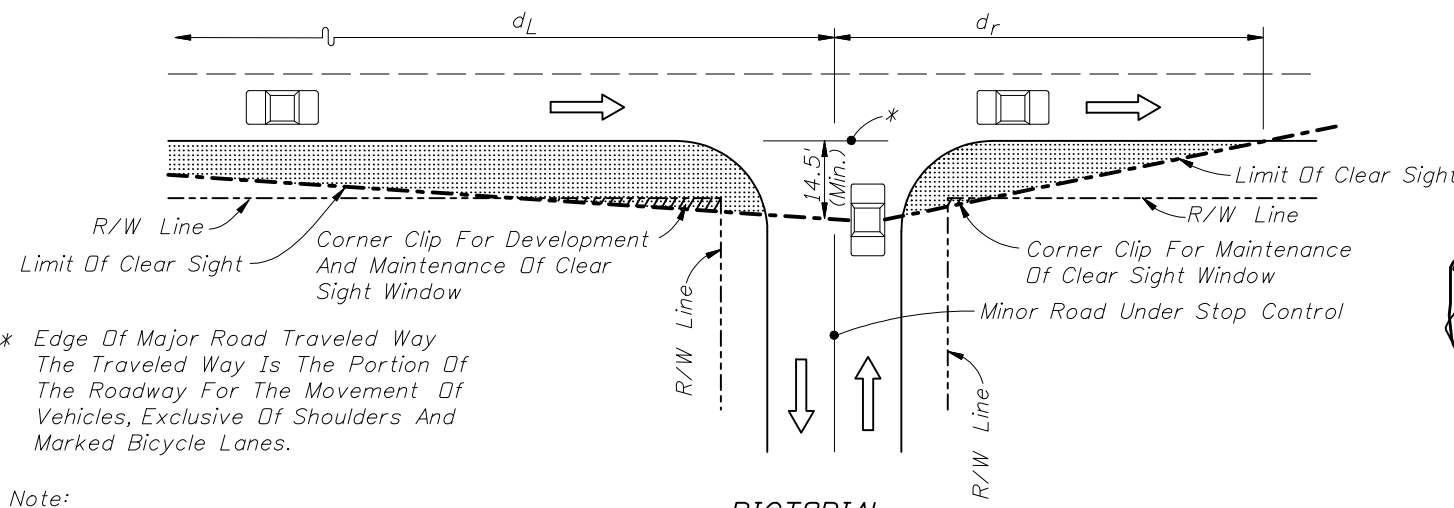


PLAN

Special Areas Limited to Ground Cover

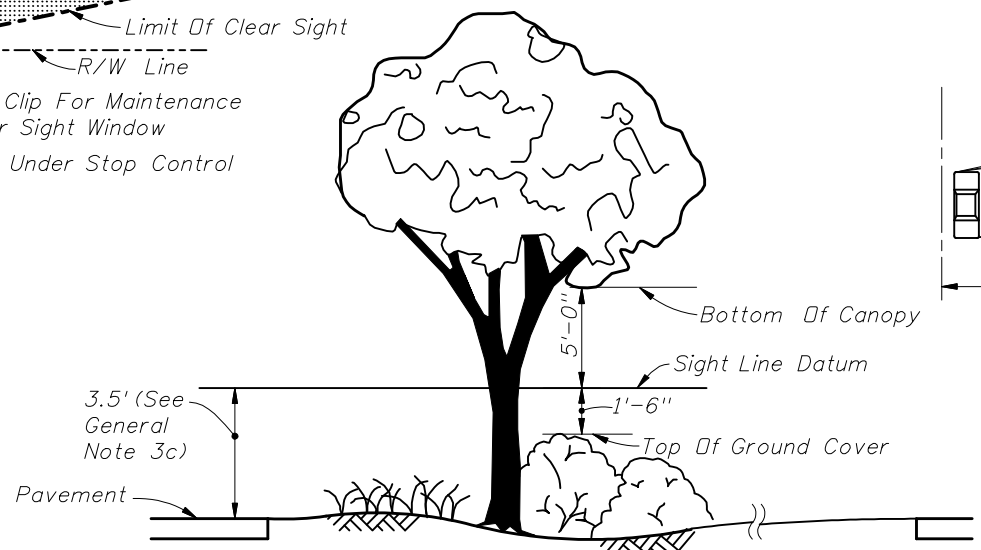
** For Signalized and unsignalized intersections, the median area along left turn lanes, including the taper, shall be limited to ground cover with height not greater than 18" below the sight line datum regardless of whether or not the area is within the limit of clear sight.





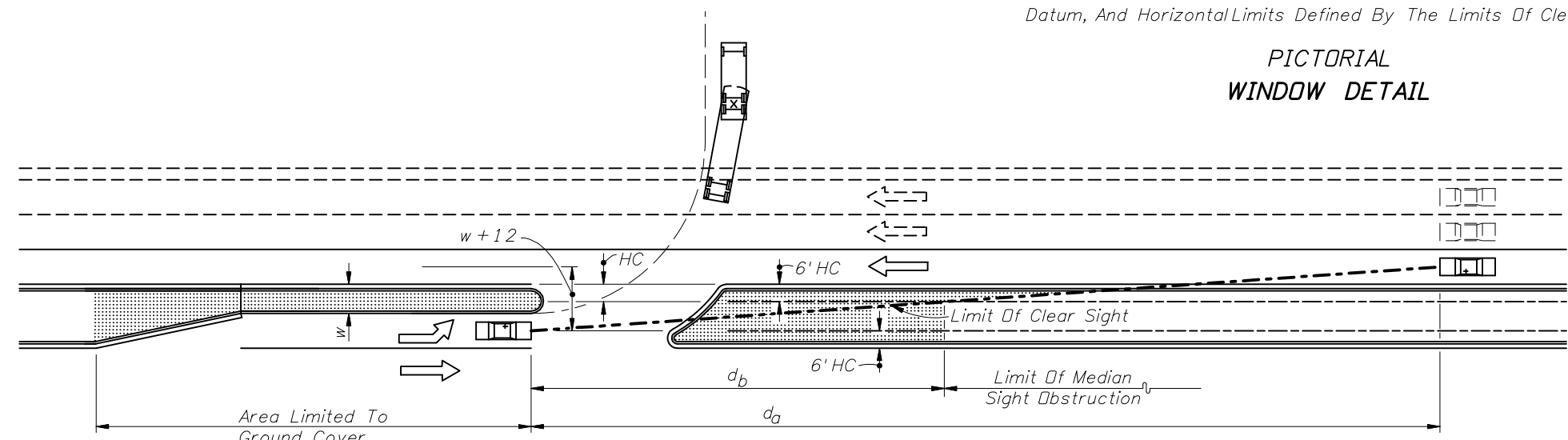
Note:
Lines For 'Limit Of Clear Sight' Are Opposite Hand When Major Road Near Lane Traffic Moving Left (e.g., One-Way Left).

PICTORIAL
ORIGIN OF CLEAR SIGHT LINE
ON MINOR ROAD



The Intent Of This Standard Is To Provide A Window With Vertical Limits Of Not Less Than 5' Above And 1'-6" Below The Sight Line Datum, And Horizontal Limits Defined By The Limits Of Clear Sight.

PICTORIAL
WINDOW DETAIL



PICTORIAL

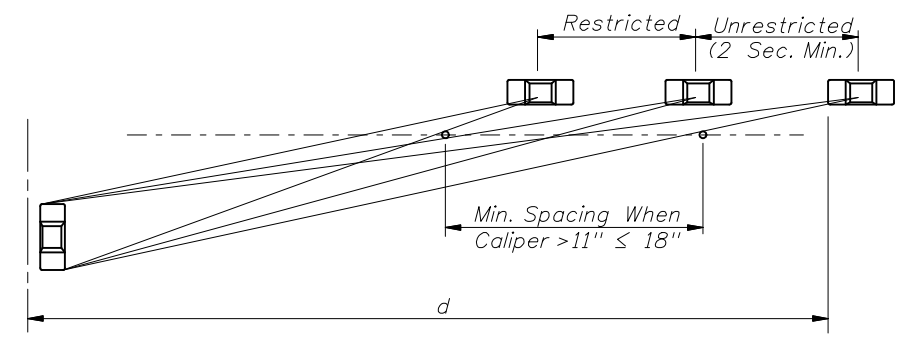
Design Speed MPH	d_a (Feet)								
	1 Lane Crossed			2 Lanes Crossed			3 Lanes Crossed		
	P	SU	Comb.	P	SU	Comb.	P	SU	Comb.
30	245	285	330	265	320	360	285	350	390
35	285	335	385	310	370	420	335	405	460
40	325	380	440	355	425	480	380	465	525
45	365	430	495	395	475	540	430	520	590

★ See Note.

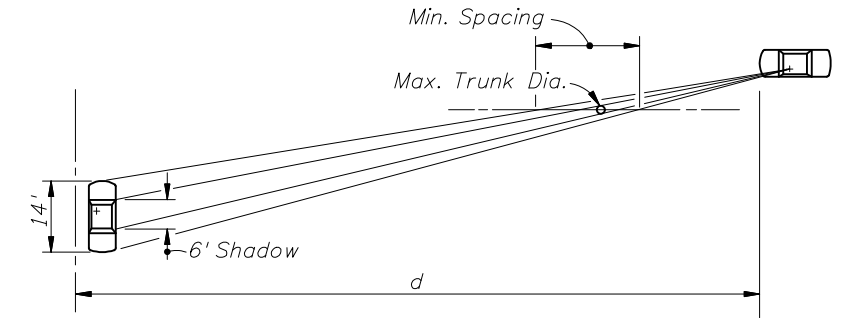
★ The d_a values in this table were established by the method referenced in Design Note 2, and are applicable to urban, predominantly curbed roadways with design speeds of 45 mph or less and meeting the restricted conditions defined in Index No. 700. For horizontal clearance (HC) of six feet (6'), the values for d_b may be determined by the equation $d_b = d_a / (w / (w + 12))$. For roadways with nonrestricted conditions, d_a and d_b should be based on the geometry for the left turn storage and on clear zone widths (See Index No. 700).

For wide medians where the turning vehicle can approach the through lanes at or near 90°, use d_v values from tables on sheets 5 or 6. (The clear sight line origin is assumed to be 14.5' from the edge of the near lane.)

CHANNELIZED DIRECTIONAL MEDIAN OPENINGS



PERCEPTION DIAGRAM
SETTING SABAL PALM (STATE TREE) SPACING

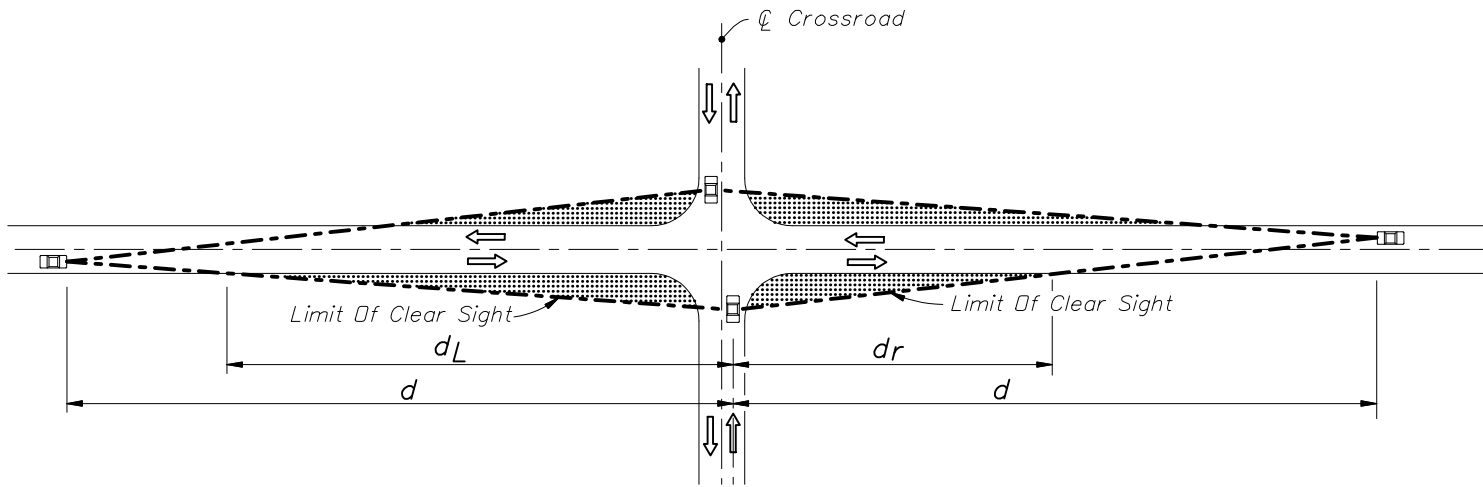


SHADOW DIAGRAM

LEGEND

▨ Areas Free Of Sight Obstructions





Design Speed	d	d _L	d _r
30	335	240	150
35	390	275	175
40	445	315	200
45	500	350	225
50	555	390	250
55	610	430	275
60	665	470	300
65	720	510	325

Passenger Vehicle

Design Speed	d	d _L	d _r
30	420	295	190
35	490	345	220
40	560	395	250
45	630	445	280
50	700	495	310
55	770	545	345
60	840	595	375
65	910	645	405

SU Vehicle

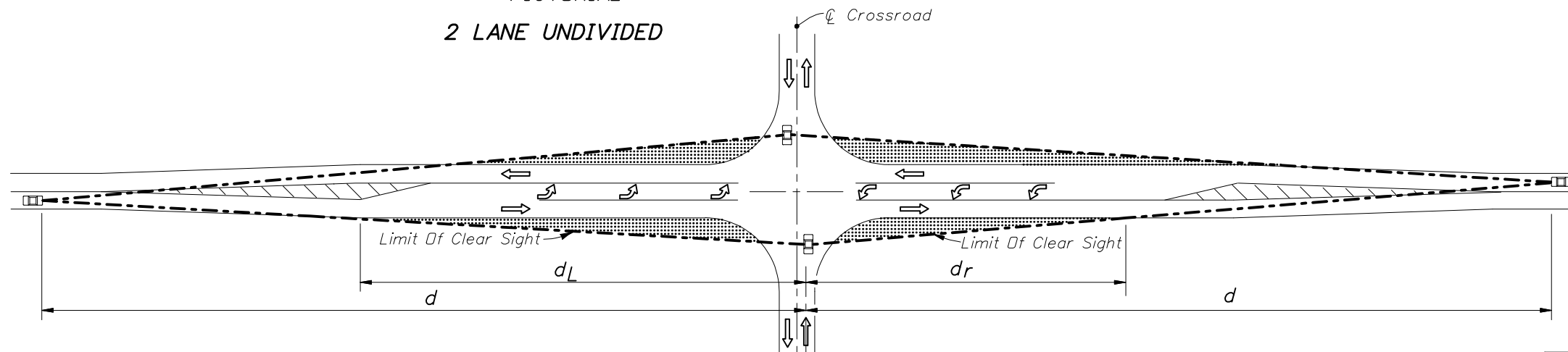
Design Speed	d	d _L	d _r
30	510	360	225
35	595	420	265
40	680	480	305
45	765	540	340
50	845	600	375
55	930	660	415
60	1015	720	450
65	1100	780	490

Combination Vehicle

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_L, d_r) (FEET)

2 LANE UNDIVIDED

PICTORIAL
2 LANE UNDIVIDED



PICTORIAL
2 LANE 2 WAY • FLARED FOR OPPOSING LEFT TURN CENTERED ON ALIGNMENT

Design Speed	d	d _L	d _r
30	355	195	135
35	415	225	155
40	475	260	180
45	530	290	200
50	590	325	220
55	650	355	245
60	710	390	265
65	765	420	290

Passenger Vehicle

Design Speed	d	d _L	d _r
30	450	250	170
35	525	290	200
40	600	330	225
45	675	370	255
50	750	410	285
55	825	450	310
60	900	490	340
65	975	530	370

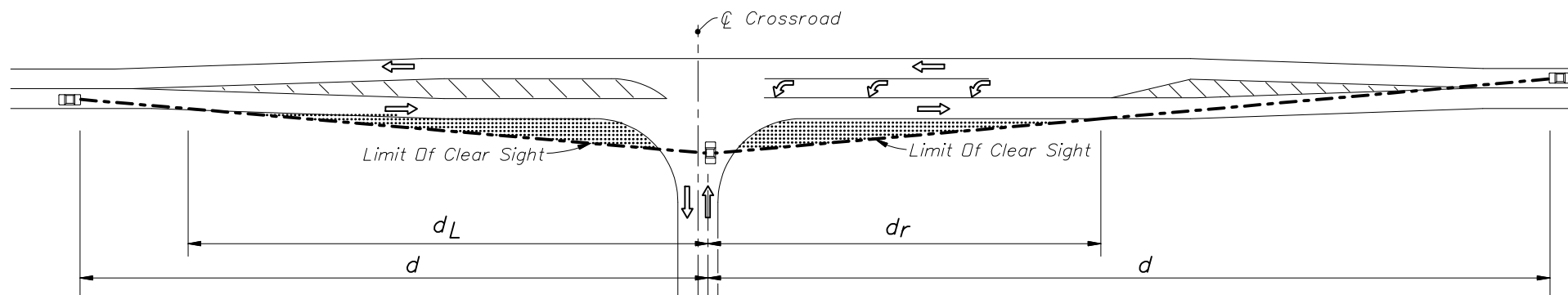
SU Vehicle

Design Speed	d	d _L	d _r
30	540	295	205
35	630	345	240
40	720	395	270
45	810	445	305
50	900	495	340
55	990	540	375
60	1080	590	405
65	1170	640	440

Combination Vehicle

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_L, d_r) (FEET)

2 LANE 2 WAY • FLARED FOR LEFT TURNS



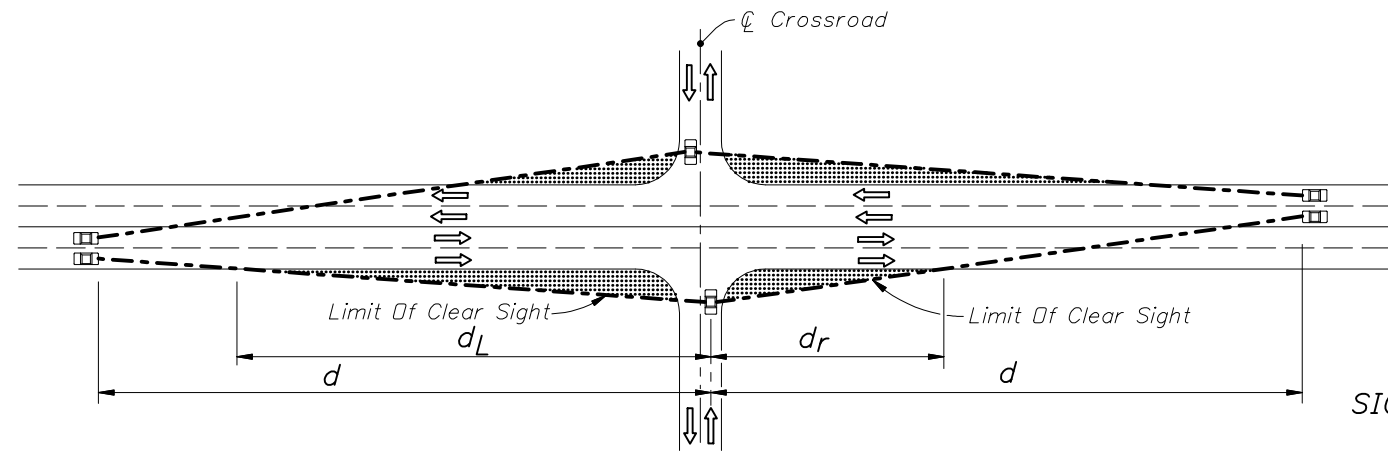
PICTORIAL
2 LANE 2 WAY • FLARED FOR SINGLE SIDE LEFT TURN CENTERED ON ALIGNMENT

LEGEND

Areas Free Of Sight Obstructions

NOTE: See Sheet 2 for intersecting roadway origin of clear sight and quadrant corner clips.





Design Speed	d	d _L	d _r
30	355	250	115
35	415	295	135
40	475	335	155
45	530	375	175
50	590	415	195
55	650	460	210
60	705	500	230
65	765	540	250

Passenger Vehicle

Design Speed	d	d _L	d _r
30	450	320	150
35	525	370	170
40	600	425	195
45	675	475	220
50	750	530	245
55	825	585	270
60	900	635	295
65	975	690	320

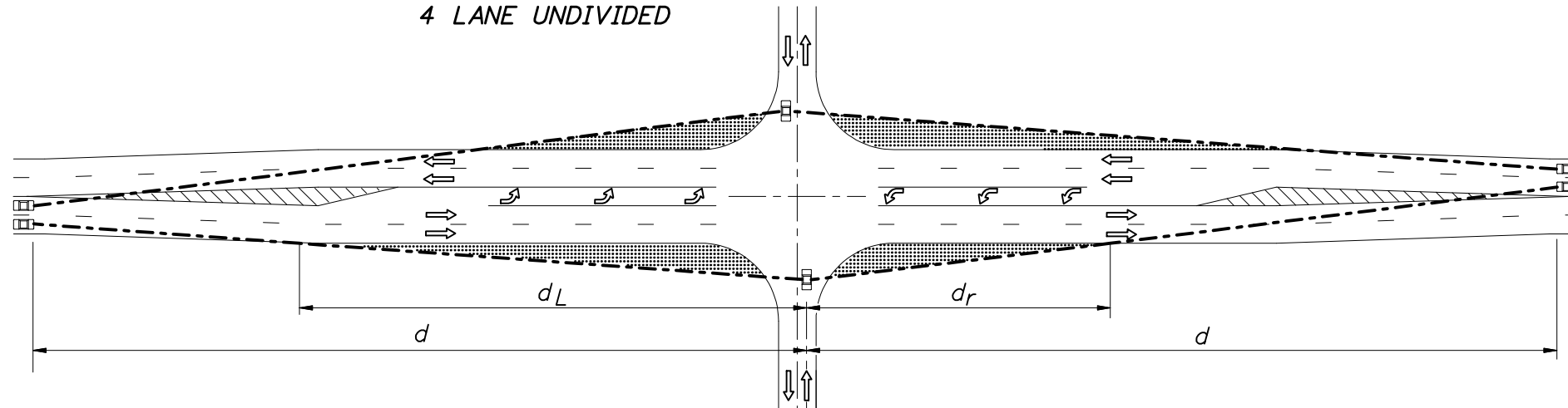
SU Vehicle

Design Speed	d	d _L	d _r
30	540	380	175
35	630	445	205
40	720	510	235
45	810	570	265
50	900	635	295
55	990	700	320
60	1080	765	350
65	1170	825	380

Combination Vehicle

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_L, d_r) (FEET)
4 LANE UNDIVIDED

PICTORIAL
4 LANE UNDIVIDED



PICTORIAL
4 LANE UNDIVIDED FLARED - SYMMETRICAL

Design Speed	d	d _L	d _r
30	375	205	120
35	440	240	145
40	500	275	165
45	565	310	185
50	625	340	205
55	690	375	225
60	750	410	245
65	815	445	265

Passenger Vehicle

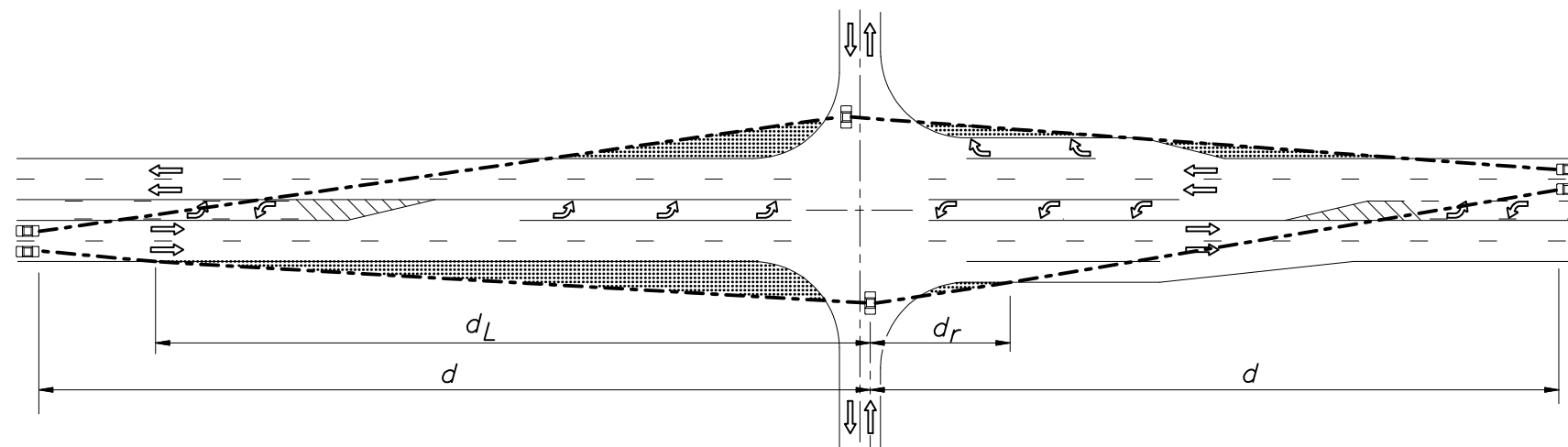
Design Speed	d	d _L	d _r
30	480	220	155
35	560	255	180
40	640	290	210
45	720	330	235
50	800	365	260
55	880	400	285
60	960	440	310
65	1040	480	340

SU Vehicle

Design Speed	d	d _L	d _r
30	570	310	185
35	665	365	215
40	760	415	250
45	855	470	280
50	950	520	310
55	1045	570	340
60	1140	625	370
65	1235	675	400

Combination Vehicle

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_r, d_L) (FEET)
4 LANE UNDIVIDED FLARED - SYMMETRICAL



PICTORIAL
4 LANE UNDIVIDED WITH OPTIONAL LANE

Design Speed	d	d _L	d _r
30	375	265	95
35	440	310	115
40	500	355	130
45	565	400	145
50	625	440	160
55	690	490	172
60	750	530	195
65	815	575	210

Passenger Vehicle

Design Speed	d	d _L	d _r
30	480	340	125
35	560	395	145
40	640	450	165
45	720	510	185
50	800	565	205
55	880	620	225
60	960	680	245
65	1040	735	265

SU Vehicle

Design Speed	d	d _L	d _r
30	570	405	145
35	665	470	170
40	760	540	195
45	855	605	220
50	950	670	245
55	1045	740	270
60	1140	805	295
65	1235	875	320

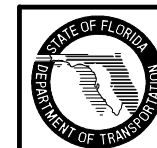
Combination Vehicle

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_L, d_r) (FEET)
4 LANE UNDIVIDED WITH OPTIONAL LANE

LEGEND

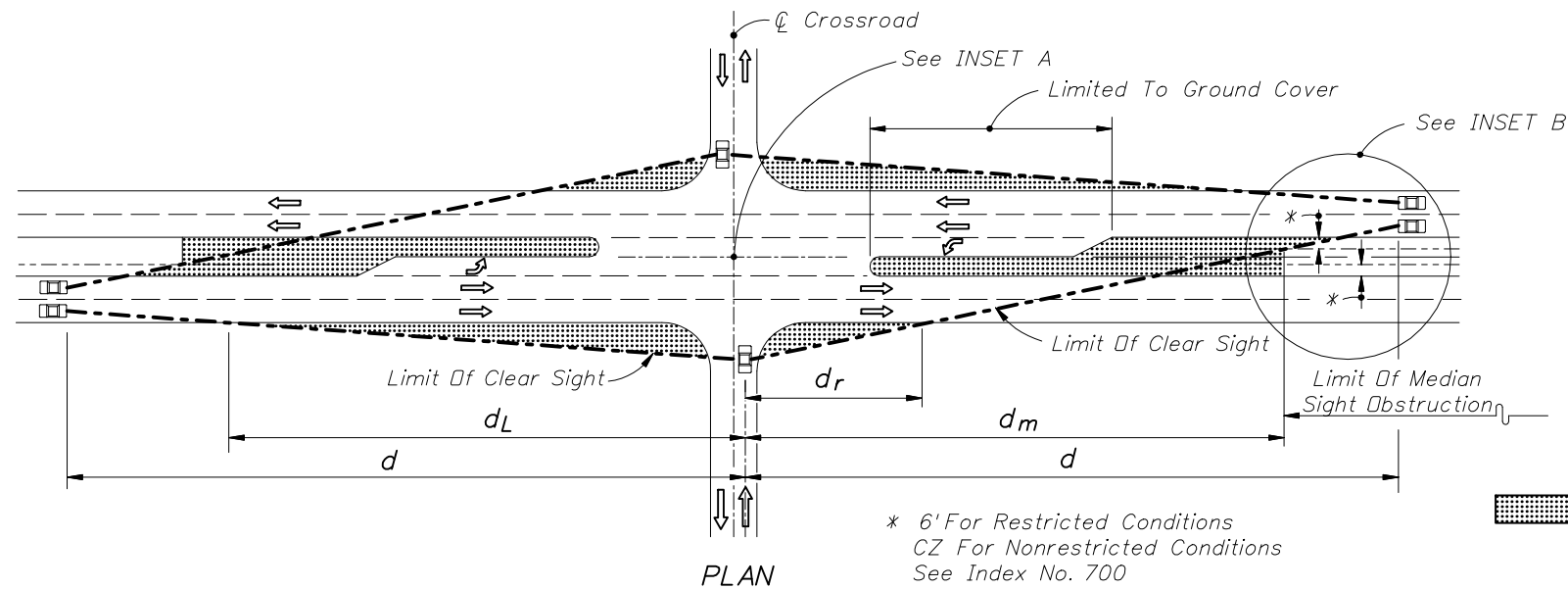
Areas Free Of Sight Obstructions

NOTE: See Sheet 2 for intersecting roadway origin of clear sight and quadrant corner clips.



MEDIAN 22' OR LESS				
Design Speed	d	d _L	d _r	d _m
30	390	280	90	320
35	460	330	100	380
40	520	370	110	430
45	590	420	130	480
50	650	460	140	530
55	720	510	160	590
60	780	550	170	640
65	850	600	190	700

25'-64' MEDIAN				
Design Speed	d	d _L	d _v	d _{vL}
30	290	210	330	230
35	330	230	390	280
40	380	270	440	310
45	430	300	500	350
50	480	340	550	390
55	530	370	610	430
60	570	400	660	470
65	620	440	720	510



LEGEND

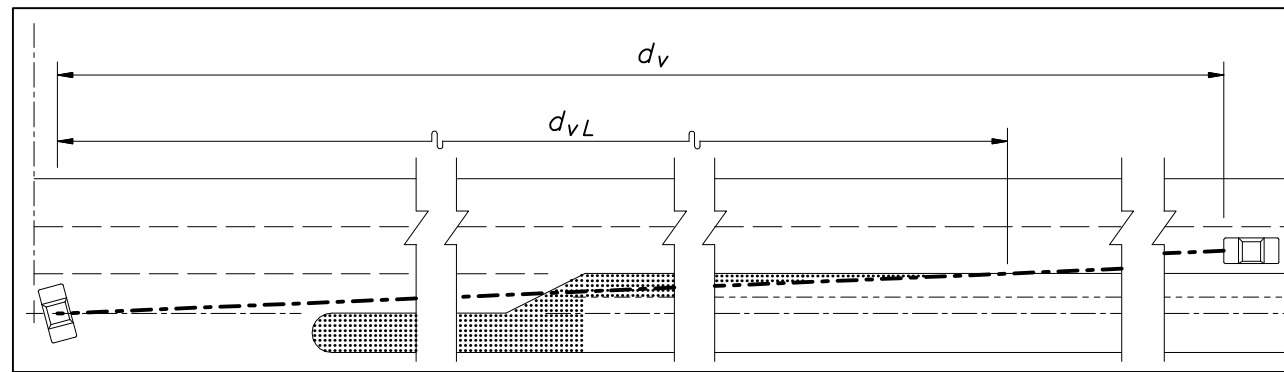
Areas Free Of Sight Obstructions

* 6' For Restricted Conditions
CZ For Nonrestricted Conditions
See Index No. 700

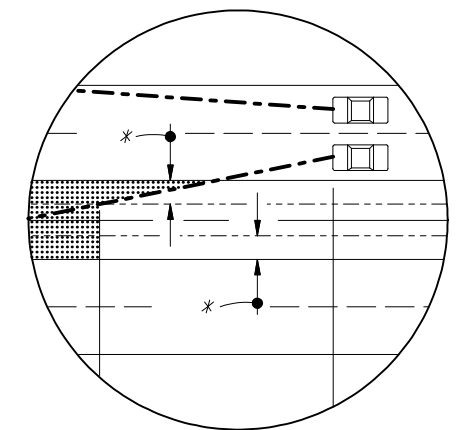
PASSENGER VEHICLE (P)

MEDIAN 35' OR LESS				
Design Speed	d	d _L	d _r	d _m
30	540	380	100	460
35	630	450	110	530
40	720	510	130	610
45	810	570	150	690
50	900	640	160	760
55	990	700	180	840
60	1080	760	200	920
65	1170	830	210	990

40'-64' MEDIAN				
Design Speed	d	d _L	d _v	d _{vL}
30	370	260	420	300
35	440	310	490	350
40	500	350	560	400
45	560	400	630	450
50	620	440	700	500
55	690	490	770	540
60	750	530	840	590
65	810	570	910	640



Where The Median Is Sufficiently Wide For The Design Vehicle To Pause In The Median (Vehicle Length Plus 6' Min.) The Clear Line Of Sight To The Right (d_v) Is Measured From The Vehicle Pause Location, i.e., Not From The Cross Road Stop Position; Distances d_r & d_m Do Not Apply.



INSET B

SINGLE-UNIT TRUCK (SU)

MEDIAN 30' OR LESS				
Design Speed	d	d _L	d _r	d _m
30	620	440	120	520
35	720	510	140	600
40	820	580	160	690
45	930	660	180	780
50	1030	730	200	860
55	1130	800	220	950
60	1240	880	240	1040
65	1340	950	260	1120

35'-50' MEDIAN				
Design Speed	d	d _L	d _r	d _m
30	670	470	100	580
35	780	550	120	680
40	890	630	140	780
45	1000	710	150	870
50	1110	790	170	970
55	1220	860	190	1070
60	1330	940	200	1160
65	1440	1020	220	1260

64' MEDIAN				
Design Speed	d	d _L	d _v	d _{vL}
30	460	330	510	360
35	540	380	590	420
40	620	440	680	480
45	690	490	760	540
50	770	540	850	600
55	850	600	930	660
60	920	650	1020	720
65	1000	710	1100	780

INSET A

Vehicle Type	Vehicle Length (Ft.)
Passenger (P)	19
Single Unit (SU)	30
Large School Bus	40
WB-40	45.5
WB-50	55

NOTES FOR 4-LANE DIVIDED ROADWAY

- See Sheet 2 for origin of clear sight line on the minor road.
- Values shown in the tables are the governing (controlling) sight distances calculated based on 'AASHTO Case B - Intersection with Stop Control on the Minor Road.'

INTERMEDIATE SEMI-TRAILERS (WB-40 & WB-50)

SIGHT DISTANCES (d) & (d_v) AND RELATED DISTANCES (d_L, d_r, d_m & d_{vL}) (FEET)

4 LANE DIVIDED ROADWAY



MEDIAN 22' OR LESS				
Design Speed	d_x	d_L	d_r	d_m
30	410	290	80	350
35	480	340	90	410
40	550	390	100	470
45	620	440	110	530
50	690	490	130	580
55	760	540	140	640
60	830	590	150	700
65	900	640	170	760

25'-64' MEDIAN				
Design Speed	d	d_L	d_v	d_{vL}
30	310	220	330	230
35	360	250	390	280
40	410	290	440	310
45	460	330	500	350
50	510	360	550	390
55	570	400	610	430
60	620	440	660	470
65	670	470	720	510

PASSENGER VEHICLE (P)

MEDIAN 35' OR LESS				
Design Speed	d_x	d_L	d_r	d_m
30	590	420	90	510
35	690	490	110	600
40	780	550	120	680
45	880	620	140	760
50	980	690	160	850
55	1080	760	170	940
60	1170	830	190	1020
65	1270	900	200	1100

40'-64' MEDIAN				
Design Speed	d	d_L	d_v	d_{vL}
30	410	290	420	300
35	470	330	490	350
40	540	380	560	400
45	610	430	630	450
50	680	480	700	500
55	740	520	770	540
60	810	570	840	590
65	880	620	910	640

SINGLE-UNIT TRUCK (SU)

MEDIAN 30' OR LESS				
Design Speed	d_x	d_L	d_r	d_m
30	670	470	110	580
35	780	550	130	670
40	890	630	150	770
45	1000	710	170	860
50	1110	790	190	960
55	1220	860	200	1050
60	1330	940	220	1150
65	1440	1020	240	1240

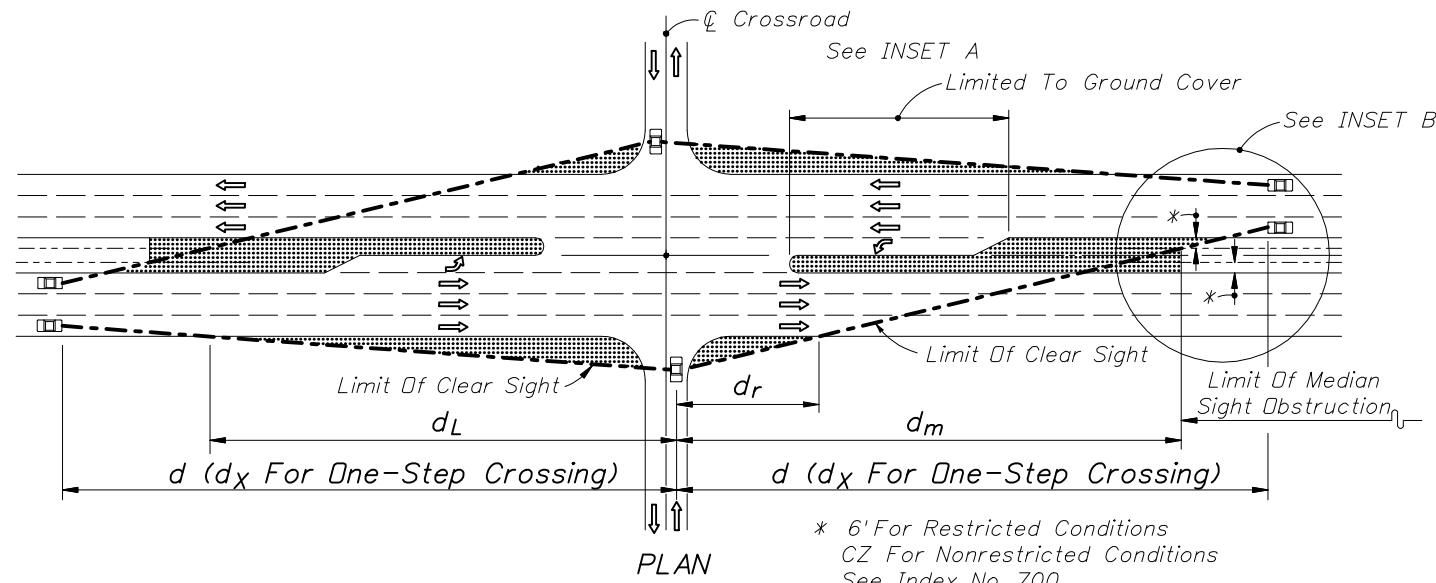
35'-50' MEDIAN				
Design Speed	d_x	d_L	d_r	d_m
30	720	510	100	640
35	830	590	110	740
40	950	670	130	840
45	1070	760	150	950
50	1190	840	160	1060
55	1310	930	180	1160
60	1430	1010	190	1270
65	1550	1100	210	1380

64' MEDIAN				
Design Speed	d	d_L	d_v	d_{vL}
30	490	350	510	360
35	580	410	590	420
40	660	470	680	480
45	740	520	760	540
50	820	580	850	600
55	910	640	930	660
60	990	700	1020	720
65	1070	760	1100	780

INTERMEDIATE SEMI-TRAILERS (WB-40 & WB-50)

SIGHT DISTANCES (d), (d_v) & (d_x) AND RELATED DISTANCES (d_L , d_r , d_m & d_{vL}) (FEET)

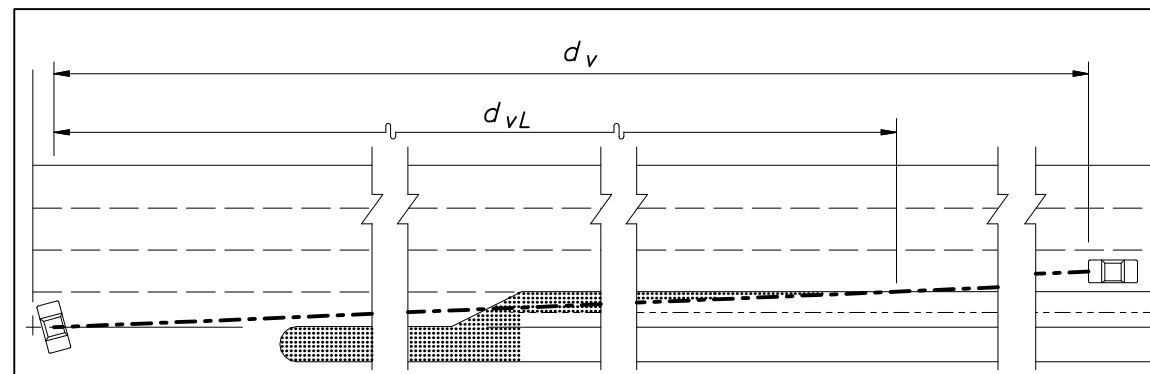
6 LANE DIVIDED



PICTORIAL

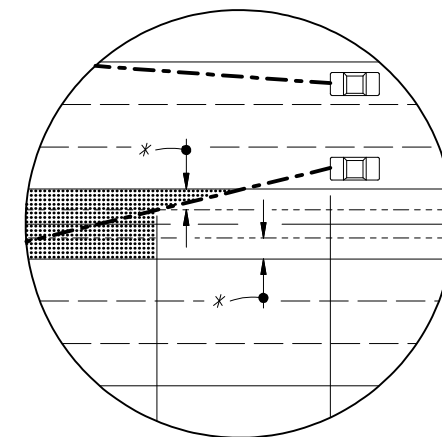
LEGEND
 Areas Free Of Sight Obstructions

* 6' For Restricted Conditions
 CZ For Nonrestricted Conditions
 See Index No. 700



INSET A

Where The Median Is Sufficiently Wide For The Design Vehicle To Pause In The Median (Vehicle Length Plus 6' Min.) The Clear Line Of Sight To The Right (d_v) Is Measured From The Vehicle Pause Location, i.e., Not From The Cross Road Stop Position; Distances d_r & d_m Do Not Apply.



INSET B

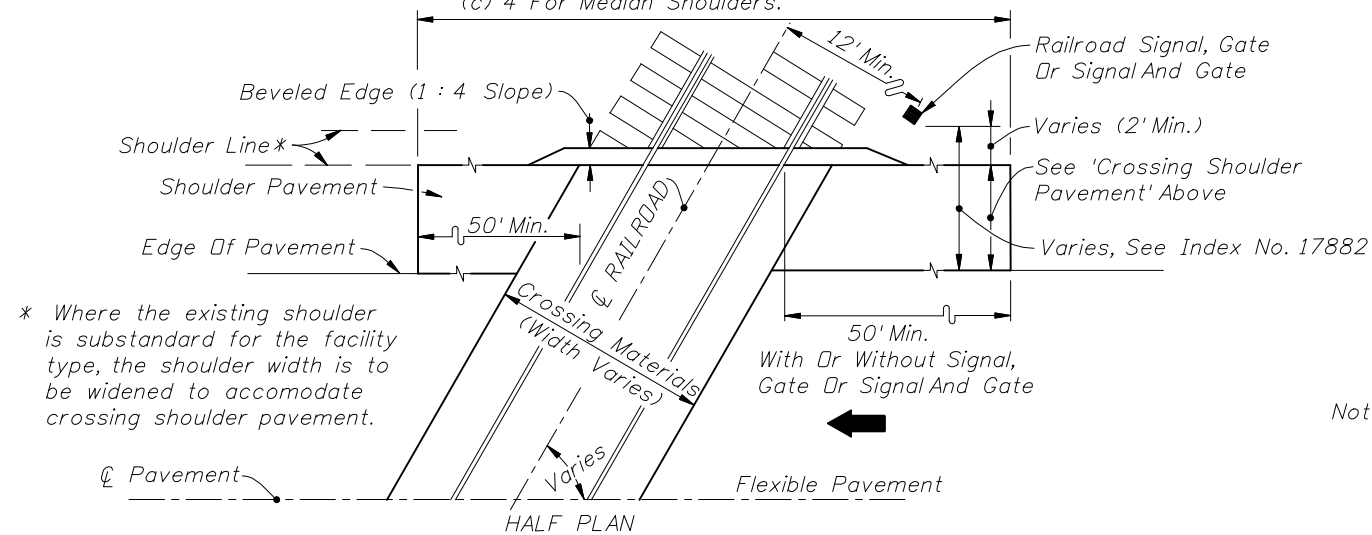
NOTES FOR 6-LANE DIVIDED ROADWAY

1. See Sheet 2 for origin of clear sight line on the minor road.
2. Values shown in the tables are the governing (controlling) sight distances calculated based on 'AASHTO Case B - Intersection with Stop Control on the Minor Road.'



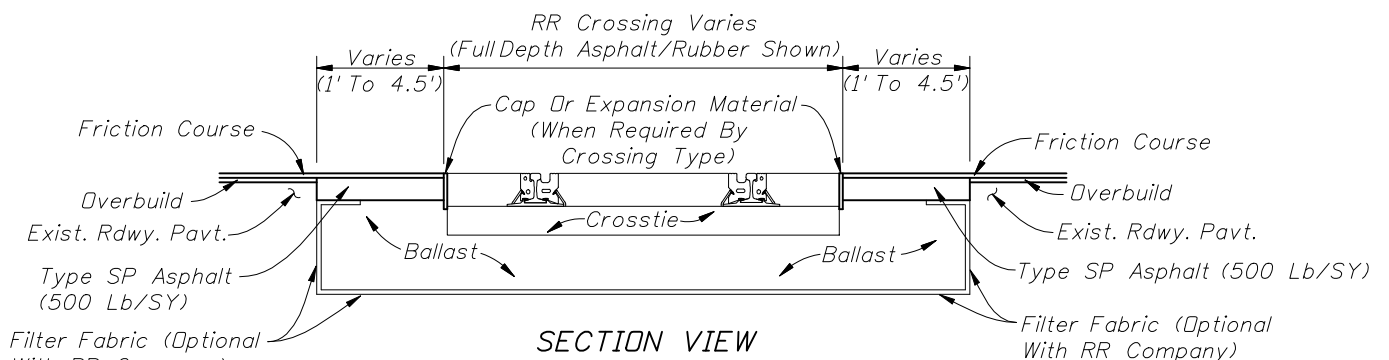
Crossing Shoulder Pavement (Except Area Occupied By Crossing Surfacing Material):

- (a) To Shoulder Line For Outside Shoulders Less Than 8' Wide.
- (b) To 8' Maximum Width For Outside Shoulders 8' Or Wider (Regardless Of Approach Shoulder Pavement Width).
- (c) 4' For Median Shoulders.



* Where the existing shoulder is substandard for the facility type, the shoulder width is to be widened to accommodate crossing shoulder pavement.

ROADWAYS WITH FLUSH SHOULDERS

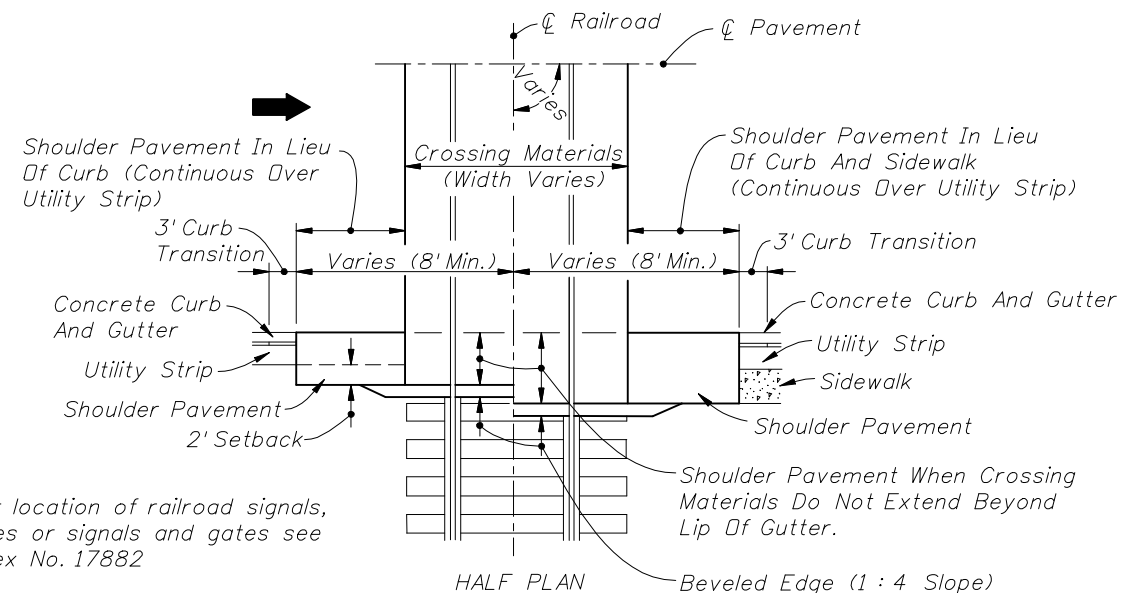


TYPICAL CROSSING MATERIAL REPLACEMENT AT RR CROSSINGS

CROSSING SURFACES	
Type	Definition
C	Concrete
R	Rubber
RA	Rubber/Asphalt

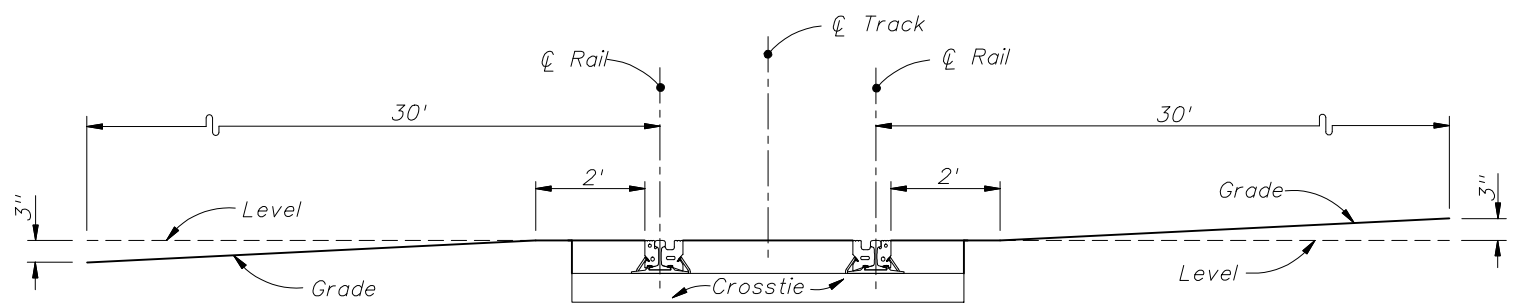
STOP ZONE FOR RUBBER CROSSING	
Design Speed (mph)	Zone Length (Distance From Stop)
45 Or Less	250'
50 - 55	350'
60 - 65	500'
70	600'

- Notes:
- Type R Crossings are NDT to be used for multiple track crossings within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.
 - Single track Type R Crossings within the zones on the chart may be used unless engineering or safety considerations dictate otherwise.



Note: For location of railroad signals, gates or signals and gates see Index No. 17882

CURBED ROADWAYS



To prevent low-clearance vehicles from becoming caught on the tracks, the crossing surface should be at the same plane as the top of the rails for a distance of 2 feet outside the rails. The surface of the highway should also not be more than 3 inches higher or lower than the top of the nearest rail at a point 30 feet from the rail unless track superelevation makes a different level appropriate. Vertical curves should be used to traverse from the highway grade to a level plane at the elevation of the rails. Rails that are superelevated, or a roadway approach section that is not level, will necessitate a site specific analysis for rail clearances.

VERTICAL ROADWAY ALIGNMENT THROUGH A RAILROAD CROSSING

General Notes

- The Railroad Company will furnish and install all track bed (ballast), crossties, rails, crossing surface panels and accessory components. All pavement material, including that through the crossing, will be furnished and installed by the Department or its Contractor, unless negotiated otherwise.
- When a railroad grade crossing is located within the limits of a highway construction project, a transition pavement will be maintained at the approaches of the crossing to reduce vehicular impacts to the crossing. The transition pavement will be maintained as appropriate to protect the crossing from low clearance vehicles and vehicular impacts until the construction project is completed and the final highway surface is constructed.
- The Central Rail Office will maintain a list of currently used Railroad Crossing Products and will periodically distribute the current list to the District Offices as the list is updated.
- The Railroad Company shall submit engineering drawings for the proposed crossing surface type to the Construction Project Engineer and/or the District Rail Office for concurrence along with the List of Railroad Crossing Products. The approved engineering drawings of the crossing surface type shall be made a part of the installation agreement.
- Sidewalks shall be constructed through the crossing between approach sidewalks of the crossing. Sidewalks shall be constructed with appropriate material to allow unobstructed travel through the crossing in accordance with ADA requirements.
- All asphalt shall be installed in accordance with Index No. 514 and Section 300 of the Standard Specifications.



2010 FDOT Design Standards

RAILROAD CROSSINGS

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Index No. 560	

SHEET NO.	CONTENTS
1	Preface Manual On Uniform Traffic Control Devices Abbreviations Symbols
2	Definitions Temporary Traffic Control Devices Pedestrian And Bicyclist Overhead Work Railroads Sight Distance Above Ground Hazard
3	Clear Zone Widths For Work Zones Superelevation Overweight/Oversize Vehicles Lane Widths Length of Lane Closures Temporary Raised Rumble Strips
4	High-Visibility Safety Apparel Flagger Control Regulatory Speeds In Work Zones Survey Work Zones
5	Sign Placement Sign Materials Intersecting Road Signing Adjoining And/Or Overlapping Work Zone Signing Sign Covering And Intermittent Work Stoppage Signing Signing for Detours, Lane Shifts & Diversions Extended Distance Advance Warning Signs Utility Work Ahead Sign Length of Road Work Sign Speeding Fines Doubled When Workers Present Sign Grooved Pavement Ahead Sign End Road Work Signs Project Information Signs
6	Work Zone Sign Supports
7	Project Information Sign
8	Commonly Used Warning and Regulatory Signs In Work Zones
9	Manholes/Crosswalks/Joints Truck Mounted Attenuators Removing Pavement Markings Signals Channelizing And Lighting Devices Channelizing And Lighting Devices Consistency Warning Lights Standard Orange Flag Portable Changeable (Variable) Message Signs (PCMS) Advance Warning Arrow Panels
10	Drop-Offs In Work Zones
11	Business Entrance Temporary Asphalt Separator
12	Identifications-Channelizing And Lighting Devices
13	Pavement Markings

PREFACE

All projects and works on highways, roads and streets shall have a traffic control plan. All work shall be executed under the established plan and Department approved procedures. This index contains information specific to the Federal and State guidelines and standards for the preparation of traffic control plans and for the execution of traffic control in work zones, for construction and maintenance operations and utility work on highways, roads and streets on the State Highway System. Certain requirements in this Index are based on the high volume nature of State Highways. For highways, roads and streets off the State Highway System, the local agency (City/County) having jurisdiction may adopt requirements based on the minimum requirements provided in the MUTCD.

Index No. 600 provides Department policy and standards. Changes are only to be made thru Department approved procedures. Index Nos. 601 thru 670 provide typical applications for various situations. Modification can be made to these Indexes as long as the changes comply with the MUTCD and Department Design Standards.

The sign spacings shown on the Indexes are typical (recommended) distances. These distances may be increased or decreased based on field conditions, in order to avoid conflicts or to improve site specific traffic controls.

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

The Florida Department of Transportation has adopted the "Manual On Uniform Traffic Control Devices For Streets And Highways" (MUTCD) and subsequent revisions and addendums, as published by the U.S. Department of Transportation, Federal Highway Administration, for mandatory use on the State Maintained Highway System whenever there exists the need for construction, maintenance operations or utility work.






















ABBREVIATIONS

Abbreviations assigned to the 600 series Design Standards and applicable to traffic control plans, unless otherwise identified in the plans, are as follows:

CFR	Code of Federal Regulations
DTOE	District Traffic Operations Engineer
FDDT	Florida Department Of Transportation
HAR	Highway Advisory Radio
L	Taper Length, Buffer Length Or Taper Length Plus Buffer Space
MAS	Motorist Awareness System
MOT	Maintenance Of Traffic
MOTC	Maintenance Of Traffic Committee
MUTCD	Manual On Uniform Traffic Control Devices For Streets And Highways
NCHRP	National Cooperative Highway Research Program
PCMS	Portable Changeable (Variable) Message Sign
PRS	Portable Regulatory Sign
R	Radius
RPM	Raised Retroreflective Pavement Marker
RSDU	Radar Speed Display Unit
S	Posted Speed Of Off-Peak 85 Percentile Speed (MPH)
SLED	Speed and Law Enforcement Officer
TTC	Temporary Traffic Control
TCP	Traffic Control Plan(s)
TCZ	Traffic Control Zones
TMA	Truck Mounted Attenuator
VECP	Value Engineering Change Proposal
W	Width Of Taper Transition In Feet, i.e., Lateral Offset

SYMBOLS

The symbols shown are found in the FDOT site menu under Traffic Control Cell library on the CADD system. Symbols assigned to the 600 series Design Standards and applicable to traffic control plans, unless otherwise identified in the plans, are as follows:

	Work Area, Hazard Or Work Phase (Any pattern within a boundary)
	Sign With 18" x 18" (Min.) Orange Flag And Type B Light
	Channelizing Device
	Type III Barricade
	Work Zone Sign
	Flagger
	Traffic Signal
	Advance Warning Arrow Panel
	Portable Signal
	Crash Cushion
	Stop Bar
	Work Vehicle With Flashing Beacon
	Shadow (S) Or Advance Warning (AW) Vehicle With Advance Warning Arrow Panel And Warning Sign
	Truck Mounted Attenuator (TMA)
	Orange Flag For TCZ Signs
	Type B Light For TCZ Signs
	Law Enforcement Officer
	Portable Regulatory Sign
	Radar Speed Display Unit
	Portable Changeable (Variable) Message Sign
	Lane Identification + Direction Of Traffic



2010 FDOT Design Standards

GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

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DEFINITIONS

Regulatory Speed (In Work Zones)

The maximum permitted travelspeed posted for the work zone is indicated by the regulatory speed limit signs. The work zone speed must be shown or noted in the plans. This speed should be used as the minimum design speed to determine runout lengths, departure rates, flare rates, lengths of need, clear zone widths, taper lengths, crash cushion requirements, marker spacings, superelevation and other similar features.

Advisory Speed

The maximum recommended travelspeed through a curve or a hazardous area.

Travel Way

The portion of the roadway for the movement of vehicles. For traffic controlthrough work zones, travelway may include the temporary use of shoulders and any other permanent or temporary surface intended for use as a lane for the movement of vehicular traffic.

- a. *Travel Lane:* The designated widths of roadway pavement marked to carry through traffic and to separate it from opposing traffic or traffic occupying other traffic lanes.
- b. *Auxiliary Lane:* The designated widths of roadway pavement marked to separate speed change, turning, passing and climbing maneuvers from through traffic.

Detour, Lane Shift, and Diversion

A detour is the redirection of traffic onto another roadway to bypass the temporary traffic controlzone. A lane shift is the redirection of traffic onto a different section of the permanent pavement. A diversion is the redirection of traffic onto a temporary roadway, usually adjacent to the permanent roadway and within the limits of the right-of-way.

Above Ground Hazard

An above ground hazard is any object, material or equipment other than traffic controldevices that encroaches upon the travelway or that is located within the clear zone which does not meet the Department's safety criteria, i.e., anything that is greater than 4" in height and is firm and unyielding or doesn't meet breakaway requirements.

TEMPORARY TRAFFIC CONTROL DEVICES

All temporary traffic controldevices shallbe removed as soon as practical when they are no longer needed. When work is suspended for short periods of time, temporary traffic controldevices that are no longer appropriate shallbe removed or covered. Arrow Panels, Portable Changeable Message Signs, Radar Speed Display Trailers, Portable Regulatory Signs, and any other trailer mounted devices shallbe delineated with retroreflective TTC devices when in use and shallbe moved outside the travelway and clear zone or be shielded by a barrier or crash cushion when not in use.

PEDESTRIAN AND BICYCLIST

When an existing pedestrian way or bicycle way is located within a traffic controlwork zone, accommodation must be maintained and provision for the disabled must be provided.

Only approved temporary traffic controldevices may be used to delineate a temporary traffic controlzone pedestrian walkway.

Advanced notification of sidewalk closures and marked detours shallbe provided by appropriate signs.

OVERHEAD WORK

Work is only allowed over a traffic lane when one of the following options is used:

OPTION 1 (OVERHEAD WORK USING A MODIFIED LANE CLOSURE)

Overhead work using a modified lane closure is allowed if all of the following conditions are met:

- a. Work operation is located in a signalized intersection and limited to signals, signs, lighting and utilities.
- b. Work operations are 60 minutes or less.
- c. Speed limit is 45 mph or less.
- d. Aeriallift equipment in the work area has high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- e. Aeriallift equipment is placed directly below the work area to close the lane.
- f. Traffic controldevices are placed in advance of the vehicle/equipment closing the lane using a minimum 100 foot taper.
- g. Volume or complexity of the roadway may dictate additional devices, signs, flagmen and/or a traffic controlofficer.

OPTION 2 (OVERHEAD WORK ABOVE AN OPEN TRAFFIC LANE)

Overhead work above a open traffic lane is allowed if all of the following conditions are met:

- a. Work operation is located on a utility pole, light pole, signal pole, or their appurtenances.
- b. Work operations are 60 minutes or less.
- c. Speed limit is 45 mph or less.
- d. No encroachment by any part of the work activities and equipment within an area bounded by 2 feet outside the edge of travelway and 18 feet high.
- e. Aeriallift equipment in the work area has high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- f. Volume or complexity of the roadway may dictate additional devices, signs, flagmen and/or a traffic controlofficer.
- g. Adequate precautions are taken to prevent parts, tools, equipment and other objects from falling into open lanes of traffic.
- h. Other Governmental Agencies, Rail facilities, or Codes may require a greater clearance. The greater clearance required prevails as the rule.

OPTION 3 (OVERHEAD WORK ADJACENT TO AN OPEN TRAFFIC LANE)

Overhead work adjacent to an open traffic lane is allowed if all of the following conditions are met:

- a. Work operation is located on a utility pole, light pole, signal pole, or their appurtenances.
- b. Work operations are 1 day or less.
- c. Speed limit is 45 mph or less.
- d. No encroachment by any part of the work activities and equipment within 2 foot from the edge of travelway up to 18' height. Above 18' in height, no encroachment by any part of the work activities and equipment over the open traffic lane (except as allowed in Option 2 for work operations of 60 minutes or less).
- e. Aeriallift equipment in the work area has high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- f. Volume or complexity of the roadway may dictate additional devices, signs, flagmen and/or a traffic controlofficer.
- g. Adequate precautions are taken to prevent parts, tools, equipment and other objects from falling into open lanes of traffic.
- h. Other Governmental Agencies, Rail facilities, or Codes may require a greater clearance. The greater clearance required prevails as the rule.

OVERHEAD WORK CONTINUED..

OVERHEAD WORK CONTINUED..

OPTION 4 (OVERHEAD WORK MAINTAINING TRAFFIC WITH NO ENCROACHMENT BELOW THE OVERHEAD WORK AREA)

Traffic shallbe detoured, shifted, diverted or paced as to not encroach in the area directly below the overhead work operations in accordance with the appropriate standard index drawing or detailed in the plans. This option applies to, but not limited to, the following construction activities:

- a. Beam, girder and segment placement.
- b. Deck form placement and removal.
- c. Concrete deck placement.
- d. Railing construction located at edge of deck.
- e. Structure demolition.

OPTION 5 (CONDUCTOR/CABLE PULLING ABOVE AN OPEN TRAFFIC LANE)

Overhead cable and/or de-energized conductor installations initialpull to proper tension shallbe done in accordance with the appropriate Standard Index or temporary traffic controlplan.

Continuous pulling operations of secured cable and/or conductors are allowed over open lane(s) of traffic with no encroachment by any part of the work activities, materials or equipment within the minimal vertical clearance above the travelway. The utility shalltake precautions to ensure that pullropes and conductors/cables at no time fallbelow the minimum vertical clearance.

On Limited Access facilities, a site specific temporary traffic controlplan is required. The temporary traffic controlplan shallinclude:

- a. The temporary traffic controlset up for the initialpulling of the pullrope across the roadway.
- b. During pulling operations, advance warning consisting of no less than a Changeable Message Sign upstream of the work area with alternating messages, "Overhead Work Ahead" and "Be Prepared to Stop" followed by a traffic controlofficer and police vehicle with blue lights flashing during the pulling operation.

RAILROADS

Railroad crossings affected by a construction project should be evaluated for traffic controls to reduce queuing on the tracks. The evaluation should include as a minimum: traffic volumes, distance from the tracks to the intersections, lane closure or taper locations, signal timing, etc.

SIGHT DISTANCE

Tapers: Transition tapers should be obvious to drivers. If restricted sight distance is a problem (e.g., a sharp vertical or horizontal curve), the taper should begin well in advance of the view obstruction. The beginning of tapers should not be hidden behind curves.

Intersections: Traffic controldevices at intersections must provide sight distances for the road user to perceive potential conflicts and to traverse the intersection safely.

ABOVE GROUND HAZARD

Above ground hazards (see definitions) are to be considered work areas during working hours and treated with appropriate work zone traffic controlprocedures. During nonworking hours, all objects, materials and equipment that constitute an above ground hazard must be stored/placed outside the travelway and clear zone or be shielded by a barrier or crash cushion.

For above ground hazards within a work zone the clear zone required should be based on the regulatory speed posted during construction.



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GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

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CLEAR ZONE WIDTHS FOR WORK ZONES

The term 'clear zone' describes the unobstructed relatively flat area, impacted by construction, extending outward from the edge of the traffic lane. The table below gives clear zone widths in work zones for medians and roadside conditions other than for roadside canals; where roadside canals are present, clear zone widths are to conform with the distances to canals as described in Volume I, Chapter 4, Section 4.2 and Exhibit 4-A and 4-B of the Plans Preparation Manual.

CLEAR ZONE WIDTHS FOR WORK ZONES		
WORK ZONE SPEED (MPH)	TRAVEL LANES & MULTILANE RAMPS (feet)	AUXILIARY LANES & SINGLE LANE RAMPS (feet)
60-70	30	18
55	24	14
45-50	18	10
30-40	14	10
ALL SPEEDS CURB & GUTTER	4' BEHIND FACE OF CURB	4' BEHIND FACE OF CURB

SUPERELEVATION

Horizontal curves constructed in conjunction with work zone traffic control should have the required superelevation applied to the design radii. Under conditions where normal cross slope controls curvature, the minimum radii that can be applied are listed in the table below.

MINIMUM RADII FOR NORMAL CROSS SLOPES	
DESIGN SPEED	MINIMUM RADIUS
MPH	feet
65	3130
60	2400
55	1840
50	1390
45	1080
40	820
35	610
30	430
Superelevate When Smaller Radii is Used	

OVERWEIGHT/OVERSIZE VEHICLES

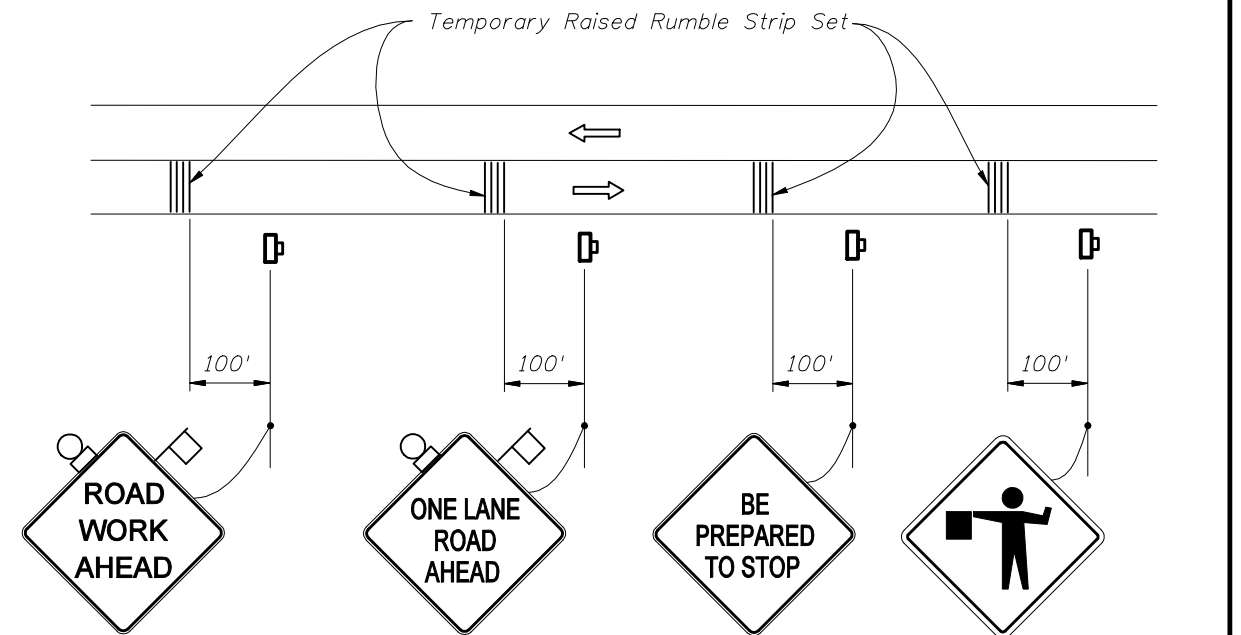
Restrictions to Lane Widths, Heights or Load Capacity can greatly impact the movement of over dimensioned loads. The Contractor shall notify the Engineer who in turn shall notify the State Permits Office, phone no. (850) 410-5777, at least seven calendar days in advance of implementing a maintenance of traffic plan which will impact the flow of overweight/oversized vehicles. Information provided shall include location, type of restriction (height, width or weight) and restriction time frames. When the roadway is restored to normal service the State Permits Office shall be notified immediately.

LANE WIDTHS

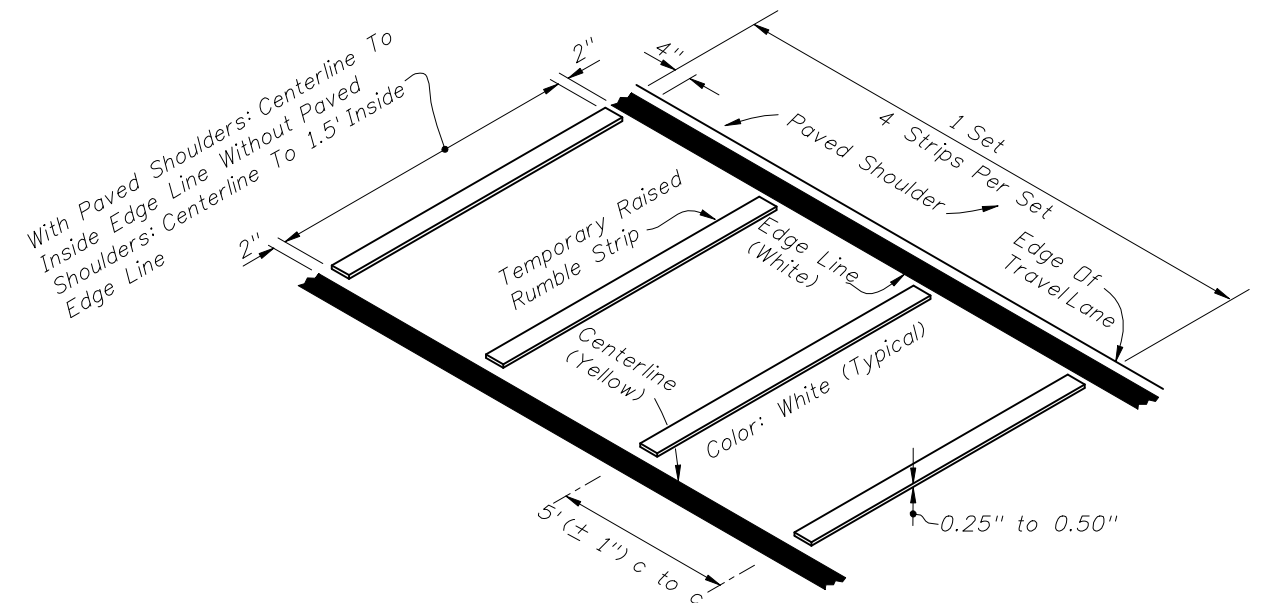
Lane widths of through roadways should be maintained through work zone travelways wherever practical. The minimum widths for work zone travel lanes shall be as follows: 11' for Interstate with at least one 12' lane provided in each direction, unless formally excepted by the Federal Highway Administration; 11' for freeways; and 10' for all other facilities.

LENGTH OF LANE CLOSURES

Lane closures shall not exceed 2 miles in total length (taper, buffer space and work space) in any given direction on the Interstate or on state highways with a posted speed of 55 MPH or greater.



TYPICAL PLACEMENT OF TEMPORARY RAISED RUMBLE STRIPS



TEMPORARY RAISED RUMBLE STRIP SET (PAVED SHOULDER SHOWN)

GENERAL NOTES

1. Temporary raised rumble strips sets shall be placed in advance of each flagging station when called for in the plans.
2. Temporary raised rumble strip sets are used to supplement a series of advanced warning signs and shall be installed and removed when the signs are installed and removed.
3. Remove the temporary raised rumble strips prior to removing the advance warning signs.



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GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

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HIGH-VISIBILITY SAFETY APPAREL

All high-visibility safety apparel shall meet the requirements of the International Safety Equipment Association (ISEA) and the American National Standards Institute (ANSI) for High-Visibility Safety Apparel", and labeled as ANSI/ISEA 107-2004. The apparel background (outer) material color shall be either fluorescent orange-red or fluorescent yellow-green as defined by the standard. The retroreflective material shall be orange, yellow, white, silver, yellow-green, or a fluorescent version of these colors, and shall be visible at a minimum distance of 1,000 feet. Class 3 apparel may be substituted for Class 2 apparel. Replace apparel that is not visible at 1,000 feet.

WORKERS: All workers within the right-of-way shall wear ANSI/ISEA Class 2 apparel. Workers operating machinery or equipment in which loose clothing could become entangled during operation shall wear fitted high-visibility safety apparel. Workers inside the bucket of a bucket truck are not required to wear high-visibility safety apparel.

UTILITIES: When other industry apparel safety standards require utility workers to wear apparel that is inconsistent with FDOT requirements such as NFPA, OSHA, ANSI, etc., the other standards for apparel may prevail.

FLAGGERS: For daytime activities, Flaggers shall wear ANSI/ISEA Class 2 apparel. For nighttime activities, Flaggers shall wear ANSI/ISEA Class 3 apparel.

FLAGGER CONTROL

Where flaggers are used, a FLAGGER symbol or legend sign must replace the WORKERS symbol or legend sign.

The flagger must be clearly visible to approaching traffic for a distance sufficient to permit proper response by the motorist to the flagging instructions, and to permit traffic to reduce speed or to stop as required before entering the work site. Flaggers shall be positioned to maintain maximum color contrast between the Flagger's high-visibility safety apparel and equipment and the work area background.

Hand-Signaling Devices

STOP/SLOW paddles are the primary hand-signaling device. The STOP/SLOW paddle shall have an octagonal shape on a rigid handle. If the STOP/SLOW paddle is placed on a rigid staff, the minimum length of the staff, measured from the bottom of the paddle to the end of the staff that rests on the ground, should be 7 ft. STOP/SLOW paddles shall be at least 24 inches wide with letters at least 6 inches high and should be fabricated from light semirigid material. The background of the STOP face shall be red with white letters and border. The background of the SLOW face shall be orange with black letters and border. When used at night-time, the STOP/SLOW paddle shall be retroreflectorized.

Flag use is limited to immediate emergencies, intersections, and when working on the centerline or shared left turn lanes where two (2) flaggers are required and there is opposing traffic in the adjacent lanes. Flags, when used, shall be a minimum of 24 inches square, made of a good grade of red material, and securely fastened to a staff that is approximately 36 inches in length. When used at nighttime, flags shall be retroreflectorized red.

Flashlight, lantern or other lighted signal that will display a red warning light shall be used at night.

Flagger Stations

Flagger stations shall be located far enough in advance of the work space so that approaching road users will have sufficient distance to stop before entering the work space. When used at nighttime, the flagger station shall be illuminated.

REGULATORY SPEEDS IN WORK ZONES

Traffic Control Plans (TCP's) for all projects must include specific regulatory speeds for each phase of work. This can either be the posted speed or a reduced speed. The speed shall be noted in the TCPs; this includes indicating the existing speed if no reduction is to be made. Regulatory speeds are to be uniformly established through each phase.

In general, the regulatory speed should be established to route vehicles safely through the work zone as close as to normal highway speed as possible. The regulatory speed should not be reduced more than 10 mph below the posted speed and never below the minimum statutory speed for the class of facility. When a speed reduction greater than 10 mph is imposed, the reduction is to be done in 10 mph per 500' increments.

Temporary regulatory speed signs shall be removed as soon as the conditions requiring the reduced speed no longer exist. Once the work zone regulatory speeds are removed, the regulatory speed existing prior to construction will automatically go back into effect unless new speed limit signing is provided for in the plans.

On projects with interspaced work activities, speed reductions should be located in proximity to those activities which merit a reduced speed, and not "blanketed" for the entire project. At the departure of such activities, the normal highway speed should be posted to give the motorist notice that normal speed can be resumed.

If the existing regulatory speed is to be used, consideration should be given to supplementing the existing signs when the construction work zone is between existing regulatory speed signs. For projects where the reduced speed conditions exist for greater than 1 mile in rural areas (non-interstate) and on rural or urban interstate, additional regulatory speed signs are to be placed at no more than 1 mile intervals. Engineering judgement should be used in placement of the additional signs. Locating these signs beyond ramp entrances and beyond major intersections are examples of proper placement. For urban situations (non-interstate), additional speed signs are to be placed at a maximum of 1000' apart.

When field conditions warrant speed reductions different from those shown in the TCP the contractor may submit to the project engineer for approval by the Department, a signed and sealed study to justify the need for further reducing the posted speed, or, the engineer may request the District Traffic Operations Engineer (DTOE) to investigate the need. It will not be necessary for the DTOE to issue regulations for regulatory speeds in work zones due to the revised provisions of F.S. 316.07451(2) (b). Advisory Speed plates will be used at the option of the field engineer for temporary use while processing a request to change the regulatory speed specified in the plans when deemed necessary. Advisory speed plates cannot be used alone but must be placed below the construction warning sign for which the advisory speed is required.

For additional information refer to the FDOT Plans Preparation Manual, Volume I, Chapter 10.

SURVEY WORK ZONES

The SURVEY CREW AHEAD symbol or legend sign shall be the principal Advance Warning Sign used for Traffic Control Through Survey Work Zones and may replace the ROAD WORK AHEAD sign when lane closures occur, at the discretion of the Party Chief. Type B Light or dual orange flags shall be used at all times to enhance the SURVEY CREW AHEAD sign, even with mesh signs.

When Traffic Control Through Work Zones is being used for survey purposes only, the END ROAD WORK sign as called for on certain 600 Series Indexes should be omitted.

Survey Between Active Traffic Lanes or Shared Left Turn Lanes

The following provisions apply to Main Roadway Traffic Control Work Zones. These provisions must be adjusted by the Party Chief to fit roadway and traffic conditions when the Survey Work Zone includes intersections.

- (A) A STAY IN YOUR LANE (MOT-1-06) sign shall be added to the Advance Warning Sign sequence as the second most immediate sign from the work area.
- (B) Elevation Surveys-Cones may be used at the discretion of the Party Chief to protect prism holder and flagger(s). Cones, if used, may be placed at up to 50' intervals along the break line throughout the work zone.
- (C) Horizontal Control-With traffic flow in the same direction, cones shall be used to protect the backsight tripod and/or instrument. Cones shall be placed at the equipment, and up to 50' intervals for at least 200' towards the flow of traffic.
- (D) Horizontal Control-With traffic flow in opposite directions, cones shall be used to protect the backsight tripod and/or instrument. Cones shall be placed at the equipment, and up to 50' intervals for at least 200' in both directions towards the flow of traffic.



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GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

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SIGN PLACEMENT

Post-mounted signs installed at the side of the road shall be mounted at a height at least 7 feet measured from the bottom of the sign to a horizontal line extended from the near edge of the pavement. Signs mounted on barricades, or other portable supports shall be no less than 1 foot above the traveled way.

SIGN MATERIALS

Mesh signs may be used only for Daylight Operations as noted in the standards. Type B Lights and Orange Flags are not required except for survey work zones.

Vinyl signs may be used for Day or Night Operations not to exceed 1 day except as noted in the standards. Type B Lights and Orange Flags are not required except for survey work zones.

INTERSECTING ROAD SIGNING

Signing for the control of traffic entering and leaving work zones by way of intersecting highways, roads and streets shall be adequate to make drivers aware of work zone conditions. Under no condition will intersecting leg signing be less than a ROAD WORK AHEAD sign.

ADJOINING AND/OR OVERLAPPING WORK ZONE SIGNING

Adjoining work zones may not have sufficient spacing for standard placement of signs and other traffic control devices in their advance warning areas or in some cases other areas within their traffic control zones. Where such restraints or conflicts occur or are likely to occur, one of the following methods will be employed to avoid conflicts and prevent conditions that could lead to misunderstanding on the part of the traveling public as to the intended travel way by the traffic control procedure applied:

- (A) For scheduled projects the engineer in responsible charge of project design will resolve anticipated work zone conflicts during the development of the project traffic control plan. This may entail revision of plans on preceding projects and coordination of plans on concurrent projects.
- (B) Unanticipated conflicts arising between adjoining in progress highway construction projects will be resolved by the Resident Engineer for projects under his residency, and, by the District Construction Engineer for in progress projects under adjoining residencies.
- (C) The District Maintenance Engineer will resolve anticipated and occurring conflicts within scheduled maintenance operations.
- (D) The Unit Maintenance Engineer will resolve conflicts that occur within routine maintenance works; between routine maintenance work, unscheduled work and/or permitted work; and, between unit controlled maintenance works and highway construction projects.

SIGN COVERING AND INTERMITTENT WORK STOPPAGE SIGNING

Existing or temporary traffic control signs that are no longer applicable or are inconsistent with intended travel paths shall be removed or fully covered.

Sign blanks or other available coverings must completely cover the existing sign. Rigid sign coverings shall be the same size as the sign it is covering, and bolted in a manner to prevent movement.

Sign covers are incidental to work operations and are not paid for separately.

SIGNING FOR DETOURS, LANE SHIFTS AND DIVERSIONS

Detours should be signed clearly over their entire length so that motorists can easily determine how to return to the original roadway. The reverse curve (W1-4) warning sign should be used for the advanced warning for a lane shift. A diversion should be signed as a lane shift.

EXTENDED DISTANCE ADVANCE WARNING SIGN

Advance Warning Signs shall be used at extended distance of one-half mile or more when limited sight distance or the nature of the obstruction may require a motorist to bring their vehicle to a stop. Extended distance Advanced Warning Signs may be required on any type roadway, but particularly be considered on multilane divided highways where vehicle speed is generally in the higher range (45 MPH or more).

UTILITY WORK AHEAD SIGN

The UTILITY WORK AHEAD (W21-7) sign may be used as an alternate to the ROAD WORK AHEAD or the ROAD WORK XX FT (W20-1) sign for utility operations on or adjacent to a highway.

LENGTH OF ROAD WORK SIGN

The length of road work sign (G20-1) bearing the legend ROAD WORK NEXT----- MILES is required for all projects of more than 2 miles in length. The number of miles entered should be rounded up to the nearest mile. The sign shall be located at begin construction points.

SPEEDING FINES DOUBLED WHEN WORKERS PRESENT SIGN

The SPEEDING FINES DOUBLED WHEN WORKERS PRESENT sign should be installed on all projects, but may be omitted if the work operation is less than 1 day. The placement should be 500 feet beyond the ROAD WORK AHEAD sign or midway to the next sign whichever is less.

GROOVED PAVEMENT AHEAD SIGN

The GROOVED PAVEMENT AHEAD sign is required 500 feet in advance of a milled or grooved surface open to traffic.

END ROAD WORK SIGN

The END ROAD WORK sign (G20-2A) should be installed on all projects, but may be omitted where the work operation is less than 1 day. The sign should be placed approximately 500 feet beyond the end of a construction or maintenance project unless other distance is called for in the plans. When other Construction or Maintenance Operations occur within 1 mile this sign should be omitted and signing coordinated in accordance with Index No. 600, ADJOINING AND/OR OVERLAPPING WORK ZONE SIGNING.

PROJECT INFORMATION SIGN

The Project information sign shall be installed when called for in the plans.



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GENERAL NOTES:

- All signs shall be post mounted when work operations exceed one day except for:
 - Road closure signs mounted in accordance with the vendor drawing for the Type III Barricade shown on the QPL.
 - Pedestrian advanced warning or regulatory signs mounted on sign supports in accordance with the vendor drawing shown on the QPL.

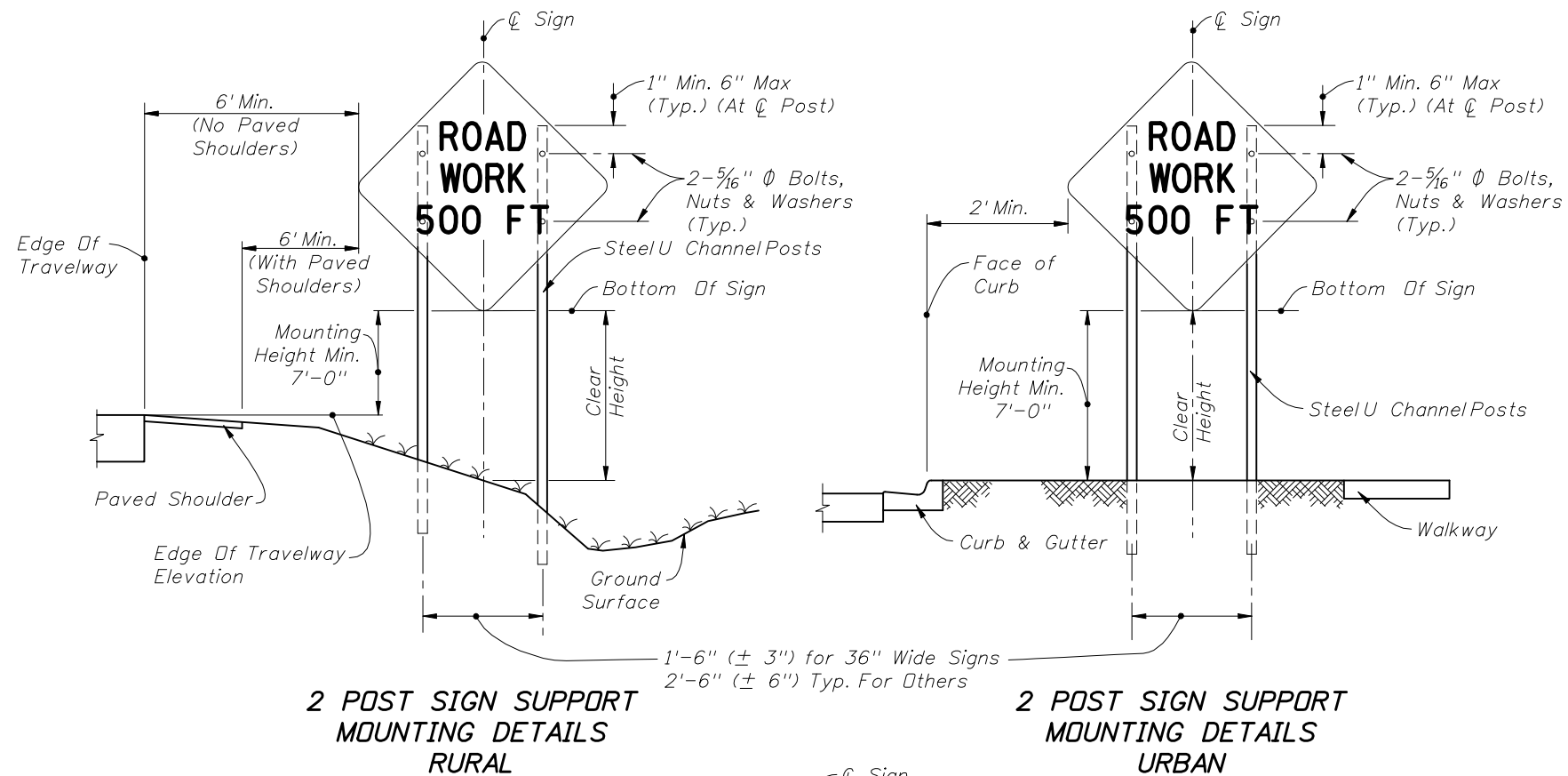
TEMPORARY SIGN SUPPORT NOTE:

- Signs mounted on temporary supports or barricades, and barricade/sign combination shall be crashworthy in accordance with NCHRP 350 requirements and included on the Qualified Products List (QPL).

POST MOUNTED SIGN NOTES:

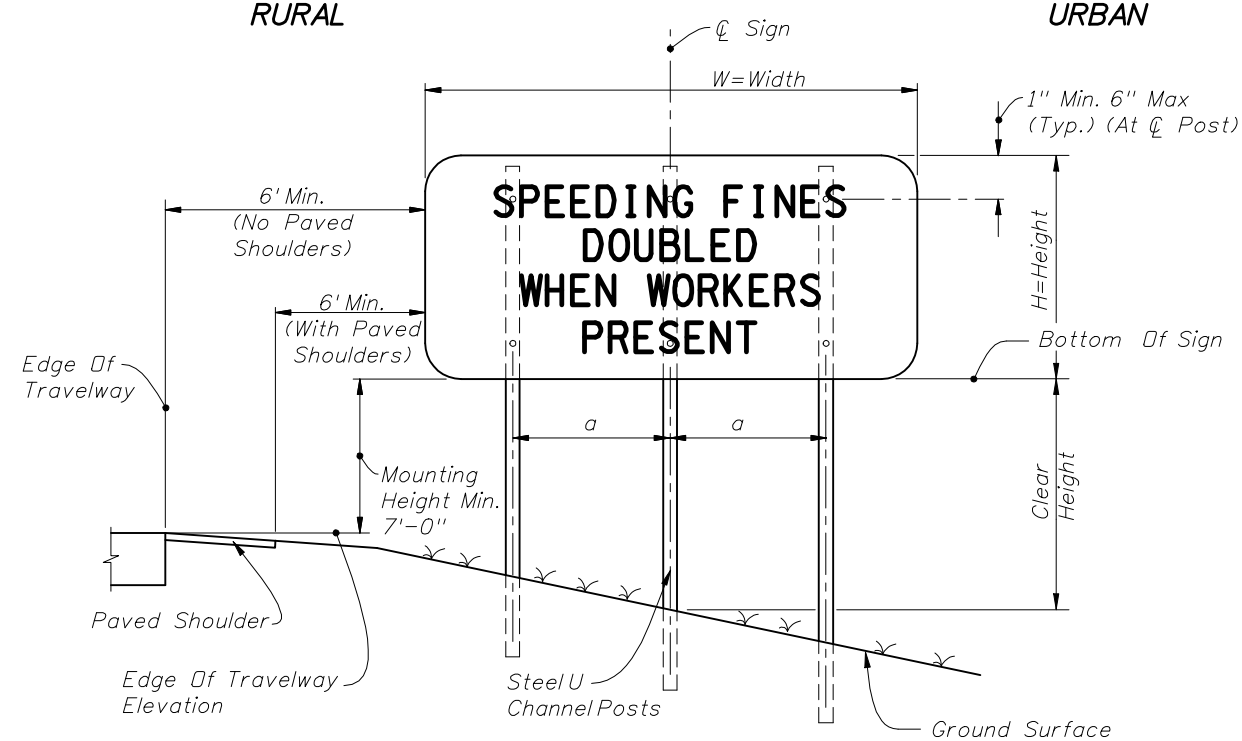
- For Single Post Sign Supports, use the appropriate rural or urban two (2) Post Sign Support Mounting Detail.
- Use only approved systems listed on the Department's Qualified Products List (Manufacturers seeking QPL approval see Index 11860. Submit soil plate details for foundation depth design.).
- Provide 3 lb/ft Steel U Channel Posts with a minimum section modulus of 0.43 in² for 60 ksi steel, or a minimum section modulus of 0.37 in² for 70 ksi steel.
- Provide 4 lb/ft Steel U Channel Posts with a minimum section modulus of 0.56 in² for 60 ksi steel, or a minimum section modulus of 0.47 in² for 70 ksi steel.
- Steel U Channel Posts shall meet the material requirements of Specification 700 with the exception that galvanization is not required.
- Sign attachment bolts, washers, nuts and spacers shall conform with ASTM A307 or A 36.
- For diamond warning signs with supplement plaque (up to 3 ft² in area), use 4 lb/ft posts for up to 10 ft Clear Height (measure to the bottom of diamond warning sign).
- Install 4 lb/ft Steel U Channel Posts with approved breakaway splice in accordance with the manufacturer's detail shown on the QPL.
- The contractor may install 3 lb/ft Steel U Channel Posts with approved breakaway splice in accordance with the manufacturer's detail shown on the QPL.
- Install all posts plumb.
- The contractor may set posts in preformed holes to the specified depth with suitable backfill tamped securely on all sides, or drive 3 lb/ft sign posts and any size base post in accordance with the manufacturer's detail shown on the QPL.

- The soilplate as shown on the QPL vendor drawing is not required for base posts or sign posts driven through existing asphalt roadway or shoulder pavement.



2 POST SIGN SUPPORT MOUNTING DETAILS RURAL

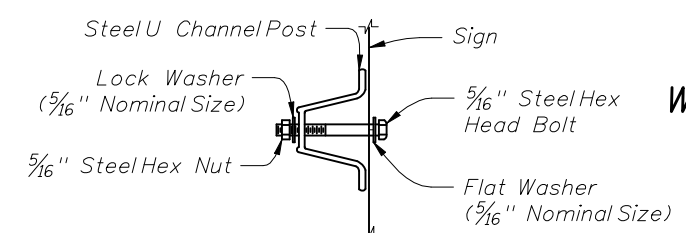
2 POST SIGN SUPPORT MOUNTING DETAILS URBAN



3 POST SIGN SUPPORT MOUNTING DETAILS

Where $W = 48''$: $a = 1' - 4\frac{1}{2}'' (\pm 1'')$
 $W = 72''$: $a = 2' - 1'' (\pm 1'')$

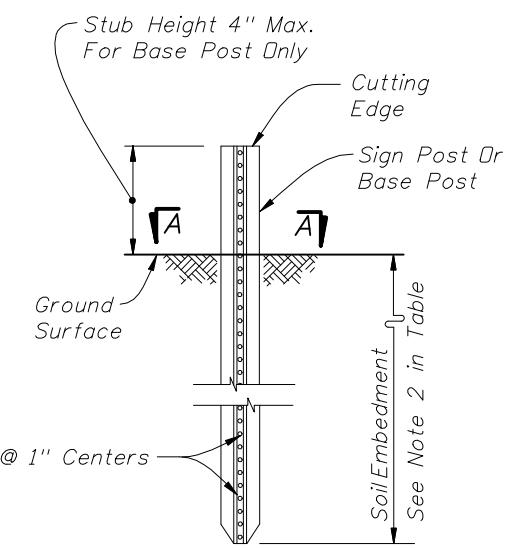
WORK ZONE SIGN SUPPORTS



SIGN ATTACHMENT DETAIL

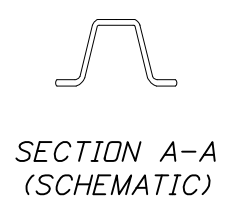
SIGN SHAPE	SIGN SIZE (inches)	NUMBER OF STEEL U CHANNEL POSTS
Octagon	30x30	1
	36x36x36	1
Triangle	48x48x48	1
	60x60x60	2
	24x18	1
Rectangle (W x H)	24x30	1
	30x24	1
	36x18	1
	48x18	1
	36x48	2
	48x30	2
	48x36	2
	54x36	2
	48x60	3
	72x48	3
Square	30x30	1
	36x36	2
	48x48	2
Diamond (See Note 6)	48x48	2
Circle	36Ø	2

Notes For Table:
 1. Use 3 lb/ft posts for Clear Height up to 10' and 4 lb/ft posts for Clear Height up to 12'.
 2. Minimum foundation depth is 4.0 feet for 3 lb/ft posts and 4.5 feet for 4 lb/ft posts.

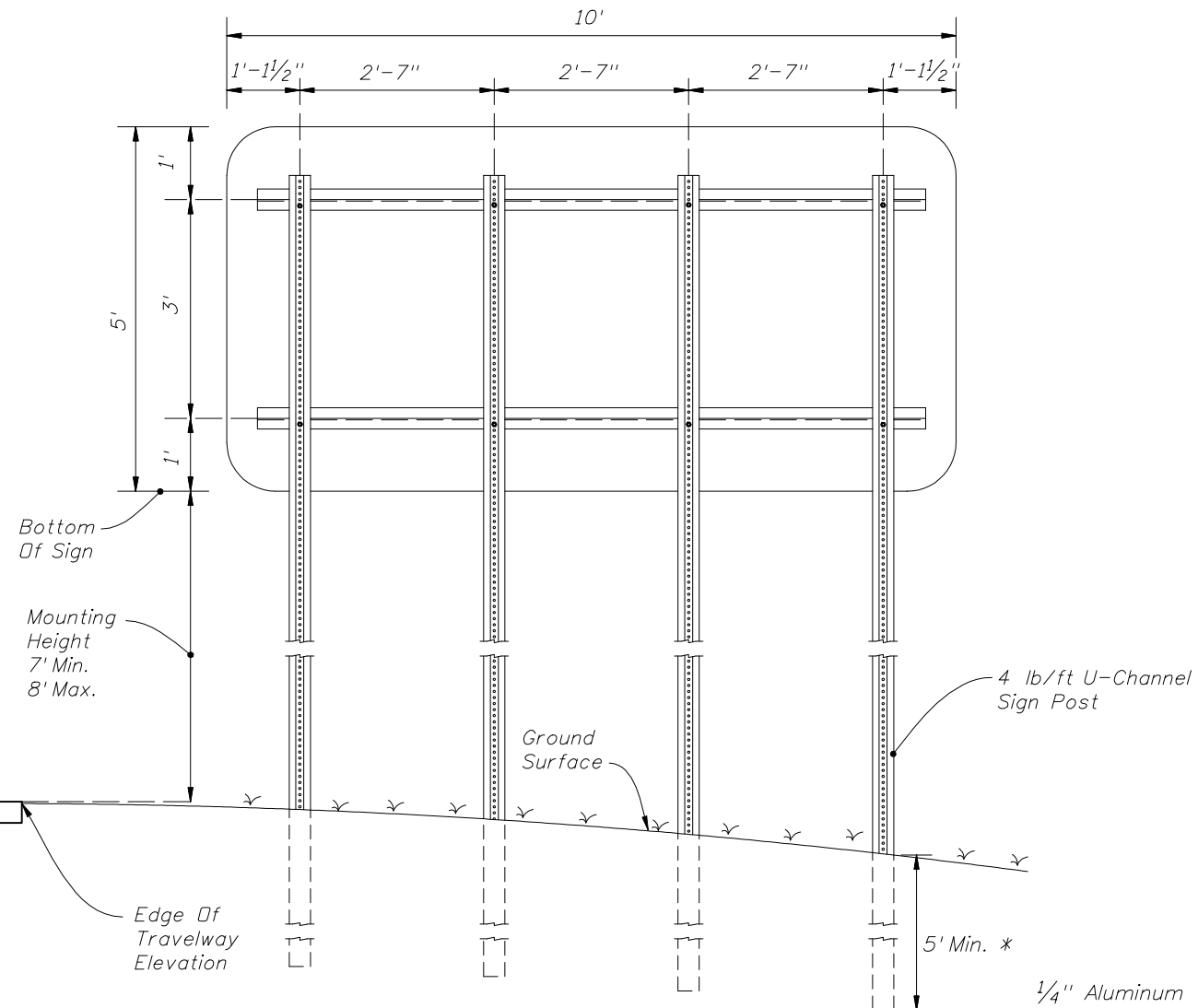


TYPICAL FOUNDATION DETAIL

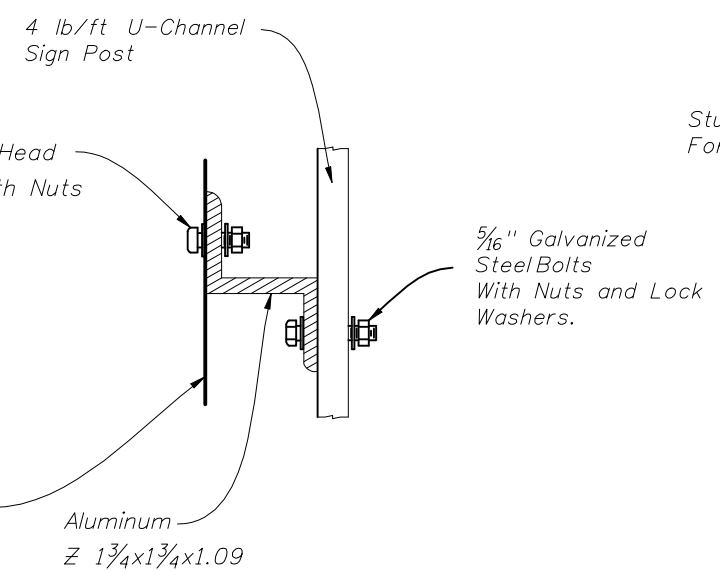
See QPL for post, splice and connection details. No bolts installed closer than 1" to cutting edge.



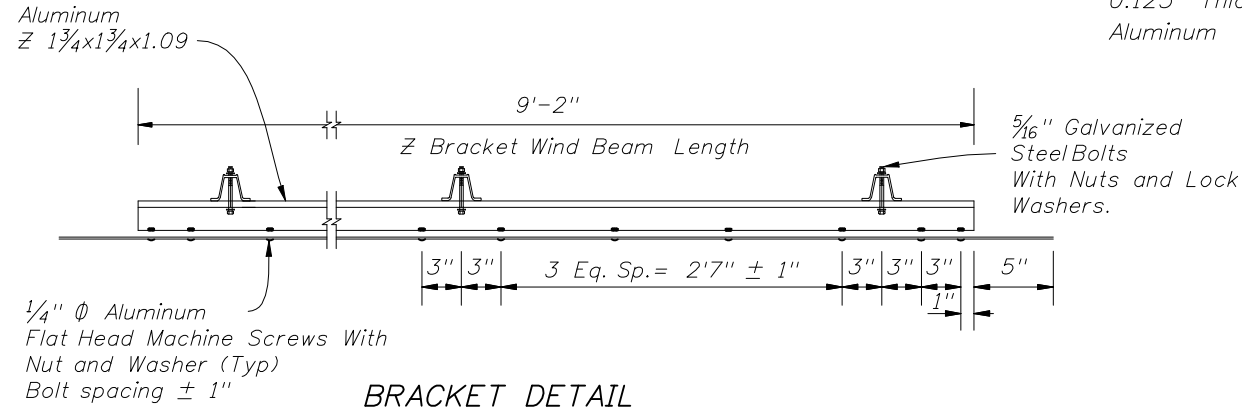
SECTION A-A (SCHEMATIC)



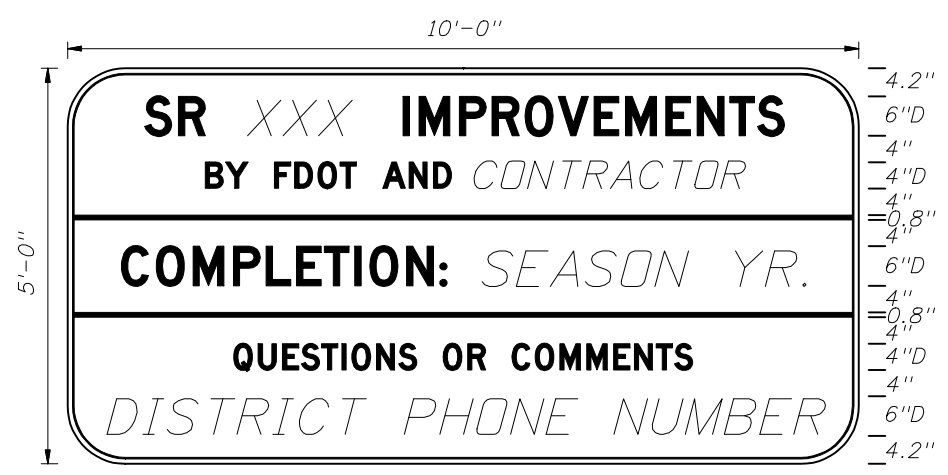
4 POST SIGN SUPPORT MOUNTING DETAIL



SIGN ATTACHMENT DETAIL

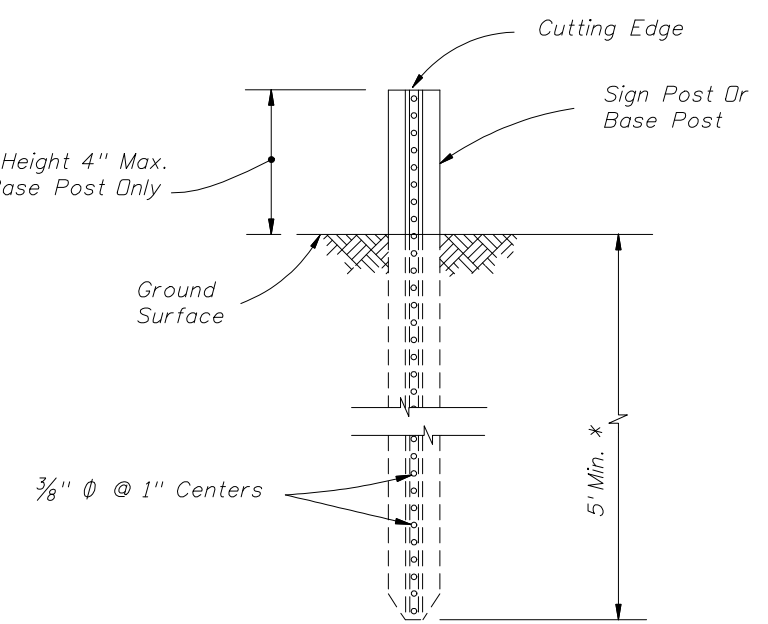


BRACKET DETAIL



BORDER 10'-0"x 5'-0"
 R=8" 8" Radii
 TH=0.25" 4" and 6" series D Legend
 IN=0.75" Blue Background
 White Legend and Border

PROJECT INFORMATION SIGN DETAIL

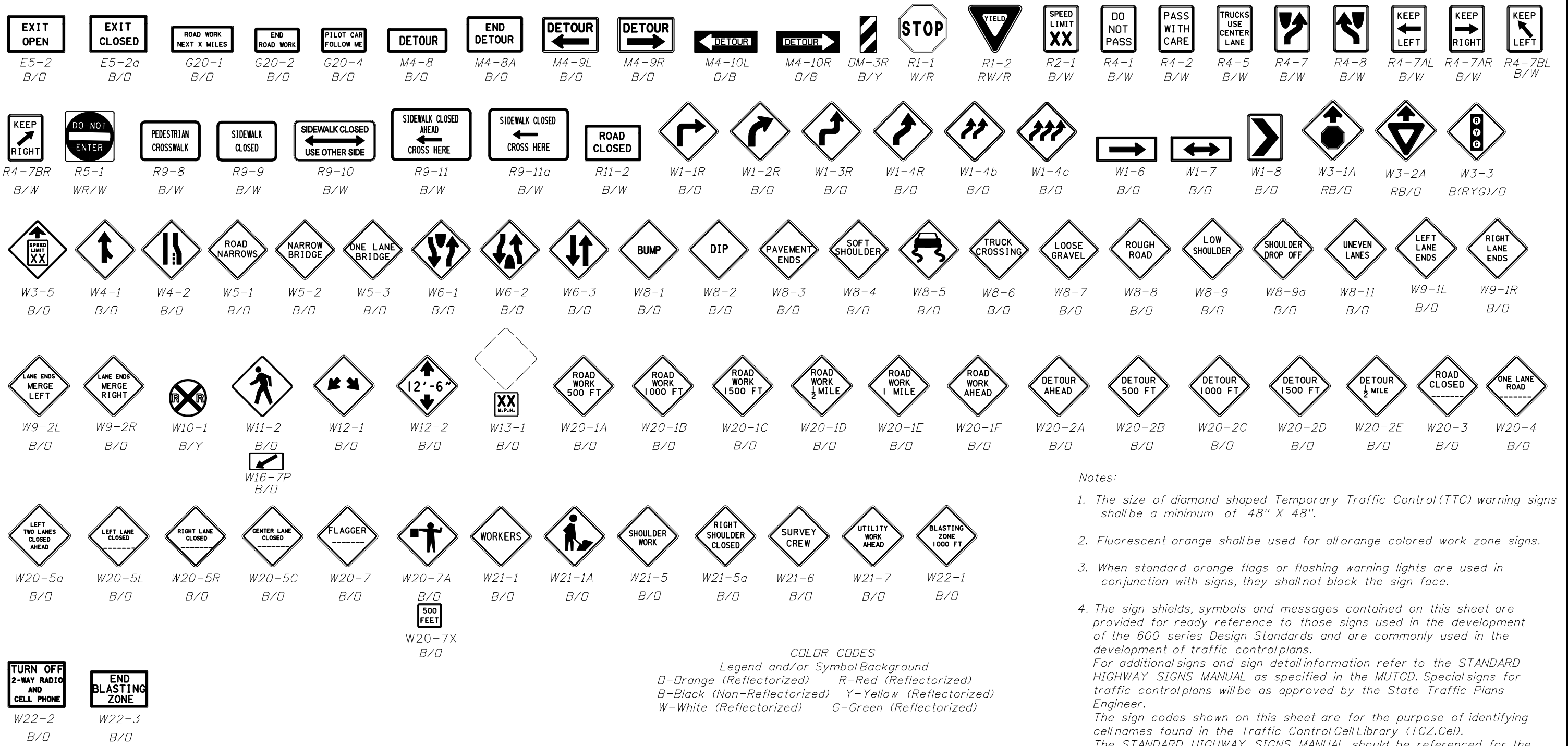


TYPICAL FOUNDATION DETAIL

See QPL for post, splice and connection details.
 No bolts installed closer than 1" to cutting edge.
 * Unless otherwise specified in the vendor drawing on the QPL.

PROJECT INFORMATION SIGN





E5-2 B/O EXIT OPEN
 E5-2a B/O EXIT CLOSED
 G20-1 B/O ROAD WORK NEXT X MILES
 G20-2 B/O END ROAD WORK
 G20-4 B/O PILOT CAR FOLLOW ME
 M4-8 B/O DETOUR
 M4-8A B/O END DETOUR
 M4-9L B/O DETOUR
 M4-9R B/O DETOUR
 M4-10L O/B DETOUR
 M4-10R O/B DETOUR
 OM-3R B/Y
 R1-1 W/R STOP
 R1-2 RW/R YIELD
 R2-1 B/W SPEED LIMIT XX
 R4-1 B/W DO NOT PASS
 R4-2 B/W PASS WITH CARE
 R4-5 B/W TRUCKS USE CENTER LANE
 R4-7 B/W
 R4-8 B/W
 R4-7AL B/W KEEP LEFT
 R4-7AR B/W KEEP RIGHT
 R4-7BL B/W KEEP LEFT

R4-7BR B/W KEEP RIGHT
 R5-1 WR/W DO NOT ENTER
 R9-8 B/W PEDESTRIAN CROSSWALK
 R9-9 B/W SIDEWALK CLOSED
 R9-10 B/W SIDEWALK CLOSED USE OTHER SIDE
 R9-11 B/W SIDEWALK CLOSED AHEAD CROSS HERE
 R9-11a B/W SIDEWALK CLOSED CROSS HERE
 R11-2 B/W ROAD CLOSED
 W1-1R B/O
 W1-2R B/O
 W1-3R B/O
 W1-4R B/O
 W1-4b B/O
 W1-4c B/O
 W1-6 B/O
 W1-7 B/O
 W1-8 B/O
 W3-1A RB/O
 W3-2A RB/O
 W3-3 B(RYG)/O

W3-5 B/O
 W4-1 B/O
 W4-2 B/O
 W5-1 B/O ROAD NARROWS
 W5-2 B/O NARROW BRIDGE
 W5-3 B/O ONE LANE BRIDGE
 W6-1 B/O
 W6-2 B/O
 W6-3 B/O
 W8-1 B/O BUMP
 W8-2 B/O DIP
 W8-3 B/O PAVEMENT ENDS
 W8-4 B/O SOFT SHOULDER
 W8-5 B/O
 W8-6 B/O TRUCK CROSSING
 W8-7 B/O LOOSE GRAVEL
 W8-8 B/O ROUGH ROAD
 W8-9 B/O LOW SHOULDER
 W8-9a B/O SHOULDER DROP OFF
 W8-11 B/O UNEVEN LANES
 W9-1L B/O LEFT LANE ENDS
 W9-1R B/O RIGHT LANE ENDS

W9-2L B/O LANE ENDS MERGE LEFT
 W9-2R B/O LANE ENDS MERGE RIGHT
 W10-1 B/Y
 W11-2 B/O
 W12-1 B/O
 W12-2 B/O 12'-6"
 W13-1 B/O
 W20-1A B/O ROAD WORK 500 FT
 W20-1B B/O ROAD WORK 1000 FT
 W20-1C B/O ROAD WORK 1500 FT
 W20-1D B/O ROAD WORK 1/2 MILE
 W20-1E B/O ROAD WORK 1 MILE
 W20-1F B/O ROAD WORK AHEAD
 W20-2A B/O DETOUR AHEAD
 W20-2B B/O DETOUR 500 FT
 W20-2C B/O DETOUR 1000 FT
 W20-2D B/O DETOUR 1500 FT
 W20-2E B/O DETOUR 1/2 MILE
 W20-3 B/O ROAD CLOSED
 W20-4 B/O ONE LANE ROAD

W20-5a B/O LEFT TWO LANES CLOSED AHEAD
 W20-5L B/O LEFT LANE CLOSED
 W20-5R B/O RIGHT LANE CLOSED
 W20-5C B/O CENTER LANE CLOSED
 W20-7 B/O FLAGGER
 W20-7A B/O
 W21-1 B/O WORKERS
 W21-1A B/O
 W21-5 B/O SHOULDER WORK
 W21-5a B/O RIGHT SHOULDER CLOSED
 W21-6 B/O SURVEY CREW
 W21-7 B/O UTILITY WORK AHEAD
 W22-1 B/O BLASTING ZONE 1000 FT
 W16-7P B/O

W22-2 B/O TURN OFF 2-WAY RADIO AND CELL PHONE
 W22-3 B/O END BLASTING ZONE
 W20-7X B/O 500 FEET

MOT-1-06 B/O STAY IN YOUR LANE
 MOT-4-06 B/O LITTER PICK UP AHEAD
 MOT-5-06 B/O TRUCKS ENTERING HIGHWAY
 MOT-6-06 B/O TRUCKS TURNING LEFT 000 FT
 MOT-7-06 B/O MERGE RIGHT ON FLASHING ARROW
 MOT-8-06 B/O LIGHTED WORK ZONE AHEAD
 MOT-9-06 B/O STATE PRISONERS WORKING
 MOT-10-06 B/O BUSINESS ENTRANCE
 MOT-11-06 BLUE/W
 MOT-12-06R B/W PEDESTRIAN WALKWAY
 MOT-12-06L B/W PEDESTRIAN WALKWAY
 MOT-13-06 (Limited access facilities) MOT-14-06 (All other facilities) SPEEDING FINES DOUBLED WHEN WORKERS PRESENT
 MOT-15-06 B/O GROOVED PAVEMENT AHEAD
 MOT-16-06 B/O Slow Down My Daddy Works Here
 MOT-17-06 B/O Slow Down My Mommy Works Here

Notes:
 1. The size of diamond shaped Temporary Traffic Control (TTC) warning signs shall be a minimum of 48" X 48".
 2. Fluorescent orange shall be used for all orange colored work zone signs.
 3. When standard orange flags or flashing warning lights are used in conjunction with signs, they shall not block the sign face.
 4. The sign shields, symbols and messages contained on this sheet are provided for ready reference to those signs used in the development of the 600 series Design Standards and are commonly used in the development of traffic control plans.
 For additional signs and sign detail information refer to the STANDARD HIGHWAY SIGNS MANUAL as specified in the MUTCD. Special signs for traffic control plans will be as approved by the State Traffic Plans Engineer.
 The sign codes shown on this sheet are for the purpose of identifying cell names found in the Traffic Control Cell Library (TCZ.Cel).
 The STANDARD HIGHWAY SIGNS MANUAL should be referenced for the official sign codes for use in the development of traffic control plans.
 See Index No. 17355 for MOT sign details.

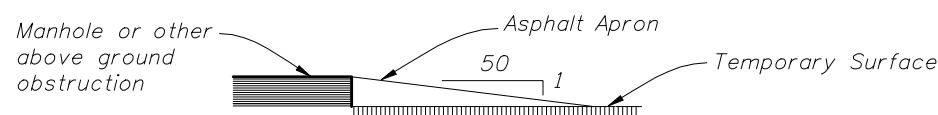
COLOR CODES
 Legend and/or Symbol Background
 O-Orange (Reflectorized) R-Red (Reflectorized)
 B-Black (Non-Reflectorized) Y-Yellow (Reflectorized)
 W-White (Reflectorized) G-Green (Reflectorized)



MANHOLES/CROSSWALKS/JOINTS

Manholes extending 1" or more above the travellane and crosswalks having an uneven surface greater than 1/4" shall have a temporary asphalt apron constructed as shown in the diagram below.

All transverse joints that have a difference in elevation of 1" or more shall have a temporary asphalt apron constructed as shown in the diagram below.



The apron is to be removed prior to constructing the next lift of asphalt. The cost of the temporary asphalt shall be included in the contract unit price for Maintenance of Traffic, LS.

TRUCK-MOUNTED ATTENUATORS

Truck-mounted attenuators (TMA) can be used for moving operations and short-term stationary operations. For moving operations, see Index Nos. 607 and 619. For short-term, stationary operations, see Part VI of the MUTCD.

REMOVING PAVEMENT MARKINGS

Existing pavement markings that conflict with temporary work zone delineation shall be removed by any method approved by the Engineer, where operations exceed one daylight period; however, painting over existing pavement markings will not be permitted. Full pavement width overlays of either a structural or friction course are a positive means to achieve obliteration.

SIGNALS

Existing traffic signal operations that require modification in order to carry out work zone traffic control shall be included in the TCP and be approved by the District Traffic Operations Engineer.

Maintain all existing actuated or traffic responsive mode signal operations for main and side street movements for the duration of the Contract and require restoration of any loss of detection within 12 hours. The contractor shall select only detection technology listed on the Department's Approved Products List (APL) and approved by the Engineer to restore detection capabilities. The plans should identify the intersections where Temporary Traffic Detection is required.

CHANNELIZING AND LIGHTING DEVICES

Channelizing and lighting devices for work zone traffic control shall be as prescribed in Part VI of the MUTCD, subject to supplemental revisions provided in the contract documents and Index 600 requirements.

Approved devices are listed on the Department's Qualified Product List.

CHANNELIZING AND LIGHTING DEVICE CONSISTENCY

Barricades, vertical panels, cones, tubular markers and drums shall not be intermixed within either the lateral transition or within the tangent alignment.

WARNING LIGHTS

Warning lights shall be in accordance with the MUTCD except for the application limitations stipulated below:

Flashing

Type A Low Intensity Flashing Warning Lights are to be mounted on barricades, drums, vertical panels or advance warning signs (except as noted below) and are intended to continually warn drivers that they are approaching or proceeding in a hazardous area. Flashing lights shall not be used to delineate the intended path of travel, and not placed with spacings that will form a continuous line to the drivers eye. The Type A light will be used to mark obstructions that are located adjacent to or in the intended travelway. Type A lights shall not be used in conjunction with the first advance warning sign nor the second such sign when used.

For post-mounted signs, Type B High Intensity Flashing Warning Lights shall be mounted on the first advanced warning sign and on the first and second advanced warning sign where two or more signs are used; this applies to all approaches to any work zone. The light shall be mounted on the channel post or on the upper edge of the sign nearest the traffic.

Steady-Burn

Type C Steady-Burn Lights are to be mounted on barricades, drums, concrete barrier walls or vertical panels and used in combination with those devices to delineate the travelway on lane closures, lane changes, diversion curves and other similar conditions. Steady-burn lights are intended to be placed in a line to delineate the traveled way through and around obstructions in the transition, buffer, work and termination areas of the traffic control zone. Their intended purpose is not for warning drivers that they are approaching or proceeding through a hazardous area.

STANDARD ORANGE FLAG

For post-mounted signs a standard orange flag 18"x 18" (min.) shall be mounted on the first advanced warning sign and on the first and second advanced warning sign where two or more signs are used; this applies to all approaches to any work zone. The flag shall be mounted on the channel post or on the upper edge of the sign furthest from traffic.

PORTABLE CHANGEABLE (VARIABLE) MESSAGE SIGNS (PCMS)

The PCMS can be used to:

- (1) Supplement standard signing in construction or maintenance work zones.
- (2) Reinforce static advance warning messages.
- (3) Provide motorists with updated guidance information.

PCMS should be placed approx. 500 to 800 feet in advance of the work zone conflicts or 1.5 to 2 miles in advance of complex traffic control schemes which require new and/or unusual traffic maneuvers.

If PCMS are to be used at night, the intensity of the flashers shall be reduced during darkness when lower intensities are desirable.

For additional information refer to the FDOT Plans Preparation Manual, Volume I, Chapter 10.

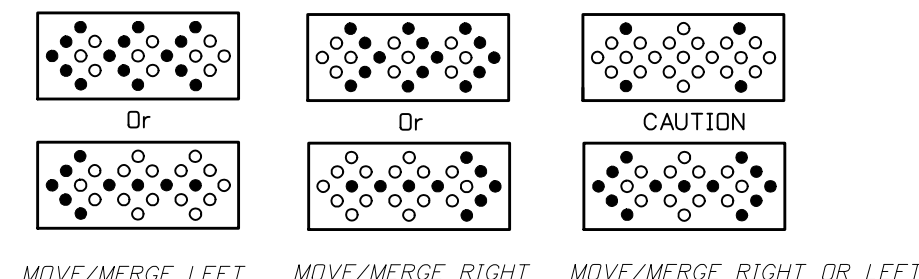
ADVANCE WARNING ARROW PANELS

An arrow panel in the arrow or chevron mode shall be used only for stationary or moving lane closures on multilane roadways.

For shoulder work, blocking the shoulder, for roadside work near the shoulder, or for temporarily closing one lane on a two-lane, two-way roadway, an arrow panel shall be used only in the caution mode.

A single arrow panel shall not be used to merge traffic laterally more than one lane. When arrow panels are used to close multiple lanes, a single panel shall be used at the merging taper for each closed lane.

When Advance Warning Arrow Panels are used at night, the intensity of the flashers shall be reduced during darkness when lower intensities are desirable.



MODES



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GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

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DROP-OFF CONDITION NOTES

1. A drop-off is defined as a drop in elevation, parallel to the adjacent travel lanes, greater than 3" with slopes (A:B) steeper than 1 : 4. When drop-offs occur within the clear zone due to construction or maintenance activities, protection devices are required. See chart.
2. Distance X is to be the maximum practical under project conditions.
3. Distance from the travel lane to the barrier or warning device should be maximum practical for project conditions.
4. Any drop-off condition that is created and restored within the same work period will not be subject to the use of barriers; however, warning devices will be required.
5. When permanent curb heights are $\geq 6"$, no warning device will be required. For curb heights $< 6"$, see chart.

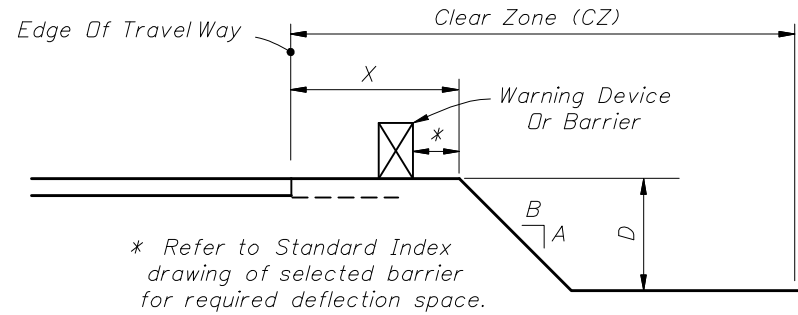
DROP-OFF NOTES

1. These conditions and treatments can be applied only in work areas that fall within a properly signed work zone.
2. The following are defined as acceptable warning devices:
 - a. Vertical panel
 - b. Type I Or Type II barricades
 - c. Drum
 - d. Cone (where allowed)
 - e. Tubular marker (where allowed)
3. Where a barrier is specified, any of the types below may be used in accordance with the applicable Index:

Index No.	Description
400	Temporary guardrail and end anchorage
412	Temporary low profile barrier
414	Type K temporary concrete barrier
415	Temporary concrete barrier

For temporary water filled barriers see the QPL
4. Warning device spacing shall be as shown in Table I.

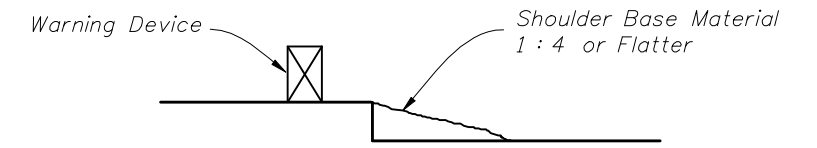
Table I Device Spacing				
Speed (mph)	Max. Distance Between Devices (ft)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100



DROP-OFF PROTECTION REQUIREMENTS ALL SPEEDS NO CURB AND GUTTER		
X (ft.)	D (in.)	Device Required
0-12	> 3	Barrier
12-CZ	>3 to ≤ 5	Warning Device
0-CZ	> 5	Barrier

For Clear Zone widths, see Index No. 600 sheet 2.

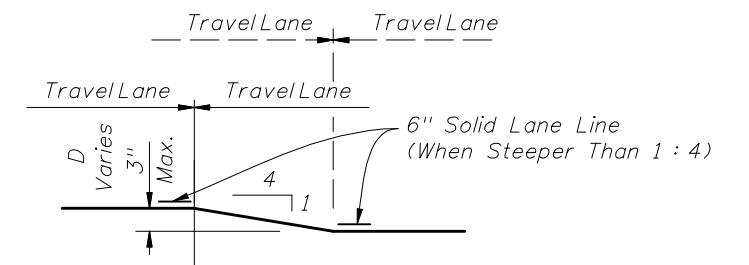
SHOULDER TREATMENT



NOTES

1. Shoulder treatment may be used in lieu of barrier. Warning devices are required.
2. Daily inspections shall be conducted to assure that no erosion, excessive slopes, rutting, or other adverse conditions exist. Any deficiencies shall be repaired immediately.
3. Compensation for the placement and removal of the material required for the shoulder treatment shall be included in the cost for Maintenance Of Traffic, LS. Use of shoulder treatment in lieu of a barrier is not eligible for VECP consideration.

TRAVEL LANE TREATMENT FOR MILLING OR RESURFACING



NOTES

1. This treatment applies to resurfacing or milling operations between adjacent travel lanes.
2. Whenever there is a difference in elevation between adjacent travel lanes, the W8-11 sign with "UNEVEN LANES" is required at intervals of $\frac{1}{2}$ mile maximum.
3. If D is $1\frac{1}{2}"$ or less, no treatment is required.
4. Treatment allowed only when D is 3" or less.
5. If the slope is steeper than 1:4 (not to be steeper than 1:1), the R4-1 and MOT-1-06 signs shall be used as a supplement to the W8-11; this condition should never exceed 3 miles in length.

DROPOFFS IN WORK ZONES

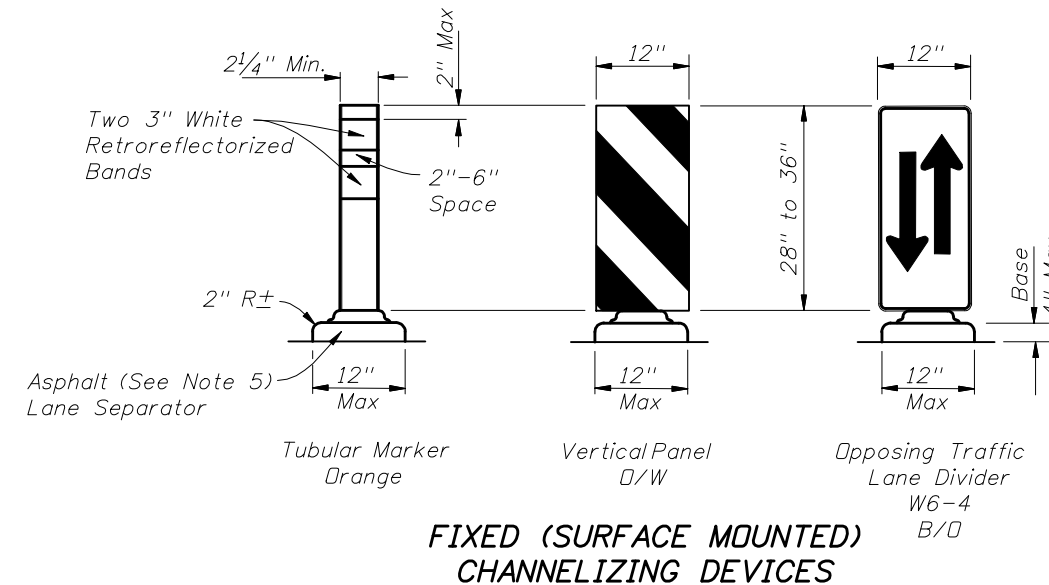
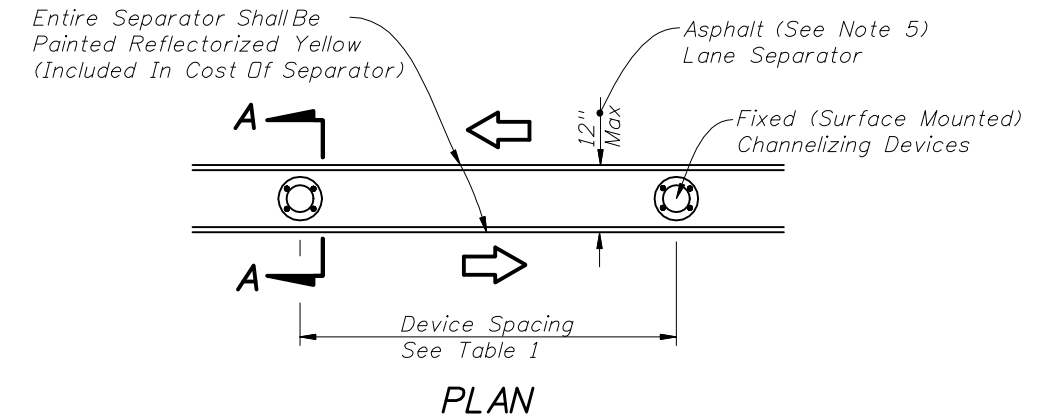


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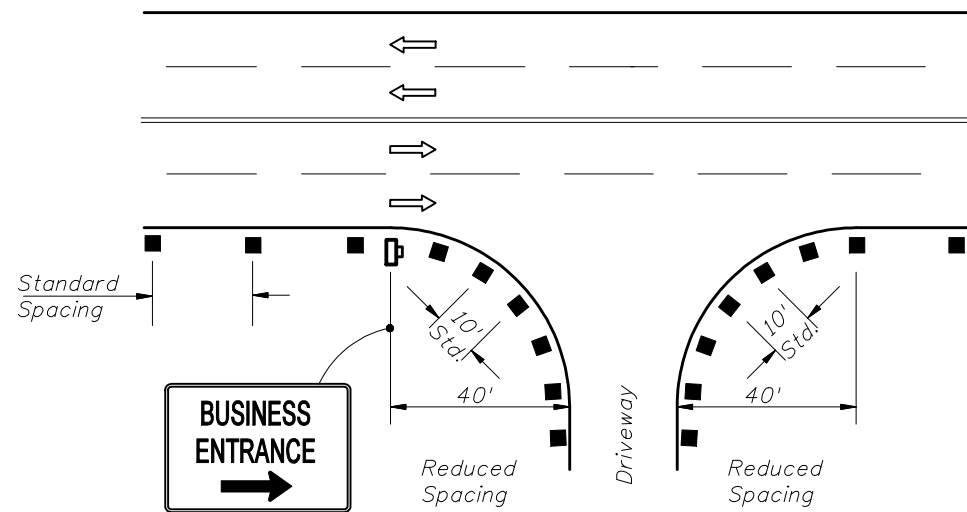
GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

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Table I Device Spacing				
Speed (mph)	Max. Distance Between Devices (ft.)			
	Tubular Markers		Vertical Panels or Opposing Traffic Lane Divider	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100



SECTION AA

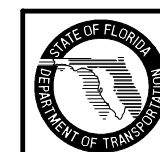


1. Sign height shall be 7' minimum. Sign offset from edge of travelway should be between 6' and 10' and relatively consistent through the project phase.
2. Signs should show specific business names. Logos may be provided by business owners. BUSINESS ENTRANCE sign in accordance with Index 17355 may be used when approved by the Engineer.
3. Place one business sign for each driveway entrance affected. When several businesses share a common driveway entrance, place one sign per common driveway entrance.
4. Channelizing devices should be placed at a reduced spacing on each side of the driveway entrance as to not to interfere with providing sight distances for the driveway user.

PLACEMENT OF BUSINESS ENTRANCE SIGNS AND CHANNELIZING DEVICES AT BUSINESS ENTRANCE

1. Temporary lane separators shall be supplemented with any of the following approved fixed (surface mounted) channelizing devices: tubular markers, vertical panels, or opposing traffic lane divider panels. Opposing traffic lane divider panels (W6-4) shall only be used as center lane dividers to separate opposing vehicular traffic on a two-lane, two-way operation.
2. Reflectorized materials shall have a smooth sealed outer surface which will display the same approximate color day and night.
3. 12" openings for drainage will be constructed in the separator island every 25' in areas with grades of 1% or less or every 50' in areas with grades over 1% as directed by the Engineer.
4. Tubular Markers, Vertical Panels and Opposing Traffic Lane Divider panels shall not be intermixed within the limits where the temporary lane separator is used.
5. The Contractor has the option of using temporary lane separator systems (including channelizing devices) from the qualified products list in lieu of the temporary asphalt separator and channelizing devices detailed on this sheet.
6. Temporary lane separator shall be paid for under the contract unit price for Maintenance of Traffic, LS, and will include all materials and work necessary to construct, relocate, maintain, and remove the temporary lane separator. Any damage to existing pavement caused by the removal of temporary lane separator shall be satisfactorily repaired and the cost of such repairs are to be included in the cost of Maintenance of Traffic, LS.

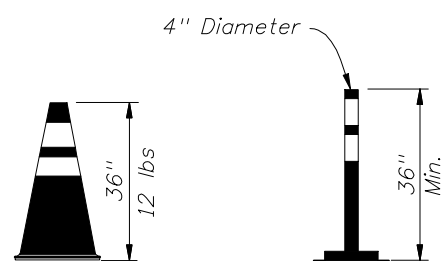
TEMPORARY LANE SEPARATOR



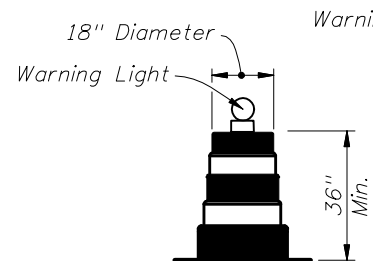
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GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

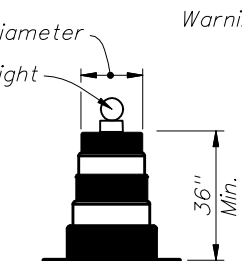
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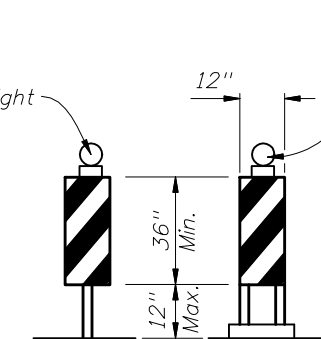
CONES



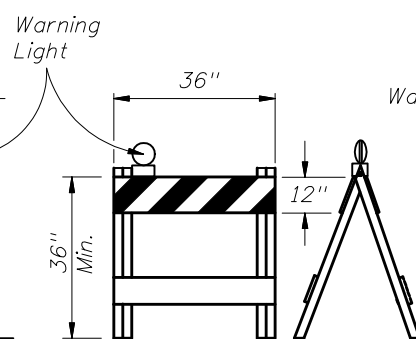
TUBULAR NON-FIXED MARKER TO BE USED DURING DAYLIGHT ONLY
TUBULAR MARKER



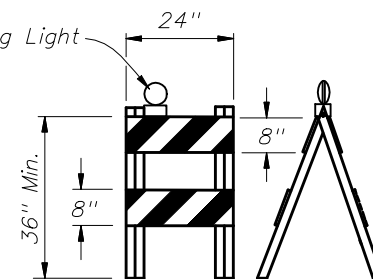
PLASTIC DRUMS



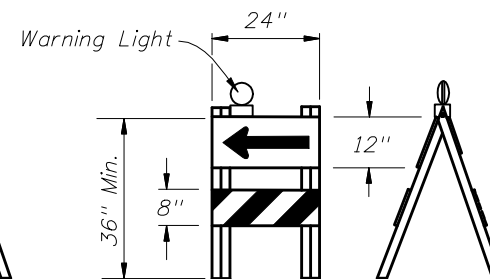
POST MOUNT VERTICAL PANEL



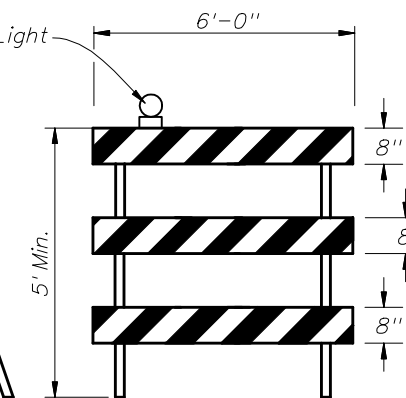
TYPE I BARRICADE



TYPE II BARRICADE



DIRECTION INDICATOR BARRICADE



TYPE III BARRICADE

CHANNELIZING AND LIGHTING DEVICE NOTES

1. Only approved traffic control devices included on the Qualified Products List (QPL) may be used.
2. The FDOT approval number shall be engraved on the device at a convenient and readily visible location. Where engraving is not practical a water-resistant type label may be used.
3. The details shown on this sheet are for the following purposes: (a) For ease of identification and (b) To provide information that supplements or supersedes that provided by the MUTCD.
4. The Type III Barricade shall have a unit length of 6'-0" only. When barricades of greater lengths are required those lengths shall be in multiples of the 6'-0" unit.
5. No sign panel should be mounted on any barricade type unless the barricade/sign combination was found to be crashworthy and the sign panel is mounted in accordance with the vendor drawing for the barricade shown on the QPL.

6. During hours of darkness, warning lights shall be used on drums, vertical panels, Type I, Type II, Type III and direction indicator barricades in accordance with 'Warning Lights' in Index No. 600.
7. Ballast shall not be placed on top rails or any striped rails or higher than 13" above the driving surface.
8. The direction indicator barricade may be used in tapers and transitions where specific directional guidance to drivers is necessary. If used, direction indicator barricades shall be used in series to direct the driver through the transition and into the intended travel lane.
9. The splicing of sheeting is not permitted on either channelizing devices or MDT signs.
10. For rails less than 3'-0" long, 4" stripes shall be used.

11. Cones shall:
 - a. Be used only in active work zones where workers are present.
 - b. Not exceed 2 miles in length of use at any one time.
 - c. Be reflectorized as per the MUTCD with Department approved reflective collars when used at night.

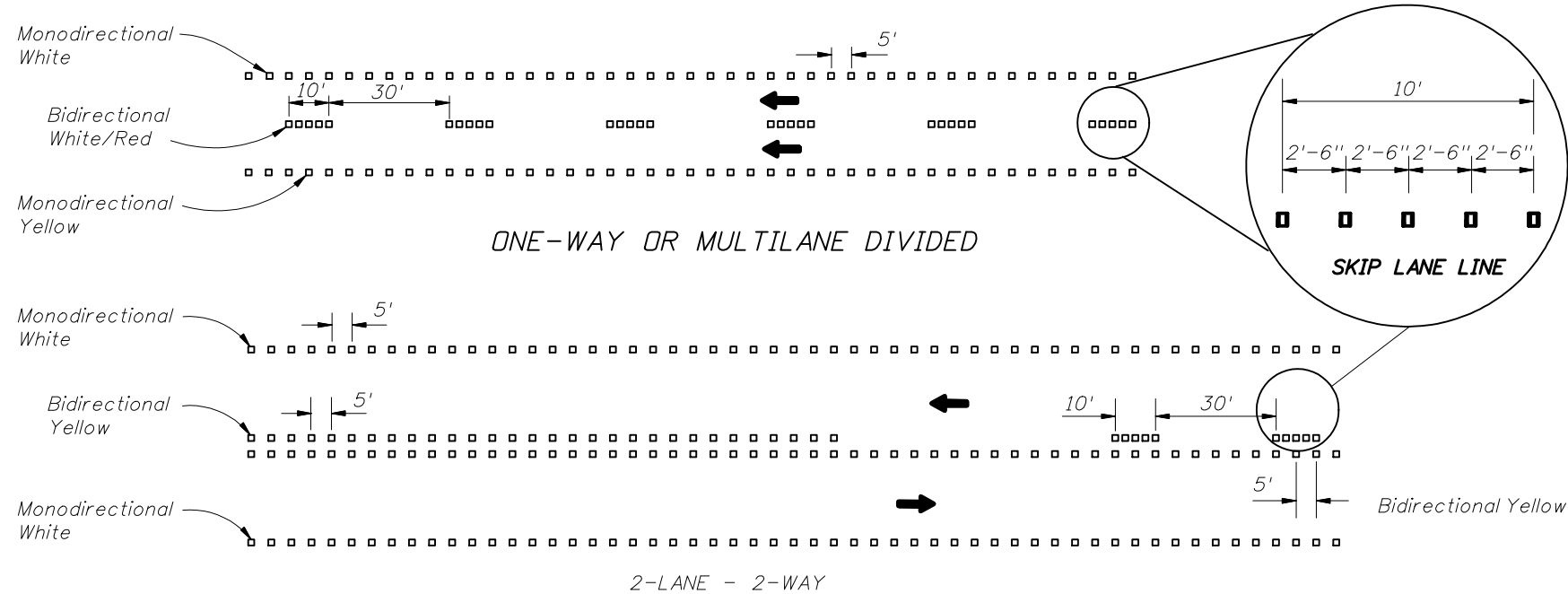
IDENTIFICATIONS - CHANNELIZING AND LIGHTING DEVICES



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GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

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TEMPORARY SUBSTITUTION OF RPM'S FOR PAINT OR REMOVABLE TAPE

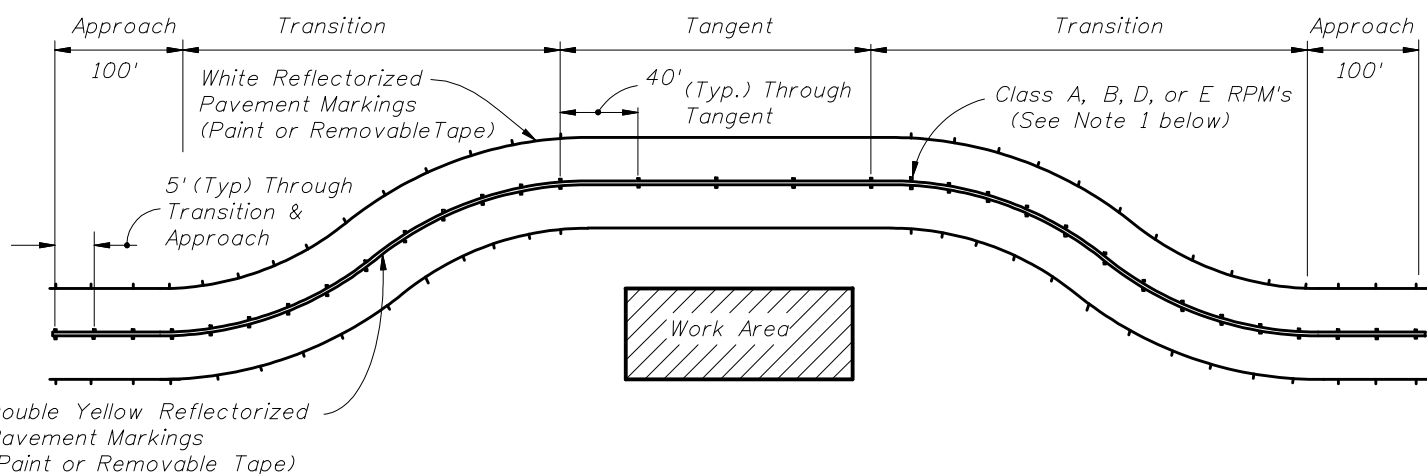
1. Paint or removable tape are the required work zone markings and shall be placed in accordance with the plans and specifications. If these work zone markings can not be placed due to weather restrictions identified in the appropriate specification, temporary substitution of RPM's for work zone markings will be allowed until the weather condition permits the placement of appropriate work zone marking. Temporary substitution of RPM's for work zone markings will be allowed for equipment malfunction, placement of the appropriate work zone marking shall be made within 3 days, or sooner if possible. When RPM's are used as a temporary substitution for work zone markings the following shall apply:
 - a) Lane widths identified in the plans must be maintained. Placement of RPM's should consider where work zone markings will be placed as soon as conditions allow. If the RPM's can not be placed so that the lane width is maintained after the placement of the work zone markings, the conflicting RPM's must be removed.
 - b) The color of the RPM body and the reflective face shall conform to the color of the marking for which they substitute.
 - c) In work zones, CLASS A, B or D RPM's may be used to form lane lines, edge lines and temporary gore areas as a temporary substitute for paint or removable tape at the spacing shown above. Where the RPM's will be used for five (5) days or less, CLASS E RPM's may be used.

RPM CLASS APPLICATION FOR REFLECTIVE PAVEMENT MARKERS

- A Work Zone Applications Only, For Traffic And Nontraffic Areas.
- B Permanent Application In Traffic And Nontraffic Areas Or Can Be Used In Work Zone Applications For Traffic And Nontraffic Areas.
- D Work Zone Application Only, For Traffic And Nontraffic Areas.
- E Temporary Work Zone Application Only, Not Exceeding Five (5) Continuous Days, For Traffic And Nontraffic Areas.

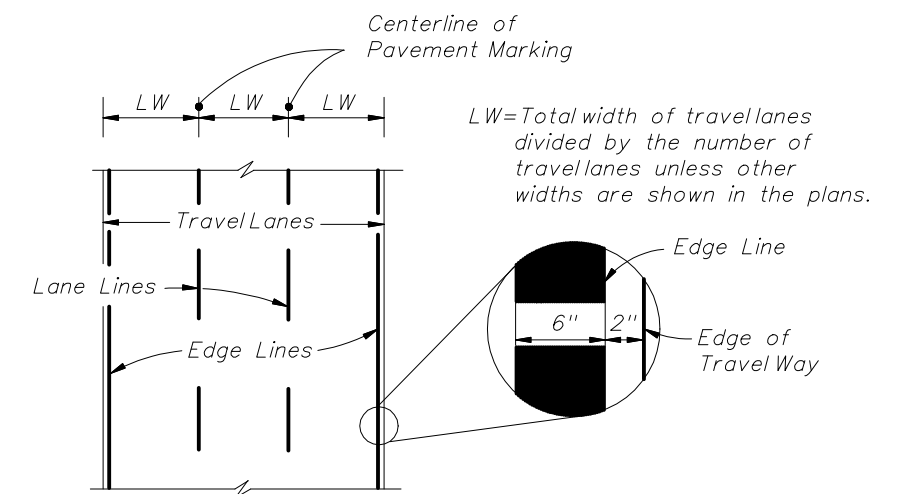
NOTES FOR REFLECTIVE PAVEMENT MARKERS

1. The color of the raised pavement marker under both day and night conditions shall conform to the color of the marking for which they serve as a positioning guide, or for which they supplement or substitute.
2. To provide contrast on concrete pavement, or light asphalt, the five (5) white RPM's shall be followed by five black RPM's. The spacing between RPM's shall be 2'-6". Black RPM's will not be required for contrast with yellow RPM's.
3. RPM's used to supplement lane lines are to be paid for as Reflective Pavement Marker (Temporary), EA. RPM's used as a temporary substitute for paint or removable tape due to weather restrictions are to be paid for as Reflective Pavement Marker (Temporary), EA. RPM's used as a temporary substitute for paint or removable tape due to equipment malfunction are to be placed at the Contractor's expense.



USE OF RPMS TO SUPPLEMENT PAINT OR REMOVABLE TAPE IN WORK ZONES

1. RPM's shall be installed as a supplement to:
 - a) All lane lines.
 - b) Edge lines in transition & approach areas.
 - c) Edge lines of gore areas.
2. Placement of RPM's should be as shown in Index No. 17352 with the following exceptions:
 - RPM's shall be placed at 5 feet center to center in approach and transition areas.
 - Class D markers be placed at a maximum spacing of 5 feet center to center.



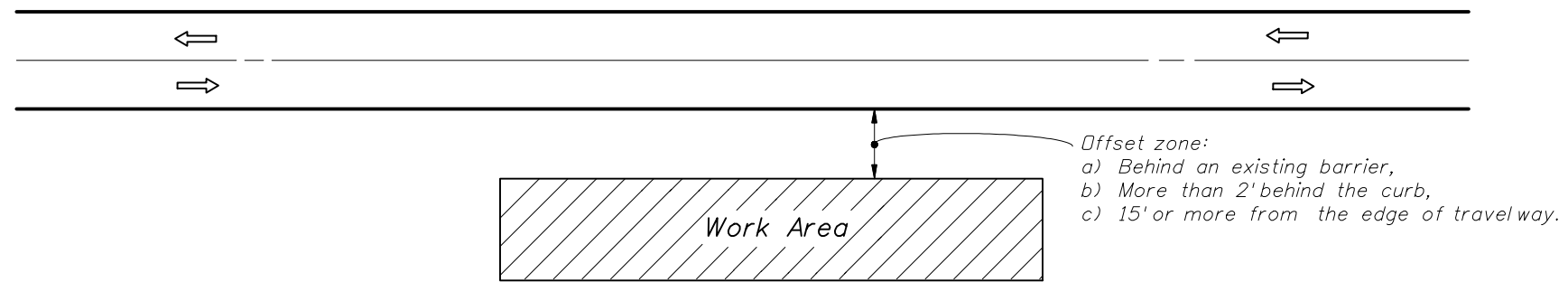
PLACEMENT OF PAVEMENT MARKINGS



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GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

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GENERAL NOTES

1. If the work operation (excluding establishing and terminating the work area) requires that two or more work vehicles cross the offset zone in any one hour, traffic control will be in conformance with Index No. 602.
2. No special signing is required.
3. When a side road intersects the highway within the work area, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
4. When construction activities encroach on a sidewalk refer to Index No. 660.
5. For general TCZ requirements and additional information, refer to Index No. 600.

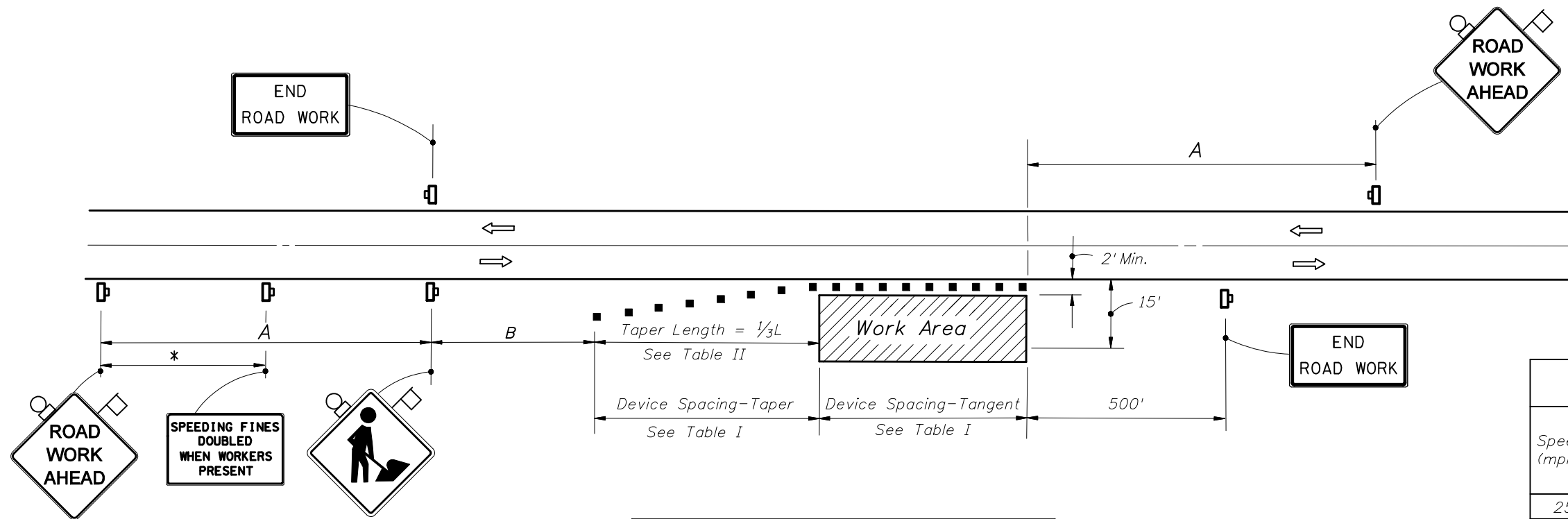
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS AND THEIR ACTIVITIES ARE BEHIND AN EXISTING BARRIER, MORE THAN 2' BEHIND THE CURB, OR 15' OR MORE FROM THE EDGE OF TRAVEL WAY.

SYMBOLS

-  Work Area
-  Lane Identification + Direction of Traffic





DISTANCE BETWEEN SIGNS		
Speed	Spacing (ft.)	
	A	B
40 mph or less	200	200
45 mph	350	350
50 mph or greater	500	500

* 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

Table I Device Spacing				
Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

Table II Taper Length - Shoulder				
Speed (mph)	1/3L (ft)			Notes
	8' Shldr.	10' Shldr.	12' Shldr.	
25	28	35	42	$L = \frac{WS^2}{60}$
30	40	50	60	
35	55	68	82	
40	72	90	107	$L = WS$
45	120	150	180	
50	133	167	200	
55	147	183	220	
60	160	200	240	
65	173	217	260	
70	187	233	280	

8' minimum shoulder width

1/3L = Length of shoulder taper in feet

W = Width of total shoulder in feet (combined paved and unpaved width)

S = Posted speed limit (mph)

GENERAL NOTES

- When four or more work vehicles enter the through traffic lanes in a one hour period or less (excluding establishing and terminating the work area), the advanced FLAGGER sign shall be substituted for the WORKERS sign. For location of flaggers and FLAGGER signs, see Index No. 603.
- WORKERS sign to be removed or fully covered when no work is being performed.
- SHOULDER WORK sign may be used as an alternate to the WORKER symbol sign only on the side where the shoulder work is being performed.
- When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

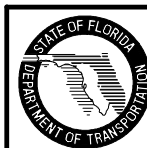
- Signs and channelizing devices may be omitted if all of the following conditions are met:
 - Work operations are 60 minutes or less.
 - Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.

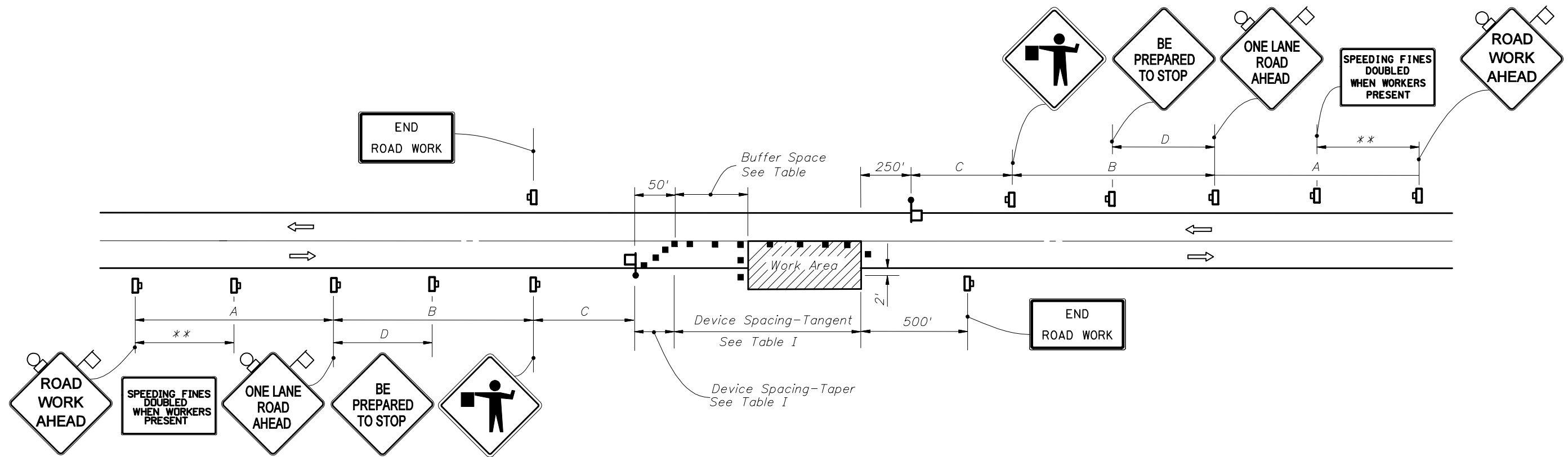
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Lane Identification + Direction of Traffic

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF TRAVEL WAY.





DISTANCE BETWEEN SIGNS				
Speed (mph)	Spacing (ft.)			
	A	B	C	D
40 or less	200	200	200	100
45	350	350	350	175
50	500	500	500	250
55 or greater	2640	1640	1000	500

* The ROAD WORK 1 MILE sign may be used as an alternate to the ROAD WORK AHEAD sign.

** 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

*** BE PREPARED TO STOP sign may be omitted for speeds of 45 MPH or less.

TABLE I DEVICE SPACING				
Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25 to 45	20	50	20	50
50 to 70	20	50	20	100

BUFFER SPACE	
Speed (mph)	Dist. (ft.)
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

GENERAL NOTES

- Work operations shall be confined to one traffic lane, leaving the opposite lane open to traffic.
- Additional one-way control may be effected by the following means:
(1) Flag-carrying vehicle; (2) Official vehicle; (3) Pilot vehicles; (4) Traffic signals.

When flaggers are the sole means of one-way control, the flaggers shall be in sight of each other or in direct communication at all times.
- The ONE-LANE ROAD signs are to be fully covered and the FLAGGER signs either removed or fully covered when no work is being performed and the highway is open to two-way traffic.
- When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- The two channelizing devices directly in front of the work area and the one channelizing device directly at the end of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
- For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

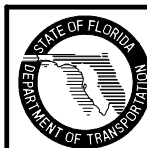
- ROAD WORK AHEAD and the BE PREPARED TO STOP signs may be omitted if all of the following conditions are met:
 - Work operations are 60 minutes or less.
 - Speed limit is 45 mph or less.
 - No sight obstructions to vehicles approaching the work area for a distance equal to the buffer space.
 - Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
 - Volume and complexity of the roadway has been considered.

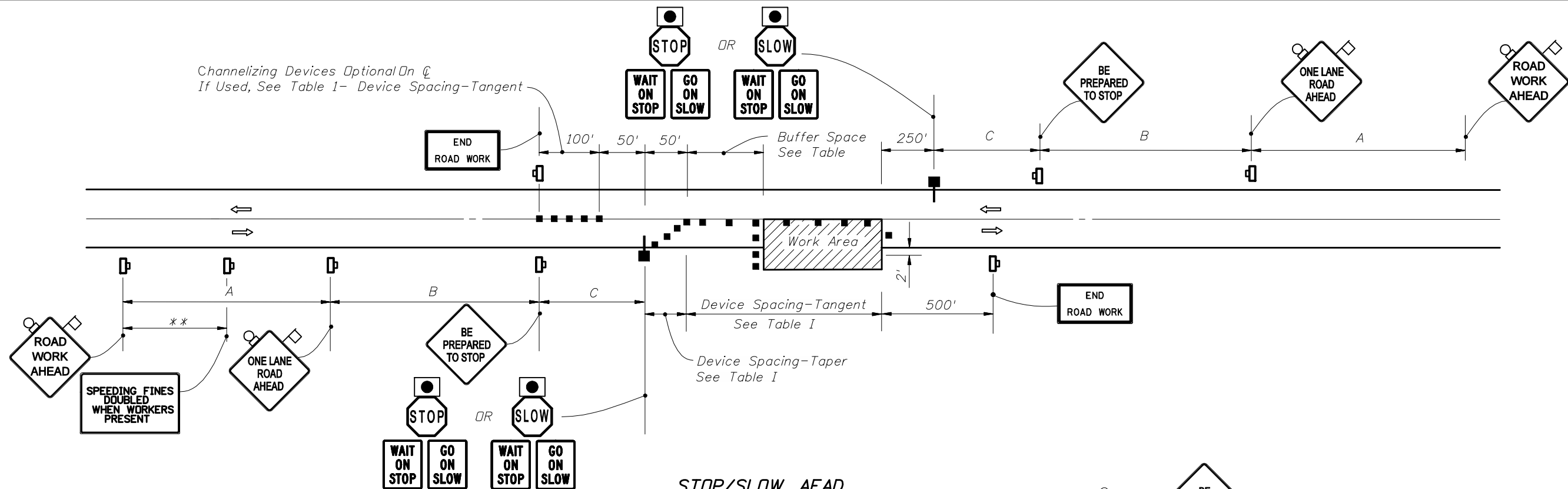
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF TRAVEL WAY.

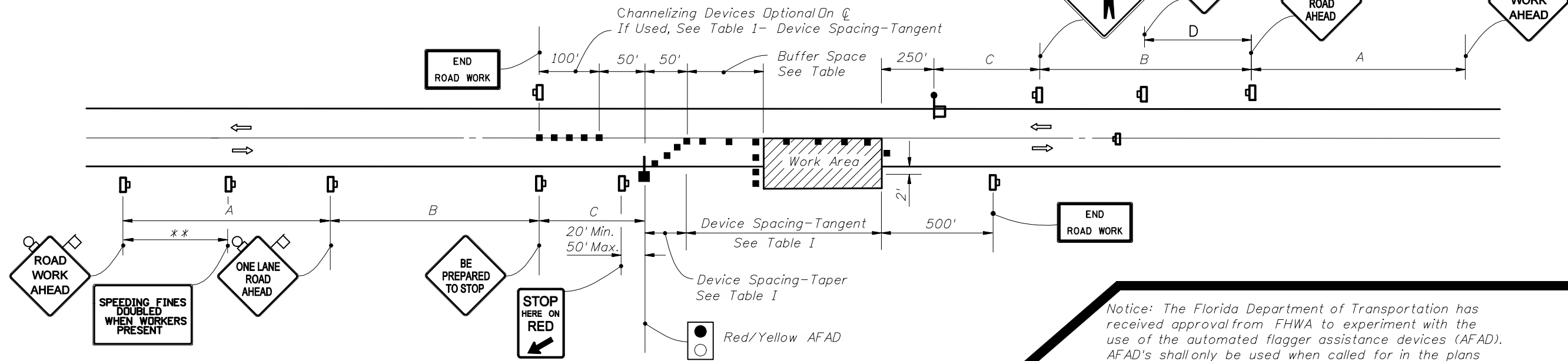
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.)
Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Flagger
- Automated Flagger Assistance Devices (AFAD), With Gate
- Lane Identification + Direction of Traffic





**STOP/SLOW AFAD
METHOD 1- 2 AFAD's**



**RED/YELLOW AFAD
METHOD 2- 1 AFAD AND A FLAGGER**

AUTOMATED FLAGGER ASSISTANCE DEVICES (AFAD)

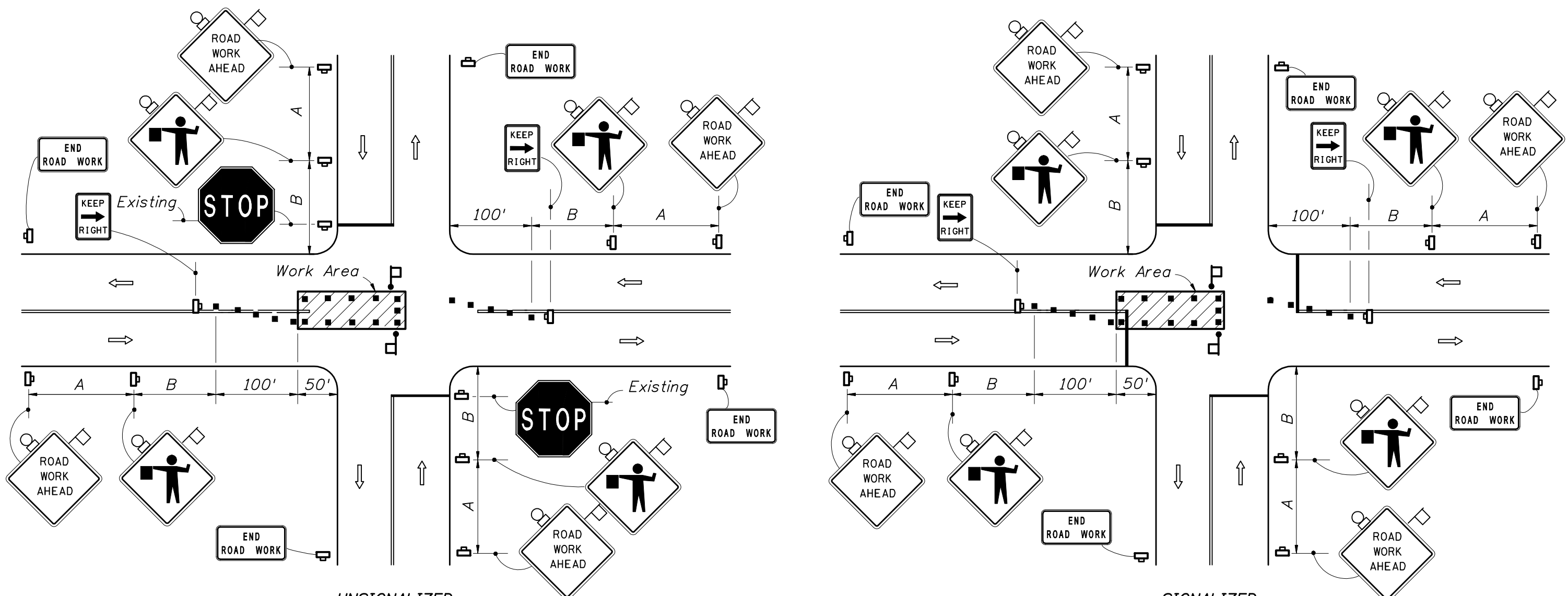
1. When used at nighttime, the AFAD flagging station shall be illuminated.
2. When the AFAD is not in use, it shall be moved outside the clear zone or be shielded by a barrier or crash cushion and the signs associated with the AFAD shall be removed or covered.
3. Duration Notes shown on sheet 1 of 2 do not apply when AFAD are used.

Notice: The Florida Department of Transportation has received approval from FHWA to experiment with the use of the automated flagger assistance devices (AFAD). AFAD's shall only be used when called for in the plans that include the appropriate pay item and developmental specification or approved by the State Roadway Design Office.

Speed (mph)	DISTANCE BETWEEN SIGNS			
	Spacing (ft.)			
	A	B	C	D
40 or less	200	200	200	100
45	350	350	350	175
50	500	500	500	250
55 or greater	2640	1640	1000	500

* (See Sheet 1 Notes)
** (See Sheet 1 Notes)





UNSIGNALIZED

SIGNALIZED

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.)
Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Flagger
- Stop Bar
- Lane Identification + Direction of Traffic

GENERAL NOTES

1. The FLAGGER legend sign may be substituted for the symbolsign.
2. When vehicles in a parking zone block the line of sight to TCZ signs, the signs shall be post mounted and located in accordance with Index No. 17302.
3. If the work space extends across a crosswalk, the crosswalk should be closed using the information in Index No. 660.
4. Flaggers shall be located where they can control more than one direction of traffic.

Flaggers shall be in sight of each other or in direct communication at all times.
5. Maximum spacing between channelizing devices shall be not greater than 20'.
6. Temporary signalphasing modifications are to be approved by the District Traffic Operations Engineer prior to the beginning of work.
7. For general TCZ requirements and additional information, refer to Index No. 600.

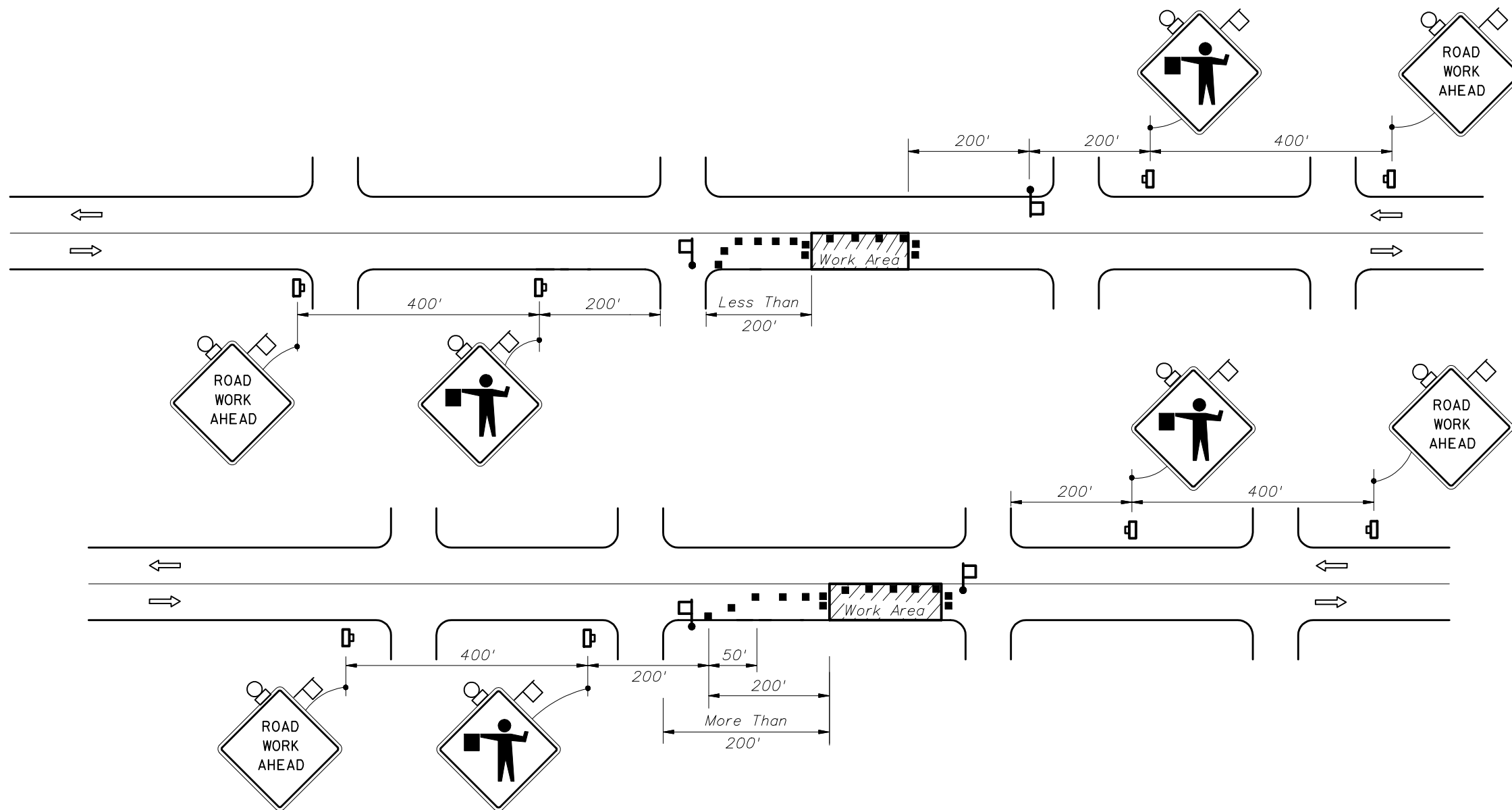
DURATION NOTES

1. ROAD WORK AHEAD AND END ROAD WORK sign may be omitted if all of the following conditions are met:
 - a) Work operations are 60 minutes or less.
 - b) Speed is 45 mph or less.
 - c) No sight obstructions to vehicles approaching the work area for a distance equal to A plus B.
 - d) Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
 - e) Volume and complexity of the roadway has been considered.

DISTANCE BETWEEN SIGNS		
Speed	Spacing (ft.)	
	A	B
40 mph or less	200	200
45 mph	350	350

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON THE PAVEMENT REQUIRING THE CLOSURE OF A PORTION OF ONE OR MORE TRAFFIC LANES IN AN INTERSECTION.



CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON THE PAVEMENT REQUIRING THE CLOSURE OF ONE TRAFFIC LANE, FOR WORK AREAS LESS THAN 200' DOWNSTREAM FROM AN INTERSECTION FOR A PERIOD OF MORE THAN 60 MINUTES.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON THE PAVEMENT REQUIRING THE CLOSURE OF ONE TRAFFIC LANE, FOR WORK AREAS 200' OR MORE DOWNSTREAM FROM AN INTERSECTION FOR A PERIOD OF MORE THAN 60 MINUTES.

GENERAL NOTES

DURATION NOTES

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.)
Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Flagger
- Lane Identification + Direction of Traffic

1. Work operations shall be confined to one travel lane, leaving the opposing travel lane open to traffic.
2. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post mounted and located in accordance with Index No. 17302.
3. If work area is confined to an outside auxiliary lane, the work area shall be barricaded and the FLAGGER signs replaced by ROAD WORK AHEAD signs. Flaggers are not required.
4. Flaggers shall be in sight of each other or in direct communication at all times.

5. The FLAGGER legend sign may be substituted for the symbol sign.
6. The maximum spacing between devices shall be no greater than 25'.
7. For general TCZ requirements and additional information, refer to Index No. 600.
8. The two channelizing devices directly in front and directly at the end of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.

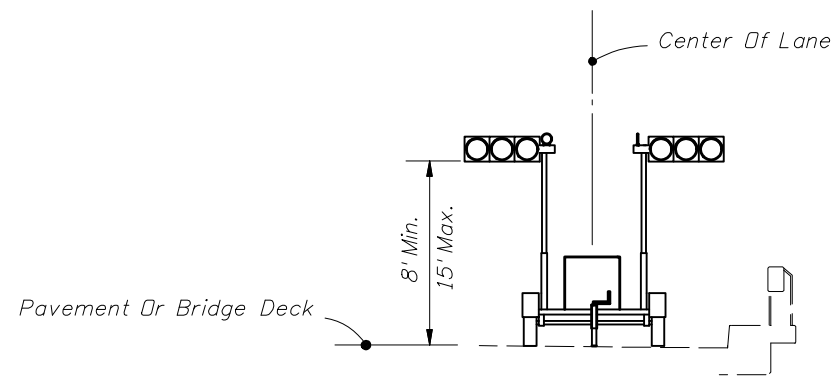
1. ROAD WORK AHEAD sign may be omitted if all of the following conditions are met:
 - a) Work operations are 60 minutes or less.
 - b) Speed is 45 mph or less.
 - c) No sight obstructions to vehicles approaching the work area for a distance of 600 feet.
 - d) Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
 - e) Volume and complexity of the roadway has been considered.



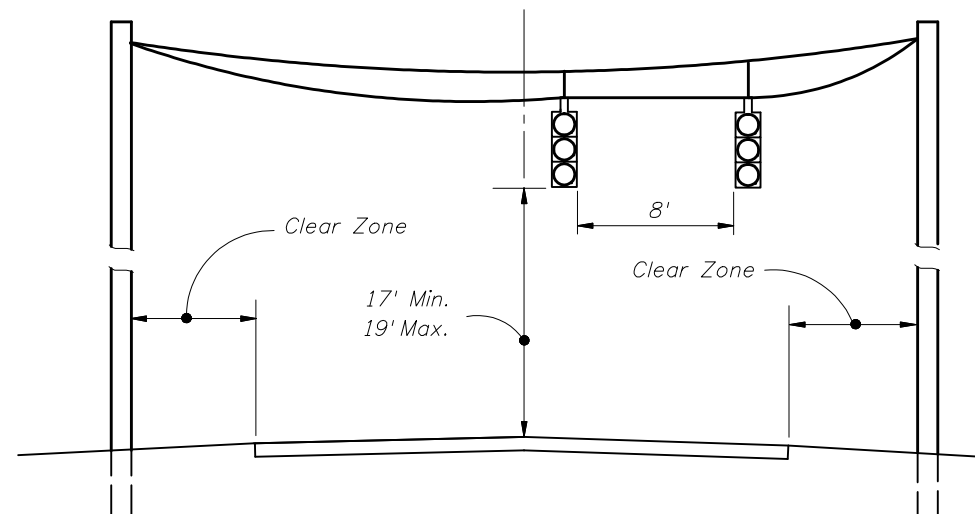
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TWO-LANE TWO-WAY, WORK NEAR INTERSECTION

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PORTABLE SIGNALS



SPAN WIRE SIGNALS

SIGNAL MOUNT DETAILS

GENERAL NOTES

1. Work operations shall be confined to one traffic lane, except for haulroad crossings, leaving the opposite lane open to traffic.
2. The installation and timing of signals shall be approved by the District Traffic Operations Engineer prior to signals being placed in operation.



Where sight distance to the signal is limited, the signals may be mounted on span wire at the discretion of the Engineer.

The maximum distance between portable traffic signals (receiver/controllers) shall be 0.25 mile; however, in no case shall the distance exceed the maximum distance at which the remote operator (transmitter) can positively and safely operate both portable signals.

3. Flaggers to supplement the signal operator/flagger shall be used when needed to assure safe movements between traffic and operating equipment, as determined by the Engineer.
4. When needed, an additional warning sign may be installed in advance of the ROAD WORK AHEAD sign. The distance between successive signs shall be 500'.
5. The SIGNAL AHEAD legend sign may be substituted for the symbol sign.

6. SIGNAL AHEAD and EQUIPMENT CROSSING AHEAD signs are to be removed or fully covered when no work is being performed and the highway is open to two-way traffic. Type III Barricades shall be in place to block haulroad access when the haulroad is not in operation and a flagger/signal operator is not on duty, except when the haulroad is an existing properly marked road.
7. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
8. For general TCZ requirements and additional information, refer to Index No. 600.
9. Span wire signals are to be used only in work zones with workers present, where the contractor can monitor signal operation and maintain traffic with flaggers in the event of a power failure.

SYMBOLS

-  Work Area
-  Sign With 18" x 18" (Min.)
Orange Flag And Type B Light
-  Work Zone Sign
- Channelizing Device (See Index No. 600)
-  Traffic Signal
-  Type III Barricade
-  Flagger
-  Stop Bar
-  Portable Signal
-  Lane Identification + Direction of Traffic

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES WILL ENCRDACH ON ONE LANE OR MOMENTARILY ENCRDACH ON BOTH LANES OF A TWO-LANE TWO-WAY ROADWAY AND TRAFFIC SIGNALS ARE NEEDED.



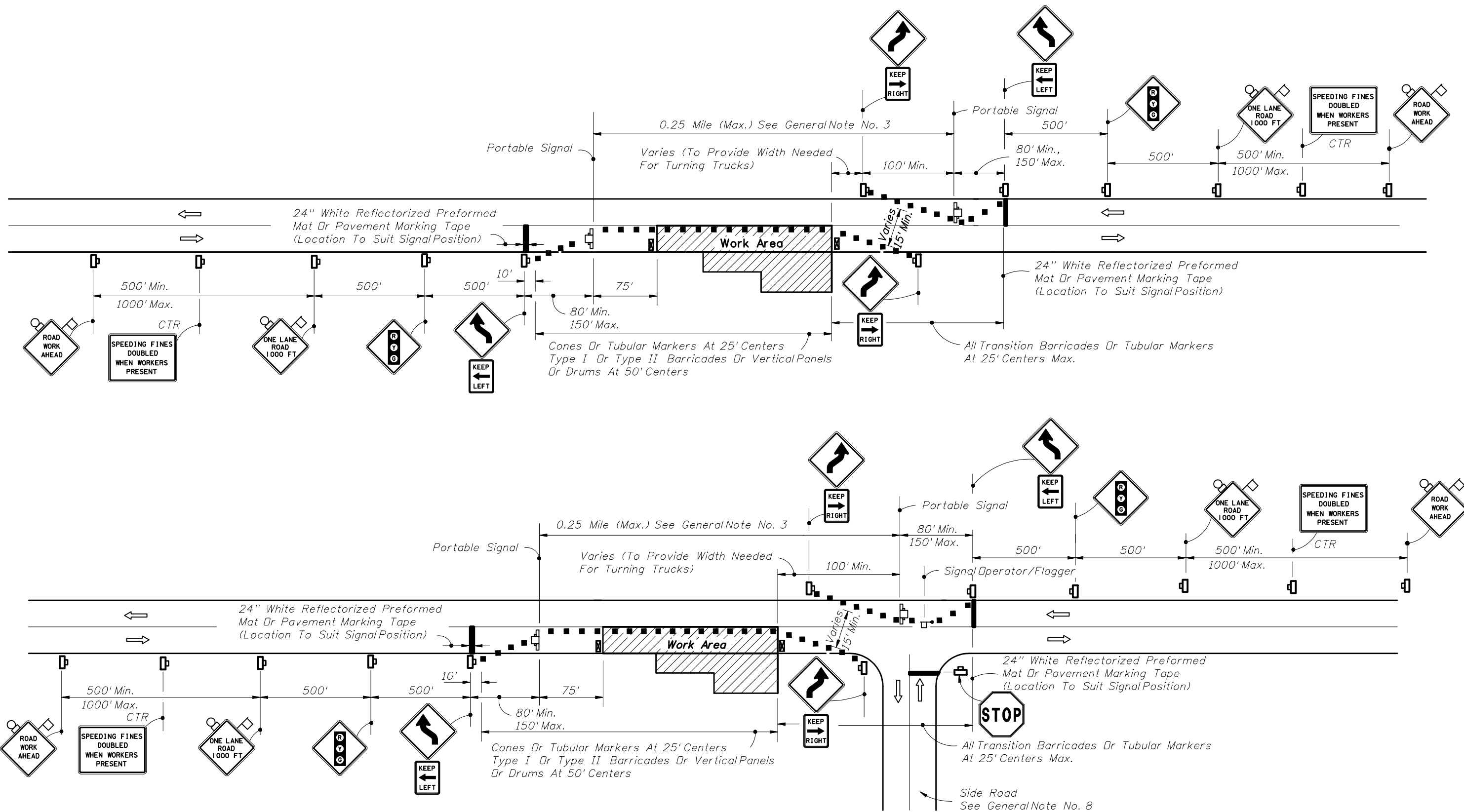
2010 FDOT Design Standards

**TWO-LANE TWO WAY, WORK WITHIN THE TRAVEL WAY
SIGNAL CONTROL**

Last
Revision
07/01/09

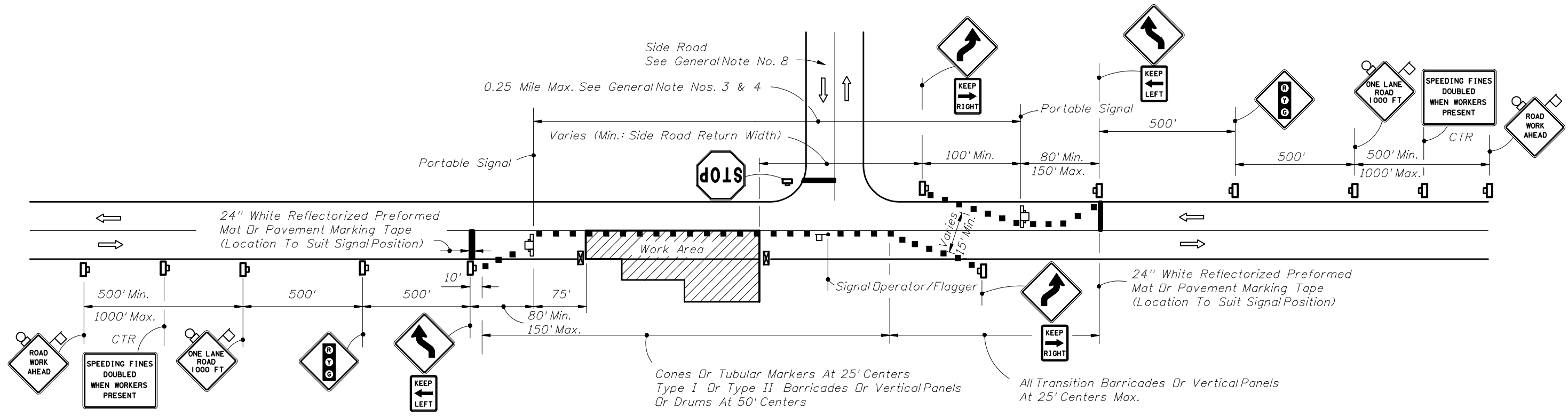
Sheet No.
1 of 4

Index No.
606

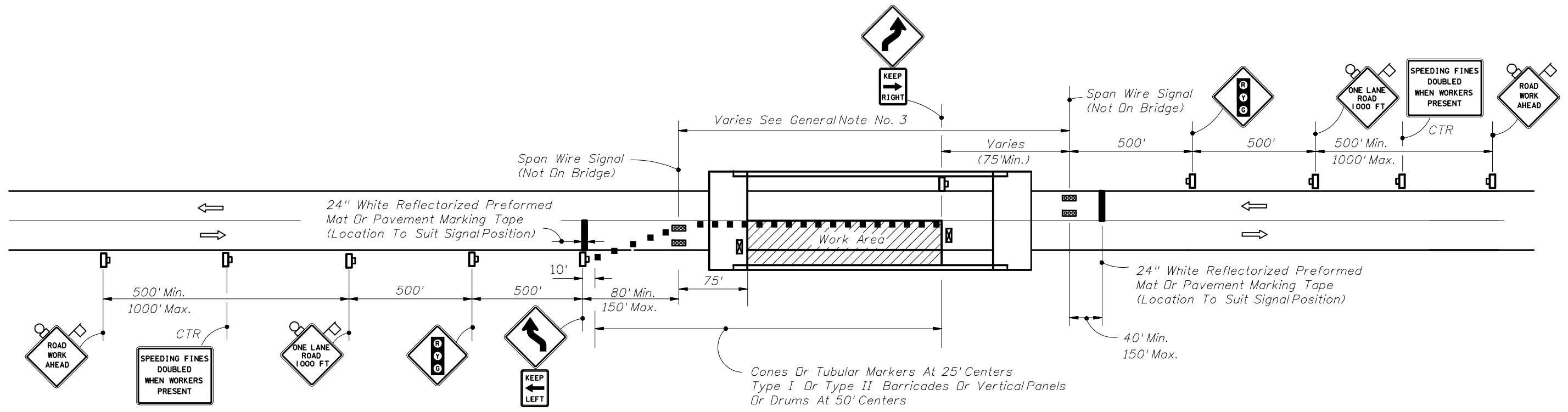


SINGLE LANE CLOSURE • ROADWAY AND BRIDGES ALL LENGTHS

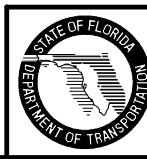


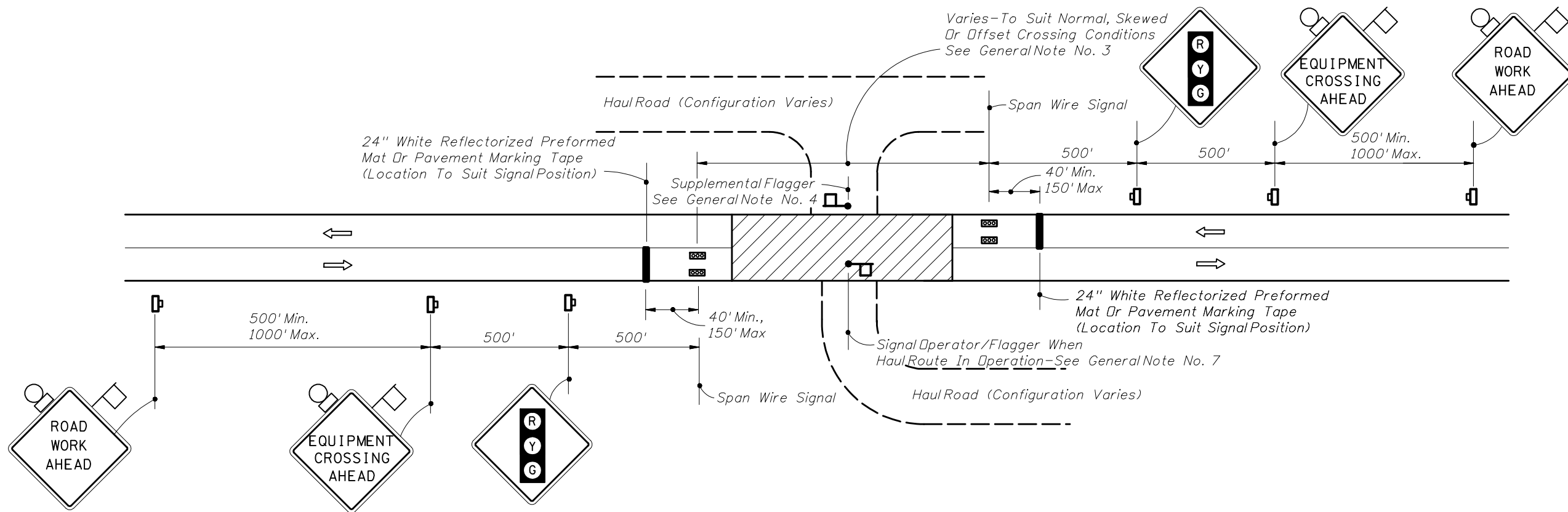


SINGLE LANE CLOSURE • ROADWAY AND BRIDGES ALL LENGTHS



SINGLE LANE CLOSURE • SHORT BRIDGES





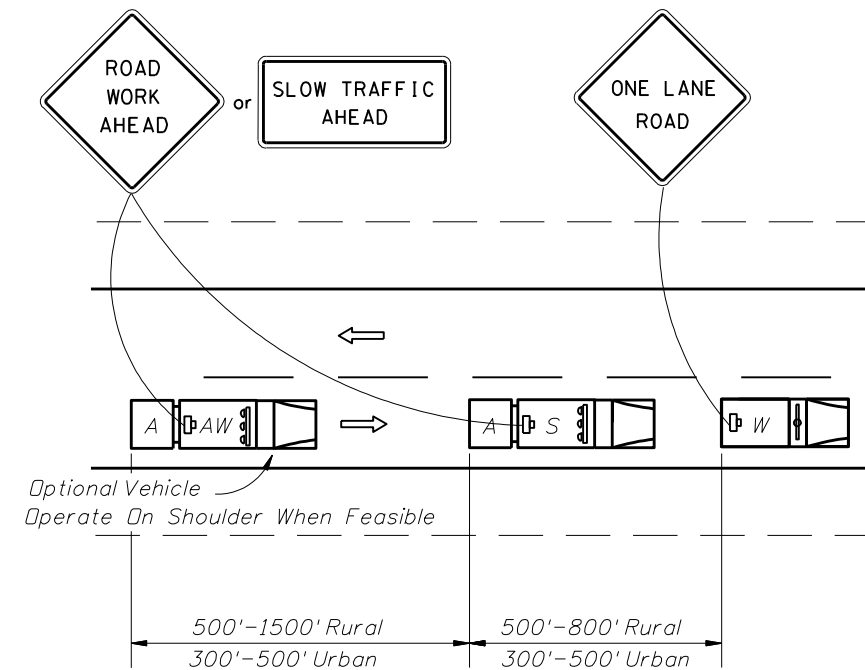
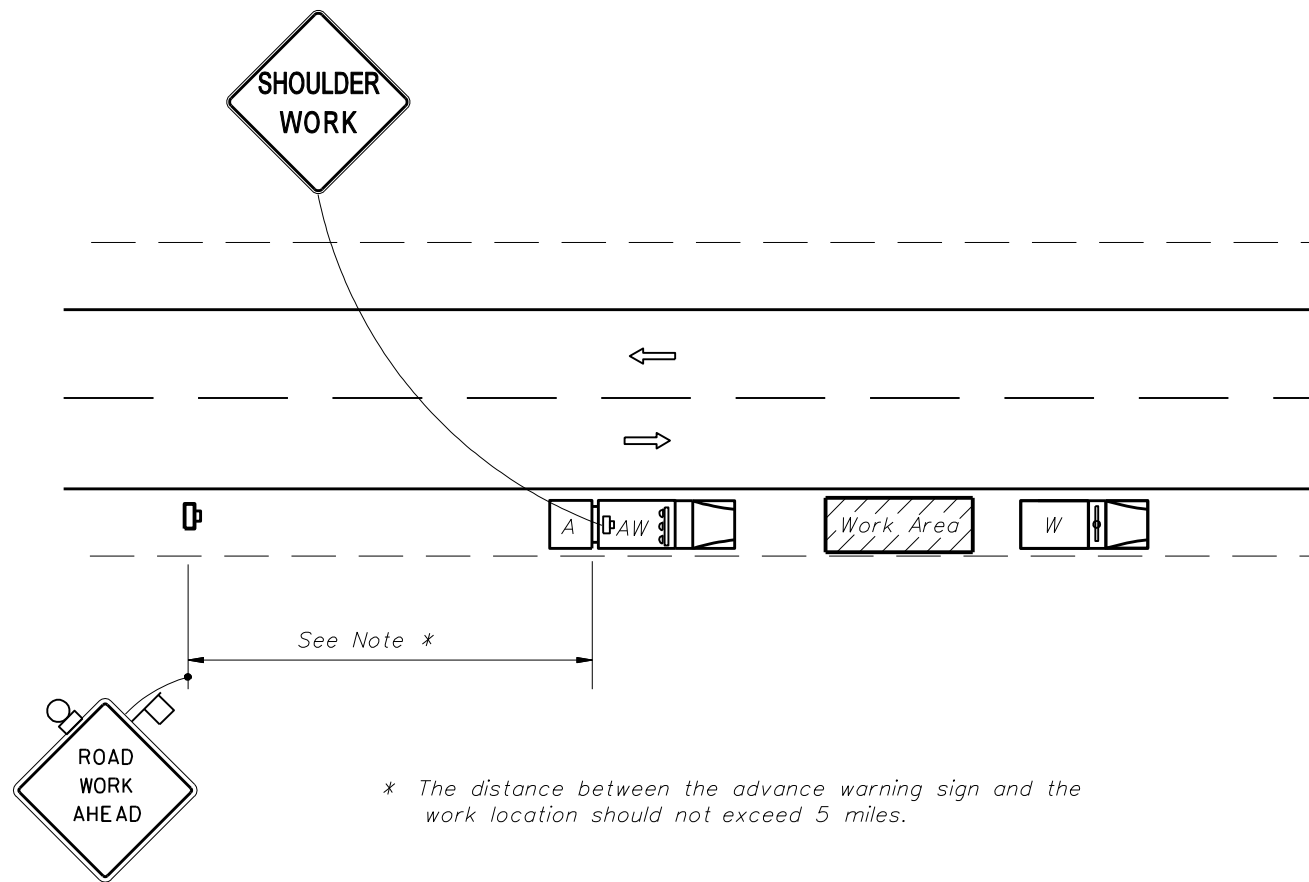
MOMENTARY ROADWAY CLOSURE • HAUL ROUTE CROSSING



2010 FDOT Design Standards

**TWO-LANE TWO-WAY, WORK WITHIN THE TRAVEL WAY
SIGNAL CONTROL**

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The Advance Warning Vehicle (Optional) may be used at the direction of the Engineer. If an Advance Warning Vehicle is operated within the travel way, an approved Truck Mounted Attenuator will be required on the Advance Warning Vehicle but not required on the Shadow Vehicle. The Advance Warning Arrow Panel and Warning Sign are required on both the Advance Warning and Shadow Vehicles.

WORK IN TRAVEL WAY

GENERAL NOTES

1. Where work activities within 2' of the edge of travelway are incidental (i.e., Mowing, Litter Removal), the Engineer may delete requirements for signs and the advance warning vehicle provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
2. If an arrow panel is used, the caution mode shall be used.
3. Shadow and Advance Warning Vehicle shall display rotating/strobe lights.
4. For general TCZ requirements and additional information, refer to Index No. 600.

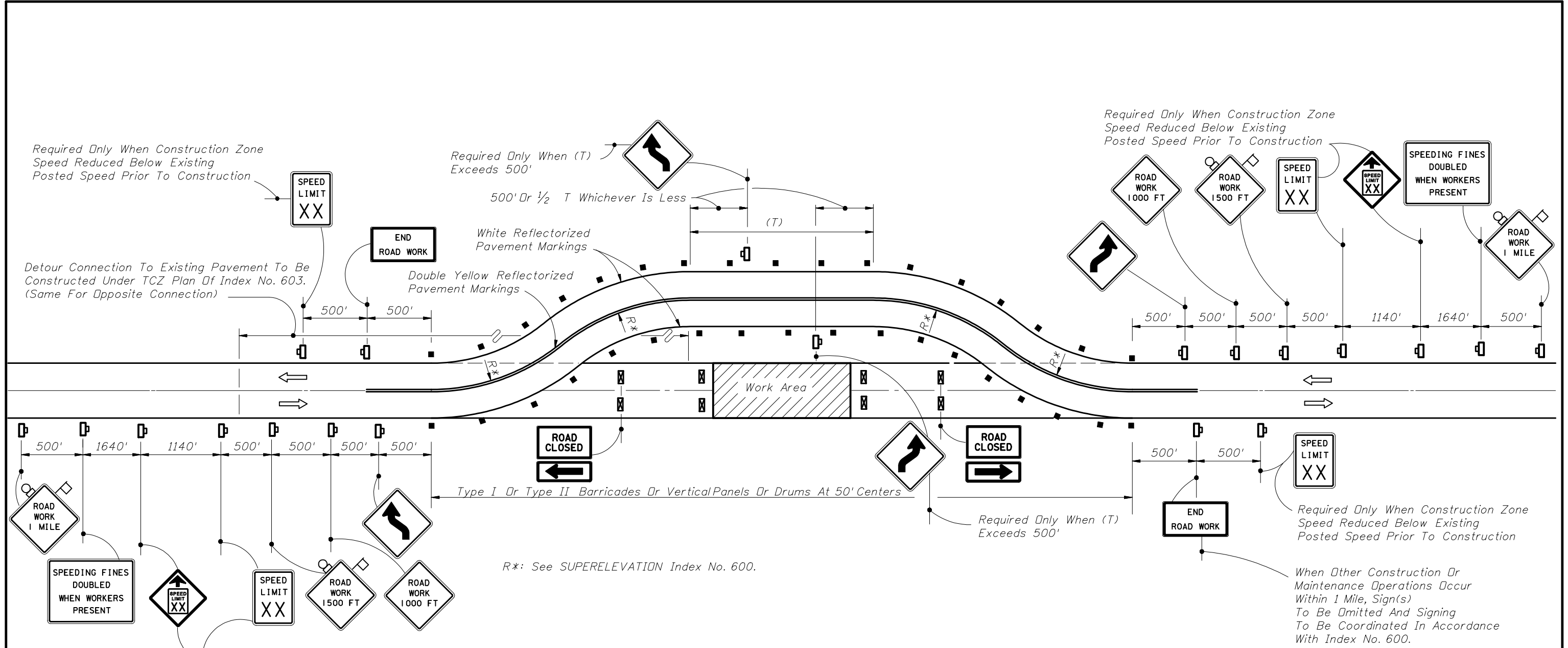
CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE AN INTERMITTENT OR CONTINUOUS MOVING OPERATION.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Work Zone Sign
- Work Vehicle With Rotating/Strobe Lights
- Shadow (S) Or Advance Warning (AW) Vehicle with Advance Warning Arrow Panel and Sign Message
- Truck Mounted Attenuator (TMA)
- Lane Identification + Direction of Traffic





GENERAL NOTES

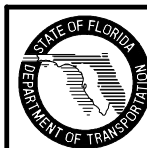
1. For speed sign applications, see Index No. 600.
2. Where the tangent distance (T) exceeds 600', spacing between cones or tubular markers may be increased to 50' or spacing between Type I or Type II barricades, vertical panels or drums may be increased to 100' within limits of the tangent, or post mounted delineators at 50' centers may be substituted for the barricades, vertical panels or drums.
3. On the existing pavement, all existing markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement markings used for marking a new centerline and edge lines.
4. Where the tangent distance (T) exceeds 600' and no passing or stopping sight distance restrictions exist, the yellow reflectorized markings used to indicate the centerline of the traveled way may be replaced with yellow reflectorized markings in a broken pattern. For raised pavement marker application see Index No. 600 and Index No. 17352.
5. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
6. If temporary structures are required on the diversion, traffic control will be in conformance with Index No. 650.
7. For general TCZ requirements and additional information, refer to Index Nos. 600 and 17352.
8. If posted speed for Work Zone is 45 mph or less, use "ROAD WORK 1/2 MILE" and space accordingly.

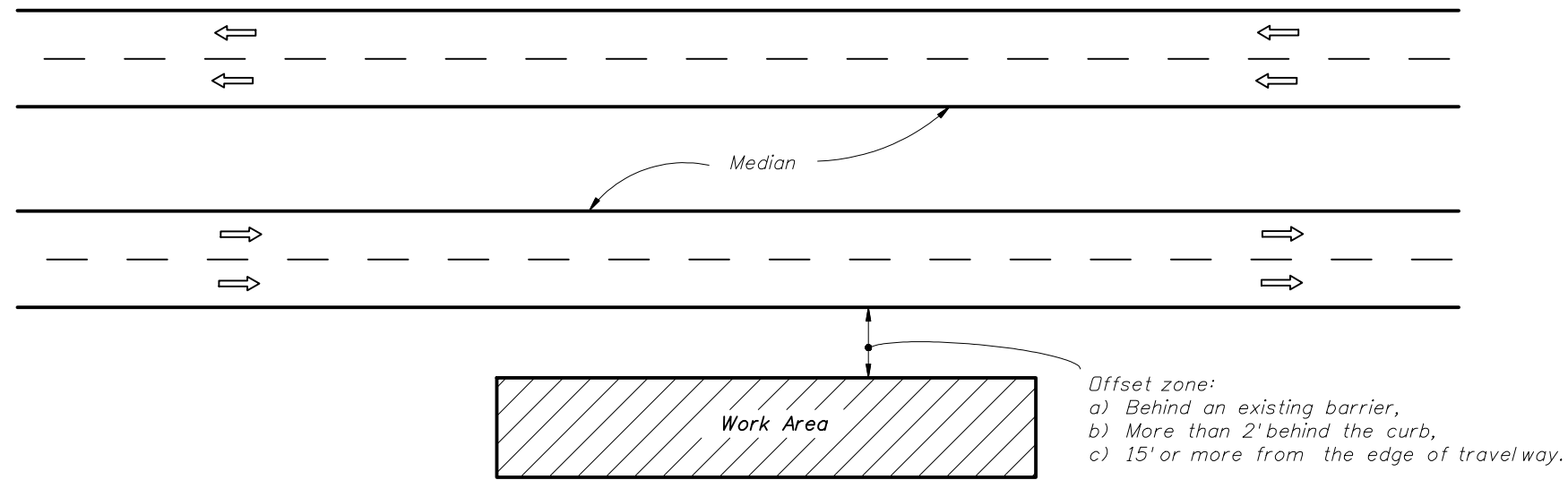
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Type III Barricade
- Lane Identification + Direction of Traffic

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF BOTH LANES AND A TEMPORARY DIVERSION IS CONSTRUCTED.





GENERAL NOTES

1. If the work operation (excluding establishing and terminating the work area), requires that two or more work vehicles cross the offset zone in any one hour, traffic control will be in accordance with Index No. 612.
2. No special signing is required.
3. This index also applies when work is being performed on a multilane undivided highway.
4. This index also applies to work performed in the median behind an existing barrier or more than 15' from the edge of travelway, both roadways. Work performed in the median behind curb and gutter shall be in accordance with Index No. 612.
5. When a side road intersects the highway within the work area, additional traffic control devices shall be placed in accordance with other applicable TCZ Indexes.
6. When construction activities encroach on a sidewalk, refer to Index No. 660.
7. For general TCZ requirements and additional information, refer to Index No. 600.

SYMBOLS

-  Work Area
-  Lane Identification + Direction of Traffic

CONDITIONS

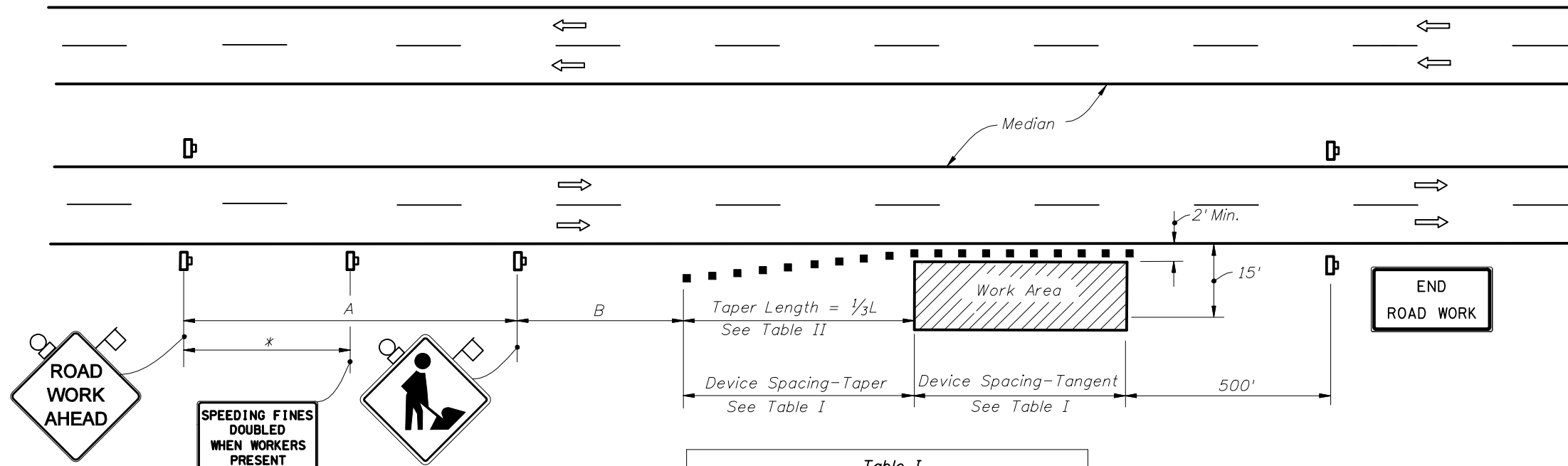
WHERE ANY VEHICLE, EQUIPMENT, WORKERS AND THEIR ACTIVITIES ARE BEHIND AN EXISTING BARRIER, MORE THAN 2' BEHIND THE CURB, OR 15' OR MORE FROM THE EDGE OF TRAVEL WAY.



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MULTILANE, WORK OUTSIDE SHOULDER

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611	



Speed	Spacing (ft.)	
	A	B
40 mph or less	200	200
45 mph	350	350
50 mph or greater	500	500

* 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

Speed (mph)	$\frac{1}{3}L$ (ft.)			Notes
	8' Shldr.	10' Shldr.	12' Shldr.	
25	28	35	42	$L = \frac{WS^2}{60}$
30	40	50	60	
35	55	68	82	
40	72	90	107	$L = WS$
45	120	150	180	
50	133	167	200	
55	147	183	220	
60	160	200	240	
65	173	217	260	
70	187	233	280	

8' minimum shoulder width.
 $\frac{1}{3}L$ = Length of shoulder taper in feet
 W = Width of total shoulder in feet (combined paved and unpaved width)
 S = Posted speed limit (mph)

- SYMBOLS**
- Work Area
 - Sign With 18" x 18" (Min.) Orange Flag And Type B Light
 - Channelizing Device (See Index No. 600)
 - Work Zone Sign
 - Lane Identification + Direction of Traffic

GENERAL NOTES

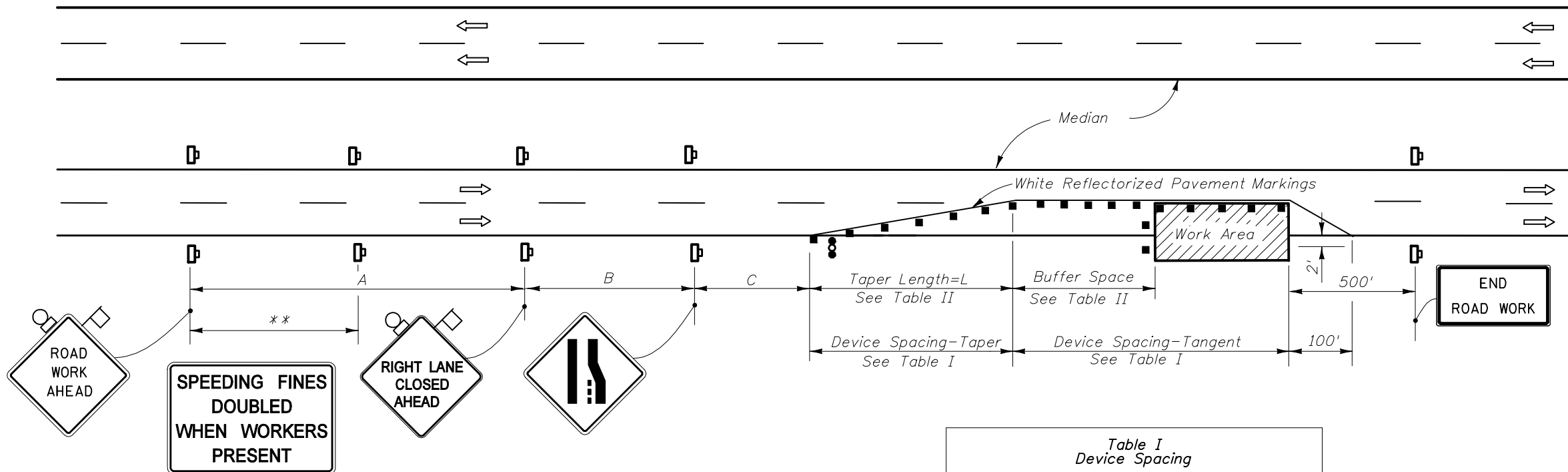
- If the work operation encroaches on the through traffic lanes or when four or more vehicles enter the through traffic lanes in a one hour period (excluding establishing and terminating the work area), a flagger shall be provided and a FLAGGER sign shall be substituted for the WORKERS sign. The flagger shall be positioned at the point of vehicle entry or departure from the work area.
- This TCZ plan also applies to work performed in the median more than 2' but less than 15' from the edge of travelway.
- When work is being performed on a multilane undivided roadway the signs normally mounted in the median (as shown) shall be omitted.
- WORKERS signs to be removed or fully covered when no work is being performed.
- SHOULDER WORK sign may be used as an alternate to the WORKER symbol sign.
- When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

- Signs and channelizing devices may be omitted if all of the following conditions are met:
 - Work operations are 60 minutes or less.
 - Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF TRAVEL WAY.



**Table II
Buffer Space and Taper Length**

Speed (mph)	Buffer Space	Taper Length (12' Lateral Transition)	
	Dist. (ft.)	L (ft.)	Notes (Merge)
25	155	125	$L = \frac{WS^2}{60}$
30	200	180	
35	250	245	
40	305	320	$L = WS$
45	360	540	
50	425	600	
55	495	660	
60	570	720	
65	645	780	
70	730	840	

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in the notes column. Where:
 L = Length of taper in feet
 W = Width of lateral transition in feet
 S = Posted speed limit (mph)

**Table I
Device Spacing**

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

DISTANCE BETWEEN SIGNS

Speed	Spacing (ft.)		
	A	B	C
40 mph or less	200	200	200
45 mph	350	350	350
50 mph	500	500	500
*55 mph or greater	2640	1640	1000

GENERAL NOTES

1. Work operations shall be confined to one traffic lane, leaving the adjacent lane open to traffic.
2. On undivided highways the median signs as shown are to be omitted.
3. When work is performed in the median lane on divided highways, the channelizing device plan is inverted and left lane closed and lane ends signs substituted for the right lane closed and lane end signs.
 The same applies to undivided highways with the following exceptions:
 (a) Work shall be confined within one median lane.
 (b) Additional barricades, cones, or drums shall be placed along the centerline abutting the work area and across the trailing end of the work area.

When work on undivided highways occurs across the centerline so as to encroach on both median lanes, the inverted plan is applied to the approach of both roadways.

4. Signs and traffic control devices are to be modified in accordance with INTERMITTENT WORK STOPPAGE details (sheet 2 of 2) when no work is being performed and the highway is open to traffic.
5. The two channelizing devices directly in front of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
6. When paved shoulders having a width of 8 ft. or more are closed, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the travel way. See Index No. 612 for shoulder taper formulas.

7. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
8. This TCZ plan does not apply when work is being performed in the middle lane(s) of a six or more lane highway. See Index No. 614.
9. For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

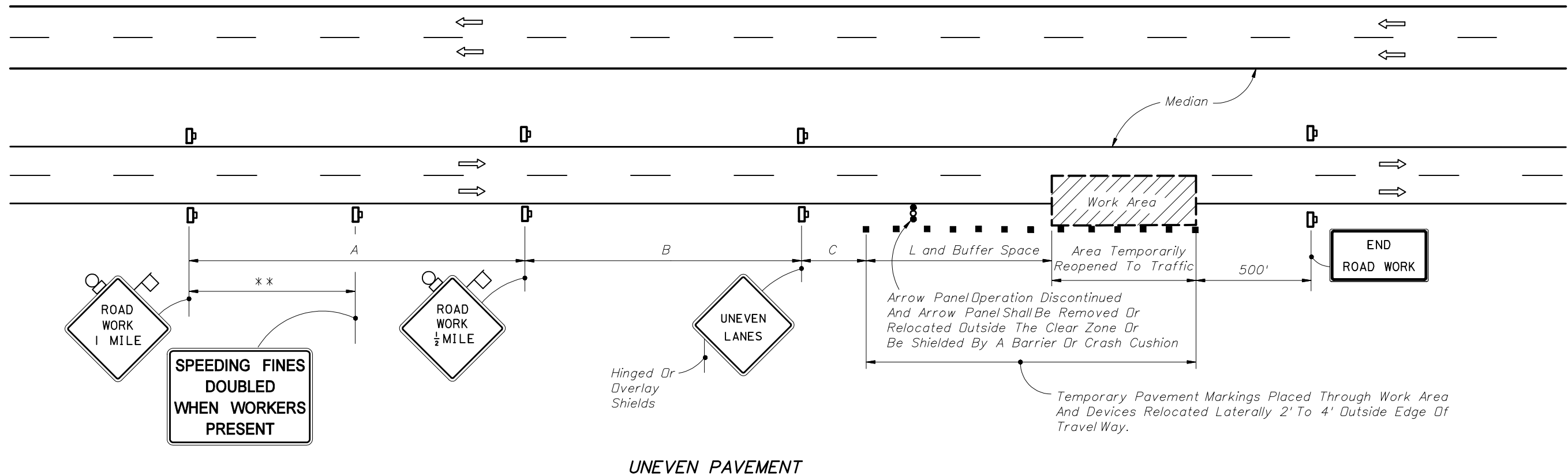
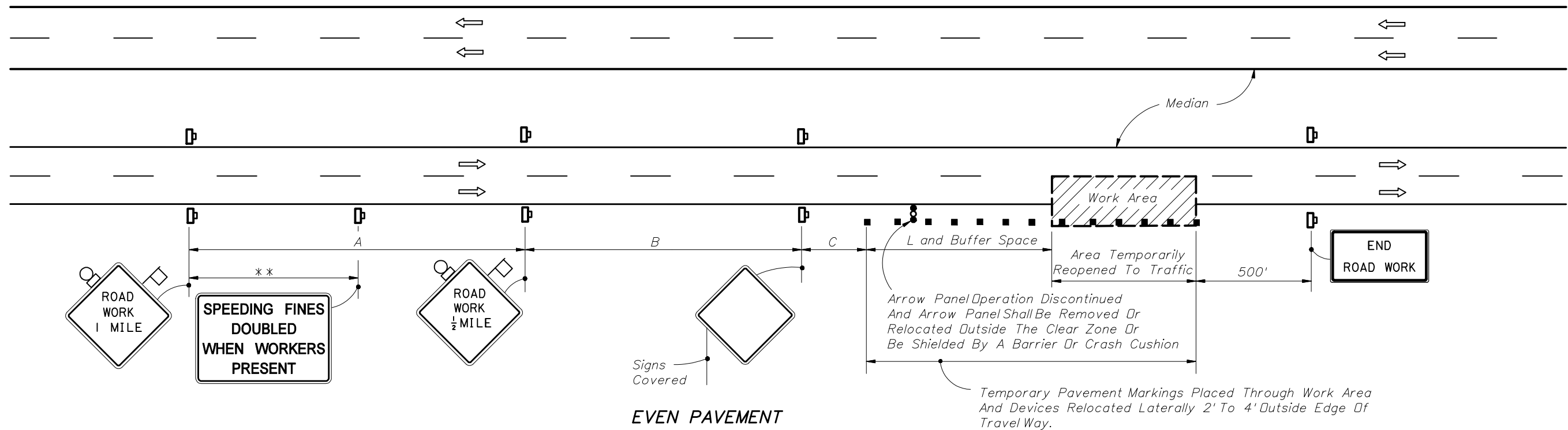
1. Temporary white edgeline may be omitted for work operations less than 3 days.
2. Signs, arrow panel and buffer space may be omitted if all of the following conditions are met:
 - a) Work operations are 60 minutes or less.
 - b) Speed limit is 45 mph or less.
 - c) No sight obstructions to vehicles approaching the work area for a distance equal to the buffer space and the taper length combined.
 - d) Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
 - e) Volume and complexity of the roadway has been considered.

CONDITIONS

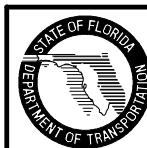
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF TRAVEL WAY.

SYMBOLS

- Work Area
- Sign With 18"x 18" (Min.)
Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic



INTERMITTENT WORK STOPPAGE - LANE REOPENED TO TRAFFIC



EXISTING POSTED SPEED	PROPOSED WORK ZONE SPEED	REMARKS
MPH	MPH	The 'Proposed Work Zone Speeds' are recommended speeds for the traffic control plan detailed below; however, where the Engineer deems other speeds are appropriate, the applicable speeds are to be shown on the plans.
65	55	
55	45	
45	35	

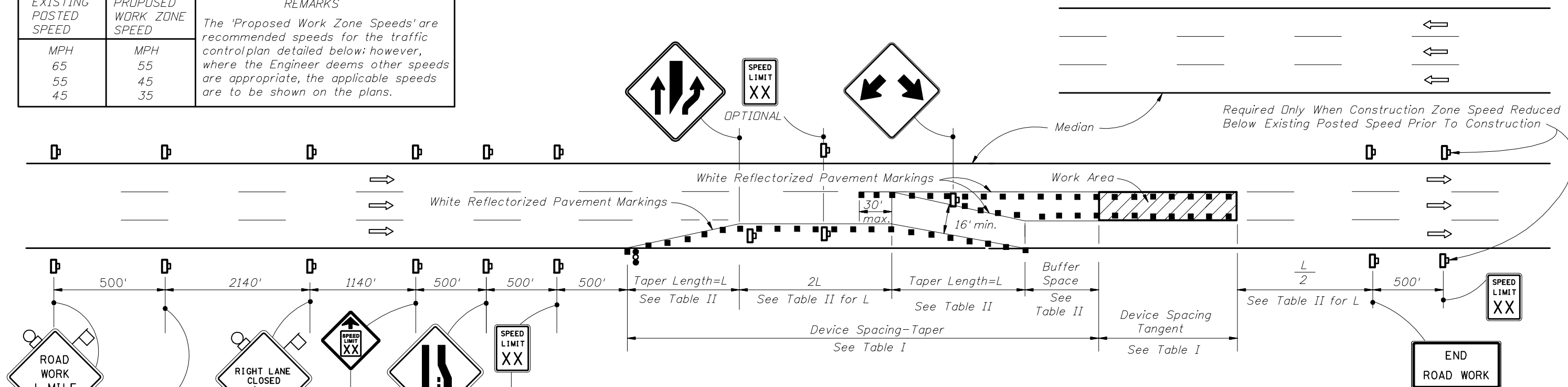


Table I
Device Spacing

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

Table II
Buffer Space and Taper Length

Speed (mph)	Buffer Space	Taper Length (12' Lateral Transition)		Notes (Merge)
	Dist. (ft.)	L (ft.)		
25	155	125		$L = \frac{WS^2}{60}$
30	200	180		
35	250	245		
40	305	320		L = WS
45	360	540		
50	425	600		
55	495	660		
60	570	720		
65	645	780		
70	730	840		

CONDITION NOTES

1. The RIGHT LANE CLOSED and lane reduction signs are to be removed or fully covered when no work is being performed and the center lane is opened to traffic.
2. For work performed in the median or outside lane, refer to Index No. 613.
3. When the lane closure exceeds a continuous 24 hour period, all existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement marking used for marking new edge lines and centerline.

GENERAL NOTES

1. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
2. For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

1. Temporary pavement markings may be omitted for work operations less than 3 days.

SYMBOLS

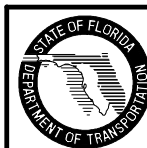
- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic

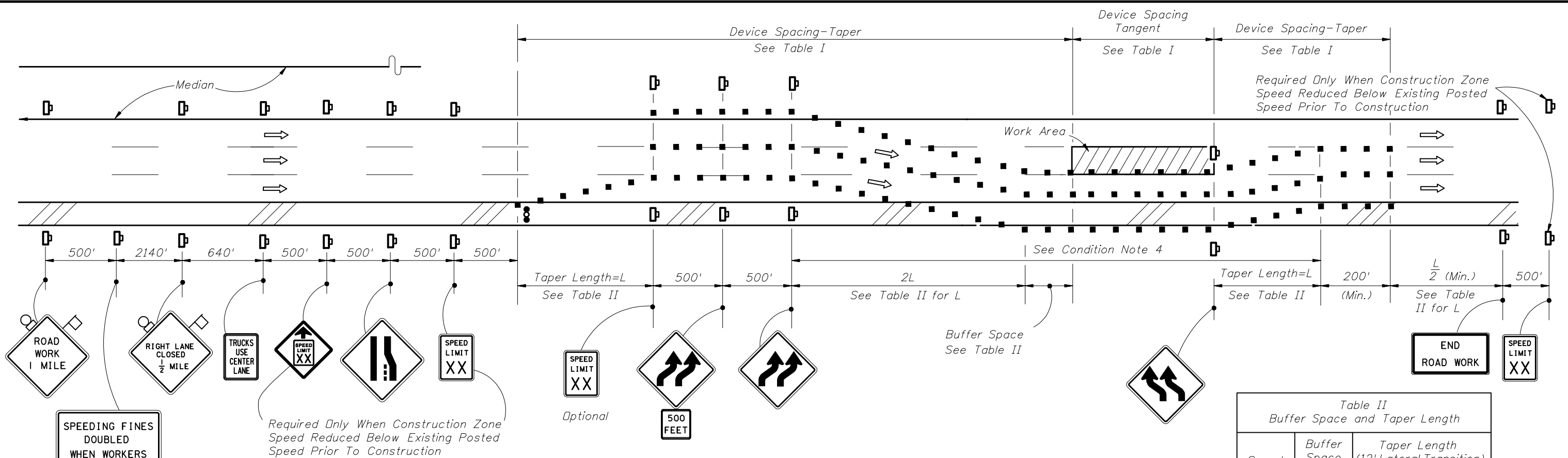
When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in the notes column. Where:
 L = Length of taper in feet
 W = Width of lateral transition in feet
 S = Posted speed limit (mph)

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON ANY PORTION OF A CENTER LANE OF A MULTILANE HIGHWAY, AND TWO DRIVING LANES ARE MAINTAINED ON THE TRAVEL WAY.





SPEEDING FINES DOUBLED WHEN WORKERS PRESENT

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Optional

Buffer Space See Table II

EXISTING POSTED SPEED	PROPOSED WORK ZONE SPEED	REMARKS
MPH	MPH	The 'Proposed Work Zone Speeds' are recommended speeds for the traffic control plan detailed below; however, where the Engineer deems other speeds are appropriate, the applicable speeds.
65	55	
55	45	
45	35	

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

Speed (mph)	Buffer Space	Taper Length (12' Lateral Transition)		Notes (Merge)
	Dist. (ft.)	L (ft.)		
25	155	125		$L = \frac{WS^2}{60}$
30	200	180		
35	250	245		
40	305	320		$L = WS$
45	360	540		
50	425	600		
55	495	660		
60	570	720		
65	645	780		
70	730	840		

CONDITION NOTES

1. See General Notes, Sheet 1 of 2.
2. Length of time that traffic is using shoulder should be minimized. For example, remove lane closure and lane shift at night (unless performing night work) if practical.
3. The RIGHT LANE CLOSED, lane reduction and reverse curve signs are to be removed or fully covered when no work is being performed and the travelway is open to traffic.
4. When the lane closure exceeds a continuous 24 hour period, all existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement markings used for marking new edge lines and centerlines.
5. For general TCZ requirements and additional information, refer to Index No. 600.

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

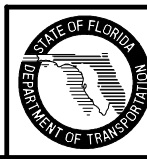
For lateral transitions other than 12', use formula for L shown in the notes column. Where:
 L = Length of taper in feet
 W = Width of lateral transition in feet
 S = Posted speed limit (mph)

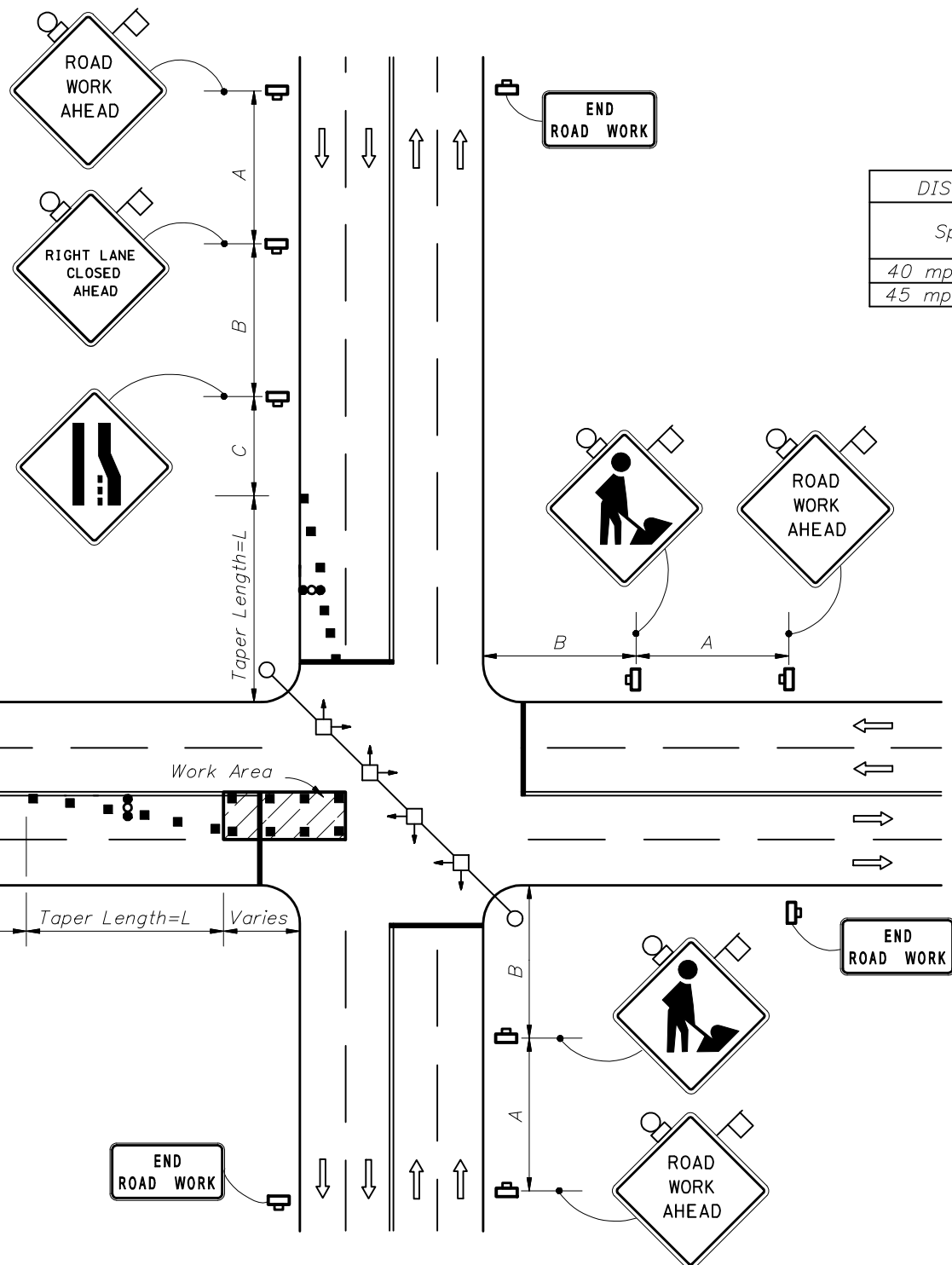
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON ANY PORTION OF A CENTER LANE OF A MULTILANE HIGHWAY, AND TWO DRIVING LANES ARE MAINTAINED, AND, THE OUTSIDE SHOULDER PAVEMENT IS TEMPORARILY USED AS A TRAVEL LANE.





Speed	Spacing (ft.)		
	A	B	C
40 mph or less	200	200	200
45 mph	350	350	350

Speed (mph)	L (ft.)	Notes (Merge)
25	125	$L = \frac{WS^2}{60}$
30	180	
35	245	
40	320	
45	540	$L = WS$

For lateral transitions other than 12', use formula for L shown in the notes column. Where:
 L = Length of taper in feet
 W = Width of lateral transition in feet
 S = Posted speed limit (mph)

GENERAL NOTES

1. The WORKERS legend sign may be substituted for the symbol sign.
2. When vehicles in a parking zone block the line of sight to TCZ signs, the signs shall be post mounted and located in accordance with Index No. 17302.
3. If the work space extends across a crosswalk, the crosswalk should be closed using the information in Index No. 660.
4. Dual signs are required for divided roadways.
5. Maximum spacing between barricades, vertical panels, cones, tubular markers and drums shall not be greater than 25'.
6. Temporary signal phasing modifications are to be approved by the District Traffic Operations Engineer prior to the beginning of work.
7. For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

1. Signs and arrow panel may be omitted if all of the following conditions are met:
 - a) Work operations are 60 minutes or less.
 - b) Speed is 45 mph or less.
 - c) No sight obstructions to vehicles approaching the work area for a distance equal to twice the taper length.
 - d) Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
 - e) Volume and complexity of the roadway has been considered.

- SYMBOLS**
- Work Area
 - Sign With 18"x 18" (Min.)
Orange Flag And Type B Light
 - Channelizing Device (See Index No. 600)
 - Work Zone Sign
 - Stop Bar
 - Advance Warning Arrow Panel
 - Lane Identification + Direction of Traffic

SIGNALIZED

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON THE PAVEMENT REQUIRING THE CLOSURE OF AT LEAST ONE MEDIAN TRAFFIC LANE.



GENERAL NOTES

1. Work operations shall be confined to either one lane, or lane combinations as follows:

- (a) Outside travel lane; (b) Outside auxiliary lane;
- (c) Outside travel lane and adjoining auxiliary lane;
- (d) Inside travel lane Δ ; (e) Inside auxiliary lane Δ ;
- (f) Inside travel lane and adjoining auxiliary lane Δ

Δ See Sheet 3 of 3

If the work area is confined to an auxiliary lane the work area shall be barricaded and the RIGHT (LEFT) LANE CLOSED AHEAD signs replaced by ROAD WORK AHEAD signs, and the merge symbol signs eliminated.








- 2. When vehicles in a parking zone block the line of sight to TCZ signs, the signs shall be post mounted and located in accordance with Index No. 17302.
- 3. If the work space extends across a crosswalk, the crosswalk should be closed using the information in Index No. 660.
- 4. Signs are required on the median side for divided highways.
- 5. The two channelizing devices directly in front and directly at the end of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
- 6. For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

1. Signs and arrow panel may be omitted if all of the following conditions are met:

- a) Work operations are 60 minutes or less.
- b) Speed limit is 45 mph or less.
- c) No sight obstructions to vehicles approaching the work area for a distance equal to twice the taper length.
- d) Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
- e) Volume and complexity of the roadway has been considered.

SYMBOLS

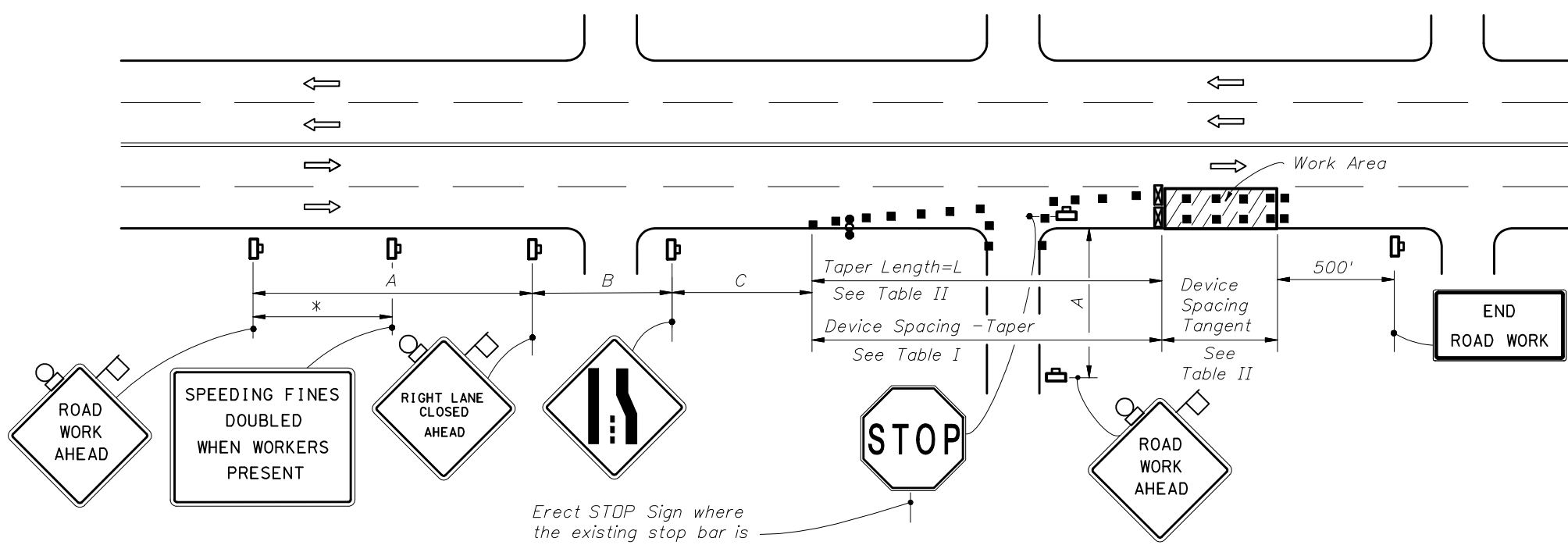
-  Work Area
-  Sign With 18" x 18" (Min.)
Orange Flag And Type B Light
-  Channelizing Device (See Index No. 600)
-  Type III Barricade
-  Work Zone Sign
-  Advance Warning Arrow Panel
-  Lane Identification + Direction of Traffic



2010 FDOT Design Standards

MULTILANE, WORK NEAR INTERSECTION MEDIAN OR OUTSIDE LANE

Last Revision	Sheet No.
07/01/09	1 of 3
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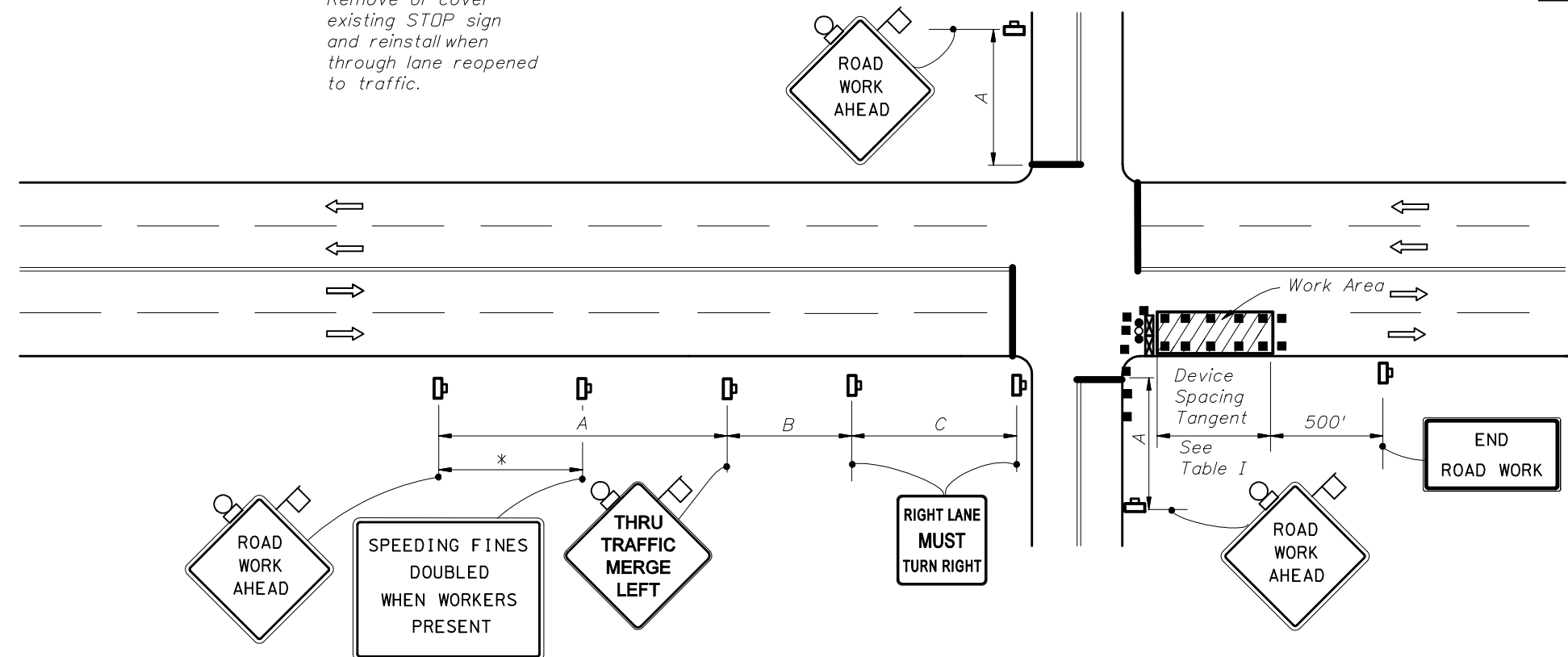
Erect STOP Sign where the existing stop bar is more than 30 foot from the taper line. Remove or cover existing STOP sign and reinstall when through lane reopened to traffic.

RIGHT LANE CLOSED ON FAR SIDE OF MINOR SIDESTREET

Speed	Spacing (ft.)		
	A	B	C
40 mph or less	200	200	200
45 mph	350	350	350

* 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50



RIGHT LANE CLOSED ON FAR SIDE OF INTERSECTION WITH SIGNIFICANT RIGHT TURNING MOVEMENTS

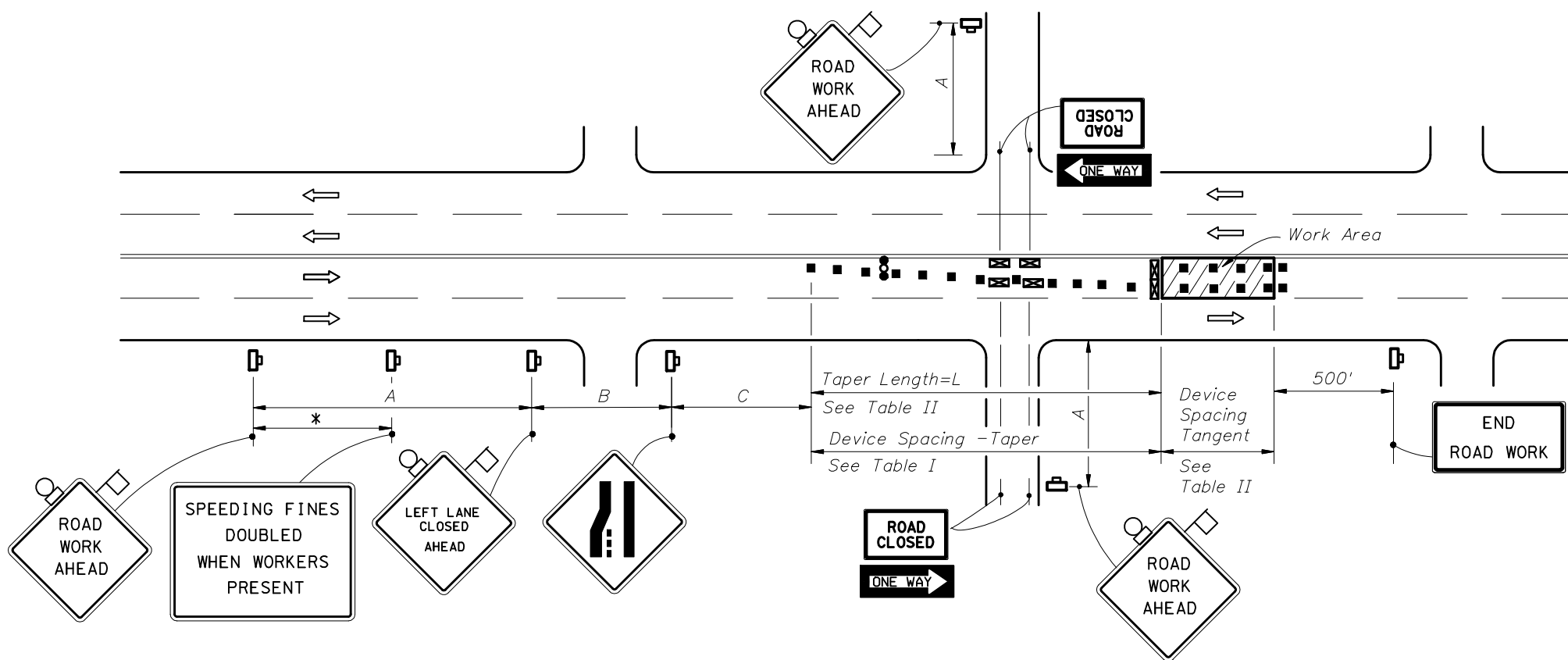
Speed (mph)	L (ft.)	Notes (Merge)
25	125	$L = \frac{WS^2}{60}$
30	180	
35	245	
40	320	$L = WS$
45	540	

For lateral transitions other than 12', use formula for L shown in the notes column. Where:
 L= Length of taper in feet
 W= Width of lateral transition in feet
 S= Posted speed limit (mph)

1. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a right lane having significant right turning movements, then the right lane may be restricted to right turns only as shown in this detail.

2. For intersection approaches reduced to a single lane, left turning movements may be prohibited to maintain capacity for through vehicular traffic.





DISTANCE BETWEEN SIGNS			
Speed	Spacing (ft.)		
	A	B	C
40 mph or less	200	200	200
45 mph	350	350	350

* 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

Table I Device Spacing				
Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50

LEFT LANE CLOSED ON FAR SIDE OF MINOR SIDESTREET - RESTRICTED TURNING MOVEMENTS

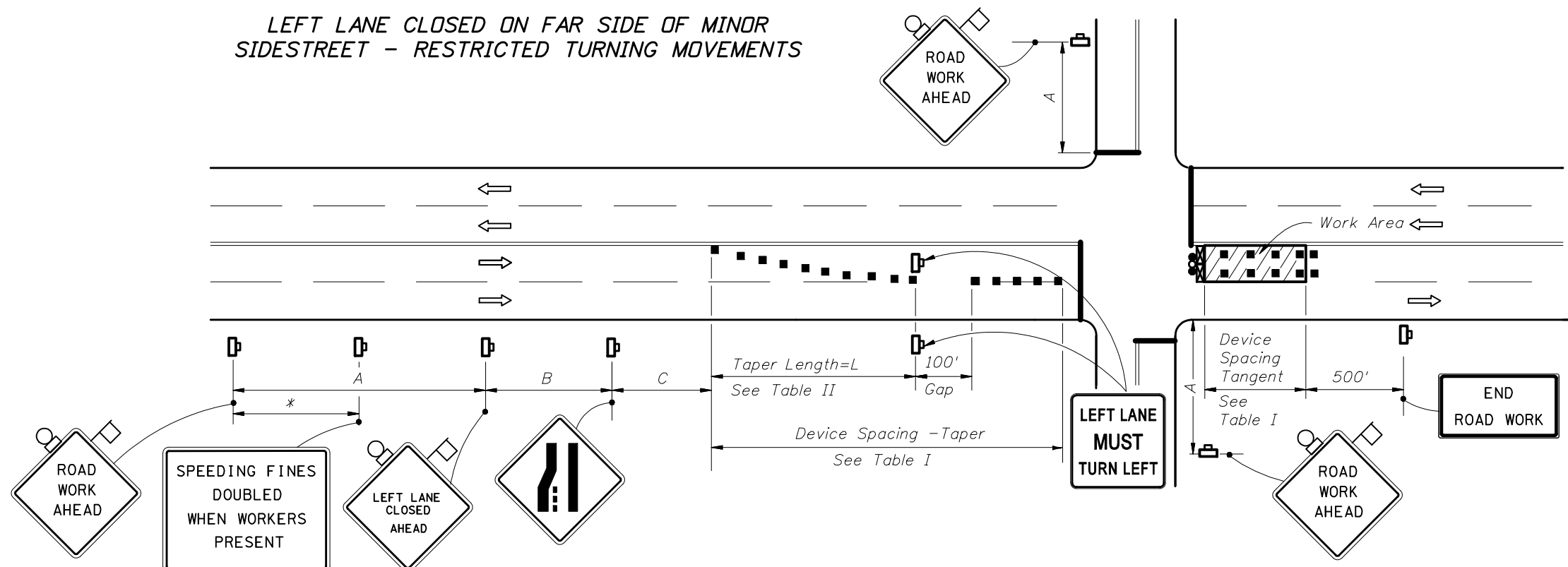


Table II Taper Length - Merge (12' Lateral Transition)		
Speed (mph)	L (ft.)	Notes (Merge)
25	125	$L = \frac{WS^2}{60}$
30	180	
35	245	
40	320	
45	540	$L = WS$

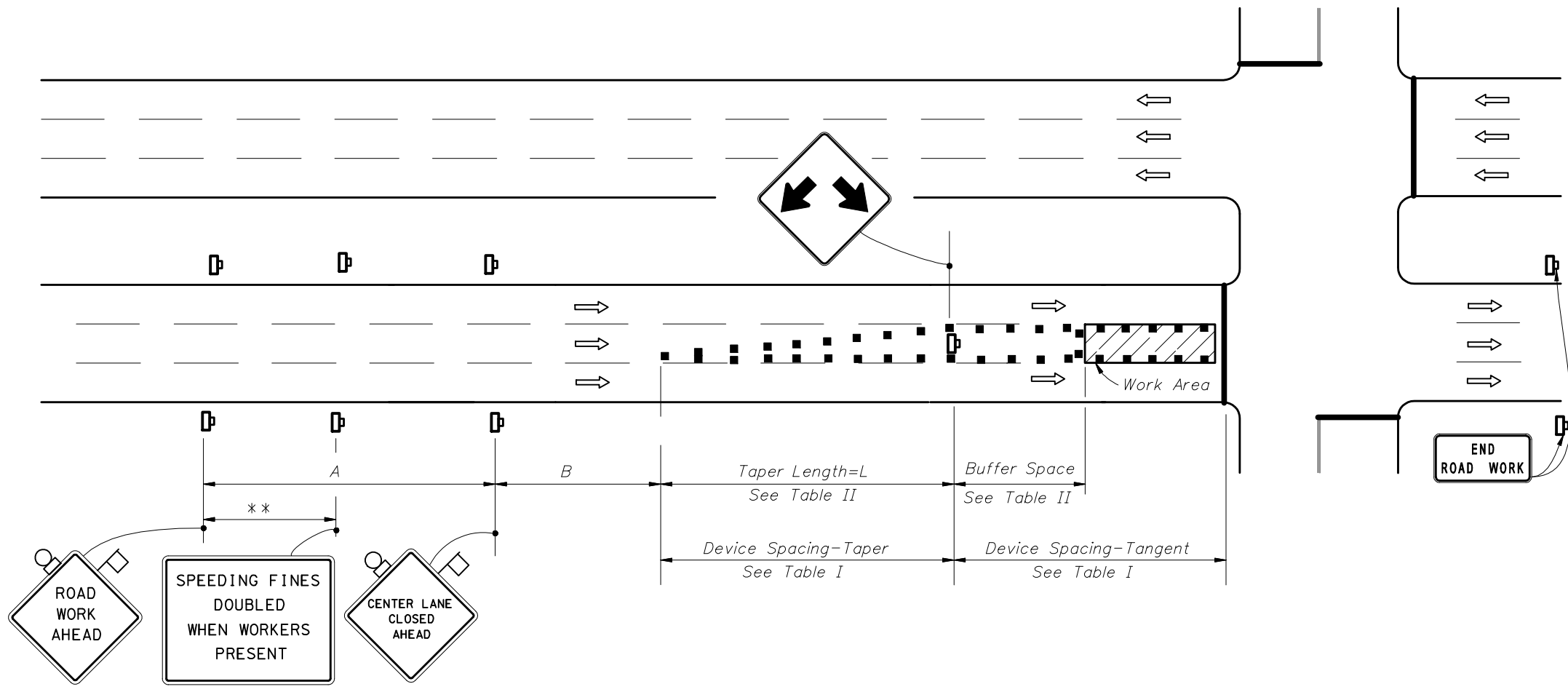
For lateral transitions other than 12', use formula for L shown in the notes column. Where:
 L = Length of taper in feet
 W = Width of lateral transition in feet
 S = Posted speed limit (mph)

LEFT LANE CLOSED ON FAR SIDE OF INTERSECTION TURNING MOVEMENTS ALLOWED

1. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a left lane having significant right turning movements, then the left lane may be reopened as a turn bay for left turns only as show in this detail.



DISTANCE BETWEEN SIGNS		
Speed	Spacing (ft.)	
	A	B
40 mph or less	200	200
45 mph	350	350



** 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50

Speed (mph)	Buffer Space Dist. (ft.)	Taper Length (12' Lateral Transition)	
		L (ft.)	Notes (Merge)
25	155	125	$L = \frac{WS^2}{60}$
30	200	180	
35	250	245	
40	305	320	L=WS
45	360	540	

GENERAL NOTES

1. Work operations shall be confined to one center travel lane, leaving the adjacent travel lanes open to traffic.
2. The merging taper shall direct vehicular traffic into either the right or left lane, but not both.
3. When vehicles in a parking zone block the line of sight to TCZ signs, the signs shall be post mounted and located in accordance with Index No. 17302.
4. If the work space extends across a crosswalk, the crosswalk should be closed using the information in Index No. 660.
5. For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTES

1. Signs and buffer space may be omitted if all of the following conditions are met:
 - a) Work operations are 60 minutes or less.
 - b) Speed limit is 45 mph or less.
 - c) No sight obstructions to vehicles approaching the work area for a distance equal to the buffer space and the taper length combined.
 - d) Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
 - e) Volume and complexity of the roadway has been considered.

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

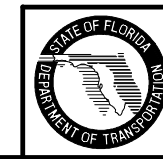
For lateral transitions other than 12', use formula for L shown in the notes column. Where:
 L= Length of taper in feet
 W= Width of lateral transition in feet
 S= Posted speed limit (mph)

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON THE PAVEMENT REQUIRING THE CLOSURE OF THE CENTER LANE NEAR AN INTERSECTION.

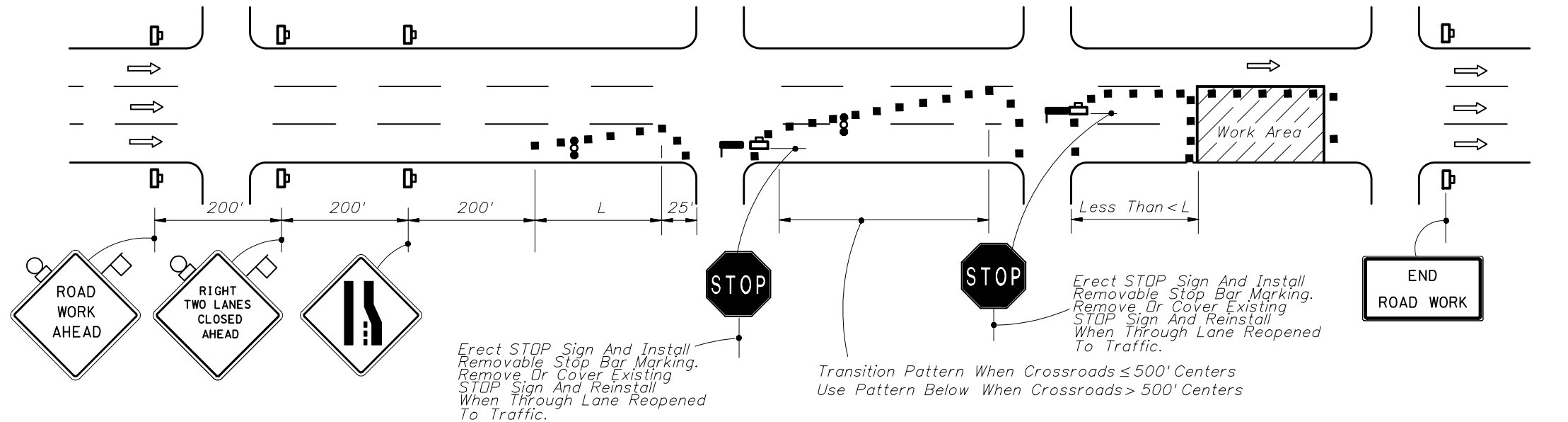
SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic



CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON THE PAVEMENT REQUIRING THE CLOSURE OF EITHER THE OUTSIDE AND CENTER TRAVEL LANES OR THE MEDIAN AND CENTER TRAVEL LANES, WITH OR WITHOUT CLOSURE OF ADJOINING AUXILIARY LANES, FOR WORK AREA LESS THAN 200' FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.



CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON THE PAVEMENT REQUIRING THE CLOSURE OF EITHER THE OUTSIDE AND CENTER TRAVEL LANES OR THE MEDIAN AND CENTER TRAVEL LANES, WITH OR WITHOUT CLOSURE OF ADJOINING AUXILIARY LANES, FOR WORK AREA 200' OR MORE FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

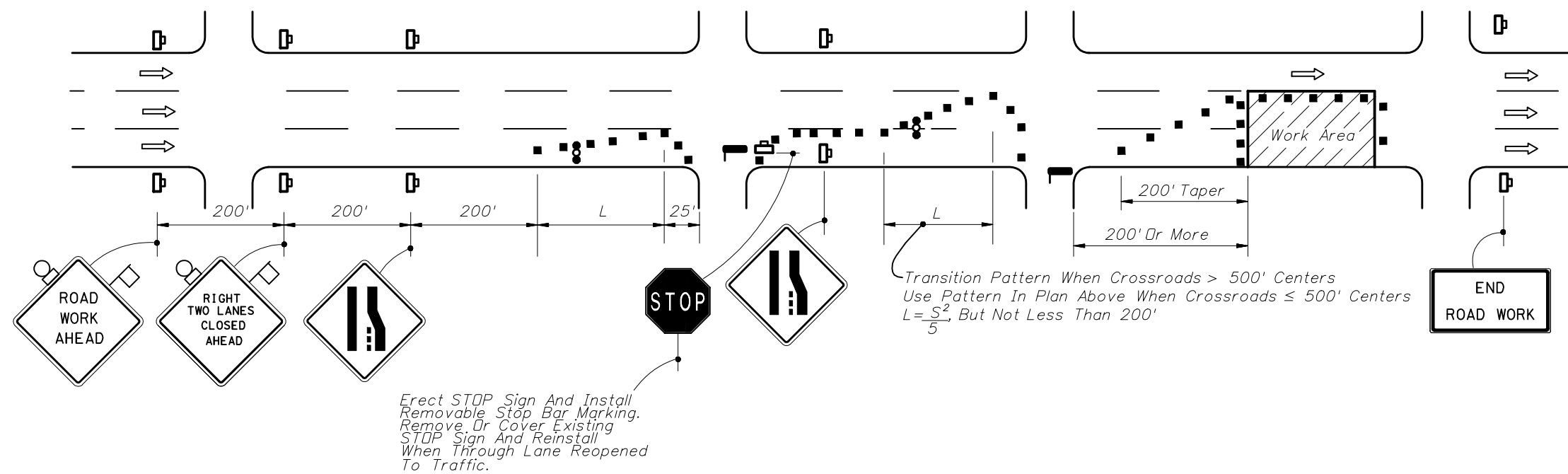


Table II
Taper Length - Merge
(12' Lateral Transition)

Speed (mph)	L (ft.)	Notes (Merge)
25	125	$L = \frac{WS^2}{60}$
30	180	
35	245	
40	320	$L = WS$
45	540	

For lateral transitions other than 12', use formula for L shown in the notes column. Where:
L = Length of taper in feet
W = Width of lateral transition in feet
S = Posted speed limit (mph)

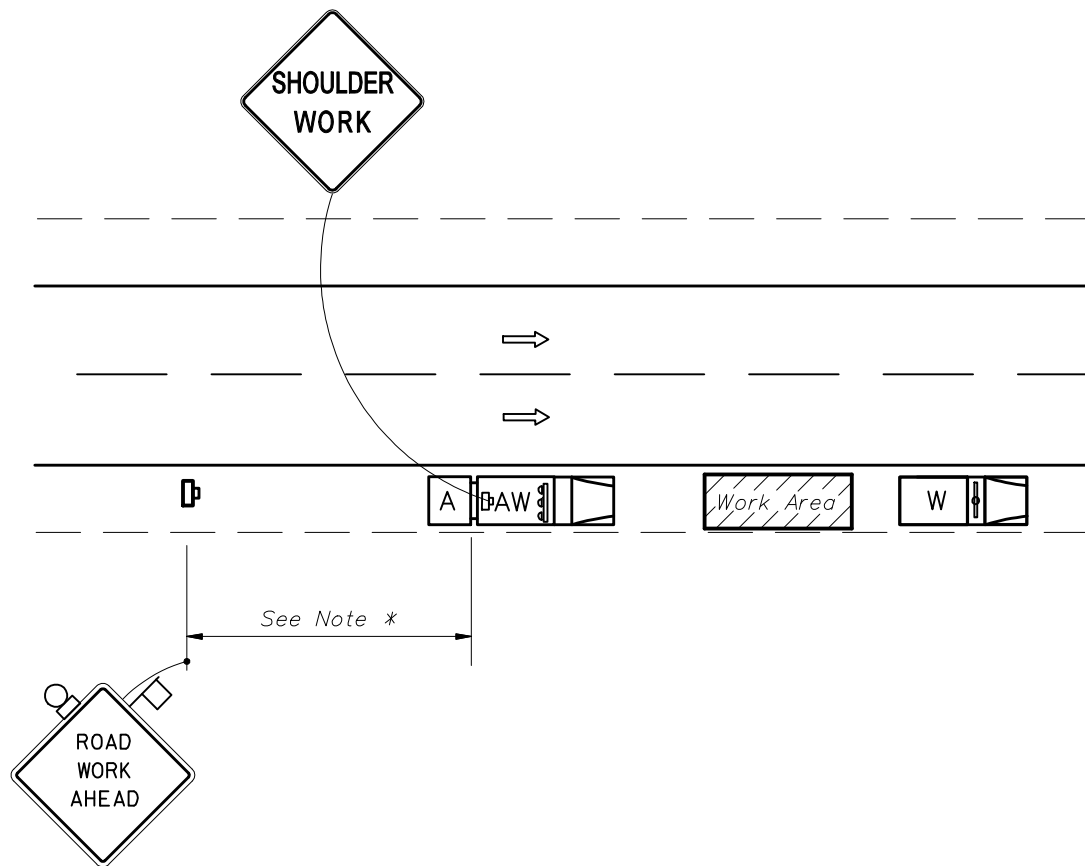
SYMBOLS

- Work Area
- Sign With 18"x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar
- Lane Identification + Direction of Traffic

GENERAL NOTES

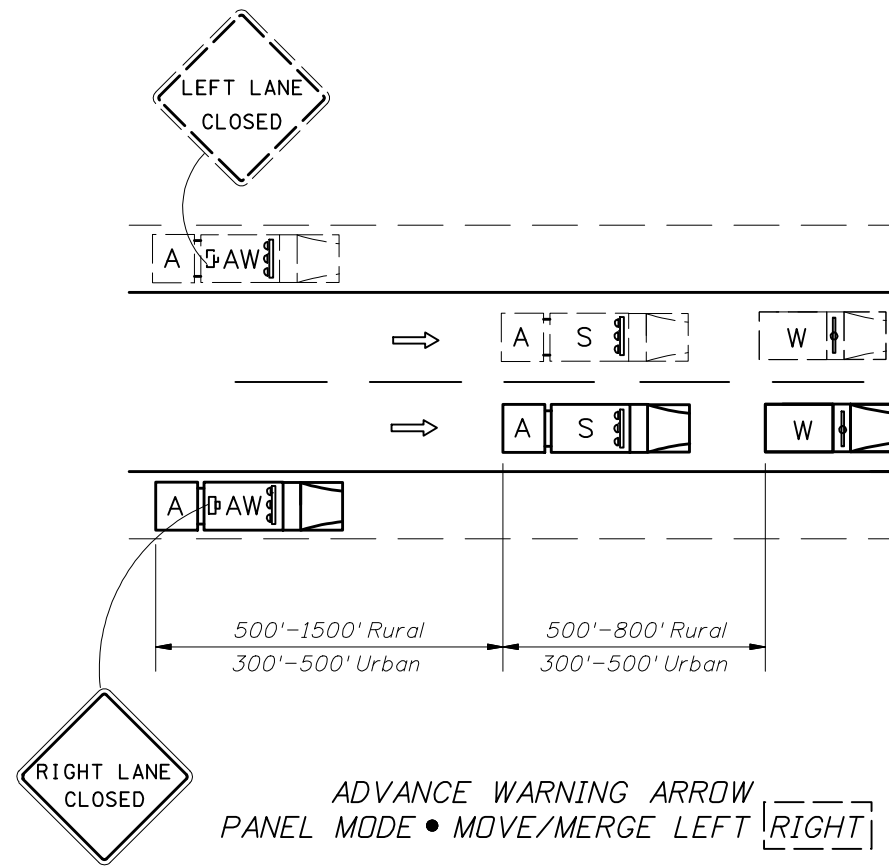
1. If the work space extends across a crosswalk, the crosswalk should be closed using the information in Index No. 660.
2. Signs are required on the median side for divided highways.
3. The two channelizing devices directly in front and directly at the end of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
4. Within the lateral transitions, the maximum spacing between cones and tubular markers shall be 25'. Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 30-40 MPH; 50' for 45 MPH.

Spacing for devices parallel to the travel lanes shall be 25' centers for cones or tubular markers and 50' centers for Type I or Type II barricades or vertical panels or drums for 250', thereafter, cones or tubular markers at 50' centers and Type I or Type II barricades or vertical panels or drums at 100' centers.
5. For general TCZ requirements and additional information, refer to Index No. 600.



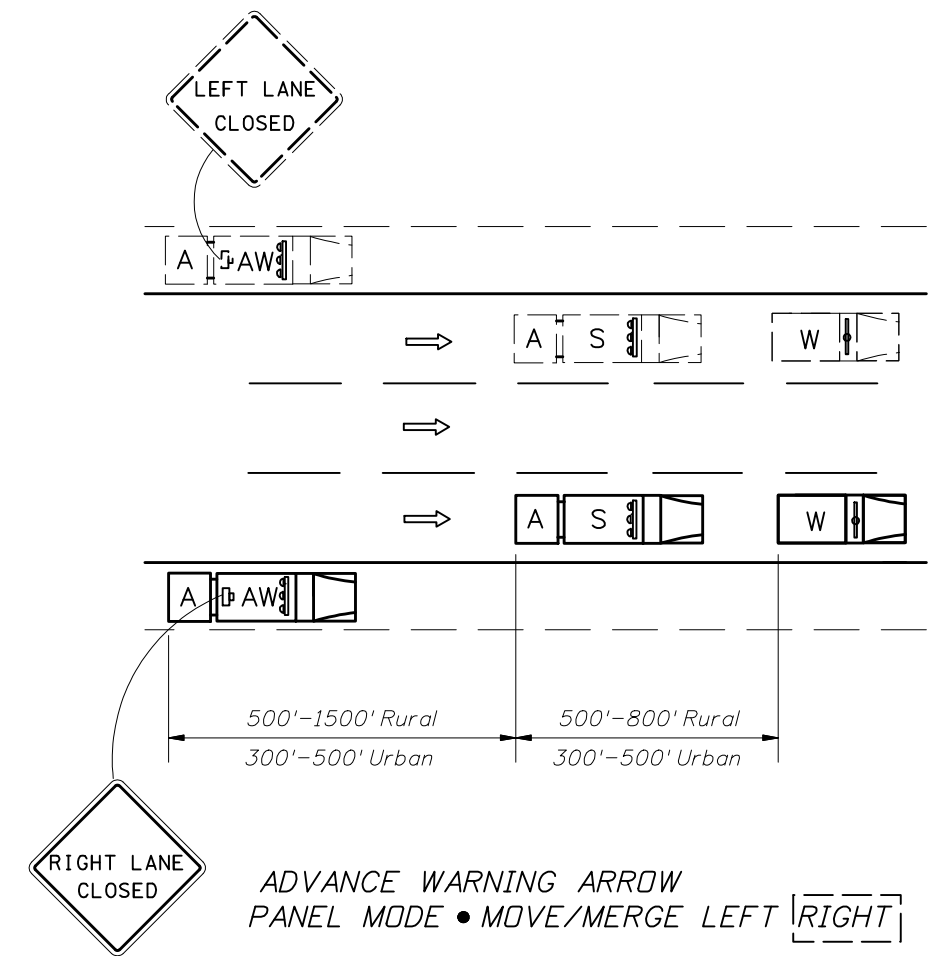
* The distance between the advance warning sign and the work location should not exceed 5 miles.

WORK ON SHOULDER



ADVANCE WARNING ARROW
 PANEL MODE • MOVE/MERGE LEFT [RIGHT]

Where adequate shoulder width is not available,
 the advance warning vehicle may drive in the lane.



ADVANCE WARNING ARROW
 PANEL MODE • MOVE/MERGE LEFT [RIGHT]

Where adequate shoulder width is not available,
 the advance warning vehicle may drive in the lane.

WORK WITHIN TRAVEL LANE

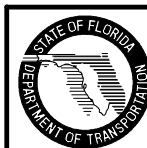
GENERAL NOTES

1. These illustrations are representative of general conditions.
2. The intensity of light and position of panels shall be as specified in Index No. 600.
3. Vehicle-mounted signs shall be mounted with the bottom of the sign at a minimum height of 48 inches above the pavement. Sign legends shall be covered or turned from view when work is not in progress.
4. If the work vehicle speed exceeds the minimum legal speed limit on limited access facilities and one half the posted speed limit on other facilities, the engineer in charge may delete requirements for shadow vehicle and attenuators. The work vehicle will be required to have an advance warning arrow panel and sign message.
5. Where work activities within 2' of the edge of travelway are incidental (i.e. Mowing, Litter Removal), the Engineer may delete requirements for signs and the advance warning vehicle provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
6. Shadow and Advance Warning Vehicle shall display rotating/strobe lights.
7. For general TCZ requirements and additional information, refer to Index No. 600.

SYMBOLS

- Work Vehicle With Rotating/Strobe Lights
- Shadow (S) Or Advance Warning (AW) Vehicle with Advance Warning Arrow Panel and Sign Message
- Truck Mounted Attenuator (TMA)
- Lane Identification And Direction Of Traffic

CONDITIONS MOVING OPERATION






GENERAL NOTES

1. *TWO-WAY TRAFFIC* sign(s) shall be repeated every $\frac{1}{4}$ mile in each direction, throughout the tangent distance (T).
2. L (min.) = WS for speeds ≥ 45 mph
 $= \frac{WS^2}{60}$ for speeds ≤ 40 mph
 Where:
 W = Width of lateral transition in feet.
 S = Posted speed limit (mph).
3. Where the tangent distance (T) exceeds 250', spacing between Type I or II barricades or vertical panels or drums may be increased to 100' within the limits of the tangent, or post mounted delineators at 50' centers may be substituted for barricades, vertical panels or drums.
4. All existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement markings used for making new edge lines.
5. When side roads, cross roads or interchanges intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
6. For general TCZ requirements and additional information, refer to Index No. 600.

SCHEME APPLICATIONS

- Scheme 1: *Restricted Construction Limits.*
- Scheme 2: *Unrestricted Construction Limits And Light To Moderate Traffic.*
- Scheme 3: *Unrestricted Construction Limits And Moderate To Heavy Traffic.*
- Where: *Construction Limits Are The Outward Beginning Or Ending Of Lane Reductions.*
- Where: *Unless A Specific Scheme Is Called For In The Plans, Scheme Selection Shall Be At The Contractor's Option And As Approved By The Engineer.*

SYMBOLS

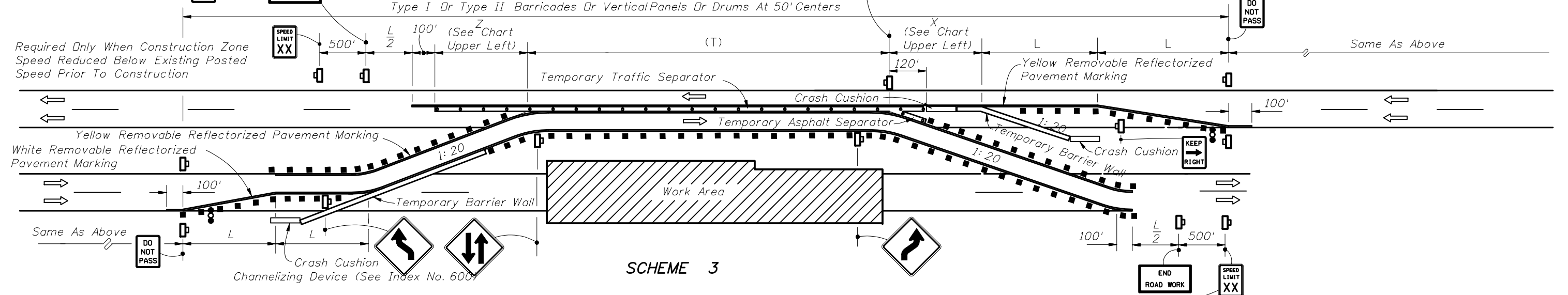
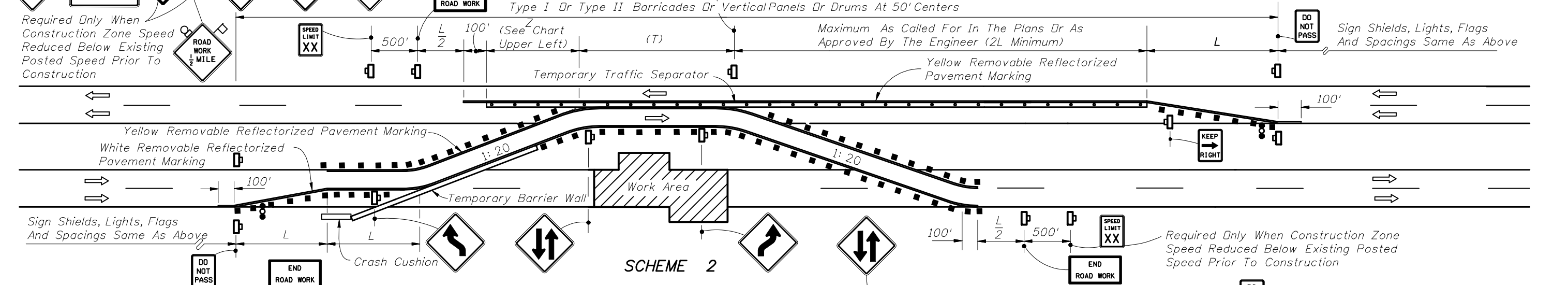
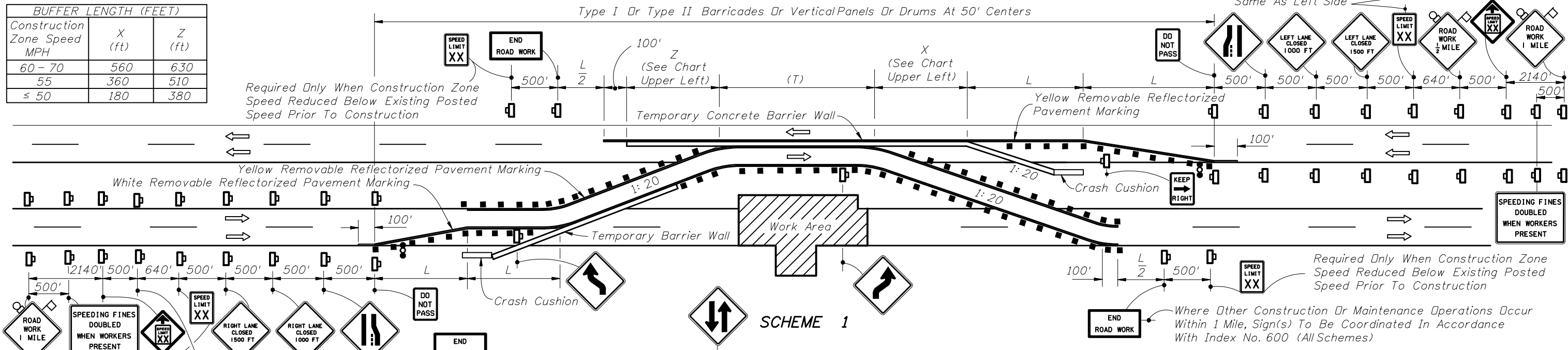
-  Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
-  Work Zone Sign
- ∞ Advance Warning Arrow Panel
-  Lane Identification + Direction of Traffic

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF ONE ROADWAY AND THE OPPOSING ROADWAY IS CONVERTED TO TEMPORARY TWO-WAY TRAVEL BY WAY OF CROSSOVERS.

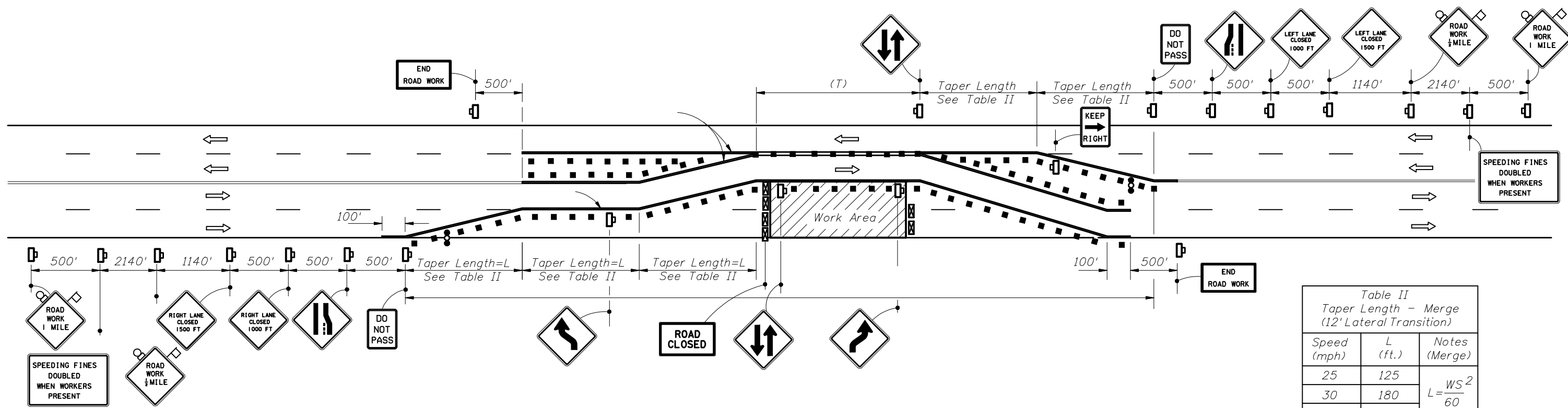


BUFFER LENGTH (FEET)		
Construction Zone Speed MPH	X (ft)	Z (ft)
60-70	560	630
55	360	510
≤ 50	180	380



Note: See Sheet 1 of 2 for Scheme Applications





GENERAL NOTES

1. TWD-TWO-WAY TRAFFIC signs shall be repeated every 1/4 mile in each direction, through the tangent distance (T).
2. When paved shoulders having a width of 8 ft. or more are closed, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the travelway. See Index No. 612 for shoulder taper formulas.
3. Where the tangent distance (T) exceeds 250', spacing between cones or tubular markers may be increased to 50' or spacing between Type I or Type II barricades or vertical panels or drums may be increased to 100' within the limits of the tangent.
4. This index does not apply when work is being performed in the middle lane(s) of a six or more lane highway. Special maintenance of traffic details will be required.
5. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
6. For general TCZ requirements and additional information, refer to Index No. 600.

SYMBOLS

- Work Area
- Sign With 18"x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Type III Barricade
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic

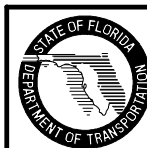
Table II
Taper Length - Merge
(12' Lateral Transition)

Speed (mph)	L (ft.)	Notes
25	125	$L = \frac{WS^2}{60}$
30	180	
35	245	
40	320	
45	540	L=WS
50	600	
55	660	
60	720	
65	780	
70	840	

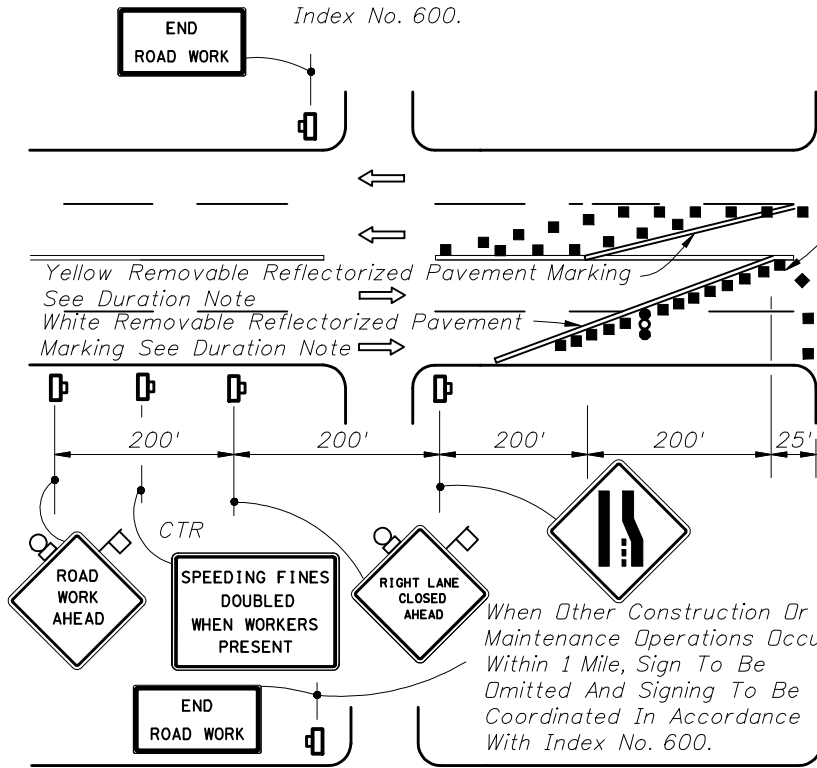
For lateral transitions other than 12' use formula for L shown in the notes column. Where:
L = Length of taper in feet
W = Width of lateral transition in feet
S = Posted speed limit (mph)

CONDITIONS

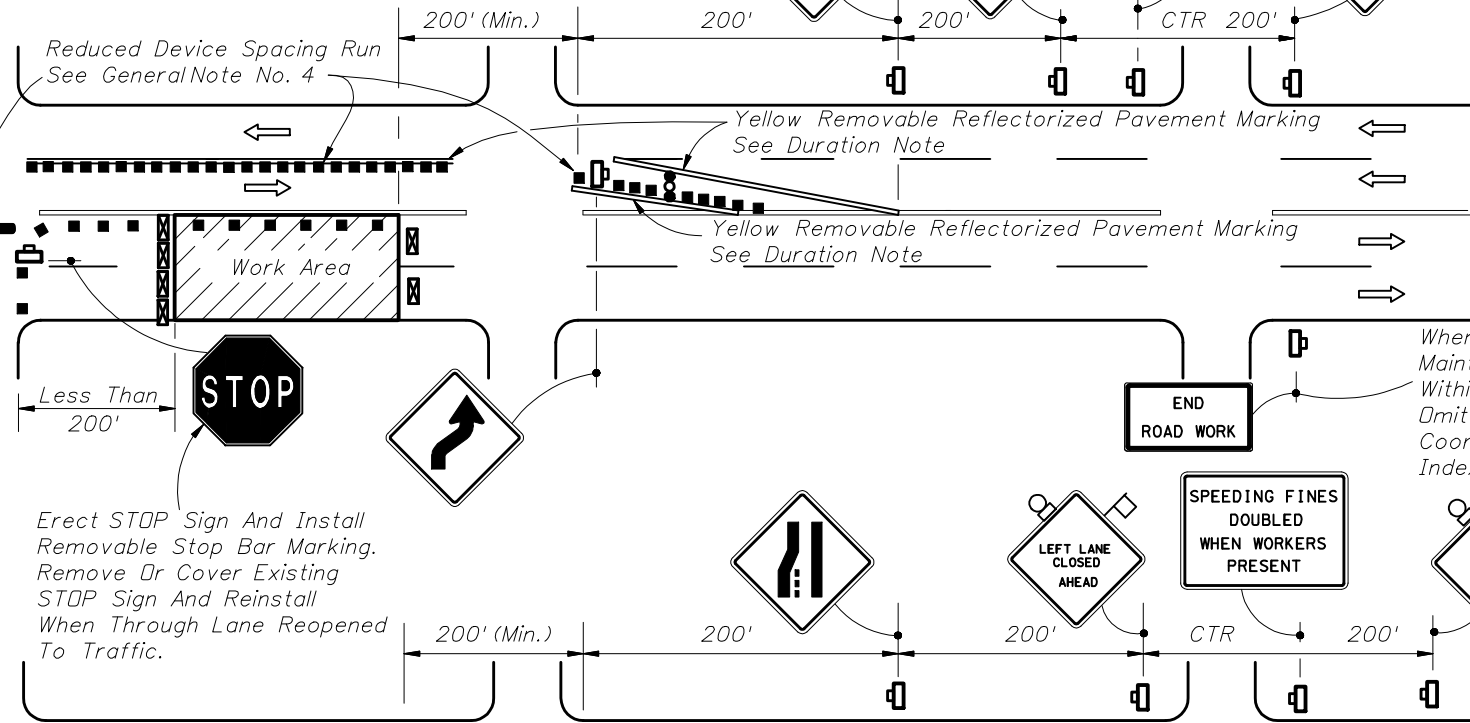
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF THE LANES IN ONE DIRECTION AND A DIVERSION IS PROVIDED BY UTILIZING ONE LANE OF THE OPPOSING TRAFFIC LANES.



When Other Construction Or Maintenance Operations Occur Within 1 Mile, Sign To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.



When Other Construction Or Maintenance Operations Occur Within 1 Mile, Sign To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.



Erect STOP Sign And Install Removable Stop Bar Marking. Remove Or Cover Existing STOP Sign And Reinstall When Through Lane Reopened To Traffic.

GENERAL NOTES

1. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post mounted and located in accordance with Index No. 17302.
2. Dual signs are required for divided roadways.
3. Channelizing devices are to be spaced with Type I or Type II barricades or vertical panels or drums at 30' centers in tapers, 50' centers in tangent sections and 15' centers where reduced device spacing runs are identified in the drawing.
4. For general TCZ requirements and additional information, refer to Index No. 600.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON THE PAVEMENT REQUIRING THE CLDSURE OF TRAFFIC LANES IN ONE DIRECTION AND THE USE OF ONE OPPOSING TRAFFIC LANE TO MAINTAIN TWO-WAY TRAFFIC, FOR WORK AREA LESS THAN 200' FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON THE PAVEMENT REQUIRING THE CLDSURE OF TRAFFIC LANES IN ONE DIRECTION AND THE USE OF ONE OPPOSING TRAFFIC LANE TO MAINTAIN TWO-WAY TRAFFIC, FOR WORK AREA 200' OR MORE FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Type III Barricade
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar
- Lane Identification + Direction of Traffic

DURATION NOTE

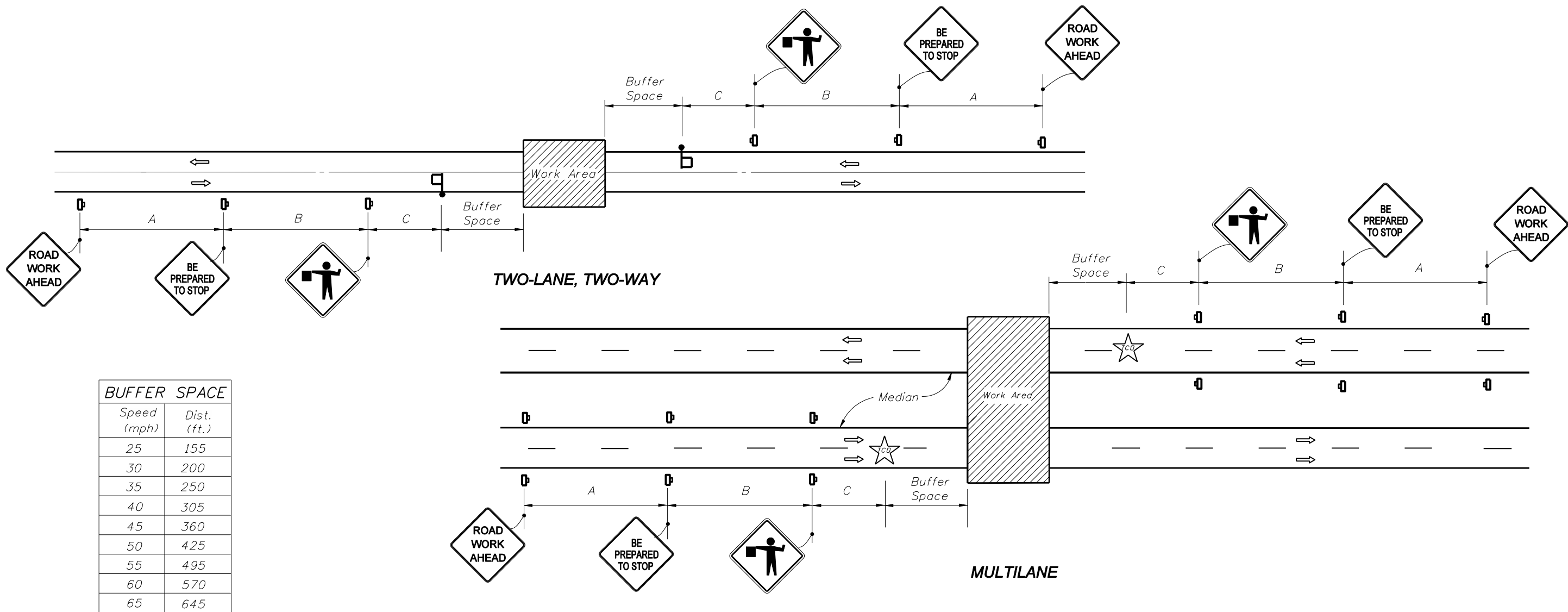
1. Removable reflectorized pavement markings shall be used when closure time exceeds one daylight period.



2010 FDOT Design Standards

**MULTILANE, WORK NEAR INTERSECTION
TEMPORARY DIVERSION CONNECTION - 35 MPH OR LESS**

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BUFFER SPACE	
Speed (mph)	Dist. (ft.)
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645

Speed (mph)	DISTANCE BETWEEN SIGNS		
	A	B	C
40 or less	200	200	200
45	350	350	350
50 or greater	500	500	500

- SYMBOLS**
- Work Area
 - Sign
 - Work Zone Sign
 - Flagger
 - Traffic Control Officer
 - Lane Identification + Direction of Traffic

GENERAL NOTES

1. This Index does not apply to limited access facilities.
2. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with applicable TCZ Indexes.
3. Traffic volume or complexity of the roadway may dictate additional devices, signs, flagmen and/or a traffic control officer.
4. The buffer space may be omitted if there are no sight obstructions to vehicles approaching the Flagger/Officer for distance equal to the buffer space.
5. The BE PREPARED TO STOP sign may be omitted if all of the following conditions are met:
 - a) Speed limit is 45 mph or less.
 - b) No sight obstructions to vehicles approaching the Flagger/Officer for a distance equal to the buffer space.
 - c) Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
6. On undivided highways the median sign as shown are to be omitted.
7. For general TCZ requirements and additional information refer to FDOT Index No. 600.

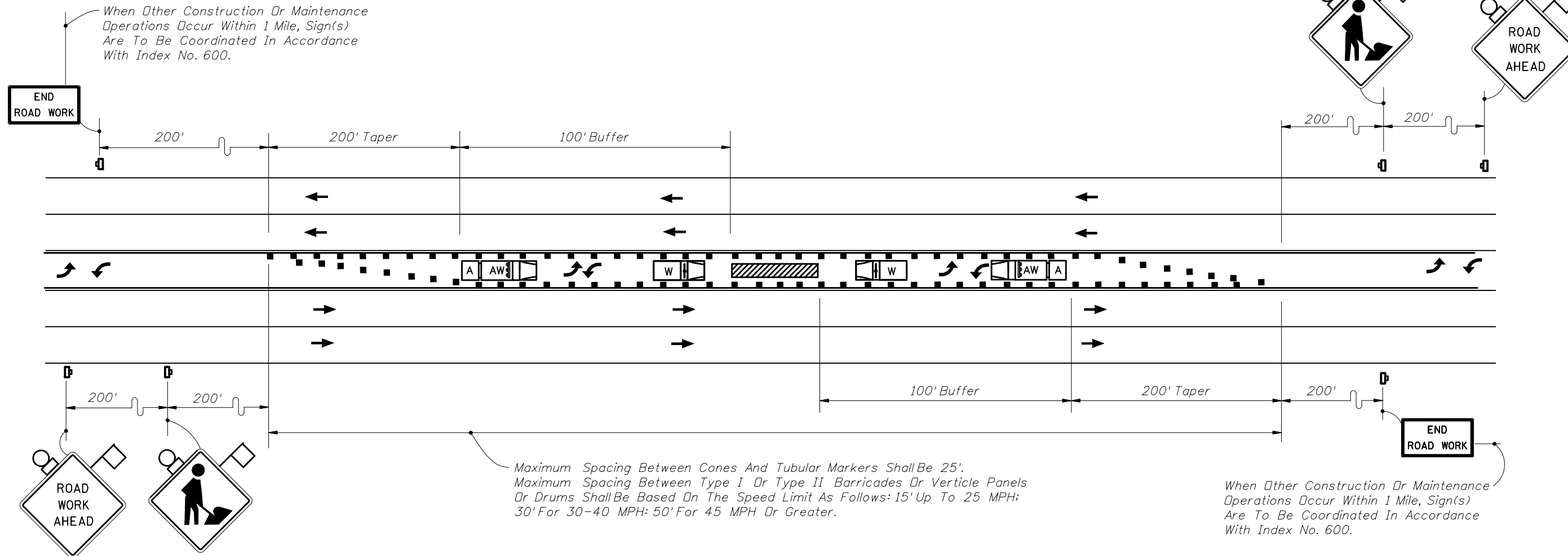
CONDITIONS
 PLANNED CLOSURE NOT EXCEEDING 5 MINUTES.










2010 FDOT Design Standards

**TEMPORARY ROAD CLOSURE
 5 MINUTES OR LESS**

Last Revision 07/01/09	Sheet No. 1 of 1
Index No. 625	



SYMBOLS

-  Work Area
-  Sign With 18" x 18" (Min.) Orange Flag And Type B Light
-  Channelizing Device (See Index No. 600)
-  Work Zone Sign
-  Work Vehicle With Rotating/Strobe Lights
-  Shadow (S) Or Advance Warning (AW) Vehicle with Advance Warning Arrow Panel and Sign Message
-  Truck Mounted Attenuator (TMA)

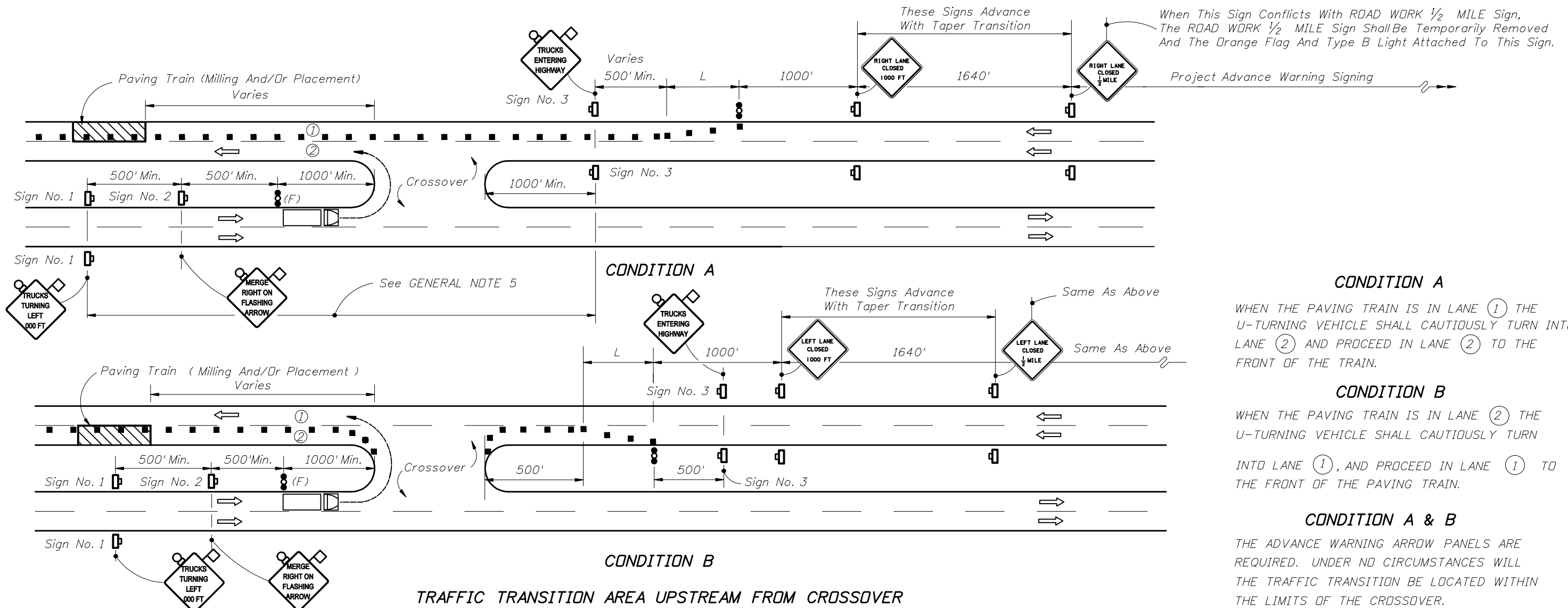
GENERAL NOTES

1. Work operations shall be confined to two way left turn lane, leaving the adjacent lanes open to traffic.
2. Advance Warning Vehicle will have an Advanced Warning Arrow Panel in the Warning Mode.
3. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
4. For general TCZ requirements and additional information, refer to Index No. 600.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ARE BEING CONDUCTED IN THE TWO WAY LEFT TURN LANE.





CONDITION A
 WHEN THE PAVING TRAIN IS IN LANE ① THE U-TURNING VEHICLE SHALL CAUTIOUSLY TURN INTO LANE ② AND PROCEED IN LANE ② TO THE FRONT OF THE TRAIN.

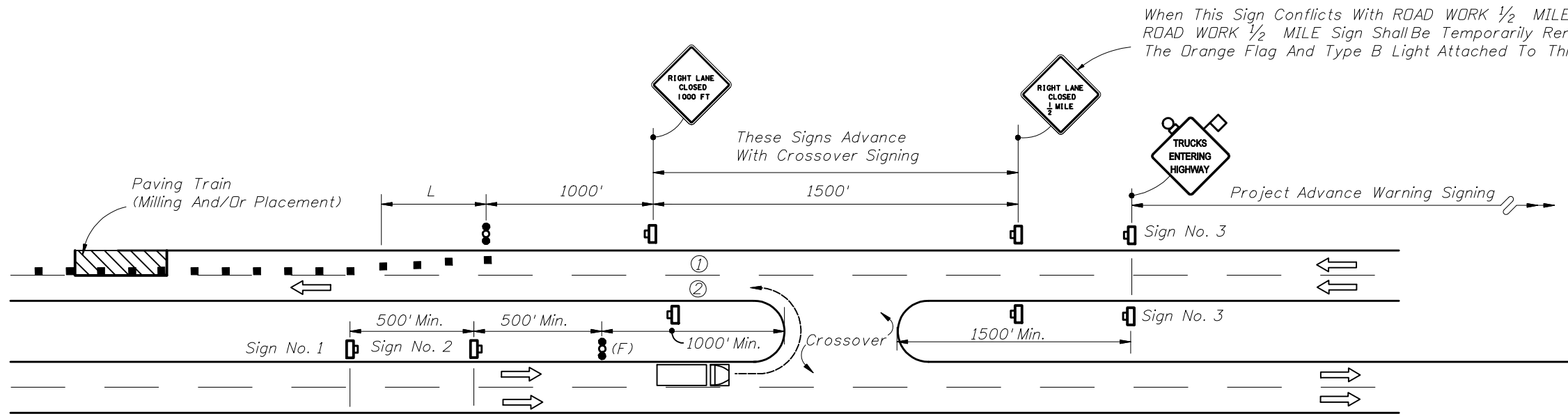
CONDITION B
 WHEN THE PAVING TRAIN IS IN LANE ② THE U-TURNING VEHICLE SHALL CAUTIOUSLY TURN INTO LANE ①, AND PROCEED IN LANE ① TO THE FRONT OF THE PAVING TRAIN.

CONDITION A & B
 THE ADVANCE WARNING ARROW PANELS ARE REQUIRED. UNDER NO CIRCUMSTANCES WILL THE TRAFFIC TRANSITION BE LOCATED WITHIN THE LIMITS OF THE CROSSOVER.

- SYMBOLS**
- Work Area
 - Channelizing Device (See Index No. 600)
 - Sign With 18"x 18" (Min.) Orange Flag And Type B Light
 - Work Zone Sign
 - Advance Warning Arrow Panel - Type C (48"x 96")
 - Advance Warning Arrow Panel - Type C (48"x 96") Trailer Mounted And Actuated By Flagger Upon Approach Of The Work Vehicle
 - Work Vehicle
 - Lane Number
 - Lane Identification + Direction of Traffic

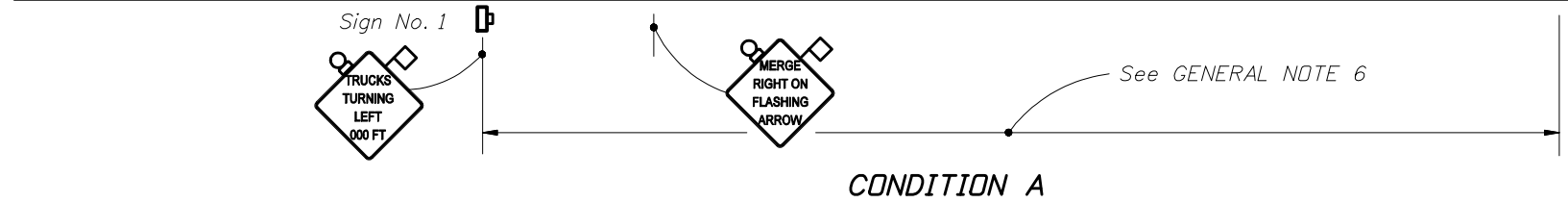
- GENERAL NOTES**
1. This index does not apply to limited access facilities.
 2. When crossovers do not exist, the contractor will construct temporary crossovers in accordance with Index No. 631.
 3. L = Length of taper in feet:
 = WS for speeds ≥ 45 mph
 = $\frac{WS^2}{60}$ for speeds ≤ 40 mph
 Where:
 W = Width of lateral transition in feet.
 S = Posted speed limit (mph).

4. Within the lateral transitions, the maximum spacing between cones and tubular markers shall be 25'. Maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 30-40 MPH; 50' for 45 MPH or greater.
 Spacing for devices parallel to the travel lanes shall be 25' centers for cones or tubular markers and 50' for Type I or Type II barricades or vertical panels or drums.
5. For Case I, Condition A, when the median width is too narrow for trucks to make turns into Lane No. 2, Sign Nos. 1, 2, 3 and the Flagger Actuated Advance Warning Arrow Panel shall be moved ahead to a crossover in advance of the paving lane taper. Project advance warning signs (not shown) shall be located in advance of the relocated Sign No. 3.
6. For Case II, Conditions A & B, when the median width is too narrow for trucks to make turns into Lane No. 2, Sign Nos. 1, 2, 3 and the Flagger Actuated Advance Warning Arrow Panel shall be moved ahead to a crossover in advance of the 'RIGHT LANE CLOSED 1/2 MILE' sign. Project advance warning signs (not shown) shall be located in advance of the relocated Sign No. 3.



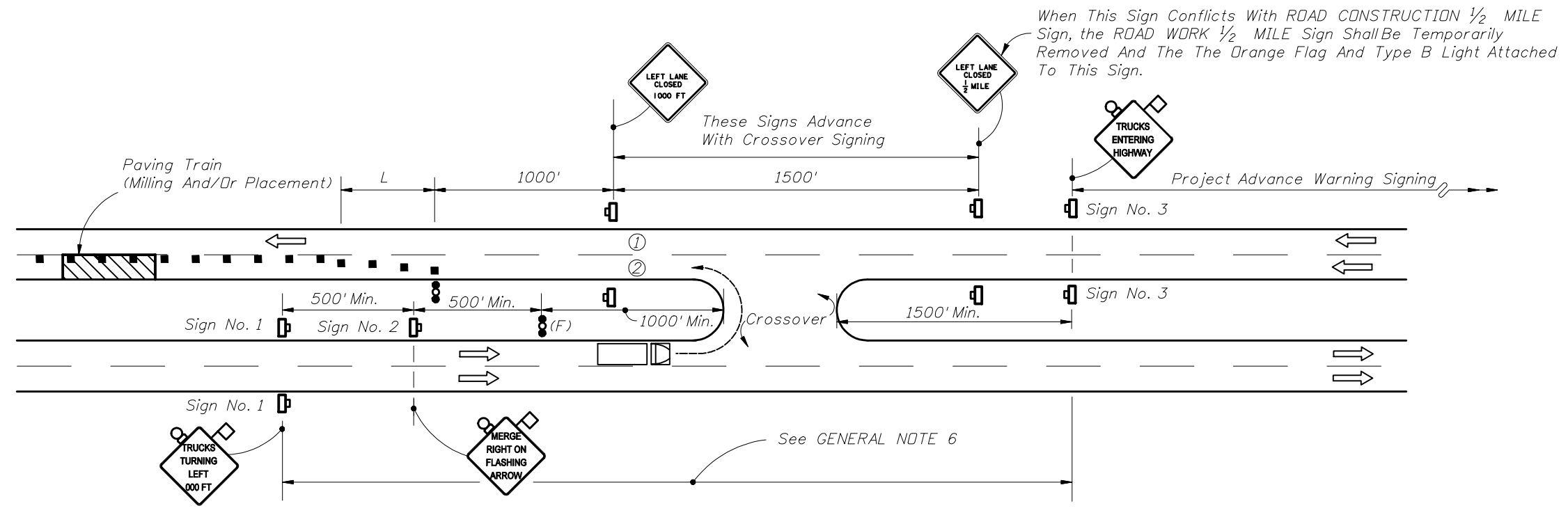
CONDITION A

WHEN THE PAVING TRAIN IS IN LANE ① THE U-TURNING VEHICLE SHALL CAUTIOUSLY TURN INTO LANE ② AND PROCEED IN LANE ② TO THE FRONT OF THE TRAIN.



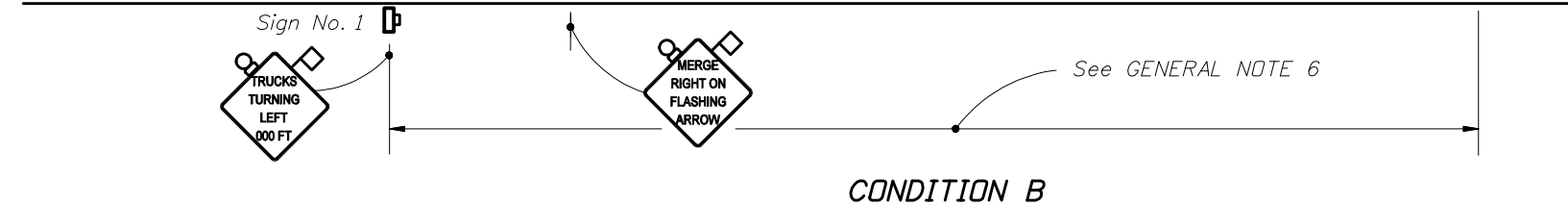
CONDITION B

WHEN THE PAVING TRAIN IS IN LANE ② THE U-TURNING VEHICLE SHALL TURN INTO LANE ①, CAUTIOUSLY MERGE INTO LANE ② AND PROCEED TO THE FRONT OF THE PAVING TRAIN.



CONDITION A & B

THE ADVANCE WARNING ARROW PANEL IS REQUIRED. UNDER NO CIRCUMSTANCES WILL THE TRAFFIC TRANSITION BE LOCATED WITHIN THE LIMITS OF THE CROSSOVER.



TRAFFIC TRANSITION AREA DOWNSTREAM FROM CROSSOVER

CASE II

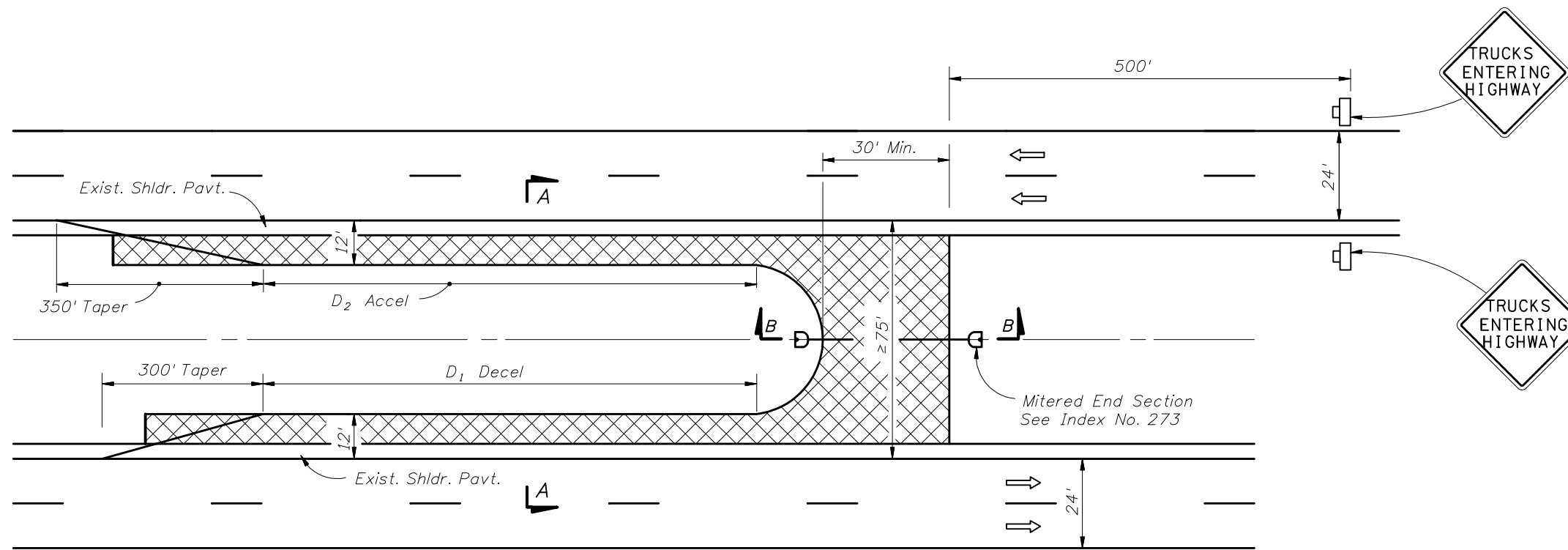
Note: See Sheet 1 of 2 for General Notes.



2010 FDOT Design Standards

CROSSOVER FOR PAVING TRAIN OPERATIONS, RURAL

Last Revision	Sheet No.
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630	

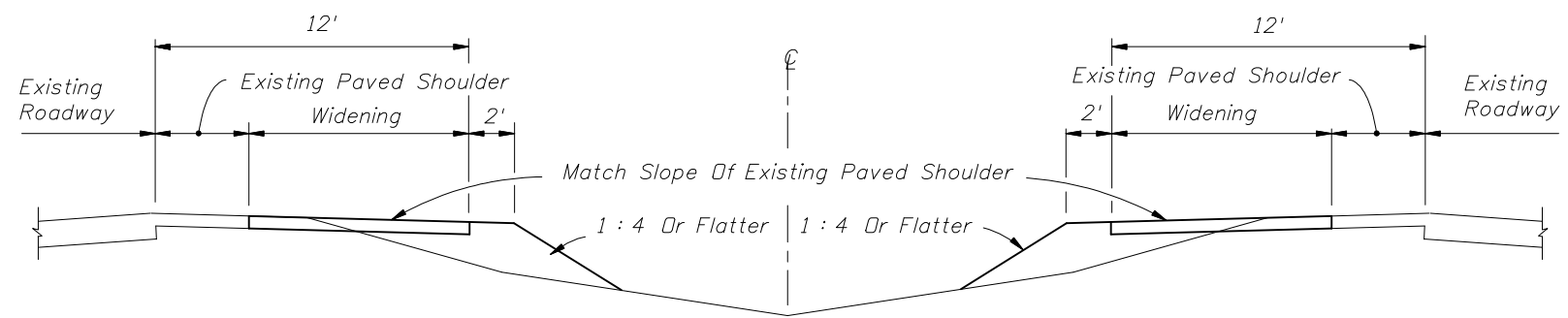


LENGTH OF ACCESS LANES (Ft.)		
Grade	D ₁	D ₂
2% or less	590'	1540'
3 to 4% Upgrade	530'	2310'
3 to 4% Downgrade	710'	925'

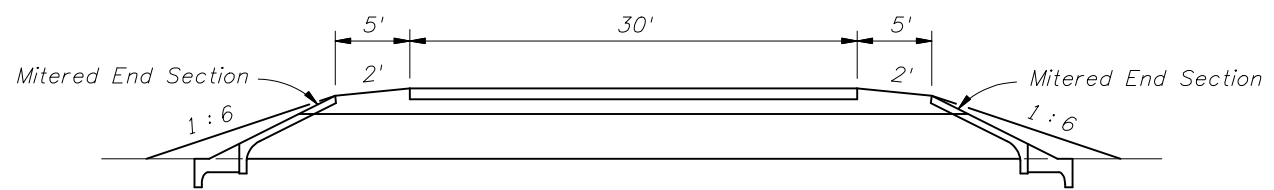
PLAN

GENERAL NOTES

1. Temporary median crossovers shall be within the project limits and shall not be used for transporting materials to or from any other project. The acceleration-deceleration surfaces shall be paved. RAP material is acceptable for crossing surfacing.
2. Temporary median crossovers shall be located only in areas having adequate sight distance. On limited access facilities temporary median crossovers shall not be located within 1.5 miles of interchanges nor within 2000 ft. of acceleration-deceleration lanes at rest areas, other access openings or other highway service areas.
3. For paving train operations at permanent crossovers, see Index No. 630.
4. All traffic control devices are to be removed when crossover will not be in use for one hour or longer.
5. Trailer mounted advance warning panel may be used in lieu of advance warning vehicle.
6. When a crossover is no longer needed, all temporary construction shall be immediately removed and the area restored to its original condition.
7. Cost of construction, maintenance, removal and restoration work related to temporary crossovers shall be included in the contract unit price for Maintenance of Traffic, LS.
8. Temporary crossovers on limited access right of way and use of this Index are prohibited unless specifically permitted in the Contract Plans or Special Provisions. When permitted in the Contract Plans or Special Provisions and prior to construction of any temporary crossover, the Contractor must submit, in writing, a request identifying specific locations for approval by the Engineer.



SECTION AA



SECTION BB

- SYMBOLS**
- Work Zone Sign
 - Lane Identification + Direction of Traffic
 - Temporary Pavement

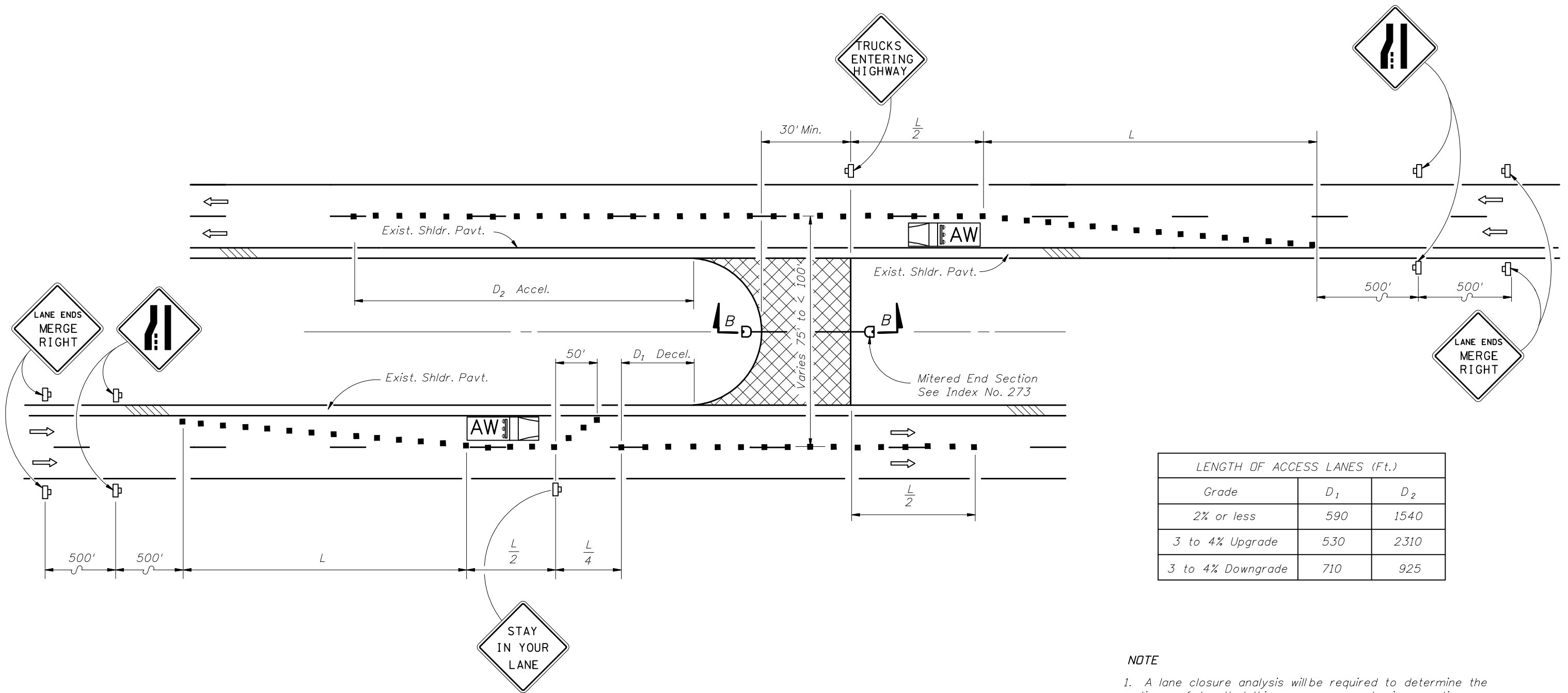
TEMPORARY CROSSOVER FOR MEDIAN WIDTHS ≥ 75'



2010 FDOT Design Standards

TEMPORARY CROSSOVER

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631	



LENGTH OF ACCESS LANES (Ft.)		
Grade	D_1	D_2
2% or less	590	1540
3 to 4% Upgrade	530	2310
3 to 4% Downgrade	710	925

NOTE
 1. A lane closure analysis will be required to determine the times of day that this crossover can be in operation.

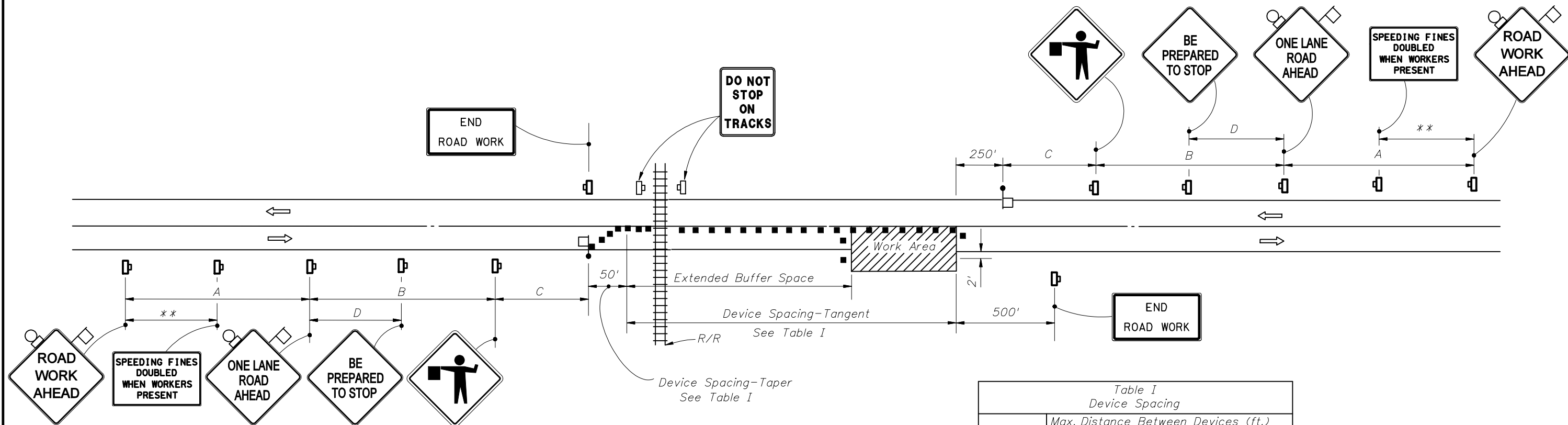
SYMBOLS

- Channelizing Device (See Index No. 600)
- Work Zone Sign
- AW Advance Warning Vehicle
- Lane Identification + Direction of Traffic
- ⊠ Temporary Pavement

Maximum Spacing Between Cones And Tubular Markers Shall Be 25'

L (Min.) = WS
 S = Existing Posted Speed (MPH)

TEMPORARY CROSSOVER FOR MEDIAN WIDTHS FROM 50' TO <75'



DISTANCE BETWEEN SIGNS				
Speed	Spacing (ft.)			
	A	B	C	D ***
40 mph or less	200	200	200	100
45 mph	350	350	350	175
50 mph	500	500	500	250
*55 mph or greater	2640	1640	1000	500

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25 to 45	20	50	20	50
50 to 70	20	50	20	100

GENERAL NOTES

- Work operations shall be confined to one traffic lane, leaving the opposite lane open to traffic.
- Additional one-way control may be effected by the following means:
(1) Flag-carrying vehicle; (2) Official vehicle; (3) Pilot vehicles; (4) Traffic signals.

When flaggers are the sole means of one-way control, the flaggers shall be in sight of each other or in direct communication at all times.
- The ONE-LANE ROAD signs are to be fully covered and the FLAGGER signs either removed or fully covered when no work is being performed and the highway is open to two-way traffic.
- When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
- The two channelizing devices directly in front of the work area and the one channelizing device directly at the end of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
- Discontinuance of extended buffer space will not occur until the queue length plus 300' is reached.
- If the queuing of vehicles across active rail tracks cannot be avoided, a uniformed traffic control officer or flagger shall be provided at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic warning devices are in place.
- For general TCZ requirements and additional information, refer to Index No. 600.

DURATION NOTE

- ROAD WORK AHEAD and the BE PREPARED TO STOP signs may be omitted if all of the following conditions are met:
 - Work operations are 60 minutes or less.
 - Speed limit is 45 mph or less.
 - No sight obstructions to vehicles approaching the work area for a distance equal to the buffer space.
 - Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
 - Volume and complexity of the roadway has been considered.
 - No queuing of vehicles across rail tracks.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF TRAVEL WAY THAT REQUIRES A LANE CLOSURE IN THE VICINITY OF A RAILROAD CROSSING.

SYMBOLS

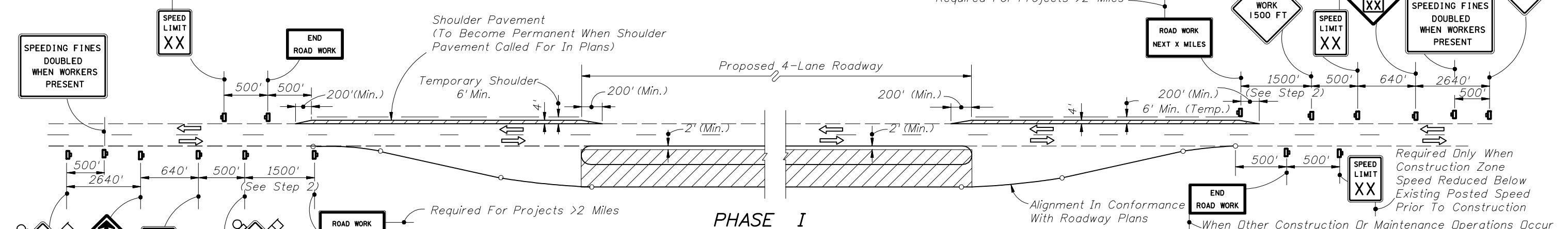
- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Flagger
- Lane Identification + Direction of Traffic



Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

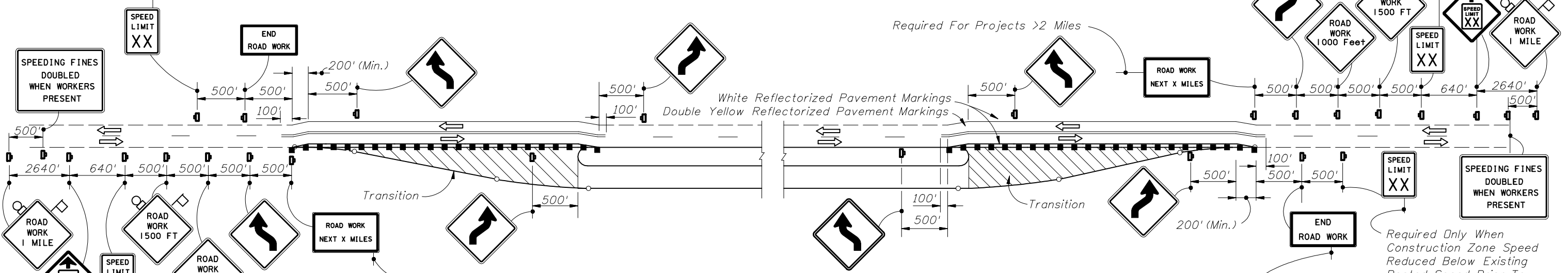
Required For Projects >2 Miles



1. Maintain two-lane two-way traffic over existing pavement. Construct new roadway within the proposed 4-lane limits, excluding the friction course. Sign as shown if roadway construction area falls within 15' of existing pavement edge. When the construction area falls more than 15' from the existing pavement edge, traffic shall be controlled in accordance with Index No. 601 or 602.
2. Construct shoulder pavement to provide two-lane two-way traffic over shoulder and existing pavement during Phase II roadway construction. For lane width requirements see Index No. 600. Signing as shown, with the near 1500' zone modified in accordance with Index No. 603, to be in place prior to shoulder pavement construction.

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction



1. Remove existing pavement marking in areas of diversion and remark as shown, install warning devices and resign as shown. Traffic to be controlled in accordance with Index No. 607. For lane width requirements see Index No. 600.
2. Route through traffic to temporary and existing pavement.
3. Construct transitions, excluding friction course.

When Other Construction Or Maintenance Operations Occur Within 1 Mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

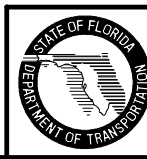
SYMBOLS

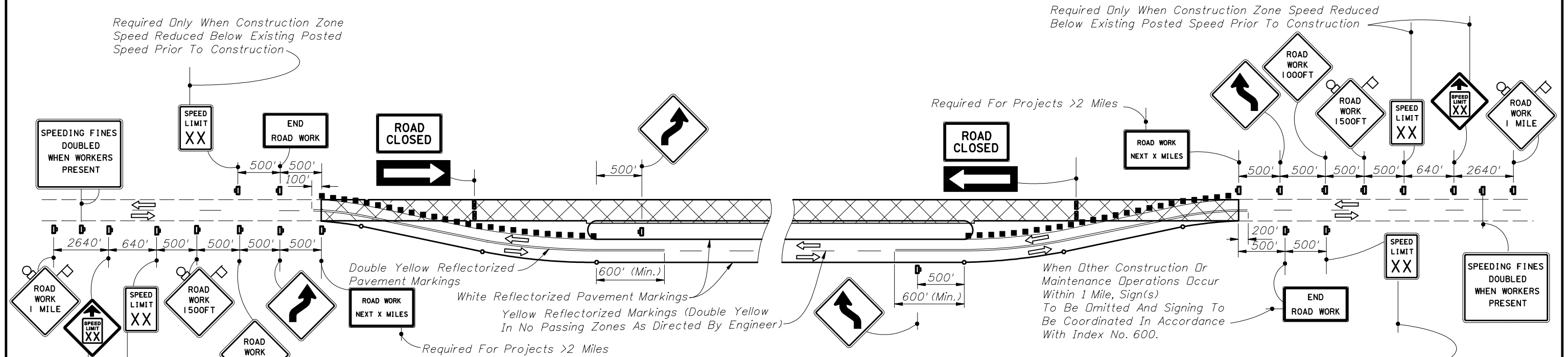
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Lane Identification + Direction of Traffic

LEGEND

- Phase I Construction
- Phase II Construction
- Phase III Construction

Note: See Sheet 2 for General Notes.





PHASE III

1. Remove temporary marking from the existing pavement and temporary shoulder pavement. Mark pavement, install warning devices and resign as shown. Traffic to be controlled in accordance with Index No. 607. For lane width requirements see Index No. 600.
2. Route through traffic to newly constructed roadway.
3. Resurface or reconstruct existing pavement including required shoulder pavement and friction course.

PHASE IV

1. Reroute through traffic as shown in Phase II. Signing to be as shown in Phase II.
2. Construct friction course over pavement constructed in Phases I and II.

GENERAL NOTES

1. Existing signs and pavement markings that conflict with construction signing and marking shall be obliterated or removed.
2. Lane widths for maintenance of two-way traffic should desirably be equal to lane widths of the existing facility, but lanes shall be not less than 10' in width. When one-lane one-way operations are necessary, a minimum width of 12' shall be maintained and traffic controlled in accordance with Index Nos. 603 and 607. Minimum width for the temporary shoulders is 6'.
3. Within the lateral transitions, the maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30'-40 MPH; 50' for 45 MPH or greater.

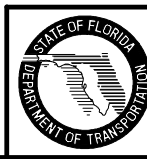
The maximum spacing between warning devices used for delineation between the travelway and construction area is 50' for Type I or Type II barricades or vertical panels or drums.
4. Warning devices shall be in conformance with 'Dropoffs In Work Zones', see Index No. 600.
5. For speed sign applications, see 'Regulatory Speed In Work Zones' Index No. 600.
6. For reflectorized raised pavement marker applications, see 'Pavement Markers' Index No. 600 and Index No. 17352.
7. Additional barricades, signing lighting or other traffic controls shall be provided for limited work areas in accordance with other applicable TCZ Indexes.
8. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
9. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
10. For general TCZ requirements and additional information, refer to Index No. 600.

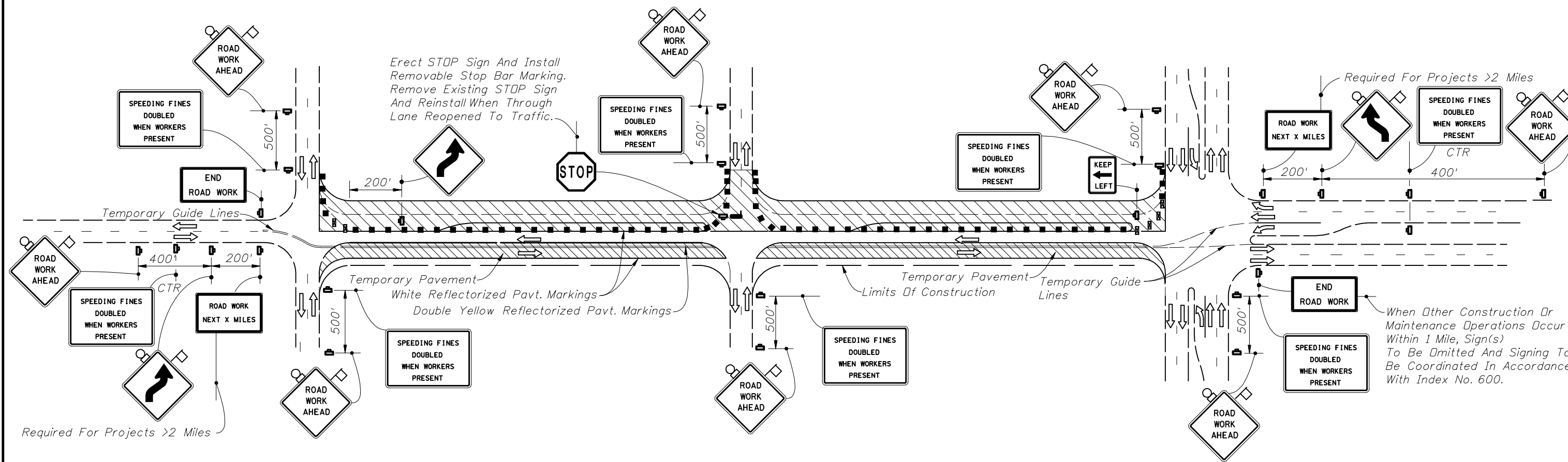
SYMBOLS

- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Type III Barricade
- Work Zone Sign
- Lane Identification + Direction of Traffic

LEGEND

- Phase I Construction
- Phase II Construction
- Phase III Construction





PHASE I

1. Maintain two-lane two-way traffic along existing facility. Install construction signing.
2. Remark existing pavement to facilitate temporary pavement construction. For lane width requirements see Index No. 600.
3. Construct temporary pavement of sufficient width to accommodate two-lane two-way traffic on the temporary pavement and a portion of the existing pavement during Phase I roadway construction. When two-lane two-way traffic can not be maintained during temporary pavement construction one-lane operations shall be maintained in accordance with Index No. 605. Channelizing devices shall be in conformance with 'Drop-Offs in Work Zones' of Index No. 600.
4. Mark the pavement in accordance with the Phase I diagram. Reroute through traffic to the temporary pavement and a portion of the existing pavement. For lane width requirements see Index No. 600.
5. Construct two lanes of the proposed roadway, excluding the friction course. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Index Nos. 604, 605 and 615. Barricading shall be in conformance with 'Drop-Offs in Work Zones', Index No. 600. When work extends through an intersection, temporarily reroute the cross traffic to other cross streets. When rerouting is not possible, provide one-lane access (minimum) for two-lane two-way cross streets and one-lane access (minimum) each direction for four-lane two-way cross streets, in accordance with Index Nos. 604, 605 and 615.

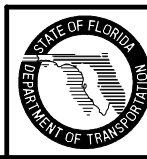
SYMBOLS

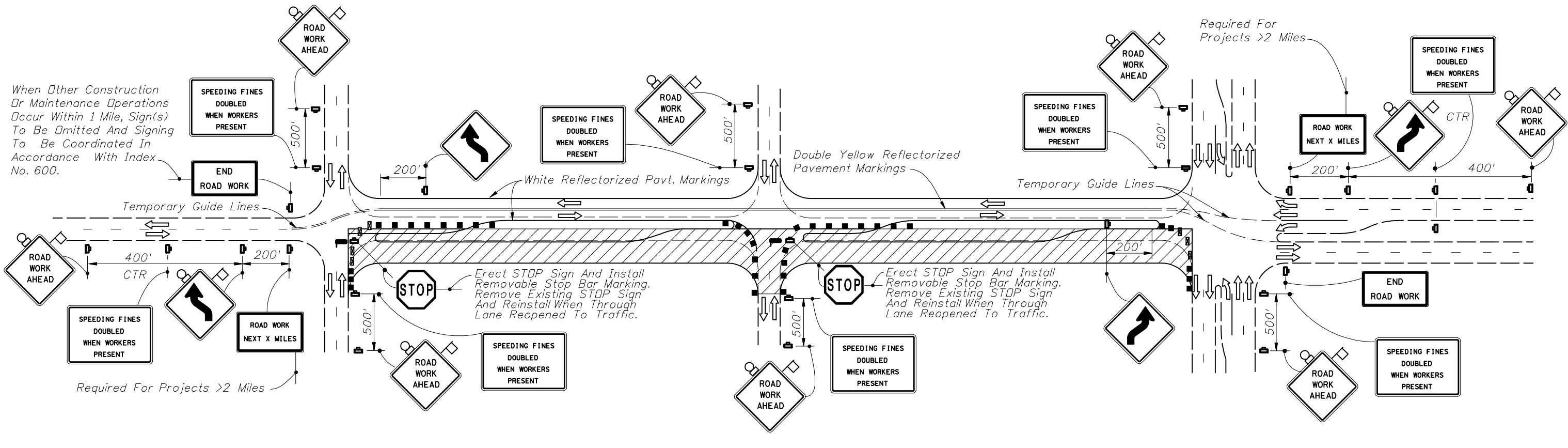
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Type III Barricade
- Work Zone Sign
- Stop Bar
- Lane Identification + Direction of Traffic

LEGEND

- Phase I Construction
- Phase II Construction
- Phase III Construction

See Sheet 3 for General Notes.





When Other Construction Or Maintenance Operations Occur Within 1 Mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

Required For Projects >2 Miles

Required For Projects >2 Miles

PHASE II

1. Sign and mark Phase I pavement in accordance with the Phase II diagram. For lane width requirements see Index No. 600.
2. Reroute through traffic to Phase I pavement.
3. Complete all Phase II construction, including the friction course. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Index Nos. 604, 605 and 615. Channelizing devices shall be in conformance with 'Drop-Offs in Work Zones' of Index No. 600. When work extends through an intersection, temporarily reroute cross traffic to other cross streets. When rerouting is not possible, provide one-lane access (minimum) for two-lane two-way cross streets and one-lane access (minimum) each direction for four-lane two-way cross streets, in accordance with Index Nos. 604, 605 and 615.

SYMBOLS

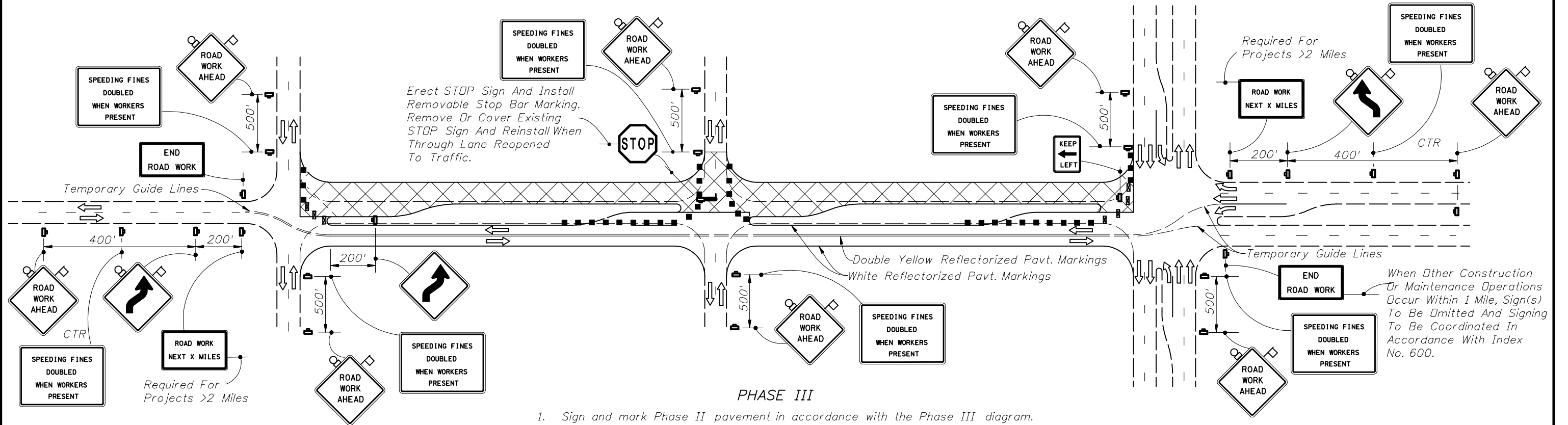
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Type III Barricade
- Work Zone Sign
- Stop Bar
- Lane Identification + Direction of Traffic

LEGEND

- Phase I Construction
- Phase II Construction
- Phase III Construction

See Sheet 3 for General Notes.





PHASE III

1. Sign and mark Phase II pavement in accordance with the Phase III diagram.
2. Reroute through traffic to Phase II pavement.
3. Construct friction course over Phase I pavement. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Index Nos. 604, 605 or 615. When work extends through an intersection, temporarily reroute cross traffic to other cross streets. When rerouting is not possible, provide one-lane access (minimum) for two-lane two-way cross streets and one-lane across (minimum) each direction for four-lane two-way cross streets.

GENERAL NOTES

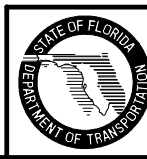
1. All signing, pavement marking, barricades and warning lights necessary for maintenance of traffic shall conform to Index No. 600.
2. Lane widths for maintenance of two-way traffic should desirably be equal to lane widths of the existing facility, but lanes shall not be less than 10' in width. When one-lane one-way operations are necessary, a minimum width of 12' should be maintained and traffic controlled in accordance with Index Nos. 604, 605 or 615.
3. At signalized intersections, signals shall be directed or relocated as required to the center of relocated lanes.
4. For reflectorized raised pavement marker application, see Index Nos. 600 and 17352.
5. Additional barricades, signing, lighting or other traffic controls for limited work areas shall be provided in accordance with other applicable TCZ Indexes as conditions warrant in each phase.
6. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
7. For general TCZ requirements and additional information, refer to Index No. 600.

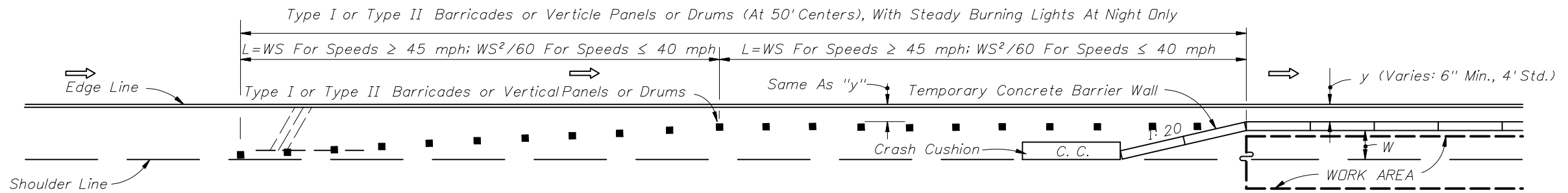
SYMBOLS

- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Type III Barricade
- Work Zone Sign
- Stop Bar
- Lane Identification + Direction of Traffic

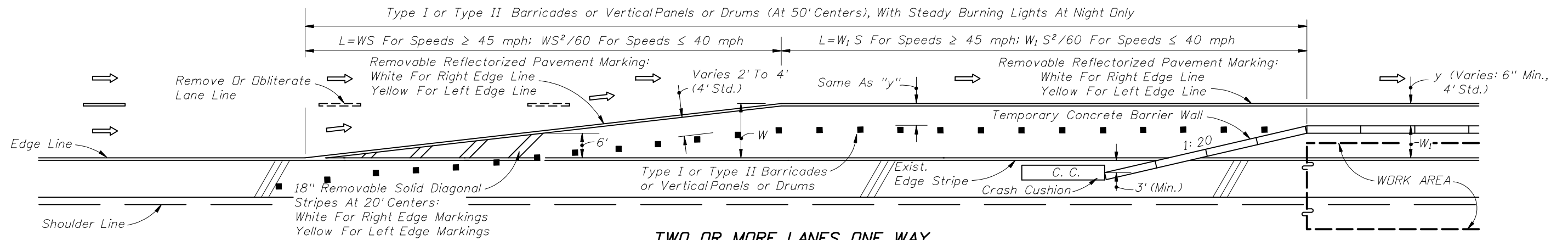
LEGEND

- Phase I Construction
- Phase II Construction
- Phase III Construction

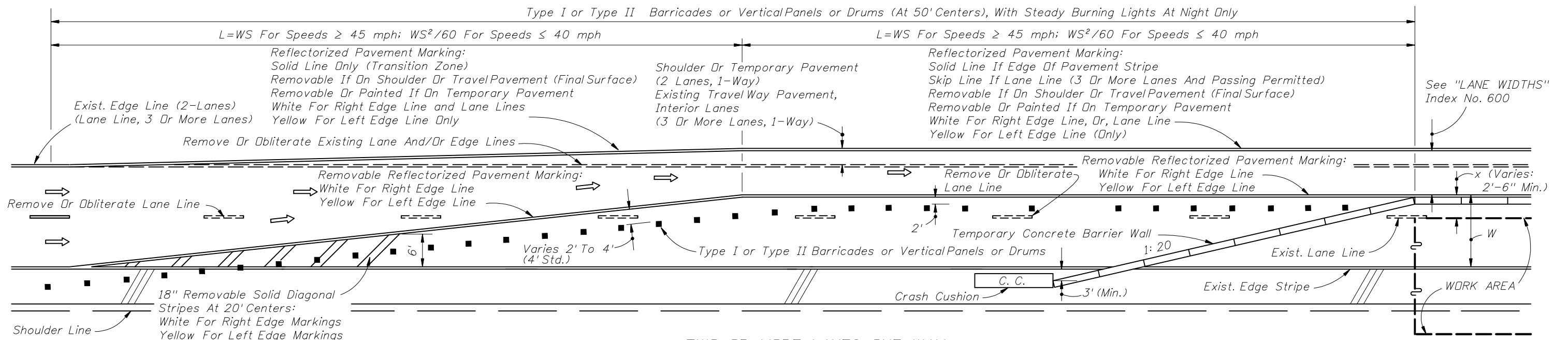




**BARRIER AND TRANSITION LOCATED ON PAVED OR UNPAVED SHOULDERS
PLAN SHOWN FOR RIGHT LANE - INVERTED PLAN FOR LEFT LANE**



**TWO OR MORE LANES ONE WAY
LANE DROP • PLAN SHOWN FOR RIGHT LANE MERGE LEFT - INVERTED PLAN FOR LEFT LANE MERGE RIGHT**



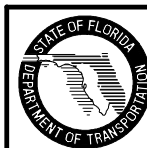
**TWO OR MORE LANES ONE WAY
LANE DROP AND LANE SHIFTS - PLAN SHOWN FOR RIGHT LANE MERGE LEFT - INVERTED PLAN FOR LEFT LANE MERGE RIGHT**

GENERAL NOTES

1. For signing information see the Plans, Specifications, MUTCD and other TCZ Standards.
2. Where W=width of lateral transition in feet, S=posted speed limit.

SYMBOLS

- Channelizing Device (See Index No. 600)
- ⇒ Lane Identification + Direction of Traffic



2010 FDOT Design Standards

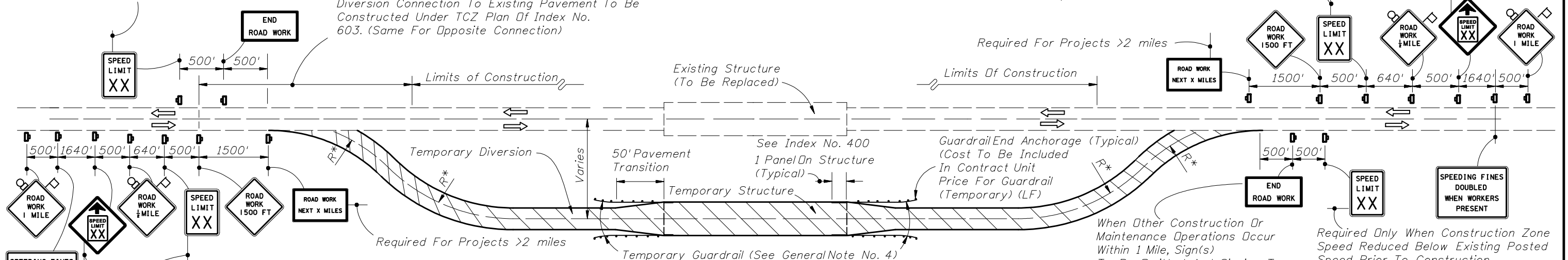
**TRANSITIONS FOR TEMPORARY CONCRETE BARRIER
WALL ON FREEWAY FACILITIES**

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Index No.	
642	

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Diversion Connection To Existing Pavement To Be Constructed Under TCZ Plan Of Index No. 603. (Same For Opposite Connection)

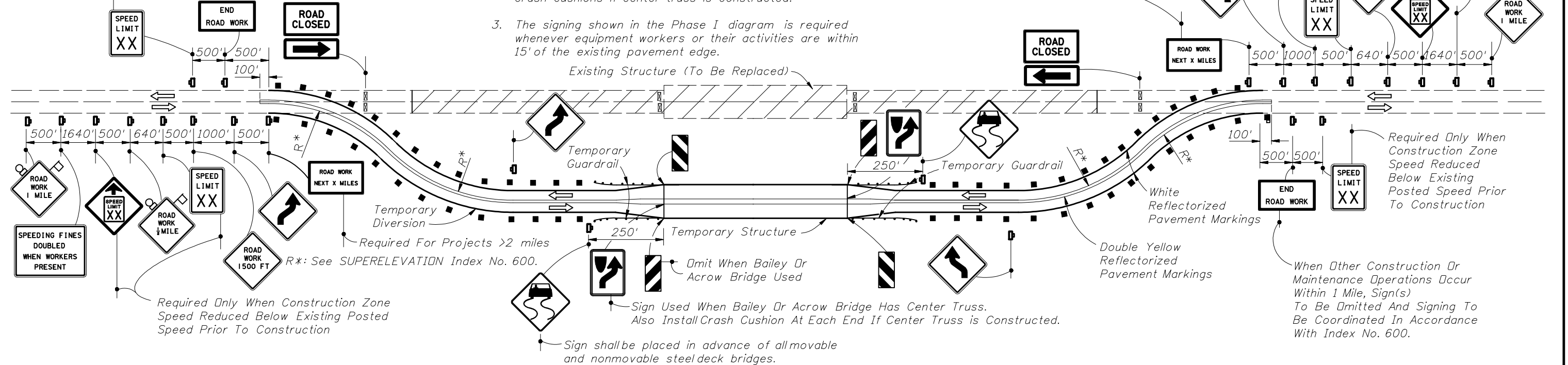
Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction



PHASE I

1. Maintain two-lane two-way traffic over existing facility.
2. Construct temporary structure, approaches, guardrail and install crash cushions if center truss is constructed.
3. The signing shown in the Phase I diagram is required whenever equipment workers or their activities are within 15' of the existing pavement edge.

Existing Structure (To Be Replaced)



PHASE II

1. Resign and mark as shown in Phase II plan.
2. Reroute traffic to diversion and maintain two-way traffic on diversion. Install Type III barricades.
3. Construct proposed structure and reconstruct or resurface existing approaches.

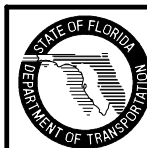
SYMBOLS

- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Type III Barricade
- Work Zone Sign
- Lane Identification + Direction of Traffic

LEGEND

- Phase I
- Phase II

PHASE III and General Notes (See Sheet 2 of 2)



2010 FDOT Design Standards

**TWO-LANE TWO-WAY,
RURAL STRUCTURE REPLACEMENT**

Last Revision
07/01/09

Sheet No.
1 of 2

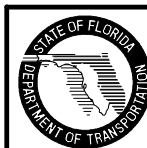
Index No.
650

PHASE III

1. Reroute traffic to final alignment and maintain two-way traffic.
2. Remove all temporary construction items.

GENERAL NOTES

1. All signing, pavement marking, barricades and warning lights necessary for maintenance of traffic shall conform to Index No. 600.
2. For speed sign applications, see Index No. 600.
3. For lane width requirements see Index No. 600. When one-way one-lane operations are necessary, a minimum width of 12' shall be maintained and traffic controlled in accordance with Index Nos. 603, 606 or 607. Minimum width for the diversion shoulders is 6'.
4. Method of attaching temporary guardrail to the diversion structure to be approved by the Engineer. Cost of temporary guardrail systems, including end anchorage assemblies, transitions and attachment to temporary structures, are to be included in the contract unit price for Guardrail (Temporary) LF.
5. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.
6. Only temporary crash cushions approved by the Department shall be used unless specified devices called for in the plans.
7. Where the temporary structure is not required, the diversion may be constructed in accordance with Index No. 608, unless otherwise stipulated in the plans.
8. For reflective raised pavement marker application, see Index Nos. 600 and 17352.
9. For general TCZ requirements and additional information, refer to Index No. 600.



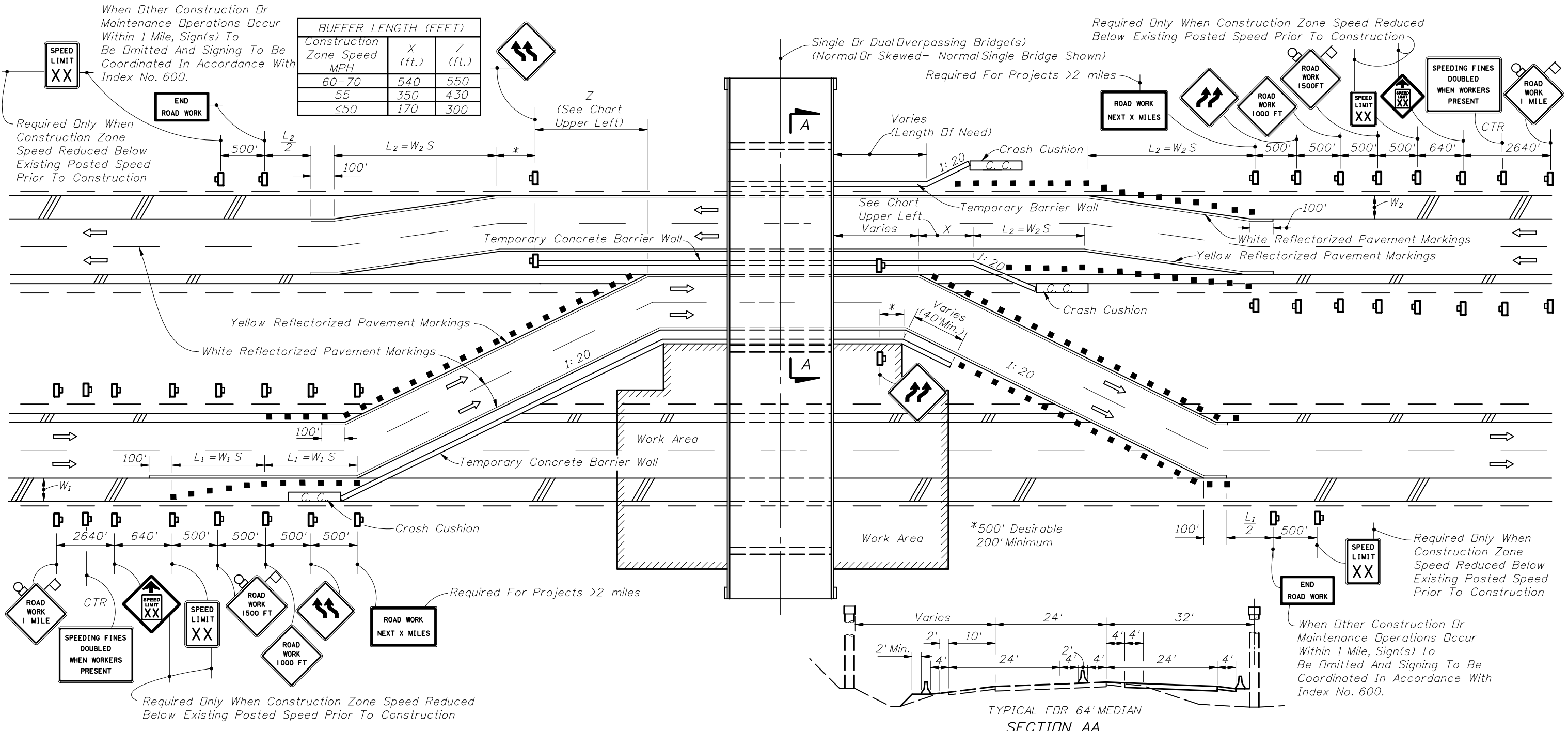
2010 FDOT Design Standards

TWO-LANE TWO-WAY RURAL STRUCTURE REPLACEMENT

Last
Revision
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Sheet No.
2 of 2

Index No.
650



BUFFER LENGTH (FEET)		
Construction Zone Speed MPH	X (ft.)	Z (ft.)
60-70	540	550
55	350	430
≤50	170	300

When Other Construction Or Maintenance Operations Occur Within 1 Mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Required For Projects >2 miles

SPEEDING FINES DOUBLED WHEN WORKERS PRESENT

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

Required Only When Construction Zone Speed Reduced Below Existing Posted Speed Prior To Construction

When Other Construction Or Maintenance Operations Occur Within 1 Mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

GENERAL NOTES

1. S=Posted speed limit (mph).
2. Within the lateral transitions, the maximum spacing between Type I or Type II barricades or vertical panels or drums shall be based on the speed limit as follows: 15' up to 25 MPH; 30' for 30-40 MPH; 50' for 45 MPH or greater. Barricades, vertical panels, and drums shall not be intermixed in lateral transitions.
3. For speed sign applications, see 'Regulatory Speed in Work Zones' Index No. 600.

4. All existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and new pavement markings used for marking edge lines and lane lines.
5. When side roads, cross roads or interchanges within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes
6. For general TCZ requirements and additional information, refer to Index No. 600.

CONDITIONS

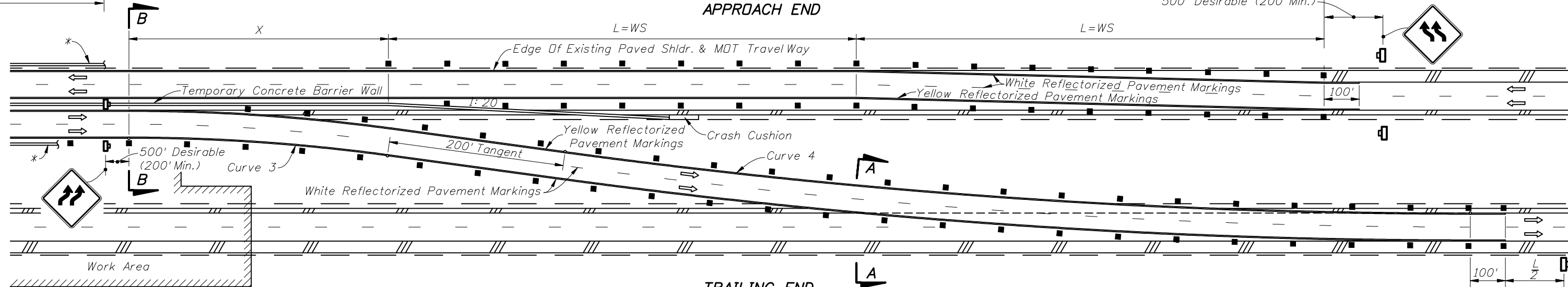
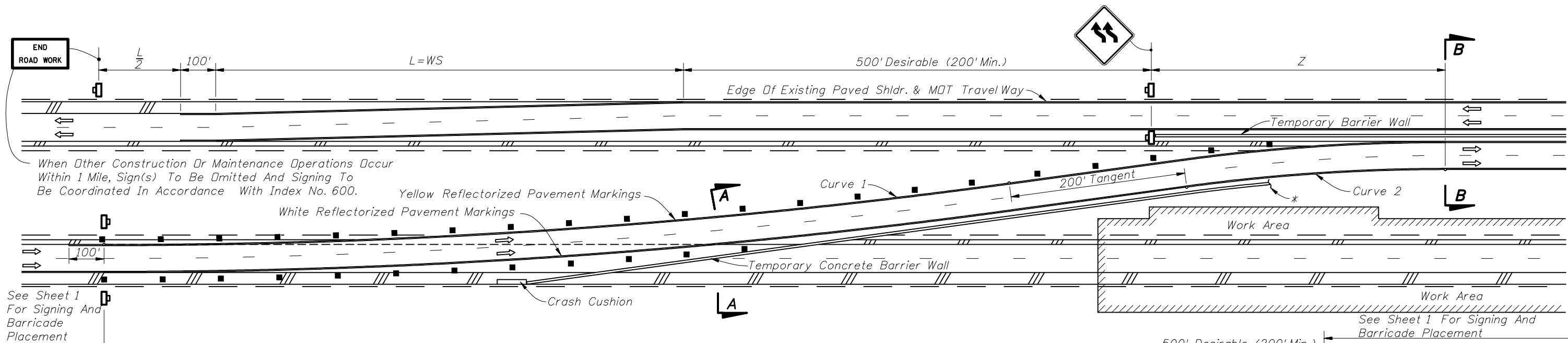
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF ONE ROADWAY AND THE OPPOSING ROADWAY IS CONVERTED TO TEMPORARY TWO-WAY TRAVEL BY WAY OF CROSSOVERS.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Lane Identification + Direction of Traffic

TYPICAL FOR 64' MEDIAN SECTION AA





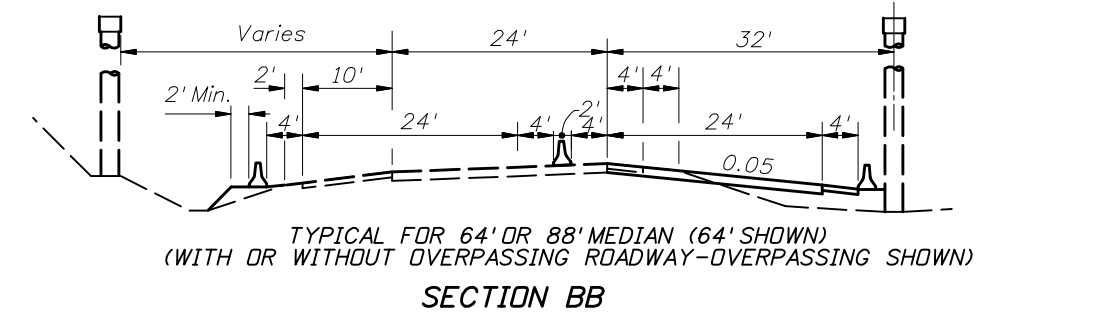
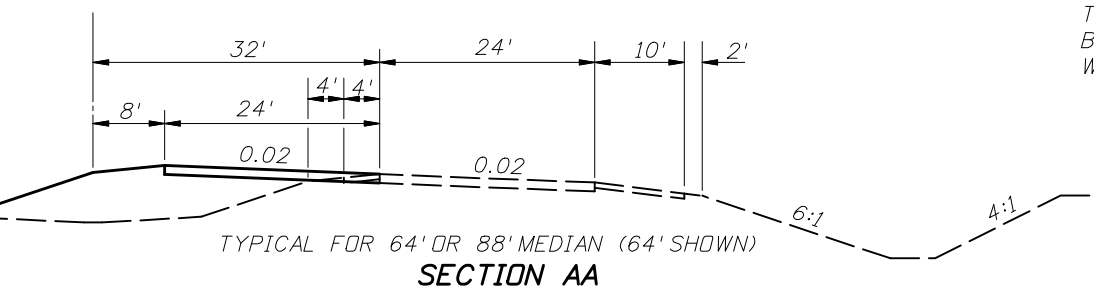
TRAILING END
CURVILINEAR ALIGNMENT CROSSOVER

*Length of barrier wall needed for protection of work area and/or other hazards to be shown in the plans. For complimentary information on barrier walls and work area see Sheet 1. See Index No. 600 for clear zone requirements.

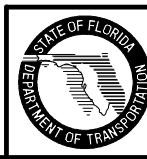
When Other Construction Or Maintenance Operations Occur Within 1 Mile, Sign(s) To Be Omitted And Signing To Be Coordinated In Accordance With Index No. 600.

Construction Zone Speed MPH	BUFFER LENGTH (ft)			
	64' Median		88' Median	
	X	Z	X	Z
70	607	588	582	545
65	581	562	552	514
60	562	543	531	492
55	337	369	330	350
50	201	286	200	276
45	115	164	115	163
40	104	149	104	148
35	91	134	91	132
30	78	118	78	115

Construction Zone Speed MPH	MINIMUM RADII FOR NORMAL CROSS SLOPES	
	Minimum Radius (ft) R	
	Curves 1 & 4	Curves 2 & 3
70	22,918 (0° 15')	4,584 (1° 15')
65	22,918 (0° 15')	3,820 (1° 30')
60	22,918 (0° 15')	3,274 (1° 45')
55	11,459 (0° 30')	2,546 (2° 15')
50	11,459 (0° 30')	2,292 (2° 30')
45	1,080 (5° 18')	700 (8° 11')
40	830 (6° 54')	550 (10° 25')
35	620 (9° 14')	410 (13° 58')
30	450 (12° 44')	285 (20° 06')



NOTE: Diversions with speeds of 50 mph or greater are considered high speed facilities; curvature and superelevation criteria for open highway conditions apply.



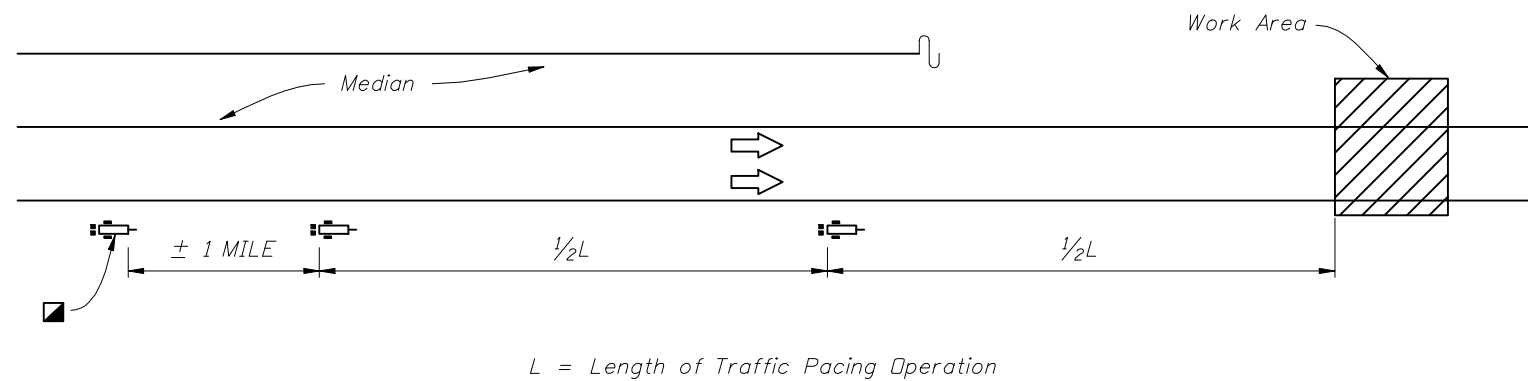
TRAFFIC PACING GUIDE

Traffic pacing is a traffic control technique to slow but not stop traffic to facilitate short duration work operations without an elaborate and difficult detour or diversion. Traffic Control Officers pace or slow the traffic to a speed that provides approximately 20-30 minutes to perform the overhead construction. The Department has frequently used this technique for setting bridge beams, overhead sign structures and replacing overhead sign panels.

The traffic pacing begins with approval of the exact date of the activity that shall be made two weeks in advance. The District Public Information Office, the District Traffic Operations Engineer, Local Emergency Management Agencies and Project Personnel shall be notified of the location, date and time. Advance notification to the public shall begin at least one week in advance by using Changeable Message Signs.

The day of the traffic pacing operation, the Changeable Message Sign messages shall be revised to indicate the activity will occur that night or day. The traffic pacing operation begins with a Traffic Control Officer Supervisor at the work site initiating the pacing operation in accordance with pacing details shown on sheet 2. The intent is to keep traffic moving unless there is an emergency.

CHANGEABLE MESSAGE SIGNS (Typical Placement and Messages)



CHANGEABLE MESSAGE SIGN MESSAGE (MAINLINE AND RAMPS)

Symbols

- Channelizing Device (See Index No. 600)
- ▢▢ Marked Police Vehicle with Flashing Blue Lights
- ☐ PCMS, Portable Changeable Message Sign
- ☑ To be placed the day of pacing operation
- ➡ Lane Identification and Direction of Traffic

ONE WEEK PRIOR TO
PACING OPERATION

DURING DAY
OF PACING OPERATION

DURING PACING
OPERATION

EXPECT DELAYS ON	MMM DD-DD X AM - X AM
ROAD WORK TONIGHT	EXPECT PERIODIC DELAYS
SLOW TRAFFIC AHEAD	BE PREPARED TO STOP

NOTICE

This Index applies to Limited Access Facilities.

This Index represents the minimum requirements for traffic pacing operations on the State Highway System.

A site specific traffic control plan shall be developed for each pacing operation.

TRAFFIC PACING GENERAL NOTES

1. Install ROAD CLOSED (W20-3) signs approximately 1000' prior to the work area. These signs shall remain covered until the pacing operation begins and covered when the pacing operation has ended.
2. Prior to requesting that the traffic control officer supervisor initiate the pacing operation, the contractor shall ensure that the necessary equipment is properly positioned (off the roadway) for the construction activity requiring the traffic pacing operation.
3. Truck mounted attenuator(s) with changeable message sign(s) are required to protect workers and/or equipment positioned in a travel lane(s) at the work area during the pacing operation from an errant vehicle. If no workers and/or equipment are positioned in a travel lane(s) at the work area, truck mounted attenuator(s) are not required.
4. A traffic control officer supervisor shall be stationed at the work area continuously throughout the pacing operation to insure radio communications between the contractor and/or the project administrator, and all the police vehicles involved in the pacing operation.
5. When more than one pacing operation is required in one work period the contractor shall allow sufficient time between pacing operations to permit traffic to return to normal speeds and flow. Additional time may be required between pacing operations to allow traffic to resume normal speeds and flow upstream of the work area as determined by the project administrator or traffic control officer supervisor.

TRAFFIC CONTROL PLANS OR TECHNICAL SPECIFICATION

1. The specific activities and locations, along with allowable times of day and days of the week, when pacing will be allowed should be clearly detailed in the traffic control plans or technical specification. If there are specific holiday or special event dates that, due to anticipated traffic congestion, pacing operations should not be allowed, these dates should also be spelled out in plans or specifications. When detailing the specific activities and locations of pacing activities, identify the minimum number of traffic control officers needed for each function and location of the pacing operation. If there are certain work activities that need to be completed prior to the contractor starting the work anticipated during the pacing operation, the activities should be clearly detailed in the plans or technical specification.
2. When developing a pacing plan, failsafe "stop points" should be identified for those work operations in which a construction problem could create a condition that could not be immediately cleared. A failsafe stop point is the last safe egress from the highway facility prior to traffic coming upon the work that is being completed during the operation. In the unlikely event that the work is not completed during the time estimated for the pacing, the plans or specification should direct the pacing to not proceed past the failsafe stop point until the highway is cleared. In the event of major construction problem that cannot be immediately cleared, traffic can then be diverted off the facility.
3. The traffic control plans or technical specification should require the contractor to submit a pacing plan in advance of the operation. The pacing plan should outline the contractor's expected equipment and personnel, outline the operation, and include a contingency plan should any of the contractor's critical equipment break down. If the project includes a damage recovery clause, the traffic control plan or technical specification should be clear that the damage recovery applies to the pacing operation as well.
4. Changeable message signs shall be displayed one week prior to work using messages described in the traffic pacing plan. The number and location of changeable message signs shall be called out in the traffic control plans.



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TRAFFIC PACING

Last
Revision

07/01/09

Sheet No.

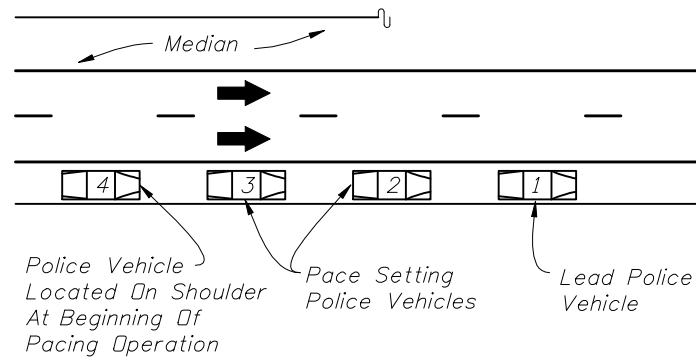
1 of 3

Index No.

655

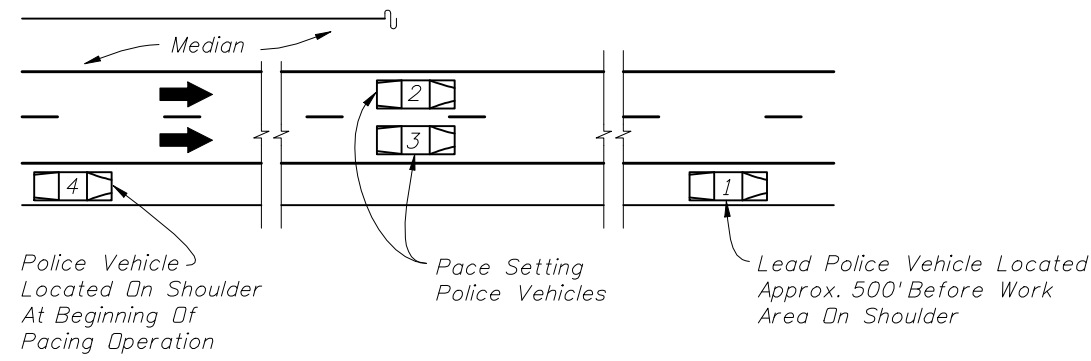
MAINLINE PACING DETAILS

(1 DIRECTION OF FOUR LANE ROADWAY EXAMPLE)



STAGE ONE

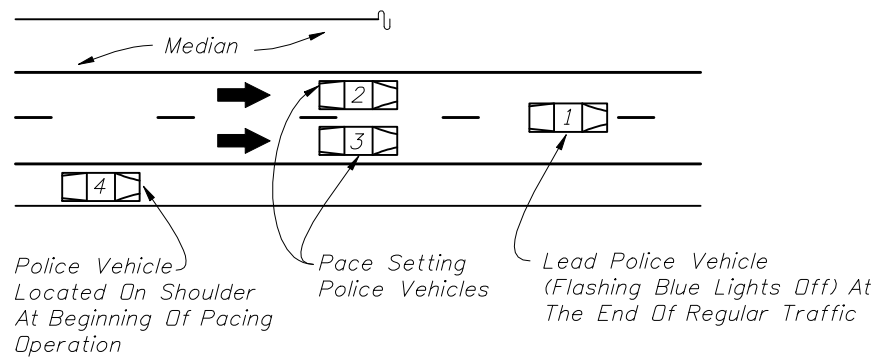
1. Four police vehicles located upstream of the work area at the beginning location of the traffic pacing operation with flashing blue lights off.



STAGE THREE

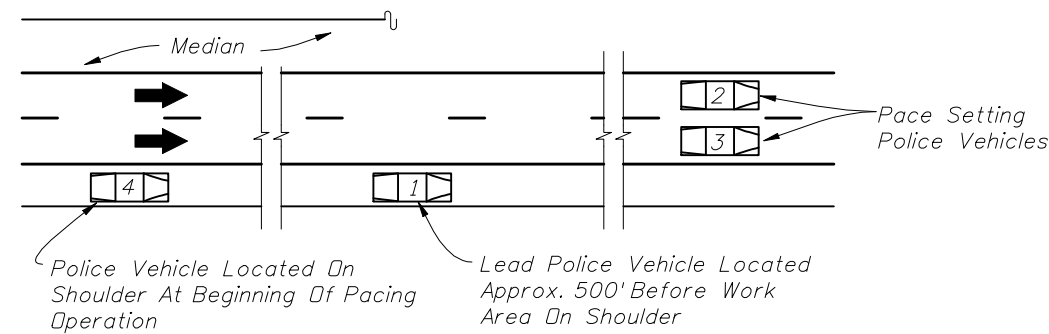
1. The two pace setting police vehicles shall begin to slow to the pacing speed (20 mph is preferred, 10 mph minimum), for the duration of the traffic pacing operation.

2. The lead police vehicle (flashing blue lights off) shall match the speed of the last vehicles ahead of the pacing vehicles and continue following traffic until a point approximately 500' in advance of the work area. The lead police vehicle shall then come to a complete stop on the right shoulder and turn on its flashing blue lights. If required, crash truck(s) with rear mounted impact attenuator(s) and changeable message sign(s) shall move into the travel lanes approximately 200 ft. upstream of the work area with the impact attenuators down and operating once traffic has cleared the work area.



STAGE TWO

1. Once the police vehicles are in place and the traffic control officer supervisor at the work area notifies all officers to begin the traffic pacing operation, the last three police vehicles shall turn on their flashing blue lights. The first three police vehicles shall enter the travel lanes with the second and third police vehicles immediately forming a side by side "pacing operation" of all lanes behind the lead police vehicle (flashing blue lights off).

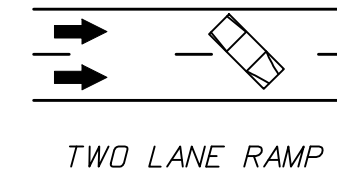
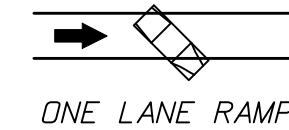


STAGE FOUR

1. When the pace setting police vehicles are within approximately two miles of the work area they shall notify the onsite traffic control officer supervisor who will immediately inform the contractors on site supervisor of their location. Once the contractors on site supervisor has been notified of the pacing vehicles location, the contractor shall begin to clear the travel lanes of all equipment and debris in order to reopen all travel lanes.

2. In case of emergency the pace setting police vehicles shall come to a complete stop once they reach the lead police vehicle. If no emergency is encountered, the crash truck(s) shall be moved from the travel lanes and the two pace setting police vehicles shall clear the work area and immediately move to the right shoulder or an area designated by the traffic control officer supervisor and turn off the flashing blue lights. Once the two pace setting police vehicles pass the work area, the traffic control officer supervisor shall instruct the lead and last police vehicles to turn off their flashing blue lights.

RAMP PACING DETAILS



RAMP CLOSURE DETAIL

1. Once notified by the on site traffic control officer supervisor to begin the traffic pacing operation each police vehicle at the indicated ramp shall turn their flashing blue lights on and position the vehicle across the ramp lane(s) to close ramp access.

2. Once the pacing operation passes the closed on ramp the police vehicle on the ramp shall turn off the flashing blue lights and move from the ramp lane(s) to allow traffic to enter the mainline pacing operation.

GENERAL NOTES

1. Each Traffic Control Officer shall have a marked vehicle with flashing blue lights, for the pacing operation. The location and number of officers at each location will be as follows:

No. Of Traffic Control Officers With Vehicles	Function	Location
1 min.	Supervisor	Work Area
1 Lead Vehicle	Varies	Mobile operation
1 for each travel lane	Pacing Operation	Mobile operation beginning x miles upstream and terminating at the work area
1 Stationed at the Beginning of Pacing Operation	Advanced Warning to Motorist	Stationed at the Beginning of Pacing Operation
1 for each entrance ramp	Entrance Ramp Roadblocks	One at each of the entrance ramps upstream of the work area



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TRAFFIC PACING

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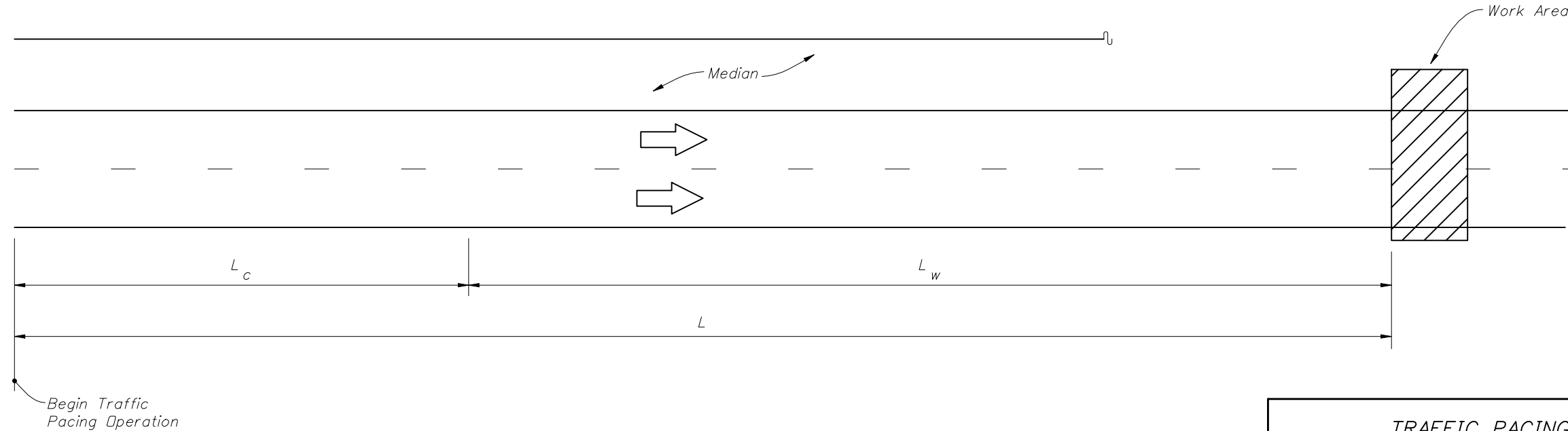
07/01/09

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DESIGN CONSIDERATIONS:

The design shall evaluate the actual distance required for the pacing operation based on site specific features such as: roadway geometrics, pacing speeds, regulatory speeds, interchange spacing, work duration, availability of traffic control officers, traffic volumes and maximum queue length.

The starting point of a traffic pacing operation must consider the following factors: the speed of the pacing vehicles, the location of entrance ramps, horizontal and vertical alignment of the facility.

In some instances, it may be necessary to close a lane at the work site to position a crane(s) and the materials to be lifted.

All material to be installed shall be on-site before the traffic pacing operation begins.

It may be necessary to install temporary barrier walls to protect pre-positioned and assembled materials in the right of way.

The minimum speed allowed for a pacing operation is 10 mph with 20 mph the preferred speed.

The maximum allowed work duration is 1/2 hour (30 min).

The maximum practical pacing operation length is 10 miles.

S_r = Regulatory speed (mph)

S_p = Pacing speed (mph)

t_w = Work duration (min)

L = Total pacing distance in miles

$$L = \frac{t_w}{60} S_p \left(\frac{S_p}{S_r - S_p} + 1 \right)$$

$$L = L_c + L_w$$

L_c = distance paced vehicles must travel before the vehicles at regulatory speed have cleared the work zone

$$L_c = \left(\frac{t_w}{60} \times S_p^2 \right) / (S_r - S_p)$$

L_w = distance paced vehicles travel while work is performed

$$L_w = \left(\frac{t_w}{60} \times S_p \right)$$

F_{HV} = Heavy Vehicle Factor

$$F_{HV} = 1 + \left(\frac{P_t}{100} \times 0.5 \right)$$

P_t = % Trucks

TRAFFIC PACING DISTANCES
(L) miles

$S_p = 20$; $pcphpl \leq 1,750$

S_r	t_w (min)					
	5	10	15	20	25	30
70	2.3	4.7	7.0	9.3	*	*
65	2.4	4.8	7.2	9.6	*	*
60	2.5	5.0	7.5	10.0	*	*
55	2.6	5.2	7.9	*	*	*
50	2.8	5.6	8.3	*	*	*

* Site Specific design required.

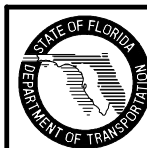
NOTES FOR TABLE:

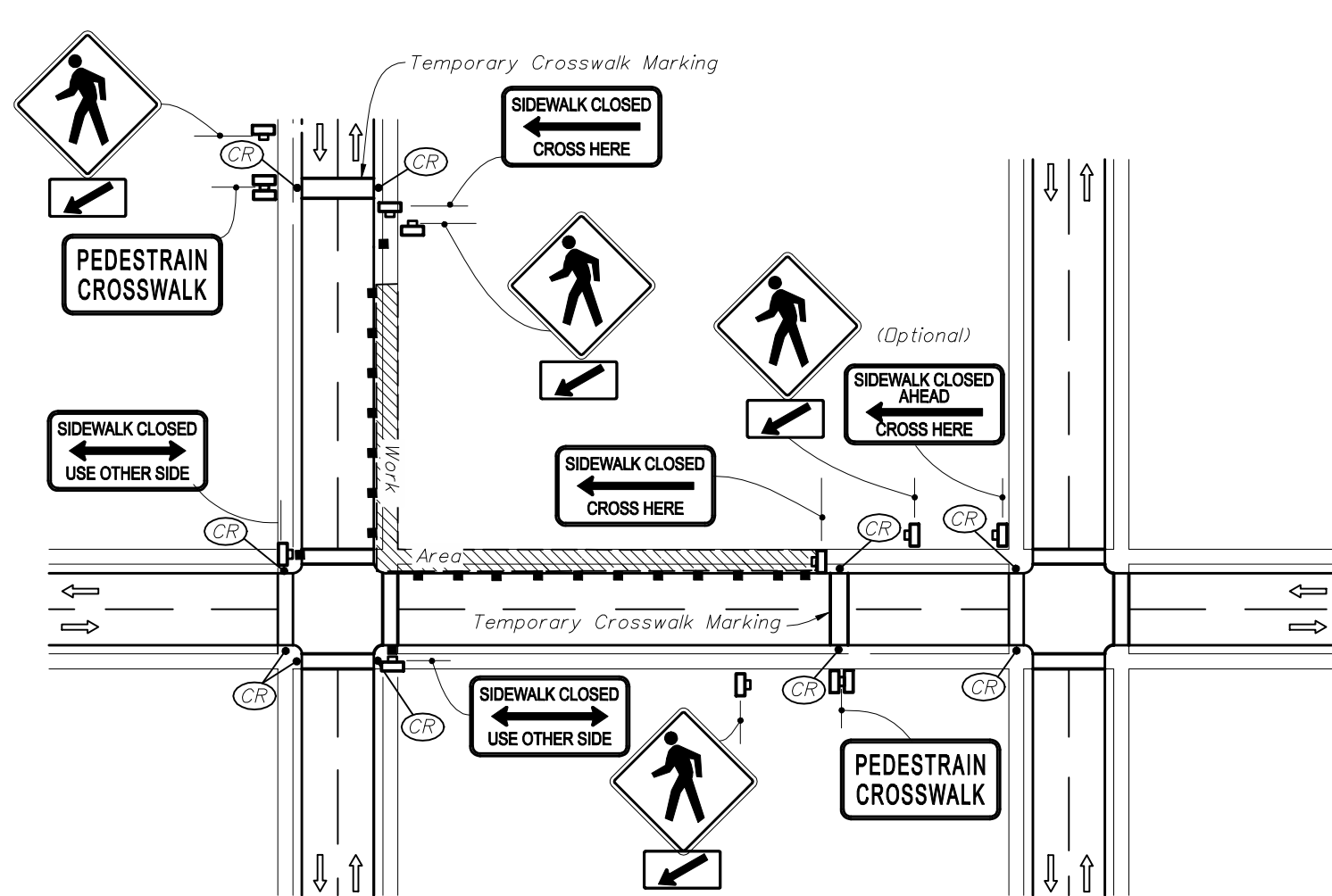
t_w is the total time allowed for work activity in minutes. This time starts just after the last vehicle traveling at the pre-pacing regulatory speed clears the work area and ends just as the pacing operation reaches the work area. t_w must include the time required to clear the roadway of equipment, materials, and personnel.

Demand volume may not exceed 1,750 pcphpl (passenger cars per hour per lane) without a site specific design. Traffic counts can be obtained from the Office of Planning, or you may need to collect traffic counts. Hourly directional traffic volumes must be converted to pcphpl using the following:

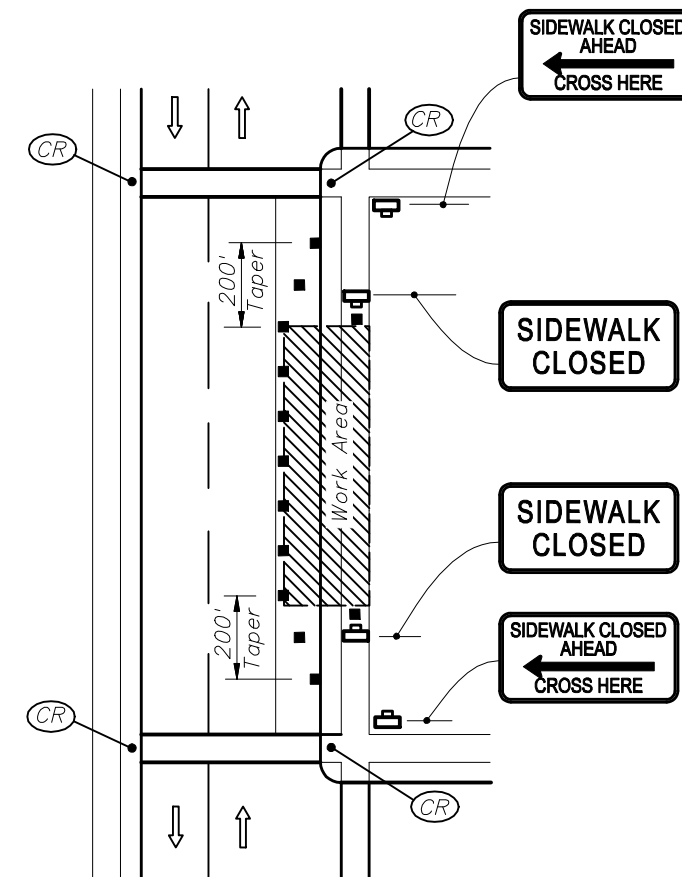
$$pcphpl = \left(\frac{\text{Hourly Directional Volume}}{\# \text{ Lanes (each direction)}} \right) \times \text{Heavy Vehicle Factor}$$

For additional guidance for site specific designs refer to the Plans Preparation Manual, Volume 1 Chapter 10.

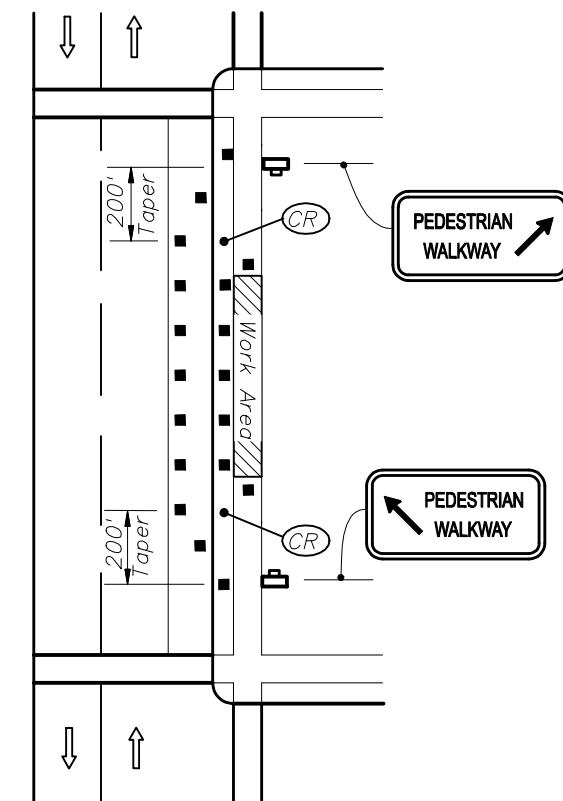




CORNER SIDEWALK CLOSURE WITH TEMPORARY CROSSWALKS



MID-BLOCK SIDEWALK CLOSURE



MID-BLOCK SIDEWALK CLOSURE WITH TEMPORARY WALKWAY

GENERAL NOTES

1. Only the signs controlling pedestrian flows are shown. Other work zone signs will be needed to control traffic on the streets.
2. For spacing of traffic control devices and general TCZ requirements refer to Index No. 600. Maximum spacing between barricades, vertical panels, drums or tubular markers shall not be greater than 25'.
3. Street lighting should be considered.
4. For nighttime closures use Type A flashing warning lights on barricades supporting signs and closing sidewalks. Use Type C steady-burn lights on channelizing devices separating the work area from vehicular traffic.
5. Pedestrian traffic signal display controlling closed crosswalks shall be covered or deactivated.
6. Post Mounted Signs located near or adjacent to a sidewalk shall have a 7' minimum clearance from the bottom of sign to the sidewalk.

7. When construction activities involve sidewalks on both sides of the street, efforts should be made to stage the construction so that both sidewalks are not out of service at the same time.
8. In the event that sidewalks on both sides of the street are closed, pedestrians shall be guided around the construction zone.
9. Temporary walkways shall be a minimum of 4' wide with a maximum 0.02 cross slope and a maximum 0.05 running slope between ramps. Temporary walkways less than 5' in width shall provide for a 5' x 5' passing space at intervals not to exceed 200'. Temporary ramps shall meet the requirements for curb ramps specified in Index No. 304. Temporary walkway surfaces and ramps shall be stable, firm, slip resistant, and kept free of any obstructions and hazards such as holes, debris, mud, construction equipment, stored materials, etc.
10. Temporary ramps and temporary crosswalk markings shall be removed with reopening of the sidewalk, unless otherwise noted in the plans. All work and materials associated with constructing temporary curb ramps and temporary crosswalk markings, removal and disposal of temporary curb ramps and temporary crosswalk markings, and restoration to original condition shall be paid for as Maintenance of Traffic, Lump Sum.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT WORKERS OR THEIR ACTIVITIES ENCRDACH ON THE SIDEWALK FOR A PERIOD OF MORE THAN 60 MINUTES.

SYMBOLS

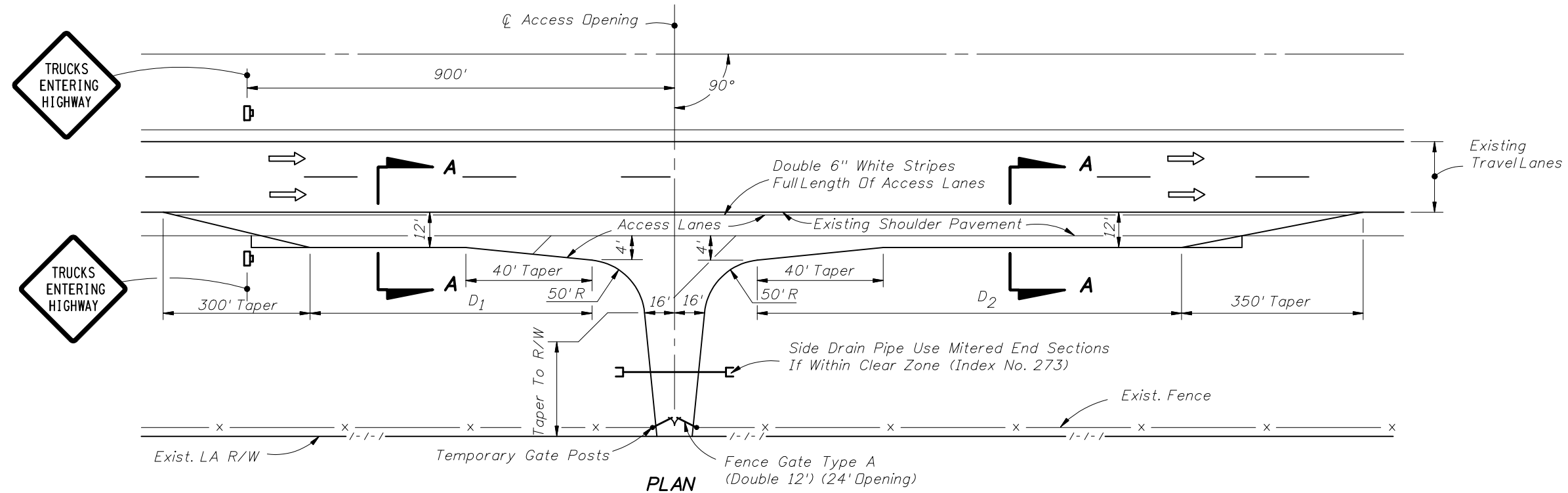
- Work Area
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Required Locations For Either Temporary Or Permanent Curb Ramps.
- Lane Identification + Direction of Traffic



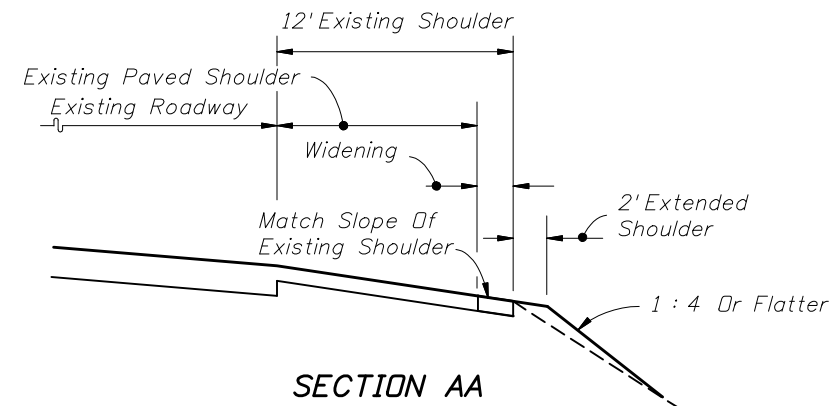
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PEDESTRIAN CONTROL FOR CLOSURE OF SIDEWALKS

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LENGTH OF ACCESS LANES (Ft.)		
Grade	D ₁	D ₂
2% or less	590	1540
3 to 4% Upgrade	530	2310
3 to 4% Downgrade	710	925



GENERAL NOTES

- Access openings across limited access right of way and use of this Index are prohibited unless specifically permitted in the Contract Plans or Special Provisions. When permitted in the Contract Plans or Special Provisions and prior to construction of any opening, the Contractor must submit, in writing, a request identifying specific locations for approval by the Engineer.
- No more than two (2) access openings will be allowed on each project.
- Access openings shall be located only in areas having adequate sight distance and shall not be located within 1.5 miles of interchanges nor within 2000 ft. of acceleration-deceleration lanes at rest areas, other access openings or other highway service areas.
- Access openings shall not be constructed directly opposite temporary median crossovers nor within 2000 ft. of temporary median crossovers.
- Access openings shall be within the project limits and shall not be used for transporting materials to or from any other project. The acceleration-deceleration surfaces shall be paved. RAP materials acceptable for driveway surfacing.
- Any Motorist Aid Call Boxes affected by the temporary access openings shall be relocated outside the limits of access lanes and remain in use during construction. Upon removal of access lanes, call boxes shall be returned to their previous location. Temporary relocation and restoration of call boxes shall be at the contractor's expense.
- Access openings in the limited access fence shall have gates which are to be locked during nonwork hours or periods when the access is not in active use.
- The contractor shall take all precautions necessary to insure against entrance by livestock or unauthorized persons or vehicles.
- The contractor shall not vary from the plan detail without approval of the Engineer.
- Gates shall be removed and access opening locations shall be restored to preconstruction condition immediately upon completion of activities utilizing the materials being transported through the openings whether or not the project is completed.
- Failure to comply with any provision of the access opening plan shall be cause for terminating use of all openings. Upon notification by the Engineer, the contractor shall cease hauling and begin restoration of affected areas. Under this condition expense of removal, restoration and of additional hauling distances shall be borne by the contractor.
- No guardrail or barrier wall will be removed for access openings.
- Construction and removal of the access and restoring the area to preconstruction condition shall be included in the cost of Maintenance Of Traffic, LS.

SYMBOLS

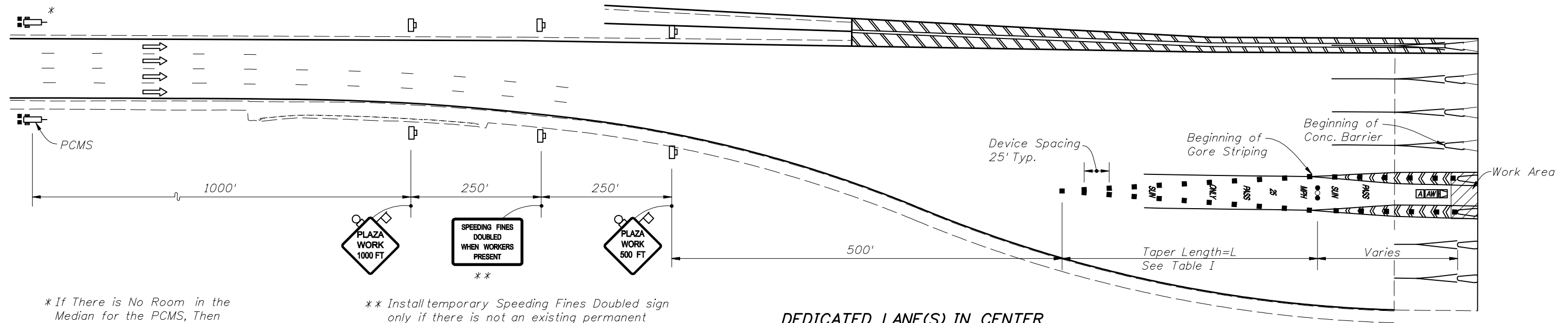
□ Work Zone Sign



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**LIMITED ACCESS
TEMPORARY OPENING**

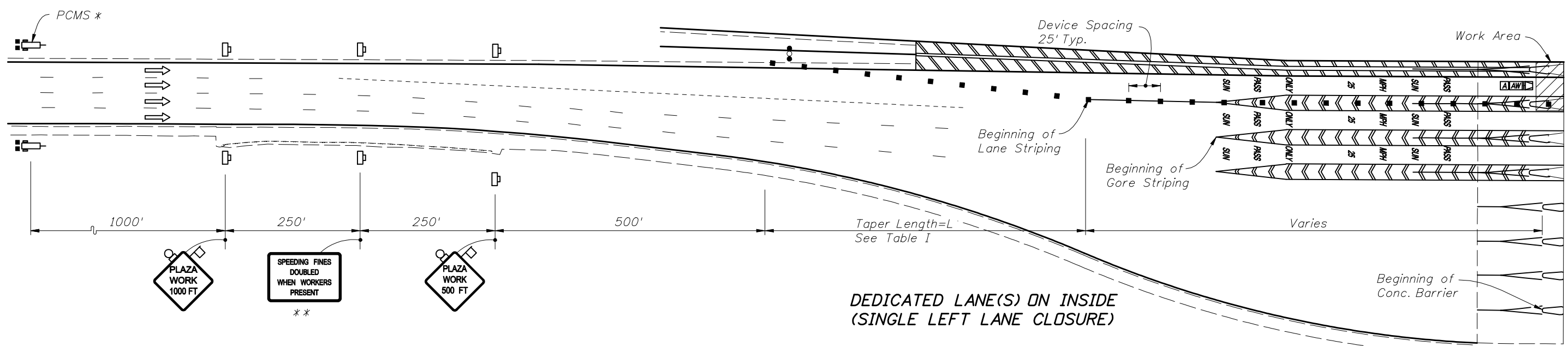
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* If There is No Room in the Median for the PCMS, Then Locate it on the Outside of the Roadway only.

** Install temporary Speeding Fines Doubled sign only if there is not an existing permanent "Speeding Fines Doubled Through Toll Plaza" sign or an existing "Speeding Fines Doubled When Workers Present" sign in place.

DEDICATED LANE(S) IN CENTER



DEDICATED LANE(S) ON INSIDE (SINGLE LEFT LANE CLOSURE)

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic
- Advance Warning Vehicle Equipped with Advance Warning Arrow Panel and Truck Mounted Attenuator
- Portable Changeable (Variable) Message Sign

- PCMS DISPLAY A**
 MESSAGE 1: SUNPASS LANE(S) CLOSED MESSAGE 2: USE CASH LANES
- PCMS DISPLAY B**
 MESSAGE 1: SUNPASS ONLY LANE(S) MESSAGE 2: CLOSED AT PLAZA
- PCMS DISPLAY C**
 MESSAGE 1: SUNPASS ONLY LANE(S) MESSAGE 2: KEEP LEFT/RIGHT

**Table I
Taper Length (L)**

Dedicated Lane Location	Number of Dedicated Lanes	Number of Dedicated Lanes Closed	Taper Length (Feet)	PCMS Display
Center	1	1	200	A
	2	1	200	B
		2	350	A
	3	1	350	B
		2	350	B
		3	350	A
*** Inside	1	1	350	A
	2	1	350	C
	3	1	350	C

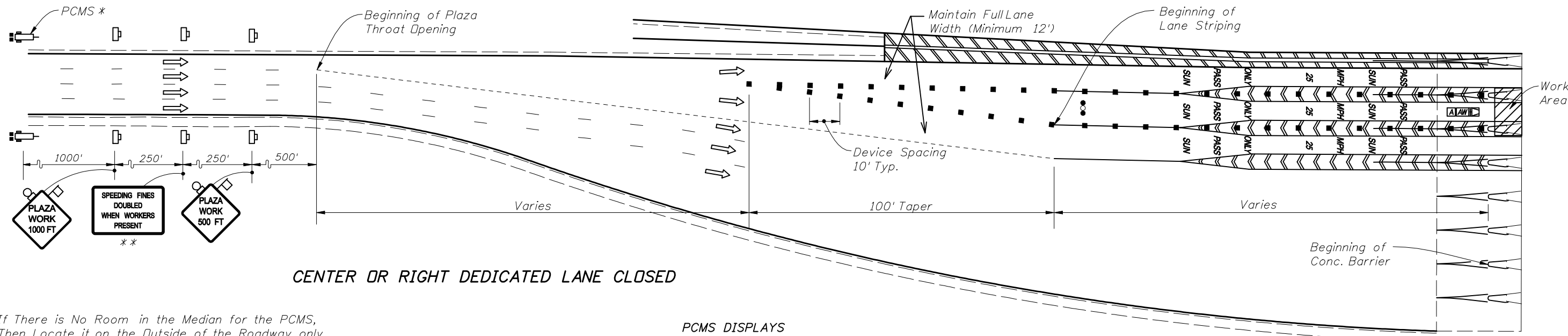
*** See Index 667 Sheet 2 for Right or Center Inside Dedicated Lane Closed, or Two or More Inside Dedicated Lanes Closed Configurations.

GENERAL NOTES

1. This Plan is to be used at Mainline Plazas Only.
2. This Plan is for Lane Closures that exceed three hours.
3. Plaza canopies which have existing DMS signs on the canopies shall display the message "LANE CLOSED" for the duration of this closure.
4. Aerial work requires the use of a truck mounted attenuator.
5. Lane use controllights, signs, or signals over toll lanes shall be switched to the appropriate symbol, message, or correct color prior to the start of any lane closure. They should also be switched at project completion.
6. At least 48 hours prior to any closure, other than emergencies, the plaza manager shall be notified for security and staffing.

DEDICATED LANES





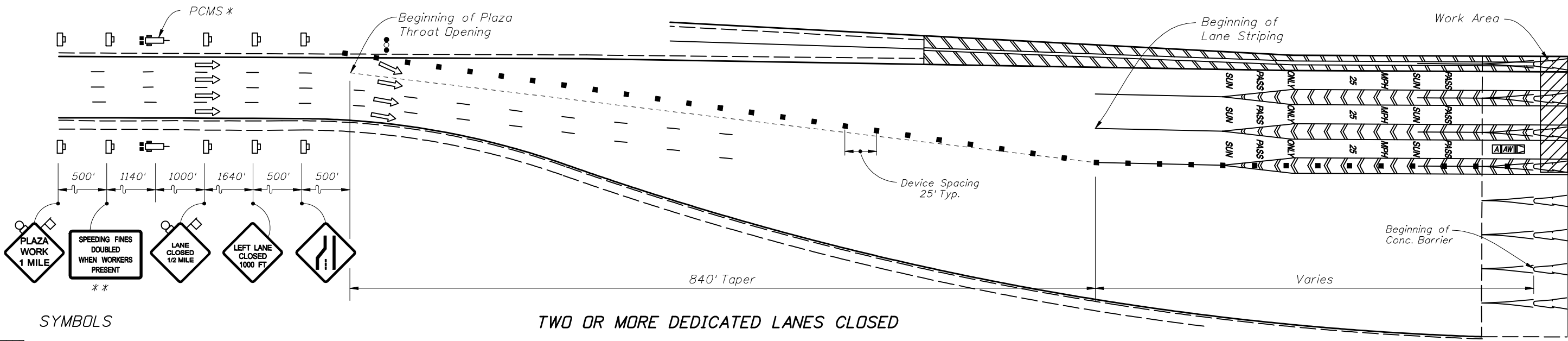
CENTER OR RIGHT DEDICATED LANE CLOSED

* If There is No Room in the Median for the PCMS, Then Locate it on the Outside of the Roadway only.

** Install temporary Speeding Fines Doubled sign if there is not an existing permanent "Speeding Fines Doubled Through Toll Plaza" sign or an existing "Speeding Fines Doubled When Workers Present" sign in place.

PCMS DISPLAYS

FOR CENTER DEDICATED LANE CLOSURE		FOR RIGHT DEDICATED LANE CLOSURE	
MESSAGE 1: CENTER SUNPASS LANE	MESSAGE 2: CLOSED AT PLAZA	MESSAGE 1: SUNPASS ONLY LANE(S)	MESSAGE 2: KEEP LEFT



TWO OR MORE DEDICATED LANES CLOSED

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic
- Advance Warning Vehicle Equipped with Advance Warning Arrow Panel and Truck Mounted Attenuator
- Portable Changeable (Variable) Message Sign

PCMS DISPLAY

MESSAGE 1: SUNPASS LANES	MESSAGE 2: USE CASH LANES
MESSAGE 1: CLOSED LANES	MESSAGE 2: USE CASH LANES

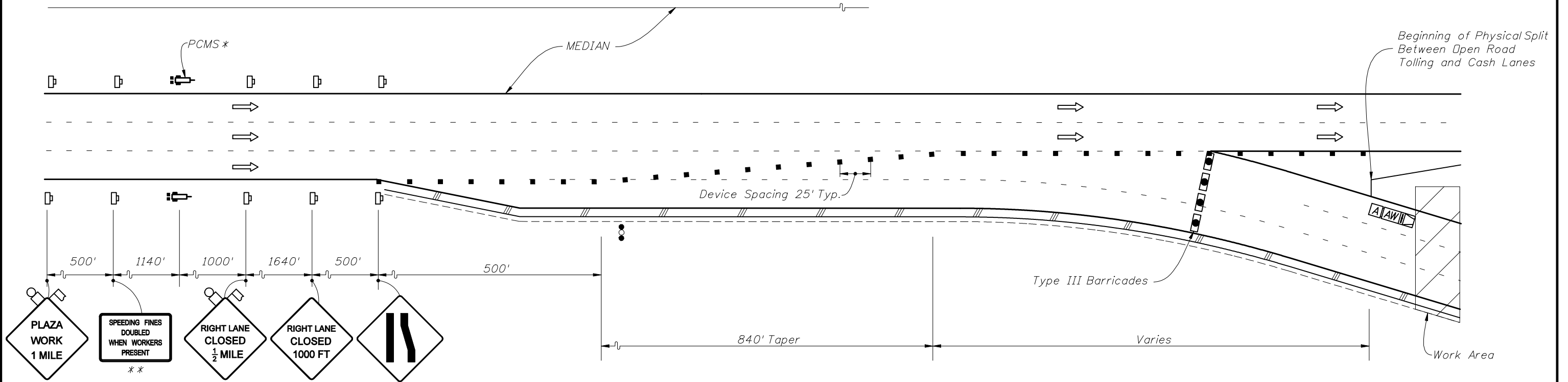
GENERAL NOTES

1. This Plan is to be used at Mainline Plazas Only.
2. This Plan is for Lane Closures that exceed three hours.
3. Plaza canopies which have existing DMS signs on the canopies shall display the message "LANE CLOSED" for the duration of this closure.
4. Aerial work requires the use of a truck mounted attenuator.
5. See INDEX 667 sheet 1 for Two or More Inside Dedicated Lanes Single Left Lane Closed Configuration.
6. Lane use control lights, signs, or signals over toll lanes shall be switched to the appropriate symbol, message, or correct color prior to the start of any lane closure. They should also be switched at project completion.
7. At least 48 hours prior to any closure, other than emergencies, the plaza manager shall be notified for security and staffing.

INSIDE DEDICATED LANES



* If there is no room in the median for the PCMS then locate it on the outside of the roadway only.



ALL LANES CLOSED***

** Install temporary Speeding Fines Doubled sign only if there is not an existing permanent "Speeding Fines Doubled Through Toll Plaza" sign or an existing "Speeding Fines Doubled When Workers Present" sign in place.

*** Inverted for Inside Open Road Tolling Lanes Configuration

GENERAL NOTES

1. This Plan is to be used at Mainline Plazas Only.
2. This Plan is for lane closures of any time length.
3. Plaza canopies which have existing DMS signs on the canopies shall display the message "LANE CLOSED" for the duration of this closure.
4. For planned lane closure, a portable changeable message sign shall be placed and shall display the message shown at a minimum of one week prior to closure. If planned lane closure is less than one week, place portable changeable message sign immediately using "prior to closure" messages.
5. Aerial work requires the use of a truck mounted attenuator.
6. Lane closure configurations applicable to 2 or 3 lane open road tolling plazas.
7. At least 48 hours prior to any closure, other than emergencies, the plaza manager shall be notified for security and staffing.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic
- Advance Warning Vehicle Equipped with Advance Warning Arrow Panel and Truck Mounted Attenuator
- Portable Changeable (Variable) Message Sign
- Type III Barricades w/ Flashing Lights and "RAMP CLOSED" sign

PCMS DISPLAYS

PCMS DISPLAY PRIOR TO CLOSURE

MESSAGE 1: SUNPASS ONLY LANES MESSAGE 2: CLOSED "DATE(S)"

PCMS DISPLAY DURING CLOSURE

MESSAGE 1: SUNPASS LANES CLOSED MESSAGE 2: USE CASH LANES

OUTSIDE OPEN ROAD TOLLING LANES



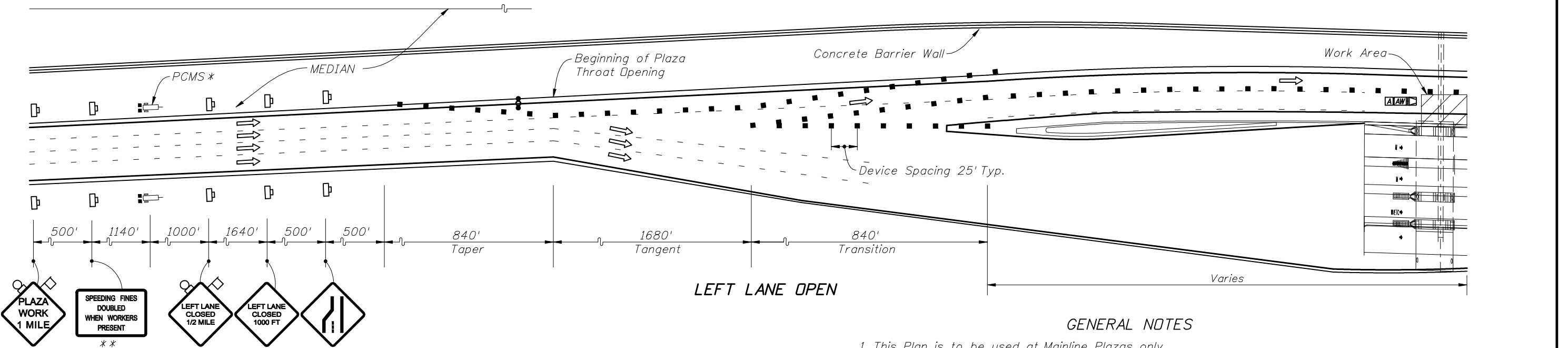
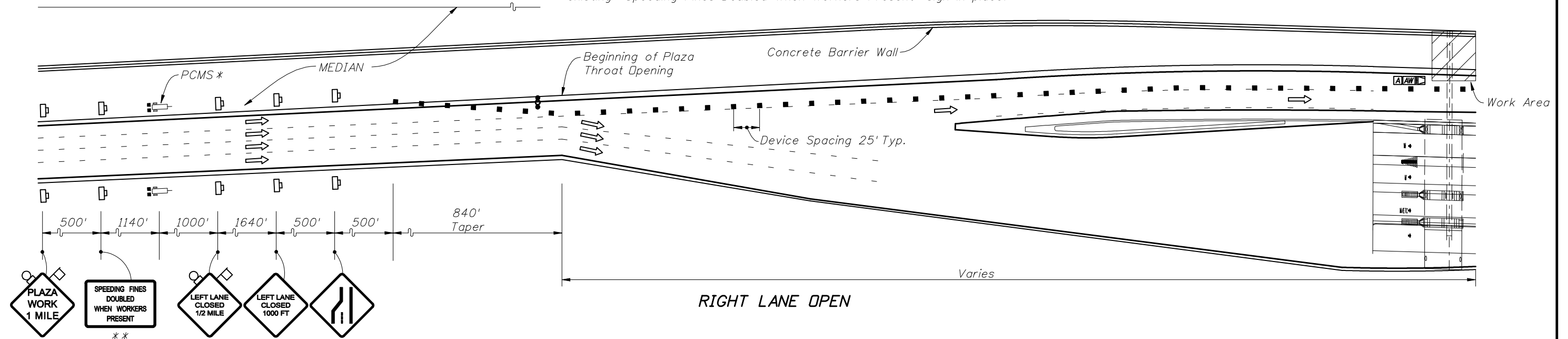
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TOLL PLAZA TRAFFIC CONTROL STANDARDS

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* If there is no room in the median for the PCMS sign, then locate it on the outside of the roadway only.

** Install temporary Speeding Fines Doubled sign only if there is not an existing permanent "Speeding Fines Doubled Through Toll Plaza" sign or an existing "Speeding Fines Doubled When Workers Present" sign in place.



GENERAL NOTES

1. This Plan is to be used at Mainline Plazas only.
2. This Plan is for lane closures of any time length.
3. Plaza canopies which have existing DMS signs on the canopies shall display the message "LANE CLOSED" for the duration of this closure.
4. For planned lane closure, a portable changeable message sign shall be placed and shall display the messages shown at a minimum of one week prior to closure. If planned lane closure is less than one week, place portable changeable message sign immediately using "prior to closure" messages.
5. Aerialwork requires the use of a truck mounted attenuator.
6. Lane closure configurations applicable to 2 or 3 lane open road tolling plazas.
7. At least 48 hours prior to any closure, other than emergencies, the plaza manager shall be notified for security and staffing.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic
- Advance Warning Vehicle Equipped with Advance Warning Arrow Panel and Truck Mounted Attenuator
- Portable Changeable (Variable) Message Sign

PCMS DISPLAYS

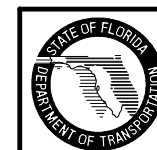
PCMS DISPLAY PRIOR TO CLOSURE

Message 1: ONE SUNPASS ONLY
 Message 2: LANE OPEN "DATE(S)"

PCMS DISPLAY DURING CLOSURE

Message 1: SUNPASS ONLY LANE
 Message 2: OPEN USE CAUTION

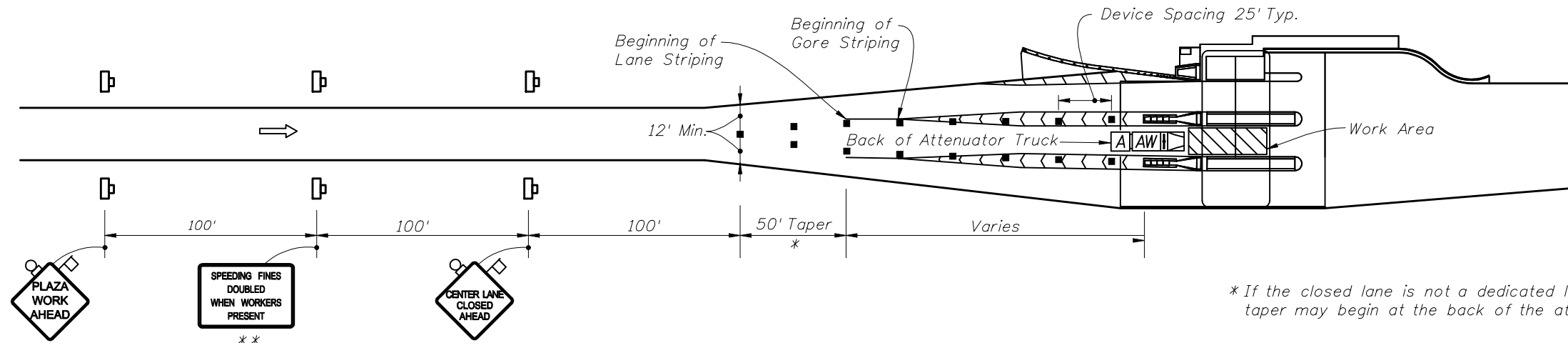
INSIDE OPEN ROAD TOLLING LANES



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* If the closed lane is not a dedicated lane, the 50' taper may begin at the back of the attenuator truck.

EXHIBIT A
DEDICATED, CASH, OR MIXED-USE LANES IN CENTER - ONE LANE CLOSED
 (This same plan can be used for any non-dedicated lane even if they are not in the center of the plaza)

** Install temporary Speeding Fines Doubled sign only if there is not an existing permanent "Speeding Fines Doubled Through Toll Plaza" sign or an existing "Speeding Fines Doubled When Workers Present" sign in place.

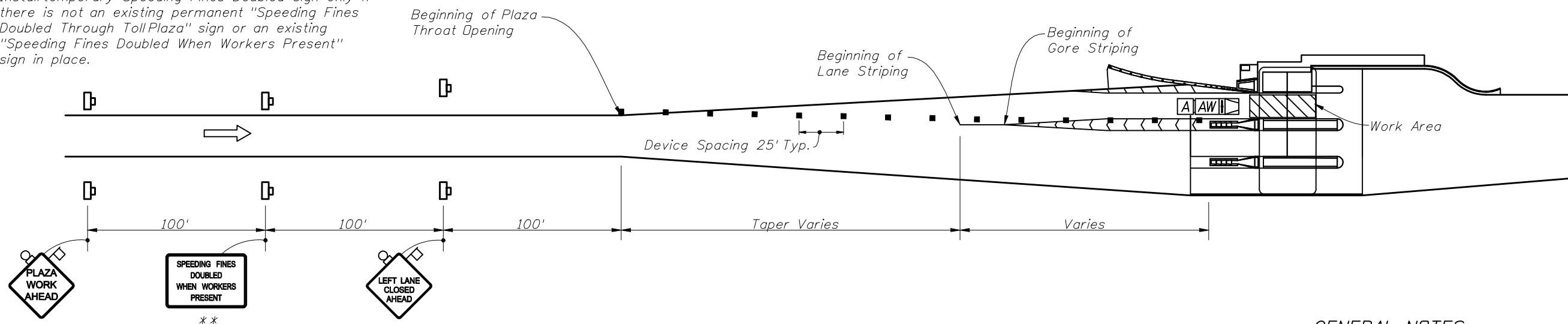


EXHIBIT B
DEDICATED LANE INSIDE OR OUTSIDE - ONE LANE CLOSED
 (Outside Lane Closure is a Mirror Image of this Exhibit)

GENERAL NOTES

1. This Plan is for lane closures that exceed three hours.
2. If the closed lane is a dedicated lane, Exhibit A shall be used at Ramp Plazas only. If the closed lane is a cash or mixed-use lane, Exhibit A may be used at Ramp or Mainline Plazas.
3. Aerial work requires the use of a truck mounted attenuator.
4. Exhibit B shall be used at Ramp Plazas only.
5. Lane use control lights, signs, or signals over toll lanes shall be switched to the appropriate symbol, message, or correct color prior to the start of any lane closure. They should also be switched at project completion.
6. At least 48 hours prior to any closure, other than emergencies, the plaza manager shall be notified for security and staffing.

MAINLINE PLAZAS & RAMP PLAZAS

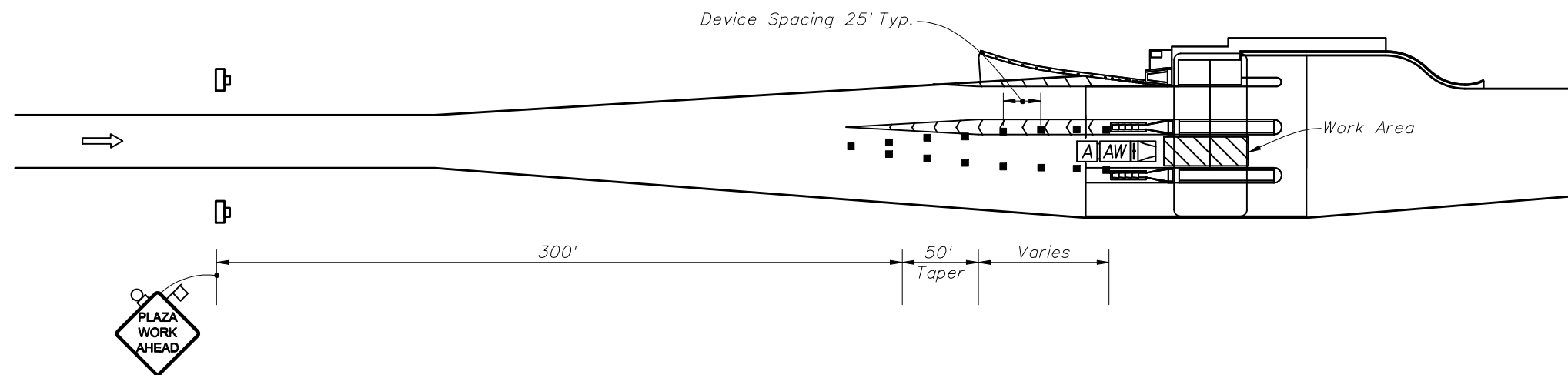
- SYMBOLS**
- Work Area
 - Sign With 18" x 18" (Min.) Orange Flag And Type B Light
 - Channelizing Device (See Index No. 600)
 - Work Zone Sign
 - Lane Identification + Direction of Traffic
 - Advance Warning Vehicle Equipped with Advance Warning Arrow Panel and Truck Mounted Attenuator



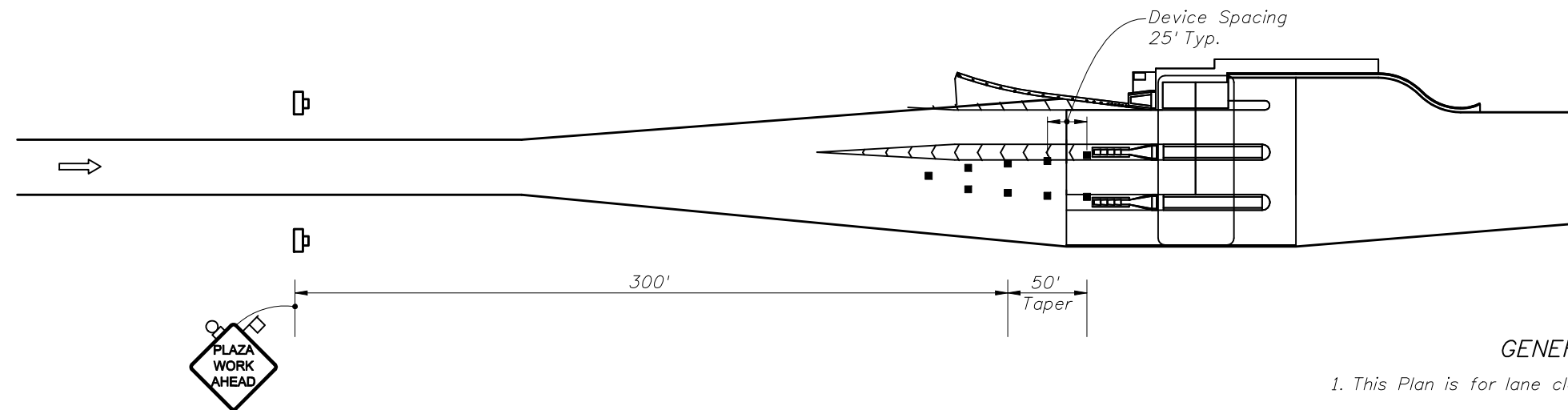
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**TOLL PLAZA
 TRAFFIC CONTROL STANDARDS**

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



WORK DONE WITHIN TRAVEL LANE - ONE LANE CLOSED



WORK NOT DONE WITHIN TRAVEL LANE - ONE LANE CLOSED

SYMBOLS

-  Work Area
-  Sign With 18" x 18" (Min.) Orange Flag And Type B Light
-  Channelizing Device (See Index No. 600)
-  Work Zone Sign
-  Lane Identification + Direction of Traffic
-  Advance Warning Vehicle Equipped with Advance Warning Arrow Panel and Truck Mounted Attenuator

GENERAL NOTES

1. This Plan is for lane closures that are three hours or less.
2. This Plan is to be used at Ramp or Mainline Plazas.
3. This plan can be used for any lane, with appropriate modifications, even if it is not in the center of the Plaza.
4. Lane use control lights, signs, or signals over toll lanes shall be switched to the appropriate symbol, message, or correct color prior to the start of any lane closure. They should also be switched at project completion.
5. At least 48 hours prior to any closure, other than emergencies, the plaza manager shall be notified for security and staffing.
6. A Truck Mounted Attenuator is required for all aerial work operations (lift truck). For non-aerial operations, the Truck Mounted Attenuator or additional devices may be required by the Engineer based on the work being performed.

SHORT-TERM CLOSURES



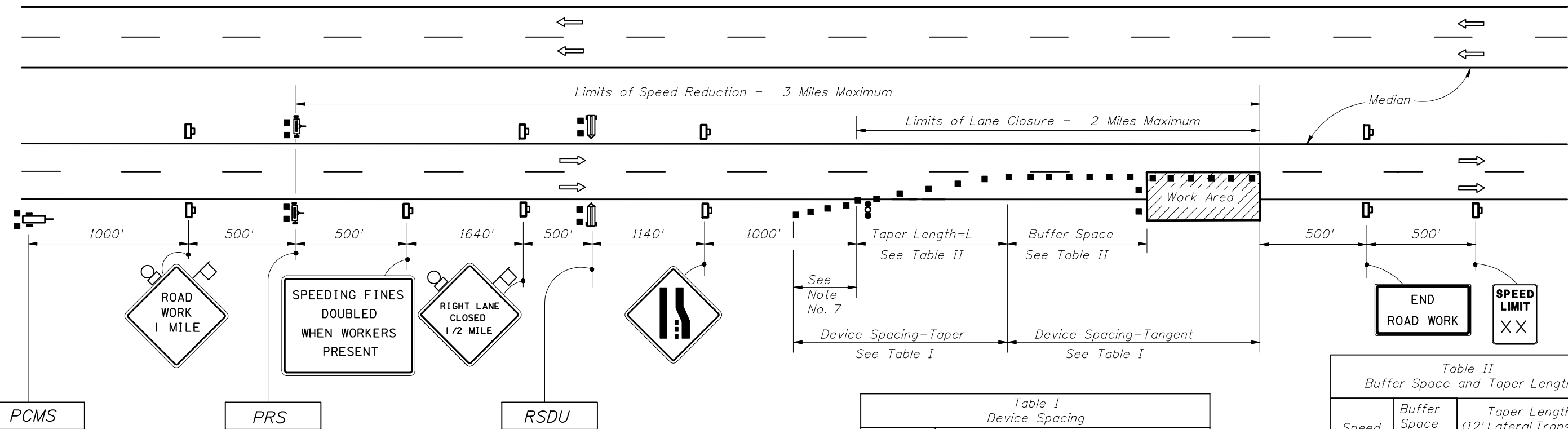
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Typical PCMS Display

With speed reduction:

Message 1: WORKERS PRESENT AHEAD
Message 2: SPEED REDUCED NEXT 3MI

Without speed reduction:

Message 1: WORKERS PRESENT AHEAD
Message 2: NEXT 3 MILES

See General Note No. 1

Table I
Device Spacing

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

Table II
Buffer Space and Taper Length

Speed (mph)	Buffer Space	Taper Length (12' Lateral Transition)		Notes (Merge)
	Dist. (ft.)	L (ft.)		
25	155	125	$L = \frac{WS^2}{60}$	
30	200	180		
35	250	245		
40	305	320	$L = WS$	
45	360	540		
50	425	600		
55	495	660		
60	570	720		
65	645	780		
70	730	840		

GENERAL NOTES

- At lane closures where workers are present, reduce the posted speed limit (speed limit that existed prior to construction) by 10 MPH using the Portable Regulatory Sign (PRS), but not less than 55 MPH or to a speed warranted by geometric condition, whichever is lower. Taper lengths, buffer space and device spacing shall be selected using the posted speed, not the reduced speed.
- All Arrow Panels, Portable Changeable Message Signs, Portable Regulatory Signs and Radar Speed Display Trailers, shall be turned off and moved outside the clear zone or be shielded by a barrier or crash cushion when not in use.
- Work operations shall be confined to one traffic lane, leaving the adjacent lane(s) open to traffic.
- When work is performed in the median lane on divided highways, the barricading plan is inverted and left lane closed and lane reduction signs substituted for the right lane closed and lane reduction signs.
- When work is being performed on a multilane undivided roadway, the signs and traffic control devices normally placed in the median (as shown) shall be omitted.
- When paved shoulders having a width of 8 ft. or more are closed, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the travelway. See Index No. 612 for shoulder taper formulas.
- For general TCZ requirements and additional information, refer to Index No. 600.

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in the notes column. Where:
L= Length of taper in feet
W= Width of lateral transition in feet
S= Posted speed limit (mph)

CONDITIONS

The MAS shall be used if all the following conditions exist:

MULTILANE FACILITY

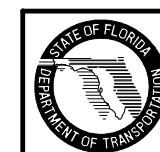
POSTED SPEED LIMIT IS 55 MPH OR GREATER

WORK ACTIVITY REQUIRES A LANE CLOSURE FOR MORE THAN 5 DAYS (CONSECUTIVE OR NOT)

WORKERS ARE PRESENT

SYMBOLS

- Work Area
- Sign With 18"x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel
- Lane Identification + Direction of Traffic
- (1) PCMS= Portable Changeable(Variable) Message Sign
- (2) PRS= Portable Regulatory Sign- Speed Limit When Flashing
- (2) RSDU= Radar Speed Display Unit



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MOTORIST AWARENESS SYSTEM

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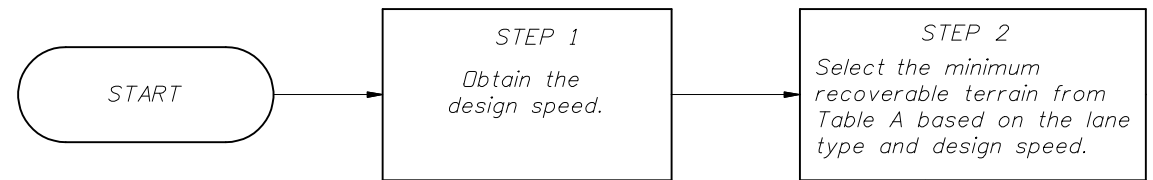
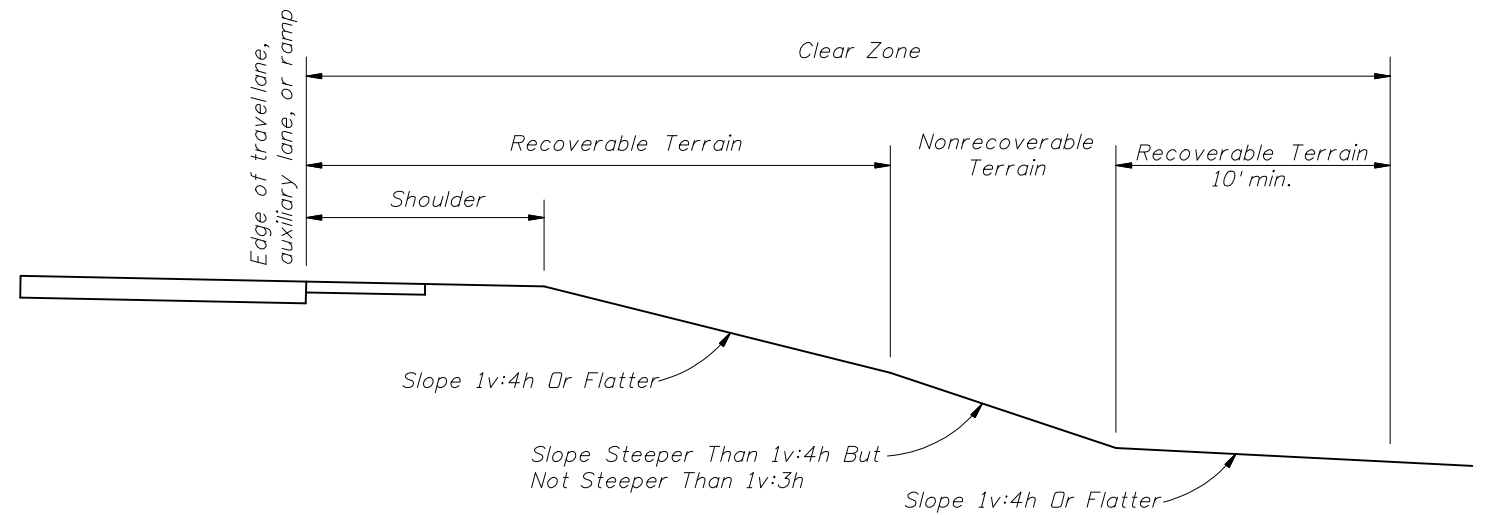


TABLE A MINIMUM RECOVERABLE TERRAIN (ft)		
Design Speed (mph)	Travel Lanes & Multilane Ramps	Auxiliary Lanes & Single Lane Ramps
< 45	18	10
45	24	14
50	24	14
55	30	18
> 55	36	24

TABLE B RESTRICTING CONDITIONS
1. The facility is an urban facility. 2. The facility's design speed is 45 mph or lower. 3. The facility is predominantly a curbed facility. 4. The distance from the face of curb to the R/W line is less than the value obtained in STEP 2.



Clear Zone is the relatively flat unobstructed area that is to be provided for safe use by errant vehicles, and must be wide enough so that the sum of all the recoverable terrain within is equal to or greater than the value obtained in STEP 2. Recoverable terrain provided beyond nonrecoverable terrain must be a minimum of 10 feet. Areas beyond nontraversable and hazardous terrain cannot be used as recoverable or nonrecoverable terrain.

Roadside Terrain includes all surfaces along the roadway other than travel lanes, auxiliary lanes, and ramps. For the purpose of establishing clear zones and horizontal clearance requirements, roadside terrain is defined as recoverable, nonrecoverable, non-traversable, and hazardous as follows:

Recoverable when it is safely traversable and on a slope that is 1v:4h or flatter.

Nonrecoverable when it is safely traversable and on a slope that is steeper than 1v:4h but not steeper than 1v:3h.

Nontraversable when it is not safely traversable or on a slope that is steeper than 1v:3h.

Hazardous when a slope is steeper than 1v:3h and deeper than 6 feet as shown in Figure 2.

Horizontal Clearance Requirements are shown in Table C and are the required offsets to an object from a specified point on the roadway.

ROADSIDE TERRAIN
FIGURE 1

PROCESS FOR DETERMINING HORIZONTAL CLEARANCE REQUIREMENTS AND CLEAR ZONES

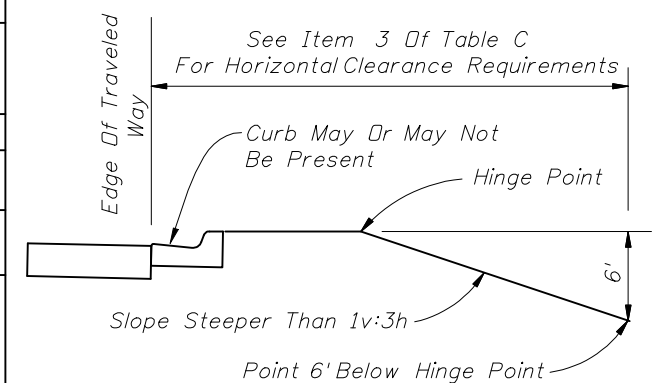


TABLE C

Item No.	OBJECTS, OBSTRUCTIONS OR CONDITIONS	HORIZONTAL CLEARANCE REQUIREMENTS		
		Restricted	Nonrestricted	
GENERAL	1	Above ground fixed hazards: All roadside objects, obstructions or conditions other than those listed below that exceed 4 inches in height and pose a hazard to errant vehicles and vehicle occupants.	Locate as close to the Right Of Way as practical and not less than 4 feet from face of curb.	Locate outside the clear zone as close to the Right Of Way as practical.
	2	All FDOT approved guardrails, crash cushions, permanent or temporary concrete barriers, and guardrail end terminals.	Locate as shown in the Design Standards.	Locate as shown in the Design Standards.
ROADWAY	3	Drop-off hazards: Any point along a roadside slope steeper than 1v:3h that is deeper than 6 feet below the hinge point. See Figure 2.	Locate the point that is 6 feet below the hinge point no less than 22 feet from the traveled way.	Treat as roadside slopes in accordance with Design Standard 400.
	4	Mailboxes not shown in Design Standard 532.	Not to be used.	Not to be used.
	5	Mailboxes shown in Design Standard 532.	Locate in accordance with Design Standard 532.	Locate in accordance with Design Standard 532.
	6	Trees expected to become greater than 4 inches in diameter measured 6 inches above the ground.	Outside roadways: Locate no less than 4 feet from face of curb in accordance with Design Standard 546. Inside medians: Locate no less than 6 feet from the edge of traffic lane and in accordance with Design Standard 546.	Locate outside the clear zone as close to the Right Of Way as practical and in accordance with Design Standard 546.
	7	Trees not expected to become greater than 4 inches in diameter measured 6 inches above the ground.	Locate in accordance with Design Standard 546.	Locate in accordance with Design Standard 546.
	8	Canals behind guardrail.	Locate no less than 5 feet from the back of the guardrail post.	Locate no less than 5 feet from the back of the guardrail post.
	9	Canals without guardrail.	Locate as close to the Right Of Way as practical and not less than 40 feet from the traveled way.	Design speeds of 50 mph and greater: Locate as close to the Right Of Way as practical and not less than 60 feet from the traveled way. Design speeds less than 50 mph: Locate as close to the Right Of Way as practical and not less than 50 feet from the traveled way.
DRAINAGE	10	Culvert wing wall, endwall, retaining walls and flared end sections less than 6 feet deep.	Locate no less than 4 feet from face of curb.	Locate outside the clear zone.
	11	Culvert wing wall, endwall, retaining walls and flared end sections 6 feet and greater in depth.	Treat as drop-off hazard; See Item No. 3.	Treat as drop-off hazard; See Item No. 3.
	12	Mitered end sections.	Locate as shown in Design Standards 272 and 273.	Locate as shown in Design Standards.
TRAFFIC CONTROL DEVICES	13	Frangible sign supports.	Locate no less than 4 feet from face of curb and in accordance with Design Standard 17302.	Locate in accordance with Design Standard 17302.
	14	Overhead sign supports and other nonfrangible signs.	Locate no less than 4 feet from face of curb.	Locate outside the clear zone.
	15	Signal controller cabinets, signal poles, strain poles and mast arms.	Locate no less than 4 feet from face of curb and not in medians.	Locate outside the clear zone and not in medians.
LIGHTING	16	Conventional lighting (frangible and nonfrangible).	Locate no less than 4 feet from face of curb and not in medians.	Locate 20 feet from travel lanes or 14 feet from auxiliary lanes. Not in medians. May be clear zone width when the clear zone is less than 20 feet.
	17	Highmast lighting.	Not applicable.	Locate outside the clear zone.
STRUCT.	18	Bridge piers and abutments: Above ground vertical structures.	Locate not less than 16 feet from edge of travel lane.	Locate outside the clear zone.
UTILITIES	19	Fire hydrants with bases no higher than 4 inches above the ground.	Locate not less than 2 feet from face of curb.	Locate as close to the Right Of Way as practical.
	20	Utility installations: All above ground fixed objects.	Locate as close to the Right Of Way as practical and not less than 4 feet from face of curb and not in medians.	Locate outside the clear zone as close to the Right Of Way as practical and not in medians and not within limited access facilities. May be placed 4 feet behind the back of shields that have been justified for other reasons.
RAILROADS	21	Railroad crossing traffic control devices.	Locate in accordance with Design Standard 17882.	Locate in accordance with Design Standard 17882.

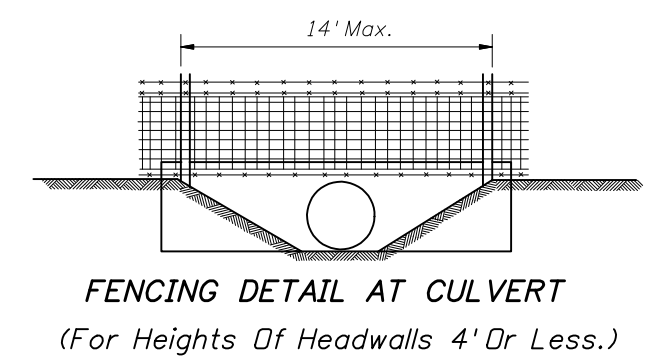
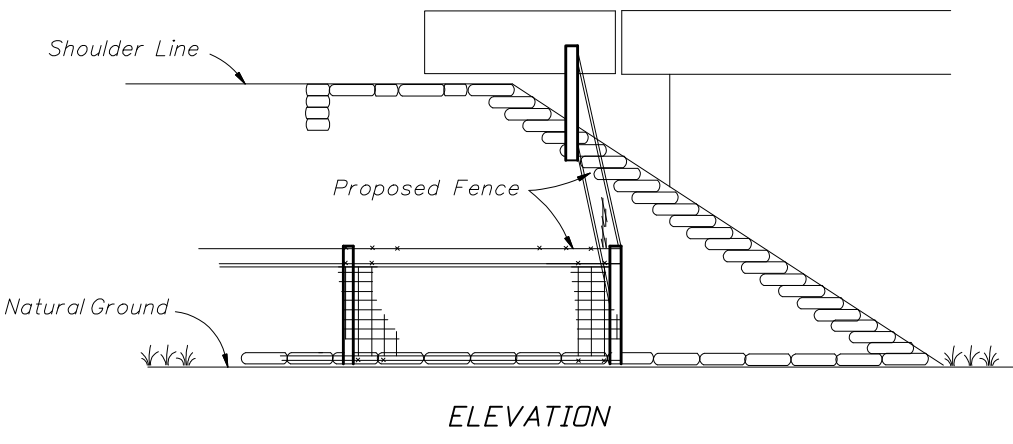
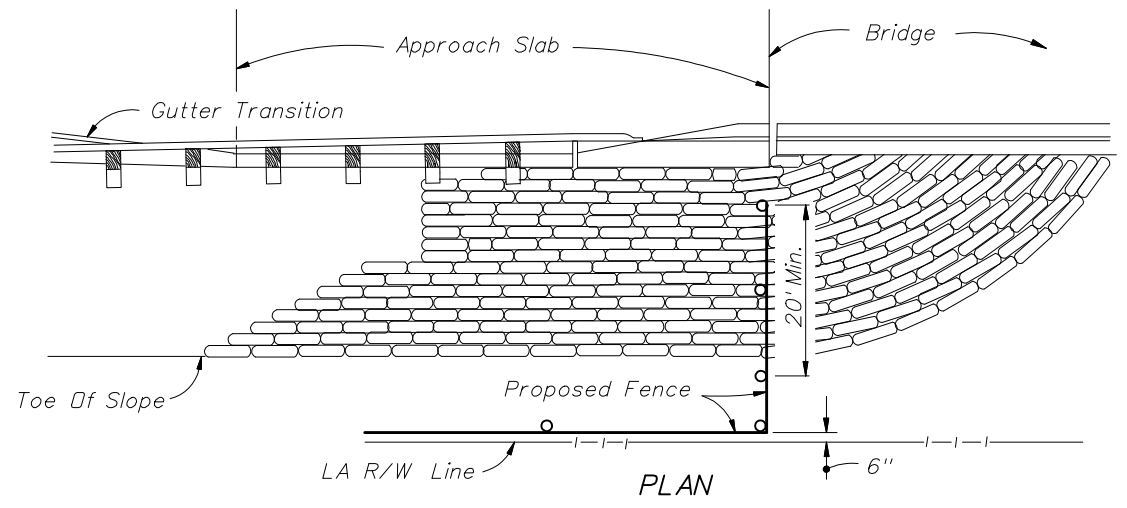
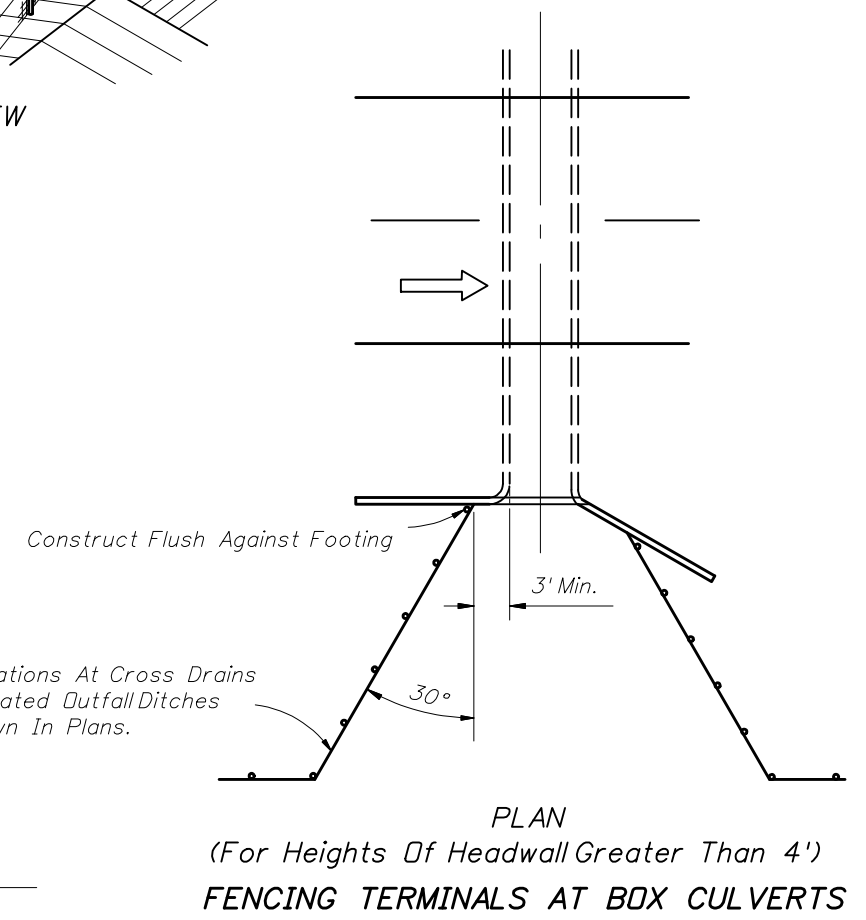
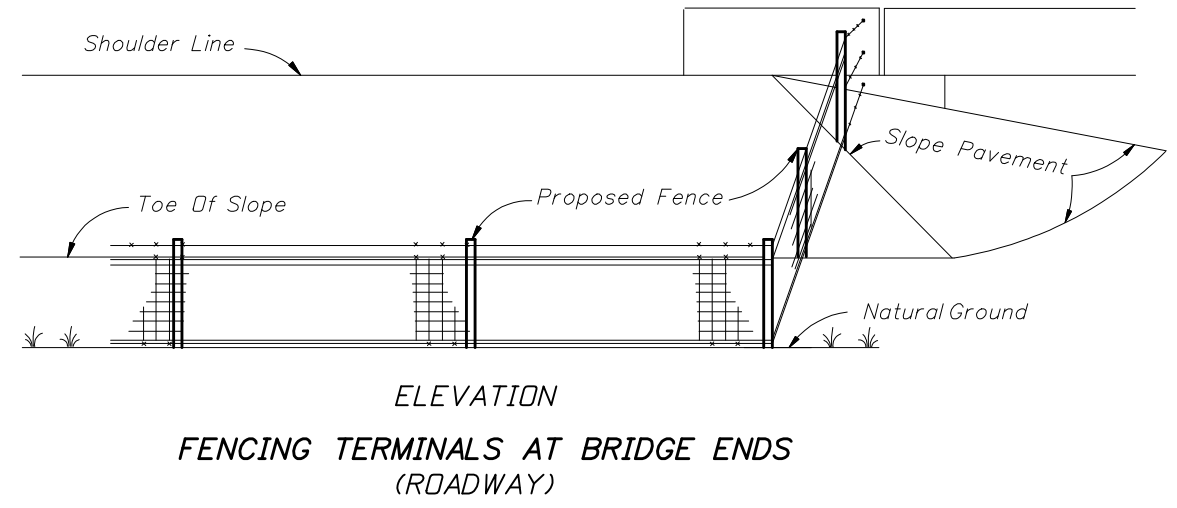
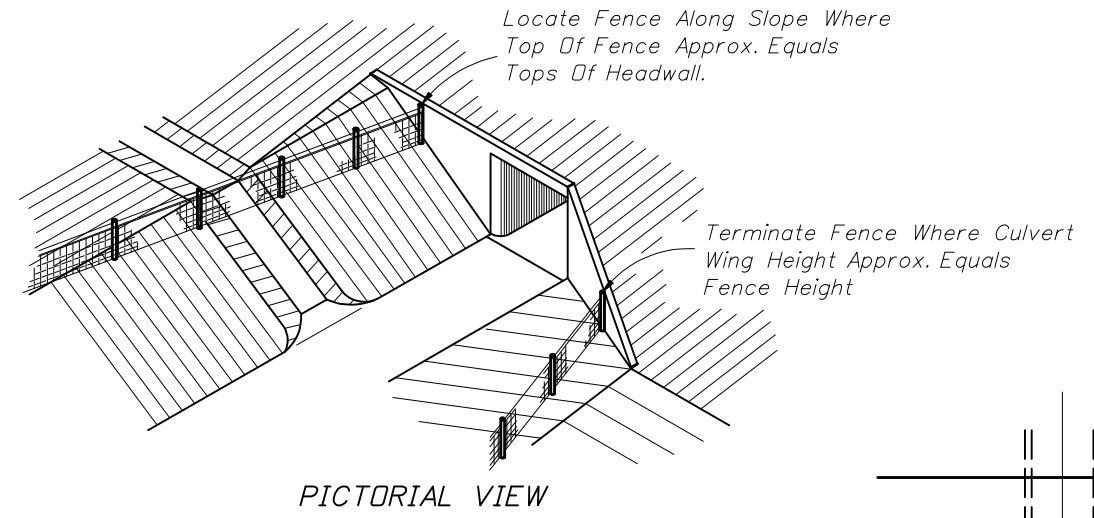
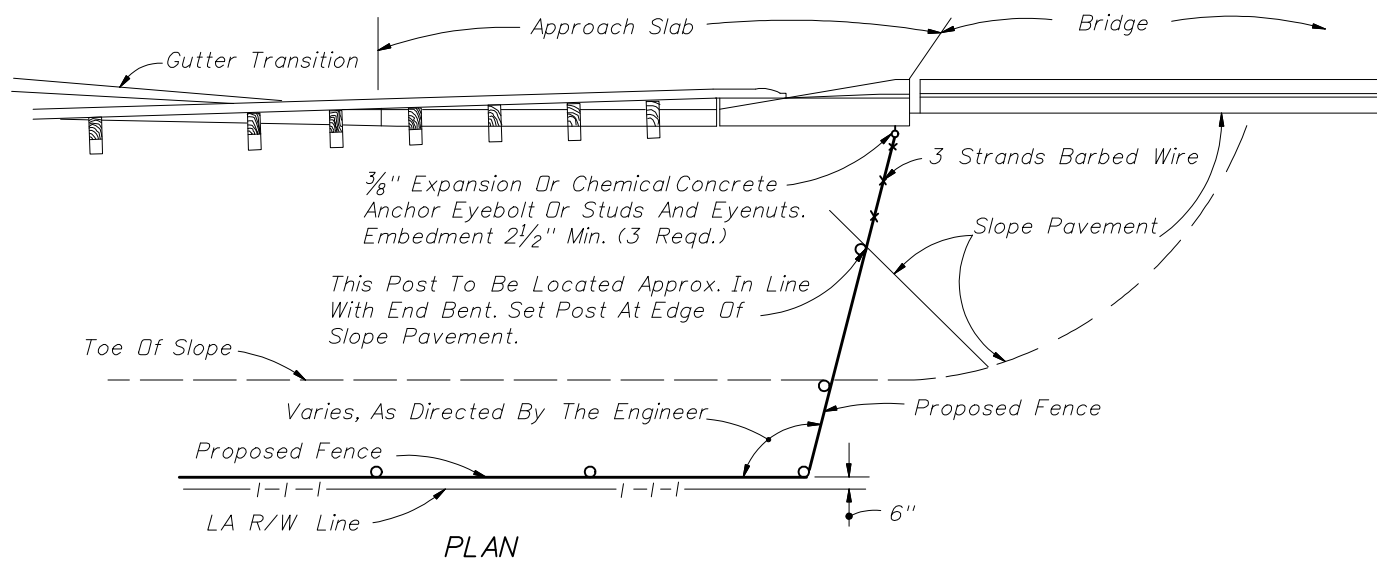
GENERAL NOTES

- When sidewalks are present, an unobstructed sidewalk width of at least 4 feet must be provided.
- When site specific conditions prohibit meeting the horizontal clearance requirements in TABLE C, the object, obstruction or condition must be mitigated, possibly by shielding. Otherwise, the Plans Preparation Manual, Volume 1, Chapters 2, 4, 21 and 25, or Chapters 5 and 9 of the Utility Accommodation Manual must be researched to determine viable alternatives. The minimum requirements in these manuals can only be reduced when a Design Variation or Design Exception has been approved in accordance with Chapter 23 of the Plans Preparation Manual, Volume 1 or a Utility Exception has been approved in accordance with Chapter 13 of the Utility Accommodation Manual.



**DROP-OFF HAZARDS
FIGURE 2**

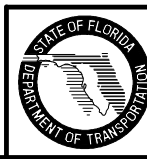


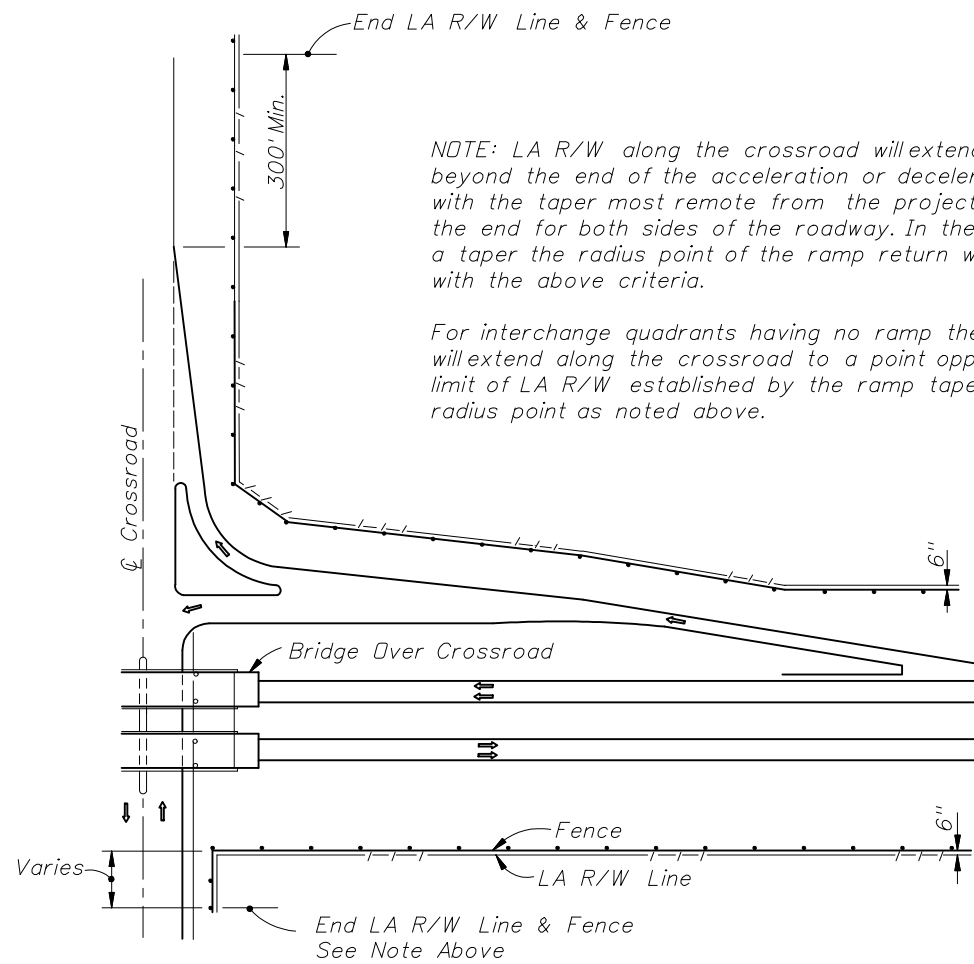


FENCING TERMINALS AT BRIDGE ENDS (STREAM CROSSING)

FENCING TERMINALS AT BOX CULVERTS

Note: When height of headwall is 4' or less (drainage pipe 36" or less) the fence shall not be tied to the headwall, but shall span the lateral ditch.



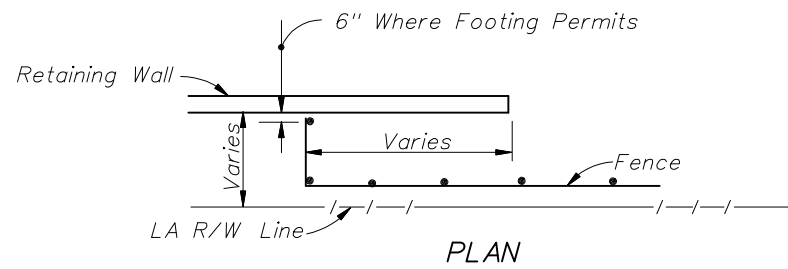


NOTE: LA R/W along the crossroad will extend a minimum 300' beyond the end of the acceleration or deceleration taper, with the taper most remote from the project establishing the end for both sides of the roadway. In the absence of a taper the radius point of the ramp return will be used with the above criteria.

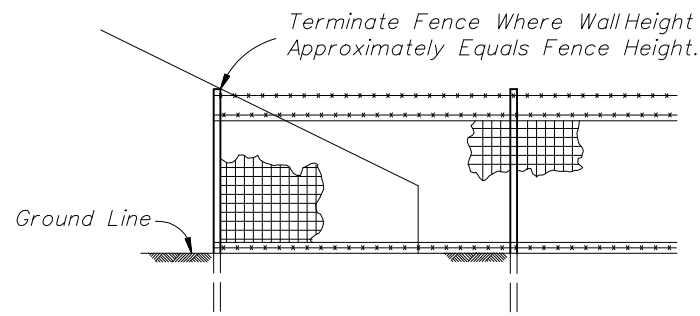
For interchange quadrants having no ramp the LA R/W will extend along the crossroad to a point opposite the limit of LA R/W established by the ramp taper or radius point as noted above.

APPLIES TO BRIDGE OVER CROSSROAD AND CROSSROAD OVER FREEWAY (BRIDGE OVER CROSSROAD SHOWN)

FENCING TERMINALS AT RURAL INTERCHANGES

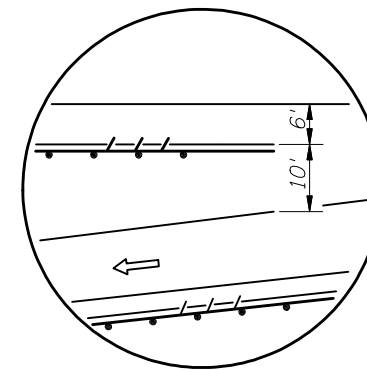


PLAN

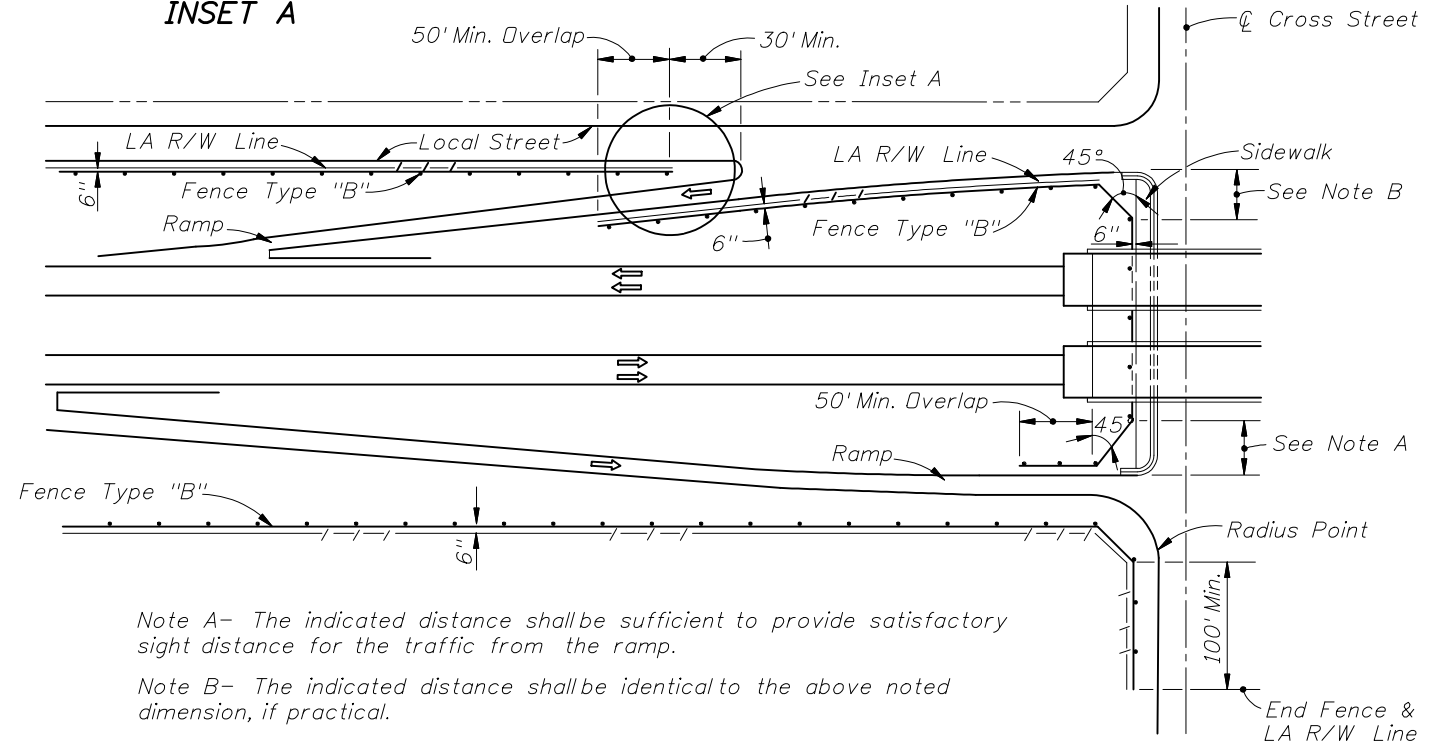


ELEVATION

FENCING TERMINALS AT RETAINING WALLS



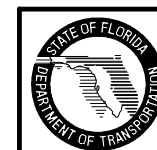
INSET A



Note A- The indicated distance shall be sufficient to provide satisfactory sight distance for the traffic from the ramp.

Note B- The indicated distance shall be identical to the above noted dimension, if practical.

FENCING TERMINALS AT URBAN INTERCHANGES



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FENCE LOCATION

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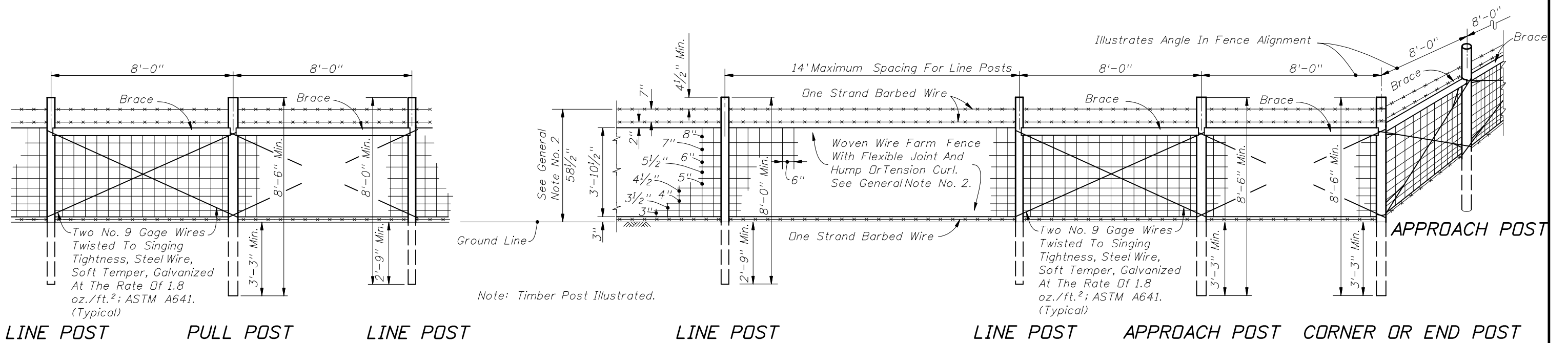
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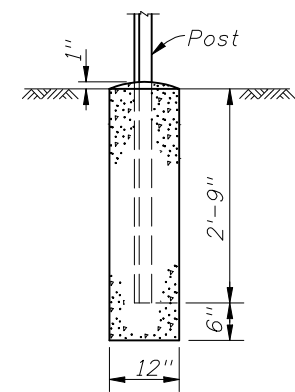
GENERAL NOTES

1. This fence to be provided generally in rural areas. For supplemental information see Section 550 of the FDOT Specifications.
2. Fabric shall be woven wire, either galvanized steel, meeting the requirements of ASTM A116, No. 9 Farm, Design Number 1047-6-9, with Class 3 zinc coating, or aluminum coated steel, meeting the requirements of ASTM A584, No. 9 Farm, Design Number 1047-6-9, with a minimum coating weight of 0.40 oz./ft.². For additional information see payment note below.
3. Fence shall be installed with wire side to private property except on horizontal curves greater than 3° the fence shall be installed so as to pull against all posts.
4. Posts may be either timber, steel, recycled plastic or concrete. Unless a specific post material is called for in the plans, the Contractor may elect to use either a single material or a combination of timber, steel, recycled plastic or concrete materials. Line posts of one material may be used with corner, pull and end post assemblies of a different material. Line posts of only one optional material and pull post assemblies of only one optional material will be permitted between corner and end post assemblies. Within individual corner and end post assemblies only one optional material will be permitted.
5. Timber posts shall meet the material requirements of Specification Section 954. Timber line posts are to be minimum 4" diameter. Timber corner, pull, approach and end posts are to be a minimum 5" diameter. Timber braces are to be minimum 4" diameter.
 - (A) Staples for line posts to be 1 1/4" minimum length; for approach, corner and pull posts 1 1/2" minimum length. At approach, corner and pull posts, staple every line wire. At line posts, staple every line wire in top half and alternate line wires in bottom half. Staples shall be driven diagonally across the line wire with the points in separate grains.
 - (B) Connections between timber posts and braces to be provided by dowels as shown in fastener details.
 - (C) Wire to be wrapped and tied, as shown in the splice details, at the following locations:
 - (a) All end posts, (b) Corner post, including the assemblies at vertical breaks of 15° or more and
 - (c) Pull posts where the wire is not spliced and pulled through the assembly; see General Note 18.
6. Steel posts and braces shall be standard steel posts, galvanized at the rate of 2 oz./ft.², together with necessary hardware and wire clamps and meeting the following requirements:
 - (A) Line posts: 8' long; 1.33 lbs./ft.; roll formed studding; anchor plate attached (23 in.²).
 - (B) Approach posts: 2 1/2" x 2 1/2" x 1/4" angles, 8' long; fabricated for attaching brace; with necessary hardware, clamps, etc.
 - (C) Pull, end and corner posts: 2 1/2" x 2 1/2" x 1/4" angles, 8' long; fabricated for attaching brace; with necessary hardware, clamps, etc.
 - (D) Braces: 2" x 2" x 1/4" angles with necessary hardware and fabricated for attaching to post.
 - (E) The pull, corner, approach and end posts are to be set in concrete as per detail. (Also see General Note No. 15)
7. Recycled plastic posts shall meet the material requirements of specification Section 972 and be one of the products included on the Qualified Products List current at the time of installation. Line posts shall have a minimum section of 4" round or 4" square. Plastic posts shall not be used as corner, pull, end or approach posts unless such use specifically detailed in the plans. Plastic posts can be set by either digging and tamped backfill or by driving into full depth preformed holes 1/4" to 1/2" smaller than cross section of post. Staples for fabric and barbed wire connection to plastic line posts shall be the same size, count and location as that for timber posts.
8. The Contractor, at his option, may use any suitable precast or prestressed concrete posts; however, approval by the Engineer, of posts not shown on this index, will be required prior to construction of the fence. Precast posts shall be Class I concrete. Prestressed posts shall be Class III concrete. Lengths of concrete post to be as indicated for timber posts.
9. Aluminum post, braces and accessory framing hardware shall not be used unless the plans specifically detail their application or the Engineer specifically approves their incorporation in fence construction or repair. Aluminum framed gates are permitted as described in General Note 19.
10. The woven wire shall be attached to steel and concrete posts by a minimum of five tie wires. The single wire ties shall be applied to the top, bottom and three intermittent line wires. The ends of each tie wire shall have a minimum of two tight turns around the line wire. Tie wires shall be steel wire not less than 0.120" diameter, zinc coating Class 3, soft temper, in accordance with ASTM A641.
11. Steel Barbed Wire can be either of the following types:
 - Type I: This type shall conform to the requirements of ASTM A121, with two strands of 12 1/2 gage wire; four-point barbs, wire size 14 gage, twisted around both line wires; and, Class 3 coating.
 - Type II: This type same as Type I except the two strand wires are twisted in alternating directions between consecutive barbs.
 Aluminum Barbed Wire shall be fabricated of two strands of 0.110-inch wire with 0.08-inch diameter four-point barbs spaced at approximately 5 1/2", and at a maximum spacing of 6". The wire for the strands and for the barbs shall be of ASTM B211M Alloy 5052-H38 or equal.
12. The woven wire shall be stretched only until one-half the tension curl has been pulled out of the line wires.
13. Posts to be set by driving or digging. If by digging, the posts shall be set at the center of the hole and the soil tamped securely on all sides.
14. Longer posts than those indicated above may be required by the plans or for deeper installations.
15. Concrete bases for angular steel posts (pull, corner, end and approach) shall be Class NS as specified in Section 347. Materials for Class NS concrete may be proportioned by volume and/or by weight.
16. Pull post assemblies shall be installed at approximately 330' centers except that this maximum interval may be reduced by the Engineer on curves where the radius is less than 3°.
17. Corner post assemblies are to be installed at all horizontal and vertical breaks in fence of 15° or more.
18. A maximum length of 1320' of wire may be installed as a unit. For pulls through a pull post assembly the fabric shall be spliced by crimping sleeves only. Pulls through a corner post assembly will not be permitted.
19. Unless otherwise called for in the plans gates shall be commercially available metal swing gates assembled and installed in accordance with the manufacturer's specifications as approved by the Engineer. Chain link swing gates in accordance with Index No. 802 may be substituted for metal swing gates as approved by the Engineer. Gate size is full opening width whether single leaf or double leaves. Payment for gates shall include the gate, single or double, all necessary hardware for installation and any additional length and/or size for posts at the opening. Gates shall be paid for under the contract unit price for Fence Gates, EA.
20. For construction purposes, assemblies are defined as follows: End post assemblies shall consist of: one end post, one approach post, two braces, four diagonal tension wires and all necessary fittings and hardware. Pull post assemblies shall consist of: one pull post, two braces, four diagonal tension wires and necessary fittings and hardware. Corner post assemblies shall consist of: one corner post, two approach posts, four braces, eight diagonal tension wires and all necessary fittings and hardware.
21. All posts, braces, tension wires, fabric, tie wires, Class NS concrete, and all miscellaneous fittings and hardware to be included in the cost for Fencing, LF. Fencing shall be inclusive of the lengths of pull, end and corner post assemblies, but exclusive of gate widths.

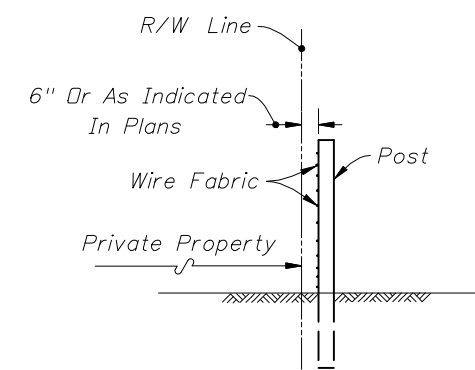




Note: Timber Post Illustrated.



(Pull, Corner, End And Approach Posts)
CONCRETE BASE FOR ANGULAR STEEL POST

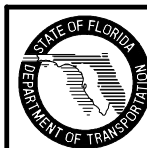


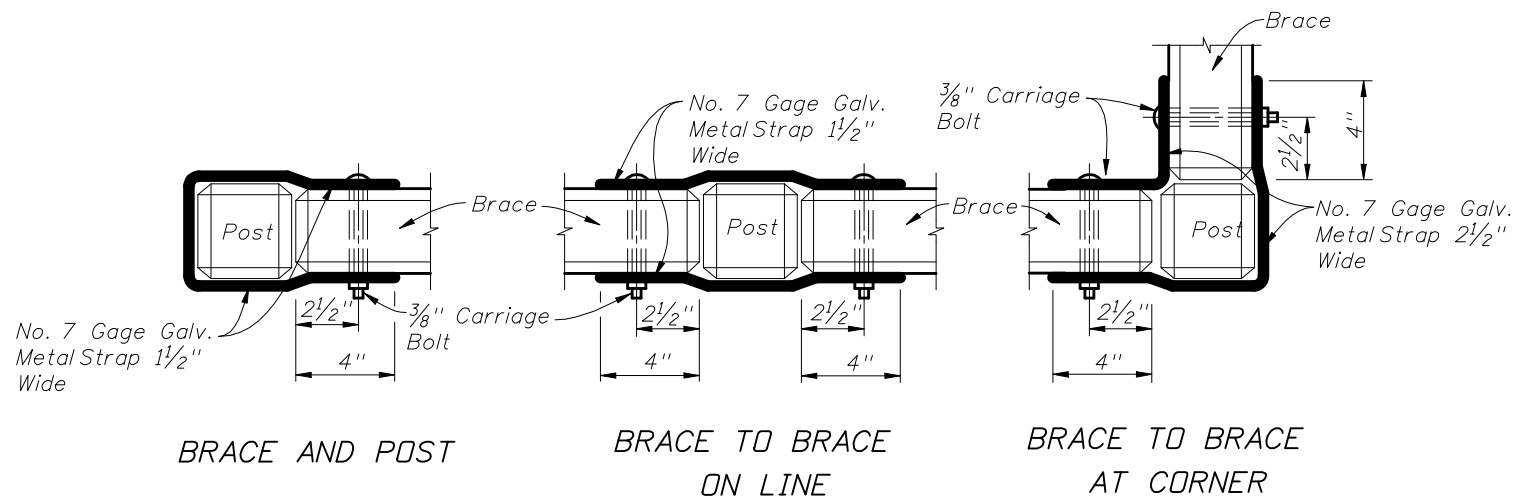
FENCE POSITION AT LOCATIONS WITHOUT FRONTAGE ROADS

(REFER TO DETAIL PLANS FOR FENCE POSITION AT LOCATIONS WITH FRONTAGE ROADS)

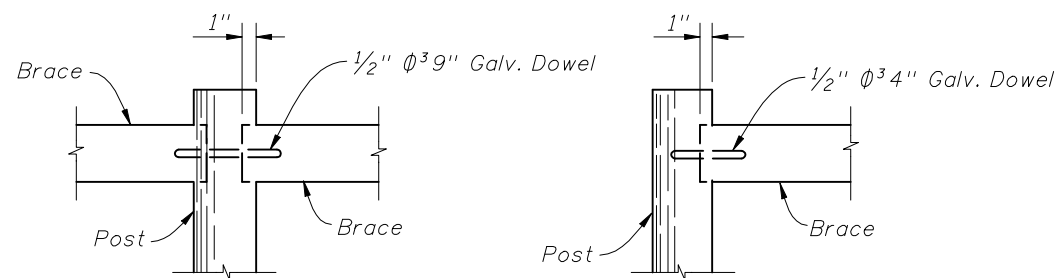
DESIGN NOTE

This index details fencing that is constructed with farm fabric 46 1/2" (47" nominal) in height and with specific ground clearance and specific barbed wire spacings. For fencing of different height or installation details, the fence shall be fully detailed in the Contract plans.

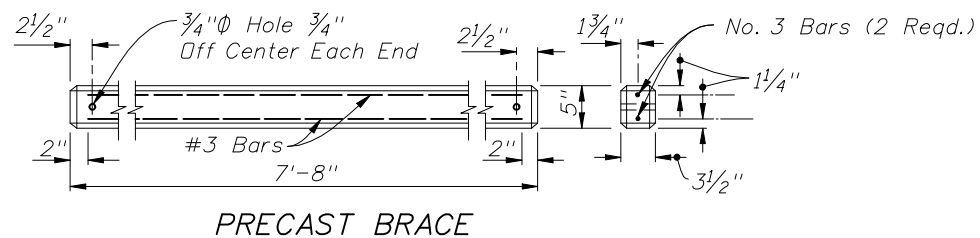
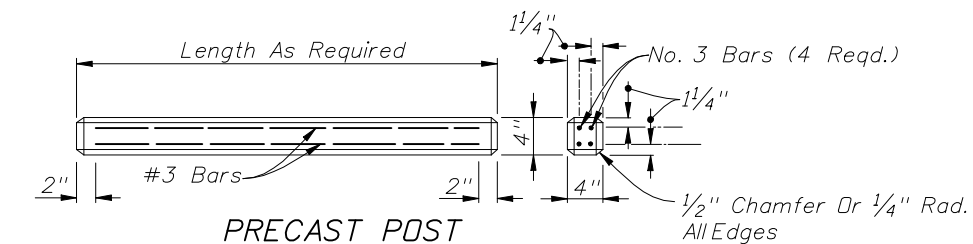
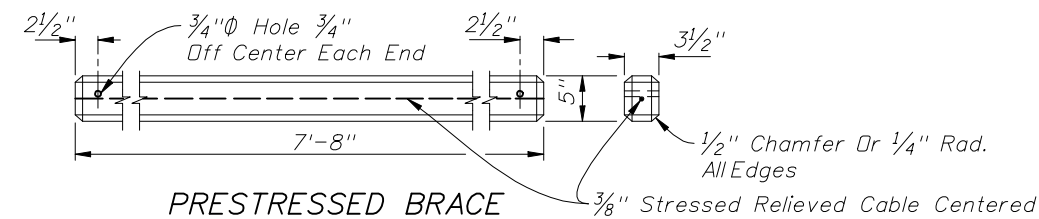
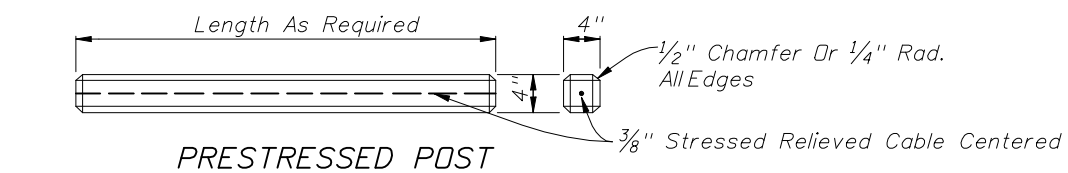




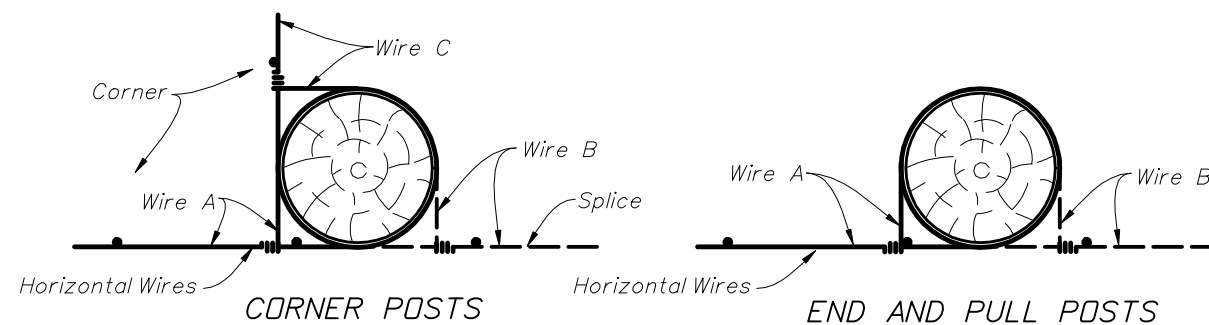
FASTENER FOR CONCRETE POST AND BRACES



FASTENER FOR TIMBER POST AND BRACE



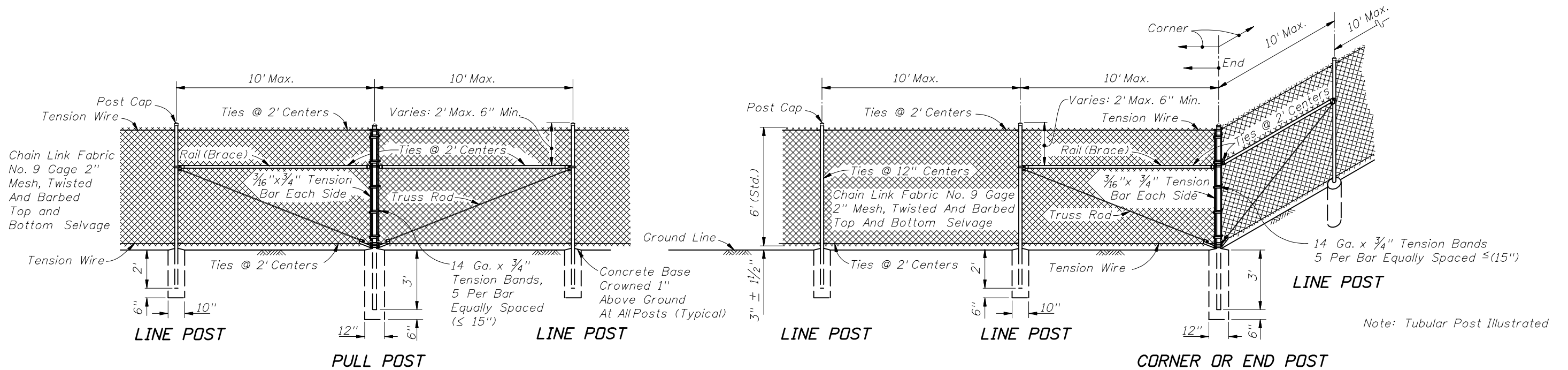
ALTERNATE CONCRETE POSTS AND BRACES



Each horizontal wire to be wrapped around corner, end and pullposts and tied to same wire. See General Notes 5 and 17. Timber post illustrated. These methods also apply to steel and concrete post illustrations.

SPLICES





GENERAL NOTES

- This fence to be used generally in urban areas.
- For supplemental information refer to Section 550 of FDOT Standard Specifications.
- Chain link fabric, post, truss rods, tension wires, tie wires, stretcher bars, gates and all miscellaneous fittings and hardware shall meet the requirements of AASHTO and ASTM signify current reference.
- Fence Component Options:
 - Line post options:
 - Galvanized steel pipe, Schedule 40- 1 1/2" nominal dia. zinc galvanized at the rate of 1.8 oz./ft²: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
 - Aluminum coated steel pipe: ASTM A53, X 2 Tables: Schedule 40- 1 1/2" nominal dia., 1.90" OD; coated at the rate 0.40 oz./ft.: AASHTO M111.
 - Aluminum alloy pipe- 2" nominal dia.: ASTM B241 or B221, Alloy 6063, T6.
 - Steel H-Beam- 1 7/8" x 1 5/8" Zinc Galv. 1.8 oz./ft.: AASHTO M111 and Detail.
 - Aluminum alloy H-Beam- 1 7/8" x 1 5/8" Detail.
 - Steel C- 1 7/8" x 1 5/8" Galv.: 1.8 oz./ft. zinc: AASHTO M111; DR, 0.9 oz./ft². zinc-5% aluminum-mischmetal: ASTM F1043 and Detail.
 - Resistance welded steel pipe; 50,000 psi min. yield strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 2" OD, 1 1/2" NPS, 1.900" dec. equiv., 0.120" min. wall thick. and min. wt. 228 lb./ft.; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15 µg/in². min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.
 - Corner, end, and pull post options:
 - Galvanized steel pipe, Schedule 40- 2" nominal dia. zinc galvanized at the rate of 1.8 oz./ft²: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
 - Aluminum coated steel pipe: ASTM A53 steel, X 2 Tables: Schedule 40; 2" nominal dia., 2.375" OD; coated at the rate 0.40 oz./ft.: AASHTO M111.
 - Aluminum alloy pipe- 2 1/2" nominal dia.: ASTM B241 or B221, Alloy 6063, T6.
 - Resistance welded steel pipe; 50,000 psi min. yield strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 2 1/2" OD, 2" NPS, 2.375" dec. equiv., 0.130" min. wall thick. and min. wt. 3.117 lb./ft.; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15 µg/in². min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.

- Rail options:
 - Galvanized steel pipe, Schedule 40- 1 1/4" nominal dia. zinc galvanized at the rate of 1.8 oz./ft²: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
 - Aluminum coated steel pipe: ASTM A53 steel, X 2 Tables Schedule 40; 1 1/4" nominal dia., 1.660" OD; coated at the rate 0.40 oz./ft.: AASHTO M111.
 - Aluminum alloy pipe- 1 1/4" nominal dia.: ASTM B241 or B221, Alloy 6063, T6.
 - Resistance welded steel pipe; 50,000 psi min. yield strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 1 5/8" OD, 1 1/4" NPS, 1.660" dec. equiv., 0.111" min. wall thick. and min. wt. 1.836 lb./ft.; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15 µg/in². min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.
- Chain link fabric options (2" mesh with twisted and barbed selvage top and bottom for all options except as described in Note No. 10):
 - AASHTO M181 Type I - Zinc Coated Steel, No. 9 gage (coated wire diameter), coated at the rate of 1.8 oz./ft². (M181 Class D 2.0 oz./ft². modified to 1.8 oz./ft².)
 - AASHTO M181 Type II - Aluminum Coated Steel, No. 9 gage (coated wire diameter), coated at the rate of 0.40 oz./ft².
 - AASHTO M181 Type IV - Polyvinyl Chloride (PVC) Coated Steel, No. 9 gage (coated core wire diameter), core wire-zinc coated steel. PVC coating: M181 Class A (either extruded or extruded and bonded) or Class B (bonded). See table right. Unless the plans call for M181 standard colors medium green, dark green or black the coating color shall be soft gray matching that of No. 36622 of Federal Standard 595a.
- Tension wire options:
 - Steel wire No. 7 gage zinc galvanized at the rate of 1.2 oz./ft²: AASHTO M181.
 - Aluminum alloy wire with a diameter of 0.1875" or larger conforming to the requirements of ASTM B211, Alloy 5056 Temper H38, or, Alclad Alloy 5056 Temper H192.
 - Aluminum coated steel wire No. 7 gage coated at the rate of 0.040 oz./ft²: AASHTO M181.
- Tie wire and hog ring operations:
 - Steel wire No. 9 gage zinc galvanized at the rate of 1.2 oz./ft².
 - Aluminum alloy wire with a diameter of 0.1443" or larger conforming to the requirements of ASTM B211, Alloy 5056 Temper H38, or, Alclad Alloy 5056 Temper H192.
 - Aluminum coated steel wire No. 7 gage coated at the rate of 0.040 oz./ft².

GENERAL NOTES CONTINUED

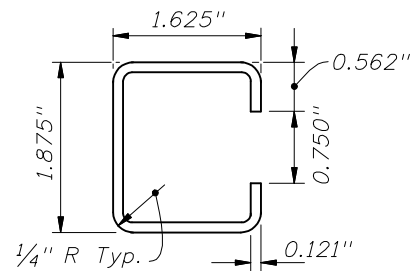
5. Unless a specific material is called for in the plans the Contractor may elect to use either a single type of material or a combination of material types from the component options listed in note 4. Combinations of optional materials are restricted as follows:
- (a) Only one fabric optional material will be permitted between corner and/or end post assemblies.
 - (b) Only one line post optional material will be permitted between corner and/or end post assemblies.
 - (c) Pull post assemblies shall be optional materials identical to either the line post optional material or the corner and end post assembly optional material; but, pull post assemblies shall be the same optional material between any set of corner and/or end post assemblies.
6. Concrete for bases shall be Class NS concrete as specified in Section 347 of the Standard Specifications or a packaged, dry material meeting the requirements of a concrete under ASTM C-387. Materials for Class NS concrete may be proportioned by volume and/or by weight.
7. Line post shall be 8'-6" long (Standard). Line post are to be set in concrete as described above or by the following methods:
- (a) In accordance with special details and/or as specifically described in the contract plans and specifications.
 - (b) In accordance with ASTM F567 Subsections 5.4 through 5.10 as approved by the Engineer. Line post installed in accordance with Section 5.8 shall be 9'-6" long.
 - (c) Post mounted on concrete structure or solid rock shall be mounted in accordance with the base plate detail "Fence Mounting On Concrete Endwalls And Retaining Wall", Sheet 3; or, by embedment in accordance with ASTM F567 Subsection 5.5.
- End, pull and corner post assemblies shall be in concrete as detailed above for all soil conditions other than solid rock. Post within assemblies that are located on concrete structures or solid rock shall be set by base plate or by embedment as prescribed under (b) above for line post.
- Line and assembly post set in concrete bases shall be set an additional 3" in depth for each 1' of fence height greater than 6'.
8. Pull post shall be used at breaks in vertical grades of 15° or more, or at approximately 350' centers except that this maximum interval may be reduced by the Engineer on curves where the curve is greater than 3°.
9. Corner post are to be installed at all horizontal breaks in fence at 15° or more and as required at vertical breaks over 15° as determined by the Engineer.
10. When fence has an installed top of fabric height less than 6' knuckled top and bottom selvages shall be used unless the plans specifically identify locations for twisted selvage fabrics.
11. Unless sliding gates or special gates are called for in the plans, all gates shall be chain link swing gates meeting the material requirements described and as approved by the Engineer. Payment shall include the gates, single or double, all necessary hardware for installation and any additional length and/or size for posts at the opening. Gates shall be paid for under the contract unit price for Fence Gates, EA.
12. For construction purposes corner post assemblies shall consist of one corner post, two braces, two truss rods, and all necessary fittings and hardware as detailed. End post assemblies shall consist of one end post, one brace, one truss rod and all necessary fittings and hardware as detailed.
13. All post, tension wires, chain link fabric, tie wires, Class NS concrete, and all miscellaneous fittings and hardware to be included in the cost for Fencing, LF.

TYPE IV VINYL COATED FABRIC								
AASHTO M181 Table 4 Redefined As Follows								
Specified Diameter Of Metallic Coated Core Wire			Minimum Weight Of Zinc Coating		PVC Thickness Range			
					M181 Class A (Extruded Or Extruded And Bonded Coating)		M181 Class B (Bonded Coating)	
in.	mm	gage	oz./ft ² .	g/m ²	in.	mm	in.	mm
0.148	3.77	9	0.30	92	0.015 to 0.025	0.38 to 0.64	0.006 to 0.010	0.15 to 0.25

DESIGN NOTE

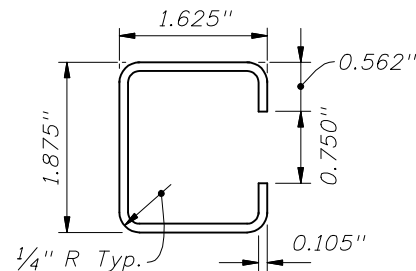
This index details fencing that is constructed with chain link fabric 6' (nominal) in height and with specific ground clearance. For fencing of different height or installation details, the fence shall be fully detailed in the Contract plans.





Galv. Wt. Per. Ft. = 2.34# ±5%
Yield PSI (Min.) 45,000

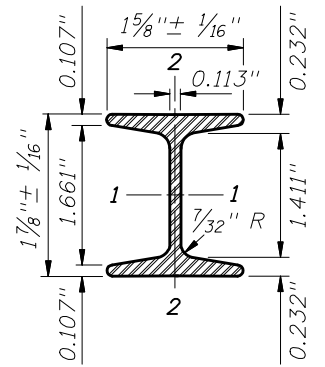
STANDARD WALL



Galv. Wt. Per. Ft. = 1.85# ±5%
Yield PSI (Min.) 45,000

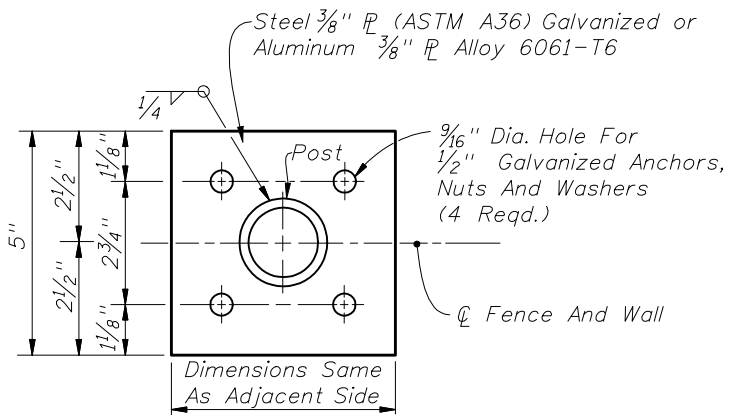
THINWALL

OPTIONAL "C" LINE POST

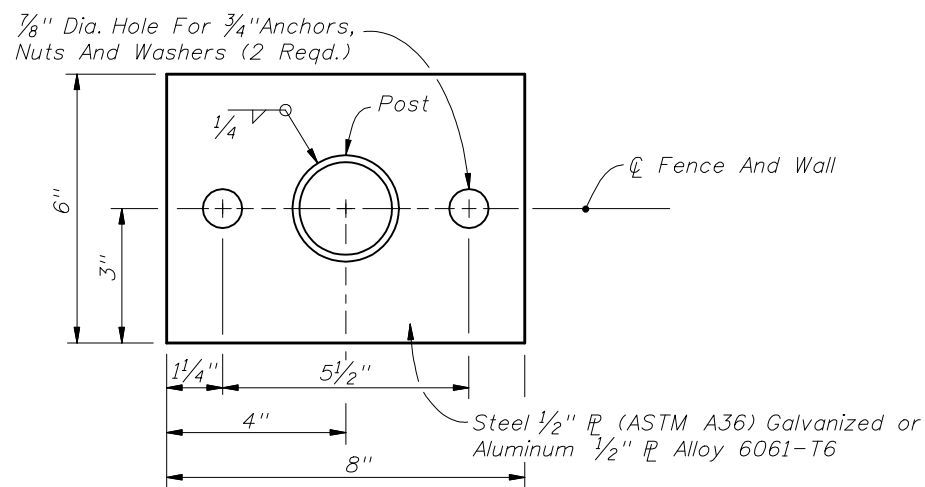


	STEEL		ALUMINUM	
Area (Sq. In.)	724		724	
Weight (Lb./Ft.)	2.72 ± 5% (Galv.)		0.91 ± 5%	
Surface Area (SF/Ft.)	0.776		0.776	
Tensile Strength (psi Min.)	80,000		30,000	
Yielding Point (psi Min.)	48,000		25,000	
	Axes		Axes	
	1-1	2-2	1-1	2-2
Moment Of Inertia	0.428	0.101	0.428	0.101
Section Modulus	0.456	0.124	0.456	0.124
Rad. Of Gyration	0.779	0.373	0.779	0.373

OPTIONAL 1 7/8" x 1 5/8" H-BEAM LINE POST

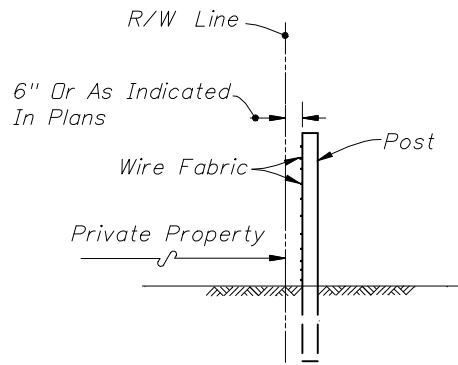


TOP VIEW
FOUR ANCHOR PLATE OPTION



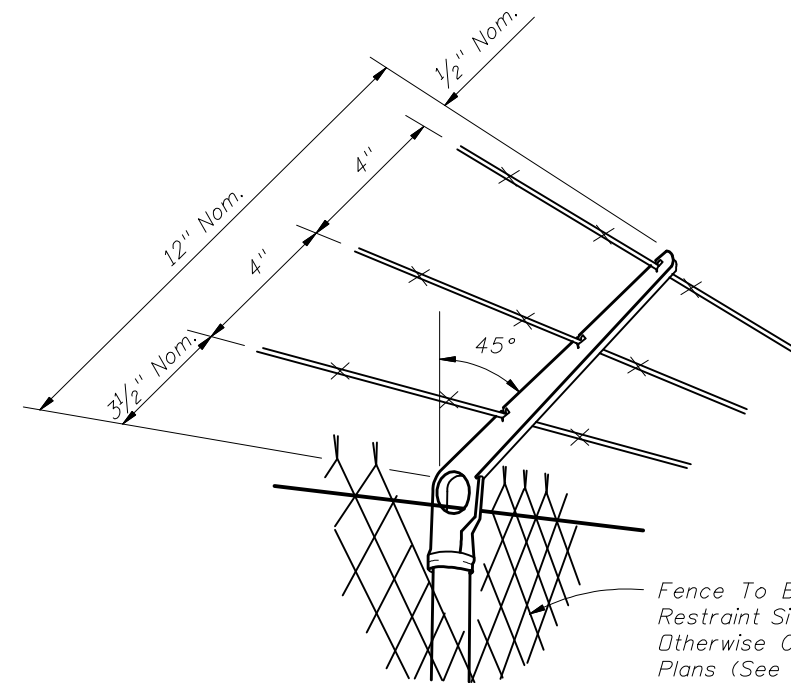
TOP VIEW
TWO ANCHOR PLATE OPTION

FENCE MOUNTING ON CONCRETE ENDWALL AND RETAINING WALLS



FENCE POSITION AT LOCATIONS WITHOUT FRONTAGE ROADS

(REFER TO DETAIL PLANS FOR FENCE POSITION AT LOCATIONS WITH FRONTAGE ROADS)



Fence To Be Mounted On Restraint Side Unless Otherwise Called For In Plans (See Notes)

NOTES

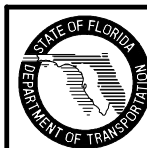
- Attachments to be used only when called for in the plans. Attachments to extend in direction of restraint. Unless otherwise called for in plans, direction of restraint will be as follows:
- Outward on limited access right of way line.
 - Outward on controlled access right of way line.
 - Outward from utilities and hazardous facilities located within highway right of way.
 - Outward from lateral ditches, outfalls, retention basins, canals, borrow areas and similar support facilities.
 - Inward on pedestrian ways.
- The cap-arm shall be designed to provide a drive fit over the top of posts and to exclude moisture in posts with tubular sections.

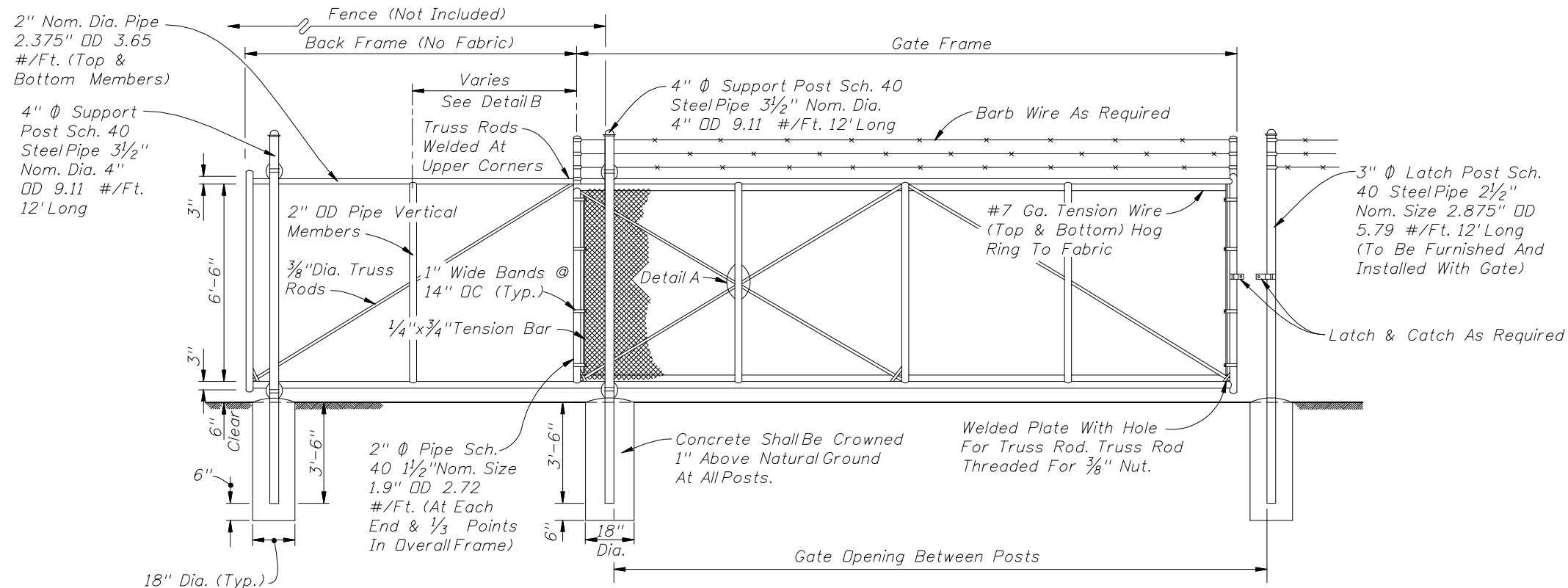
BARB WIRE ATTACHMENT

BASE PLATE AND ANCHOR NOTES:

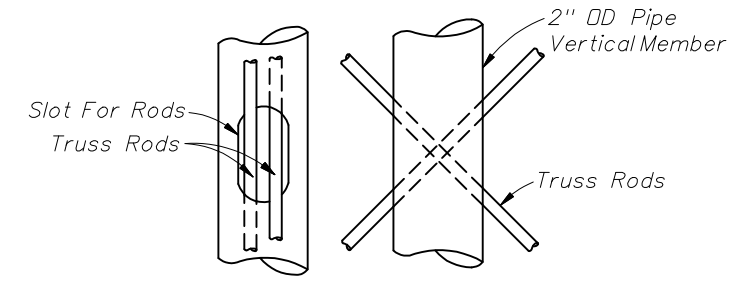
- Base plate identical for line, pull, end and corner posts and shall be considered an integral part of the respective posts for basis of payment.
- Post to be plumbed by grout shim under base plate.
- Anchors (Galvanized Steel):
 - 12" Cast In Place, 10 1/2" Embedment: Headed Bolts, U-Bolts or Cluster Plates.
 - 8" Adhesive Anchors, 6" Min. Embedment. *

* Adhesive anchors shall be headless anchor bolts set in drilled holes with an Adhesive Material System in accordance with Specification Sections 416 and 937; drilled holes shall be 1/8" larger in diameter than the anchor bolt. Expansion Bolts Not Permitted.





FRONT ELEVATION



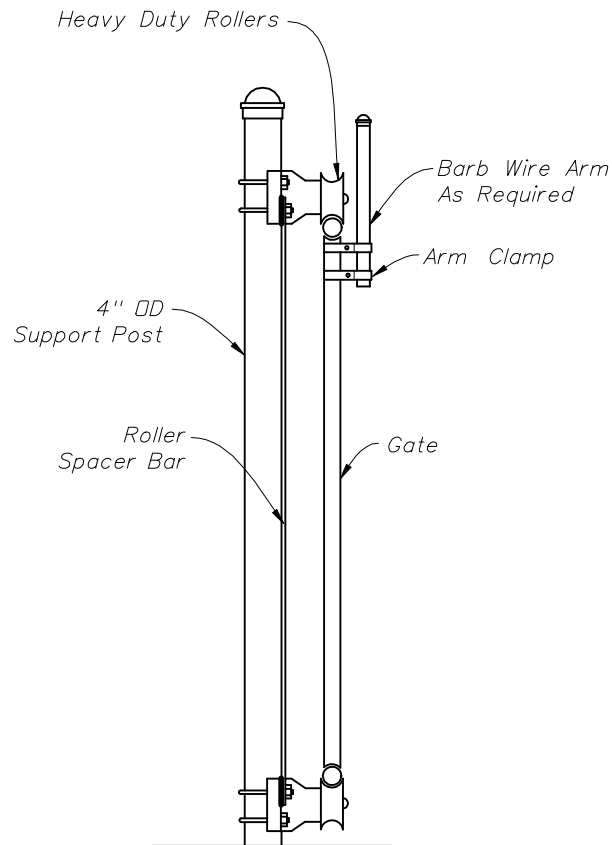
DETAIL A

GENERAL NOTES

- When approved by the Engineer the Contractor may substitute any cantilever slide gate from the fencing systems on the Qualified Products List.

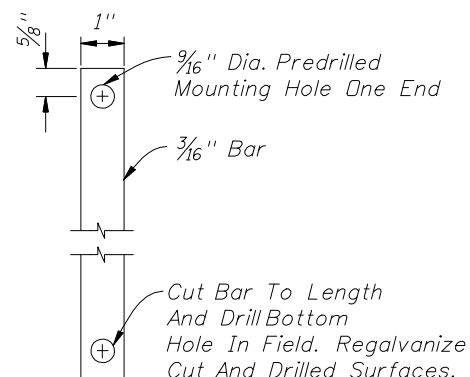
Extruded, rolled or formed components that provide equal strength and stability may be used in lieu of the pipe components shown; and, internal rollers may be used in lieu of the external roller units shown.

Gate components shall meet or exceed the protective coatings specified on Index No. 802.
- Steel gate frame shall be fabricated prior to galvanizing, except that truss rods may be fabricated following frame galvanizing provided surfaces damaged during welding are galvanized in accordance with Section 24 of AASHTO M36; or, fabricated from pipe components with protective coating meeting the requirements of Index No. 802 that are tolerant of welding (low burn back), and a protective coating applied to the weld and damaged pipe surfaces that is equivalent to the protective coating of the fabricated pipe stock.
- All fabric shall be knuckled top and bottom selvages.
- Concrete for bases shall be either Class NS concrete as specified in Section 347 of the Standard Specifications or a packaged, dry material meeting the requirements of a concrete under ASTM C-387. Materials for Class NS concrete may be proportioned by volume and/or by weight.
- Cost of all gate components shall be included in the contract unit price for Sliding Fence Gate (Cantilever), EA.

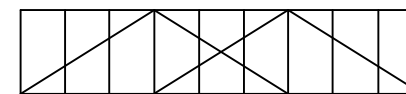


SUPPORT POST DETAIL

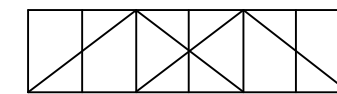
GATE OPENING	GATE FRAME	BACK FRAME
12'	12'-3"	6'
16'	16'-3"	8'
20'	20'-3"	10'
24'	24'-3"	12'



ROLLER SPACER BAR

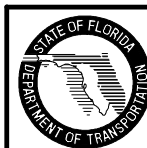


TYPICAL FRAME - 24' Opening



TYPICAL FRAME - 12', 16' & 20' Opening

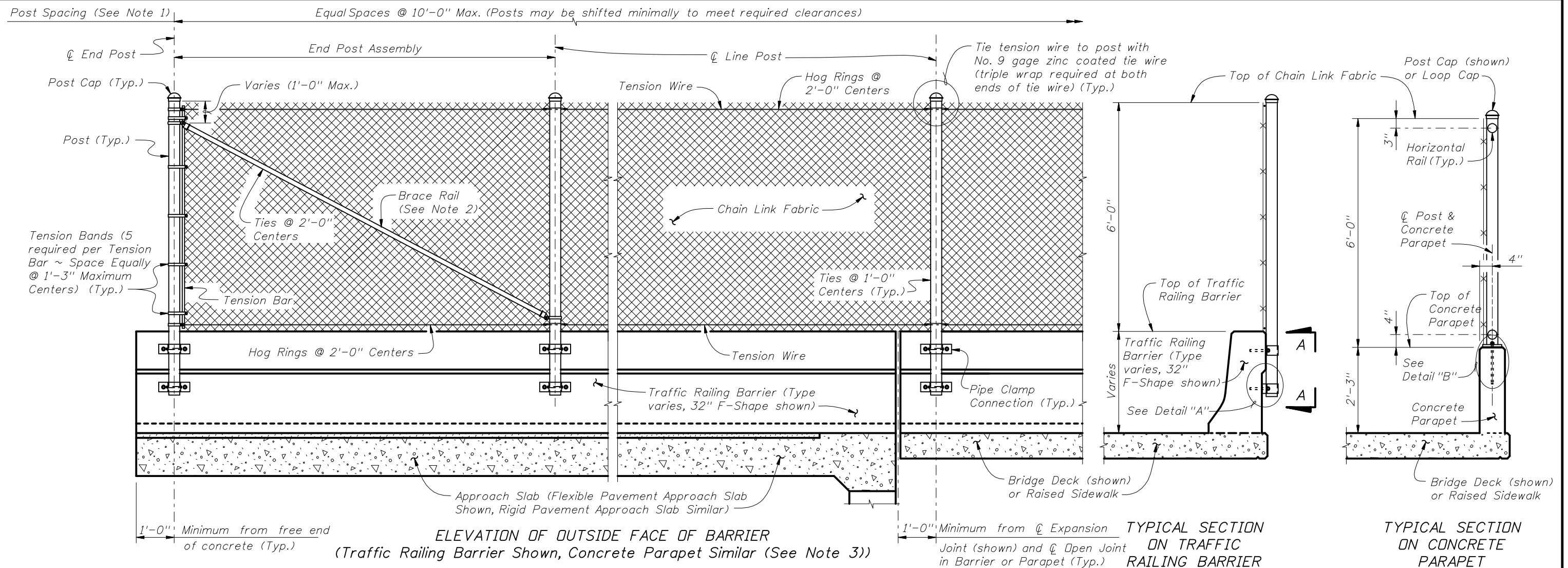
DETAIL B



2010 FDOT Design Standards

**CANTILEVERED SLIDE GATE
TYPE B FENCE**

Last Revision	Sheet No.
07/01/05	1 of 1
Index No.	
803	



NOTES:

1. A Pull Post Assembly is required at maximum intervals of 500'-0". See Sheet Nos. 3 of 4 or 4 of 4.
2. Brace rails are only required for vertical fence installations on Traffic Railing Barriers.
3. Provide horizontal rails for vertical fence installations on Concrete Parapets in lieu of tension wire. Locate horizontal rails as shown in the Typical Section for Concrete Parapets at right.

FENCING NOTES

FENCE INSTALLATION:

Install posts plumb (within a tolerance of $\pm 1\frac{1}{2}$ "). Use shim plates as required to achieve plumb. The required quantity and thickness of shim plates will be determined in the field. Install chain link fence in accordance with ASTM F 567 as applicable.

TRAFFIC RAILING BARRIER DETAILS:

See Superstructure Sheets for Traffic Railing Barrier details.

CONCRETE PARAPET DETAILS:

See Index No. 820 - Pedestrian/Bicycle Railing for Concrete Parapet details. Provide fencing in lieu of aluminum bullet railing as shown on Index No. 820.

LIMITS OF FENCING:

Limits of fencing are from begin of approach slab at Begin Bridge to end of approach slab at End Bridge, unless otherwise shown in the plans.

PAYMENT:

Payment will be made under Fencing, Type R. Payment includes posts, horizontal and expansion rails, brace rails and bands, rail ends, combination rail ends, boulevard clamps, chain link fabric, tension wire, ties, hog rings, tension bars and bands, post and loop caps, pipe clamps, base plates, anchor rods, bolts, nuts, washers, shim plates, spacers, neoprene pads, miscellaneous fence fittings and hardware and all incidental materials and labor required to complete installation of the fence.

CROSS REFERENCE:

For Table of Fence Components, Table of Post Attachment Components, View A-A and Detail "A" see Sheet No. 2 of 4.
For Pull Post Assembly Detail for Traffic Railing Barriers see Sheet No. 3 of 4.
For Pull Post Assembly Detail for Concrete Parapets and Detail "B" see Sheet No. 4 of 4.



2010 FDOT Design Standards

BRIDGE FENCING (VERTICAL)

Last Revision	Sheet No.
01/01/06	1 of 4
Index No.	
810	

TABLE OF CHAIN LINK FENCE COMPONENTS

COMPONENT		ASTM DESIGNATION	COMPONENT INFORMATION
Traffic Railing Barriers and Concrete Parapets	Posts	F 1083	Galvanized Steel Pipe - 3" NPS, Schedule 40 (3.500" Outside Diameter, 0.216" Wall Thickness)
	Chain Link Fabric (2" mesh with twisted top and knuckled 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) ~ Specify the color of the polymer coating in the General Notes
	Tie Wires	F 626	Zinc Coated Steel Wire - No. 9 gage
	Brace Bands	F 626	No. 12 Gage (min. thickness) x 3/4" (min. width) Steel Bands (Beveled or Heavy)
	Tension Bars	F 626	3/16" (min. thickness) x 3/4" (min. width) x 5'-10" (min. height) Steel Bars
	Tension Bands	F 626	No. 14 Gage (min. thickness) x 3/4" (min. width) Steel Bands
Miscellaneous Fence Components	F 626	Zinc Coated Steel ~ (includes post or loop caps, horizontal and brace rail ends, combination rail ends, boulevard clamps and all other miscellaneous fittings & hardware)	
Concrete Parapets	Horizontal Rails	F 1083	Galvanized Steel Pipe - 2 1/2" NPS, Schedule 40 (2.875" Outside Diameter, 0.203" Wall Thickness)
	Expansion Rails	F 1083	Galvanized Steel Pipe - 2" NPS, Schedule 40 (2.375" Outside Diameter, 0.154" Wall Thickness)
	Bolts	A 307	1/4" Ø x 4 1/4" Hex Head Bolts for Expansion Rail Connections
	Nuts	A 563	Hex Nuts for Expansion Rail Connections
	Washers	F 436	Flat Washers for Expansion Rail Connections
Traffic Railing Barriers	Tension Wire	A 824 & A 817	Type II (Zinc Coated Steel Wire) - No. 7 gage, Class 4 Coating Type I (Aluminum Coated Steel Wire) - No. 7 gage
		F 626	Zinc Coated Steel Wire - No. 12 gage
	Brace Rails	F 1083	Galvanized Steel Pipe - 1 1/4" NPS, Schedule 40 (1.660" Outside Diameter, 0.140" Wall Thickness)

LEGEND: NPS = Nominal Pipe Size

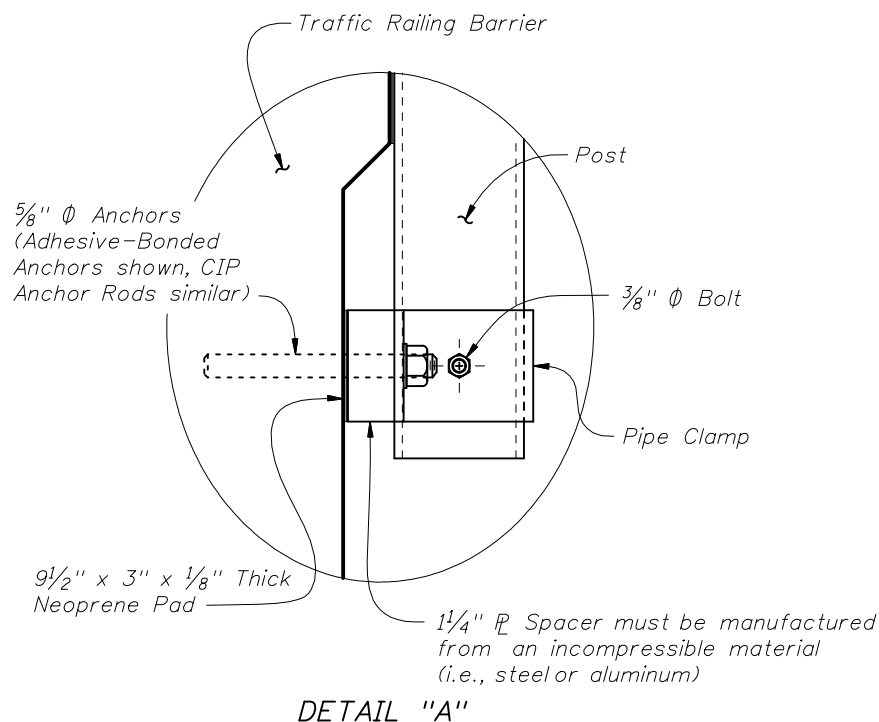
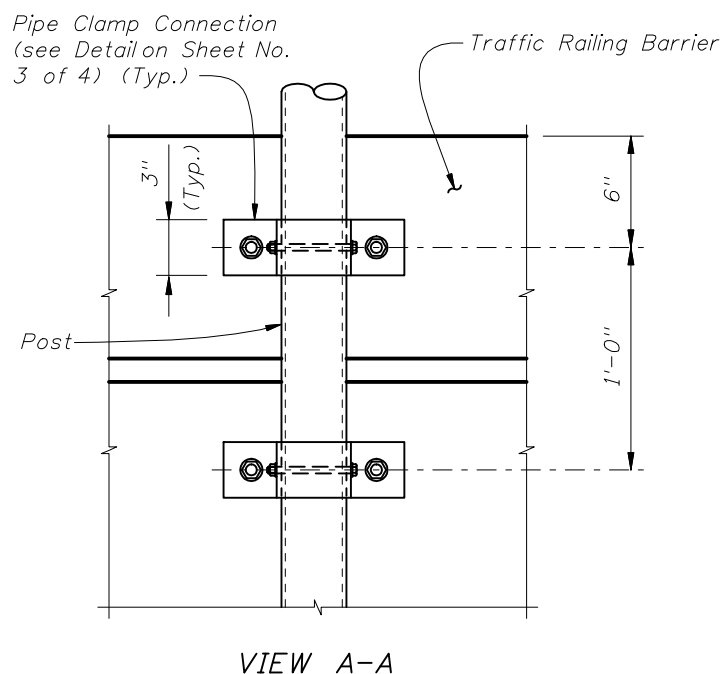


TABLE OF POST ATTACHMENT COMPONENTS

COMPONENT		ASTM DESIGNATION	COMPONENT INFORMATION
Pipe Clamps		A 36 or A 709 Grade 36	1/4" Steel P
Base Plates		A 36 or A 709 Grade 36	3/4" Steel P
Shim Plates		A 36 or A 709 Grade 36 or B 209 Alloy 6061-T6 or B 221 Alloy 6063-T5	Plate thicknesses as required; Holes in shim plates will be 3/4" Ø
Spacers		-	1 1/4" P for all materials
Pipe Clamp Connection	Adhesive Anchor Rods	F 1554 Grade 36	Fully threaded Headless Anchor Rods ~ 5/8" Ø x 6" (no spacer) or 5/8" Ø x 7 1/4" (with spacer)
	CIP Anchor Rods	F 1554 Grade 36	Hex Head Anchor Rods ~ 5/8" Ø x 6" (no spacer) or 5/8" Ø x 7 1/4" (with spacer)
Base Plate Connection	Adhesive Anchor Rods	F 1554 Grade 36	Fully threaded Headless Anchor Rods ~ 7/8" Ø x 14 1/2"
	CIP Anchor Rods	F 1554 Grade 36	Hex Head Anchor Rods ~ 7/8" Ø x 14 1/2"
Bolts		A 307	3/8" Ø x 4 3/4" Hex Head Bolts for Pipe Clamp Connections to Posts
Nuts		A 563	Hex Nuts for Pipe Clamp and Base Plate Connections
Washers		F 436	Flat Washers for Pipe Clamp and Base Plate Connections
Neoprene Pads		-	In accordance with Specification Section 932

POST ATTACHMENT NOTES

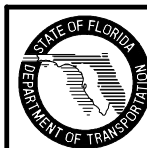
ANCHOR RODS, NUTS AND WASHERS:
After the nuts have been tightened, distort the Anchor Rod threads to prevent removal of the nuts. Coat distorted threads and exposed trimmed ends of anchors with a galvanizing compound in accordance with Specification Section 975.

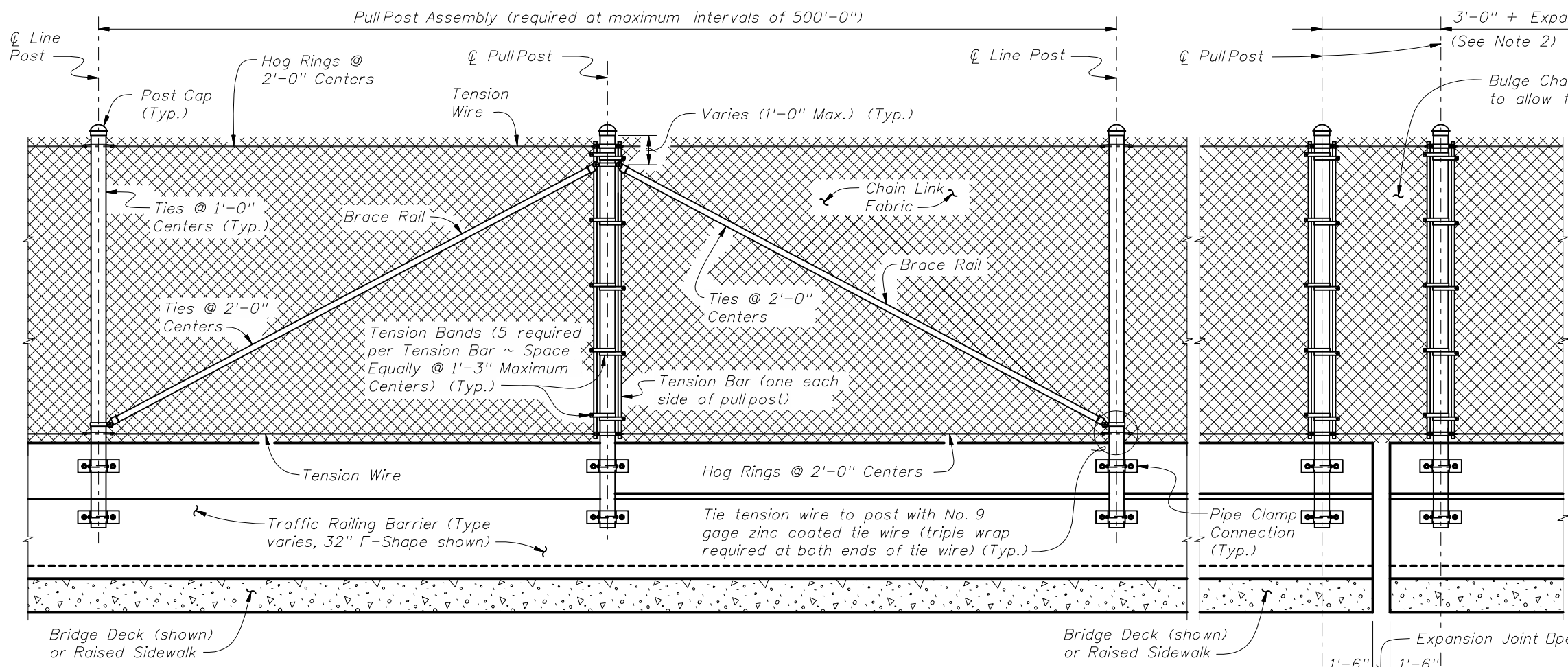
COATINGS:
Hot-dip galvanize all Nuts, Washers, Bolts, CIP Anchor Rods, Adhesive Anchors and Fence Framework (Posts, Internal Sleeves, Shim Plates, Base Plates, Pipe Clamps and Spacers) in accordance with Specification Section 962. Hot-dip galvanize Fence Framework after fabrication.

ADHESIVE-BONDED ANCHORS AND DOWELS:
Adhesive Bonding Material Systems for Anchors and Dowels will comply with Specification Section 937 and be installed in accordance with Specification Section 416. Cutting of reinforcing steel is permitted for drilled hole installation.

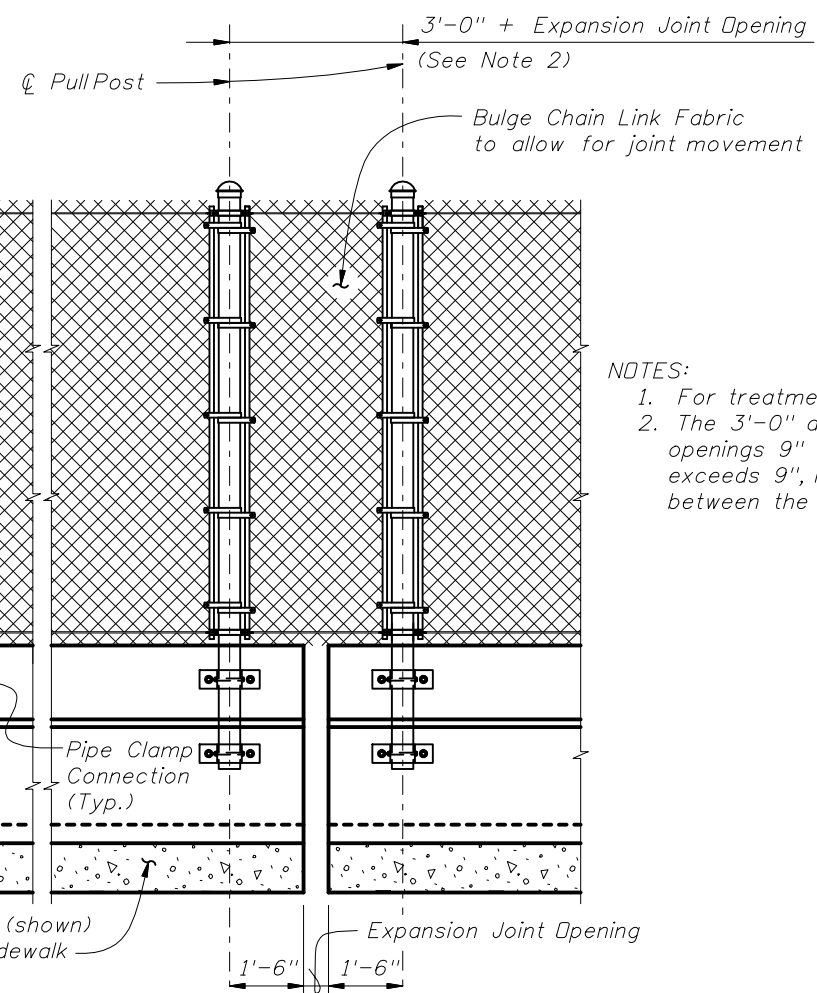
WELDING:
All welding will be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal will be E60XX or E70XX. Nondestructive testing of welds is not required.

CROSS REFERENCE:
For location of View A-A and Detail "A" see Sheet No. 1 of 4.





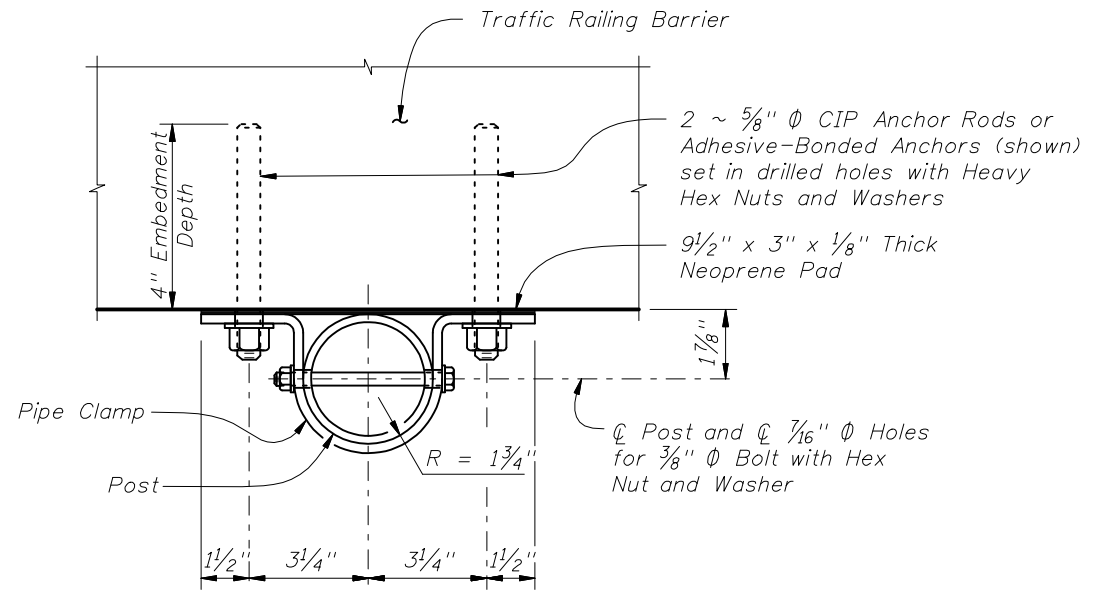
PULL POST ASSEMBLY DETAIL FOR TRAFFIC RAILING BARRIERS



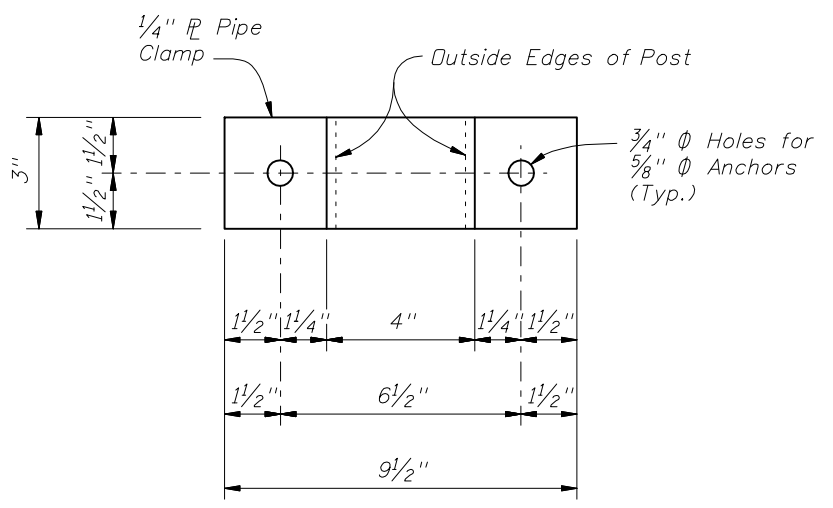
EXPANSION ASSEMBLY DETAIL

(Required only at expansion joint locations where total movement exceeds 6")

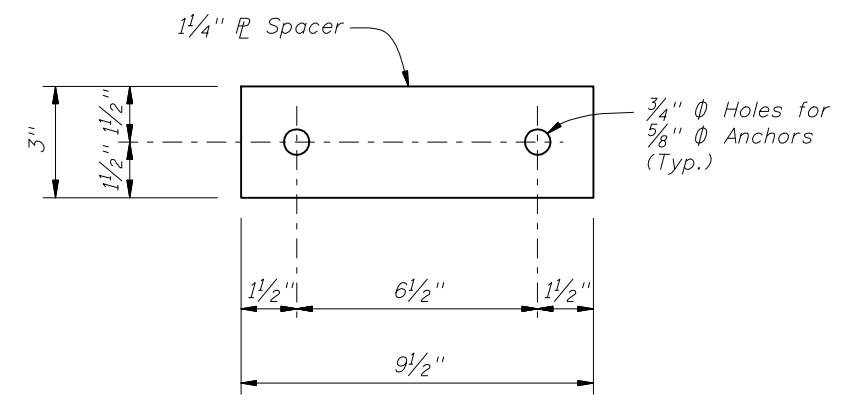
- NOTES:
1. For treatment at bridge ends, see Sheet No. 1 of 4.
 2. The 3'-0" dimension shown is for expansion joint openings 9" or less. If the expansion joint opening exceeds 9", increase this dimension by the difference between the expansion joint opening and 9".



PIPE CLAMP CONNECTION DETAIL
(Connection without spacer shown, Connection with spacer similar)



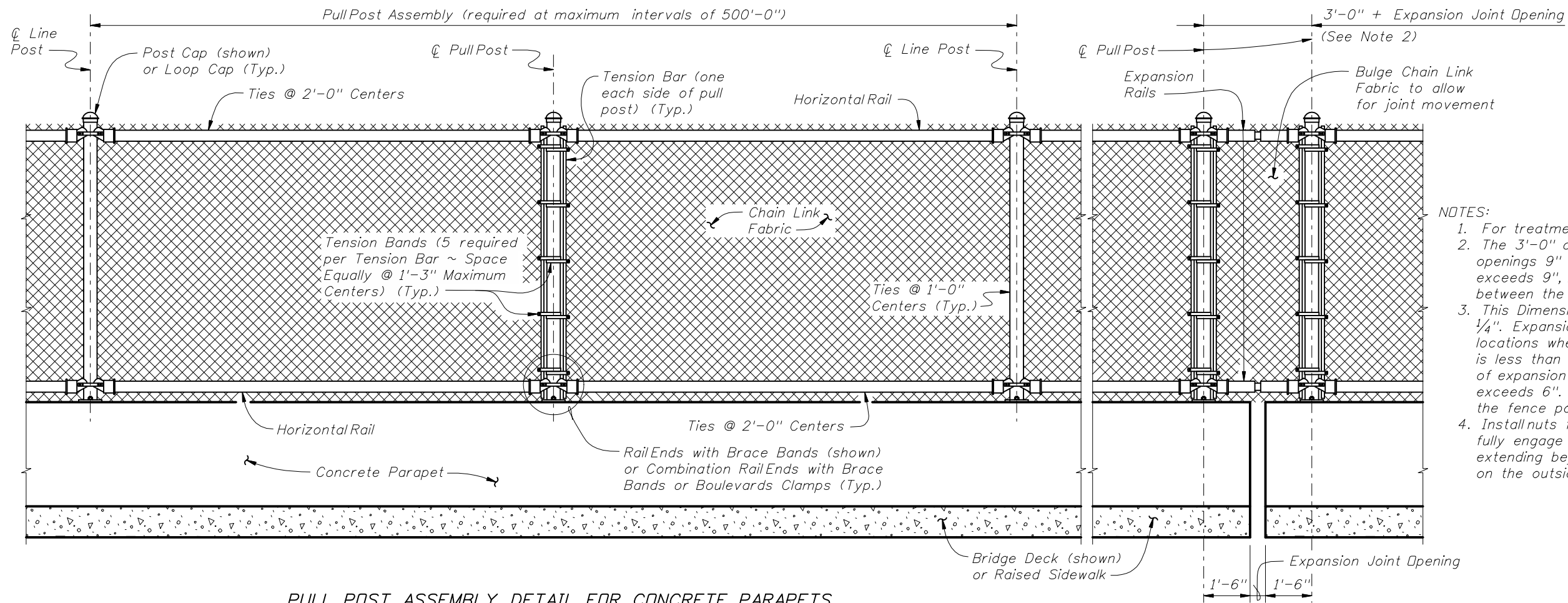
PIPE CLAMP DETAIL



SPACER DETAIL

(Must be manufactured from an incompressible material (i.e., steel or aluminum))





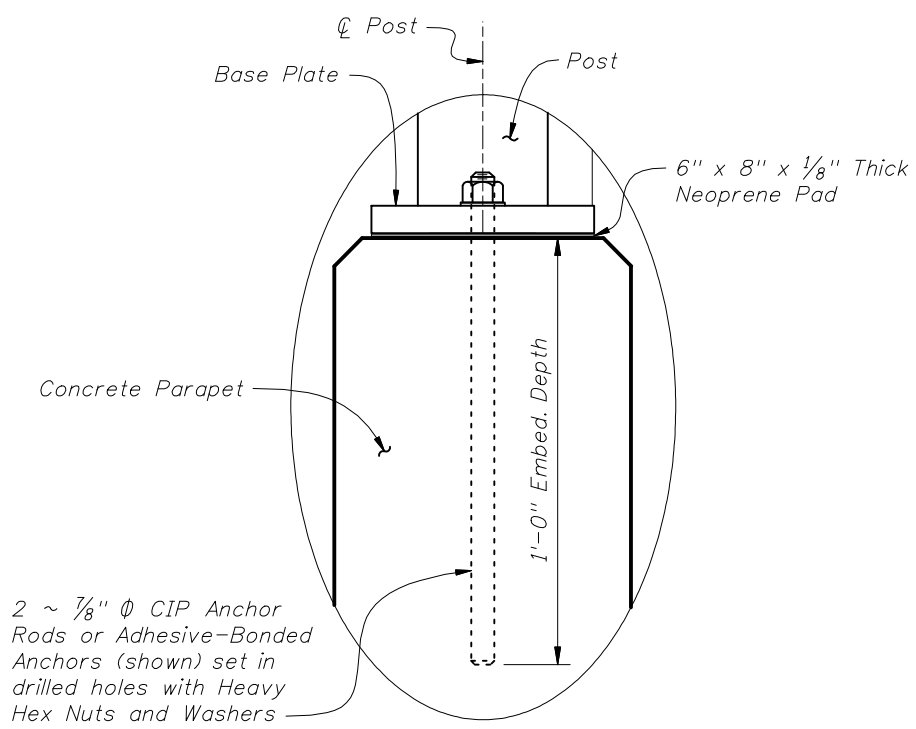
- NOTES:
1. For treatment at bridge ends, see Sheet No. 1 of 4.
 2. The 3'-0" dimension shown is for expansion joint openings 9" or less. If the expansion joint opening exceeds 9", increase this dimension by the difference between the expansion joint opening and 9".
 3. This Dimension is the expansion joint opening plus $\frac{1}{4}$ ". Expansion rails are required at expansion joint locations where the total movement exceeds 1", but is less than or equal to 6". Expansion rails are part of expansion assemblies when the total movement exceeds 6". Install expansion rails midway between the fence posts spanning the expansion joint.
 4. Install nuts for expansion rails finger-tight. Nuts will fully engage bolts with a minimum of one bolt thread extending beyond the nuts. Distort the first thread on the outside of the nut to prevent loosening.

PULL POST ASSEMBLY DETAIL FOR CONCRETE PARAPETS

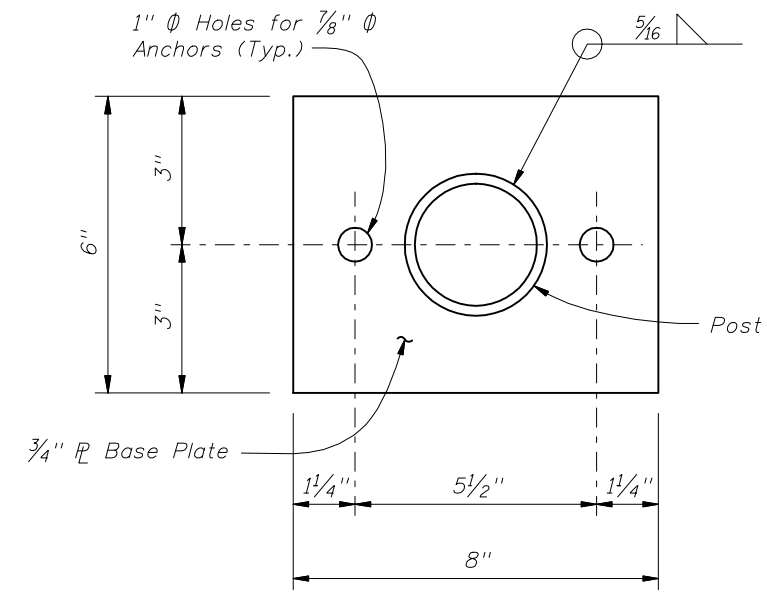
EXPANSION ASSEMBLY DETAIL

(Required only at expansion joint locations where total movement exceeds 6")

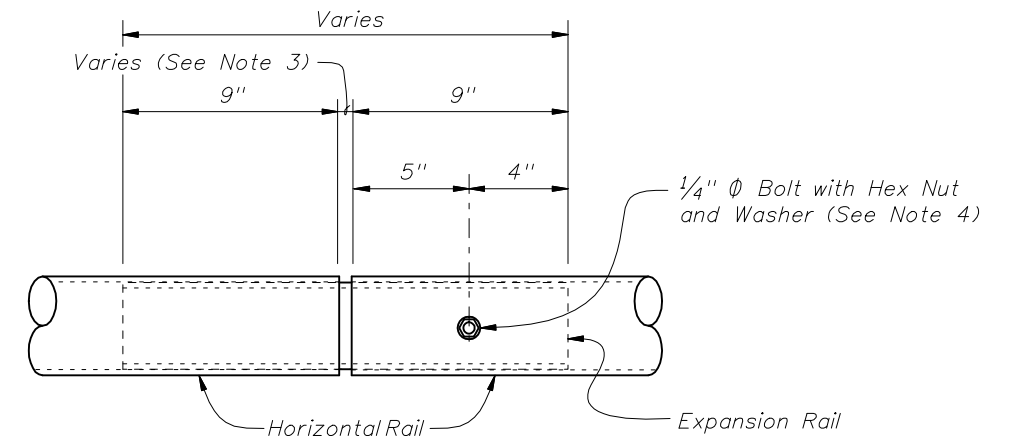
CROSS REFERENCE:
For location of Detail "B" see Sheet No. 1 of 4.



DETAIL "B"

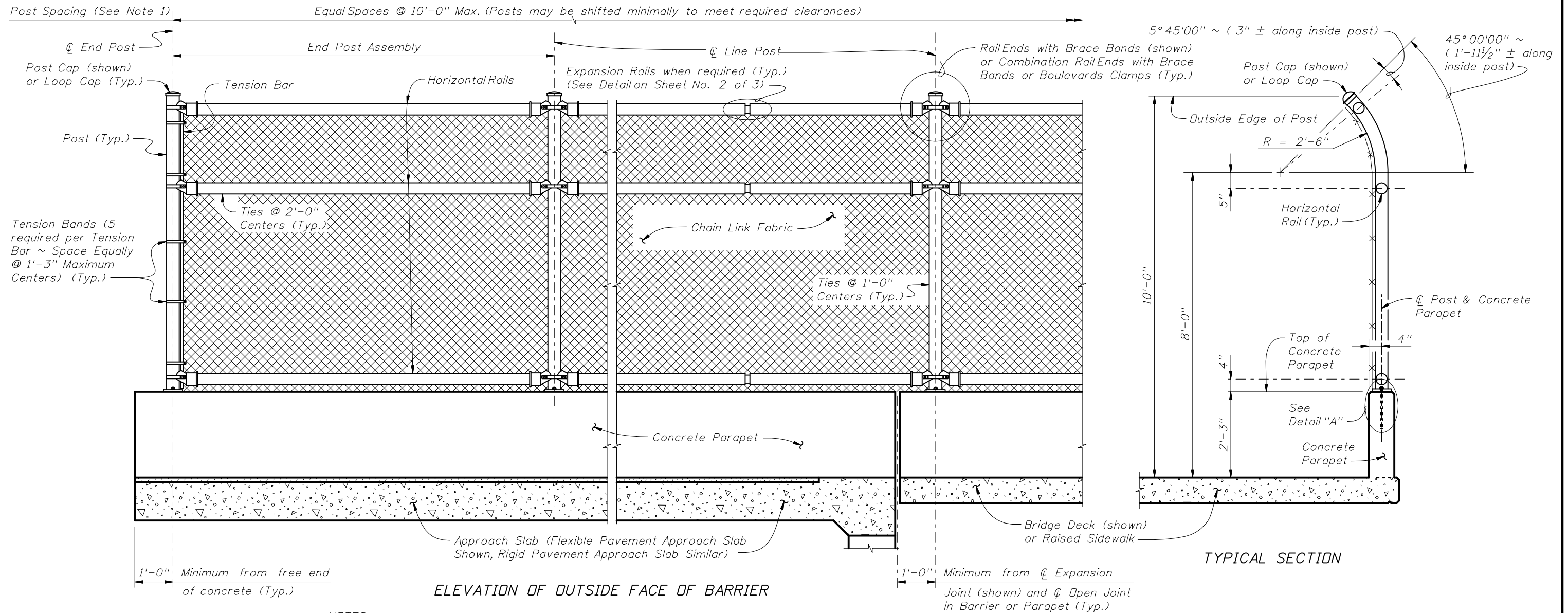


BASE PLATE DETAIL



EXPANSION RAIL DETAIL





NOTES:

1. A Pull Post Assembly is required at maximum intervals of 500'-0". See Sheet No. 2 of 3.

FENCING NOTES

FENCE APPLICATION:

This bridge fence can only be used on sidewalk installations separated from traffic by a traffic railing barrier.

FENCE INSTALLATION:

Install posts plumb (within a tolerance of $\pm 1/2"$). Use shim plates as required to achieve plumb. The required quantity and thickness of shim plates will be determined in the field. Install chain link fence in accordance with ASTM F 567 as applicable.

CONCRETE PARAPET DETAILS:

See Index No. 820 - Pedestrian/Bicycle Railing for Concrete Parapet details. Provide fencing in lieu of aluminum bullet railing as shown in Index No. 820.

LIMITS OF FENCING:

Limits of fencing are from begin of approach slab at Begin Bridge to end of approach slab at End Bridge, unless otherwise shown in the plans.

PAYMENT:

Payment will be made under Fencing, Type R. Payment includes posts, horizontal and expansion rails, brace bands, rail ends, combination rail ends, boulevard clamps, chain link fabric, ties, tension bars and bands, post and loop caps, base plates, anchor rods, bolts, nuts, washers, shim plates, neoprene pads, miscellaneous fence fittings and hardware and all incidental materials and labor required to complete installation of the fence.

CROSS REFERENCE:

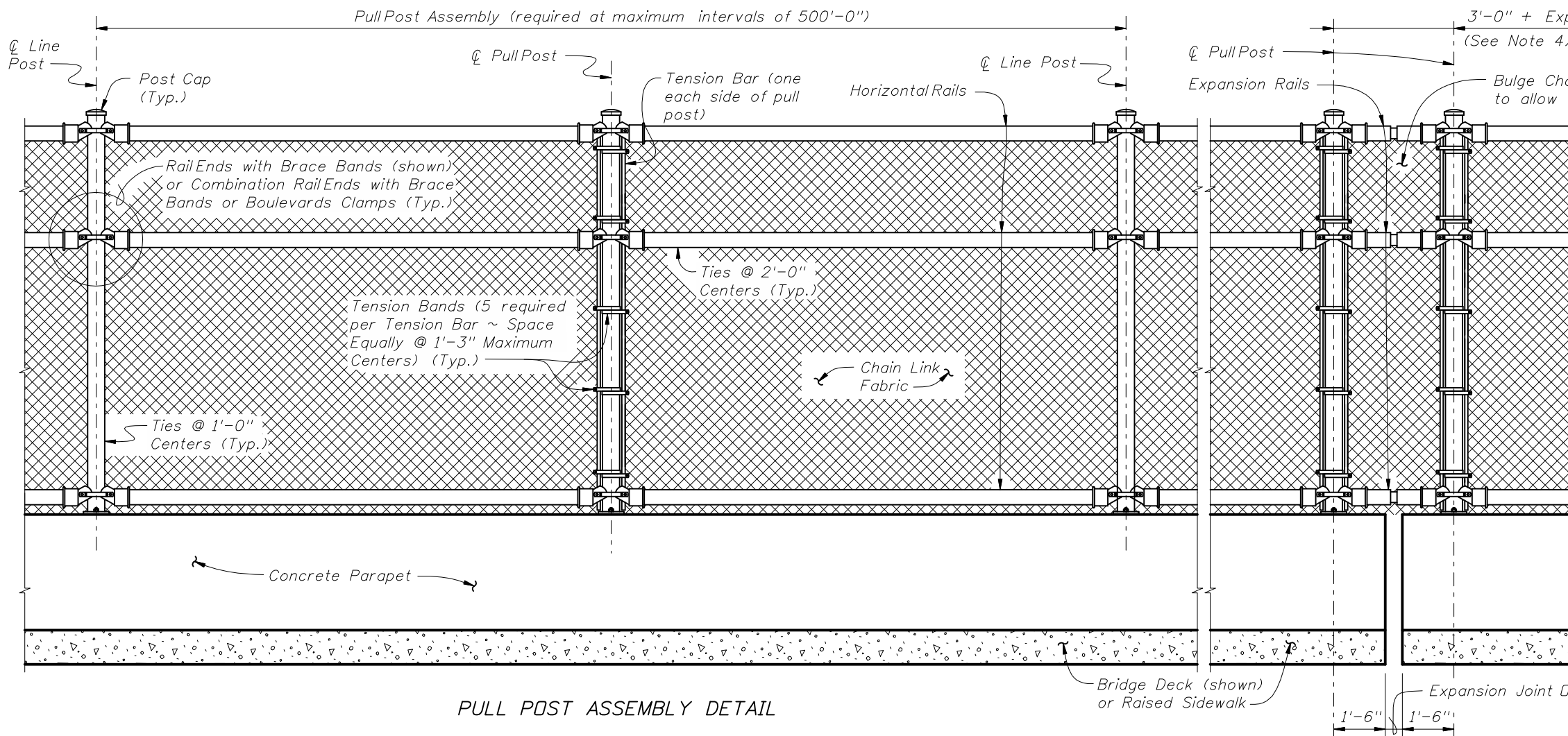
For Table of Fence Components and Pull Post Assembly Detail see Sheet No. 2 of 3.
For Table of Post Attachment Components and Detail "A" see Sheet No. 3 of 3.



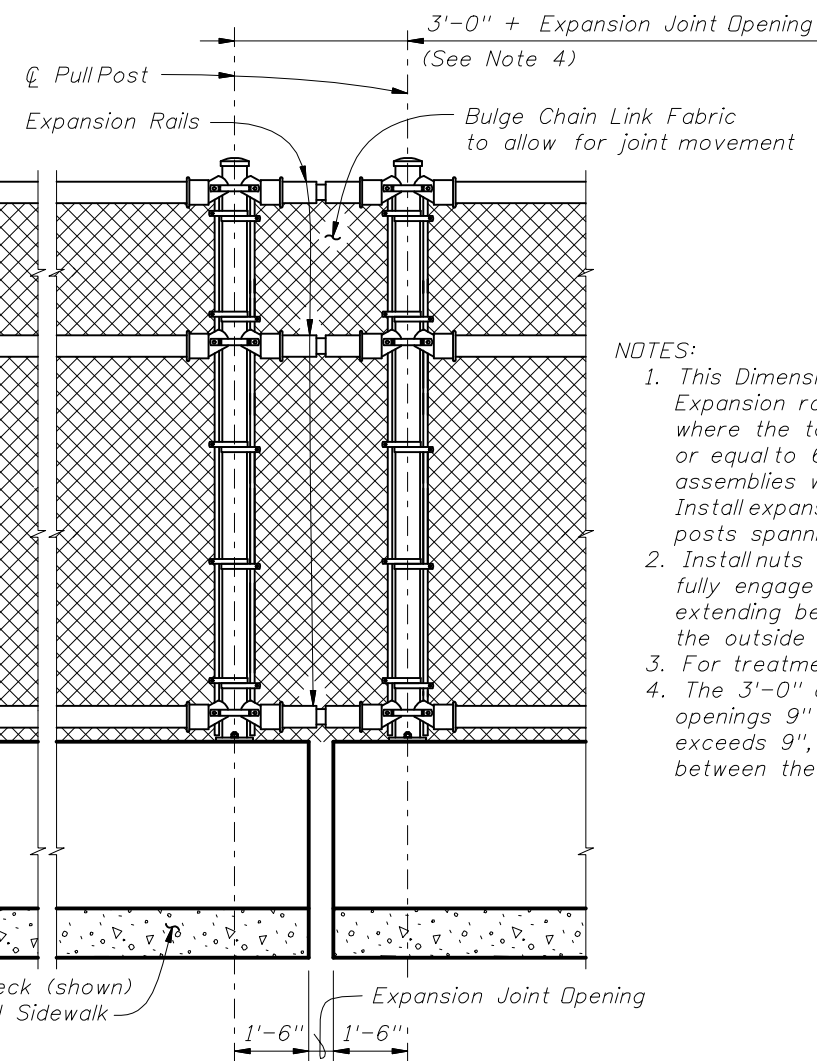
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BRIDGE FENCING (CURVED TOP)

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PULL POST ASSEMBLY DETAIL



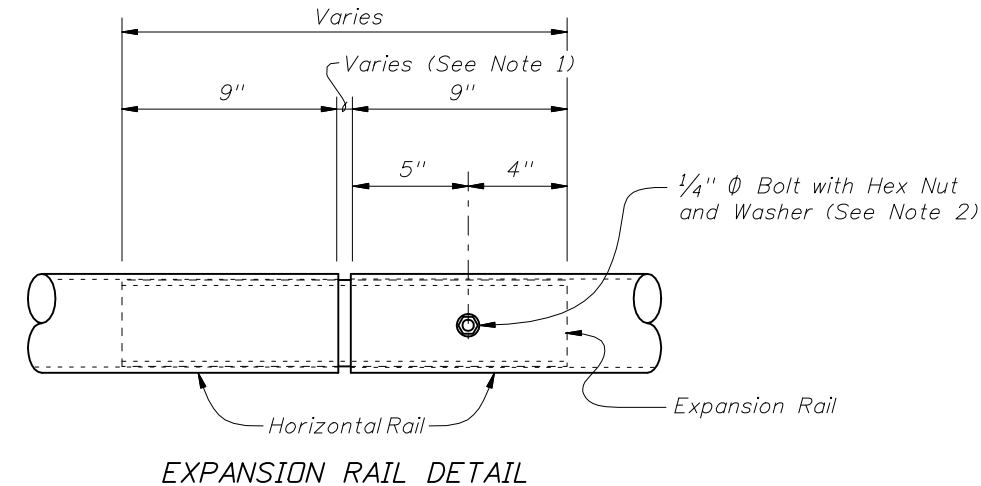
EXPANSION ASSEMBLY DETAIL

(Required only at expansion joint locations where total movement exceeds 6")

- NOTES:
1. This Dimension is the expansion joint opening plus 1/4". Expansion rails are required at expansion joint locations where the total movement exceeds 1", but is less than or equal to 6". Expansion rails are part of expansion assemblies when the total movement exceeds 6". Install expansion rails midway between the fence posts spanning the expansion joint.
 2. Install nuts for expansion rails finger-tight. Nuts will fully engage bolts with a minimum of one bolt thread extending beyond the nuts. Distort the first thread on the outside of the nut to prevent loosening.
 3. For treatment at bridge ends, see Sheet No. 1 of 3.
 4. The 3'-0" dimension shown is for expansion joint openings 9" or less. If the expansion joint opening exceeds 9", increase this dimension by the difference between the expansion joint opening and 9".

TABLE OF CHAIN LINK FENCE COMPONENTS		
COMPONENT	ASTM DESIGNATION	COMPONENT INFORMATION
Posts	F 1083	Galvanized Steel Pipe - 3 1/2" NPS, Schedule 40 (4.000" Outside Diameter, 0.226" Wall Thickness)
Horizontal Rails	F 1083	Galvanized Steel Pipe - 3" NPS, Schedule 40 (3.500" Outside Diameter, 0.216" Wall Thickness)
Expansion Rails	F 1083	Galvanized Steel Pipe - 2 1/2" NPS, Schedule 40 (2.875" Outside Diameter, 0.203" Wall Thickness)
Bolts	A 307	1/4" Ø x 4 1/4" Hex Head Bolts for Expansion Rail Connections
Nuts	A 563	Hex Nuts for Expansion Rail Connections
Washers	F 436	Flat Washers for Expansion Rail Connections
Chain Link Fabric (2" mesh with twisted top and knuckled 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) ~ Specify the color of the polymer coating in the General Notes
Tie Wires	F 626	Zinc Coated Steel Wire - No. 9 gage
Brace Bands	F 626	No. 12 Gage (min. thickness) x 3/4" (min. width) Steel Bands (Beveled or Heavy)
Tension Bars	F 626	3/16" (min. thickness) x 3/4" (min. width) x Variable Height Steel Bars ~ Height = Post Length along inside Post - 2" max.
Tension Bands	F 626	No. 14 Gage (min. thickness) x 3/4" (width) Steel Bands
Miscellaneous Fence Components	F 626	Zinc Coated Steel ~ (includes post or loop caps, horizontal and brace rail ends, combination rail ends, boulevard clamps and all other miscellaneous fittings and hardware)

LEGEND: NPS = Nominal Pipe Size



EXPANSION RAIL DETAIL



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TABLE OF POST ATTACHMENT COMPONENTS		
COMPONENT	ASTM DESIGNATION	COMPONENT INFORMATION
Base Plates	A 36 or A 709 Grade 36	$\frac{3}{4}$ " Steel \mathcal{P}
Shim Plates	A 36 or A 709 Grade 36 or B 209 Alloy 6061-T6 or B 221 Alloy 6063-T5	Plate thicknesses as required, Holes in shim plates will be $\frac{3}{4}$ " Φ
Adhesive Anchor Rods	F 1554 Grade 36	Fully threaded Headless Anchor Rods $\sim \frac{7}{8}$ " Φ x $14\frac{1}{2}$ "
CIP Anchor Rods	F 1554 Grade 36	Hex Head Anchor Rods $\sim \frac{7}{8}$ " Φ x $14\frac{1}{2}$ "
Nuts	A 563	Hex Nuts for Base Plate Connections
Washers	F 436	Flat Washers for Base Plate Connections
Neoprene Pads	-	In accordance with Specification Section 932

POST ATTACHMENT NOTES

ANCHOR RODS, NUTS AND WASHERS:

After the nuts have been tightened, distort the Anchor Rod threads to prevent removal of the nuts. Coat distorted threads and exposed trimmed ends of anchors with a galvanizing compound in accordance with Specification Section 975.

COATINGS:

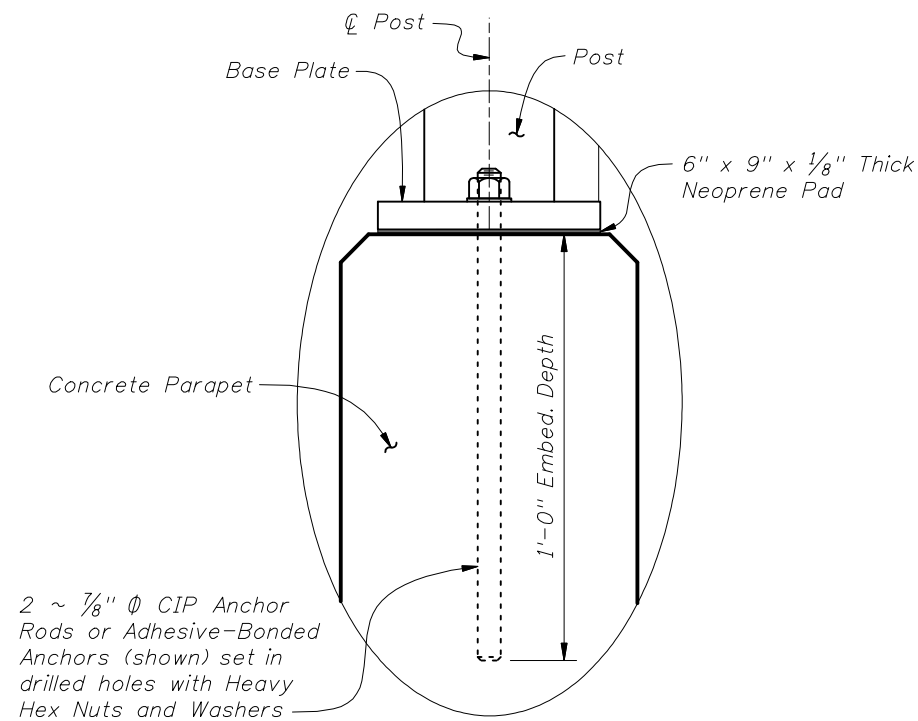
Hot-dip galvanize all Nuts, Washers, Bolts, CIP Anchor Rods, Adhesive Anchors and Fence Framework (Posts, Internal Sleeves, Shim Plates and Base Plates) in accordance with Specification Section 962. Hot-dip galvanize Fence Framework after fabrication.

ADHESIVE-BONDED ANCHORS AND DOWELS:

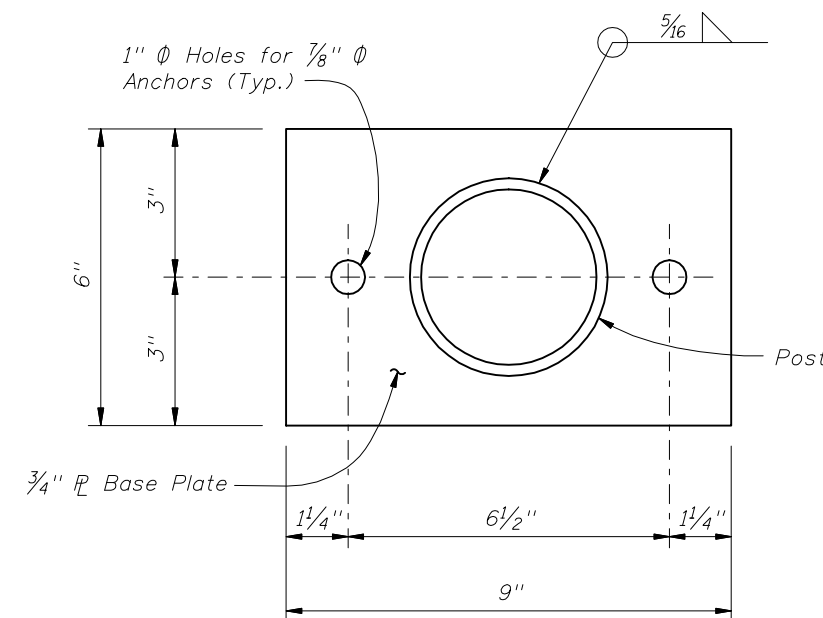
Adhesive Bonding Material Systems for Anchors and Dowels will comply with Specification Section 937 and be installed in accordance with Specification Section 416. Cutting of reinforcing steel is permitted for drilled hole installation.

WELDING:

All welding will be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal will be E60XX or E70XX. Nondestructive testing of welds is not required.



DETAIL "A"



BASE PLATE DETAIL

CROSS REFERENCE:

For location of Detail "A" see Sheet No. 1 of 3.



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BRIDGE FENCING (CURVED TOP)

Last Revision

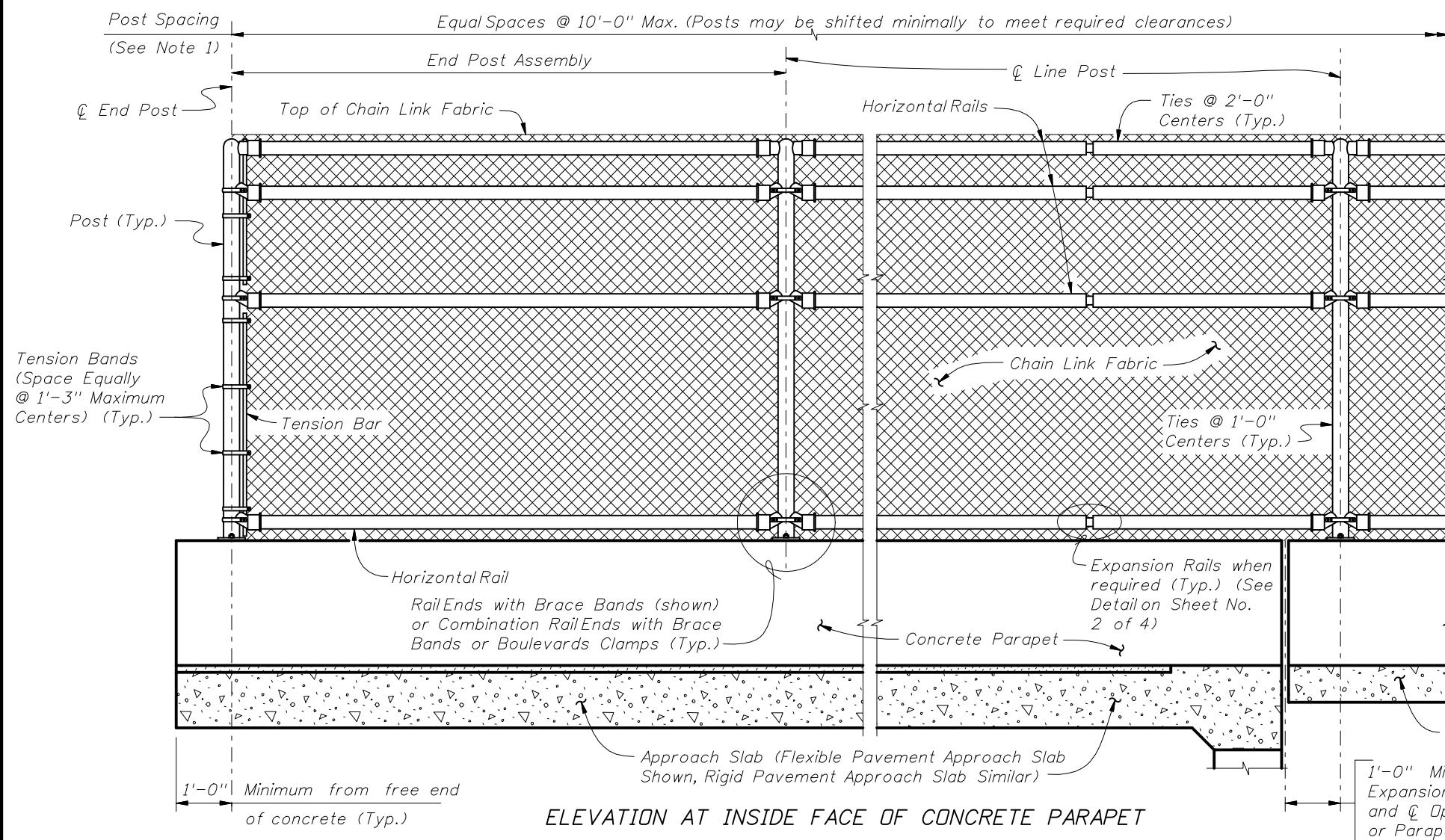
07/01/08

Sheet No.

3 of 3

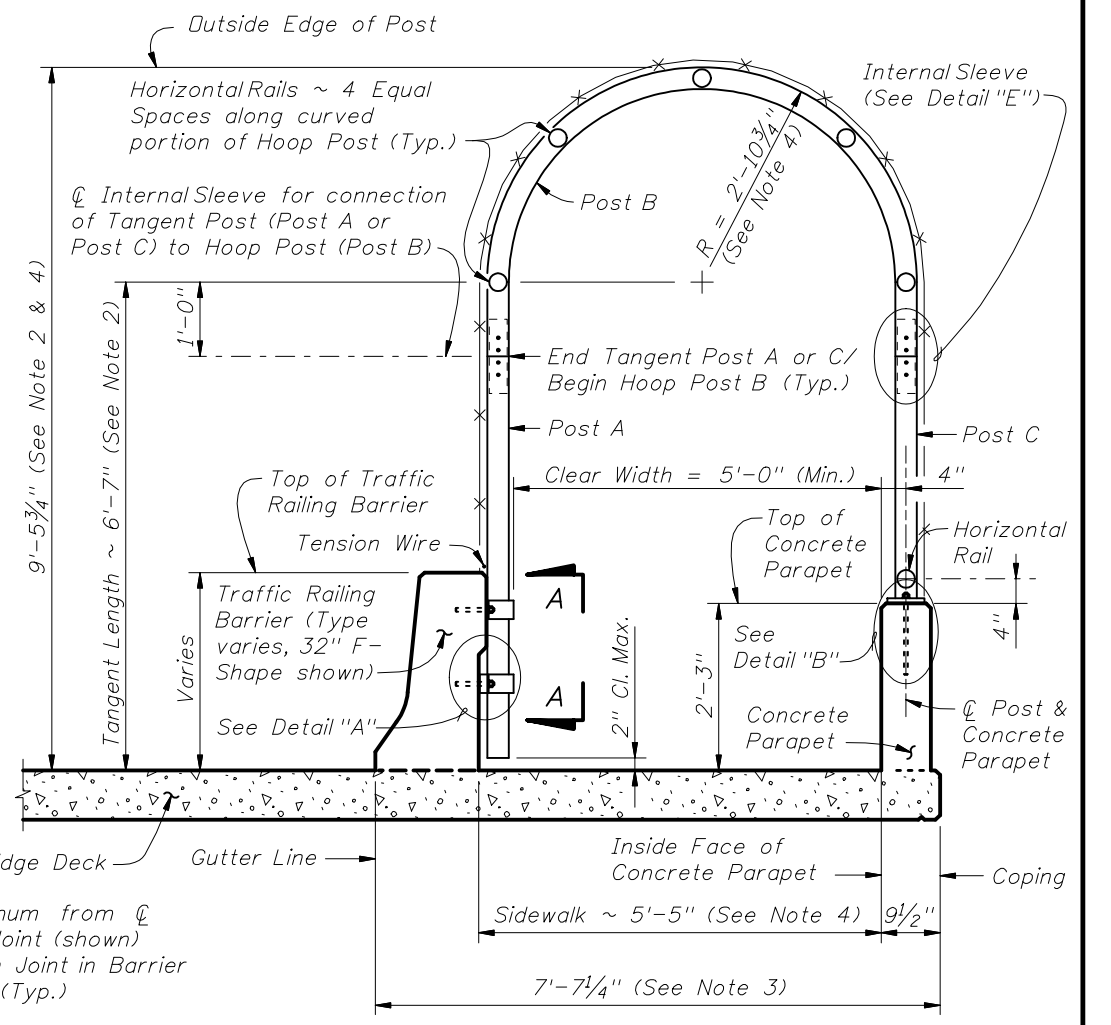
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ELEVATION AT INSIDE FACE OF CONCRETE PARAPET

- NOTES:
1. A Pull Post Assembly is required at maximum intervals of 500'-0". See Sheet No. 3 of 4.
 2. Dimension is measured along Inside Face of Concrete Parapet.
 3. Dimension shown is for 32" F-Shape Traffic Railing Barriers as shown in Index No. 420. Adjust as required for other Traffic Railing Barriers and sidewalk widths.
 4. For sidewalk clear widths greater than 5'-0", increase the radius and height of the curved portion of the Hoop Post at the rate of 6" for every one foot increase in sidewalk width.



TYPICAL SECTION

FENCING NOTES

FENCE INSTALLATION:
Install posts plumb (within a tolerance of $\pm 1\frac{1}{2}$ "'). Use shim plates as required to achieve plumb. The required quantity and thickness of shim plates will be determined in the field. Install chain link fence in accordance with ASTM F 567 as applicable.

TRAFFIC RAILING BARRIER DETAILS:
See Superstructure Sheets for Traffic Railing Barrier details.

CONCRETE PARAPET DETAILS:
See Index No. 820 - Pedestrian/Bicycle Railing for Concrete Parapet details. Provide fencing in lieu of aluminum bullet railing as shown on Index No. 820.

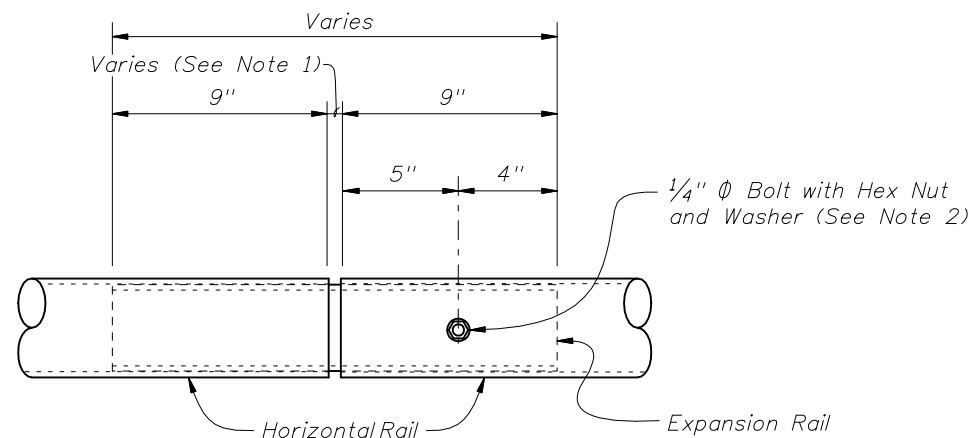
LIMITS OF FENCING:
Limits of fencing are from begin of approach slab at Begin Bridge to end of approach slab at End Bridge, unless otherwise shown in the plans.

PAYMENT:
Payment will be made under Fencing, Type R. Payment includes posts, horizontal and expansion rails, brace bands, rail ends, combination rail ends, boulevard clamps, chain link fabric, tension wire, ties, hog rings, tension bars and bands, pipe clamps, base plates, anchor rods, bolts, nuts, washers, shim plates, spacers, neoprene pads, miscellaneous fence fittings and hardware and all incidental materials and labor required to complete installation of the fence.

CROSS REFERENCE:
For Table of Fence Components and Table of Post Attachment Components see Sheet No. 2.
For Pull Post Assembly Detail, View A-A and Detail "A" see Sheet No. 3.
For Detail "B" and "E" see Sheet No. 4.

TABLE OF CHAIN LINK FENCE COMPONENTS		
COMPONENT	ASTM DESIGNATION	COMPONENT INFORMATION
Posts	F 1083	Galvanized Steel Pipe – 3" NPS, Schedule 40 (3.500" Outside Diameter, 0.216" Wall Thickness)
Horizontal Rails and Internal Sleeves	F 1083	Galvanized Steel Pipe – 2½" NPS, Schedule 40 (2.875" Outside Diameter, 0.203" Wall Thickness)
Expansion Rails	F 1083	Galvanized Steel Pipe – 2" NPS, Schedule 40 (2.375" Outside Diameter, 0.154" Wall Thickness)
Chain Link Fabric (2" mesh with knuckled bottom selvages)	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) ~ Specify the color of the polymer coating in the General Notes
Tension Wire	A 824 & A 817	Type II (Zinc Coated Steel Wire) – No. 7 gage, Class 4 Coating
		Type I (Aluminum Coated Steel Wire) – No. 7 gage
Tie Wires	F 626	Zinc Coated Steel Wire – No. 9 gage
Hog Rings	F 626	Zinc Coated Steel Wire – No. 12 gage
Brace Bands	F 626	No. 12 Gage (min. thickness) x ¾" (min. width) Steel Bands (Beveled or Heavy)
Tension Bars	F 626	⅜" (min. thickness) x ¾" (min. width) x Variable Height Steel Bars ~ Height = Tangent or Hoop Length – Barrier or Parapet Height – 2" max.
Tension Bands	F 626	No. 14 Gage (min. thickness) x ¾" (min. width) Steel Bands
Miscellaneous Fence Components	F 626	Zinc Coated Steel ~ (includes horizontal rail ends, combination rail ends, boulevard clamps and all other miscellaneous fittings and hardware)
Bolts	A 307	⅜" Ø x 4¼" Hex Head Bolts for Internal Sleeve connections ¼" Ø x 4¼" Hex Head Bolts for Expansion Rail connections
Nuts	A 563	Hex Nuts for Internal Sleeve and Expansion Rail connections
Washers	F 436	Flat Washers for Internal Sleeve and Expansion Rail connections

LEGEND: NPS = Nominal Pipe Size



EXPANSION RAIL DETAIL

NOTES:

1. This Dimension is the expansion joint opening plus ¼". Expansion rails are required at expansion joint locations where the total movement exceeds 1", but is less than or equal to 6". Expansion rails are part of expansion assemblies when the total movement exceeds 6". Install expansion rails midway between the fence posts spanning the expansion joint.
2. Install nuts for expansion rails finger-tight. Nuts will fully engage bolts with a minimum of one bolt thread extending beyond the nuts. Distort the first thread on the outside of the nut to prevent loosening.

TABLE OF POST ATTACHMENT COMPONENTS		
COMPONENT	ASTM DESIGNATION	COMPONENT INFORMATION
Pipe Clamps	A 36 or A 709 Grade 36	¼" Steel Ⓟ
Base Plates	A 36 or A 709 Grade 36	¾" Steel Ⓟ
Shim Plates	A 36 or A 709 Grade 36 or B 209 Alloy 6061-T6 or B 221 Alloy 6063-T5	Plate thicknesses as required; Holes in shim plates will be ¾" Ø
Spacers	-	1¼" Ⓟ for all materials
Pipe Clamp Connection	Adhesive Anchor Rods	F 1554 Grade 36 Fully threaded Headless Anchor Rods ~ ⅝" Ø x 6" (no spacer) or ⅝" Ø x 7¼" (with spacer)
	CIP Anchor Rods	F 1554 Grade 36 Hex Head Anchor Rods ~ ⅝" Ø x 6" (no spacer) or ⅝" Ø x 7¼" (with spacer)
Base Plate Connection	Adhesive Anchor Rods	F 1554 Grade 36 Fully threaded Headless Anchor Rods ~ ⅞" Ø x 14½"
	CIP Anchor Rods	F 1554 Grade 36 Hex Head Anchor Rods ~ ⅞" Ø x 14½"
Bolts	A 307	⅜" Ø x 4¾" Hex Head Bolts for Pipe Clamp Connections to Posts
Nuts	A 563	Hex Nuts for Pipe Clamp and Base Plate Connections
Washers	F 436	Flat Washers for Pipe Clamp and Base Plate Connections
Neoprene Pads	-	In accordance with Specification Section 932

POST ATTACHMENT NOTES

ANCHOR RODS, NUTS AND WASHERS:

After the nuts have been tightened, distort the Anchor Rod threads to prevent removal of the nuts. Coat distorted threads and exposed trimmed ends of anchors with a galvanizing compound in accordance with Specification Section 975.

COATINGS:

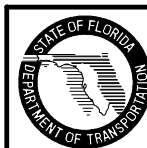
Hot-dip galvanize all Nuts, Washers, Bolts, CIP Anchor Rods, Adhesive Anchors and Fence Framework (Posts, Internal Sleeves, Shim Plates, Base Plates, Pipe Clamps and Spacers) in accordance with Specification Section 962. Hot-dip galvanize Fence Framework after fabrication.

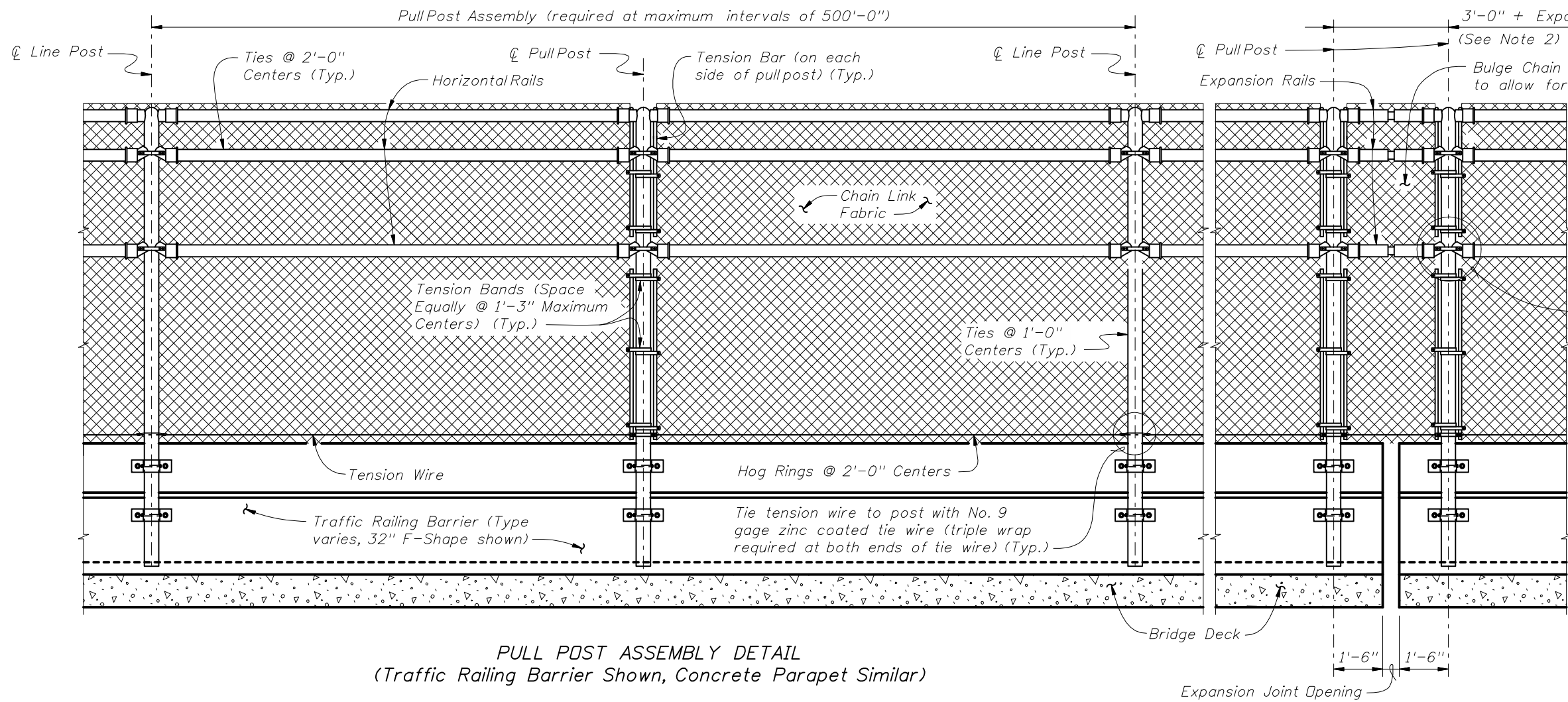
ADHESIVE-BONDED ANCHORS AND DOWELS:

Adhesive Bonding Material Systems for Anchors and Dowels will comply with Specification Section 937 and be installed in accordance with Specification Section 416. Cutting of reinforcing steel is permitted for drilled hole installation.

WELDING:

All welding will be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal will be E60XX or E70XX. Nondestructive testing of welds is not required.

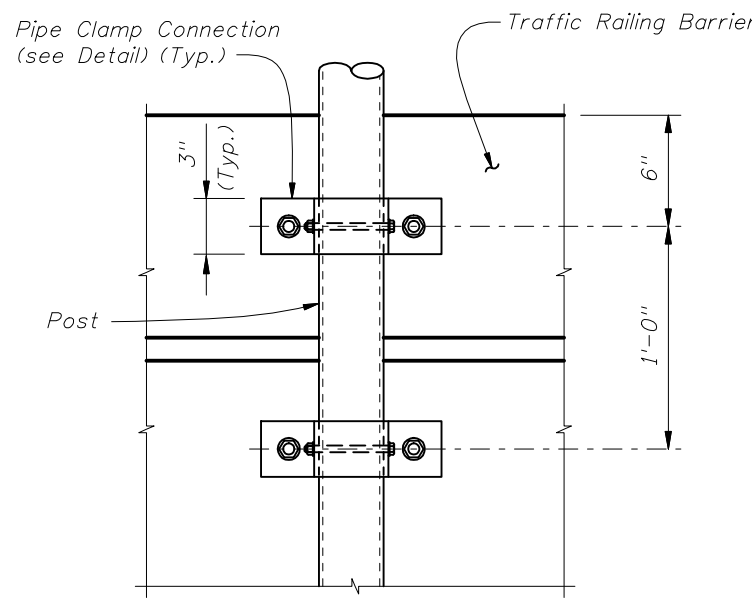




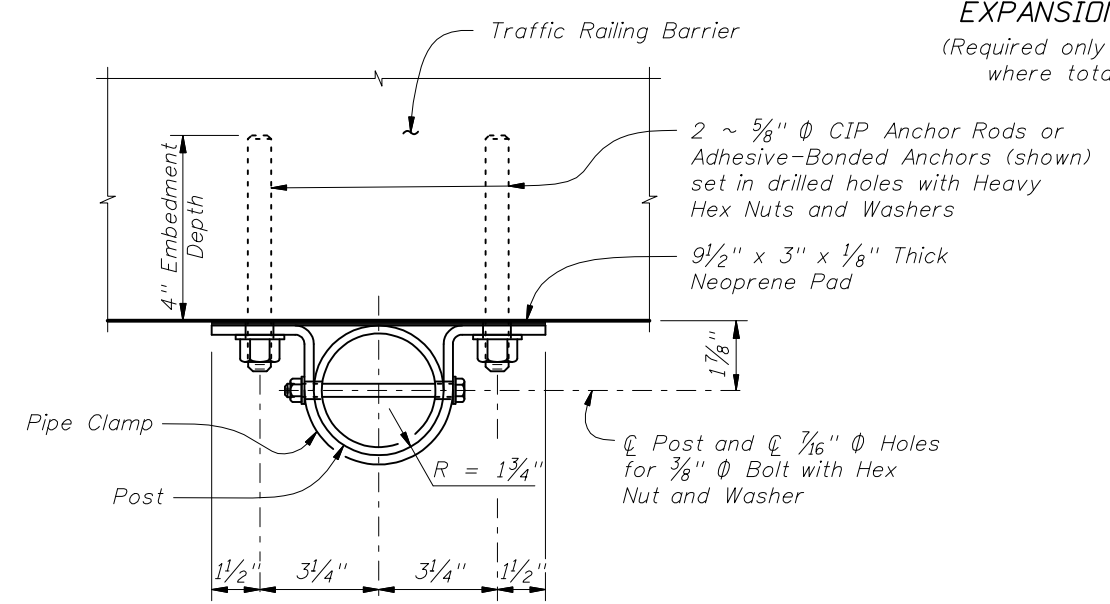
PULL POST ASSEMBLY DETAIL
(Traffic Railing Barrier Shown, Concrete Parapet Similar)

- NOTES:**
1. For treatment at bridge ends, see Sheet No. 1 of 4.
 2. The 3'-0" dimension shown is for expansion joint openings 9" or less. If the expansion joint opening exceeds 9", increase this dimension by the difference between the expansion joint opening and 9".

Rail Ends with Brace Bands (shown) or Combination Rail Ends with Brace Bands or Boulevards Clamps (Typ.)



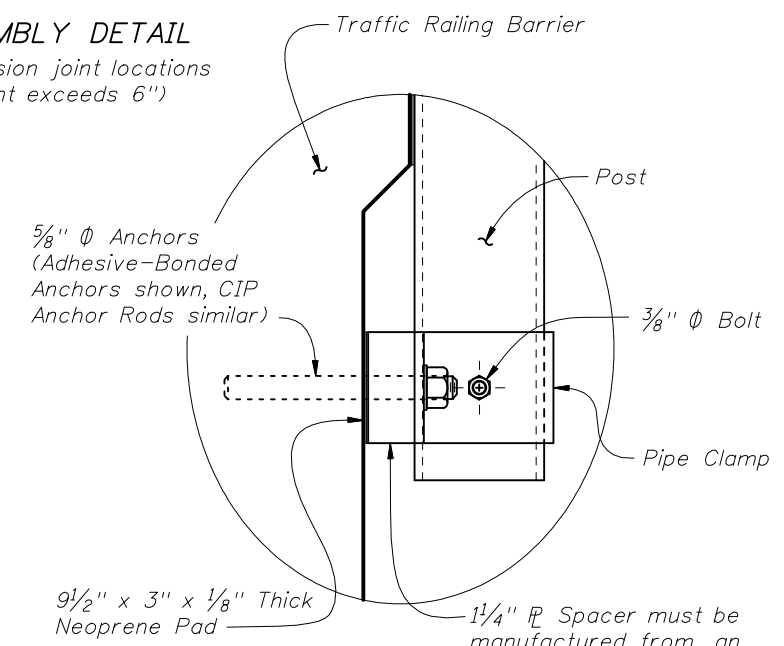
VIEW A-A



PIPE CLAMP CONNECTION DETAIL
(Connection without spacer shown, Connection with spacer similar)

CROSS REFERENCE:
For location of View A-A and Detail "A" see Sheet No. 1 of 4.

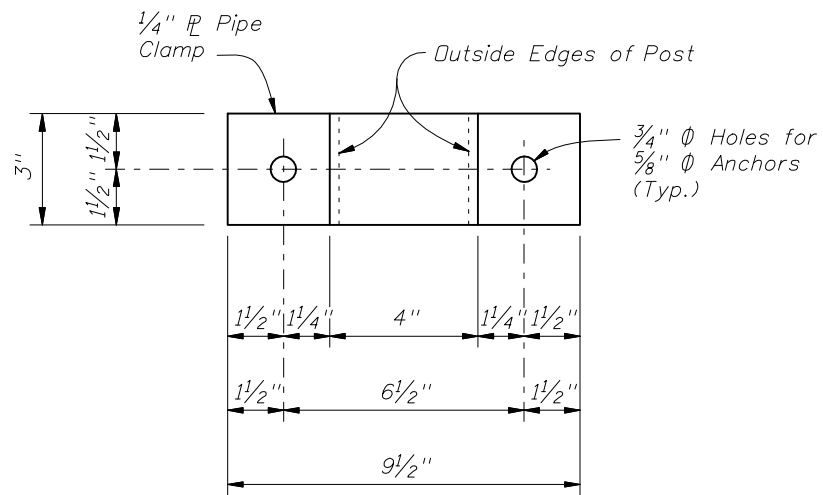
EXPANSION ASSEMBLY DETAIL
(Required only at expansion joint locations where total movement exceeds 6")



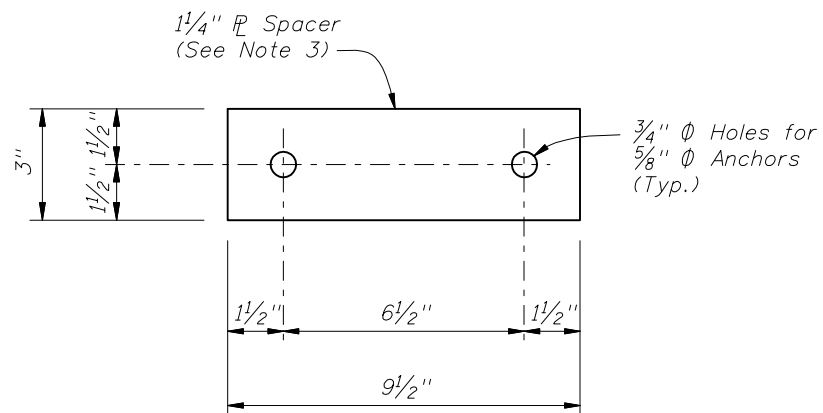
DETAIL "A"

1 1/4" R Spacer must be manufactured from an incompressible material (i.e., steel or aluminum)



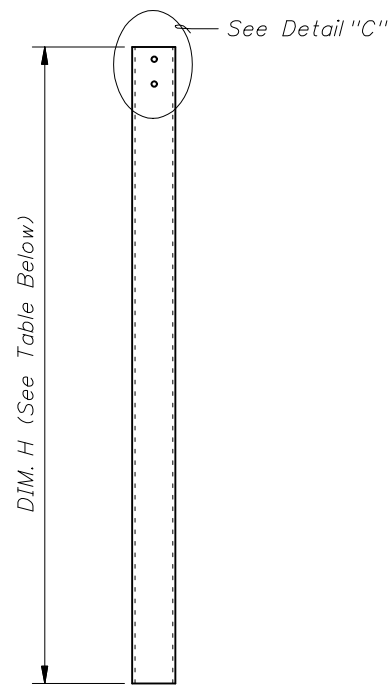


PIPE CLAMP DETAIL

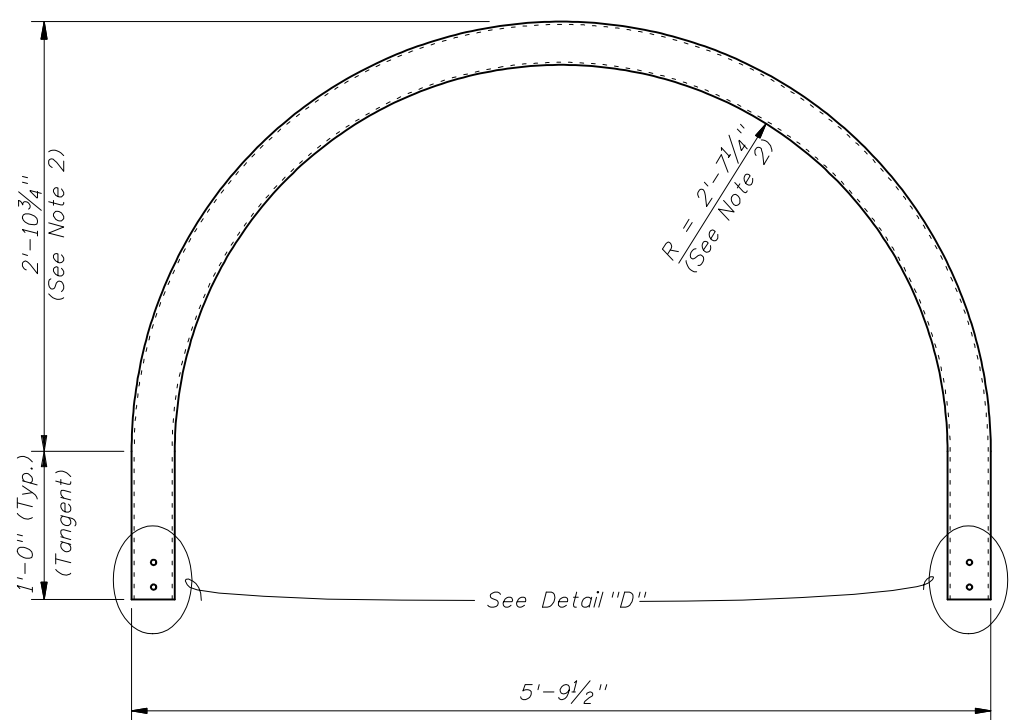


SPACER DETAIL

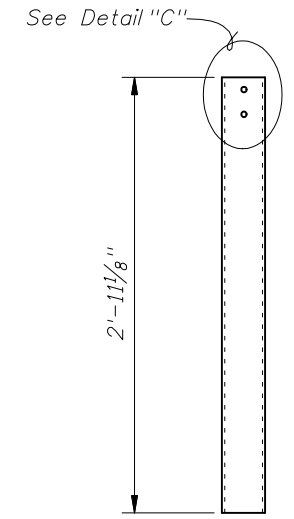
(Must be manufactured from an incompressible material (i.e., steel or aluminum))



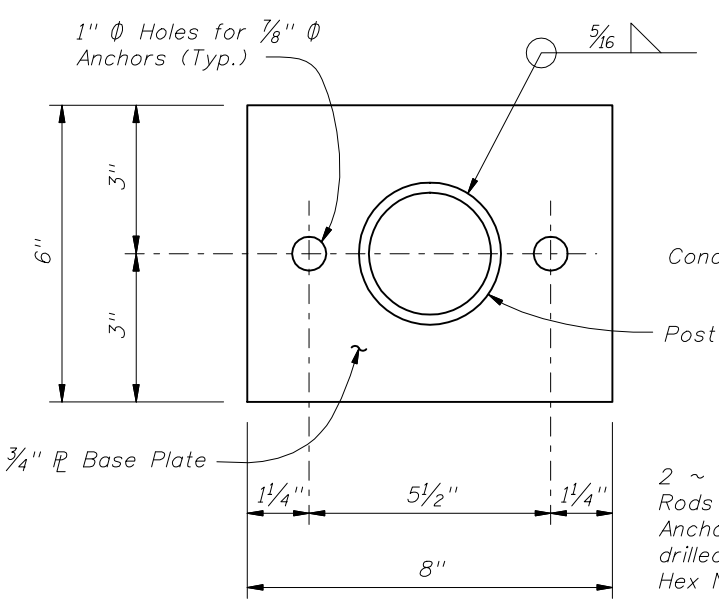
POST A DETAIL



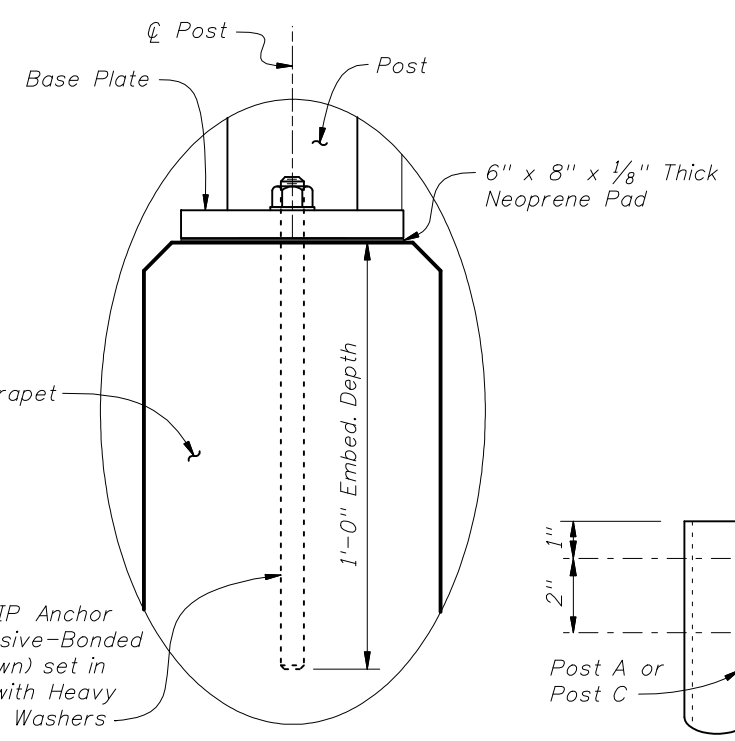
POST B DETAIL



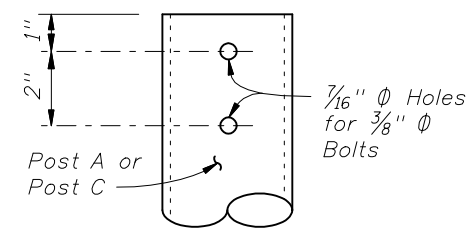
POST C DETAIL



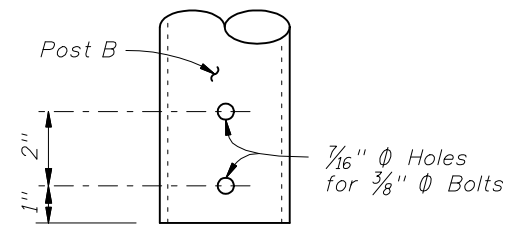
BASE PLATE DETAIL



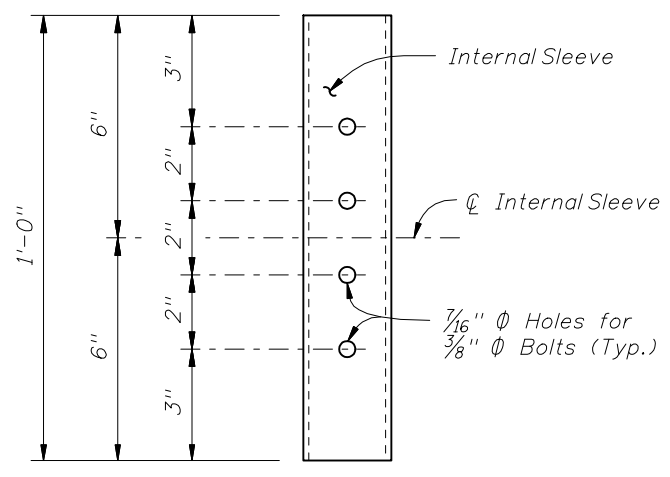
DETAIL "B"



DETAIL "C"



DETAIL "D"



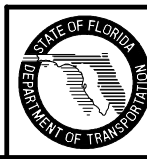
DETAIL "E"
(INTERNAL SLEEVE DETAIL)

SIDEWALK CROSS-SLOPE	DIM. H (See Note 1)
2% Left	5'-6 1/4"
2% Right	5'-3 3/4"

NOTES:

1. Values shown for DIM. H are for a 5'-0" clear sidewalk width. Adjust as required for clear sidewalk widths greater than 5'-0".
2. For clear sidewalk widths greater than 5'-0" increase radius and height by 6" for every one foot increase in sidewalk width.
3. Spacer plate thickness shown is for the 32" F-Shape Traffic Railing shown in Index No. 420. Adjust thickness as required for other Traffic Railings.

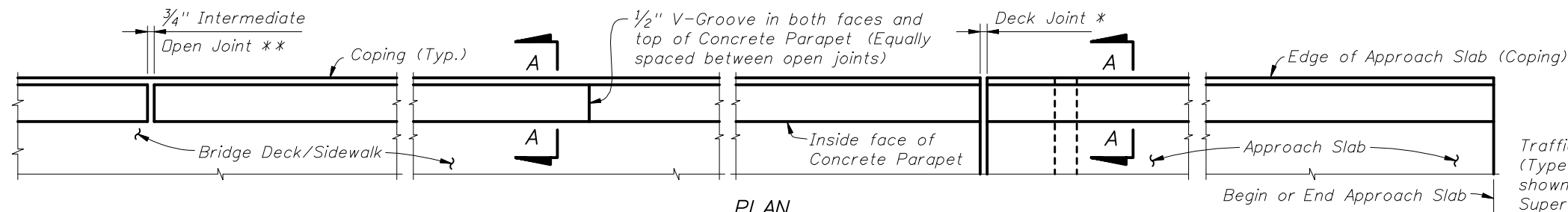
CROSS REFERENCE:
For location of Details "B" and "E" see Sheet No. 1 of 4.



2010 FDOT Design Standards

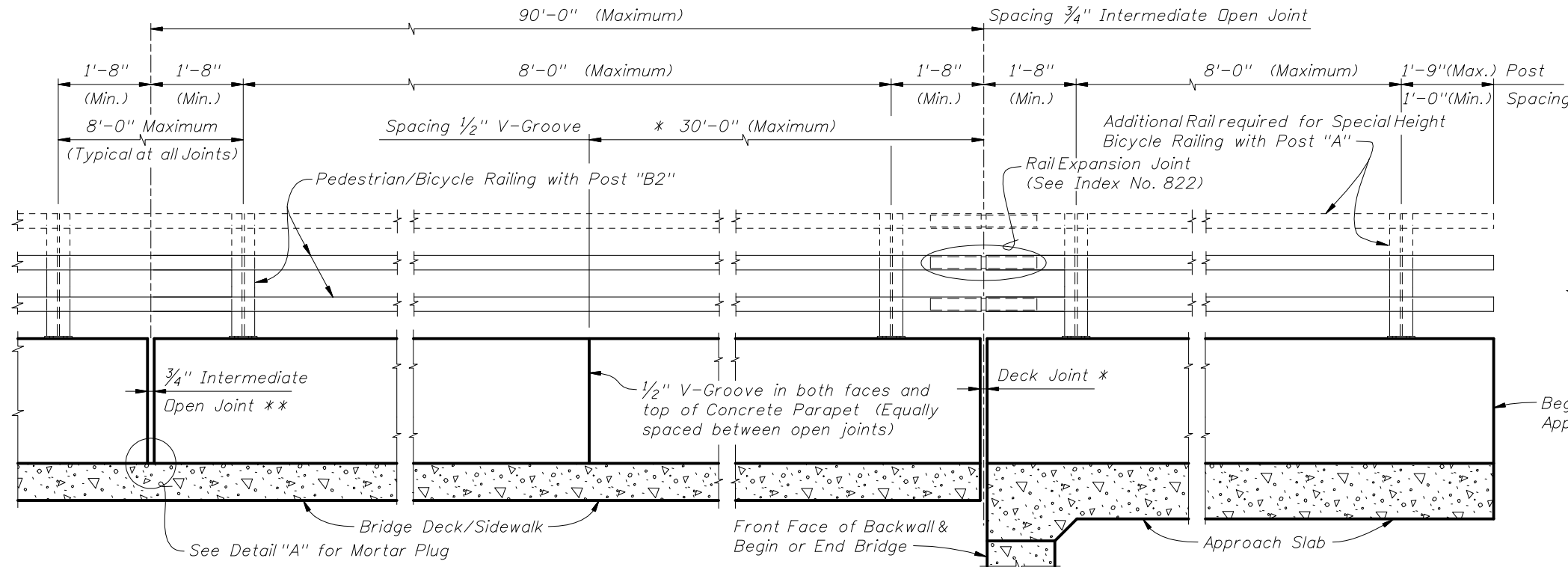
BRIDGE FENCING (ENCLOSED)

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812	



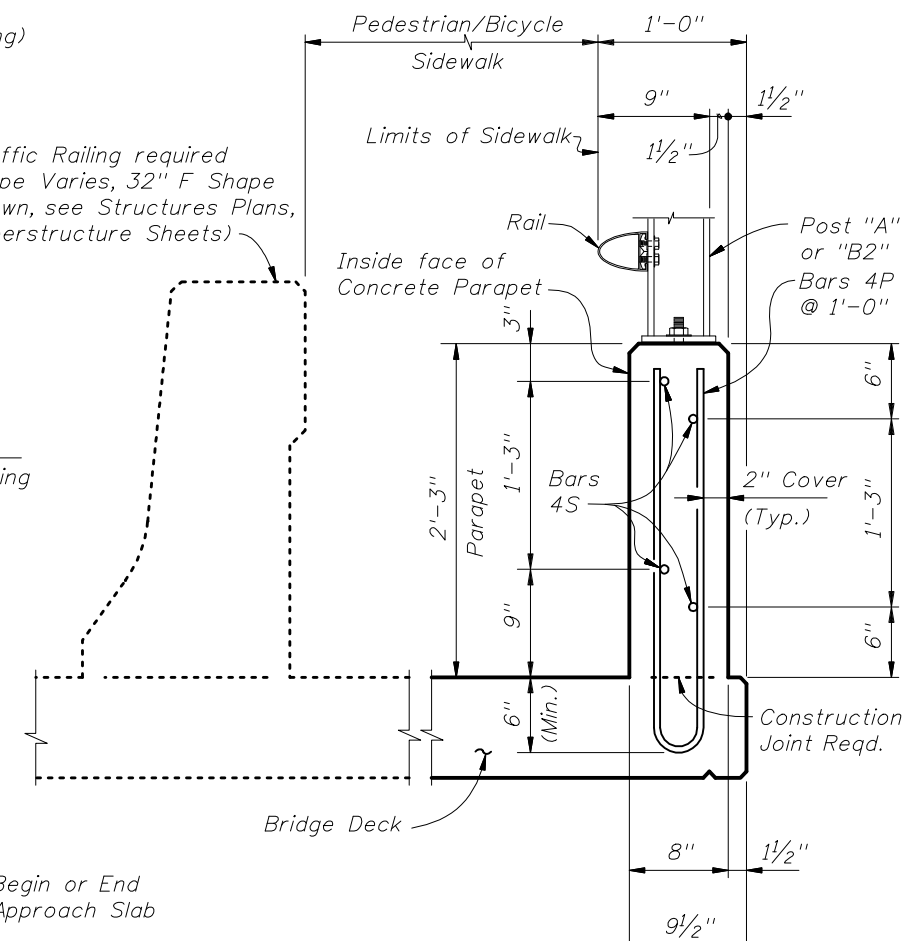
PLAN
(Rails, Posts & Reinforcing Steel not shown for clarity)

** 3/4" Intermediate Open Joints shall be provided at locations coinciding with 3/4" Joints for the Traffic Railing.



ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)
(Aluminum Bullet Railing Shown, For Bridge Fencing see Index Nos. 810, 811 or 812)

Traffic Railing required (Type Varies, 32" F Shape shown, see Structures Plans, Superstructure Sheets)

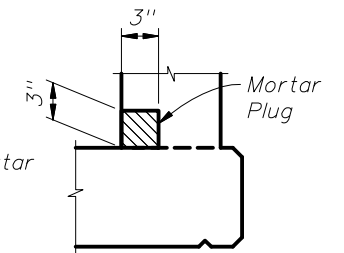


SECTION A-A
(Typical Section Thru Bridge Deck Shown, Section Thru Approach Slab Similar)
(Aluminum Bullet Railing Shown, For Bridge Fencing see Index Nos. 810, 811 or 812)

* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Parapet Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown. Deck Joint at Pier or Intermediate Bent similar.

NOTE:

At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.



DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT

ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS

NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4 3/4" are not permitted.

SPLICE DETAIL
(Between WWR Sections)

WELDED WIRE REINFORCEMENT (WWR)

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
P	4	5'-5"
S	4	As Req.

BAR 4P **BAR 4S**

ESTIMATED CONCRETE PARAPET QUANTITIES

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.056
Reinforcing Steel	LB/LF	6.29

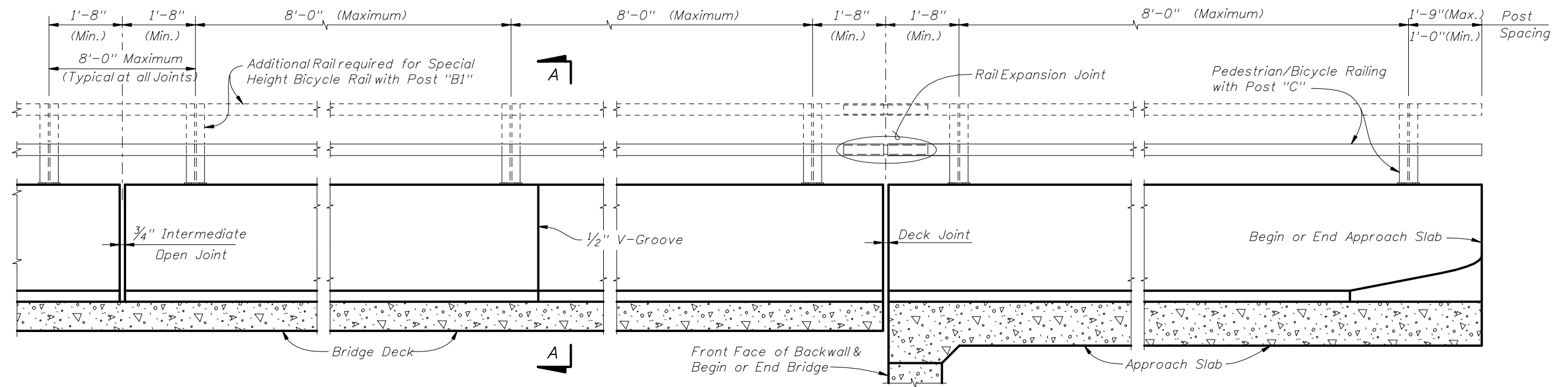
(The above quantities are based on a deck with a 2% cross slope)

REINFORCING STEEL NOTES:

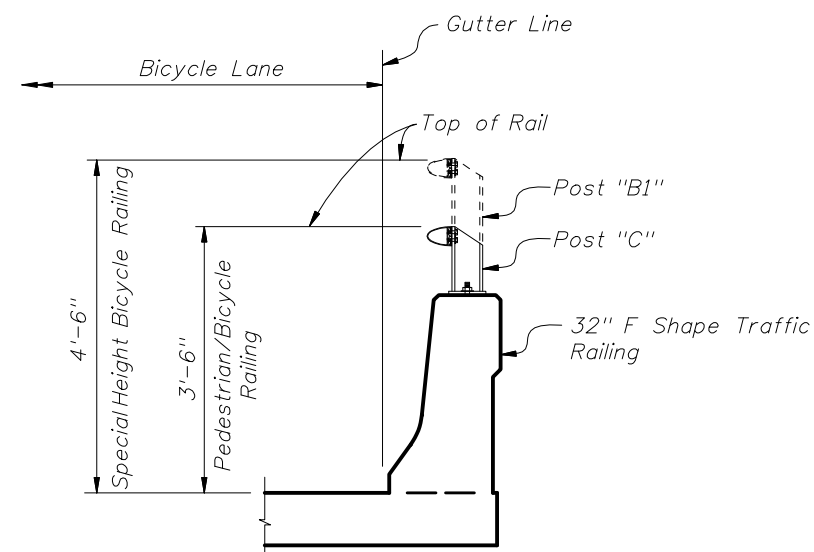
- All bar dimensions in the bending diagrams are out to out.
- The reinforcement for the parapet on a retaining wall shall be the same as detailed above for a 8" deck.
- All reinforcing steel at the open joints shall have a 2" minimum cover.
- Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
- At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 4P and 4S. Welded Wire Reinforcement shall conform to ASTM A497.

PEDESTRIAN/BICYCLE RAILING NOTES:

- CONCRETE PARAPET:** Concrete parapet shall be placed vertical and top surface shall be level transversely.
- RAIL AND POST DETAILS:** For Rail, Post, Rail Expansion Joint fabrication and installation details and notes see Index No. 822.
- BRIDGE FENCING:** For Bridge Fencing see Index Nos. 810, 811 or 812 in lieu of Posts and Rails on Index No. 822.



ELEVATION OF INSIDE FACE OF TRAFFIC RAILING WITH PEDESTRIAN/BICYCLE BULLET RAILING



SECTION A-A
TYPICAL SECTION THRU BRIDGE DECK
(APPROACH SLAB SIMILAR)

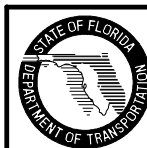
NOTES:

RAIL AND POST DETAILS: For Post, Rail and Rail Expansion Joint fabrication and installation Details and Notes see Index No. 822.

TRAFFIC RAILING DETAILS: For Traffic Railing Details, Reinforcement and Notes see Index No. 420.

INSTRUCTIONS TO DESIGNER:

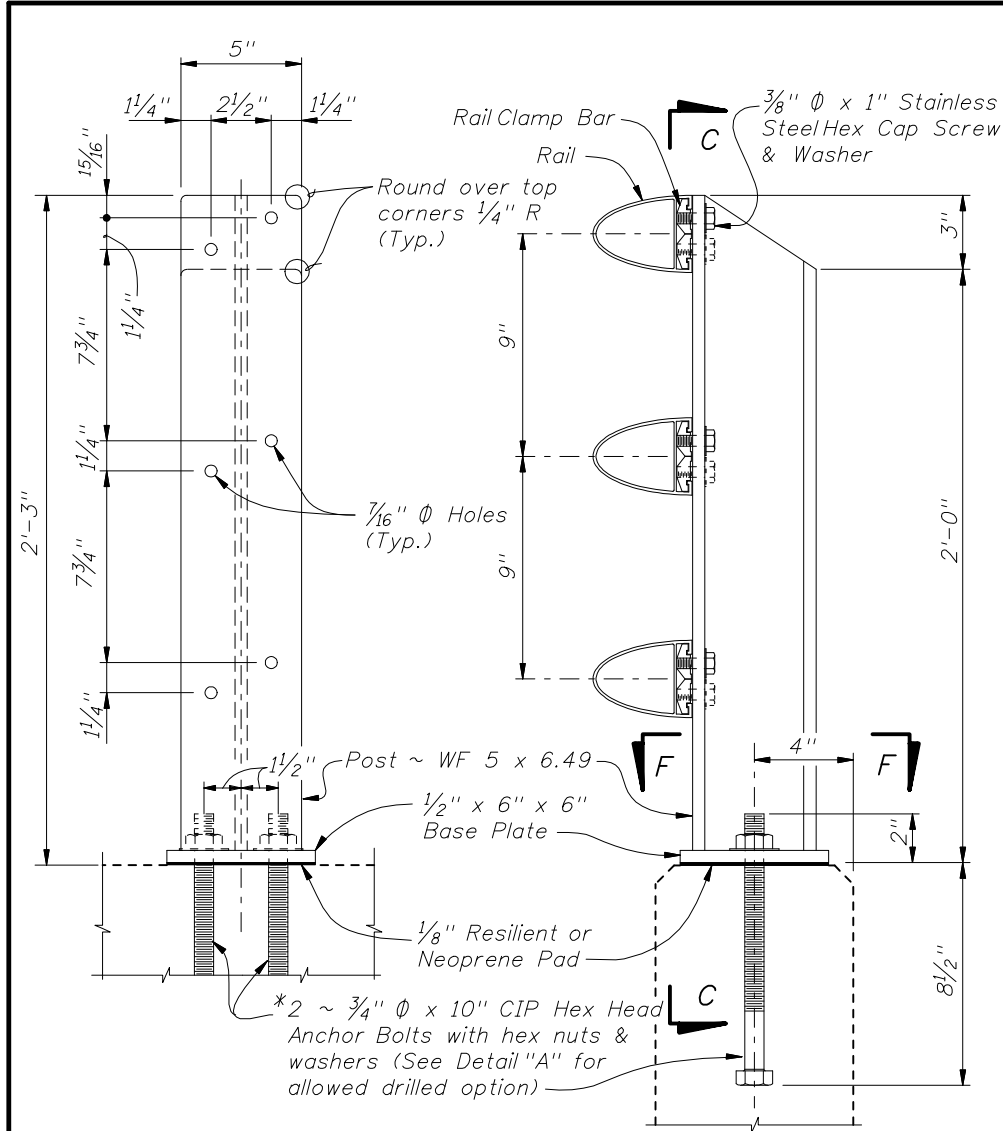
This railing is intended for use when a Bicycle Lane is required and a raised pedestrian sidewalk is not provided. See Index No. 422 and 423 for railings on a raised pedestrian sidewalk.



2010 FDOT Design Standards

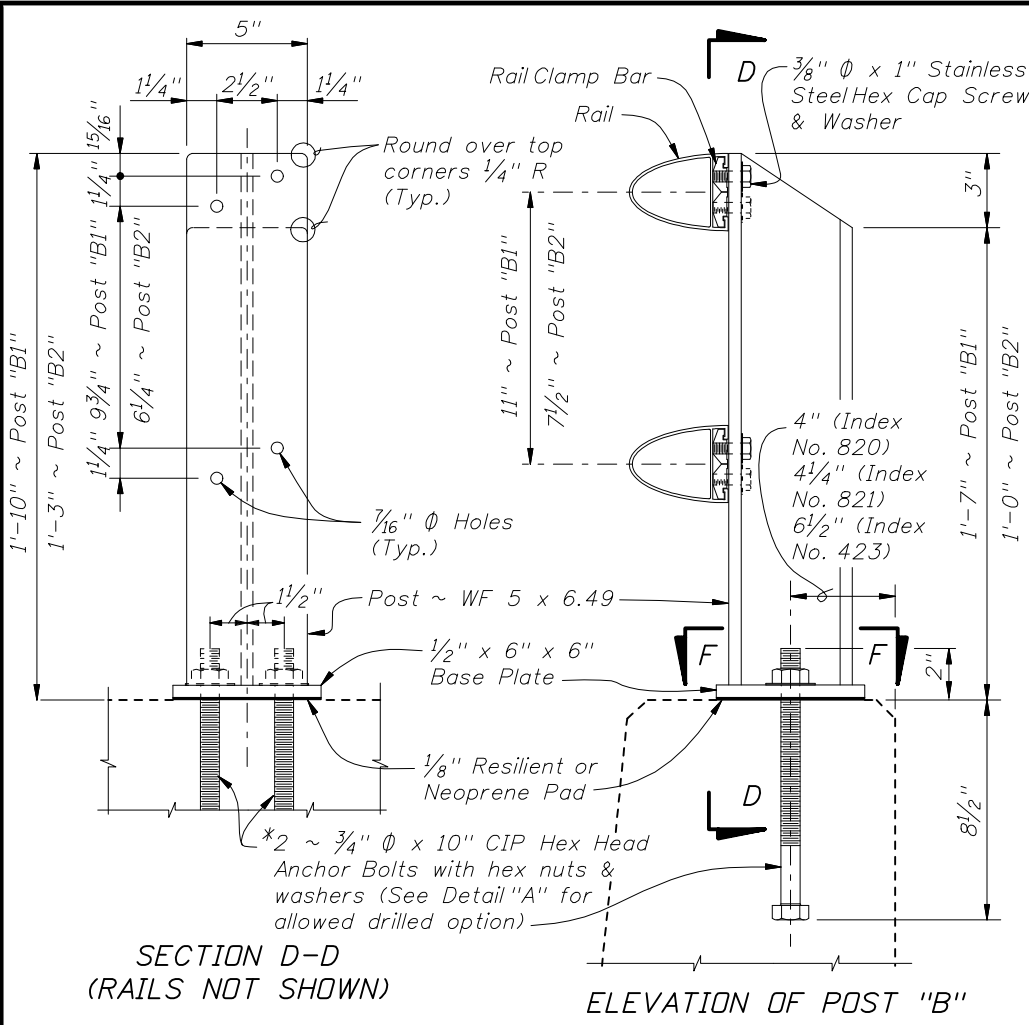
ALUMINUM PEDESTRIAN/BICYCLE BULLET RAILING
FOR TRAFFIC RAILING (32" F SHAPE)

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SECTION C-C
(RAILS NOT SHOWN)

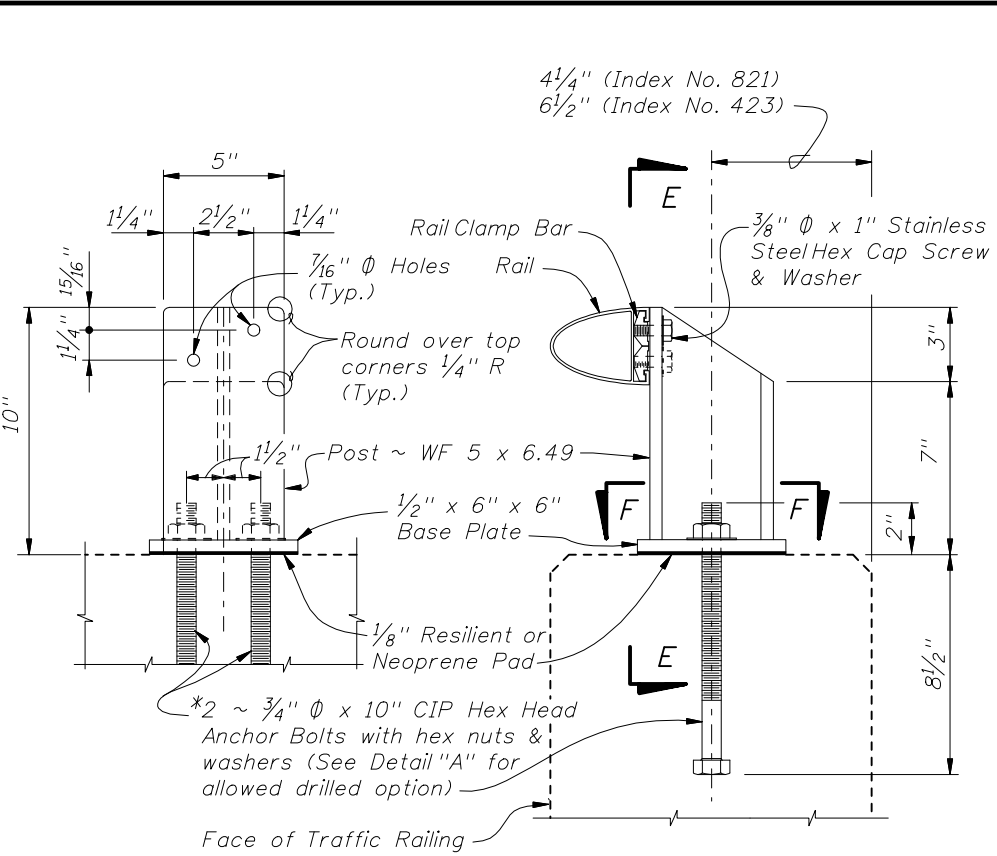
POST "A" DETAILS FOR SPECIAL HEIGHT BICYCLE RAILING ON CONCRETE PARAPET (INDEX NO. 820)



SECTION D-D
(RAILS NOT SHOWN)

ELEVATION OF POST "B"

POST "B1" DETAILS FOR SPECIAL HEIGHT BICYCLE RAILING ON TRAFFIC RAILINGS (INDEX NO. 423 AND 821) AND POST "B2" DETAILS FOR PEDESTRIAN/BICYCLE RAILING ON CONCRETE PARAPETS (INDEX NO. 820)

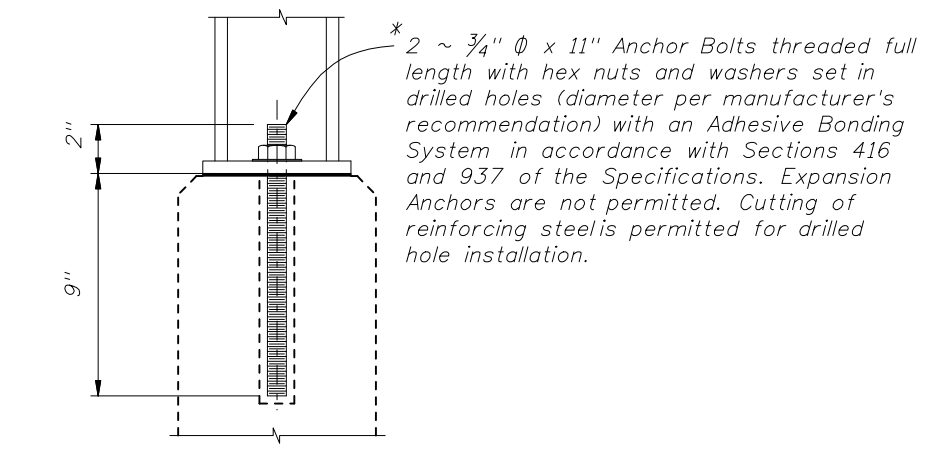


SECTION E-E
(RAIL NOT SHOWN)

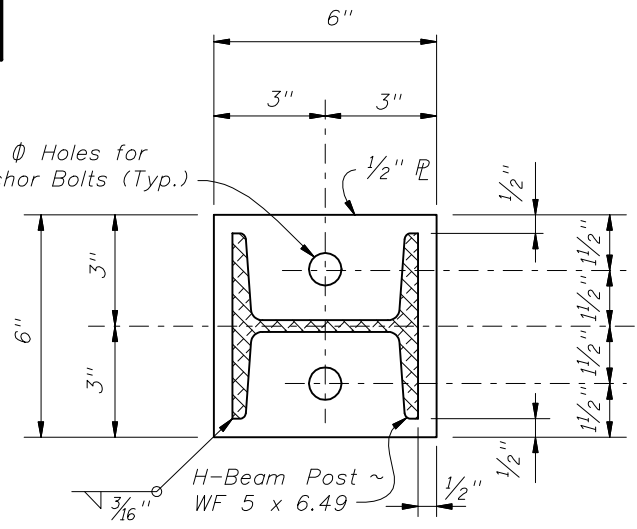
ELEVATION OF POST "C"

POST "C" DETAILS FOR PEDESTRIAN/BICYCLE RAILING ON TRAFFIC RAILINGS (INDEX NO. 423 AND 821)

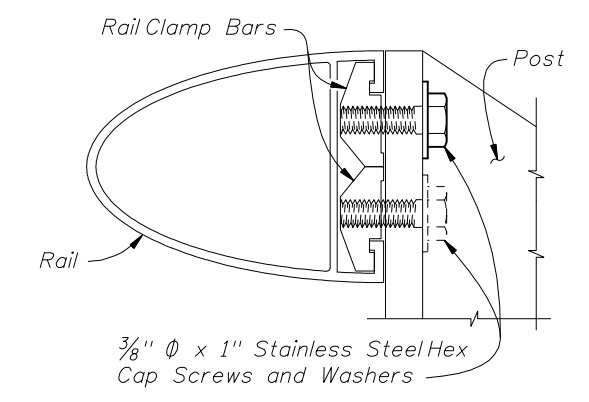
NOTE: After nuts have been tightened, the bolt threads shall be deformed to prevent removal of nuts. Tack welding of nuts to anchor bolts, to prevent theft, is permitted. Coat deformed or tack welded threads with a galvanizing compound in accordance with Section 562 of the Specifications.



ALTERNATE ANCHOR BOLT DETAIL "A"
(CONCRETE PARAPET SHOWN, TRAFFIC RAILINGS SIMILAR)



SECTION F-F
BASE PLATE DETAIL



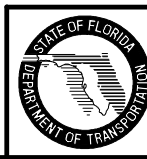
RAIL TO POST CONNECTION DETAIL

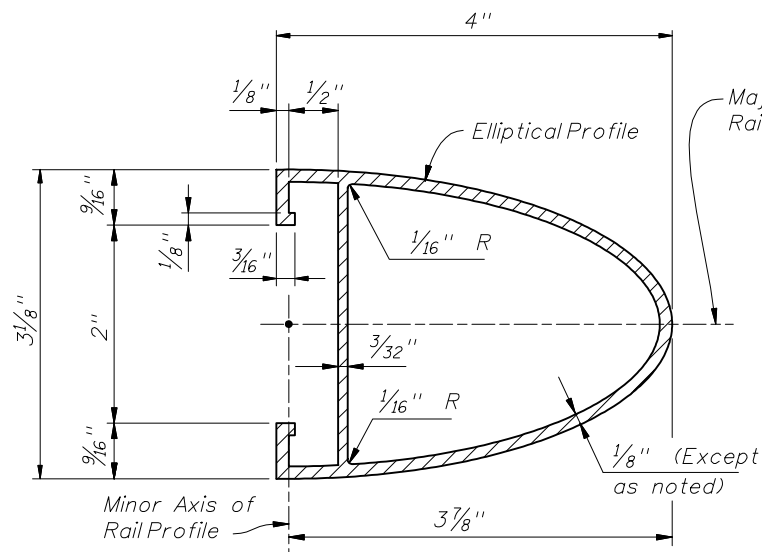
CROSS REFERENCES:

For Post "A" and Post "B2" spacing see Index No. 820.

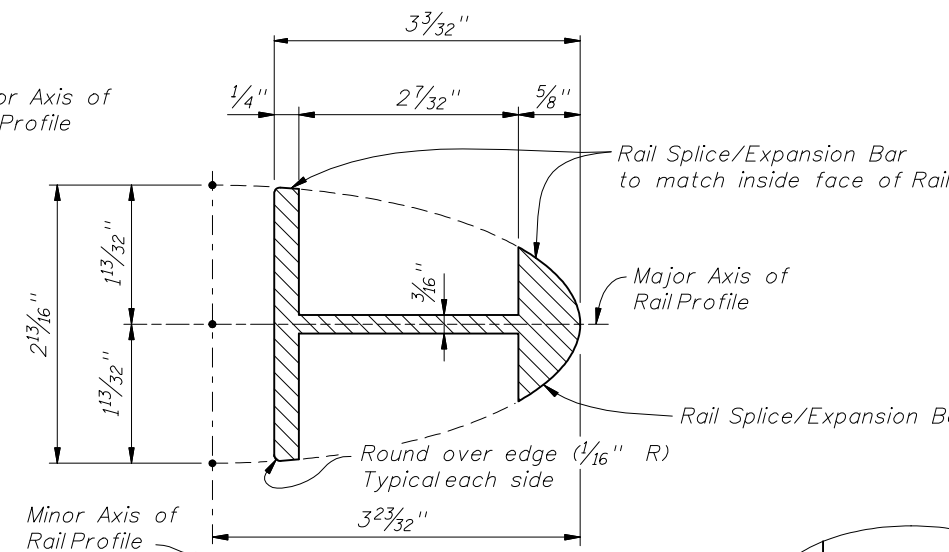
For Post "B1" & Post "C" spacing see Index Nos. 423 or 821.

For Rail Details and Notes see Index No. 822, Sheet 2.

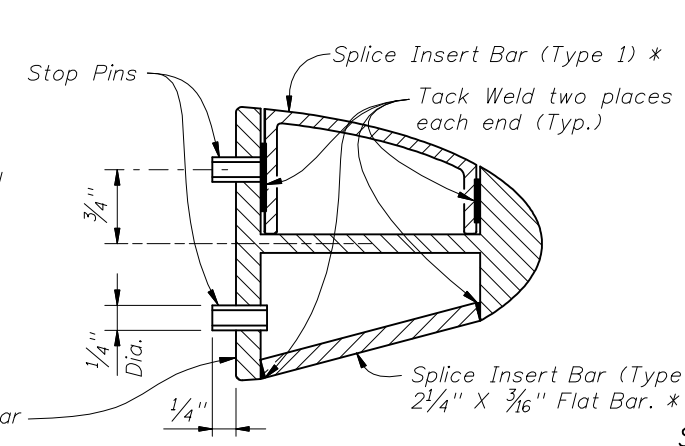




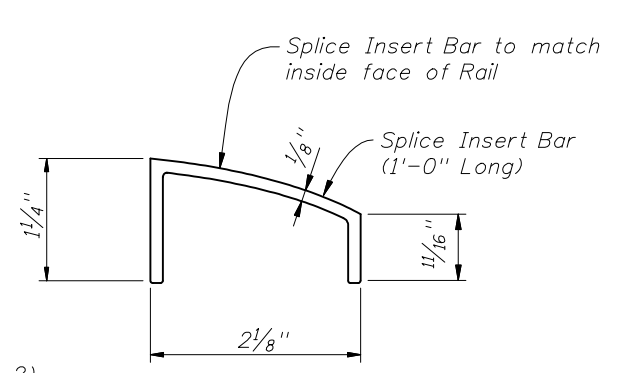
SECTION A-A
(TYPICAL SECTION THRU RAIL)



SECTION B-B - RAIL SPLICE/EXPANSION BAR
(RAIL NOT SHOWN FOR CLARITY)

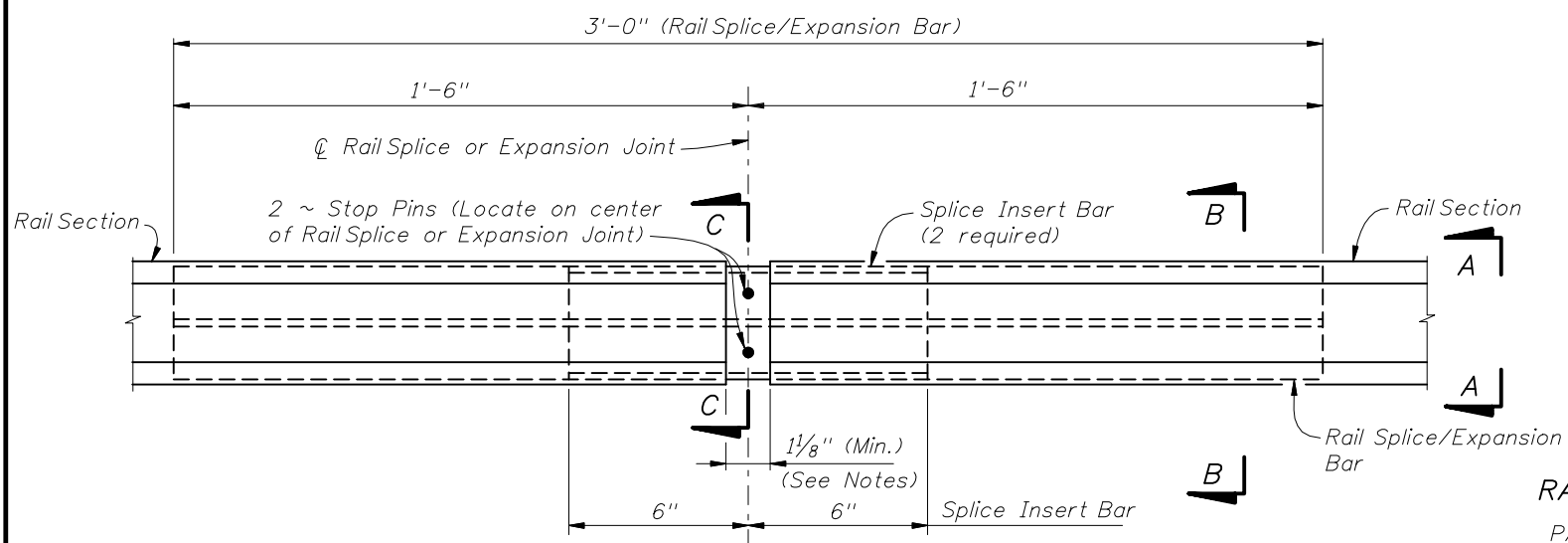


SECTION C-C

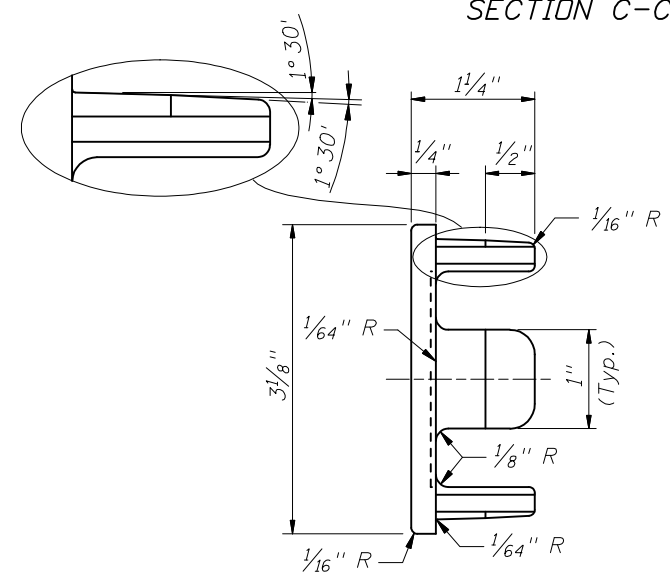


SPLICE INSERT BAR DETAIL (TYPE 1)

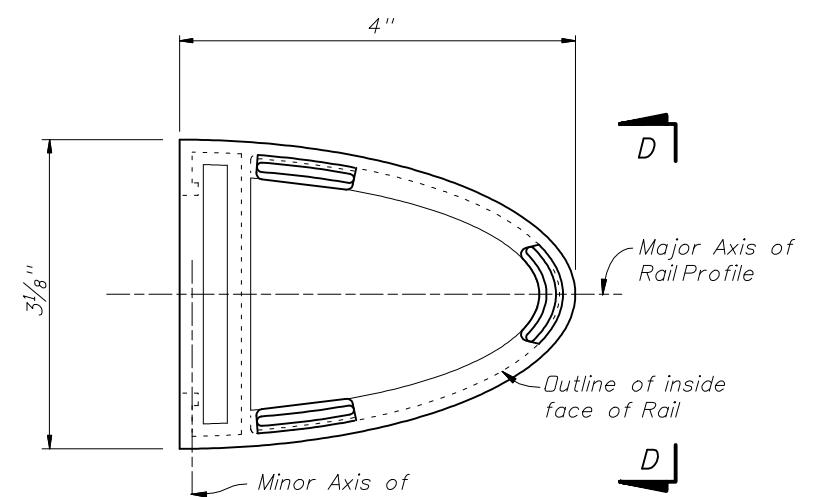
* Use of either Type 1 or Type 2 Splice Insert Bars is at the option of the Contractor.



RAIL SPLICE ASSEMBLY DETAIL (TYPICAL AT BRIDGE EXPANSION JOINTS AND RAIL SPLICE LOCATIONS)

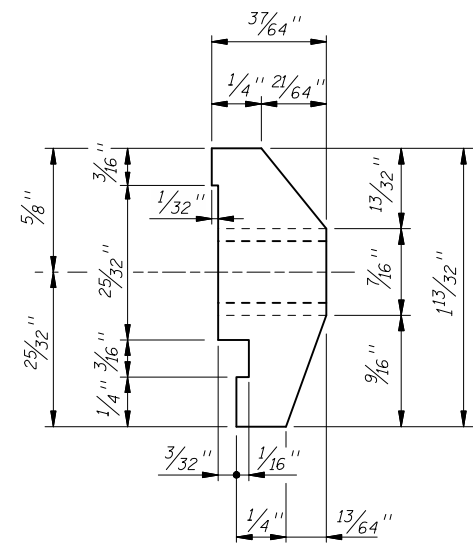


VIEW D-D

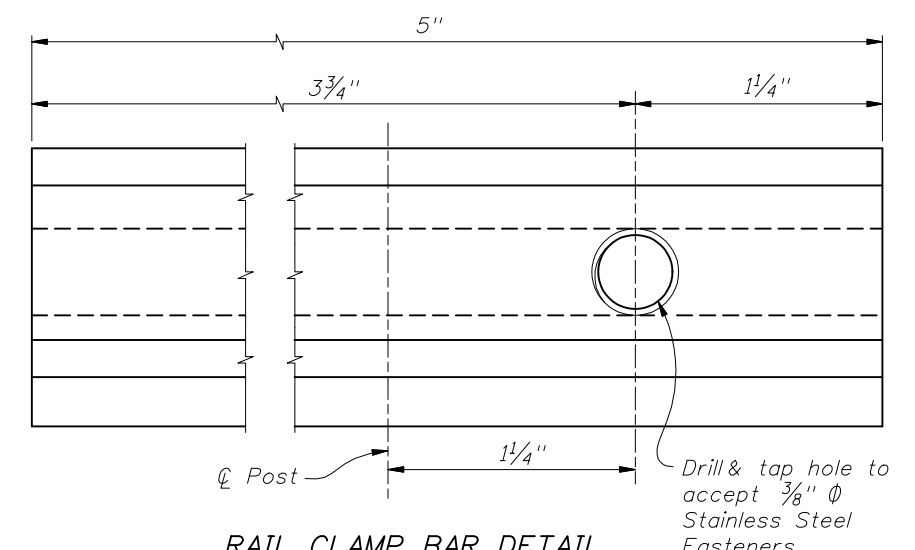


RAIL END CAP DETAIL

NOTE: Provide for drive fit.



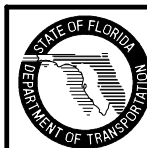
VIEW E-E



RAIL CLAMP BAR DETAIL

RAILING NOTES:

PAYMENT: Payment for the railing includes Rails, Posts, Rail Splice Assemblies, Rail Clamp Bars, Rail End Caps, Anchor Bolts, Nuts, Resilient Pads, Screws and Washers and all incidental materials and labor required to complete the installation.
POST ASSEMBLY: Fabricated wrought aluminum; Post - ASTM B221, alloy 6061-T6, or alloy 6351-T5; Base Plate - ASTM B209, alloy 6061-T6.
WELDING: Welding of aluminum components shall be in accordance with ANSI and AWS D1.2 "Structures Welding Code - Aluminum".
RAIL AND RAIL SPLICE ASSEMBLIES: Aluminum; ASTM B221, alloy 6061-T6, or alloy 6351-T5. Stop Pins shall be press-fit Aluminum or Stainless Steel pins or tubes, unless otherwise approved by the Engineer.
RAIL CLAMP BAR: Aluminum; ASTM B221, alloy 6061-T6, or alloy 6351-T5.
STAINLESS STEEL FASTENERS: 3/8" Ø Hex Cap Screws and Washers shall be ASTM F-593, alloy group 2 (316).
ANCHOR BOLTS: Anchor bolts shall be in accordance with ASTM A36 or ASTM F1554, Grade 36. Anchor Bolts, Nuts, and Washers shall be hot dip galvanized in accordance with Section 962 of the Specifications.
RAIL END CAP: ASTM B26 sand cast aluminum alloy 356.0-F.
RAIL INSTALLATION: Set Rail Posts normal to Profile Grade longitudinally and vertical transversely. Post spacings that land on barrier or parapet obstacles such as armor expansion plates etc. shall be adjusted to clear obstacles by 9" without exceeding maximum post spacing. Set Posts on 1/8" thick resilient or neoprene pads in accordance with Section 932 of the Specifications. The pad dimension shall be the same as the post base plate. Provide rail expansion joint in panels between posts on either side of Bridge Expansion Joints. Rail expansion joints shall be similar to rail splice with provision for movement equal to 1.5 times the bridge joint opening. Take care to ensure rails are set with the proper openings. Remove any burrs or sharp edges on rails and posts to prevent injury.
RAIL SPLICES: Rails shall be continuous over a minimum of 3 posts, except that lengths less than 12' need only be continuous over 2 posts. Space splices at 40'-0" maximum centers. Locate center of splice 1'-5" minimum from the edge of a post. Splice all rails in any railing section about the same center line.
RESILIENT AND NEOPRENE PADS: Resilient and Neoprene Pads shall be in accordance with the Specifications except that testing of the finished pads is not required. Neoprene pads shall be durometer hardness 60 or 70.
SHOP DRAWINGS: Submit complete details including rail, post and expansion joint locations and description of material of the proposed railing for the Engineer's approval prior to fabrication.
CROSS REFERENCE: For Post Details see Index No. 822, Sheet 1.



NOTES

DESIGN SPECIFICATIONS:

American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Third Edition, 2004, including 75 year Design Life
 Florida Department of Transportation (FDOT) "Structures Design Guidelines for Load and Resistance Factor Design", January 2006.
 Florida Building Commission "Florida Building Code", 2004 Edition, except for Handrail diameter.
 U.S. Access Board "ADA Accessibility Guidelines" July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.
 National Fire Protection Association (NFPA) 101, "Life Safety Code", 2003 Edition.

DESIGN LIVE LOADS:

Post and Base Plate: Equivalent point load = 200 lb. load + (50 lb./ft. x Post Spacing (ft.)) applied transversely at top rail connection.
 Top & Bottom Rails: 50 lb./ft. uniform load applied simultaneously vertically and transversely + 200 lb. concentrated point load applied at midspan in the directions for both maximum stress and deflection.
 Handrails: Maximum of either 50 lb./ft. uniform load applied in any direction or 250 lb. concentrated load applied in any direction at any point along the top.
 Pickets: Concentrated 200 lb. load applied transversely over an area of 1.0 square foot.

GEOMETRY:

Clear Opening between Pickets: Shall reject the passage of a 4" diameter sphere below 42" height, and a 8" diameter sphere above 42" height.
 Clear Opening under Bottom Rail: Shall reject the passage of a 2" diameter sphere.
 ADA Handrail Height: 34"
 Standard Pedestrian/Bicycle Railing Height: 42" minimum.
 Special Height Bicycle Railing Height: 54" minimum.

DEFLECTION:

Total combined deflection of the railing system including the resilient or neoprene pads, due to the top rail design live loads, shall not exceed 1/2" when measured at midspan of the top rail.

APPLICABILITY NOTE TO DESIGNER:

This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazard exceeds 2'-6" or when a drop-off hazard is less than 2'-6" and is required by design. See Index No. 851 for special requirements and modifications for use on bridges. Adequate foundation support shall be provided for anchorage and stability against overturning. For unusual site conditions a site specific railing is to be designed by the responsible engineer. 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). Refer to FDOT Plans Preparation Manual (Volume I) Chapters 4 & 8, for the definition of vehicular, pedestrian and bicyclist "drop-off hazards".

ALTERNATE DESIGN:

Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the design life, live loads, geometry and deflection requirements specified herein. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1 1/2" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

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, 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.

RAILS, PICKETS & POSTS:

Pipe Rails and Pickets shall be in accordance with ASTM A53 Grade B for standard weight pipe (Schedule 40) or ASTM A36 for bars. Structural Tube Posts shall be in accordance with ASTM A500 Grade A, B, C or D, or ASTM A501. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Pickets shall be fabricated parallel to the posts. 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.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" x 4" Rectangular Tube	2.00" x 4.00"	0.188"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A
Pickets	1/2" NPS (Sch. 40)	0.840"	0.109"
	3/4" Ø Round Bar	0.750"	N/A

BASE PLATES & POST CAPS:

Base Plates and Post Cap plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

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 1/4" and localized irregularities greater than 1/8". 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 an adhesive bonding material and limited to a maximum total thickness of 1/2", unless longer anchor bolts are provided for the exposed thread length.

COATINGS:

The railing shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

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 PRESTRESSED hardness 60 or 70.

JOINTS:

All fixed joints are to be welded all around and ground smooth. Expansion joints shall be spaced at a maximum 40'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate hot-dip galvanizing and handling, but railing must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments. Metallize rail ends with a galvanizing compound when field adjustments are required.

WELDING:

All welding shall be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required.

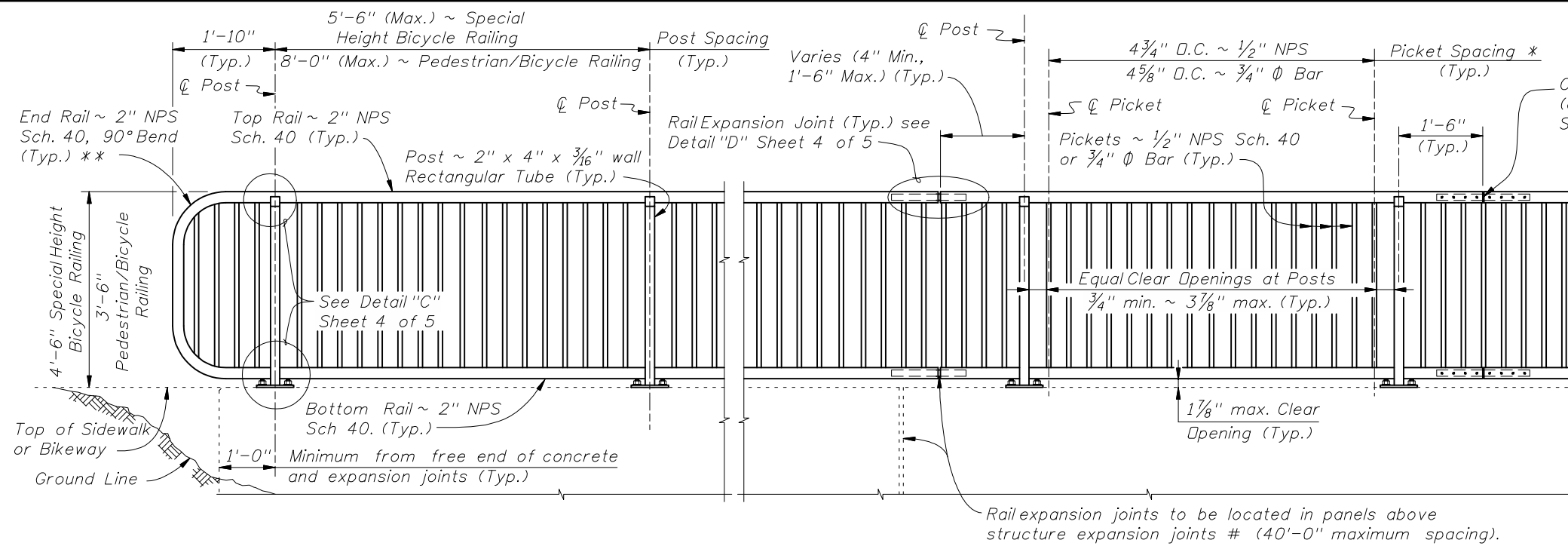
WEEP HOLES:

Weep holes shall be 1/4" Ø and located at the low point between adjacent posts for both top and bottom rails. Holes shall be drilled through the underside of the rails prior to hot-dip galvanizing.

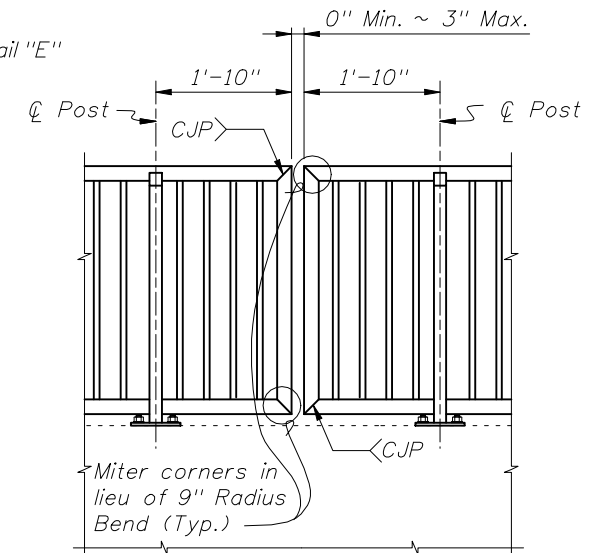
SHOP DRAWINGS:

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations, anchor bolt installation "Case" or lengths, and venting holes for galvanizing, 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.





ELEVATION
(Showing Outside Face of Railing)



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

EXPANDED ELEVATION AT CORNERS

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

DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS

NOTES:

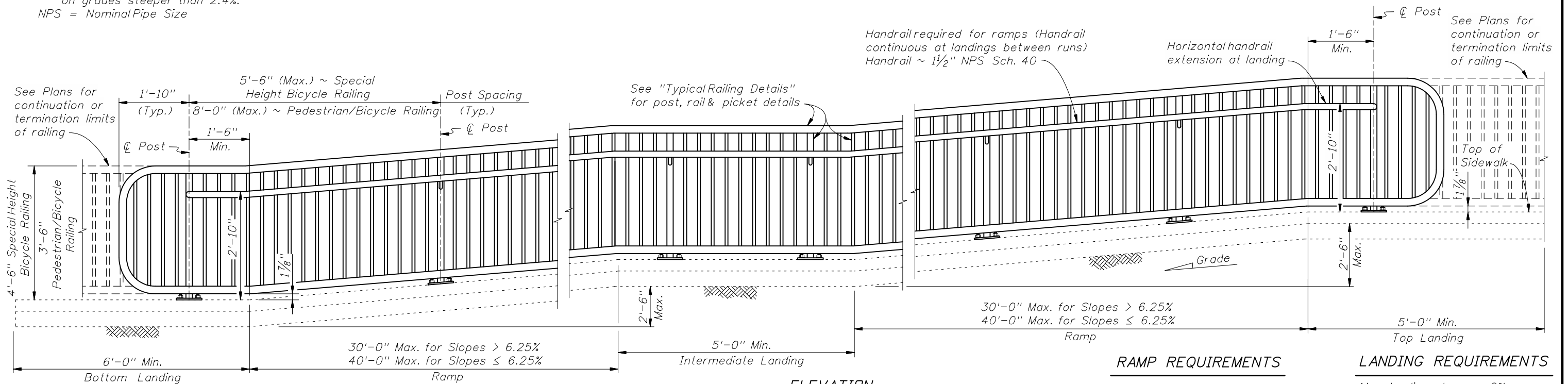
- * Picket Spacing based on the optional picket members shown. If an alternate design is used maintain a maximum clear opening of 3 7/8".
- ** End Rail bend varies for Railings on grades steeper than 2.4%.
- NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:

- # Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

CROSS REFERENCE:

For Details "C", "D" and "E", see Sheet 4 of 5.



ELEVATION
(Showing Inside Face of Railing)

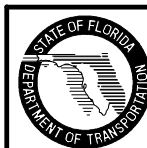
RAMP REQUIREMENTS

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% TO 8.33%

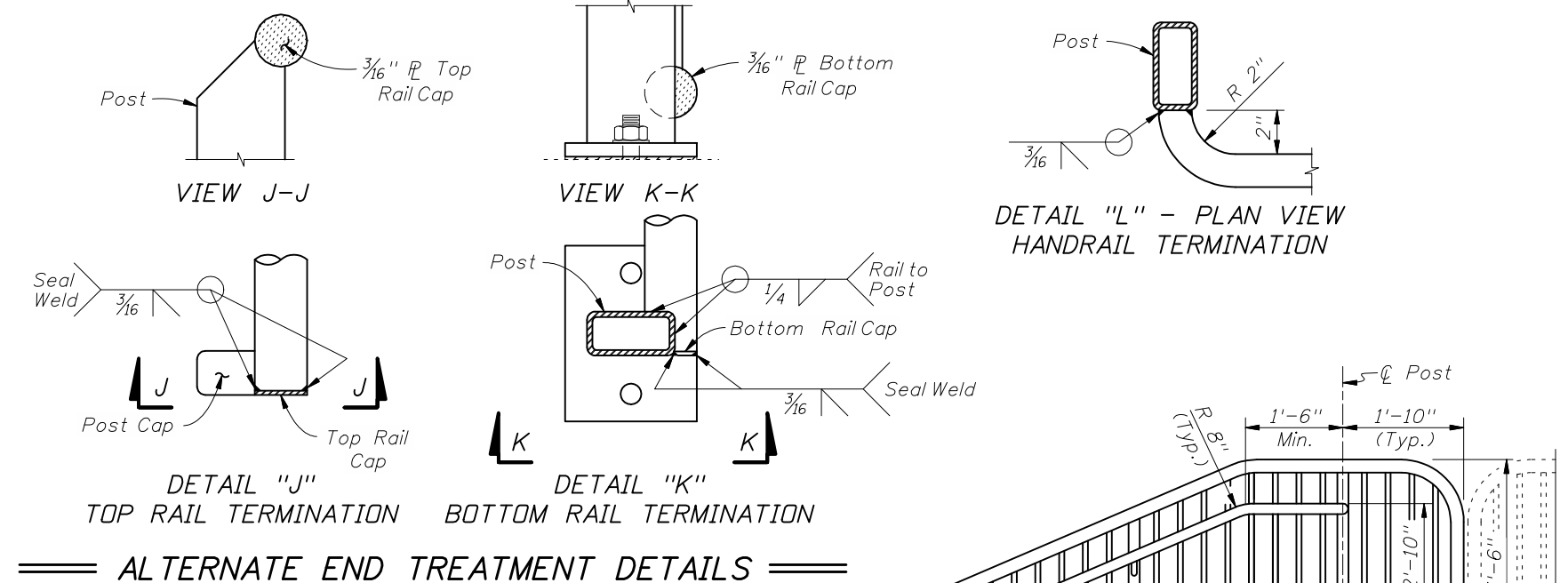
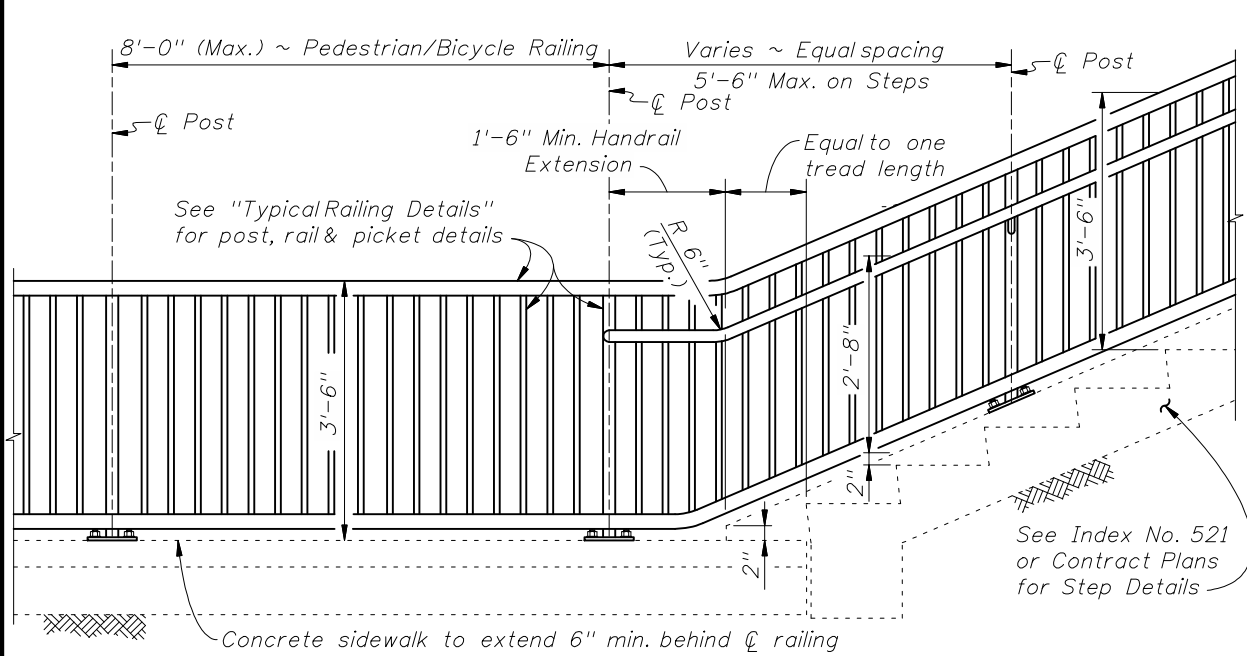


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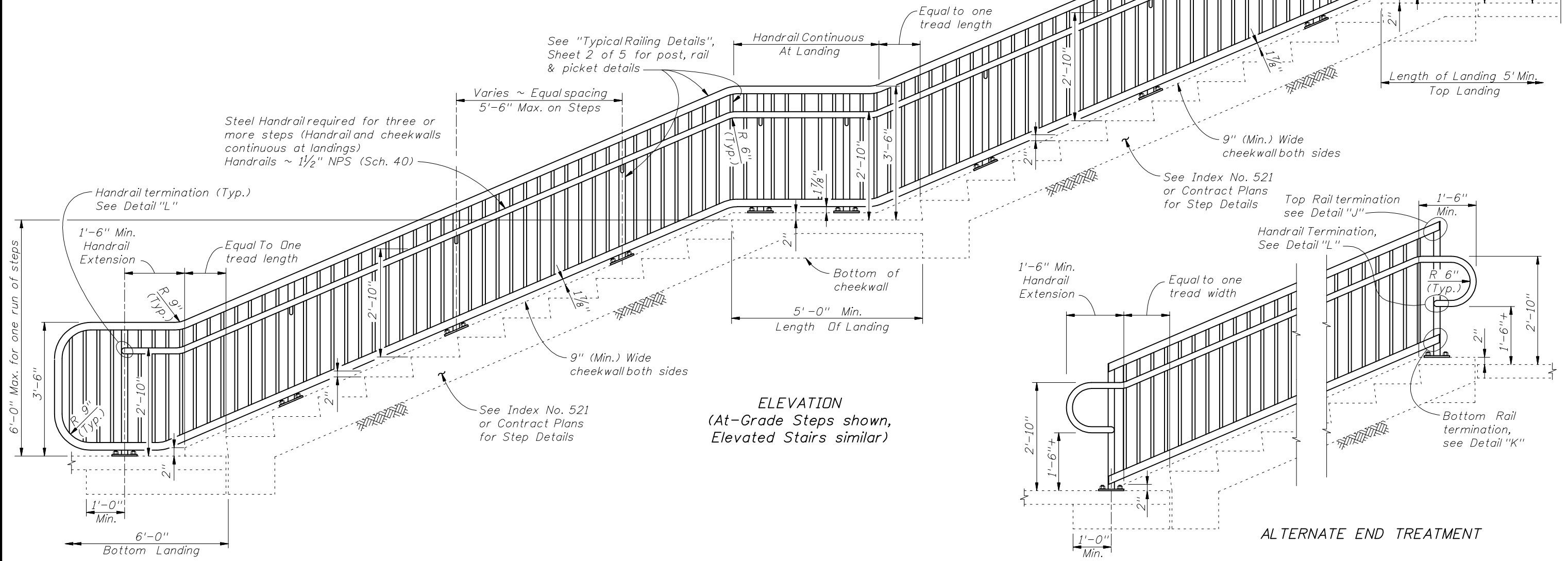
STEEL PEDESTRIAN/BICYCLE PICKET RAILING

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2 of 5

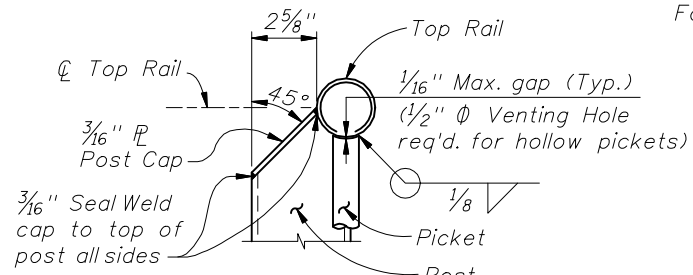
Index No.
850



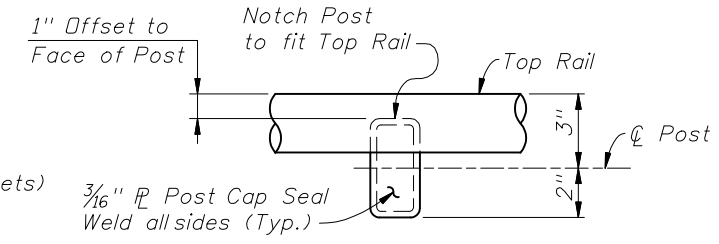
RAILING CONTINUATION BEYOND STEPS OR STAIRS
 (Bottom shown, Top similar)



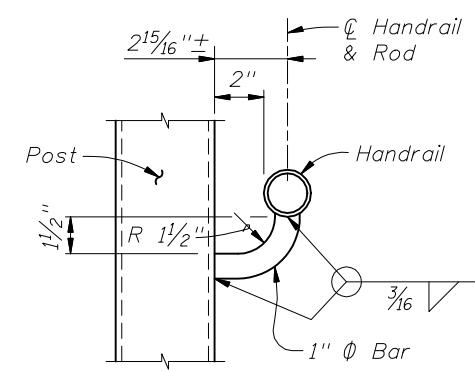
RAILINGS ON STEPS & STAIRS



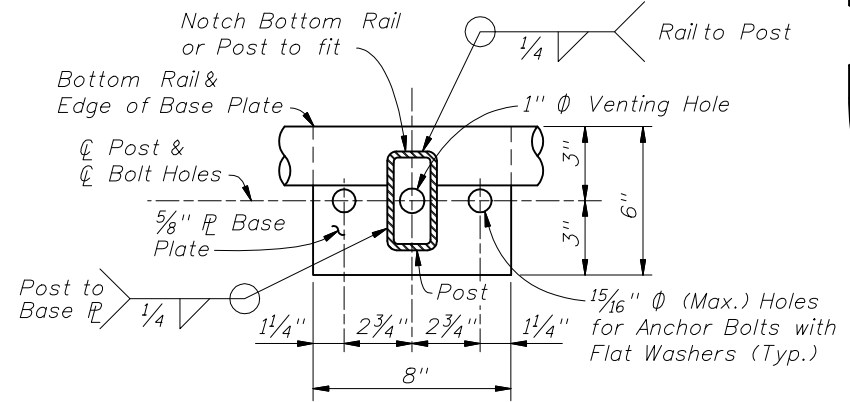
SECTION A-A
(Top of Picket Connection)



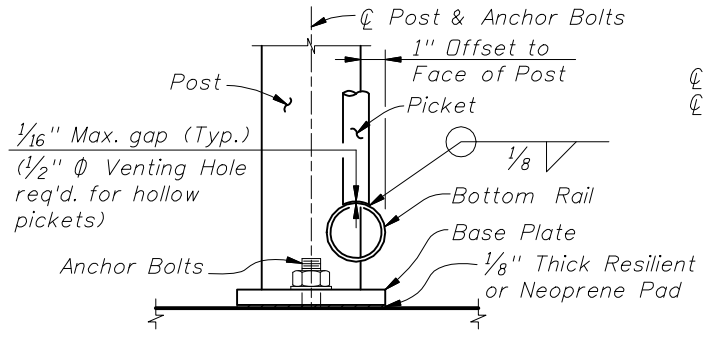
VIEW F-F
TOP RAIL CONNECTION
(Base Plate Not Shown for Clarity)



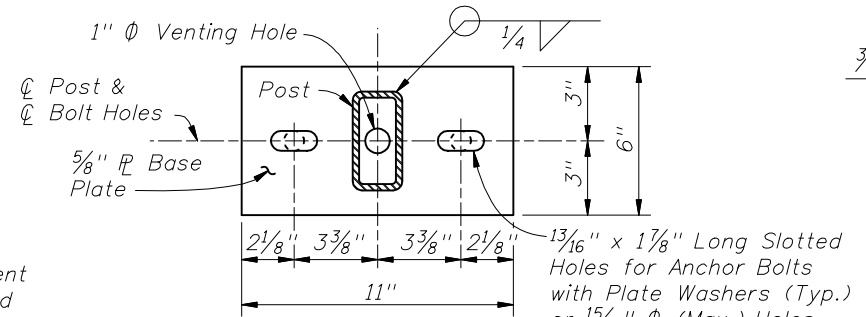
SECTION B-B
(Handrail Connection)



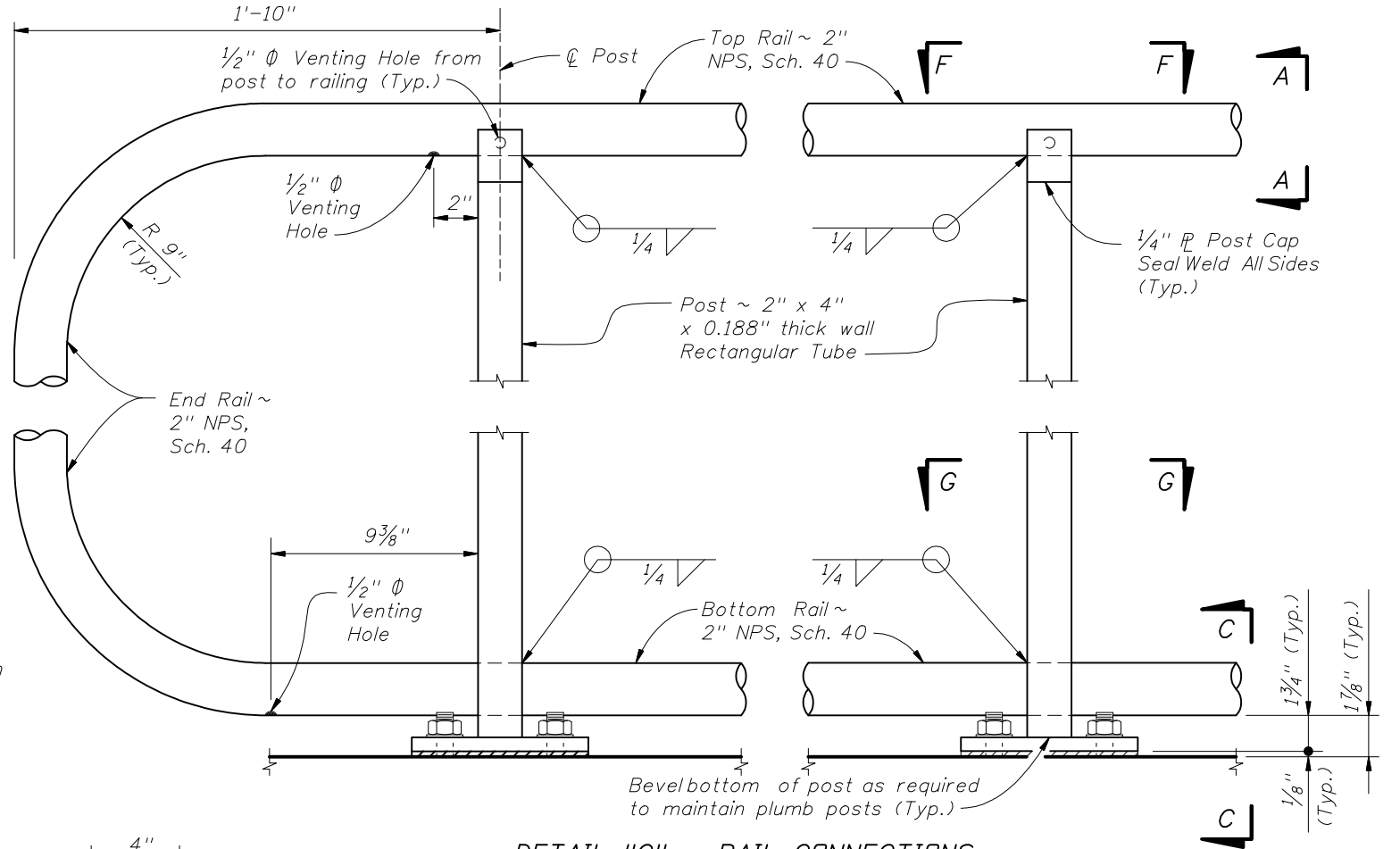
SECTION G-G
BASE PLATE & BOTTOM RAIL CONNECTION



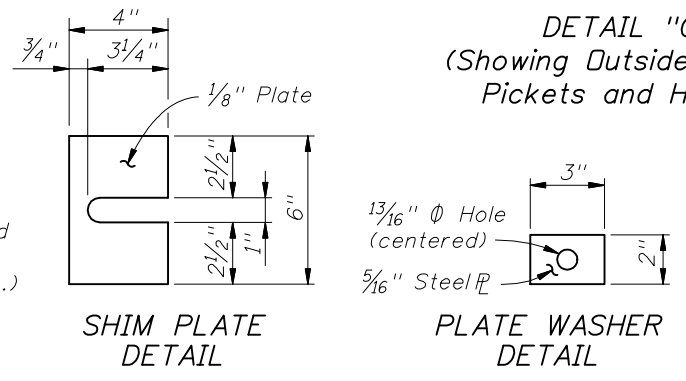
SECTION C-C
(Bottom of Picket connection)



ALTERNATE
BASE PLATE DETAIL
(Recommended for Top of Step Cheekwalls)

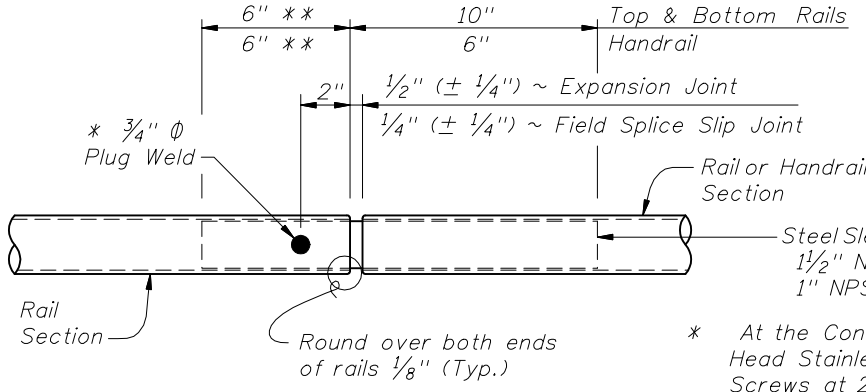


DETAIL "C" - RAIL CONNECTIONS
(Showing Outside Face of Structure and Railing,
Pickets and Handrail Not Shown for Clarity)

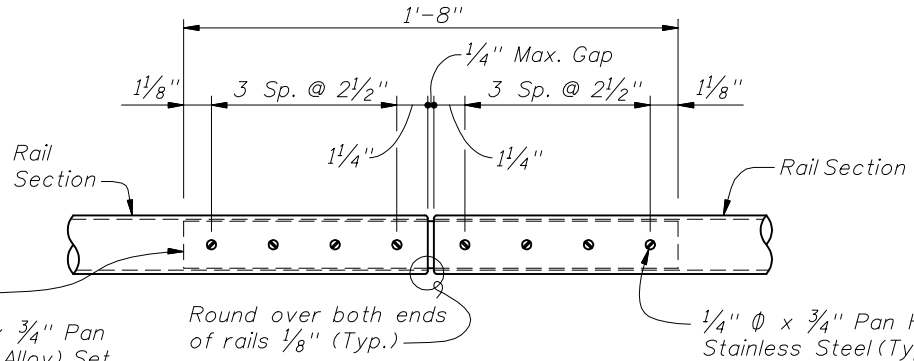


SHIM PLATE
DETAIL

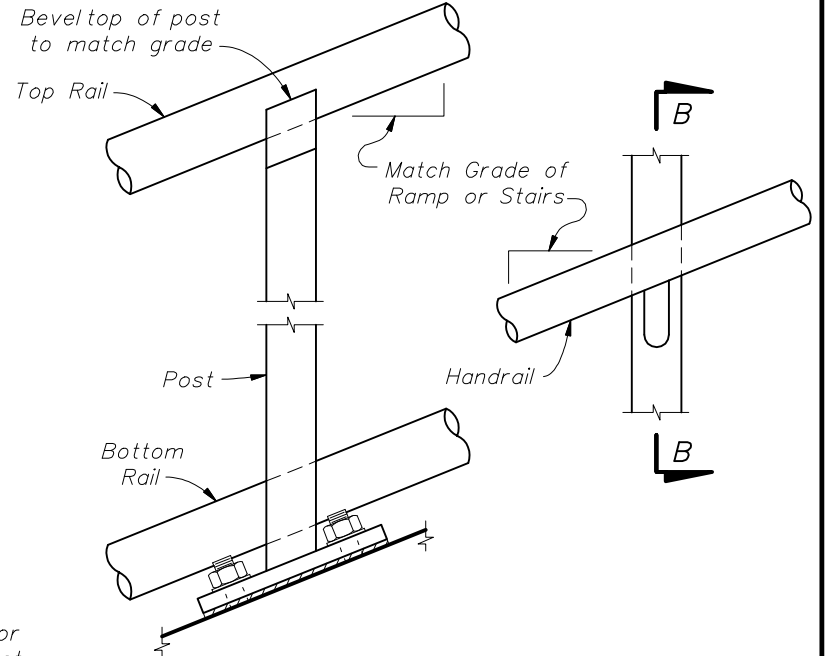
PLATE WASHER
DETAIL



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



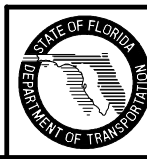
DETAIL "E" - CONTINUITY
FIELD SPLICE

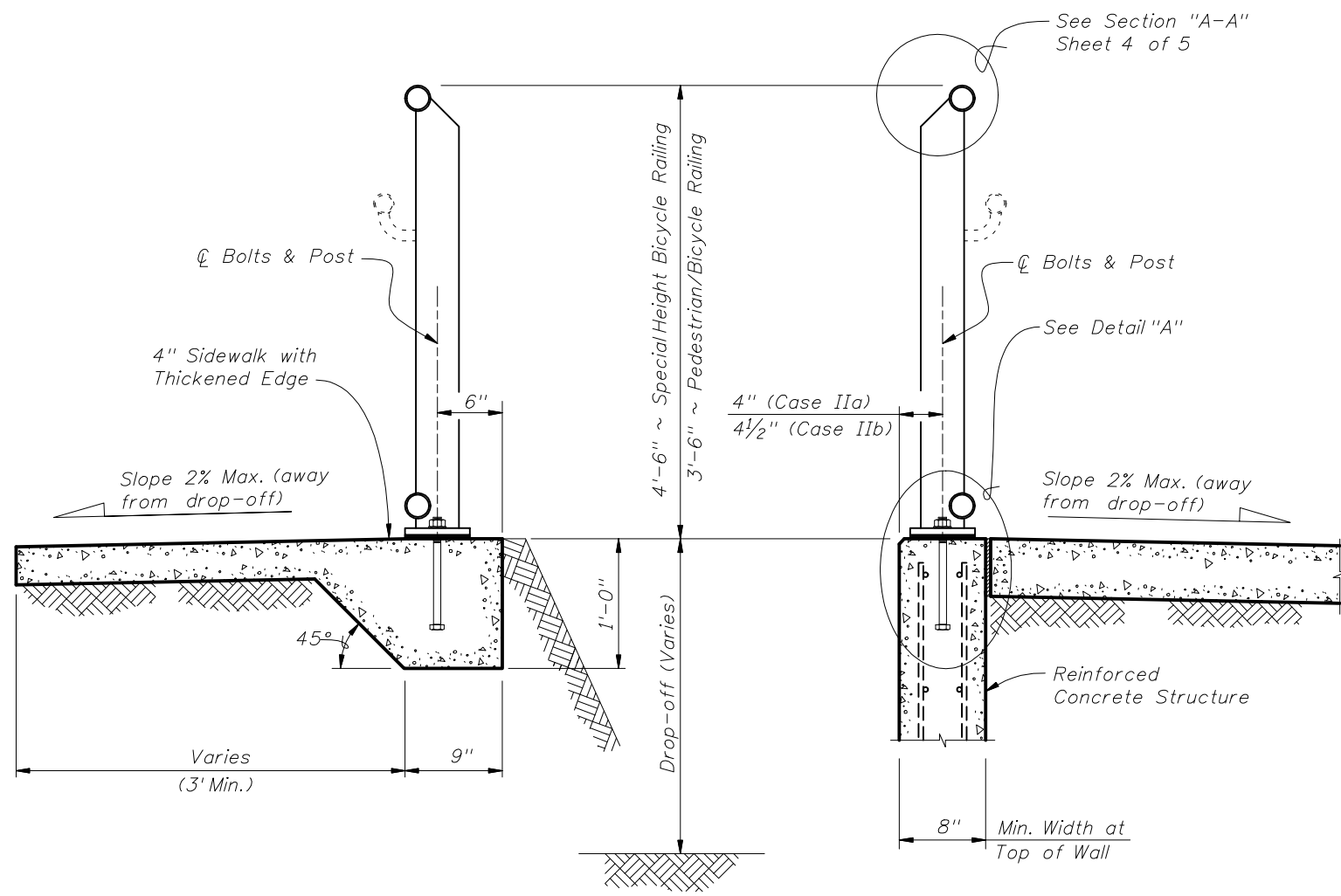


DETAIL "B" - RAIL AND HANDRAIL
(Showing Sloped Condition for Stairs or Ramp)

* At the Contractor's option 2 ~ 1/4" ϕ x 3/4" Pan Head Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing may be substituted for the 3/4" ϕ plug weld. Set screws must be set flush against the outside face of rail and underside of handrail.
** Embedded length may be 4" for plug welded connection. Maintain venting of ends of pickets during galvanizing.

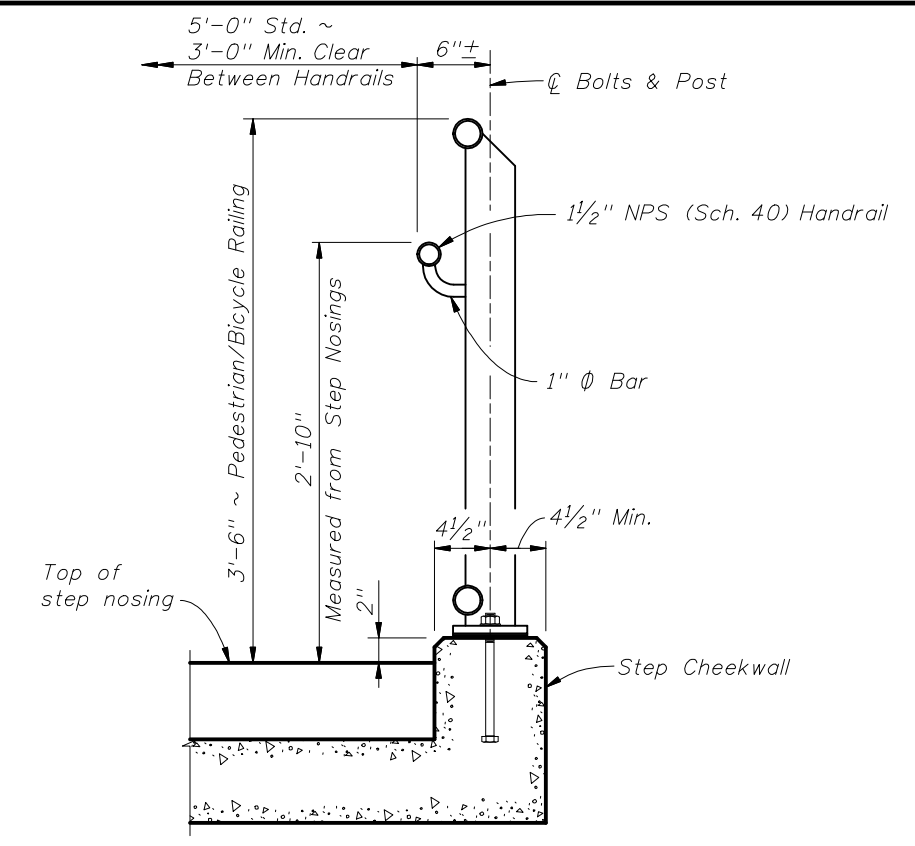
CROSS REFERENCE:
For locations of Details "C", "D" and "E", see Sheet 2 of 5.



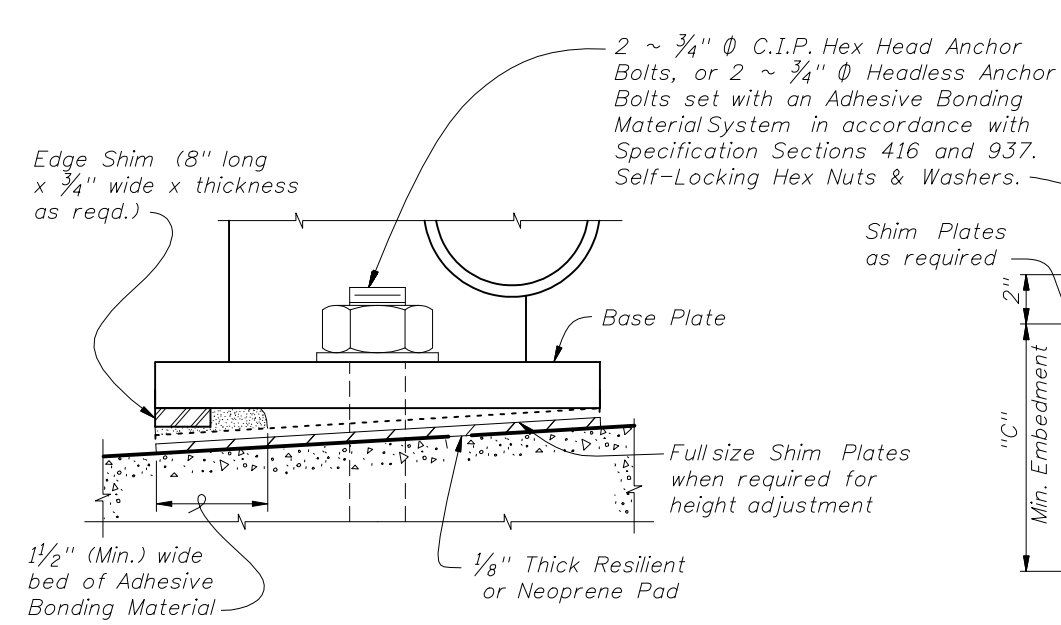


TYPICAL SECTION ON CONCRETE SIDEWALK (Case I)

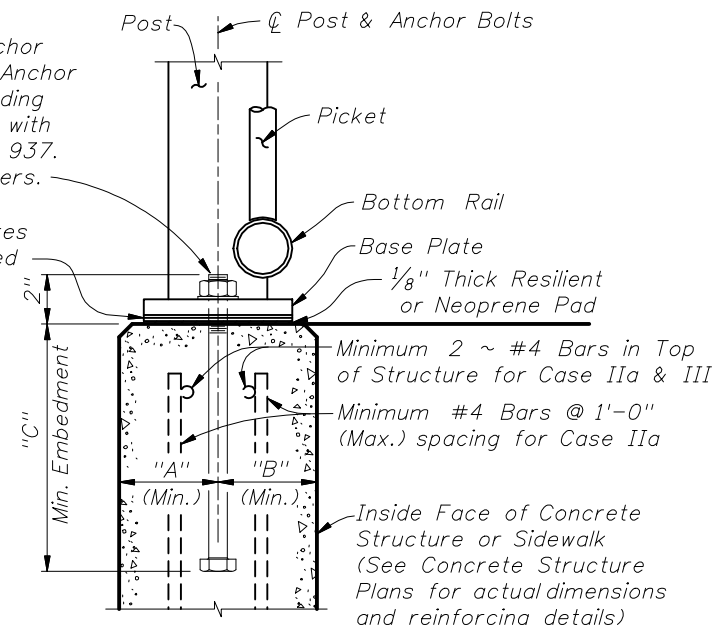
TYPICAL SECTION ON RETAINING WALL (Case II)



TYPICAL SECTION ON STEPS & STAIRS (Case III)



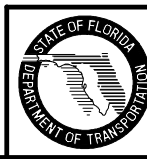
DETAIL "F" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION) (Used in lieu of Beveled Shim Plates)

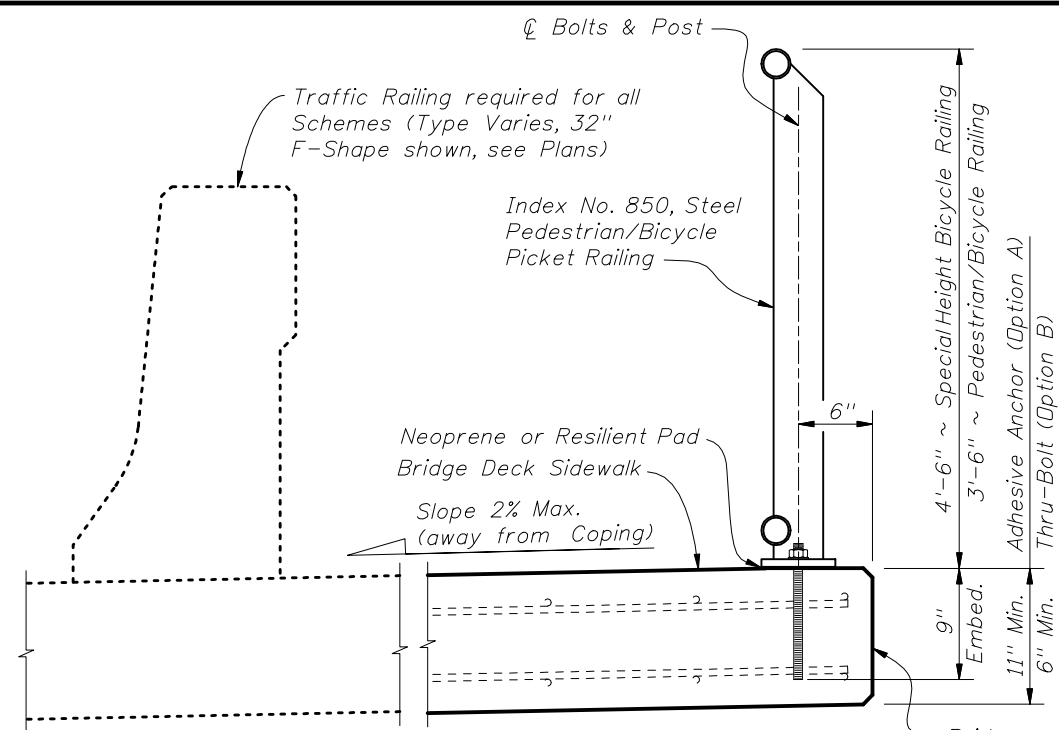


DETAIL "A" (Cast-In-Place Anchor Bolts shown, Adhesive Anchors similar)

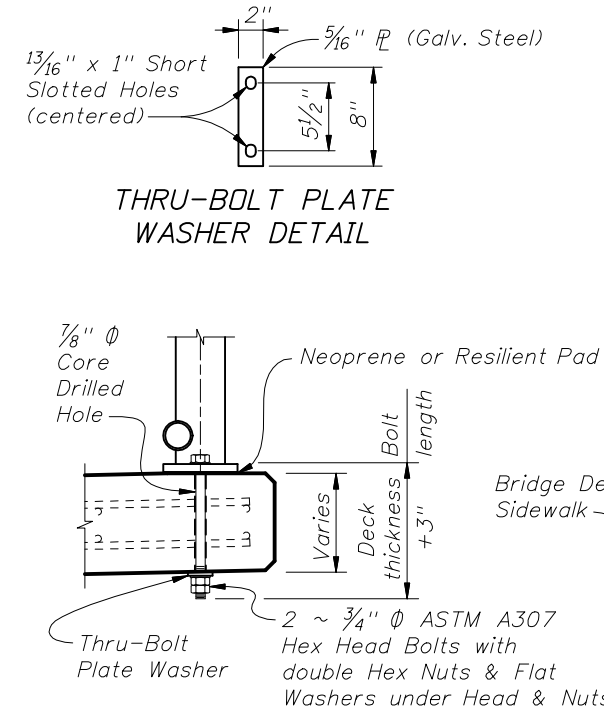
ANCHOR BOLT TABLE							
CASE	STRUCTURE TYPE	DIMENSIONS			ANCHOR LENGTH		ANCHOR SIZE
		"A" Edge Dist.	"B" Edge Dist.	"C" Embedment	C.I.P Hex Head Bolt	Adhesive Anchor	
I	Unreinforced Concrete	6"	1'-2"	9"	10 1/2"	11"	3/4" ϕ
IIa	Reinforced Concrete	4"	4"	9"	10 1/2"	11"	3/4" ϕ
IIb	Gravity Wall Index No. 520	4 1/2"	3 1/2" @ top	1'-0" *	1'-1 1/2"	1'-2"	3/4" ϕ
III	Step Cheekwall	4 1/2"	4 1/2"	9"	10 1/2"	11"	3/4" ϕ

* Embedment length "C" may be reduced to 9" for the 3'-6" height railings for Case IIb, when the post spacing does not exceed 5'-0".

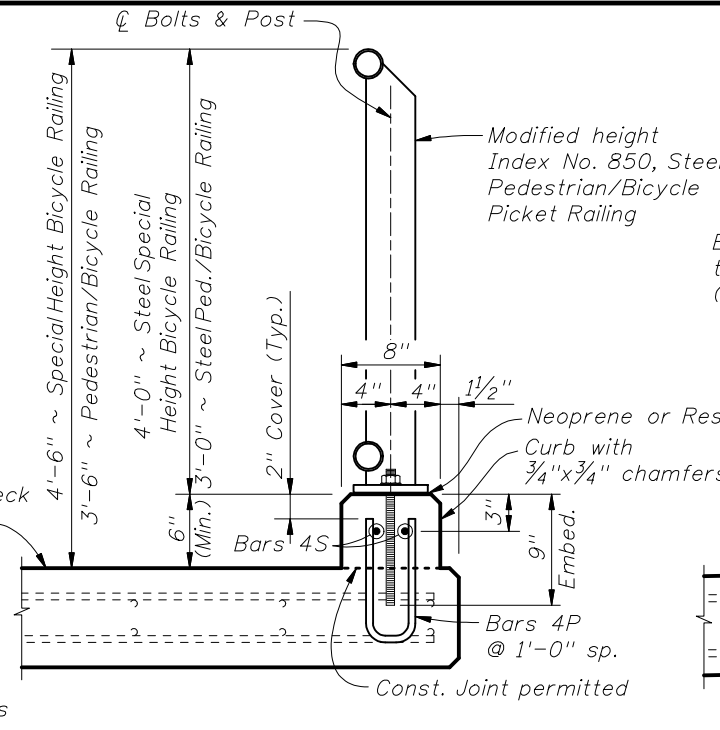




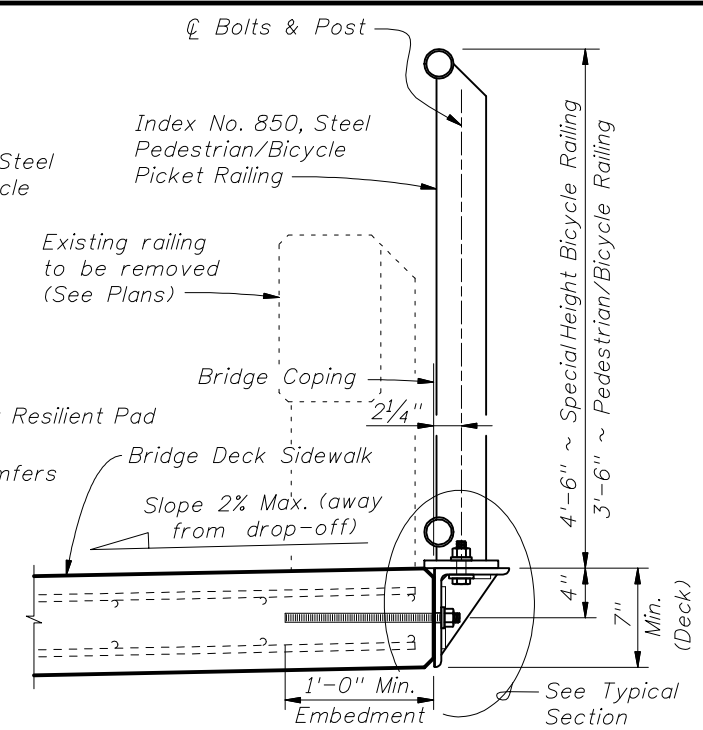
SCHEME 1 -
TYPICAL SECTION THROUGH DECK MOUNTED RAILING
(Adhesive Anchor Option shown - SCHEME 1A)



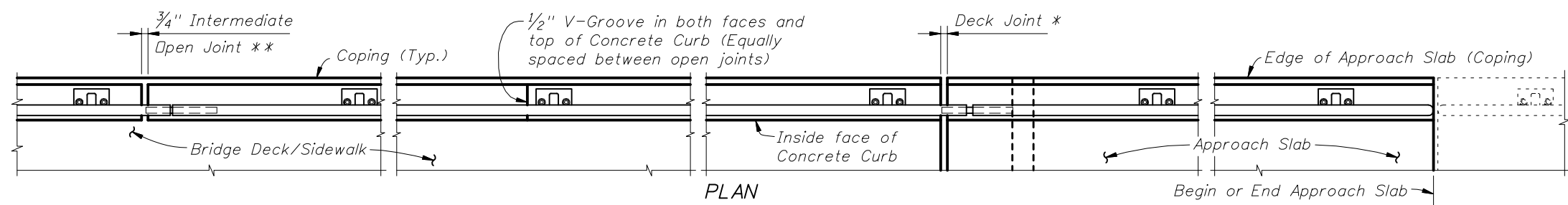
SCHEME 1B - DETAILS
(Thru-Bolt Option)



SCHEME 2 -
TYPICAL SECTION THROUGH CURB MOUNTED RAILING



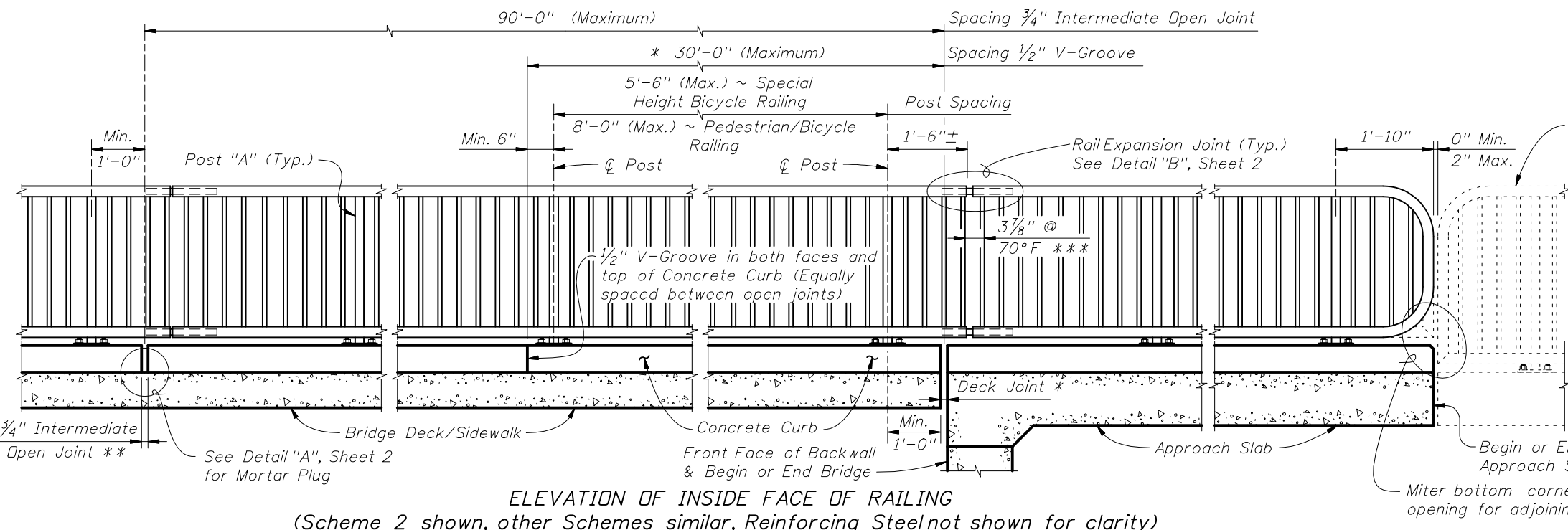
SCHEME 3 -
TYPICAL SECTION THROUGH SIDE MOUNTED RAILING (RETROFIT)



PLAN
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)

INSTRUCTIONS TO DESIGNER:

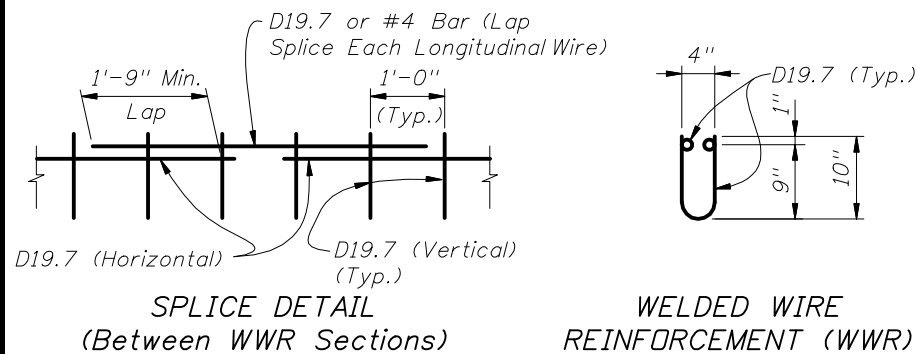
1. Provide railing layout ControlDrawings in the Plans to show post spacing, curb joint, V-groove, deck joint, expansion joint locations and Scheme number.
2. For existing bridge retrofits special end treatment details may be required for perpendicular or flared wingwalls at Begin and End Bridge. Provide existing railing removal details when required.



ELEVATION OF INSIDE FACE OF RAILING
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)

ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS

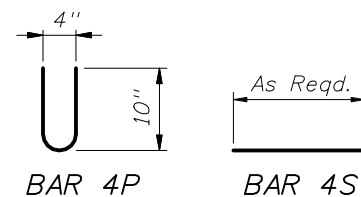
NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4 3/4" are not permitted.



CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

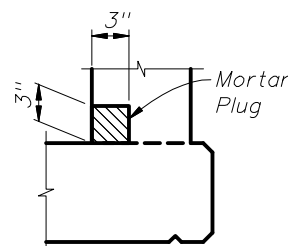
BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
P	4	2'-0"
S	4	As Reqd.



CURB REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- The reinforcement for the curb on a retaining wall shall be the same as detailed for an 8" deck.
- All reinforcing steel at the open joints shall have a 2" minimum cover.
- Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
- At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 4P and 4S. Welded Wire Reinforcement shall conform to ASTM A497.



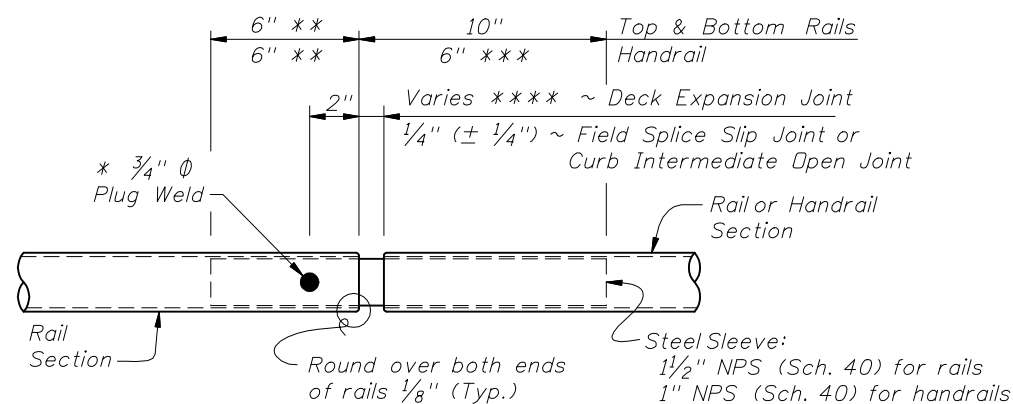
DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT

NOTE: At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.

ESTIMATED CONCRETE CURB QUANTITIES (SCHEME 2)

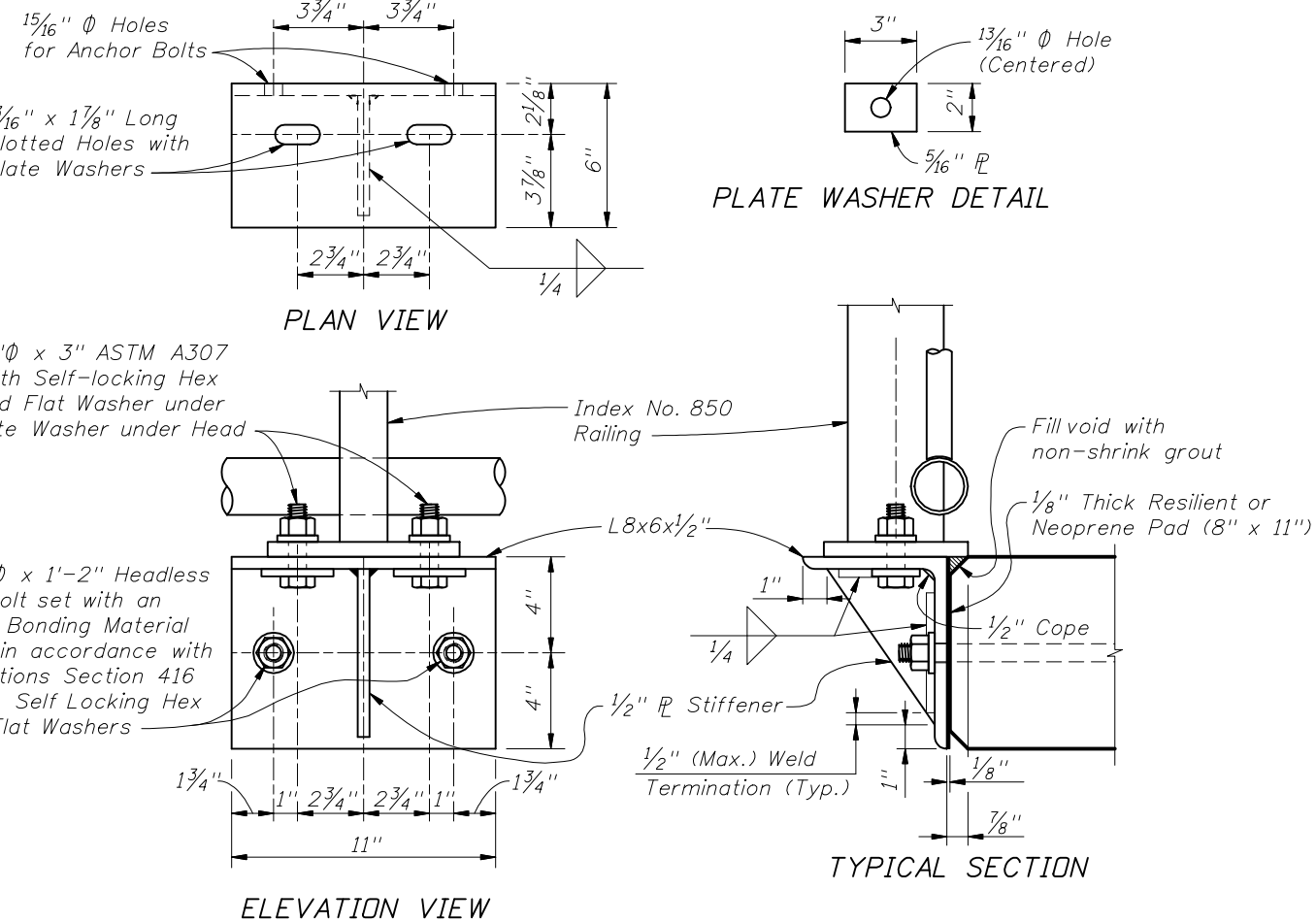
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.0124
Reinforcing Steel	LB/LF	4.01

SCHEME 2 - CONCRETE CURB DETAILS



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

- * At the Contractor's option 2 ~ 1/4" Ø x 3/4" Pan Head Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing along outside face of railing may be substituted for the 3/4" Ø plug weld. Set screws must be set flush against the outside face of rail.
- ** Embedded length may be 4" for plug welded connection. Maintain venting of ends of pickets during galvanizing.
- *** 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".



SCHEME 3 - SIDE MOUNTED SUPPORT BRACKET DETAILS

BRIDGE PICKET RAILING NOTES:

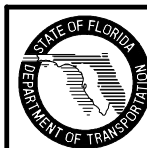
APPLICABILITY NOTE: Bridge Picket Railing is limited to use on bridges with an expansion joint thermal movements not exceeding 5". Scheme 3 is limited to bridge retrofit applications where additional sidewalk width is required.

RAILING DETAILS: For Railing fabrication and installation details and notes see Index No. 850, except that railing shall be fabricated and installed normal to the Profile Grade longitudinally and vertical transversely.

CONCRETE CURB (Scheme 2): Construct concrete curb vertical with the top surface finished level transversely. Concrete class shall be the same as the bridge deck.

SIDE MOUNTED SUPPORT BRACKET (Scheme 3): L-Shape and Stiffener Plate shall be in accordance with ASTM A36. Welding shall be in accordance with the American Society of Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required. The bracket shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications.

PAYMENT: Railing shall be paid per linear foot (Item No. 515-2-abb) for the steel railing and include the cost of support brackets (Scheme 3). Concrete and reinforcing steel quantities for the concrete curb (Scheme 2), will be included in the bridge deck plan quantity pay items. Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, 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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BRIDGE PEDESTRIAN/BICYCLE PICKET RAILING (STEEL)

Last Revision 01/01/08	Sheet No. 2 of 2
Index No. 851	

NOTES

DESIGN SPECIFICATIONS:

American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Third Edition, 2004, including 75 year Design Life
 Florida Department of Transportation (FDOT) "Structures Design Guidelines for Load and Resistance Factor Design", January 2006.
 Florida Building Commission "Florida Building Code", 2004 Edition, except for Handrail diameter.
 U.S. Access Board "ADA Accessibility Guidelines", July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.
 National Fire Protection Association (NFPA) 101, "Life Safety Code", 2003 Edition.

DESIGN LIVE LOADS:

Post and Base Plate: Equivalent point load = 200 lb. load + (50 lb./ft. x Post Spacing (ft.)) applied transversely at top rail connection.

Top & Bottom Rails: 50 lb./ft. uniform load applied simultaneously vertically and transversely + 200 lb. concentrated point load applied at midspan in the directions for both maximum stress and deflection.

Handrails: Maximum of either 50 lb./ft. uniform load applied in any direction or 250 lb. concentrated load applied in any direction at any point along the top.

Pickets: Concentrated 200 lb. load applied transversely over an area of 1.0 square foot.

GEOMETRY:

Clear Opening between Pickets: Shall reject the passage of a 4" diameter sphere below 42" height, and a 8" diameter sphere above 42" height.

Clear Opening under Bottom Rail: Shall reject the passage of a 2" diameter sphere.

ADA Handrail Height: 34"

Standard Pedestrian/Bicycle Railing Height: 42" minimum.

Special Height Bicycle Railing Height: 54" minimum.

DEFLECTION:

Total combined deflection of the railing system including the resilient or neoprene pads, due to the top rail design live loads, shall not exceed 1/2" when measured at midspan of the top rail.

APPLICABILITY NOTE TO DESIGNER:

This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazard exceeds 2'-6" or when a drop-off hazard is less than 2'-6" and is required by design. See Index No. 861 for special requirements and modifications for use on bridges. Adequate foundation support shall be provided for anchorage and stability against overturning. For unusual site conditions a site specific railing is to be designed by the responsible engineer. 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). Refer to FDOT Plans Preparation Manual (Volume I) Chapters 4 & 8, for the definition of vehicular, pedestrian and bicyclist "drop-off hazards".

ALTERNATE DESIGN:

Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the design life, live loads, geometry and deflection requirements specified herein. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1 1/2" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

RAILS, PICKETS & POSTS:

Structural Tube, Pipe and Bar shall be in accordance with ASTM B221 or ASTM B429, Alloy 6061-T6. End Rail 90° bends and corner bends with maximum 4'-0" post spacing, may be Alloy 6063-T6. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Pickets shall be fabricated parallel to the posts. 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.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" x 4" Rectangular Tube	2.00" x 4.00"	0.250"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A
Pickets	3/4" NPS (Sch. 40)	1.050"	0.113"

BASE PLATES & POST 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 1/4" and localized irregularities greater than 1/8". 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 1/2", unless longer anchor bolts are provided for the exposed thread length.

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 Section 962 of the Specifications.

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 or 70.

JOINTS:

All fixed joints are to be welded all around and 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 railing must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments.

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 picket welds may be ER4043.

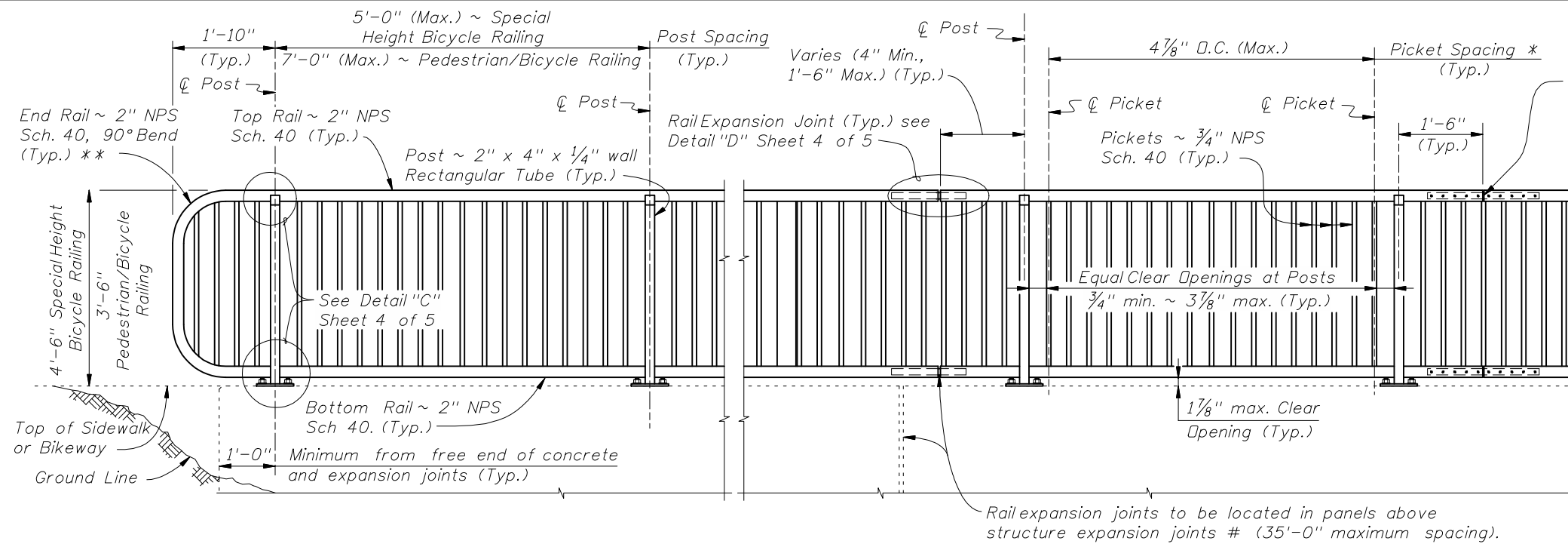
SHOP DRAWINGS:

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations, 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.

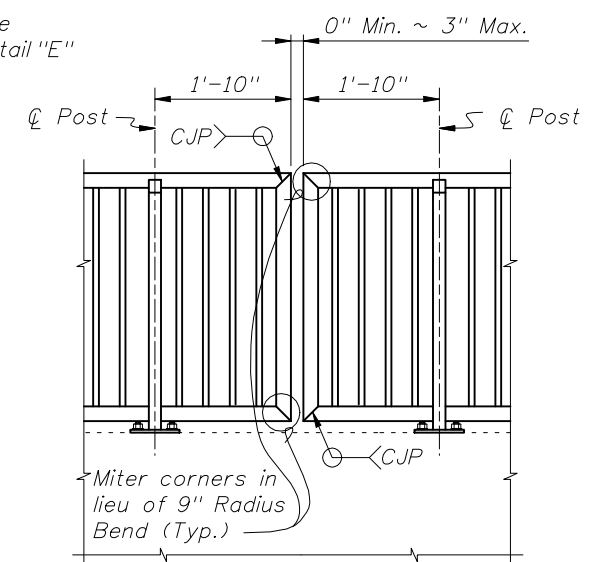
PAYMENT:

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, 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.





ELEVATION
(Showing Outside Face of Railing)



EXPANDED ELEVATION AT CORNERS
Note: Non-continuous corners are permitted when handrails are not required.

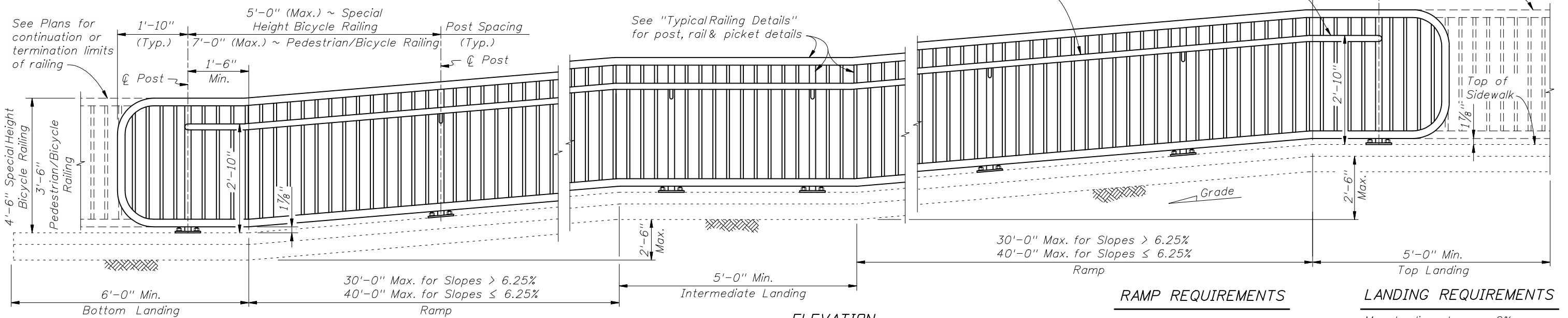
TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%

DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS

NOTES:
 * Picket Spacing of 4 7/8" centers is based on a 3/4" NPS. If an alternate design is used maintain a maximum clear opening of 3 7/8".
 ** End Rail bend varies for Railings on grades steeper than 2.4%.
 NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:
 # Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.
 CROSS REFERENCE:
 For Details "C", "D" and "E", see Sheet 4 of 5.

Handrail required for ramps (Handrail continuous at landings between runs)
 Handrail ~ 1 1/2" NPS Sch. 40



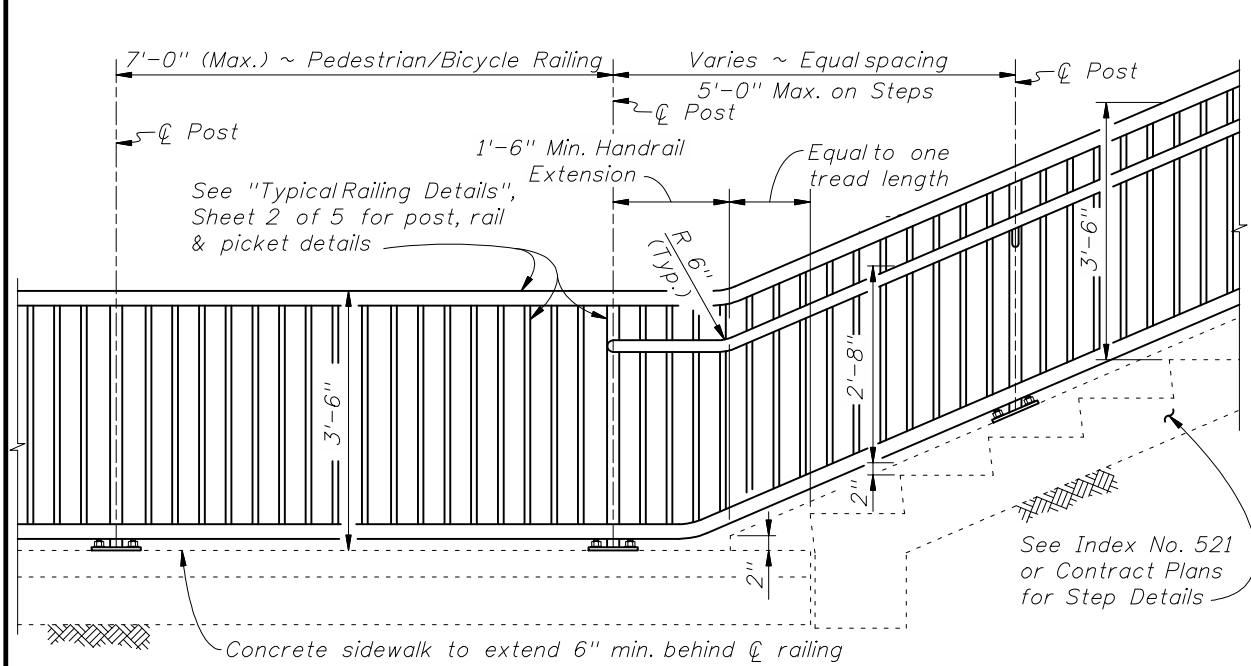
ELEVATION
(Showing Inside Face of Railing)

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

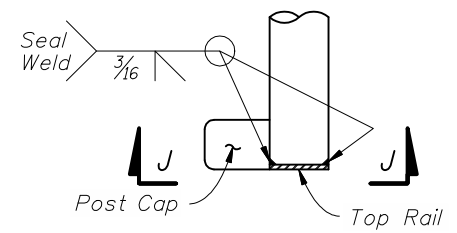
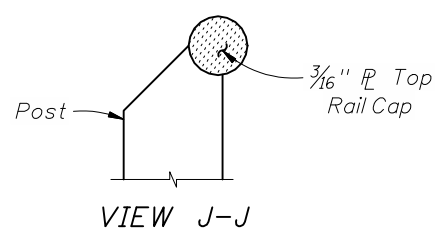
LANDING REQUIREMENTS
 Max. landing slope = 2%
 Max. landing cross-slope = 2%

RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%

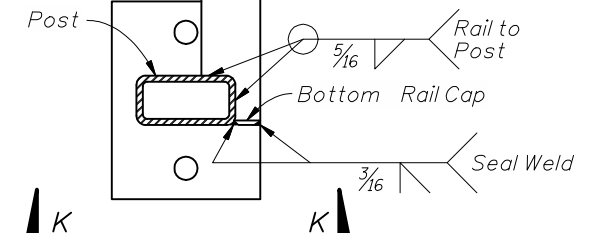
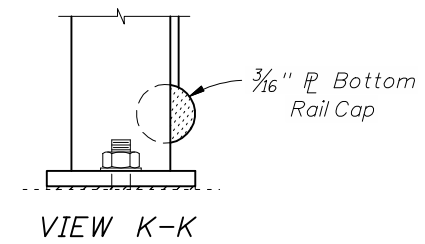




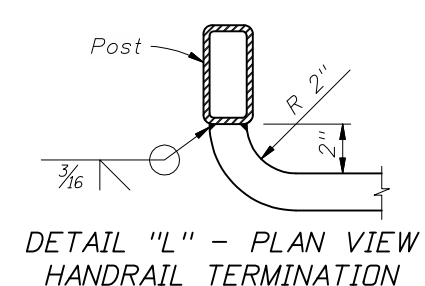
RAILING CONTINUATION BEYOND STEPS OR STAIRS
(Bottom shown, Top similar)



DETAIL "J" - PLAN VIEW
TOP RAIL TERMINATION

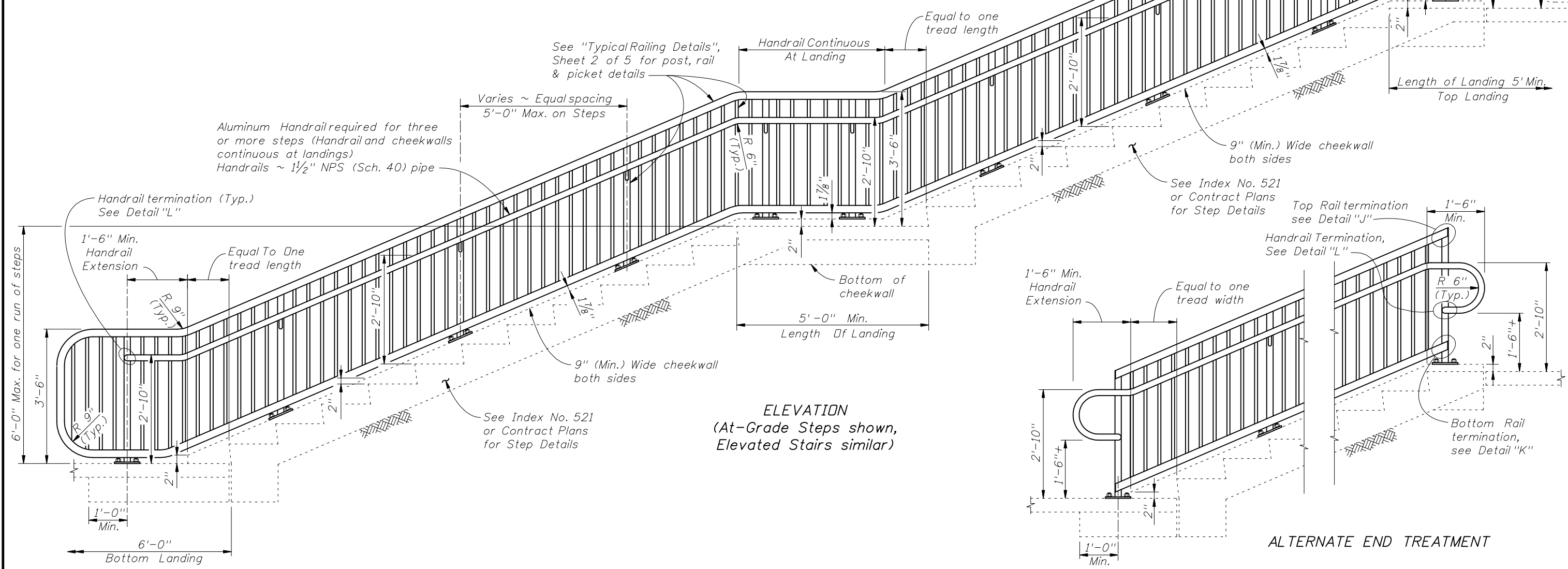


DETAIL "K" - PLAN VIEW
BOTTOM RAIL TERMINATION



DETAIL "L" - PLAN VIEW
HANDRAIL TERMINATION

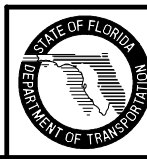
ALTERNATE END TREATMENT DETAILS



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

ALTERNATE END TREATMENT

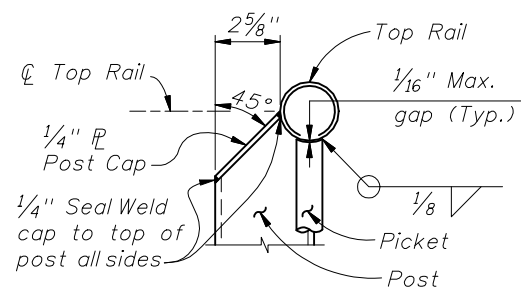
RAILINGS ON STEPS & STAIRS



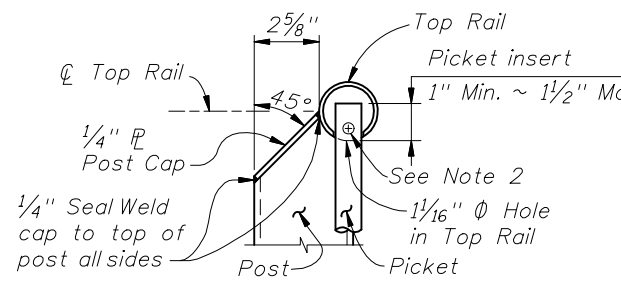
2010 FDOT Design Standards

ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING

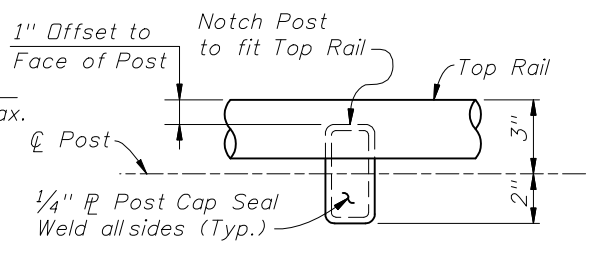
Last Revision 01/01/08	Sheet No. 3 of 5
Index No. 860	



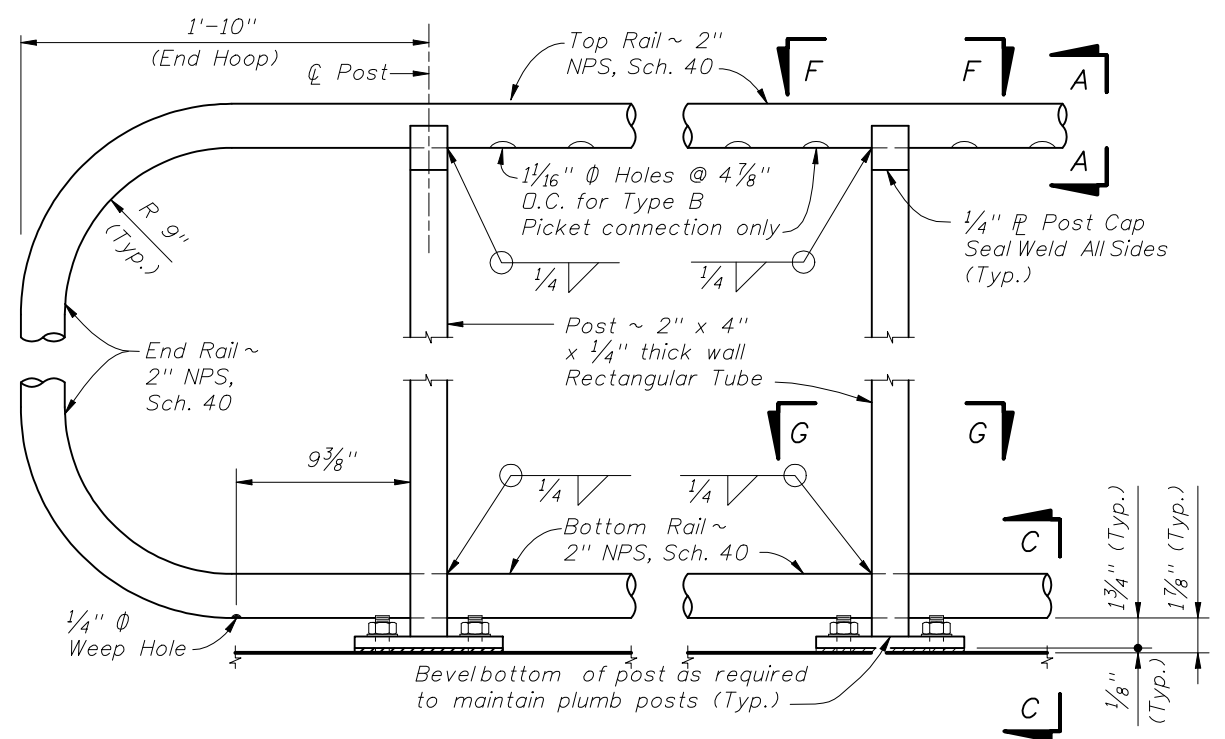
TYPE A (WELDED)



TYPE B (NONWELDED)

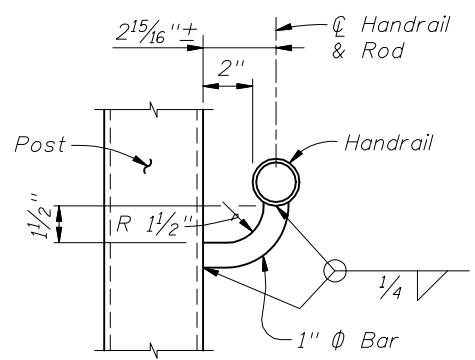


VIEW F-F
TOP RAIL CONNECTION
(Base Plate Not Shown for Clarity)

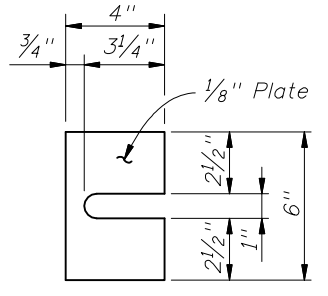


DETAIL "C" - RAIL CONNECTIONS
(Showing Outside Face of Structure and Railing,
Pickets and Handrail Not Shown for Clarity)

SECTION A-A
(Top of Picket Connection)



SECTION B-B
(Handrail Connection)



SHIM PLATE
DETAIL

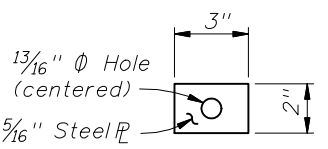
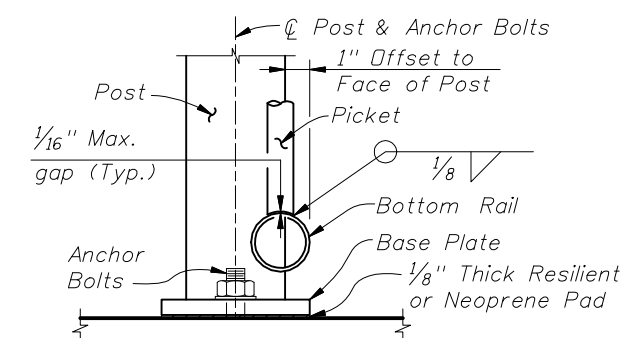
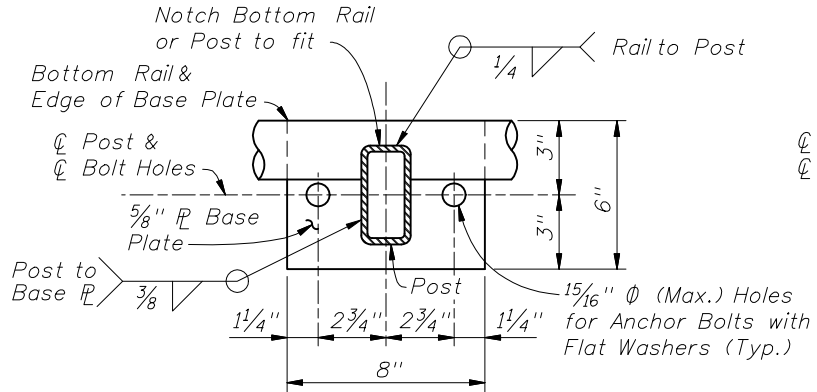


PLATE WASHER
DETAIL

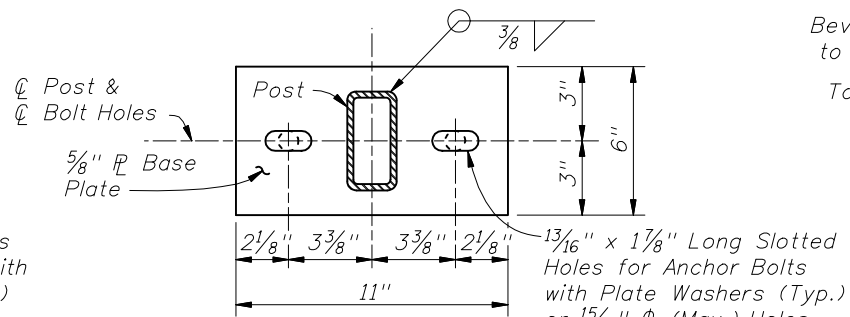
Notes:
1. Type B connection is required for use with Index No. 861 on bridges, except End Hoops may use Type A connections. Optional for other installations and for connection to bottom rail.
2. Provide #10 x 1/2" Pan Head Stainless Steel (316 or 18-8 Alloy) Screw in the last picket at each expansion or field splice joint to secure the end of the top rail.



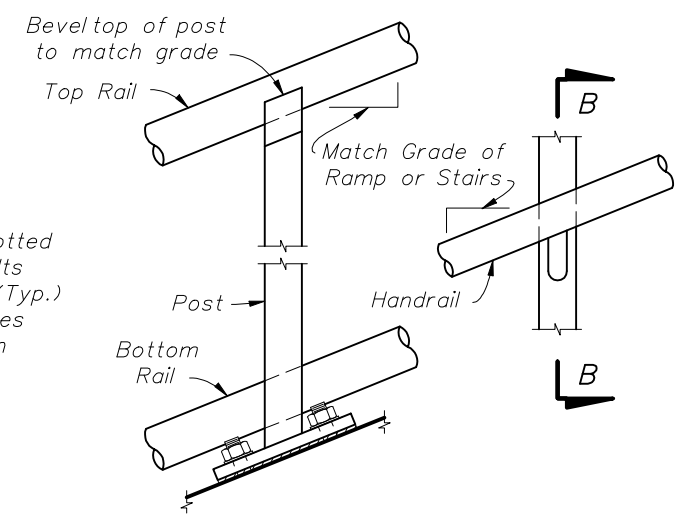
SECTION C-C
(Bottom of Picket connection)



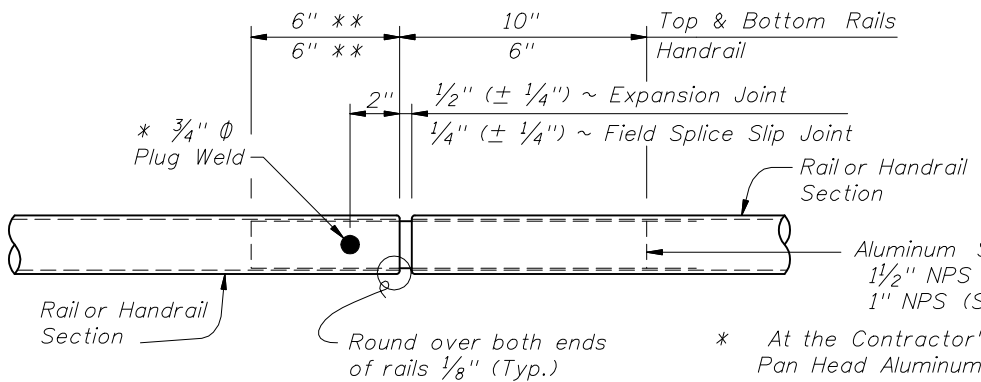
SECTION G-G
BASE PLATE & BOTTOM RAIL CONNECTION



ALTERNATE
BASE PLATE DETAIL
(Recommended for Top of Step Cheekwalls)

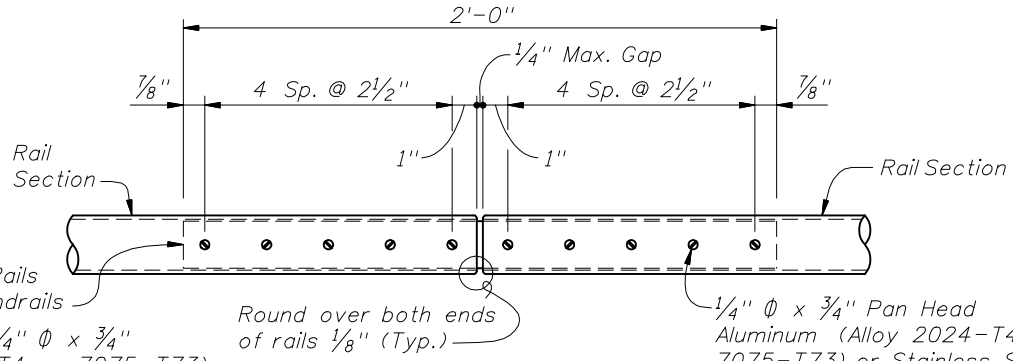


DETAIL "B" - RAIL AND HANDRAIL
(Showing Sloped Condition for Stairs or Ramp)

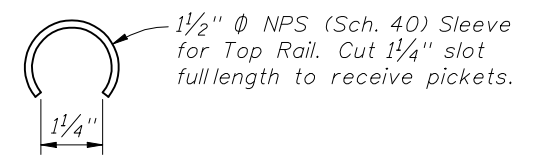


DETAIL "D" - EXPANSION JOINT
(FIELD SPLICE SLIP JOINT SIMILAR)

* At the Contractor's option 2 ~ 1/4" x 3/4" Pan Head Aluminum (Alloy 2024-T4 or 7075-T73) or Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing may be substituted for the 3/4" diameter plug weld. Set screws must be set flush against the outside face of rails and underside of handrails.
** Embedded length may be 4" for plug welded connection.



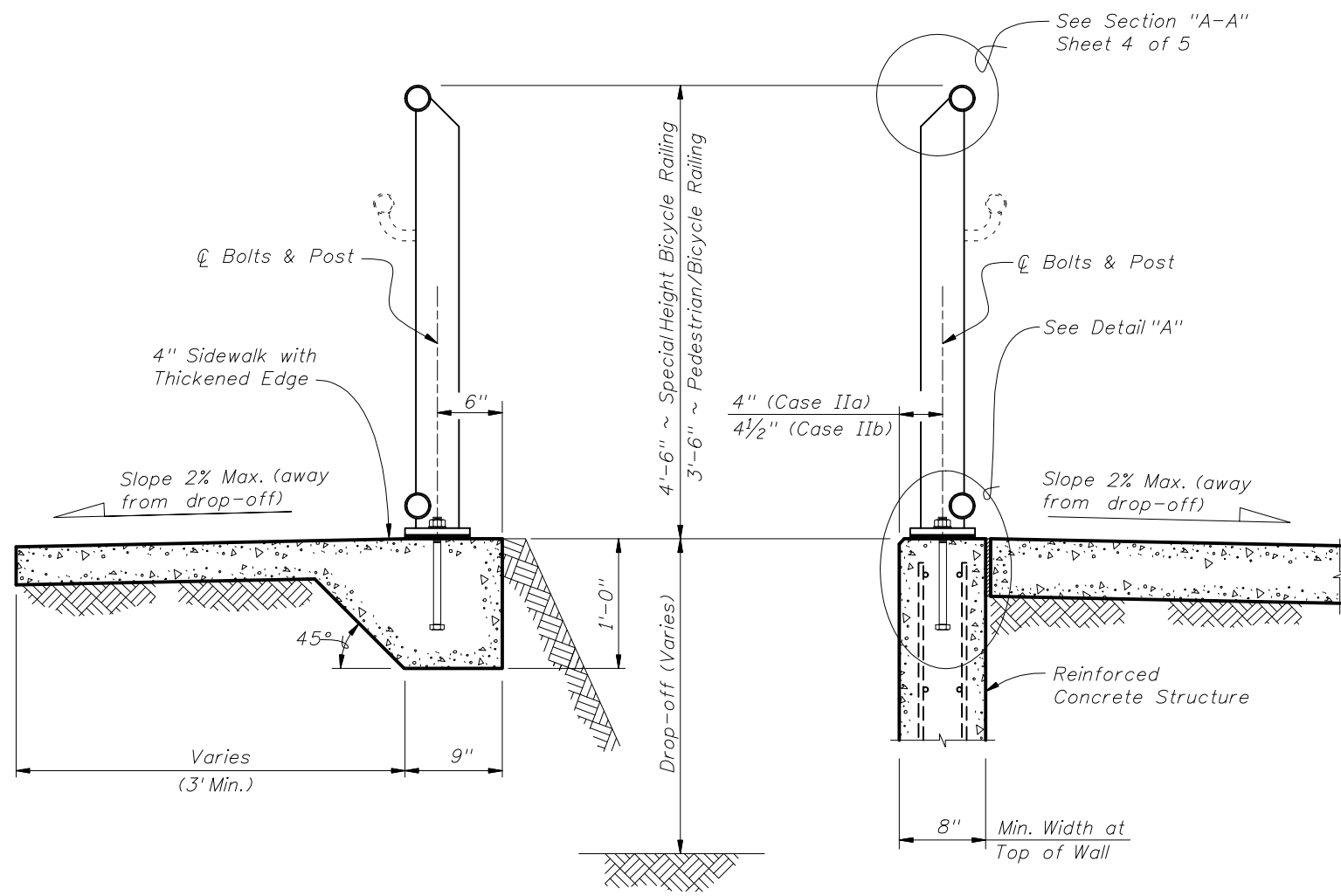
DETAIL "E" - CONTINUITY
FIELD SPLICE



SLEEVE MODIFICATION FOR
TOP RAIL TYPE B CONNECTION

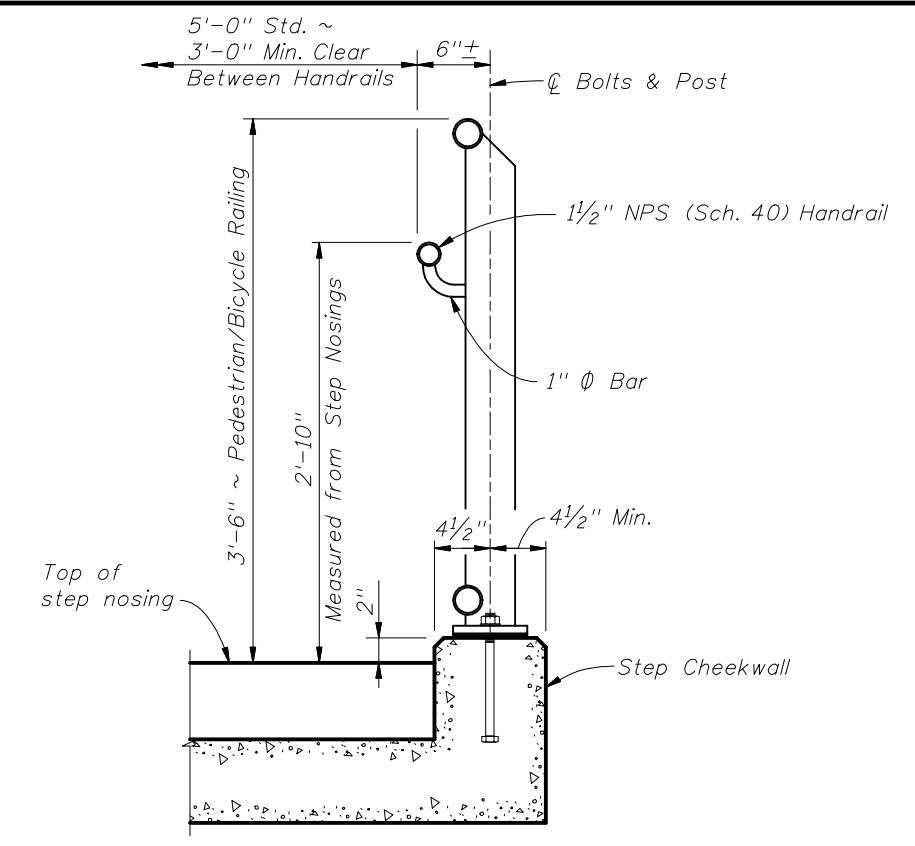
CROSS REFERENCE:
For locations of Details "C", "D" and "E", see Sheet 2 of 5.



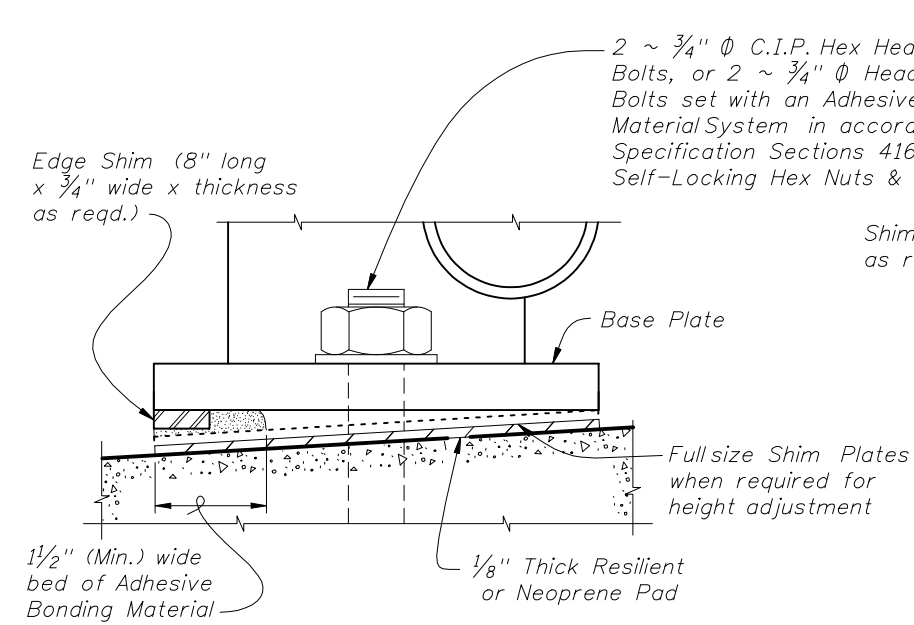


TYPICAL SECTION ON CONCRETE SIDEWALK (Case I)

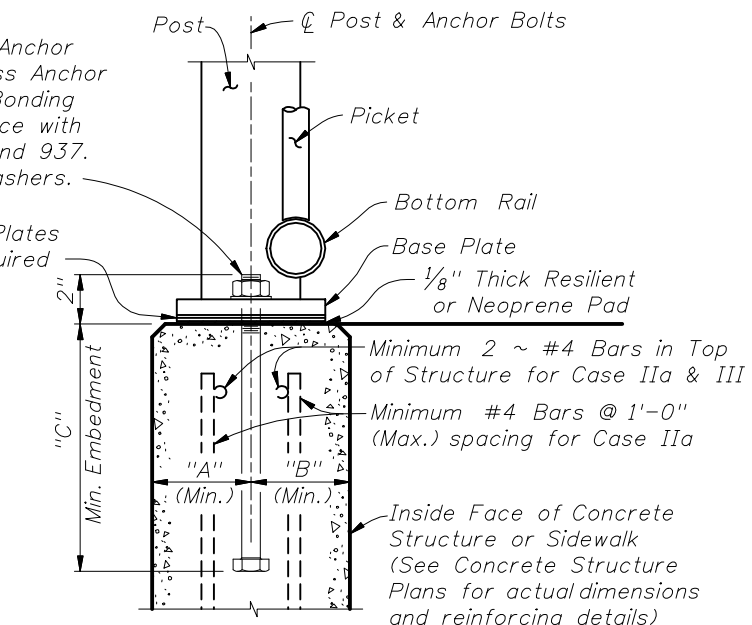
TYPICAL SECTION ON RETAINING WALL (Case II)



TYPICAL SECTION ON STEPS & STAIRS (Case III)



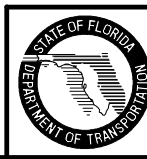
DETAIL "F" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION) (Used in lieu of Beveled Shim Plates)

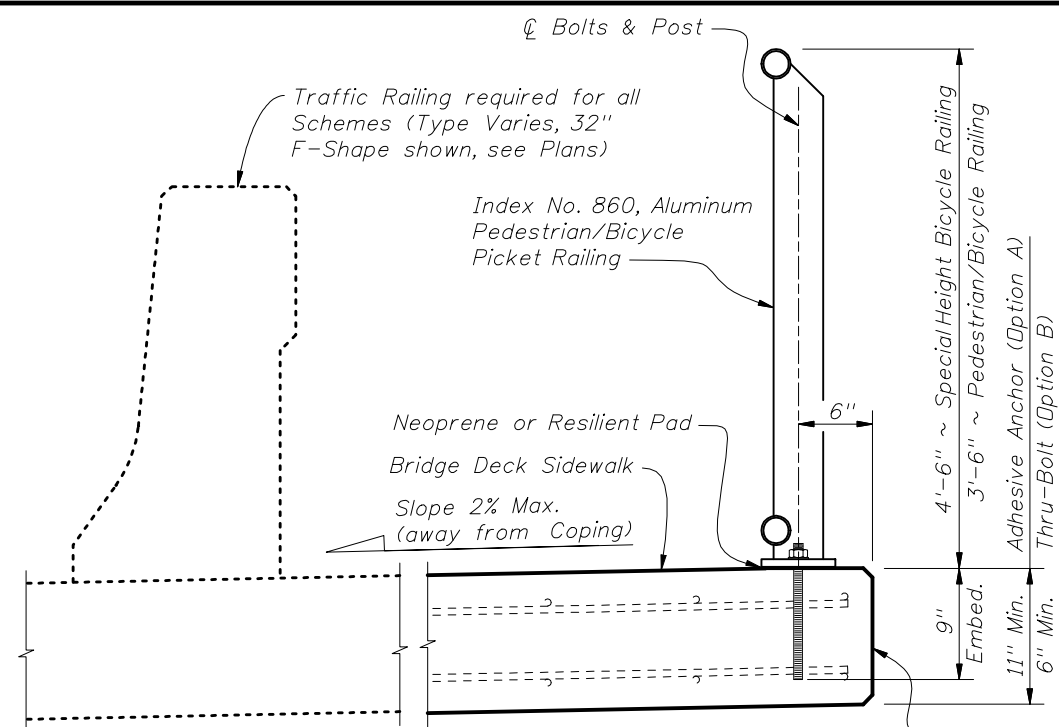


DETAIL "A" (Cast-In-Place Anchor Bolts shown, Adhesive Anchors similar)

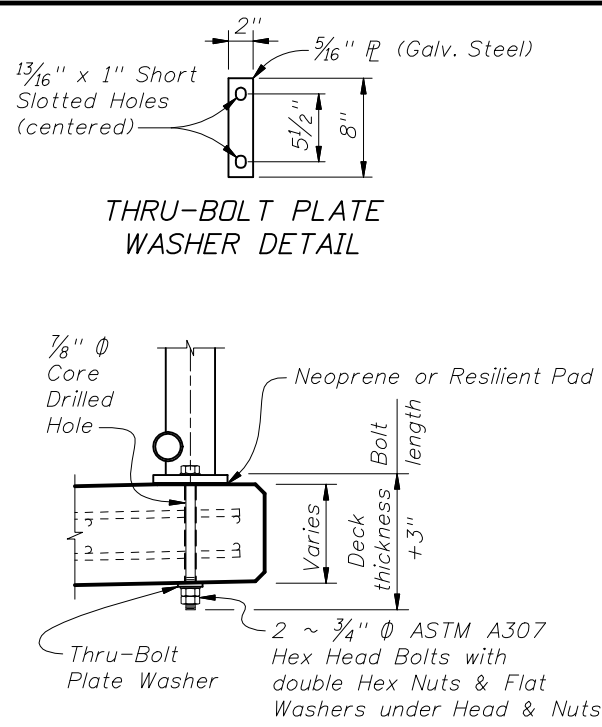
CASE	STRUCTURE TYPE	DIMENSIONS			ANCHOR LENGTH		ANCHOR SIZE
		"A"	"B"	"C"	C.I.P. Hex Head Bolt	Adhesive Anchor	
		Edge Dist.	Edge Dist.	Embedment			
I	Unreinforced Concrete	6"	1'-2"	9"	10 1/2"	11"	3/4" ϕ
IIa	Reinforced Concrete	4"	4"	9"	10 1/2"	11"	3/4" ϕ
IIb	Gravity Wall Index No. 520	4 1/2"	3 1/2" @ top	1'-0" *	1'-1 1/2"	1'-2"	3/4" ϕ
III	Step Cheekwall	4 1/2"	4 1/2"	9"	10 1/2"	11"	3/4" ϕ

* Embedment length "C" may be reduced to 9" for the 3'-6" height railings for Case IIb, when the post spacing does not exceed 5'-0".

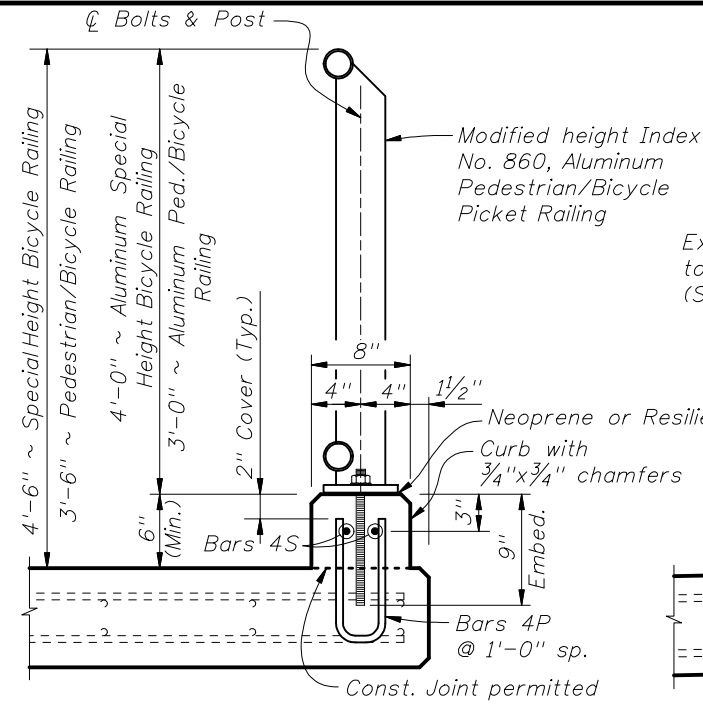




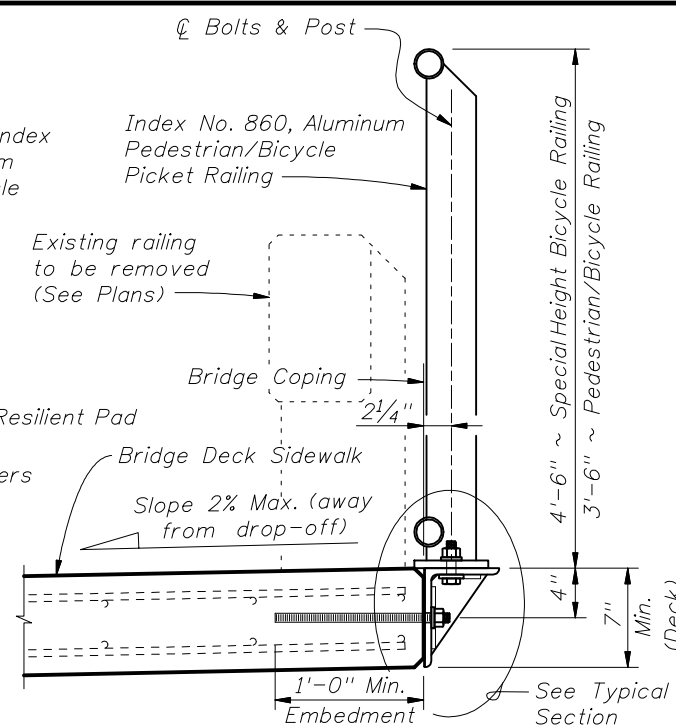
SCHEME 1 -
TYPICAL SECTION THROUGH DECK MOUNTED RAILING
(Adhesive Anchor Option shown - SCHEME 1A)



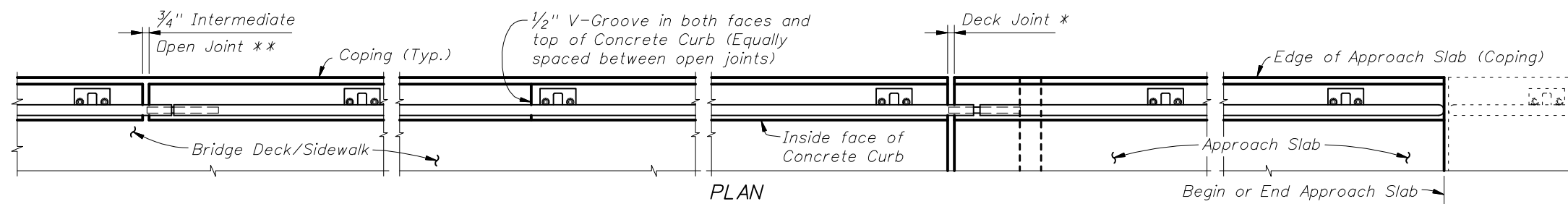
SCHEME 1B - DETAILS
(Thru-Bolt Option)



SCHEME 2 -
TYPICAL SECTION THROUGH CURB MOUNTED RAILING



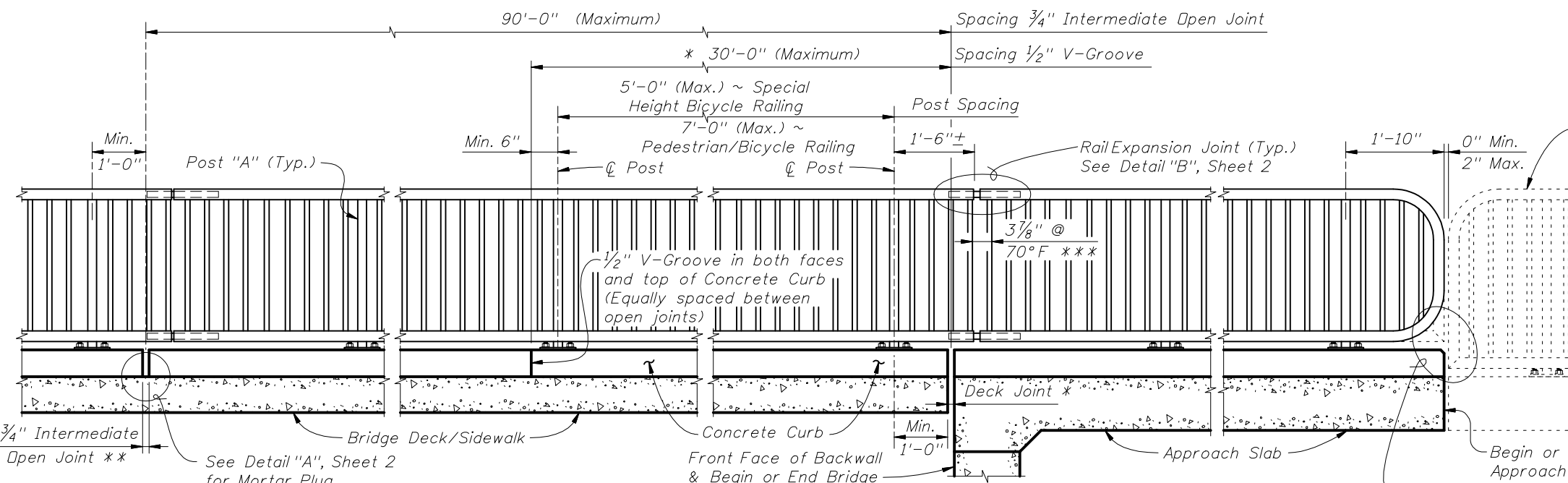
SCHEME 3 -
TYPICAL SECTION THROUGH SIDE MOUNTED RAILING (RETROFIT)



PLAN
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)

INSTRUCTIONS TO DESIGNER:

1. Provide railing layout Control Drawings in the Plans to show post spacing, curb joint, V-groove, deck joint, expansion joint locations and Scheme number.
2. For existing bridge retrofits special end treatment details may be required for perpendicular or flared wingwalls at Begin and End Bridge. Provide existing railing removal details when required.



ELEVATION OF INSIDE FACE OF RAILING
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)

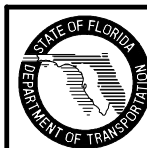
Index No. 860 Railing shown, see Contract Plans for actual railing continuation or termination

* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Curb Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown. Deck Joint at Pier or Intermediate Bent similar.

** 3/4" Intermediate Open Joints shall be provided at locations coinciding with 3/4" Joints for the Traffic Railing.

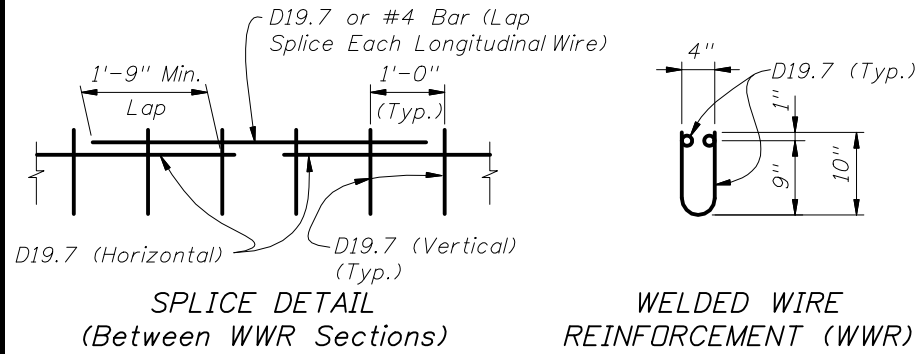
*** Clear opening between adjacent pickets at Rail Expansion Joints, above Deck Expansion Joints with a total thermal movement greater than 4", must be reduced to 3/2".

Miter bottom corners to limit opening for adjoining railings



ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS

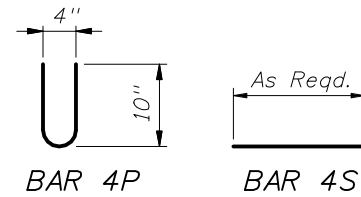
NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4 3/4" are not permitted.



CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

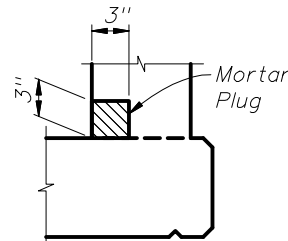
BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
P	4	2'-0"
S	4	As Reqd.



CURB REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- The reinforcement for the curb on a retaining wall shall be the same as detailed for an 8" deck.
- All reinforcing steel at the open joints shall have a 2" minimum cover.
- Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
- At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 4P and 4S. Welded Wire Reinforcement shall conform to ASTM A497.



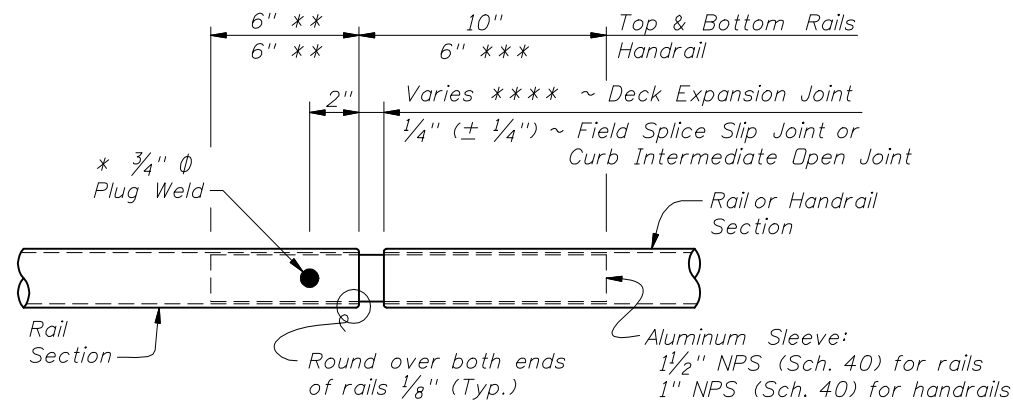
DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT

NOTE: At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.

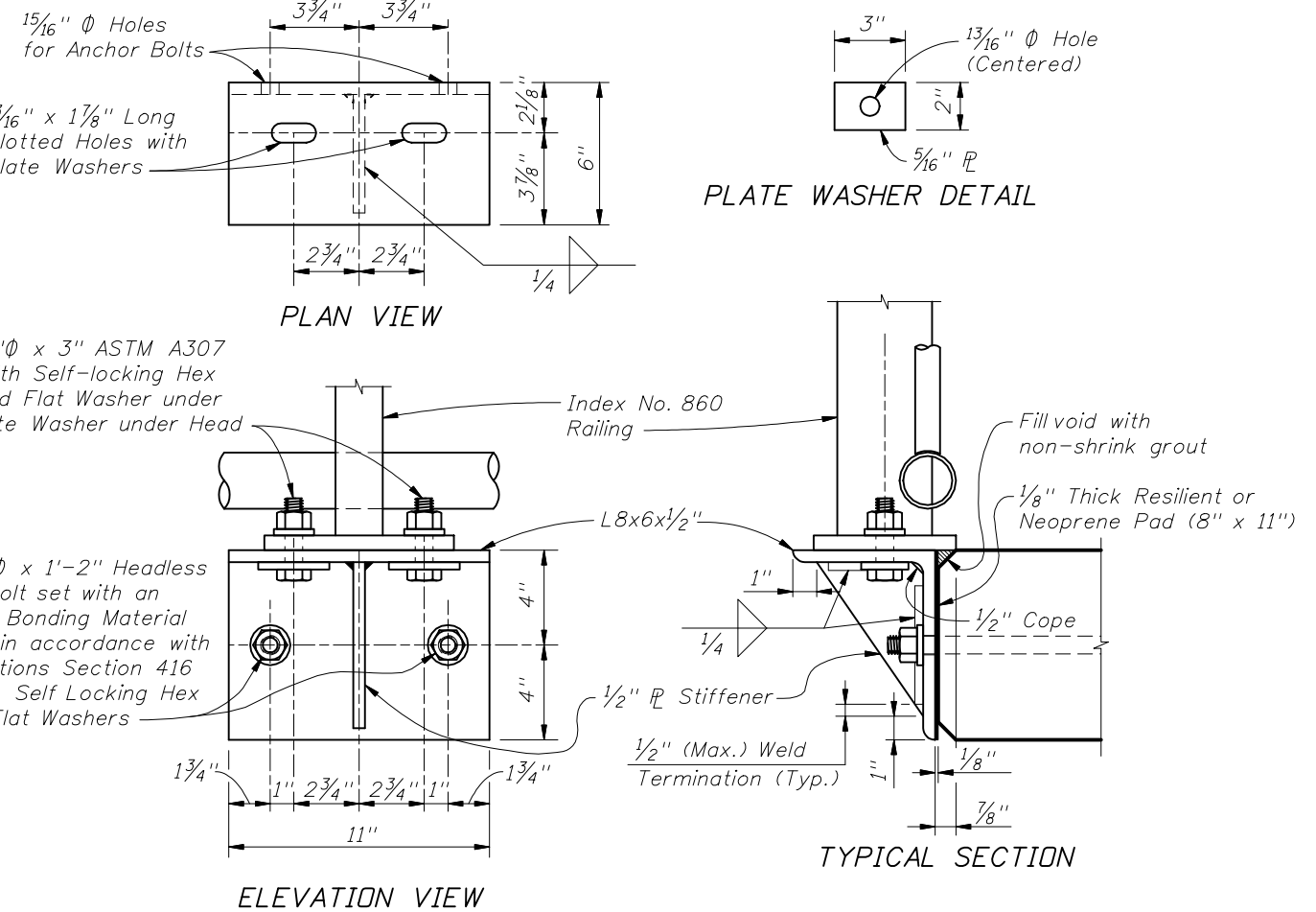
ESTIMATED CONCRETE CURB QUANTITIES (SCHEME 2)

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.0124
Reinforcing Steel	LB/LF	4.01

SCHEME 2 - CONCRETE CURB DETAILS



- * At the Contractor's option 2 ~ 1/4" Ø x 3/4" Pan Head Aluminum (Alloy 2024-T4 or 7075-T73) or Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing along outside face of railing may be substituted for the 3/4" Ø plug weld. Set screws must be set flush against the outside face of rail.
- ** 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".



2 ~ 3/4" Ø x 3" ASTM A307 Bolts with Self-locking Hex Nuts and Flat Washer under Nut, Plate Washer under Head

2 ~ 3/4" Ø x 1'-2" Headless Anchor Bolt set with an Adhesive Bonding Material System in accordance with Specifications Section 416 and 937. Self Locking Hex Nuts & Flat Washers

SCHEME 3 - SIDE MOUNTED SUPPORT BRACKET DETAILS

BRIDGE PICKET RAILING NOTES:

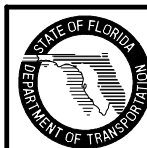
APPLICABILITY NOTE: Bridge Picket Railing is limited to use on bridges with an expansion joint thermal movements not exceeding 5". Scheme 3 is limited to bridge retrofit applications where additional sidewalk width is required.

RAILING DETAILS: For Railing fabrication and installation details and notes see Index No. 860, except that railing shall be fabricated and installed normal to the Profile Grade longitudinally and vertical transversely.

CONCRETE CURB (Scheme 2): Construct concrete curb vertical with the top surface finished level transversely. Concrete class shall be the same as the bridge deck.

SIDE MOUNTED SUPPORT BRACKET (Scheme 3): L-Shape and Stiffener Plate shall be in accordance with ASTM B209, Alloy 6061-T6. Welding shall be in accordance with the American Society of 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.

PAYMENT: Railing shall be paid per linear foot (Item No. 515-2-abb) for the aluminum railing and include the cost of support brackets (Scheme 3). Concrete and reinforcing steel quantities for the concrete curb (Scheme 2), will be included in the bridge deck plan quantity pay items. Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, 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.



NOTES

DESIGN SPECIFICATIONS:

U.S. Access Board "ADA Accessibility Guidelines", July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.

DESIGN LIVE LOADS:

This Guiderail was tested by the FDOT Structural Research Center and found to resist an equivalent Service Loading of 50 lbs./ft. acting simultaneously in the transverse and vertical direction when applied at the height of the Top Rail.

APPLICABILITY NOTE TO DESIGNER:

This Index is not approved for use on bridges. This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazards do not exceed 2'-6", Pedestrian/Bicycle Railings for customary applications are provided in Index No's. 850 or 860. Also applicable for select uses on sidewalks within service areas and similar locations or maintenance areas where the drop off exceeds 2'-6". Adequate foundation support shall be provided for anchorage and stability against overturning. For unusual site conditions a site specific railing is to be designed by the responsible engineer. Refer to FDOT Plans Preparation Manual (Volume I) Chapters 4 & 8, for the definition of vehicular, pedestrian and bicyclist "drop-off hazards".

ALTERNATE DESIGN:

Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the live load and geometric requirements specified herein, provides a minimum 50 year design life and that deflections due to the Design Live Loads do not exceed 1 1/2" at midspan of the top rail. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1 1/2" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

PIPE RAILING & POSTS:

Structural Tube, Pipe and Bar shall be in accordance with ASTM B221 or ASTM B429, Alloy 6061-T6. End Rail 90° bends and corner bends with maximum 4'-0" post spacing, may be Alloy 6063-T6. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Corners and changes in tangential longitudinal alignment, may be made continuous with a 9" bend radius or terminated at adjoining sections with a standard end hoop 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.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" NPS (Sch. 40)	2.375"	0.154"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrails Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A

BASE PLATES:

Base 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 1/4" and localized irregularities greater than 1/8". Field trim shim plates when necessary to match the contours of the foundation. Bevelled 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 1/2", unless longer anchor bolts are provided for the exposed thread length.

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 Section 962 of the Specifications.

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. 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 or 70.

JOINTS:

All fixed joints are to be welded all around and ground smooth. Expansion Joints shall be spaced at a maximum of 30'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate shipping and handling, but rails must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments.

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.

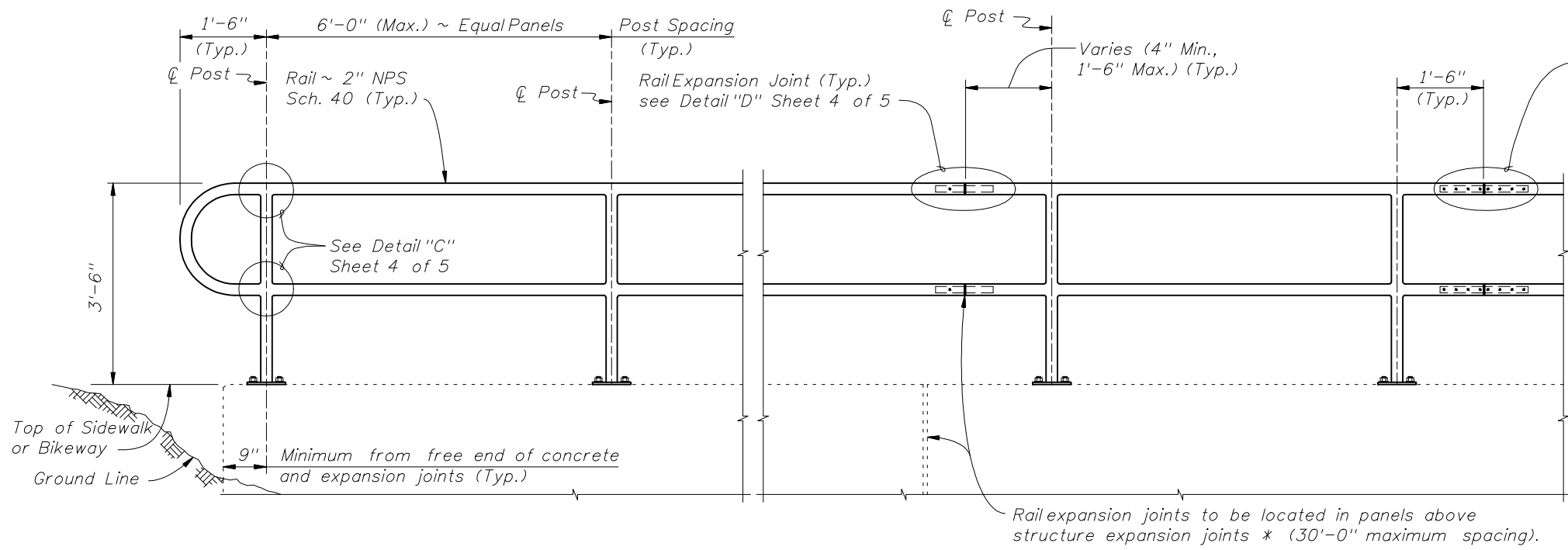
SHOP DRAWINGS:

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations 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:

Guiderail shall be paid for under the contract unit price for Pipe Guiderail (Aluminum), LF (Item No. 515-1-2). Payment for the Guiderail will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, 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 Guiderail.





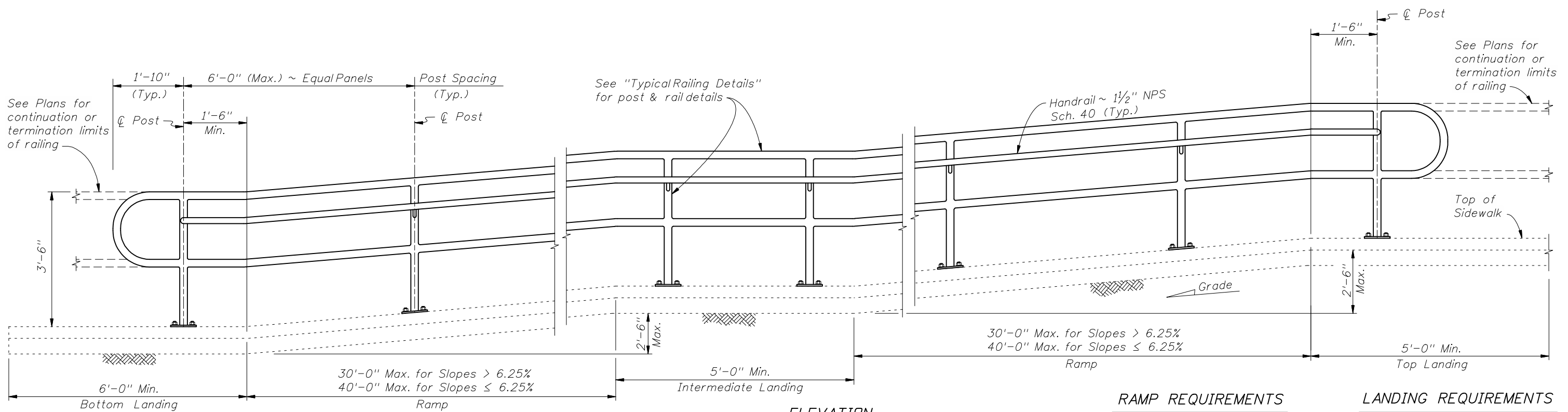
NOTES:
 NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:
 * Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

CROSS REFERENCE:
 For Details "C", "D" and "E", see Sheet 4 of 5.

ELEVATION

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

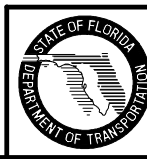


ELEVATION
 (Showing Inside Face of Railing)

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%

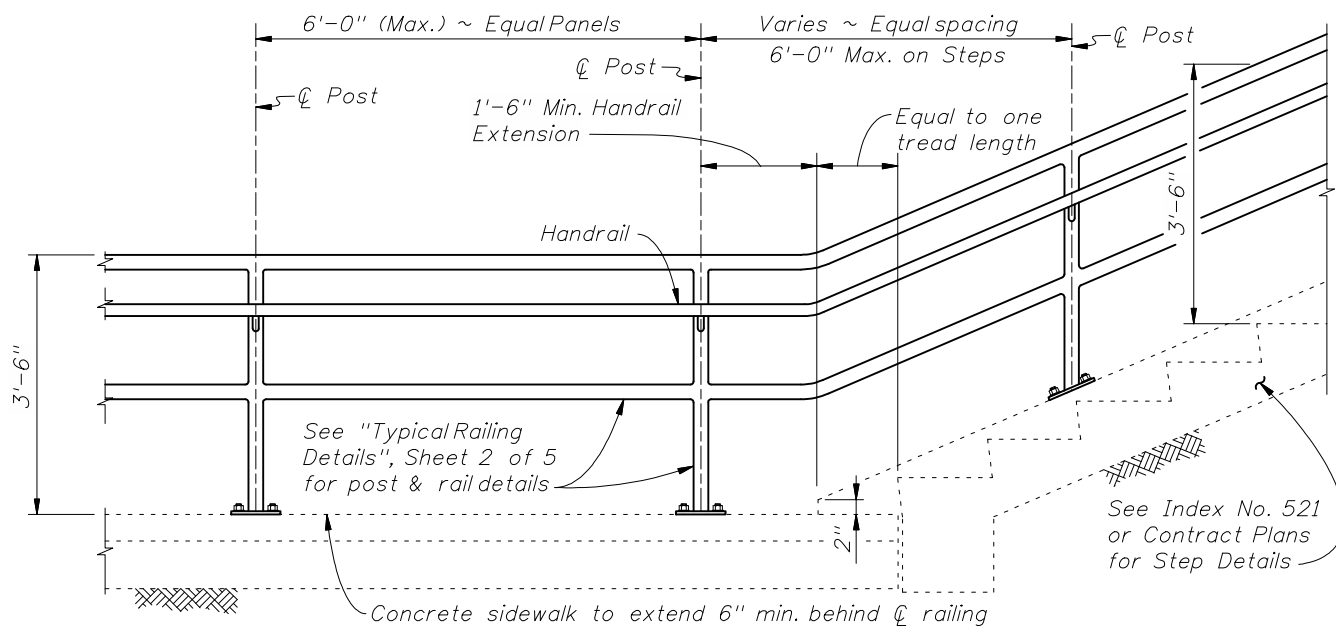
RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%



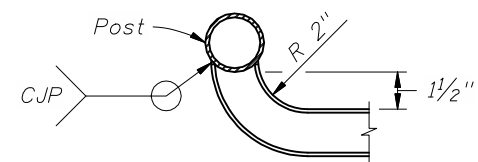
2010 FDOT Design Standards

ALUMINUM PIPE GUIDERAIL

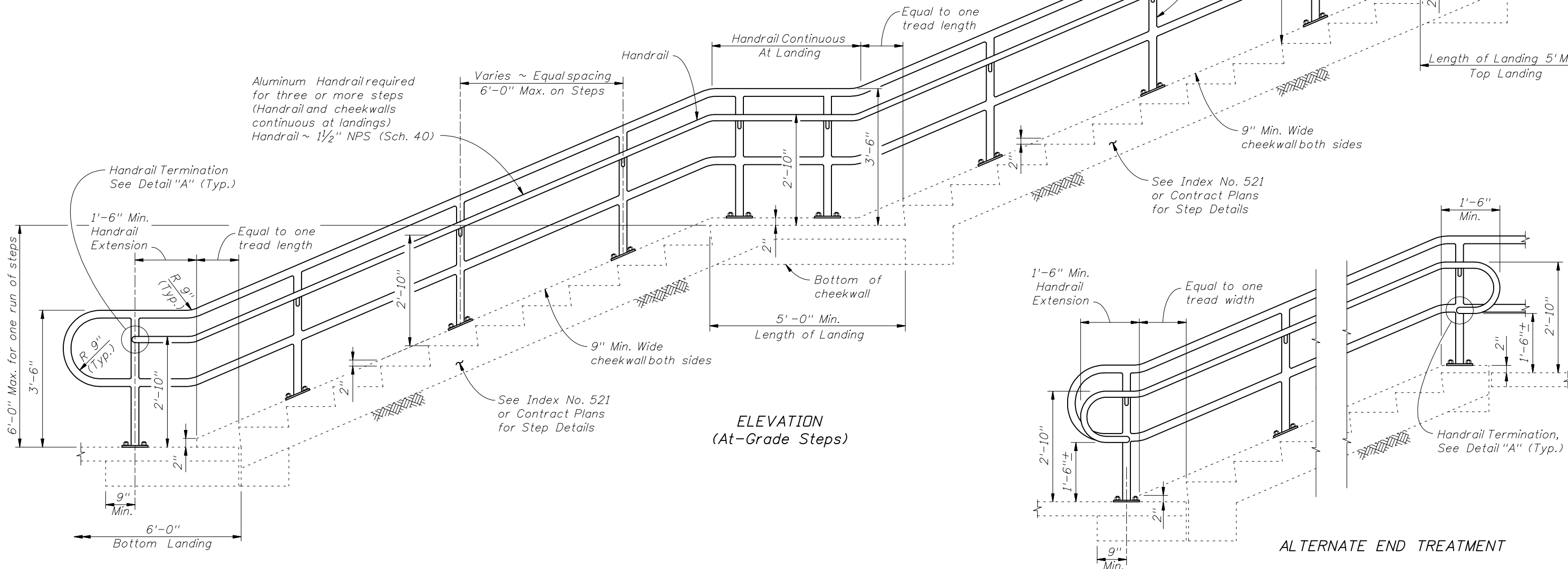
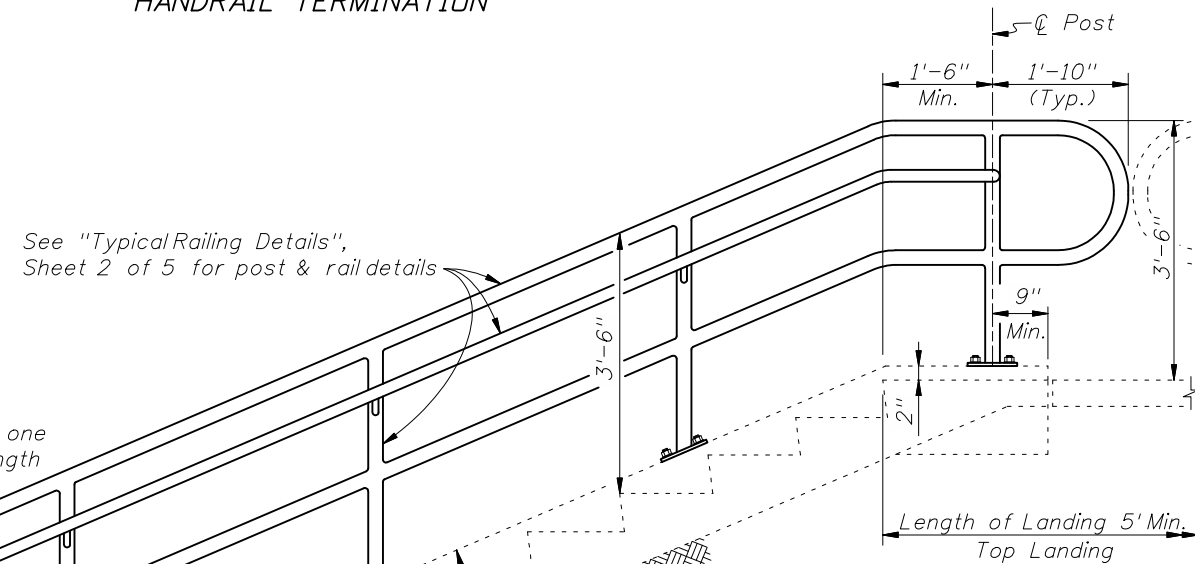
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RAILING CONTINUATION BEYOND STEPS
(Bottom shown, Top similar)



DETAIL "A" - PLAN VIEW
HANDRAIL TERMINATION



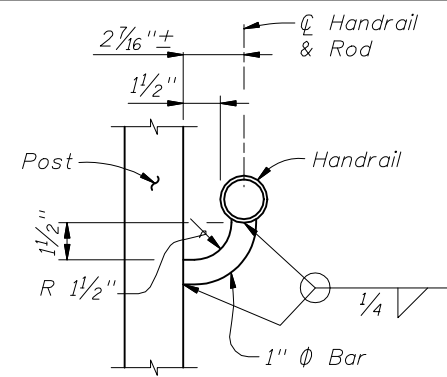
RAILINGS ON STEPS & STAIRS



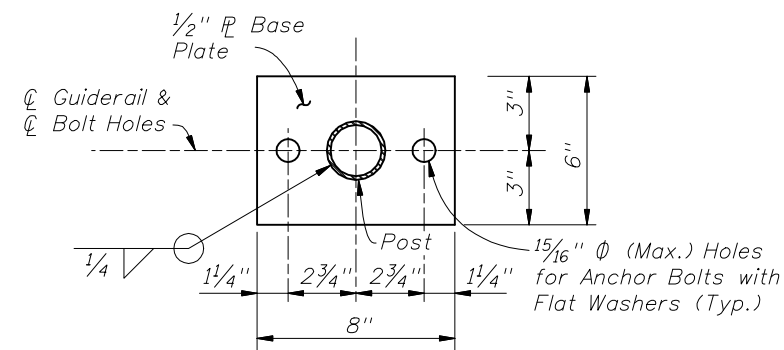
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ALUMINUM PIPE GUIDERAIL

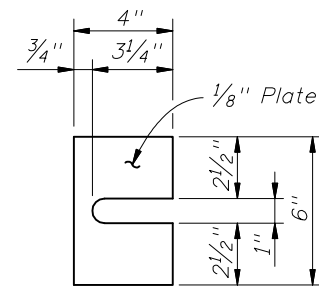
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SECTION B-B
(Handrail Connection)



SECTION C-C
BASE PLATE DETAIL



SHIM PLATE
DETAIL

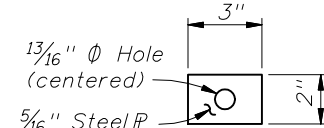
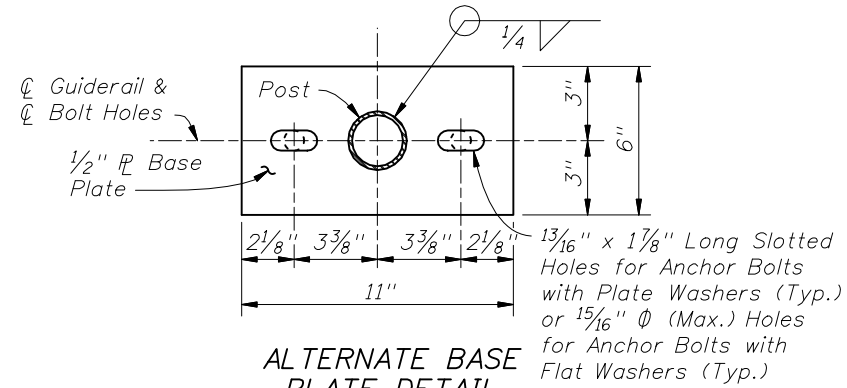
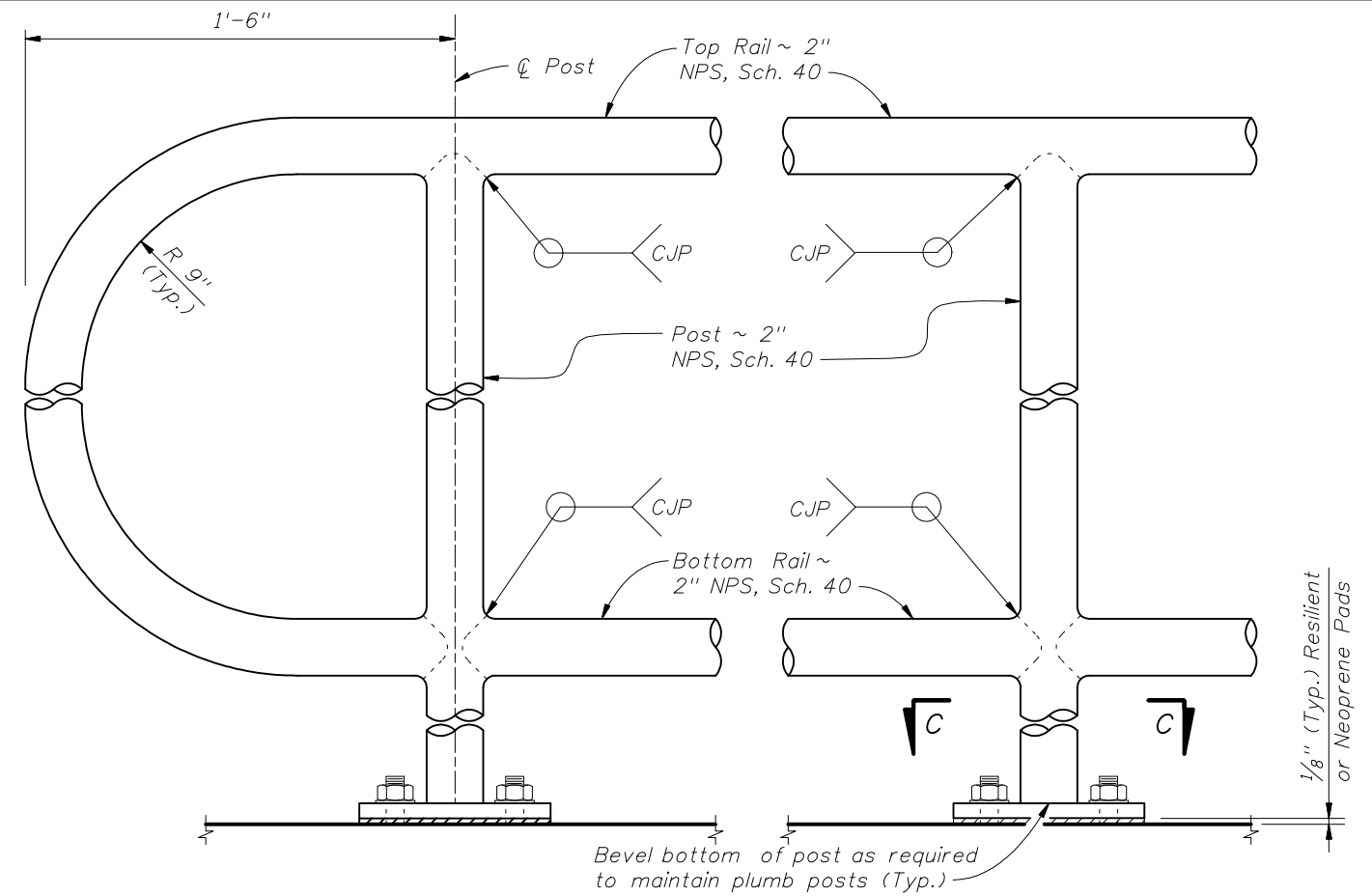


PLATE WASHER
DETAIL

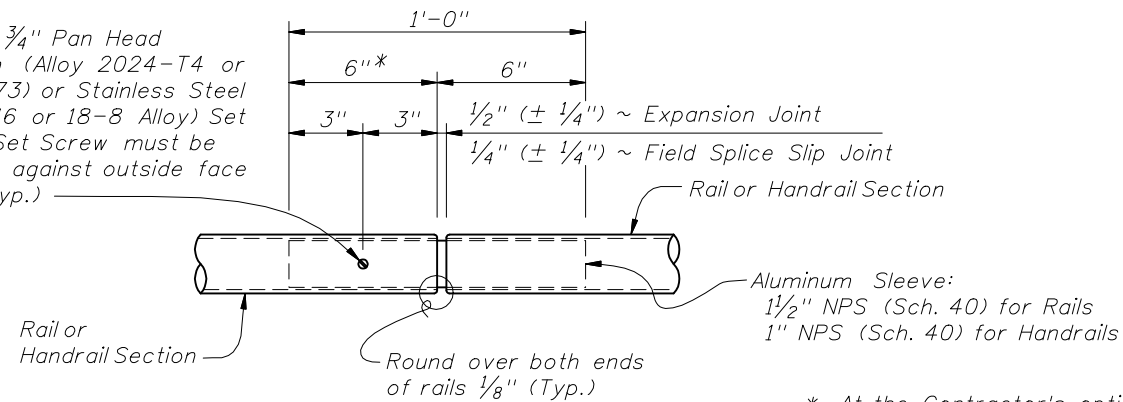


ALTERNATE BASE
PLATE DETAIL
(Recommended for Top of Step Cheekwalls)



DETAIL "C" - RAIL CONNECTIONS
(Handrail Not Shown)

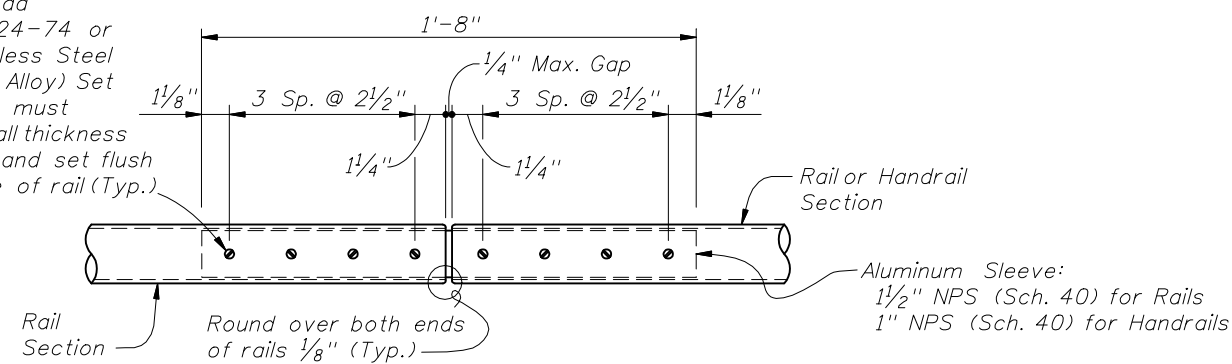
1/4" ϕ x 3/4" Pan Head
Aluminum (Alloy 2024-T4 or
7075-T73) or Stainless Steel
(Type 316 or 18-8 Alloy) Set
Screw. Set Screw must be
set flush against outside face
of rail (Typ.)



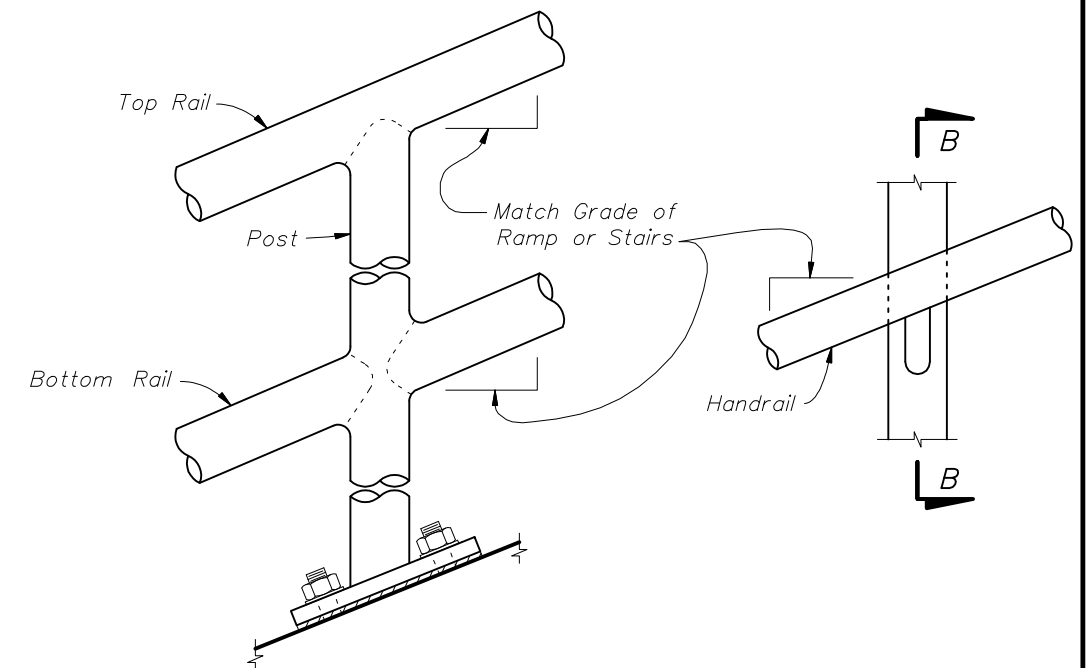
DETAIL "D" - EXPANSION JOINT
(FIELD SPLICE SLIP JOINT SIMILAR)

* At the Contractor's option, embedded length may be 4" when a 3/4" ϕ plug weld is substituted for the 1/4" ϕ set screw.

1/4" ϕ x 3/4" Pan Head
Aluminum (Alloy 2024-T4 or
7075-T73) or Stainless Steel
(Type 316 or 18-8 Alloy) Set
Screws. Set Screws must
penetrate the full wall thickness
of the inner sleeve and set flush
against outside face of rail (Typ.)



DETAIL "E" - CONTINUITY
FIELD SPLICE



DETAIL "B" - RAIL AND HANDRAIL
(Showing Sloped Condition for Stairs or Ramp)

CROSS REFERENCE:
For locations of Details "C", "D" and "E", see Sheet 2 of 5.



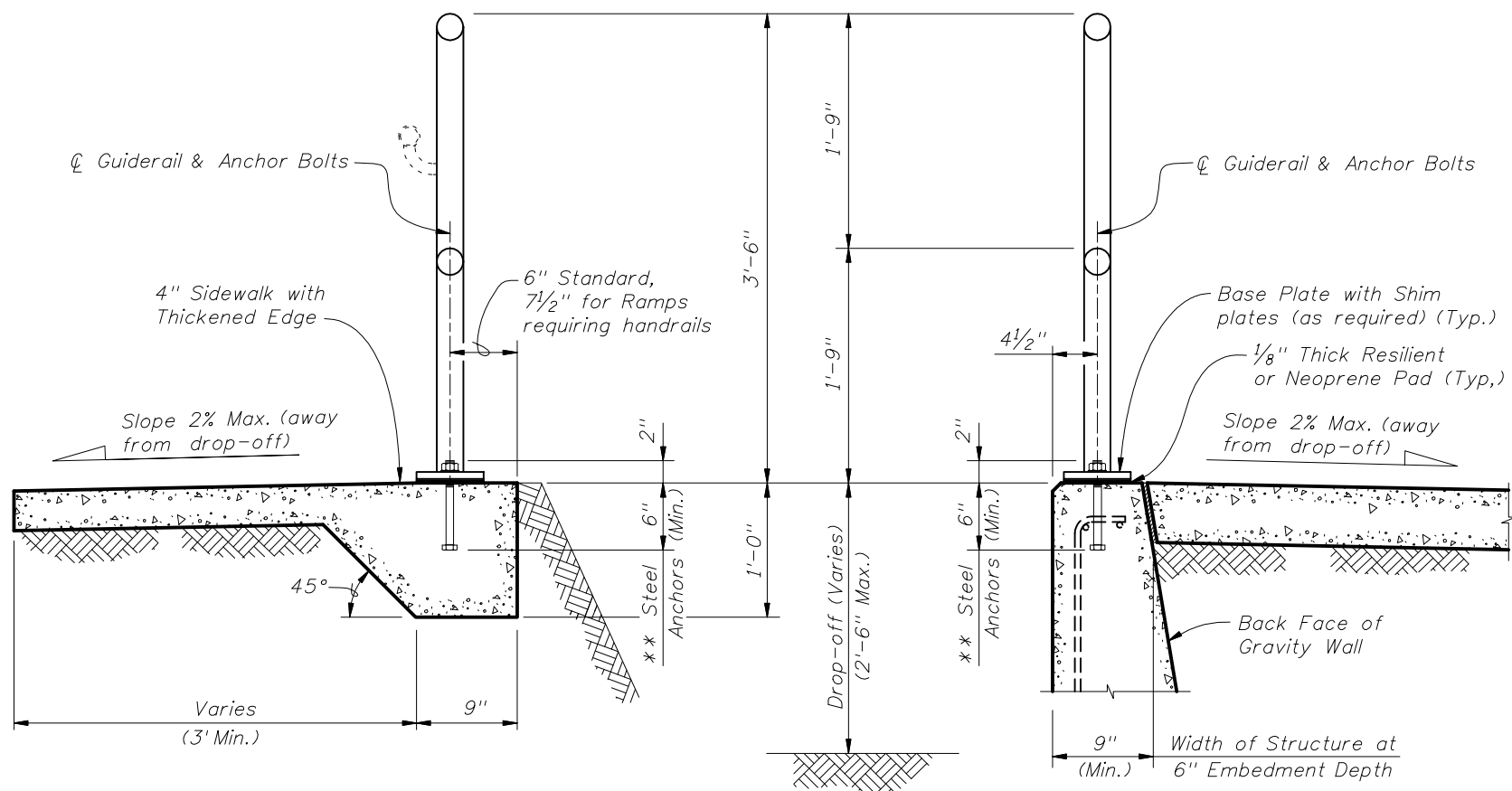
2010 FDOT Design Standards

ALUMINUM PIPE GUIDERAIL

Last Revision
01/01/08

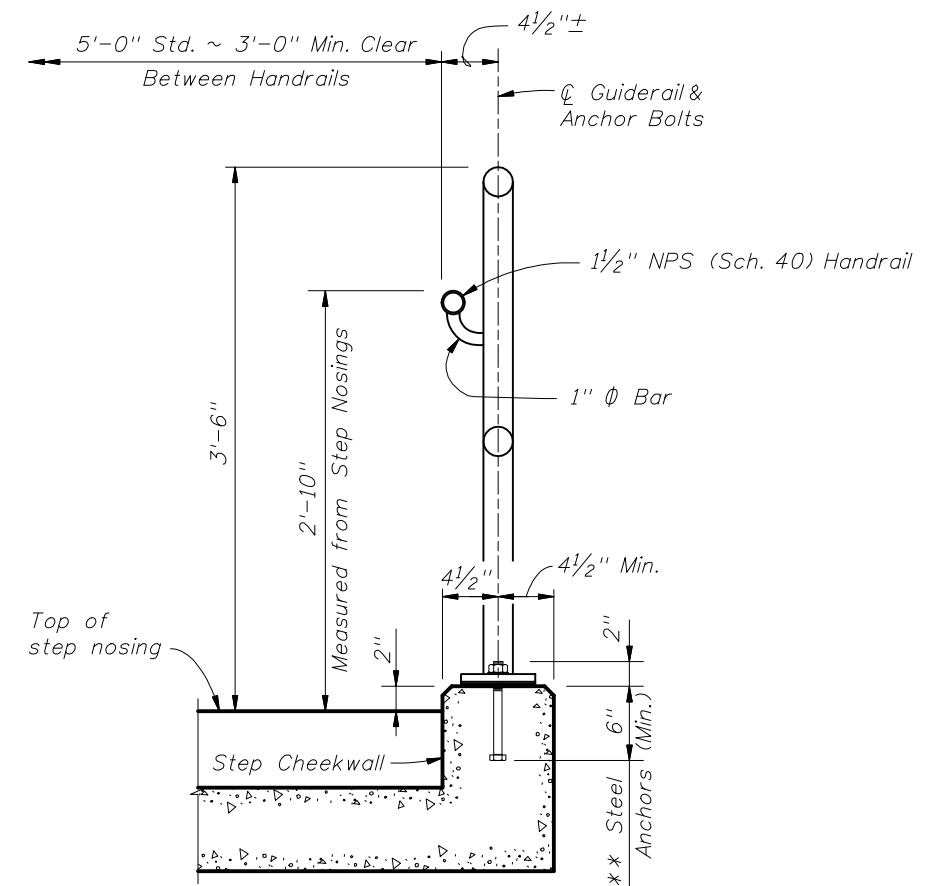
Sheet No.
4 of 5

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870

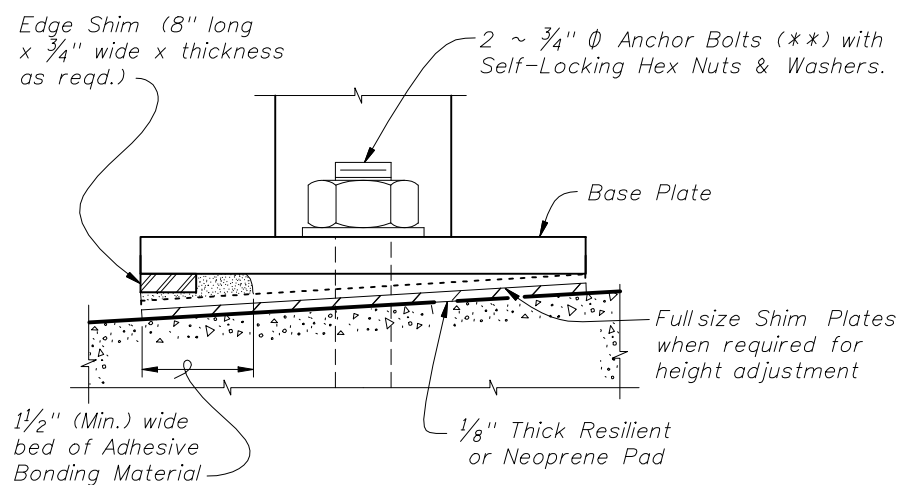


TYPICAL SECTION ON CONCRETE SIDEWALK

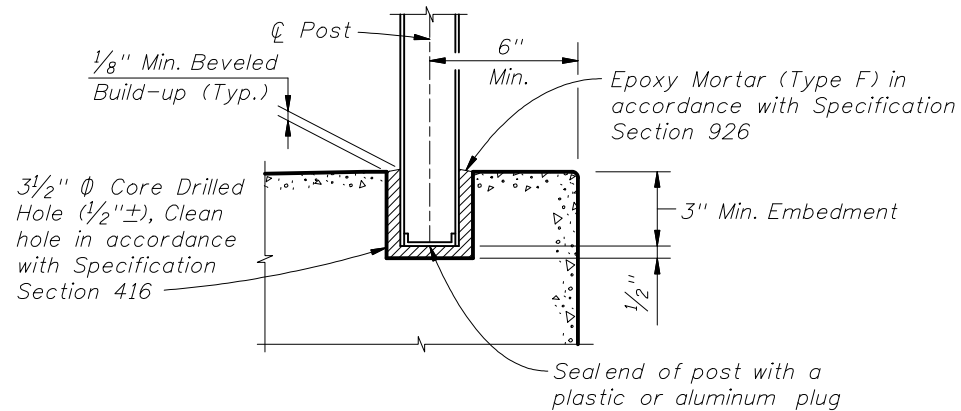
TYPICAL SECTION ON GRAVITY WALL
(Other Retaining Walls Similar)



TYPICAL SECTION ON STEPS & STAIRS



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



OPTIONAL SIDEWALK ANCHORAGE DETAIL

NOTES:

- ** 2 ~ 3/4" Φ x 8" Steel Anchors:
Galvanized Steel Bolts (As Shown) (C-I-P); Galvanized U-Bolts Permitted (C-I-P); Galvanized Adhesive Anchors Permitted (***) ; Expansion Anchors Not Permitted.
- *** Adhesive anchors shall be fully threaded headless anchor bolts set in drilled holes (manufacturer recommended diameter) with an Adhesive Bonding Material System in accordance with Specification Section 937 and installed in accordance with Specification Section 416. The minimum embedment is 6".



NOTES

DESIGN SPECIFICATIONS:

U.S. Access Board "ADA Accessibility Guidelines", July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.

DESIGN LIVE LOADS:

The Guiderail shall resist an equivalent Service Loading of 50 lbs./ft. acting simultaneously in the transverse and vertical direction when applied at the height of the top rail.

APPLICABILITY NOTE TO DESIGNER:

This Index is not approved for use on bridges. This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazards do not exceed 2'-6". Pedestrian/Bicycle Railings for customary applications are provided in Index No's. 850 or 860. Also applicable for select uses on sidewalks within service areas and similar locations or maintenance areas where the drop off exceeds 2'-6". Adequate foundation support shall be provided for anchorage and stability against overturning. For unusual site conditions a site specific railing is to be designed by the responsible engineer. Refer to FDOT Plans Preparation Manual (Volume I) Chapters 4 & 8, for the definition of vehicular, pedestrian and bicyclist "drop-off hazards".

ALTERNATE DESIGN:

Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the live load and geometric requirements specified herein, provides a minimum 50 year design life and that deflections due to the Design Live Loads do not exceed 1 1/2" at midspan of the top rail. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1 1/2" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

PIPE RAILING & POSTS:

Pipe Rails and Posts shall be in accordance with ASTM A53 Grade B for standard weight pipe and ASTM A500 Grade B, C or D or ASTM A501 for structural tube. Bars for handrail supports shall be ASTM A36. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Corners and changes in tangential longitudinal alignment, may be made continuous with a 9" bend radius or terminated at adjoining sections with a standard end hoop 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.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" NPS (Sch. 40)	2.375"	0.154"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrails Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1 1/2" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A

BASE PLATES:

Base Plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

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 1/4" and localized irregularities greater than 1/8". 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 1/2", unless longer anchor bolts are provided for the exposed thread length.

COATINGS:

The railing shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 of the Specifications.

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. 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 or 70.

JOINTS:

All fixed joints are to be welded all around and ground smooth. Expansion Joints shall be spaced at a maximum of 30'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate shipping and handling, but rails must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments.

WELDING:

All welding shall be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required.

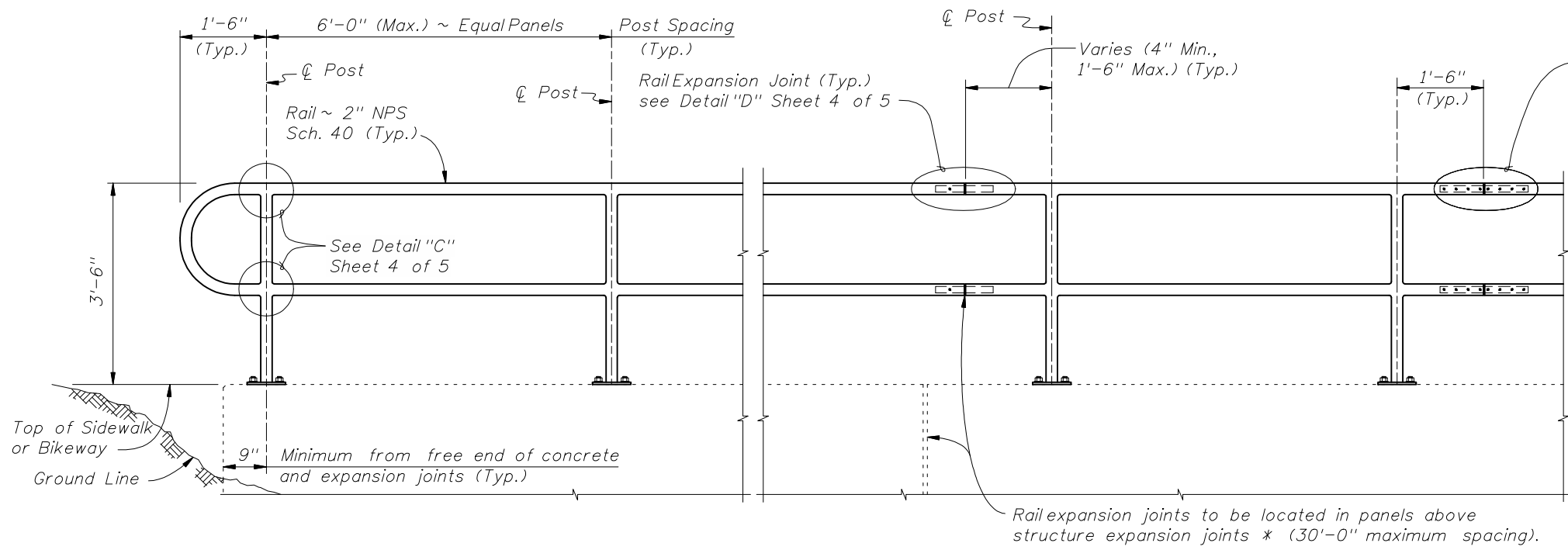
SHOP DRAWINGS:

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations 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:

Guiderail shall be paid for under the contract unit price for Pipe Guiderail (Steel), LF (Item No. 515-1-1). Payment for the Guiderail will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, 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 Guiderail.





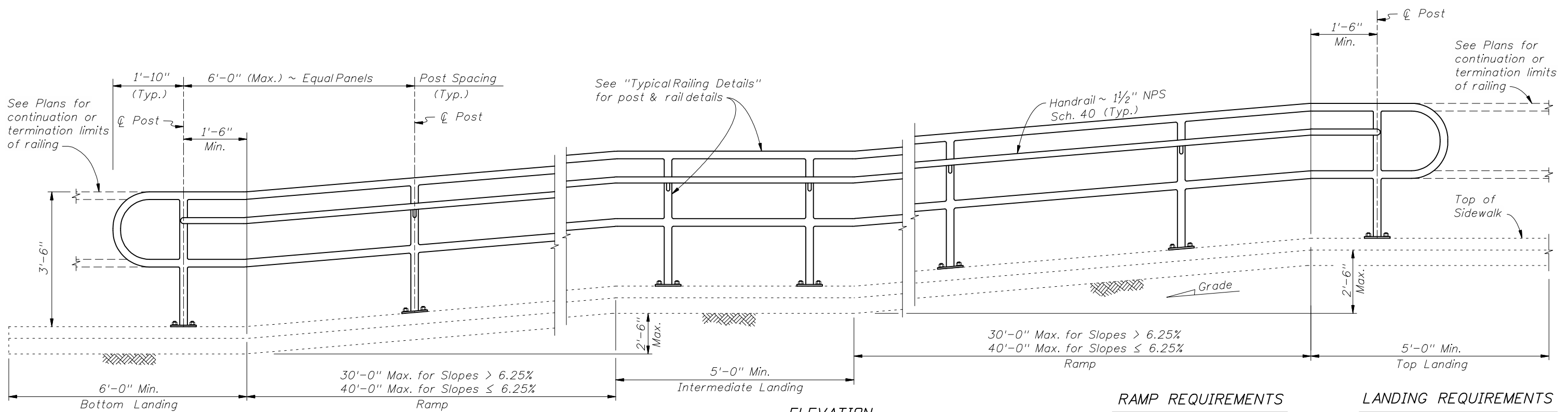
NOTES:
 NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:
 * Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

CROSS REFERENCE:
 For Details "C", "D" and "E", see Sheet 4 of 5.

ELEVATION

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

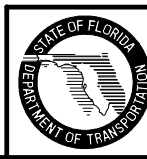


ELEVATION
 (Showing Inside Face of Railing)

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%

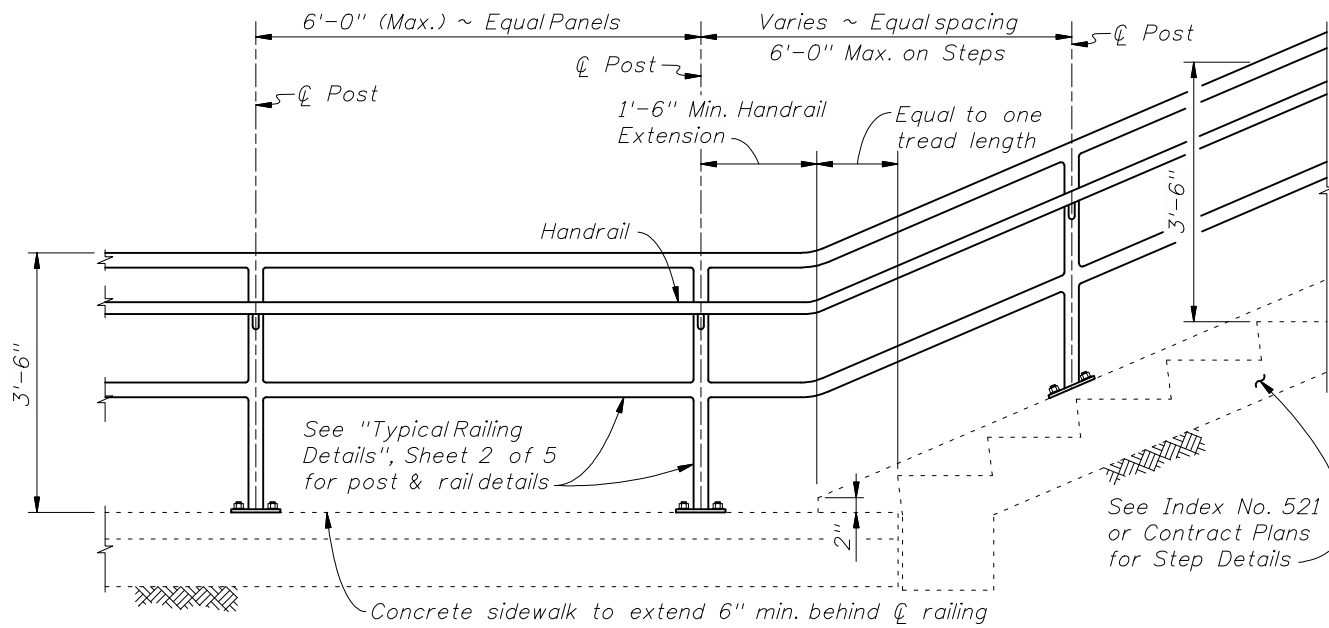
RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%



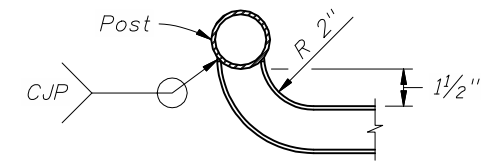
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STEEL PIPE GUIDERAIL

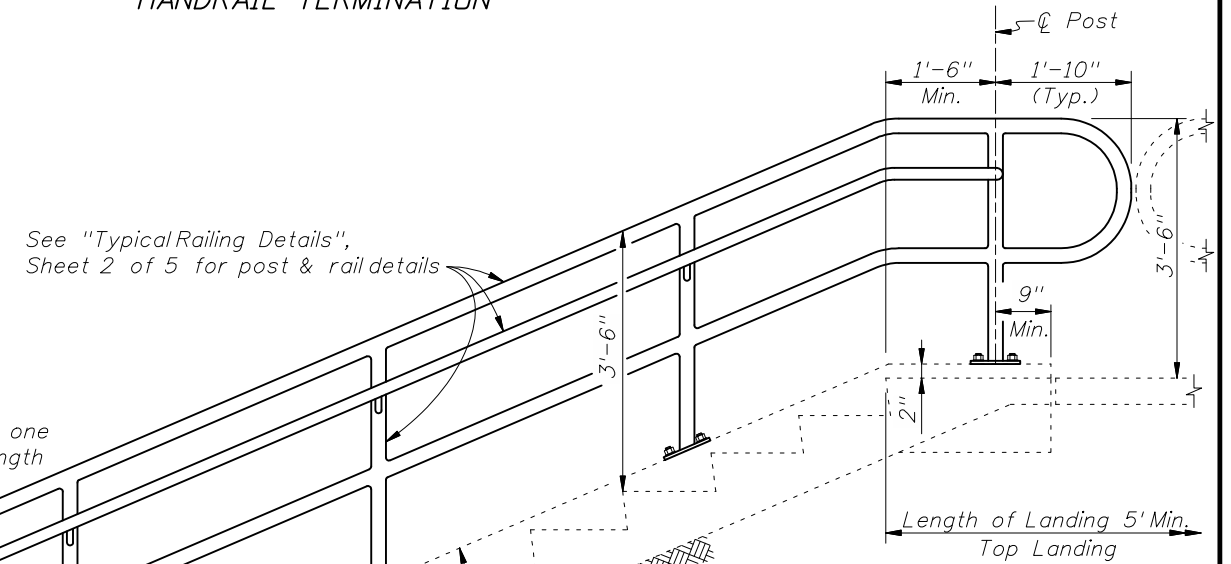
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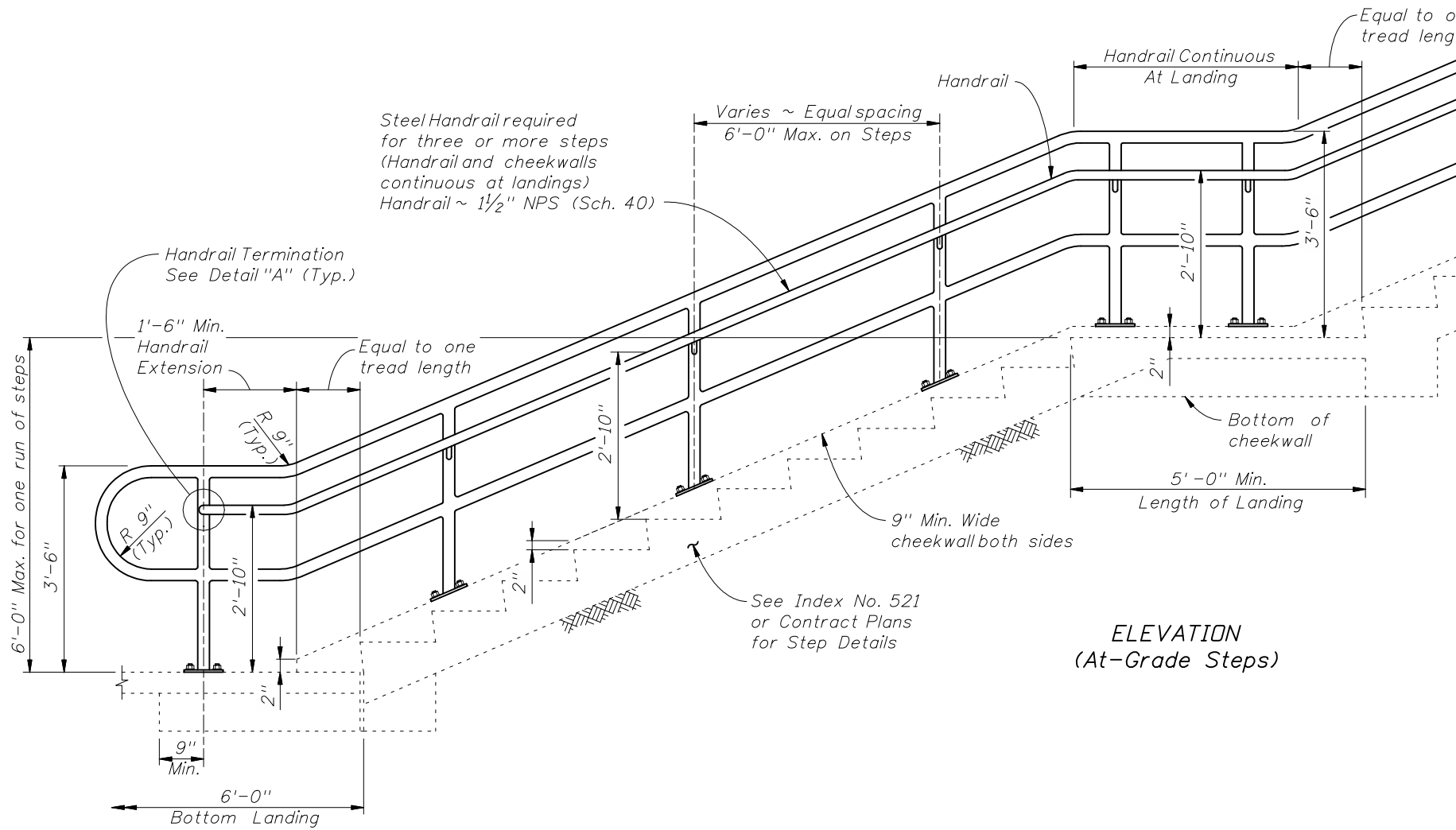
RAILING CONTINUATION BEYOND STEPS
(Bottom shown, Top similar)



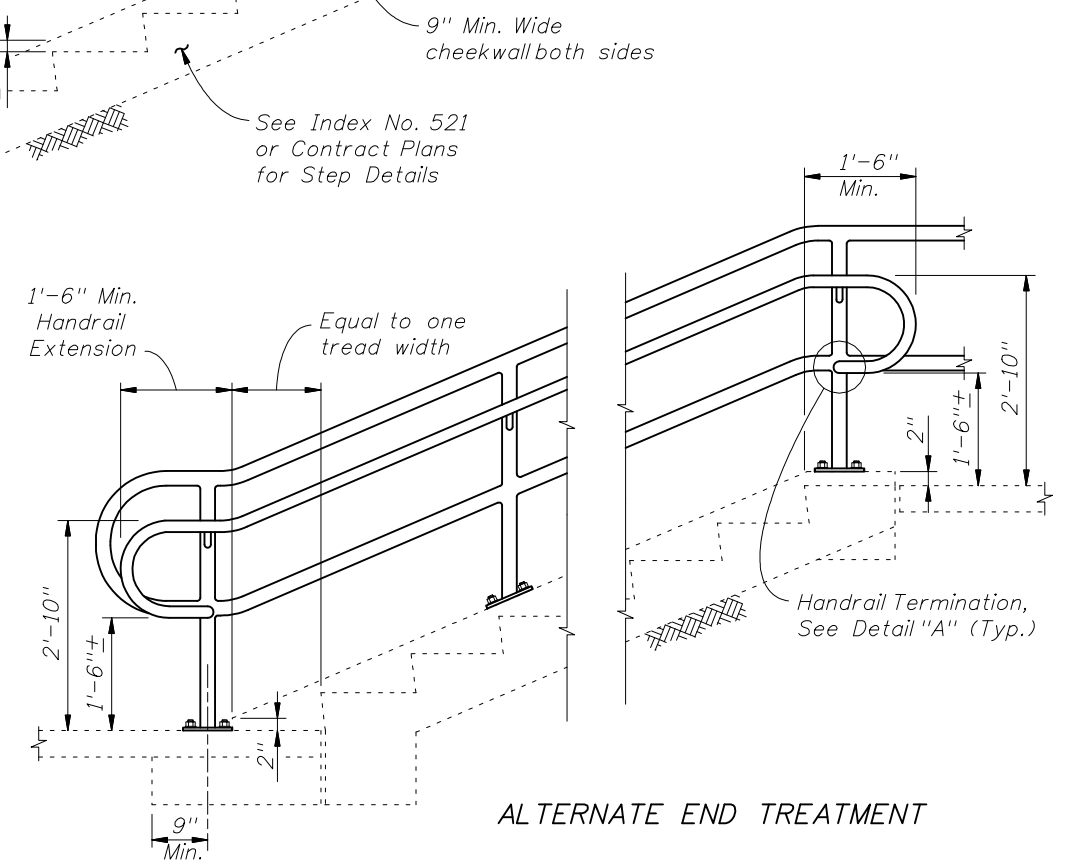
DETAIL "A" - PLAN VIEW
HANDRAIL TERMINATION



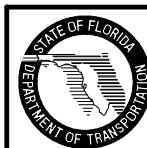
See "Typical Railing Details",
Sheet 2 of 5 for post & rail details

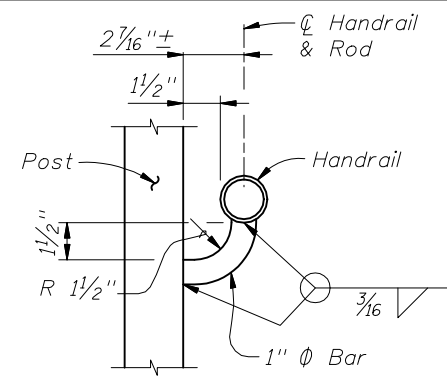


ELEVATION
(At-Grade Steps)

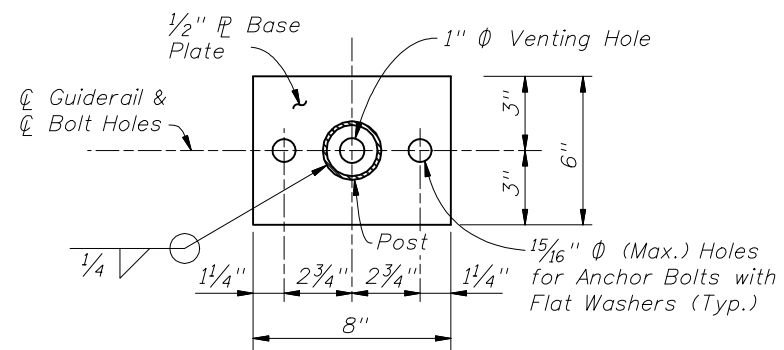


ALTERNATE END TREATMENT

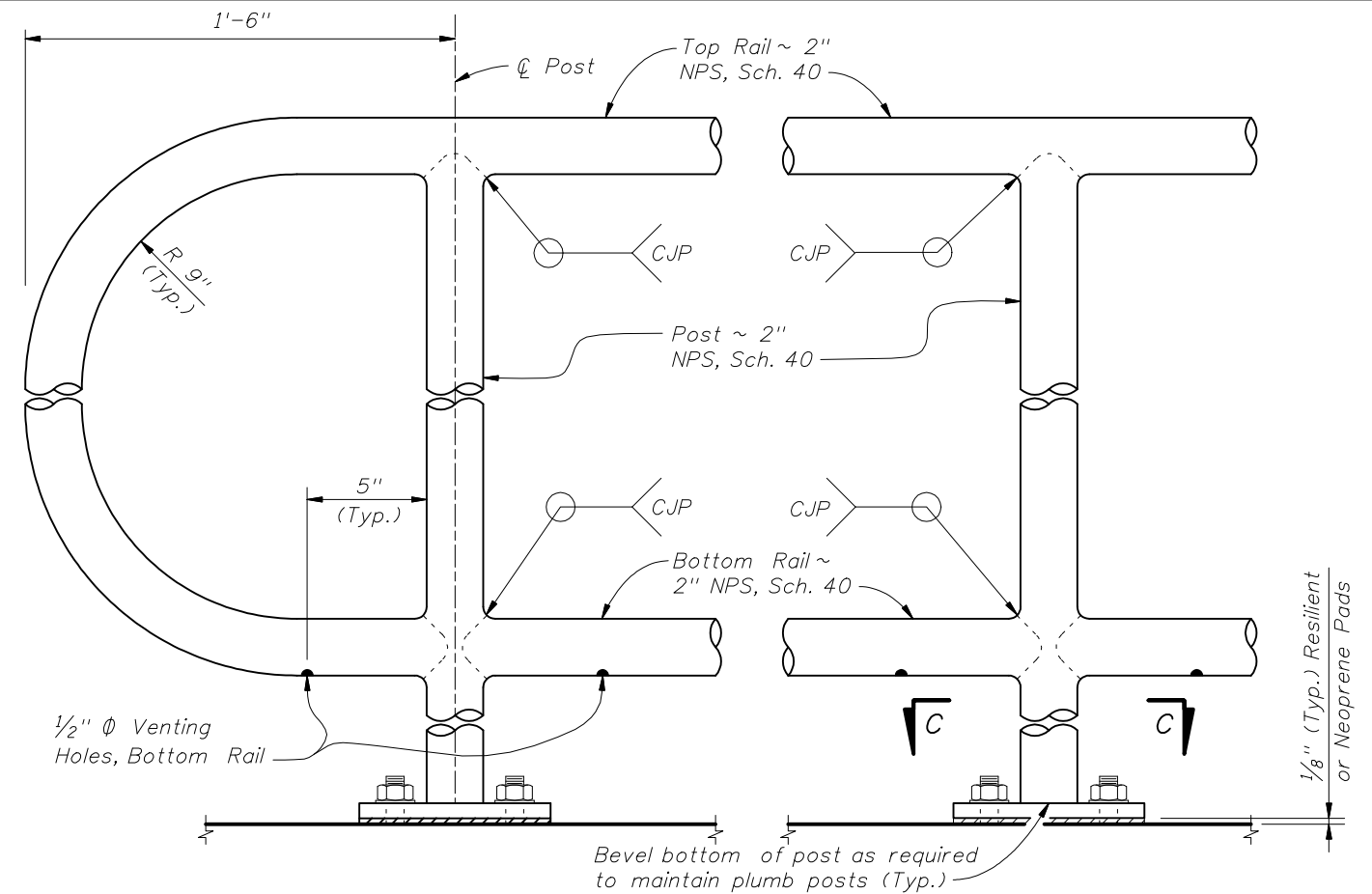




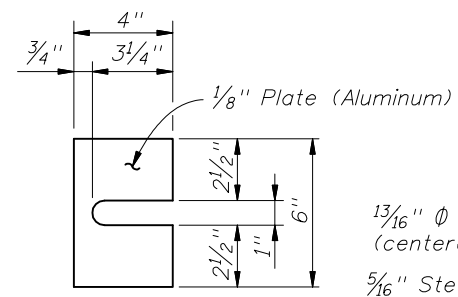
SECTION B-B
(Handrail Connection)



SECTION C-C
BASE PLATE DETAIL



DETAIL "C" - RAIL CONNECTIONS
(Handrail Not Shown)



SHIM PLATE
DETAIL

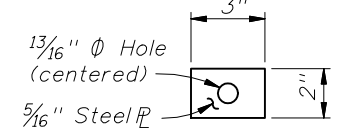
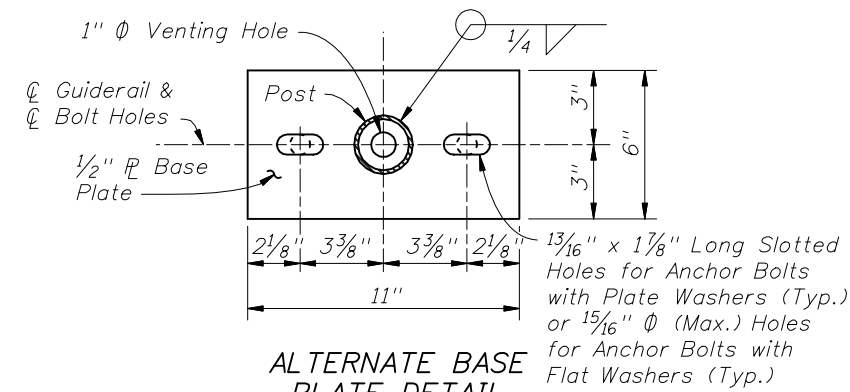
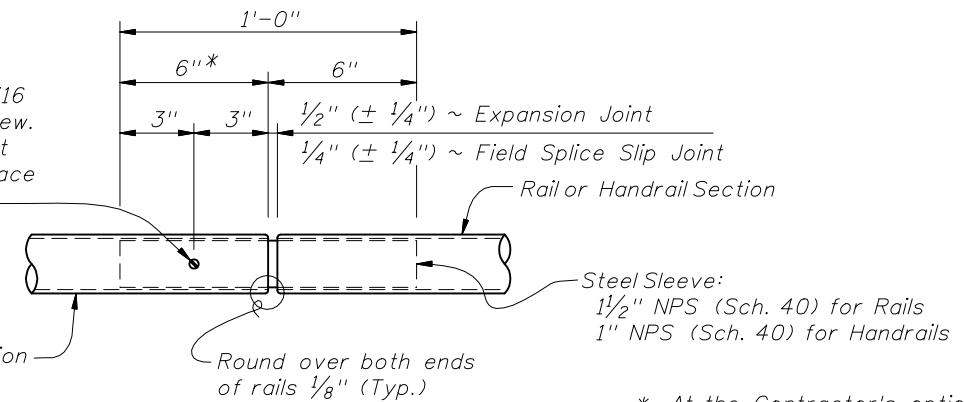


PLATE WASHER
DETAIL



ALTERNATE BASE
PLATE DETAIL
(Recommended for Top of Step Cheekwalls)

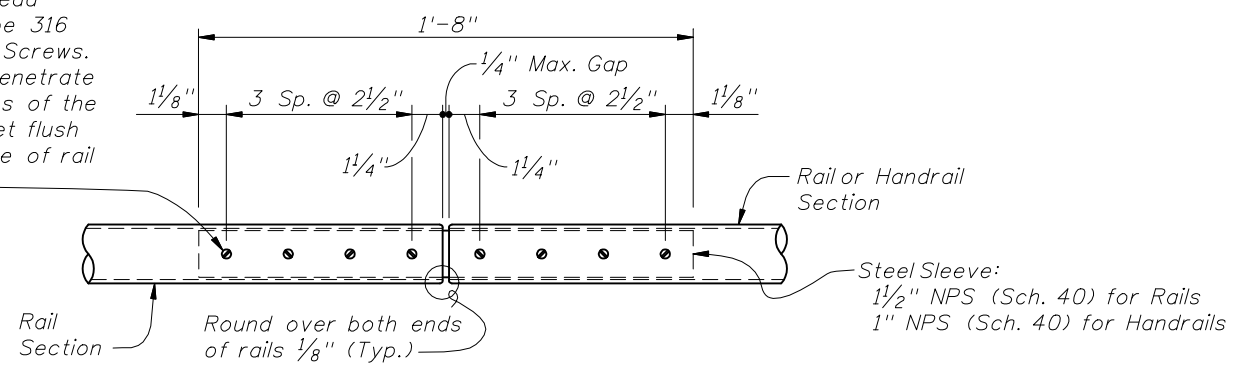
1/4" ϕ x 3/4" Pan Head
Stainless Steel (Type 316
or 18-8 Alloy) Set Screw.
Set Screw must be set
flush against outside face
of rail (Typ.)



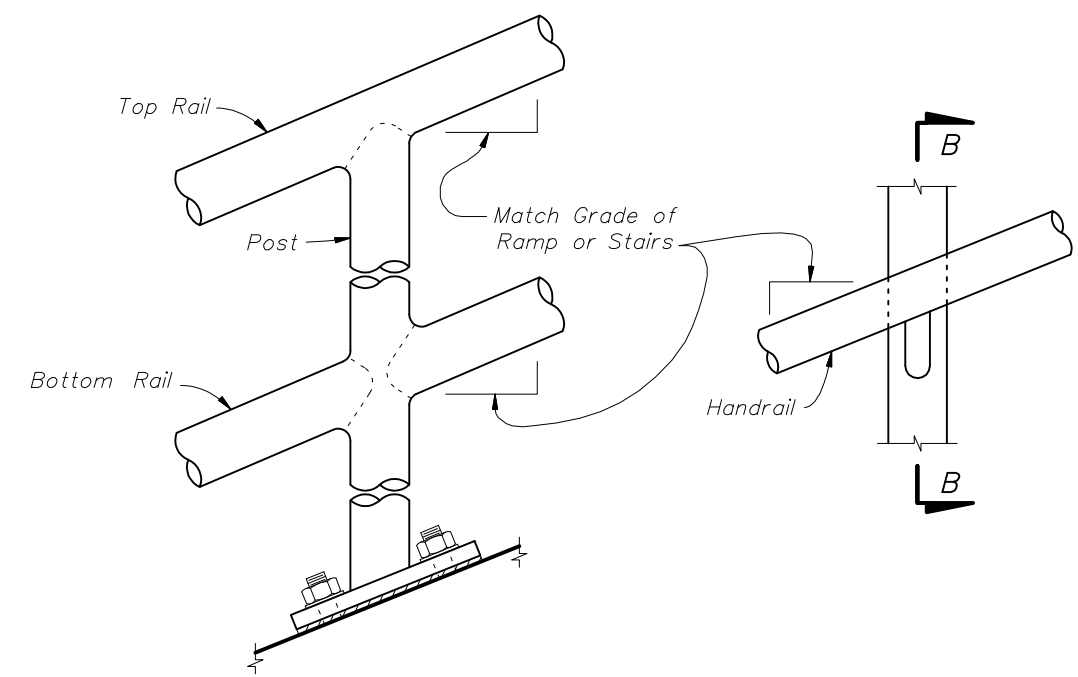
DETAIL "D" - EXPANSION JOINT
(FIELD SPLICE SLIP JOINT SIMILAR)

* At the Contractor's option, embedded length may be 4" when a 3/4" ϕ plug weld is substituted for the 1/4" ϕ set screw.

1/4" ϕ x 3/4" Pan Head
Stainless Steel (Type 316
or 18-8 Alloy) Set Screws.
Set Screws must penetrate
the full wall thickness of the
inner sleeve and set flush
against outside face of rail
(Typ.)



DETAIL "E" - CONTINUITY
FIELD SPLICE



DETAIL "B" - RAIL AND HANDRAIL
(Showing Sloped Condition for Stairs or Ramp)

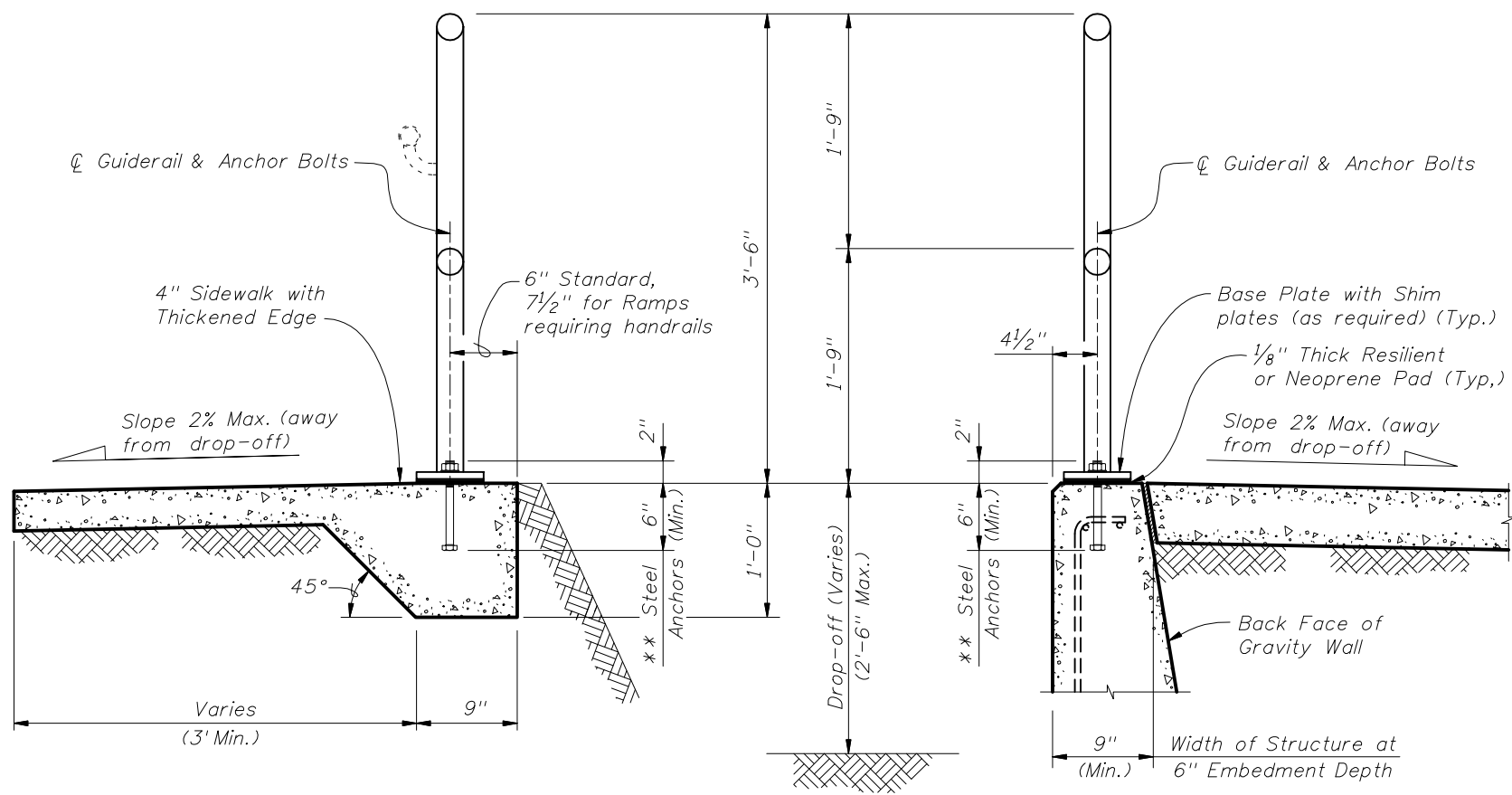
CROSS REFERENCE:
For locations of Details "C", "D" and "E", see Sheet 2 of 5.



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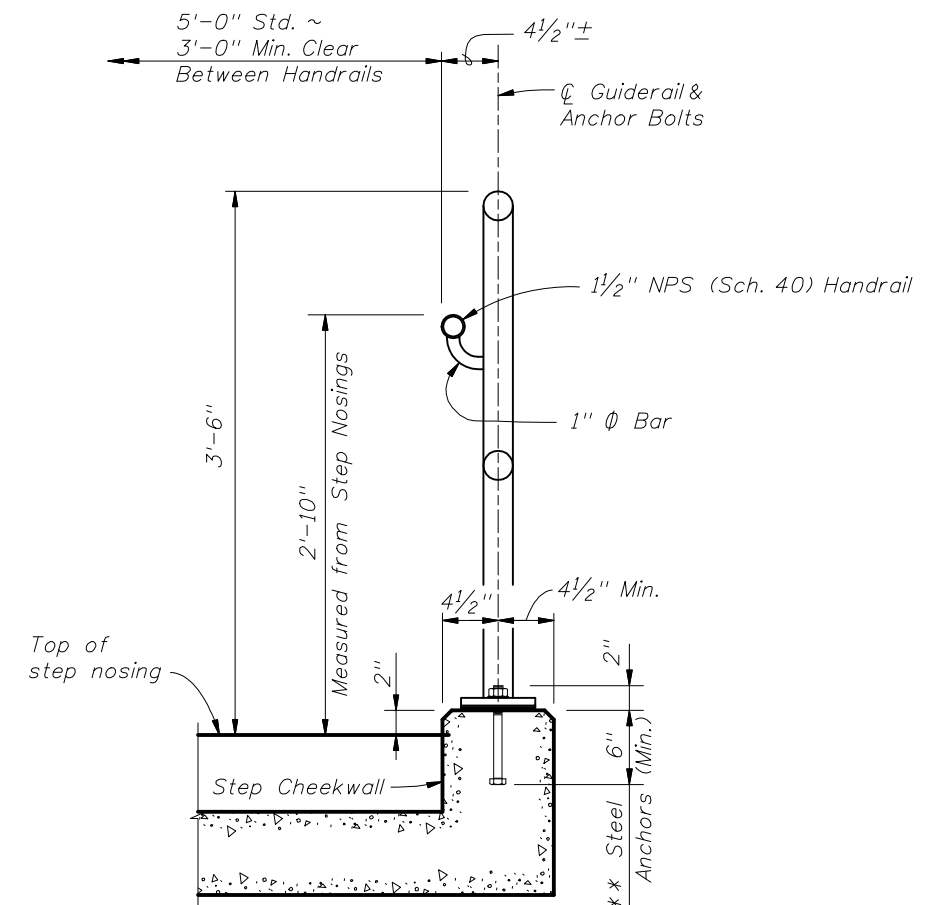
STEEL PIPE GUIDERAIL

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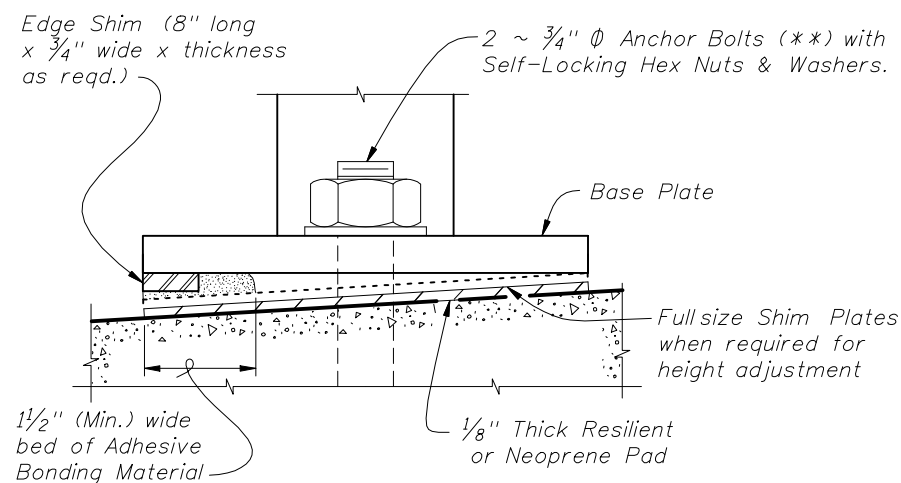


TYPICAL SECTION ON CONCRETE SIDEWALK

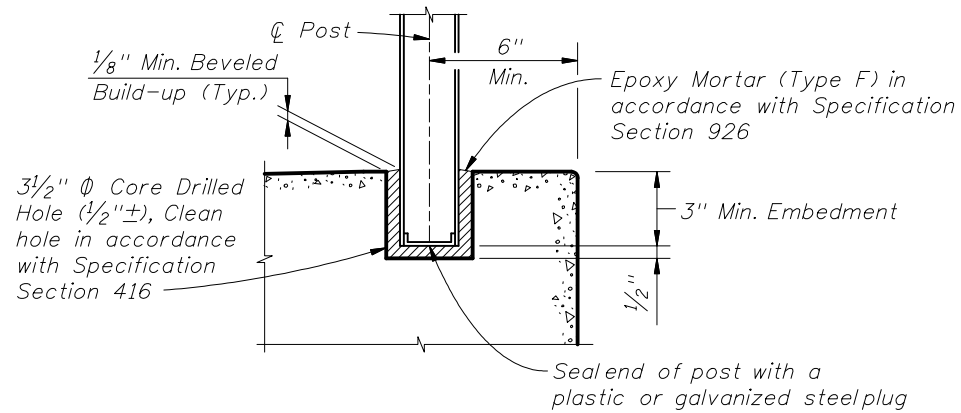
TYPICAL SECTION ON GRAVITY WALL
(Other Retaining Walls Similar)



TYPICAL SECTION ON STEPS & STAIRS



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

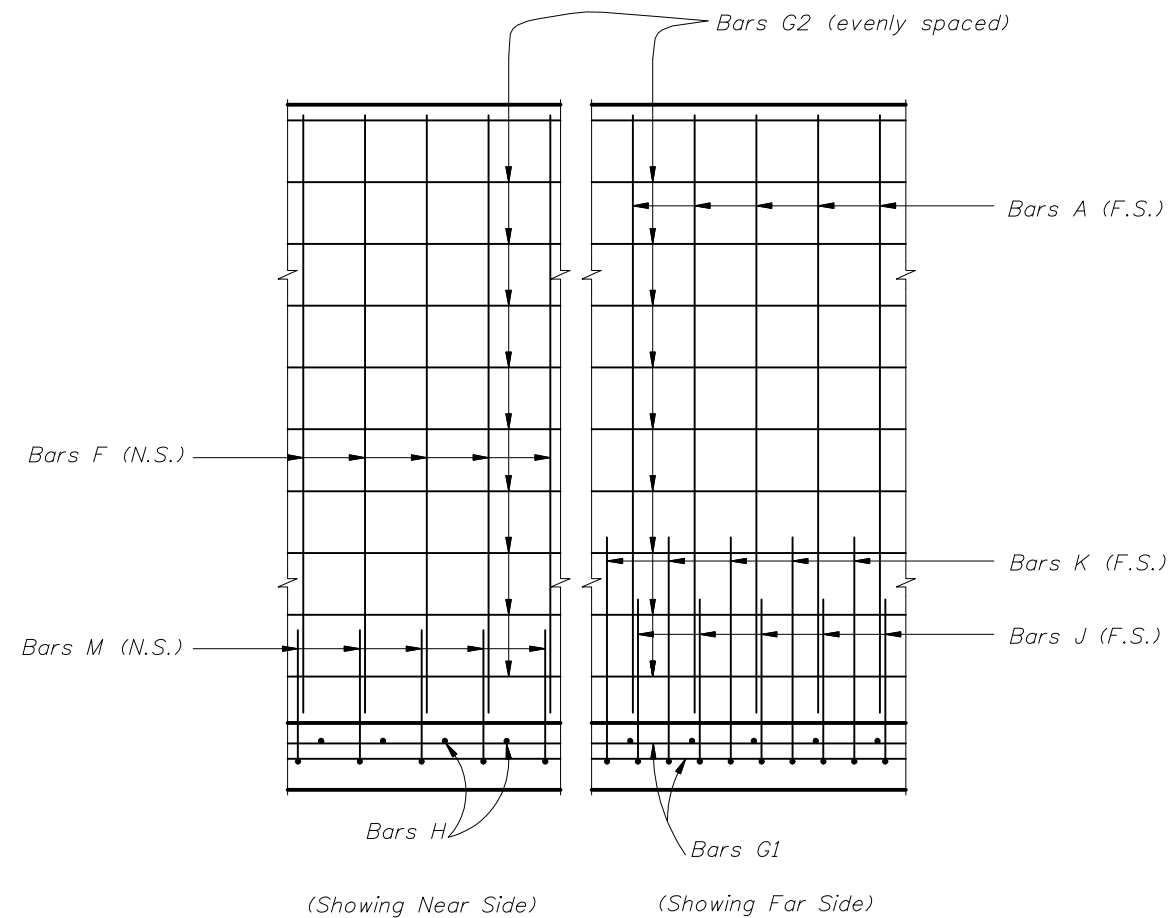


OPTIONAL SIDEWALK ANCHORAGE DETAIL

NOTES:

- ** 2 ~ 3/4" Φ x 8" Steel Anchors:
Galvanized Steel Bolts (As Shown) (C-I-P); Galvanized U-Bolts Permitted (C-I-P); Galvanized Adhesive Anchors Permitted (***) ; Expansion Anchors Not Permitted.
- *** Adhesive anchors shall be fully threaded headless anchor bolts set in drilled holes (manufacturer recommended diameter) with an Adhesive Bonding Material System in accordance with Specification Section 937 and installed in accordance with Specification Section 416. The minimum embedment is 6".





VIEW A-A
(Shear key not shown)

NOTES

DESIGN SPECIFICATIONS:

Design according to FDOT Structures Manual (current edition).

MATERIALS:

All reinforcing steel shall conform to ASTM A615 Grade 60.

SURFACE FINISH:

A Class 5 Applied Finish Coating shall be applied to the top of the wall and the exposed face above ground line.

ARCHITECTURAL TREATMENT:

Alternate Architectural Treatments may be substituted for the Striated Pattern shown when approved by the Engineer. Concrete required for Architectural Treatment is not included in the quantities.

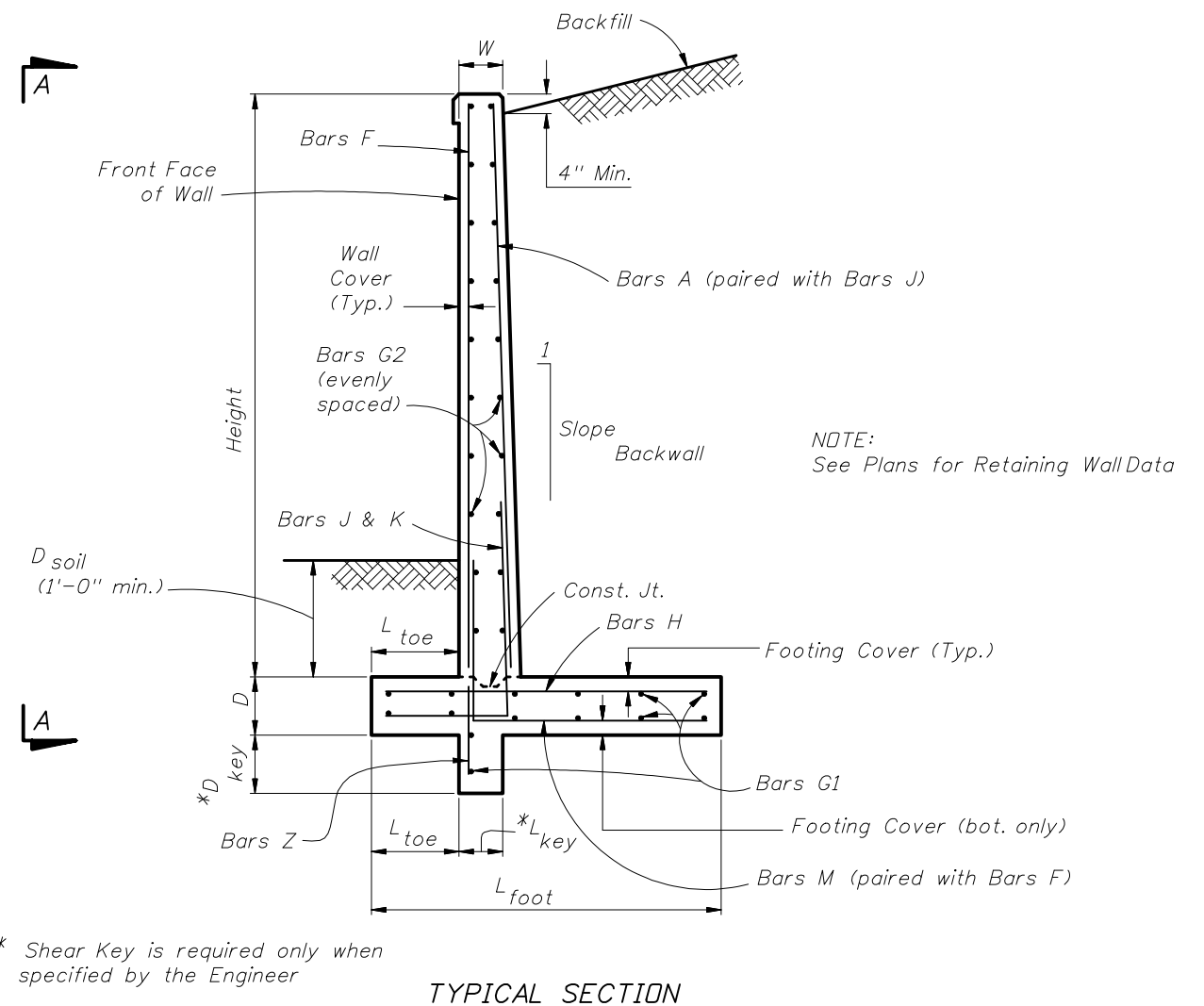
TRAFFIC RAILING BARRIER:

If there is a Traffic Railing Barrier on the wall, Wall Joints and Barrier V-Grooves shall align and Wall Expansion Joints and Barrier Open Joints shall align.

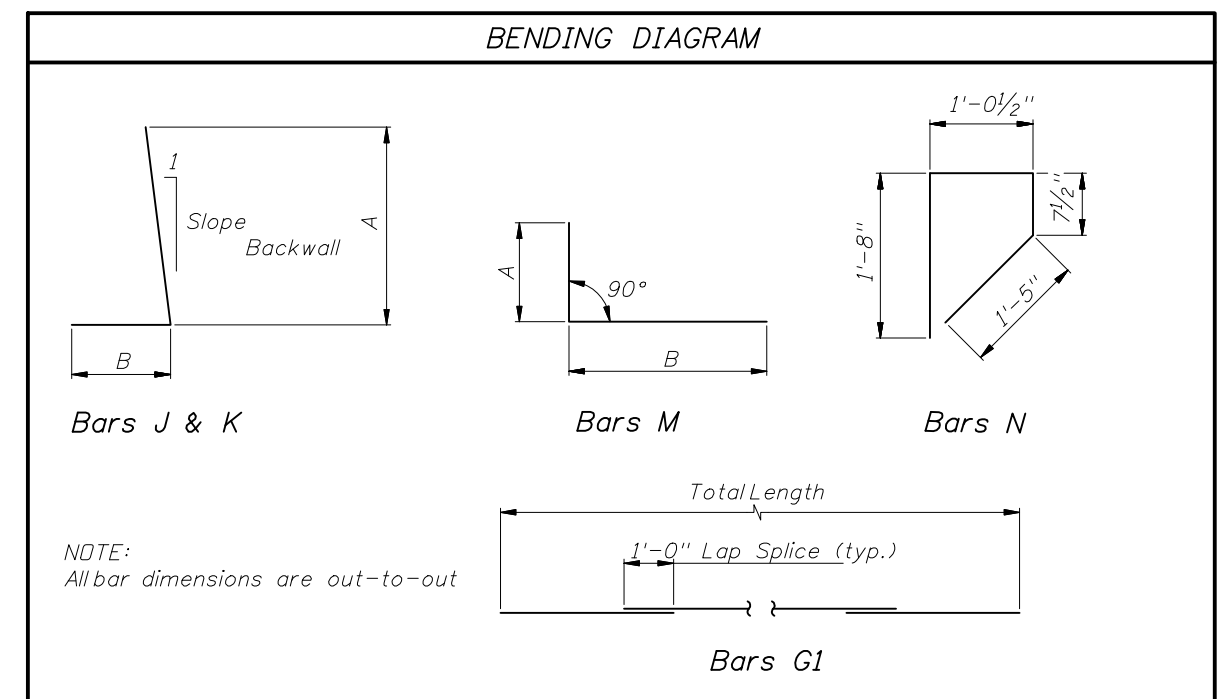
FOUNDATION: Prepare the soil below the footing in accordance with the requirements for spread footings in Specification Section 455.

PAYMENT:

All Retaining Wall costs, including all miscellaneous costs, shall be paid for at the unit contract price for either Class II, III or IV Concrete (Retaining Walls) (CY) and Reinforcing Steel (Retaining Walls) (LBS). Retaining Wall quantities shall not include concrete nor reinf. steel for Traffic Railings. Traffic Railing (including Bars 5V) shall be paid for under Concrete Traffic Railing (Bridge).



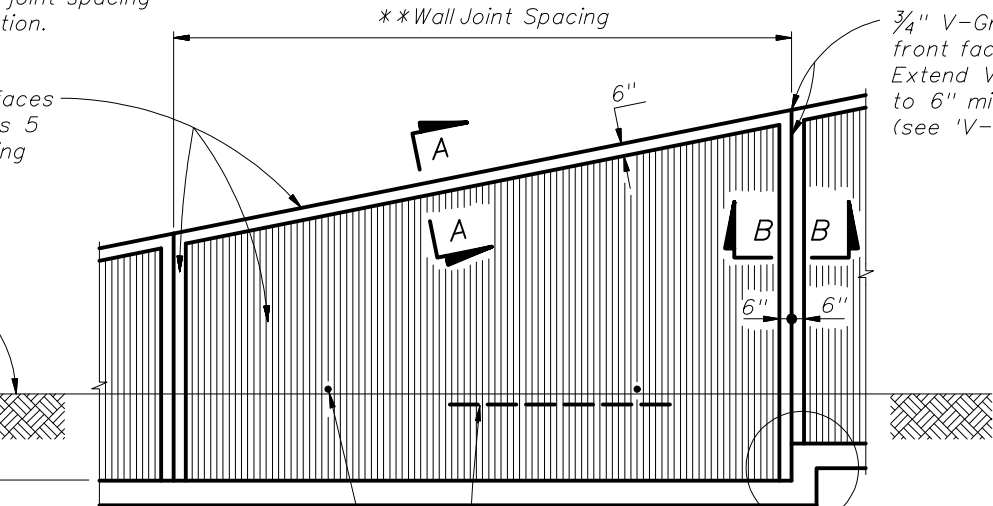
TYPICAL SECTION



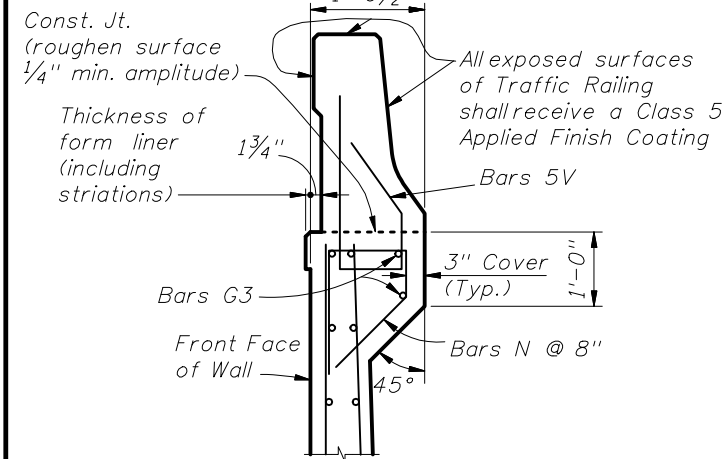
**Wall joint spacing 25 ft. maximum.
At minimum, every fourth wall joint to be an expansion joint.
See Plans for actual wall joint spacing and expansion joint location.

All exposed wall surfaces shall receive a Class 5 Applied Finish Coating

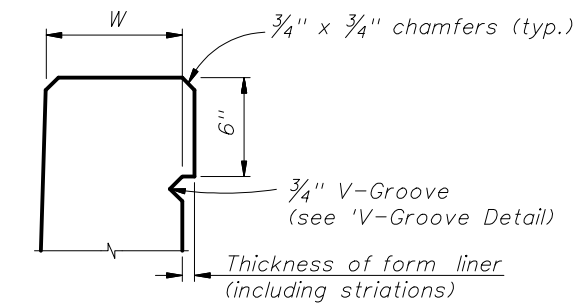
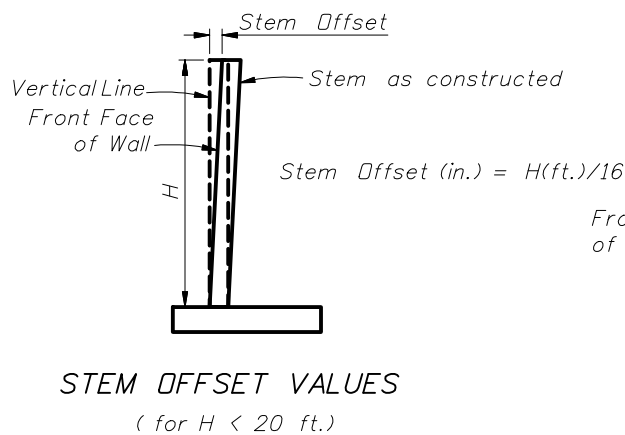
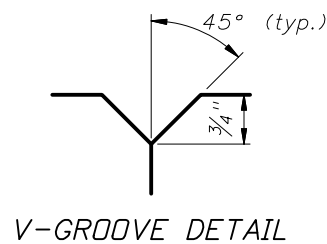
Ground Line
Top of Footing Level (typ.)



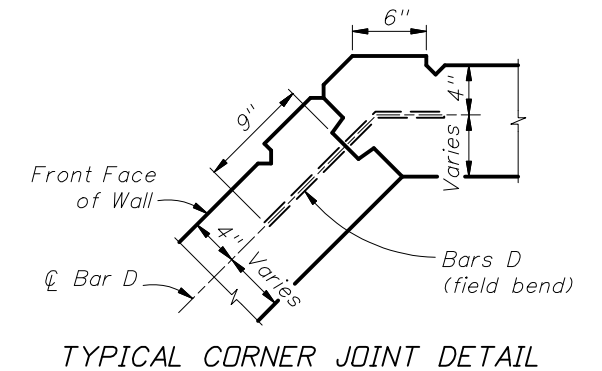
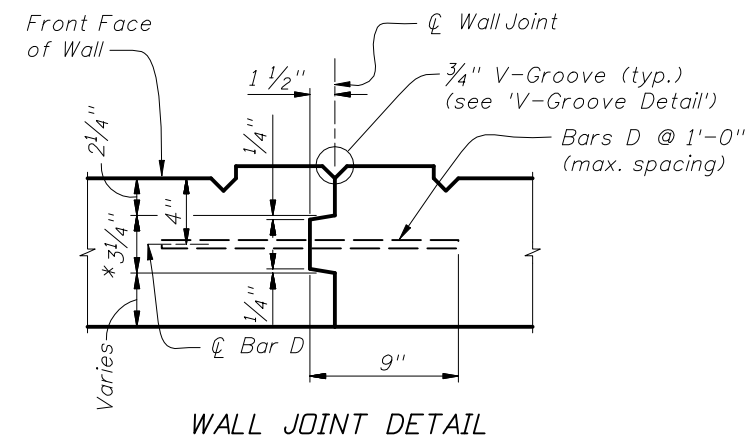
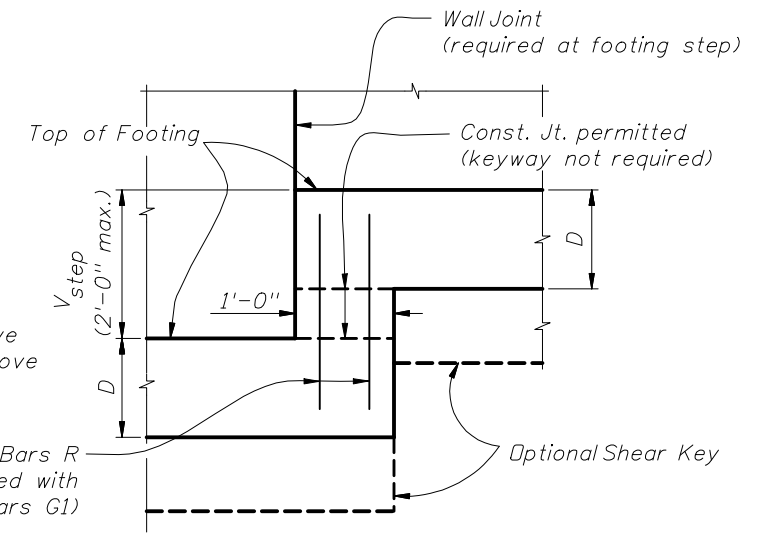
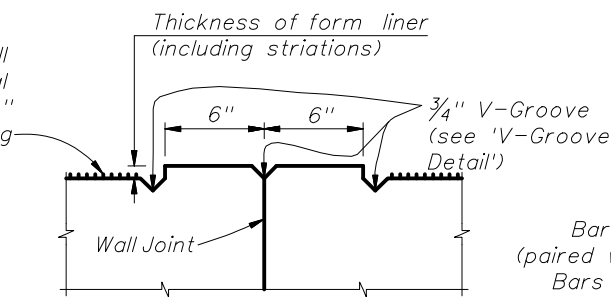
FRONT ELEVATION



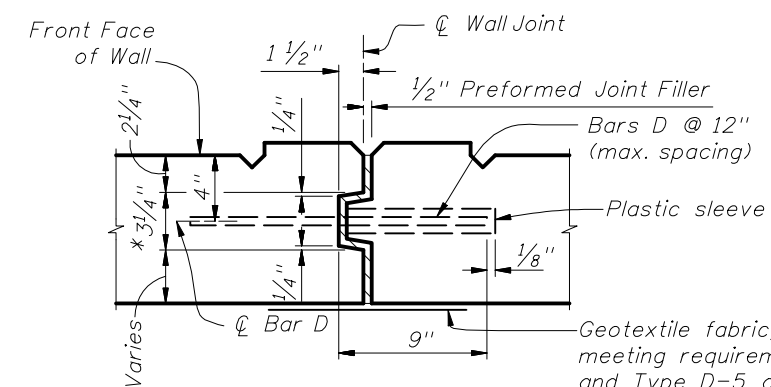
TRAFFIC RAILING ON WALL DETAIL
(for Traffic Railing details see Index No. 420)



Striated Surface shall consist of uniform vertical grooves of 1/8" to 1/4" depth and spacing



*Key to stop at top of footing and 6" from top of wall. Joint across footing and top of wall to be straight line.



Geotextile fabric, 1'-0" wide and full height of fill, meeting requirements of FDOT Specification 985 and Type D-5 of Index No. 199. Apply an adhesive approved by the Engineer to the back of wall for attachment of fabric material.

Front Face of Wall

3" Ø PVC Drain Pipe. Slope down 1/2" from back to front of wall and extend 1/2" beyond both front face and back face of wall.

1" clr.

Final Groundline.

Inside ends of weep holes shall be covered with 1.0 square foot of galvanized mesh with 1/4" openings

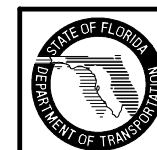
TYPICAL BACKFILL DETAIL

See Roadway Plans for drainage requirement

Backfill layers to be sloped both transversely and longitudinally as necessary to drain and prevent ponding during backfilling. Backfilling shall comply with FDOT Specifications.

Excavation shall comply with FDOT Specifications.

Drain shall be continuous 1.5' x 1.5' clean, broken stone or gravel, graded and placed so as to allow free drainage. Place geotextile fabric, meeting requirements of FDOT Specification 985 and Type D-3 of Index No. 199, around the perimeter to prevent fill from washing out.



NOTES

A. DESIGN SPECIFICATIONS:

1. AASHTO Standard Specifications for Highway Bridges (Current Edition),
2. AASHTO Guide Specifications for Structural Design of Sound Barriers (Current Edition)
3. Florida Department of Transportation's Plans Preparation Manual, Volume I (Current Edition).

B. DESIGN CRITERIA:

The Precast Sound Barriers are pre-designed and based on the criteria in the Plans Preparation Manual, Volume I and the following soil conditions: Sites with soil SPT N values between 10 and 40.

C. CONCRETE AND GROUT:

1. Concrete Class and Compressive Strength:
 - a. Cast-in-Place Collars: Class IV ($f'_c = 5500$ psi)
 - b. Precast Panels, Collars and Post Caps: Class IV ($f'_c = 5500$ psi)
 - c. Posts: Class IV ($f'_c = 5500$ psi)
2. Grout for Auger Cast Piling:
 - a. Maximum Working Compressive Strength = 2200 psi
 - b. Minimum 28 Day Strength = 5500 psi
3. Minimum Compressive Strength for Form Removal and Handling of Posts and Panels:
 - a. 2,500 psi for horizontally cast post and panels.
 - b. 2,000 psi for vertically cast panels or when tilt-up form tables are used for horizontally cast panels.

D. REINFORCING STEEL:

1. Reinforcing steel shall conform to ASTM A 615, Grade 60.
2. Welded wire fabric shall conform to ASTM A 185 (smooth wire) or ASTM A 497 (deformed wire).
3. Concrete Cover of 2" shall be provided, unless otherwise noted.
4. In addition to the requirements of Specification Section 415, tie post and pile stirrups at the following locations as a minimum:
 - a. Post Stirrups - Tie at all four corner bars and at every third interior bar intersection.
 - b. Pile Stirrups - Tie to the main vertical reinforcing at alternate intersections for circular configurations and for rectangular configurations at the four corners and at every third interior bar intersection.

E. SURFACE FINISHES:

Provide a Class 5 Finish in accordance with Specification Section 400, unless otherwise shown on the Wall Control Drawings. See Index No. 5201 for texture finish options.

F. PILING:

Construct Auger Cast Piling in accordance with the Plans and Specification Section 455.

G. UTILITIES:

Field verify the locations of all overhead and underground utilities shown in the Wall Control Drawings.

H. NEOPRENE PADS AND RESILIENT PADS:

1. Neoprene Pads for Panel Bearing Points Between the Stacked Panels:
The Neoprene pads for the panel bearing points shall be Plain Pads, Grade 50 durometer hardness in accordance with Specifications Sections 932-2.1.
2. Neoprene Pads for Collar Bearing Points:
Neoprene Pads shall be Fiber Reinforced Pads, Grade 50, 60 or 70 durometer hardness in accordance with Specification Section 932-2.1. Plain Pads may be substituted for Fiber Reinforced Pads when sufficient bearing area is available on the concrete collar, as follows:
 - a. 10' post spacing: 4" x 4" x 1/2" Plain Pads, Grade 50 durometer hardness.
 - b. 20' post spacing and < 18' wall height: 4" x 4" x 1/2" Plain Pads, Grade 50 durometer hardness.
 - c. 20' post spacing and ≥ 18' wall height: 4" x 5" x 1/2" Plain Pads, Grade 50 durometer hardness.

J. CASTING TOLERANCES:

1. Overall Height & Width: $\pm 1/4$ "
2. Thickness: $\pm 1/4$ "
3. Plane of side mold: $\pm 1/16$ "
4. Openings: $\pm 1/2$ "
5. Out of Square: 1/8" per 6 ft., but not more than 3/8" total along any side
6. Warping: 1/16" per foot distance to nearest corner
7. Bowing: 1/240 panel dimension
8. Surface Smoothness for Type "A" (Smooth) Surface Texture Option: $\pm 1/16$ " along a 10 ft. straightedge.

K. SOUND BARRIER WALL NOTES:

1. Distance between piles shall be a maximum of 20 ft. from centerline to centerline. These Sound Barrier Wall Standard Indexes allow for 5 Pile/Post connection options based on either 10 or 20 ft. post spacing. The panel system depicted in Index Nos. 5202 through 5204 is based on a 20 ft. post spacing.
2. Walls greater than 12 ft. in height shall consist of 2 or 3 stacked panels (upper and lower), each less than 12 ft. in height. The height of the upper panel shall be a minimum 8 ft. or greater as necessary to accommodate any graphic relief (if applicable). The lower panel(s) shall be not less than 4 ft. in height. Walls equal to or less than 12 ft. in height shall consist of either a single panel or 2 stacked panels with an 8 ft. upper panel provided that any graphic relief (if applicable) will fit within the upper panel.
3. Horizontal panel joints shall be located outside of the graphic relief (if applicable). Horizontal panel joints shall be held at a constant elevation for a given wall, where possible.
4. Posts shall be "H" type cross-section with panels installed from above. Panels shall not be installed until auger cast piles and C.I.P. collars have reached their 28 day design strength.
5. See Index No. 5205 for the five pile/post connection options. The Contractor may choose any of these options, unless specifically excluded in the Wall Control Drawings.
6. All posts shall be held plumb in auger cast piles with an installation template. The template shall be adjustable for horizontal placement, vertical placement and plumbness of posts. The template shall be such that the installation tolerances can be held. Template shall remain in place for a minimum of 12 hours after post installation.
7. The Contractor shall be responsible for meeting OSHA requirements. Any utility adjustments, charges for power stoppages, all realignments, special erection methods, etc. to meet these requirements shall be included in bid.
8. Structural Steel shall be in accordance with ASTM A 36.
9. Structural Steel - Pile/Post Connection Option D: Post assemblies shall be shop fabricated in accordance with Specification Section 460. Welding details and welding operations shall be in accordance with the current edition of ANSI/AWS D1.1 Welding Code. Field welding is not permitted.
10. Structural Steel with Concrete Casting - Pile/Post Connection Option C: Store steel posts in a location protected against environmental conditions. Prior to pouring the concrete around the structural post, post shall be free of loose rust, scale, dirt, paint, oil and foreign material.
11. Shimming of wall panels above the pile collar, beneath the bearing pads is permitted up to a maximum of 1 1/2" height. Shims must be either stainless steel (Type 304 or 316) or engineered polymer (copolymer or multipolymer) plastic. Plastic shims must have a minimum compressive strength of 8,000 psi without any fractures. Stacking of shims is permitted as follows:
 - a. For shimming height of 1" or less, provide up to 4 ~ 1/4" shims;
 - b. For shimming heights greater than 1", use a minimum 3/4" thick single shim and up to 3 ~ 1/4" shims. Stacked shim plates must be bonded together with a compatible epoxy adhesive.

L. VECP OR CONTRACTOR REDESIGN:

1. In no case will VECP's or Contractor Redesigns be allowed to modify foundation designs, or post spacing.
2. Substitution of proprietary panels or systems not listed in the Wall Control Drawings will not be allowed.

M. QUALIFIED PRODUCTS LIST:

Manufacturers seeking approval of proprietary sound barrier panels, posts and foundations or systems for inclusion on the Qualified Products List as pre-approved suppliers must submit a QPL Product Evaluation Application along with design documentation, vendor drawings and other information as required in the Sound Barrier QPL Acceptance Criteria showing the proprietary product is designed to meet all specified requirements. Project specific Shop Drawings are required for sound barrier projects in accordance with Specification Section 534.

N. ALTERNATES

The Contractor shall construct the standard precast 20'-0" panel option depicted in the plans or shall construct one of the proprietary sound barrier panel or proprietary system options (panel and foundation) listed in the Wall Control Drawings.

O. FINISH COATING:

1. All wall areas not shown to receive an anti-graffiti coating shall be coated in accordance with Specification Section 400 of the Specifications with a Class 5 Applied Finish Coating. The color of the system shall be same as the anti-graffiti system or as directed by the Engineer.
2. Structural Steel Post Assembly Coating System - Pile/Post Connection Option D: The steel post assembly shall receive a shop applied three-coat system comprised of one coat of inorganic zinc primer and two coats of Type M coal tar-epoxy in accordance with Specifications Section 560. The limits of the coating system shall be the exposed surface area of the post assembly from the top of post to 2'-0" below Top of Collar (Elev. A). After the post assembly is installed, it shall be coated with an approved compatible Class 5 Applied Finish Coating in accordance with Specification Section 400 or an anti-graffiti coating. The color of the Class 5 Coating shall match the color of the panel unless otherwise noted in the plans. All components of coating system shall be on the Department's Qualified Products List. The material supplier shall certify compatibility of paint system.

P. TEST WALL:

The Contractor shall construct a test wall at the beginning of the project consistent with Specification Section 534. The Contractor shall demonstrate that all casting and erection tolerances can be met in order to assure that the prefabricated elements fit together as intended.



2010 FDOT Design Standards

PRECAST SOUND BARRIERS - GENERAL NOTES

Last Revision

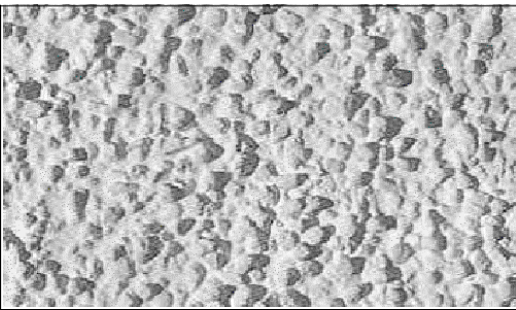
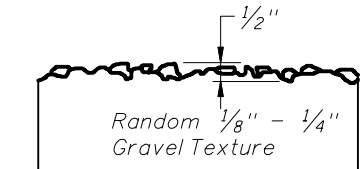
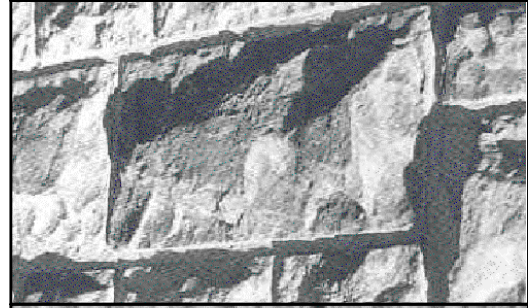
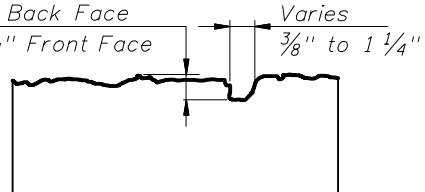
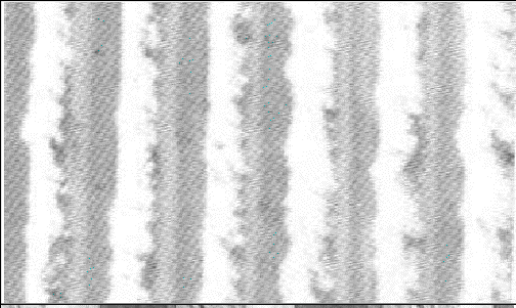
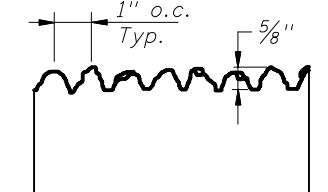

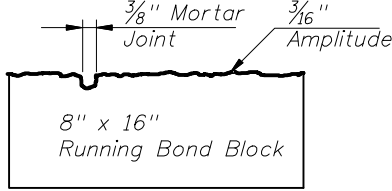
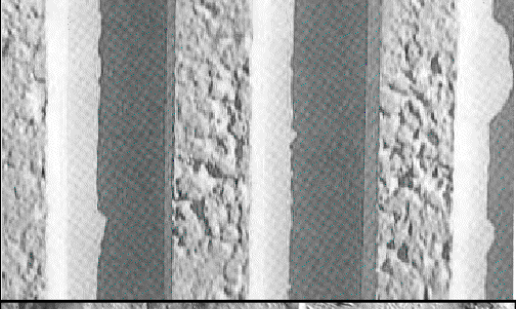
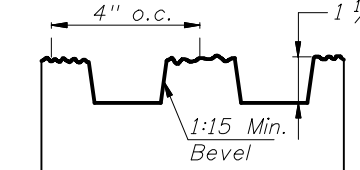
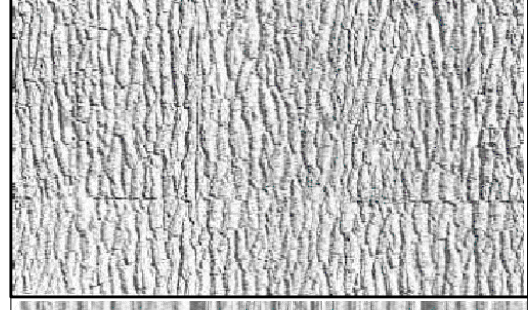
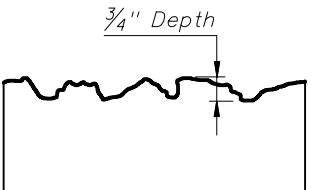
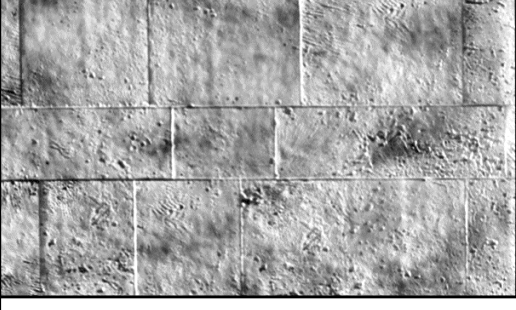
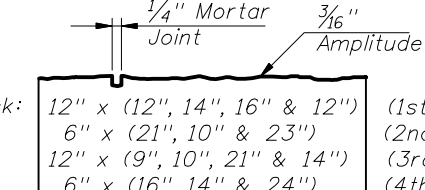
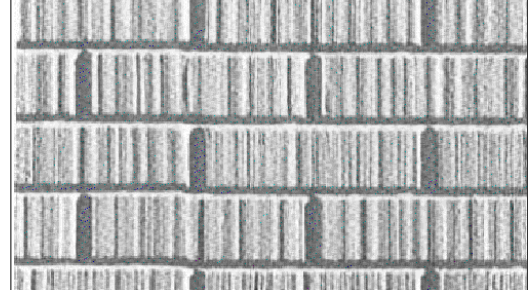
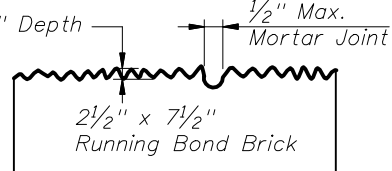
07/01/08

Sheet No.

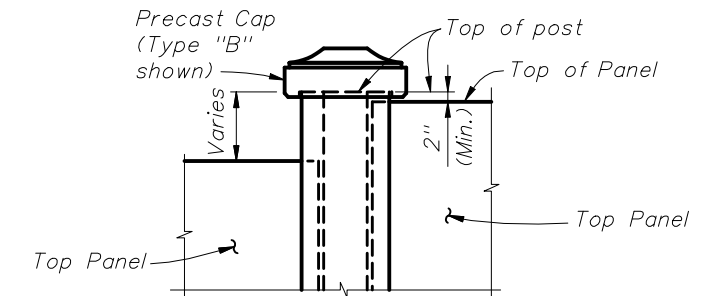
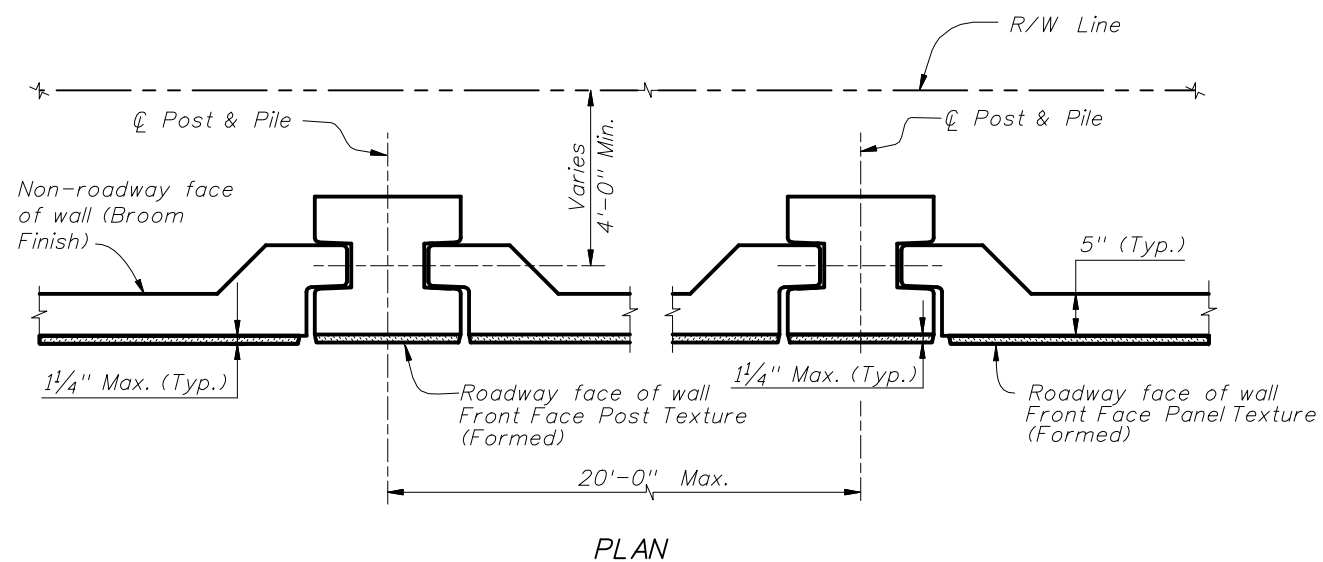
1 of 1

Index No.

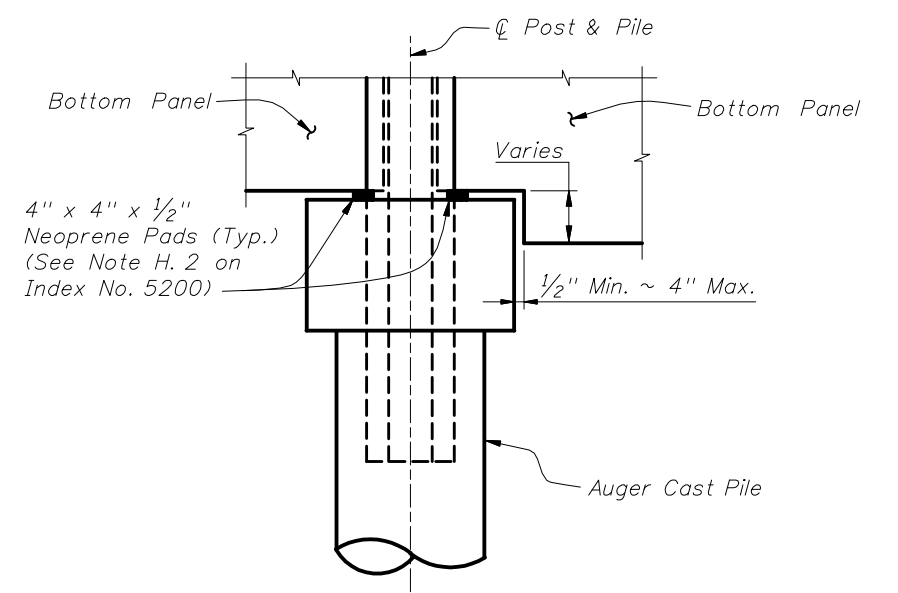
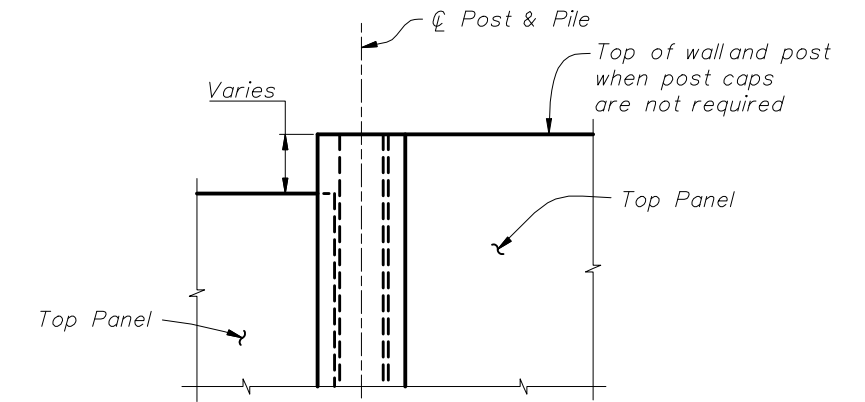
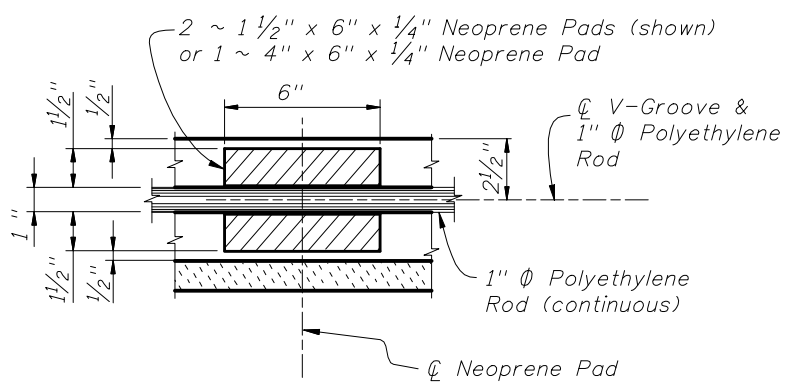
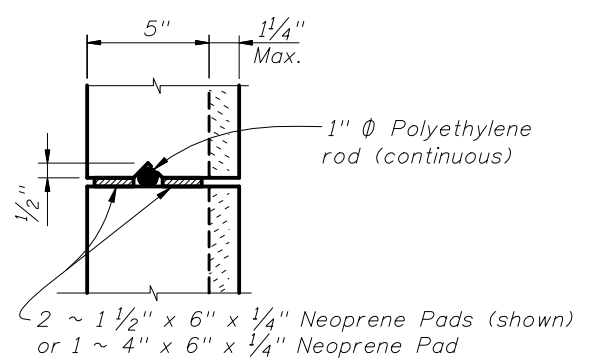
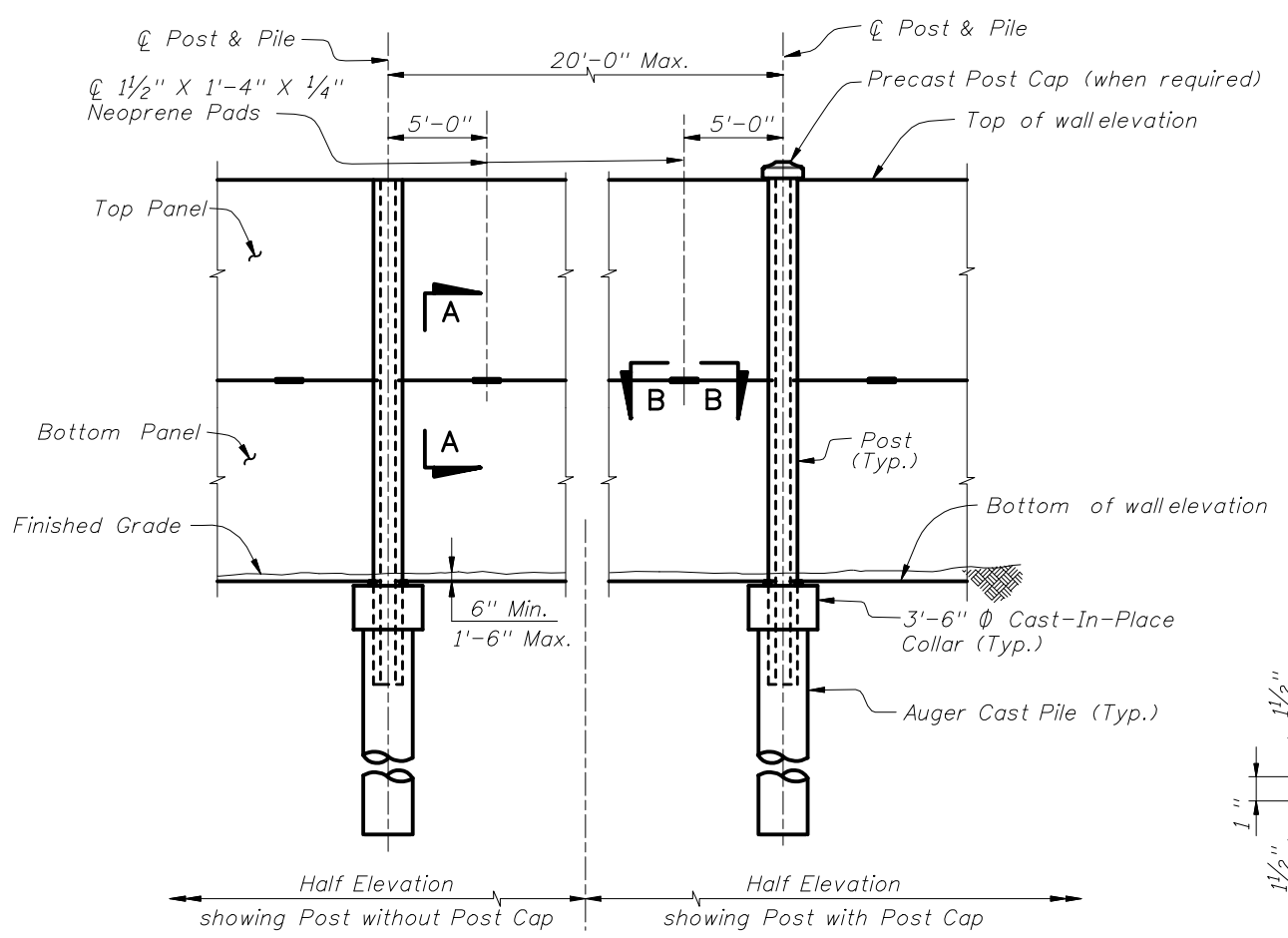
5200

	<p>Type "A" SMOOTH</p>		<p>Type "F" PEA GRAVEL</p> 								
	<p>Type "B" ASHLAR STONE</p> 		<p>Type "G" VERTICAL FRACTURED FIN</p> 								
	<p>Type "C" SPLIT FACE RUNNING BOND BLOCK</p> 		<p>Type "H" TRAPEZOID VERTICAL FINNS W/ FRACTURED FACE (COLORADO DRAG AGGREGATE)</p> 								
	<p>Type "D" FRACTURED GRANITE</p> 		<p>Type "I" CUT CORAL BLOCK (RUNNING BOND)</p>  <p>Running Bond Block:</p> <table border="0"> <tr> <td>12" x (12", 14", 16" & 12")</td> <td>(1st course)</td> </tr> <tr> <td>6" x (21", 10" & 23")</td> <td>(2nd course)</td> </tr> <tr> <td>12" x (9", 10", 21" & 14")</td> <td>(3rd course)</td> </tr> <tr> <td>6" x (16", 14" & 24")</td> <td>(4th course)</td> </tr> </table>	12" x (12", 14", 16" & 12")	(1st course)	6" x (21", 10" & 23")	(2nd course)	12" x (9", 10", 21" & 14")	(3rd course)	6" x (16", 14" & 24")	(4th course)
12" x (12", 14", 16" & 12")	(1st course)										
6" x (21", 10" & 23")	(2nd course)										
12" x (9", 10", 21" & 14")	(3rd course)										
6" x (16", 14" & 24")	(4th course)										
	<p>Type "E" WIRE-CUT BRICK</p> 	<p>NOTES:</p> <ol style="list-style-type: none"> 1. Surfaces shall be formed, rolled, or pressed using form liners in accordance with the Plans and Specifications (Class 3 Surface Finish). 2. See Wall Control Drawings for project aesthetic requirements. 									





Note: See plans for Post Cap requirements.
See Index No. 5207 for Post Cap details.



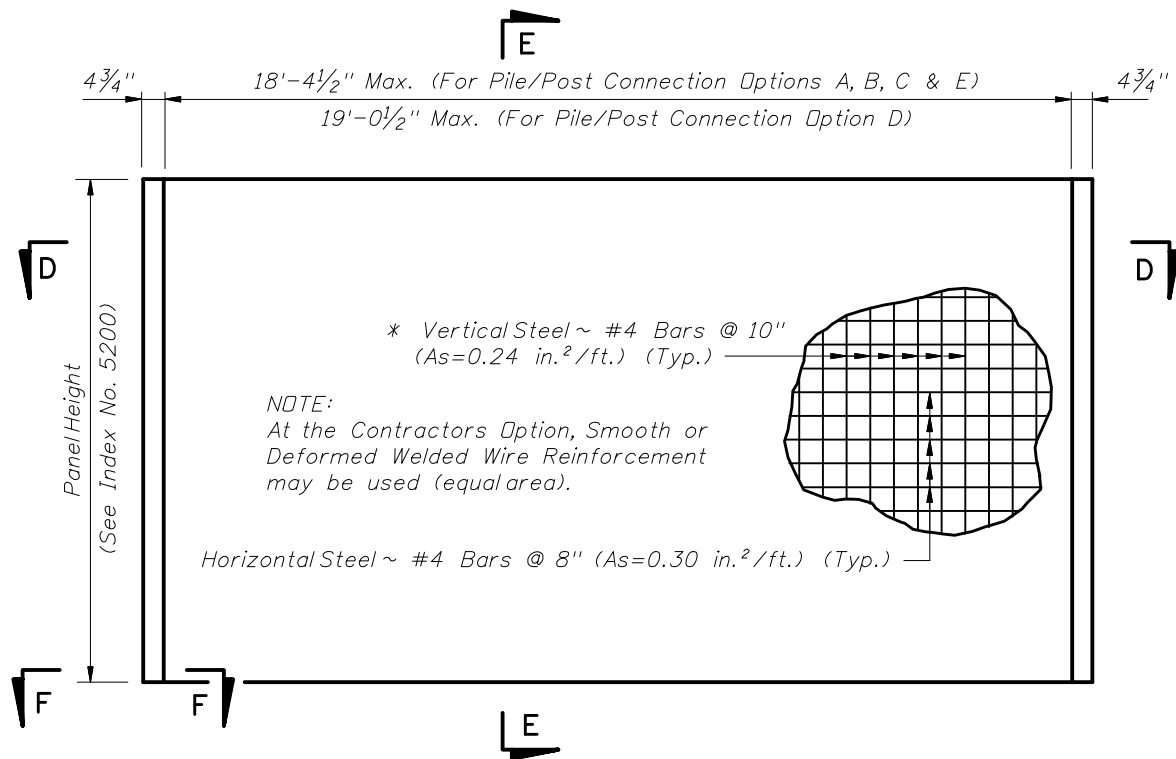
TYPICAL PANELS AND POSTS



2010 FDOT Design Standards

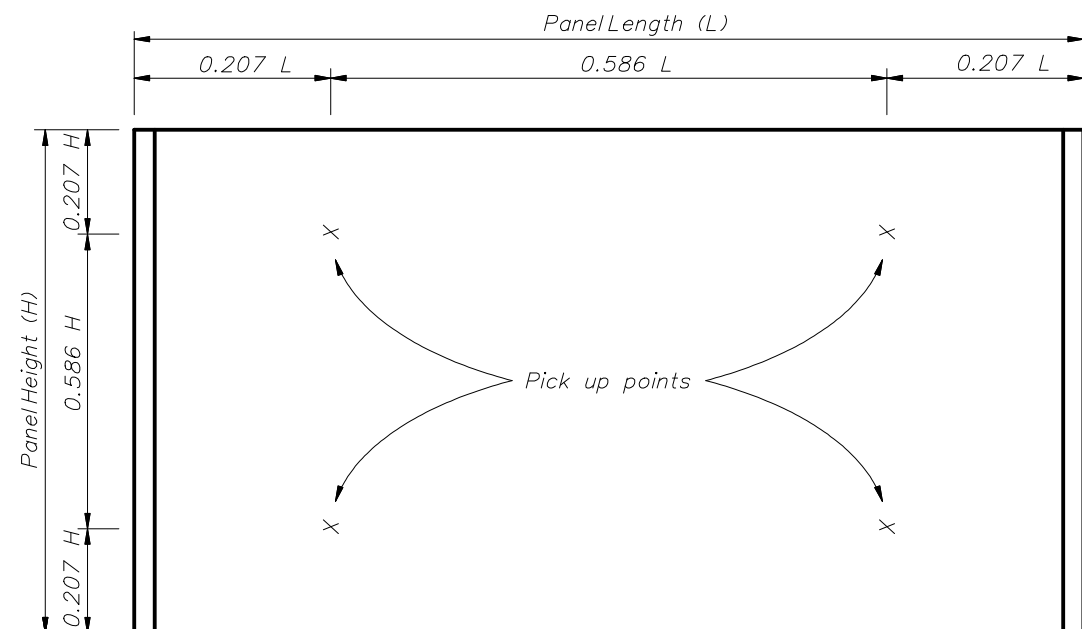
PRECAST SOUND BARRIERS
- FLUSH PANEL OPTION

Last Revision	Sheet No.
07/01/08	1 of 4
Index No.	
5202	

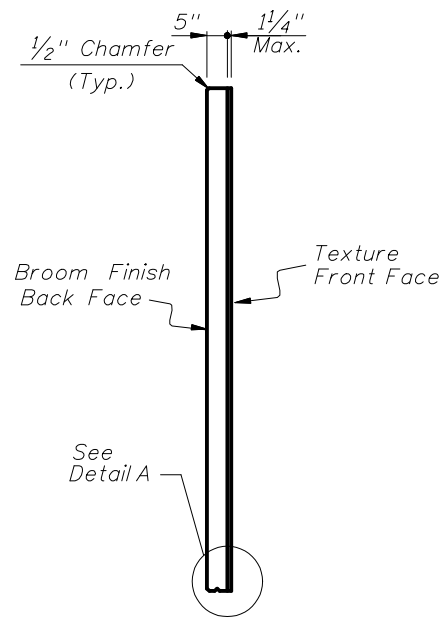


TYPICAL PANEL ELEVATION

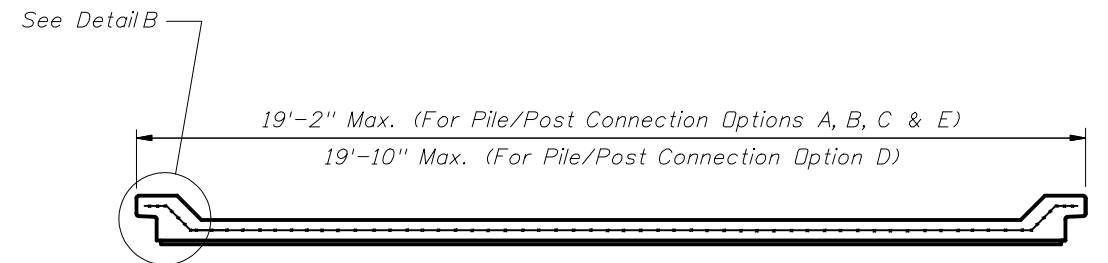
* In lieu of utilizing the pick up points below, panels may be cast vertically or cast horizontally then tilted upright using tilt-tables prior to lifting from form. In this case, the vertical steel may be reduced to #4 Bars @ 1'-3" (As=0.15 in.²/ft.).



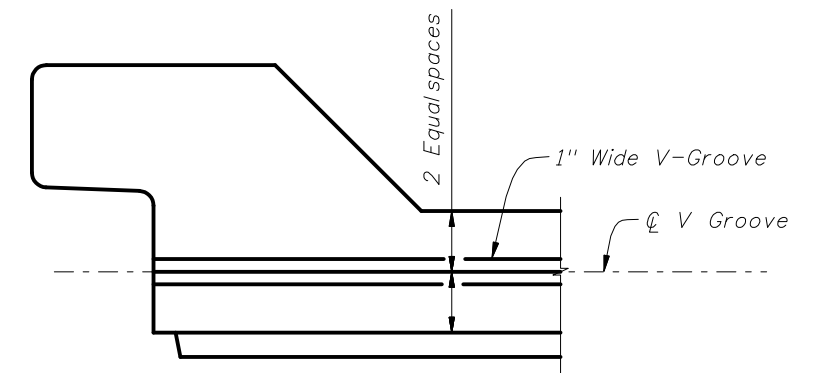
REQUIRED PICK UP POINTS FOR PANELS
(Panels shall be rotated about long axis only)



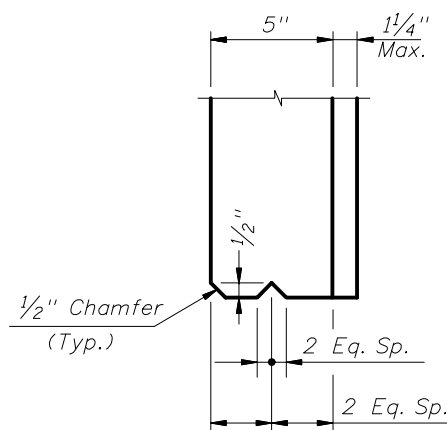
SECTION E-E



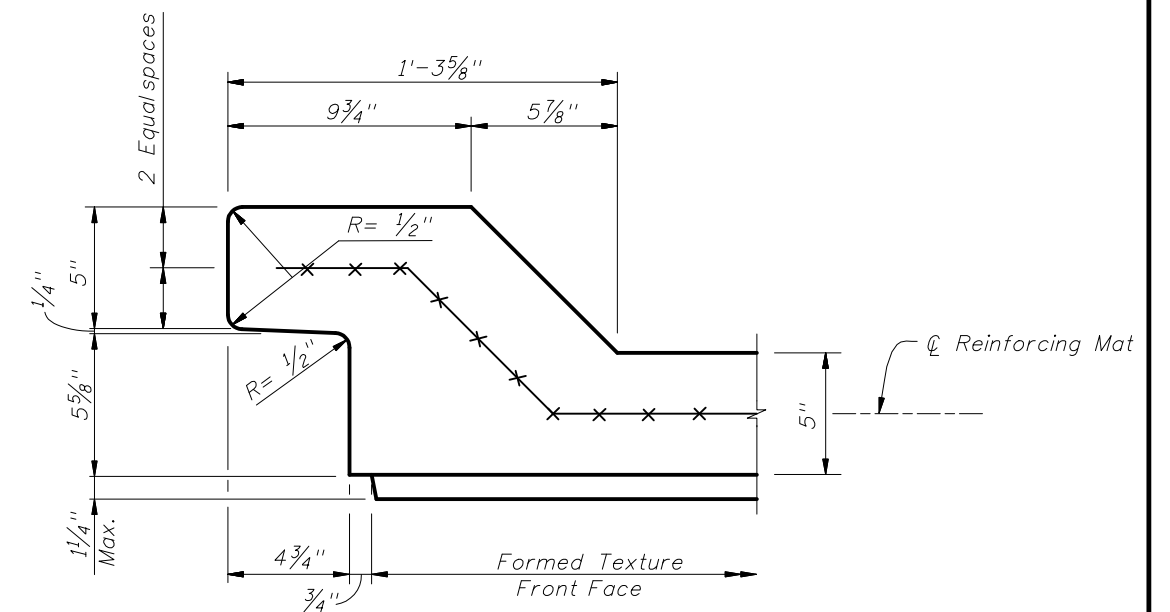
SECTION D-D



SECTION F-F



DETAIL A



DETAIL B
(Typical both ends)

TYPICAL PANELS AND POSTS

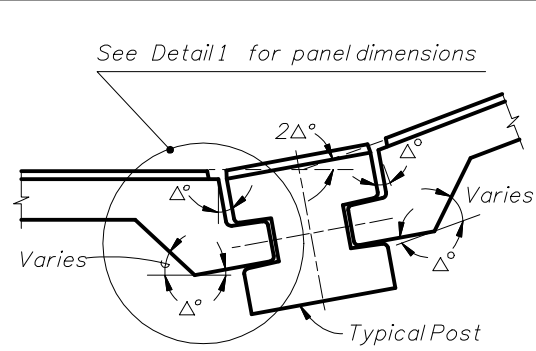


2010 FDOT Design Standards

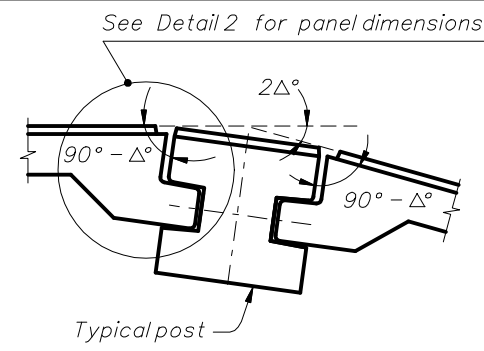
PRECAST SOUND BARRIERS
- FLUSH PANEL OPTION

Last Revision 01/01/06 Sheet No. 2 of 4

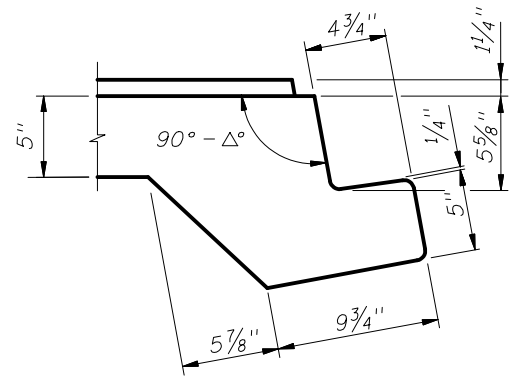
Index No. 5202



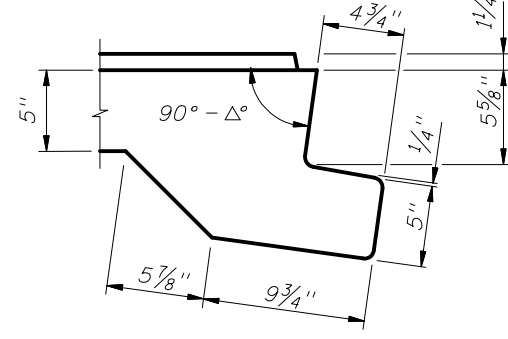
CASE 1
(Interior Angle)



CASE 2
(Exterior Angle)



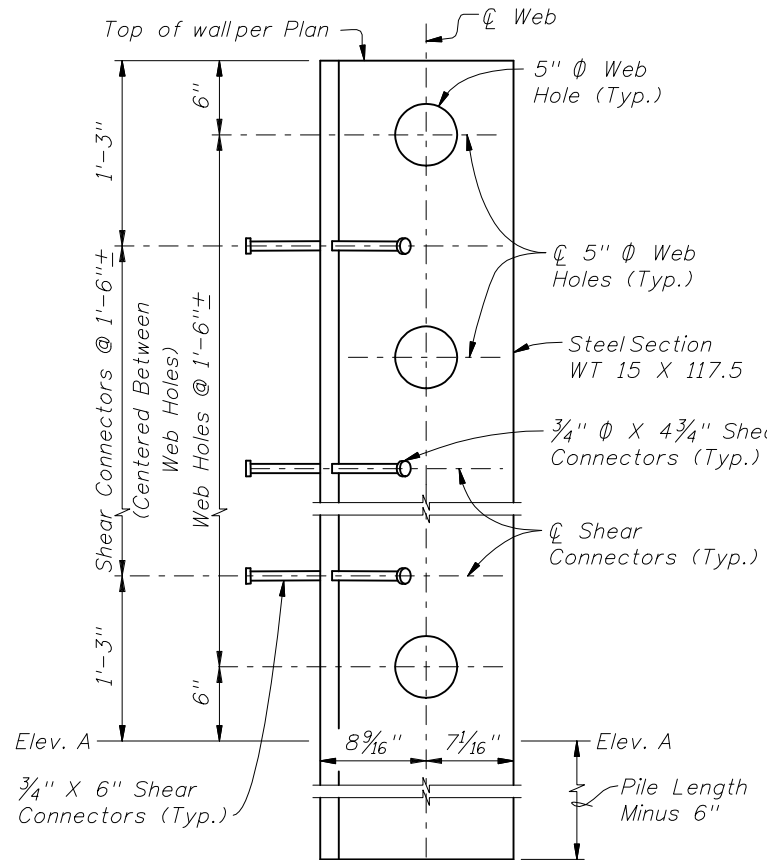
DETAIL 1



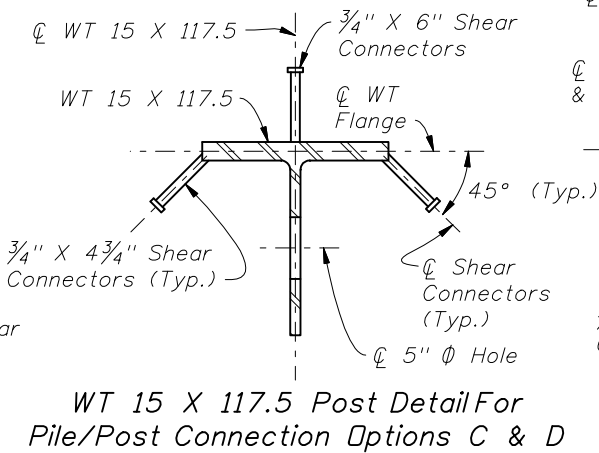
DETAIL 2

PIVOTING POINT DETAILS

NOTE: The shop drawings shall include specific pivoting point details of panel ends at locations where the deflection angle (2Δ) between panels exceeds 7° .

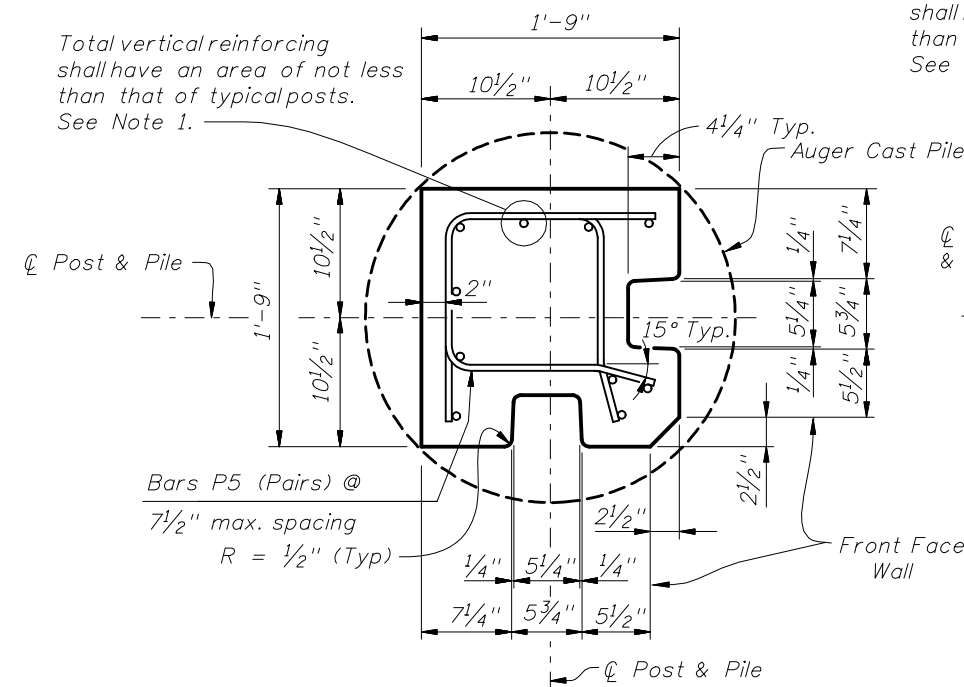


WEB HOLE & SHEAR CONNECTOR SPACING DETAIL
(Concrete not shown for clarity. For limits of concrete see Index No. 5205, Sheet No. 4 of 7.)



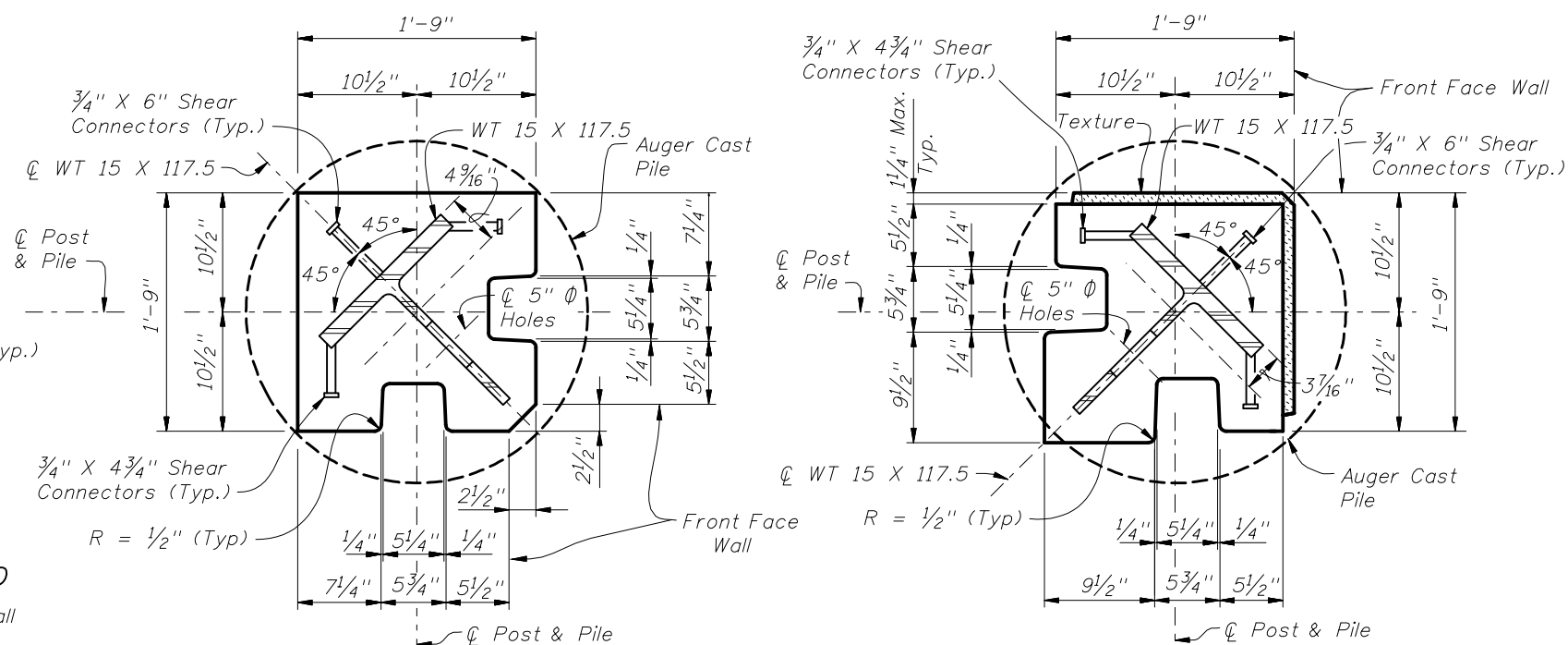
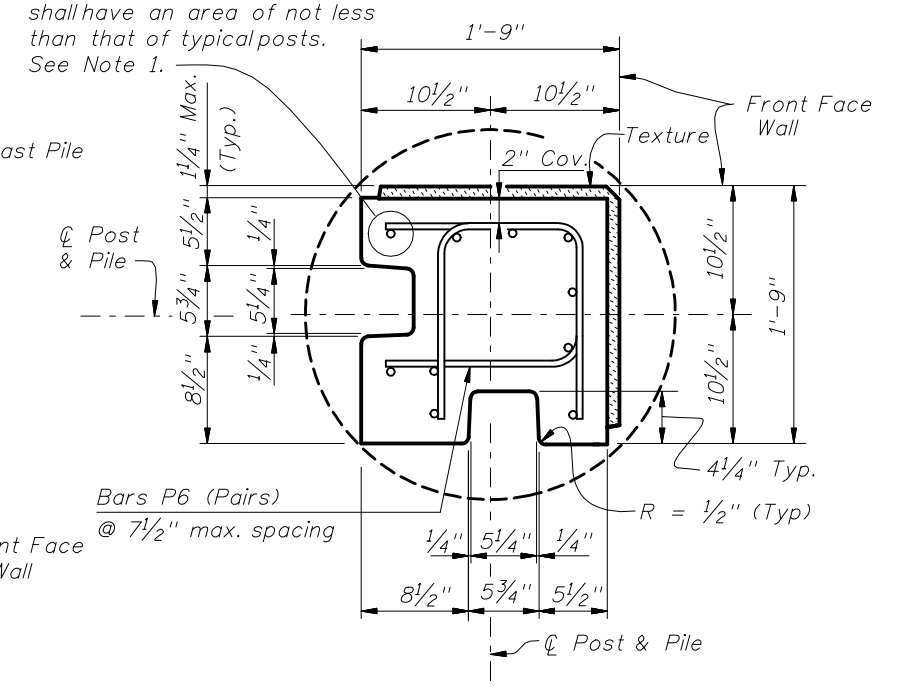
NOTE: The WT 15 X 117.5 Section shall extend into the Auger Cast Pile.

Total vertical reinforcing shall have an area of not less than that of typical posts. See Note 1.

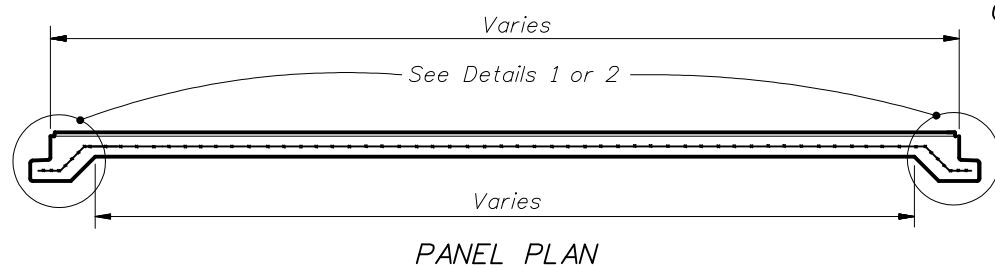


SPECIAL POSTS FOR 90° CORNERS FOR PILE/POST CONNECTION OPTIONS A, B & E
Collars for Special Posts shall be 3'-6" Ø

Total vertical reinforcing shall have an area of not less than that of typical posts. See Note 1.

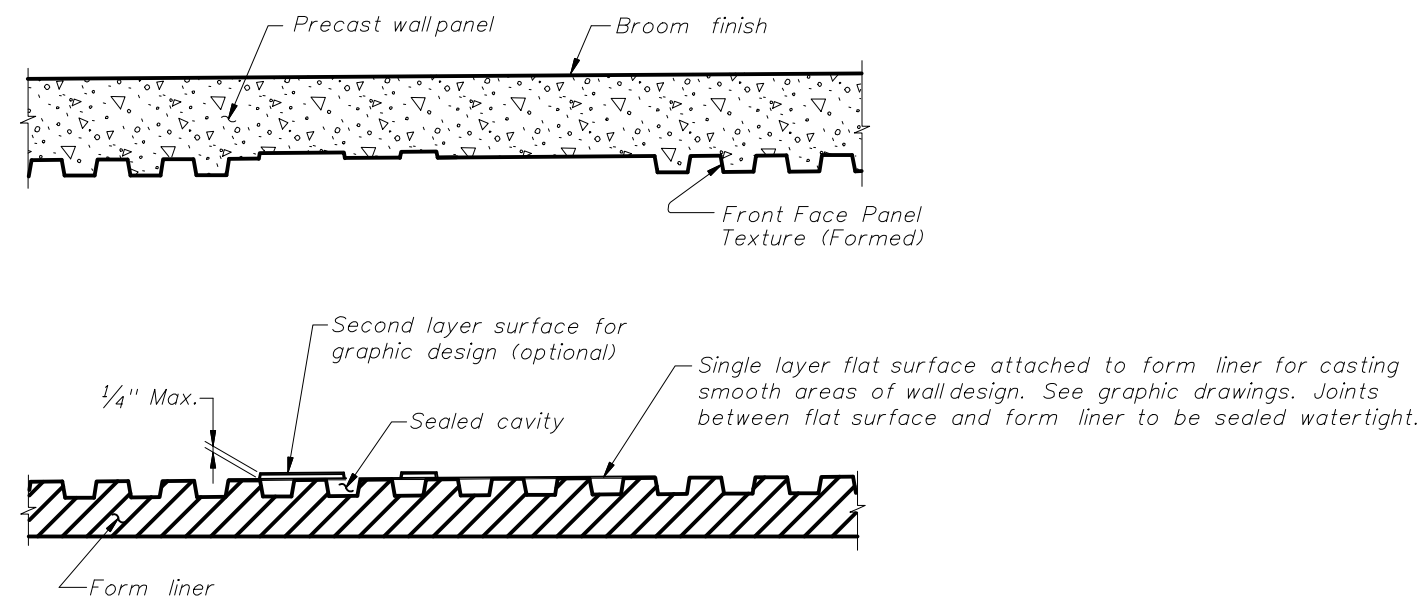
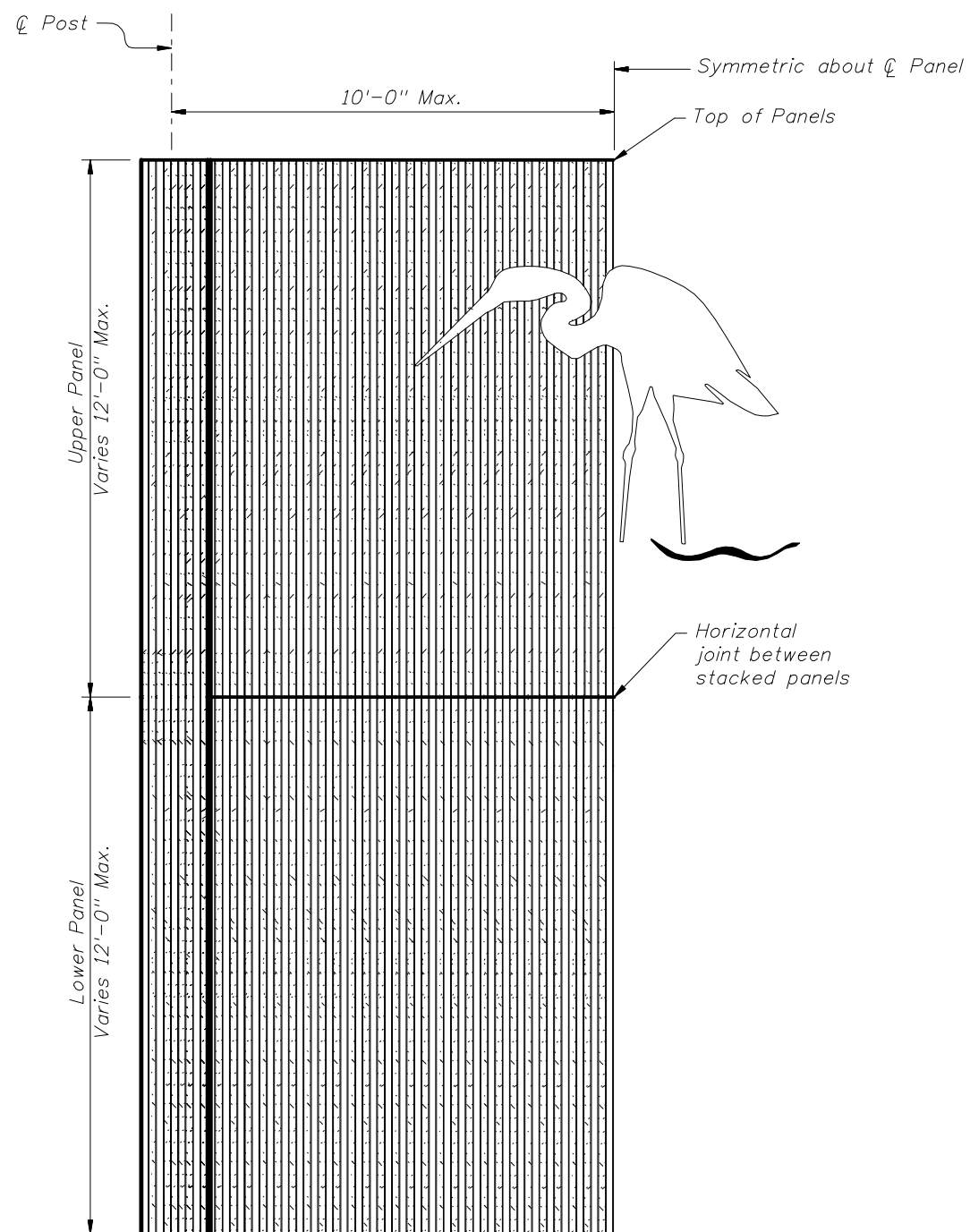


SPECIAL POSTS FOR 90° CORNERS FOR PILE/POST CONNECTION OPTIONS C & D
Collars for Special Posts shall be 3'-6" Ø



- NOTES:
- For Table of Reinforcing Steel Sizes, see Index No. 5206.
 - For Pile/Post Connection Options A through E, see Index No. 5205.
 - For Post & Pile Lengths, see Index No. 5206.

SPECIAL PANELS AND POSTS



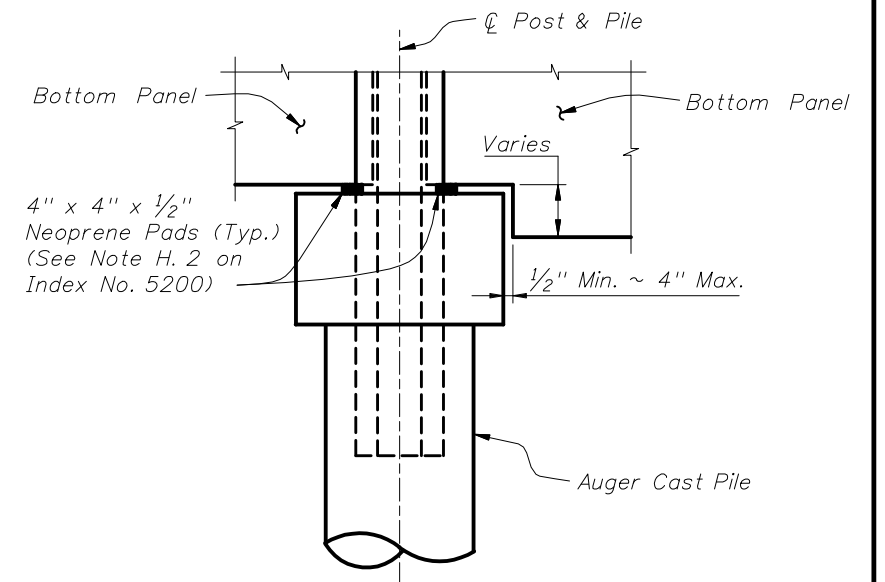
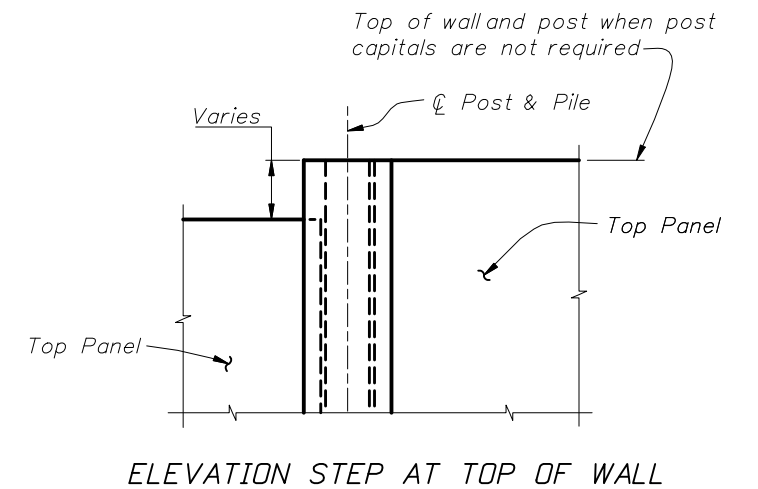
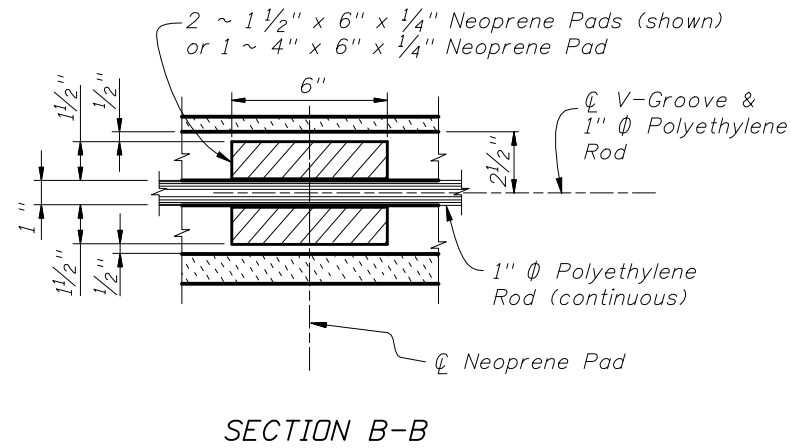
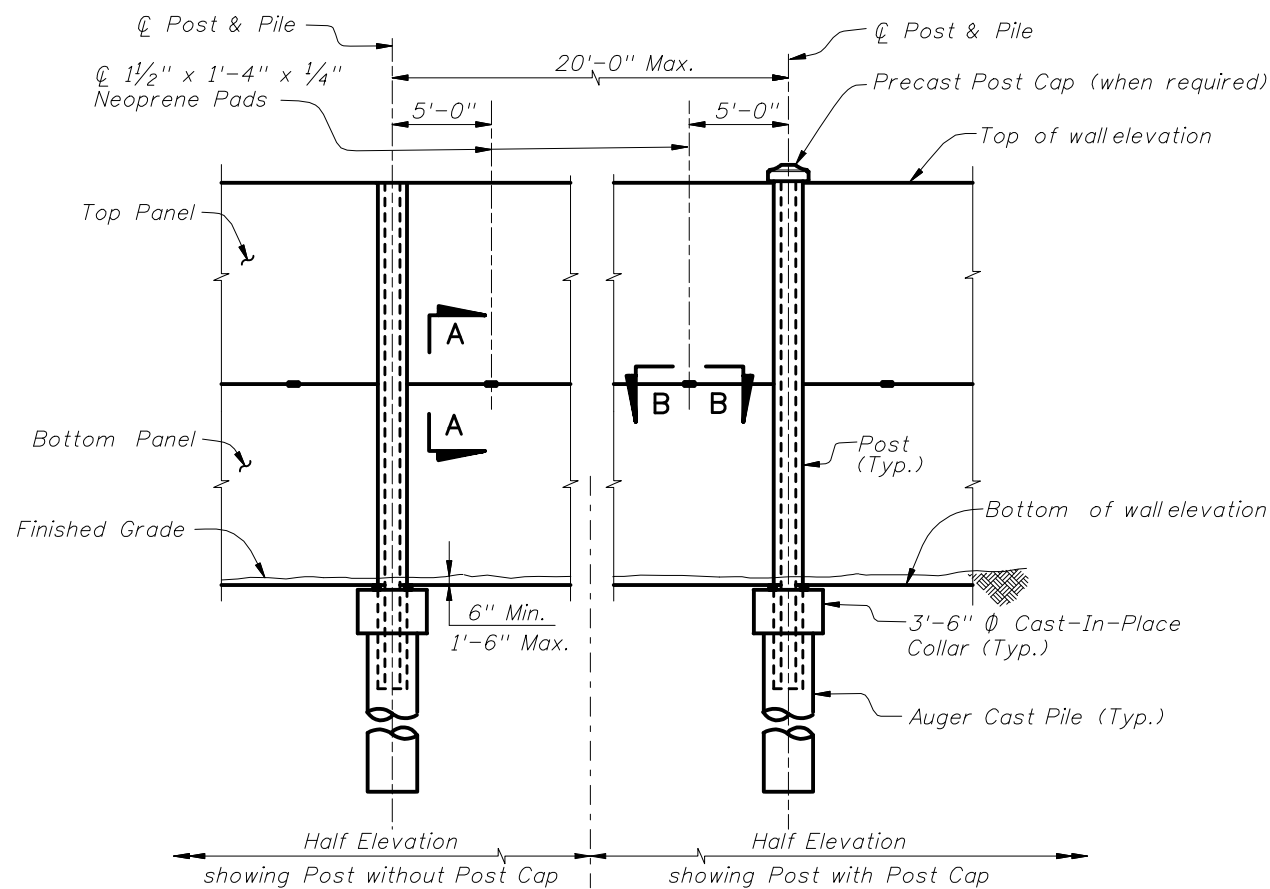
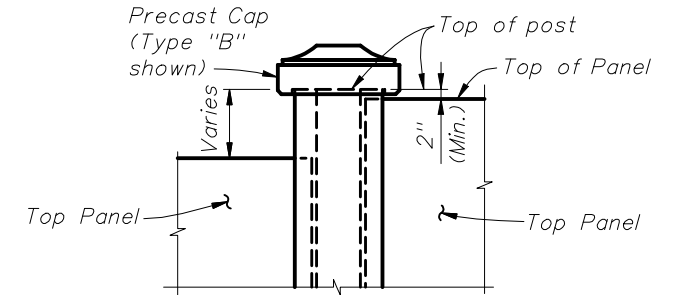
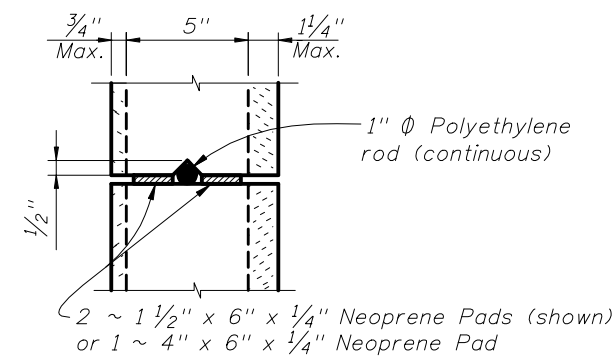
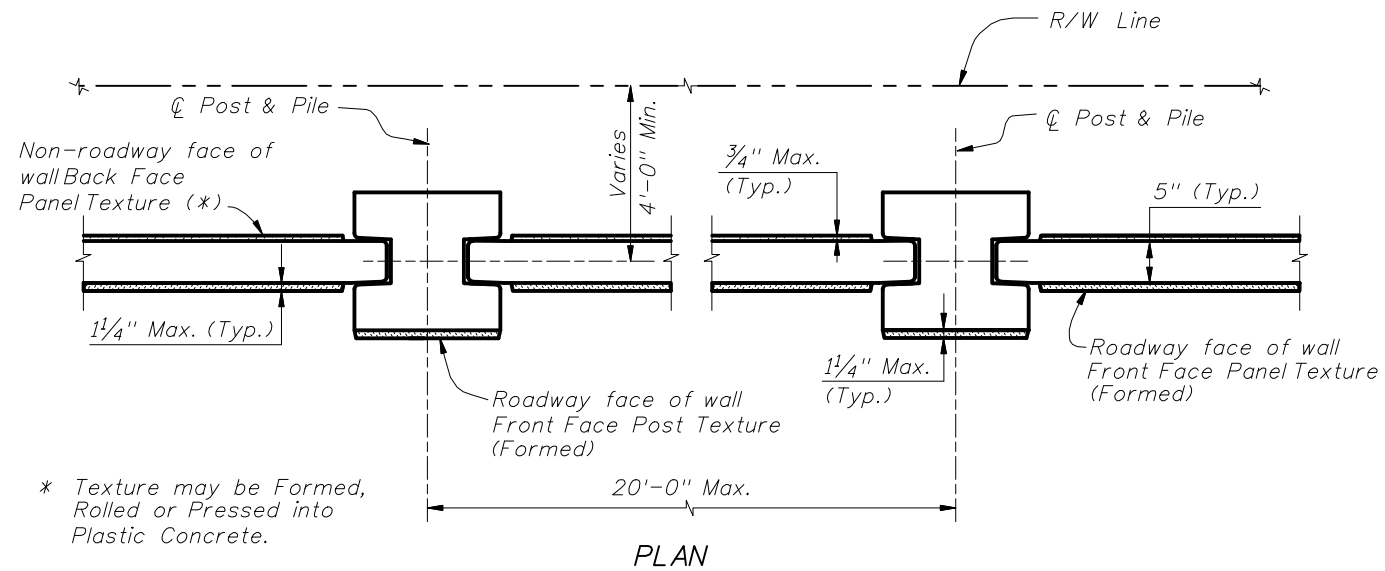
TYPICAL FORMING DETAIL
(Front Face Panel Texture Type "H" Shown.)

NOTES:

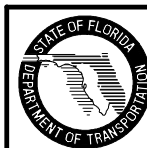
1. Broom finish shall be scored in plastic concrete on the back face of precast panels.
2. Contractor shall submit specific form liner samples for approval by the Engineer.
3. Textures and graphics shown are for demonstration purposes only. See Wall Control Drawings for project specific texture and graphic requirements.

HALF ELEVATION
(Pile/Post Connection Options A, B, C and E Shown.)
(Front Face Panel Texture Type "H" and Front Face Post Texture Type "H" Shown.)
(Graphic Type SE-2 Shown.)





TYPICAL PANELS AND POSTS

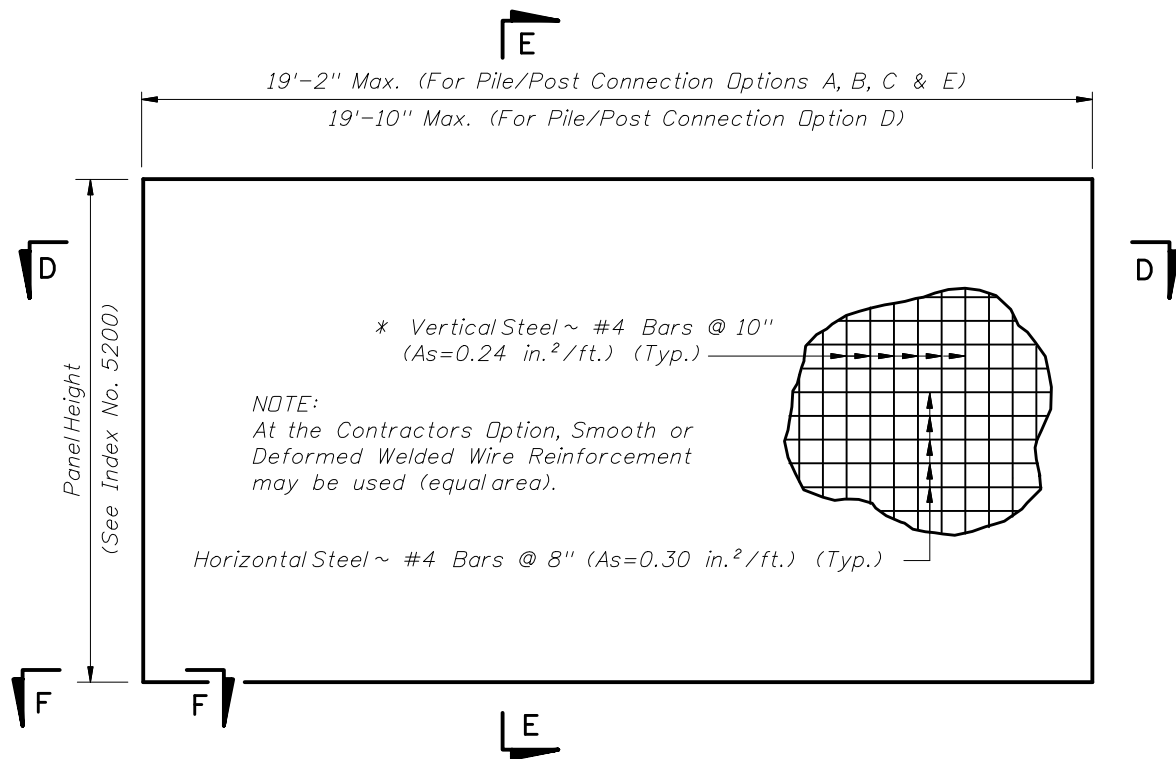


2010 FDOT Design Standards

PRECAST SOUND BARRIERS
- RECESSED PANEL OPTION

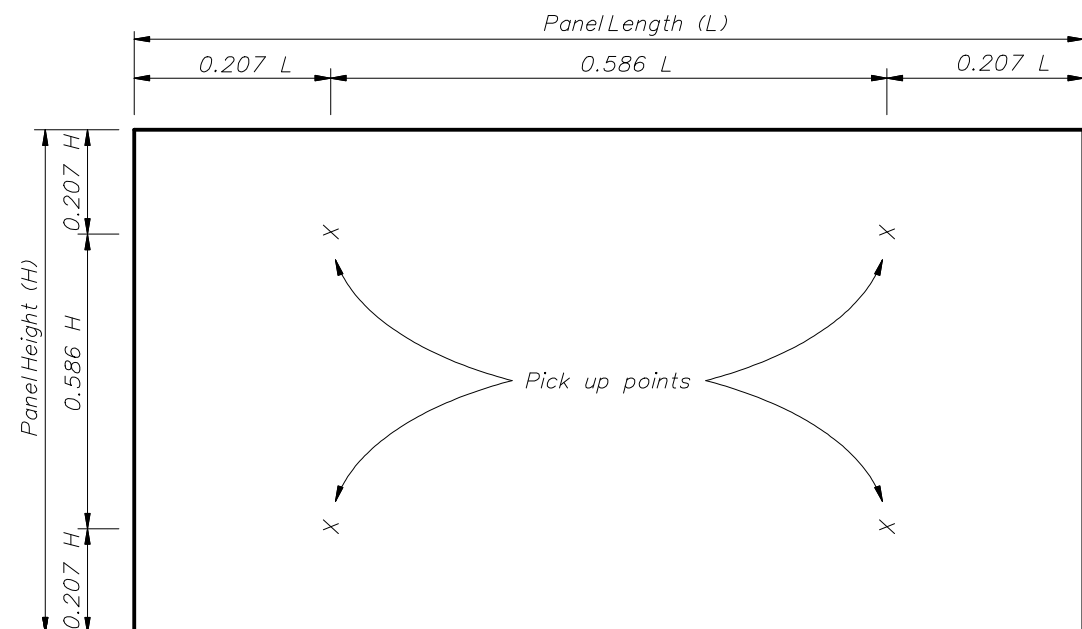
Last Revision 07/01/08
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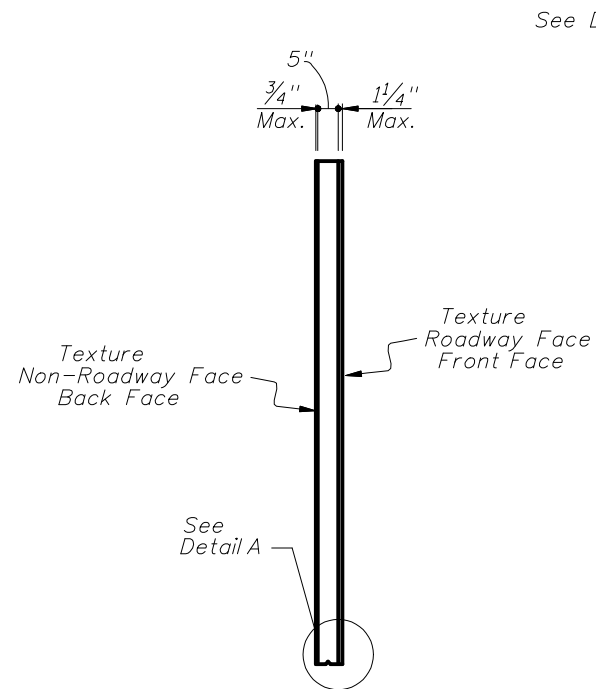


TYPICAL PANEL ELEVATION

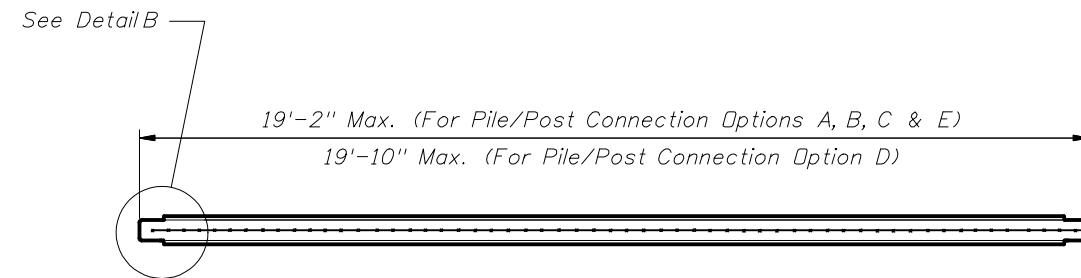
* In lieu of utilizing the pick up points below, panels may be cast vertically or cast horizontally then tilted upright using tilt-tables prior to lifting from form. In this case, the vertical steel may be reduced to #4 Bars @ 1'-3" (As=0.15 in.²/ft.).



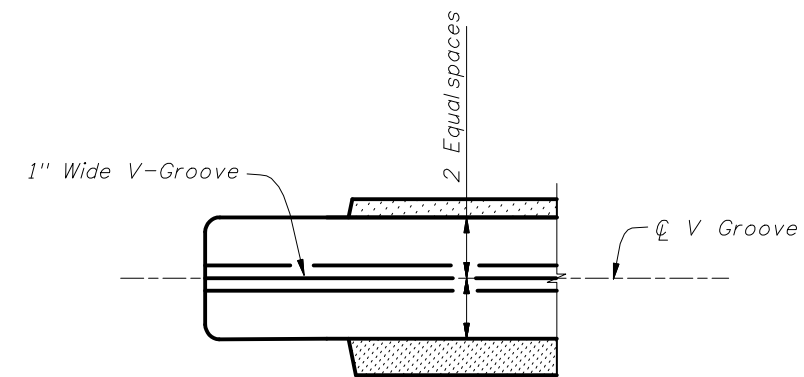
REQUIRED PICK UP POINTS FOR PANELS
(Panels shall be rotated about long axis only)



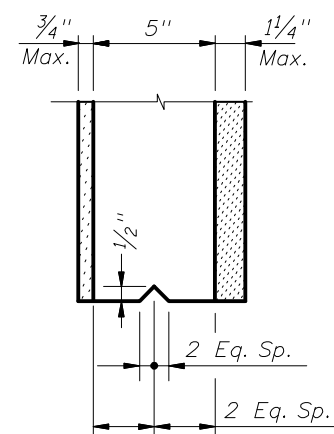
SECTION E-E



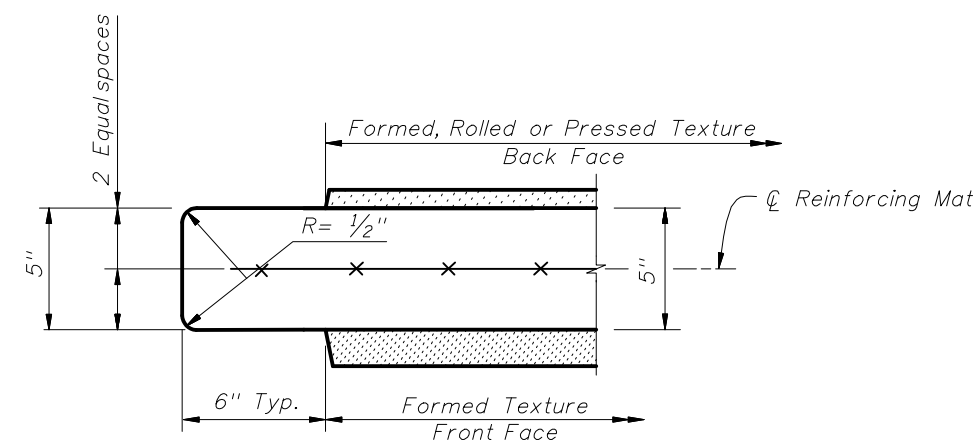
SECTION D-D



SECTION F-F



DETAIL A



DETAIL B
(Typical both ends)

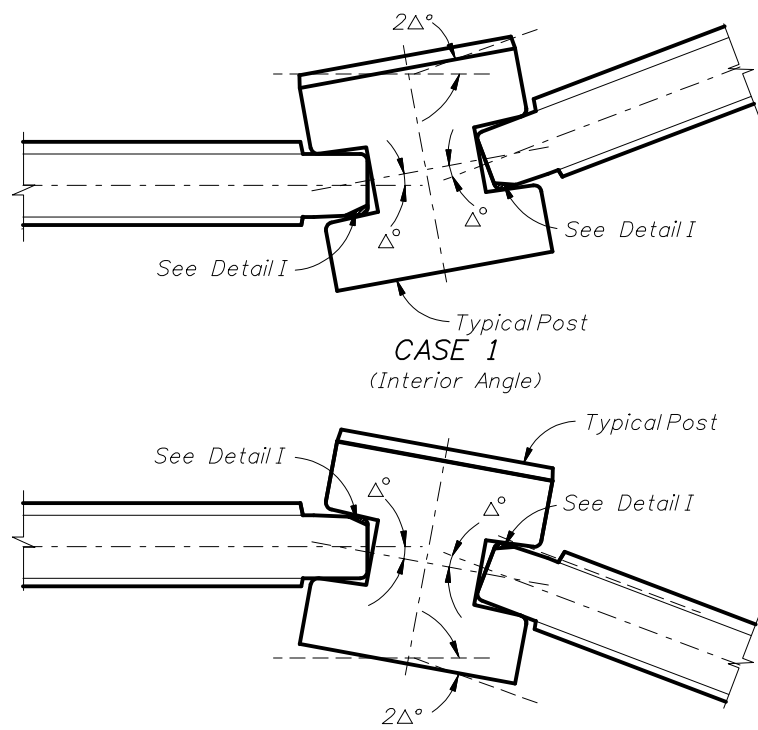
TYPICAL PANELS AND POSTS



2010 FDOT Design Standards

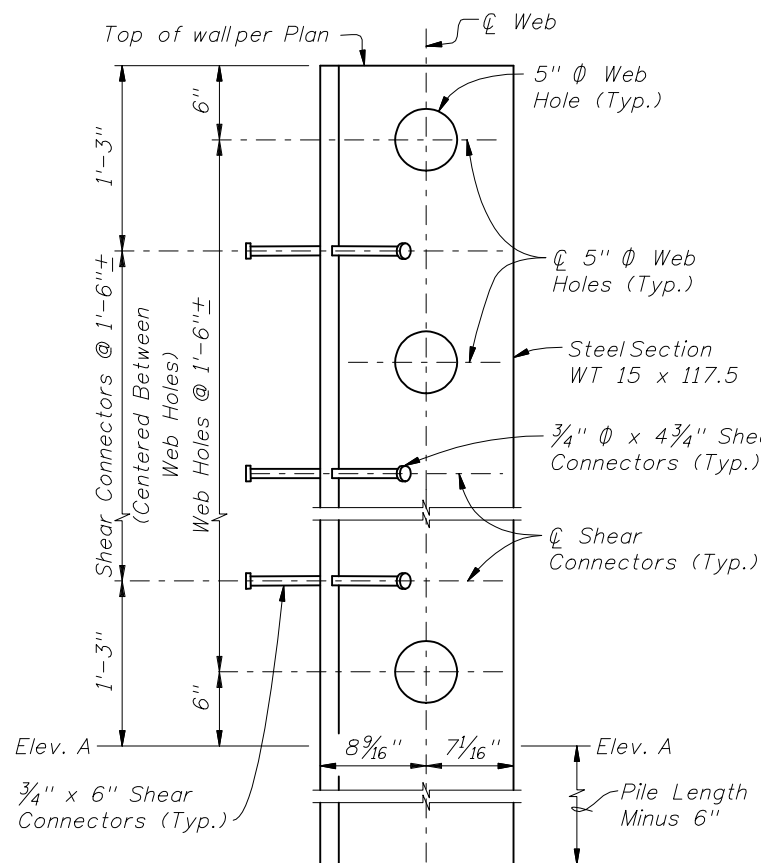
PRECAST SOUND BARRIERS
- RECESSED PANEL OPTION

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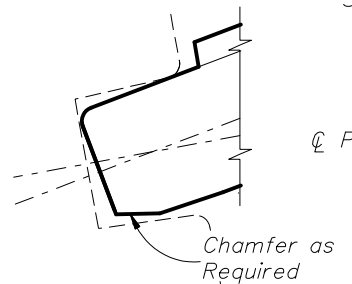


PIVOTING POINT DETAILS

NOTE: The shop drawings shall include specific pivoting point details of panel ends at locations where the deflection angle (2Δ) between panels exceeds 20° .

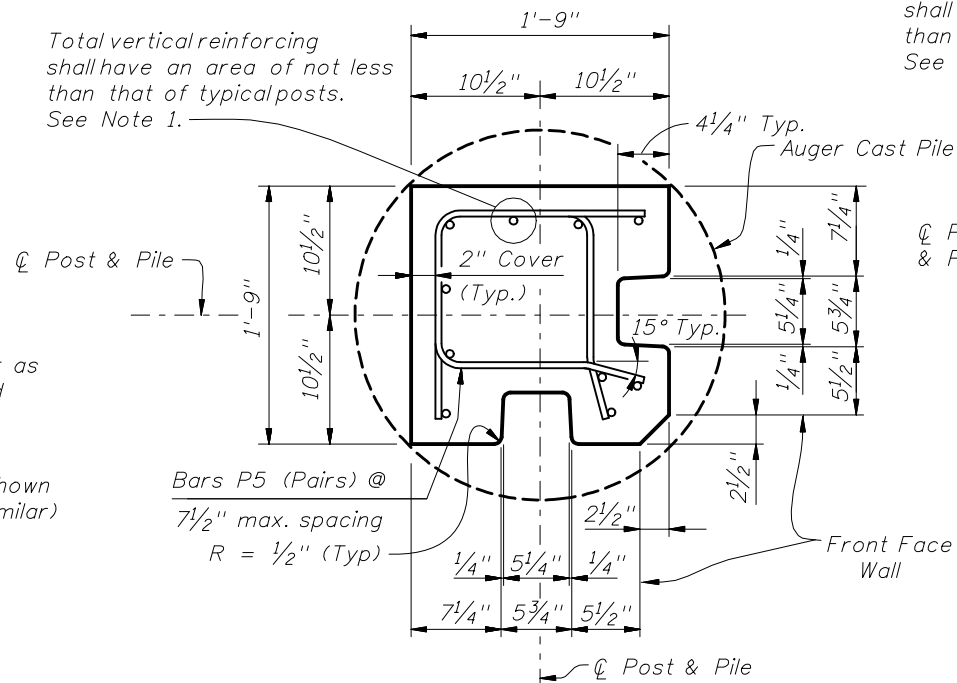


WEB HOLE & SHEAR CONNECTOR SPACING DETAIL
(Concrete not shown for clarity. For limits of concrete see Index No. 5205, Sheet No. 4 of 7.)



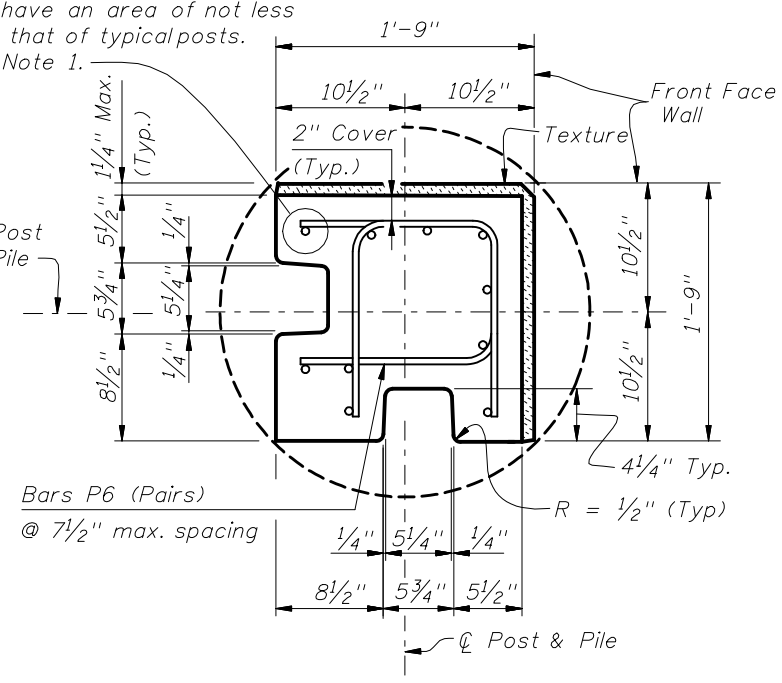
DETAIL I
(Back Face Chamfer Shown Front Face Chamfer Similar)

Total vertical reinforcing shall have an area of not less than that of typical posts. See Note 1.



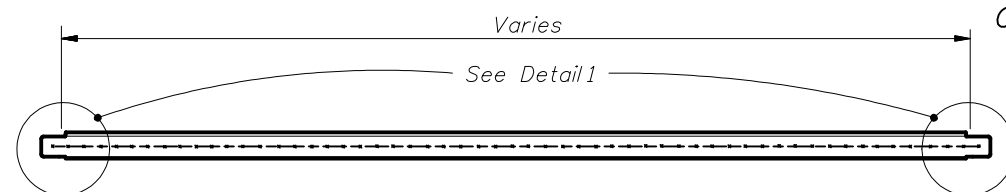
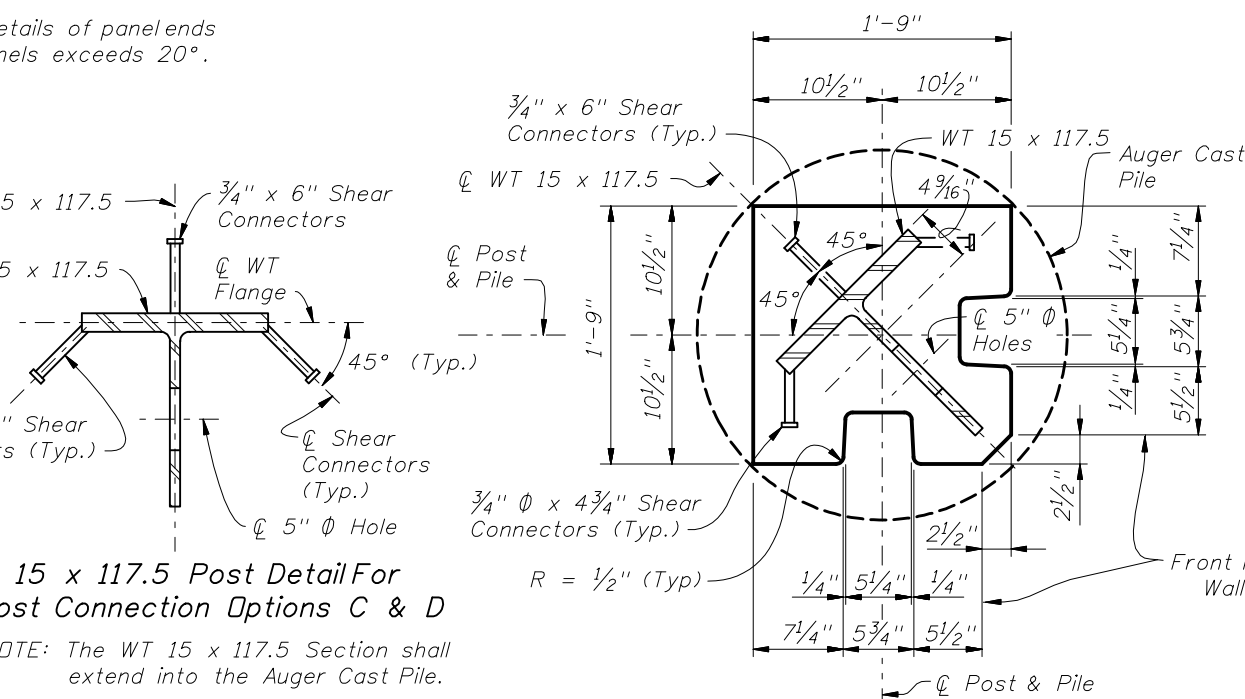
SPECIAL POSTS FOR 90° CORNERS FOR PILE/POST CONNECTION OPTIONS A, B & E
Collars for Corner Posts shall be 3'-6" Φ

Total vertical reinforcing shall have an area of not less than that of typical posts. See Note 1.



SPECIAL POSTS FOR 90° CORNERS FOR PILE/POST CONNECTION OPTIONS C & D
Collars for Corner Posts shall be 3'-6" Φ

- NOTES:
- For Table of Reinforcing Steel Sizes, see Index No. 5206.
 - For Pile/Post Connection Options A through E, see Index No. 5205.
 - For Post & Pile Lengths, see Index No. 5206.



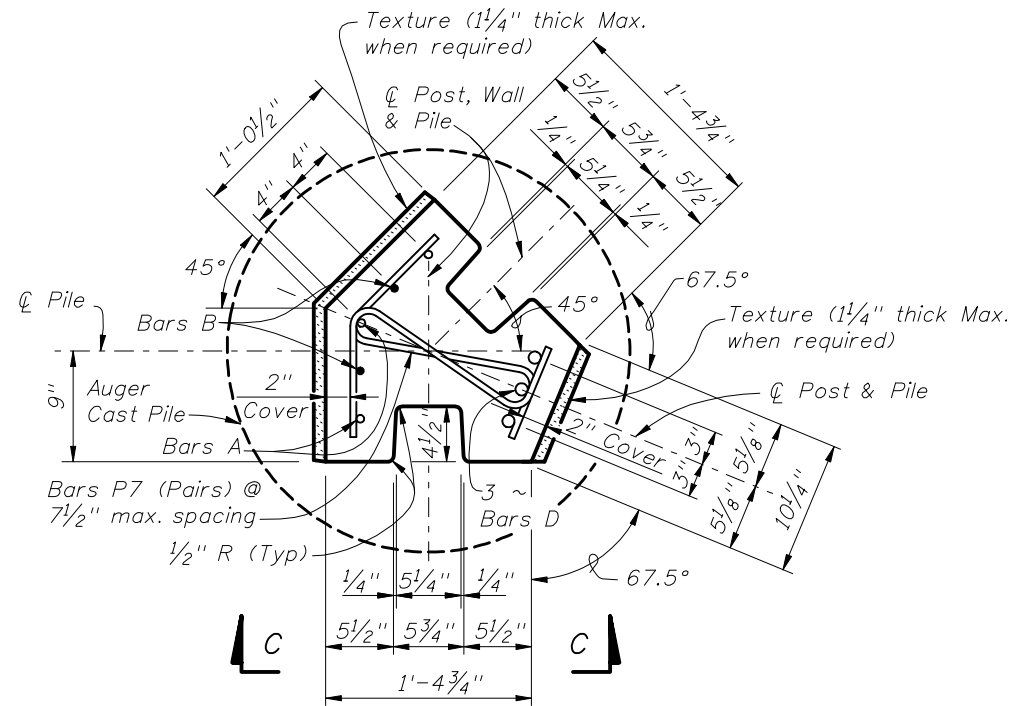
SPECIAL PANELS AND 90° CORNER POSTS



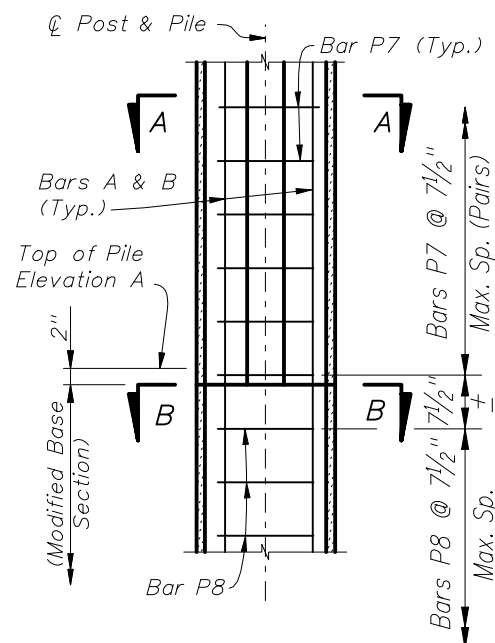
2010 FDOT Design Standards

PRECAST SOUND BARRIERS - RECESSED PANEL OPTION

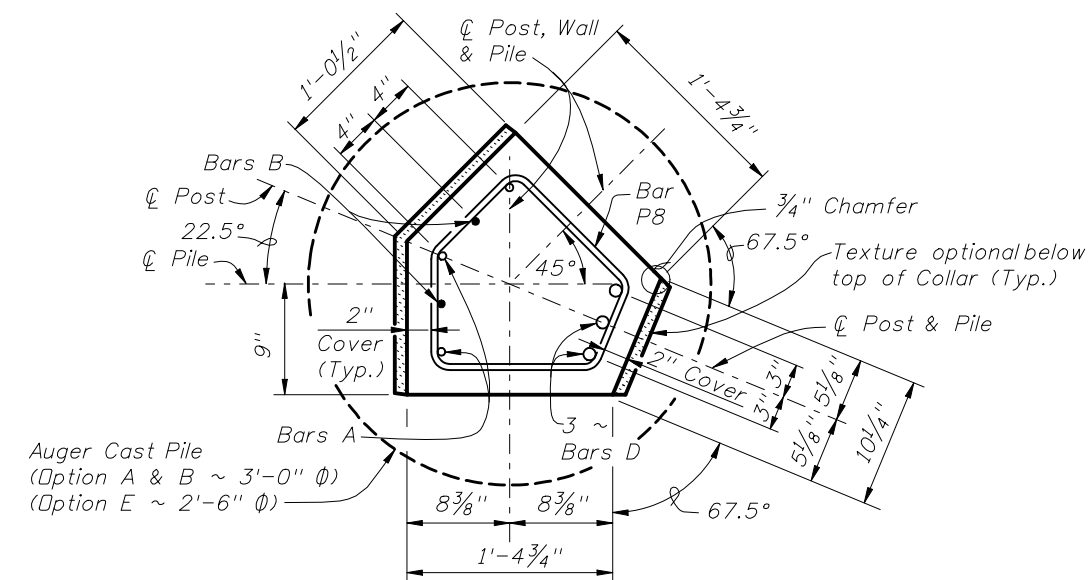
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SECTION A-A
TYPICAL SECTION ABOVE PILE

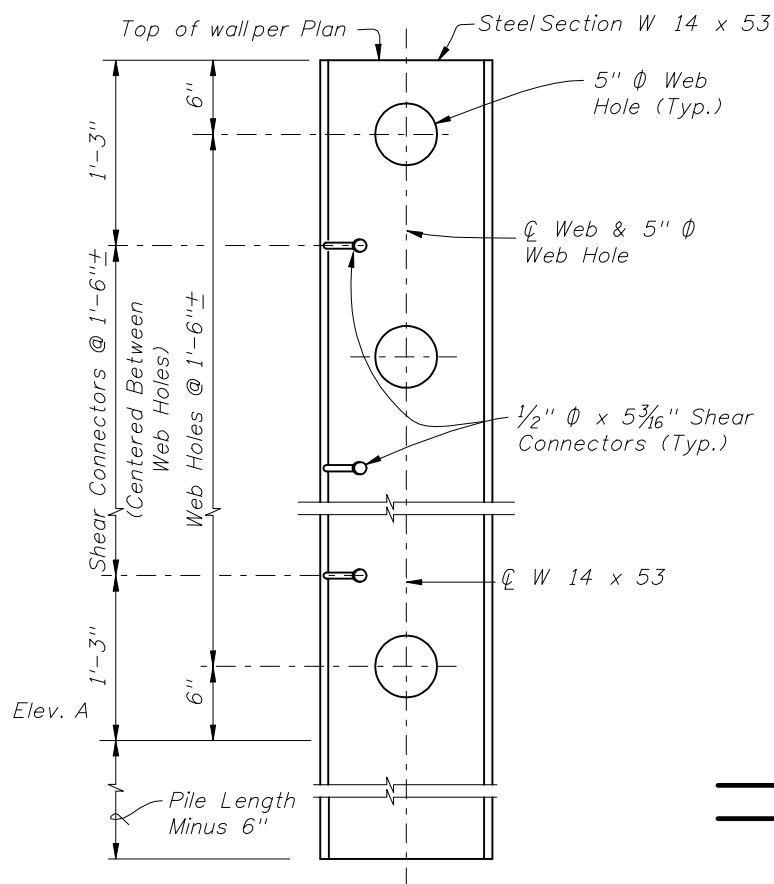


VIEW C-C (PARTIAL ELEVATION)
(Only Front Faces Shown for Clarity)

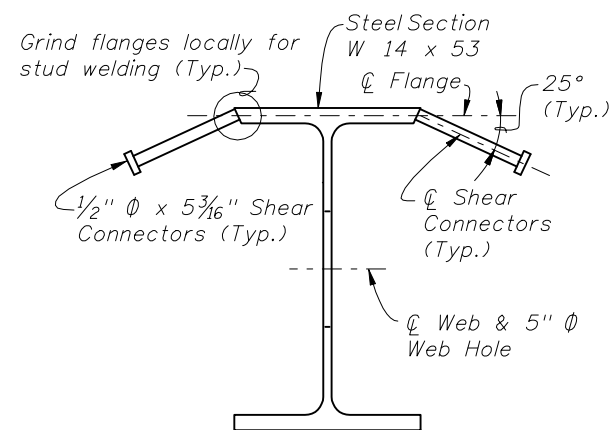


SECTION B-B
PRECAST COLLAR SECTION

**SPECIAL POSTS FOR 45° CORNERS FOR
PILE/POST CONNECTION OPTIONS A, B & E**

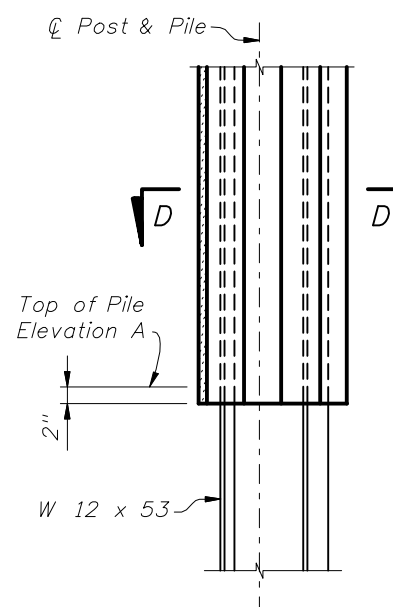


WEB HOLE AND SHEAR CONNECTOR
SPACING DETAIL
(Concrete not shown for clarity)

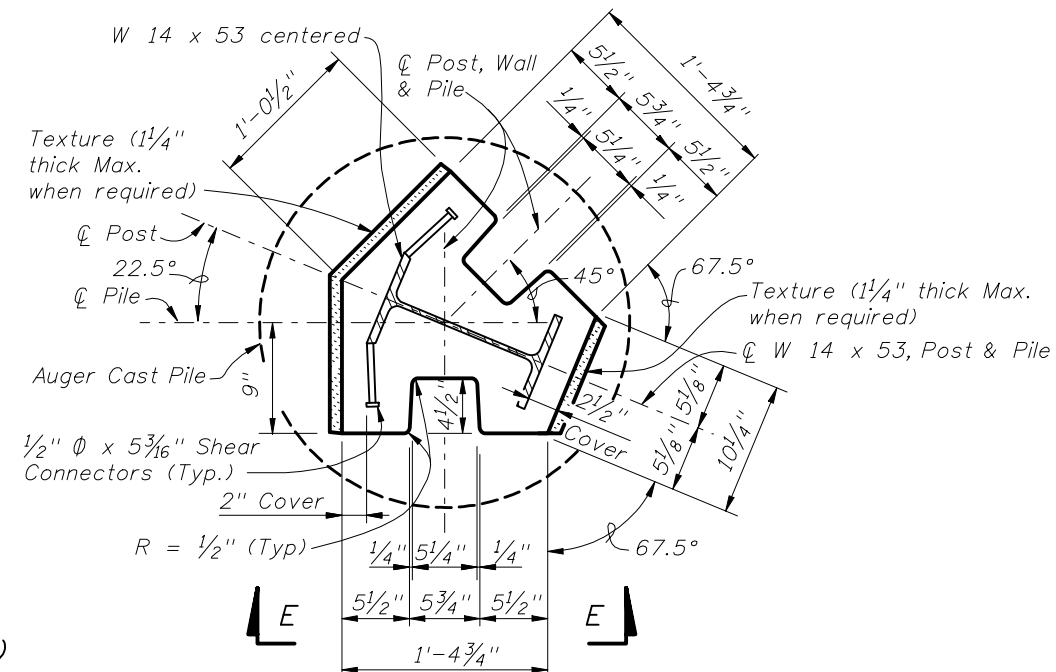


W 14 x 53 POST DETAIL

NOTE: The W 14 x 53 Section shall extend into the Auger Cast Pile.



VIEW E-E (PARTIAL ELEVATION)
(Only Front Faces Shown for Clarity)



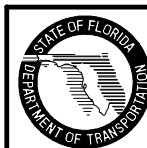
SECTION D-D
TYPICAL SECTION ABOVE PILE

**SPECIAL POSTS FOR 45° CORNERS FOR
PILE/POST CONNECTION OPTIONS C & D**

NOTES:

1. For Table of Reinforcing Steel Sizes, see Index No. 5206.
2. For Pile/Post Connection Options A through E, see Index No. 5205.
3. For Post & Pile Lengths, see Index No. 5206.
4. Shear Connectors shall be 5" long after welding.

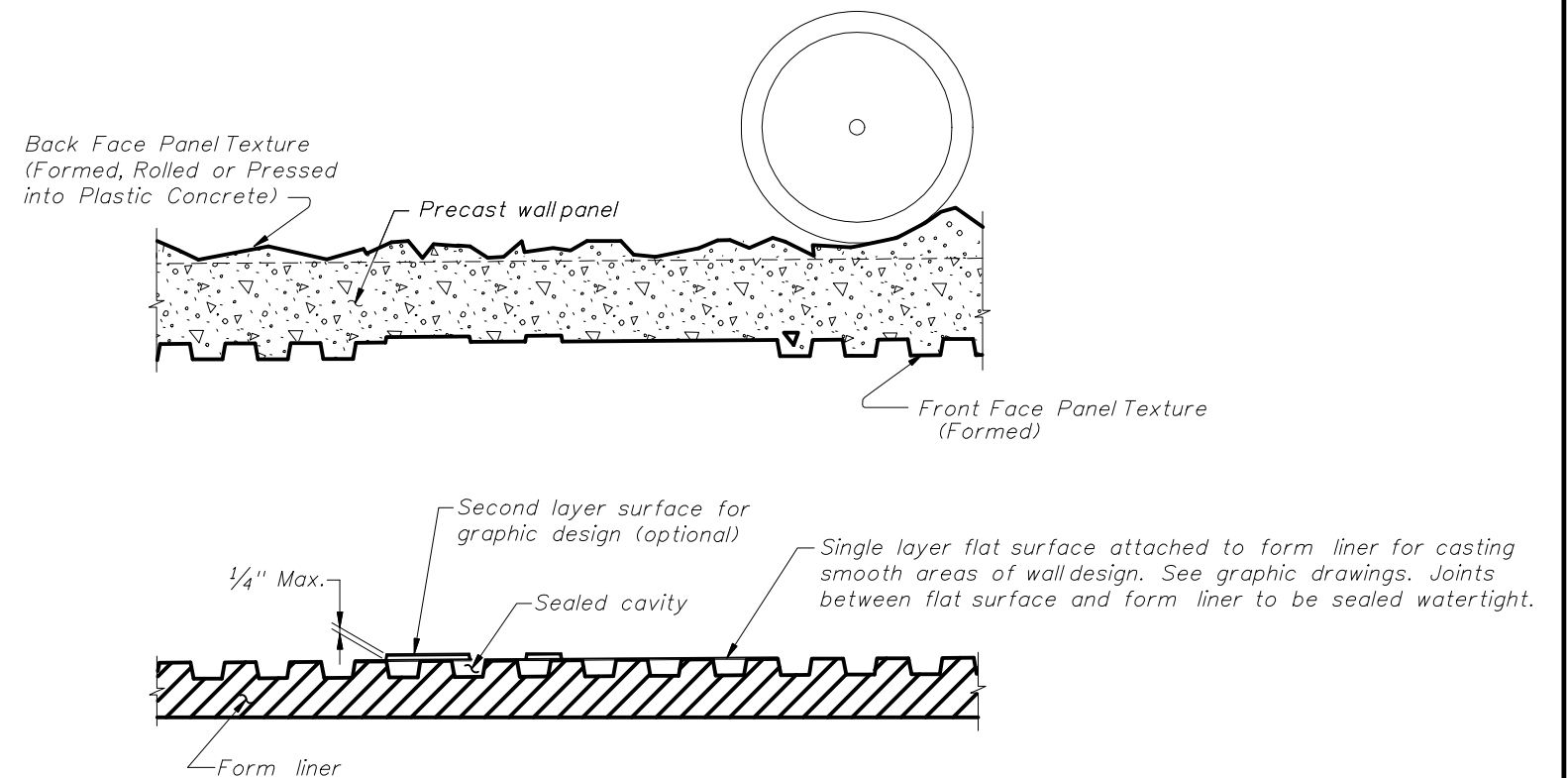
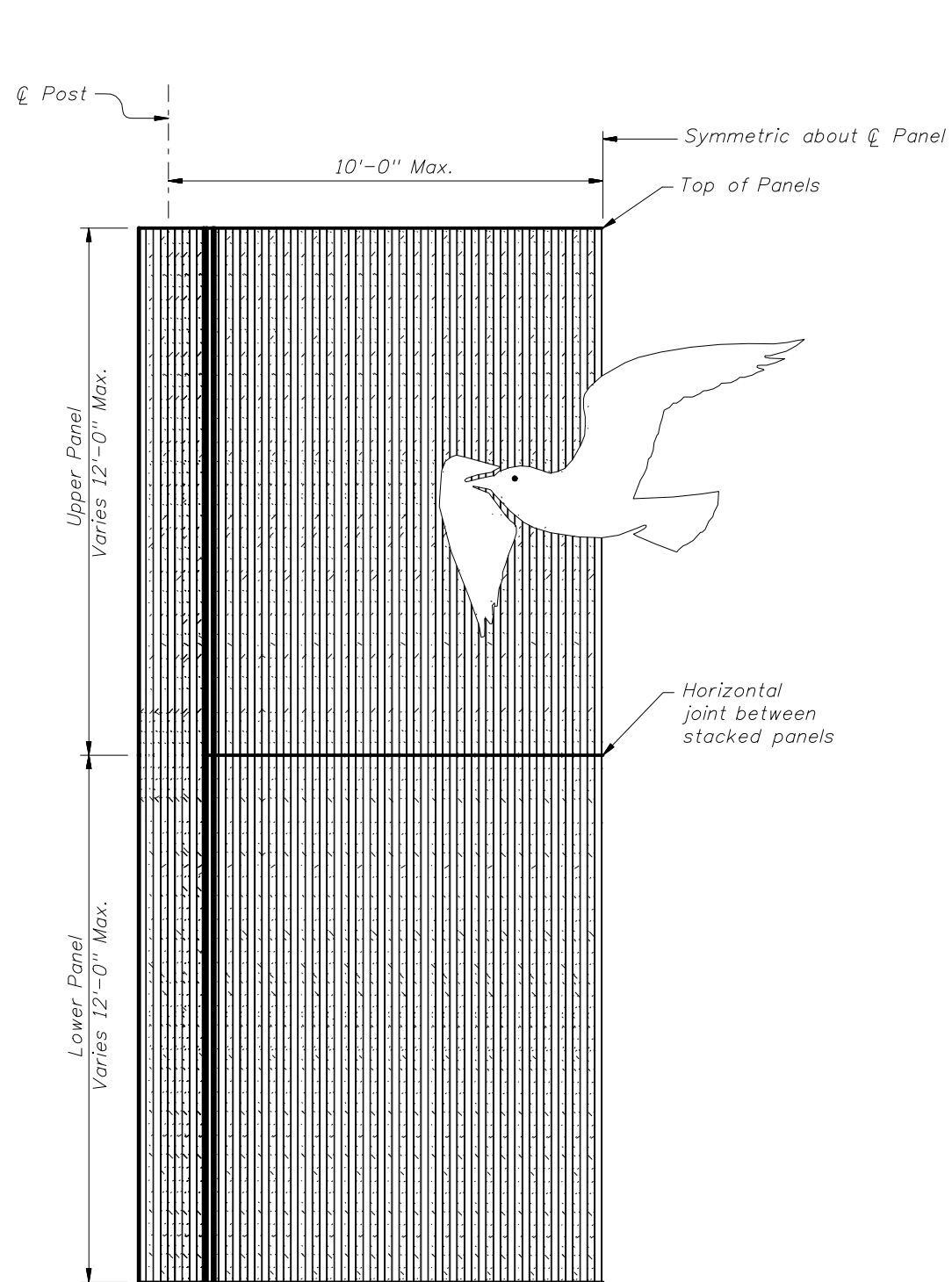
SPECIAL 45° CORNER POSTS



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**PRECAST SOUND BARRIERS
- RECESSED PANEL OPTION**

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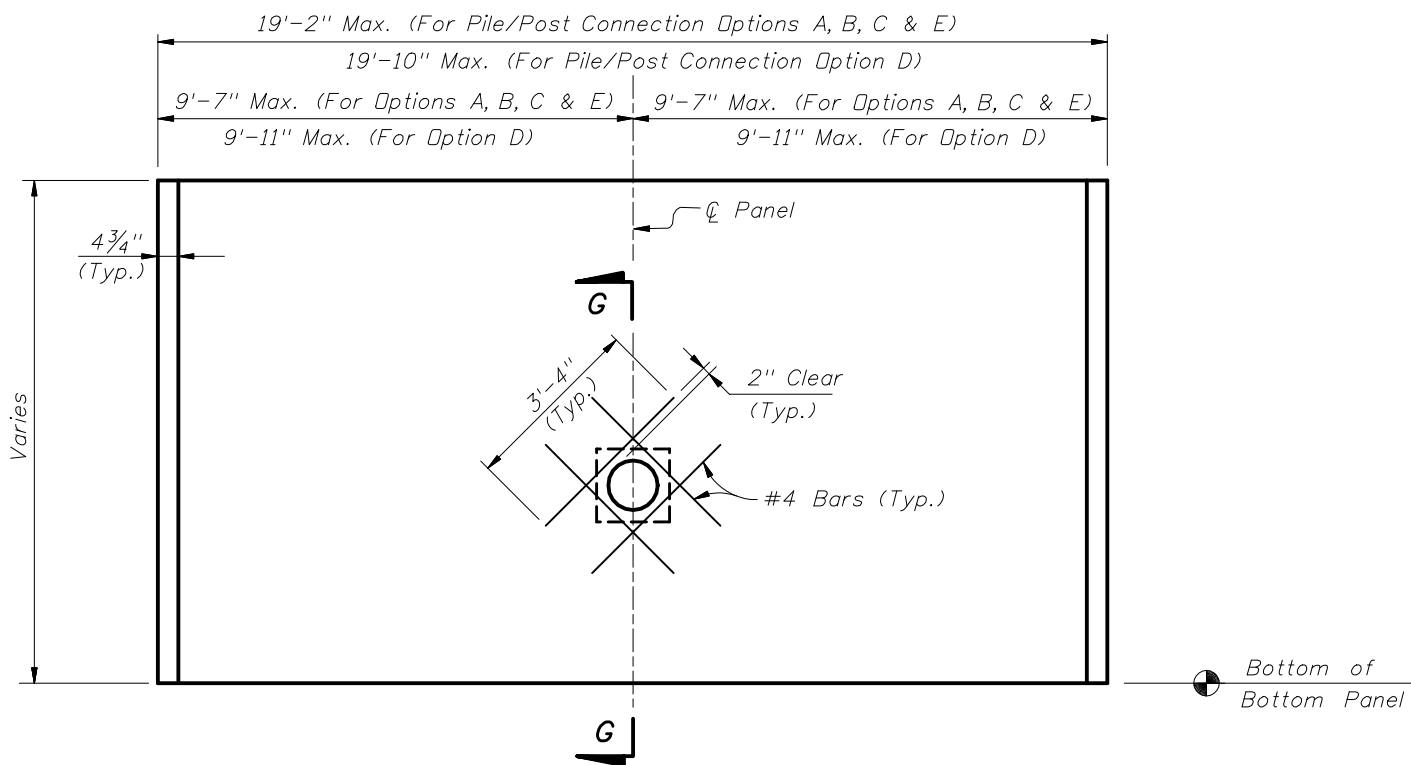
TYPICAL FORMING DETAIL
 (Front Face Panel Texture Type "H" Shown.)
 (Back Face Panel Texture Type "D" Shown.)

NOTES:

1. Contractor shall submit specific form liner samples for approval by the Engineer.
2. Textures and graphics shown are for demonstration purposes only. See Wall Control Drawings for project specific texture and graphic requirements.

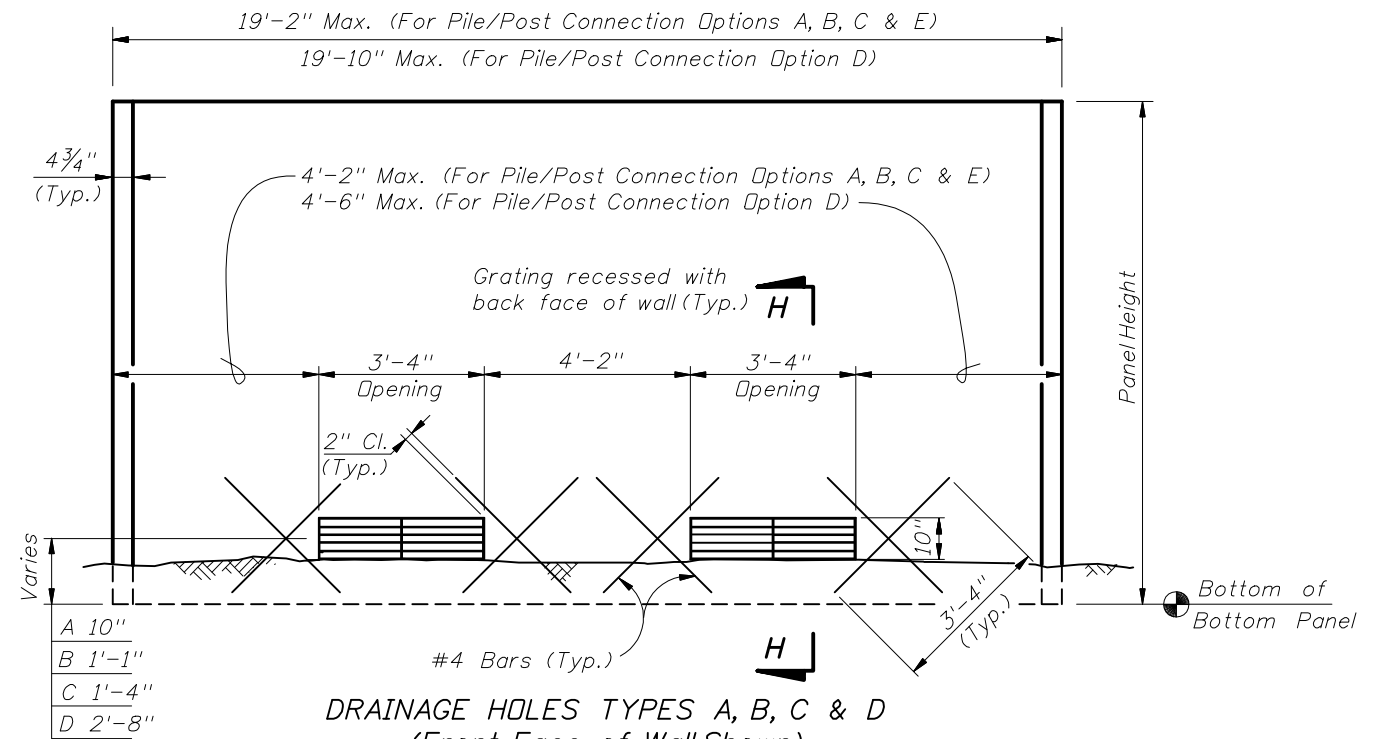
HALF ELEVATION
 (Pile/Post Connection Options A, B, C and E Shown.)
 (Front Face Panel Texture Type "H" and Front Face Post Texture Type "H" Shown.)
 (Graphic Type LG-3 Shown.)





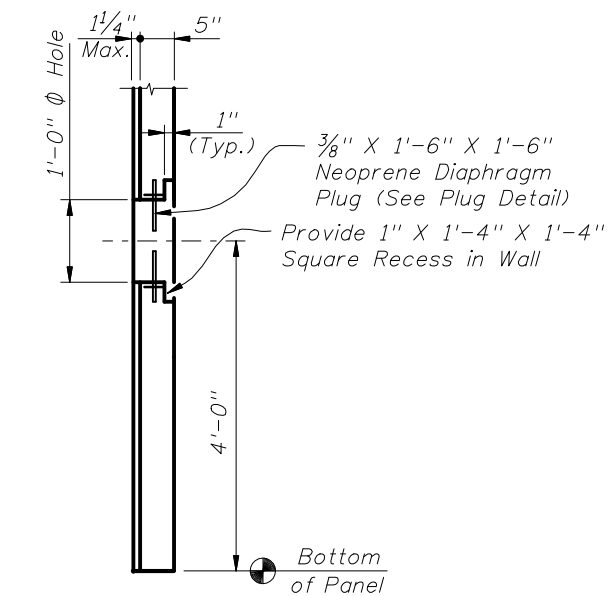
FIRE HOSE ACCESS HOLE TYPICAL DETAIL
 (Front Face of Wall Shown)
 (Flush Panel Option Shown)
 Recessed Panel Option Similar)

NOTE: Fire Hose Access Point to be located at or near fire hydrants

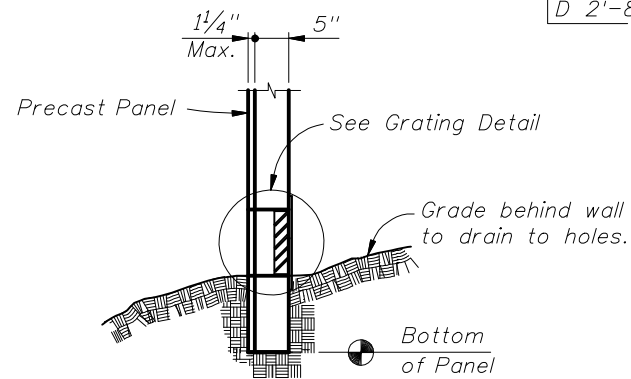


DRAINAGE HOLES TYPES A, B, C & D
 (Front Face of Wall Shown)
 (Flush Panel Option Shown)
 Recessed Panel Option Similar)

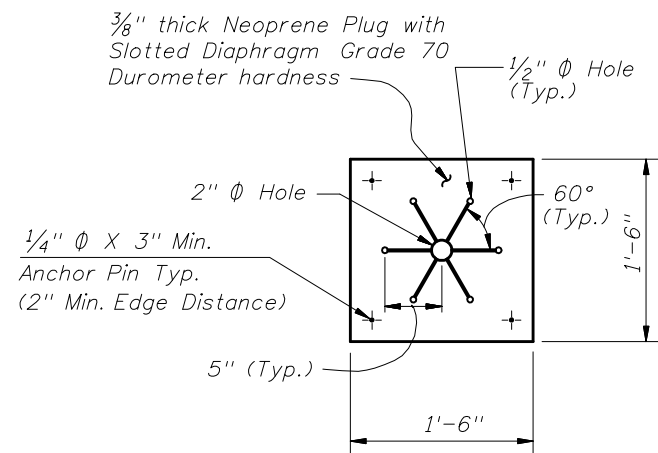
NOTE: Place double mat of welded wire reinforcement in bottom 5'-0" of panels with drainage holes. Hole Types A, B, C and D refer to distance from bottom of panel to center of opening. See Wall Control Drawings.



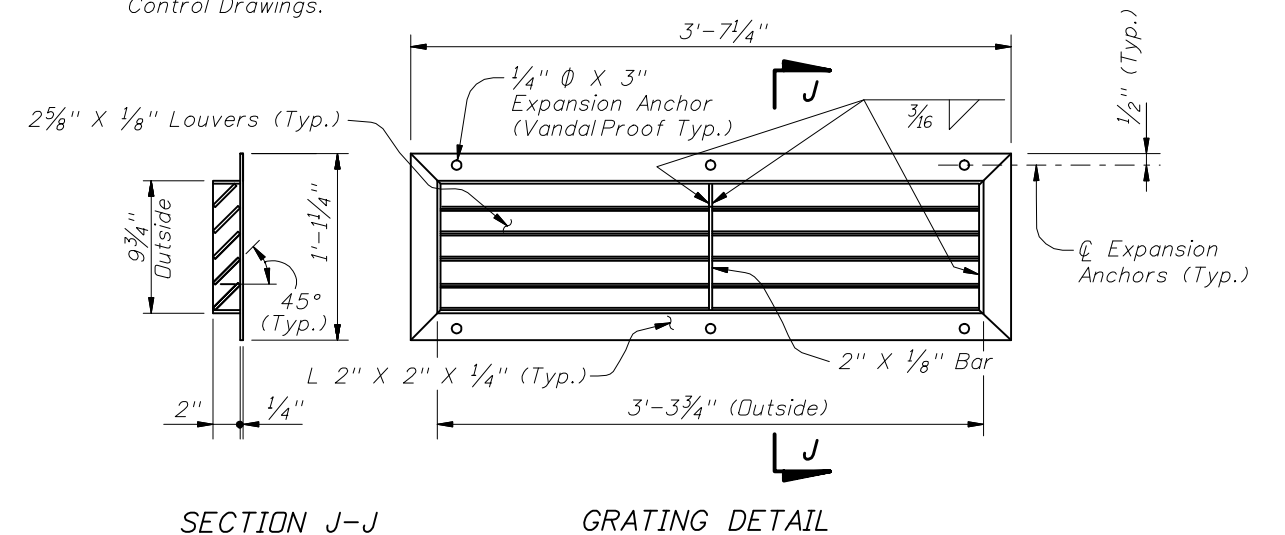
SECTION G-G
 (Flush Panel Option Shown)
 Recessed Panel Option Similar)



SECTION H-H
 (Flush Panel Option Shown)
 Recessed Panel Option Similar)



PLUG DETAIL



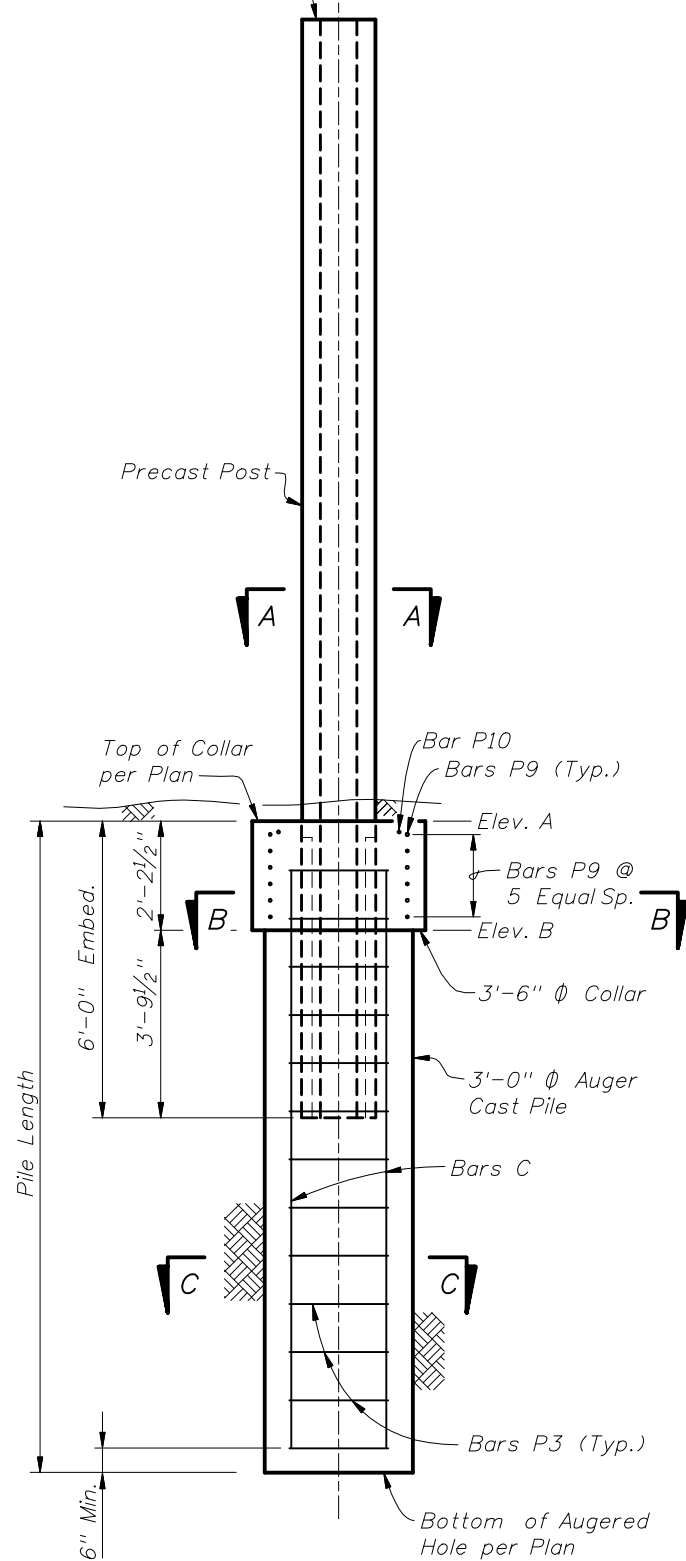
SECTION J-J GRATING DETAIL

NOTES:
 Grating shall be ASTM A 36 steel and shall be hot dip galvanized after assembly in accordance with ASTM Specification A 123.
 Expansion anchors shall be in accordance with ASTM A 307 (Galvanized).
 Welding shall be in accordance with the current edition of the ANSI/AWS D1.1 Welding Code.

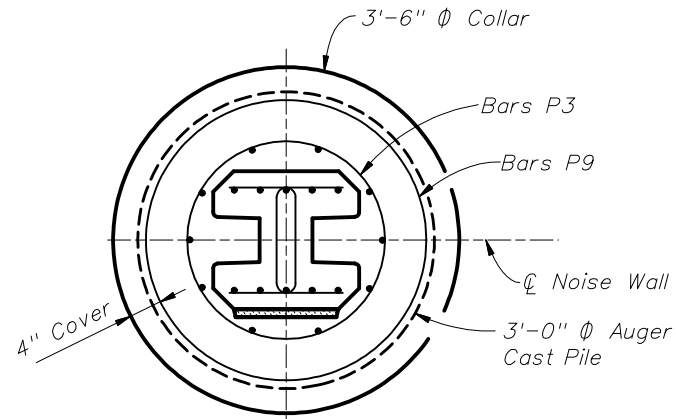


☉ Post, 3'-6" Ø Collar and 3'-0" Ø Auger Cast Pile
 * Top of wall per Plan

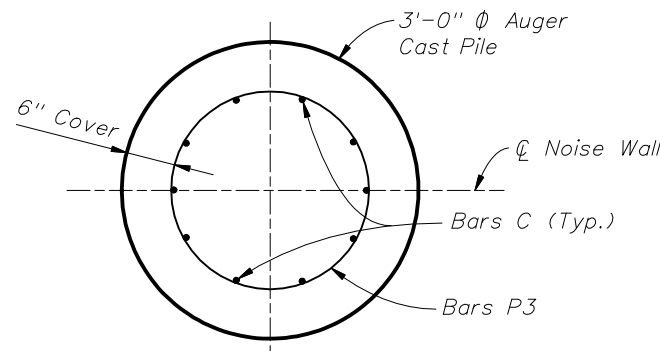
* Extend Post 2" above top of high side wall panel when post caps are shown in plans.



POST IN AUGERED HOLE
 (Cast-In-Place Collar Shown, Precast Collar Similar)

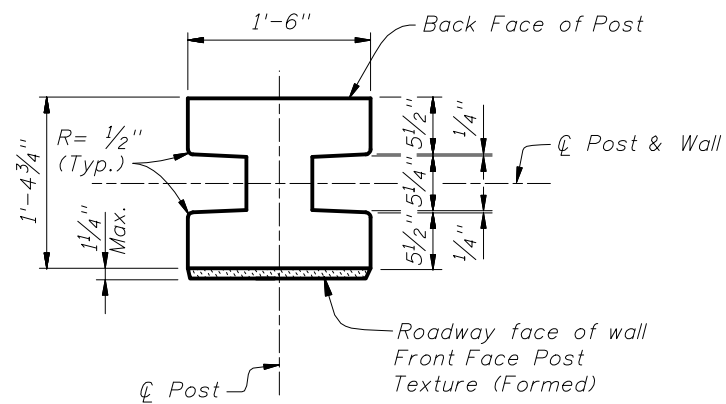


SECTION B-B

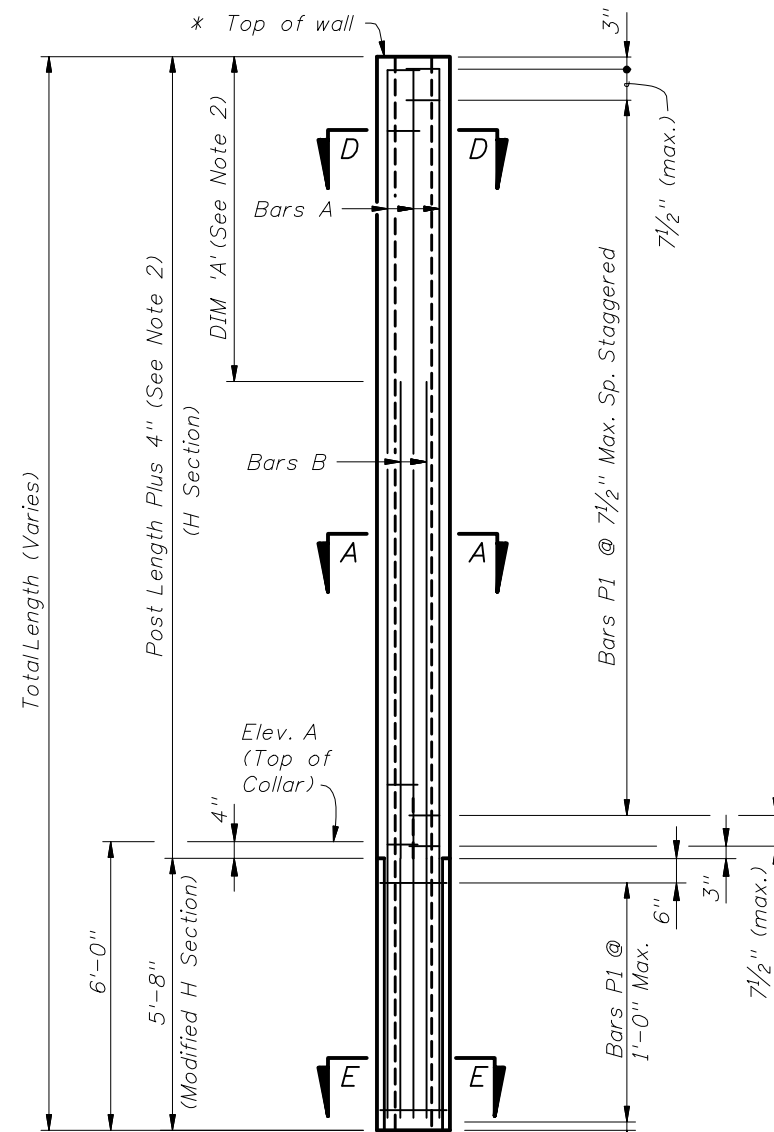


SECTION C-C

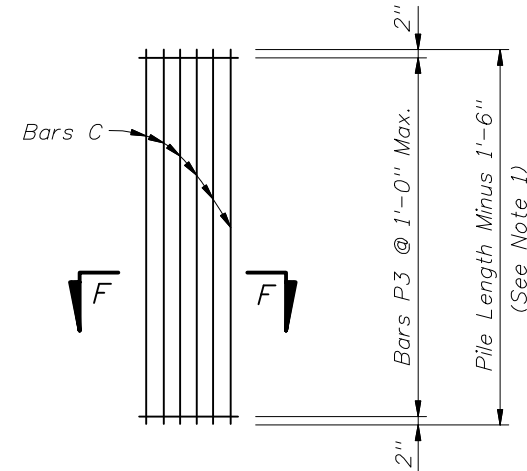
- NOTES:
1. For Post and Pile Lengths, see Index No. 5206.
 2. For Table of Reinforcing Steel Sizes and DIM 'A', see Index No. 5206.
 3. For Precast Collar Option, see Sheet 2.



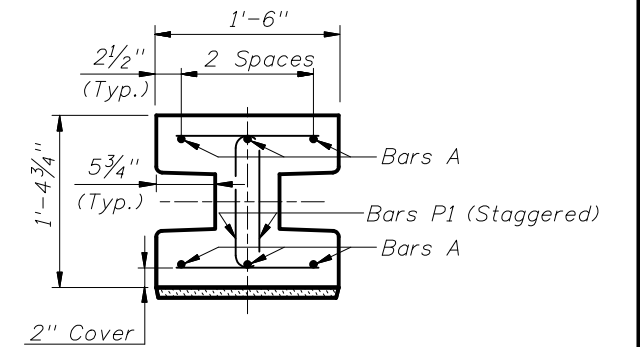
TYPICAL POST SECTION
 (H Section)



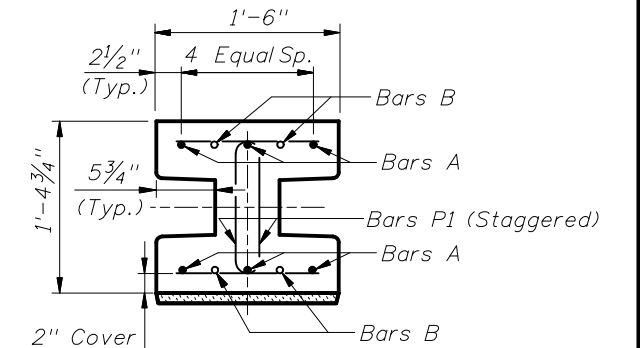
POST DETAIL WITH C-I-P COLLAR
 (Prior to placement in augered hole)



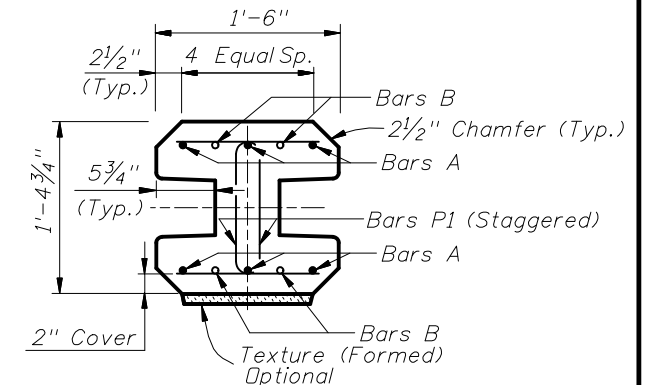
AUGERED PILE REINFORCEMENT DETAIL



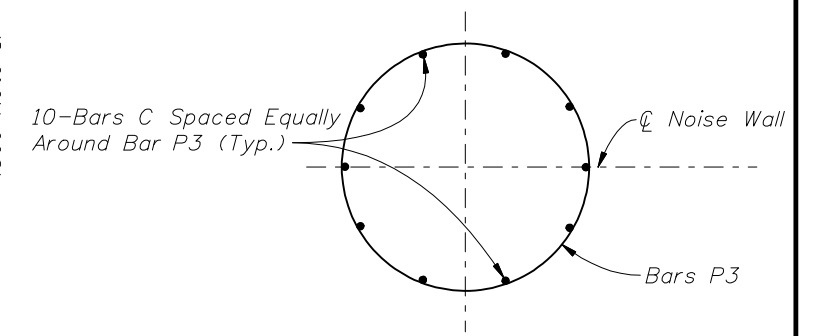
SECTION D-D
 (H Section)



SECTION A-A
 (H Section)



SECTION E-E
 (Modified H Section)



SECTION F-F

PILE/POST CONNECTION OPTION A

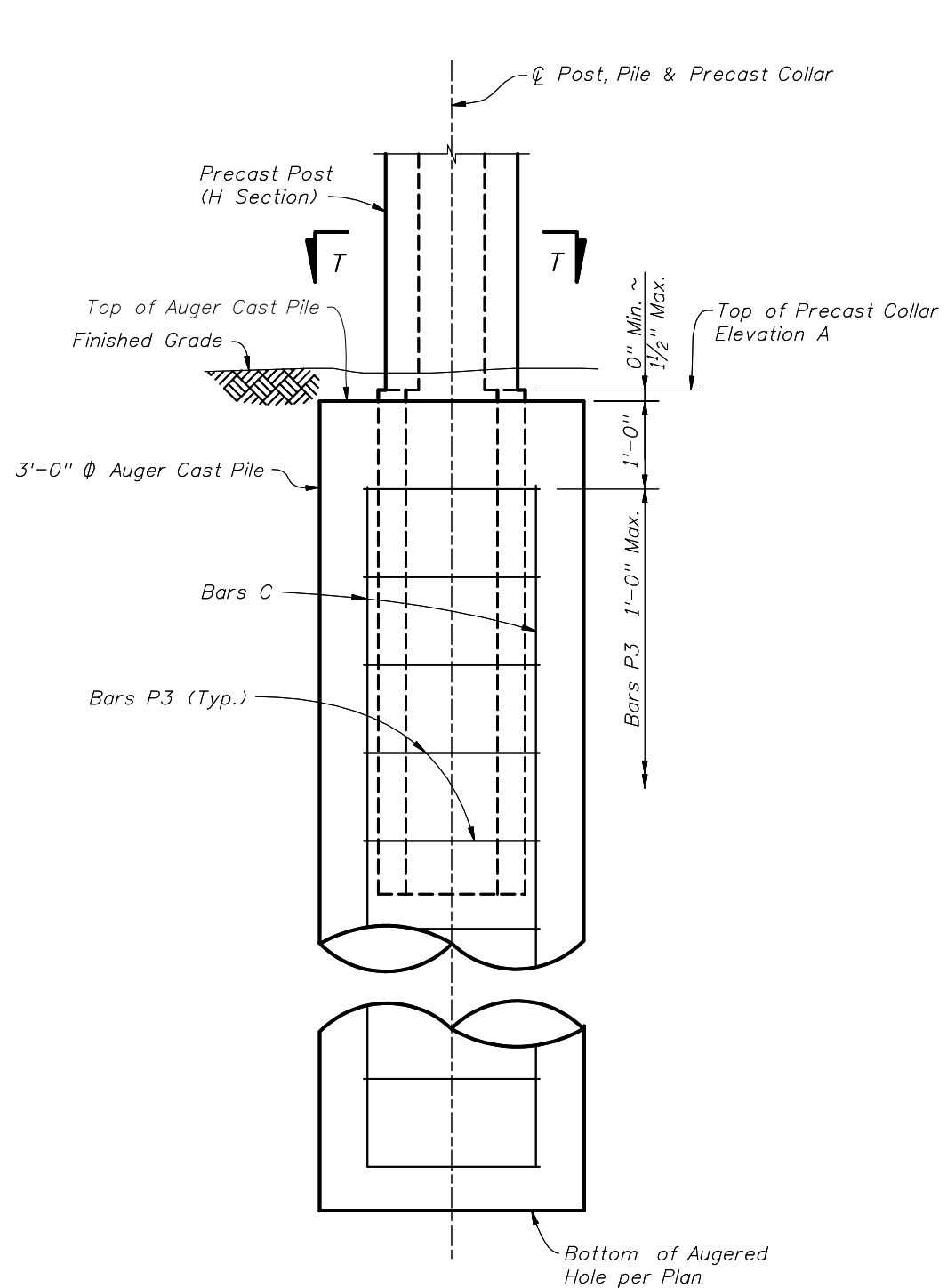


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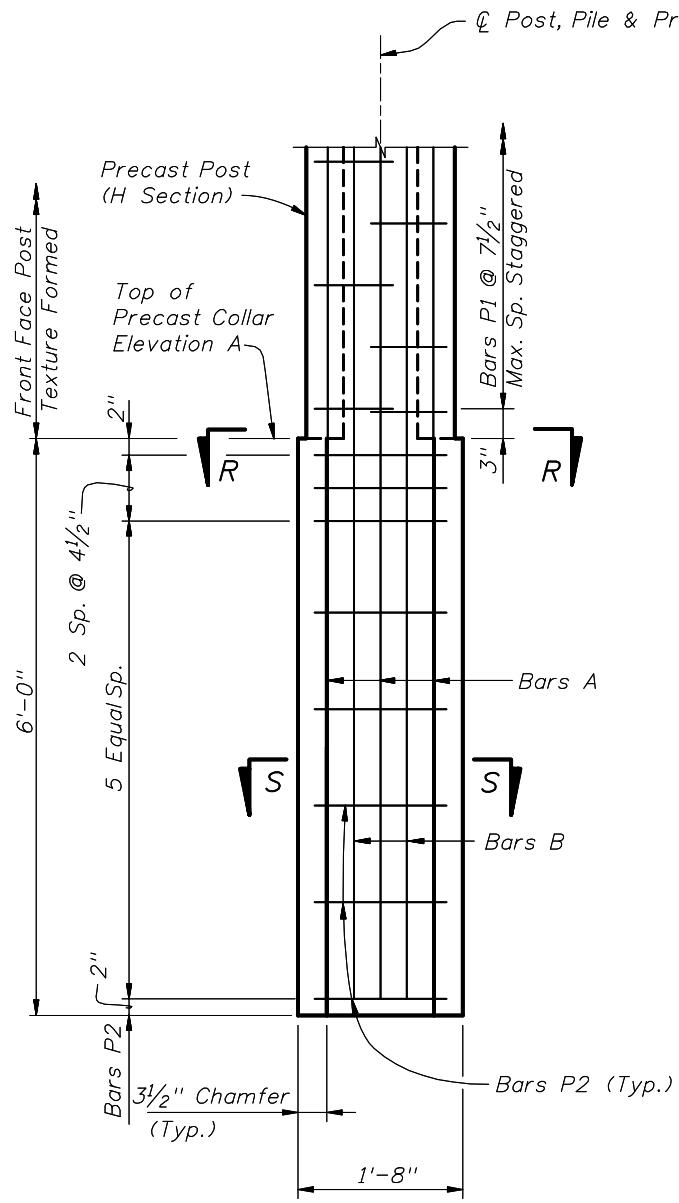
PRECAST SOUND BARRIERS -
 PILE AND POST REINFORCING STEEL

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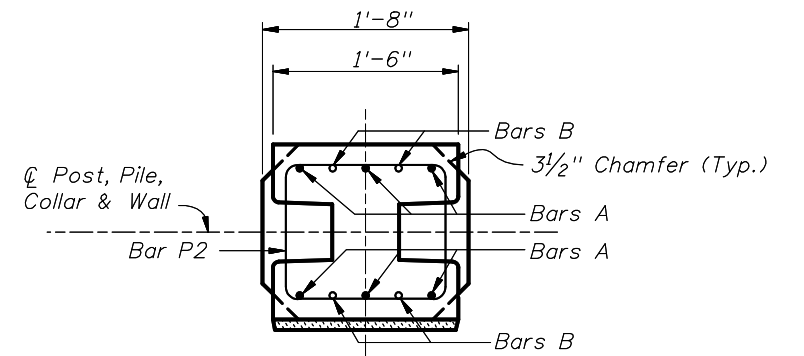
Index No. 5205



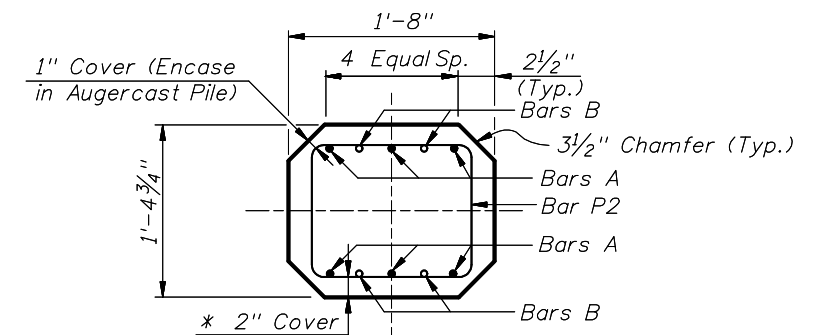
PRECAST COLLAR IN AUGER CAST PILE



PRECAST COLLAR DETAIL

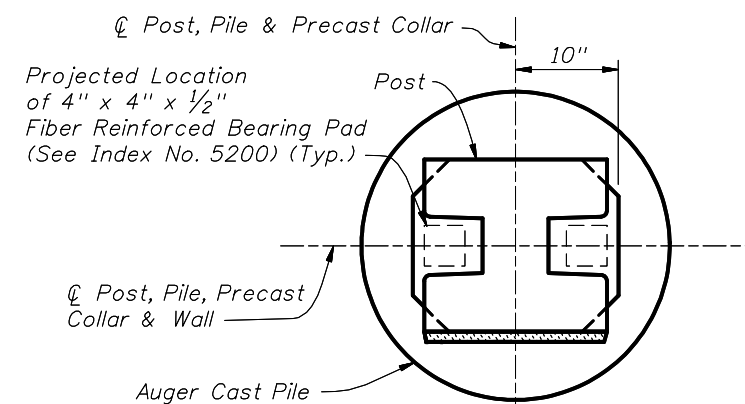


SECTION R-R



SECTION S-S

* - Unless Otherwise Noted.



SECTION T-T

NOTES:

1. For Post and Pile Lengths, see Index No. 5206.
2. For Reinforcing Steel Sizes, see Index No. 5206.
3. For Pile/Post Connection Option A, see Sheet No. 1 of 7.

PRECAST COLLAR FOR PILE/POST CONNECTION OPTION A



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PRECAST SOUND BARRIERS -
PILE AND POST REINFORCING STEEL

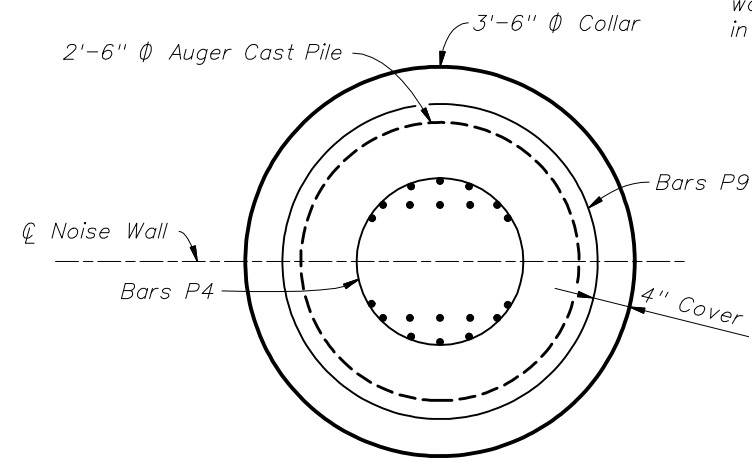
Last Revision 07/01/08

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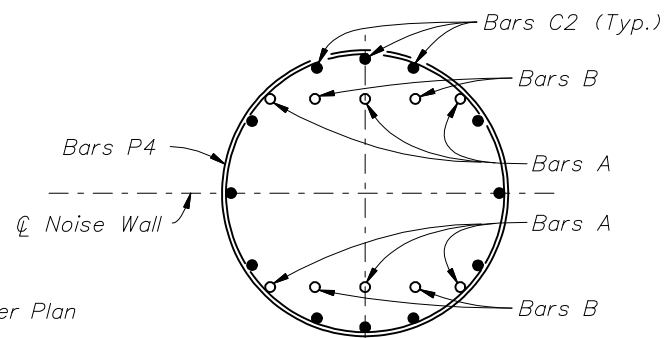
Index No. 5205

* Extend Post 2" above top of high side wall panel when post caps are shown in plans.

☉ Post, 3'-6" Ø Collar and 2'-6" Ø Auger Cast Pile
* Top of wall per Plan

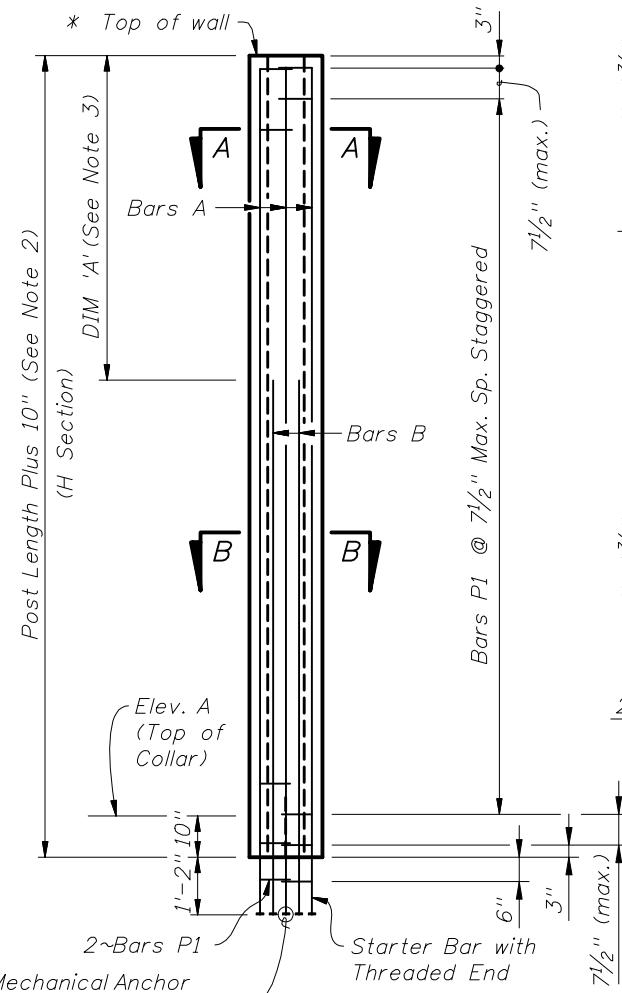


SECTION C-C

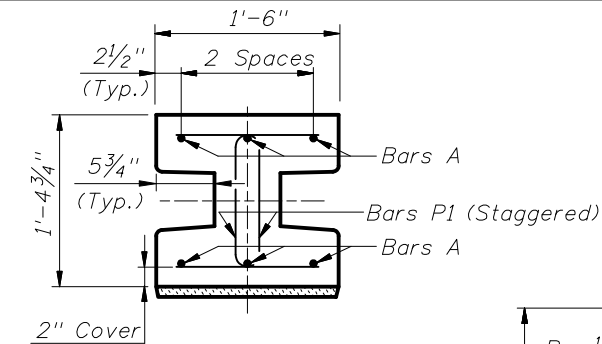


SECTION C-C (Showing Post & Pile Reinforcement)

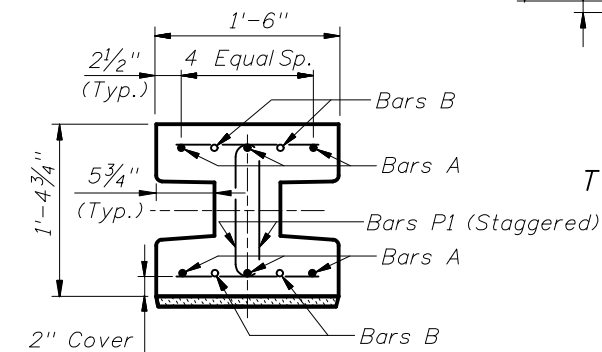
Legend:
○ Post Bars A or Bars B
● Pile Bars C2



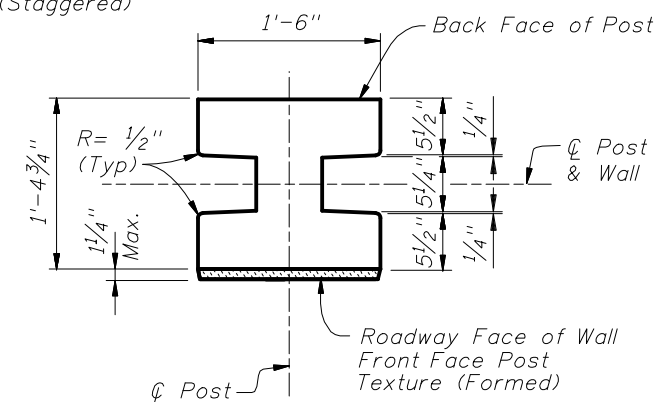
POST DETAIL



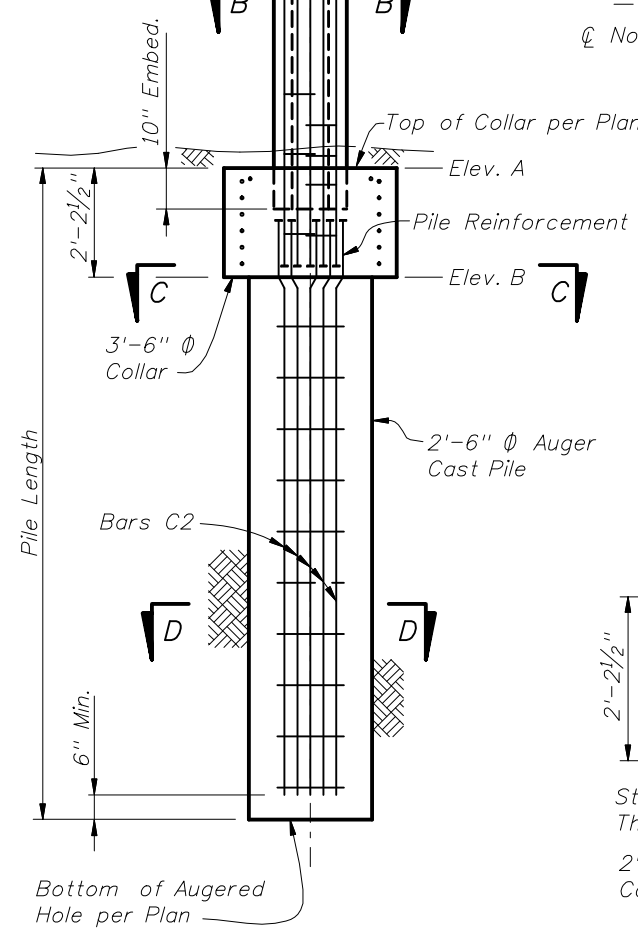
SECTION A-A (H Section)



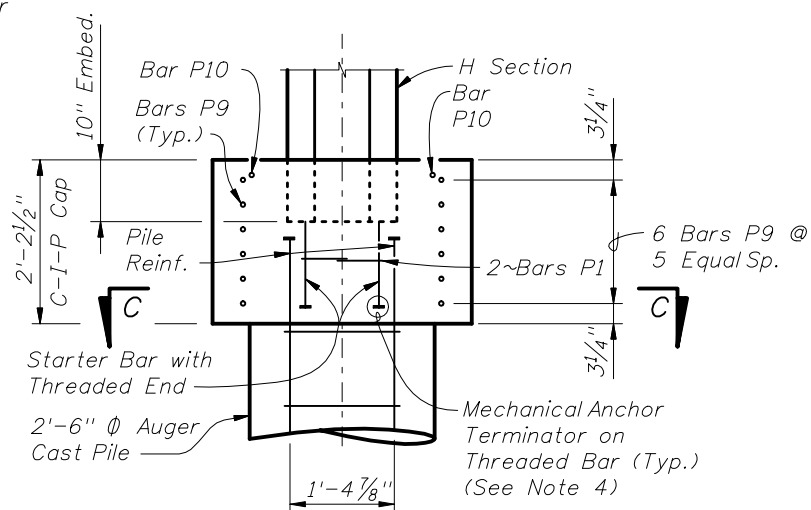
SECTION B-B (H Section)



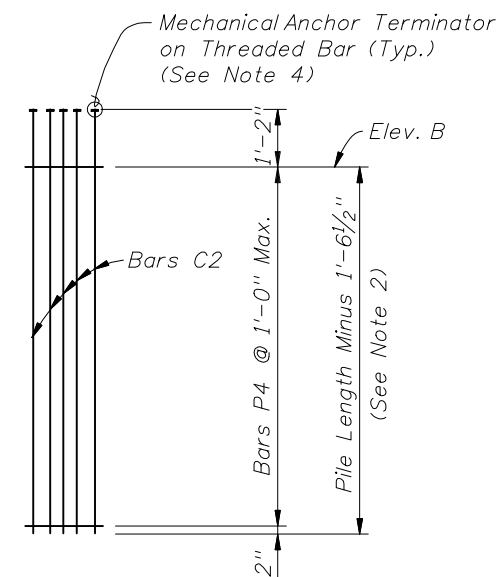
TYPICAL POST SECTION (H Section)



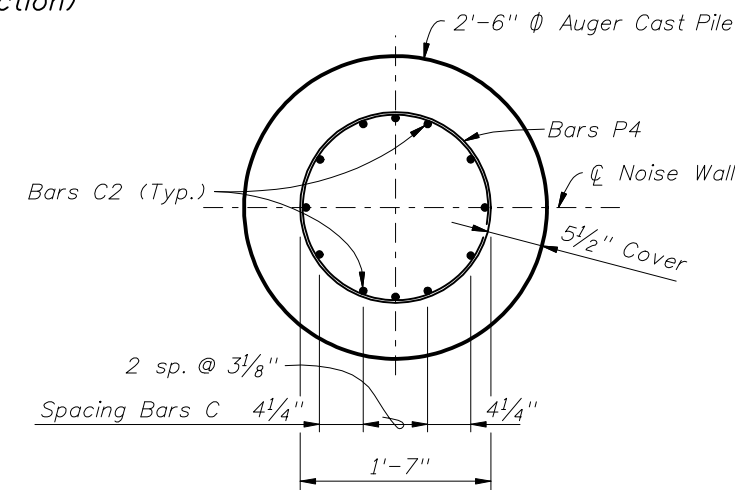
POST IN AUGERED HOLE



LAP AND COLLAR DETAIL (Looking Down the Wall)



AUGERED PILE REINFORCEMENT DETAIL



Section D-D (Showing 2'-6" Auger Cast Pile)

- NOTES:
1. A precast collar shall not be permitted with this Pile/Post Connection Option.
 2. For Post and Pile Lengths, see Index No. 5206.
 3. For Table of Reinforcing Steel Sizes and DIM 'A', see Index No. 5206.
 4. Mechanical Anchor Terminators shall develop 125% of the specified yield strength of the bar.

PILE/POST CONNECTION OPTION B

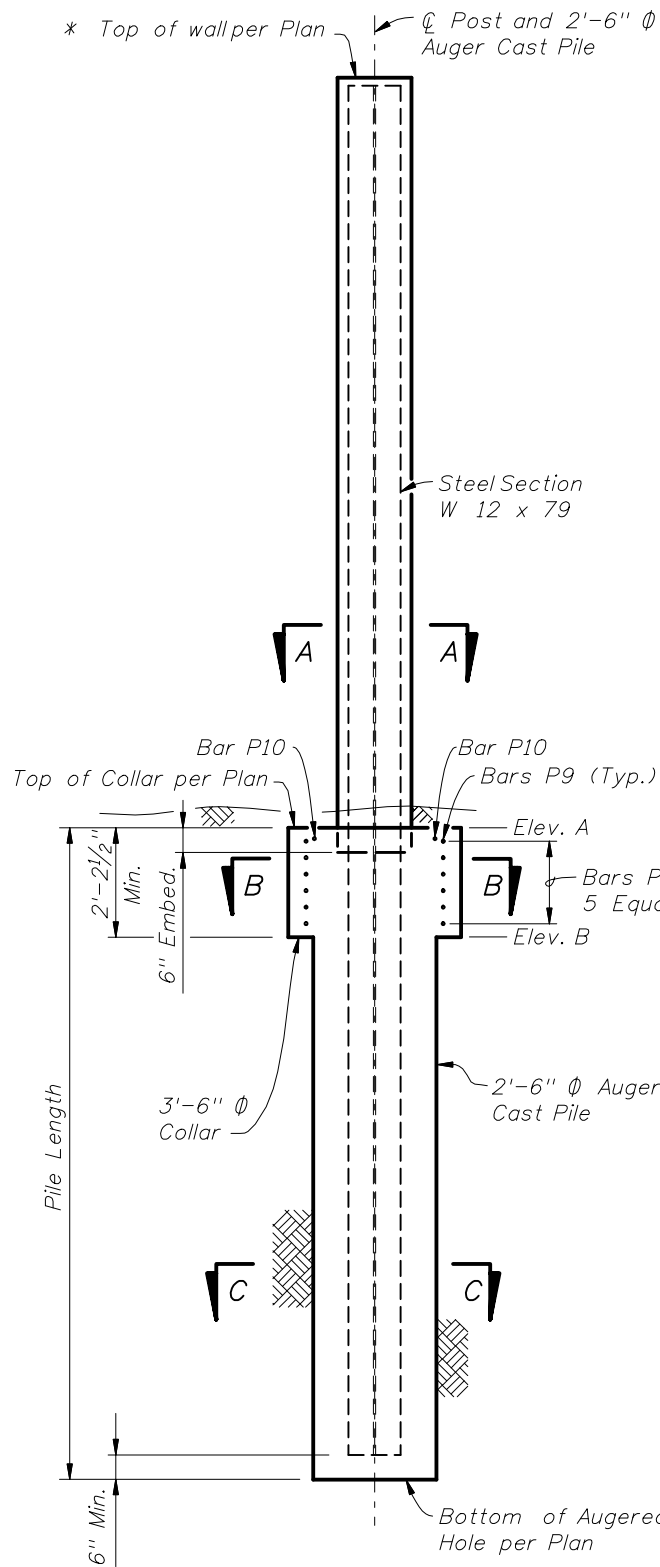


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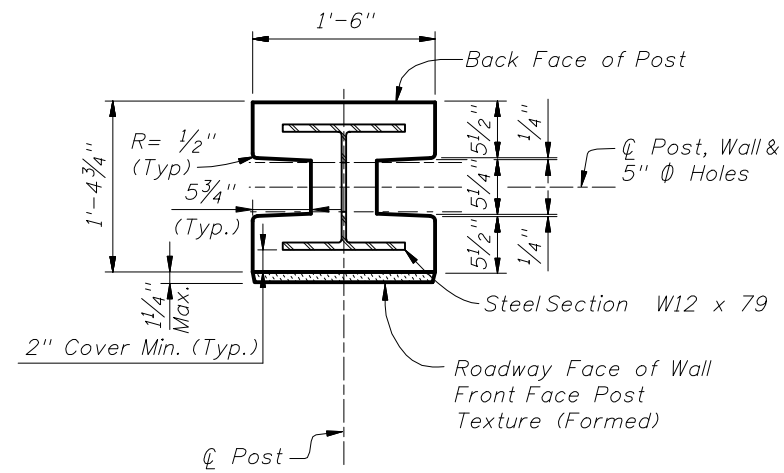
PRECAST SOUND BARRIERS -
PILE AND POST REINFORCING STEEL

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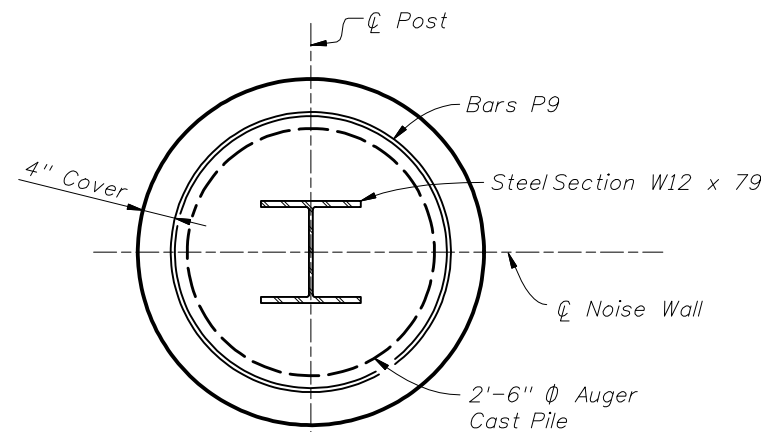
* Extend Post 2" above top of high side wall panel when post caps are shown in plans.



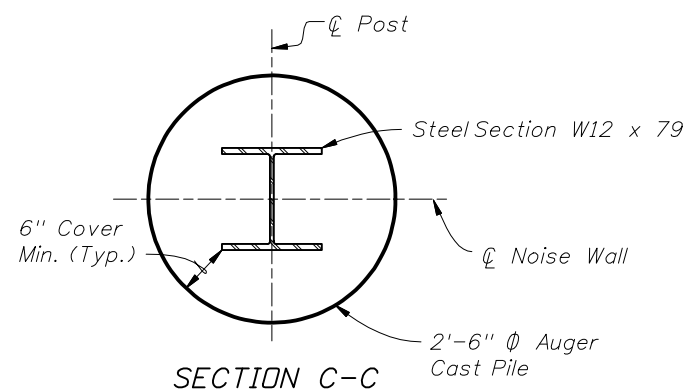
POST IN AUGERED HOLE



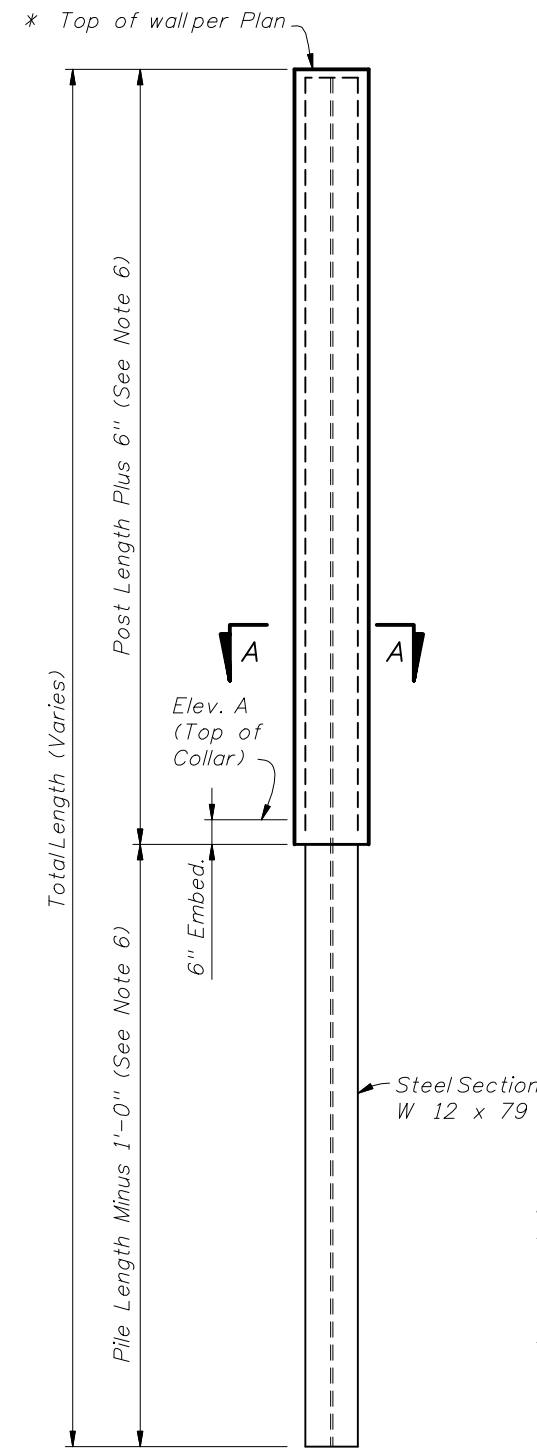
SECTION A-A
(Post Assembly)



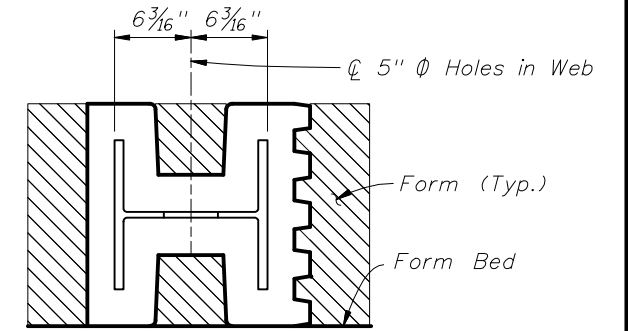
SECTION B-B



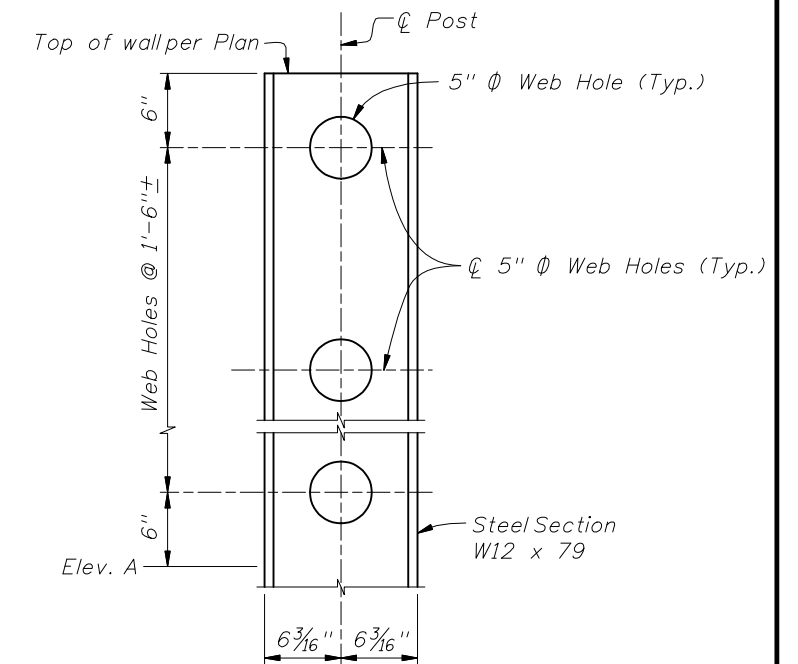
SECTION C-C



POST ASSEMBLY DETAIL



HORIZONTAL CASTING ORIENTATION
(Front Face Post Texture Type "H" Shown)



WEB HOLE SPACING DETAIL

NOTES:

1. The W12 x 79 load carrying member is coated with concrete for durability, aesthetic reasons and to make the connection to the panels.
2. The steel and concrete post assembly is not a reinforced concrete design.
3. The steel and concrete post assembly shall be cast vertical or cast horizontal according to the casting orientation shown above.
4. All Structural Steel shall be in accordance with ASTM A 36.
5. A precast collar shall not be permitted with this Pile/Post Connection Option.
6. For Post and Pile Lengths, see Index No. 5206.

PILE/POST CONNECTION OPTION C



2010 FDOT Design Standards

PRECAST SOUND BARRIERS -
PILE AND POST REINFORCING STEEL

Last Revision

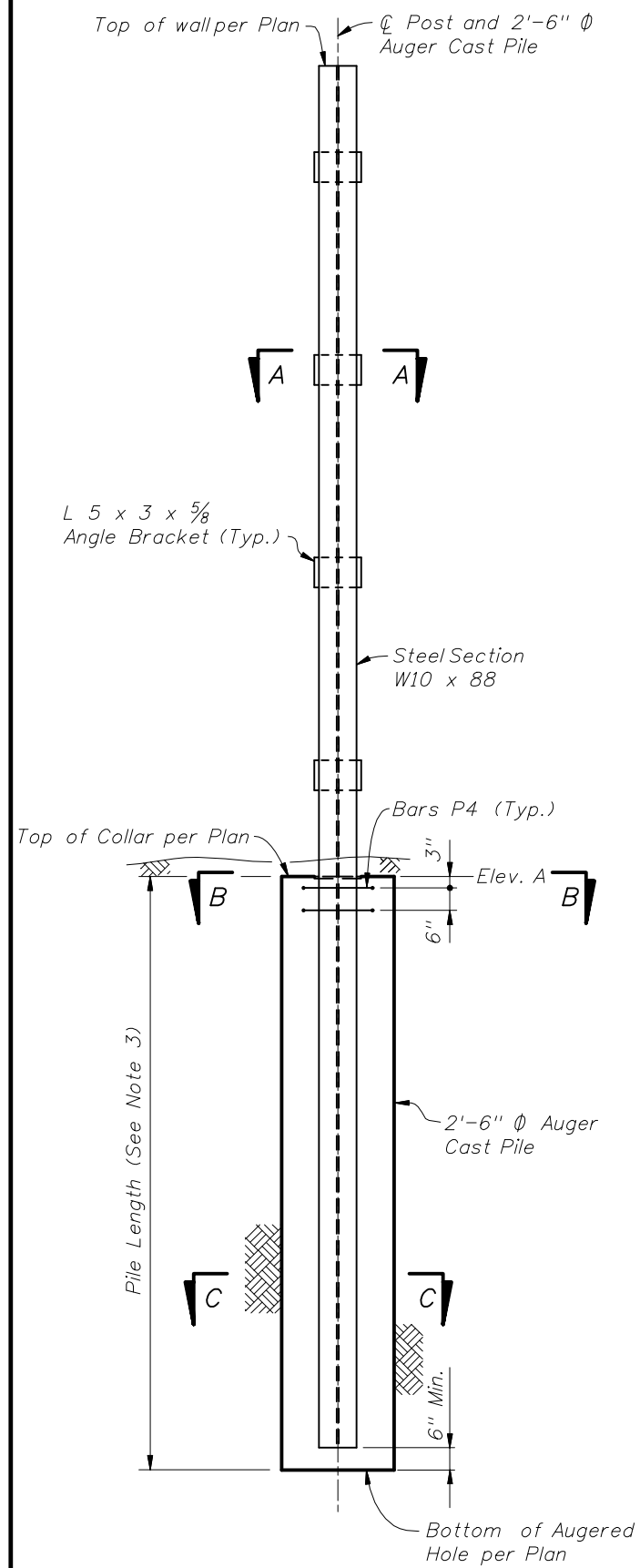
07/01/08

Sheet No.

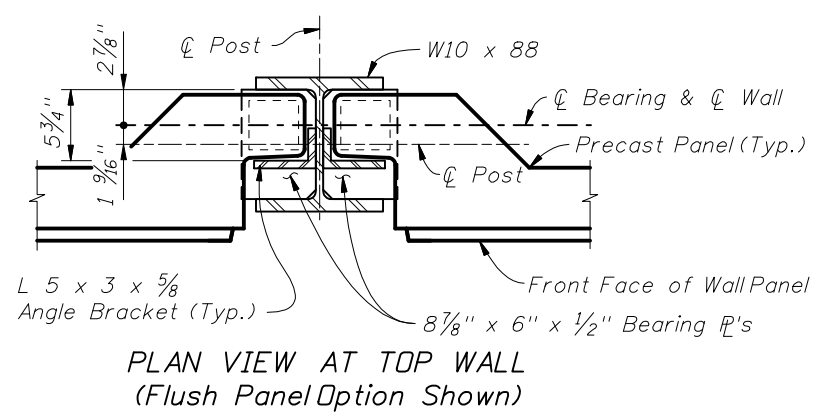
4 of 7

Index No.

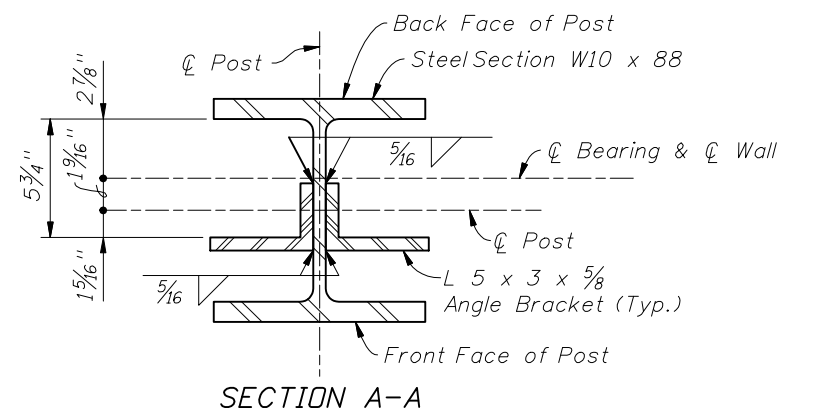
5205



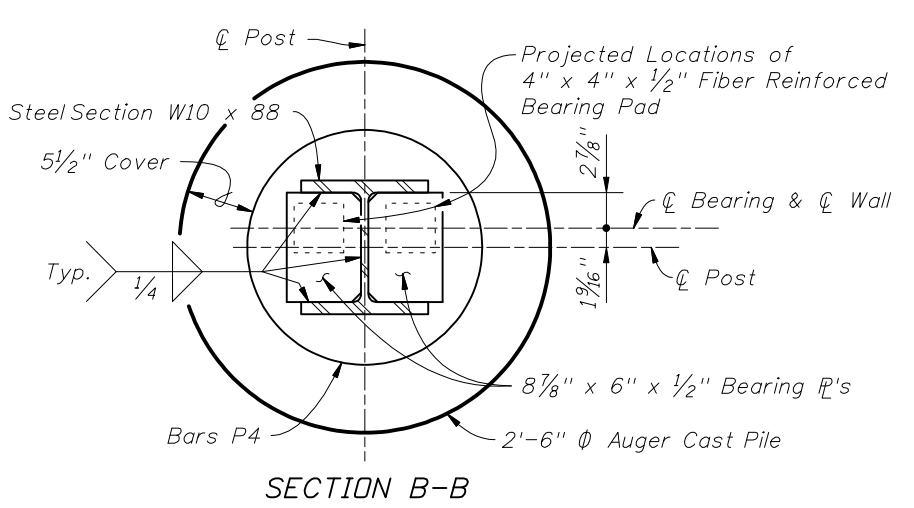
POST IN AUGERED HOLE



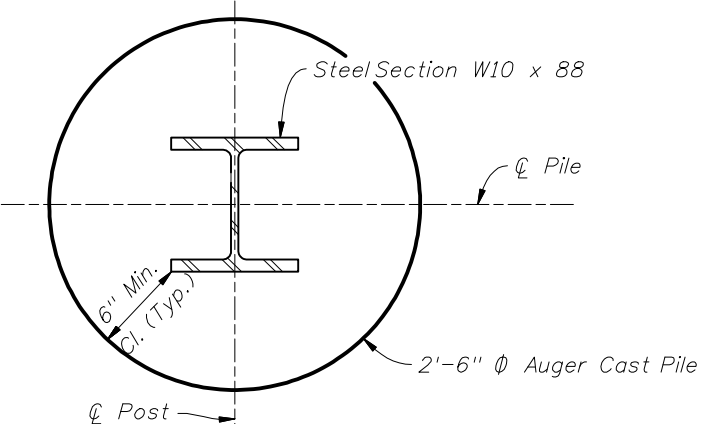
PLAN VIEW AT TOP WALL
(Flush Panel Option Shown)



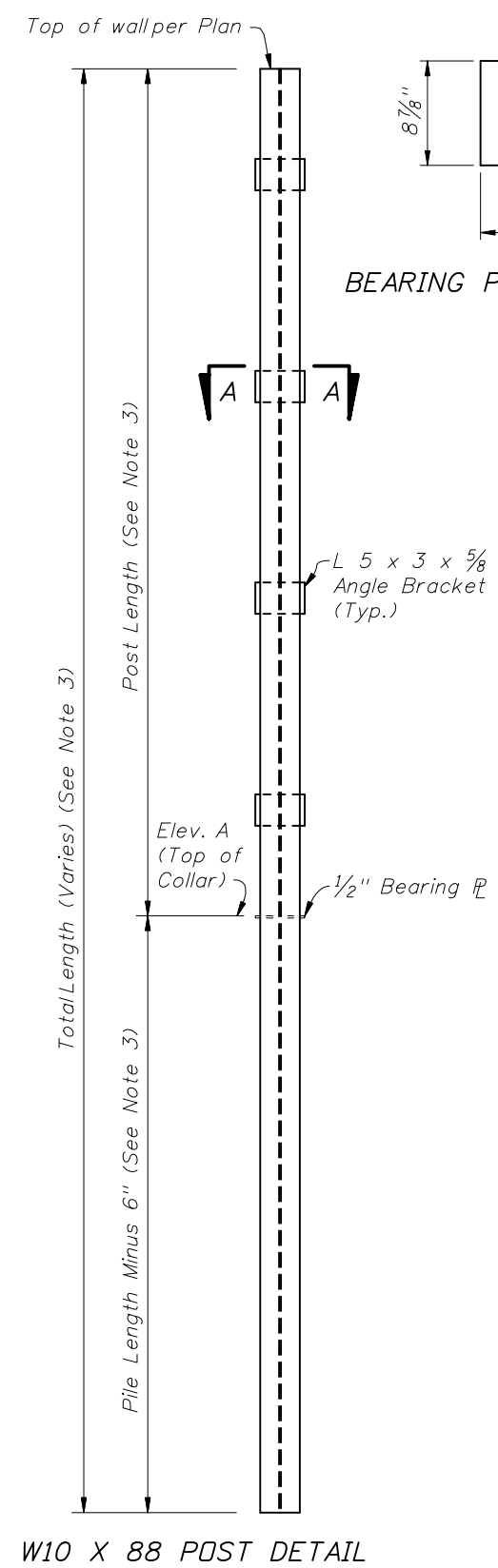
SECTION A-A



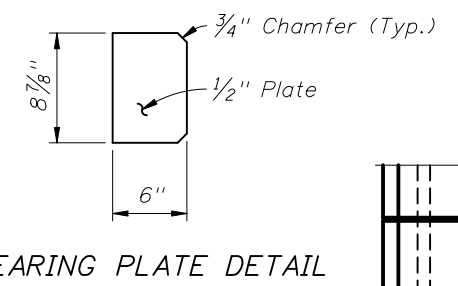
SECTION B-B



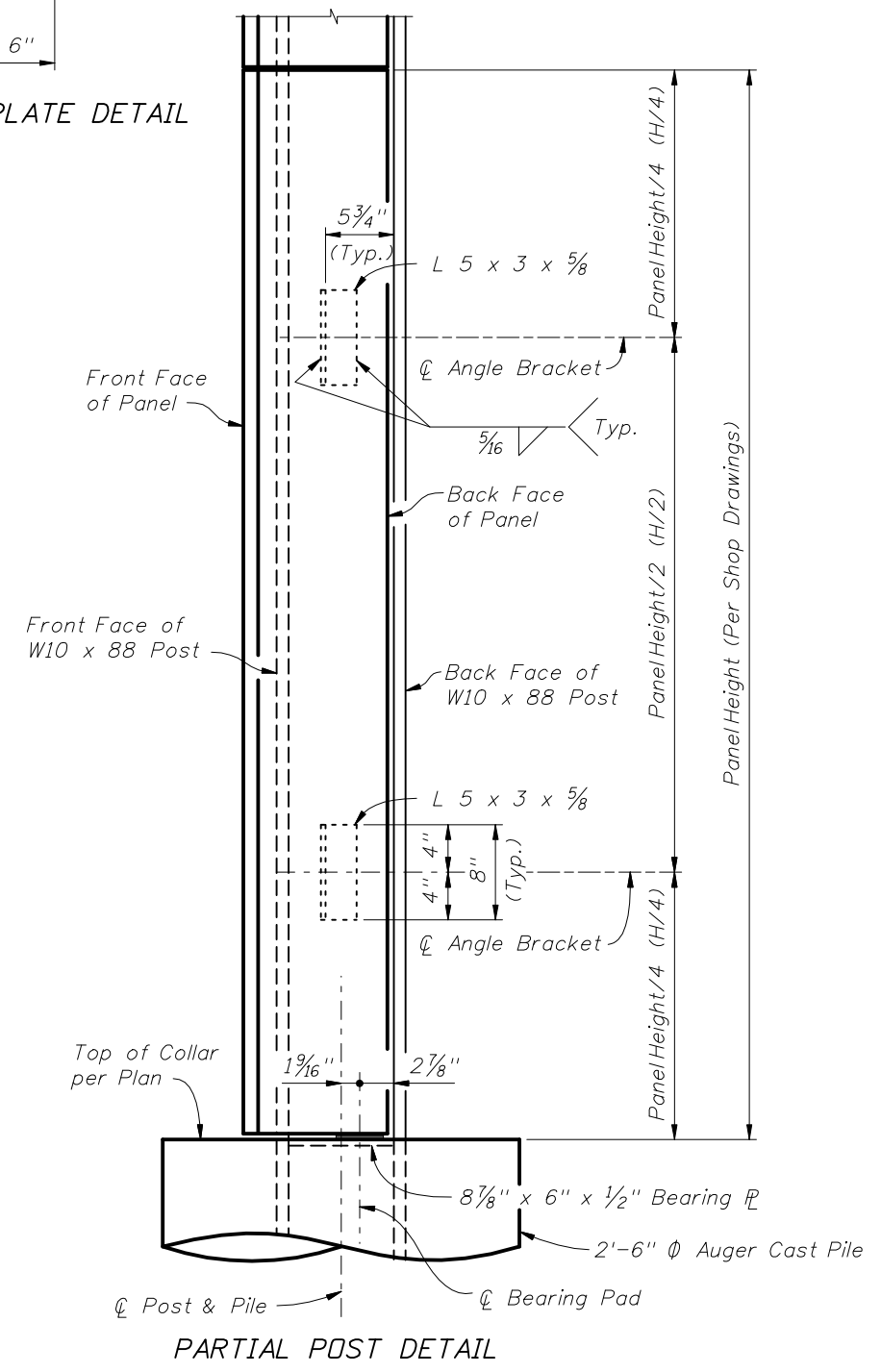
SECTION C-C



W10 X 88 POST DETAIL



BEARING PLATE DETAIL



PARTIAL POST DETAIL

- NOTES:
1. All Structural Steel shall be in accordance with ASTM A 36.
 2. For this Pile/Post Connection Option the Wall Panel Length increased by 8" to 9'-10" and 19'-10" respectively for the 10'-0" and 20'-0" post spacing.
 3. For Post and Pile Lengths, see Index No. 5206.

PILE/POST CONNECTION OPTION D



Ø Post, 3'-6" Ø Collar and
2'-6" Ø Auger Cast Pile

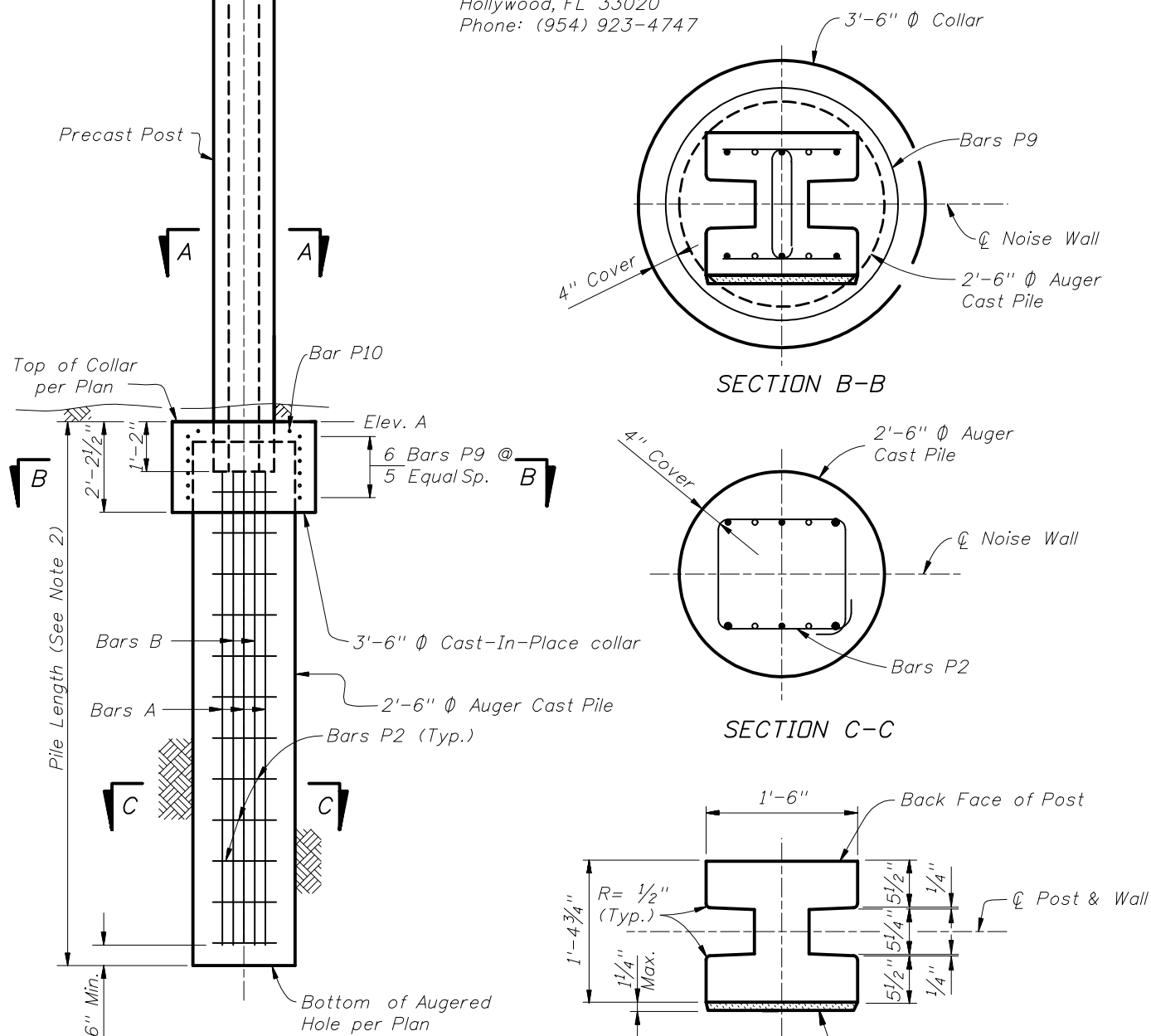
* Top of wall per Plan

NOTES:

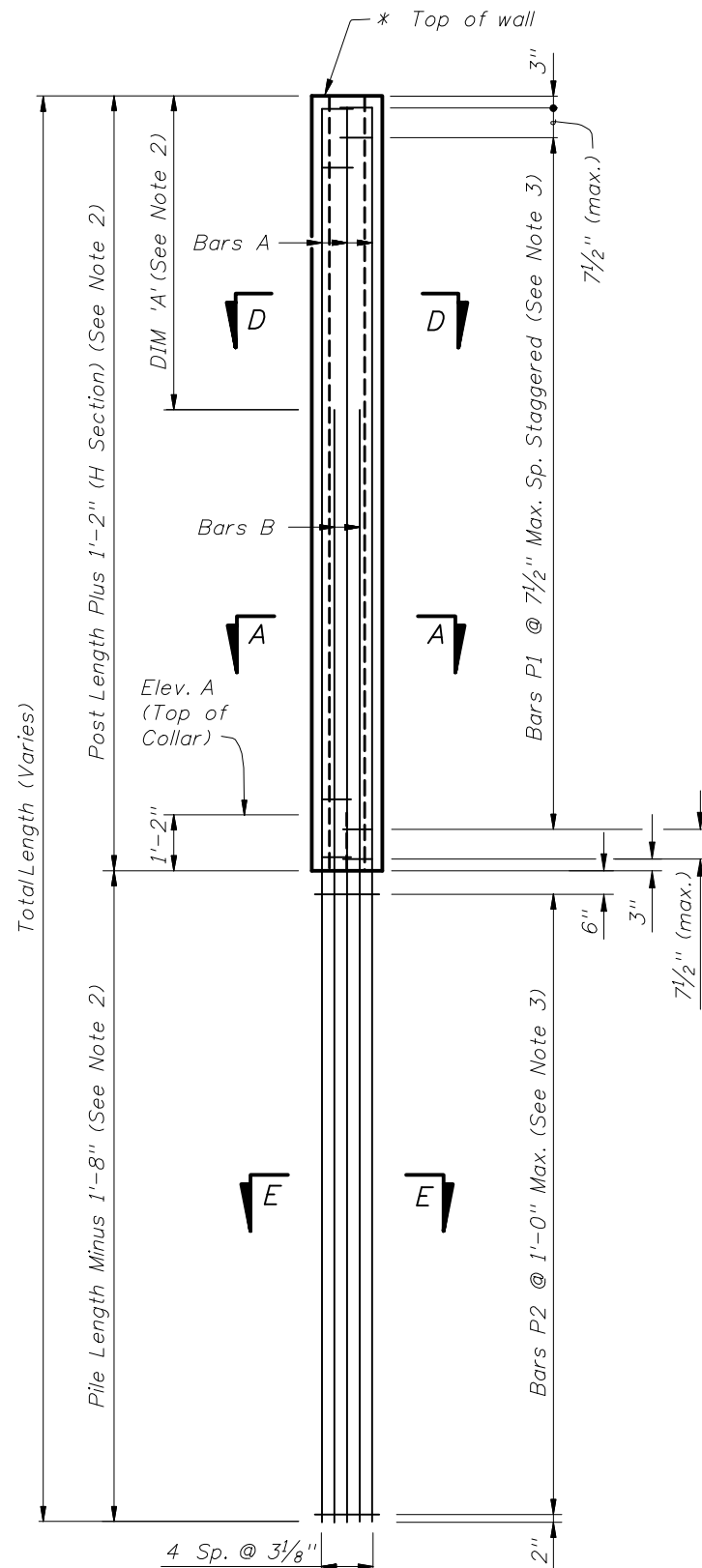
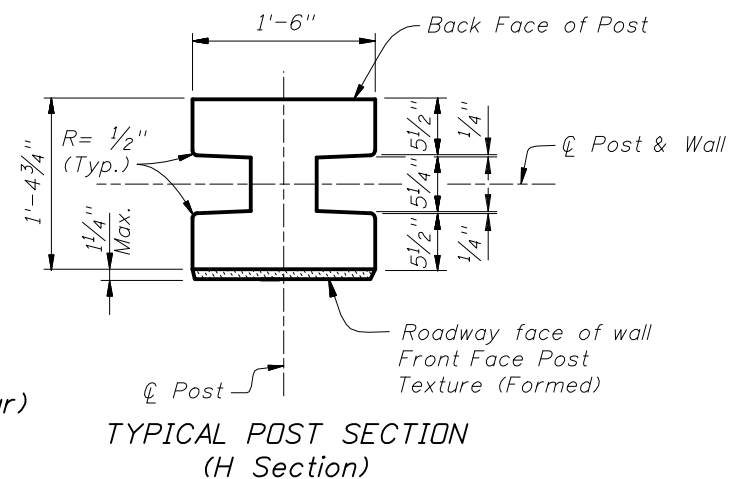
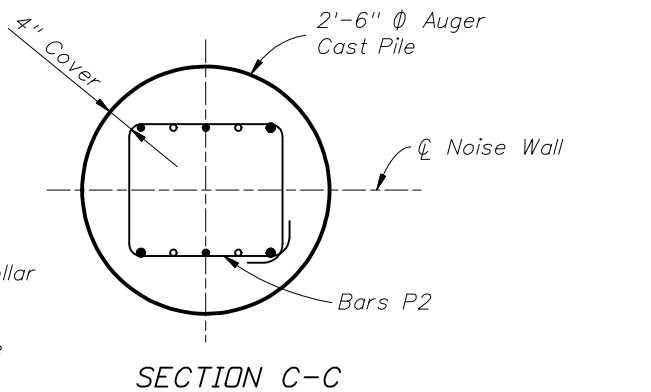
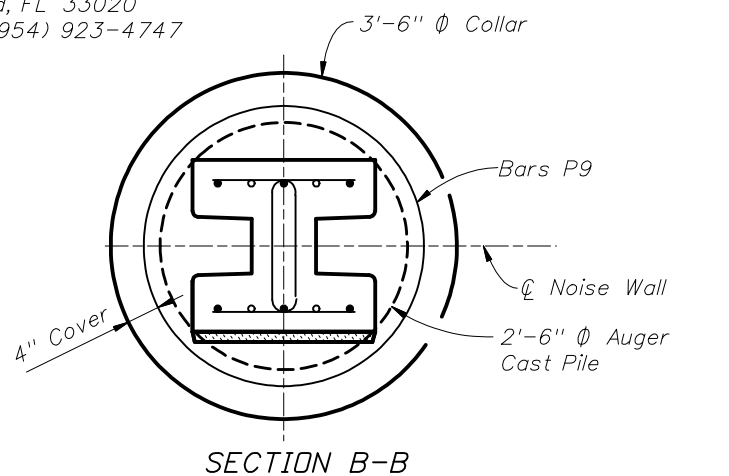
1. The construction of this option utilizes a patented process covered by patents held by State Contracting and Engineering Inc. Any use of this design is subject to the rights of the patent holder (U.S. Patent Nos. 5,234,288 & 5,429,455) and all patent royalties or license fees shall be the sole responsibility of the user.
2. For Post and Pile Lengths, see Index No. 5206.
3. For Table of Reinforcing Steel Sizes and DIM 'A', see Index No. 5206.
4. For Precast Collar Option, see Sheet No. 7 of 7.

To use this design contact:
State Contracting and Engineering, Corp.
3800 North 29th Avenue
Hollywood, FL 33020
Phone: (954) 923-4747

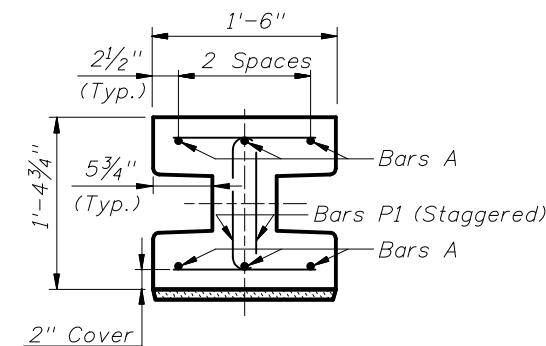
* Extend Post 2" above top of high side wall panel when post caps are shown in plans.



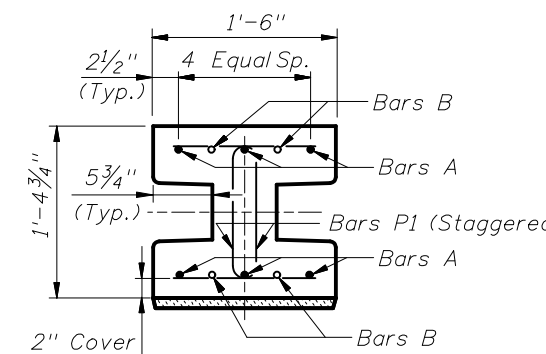
POST IN AUGERED HOLE
(Cast-In-Place Collar Shown, Precast Collar Similar)



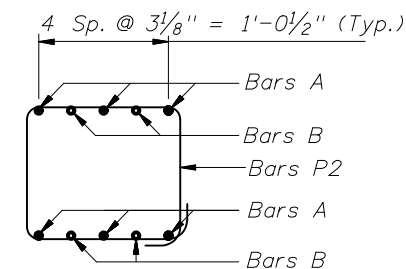
GROUND MOUNTED POST REINFORCEMENT
(Prior to placement in augered hole)



SECTION D-D
(H Section)



SECTION A-A
(H Section)



SECTION E-E

KEITH and SCHNARS, P.A.
ENGINEERS - PLANNERS - SURVEYORS
6500 NORTH ANDREWS AVENUE
FORT LAUDERDALE, FL 33309-2132
CERTIFICATE OF AUTHORIZATION NO. 1337



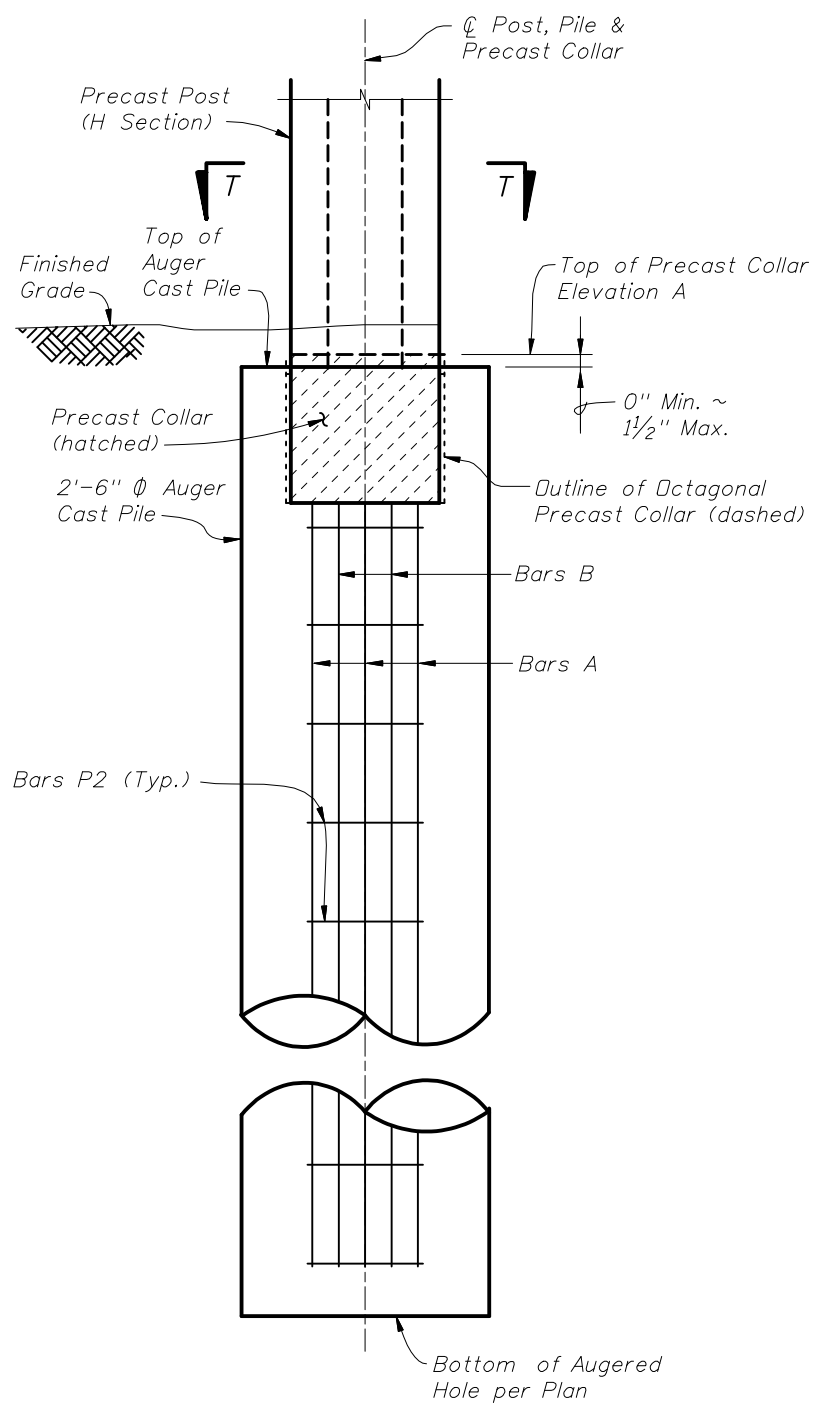
STATE CONTRACTING & ENGINEERING CORP.
PILE/POST CONNECTION OPTION E



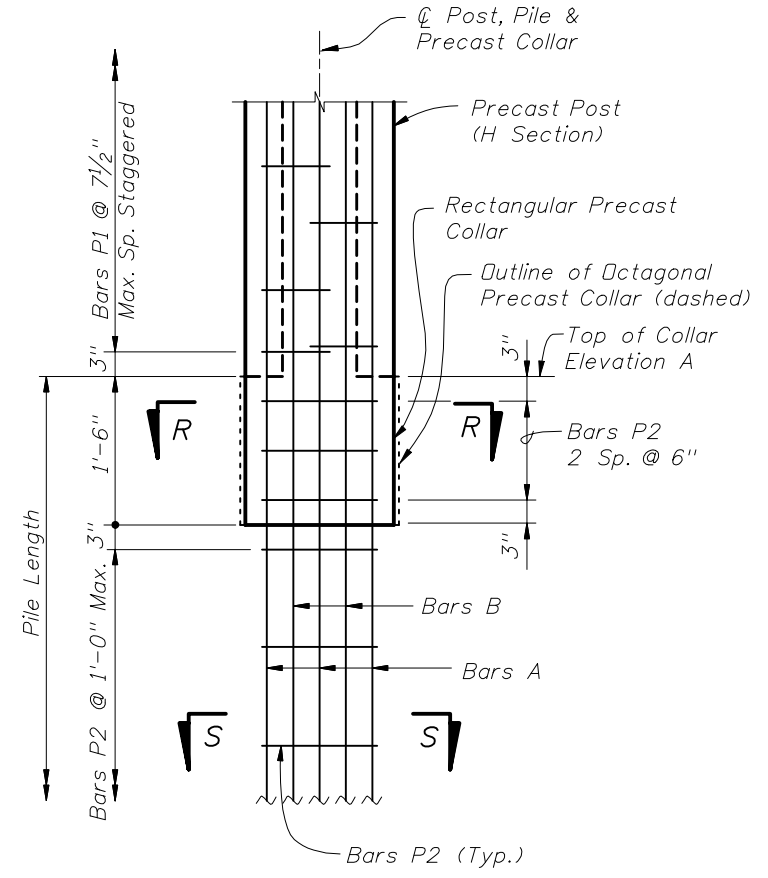
2010 FDOT Design Standards

**PRECAST SOUND BARRIERS -
PILE AND POST REINFORCING STEEL**

Last Revision	Sheet No.
07/01/08	6 of 7
Index No.	
5205	

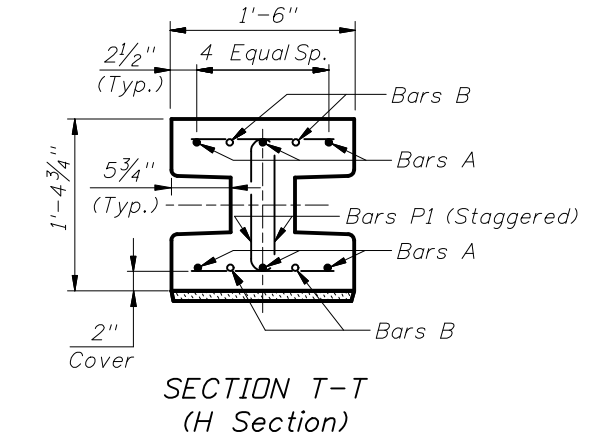


PRECAST COLLAR IN AUGER CAST PILE

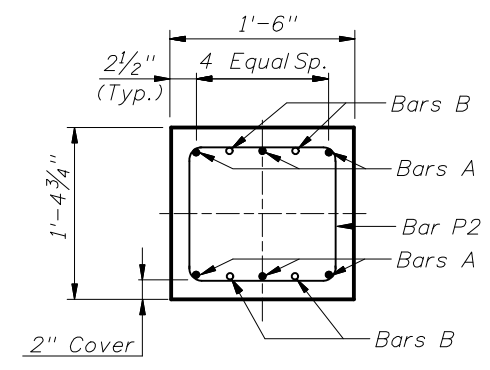


PRECAST COLLAR DETAIL

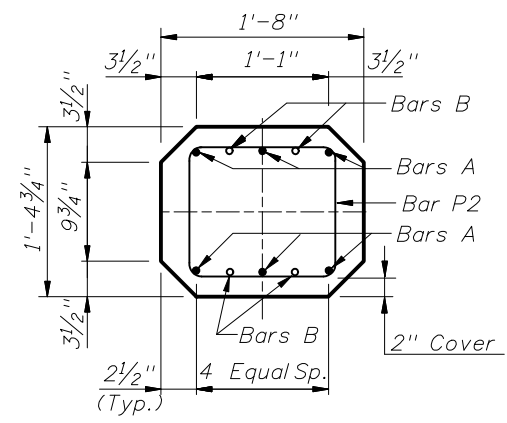
- NOTES:
1. For Post and Pile Lengths, see Index No. 5206.
 2. For Reinforcing Steel Sizes, see Index No. 5206.
 3. For Pile/Post Connection Option E, see Sheet No. 6 of 7.



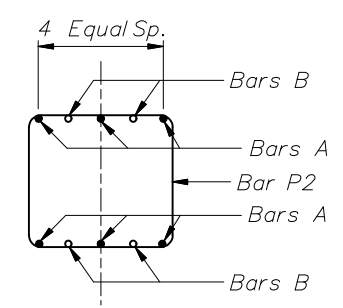
SECTION T-T (H Section)



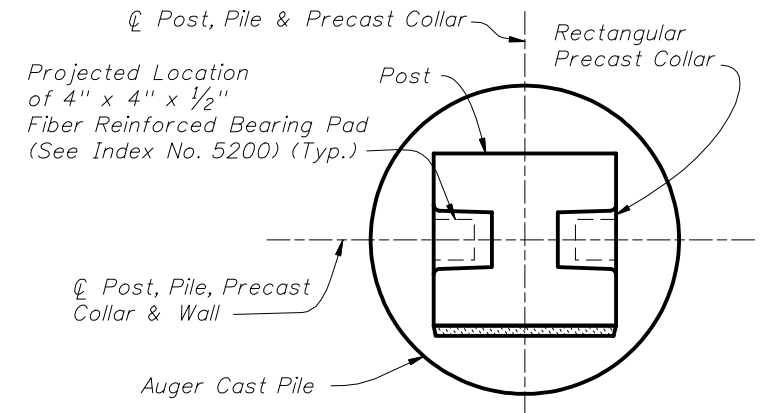
SECTION R-R (Rectangular Precast Collar)



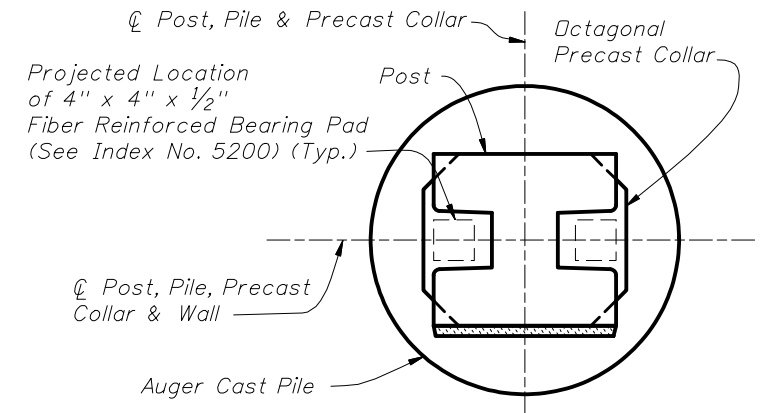
SECTION R-R (Octagonal Precast Collar)



SECTION S-S



SECTION T-T (Showing Rectangular Precast Collar and Auger Cast Pile)

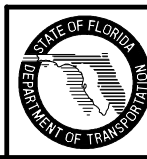


SECTION T-T (Showing Octagonal Precast Collar and Auger Cast Pile)

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FORT LAUDERDALE, FL 33309-2132
CERTIFICATE OF AUTHORIZATION NO. 1337

State Contracting & Engineering Corp.

STATE CONTRACTING & ENGINEERING CORP.
PRECAST COLLAR FOR PILE/POST CONNECTION OPTION E



2010 FDOT Design Standards

**PRECAST SOUND BARRIERS -
PILE AND POST REINFORCING STEEL**

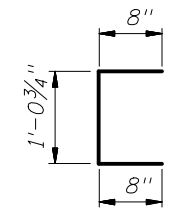
Last Revision 07/01/08 Sheet No. 7 of 7

Index No. **5205**

BAR BENDING DETAILS

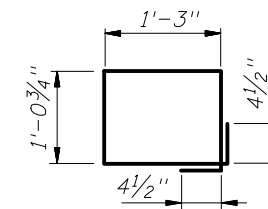
All bar dimensions in bending diagrams are out-to-out. All bars not shown in the bending diagrams are straight.

POST & PILE



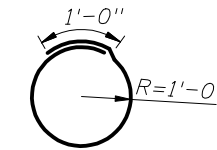
BAR P1

Bar Length = 2'-5"



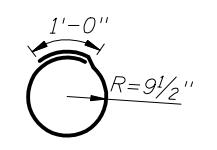
BAR P2

Bar Length = 5'-5"



BAR P3

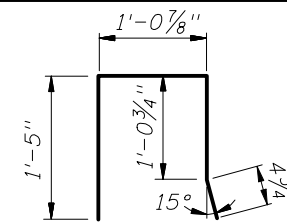
Bar Length = 7'-4"



BAR P4

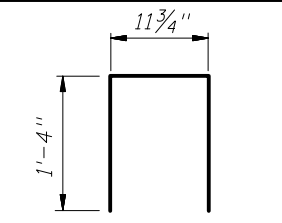
Bar Length = 6'-0"

90° CORNER POST & PILE



BAR P5

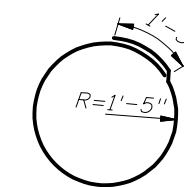
Bar Length = 3'-9 1/4"



BAR P6

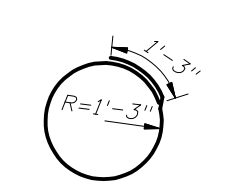
Bar Length = 3'-5 1/2"

CAST-IN-PLACE COLLAR



BAR P9

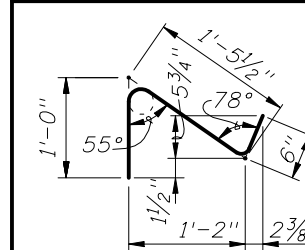
Bar Length = 10'-2"



BAR P10

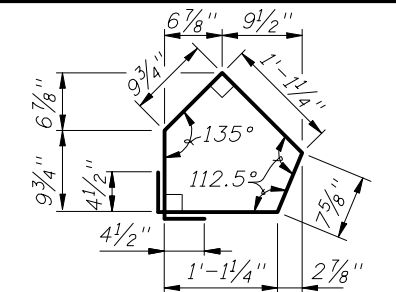
Bar Length = 9'-2"

45° CORNER POST & PILE



BAR P7 (POST)

Bar Length = 2'-8"



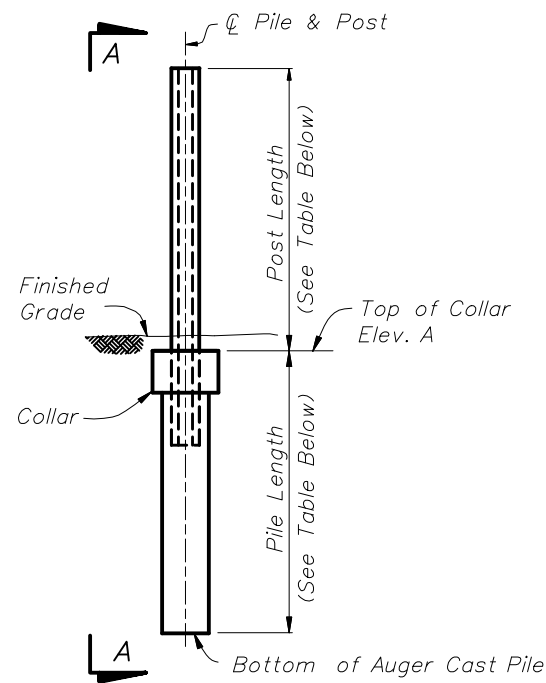
BAR P8 (PILE)

Bar Length = 5'-0 1/4"

NOTES:

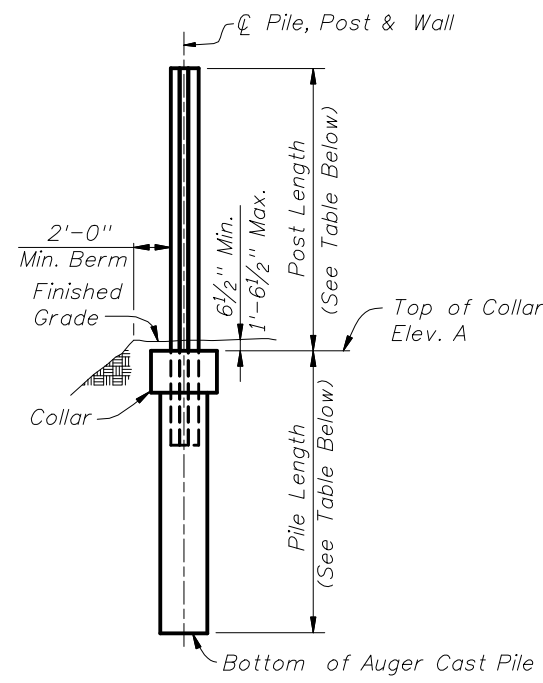
- Bars A, B & P1 are used in Options A, B & E.
- Bars C are only used in Option A.
- Bars C2 are only used in Option B.
- Bars P2 are used in Options A & E.
- Bars P3 are only used in Option A.
- Bars P4 are only used in Option B.
- Bars P5 & P6 are only used in 90° Corner Posts.
- Bars P7 & P8 are only used in 45° Corner Posts.
- Bars P9 & P10 are used in the Cast-In-Place Collar Options.

For Bar Designations, See Index No. 5205.



PILE/POST ELEVATION

(Pile/Post Connection Option A Shown)



VIEW A-A

(Pile/Post Connection Option A Shown)

POST AND PILE DIMENSIONS

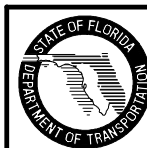
WALL TYPE	POST LENGTH WITHOUT CAP	POST LENGTH WITH CAP	PILE LENGTH OPTION A		PILE LENGTH OPTIONS B, C, D & E	
			10'-0" POST SPACING	20'-0" POST SPACING	10'-0" POST SPACING	20'-0" POST SPACING
A	12'-0 1/2"	12'-2 1/2"	11'-0"	14'-0"	12'-0"	15'-0"
B	13'-0 1/2"	13'-2 1/2"	11'-0"	15'-0"	12'-0"	16'-0"
C	14'-0 1/2"	14'-2 1/2"	12'-0"	16'-0"	13'-0"	17'-0"
D	15'-0 1/2"	15'-2 1/2"	12'-0"	17'-0"	13'-0"	18'-0"
E	16'-0 1/2"	16'-2 1/2"	13'-0"	17'-0"	14'-0"	18'-0"
F	17'-0 1/2"	17'-2 1/2"	14'-0"	18'-0"	14'-0"	19'-0"
G	18'-0 1/2"	18'-2 1/2"	14'-0"	19'-0"	15'-0"	20'-0"
H	19'-0 1/2"	19'-2 1/2"	15'-0"	20'-0"	15'-0"	21'-0"
I	20'-0 1/2"	20'-2 1/2"	15'-0"	21'-0"	16'-0"	22'-0"
J	21'-0 1/2"	21'-2 1/2"	16'-0"	22'-0"	16'-0"	24'-0"
K	22'-0 1/2"	22'-2 1/2"	16'-0"	23'-0"	17'-0"	26'-0" *

* For SteelPost Option "D", use 30'-0".

TABLE OF REINFORCING STEEL

PILE/POST REINFORCING																	CAST-IN-PLACE COLLAR				
10'-0" POST SPACING										20'-0" POST SPACING							BARS C	BARS C2	BARS P1, P2, P3, P4, P5, P6, P7 & P8	BARS P9	BARS P10
BARS A	BARS B			BARS D	BARS A	BARS B			BARS D	BARS C	BARS C2	BARS P1, P2, P3, P4, P5, P6, P7 & P8		BARS P9	BARS P10						
SIZE	SIZE	DIM 'A'	SIZE	SIZE	SIZE	SIZE	DIM 'A'	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE				
#4	#4	10'-0"	#4	#5	#5	9'-0"	#6	#9	#7	#4	#5	#5	#4	#5	#5						
#4	#4	10'-7"	#5	#5	#5	8'-10"	#7	#9	#7	#4	#5	#5	#4	#5	#5						
#4	#4	10'-5"	#5	#6	#6	10'-4"	#7	#9	#7	#4	#5	#5	#4	#5	#5						
#5	#5	12'-11"	#6	#6	#6	10'-3"	#8	#9	#7	#4	#5	#5	#4	#5	#5						
#5	#5	12'-9"	#6	#7	#7	11'-10"	#8	#9	#7	#4	#5	#5	#4	#5	#5						
#5	#5	12'-7"	#6	#7	#7	11'-8"	#9	#9	#7	#4	#5	#5	#4	#5	#5						
#6	#6	14'-11"	#7	#8	#8	13'-1"	#10	#9	#7	#4	#5	#5	#4	#5	#5						
#6	#6	14'-10"	#7	#8	#8	13'-0"	#10	#9	#7	#4	#5	#5	#4	#5	#5						
#6	#6	14'-9"	#8	#9	#9	14'-3"	#11	#9	#7	#4	#5	#5	#4	#5	#5						
#6	#6	14'-8"	#8	#9	#9	14'-2"	#11	#9	#7	#4	#5	#5	#4	#5	#5						
#7	#7	17'-1"	#8	#9	#9	14'-1"	2~ #14 & 1~ #9	#9	#7	#4	#5	#5	#4	#5	#5						

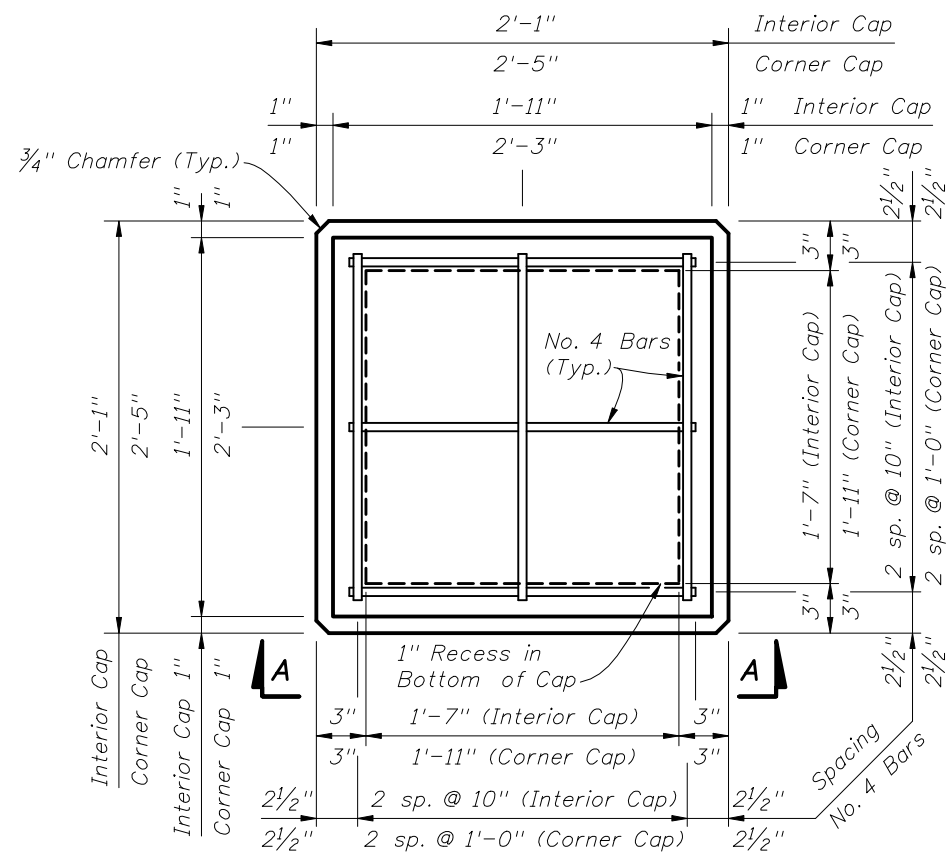
NOTE: USE THIS INDEX ONLY WHEN SOIL SPT N VALUES ARE BETWEEN 10 AND 40



2010 FDOT Design Standards

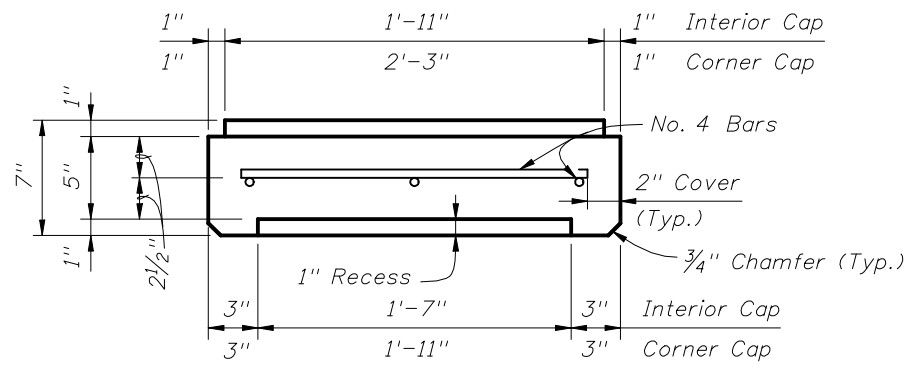
PRECAST SOUND BARRIERS - PILE DEPTH AND REINFORCING SUMMARY

Last Revision: 07/01/08
Sheet No. 1 of 1
Index No. 5206



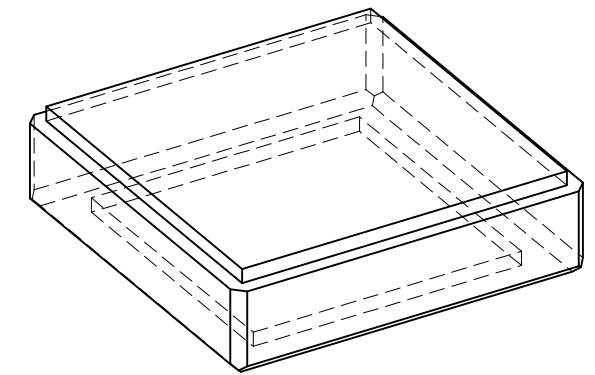
PLAN VIEW

(Type "A" Cap Shown, Type "B" & "C" Caps Similar)

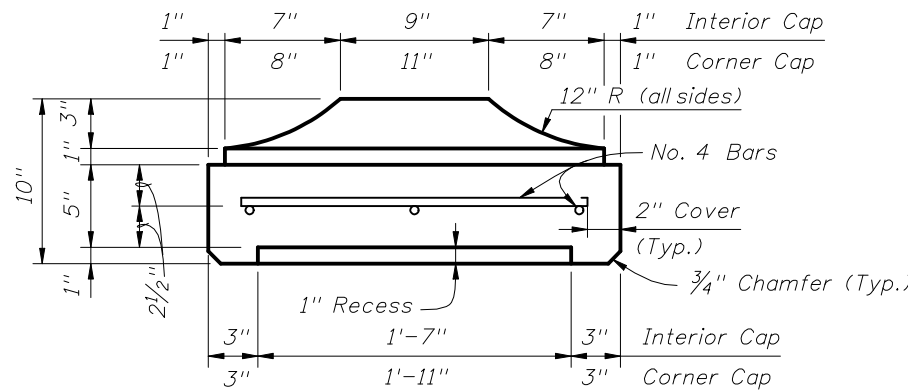


SECTION C-C

TYPE "A" CAP DETAILS

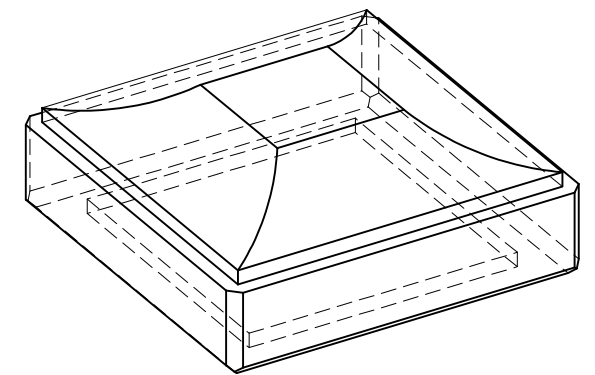


PICTORIAL VIEW

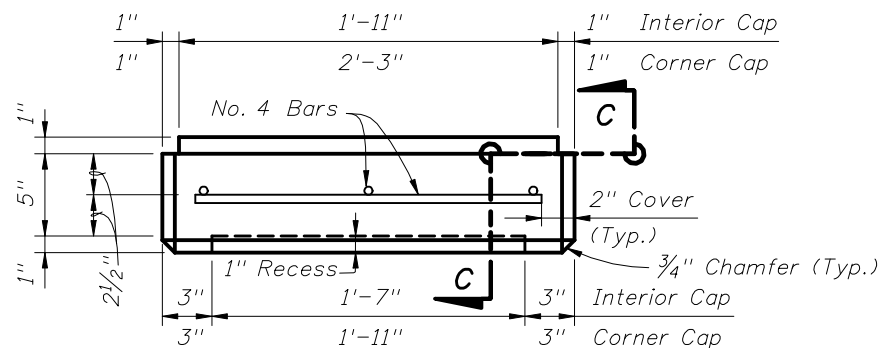


SECTION C-C

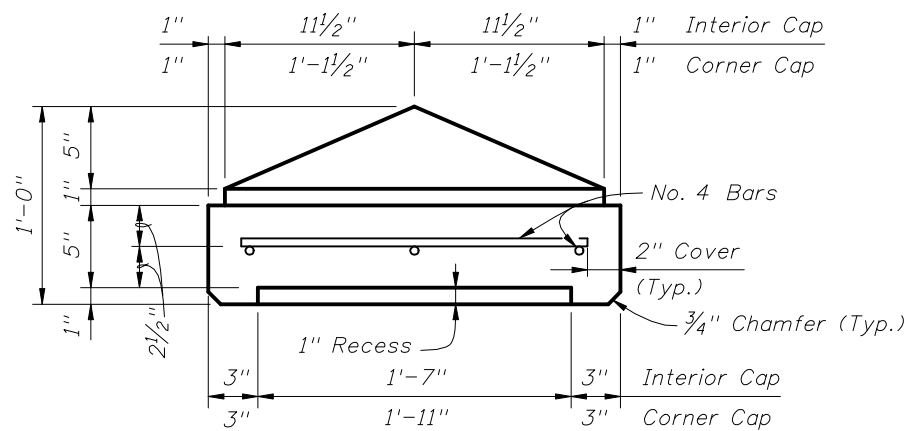
TYPE "B" CAP DETAILS



PICTORIAL VIEW

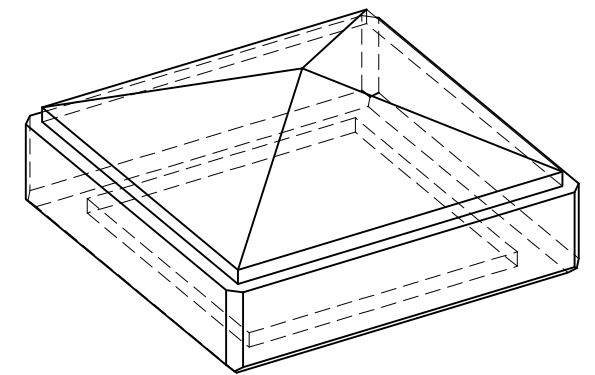


VIEW A-A SHOWN, VIEW B-B SIMILAR
(Type "A" Cap Shown, Type "B" & "C" Caps Similar)

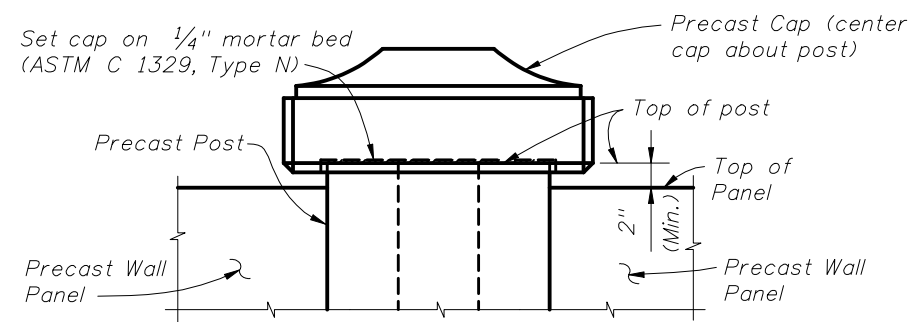


SECTION C-C

TYPE "C" CAP DETAILS



PICTORIAL VIEW



CAP PLACEMENT DETAIL

(Type "B" Cap Shown, Type "A" & "C" Caps Similar)

NOTE: See Index No. 5200 for concrete and reinforcing notes.

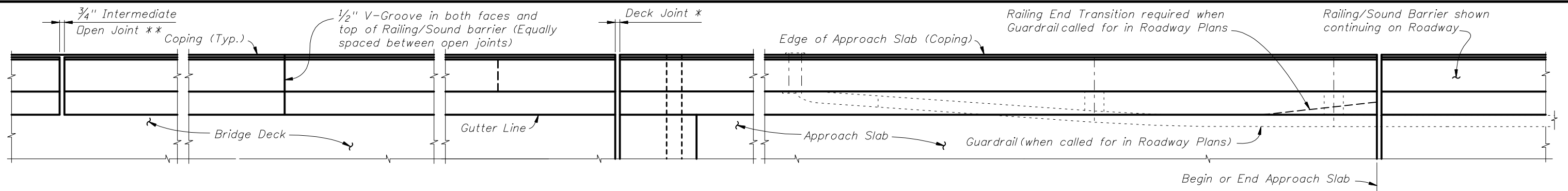


2010 FDOT Design Standards

**PRECAST SOUND BARRIERS
- PRECAST POST CAPITAL**

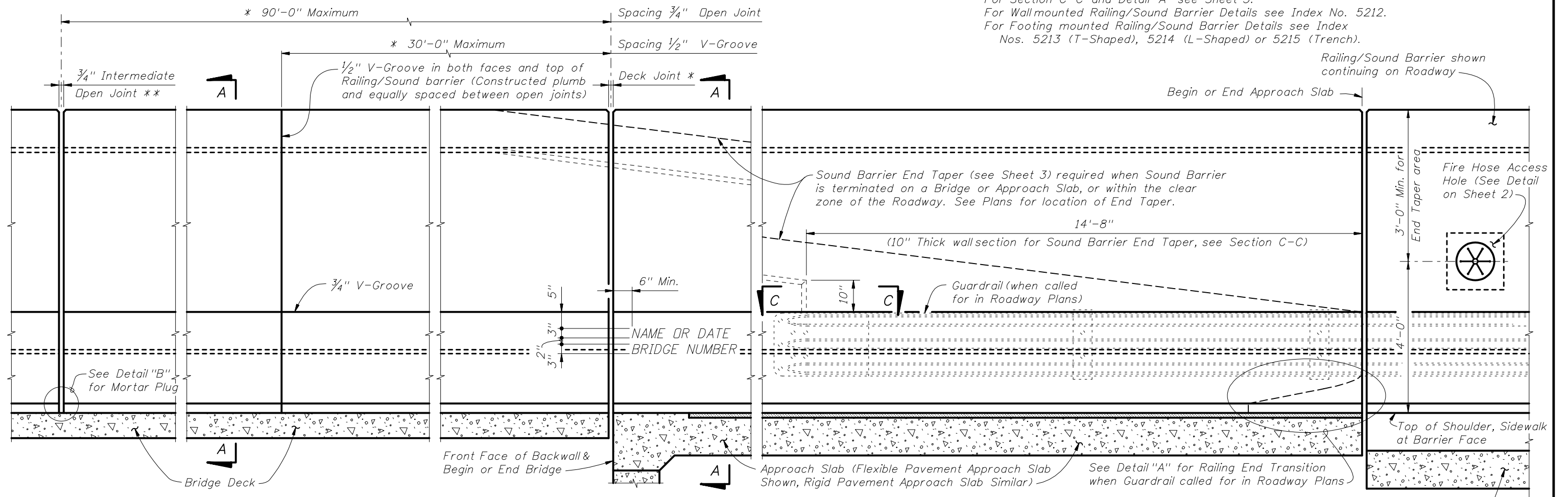
Last Revision 07/01/08 Sheet No. 1 of 1

Index No. **5207**



PLAN (BRIDGE MOUNTED RAILING/SOUND BARRIER SHOWN, WALL OR FOOTING MOUNTED RAILING/SOUND BARRIER SIMILAR) (Reinforcing Steel not shown for clarity)

CROSS REFERENCE:
 For Detail "B" and V-Groove Lettering Detail see Sheet 2.
 For Section A-A see Sheet 4.
 For Section C-C and Detail "A" see Sheet 5.
 For Wall mounted Railing/Sound Barrier Details see Index No. 5212.
 For Footing mounted Railing/Sound Barrier Details see Index Nos. 5213 (T-Shaped), 5214 (L-Shaped) or 5215 (Trench).

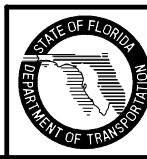


ELEVATION OF INSIDE FACE OF RAILING/SOUND BARRIER (BRIDGE MOUNTED RAILING/SOUND BARRIER SHOWN, WALL OR FOOTING MOUNTED RAILING/SOUND BARRIER SIMILAR) (Reinforcing Steel not shown for clarity)

T-Shaped Spread Footing Shown, L-Shaped Spread Footing, Trench Footing Similar and Junction Slab similar

- * On Bridges see Superstructure and Approach Slab Sheets for actual dimensions and joint orientation. Open Railing/Sound Barrier Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railing/Sound Barrier walls on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at ϕ Pier or Intermediate Bent, Junction Slab or Footing similar.
- ** $\frac{3}{4}$ " Intermediate Open Joints shall be constructed plumb and provided at :
 - (1) - Substructure supports where superstructure slab is continuous.
 - (2) - Midspan where span length exceeds 90 ft.
 - (3) - Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.
 - (4) - Construction Joints for Junction Slabs and Footings

INSTRUCTIONS TO DESIGNER:
 FORM LINERS : Form liners providing a textured finish are permitted on the outside face of the Traffic Railing Barrier/Soundwall with the following provisions: (1) The maximum amplitude of the form liner on the lower 2'-8" section shall be limited to 1" depth; (2) Any form liner used above 2'-8", must provide a thickened concrete section to maintain 2" cover. Full details of this thickened section and the form liner shall be provided in the plans. Form liners on the inside face of the Traffic Railing Barrier/Soundwall are not recommended.
 END TAPER LOCATION : When the Soundwall terminates on the bridge, the End Taper shall be located at an open joint. When the Soundwall terminates on the Approach Slab, the End Taper shall terminate at Begin or End Approach Slab as shown above.



TRAFFIC RAILING/SOUND BARRIER NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to a safety shape/sound barrier combination railing which has been crash tested to NCHRP Report 350 TL-4 Criteria. The Transverse Design Force for the design of bridge deck overhang shall be 54 kips applied horizontally at 3'-6" height above the deck.

CONSTRUCTION REQUIREMENTS : The Traffic Railing/Sound Barrier and joints shall be constructed plumb, they shall not be constructed perpendicular to the roadway surface. Slip forming is not permitted.

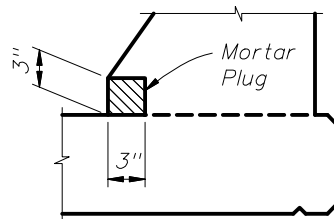
CONCRETE AND REINFORCING STEEL : For Railing/Sound Barrier on bridges see General Notes. For Wall and Footing mounted Railing/Sound Barrier, concrete shall be Class II for slightly aggressive environments and Class IV for moderately or extremely aggressive environments. All reinforcing steel shall be Grade 60.

NAME, DATE AND BRIDGE NUMBER : For Railing/Sound Barrier on bridges, 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 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

MARKERS : For Railing/Sound Barrier on bridges, Elevation Markers shall be placed on top of the Traffic Railing/Sound Barrier or Bridge Deck at the end bents as directed by the Engineer. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Railing/Sound Barrier.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers 2'-4" above the riding surface at the spacing shown in the table below. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing/Sound Barrier.

REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

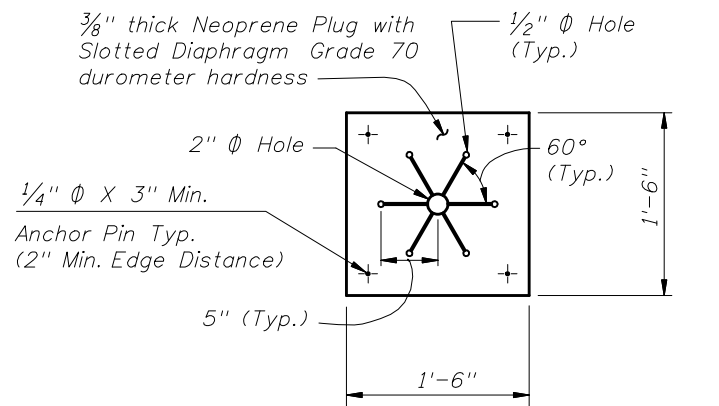


DETAIL "B" - SECTION AT INTERMEDIATE OPEN JOINT

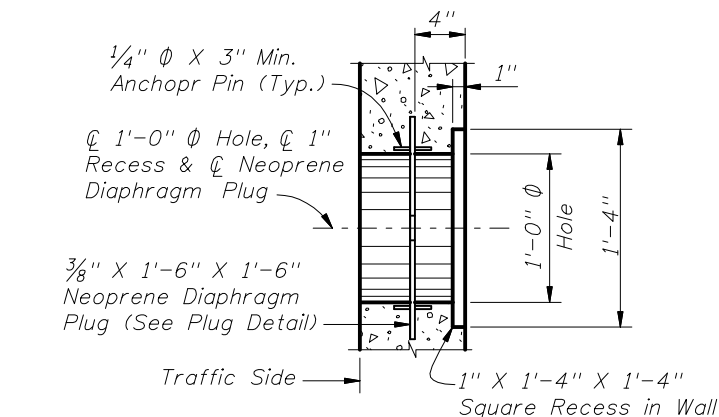
NOTE: At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.

ESTIMATED TRAFFIC RAILING/SOUND BARRIER QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete (Railing)	CY/LF	0.104
Concrete (Sound Barrier)	CY/LF	0.145
Reinforcing Steel (Typical)	LB/LF	78.57
Additional Reinf. @ Open Joint	LB	430.24

(The above quantities are based on the bridge mounted typical section, 2% deck cross slope and railing on low side of deck.)

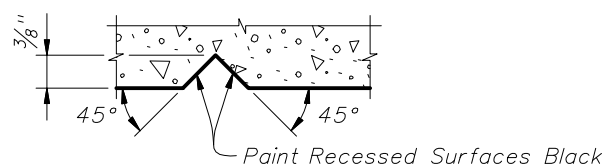


NEOPRENE DIAPHRAGM PLUG DETAIL



TYPICAL SECTION FIRE HOSE ACCESS DETAIL

NOTE: Fire hose access holes are required at or near fire hydrant locations. Field cut reinforcement as required to maintain 2" minimum cover at access holes. Locate fire hose access holes a minimum of 10'-0" from 3/4" open joints when possible.

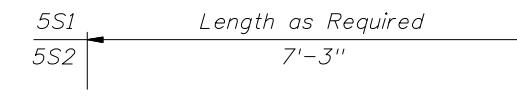


SECTION THRU RECESSED "V" GROOVE TO FORM INSCRIBED LETTERS AND FIGURES

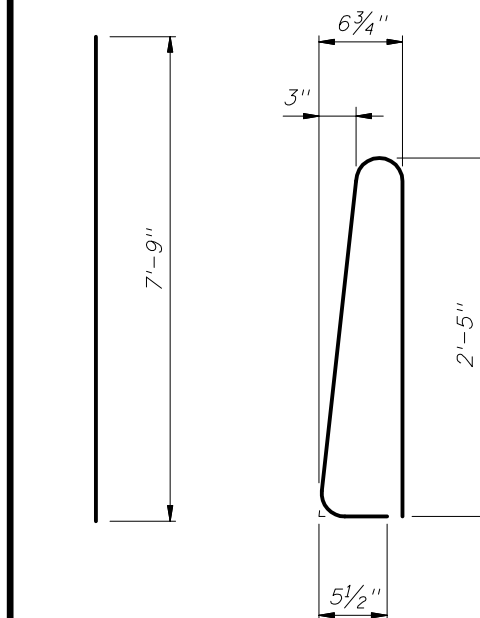
REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
P	5	5'-7"
R	5	7'-9"
S1	5	As Req'd.
S2	5	7'-3"
V (Bridge and Wall)	5	5'-1"
V (Footing)	5	7'-7"

BRIDGE CROSS-SLOPE		LOW GUTTER		HIGH GUTTER	
		ØA	ØB	ØA	ØB
BRIDGE MOUNTED	0% to 2%	90°	90°	90°	90°
	2% to 6%	93°	87°	87°	93°
	6% to 10%	96°	84°	84°	96°
WALL & FOOTING MOUNTED		90°	90°	90°	90°

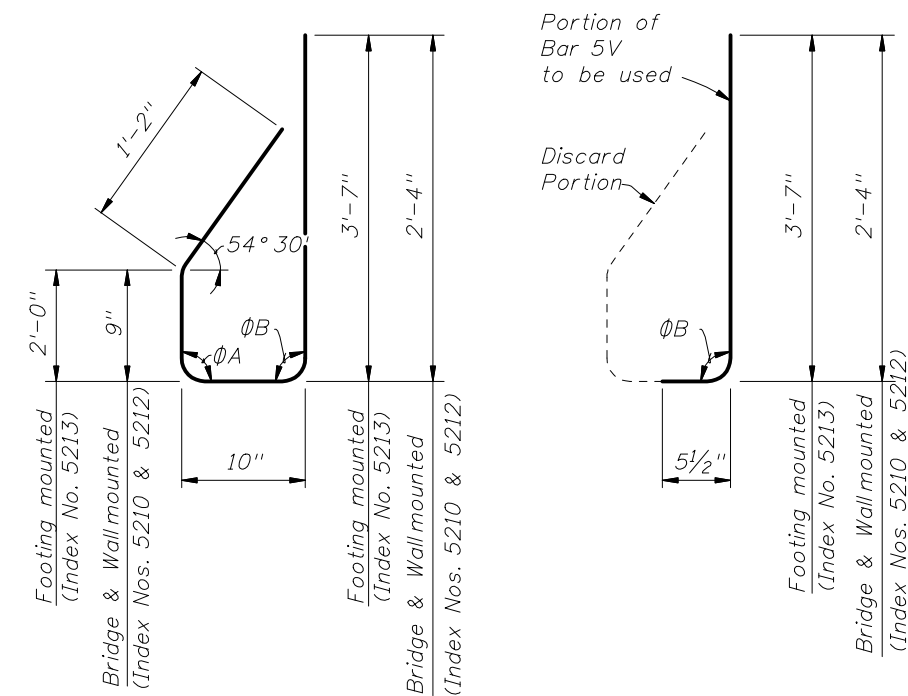


BARS 5S1 & 5S2



BAR 5R (Field Cut for End Taper)

STIRRUP BAR 5P



STIRRUP BAR 5V

END STIRRUP BAR 5V To Be Field Cut (One Required per Railing End Transition)

REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- All reinforcing steel at the open joints shall have a 2" minimum cover.
- Bars 5S1 may be continuous or spliced at the construction joints. Lap splices for Bars 5S1 shall be a minimum of 2'-2".
- The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A 497.
- Bars 5R shall be one continuous bar. No mechanical couplers or lap splices are permitted.
- See Index Nos. 5214 and 5215 for Bars 5V and 5T in L-shaped and Trench footings.

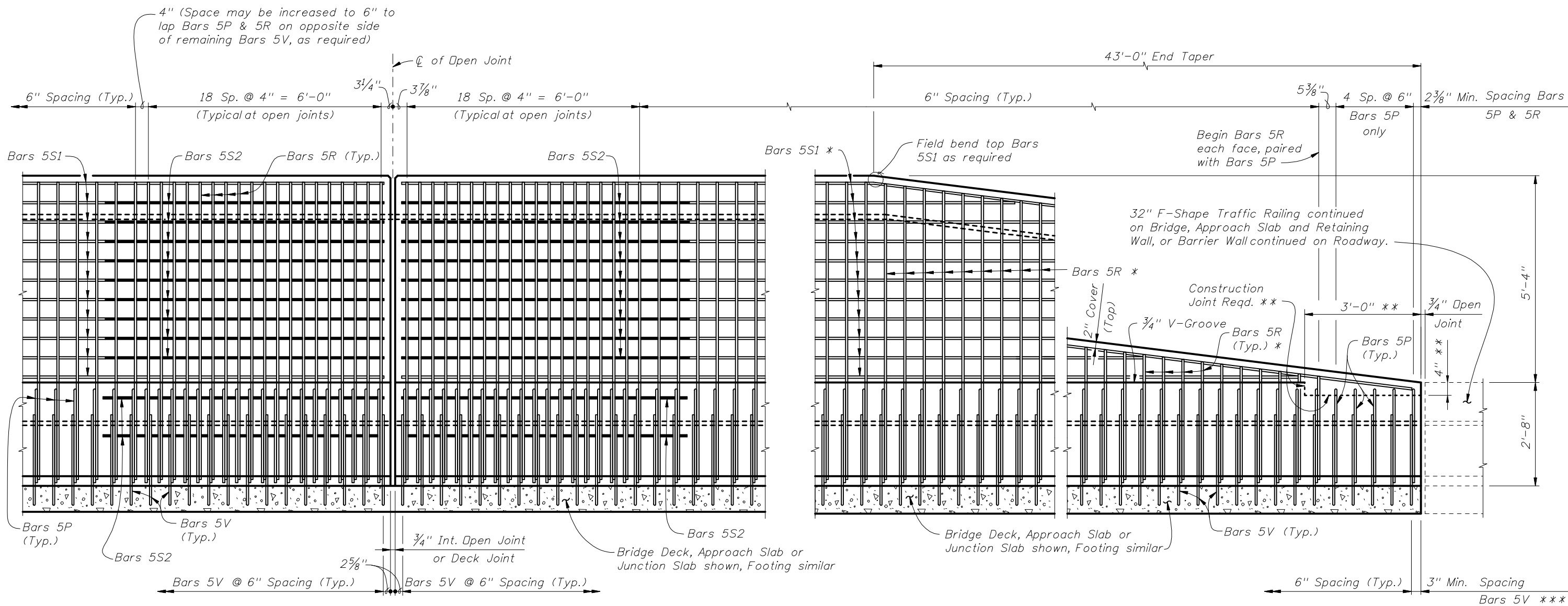
CROSS REFERENCE: For locations of Detail "B", see Sheet 1.



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TRAFFIC RAILING/SOUND BARRIER (8'-0")

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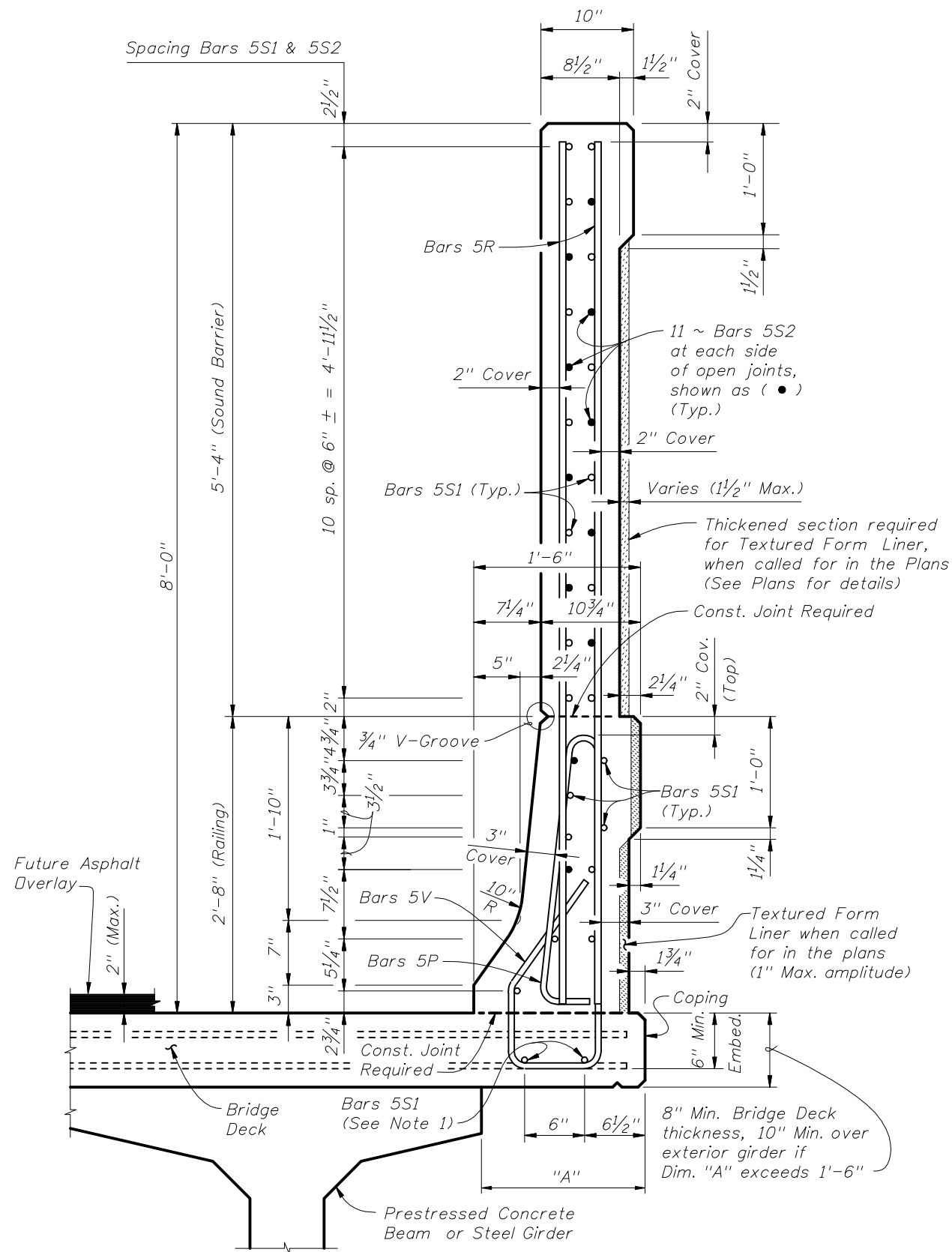


ELEVATION OF RAILING/SOUND BARRIER REINFORCING STEEL (INTERMEDIATE OPEN JOINT SHOWN, DECK JOINT SIMILAR) (Bars 5S1 in Barrier not shown for clarity)

ELEVATION OF RAILING/SOUND BARRIER END TAPER (ADJACENT TO TRAFFIC RAILING SHOWN, GUARDRAIL ATTACHMENT SIMILAR SEE DETAIL "A" BELOW) (Bars 5S1 in Railing not shown for clarity)

- NOTES:
- * Field Cut Bars 5R & 5S1 to maintain clearance.
 - ** Terminate 3/4" V-groove at construction joint & cast top of railing with End Taper.
 - *** Bar spacing shown for Bars 5V applies only to bridge mounted Railing/Sound Barrier. See Index No. 5212 for spacing of Bars 5V in junction slabs and Index Nos. 5213 (T-Shaped), 5214 (L-Shaped) or 5215 (Trench) for Bars 5V spacing in footings.



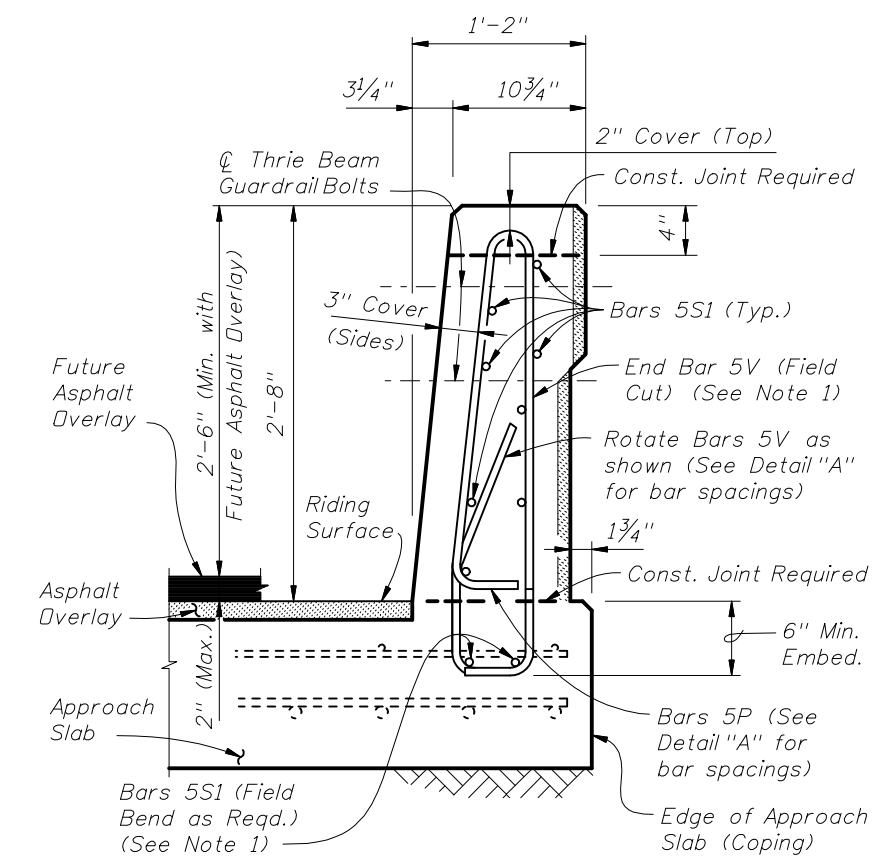


SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING/SOUND BARRIER
 (Section Thru Bridge Deck Shown, Section Thru Approach Slab, Junction Slab or Footing Similar)

INSTRUCTIONS TO DESIGNER:
 For Bridge Decks up to a maximum thickness of 9", the two Bars 5S1 placed in the Bridge Deck may substitute for the longitudinal deck steel located within the limits of Bars 5V, provided that the total area of longitudinal deck steel beneath the barrier, as required by calculation, is not reduced. Show these bars on the Superstructure Sheets with the deck steel.

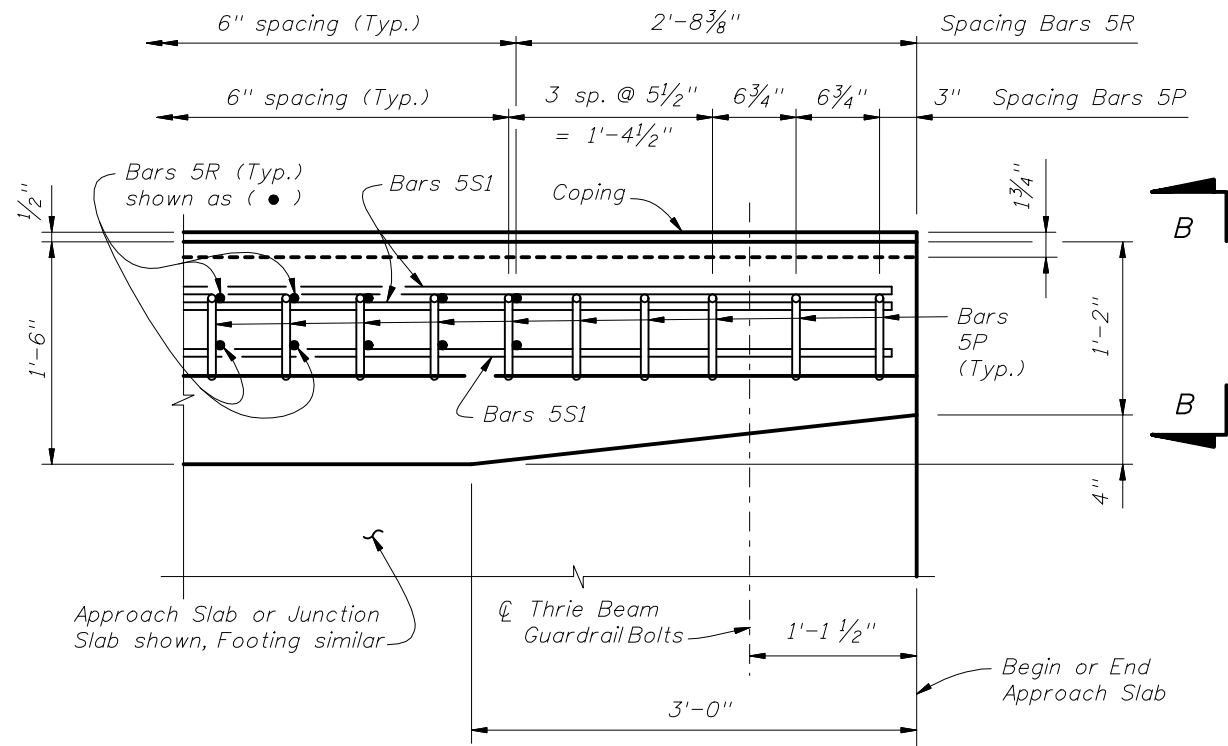
NOTES:
 1. Bottom Bars 5S1 and End Bar 5V are not present in L-Shaped (Index No. 5214) or Trench (Index No. 5215) Footings. For Bridge Mounted installations, see the Superstructure Sheets for Deck Steel. Omit Bars 5S1 if not specifically shown on the Superstructure Sheets.

CROSS REFERENCE:
 For locations of Section A-A see Sheet 1.
 For location of View B-B, see Sheet 5.

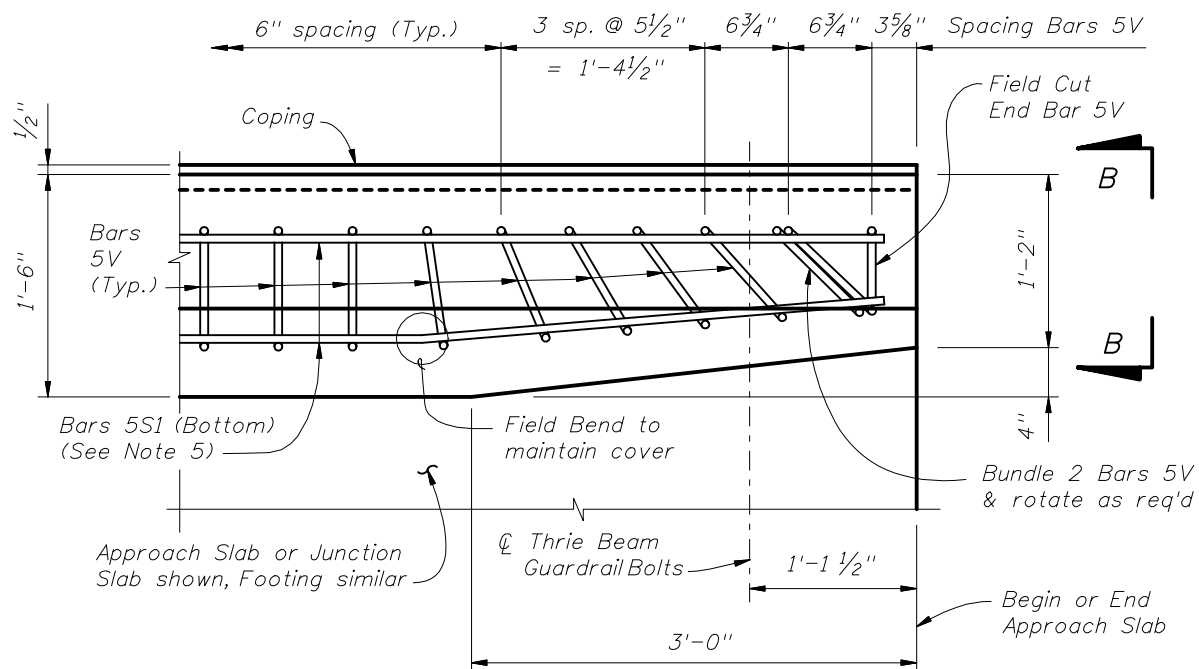


VIEW B-B
END VIEW OF RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT AT END OF APPROACH SLAB
 (Flexible Pavement Approach Slab Shown, Rigid Pavement Approach Slab, Junction Slab or Footing Similar)





PLAN - RAILING END TRANSITION
(Showing Bars 5P, 5R, and Bars 5S1) (Bars 5V,
Soundwall & Reinforcement not shown for Clarity)

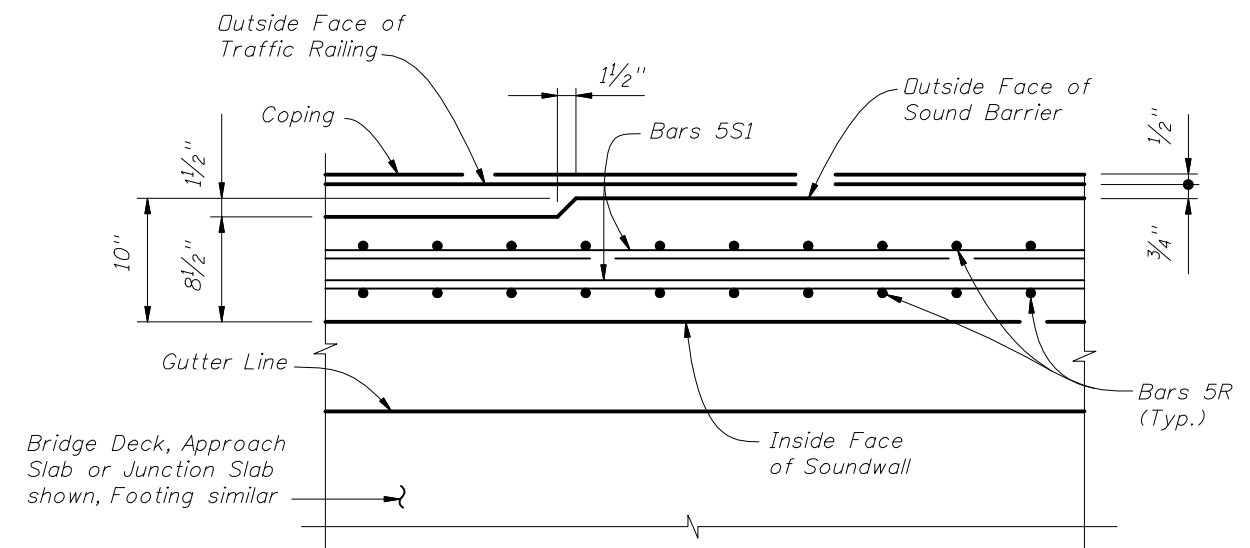


PLAN - RAILING END TRANSITION
(Showing Bars 5V and Bars 5S1) (Bars 5P, 5R,
Soundwall & Reinforcement not shown for Clarity)

DETAIL "A"

DETAIL "A" NOTES:

1. Rotate Bars 5P & 5V in Railing End Transition to maintain cover. Begin placing Railing Bars 5P and 5V at the railing end and proceed toward the guardrail (thrie beam) terminal connector to ensure placement of guardrail bolt holes. Pair Bars 5R with Bars 5P as shown. Clearance of Bars 5P, 5R & 5V to guardrail bolt holes shall be checked to prevent cutting of bars if holes are to be drilled. Shift bars locally where conflicts occur.
2. For Guardrail connection details see Design Standards Index No. 400.
3. Omit Railing End Transition if a 32" F-Shape Traffic Railing is used beyond the End Taper. See the Plan Sheets. If Railing End Transition is omitted, space Bars 5P, 5R & 5V at 6" as shown above (Typ.).
4. For L-Shaped (Index No. 5214) and Trench (Index No. 5215) footings, Bars 5V and 5T replace Bars 5V as shown at left. Details and bar spacing shown apply except that it is not necessary to rotate Bars 5V and 5T to maintain cover and there is no field cut End Bar 5V.
5. Bottom Bars 5S1 are not present in L-Shaped or Trench Footings.



SECTION C-C
THRU SOUNDWALL END TAPER

CROSS REFERENCE:

- For location of Detail "A" see Sheet 1.
- For location of Section C-C see Sheet 1.
- For View B-B see Sheet 4.



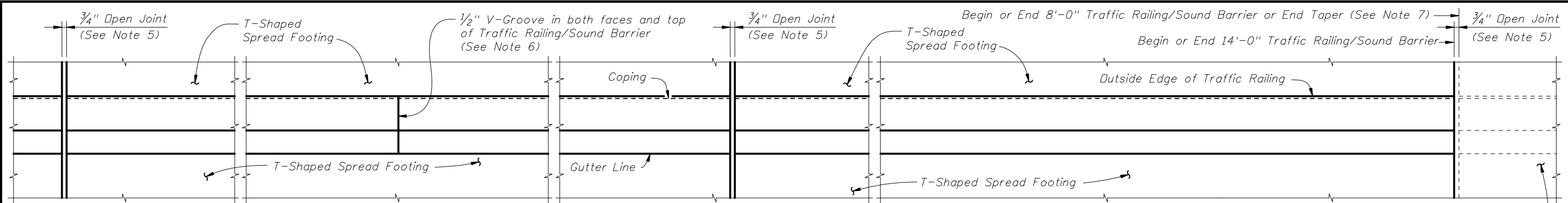
2010 FDOT Design Standards

TRAFFIC RAILING/SOUND BARRIER (8'-0")

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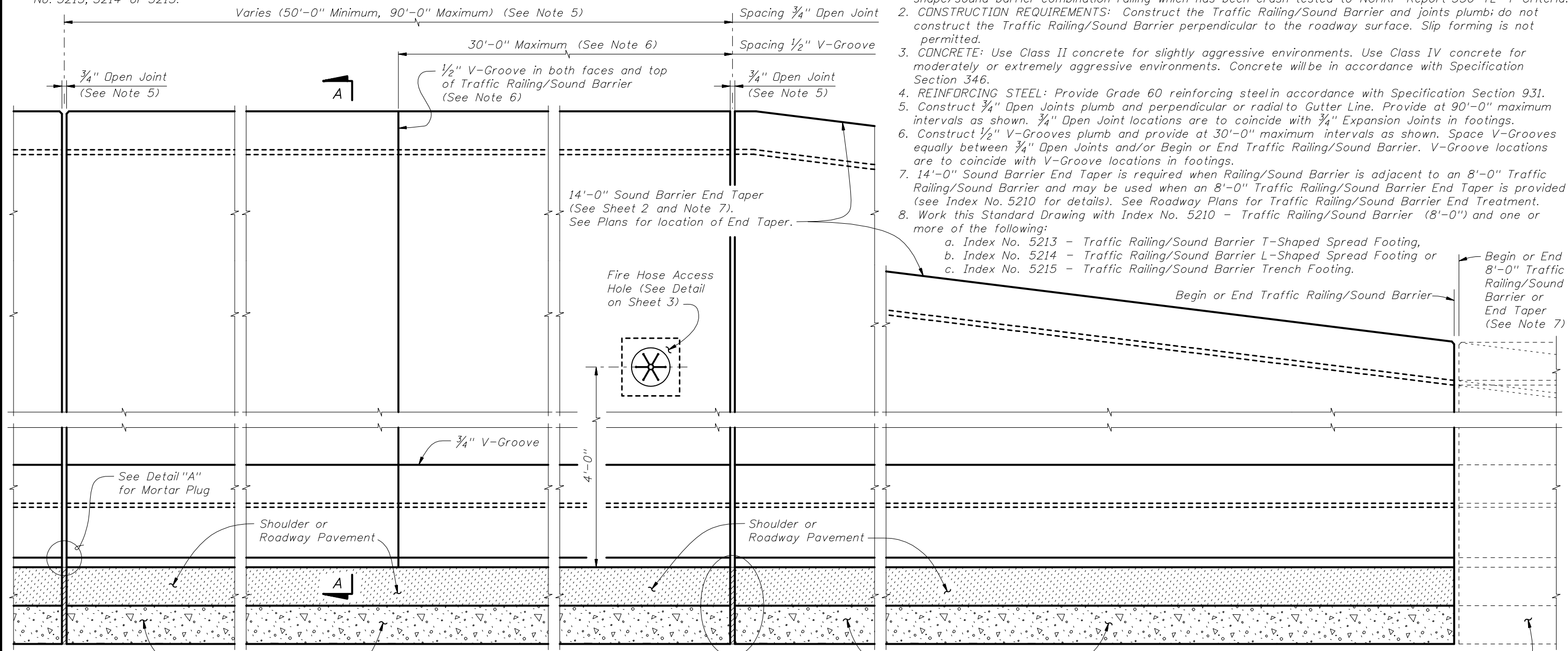


CROSS REFERENCE:
 For Section A-A, Detail "A" and Estimated Quantities, see Sheet 3.
 For Expansion Joint Detail in Footing, see Index No. 5213, 5214 or 5215.

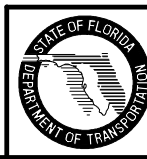
PLAN (Reinforcing Steel not shown for clarity)
 (T-Shaped Spread Footing Shown, L-Shaped Spread Footing and Trench Footing Similar)

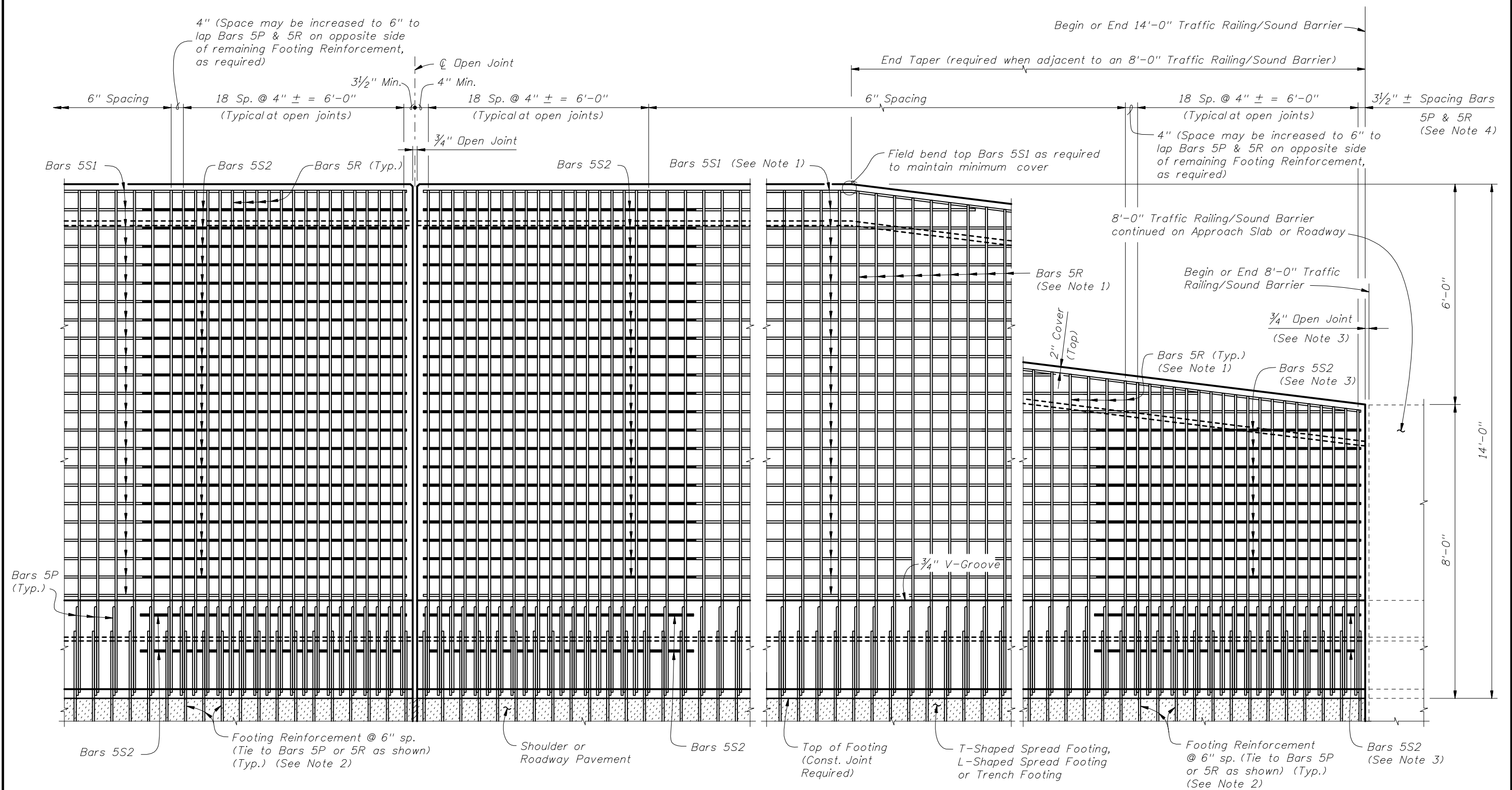
TRAFFIC RAILING/SOUND BARRIER NOTES

1. This railing has been structurally evaluated to be equivalent or greater in strength to a safety shape/sound barrier combination railing which has been crash tested to NCHRP Report 350 TL-4 Criteria.
2. **CONSTRUCTION REQUIREMENTS:** Construct the Traffic Railing/Sound Barrier and joints plumb; do not construct the Traffic Railing/Sound Barrier perpendicular to the roadway surface. Slip forming is not permitted.
3. **CONCRETE:** Use Class II concrete for slightly aggressive environments. Use Class IV concrete for moderately or extremely aggressive environments. Concrete will be in accordance with Specification Section 346.
4. **REINFORCING STEEL:** Provide Grade 60 reinforcing steel in accordance with Specification Section 931.
5. Construct 3/4" Open Joints plumb and perpendicular or radial to Gutter Line. Provide at 90'-0" maximum intervals as shown. 3/4" Open Joint locations are to coincide with 3/4" Expansion Joints in footings.
6. Construct 1/2" V-Grooves plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between 3/4" Open Joints and/or Begin or End Traffic Railing/Sound Barrier. V-Groove locations are to coincide with V-Groove locations in footings.
7. 14'-0" Sound Barrier End Taper is required when Railing/Sound Barrier is adjacent to an 8'-0" Traffic Railing/Sound Barrier and may be used when an 8'-0" Traffic Railing/Sound Barrier End Taper is provided (see Index No. 5210 for details). See Roadway Plans for Traffic Railing/Sound Barrier End Treatment.
8. Work this Standard Drawing with Index No. 5210 - Traffic Railing/Sound Barrier (8'-0") and one or more of the following:
 - a. Index No. 5213 - Traffic Railing/Sound Barrier T-Shaped Spread Footing,
 - b. Index No. 5214 - Traffic Railing/Sound Barrier L-Shaped Spread Footing or
 - c. Index No. 5215 - Traffic Railing/Sound Barrier Trench Footing.



ELEVATION OF INSIDE FACE OF TRAFFIC RAILING/SOUND BARRIER
 (Reinforcing Steel not shown for clarity)
 (T-Shaped Spread Footing Shown, L-Shaped Spread Footing and Trench Footing Similar)





ELEVATION OF TRAFFIC RAILING/SOUND BARRIER REINFORCING STEEL
(Bars 5S1 in Railing not shown for clarity)

ELEVATION OF TRAFFIC RAILING/SOUND BARRIER END TAPER
(Bars 5S1 in Railing not shown for clarity)

NOTES:

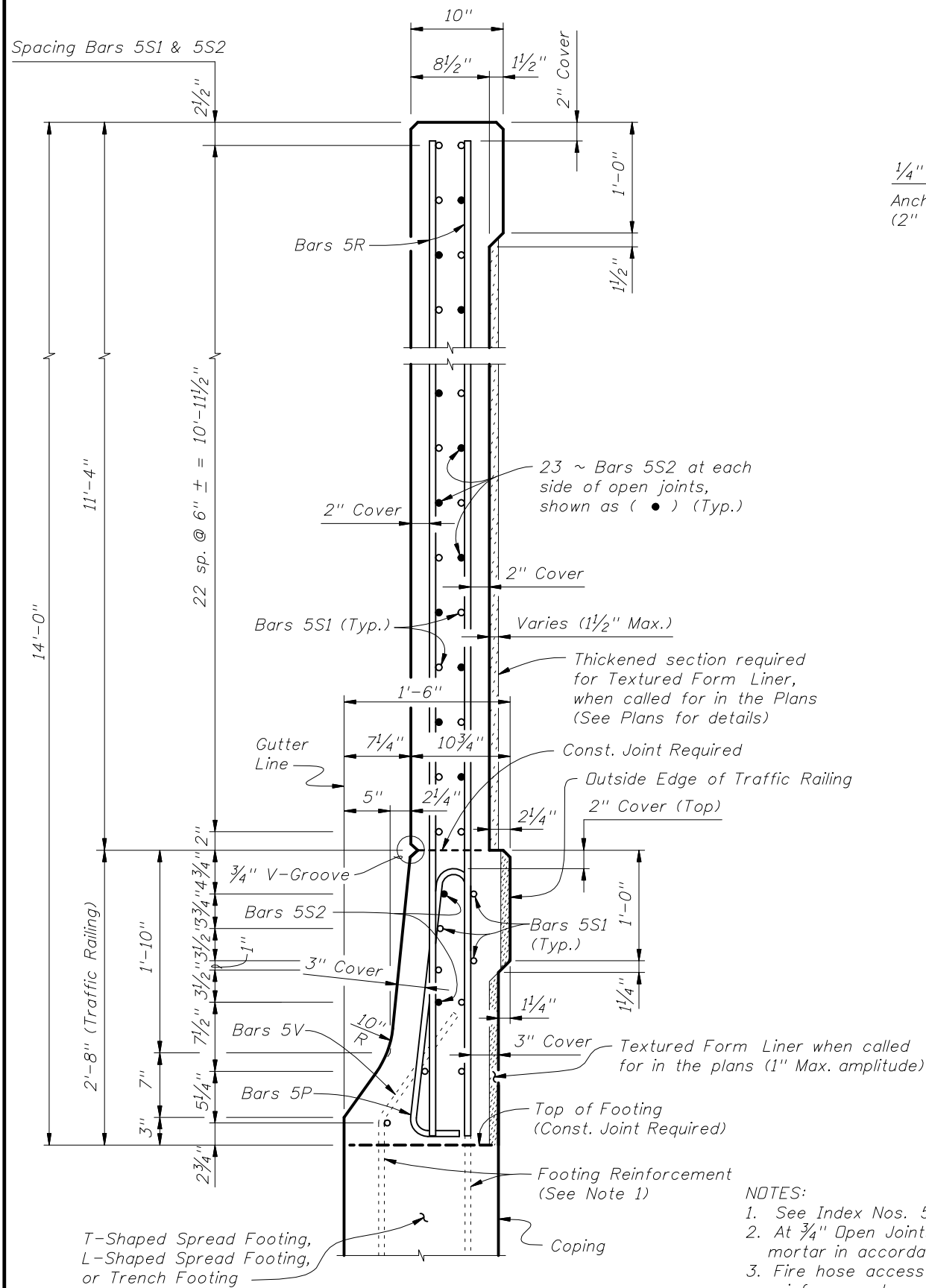
1. Field Cut Bars 5R & 5S1 in Sound Barrier End Taper as required to maintain minimum cover.
2. See Index Nos. 5213, 5214 and 5215 for footing reinforcement.
3. 3/4" Open Joint may be omitted when 8'-0" Railing/Sound Barrier End Taper is adjacent to a 14'-0" Traffic Railing/Sound Barrier End Taper as shown on Sheet 1. See Index No. 5210 for reinforcement details and spacing. Bars 5S2 are not required when 3/4" Open Joint is omitted.
4. Bar spacing shown is along the Gutter Line.



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TRAFFIC RAILING/SOUND BARRIER (14'-0")

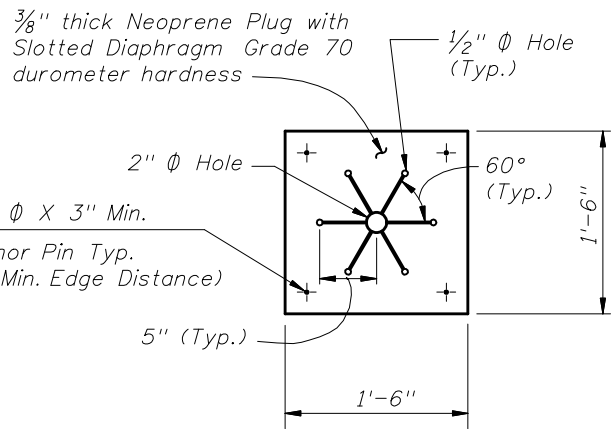
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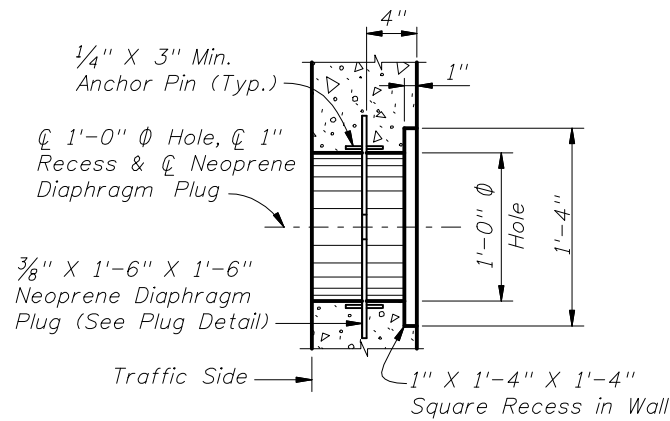
SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING/SOUND BARRIER

NOTES:

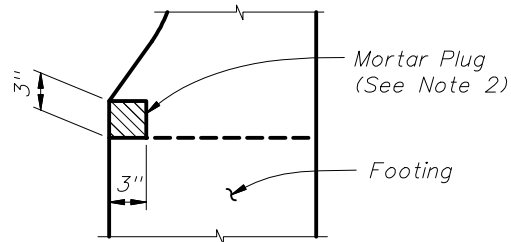
1. See Index Nos. 5213, 5214 and 5215 for footing reinforcement.
2. At 3/4" Open Joints, plug the lower 3" portion of the open joint by filling it with mortar in accordance with Specification Section 400.
3. Fire hose access holes are required at or near fire hydrant locations. Field cut reinforcement as required to maintain 2" minimum cover at access holes. Locate fire hose access holes at least 10'-0" from 3/4" open joints when possible.



NEOPRENE DIAPHRAGM PLUG DETAIL



TYPICAL SECTION
FIRE HOSE ACCESS DETAIL

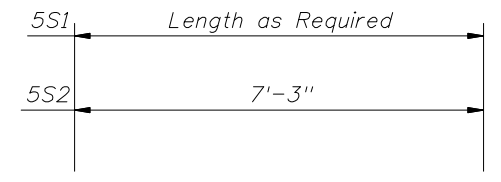


DETAIL "A" -
SECTION AT OPEN JOINT

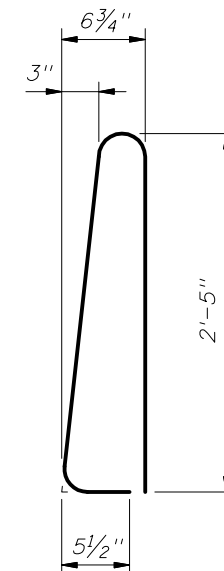
REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
P	5	5'-7"
R	5	13'-9"
S1	5	AS REQ'D.
S2	5	7'-3"



BARS 5S1 & 5S2



STIRRUP
BAR 5P

BAR 5R
(Field Cut for
End Taper)

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints will have a 2" minimum cover.
3. Bars 5R may be continuous or spliced at construction joints. Lap splices for Bars 5R and 5S1 will be a minimum of 2'-2".
4. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.

ESTIMATED TRAFFIC RAILING BARRIER/SOUNDWALL QUANTITIES

ITEM	UNIT	QUANTITY
Concrete (Traffic Railing)	CY/Ft.	0.104
Concrete (Sound Barrier, excluding any thickening)	CY/Ft.	0.302
Reinforcing Steel (Railing/Sound Barrier) (Typical, excluding Footing Reinforcement)	Lb./Ft.	103.43
Additional Reinf. @ Open Joint (Railing/Sound Barrier)	Lb.	761.91

CROSS REFERENCE:

For locations of Section A-A and Detail "A", see Sheet 1.



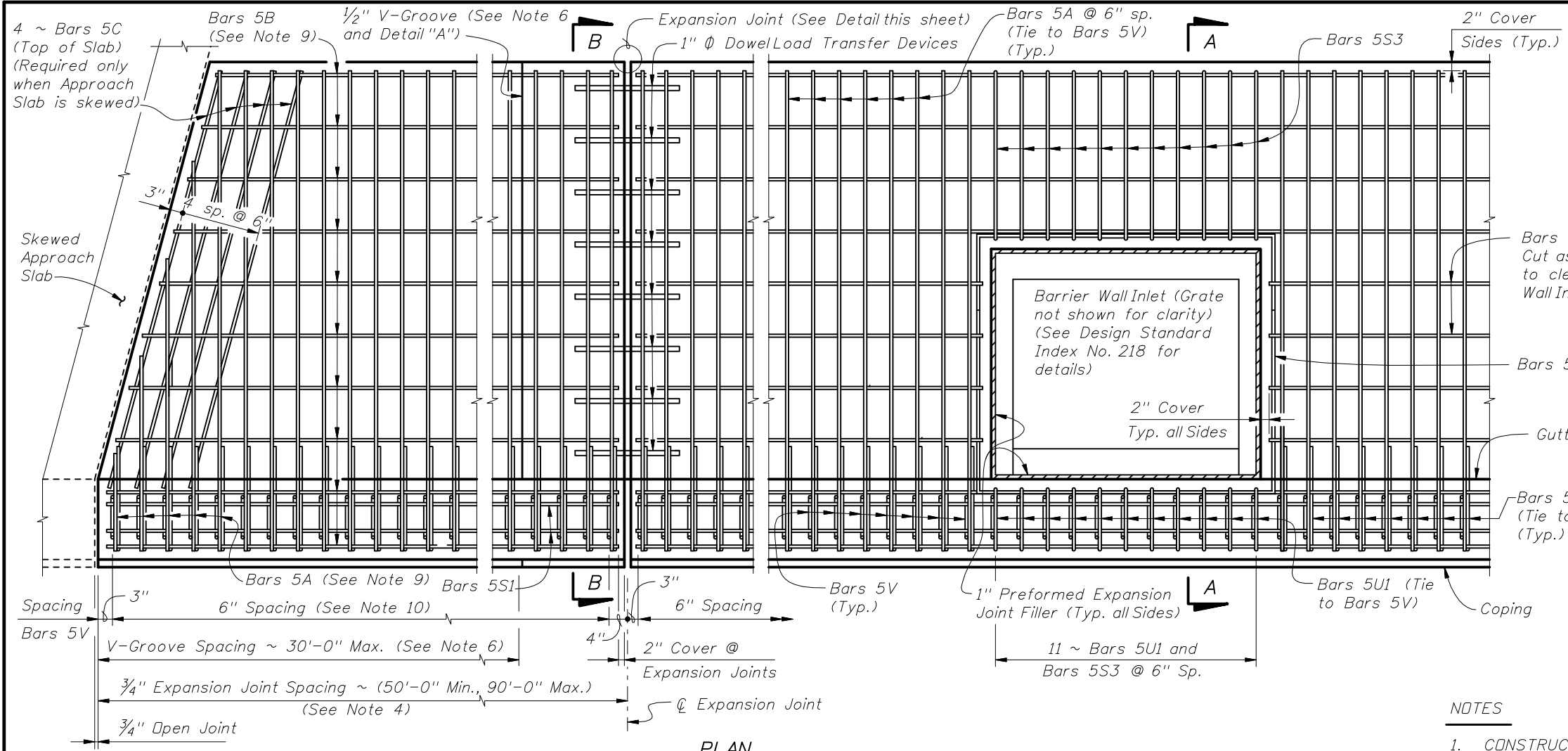
2010 FDOT Design Standards

TRAFFIC RAILING/SOUND BARRIER (14'-0")

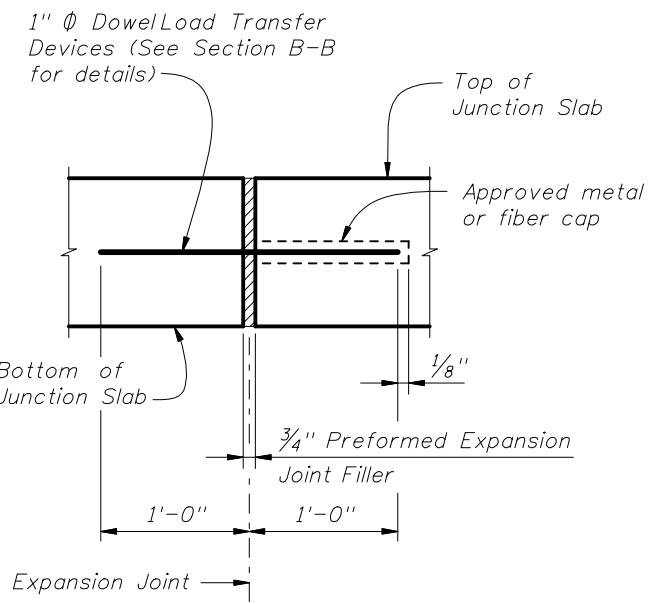
Last Revision
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3 of 3

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5211



PLAN
 JUNCTION SLAB ADJACENT TO SKEWED APPROACH SLAB AND WITH BARRIER WALL INLET



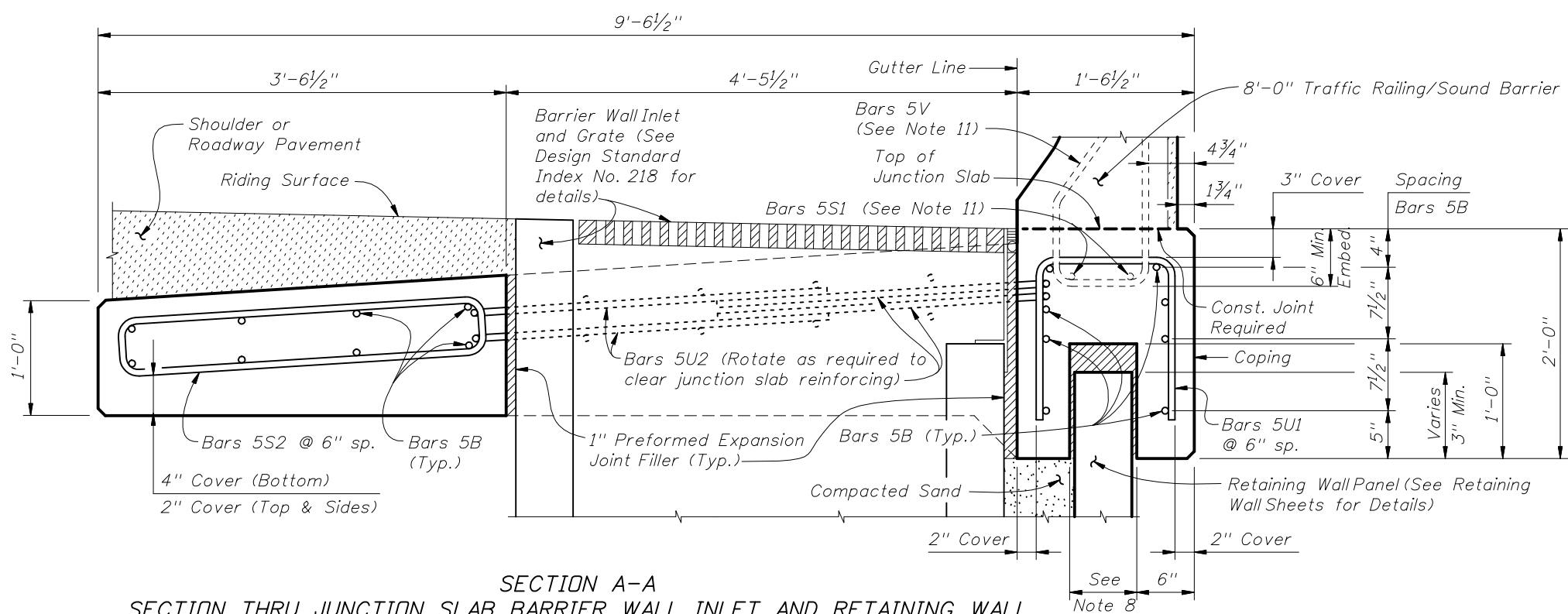
EXPANSION JOINT DETAIL

(Junction Slab expansion joints are required at 3/4" open joints in Traffic Railing/Sound Barrier)

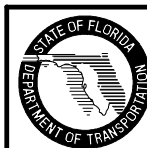
NOTES

1. CONSTRUCTION REQUIREMENTS: Construct the Junction Slab level transversely and expansion joints plumb; do not construct the junction slab perpendicular to the roadway surface. Slip forming is not permitted.
2. CONCRETE: Use Class II concrete for slightly aggressive environments. Use Class IV concrete for moderately or extremely aggressive environments. Concrete will be in accordance with Specification Section 346.
3. REINFORCING STEEL: Provide Grade 60 reinforcing steel in accordance with Specification Section 931. Dowel Load Transfer Devices will be ASTM A 36 smooth round bar and hot-dip galvanized in accordance with Specification Section 962. Install Dowel Load Transfer Devices in accordance with Specification Section 350.
4. Construct 3/4" Expansion Joints plumb and perpendicular or radial to Gutter Line. Provide at 90'-0" maximum intervals as shown.
5. Provide and install Preformed Expansion Joint Filler in accordance with Specification Section 932.
6. Construct 1/2" V-Grooves plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between 3/4" Expansion Joints and/or Begin or End Junction Slab. V-Groove locations are to coincide with V-Groove locations in the Railing/Sound Barrier.
7. FILL REQUIREMENTS: Shoulder or Roadway Pavement or Fill is required on top of the junction slab for its entire length on the traffic side of the Railing/Sound Barrier. See Section B-B for details.
8. Actual allocation & width vary depending on type of Retaining Wall used.
9. Field cut Bars 5A and 5B as required to maintain minimum cover for skewed Approach Slab.
10. Spacing shown is along the Gutter Line.
11. See Index No. 5210 for Bars 5V and 5S1.
12. Work this Standard Drawing with the following:
 Index No. 5210 - Traffic Railing/Sound Barrier (8'-0").

CROSS REFERENCE:
 For Section B-B and Detail "A", see Sheet 2.



SECTION A-A
 SECTION THRU JUNCTION SLAB, BARRIER WALL INLET AND RETAINING WALL

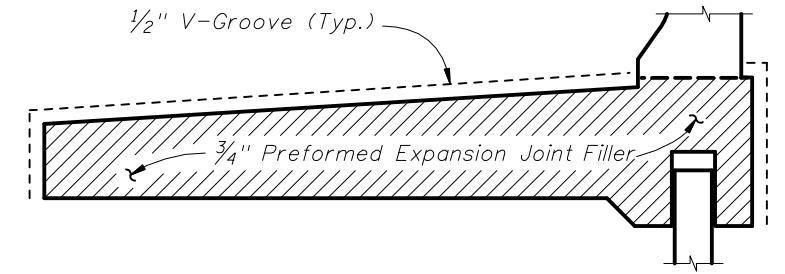
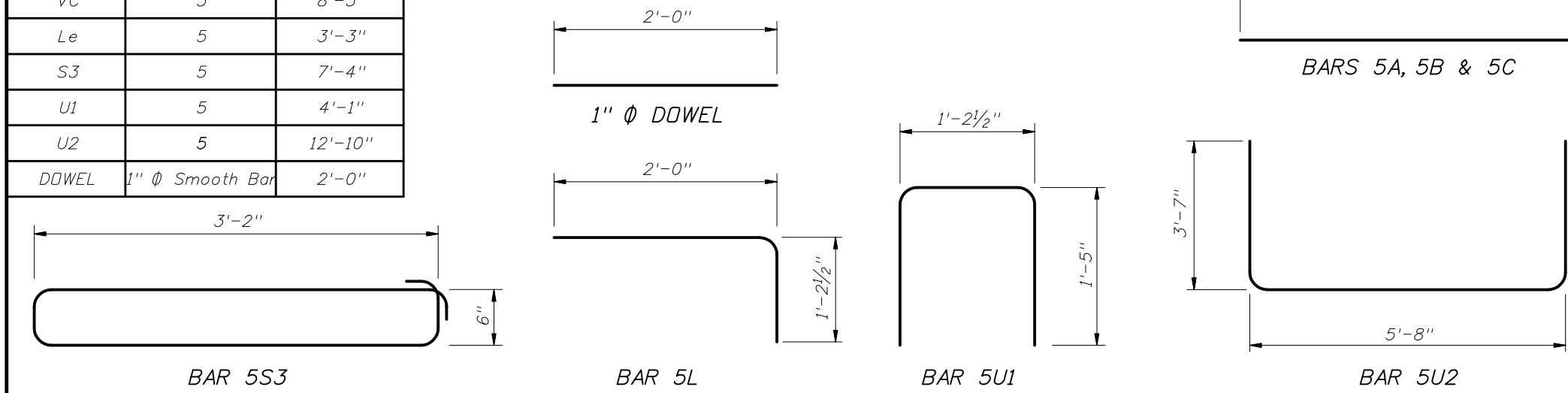


REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
A	5	9'-2"
B	5	AS REQ'D.
VC	5	8'-3"
Le	5	3'-3"
S3	5	7'-4"
U1	5	4'-1"
U2	5	12'-10"
DOWEL	1" ϕ Smooth Bar	2'-0"

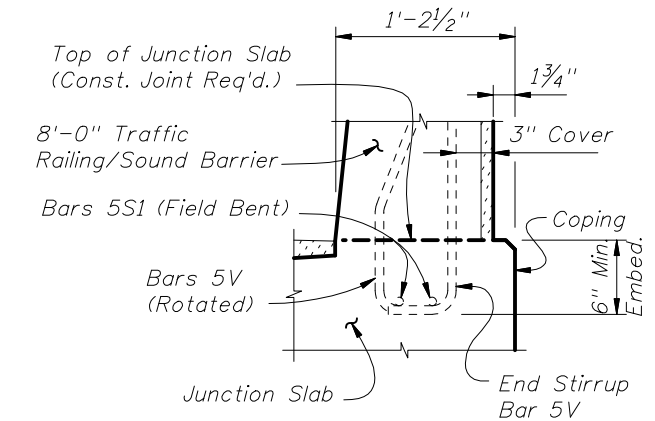
REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints will have a 2" minimum cover.
3. Lap splices for Bars 5B will be a minimum of 2'-2".
4. The Contractor may use Welded Wire Fabric when approved by the Engineer. Welded Wire Fabric will conform to ASTM A 497.



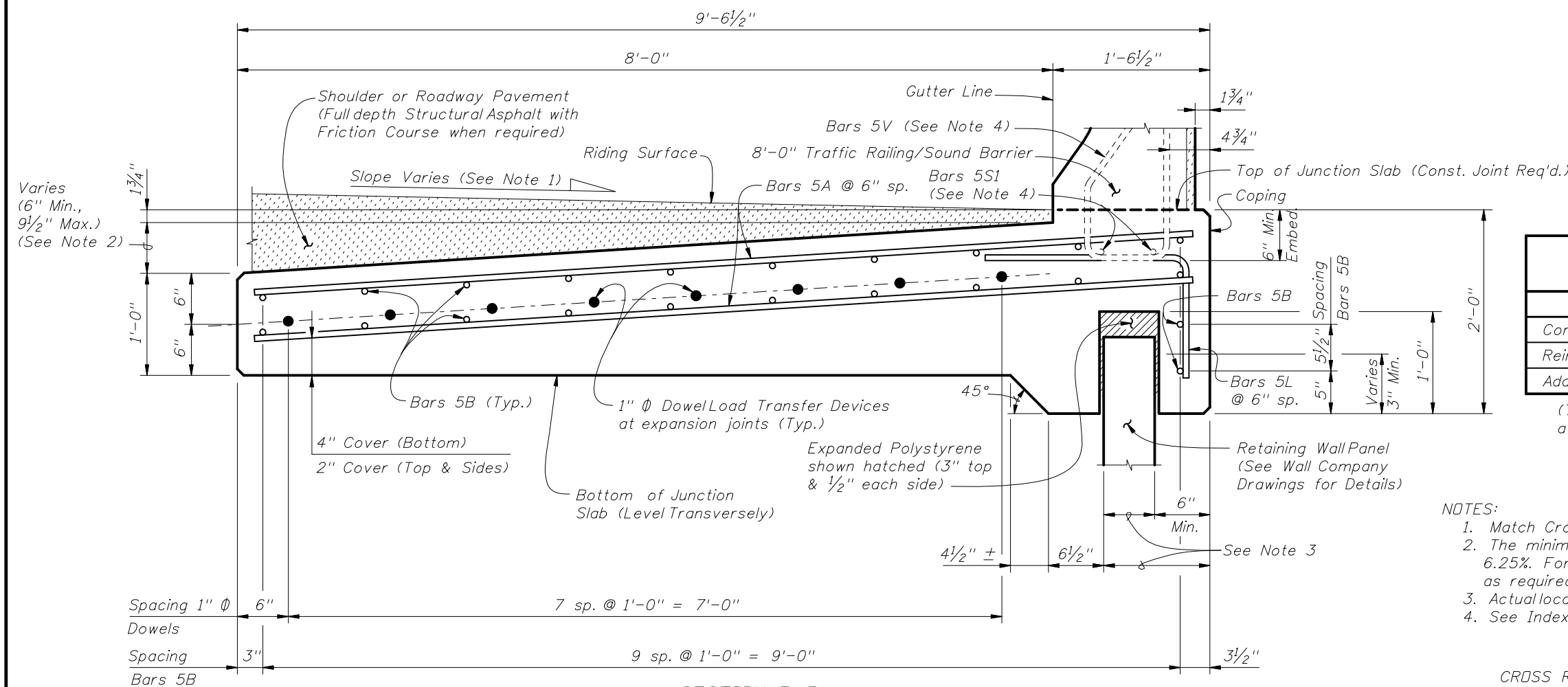
DETAIL "A"

(Showing Locations of 1/2" V-Grooves and 3/4" Preformed Expansion Joint Filler)



PARTIAL END VIEW OF RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT (Showing Bars 5V and Bars 5S1)

NOTE: See Index No. 5210, Detail "A" for details.



SECTION B-B
TYPICAL SECTION THRU JUNCTION SLAB AND RETAINING WALL

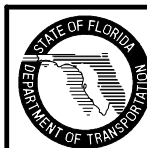
ESTIMATED JUNCTION SLAB QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete (Junction Slab)	CY/Ft.	0.470
Reinforcing Steel (Typical)	LB/Ft.	67.97
Additional Reinf. @ Expansion Joint	Lb.	42.72

(The above concrete quantities are based on a superelevation of 6.25%.)

NOTES:

1. Match Cross Slope of Travel Lane or Shoulder.
2. The minimum dimension of 6" corresponds to a superelevation of 6.25%. For superelevations exceeding 6.25%, increase this dimension as required to match roadway superelevation.
3. Actual location & width vary depending on type of Retaining Wall used.
4. See Index No. 5210 for Bars 5V and 5S1.

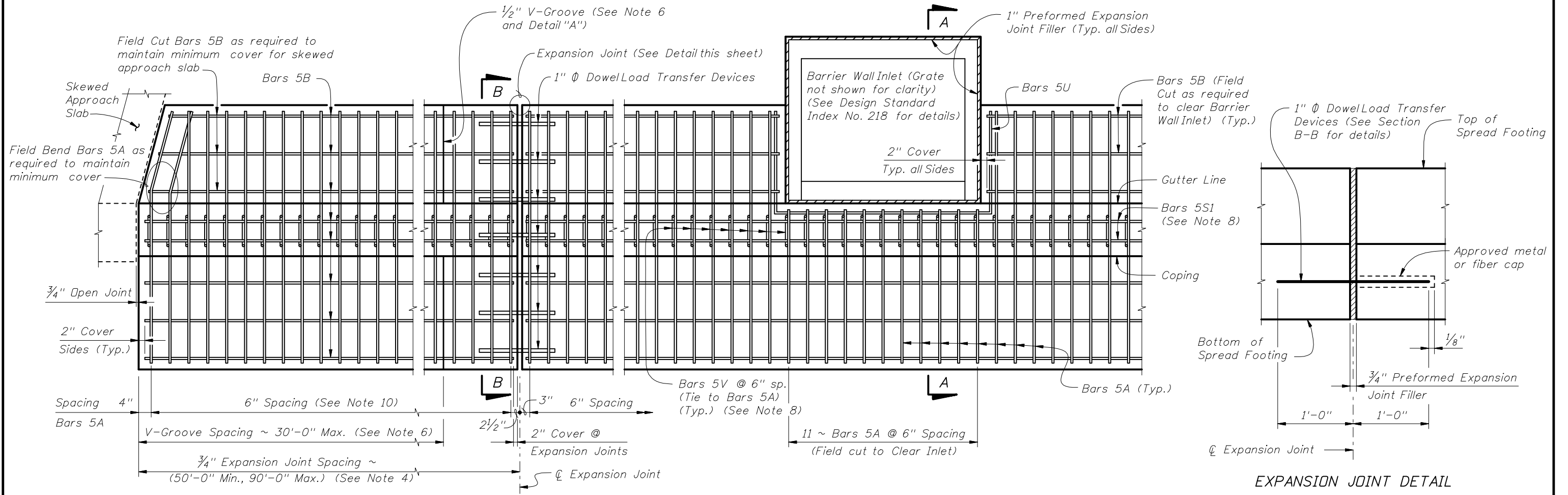
CROSS REFERENCE:
For location of Section B-B, see Sheet 1.



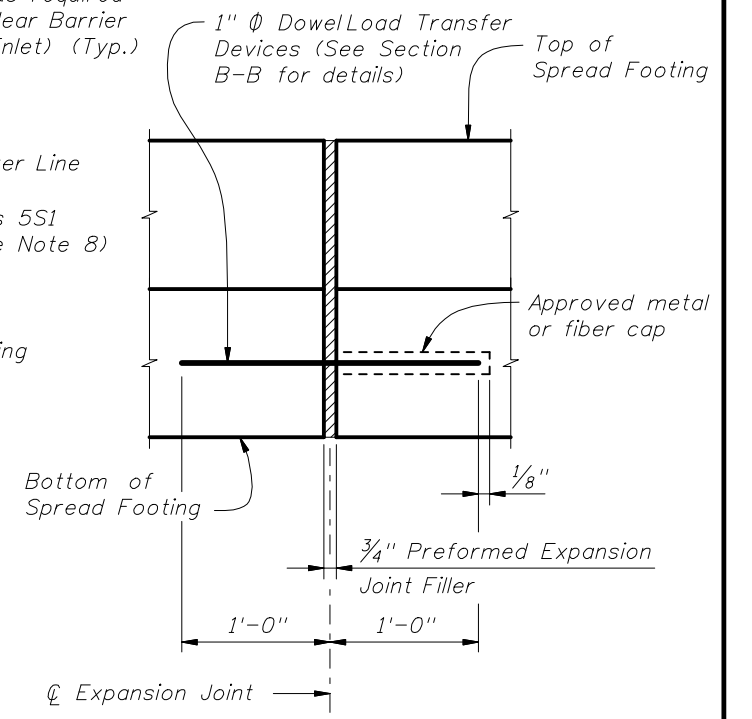
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TRAFFIC RAILING/SOUND BARRIER (8'-0")
JUNCTION SLAB

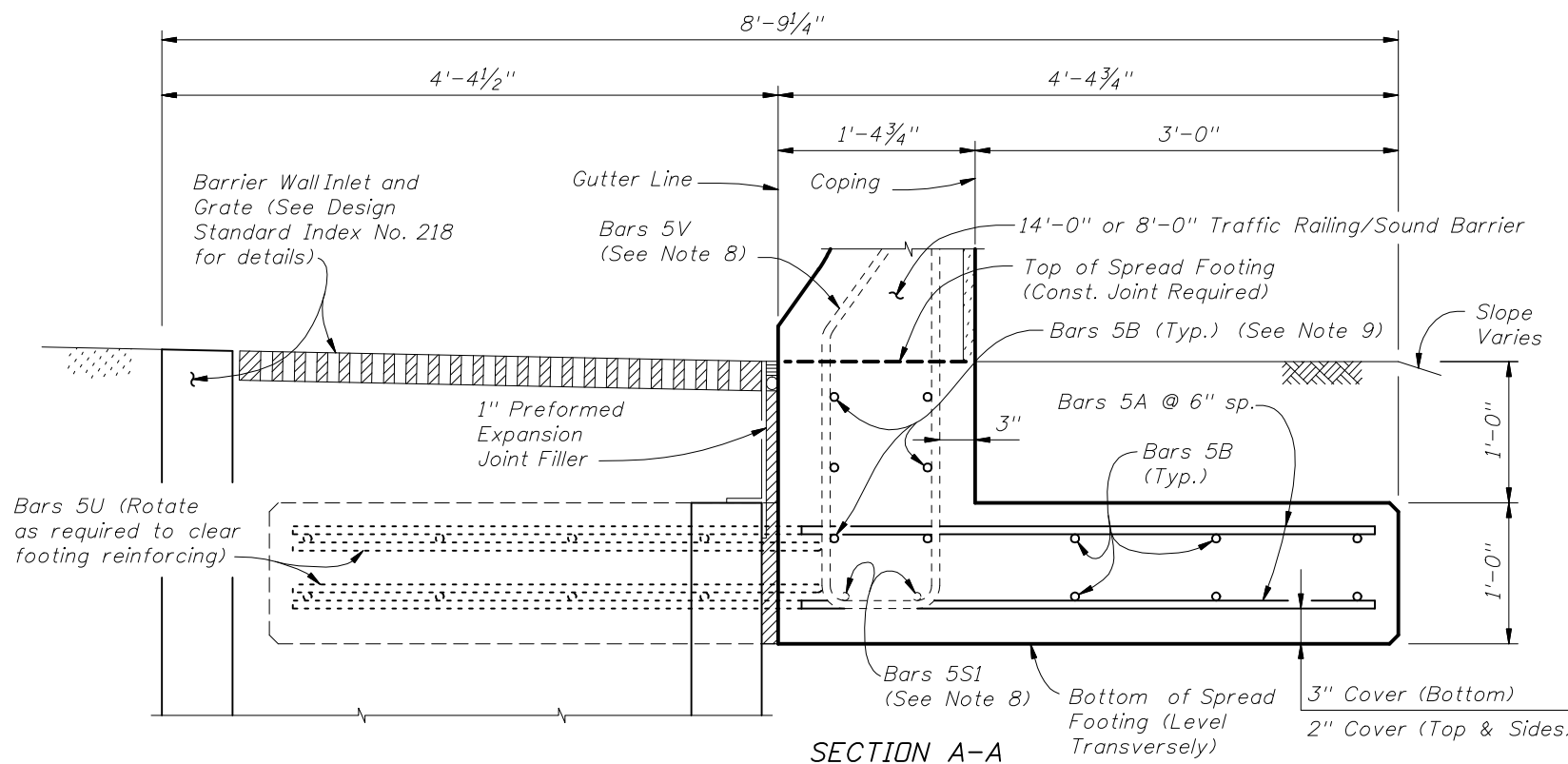
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PLAN
SPREAD FOOTING ADJACENT TO SKEWED APPROACH SLAB AND WITH BARRIER WALL INLET



EXPANSION JOINT DETAIL
(Spread Footing expansion joints are required at 3/4" open joints in Traffic Railing/Sound Barrier)

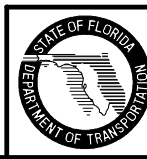


SECTION A-A
SECTION THRU SPREAD FOOTING AND BARRIER WALL INLET
(Bars 5P, 5R and 5S1 in Traffic Railing/Sound Barrier not shown for clarity)

NOTES

1. CONSTRUCTION REQUIREMENTS: Construct the Spread Footing level transversely and expansion joints plumb; do not construct the spread footing perpendicular to the roadway surface. Slip forming is not permitted.
2. CONCRETE: Use Class II concrete for slightly aggressive environments. Use Class IV concrete for moderately or extremely aggressive environments. Concrete will be in accordance with Specification Section 346.
3. REINFORCING STEEL: Provide Grade 60 reinforcing steel in accordance with Specification Section 931. Dowel Load Transfer Devices will be ASTM A 36 smooth round bar and hot-dip galvanized in accordance with Specification Section 962. Install Dowel Load Transfer Devices in accordance with Specification Section 350.
4. Construct 3/4" Expansion Joints plumb and perpendicular or radial to Gutter Line. Provide at 90'-0" maximum intervals as shown.
5. Provide and install Preformed Expansion Joint Filler in accordance with Specification Section 932.
6. Construct 1/2" V-Grooves plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between 3/4" Expansion Joints and/or Begin or End Spread Footing. V-Groove locations are to coincide with V-Groove locations in the Railing/Sound Barrier.
7. FILL REQUIREMENTS: Shoulder or Roadway Pavement or Fill is required on top (1'-0" minimum depth) for the entire length of the spread footing on both sides of the Railing/Sound Barrier. See Section B-B for details.
8. See Index No. 5210 for Bars 5V and 5S1.
9. Place 6 ~ Bars 5B inside Stirrup Bars 5V as shown.
10. Spacing shown is along the Gutter Line.
11. Work this Standard Drawing with one or both of the following:
 - a. Index No. 5210 - Traffic Railing/Sound Barrier (8'-0").
 - b. Index No. 5211 - Traffic Railing/Sound Barrier (14'-0").

CROSS REFERENCE:
For Section B-B and Detail "A", see Sheet No. 2.



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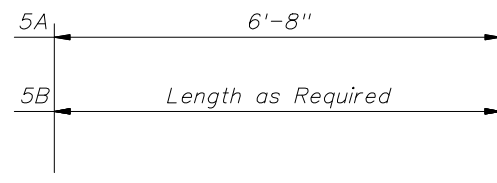
TRAFFIC RAILING/SOUND BARRIER
T-SHAPED SPREAD FOOTING

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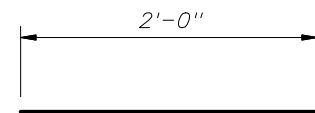
REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

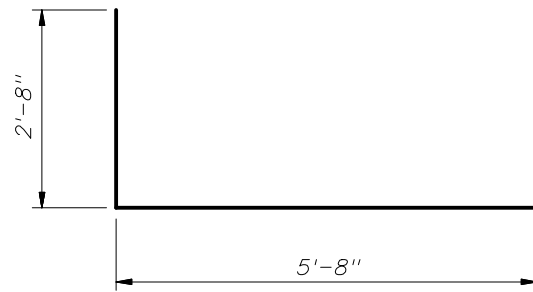
MARK	SIZE	LENGTH
A	5	6'-8"
B	5	AS REQ'D.
U	5	11'-0"
DWEL	1" \emptyset Smooth Bar	2'-0"



BARS 5A & 5B



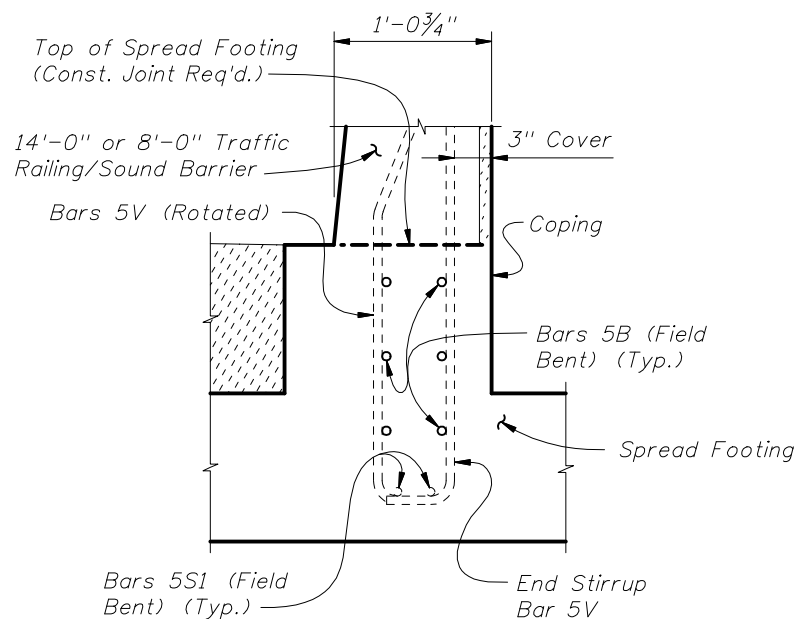
1" \emptyset DOWEL



BAR 5U

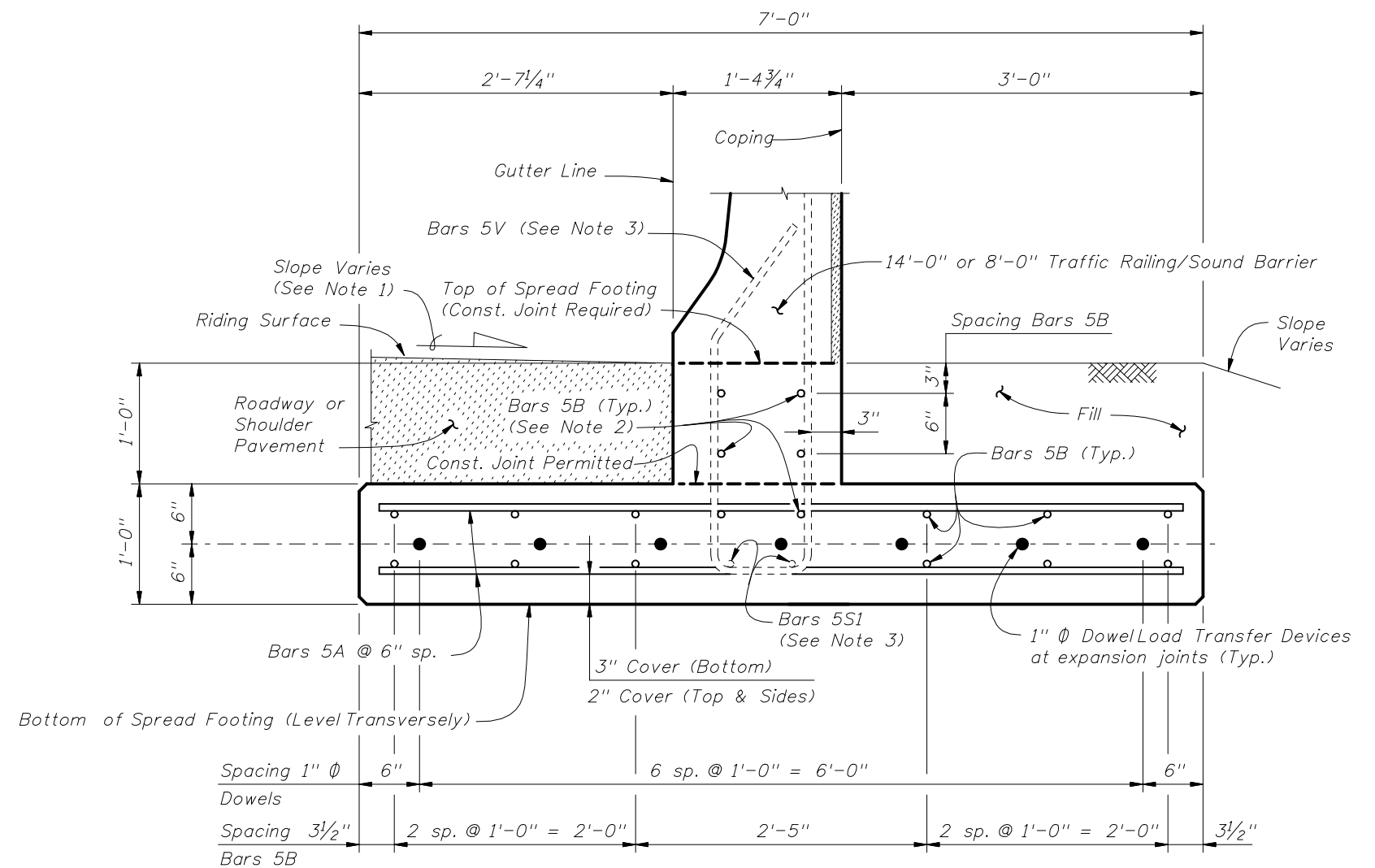
REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints will have a 2" minimum cover.
3. Lap splices for Bars 5B will be a minimum of 2'-2".
4. The Contractor may use Welded Wire Fabric when approved by the Engineer. Welded Wire Fabric will conform to ASTM A 497.



PARTIAL END VIEW OF RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT (Showing Bars 5V, Bars 5S1 and Bars 5B inside of Stirrup Bars 5V)

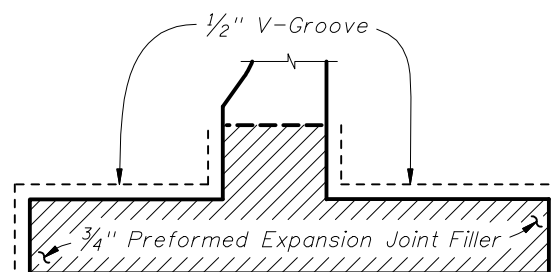
NOTE: See Index No. 5210, Detail "A" for details.



SECTION B-B
TYPICAL SECTION THRU SPREAD FOOTING
(Bars 5P, 5R and 5S1 in Traffic Railing/Sound Barrier not shown for clarity)

NOTES:

1. Match Cross Slope of Travel Lane or Shoulder.
2. Place 6 ~ Bars 5B inside Stirrup Bars 5V as shown.
3. See Index No. 5210 for Bars 5V and Bars 5S1.



DETAIL "A"

(Showing Locations of 1/2" V-Grooves and 3/4" Preformed Expansion Joint Filler)

ESTIMATED T-SHAPED SPREAD FOOTING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete (Footing)	CY/Ft.	0.311
Reinforcing Steel (Typical)	LB/Ft.	51.80
Additional Reinf. @ Expansion Joint	Lb.	37.38

Note: The reinforcing steel quantity accounts for the difference between the shorter Stirrup Bars 5V for junction slabs or bridges and the longer Stirrup Bars 5V for spread footings.

CROSS REFERENCE:

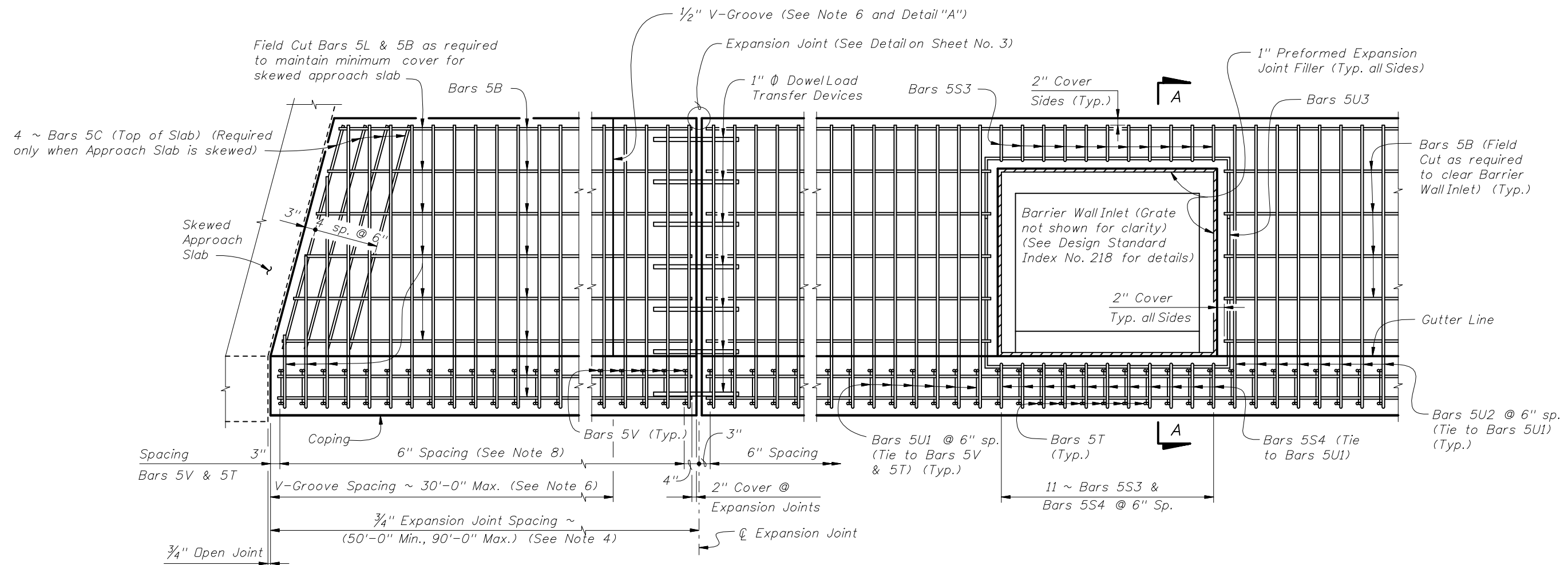
For location of Section B-B, see Sheet 1.



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TRAFFIC RAILING/SOUND BARRIER
T-SHAPED SPREAD FOOTING

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PLAN - OPTION B
SPREAD FOOTING ADJACENT TO SKEWED APPROACH SLAB AND WITH BARRIER WALL INLET
 (Option A Similar)

NOTES

1. **CONSTRUCTION REQUIREMENTS:** Construct the Spread Footing level transversely and expansion joints plumb; do not construct the spread footing perpendicular to the roadway surface. Slip forming is not permitted.
2. **CONCRETE:** Use Class II concrete for slightly aggressive environments. Use Class IV concrete for moderately or extremely aggressive environments. Concrete will be in accordance with Specification Section 346.
3. **REINFORCING STEEL:** Provide Grade 60 reinforcing steel in accordance with Specification Section 931. Dowel Load Transfer Devices will be ASTM A 36 smooth round bar and hot-dip galvanized in accordance with Specification Section 962. Install Dowel Load Transfer Devices in accordance with Specification Section 350.
4. Construct 3/4" Expansion Joints plumb and perpendicular or radial to Gutter Line. Provide at 90'-0" maximum intervals as shown.
5. Provide and install Preformed Expansion Joint Filler in accordance with Specification Section 932.
6. Construct 1/2" V-Grooves plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between 3/4" Expansion Joints and/or Begin or End Spread Footing. V-Groove locations are to coincide with V-Groove locations in the Railing/Sound Barrier.
7. **FILL REQUIREMENTS:** Shoulder or Roadway Pavement and Fill is required on the traffic side of the spread footing for a distance of 4'-0" and the full length of the spread footing (3'-0" minimum depth) on the backside of the spread footing for Option A. Fill is required for a distance of 4'-0" on the backside of the spread footing and the full length of the spread footing (3'-0" minimum depth) on the traffic side of the spread footing for Option B. See Typical Sections on Sheet Nos. 2 and 3 for details.
8. Spacing shown is along the Gutter Line.
9. Work this Standard Drawing with one or both of the following:
 - a. Index No. 5210 - Traffic Railing/Sound Barrier (8'-0").
 - b. Index No. 5211 - Traffic Railing/Sound Barrier (14'-0").

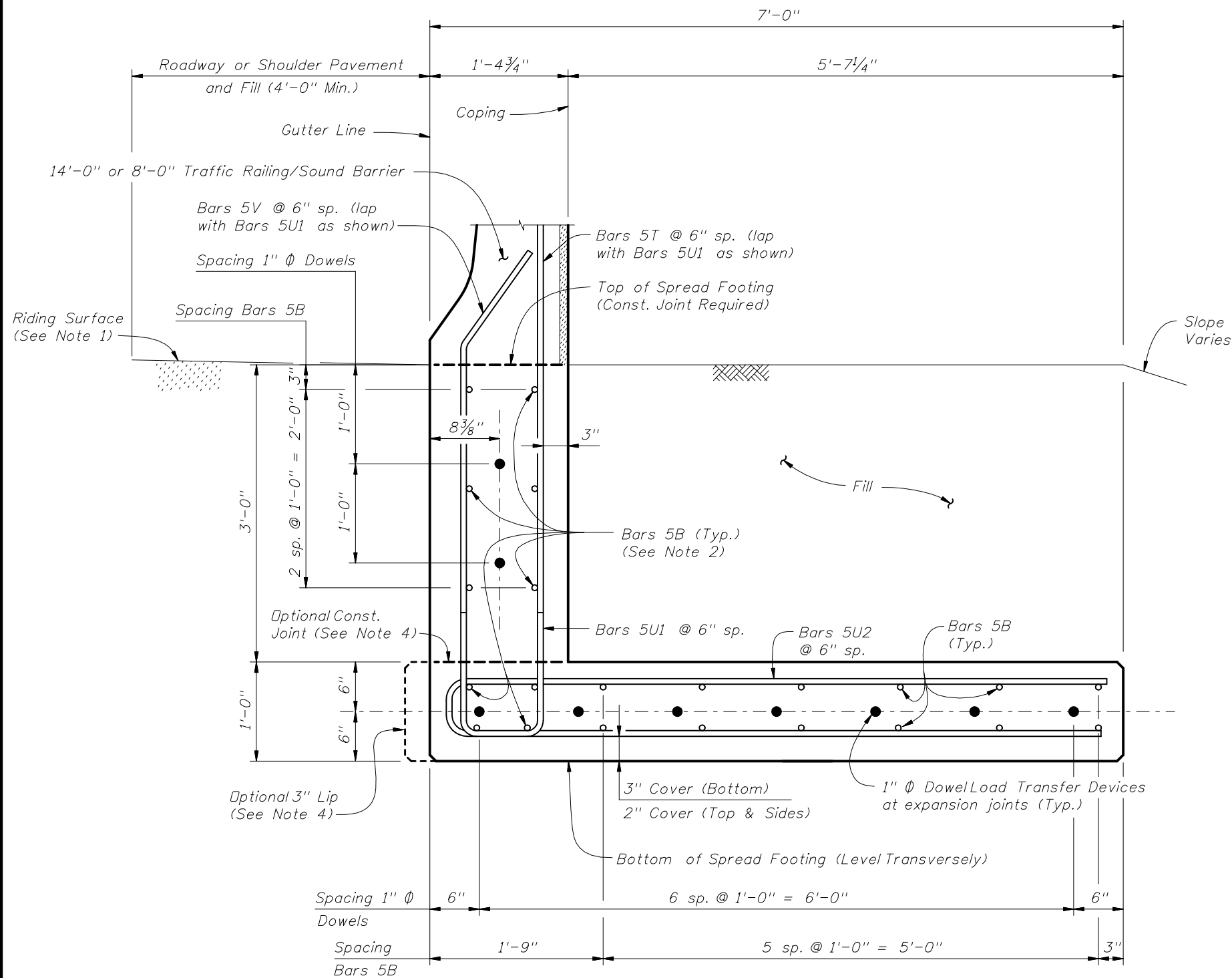
CROSS REFERENCE:
 For Detail "A", see Sheet 3.
 For Section A-A and Estimated Quantities, see Sheet 4.



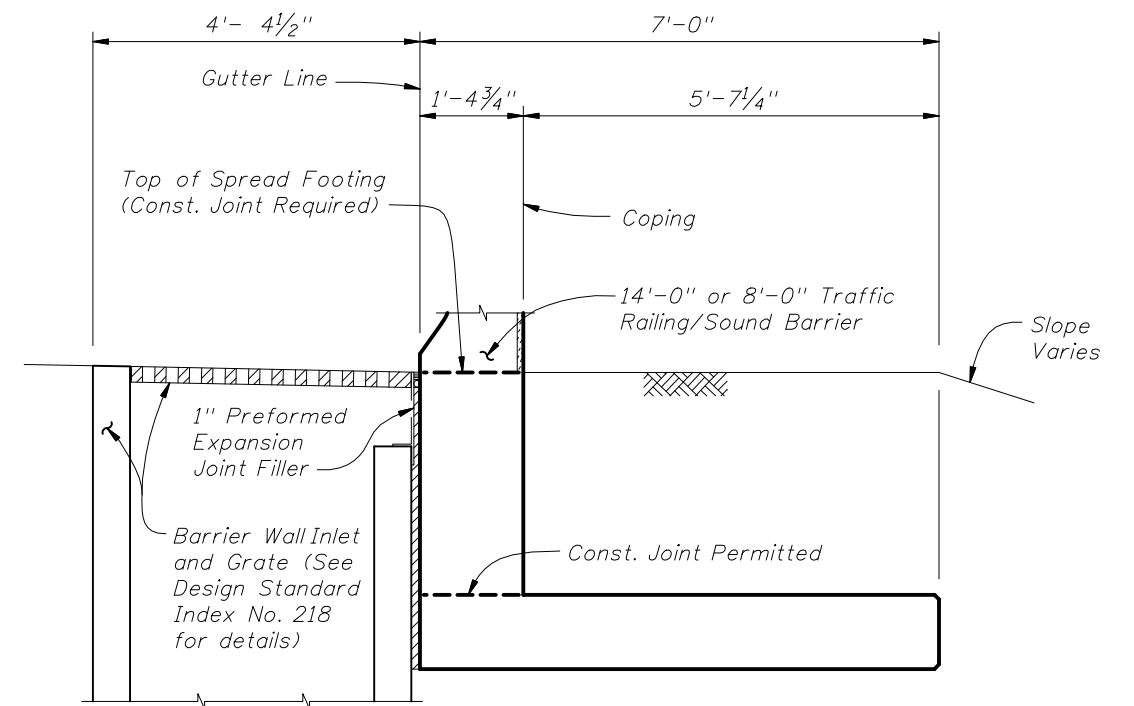
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TRAFFIC RAILING/SOUND BARRIER
L-SHAPED SPREAD FOOTING

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TYPICAL SECTION THRU SPREAD FOOTING - OPTION A
(Bars 5P, 5R and 5S1 in Traffic Railing/Sound Barrier not shown for clarity)



TYPICAL SECTION THRU SPREAD FOOTING AND BARRIER WALL INLET - OPTION A
(Reinforcing Steel not shown for clarity (See Note 3))

NOTES:

1. Match Cross Slope of Travel Lane or Shoulder.
2. Place 10 ~ Bars 5B inside Bars 5U1 as shown.
3. For Reinforcing Steel spacing, see Typical Section Thru Spread Footing - Option A this Sheet.
4. Provide 3" lip when optional construction joint is used.



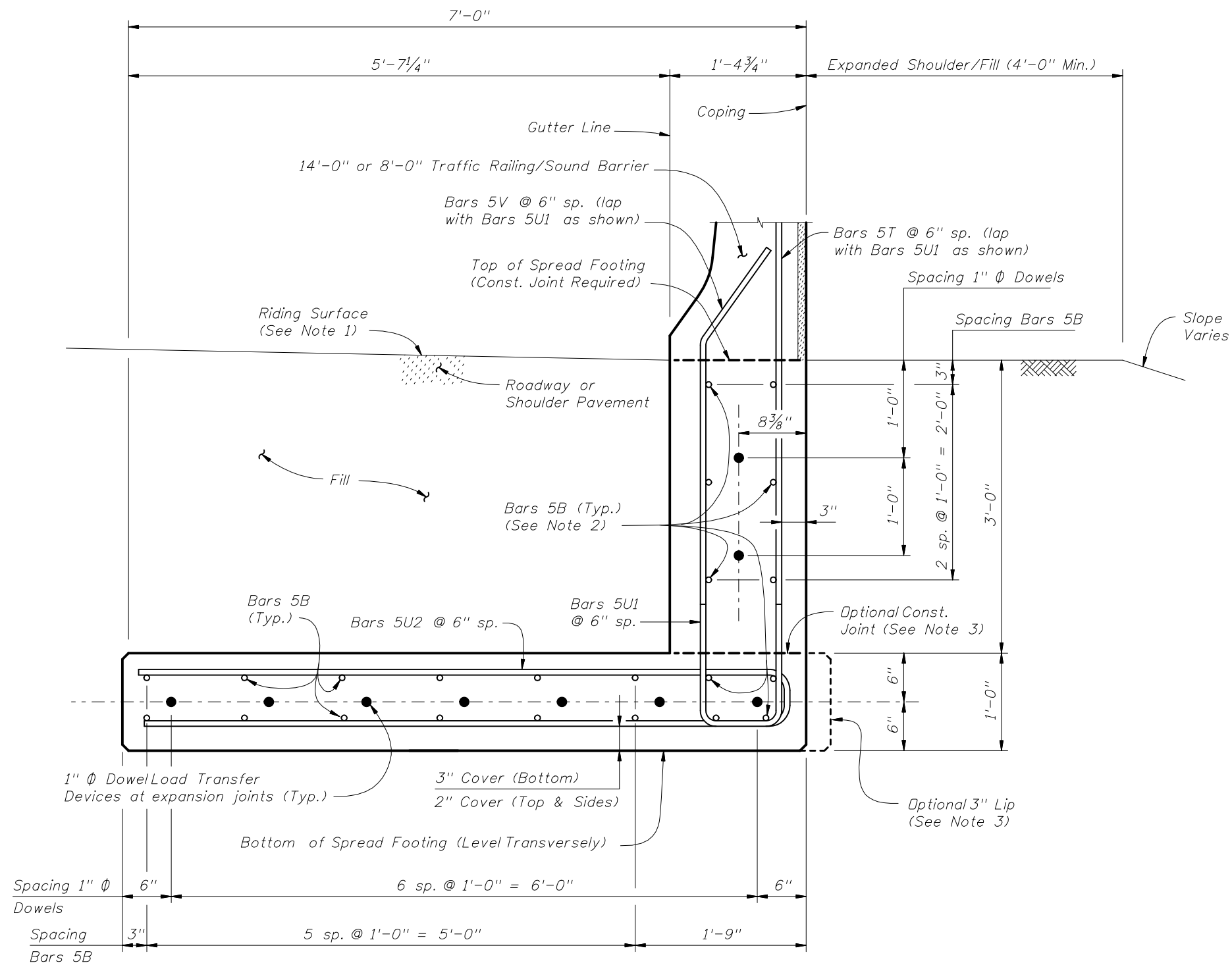
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**TRAFFIC RAILING/SOUND BARRIER
L-SHAPED SPREAD FOOTING**

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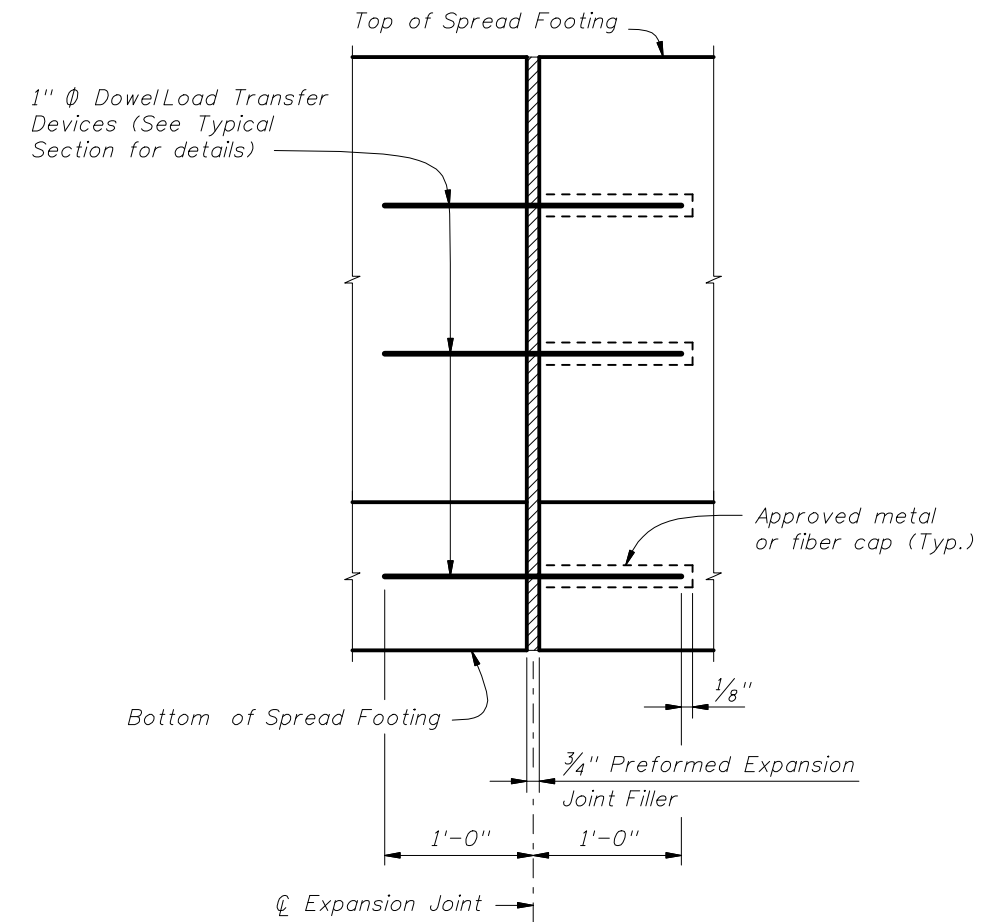
Index No.
5214



TYPICAL SECTION THRU SPREAD FOOTING - OPTION B
 (Bars 5P, 5R and 5S1 in Traffic Railing/Sound Barrier not shown for clarity)

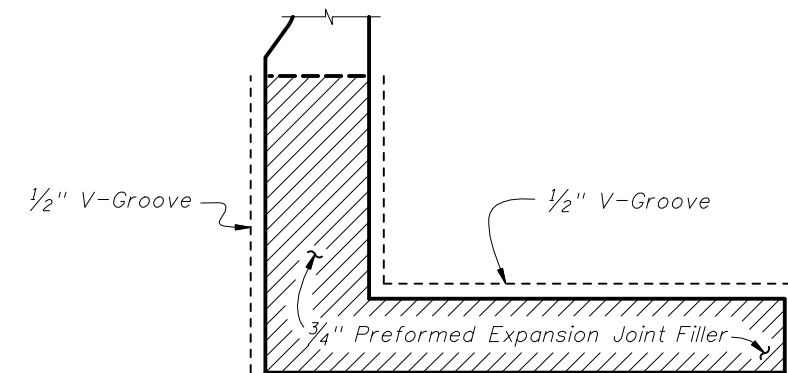
NOTES:

1. Match Cross Slope of Travel Lane or Shoulder.
2. Place 10 ~ Bars 5B inside Bars 5U1 as shown.
3. Provide 3" lip when optional construction joint is used.



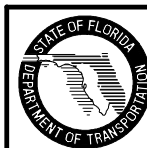
EXPANSION JOINT DETAIL

(Spread Footing expansion joints are required at 3/4" open joints in Traffic Railing/Sound Barrier)



DETAIL "A"
 (Option A Shown, Option B Similar)

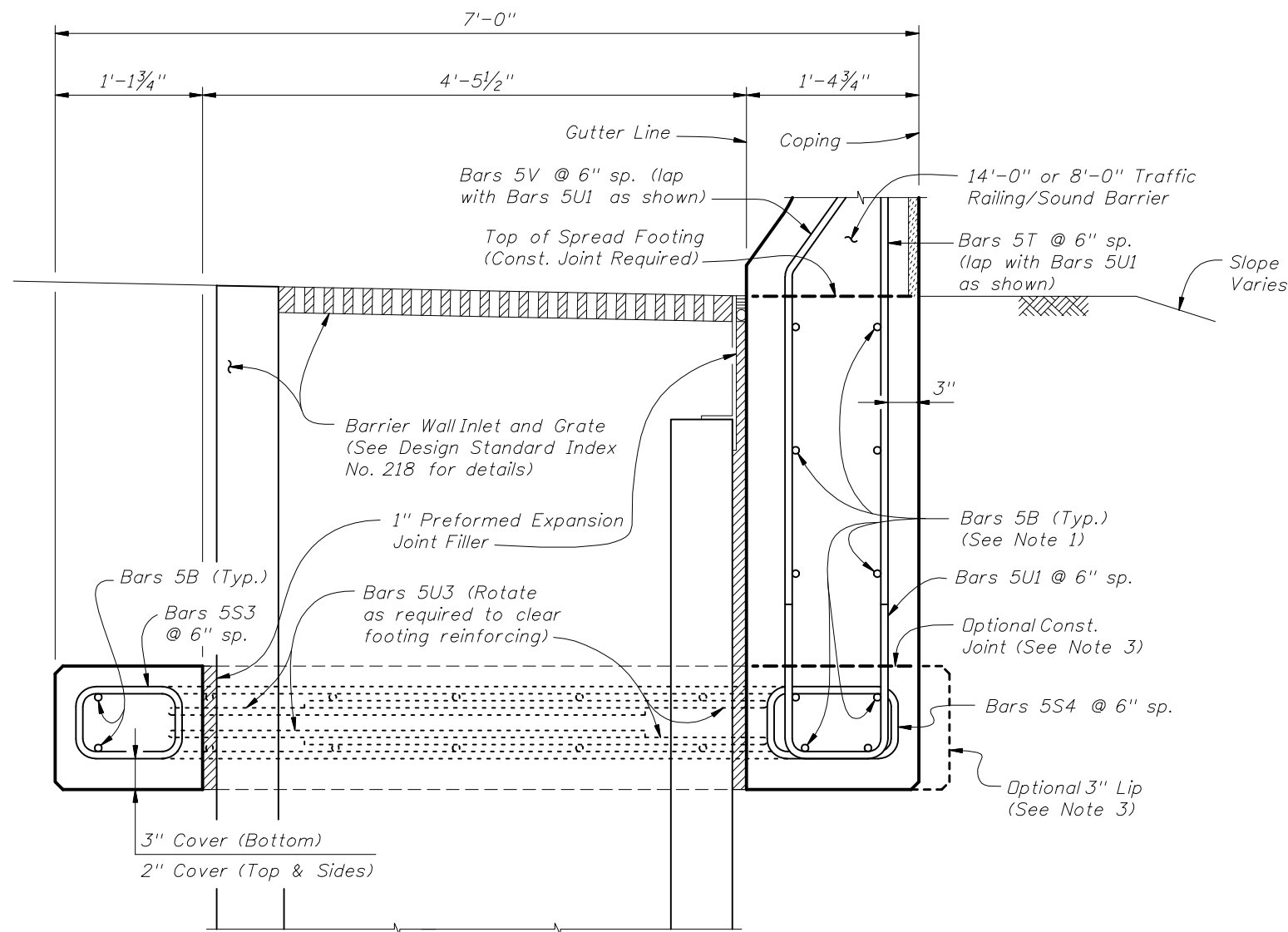
(Showing Locations of 1/2" V-Grooves and 3/4" Preformed Expansion Joint Filler)



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**TRAFFIC RAILING/SOUND BARRIER
 L-SHAPED SPREAD FOOTING**

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SECTION A-A
TYPICAL SECTION THRU SPREAD FOOTING AND BARRIER WALL INLET - OPTION B
(Bars 5P, 5R and 5S1 in Traffic Railing/Sound Barrier not shown for clarity)

NOTES:

1. Place 10 ~ Bars 5B inside Bars 5U1 as shown.
2. For Reinforcing Steel spacing, see Typical Section Thru Spread Footing - Option B on Sheet 3.
3. Provide 3" lip when optional construction joint is used.

ESTIMATED L-SHAPED SPREAD FOOTING QUANTITIES

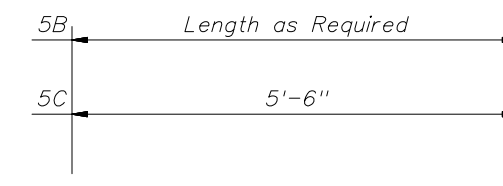
ITEM	UNIT	QUANTITY
Concrete (Footing)	CY/Ft.	0.414
Reinforcing Steel (Typical)	LB/Ft.	85.53
Additional Reinf. @ Expansion Joint	Lb.	48.06

(Subtract 12.69 lb/ft from typical reinforcing steel quantity shown on Index No. 5210 to account for the absence of Stirrup Bars 5V and 5S1 in L-Shaped Spread Footings.)

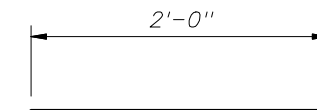
CROSS REFERENCE:
For location of Section A-A, see Sheet 1.

REINFORCING STEEL BENDING DIAGRAMS

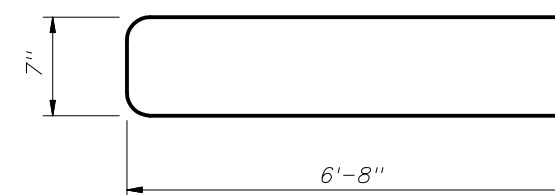
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
B	5	AS REQD.
C	5	5'-6"
S3	5	3'-10"
S4	5	4'-3"
T	5	4'-3"
U1	5	8'-0"
U2	5	13'-11"
U3	5	12'-10"
V	5	3'-10"
DOWEL	1" ϕ Smooth Bar	2'-0"



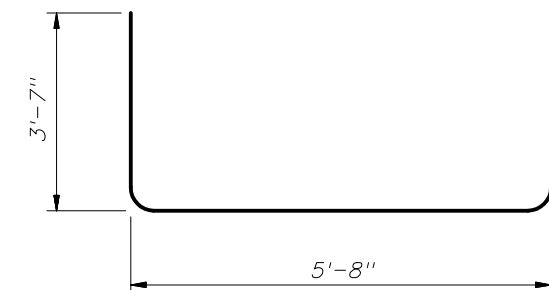
BARS 5B & 5C



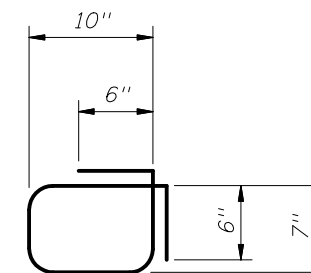
1" ϕ DOWEL



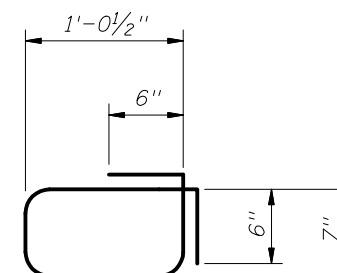
BAR 5U2



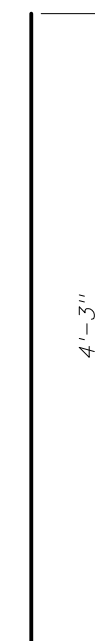
BAR 5U3



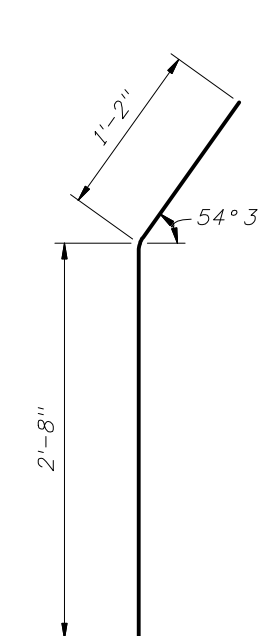
BAR 5S3



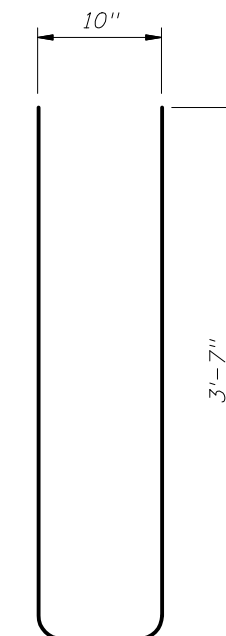
BAR 5S4



BAR 5T



BAR 5V



BAR 5U1

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints will have a 2" minimum cover.
3. Lap splices for Bars 5B will be a minimum of 2'-2".
4. Lap splices Bars 5T and 5V with 5U1 will be a minimum of 2'-2".
5. The Contractor may use Welded Wire Fabric when approved by the Engineer. Welded Wire Fabric will conform to ASTM A 497.



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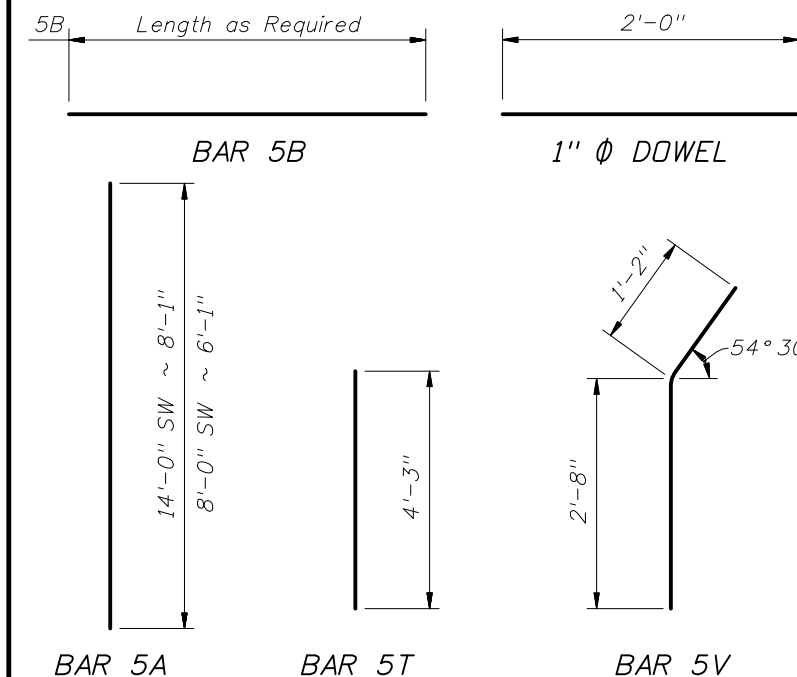
TRAFFIC RAILING/SOUND BARRIER
L-SHAPED SPREAD FOOTING

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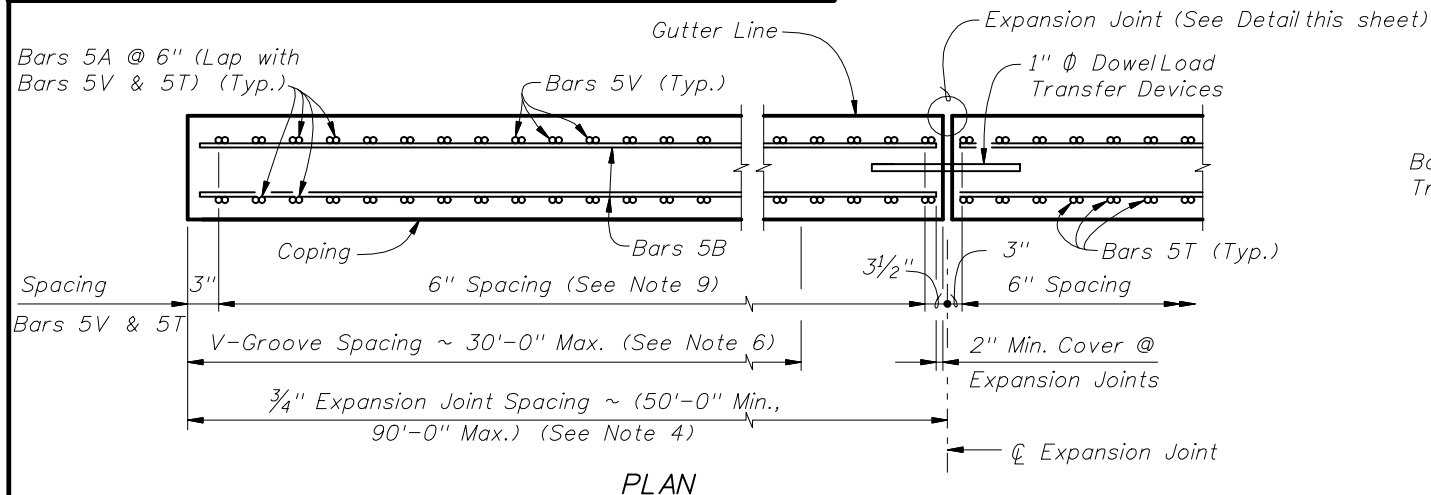
REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
A (8'-0" SW)	5	6'-1"
A (14'-0" SW)	5	8'-1"
B	5	AS REQD.
T	5	4'-3"
V	5	3'-10"
DOWEL	1" ϕ Smooth Bar	2'-0"



- REINFORCING STEEL NOTES:**
- All bar dimensions in the bending diagrams are out to out.
 - All reinforcing steel at the open joints will have a 2" minimum cover.
 - Lap splices for Bars 5B will be a minimum of 2'-2".
 - Lap splices Bars 5T and 5V with 5U1 will be a minimum of 2'-2".
 - The Contractor may use Welded Wire Fabric when approved by the Engineer. Welded Wire Fabric will conform to ASTM A 497.



NOTES

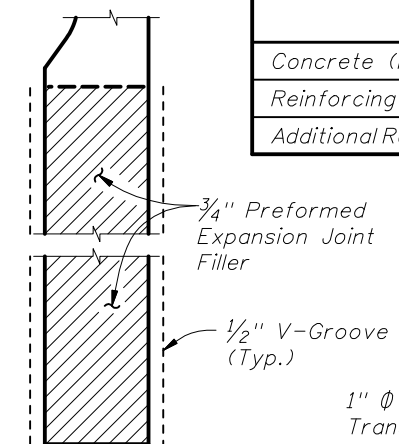
- CONSTRUCTION REQUIREMENTS:** Construct the Trench Footing and expansion joints plumb; do not construct the Trench Footing perpendicular to the roadway surface. Slip forming is not permitted.
- CONCRETE:** Use Class II concrete for slightly aggressive environments. Use Class VI concrete for moderately or extremely aggressive environments. Concrete will be in accordance with Specification Section 346.
- REINFORCING STEEL:** Provide Grade 60 reinforcing steel in accordance with Specification Section 931. Dowel Load Transfer Devices will be ASTM A 36 smooth round bar and hot-dip galvanized in accordance with Specification Section 962. Install Dowel Load Transfer Devices in accordance with Specification Section 350.
- Construct $\frac{3}{4}$ " Expansion Joints plumb and perpendicular or radial to Gutter Line. Provide at 90'-0" maximum intervals as shown.
- Provide and install Preformed Expansion Joint Filler in accordance with Specification Section 932.
- Construct $\frac{1}{2}$ " V-Grooves plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between $\frac{3}{4}$ " Expansion Joints and/or Begin or End Trench Footing. V-Groove locations are to coincide with V-Groove locations in the Railing/Sound Barrier.
- FILL REQUIREMENTS:** Fill is required a distance of 4'-0" on both sides for the entire depth of the trench footing. See Typical Section for details.
- Match Cross Slope of Travel Lane or Shoulder.
- Spacing shown is along the Gutter Line.
- Work this Standard Drawing with one or both of the following:
 - Index No. 5210 - Traffic Railing/Sound Barrier (8'-0").
 - Index No. 5211 - Traffic Railing/Sound Barrier (14'-0").

LEGEND: SW = Traffic Railing Barrier/Soundwall

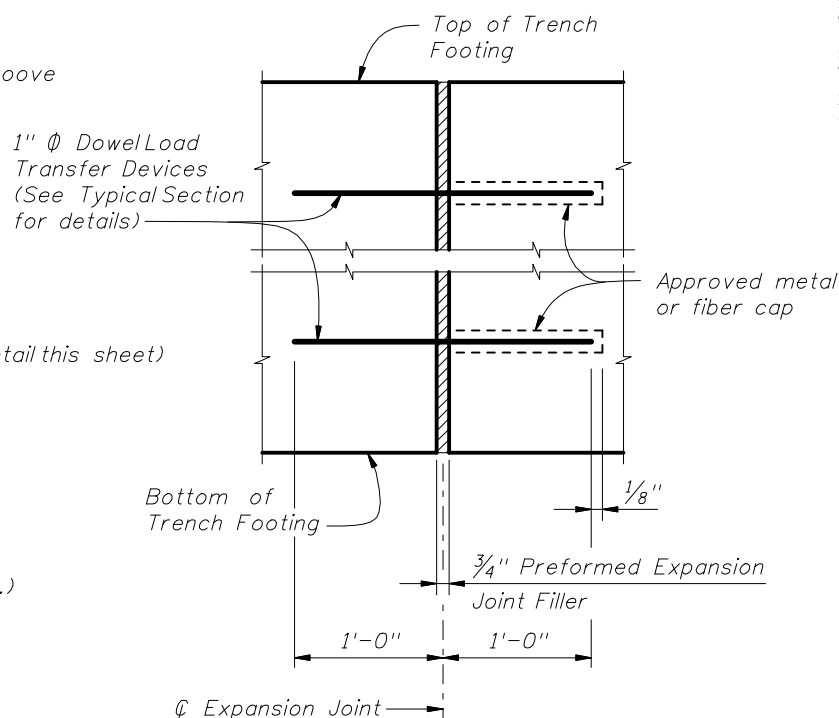
ESTIMATED TRENCH FOOTING QUANTITIES

ITEM	UNIT	QUANTITY	
		8'-0" SW	14'-0" SW
Concrete (Footing)	CY/FT	0.336	0.439
Reinforcing Steel (Typical)	LB/FT	56.84	69.36
Additional Reinf. @ Expansion Joint	LB	32.04	42.72

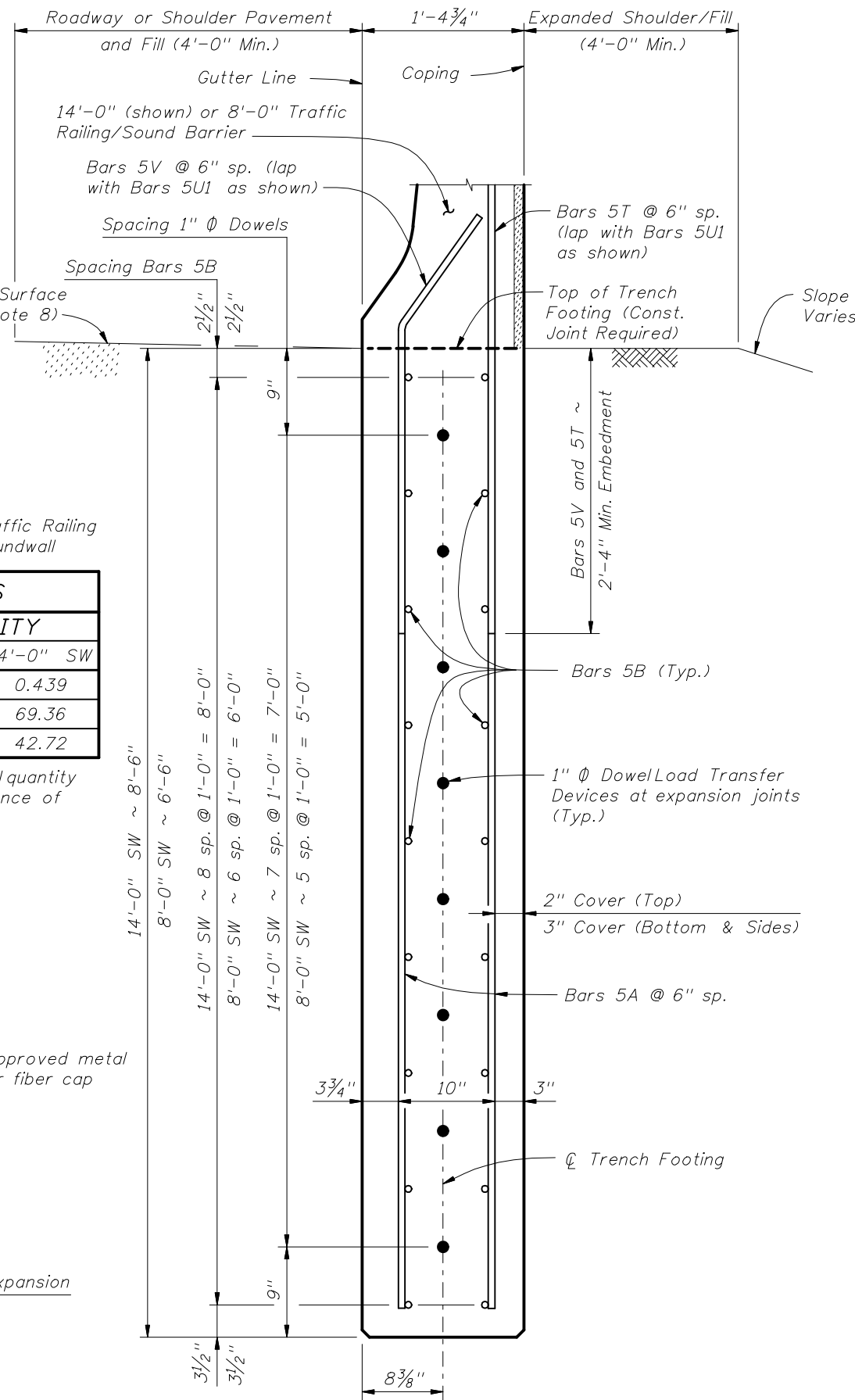
(Subtract 12.69 lb/ft from typical reinforcing steel quantity shown on Index No. 5210 to account for the absence of Stirrup Bars 5V and 5S1 in Trench Footings.)



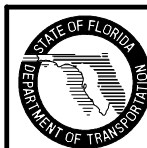
DETAIL "A"
(Showing Locations of $\frac{1}{2}$ " V-Grooves and $\frac{3}{4}$ " Preformed Expansion Joint Filler)



EXPANSION JOINT DETAIL
(Trench Footing expansion joints are required at $\frac{3}{4}$ " open joints in Traffic Railing/Sound Barrier)



TYPICAL SECTION THRU TRENCH FOOTING
(Bars 5P, 5R and 5S1 in Traffic Railing Barrier/Soundwall not shown for clarity)



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**TRAFFIC RAILING/SOUND BARRIER
TRENCH FOOTING**

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NOTES

SPECIFICATIONS:

1. General Specifications:

The Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", Current Edition and Supplements as Amended.

2. Design Specifications:

- Florida Department of Transportation (FDOT) "Structures Design Guidelines", Current Edition.
- American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Current Edition.
- AASHTO-AGC-ARTBA Task Force 27 (Ground Modification Techniques), "Insitu Soil Improvement Techniques", January 1990.

DESIGN CRITERIA:

- Design is based on the assumption that the material contained within the reinforced soil volume, methods of construction and quality of prefabricated materials are in accordance with Specification Section 548 and the reinforced backfill is free of subsurface drainage of water (seepage).
- It is the responsibility of the Engineer of Record to determine that the maximum factored bearing pressure shown for the wall does not exceed the factored bearing resistance of the foundation for that specific wall location.
- The Wall Company is responsible for internal stability of the wall. External stability design, including foundation and slope stability, is the responsibility of the Engineer of Record.

SOIL PARAMETERS:

- See Wall Control Drawings for soil characteristics of foundation material to be used in the design of the wall system. The Contractor will provide soil design parameters for backfill material based on the actual soil characteristics utilized at the site. Provide the values of unit weight, cohesion and internal friction angle in the Shop Drawings.

MATERIALS:

- Concrete class and minimum compressive strength (f'c):
 - Except for precast wall facing panels and leveling pads, use Class II concrete for slightly aggressive environments and Class IV concrete for moderately or extremely aggressive environments. Provide all concrete, except for precast wall facing panels and leveling pads in accordance with Specification Section 346. Provide concrete for precast wall facing panels and leveling pads in accordance with Specification Section 548.
 - For precast wall facing panels only, see Wall Control Drawings.
- Provide reinforcing steel for systems with non-metallic soil reinforcement and metallic soil reinforcement above the 100 year flood elevation in accordance with Specification Section 548. For reinforcing steel requirements for systems with metallic soil reinforcement below the 100 year flood elevation see Wall Company Drawings.
- Provide soil reinforcement in accordance with Specification Section 548.
- Payment for Dowel Bars 4D used with precast or C.I.P. coping will be made under Retaining Wall System (Permanent).
- For additional material notes see Wall Company General Notes.

CONSTRUCTION:

- Walls will be constructed in accordance with Specification Section 548 and the Wall Company's instructions.
- For location and alignment of retaining walls, see Wall Control Drawings.
- If present, consider in design and analysis and locate manholes and drop inlets as shown on wall elevations.
- Refer to Wall Control Drawings of individual walls for minimum reinforcement strip/mesh length, factored bearing resistances, minimum wall embedment and anticipated long term and differential settlements.
- The Contractor is responsible for water retention as needed during construction.
- It is the Contractor's responsibility to determine the location of any guardrail posts behind retaining wall panels. Prior to placement of the top layer of soil reinforcement, individual reinforcing strips/mesh may be skewed (15° maximum) to avoid the post locations if authorized by the Engineer. No cutting of soil reinforcement is allowed unless shown on Shop Drawings and approved by the Engineer. Any damage done to the soil reinforcement due to installation of the guardrail will be repaired by the Contractor at the Contractor's expense. Repair method will be approved by the Engineer.

- If existing or future structures, pipes, foundations or guardrail posts within the reinforced soil volume interfere with the normal placement of soil reinforcement and specific directions have not been provided on the plans, the Contractor will notify the Engineer to determine what course of action should be taken.
- The Contractor is responsible for gradually displacing upper layer(s) of soil reinforcement downward (15° maximum from horizontal) to avoid cutting soil reinforcement and conflicts with paving and subgrade preparation. The Contractor's attention is directed especially to situations where roadway superelevation and/or soil mixing are anticipated.
- Finish sidewalks in accordance with Specification Section 522.
- All exposed concrete surfaces will receive a Class 5 Applied Finish Coating in accordance with Specification Section 400. Refer to Typical Sections on Sheet 2 and the following notes for limits of applied finish:
 - The inside, backside and top of Traffic Railings and Pedestrian/Bicycle Railings.
 - Exposed surfaces of coping on top of retaining wall. Other coatings, colors or textures will be applied as required in the Wall Control Drawings.
- For concrete facing panel surface treatment, see Wall Control Drawings. Extend surface treatment a minimum of 6" below final ground line.
- Piles within the soil volume will be driven prior to construction of the retaining wall. The portion of the pile within the soil volume will be wrapped with polyethylene sheeting in accordance with Specification Section 459. Drive piles located within the soil volume prior to construction of the retaining wall, unless a method to protect the structure, acceptable to both the Engineer and Wall Company, is proposed and approved in writing.
- A structural extension of the connection of the retaining wall panel to soil reinforcement will be used whenever necessary to avoid cutting or excessive skewing (greater than 15°) of the soil reinforcement around obstructions (i.e. piles, pipes, etc.).
- For Mechanically Stabilized Earth (MSE) Walls, steps in leveling pads will occur at panel interfaces. Panels will not cantilever more than 2" past the end of the leveling pad.
- The top of the leveling pad or footing will be 2'-0" minimum below final ground line.
- The height of panels in the bottom course of MSE Walls must not be less than half the height of a standard panel.

QUALIFIED PRODUCTS LIST:

- Manufacturers seeking approval of proprietary retaining wall systems for inclusion on the Qualified Products List as pre-approved wall system suppliers must submit a QPL Product Evaluation Application along with design documentation, vendor drawings, wall system construction manual and other information as required in the Retaining Wall System QPL Acceptance Criteria showing the proprietary wall system is designed to meet all specified requirements. Project specific Shop Drawings are required for QPL approved wall systems (see Shop Drawing Requirements below).

SHOP DRAWING REQUIREMENTS

The successful bidder will submit the final design of the wall for review as Shop Drawings. Details and Design Criteria shown on Shop Drawings shall not deviate from those shown on the approved QPL Vendors Drawings. The Shop Drawings will include detailed design computations and all details, dimensions and quantities necessary to construct the wall. The design and fully detailed plans will be prepared as required by current FDOT standards at time of bidding and will include, but not be limited to, presentation of required information as follows:

- Provide an elevation view of the wall indicating:
 - Elevations/Stations at the top of wall, top of leveling pad or footing and bottom of footing for Begin/End Retaining Wall, all breaks in vertical alignment, all whole stations and every 25 foot station increments.
 - Panel designations and the length, size and designation of soil reinforcement in elevation view.
 - Location of the proposed final ground line.
- Provide a plan view detailing the horizontal alignment and offsets from the horizontal control line(s) to the exterior face of the wall.
- Show in plan and elevation all utilities, sign supports, light pole pilasters, drainage structures, drainage pipes, etc. that affect the wall(s). Locate in the plan view all piles within the reinforced earth volume, including those for future widening, as shown on Foundation Layout Drawings.

- Provide general notes and design parameters on the Shop Drawings. Include design soil characteristics and all other pertinent notes required for design and construction of the walls. Provide factored bearing resistances and factored bearing pressures for each wall height increment.
- Show the limits of the soil volume (see Typical Sections at right for details).
- Show complete details of each precast wall facing panel, slip joint and all other concrete elements incorporated in the wall. Include reinforcing bar size and spacing, complete bar bending diagrams and required embedment(s).
- Show complete details of leveling pads and/or footings, including all steps in leveling pads.
- Show complete details for construction of wall around obstructions. Show details for placement of soil reinforcement at acute corners and at interfaces with temporary walls.
- Show complete details addressing conflicts between soil reinforcement, precast concrete facing panels and embedments in the reinforced soil volume. Provide full details of railings, coping, sign supports, light pole pilasters, acute corners, etc.
- Show complete details where walls of different types intersect/influence one another.
- Provide fully detailed design calculations for each wall height increment detailed in the Shop Drawings. Submit Shop Drawings and design calculations signed and sealed by a Professional Engineer registered in the State of Florida.

GENERAL NOTES



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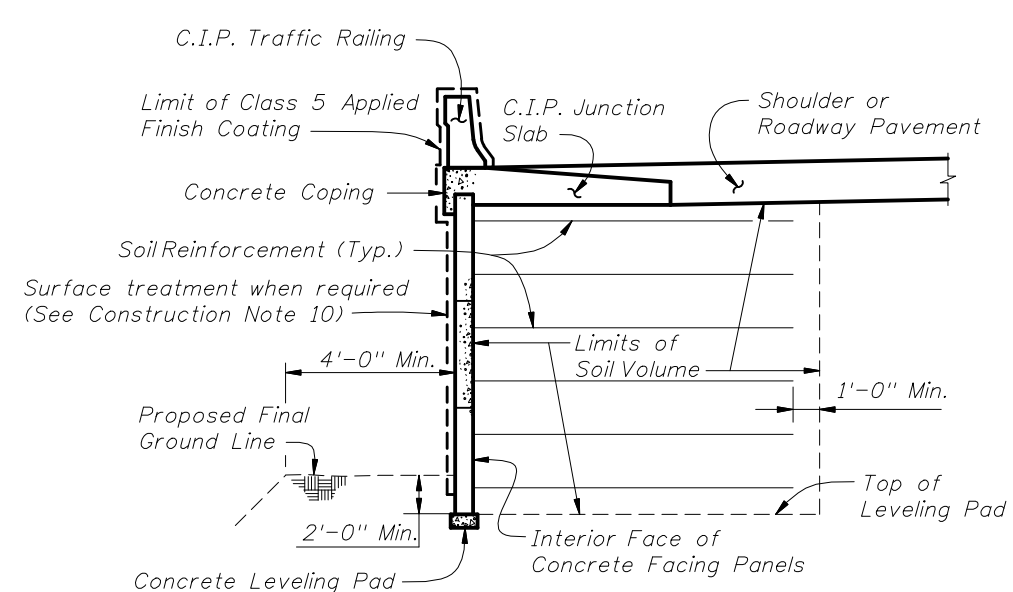
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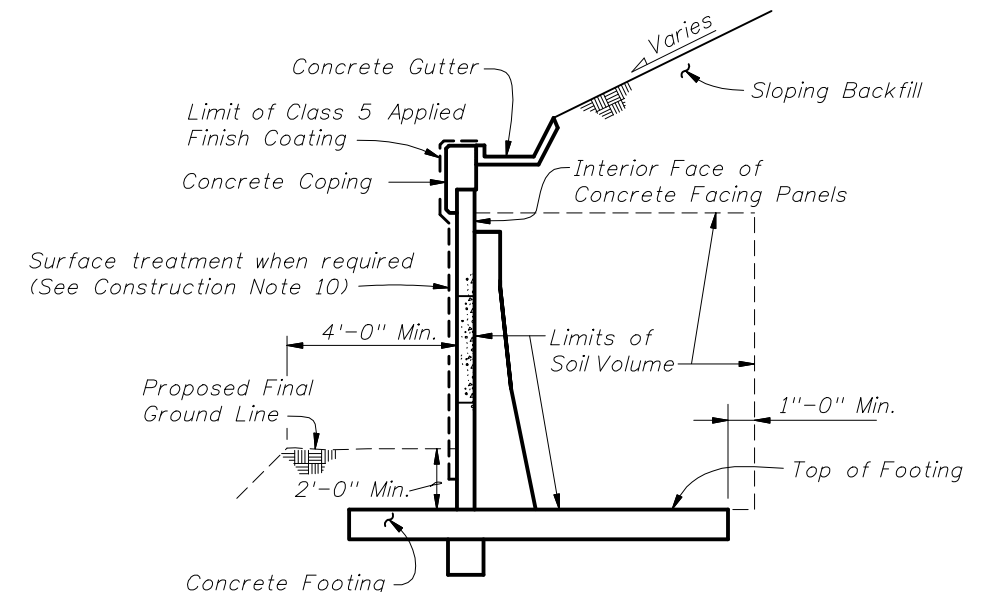
FDOT WALL TYPE TABLE NOTES

1. Listed in the Plans; Wall Type combines both Settlement Limitations and Durability Factors.
2. Amount of wall settlements that will occur in its design life and includes both short and long term settlements. Short term settlements occur during wall construction and may contain elastic deformation and densification settlement. Long term settlements continue after the completion of the wall and may include consolidation and secondary consolidation/creep settlements.
3. Settlements along the alignment of and perpendicular to the wall face; usually are not uniform. Expansion joints for the cast-in-place walls and slip joints for MSE walls are provided to control wall and wall panel cracks, respectively.
4. Includes all underground walls and walls submerged in water.
5. For concrete requirements, see Specification Section 346 using slightly aggressive environment.
6. For concrete requirements, see Specification Section 346 using extremely aggressive environment.
7. "Other Allowable Wall Types" listed with an "✓", have Settlement Limitations and Durability Factors greater than those required by the "Wall Type" (Column 1).

TABLE OF FDOT WALL TYPES															
Wall Type ¹	QPL Item	Typical Wall Construction	Durability Factors				Other Allowable Wall Types ⁷								
			Concrete Cover	Concrete Class	Calcium Nitrate	Soil Strap Type	1A	1B	1C	1D	2A	2B	2C	2D	2E
Type 1	No	Cantilever, and Counterfort Walls	Project Specific				Project Specific								
Type 1A	Yes		2"	II	No	n/a	✓	✓	✓	✓	✓	✓	✓	✓	✓
Type 1B			2"	IV	No		✓	✓	✓	✓	✓	✓	✓	✓	
Type 1C			3"	IV	No		✓	✓	✓	✓	✓	✓	✓	✓	
Type 1D ⁴			3"	IV	Yes		✓	✓	✓	✓	✓	✓	✓	✓	
Type 2	No	MSE Walls	Project Specific				Project Specific								
Type 2A	Yes		2"	II ⁵	No	metal	✓	✓	✓	✓	✓	✓	✓		
Type 2B			2"	IV ⁵	No		✓	✓	✓	✓	✓	✓	✓		
Type 2C			3"	IV ⁵	No		✓	✓	✓	✓	✓	✓	✓		
Type 2D			3"	IV ⁶	Yes		✓	✓	✓	✓	✓	✓	✓		
Type 2E			3"	IV ⁶	No		plastic	✓	✓	✓	✓	✓	✓	✓	
Type 2F ⁴			3"	IV ⁶	Yes			✓	✓	✓	✓	✓	✓	✓	
Type 3	Yes	Temporary Walls	n/a			metal/plastic									

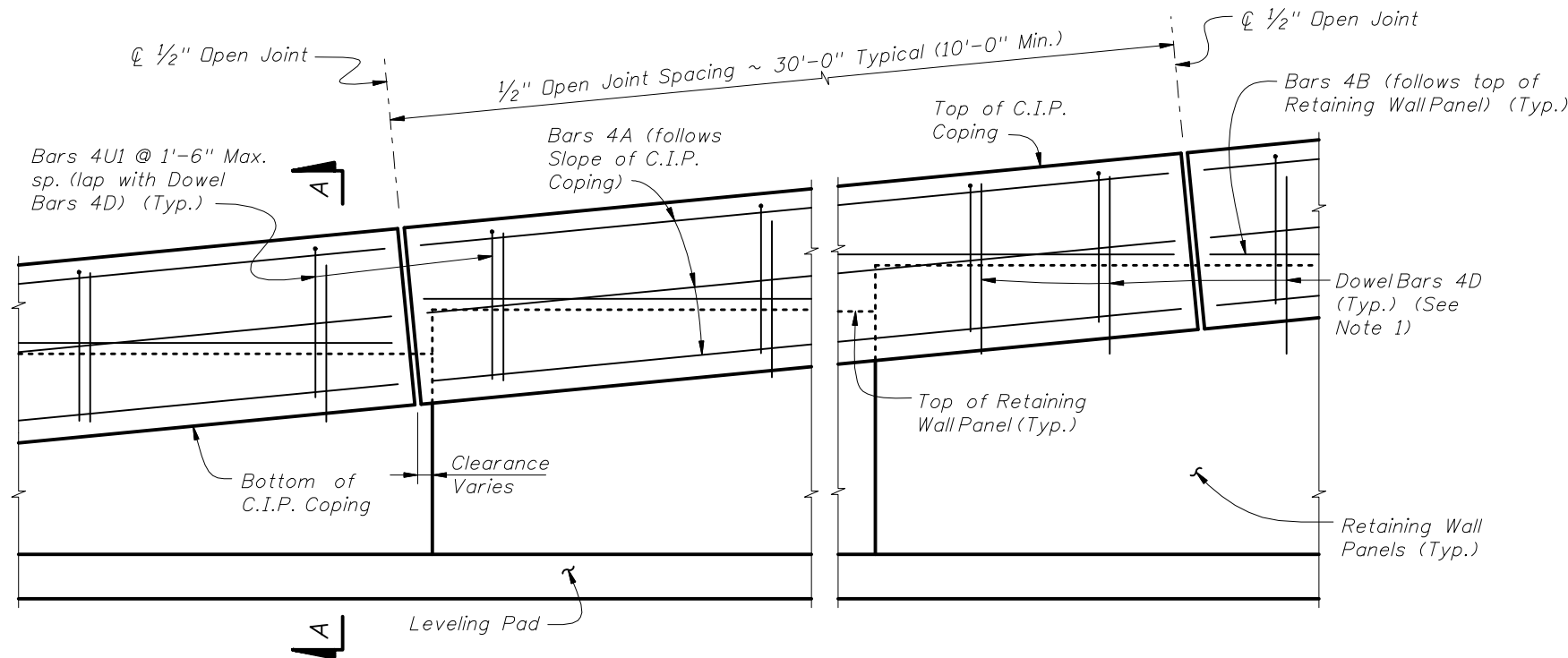


TYPICAL RETAINING WALL SECTION WITH A TRAFFIC RAILING (MSE Wall Type Shown, Others Similar) (Showing Limits of the Reinforced Soil Volume)

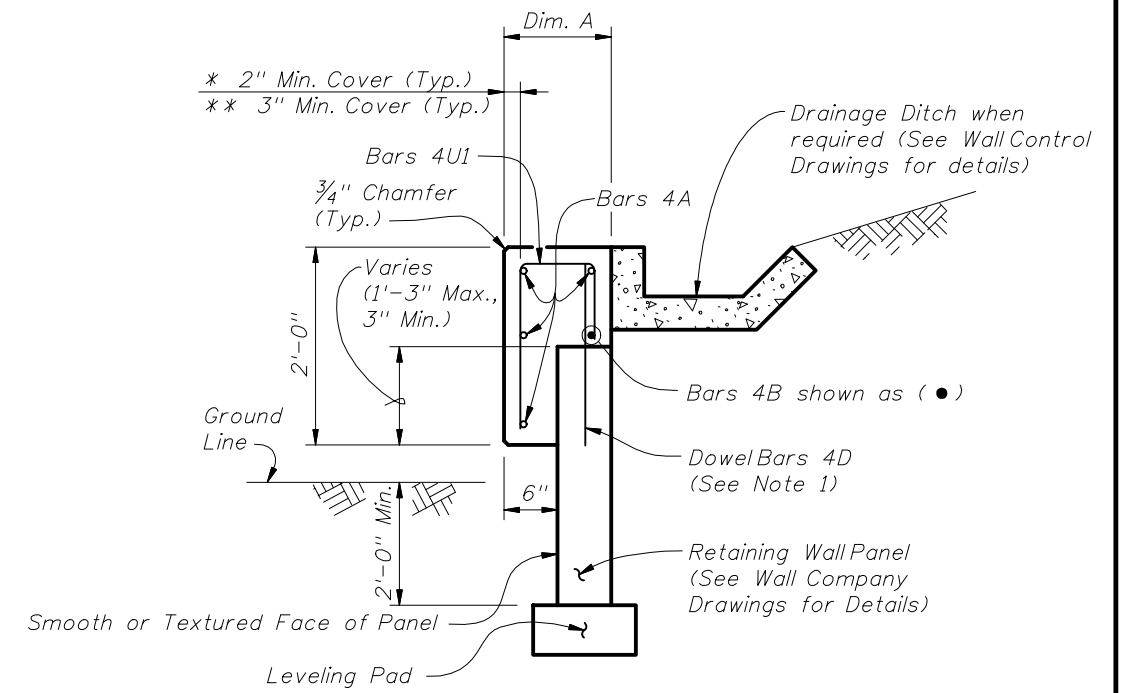


TYPICAL RETAINING WALL SECTION WITHOUT A TRAFFIC RAILING (Counterfort Wall Type Shown, Others Similar) (Showing Limits of the Soil Volume)





C.I.P. COPING - PARTIAL ELEVATION VIEW

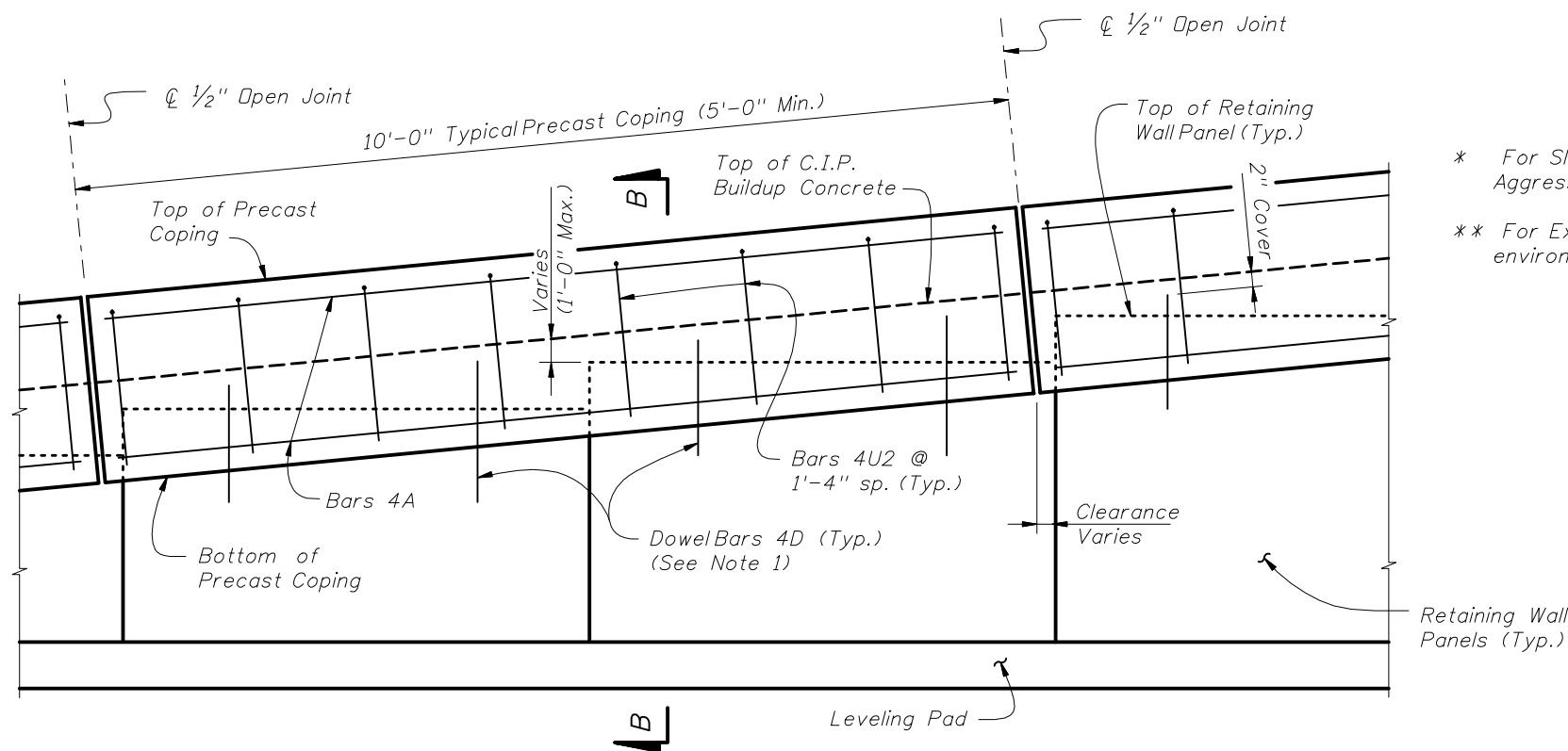


SECTION A-A
C.I.P. COPING

Dim. A	Panel width + 6"
Dim. B	Panel width + 1'-0" Min.

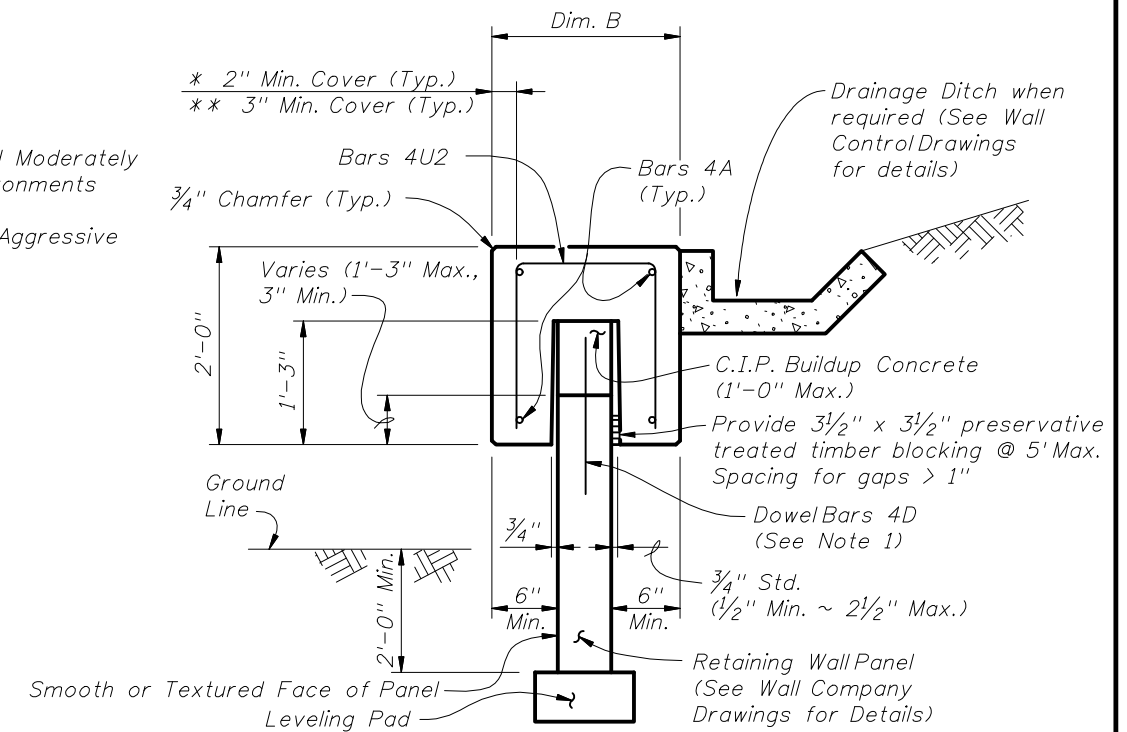
PRECAST AND C.I.P. COPING NOTES:

1. DowelBars 4D extend 1'-0" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover. See Wall Company Drawings for number and spacing of DowelBars 4D.



PRECAST COPING - PARTIAL ELEVATION VIEW

- * For Slightly and Moderately Aggressive environments
- ** For Extremely Aggressive environments.



SECTION B-B
PRECAST COPING

PRECAST AND C.I.P. COPING DETAILS



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REINFORCING STEEL BENDING DIAGRAMS - PRECAST AND C.I.P. COPINGS

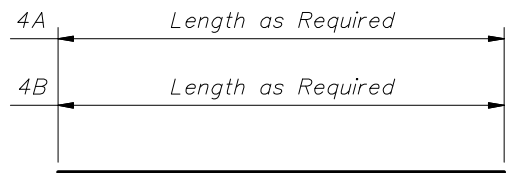
BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH # S or M	LENGTH # E
A	4	AS REQD.	AS REQD.
B	4	AS REQD.	AS REQD.
D	4	2'-0"	2'-0"
U1	4	Panel width + 4"	Panel width + 3"
U2	4	Panel width + 8"	Panel width + 6"
U3	4	Panel width + 4"	Panel width + 3"

REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- All reinforcing steel at the open joints will have a 2" minimum cover.
- Bars 4A may be continuous or spliced at the construction joints. Lap splices for Bars 4A will be a minimum of 1'-8".
- The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.

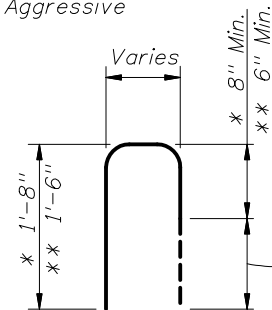
S = Slightly Aggressive
M = Moderately Aggressive
E = Extremely Aggressive



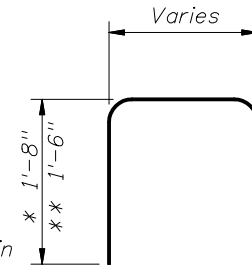
BARS 4A & 4B



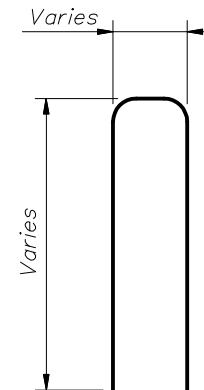
DOWEL BAR 4D



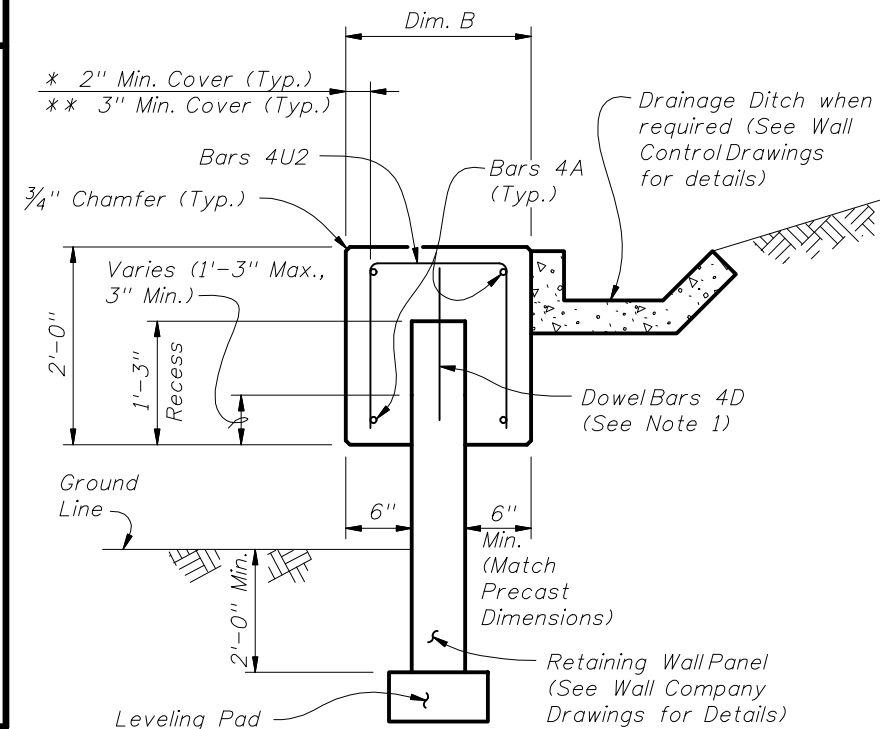
BAR 4U1



BAR 4U2

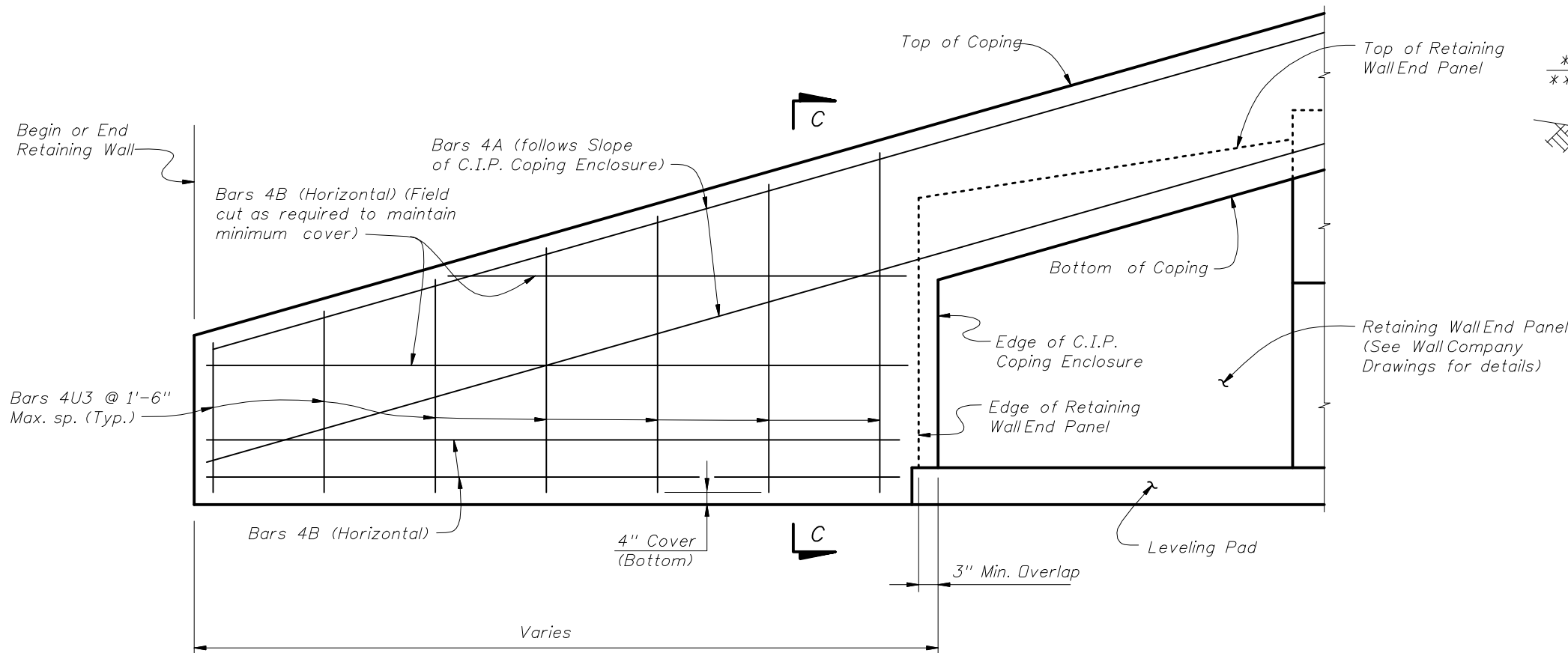


BAR 4U3

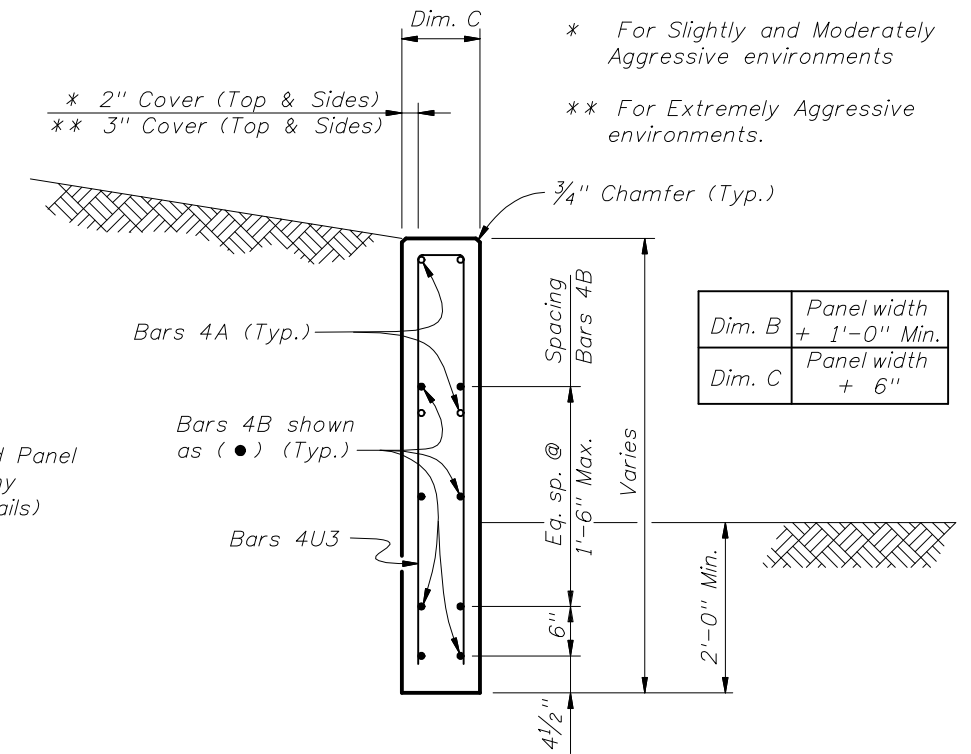


C.I.P. COPING USED WITH PRECAST COPING

Note: When precast coping units do not fit the entire length of the retaining wall, use this similar C.I.P. coping for short portions between precast coping units. This C.I.P. coping may also be used for vertical copings.



C.I.P. COPING ENCLOSURE DETAIL



SECTION C-C

PRECAST AND C.I.P. COPING DETAILS

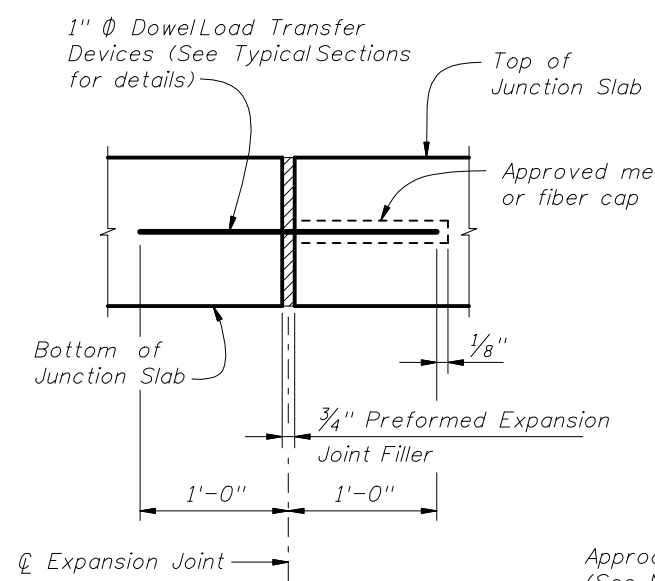


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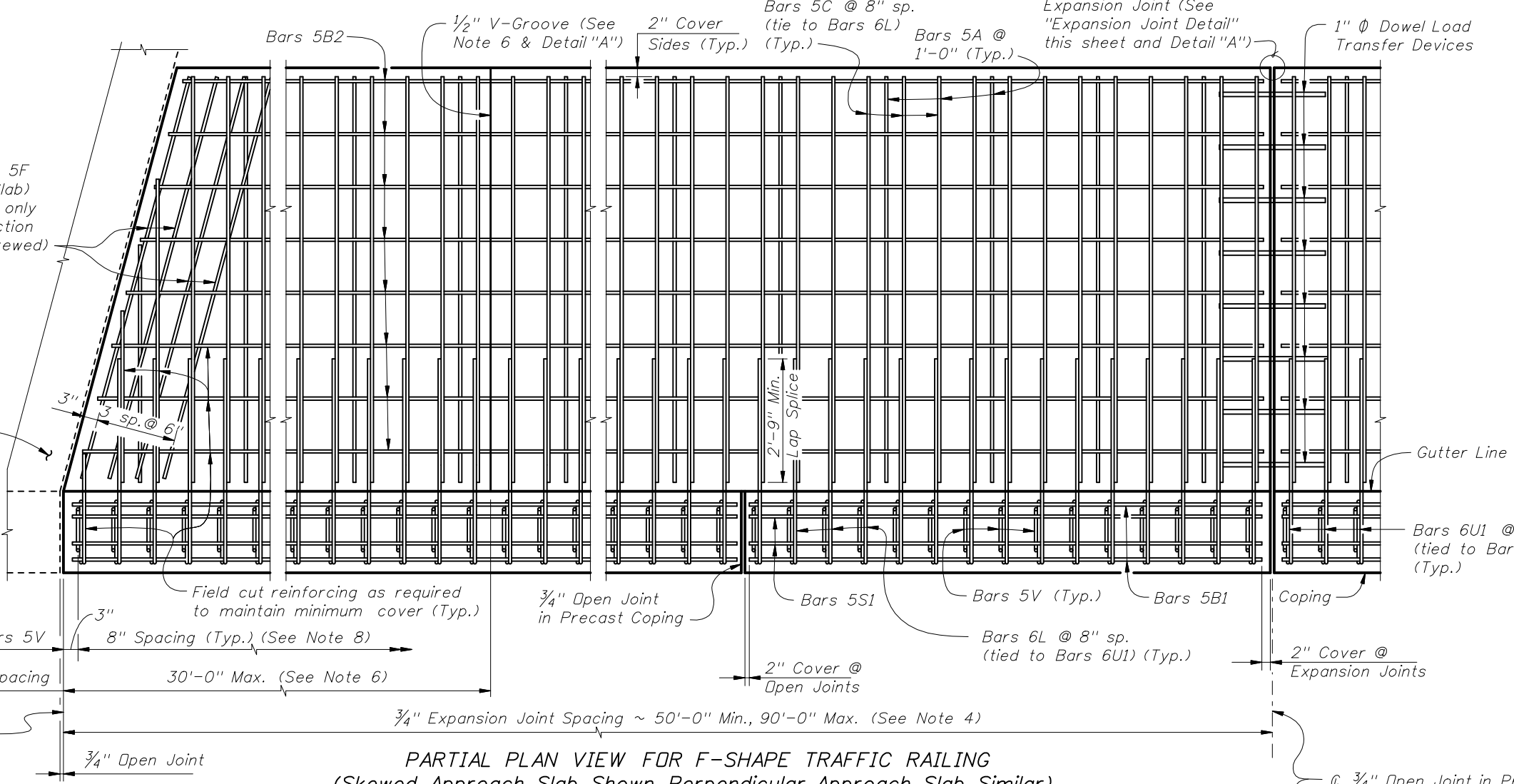
Index No. 5300



EXPANSION JOINT DETAIL

(Junction Slab expansion joints are to coincide with 3/4" open joints in Traffic Railing)

CROSS REFERENCE: For Detail "A", see Sheet 7 of 19.

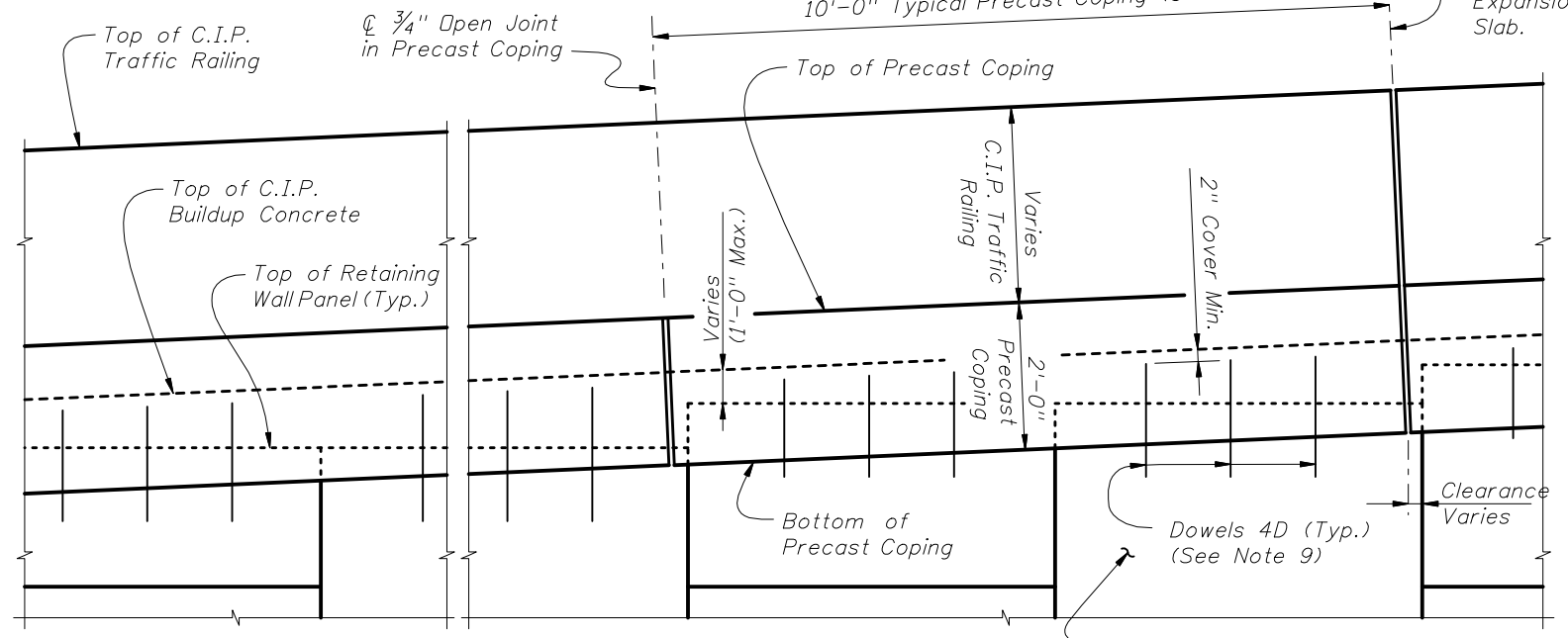


PARTIAL PLAN VIEW FOR F-SHAPE TRAFFIC RAILING

(Skewed Approach Slab Shown, Perpendicular Approach Slab Similar)
(Precast Coping Shown, C.I.P. Coping Similar) (Traffic Railing not Shown for Clarity)

JUNCTION SLAB NOTES:

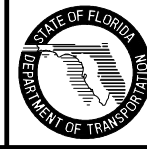
1. CONSTRUCTION REQUIREMENTS: Construct the Junction Slab level transversely and expansion joints plumb; do not construct the junction slab or C.I.P. coping perpendicular to the roadway surface. Slip forming is not permitted.
2. APPLICATIONS: This junction slab is only applicable for a TL-4 crash test rating. Precast Traffic Railings are not allowed.
3. REINFORCING STEEL: Dowel Load Transfer Devices will be ASTM A 36 smooth round bar and hot-dip galvanized in accordance with Specification Section 962. Install Dowel Load Transfer Devices in accordance with Specification Section 350.
4. Construct 3/4" Expansion Joints in junction slabs and C.I.P. copings plumb and perpendicular or radial to the Gutter Line. Provide at 90'-0" maximum intervals as shown.
5. Provide and install Preformed Expansion Joint Filler in accordance with Specification Section 932.
6. Construct 1/2" V-Grooves in junction slabs and C.I.P. copings plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between 3/4" Expansion Joints and/or Begin or End Junction Slab. V-Groove locations are to coincide with V-Groove locations in the Traffic Railing.
7. FILL REQUIREMENTS: Shoulder or Roadway Pavement or Fill is required on top of the junction slab for its entire length on the traffic side of the Traffic Railing. See Typical Sections on Sheet Nos. 6 and 7 of 19 for details.
8. Spacing shown is along the Gutter Line.
9. For Precast Coping only, Dowel Bars 4D are to extend 1'-0" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover to the top of the buildup concrete. See Wall Company Drawings for number and spacing of Dowel Bars 4D.
10. Work this Index with the following:
Index No. 420 - Traffic Railing - (32" F-Shape)
Index No. 425 - Traffic Railing - (42" F-Shape).
11. The following Indexes contain details of the intersection of the retaining wall at approach slabs:
Index No. 20900 - Approach Slabs (Flexible Pavement Approaches)
Index No. 20910 - Approach Slabs (Rigid Pavement Approaches)



PARTIAL ELEVATION VIEW

(Precast Coping and Junction Slab Reinforcing not Shown for Clarity)
(Precast Coping Shown, C.I.P. Coping Similar)

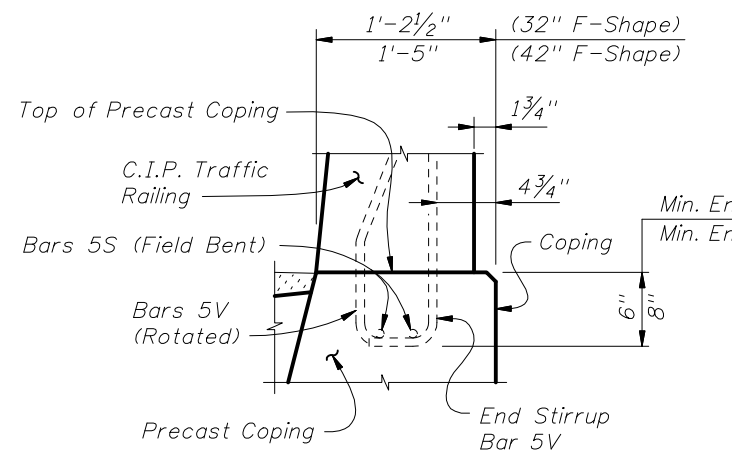
PRECAST OR C.I.P. COPING WITH C.I.P. JUNCTION SLAB DETAILS



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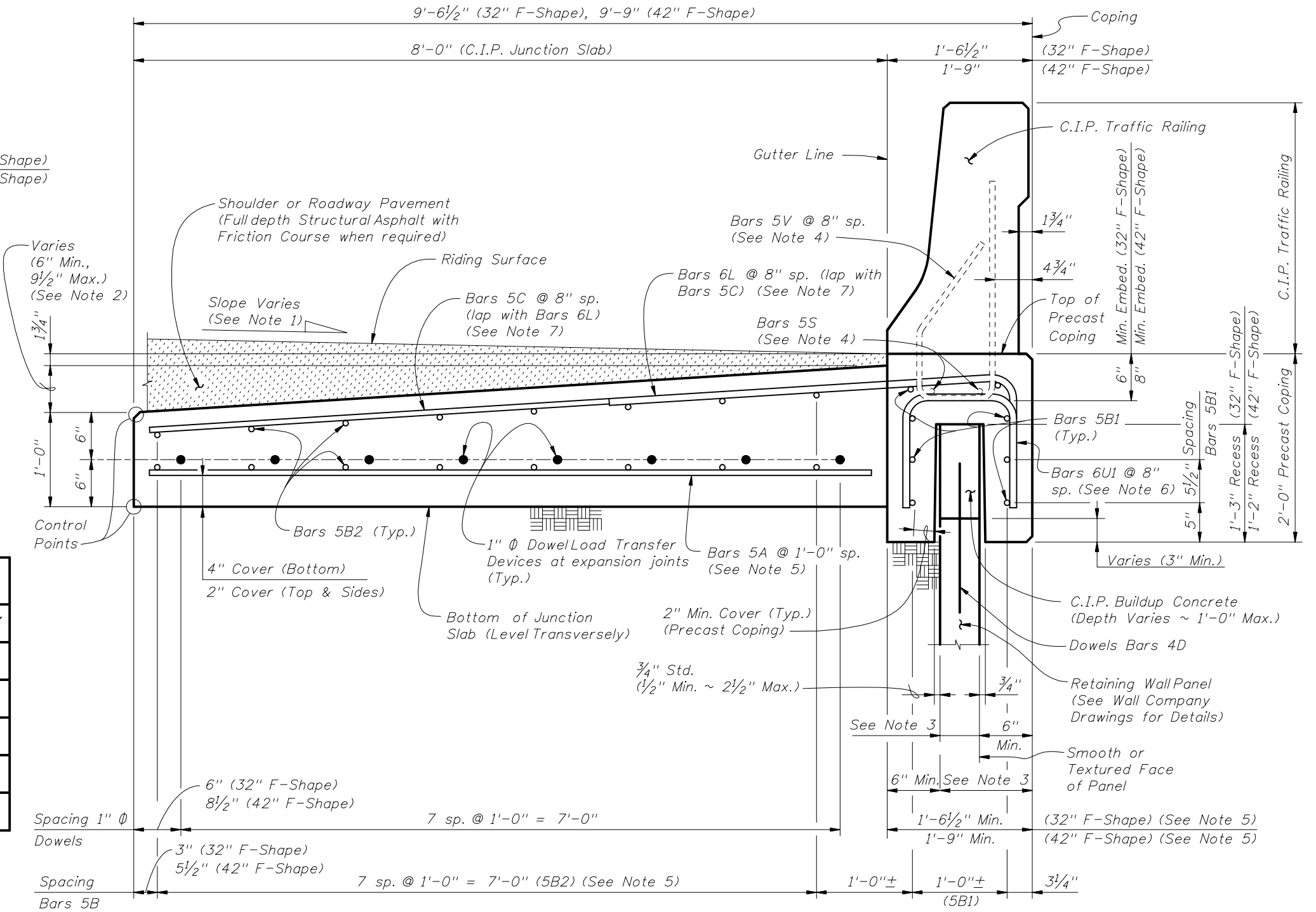


PARTIAL END VIEW OF TRAFFIC RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT (Showing Bars 5V and Bars 5S) (Precast Coping Shown, C.I.P. Coping Similar)

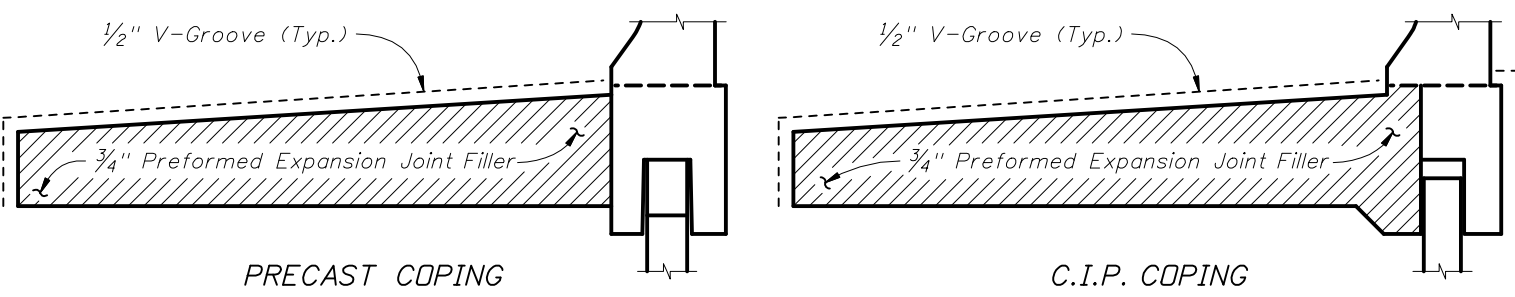
NOTE: See Index No. 420 and Index No. 425, Detail "A" for details.

ESTIMATED QUANTITIES FOR PRECAST COPING		
ITEM	UNIT	QUANTITY
Concrete (Precast Coping)	CY	0.921
Concrete (C.I.P. Junction Slab)	CY/FT	0.370
Reinforcing Steel (Precast Coping) excluding Bars 5V and 5S (Typ.)	LB	282.04
Reinforcing Steel (C.I.P. Junction Slab) (Typ.)	LB/FT	36.68
Additional Reinf. @ Expansion Joints	LB	42.72

(The above concrete quantities are based on a superelevation of 6.25% and a 5" wide retaining wall panel, beneath a 32" F-Shape Traffic Railing. The above Precast Coping quantities are based on one 10'-0" Precast Coping segment.)



TYPICAL SECTION THRU PRECAST COPING WITH C.I.P. JUNCTION SLAB AND RETAINING WALL AT EXPANSION JOINTS



DETAIL "A"
(Showing Locations of 1/2" V-Grooves and 3/4" Preformed Expansion Joint Filler)

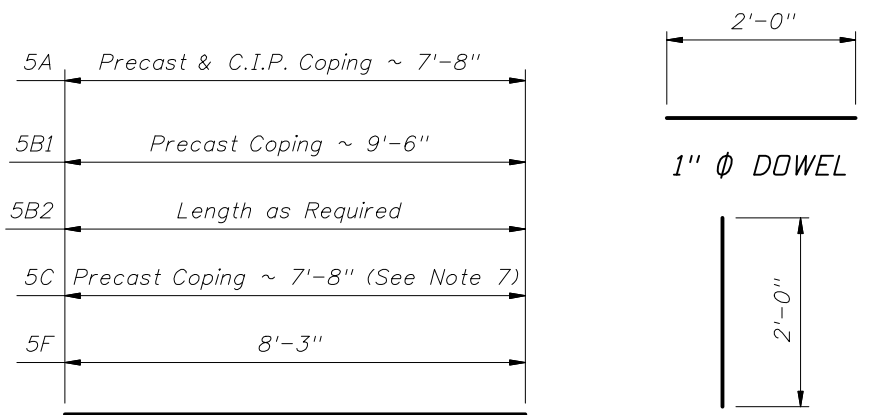
- JUNCTION SLAB NOTES:**
1. Match Cross Slope of Travel Lane or Shoulder.
 2. The minimum dimension of 6" corresponds to a superelevation of 6.25%. For superelevations exceeding 6.25%, increase this dimension (i.e., shift control points down) as required to match roadway superelevation.
 3. Actual width varies depending on type of Retaining Wall used.
 4. See Index No. 420 and Index No. 425 for Bars 5S and 5V.
 5. The Precast Coping width is based on a maximum 6 1/2" wide Retaining Wall Panel. If the Retaining Wall Panel is wider than 6 1/2", increase the width by the difference between the two Retaining Wall Panel widths. Increase the length of Bars 6L and decrease the length of Bars 5A & 5C as required when the coping width is increased and adjust spacing of Bars 5B2 as required to maintain 2" minimum cover.
 6. Increase the width (1'-2 1/2") of Bars 6U1 as required to maintain 2" minimum cover when recess width exceeds 8".
 7. At the Contractor's option, mechanical couplers may be used to splice reinforcing. Complete details, including reinforcement lengths are required in the Shop Drawings. Mechanical couplers shall develop 125% of the bar yield strength.

PRECAST OR C.I.P. COPING WITH C.I.P. JUNCTION SLAB DETAILS (F-SHAPE TRAFFIC RAILINGS)

REINFORCING STEEL BENDING DIAGRAMS - JUNCTION SLAB

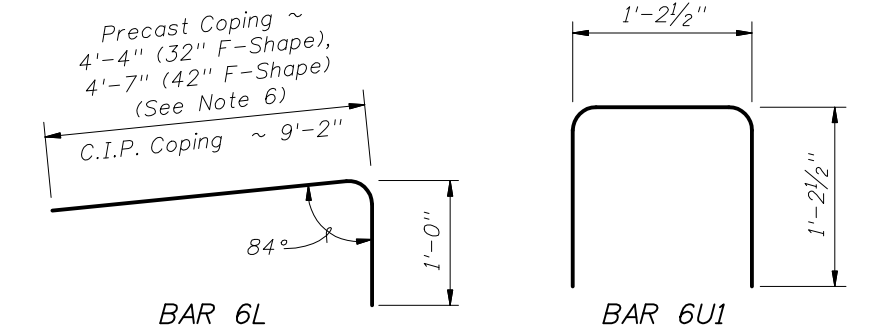
BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH		
		PRECAST COPING		C.I.P. COPING
		(32" F-SHAPE)	(42" F-SHAPE)	
A	5	7'-8"	7'-8"	7'-8"
B1	5	9'-6"	9'-6"	N/A
B2	5	AS REQD.	AS REQD.	AS REQD.
C	5	7'-8"	7'-8"	N/A
D	4	2'-0"	2'-0"	N/A
F	5	8'-3"	8'-3"	8'-3"
L	6	5'-4"	5'-7"	10'-2"
U1	6	3'-8"	3'-8"	3'-8"
1" Φ Dowel	Smooth Steel Bar	2'-0"	2'-0"	2'-0"



BARS 5A, 5B1, 5B2, 5C & 5F

DOWEL BAR 4D

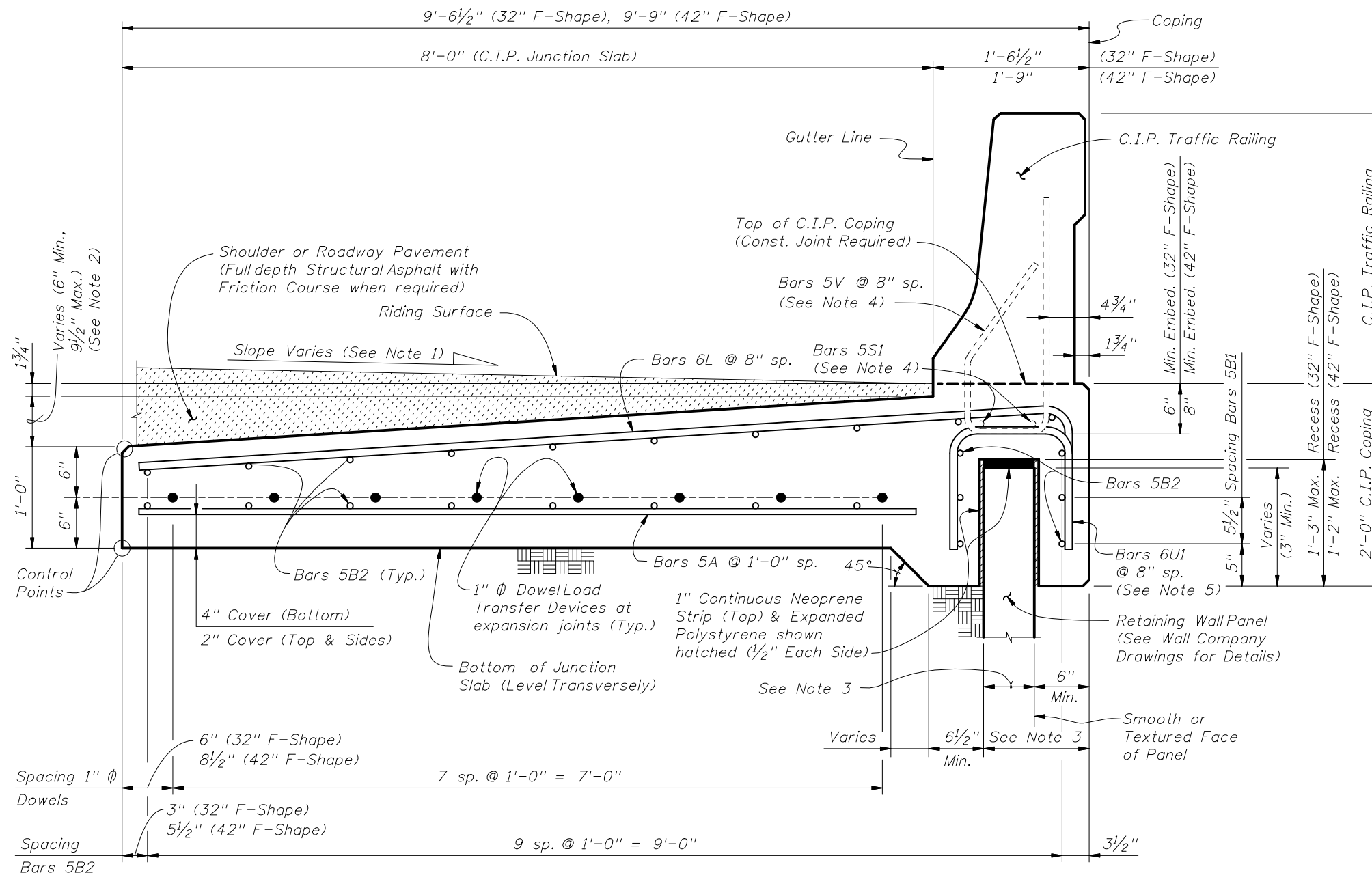


BAR 6L

BAR 6U1

REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- All reinforcing steel at expansion joints will have a 2" minimum cover.
- Lap splices for Bars 5B2 will be a minimum of 2'-2".
- For Precast Coping only, lap splice Bars 6L with Bars 5C. Lap splices will be a minimum of 2'-9".
- See Index No. 420 and Index No. 425 for Bars 5S and 5V.
- Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 1'-4 1/2" (32" F-Shape) or 1'-7" (42" F-Shape).
- Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 7'-9".
- The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.



TYPICAL SECTION THRU C.I.P. COPING AND JUNCTION SLAB AND RETAINING WALL AT EXPANSION JOINTS

ESTIMATED QUANTITIES FOR C.I.P. COPING

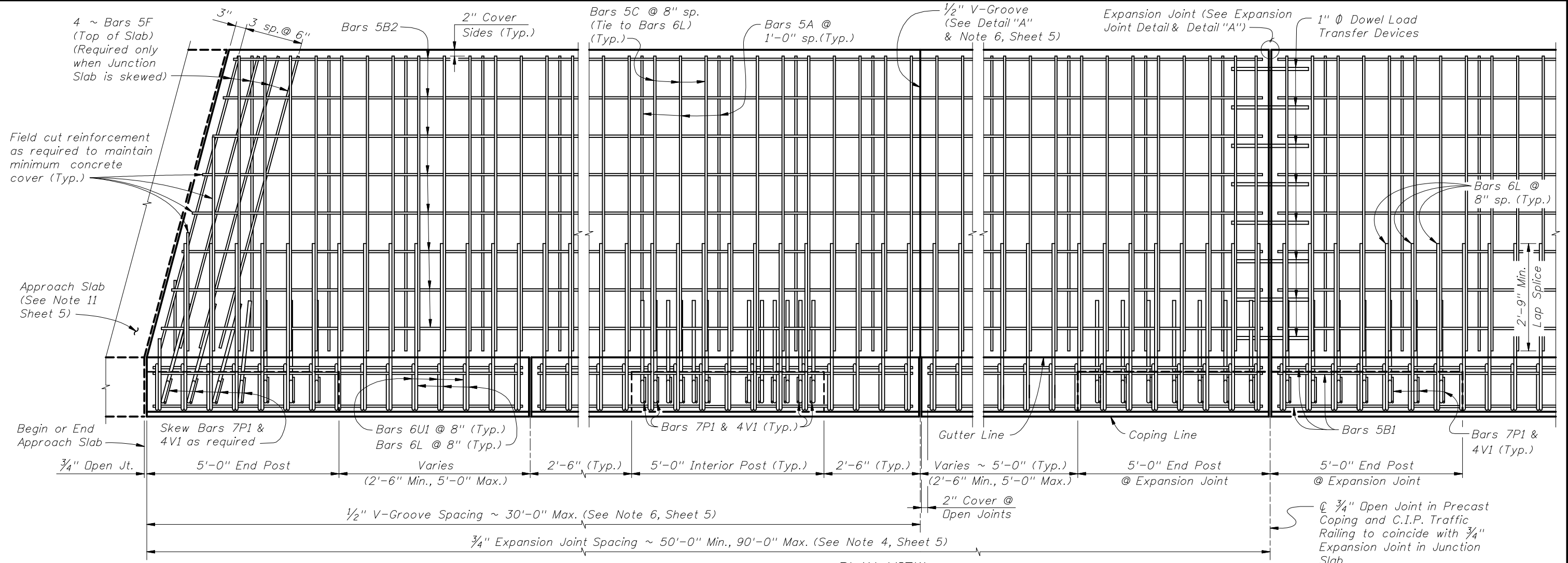
ITEM	UNIT	QUANTITY
Concrete	CY/Ft.	0.468
Reinforcing Steel (Typical) excluding Bars 5V and 5S (Typ.)	Lb./Ft.	64.20
Additional Reinf. @ Expansion Joint	Lb./Ft.	42.72

(The above concrete quantities are based on a superelevation of 6.25% and a 5" wide retaining wall panel, beneath a 32" F-Shape Traffic Railing).

JUNCTION SLAB NOTES:

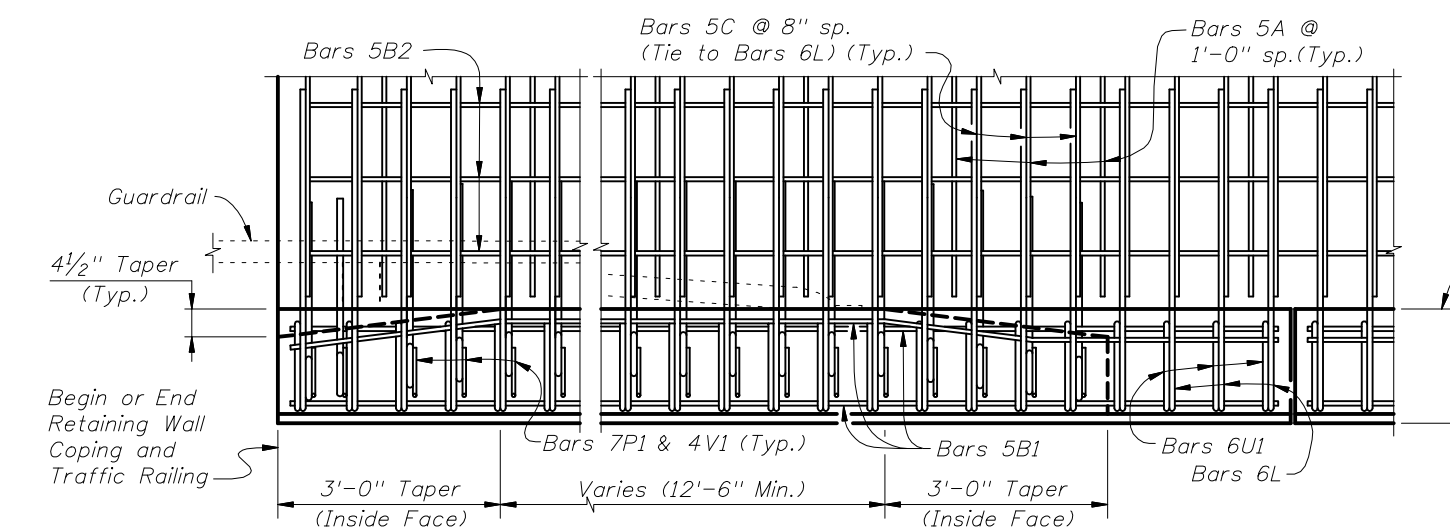
- Match Cross Slope of Travel Lane or Shoulder.
- The minimum dimension of 6" corresponds to a superelevation of 6.25%. For superelevations exceeding 6.25%, increase this dimension (i.e., shift control points down) as required to match roadway superelevation.
- Actual width varies depending on type of Retaining Wall used.
- See Index No. 420 and Index No. 425 for Bars 5S and 5V.
- Increase the width (1'-2 1/2") of Bars 6U1 as required to maintain 2" minimum cover when recess width exceeds 8".

PRECAST OR C.I.P. COPING WITH C.I.P. JUNCTION SLAB DETAILS (F-SHAPE TRAFFIC RAILINGS)

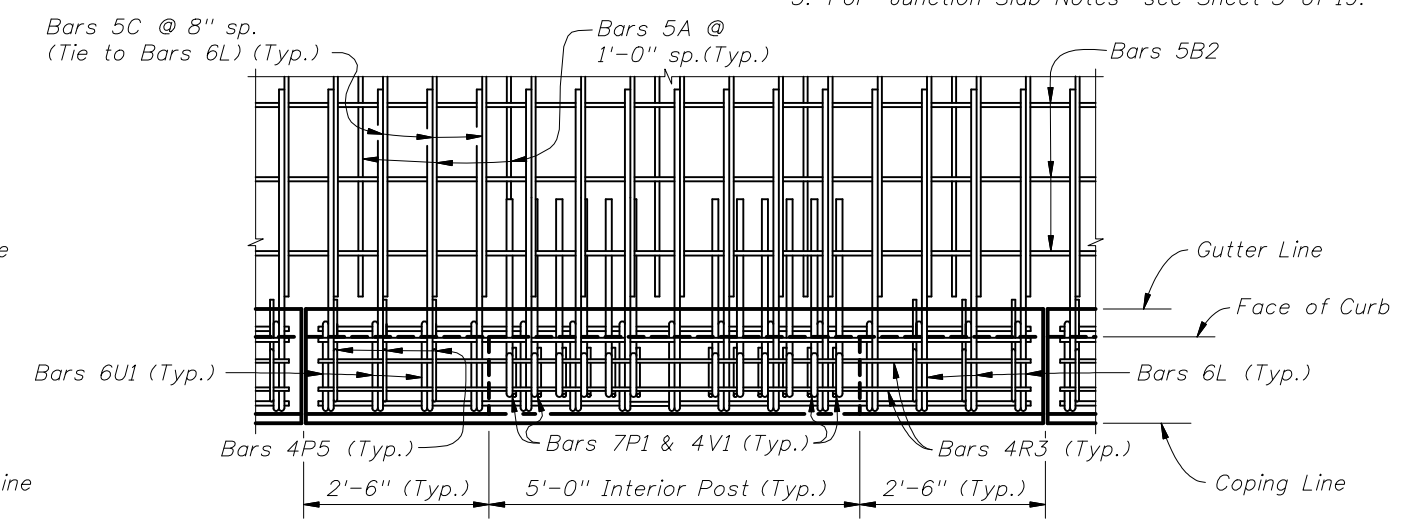


PLAN VIEW
 (Skewed Approach Slab shown, Perpendicular Approach Slab similar)
 (Precast Coping shown, C.I.P. Coping similar)
 (Traffic Railing reinforcement not shown, except for Bars 7P1 & 4V1)

- CROSS REFERENCES:**
1. For Detail "A" see Sheet 6 of 19.
 2. For "Expansion Joint Detail" see Sheet 5 of 19.
 3. For "Junction Slab Notes" see Sheet 5 of 19.



PARTIAL PLAN VIEW OF GUARDRAIL TRANSITION AT BEGIN OR END RETAINING WALL
 (Precast Coping shown, C.I.P. Coping similar)
 (Traffic Railing reinforcement not shown, except for Bars 7P1 & 4V1)



PARTIAL PLAN VIEW OF COPING WITH CURB
 (Precast Coping shown, C.I.P. Coping similar)
 (Traffic Railing reinforcement not shown, except for Bars 4P5, 4R3, 7P1 & 4V1)

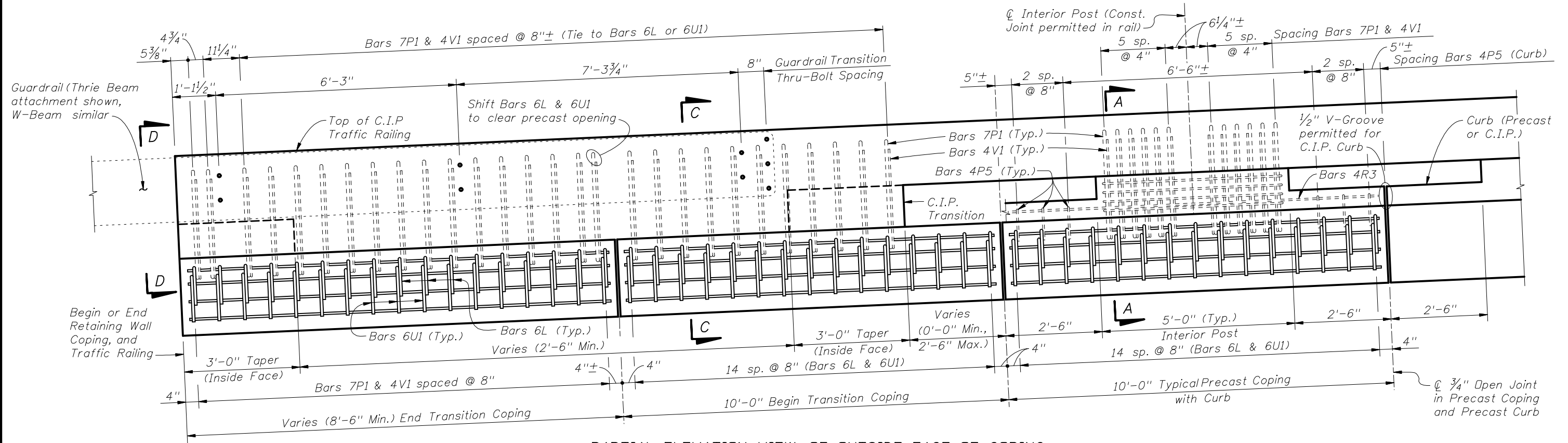
PRECAST OR C.I.P. COPING WITH JUNCTION SLAB (CORRAL SHAPE TRAFFIC RAILING)



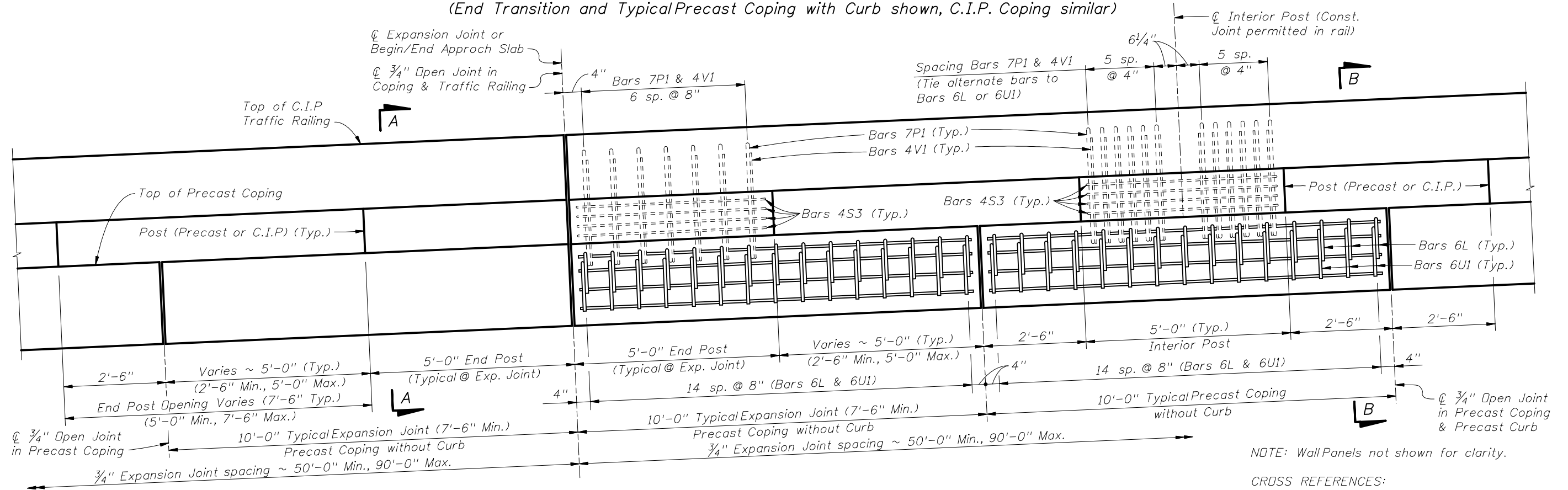
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PARTIAL ELEVATION VIEW OF OUTSIDE FACE OF COPING
(End Transition and Typical Precast Coping with Curb shown, C.I.P. Coping similar)



PARTIAL ELEVATION VIEW OF OUTSIDE FACE OF COPING
(Precast Coping at Expansion Joint and Typical Precast Coping without Curb shown, C.I.P. Coping similar)

NOTE: Wall Panels not shown for clarity.

- CROSS REFERENCES:
1. For Sections A-A, B-B, C-C & D-D, see Sheet 10 of 19.
 2. For Junction Slab Notes, see Sheet 5 of 19.

PRECAST OR C.I.P. COPING WITH JUNCTION SLAB (CORRAL SHAPE TRAFFIC RAILING)



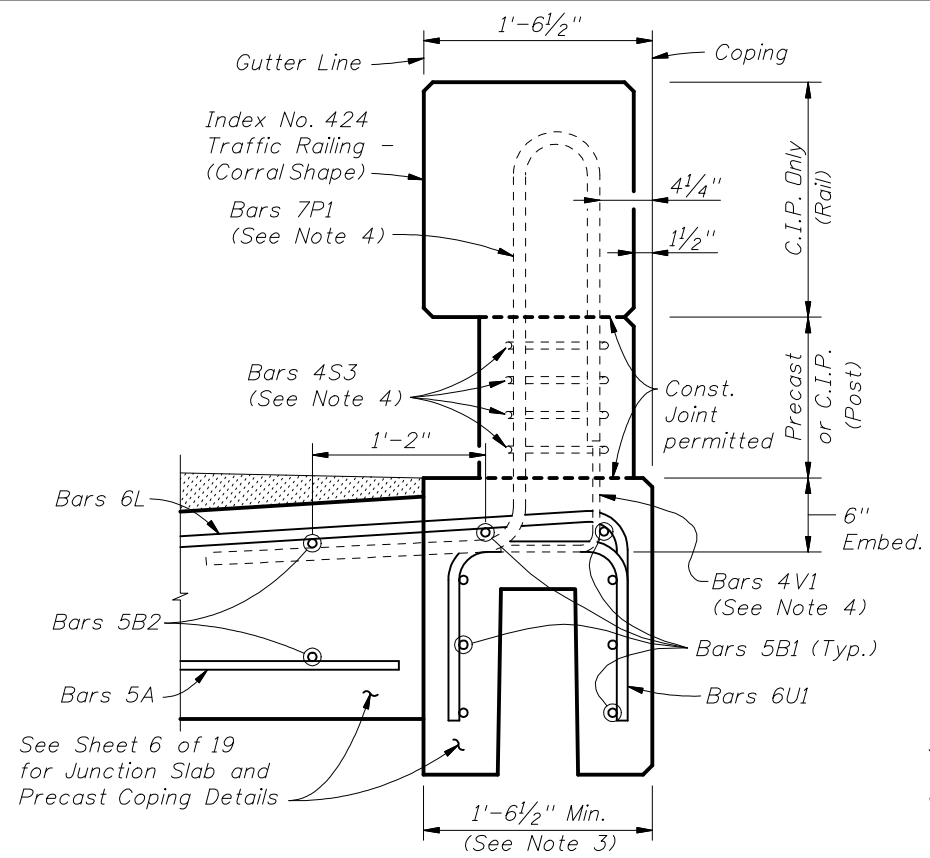
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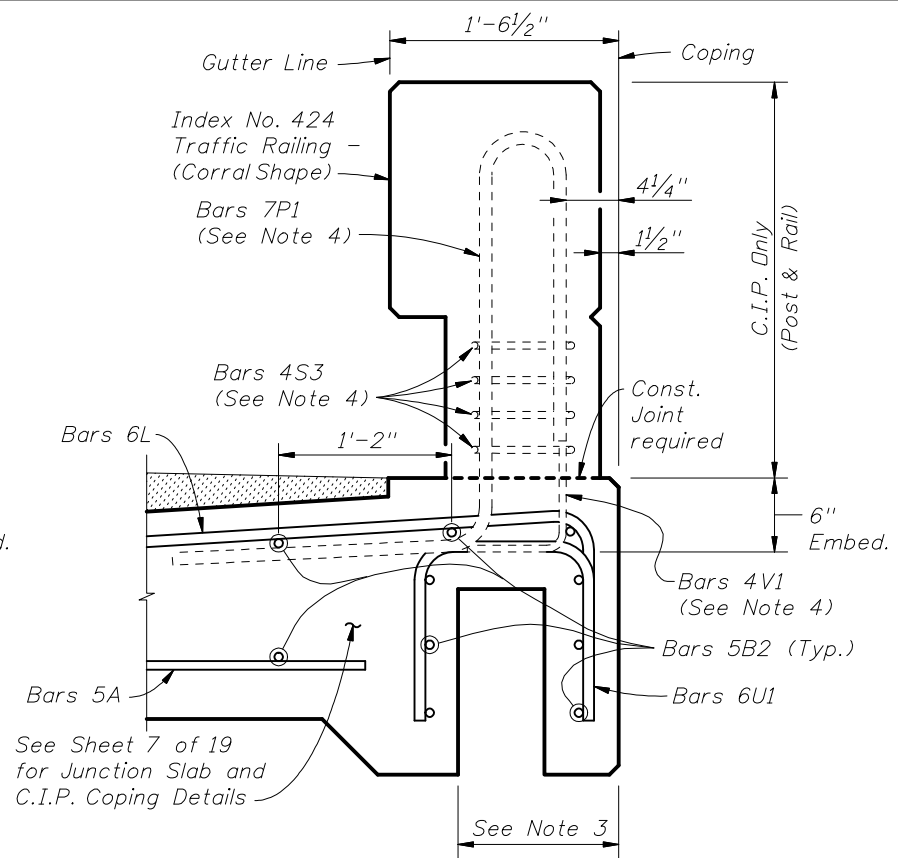
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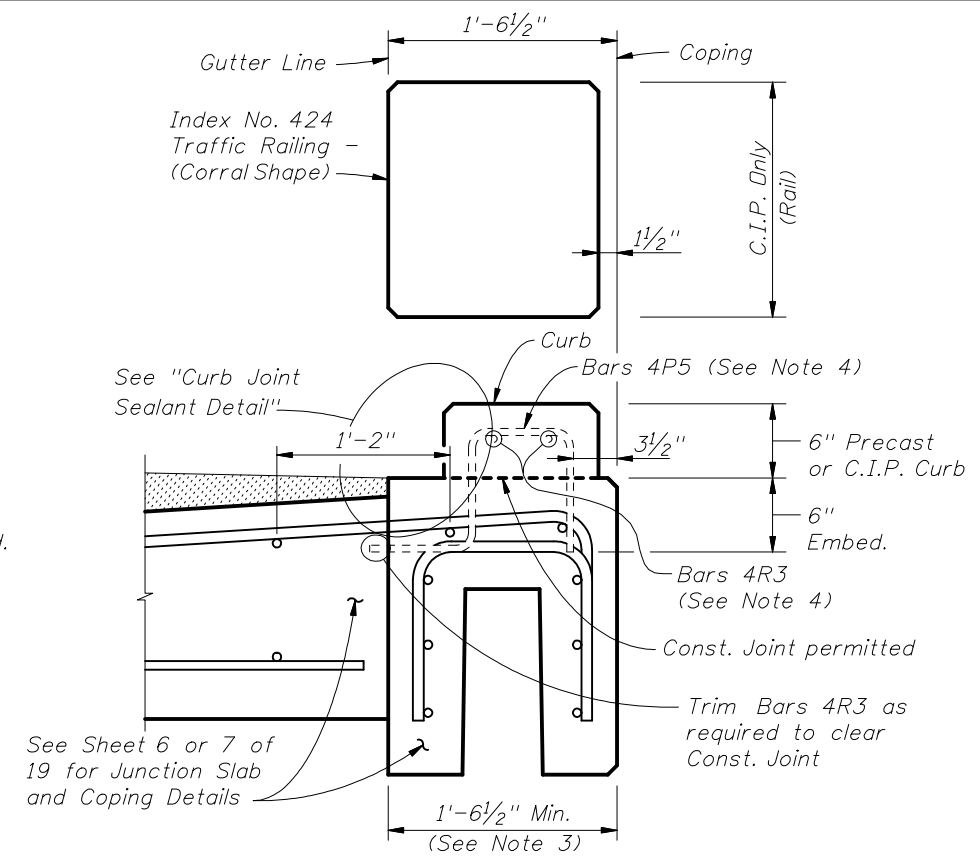
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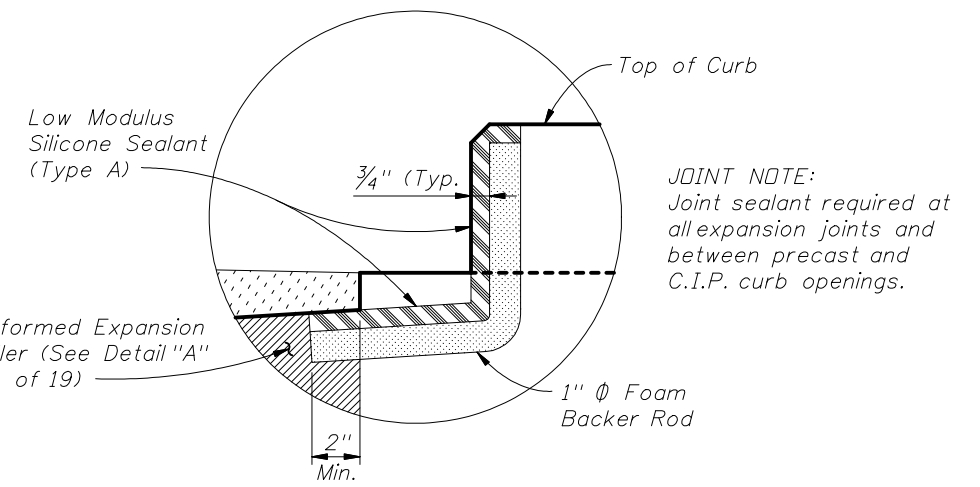
SECTION A-A
(TYPICAL SECTION PRECAST COPING WITHOUT CURB)



SECTION A-A
(TYPICAL SECTION C.I.P. COPING WITHOUT CURB)

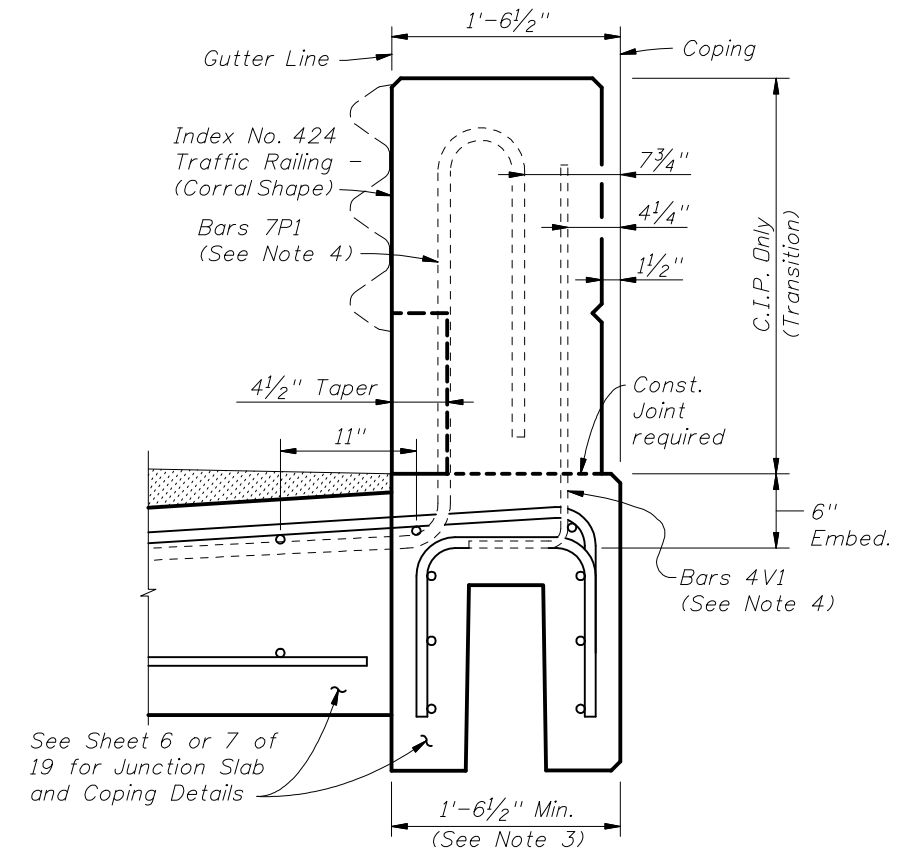


SECTION B-B
(TYPICAL SECTION WITH CURB)
(Precast Coping Shown, C.I.P. Coping Similar)

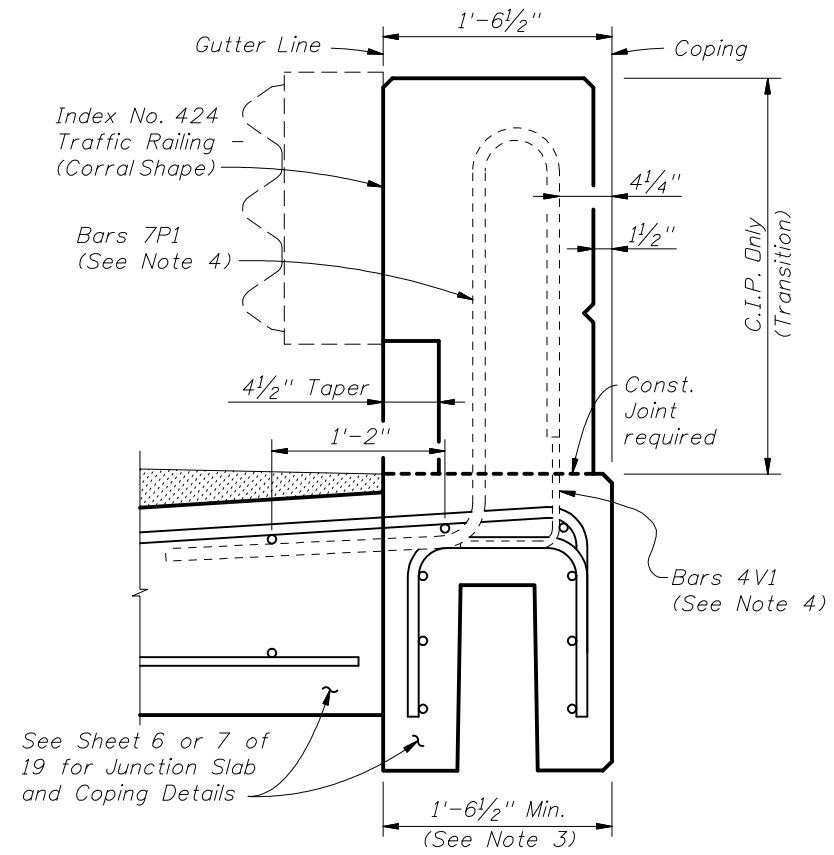


CURB JOINT SEALANT DETAIL

- NOTES:**
1. See Sheets 6 & 7 of 19 for Junction Slab and Coping details.
 2. Slip Forming of C.I.P. Traffic Railing is not permitted.
 3. Actual width varies depending on type of Retaining Wall used.
 4. See Index No. 424 for Traffic Railing details and Bars 7P1, 4P5, 4R3, 4S3 & 4V1. Bars 5R2 and 5U are not required in Retaining Wall Coping.



SECTION C-C
(TYPICAL SECTION TRANSITION COPING)
(Precast Coping shown, C.I.P. Coping similar)



END VIEW D-D
(TYPICAL SECTION COPING TRANSITION)
(Precast Coping shown, C.I.P. Coping similar)

PRECAST OR C.I.P. COPING WITH JUNCTION SLAB (CORRAL SHAPE TRAFFIC RAILING)

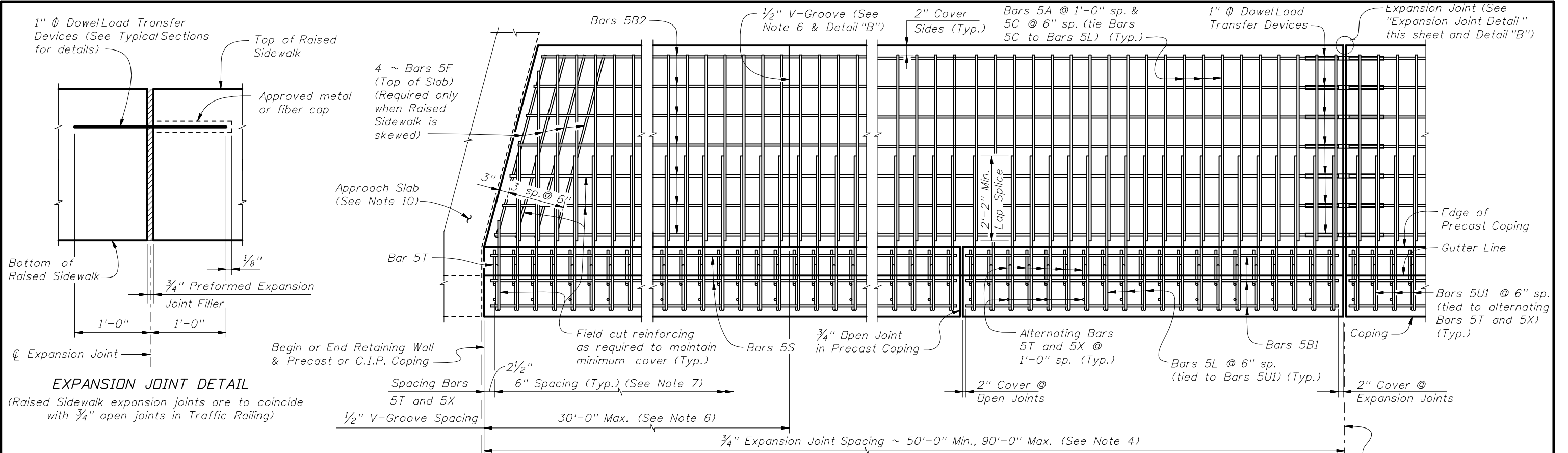


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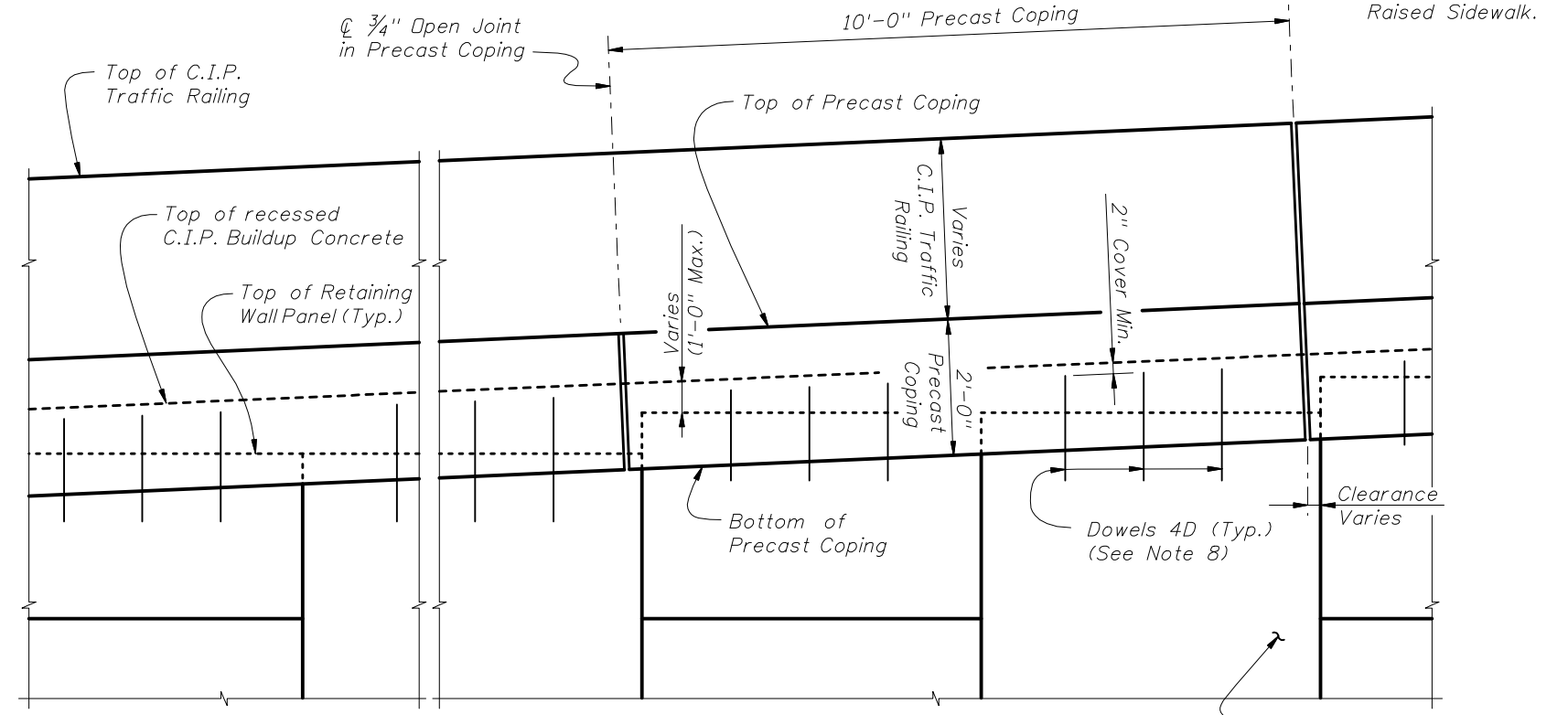
Last Revision 01/01/07 Sheet No. 10 of 19

Index No. **5300**



EXPANSION JOINT DETAIL
 (Raised Sidewalk expansion joints are to coincide with 3/4" open joints in Traffic Railing)

PARTIAL PLAN VIEW FOR VERTICAL SHAPE TRAFFIC RAILING
 (Skewed Approach Slab Shown, Perpendicular Approach Slab Similar)
 (Precast Coping Shown, C.I.P. Coping Similar) (Traffic Railing not Shown for Clarity)



PARTIAL ELEVATION VIEW
 (Precast Coping & Raised Sidewalk Reinforcing not Shown for Clarity)
 (Precast Coping Shown, C.I.P. Coping Similar) **PRECAST OR C.I.P. COPING WITH C.I.P. RAISED SIDEWALK DETAILS**

RAISED SIDEWALK NOTES:

- CONSTRUCTION REQUIREMENTS:** Construct the raised sidewalk level transversely and expansion joints plumb; do not construct the raised sidewalk or C.I.P. coping perpendicular to the roadway surface. Slip forming is not permitted.
- APPLICATIONS:** This raised sidewalk is only applicable for a TL-4 crash test rating. Precast Traffic Railings are not allowed.
- REINFORCING STEEL:** Dowel Load Transfer Devices will be ASTM A 36 smooth round bar and hot-dip galvanized in accordance with Specification Section 962. Install Dowel Load Transfer Devices in accordance with Specification Section 350.
- Construct 3/4" Expansion Joints in raised sidewalk and C.I.P. copings plumb and perpendicular or radial to the Gutter Line. Provide at 90'-0" maximum intervals as shown.
- Provide and install Preformed Expansion Joint Filler in accordance with Specification Section 932.
- Construct 1/2" V-Grooves in raised sidewalk and C.I.P. coping plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between 3/4" Expansion Joints and/or Begin or End Raised Sidewalk. V-Groove locations are to coincide with V-Groove locations in the Traffic Railing.
- Spacing shown is along the Gutter Line.
- For Precast Coping only, Dowel Bars 4D are to extend 1'-0" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover to the top of the buildup concrete. See Wall Company Drawings for number and spacing of Dowel Bars 4D.
- Work this Index with the following:
 Index No. 422 - Traffic Railing - (42" Vertical Shape)
 Index No. 423 - Traffic Railing - (32" Vertical Shape)
- The following Indexes contain details of the intersection of the retaining wall at approach slabs:
 Index No. 20900 - Approach Slabs (Flexible Pavement Approaches)
 Index No. 20910 - Approach Slabs (Rigid Pavement Approaches)

CROSS REFERENCE: For Detail "B", see Sheet 12 of 19.

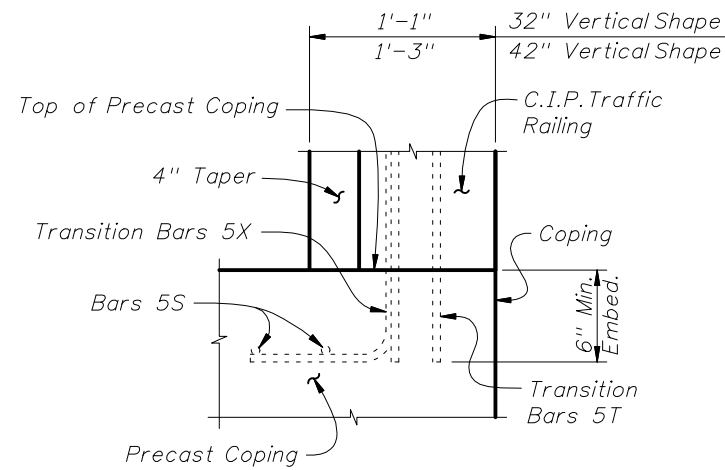


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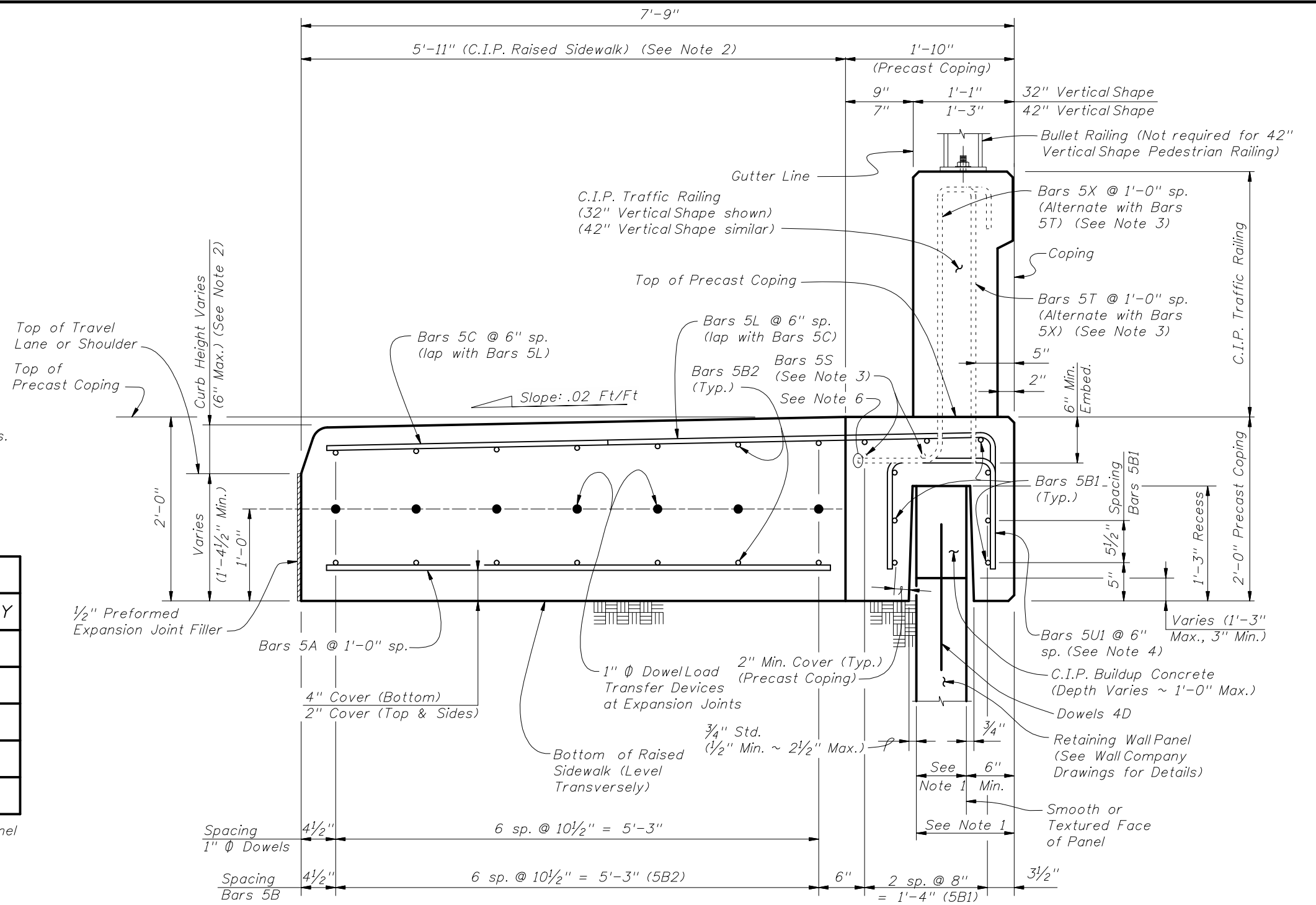


PARTIAL END VIEW OF TRAFFIC RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT
(Showing Bars 5S, Bars 5T and Bars 5X)
(Precast Coping Shown, C.I.P. Coping Similar)

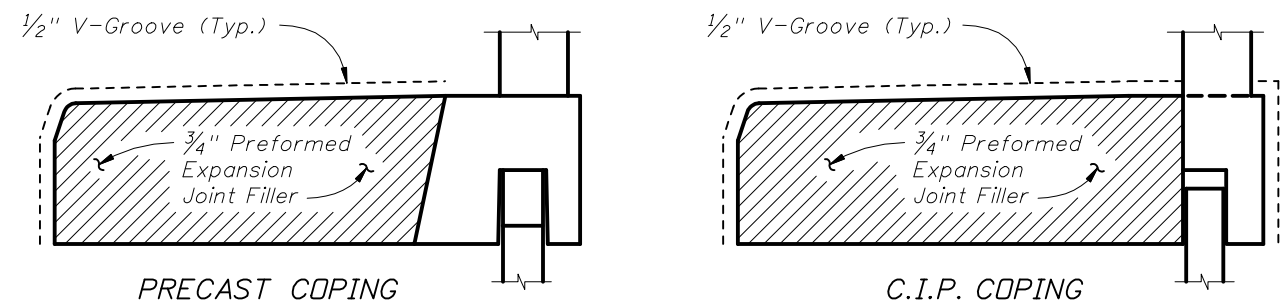
NOTE: See Index No. 422 and Index No. 423, Railing End Detail for details.

ESTIMATED QUANTITIES FOR PRECAST COPING		
ITEM	UNIT	QUANTITY
Concrete (Precast Coping)	CY	1.136
Concrete (C.I.P. Raised Sidewalk)	CY/Ft.	0.424
Reinforcing Steel (Precast Coping) excluding Bars 5T, 5X and 5S (Typ.)	Lb.	269.96
Reinforcing Steel (C.I.P. Raised Sidewalk) (Typ.)	Lb./Ft.	31.73
Additional Reinf. @ Expansion Joints	Lb.	37.38

(The above concrete quantities are based on a 5" wide retaining wall panel and a Type D Concrete Curb (See Note 2). The above Precast Coping quantities are based on one 10'-0" Precast Coping segment.)



TYPICAL SECTION THRU PRECAST COPING WITH C.I.P. RAISED SIDEWALK AND RETAINING WALL AT EXPANSION JOINTS



DETAIL "B"

(Showing Locations of 1/2" V-Grooves and 3/4" Preformed Expansion Joint Filler)

RAISED SIDEWALK NOTES:

- Actual width varies depending on type of Retaining Wall used.
- Match roadway curb shape (Type) and height. See Roadway Plans and Index No. 300. 5'-11" dimension is based on a 32" Vertical Shape Traffic Railing with a Type D curb adjacent to a 6'-0" wide sidewalk. Adjust this dimension as required for other curb types or transitions at Begin or End Retaining Wall.
- See Index No. 422 and Index No. 423 for Bars 5S, 5T & 5X and Bullet Railing details. Adjust vertical dimension of Bars 5T and 5X, see Reinforcing Steel Note 5.
- Increase the width (1'-2 1/2") of Bars 5U1 as required to maintain 2" minimum cover when recess width exceeds 8".
- At the Contractor's option, mechanical couplers may be used to splice reinforcing. Complete details, including reinforcement lengths are required in the Shop Drawings. Mechanical couplers shall develop 125% of the bar yield strength.
- Trim end of Bars 5T and 5X to clear construction joint for 42" Vertical Shape Traffic Railing.

PRECAST OR C.I.P. COPING WITH C.I.P. RAISED SIDEWALK DETAILS (VERTICAL SHAPE TRAFFIC RAILINGS)



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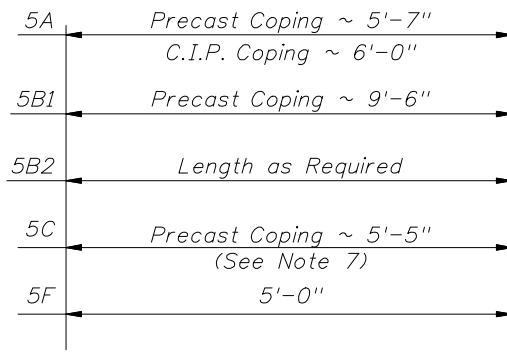
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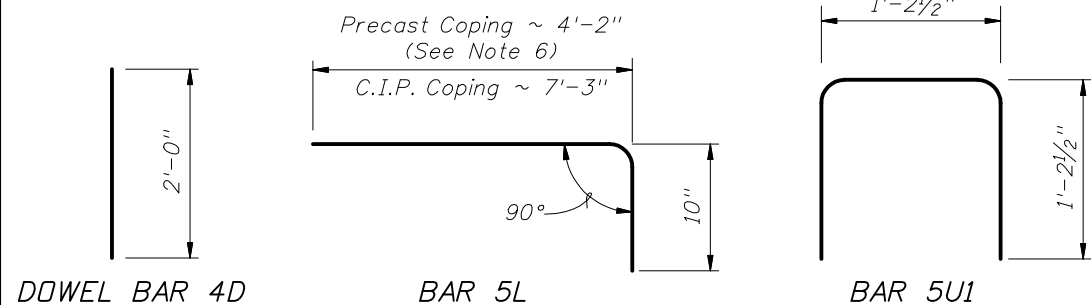
REINFORCING STEEL BENDING DIAGRAMS - RAISED SIDEWALK

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH	
		PRECAST COPING	C.I.P. COPING
A	5	5'-7"	6'-0"
B1	5	9'-6"	N/A
B2	5	AS REQD.	AS REQD.
C	5	5'-5"	N/A
D	4	2'-0"	N/A
F	5	5'-0"	5'-0"
L	5	5'-0"	8'-1"
U1	5	3'-8"	3'-8"
1" Ø Dowel	Smooth Steel Bar	2'-0"	2'-0"



BARS 5A, 5B1, 5B2, 5C & 5F



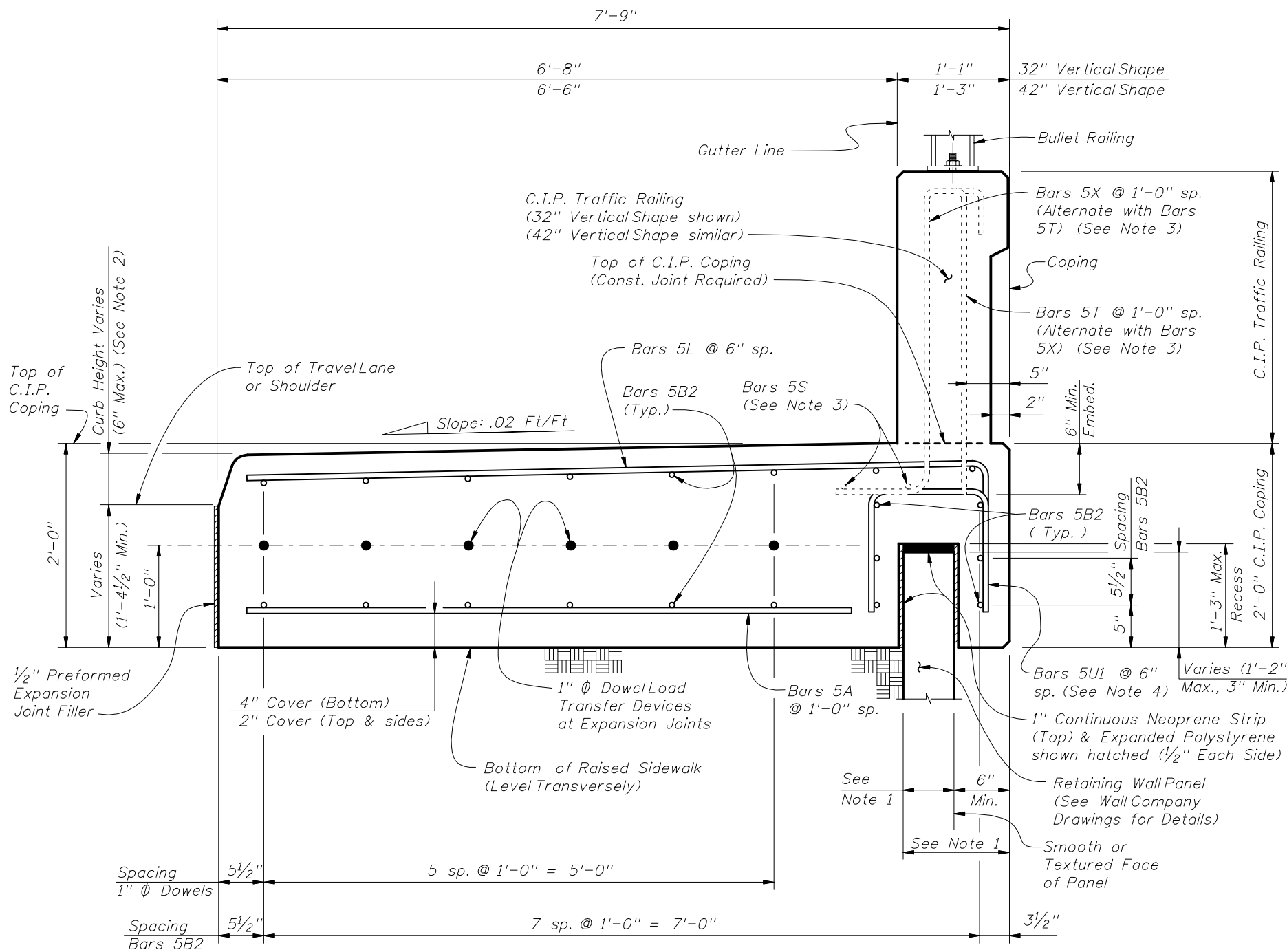
REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- All reinforcing steel at expansion joints will have a 2" minimum cover.
- Lap splices for Bars 5B will be a minimum of 2'-2".
- Lap splice Bars 5L with Bars 5C. Lap splices will be a minimum of 2'-2".
- See Index No. 422 and Index No. 423 for Bars 5S, 5T and 5X. Adjust vertical dimensions of Stirrup Bars 5T and 5X to 3'-0" for 32" Vertical Shape or 3'-10" for 42" Vertical Shape.
- Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 1'-8".
- Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 5'-8".
- The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.

ESTIMATED QUANTITIES FOR C.I.P. COPING

ITEM	UNIT	QUANTITY
Concrete	CY/Ft.	0.538
Reinforcing Steel (Typical) excluding Bars 5T, 5X and 5S (Typ.)	Lb./Ft.	51.63
Additional Reinf. @ Expansion Joints	Lb.	32.04

The above concrete quantities are based on a 5" wide retaining wall panel and a Type D Concrete Curb (See Note 2).

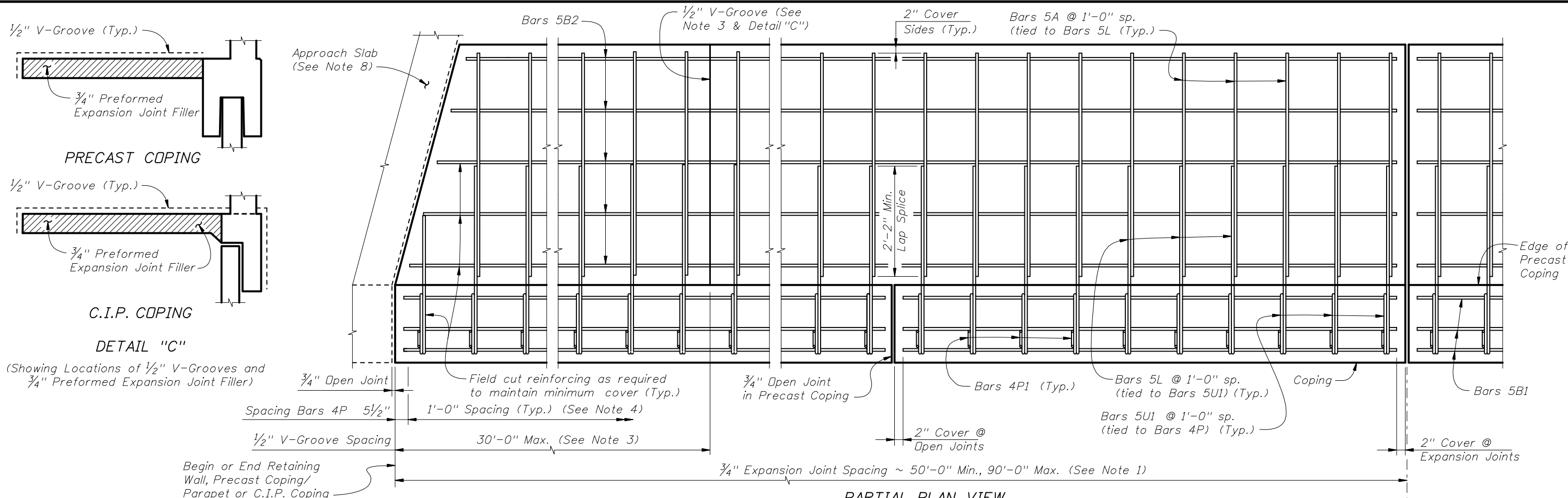


TYPICAL SECTION THRU C.I.P. COPING AND RAISED SIDEWALK AND RETAINING WALL AT EXPANSION JOINTS

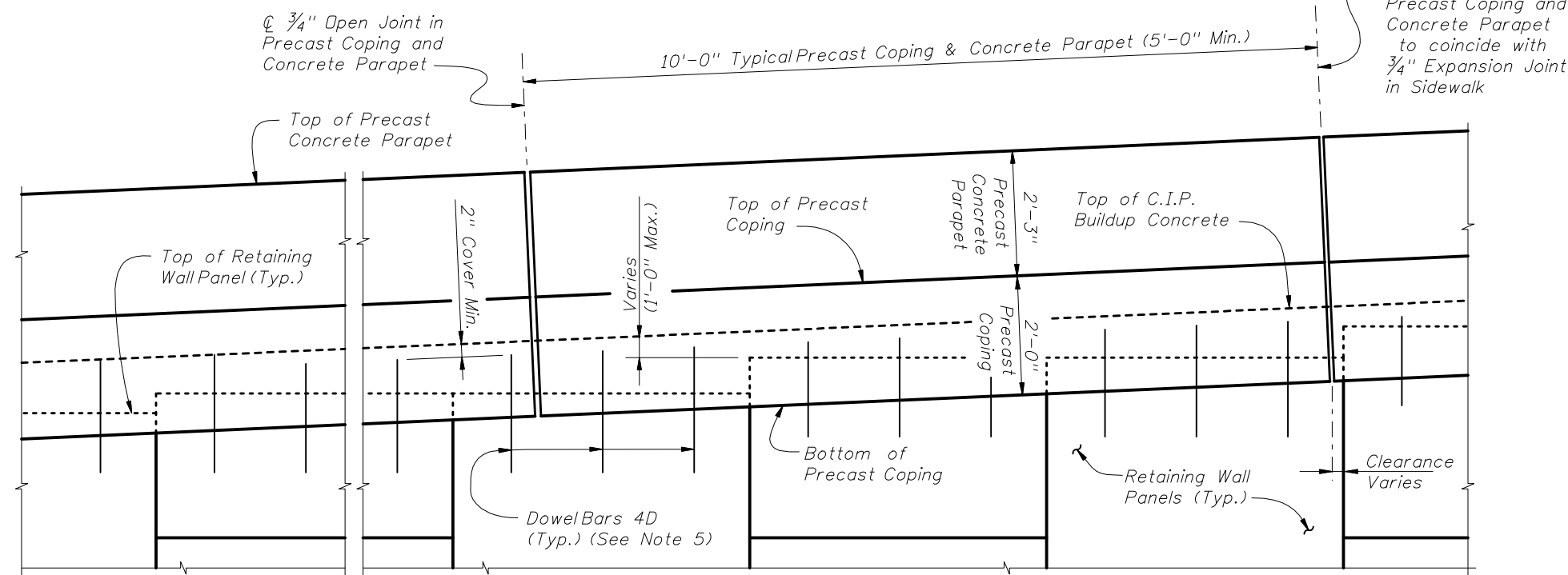
RAISED SIDEWALK NOTES:

- Actual width varies depending on type of Retaining Wall used.
- Match roadway curb shape (Type) and height. See Roadway Plans and Index No. 300. 6'-8" dimension is based on a 32" Vertical Shape Traffic Railing with a Type D curb adjacent to a 6'-0" wide sidewalk. Adjust this dimension as required for other curb types or transitions at Begin or End Retaining Wall.
- See Index No. 422 and Index No. 423 for Bars 5S, 5T & 5X and Bullet Railing details. Adjust vertical dimension of Bars 5T and 5X, see Reinforcing Steel Note 5.
- Increase the width (1'-2 1/2") of Bars 5U1 as required to maintain 2" minimum cover when recess width exceeds 8".

PRECAST OR C.I.P. COPING WITH C.I.P. RAISED SIDEWALK DETAILS (VERTICAL SHAPE TRAFFIC RAILINGS)



PARTIAL PLAN VIEW
 (Skewed Approach Slab Shown, Perpendicular Approach Slab Similar)
 (Precast Coping Shown, C.I.P. Coping Similar) (Concrete Parapet not Shown for Clarity)

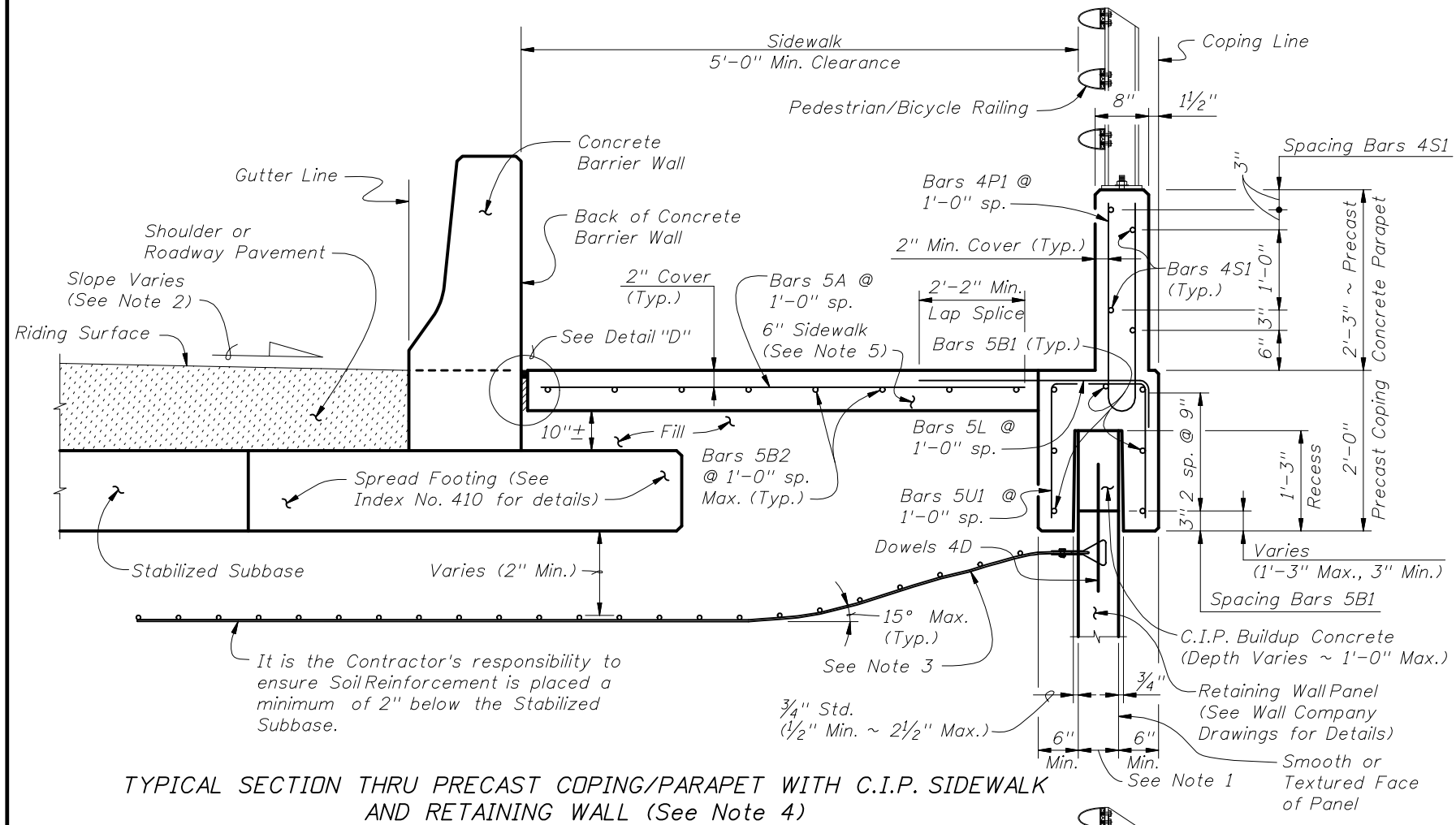


PARTIAL ELEVATION VIEW
 (Precast Coping and Sidewalk Reinforcing not Shown for Clarity)
 (Precast Coping Shown, C.I.P. Coping Similar)

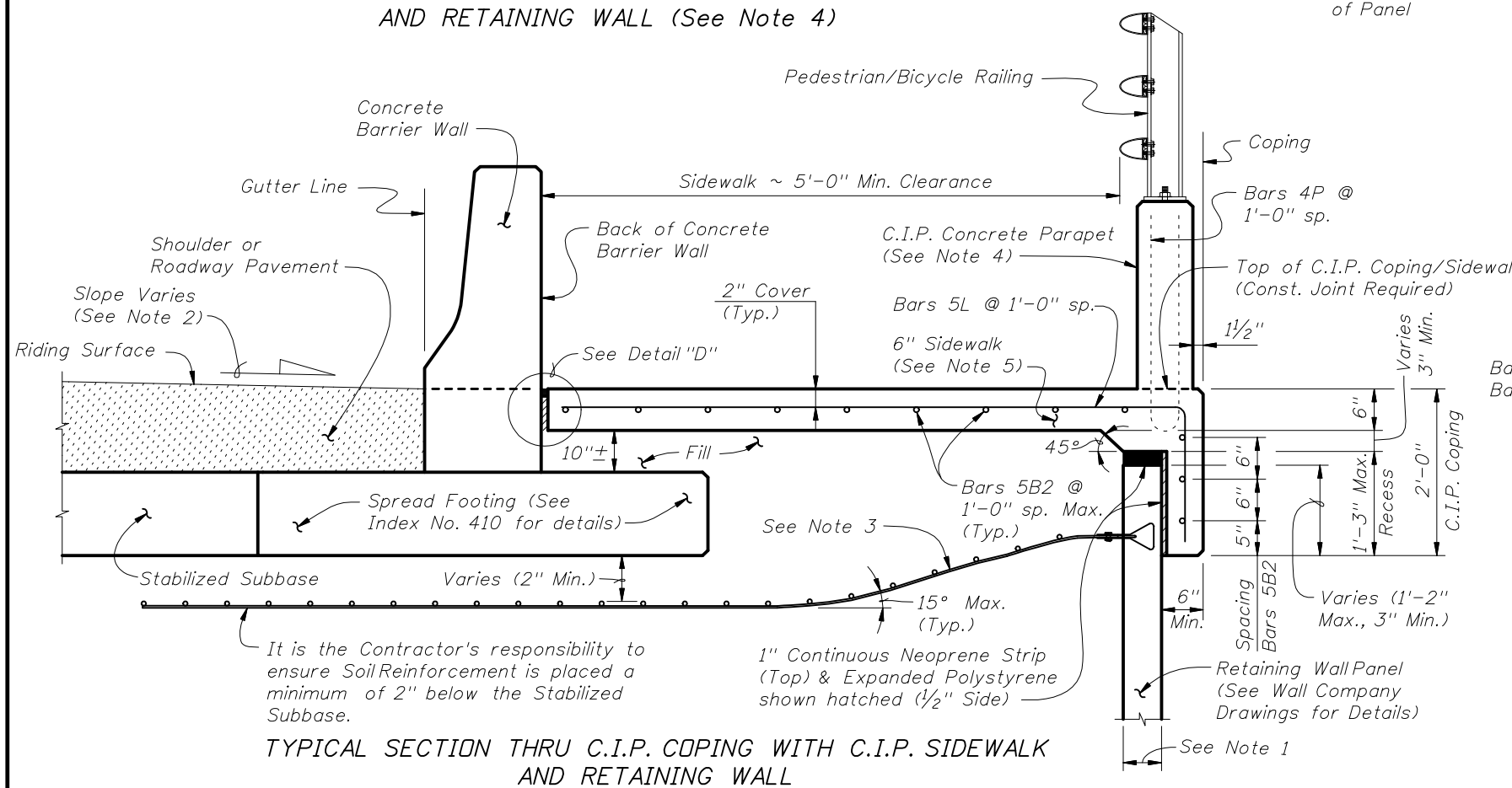
- PRECAST COPING/PARAPET AND SIDEWALK NOTES:**
1. Construct $\frac{3}{4}$ " Expansion Joints in sidewalk and C.I.P. coping plumb and perpendicular or radial to the Gutter Line. Provide at 90'-0" maximum intervals as shown.
 2. Provide and install Preformed Expansion Joint Filler in accordance with Specification Section 932.
 3. Construct $\frac{1}{2}$ " V-Grooves in sidewalk and C.I.P. coping plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between $\frac{3}{4}$ " Expansion Joints and/or Begin or End Sidewalk. For C.I.P. Coping only, V-Groove locations are to coincide with V-Groove locations in the Concrete Parapet.
 4. Spacing shown is along the Gutter Line.
 5. For Precast Coping only, Dowel Bars 4D are to extend 1'-0" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover to the top of the buildup concrete. See Wall Company Drawings for number and spacing of Dowel Bars 4D.
 6. Work this Index with the following:
 Index No. 410 - Concrete Barrier Wall
 7. For C.I.P. Coping only, work this Index with the following:
 Index No. 820 - Pedestrian/Bicycle Railing.
 8. The following Indexes contain details of the intersection of the retaining wall at approach slabs:
 Index No. 20900 - Approach Slabs (Flexible Pavement Approaches)
 Index No. 20910 - Approach Slabs (Rigid Pavement Approaches)

PRECAST COPING/PARAPET OR C.I.P. COPING WITH C.I.P. SIDEWALK DETAILS





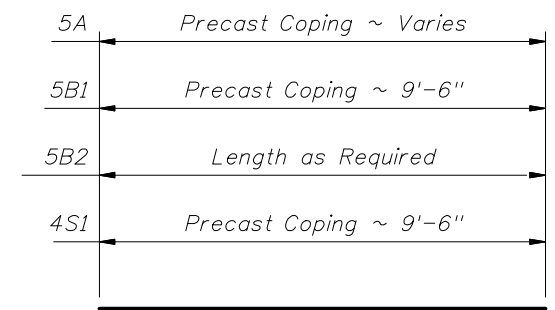
TYPICAL SECTION THRU PRECAST COPING/PARAPET WITH C.I.P. SIDEWALK AND RETAINING WALL (See Note 4)



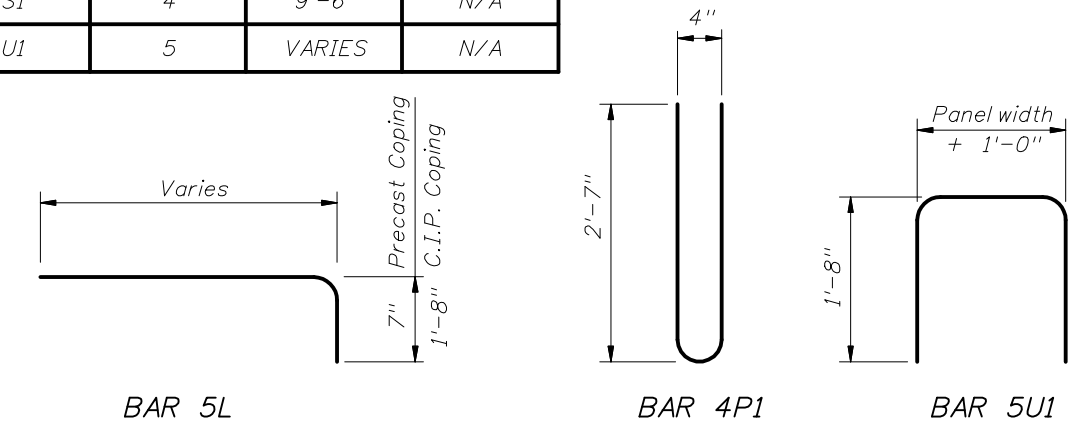
TYPICAL SECTION THRU C.I.P. COPING WITH C.I.P. SIDEWALK AND RETAINING WALL

REINFORCING STEEL BENDING DIAGRAMS - COPING/PARAPET AND SIDEWALK

BILL OF REINFORCING STEEL			
MARK	SIZE	LENGTH	
		PRECAST COPING	C.I.P. COPING
A	5	VARIABLES	N/A
B1	5	9'-6"	N/A
B2	5	AS REQD.	AS REQD.
D	4	2'-0"	N/A
L	5	VARIABLES	VARIABLES
P1	4	5'-5"	N/A
S1	4	9'-6"	N/A
U1	5	VARIABLES	N/A



BARS 5A, 5B1, 5B2 & 4S1

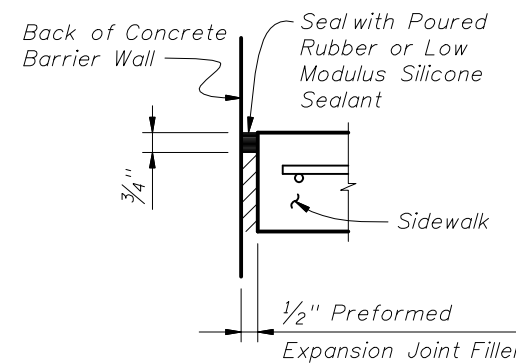


REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- All reinforcing steel at expansion joints will have a 2" minimum cover.
- Lap splices for Bars 5B2 will be a minimum of 2'-2".
- For Precast Coping only, lap splice Bars 5L with Bars 5A. Lap splices will be a minimum of 2'-2".
- For C.I.P. only, see Index No. 820 for Bars 4P and 4S.
- The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.

PRECAST COPING/PARAPET AND SIDEWALK NOTES:

- Actual width varies depending on type of Retaining Wall used.
- Match Cross Slope of Travel Lane or Shoulder.
- Gradually deflect/displace Soil Reinforcement downward as required. Soil Reinforcement is shown deflected downward for illustrative purposes only and is not to scale. See Wall Company Drawings for details.
- C.I.P. Concrete Parapet shown, Vertical Shape Traffic Railing similar. Complete details and dimensions of Vertical Traffic Railings are required in the Shop Drawings.
- Match cross slope of connecting sidewalk or as shown in the Wall Control Drawings.



DETAIL "D"

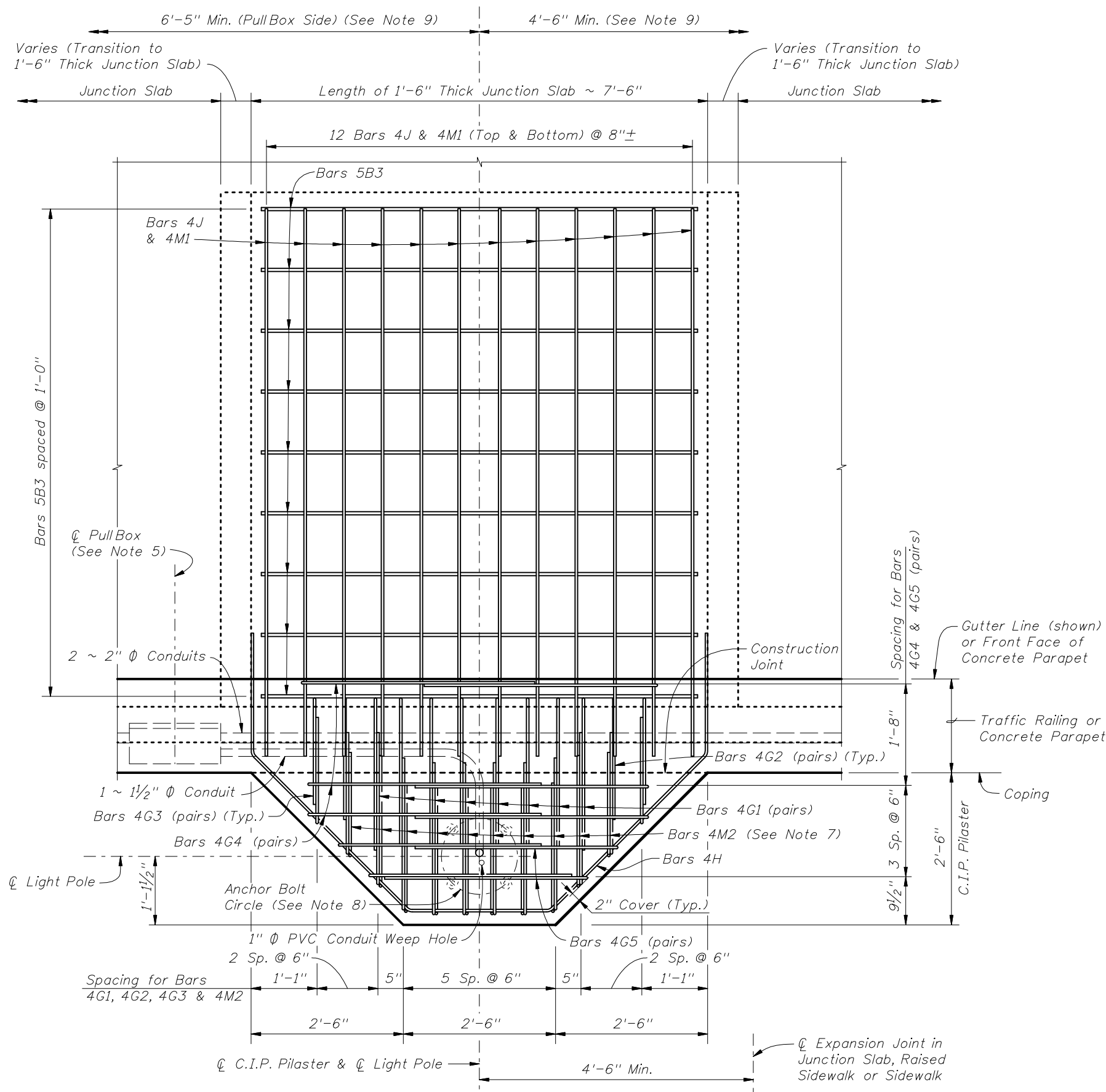
PRECAST COPING/PARAPET OR C.I.P. COPING WITH C.I.P. SIDEWALK DETAILS



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PLAN VIEW
 (Junction Slab reinforcing not shown for clarity)
 (Junction Slab Shown, Raised Sidewalk or Sidewalk Similar)

LIGHT PILASTER NOTES:

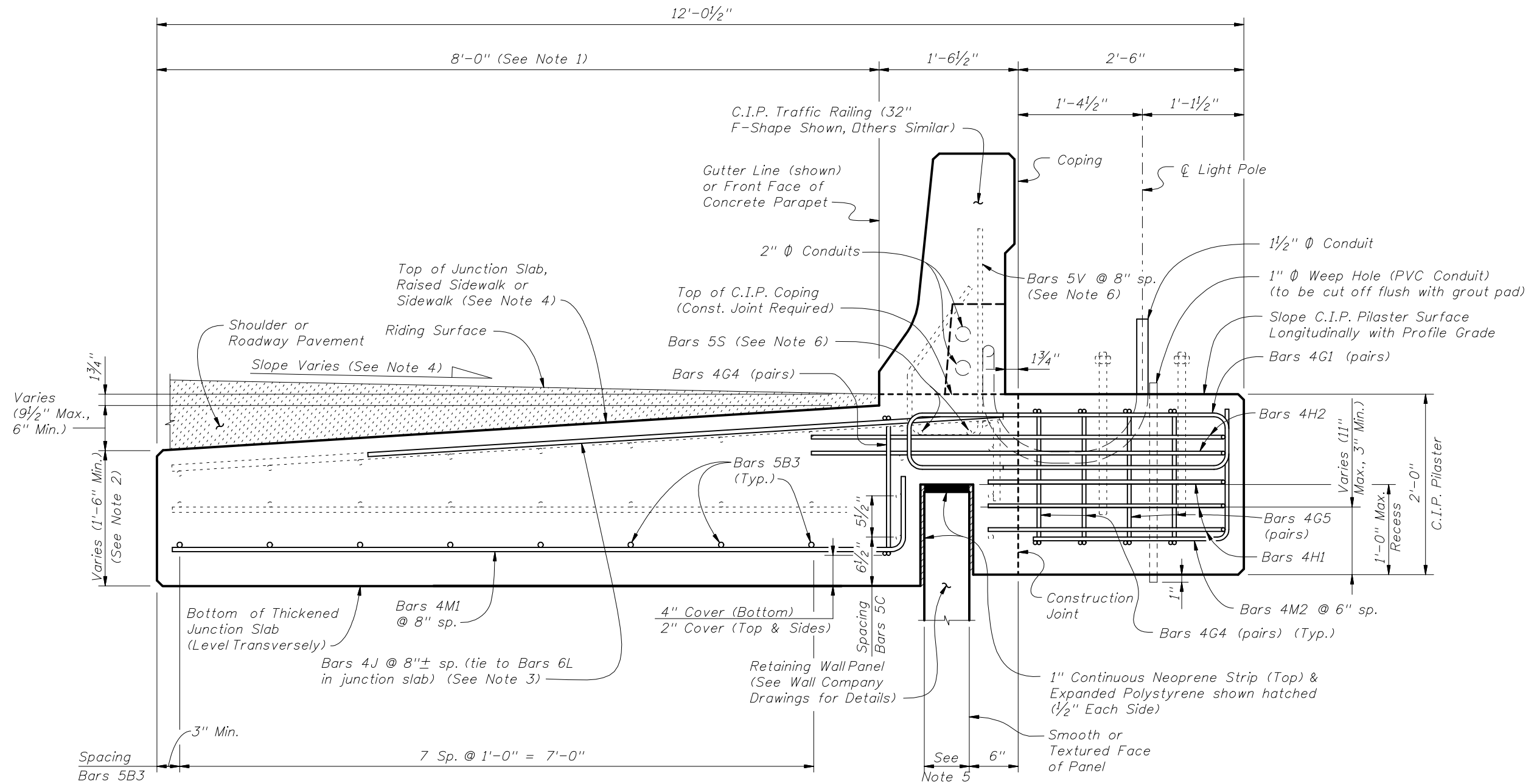
- The pilaster and junction slab are designed to resist the following working loads from the light pole applied at the top of the Pilaster:

Axial Deadload	=	1.560 kip
Windload Moment about Transverse Axis (*)	=	40.60 kip-ft
Windload Moment about Longitudinal Axis (*)	=	28.30 kip-ft
Deadload Moment about Longitudinal Axis (*)	=	1.690 kip-ft
Maximum Shear	=	1.380 kip
Torsion about Pole Axis	=	3.560 kip-ft

 (*) - Axis refers to Bridge Axis.
- Provide grout in accordance with Specification Section 934.
- It is the Contractor's responsibility to provide anchor bolts, nuts, washers and anchor plates that effectively transmit the light pole loads to the pilaster and fit the reinforcing cage. Submit calculations for anchor bolt design and embedment depth, signed and sealed by a Professional Engineer registered in the State of Florida to the Engineer for review and approval prior to construction.
- Install Anchor Bolts plumb.
- For conduit, pull box and expansion/deflection fitting details, see Utility Conduit Detail Drawings.
- The cost of anchor bolts, nuts, washers and anchor plates will be included in the Bid Price for Light Poles. Include the cost of all labor, concrete and reinforcing steel required for construction of the pilasters, grout pads, pull boxes and miscellaneous hardware required for the completion of the electrical system in the Bid Price for either the Traffic Railing or Concrete Parapet that the pilaster is behind.
- Field Cut Bars 4M2 as required to maintain clearance.
- Anchor Bolt pattern orientation will be as shown.
- Slip Forming Method of construction is not allowed within the limits shown.
- Reinforcing shown for light pole pilasters is in addition to typical reinforcing for C.I.P. Junction Slabs and Raised Sidewalks (Bars 5A and 5B2). Omit Junction Slab Bars 6U1 and Raised Sidewalk Bars 5U1 within light pole pilaster limits.
- Work this Sheet with the following as appropriate:
 - Sheet Nos. 5 thru 10 of 19 - Precast or C.I.P. Coping with C.I.P. Junction Slab Details
 - Sheet Nos. 11, 12 and 13 of 19 - Precast or C.I.P. Coping with C.I.P. Raised Sidewalk Details
 - Sheet Nos. 14 and 15 of 19 - Precast Coping/Parapet or C.I.P. Coping with C.I.P. Sidewalk Details

CROSS REFERENCE: For Estimated Quantities, see Sheet No. 18 of 19.





TYPICAL SECTION AT LIGHT POLE PILASTER
 (Traffic Railing Shown, Concrete Parapet Similar)
 (Junction Slab Shown, Raised Sidewalk or Sidewalk Similar)

NOTES:

1. The 8'-0" dimension shown is for Junction Slabs. This dimension must be a minimum of 5'-0" for all applications.
2. For junction slabs, increase the 1'-0" depth dimension to 1'-6". For raised sidewalks, increase the 2'-0" depth dimension to 2'-6". For sidewalks, increase 6" depth dimension to 1'-6". The minimum length of the Junction Slabs, Raised sidewalks and Sidewalks is 50'-0", measured along the Gutter Line.
3. Bars 4J are only required when pilasters are behind a Traffic Railing.
4. Match the slope of the adjoining junction slab and shoulder or roadway pavement, raised sidewalk or sidewalk.
5. Actual width varies depending on type of Retaining Wall used.
6. See Index No. 420 for Bars 5V and 5S.

C.I.P. LIGHT POLE PILASTER DETAILS

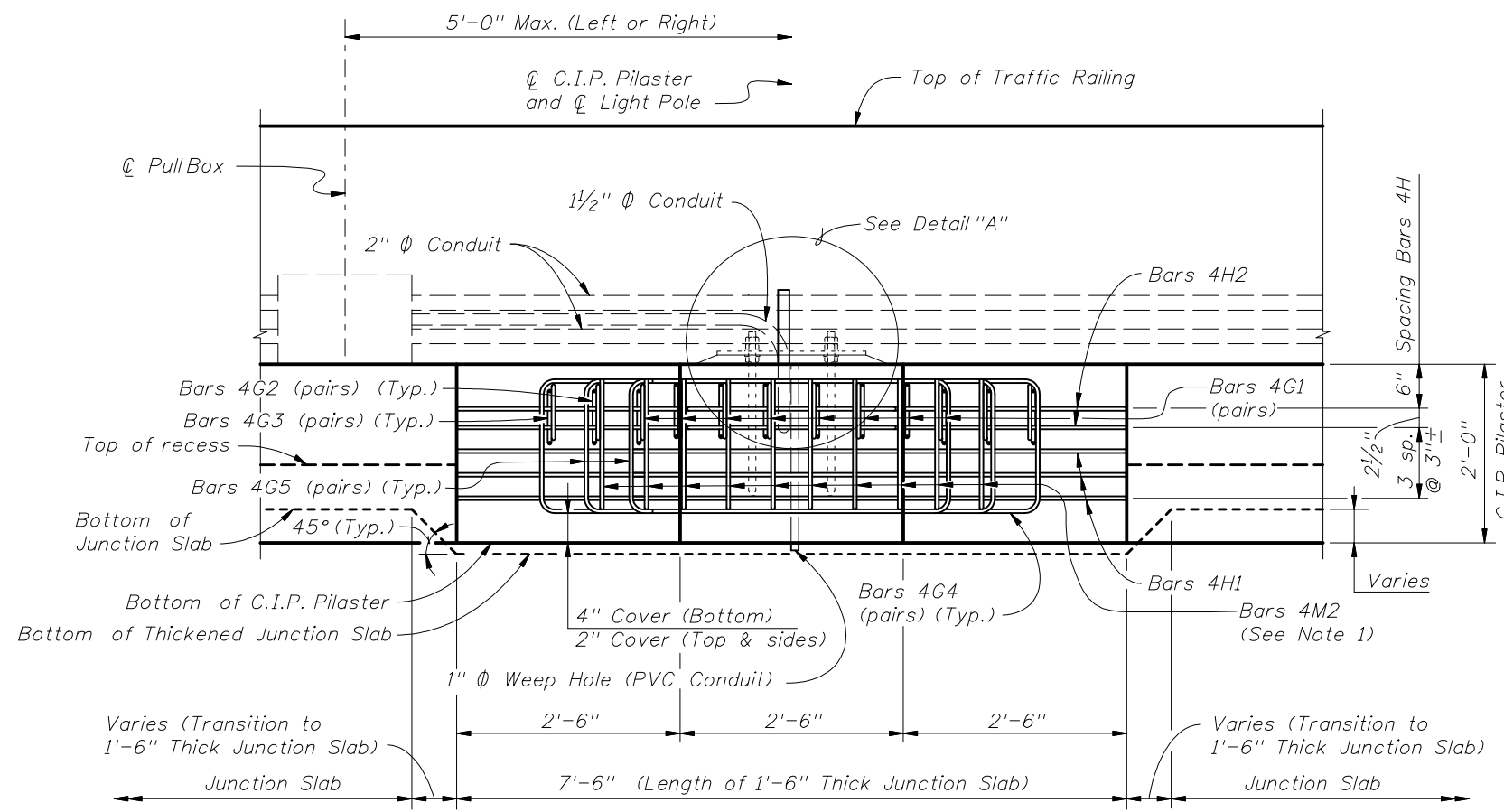


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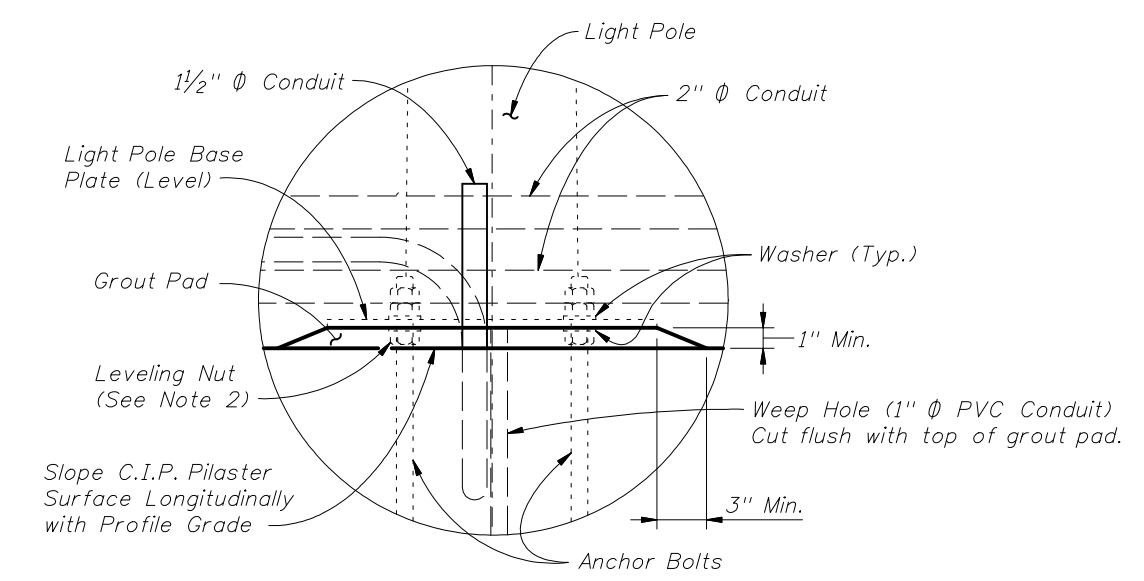
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ELEVATION VIEW
 (Junction Slab Reinforcing & Bars 4J not Shown for Clarity)
 (Traffic Railing Shown, Concrete Parapet Similar)
 (Junction Slab Shown, Raised Sidewalk or Sidewalk Similar)



DETAIL "A"

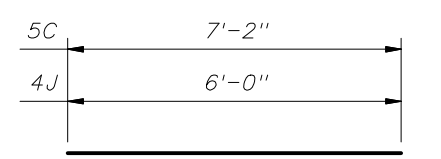
NOTES:
 1. Field Cut Bars 4M2 as required to maintain minimum cover.
 2. Maximum clearance between leveling nut and top of pilaster will not exceed anchor bolt diameter.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete (Pilaster)	CY	0.926
Concrete (Thickened Junction Slab)	CY	1.180
Reinforcing Steel	Lb.	431.65

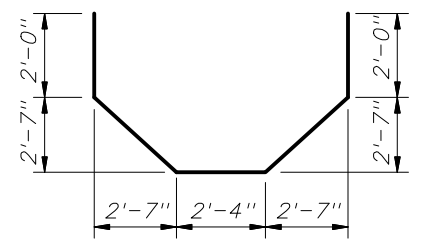
(The quantities above are for one C.I.P. Light Pole Pilaster. The concrete quantity for the thickened junction slab is based on a 6 inch increase in thickness and a 5 inch wide retaining wall panel. Adjust thickened concrete quantity as required for raised sidewalks and sidewalks.)

REINFORCING STEEL BENDING DIAGRAMS - LIGHT PILASTER

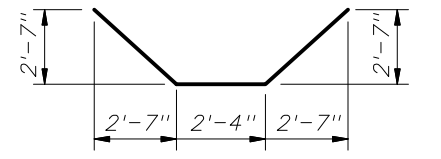
BILL OF REINFORCING STEEL			
MARK	SIZE	NO. REQD.	LENGTH
B3	5	8	7'-2"
G1	4	16	5'-8"
G2	4	4	4'-8"
G3	4	4	4'-2"
G4	4	6	9'-2"
G5	4	4	8'-2"
H1	4	3	9'-8"
H2	4	2	13'-8"
J	4	24	6'-0"
M1	4	12	8'-10"
M2	4	10	3'-8"



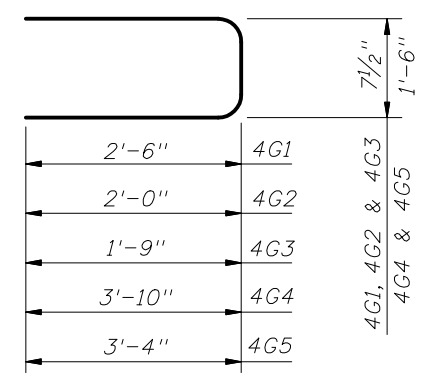
BARS 5B3 & 4J



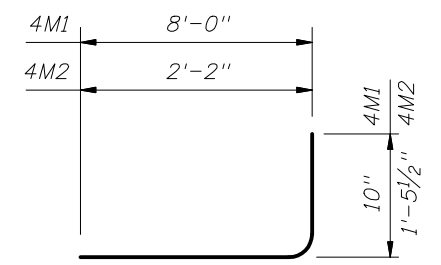
BAR 4H2



BAR 4H1



BARS 4G1, 4G2, 4G3, 4G4 & 4G5



BAR 4M1 & 4M2

REINFORCING STEEL NOTES:
 1. All bar dimensions in the bending diagrams are out to out.
 2. Lap splices for Bars 4G1, 4G2 & 4G3 will be a minimum of 1'-4". Lap splices for Bars 4G4 & 4G5 will be a minimum of 1'-8".
 3. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.

C.I.P. LIGHT POLE PILASTER DETAILS



Bars 5B2 (Field Cut as required to clear Barrier Wall Inlet) (Typ.)

Barrier Wall Inlet

10'-0" Min.

Bars 5S2

Expansion Joint in Junction Slab, Raised Sidewalk or Sidewalk, C.I.P. Coping and Traffic Railing or Concrete Parapet

1" Preformed Expansion Joint Filler (Typ. all Sides)

Bars 6L (Top) (Typ.)

Bars 5A (Bottom) (Typ.)

Bars 5U3

Gutter Line

Bars 6U1 (Typ.)

Barrier Wall Inlet (Grate not shown for clarity) (See Index No. 218 for details)

2" Cover (Typ. all Sides)

Coping

8 ~ Bars 6U2 & 5S2 @ 8" sp. (See Note 3)

Bars 5V (Typ.)

Bars 5S

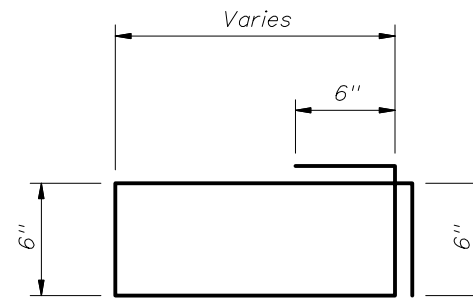
Bars 6U2

PLAN VIEW
(Junction Slab Shown, Raised Sidewalk Similar)

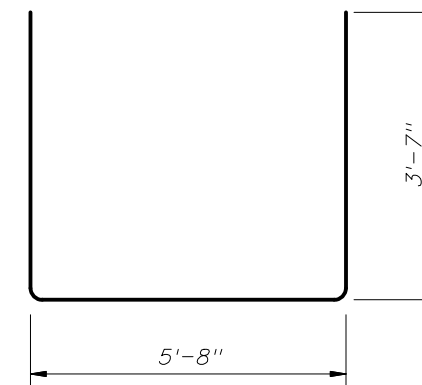
REINFORCING STEEL BENDING DIAGRAMS - DRAINAGE

BILL OF REINFORCING STEEL

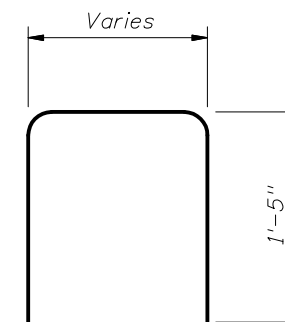
MARK	SIZE	LENGTH
S2	5	VARIABLES
U2	6	VARIABLES
U3	5	14'-2"



BAR 5S2



BAR 5U3



BAR 6U2

REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- All reinforcing steel at open joints will have a 2" minimum cover.
- See Sheet Nos. 5 thru 15 of 19 for Bars 5A, 5B2 and 6U1 (or 5U1).
- The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.

9'-6 1/2" (See Note 4)

3'-6 1/2" (See Note 4)

4'-5 1/2"

Gutter Line

1'-6 1/2" Min.

C.I.P. Traffic Railing (32" F-Shape shown, 42" F-Shape similar)

Bars 5V (See Note 6)

Top of C.I.P. Coping Const. Joint Required

Bars 5S (See Note 6)

4 3/4"

1 3/4"

3" Cover

Spacing

Bars 5B2

6" Min Embed

4"

7 1/2"

7 1/2"

5"

Varies (1'-2" Max., 3" Min.)

1'-3" Max. Recess

2'-0"

See Note 5

Coping

Bars 6U2 @ 8" sp.

Retaining Wall Panel (See Wall Company Drawings for Details)

2" Cover

2" Cover

6"

See Note 3

Barrier Wall Inlet and Grate (See Index No. 218 for details)

Bars 5U3 (Rotate as required to clear junction slab reinforcing)

1" Preformed Expansion Joint Filler (Typ.)

Bars 5B2 (Typ.)

Compacted Sand

2" Cover

2" Cover

Shoulder or Roadway Pavement

Riding Surface

4" Cover (Bottom)

2" Cover (Top & Sides)

Bars 5S2 @ 8" sp.

Bars 5B2 (Typ.)

SECTION A-A

SECTION THRU JUNCTION SLAB, BARRIER WALL INLET AND RETAINING WALL
(Junction Slab Shown, Raised Sidewalk Similar)

NOTES:

- Spacing shown is along the Gutter Line. Spacing shown is for C.I.P. Junction Slab. For C.I.P. Raised Sidewalks or Sidewalks, match bar spacing and size shown in Typical Sections (i.e., 11 ~ Bars 5U2 and 5S2 @ 6" spacing for Raised Sidewalks).
- Dimensions shown are for junction slabs. The 3'-6 1/2" dimension must be a minimum of 1'-0" for raised sidewalks.
- Actual location & width vary depending on type of Retaining Wall used.
- See Index No. 420 and 425 for Bars 5V and 5S.
- 1" Continuous Neoprene Strip (Top) & Expanded Polystyrene shown hatched (1/2" Each Side).
- Locate Barrier Wall Inlet a minimum of 10'-0" away from Expansion Joints in Junction Slab, Raised Sidewalk or Sidewalk, C.I.P. Coping and Traffic Railing or Concrete Parapet.
- Work this Sheet with the following as appropriate:
Sheet Nos. 5 thru 10 of 19 - Precast or C.I.P. Coping with C.I.P. Junction Slab Details
Sheet Nos. 11, 12 and 13 of 19 - Precast or C.I.P. Coping with C.I.P. Raised Sidewalk Details
Sheet Nos. 14 and 15 of 19 - Precast Coping/Parapet or C.I.P. Coping with C.I.P. Sidewalk Details

C.I.P. DRAINAGE DETAILS



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PERMANENT RETAINING WALL SYSTEMS

Last Revision 01/01/07 Sheet No. 19 of 19

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NOTES

SPECIFICATIONS:

1. General Specifications:
The Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", Current Edition and Supplements as Amended.
2. Design Specifications:
 - a. Florida Department of Transportation (FDOT) "Structures Design Guidelines", Current Edition.
 - b. American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Current Edition.
 - c. AASHTO-AGC-ARTBA Task Force 27 (Ground Modification Techniques), "Insitu Soil Improvement Techniques", January 1990.

DESIGN CRITERIA:

1. Design is based on the assumption that the material contained within the reinforced soil volume, methods of construction and quality of prefabricated materials are in accordance with Specification Section 548.
2. It is the responsibility of the Engineer to determine that the factored bearing pressure shown for the wall does not exceed the factored bearing resistance of the foundation for that specific wall location.
3. The Wall Company is responsible for internal stability of the wall. External stability design, including foundation and slope stability, is the responsibility of the Engineer.

SOIL PARAMETERS:

1. See wall control drawings for soil characteristics of foundation material to be used in the design of the wall system. The Contractor must provide soil design parameters for backfill material based on the actual soil characteristics utilized at the site. Provide the values of unit weight, cohesion and internal friction angle in the Shop Drawings.

MATERIALS:

1. Provide soil reinforcement in accordance with Specification Section 548.
2. For additional material notes, see Wall Company General Notes.

CONSTRUCTION:

1. Walls must be constructed in accordance with Specification Section 548 and the Wall Company's instructions.
2. For location and alignment of retaining walls, see Wall Control Drawings.
3. If present, consider in design and analysis and locate manholes and drop inlets as shown on wall elevations.
4. Refer to Plan and Elevation sheets of individual walls for minimum reinforcement strip/mesh length, factored bearing resistances, minimum wall embedment and anticipated long term and differential settlements.
5. It is the Contractor's responsibility to determine the location of any guardrail posts behind retaining wall panels. Prior to placement of the top layer of soil reinforcement, individual reinforcing strips/mesh may be skewed horizontally (15° maximum) to avoid the post locations if authorized by the Engineer. No cutting of soil reinforcement is allowed unless shown on shop drawings and approved by the Engineer. Any damage done to the soil reinforcement due to installation of the guardrail must be repaired by the Contractor at the Contractor's expense. All repair methods must be approved by the Engineer.
6. If existing or future structures, pipes, foundations or guardrail posts within the reinforced soil volume interfere with the normal placement of soil reinforcement and specific directions have not been provided on the plans, the Contractor must notify the Engineer to determine what course of action should be taken.
7. The Contractor is responsible for gradually deflecting upper layer(s) of soil reinforcement downward (15° maximum from horizontal) to avoid cutting soil reinforcement and conflicts with paving and subgrade preparation. The Contractor's attention is directed especially to situations where roadway superelevation and/or soil mixing are anticipated.

CONSTRUCTION (CON'T.):

8. Piles within the soil volume must be driven prior to construction of the retaining wall. The portion of the pile within the soil wall volume must be wrapped with polyethylene sheeting in accordance with Specification Section 459. Drive piles located within soil volume prior to construction of the retaining wall, unless a method to protect the structure, acceptable to both the Engineer and Wall Company, is proposed and approved in writing.
9. A structural extension of the connection of the retaining wall panel to soil reinforcement must be used whenever necessary to avoid cutting or excessive skewing (greater than 15°) of the soil reinforcement around obstructions (i.e., piles, pipes, etc.).

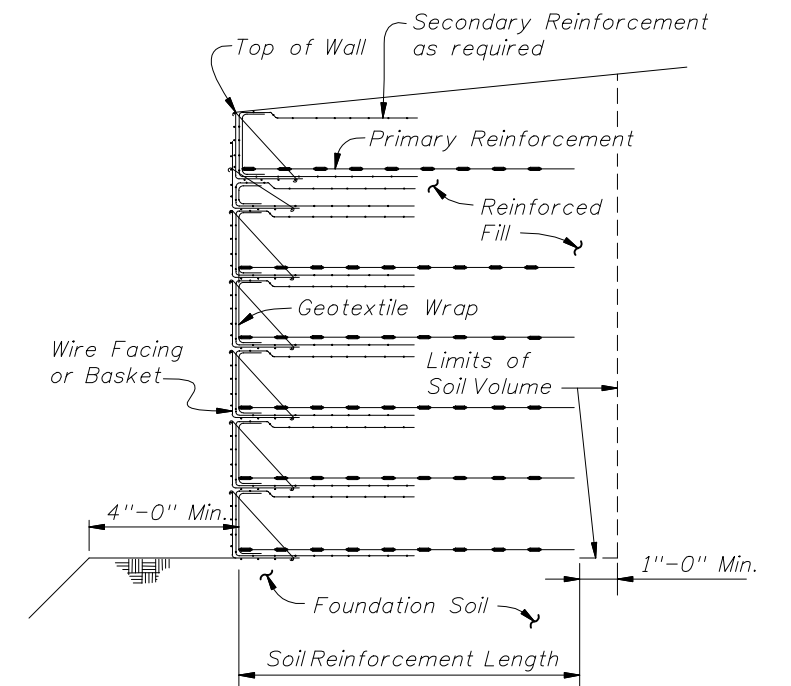
QUALIFIED PRODUCTS LIST

1. Manufacturers seeking approval of proprietary retaining wall systems for inclusion on the Qualified Products List as pre-approved wall system suppliers must submit a QPL Product Evaluation Application along with design documentation, vendor drawings, wall system construction manual and other information as required in the Retaining Wall System QPL Acceptance Criteria showing the proprietary wall system is designed to meet all specified requirements. Project specific Shop Drawings are required for QPL approved wall systems (see Shop Drawing Requirements below).

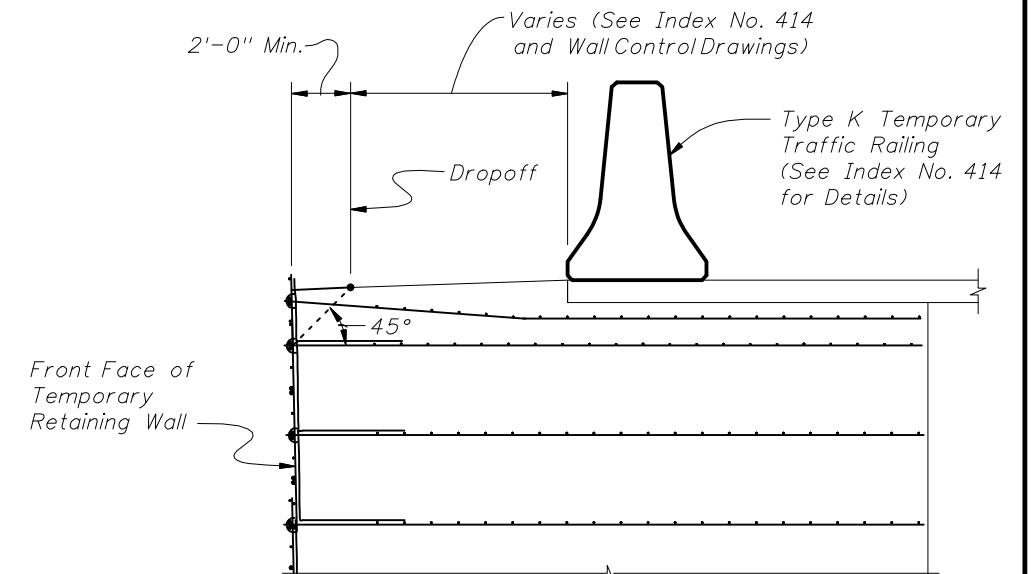
SHOP DRAWING REQUIREMENTS

The successful bidder must submit the final design of the wall for review as Shop Drawings. Details and Design Criteria shown on the Shop Drawings must not deviate from those shown on the approved QPL Vendor Drawings. The Shop Drawings must include detailed design computations and all details, dimensions and quantities necessary to construct the wall. The design and fully detailed plans must be prepared as required by FDOT Specification Section 548 and must include, but not be limited to, presentation of required information as follows:

1. Provide an elevation view of the wall indicating:
 - a. Elevations/Stations at the top and bottom of wall, for Begin/End Retaining Wall, all breaks in vertical alignment, all whole stations and every 25 foot station increments.
 - b. Length, size and designation of soil reinforcement in elevation view.
 - c. Location of the proposed final ground line.
2. Provide a plan view detailing the horizontal alignment and offsets from the horizontal control line(s) to the exterior face of the wall.
3. Show in plan and elevation all utilities, drainage structures, drainage pipes, etc. that affect the wall(s). Locate in the plan view all piles within the reinforced earth volume, as shown on Foundation Layout Drawings.
4. Provide general notes and design parameters on the Shop Drawings. Include design soil characteristics and all other pertinent notes required for construction of the walls. Provide the factored bearing resistance and factored bearing pressure for each wall height increment.
5. Show the limits of the reinforced soil volume.
6. Show complete details for construction of wall around obstructions. Show details for placement of soil reinforcement at acute corners.
7. Show complete details addressing conflicts between soil reinforcement and embedments in the reinforced soil volume.
8. Show complete details where walls of different types intersect/influence one another.
9. Provide fully detailed design calculations for each wall height increment detailed in the Shop Drawings. Submit Shop Drawings and design calculations signed and sealed by a Professional Engineer registered in the State of Florida.

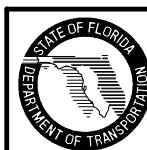


**TYPICAL RETAINING WALL SECTION
(Showing Limits of the Reinforced Soil Volume)**



**TEMPORARY TRAFFIC RAILING
PLACEMENT DETAIL**

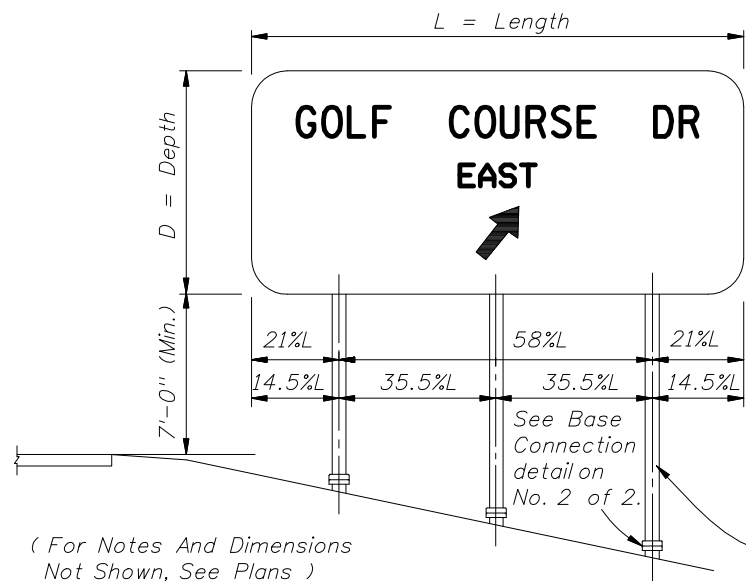
GENERAL NOTES AND DETAILS



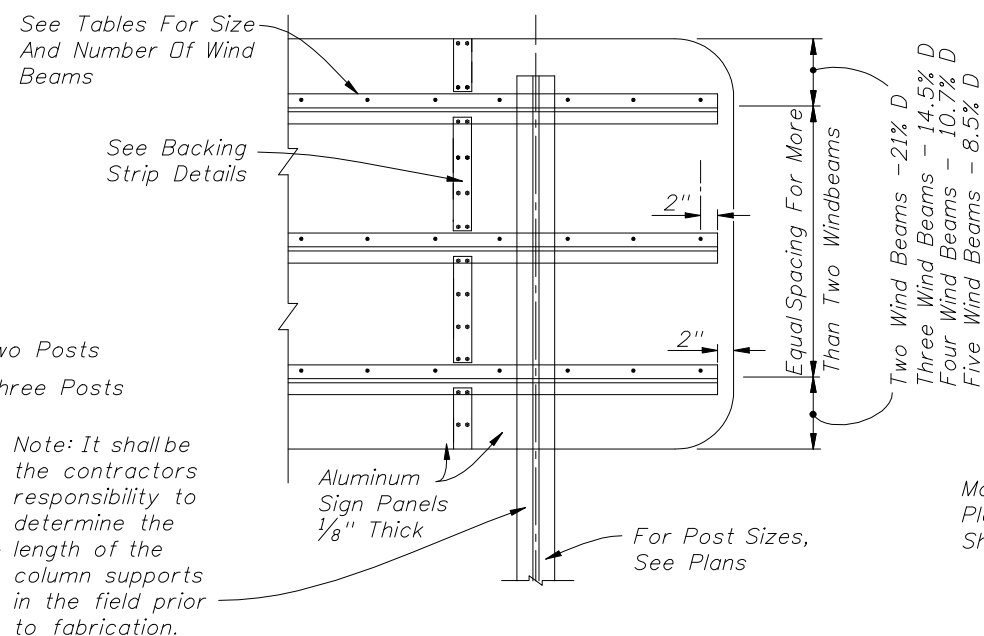
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TEMPORARY RETAINING WALL SYSTEMS

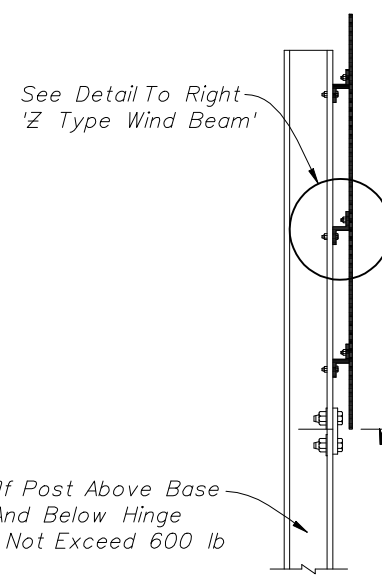
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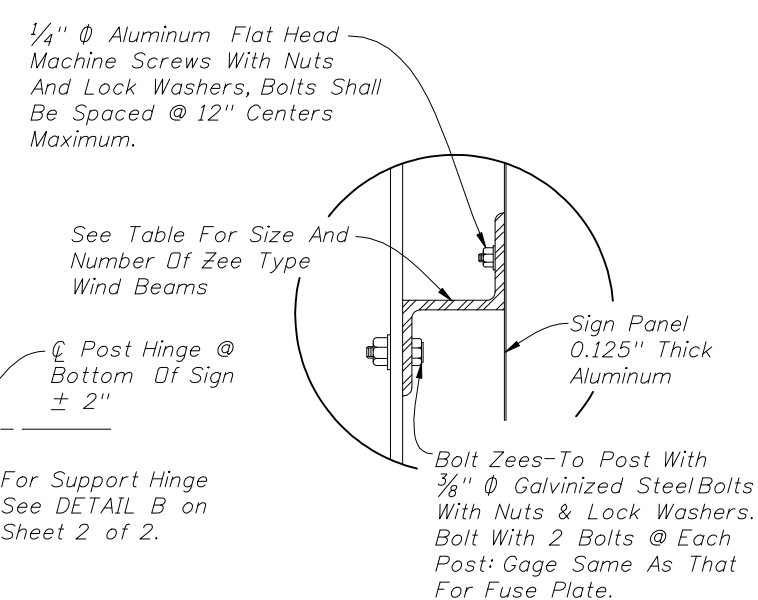
TYPICAL ELEVATION



PARTIAL REAR ELEVATION



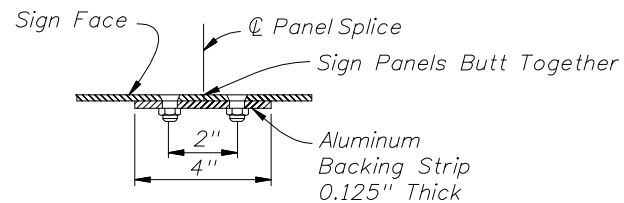
SIDE VIEW



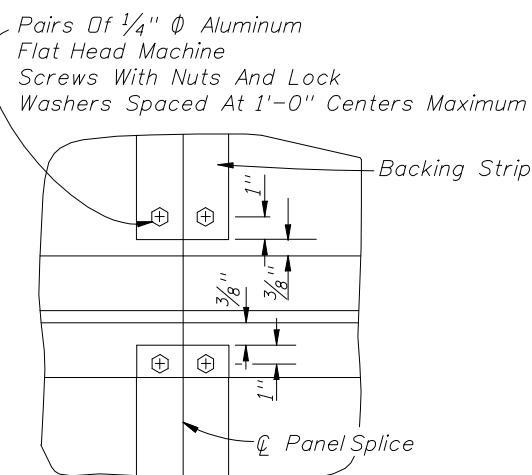
Z TYPE WIND BEAM

(For Notes And Dimensions Not Shown, See Plans)

Note: If the sign panels are deeper than 10', a Horizontal Panel Splice is allowed at an interior Z bar support, shop drawings shall be required. Minimum panel section width = 2'-6".



BACKING STRIP DETAILS



GENERAL NOTES

DESIGN SPECIFICATIONS: Design according to FDOT Structures Manual (current edition). Standard Specification for Structural Supports for Highway Signs, Luminaries and Traffic Signals, AASHTO 2001.
 WELDING: For welding refer to the latest editions of the AWS Structural Welding Codes for Steel and Aluminum, the AASHTO Standard Specifications for Welding Structural Steel Highway Bridges.
 ALUMINUM MATERIALS: All aluminum materials shall meet the requirements of the Aluminum Association's Alloy 6061-T6 and also the following ASTM specifications: Sheets and plates, B209; extruded tube, bars, rods & shapes, B221; and standard structural shapes, B308. No stenciling permitted on sheets. Aluminum welding rods shall meet the requirements of Aluminum Association Alloy No. 5556 filler wire.
 ALTERNATE MATERIAL: Material meeting the requirements of ASTM B209 or Aluminum Association Alloys 5154-H38 or 5052-H38 may be used for sheet and plate. Material meeting the requirements of Aluminum Association Alloy 6351-T5 and ASTM B221 may be used for extruded bars, rods, shapes and tubes.
 STRUCTURAL STEEL: All structural steel shall meet the requirements of ASTM A36.
 ALUMINUM BOLTS, NUTS, & LOCK WASHERS: Aluminum bolts shall meet the requirements of Aluminum Association Alloy 2024-T4 (ASTM F468). The bolts shall have an anodic coating at least 0.0002" thick and be Chromate sealed. Lock washers shall meet the requirements of Aluminum Association Alloy 7075-T6 (ASTM B221). Nuts shall meet the requirements of Aluminum Association Alloy 6061-T6 or 6262-T9 (ASTM F467).
 STEEL BOLTS, NUTS, & WASHERS: All steel bolts, nuts and washers shall meet the requirements of ASTM A325.
 TOLERANCES: All above materials shall be in accordance with the governing ASTM specifications.
 GALVANIZED: All steel shapes, angles, tees, plates, bolts, nuts and washers shall be galvanized in accordance with Standard Specifications 962-9.
 BASE CONNECTION: High strength bolts L₂ in the base connection shall be tightened only to the torque shown in the table on sheet 2 of 2. Overtightened base connections will not be accepted.
 FUSE PLATE: All holes in fuse plates shall be drilled. All plate cuts shall, preferably, be saw cuts; however, flame cutting will be permitted provided all edges are round. Metal projecting beyond the plane of the plate face will not be allowed.
 SIGN FACE: All sign face corners shall be rounded.
 SHOP DRAWINGS: When ground sign supports are fabricated in accordance with these plans no shop drawings are required. Shop drawings will be required for approval when the column length exceeds the length shown in the plans by more than 2'-0". However, shop drawings for sign panels, messages, lettering and quantities shall be submitted to the Engineer of Record for approval.
 FABRICATOR NOTE: All bolts, except L₂ bolts and zee to post bolts, shall be tightened in accordance with Section 700 of the Specifications.
 FOUNDATION: Contractor may use precast foundations in pre-drilled holes a minimum of 12" larger than the foundation indicated on the plans in either wet or dry conditions. The holes shall be clean and without loose material. Temporary casing shall be required if the soil is unstable. Fill the void around the precast foundation with flowable fill meeting the requirements of Section 121 or clean sand placed using hydraulic methods. The cost of flowable fill, installing and removal of casing shall be included in the unit price of Sign Multi-Post.

DESIGN WIND SPEEDS BY COUNTY

- 110 mph Alachua, Baker, Bradford, Clay, Columbia, Gadsden, Gilchrist, Hamilton, Hardee, Jackson, Jefferson, Lafayette, Lake, Leon, Madison, Marion, Polk, Putnam, Sumter, Suwannee, and Union Counties.
- 130 mph Bay, Brevard, Calhoun, Charlotte, Citrus, DeSoto, Dixie, Duval, Flagler, Franklin, Glades, Gulf, Hendry, Hernando, Highlands, Hillsborough, Holmes, Lee, Levy, Liberty, Manatee, Nassau, Okaloosa, Okeechobee, Orange, Osceola, Pasco, Pinellas, Sarasota, Seminole, St. Johns, Taylor, Volusia, Wakulla, Walton, and Washington Counties.
- 150 mph Broward, Collier, Escambia, Indian River, Martin, Miami-Dade, Monroe, Palm Beach, Santa Rosa, and St. Lucie Counties.

Wind	No. Beams	Max. Depth	Wind	No. Beams	Max. Depth
110	2	7'-0"	150	2	6'-0"
110	3	12'-0"	150	3	10'-4"
110	4	16'-4"	150	4	14'-0"
110	5	20'-8"	150	5	17'-8"
130	2	6'-8"			
130	3	11'-4"			
130	4	15'-4"			
130	5	19'-0"			

SIZE OF WIND BEAMS		
Size Of Zee*	Length Of Sign (Feet)	
	2 Posts	3 Posts
Z 1.75 x 1.75 x 1.08	0 - 11'-0"	0 - 17'-4"
Z 3 x 2.69 x 2.33	11'-1"-19'-0"	17'-5"-29'-6"
Z 3 x 2.69 x 3.38	19'-1"-20'-8"	29'-7"-31'-6"

*Note: Zees Are Aluminum - No Steel Equivalent Available Designation Gives (Member Depth) x (Flange=Width) x (lb/ft)



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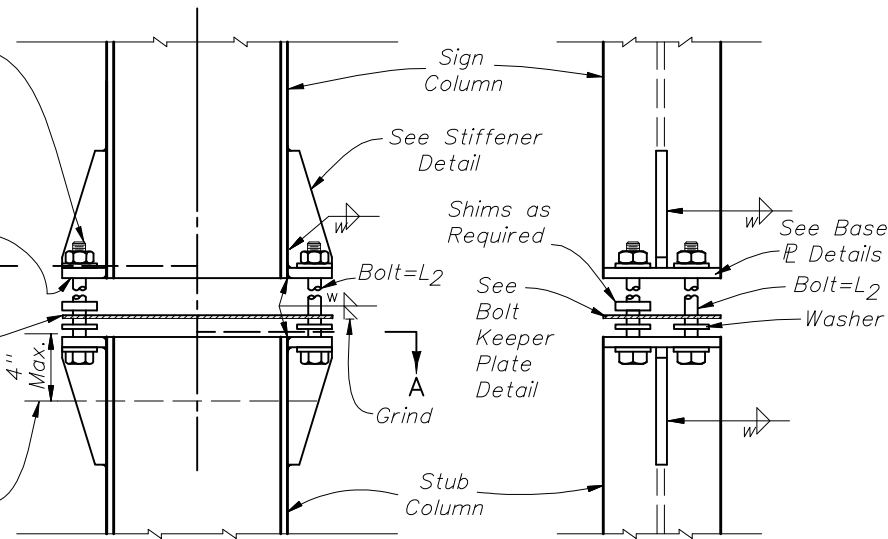
MULTI-COLUMN GROUND SIGN

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H. S. Bolt With Hex Head, Hex Nut & 3 Washers With Each Bolt. See Table For Bolt Diameter And Torque. See Bolting Procedure.

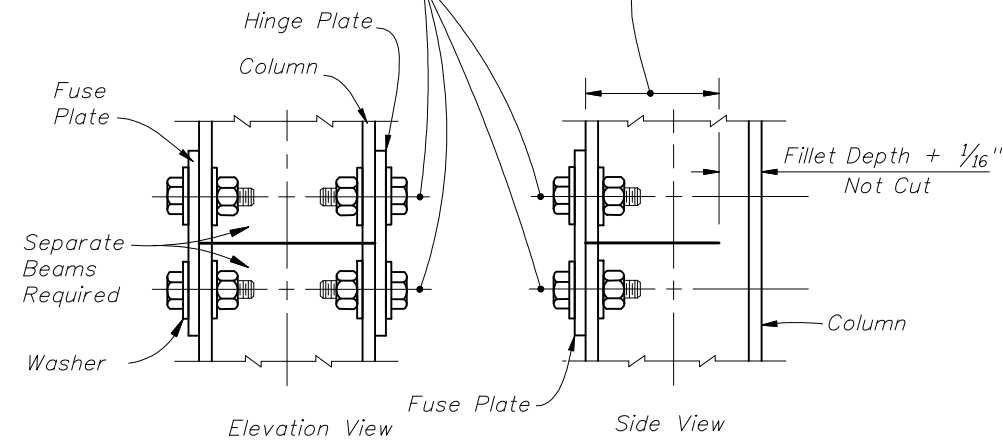
Remove All Galvanizing Runs Or Beads In Washer Area
See Bolt Keeper Plate Detail

Top of Foundation See Detail Below

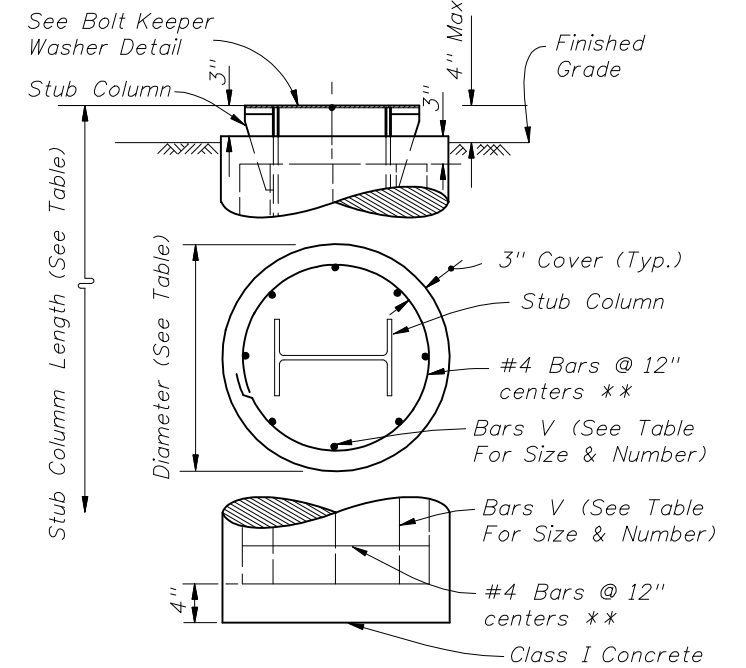


SIGN COLUMN & STUB COLUMN ELEVATION
BASE CONNECTION

Flange Holes For Fuse And Hinge Plate Shall Be Drilled Or Sub-Punched and Reamed. H.S. Bolts (See Table For Size), For Bolt Tension See the Specification. Flat Washers (Typ.)



OPTIONAL HINGE TYPICAL HINGE



FOUNDATION ELEVATION

NOTE: All Reinforcing To Be Grade 60.

** At the Option of the Contractor, D10 Spiral Wire @ 6" Pitch, Three Flat Turns Top and One Flat Turn Bottom may be Utilized in Lieu of Specified.

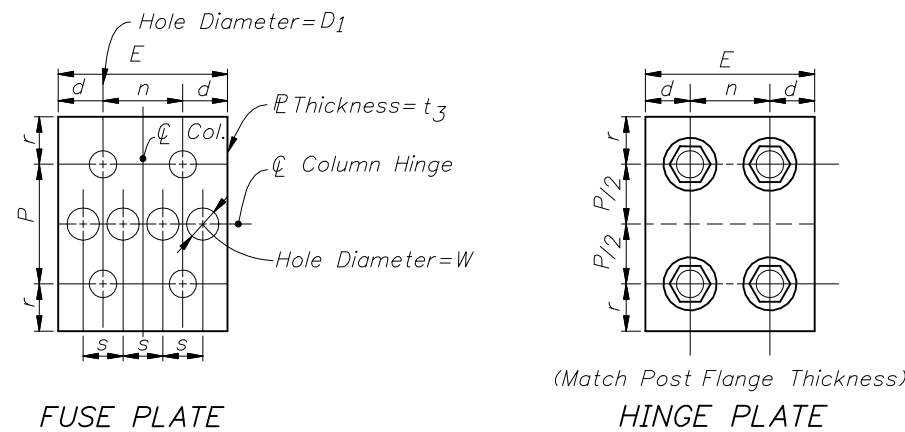
Shop-weld assemblies of foundation stirrup reinforcing bars are permitted in reinforced concrete foundation provided that:

1. The reinforcing bars conform to ASTM Specification A706/706M.
2. The holding wires conform to ASTM Specification A82 or A496.
3. The Shop welding is performed by machines under a continuous, controlled process, approved by the Engineer.
4. Quality control test are performed on shop-welded specimens and the test results are available, upon request, to the Engineer.

FUSE & HINGE PLATES

(See Fabricator Note on Sheet 1 of 2)

DETAIL B



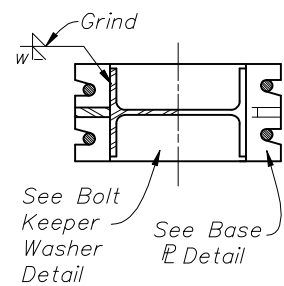
FUSE PLATE

HINGE PLATE

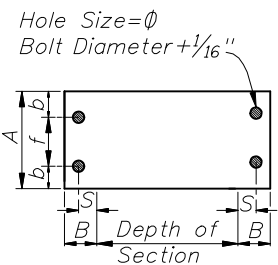
Provide 2 - 0.0149" Thick and 2 - 0.0329" Thick Brass Shims (ASTM B36) Per Post

SHIM DETAIL

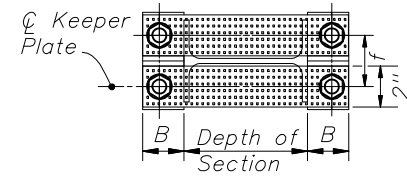
Direction of Traffic



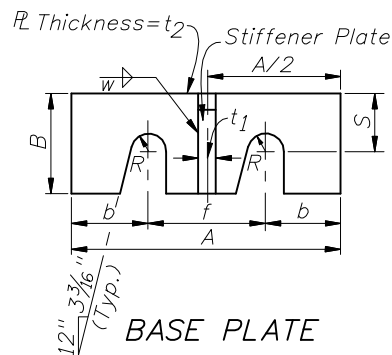
SECTION A-A



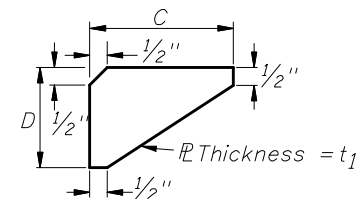
BOLT KEEPER PLATE



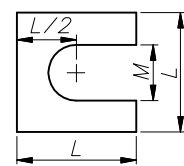
ALTERNATE BOLT KEEPER PLATE



BASE PLATE



STIFFENER PLATE



Provide 2 - 0.0149" Thick and 2 - 0.0329" Thick Brass Shims (ASTM B36) Per Post

SHIM DETAIL

PROCEDURE FOR ASSEMBLY OF BASE CONNECTION

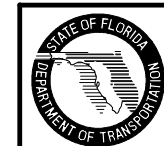
1. Assemble post to stub with bolts and with one flat washer on each bolt between plates.
2. Shim as required to plumb post (see shim detail).
3. Tighten all L2 bolts the maximum possible with 1'-0" to 1'-3" wrench to bed washers and shims and to clean bolt threads. Then loosen each bolt in turn and retighten in a systematic order to the torque specified in the table.
4. Burr threads at junction with nut using a center punch to prevent nut loosening.
5. Sections shown are for installation on right shoulder. For left shoulder plate slot bevels are opposite hand from that shown.

Section *	BASE CONNECTION DATA											SHIM		FUSE (HINGE) PLATE DATA										FOUNDATION DATA				
	A	B	C	D	Bolt Size(L2) & Torque(in-lb)	R	b	f	S	t ₁	t ₂	w	L	M	Bolt Size	E	P	D ₁	d	n	r	s	t ₃	W	Dia.	Depth	Stub Length	Reinf. Bars V
W 6x12	4 3/4"	2"	5 1/8"	2"	5/8" Ø 345	3/8"	1 1/8"	2 1/2"	1 3/16"	1/2"	1/2"	1/4"	1 3/8"	1 1/16"	5/8"	4 1/4"	3"	1 1/16"	1 1/8"	2"	1 3/16"	1"	1/4"	1 3/16"	2'-0"	5'-6"	2'-4"	10-#6
W 8x18	5 3/4"	2 3/16"	6 1/4"	2 3/16"	3/4" Ø 550	7/16"	1 1/2"	2 3/4"	1 3/8"	1/2"	5/8"	1/4"	1 3/4"	1 3/16"	7/8"	5 1/2"	3 3/4"	1 5/16"	1 1/2"	2 1/2"	1 3/8"	1 5/16"	3/8"	1 1/16"	2'-0"	7'-6"	2'-10"	10-#6
W 10x22	6 1/8"	2 3/8"	8"	2 3/8"	7/8" Ø 640	1/2"	1 1/16"	3"	1 3/8"	1/2"	3/4"	5/16"	2"	1 5/16"	1"	6 3/8"	4 5/16"	1 1/16"	1 3/4"	2 7/8"	1 3/4"	1 1/2"	3/8"	1 3/16"	2'-4"	8'-6"	3'-4"	8-#8
W 10x33	8"	2 3/4"	8"	2 3/4"	1 1/8" Ø 780	5/8"	2"	4"	1 9/16"	1/2"	3/4"	5/16"	2 3/8"	1 3/16"	1 1/8"	7 7/8"	5 5/16"	1 3/16"	2 1/4"	3 3/8"	2"	1 1/8"	1/2"	1 9/16"	2'-4"	10'-3"	4'-0"	8-#8
W 12x40	8"	3"	8"	3"	1 1/8" Ø 780	5/8"	2"	4"	1 1/16"	1/2"	3/4"	5/16"	2 3/8"	1 3/16"	1 1/4"	8 3/8"	5 3/4"	1 5/16"	2 1/4"	3 7/8"	2 3/16"	2"	1/2"	1 11/16"	2'-8"	11'-3"	4'-8"	10-#8

* Designations: Normal Depth in inches and weight in pounds per linear foot.

STEEL POST, BASE, FOUNDATION & FUSE PLATE DETAILS

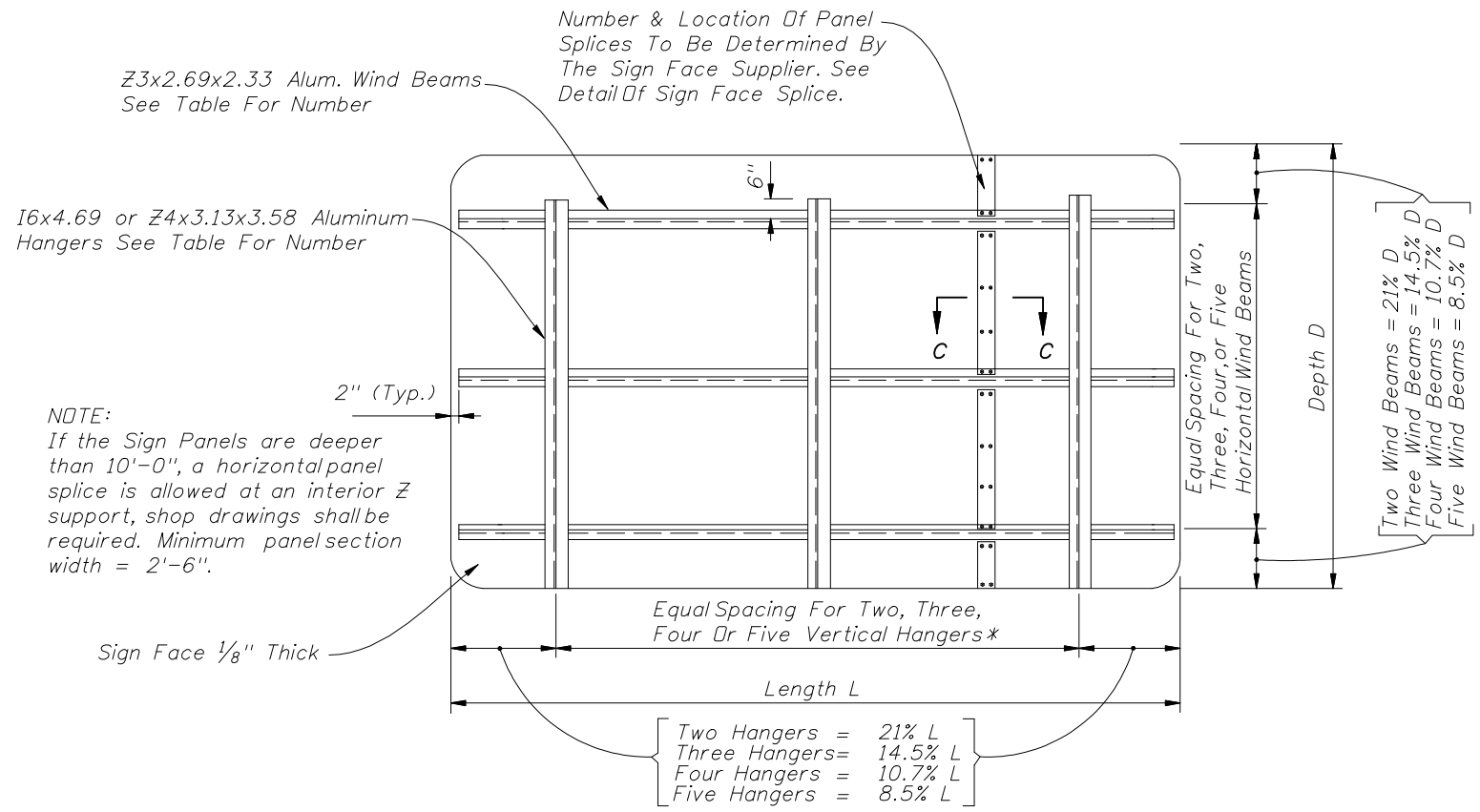
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MULTI-COLUMN GROUND SIGN

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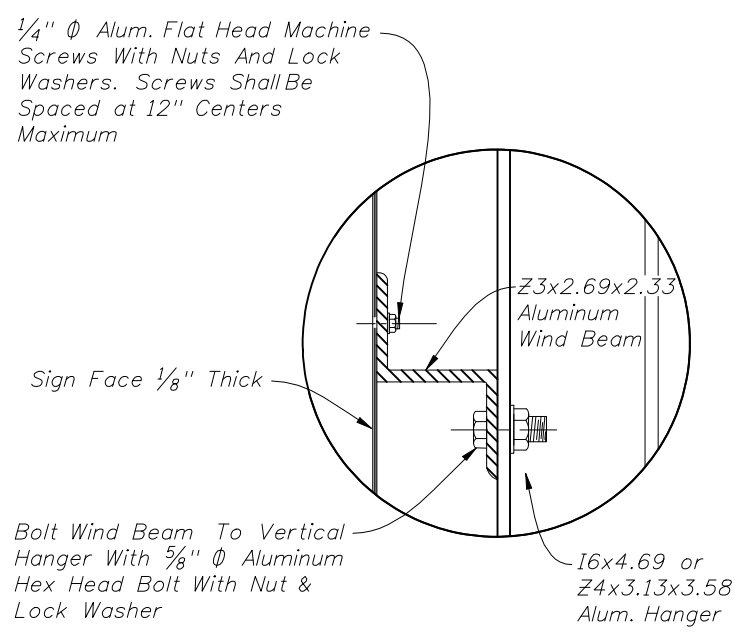
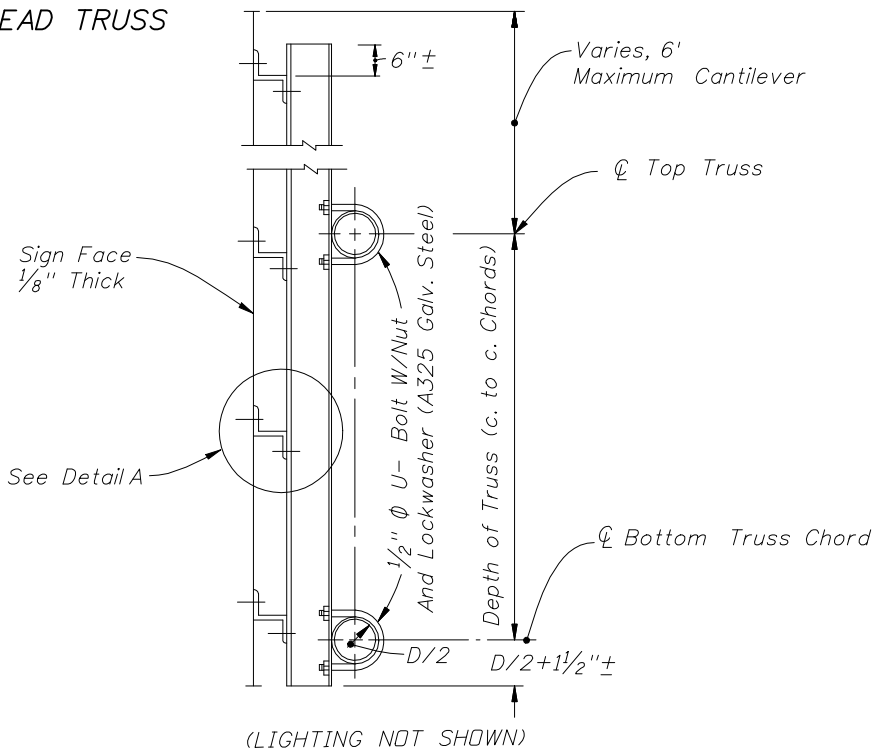
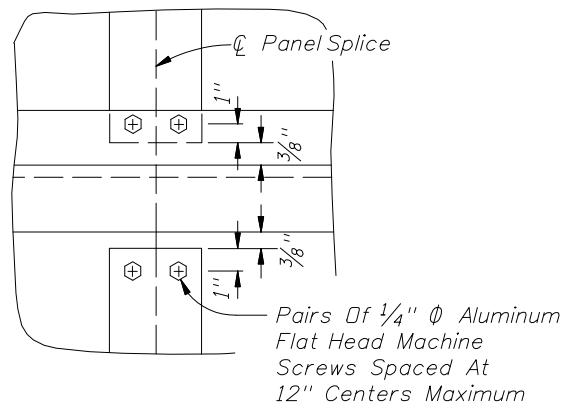
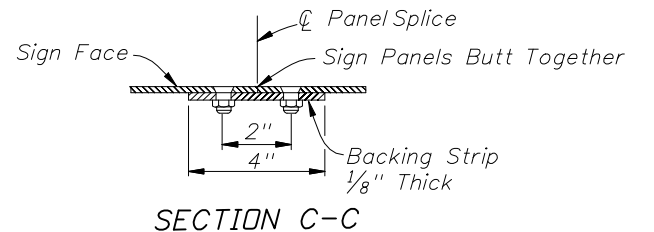
Index No. 11200



Wind M.P.H.	No. Beams	Max. Depth	Number Of 16x4.69 or Z4x3.13x3.58 Vertical Hanger Beams For Sign Length			
			2 Hangers Sign Length	3 Hangers Sign Length	4 Hangers Sign Length	5 Hangers Sign Length
150	2	5'-0"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
150	3	8'-6"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
150	4	11'-6"	0 to 13'-0"	13'-1" to 18'-3"	18'-4" to 24'-9"	24'-10" to 31'-4"
150	5	14'-0"	0 to 13'-0"	13'-1" to 18'-3"	18'-4" to 24'-9"	24'-10" to 31'-4"
130	2	5'-3"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
130	3	8'-10"	0 to 15'-0"	15'-1" to 22'-3"	22'-4" to 30'-0"	30'-1" to 45'-0"
130	4	12'-0"	0 to 15'-0"	15'-1" to 22'-3"	22'-4" to 30'-0"	30'-1" to 38'-0"
130	5	15'-0"	0 to 11'-7"	11'-8" to 16'-4"	16'-5" to 22'-2"	22'-3" to 28'-0"
110	2	5'-6"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
110	3	9'-6"	0 to 15'-0"	15'-1" to 27'-3"	27'-4" to 37'-0"	37'-1" to 45'-0"
110	4	12'-9"	0 to 15'-0"	15'-1" to 27'-3"	27'-4" to 37'-0"	37'-1" to 45'-0"
110	5	16'-0"	0 to 14'-3"	14'-4" to 20'-0"	20'-1" to 27'-0"	27'-1" to 34'-3"

*Note: Spacing of vertical hangers may be varied slightly or as necessary to clear the truss struts and diagonals at panel points.

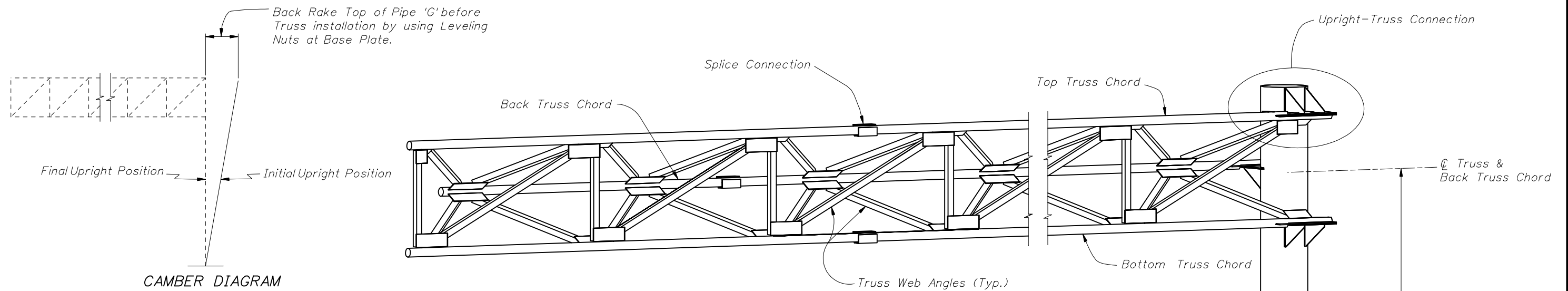
TYPICAL SIGN FACE ELEVATION FOR OVERHEAD TRUSS



(SHOWING ATTACHMENT OF SIGN FACE PANEL TO VERTICAL HANGER SUPPORTS, VERTICAL I SHAPE HANGER AS SHOWN, Z SHAPE OPTIONAL)

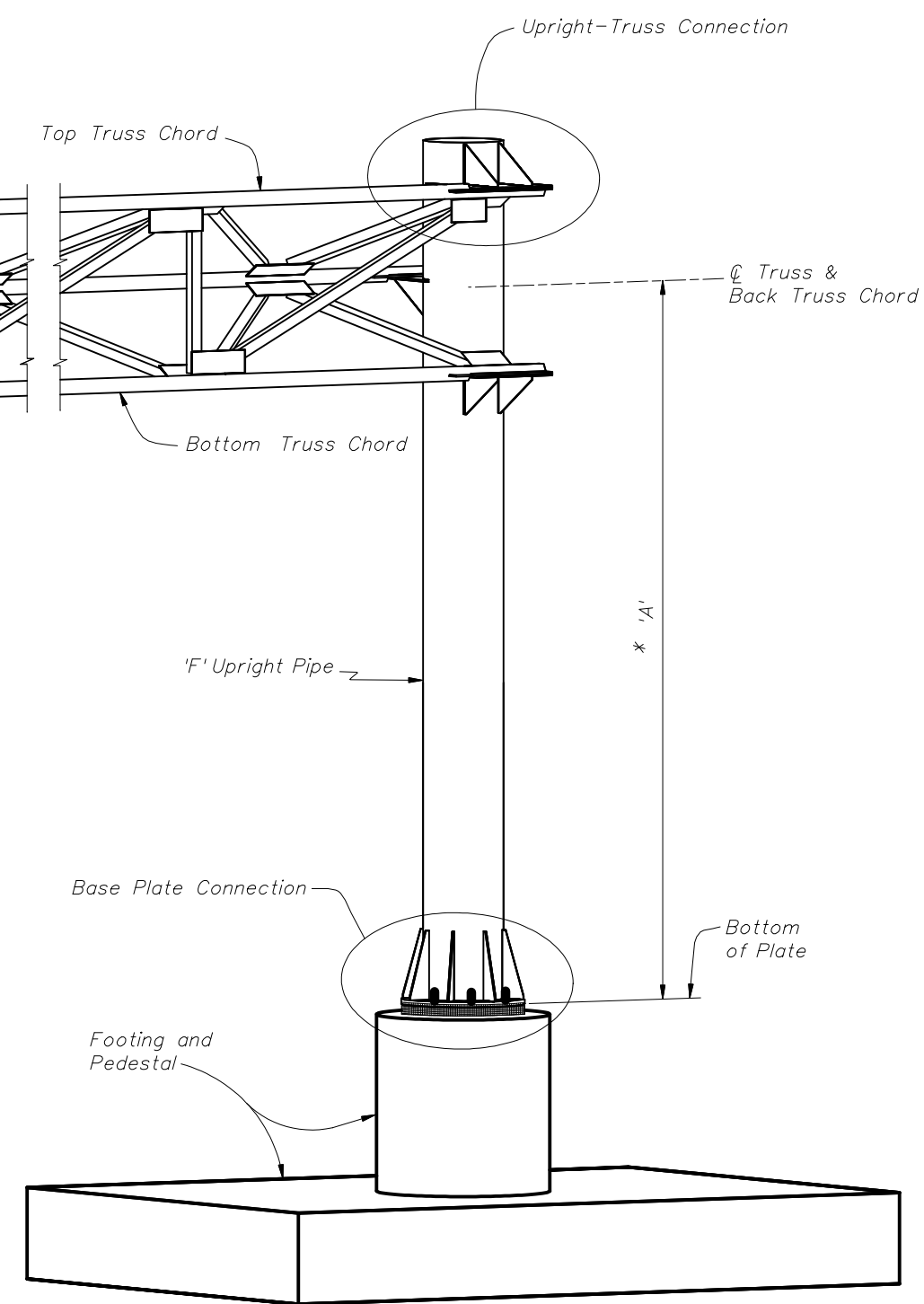
- GENERAL NOTES
- (1) For "General Notes" covering Material Specifications see Index 11200.
 - (2) Design based on 32 ft. maximum height to centroid of sign panel.
 - (3) The Design Wind Speed shall conform to Wind Speed by County shown on Index 11200, Sheet 1 of 2.

DETAILS OF SIGN FACE & TRUSS CONNECTION



CANTILEVER SIGN STRUCTURE NOTES

- 1) Design according to FDOT Structures Manual. Alternate Designs are not allowed.
- 2) Submit shop drawings for all work. Include:
 - a. Field verification of all upright heights.
 - b. Foundation elevations necessary to insure minimum vertical clearances as per traffic plans.
 - c. Anchor bolt orientation with respect to centerline of truss and the direction of traffic.
 - d. Show chord splices a minimum distance of 2 truss panel lengths apart. "SD" Panel from upright is the closest panel in which a chord splice may be used. See plans for Cantilever Sign Structure Data Table. Upright splices are not allowed.
- 3) Shop Fabrication, Assembly, Handling and Shipping:
 - a. Do not begin fabrication before receiving shop drawing approval.
 - b. Welding: Conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).
 - c. Shop assemble the entire structure after galvanizing and prior to shipment.
 - d. If necessary, disassemble and secure components for shipment.
- 4) Sign Structure Materials:
 - a. Upright and Chords (Steel Pipe): API -5L-X42 (42 ksi yield) or ASTM A500, Grade B.
 - b. Steel Angles: ASTM A 709, Grade 36.
 - c. Steel Plates: ASTM A 709, Grade 36.
 - d. Weld Metal: E70XX.
 - e. Bolts: ASTM A325 Type 1, (install per Specification Section 700) with single, self-locking nuts.
 - f. Anchor Bolts: ASTM F1554, Grade 55 with ASTM A563 Grade A heavy-hex double nuts.
 - g. Install all nuts per manufacturer's instructions.
 - h. Bolt hole diameters: equal to the bolt diameter plus $\frac{1}{16}$ ".
 - i. Anchor bolt hole diameters: equal to the bolt diameter plus $\frac{1}{2}$ ".
- 5) Galvanization: Nuts, bolts and washers: ASTM F2329. Other steel items: ASTM A123
- 6) Sign Panels: Aluminum. See Elevation drawing for sizes and locations.
- 7) Foundation Materials:
 - a. Reinforcing Steel: ASTM A615, Grade 60.
 - b. Concrete: Class IV, minimum 5.5 ksi compressive strength at 28-days for all environmental classifications for Spread Footing.
Class IV (Drilled Shaft), minimum 4.0 ksi compressive strength at 28-days for all environmental classifications for Drilled Shaft.
- 8) Construct the Sign Structure foundation in accordance with FDOT Specification Section 455.
- 9) Prior to erection, record the as-built anchor locations and provide to the Engineer.
- 10) After placement of the upright and prior to installation of the truss, adjust the leveling nuts beneath the base plate to achieve the back rake shown on the Camber Diagram.
- 11) Place backfill above the footing prior to installation of the sign panels. Do not remove or reduce in height without prior approval of the Engineer.
- 12) Install sign panels as shown on the Elevation drawing.
- 13) Payment: All costs associated with the Sign Structure, Sign Panels, Foundation and all incidental items will be paid for under the Sign Structure pay item.
- 14) Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location \pm two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.



ISOMETRIC VIEW

*NOTE: Contractor shall verify these Dimensions prior to Fabrication of Upright.

NOTE: See Plans for Cantilever Sign Structure Data Table.



2010 FDOT Design Standards

CANTILEVER SIGN STRUCTURE

Last Revision

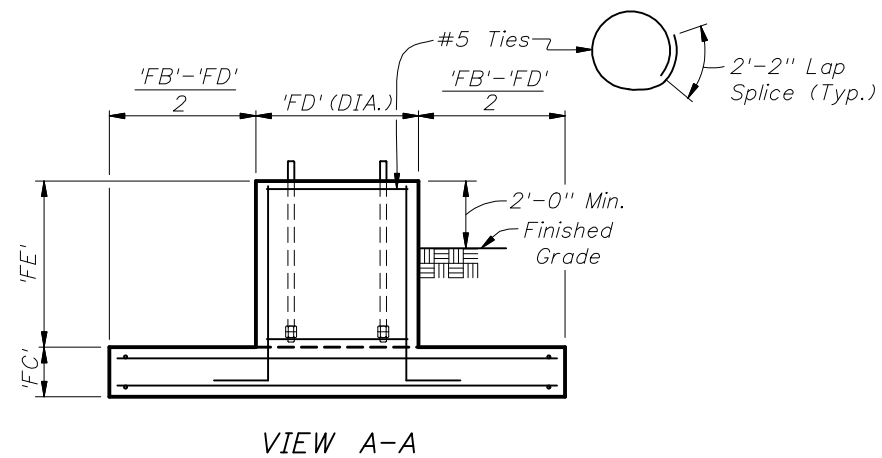
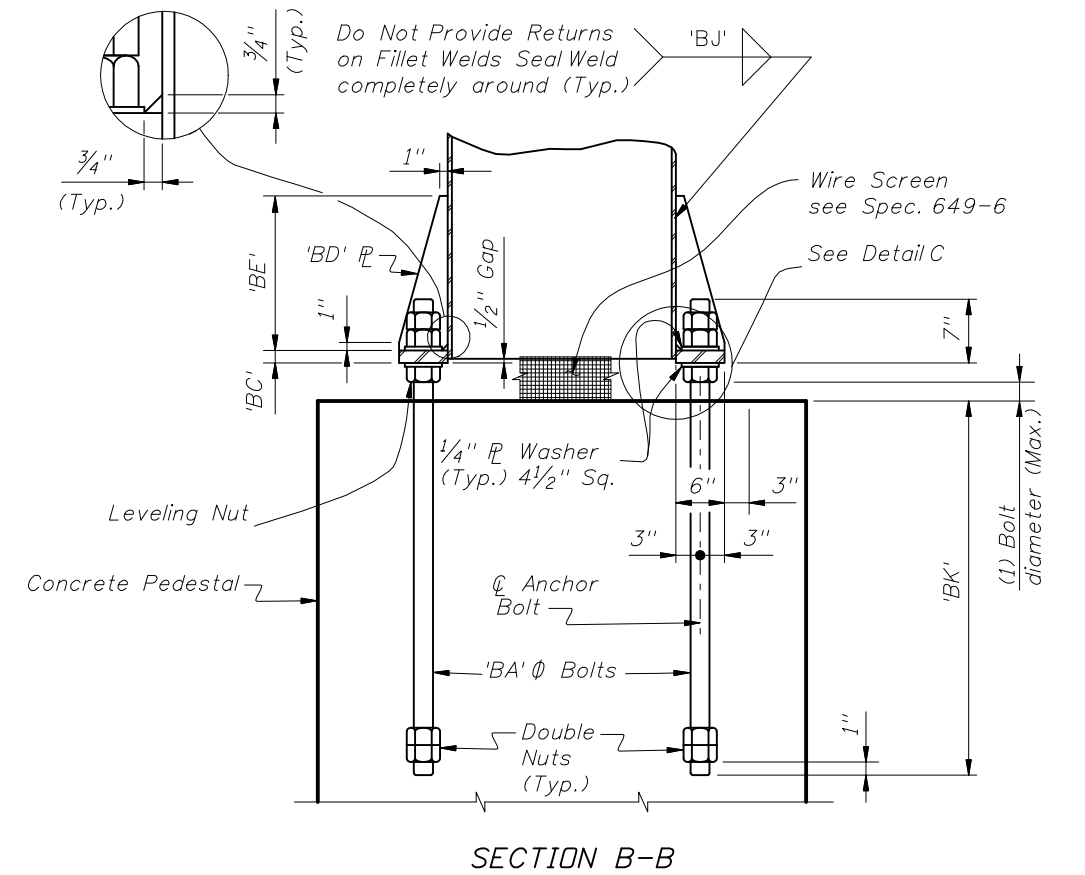
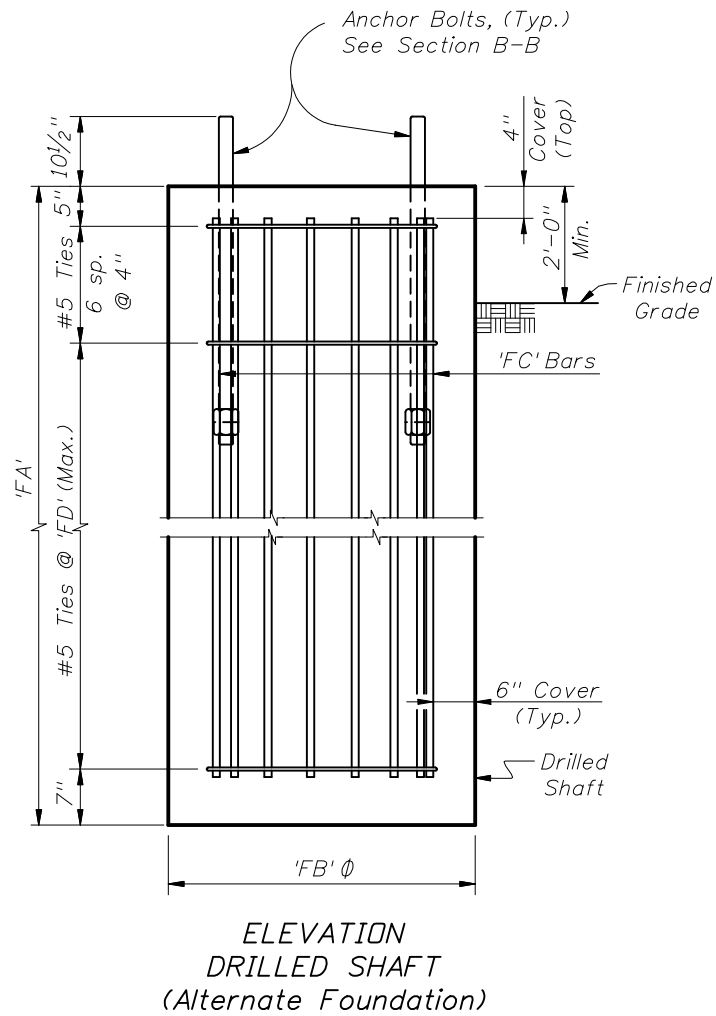
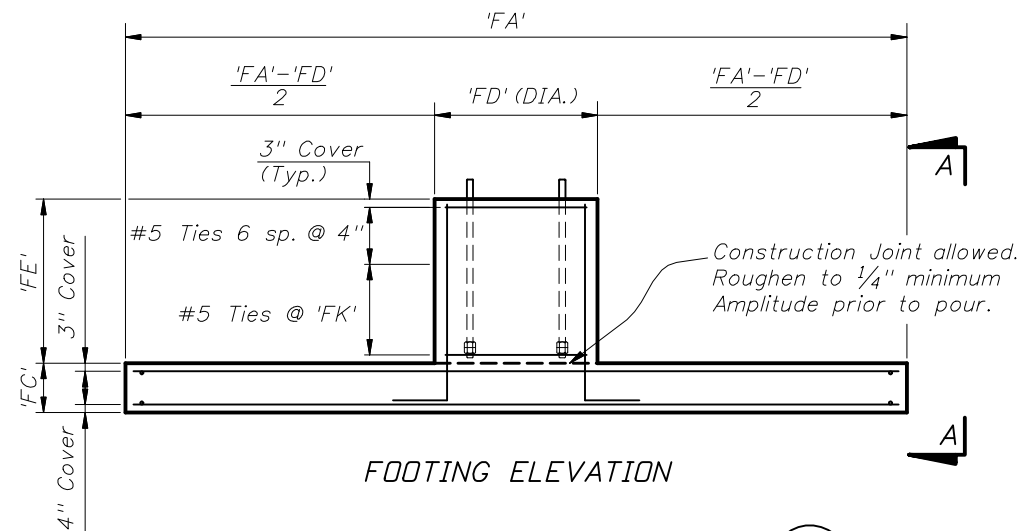
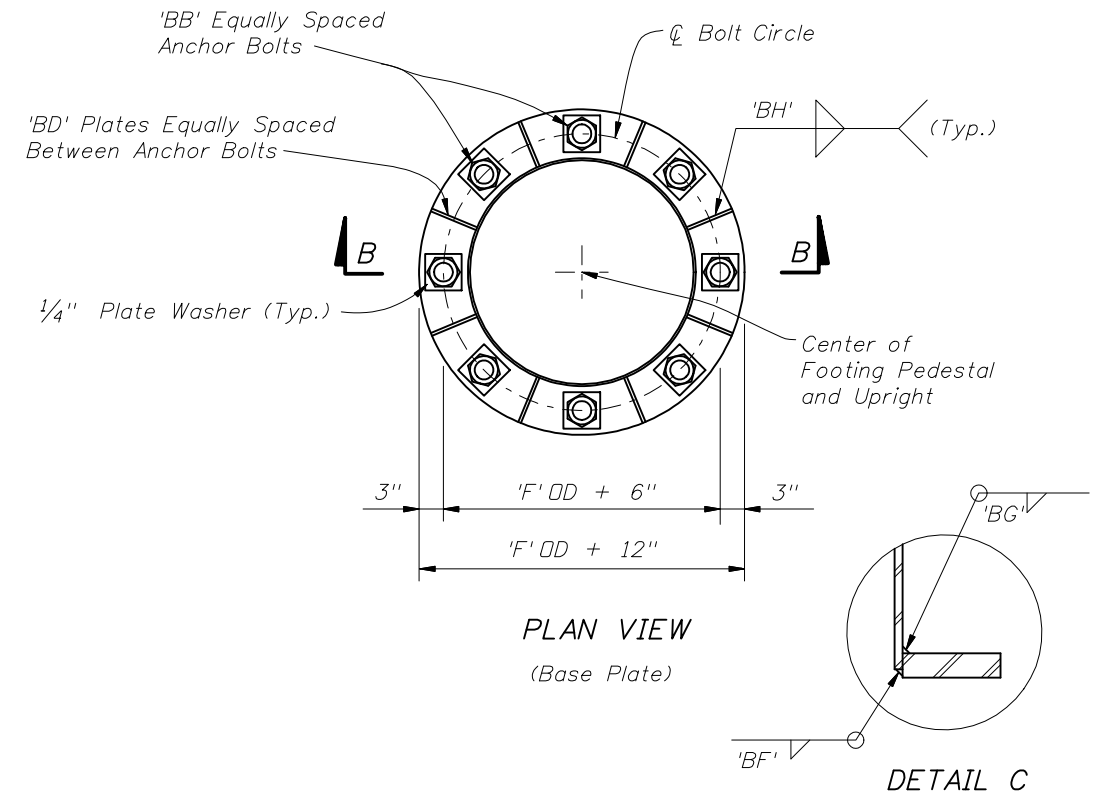
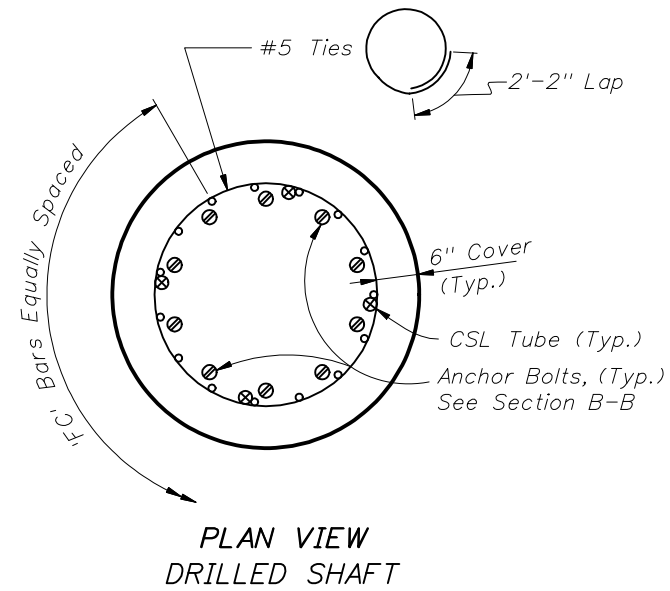
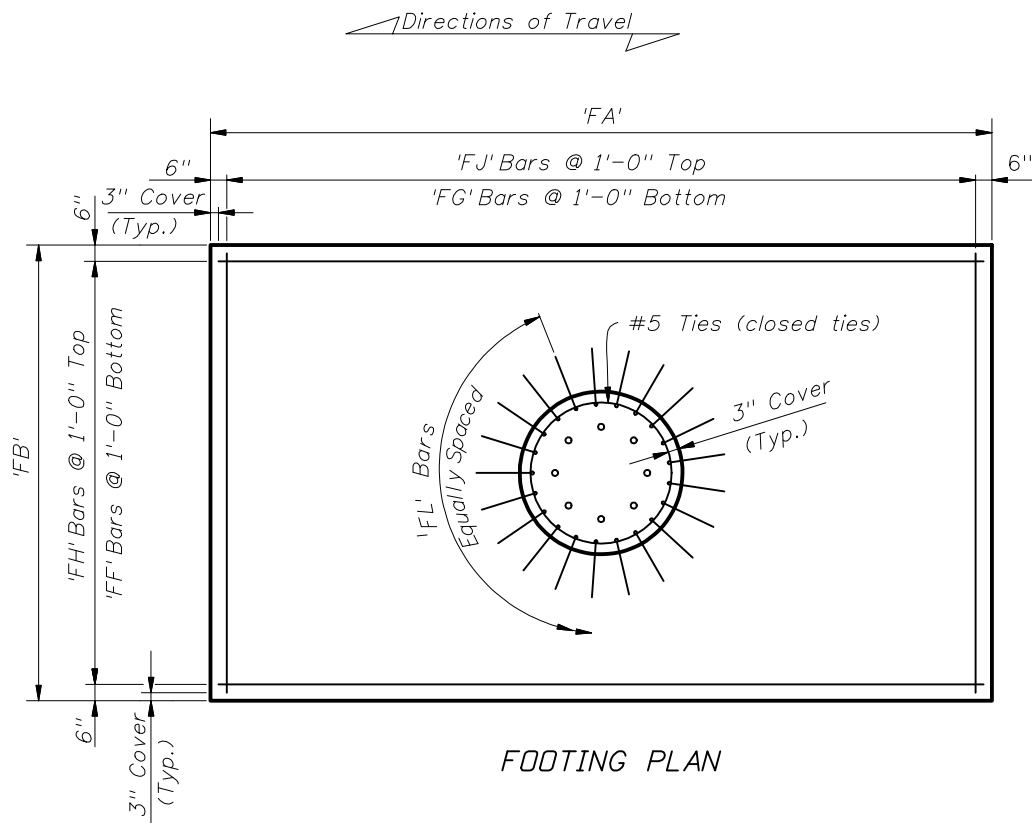
01/01/09

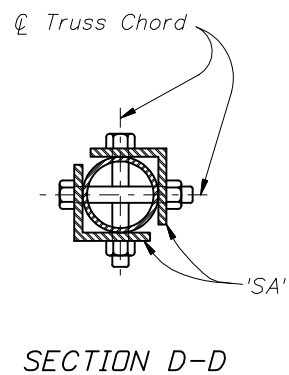
Sheet No.

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11310





'SC' ϕ Bolts 'SB' Required
(One Half Each Side of Splice)

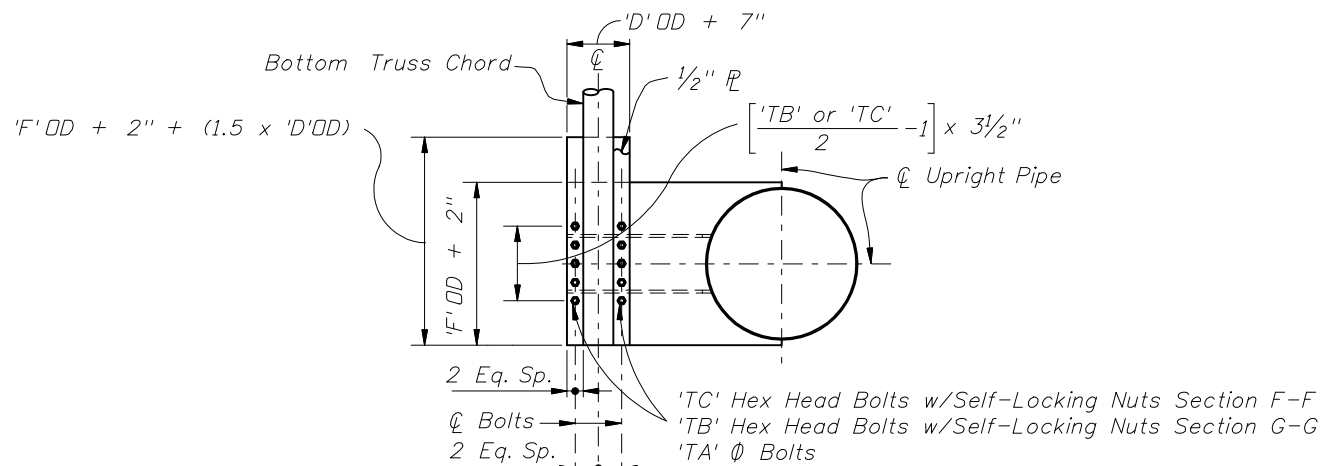
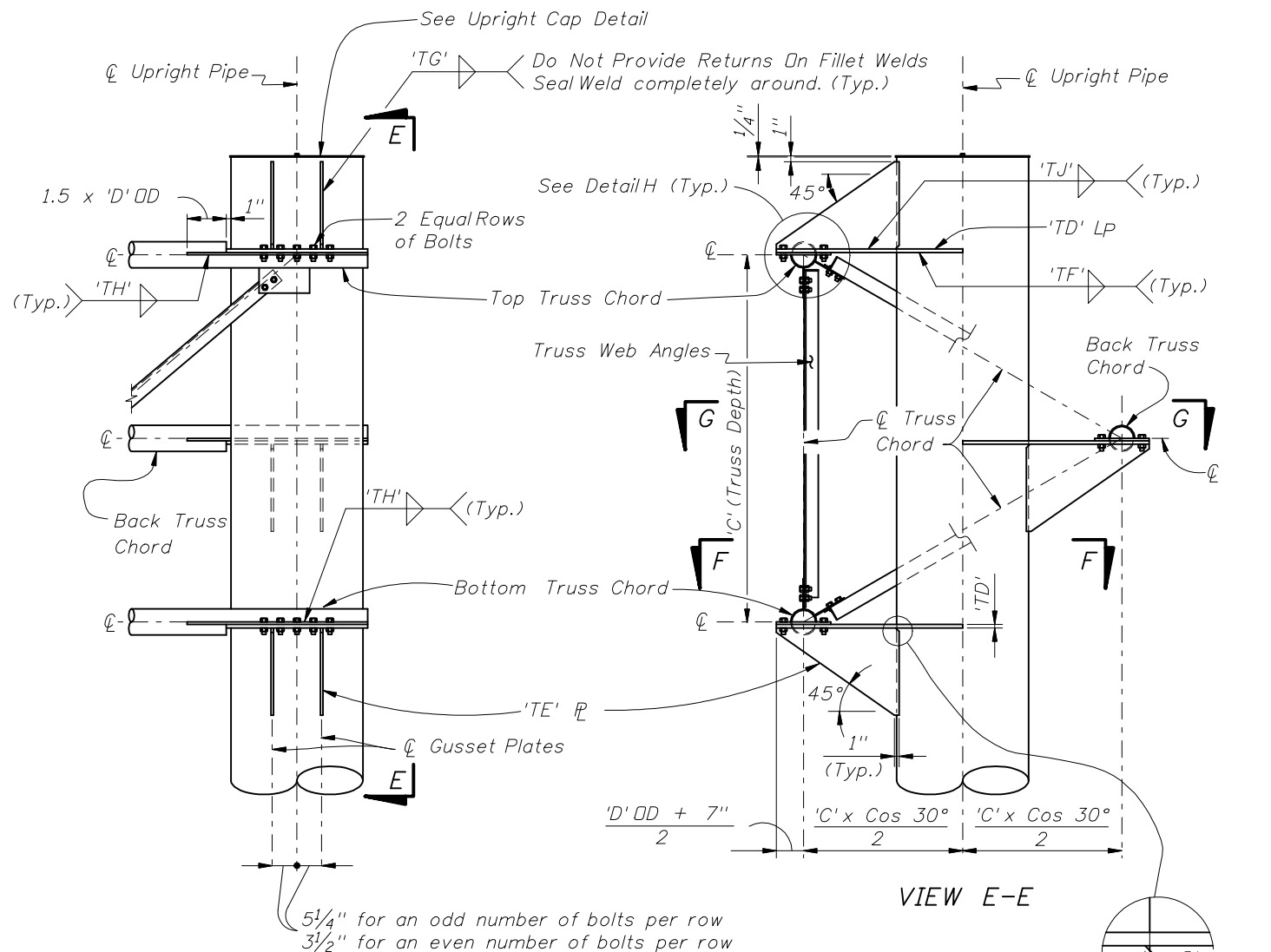
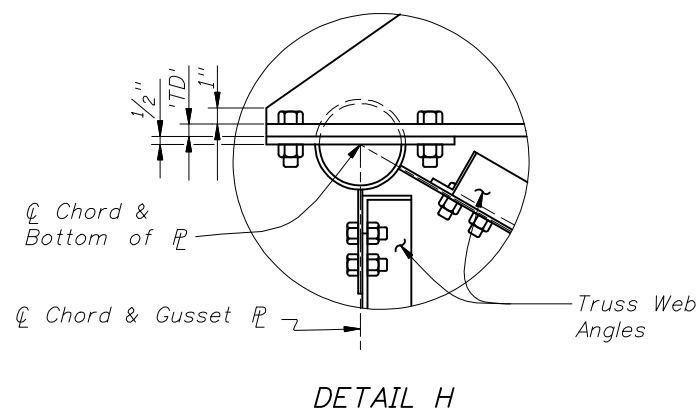
NOTE: Only 6 Bolts
shown for clarity

Maximum Gap Between
Pipes is $\frac{1}{8}$ "

$1\frac{3}{4}$ " for 1" ϕ Bolts
 $1\frac{1}{2}$ " for $\frac{7}{8}$ " ϕ Bolts
 $1\frac{1}{4}$ " for $\frac{3}{4}$ " ϕ Bolts

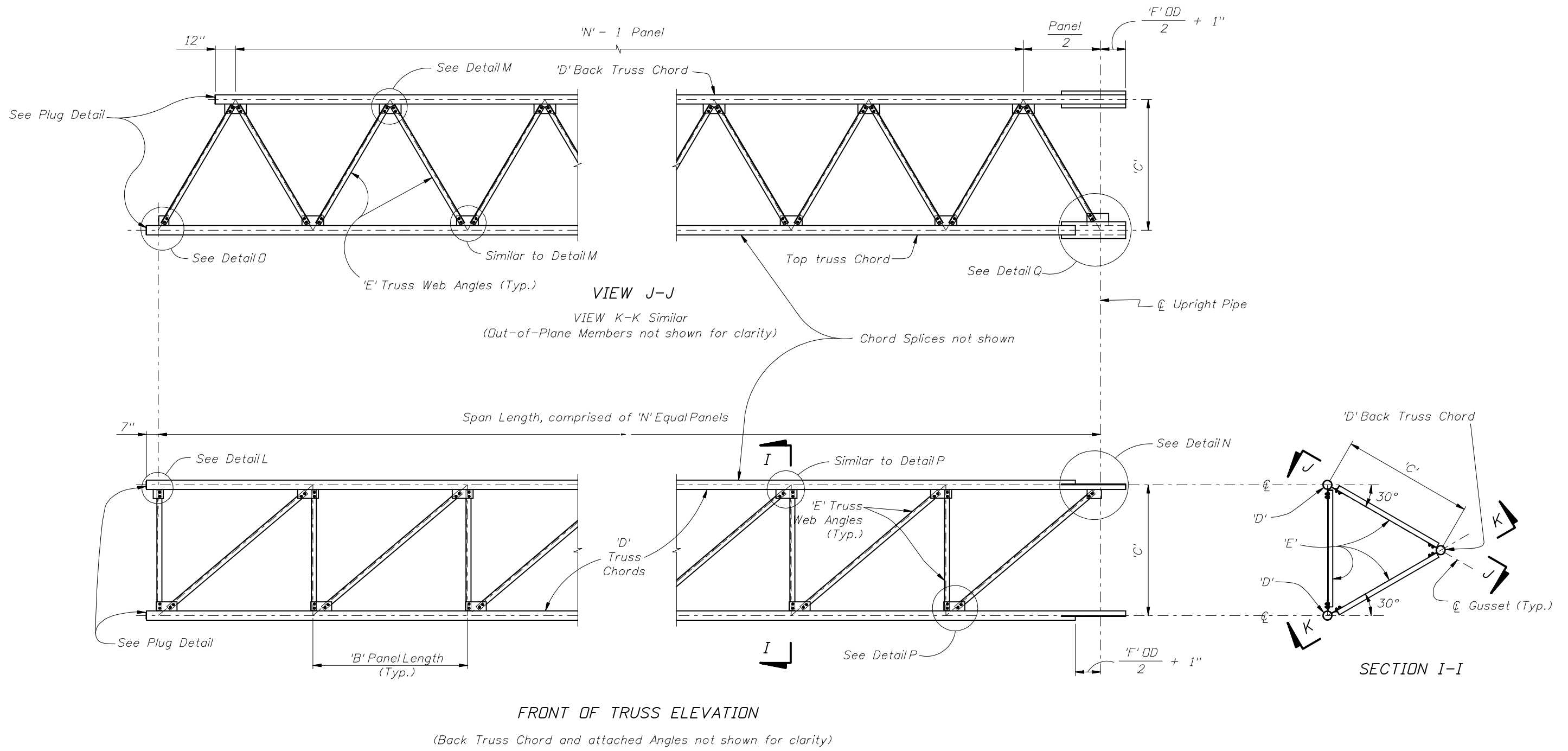
$3\frac{1}{2}$ " for 1" ϕ Bolts
3" for $\frac{7}{8}$ " ϕ Bolts
 $2\frac{1}{2}$ " for $\frac{3}{4}$ " ϕ Bolts

SPLICE CONNECTION DETAIL



NOTE:
Abbreviation
OD ~ Outside Diameter





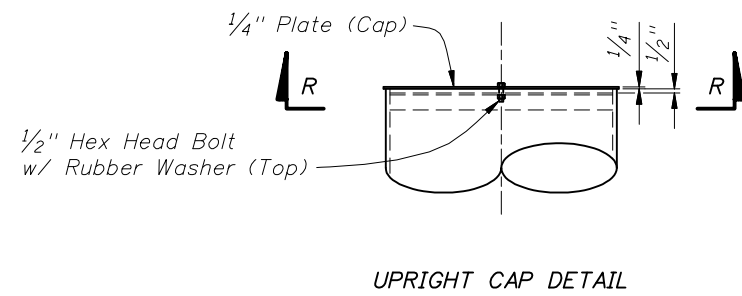
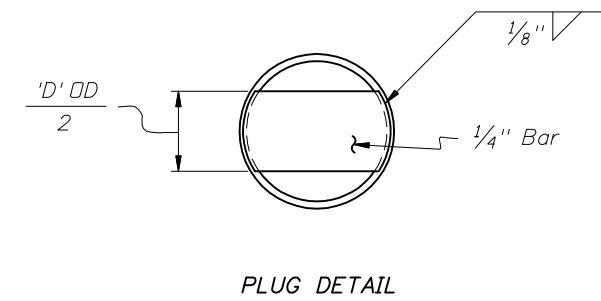
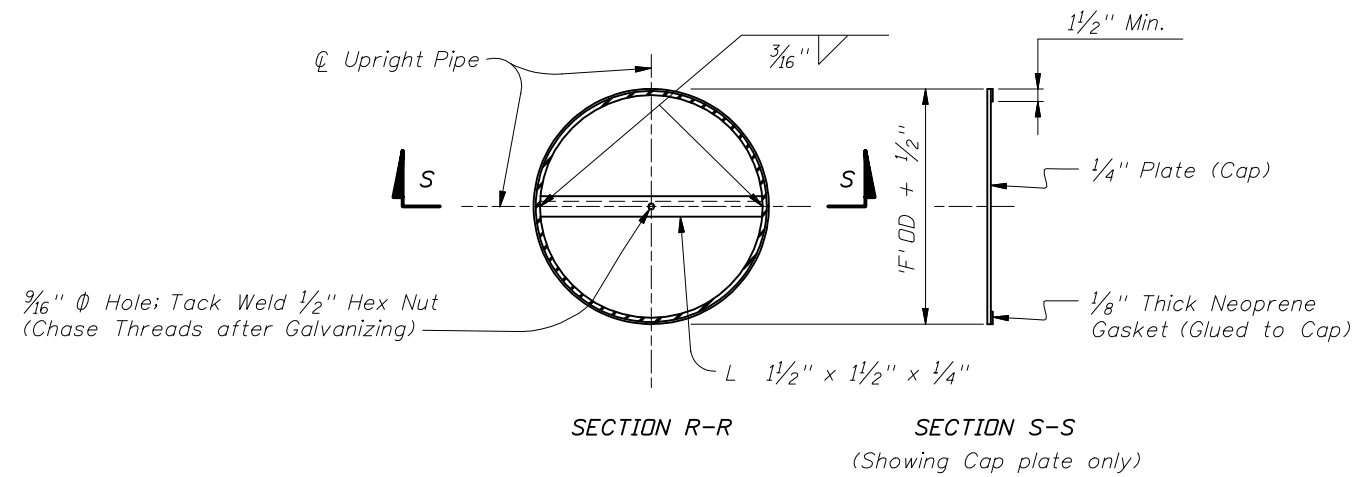
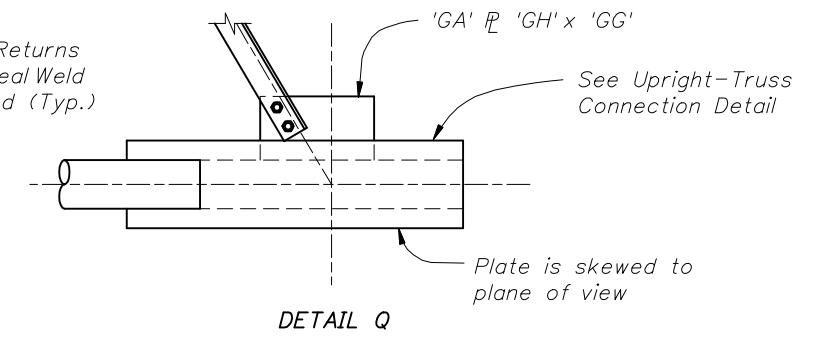
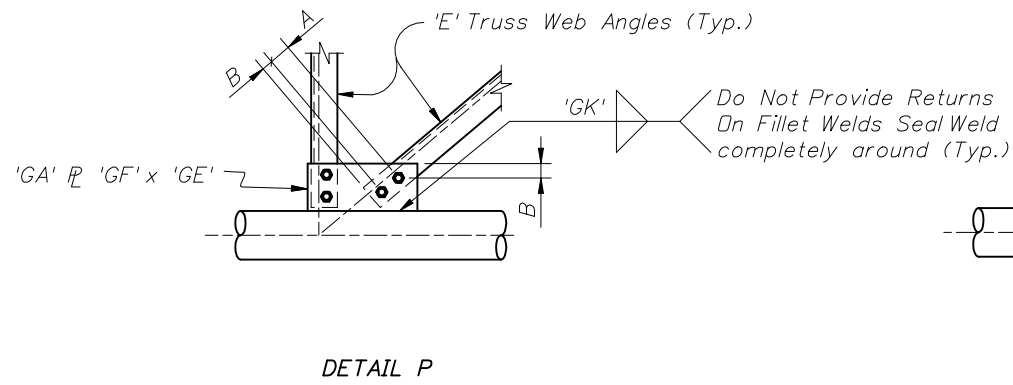
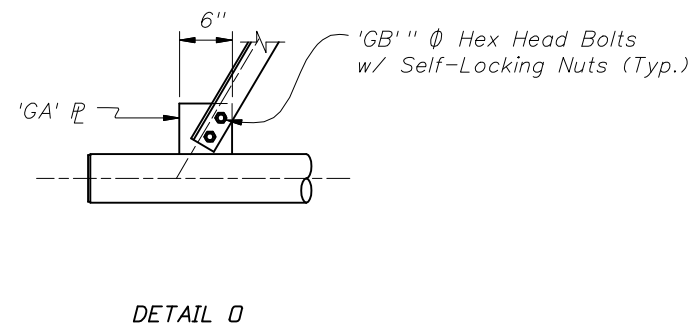
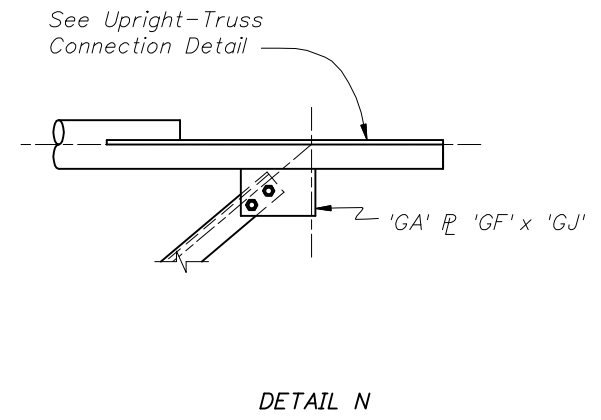
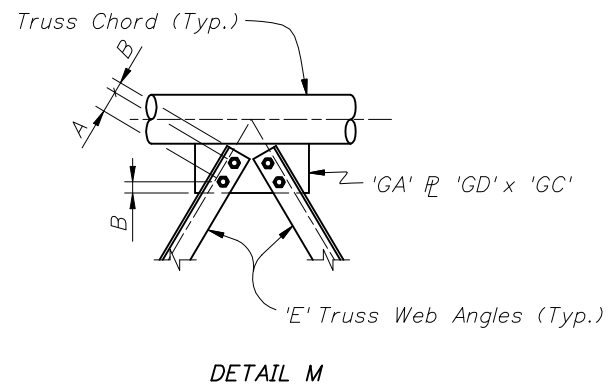
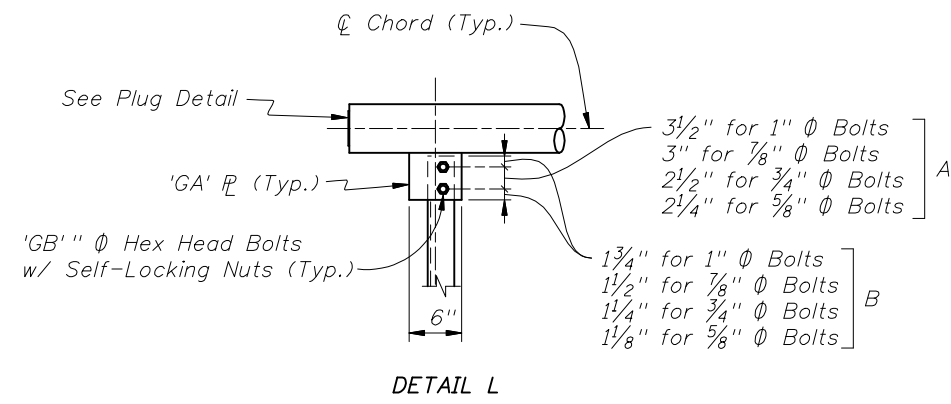
NOTE:
Abbreviation
OD ~ Outside Diameter



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CANTILEVER SIGN STRUCTURE

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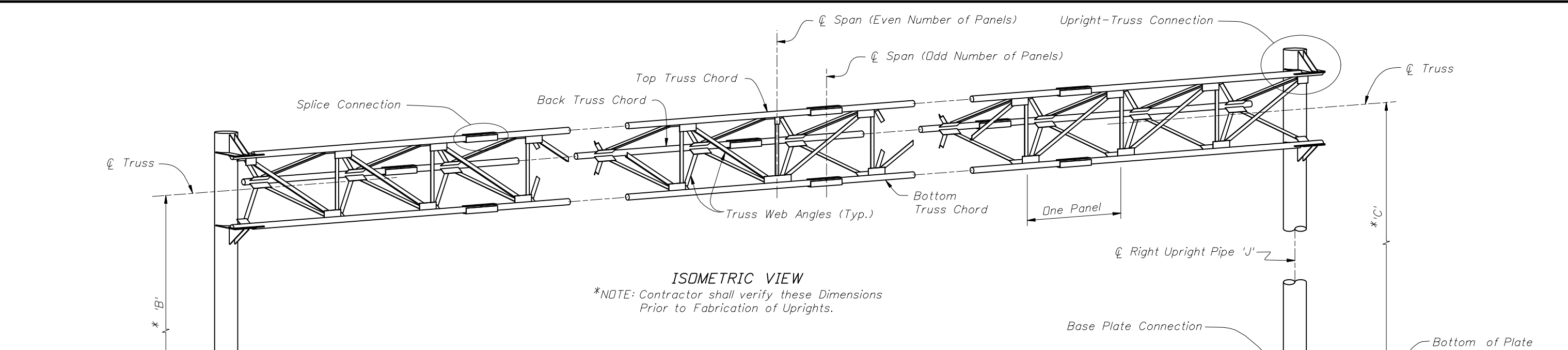
NOTE:
Abbreviation
OD ~ Outside Diameter



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CANTILEVER SIGN STRUCTURE

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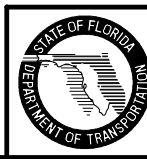
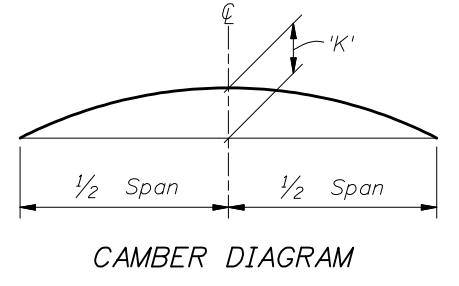
ISOMETRIC VIEW

*NOTE: Contractor shall verify these Dimensions Prior to Fabrication of Uprights.

SPAN SIGN STRUCTURE NOTES

- 1) Design according to FDOT Structures Manual. Alternate Designs are not allowed.
- 2) Submit shop drawings for all work. Include:
 - a. Field verification of all upright heights.
 - b. Foundation elevations necessary to insure minimum vertical clearances as per traffic plans.
 - c. Anchor bolt orientation with respect to centerline of truss and the direction of traffic.
 - d. The method to be used to provide the required parabolic camber. (See Camber Diagram)
- 3) Shop Fabrication, Assembly, Handling and Shipping:
 - a. Do not begin fabrication before receiving shop drawing approval.
 - b. Welding: Conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).
 - c. Shop assemble the entire structure after galvanizing and prior to shipment.
 - d. If necessary, disassemble and secure components for shipment.
- 4) Sign Structure Materials:
 - a. Upright and Chords (Steel Pipe): API -5L-X42 (42 ksi yield) or ASTM A500, Grade B.
 - b. Steel Angles: ASTM A 709, Grade 36.
 - c. Steel Plates: ASTM A 709, Grade 36.
 - d. Weld Metal: E70XX.
 - e. Bolts: ASTM A325 Type 1, (install per Specification Section 700) with single, self-locking nuts.
 - f. Anchor Bolts: ASTM F1554, Grade 55 with ASTM A563 Grade A heavy-hex double nuts.
 - g. Install all nuts per manufacturer's instructions.
 - h. Bolt hole diameters: equal to the bolt diameter plus $\frac{1}{16}$ ".
 - i. Anchor bolt hole diameters: equal to the bolt diameter plus $\frac{1}{2}$ ".
- 5) Galvanization: Nuts, bolts and washers: ASTM F2329. Other steel items: ASTM A123
- 6) Sign Panels: Aluminum. See Elevation drawing for sizes and locations.
- 7) Foundation Materials:
 - a. Reinforcing Steel: ASTM A615, Grade 60.
 - b. Concrete: Class IV (Drilled Shaft), minimum 4.0 ksi compressive strength at 28-days for all environmental classifications.
- 8) Construct the Sign Structure foundation in accordance with FDOT Specification Section 455.
- 9) Prior to erection, record the as-built anchor locations and provide to the Engineer.
- 10) Provide a parabolic camber with the maximum upward deflection as shown on the Camber Diagram.
- 11) Locate Chord splices a minimum of 3 truss panel lengths apart. Chord splices may be either the Standard splice or the Alternate splice but not both on this structure. Upright splices are not allowed.
- 12) Install sign panels as shown on the Elevation drawing.
- 13) Payment: All costs associated with the Sign Structure, Sign Panels, Foundation and all incidental items will be paid for under the Sign Structure pay item.
- 14) Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location \pm two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations

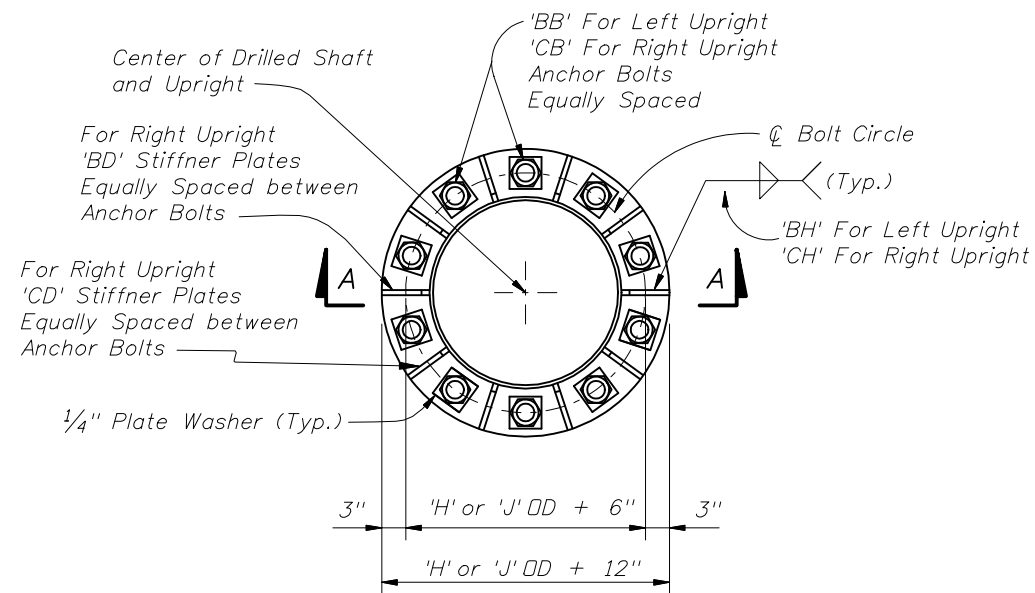
NOTE: See Plans for Span Sign Structure Data Table.



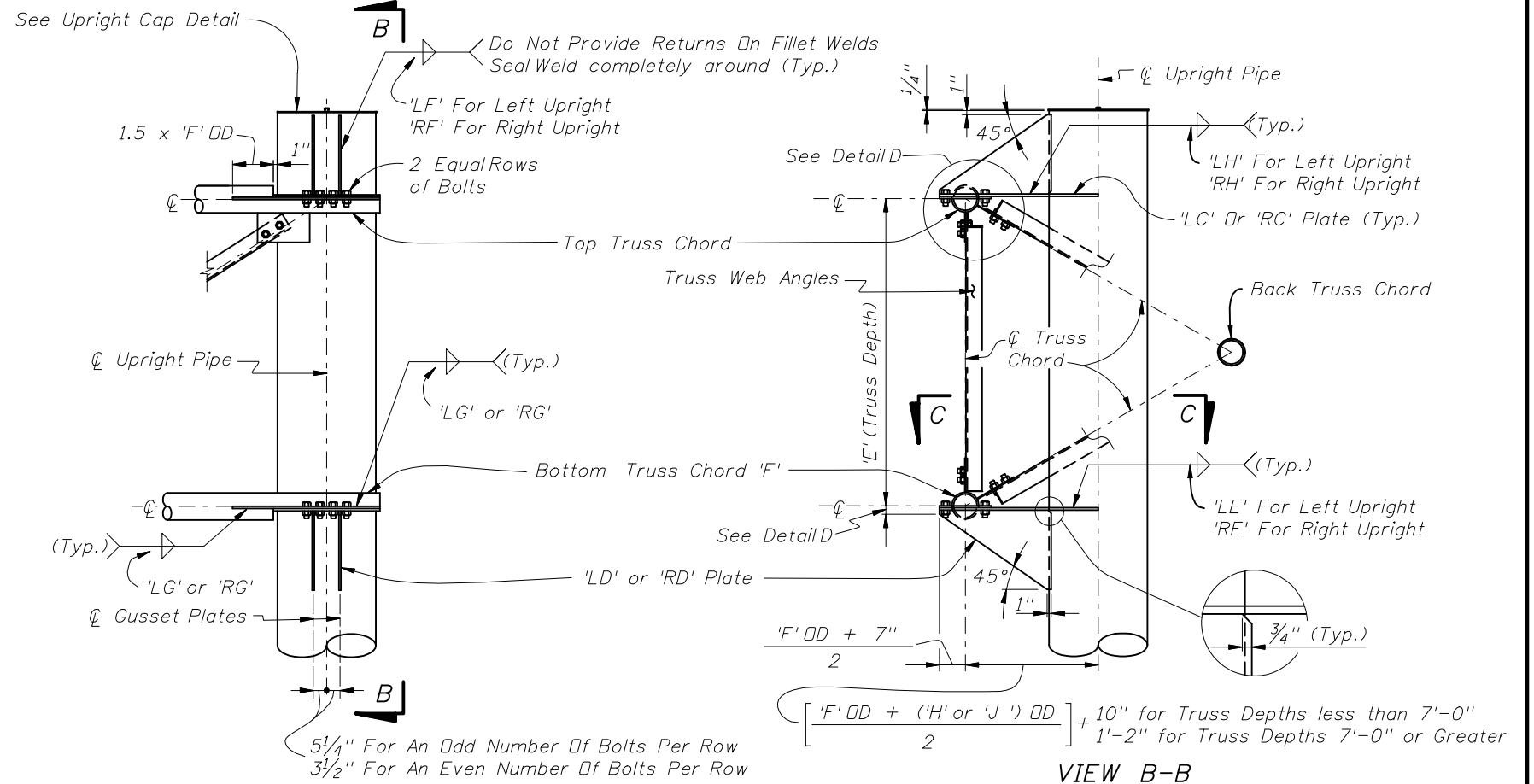
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SPAN SIGN STRUCTURE

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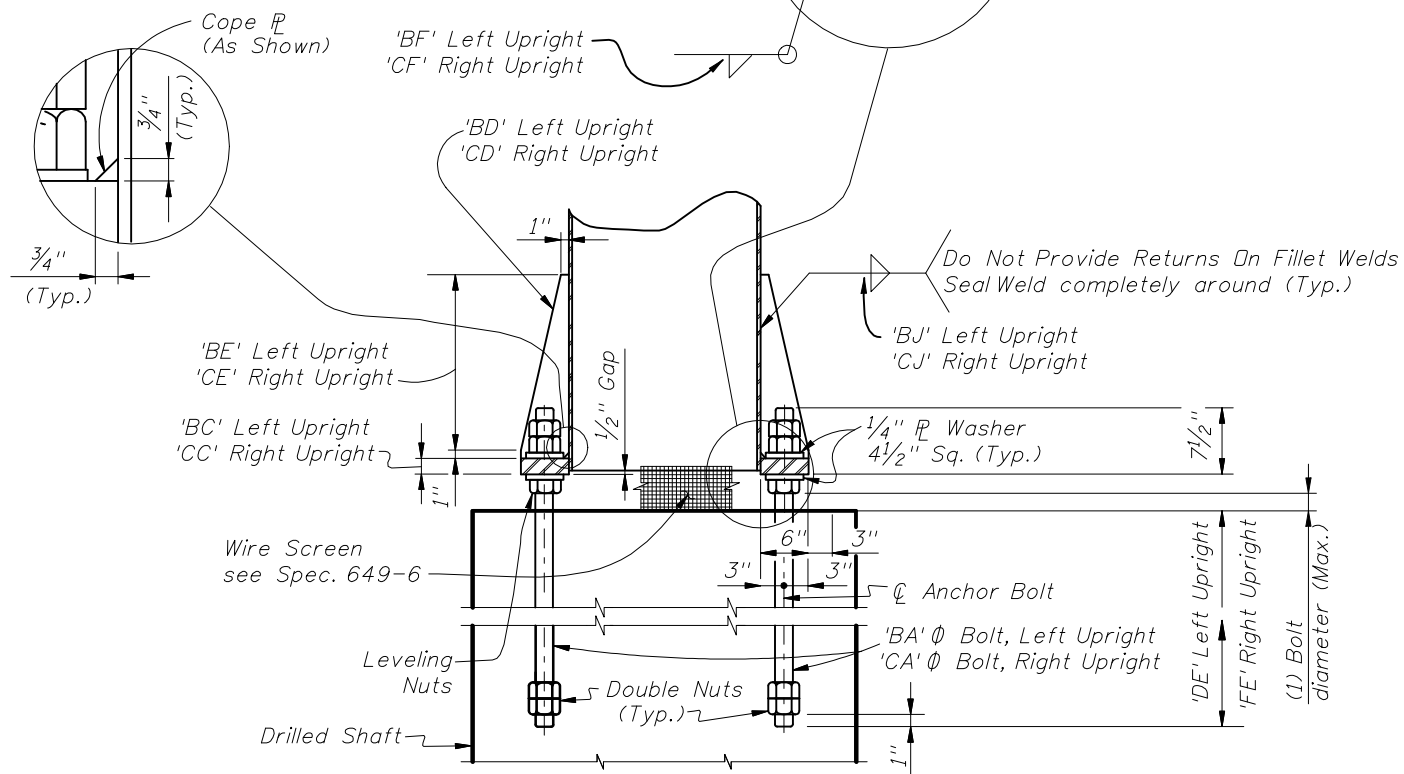


PLAN VIEW
BASE PLATE

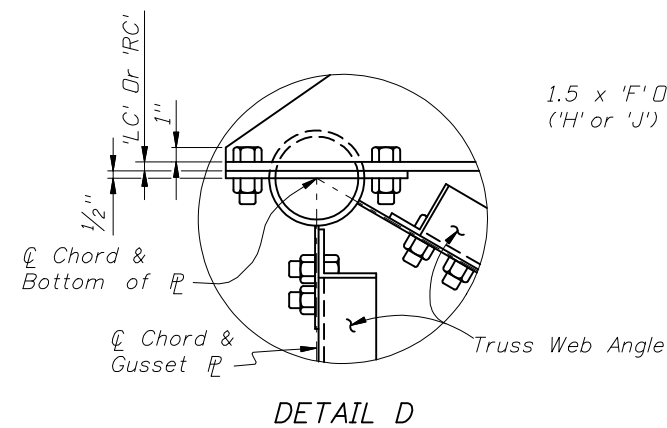


RIGHT UPRIGHT-TRUSS CONNECTION DETAIL
(LEFT UPRIGHT -TRUSS CONNECTION SIMILAR)

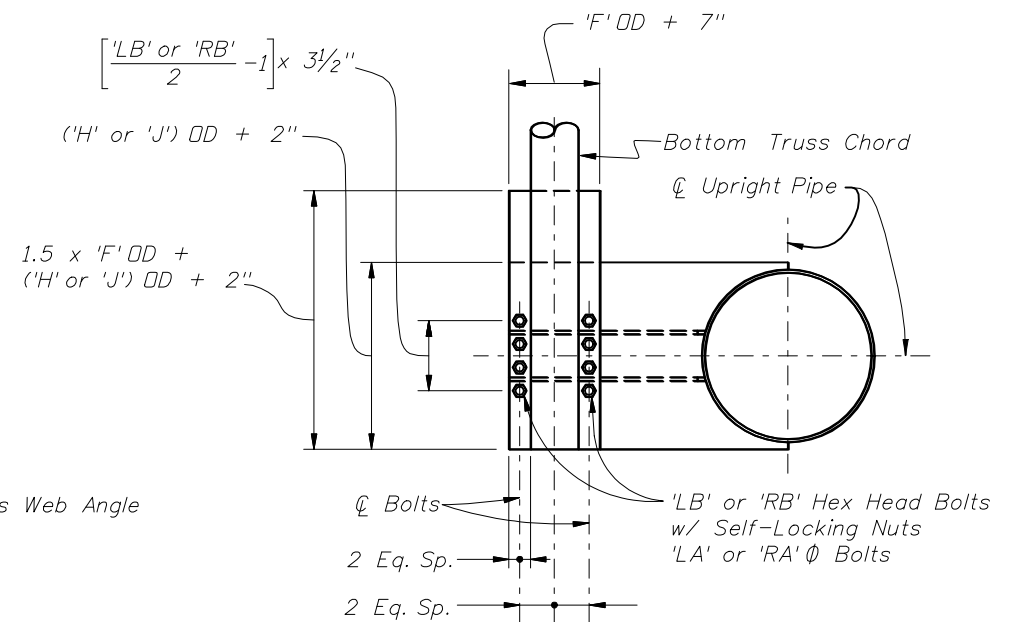
Web Members From Back Truss
Chord Omitted For Clarity



SECTION A-A



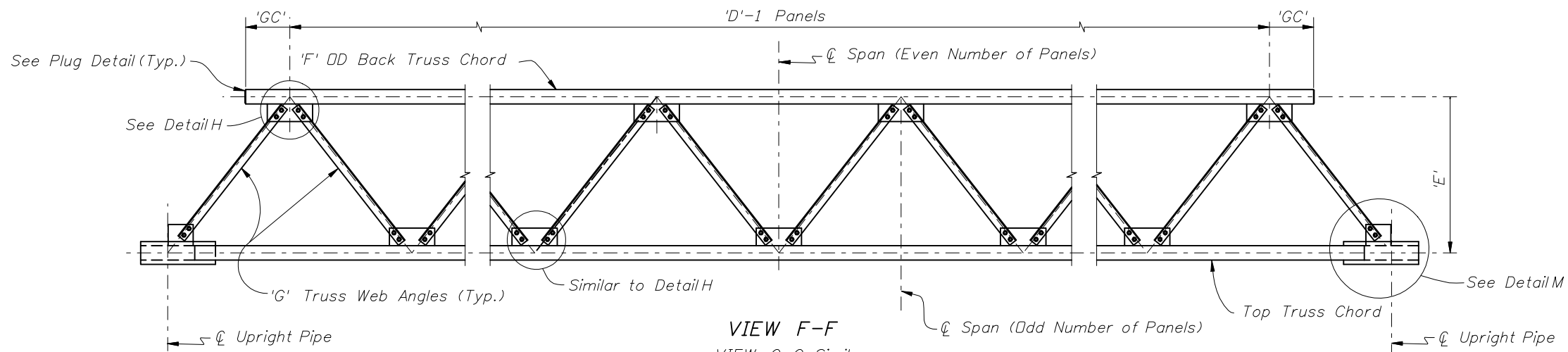
DETAIL D



SECTION C-C
(With Gusset Plate and
Angles omitted for clarity)

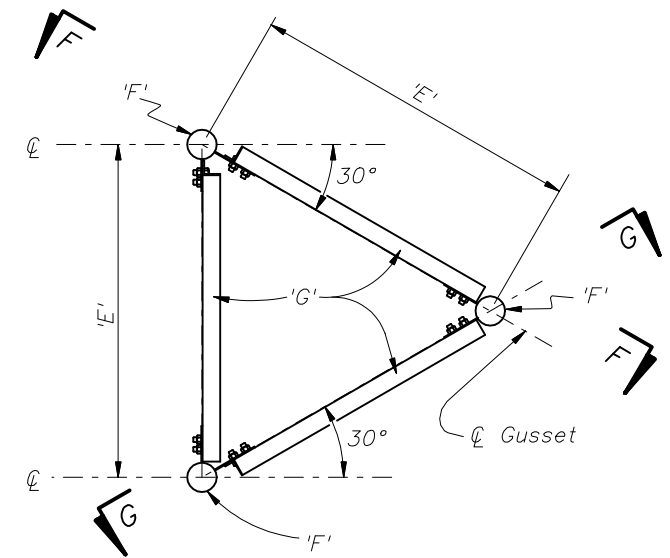
NOTE:
Abbreviation
OD ~ Outside Diameter



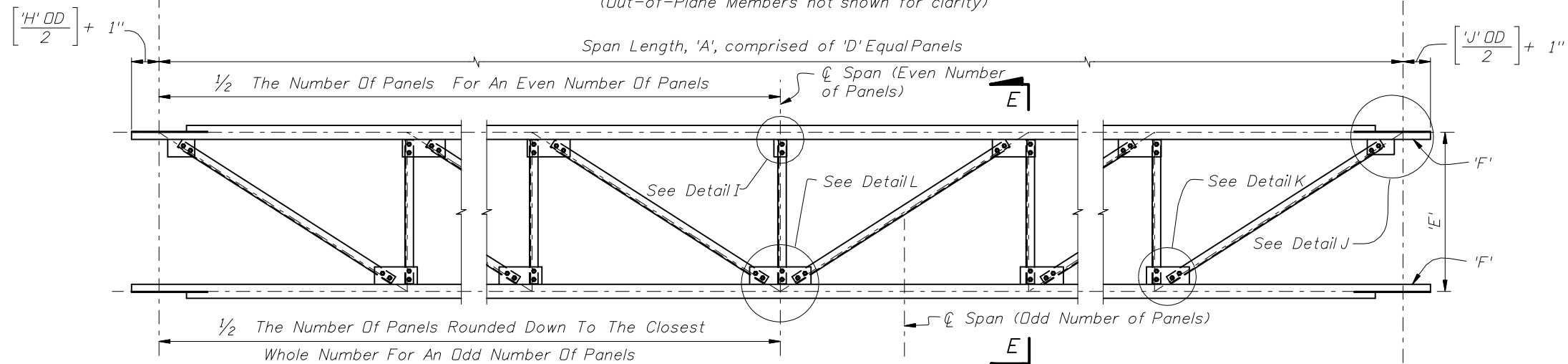


VIEW F-F

VIEW G-G Similar
(Out-of-Plane Members not shown for clarity)

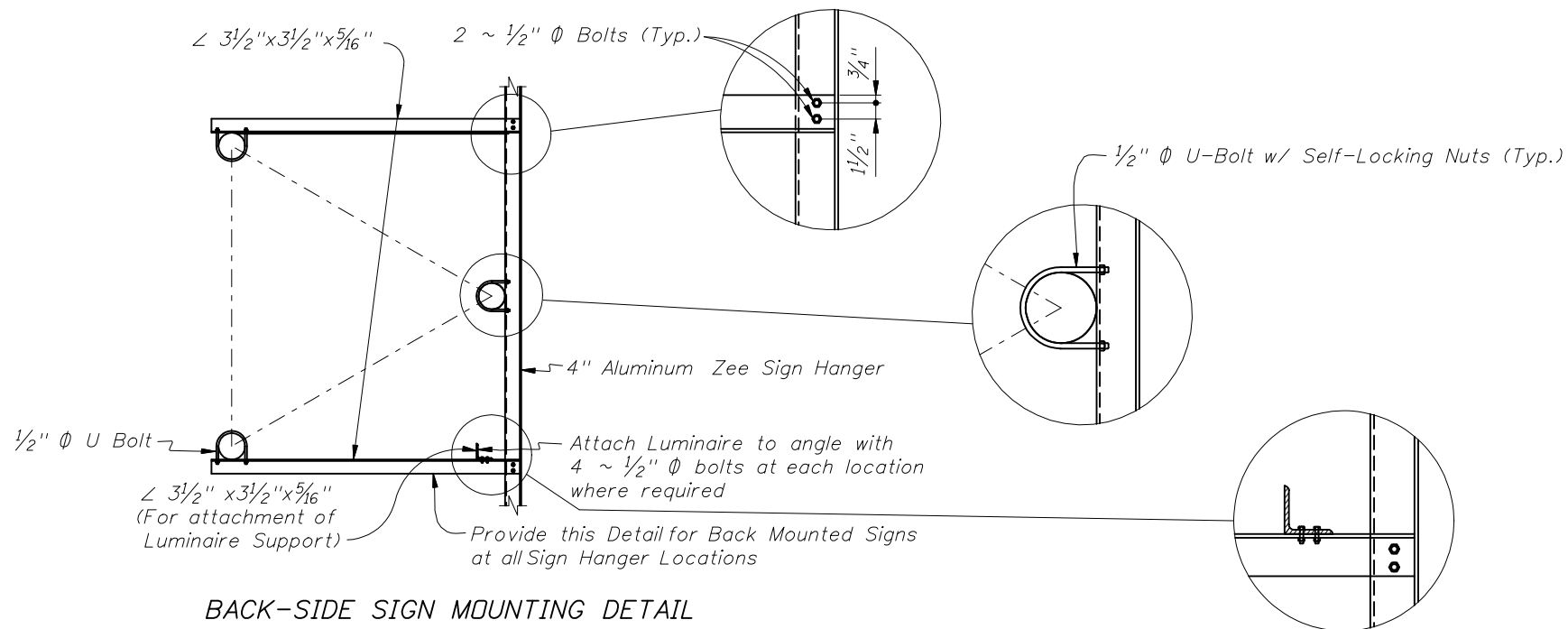


SECTION E-E



FRONT OF TRUSS ELEVATION

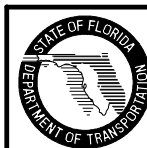
(Back Truss Chord and attached Angles not shown for clarity)



BACK-SIDE SIGN MOUNTING DETAIL

NOTE: See Index No. 11300.

NOTE:
Abbreviation
OD ~ Outside Diameter



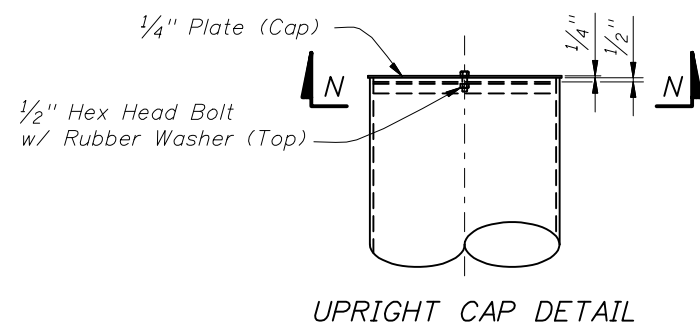
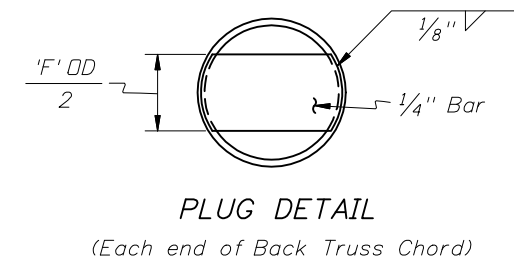
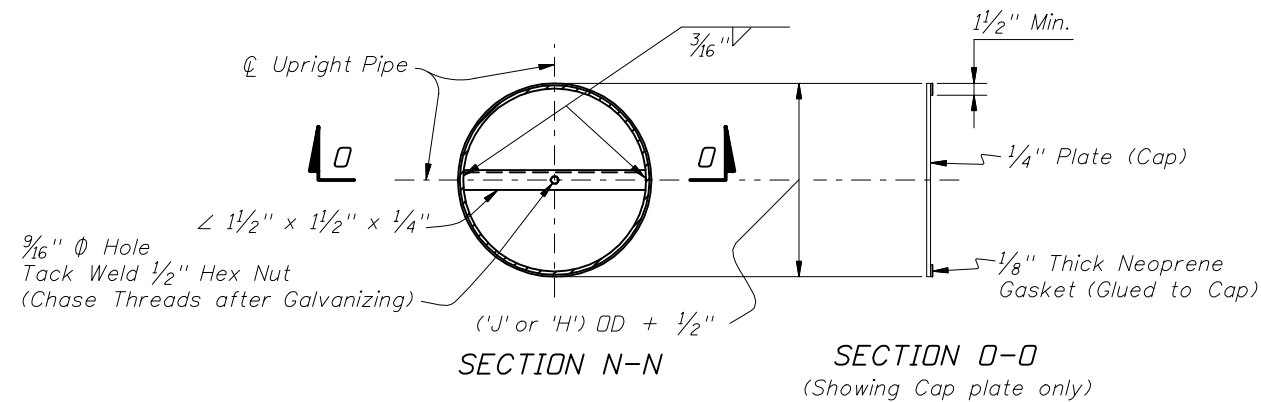
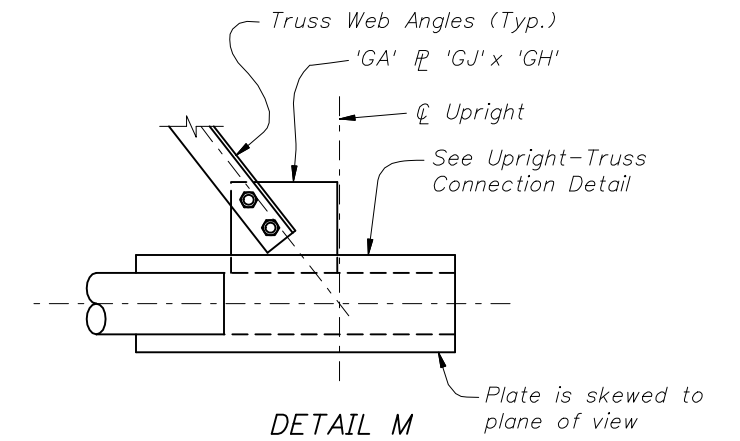
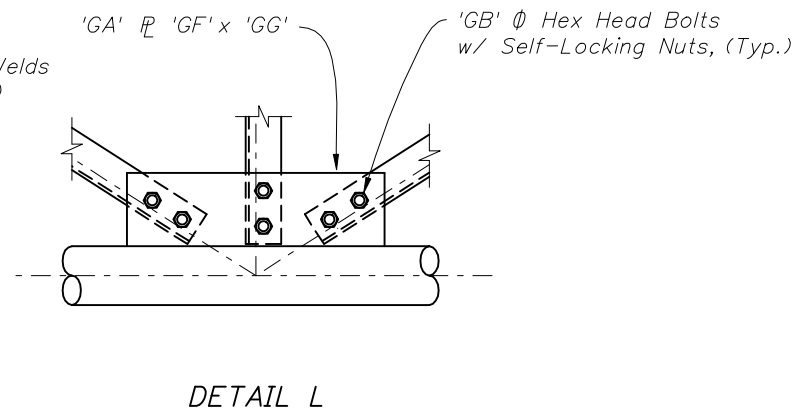
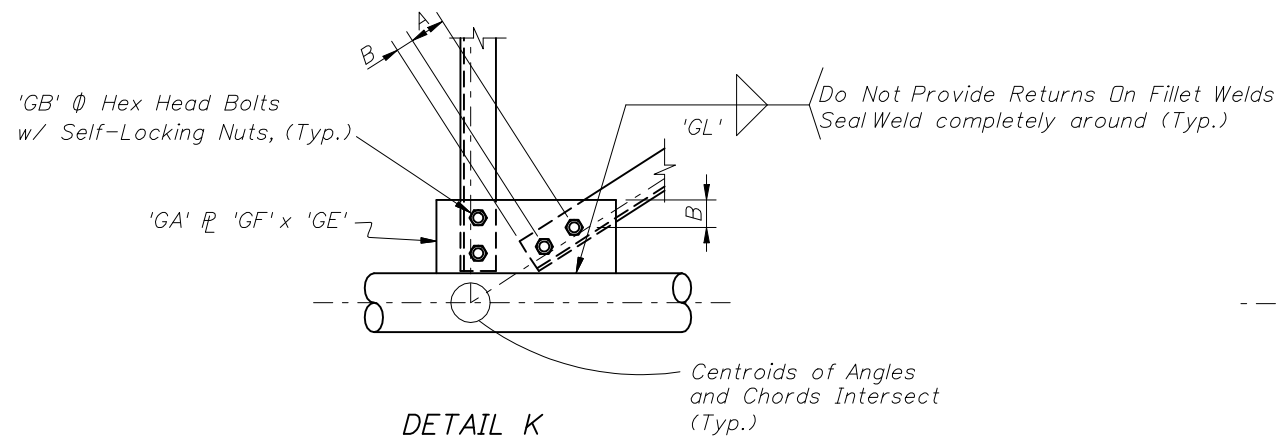
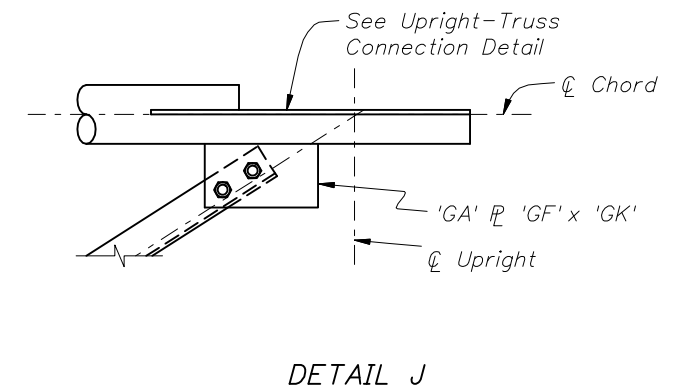
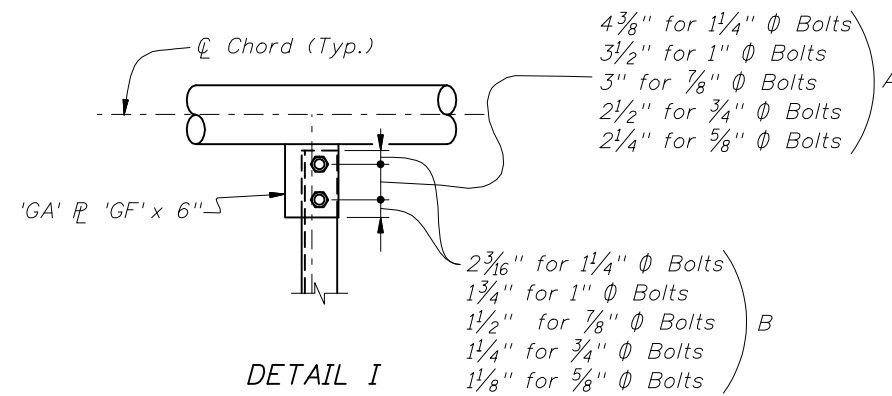
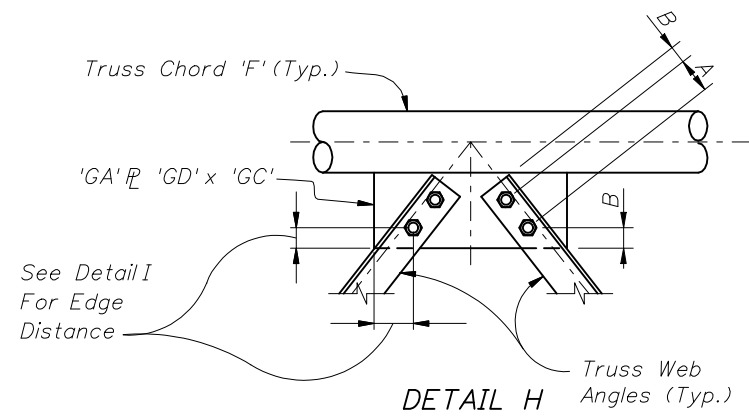
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SPAN SIGN STRUCTURE

Last Revision
07/01/05

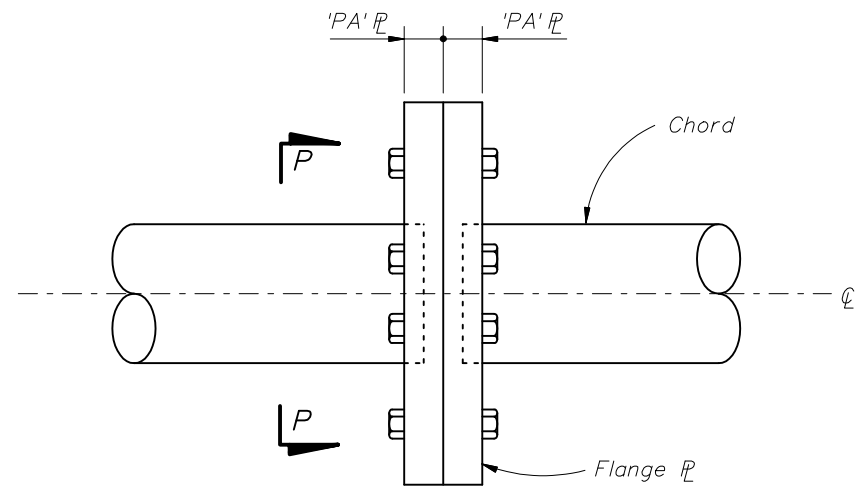
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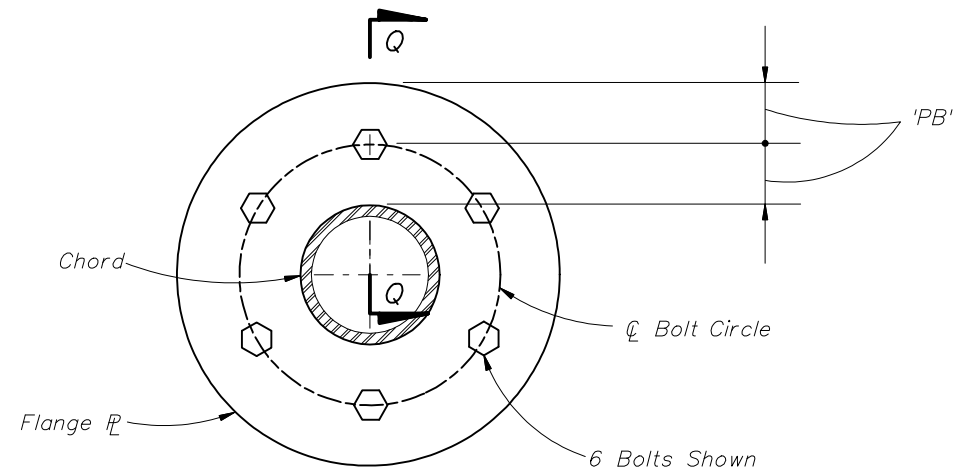


NOTE:
Abbreviation
OD ~ Outside Diameter

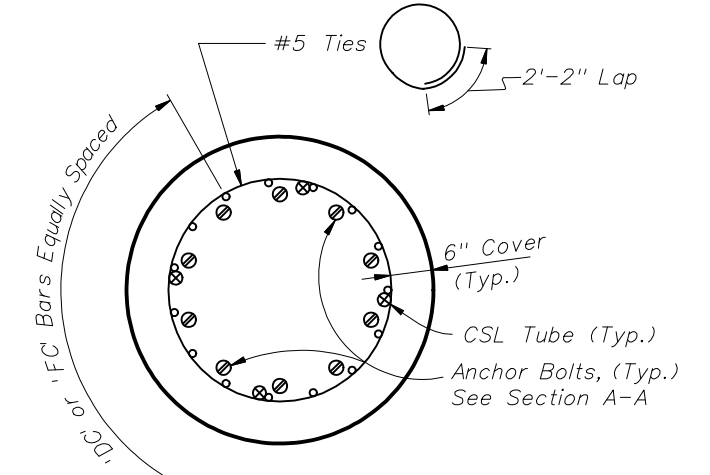




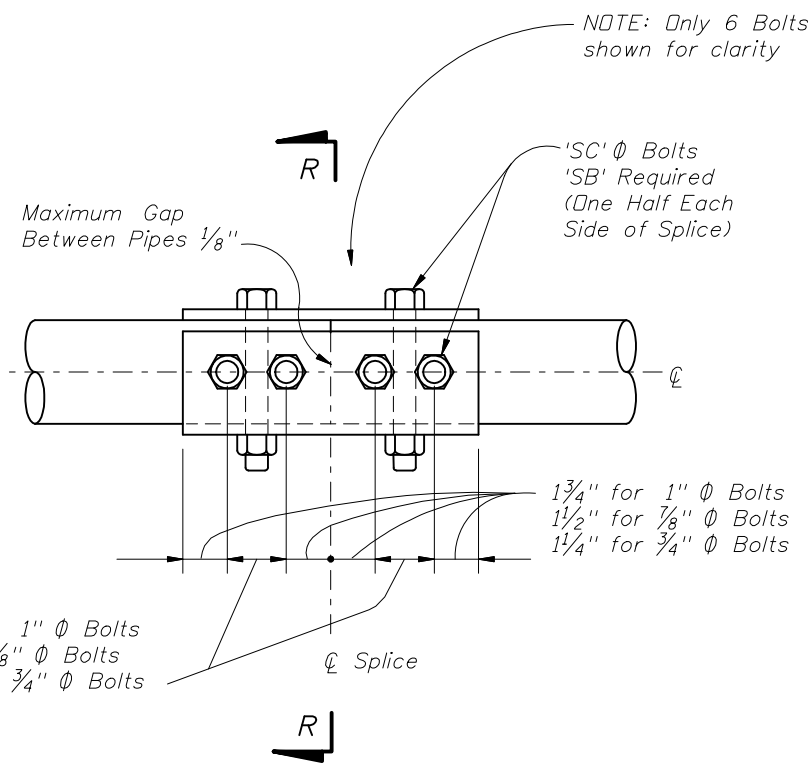
ELEVATION
ALTERNATE SPLICE CONNECTION



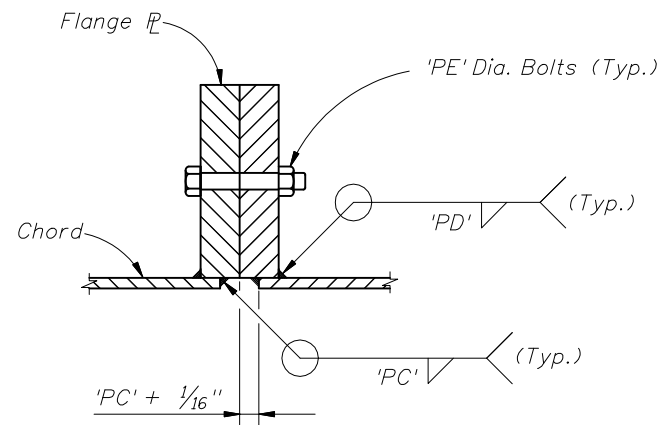
SECTION P-P



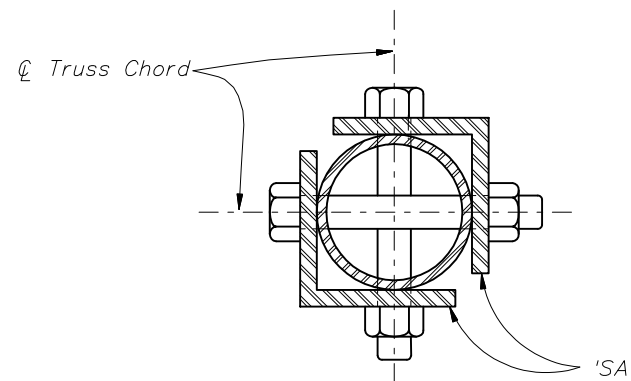
PLAN VIEW
DRILLED SHAFT



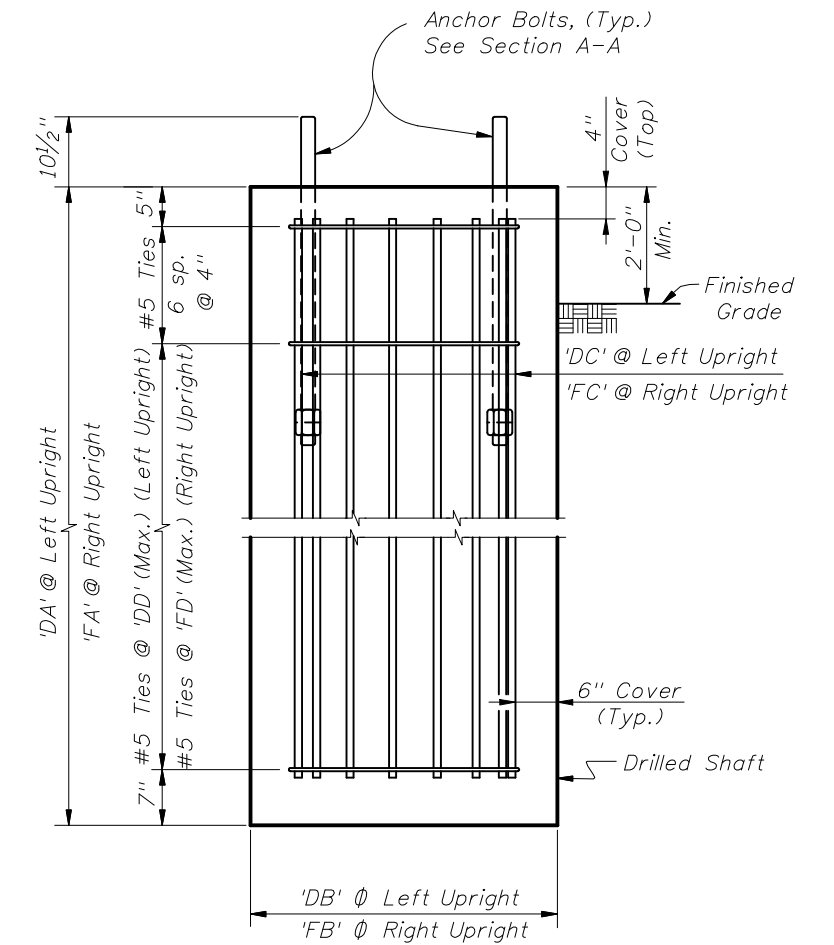
ELEVATION
SPLICE CONNECTION



SECTION Q-Q



SECTION R-R



ELEVATION
DRILLED SHAFT



SINGLE COLUMN GROUND SIGN NOTES:

- 1) DESIGN WIND SPEED: See Wind Speeds by County.
- 2) GENERAL SPECIFICATIONS: Current FDOT Standard Specifications for Road and Bridge Construction and supplements thereto.
- 3) DESIGN SPECIFICATIONS: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, as modified by the FDOT Structures Manual.
- 4) ALUMINUM: Aluminum Materials shall meet the requirements of Aluminum Association Alloy 6061-T6 (ASTM B209, B221, or B308), except as noted below.
- 5) CONCRETE: Class I.
- 6) SIGN PANELS: 0.08 inches min. thick Aluminum Plate with all corners rounded.
- 7) ALUMINUM BOLTS, NUTS, AND LOCK WASHERS:
 - a. Aluminum bolts: ASTM F468, Alloy 2042-T4 with at least 0.0002 inches thick anodic coating and chromate sealed.
 - b. Nuts: ASTM F467, Alloy 6061-T6 or 6262-T9.
 - c. Lockwashers: ASTM B221, Alloy 7075-T6.
- 8) STAINLESS STEEL BOLTS, NUTS, AND LOCKWASHERS:

Stainless Steel Bolts, Nuts, and Lockwashers: ASTM F593 and ASTM F594, Alloy Group 2. Condition A, CW2, or SH4 may be provided in lieu of Aluminum Bolts, Nuts, and Washers.
- 9) U-BOLTS, NUTS, AND LOCKWASHERS:

U-bolts, Nuts, and Lockwashers: ASTM A307, Grade A, galvanized in accordance with ASTM F2329.
- 10) BREAKAWAY SUPPORTS REQUIREMENTS: Install non-frangible aluminum column (post) (larger than 3 1/2") with breakaway supports as shown on Sheet 5 of 8. Signs shielded by barrier wall or guardrail do not require breakaway support.
- 11) QPL: Manufacturers seeking approval of alternates to aluminum round tube, such as steel U-channel and steel square tube single post ground sign assemblies for inclusion on the Qualified Products List (QPL), must submit a QPL application, design calculations, detailed drawings and design tables showing the product meets all the requirements.

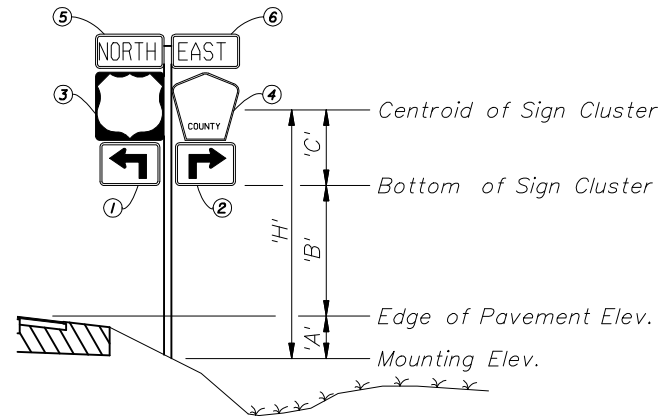
WIND SPEEDS BY COUNTY:

- 110 MPH**
Alachua, Baker, Bradford, Clay, Columbia, Gadsden, Gilchrist, Hamilton, Hardee, Jackson, Jefferson, Lafayette, Lake, Leon, Madison, Marion, Polk, Putnam, Sumter, Suwannee and Union counties.
- 130 MPH**
Bay, Brevard, Calhoun, Charlotte, Citrus, De Soto, Dixie, Duval, Flagler, Franklin, Glades, Gulf, Hendry, Hernando, Highlands, Hillsborough, Holmes, Lee, Levy, Liberty, Manatee, Nassau, Okaloosa, Okeechobee, Orange, Osceola, Pasco, Pinellas, Sarasota, Seminole, St Johns, Taylor, Volusia, Wakulla, Walton and Washington counties.
- 150 MPH**
Broward, Collier, Dade, Escambia, Indian River, Martin, Monroe, Palm Beach, Santa Rosa and St. Lucie counties.

GUIDE TO USE THIS STANDARD:

1. Calculate the area and the centroid for an individual sign or a sign cluster. Note that the centroid and areas have been calculated for frequently used sign clusters. These are shown on Sheet No. 6, 7 & 8 of 8.
2. Determine the height 'H' from groundline for the individual sign or the cluster.
3. Select the appropriate Column (Post) Selection Tables by Wind Speed and find the intersection point.
4. Design the post and the foundation according to the dark-bold lines or shaded area (if cantilever sign) in the Column (Post) Selection Tables and Post and Foundation Table. For sign posts with signs oriented in two directions, only the sign with the largest area should be analyzed to determine the post requirements.

EXAMPLE:



Size H x V	Centroid			'A _n '	'X _n ' x 'A _n '	'Y _n ' x 'A _n '	
	local 'Y _n '	global 'X _n '	global 'Y _n '				
(IN x IN)	(IN)	(IN)	(IN)	(IN ²)	(IN ³)	(IN ³)	
① 21 x 15	7.5	-10.5-1.5-1.5 = -13.5	7.5	315	-4,252.5	2,362.5	
② 21 x 15	7.5	10.5+1.5+1.5 = 13.5	7.5	315	+4,252.5	2,362.5	
③ 24 x 24	12	-12-1.5 = -13.5	15+1+12= 28	576	-7,776	16,128	
④ 24 x 24	12	12+1.5 = 13.5	15+1+12= 28	436	5,886	12,208	
⑤ 24 x 12	6	-12-1.5 = -13.5	15+1+24+ 1+6=47	288	-3,888	13,536	
⑥ 24 x 12	6	12+1.5 = 13.5	15+1+24+ 1+6=47	288	3,888	13,536	
				2,218	-1,890	60,133	TOTALS

$\Sigma('A_n') = 2,218 \text{ IN}^2 = 15.4 \text{ FT}^2$ $\Sigma('X_n' \times 'A_n') = -1,890 \text{ IN}^3 = -1.09 \text{ FT}^3$ $\Sigma('Y_n' \times 'A_n') = 60,133 \text{ IN}^3 = 34.8 \text{ FT}^3$

$'X'_c = \frac{\Sigma('X_n' \times 'A_n')}{\Sigma('A_n')} = -0.1 \text{ FT}$ $'Y'_c = \frac{\Sigma('Y_n' \times 'A_n')}{\Sigma('A_n')} = 2.26 \text{ FT}$

Assume: Bay County, 'A' = 1 FT, 'B' = 7 FT
 Calculated: 'X'_c = -0.1 FT 'C' = 'Y'_c = 2.26 FT
 Since 'X'_c < 6", it is not a cantilever sign, only dark-bold lines in the table will be referenced to.

'H' = 'A' + 'B' + 'C' = 10.26 FT ==> **USE 11 FT** $\Sigma('A_n') = 15.4 \text{ FT}^2$ ==> **USE 16 FT²**

ALUMINUM COLUMN (POST) SELECTION TABLE
(WIND SPEED = 130 MPH)

TOTAL PANEL AREA (SF)	'H' (FT)												
	8	9	10	11	12	13	14	15	16	17	18	19	20
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													

For WIND SPEED = 130 MPH,
'H' = 11 FT, Area = 16 FT²

- Refer to the 130 mph Column (Post) Selection Table, as copied from Sheet 3 of 8 and shown here.
- Using the 16 ft² area on the left hand side of the table, go across to the 11 ft height and find the cell marked with X.
- find the symbol **4** which the dark-bold line under the X cell leads to.
- In the Post and Foundation Table, the symbol **4** concludes that the design requires a 4.0" diameter and 0.25" thick Aluminum Column (Post) and a 2.0' diameter and 4.0' deep Concrete Foundation.

= If CANTILEVER SIGN configuration (see Cantilever Sign Details) falls in this region, use next larger post size than that indicated.

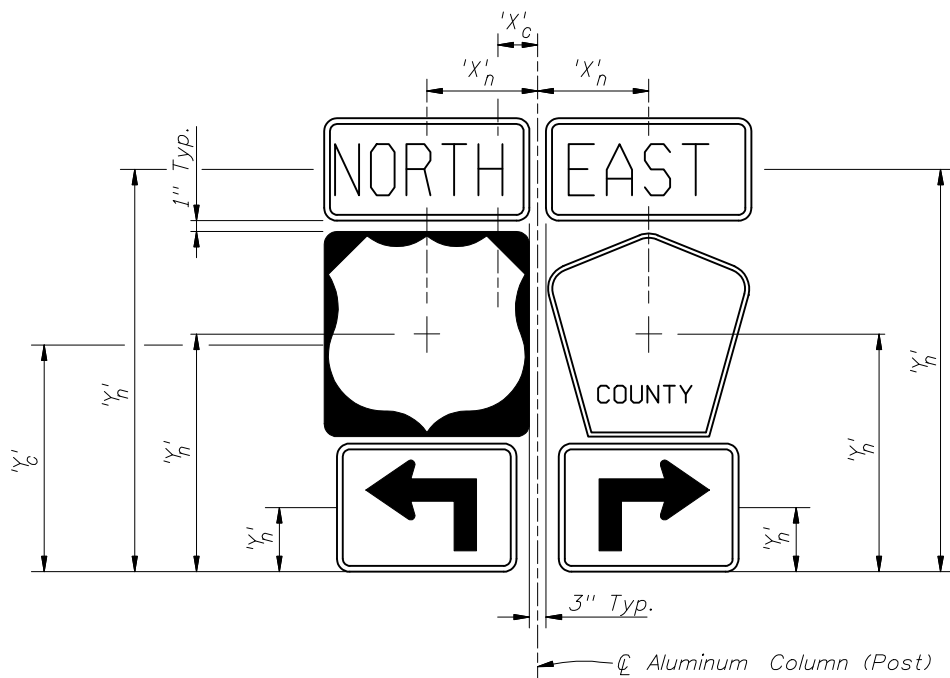
NOTES AND EXAMPLE



2010 FDOT Design Standards

SINGLE COLUMN GROUND SIGNS

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SIGN CLUSTER

CALCULATION OF SIGN CLUSTER CENTROID:

$$'X'_c = \frac{\sum ('X'_n \times 'A'_n)}{\sum 'A'_n}$$

$$'Y'_c = \frac{\sum ('Y'_n \times 'A'_n)}{\sum 'A'_n}$$

'X'_c = Centroid horizontal location of sign or cluster from \varnothing Column (post)

'Y'_c = Centroid height of sign or cluster from bottommost edge

'H' = Height of sign or cluster centroid from groundline

'X'_n = Individual sign centroid horizontal location from \varnothing Column (post)

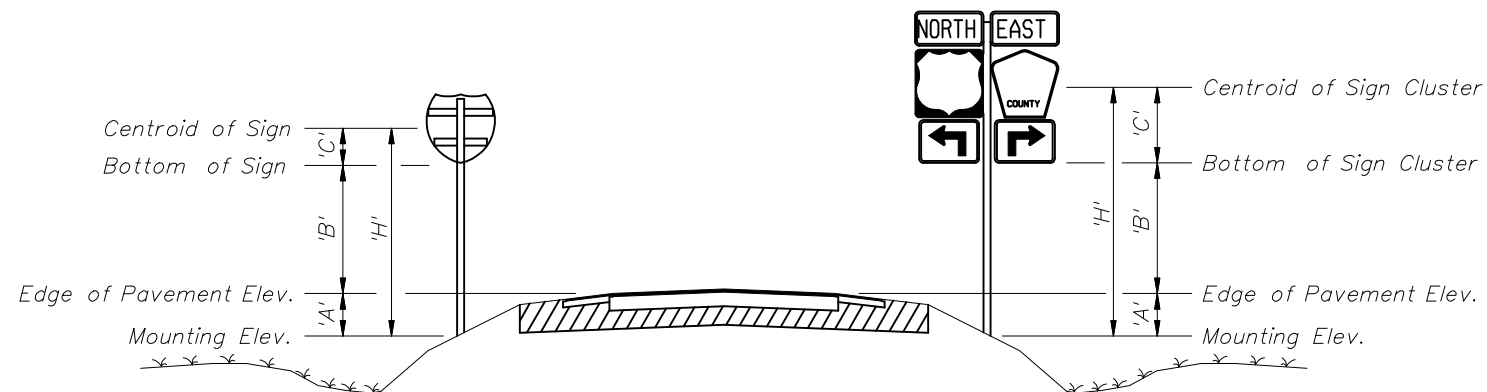
'Y'_n = Individual sign centroid height from bottommost edge

'A'_n = Area of individual sign

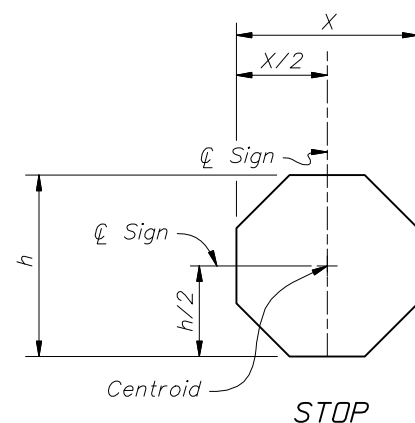
For 'A' & 'B' see Index No. 17302 and Roadway Plans.

NOTE:

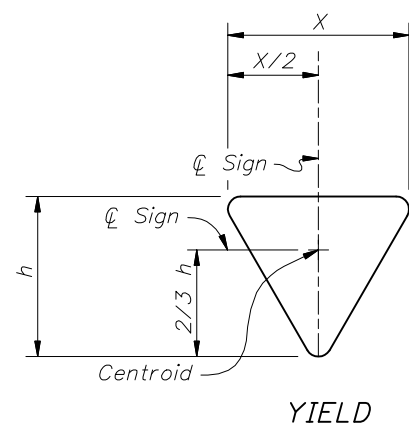
No sign or sign cluster area shall exceed 30 SF nor shall any sign or sign cluster have a total width exceeding 60 inches.



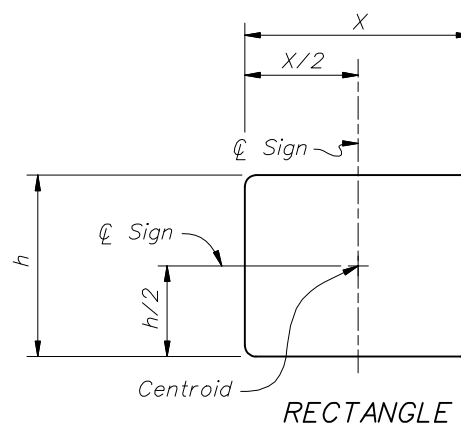
TYPICAL SECTION



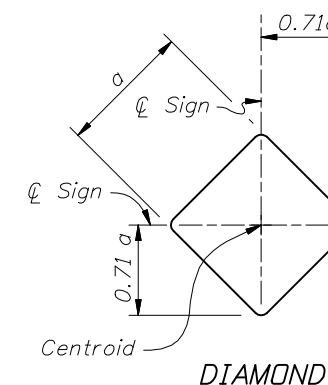
STOP



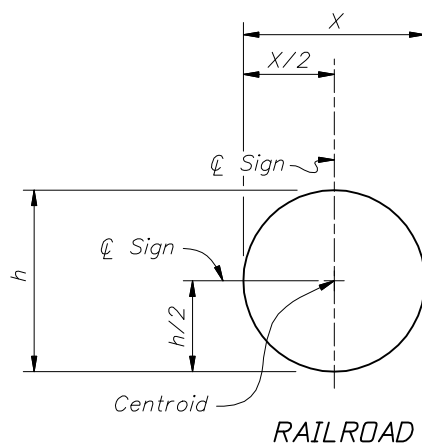
YIELD



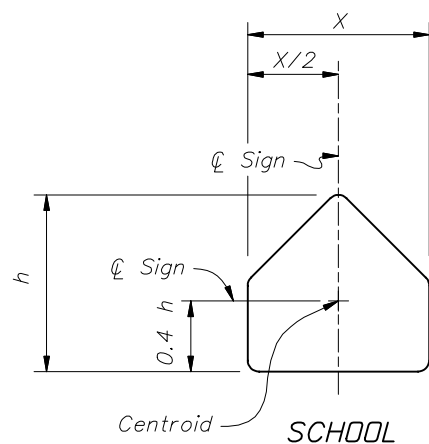
RECTANGLE



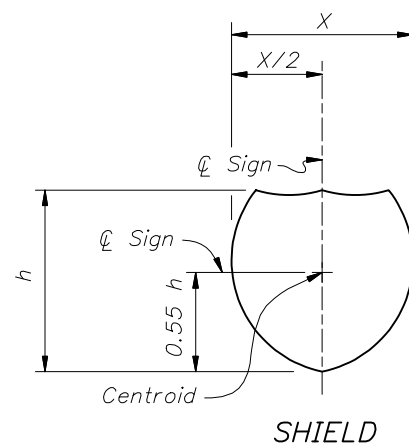
DIAMOND



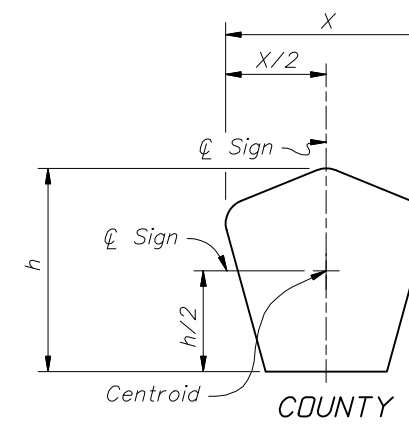
RAILROAD



SCHOOL



SHIELD

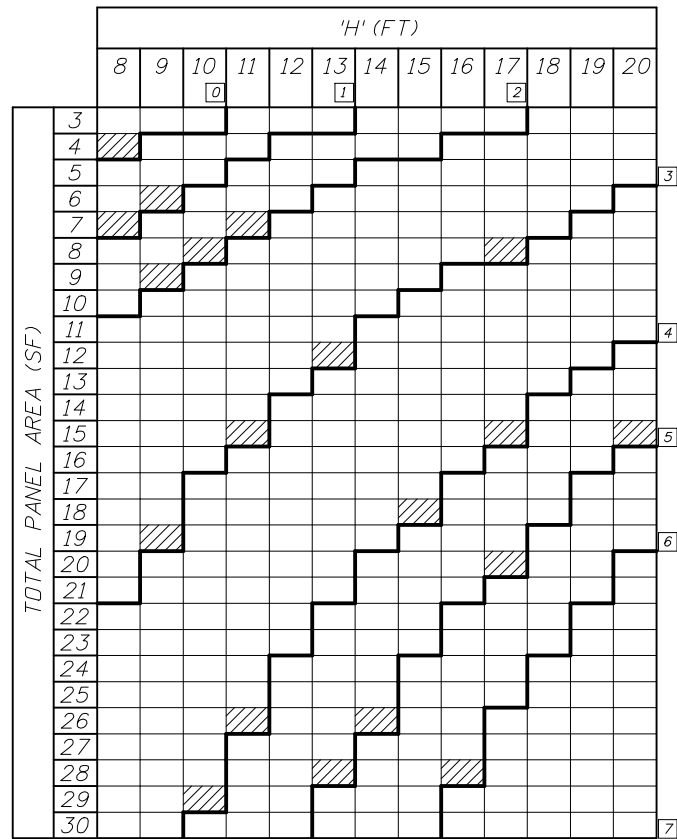


COUNTY

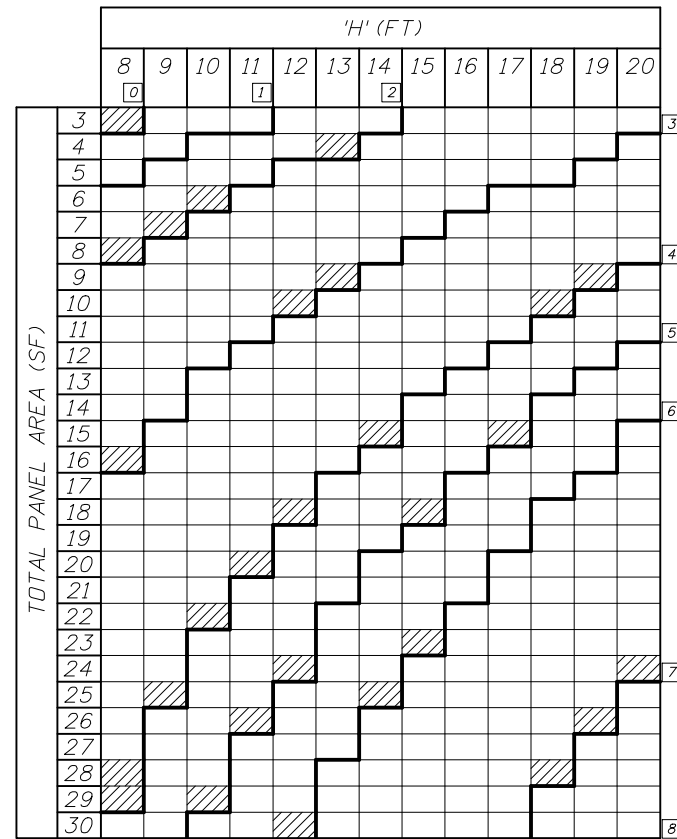
CENTROID AND HEIGHT



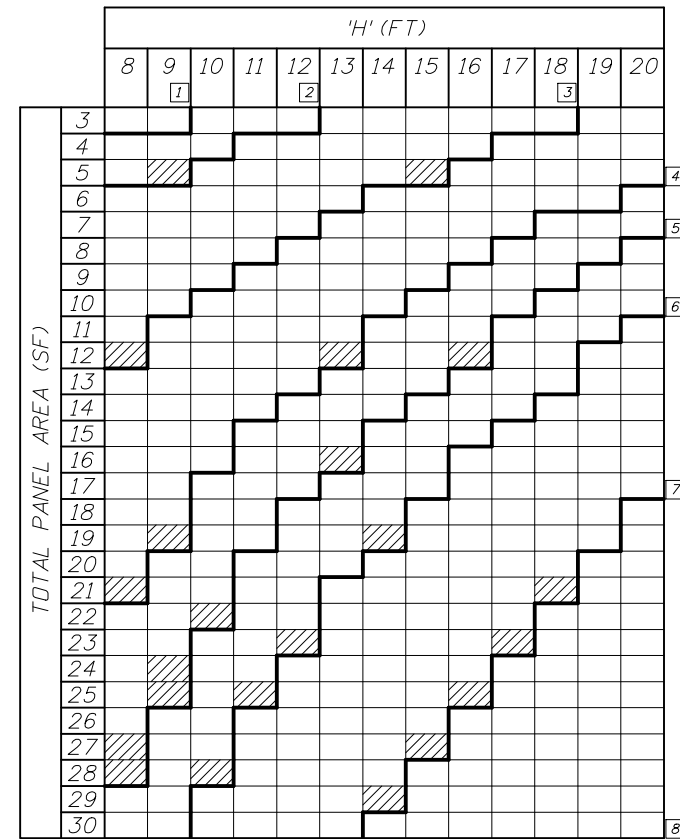
ALUMINUM COLUMN (POST) SELECTION TABLE
(WIND SPEED = 110 MPH)



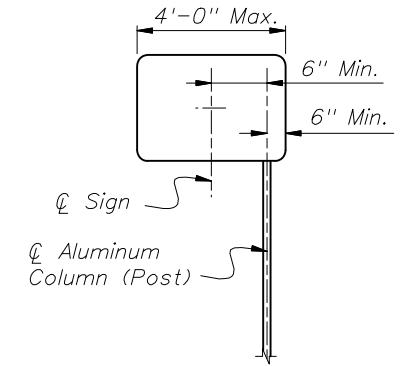
ALUMINUM COLUMN (POST) SELECTION TABLE
(WIND SPEED = 130 MPH)



ALUMINUM COLUMN (POST) SELECTION TABLE
(WIND SPEED = 150 MPH)



= If CANTILEVER SIGN configuration (see Cantilever Sign Details) falls in this region, use next larger post size than that indicated.



CANTILEVER SIGN

NOTE:
All cantilever sign installations shall comply with Standard Index 17302.

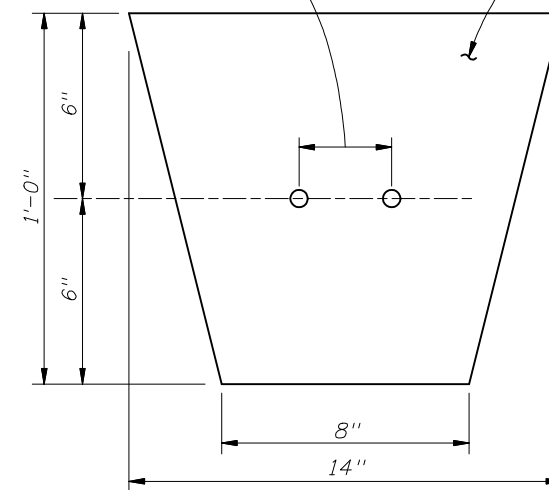
POST AND FOUNDATION TABLE						
Foundation Alternatives						
Post Size		Driven Post *		Concrete **		
Diameter (IN)	Wall (IN)	Depth (FT)		Diameter (FT)	Depth (FT)	
		without Soil Plate	with Soil Plate			
0	2.0	1/8	4.5	2.5	2.0	2.0
1	2.5	1/8	5	3	2.0	2.0
2	3.0	1/8	5	3.5	2.0	2.5
3	3.5	3/16	6	4.5	2.0	3.0
4	4.0	1/4	---	---	2.0	4.0
5	4.5	1/4	---	---	2.0	4.0
6	5.0	1/4	---	---	2.0	4.5
7	6.0	1/4	---	---	2.0	5.0
8	8.0	5/16	---	---	2.0	5.5

* INSTALLING FRANGIBLE COLUMN SUPPORTS:
Columns (posts) may be installed by driving the columns in accordance with this Index, or as an alternate method, the columns (posts) may be set to the depth indicated in preformed holes backfilled with suitable material tamped in layers not thicker than 6" to provide adequate compaction or filled with flowable fill or bagged concrete.

** See Note 5 on Sheet 1 of 8.

3/16" Φ Bolt Holes (Hole spacing to match U-Bolts) (washers as required)

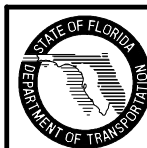
R Thickness = 1/4"



ALUMINUM SOIL PLATE DETAILS

NOTES: 1. Align SoilPlate bottom at 2/3 of foundation depth.
2. Slot up to 1 5/16" long is allowed to accommodate various post sizes.

POST AND FOUNDATION TABLES

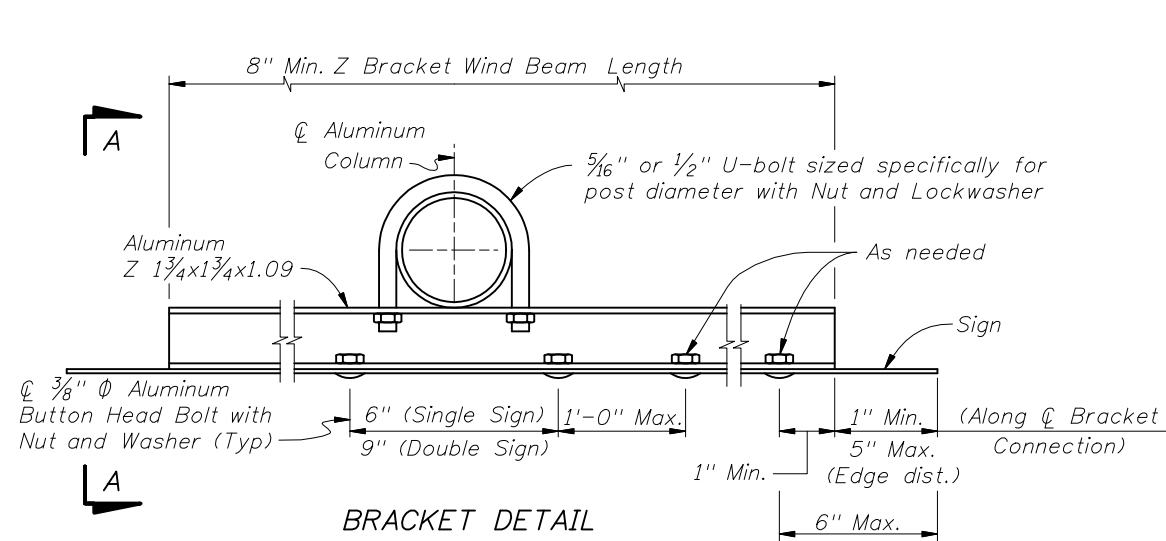


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SINGLE COLUMN GROUND SIGNS

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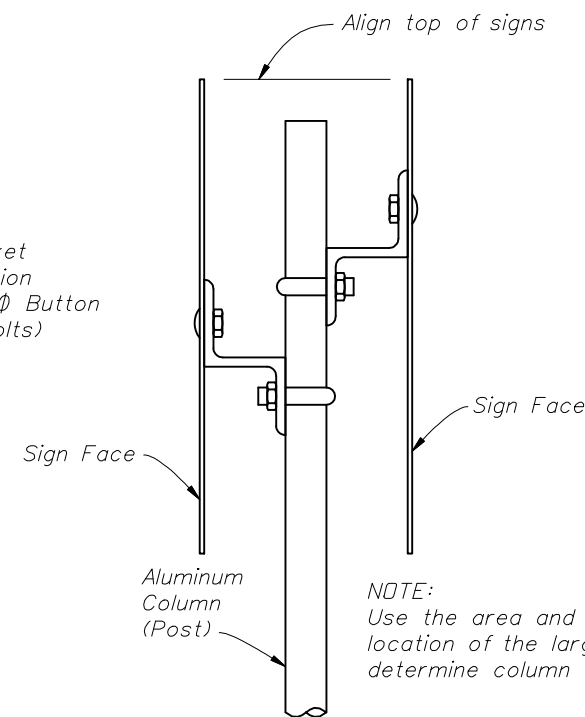
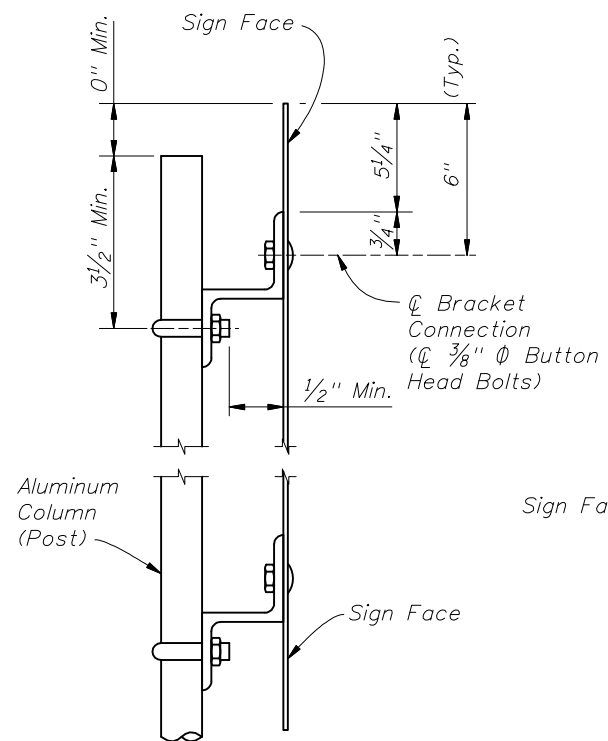
Index No. 11860



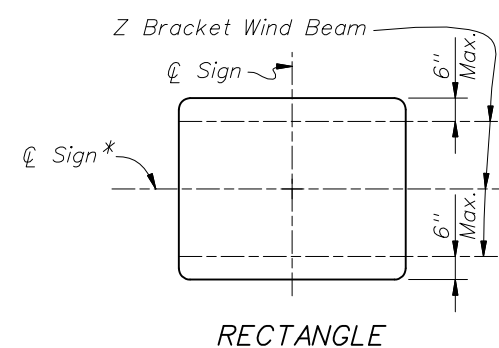
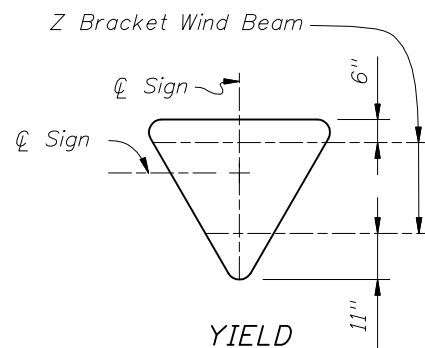
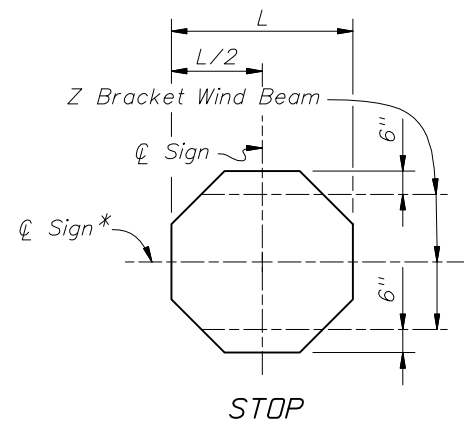
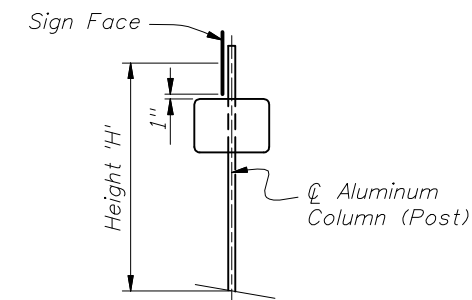
NOTES:

1. $\frac{5}{16}$ " Φ Stainless Steel Hex Head Bolts with Flat Washer under Head and Lockwasher under Nut may be used in lieu of $\frac{3}{8}$ " Φ Aluminum Button Head Bolts.
2. Nylon washers provided by the sheeting supplier shall be used on all ground mounted signs. The washers shall be installed under the sign bolt head to protect the sheeting.
3. Vertical spacing of brackets shall not exceed 2'-6". Use additional brackets, spaced evenly, to maintain maximum spacing.

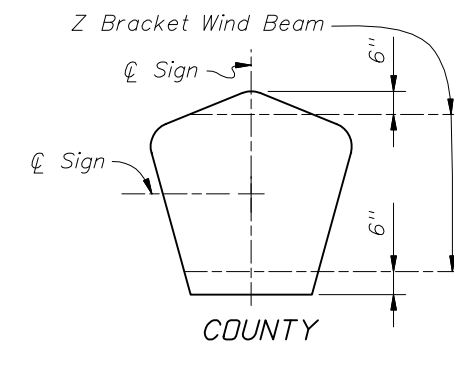
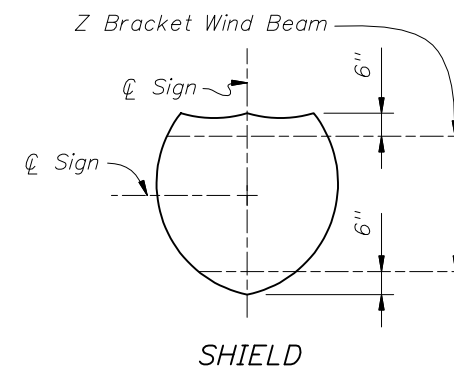
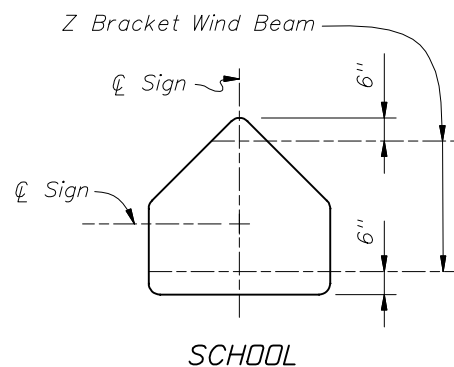
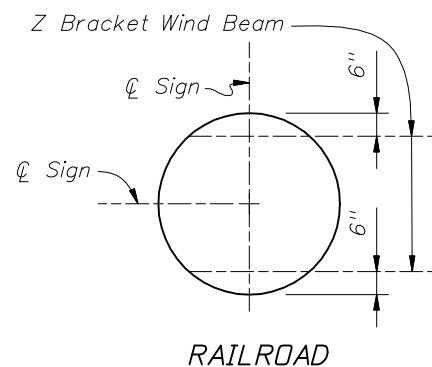
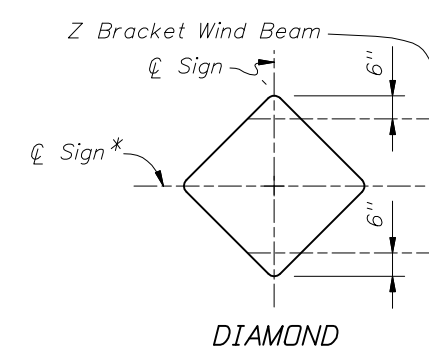
*For signs with either dimension of sign size greater than 30". (See Sheet No. 6 thru 8 of 8 for sign size)



NOTE: Use the area and the centroid location of the largest sign to determine column (post) size.



(Use only one Wind Beam at Φ Sign for sign height up to 12")



CONNECTION AND WIND BEAM

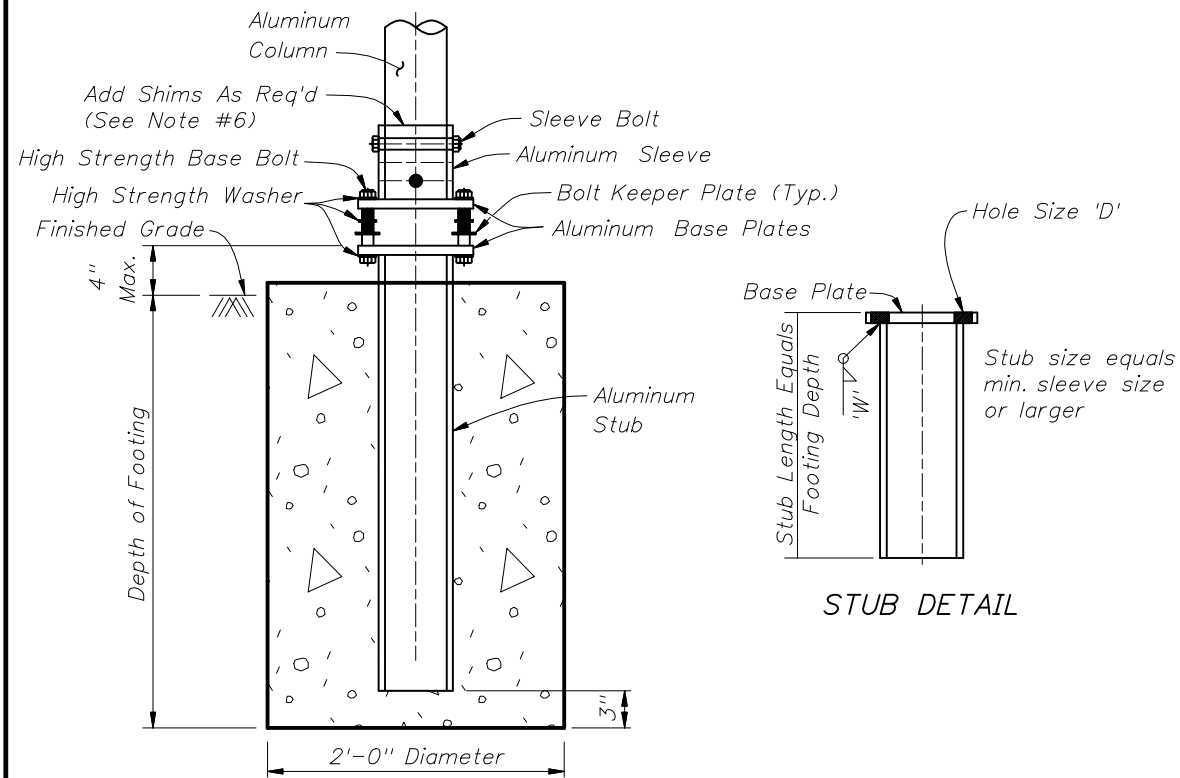


2010 FDOT Design Standards

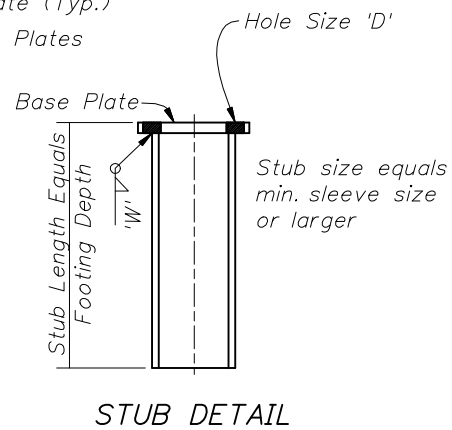
SINGLE COLUMN GROUND SIGNS

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Index No. 11860



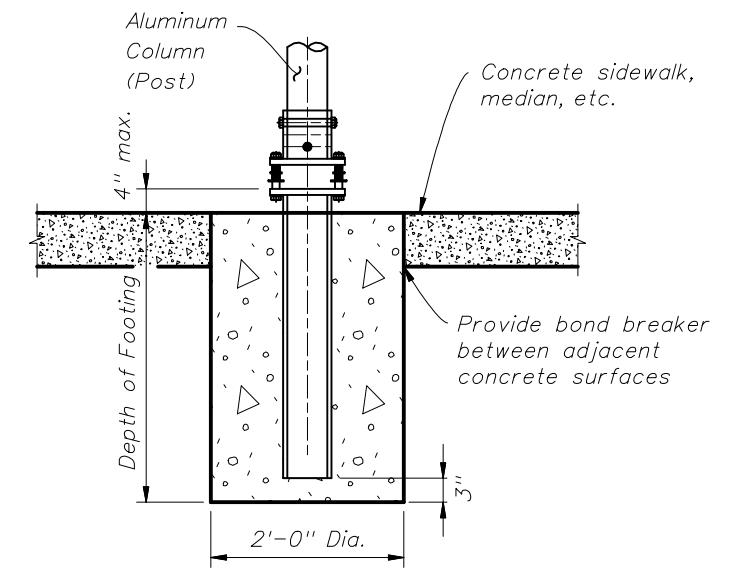
SLIP BASE AND FOOTING DETAIL
(non-frangible post)



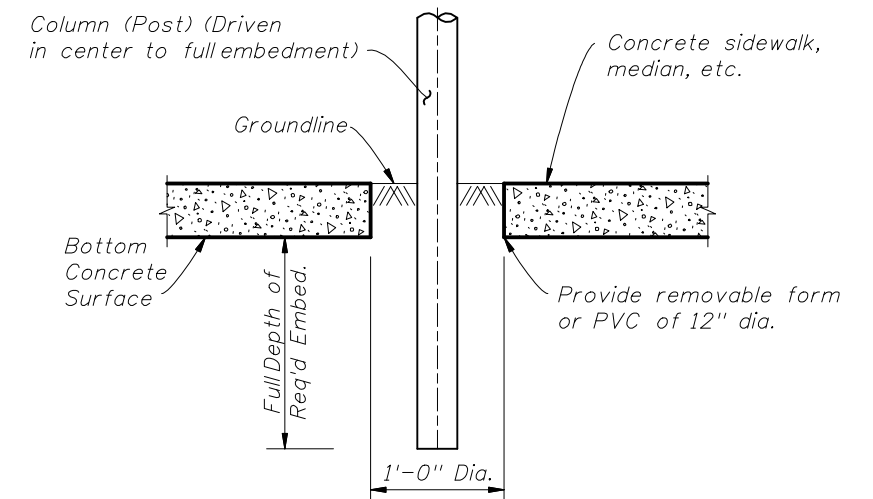
STUB DETAIL

SLIP BASE NOTES:

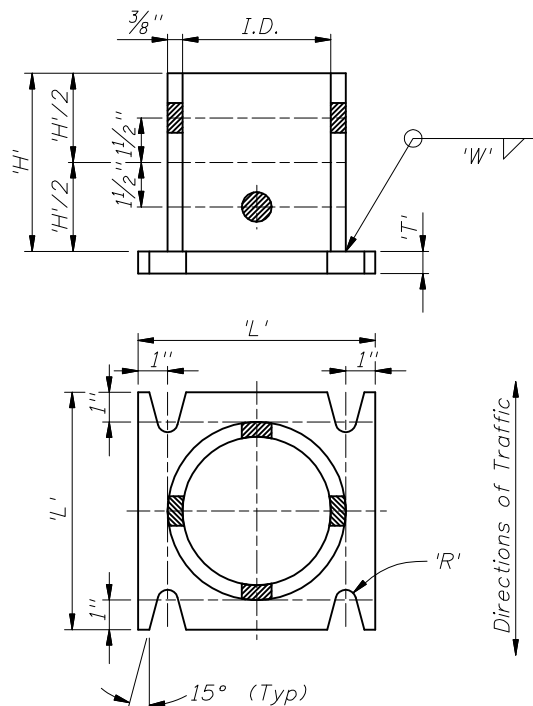
1. Use sleeves with an inside diameter (I.D.) no more than $\frac{1}{16}$ " larger than the outside diameter (O.D.) of the column.
2. Sleeve Bolts: ASTM A-307, $\frac{1}{2}$ " Φ galvanized steel bolt (with lock nuts) or Alloy 2024-T4 or 6061-T6 (ASTM B-211).
3. Base bolts, Nuts, and Washers: high strength ASTM A-325 with ASTM B633 SC3, Type II electroplated zinc coating.
4. Base plates may have either single or double beveled slots.
5. An alternate cast base plate of aluminum alloy 356 and T6 temper in lieu of the fabricated base plate may be submitted for approval. If a cast base plate is used, the stub will be the same size as the column and will be bolted to the casting.
6. Assemble the slip base connection in the following manner:
 - a. Connect column to sleeve using two $\frac{1}{2}$ " Φ machine bolts.
 - b. Assemble top base plate to stub base plate using high strength bolts with three hardened washers per bolt. One of the three washers per bolt and two bolt keeper plates go between the base plates.
 - c. Use shim stock as required to plumb the column.
 - d. Tighten all bolts to the maximum possible with a 12" to 15" wrench. (This will bed the washers and shims and clear the bolt threads.)
 - e. Loosen each bolt one turn and using a calibrated wrench retighten to the prescribed torque (see table) under the supervision of the Project Engineer.
 - f. Burr threads at junction with nut using a center punch to prevent nut loosening.
7. Use galvanized steel shims to obtain a tight fit between the column face and the sleeve. Place shims in all quadrants between the $\frac{1}{2}$ " Φ sleeve bolts. Use shims that are 1" shorter than the height of the sleeve.
8. Both fabricated and cast base assemblies were impact tested by the Texas Transportation Institute, College Station, TX on February 10, 2003, and both alternate assemblies were determined to be compliant with the performance recommendations of the National Cooperative Highway Research Program (NCHRP) report 350.



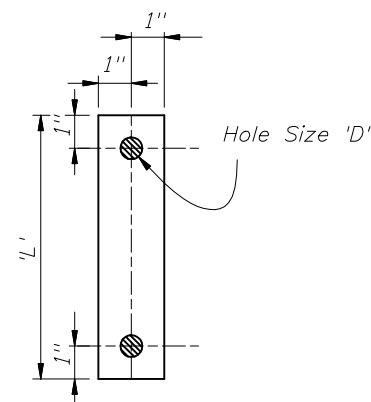
SLIP BASE AND FOOTING DETAIL IN CONCRETE
(non-frangible post in crossovers, medians, & sidewalks)



DRIVEN POST DETAIL IN CONCRETE
(frangible post in crossovers, medians, & sidewalks)



ALUMINUM SLEEVE & BASE PLATE DETAILS
(DOUBLE BEVELED SLOTS)



0.0149" Thick Alum. Strip - 2 Req'd Per Base
BOLT KEEPER PLATE DETAIL

SLIP BASE DETAILS

Column Size	Sleeve I.D. (Max)	Sleeve Height 'H'	Weld 'W'	Base Plate		Radius 'R'	Base Bolt		Base Plate Torque		Hole Size 'D'
				'L'	'T'		Size	Length	Ft-lbs	In-lbs	
4 x 1/4	4 1/16	6	5/8	8	3/4	1 1/32	5/8	3	29	345	1 1/16
4 1/2 x 1/4	4 9/16	6	5/8	8	7/8	1 1/32	5/8	3 1/4	29	345	1 1/16
5 x 1/4	5 1/16	7	5/8	8	7/8	1 1/32	5/8	3 1/4	29	345	1 1/16
6 x 1/4	6 1/16	8	1 1/16	9	1	1 3/32	3/4	3 1/2	46	554	1 3/16

Note: Unless notes otherwise, all dimensions are in inches.

BASE AND FOUNDATION DETAILS



































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SINGLE COLUMN GROUND SIGNS

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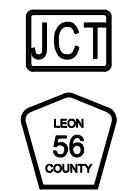
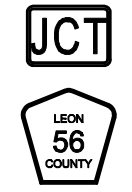
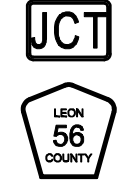
Index No. 11860






	Size	Area	Total Area	Centroid
 	36x12	3.00 SF	6.31 SF	1.75 Ft.
	24x24	3.31 SF		
 	36x12	3.00 SF	8.18 SF	1.92 Ft.
	30x30	5.18 SF		
 	36x12	3.00 SF	10.46 SF	2.10 Ft.
	36x36	7.46 SF		
 	36x12	3.00 SF	16.25 SF	2.48 Ft.
	48x48	13.25 SF		
 	24x24	3.31 SF	6.31 SF	1.71 Ft.
	24x18	3.00 SF		
 	30x30	5.18 SF	10.18 SF	2.19 Ft.
	30x24	5.00 SF		
 	36x36	7.46 SF	12.46 SF	2.55 Ft.
	30x24	5.00 SF		
  	36x12	3.00 SF	13.18 SF	2.87 Ft.
	30x30	5.18 SF		
	30x24	5.00 SF		





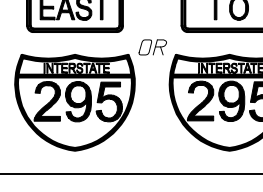
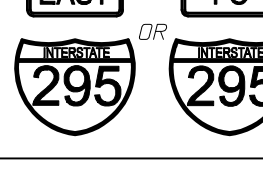
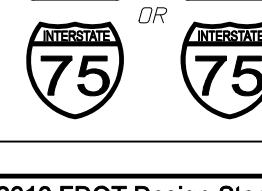
	Size	Area	Total Area	Centroid
  	36x12	3.00 SF	15.46 SF	3.15 Ft.
	36x36	7.46 SF		
	30x24	5.00 SF		
 	21x15	2.19 SF	6.19 SF	1.60 Ft.
	24x24	4.00 SF		
 	21x15	2.19 SF	7.19 SF	1.52 Ft.
	30x24	5.00 SF		
 	24x12	2.00 SF	6.00 SF	1.53 Ft.
	24x24	4.00 SF		
 	24x12	2.00 SF	7.00 SF	1.45 Ft.
	30x24	5.00 SF		
 	30x15	3.13 SF	8.13 SF	1.66 Ft.
	30x24	5.00 SF		
 	24x24	4.00 SF	6.19 SF	1.73 Ft.
	21x15	2.19 SF		

	Size	Area	Total Area	Centroid
 	30x24	5.00 SF	7.19 SF	1.81 Ft.
	21x15	2.19 SF		
  	24x12	2.00 SF	8.19 SF	2.26 Ft.
	24x24	4.00 SF		
	21x15	2.19 SF		
  	24x12	2.00 SF	9.19 SF	2.27 Ft.
	30x24	5.00 SF		
	21x15	2.19 SF		
  	30x15	3.13 SF	10.32 SF	2.49 Ft.
	30x24	5.00 SF		
	21x15	2.19 SF		
   	24x12	2.00 SF	10.19 SF	2.80 Ft.
	24x12	2.00 SF		
	24x24	4.00 SF		
	21x15	2.19 SF		

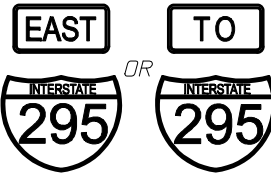
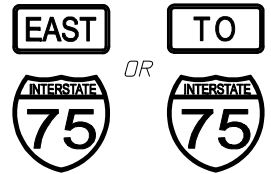

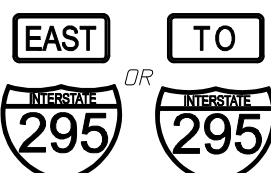

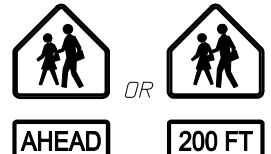








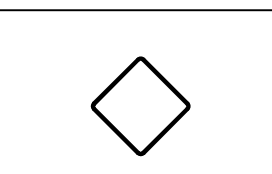
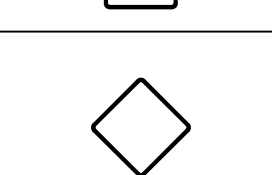
	Size	Area	Total Area	Centroid
	24x12	2.00 SF	11.19 SF	2.76 Ft.
	24x12	2.00 SF		
	30x24	5.00 SF		
	21x15	2.19 SF		
	Size	Area	Total Area	Centroid
	30x15	3.13 SF	13.45 SF	3.16 Ft.
	30x15	3.13 SF		
	30x24	5.00 SF		
	21x15	2.19 SF		
	Size	Area	Total Area	Centroid
	21x15	2.19 SF	3.90 SF	1.57 Ft.
	18x18	1.71 SF		
	Size	Area	Total Area	Centroid
	21x15	2.19 SF	5.22 SF	1.72 Ft.
	24x24	3.03 SF		
	Size	Area	Total Area	Centroid
	21x15	2.19 SF	6.95 SF	1.87 Ft.
	30x30	4.76 SF		

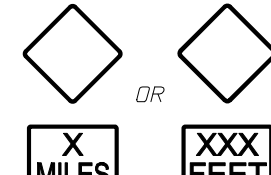
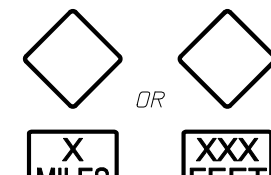
	Size	Area	Total Area	Centroid
	18x18	1.71 SF	3.90 SF	1.26 Ft.
	21x15	2.19 SF		
	Size	Area		
	24x24	3.03 SF	5.22 SF	1.62 Ft.
	21x15	2.19 SF		
	Size	Area	Total Area	Centroid
	30x30	4.76 SF	6.95 SF	1.97 Ft.
	21x15	2.19 SF		
	Size	Area		
	24x12	2.00 SF	9.39 SF	2.87 Ft.
	24x12	2.00 SF		
	24x24	3.20 SF		
	21x15	2.19 SF		
	Size	Area	Total Area	Centroid
	24x12	2.00 SF	10.18 SF	2.84 Ft.
	24x12	2.00 SF		
	30x24	3.99 SF		
	21x15	2.19 SF		

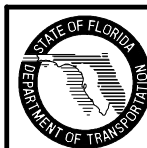
	Size	Area	Total Area	Centroid
	30x15	3.13 SF	12.44 SF	3.26 Ft.
	30x15	3.13 SF		
	30x24	3.99 SF		
	21x15	2.19 SF		
	Size	Area	Total Area	Centroid
	21x15	2.19 SF	5.39 SF	1.75 Ft.
	24x24	3.20 SF		
	Size	Area		
	21x15	2.19 SF	6.18 SF	1.67 Ft.
	30x24	3.99 SF		
	Size	Area	Total Area	Centroid
	24x12	2.00 SF	5.20 SF	1.67 Ft.
	24x24	3.20 SF		
	Size	Area	Total Area	Centroid
	24x12	2.00 SF	5.99 SF	1.60 Ft.
	30x24	3.99 SF		
	Size	Area	Total Area	Centroid
	30x15	3.13 SF	7.12 SF	1.81 Ft.
	30x24	3.99 SF		
	Size	Area	Total Area	Centroid
	30x15	3.13 SF	10.33 SF	2.27 Ft.
	36x36	7.20 SF		

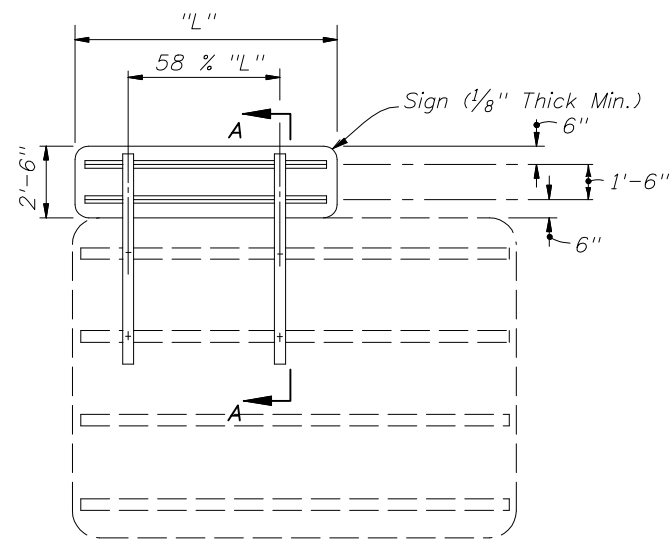


Size	Area	Total Area	Centroid
	30x15	3.13 SF	
		12.12 SF	2.18 Ft.
	45x36	8.99 SF	
Size	Area	Total Area	Centroid
	24x12	2.00 SF	
		7.39 SF	2.30 Ft.
	24x24	3.20 SF	
	21x15	2.19 SF	
Size	Area	Total Area	Centroid
	24x12	2.00 SF	
		8.18 SF	2.31 Ft.
	30x24	3.99 SF	
	21x15	2.19 SF	
Size	Area	Total Area	Centroid
	30x15	3.13 SF	
		9.31 SF	2.55 Ft.
	30x24	3.99 SF	
	21x15	2.19 SF	
Size	Area	Total Area	Centroid
	30x30	4.69 SF	
		6.69 SF	1.61 Ft.
	24x12	2.00 SF	
Size	Area	Total Area	Centroid
	30x30	4.69 SF	
		8.44 SF	1.77 Ft.
	30x18	3.75 SF	
Size	Area	Total Area	Centroid
	36x36	6.75 SF	
		10.50 SF	2.06 Ft.
	30x18	3.75 SF	

Size	Area	Total Area	Centroid
	30X30	4.69 SF	
		6.69 SF	1.61 Ft.
	24X12	2.00 SF	
Size	Area	Total Area	Centroid
	30X30	4.69 SF	
		8.44 SF	1.77 Ft.
	30X18	3.75 SF	
Size	Area	Total Area	Centroid
	36X36	6.75 SF	
		10.50 SF	2.06 Ft.
	30X18	3.75 SF	
Size	Area	Total Area	Centroid
	30X30	6.25 SF	
		8.25 SF	2.28 Ft.
	24X12	2.00 SF	
Size	Area	Total Area	Centroid
	36X36	9.00 SF	
		12.75 SF	2.84 Ft.
	30X18	3.75 SF	
Size	Area	Total Area	Centroid
	30X30	6.25 SF	
		10.25 SF	2.74 Ft.
	24X24	4.00 SF	
Size	Area	Total Area	Centroid
	36X36	9.00 SF	
		15.25 SF	3.29 Ft.
	30X30	6.25 SF	

Size	Area	Total Area	Centroid
	30X30	6.25 SF	
		9.25 SF	2.51 Ft.
	24X18	3.00 SF	
Size	Area	Total Area	Centroid
	36X36	9.00 SF	
		14.00 SF	3.06 Ft.
	30X24	5.00 SF	



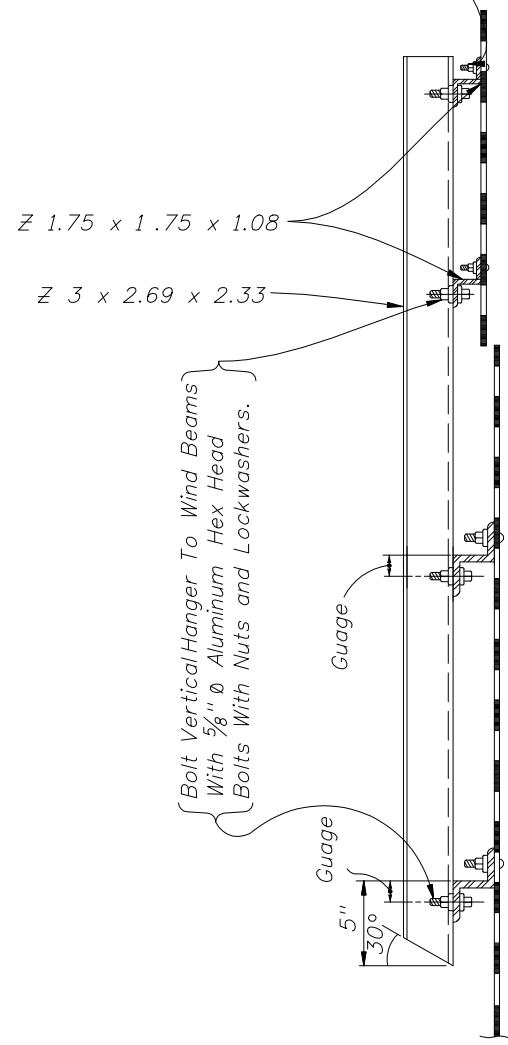


NOTE: Exit numbering panel shall be located to the right side for right exit and to the left for left exit.

Mounting of Exit Numbering Panels To Highway Signs

ELEVATION

Bolt Sign to Zee Using $\frac{1}{4}$ " ϕ Aluminum Flat Head Bolts, Nuts and Lock Washers (Typ.)
12" Max Spacing



SECTION AA

GENERAL NOTES

DESIGN SPECIFICATION: Design according to FDOT Structures Manual (current edition) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, AASHTO 2001.
SHEETS AND PLATES: Material used shall meet the requirements of Aluminum Association Alloy 6061-T6 and ASTM B209.
MATERIALS: All aluminum materials shall meet the requirements of the Aluminum Association Alloy 6061-T6 and also the following ASTM specifications for the following: Sheets and plates B209; extruded shapes B221 and standard structural shapes B308.
ALUMINUM BOLTS, NUTS & LOCK WASHERS: Aluminum bolts shall meet the requirements of the Aluminum Association Alloy 2024-T4 (ASTM F468). The bolts shall have an anodic coating of at least .0002" thick and be chromate sealed. Lockwashers shall meet the requirement of Aluminum Association Alloy 7075-T6 (ASTM B221). Nuts shall meet the requirement of Aluminum Association Alloy 6262-T9 (ASTM F467) or 6061-T6.
SIGN FACE: All sign face corners shall be rounded. See sign layout sheet for dimension "L" and sign face details. For mounting details refer to Index No. 11300.



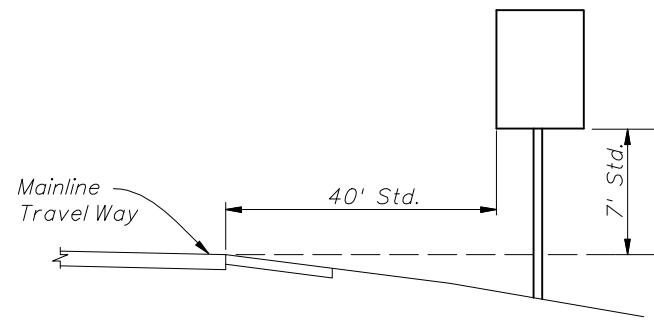
2010 FDOT Design Standards

MOUNTING EXIT NUMBERING PANELS TO HIGHWAY SIGNS

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CASE I

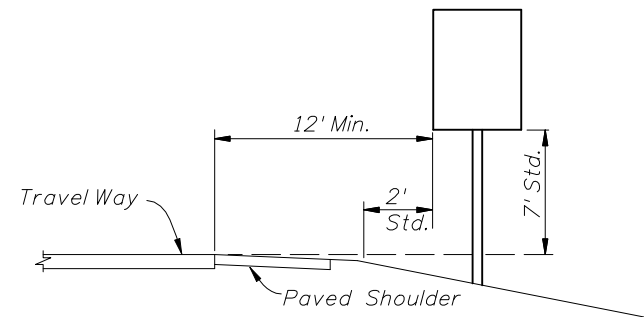
For Use On Freeway And Expressway Systems For Signs On Mainline.



For Median Installation:
If Median Width Does Not Allow Std. Offset From Both Roadways, Center Sign In Median.

CASE II

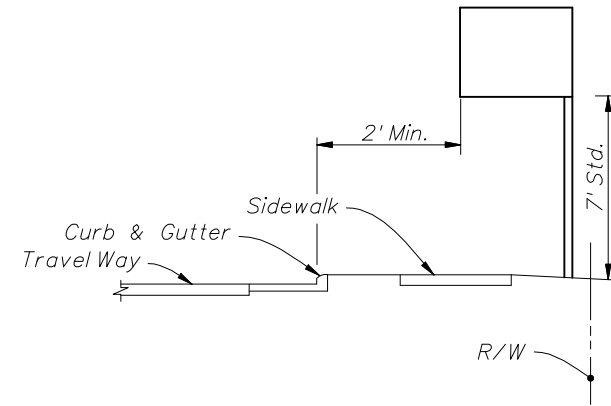
For Use In All Rural Roads And On Freeway And Expressway Ramps.



14' Horizontal Clearance Standard On All Freeway And Expressway Ramps.

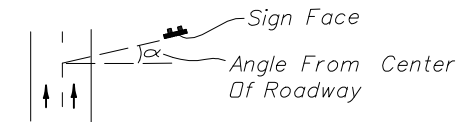
CASE III

For Use On All Roads With Signs Mounted Behind Sidewalk.



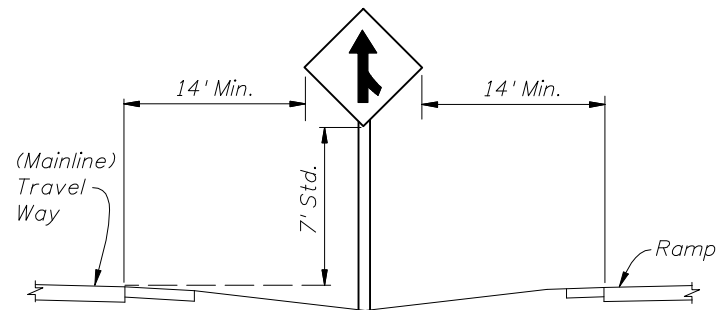
GENERAL NOTES:

1. The typical sections shown hereon serve as a guide for locating the traffic signs required under various roadside conditions. For size and details of sign construction and footing, refer to the appropriate standard index drawing for roadside sign.
2. It shall be the CONTRACTORS responsibility to verify the length of sign supports in the field prior to fabrication.
3. Ground signs shall be installed at an angle of 1 to 4 degrees away from the traffic flow (see illustration). Shoulder mounted signs shall be rotated counterclockwise and median mounted signs rotated clockwise. Signs on curves shall be mounted as noted above from the perpendicular to the motorist line of sight.



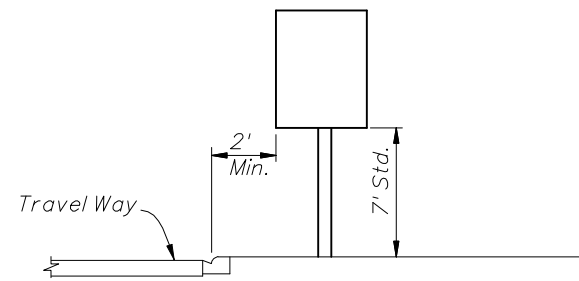
CASE IV (MERGE SIGN)

For Use On All Rural, Freeway And Expressway Systems.



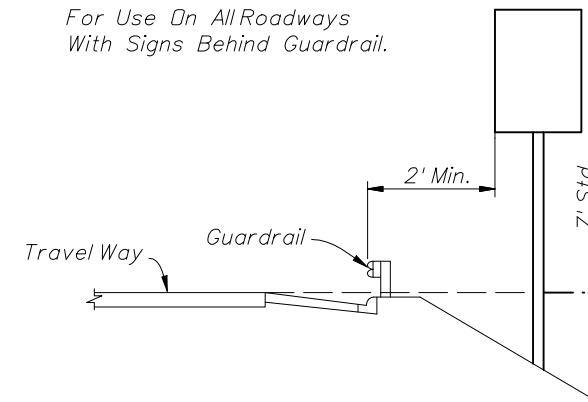
CASE V

For Use In Business Or Residential Areas Only.



CASE VI

For Use On All Roadways With Signs Behind Guardrail.



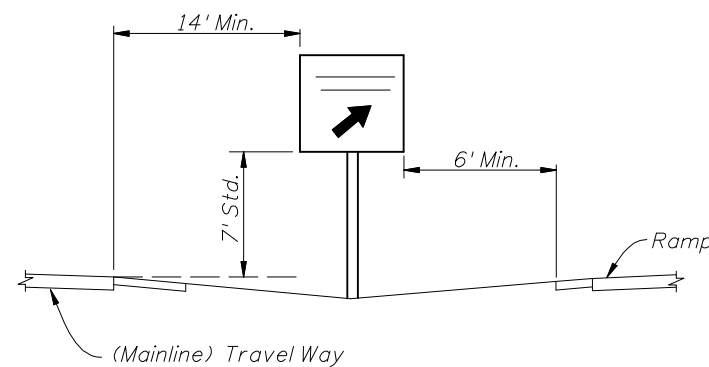
4. The setback for stop and yield signs may be reduced to 3' minimum from the driving lane if required for visibility in business or residential sections with no curb and speeds of 30 MPH or less.
5. The mounting heights are measured from the bottom of the sign panel to a horizontal line extended from the edge of the driving lane. If the standard heights cannot be met, the minimum heights are as follows:

Expressway & Freeway Systems	7'
Other Roadway Systems	
Rural	5'
Urban (including residential with parking and /or pedestrian activity)	7'

If a secondary sign is mounted below the major sign, the major sign shall be at least 8' and the secondary sign at least 5' for expressway & freeway systems and for other systems the height to the secondary sign shall be at least 5' for rural and 7' for urban sections.

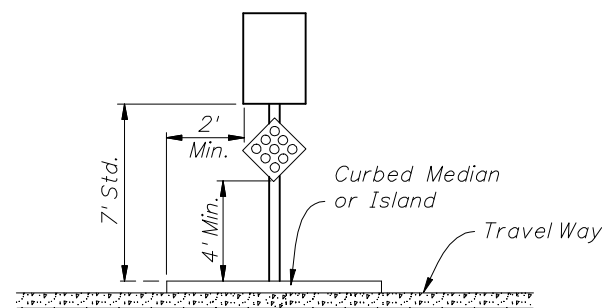
CASE VII (REST AREA & EXIT GORE SIGNS)

For Use On All Freeway And Expressway Systems



CASE VIII

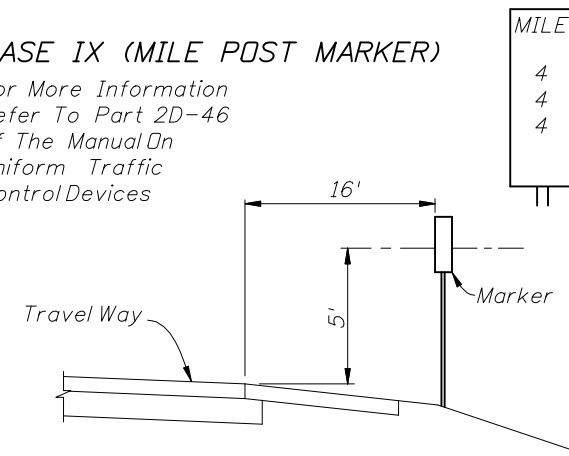
Sign On Island or Curbed Median



Center Sign Column On Island

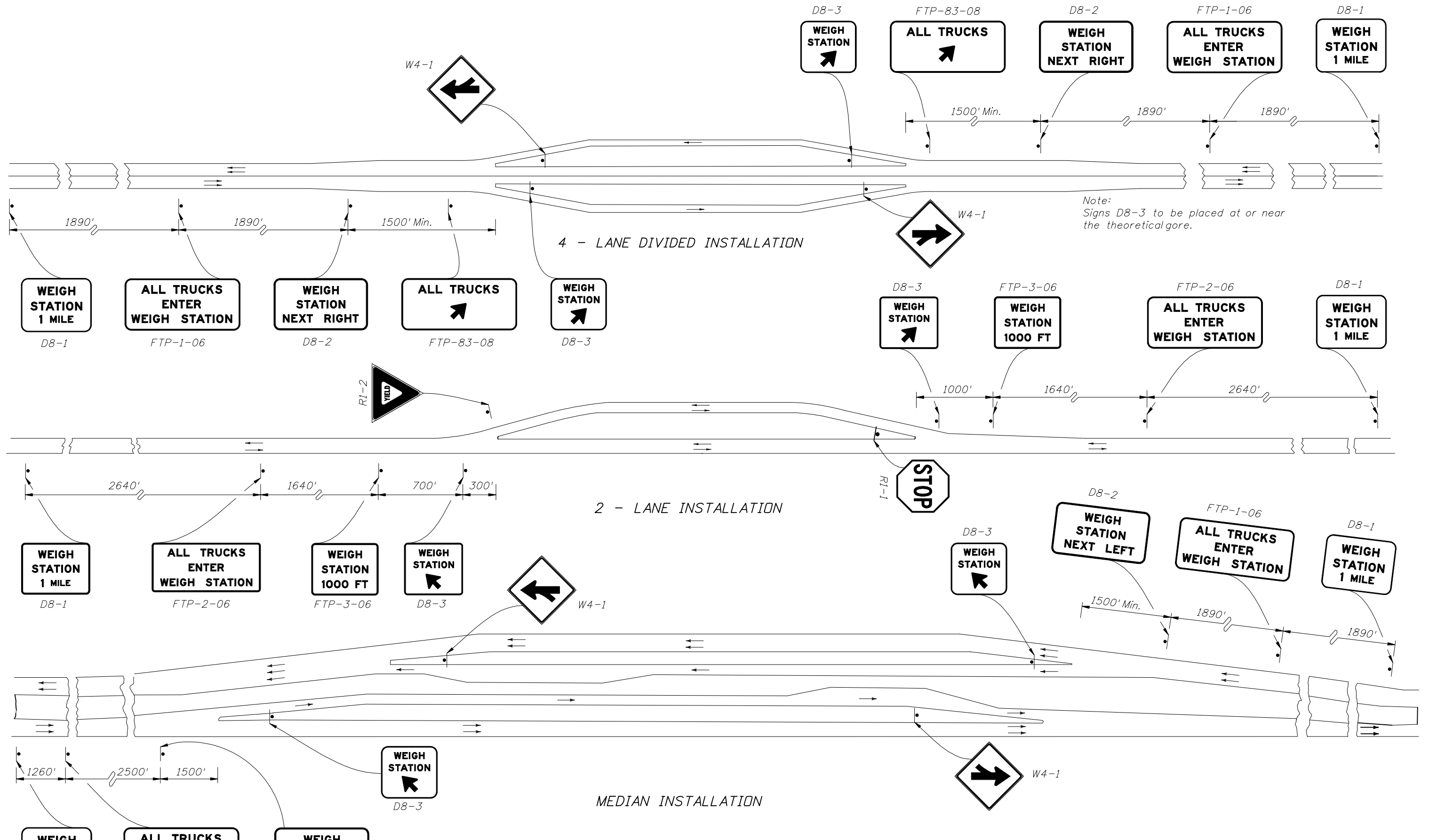
CASE IX (MILE POST MARKER)

For More Information Refer To Part 2D-46 Of The Manual On Uniform Traffic Control Devices

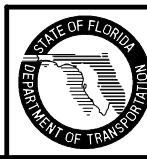


6. Sign supports should never be placed in the bottom of ditches where erosion might affect the proper operation of the breakaway feature.
7. Sign supports shall not reduce the accessible route /continuous passage to less than 4' min. clear width as required by the Americans with Disabilities Act (ADA) Accessibility Guidelines.





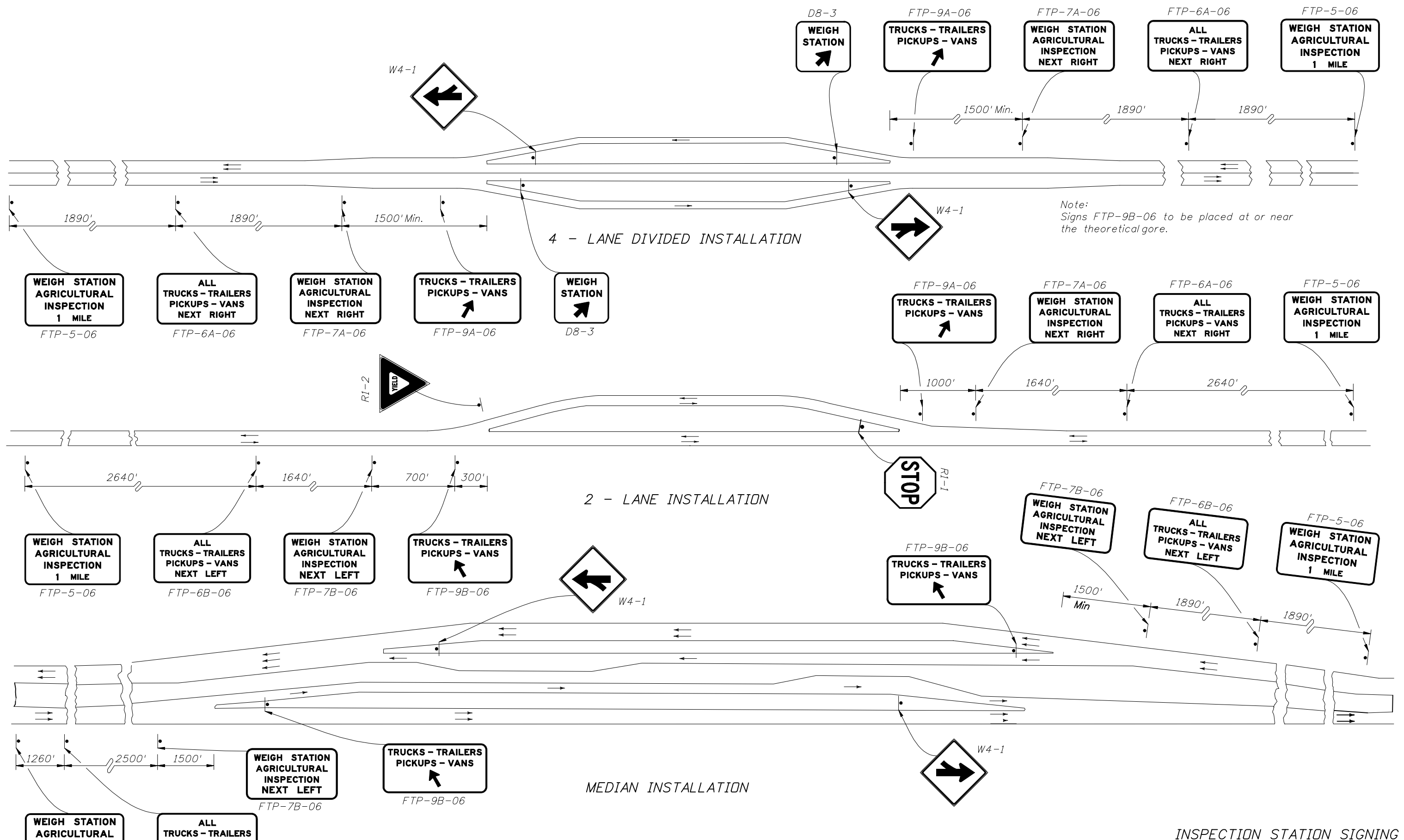
WEIGH STATION SIGNING



2010 FDOT Design Standards

TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS

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INSPECTION STATION SIGNING

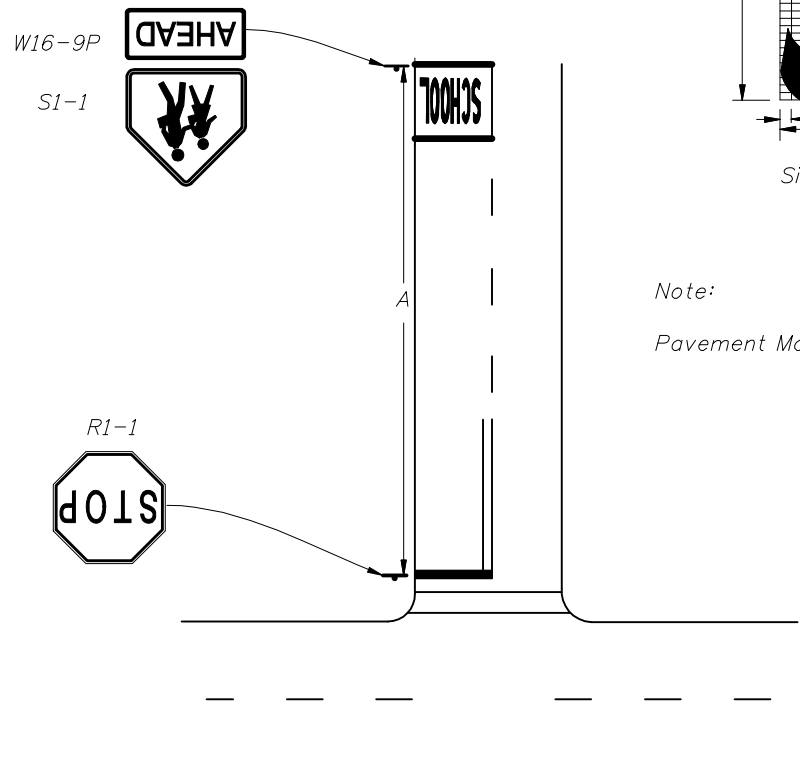
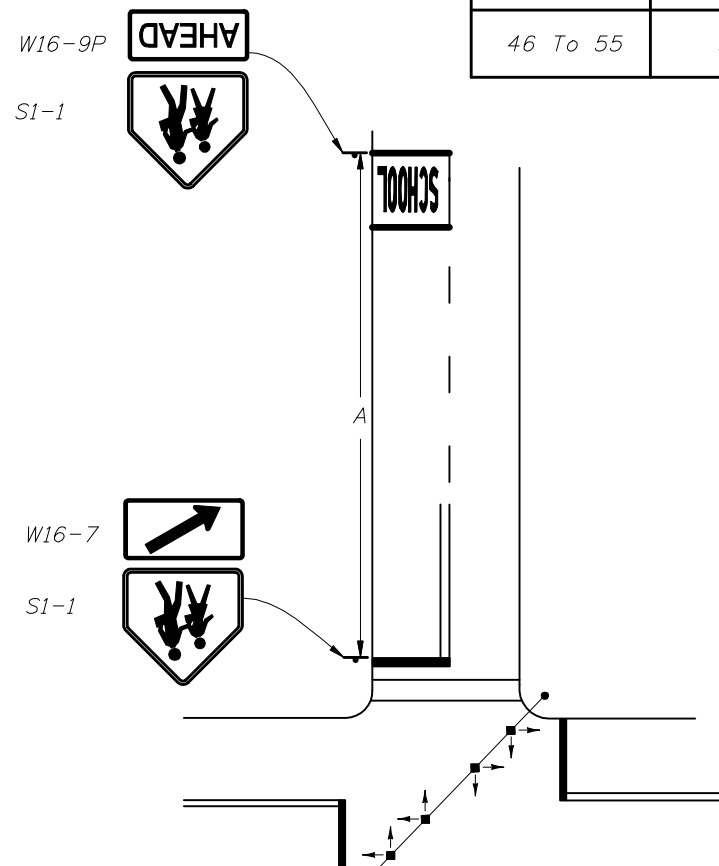


2010 FDOT Design Standards

TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS

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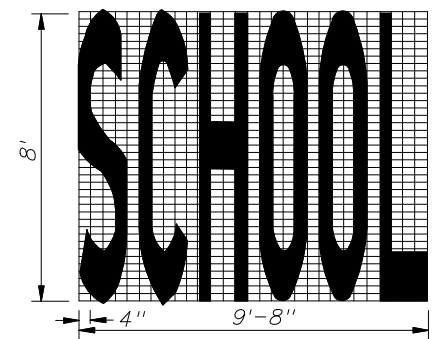
Approach Speed (MPH)	Distance A (FT.)
25 or Less	200
26 To 35	250
36 To 45	300
46 To 55	325



"No Right Turn On Red" Signs may be erected as deemed necessary by the local traffic engineers.

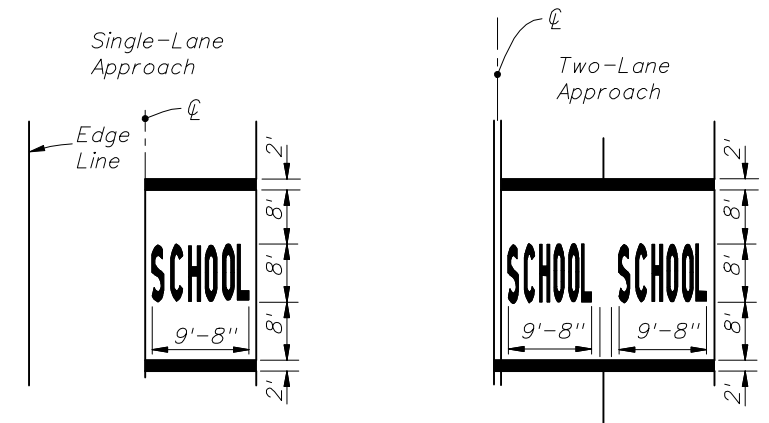
1. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK AT A SIGNALIZED INTERSECTION

2. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK AT A STOP CONTROLLED INTERSECTION



Single-Lane Pavement Marking
33 s.f.

Note:
Pavement Marking Should Not Extend Into Opposing Lane.



Multi-Lane Approach
(Three or More)

PAVEMENT MARKINGS

Notes:
Signs shall be erected in accordance with index No. 17302.
When computing pavement message quantities do not include transverse lines.
School crosswalk widths at intersections shall be 6' minimum 10' standard without public sidewalk curb ramps 10' minimum with public sidewalk curb ramps.
For additional marking information, see Index 17346, Sheet 2.

Note:
Special speed restrictions are not normally applicable to these two cases.



2010 FDOT Design Standards

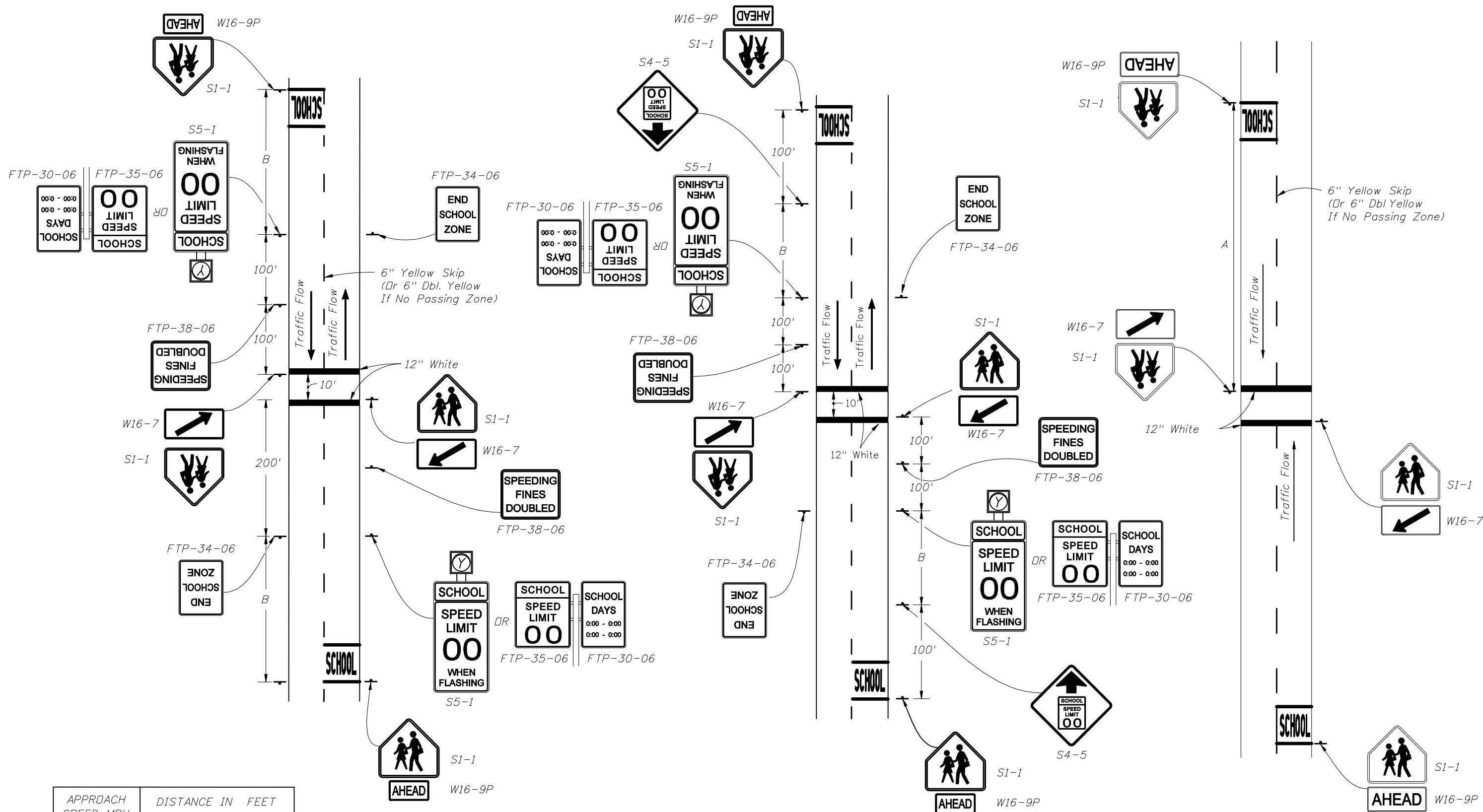
SCHOOL SIGNS & MARKINGS

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17344	

3. TRAFFIC CONTROL DEVICES FOR REDUCED SPEED ZONE AT A SCHOOL CROSSWALK 2 LANES-2 WAY TRAFFIC (40 MPH OR LESS) (MIDBLOCK OR ON THRU STREET AT AN INTERSECTION)

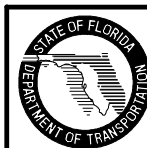
4. TRAFFIC CONTROL DEVICES FOR REDUCED SPEED ZONE AT A SCHOOL CROSSWALK 2 LANES-2 WAY TRAFFIC (45 MPH OR GREATER) (MIDBLOCK OR ON THRU STREET AT AN INTERSECTION)

5. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK WITHOUT A SPEED REDUCTION (2 LANE-2 WAY TRAFFIC)



APPROACH SPEED MPH	DISTANCE IN FEET	
	A	B
25 or Less	200'	100' Min.
26 To 35	250'	100' Min.
36 To 45	300'	100'
46 To 55	325'	125'

SCHOOL CROSSWALK
Midblock crosswalks shall be a minimum of 10'.
See Index No. 17346 sheet 2 and 8.



2010 FDOT Design Standards

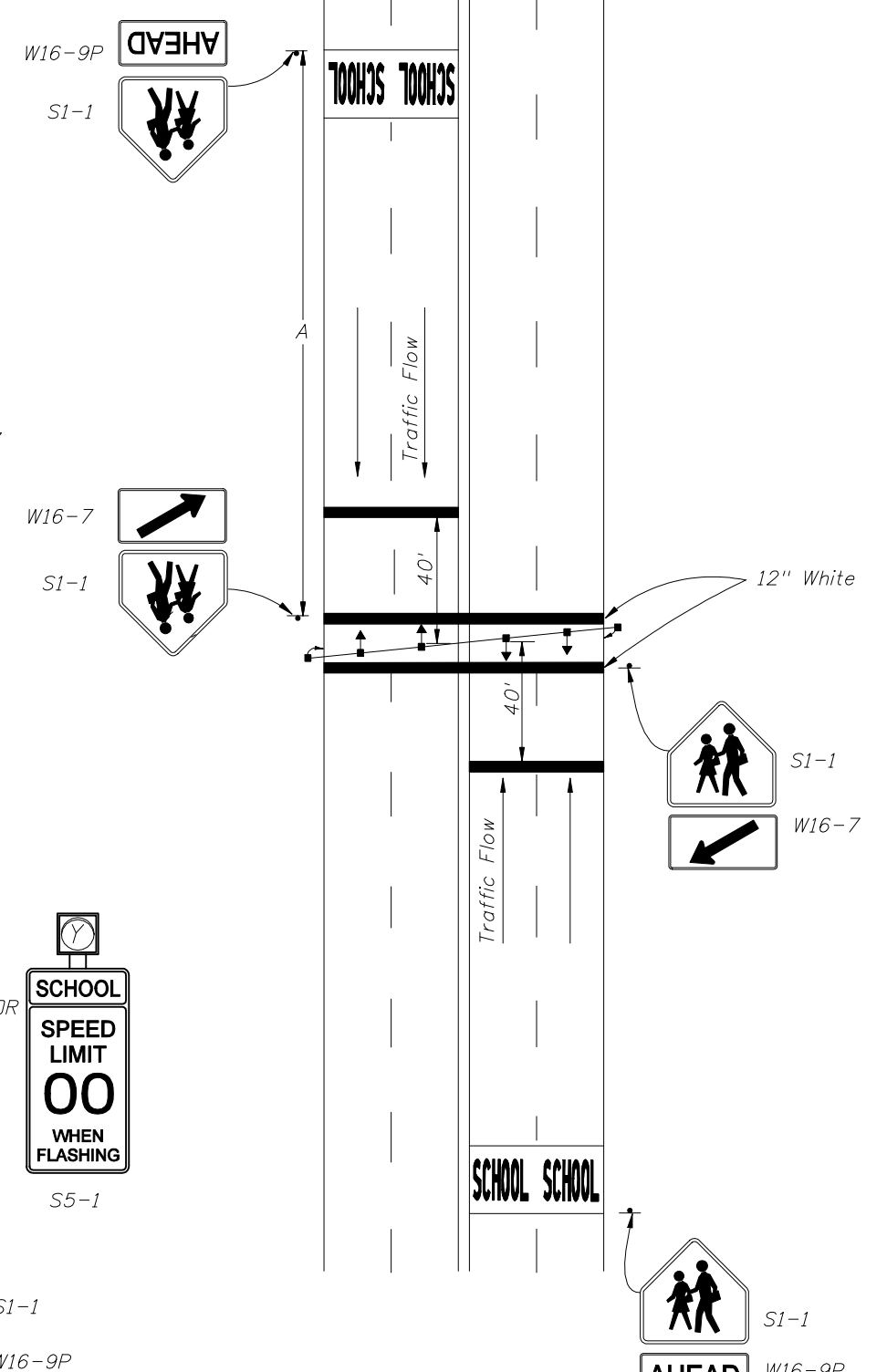
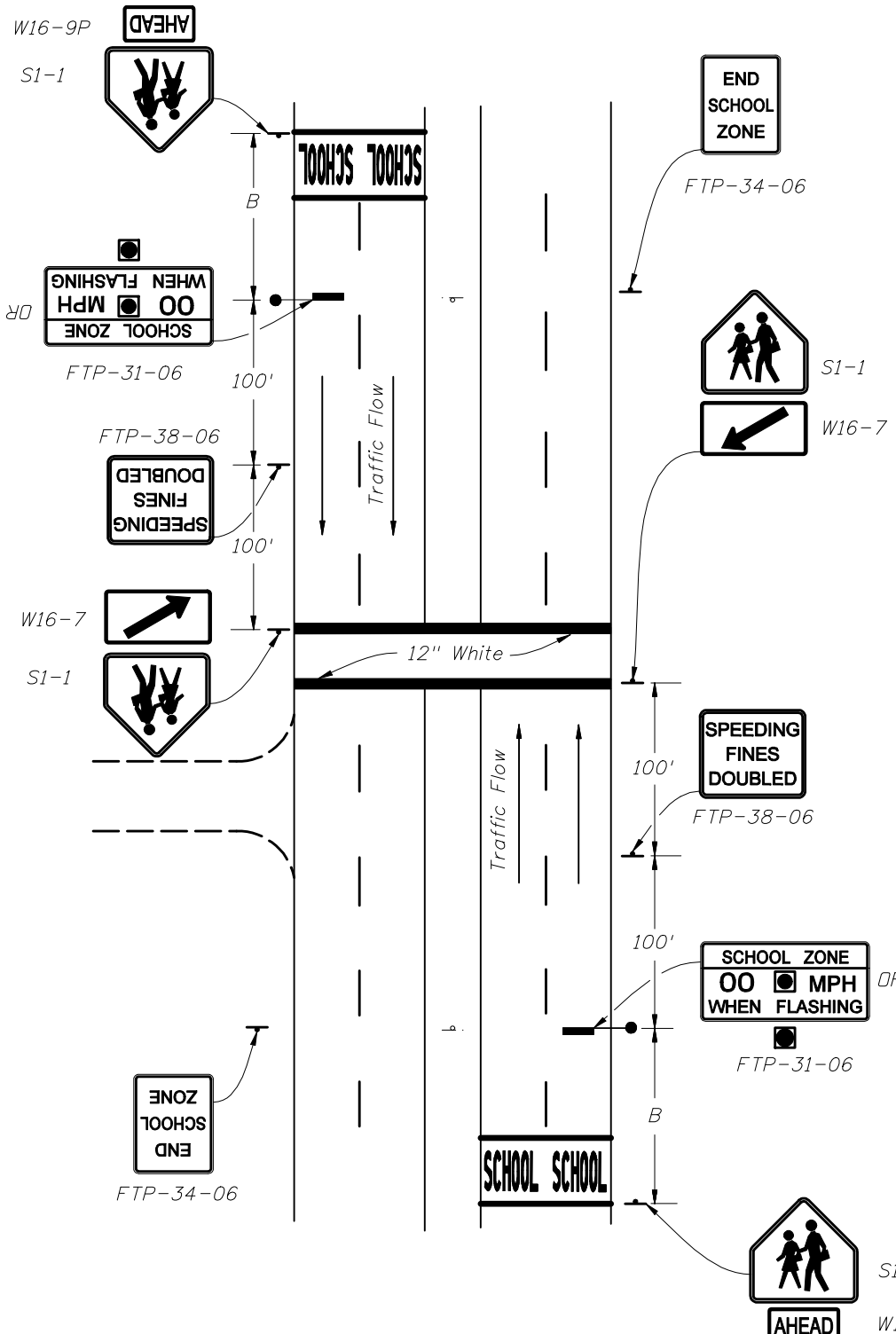
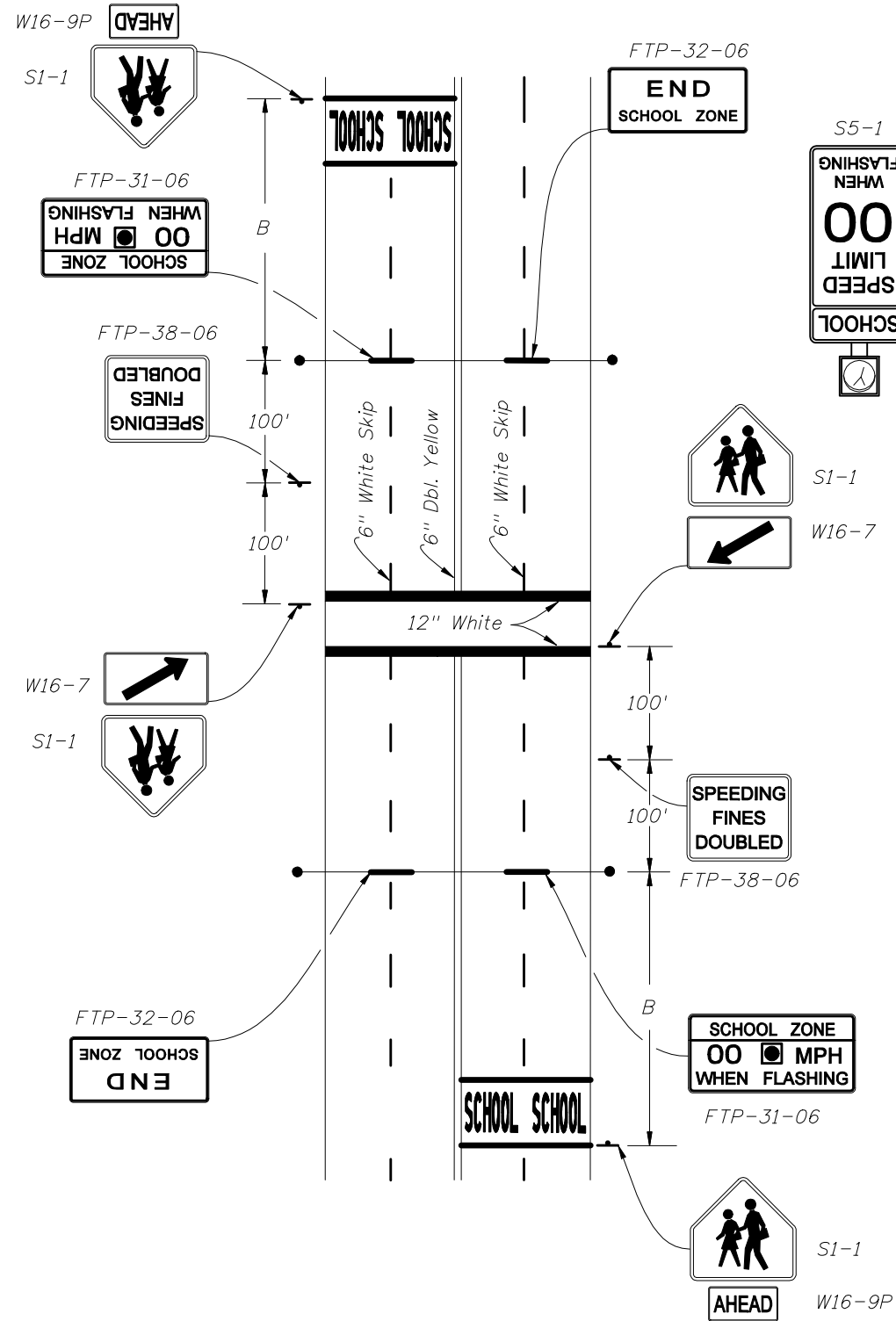
SCHOOL SIGNS & MARKINGS

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6. TRAFFIC CONTROL DEVICES FOR A REDUCED SPEED ZONE AT A SCHOOL CROSSWALK WITH OVERHEAD FLASHING BEACON SPEED LIMIT SIGNS (4 LANES UNDIVIDED-2 WAY TRAFFIC) (MIDBLOCK OR ON THRU STREET AT AN INTERSECTION)

7. TRAFFIC CONTROL DEVICES FOR A REDUCED SPEED ZONE AT A SCHOOL CROSSWALK WITH OVERHEAD OR GROUND MOUNTED FLASHING BEACON SPEED LIMIT SIGNS (4 LANES DIVIDED-2 WAY TRAFFIC)

8. TRAFFIC CONTROL DEVICES FOR SIGNALIZED MIDBLOCK SCHOOL CROSSWALK



APPROACH SPEED MPH	DISTANCE IN FEET	
	A	B
25 or Less	200'	100' Min.
26 To 35	250'	100' Min.
36 To 45	300'	100'
46 To 55	325'	125'

SCHOOL CROSSWALK
Midblock crosswalk shall be a minimum of 10'.
See Index No. 17346, Sheet 2 and 8.

NOTE- CONDITION 7:
Where engineering judgement determines the overhead structure is not suitable or cannot be installed due to site restrictions, S5-1 with flashing beacons on each side of the road may be substituted for the overhead structure.



2010 FDOT Design Standards

SCHOOL SIGNS & MARKINGS

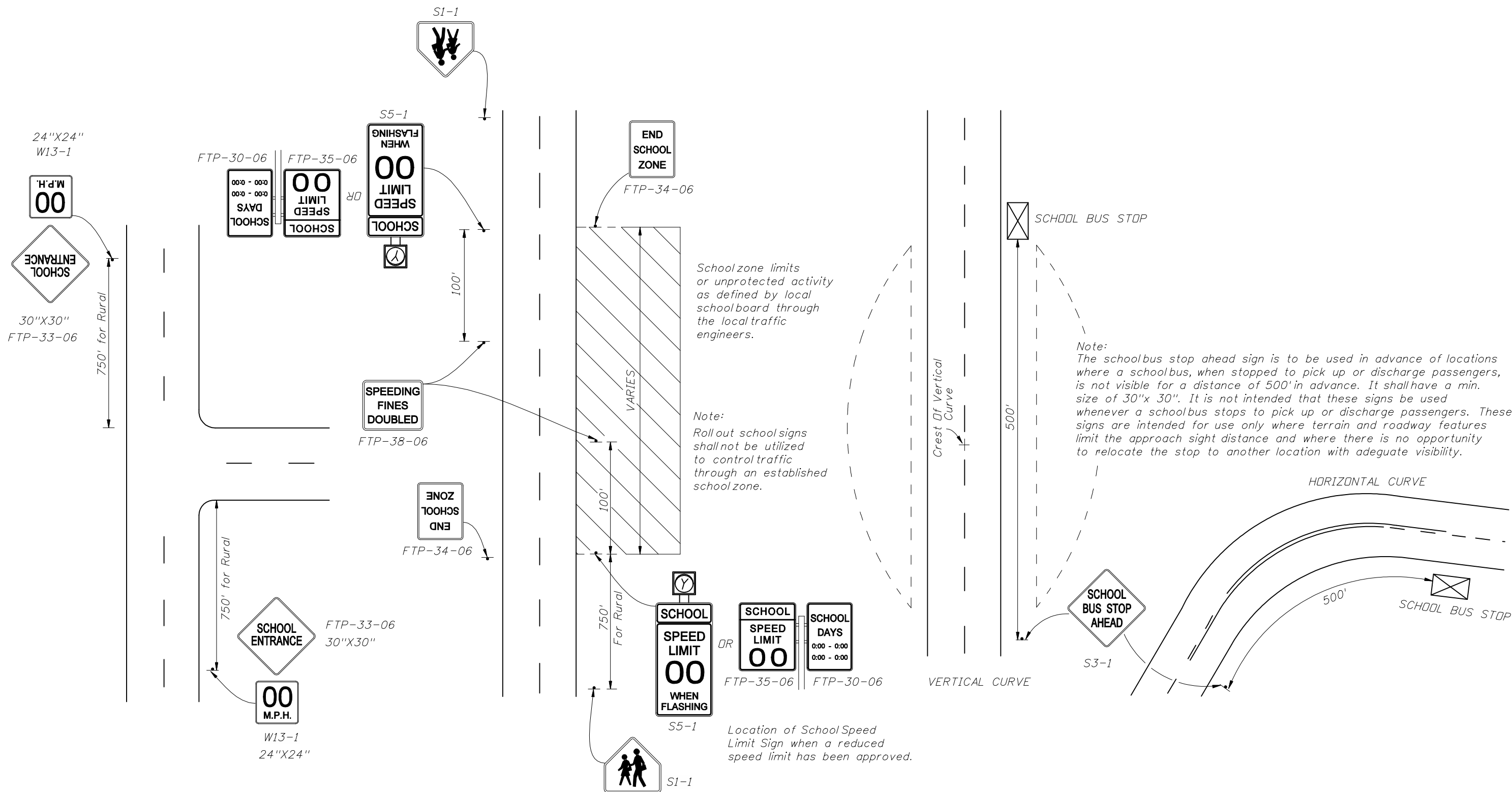
Last Revision 07/01/09 Sheet No. 3 of 6

Index No. 17344

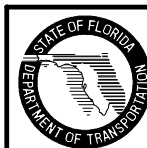
9. TRAFFIC CONTROL DEVICES AT SCHOOL ENTRANCES WITH LOW VOLUMES OF WALKING STUDENTS

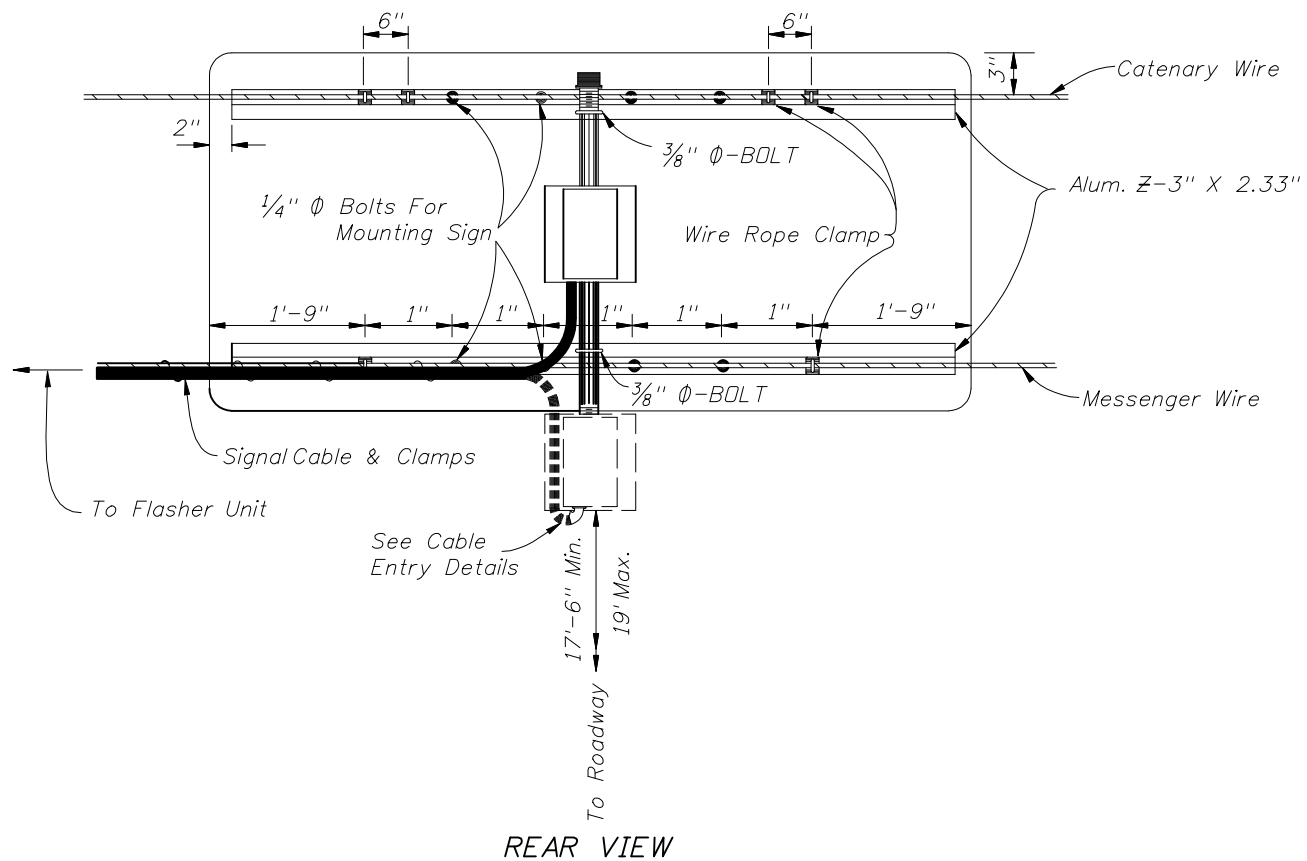
10. TRAFFIC CONTROL DEVICES FOR A TYPICAL SCHOOL ZONE FRONTING THE SCHOOL PROPERTY

11. SCHOOL BUS STOP

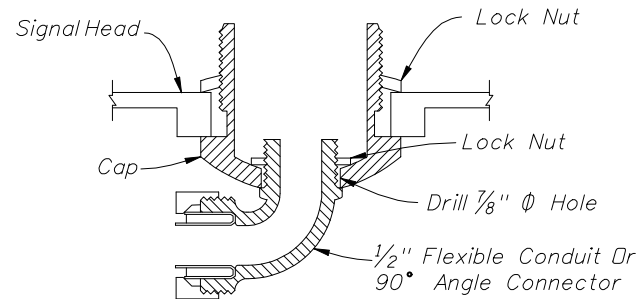


These signs are intended for use only at those few locations where the school entrance is not evident to the motorist, and must be approved in advance by the responsible traffic engineering authority.

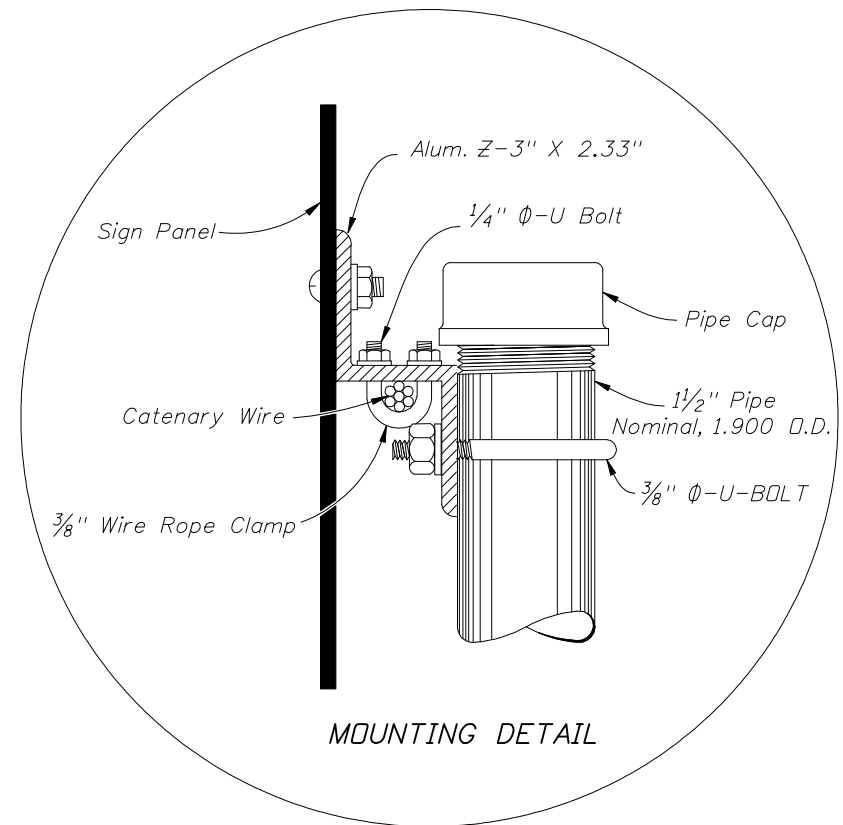




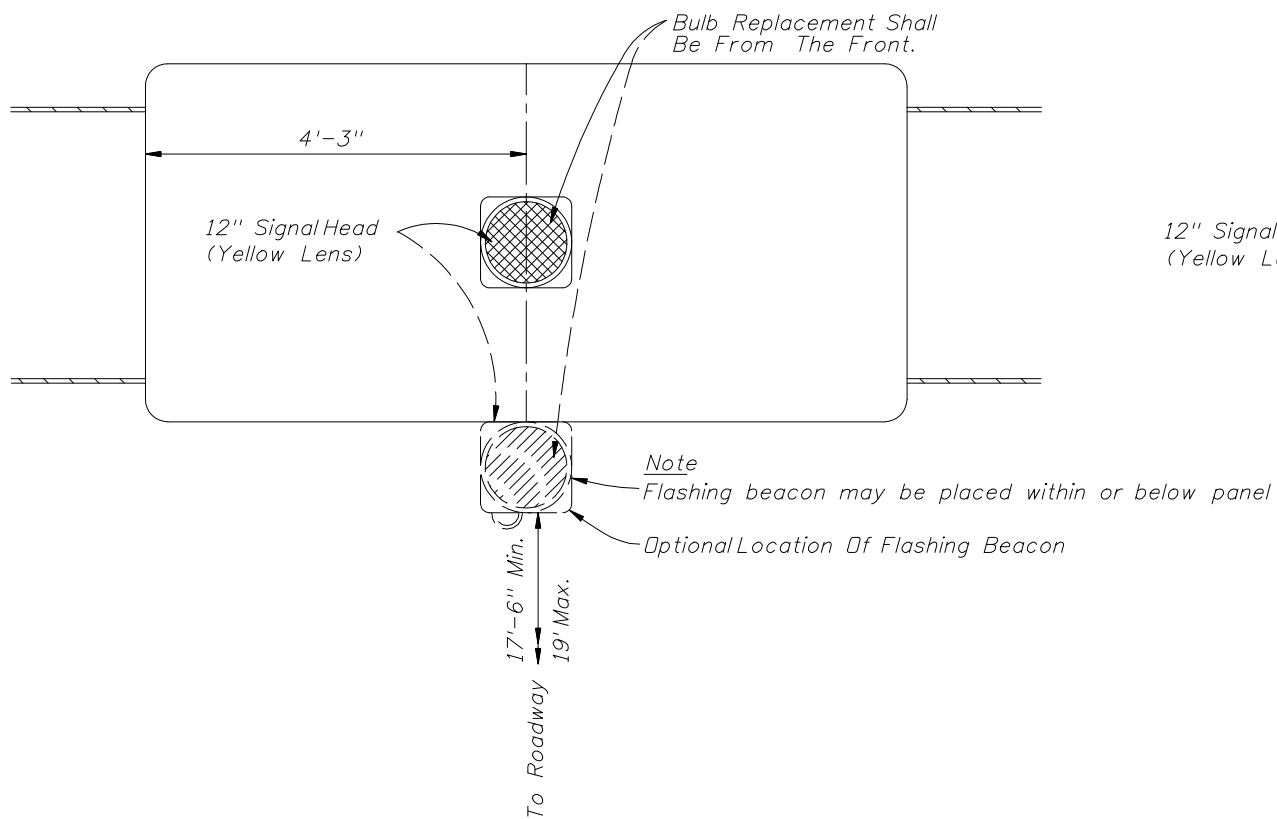
REAR VIEW



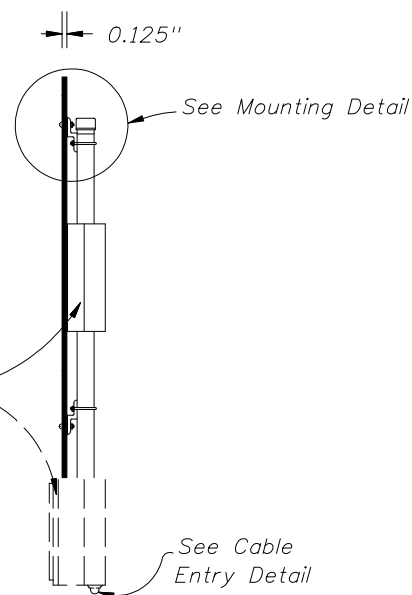
CABLE ENTRY DETAIL



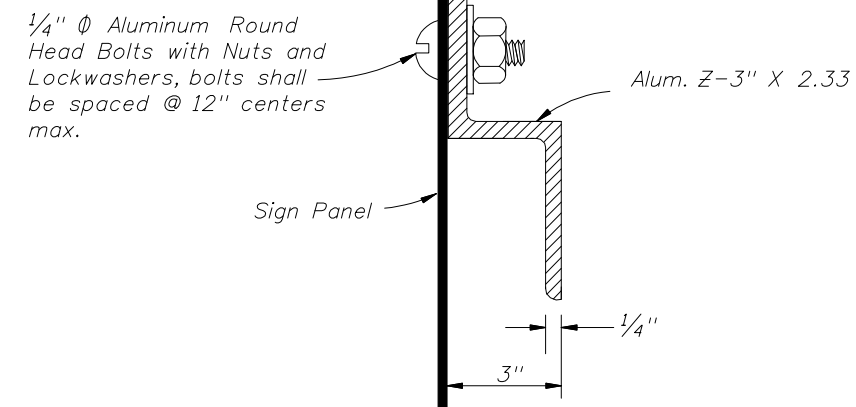
MOUNTING DETAIL



FRONT VIEW

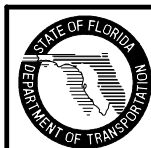


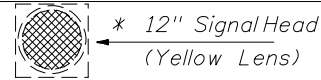
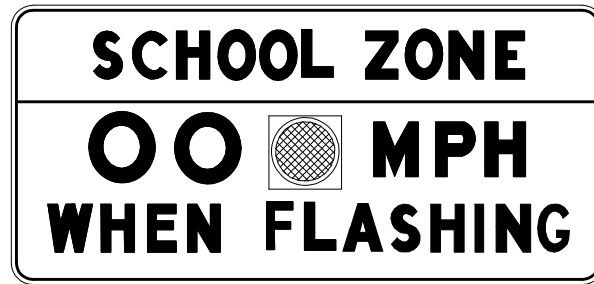
SIDE VIEW



Z SECTION DETAIL

Flasher unit and cabinet to be placed on the strain pole supporting overhead sign assembly or on service pole. The flasher unit not to overhang private property or sidewalk.





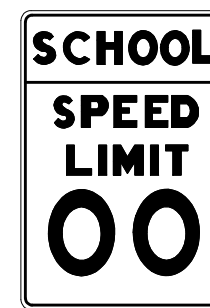
FTP-31-06

OVERHEAD STANDARD

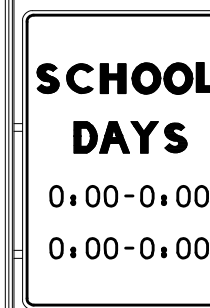
* Flashing Beacon May Be Placed Within Or Below Panel



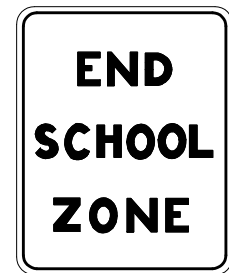
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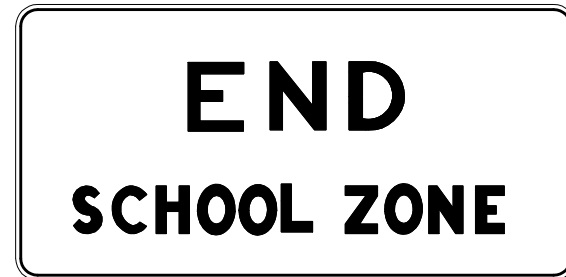
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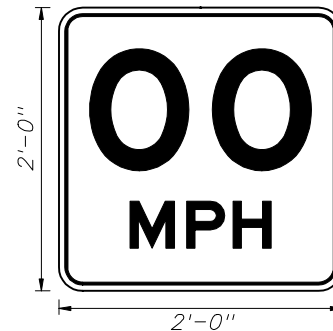
FTP-30-06



FTP-34-06



FTP-32-06

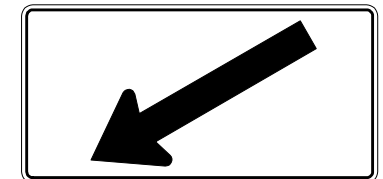


W13-1

SPEED LIMIT ASSEMBLY



S1-1



W16-7



W16-9P



FTP-38-06



S4-5



S3-1

12" Signal Head (Yellow Lens)



S5-1

Ground Mount Standard

Notes:

1. Standard size signs should be used whenever possible. Minimum sizes may be used only on low volume, low speed (less than 35 mph) streets. Special sizes should be used on expressway facilities where special emphasis is needed.
2. The value of the actual school zone speed limit shall be determined by the District Traffic Operations Engineer in cooperation with local school superintendents. In no case shall it be less than the 15 mph min. as set by law.
3. See Index No. 17355 for sign details.
4. When fluorescent yellow-green background color is used, a systematic approach featuring one background color within a zone or area should be used. The mixing of standard yellow and fluorescent yellow green background within a zone should be avoided.

Note:

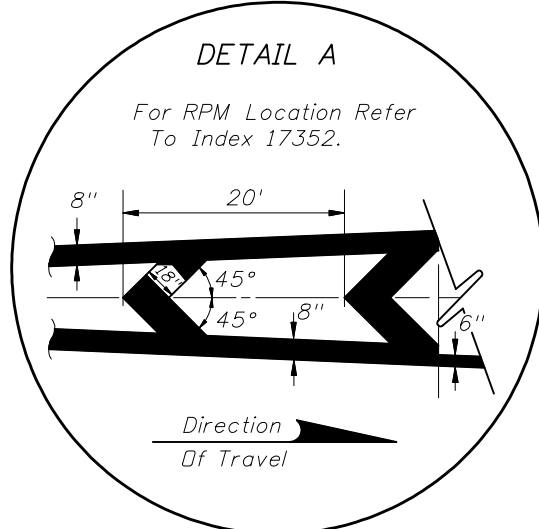
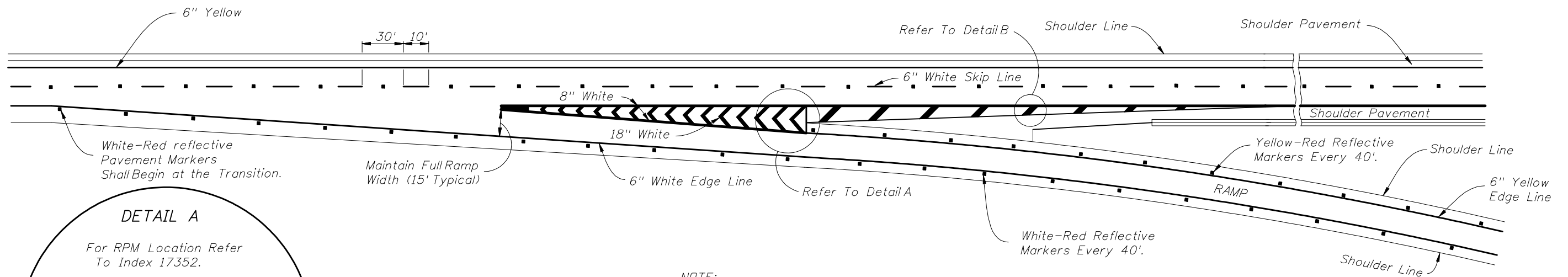
Existing ground mount school speed limit signs utilizing a single 8" min. size beacon or two 6" min. size beacons inside the sign border are considered meeting the standard. However, replacement or upgrading of these school speed limit signs shall conform to the above standard. Numerical speed limit displayed shall be established by appropriate regulatory authorities.



2010 FDOT Design Standards

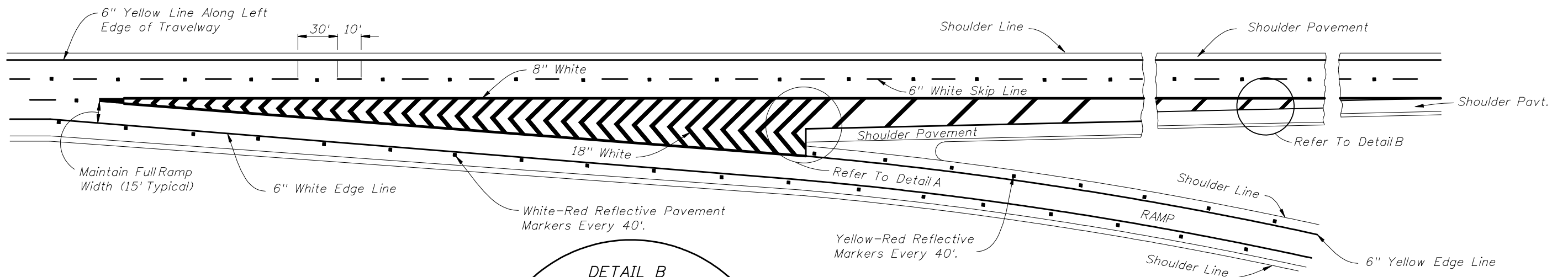
SCHOOL SIGNS & MARKINGS

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07/01/09	6 of 6
Index No.	
17344	

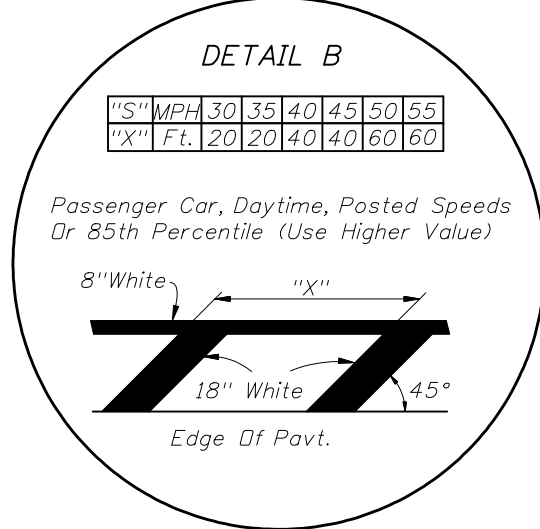


NOTE:
Reflective pavement markers are installed adjacent to the edge line.

NORMAL TAPERED EXIT
(TWO THRU LANES)

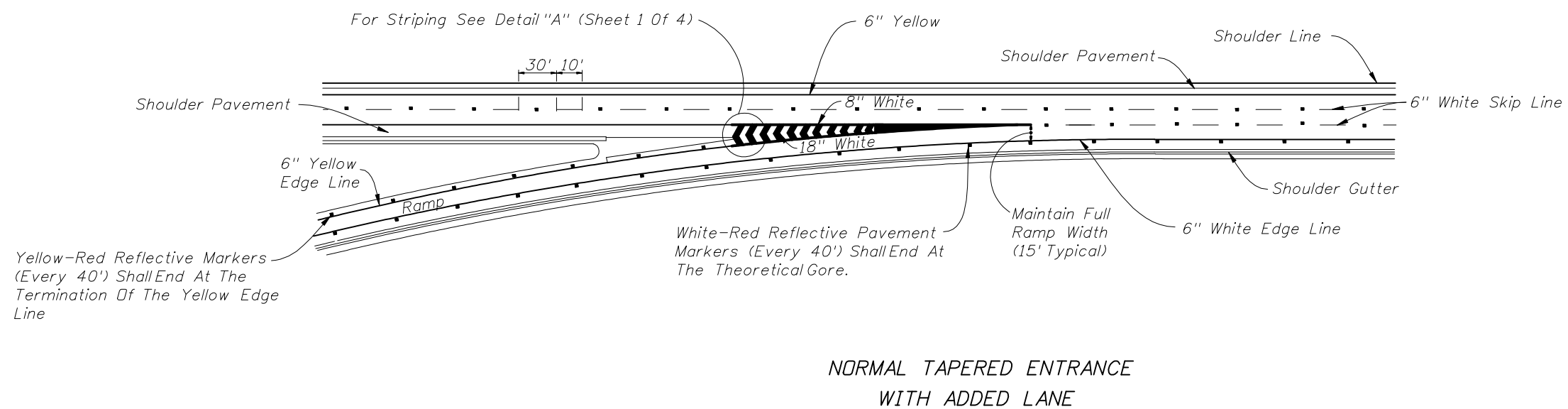
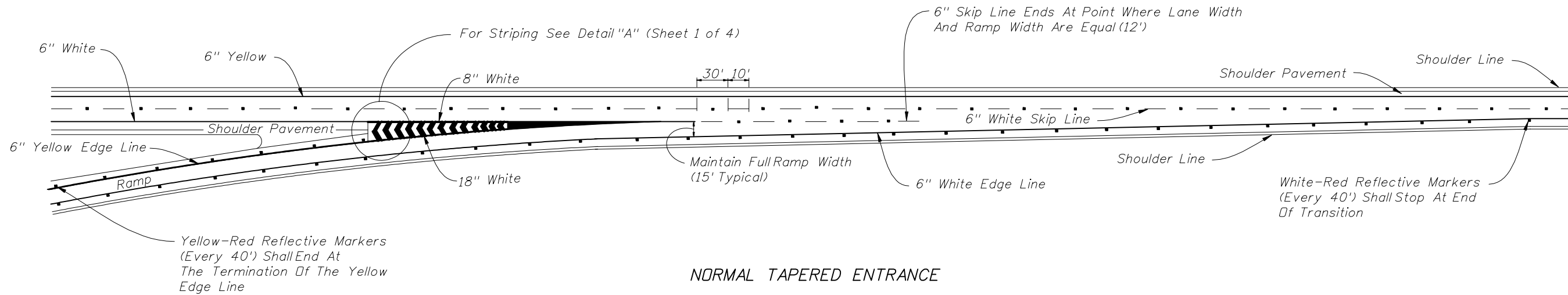


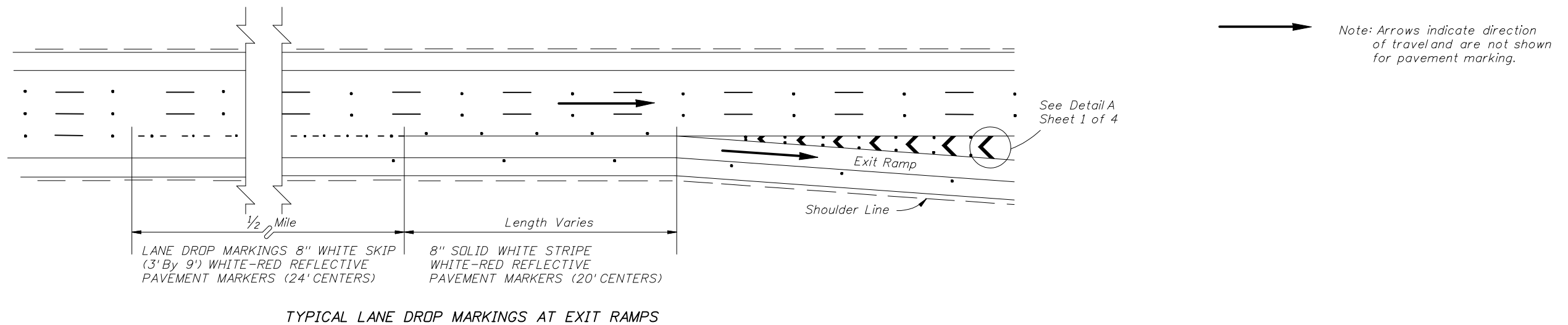
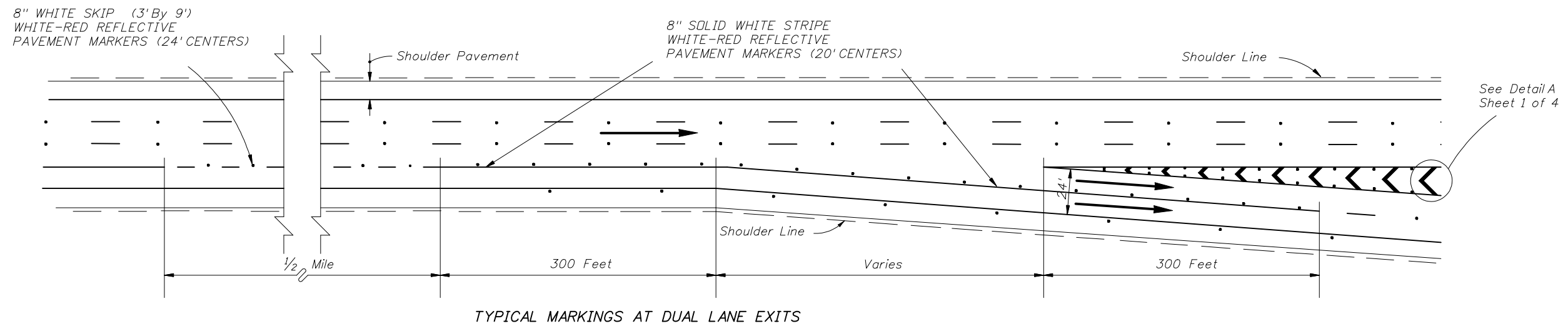
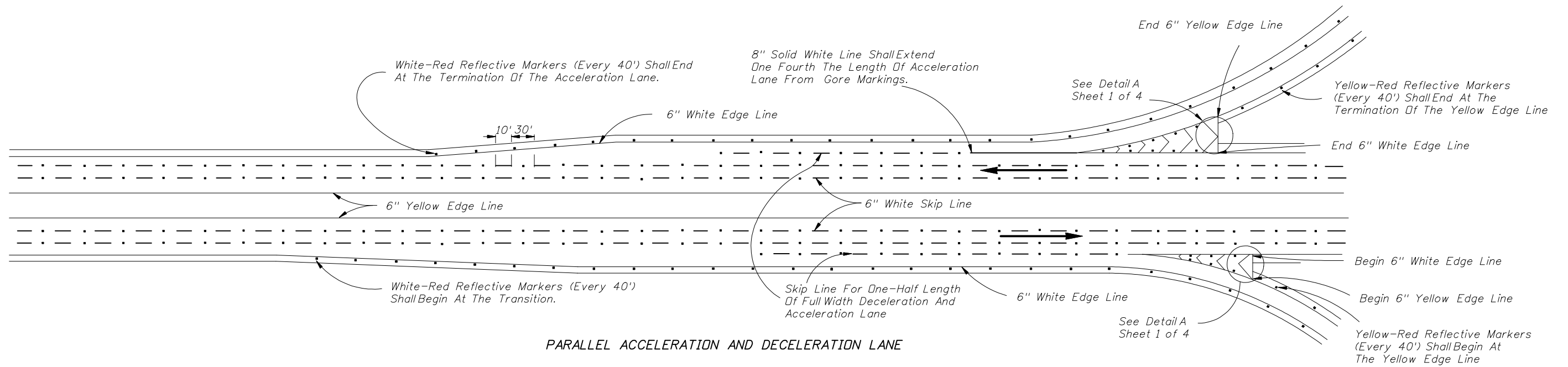
NOTE:
In advance of lane drops at exit ramps a special marking pattern may be used to distinguish the lane drop situation from a normal exiting ramp or auxiliary lane. A typical special marking for lane drops consist of 8" wide by 3' long white stripes separated by 9' gaps. If used, this special marking should begin 1/2 mile in advance of the theoretical gore point. Where lane changes may cause conflicts, an 8" wide solid white channelizing line may be extended 300' upstream from the theoretical gore. (MUTCD Section 3B.05).



NORMAL TAPERED EXIT ONLY
(TWO THRU LANES - THREE APPROACH LANES)

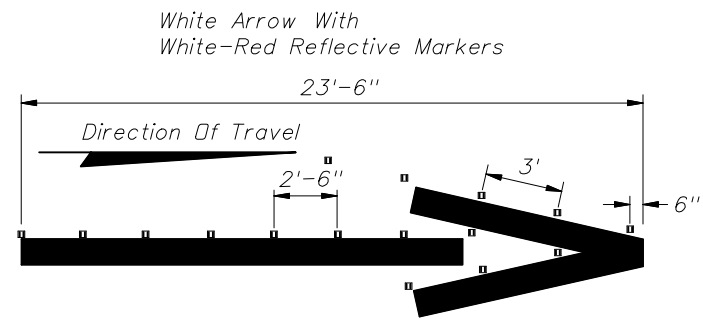
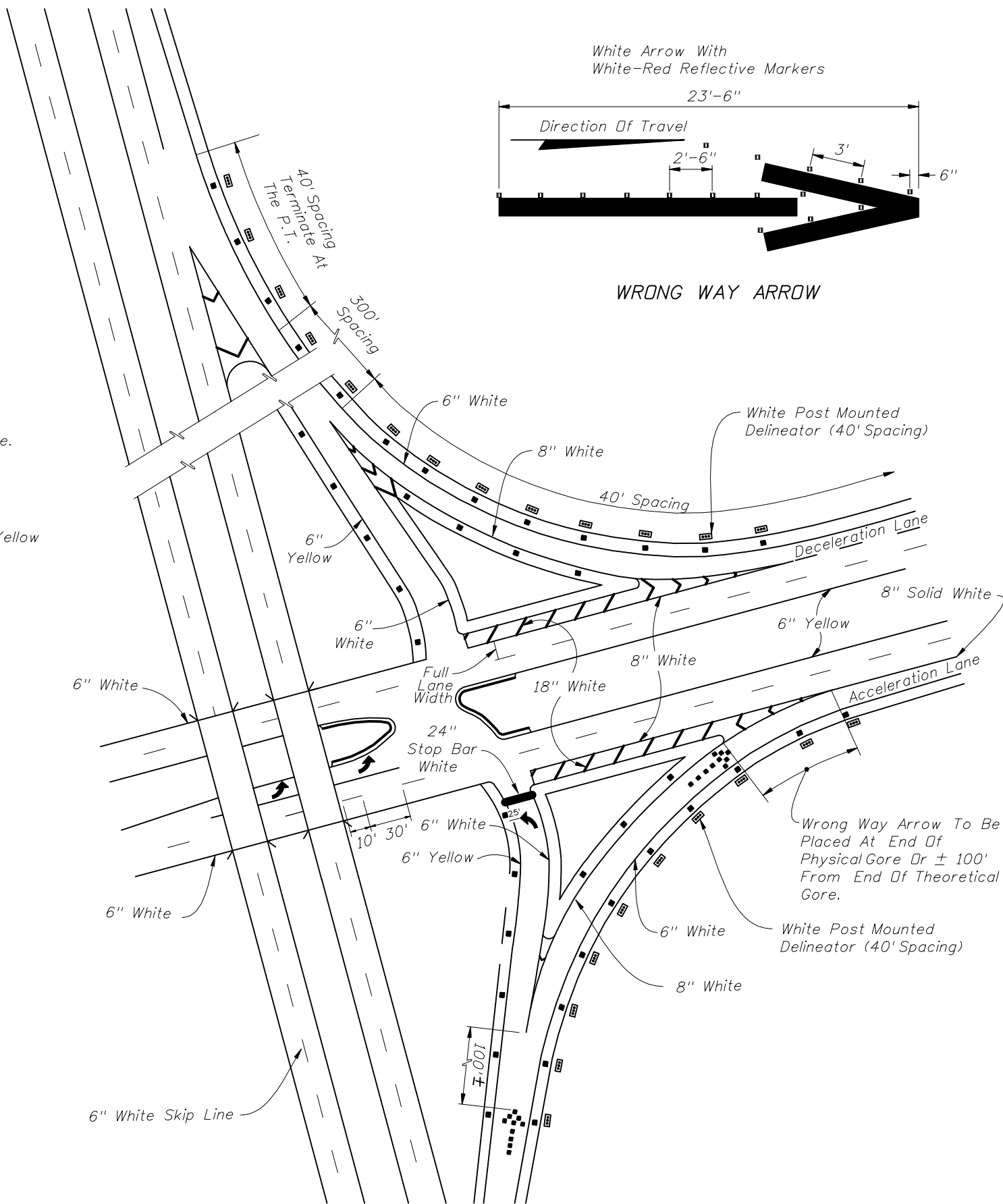
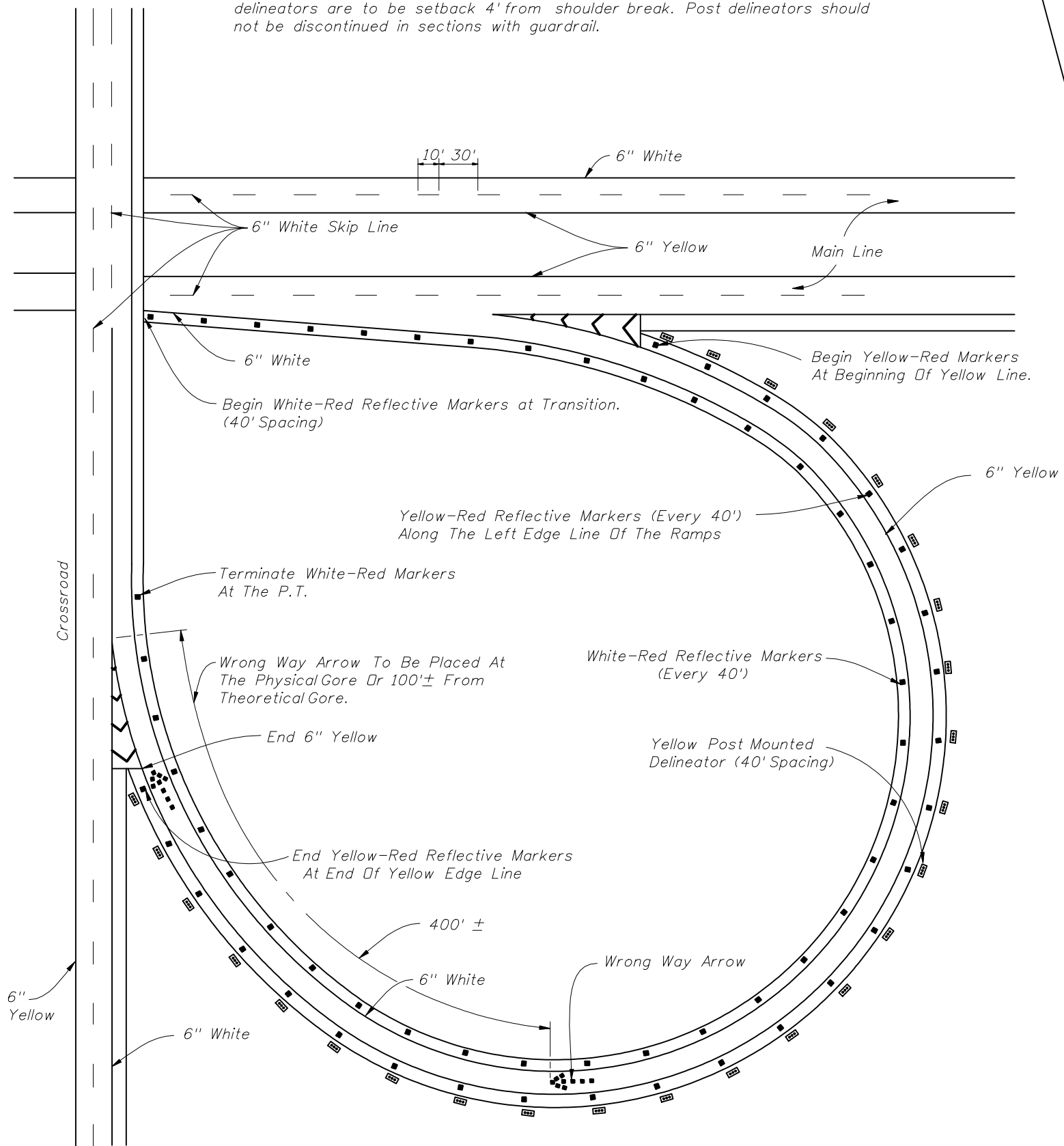




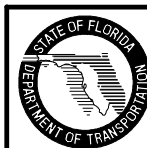


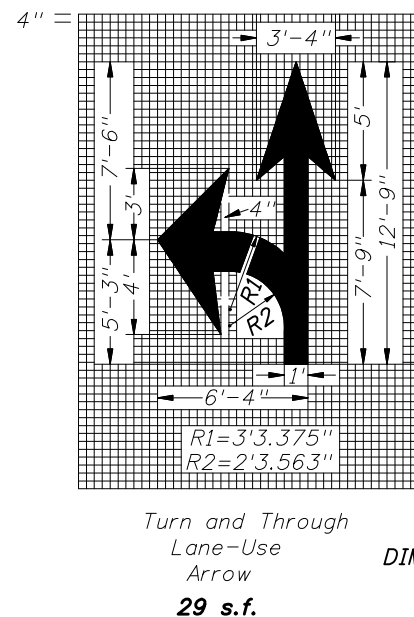
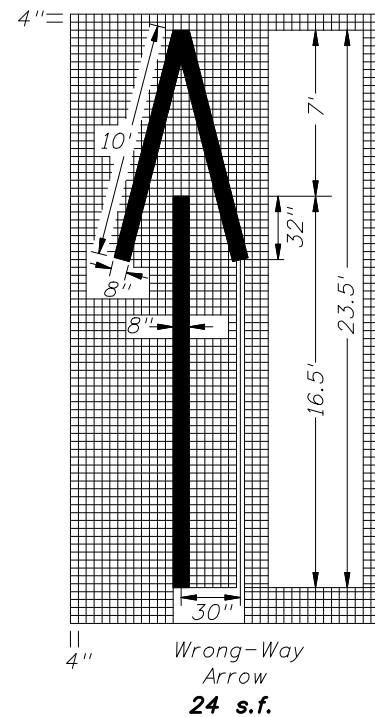
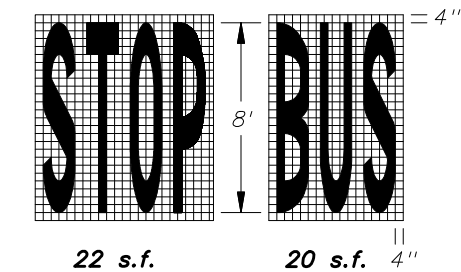
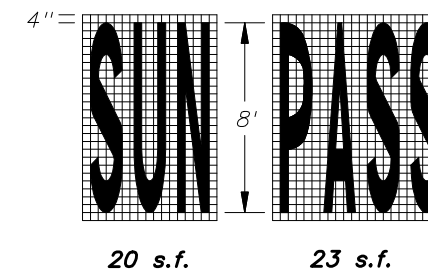
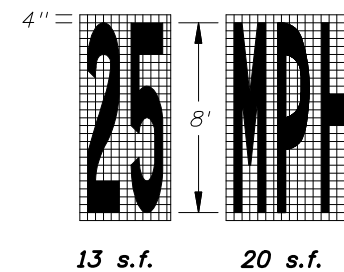
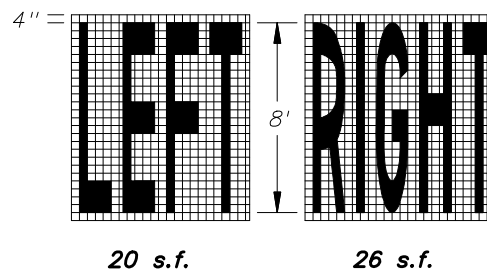
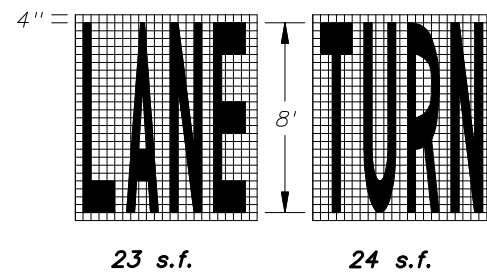
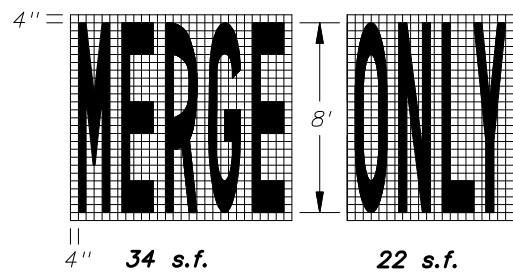
Notes:

1. Post delineators spaced at 40' on curves of the entrance and exit of ramps. The spacing on the tangent portion of the ramp section shall be 300'. All delineators are to be setback 4' from shoulder break. Post delineators should not be discontinued in sections with guardrail.

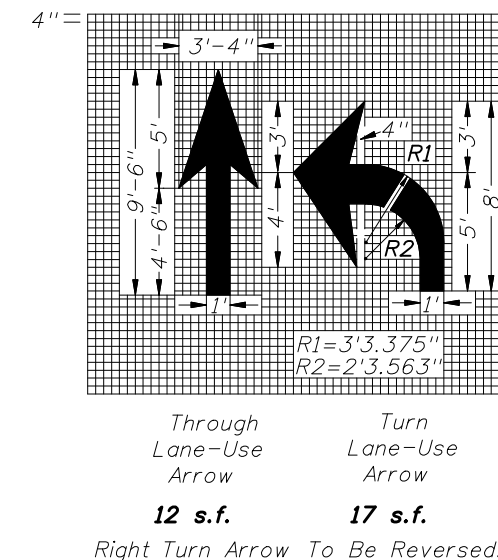
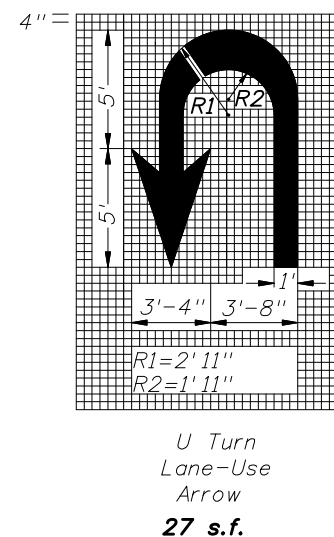


WRONG WAY ARROW

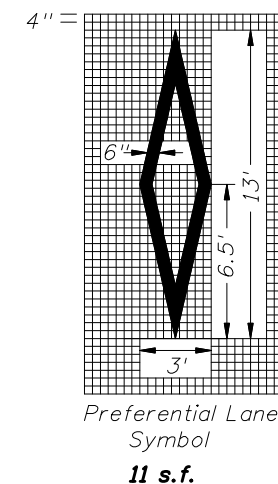




DIMENSIONS ARE WITHIN 1" ±



Right Turn Arrow To Be Reversed.



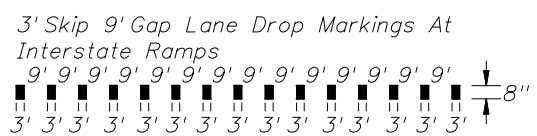
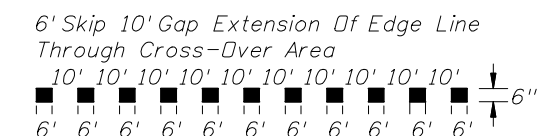
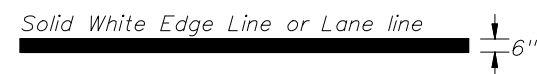
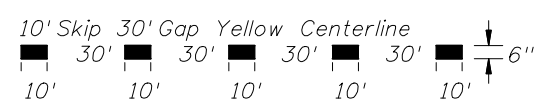
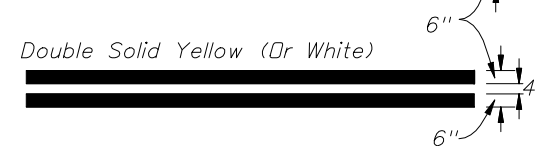
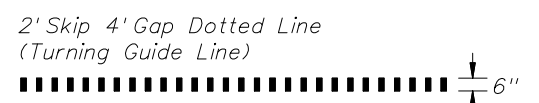
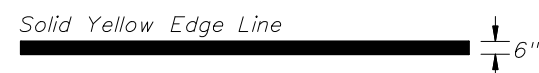
PAVEMENT ARROW AND MESSAGE DETAILS

NOTE: When arrow and pavement message are used together, the arrow shall be located down stream of the pavement message and shall be separated from the pavement message by a distance of 25' (Base of the arrow to the base of the message). Stop message shall be placed 25' from back of stop line.

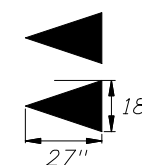
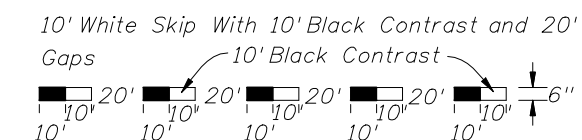
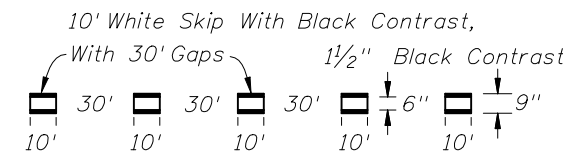
TYPES OF PERMANENT LONGITUDINAL LINES

BASIC COLOR RULE:

White lines separate traffic in the same direction. Yellow lines separate traffic in opposing directions. Yellow dotted lines may be used in special cases. Black may be used in combination with white for skip lines where a light-colored pavement does not provide sufficient contrast with the markings.

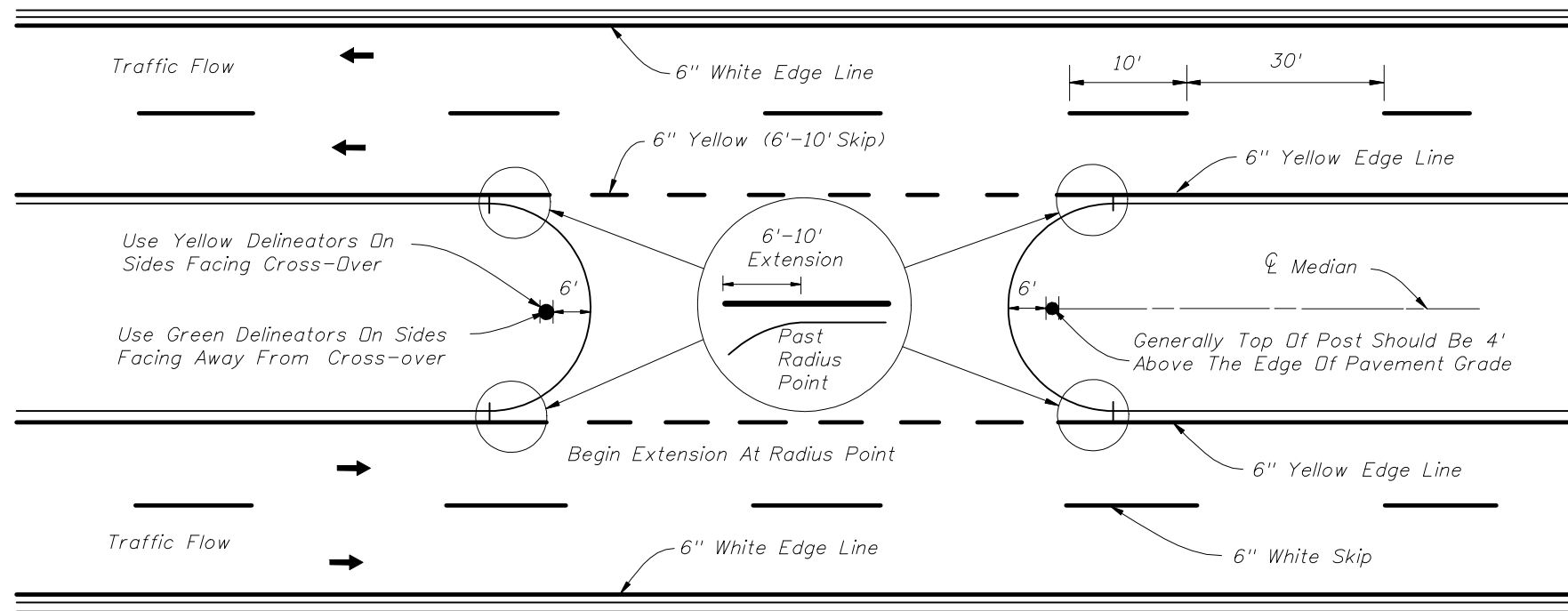


CONTRAST MARKINGS

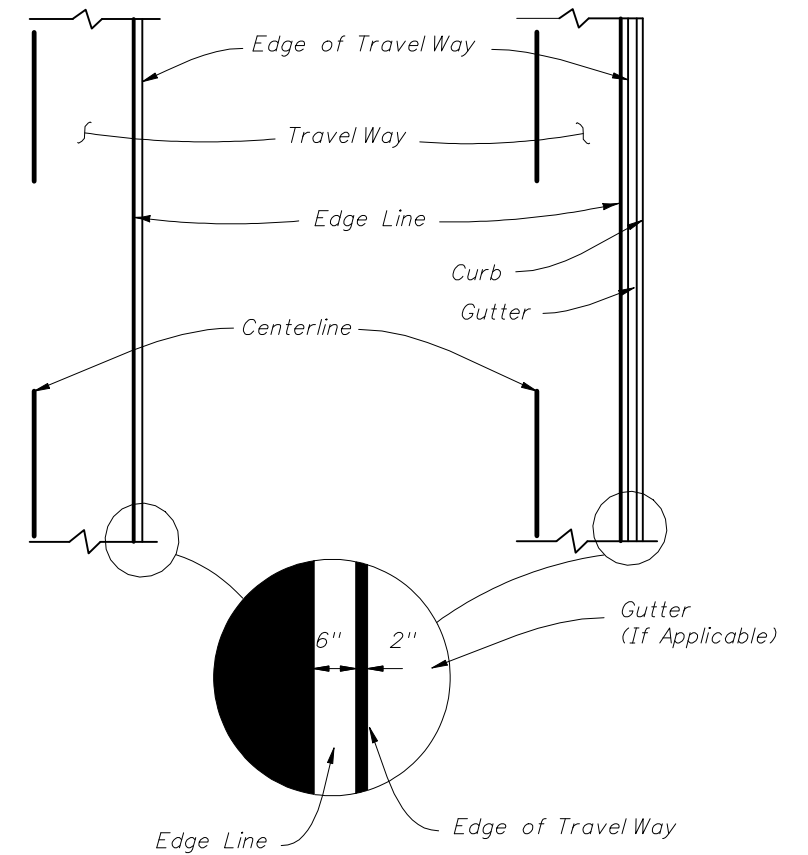


equally spaced within travel lane with 1 additional triangle using same spacing when a bike lane is present.

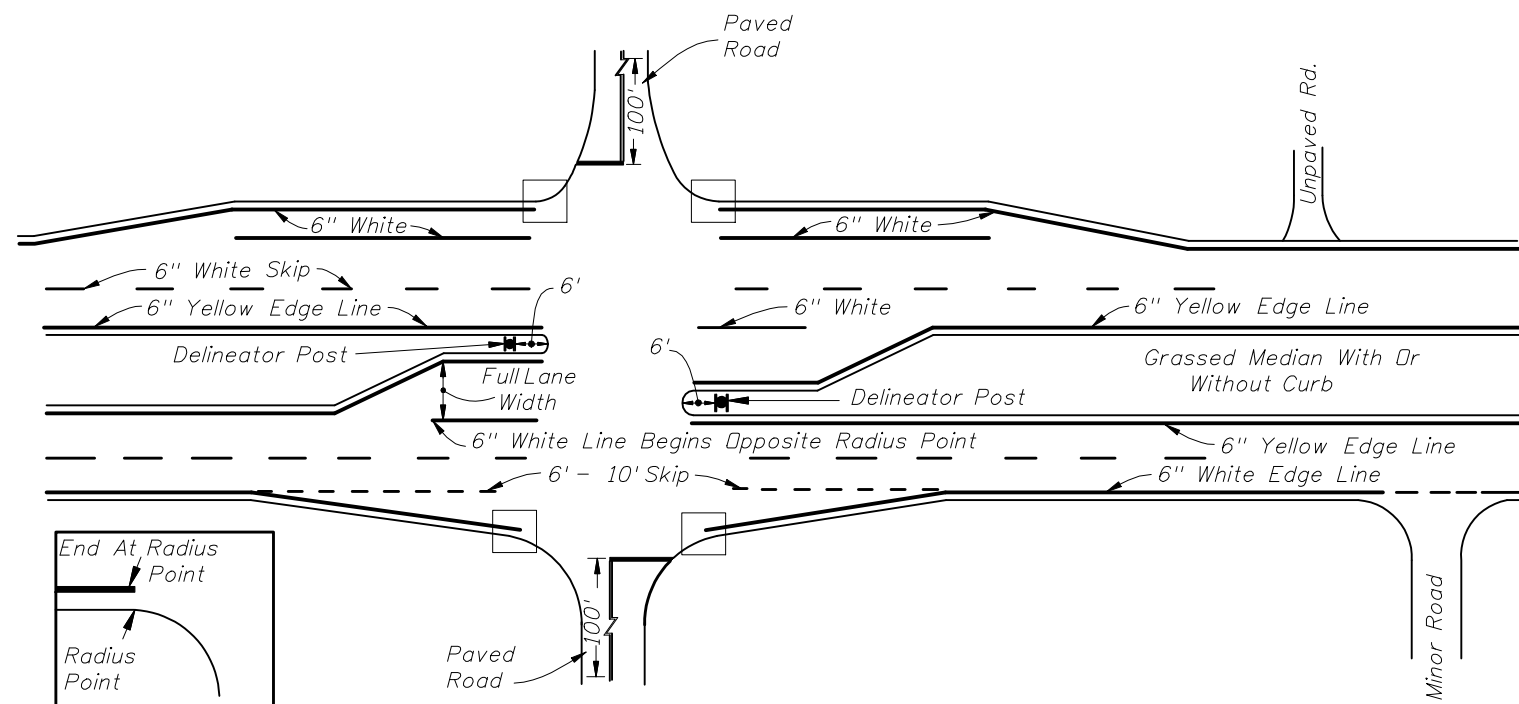




PAVEMENT MARKINGS AND DELINEATORS FOR MEDIAN CROSS-OVER



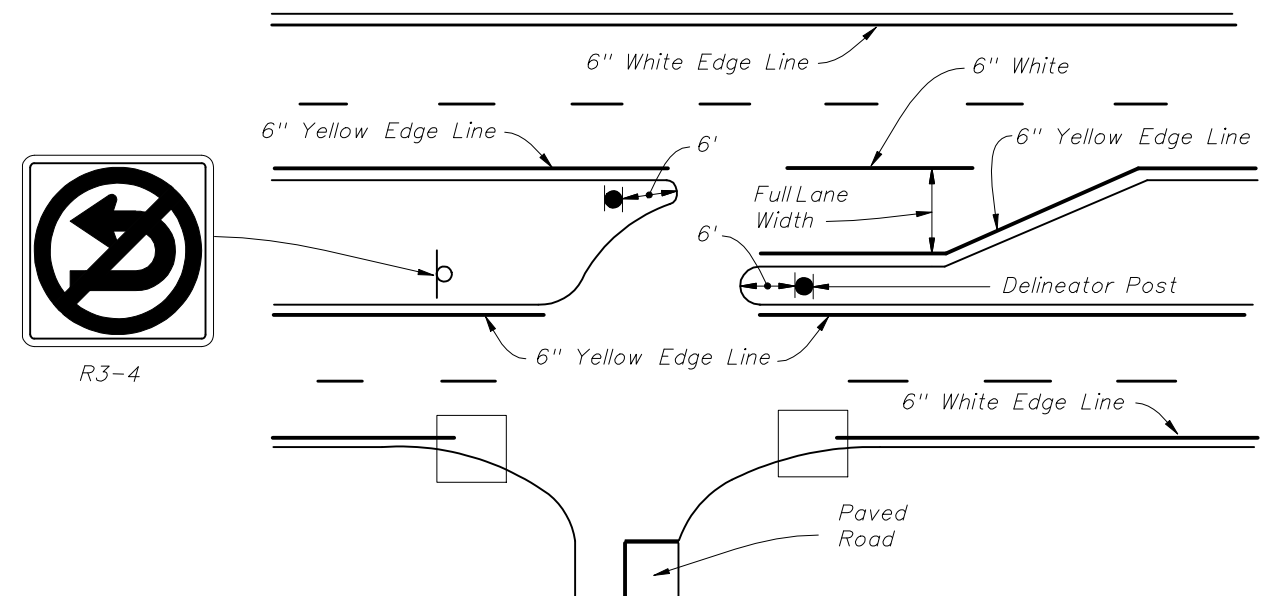
PLACEMENT OF EDGE LINES

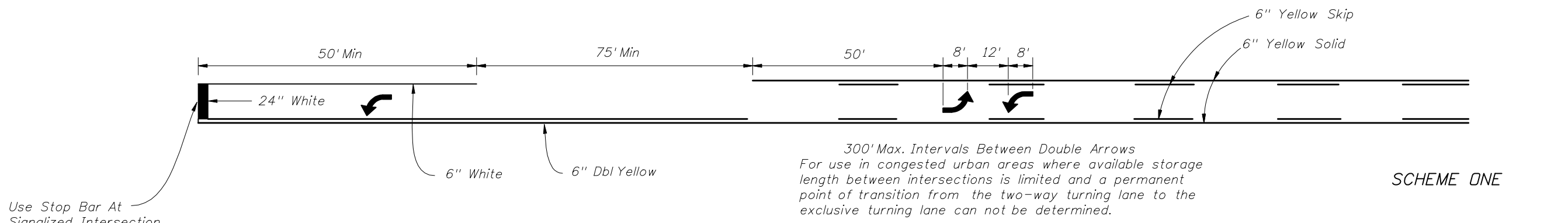


PAVEMENT MARKINGS FOR INTERSECTIONS WITH MAJOR AND MINOR ROADS

NOTE:

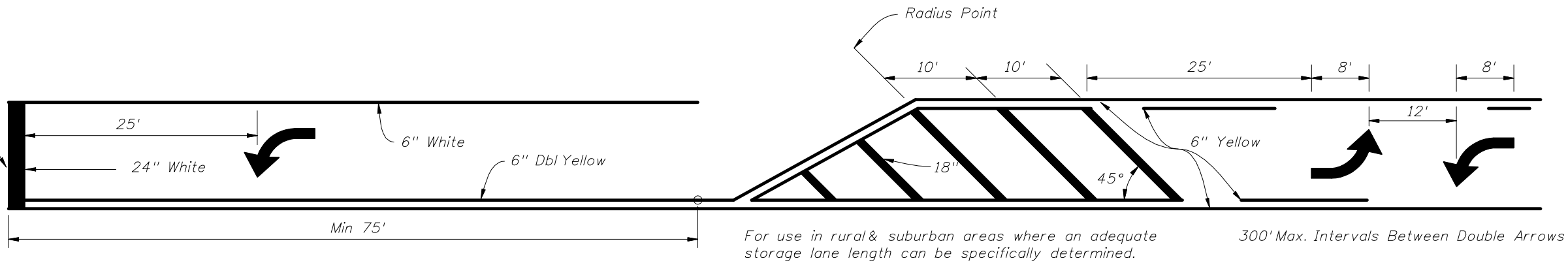
Markings applied to median noses shall be yellow in color.





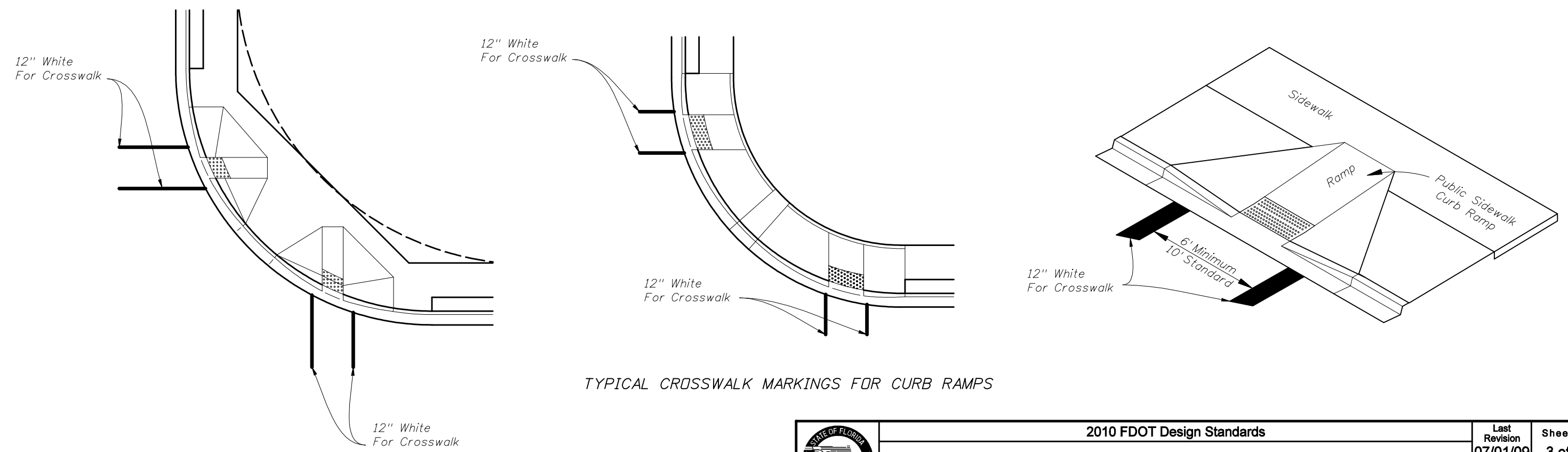
SCHEME ONE

Use Stop Bar At Signalized Intersection Only

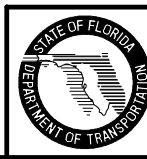


SCHEME TWO

(WITH SINGLE LANE LEFT TURN CHANNELIZATION)
TWO WAY LEFT TURN LANE



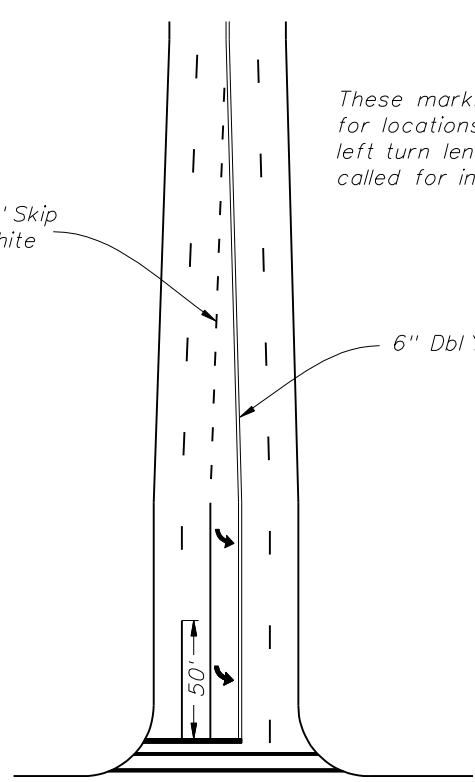
TYPICAL CROSSWALK MARKINGS FOR CURB RAMPS



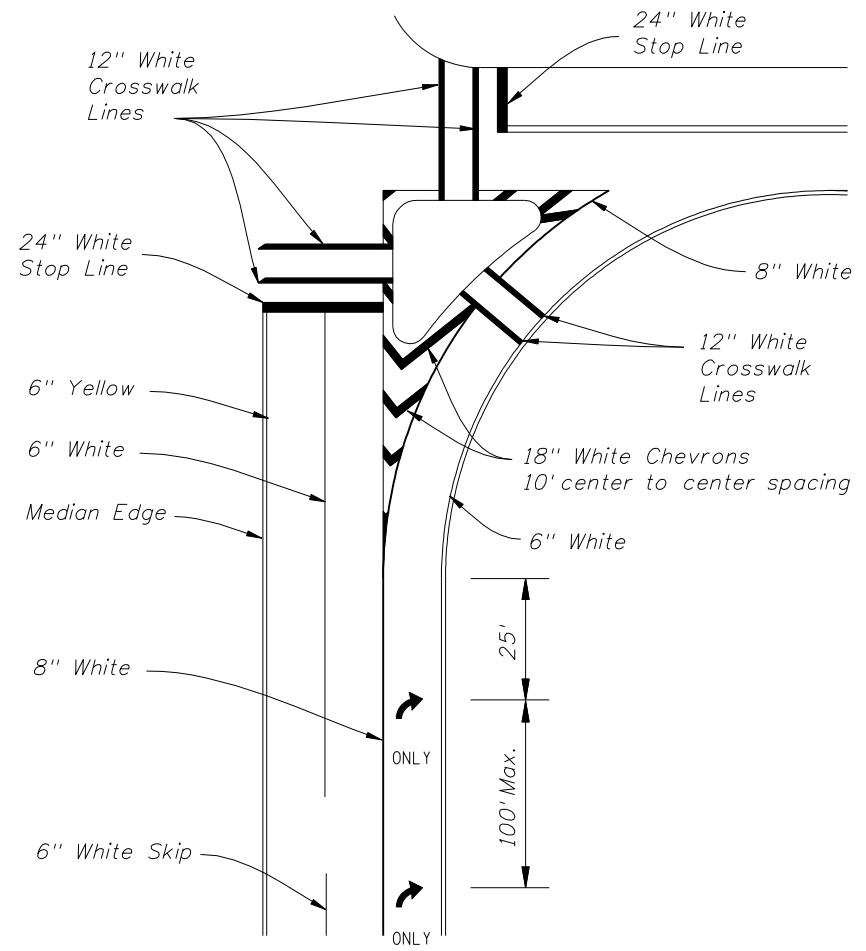
6'-10' Skip
6" White

These markings may be used for locations with restricted left turn lengths, only when called for in plans.

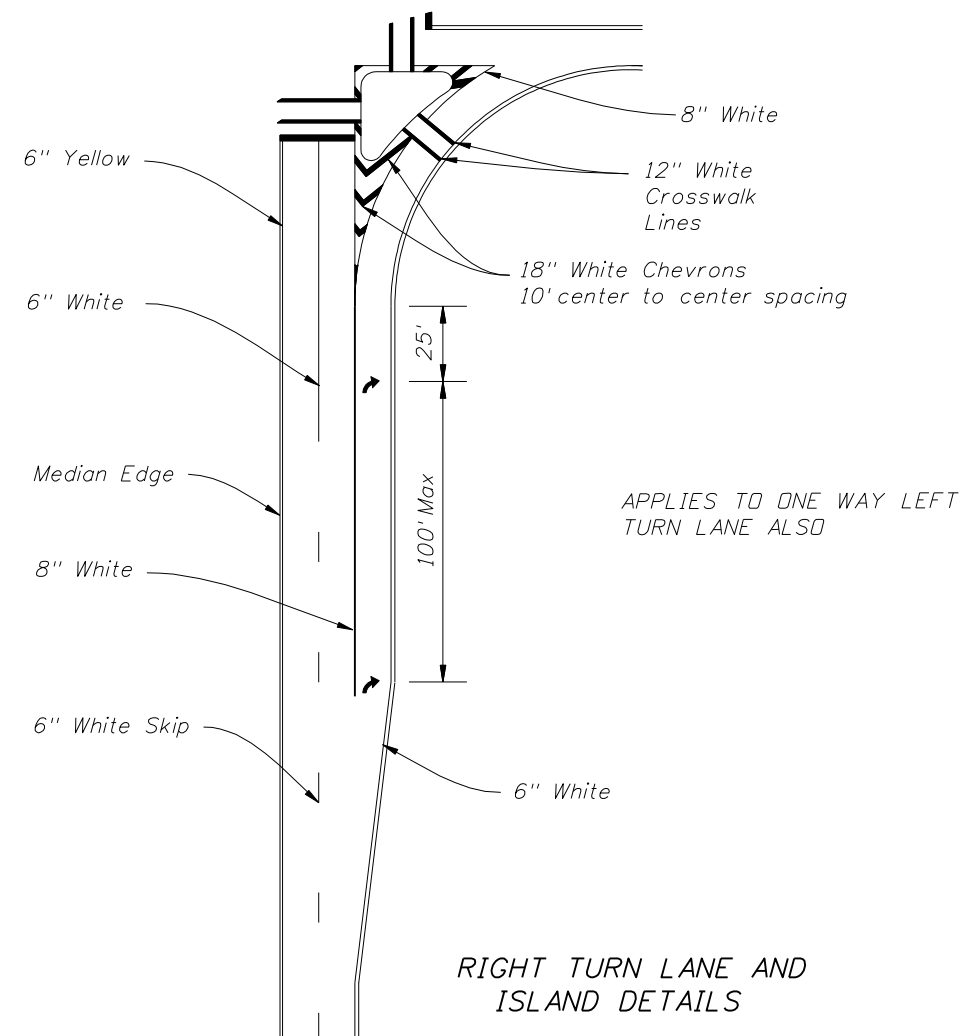
6" Dbl Yellow



RESTRICTED LEFT TURN MARKING



RIGHT TURN LANE DROP AND ISLAND DETAILS
LEFT TURN LANE DROP IS MIRROR IMAGE



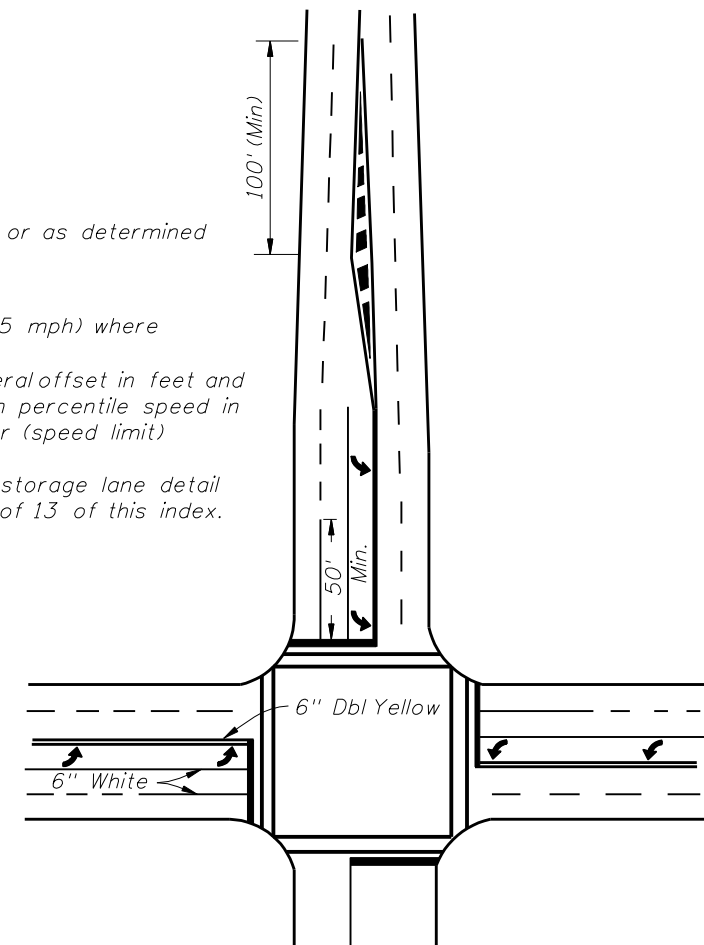
RIGHT TURN LANE AND ISLAND DETAILS

100' Minimum or as determined by $L=WS$

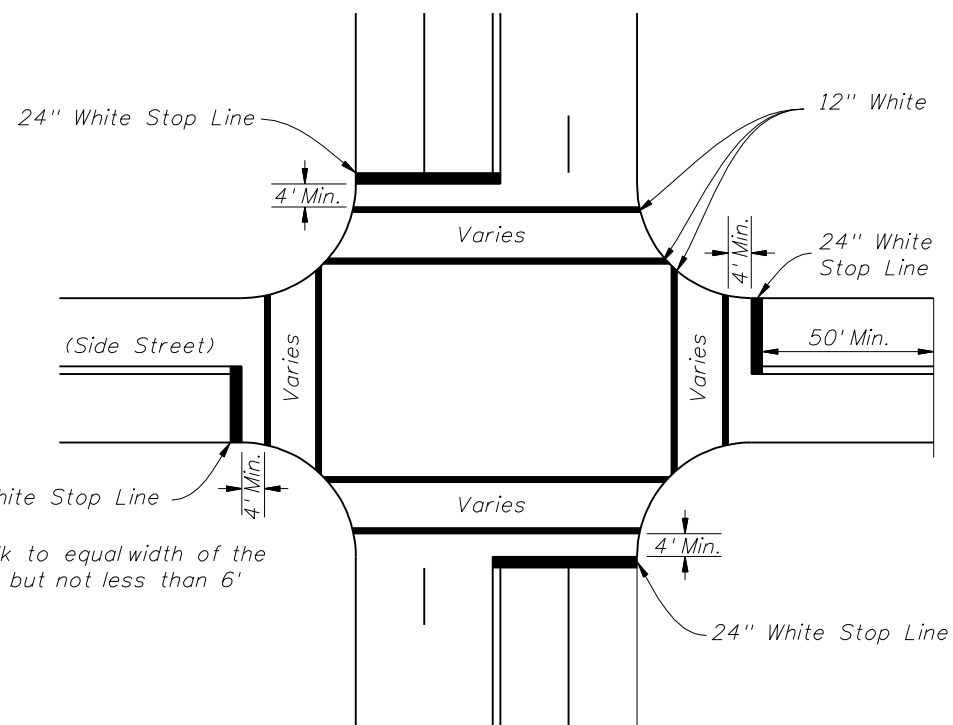
$$(L = \frac{WS^2}{60} < 45 \text{ mph}) \text{ where}$$

W is the lateral offset in feet and S is the 85th percentile speed in miles per hour (speed limit)

For left turn storage lane detail see sheet 2 of 13 of this index.



TYPICAL INTERSECTION 2 THRU LANES PLUS LEFT TURN LANE, WITH CROSSWALK



Width of crosswalk to equal width of the adjacent sidewalk, but not less than 6'

STOP BARS, CROSSWALKS AND DOUBLE CENTER LINE DETAILS

NOTES:

1. When public sidewalk curb ramps are present, refer Index 17344 and Index No. 304 for crosswalk widths.
2. Double yellow longitudinal center lines on all roadway approaches shall be extended back 100' for projects involving intersection improvements only.
3. When specified, "stop" message shall be placed 25' back of stop lines.



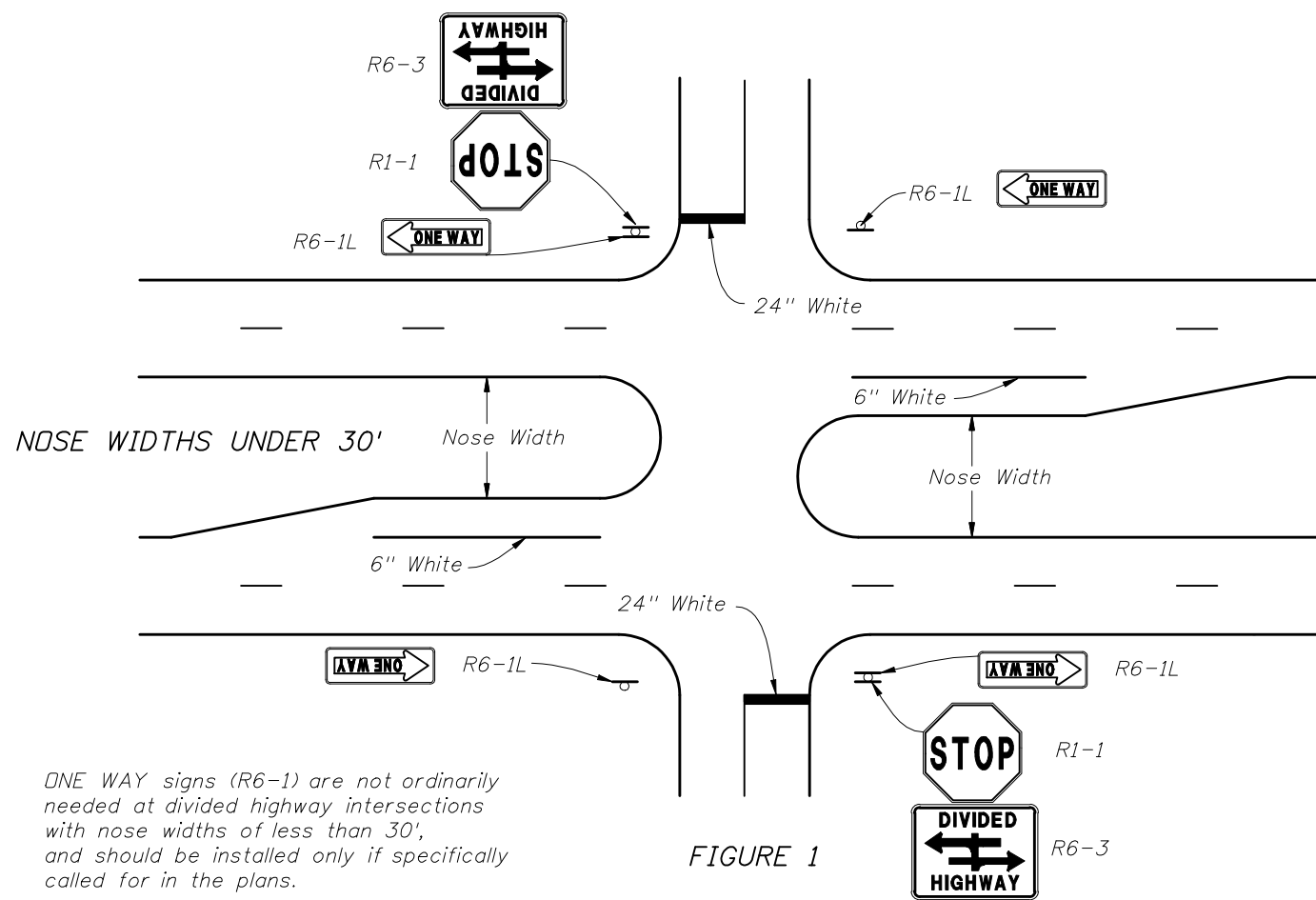


FIGURE 1

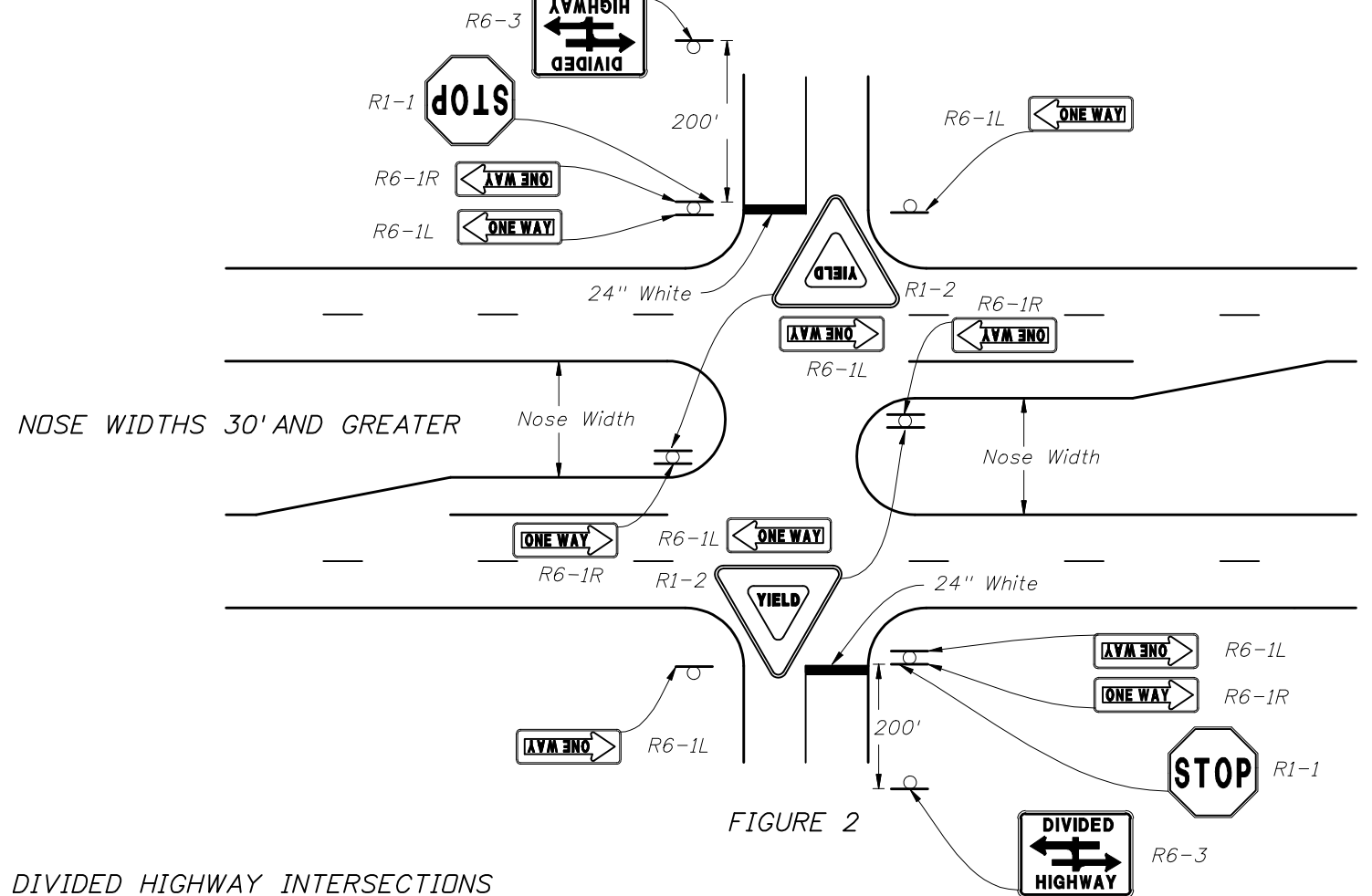
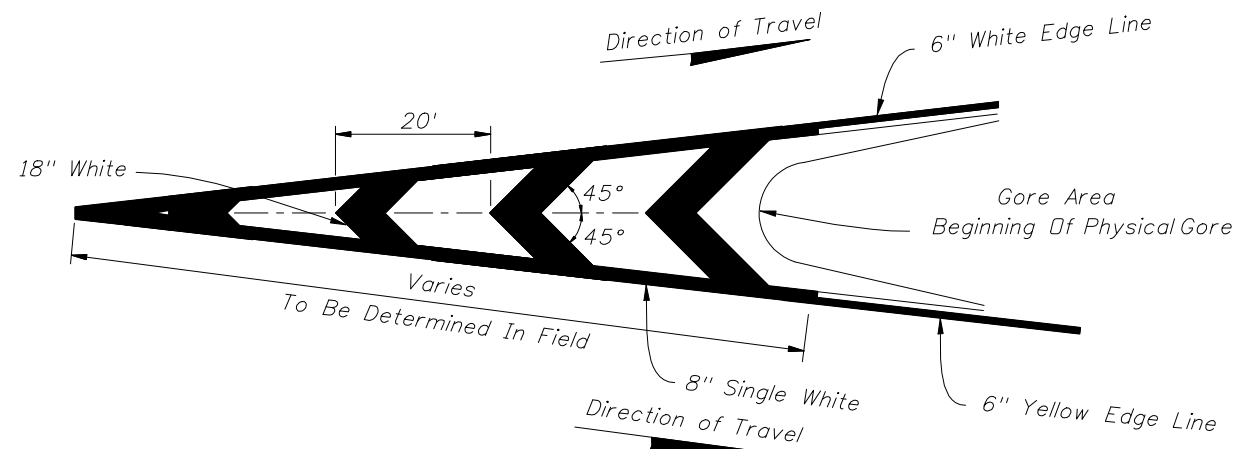
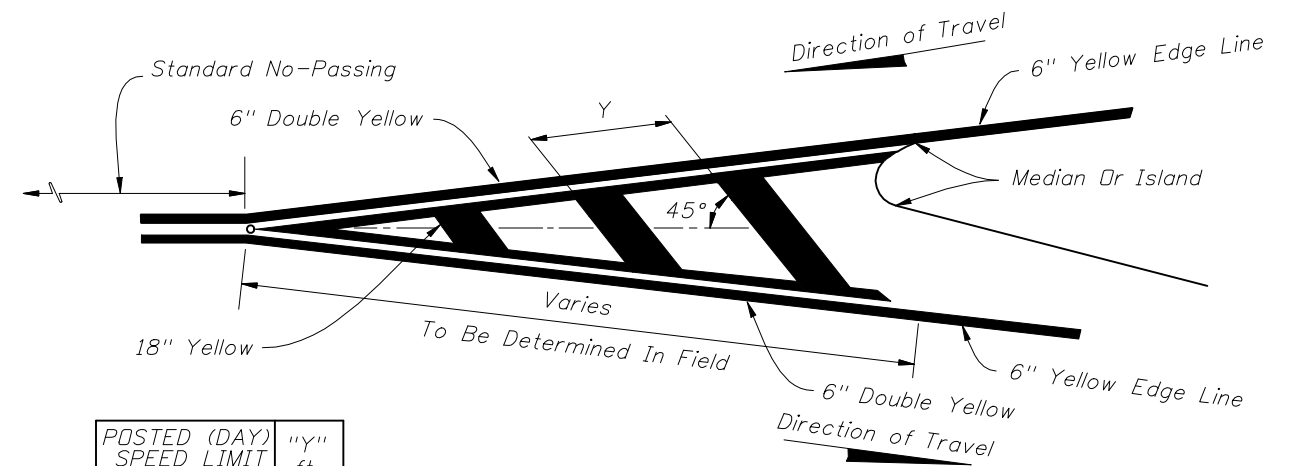


FIGURE 2

ONE-WAY SIGNS ON DIVIDED HIGHWAY INTERSECTIONS

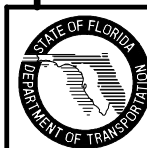


PAVEMENT MARKINGS FOR TRAFFIC CHANNELIZATION AT GORE
(TRAFFIC FLOWS IN SAME DIRECTION)

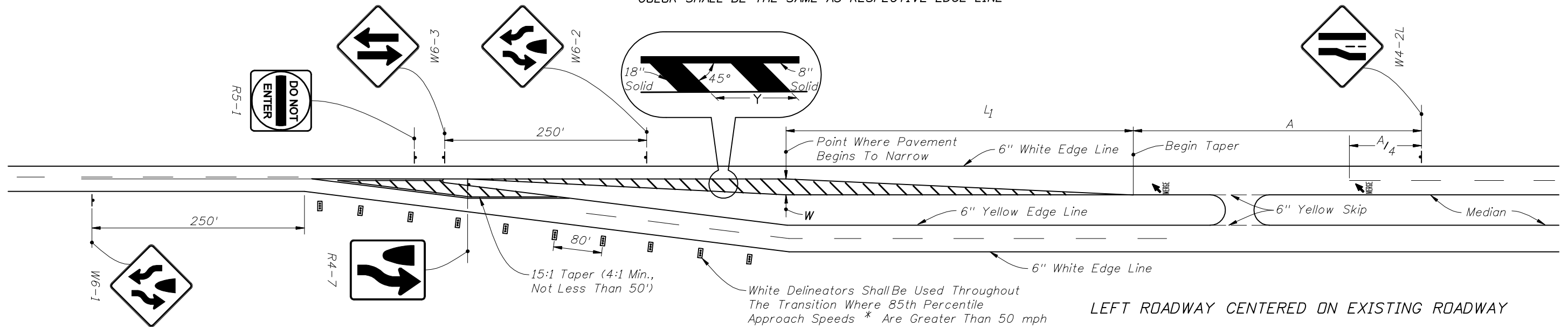


POSTED (DAY) SPEED LIMIT MPH	"Y" ft.
30 OR LESS	10
35	20
40	20
45	30
50 OR MORE	40

PAVEMENT MARKING FOR TRAFFIC SEPARATION
(TRAFFIC FLOWS IN OPPOSING DIRECTIONS)



TYPICAL TRANSITION MARKING
 COLOR SHALL BE THE SAME AS RESPECTIVE EDGE LINE

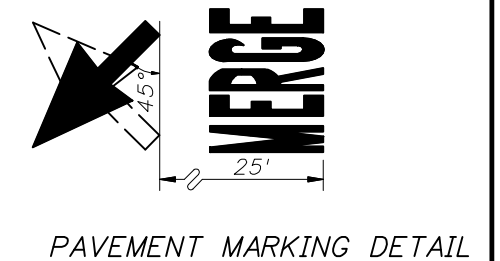
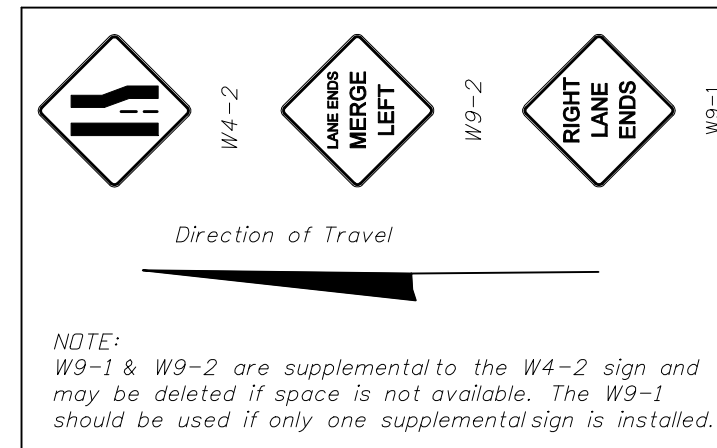


LEFT ROADWAY CENTERED ON EXISTING ROADWAY

** S \ ** W	TRANSITION DISTANCE L ₁ (FEET)						
MPH	8	9	10	11	12	13	14
30	120	135	150	165	180	195	210
35	165	185	205	225	245	265	285
40	215	240	270	295	320	350	375
45	360	405	450	495	540	585	630
50	400	450	500	550	600	650	700
55	440	495	550	605	660	715	770
60	480	540	600	660	720	780	840
65	520	585	650	715	780	845	910

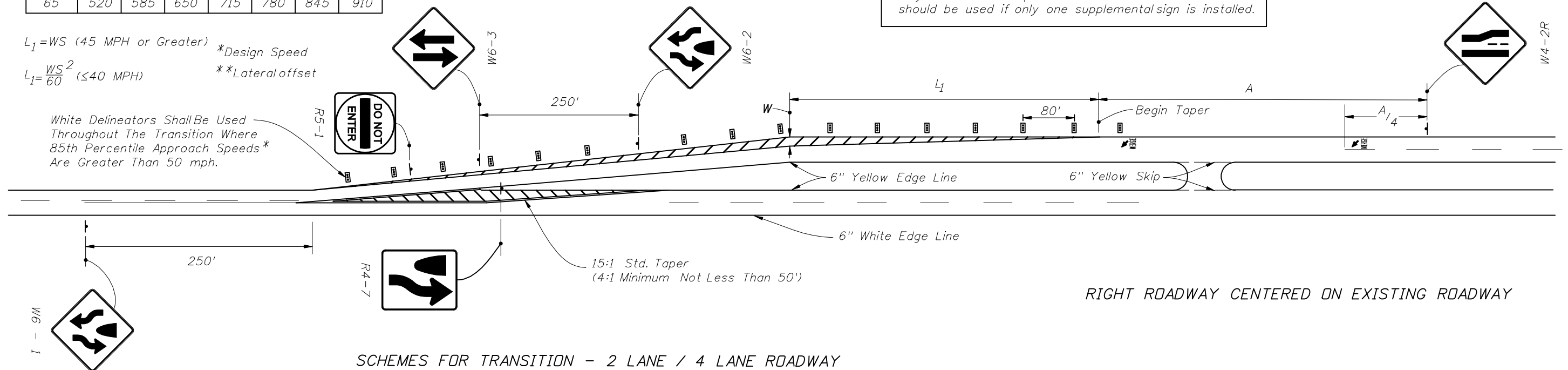
SPEED* MPH	"A" (FT.)
55	950
50	850
45	750
40	650
30	450

POSTED (DAY) SPEED LIMIT MPH	"Y" (FT.)
30 OR LESS	10
35	20
40	20
45	30
50 OR MORE	40



$L_1 = WS$ (45 MPH or Greater) *Design Speed
 $L_1 = \frac{WS^2}{60}$ (<40 MPH) **Lateral offset

White Delineators Shall Be Used Throughout The Transition Where 85th Percentile Approach Speeds* Are Greater Than 50 mph.



RIGHT ROADWAY CENTERED ON EXISTING ROADWAY

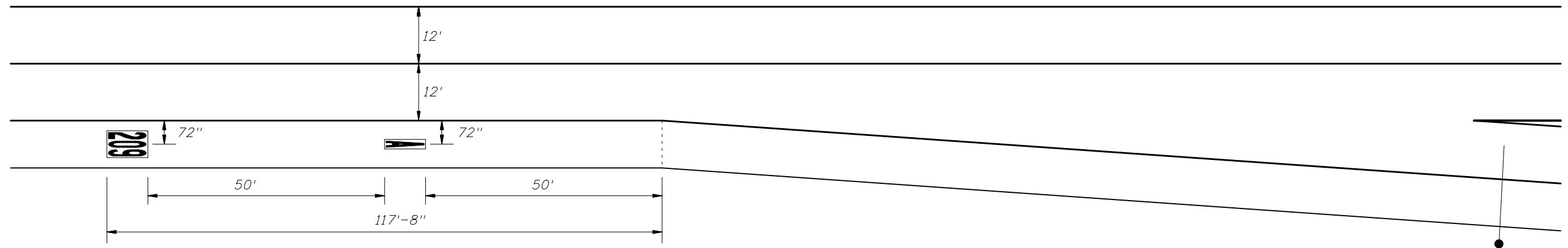
SCHEMES FOR TRANSITION - 2 LANE / 4 LANE ROADWAY



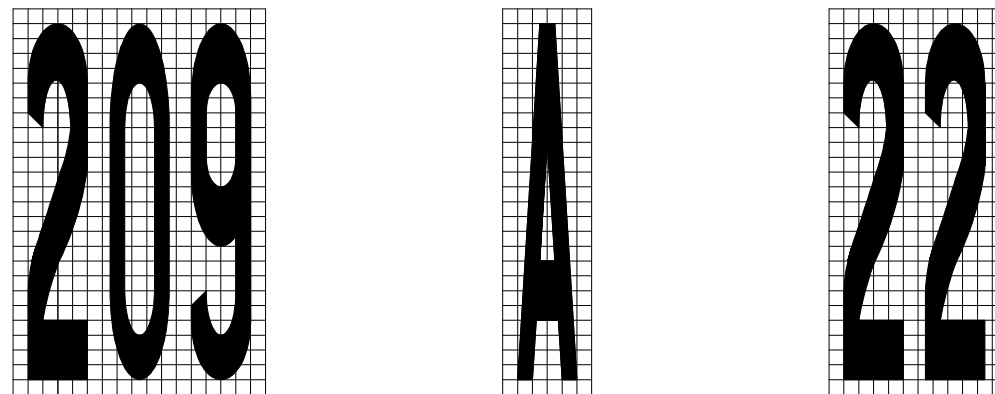
2010 FDOT Design Standards

SPECIAL MARKING AREAS

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Index No. 17346	



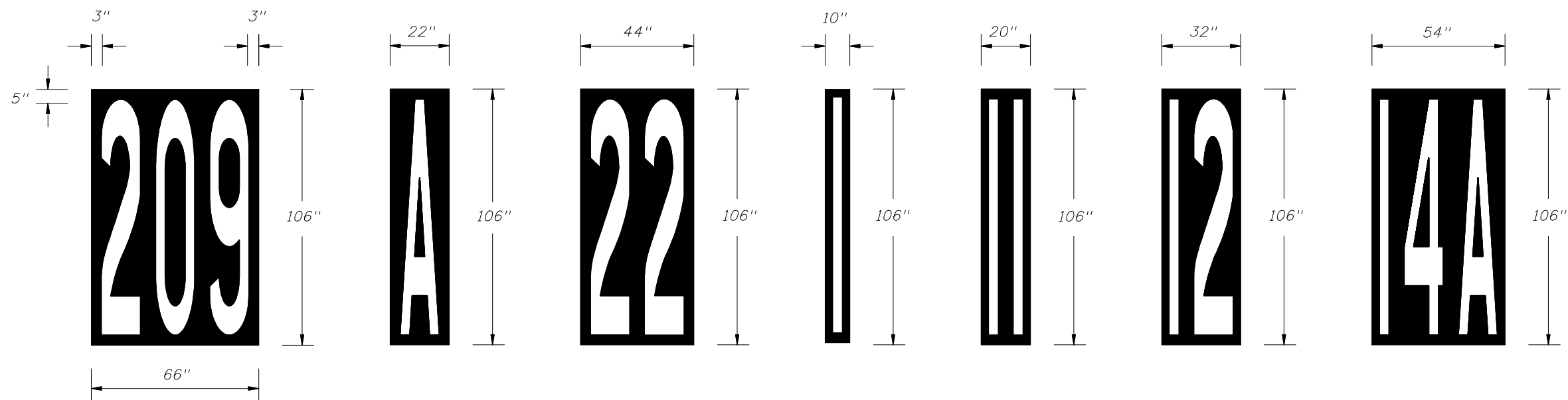
LAYOUT FOR 1, 2 AND 3 DIGIT NUMBERS AND LETTERS



MESSAGE SIZE AND SPACING

NOTES:

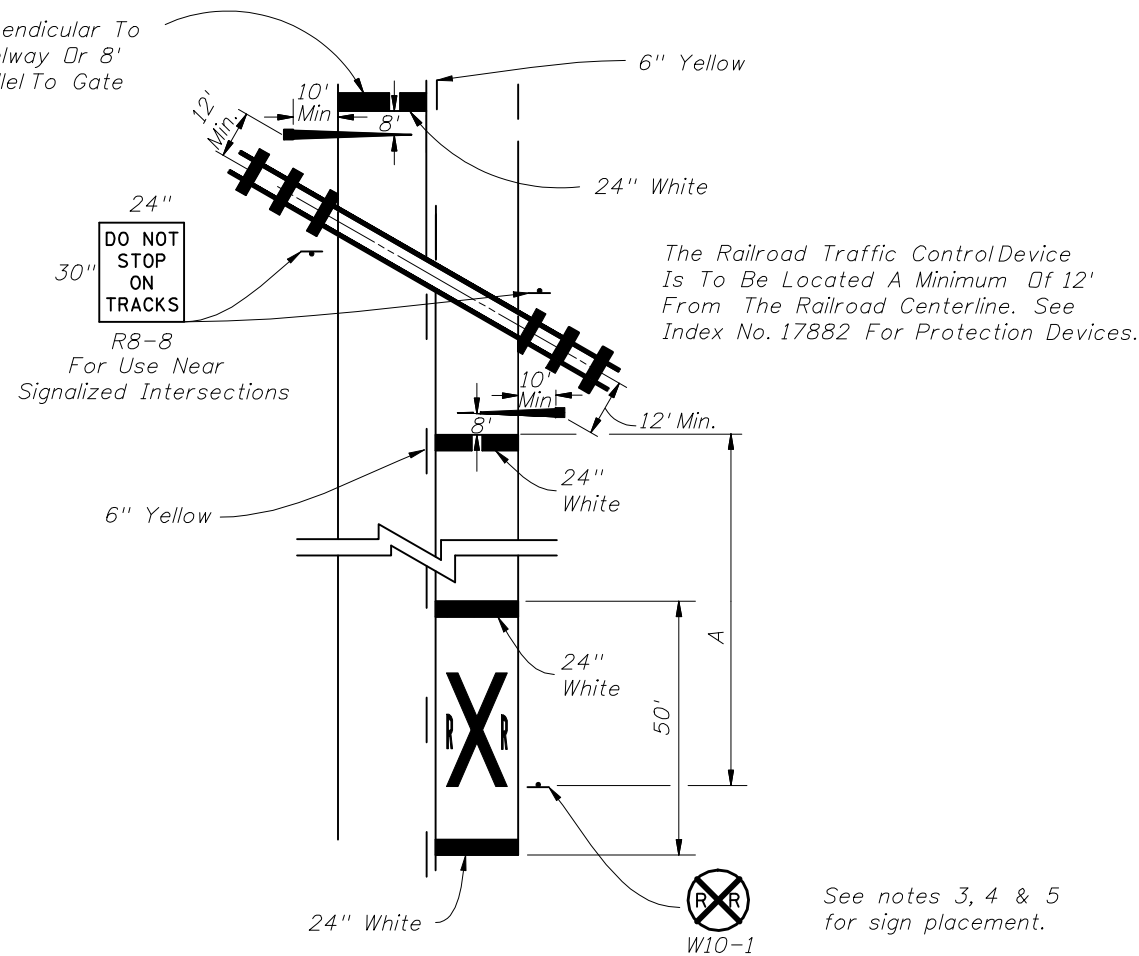
1. Messages shall meet requirements of Specification Section 971-7 and Section 711.
2. The thickness of the preformed message shall be 125 mils.
3. The message shall consist of white letters and numbers with black contrasting material. The black material shall meet the mat dimensions shown and have a minimum skid resistance value of 55 BPN.
4. The "EXIT NUMBER" position remains the same (117'-8") from the beginning of taper regardless of the number of lines of information.



MAT DIMENSIONS

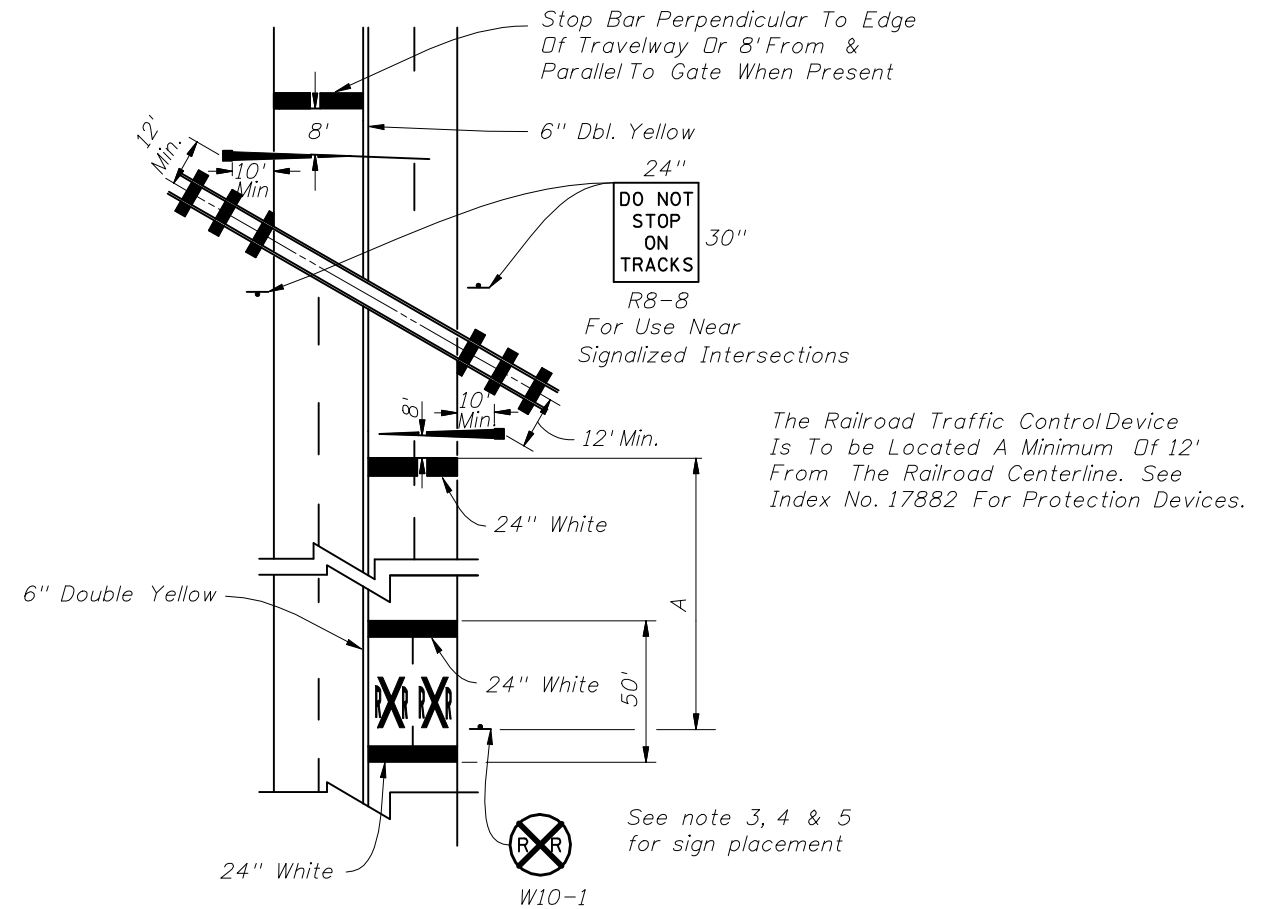


Stop Bar Perpendicular To Edge Of Travelway Or 8' From & Parallel To Gate When Present.

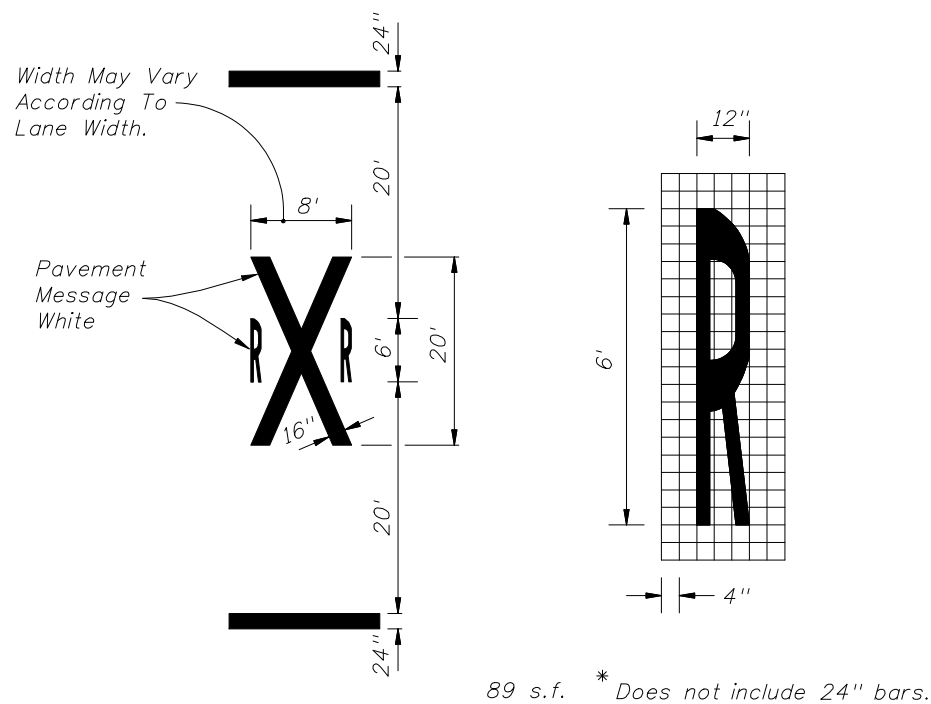


RAILROAD CROSSING AT 2-LANE ROADWAY

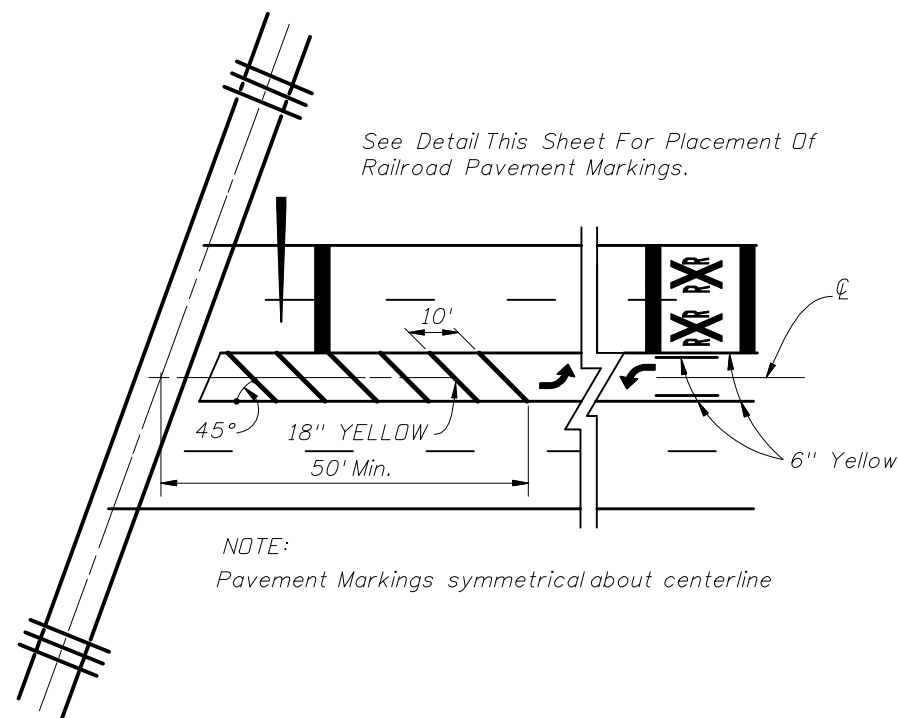
Stop Bar Perpendicular To Edge Of Travelway Or 8' From & Parallel To Gate When Present



RAILROAD CROSSING AT 4-LANE ROADWAY



TYPICAL PAVEMENT MARKINGS FOR R/R CROSSING



PAVEMENT MARKINGS FOR TERMINATION OF TWO WAY LEFT TURN AT R/R CROSSINGS

NOTES:

1. When computing pavement messages, quantities do not include transverse lines.
2. When dynamic devices are not present or are to be installed, the crossbuck shall be located at the future location of the RR gate or signal and gate in accordance with Index No. 17882.
3. Placement of sign W10-1 in a residential or business district, where low speeds are prevalent, the W10-1 sign may be placed a minimum distance of 100' from the crossing. Where street intersections occur between the RR pavement message and the tracks an additional W10-1 sign & additional Pavement message should be used.
4. Recommended location for FTP-61-06 or FTP-62-06 sign, 100' urban & 300' rural in advance of the crossings.
5. A portion of the pavement marking symbol should be directly opposite the W10-1 sign.

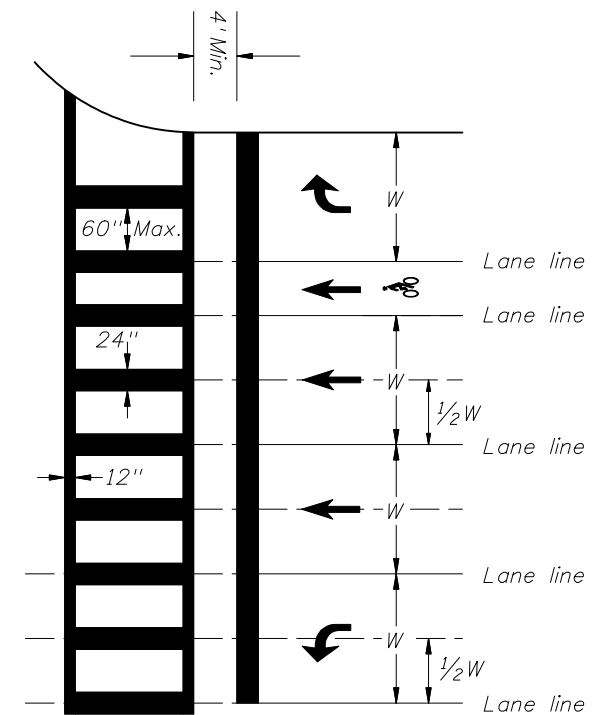
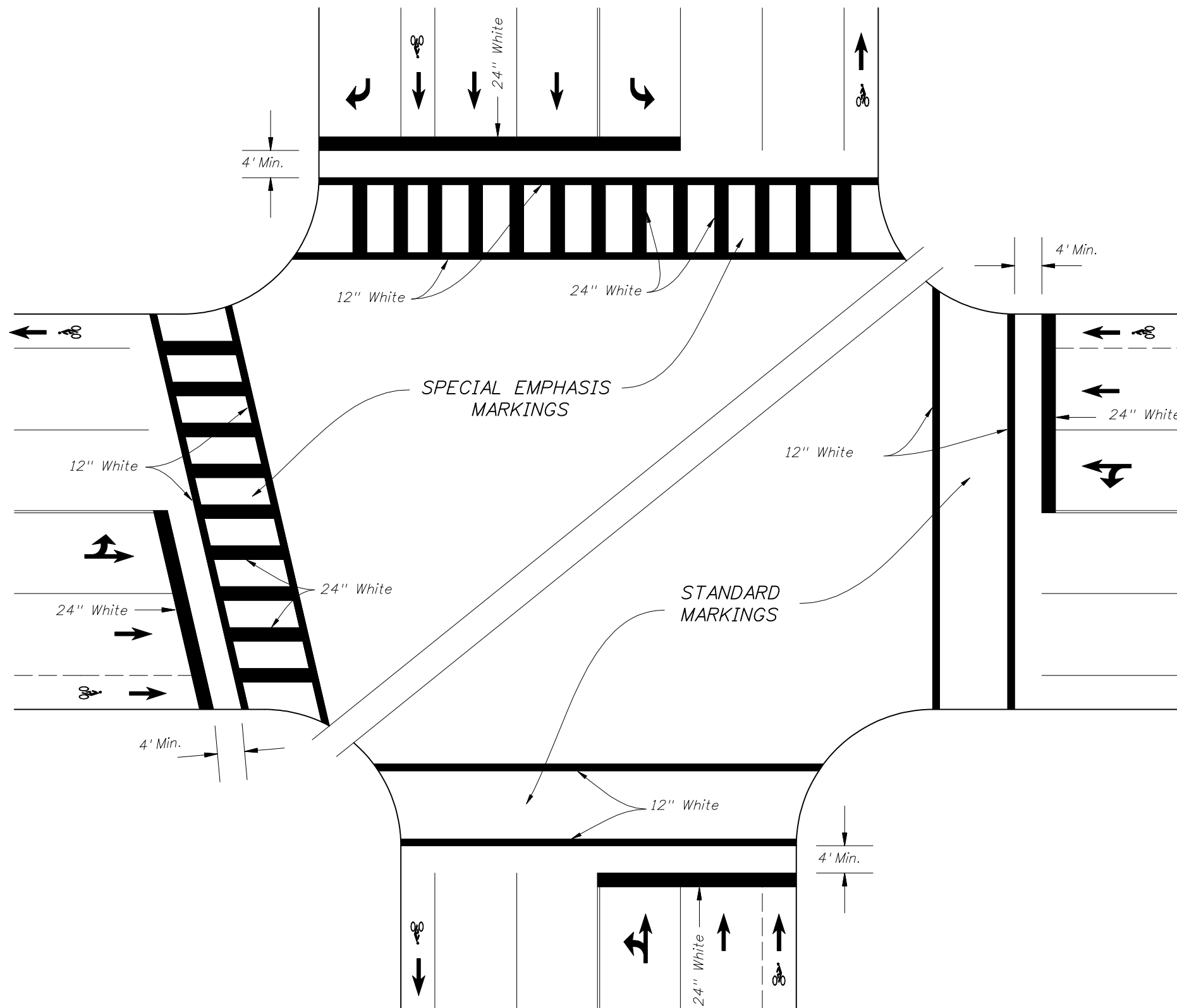
SPEED MPH	" A " IN FT.
60	400
55	325
50	250
45	175
40	125
35	100
URBAN	85 MIN.



GENERAL NOTES

1. For traffic and pedestrian signal installation, refer to Index No. 17721 through 17890.
2. For public sidewalk curb ramps, refer to Index No. 304.
3. For pavement marking and sign installation, refer to Indexes 11200 through 17356.
4. Crosswalk minimum widths: Intersection Crosswalk 6'.
Midblock Crosswalk 10'.
5. All crosswalk markings shall be white.
6. Longitudinal lines in Special Emphasis Crosswalk shall be 24" wide and spaced to avoid the wheelpath of vehicles as shown in detail. The maximum space between markings shall not exceed 60". A longitudinal marking shall be centered at each lane line. Additional longitudinal markings shall be placed at the center of each lane (1/2W).

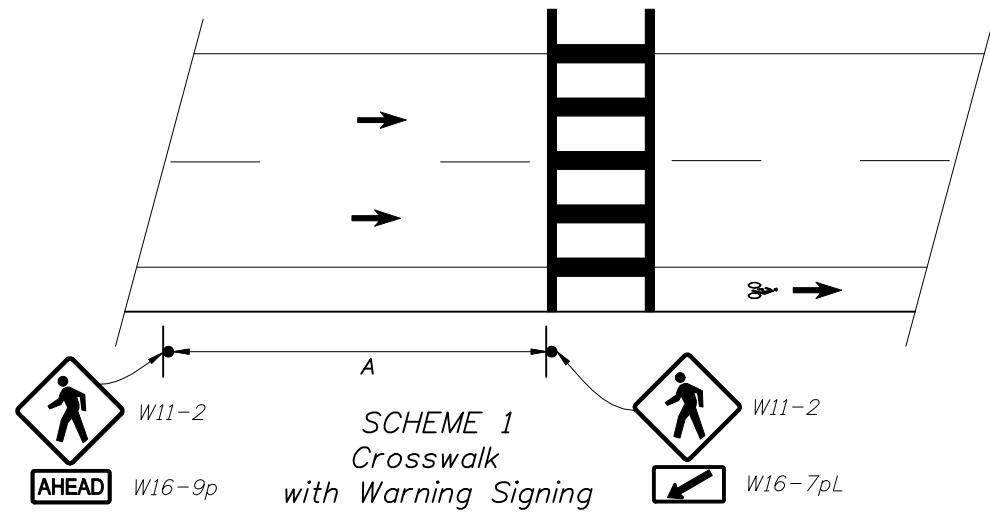
Where the Crosswalk is skewed to the lane lane lines, the Special Emphasis longitudinal lines should be parallel to the lane line.



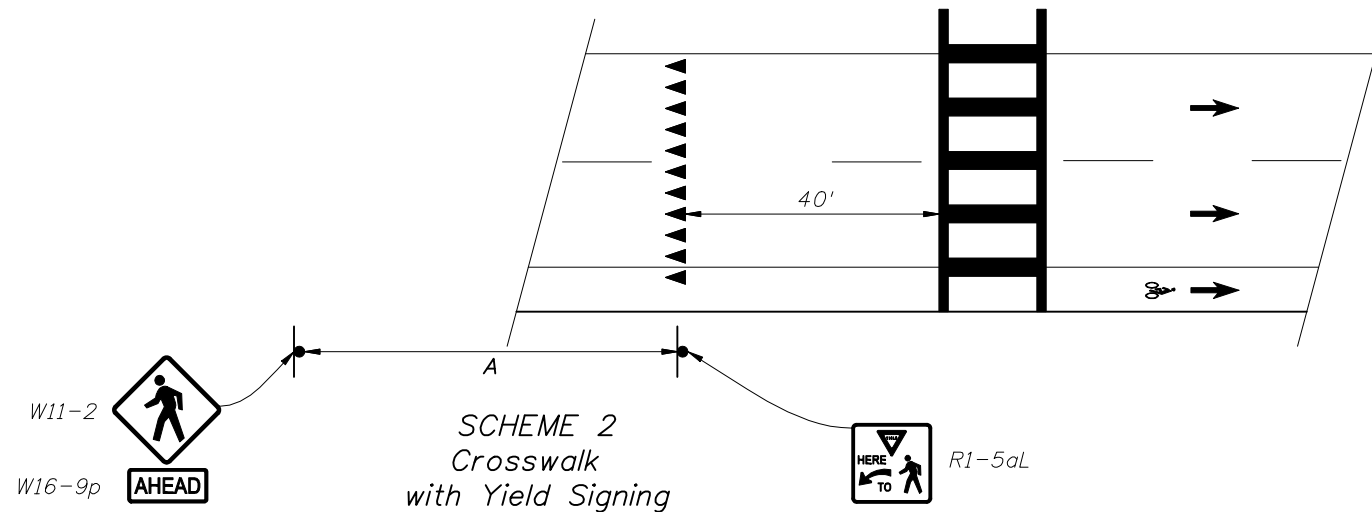
SPECIAL EMPHASIS CROSSWALK MARKING DETAIL

SPECIAL EMPHASIS AND STANDARD CROSSWALKS SIGNALIZED OR STOP SIGN CONTROLLED INTERSECTION

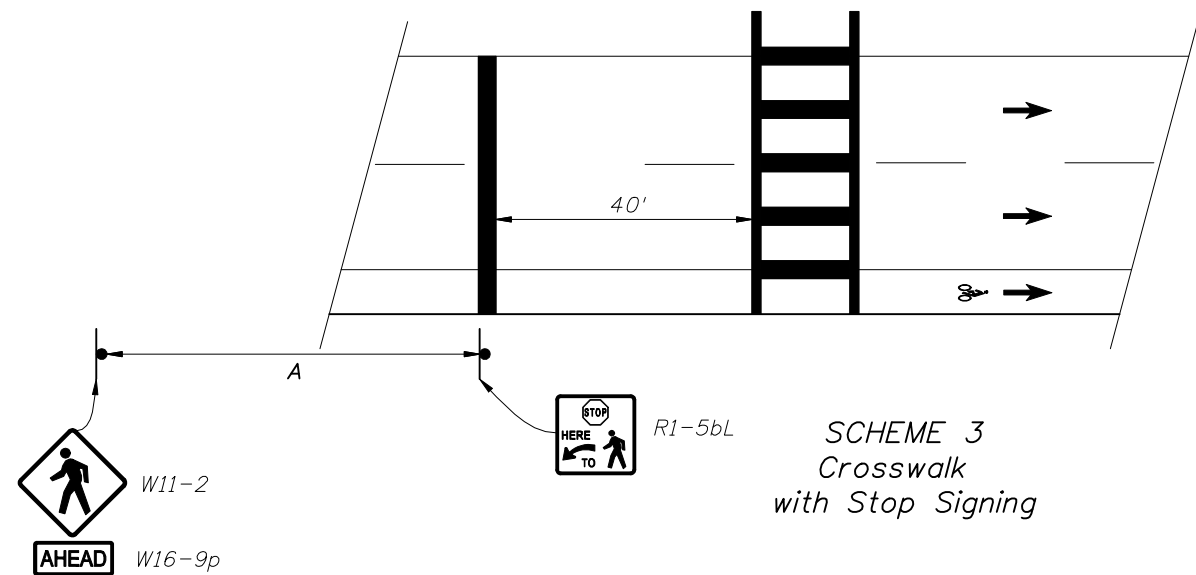




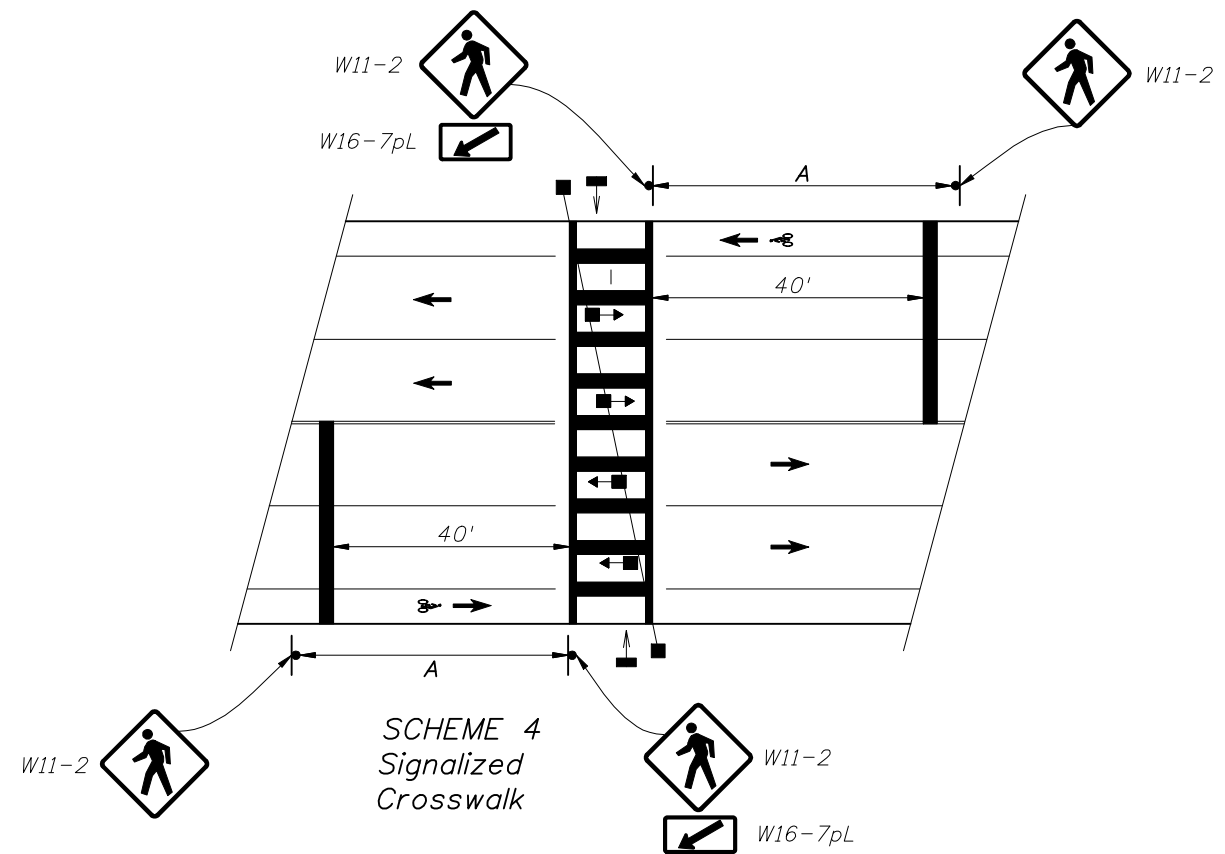
SCHEME 1
Crosswalk
with Warning Signing



SCHEME 2
Crosswalk
with Yield Signing



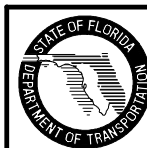
SCHEME 3
Crosswalk
with Stop Signing

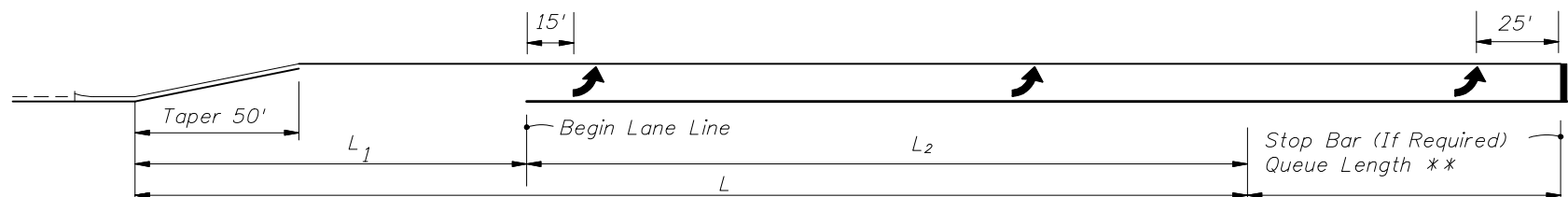


SCHEME 4
Signalized
Crosswalk

APPROACH SPEED MPH	A-SUGGESTED DISTANCE (Ft.)
25 Or Less	200
26 To 35	250
36 To 45	300
46 To 55	325

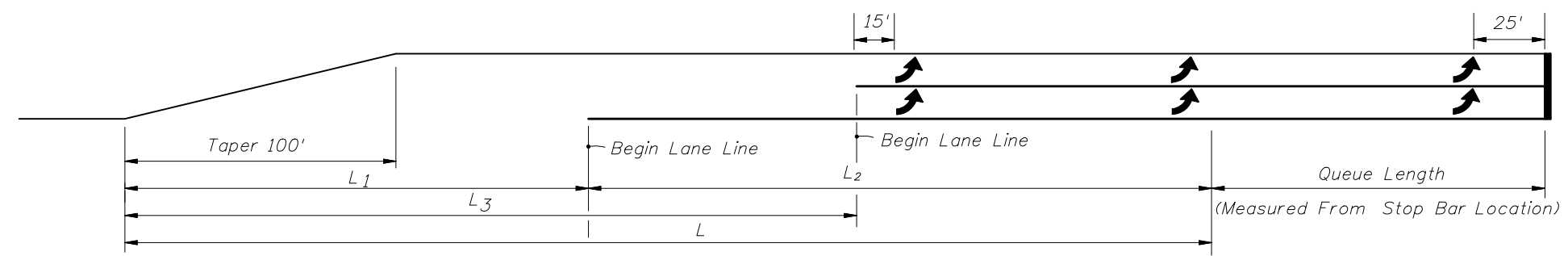
- Plans shall indicate which crosswalk scheme is to be used.
- The details shown do not depict the signing and markings for multi-lane roadways with divided medians. For these applications, additional signs shall be installed on the median side.
- All mid-block crosswalks shall use high emphasis crosswalk markings.
- Crosswalk marking should utilize preformed marking materials.



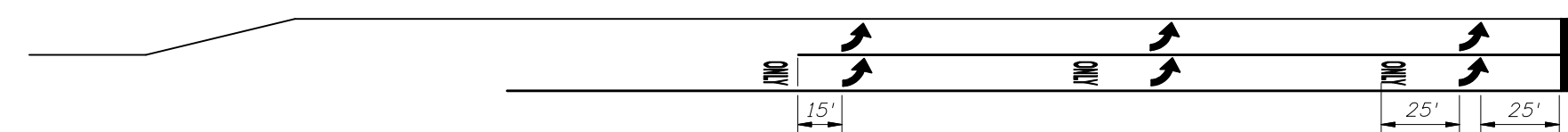


SINGLE LEFT TURNS

** Queue Length Is Measured From The Median Nose Radial Point Or, When A Stop Bar Is Required, From The Stop Bar.

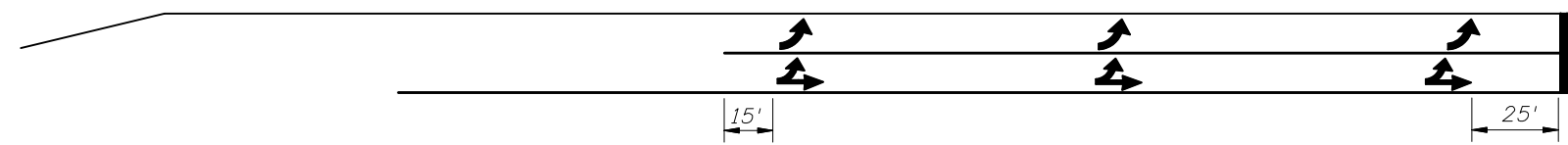


DOUBLE LEFT TURNS



The ONLY pavement message is required for turn lanes, where the thru lane becomes turn lane.

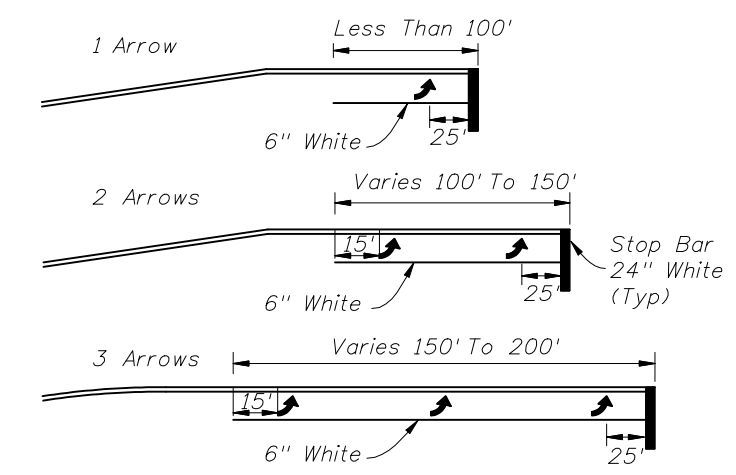
Through Lane Becomes Exclusive Left Turn



Through Lane Becomes Optional Left Turn

DOUBLE LEFT TURN MARKINGS

TURN LANES • CURBED AND UNCURBED MEDIANS							
Design Speed (mph)	Clearance Distance L_1	URBAN CONDITIONS			RURAL CONDITIONS		
		Brake To Stop Distance L_2	Total Decel. Distance L	Clearance Distance L_3	Brake To Stop Distance L_2	Total Decel. Distance L	Clearance Distance L_3
35	70'	75'	145'	110'	---	---	---
40	80'	75'	155'	120'	---	---	---
45	85'	100'	185'	135'	---	---	---
50	105'	135'	240'	160'	185'	290'	160'
55	125'	---	---	---	225'	350'	195'
60	145'	---	---	---	260'	405'	230'
65	170'	---	---	---	290'	460'	270'

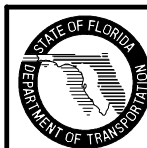


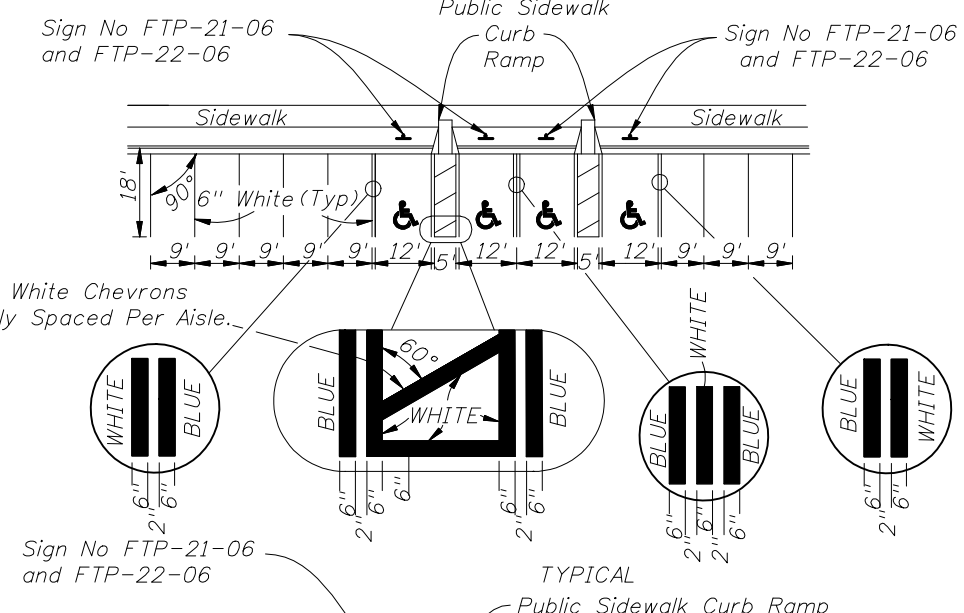
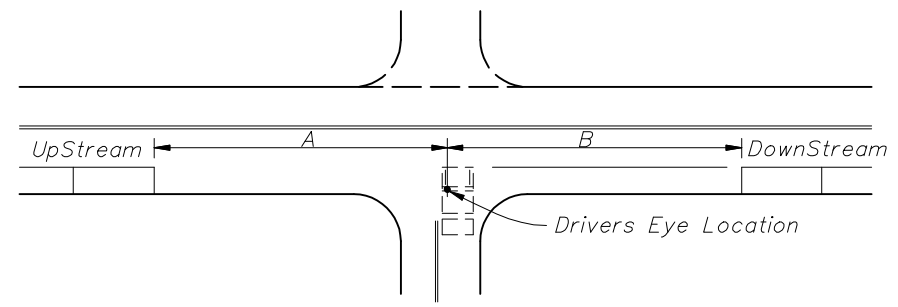
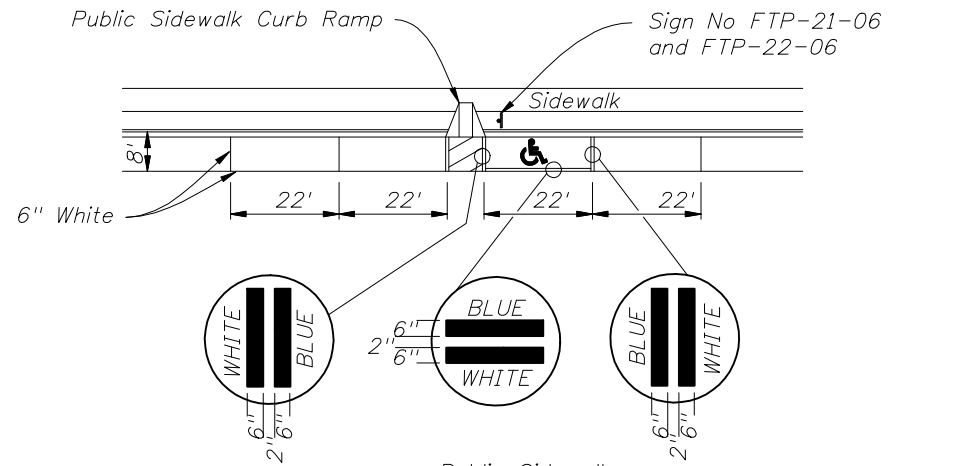
Arrow should be evenly spaced between first and last arrow. Turn lanes longer than 200' add one arrow for each 100' additional length.

ARROW SPACING

NOTES:

1. The "Begin Lane Line" locations are based on the standard lengths shown in Design Standard 301. These locations must be adjusted on a case by case basis for turn lanes not meeting the standard lengths.
2. Yellow left turn edge marking may be used adjacent to raised curb or grass medians if lane use is not readily apparent to drivers approaching a left turn storage lane.
3. Refer to Design Standard Index 301 for Roadway Details.
4. This Index also applies to right turn lanes.

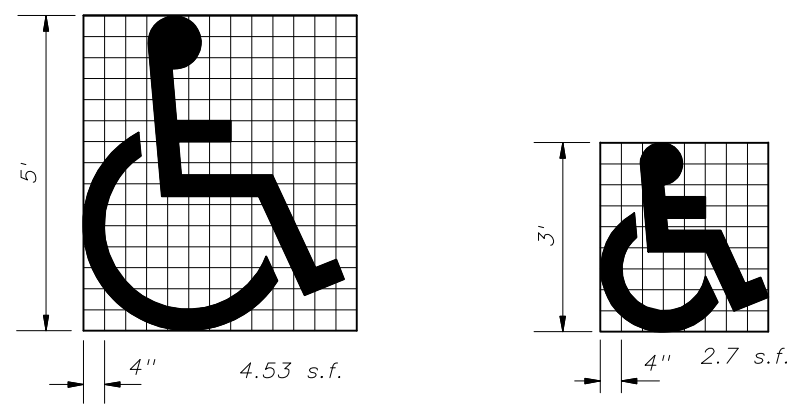




SPEED MPH	UP STREAM (A)	DOWN STREAM (B)	
		2 LANE	4 LANE
0-30	85'	60'	45'
35	100'	70'	50'

- NOTES**
- Distances measured longitudinally along the street from driver location of entering vehicle to end of parking restriction.
 - Distances applicable to intersecting street, major driveways and other driveways to the extent practical.
 - For nonsignalized intersections, the values above shall be compared with the values for signalized intersections and the maximum restrictions implemented. These restrictions apply to both accessible and nonaccessible parking.

MINIMUM PARKING RESTRICTION FOR NONSIGNALIZED INTERSECTIONS

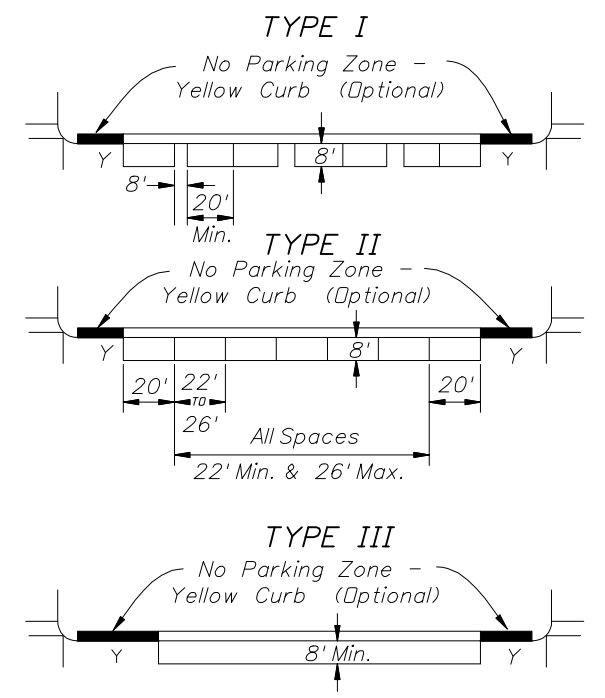


Use of pavement symbol in accessible parking spaces is optional, when used the symbol shall be 3' or 5' high and white in color.

UNIVERSAL SYMBOL OF ACCESSIBILITY

GENERAL NOTES (Signalized & Nonsignalized)

- For entrances to a one-way street, the downstream restriction may be reduced to 20'.
- Parking shall not be allowed within 20' of a crosswalk.
- All parking lane markings shall be 6" white.
- Parking lane lines shall be broken at driveways.
- Refer to Chapter 316, Fla. Statutes, for laws governing parking spaces.
- Where curb and gutter is used, the gutter pan width may be included as part of the minimum width of parking lane, but desirably the lane width should be in addition to that of the gutter pan.



SPEED LIMIT MPH	SIGNALIZED INTERSECTIONS	DISTANCE FROM CURB RADIUS (Y)
0-30	30'	
35	50'	

PARKING RESTRICTION (FT.) FOR SIGNALIZED INTERSECTION

- NOTES:**
- Parking restrictions measured from curb radius point.
 - Restrictions for accessible parking are the same as those applied to nonsignalized intersections.

MINIMUM PARKING RESTRICTION FOR SIGNALIZED INTERSECTION

- NOTES:**
- Dimensions are to the centerline of markings.
 - An Access Aisle is required for each accessible space when angle parking is used.
 - Criteria for pavement markings only, not public sidewalk curb ramp locations. For ramp locations refer to plans.
 - Blue pavement markings shall be tinted to match shade 15180 of Federal Standards 595a.
 - The FTP-22-06 panel shall be mounted below the FTP-21-06 sign.

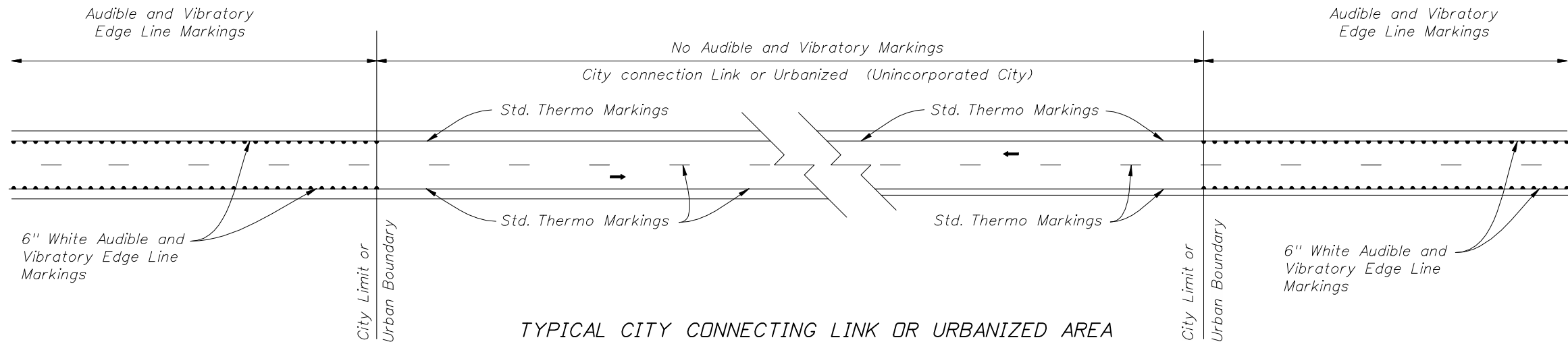
PAVEMENT MARKING FOR PUBLIC SIDEWALK CURB RAMP IN REST AREAS



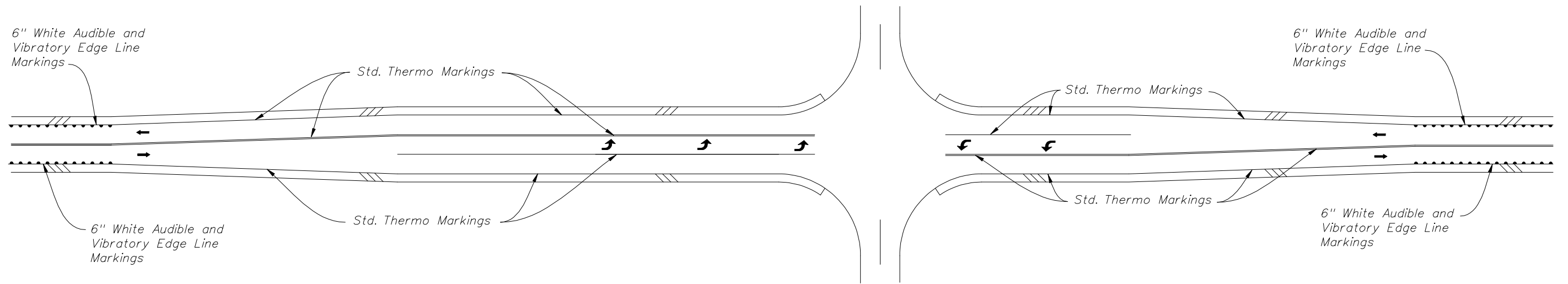
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SPECIAL MARKING AREAS (PARKING)

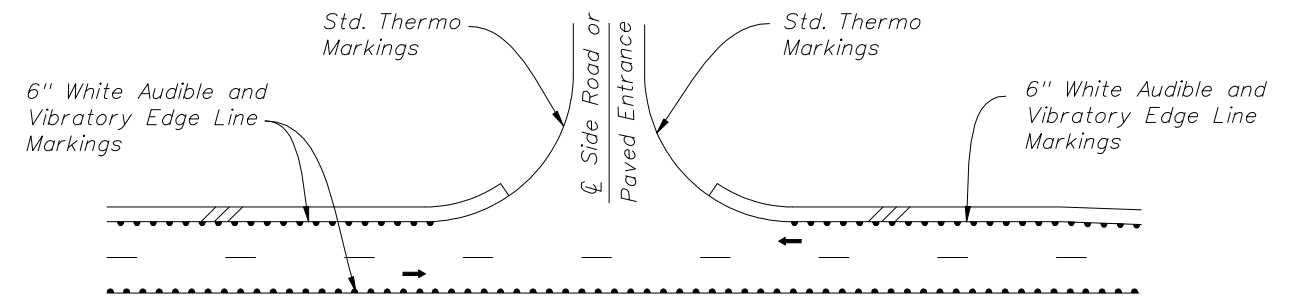
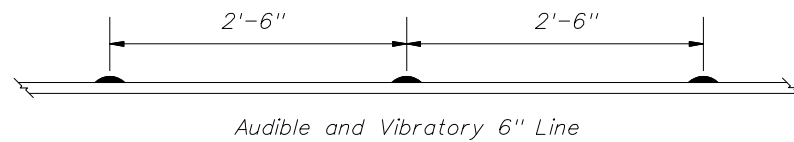
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TYPICAL CITY CONNECTING LINK OR URBANIZED AREA



TYPICAL RURAL INTERSECTION WITH TURN LANES

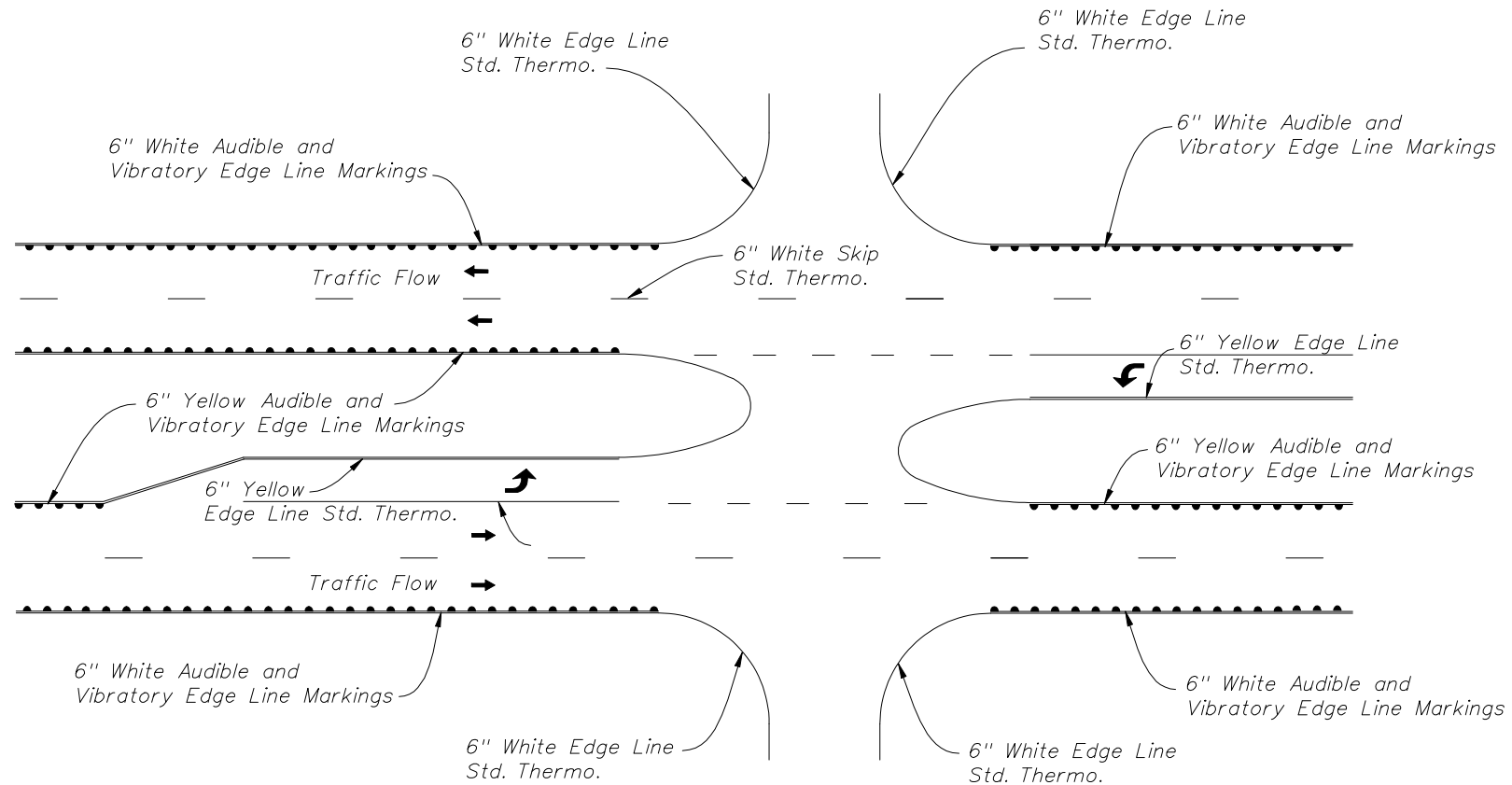


TYPICAL RURAL INTERSECTION WITHOUT TURN LANES

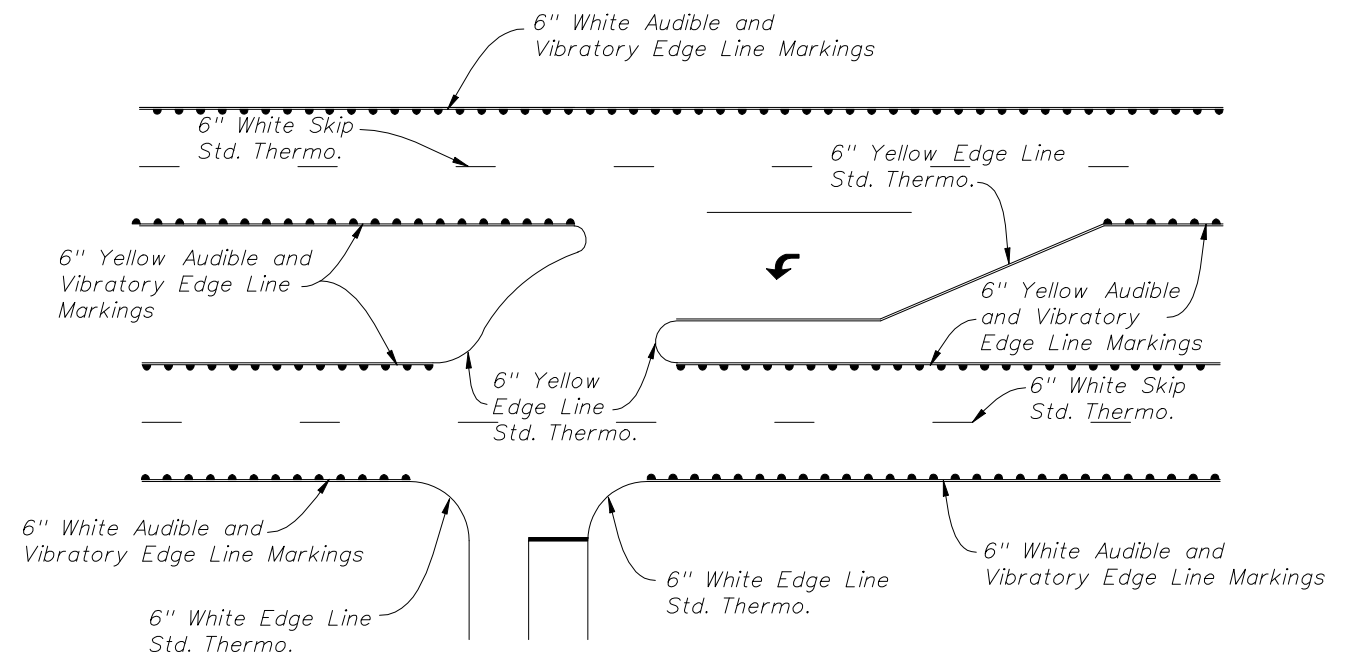
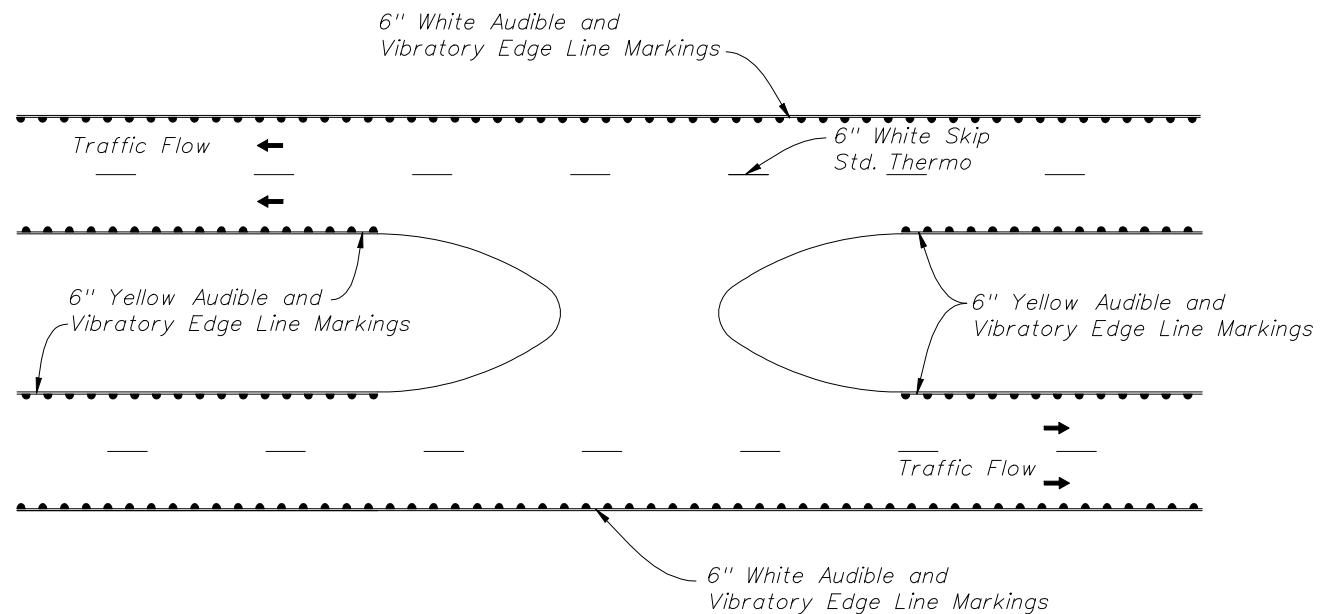
AUDIBLE AND VIBRATORY MARKINGS

2 LANE ROADWAYS

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	SPECIAL MARKING AREAS			
	Index No. 17346			



1. The Contractor Shall Adjust The Maintenance Of Traffic During Installation To Provide Sufficient Time For The Markings To Bear Traffic.
2. The Height Of The Transverse Bar For Markings Shall Be 0.45 To 0.55 Inches Above The Pavement Surface At The Edge Of The Marking.
3. Transverse Bars Shall Be Evenly Space In The Marking At Intervals Of 30 Inches Center To Center.
4. The Transverse Bar May Have A Drainage Channel On Each Bar. The Width Of The Drainage Channel May Not Exceed 0.25 Inches At The Bottom Of The Channel.
5. Audible And Vibratory Markings Shall Only Be Installed On Centerline Markings Of Two Lane Roads When Shown In The Plans.
6. When Raised Pavement Markers Conflict With The Installation Of The Centerline Markings, The Contractor Shall Be Responsible For Removing And Replacing The Raised Pavement Markings. The Additional Expenses Associated With The Raised Pavement Markings Shall Be Included In The Cost Of The Marking.
7. Grinding Is An Acceptable Method Of Removal Of The Existing Markings Where Markings Are Installed As Replacement Markings.
8. The Specifications Allow The Audible Markings To Utilize A Flat Base Line Or An Inverted Rib Profile Base Line.

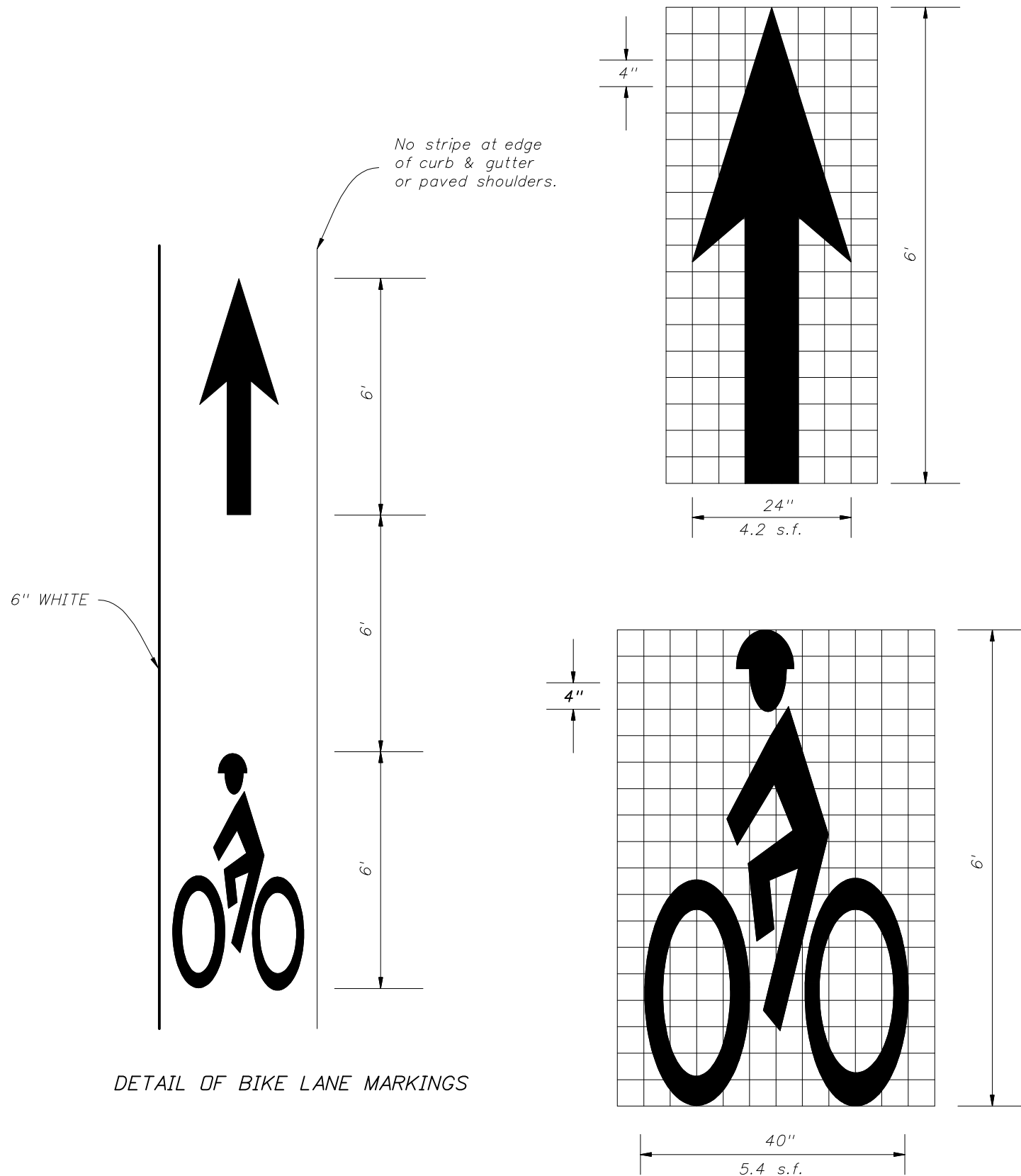


AUDIBLE AND VIBRATORY MARKINGS

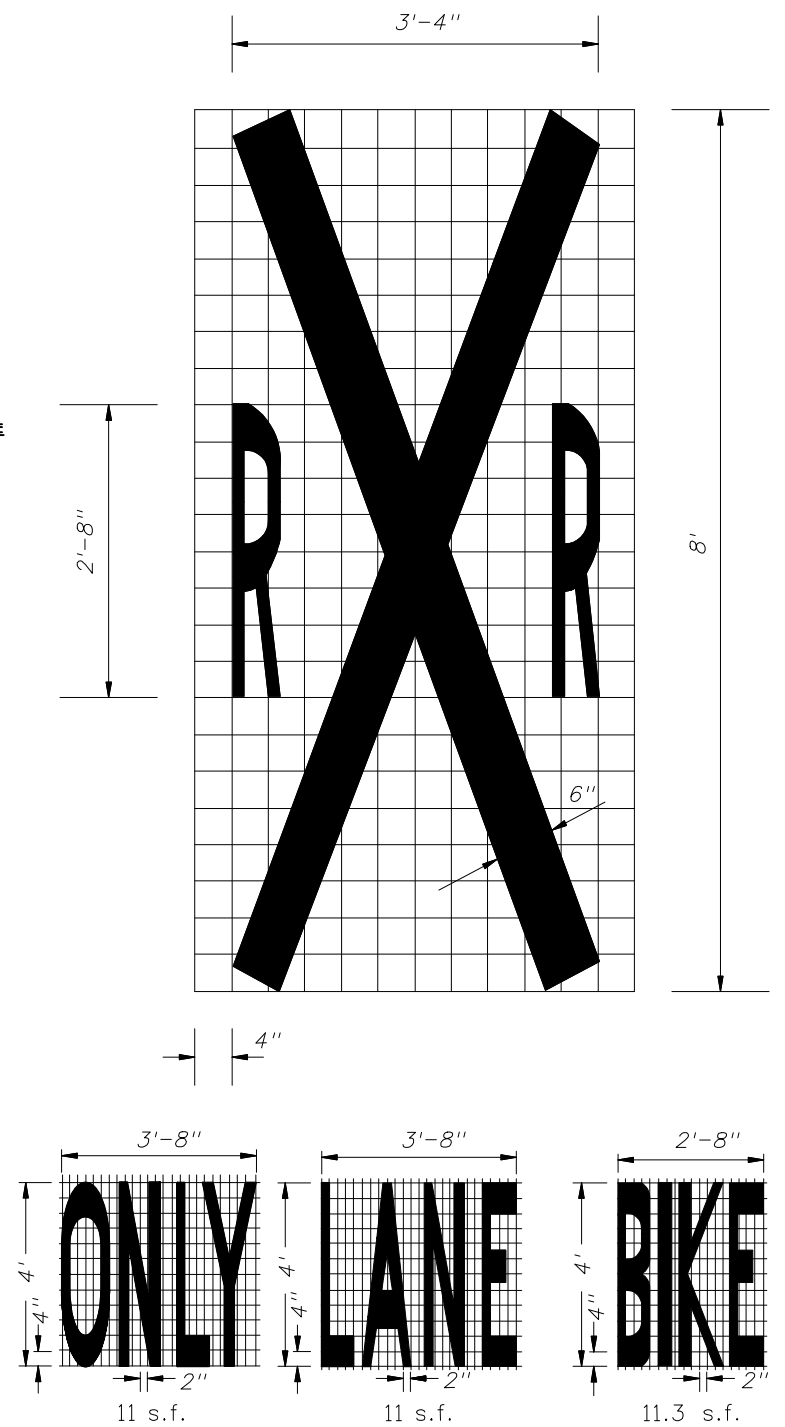
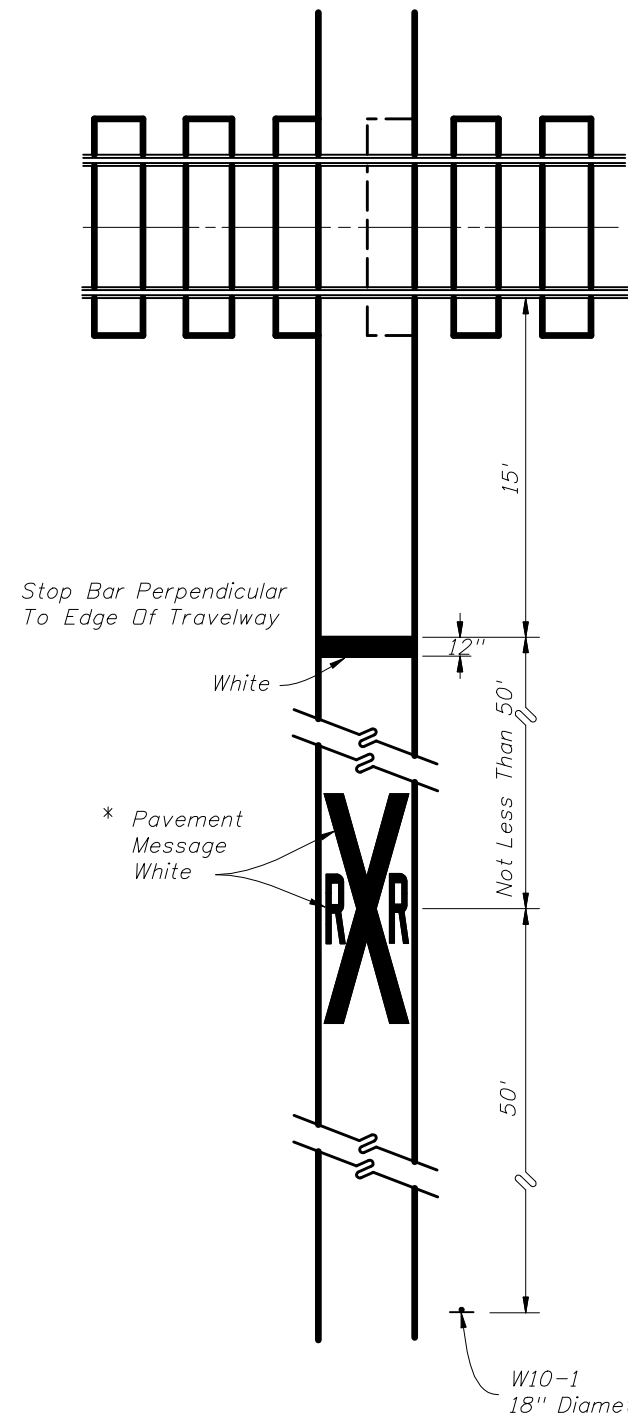
MULTI-LANE ROADWAYS

1. Recommended spacing of symbols: Immediately after intersections and major driveways and at a maximum spacing of 600 feet for urban sections and 1320 feet for rural sections.

2. All pavement markings and pavement messages shall be white.



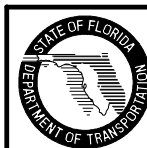
DETAIL OF BIKE LANE MARKINGS



PAVEMENT MESSAGE DETAILS

* NOTE

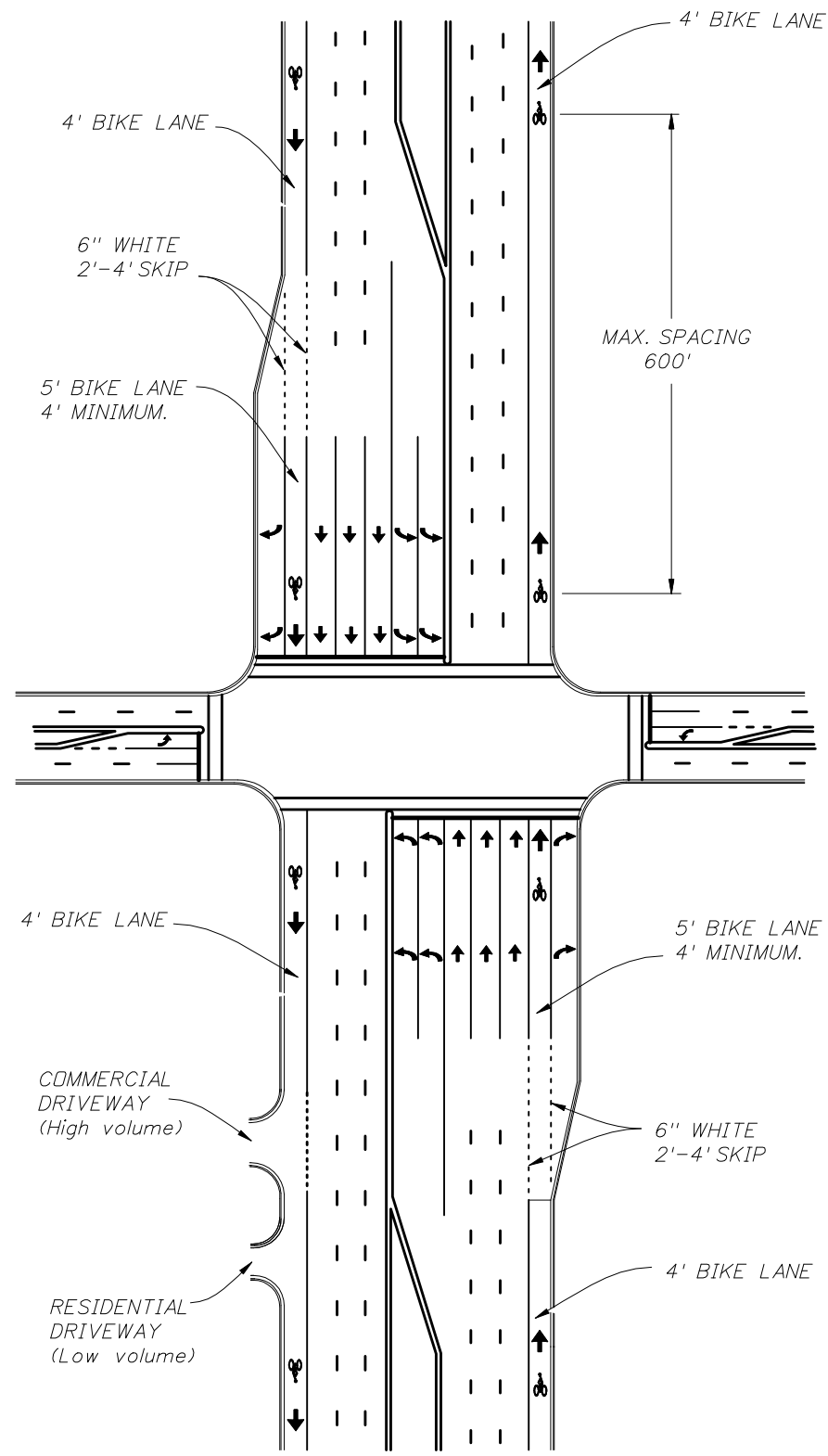
3. When used on a bike lane (adjacent to vehicle lane) markings shall be placed adjacent to markings for vehicles & W10-1 sign shall be sized and placed for vehicles.



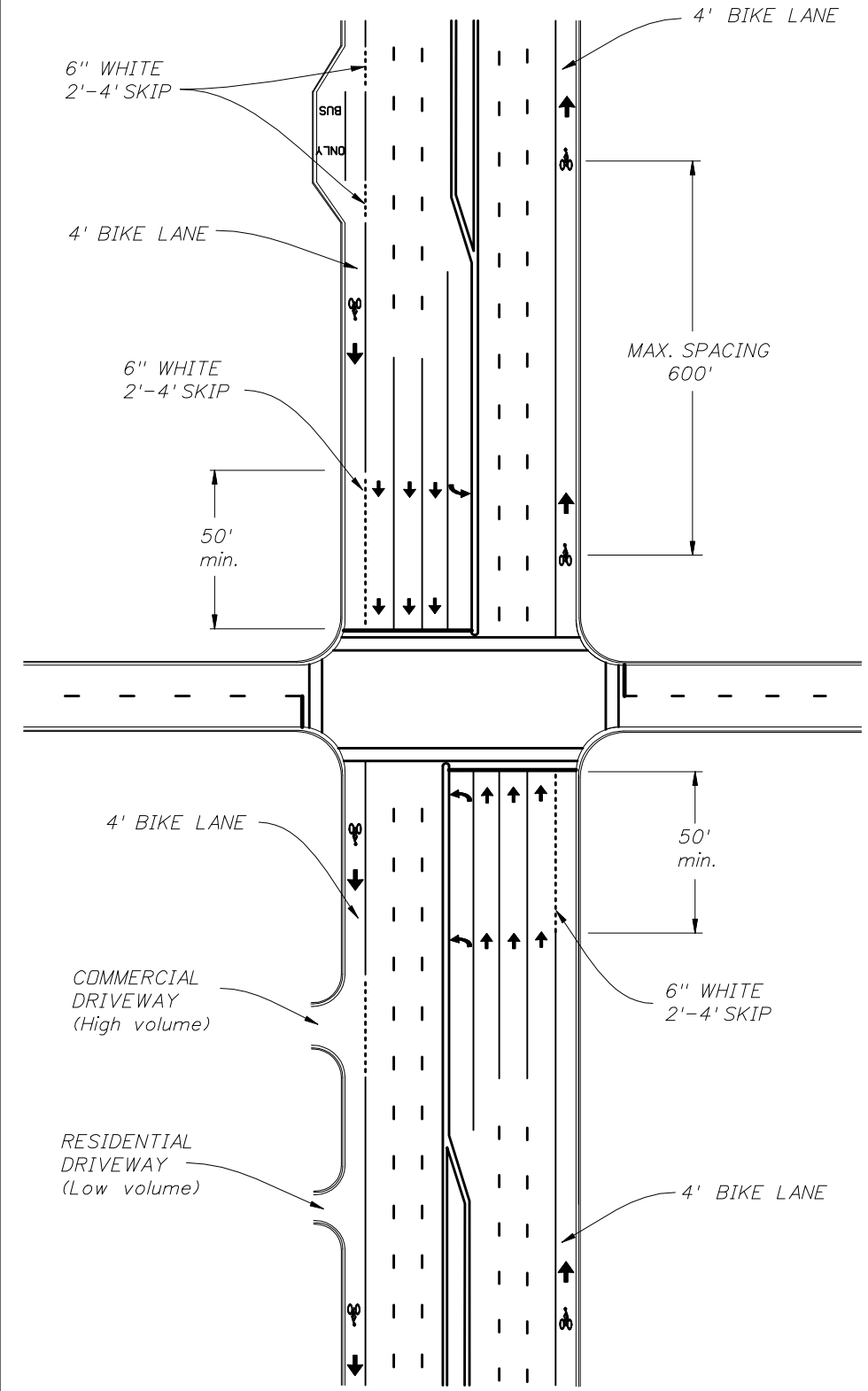
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BICYCLE MARKINGS

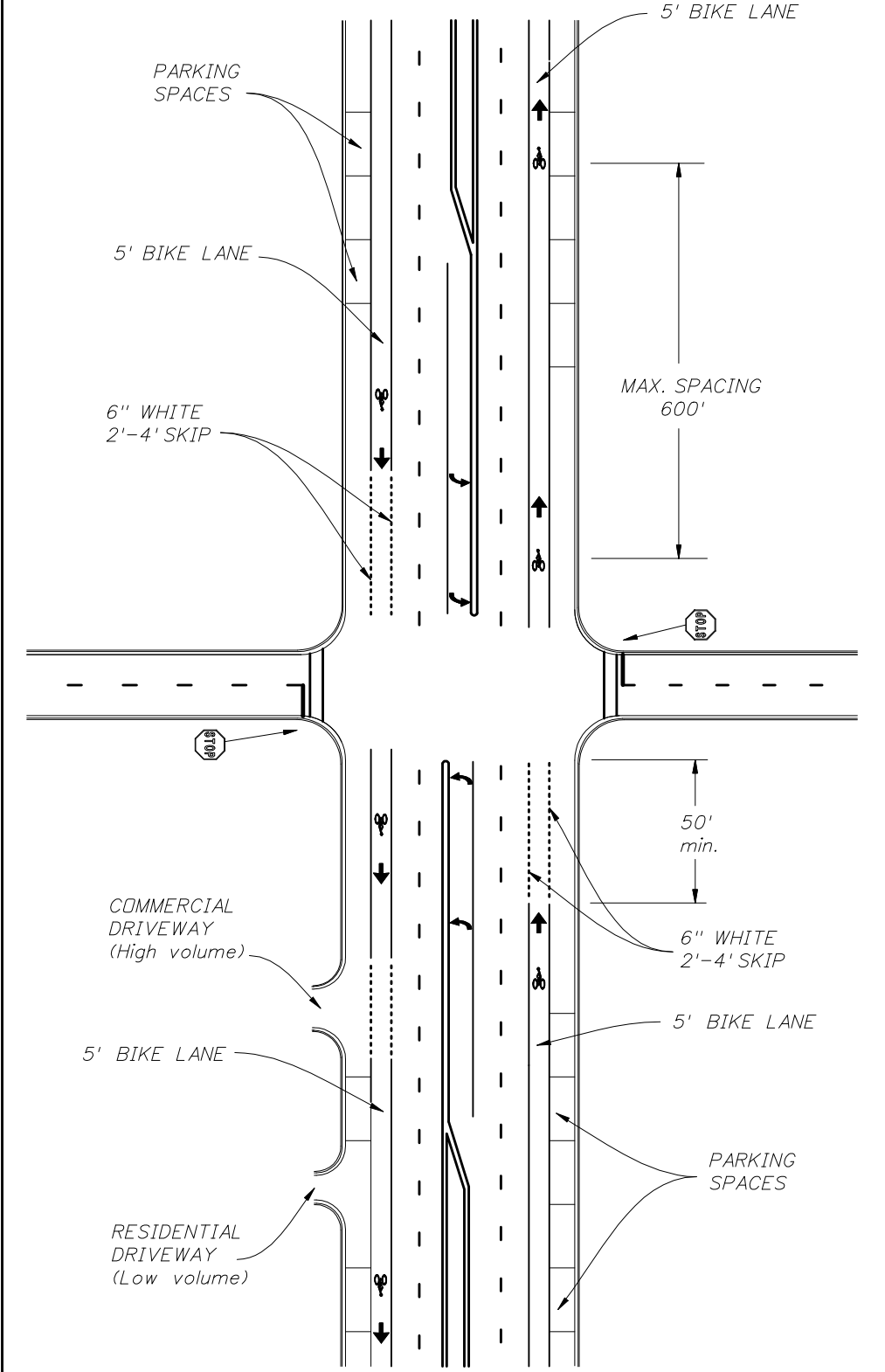
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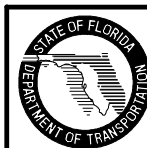
MAJOR INTERSECTION WITH SEPARATE RIGHT TURN LANE URBAN TYPICAL SECTION (CURB AND GUTTER)

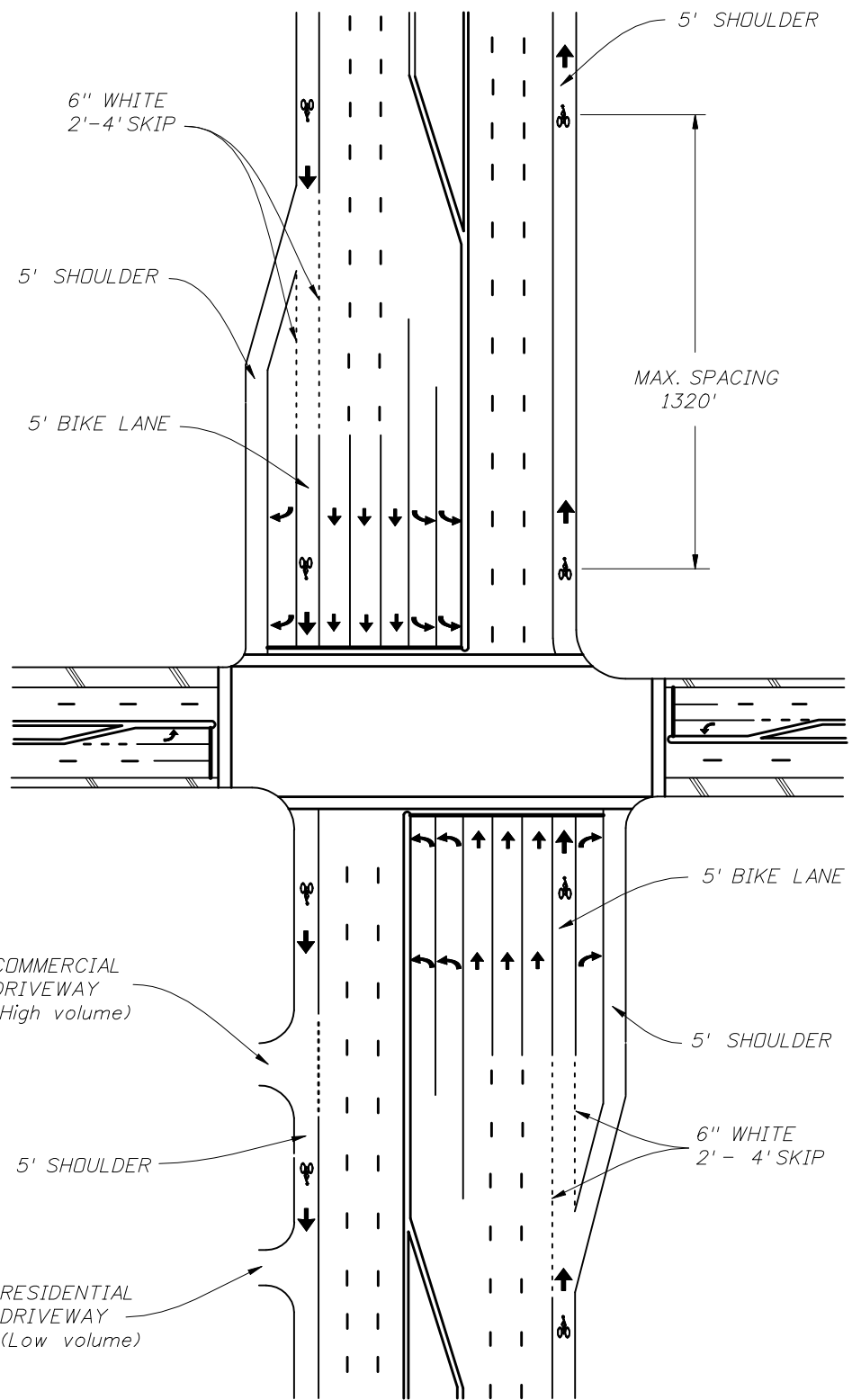


MAJOR INTERSECTION, NO RIGHT TURN LANE PLUS BUSBAY URBAN TYPICAL SECTION (CURB AND GUTTER)

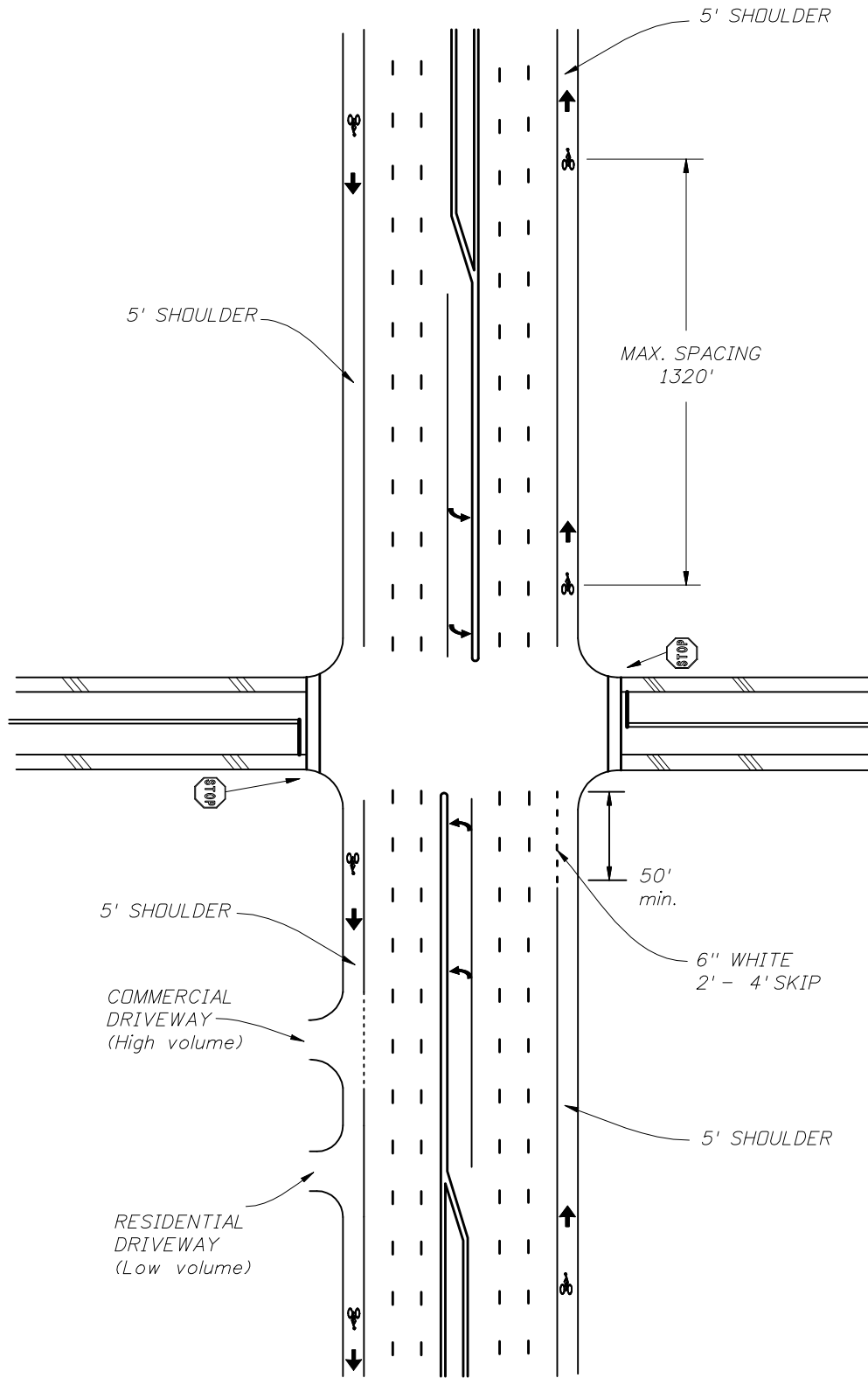


MAJOR WITH LOCAL STREET INTERSECTION, NO RIGHT TURN LANE, ON STREET PARKING URBAN TYPICAL SECTION (CURB AND GUTTER)

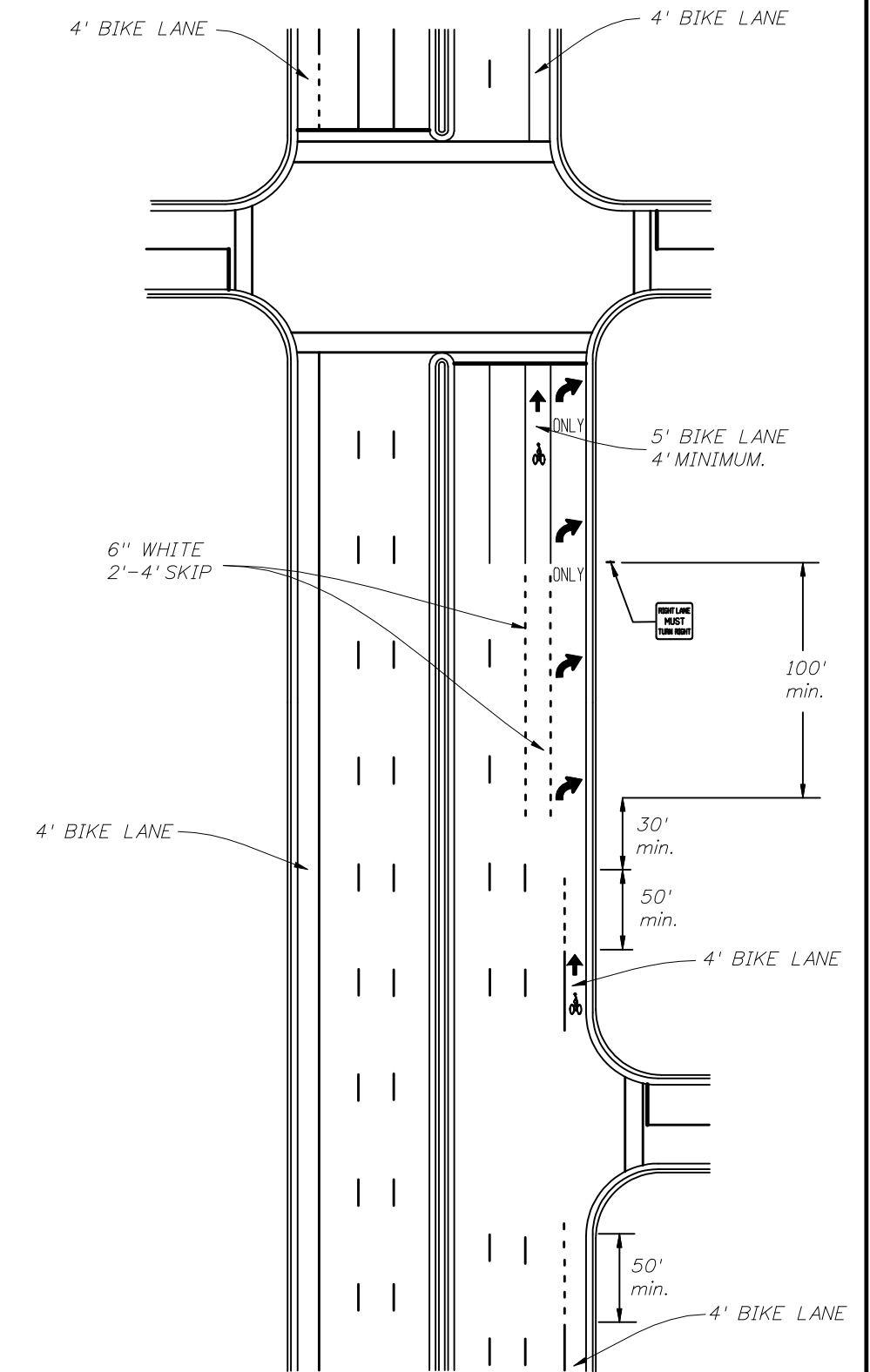




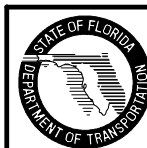
MAJOR INTERSECTION WITH DESIGNATED SHOULDER,
AND SEPARATE RIGHT TURN LANE RURAL TYPICAL
SECTION (PAVED SHOULDER)

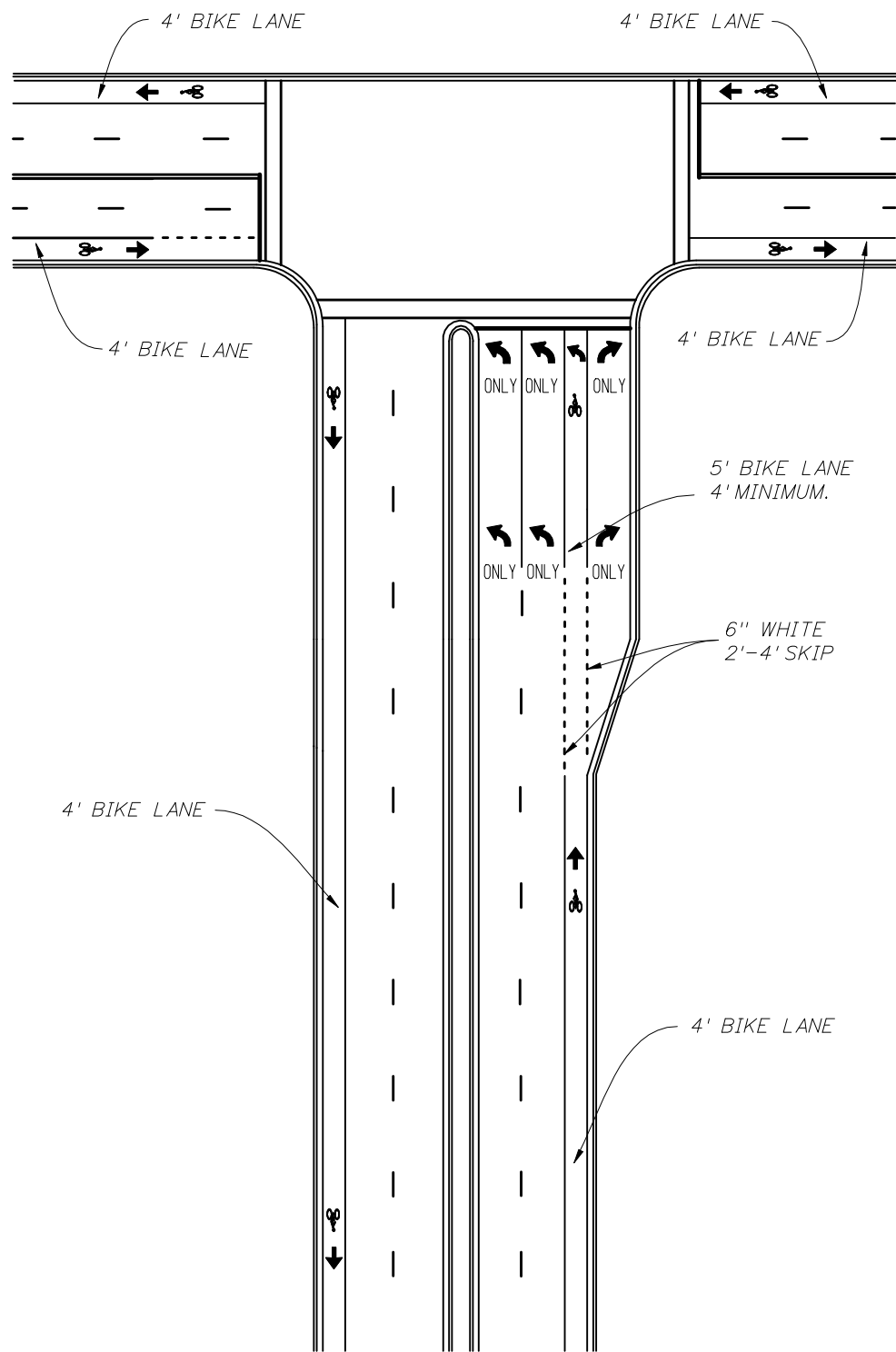


MAJOR WITH LOCAL STREET INTERSECTION, DESIGNATED
SHOULDER, AND NO RIGHT TURN LANE RURAL TYPICAL
SECTION (PAVED SHOULDER)

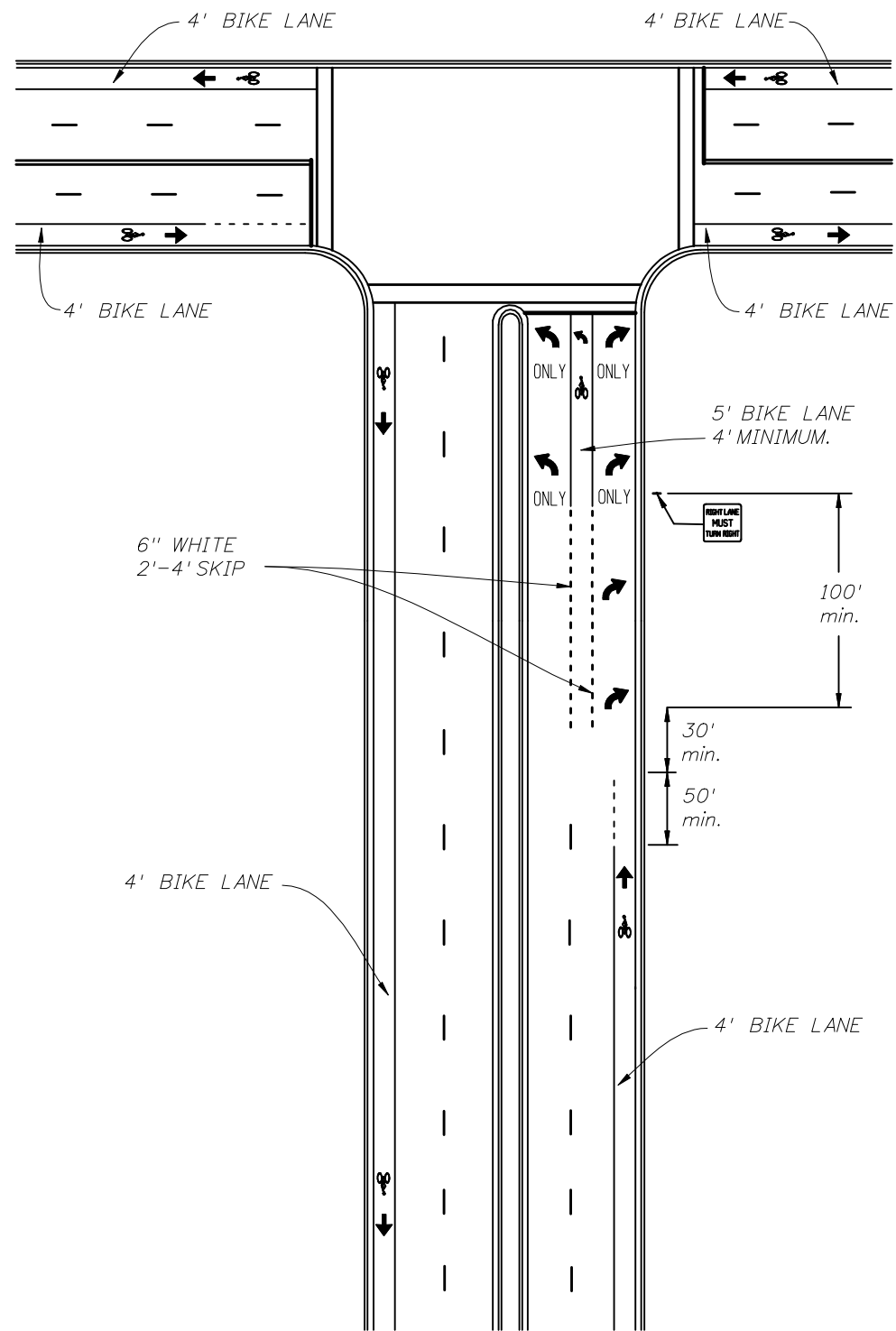


MAJOR INTERSECTION WITH RIGHT TURN DROP LANE AND
DESIGNATED OR UNDESIGNATED BIKE LANE URBAN TYPICAL
SECTION (CURB AND GUTTER)

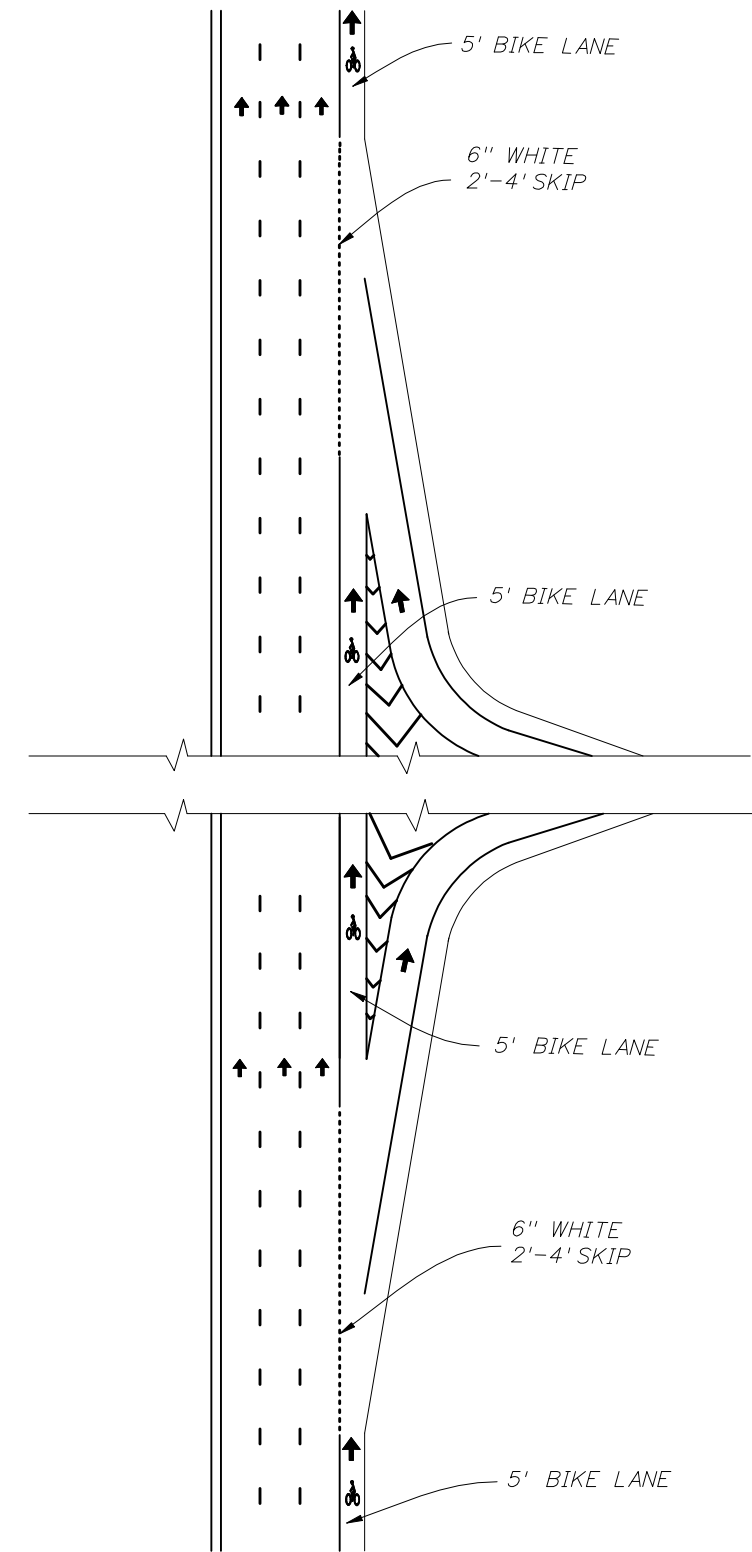




"TEE" INTERSECTION WITH SEPARATE RIGHT TURN LANE URBAN TYPICAL SECTION (CURB & GUTTER)



"TEE" INTERSECTION WITH RIGHT TURN DROP LANE URBAN TYPICAL SECTION (CURB & GUTTER)



INTERCHANGE RAMPS RURAL TYPICAL SECTION (PAVED SHOULDER)

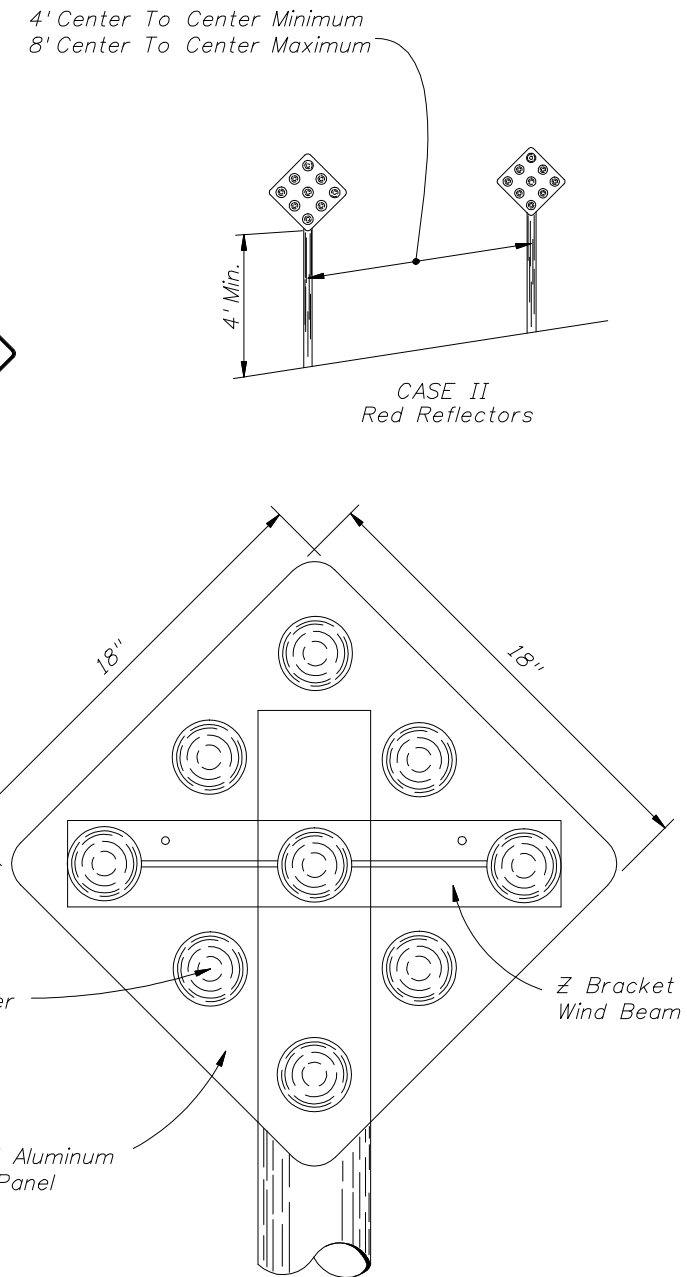
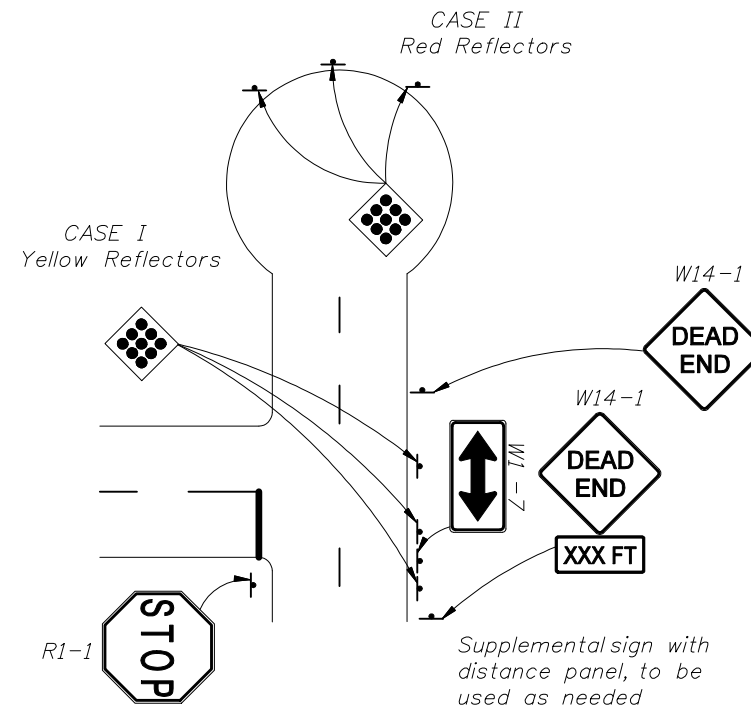
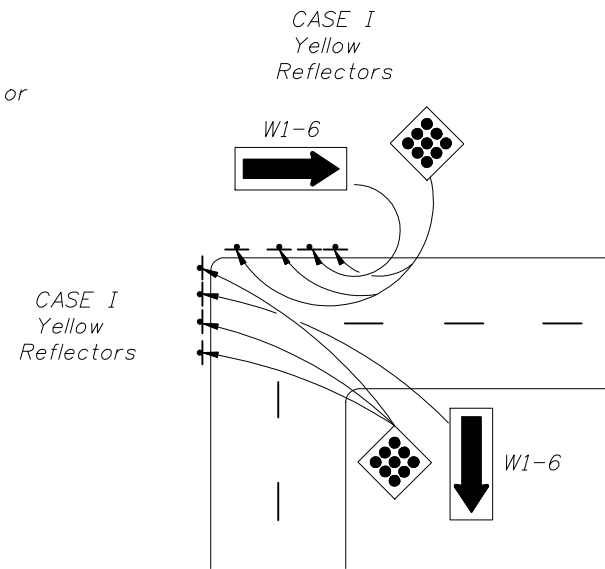


CASE I Type 1 Object Markers shall consist of nine yellow reflectors mounted on a yellow reflective background or consist of a retroreflective panel of the same size.

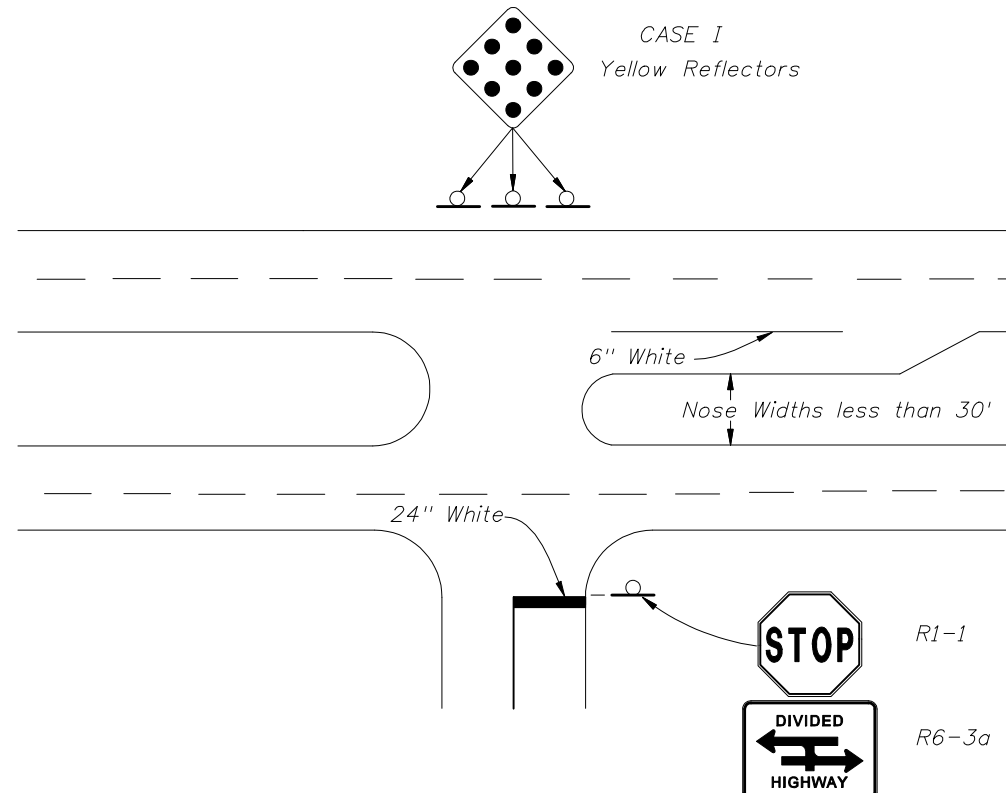
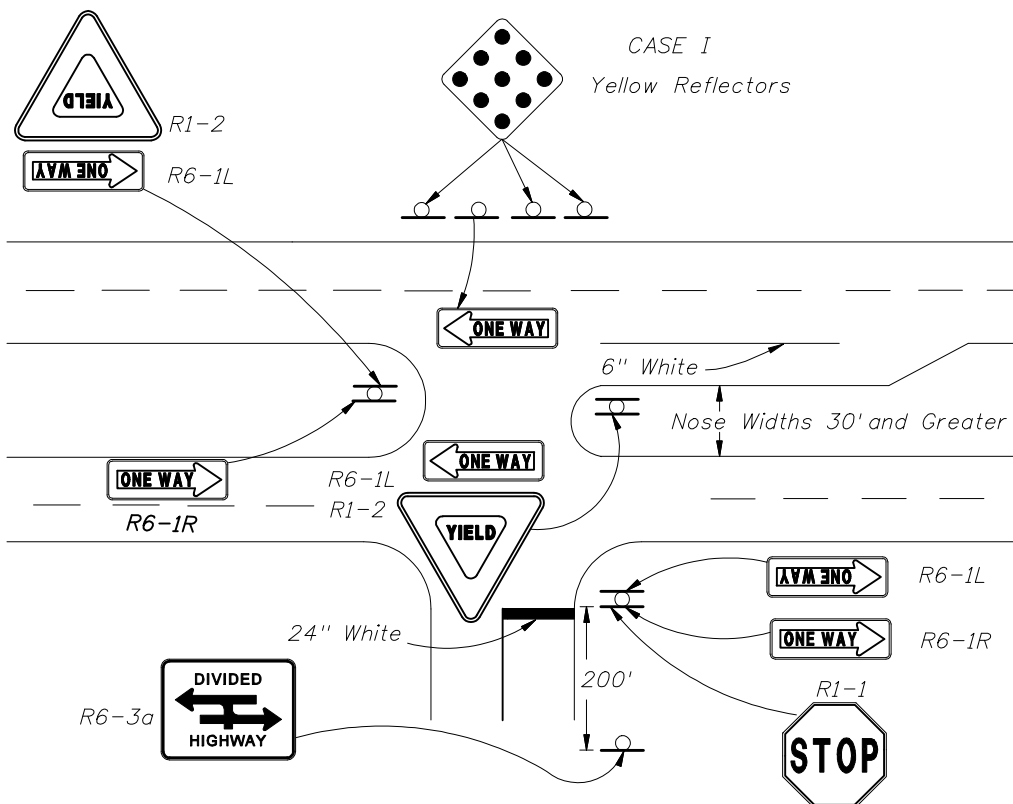
CASE II End of Road Markers shall consist of nine red reflectors mounted on a red reflective background or consist of a retroreflective panel of the same size.

NOTES:

1. This index applicable to residential and minor streets only. Major streets to be evaluated on a case by case basis.
2. "T"-intersection-Two-Way arrows and reflectors are optional. The need should be based on a review of each location.
3. For additional details on aluminum round post, sign panel material and bolts, nuts and washers see Index Nos. 11860.
4. Case I Installation - The arrow panels and object markers shall be located approximately 20', but not less than 12' from the edge of the travel lane.
5. Dead end sign shall be posted a sufficient advance distance to permit the vehicle operator to avoid the dead end by turning off, if possible, at the nearest intersecting street.
6. For pavement marking see Index No. 17346
7. No guardrail is required unless special field conditions require its use.



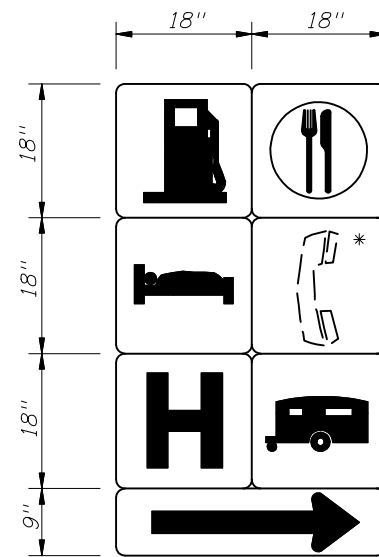
Object markers shall be installed on 2" ϕ x $\frac{1}{8}$ " Aluminum Round Post.
 $\frac{3}{8}$ " ϕ Aluminum Button Head Bolt with Nut and Lockwasher or $\frac{15}{16}$ " ϕ Stainless Steel Hex Head Bolt with Flat Washer under Head and Lockwasher under Nut. Post foundation shall be installed in accordance with Index No. 11860.



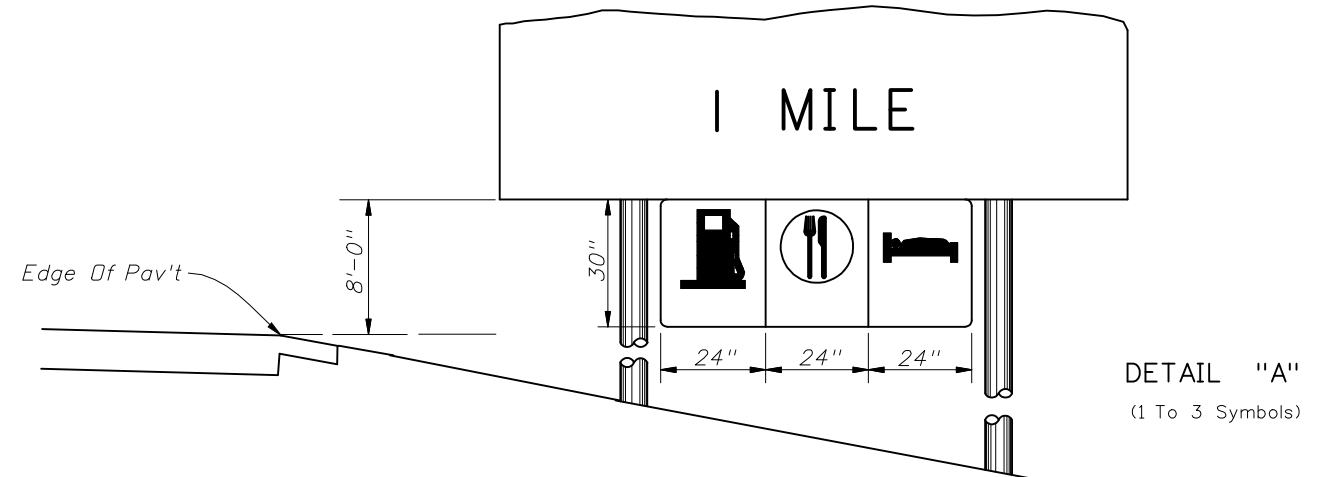
****Note:**

Two assemblies are required; one for each side of the ramp, showing those services in each particular direction from the ramp terminal.

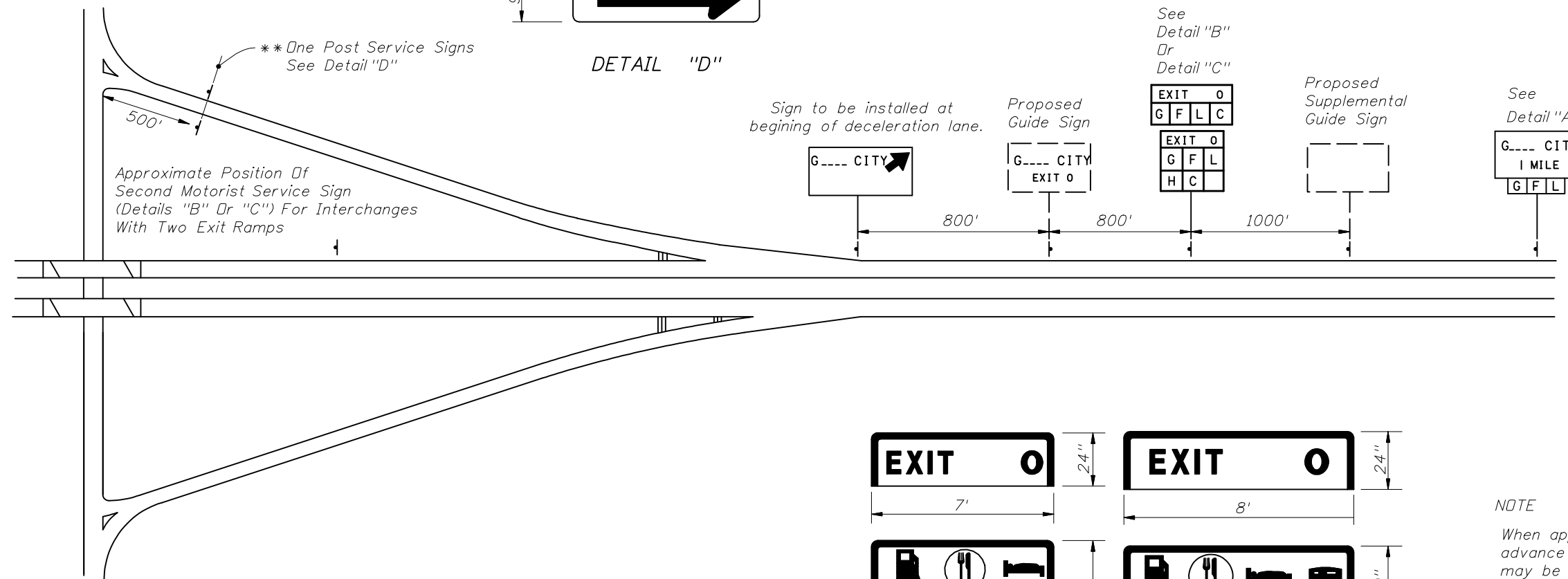
Ramp mounted signs shall be installed to avoid conflict with existing signs and in no case should they be placed within 100' of another sign.



DETAIL "D"



DETAIL "A"
(1 To 3 Symbols)



Approximate Position Of Second Motorist Service Sign (Details "B" Or "C") For Interchanges With Two Exit Ramps

**One Post Service Signs See Detail "D"

Sign to be installed at beginning of deceleration lane.

Proposed Guide Sign

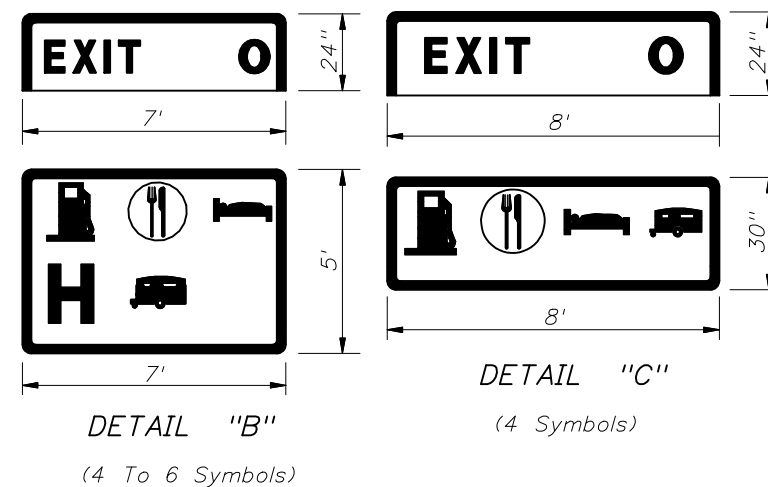
See Detail "B" Or Detail "C"

Proposed Supplemental Guide Sign

See Detail "A"

GENERAL NOTES

- Only those services meeting criteria established by the Department and approved by the State Traffic Operations Engineer for each interchange shall be shown. Symbolsigns for motorist services shall always appear in the following order reading from left to right and top to bottom: Gas, Food, Lodging, Phone *, Hospital, Camping. The phone symbol shall not be shown whenever any Gas, Food, Lodging or Camping symbol appears.
- Symbols shall appear consecutively on the sign with no positions left blank or reserved for intermediate symbols not currently approved for a particular interchange.
- All motorist service signs to have White Legend and Border with Blue Background.
- For mounting details see Index 11200 for Type "A" breakaway or Index 11860 for Type "C" Frangibility.



DETAIL "B"

(4 To 6 Symbols)

DETAIL "C"

(4 Symbols)

NOTE

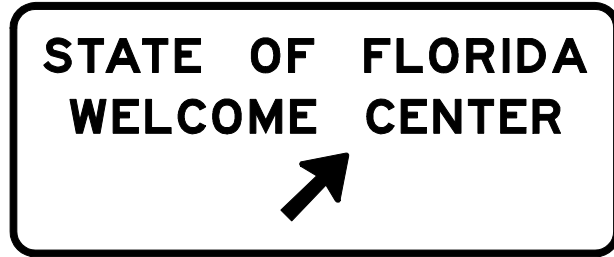
When approved for attachment to the advance guide signs, up to 3 services may be used for an exit. The symbol signs shall be suspended from the guide sign panel or existing wind beams. Symbolsigns are not to be connected to existing sign posts.

The mounting height of the advance guide sign shall be increased, where necessary, to provide 8' between the level of the pavement edge and the bottom of the guide sign, prior to mounting the supplementary panel.

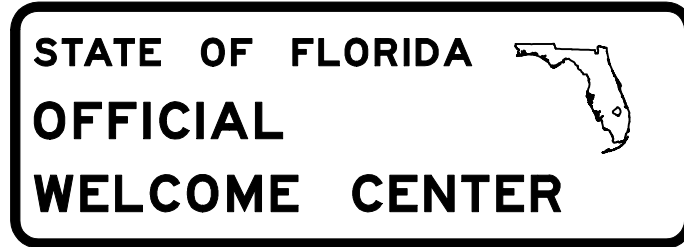




Sign No. FTP-10-06



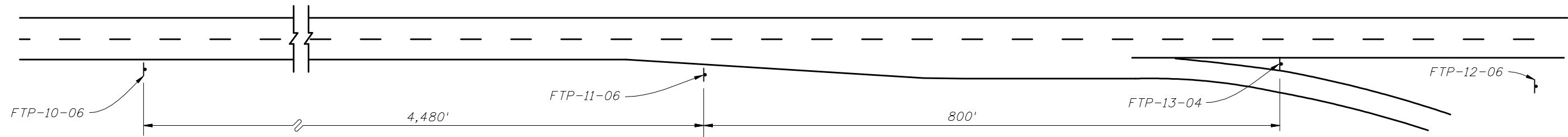
Sign No. FTP-11-06



Sign No. FTP-12-06



Sign No. FTP-13-06



Note : Roadway not drawn to scale
Distances shown are adequate for driver communication
but may be altered slightly if conditions require.



Sign No. FTP-14-06

Note: Sign FTP-14-06 shall be used as a supplemental guide sign at interchanges which have a Tourist Information Center approved for such signing (locate half-way between normal guide signs)

Notes:

1. Signs and sign structures shall be erected in accordance with the details shown on Index No. 11200.
2. Sign FTP-12-06 shall be located on the Welcome Center grounds in proximity to the building and as far from the main line roadway as possible (2 signs back to back).
3. Sign FTP-10-06, 11-06, 12-06 shall be located as limited access highways only.
4. All legend to be Series E.
5. See Index No. 17355 for sign details.

FOR LIMITED ACCESS HIGHWAYS




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WELCOME CENTER SIGNING

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**STATE OF FLORIDA
WELCOME CENTER
1 MILE**


SIGN NO. FTP-15A-04

STATE OF FLORIDA 
**OFFICIAL
WELCOME CENTER**

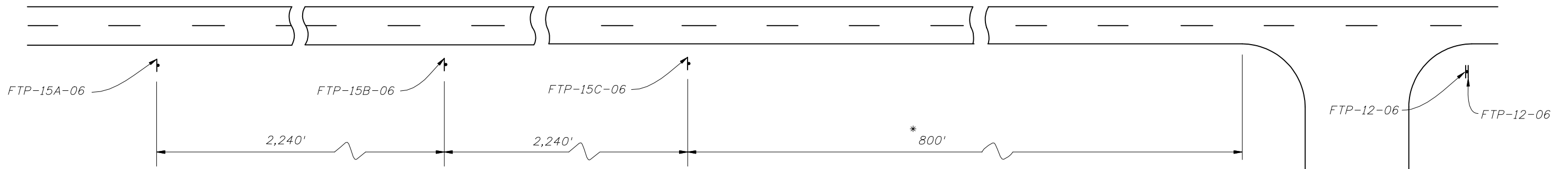
SIGN NO. FTP-12-04

1/2 MILE

SIGN NO. FTP-15B-04



SIGN NO. FTP-15C-04



Notes:

1. Signs and sign structures shall be erected in accordance with the details shown on Index 11200.
2. Sign FTP-12-06 shall be located on the Welcome Center grounds in proximity to the building and as far from the Main Line Roadway as possible (2 signs back to back).
3. All legend to be Series E.
4. One sign FTP-15A-06 or 15B-06 should be used depending on speed, roadside development & geometric conditions.

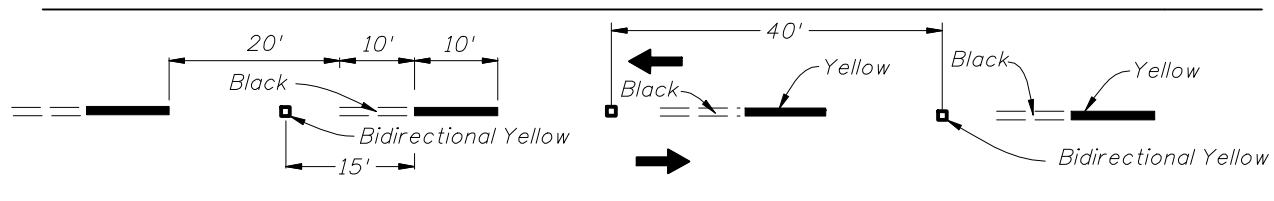
FOR PRIMARY HIGHWAYS



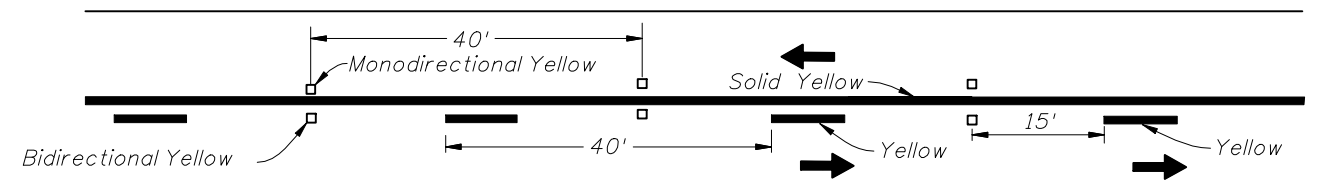
2010 FDOT Design Standards

WELCOME CENTER SIGNING

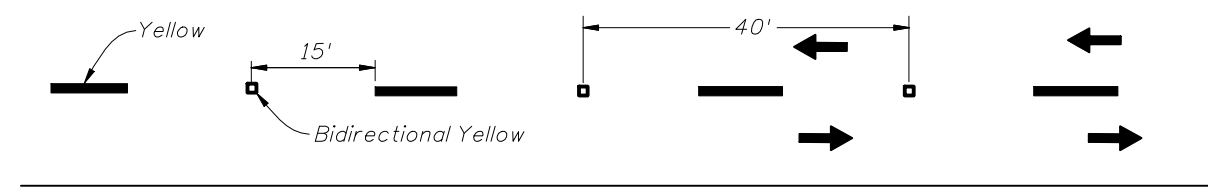
Last Revision 07/01/07	Sheet No. 2 of 2
Index No. 17351	



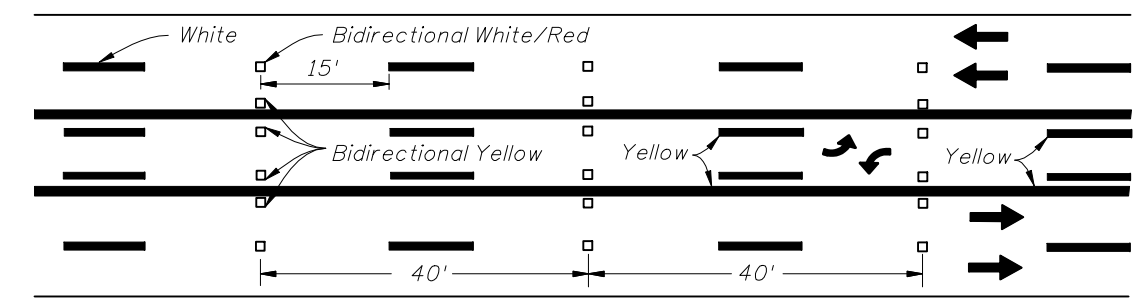
ALTERNATING SKIP LINE



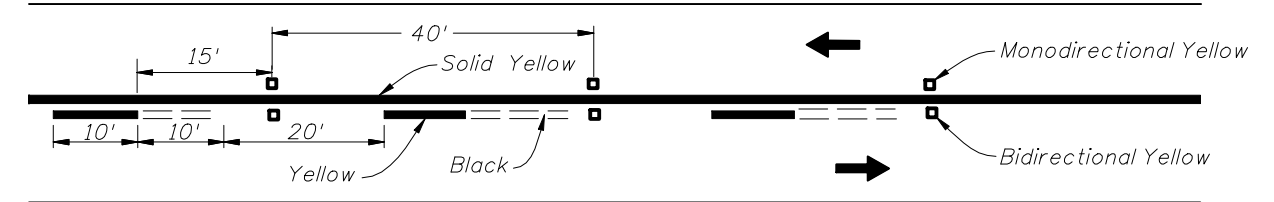
SOLID LINE WITH SKIP



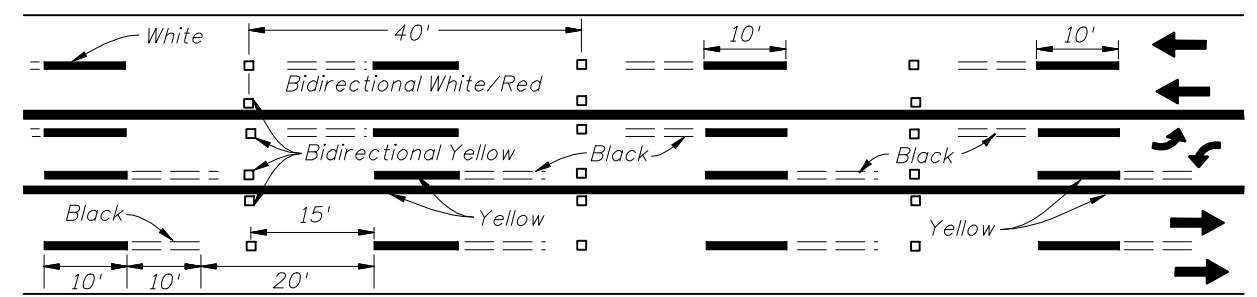
SKIP LINE



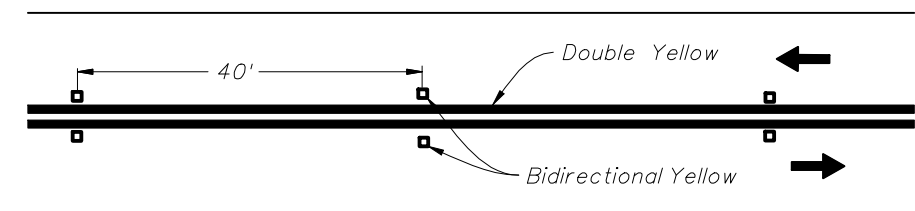
SKIP LINE WITH TWO-WAY LEFT TURN LANE



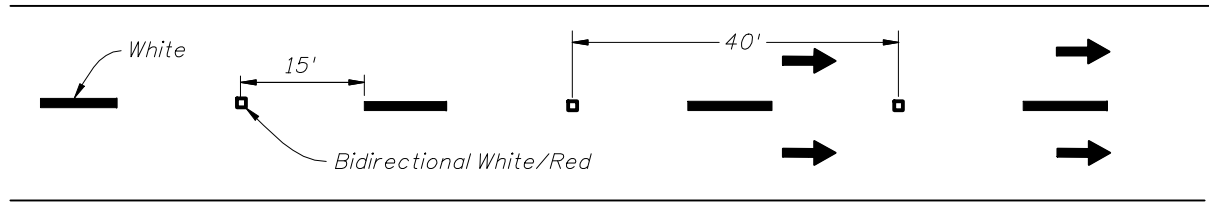
SOLID LINE WITH ALTERNATING SKIP



ALTERNATING SKIP LINE WITH TWO-WAY LEFT TURN LANE



DOUBLE SOLID LINE



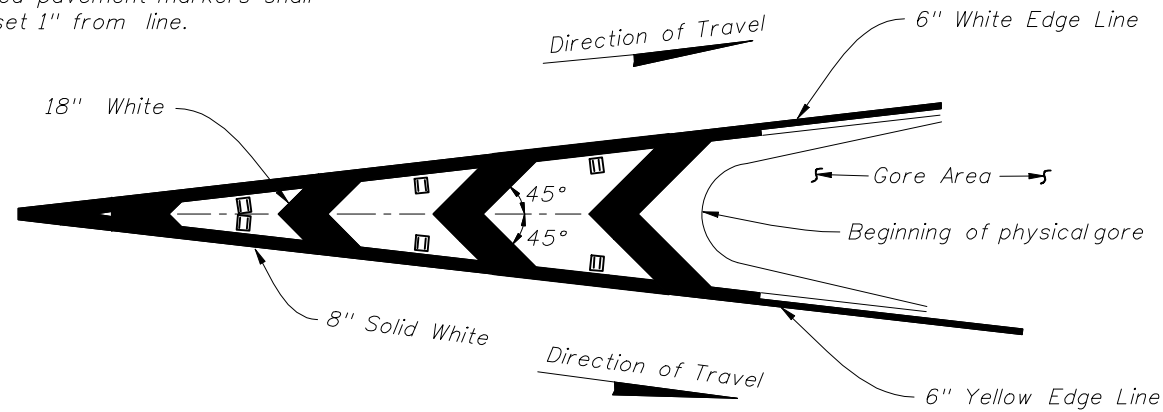
MULTILANE

1. Reflective Pavement Markers shall be spaced at 40' on all skip lane lines and skip center lines. This spacing may be reduced to 20' if specifically called for in the plans.
2. The spacing on solid lines and solid/skip combination lines shall be 40'.
3. All RPM's shall be offset 1" from solid lines.
4. These spacings may be reduced for sharp curves if required.
5. All RPM's shall be class "B".



NOTE

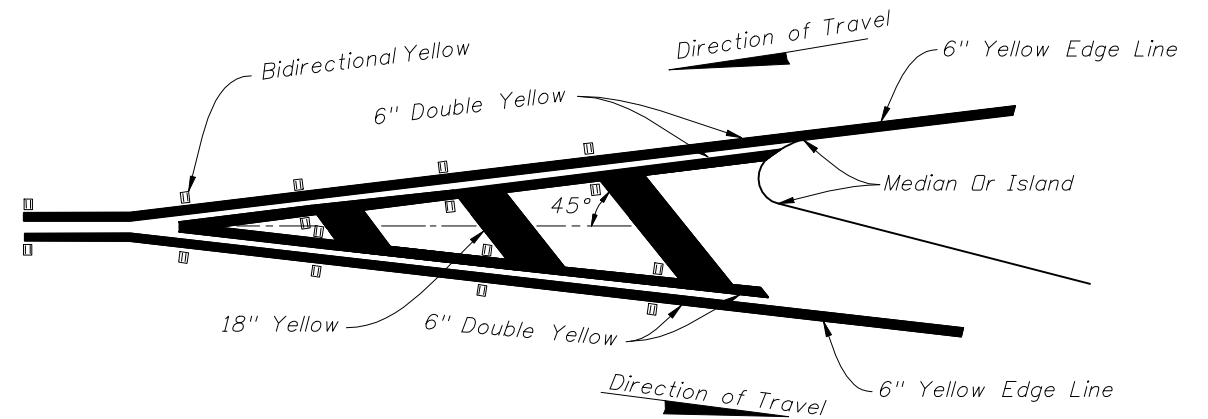
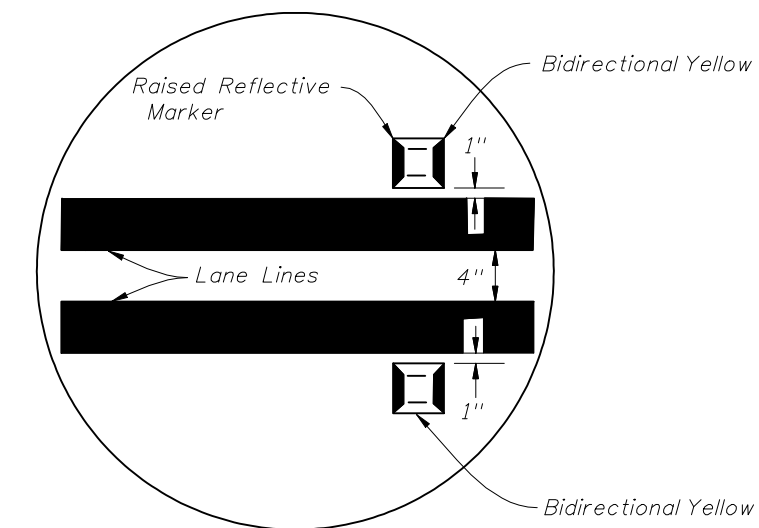
Raised pavement markers shall be set 1" from line.



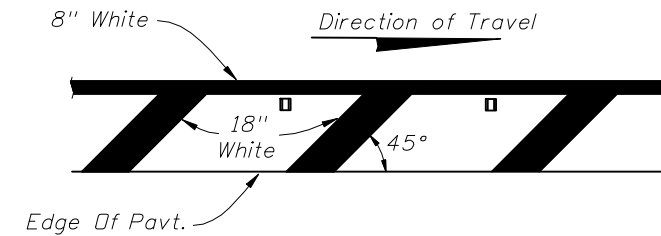
RPM PLACEMENT FOR TRAFFIC CHANNELIZATION AT GORE
(TRAFFIC FLOWS IN SAME DIRECTION)

NOTE

Raised pavement markers (Bidirectional White/Red) should be used in all gores of this type



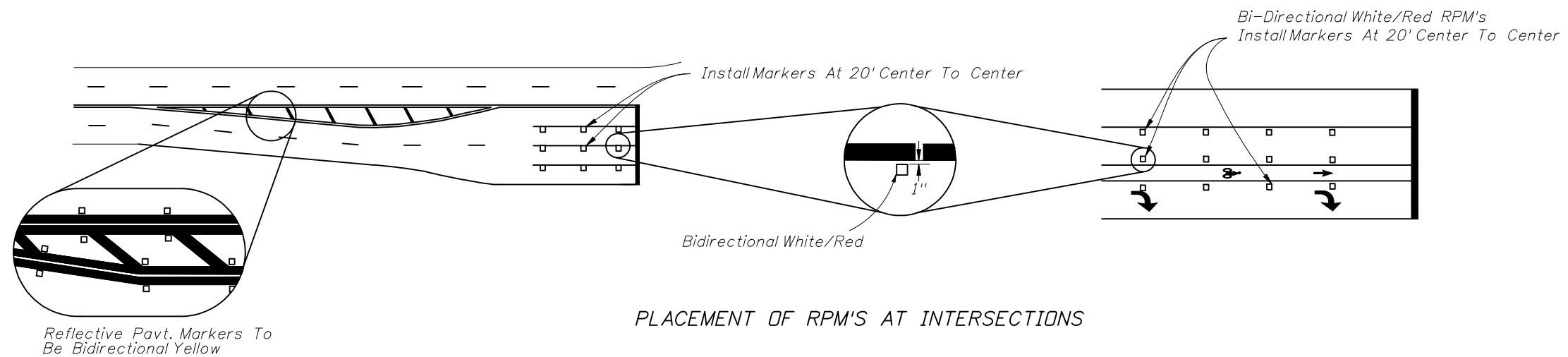
RPM PLACEMENT FOR TRAFFIC SEPARATION
(TRAFFIC FLOWS IN OPPOSITE DIRECTION)



PLACEMENT OF RPM'S ON SHOULDER MARKINGS

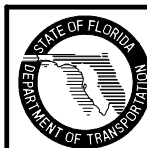
For Left Side Of Roadway The Plan Is Opposite Hand And Markings Shall Be Yellow.

For Placement Of Rpm's On Ramps See Index 17345.



PLACEMENT OF RPM'S AT INTERSECTIONS

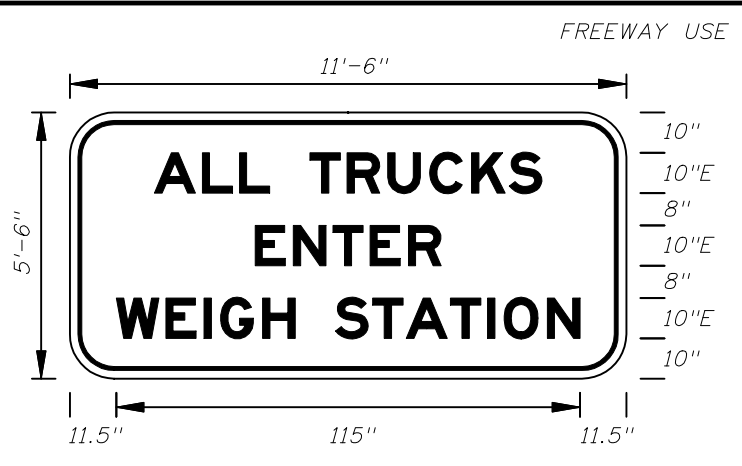
Reflective Pavt. Markers To Be Bidirectional Yellow



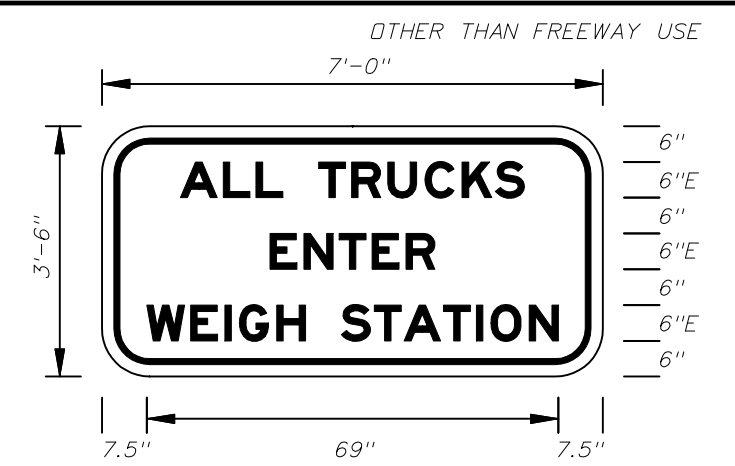
2010 FDOT Design Standards

TYPICAL PLACEMENT OF
REFLECTIVE PAVEMENT MARKERS

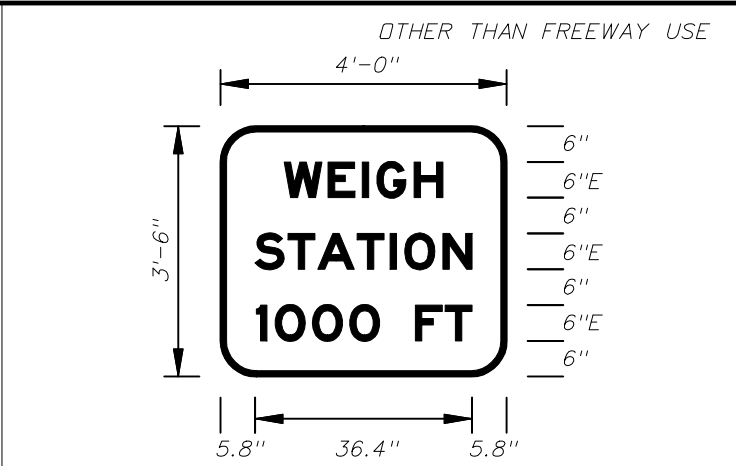
Last Revision	Sheet No.
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Index No.	
17352	



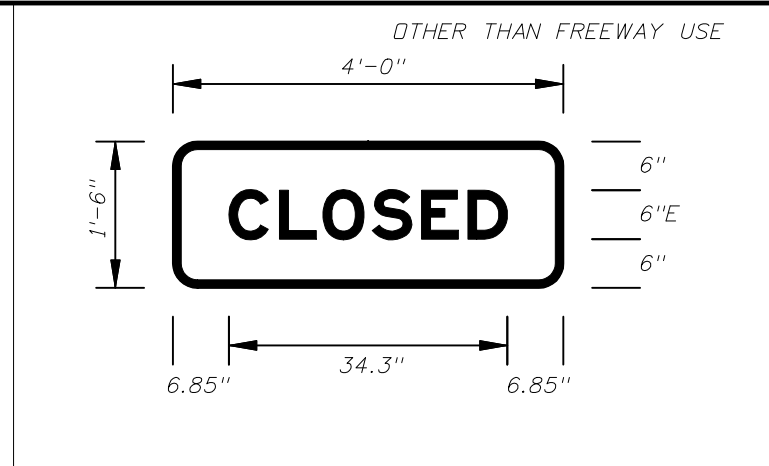
FTP-1-06
11'-6" X 5'-6"
9" Radii 2" Border
10" Series E Legend
White Background
Black Legend and Border



FTP-2-06
7' X 3'-6"
6" Radii 2" Border
6" Series E Legend
White Background
Black Legend and Border

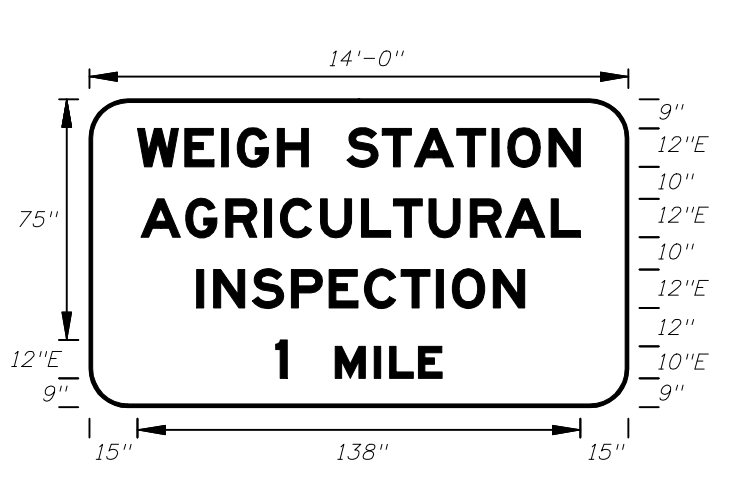


FTP-3-06
4' X 3'-6"
6" Radii 2" Border
6" Series E Legend
Green Background
White Legend and Border

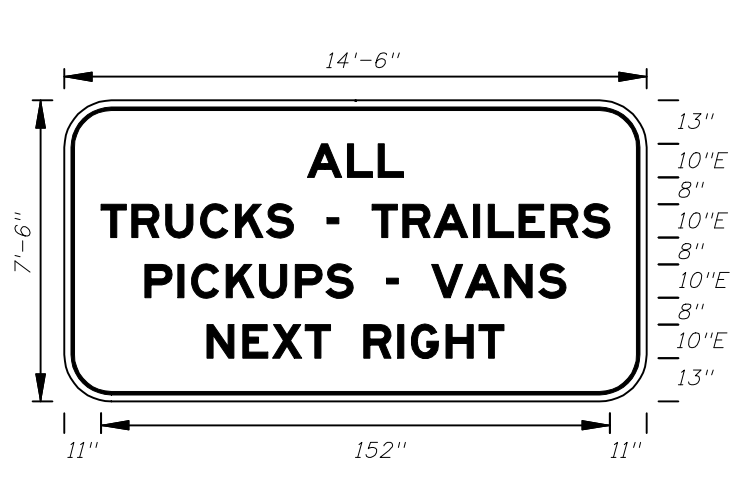


FTP-4-06
4' X 1'-6"
3" Radii 2" Border
6" Series E Legend
Green Background
White Legend and Border

Note:
FTP-4-06 to be used with FTP-3-06

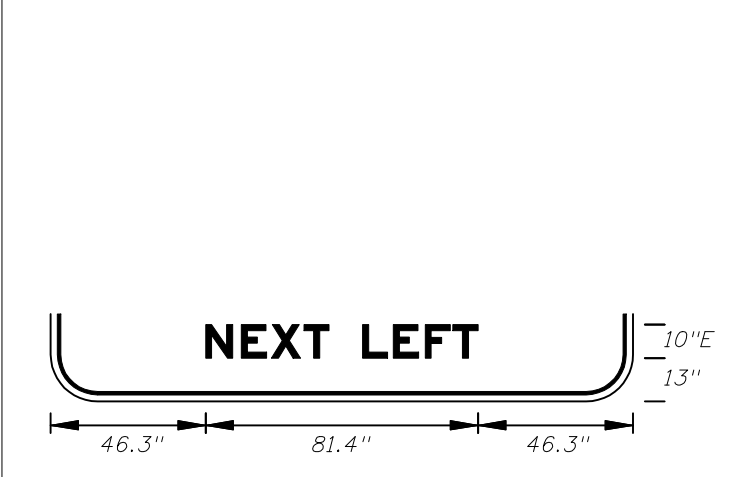


FTP-5-06
14' X 8'
12" Radii 2" Border
12" and 10" Series E Legend
Green Background
White Legend and Border



FTP-6A-06
14'-6" X 7'-6"
12" Radii 2" Border
10" Series E Legend
White Background
Black Legend and Border

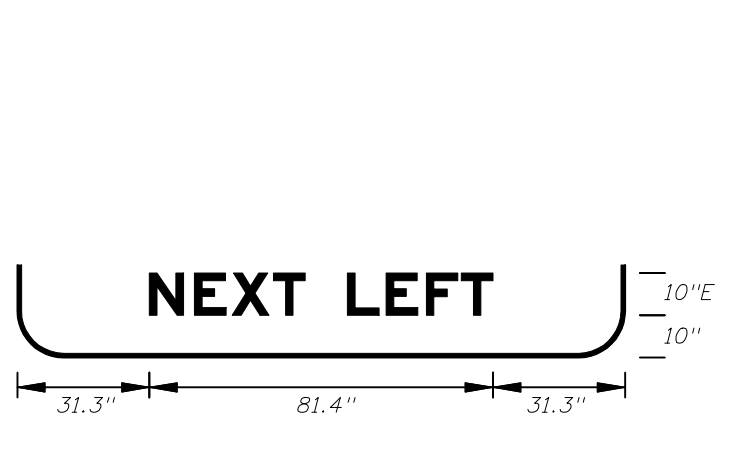
On Interstate Station
Delete Pickups-Vans,
and reduce Sign height
accordingly.



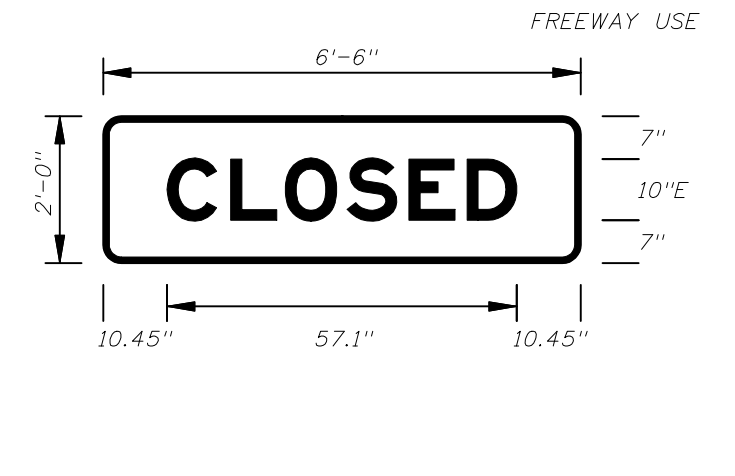
FTP-6B-06
14'-6" X 7'-6"
12" Radii 2" Border
10" Series E Legend
White Background
Black Legend and Border



FTP-7A-06
12' X 7'
11" Radii 2" Border
10" Series E Legend
Green Background
White Legend and Border

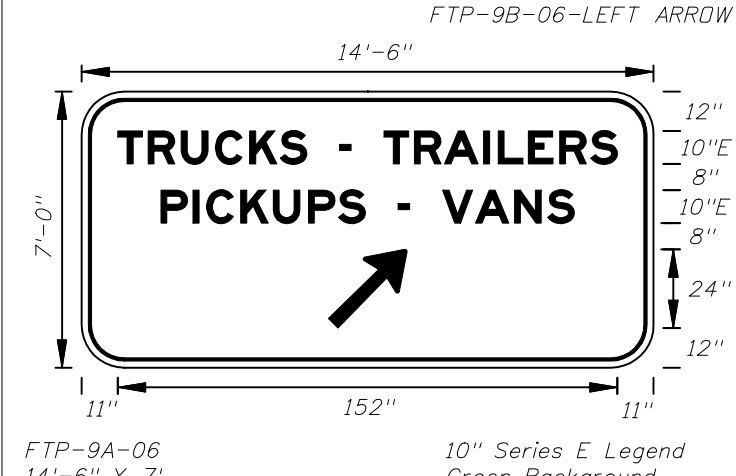


FTP-7B-06
12' X 7'
11" Radii 2" Border
10" Series E Legend
Green Background
White Legend and Border



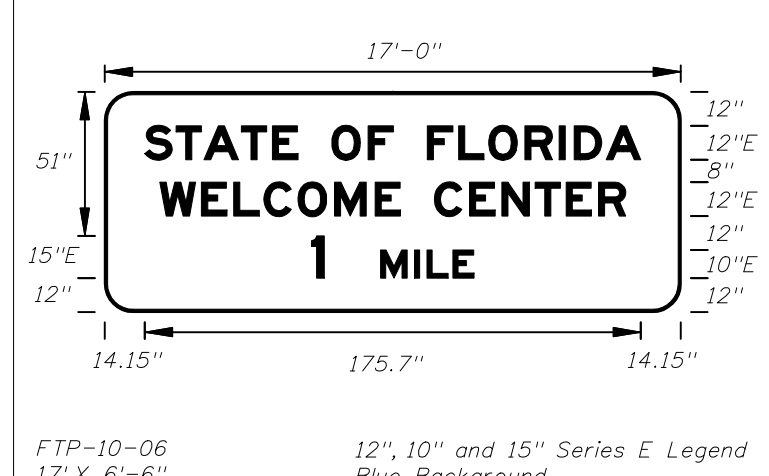
FTP-8-06
6'-6" X 2'
3" Radii 2" Border
10" Series E Legend
Green Background
White Legend and Border

Note:
FTP-8-06 to be used with FTP-7A-06 & FTP-7B-06.



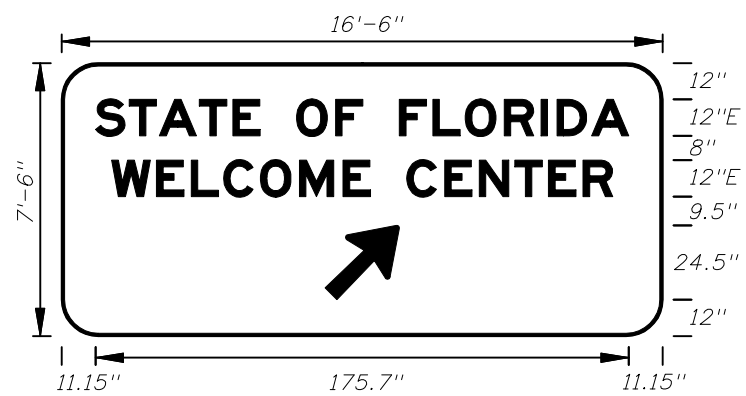
FTP-9A-06
14'-6" X 7'
11" Radii 2" Border

10" Series E Legend
Green Background
White Legend and Border

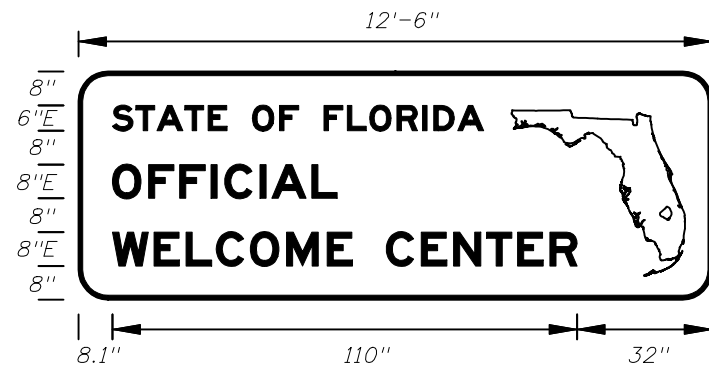


FTP-10-06
17' X 6'-6"
10" Radii 2" Border

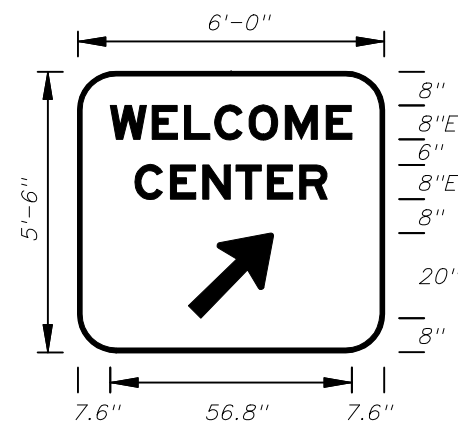
12", 10" and 15" Series E Legend
Blue Background
White Legend and Border



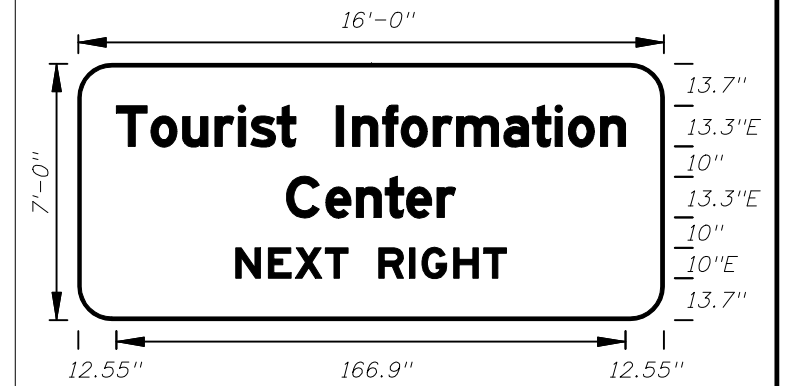
FTP-11-06
16'-6" X 7'-6"
12" Radii 2" Border
12" Series E Legend
Blue Background
White Legend and Border



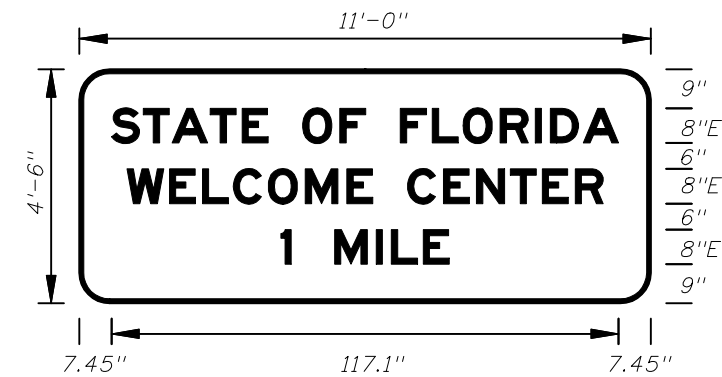
FTP-12-06
12'-6" X 4'-6"
7" Radii 2" Border
6" and 8" Series E Legend
Blue Background
White Legend and Border



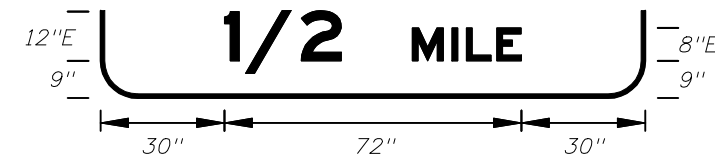
FTP-13-06
6' 0" X 5'-6"
9" Radii 2" Border
8" Series E Legend
Blue Background
White Legend and Border



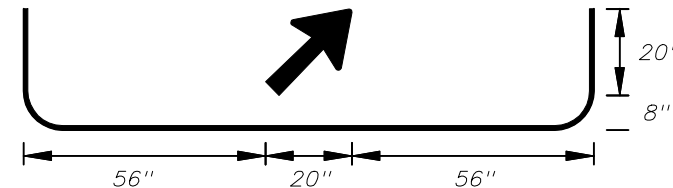
FTP-14-06
16'-0" X 7'-0"
11" Radii 2" Border
13.3 and 10" Series E Legend
Blue Background
White Legend and Border



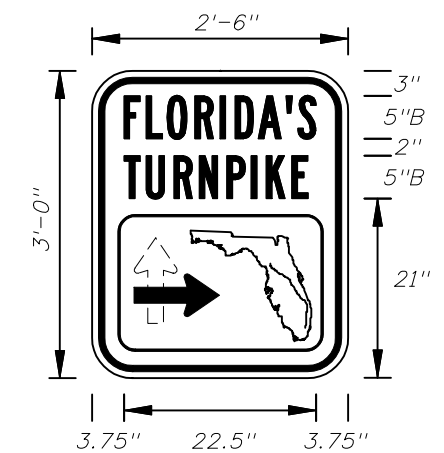
FTP-15A-06
11'-0" X 4'-6"
7" Radii 2" Border
8" Series E Legend
Blue Background
White Legend and Border



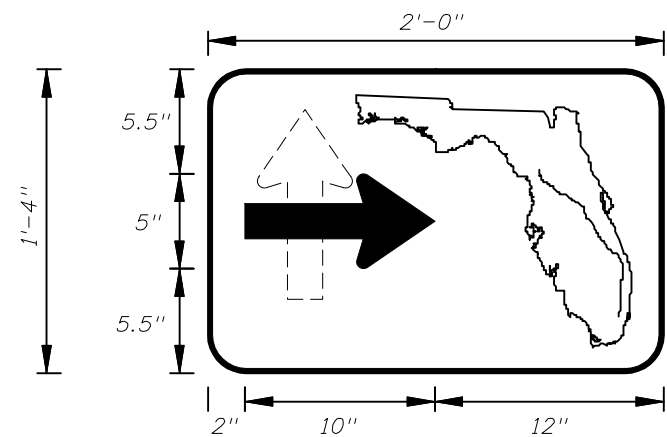
FTP-15B-06
11'-0" X 5'-0"
8" Radii 2" Border
8" and 12" Series E Legend
Blue Background
White Legend and Border



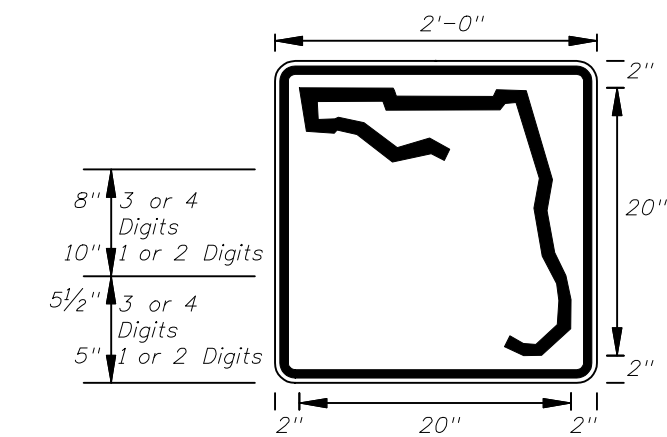
FTP-15C-06
11'-0" X 5'-6"
9" Radii 2" Border
8" Series E Legend
Blue Background
White Legend and Border



FTP-16-06
2'-6" X 3'-0"
4" Radii 2" Border
5" Series B Legend
Green Background
White Legend and Border



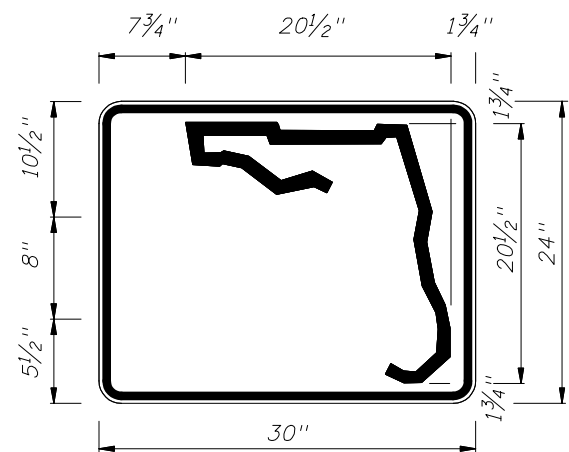
FTP-16-06 DETAIL
2' X 1'-4"
2" Radii 1" Border
White Background
Black Legend and Border



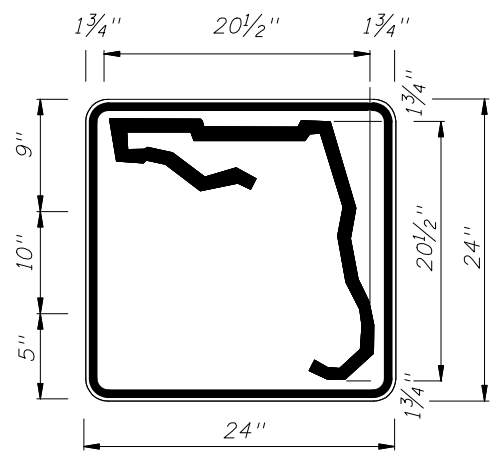
FTP-17-06
2' X 2'
1.13" Radii .0521" Border
White Background
Black Legend and Border

See Sheet 3 of 11
For Additional Details





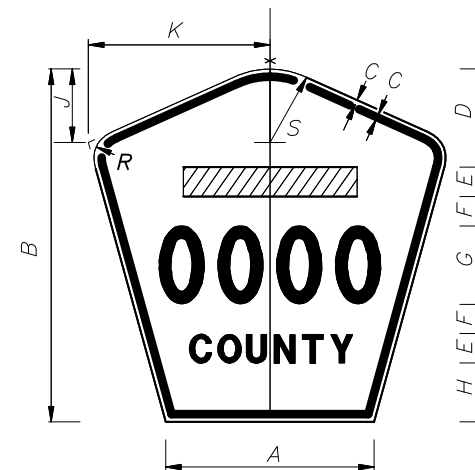
3 or 4 DIGITS



1 or 2 DIGITS

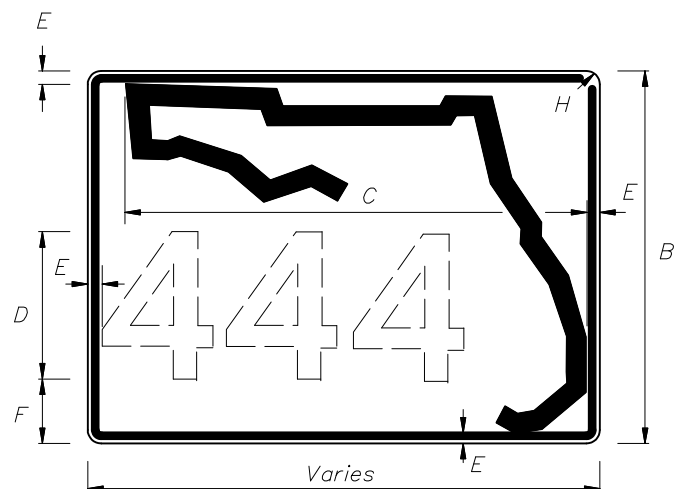
DIGITS	NUMERAL SIZE	SERIES	PANEL SIZE
1-2	10"	D	24" x 24"
3-4	8"	D	24" x 24"
3	8"	C	30" x 24"
4	8"	C	30" x 24"

Note :
The 24" X 24" panel shall only be used for a 3 or 4 digit route when the panel is to be used on a sign cluster with other 24" X 24" panels.

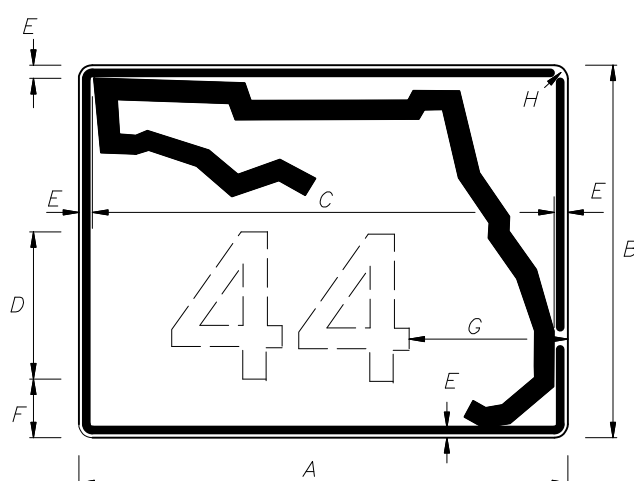


- Notes :
- All Legend Series "D".
 - Color: Yellow Legend and Border on Blue Background.
 - When used on a guide sign, marker must be overlaid on a rectangular Yellow Background as shown in chart. **

INDEPENDENT USE OTHER THAN FREEWAY



3 OR MORE DIGITS



1 OR 2 DIGITS

SIGN	DIMENSIONS												**
	A	B	C	D	E	F	G	H	J	K	R	S	
4 DIGIT POST MOUNTED	25 1/8"	42"	3/4"	10"	4"	4"	8"	8"	8 3/8"	22"	5"	8 3/4"	
2 DIGIT OVERHEAD	21 1/2"	36"	1/2"	7 1/2"	3"	3"	12"	4 1/2"	7 1/8"	18 7/8"	4 1/4"	7 1/2"	42" x 42"
3 DIGIT OVERHEAD	25 1/8"	42"	3/4"	8"	4"	4"	12"	6"	8 3/8"	22"	5"	8 3/4"	48" x 48"
4 DIGIT OVERHEAD	29 7/8"	48"	3/4"	8"	5"	5"	12"	8"	9 3/4"	25 5/8"	5 3/4"	10 1/4"	52" x 52"

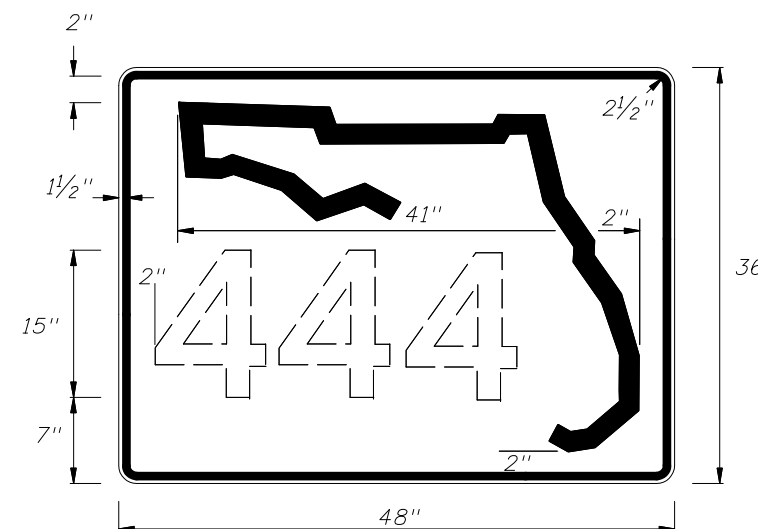
M1-6 COUNTY ROUTE MARKER DETAIL
FTP-18-06

A	B	C	D	E	F	G	H
30"	24"	26"	12"	1 1/4"	2 3/4"	8 1/4"	1 1/4"
36"	30"	32"	15"	1 1/4"	3 1/4"	8 3/4"	1 1/4"
42"	36"	38"	15"	1 1/4"	6 1/4"	11"	1 1/4"

GUIDE SIGN USE

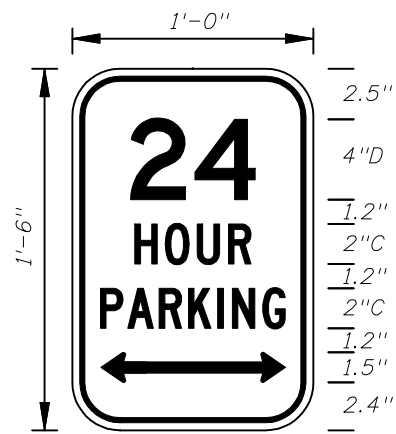
- Notes:
- Florida marker shall have Black Legend with White Background.
 - Stroke width of State outline to be 1" for independent use and 1 1/4" for Guide Sign.
 - Numbers are series D.

FLORIDA ROUTE MARKER
FTP-17-06

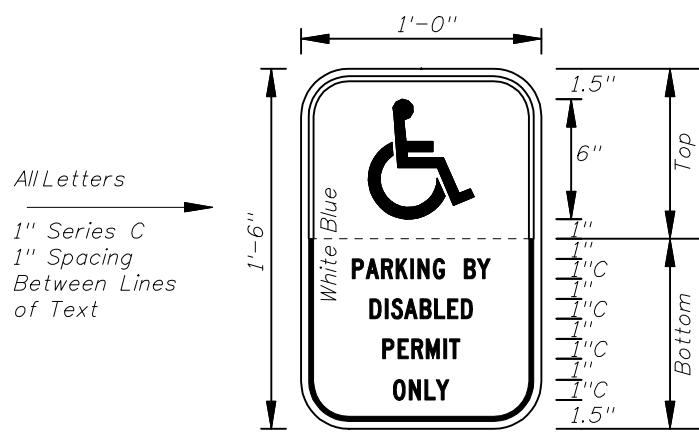


1-3 DIGITS 15" SERIES C
4 DIGITS 12" SERIES C
INDEPENDENT USE FOR FREEWAY

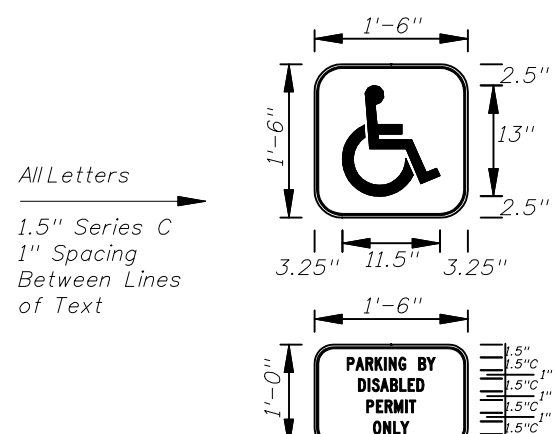




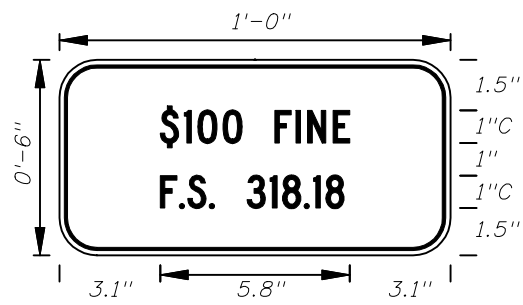
FTP-19-06
1' X 1'-6"
4" Radii $\frac{3}{8}$ " Border
Top 4" Series D
Bottom 2" Series C
White Background
Green Legend and Border



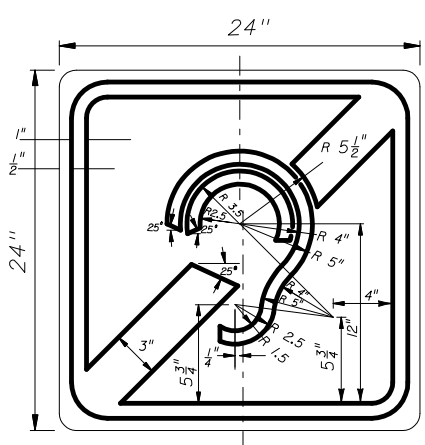
FTP-20-06
1' X 1'-6"
2" Radii $\frac{3}{8}$ " Border
1" Series C Legend
Color
Background
Legend and Border
Top Blue
Bottom White
White Black



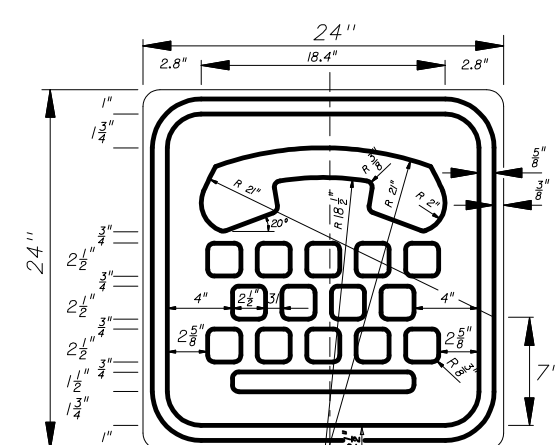
FTP-21-06
1'-6" X 2'-6"
2" Radii $\frac{3}{8}$ " Border
1.5" Series C Legend
Color
Background
Legend and Border
Top Blue
Bottom White
White Black



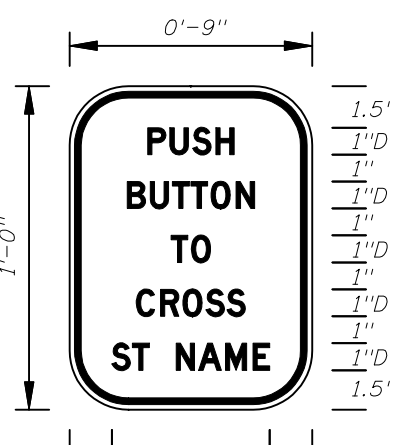
FTP-22-06
1' X 6"
1" Radii $\frac{3}{8}$ " Border
1" Series C Legend
White Background
Black Legend and Border
Supplemental panel
for the FTP-20-06
and FTP-21-06 signs



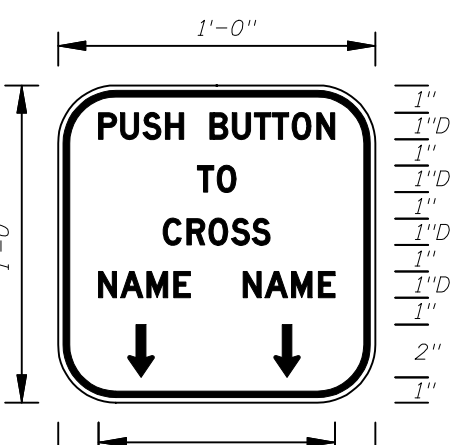
FTP-23-06
2' X 2'
1.5" Radii $\frac{5}{8}$ " Border
Blue Background
White Legend and Border



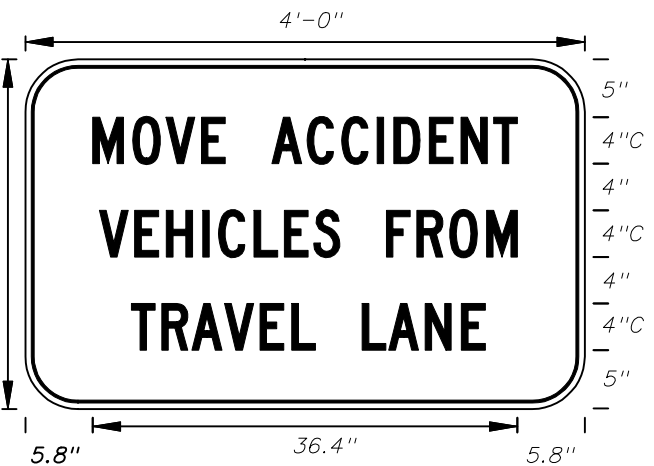
FTP-24-06
2' X 2'
1.5" Radii $\frac{5}{8}$ " Border
Blue Background
White Legend and Border



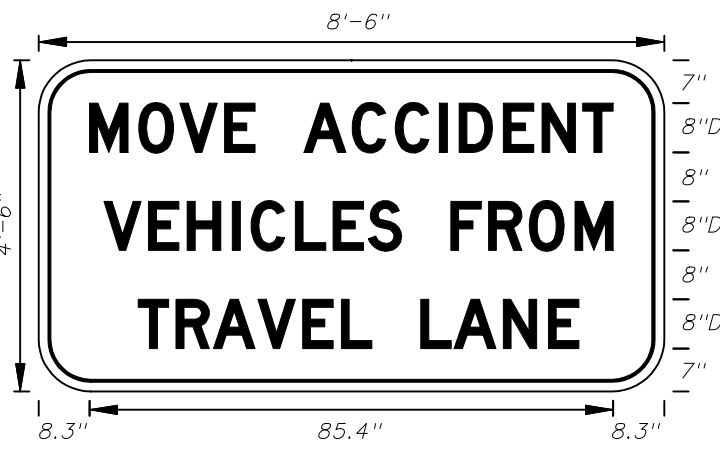
FTP-25-06
9" X 1'-0"
2" Radii $\frac{3}{8}$ " Border
1" Series D Legend
White Background
Black Legend and Border



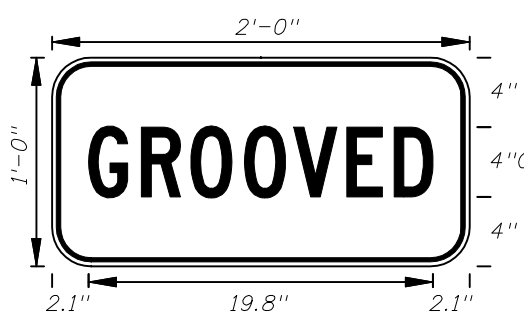
FTP-26-06
1' X 1'
2" Radii $\frac{3}{8}$ " Border
1" Series D Legend
White Background
Black Legend and Border



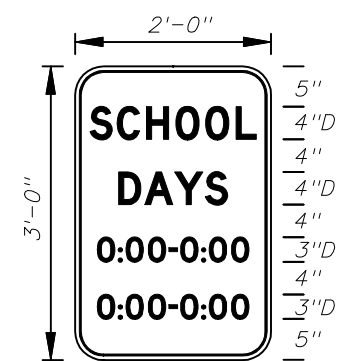
FTP-27-06
4' X 2'-6"
4" Radii $\frac{3}{4}$ " Border
4" Series C Legend
White Background
Black Legend and Border



FTP-28-06
8'-6" X 4'-6"
7" Radii $\frac{3}{4}$ " Border
8" Series D Legend
White Background
Black Legend and Border

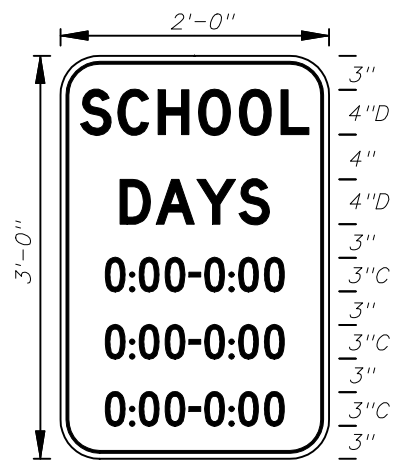


FTP-29-06
2'-0" X 1'-0"
2" Radii $\frac{5}{8}$ " Border
4" Series C Legend
Yellow Background
Black Legend and Border

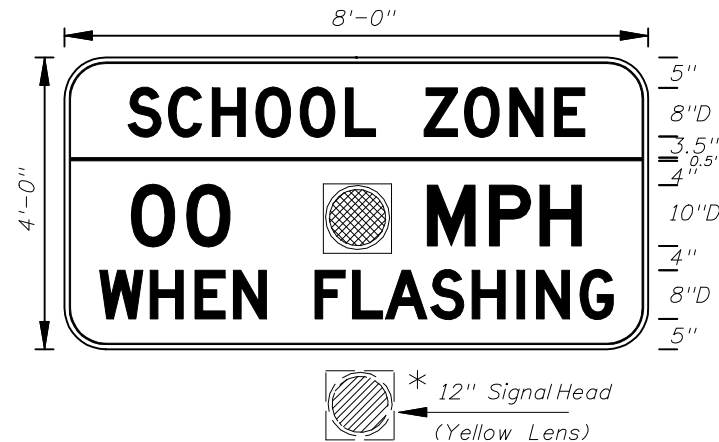


FTP-30-06
2'-0" X 3'-0"
3" Radii $\frac{5}{8}$ " Border
White Background
Black Legend and Border
Top 4" Series D Legend
Bottom 3" Series C Legend

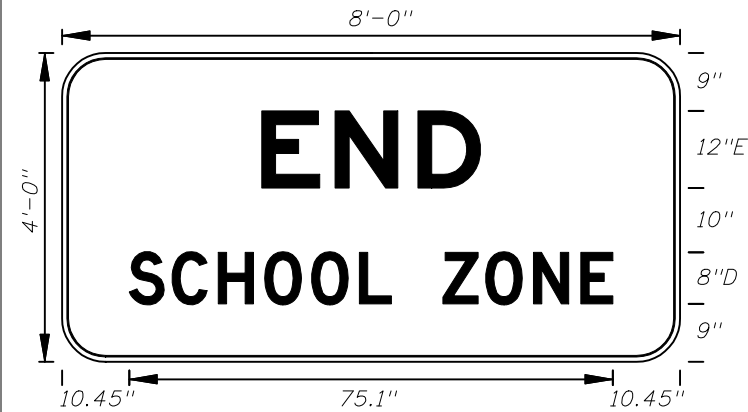




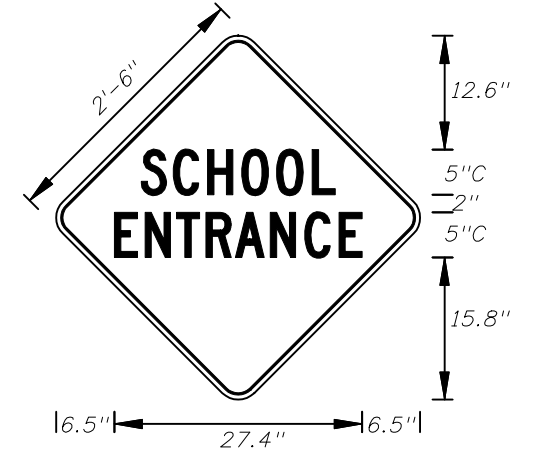
FTP-30A-06
2' X 3'
3" Radii 5/8" Border
Top 4" Series D Legend
Bottom 3" Series C Legend
White Background
Black Legend and Border



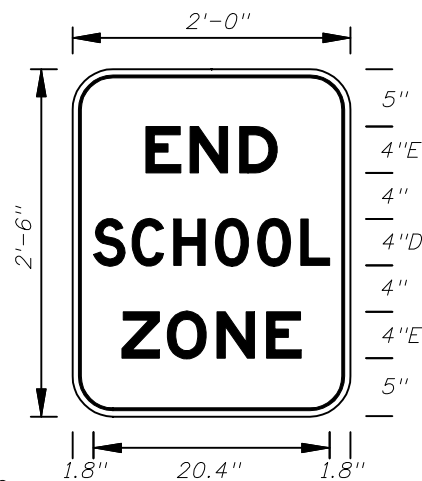
FTP-31-06
8' X 4'
6" Radii 3/4" Border
Series D Legend
Yellow Background Top
White Background Bottom
Black Legend and Border



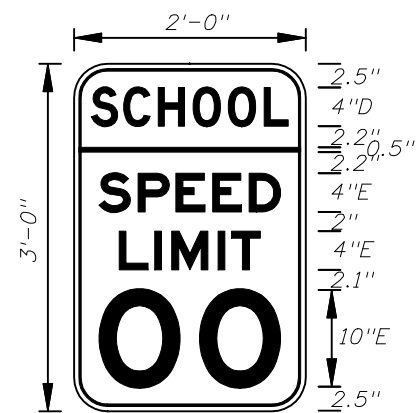
FTP-32-06
8' X 4'
6" Radii 3/4" Border
12" Series E and 8" Series D Legend
White Background
Black Legend and Border



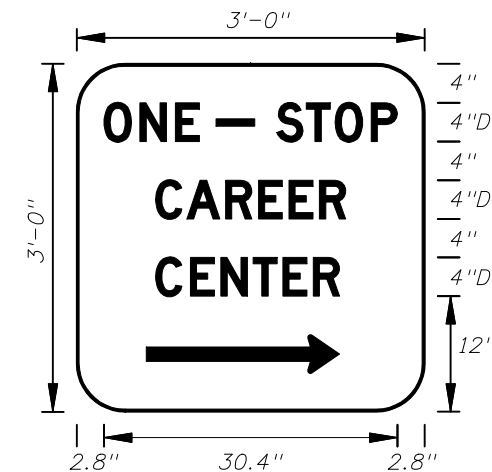
FTP-33-06
2'-6" X 2'-6"
2" Radii 3/4" Border
5" Series C Legend
Yellow Background
Black Legend and Border



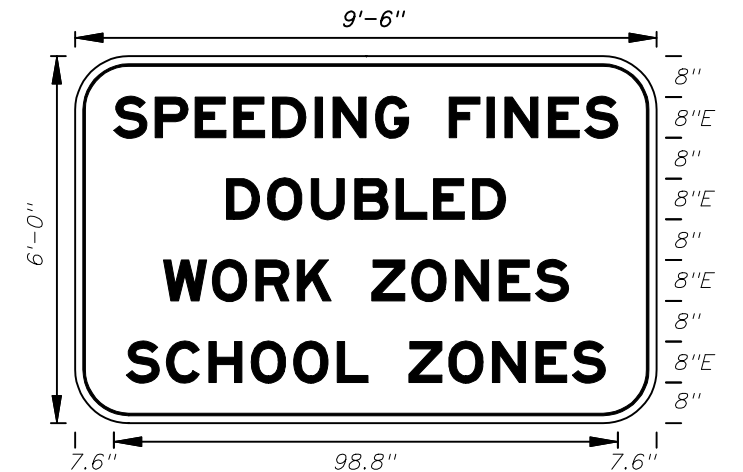
FTP-34-06
2' X 2'-6"
3" Radii 5/8" Border
4" Series D and E Legend
White Background
Black Legend and Border



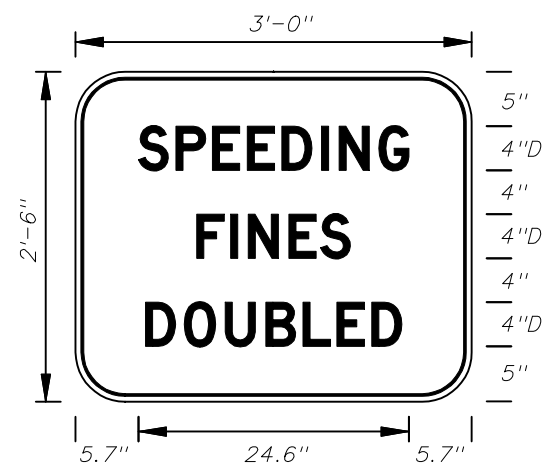
FTP-35-06
2' X 3'
3" Radii 5/8" Border
Top 4" Series D Legend
Bottom 4" and 10" Series E Legend
Yellow Background Top White Background Bottom
Black Legend and Border



FTP-36-06
3' X 3'
5" Radii
4" Series D Legend
Green Background
White Legend and Border

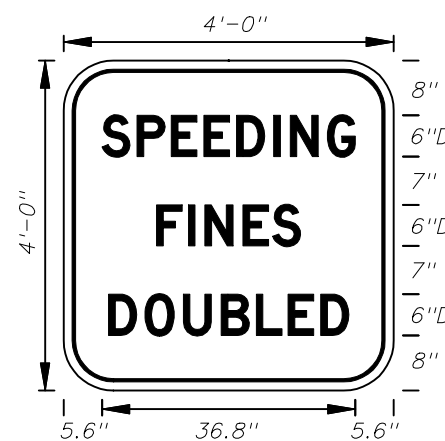


FTP-37-06
9'-6" X 6'
9" Radii 2" Border
8" Series E Legend
White Background
Black Legend and Border
State Line Sign



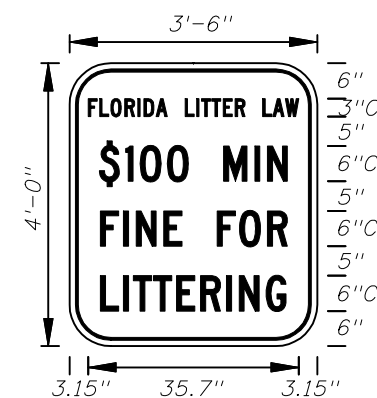
FTP-38-06
3' X 2'-6"
4" Radii 3/4" Border
4" Series D Legend
White Background
Black Legend and Border

Arterial Sign

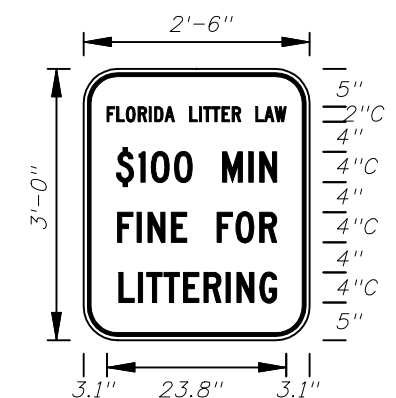


FTP-39-06
4' X 4'
6" Radii 3/4" Border
6" Series D Legend
White Background
Black Legend and Border

Freeway Sign

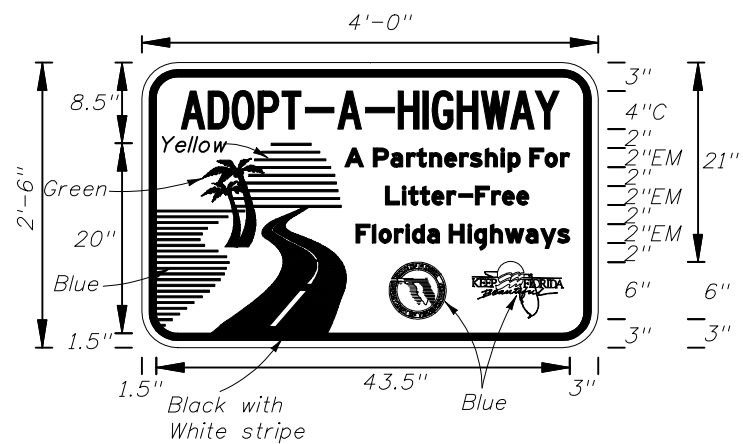


FTP-40-06
3'-6" X 4'
6" Radii 3/4" Border
3" and 6" Series C Legend
White Background
Black Legend and Border

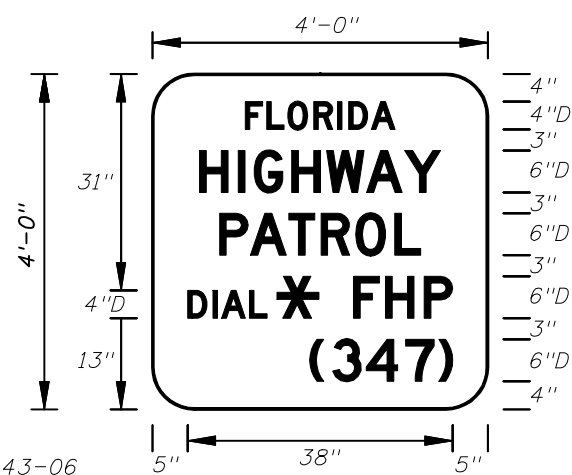


FTP-41-06
2'-6" X 3'
4" Radii 3/4" Border
2" and 4" Series C Legend
White Background
Black Legend and Border





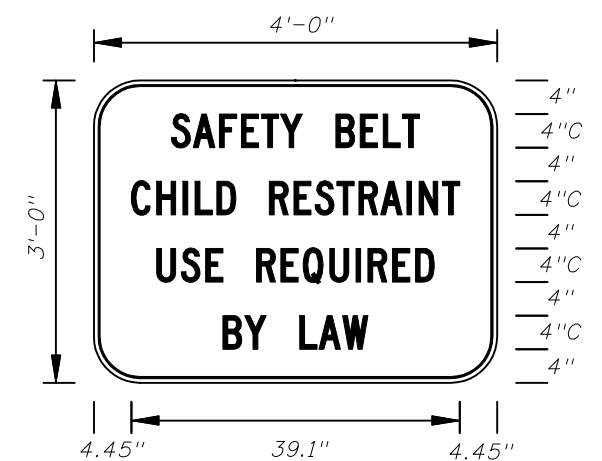
FTP-42-06
4' X 2'-6"
3" Radii
Top 4" Series C Legend
Bottom 2" Series EM Legend
White Background
Blue Legend and Border



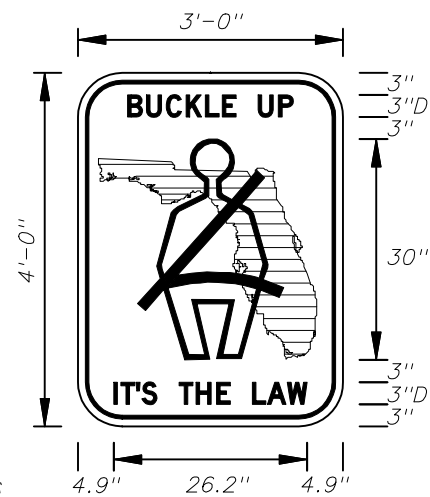
FTP-43-06
4' X 4'
6" Radii 1" Border
Top 4" Series D Legend
Bottom 6" Series D Legend
Blue Background
White Legend and Border



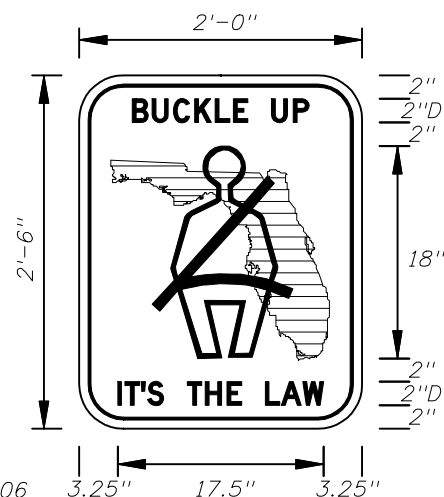
FTP-44-06
9' X 6'
9" Radii 3/4" Border
8" Series D Legend
White Background
Black Legend and Border



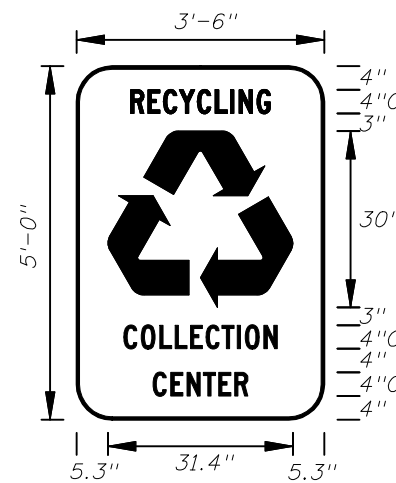
FTP-45-06
4' X 3'
5" Radii 3/4" Border
4" Series C Legend
White Background
Black Legend and Border



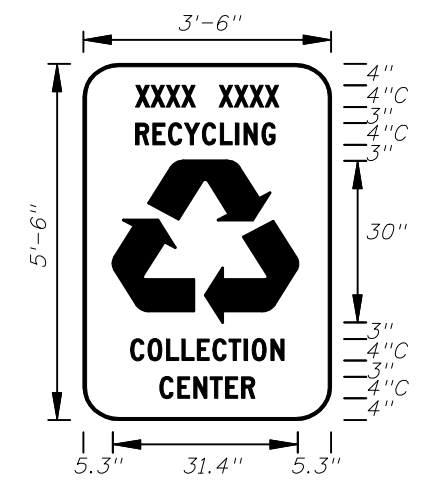
FTP-46-06
3' X 4'
5" Radii 3/4" Border
3" Series D Legend
White Background Florida Shield Green
Black Legend, Border and Man Belt Symbol



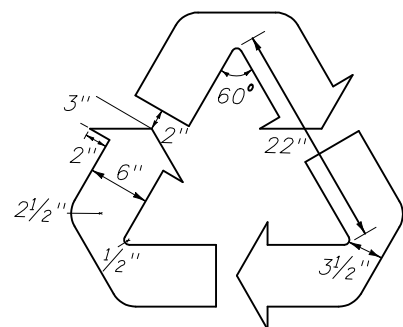
FTP-47-06
2' X 2'-6"
3" Radii 5/8" Border
2" Series D Legend
White Background Florida Shield Green
Black Legend, Border and Man Belt Symbol



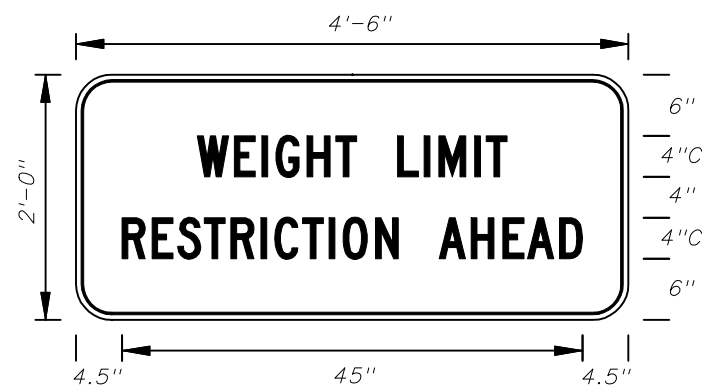
FTP-48-06
3'-6" X 5'
6" Radii
4" Series C Legend
Green Background
White Legend, Border and Symbol



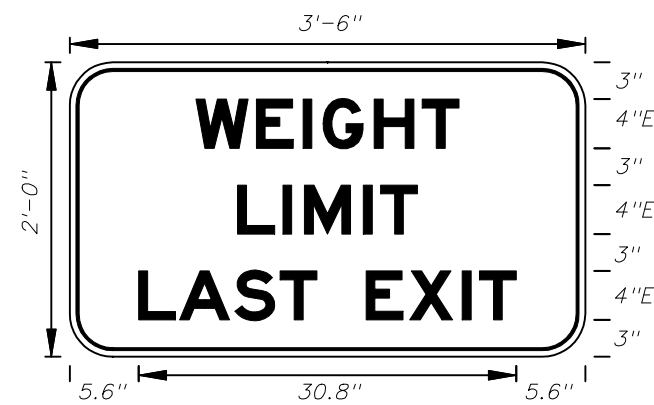
FTP-49-06
3'-6" X 5'-6"
6" Radii
4" Series C Legend
Green Background Municipality Name Optional
White Legend, Border and Symbol



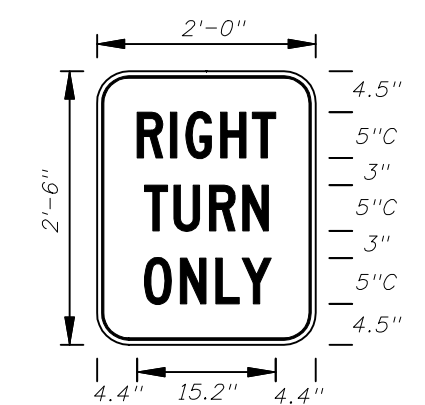
Detail for FTP-48-06 and FTP-49-06



FTP-50-06
4'-6" X 2'
3" Radii 3/4" Border
4" Series C Legend
Yellow Background
Black Legend and Border

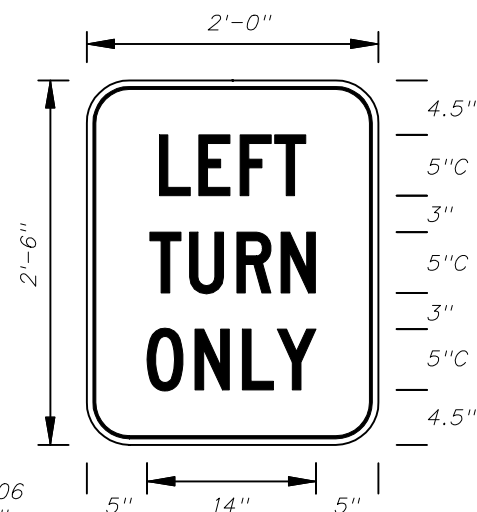


FTP-51-06
3' X 2'
3" Radii 3/4" Border
4" Series E Legend
White Background
Black Legend and Border

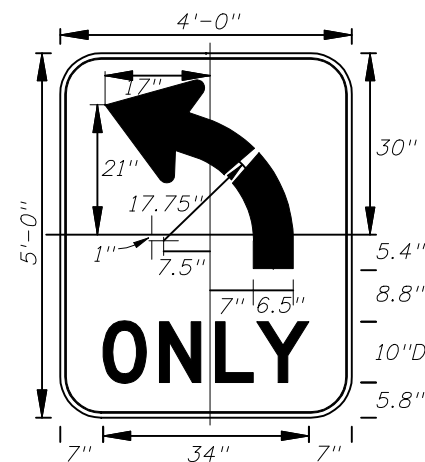


FTP-52-06
2' X 2'-6"
3" Radii 5/8" Border
5" Series C Legend
White Background
Black Legend and Border

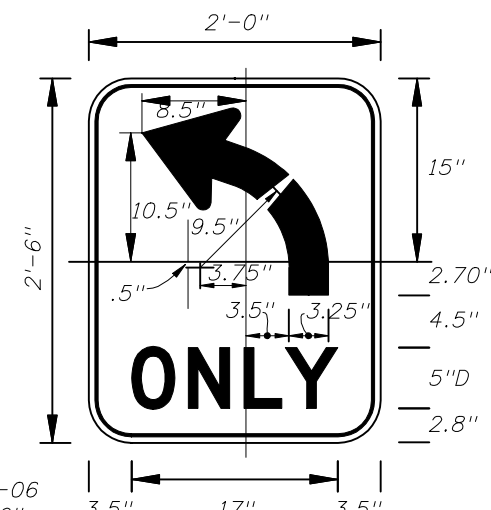




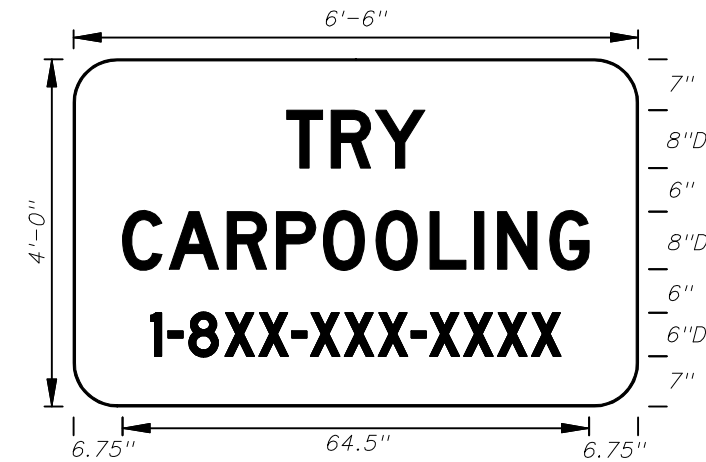
FTP-53-06
2' X 2'-6"
3" Radii 5/8" Border
5" Series C Legend
White Background
Black Legend and Border



FTP-54-06
4' X 5'
6" Radii 3/4" Border
10" Series D Legend
White Background
Black Legend and Border

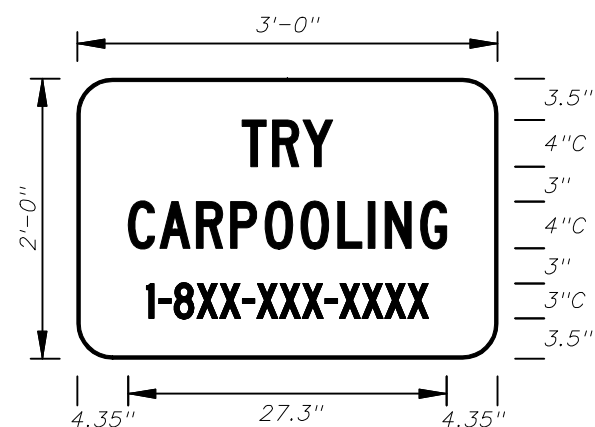


FTP-55-06
2' X 2'-6"
3" Radii 3/8" Border
5" Series D Legend
White Background
Black Legend and Border



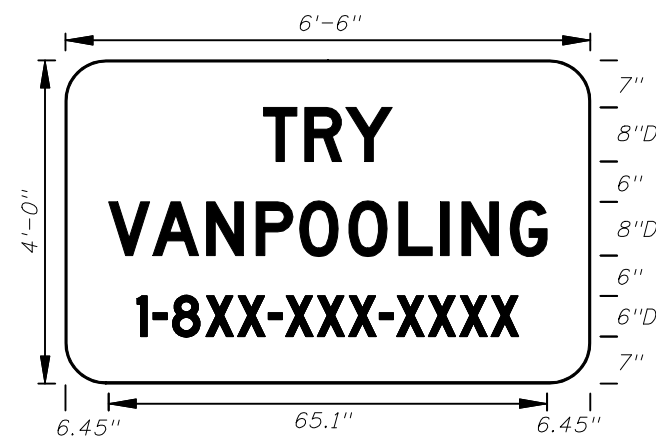
FTP-56-06
6'-6" X 4'
6" Radii 3/4" Border
8" and 6" Series D Legend
Blue Background
White Legend and Border

Design Project Manager
or Transit Administrator
will supply correct 1-8XX
number.



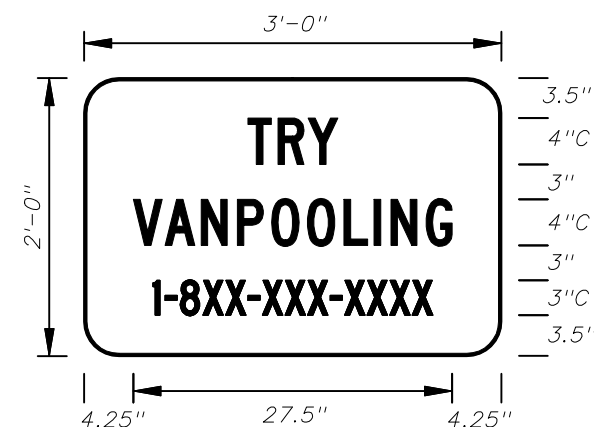
FTP-56A-06
3' X 2'
3" Radii
4" and 3" Series C Legend
Blue Background
White Legend and Border

Design Project Manager
or Transit Administrator
will supply correct 1-8XX
number.



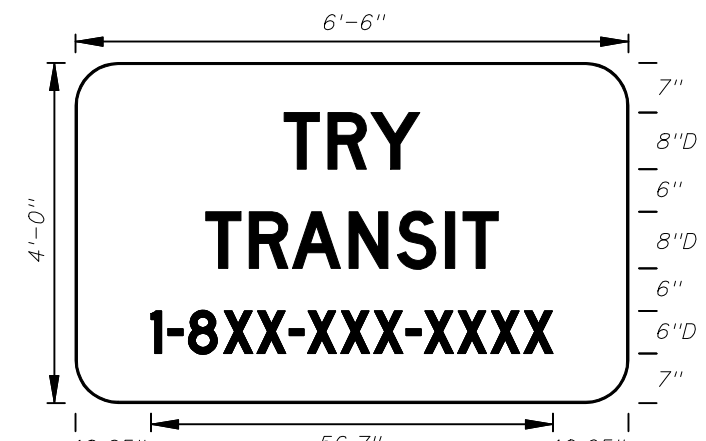
FTP-57-06
6'-6" X 4'
6" Radii
8" and 6" Series D Legend
Blue Background
White Legend and Border

Design Project Manager
or Transit Administrator
will supply correct 1-8XX
number.



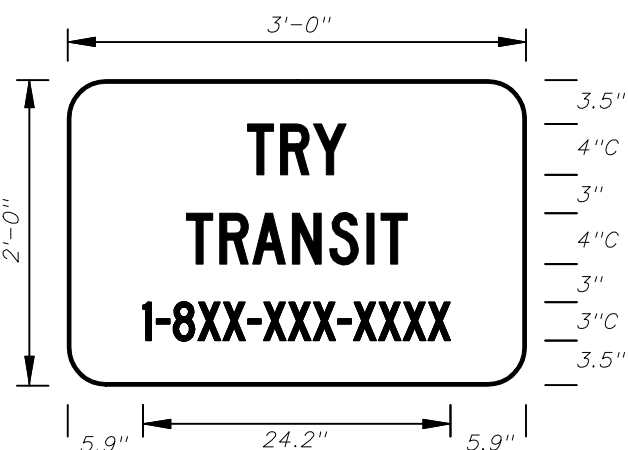
FTP-58-06
3' X 2'
3" Radii
4" and 3" Series C Legend
Blue Background
White Legend and Border

Design Project Manager
or Transit Administrator
will supply correct 1-8XX
number.



FTP-59-06
6'-6" X 4'
6" Radii
8" and 6" Series D Legend
Blue Background
White Legend and Border

Design Project Manager
or Transit Administrator
will supply correct 1-8XX
number.



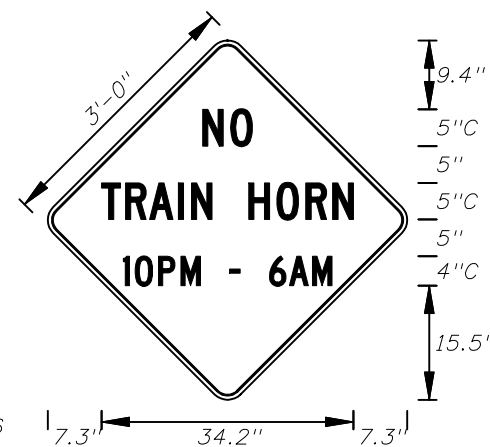
FTP-60-06
3' X 2'
3" Radii
4" and 3" Series C Legend
Blue Background
White Legend and Border

Design Project Manager
or Transit Administrator
will supply correct 1-8XX
number.

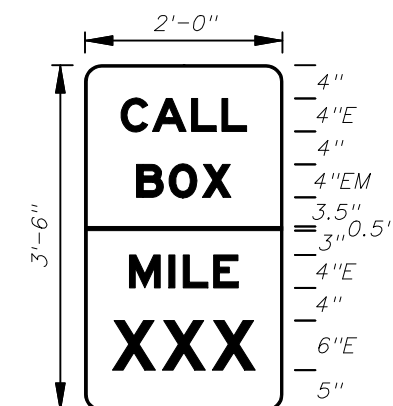


FTP-61-06
3' X 2'
3" Radii 3/4" Border
4" and 3" Series C Legend
Yellow Background
Black Legend and Border

Design Project Manager
or Transit Administrator
will supply correct 1-8XX
number.

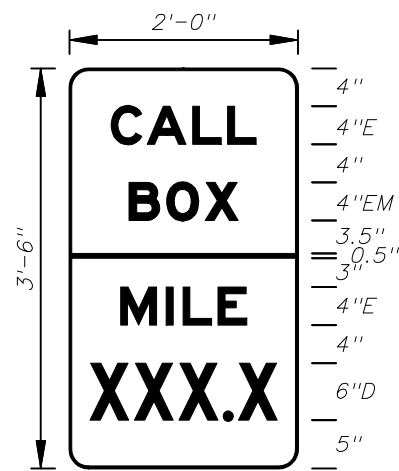


FTP-62-06
3' X 3'
2" Radii 3/4" Border
4" and 5" Series C Legend
Yellow Background
Black Legend and Border

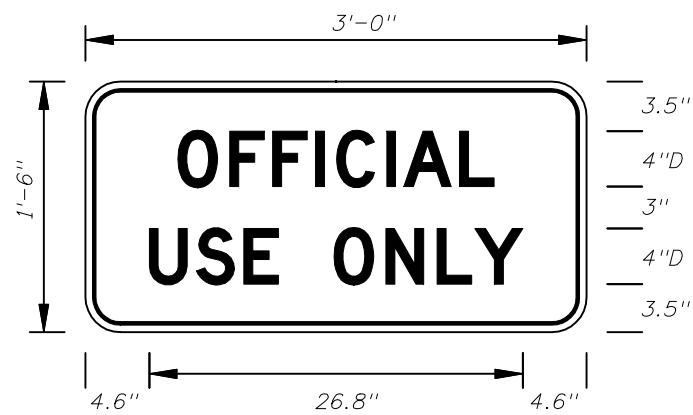


FTP-63-06
2' X 3'-6"
2" Radii 4" and 6" Series E and EM Legend
Top Blue Background White Legend and Border
Bottom Green Background White Legend and Border





FTP-64-06
2' X 3'-6"
2" Radii
Top 4" Series E and 4" Series EM Legend
Blue Background White Legend and Border
Bottom 4" Series E and 6" Series D Legend
Green Background White Legend and Border



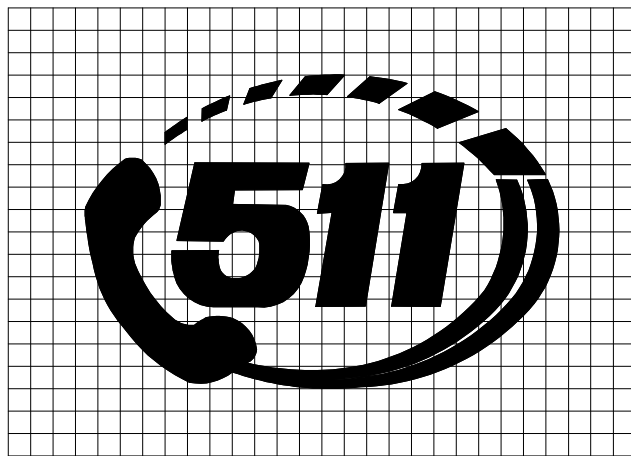
FTP-65-06
3' X 1'-6"
2" Radii 3/4" Border
4" Series D Legend
White Background
Black Legend and Border



FTP-66-06
4' X 5'
2" Radii 3/4" Border
7" Series D Legend
Blue Background
White Legend and Border

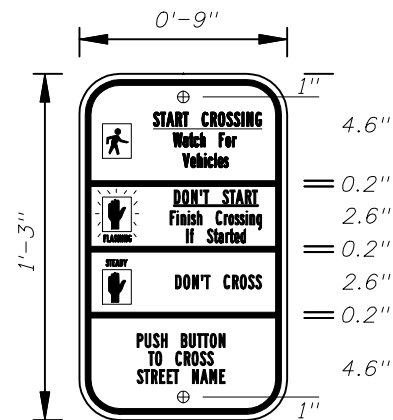


FTP-67-06
3' X 4'
2" Radii 3/4" Border
5" Series D Legend
Blue Background
White Legend and Border



DETAIL for FTP-66 AND FTP-67

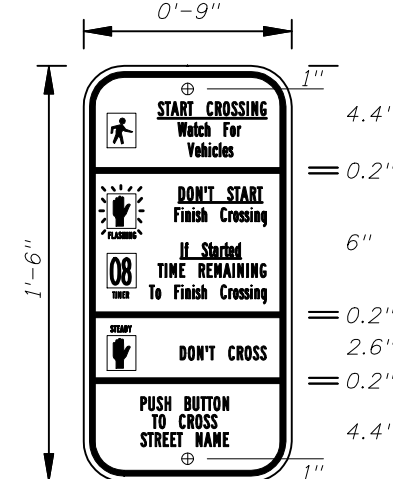
Sign Mounting Holes Can Be Punched Or Field Drilled With No Obstruction To Text Or Symbols From Holes Or Bolts.



FTP-68A-06
9" X 1'-3"
1.5" Radii 3/4" Border
Series B Legend
White Background
Black Legend and Border

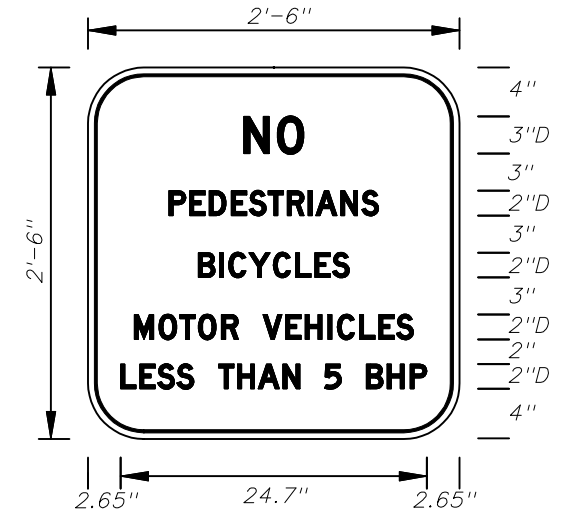
See Standard Highway Signs Manual, Sign R10-3b For Letter Size Spacing And Symbol Sizes.

Sign Mounting Holes Can Be Punched Or Field Drilled With No Obstruction To Text Or Symbols From Holes Or Bolts.

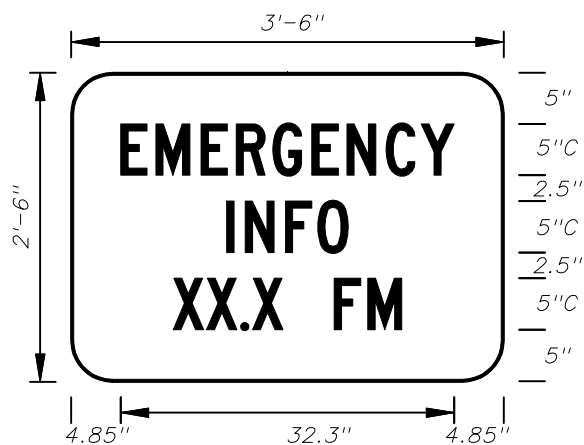


FTP-68B-06
9" X 1'-6"
1.5" Radii 3/4" Border
Series B Legend
White Background
Black Legend and Border

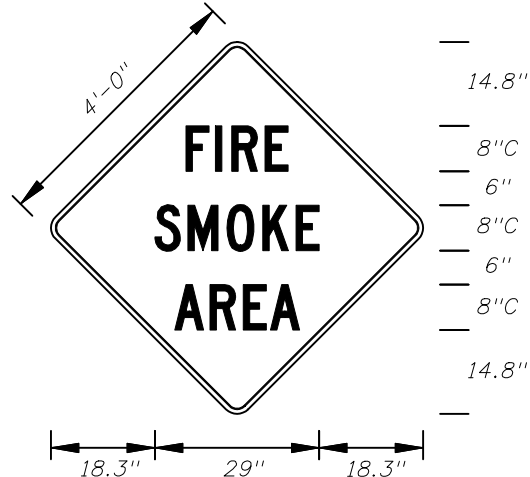
See Standard Highway Signs Manual, Sign R10-3b For Letter Size Spacing And Symbol Sizes.



FTP-69-06
2'-6" X 2'-6"
4" Radii 3/4" Border
2" and 3" Series D Legend
White Background
Black Legend and Border



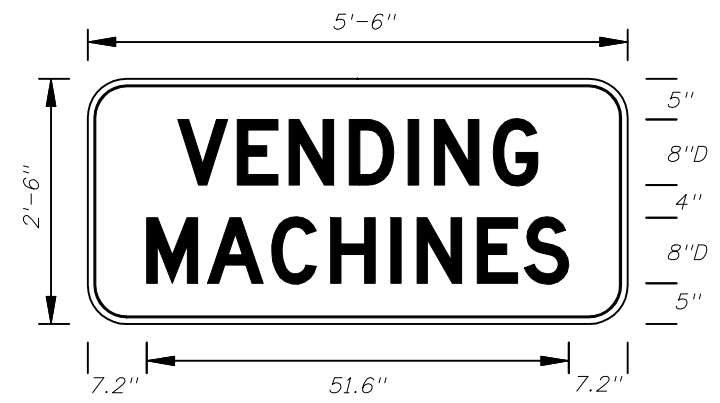
FTP-70-06
3'-6" X 2'-6"
4" Radii 3/4" Border
5" Series C Legend
Blue Background
White Legend and Border



FTP-71-06
4' X 4'
2" Radii 3/4" Border
8" Series C Legend
Yellow Background
Black Legend and Border



FTP-72-06
3' X 3'
2" Radii 3/4" Border
6" Series C Legend
Yellow Background
Black Legend and Border

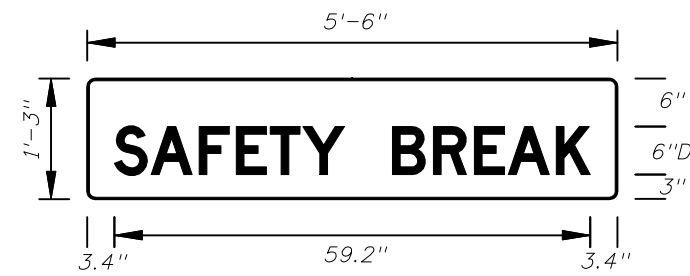


FTP-73-06
5'-6" X 2'-6"
4" Radii 3/4" Border
8" Series D Legend
Blue Background
White Legend and Border

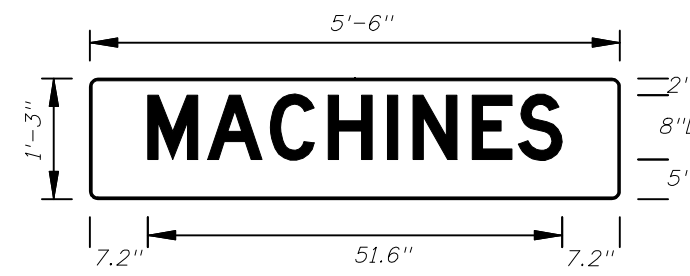




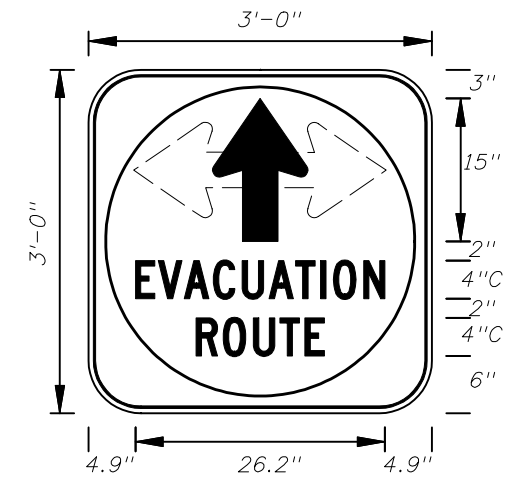
FTP-74-06
5'-6" X 2'-6"
4" Radii 3/4" Border
6" Series D Legend
Blue Background
White Legend and Border



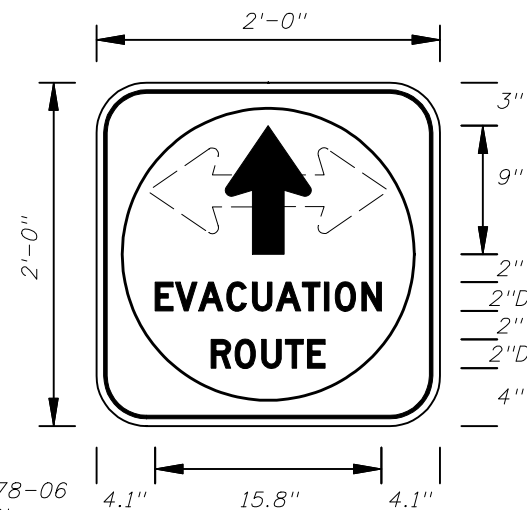
FTP-75-06
5'-6" X 1'-3"
1" Radii
6" Series D Legend
Blue Background
White Legend



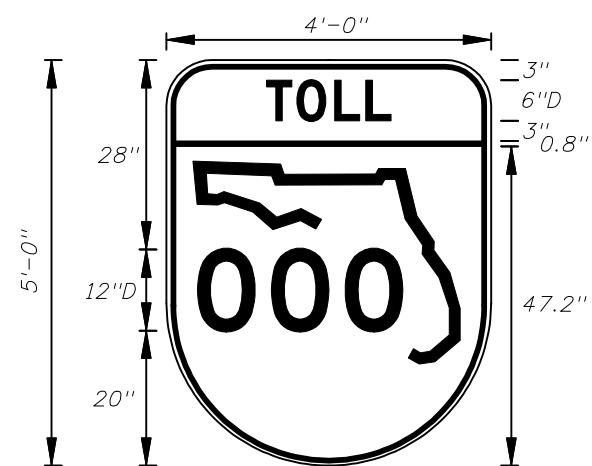
FTP-76-06
5'-6" X 1'-3"
1" Radii
8" Series D Legend
Blue Background
White Legend



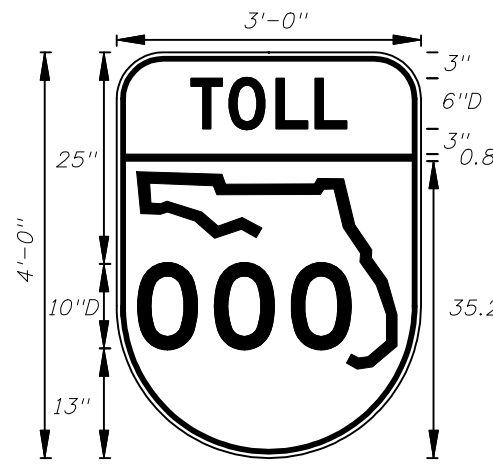
FTP-77-06
3' X 3'
5" Radii 3/4" Border
4" Series C Legend
White Background with Blue Circle Background
White Legend and Black Border



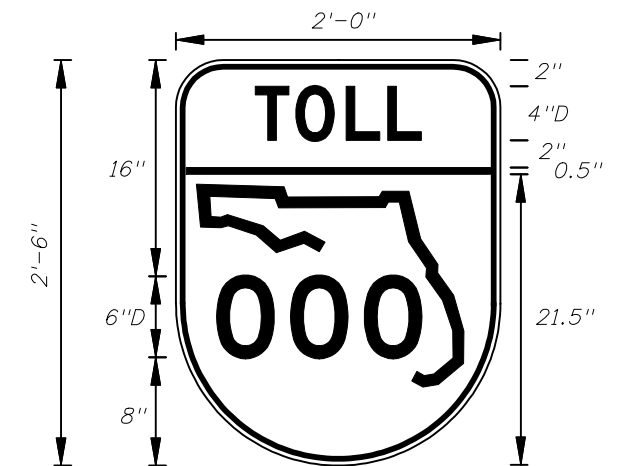
FTP-78-06
2' X 2'
3" Radii 3/4" Border
2" Series D Legend
White Background with Blue Circle Background
White Legend and Black Border



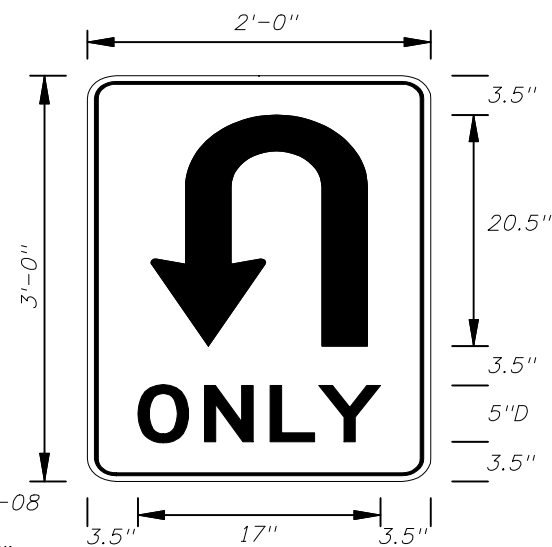
FTP-79-06
4' X 5'
6" Radii 3/4" Border
6" and 12" Series D Legend
Top Green Background with White Legend and Black Border
Bottom White Background with Black Legend and Border



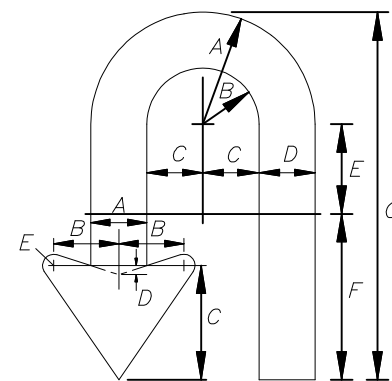
FTP-80-06
3' X 4'
5" Radii 3/4" Border
6" and 10" Series D Legend
Top Green Background with White Legend and Black Border
Bottom White Background with Black Legend and Border



FTP-81-06
2' X 2'-6"
3" Radii 3/4" Border
4" and 6" Series D Legend
Top Green Background with White Legend and Black Border
Bottom White Background with Black Legend and Border

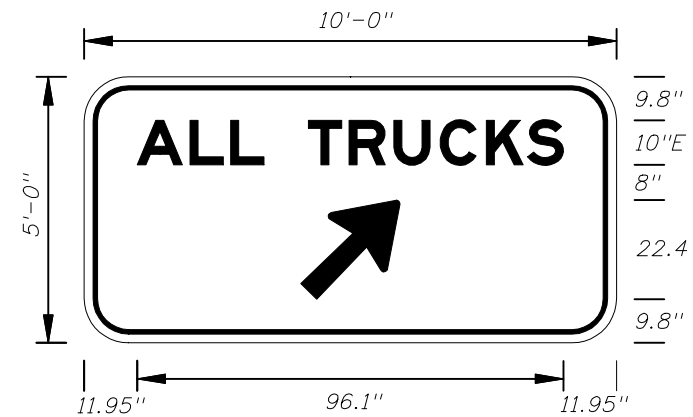


FTP-82-08
2' X 3'
1.5" Radii
5" Series D Legend
White Background
Black Legend and Border



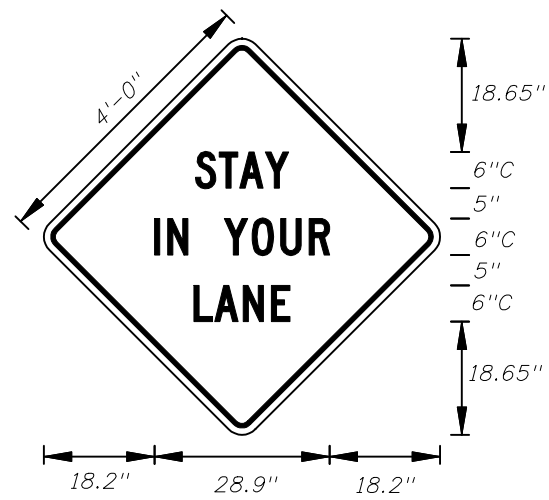
A	B	C	D	E	F	G
6.25	3.125	3.125	3.125	5	9.25	20.5

A	B	C	D	E
3.125	3.625	6.375	.5	.625

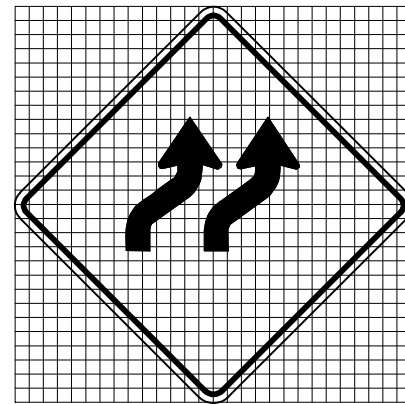


FTP-83-08
10'-0" X 5'-0"
8" Radii
10" Series E Legend
Green Background
White Legend

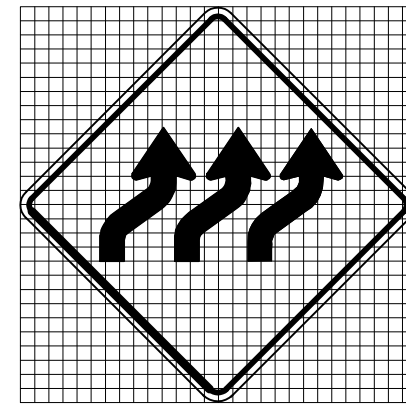




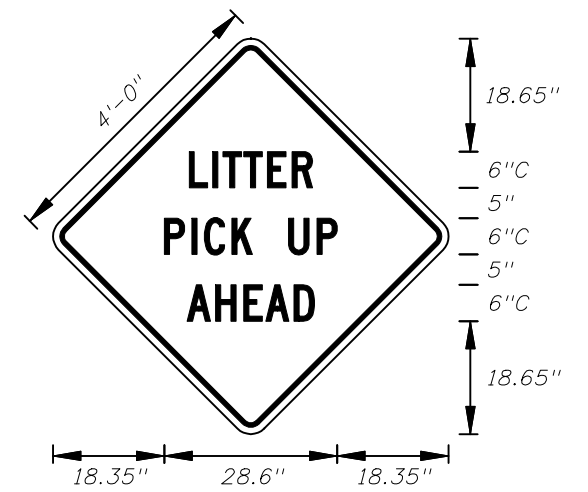
MDT-1-06
4' X 4'
2" Radii 3/4" Border
6" Series C Legend
Orange Background
Black Legend and Border



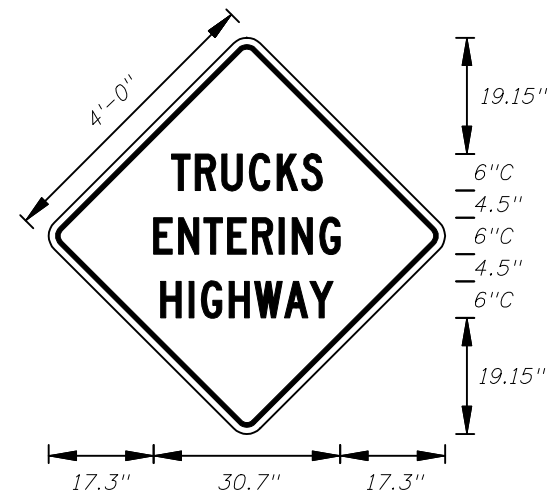
MDT-2-06
4' X 4'
2" Radii 3/4" Border
Orange Background
Black Arrows and Border



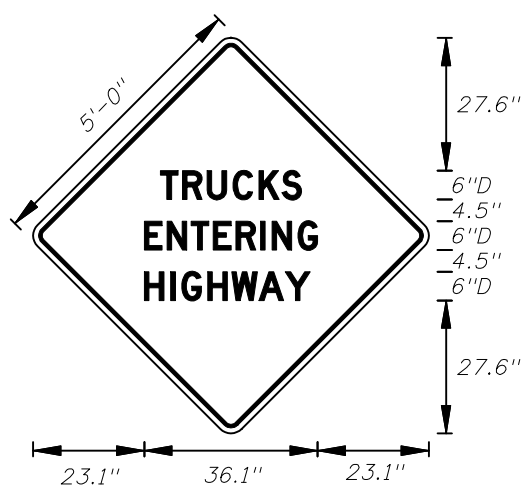
MDT-3-06
4' X 4'
2" Radii 3/4" Border
Orange Background
Black Arrows and Border



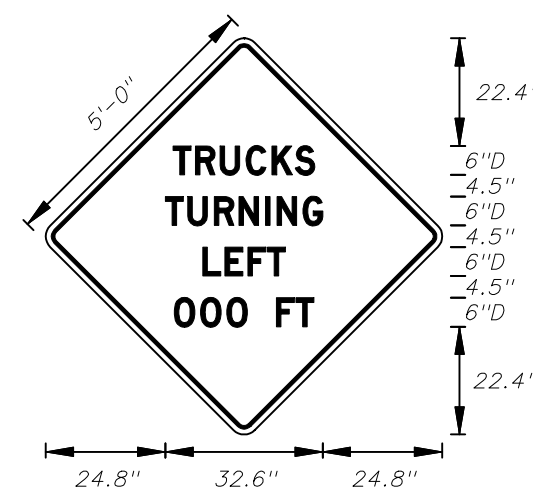
MDT-4-06
4' X 4'
2" Radii 3/4" Border
6" Series C Legend
Orange Background
Black Legend and Border



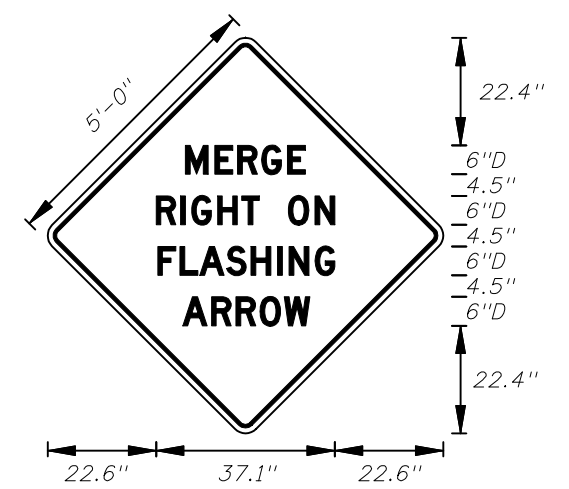
MDT-5-06
4' X 4'
2" Radii 3/4" Border
6" Series C Legend
Orange Background
Black Legend and Border



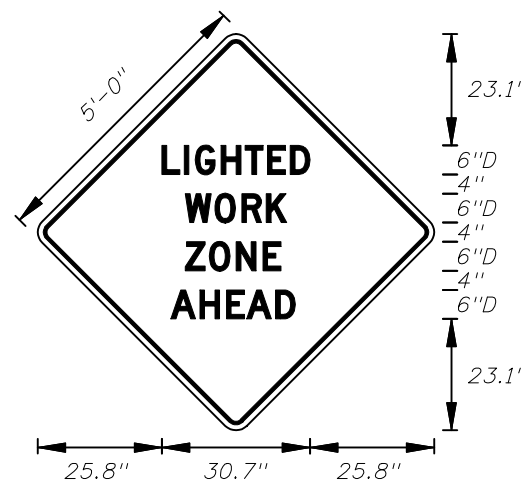
MDT-6-06
5' X 5'
2" Radii 3/4" Border
6" Series D Legend
Orange Background
Black Legend and Border



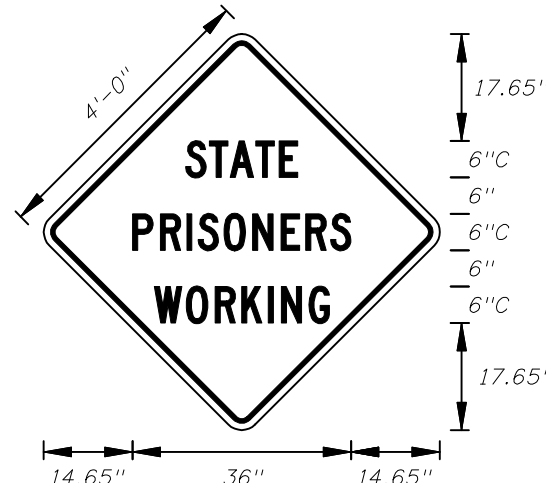
MDT-7-06
5' X 5'
2" Radii 3/4" Border
6" Series D Legend
Orange Background
Black Legend and Border



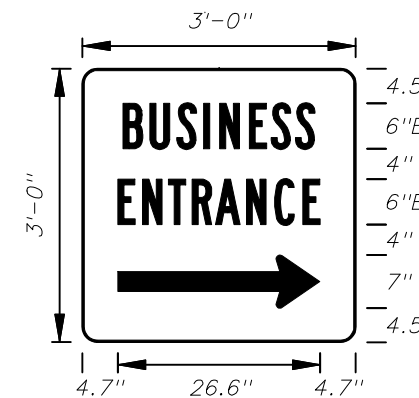
MDT-8-06
5' X 5'
2" Radii 3/4" Border
6" Series D Legend
Orange Background
Black Legend and Border



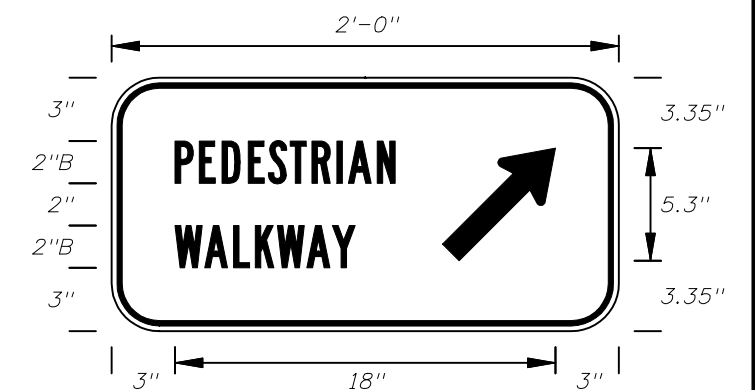
MDT-9-06
5' X 5'
2" Radii 3/4" Border
6" Series D Legend
Orange Background
Black Legend and Border



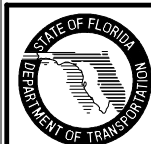
MDT-10-06
4' X 4'
2" Radii 3/4" Border
6" Series C Legend
Orange Background
Black Legend and Border

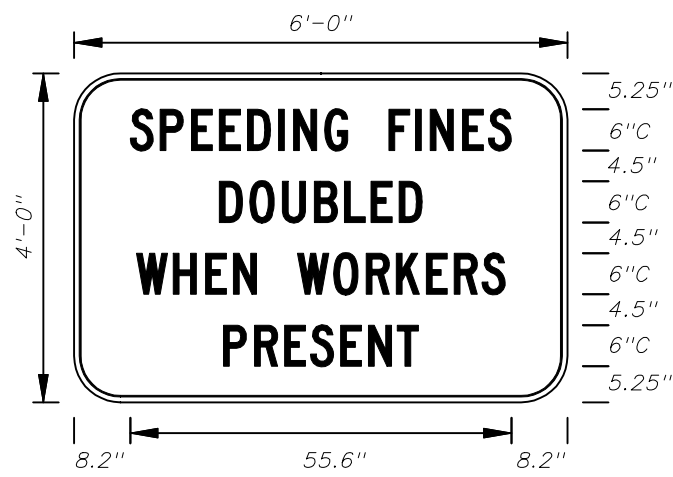


MDT-11-06
3' X 3'
2" Radii 3/4" Border
6" Series B Legend
Blue Background
White Legend and Border



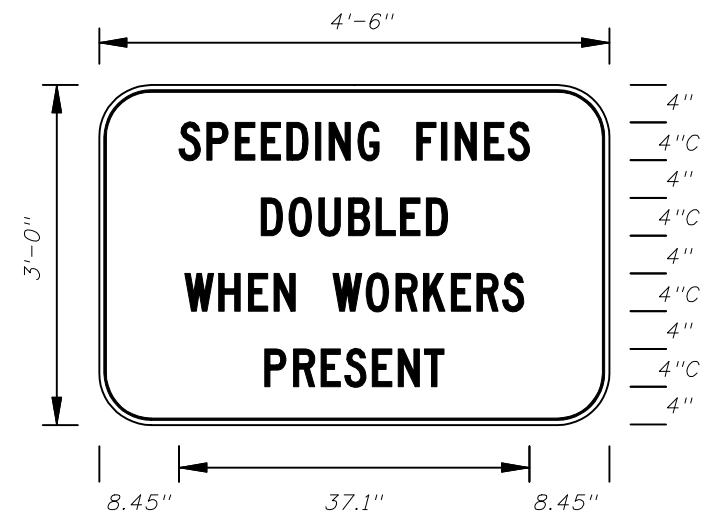
MDT-12-06
2' X 1'
2" Radii 3/4" Border
2" Series B Legend
White Background
Black Legend and Border





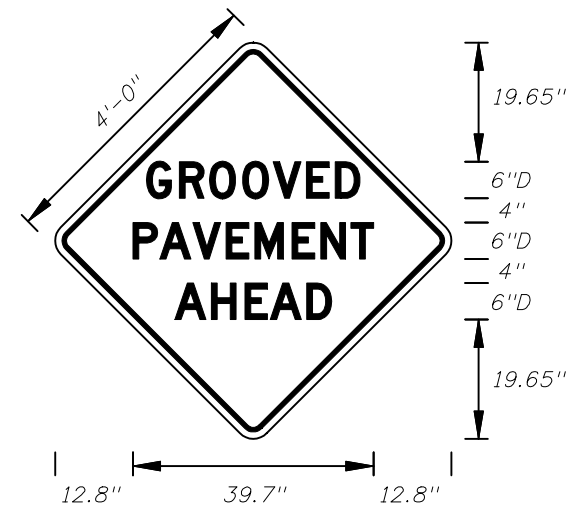
MDT-13-06 Freeway Sign
6' X 4'
6" Radii $\frac{3}{4}$ " Border

6" Series C Legend
White Background
Black Legend and Border



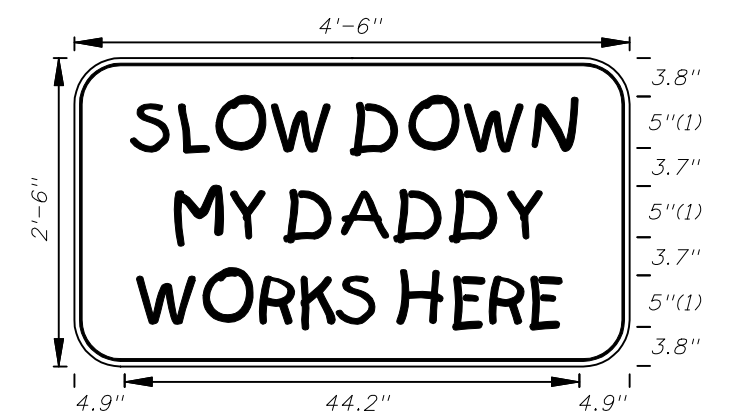
MDT-14-06 Arterial Sign
4'-6" X 3'
5" Radii $\frac{3}{4}$ " Border

4" Series C Legend
White Background
Black Legend and Border



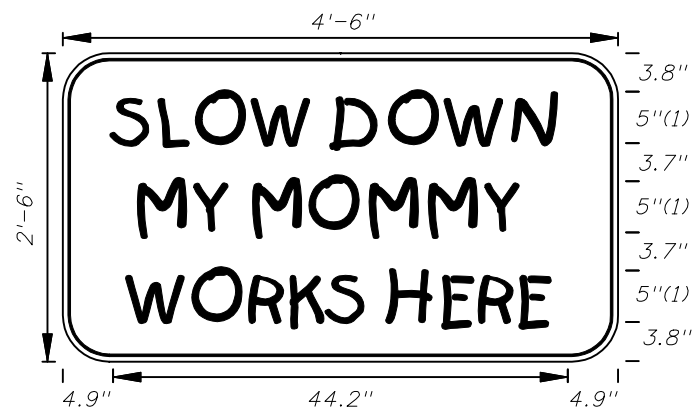
MDT-15-06
4' X 4'
2" Radii $\frac{3}{4}$ " Border

6" Series D Legend
Orange Background
Black Legend and Border



MDT-16-06
4'-6" X 2'-6"
4" Radii $\frac{3}{4}$ " Border

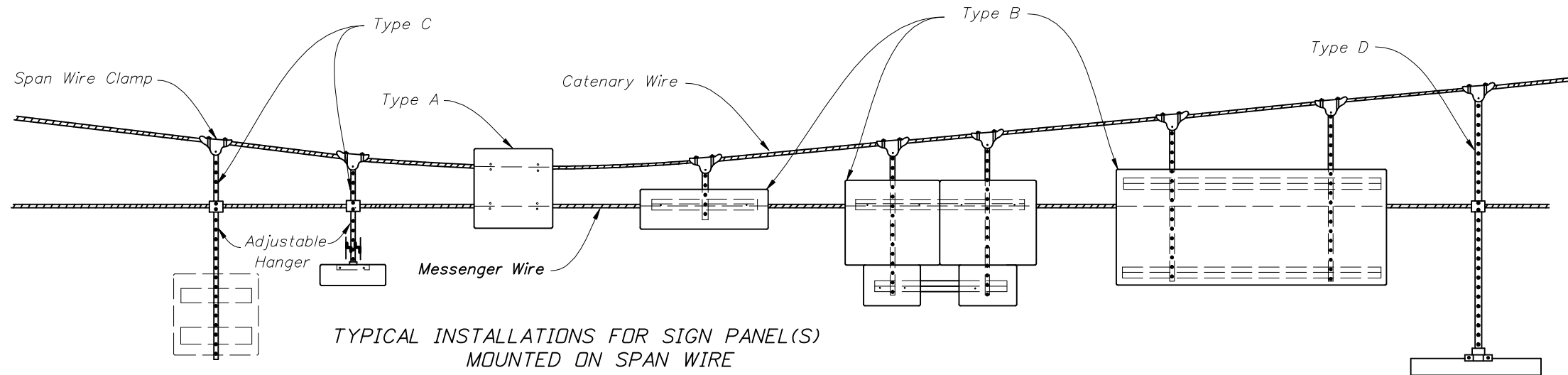
5" Kids Series Legend
Orange Background
Black Legend and Border



MDT-17-06
4'-6" X 2'-6"
4" Radii $\frac{3}{4}$ " Border

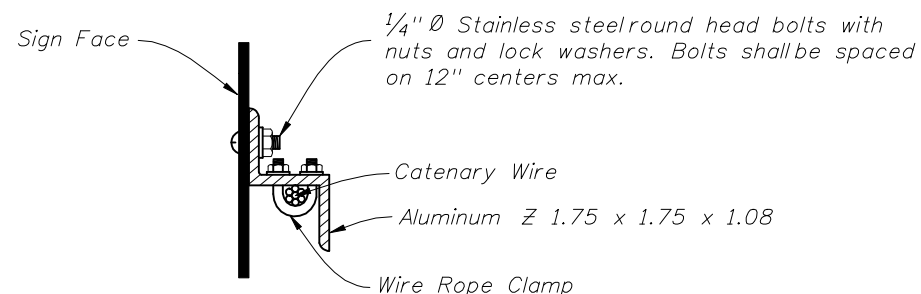
5" Kids Series Legend
Orange Background
Black Legend and Border



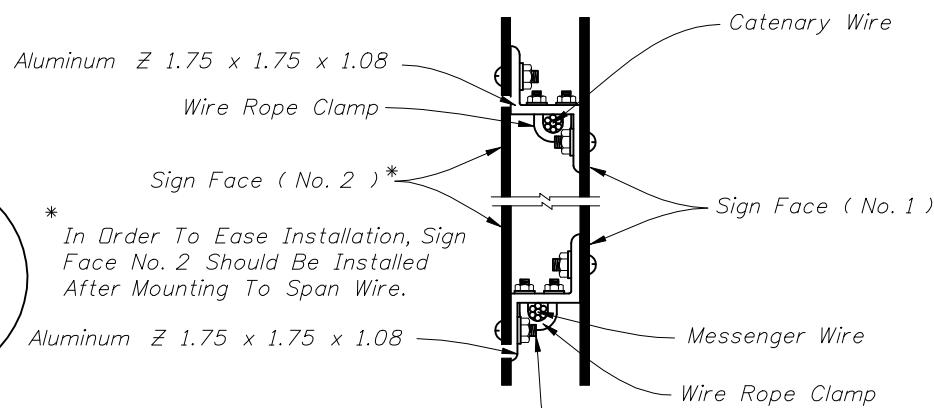


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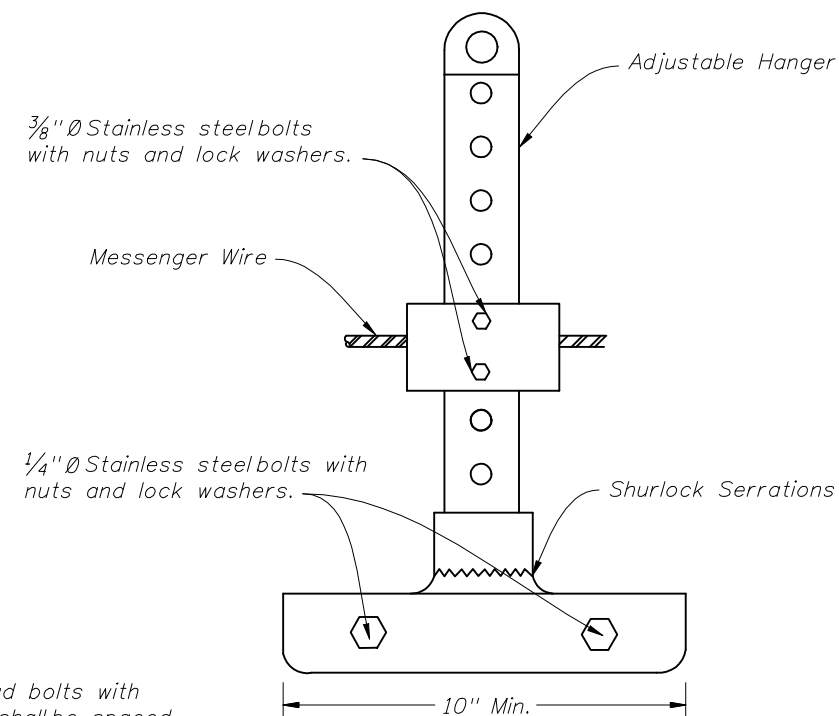
1. Bottom edge of signs shall be approximately at the same elevation.
2. Type B & C attachments with one hanger shall have wind beams for signs wider than 3 1/2'. The beams shall extend to within 6" of the sign edge.
3. Type B & C attachments for signs 4' and wider shall have 2 hangers. Signs 7' and wider shall have wind beams that extend to within 6" of the sign edge.
4. Type D attachments shall be for signs 3 1/2' wide or less.
5. Sign panels shall meet the requirements of Index 11200.
6. Refer to section 634 of the Standard Specifications For Road And Bridge Construction.
7. All bolts, nuts, and washers shall be passivated stainless steel, AISI 300 series, commercial grade, type 316.



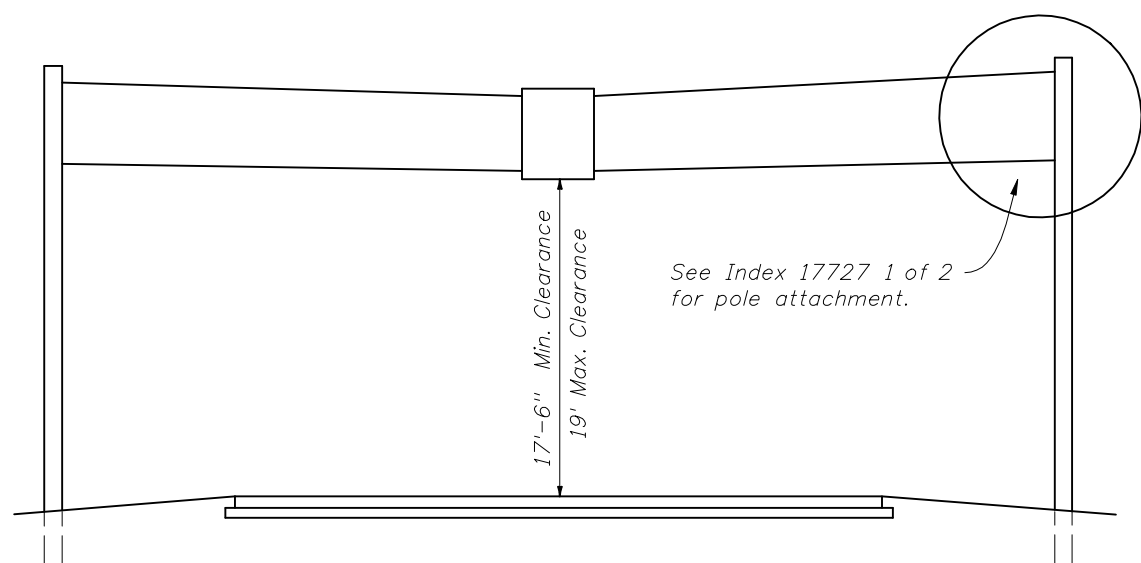
SIGN MOUNTING DETAIL



DETAIL OF OPPOSING SIGNS SPAN WIRE MOUNTED



ADJUSTABLE HANGER FOR SIGN MOUNTING



TYPICAL SPAN WIRE INSTALLATION

* In Order To Ease Installation, Sign Face No. 2 Should Be Installed After Mounting To Span Wire.

The overlapped connection of adjustable hangers shall use a minimum of 2 bolts with a minimum spacing between bolts of 2".

See Index 17727 1 of 2 for pole attachment.

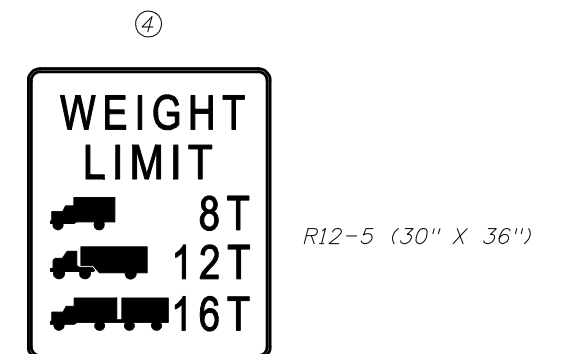
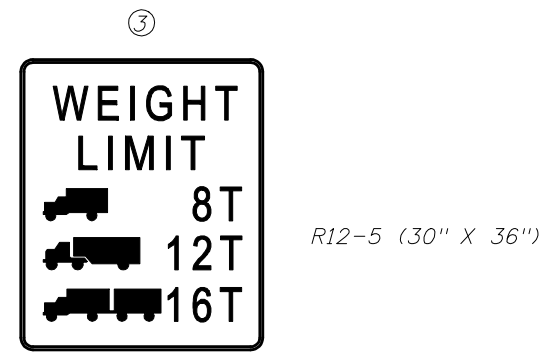
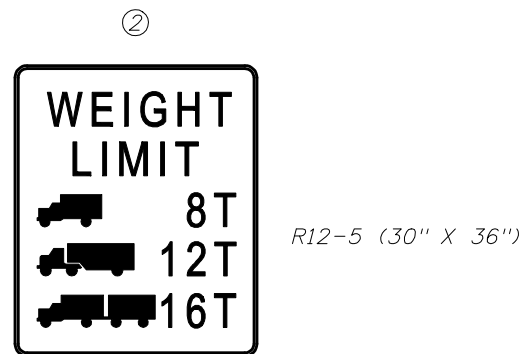
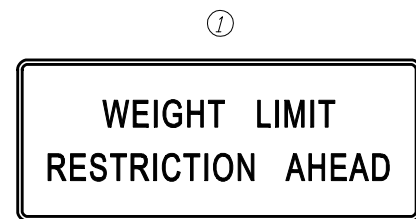
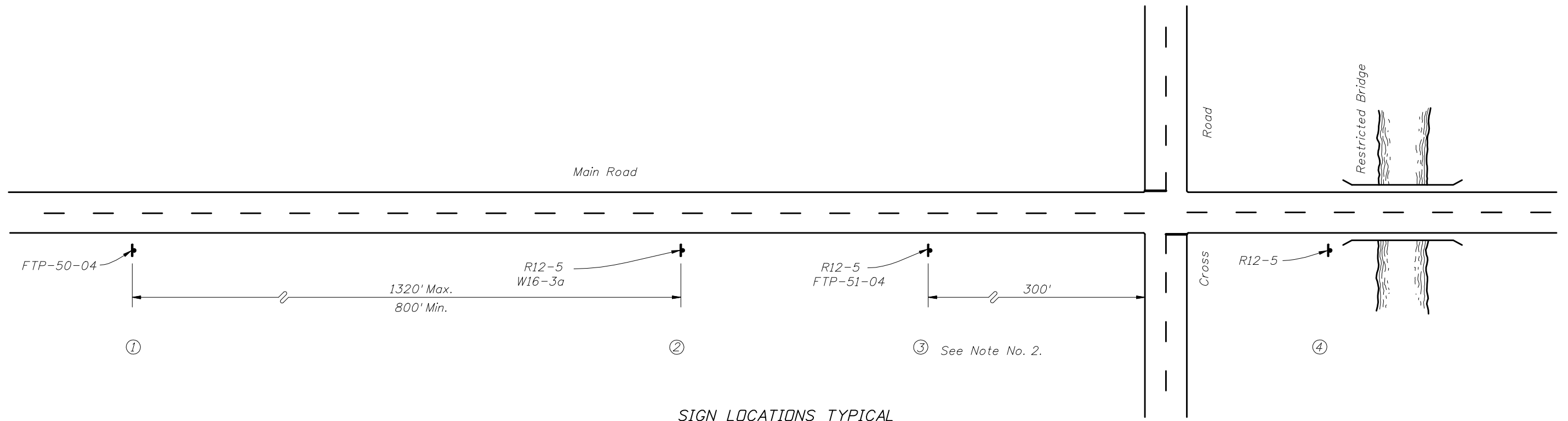
TWO POINT ATTACHMENT



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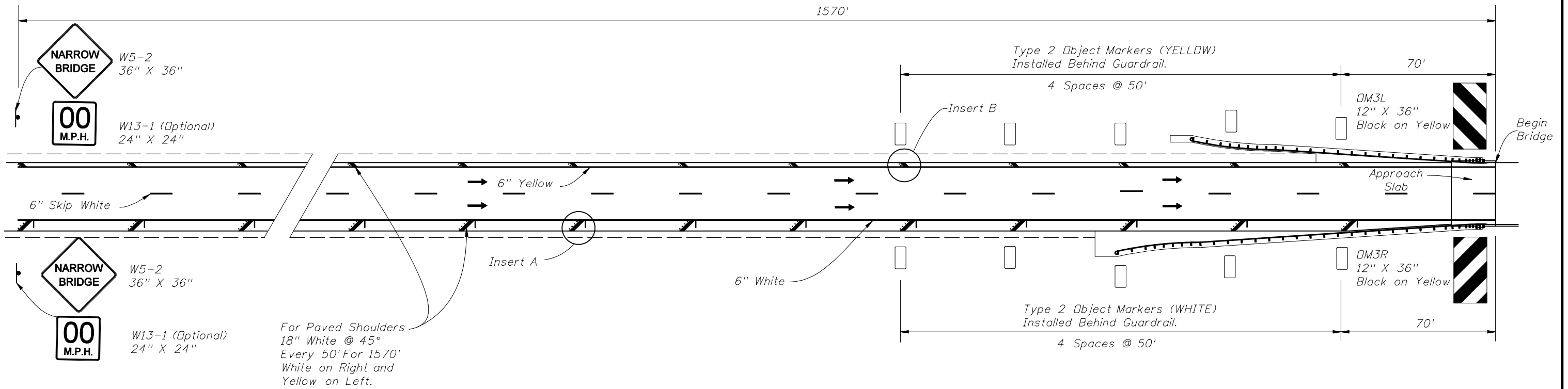
SPAN WIRE MOUNTED SIGN DETAILS

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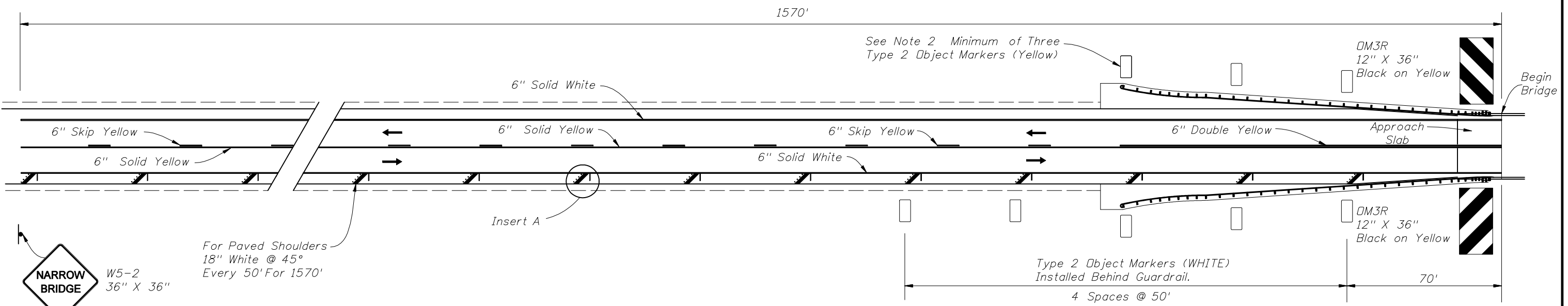


1. See Standard Highway Signs for sign R12-5 and W16-3 details.
2. Sign locatin No. 3 may require some field adjustment.
3. The Cross Road is the last detour to route around the restricted bridge.
4. Sign location No. 2 should be established from the Cross Road the following approximate distances; Interstate-1 Mile Non- Interstate-1/2 Mile.
5. See Index 17355 for sign details.





One-Way Traffic



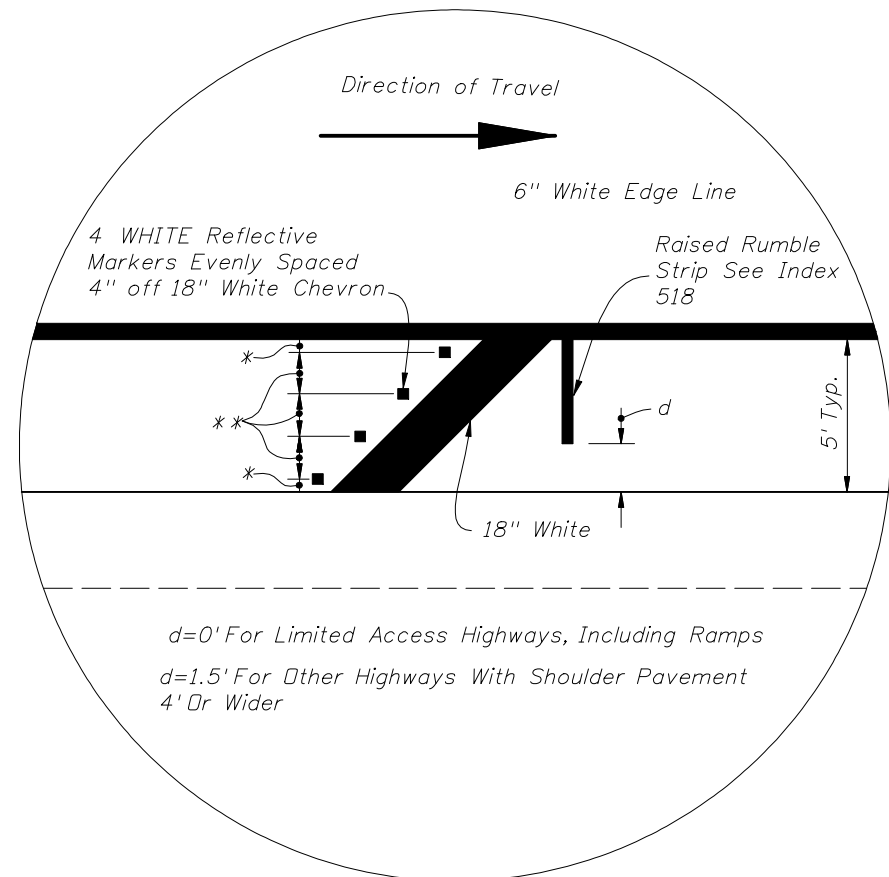
2-Way Traffic



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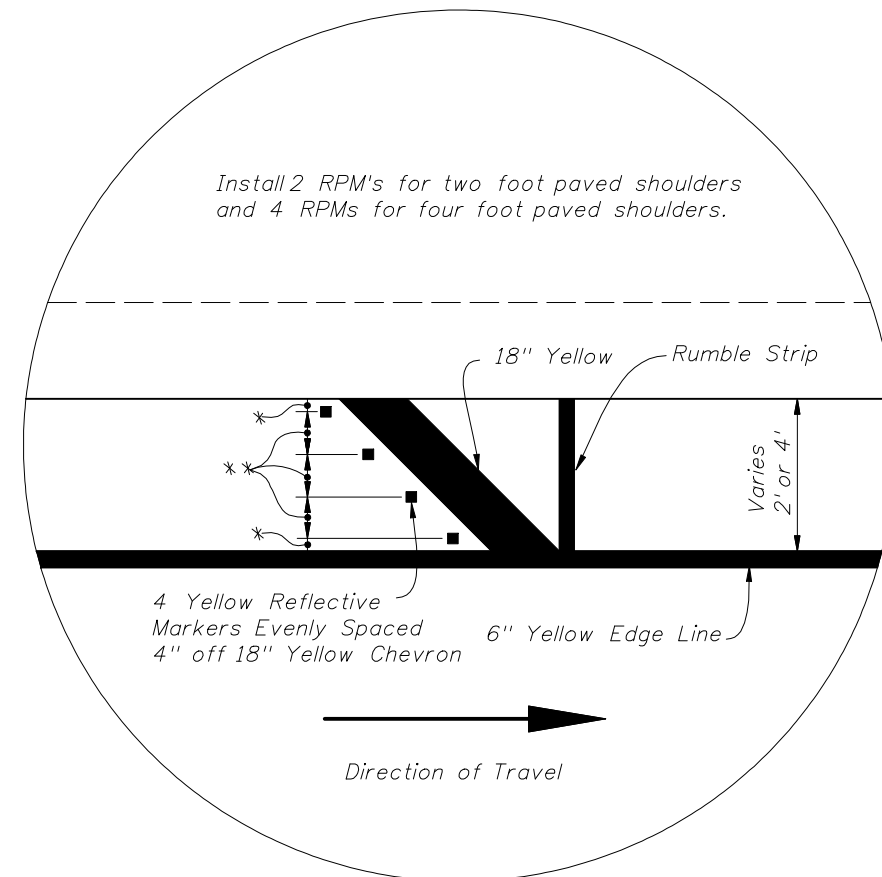
RURAL NARROW BRIDGE TREATMENT

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- * $\frac{1}{8}$ Length (4' and 5' shoulder)
 $\frac{1}{4}$ Length (2' shoulder)
- ** $\frac{1}{4}$ Length (4' and 5' shoulder)
 $\frac{1}{2}$ Length (2' shoulder)

INSERT A



- * $\frac{1}{8}$ Length (4' and 5' shoulder)
 $\frac{1}{4}$ Length (2' shoulder)
- ** $\frac{1}{4}$ Length (4' and 5' shoulder)
 $\frac{1}{2}$ Length (2' shoulder)

INSERT B

NOTES:

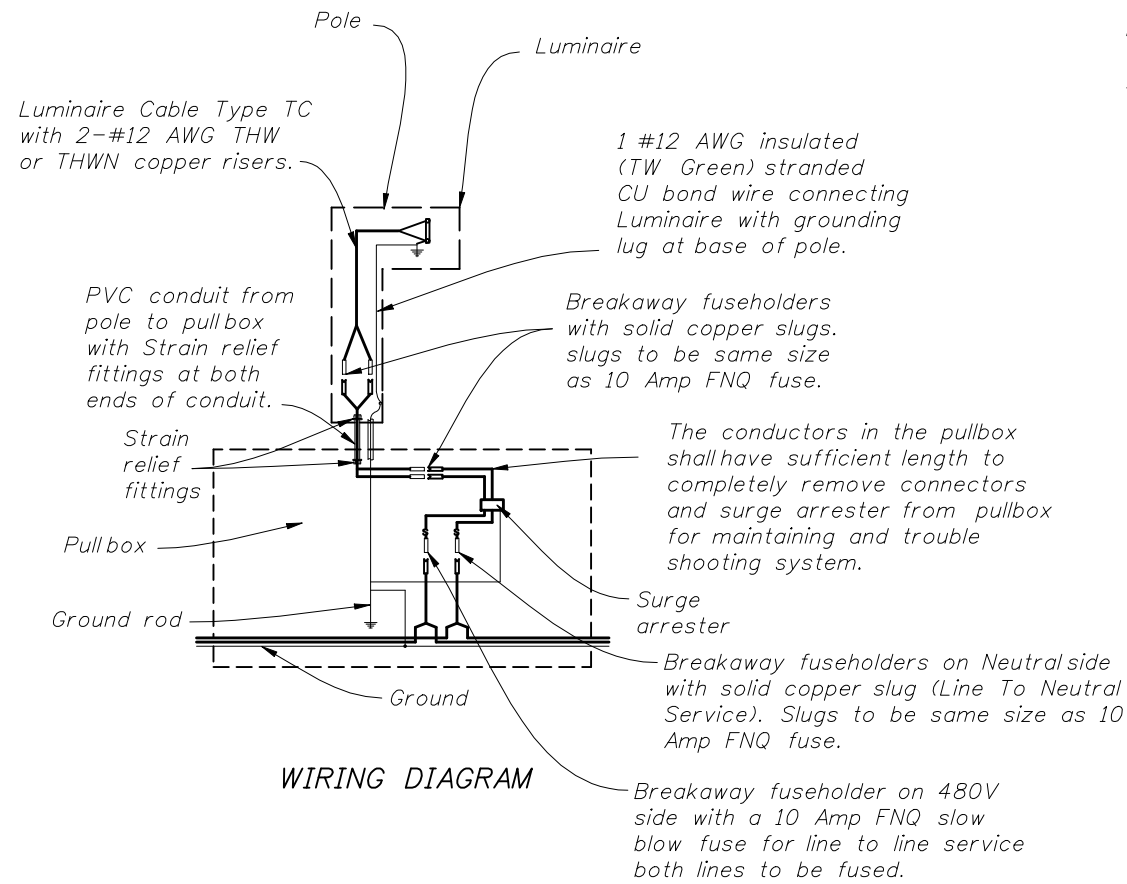
1. Bridges should be marked as narrow bridges under the following conditions:
 - (1) For approach roadways with paved shoulders when the bridge width including shoulders is less than the width of the approach roadway including paved shoulders.
 - (2) For approach roadways without paved shoulders when the bridge shoulder width is less than 2'.
2. Roadways with Two-Way Traffic:

No passing zone should be extended 1570' in advance of narrow bridge.
3. If the bridge or the approach is on a curve, delineators shall be installed for a distance of 1570' in advance of narrow bridge on the outside portion of the roadway. Spacing shall be 100' between delineators. Delineators are to be placed not less than 2' or not more than 8' outside the outer edge of pavement.
4. Object markers and delineators on both sides of roadway shall face traffic approaching bridge
5. The DM-3R & DM-3L object markers shall be installed 4' above the roadway edge. The panels may be post mounted at the bridges.

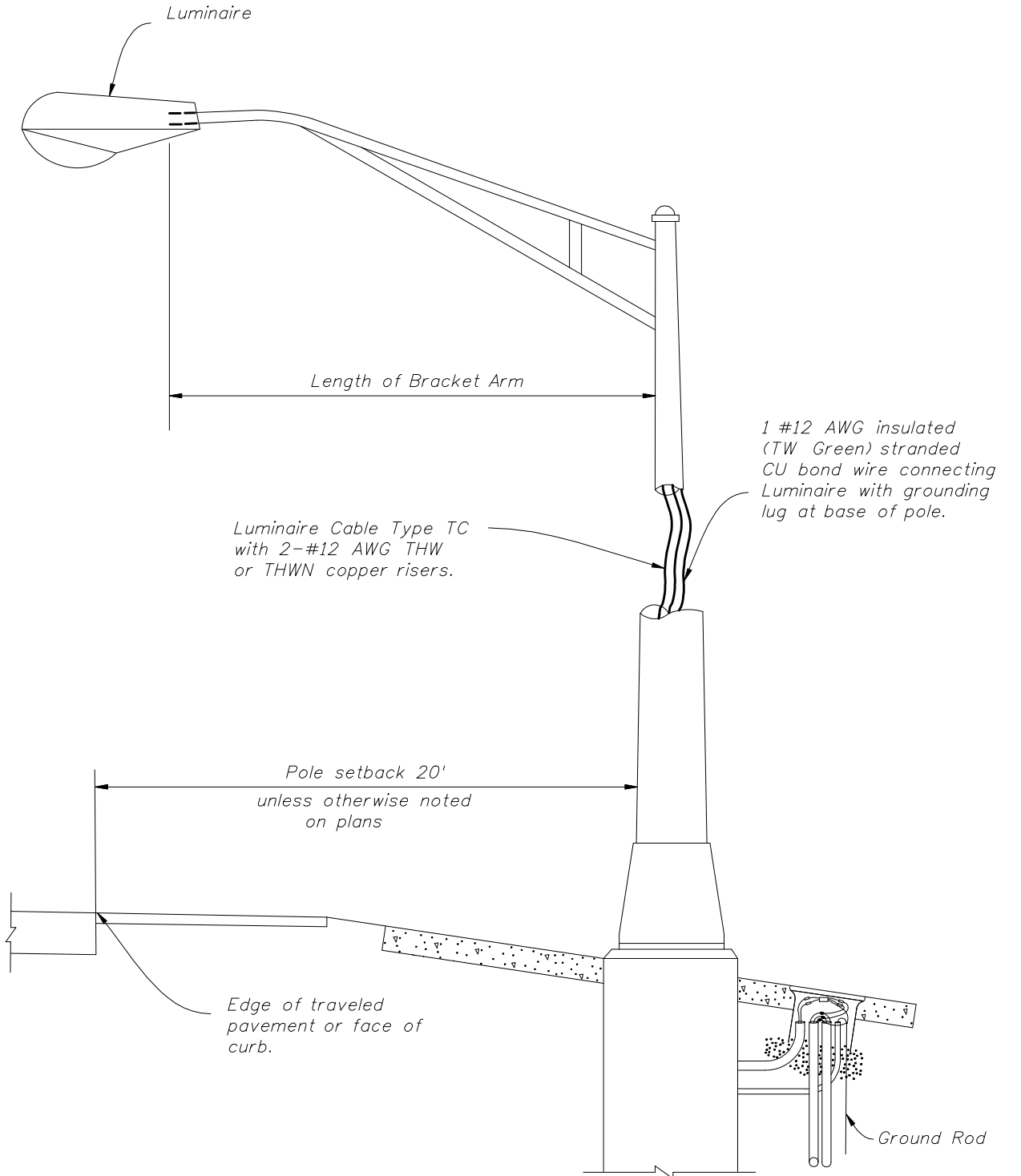


NOTES:

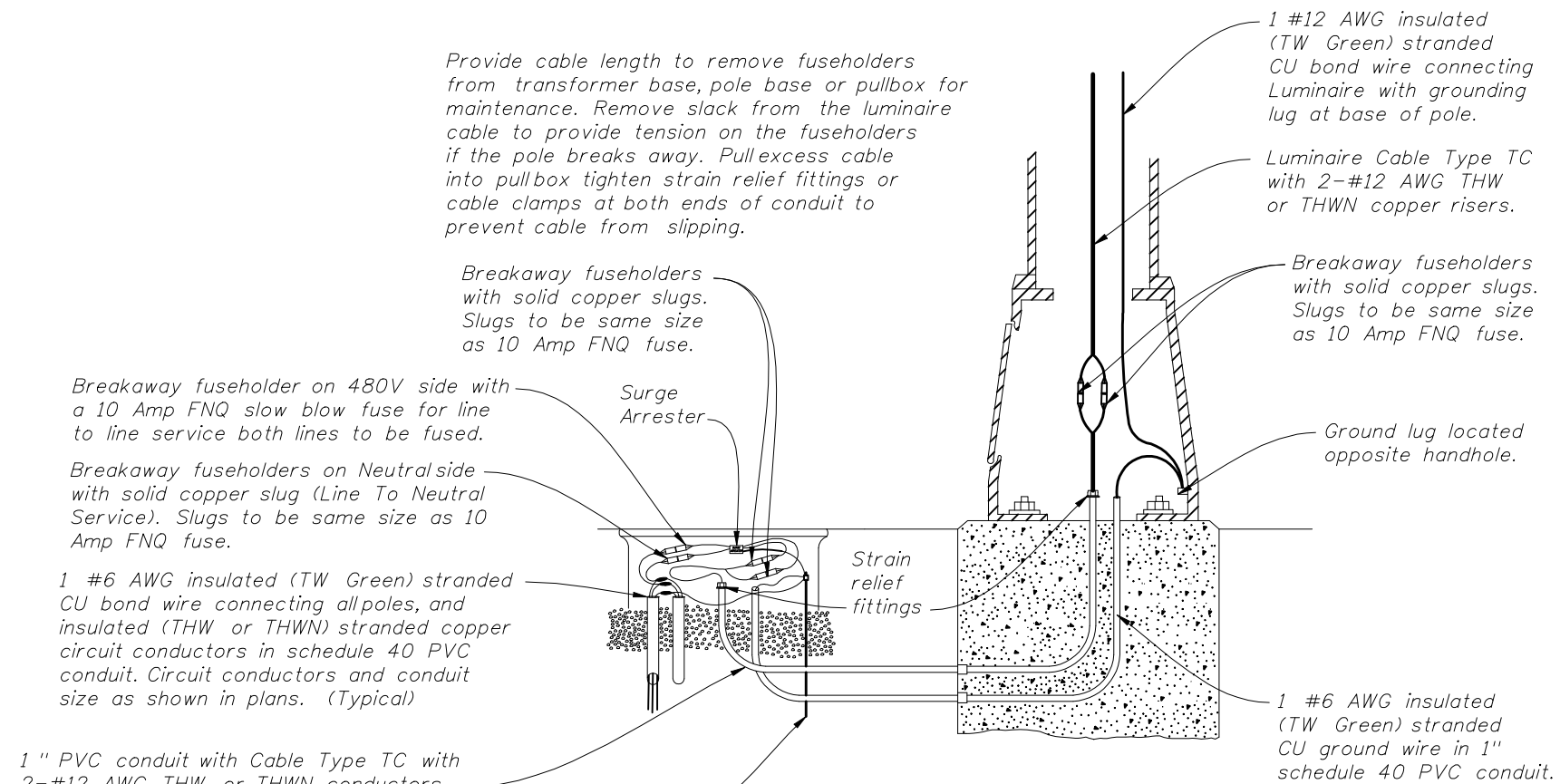
1. Barrier wall or bridge mounted poles: The wiring shall be in accordance with Section 992 of the Standard Specifications.



WIRING DIAGRAM



METAL POLE DETAIL



METAL POLE WIRING DETAIL

1" PVC conduit with Cable Type TC with 2-#12 AWG THW or THWN conductors.

U.L. approved Ground Rod 5/8" diameter 20' long copper clad with approved ground connection (At all pull boxes)

WIRING DETAILS

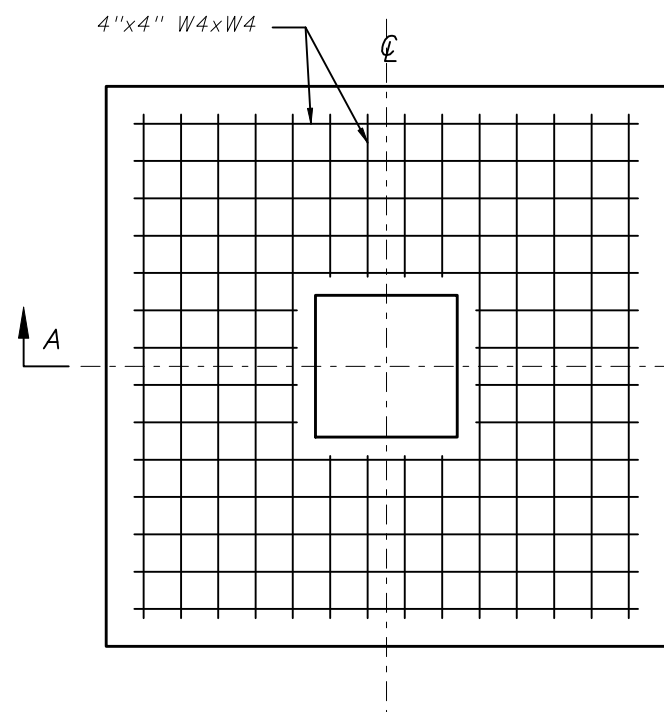


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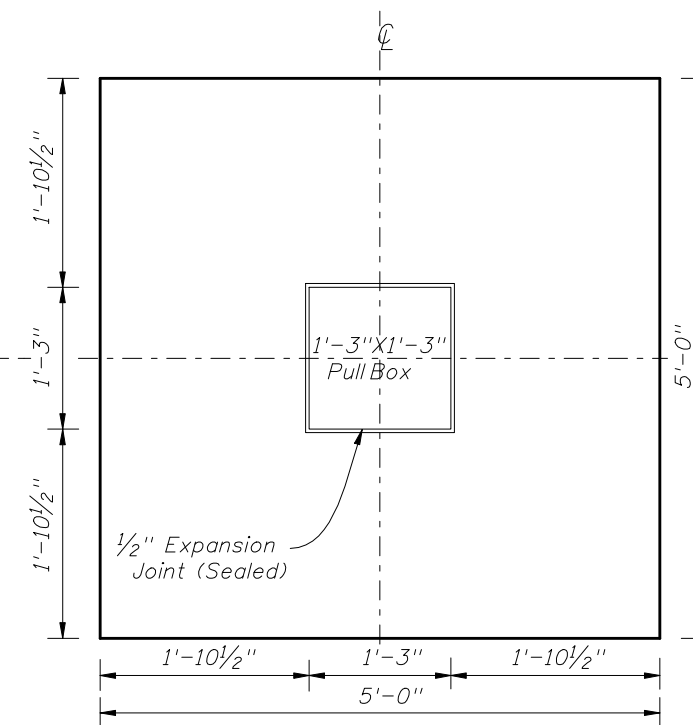
CONVENTIONAL LIGHTING

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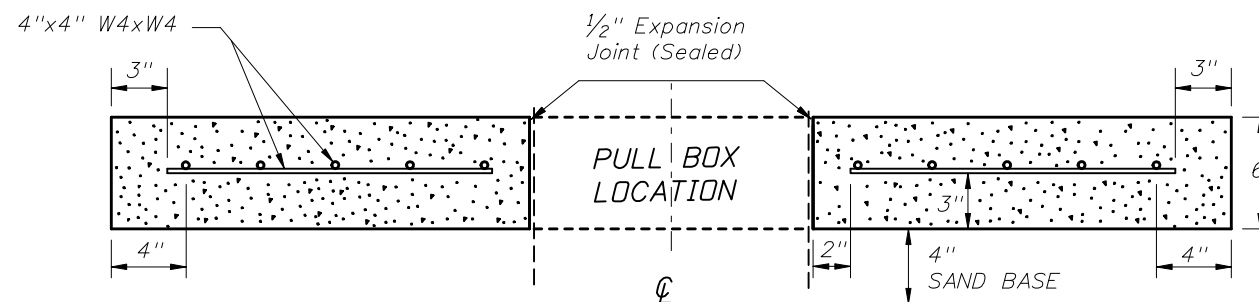
Index No. 17500



REINFORCEMENT LAYOUT



SLAB DIMENSIONS



SECTION A-A

NOTES:

1. Use clean free draining sand less than 5% passing No. 200 sieve for base (4").
2. Welded wire fabric shall meet the requirements of ASTM A185.
3. Concrete shall be Class NS with a minimum strength at 28 days of $f'c=2.5$ ksi.
4. Outside edges of slab shall be cast against formwork.
5. The pull box shown is 1'-3" x 1'-3"; others approved under Section 635 of the Standard Specifications may be used.
6. Slabs to be placed around all Poles and Pull Boxes in rural allocations. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
7. Concrete and reinforcing for slabs around poles and pull boxes shall be included in the price for pull box or pole.
8. The 1/2" thick expansion joint between the pole shaft and slab and the pull box and slab shall be sealed with a hot poured elastic joint sealer.

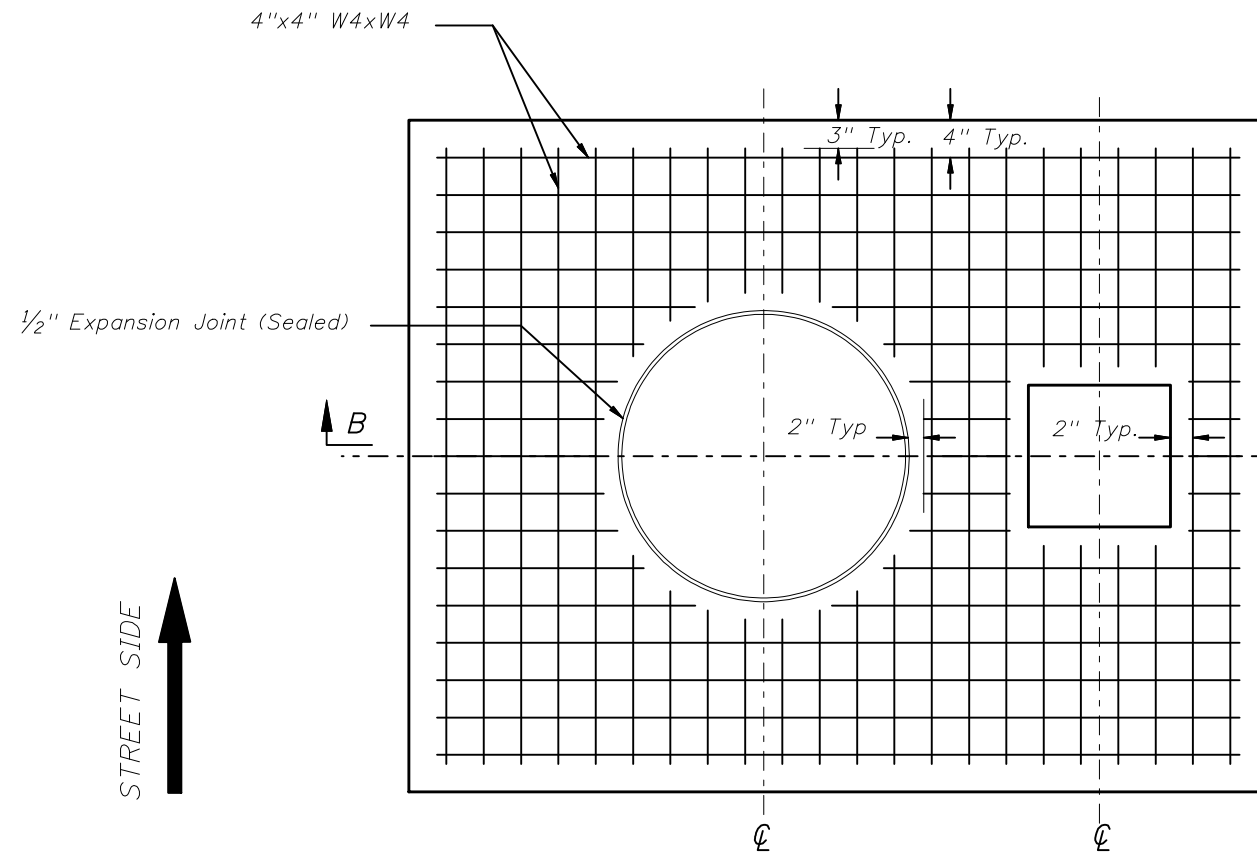
SLAB DETAILS FOR INTERMEDIATE PULLBOX LOCATIONS



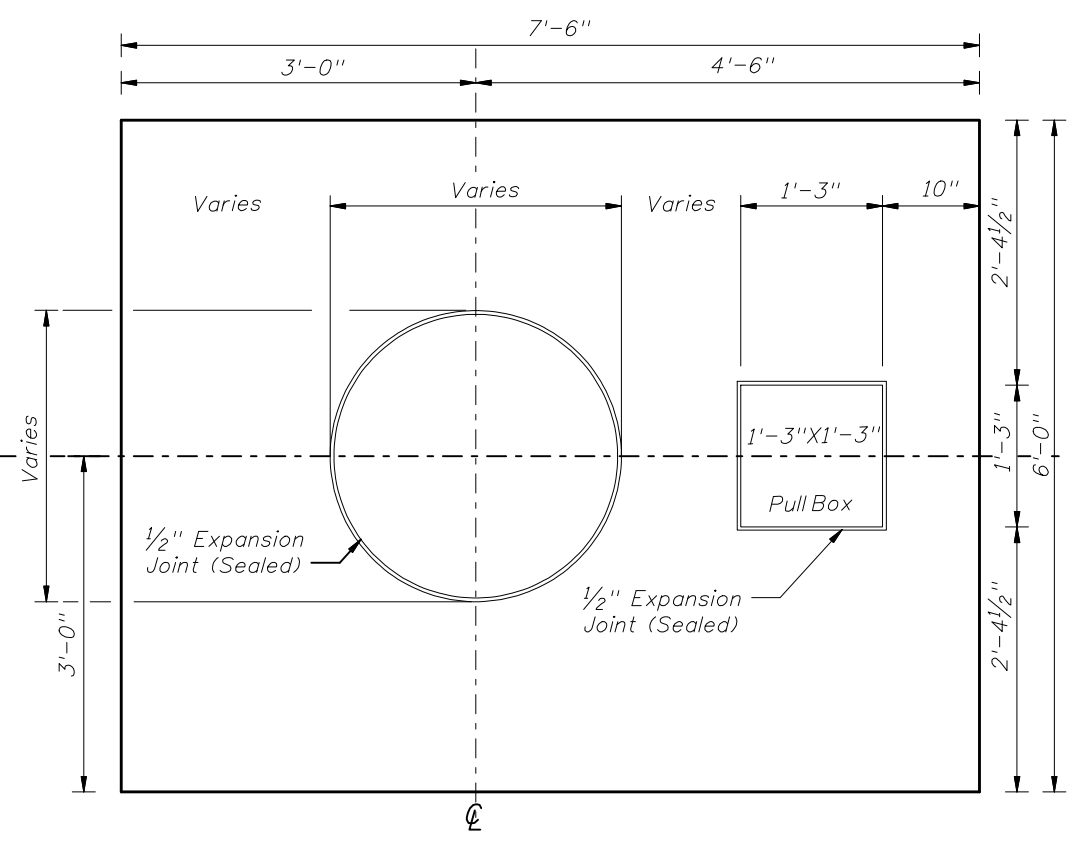
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CONVENTIONAL LIGHTING

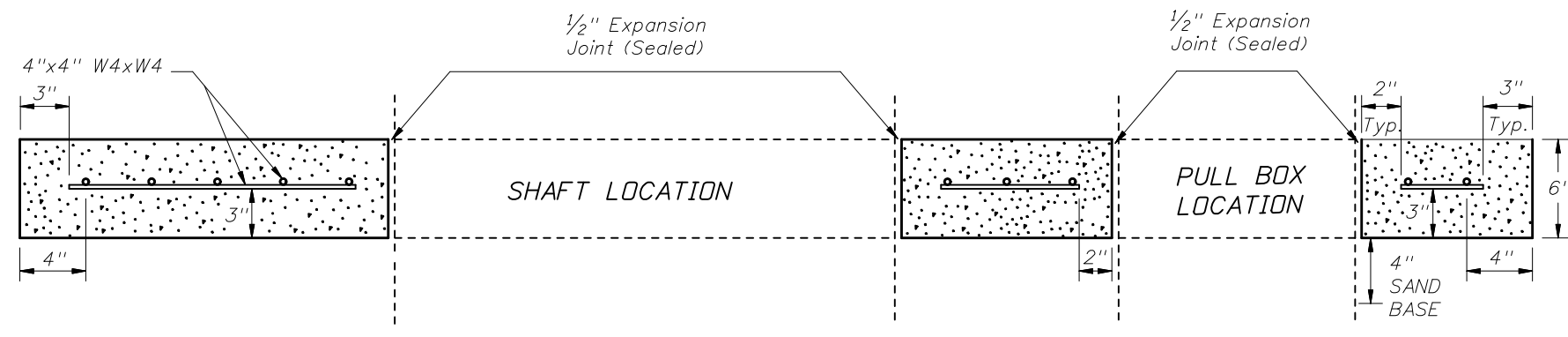
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REINFORCEMENT LAYOUT



SLAB DIMENSIONS



SECTION B-B

NOTES:

1. Use clean free draining sand less than 5% passing No. 200 sieve for base (4").
2. Welded wire fabric shall meet the requirements of ASTM A185.
3. Concrete shall be Class NS with a minimum strength at 28 days of $f'c=2.5$ ksi.
4. Outside edges of slab shall be cast against formwork.
5. The pullbox shown is 1'-3" x 1'-3"; others approved under Section 635 of the Standard Specifications may be used.
6. Slabs to be placed around all Poles and PullBoxes in rural allocations. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
7. Concrete and reinforcing for slabs around poles and pullboxes shall be included in the price for pullbox or pole.
8. The 1/2" thick expansion joint between the pole shaft and slab and the pull box and slab shall be sealed with a hot poured elastic joint sealer.

SLAB DETAILS FOR POLE AND PULL BOX LOCATIONS



- 1) All grounding system connections shall be exothermically welded. This includes all cables, ground electrode and arrays. Do not exothermically bond grounding electrode to grounding electrode. Method of Measurement and Basis of Payment as per Section 620 of the Standard Specifications.
- 2) The contractor shall be responsible for contacting all utility companies prior to any underground work. The utility company will locate and identify their facilities.
- 3) Contractor shall determine the service required date for the power company transformer installation at the pre-construction conference.
- 4) The power company reserves the right to install the riser, switch gear and weatherhead on power company poles at the expense of the contractor. Contact the power company for cost or for authorization for an alternate procedure.
- 5) Any damaged portions of galvanized steel poles and bracket arms shall be painted in accordance with Section 562 of the Standard Specifications.
- 6) Poles and bracket arms shall be designed in accordance with the design criteria, as indicated in the plans and using the applicable equations found in the AASHTO 'Standard Specifications For Structural Supports For Highway Signs, Luminaires And Traffic Signals' and FDOT Structures Manual. The calculations shall be based on the actual projected area of the luminaire or 3.0 square feet whichever is greater.
- 7) The luminaire manufacturer shall place a permanent tag on the luminaire housing on which is imprinted the following information : Wattage, ballast type, lamp shown on design plans, lamp setting (position of luminaire), IES light distribution with this lamp in the position specified, input voltage and power factor. Luminaire photometric submittals required.
- 8) Before final acceptance, contractor shall provide 2 sets of full size as built plans to the maintaining agency.
- 9) Conduit routing shall be pole to pole, maintaining pole setback distance from edge of pavement. Any cable routing in locations where guardrail is proposed shall be 2' in front of the standard guardrail position.
- 10) Pole positions and conduit routing may be adjusted, as approved by the Engineer, to prevent conflicts with utility and drainage structures not indicated, and prevent guardrail post conflict with underground lighting circuits.
- 11) Where guardrail is constructed, the poles shall be placed a minimum of 4' behind the face of the guardrail.
- 12) Install pole foundations in accordance with Section 715 of the Standard Specifications.
- 13) All splices shall be made in pullboxes or the pole base. No splices shall be made inside the conduit. The wires at pullboxes shall have sufficient length to completely remove connectors to the outside of pullboxes remove connectors to the outside of pullboxes to make connectors accessible for changing fuses and trouble shooting the system.

- 14) Neutral wires to have white insulation. Do not use white or green insulated wires for ungrounded conductors.
- 15) Unless otherwise specified, all cable shall be single conductor, 98 percent conductivity stranded copper, with THW or THWN insulation.
- 16) All exposed or surfaced mounted conduit shall be rigid or intermediate metal. These exposed runs of conduit shall be provided with either expansion joints or flexible metal conduit sections adequate to take care of vibrations and thermal expansions. All metal conduit shall be grounded. Steel conduit shall be hot-dipped galvanized.
- 17) All conduit that will remain empty as spares shall be mandrel tested, cleaned inside and both ends capped. Leave the corrosion resistant pull/drag wire and place pullboxes to mark the location of the ends of the conduits.
- 18) Pullboxes shall be located at ends of conduit crossing roadways, and as necessary for the completion of the project.
- 19) These plans represent minimum acceptable criteria. The inspection per these drawings represent the minimum base of acceptance.
- 20) All material, unless otherwise specified, shall be Underwriters Laboratory approved.
- 21) Pullboxes shall meet the requirements of Section 635 of the 'Standard Specifications For Road And Bridge Construction' and Section 635 of the 'Minimum Specifications For Traffic Control Signals And Devices'.
- 22) A pullbox shall be installed at each pole location. Pullboxes should be located 2' max from pole unless otherwise directed by the project engineer. Metal pullbox covers shall be grounded. See General Requirements Section 635-5 of the Standard Specifications for Road and Bridge Construction.
- 23) At all pullboxes and pole bases, ends of conduit shall be sealed in accordance with Section 630 of the Standard Specifications for Road and Bridge Construction.
- 24) Luminaire shall be supplied with a regulator type ballast mounted on a hinged door or panel. The unit shall swing open to provide access to the ballast assembly by release of captive screws. The electrical connector shall be a quick disconnect plug. The unit shall be easily removed from the luminaire after release of captive screws and disconnect plug.
- 25) All mounting heights are \pm 2'-6" unless otherwise noted in plans.
- 26) A handhole is required in all poles. Handhole should be located opposite approaching traffic with cover fastened with Stainless Steel Screws. The handhole opening shall be at least 20 square inches.
- 27) The luminaire and arm on joint use poles shall be grounded.

BREAKAWAY FEATURE

All conventional mounting height poles shall be mounted on a frangible metal base. The base shall be one piece and be designed to breakaway without the aid of any slipping or sliding surfaces. The design of the breakaway feature shall be in accordance with the breakaway performance requirements of the AASHTO 'Standard Specifications For Structural Supports For Highway Signs, Luminaires and Traffic Signals'. The contractor (supplier) shall submit copies of test reports as evidence the breakaway feature meets the above specifications and calculations to verify the design will meet the AASHTO wind loading specified in the contract plans. No poles are to be installed prior to approval of submittal data.

Any substantial remains of a breakaway support, when it is broken away, should not project more than 4" as discussed in Section 7 of the above AASHTO Specifications, and, Chapter 4, Section 4.2 of the AASHTO 'Roadside Design Guide'.

Poles behind bridge rail or barrier wall mounted, shall be non-frangible.

SURGE PROTECTOR SPECIFICATIONS

1. The unit shall withstand a surge current up to 20,000 Amps, and repetitive surges of 200 Amps for a minimum of 10,000 occurrences.
2. The unit shall respond in less than 50 nanoseconds and within this time have a peak clamping voltage better than 1,100 Vrms.
3. The maximum allowable voltage that can pass continuously through the hot leg of the protector must be less than 550 Vrms.
4. The current drain shall be less than 100 microamps.
5. The unit shall be insulated 600 V to ground and shall be weatherproof.
6. The unit shall not allow holdover current or conduction to ground after the surge ends.
7. Protection shall be achieved for both the 480 V and neutral conductors with the surges being passed to ground and NDT to neutral.
8. There shall be no discharge lag in the protection of the 480 V conductor over the neutral conductor.
9. Underwriters Laboratory approval not required.



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HIGHWAY LIGHTING GENERAL NOTES

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LOWERING SYSTEM SPECIFICATIONS

The lowering system shall consist of the following:

- A. Head frame and cover
- B. Luminaire ring
- C. Cables
- D. Winch
- E. Portable power unit (1 per project)

The head frame unit shall rigidly mate the top of the pole to the head frame platform. The platform with its associated sheaves, etc. shall be covered and raintight. The head frame structure shall be zinc coated steel, attached to the pole by means of a steel slipfitter. Head frame shall encompass six 6" nominal steel cable sheaves grooved to the exact cable diameter, for 180° cable bearing surface. The sheave shall be zinc electroplated to ASTM 164 and dipped in yellow chromate for corrosion resistance. Bearings and cable keepers shall have permanent lubrication. Three (3) stainless steel 7 x 19 aircraft cables of 3/16" or greater diameter shall be provided.

The pole cable shall be attached to the luminaire ring with a waterproof connector capable of withstanding the pull of the weight of the pole cable. Where the wire ropes are required to bend over sheaves or over the winch drum, the maximum working stress in the outer fibers of wire rope shall not exceed 20% of the wire rope manufacturer's rated ultimate stress.

Drum design shall cause level wind of wire rope. The power cord shall travel on sheave (s) or a combination of rollers providing a radius for the cord of 6" or larger. Each end of the sheave (s) or rollers shall have a keeper to prevent the cable from jumping out of the roller track.

The head frame shall also include three (3) latching devices to support the luminaire ring assembly when the lowering device is not in operation. The latches shall be actuated by alternate raising and lowering of the hoisting cables. Locking of luminaire ring shall be signaled by indicators visible from ground. All moving parts of the latch mechanism shall be serviceable from the ground. Each of the three latches shall be strong enough, by itself, to support twice the weight of the ring and all the luminaires. Latching mechanisms which depend primarily upon spring operation or contain dissimilar metals are not acceptable. The latching mechanism shall not require adjustment after the original installation.

The luminaire ring shall be constructed of a minimum of 6" x 2" x 7 gauge steel channel galvanized in accordance with ASTM A123 Class "B" steel channel with the appropriate number of 2" steel pipe mounting arms. The luminaire ring shall be prewired with Type "W" or specially reinforced Type "SD" power cable with suitable conductor quantity and size for proper operation and Type "ST" distribution wiring with insulation suitable for at least 105°C. All power cables should be attached to the aluminum weathertight wiring chamber with weathertight cable connectors. A 600 volt terminal block, completely prewired shall be included in the weathertight wiring chamber. A weather-tight twistlock power inlet shall be provided on the luminaire ring to allow testing of the luminaire while in the lowered position. The power inlet shall face away from the pole for easy access. Raising speed of the luminaire ring shall be a minimum of 12' per minute.

The ultimate support of the luminaire ring shall not be dependent upon the lowering and raising cables.

The system shall be provided with a circuit breaker assembly with a lightning arrester on the circuit breaker enclosure. A pigtail cord and receptacle shall be supplied from the circuit breaker assembly. The receptacle on the pigtail cord shall be of dead front construction. The receptacle shall have a push button pawl which screws the plug to the receptacle and when secure shall provide a NEMA 3R rating. The plug and receptacle shall be UL/CSA switch rated.

The winch shall be a reversible worm gear self locking type with an integral friction drag brake to prevent freespooling. The winch shall be designated for hand operation or for operation by means of a 1/2" heavy duty reversing electric drill motor, remote controlled to enable the operator to stand 25' from the pole, Stainless Steel 7 x 19 aircraft cables of 1/4" or greater diameter equal to MIL-W83420C shall be supplied on the winch. The winch shall be provided with keepers above the drum to force the cable away from the ends of the drum for spooling. The drum shall have a wire guard to prevent the cable from coming off.

The winch shall be mounted in such a way that the cable terminator and the riser cable connector may be reached and worked on by a person with his arm through the handhole.

Roller contact spring-loaded centering arms shall be provided to center the luminaire ring while ascending or descending the pole. The rollers for the centering arm shall be made of a water resistant nonmarking composition material. All axle shafts for arms and rollers shall be 304 stainless steel. The rollers shall be in contact with the pole at all times. The centering arms shall be interconnected and loaded with stainless steel springs to uniformly apply equal centering force from the arms.

LUMINAIRE SPECIFICATIONS

The reflector with its aluminum cover shall be firmly attached to a cast ring. This ring shall have keyhole slots in its upper surface such that the reflector/refractor assembly may be readily attached to, or detached from, the luminaire bracket entry and lamp support assembly without completely removing the support bolts.

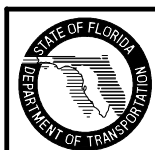
Each luminaire shall contain an integral auto-regulator type ballast connected for 480 volts input + 10% and a power factor of more than 90%. The luminaire ballast shall be enclosed within an aluminum housing which integrally attaches to the luminaire bracket entry and lamp support assembly. It shall be readily removable without removing the luminaire from the bracket arm.

The luminaire shall be attached to the bracket arm by means of a bracket entry and lamp support assembly. The assembly shall include a side entry slipfitter designed for 2" pipe with provision for 3° adjustment for leveling the luminaire. An enclosed terminal block shall be included such that all electrical connections shall be protected from exposure to weather.

All electrical connections shall be made waterproof or be made inside a weather resistant enclosure. All luminaires shall be ANSI/IES light distribution as indicated in plans. Each luminaire shall be labeled with a permanent label which states the type of lamp, voltage input, power input, power factor, ballast type, socket position, ANSI/IES light distribution, and such other catalog information that a complete replacement can be readily ordered.

The contractor's attention is directed to those plan sheets detailing the mounting of luminaires at the pole top. Particular attention is directed to alignment of luminaire light distributions. Special attention must be exercised in the physical alignment of these luminaires to ensure that the approved photometric layout is physically produced at each lighting standard in the field. A marking shall be placed on the external face of the refractor to allow visual inspection of alignment. The marking shall correspond to the 0° axis of the refractor.

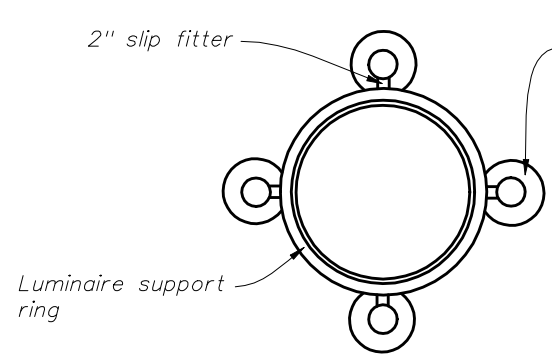
LOWERING SYSTEM AND LUMINAIRE SPECIFICATIONS



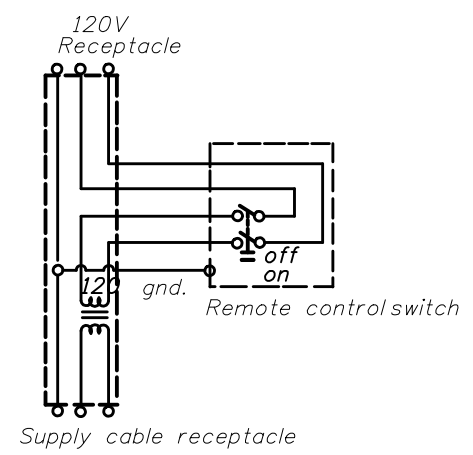
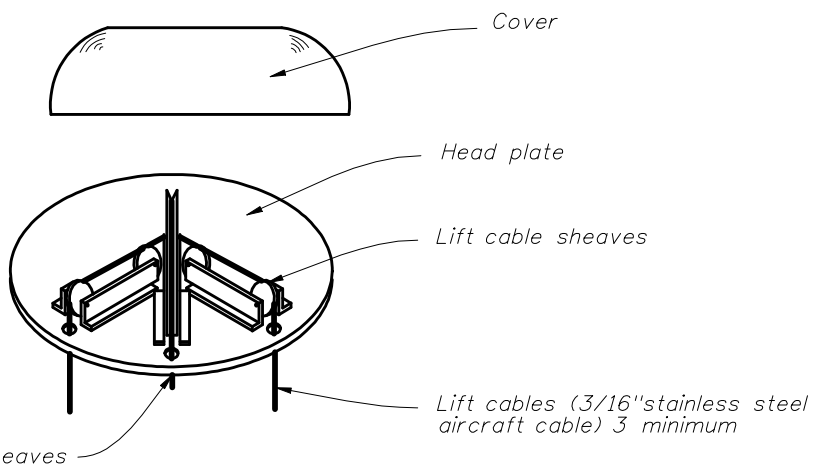
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HIGHMAST LIGHTING

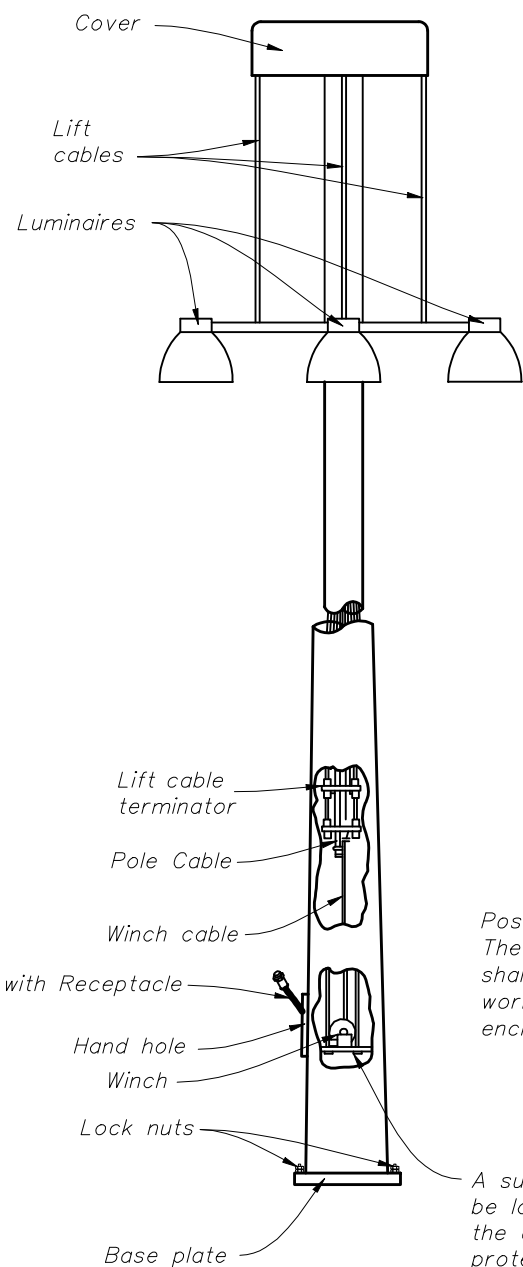
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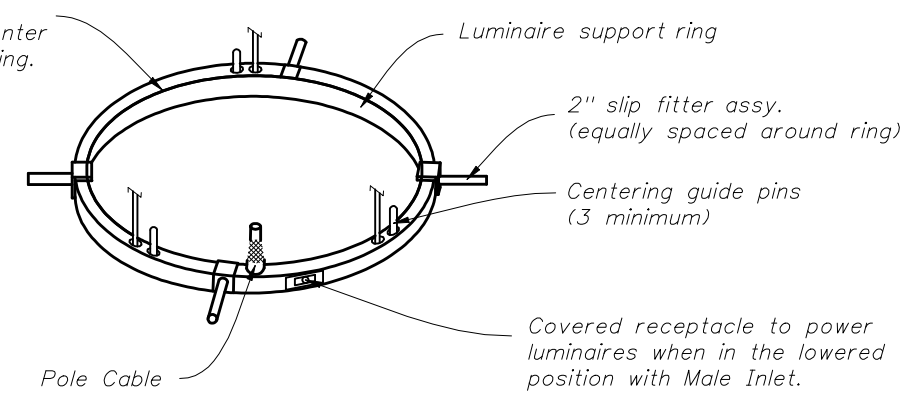
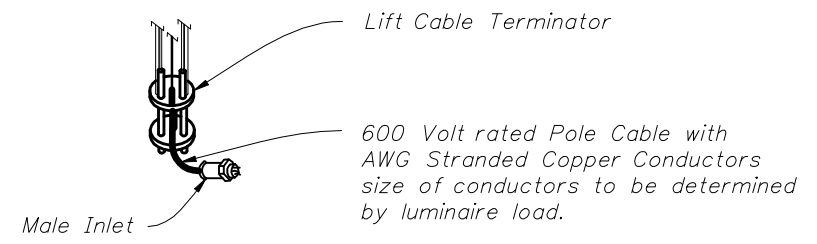
See legend for number of luminaires, lamp wattage and light distribution.



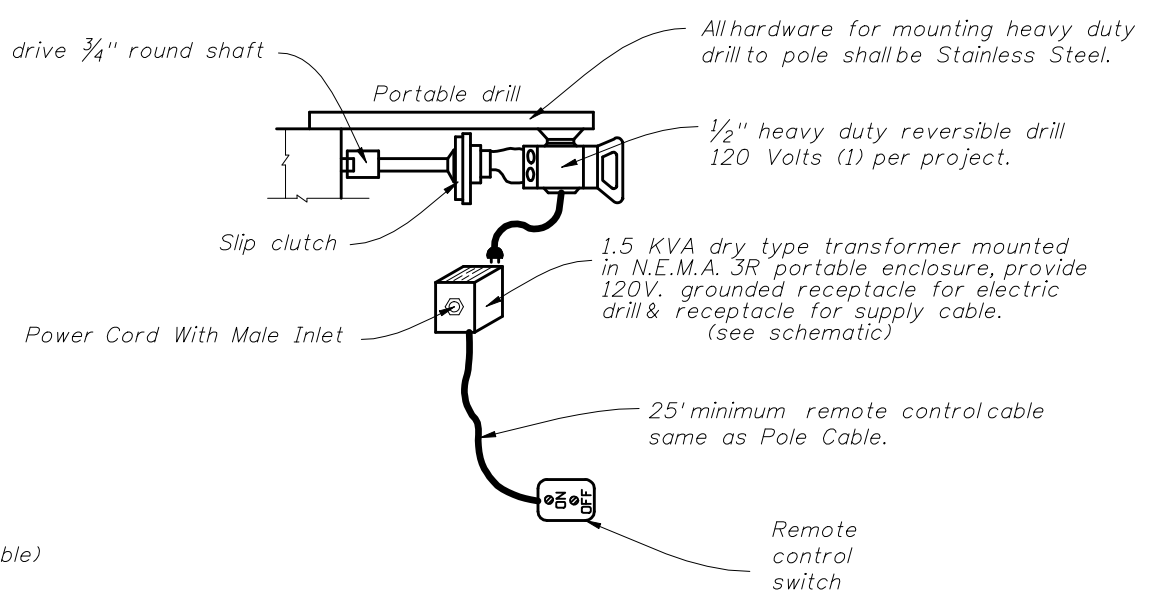
SCHEMATIC OF REMOTE AUXILIARY POWER UNIT



Spring supported centering arms provided to center the luminaire ring.

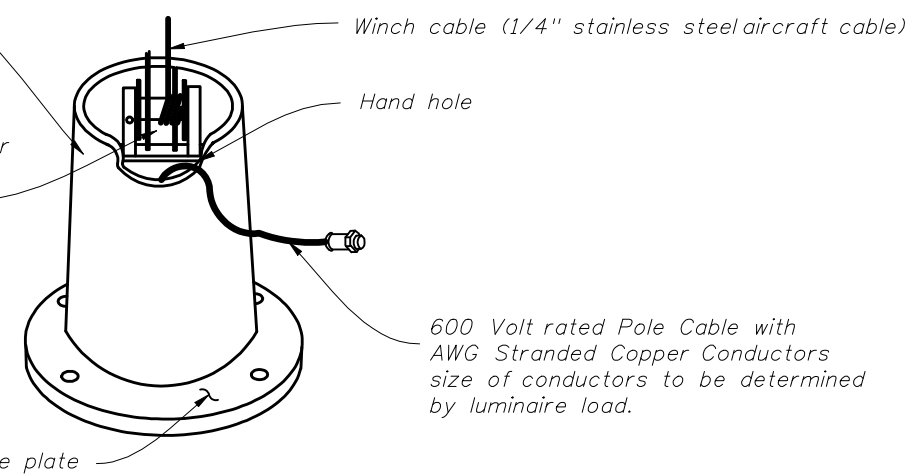


5/8" hex drive 3/4" round shaft



High mast pole

Positive drive reversible winch. The complete enclosed drum gear shall directly mesh with the worm gear train, in the same enclosure.



A surge protector shall be located in the pole with the circuit breaker. The surge protector shall be mounted at the front near hand hole for easy access.

LOWERING DETAILS



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HIGHMAST LIGHTING

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HIGHMAST LIGHTING NOTES:

- 1) High Mast materials:
 - a. Pole: ASTM A1011 Grade 50, 55, 60 or 65 (Less than 1/4") or ASTM A572 Grade 50, 55, 60, or 65 (1/4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).
 - b. Steel Plates: ASTM A709 Grade 36 or ASTM A36
 - c. Weld Metal: E70XX
 - d. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563, Grade A heavy-hex nuts and ASTM F436 Type I washers.
 - e. Handhole: ASTM A709 Grade 36 or ASTM A36 Frame with ASTM A36 cover.
 - f. Caps: ASTM A1011 Grade 50, 55, 60 or 65 or ASTM B209.
 - g. Nut Covers: ASTM B26 (319-F)
 - h. Stainless Steel Screws: AISI Type 316
- 2) Reinforcing steel: ASTM A615, Grade 60.
- 3) Concrete: Class IV (Drilled Shaft) with a minimum 4,000 psi compressive strength at 28 days for all environmental classifications.
- 4) Welding: American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (Current edition).
- 5) Galvanization:
 - a. Nuts, Bolts, Washers and Threaded Bars/Studs: ASTM F2329.
 - b. Other items (Including Pole): ASTM A123
- 6) Hole diameters for anchor bolts: not greater than the bolt diameter plus 1/2".
- 7) Poles: Tapered with the diameter changing at a rate of 0.14 inch per foot with a minimum 16-sided pole shaft and only one longitudinal seam weld. Circumferentially welded pole shaft butt splices and laminated pole shafts are not permitted. Longitudinal seam welds within 6 inches of pole to base must be complete penetration welds. Longitudinal seam welds at telescopic field joints must be complete penetration welds for the splice length plus 6 inches.
- 8) One hundred percent of full-penetration groove welds and a random 25 percent of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.
- 9) Furnish each pole with a 2"x4" (max.) aluminum identification tag. Submit details for approval. Secure to pole with 0.124" stainless steel rivets or screws. Locate identification tag on the inside of pole and visible from handhole. Include the following information: Financial Project ID, Pole Mounting Height, Manufacturer's Name, Certification Number and QPL Number.
- 10) Manufacturers seeking approval of a Highmast Lighting structural assembly (exclude lowering system) for inclusion on the Qualified Products List must submit a QPL Production Evaluation Application along with drawings showing the product meets all specified requirements of this Index.
- 11) Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location ± two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.

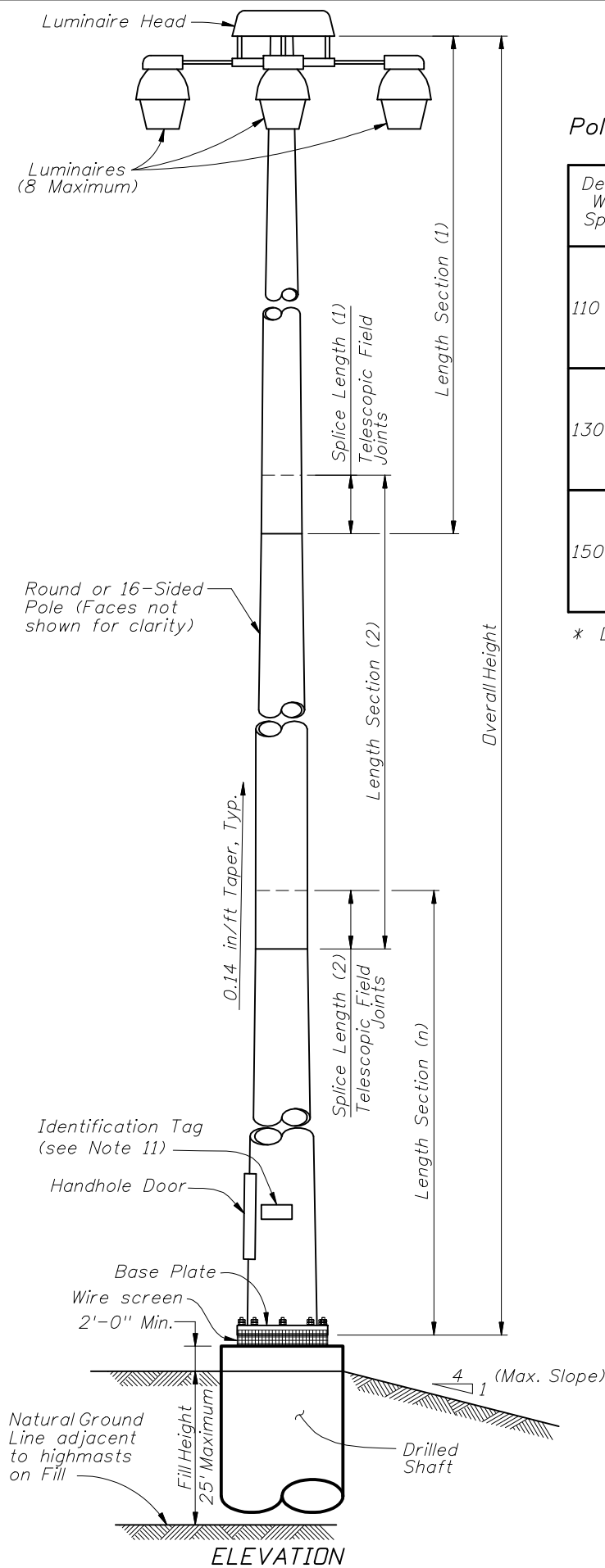
DESIGN CRITERIA:

- 1) Designed in accordance with the FDOT Structures Manual.
- 2) Poles are designed to support the following:
 - a. (1) cylindrical head assembly with a maximum effective projected area of 6 Sq. ft. (Cd=1) and 340 lbs (Max).
 - b. (8) cylindrical luminaires with a maximum effective projected area of 3.0 Sq. ft (Cd=0.5) and 77 lbs. each.
- 3). Foundation design based upon the following soil criteria:
 - Classification = Cohesionless (Fine Sand)
 - Friction Angle = 30 Degrees (30°)
 - Unit Weight = 50 lbs./cu. Ft. (assumed saturated)

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.
- 4) Foundation applies only to slopes of 1:4 or flatter. Provide a minimum 24" shaft projection on the high side.
- 5) Poles are designed for 6 mil galvanization thickness.

STANDARD POLE DESIGN NOTES

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Pole Design Table*

Design Wind Speed	Pole Overall Height	Section 1 (Top)					Section 2					Section 3				
		Length.	Wall Th.	Minimum Splice L.	Tip Dia.	Base Dia.	Length.	Wall Th.	Minimum Splice L.	Tip Dia.	Base Dia.	Length.	Wall Th.	Minimum Splice L.	Tip Dia.	Base Dia.
110 mph	80 ft	42'-0"	0.250"	2'-0"	5.313"	11.219"	40'-0"	0.250"	---	10.375"	16.000"	---	---	---	---	---
	100 ft	24'-6"	0.179"	2'-0"	6.406"	9.844"	40'-0"	0.250"	2'-6"	9.188"	14.781"	40'-0"	0.250"	---	13.875"	19.500"
	120 ft	44'-9"	0.250"	2'-0"	6.250"	12.531"	40'-0"	0.250"	2'-9"	11.688"	17.313"	40'-0"	0.313"	---	16.375"	22.000"
130 mph	80 ft	42'-0"	0.250"	2'-0"	5.281"	11.188"	40'-0"	0.313"	---	10.375"	16.000"	---	---	---	---	---
	100 ft	24'-6"	0.179"	2'-0"	6.906"	10.344"	40'-0"	0.250"	2'-6"	9.656"	15.281"	40'-0"	0.313"	---	14.375"	20.000"
	120 ft	45'-6"	0.250"	2'-6"	9.250"	15.625"	40'-0"	0.250"	3'-0"	14.719"	20.344"	40'-0"	0.313"	---	19.375"	25.000"
150 mph	80 ft	42'-3"	0.250"	2'-3"	7.281"	13.219"	40'-0"	0.313"	---	12.375"	18.000"	---	---	---	---	---
	100 ft	24'-6"	0.250"	2'-0"	8.188"	11.625"	40'-0"	0.313"	2'-6"	10.781"	16.406"	40'-0"	0.375"	---	15.375"	21.000"
	120 ft	46'-6"	0.250"	3'-0"	12.406"	18.938"	40'-0"	0.313"	3'-6"	17.938"	23.563"	40'-0"	0.375"	---	22.375"	28.000"

* Diameter Measured Flat to Flat

Base Plate and Bolts Design Table

Design Wind Speed.	Pole Overall Height	Base Plate Diameter	Base Plate Thickness	"TW"	"BW"	Bolt Circle	No. Bolts	Bolt Diameter	Bolt Embedment
110 mph	80 ft	30.0"	2.500"	0.375"	0.188"	23.0"	8	1.75"	38"
	100 ft	33.5"	2.500"	0.375"	0.188"	26.5"	8	1.75"	42"
	120 ft	36.0"	2.750"	0.375"	0.250"	29.0"	8	1.75"	45"
130 mph	80 ft	30.0"	2.500"	0.438"	0.250"	23.0"	8	1.75"	43"
	100 ft	34.0"	2.750"	0.438"	0.250"	27.0"	8	1.75"	50"
	120 ft	41.0"	3.250"	0.500"	0.250"	33.0"	8	2.00"	52"
150 mph	80 ft	32.0"	2.750"	0.500"	0.250"	25.0"	8	1.75"	49"
	100 ft	37.0"	3.000"	0.563"	0.313"	29.0"	8	2.00"	53"
	120 ft	46.0"	3.250"	0.563"	0.313"	37.0"	10	2.25"	57"

Shaft Design Table

Design Wind Speed.	Pole Overall Height	Shaft Diameter	Shaft Length	Longitudinal Reinforcement
110 mph	80 ft	4'-0"	13'-0"	14 - # 11
	100 ft	4'-0"	15'-0"	14 - # 11
	120 ft	4'-6"	16'-0"	16 - # 11
130 mph	80 ft	4'-0"	14'-0"	14 - # 11
	100 ft	4'-0"	16'-0"	14 - # 11
	120 ft	4'-6"	18'-0"	16 - # 11
150 mph	80 ft	4'-0"	16'-0"	14 - # 11
	100 ft	4'-6"	17'-0"	16 - # 11
	120 ft	5'-0"	20'-0"	18 - # 11

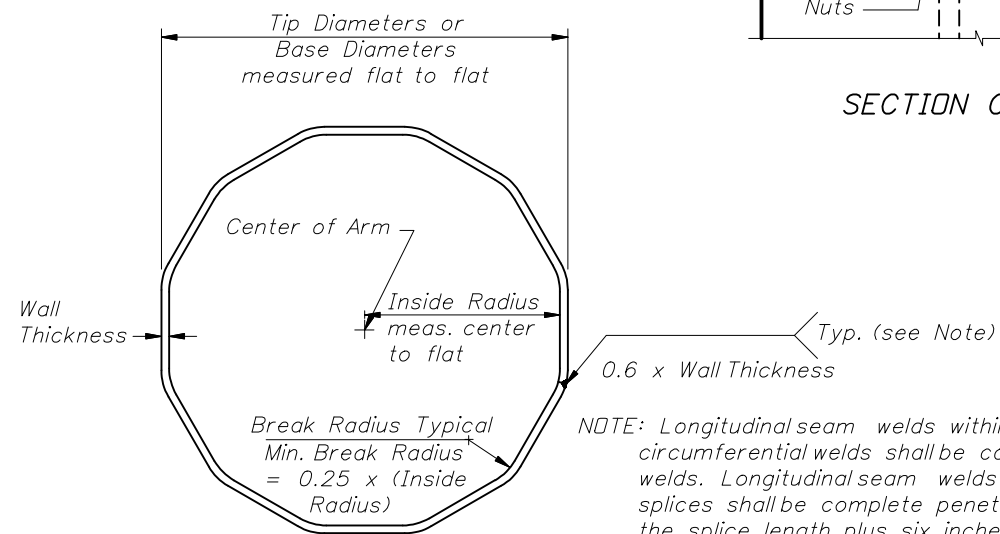
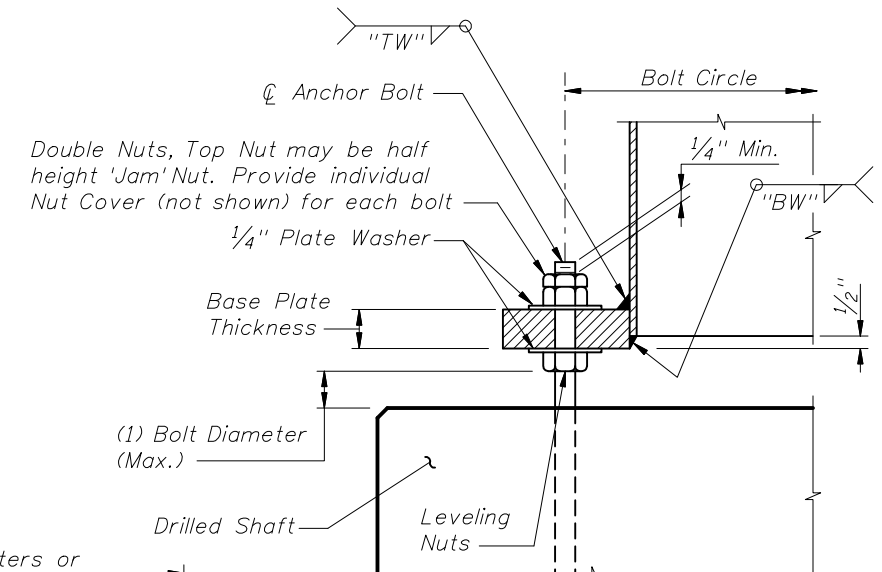
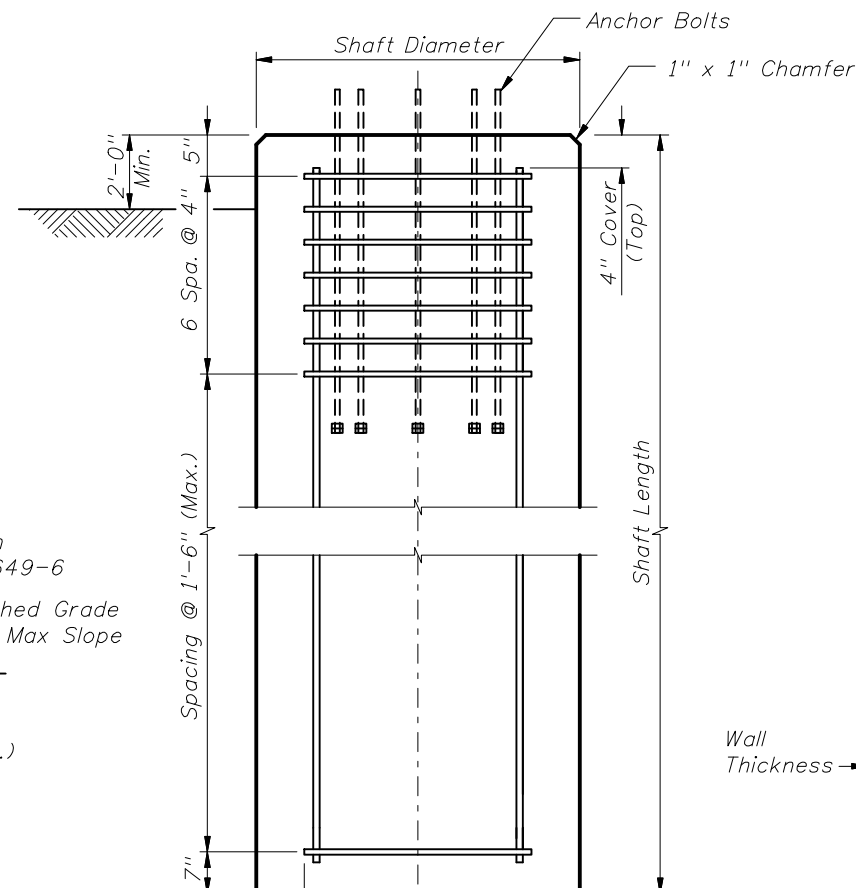
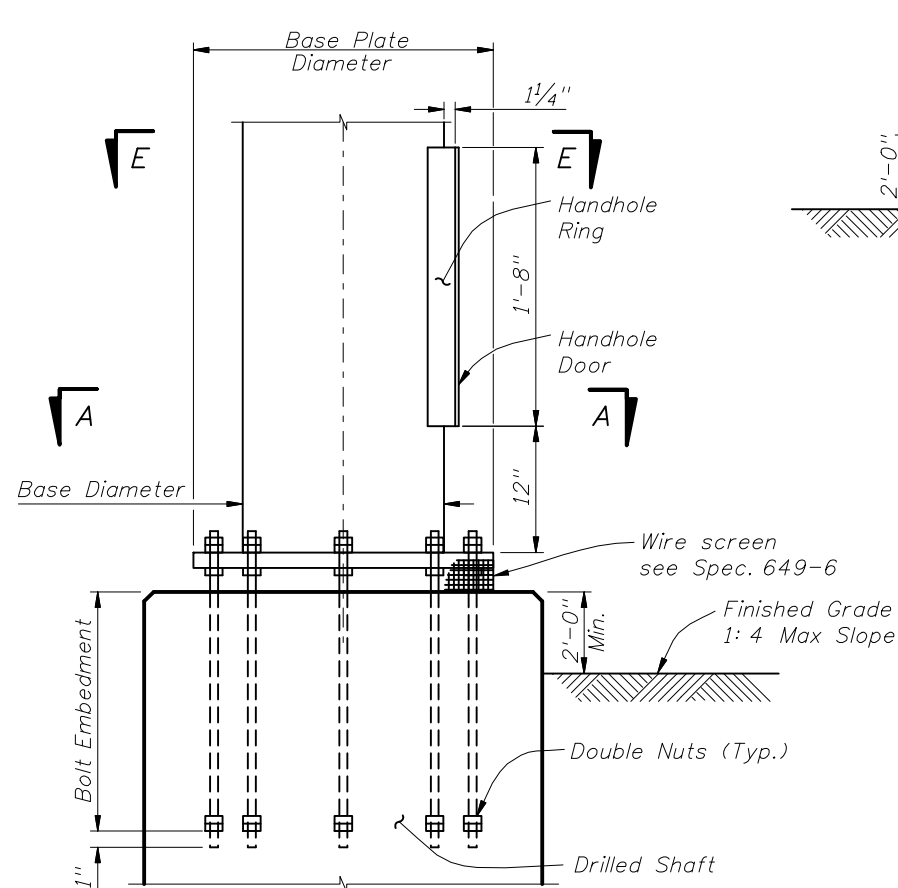
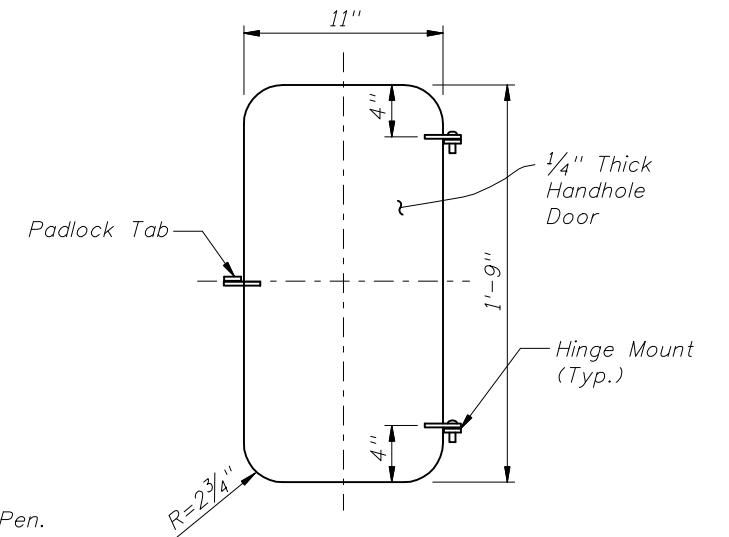
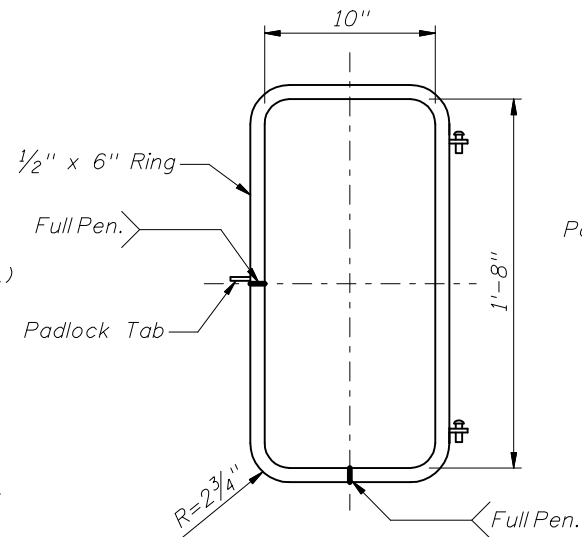
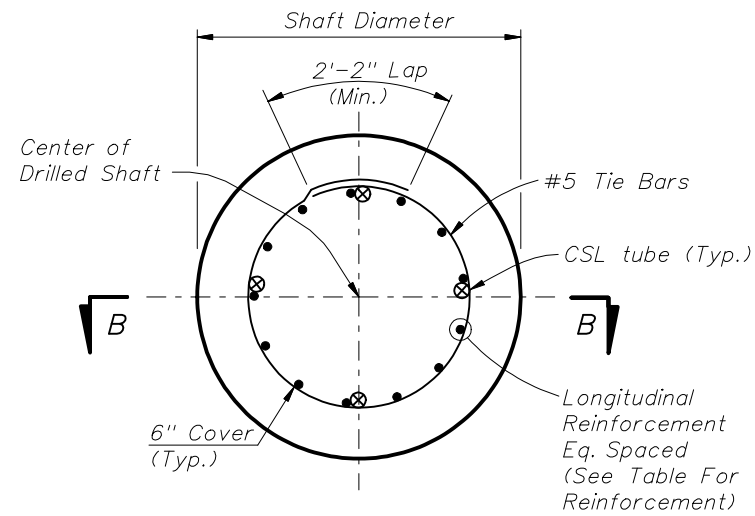
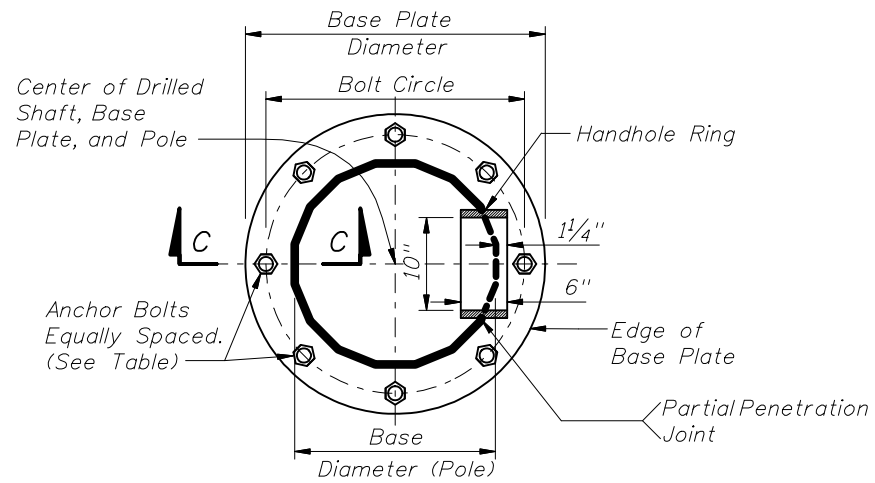
POLE DESIGN TABLES



2010 FDOT Design Standards

HIGHMAST LIGHTING

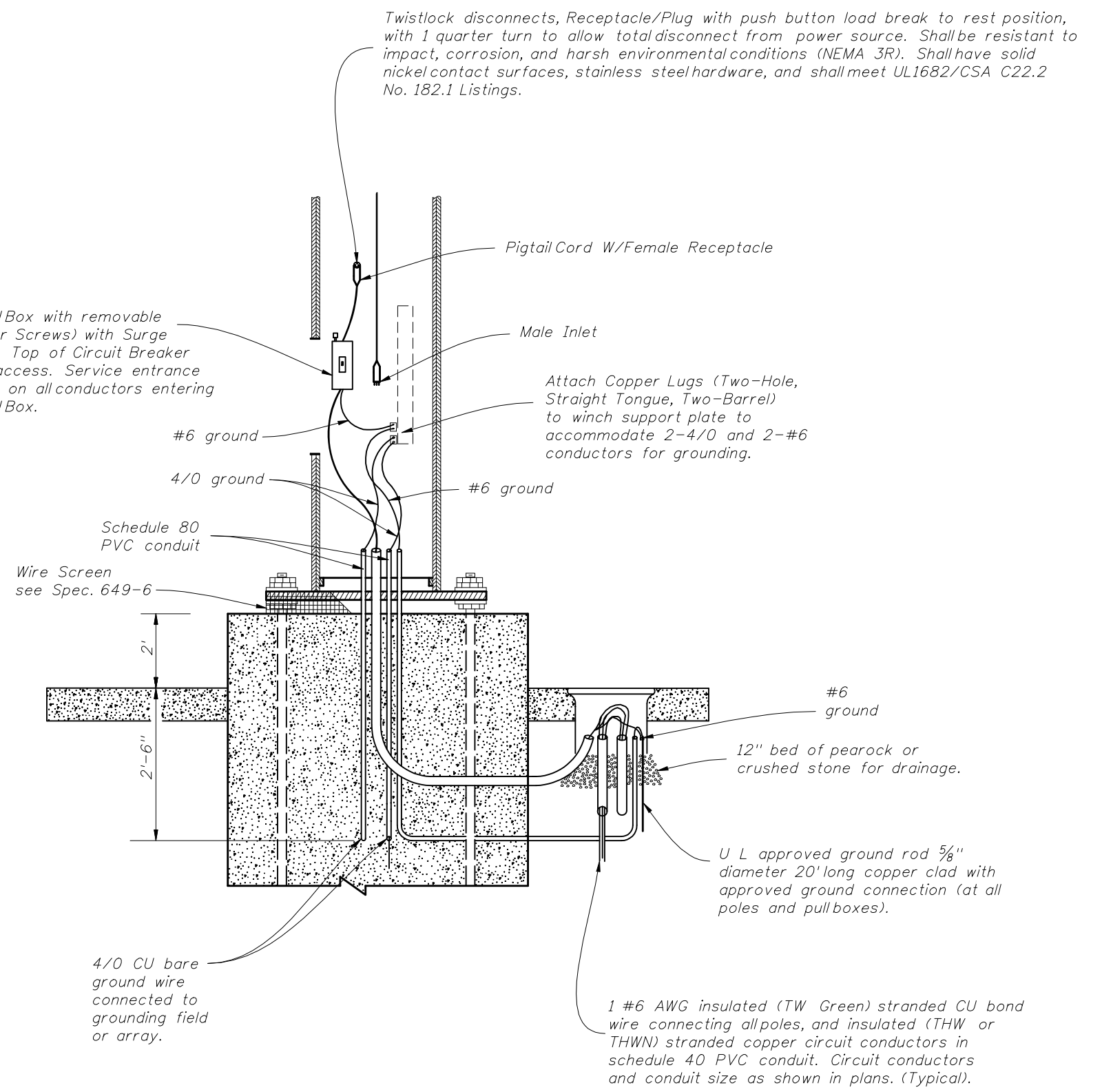
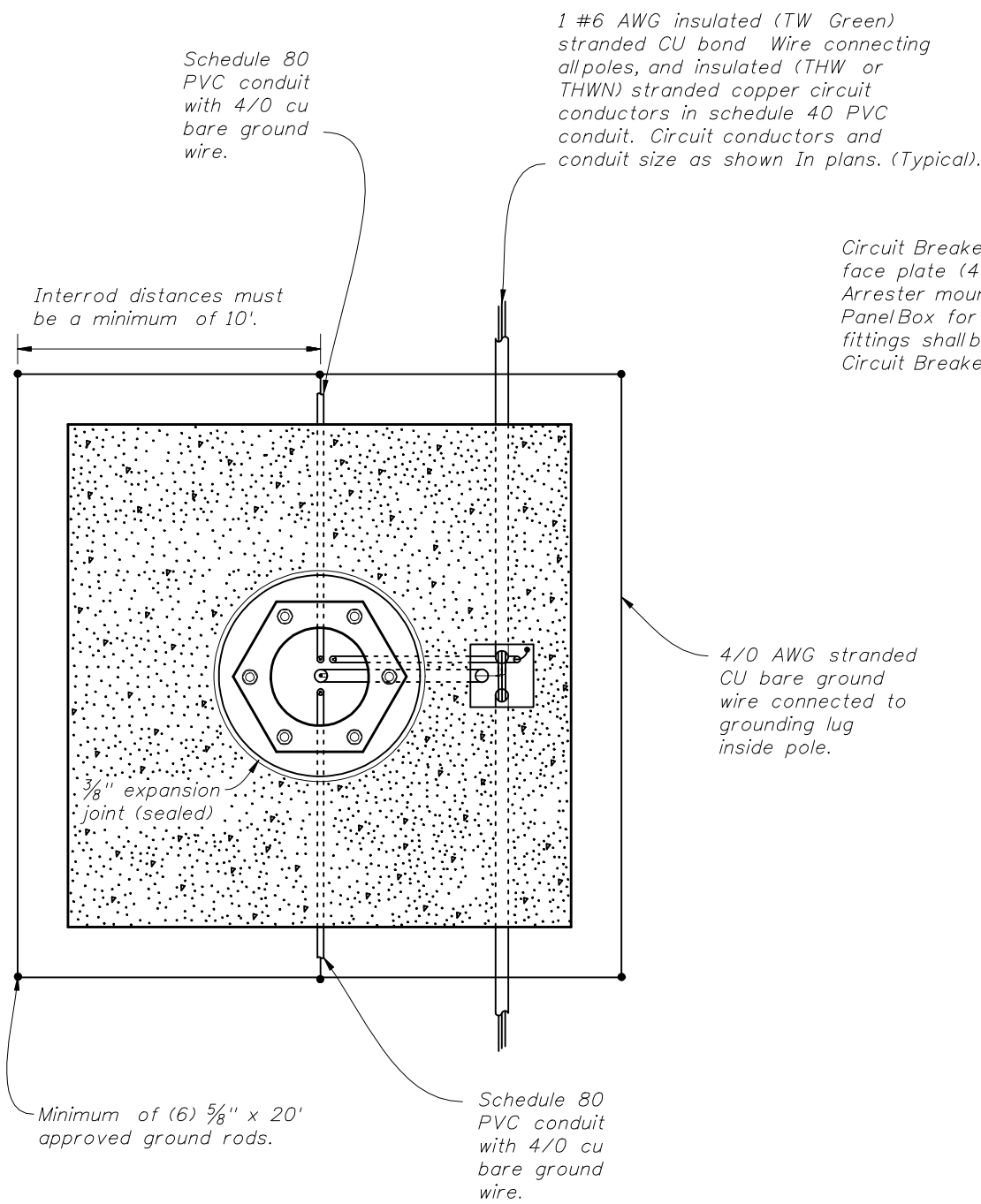
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NOTE: Longitudinal seam welds within six inches of circumferential welds shall be complete penetration welds. Longitudinal seam welds at telescopic field splices shall be complete penetration welds for the splice length plus six inches. For tubes greater than 70" in circumference, two longitudinal seam welds are allowed.

POLE FOUNDATION

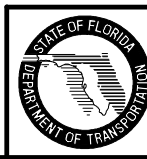




NOTES:

1. At all pullboxes and pole bases, ends of conduit shall be sealed in accordance with Section 630 of the Standard Specifications For Road And Bridge Construction.
2. Slabs to be placed around all Poles and PullBoxes.
3. For PullBoxes between Poles refer to Index 17500.

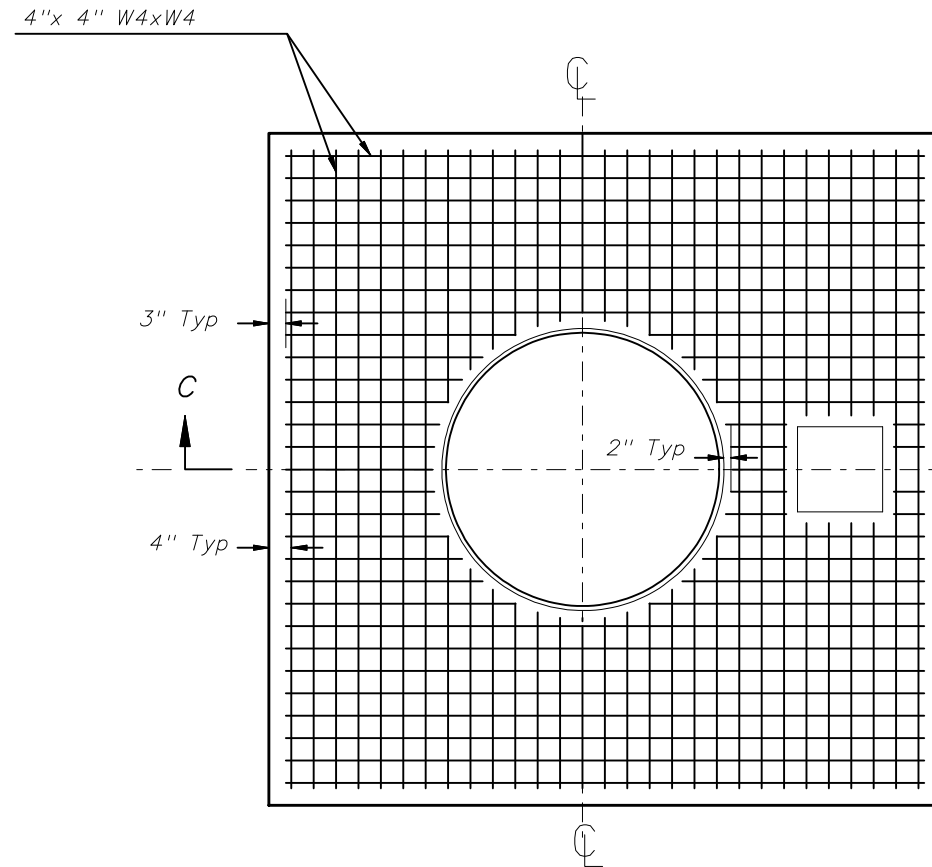
WIRING DETAILS



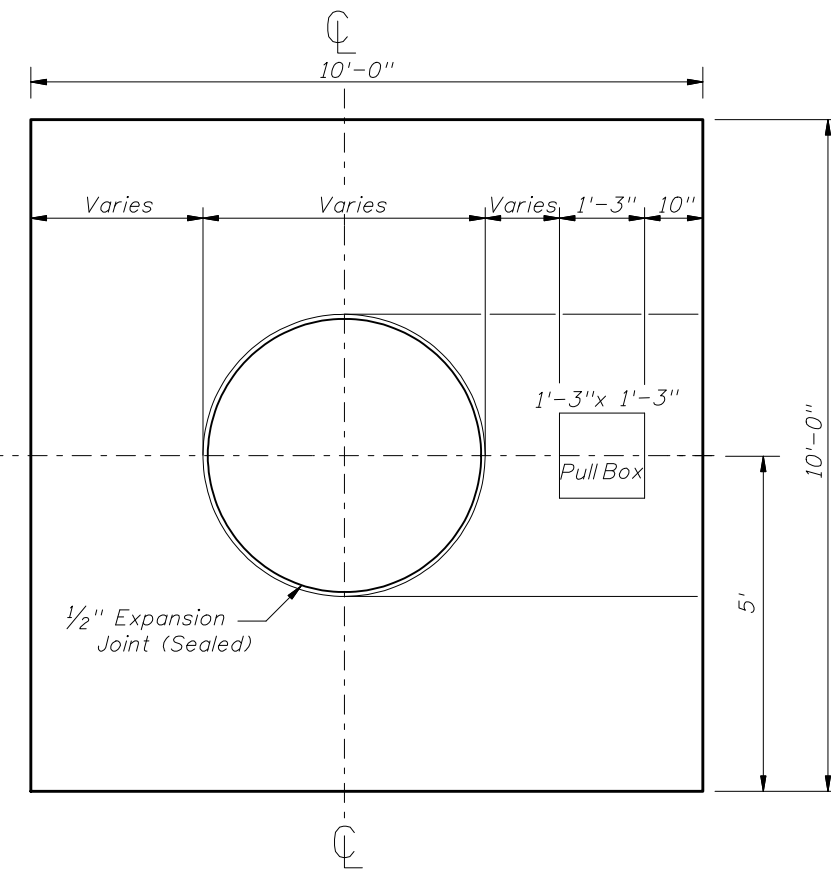
2010 FDOT Design Standards

HIGHMAST LIGHTING

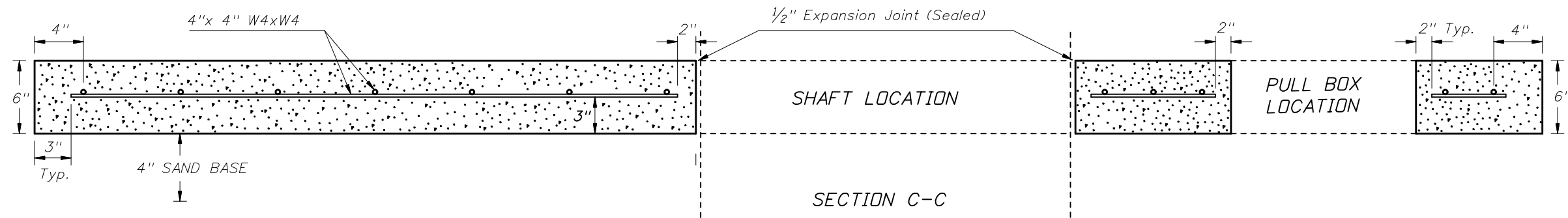
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REINFORCEMENT LAYOUT



SLAB DIMENSIONS



SECTION C-C

NOTES:

1. Use clean free draining sand less than 5% passing No. 200 sieve for base (4").
2. Welded wire fabric shall meet the requirements of ASTM A185.
3. Concrete shall be Class NS with a minimum strength at 28 days of $f'c=2.5$ ksi.
4. Outside edges of slab shall be cast against formwork.
5. The pullbox shown is 1'-3" x 1'-3"; others approved under Section 635 of the Standard Specifications may be used.
6. Slabs to be placed around all Poles and Pull Boxes in rural locations. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
7. Concrete and reinforcing for slabs around poles and pullboxes shall be included in the price of pole or pullbox.
8. The 1/2" thick expansion joint between the pole shaft and slab and the pullbox and slab shall be sealed with a hot poured elastic joint sealer.

SLAB DETAILS



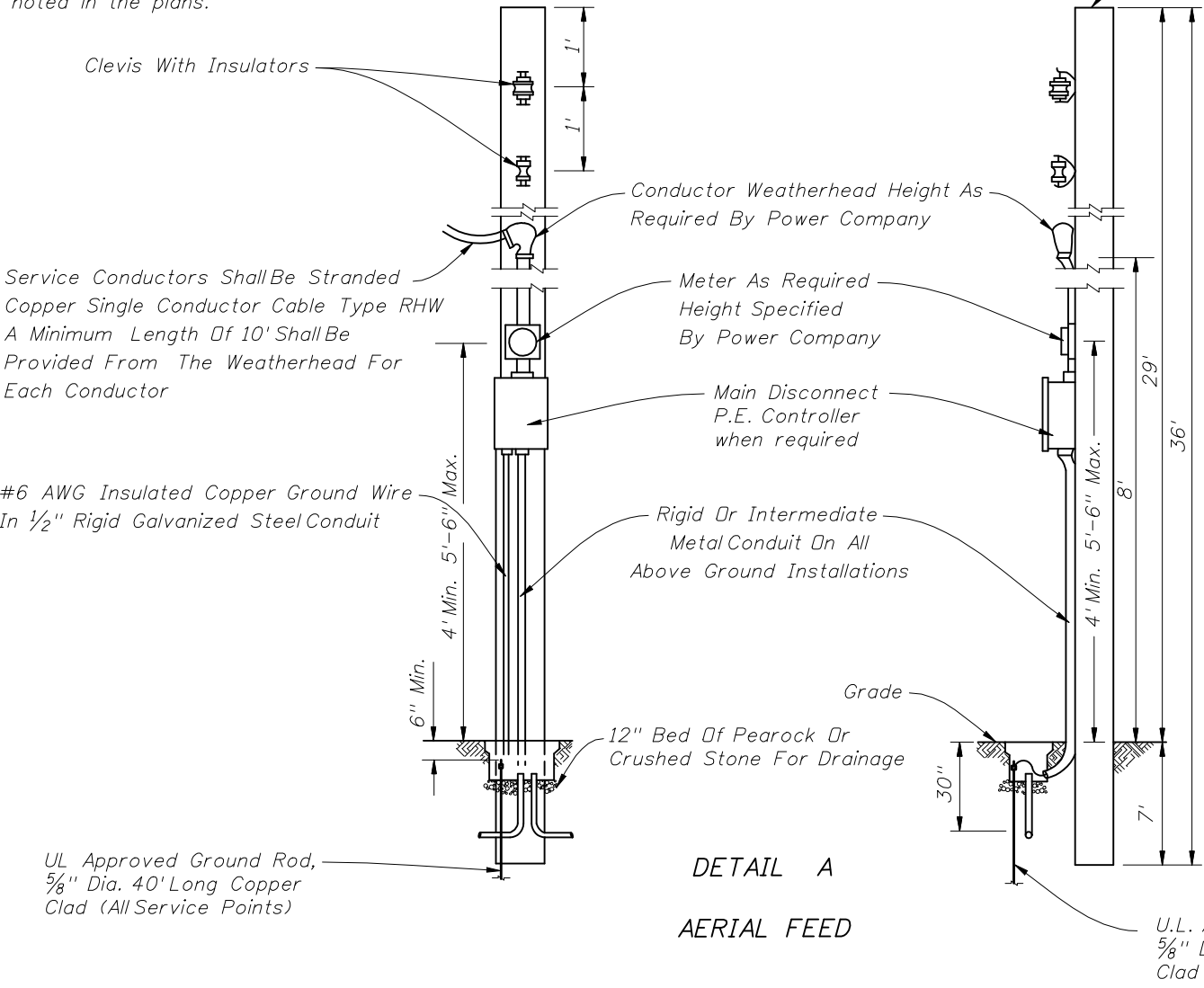
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HIGHMAST LIGHTING

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NOTE :

It shall be the contractor's responsibility to provide a complete service assembly as per the plans and service specifications. The service installation shall meet the requirements of the national electric code and applicable local codes. Shop drawings are not required for service equipment, unless noted in the plans.



DETAIL A
AERIAL FEED

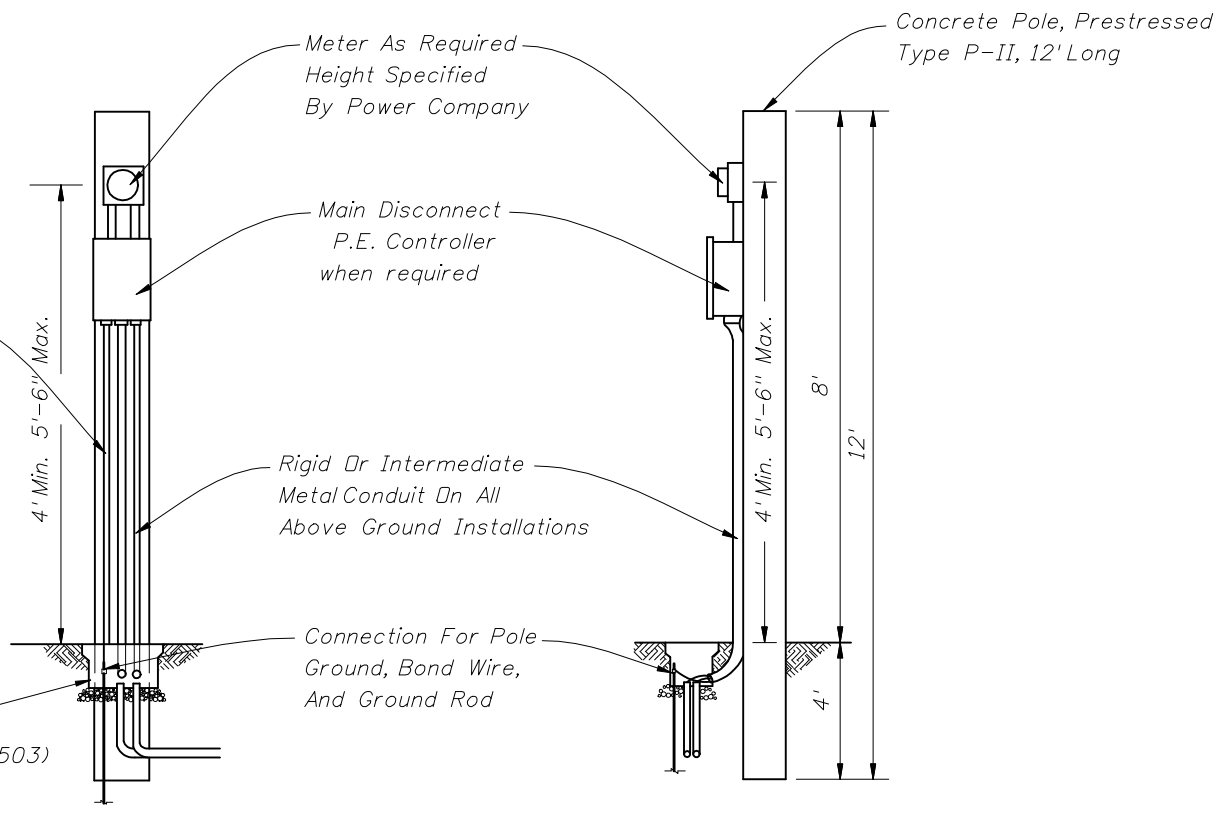
SERVICE SPECIFICATIONS

1. The main disconnect shall be NEMA 3R, pole mounted.
2. The enclosure door shall be lockable by padlock and four keys provided to the maintaining agency. The door shall have a minimum of three hinges and be latchable. No screws to be used to attach door.
3. 480 Volt minimum rating bolt-in type breakers shall be used.
4. Busbar to be copper coated and have a minimum rating of 100 amps. When main breaker exceeds 100 amps busbar to match breaker amperage.
5. Locate Contactor, Transformer, P.E. Controller, and H.D.A. Switch inside enclosure. The enclosure to be sized to accommodate as many breakers as called for and all other service equipment.
6. The enclosure to be rigidly attached to the pole face.
7. A 600 Volt lightning protector shall be wired inside the enclosure.
8. A main breaker is required in all service panels with 2 or more feeder breakers.
9. All service equipment shall be U. L. approved.

Concrete Pole Prestressed Type P-II, 36' Long

#6 AWG Insulated Copper Ground Wire In 1/2" Rigid Galvanized Steel Conduit

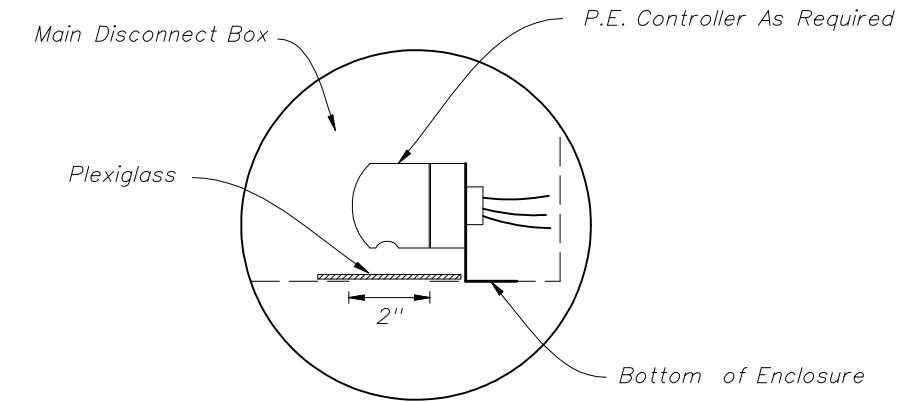
U.L. Approved Ground Rod, 5/8" Dia. 40' Long Copper Clad (All Service Points)



DETAIL B
UNDERGROUND FEED

NOTES:

1. Photo Electric Control as required.
2. All neutral wires to have White insulation, do not use White or Green insulated wires for ungrounded conductors.
3. A Pull Box is required at each service point.



Cut a 2" hole in the bottom of the Main Disconnect Box for the operation and mounting of the P.E. controller. Use plexiglass and a clear silicone sealant to cover hole, install P.E. Controller.

PHOTO ELECTRIC CONTROLLER DETAIL



SIGN LIGHTING INSTALLATION

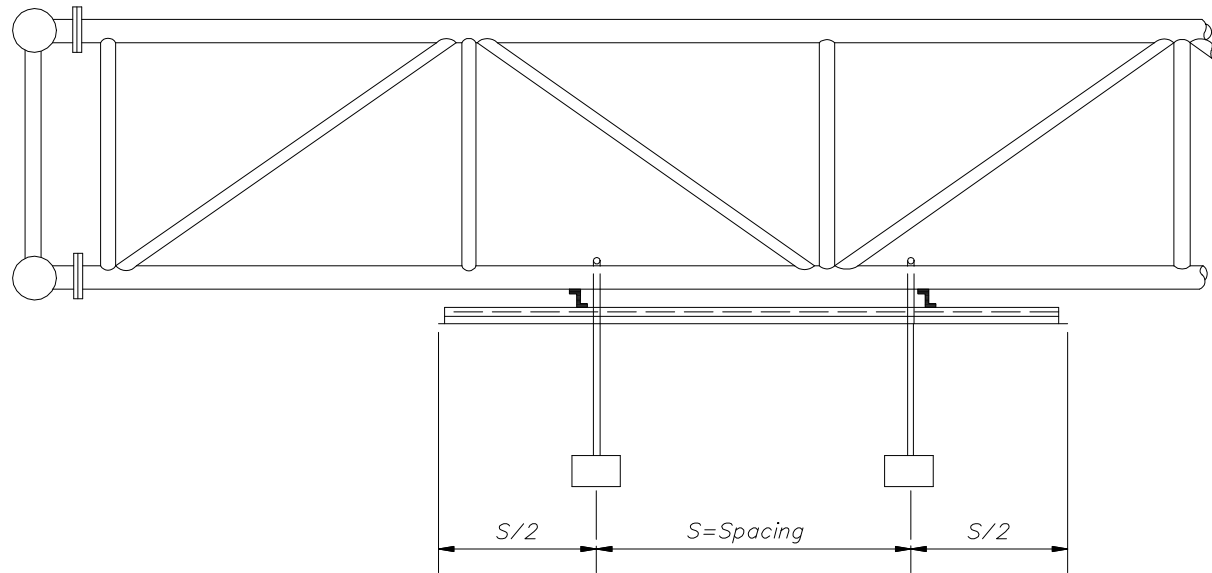
Roadway Lighting included in contract:

The power for the sign lighting shall be provided from the roadway lighting circuit. The lighting plans shall indicate the sign location and a pull box location for connection to the sign lights. The lighting contractor shall install pull box and loop 2' of lighting circuit conductors in the pull box for connection by the signing contractor.

The signing contractor shall furnish and install luminaires, Nema 3R enclosure, 30 amp breaker, conduit, conductors and all other electrical equipment necessary for connection to the lighting circuit.

Roadway Lighting not included in contract:

The signing plans shall include pay item numbers to furnish and install conduit, conductors, ground rods, pull boxes and service point equipment. The signing plans shall indicate the location of the service point equipment and circuit runs. The signing contractor shall provide all electrical equipment necessary for connection of the sign lights.

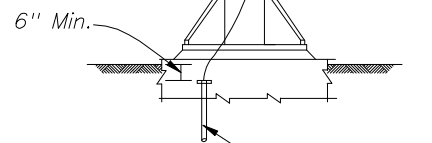
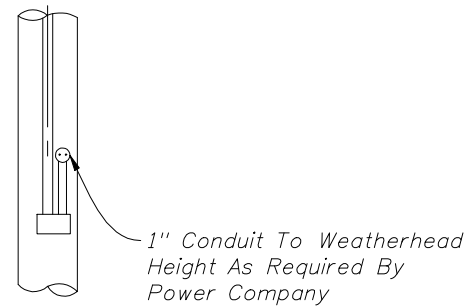
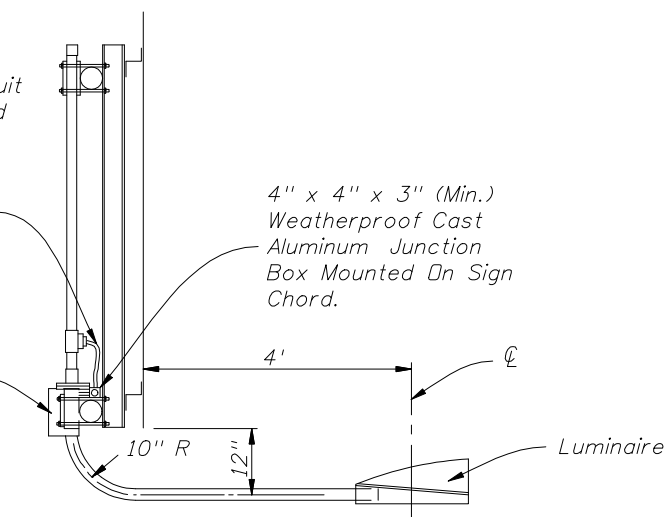


PLACEMENT OF SIGN LIGHTS

1. Luminaire shall be mounted so the lamp center is 4' in front of the sign face.
2. Luminaire shall be mounted so the back of the fixture is placed 1' below the bottom edge of the sign face.
3. Luminaires from manufacturers who recommended their fixture be tilted shall be mounted on a bracket which provides this recommended tilt.
4. Photometric data for the Induction luminaire proposed for sign lighting shall be submitted for approval to the District Lighting Engineer, Florida Department Of Transportation.

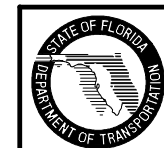
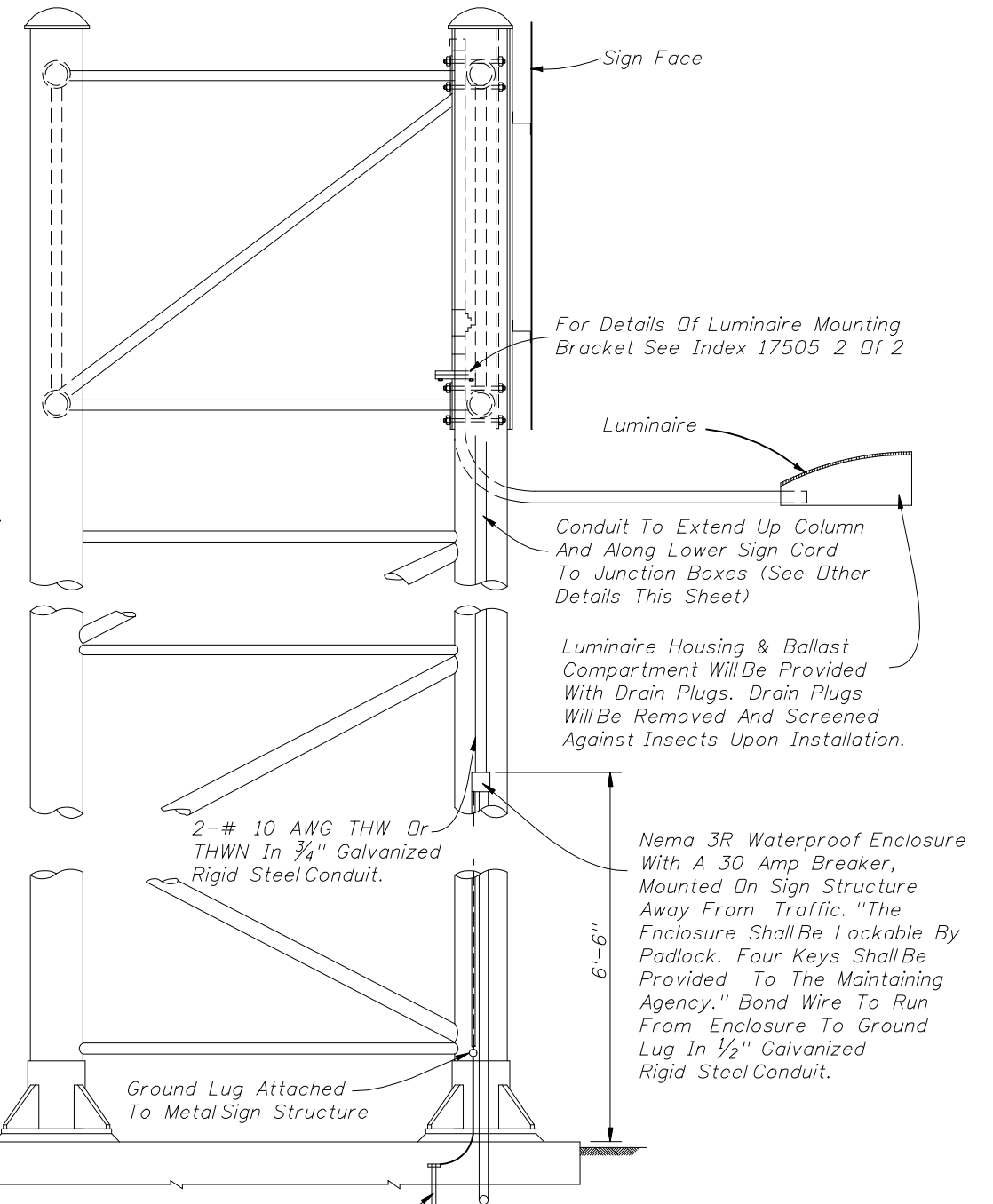
Use 3/4" Liquid Tight Flexible Conduit From Junction Box To Ballast And From Junction Box To Tee In Luminaire Bracket. Conduit Shall Be Of Sufficient Length To Allow Rotation Of Luminaire Bracket 90 In Either Direction.

Ballast Shall Be Mounted To Sign Chord With Stainless Steel Band. Bracket For Ballast To Be Fabricated From Galvanized Steel Plate For Steel Sign Structures And Aluminum Plate For Aluminum Sign Structures. (Submittal Data Required)



PLAN
OVERHEAD POWER SUPPLY

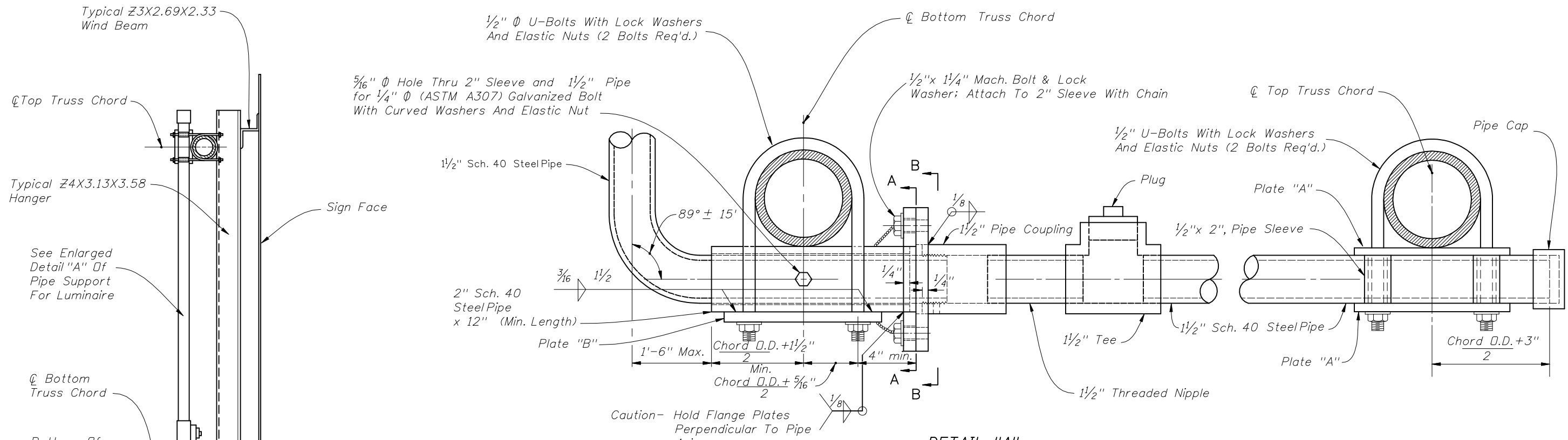
U.L. Approved Ground Rod 5/8" x 20' Copper Clad With Approved Ground Connection To Be Placed In Pull Box For Inspection Purposes. Splices To Be Made With Compression Sleeves Then Properly Insulated & waterproofed



2010 FDOT Design Standards

EXTERNAL LIGHTING FOR SIGNS

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SECTION THROUGH SIGN SUPPORT AT LUMINAIRE

DETAIL "A"

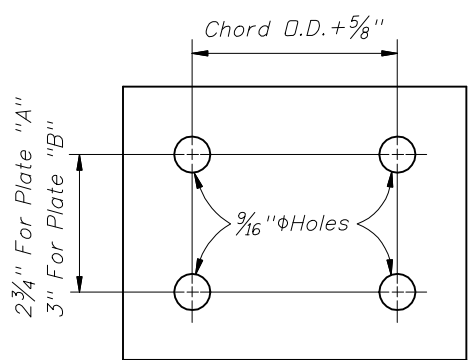
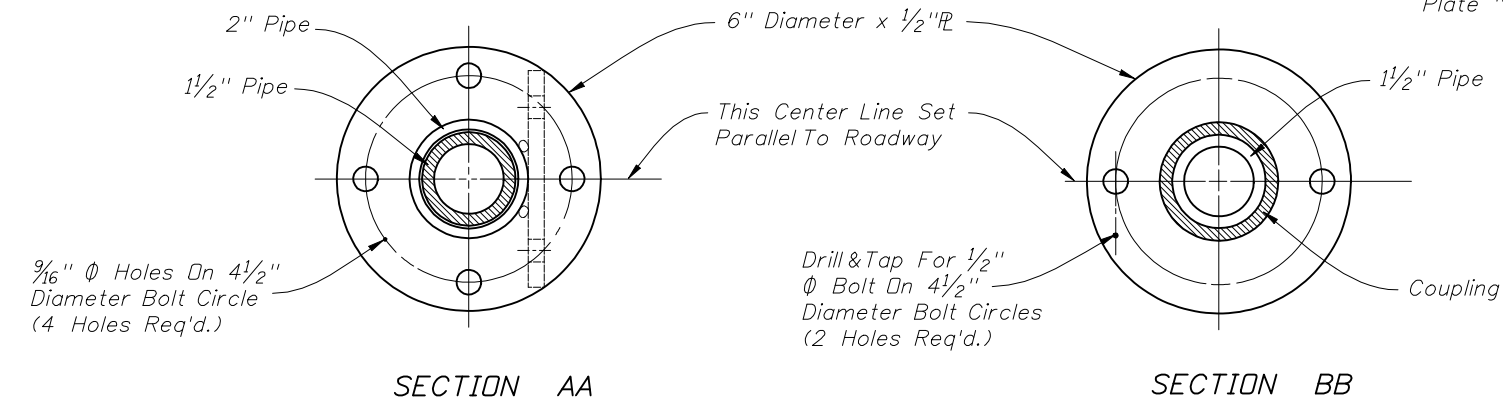


Plate "A": 1/4" x 4 3/4" x Chord D.D. + 2 1/2"
 Plate "B": 3/8" x 5" x Chord D.D. + 2 1/2"

NOTES

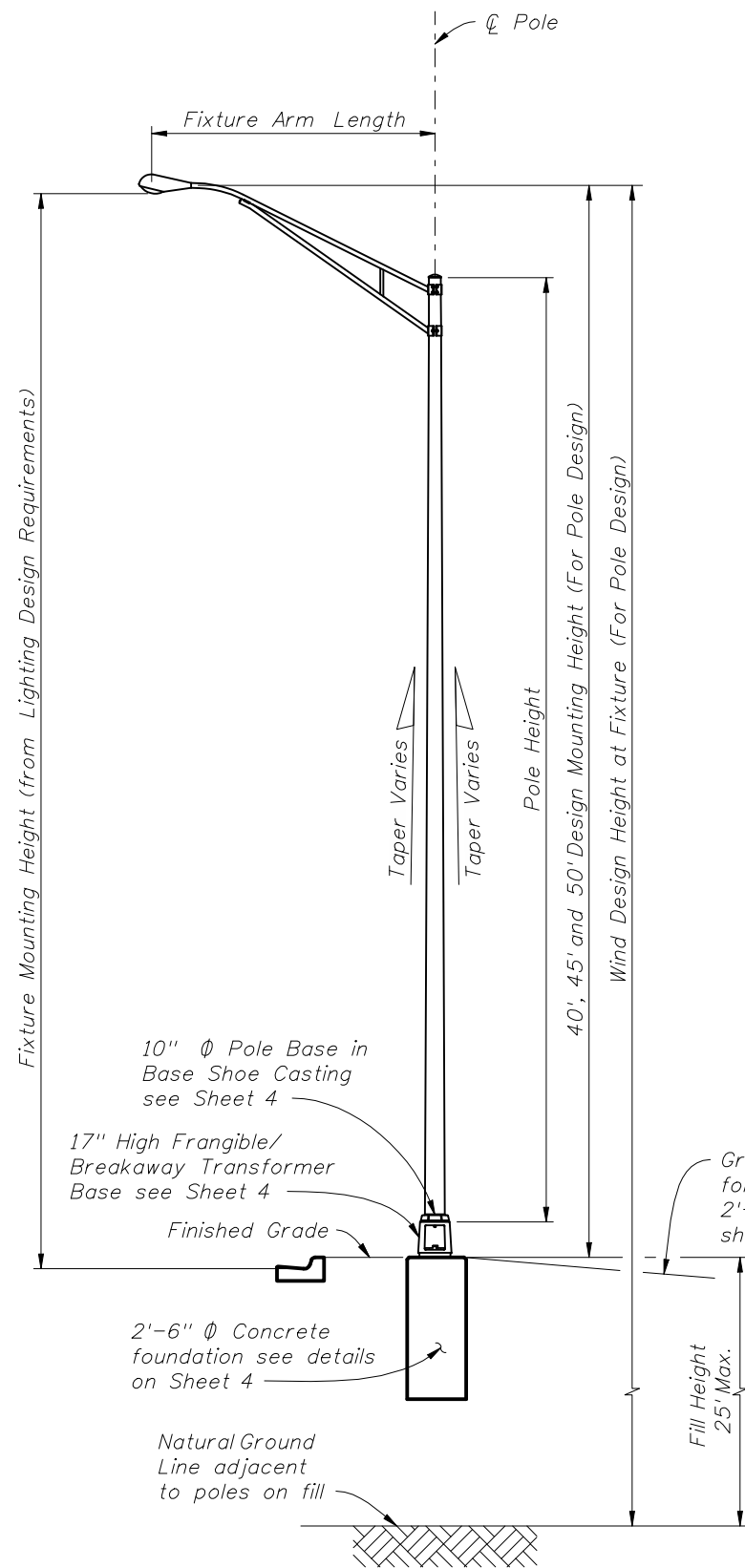
- 1 Dimension "A" to be established by type and make of luminaire to be purchased and used on the project.
- 2 The center lines of both flange plates and the luminaire support arm are to be set parallel to the roadway before the set screw is seated.
- 3 Minor adjustments in the horizontal location of the luminaire support arm along the bottom chord of the truss will be allowed so that the flange plates will clear the truss web members.
- 4 All steel pipe shall meet the strength requirements of ASTM Specification A53 Grade "A" or Grade "B". Steel plates shall meet the requirements of A36 and bolts, nuts and washers shall meet the requirements of ASTM A307.
- 5 All items shall be hot dip galvanized after fabrication in accordance with the requirements of ASTM A123 and /or A153.
- 6 Luminaire support arm shall be free to rotate in a clockwise or counter clockwise direction. When service or maintenance is required for sign face or vertical face of truss; Support arm shall be capable of being locked in a position 90° from parallel to the roadway for unobstructed working clearance.



SECTION AA

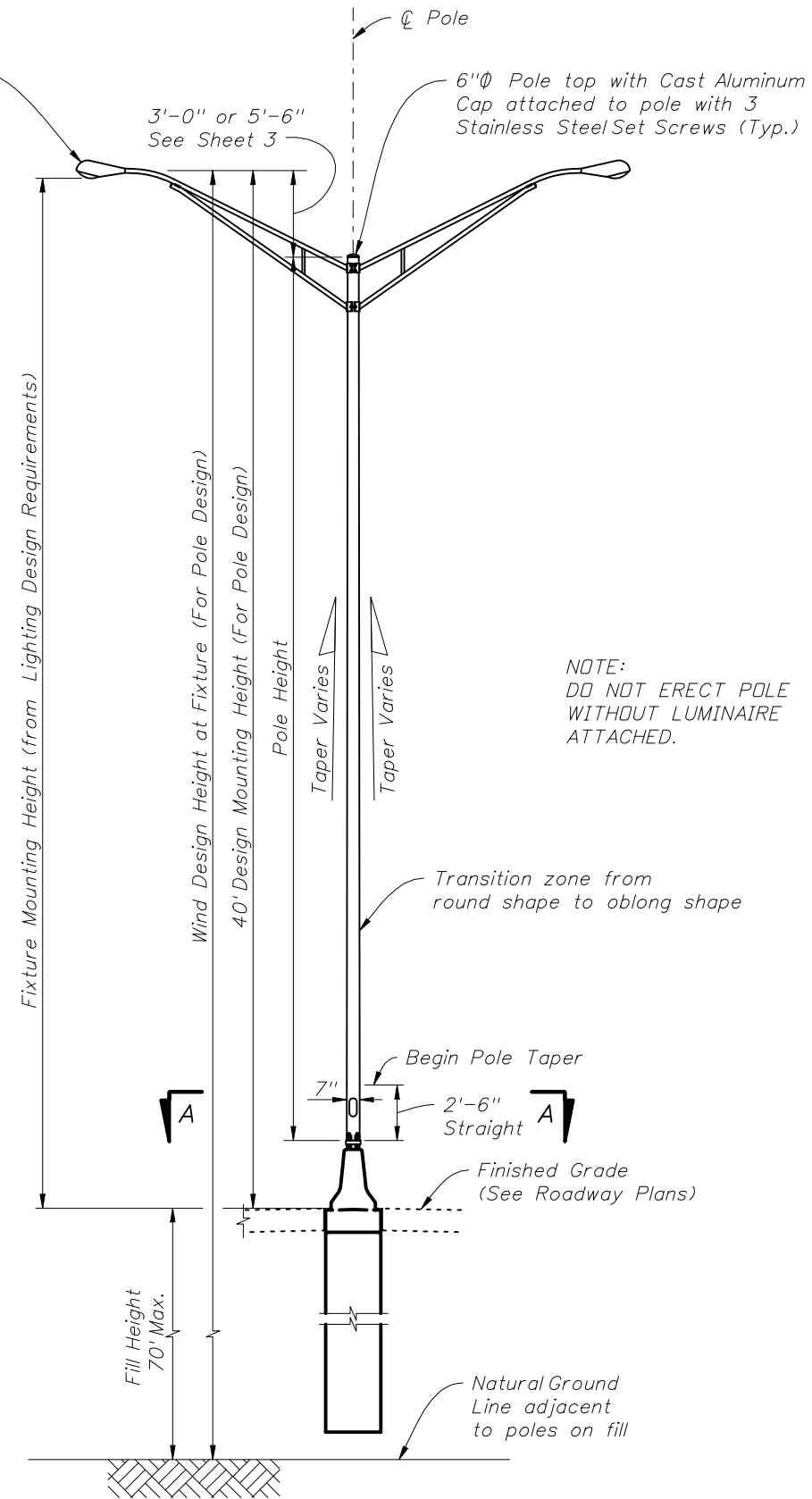
SECTION BB





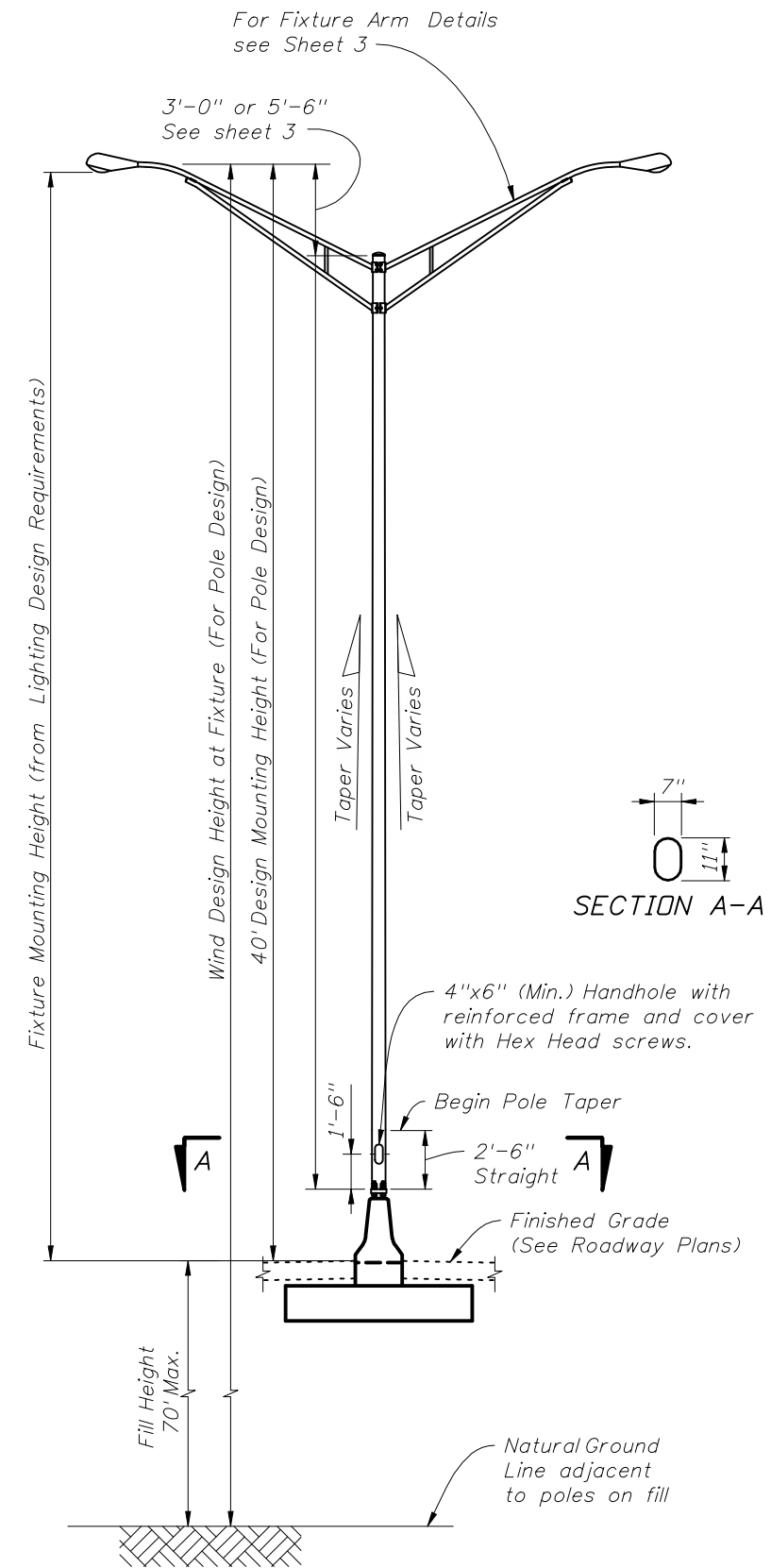
STANDARD ROADWAY ALUMINUM LIGHT POLE

Luninaire, not furnished with Pole Assembly (Typ.)

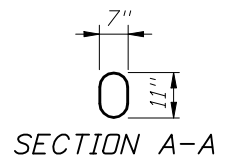


MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE ON CYLINDRICAL FOUNDATION

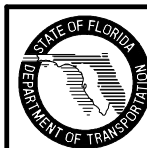
NOTE:
DO NOT ERECT POLE WITHOUT LUMINAIRE ATTACHED.



MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE ON SPREAD FOOTING FOUNDATION



ELEVATIONS



2010 FDOT Design Standards

STANDARD ALUMINUM LIGHTING

Last Revision 07/01/09 Sheet No. 1 of 8

Index No. 17515

ALUMINUM LIGHT POLE GENERAL NOTES

- 1) Designed in accordance with FDOT Structures Manual (current edition).
- 2) All tables were developed assuming the following Luminaire properties: Effective Projected Area of 1.55 ft. (includes wind drag coefficient) and 75 pounds (max.)
- 3) Perform all welding in accordance with the American Welding Society Structural Welding Code Aluminum ANSI/AWS D1.2 (current edition).
- 4) See Standard Index No. 17500 for grounding and wiring details.
- 5) Light Pole Specifications:
 - a. Poles: ASTM B221, Alloy 6063-T6.
 - b. Arm Tube Extrusions: ASTM B221 - Alloy 6063-T6.
 - c. Finish: For pole and arms: 50 grit satin rubbed finish.
 - d. Pole Connection Extrusions, Bars and Plates: ASTM B221 - Alloy 6063-T6.
 - e. Aluminum Caps and Covers: ASTM B-26(319-F).
 - f. Weld Metal: ER4043.
 - g. Stainless Steel Fasteners and Hardware: AISI Grade 304.
 - h. Aluminum alloy 6063: T4 condition and heat treated in accordance with ASTM B597 to T6.
- 6) Provide "J", "S" or "C" hook at top of pole for electrical cable.
- 7) Furnish each pole with a 2"x4" (max) aluminum identification tag. Submit details for approval. Secure to Transformer Base with 0.125" stainless steel rivets or screws. Locate Identification Tag on the inside of base and visible from the door opening. Include the following information: Financial Project ID, Pole Height, Manufacturer's Name, Certification number and QPL Number.
- 8) Manufacturers seeking approval of a Standard Roadway Aluminum Lighting Pole assembly for inclusion on the Qualified Products List must submit a QPL Product Evaluation Application along with design documentation and drawings showing the product meets all specified requirements of this Index.
 - a. For Clamp and Frangible Transformer Base Design, provide design calculation and/or test results indicating that the components are capable of providing the required capacity. Certify that the frangible Transformer Base conforms to the current FHWA required AASHTO Frangibility Requirements, tested under NCHRP Report 350 Guidelines.
 - b. For Median Barrier Mounted Aluminum Light Pole design, provide test results showing that pole will not buckle at pole shape transition area. Demonstrate in the tests that the poles will achieve full ultimate moment capacity of 36 k-ft in the strong axis and 30 k-ft in the weak axis respectively for the 0.25" thick poles, and 44 k-ft in the strong axis and 37 k-ft in the weak axis respectively for the 0.313" thick poles. Submit complete details and calculations for the reinforced 4"x6" (min.) handhole located 1'-6" above the base plate.
 - c. For Alternate foundations: Include design calculations and drawings showing that the product meets the requirements of this index, FDOT Structures Manual and Specification 715.

ROADWAY ALUMINUM LIGHTING POLE NOTES

- 1) Foundation Materials:
 - a. Reinforcing Steel: ASTM A615 Grade 60.
 - b. Concrete: Class I.
 - c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade DH nuts and ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329).
- 2) Shoe Base and Frangible/Breakaway Transformer Base Casting Specifications.
 - a. Shoe Base Casting: ASTM B26 - Alloy 356-T6 or ASTM B108 - Alloy 356-T6.
 - b. Frangible/Breakaway Transformer Base Casting: ASTM B26 - Alloy 356-T6 or ASTM B108 - Alloy 356-T6.
 - c. Shoe Base Connection Bolts: ASTM A325 Type 1 with ASTM A563 Grade DH nuts and ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329).
- 3) Pole Notes:
 - a. Tapered as required to provide a top outside diameter (D.D.) of 6" with a base D.D. of 10". Portions of the shaft near the base shoe and at the arm connections may be held constant at 10" and 6" respectively to simplify fabrication.
 - b. Transverse welds are allowed only at the base.
 - c. Poles constructed out of two or more sections with overlapping splices are not permitted.
 - d. Equip poles with a damping device if the pole location is within 5 miles of the coastline.

MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE

- 1) Foundation Materials:
 - a. Reinforcing Steel: ASTM A615 Grade 60.
 - b. Concrete: Class I.
 - c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade DH nuts and ASTM A36 Plate Washer or ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329). Coupler shall be in accordance with AASHTO 5.11.5.2.2.
- 2) Base Connection Materials:
 - a. Aluminum Base Plate and Stiffener: Alloy 6061-T6.
 - b. Backer Ring: ASTM B221, Alloy 6063-T6.
 - c. Bearing Plate for Anchor Bolts: ASTM A709 Grade 36 or ASTM A36.
- 3) Pole Notes:
 - a. Tapered as required to provide a 6" (D.D.) round top with a 11"x7" (D.D.) oblong base. Portions of the shaft near the base and at the arm connections may be held constant at 11"x7" oblong and 6" round respectively to simplify fabrication.
 - b. Transverse welds are allowed only at the base.
 - c. Poles constructed out of two or more sections with overlapping splices are not permitted.
 - d. Equip poles with a damping device.

FOUNDATION NOTES

The foundations for Standard Roadway Aluminum Light Poles are pre-designed and are based upon the following conservative soil criteria which covers the majority of soil types found in Florida:

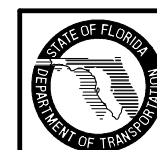
Classification = Cohesionless (Fine Sand)
 Friction Angle = 30 Degrees (30°)
 Unit Weight = 50 lbs./cu. ft. (assumed saturated)

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

PULL BOX NOTES

1. Fabricated pullboxes from ASTM A 36 steel and hot-dip galvanized in accordance with ASTM A 123 after fabrication. All seams shall be continuously welded and ground smooth. Provide watertight cover with neoprene gasket and secure cover with galvanized screws.
2. Completed pullbox and conduit risers are incidental to the cost of concrete barrier wall.

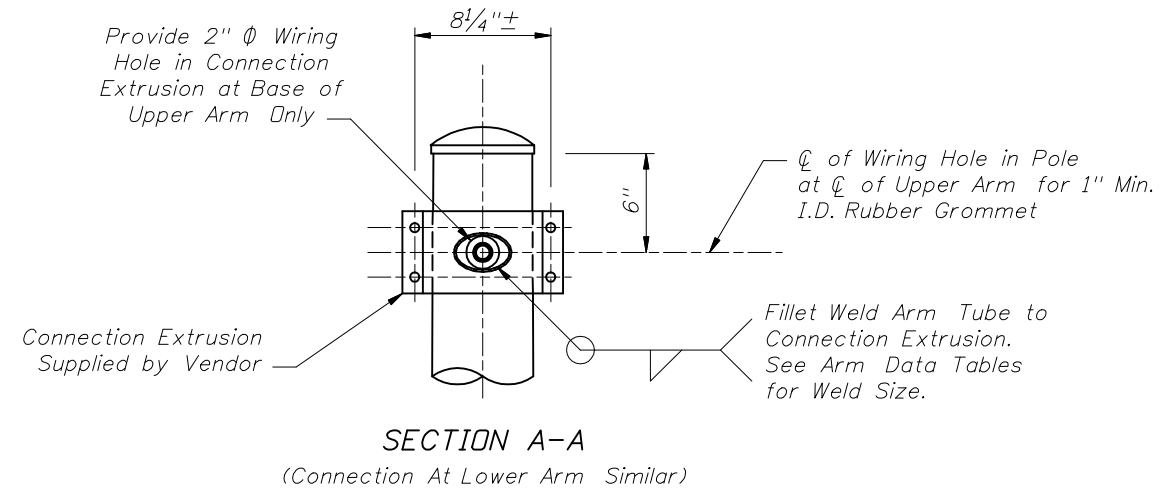
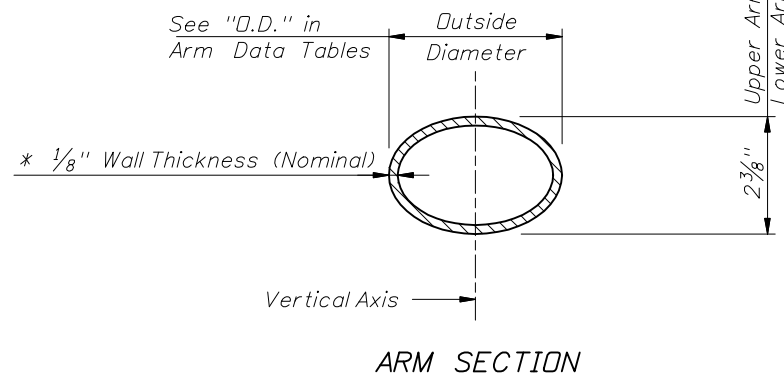
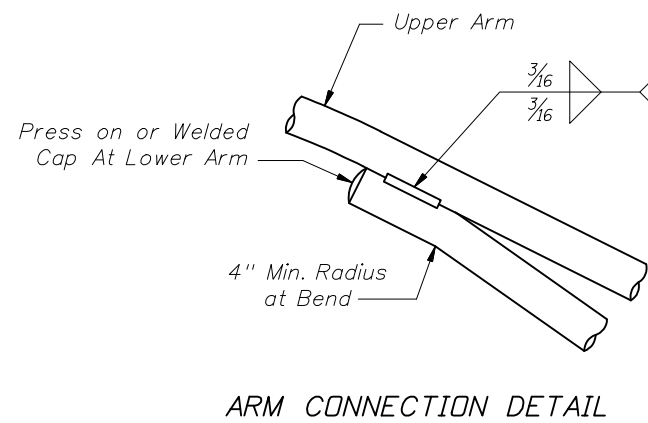
NOTES



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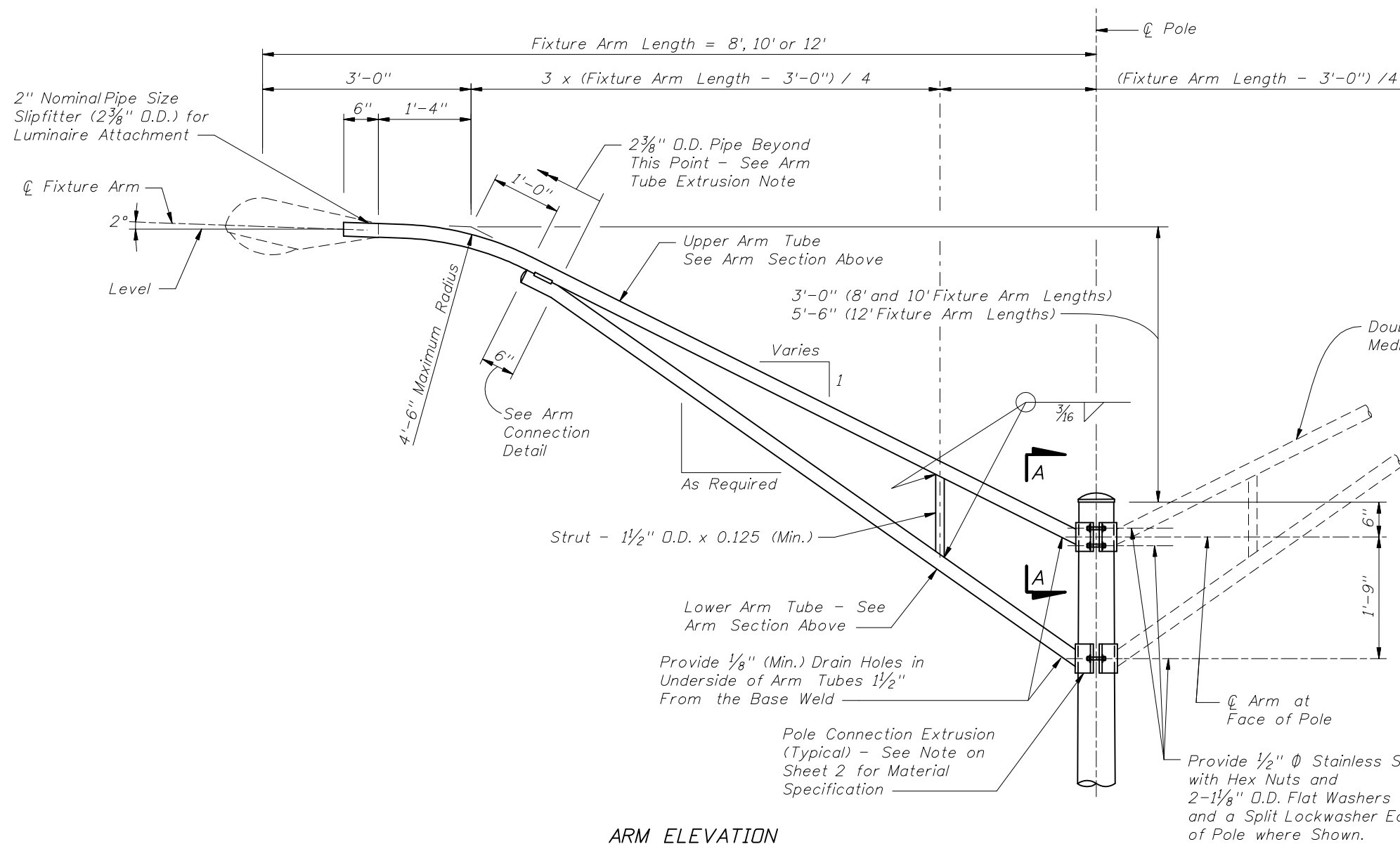


ARM TUBE EXTRUSIONS NOTES:

At the pole connections, provide arm tube extrusions with dimensions as shown in the ARM SECTION and as tabulated in the ARM DATA Tables. Uniformly transition elliptical section to a cylindrical section at the arm connection.

The fabricator may substitute elliptical cross sections other than those tabulated, provided the section properties about the vertical axis and the area of the section equal or exceed that of the required section, and provide minimum wall thickness of 1/8" nominal and within the Aluminum Association Tolerances.

The outside diameter about the minor axis should be held at 2 3/8" at the upper and lower arms.

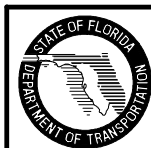


ARM TABLE					
WIND SPEED (MPH)	ARM LENGTH (FT)	UPPER ARM		LOWER ARM	
		O.D. (IN)	WELD (IN)	O.D. (IN)	WELD (IN)
110	8	2.38	0.188	2.38	0.188
110	10 & 12	3.63	0.188	3.63	0.188
110	15	4.63	0.188	4.63	0.188
130	8 & 10	3.63	0.188	3.63	0.188
130	12	4.63	0.188	4.63	0.188
130	15	4.63	0.25	4.63	0.25
150	8	3.63	0.188	3.63	0.188
150	10	3.63	0.250	3.63	0.250
150	12	4.63	0.250	4.63	0.250
150	15	4.63	0.313	4.63	0.313

* Increase Member Wall Thickness as Necessary to Meet Minimum Requirements of the Welding Code for the Connection Weld Sizes Shown in the Arm and Pole Tables.

ARM ELEVATION

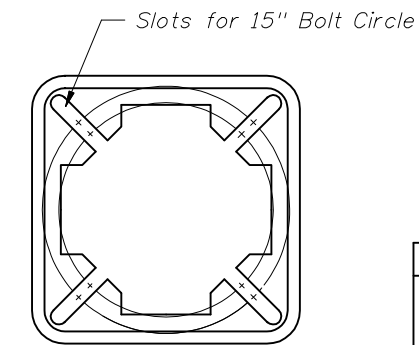
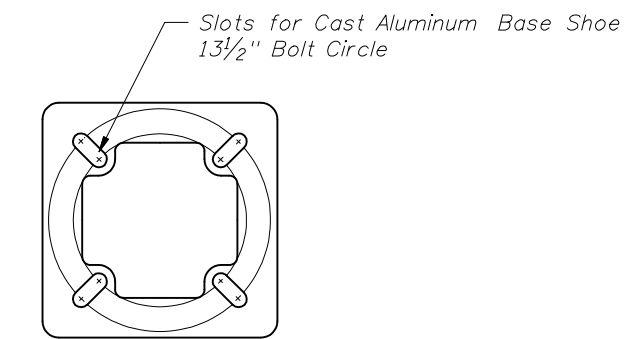
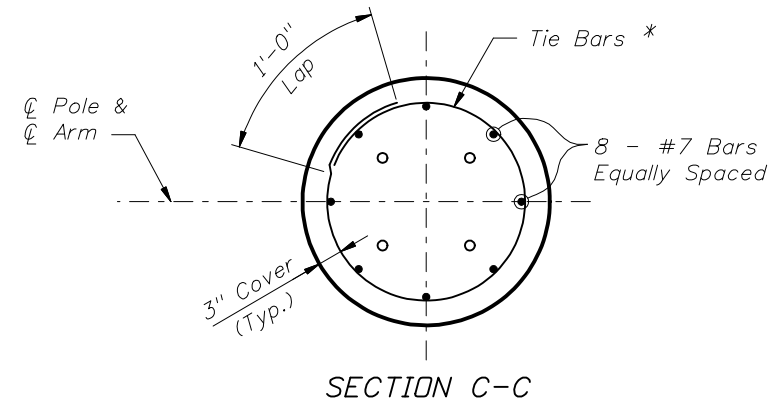
ARM DETAILS



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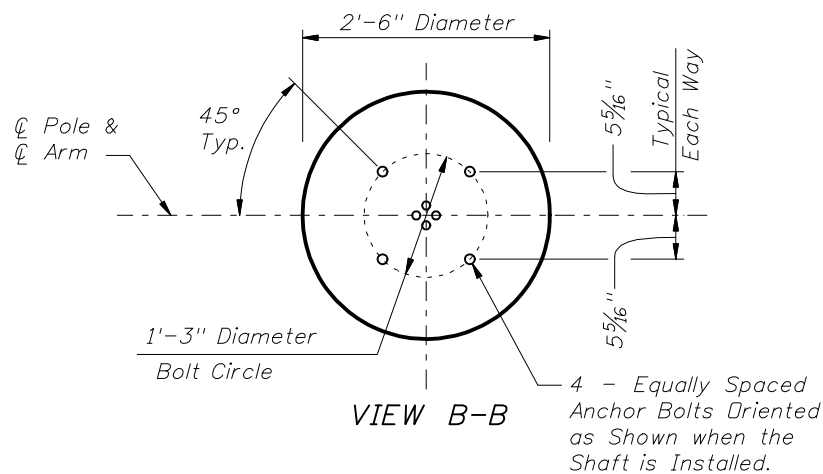
STANDARD ALUMINUM LIGHTING

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TOP VIEW TRANSFORMER BASE

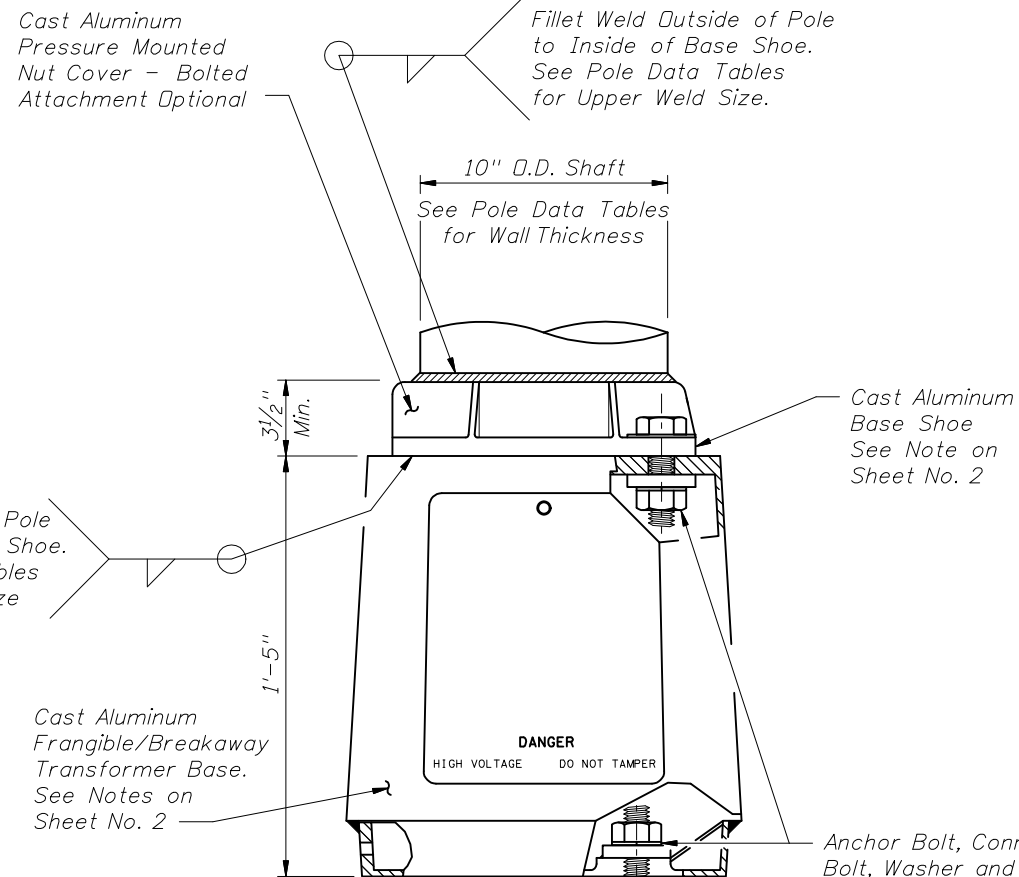
BOTTOM VIEW TRANSFORMER BASE



VIEW B-B

Cast Aluminum Pressure Mounted Nut Cover - Bolted Attachment Optional

Fillet Weld Outside of Pole to Inside of Base Shoe. See Pole Data Tables for Upper Weld Size.

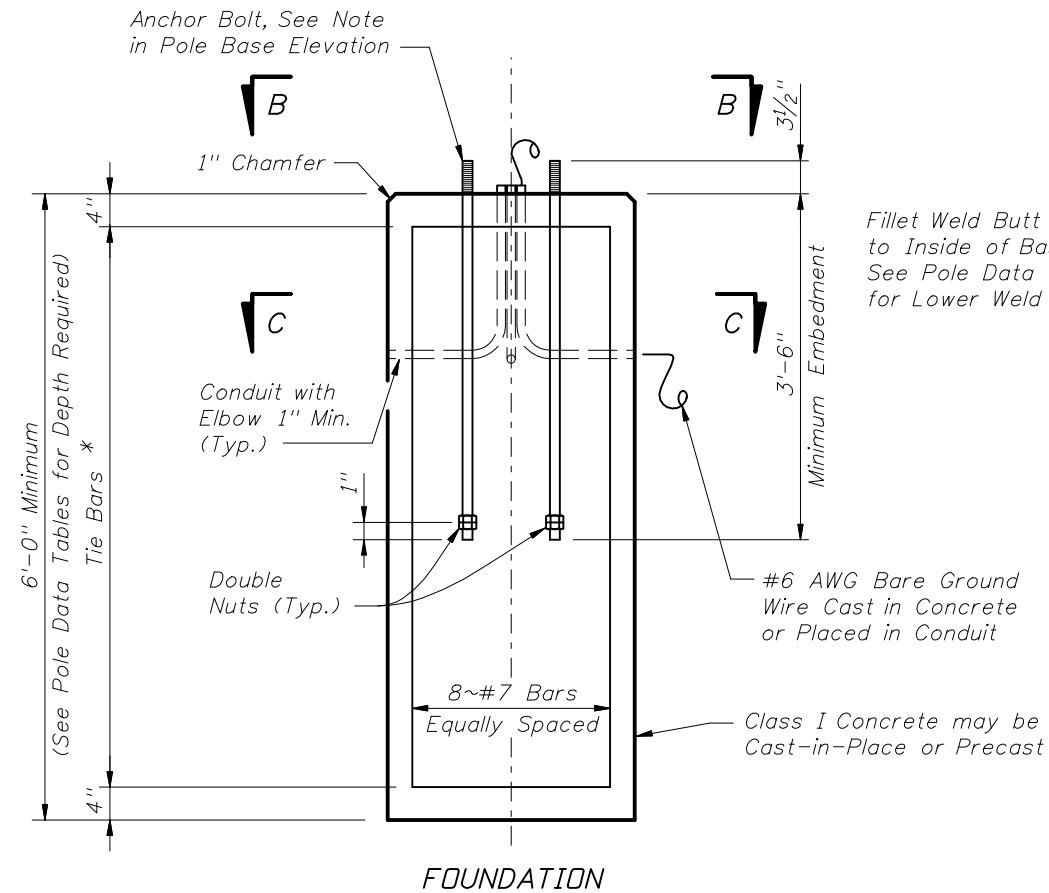


POLE BASE ELEVATION

WIND SPEED (MPH)	ARM LENGTH (FT)	DESIGN MOUNTING HEIGHT (FT)	POLE WALL (IN)	UPPER WELD (IN)	LOWER WELD (IN)
110	8, 10, 12 & 15	40 & 45	0.156	0.156	0.156
110	8, 10, 12 & 15	50	0.188	0.188	0.188
130	8, 10 & 12	40	0.156	0.156	0.156
130	15	40	0.188	0.188	0.188
130	8, 10, & 12	45	0.188	0.188	0.188
130	15	45	0.250	0.250	0.250
130	8, 10, 12 & 15	50	0.250	0.250	0.250
150	8, 10, & 12	40	0.188	0.188	0.188
150	15	40	0.250	0.250	0.250
150	8, 10, 12 & 15	45	0.250	0.250	0.250
150	8, 10, 12 & 15	50	0.313	0.313	0.313

NOTE:

Pole wall thicknesses shown in the POLE TABLE are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.



FOUNDATION

Fillet Weld Butt of Pole to Inside of Base Shoe. See Pole Data Tables for Lower Weld Size

Cast Aluminum Frangible/Breakaway Transformer Base. See Notes on Sheet No. 2

Cast Aluminum Base Shoe See Note on Sheet No. 2

Anchor Bolt, Connection Bolt, Washer and Split Lockwasher as Required by Approved Breakaway Transformer Base Manufacture (Typ.)

WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	TOTAL DEPTH (FT) **
110	40	7
110	45 & 50	8
130	40 & 45	8
130	50	9
150	40 & 45	9
150	50	10

** Depths shown in table are for grades flatter than 1:4, for grades up to 1:2 add 2'-6" to foundation depths shown in table.

- * 1. Shop-weld assemblies of foundation stirrup reinforcing bars are permitted in reinforced concrete foundation provided that:
- The reinforcing bars conform to ASTM Specification A706/706M.
 - The holding wires conform to ASTM Specification A82 or A496.
 - The Shop welding is performed by machines under a continuous, controlled process, approved by the Engineer.
 - Quality control tests are performed on shop-welded specimens and the test results are available, upon request, to the Engineer.
2. #4 Tie Bars @ 12" centers (max.) or D10 (or W10) spiral @ 6" pitch, 3 flat turns top and 1 flat turn bottom.

BASE DETAILS FOR ROADWAY ALUMINUM LIGHT POLE



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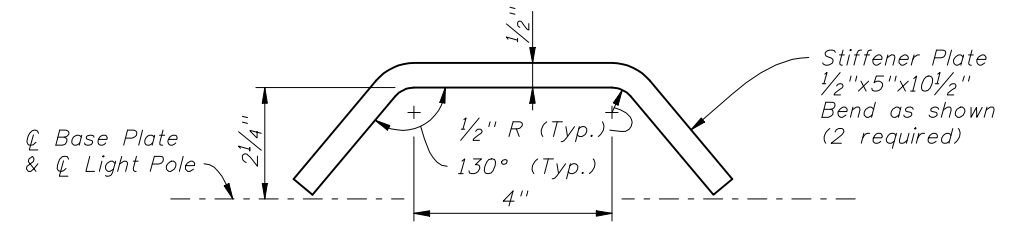
STANDARD ALUMINUM LIGHTING

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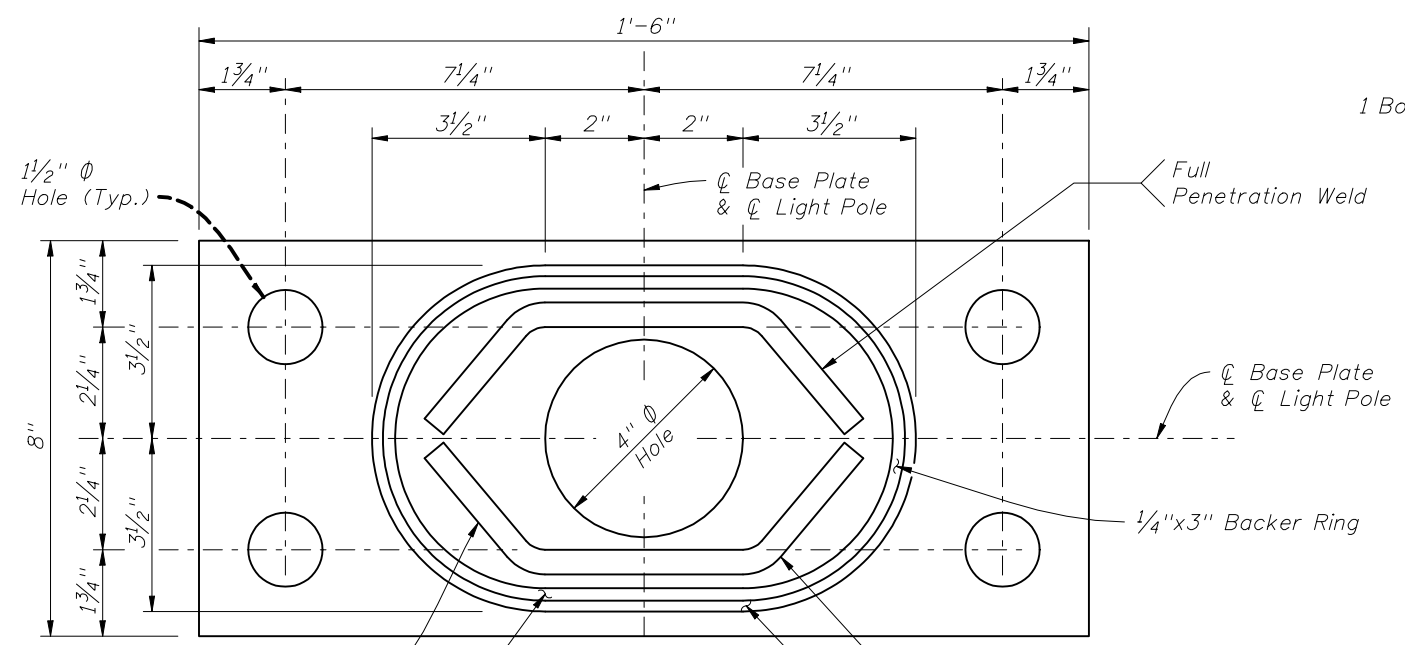
POLE TABLE				
WIND SPEED (MPH)	ARM LENGTH (FT)	DESIGN MOUNTING HEIGHT (FT)	POLE WALL (IN)	FILL HEIGHT (FT)
110	8, 10, 12	40	0.25	Up to 70'
130	8, 10, 12	40	0.25	Up to 70'
150	8, 10, 12	40	0.25	Up to 20'
150	8, 10, 12	40	0.313	>20' to 70'

NOTE:
Pole wall thicknesses shown in the POLE TABLE are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.

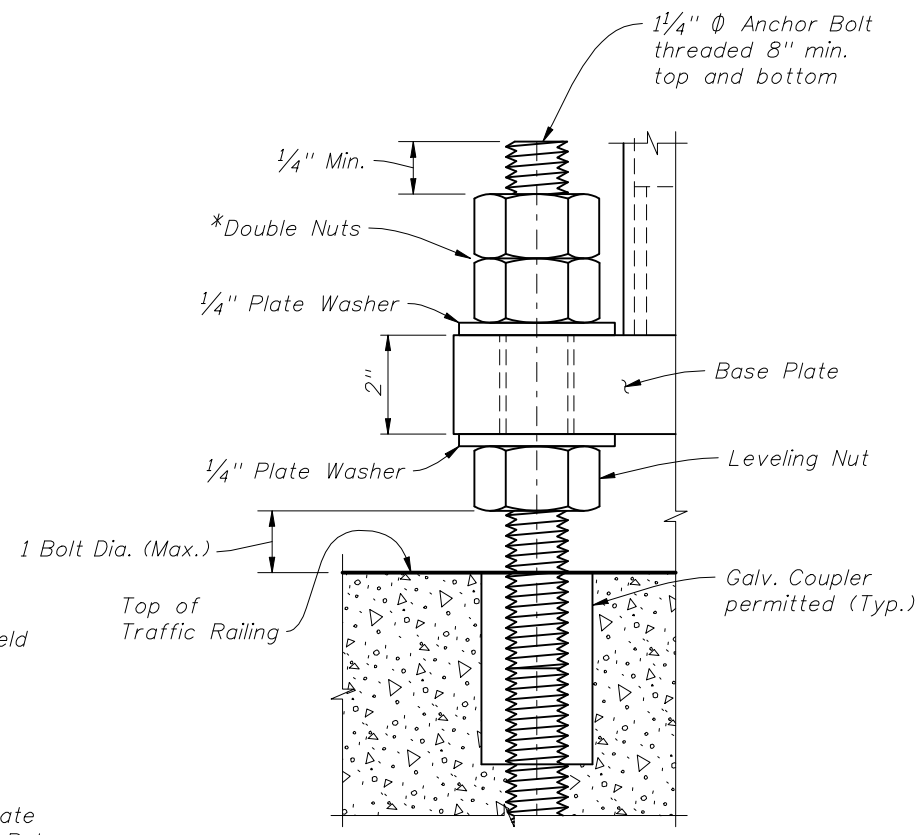
NOTE:
For locations of Bearing Plates, Base Plates and Detail 'A' see Sheets 6 & 7.



STIFFENER PLATE DETAIL

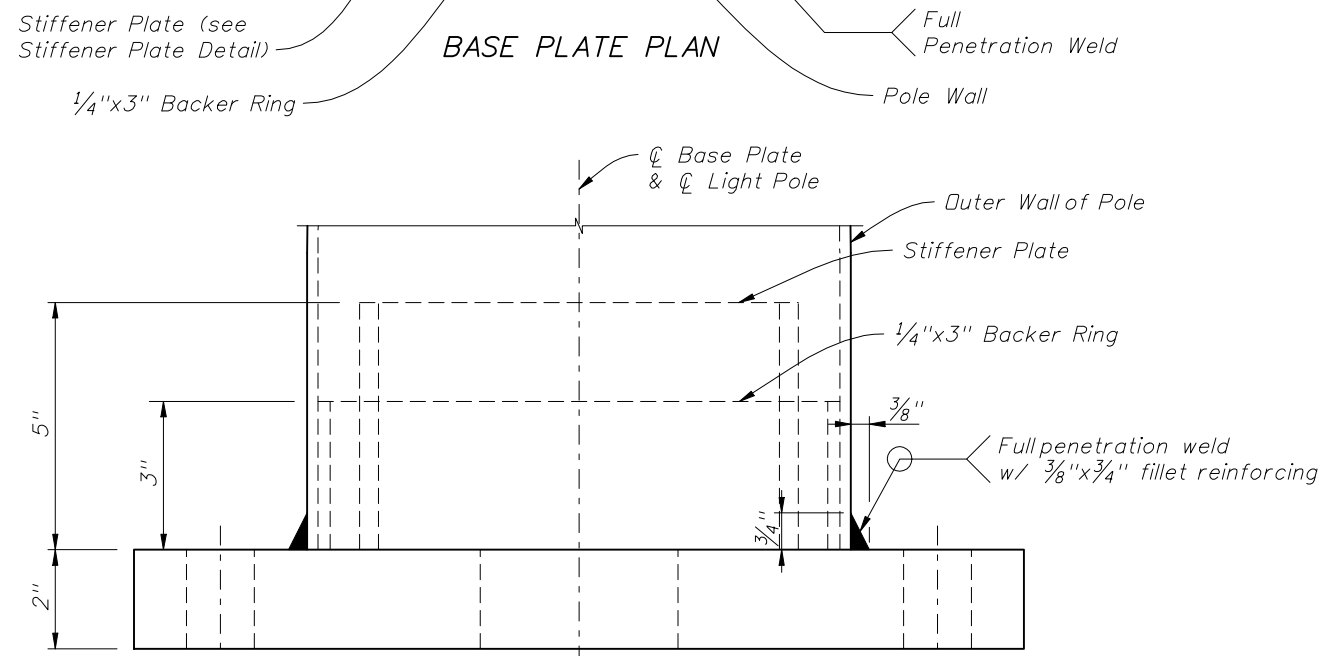


BASE PLATE PLAN

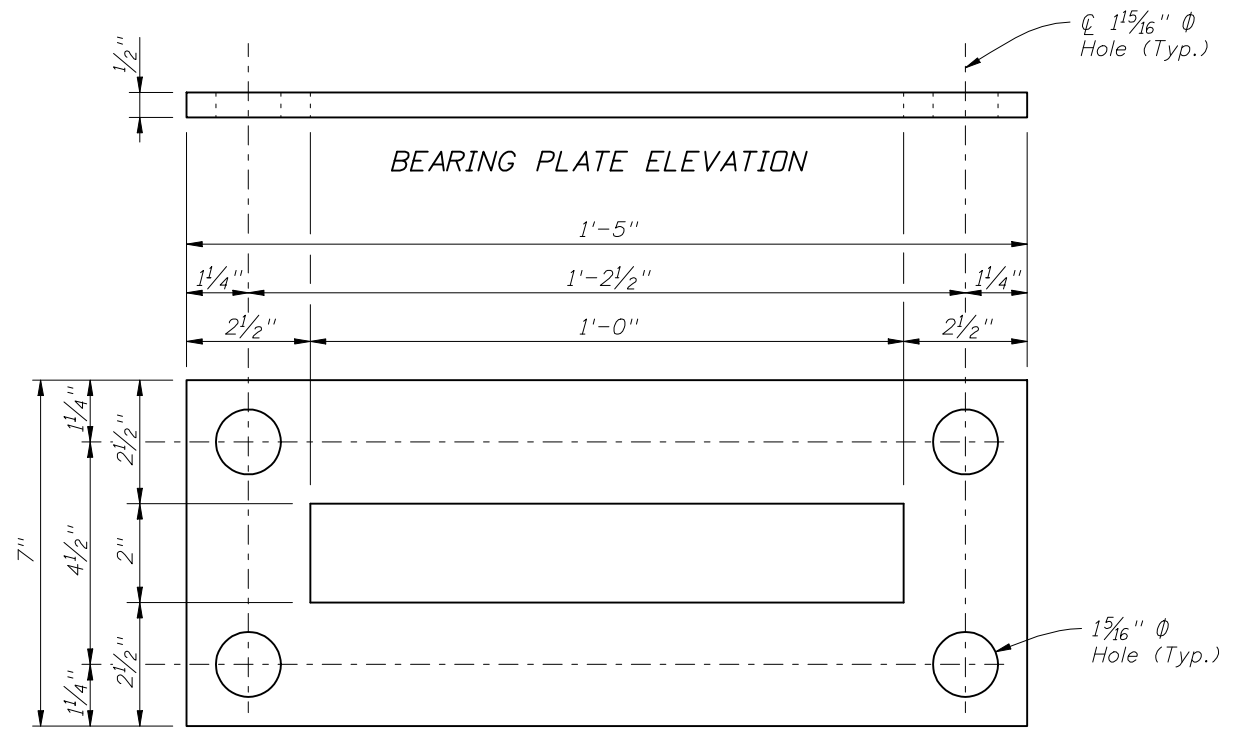


DETAIL 'A'

*Top nut may be 1/2 height Jam Nut. Provide individual nut cover (not shown) for each bolt.



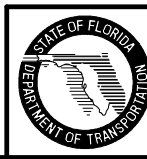
BASE PLATE ELEVATION



BEARING PLATE ELEVATION

BEARING PLATE PLAN

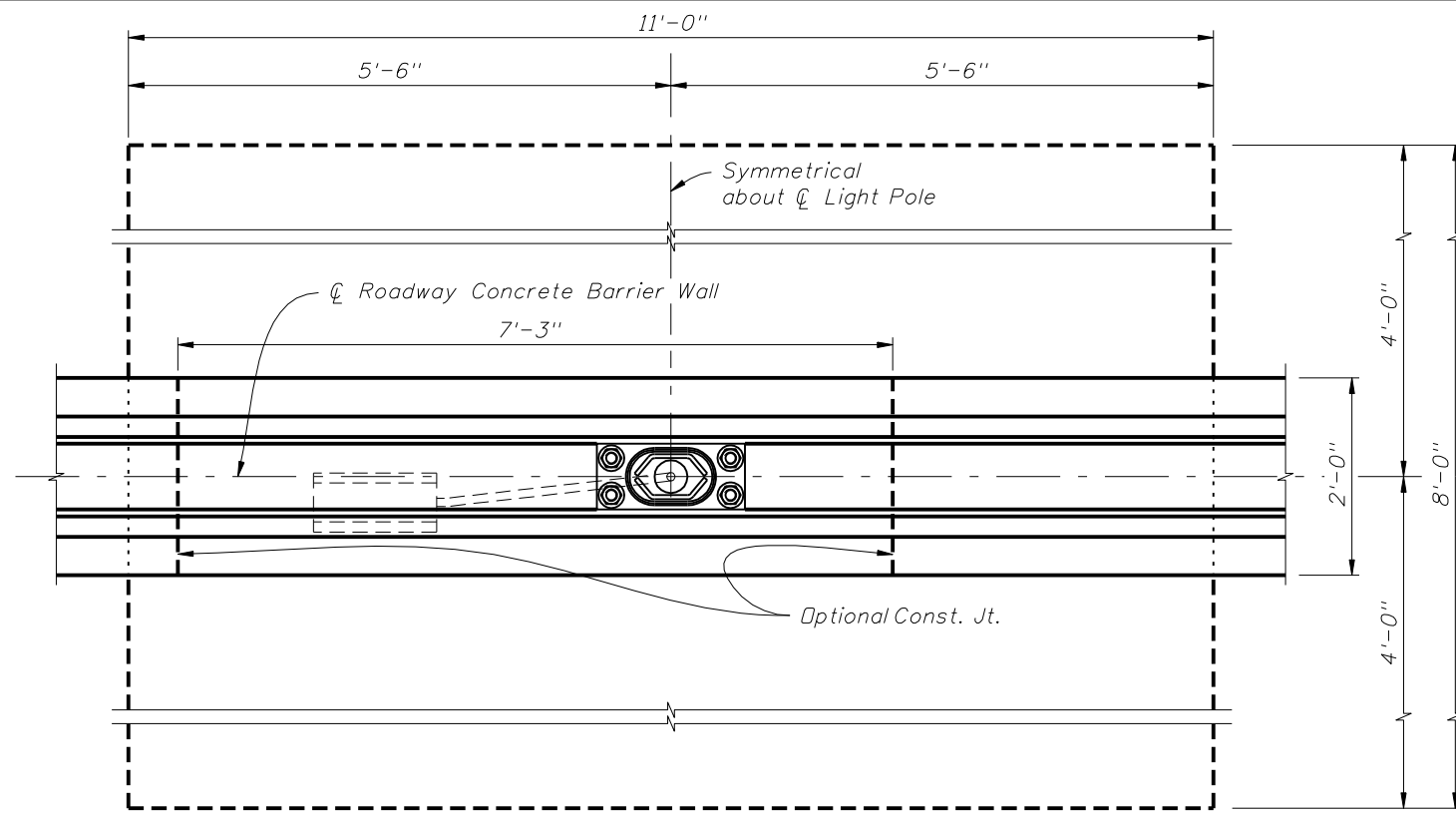
BASE PLATE DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE



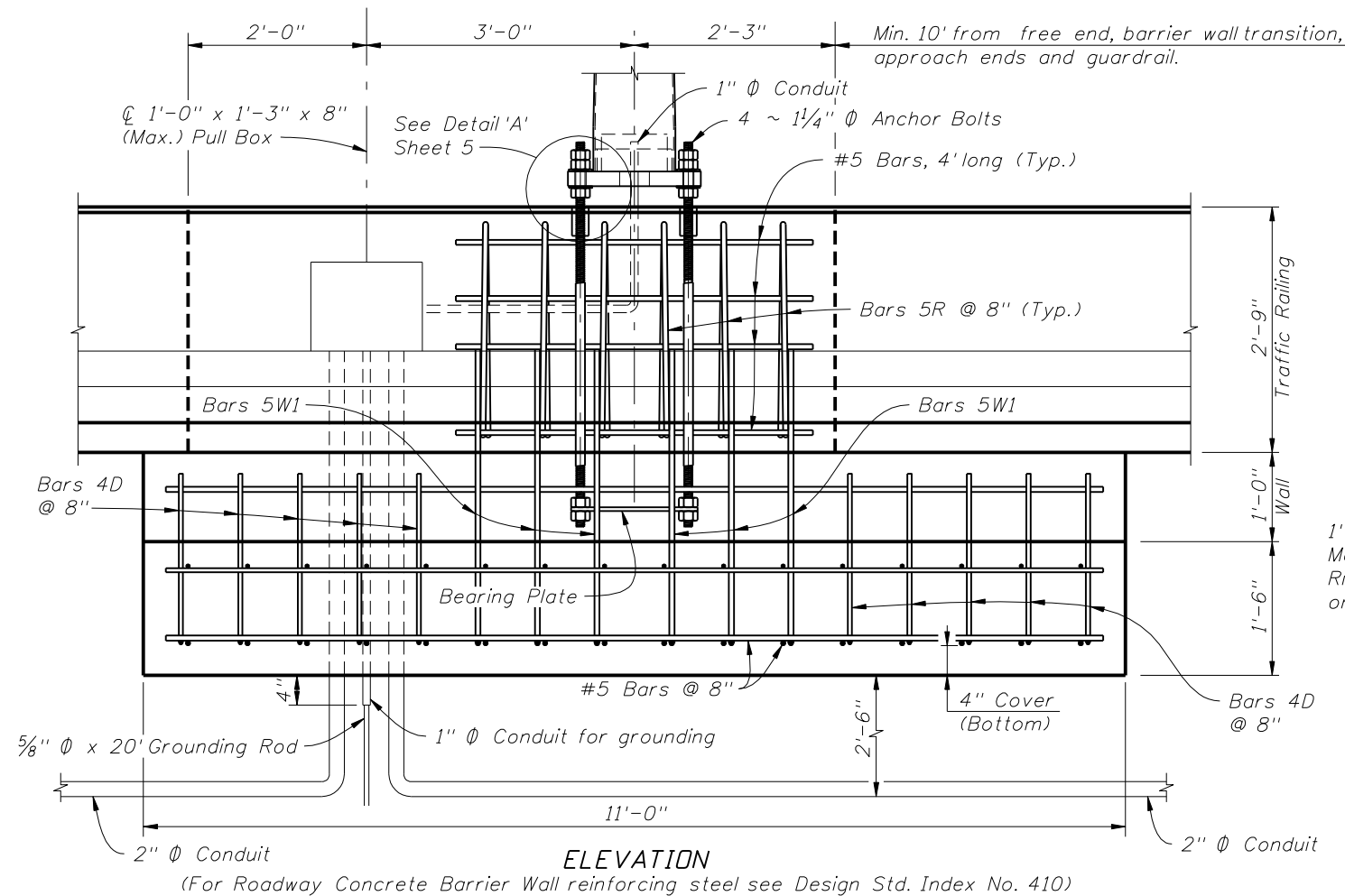
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STANDARD ALUMINUM LIGHTING

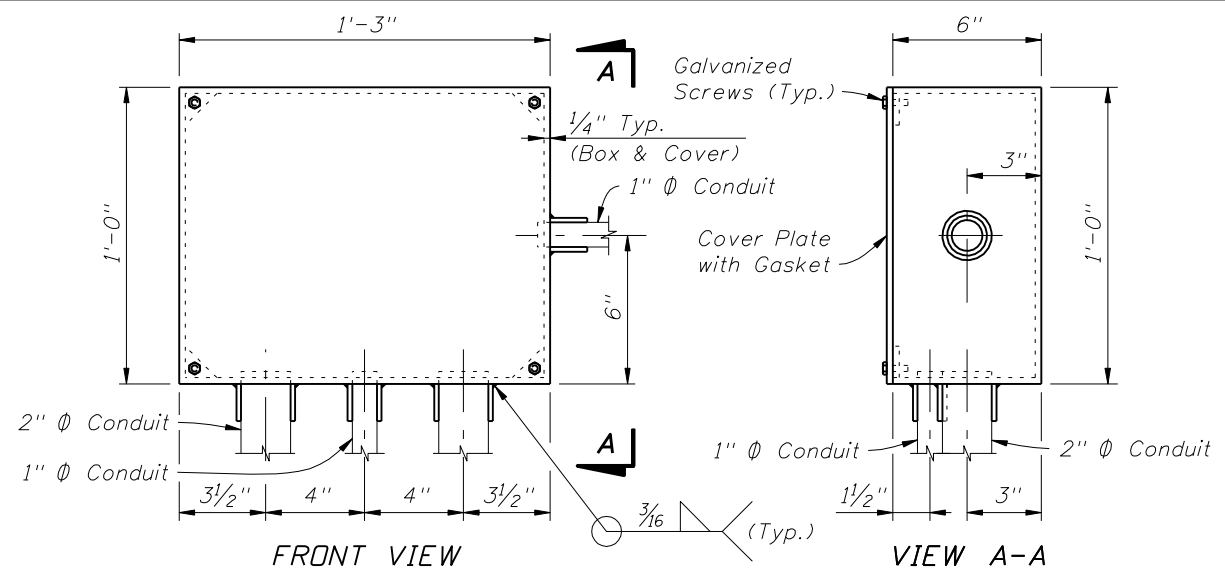
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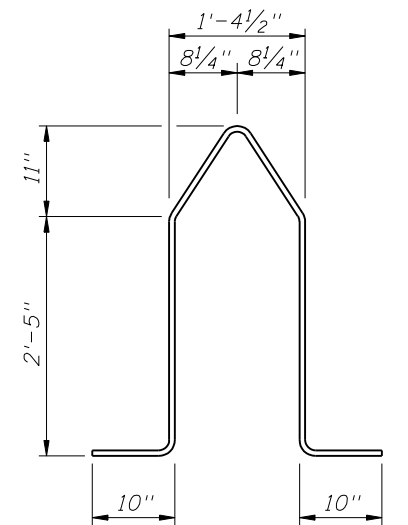
Provide dowel bars @ construction joint
PLAN
 (Reinforcing steel not shown)



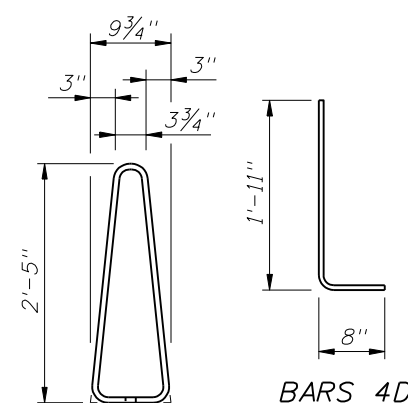
ELEVATION
 (For Roadway Concrete Barrier Wall reinforcing steel see Design Std. Index No. 410)



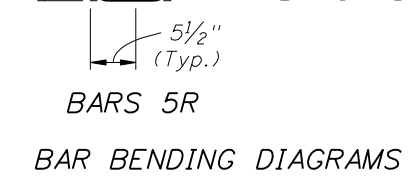
PULL BOX DETAILS



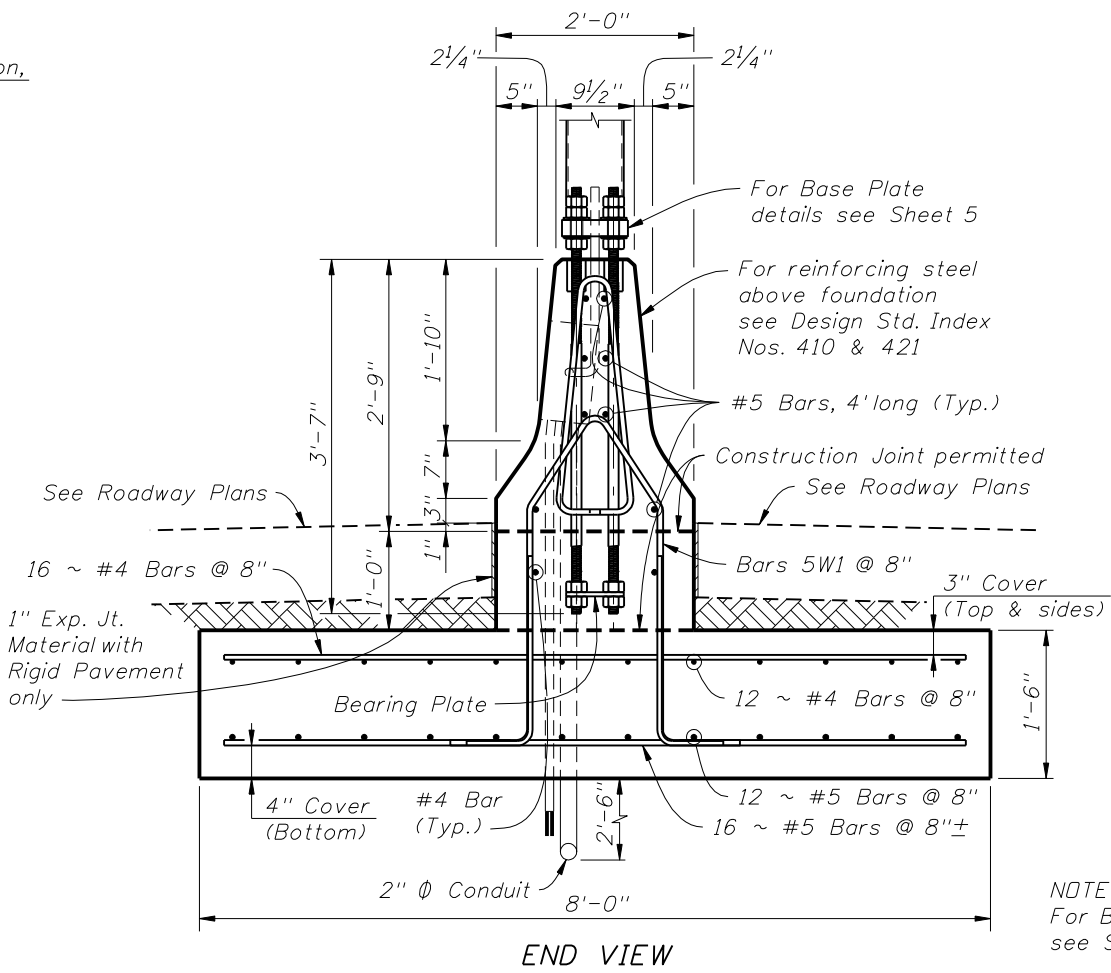
BAR BENDING DIAGRAMS
 BARS 5W1



BAR BENDING DIAGRAMS
 BARS 4D



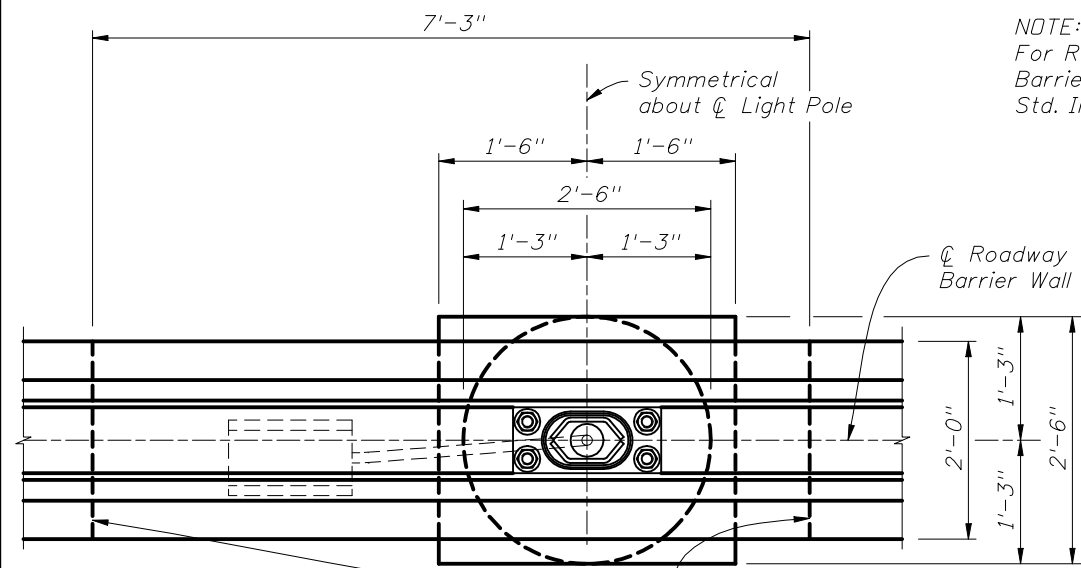
BAR BENDING DIAGRAMS
 BARS 5R



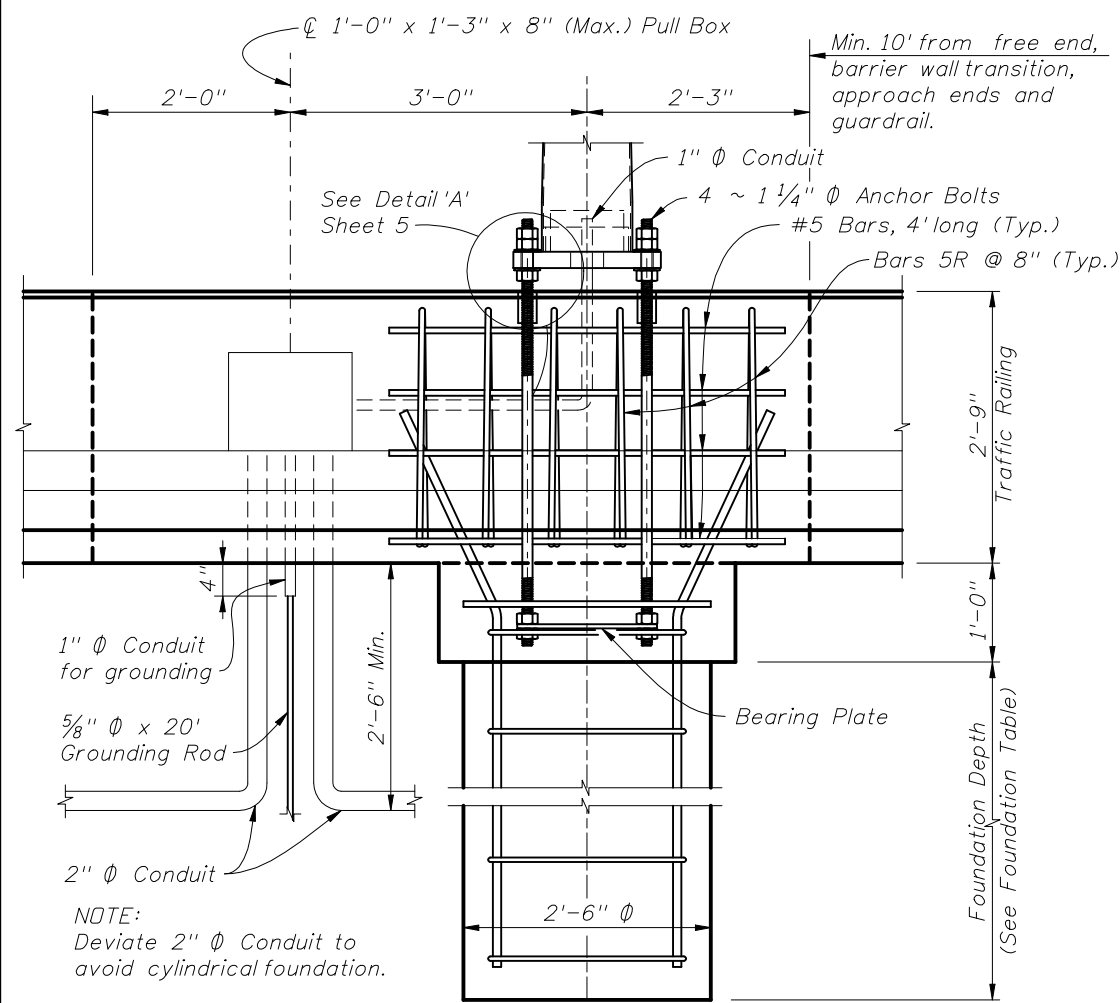
END VIEW

SPREAD FOOTING DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE





PLAN
(Reinforcing steel not shown)
Provide dowelbars @ construction joint

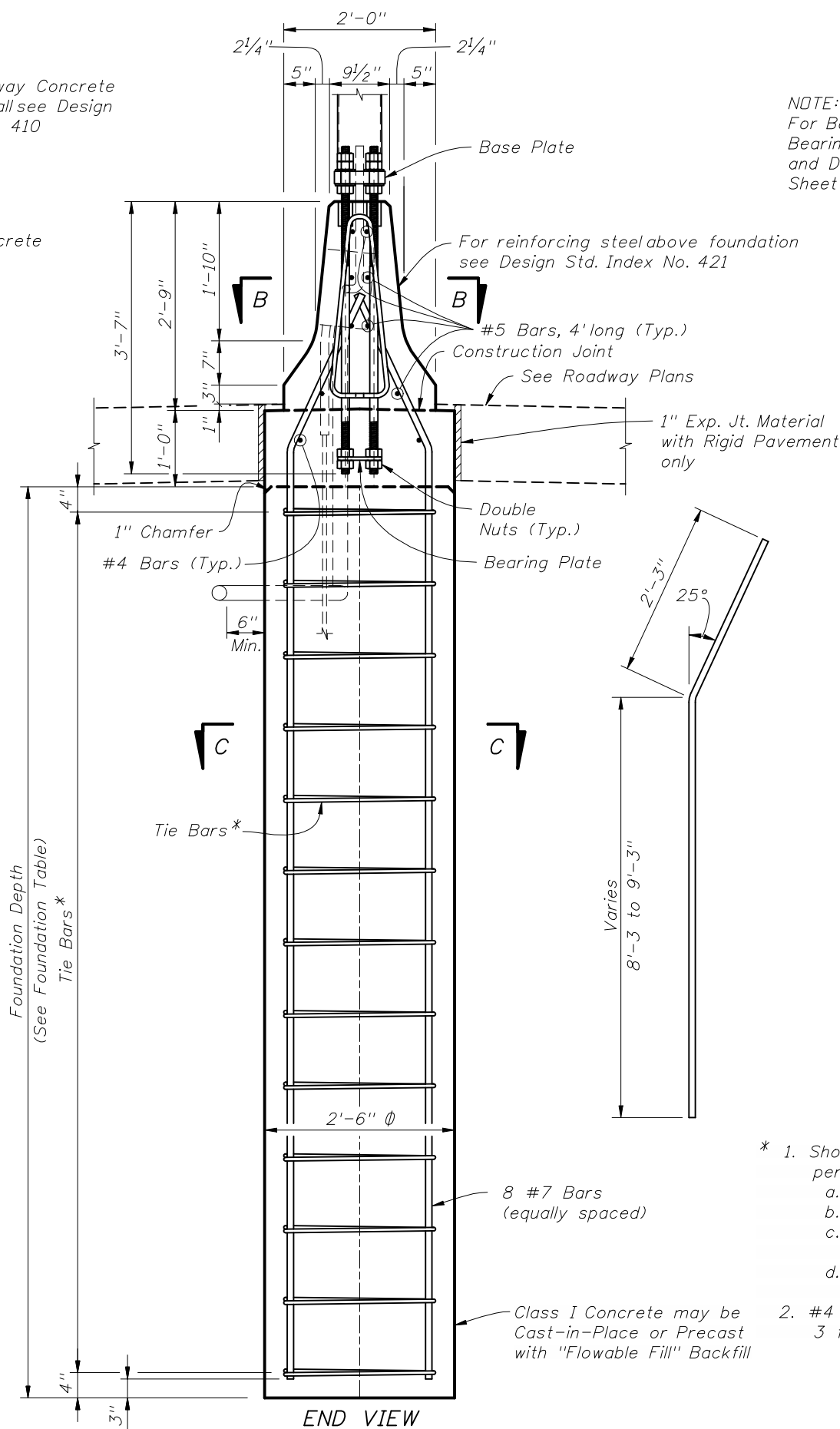


ELEVATION
(For Roadway Concrete Barrier Wall reinforcing steel see Design Std. Index No. 410)

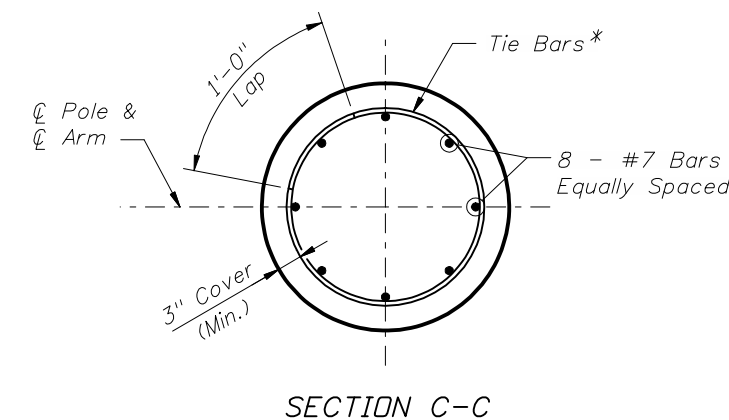
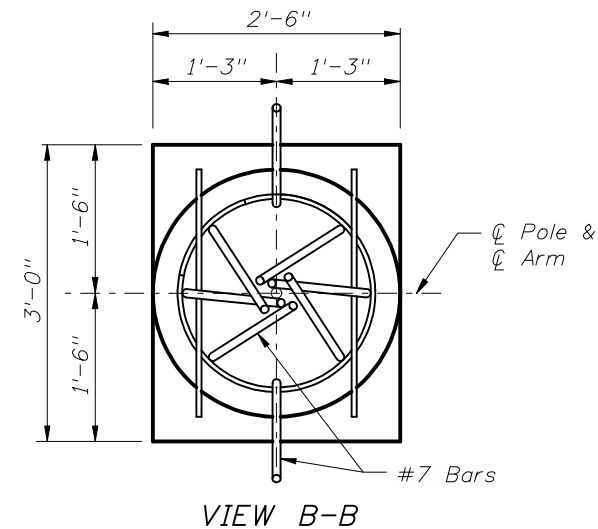
NOTE:
For Roadway Concrete Barrier Wall see Design Std. Index 410

NOTE:
For Base Plate Details, Bearing Plate Detail and Detail 'A' see Sheet 5

FOUNDATION TABLE		
WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	FOUNDATION DEPTH (FT)
110	40	8
130	40	9
150	40	9



END VIEW



- * 1. Shop-weld assemblies of foundation stirrup reinforcing bars are permitted in reinforced concrete foundation provided that:
- The reinforcing bars conform to ASTM Specification A706/706M.
 - The holding wires conform to ASTM Specification A82 or A496.
 - The Shop welding is performed by machines under a continuous, controlled process, approved by the Engineer.
 - Quality control tests are performed on shop-welded specimens and the test results are available, upon request, to the Engineer.
2. #4 Tie Bars @ 12" centers (max.) or D10 (or W10) spiral @ 6" pitch, 3 flat turns top and 1 flat turn bottom.

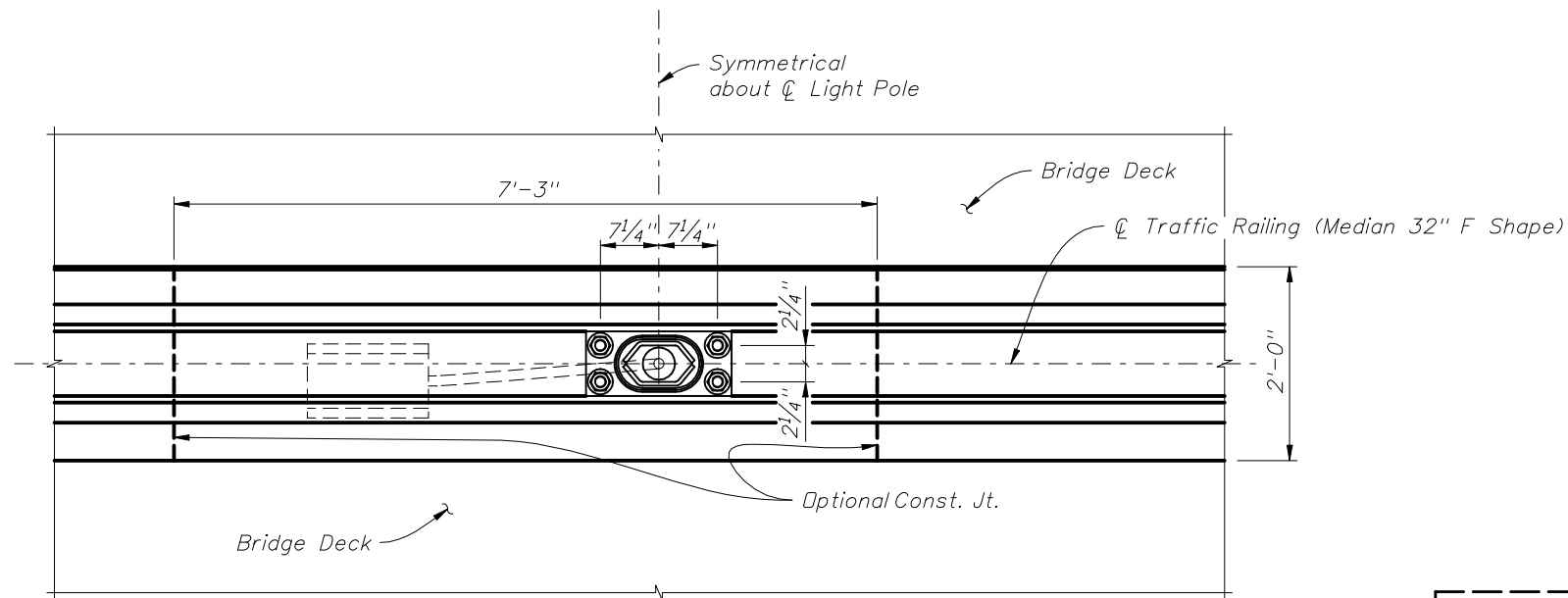
CYLINDRICAL FOUNDATION DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE



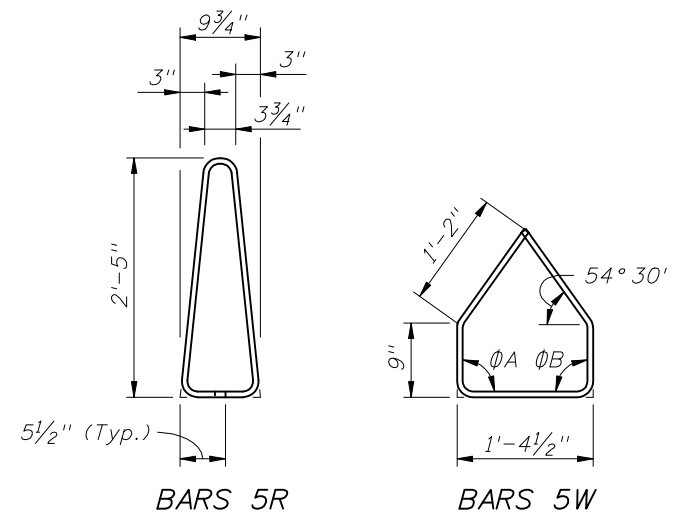
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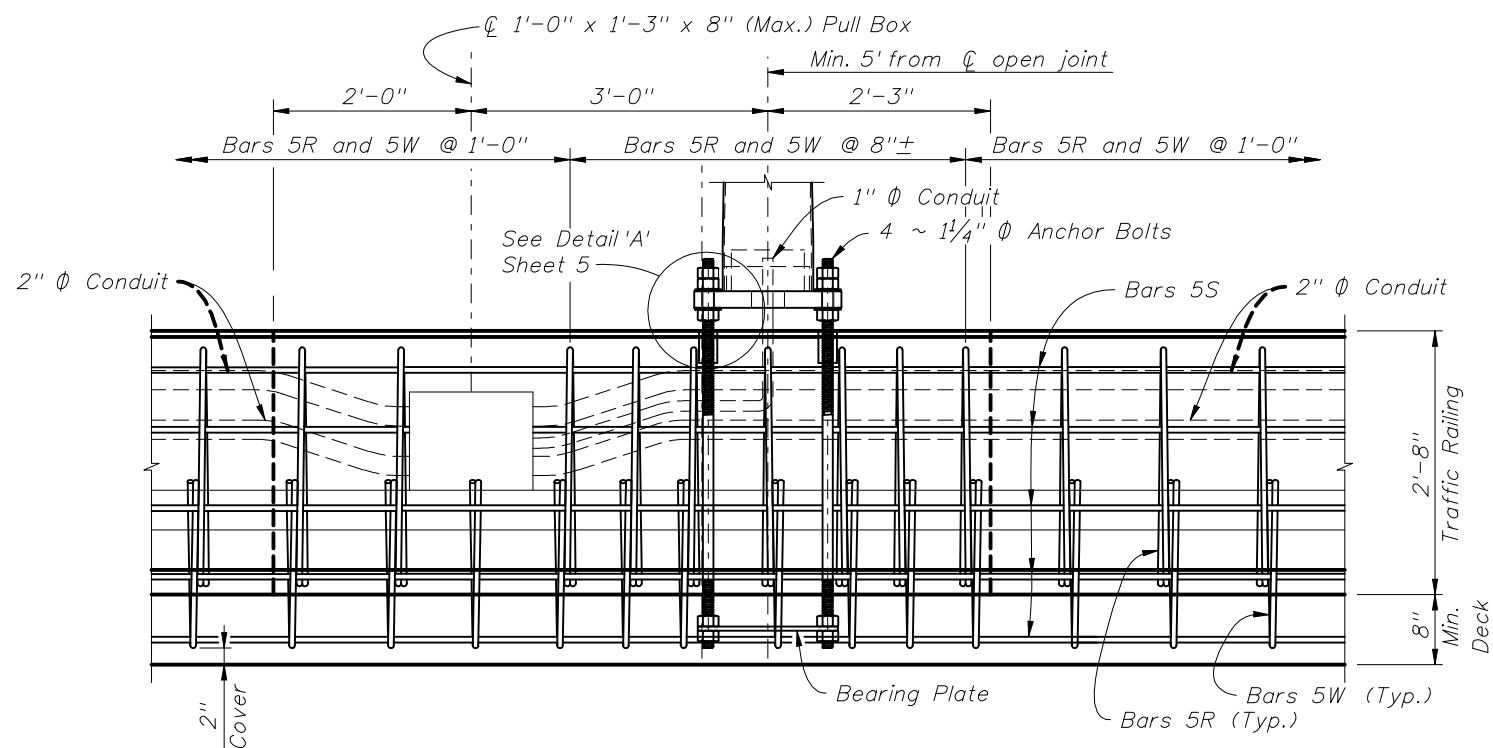
PLAN
(Reinforcing steel not shown)



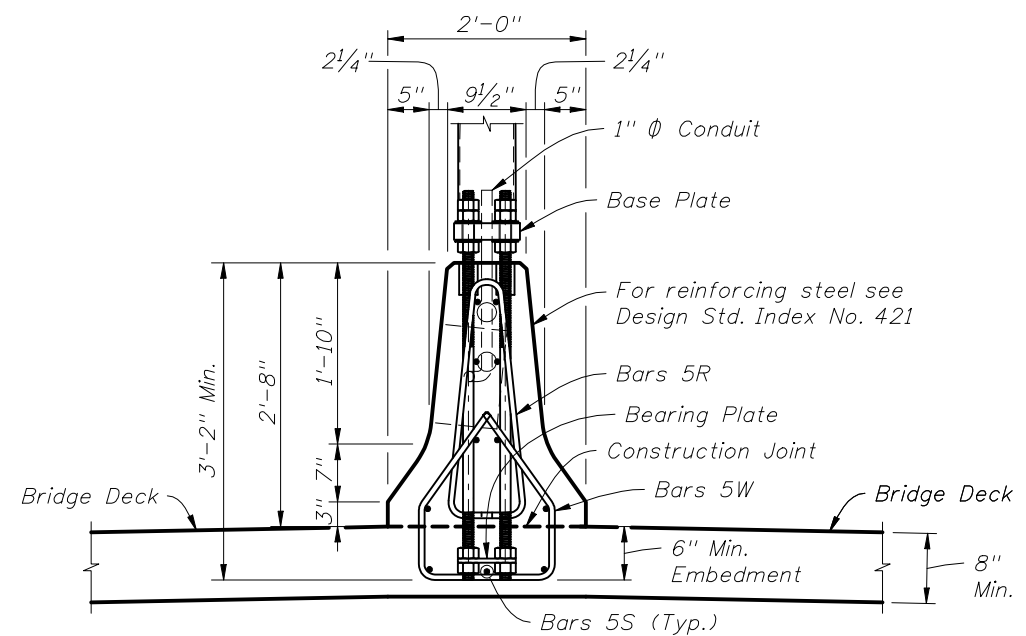
BARS 5R BARS 5W

BAR BENDING DIAGRAMS

INSTRUCTIONS TO DESIGNER:
In order to minimize vibration of light poles due to traffic, locate light poles near substructure supports.



ELEVATION
(Longitudinal and transverse deck reinforcing steel not shown)

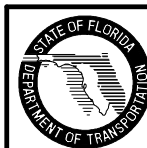


END VIEW
(Longitudinal and transverse deck reinforcing steel not shown)

NOTES:

1. For Base Plate Details, Bearing Plate Details and Detail 'A' see sheet 5.
2. See Design Standard Index No. 421 for details of Traffic Railing (Median 32" F Shape) and angles ΦA and ΦB .

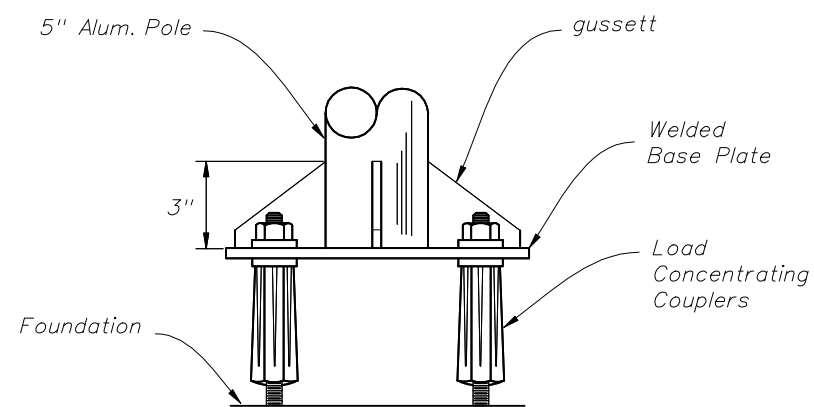
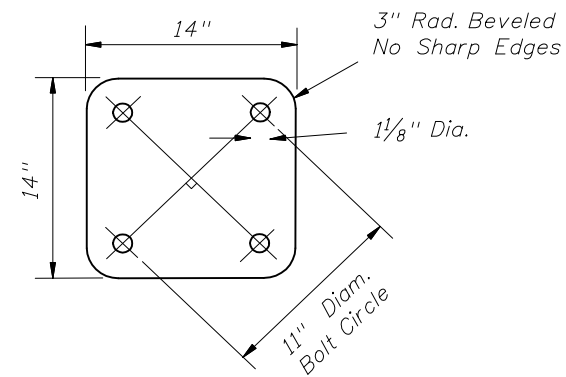
DETAILS FOR TRAFFIC RAILING (MEDIAN 32" F SHAPE) MOUNTED ALUMINUM LIGHT POLE



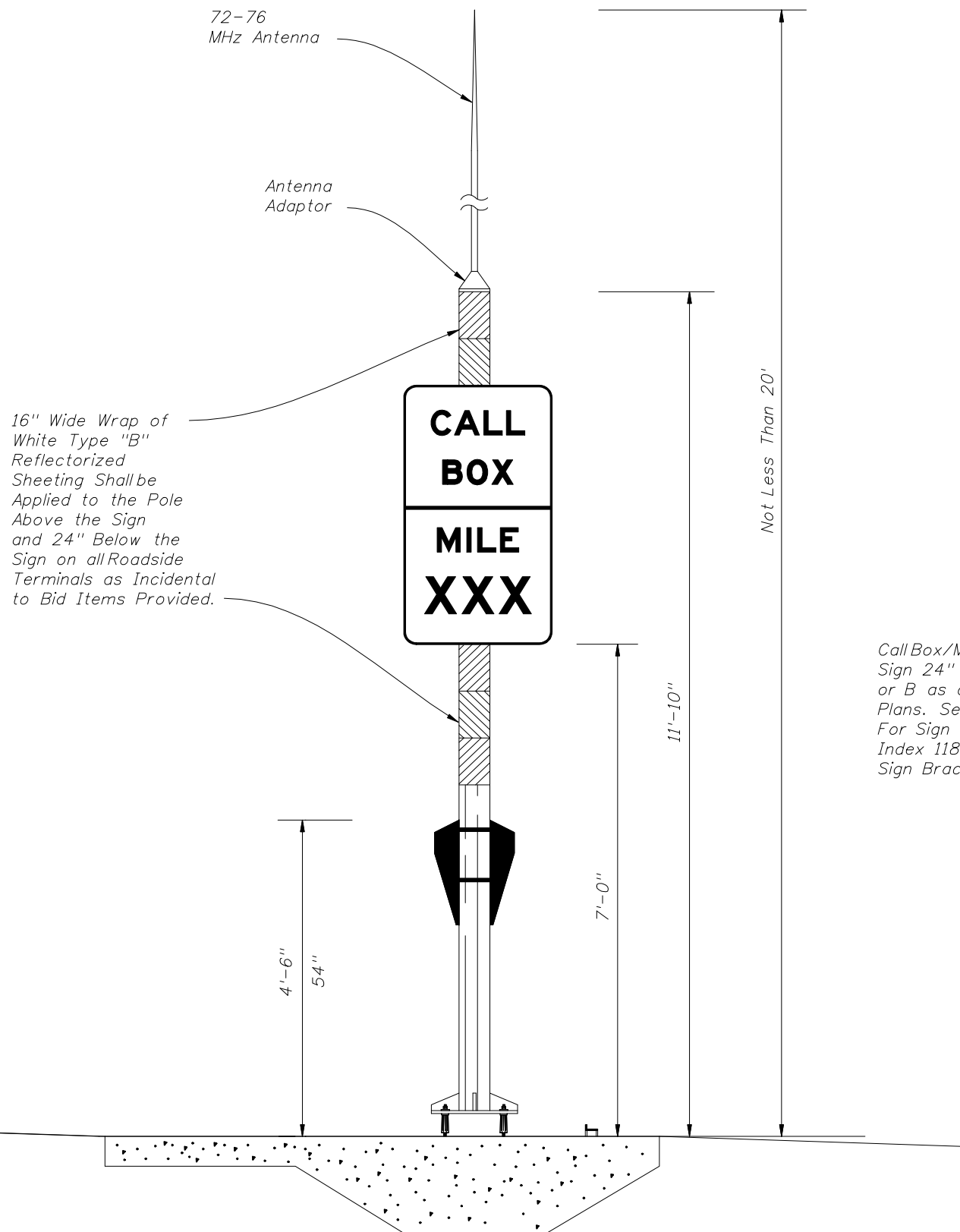
2010 FDOT Design Standards

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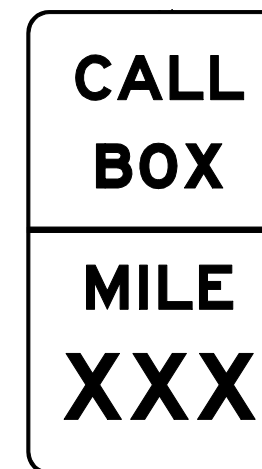


BASE PLATE & BOLT PATTERN

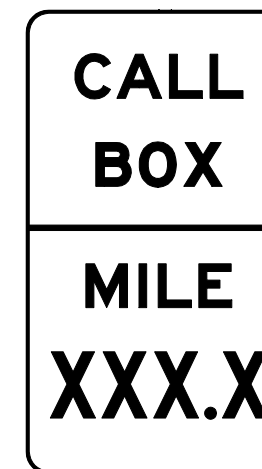


See Sheet 3 of 3 for Concrete Pad Details.

TYPICAL MOTORIST AID CALL BOX TERMINAL



FTP-63-06 SIGN A



FTP-64-06 SIGN B

Call Box/Mile Marker Sign 24" X 42". Sign A or B as called for in Plans. See Index 17355 For Sign Details and Index 11860 for Type ** Sign Bracket Details.



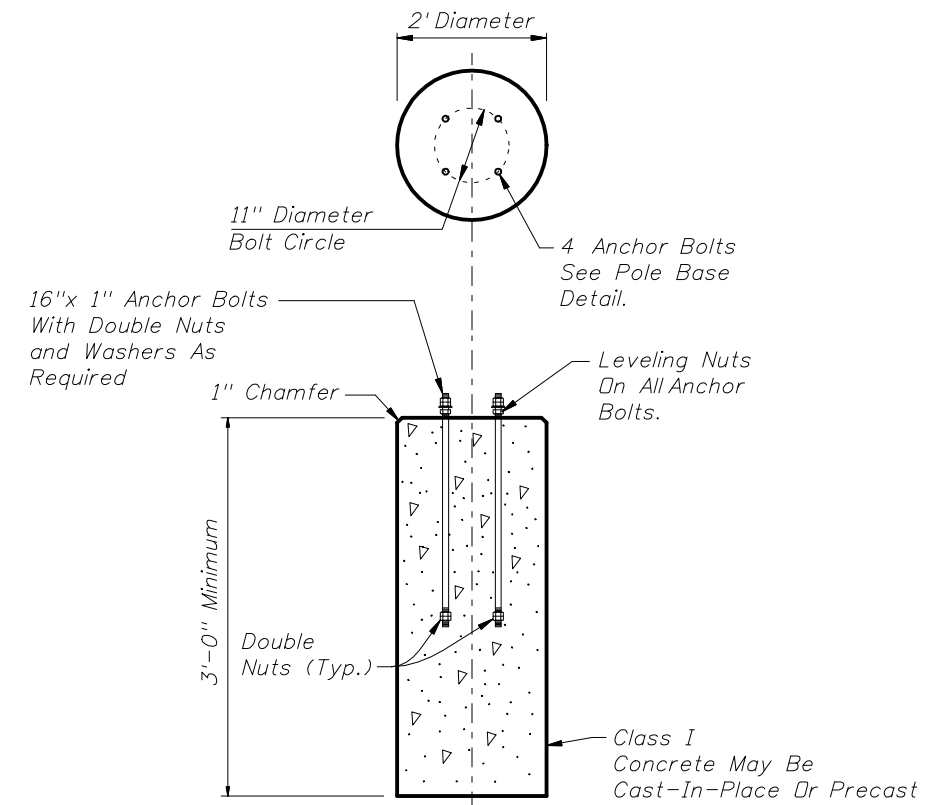
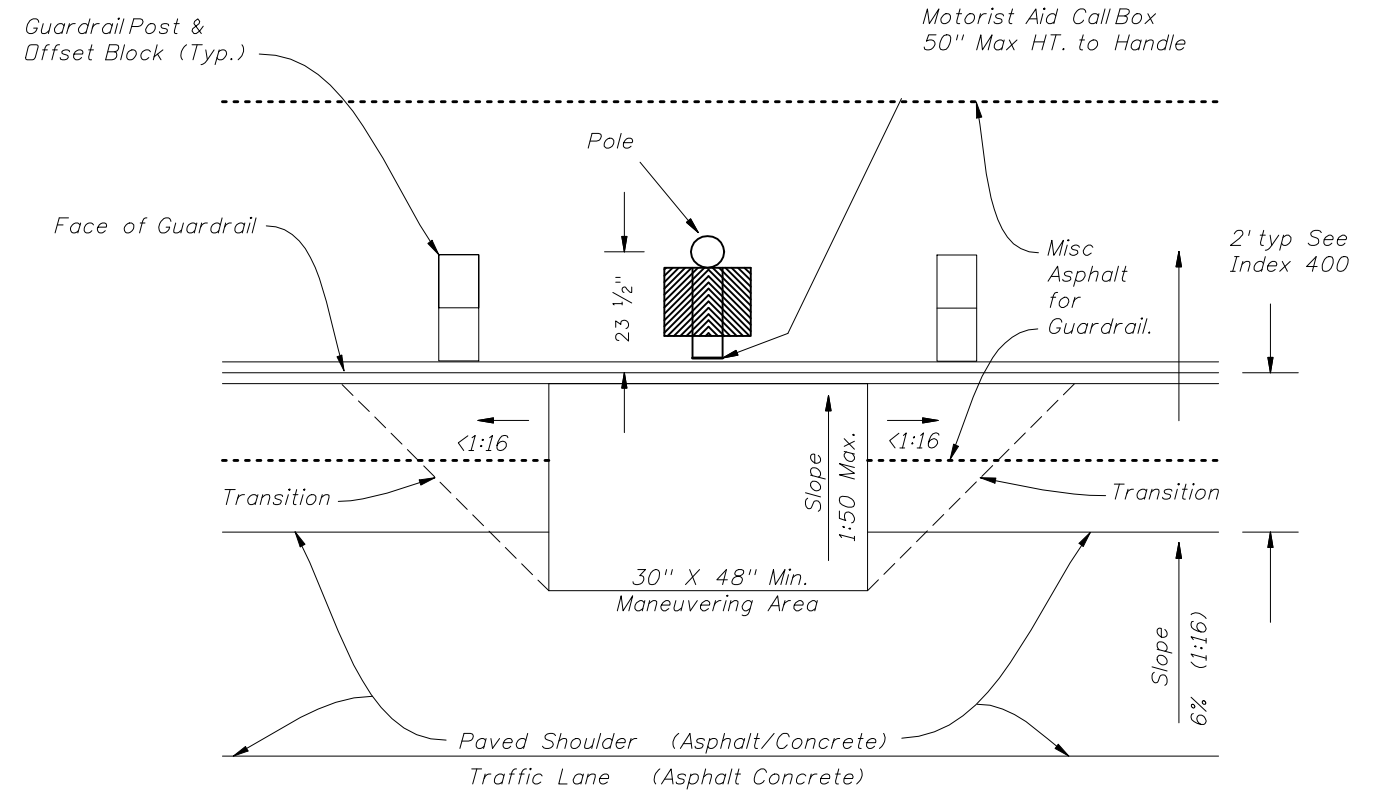
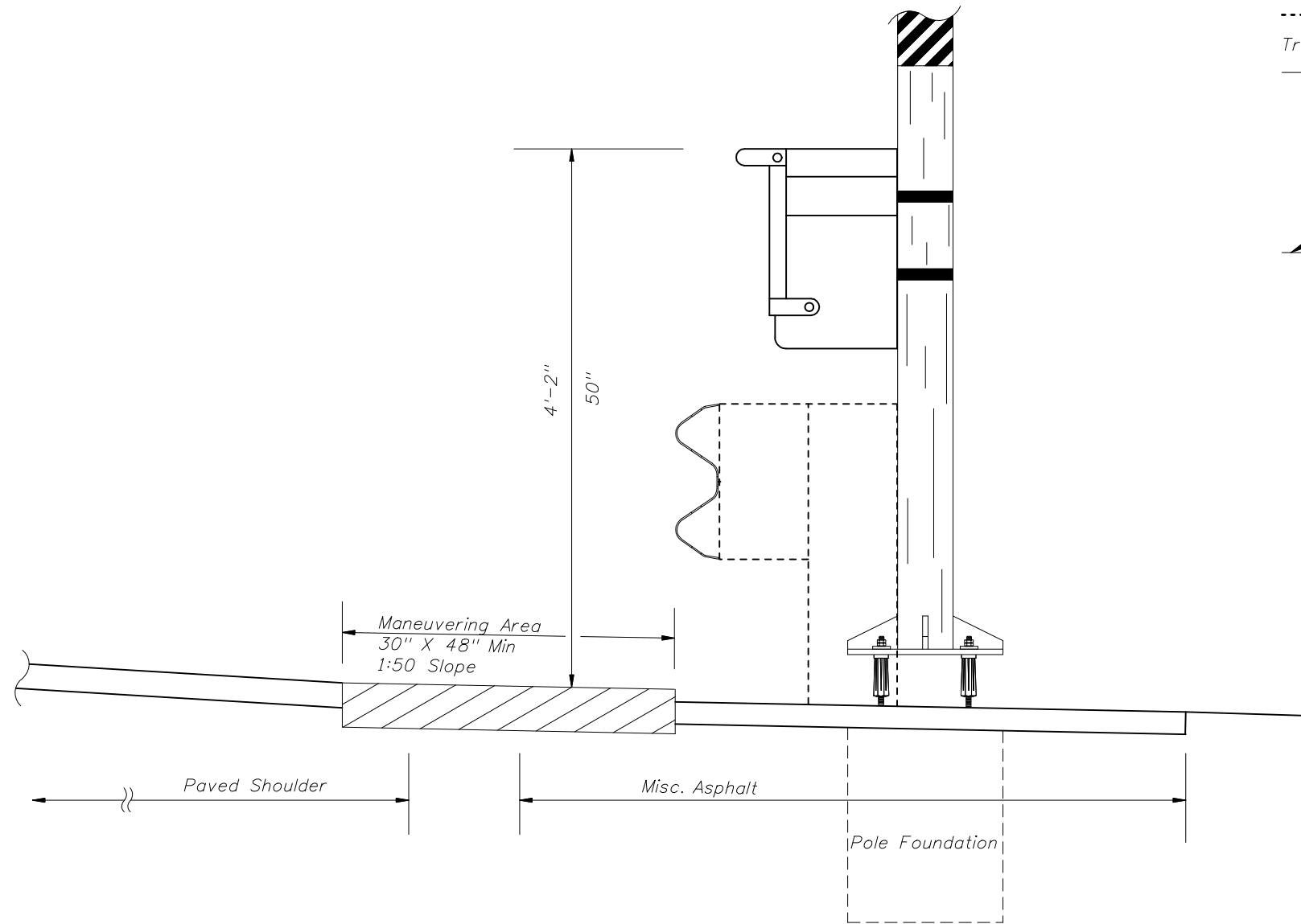
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MOTORIST AID CALL BOX

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EXISTING PAVEMENT INSTALLATION
 Remove existing pavement minimum 1" depth throughout transition and maneuvering area, replace with misc asphalt.

NEW CONSTRUCTION
 Hand work final shoulder pavement lift to plan dimensions.



**MOTORIST AID CALL BOX POLE FOUNDATION
 TO BE USED ONLY BEHIND GUARDRAIL**

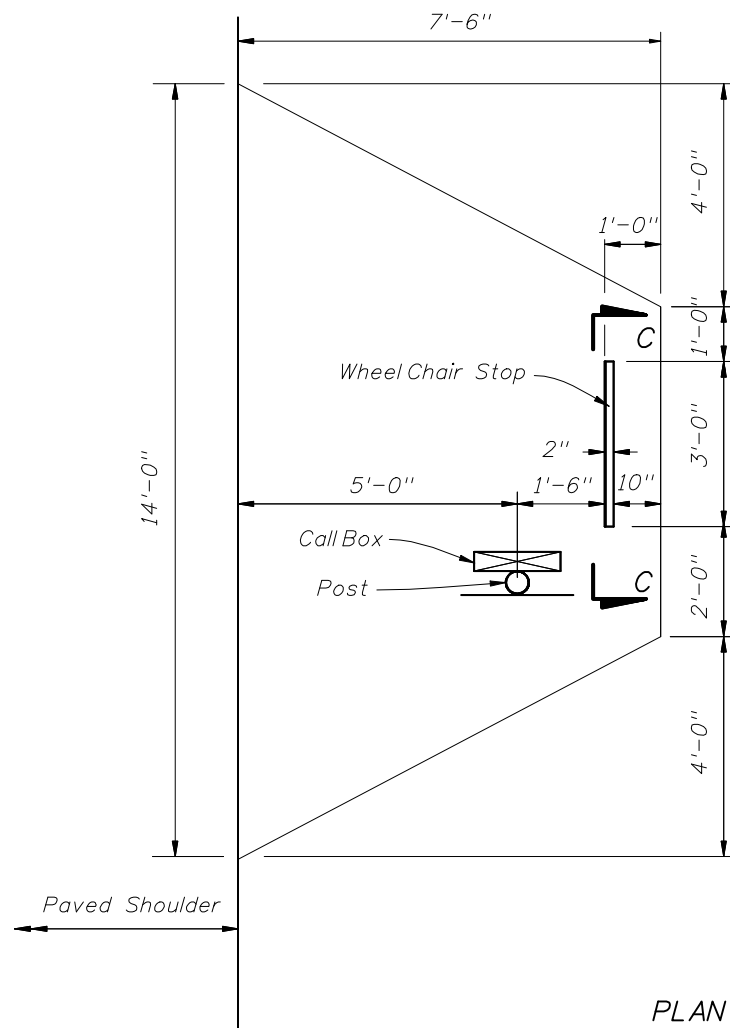
CALL BOX BEHIND GUARDRAIL



2010 FDOT Design Standards

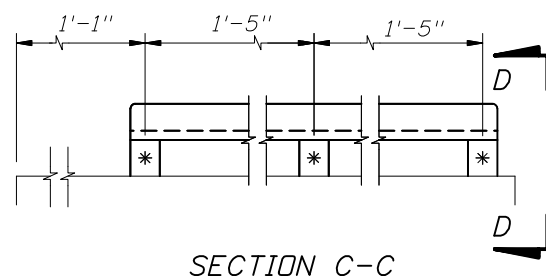
MOTORIST AID CALL BOX

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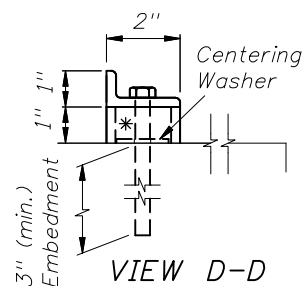
PLAN

CallBox Attachment To Slab
As Per Manufacturer's Recommendation.



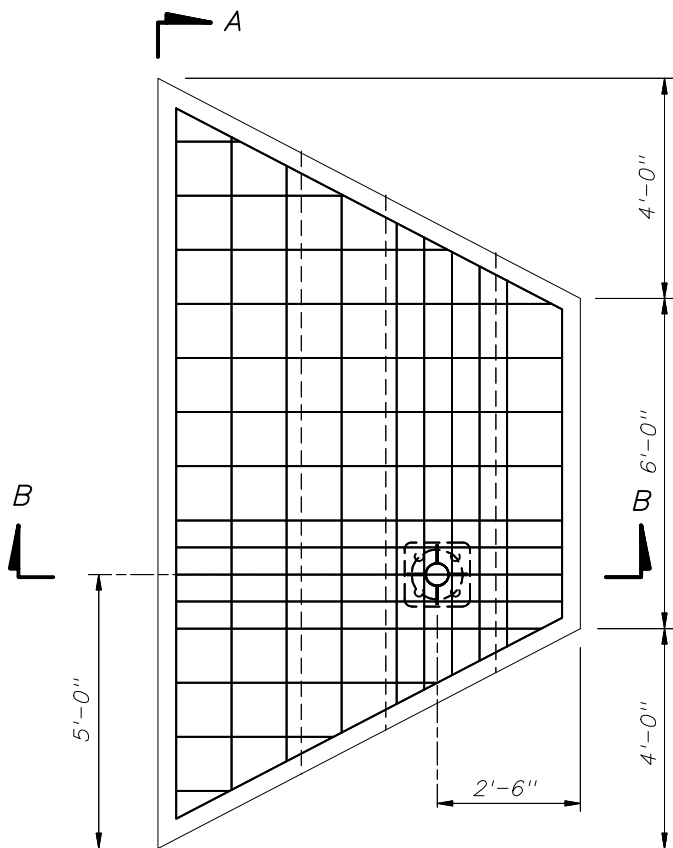
SECTION C-C

2" x 1" x 1/4" Galv. Angle And
3-3/8" ϕ x 5" Galvanized Steel Expansion
Anchor Bolt With 3" Min. Embedment

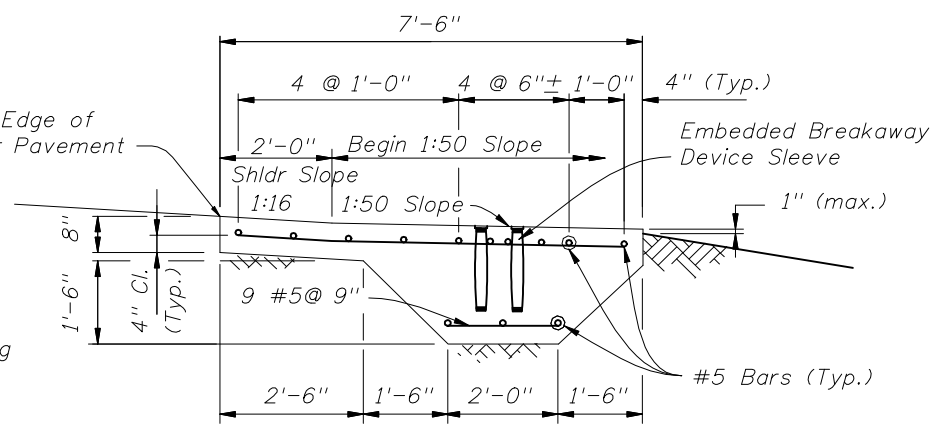


VIEW D-D

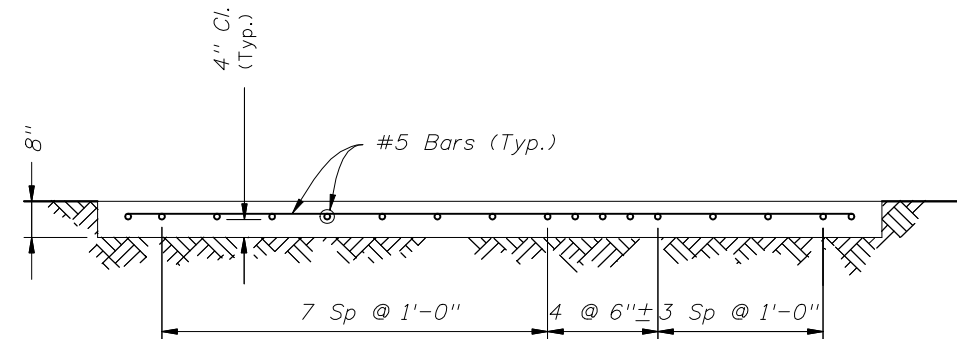
* 1 1/2" ϕ x 1" High
Galvanized Steel Pipe Spacer



SECTION A-A



SECTION B-B



SECTION A-A

MOTORIST AID CALL BOX CONCRETE PAD QUANTITIES

Concrete : 3.5 c.y. (each)
Reinforcing Steel : 243 lb (each)

GENERAL NOTES

1. Design Specifications: AASHTO Standard Specifications For Highway Bridges (Current Edition and approved revisions thereto).
2. Concrete: Concrete strength shall be Class I ($f'c=3,000$ psi).
3. Reinforcing Steel: Reinforcing Steel shall conform to ASTM A615, Grade 60.
4. Payment: Concrete Pad and Foundation shall be included in the contract unit price of call box assembly or terminal. It shall also include all labor, materials, and installation of embedded breakaway device sleeves, and miscellaneous galvanized steel for wheel chair stop and attachments.
5. Breakaway Device shall be paid for under CallBox Assembly.

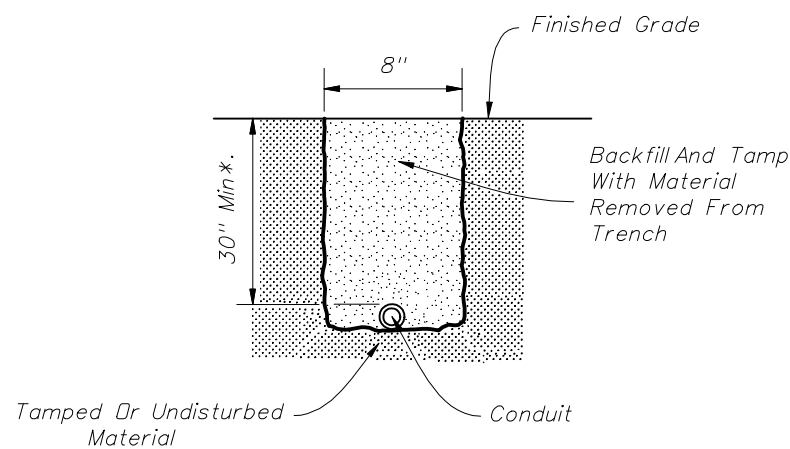
WHEEL CHAIR STOP DETAIL



2010 FDOT Design Standards

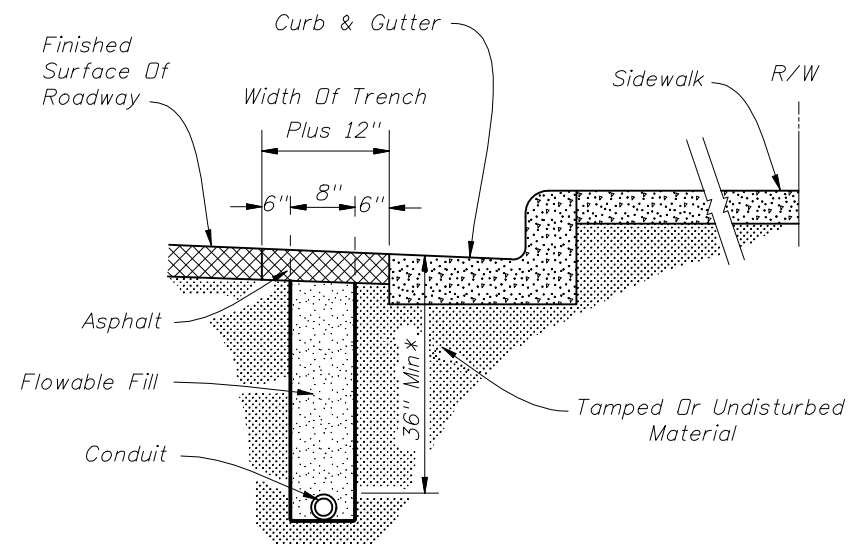
MOTORIST AID CALL BOX

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FOR USE IN AREAS NOT EXPOSED TO VEHICULAR TRAFFIC AND UNDER DRIVEWAYS

FIGURE A

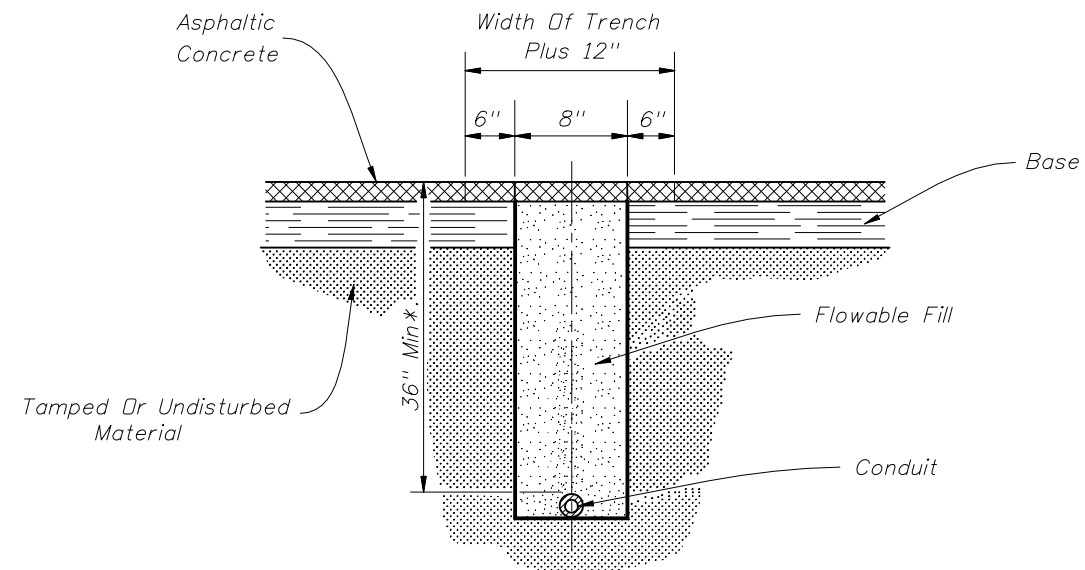


FOR USE IN ASPHALT ROADWAY ADJACENT TO GUTTER WHEN PLACEMENT OUTSIDE OF THE PAVEMENT IS NOT FEASIBLE.

Note

1. Trench not to be open more than 250' at a time when construction area is subject to vehicular or pedestrian traffic.
2. Asphalt to be sawcut and removed to leave neat lines on both sides of the 12" pavement cut.
3. See note 3 Figure C.

FIGURE B



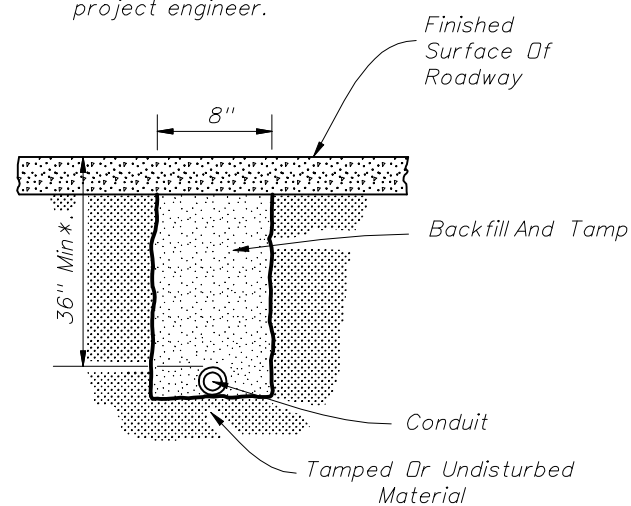
FOR USE IN INSTALLING CONDUIT UNDER EXISTING ASPHALT PAVEMENT NOT ADJACENT TO GUTTER WHEN JACKING IS NOT FEASIBLE

Note:

1. Rigid conduit must be used when jacking under existing pavement at 36" minimum depth.
2. Asphalt to be sawcut at the edges of the trench.
3. The removal and replacement of the additional pavement width (6") will not be required when the trench can be constructed without disturbing the asphalt surface on either side.

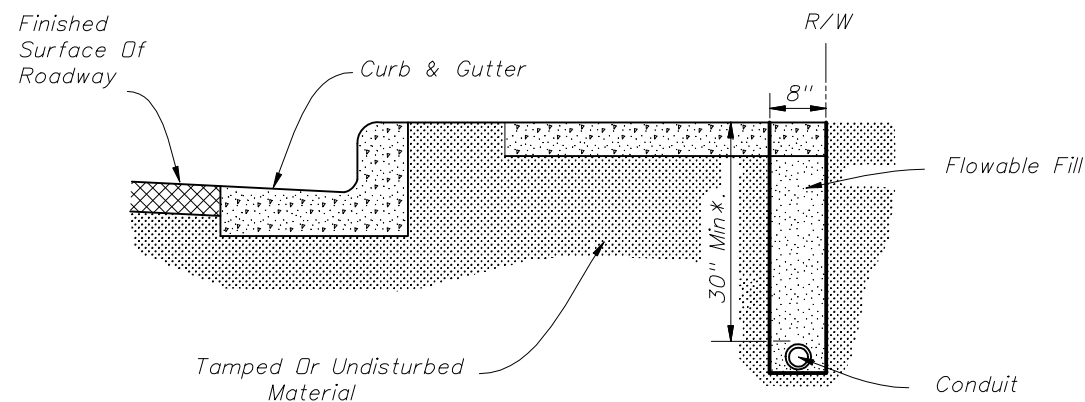
FIGURE C

*May be adjusted due to field conditions upon approval of project engineer.



FOR USE INSTALLING CONDUIT UNDER A NEW ROADWAY PRIOR TO INSTALLATION OF CURBS, BASE AND PAVEMENT

FIGURE D

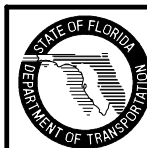


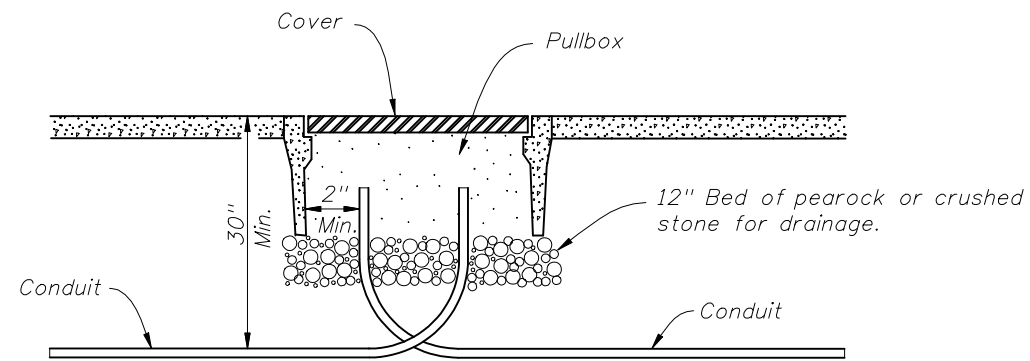
FOR USE IN INSTALLING CONDUIT UNDER SIDEWALK

Note:

1. Sidewalk patches to match existing joints.
2. Entire sidewalk slab must be replaced when specified in the plans.
3. Backfill and tamp with material from trench except at driveways. At driveways, backfill a length of trench within the driveway entirely with Flowable Fill.

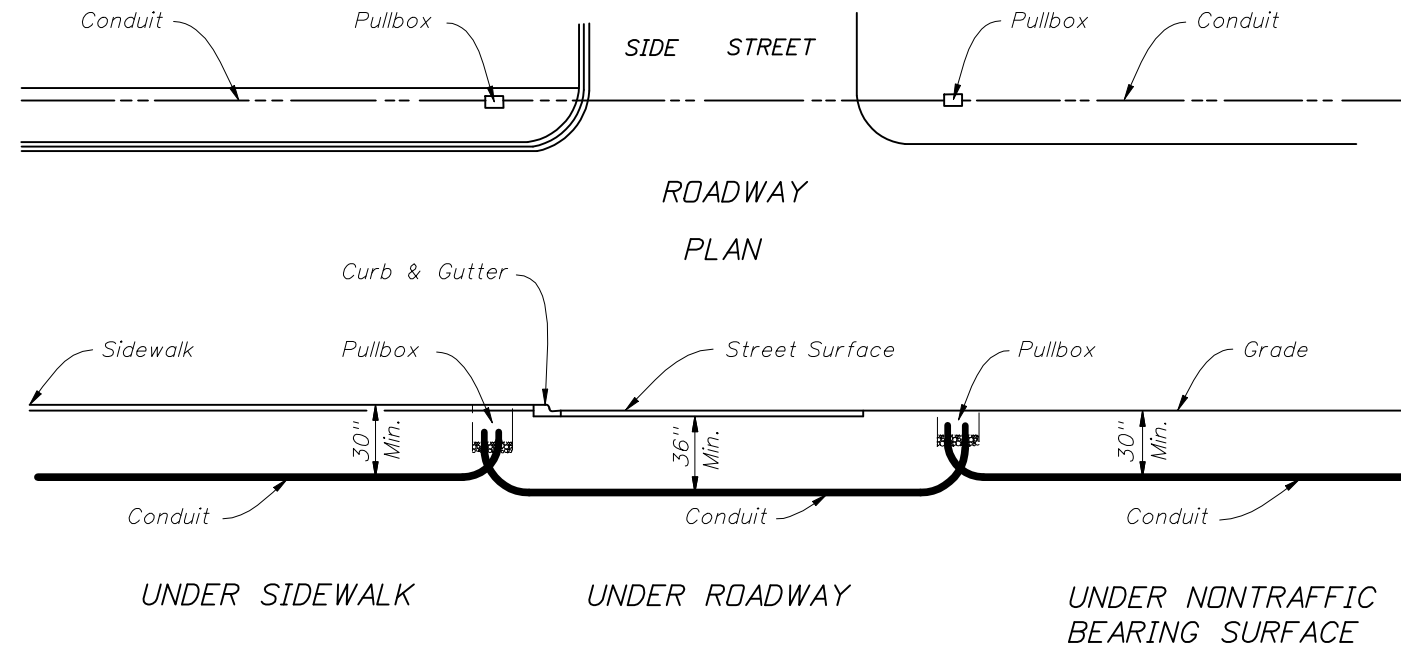
FIGURE E





PULLBOX ENTRY OF CONDUIT UNDER SIDEWALKS

FIGURE A

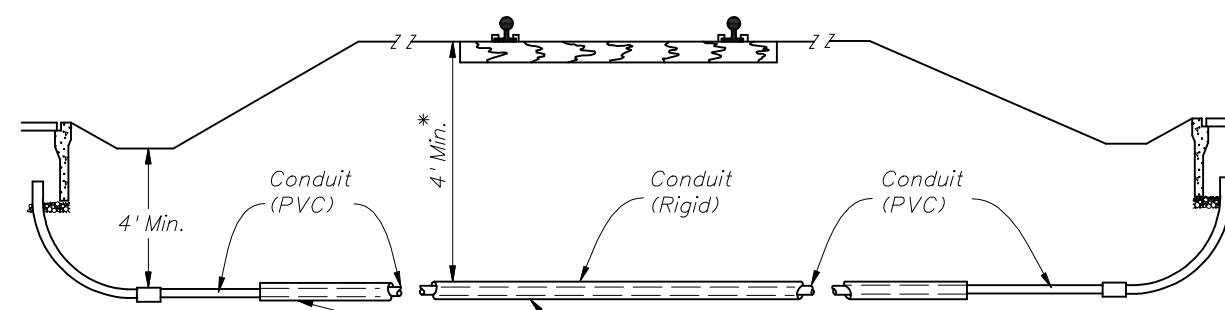


SECTION

FIGURE B

Note:
Ends of conduit shall be sealed in accordance with Section 630 of the Standard Specifications for Road and Bridge Construction.

Note:
One run of conduit (between pullboxes) shall not contain more than 360° of bend including pullbox bends.

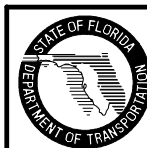


* Note
Conduit depth to be at RR requirement but not less 4'.

After jacking, leave rigid conduit as a sleeve extending to RR right of way limits.

FOR USE UNDER RAILROADS

FIGURE C



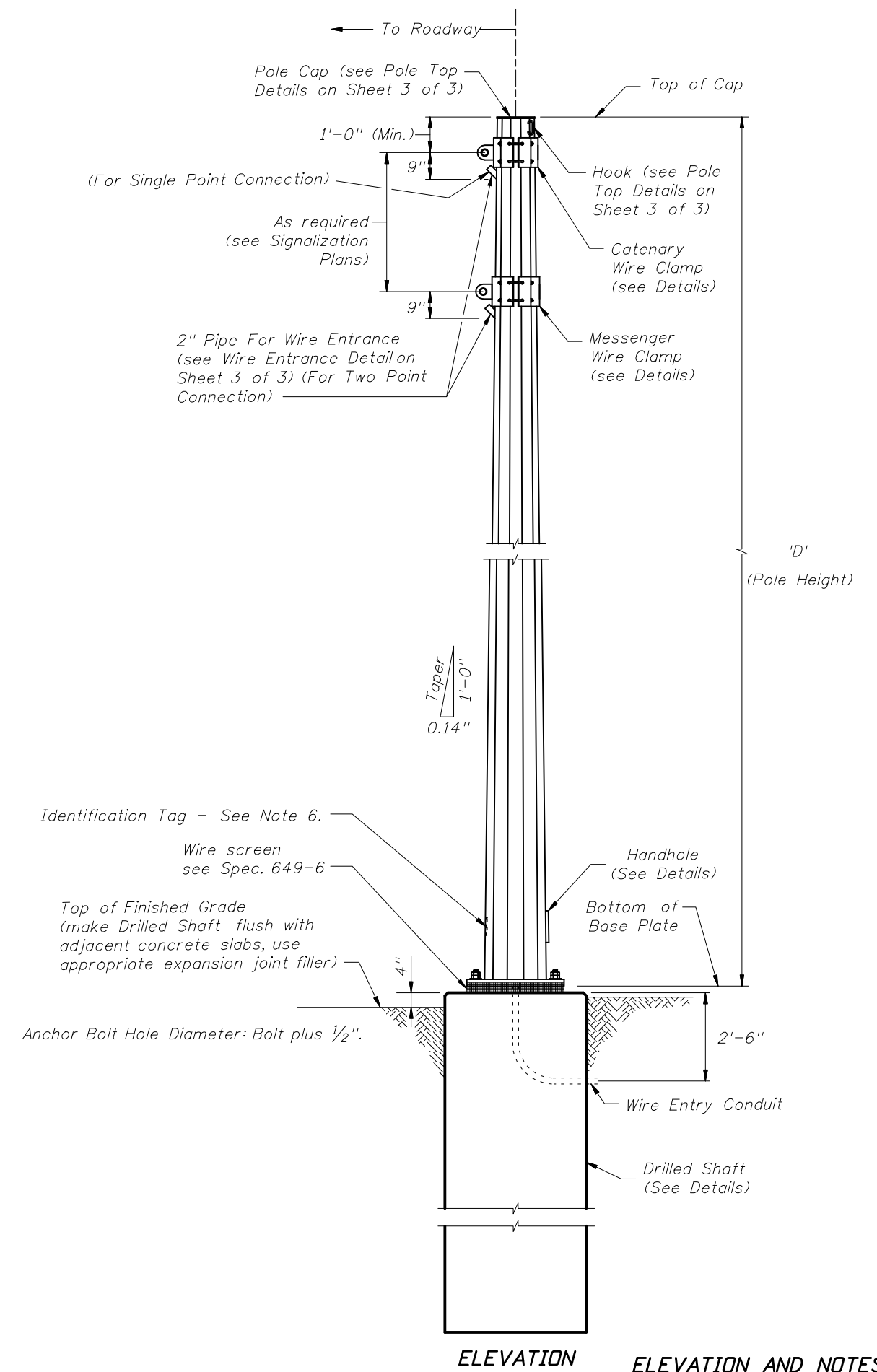
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CONDUIT INSTALLATION DETAILS

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STEEL STRAIN POLE NOTES

- 1) Designed in accordance with FDOT Structures Manual and the 2001 (4th) Edition AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and Interims.
- 2) Perform all welding in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). No field welding is permitted on any part of the pole.
- 3) See Standard Index No. 17727 for grounding and span wire details.
- 4) Foundation Materials:
 - a. Reinforcing Steel: ASTM A615 Grade 60.
 - b. Concrete: Class IV, (Drilled Shaft) 4,000 psi (f'c) minimum Compressive Strength at 28-days for all environmental classifications.
 - c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade A heavy-hex nuts and ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329)
- 5) Strain Pole Specifications:
 - a. Poles: ASTM A1011 Grade 50, 55, 60 or 65 (less than 1/4") or ASTM A572 Grade 50, 55, 60, or 65 (1/4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).
 - b. Steel Plates: ASTM A36.
 - c. Weld Metal: E70XX.
 - d. Bolts: A325, Type 1. Hole Diameter: Bolt diameter plus 1/16".
 - e. Base Plate: Hole Diameter; anchor bolt diameter plus 1/2".
 - f. Handhole: Frame; ASTM A709 Grade 36 or ASTM A36, Cover; ASTM A1011 Grade 50, 55, 60 or 65.
 - g. Aluminum Caps and Covers: ASTM B-26 (319-F).
 - h. Stainless Steel Screws: AISI Type 316.
 - i. Galvanization: All nuts, bolts and washers; ASTM F2329, All other steel; ASTM A123.
- 6) Pole Notes:
 - a. See the Signalization Plans for clamp spacing, cable sizes and forces, signal and sign mounting locations and details.
 - b. Tapered with the diameter changing at a rate of 0.14 inch per foot.
 - c. Transverse welds are allowed only at the base.
 - d. Poles constructed out of two or more sections with overlapping splices are not permitted.
 - e. Locate the handhole 180 degrees from 2-inch wire entrance pipe.
 - f. Furnish each pole with a 2"x4" (max) aluminum identification tag. Submit details for approval. Secure to pole with 0.125" stainless steel rivets or screws. Locate Identification Tag on the inside of pole and visible from handhole. Include the following information: Financial Project ID, Pole Type, Pole Height, Manufacturer's Name & Certification number and QPL number.
- 7) One hundred percent of full-penetration groove welds and a random 25 percent of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.
- 8) Manufacturers seeking approval of a steel strain pole assembly for inclusion on the Qualified Products List must submit a QPL Product Evaluation Application along with drawings showing the product meets all specified requirements of this Standard.
- 9) Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location ± two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.



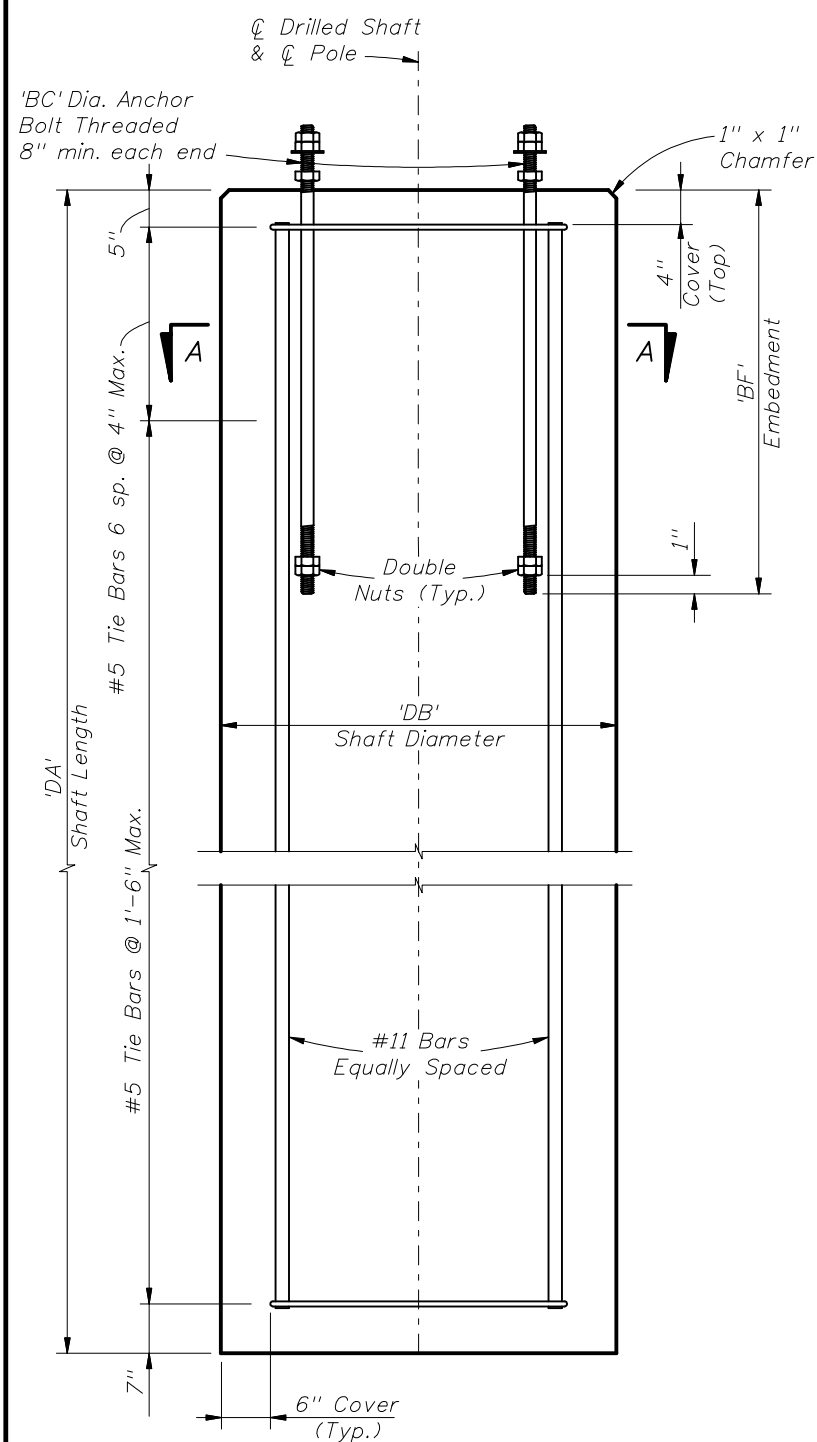
2010 FDOT Design Standards

STEEL STRAIN POLE

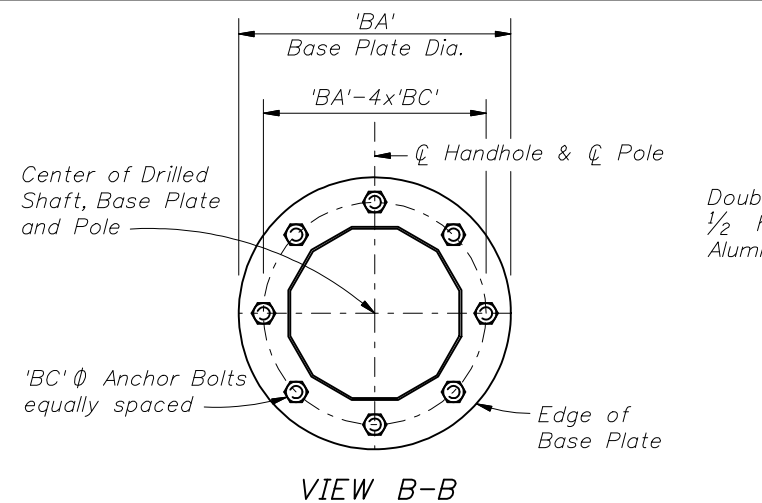
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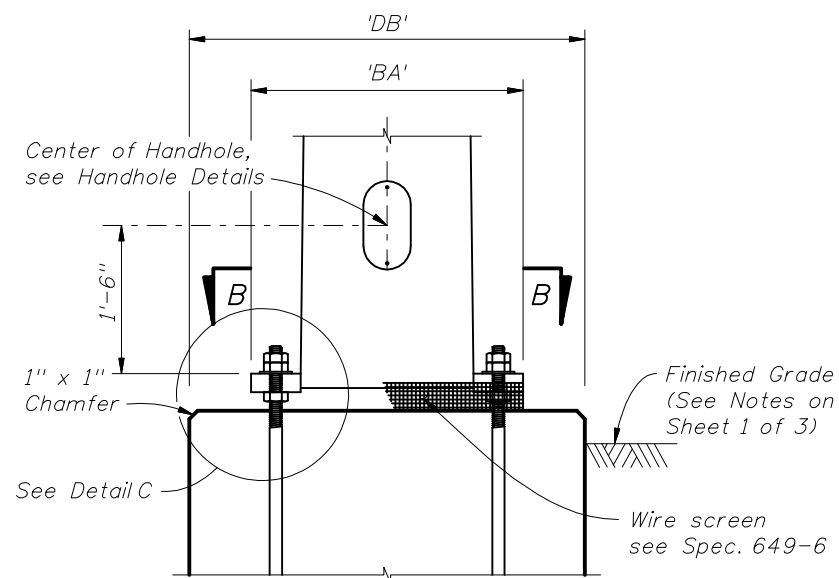


DRILLED SHAFT ELEVATION

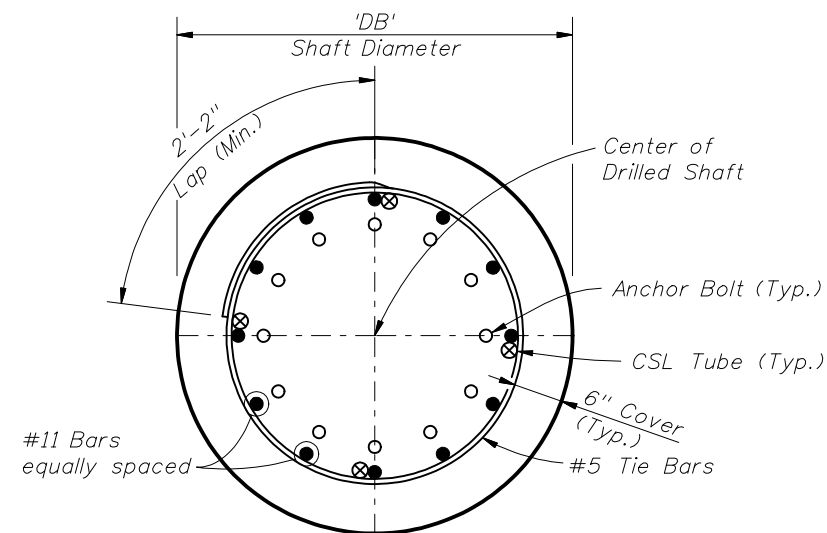


VIEW B-B

NOTE: Number of bolts shown for illustration purposes only.

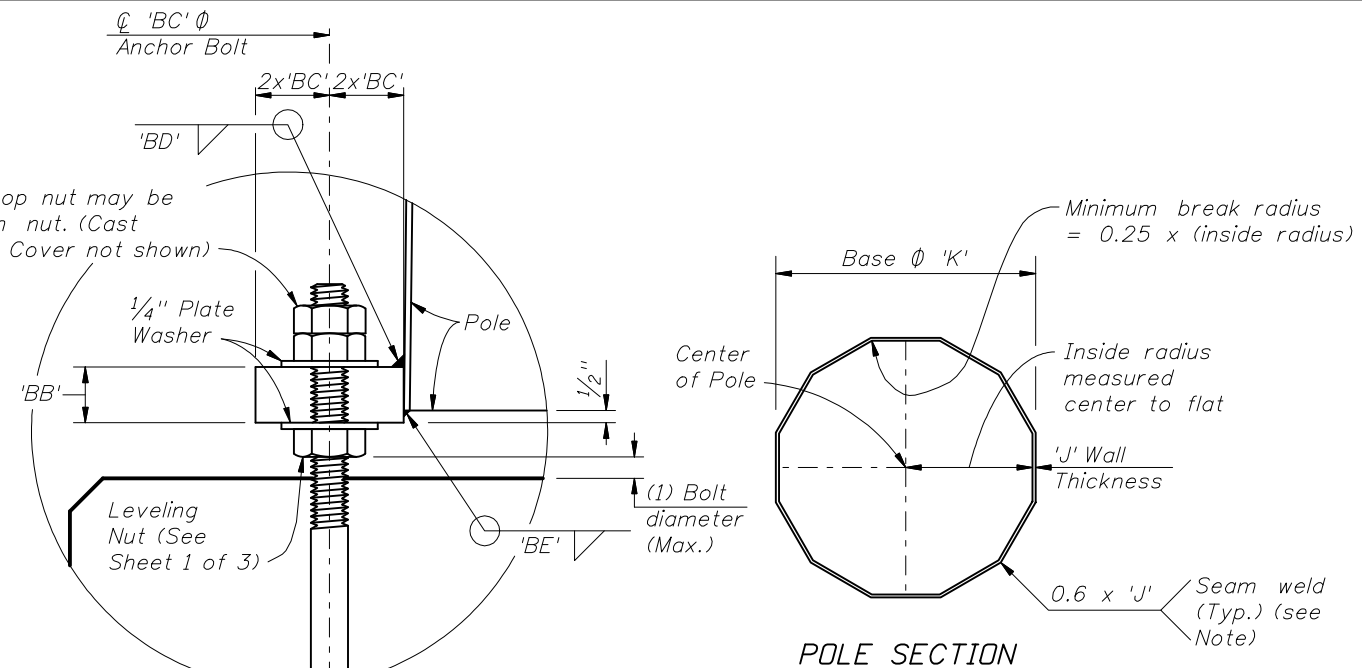


PARTIAL ELEVATION
(Showing Base Plate, Anchor bolts and Handhole)



SECTION A-A

(Number of bars shown is for illustration purposes only)



DETAIL C

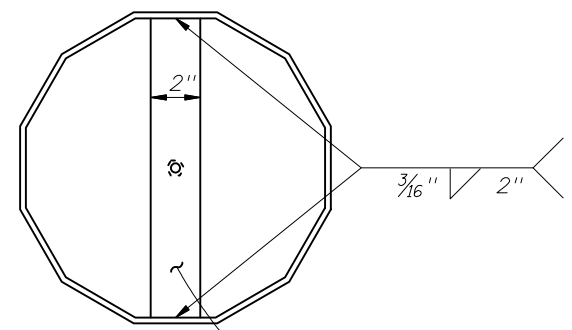
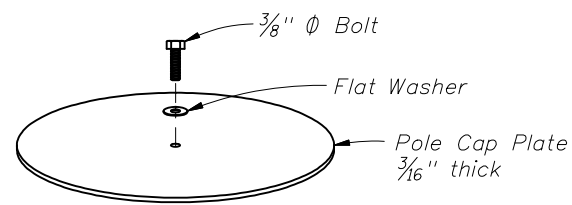
POLE SECTION

NOTE: Longitudinal seam welds within 6" of circumferential welds shall be complete penetration welds.

POLE TYPE	MAXIMUM ALLOWABLE MOMENT (kip-ft)	POLE		BASE CONNECTION							SHAFT		
		J (in.)	K (in.)	No. of Bolts	BA (in.)	BB (in.)	BC (in.)	BD (in.)	BE (in.)	BF (in.)	DA (ft)	DB (ft)	No. of #11 bars
PS-IV	95.4	0.250	14	8	25	2.25	3/8	7/16	3/16	57	15.0	3.5	10
PS-V	158.9	0.313	16	10	28	2.50	1/2	1/2	1/4	56	16.5	3.5	10
PS-VI	203.6	0.313	18	12	30	2.50	1/2	1/2	1/4	55	17.0	3.5	10
PS-VII	280.3	0.313	21	14	33	2.50	1/2	9/16	1/4	56	17.0	4.0	14
PS-VIII	338.0	0.313	23	16	35	2.50	1/2	9/16	1/4	55	18.0	4.0	14
PS-IX	400.9	0.313	25	12	39	2.75	3/4	9/16	1/4	57	17.5	4.5	16
PS-X	469.1	0.313	27	14	41	2.75	3/4	9/16	1/4	56	18.5	4.5	16

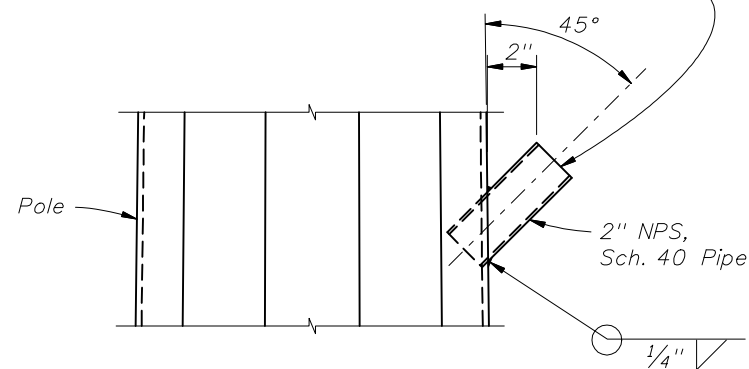
FOUNDATION NOTES:
 The foundations for SteelStrain Poles are designed based upon the following conservative soil criteria which covers the great majority of soil types found in Florida:
 Classification = Cohesionless (Fine Sand)
 Friction Angle = 30 Degrees (30°)
 Unit Weight = 50 lbs./cu. ft. (assumed saturated)
 Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

BASE AND FOUNDATION DETAILS AND TABLE OF VARIABLES

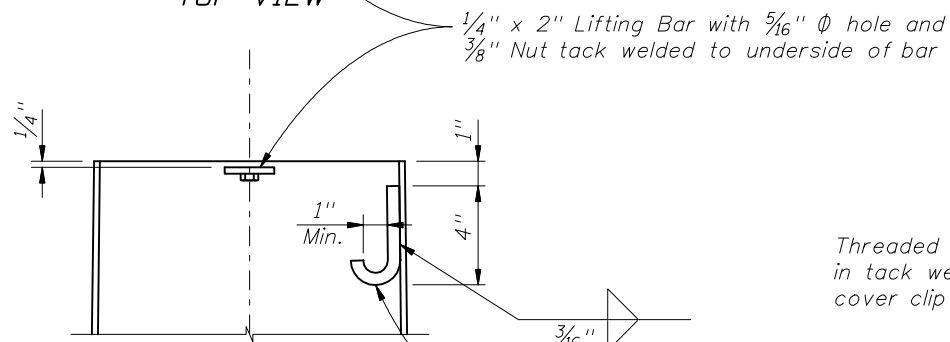


TOP VIEW

NOTE: A properly sized Service Head (Weather Head), shall be installed and fastened securely on to the standard pipe for each pole location. At locations other than service entrance, the service head face is to be left closed to outside atmosphere. Service entrance installation per Index No. 17727.



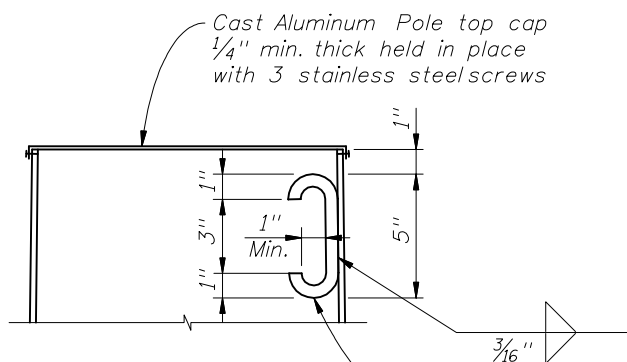
WIRE ENTRANCE DETAILS



POLE TOP CUT-AWAY (Option 'a')

1/4" x 2" Lifting Bar with 5/16" ϕ hole and 3/8" Nut tack welded to underside of bar

'J' Hook for wiring, 1/2" ϕ commercial grade hot rolled bar welded to inside of pole.

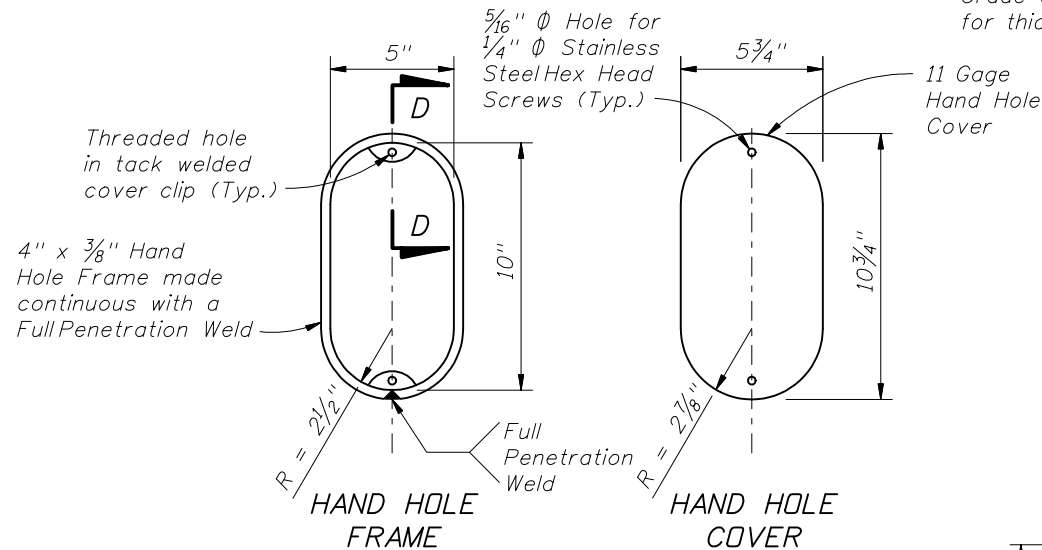


POLE TOP CUT-AWAY (Option 'b')

Cast Aluminum Pole top cap 1/4" min. thick held in place with 3 stainless steel screws

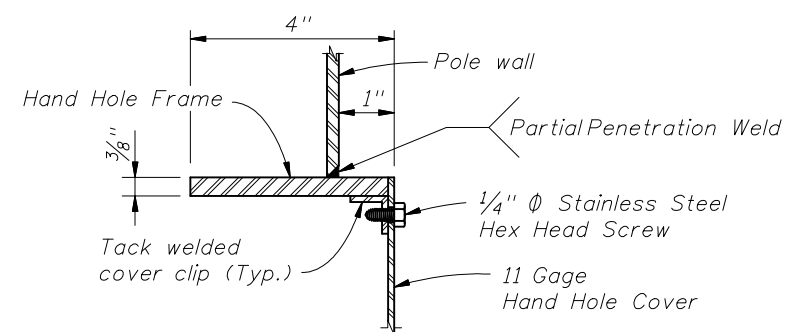
'C' Hook for wiring and lifting, 1/2" ϕ commercial grade hot rolled bar welded to inside of pole.

POLE TOP NOTE:
Any combination of the above two options may be used, provided both lifting and wiring is accommodated.

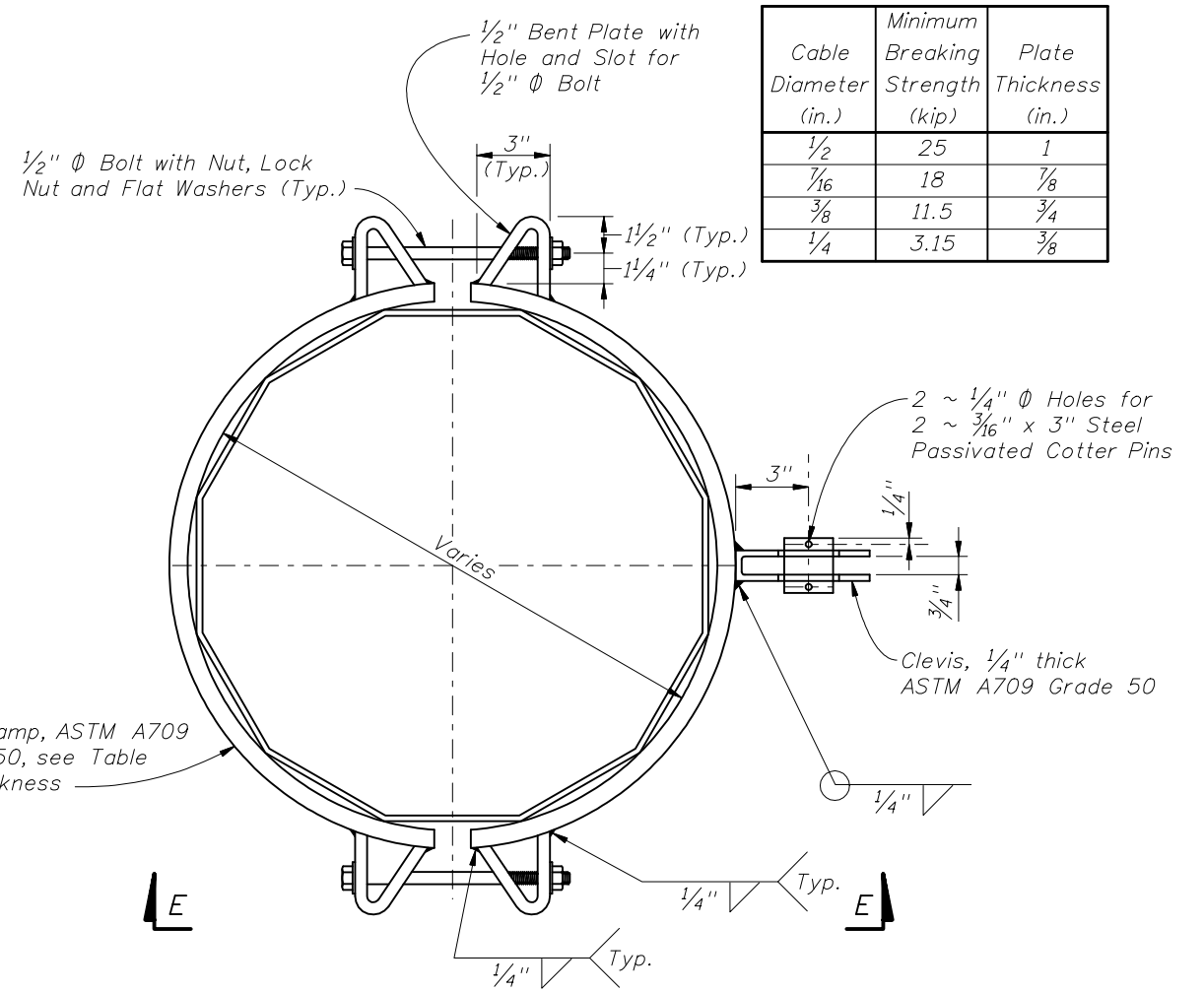


HAND HOLE FRAME

HAND HOLE COVER



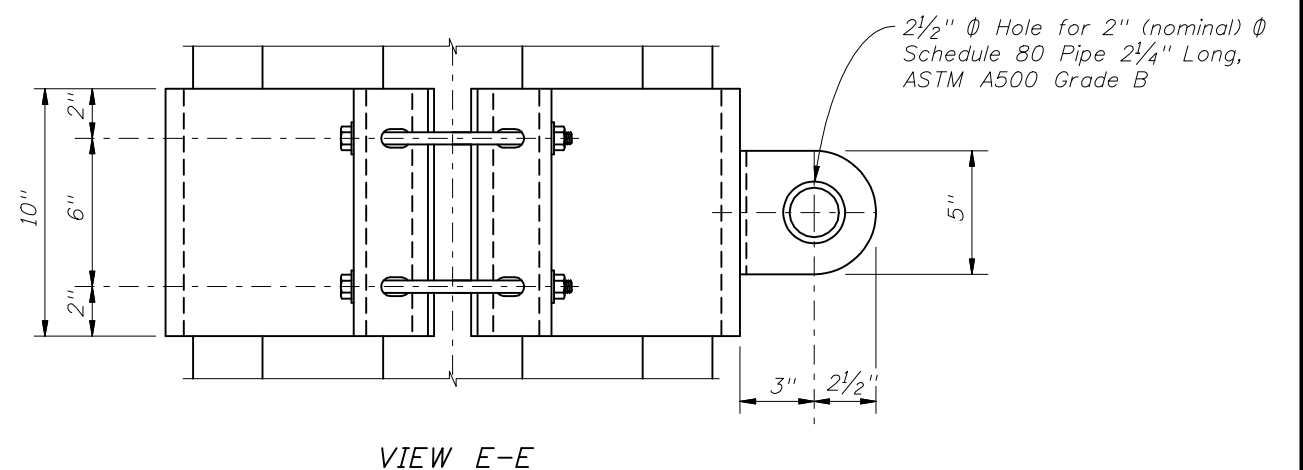
SECTION D-D (thru Hand Hole)



CATENARY AND MESSENGER WIRE CLAMPS

NOTE: Clamps have been sized for Design Cable Loads shown in the Table, and a Maximum Pole Diameter at the Clamp location of 2'-1".

Cable Diameter (in.)	Minimum Breaking Strength (kip)	Plate Thickness (in.)
1/2	25	1
7/16	18	7/8
3/8	11.5	3/4
1/4	3.15	3/8



VIEW E-E

ATTACHMENT DETAILS



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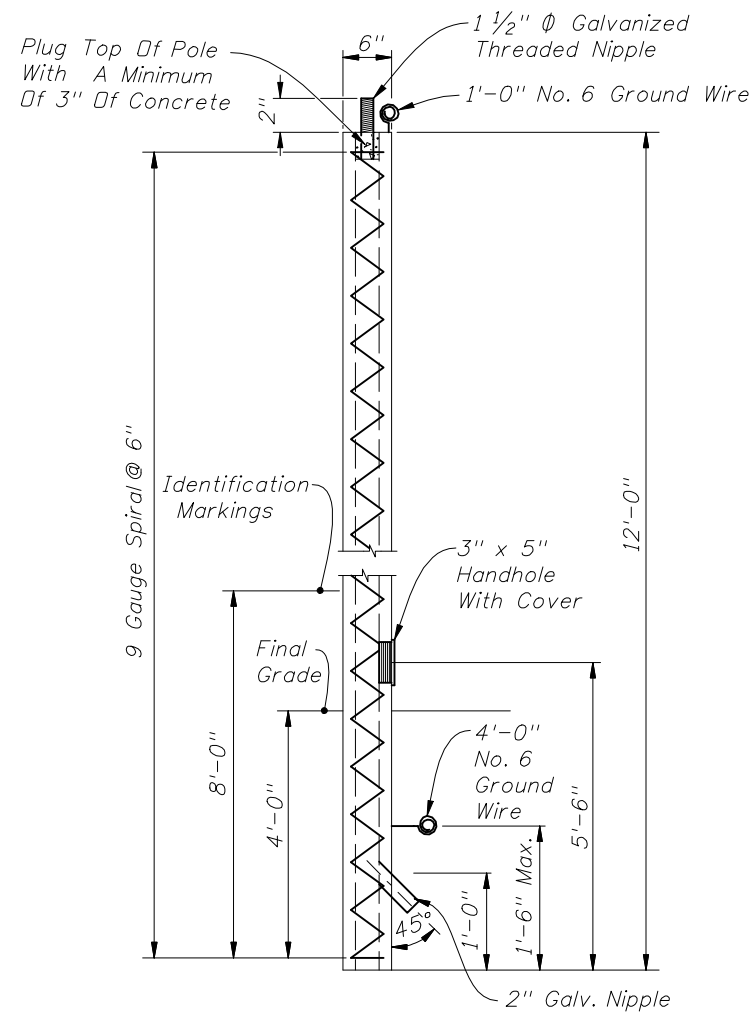
STEEL STRAIN POLE

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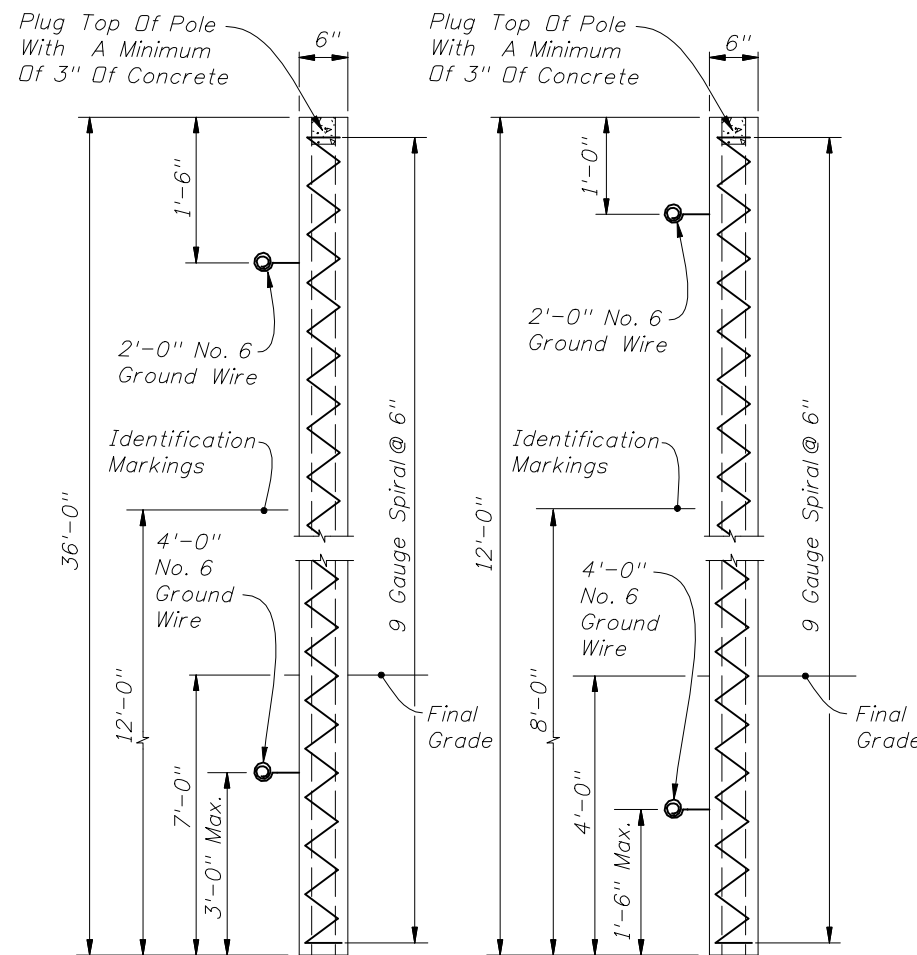
Index No. 17723

TYPE OF POLE	CONCRETE POLE **	
	SIZE AT TOP (T)	SHEAR REINFORCING
Type P-II	6" x 6"	9 Gauge Spiral @ 6"
Type P-III	6" x 6"	6 Gauge Spiral @ 6"
Type P-IV	8" x 8"	5 Gauge Spiral @ 6"
Type P-V	10" x 10"	5 Gauge Spiral @ 6"
Type P-VI	12" x 12"	5 Gauge Spiral @ 6"
Type P-VII	14" x 14"	5 Gauge Spiral @ 6"
Type P-VIII	16" x 16"	5 Gauge Spiral @ 6"

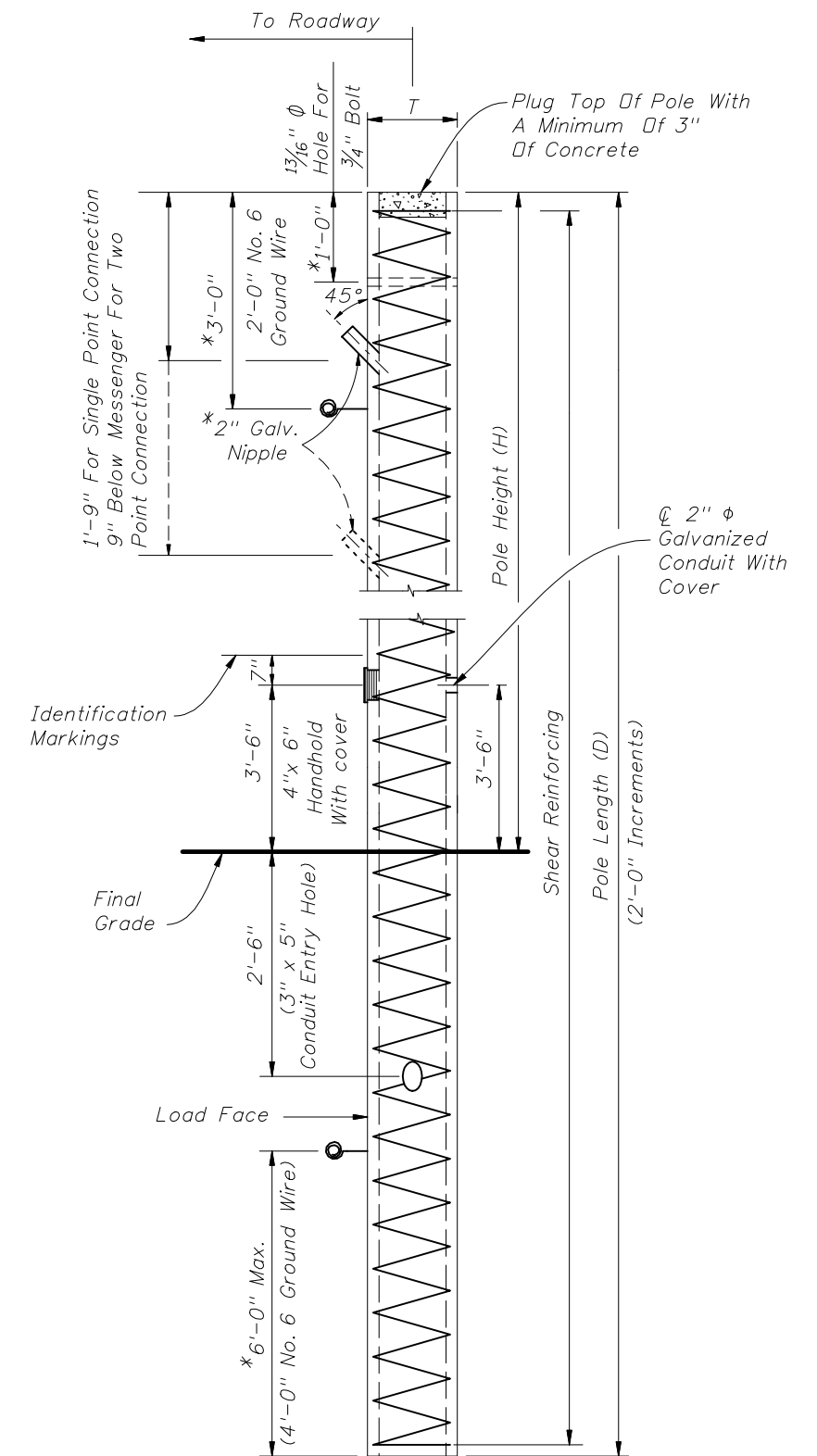
** Round poles require the same taper as square poles and top diameter not less than 1.4 times the top width (dimension "T") of a square pole.



TYPE P-II PEDESTAL POLE



TYPE P-II SERVICE POLE

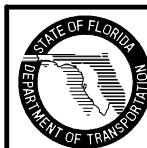


TYPE P-III LIGHTING AND TRAFFIC MONITORING POLES
TYPES P-IV THROUGH P-VIII STRAIN POLES

(For Installation, refer to Roadway and Traffic Design Standard, Index No. 17504)

* Do not apply these items to Type P-III Lighting and ITS Poles. Establish bolt hole locations, ground wire location and conduit location as shown in the plans.

Ref. Index 17900 and Sec. 744 for modifications to Type P-III poles used at traffic monitoring sites.



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CONCRETE POLES

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DESIGN NOTES:

Design according to FDOT Structures Manual (current edition) and the 2001 edition of the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" with Interim.

Manufacturers seeking approval of a prestressed concrete pole for inclusion on the Qualified Products List must submit a QPL Products Evaluation Application along with design documentation and drawings showing the product meets all specified requirements of this Index.

Place the prestressing symmetrically about one axis. Supply a sufficient amount of prestressing to provide a calculated compressive stress of 1.0 ksi for Type P-II pole (12 ft) and 1.8 ksi for Type P-II (36 ft) pole and Type P-III pole at the top of pole after all losses.

Design concrete Strain poles using Class V Special with strength of 6 ksi minimum at 28 days and 4 ksi minimum at transfer of the Prestressing force.

Reinforcing steel shall be A615 Grade 60. Provide a minimum area of non-prestressed reinforcement equal to 0.33% of the concrete area.

Prestressed Strands shall be A416 Grade 270 stress relieved or low relaxation.

One turn required for spiral splices and two turns required at the top and bottom of poles. Spiral shall be manufactured from cold-drawn steel wire meeting the requirements of ASTM A82.

Use cover plates made of non-corrosive materials and attached to the pole using lead anchors or threaded inserts embedded in the pole and round head chrome plated screws.

Attach ground wires to the reinforcing steel in the pole as necessary to prevent the ground wire from being displaced during concreting operations.

Identify concrete poles as to pole manufacturer, Department's pole type, length and Qualified Product List qualification number by inset numerals 1" in height inscribed on the same face of the pole as the handhole and ground wire.

Provide a Class 3 Surface Finish as specified in Section 400-15.2.4 of the Standard Specifications.

Provide a minimum cover of 1".

Provide all poles with a total taper of 0.162 IN/FT.

INSTALLATION NOTES:

Attach span wire assemblies (consisting of the catenary wire, the messenger wire, and the tether wire) to the concrete poles in accordance with Section 634 of the Standard Specifications.

If a two point attachment is required by the plans, provide an eye bolt hole for the messenger wire, or field drill one at the location indicated in the plans. Field drill the eyebolt hole for the tether wire, when required, prior to installation.

Rake pole back from the span wire as necessary to achieve a final rake of $\frac{1}{2} \pm \frac{1}{4}$ inch per foot.

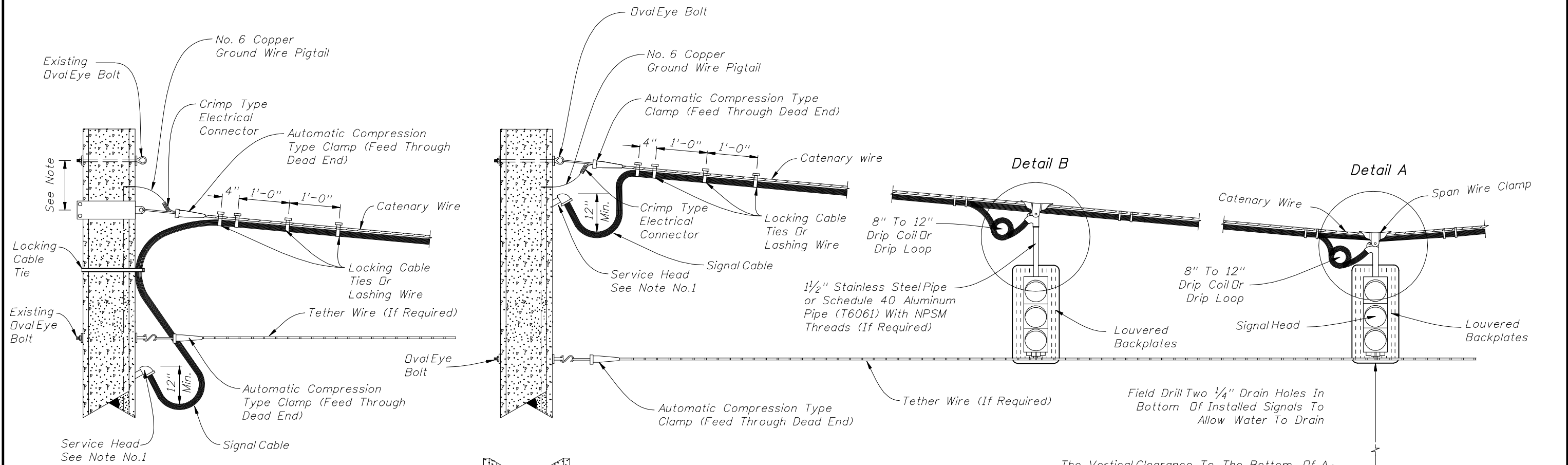
H (feet)	TYPE OF STRAIN POLE				
	P-IV (k-ft)	P-V (k-ft)	P-VI (k-ft)	P-VII (k-ft)	P-VIII (k-ft)
20	21	86	121	165	204
22	24	90	126	171	210
24	26	93	131	176	215
26	29	97	135	182	221
28	32	101	140	187	227
30	34	104	144	192	232
32	37	108	149	197	238
34	39	111	153	202	243
36	41	114	157	207	248
38	44	117	161	212	253
40	46	120	165	217	258
42	48	123	169	221	263
44	50	126	173	226	268
46	52	129	177	230	272
48	54	132	180	235	277
50	56	135	184	239	281

TABLE I shall be used for checking allowable stress in concrete for Dead Load. $MS \geq MDL$, where MDL = moment due to dead load only.

H (feet)	TYPE OF STRAIN POLE				
	P-IV (k-ft)	P-V (k-ft)	P-VI (k-ft)	P-VII (k-ft)	P-VIII (k-ft)
20	43	138	198	273	346
22	48	145	206	283	357
24	53	151	215	294	369
26	58	158	224	304	381
28	63	165	232	315	392
30	68	172	241	325	404
32	73	178	250	335	415
34	77	185	258	346	427
36	82	192	267	356	439
38	87	199	276	367	450
40	92	205	284	377	462
42	97	212	293	387	474
44	102	219	302	398	485
46	107	226	310	408	497
48	112	232	319	419	508
50	117	239	328	429	520

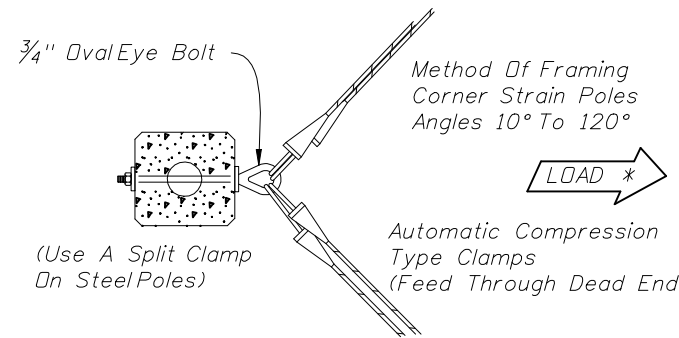
TABLE II shall be used for checking ultimate moment strength under factored loading combinations of dead load plus wind load, and is the Nominal Moment Strength (M_n) multiplied by Strength Reduction factor ($\phi = 0.9$) $\phi M_n \geq M_u = 1.3 (MDL + MWL)$, where MDL = moment due to dead load, and MWL = moment due to wind load.



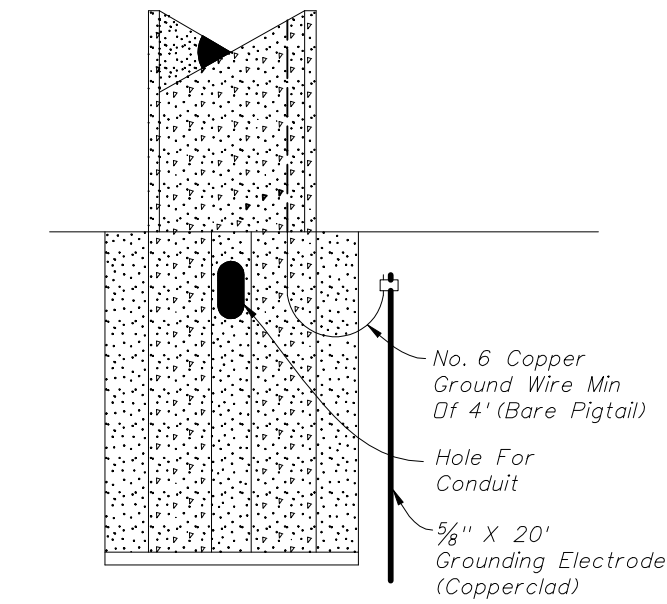


RETROFIT INSTALLATION

Note: Clamp location shall be adjusted to compensate for reduced sag and vertical clearance to bottom of signal head.

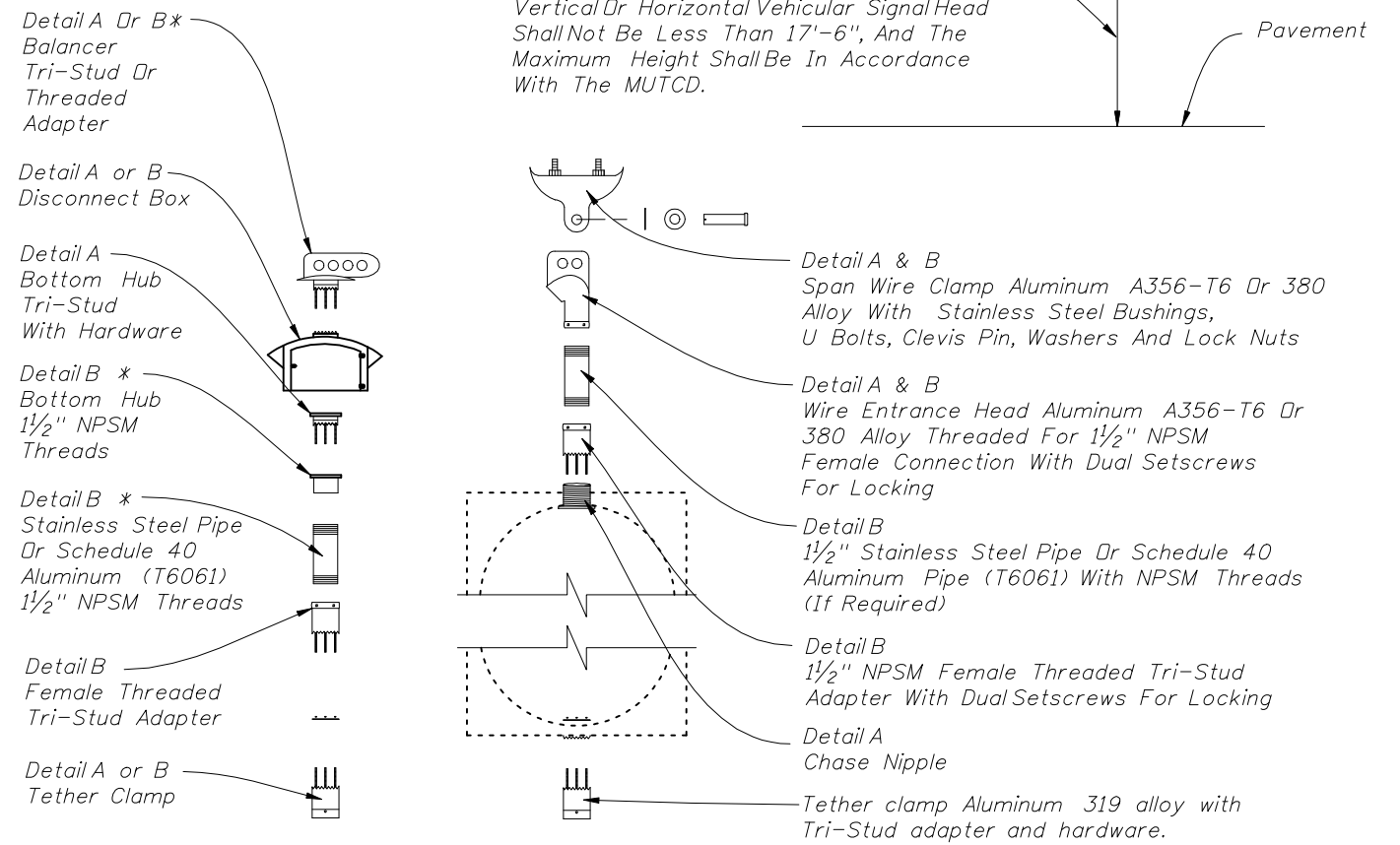


* The load face of pole shall be perpendicular to load.



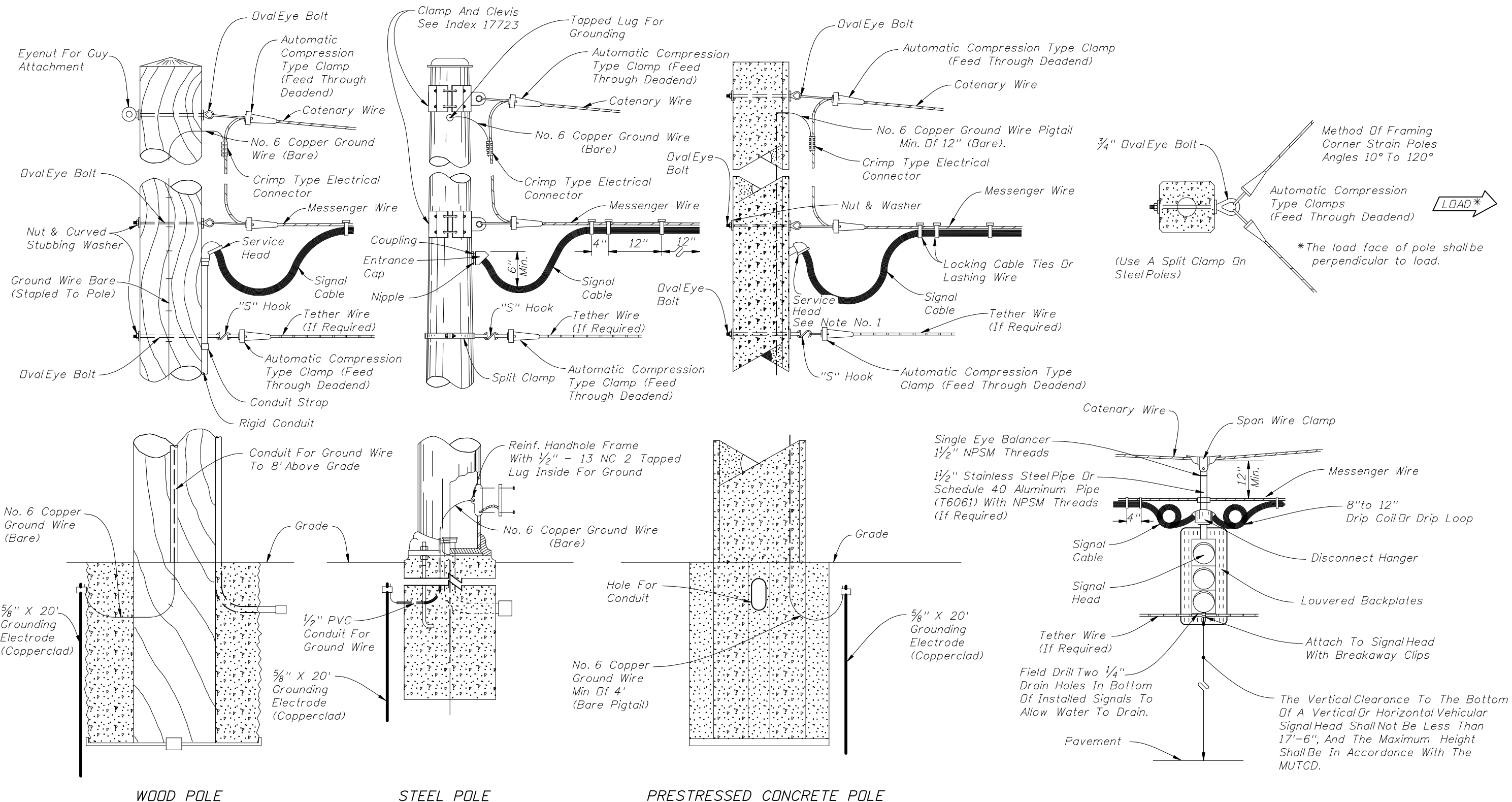
**PRESTRESSED CONCRETE POLE
NEW CONSTRUCTION**

- Notes:
1. With the approval of the resident engineer, the service head hole for joint use poles may be drilled by the utility company at an angle of 90° but not less than 45° to the face of the pole.
 2. Lashing wire should normally be used for distances of 12' or greater.
 3. All hardware for signal attachment shall be stainless steel.
 4. Meet all grounding requirements of Section 620 of the Standard Specifications.



* For long pipe hangers a wire entrance head may be substituted for balancer and the drop pipe installed above the disconnect box.

SINGLE POINT ATTACHMENT



Notes:

1. With the approval of the resident engineer, the service head hole for joint use poles may be drilled by the utility company at an angle of 90° but not less than 45° to the face of the pole.
2. Lashing wire should normally be used for distances of 12' or greater.
3. The overlapped connection of adjustable hangers shall use a minimum of 2 bolts with a minimum spacing of 2" between bolts.
4. Meet all grounding requirements of Section 620 of the Standard Specifications.

TWO POINT ATTACHMENT

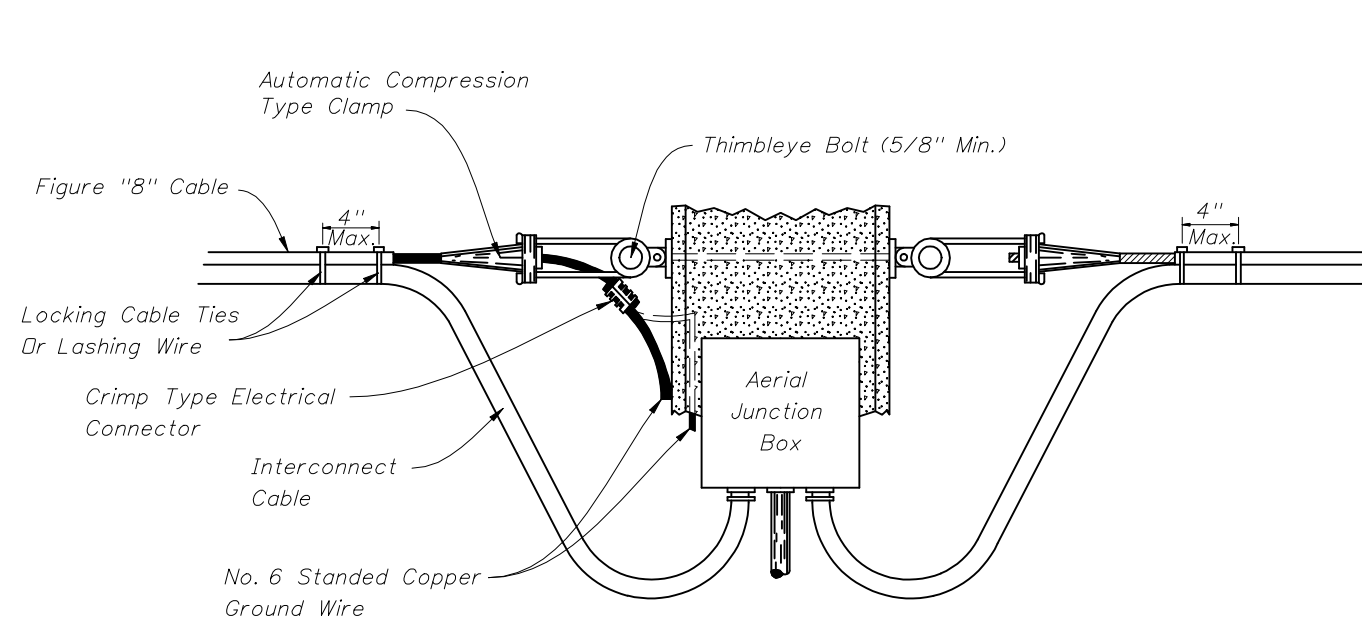


FIGURE A
CABLE DROP AND
TERMINATION DETAIL
AERIAL INTERCONNECT FIGURE "8"

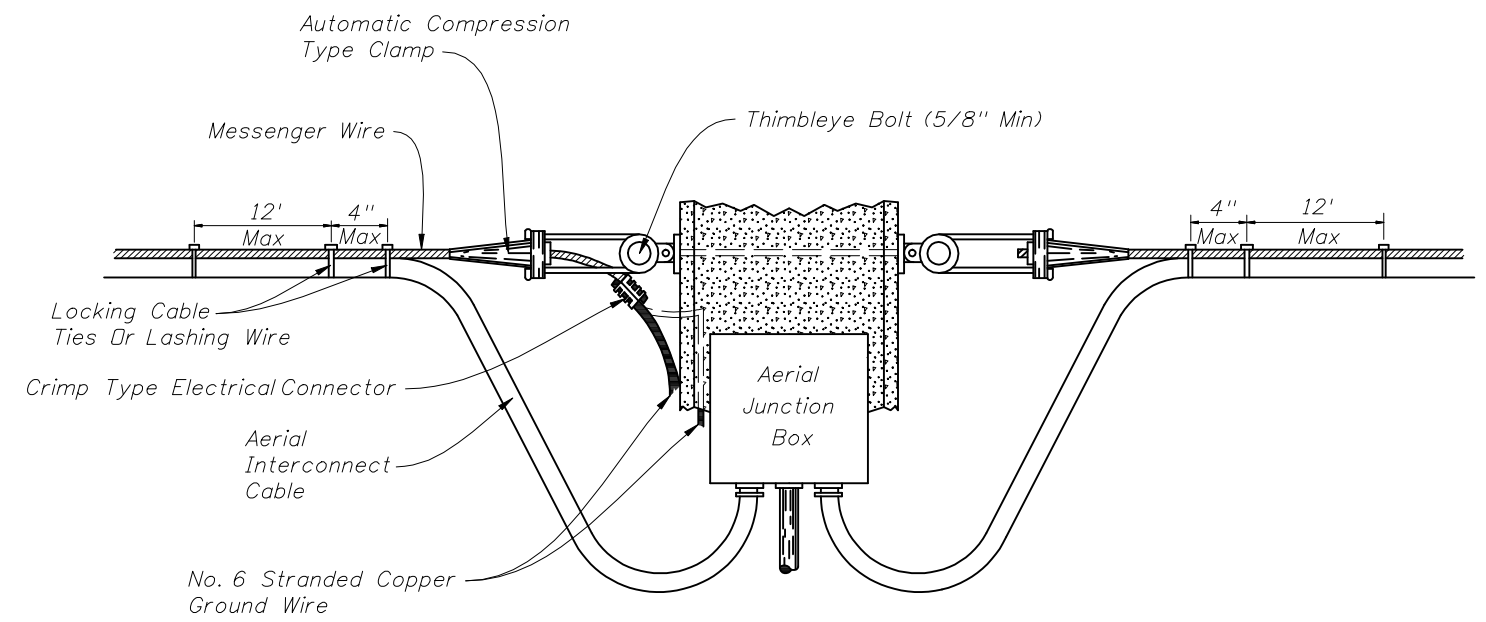


FIGURE B
CABLE DROP AND
TERMINATION DETAIL
AERIAL INTERCONNECT MESSENGER
WIRE WITH CLAMPS

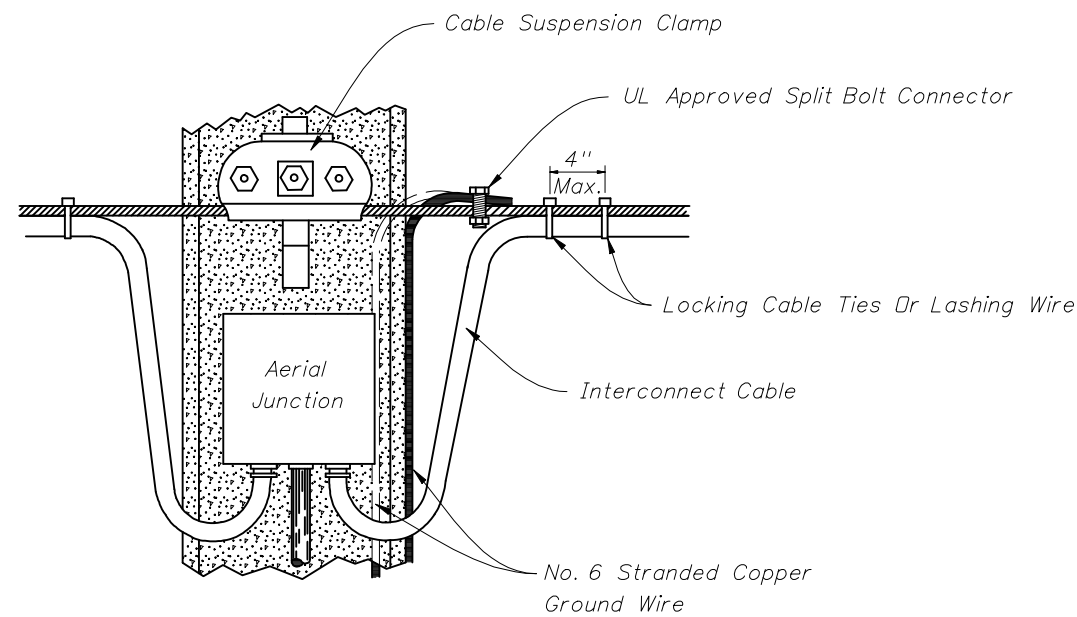
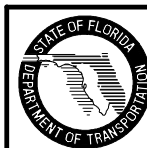
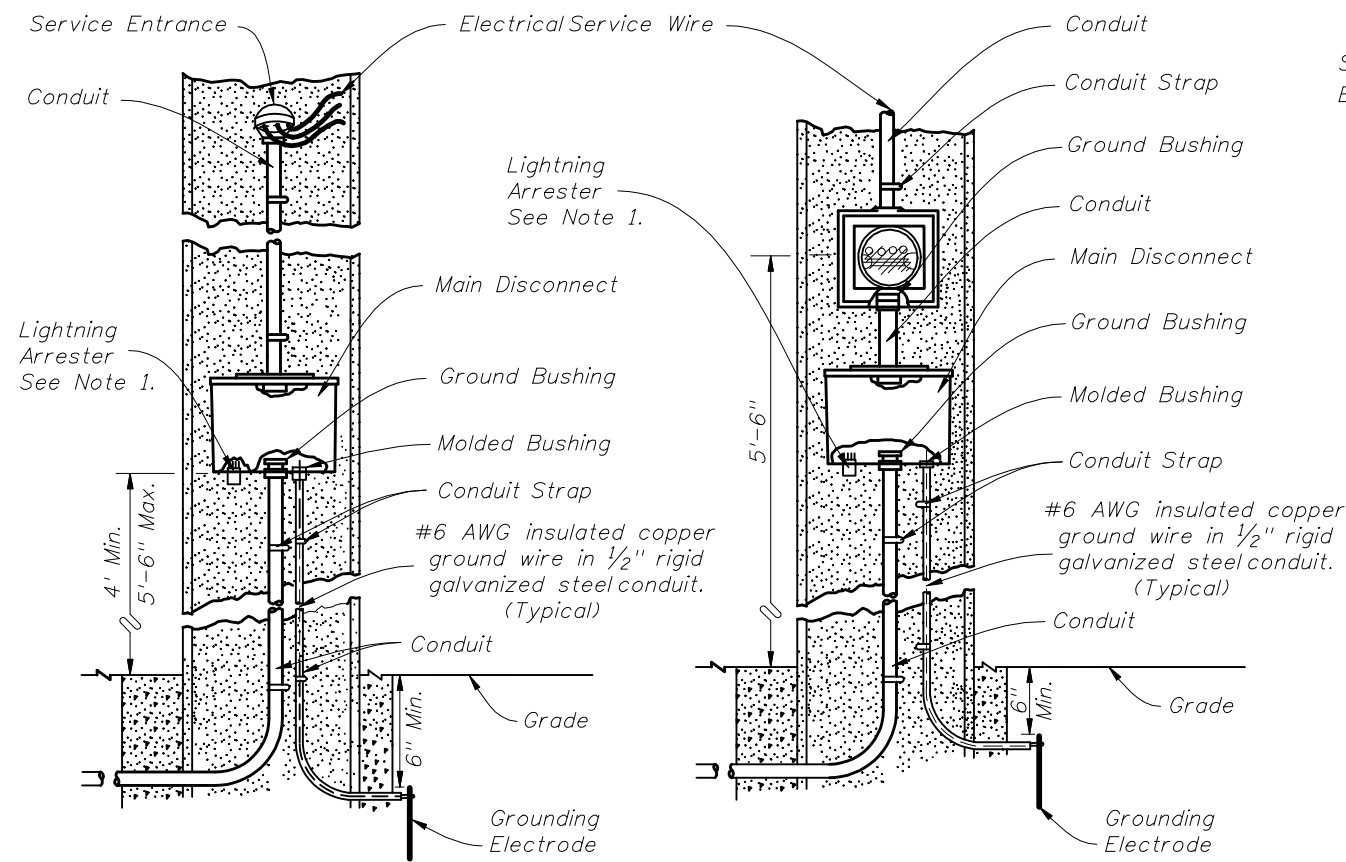


FIGURE C
CABLE DROP DETAIL
AERIAL INTERCONNECT MESSENGER
WIRE WITH CLAMPS

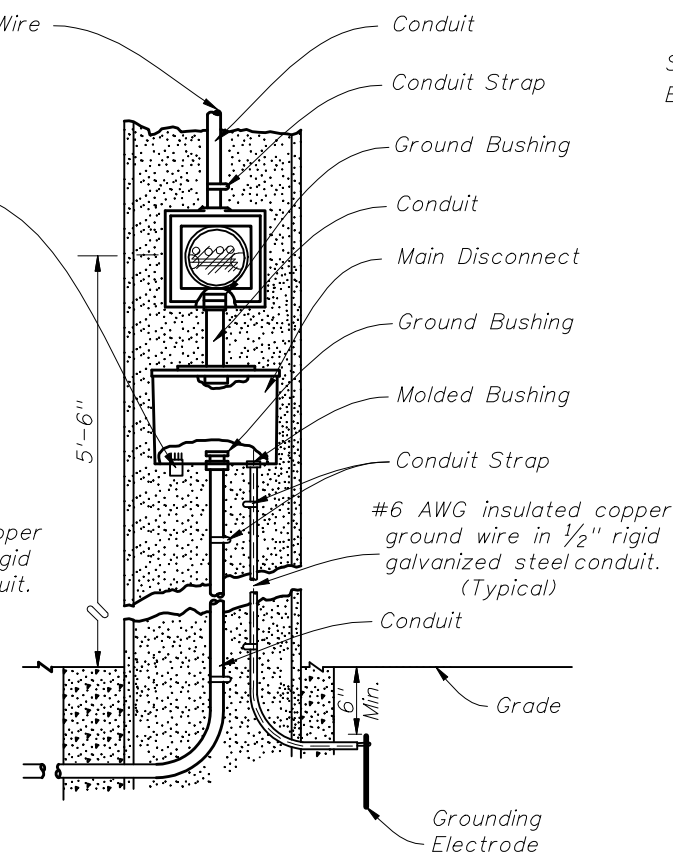
Notes:

1. The messenger wire of the interconnect cables shall be grounded to the copper ground wire of the pole or to the external wire extending down the pole.
2. When utilizing the external ground wire to the pole, a piece of 1/2" conduit shall extend up the pole externally to a point 8' above finish grade to protect the ground wire connecting the messenger wire to the ground rod.
3. Locking cable ties or lashing wire when used shall be placed no further than 12" apart except at the point of cable drop or terminations where one (1) shall be placed at the point where the cables separate from the messenger wire and another placed 4" (max) from that tie. When using figure "8" interconnect cable only the locking cable ties shall be used.
4. If accessible the internal ground wire of the support pole may be used to ground the messenger wire.
5. Lashing wire should normally be used for distances of 12' or greater.
6. Meet all grounding requirements of Section 620 of the Standard Specifications.

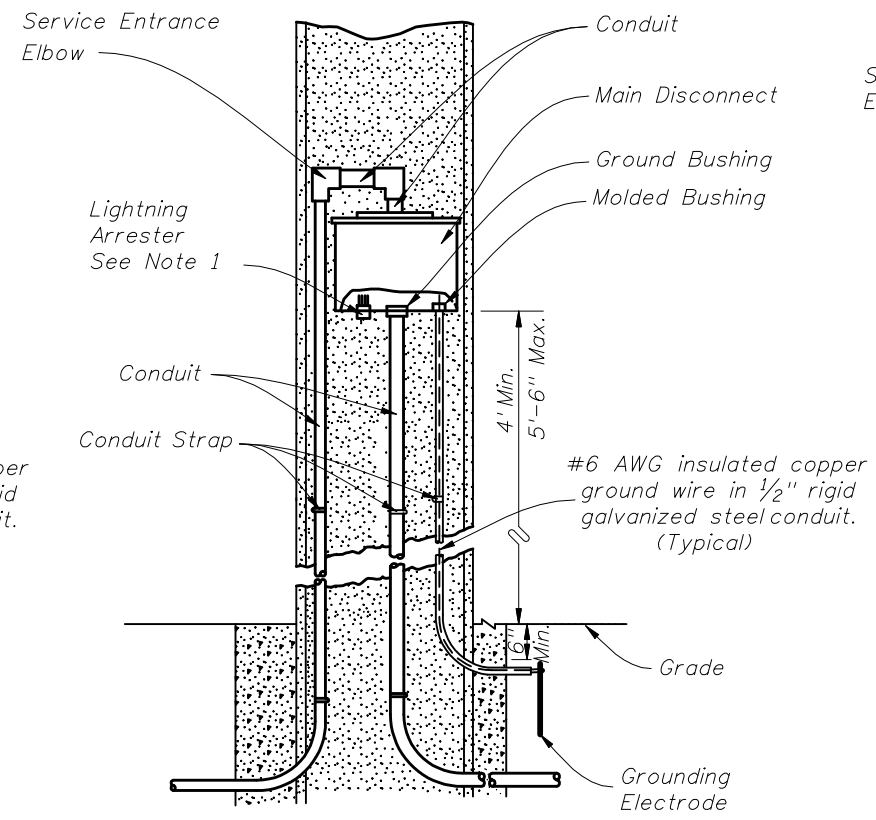




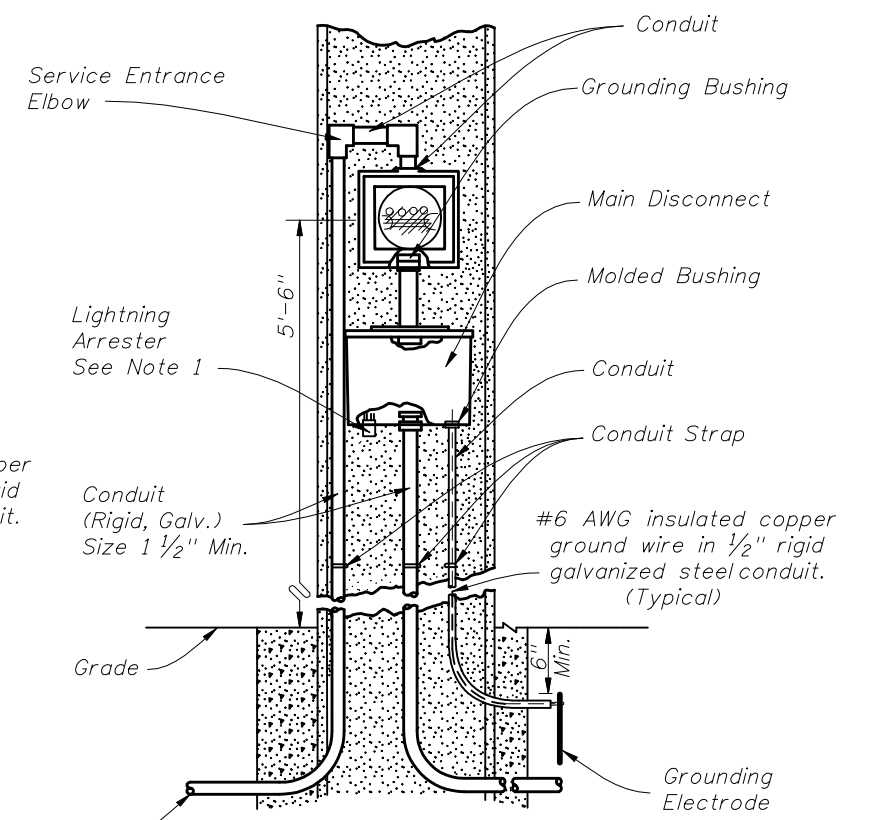
AERIAL FEED
(NO METER USED)
FIGURE A



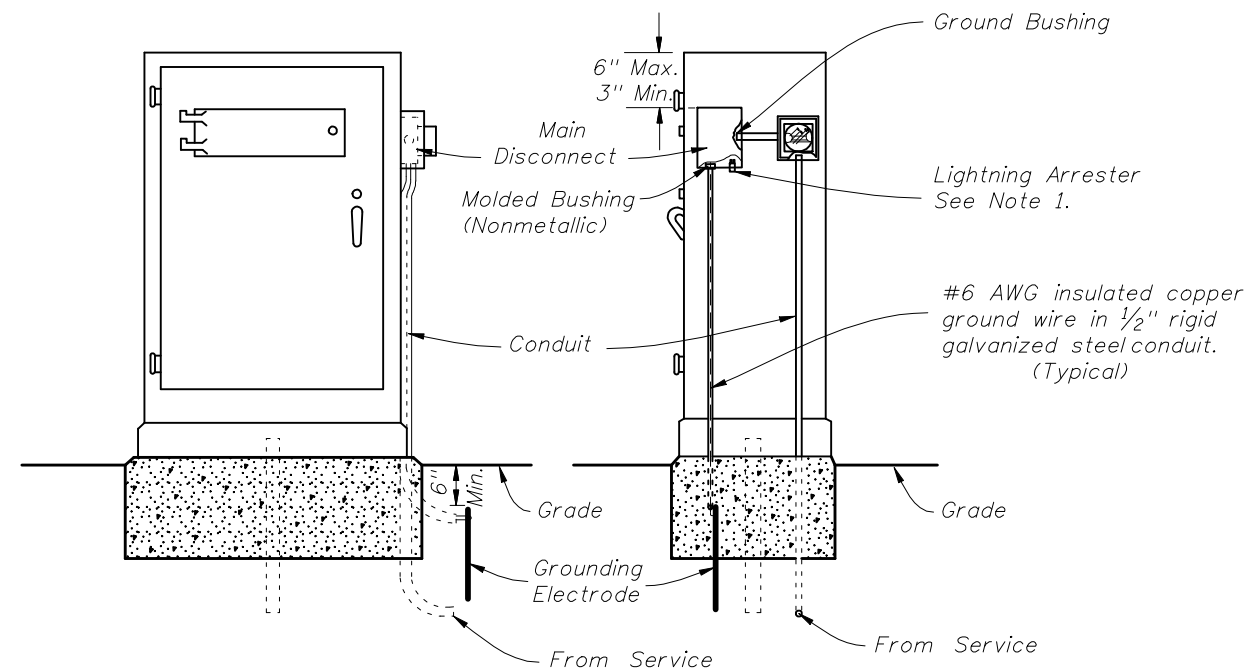
AERIAL FEED
(METER USED)
FIGURE B



UNDERGROUND FEED
(NO METER USED)
FIGURE C



TYPE "B" UNDERGROUND FEED
(METER USED)
FIGURE D



UNDERGROUND CABINET MOUNTED
(METER USED)
FIGURE E

NOTES:

1. The lightning arrester can be located on the side or bottom of the main disconnect enclosure at the Contractor's Option.
2. Liquidtight flexible conduit is approved for use from the electrical disconnect to the cabinet when both are installed on the same pole.
3. Bond all elements together to form an Intersection Grounding Network in accordance with Section 620 of the Department's current Standard Specifications for Road and Bridge Construction. The bond wire shall be run in conduit with the Electrical Service Wire or Signal Cable.
4. Meet all grounding requirements of Section 620 of the Standard Specifications.
5. The Main Disconnect shall be lockable by padlock and four keys provided to the maintaining agency. The door shall have a minimum of three hinges and be lockable. No screws to be used to attach door.
6. The Main Disconnect shall be Nema 3R or better.



POLE SELECTION TABLE - SINGLE ARM - WITH & WITHOUT LUMINAIRE					
Arm Type	D1	D3	D5	D6	D7
Pole Type	S1 & S21 Lum	S2 & S22 Lum	S3 & S23 Lum	S4 & S24 Lum	S6

POLE SELECTION TABLE - DOUBLE ARM - WITHOUT LUMINAIRE										
Arm Type	D1 - D1	D3 - D1	D5 - D2	D6 - D2	D4 - D4	D5 - D4	D6 - D4	D5 - D5	D6 - D5	D6 - D6
Pole Type	S1	S2	S3	S4	S3	S4	S4	S4	S4	S5

Arm 1 is listed first

ARM DESIGN TABLE - ALL CASES														
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS				
		FA/SA (ft)	FB/SB (in)	FC/SC (in)	FD/SD (in)	FE/SE (ft)	FF/SF (in)	FG/SG (in)	FH/SH (in)	HT (in)	FJ/SJ (in)	FK/SK (in)	FM/SM (in)	FQ/SQ (in)
D1	36'-0"	36	8.96	14	0.1793	-	-	-	-	20	25	2.5	0.125	0.313
D2	36'-0"	36	8.96	14	0.1793	-	-	-	-	30	36	3	0.125	0.313
D3	46'-0"	36.3	8.92	14	0.1793	11.7	13.36	15	0.313	20	25	2.5	0.25	0.375
D4	46'-0"	36.3	8.92	14	0.1793	11.7	13.36	15	0.313	30	36	3	0.25	0.375
D5	60'-0"	36	7.96	13	0.1793	26	12.36	16	0.375	30	36	3	0.313	0.563
D6	70'-6"	39.4	9.49	15	0.1793	33.1	14.37	19	0.375	30	36	3	0.313	0.563
D7	78'-0"	40	8.44	14	0.1793	40.0	13.40	19	0.375	30	34	3	0.313	0.625

Arm Camber Angle = 2 degrees

POLE, CONNECTION AND SHAFT DESIGN TABLE - SINGLE & DOUBLE ARM																									
POLE TYPE	UA(ft)	UC(in)	UD(in)	UE(in)	UG(ft)	UPRIGHT BASE CONNECTION						CONNECTION PLATE DATA								DRILLED SHAFT DATA					
						No. Bolts	BA (in)	BB (in)	BC (in)	BD (in)	BE (in)	BF (in)	HT (in)	FJ/SJ (in)	FL/SL (in)	FN/SN (in)	FO/SO (in)	FP/SP (in)	FR/SR (in)	FS/SS (in)	FT/ST (in)	DA (ft)	DB (ft)	RA	RB
S1	24	12.64	16	0.375	-	6	30	1.75	1.75	0.375	0.313	36	20	25	0.75	0.438	15.5	1	2	8	0.438	13	3.5	11	10
S2	24	14.64	18	0.375	-	6	32	1.75	1.75	0.375	0.313	36	20	25	0.75	0.438	15.5	1	2	8	0.438	13	4	11	14
S3	24	17.64	21	0.375	-	6	37	1.75	2	0.375	0.313	40	30	36	0.75	0.438	22	1.25	2.5	12.5	0.438	15	4	11	14
S4	24	22.64	26	0.375	-	6	42	1.75	2	0.375	0.313	40	30	36	0.75	0.438	22	1.25	2	12.5	0.438	17	4.5	11	16
S5	24	23.64	27	0.375	-	6	45	1.75	2.25	0.375	0.313	45	30	36	0.75	0.438	22	1.25	2	12.5	0.438	19	4.5	11	16
S6	24	21.64	25	0.375	-	6	41	1.75	2	0.375	0.313	40	30	34	0.75	0.5	16.5	1.25	2	12.5	0.5	15	4.5	11	16
S21 Lum	39	10.54	16	0.375	37.5	6	30	1.75	1.75	0.375	0.313	40	20	25	0.75	0.438	11.5	1	2	8	0.438	13	3.5	11	10
S22 Lum	39	12.54	18	0.375	37.5	6	32	1.75	1.75	0.375	0.313	40	20	25	0.75	0.438	12.5	1	2	8	0.438	13	4	11	14
S23 Lum	39	15.54	21	0.375	37.5	6	37	1.75	2	0.375	0.313	40	30	36	0.75	0.438	15	1.25	2.5	12.5	0.438	14	4	11	14
S24 Lum	39	20.54	26	0.375	37.5	6	42	1.75	2	0.375	0.313	40	30	36	0.75	0.438	17	1.25	2	12.5	0.438	15	4.5	11	16

LUMINAIRE AND LUMINAIRE CONNECTION											
LA(ft)	LB(ft)	LC(in)	LD(in)	LE	LF(ft)	LG(in)	LH(in)	LJ(in)	LK(in)	LL(deg)	UG(ft)
40	10	3	0.125	0.5	8	0.5	0.75	0.25	0.25	0	37.5

NOTES:

1. Work this Index with Index No. 17745.
2. Standard Mast Arm "D" Assemblies are designed to Loading Trees as indicated in Plans Preparation Manual.
3. Design Speed = 150 mph with Signal Backplates

"D" MAST ARMS



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POLE SELECTION TABLE - SINGLE ARM - WITH & WITHOUT LUMINAIRE					
Arm Type	E1	E3	E5	E6	E7
Pole Type	T1 & T21 Lum	T2 & T22 Lum	T3 & T23 Lum	T4 & T24 Lum	T6

POLE SELECTION TABLE - DOUBLE ARM - WITHOUT LUMINAIRE										
Arm Type	E1 - E1	E3 - E1	E5 - E2	E6 - E2	E4 - E4	E5 - E4	E6 - E4	E5 - E5	E6 - E5	E6 - E6
Pole Type	T1	T2	T3	T4	T3	T4	T4	T4	T4	T5

Arm 1 is listed first

ARM DESIGN TABLE - ALL CASES														
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS				
		FA/SA (ft)	FB/SB (in)	FC/SC (in)	FD/SD (in)	FE/SE (ft)	FF/SF (in)	FG/SG (in)	FH/SH (in)	HT (in)	FJ/SJ (in)	FK/SK (in)	FM/SM (in)	FQ/SQ (in)
E1	36'-0"	36.0	5.96	11	0.25	-	-	-	-	22	22	2	0.187	0.313
E2	36'-0"	36.0	5.96	11	0.25	-	-	-	-	30	32	2.75	0.187	0.313
E3	46'-0"	36.3	7.06	12.14	0.25	11.7	11.36	13	0.313	22	22	2	0.25	0.375
E4	46'-0"	36.3	7.06	12.14	0.25	11.7	11.36	13	0.313	30	32	2.75	0.25	0.375
E5	60'-0"	36.0	6.10	11.14	0.25	26	10.36	14	0.375	30	32	2.75	0.313	0.5
E6	70'-6"	39.4	6.63	12.15	0.25	33.1	11.37	16	0.375	30	32	2.75	0.313	0.563
E7	78'-0"	40.0	7.50	13.10	0.1793	40	12.40	18	0.375	30	32	2.5	0.313	0.563

Arm Camber Angle = 2 degrees

POLE, CONNECTION AND SHAFT DESIGN TABLE - SINGLE & DOUBLE ARM																									
POLE TYPE	UA(ft)	UC(in)	UD(in)	UE(in)	UG(ft)	UPRIGHT BASE CONNECTION						CONNECTION PLATE DATA								DRILLED SHAFT DATA					
						No. Bolts	BA (in)	BB (in)	BC (in)	BD (in)	BE (in)	BF (in)	HT (in)	FJ/SJ (in)	FL/SL (in)	FN/SN (in)	FO/SO (in)	FP/SP (in)	FR/SR (in)	FS/SS (in)	FT/ST (in)	DA (ft)	DB (ft)	RA	RB
T1	24	10.64	14	0.375	-	6	26	1.75	1.5	0.375	0.313	36	22	22	0.5	0.375	14	1	2.0	9	0.375	12	3.5	11	10
T2	24	12.64	16	0.375	-	6	28	1.75	1.5	0.375	0.313	36	22	22	0.5	0.375	14	1	2.0	9	0.375	14	3.5	11	10
T3	24	15.64	19	0.375	-	6	35	1.75	2	0.375	0.313	40	30	32	0.75	0.375	19.5	1.25	2.0	12.5	0.375	15	4	11	14
T4	24	18.64	22	0.5	-	6	38	1.75	2	0.5	0.438	40	30	32	0.75	0.375	19.5	1.25	2.0	12.5	0.375	19	4	11	14
T5	24	18.64	22	0.5	-	6	38	1.75	2	0.5	0.438	40	30	32	0.75	0.375	19.5	1.25	2.0	12.5	0.375	21	4	11	14
T6	24	18.64	22	0.375	-	6	38	1.75	2	0.375	0.313	40	30	32	0.75	0.438	15	1.25	2.0	12.5	0.438	18	4	11	14
T21 Lum	39	8.54	14	0.375	37.5	6	26	1.75	1.5	0.375	0.313	40	22	22	0.5	0.375	10	1	2.0	9	0.375	12	3.5	11	10
T22 Lum	39	10.54	16	0.375	37.5	6	30	1.75	1.75	0.375	0.313	40	22	22	0.5	0.375	11	1	2.0	9	0.375	13	3.5	11	10
T23 Lum	39	13.54	19	0.375	37.5	6	35	1.75	2	0.375	0.313	40	30	32	0.75	0.375	13	1.25	2.25	12.5	0.375	14	4	11	14
T24 Lum	39	16.54	22	0.375	37.5	6	38	1.75	2	0.375	0.313	40	30	32	0.75	0.375	15	1.25	2.0	12.5	0.375	17	4	11	14

LUMINAIRE AND LUMINAIRE CONNECTION											
LA(ft)	LB(ft)	LC(in)	LD(in)	LE	LF(ft)	LG(in)	LH(in)	LJ(in)	LK(in)	LL(deg)	UG(ft)
40	10	3	0.125	0.5	8	0.5	0.75	0.25	0.25	0	37.5

NOTES:

1. Work this Index with Index No. 17745.
2. Standard Mast Arm "E" Assemblies are designed to Loading Trees as indicated in Plans Preparation Manual.
3. Design Speed = 130 mph with Signal Backplates or 150 mph without Signal Backplates

"E" MAST ARMS



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POLE SELECTION TABLE - SINGLE ARM - WITH & WITHOUT LUMINAIRE					
Arm Type	F1	F3	F5	F6	F7
Pole Type	W1 & W21 Lum	W2 & W22 Lum	W3 & W23 Lum	W4 & W24 Lum	W6

POLE SELECTION TABLE - DOUBLE ARM - WITHOUT LUMINAIRE										
Arm Type	F1 - F1	F3 - F1	F5 - F2	F6 - F2	F4 - F4	F5 - F4	F6 - F4	F5 - F5	F6 - F5	F6 - F6
Pole Type	W1	W2	W3	W4	W3	W4	W4	W4	W4	W5

Arm 1 is listed first

ARM DESIGN TABLE - ALL CASES														
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS				
		FA/SA (ft)	FB/SB (in)	FC/SC (in)	FD/SD (in)	FE/SE (ft)	FF/SF (in)	FG/SG (in)	FH/SH (in)	HT (in)	FJ/SJ (in)	FK/SK (in)	FM/SM (in)	FQ/SQ (in)
F1	36'-0"	36	5.96	11	0.1793	-	-	-	-	20	20	2	0.125	0.25
F2	36'-0"	36	5.96	11	0.1793	-	-	-	-	29	29	2.25	0.125	0.25
F3	46'-0"	36.3	5.92	11	0.1793	11.7	10.36	12	0.25	20	20	2	0.188	0.313
F4	46'-0"	36.3	5.92	11	0.1793	11.7	10.36	12	0.25	29	29	2.25	0.188	0.313
F5	60'-0"	36	5.96	11	0.1793	26.0	10.36	14	0.313	29	29	2.25	0.25	0.375
F6	70'-6"	39.4	5.49	11	0.1793	33.1	10.37	15	0.313	29	29	2.25	0.25	0.438
F7	78'-0"	40	6.43	12	0.1793	40.0	11.26	17	0.313	29	29	2.25	0.25	0.438

POLE, CONNECTION AND SHAFT DESIGN TABLE - SINGLE & DOUBLE ARM																									
POLE TYPE	UA(ft)	UC(in)	UD(in)	UE(in)	UG(ft)	UPRIGHT BASE CONNECTION							CONNECTION PLATE DATA								DRILLED SHAFT DATA				
						No. Bolts	BA (in)	BB (in)	BC (in)	BD (in)	BE (in)	BF (in)	HT (in)	FJ/SJ (in)	FL/SL (in)	FN/SN (in)	FO/SO (in)	FP/SP (in)	FR/SR (in)	FS/SS (in)	FT/ST (in)	DA (ft)	DB (ft)	RA	RB
W1	24.0	9.64	13	0.375	-	6	25	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	13	0.75	2.0	8.5	0.313	12	3.5	11	10
W2	24.0	11.64	15	0.375	-	6	27	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	14	0.75	2.0	8.5	0.313	14	3.5	11	10
W3	24.0	14.64	18	0.375	-	6	32	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	15	4	11	14
W4	24.0	17.64	21	0.375	-	6	35	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	19	4	11	14
W5	24.0	17.64	21	0.375	-	6	35	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	21	4	11	14
W6	24.0	17.64	21	0.375	-	6	35	1.5	1.75	0.375	0.313	36	29	29	0.5	0.375	14	1.25	2.0	12	0.375	18	4	11	14
W21 Lum	39.0	7.54	13	0.375	37.5	6	25	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	9	0.75	2.0	8.5	0.313	10	3.5	11	10
W22 Lum	39.0	9.54	15	0.375	37.5	6	27	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	10	0.75	2.0	8.5	0.313	13	3.5	11	10
W23 Lum	39.0	12.54	18	0.375	37.5	6	32	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	11.5	1	2.0	12.5	0.313	14	4	11	14
W24 Lum	39.0	15.54	21	0.375	37.5	6	35	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	13	1	2.0	12.5	0.313	17	4	11	14

LUMINAIRE AND LUMINAIRE CONNECTION											
LA(ft)	LB(ft)	LC(in)	LD(in)	LE	LF(ft)	LG(in)	LH(in)	LJ(in)	LK(in)	LL(deg)	UG(ft)
40	10	3	0.125	0.5	8	0.5	0.75	0.25	0.25	0	37.5

NOTES:

1. Work this Index with Index No. 17745.
2. Standard Mast Arm "F" Assemblies are designed to Loading Trees as indicated in Plans Preparation Manual.
3. Design Speed = 110 mph with SignalBackplates or 130 mph without SignalBackplates.

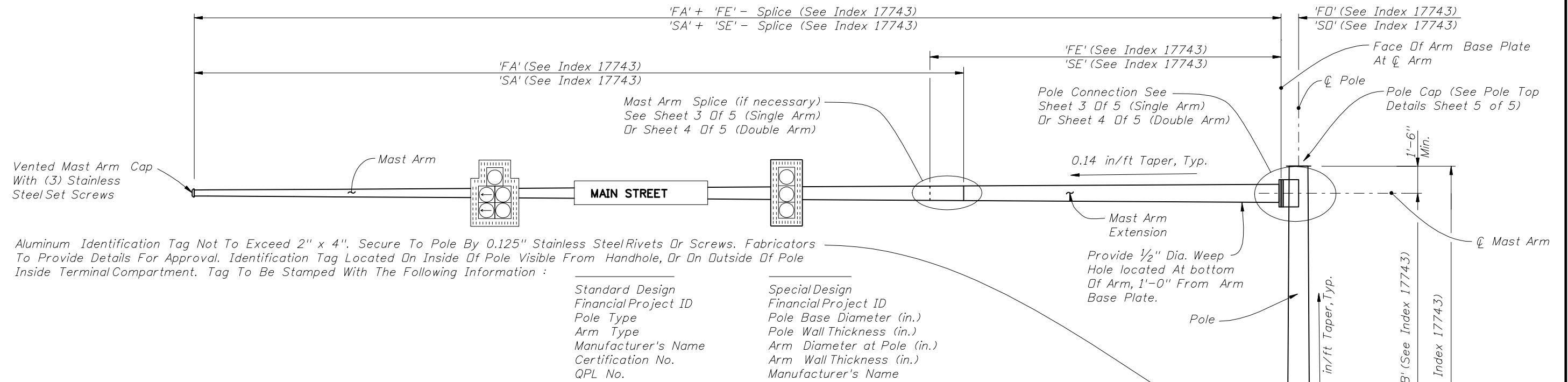
"F" MAST ARMS



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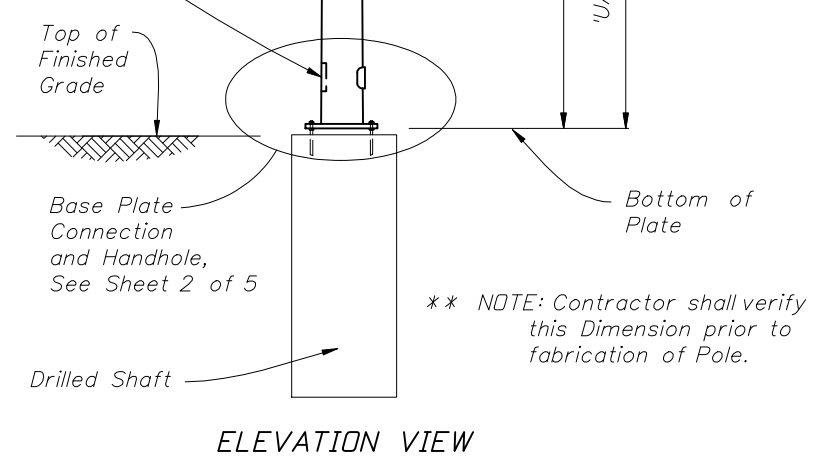
Aluminum Identification Tag Not To Exceed 2" x 4". Secure To Pole By 0.125" Stainless Steel Rivets Or Screws. Fabricators To Provide Details For Approval. Identification Tag Located On Inside Of Pole Visible From Handhole, Or On Outside Of Pole Inside Terminal Compartment. Tag To Be Stamped With The Following Information :

Standard Design	Special Design
Financial Project ID	Financial Project ID
Pole Type	Pole Base Diameter (in.)
Arm Type	Pole Wall Thickness (in.)
Manufacturer's Name	Arm Diameter at Pole (in.)
Certification No.	Arm Wall Thickness (in.)
QPL No.	Manufacturer's Name

MAST ARM ASSEMBLIES GENERAL NOTES

- Signal Structure Materials shall be as follows:
 - Poles & Mast Arms → ASTM A1011 Grade 50, 55, 60 or 65 (less than 1/4") or ASTM A572 Grade 50, 55, 60 or 65 (1/4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
 - Steel Plates → ASTM A36
 - Weld Metal → E70XX
 - Bolts (except Anchor Bolts) → ASTM A325 Type 1
 - Anchor Bolts → ASTM F1554 Grade 55 ksi
 - Nuts for Anchor Bolts → ASTM A563 Grade A Heavy Hex
 - Washers for Anchor Bolts → ASTM F436 Type 1
 - Handhole Frame → ASTM A709 Grade 36 ksi or ASTM A36
 - Handhole Cover → ASTM A1011 Grade 50, 55, 60 or 65 ksi
 - Caps → ASTM A1011 Grade 50, 55, 60 or 65 ksi or ASTM B209
 - Nut Covers → ASTM B26 (319-F)
 - Stainless Steel Screws → AISI Type 316
 - Threaded Bars/Studs → ASTM A36 or ASTM A307
- Reinforcing Steel shall be ASTM A615 Grade 60 ksi.
- Concrete shall be Class IV (Drilled Shaft) with a minimum 28-day compressive strength of 4,000 psi for all environmental classifications.
- All welding shall conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).
- All steel items shall be galvanized as follows:
 - All Nuts, Bolts, Washers and Threaded Bars/Studs → F2329
 - All other steel items (including Pole & Mast Arm) → ASTM A123
- Locate handhole 180° from arm on single arm poles or 180° from first arm of double arm poles or see special instructions on Mast Arm Tabulation Sheet.
- Except for Anchor Bolts, all bolt hole diameters shall be equal to the bolt diameter plus 1/16", prior to galvanizing. Hole diameters for Anchor Bolts shall not exceed the bolt diameter plus 1/2".

- Sign Panels and Signals attached to the Mast Arm shall be centered in elevation on the arm. Sign Panels shall be aluminum. Wire access holes shall not exceed 1 1/2" in diameter.
- Mast Arms and Poles shall be tapered with the diameter changing at a rate of 0.14 inch per foot.
- The Pole shall be installed vertically. Camber shall be accounted for in the Mast Arm connection as detailed.
- If a Mast Arm damping device is required by the Engineer, it shall be installed within eight feet of the Mast Arm tip.
- Design according to FDOT Structures Manual (current edition). Alternate Designs for Special Mast Arm Assemblies are not allowed.
- Provide "J", "S" or "C"-Hook at top of pole for signal cable support.
- First and Second Arm Camber Angle = 2°.
- Details for the Ground Rod, Signal and Sign Locations, Signal Head attachment, Sign Attachment, Pedestrian Head Attachment, and Foundation Conduit are not shown for clarity.
- One hundred percent of full-penetration groove welds and a random 25 percent of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.
- Manufacturers seeking approval of a steel mast arm assembly for inclusion on the Qualified Products List must submit a QPL Product Evaluation Application along with design documentation and drawings showing the product meets all specified requirements of this Index and Index 17743.
- Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location +/- two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.

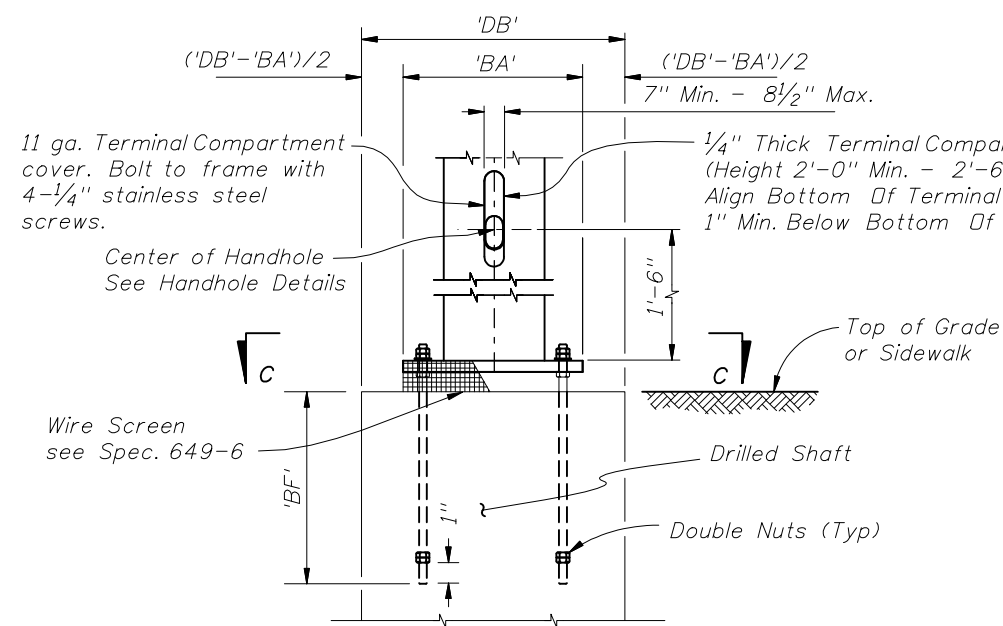


ELEVATION VIEW

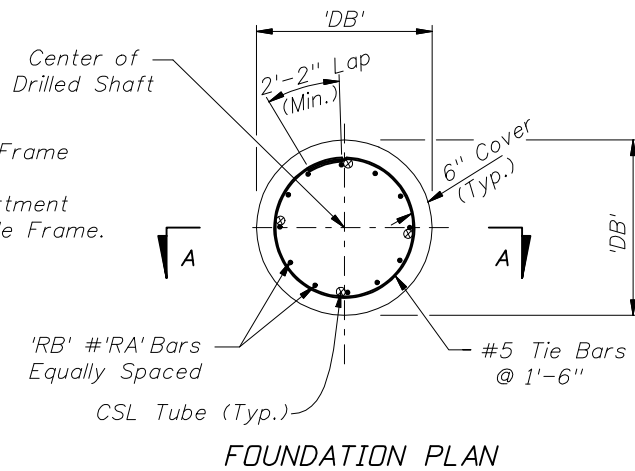
(Single Arm Shown, Double Arm Similar)
(Luminaire Arm Not Shown)

** NOTE: Contractor shall verify this Dimension prior to fabrication of Pole.

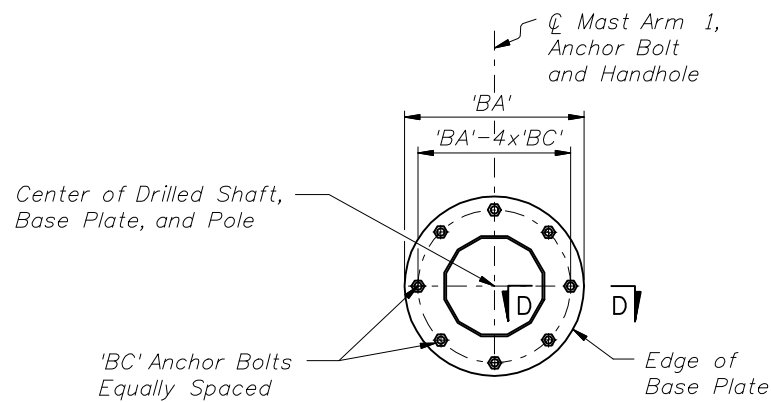
TYPICAL ELEVATION AND NOTES



BASE PLATE AND ANCHORAGE ELEVATION
(Reinforcement Not Shown)

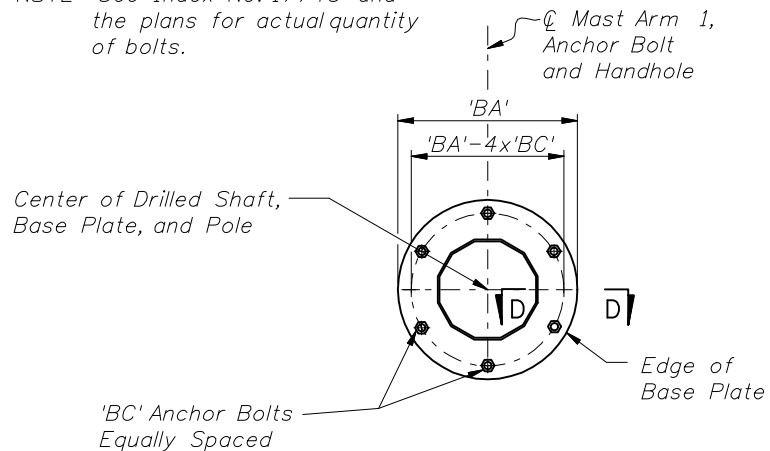


FOUNDATION PLAN

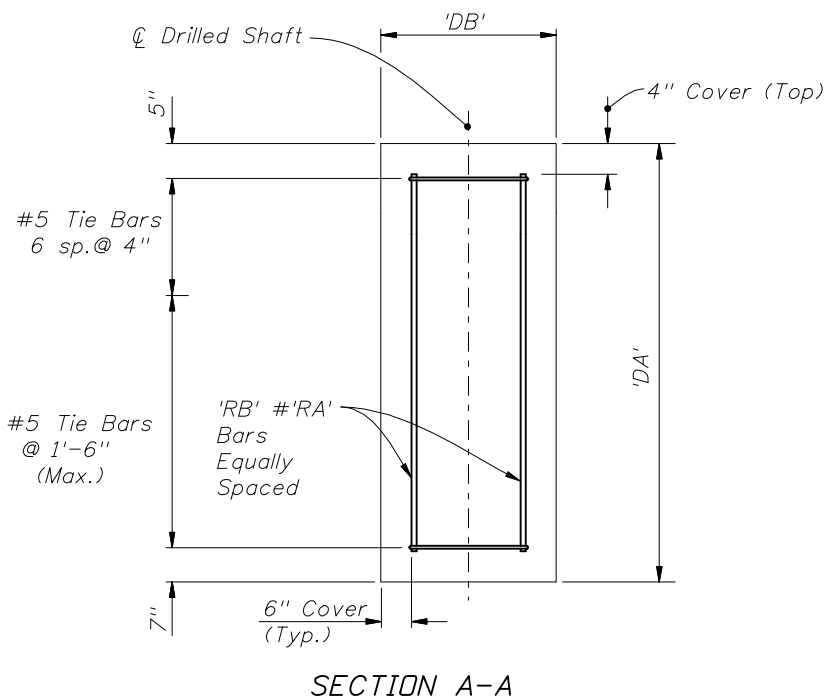


SECTION C-C
Alternate Detail
(8 Anchor Bolts)

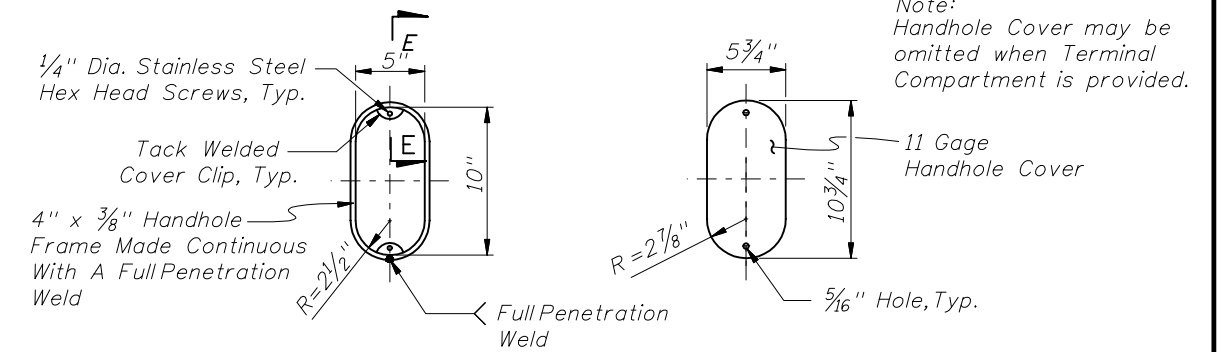
NOTE: See Index No. 17743 and the plans for actual quantity of bolts.



SECTION C-C
(6 Anchor Bolts)



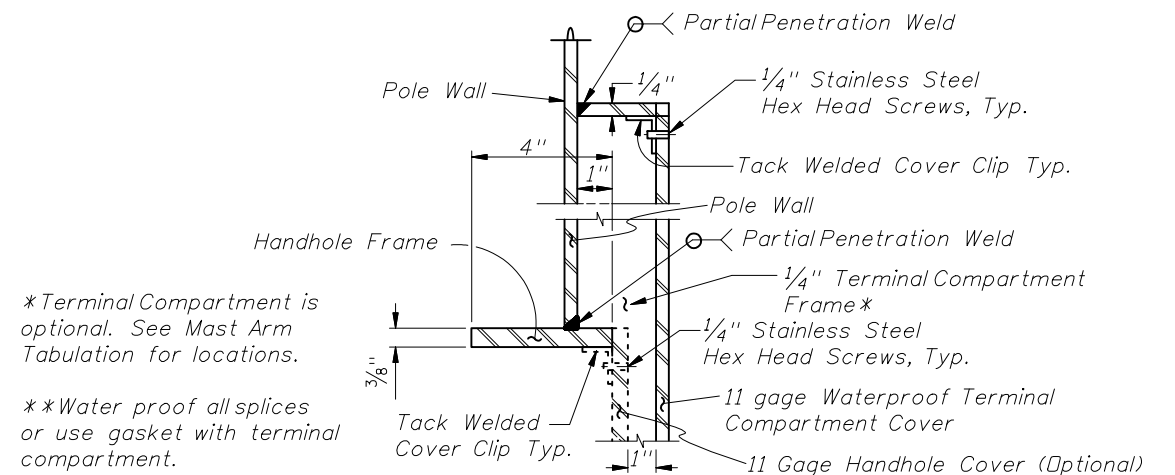
SECTION A-A



HANDHOLE FRAME
(w/ Terminal Compartment Omitted)

HANDHOLE COVER

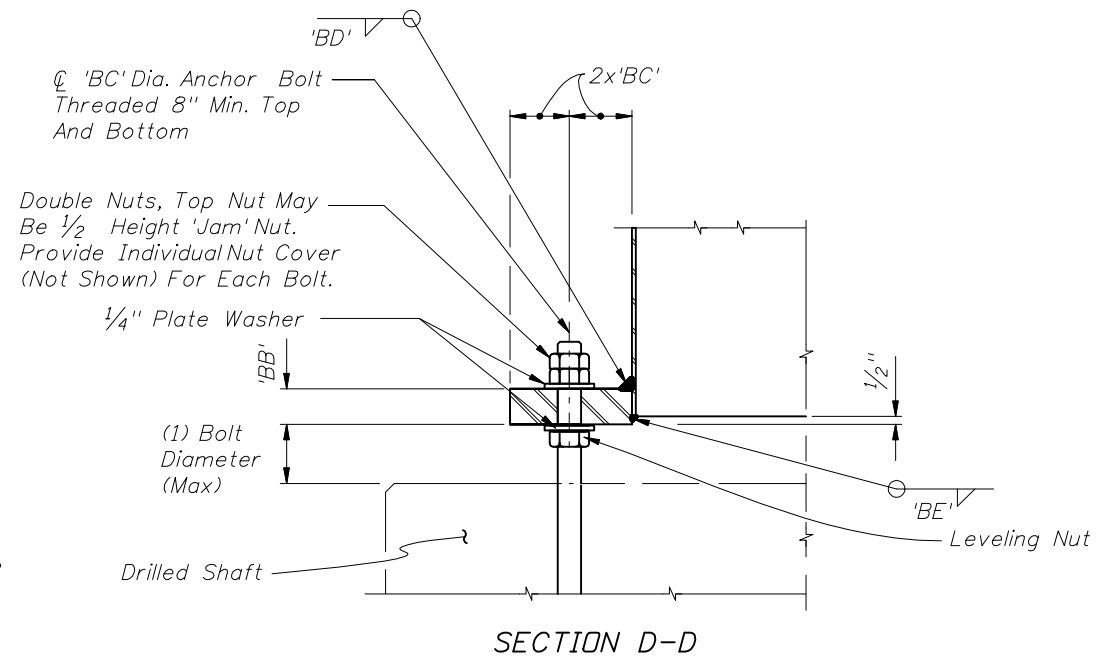
Note: Handhole Cover may be omitted when Terminal Compartment is provided.



SECTION E-E
(Thru Handhole & Terminal Compartment)

* Terminal Compartment is optional. See Mast Arm Tabulation for locations.

** Waterproof all splices or use gasket with terminal compartment.



SECTION D-D

TYPICAL FOUNDATION AND BASE PLATE DETAILS



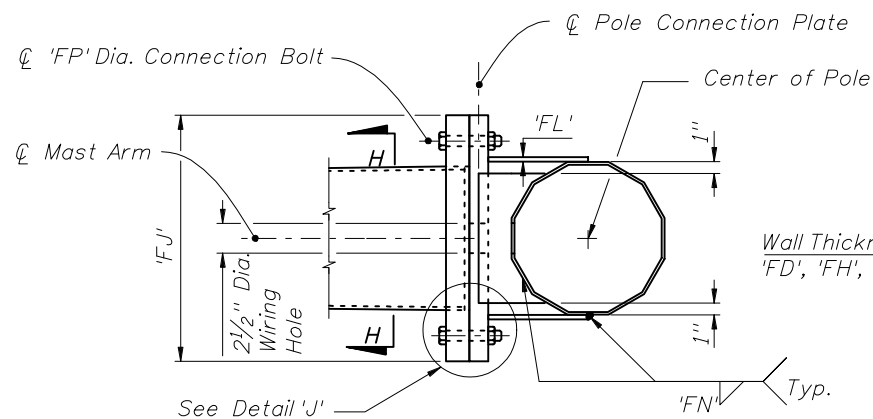
2010 FDOT Design Standards

MAST ARM ASSEMBLIES

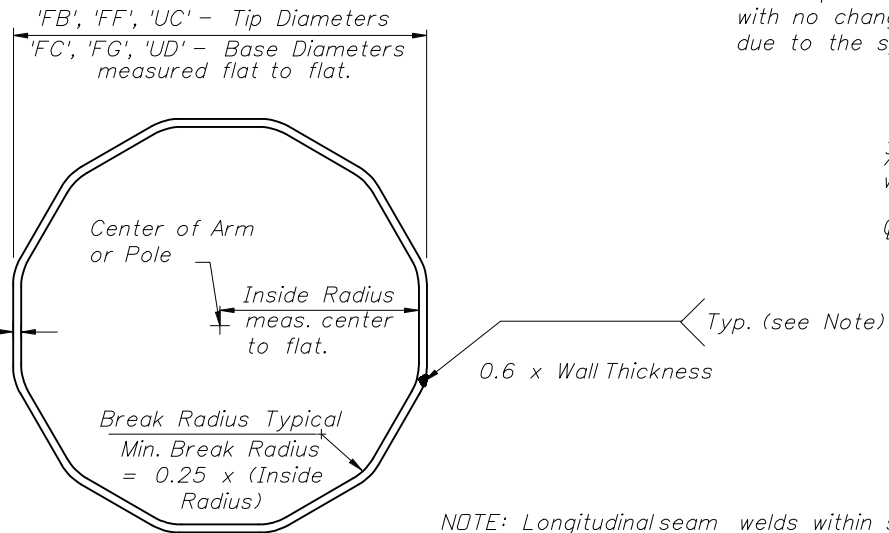
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Index No. 17745

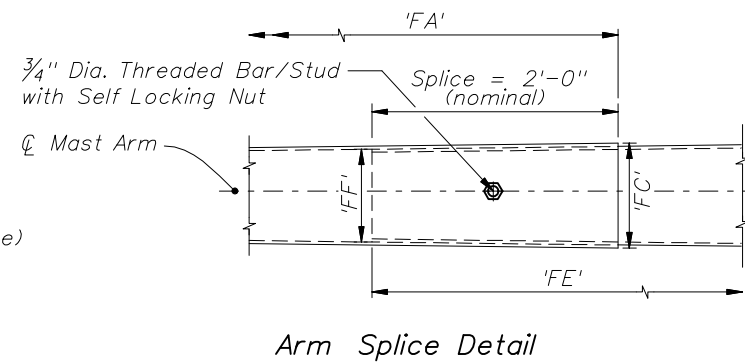
The 'Slip Joint' splice shall be a tight fit with no change in the Mast Arm slope due to the splice.



SECTION F-F

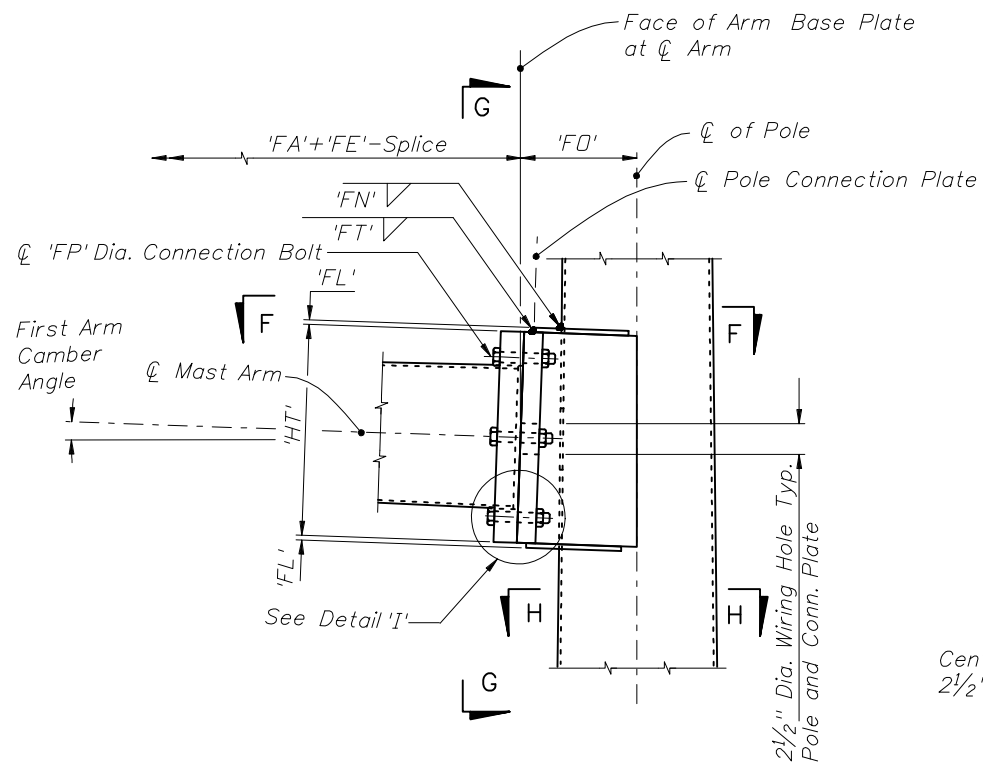


SECTION H-H

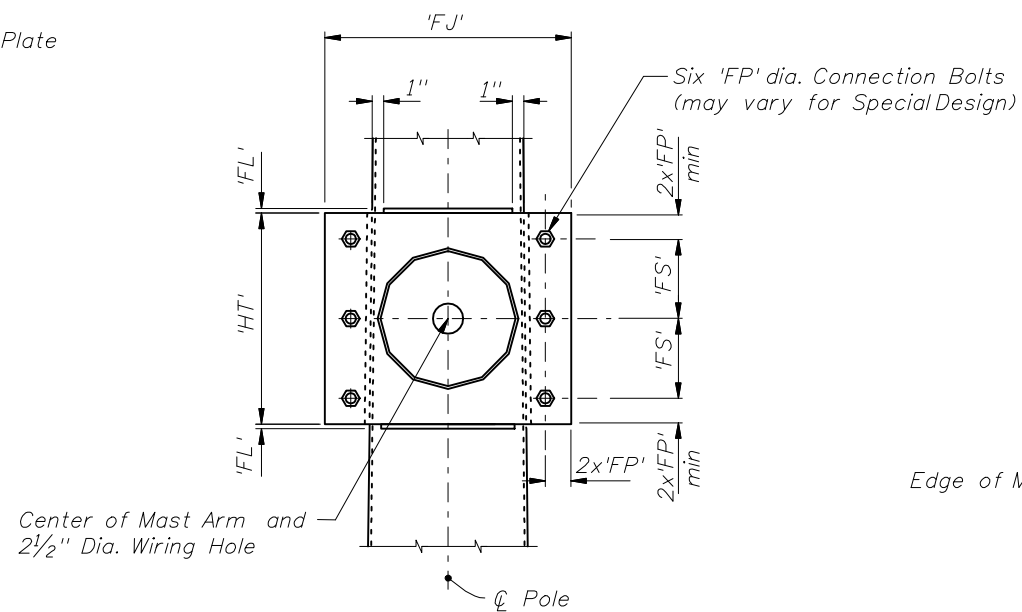


Arm Splice Detail

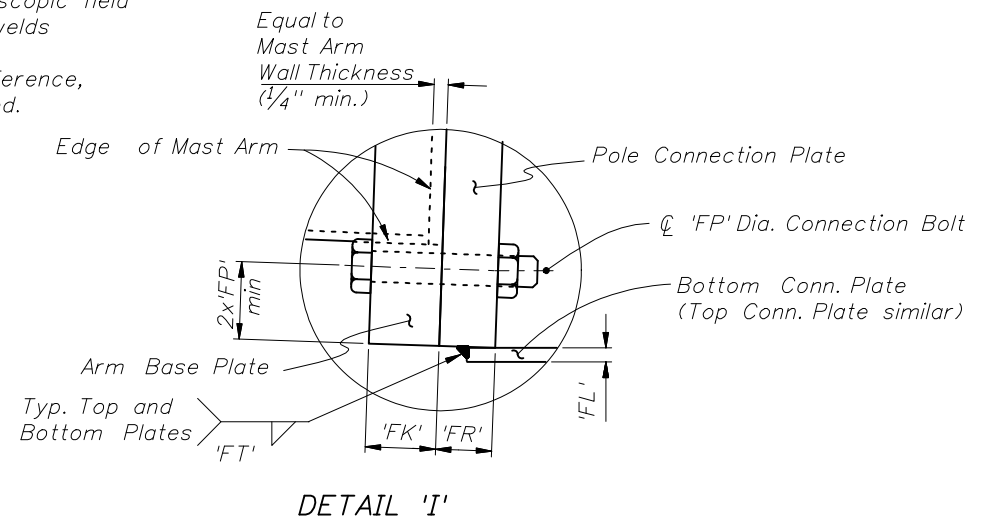
NOTE: Longitudinal seam welds within six inches of circumferential welds shall be complete penetration welds. Longitudinal seam welds at telescopic field splices shall be complete penetration welds for the splice length plus six inches. For tubes greater than 70" in circumference, two longitudinal seam welds are allowed.



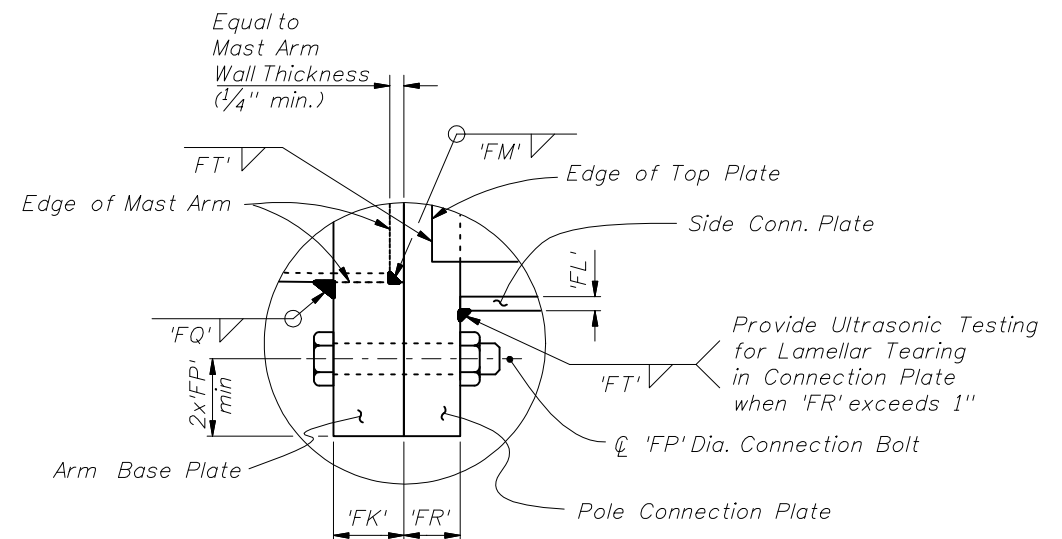
ELEVATION
(Single Arm Connection)



SECTION G-G



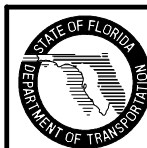
DETAIL 'I'



DETAIL 'J'

- NOTE:
- Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.
 - Mast Arm and Connection Plates shall be match marked to ensure proper assembly.

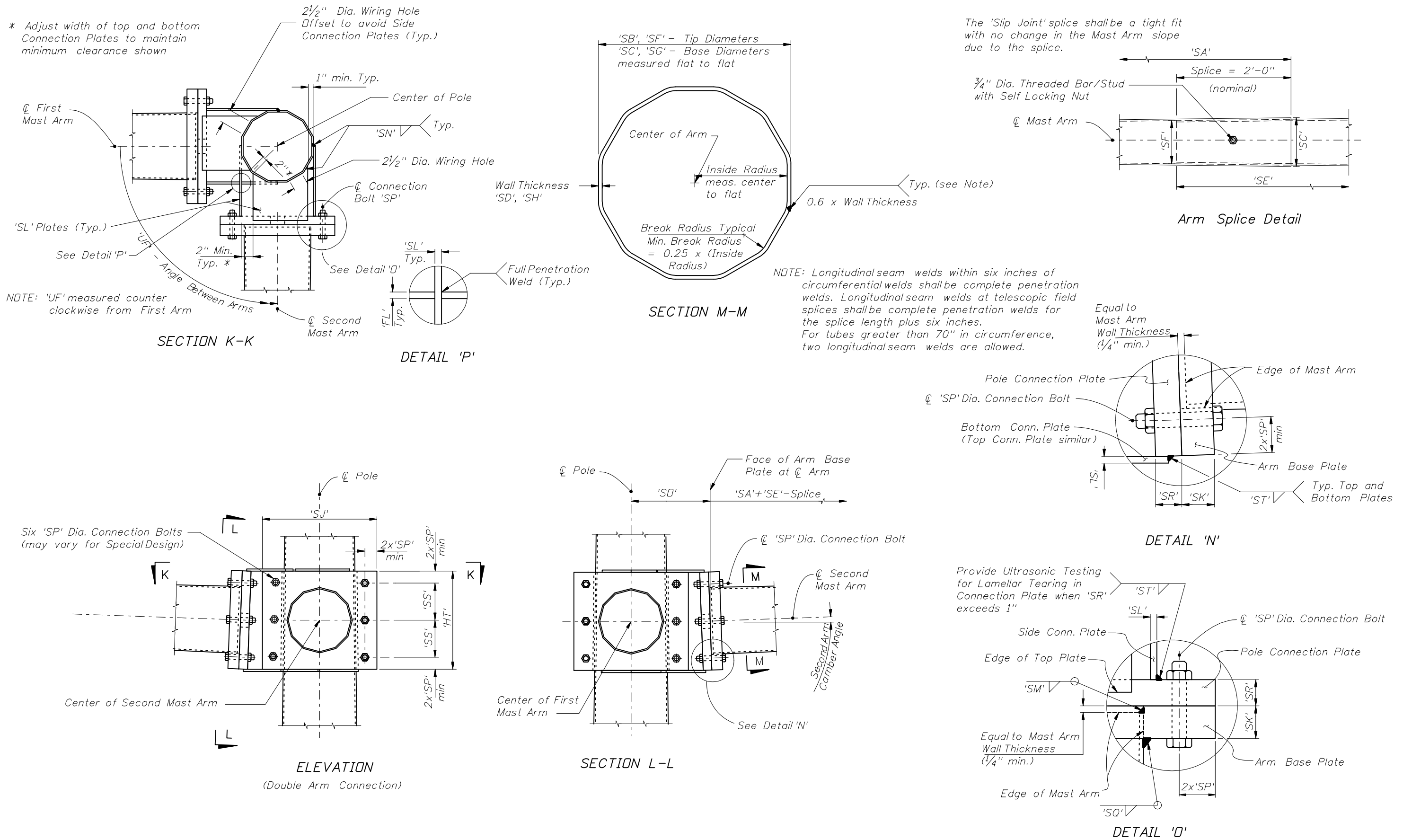
TYPICAL SINGLE ARM CONNECTION DETAILS



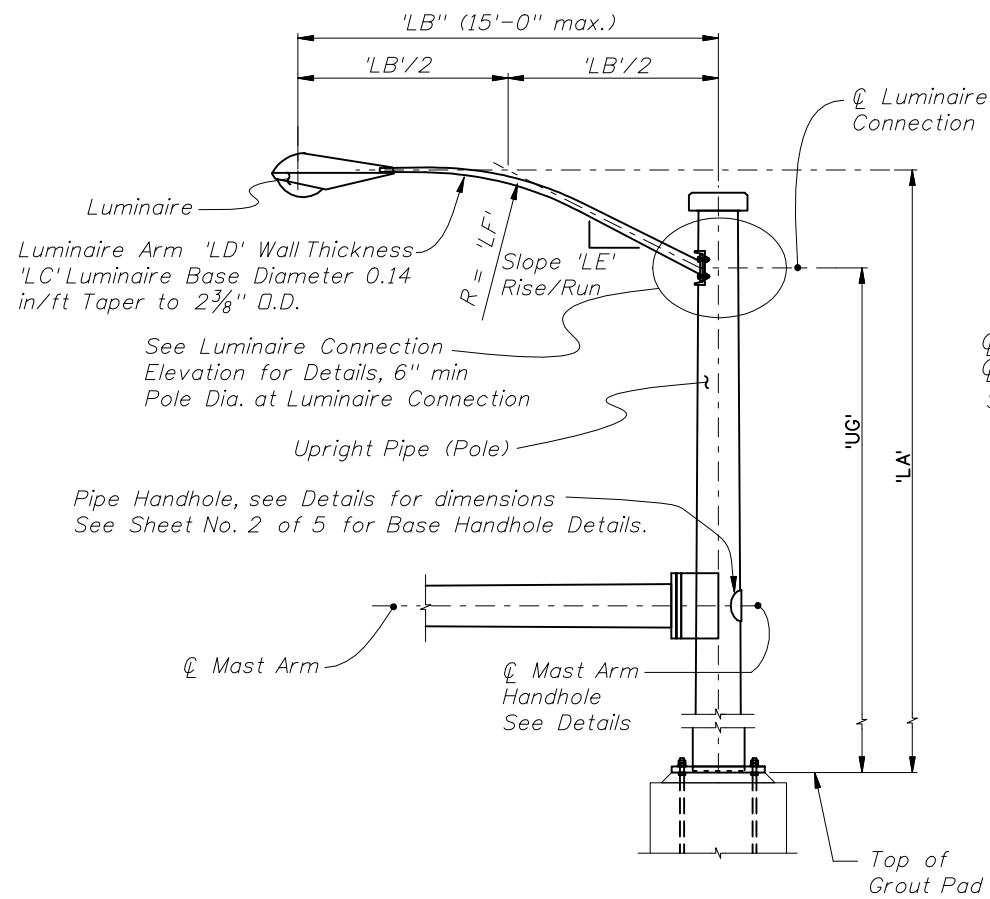
2010 FDOT Design Standards

MAST ARM ASSEMBLIES

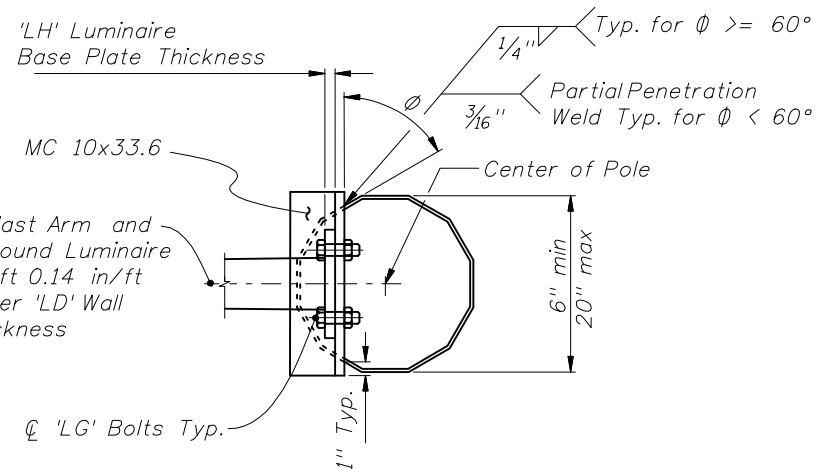
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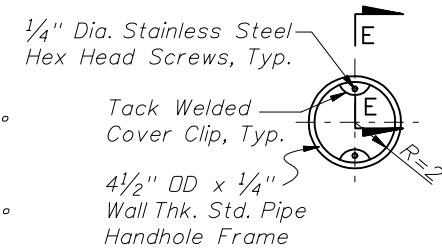
TYPICAL DOUBLE ARM CONNECTION DETAILS



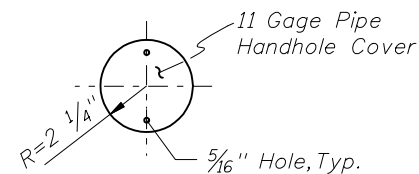
LUMINAIRE ELEVATION



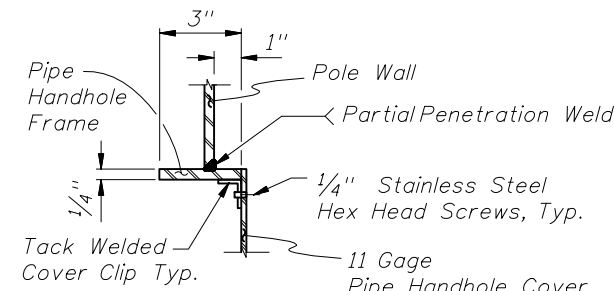
SECTION A-A



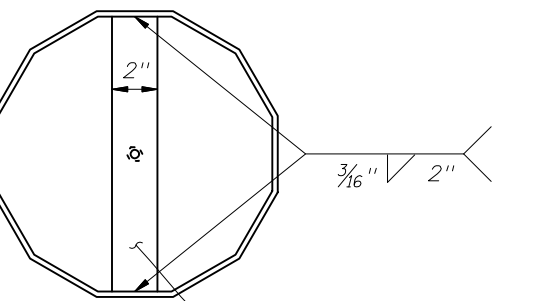
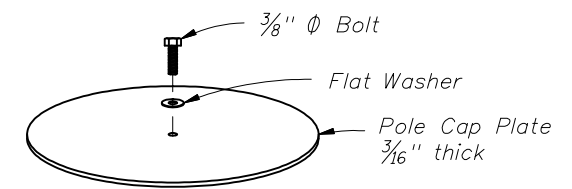
Pipe Handhole Frame



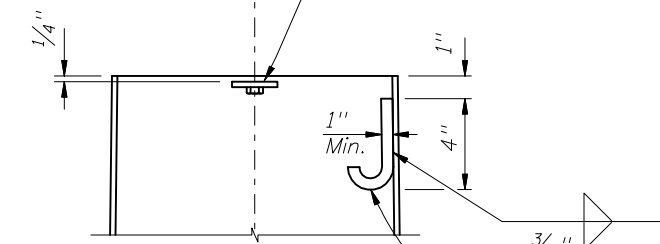
Pipe Handhole Cover



SECTION E-E
(thru Pipe Handhole)

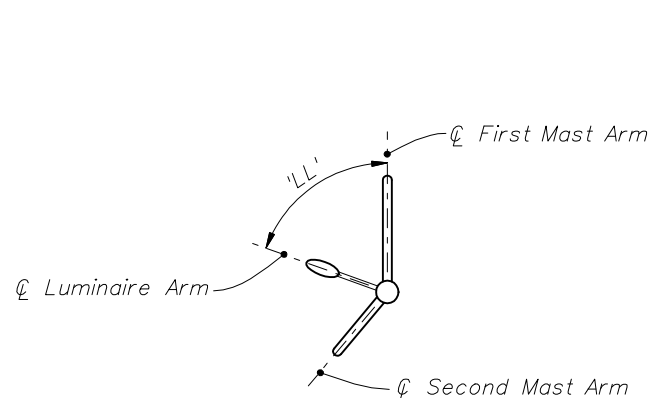


TOP VIEW

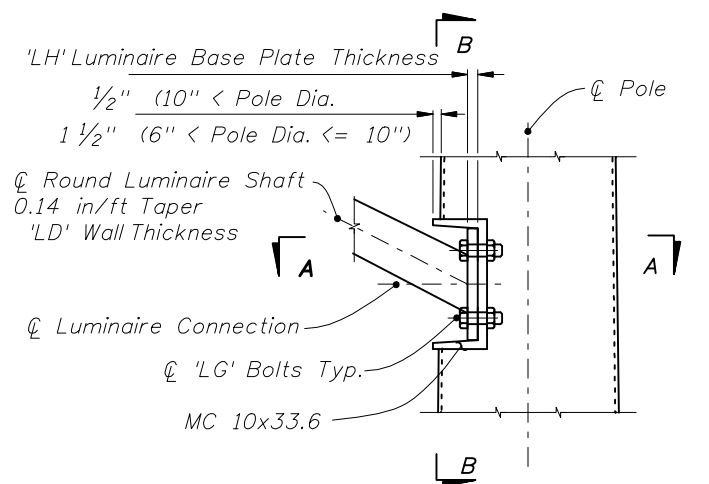


POLE TOP CUT-AWAY
(Option 'a')

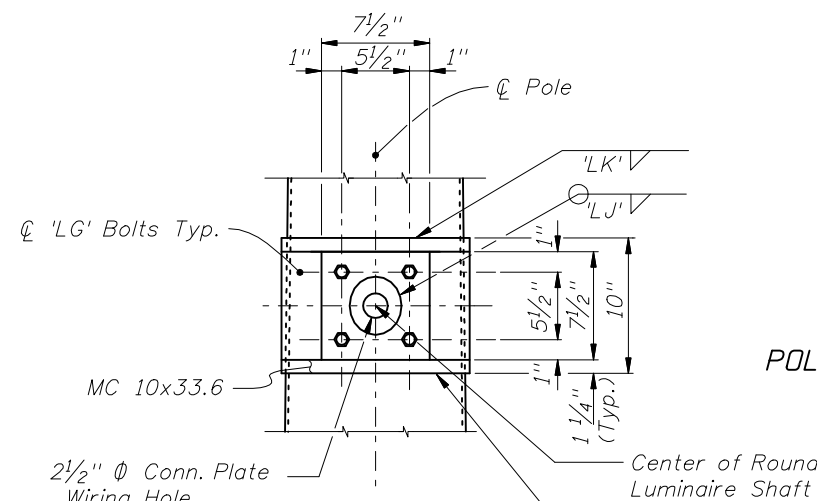
'J' Hook for wiring, 1/2" Φ commercial grade hot rolled bar welded to inside of pole.



LUMINAIRE ORIENTATION

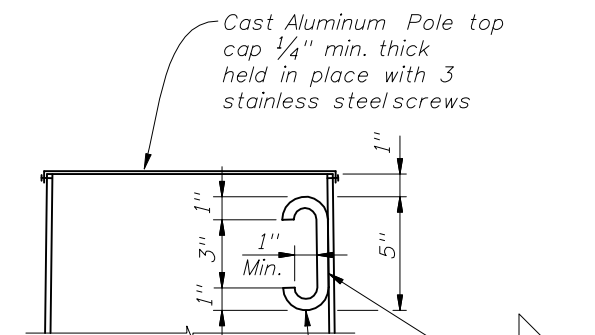


LUMINAIRE CONNECTION ELEVATION



SECTION B-B

NOTE: The Fabricator may substitute a 1/2" thick bent plate with the same flange width, height, and length as the MC 10x33.6 Channel section.



POLE TOP CUT-AWAY
(Option 'b')

'C' Hook for wiring and lifting, 1/2" Φ commercial grade hot rolled bar welded to inside of pole.

POLE TOP DETAILS

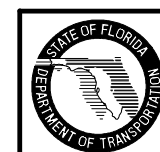
NOTE: Any combination of the above two options may be used, provided both lifting and wiring is accommodated.

NOTE: The Pole shown on this sheet is a 12 sided section. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced

NOTES:

1. Luminaire type and Luminaire to Arm Connection Details can be found elsewhere.
2. Align Luminaire Arm with single Mast Arm or first Arm of Double Mast Arm unless indicated otherwise in plans.

TYPICAL LUMINAIRE ARM AND CONNECTION DETAILS

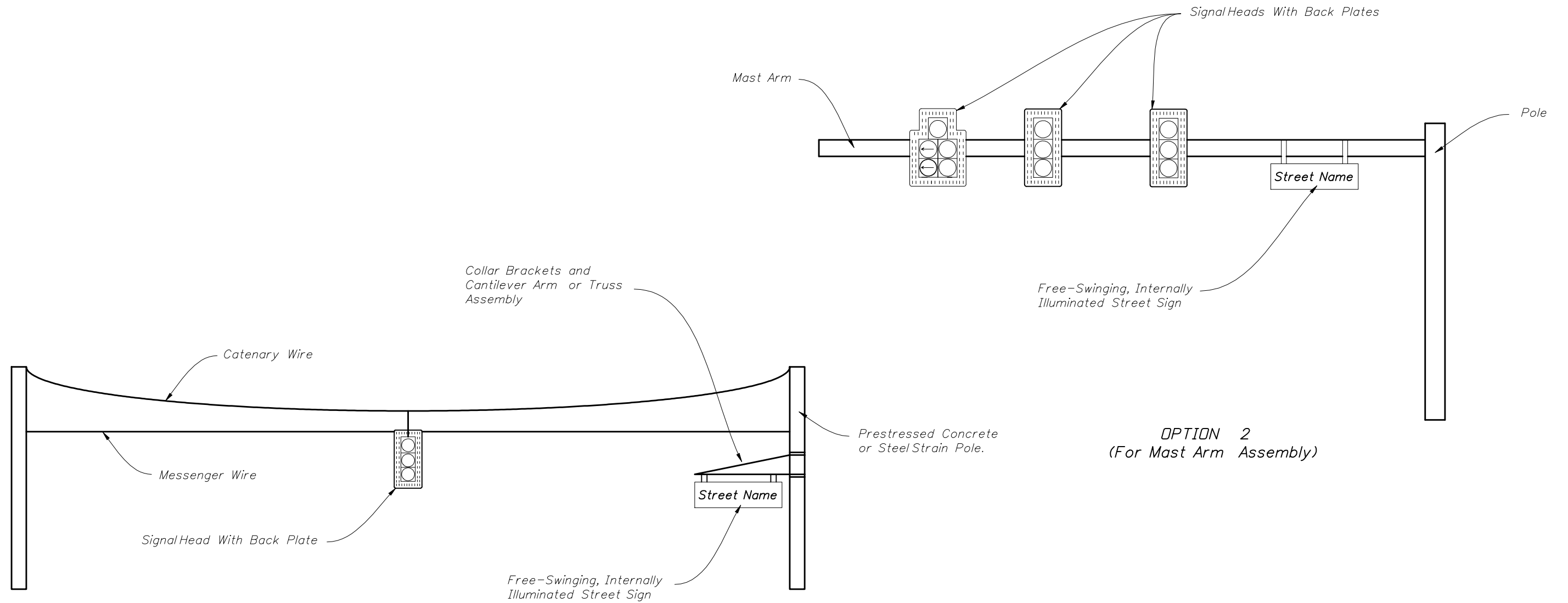


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MAST ARM ASSEMBLIES

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OPTION 1
(For Span Wire Assembly)

OPTION 2
(For Mast Arm Assembly)

NOTES:

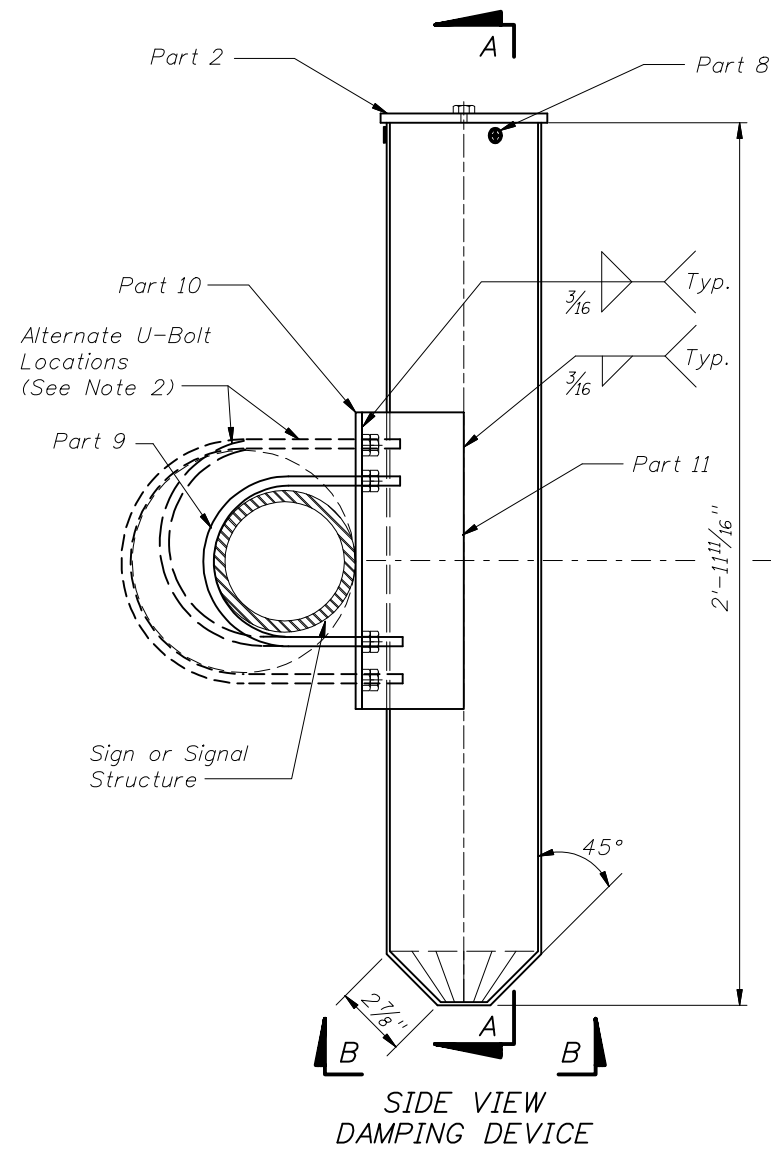
1. Free-swinging, internally-illuminated street signs shall only be installed on the signal pole for span wire assemblies. For mast arm assemblies the street sign may be installed on the arm or pole.
2. Free-swinging, internally-illuminated street signs shall meet the requirements of Section 699 of the Standard Specifications for Road and Bridge Construction.
3. Pole attachments and cantilever arm (or truss) assemblies may be accepted by Contractor certification provided the signs being supported meet the weight and area limitations included in Section 699 for "Acceptance by Certification".
4. Pole attachments and cantilever arm (or truss) assemblies supporting signs not meeting the weight or area limitations included in Section 699 for "Acceptance by Certification" require the submittal of structural calculations and Shop Drawings that have been prepared by and sealed by the Specialty Engineer.



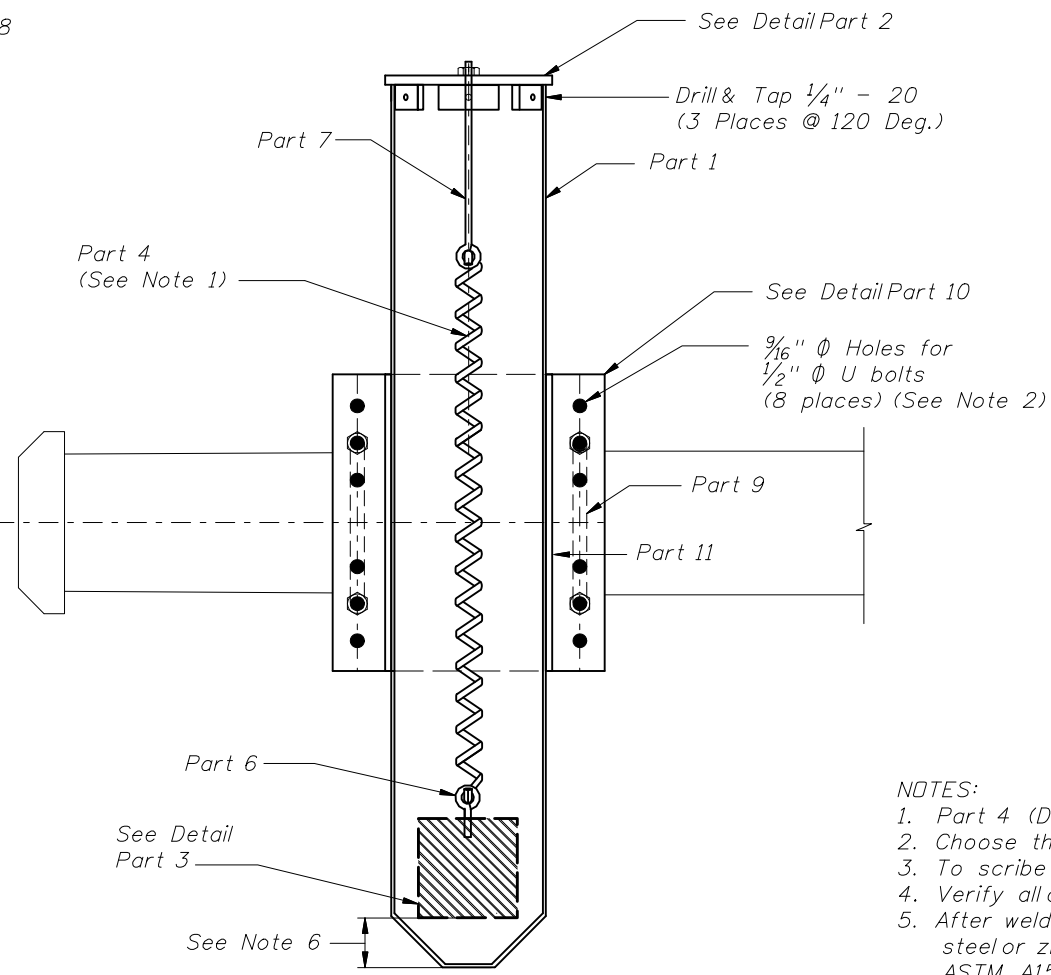
2010 FDOT Design Standards

**FREE - SWINGING, INTERNALLY - ILLUMINATED
STREET SIGN ASSEMBLIES**

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SIDE VIEW
DAMPING DEVICE

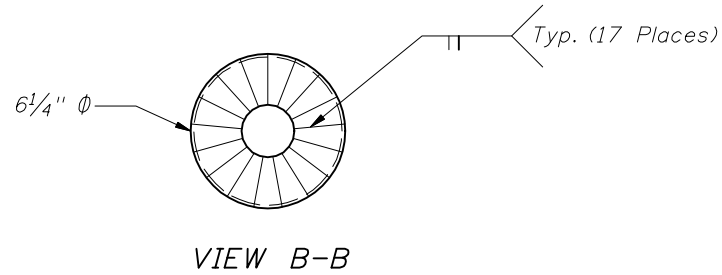


SECTION A-A

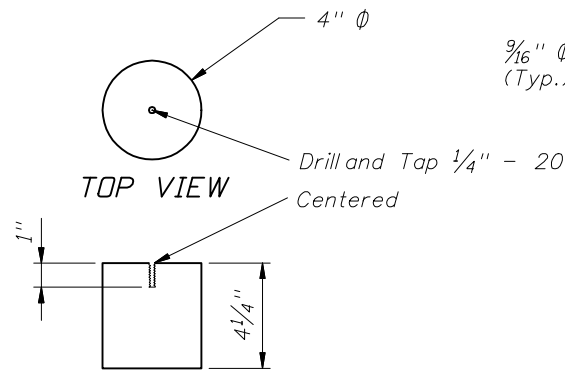
#	PART	PART DESCRIPTION	QUANTITY
1	Damper Tube	6" ID, 3'-6" long before fabrication, t=0.125", ASTM A513, Type 1	1
2	Tube Cap	Cap Assembly, 1/4" Steel plate, ASTM A36	1
3	Internal Weight	4"Ø, 15 lb. cylindrical, steel weight, ASTM A36.	1
4	Damper Spring	Century Spring (Spring Stock #147) Stiffness= 0.69 lb/in, length = 8.05", OD= 1.062"	1
5	Hex Nut	1/4" - 20 steel hex nut (zinc plated)	1
6	Eye Bolt	1/4"x2" Steel Eye Bolt (zinc plated)	1
7	Eye Bolt	1/4"x8" Steel Eye Bolt (zinc plated)	1
8	Cap Screw	#8 2'-8"x3"x3/4" Stainless Steel Machine Screws (Flat Head Phillips)	4
9	U Bolt	1/2" Ø ASTM, A307 with washers and 4 self locking nuts (Size to fit Mast Arm)	2
10	1/4" Plate	1'-0"x11", ASTM A36	1
11	1/4" Plate	1'-0"x4 1/8" ASTM A36 (Weld to Part 1 and Part 10)	2

NOTES:

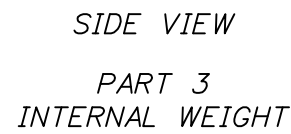
- Part 4 (Damper Spring) is shown schematically and not to scale.
- Choose the appropriate diameter U-bolt (Part 9) based on the structure's pipe arm diameter.
- To scribe tube for taper, wrap template around tube such that points are 2'-9 5/8" from top of tube.
- Verify all clearances, tolerances and dimensions before fabrication.
- After welding, hot dip galvanize all steel items except screws, bolts, and nuts noted to be stainless steel or zinc plated, and the spring (Part 4). Galvanize bolts, nuts and washers in accordance with ASTM A153. Galvanize all other items in accordance with ASTM A123.
- Install spring with 2" separation from bottom of pipe to weight at rest.



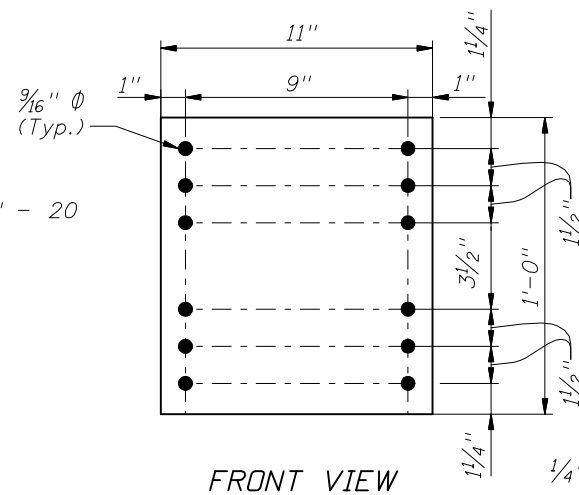
VIEW B-B



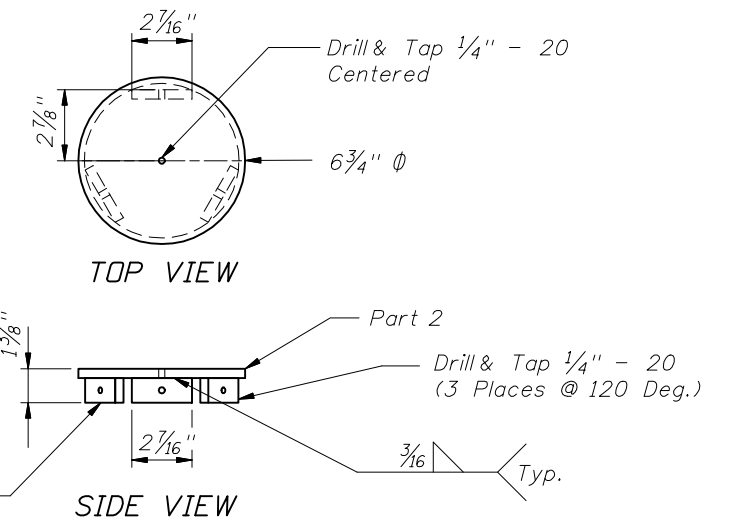
TOP VIEW



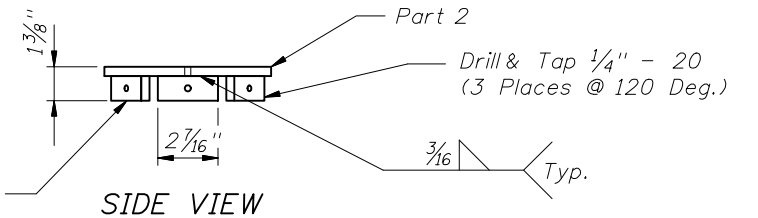
SIDE VIEW
PART 3
INTERNAL WEIGHT



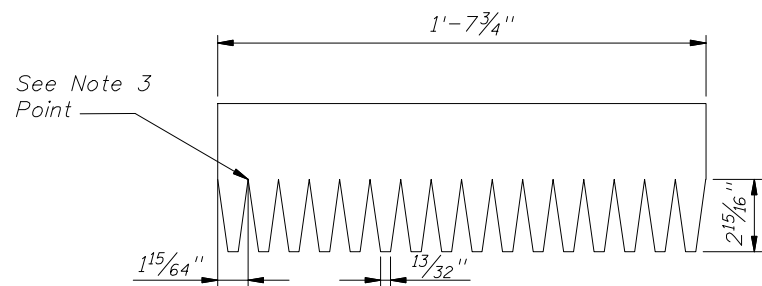
FRONT VIEW
PART 10
BACKING PLATE



TOP VIEW



SIDE VIEW
PART 2
TUBE CAP



TEMPLATE FOR SCRIBING AND CUTTING
TAPER FOR PART 1



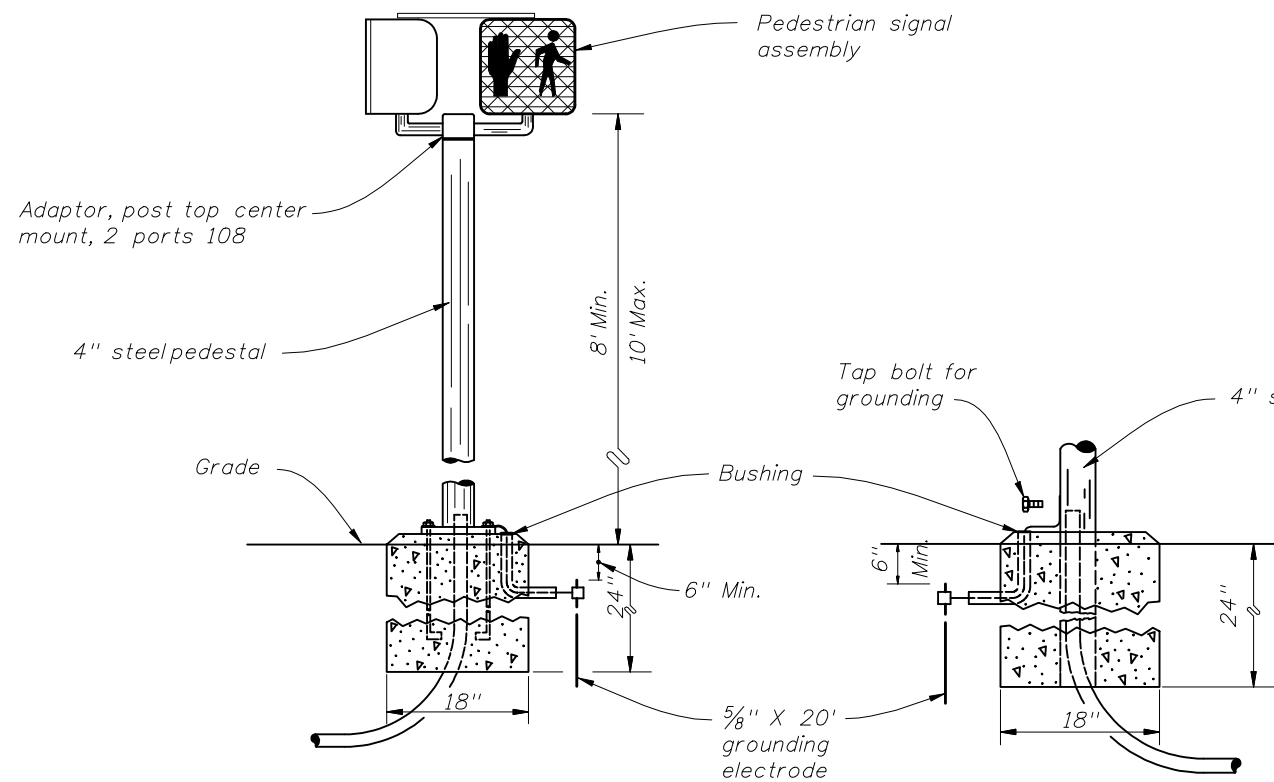


FIGURE A

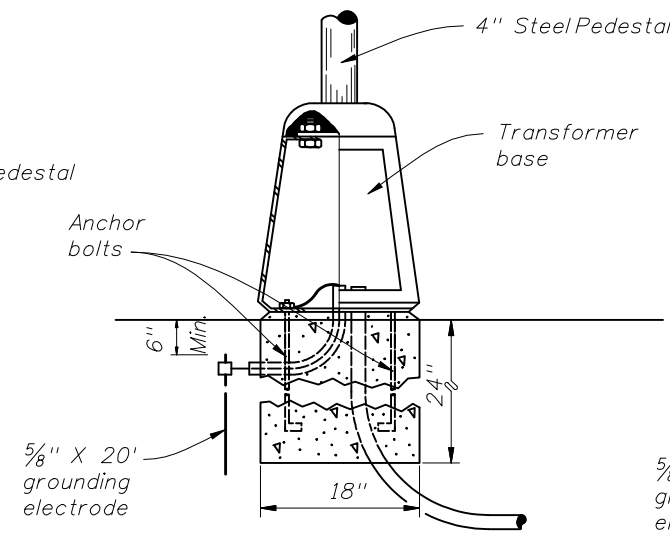


FIGURE B

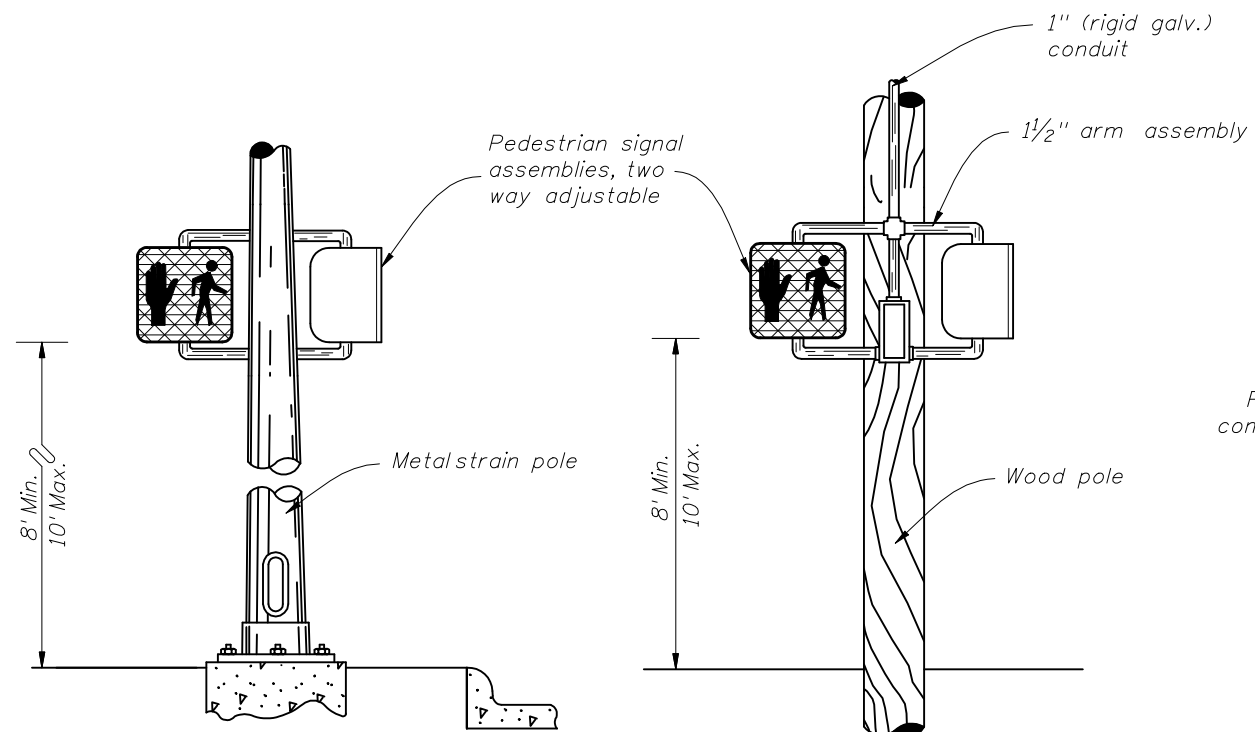


FIGURE C

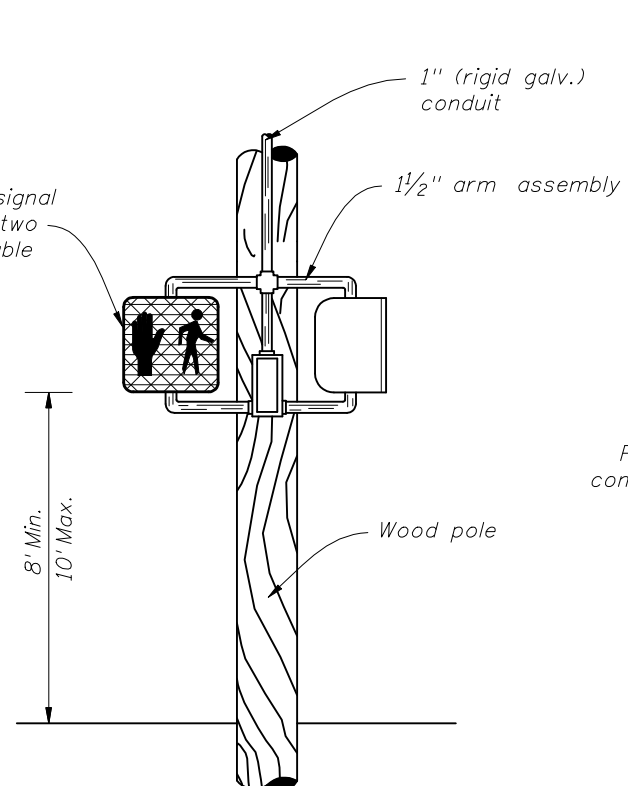


FIGURE D

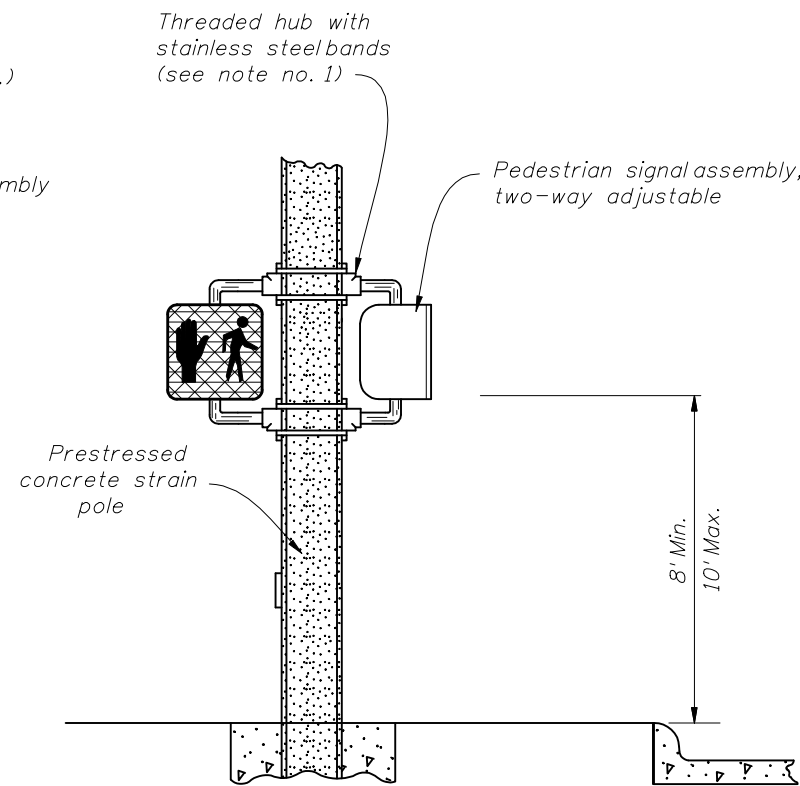


FIGURE E

Notes:

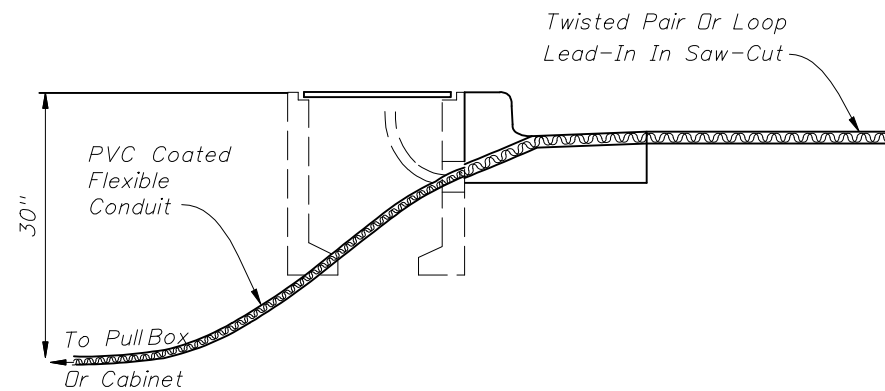
1. As an option, the contractor will be allowed to install pedestrian signals on concrete poles and pedestals with the use of lead anchors (two bolts same size per hub) in lieu of the stranded steel bands.
2. Holes drilled or punched in metal poles or pedestals shall be thoroughly reamed, cleaned of all burrs and covered with two (2) coats of zinc rich paint as specified in the standard specifications for road and bridge, construction. Grommets or bushings shall be installed in holes.
3. Meet all grounding requirements of Section 620 of the Standard Specifications.



TWISTED PAIR AND LOOP LEAD-IN INSTALLATION WITH CURB & GUTTER

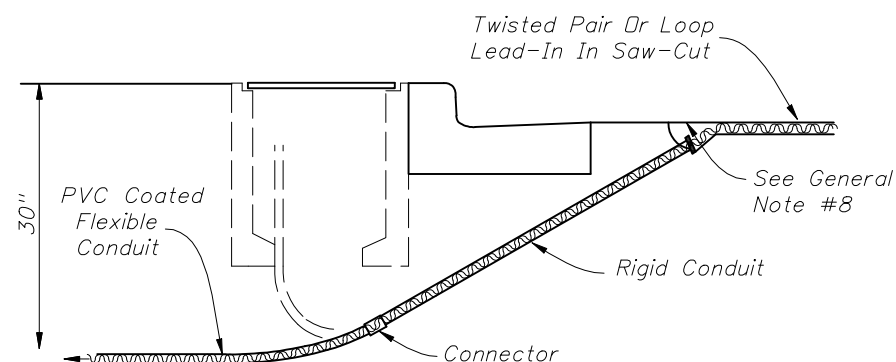
ALTERNATIVE 1

Drill A Hole Through The Curb At The Point Which The Required Saw-Cut Depth Is Obtained Just Prior To Cutting The Top Inside Edge Of The Curb. Slide A Section Of Flexible Conduit At Least 6" Into The Hole From The Back Side Of The Curb But Not Within 2" Of The Top Of The Hole. The Conduit Shall Fit Snug Within The Drilled Hole. Fill The Top Of The Hole With Loop Sealant To The Level Of The Curb Surface. A Nonmetallic Material Should Be Used To Prevent Excessive Loop Sealant From Entering The Flexible Conduit.



ALTERNATIVE 2

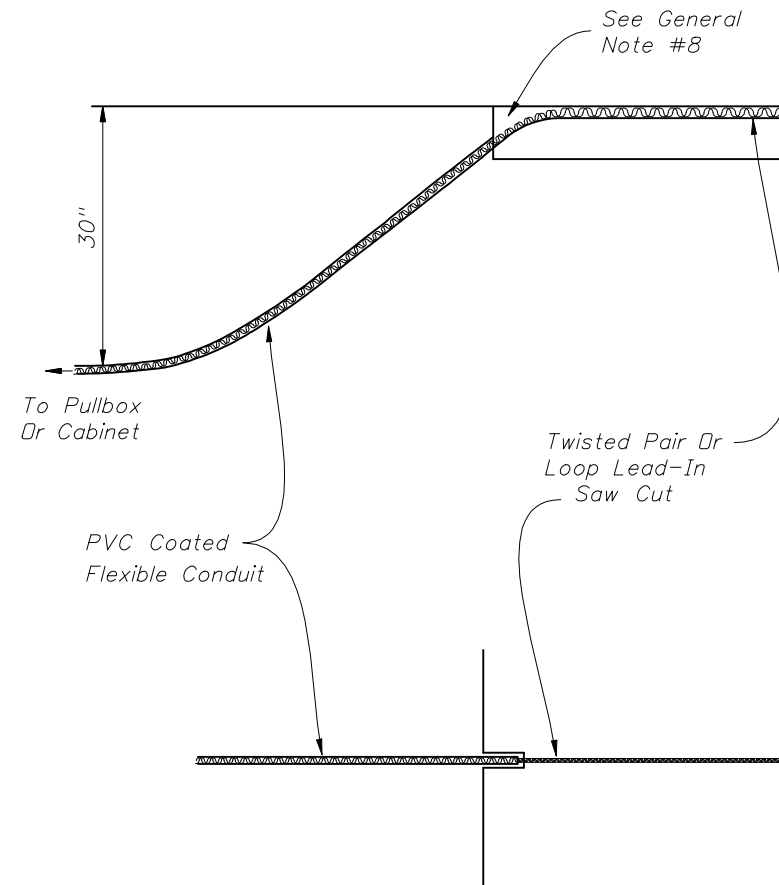
Drill A Hole $\frac{1}{2}$ " To 1" Larger In Diameter Than The Rigid Conduit To Be Used Through The Roadway Asphalt (Or Concrete) Surface And Base At An Appropriate Angle To Intercept The Trench Or Pull Box Hole. Place A Predetermined Length Of Rigid Conduit In The Hole And Drive The Conduit Into The Trench Or Hole. Install A Molded Bushing (Nonmetallic) On The Roadway End Of The Rigid Conduit. The Top Of The Rigid Conduit Shall Be Approximately 2" Below The Roadway Surface. Fill The Hole With Loop Sealant To The Level Of The Roadway Surface. A Nonmetallic Material Should Be Used To Prevent Excessive Loop Sealant From Entering The Rigid Conduit.



Note
Other alternatives may be approved by the State Traffic Operations Engineer.

TWISTED PAIR AND LOOP LEAD-IN INSTALLATION WITHOUT CURB & GUTTER

Cut A Slot In The Edge Of The Roadway Of Sufficient Size And Depth To Snugly Place The End Of The Flexible Conduit. The End Of The Conduit Shall Be At Least 6" Into The Roadway And Approximately 2" Below The Top Of The Roadway Surface. The Departure Angle Of The Conduit From The Roadway Shall Be 30° To 45° .



Note
Other alternatives may be approved by the State Traffic Operations Engineer.

GENERAL NOTES

1. If the loop lead-in is 75' or less from the edge of the loop detector to controller cabinet, continue the twisted pair to the cabinet. If the loop lead-in is greater than 75' continue the twisted pair to the specified pullbox, splice to shielded lead-in wire and continue to the controller cabinet.
2. The width of all saw cuts shall be sufficient to allow unforced placement of loop wires or lead-in cables into the saw cut. The depth of all saw cuts, except across expansion joints, shall be 3" standard with a maximum of 4".
3. On resurfacing or new roadway construction projects, the loop wires and lead-in cables may be installed in the asphalt structural course prior to the placement of the final asphalt wearing course. The loop wires and lead-in cables shall be placed in a saw cut in the structural course. The depth of the cables below the top of the final surface shall comply with note 2.
4. A nonmetallic hold down material shall be used to secure loop wires and lead-ins to the bottom of saw-cuts. Hold down material shall be placed at approximately 12" intervals around loops and 24" intervals on lead-ins.
5. The minimum distance between the twisted pairs of loop lead-in wire is 6" from the loop to 12" from the pavement edge or curb.
6. Splice Connections in pullboxes with UL listed, watertight, insulated enclosures. Place one enclosure over the end of each conductor and place a third enclosure over the exposed end of the shielded cable.
7. As an alternate, a larger diameter enclosure that will accommodate both the splices of the conductors and the exposed end of the shielded cable may be used.
8. The maximum area of asphalt to be disturbed shall be 6"x 6". This area shall be restored as directed by the Engineer.



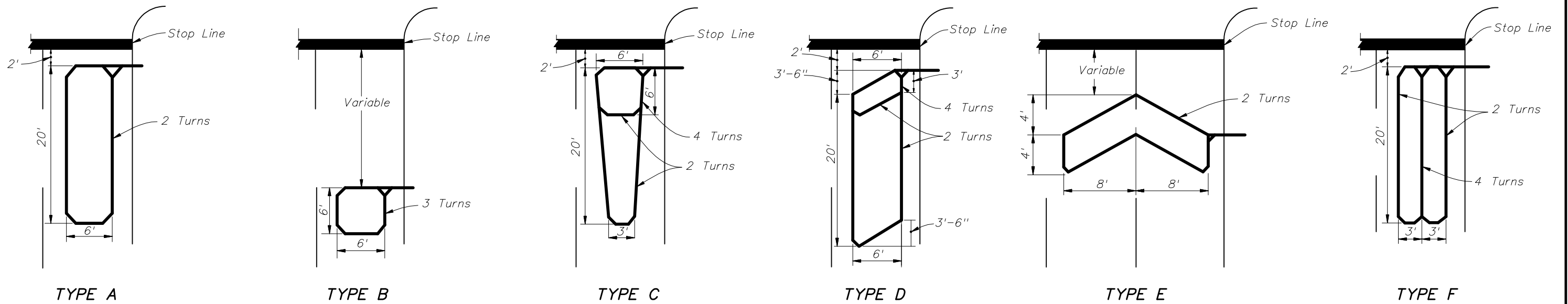
2010 FDOT Design Standards

VEHICLE LOOP INSTALLATION DETAILS

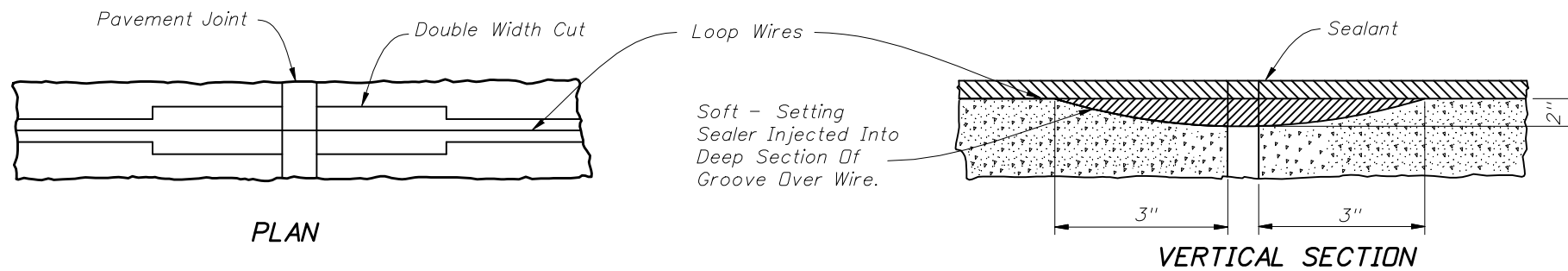
Last Revision
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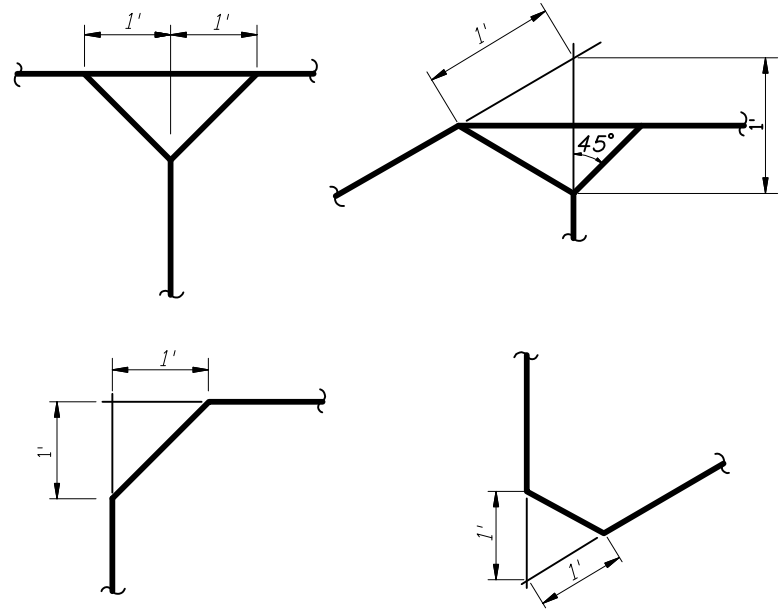
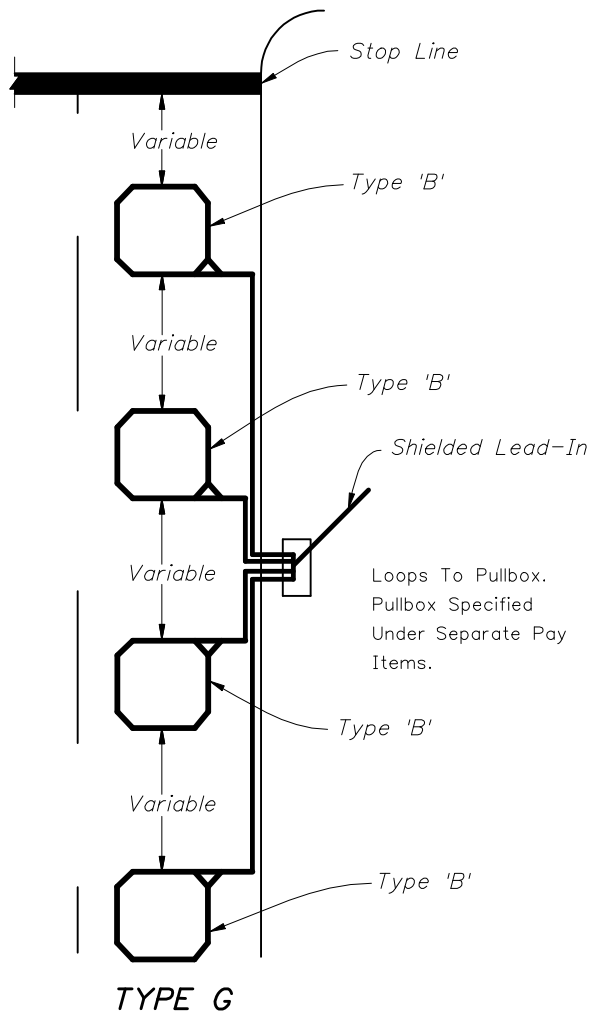
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Note: Loop conductors must follow saw-cut to bottom forming slack section at joint.



CONCRETE PAVEMENT EXPANSION JOINTS



LOOP CORNER AND LEAD-IN DETAILS

Notes:

1. The "number of turns" indicated at the specified point on the loop refers to the number of passes of loop wires which are placed in the saw-cut forming the complete loop.
2. Loop types or details not drawn to scale.
3. Loop Types are centered in a single lane except Type E which is centered on two lanes.
4. The number of individual loops in the Type G loop may vary up to a maximum of four (4).
5. Lead-in may be connected to either end of loop.
6. The leading edge of loop Types A,C,D,& F may extend past the stop line a maximum of 10'. The length of these loops may be extended to a maximum of 60'. Each intersection should be individually designed and if the modifications noted above is required it must be noted or detailed in the plans.
7. Loop lead-in wires should not be installed in the same pullbox with signal power cable.



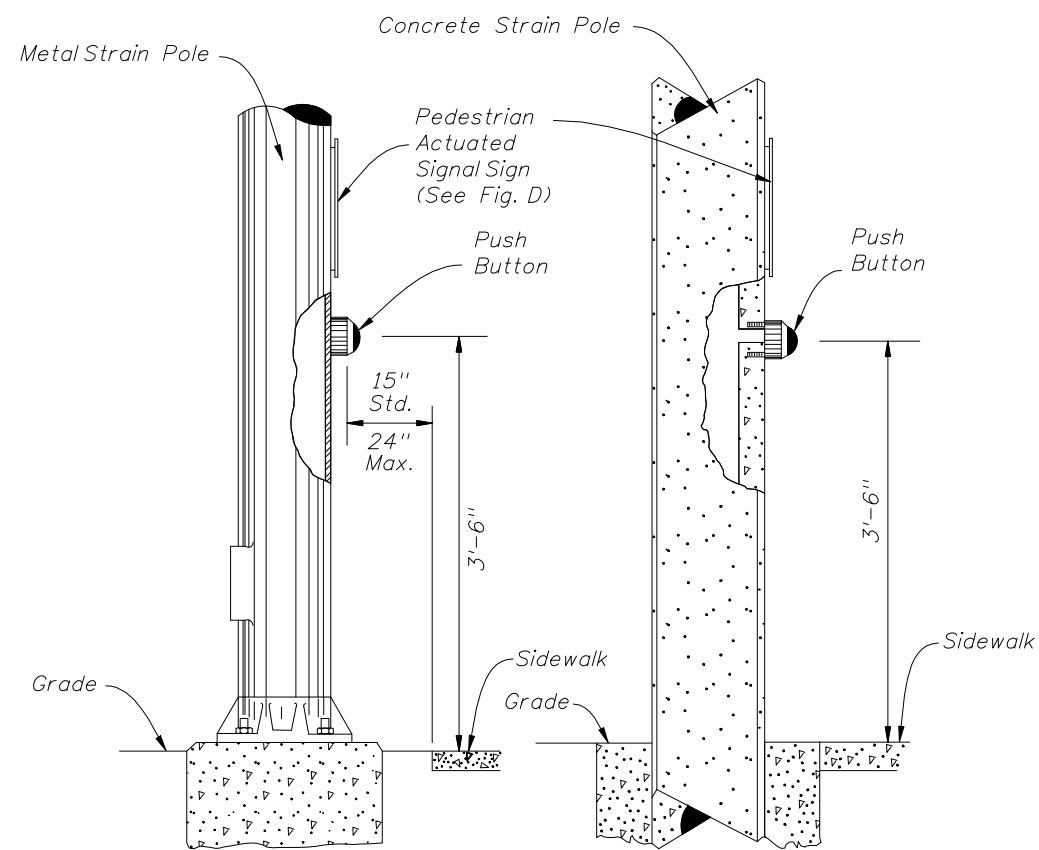


FIGURE A
POLE MOUNTED
DETECTOR STATION

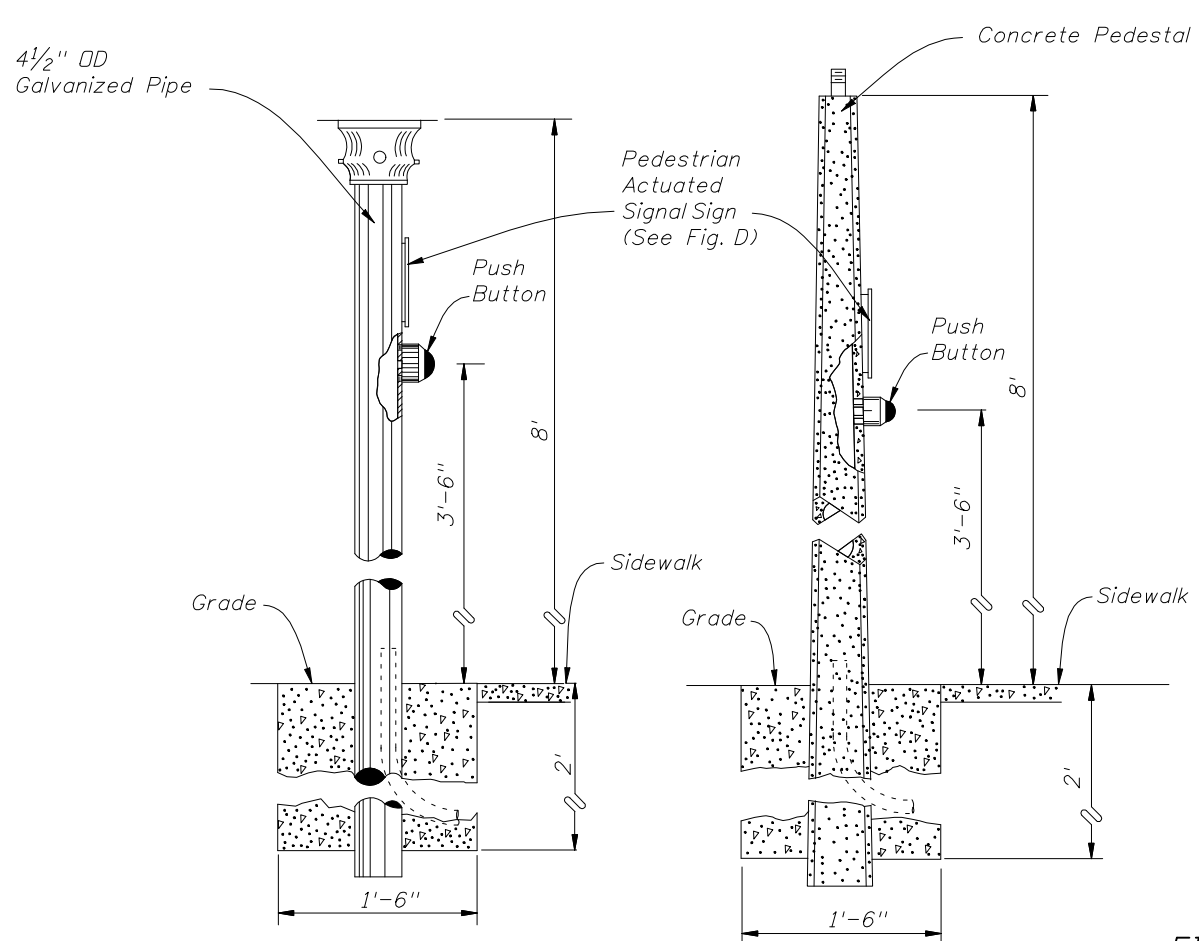


FIGURE B
PEDESTAL STATION
DETECTOR STATION

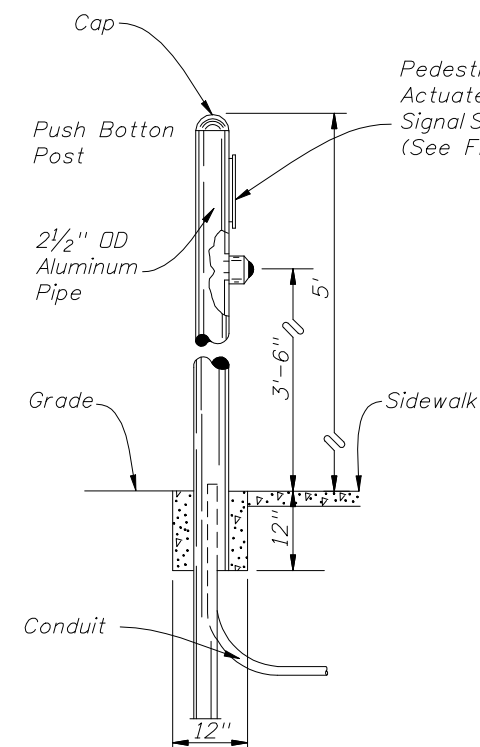
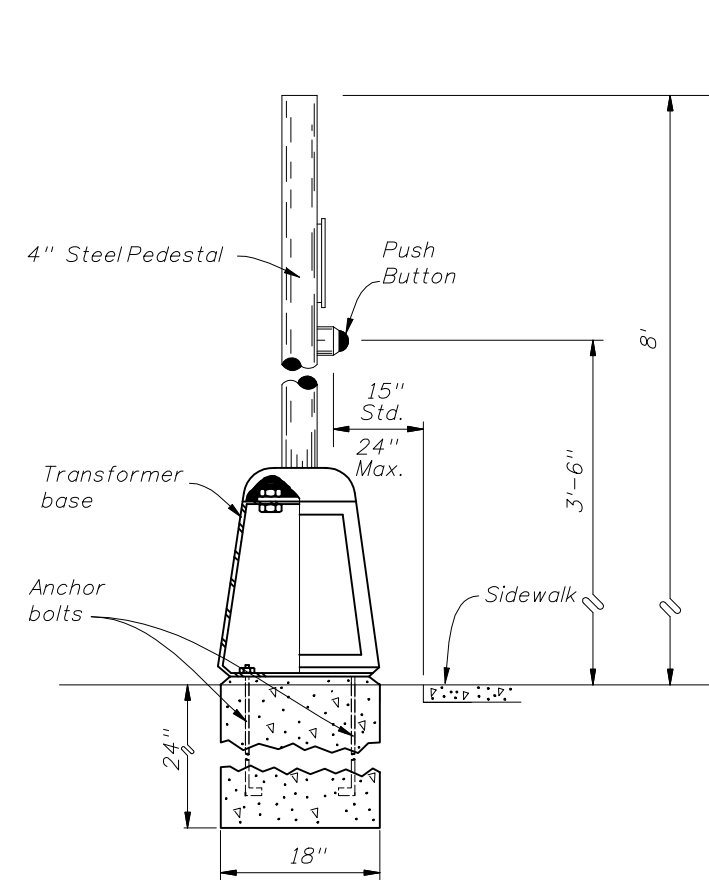


FIGURE C
POST DETECTOR STATION
DETECTOR STATION

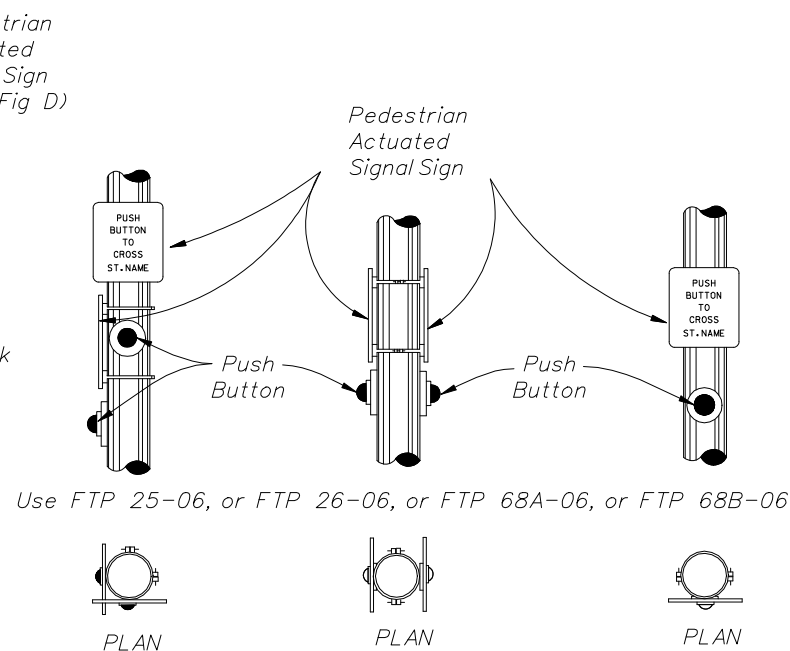


FIGURE D

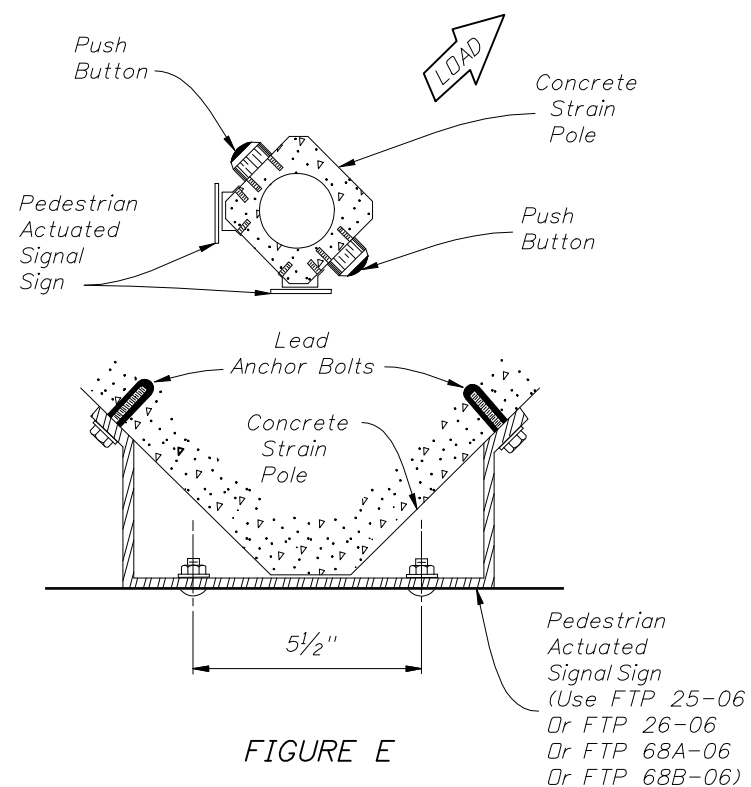


FIGURE E

Notes:

1. Signs shall be mounted above detectors, explaining their purpose and use.
2. The positioning of pedestrian push button should clearly indicate which crosswalk signal is actuated by each push button.
3. Push buttons and signs are to be mounted in accordance with Standard Specifications, section 665.
4. Meet all grounding requirements of Section 620 of the Standard Specifications.
5. A 30"X48" landing is required centered on each push button.

Note To Designers:

The designer should ensure the distance to the Push Button in Figure A & B is maintained. This distance can vary depending on post or pedestal type or whether a frangible base is used and sidewalk configuration. This is specified to meet Americans with Disabilities Act.



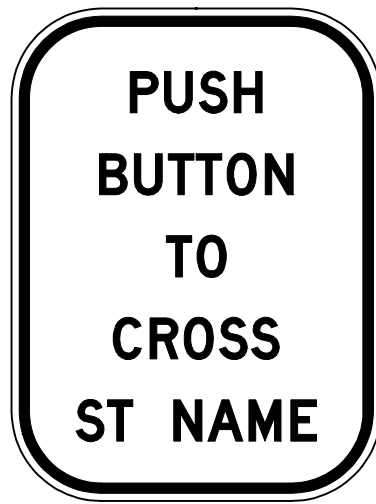
2010 FDOT Design Standards

PEDESTRIAN DETECTOR
ASSEMBLY INSTALLATION DETAILS

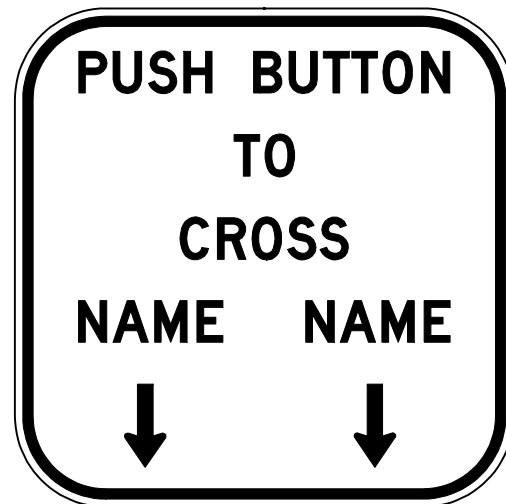
Last
Revision
07/01/09

Sheet No.
1 of 2

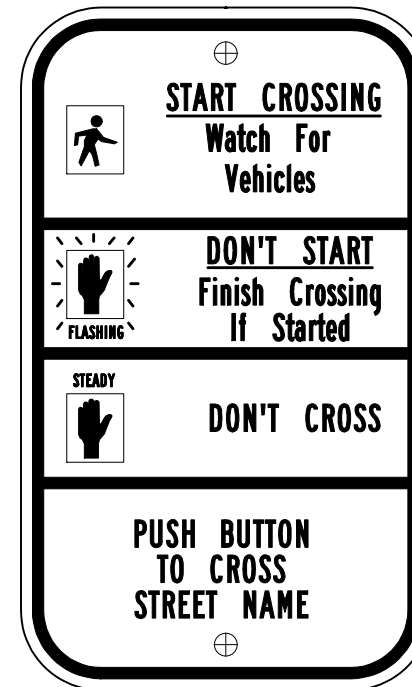
Index No.
17784



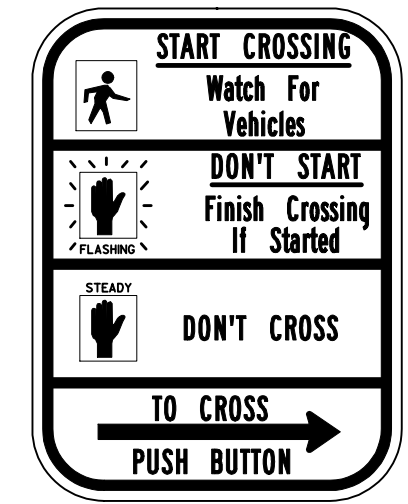
FTP-25-06



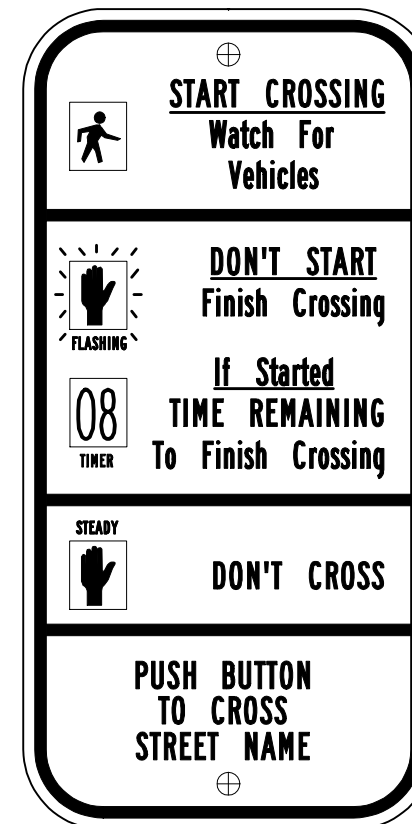
FTP-26-06



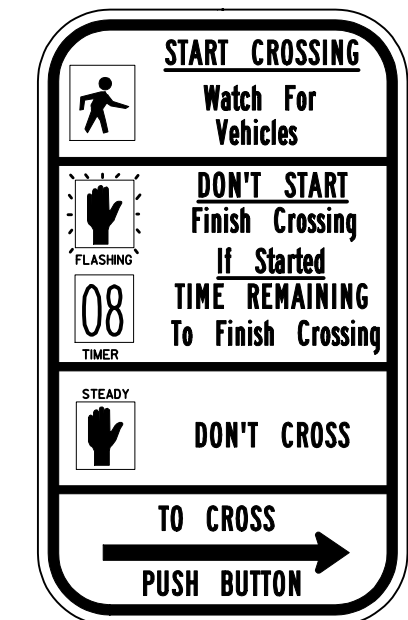
FTP-68A-06



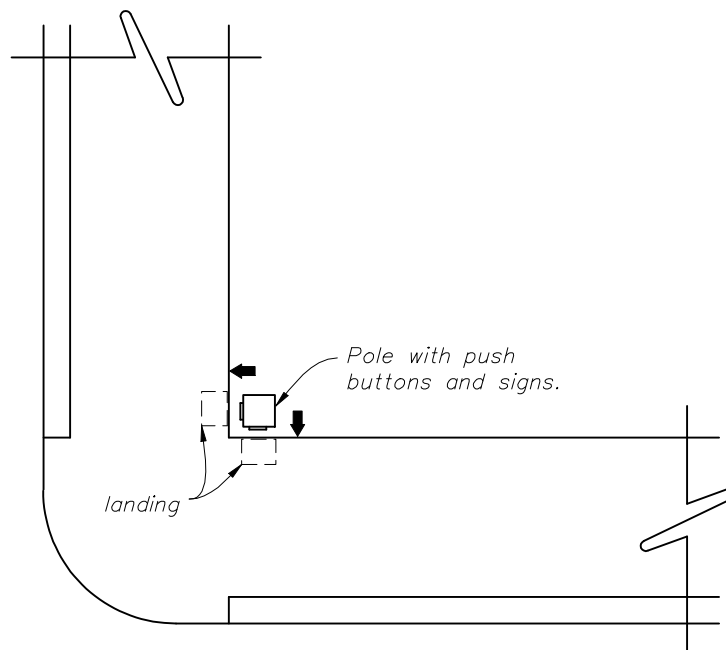
R10-3b
(Use Only for Case I)



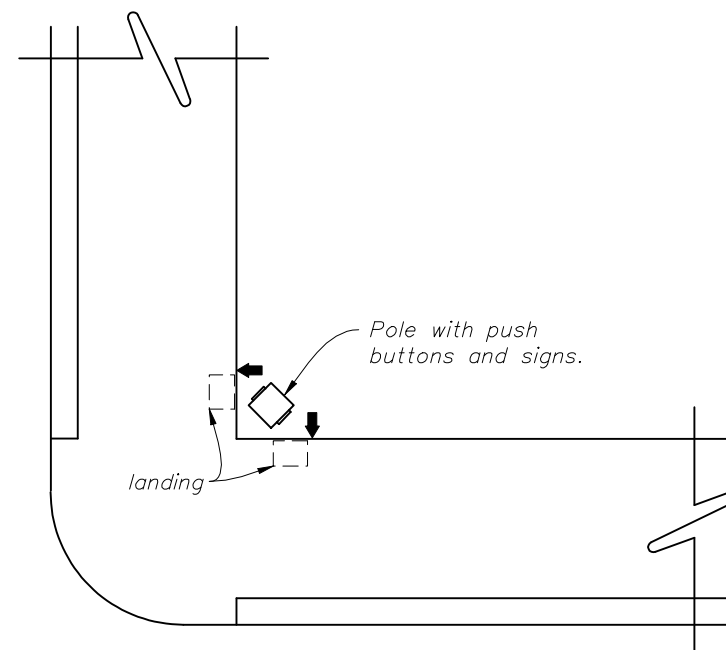
FTP-68B-06



R10-3e
(Use Only for Case I)



CASE I
POLE PARALLEL TO CURBLINE
ALTERNATE TO FIGURE F



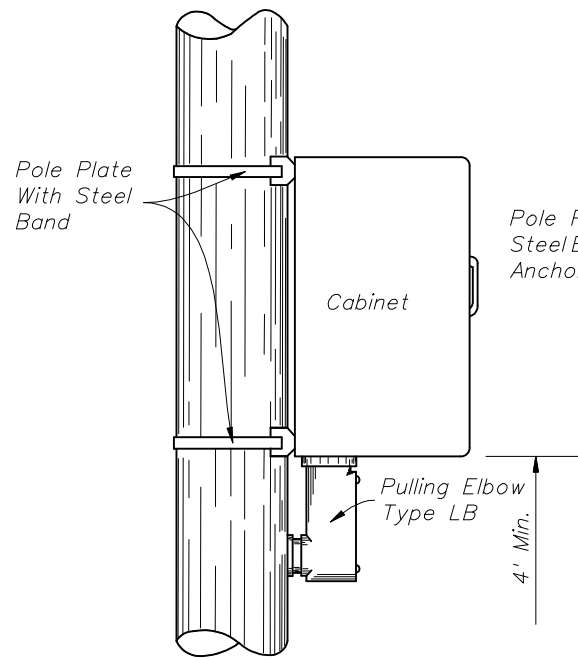
CASE II
POLE DIAGONAL TO CURBLINE

NOTE:

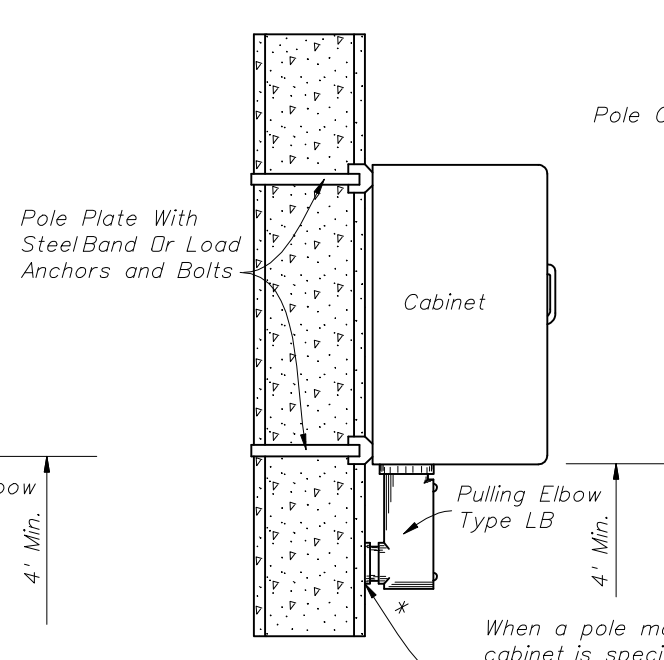
1. Refer to the MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES figure 2B-18 Pedestrian Signs, The STANDARD HIGHWAY SIGNS MANUAL (English) Sign R10-3b for Text Size, Spacing and Symbol size. Also see DESIGN STANDARDS Index 17355 for details of FTP signs.



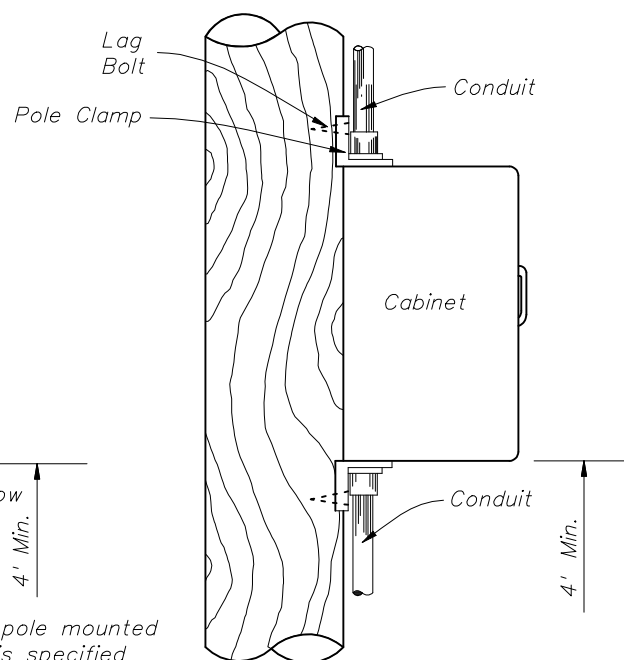
METAL POLE



CONCRETE POLE



WOOD POLE



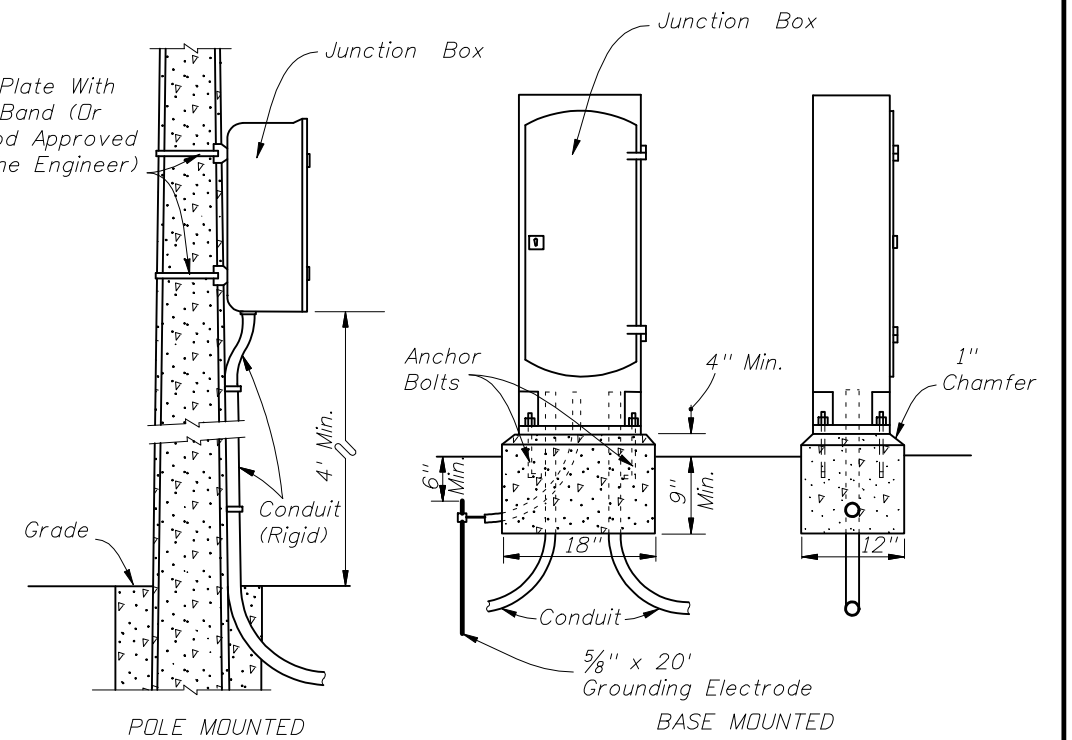
POLE MOUNTED CABINET

Liquidtight flexible conduit is approved for use from the electrical disconnect to the cabinet when both are installed on the same pole.

When a pole mounted cabinet is specified the 2 1/2" hole for the cabinet shall be field drilled.

* If holes for cabinet mounting require relocation, original holes shall be filled in with concrete or covered with a noncorrosive cover plate.

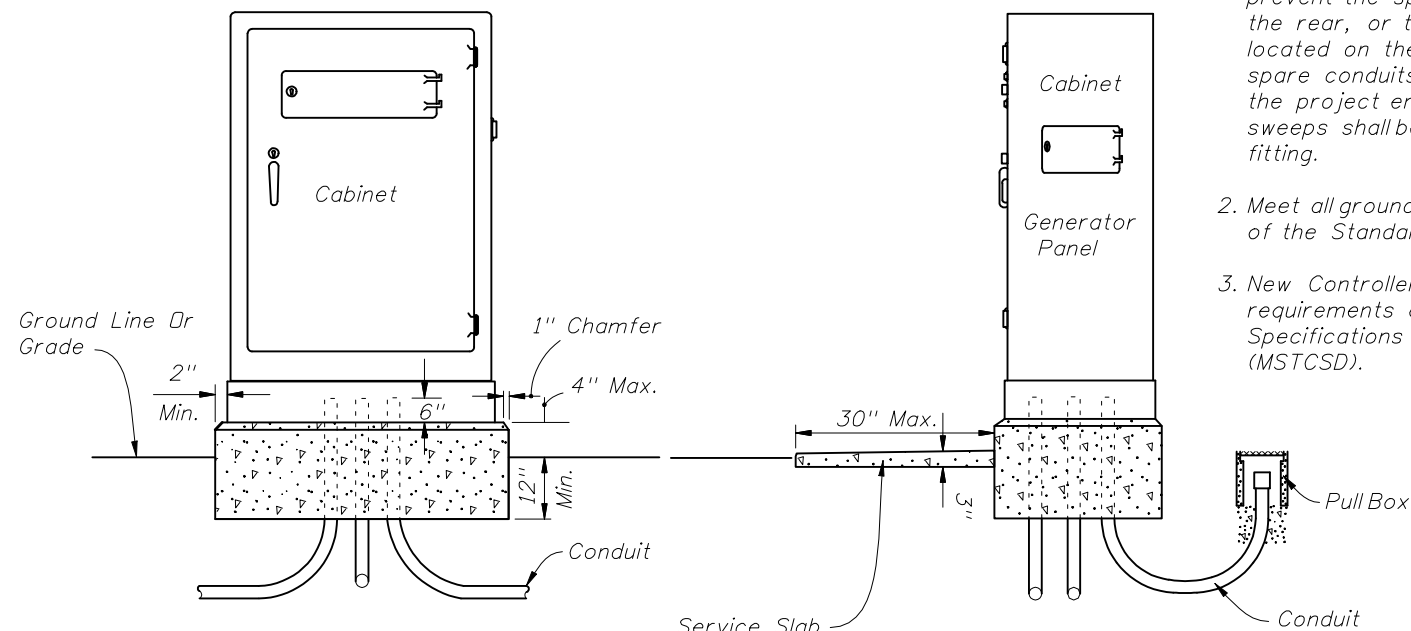
Pole Plate With SteelBand (Or Method Approved By The Engineer)



INTERCONNECT JUNCTION BOX

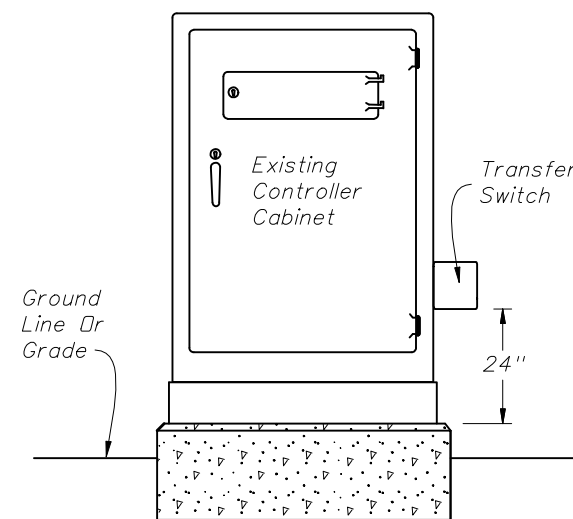
Notes:

1. The number, size and orientation of conduit sweep will vary according to site condition or locations. Two spare 2" PVC conduits shall be provided in all bases. The spares shall exit in the direction of the center rear of the cabinet base, into a pullbox and capped with a weathertight fitting. If obstructions prevent the spare conduit from exiting to the rear, or the rear of the cabinet is located on the R/W line, a side exit of the spare conduits will have to be approved by the project engineer. All spare conduit sweeps shall be capped with a weatherproof fitting.
2. Meet all grounding requirements of Section 620 of the Standard Specifications.
3. New Controller Cabinet installation shall meet the requirements of Section A676-1 of the Minimum Specifications for Traffic Control Signal Devices (MSTCSD).

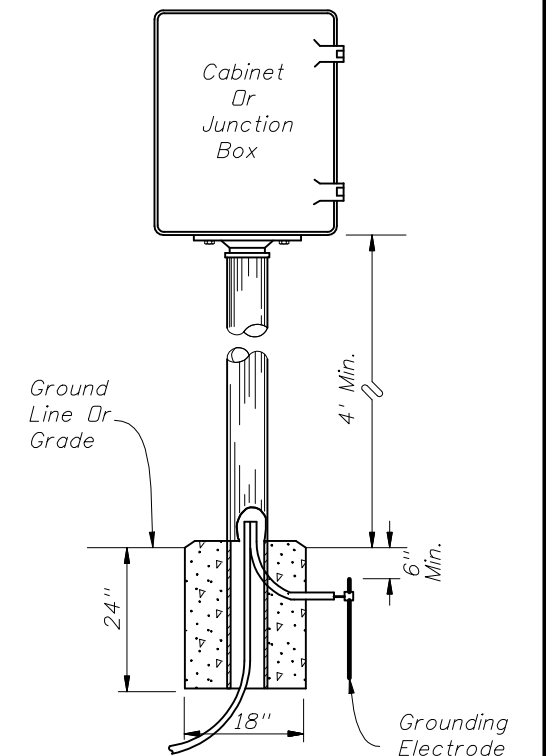


Service Slab (Slope 1/4" To 1" For Drainage) Not Required In Sidewalk Or Pavement Areas Or Where R/W Is Restricted.

BASE MOUNTED CABINET



Existing controller cabinets to be retrofitted shall meet the requirements of Section A678-16 of the Minimum Specifications for Traffic Control Signal Devices (MSTCSD). The signalized intersection controller cabinet retrofit installation procedures are located at <http://www.dot.state.fl.us/TrafficOperations/DocumentLibrary/GeneratorPowerforSignalizedIntersection>



PEDESTAL MOUNTED

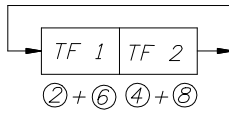
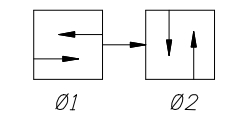


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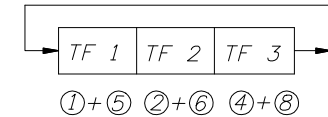
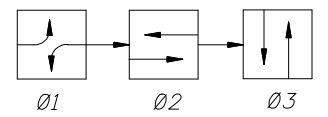
CABINET INSTALLATION DETAILS

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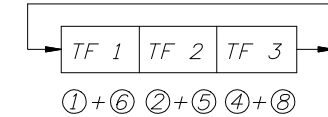
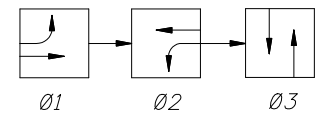
Index No. 17841



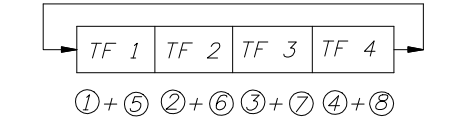
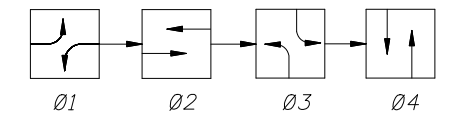
SOP 1



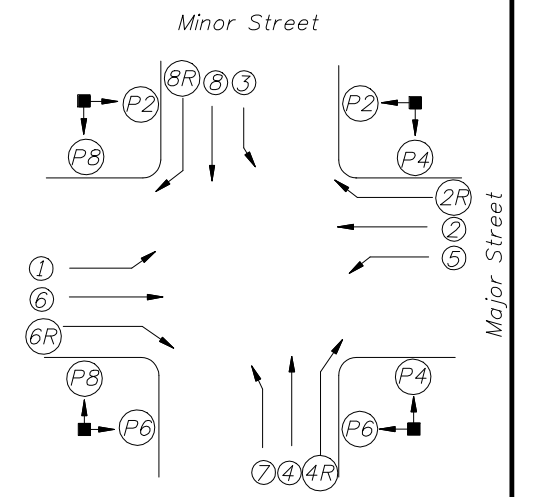
SOP 2



SOP 3

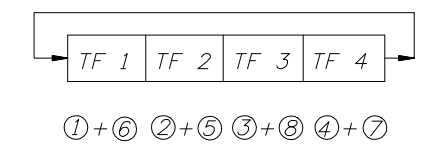
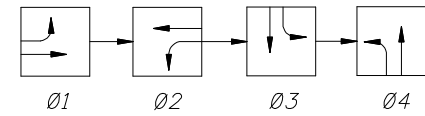


SOP 4

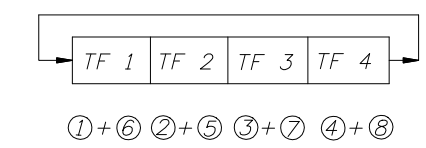
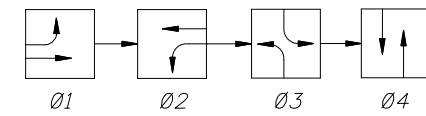


SIGNALIZED INTERSECTION
 Vehicle movements & signalhead number assignments are not directionally oriented but shall maintain their relative orientation about the intersection (I.E., movements 7 and 4 are always to the right of movements 1 and 6 etc.).

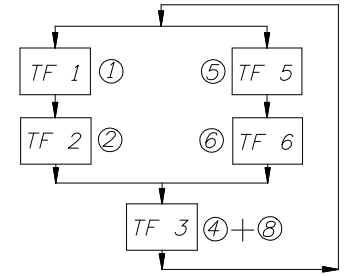
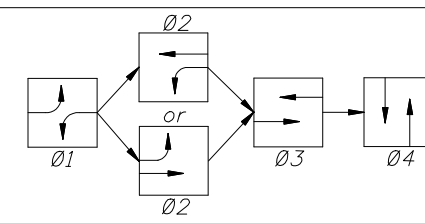
- LEGEND**
- ⊗ Vehicle Movement Number
 - ⊗ Pedestrian Movement Number
 - TF X Timing Function Number
 - ØX Phase Number
 - ↔ Green Arrow (Left or Right)
 - ↔ Red Arrow
 - ↔ Yellow Arrow



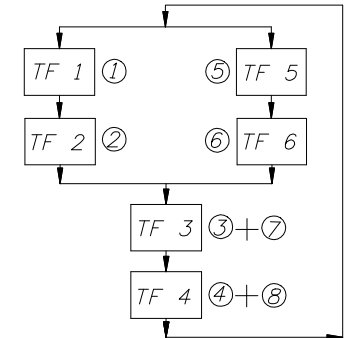
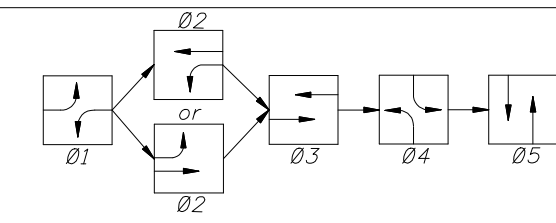
SOP 5



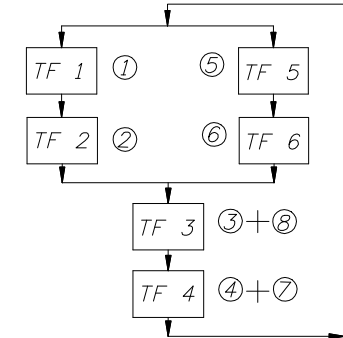
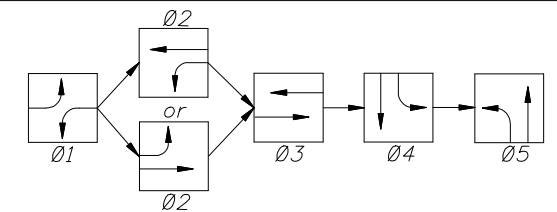
SOP 6



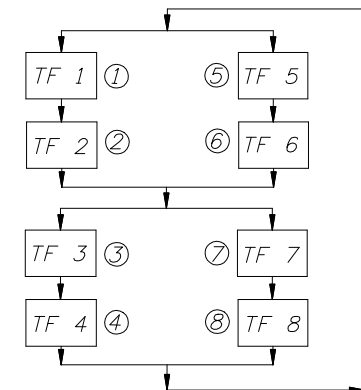
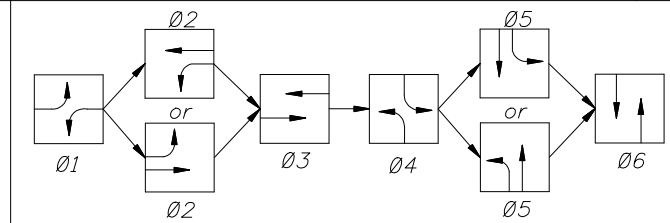
SOP 7



SOP 8



SOP 9

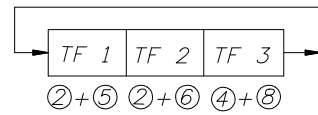
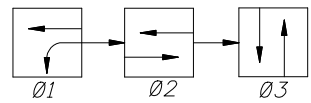


SOP 10

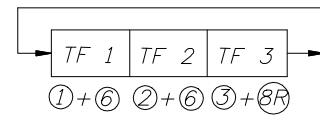
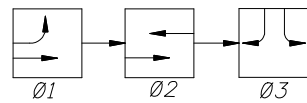
SIGNAL CLEARANCE TABLE
 (Blank Indicates No Clearance Required)

From / To		SIGNAL INDICATIONS						
		R	↔	G	↔	↔	WALK	DONT WALK
SIGNAL INDICATIONS	R			Y	↔	Y		
	↔			Y	↔	Y		
	G				↔			
	↔							
	↔							
	WALK							
	DONT WALK						Flash DONT WALK	

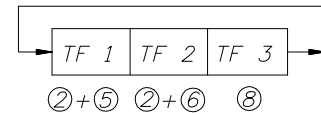
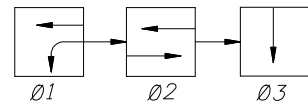




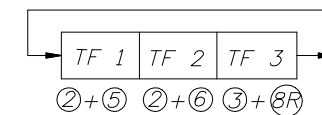
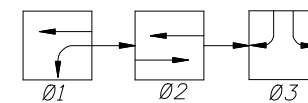
SOP 11



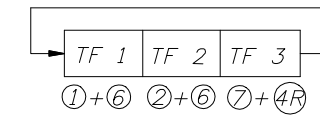
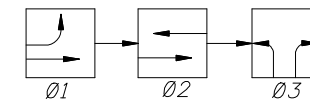
SOP 12



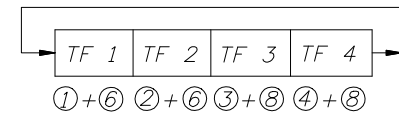
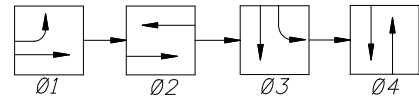
SOP 13
(ONE-WAY STREET INTERSECTION)



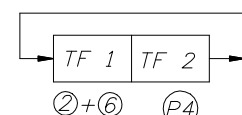
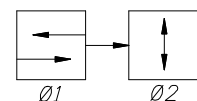
SOP 14
(DIAMOND INTERCHANGE OPERATION)



SOP 15
(DIAMOND INTERCHANGE OPERATION)

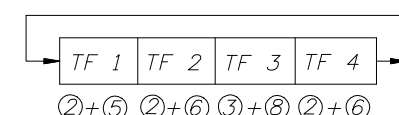
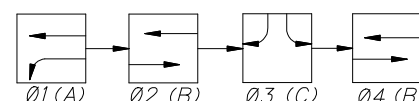


SOP 16



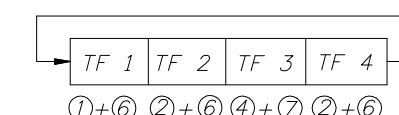
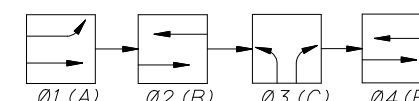
(MIDBLOCK)

SOP 17



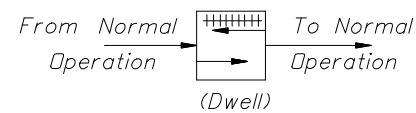
NOTE:
Only Ø2 Or Ø4 Used, Not Both To Obtain
ABC, Or ACB Operation.

SOP 18
(DIAMOND INTERCHANGE OPERATIONS)

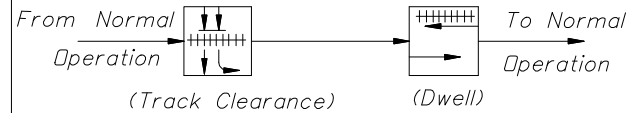


NOTE:
Only Ø2 Or Ø4 Used, Not Both To Obtain
ABC, Or ACB Operation.

SOP 19
(DIAMOND INTERCHANGE OPERATIONS)



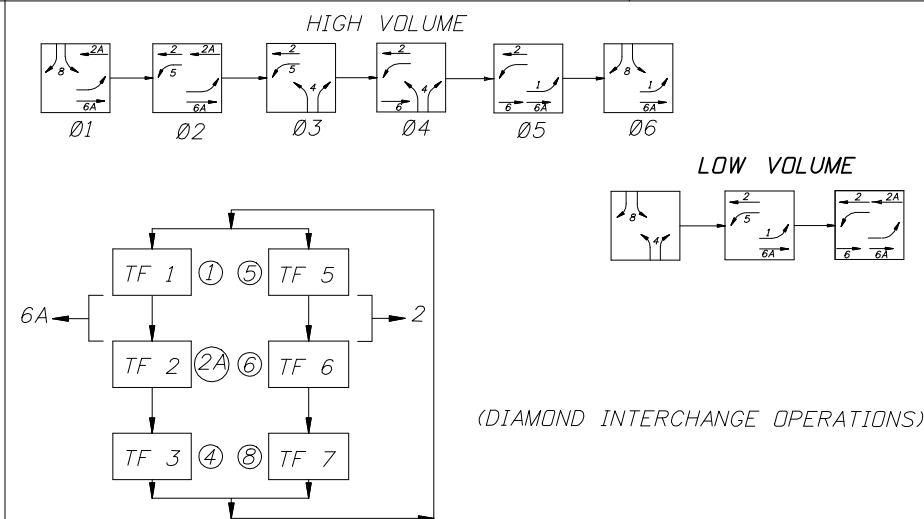
POP 1



POP 2



POP 3



SOP 20

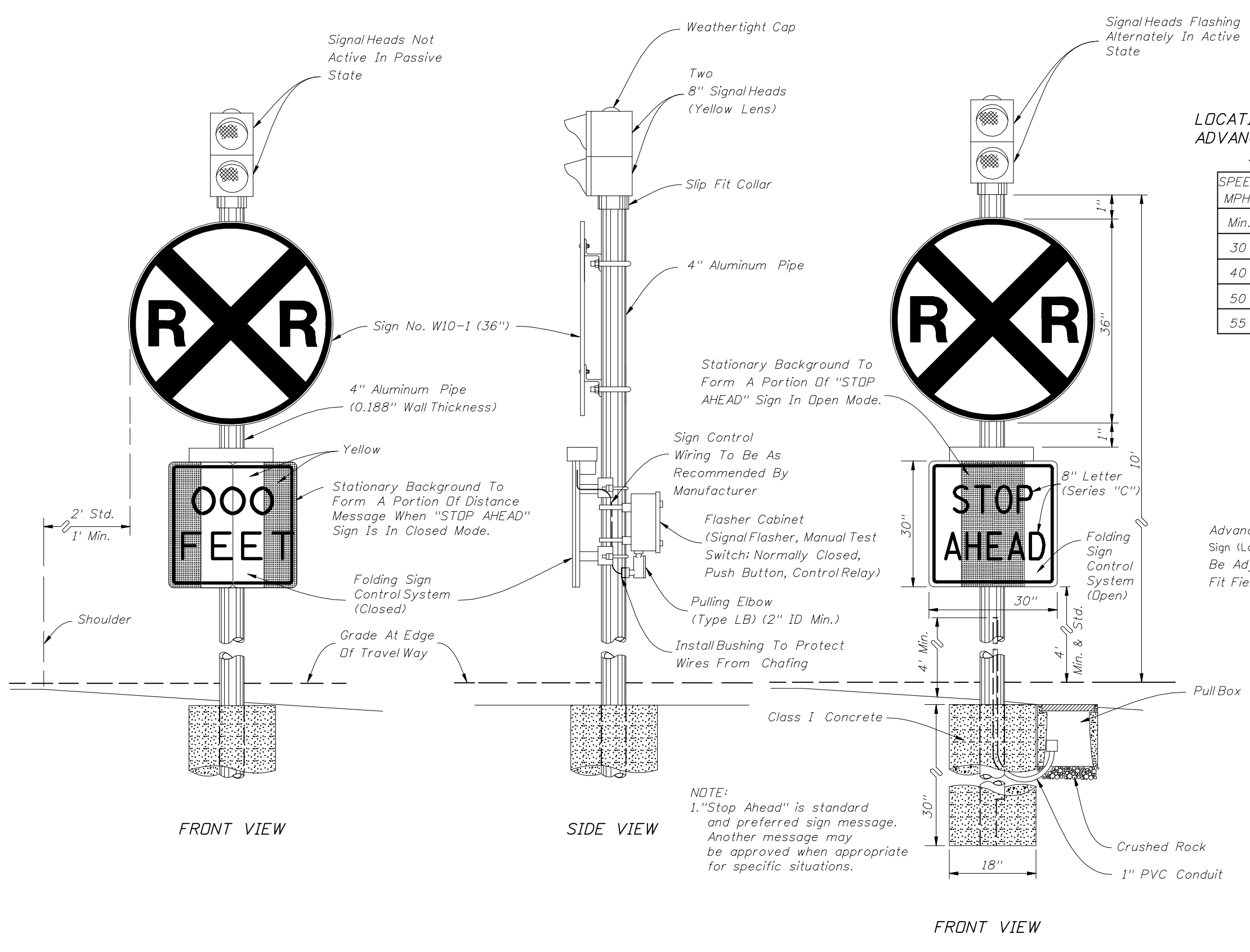


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STANDARD SIGNAL OPERATION PLANS

Last Revision 07/01/00 Sheet No. 2 of 2

Index No. 17870

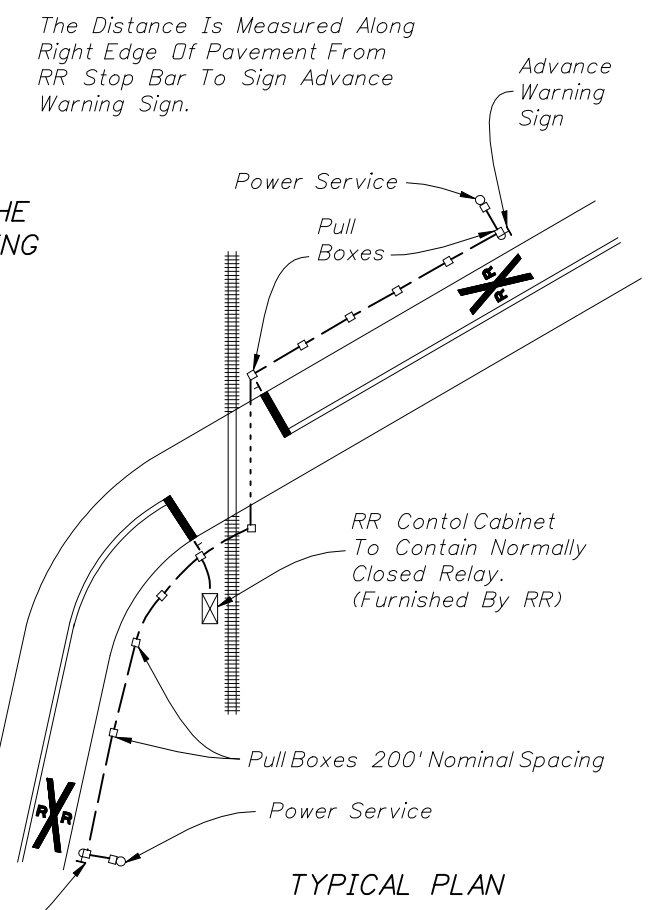


PASSIVE STATE
(TRAIN CIRCUIT NOT ACTUATED)

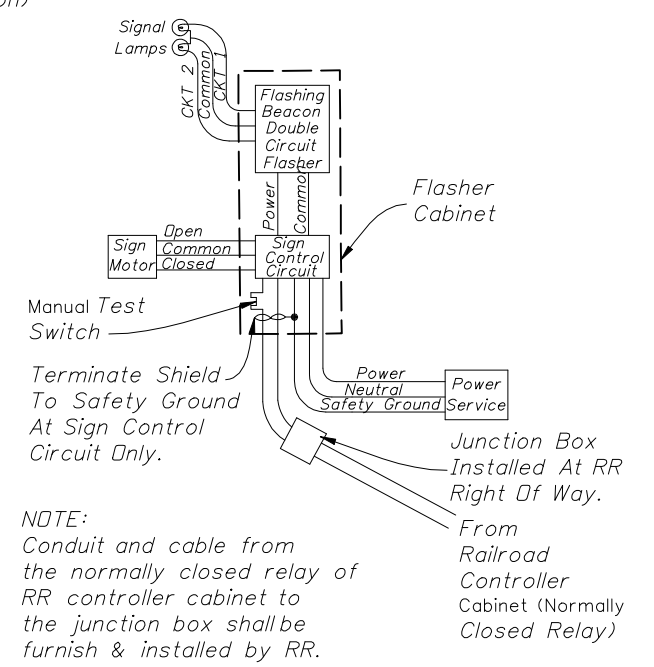
ACTIVE STATE
(TRAIN CIRCUIT ACTUATED)

LOCATION OF THE ADVANCE WARNING SIGN

SPEED MPH	DISTANCE FEET
Min.	50
30	75
40	125
50	250
55	325



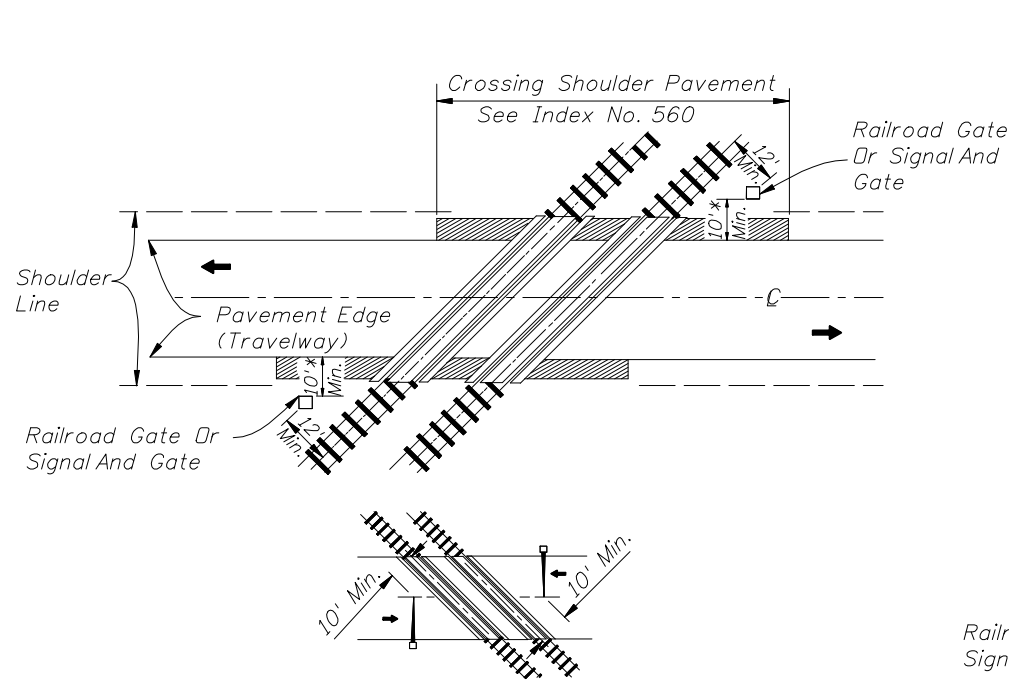
Advance Warning Sign (Location May Be Adjusted To Fit Field Condition)



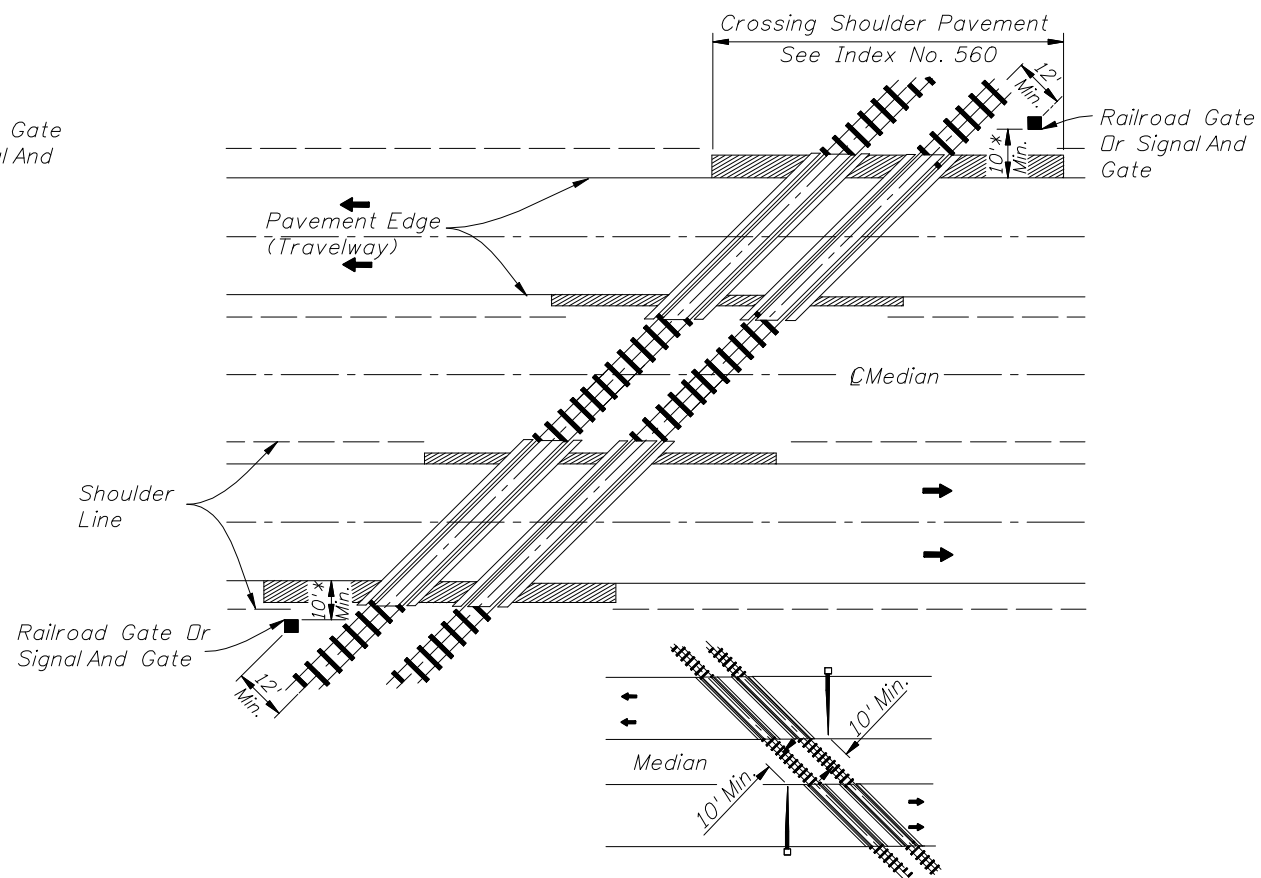
FUNCTIONAL BLOCK DIAGRAM

NOTE:
1. "Stop Ahead" is standard and preferred sign message. Another message may be approved when appropriate for specific situations.





SIGNAL PLACEMENT AT RAILROAD CROSSING
(2 - LANE DESIGN)



SIGNAL PLACEMENT AT RAILROAD CROSSING
(4 - LANE DESIGN)

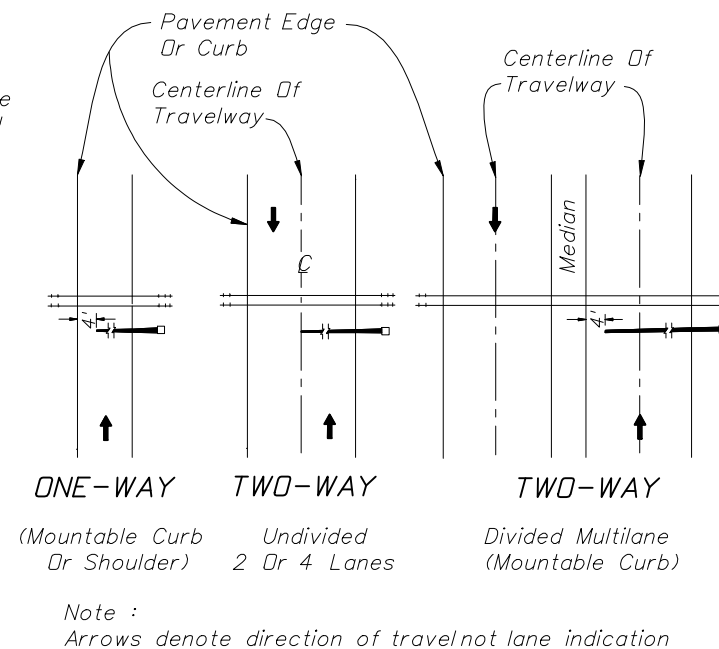
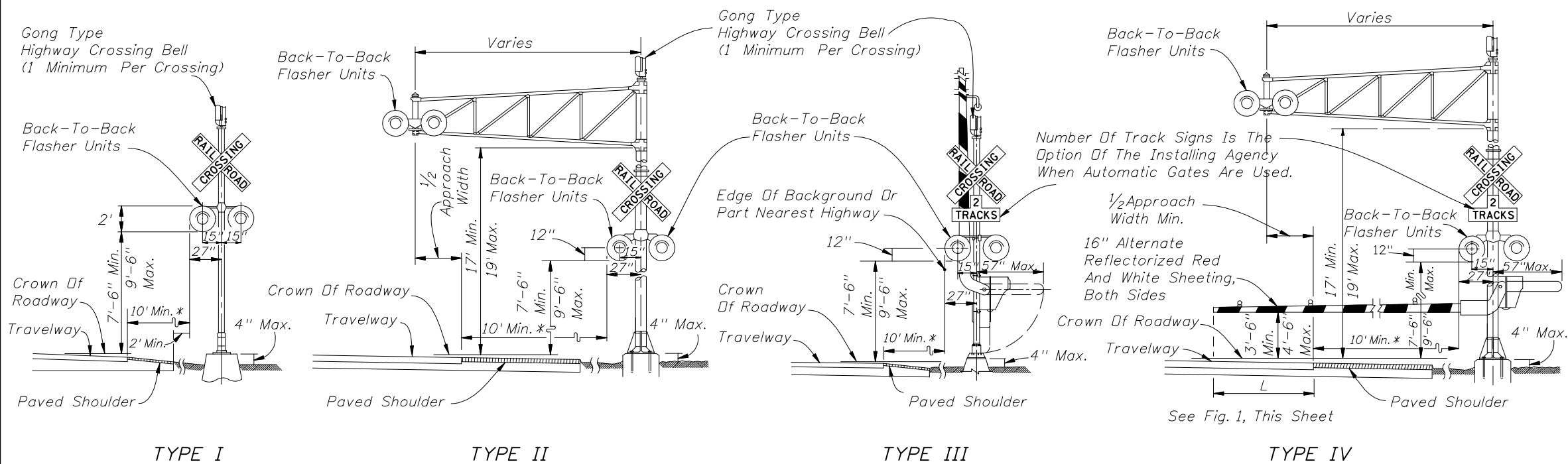


FIGURE 1
Gate Length Requirements
See Note 5 Sheet 3



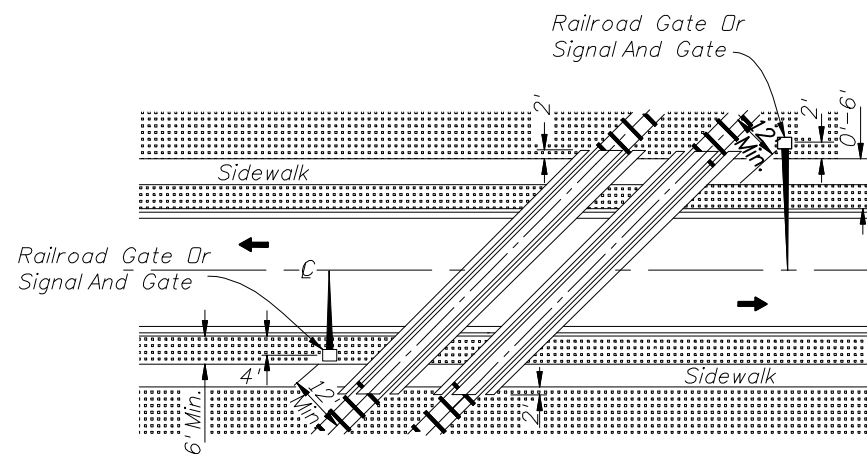
General Notes

1. No guardrail is proposed for signals; however, some form of impact attenuation device may be specified for certain locations.
2. Advance flasher to be installed when and if called for in plans or specifications.
3. Top of foundation shall be no higher than 4" above finished shoulder grade.
4. Type of traffic control device
I Flashing signals
II Flashing signals with cantilever
III Flashing signals with gate
IV Flashing signals with cantilever & gate
V Gate
5. Class of traffic control devices
I Flashing signals - one track
II Flashing signals - multiple tracks
III Flashing signals and gates - one track
IV Flashing signals and gates - multiple tracks

Note:
Two separate foundations may be required (one for signals, one for gate), depending on type of equipment used.

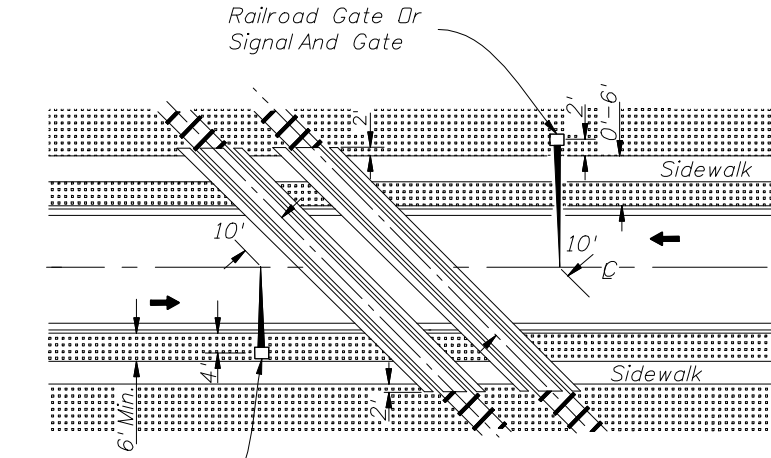
* When 10' is deemed impracticable the control device can be located as close as 2' from the edge of a paved shoulder but not less than 6' from the edge of the near traffic lane.





ACUTE ANGLE (AND RIGHT ANGLE)

SIGNAL PLACEMENT AT RAILROAD CROSSING
(2 LANES, CURB & GUTTER)

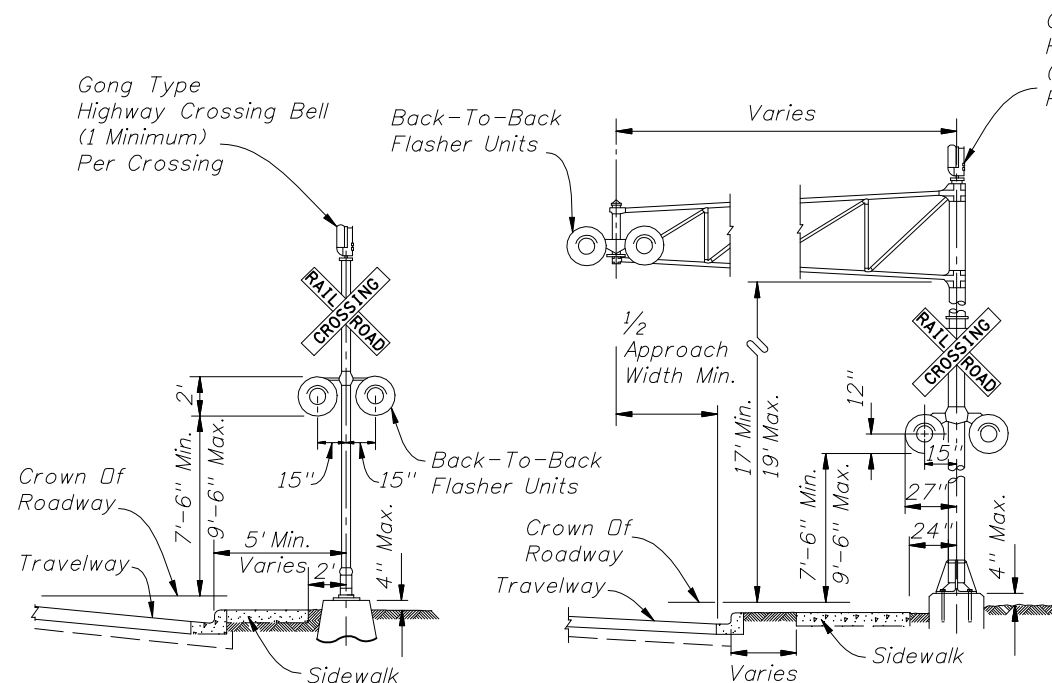


OBTUSE ANGLE

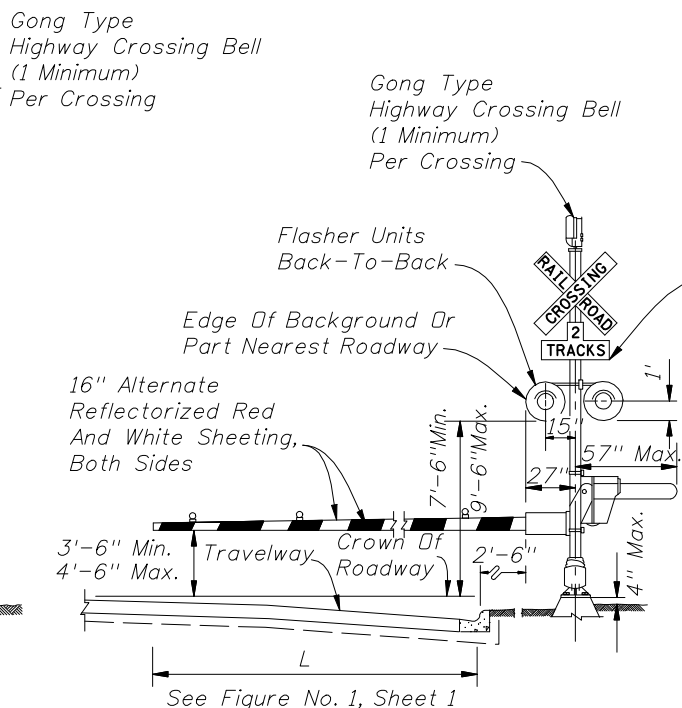
SIGNAL PLACEMENT AT RAILROAD CROSSING
(2 LANES, CURB & GUTTER)

GENERAL NOTES

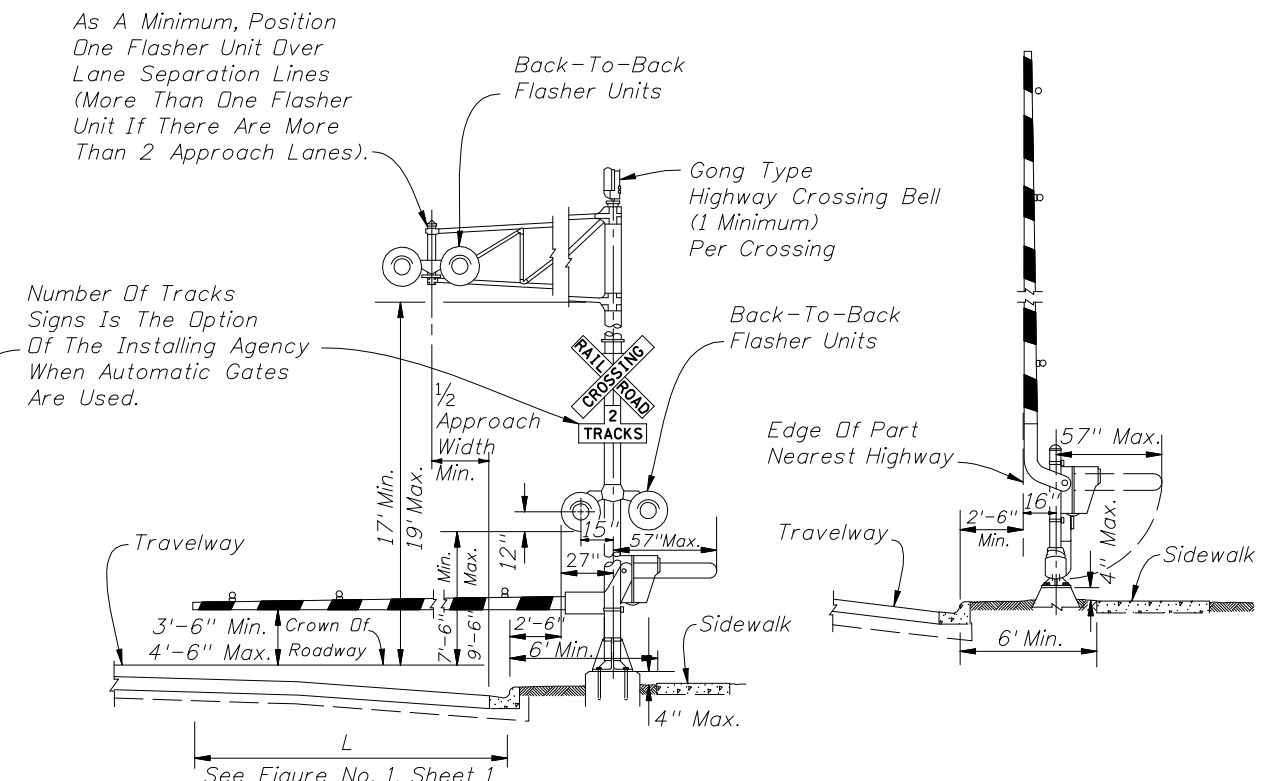
1. The location of flashing signals and stop lines shall be established based on future (or present) installation of gate with appropriate track clearances.
2. Where plans call for railroad traffic control devices to be installed in curbed medians, the minimum median width shall be 12'-6".
3. Location of railroad traffic control device is based on the distance available between face of curb & sidewalk.
0' to 6' - Locate device outside sidewalk.
Over 6' - Locate device between face of curb and sidewalk.
4. Stop line to be perpendicular to edge of roadway, approx. 15' from nearest rail; or 8' from and parallel to gate when present.



TYPE I

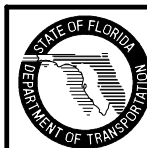


TYPE III



TYPE IV

TYPE V



2010 FDOT Design Standards

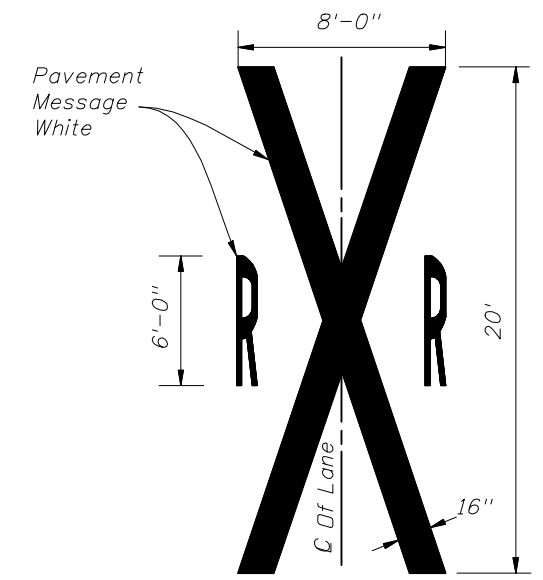
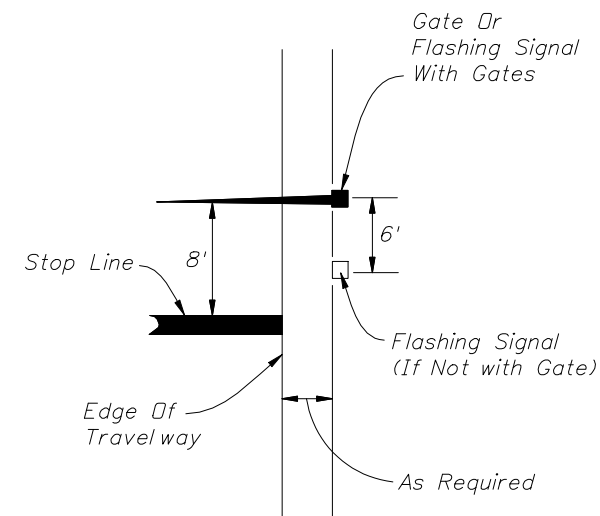
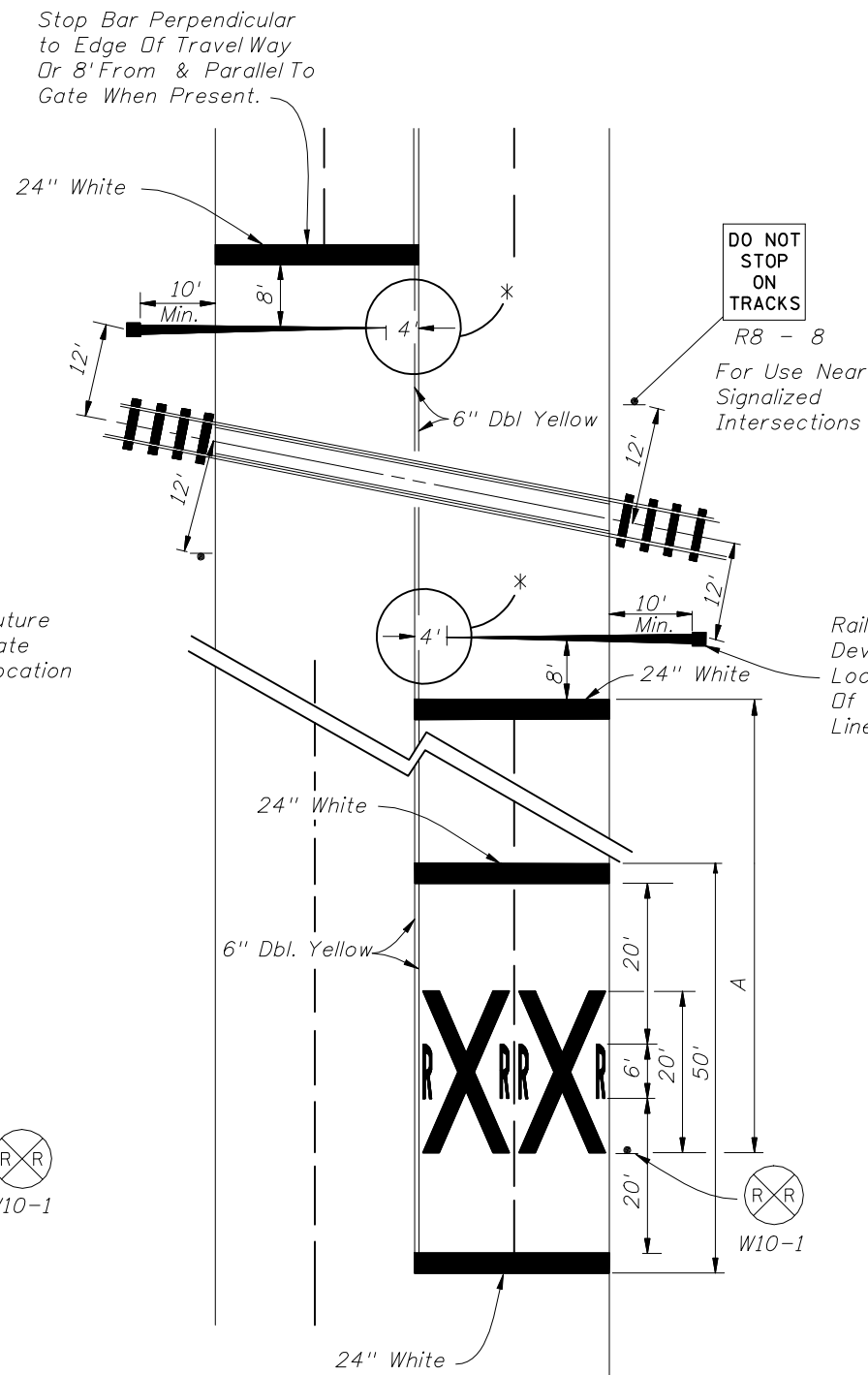
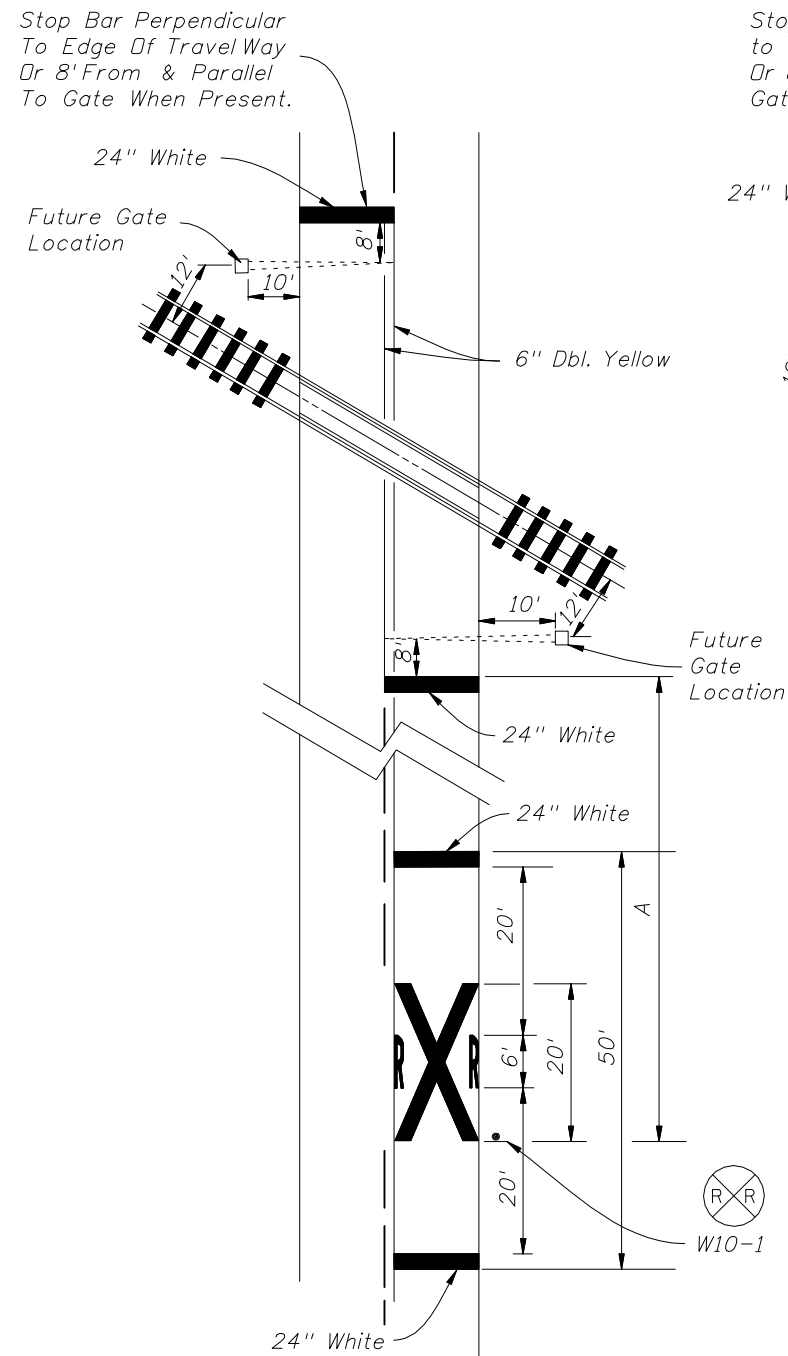
RAILROAD GRADE CROSSING
TRAFFIC CONTROL DEVICES

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RAILROAD CROSSING AT TWO (2)-LANE ROADWAY

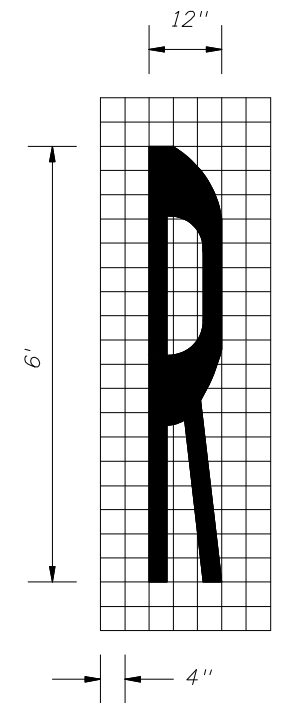
RAILROAD CROSSING AT MULTILANE ROADWAY

RELATIVE LOCATION OF CROSSING TRAFFIC CONTROL DEVICES



NOTES:

- When computing pavement message, quantities do not include traverse lines.
- Placement of sign W10-1 in a residential or business district, where low speeds are prevalent, the W10-1 sign may be placed a minimum distance of 100' from the crossing. Where street intersections occur between the RR pavement message and the tracks an additional W10-1 sign and additional pavement message should be used.
- A portion of the pavement markings symbol should be directly opposite the W10-1 sign.
- Recommended location for FTP-61-06 or FTP-62-06 signs, 100' urban and 300' rural. See Index 17355 for sign details.
- Gate Length Requirements:
For Two-way undivided sections:
The gate should extend to within 1' of the center line. On multiple approaches the maximum gate length may not reach to within 1' of the center line. For those cases, the distance from the gate to the center line shall be a maximum of 4'.
For one-way or divided sections:
The gate shall be of sufficient length such that the distance from the gate tip to the inside edge of pavement is a maximum of 4'.



SPEED MPH	" A " IN FT.
60	400
55	325
50	250
45	175
40	125
35	100
URBAN	85 MIN.

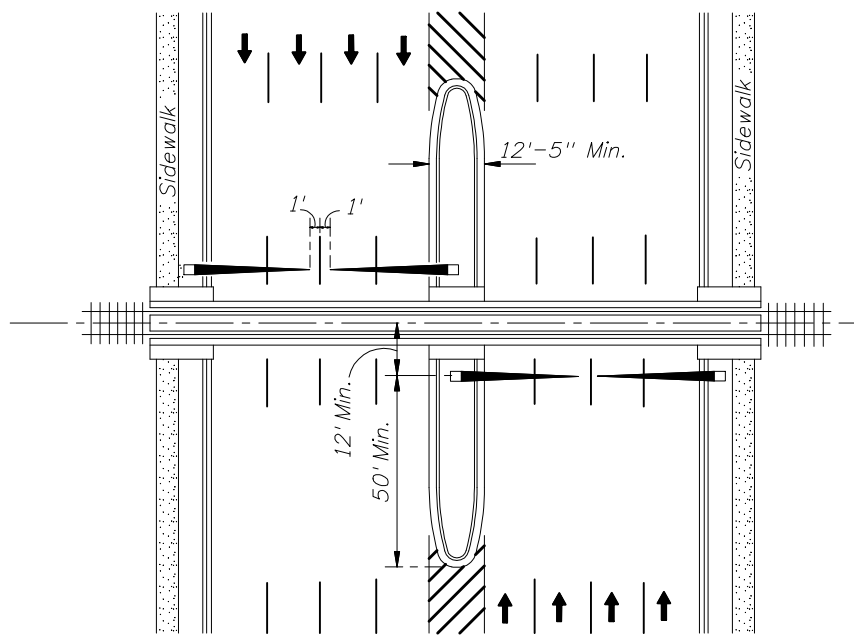
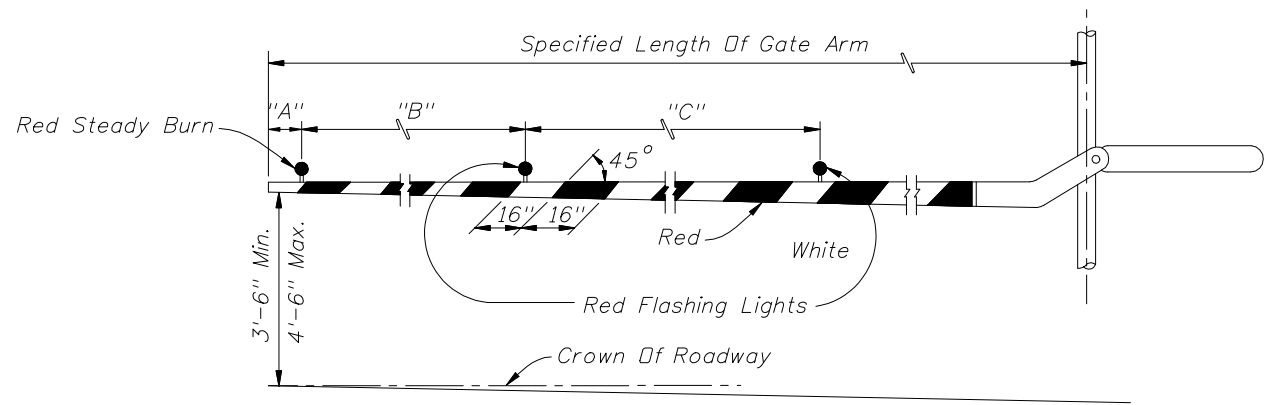


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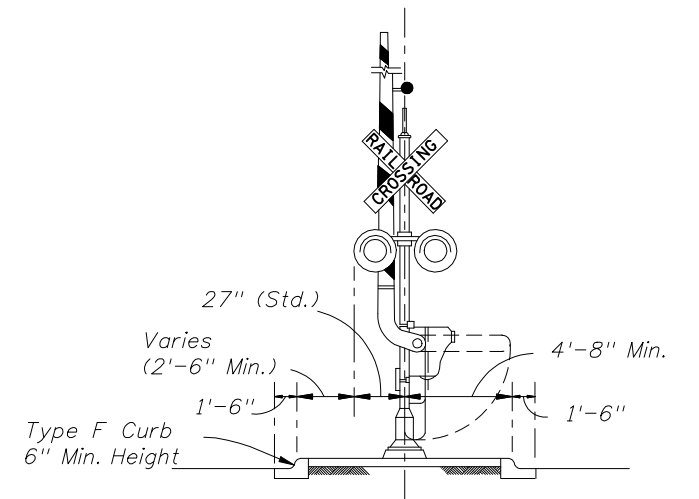
RAILROAD GRADE CROSSING TRAFFIC CONTROL DEVICES

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PLAN



MEDIAN SECTION AT SIGNAL GATES

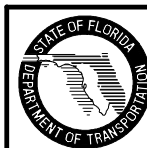
NOTE:
For additional information see the "Manual On Uniform Traffic Control Devices", Part 8; The "Traffic Control Handbook", Part VIII; and AASHTO "A Policy On Geometric Design Of Streets And Highways".

RAILROAD GATE ARM LIGHT SPACING

Specified Length Of Gate Arm	Dimension "A"	Dimension "B"	Dimension "C"
14 Ft.	6"	36"	5'
15 Ft.	18"	36"	5'
16-17 Ft.	24"	36"	5'
18-19 Ft.	28"	41"	5'
20-23 Ft.	28"	4'	5'
24-28 Ft.	28"	5'	5'
29-31 Ft.	36"	6'	6'
32-34 Ft.	36"	7'	7'
35-37 Ft.	36"	9'	9'
38 And Over	36"	10'	10'

MEDIAN SIGNAL GATES FOR
MULTILANE UNDIVIDED URBAN SECTIONS

(THREE OR MORE DRIVING LANES IN ONE DIRECTION, 45 MPH OR LESS)



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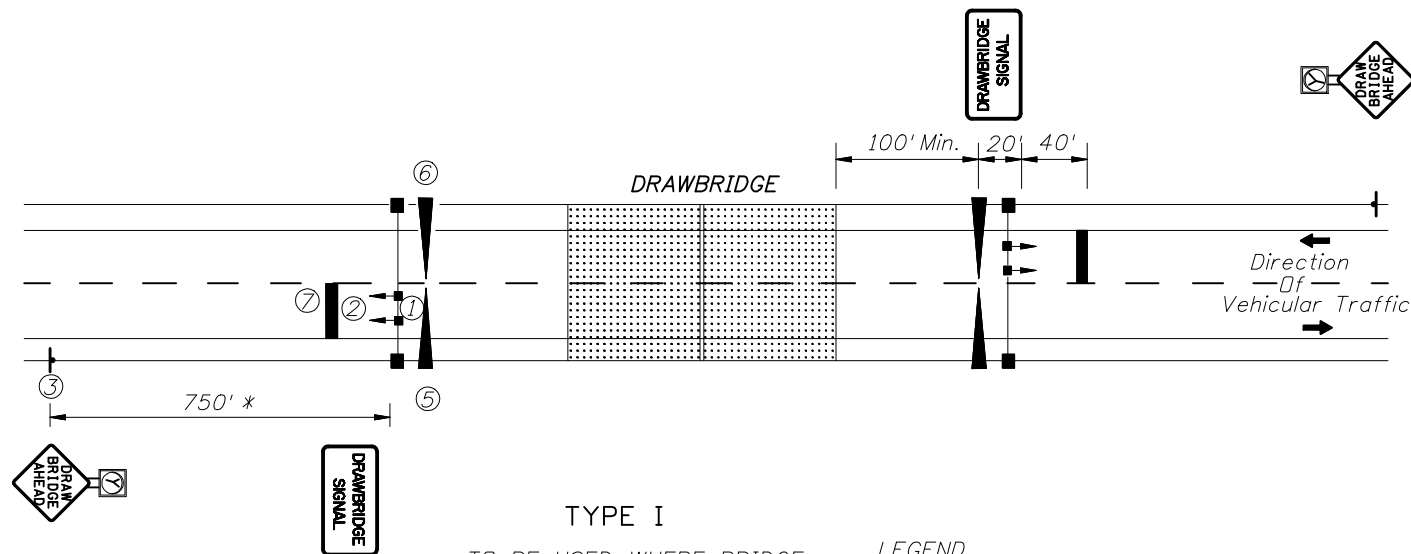
RAILROAD GRADE CROSSING
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TYPICAL BRIDGE MOUNTS



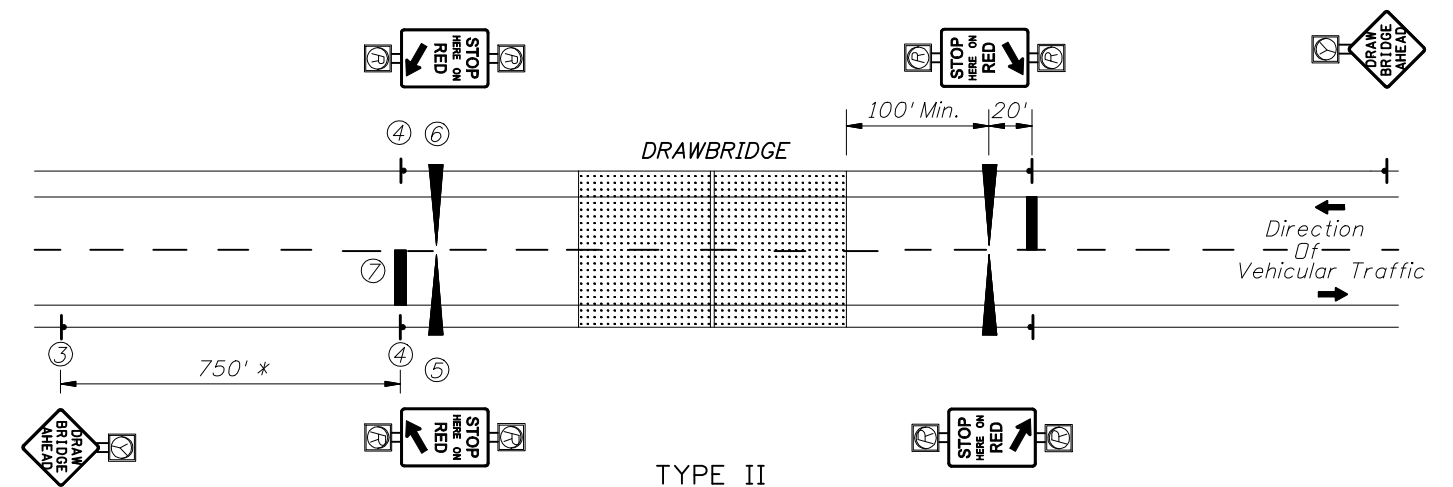
TYPE I

TO BE USED WHERE BRIDGE OPERATORS ARE FULL TIME OR A DAILY BASIS.

* Field conditions may require adjustment of this standard distance.

LEGEND

- ① TRAFFIC SIGNALS } Mast Arm Mounted (Off Bridge)
- ② DRAWBRIDGE SIGN } Monotube Support Mounted (On Bridge)
- ③ DRAWBRIDGE AHEAD SIGN WITH YELLOW FLASHING BEACON } Ground Mounted
- ④ STOP HERE ON RED SIGN WITH RED FLASHING BEACONS }
- ⑤ ENTRANCE GATE
- ⑥ EXIT GATE
- ⑦ 24" THERMOPLASTIC STOP BAR



TYPE II

TO BE USED WHERE TYPE I IS NOT APPLICABLE (USUALLY WHEN THE BRIDGE OPERATOR IS "ON CALL").

NOTES:

1. A bypass switch shall be installed to override each timing interval in case of a malfunction.
2. "STOP HERE ON RED" is omitted in Type I operation and "TRAFFIC SIGNALS" are omitted in Type II operation.
3. The time between beginning of flashing yellow on "Drawbridge Ahead" sign and the clearance of traffic signal to red, or beginning of flashing red should not be less than the travel time of a passenger car, from the sign location to the stop line, traveling at the 85 percentile approach speed.
4. Beginning of operation of drawbridge gates shall not be less than 15 seconds after steady red or 20 seconds after flashing red (Actual time may be determined by the bridge tender.)
5. Time of gate lowering and raising is dependent upon gate type.
6. Time of bridge opening is determined by the bridge tender.
7. Each gate shall be operated by a separate switch.
8. On each approach (Type II), all four red signals shall be on the same two circuit flashers, with the two top signals on one circuit, and the two bottom signals on the alternately flashing circuit.
9. A Drawbridge Ahead sign is required for both types of signal operation, However a flashing beacon shall be added to the sign when physical conditions prevent a driver traveling at the 85% approach speed from having continuous view of at least one signal indication for approximately 10 seconds.
10. Requirements on gate installation are contained in Section 4I of the "Manual on Uniform Traffic Control Devices".
11. "In accordance with Traffic Engineering Manual (Topic Number 750-000-005) Section 2.1, SLIPPERY WHEN WET SIGNS shall be placed in advance of all MOVABLE and NONMOVABLE STEEL DECK BRIDGES."

- SIGNALS & SIGNS
 - SIGNAL SWITCH
 - FLASHING BEACON DRAWBRIDGE AHEAD (See Note 9) SIGN
 - STOP HERE ON RED (Type II only)
 - TRAFFIC SIGNALS (Type I only)
- GATES
 - ENTRANCE GATES
 - EXIT GATES

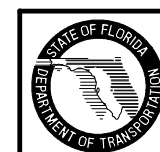
TIMING

OFF	ON	OFF
BLANK	FLASHING YELLOW	BLANK
BLANK	FLASHING RED	BLANK
GREEN	YELLOW	RED
RAISED	LOWERED	RAISED
RAISED	LOWERED	RAISED
Variable Time (See Note No.3)	5 Sec. Min.	15 Sec. Min. (See Note No.4)
Variable Time (See Note No.5)	Variable Time Bridge Open (See Note No.6)	Variable Time (See Note No.5)
Normal Operation	Operation During Bridge Preemption	

SEQUENCE CHART



W8-5
SLIPPERY WHEN WET SIGN
See Note 11.



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TRAFFIC CONTROL DEVICES FOR MOVABLE SPAN BRIDGE SIGNALS

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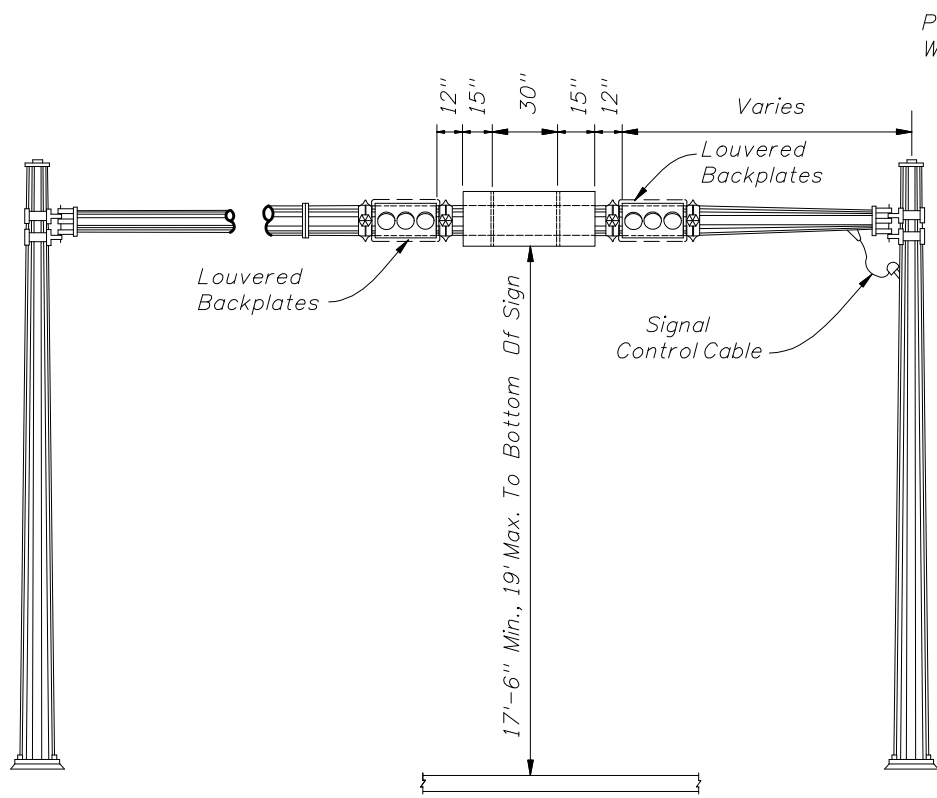


FIGURE - A
MONOTUBE SUPPORT MOUNTING

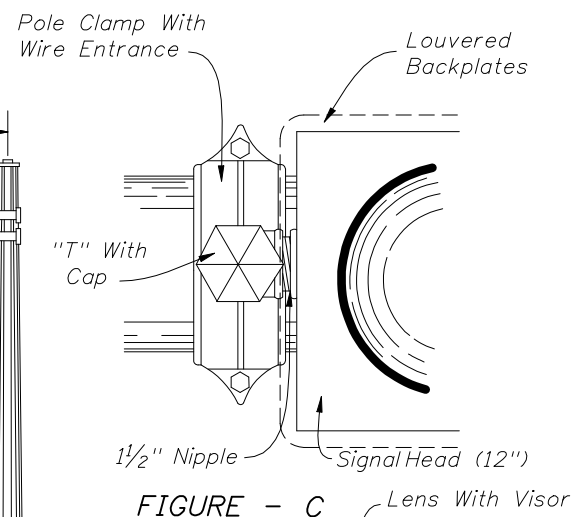


FIGURE - C

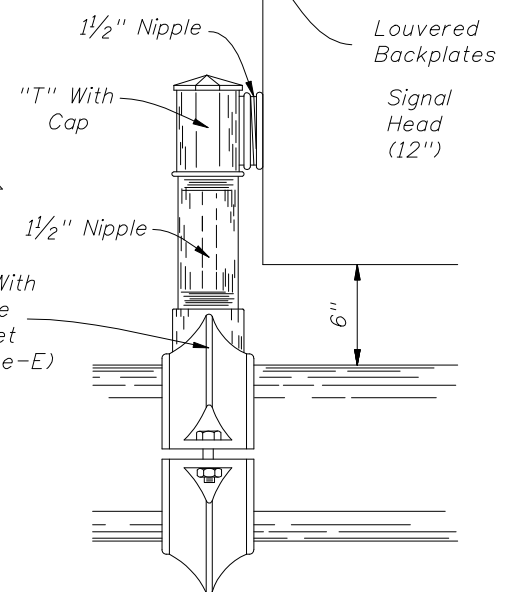


FIGURE - D

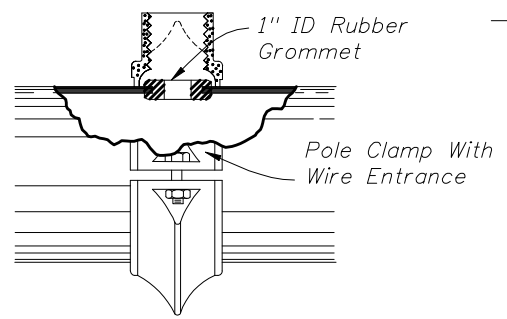


FIGURE - E
SIGNAL HEAD MOUNTING ASSEMBLY

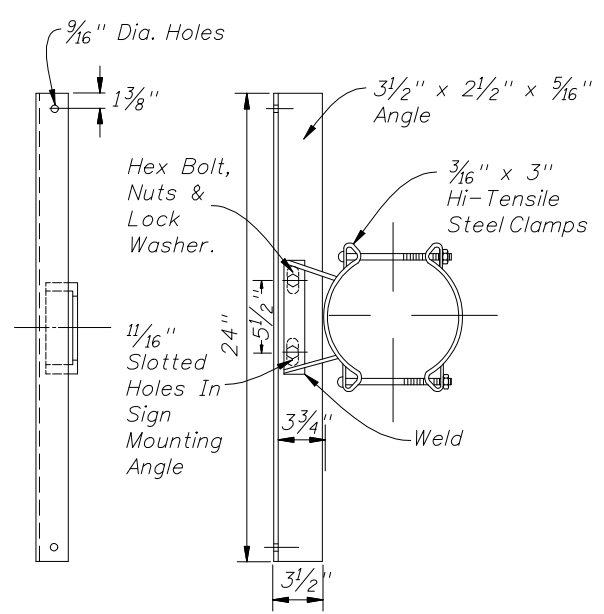


FIGURE - B
SIGN PANEL MOUNTING ASSEMBLY

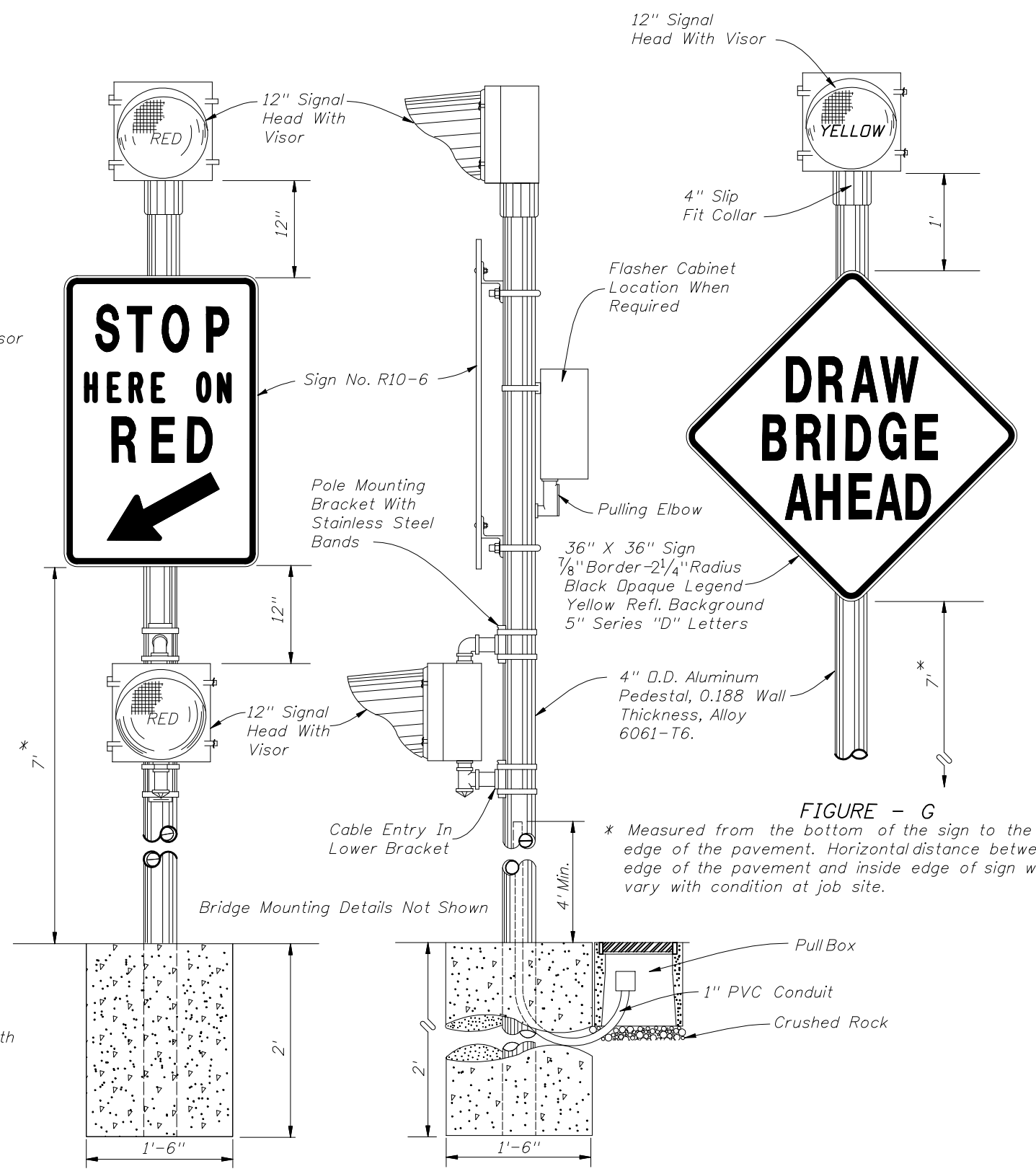
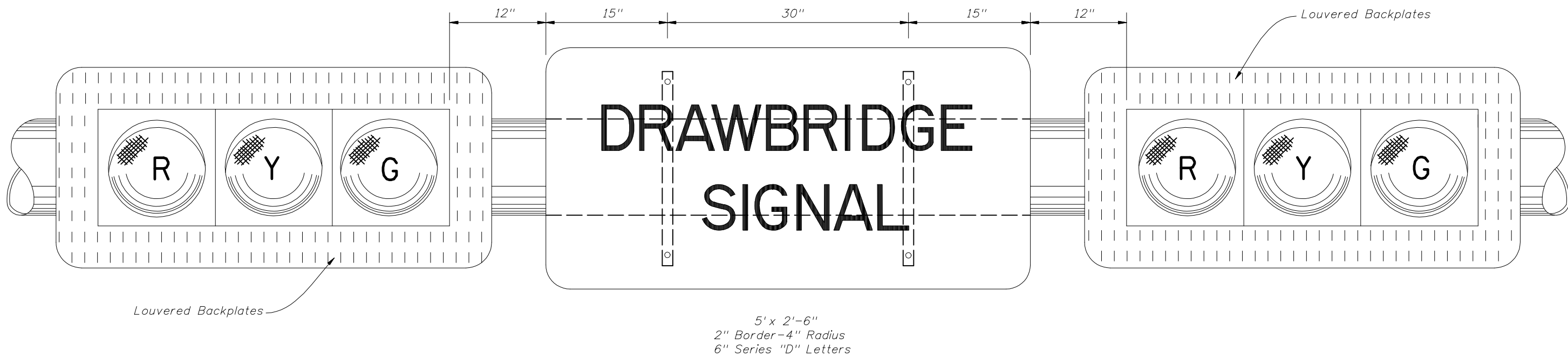
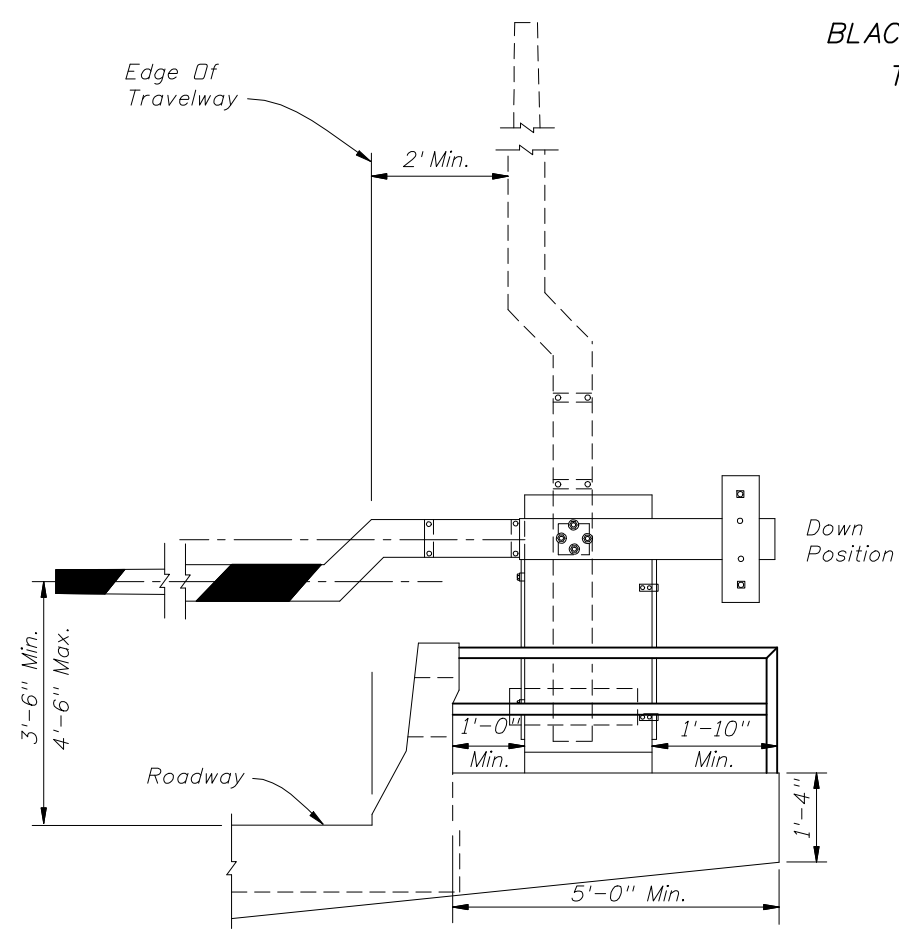


FIGURE - F

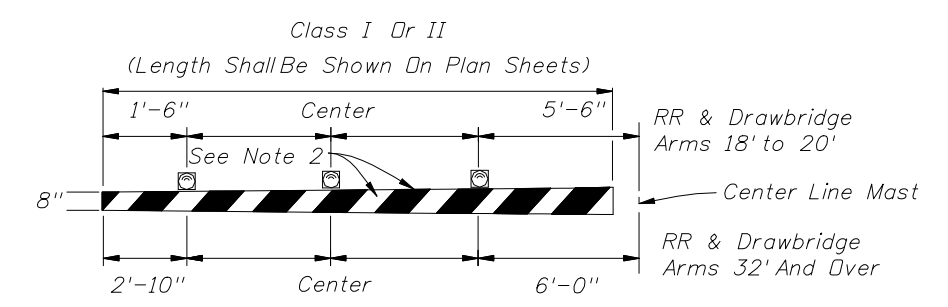
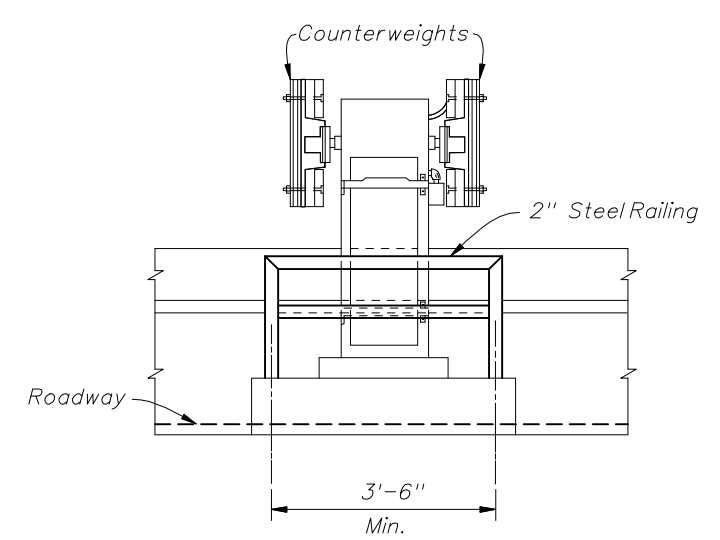
FIGURE - G



BLACK OPAQUE LEGEND AND BORDER ON REFLECTORIZED YELLOW BACKGROUND
 TO BE USED WITH TYPE I OPERATION, AS SHOWN ON PREVIOUS SHEET
 MONOTUBE SUPPORT MOUNTING



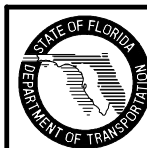
GATE & ARM DETAIL



NOTES:

- 12 volt flashing red lights shall be mounted on gate arm and shall operate in the flashing mode only when gate arm is in the lower position or in the process of being lowered. The number of lights shall vary accordingly to length of the gate arm.
- 16" alternate diagonal fully reflectorized red and white stripes.

TYPICAL LAMP PLACEMENT

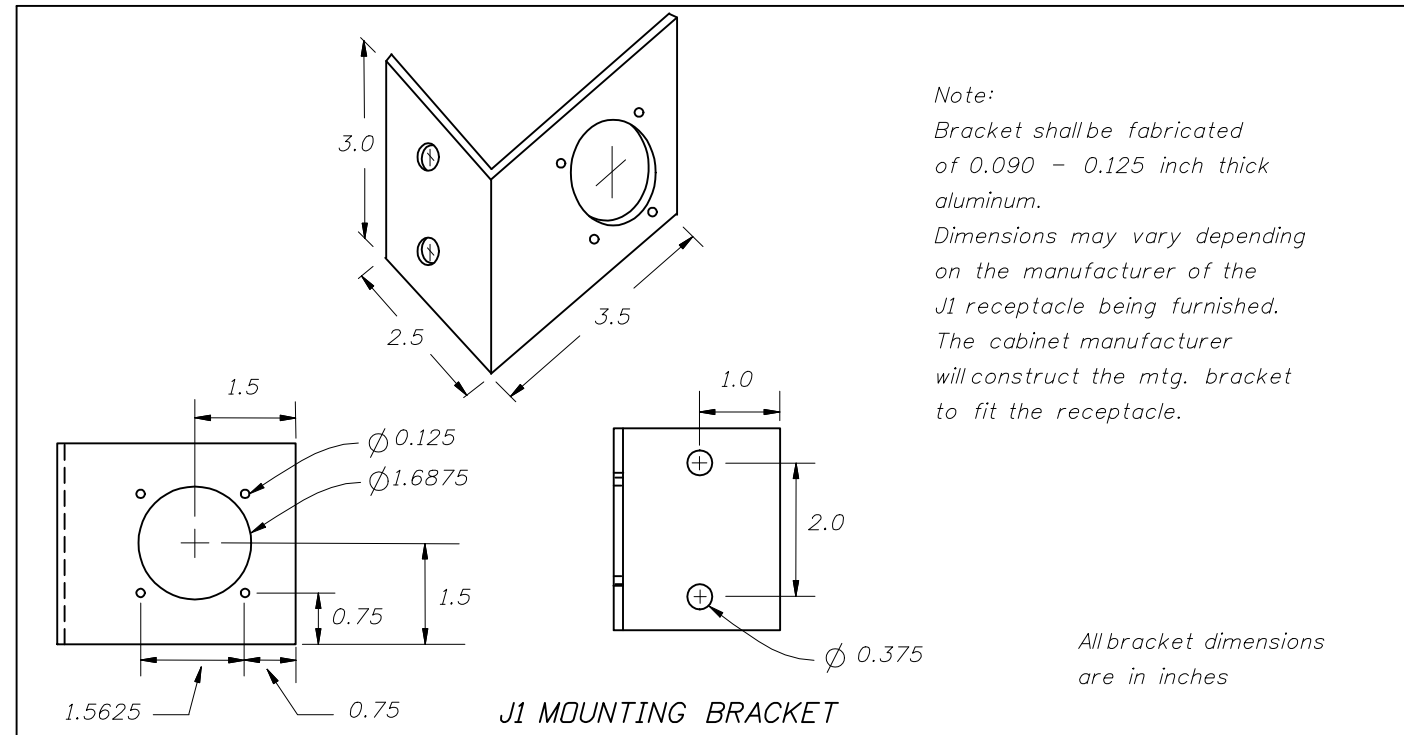
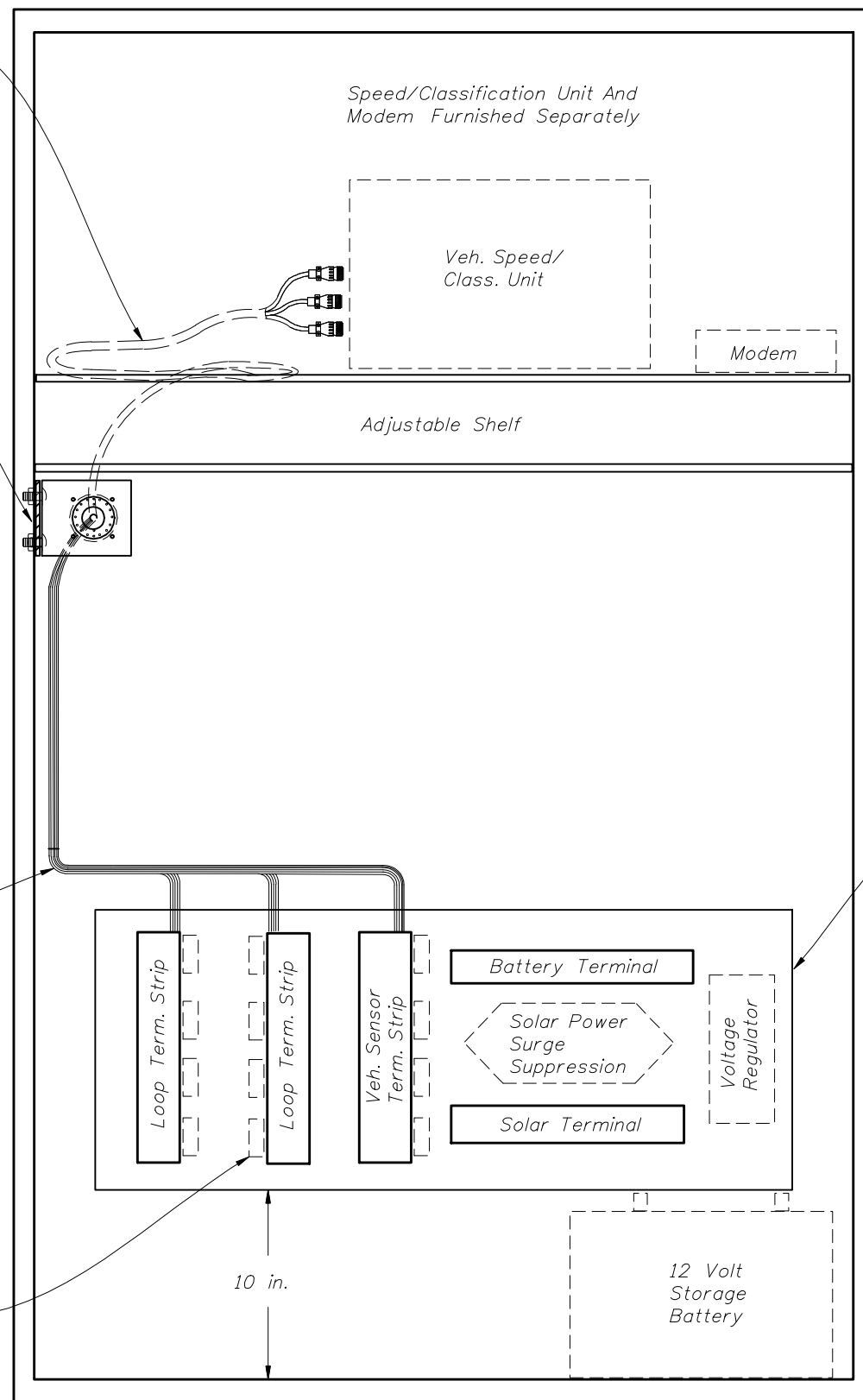


Equipment Cable, 5 ft. Long, Furnished Separately (Ref. Sheet No. 4)

J1 Recept. With Alum. Mtg. Bracket For Lanes 1 To 4 *

Cabinet Cable

Surge Suppressors (Furnished Separately)



1. Traffic monitoring site cabinet includes:
 - A. One adjustable shelf; (equipped as shown)
 - B. One backplane ass'y;
 - C. One J1 receptacle with mounting bracket;
 - D. All associated wiring and wiring harnesses.
2. Basic backplane assembly consists of:
 - A. Two inductive loop terminal strips;
 - B. One vehicle sensor terminal strip;
 - C. One battery terminal strip;
 - D. One solar panel terminal strip.

* The contractor shall be responsible for contacting the FDOT planning office for lane number information and verification.

CABINET LAYOUT DETAIL (For Up To Four Lanes)



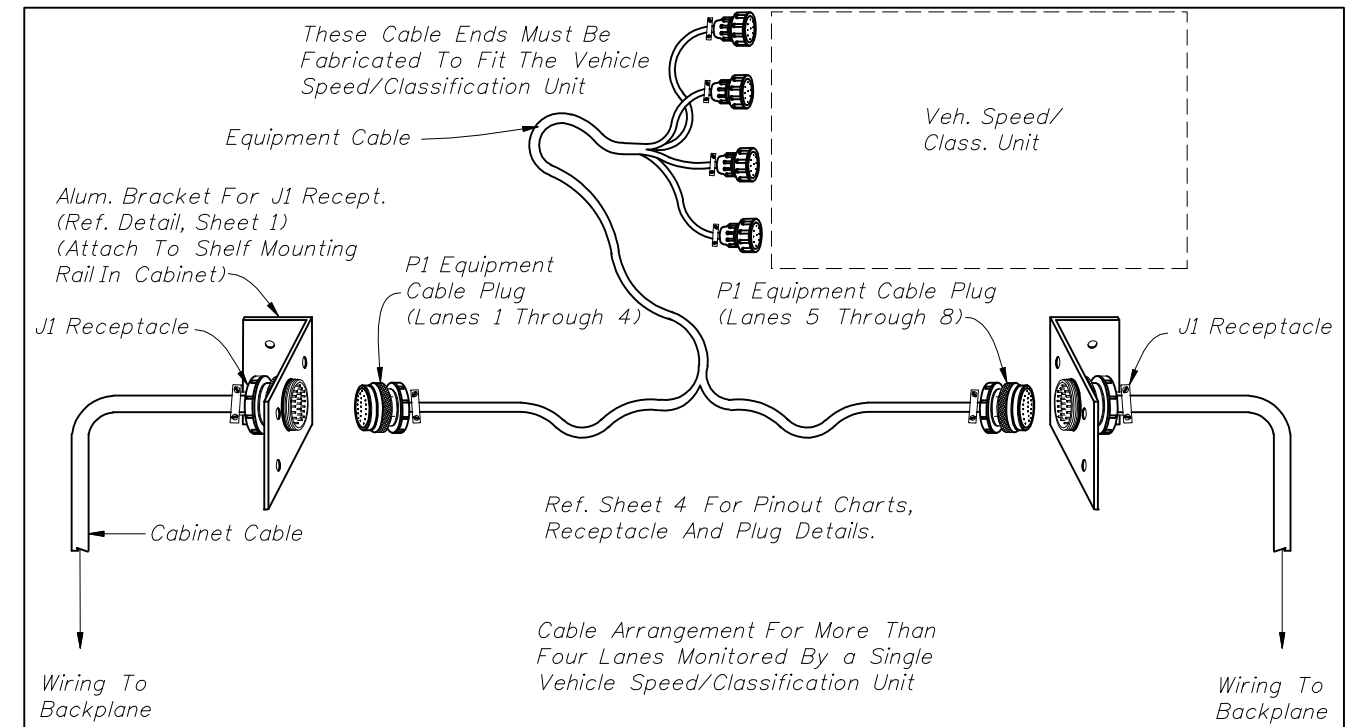
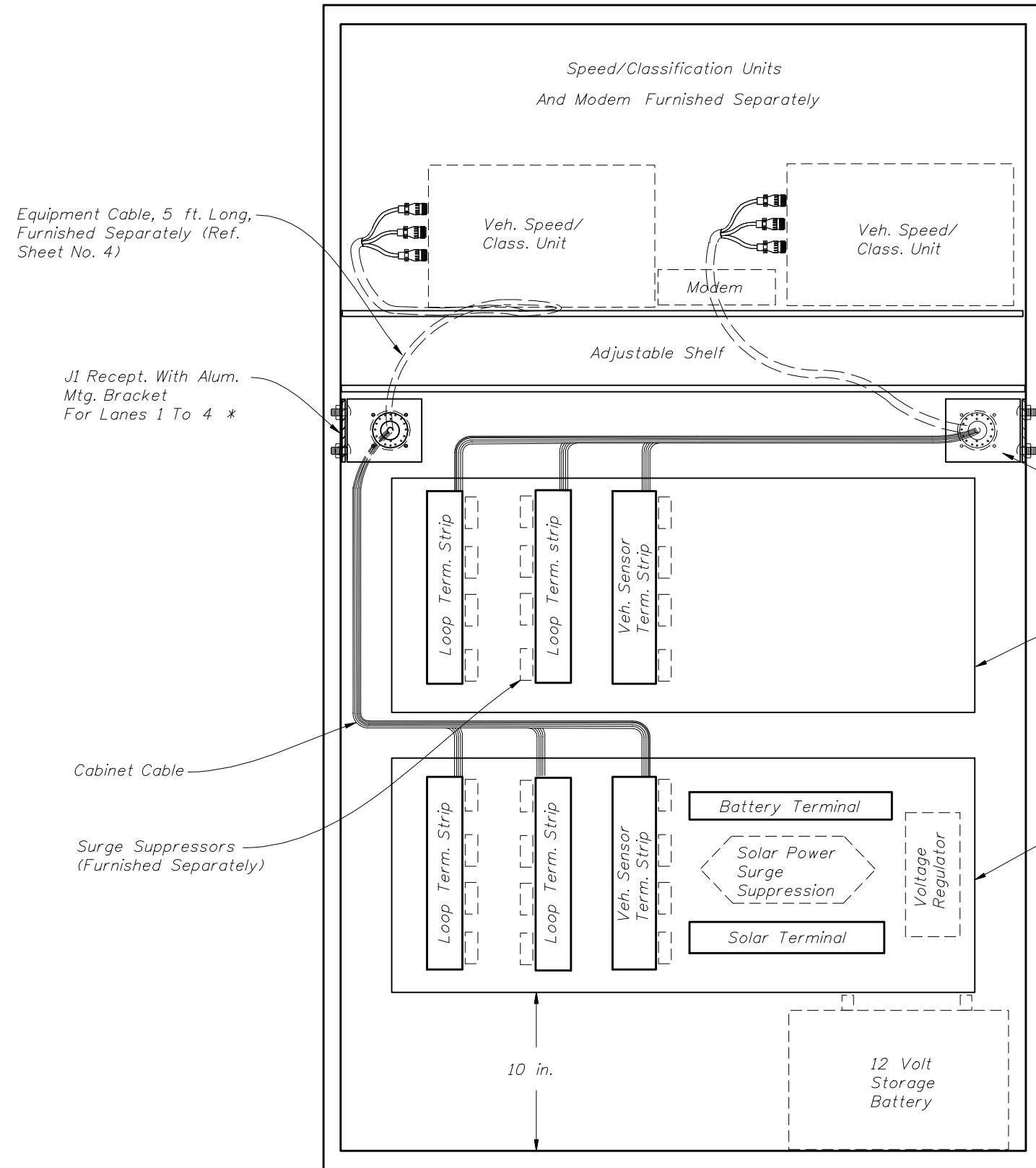
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1. Traffic monitoring site cabinet includes:
 - A. One adjustable shelf;
 - B. Two backplane assemblies (equipped as shown);
 - C. Two J1 receptacles with mtg. brackets;
 - D. All associated wiring and wiring harnesses.
2. Basic backplane assembly consists of:
 - A. Two inductive loop terminal strips;
 - B. One vehicle sensor terminal strip;
 - C. One battery terminal strip;
 - D. One solar panel terminal strip.

* The contractor shall be responsible for contacting the FDOT planning office for lane number information and verification.

CABINET LAYOUT DETAIL (For More Than Four Lanes And Up To Eight Lanes)



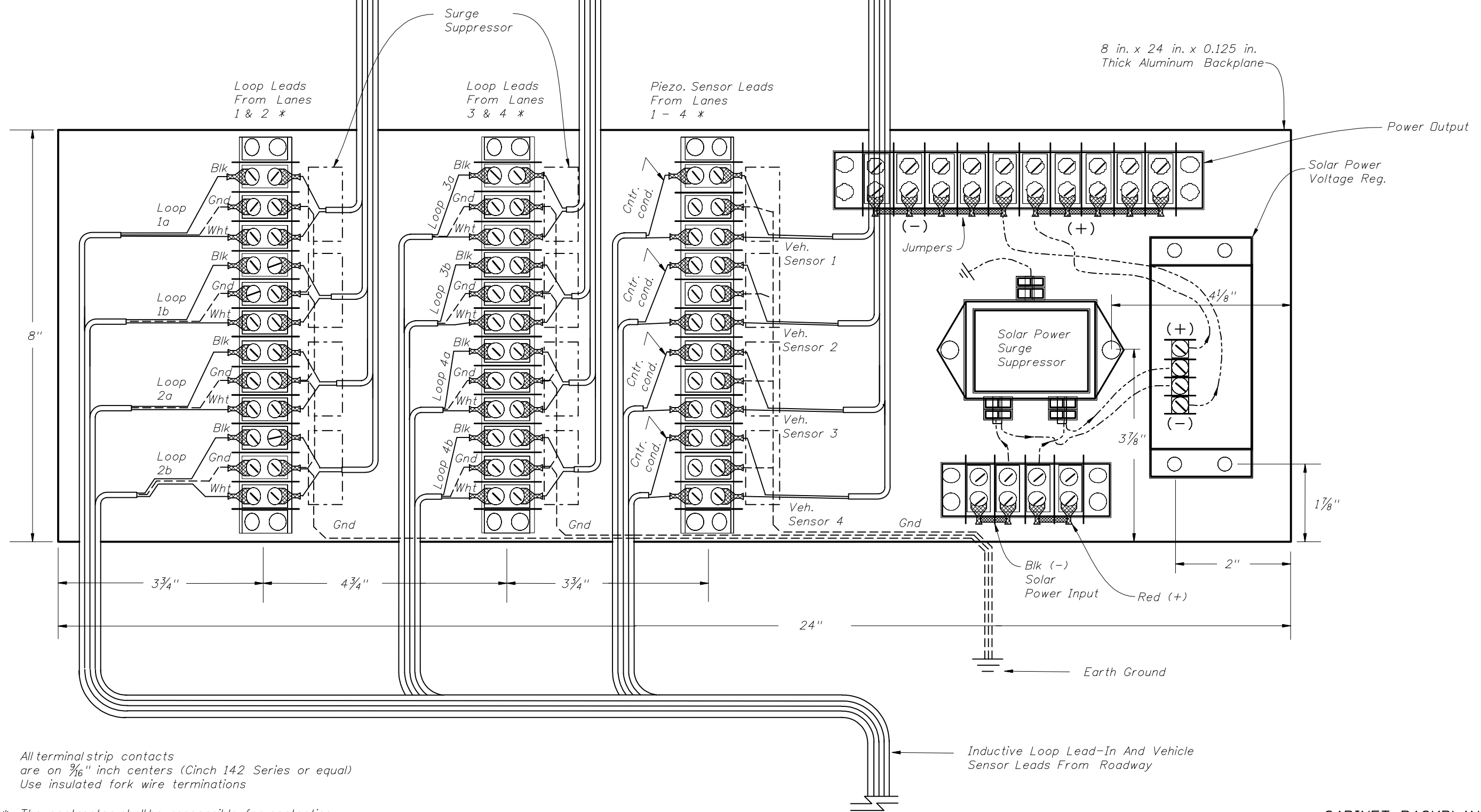
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To J1 Receptacle

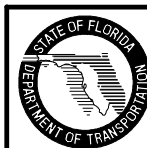
Ref. sheet no. 1 or 2, note 2
for items to be included with backplane



All terminal strip contacts are on 1/16" inch centers (Cinch 142 Series or equal) Use insulated fork wire terminations

* The contractor shall be responsible for contacting the FDOT planning office for lane number information and verification.

CABINET BACKPLANE DETAIL



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Alum. Bracket For J1 Recept.
(Attach To Shelf Mounting Rail
In Cabinet)

J1 Receptacle (Amphenol 28-12
Recept. W/Male Pins And MS
Type Clamp, Or Equal.)

Cabinet Cable

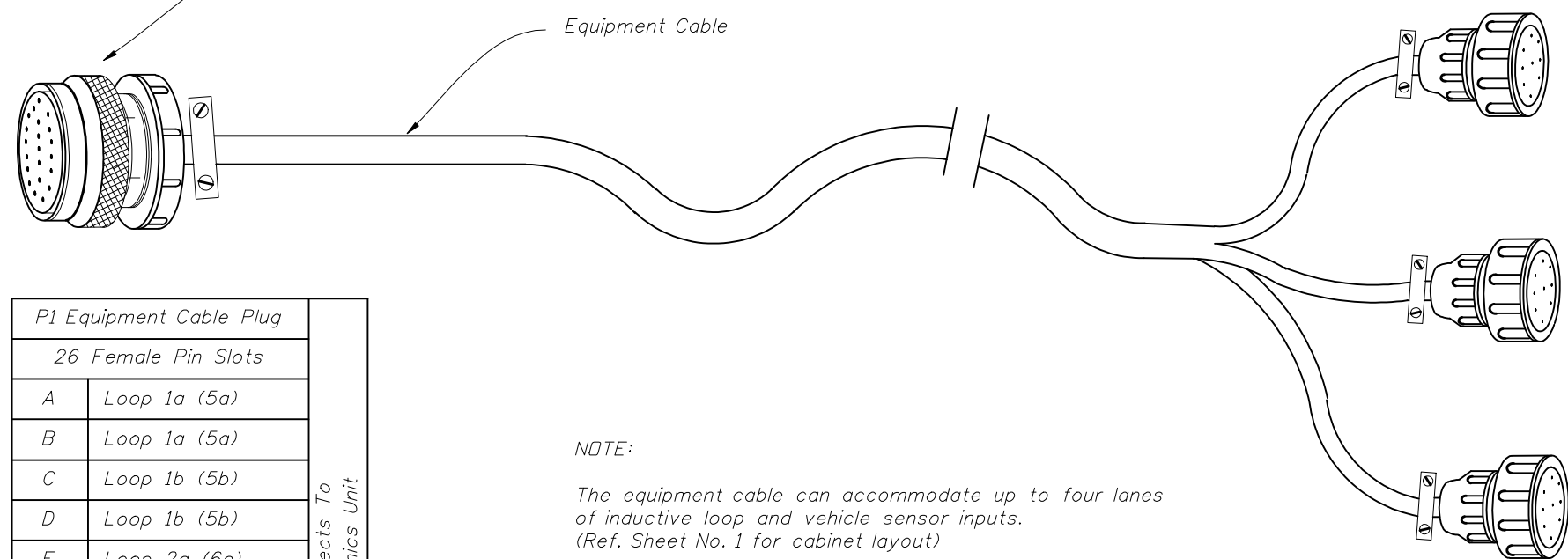
Wiring To
Backplane

J1 Receptacle Pinout	
26 Recessed Male Pins	
A	Loop 1a (5a) yellow
B	Loop 1a (5a) purple
C	Loop 1b (5b) gray
D	Loop 1b (5b) pink
E	Loop 2a (6a) brown
F	Loop 2a (6a) blue
G	Loop 2b (6b) orange
H	Loop 2b (6b) tan
J	Loop 3a (7a) white
K	Loop 3a (7a) green
L	Loop 3b (7b) red
M	Loop 3b (7b) black
N	Gnd
P	Loop 4a (8a) w/yellow
R	Loop 4a (8a) w/purple
S	Loop 4b (8b) w/gray
T	Loop 4b (8b) w/brown
U	Piezo 1 (5) (+) w/blue
V	Piezo 1 (5) sh w/orange
W	Piezo 2 (6) (+) w/green
X	Piezo 2 (6) sh w/red
Y	Piezo 3 (7) (+) w/black
Z	Piezo 3 (7) sh w/red/blk
a	Piezo 4 (8) (+) red/green
b	Piezo 4 (8) sh red/yellow
d	Gnd red/black

P1 Equipment Cable Plug
(Amphenol 28-12 Plug W/Female Pin Slots
And MS Type Clamp, Or Equal.)

Equipment Cable

These Cable Ends Must Be
Fabricated To Fit The Vehicle
Speed/Classification Unit



P1 Equipment Cable Plug		Connects To Electronics Unit
26 Female Pin Slots		
A	Loop 1a (5a)	Connects To Electronics Unit
B	Loop 1a (5a)	
C	Loop 1b (5b)	
D	Loop 1b (5b)	
E	Loop 2a (6a)	
F	Loop 2a (6a)	
G	Loop 2b (6b)	
H	Loop 2b (6b)	
N	Gnd	Connects To Electronics Unit
J	Loop 3a (7a)	
K	Loop 3a (7a)	
L	Loop 3b (7b)	
M	Loop 3b (7b)	
P	Loop 4a (8a)	
R	Loop 4a (8a)	
S	Loop 4b (8b)	
T	Loop 4b (8b)	
d	Gnd	Connects To Electronics Unit
U	Piezo 1 (5) (+)	
V	Piezo 1 sh	
W	Piezo 2 (6) (+)	
X	Piezo 2 sh	
Y	Piezo 3 (7) (+)	
Z	Piezo 3 sh	
a	Piezo 4 (8) (+)	
b	Piezo 4 sh	

NOTE:

The equipment cable can accommodate up to four lanes of inductive loop and vehicle sensor inputs. (Ref. Sheet No. 1 for cabinet layout)

For more than four lanes and up to eight lanes of inputs, the following options are available:

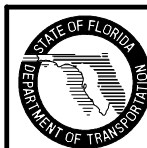
1. A second Vehicle Speed/Class. Unit and separate equipment cable connecting to a second J1 receptacle; or
2. A single Vehicle Speed/Class. Unit capable of up to eight lanes of inputs and a single equipment cable with split ends to fit two J1 receptacles. (Ref. Sheet 2 detail)

Numbers in parenthesis in the pinout chart identify lane numbers when a second backplane for lanes 5 through 8 is required.

NOTE:

The contractor shall be responsible for contacting the FDOT planning office for lane number information and verification.

EQUIPMENT CABLE DETAIL

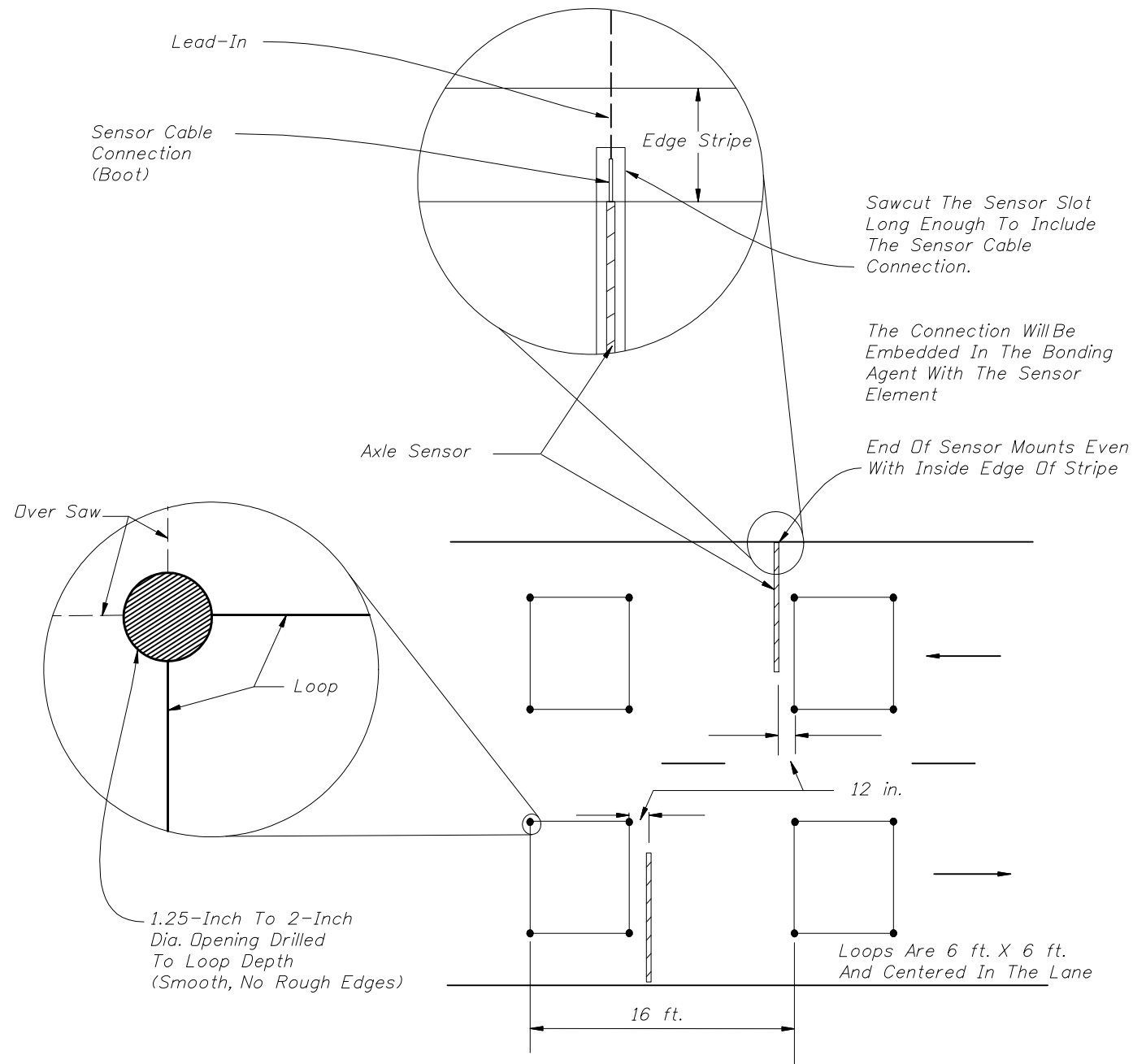


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SPEED/CLASSIFICATION LOOP ASSEMBLY WITH AXLE SENSORS PLACEMENT DETAIL



Sawcut The Sensor Slot Long Enough To Include The Sensor Cable Connection.

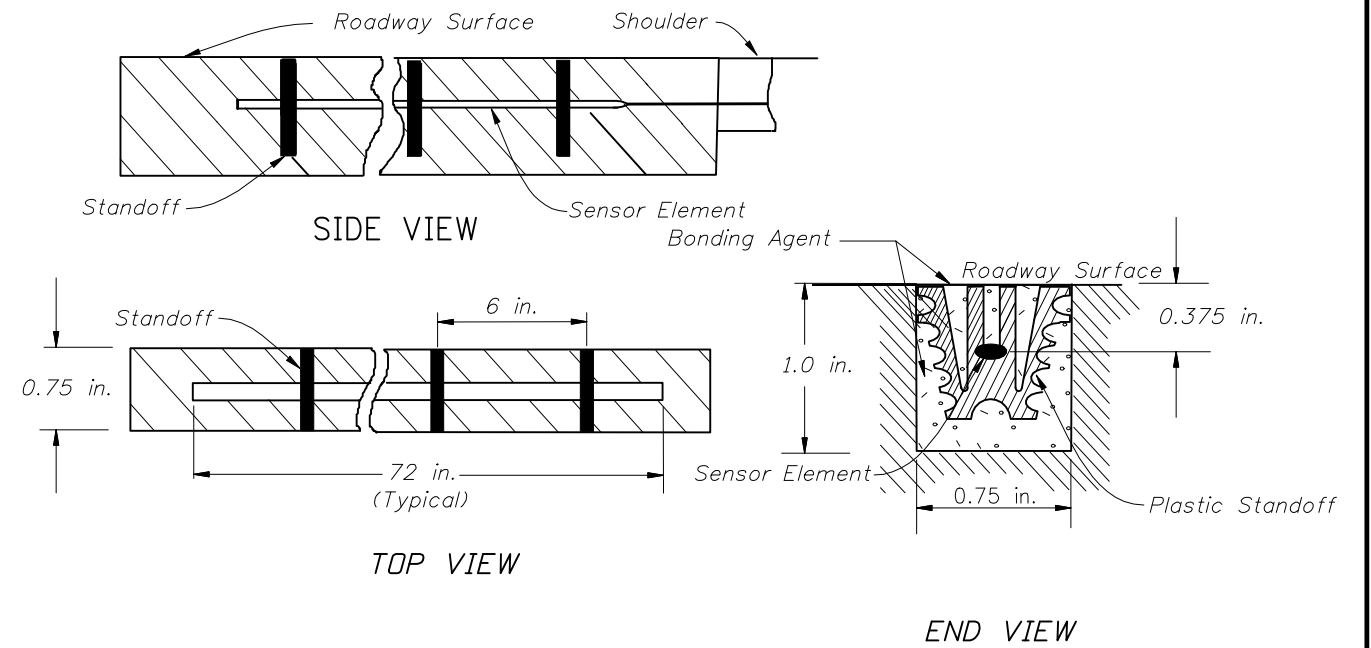
The Connection Will Be Embedded In The Bonding Agent With The Sensor Element

Note:
Loop slots shall be 0.25 inches wide (max.) by 1.5 inches to 2 inches deep. Four turns of #12 AWG, type XHHW stranded copper wire shall be placed in the slot. Backer rod shall be used to hold the loop wire in the bottom of the slot.

Loop leads shall be twisted at the rate of 10 to 12 twists per foot. The twisted pair shall extend to the pullbox with three feet of spare length coiled in the pullbox.

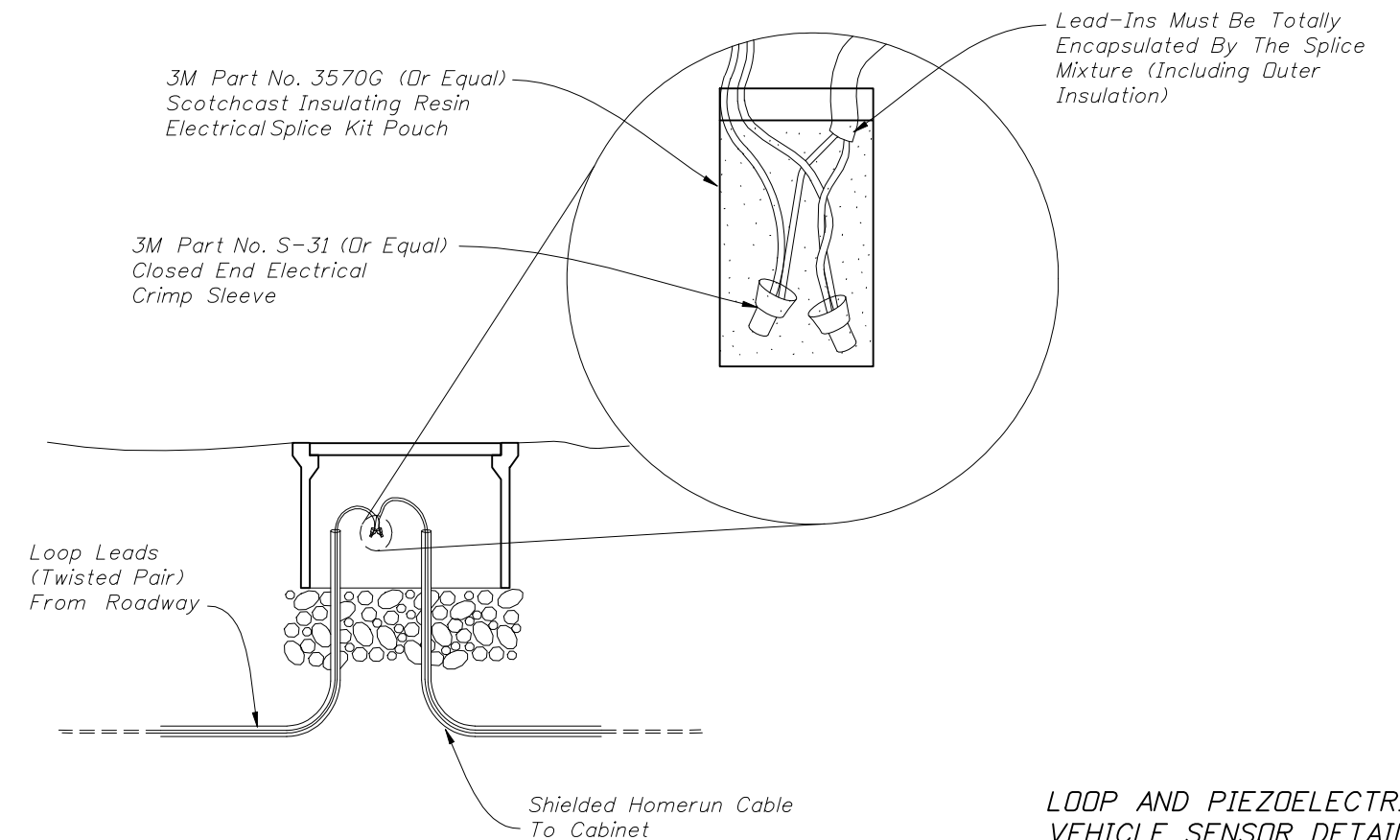
The contractor shall be responsible for contacting the FDOT office for lane number information and verification. All leads shall be labeled with permanent marker to indicate their lane number and position. For example: The leading loop in lane 1 is marked as "1A". The trailing loop (if present) is marked as "1B". The axle sensor (if present) is marked as "P1". And so on for all lanes.

TYPICAL UNENCAPSULATED CLASS II VEHICLE SENSOR

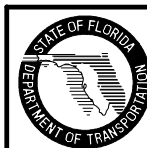


Note:
These are typical dimensions. actual dimensions, element cross-sections and standoffs may vary depending on manufacturer and model.

LOOP WIRE / HOMERUN CABLE SPLICES



LOOP AND PIEZOELECTRIC VEHICLE SENSOR DETAIL



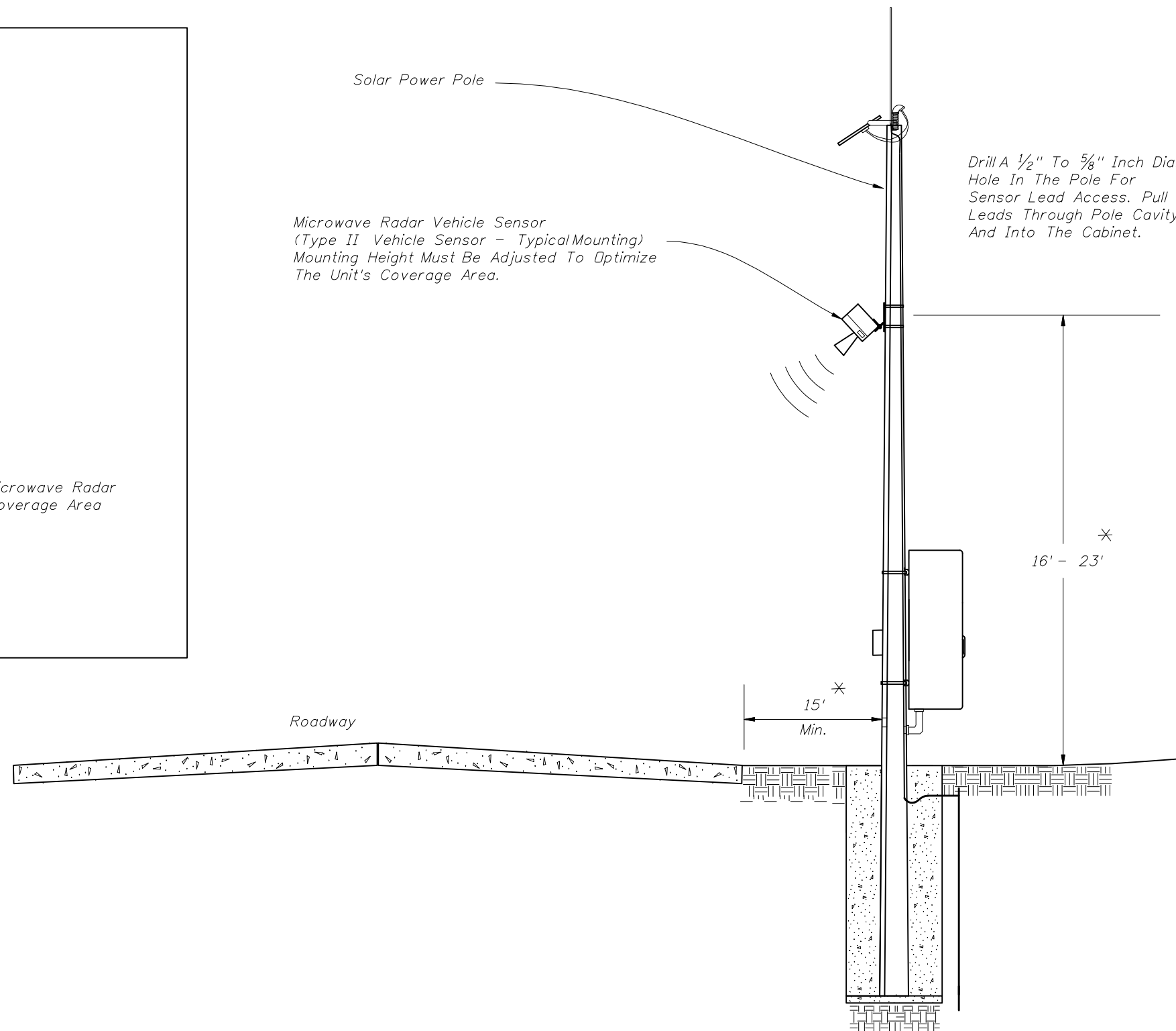
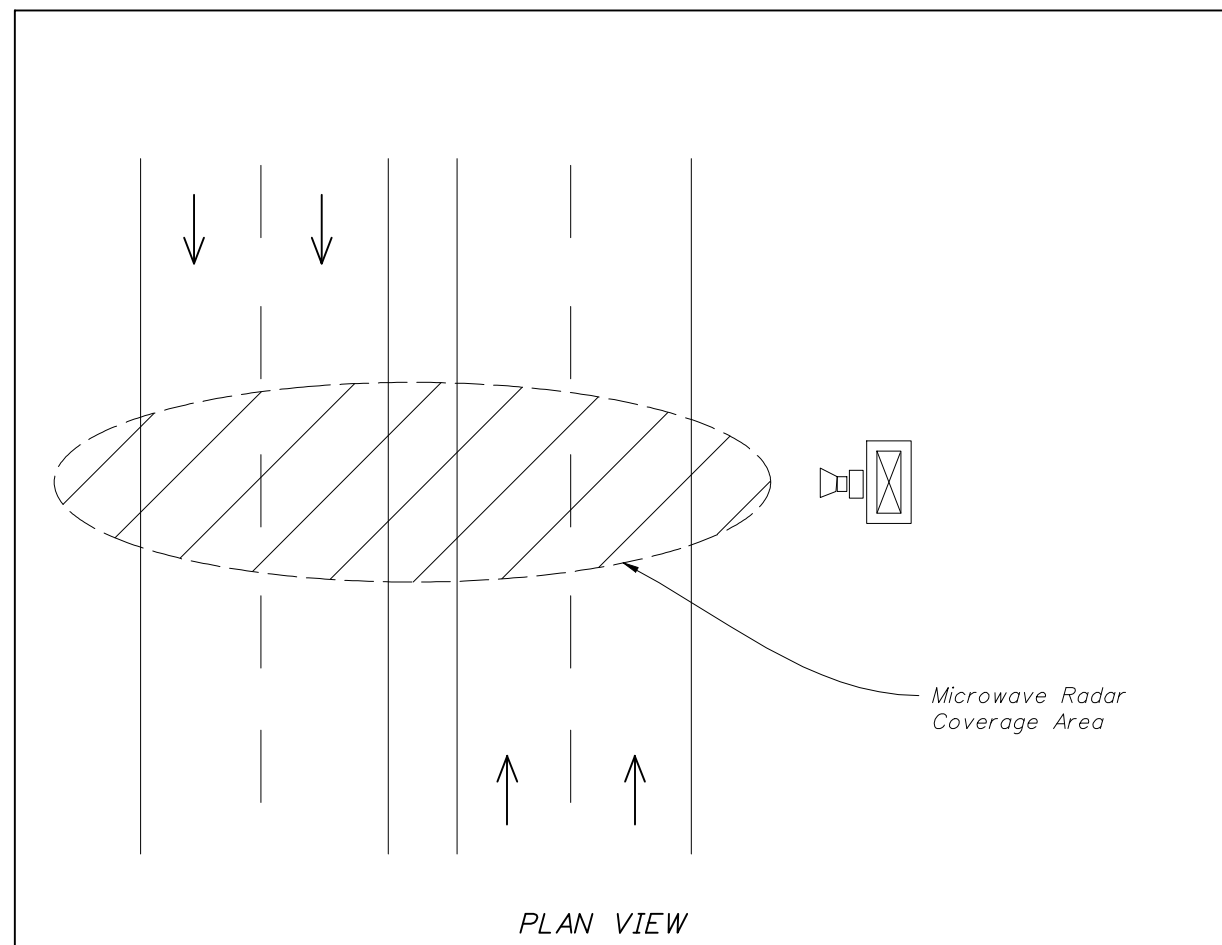
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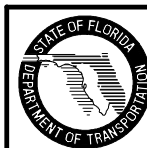


The Unit Must Be Capable Of Detecting Up To Eight Lanes Of Traffic (In Either Or Both Directions) When Mounted Perpendicular To The Roadway.

Coverage Area Of The Unit Is Affected By The Roadway Geometry: Distance From The Travel Lanes, Median Type And Width, Barrier Walls, Etc.

* Mounting height of the unit and offset from the roadway must be determined on a site-by-site basis, in accordance with the manufacturer's recommended guidelines and existing clear zone requirements.

TYPE II VEHICLE SENSOR MICROWAVE RADAR

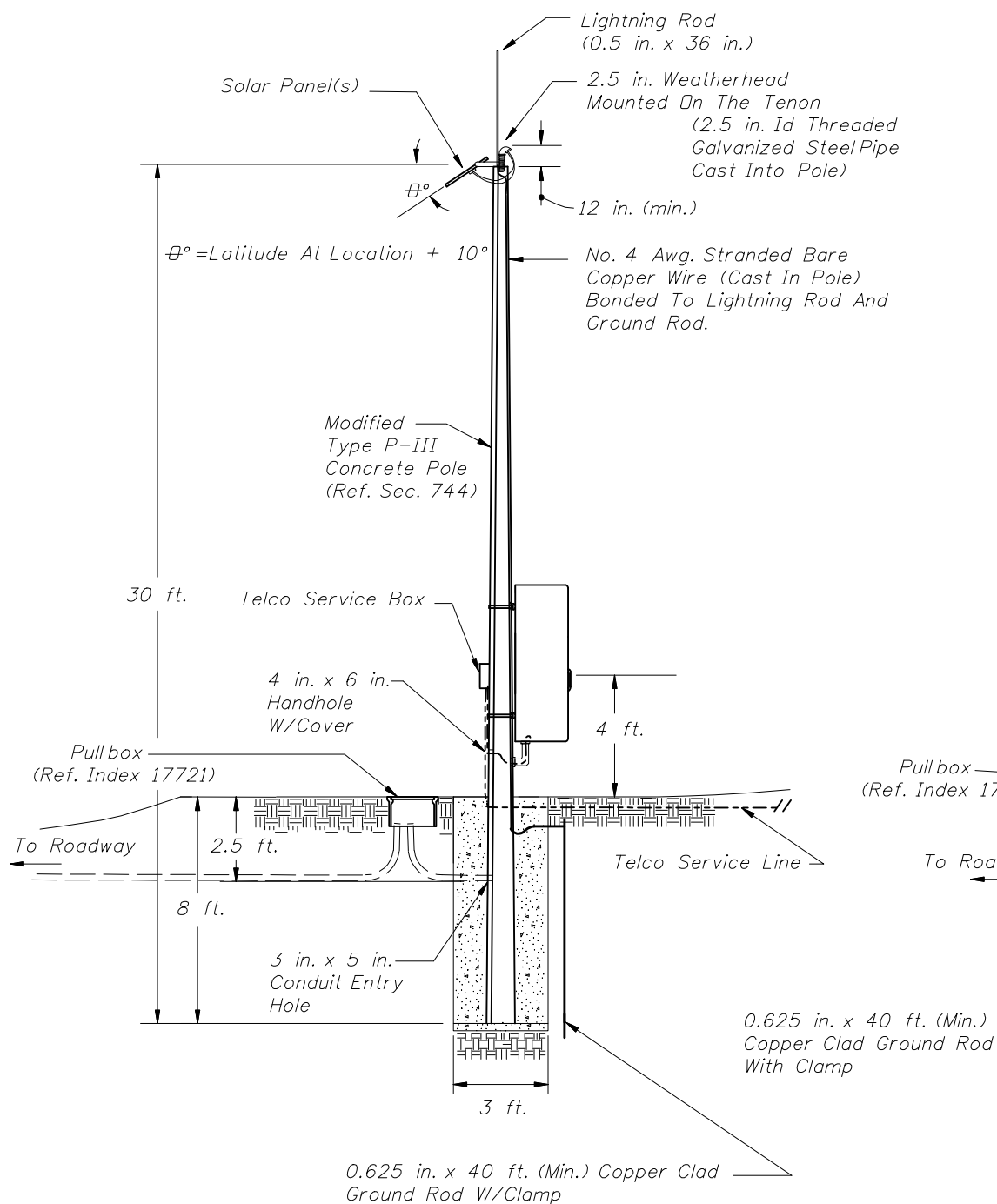


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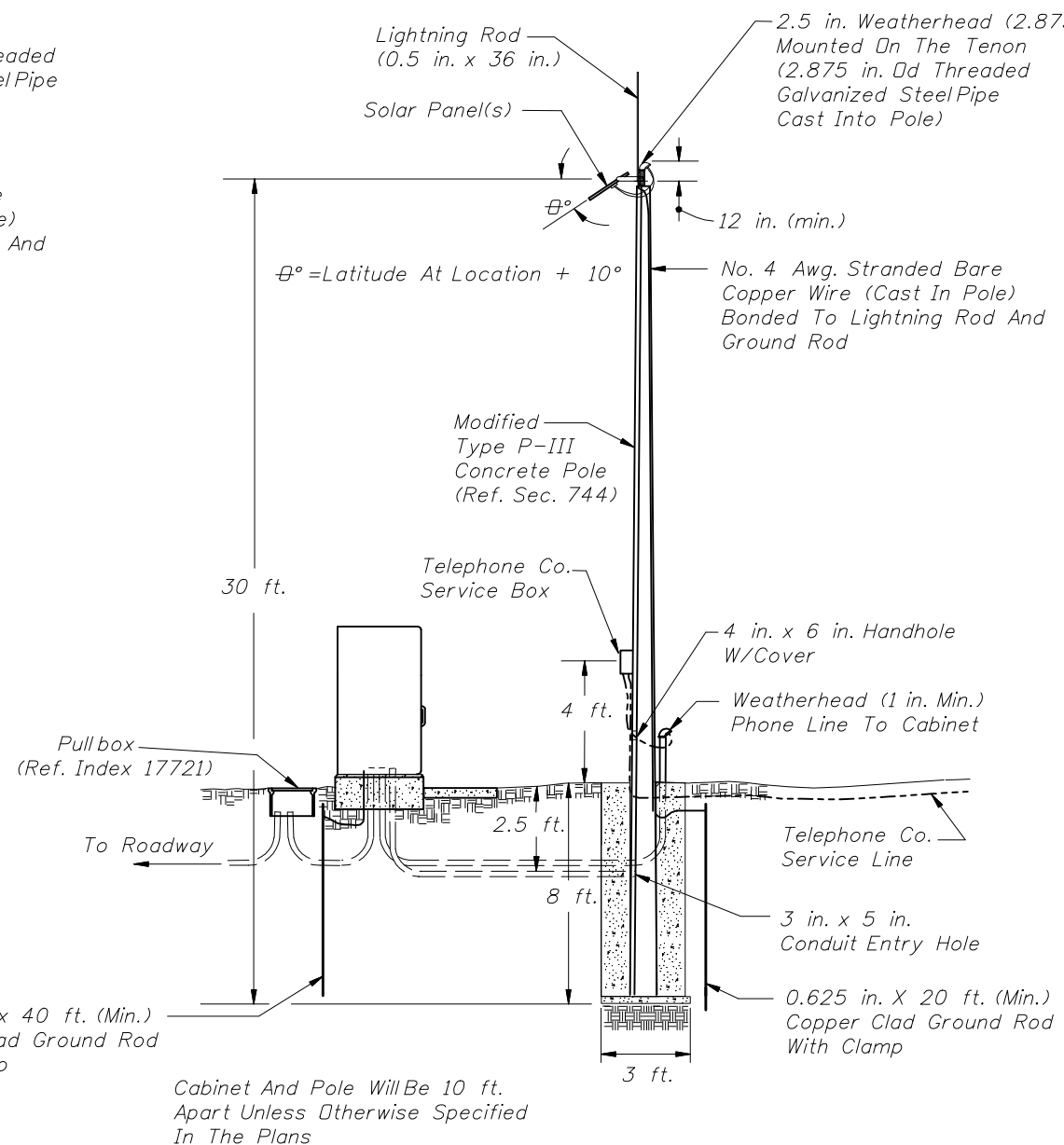
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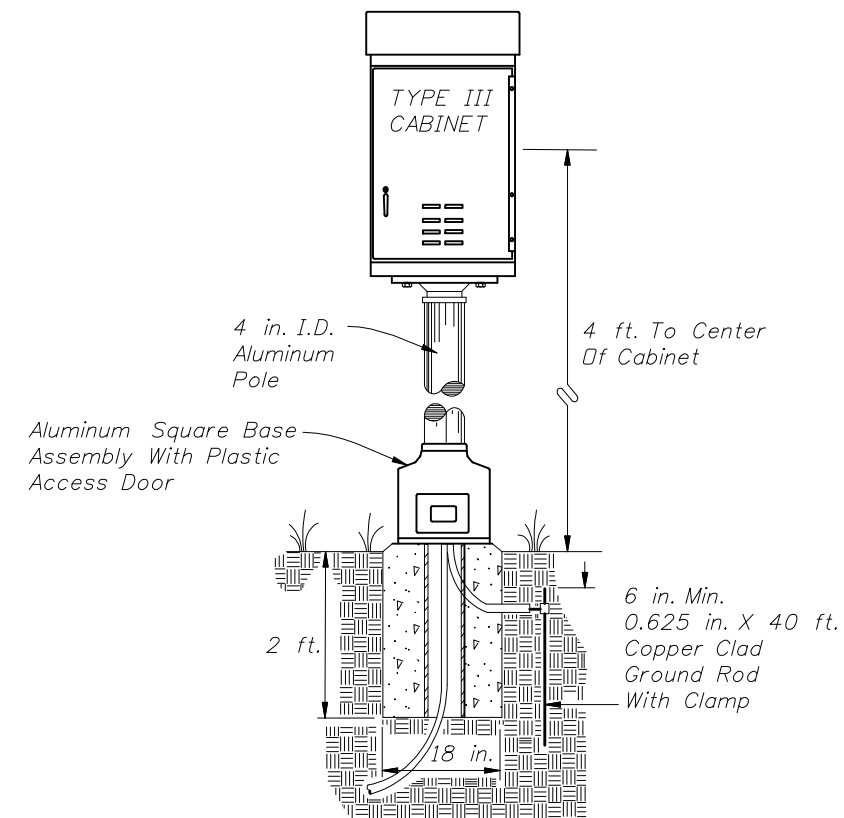
Note: Cabinet installed per Index 17841 except cabinet center will be 4 feet above grade.



SOLAR POWER POLE WITH POLE MTD. CABINET



SOLAR POWER POLE WITH BASE MTD. CABINET



PEDESTAL MTD. CABINET

Wire for Solar Panel Array installations shall be #10 AWG stranded copper, Red insulation is THHN or THWN for positive 12 volts wiring, Black insulation is THHN or THWN for negative, 12 volts wiring, Green insulation is THHN or THWN for ground bonding of the solar panel frame to the pole and earth.

Pole placement shall be in accordance with section 125.4 and 125.8.2 of the Standard Specifications.

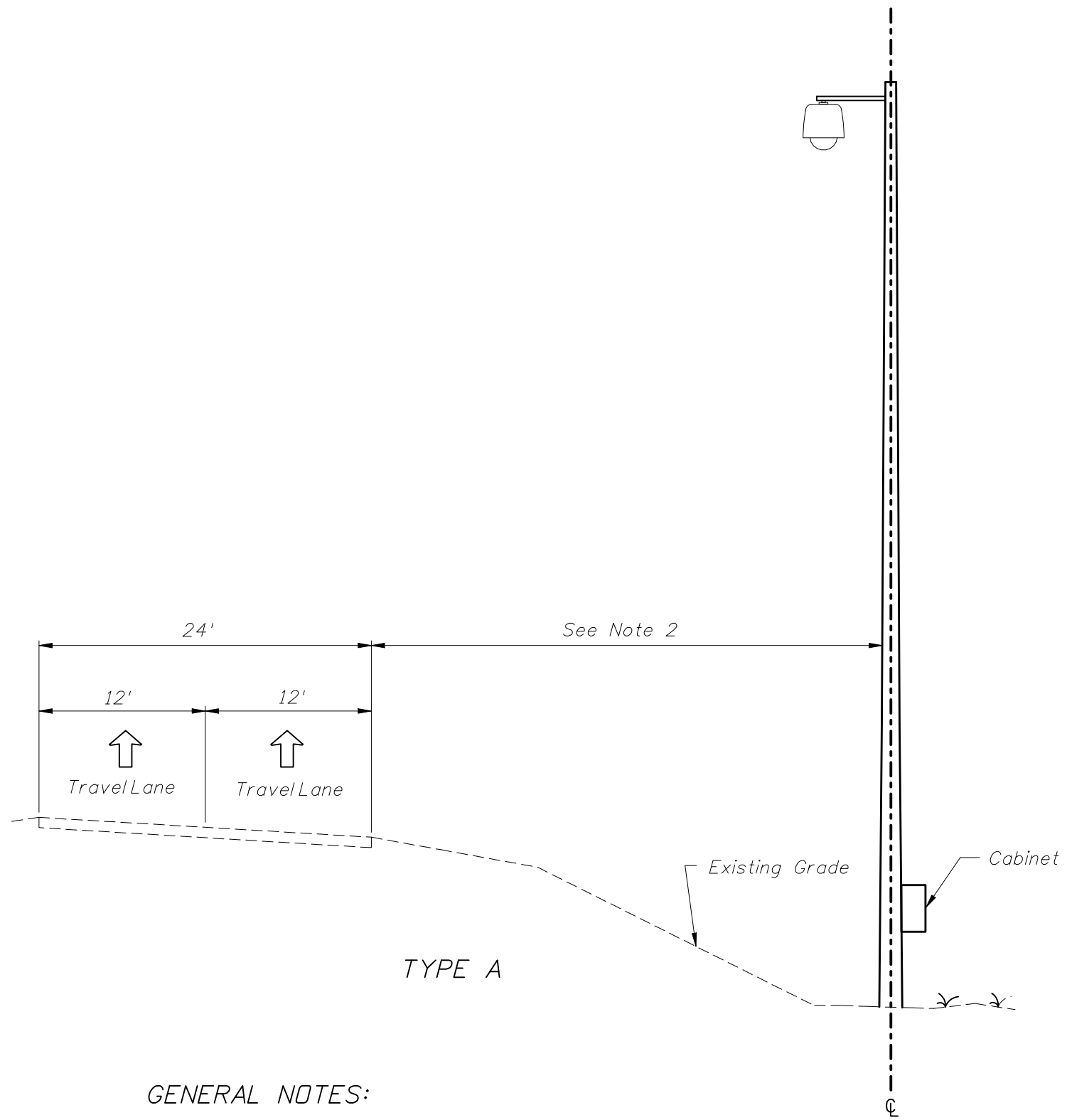
SOLAR POWER POLE DETAIL



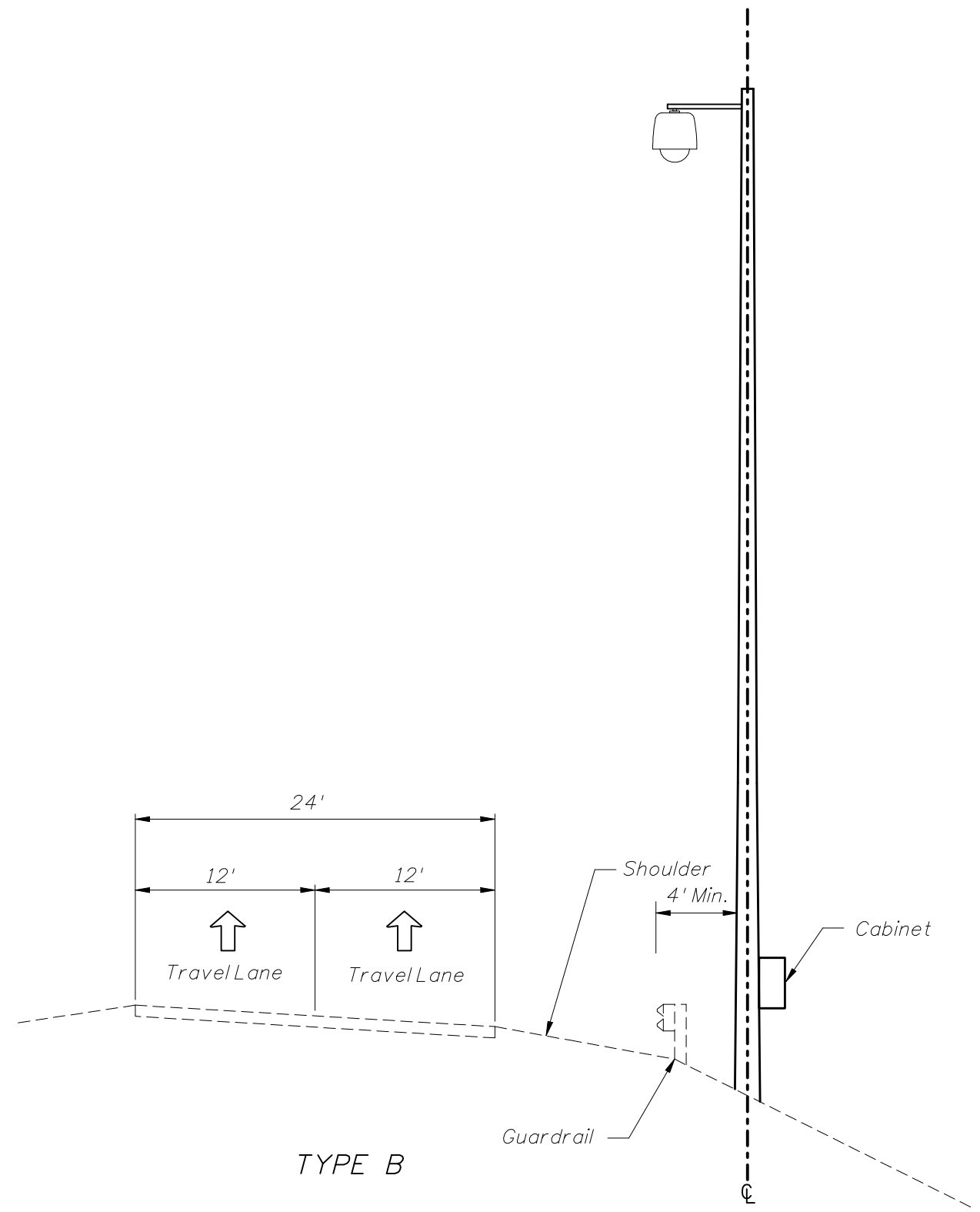
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TYPE A



TYPE B

GENERAL NOTES:

1. For location where pole foundation is lower than roadway, mount CCTV cabinet on pole. Clear zone shall be measured to the edge of drilled shaft if drilled shaft is more than 4" above adjacent grade.
2. Distance must be in accordance with project design documents and greater than or equal to minimum clear zone requirements.

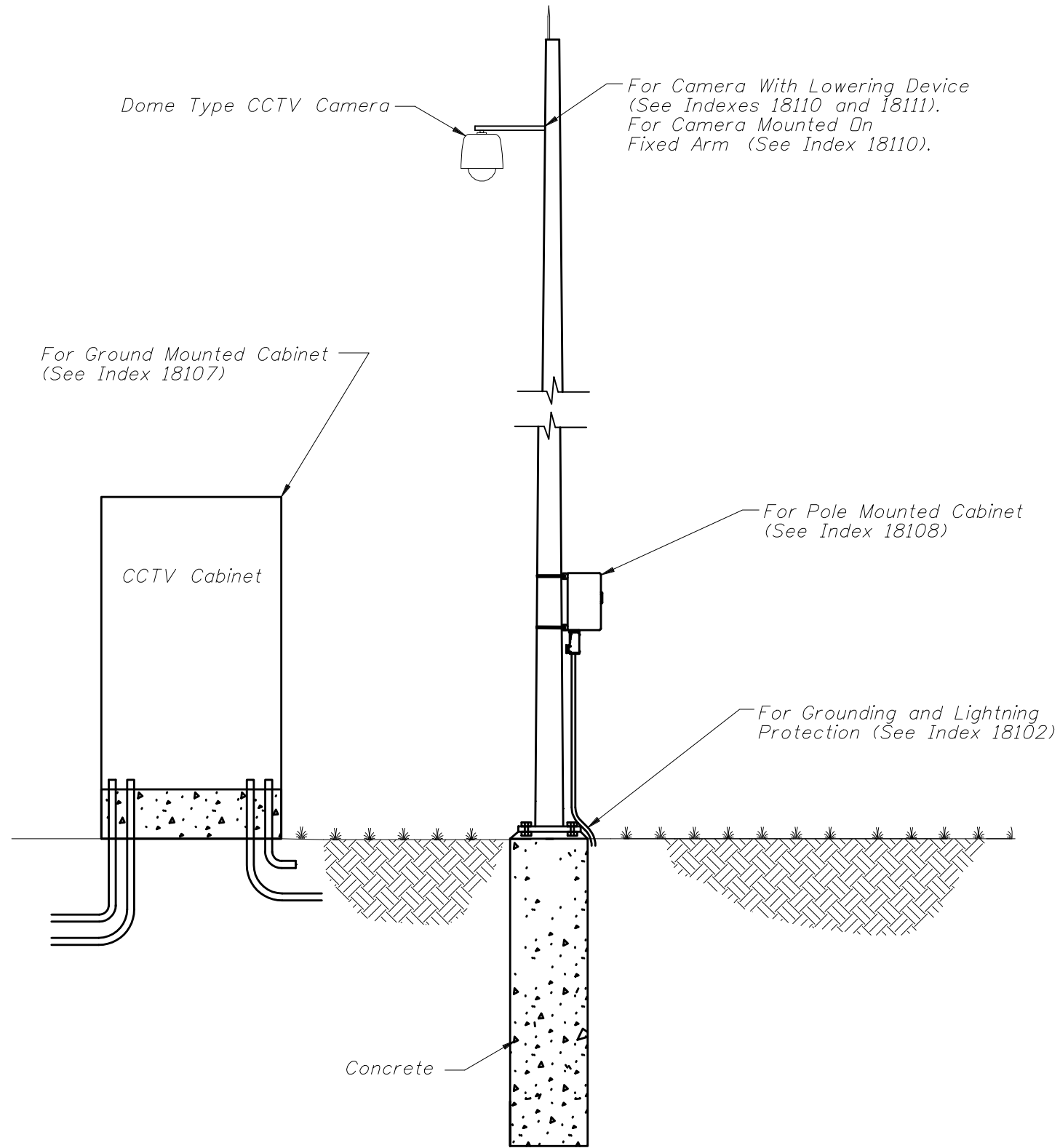
Not To Scale



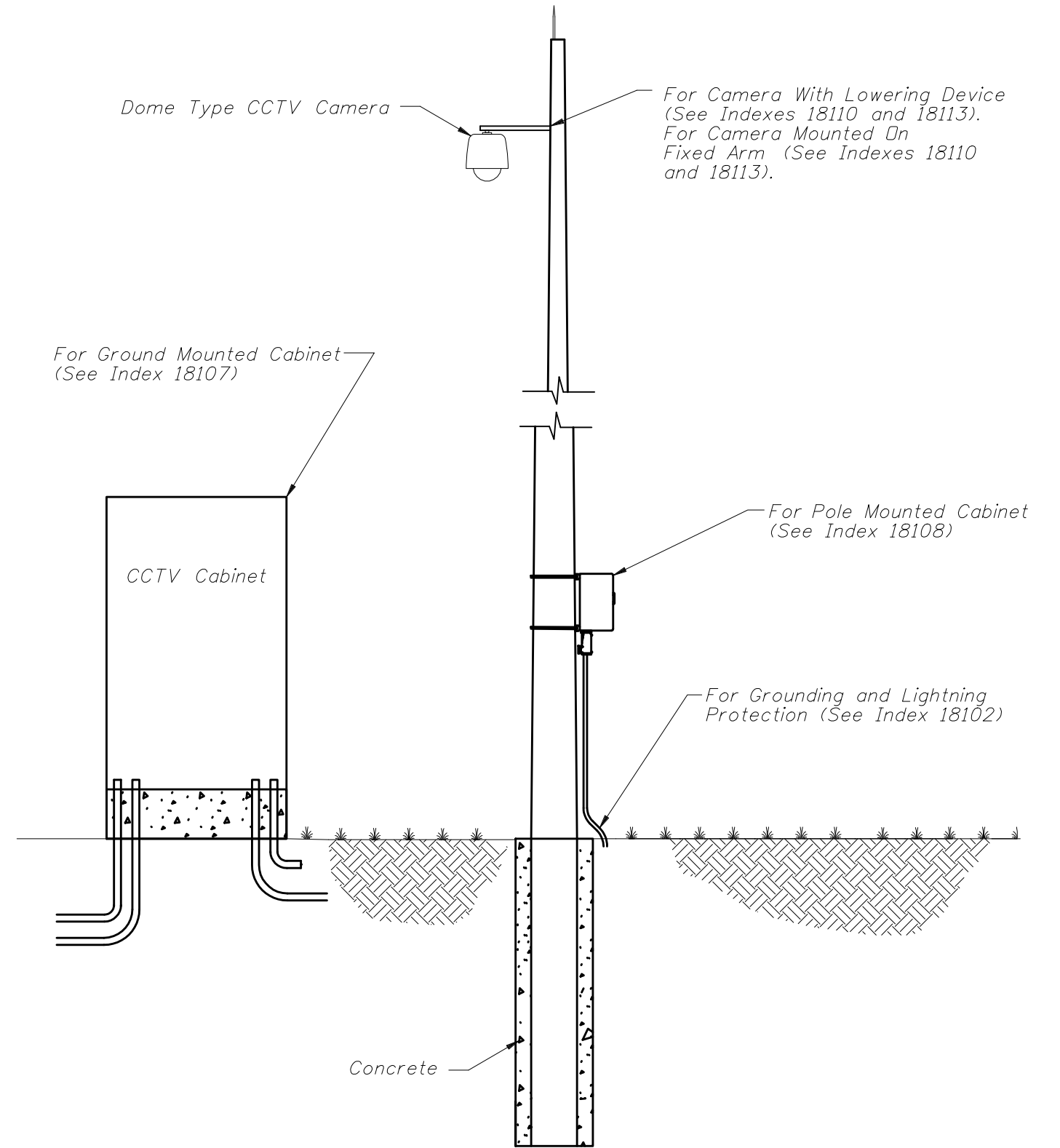
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CCTV POLE PLACEMENT

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STEEL POLE



CONCRETE POLE

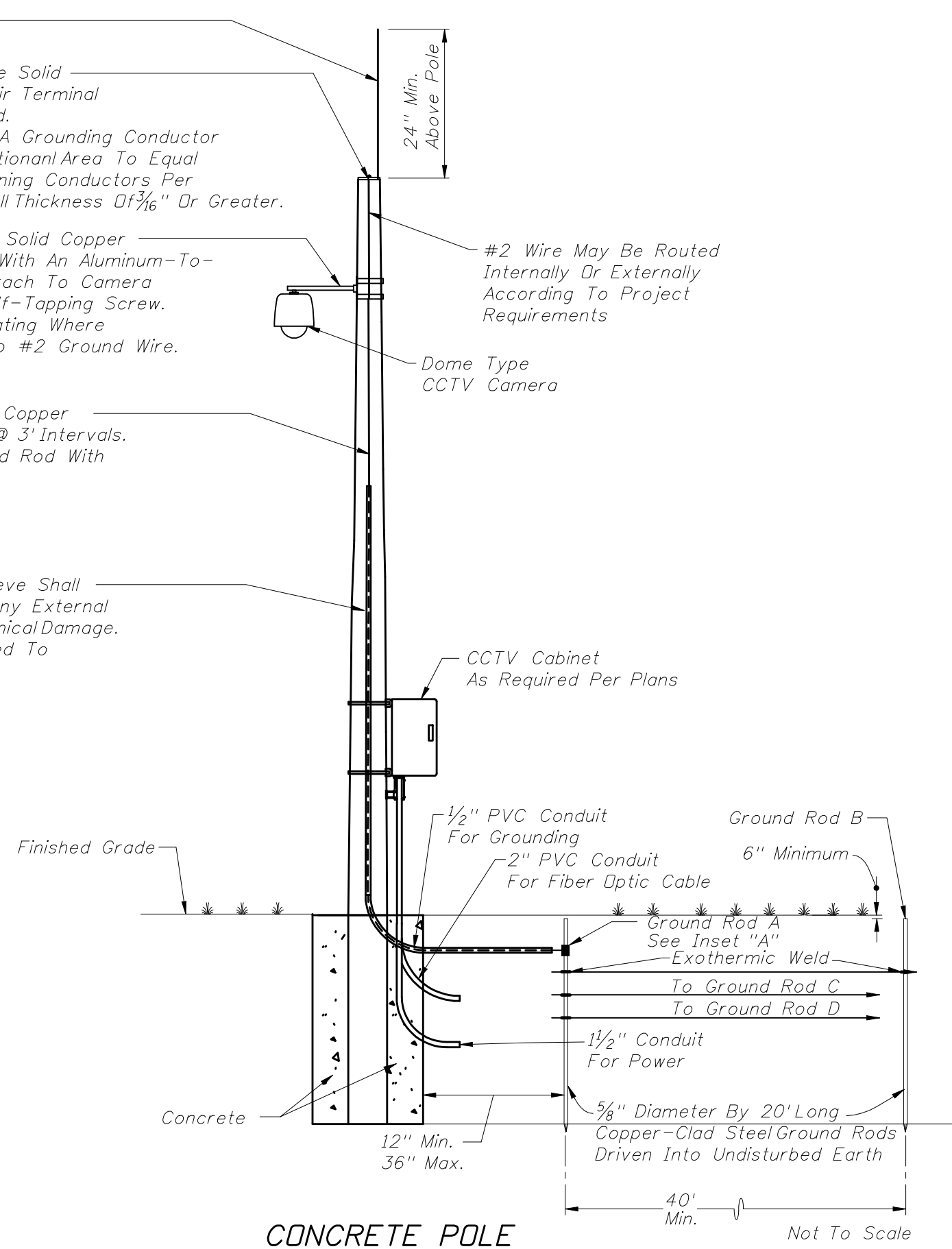
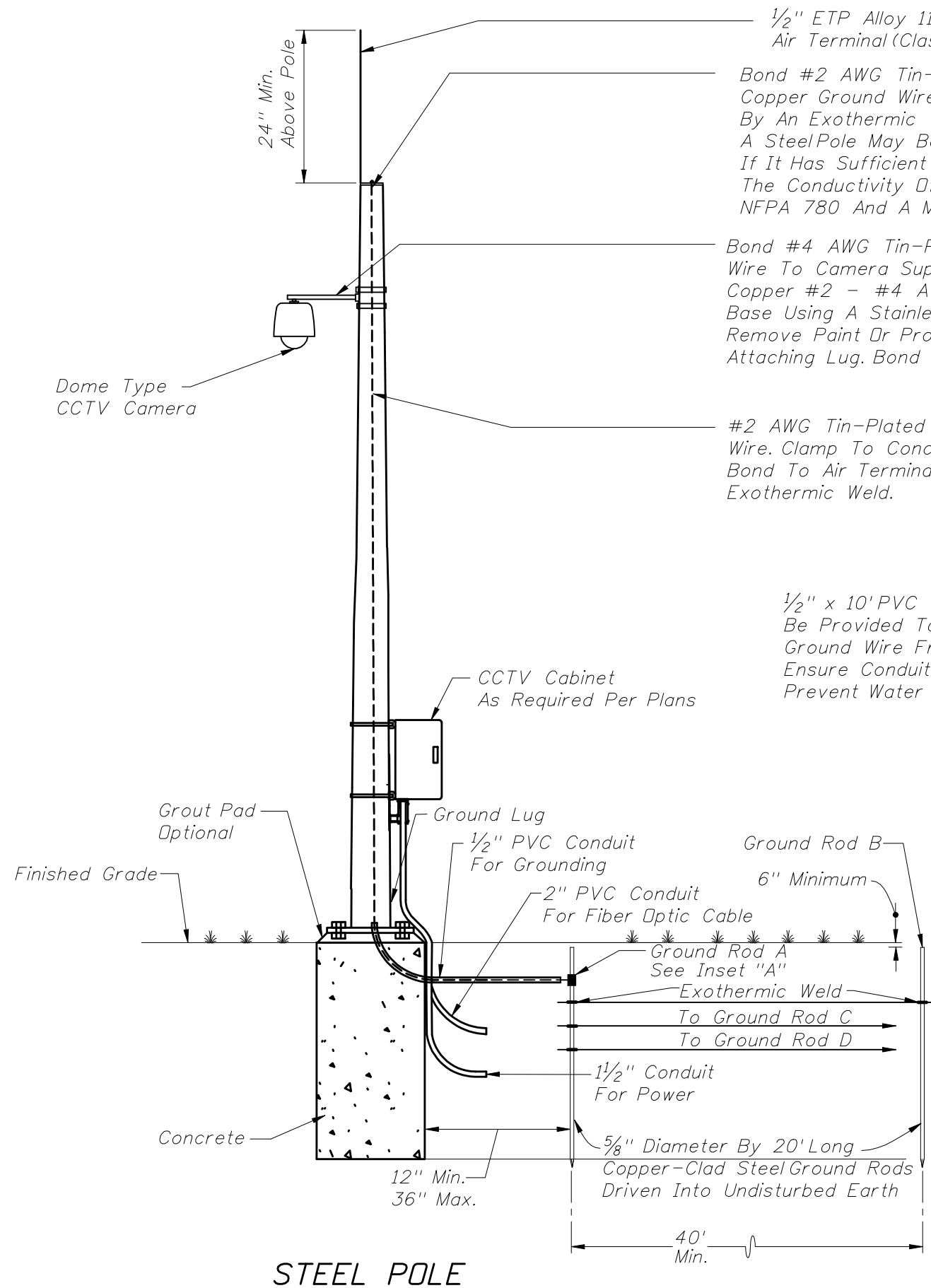
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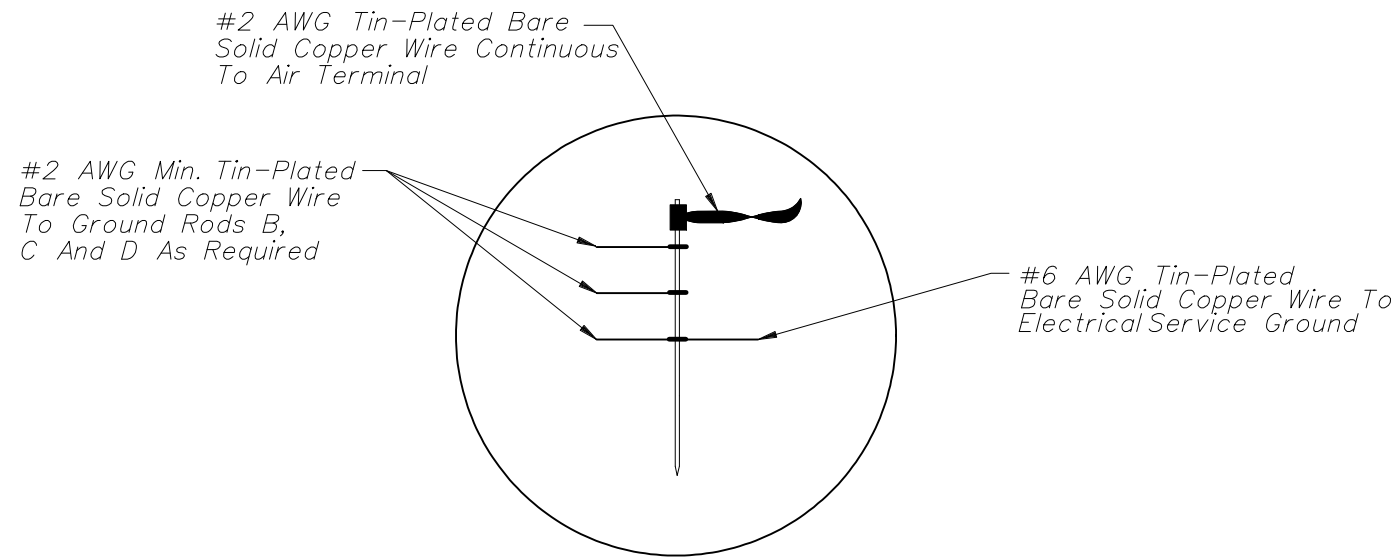


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TYPICAL CCTV SITE

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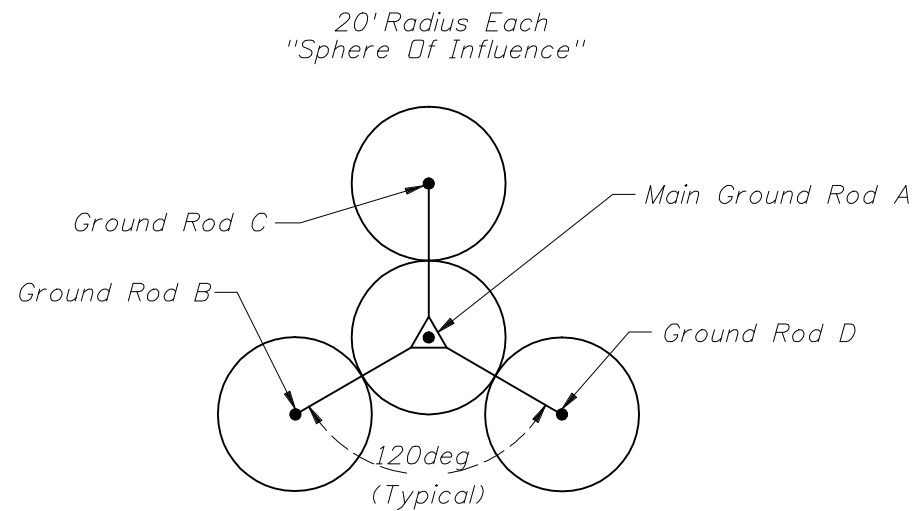




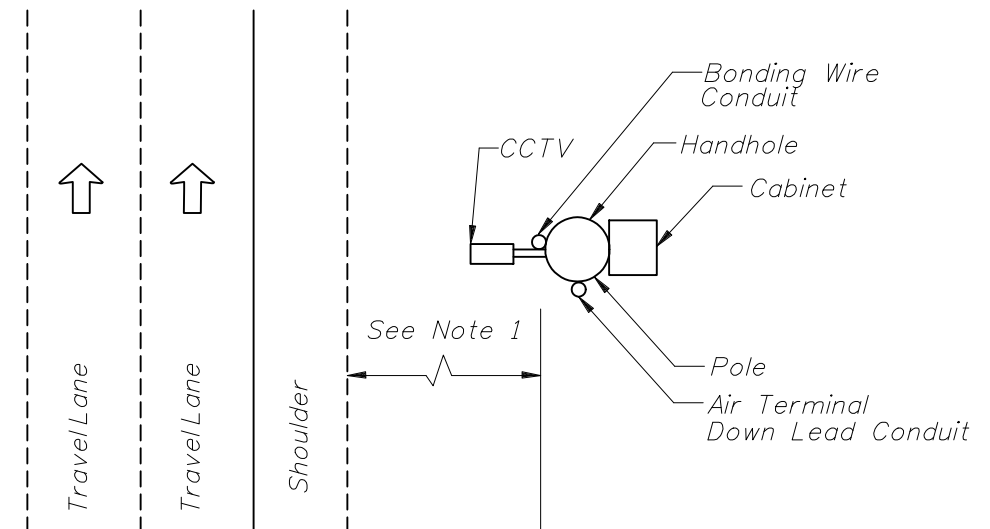
INSET "A"

GENERAL NOTES:

1. Distance must be in accordance with project design documents and greater than or equal to minimum clear zone requirements.
2. Exothermically weld all connections to ground rods.
3. Install marker tape directly above all grounding electrodes and conductors at a depth of 6".
4. All data, coaxial and power cables to the camera shall be completely concealed.
5. All air terminals must meet UL-96A.
6. Ground rod A is required. Ground rods B, C and D will be required as necessary to meet the ground resistance requirements in the contract documents.
7. Place ground system within right of way.
8. Route all camera cables inside arm of mounting bracket.
9. Main ground rod to be placed immediately adjacent to pole.



GROUND ROD PLACEMENT DETAIL
(Typical Each Pole)



ORIENTATION OF CONDUITS AND DEVICES ON POLE

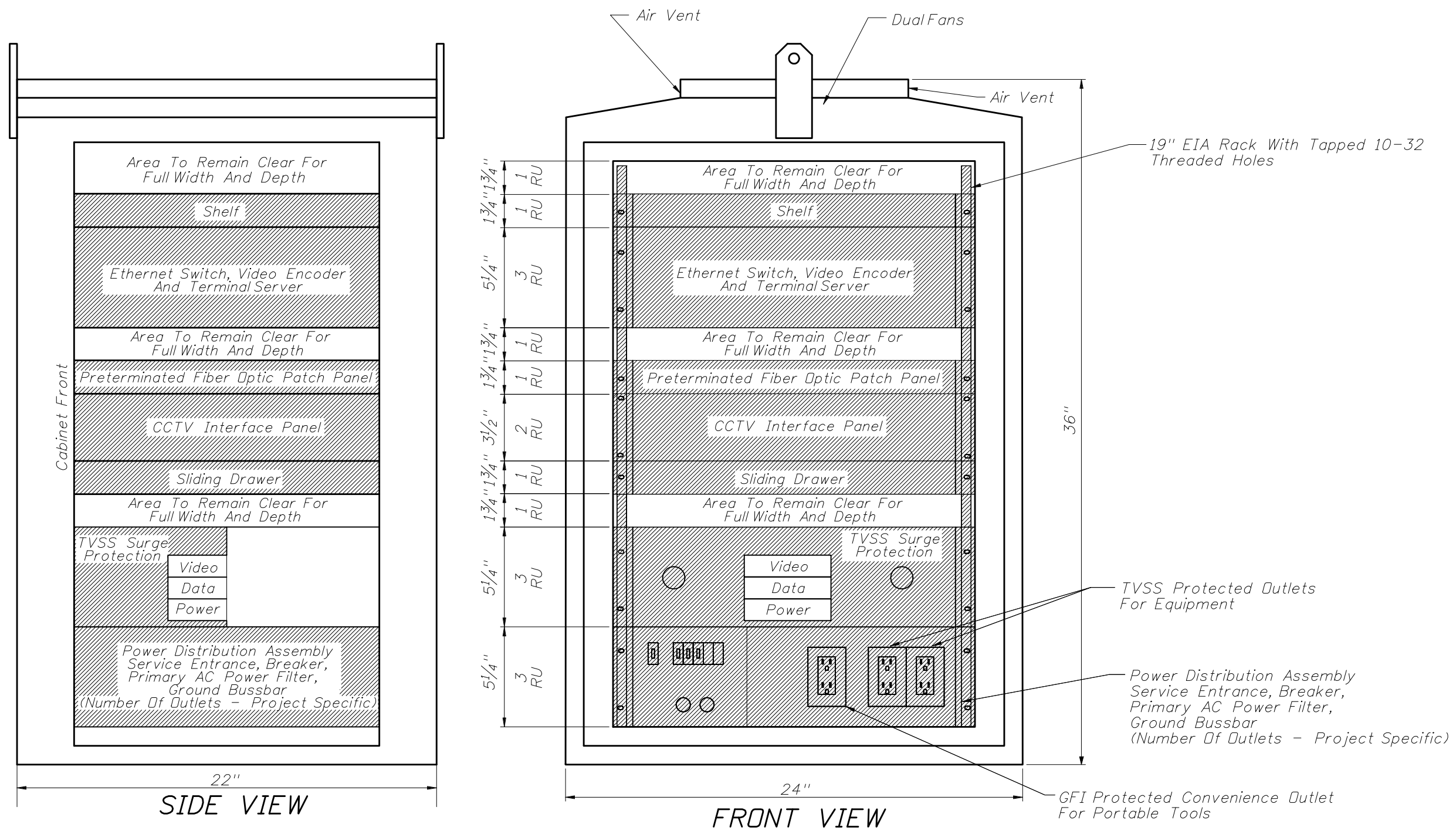
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CCTV POLE GROUNDING

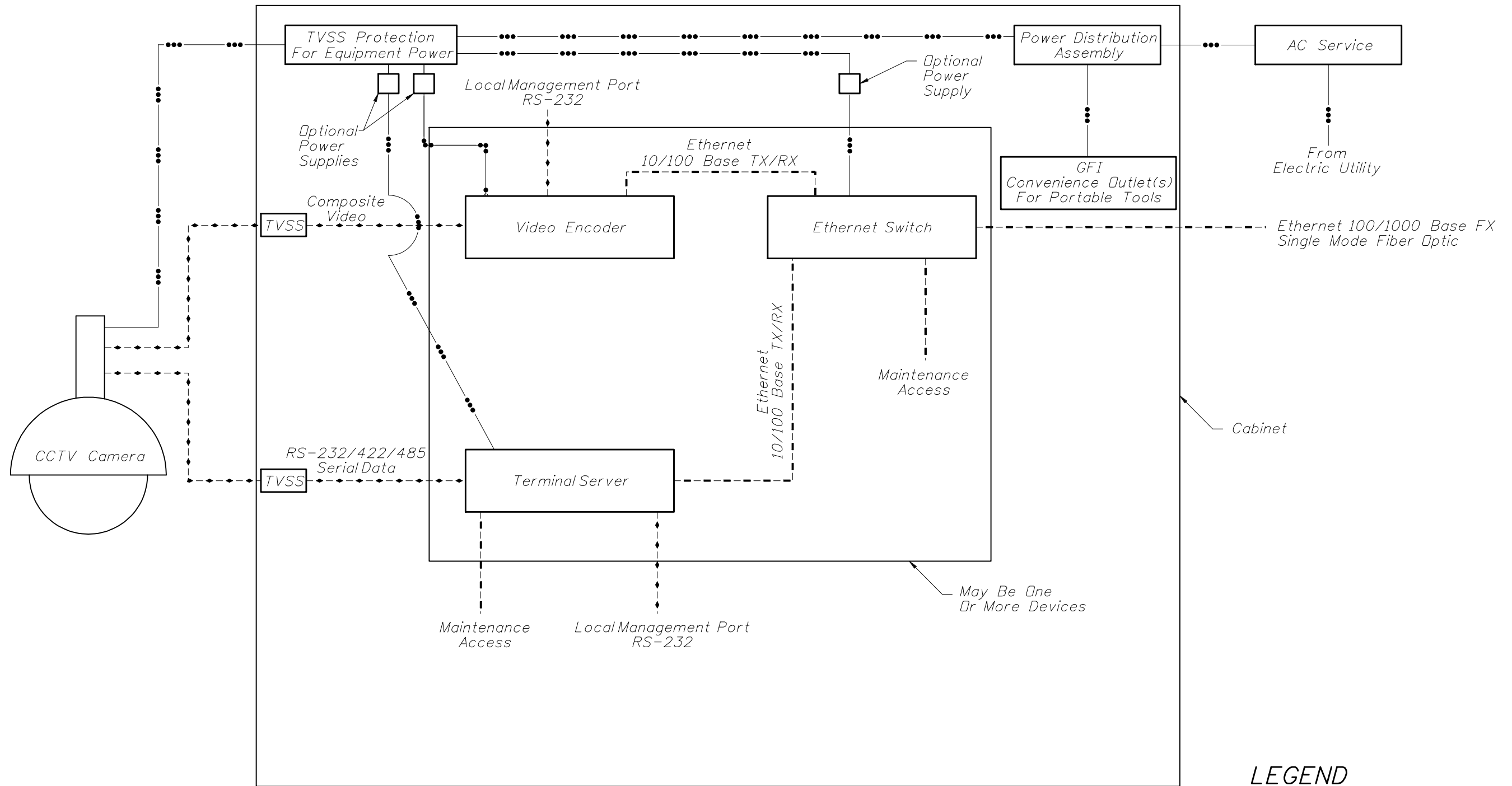
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GENERAL NOTES:

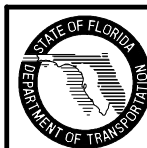
1. Cabinet layout is for pole or base mounted installations.
2. All dimensions and scale are approximate.
3. The minimum CCTV cabinet dimensions shall be 36"H X 24"W X 22"D.
4. Conduit entrances are in bottom of cabinet.
5. There shall be front and rear doors. Both doors shall have the hinged side next to the pole when pole mounted.
6. Cabinet layout represents preferred placement of typical devices. Project-specific designs may not include all components illustrated here.

Not To Scale



LEGEND

- Data
- Ethernet
- Power
- TVSS Transient Voltage Surge Suppressor



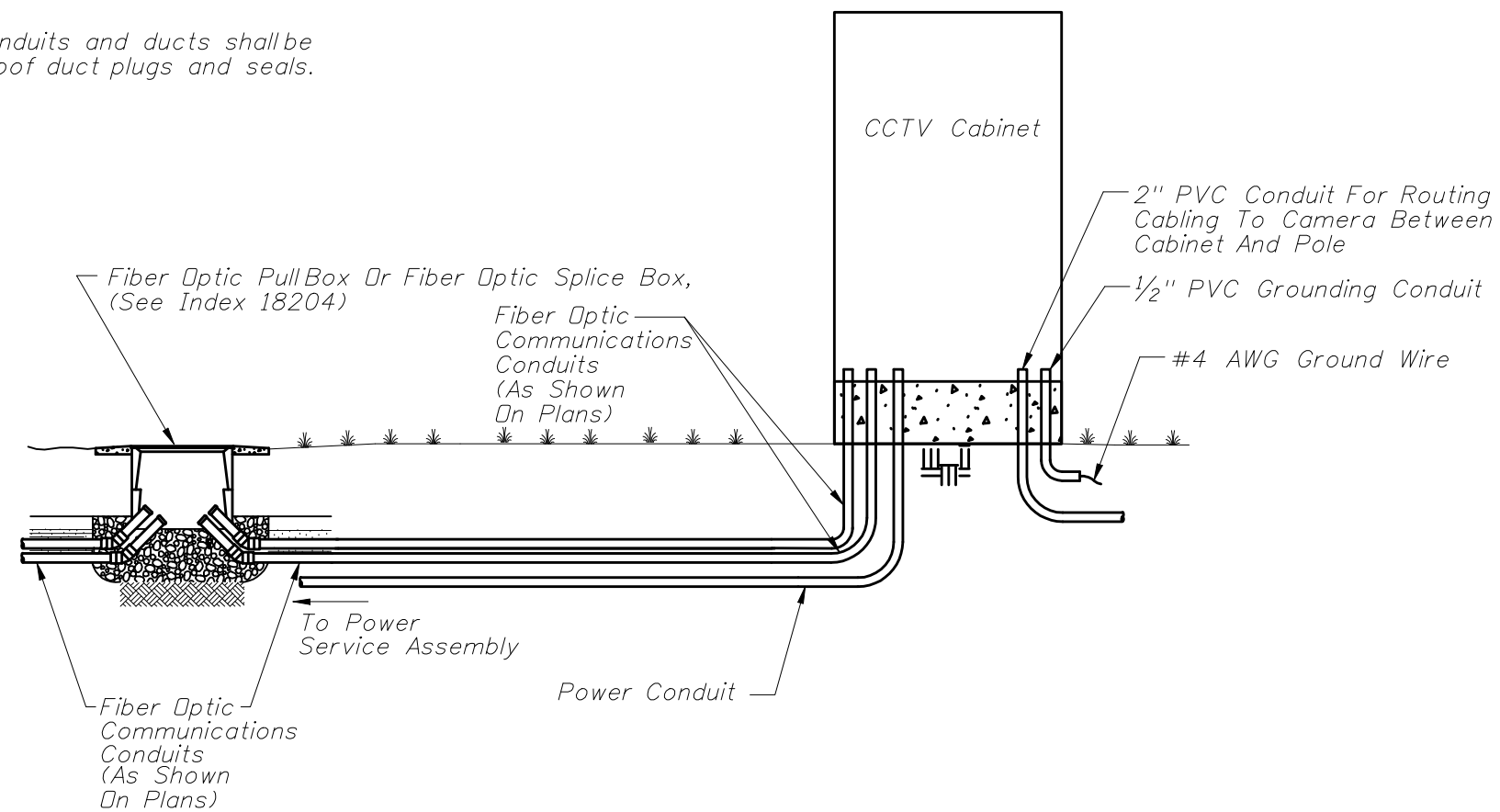
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CCTV BLOCK DIAGRAM

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GENERAL NOTES:

1. Contractor shall splice fiber optic cables in cabinet to preterminator patch panel.
2. Furnish and install TVSS protection on all video, data, and power cabling in cabinet.
3. Ensure that all electronic equipment power is protected and conditioned with TVSS devices.
4. Sizes and types of conduits and innerducts for network communications between the pullbox and cabinet are stated in the contract documents.
5. See Index 18102 for grounding requirements.
6. All network communications conduits and ducts shall be sealed with approved waterproof duct plugs and seals.



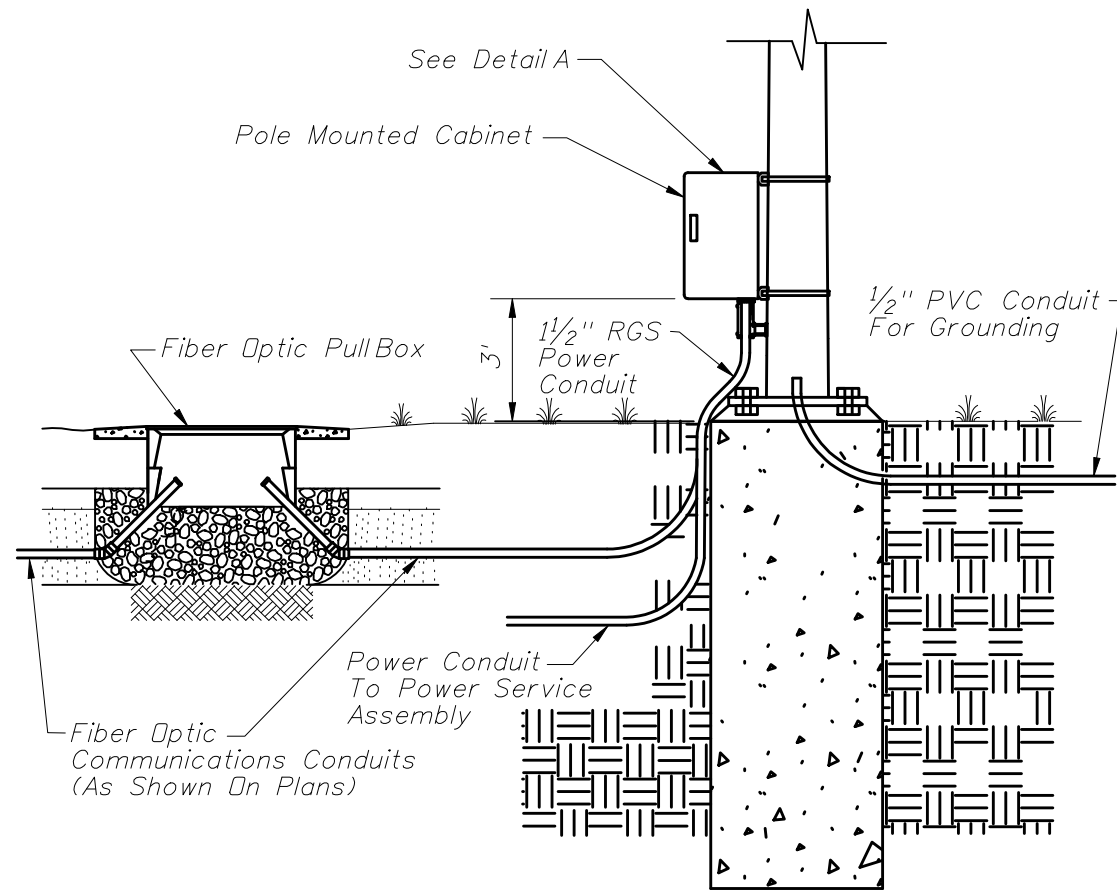
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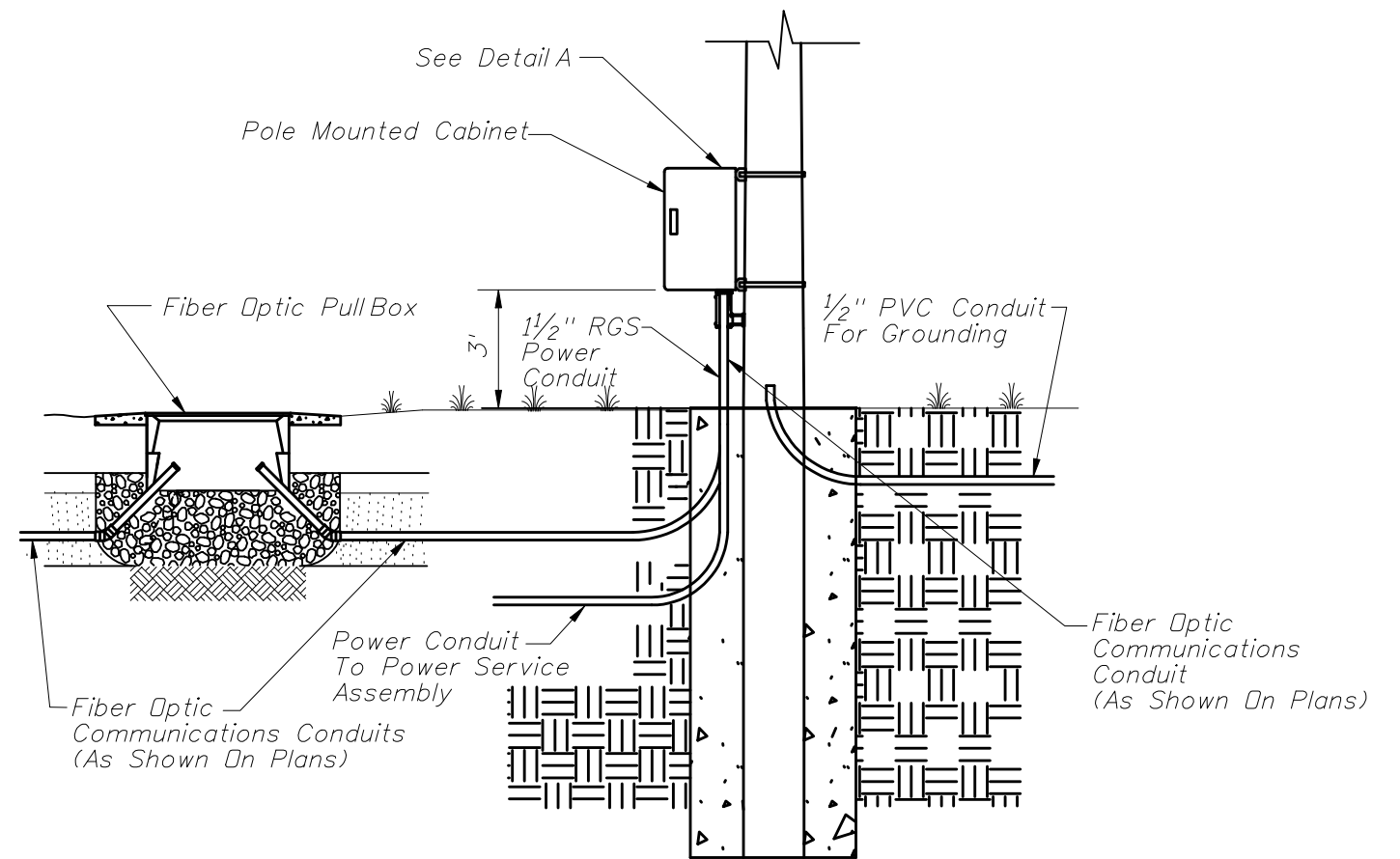
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GROUND MOUNTED CCTV CABINET

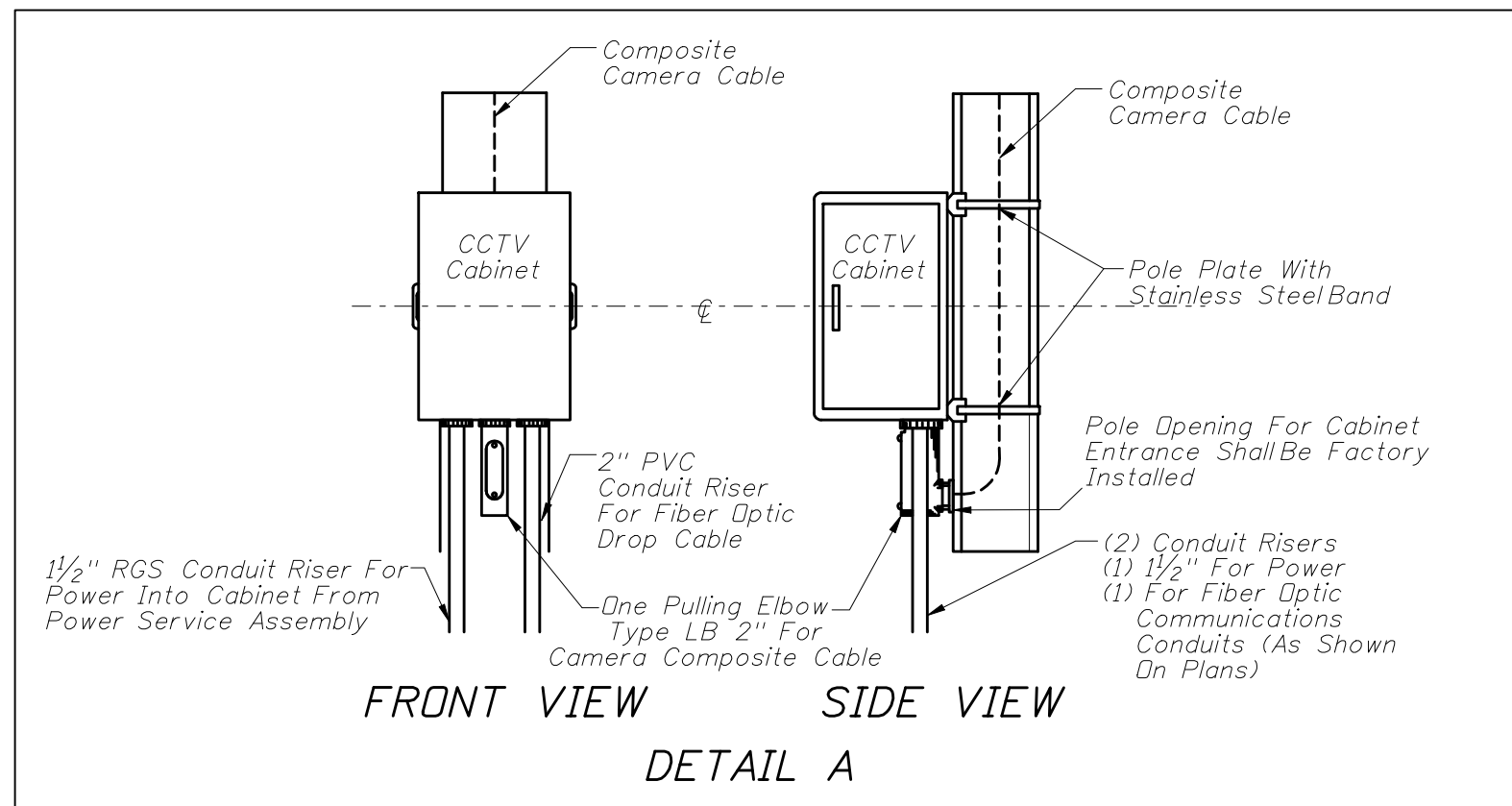
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STEEL POLE



CONCRETE POLE



GENERAL NOTES:

1. Contractor shall splice fiber optic cables in cabinet to preterminated patch panel.
2. Furnish and install TVSS protection on all cabling in cabinet.
3. Furnish and install secondary TVSS protection on outlets for equipment in cabinet.
4. Sizes and types of conduits and innerducts for network communications between the pull box and cabinet are stated in the contract documents.
5. Ensure that equipment cabinet is bonded to CCTV pole grounding system.
6. All network communications conduits and ducts shall be sealed with approved waterproof duct plugs and seals.
7. Pole mounted cabinets shall be mounted with hinges next to the pole.

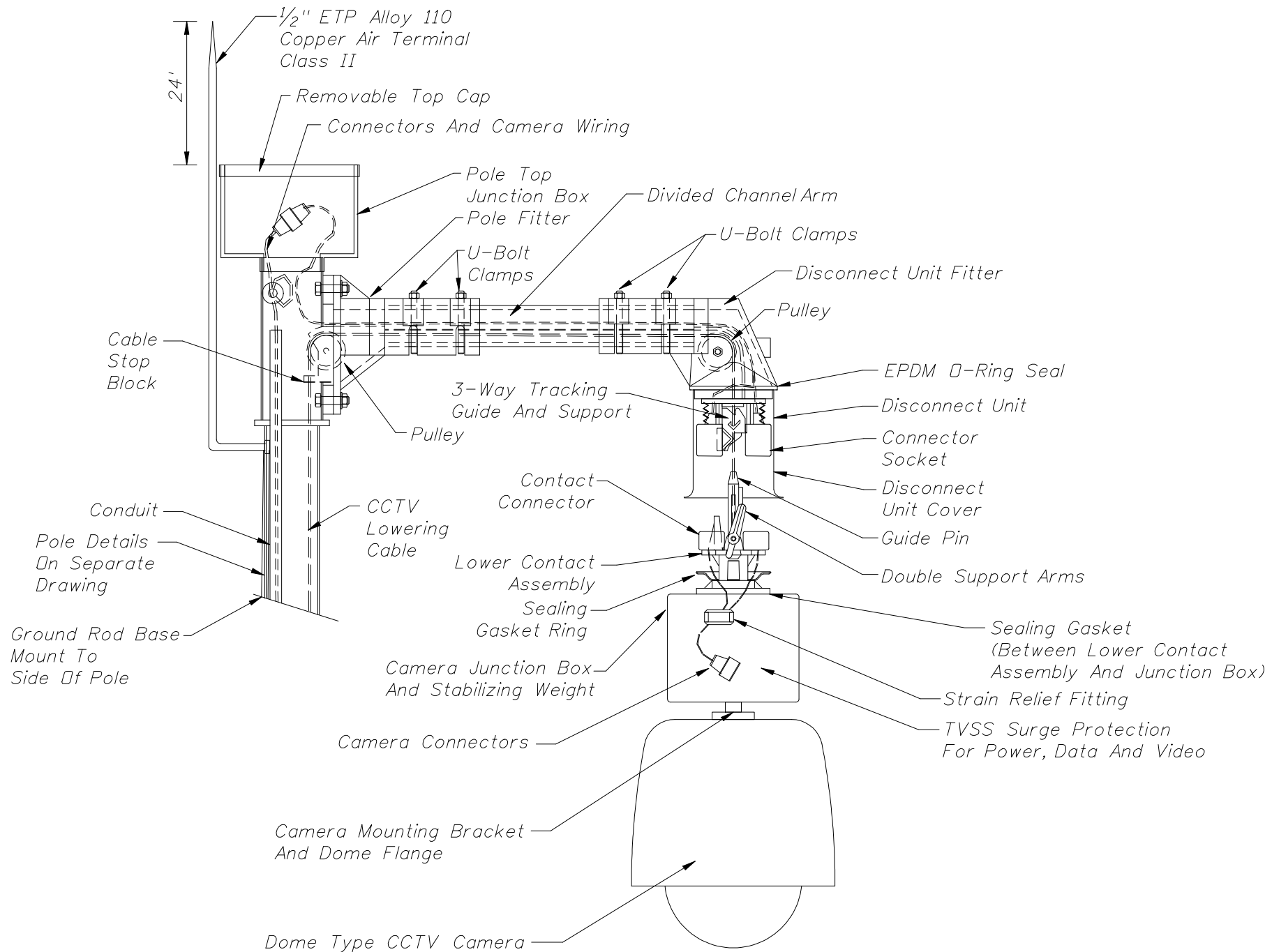
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2010 FDOT Design Standards

POLE MOUNTED CCTV CABINET

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CAMERA LOWERING DEVICE

GENERAL NOTES:

1. Lowering device to be shipped ready for pole attachment to include 100 ft. of composite power and signal cable prewired to lowering device at the factory.
2. The lowering device manufacturer shall supply both a portable lowering tool with a manual hand crank and a portable electric drill motor with custom clutch adapter. One lowering tool per every 10 lowering devices is required.
3. The lowering device manufacturer shall provide an on-site installation inspection and operator instruction and certification. This ensures the product is assembled correctly and, more importantly, that all necessary persons are trained in the proper, safe operation of the system. Before erecting the first pole the contractor must contact the lowering device supplier and schedule a representative to be on-site.
4. Lowering device connection to top of pole shall be capable of service tension and shear of 1 kip minimum. The contractor shall provide product cut sheet capacity data for the engineer's review and approval prior to installation.
5. Camera to be mounted to camera junction box and stabilizing weight via 1 1/2" Standard NPT Pipe Thread.
6. Use air terminal extension when the pole top junction box is wider than top of pole.

Not To Scale



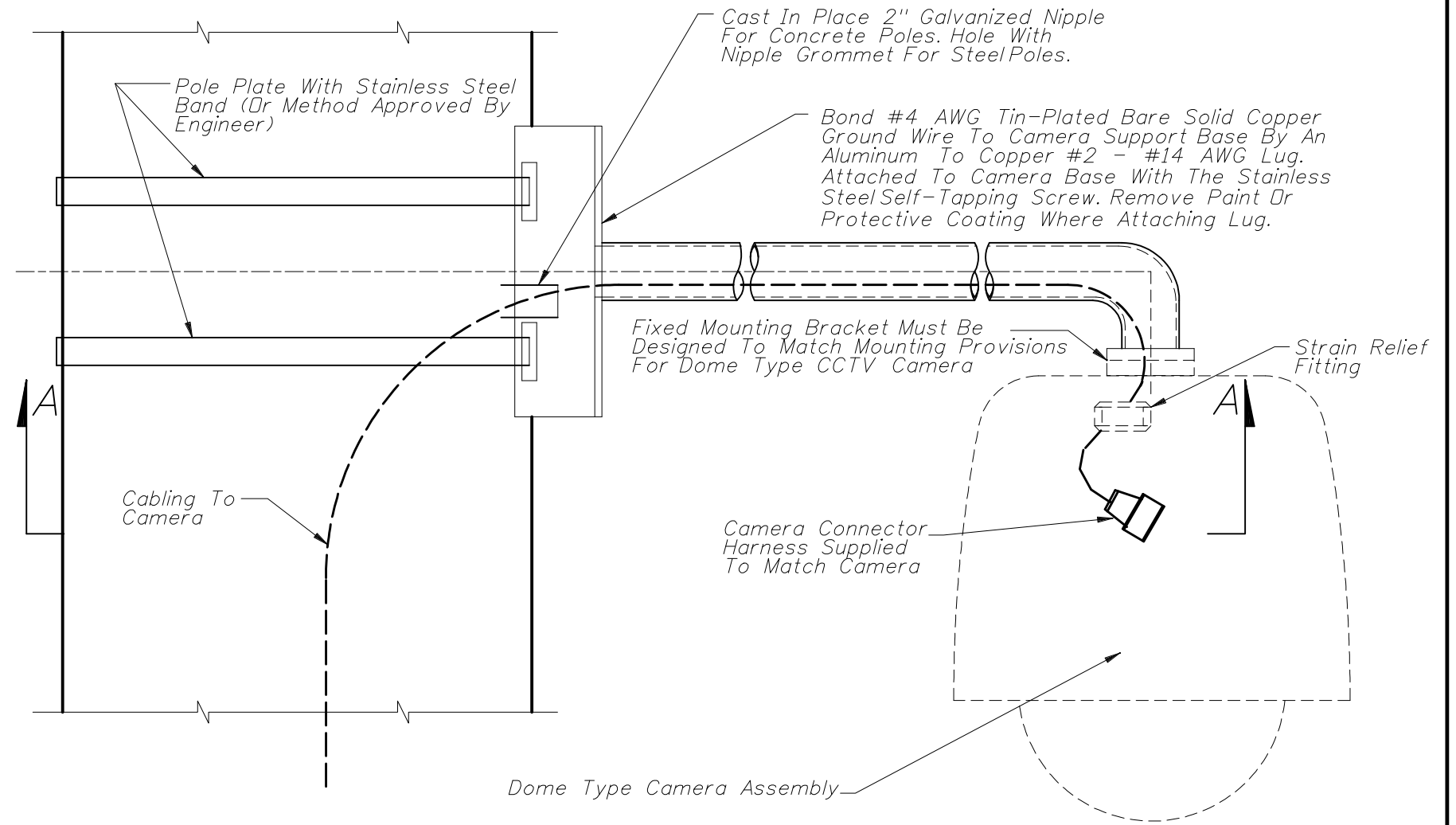
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CAMERA MOUNTING DETAILS

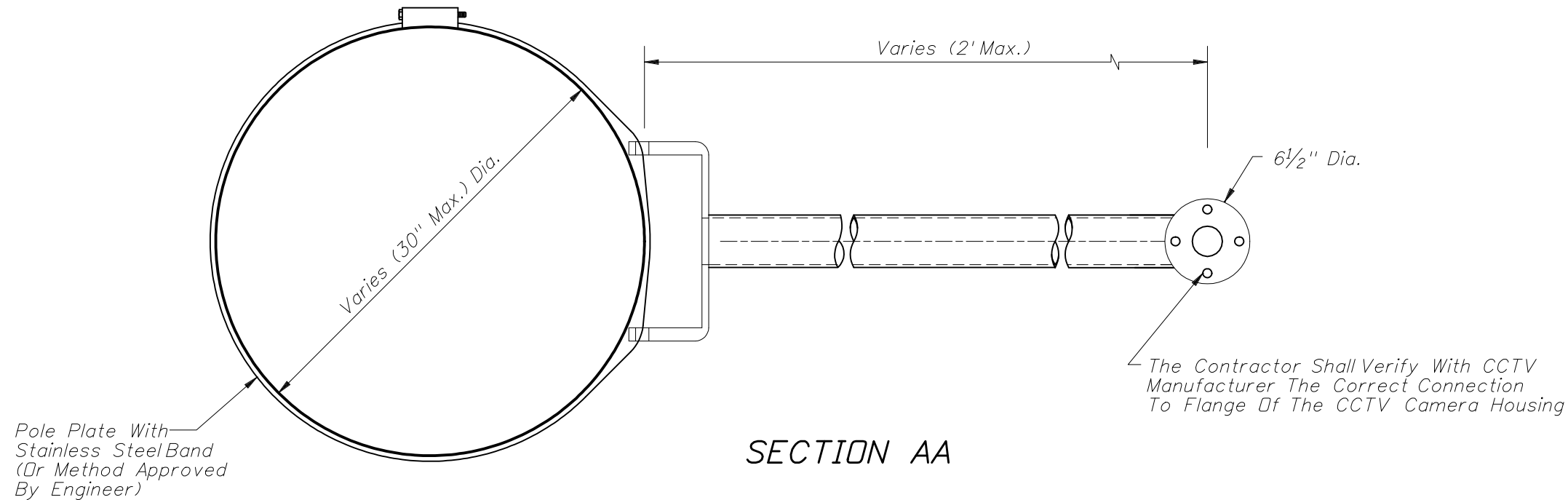
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GENERAL NOTES:

1. Verify the pole type, the dimensions of the pole at the point of installation of the camera mount, and angle with respect to the roadway before manufacturing camera mount assembly.
2. The design of the camera mounting bracket shall conform to the Plans Preparation Manual, Volume I, Chapter 29 and shall allow for the additional weight of the CCTV dome camera system.
3. No field welding shall be permitted.
4. Mounting bracket arm shall be level after installation.
5. The contractor shall submit shop drawings for the proposed fixed mounting arm, signed and sealed by a Professional Engineer registered in the State of Florida, to the Engineer for review and approval.
6. See Index 18113 for concrete pole details.
7. Galvanized pipe connections and conduit entry points shall be sealed in accordance with Section 630 of the Standard Specifications.



**ELEVATION (CCTV POLE)
WITH FIXED MOUNTING BRACKET**



SECTION AA

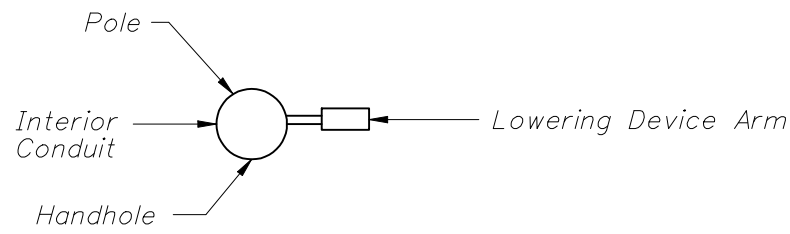
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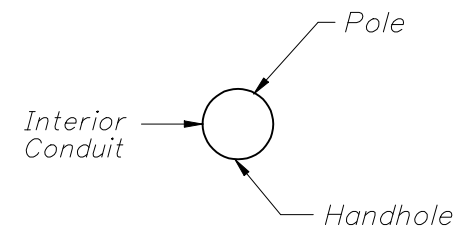
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CAMERA MOUNTING DETAILS

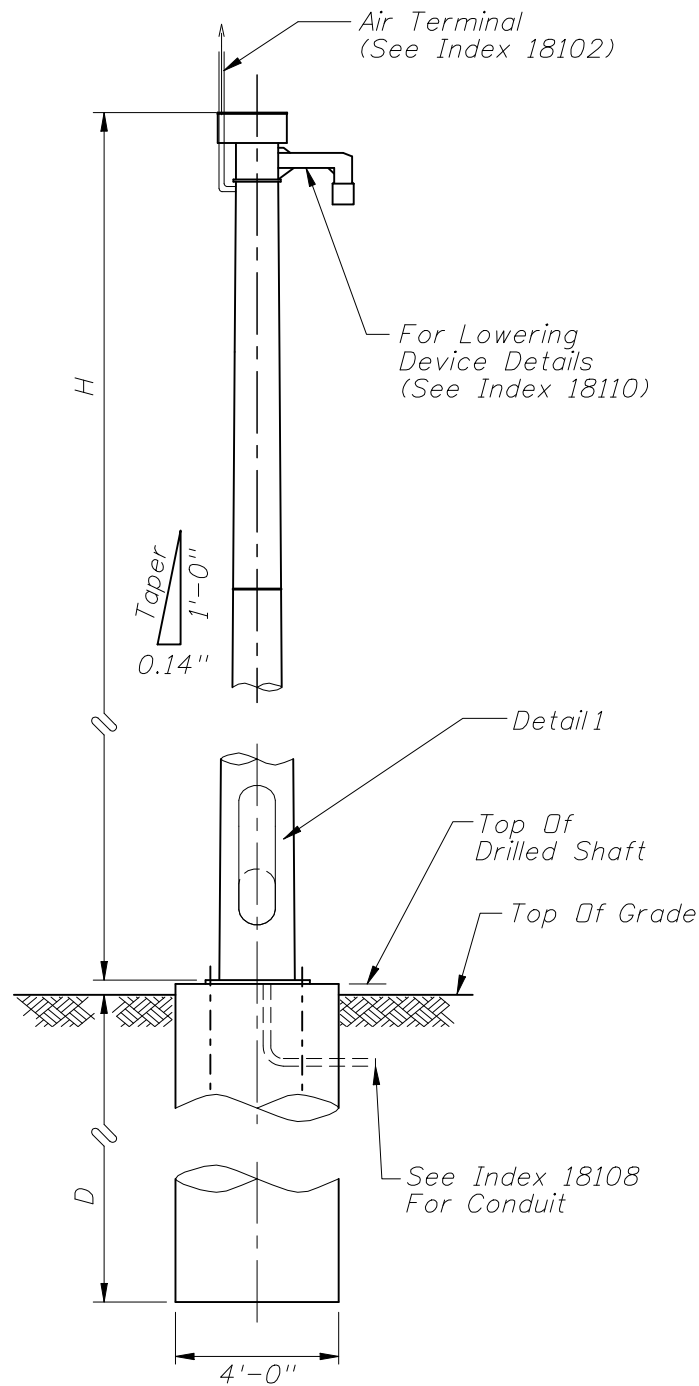
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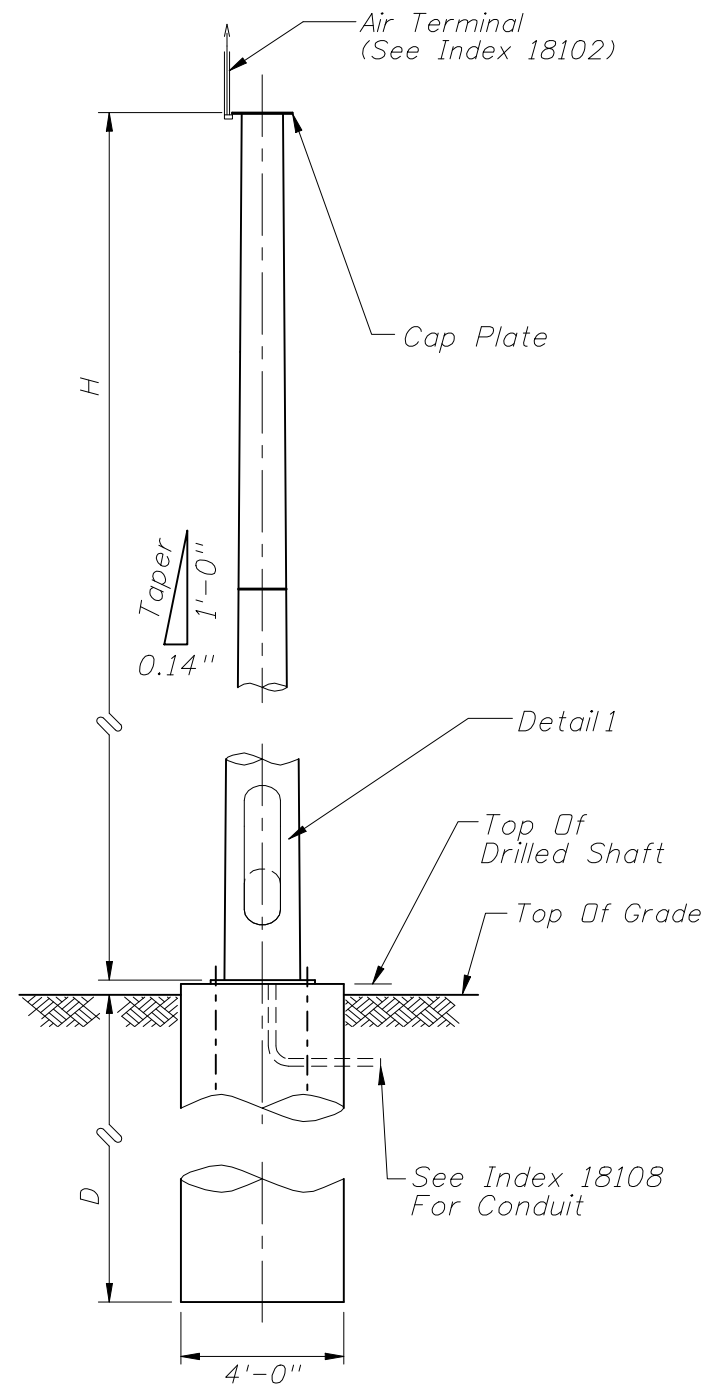
ORIENTATION VIEW



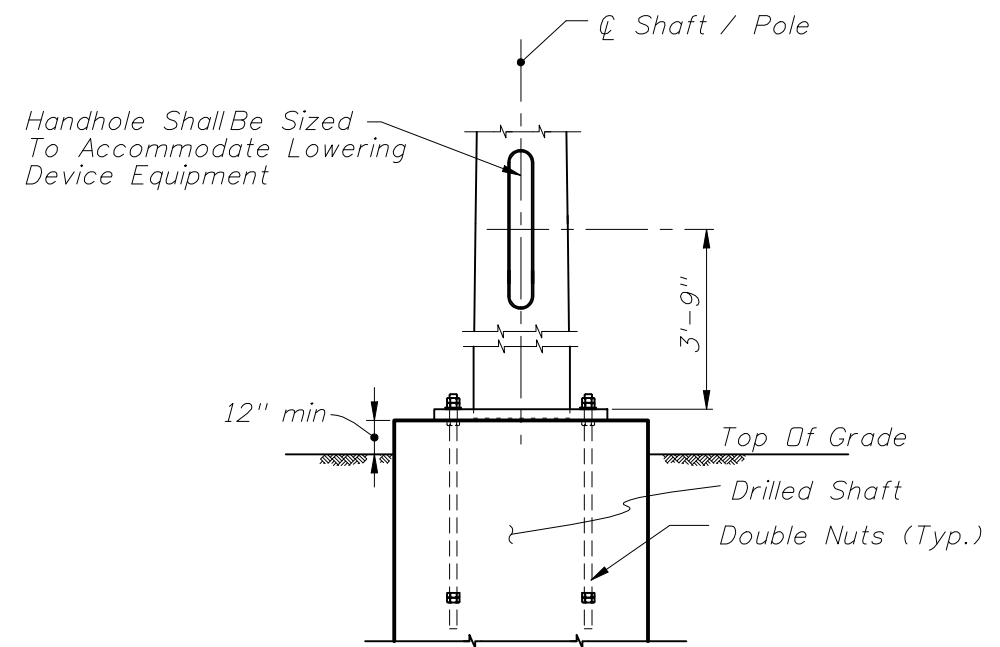
ORIENTATION VIEW



WITH LOWERING DEVICE



WITHOUT LOWERING DEVICE



DETAIL 1

H (ft)	D (ft)
50	8
55	8.5
60	9
65	9.5
70	10

Not To Scale



2010 FDOT Design Standards

STEEL CCTV POLE

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DESIGN NOTES:

Design according to FDOT Structures Manual (current edition) and the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" 5th Edition with Interims.

Maximum 1" deflection in 40mph wind (3 second gust).

Manufacturers seeking approval for inclusion on the Qualified Products List must submit a QPL Production Evaluation Application along with design documentation and drawings showing pole and foundation meet all specified requirements of this Standard.

Perform all welding in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).

Foundation Materials:

Reinforcing Steel: ASTM A615 Grade 60

Concrete: Class V Special or Class VI with 4 ksi minimum strength at transfer.

Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade A heavy-hex nuts.

ASTM F436 Type 1 washers.

ASTM F2329 galvanization.

Foundation design based upon the following soil criteria:

Classification = Cohesionless (Fine Sand)

Friction Angle = 30 Degrees (30°)

Unit Weight = 50 lbs./cu. Ft. (assumed saturated)

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

Pole:

Round or 16 sided.

Tapered 0.14 inches per foot.

Transverse welds only allowed at the base.

Two or more sections with overlapping splices not permitted.

No laminated tubes.

Only one longitudinal seam weld permitted.

Longitudinal seam welds within 6" of complete penetration pole to base welds shall be complete penetration welds.

Identification tag:

Aluminum, secured to pole with stainless steel screws.

Locate inside pole and visible from handhole.

Provide Financial Project ID, pole height, manufacturer's name & certification number, and QPL number.

Pole Specifications:

ASTM A1011 Grade 50, 55, 60 or 65 (less than 1/4") or

ASTM A572 Grade 50, 60 or 65 (greater than 1/4") or

ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).

Steel Plates and Pole Cap: ASTM A36.

Weld Metal: E70XX.

Bolts: ASTM A325, Type 1.

Handhole frame: ASTM A709 Grade 36 or ASTM A36.

Handhole cover: ASTM A1011 Grade 50, 55, 60 or 65.

Stainless steel screws: AISI Type 316.

Galvanization:

Nuts, bolts and washers: ASTM F2329.

All other steel: ASTM A123.

One hundred percent of full-penetration groove welds and a random 25% of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.

INSTALLATION NOTES:

Cable Supports: Electrical Cable Guides and Eyebolts.

Locate top and bottom electrical guides within the pole aligned with each other.

Position one cable guide 2" below the handhole.

Position other cable guide 1" directly below the top of the tenon.

Position eyebolt 2-3/4" below the top of the handhole.

Install pole plumb.

Lowering Device Installation Notes:

Design tenon dimensions to facilitate lowering device component installation. Locate slots parallel to the pole centerline for mounting the lowering device. Bolt a tenon to the pole top with mounting holes and slot as required for the mounting of the lowering device.

Place all electrical wire in interior conduit to prevent them from interfering with or being damaged by the lowering cable that moves within the pole.

Mount lowering arm perpendicular to the roadway or as shown in the plans.

Position CCTV pole so that the camera can be safely lowered without requiring lane closures.

Include a lowering device (including top J-box), mounting hardware, lowering cable, contact block, waterproof electrical connectors, camera J-box and housing.



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STEEL CCTV POLE

Last Revision

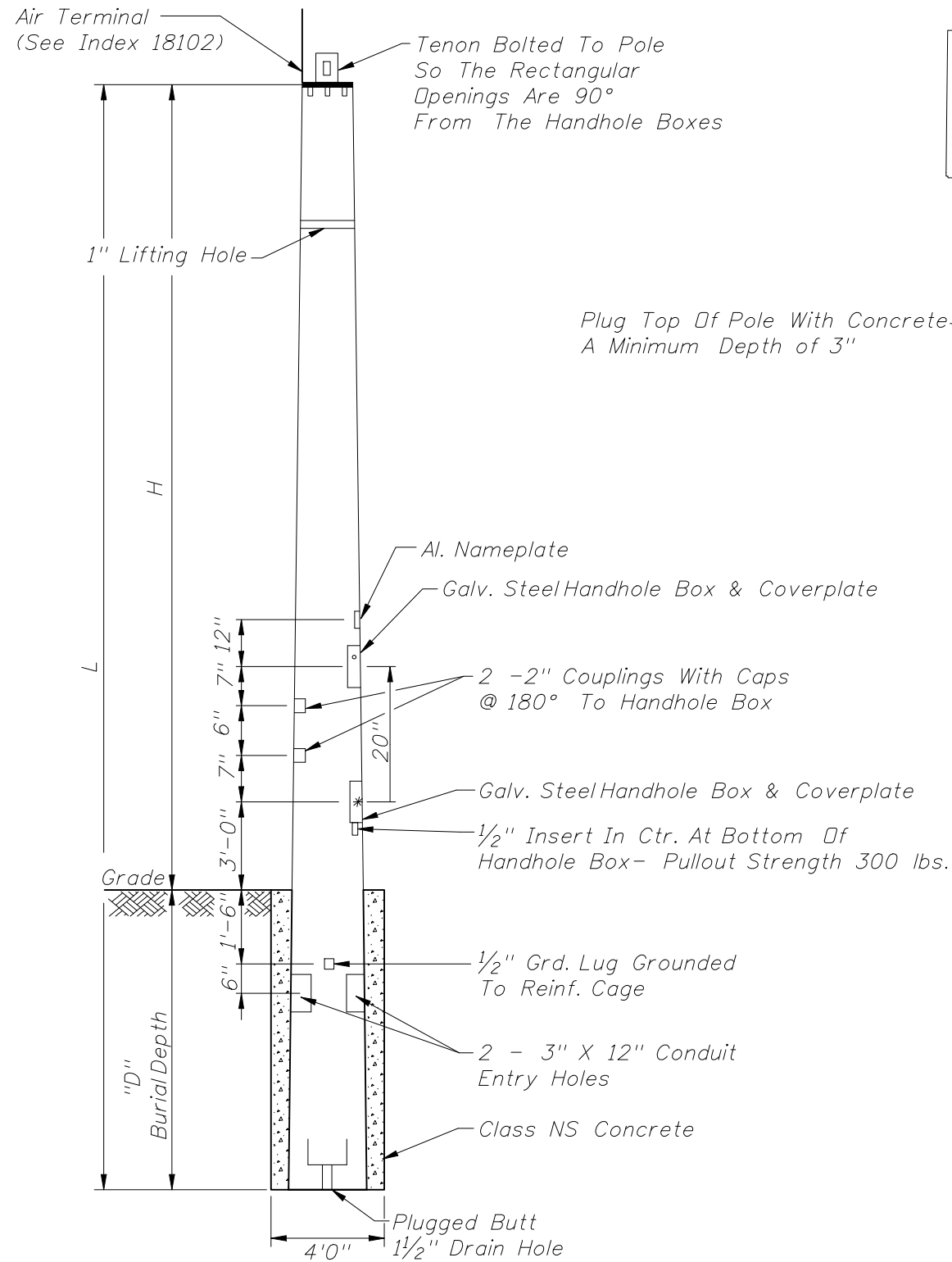
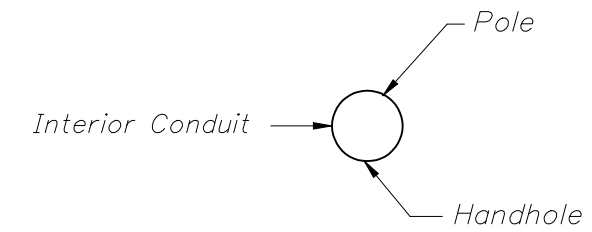
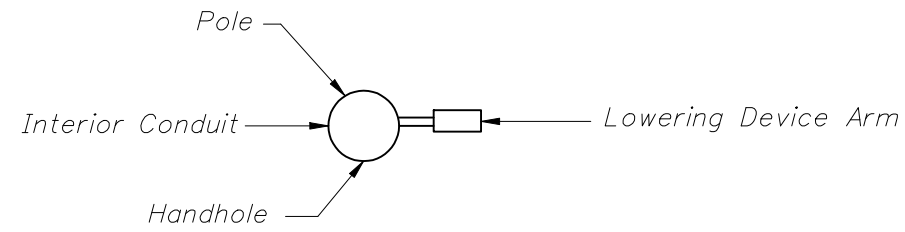
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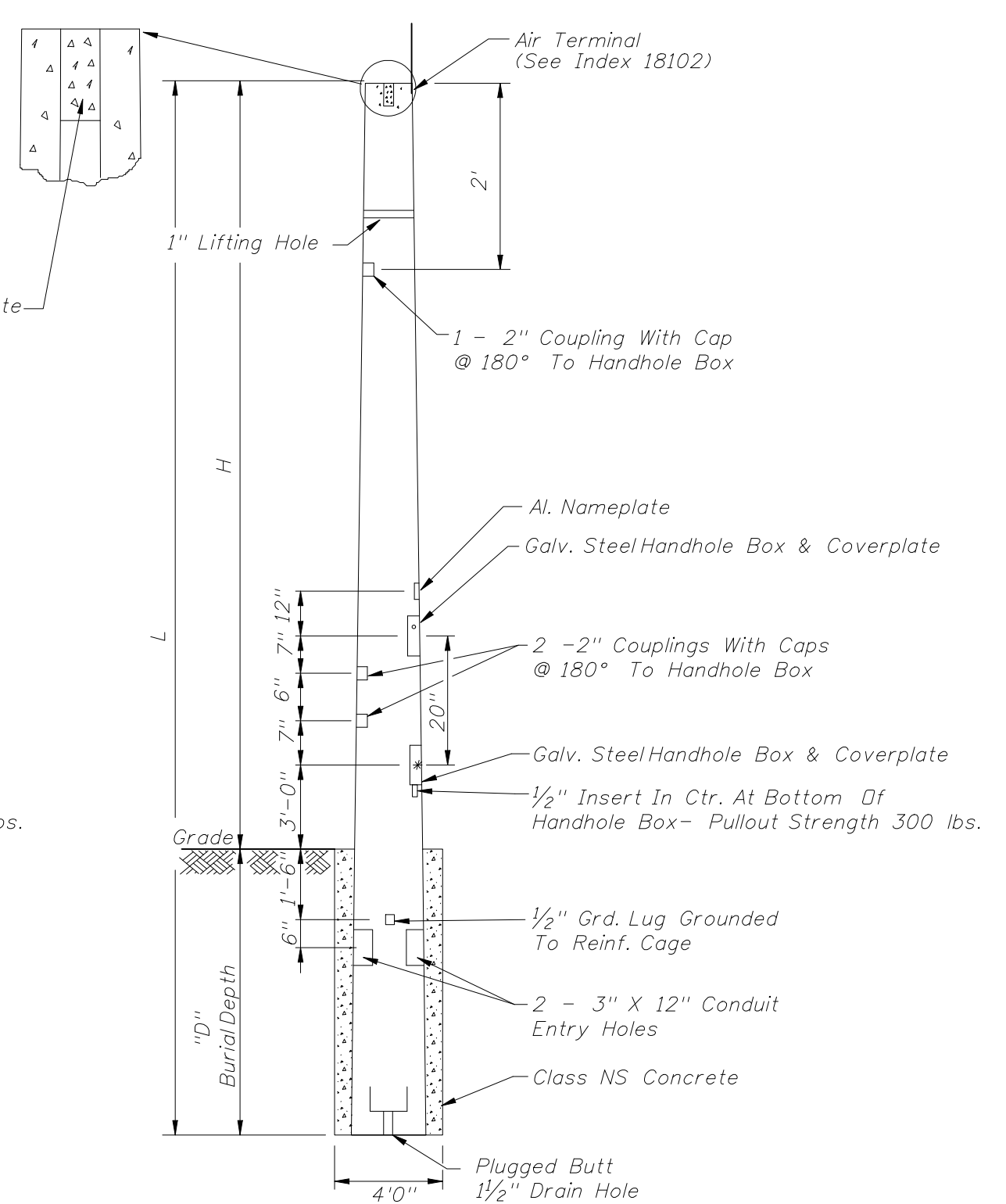
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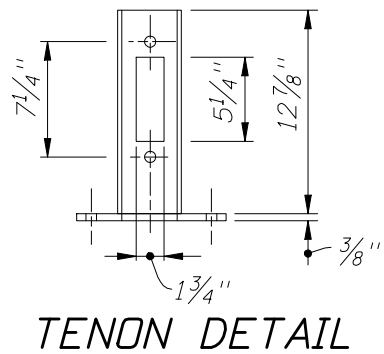
18111



WITH LOWERING DEVICE



WITHOUT LOWERING DEVICE



Not To Scale



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CONCRETE CCTV POLE

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18113	

DESIGN NOTES:

Design according to FDOT Structures Manual current edition and the fifth edition of the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals" with Interims.

Manufacturers seeking approval for inclusion on the Qualified Products List must submit a QPL Product Evaluation Application along with design documentation and drawings showing the product meets all specified requirements of this Standard.

Place prestressing symmetrically about both axis.

Use Class V Special Concrete or Class VI Concrete with 4 ksi minimum strength of transfer.

Use A615 Grade 60 reinforcing steel. Provide a minimum of non-prestressed reinforcement equal to 0.33% of the concrete area.

Use A416 Grade 270 stress relieved or low-lax prestressing strands.

One turn required for spiral splices and two turns required at the top and bottom of poles. Manufacture spirals from cold-drawn ASTM A82 steel wire.

Identify poles as to manufacturer, length, QPL qualification number by inset numerals 1" in height inscribed on the same face of the pole as the handhole and ground wire.

Provide a Class 3 surface finish.

Provide a 1" minimum cover.

Foundation design based upon the following soil criteria:

Classification = Cohesionless (Fine Sand)

Friction Angle = 30 Degrees (30°)

Unit Weight = 50 lbs./cu. Ft. (assumed saturated)

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

LOWERING DEVICE INSTALLATION NOTES:

Place all electrical wire in interior conduit to prevent them from interfering with or being damaged by the lowering cable that moves within the pole.

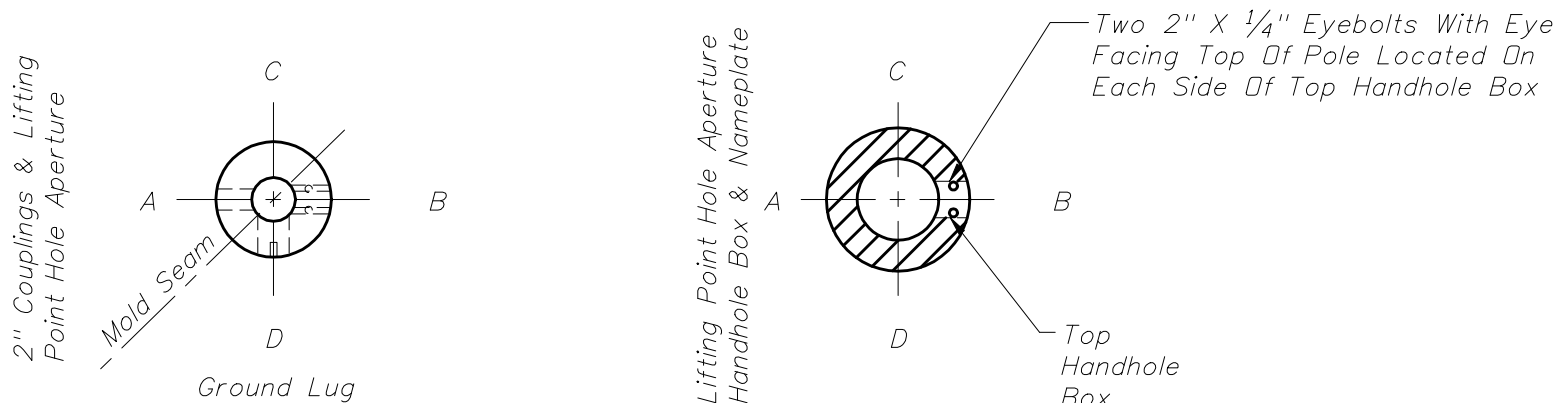
Mount lowering arm perpendicular to the roadway or as shown in the plans. Position the CCTV pole so that the camera can be safely lowered without requiring lane closures.

Include a lowering device (including top J-box), mounting hardware, lowering cable, contact block, waterproof electrical connectors, camera J-box and housing.

SPECIFICATIONS:

Pole Top:	8 1/4" Dia.
Pole Butt:	(0.2 X L) + 8 1/4"
Pole Taper:	0.2 in./ft. nominal
Defl Spec:	1" Max. in 40mph wind (3 second gust)
Max. Camera EPA:	5.60 Sq. Ft. Total
Max. Camera Wgt:	240 lbs. Total

L (ft)	H (ft)	D (ft)
58	50	8
63.5	55	8.5
69	60	9
74.5	65	9.5
80	70	10



TOP VIEW

SECTIONAL VIEW THROUGH
TOP HAND HOLE BOX

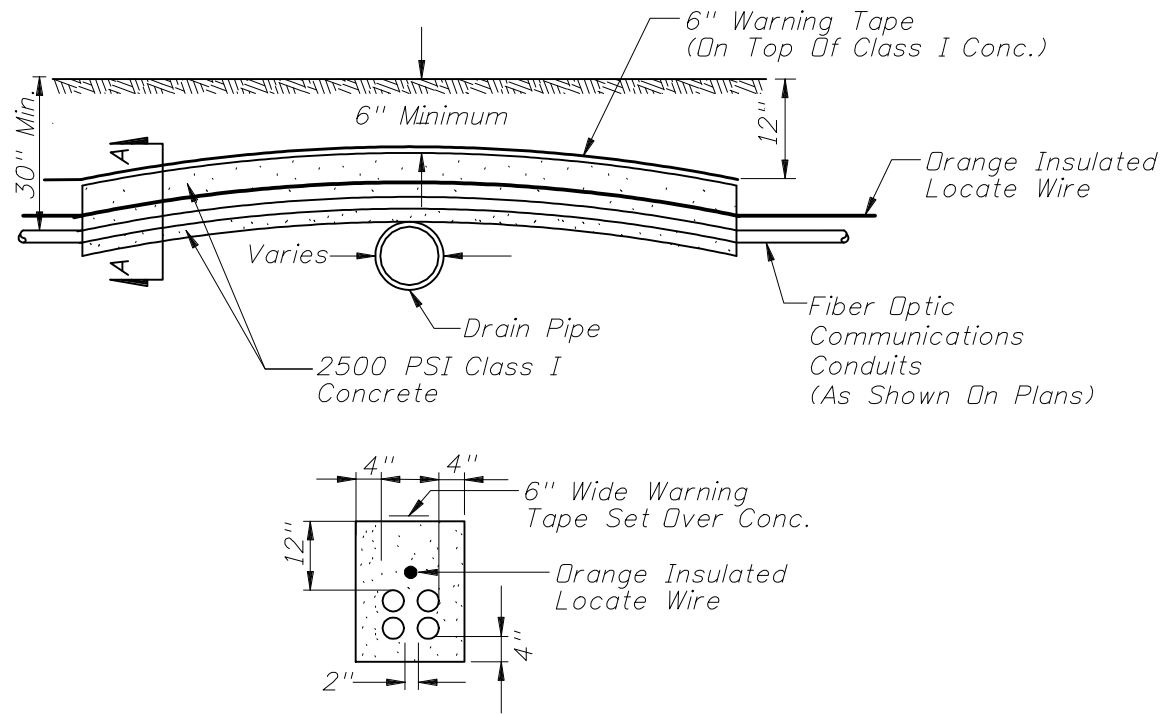
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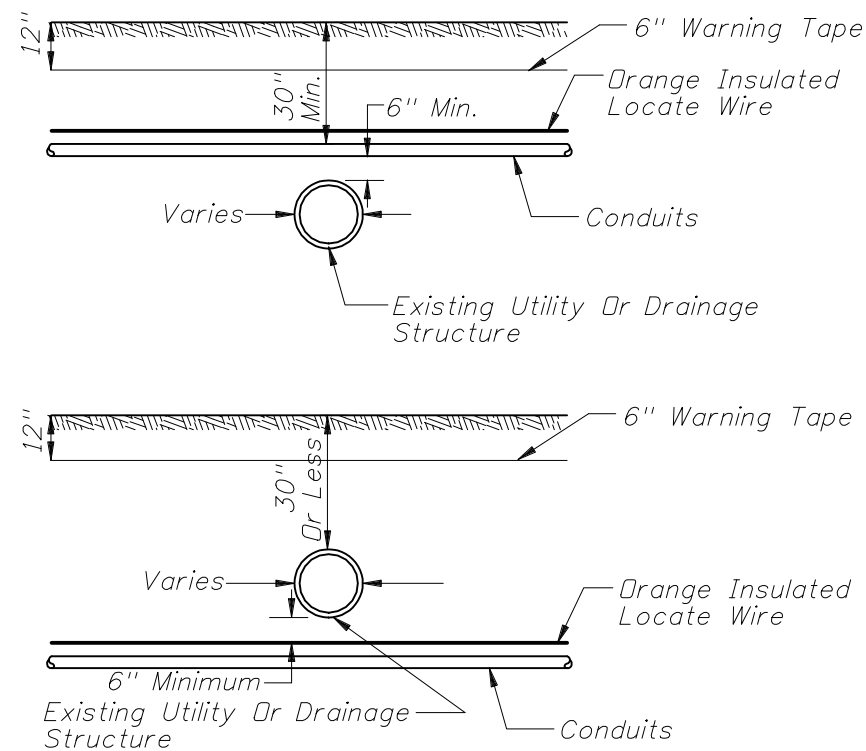
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CONCRETE CCTV POLE

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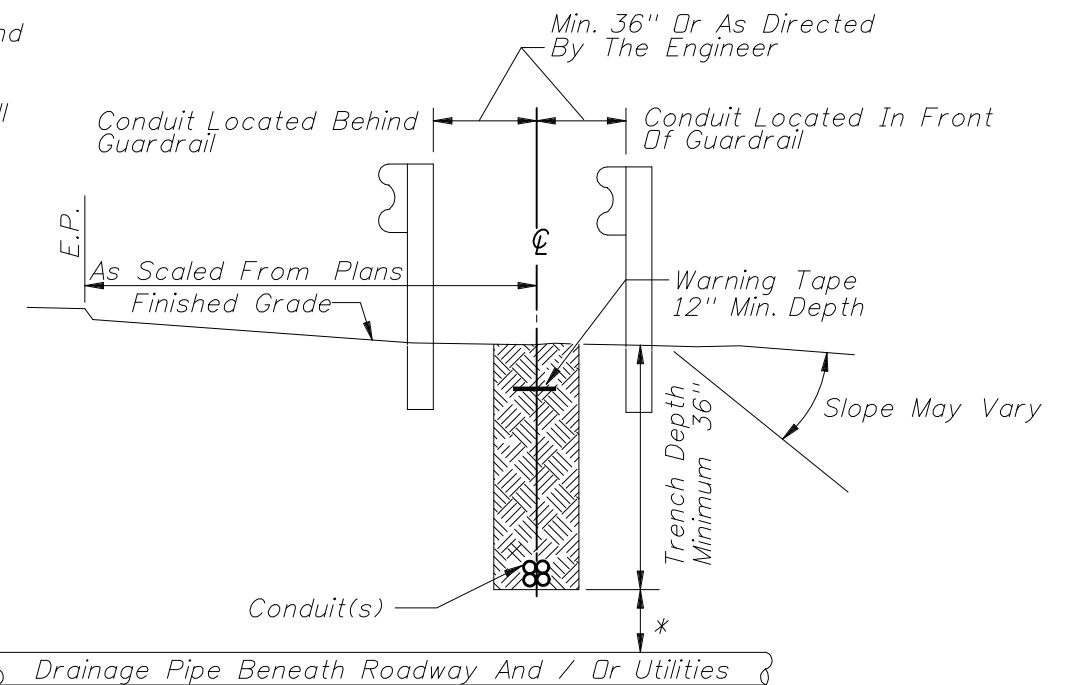
SECTION AA



CONDUIT INSTALLATION DETAILS ACROSS EXISTING DRAIN PIPES OR UTILITIES

GENERAL NOTES:

1. The contractor, with approval from the Engineer, may adjust the final burial depth of the conduit(s) in order to transverse nonmovable object conflicts.
2. Backfill with excavated material and compact the soil until firm and unyielding. Remove rock and debris from backfill material.
3. Where conduits are to be installed over existing underground structures (e.g., drain pipes or utility lines) which are less than 30" deep, the contractor shall encase the conduit in 2500 PSI Class I concrete for the entire length of conduit that is installed at a depth of less than 30".
4. If the amount of cover over the encasement is less than 6", the contractor shall install the conduit to pass below the underground structures (e.g., drain pipes).
5. Size and type of fiber optic conduits shall be shown on plans.

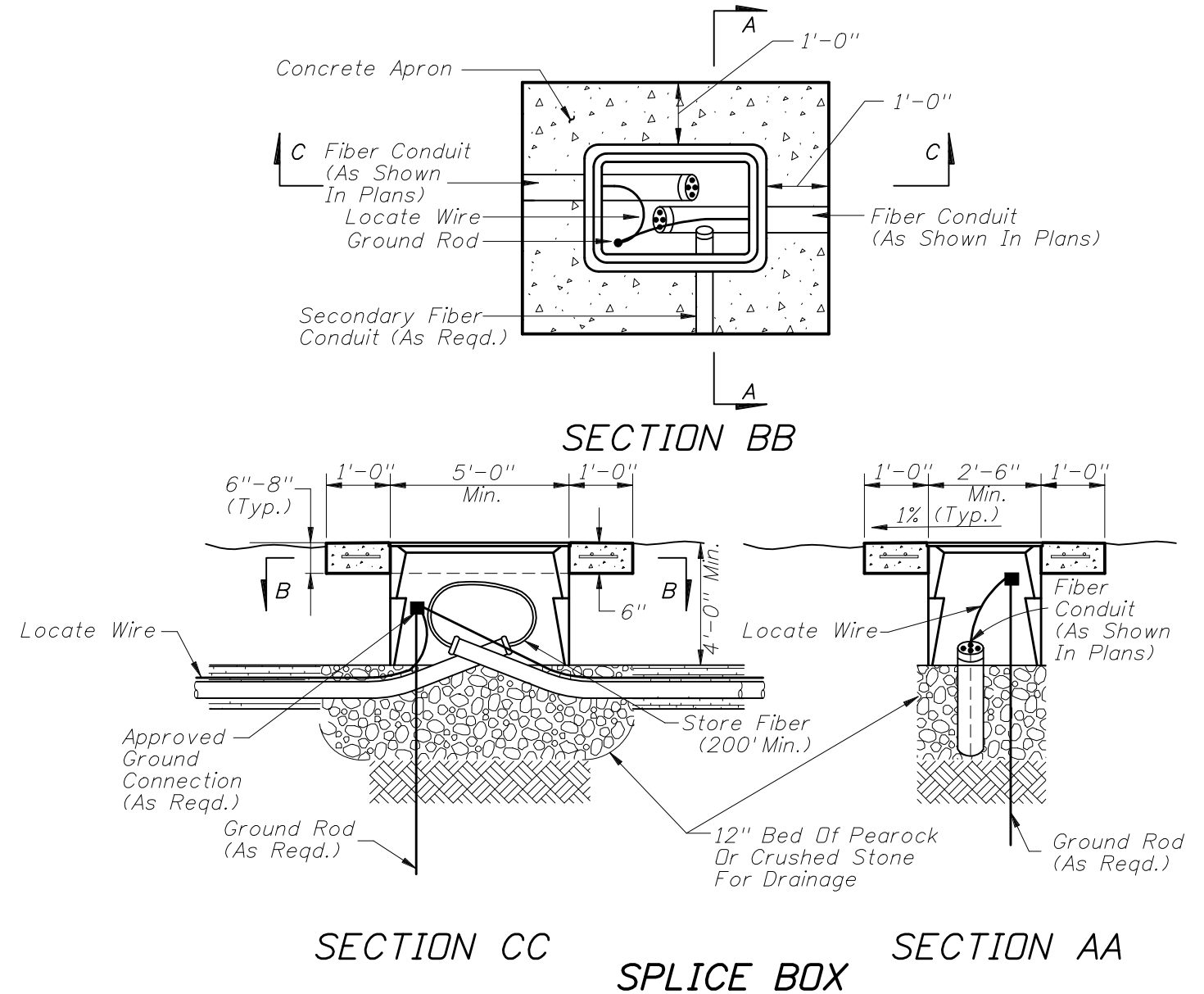
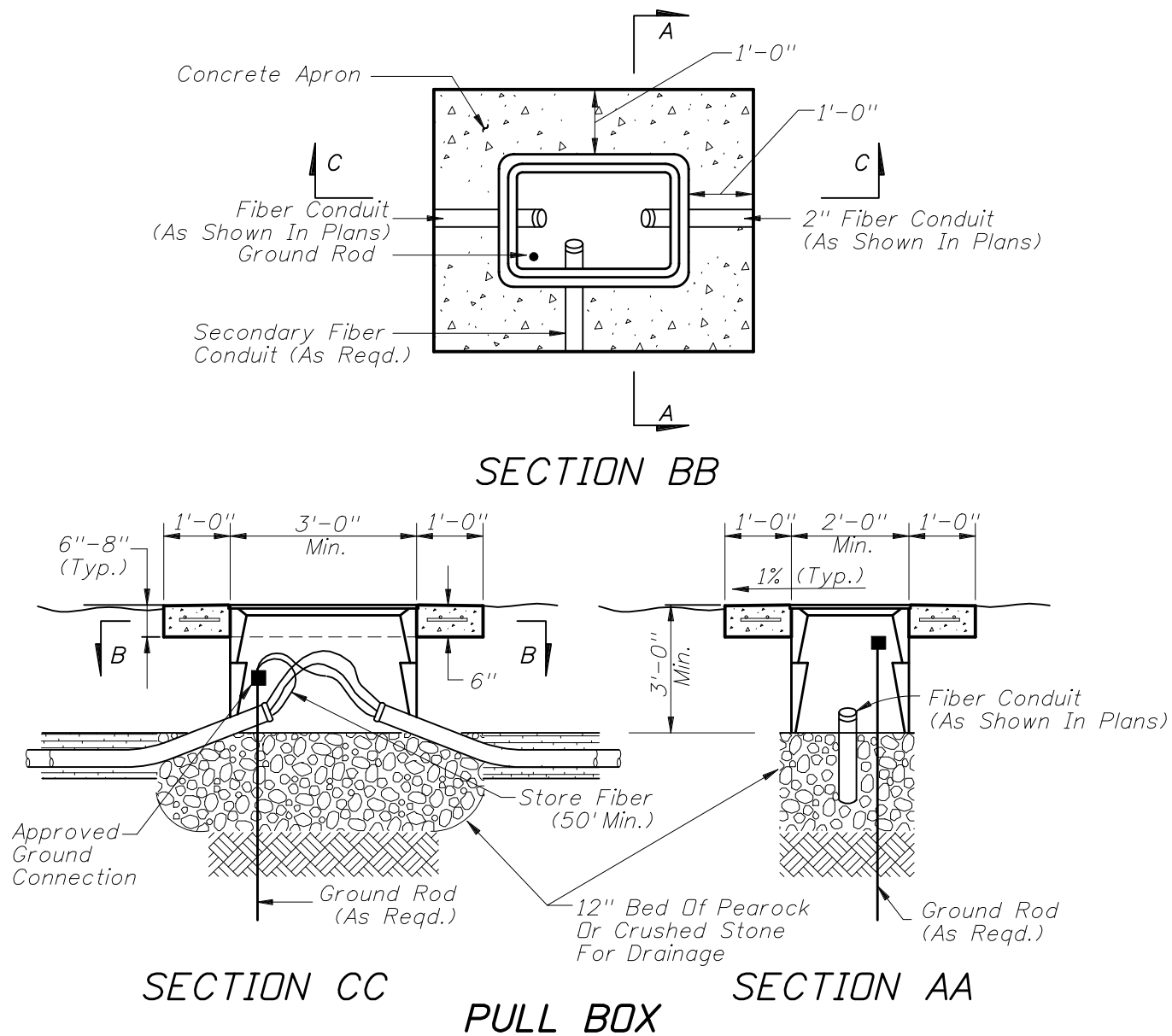


*Maintain 12" Minimum Vertical Clearance When Crossing Over Pipe And / Or Utilities. If Minimum Vertical Clearance Cannot Be Maintained, Then Conduit Is To Be Routed Under Pipe Maintaining 12" Minimum Vertical Clearance.

CONDUIT INSTALLATION TYPICAL DETAIL

Not To Scale





GENERAL NOTES:

1. Fiber optic boxes shall not be installed in roadways or driveways.
2. The fiber optic box shall be one of the products included on the Approved Product List. The legend "FDOT Fiber Optic Cable" shall be stamped on all covers.
3. Fiber optic boxes shall be installed flush with the finished grade surface.
4. Fiber optic box length (long side) shall be parallel to the roadway.
5. A pull wire shall be installed in the empty conduits for future use.
6. All splice boxes shall be provided with cable hanger racks designed to support cables and splice enclosures. Cost of racks to be included in cost of splice box.
7. Refer to Section 783 of the Standard Specifications for splice requirements.

8. Fiber optic boxes shall not contain electrical conduit or conductor. Electrical conduit and conductors shall be installed in separate boxes from each other.
9. Conduit center line shall be aligned to top edge of box to facilitate cable pulling.
10. All fiber optic boxes shall have 1'-0" wide (min.) x 6" deep concrete aprons sloped away from box. Apron is to be included in the cost of each box.
11. Fiber optic boxes shall meet FM 5-539 test procedure.
12. Refer to Section 783 of the Standard Specifications for box requirements.
13. All splices shall be properly weatherproofed.
14. The size and type of fiber optic communications conduit shall be shown on plans.
15. The use of ground rods shall be shown in the plans.

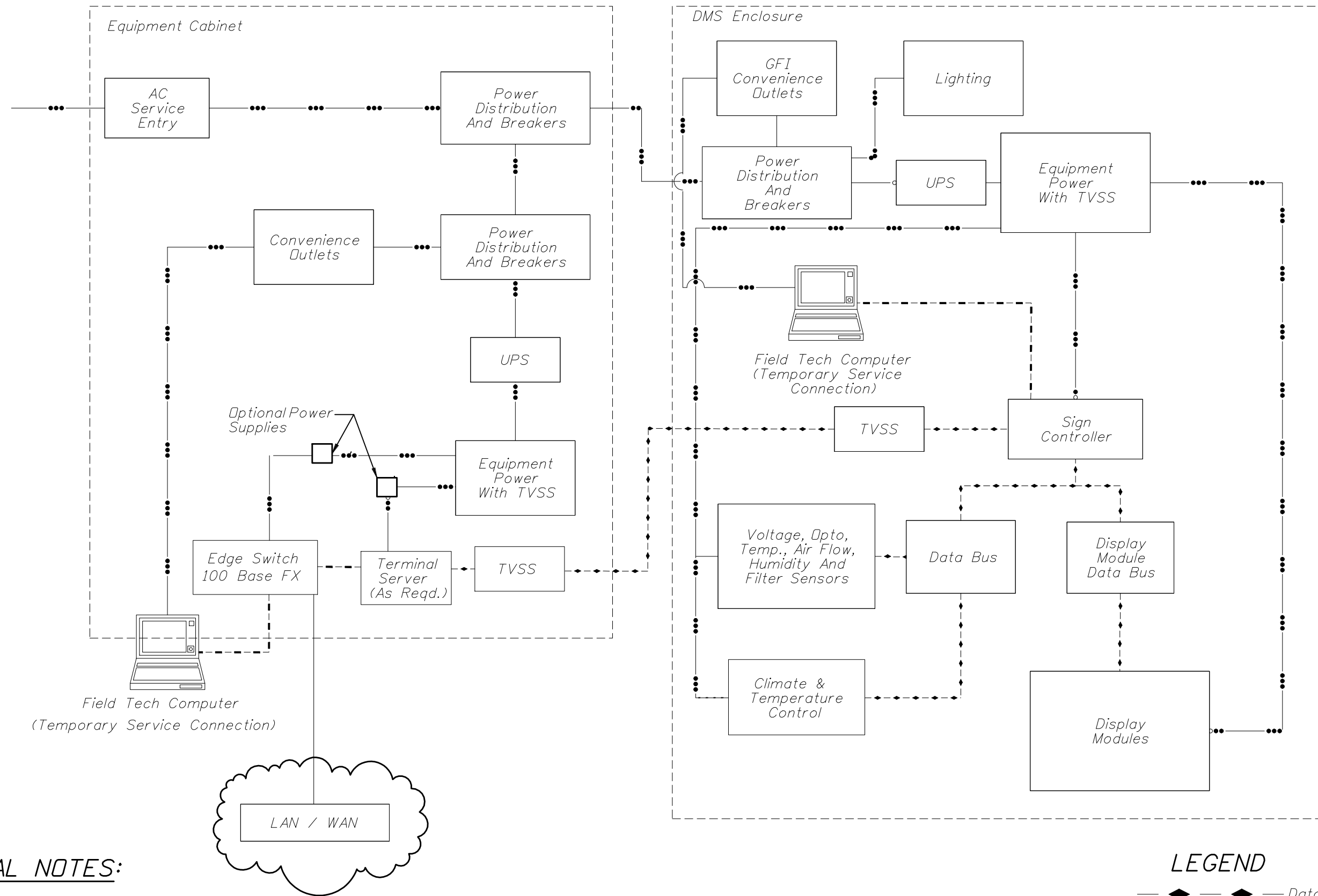
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FIBER OPTIC SPLICE BOX AND PULL BOX

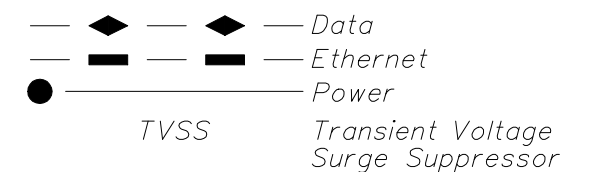
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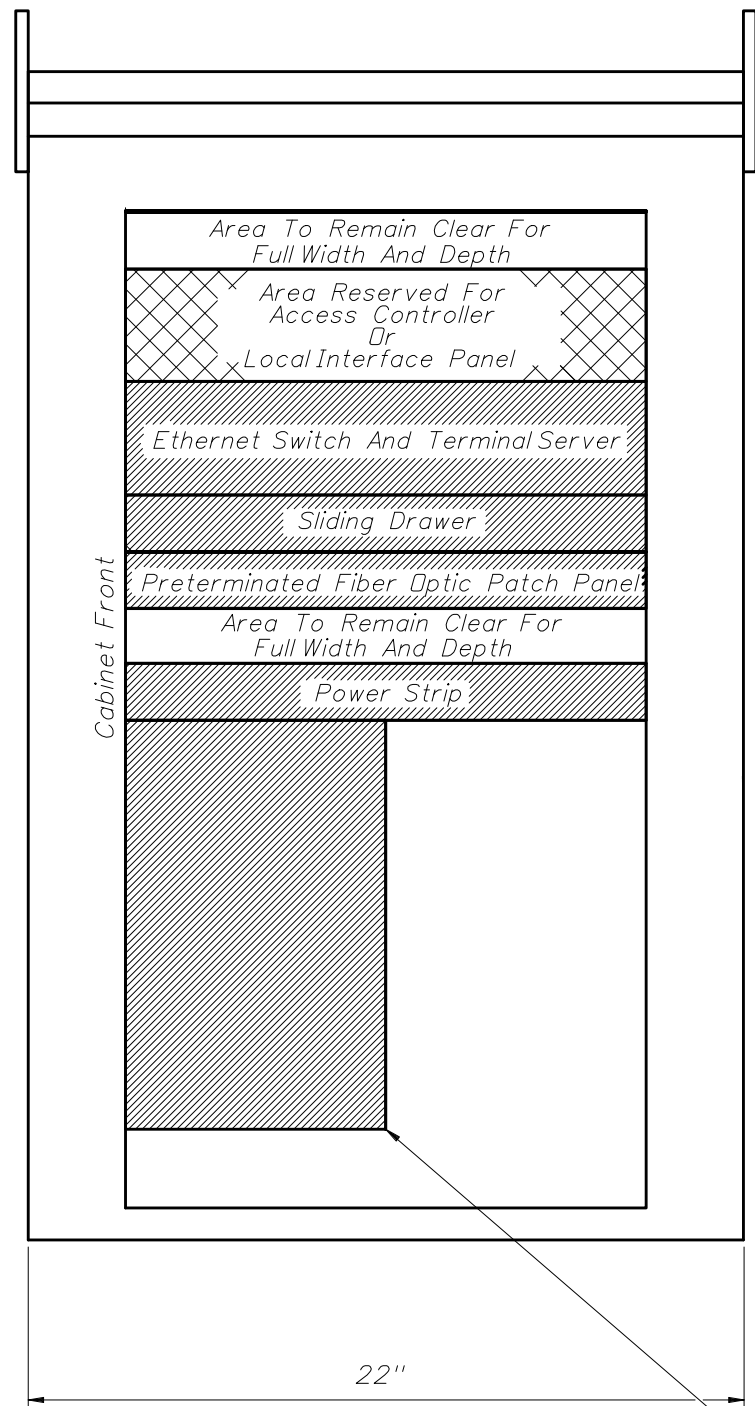


GENERAL NOTES:

1. AC wired cabinet shall be equipped with a surge protector with an alarm feature.
2. Equipment cabinet shall be located on DMS sign structure.

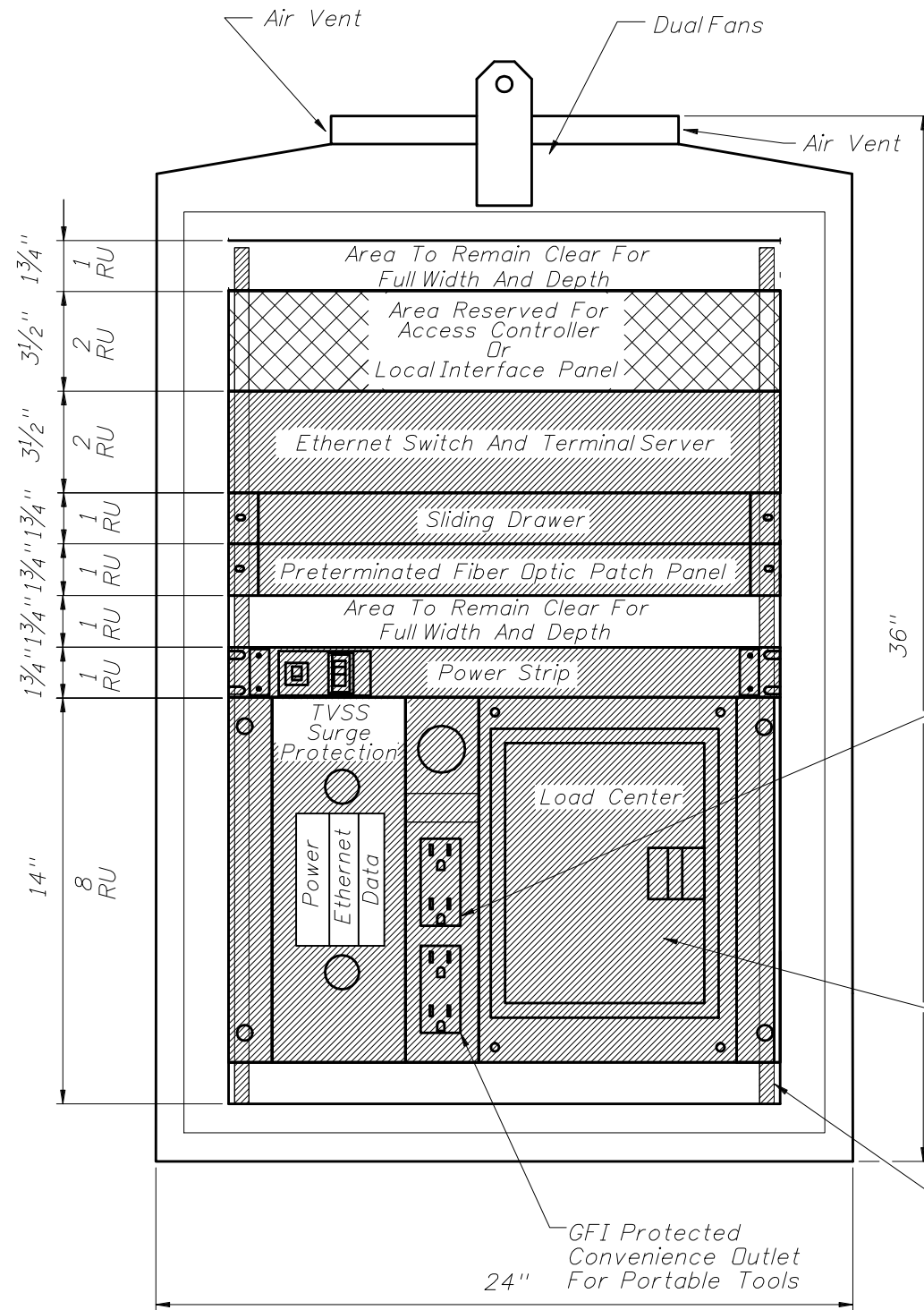
LEGEND





SIDE VIEW

Power Distribution Assembly — Service Entrance, Breakers, Primary AC Filter, Terminal Blocks, Ground Bussbar TVSS Surge Protection



FRONT VIEW

GENERAL NOTES:

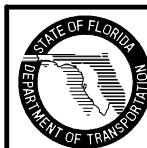
1. Cabinet layout is for pole or base mounted installations.
2. All dimensions are approximate.
3. The minimum DMS cabinet dimensions shall be 36"H X 24"W X 22"D.
4. Conduit entrances are at bottom of cabinet.
5. Minimum number of duplex outlets is two: 1 TVSS protected and 1 GFI protected.
6. Either an access controller or local access panel shall be provided to provide full access to DMS sign for control, programming and troubleshooting.
7. Load center shall be rated for at least 100 amps 120/240 VAC and with at least one main disconnect and 3 circuit breakers.

TVSS Protected Outlets For Communications Hardware

Load Center Must Include Power Distribution Assembly Service Entrance, Power Filter, Main Breaker, Separate Circuit Breakers For Equipment Power And Convenience Outlets, Ground Blocks, Ground Bussbar And Terminal Blocks For Direct Connection To Protected Power Outlets

19" EIA Rack With Tapped 10-32 Threaded Holes

Not To Scale



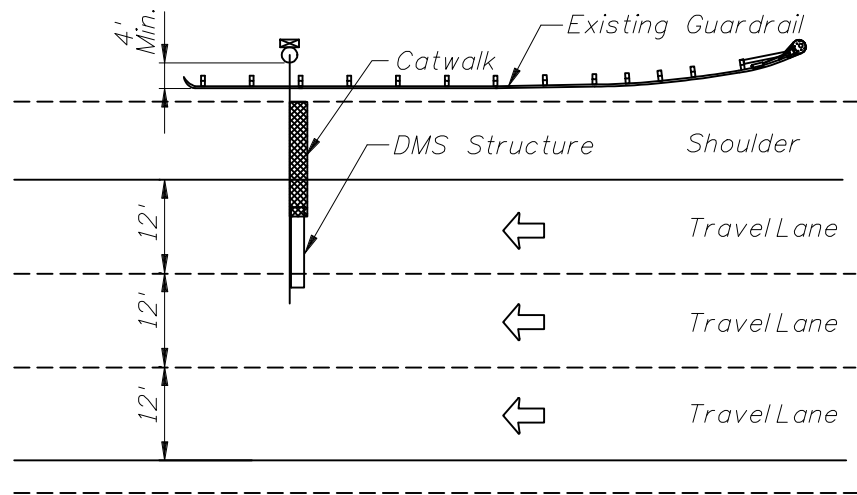
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DMS CABINET LAYOUT

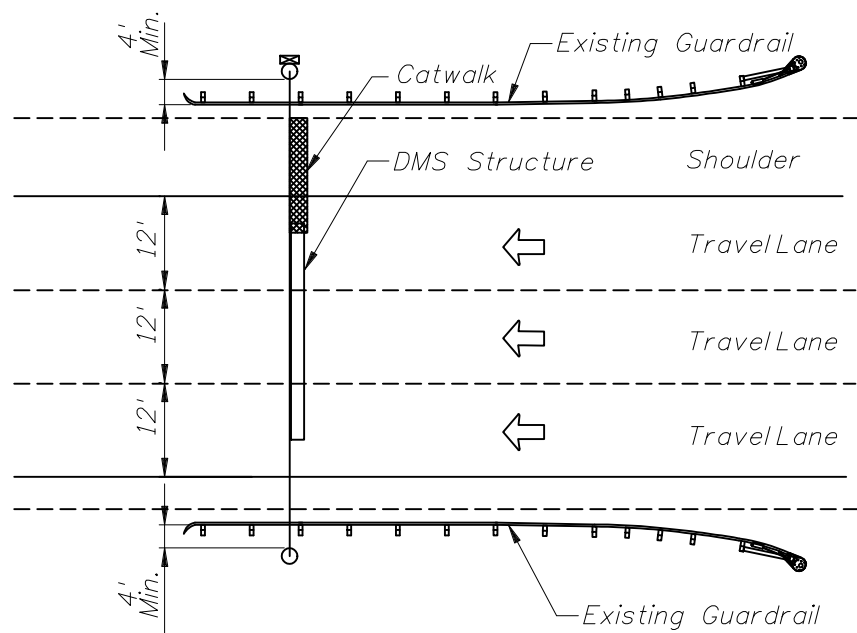
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GENERAL NOTES:

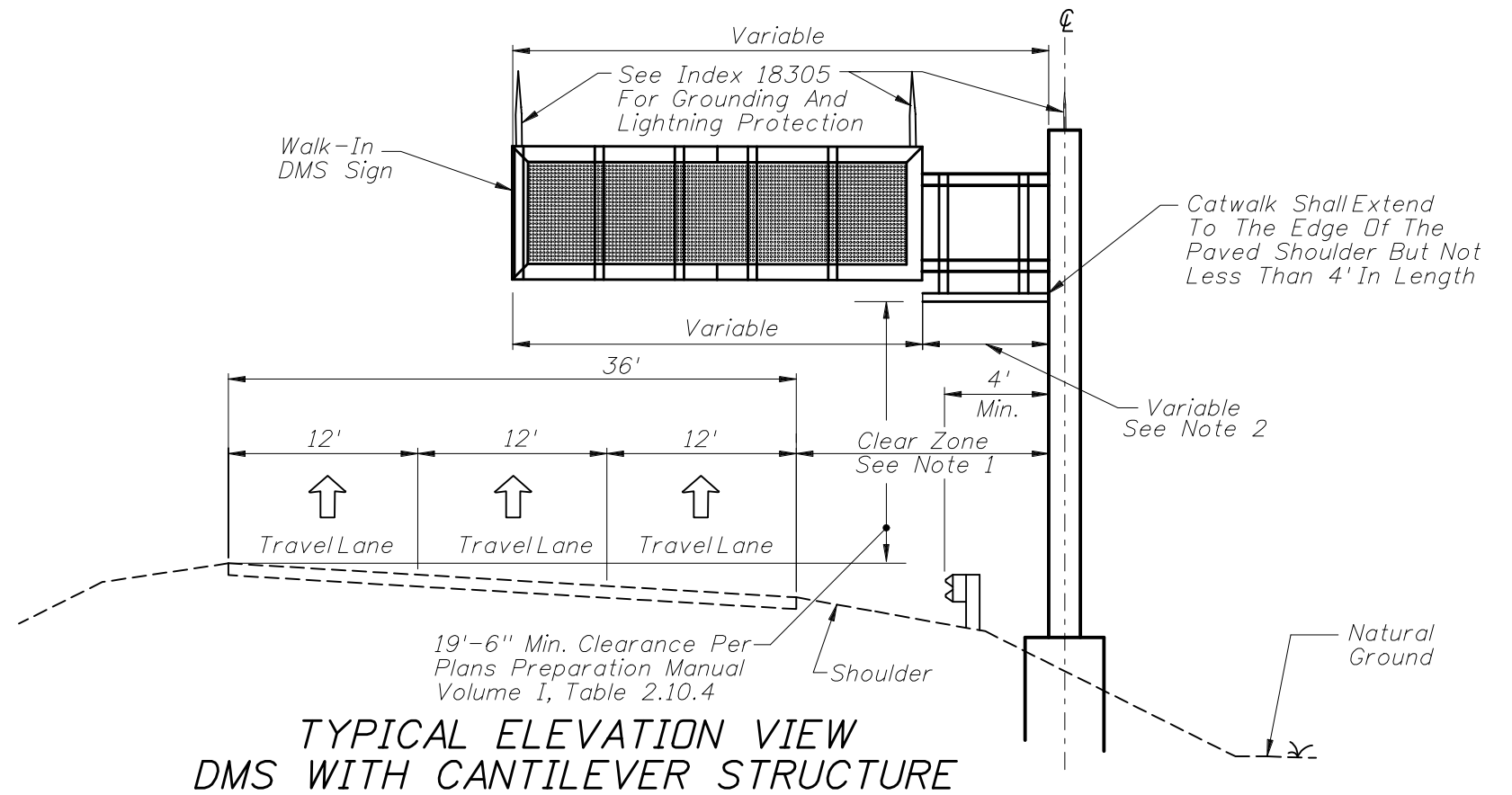
1. If no guardrail or barrier wall exists, structure shall be outside clear zone. Clear zone shall be measured to edge of drilled shaft if drilled shaft is more than 4" above adjacent grade.
2. Catwalk shall extend to outer edge of paved shoulder.
3. Clear zone distance and setbacks from edge of travel lane shall be in accordance with Plans Preparation Manual Volume I, Chapters 2 and 4.



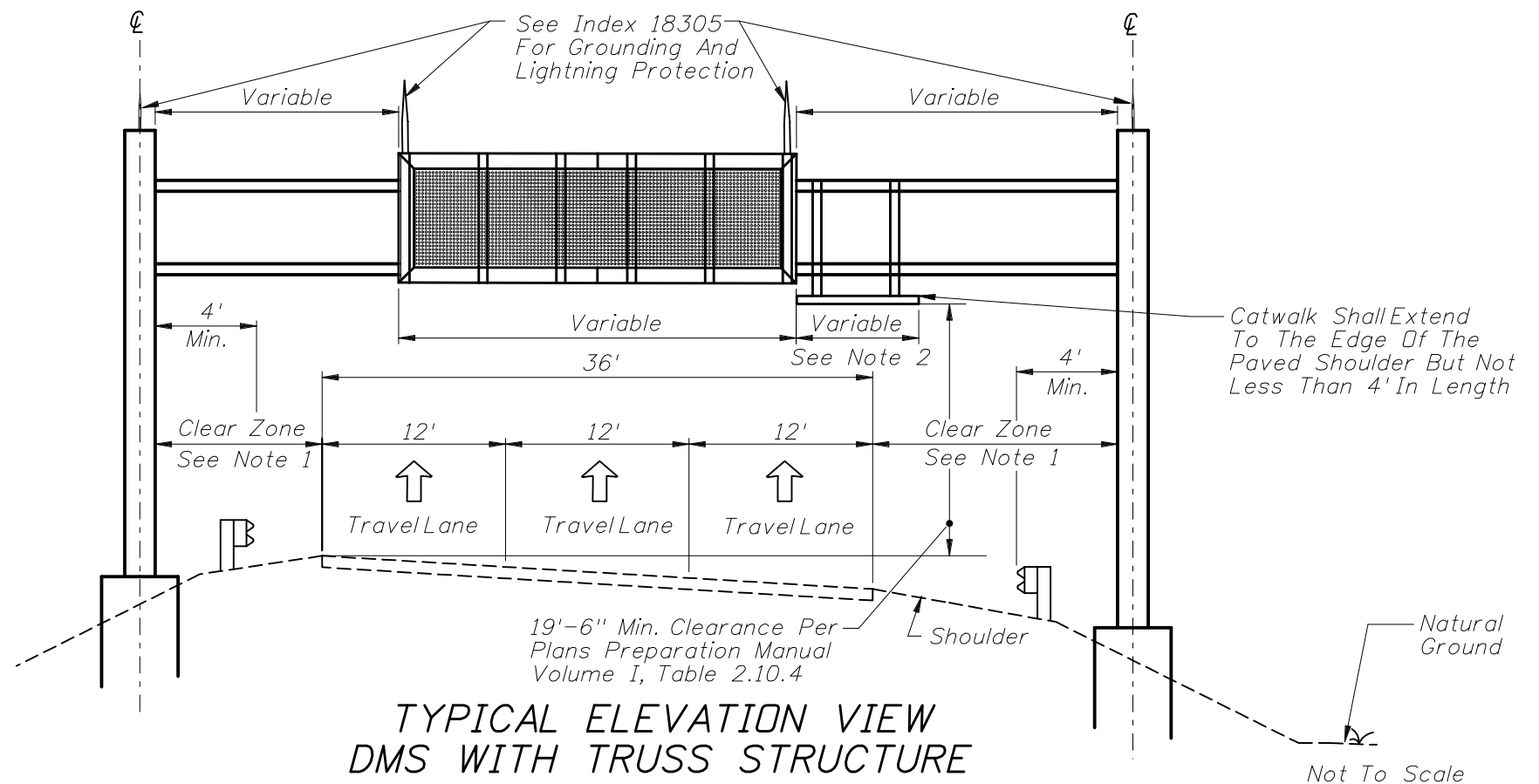
**TYPICAL PLAN VIEW
DMS CANTILEVER STRUCTURE**



**TYPICAL PLAN VIEW
DMS TRUSS STRUCTURE**



**TYPICAL ELEVATION VIEW
DMS WITH CANTILEVER STRUCTURE**



**TYPICAL ELEVATION VIEW
DMS WITH TRUSS STRUCTURE**

Not To Scale

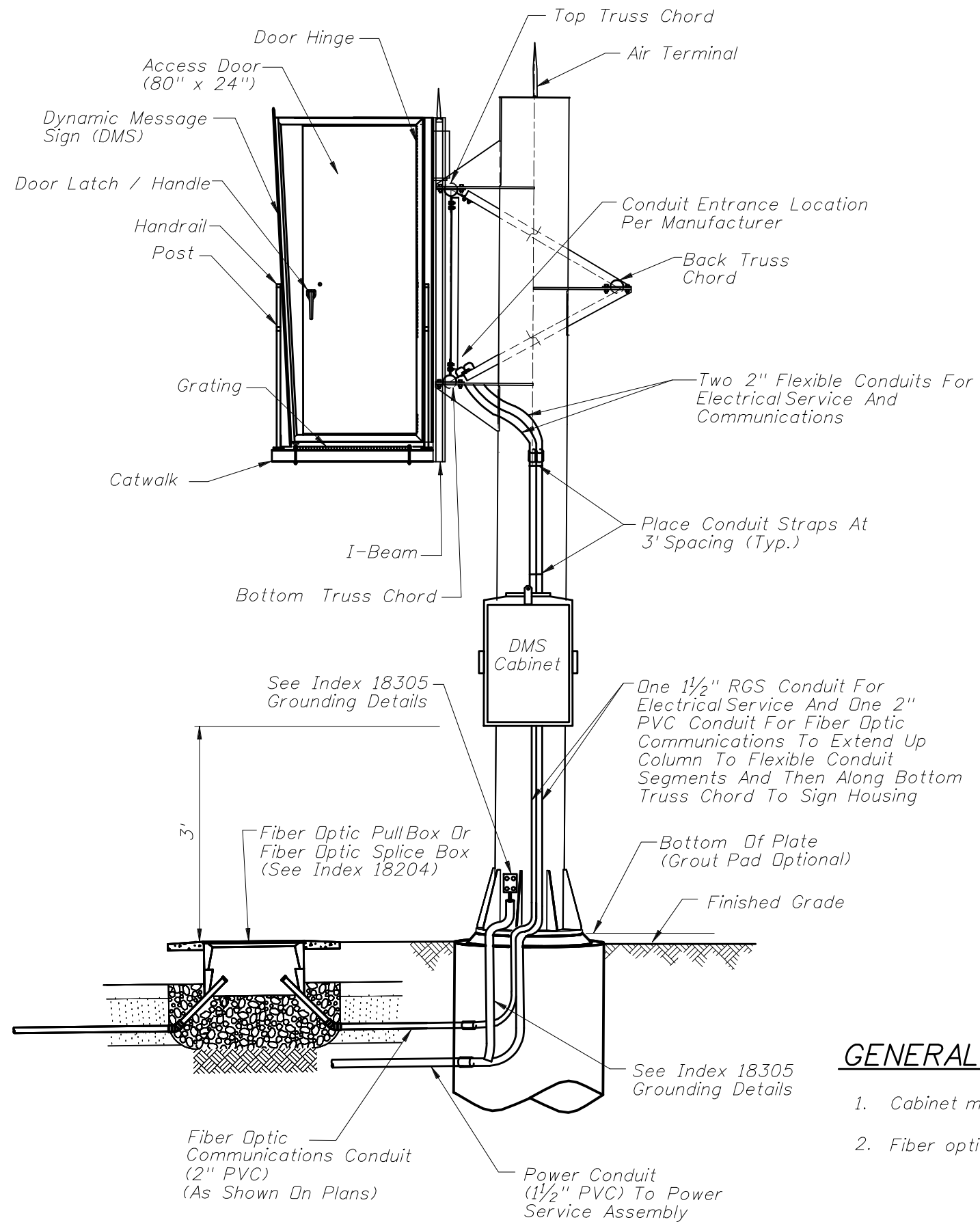


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TYPICAL DMS MOUNTING DETAILS

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Index No. 18302



GENERAL NOTES:

1. Cabinet may be pole or base mounted as shown on plans.
2. Fiber optic conduit size to be shown on plans.

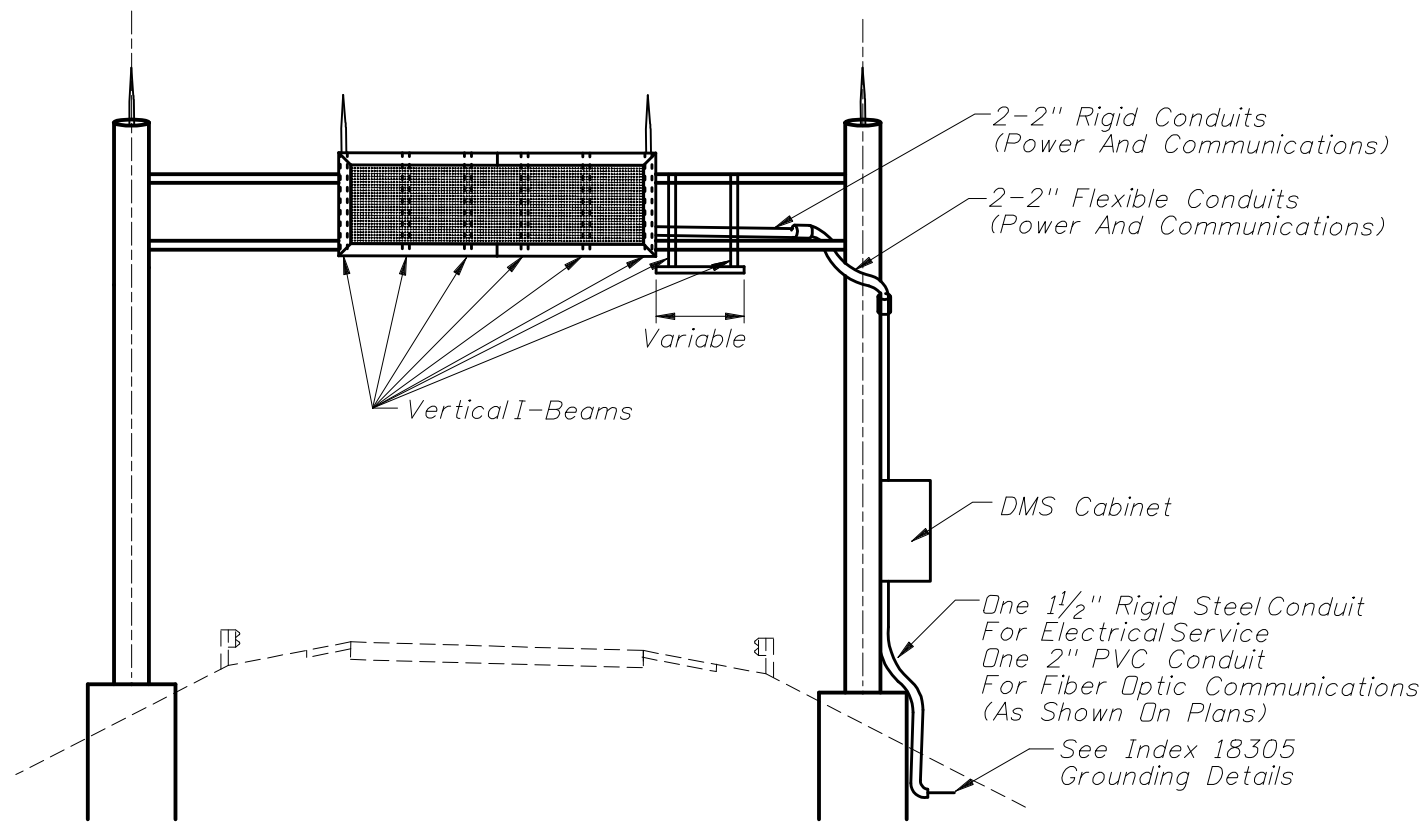
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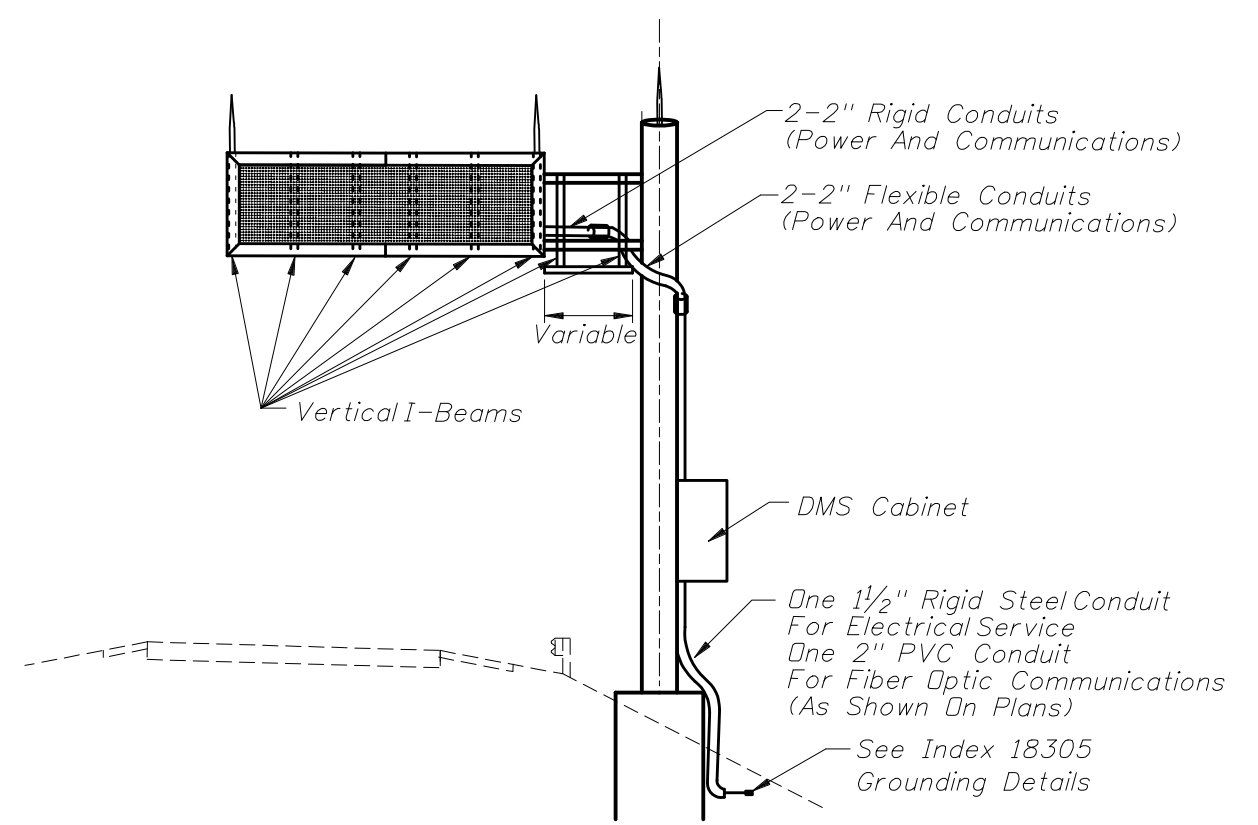
2010 FDOT Design Standards

DMS STRUCTURE DETAILS

Last Revision	Sheet No.
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18303	



TRUSS DMS

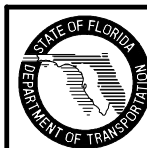


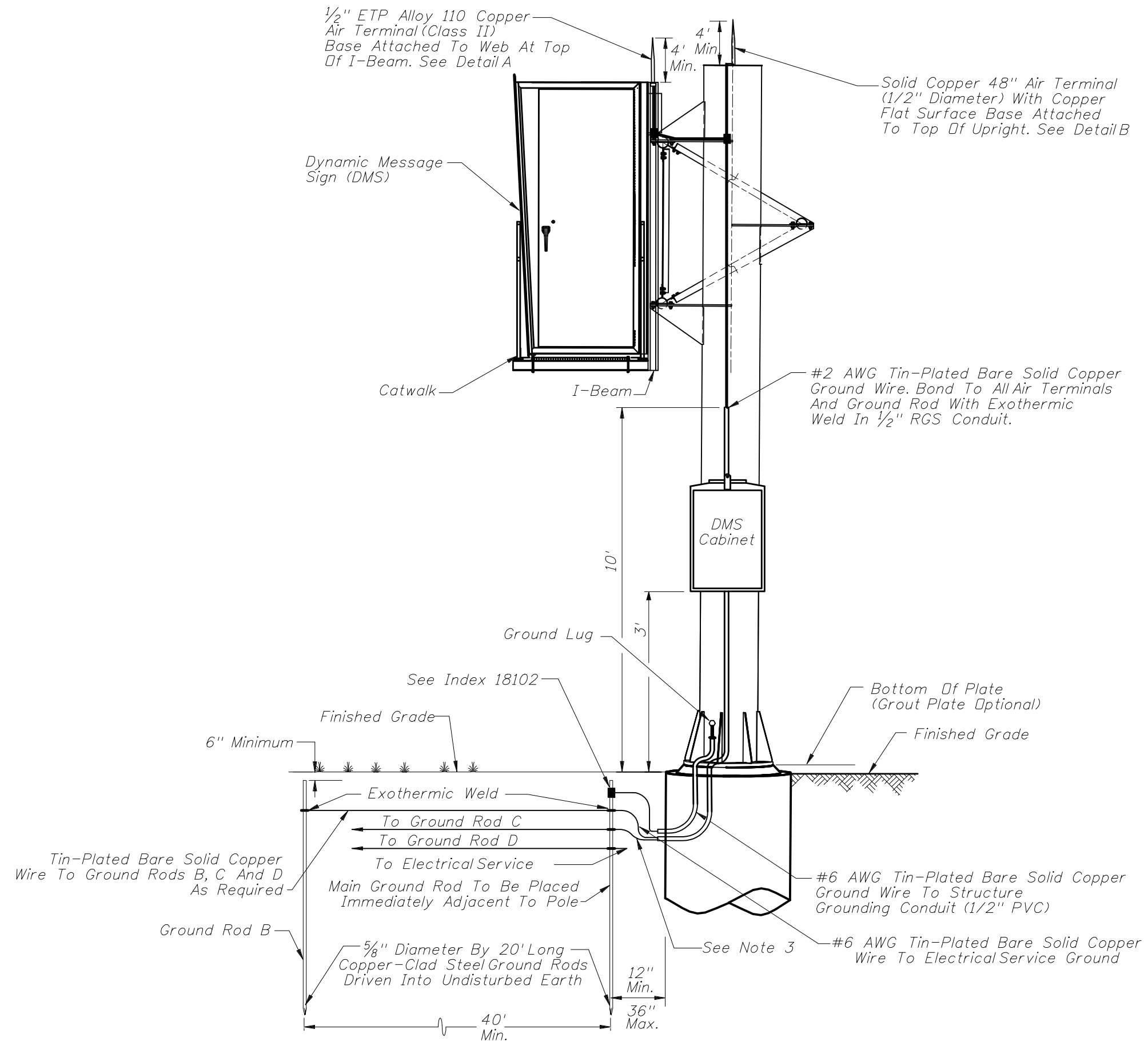
CANTILEVER DMS

GENERAL NOTES:

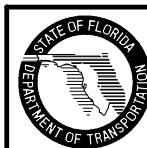
1. Conductors for grounding shall be connected to steel framework that have been cleaned to base metal, by use of bonding plates having contact area of not less than 8 square inches or by welding or brazing. Drilling and tapping the steel structure to accept a threaded connector is also an acceptable method.
2. If steel framework is to be drilled and tapped to accept threaded connector, the threaded connector shall have at least 5 threads fully engaged and secured with a jam nut to the steel framework.
3. Bends in the conduit with DMS communications cable (6-count single mode fiber optic cable) shall not be less than the manufacturer's minimum bending radius for the fiber optic cable.
4. No bend of lightning conductor shall form an included angle of less than 90 degrees, nor shall it have a radius of bend less than 8 inches.
5. Catwalk and handrail design and installation shall comply with AISC, AASHTO, and OSHA requirements as applicable.
6. All data, coaxial and power cable for the DMS shall be completely concealed.
7. Structural attachment of DMS sign to structure is responsibility of contractor.
8. Columns shall project above the top of the DMS sign. Lightning protection shall conform to NFPA 780.

Not To Scale





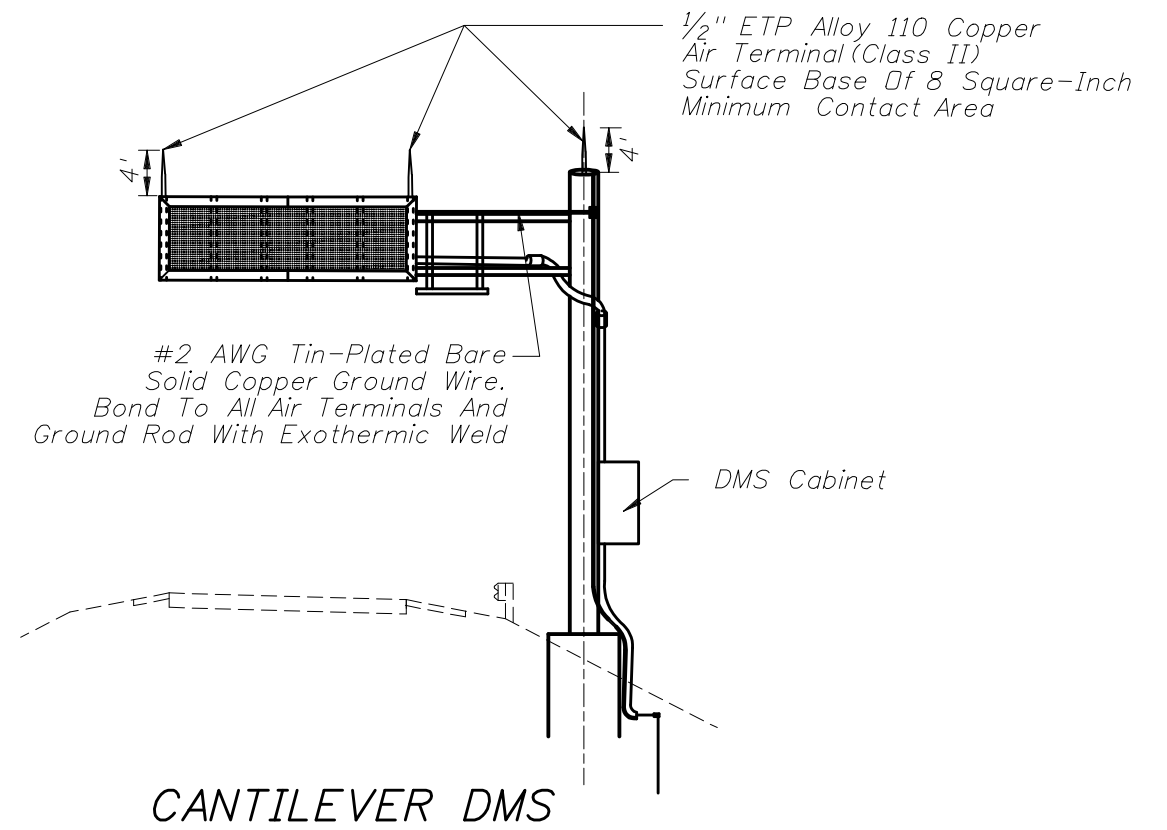
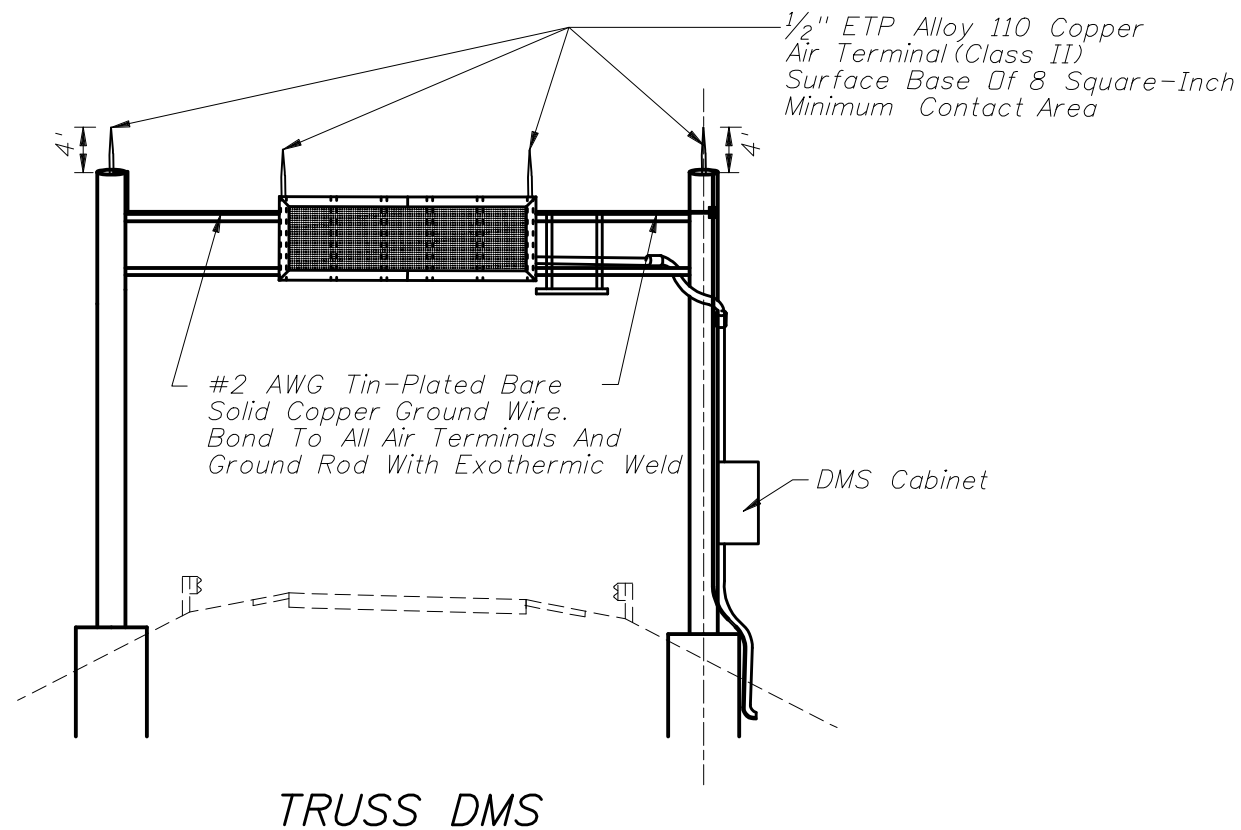
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2010 FDOT Design Standards

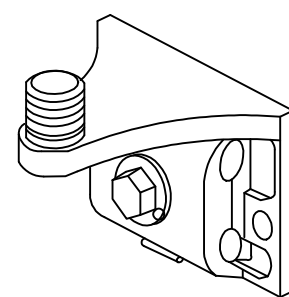
DMS GROUNDING DETAILS

Last Revision	Sheet No.
07/01/07	1 of 2
Index No.	
18305	

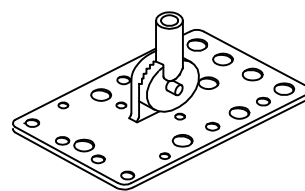


GENERAL NOTES:

1. All grounding materials shall meet the requirements of Section A620 of the current Minimum Specifications For Traffic Control Signal Devices (MSTCSD), except as noted.
2. All ground rod resistance readings shall be performed as per Standard Specification 785-2.3.4. Submit data sheets to the Engineer.
3. Exothermically weld all connections to ground rods.
4. The contractor may, upon approval of the Engineer, install a 30-foot sectional ground rod for instances when conditions will not allow for the installation of the 3 auxiliary ground rods.
5. Install marker tape directly above all grounding electrodes and conductors.
6. All RS-232 coaxial and power cable to the DMS shall be completely concealed.
7. Copper flat surfaces shall be bolted, welded, or brazed securely to framework to maintain electrical continuity.
8. All air terminals must meet UL-96A.
9. Grounding system shall be placed within right of way.
10. See Index 18102 for ground rod placement detail.



DETAIL A



DETAIL B

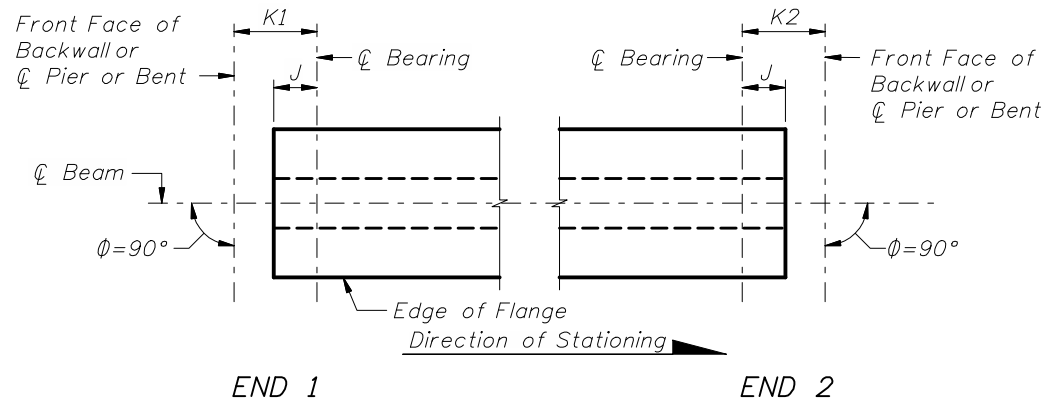
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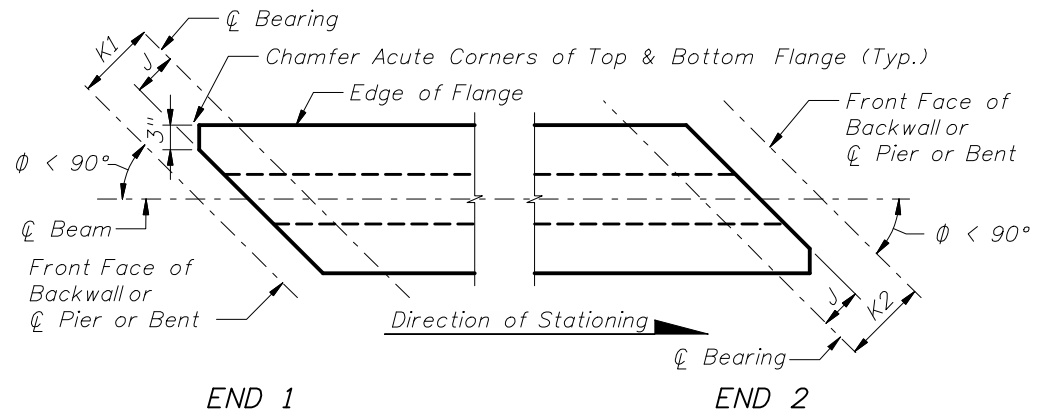
2010 FDOT Design Standards

DMS GROUNDING DETAILS

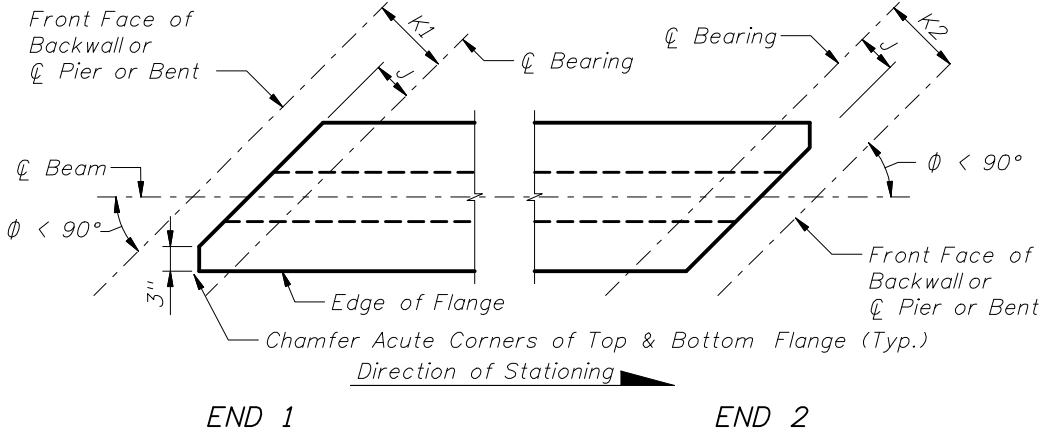
Last Revision	Sheet No.
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18305	



CASE 1

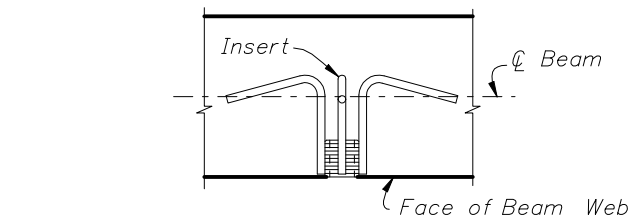


CASE 2



CASE 3

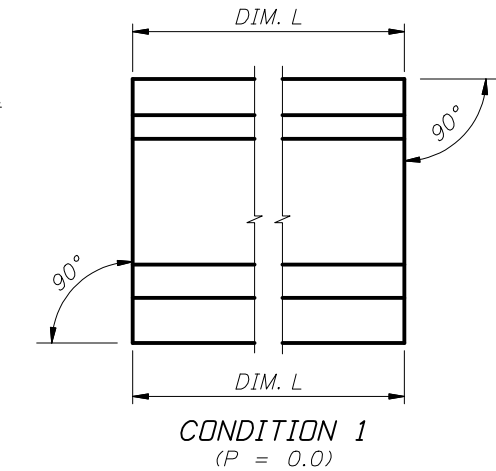
SCHEMATIC PLAN VIEWS AT BEAM ENDS



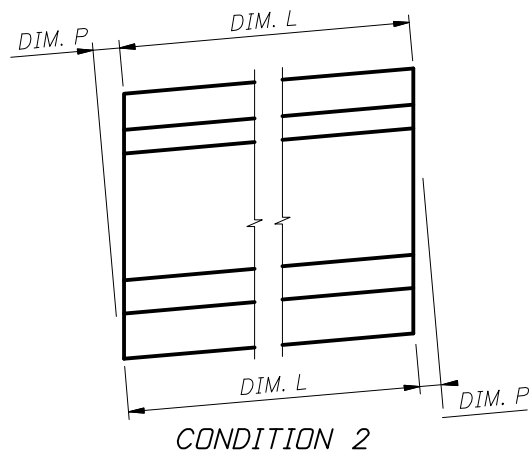
PLAN SECTION THRU BEAM WEB AT INSERT FOR DIAPHRAGM REINFORCING
(When Intermediate Diaphragms are Required by Design)

INSERT NOTES

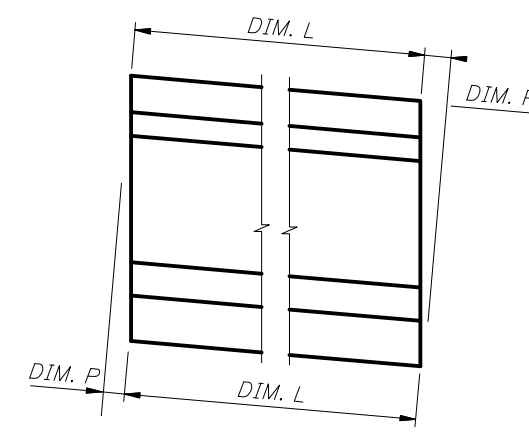
1. Provide 1"Ø, zinc-electroplated, ferrule wing nut or coil inserts, UNC threads, 1/0 minimum gage wire, not more than 4" in depth with a minimum ultimate tensile strength of 11,400 lbs. in 4,000 p.s.i. concrete.
2. If inserts are needed on both sides (faces) of beam webs, an assembly as long as the thickness of the beam web, consisting of two (2) ferrule or coil inserts attached by two (2) or more struts may be utilized. The connecting struts shall have a minimum ultimate tensile strength of 11,400 lbs.
3. Inserts for diaphragm reinforcing are required at each end of each intermediate diaphragm shown on the Beam Framing Plan. See Superstructure and Beam Framing Plans for longitudinal location of inserts for each face of beam.



CONDITION 1
(P = 0.0)



CONDITION 2



CONDITION 3

SCHEMATIC END ELEVATIONS OF BEAMS
(Showing Vertical Bevel of Beam End)

BEAM NOTES

1. All bar dimensions are out-to-out.
2. Place one (1) Bar 4K or 5K or 5Z at each location as detailed alternating the direction of the ends for each bar (see "ELEVATION AT END OF BEAM", Index Nos. 20120, 20130, 20140, 20150, 20160, 20172 and 20178).
3. Bars 4L shall be bent prior to the beam leaving the prestressing yard. Bars 4L shall be bent parallel to the ends of the beams.
4. Caution should be used with Bars 4L in the ends of exterior beams to assure the bent portion of the bar is properly oriented so that the bar will be embedded in the diaphragm concrete.
5. Strands N shall be either ASTM A416, Grade 250 or Grade 270, seven-wire strands 3/8" Ø or larger, stressed to 10,000 lbs. each.
6. Unless otherwise noted, the minimum concrete cover for reinforcing steel shall be 2".
7. At option of the Contractor, welded deformed wire reinforcement may be used in lieu of Bars 3D, 4K, 5K, 4L and 5Z except as noted below, provided the wire sizes and spacing match those shown on the Standard Beam Details sheet for these bars. In this event, Bars 4K or 5K and 5Z may be fabricated with the omission of the lower outstanding leg provided that two longitudinal wires are placed (welded) at the lower end of the bar. The first (lower) wire shall be located 1" from the end of Bars 4K or 5K and 5Z and the second wire 2" minimum from the first wire, but no less than 1/4 of the beam depth from mid-depth of the beam. In addition, Bars 5Z may consist of pairs of bars with the cross sectional area of the pair equal to or greater than the shown conventional single bar. Welded wire reinforcement shall conform to ASTM A497.
8. Install Safety Sleeves 1'-10" from ends of beam and spaced on 8'-0" (Max.) centers. Shift Bars 4K or 5K locally to allow placement. Safety Sleeves shall be:
2 1/2" NPS x 5" Sch. 40 PVC Pipe with Cap for Type III, IV, V, VI, FBT 72 and FBT 78 Beams;
1 1/2" NPS x 5" Sch. 40 PVC Pipe with Cap for Type II Beams.
Holes shall be free of debris and water prior to casting deck.
9. For beams with skewed end conditions, the end reinforcement, defined as Bars 3D1, 3D2, 4K, 5K, 4M1, 4M2, 4Y or 5Y and 5Z placed within the limits of the spacing for Bars 3D (approximately 1.5 times the overall beam depth) in "ELEVATION AT END OF BEAM", shall be placed parallel to the skewed end of the beam. Bars 4K or 5K and 4M3 located beyond the limits of Bars 3D shall be placed perpendicular to the longitudinal axis of the beam. Placement of Bars 3D1, 3D2, 4M1 and 4M2 correspond to END 1 and END 2 respectively, as shown in the beam "ELEVATION". For Bars 3D1 and 3D2, Dimension B and the overall length shall be adjusted to fit the width of the bottom flange measured parallel to the skew. For Bars 4M1 and 4M2 the overall length shall be adjusted to fit the width of the top flange as measured parallel to the skew. Fan Bars 4M1 and 4M2 as needed to maintain minimum clearance (1 1/2") between the bars at the transition to Bars 4M3 and field cut to length to maintain minimum cover.
10. Bars 4M1, 4M2 and 4M3 are applicable to AASHTO Beam Types V and VI, and Florida Bulb-T's.
11. For Beams with vertically beveled end conditions when "DIM. P" exceeds 1", Bars 3D1, 3D2, 4K, 5K, 4Y or 5Y and 5Z shall be placed parallel to the end of the beam, within the limits of Bar 4L.
12. Welded deformed wire reinforcement shall not be used for the end reinforcement (Bars 3D1, 3D2, 4K or 5K and 5Z) for beams with skewed end conditions or vertically beveled end conditions when "DIM. P" exceeds 1".
13. Bars 4K or 5K and 5Z shall be placed and tied to the fully bonded strands in the bottom row (see "STRAND PATTERN").
14. At the Contractor's option Bars 3D1 and 3D2 may be fabricated as a two-piece bar with a 1'-2" lap splice of the bottom legs.
15. For referenced Dimensions, Angles and Case Numbers see Table of Beam Variables in Structures Plans.

INSTRUCTIONS TO DESIGNER:

To limit vertical splitting forces in the webs of beams, the maximum prestress force at the beam ends from fully bonded strands must be limited to the following:

Beam Type	Max. Bonded Prestress Force	Index No.	Last Revision Date
AASHTO Type II	755 Kips	20120	7/1/05
AASHTO Type III	1100 Kips	20130	7/1/05
AASHTO Type IV	1470 Kips	20140	7/1/05
AASHTO Type V	1630 Kips	20150	7/1/05 or later
AASHTO Type VI	1815 Kips	20160	7/1/05 or later
Florida Bulb-T 72	1470 Kips	20172	7/1/05 or later
Florida Bulb-T 78	1730 Kips	20178	7/1/05 or later

No losses shall be applied when calculating the Bonded Prestress Force. The reinforcing in the ends of the beams must not be modified without the approval of the State Structures Design Engineer.



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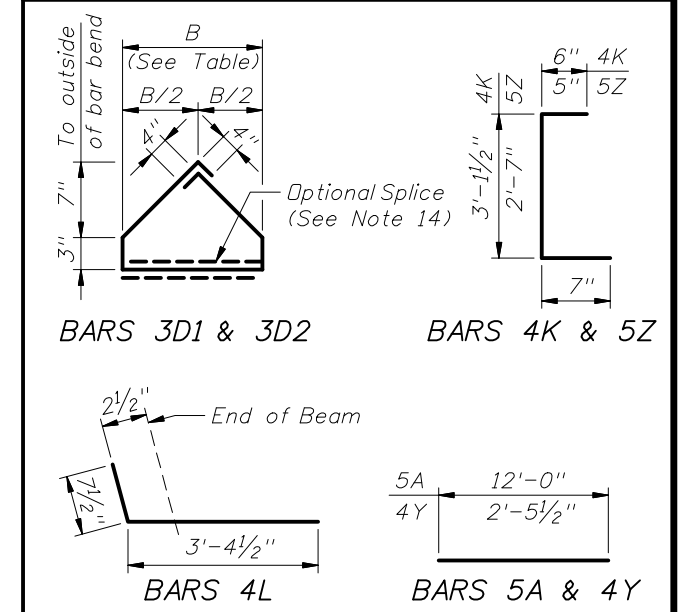
**TYPICAL AASHTO AND BULB-T BEAM
DETAILS AND NOTES**

Last Revision
12/09/08
Sheet No.
1 of 1
Index No.
20110

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	4	12'-0"
D1	9, 11 & 14	3	12	See Table
D2	9, 11 & 14	3	12	See Table
K	2, 9, 11 & 13	4	See Table	4'-3"
L	3 & 4	4	18	4'-0"
N	5	3/8" Ø Strand	2	DIM L+5"
Y	9 & 11	4	8	2'-6"
Z	2, 9, 11 & 13	5	8	3'-7"

BENDING DIAGRAMS (See Note 1)

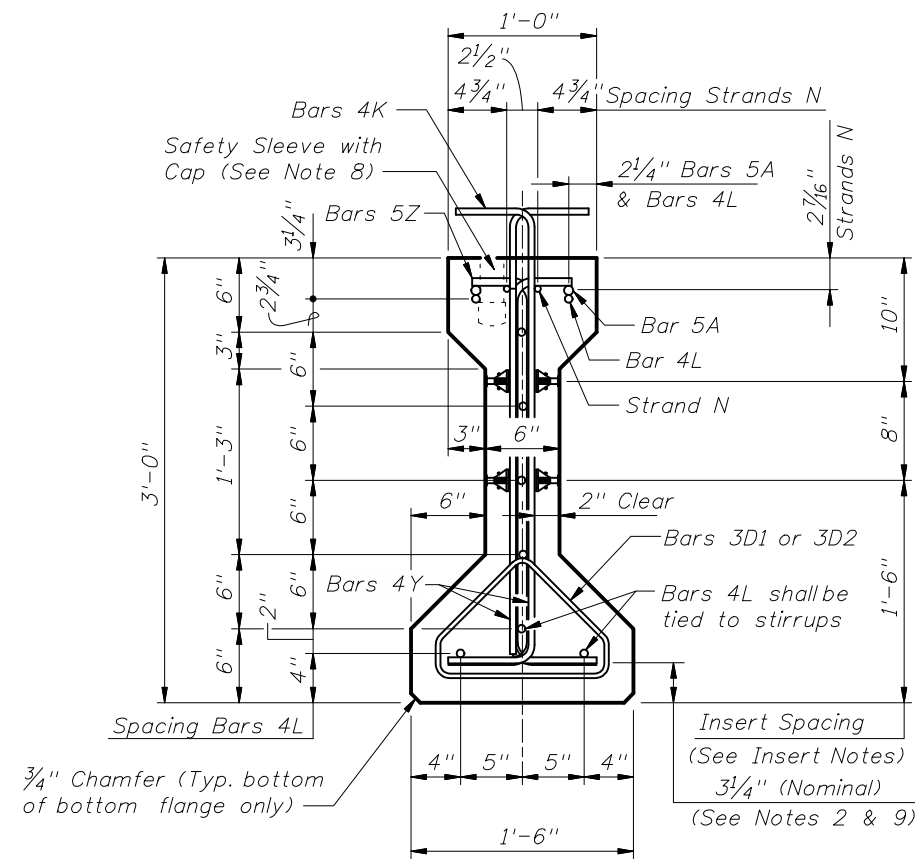


NOTES:

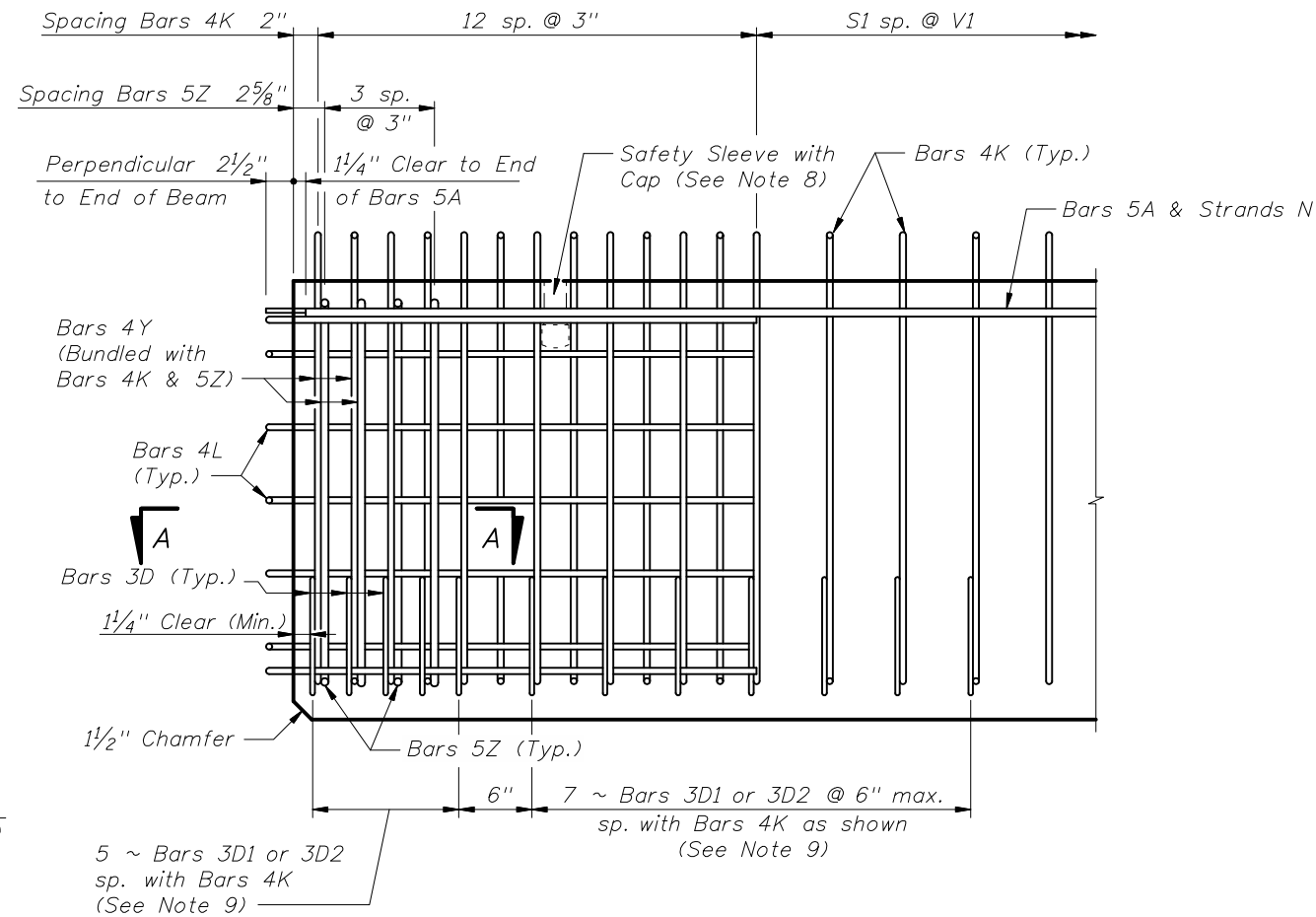
Work this Index with Index No. 20110 - Typical AASHTO and Bulb-T Beam Details and Notes and the AASHTO Type II Beam - Table of Beam Variables in Structures Plans.

For referenced notes, see Index No. 20110.

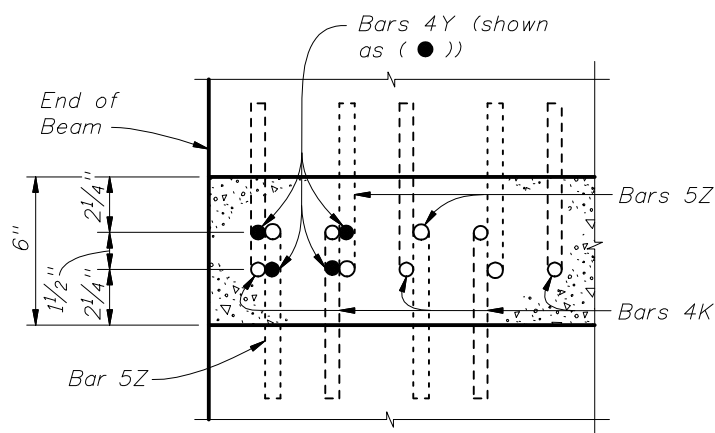
For Dimensions L, R, V1 thru V4 and number of spaces S1 thru S4, see AASHTO Type II Beam - Table of Beam Variables.



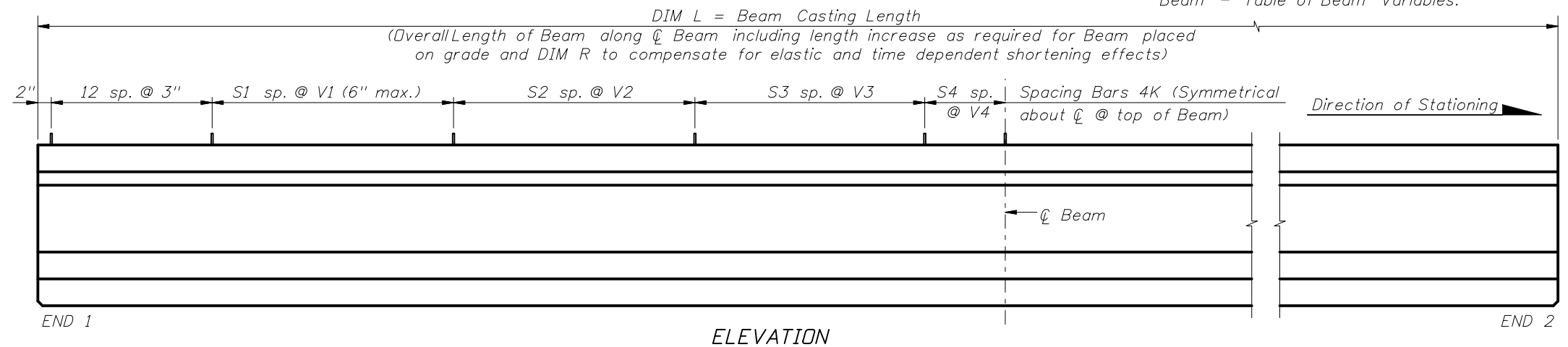
END VIEW



ELEVATION AT END OF BEAM (Flanges Not Shown For Clarity)



SECTION A-A (Showing Bars 4K, 4Y & 5Z Only)



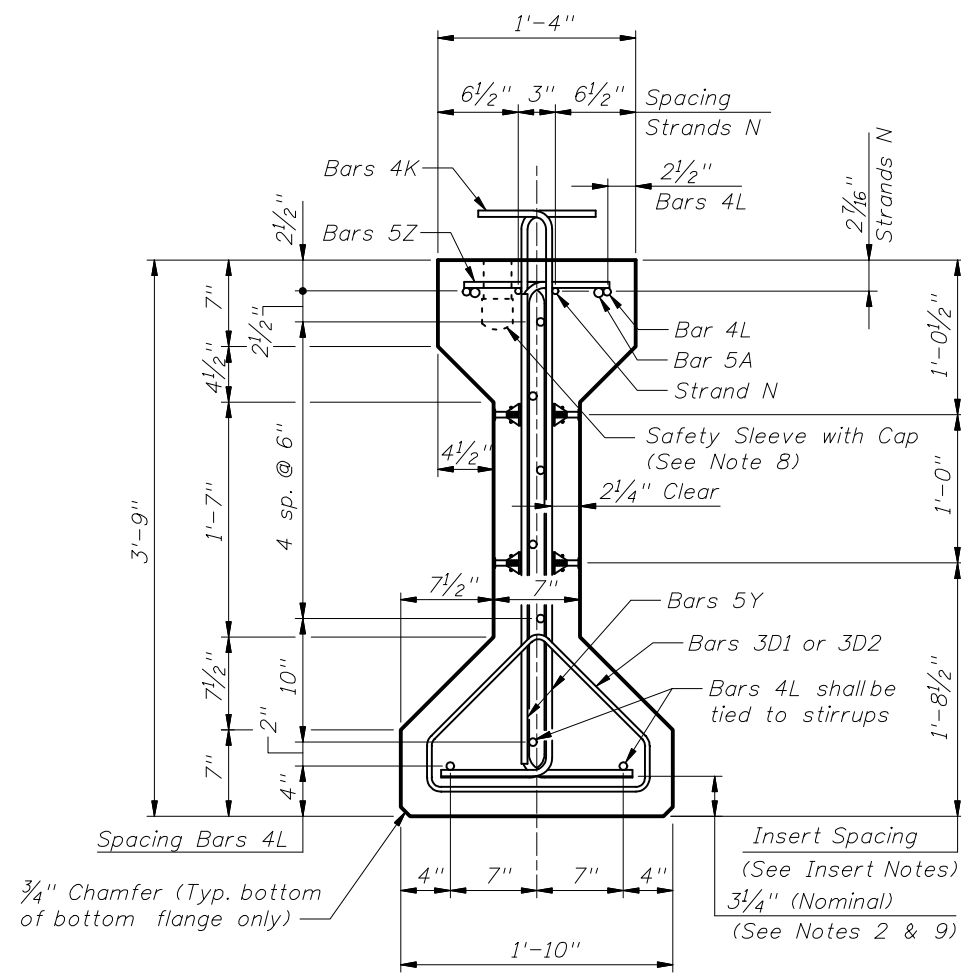
ELEVATION



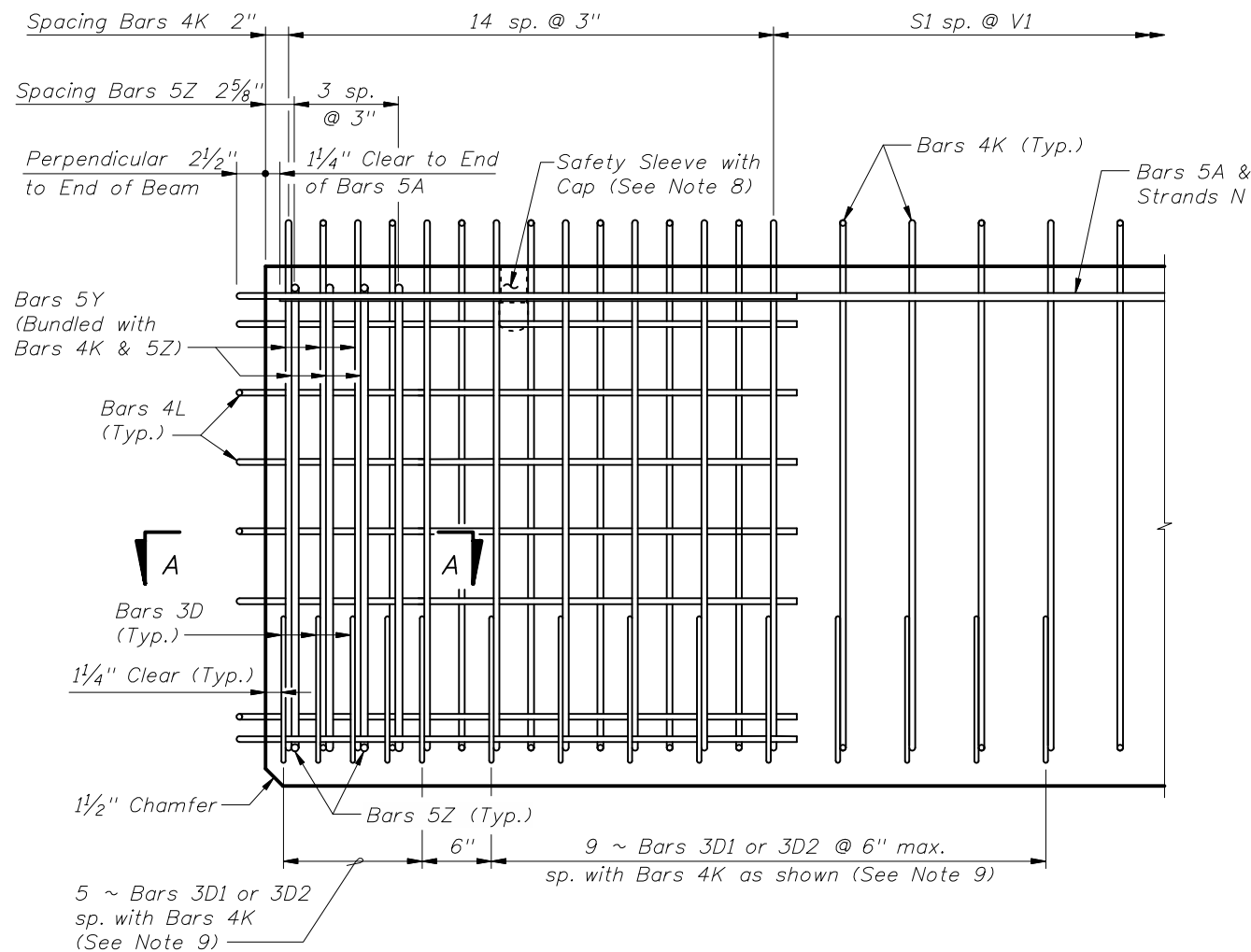
2010 FDOT Design Standards

AASHTO TYPE II BEAM - STANDARD DETAILS

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Sheet No. 1 of 1
Index No. 20120



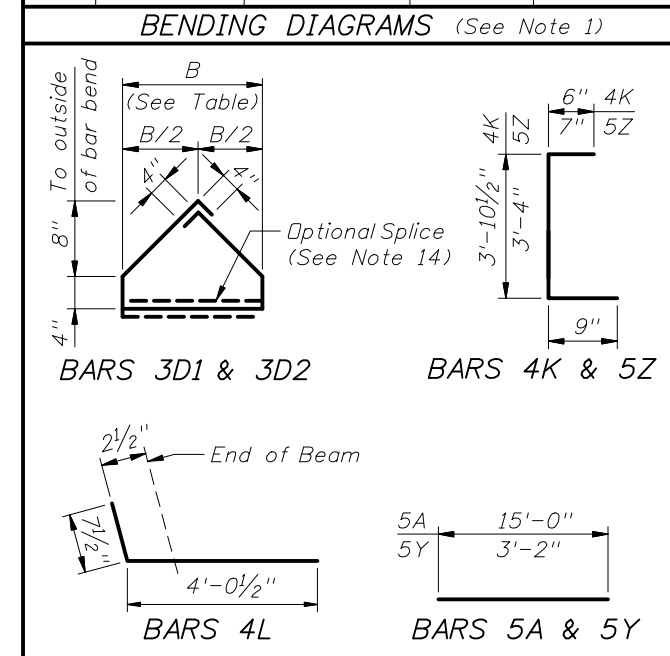
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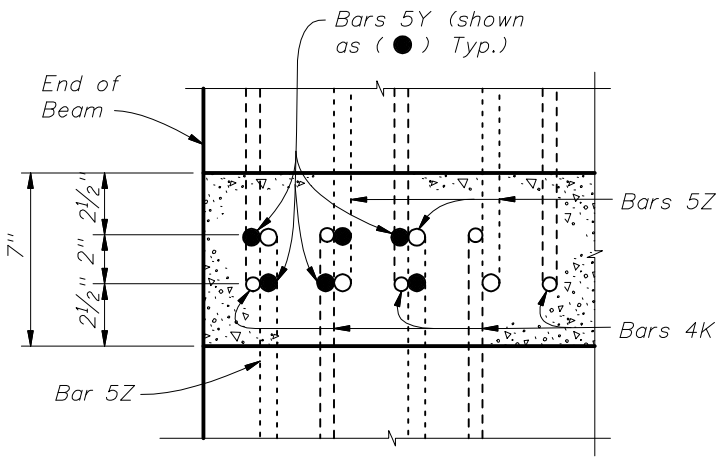
ELEVATION AT END OF BEAM
(Flanges Not Shown For Clarity)

**BILL OF REINFORCING STEEL
FOR ONE BEAM ONLY**

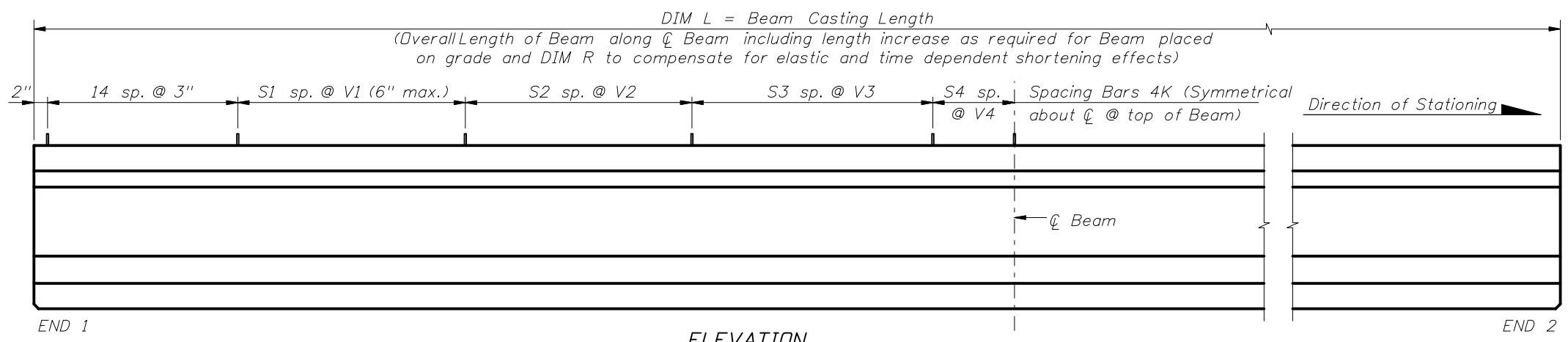
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D1	9, 11 & 14	3	14	See Table
D2	9, 11 & 14	3	14	See Table
K	2, 9, 11 & 13	4	See Table	5'-2"
L	3 & 4	4	20	4'-8"
N	5	3/8" Ø Strand	2	DIM L+5"
Y	9 & 11	5	12	3'-2"
Z	2, 9, 11 & 13	5	8	4'-8"



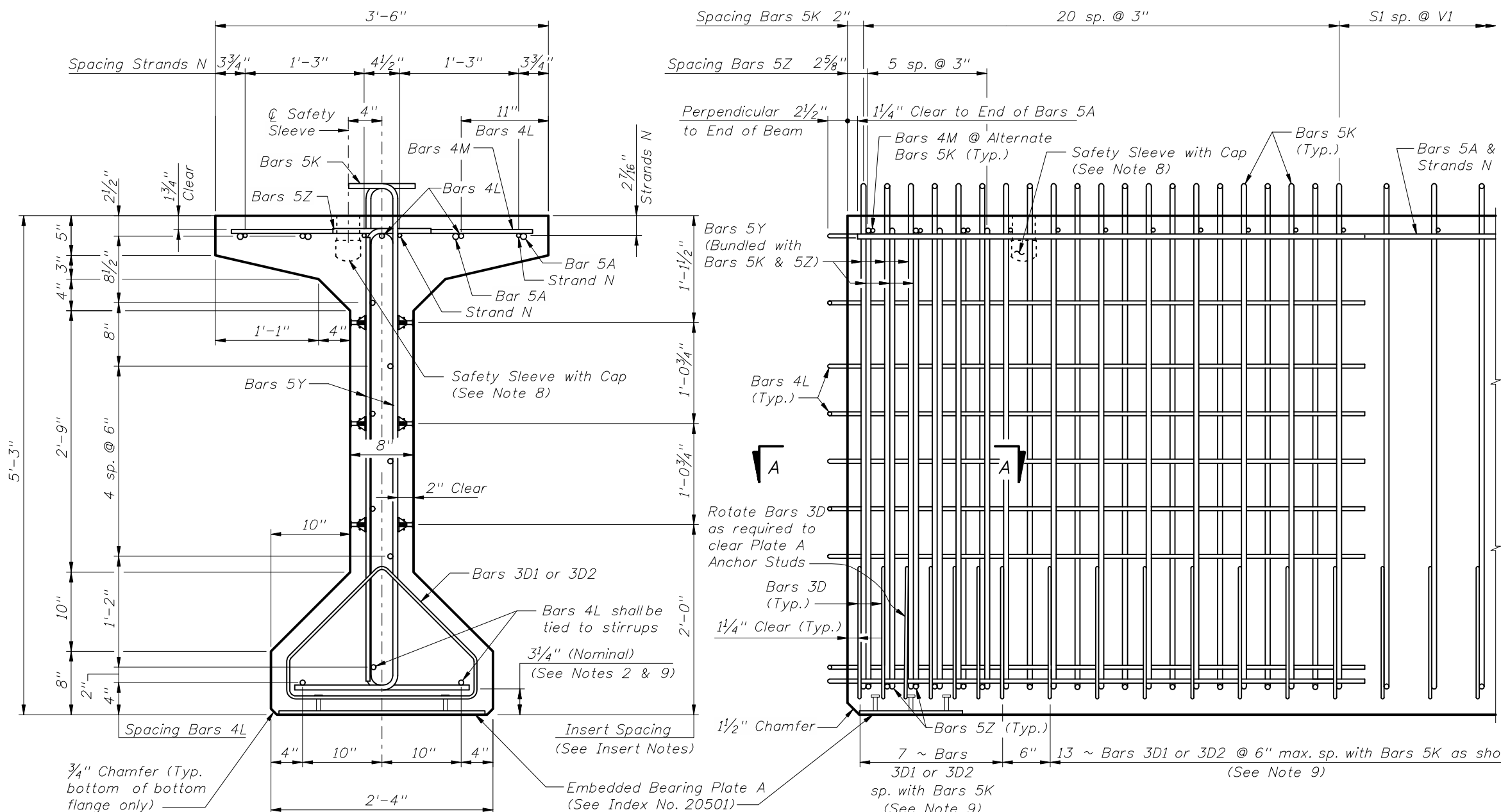
NOTES:
 Work this Index with Index No. 20110 - Typical AASHTO and Bulb-T Beam Details and Notes and the AASHTO Type III Beam - Table of Beam Variables in Structures Plans.
 For referenced notes, see Index No. 20110.
 For Dimensions L, R, V1 thru V4 and number of spaces S1 thru S4, see AASHTO Type III Beam - Table of Beam Variables.



SECTION A-A
(Showing Bars 4K, 5Y & 5Z Only)



ELEVATION

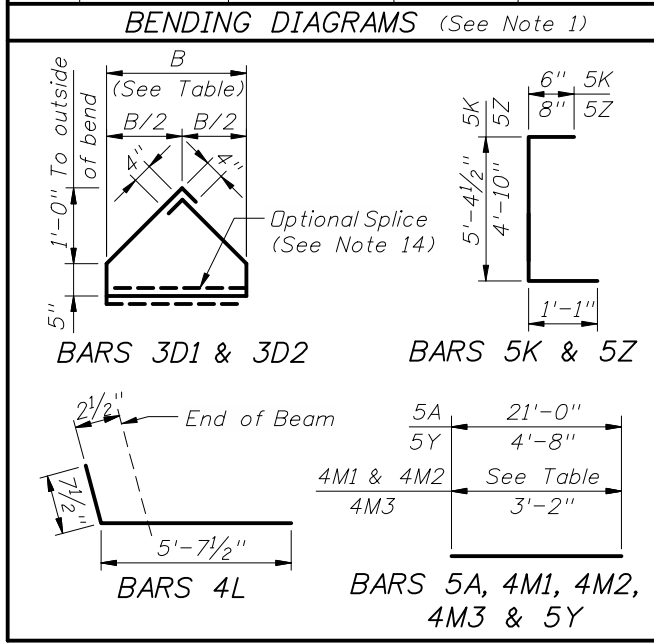


END VIEW

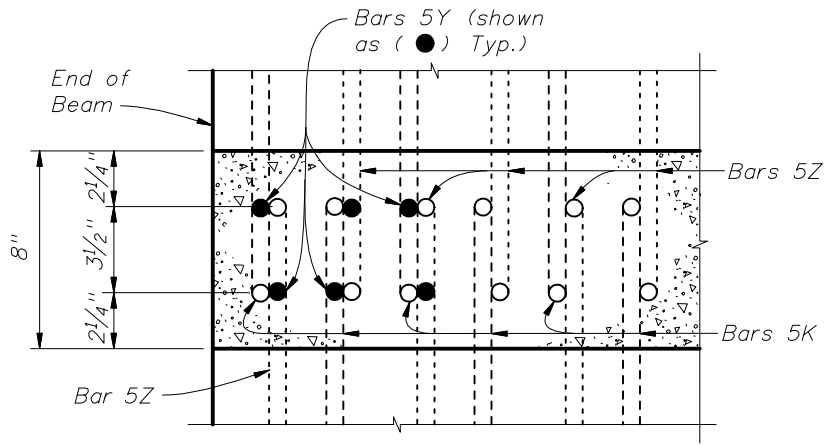
ELEVATION AT END OF BEAM
(Flanges Not Shown For Clarity)

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

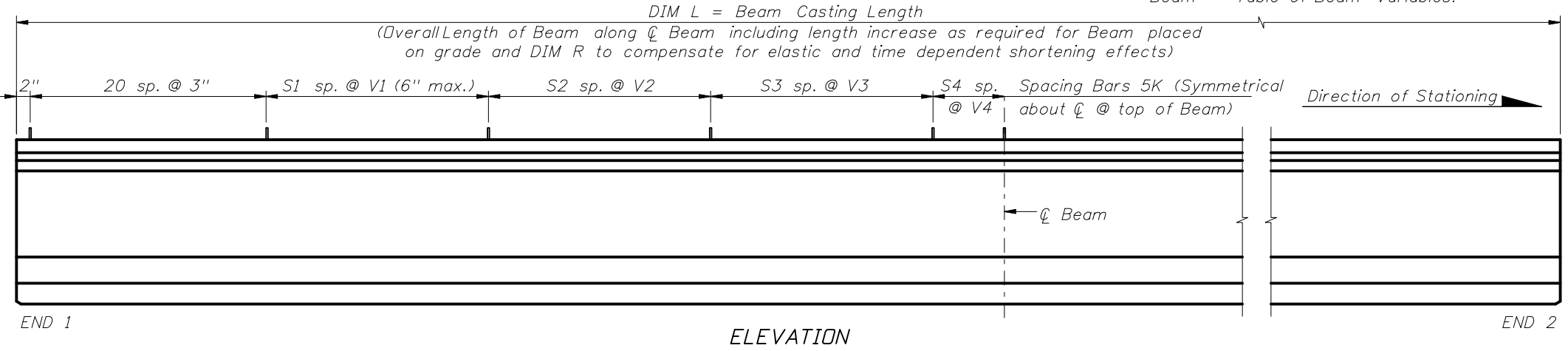
MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	8	21'-0"
D1	9, 11 & 14	3	20	See Table
D2	9, 11 & 14	3	20	See Table
K	2, 9, 11 & 13	5	See Table	7'-0"
L	3 & 4	4	24	6'-3"
M1	9 & 10	4	14	See Table
M2	9 & 10	4	14	See Table
M3	9	4	See Table	3'-2"
N	5	3/8" Ø Strand	4	DIM L+5"
Y	9 & 11	5	12	4'-8"
Z	2, 9, 11 & 13	5	12	6'-7"



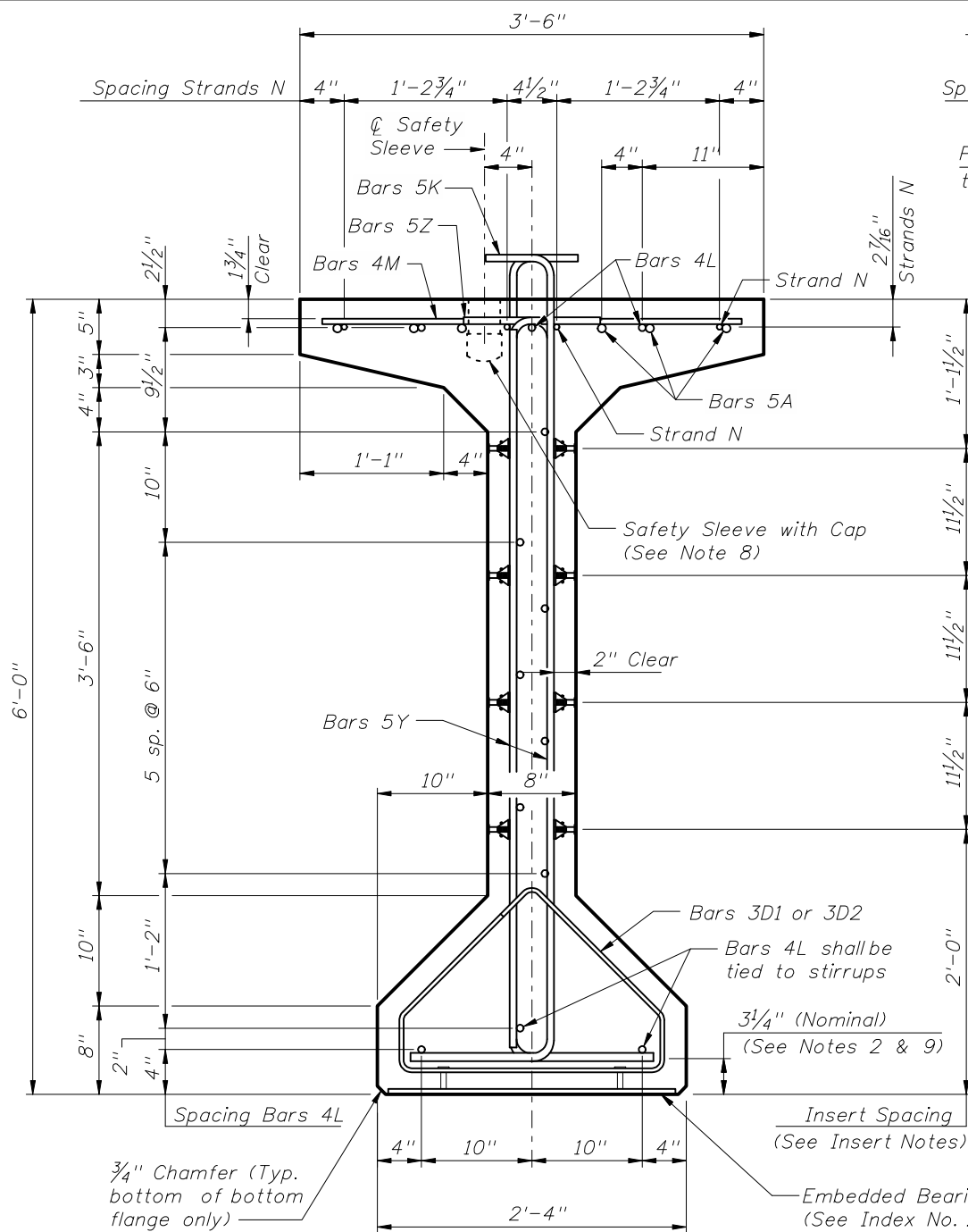
NOTES:
Work this Index with Index No. 20110 - Typical AASHTO and Bulb-T Beam Details and Notes and the AASHTO Type V Beam - Table of Beam Variables in Structures Plans.
For referenced notes, see Index No. 20110.
For Dimensions L, R, V1 thru V4 and number of spaces S1 thru S4, see AASHTO Type V Beam - Table of Beam Variables.



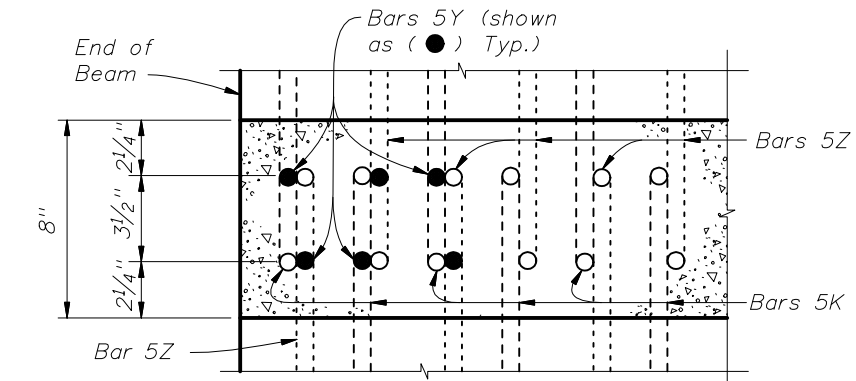
SECTION A-A
(Showing Bars 5K, 5Y & 5Z Only)



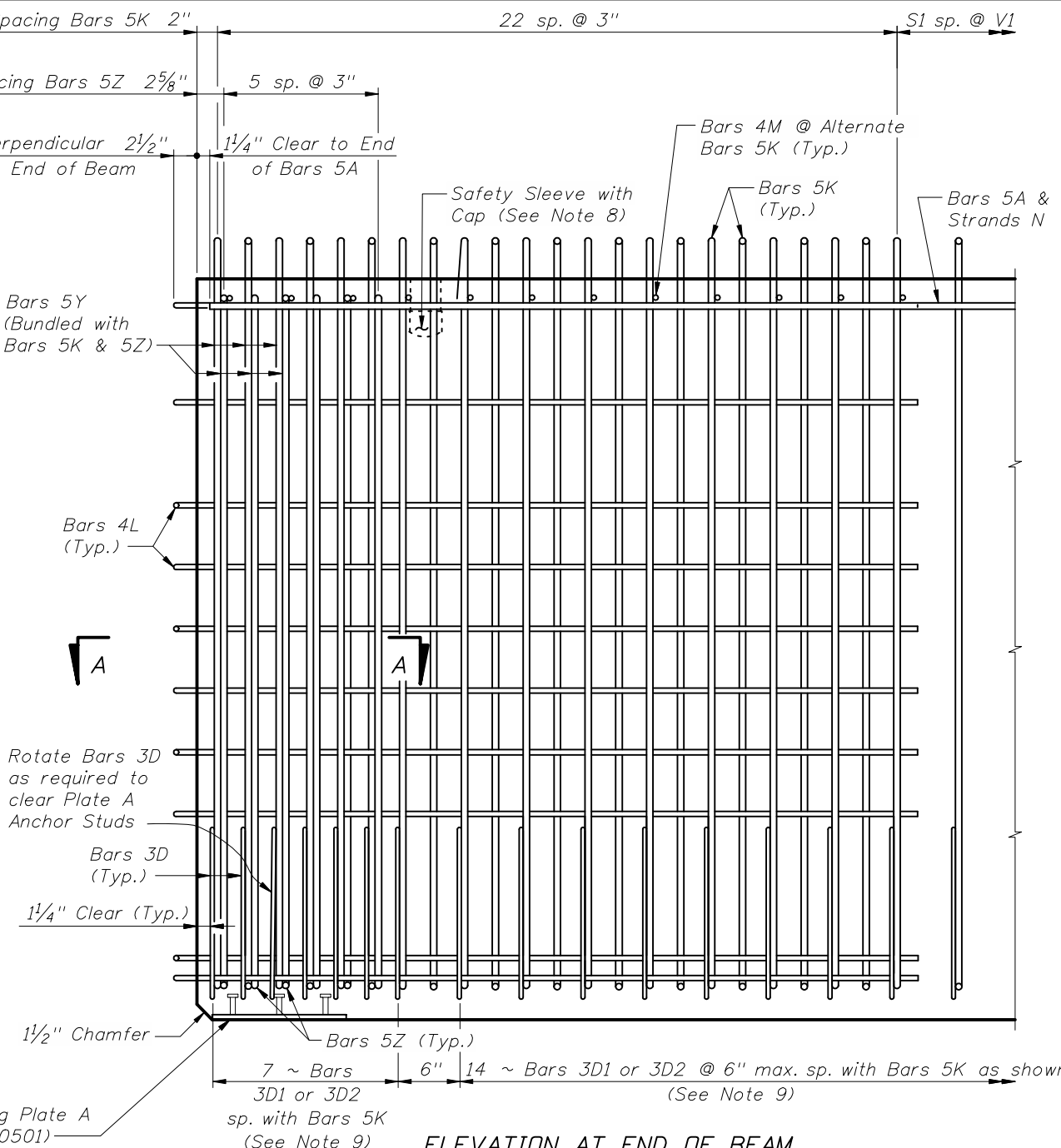
ELEVATION



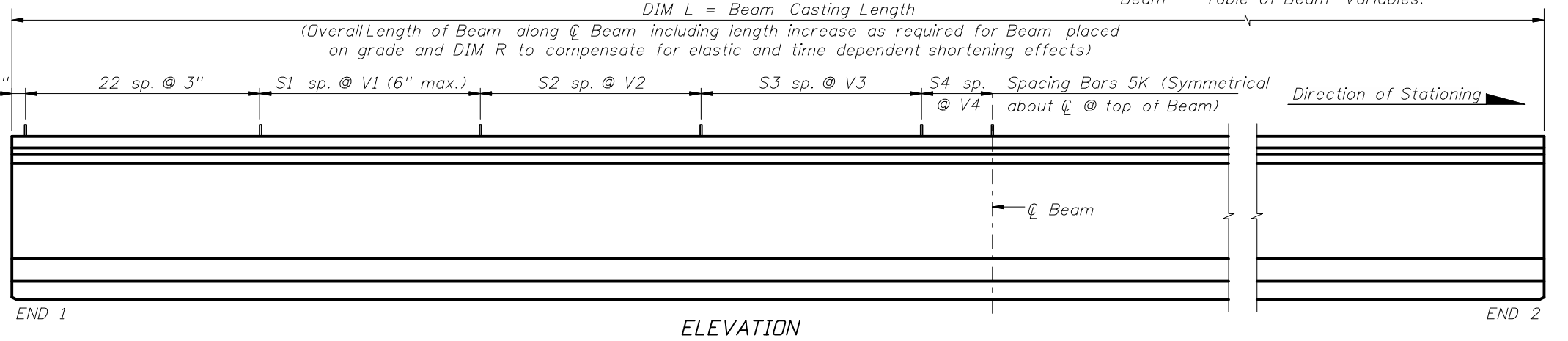
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SECTION A-A
(Showing Bars 5K, 5Y & 5Z Only)



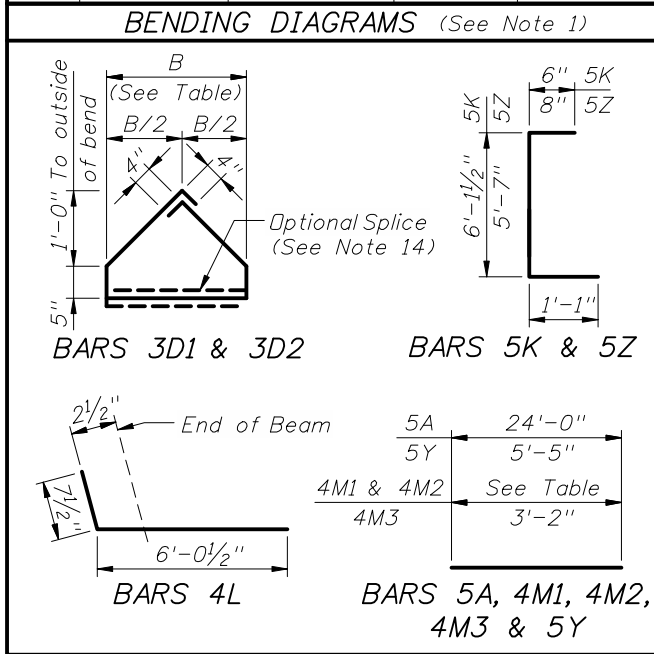
ELEVATION AT END OF BEAM
(Flanges Not Shown For Clarity)



ELEVATION

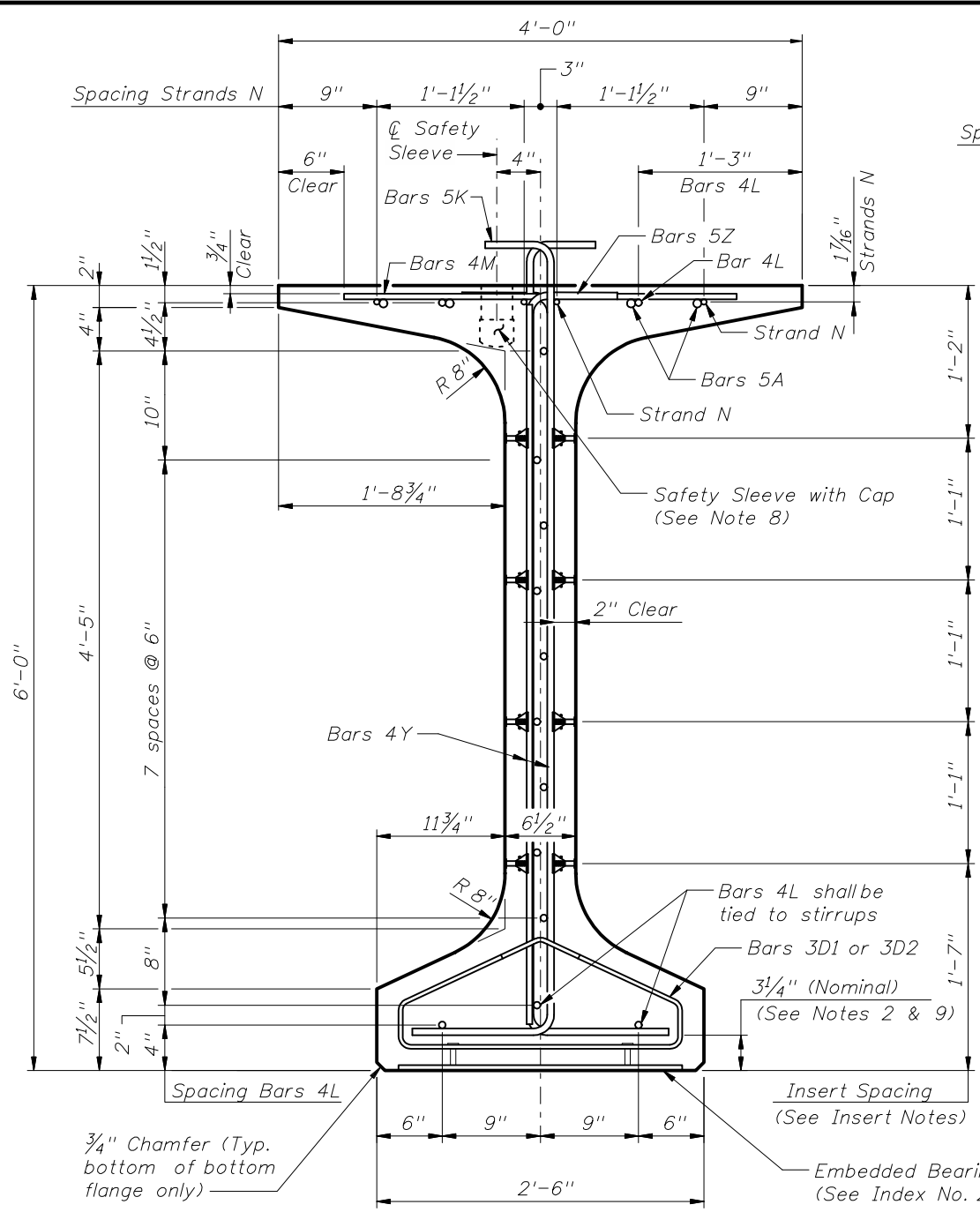
**BILL OF REINFORCING STEEL
FOR ONE BEAM ONLY**

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	12	24'-0"
D1	9, 11 & 14	3	21	See Table
D2	9, 11 & 14	3	21	See Table
K	2, 9, 11 & 13	5	See Table	7'-9"
L	3 & 4	4	26	6'-8"
M1	9 & 10	4	15	See Table
M2	9 & 10	4	15	See Table
M3	9	4	See Table	3'-2"
N	5	3/8" Ø Strand	4	DIM L+5"
Y	9 & 11	5	12	5'-5"
Z	2, 9, 11 & 13	5	12	7'-4"

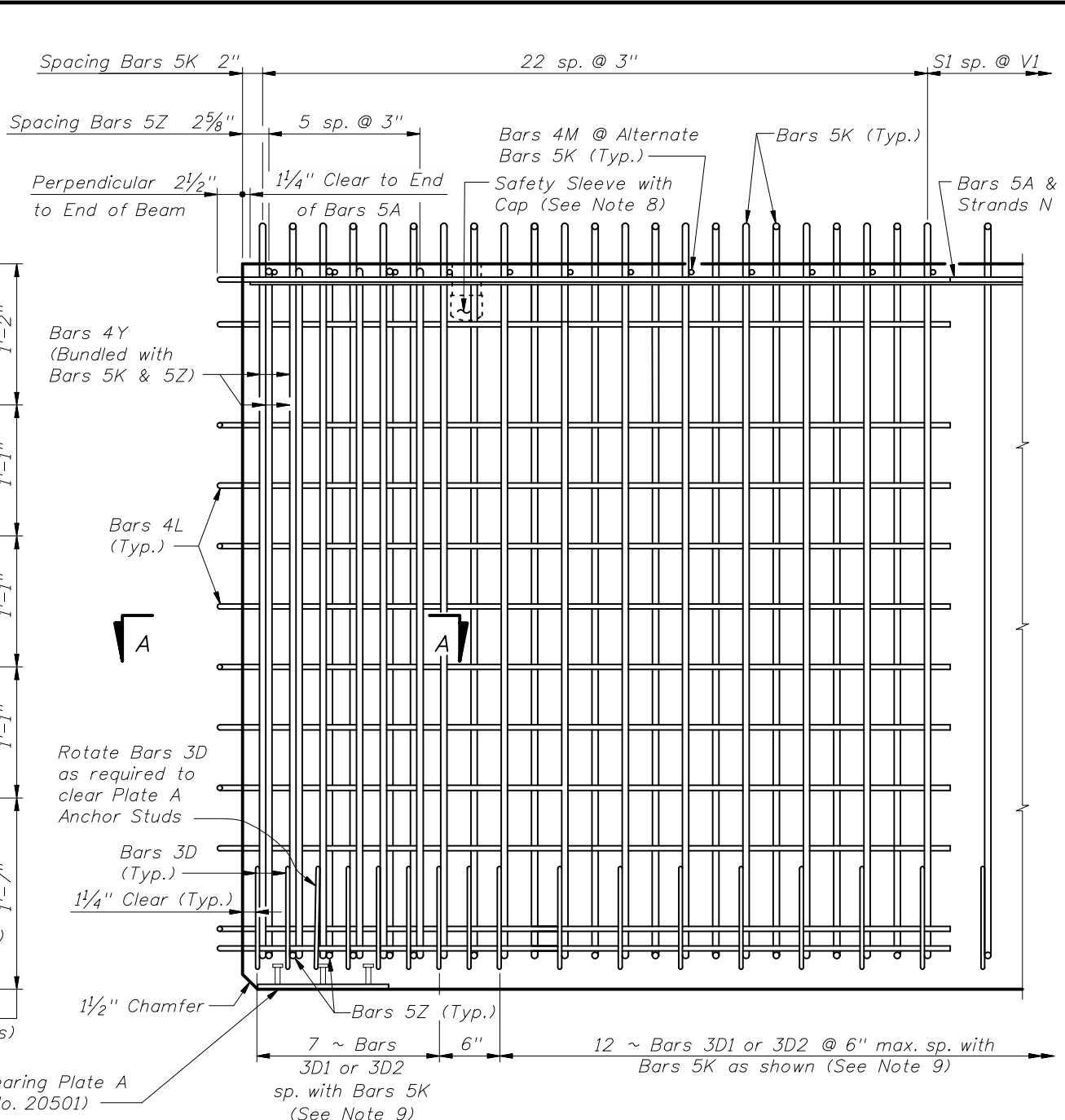


NOTES:
 Work this Index with Index No. 20110 - Typical AASHTO and Bulb-T Beam Details and Notes and the AASHTO Type VI Beam - Table of Beam Variables in Structures Plans.
 For referenced notes, see Index No. 20110.
 For Dimensions L, R, V1 thru V4 and number of spaces S1 thru S4, see AASHTO Type VI Beam - Table of Beam Variables.





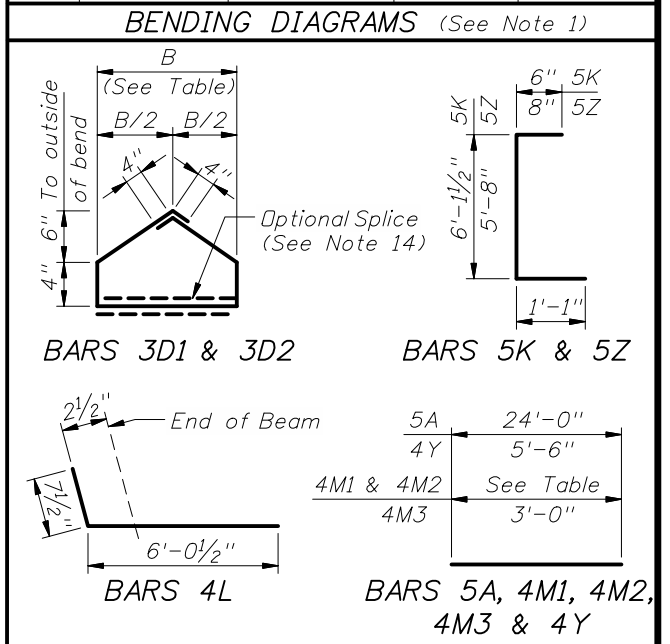
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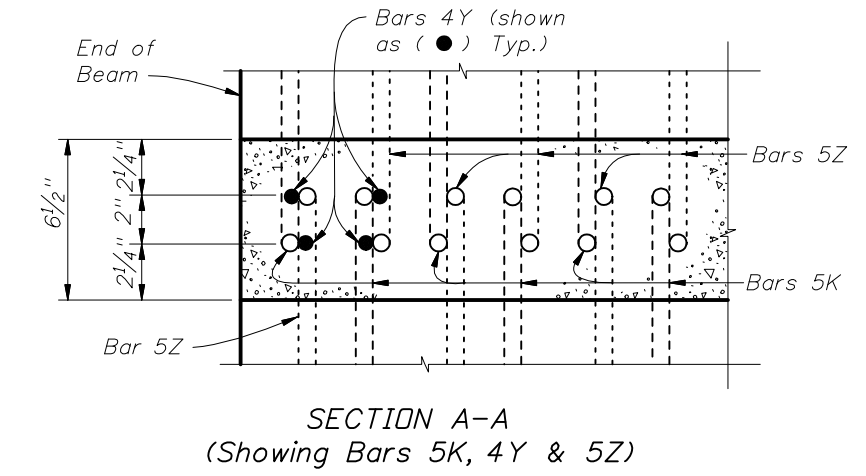
ELEVATION AT END OF BEAM
(Flanges Not Shown For Clarity)

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

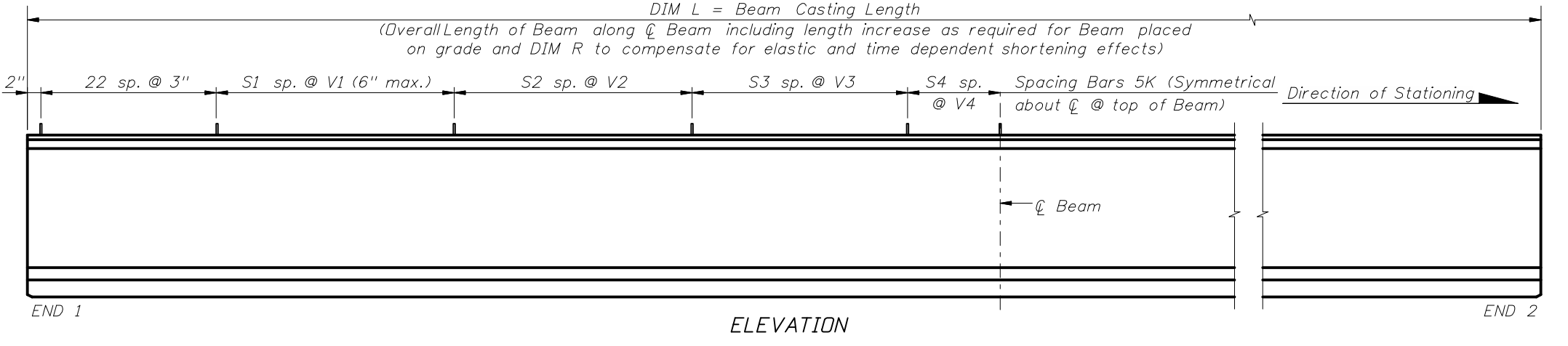
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D1	9, 11 & 14	3	19	See Table
D2	9, 11 & 14	3	19	See Table
K	2, 9, 11 & 13	5	See Table	7'-9"
L	3 & 4	4	28	6'-8"
M1	9 & 10	4	14	See Table
M2	9 & 10	4	14	See Table
M3	9	4	See Table	3'-0"
N	5	3/8" Ø Strand	4	DIM L+5"
Y	9 & 11	4	8	5'-6"
Z	2, 9, 11 & 13	5	12	7'-5"



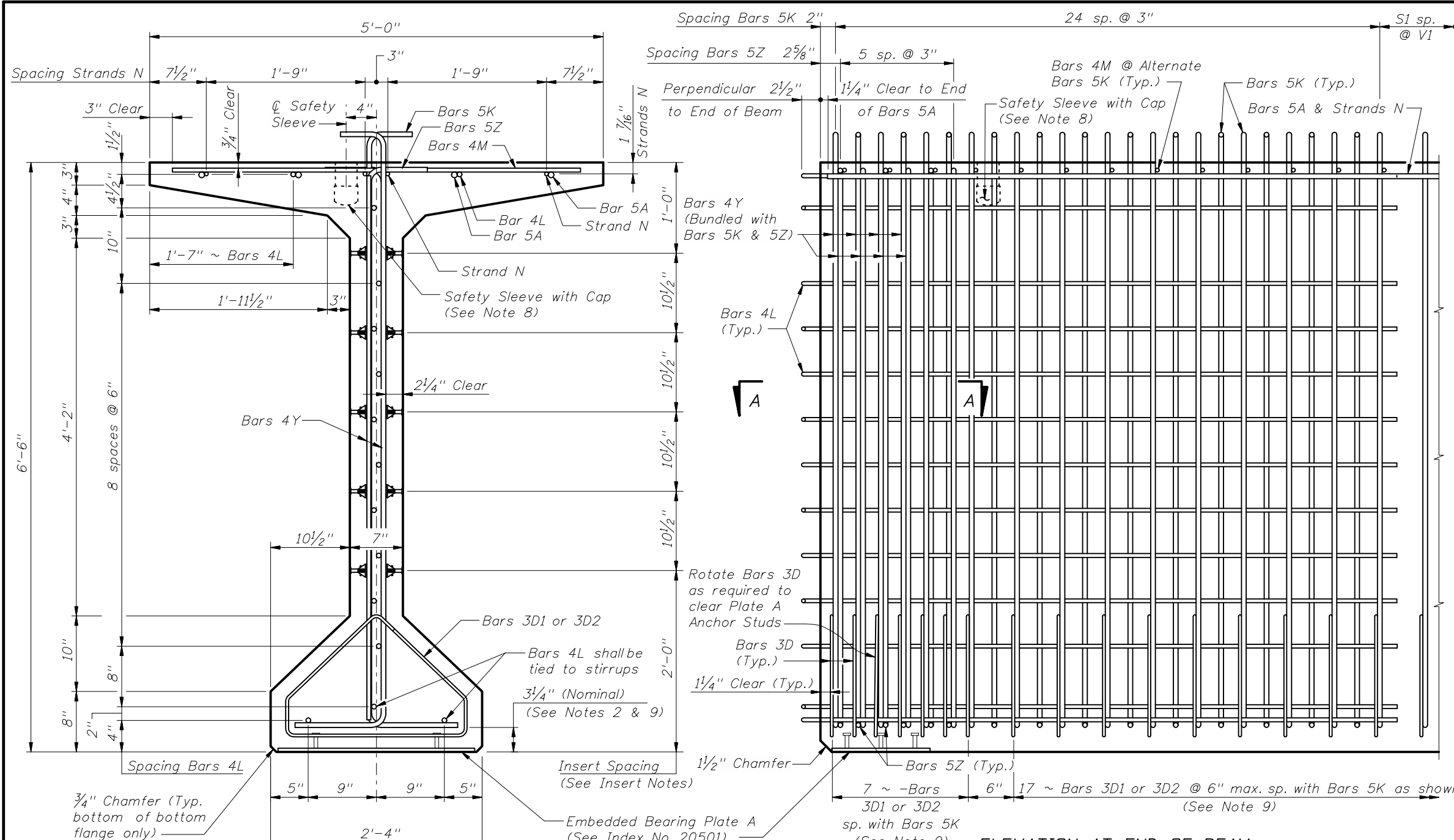
NOTES:
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 For referenced notes, see Index No. 20110.
 For Dimensions L, R, V1 thru V4 and number of spaces S1 thru S4, see Florida Bulb-T 72 Beam - Table of Beam Variables.



SECTION A-A
(Showing Bars 5K, 4Y & 5Z)



ELEVATION

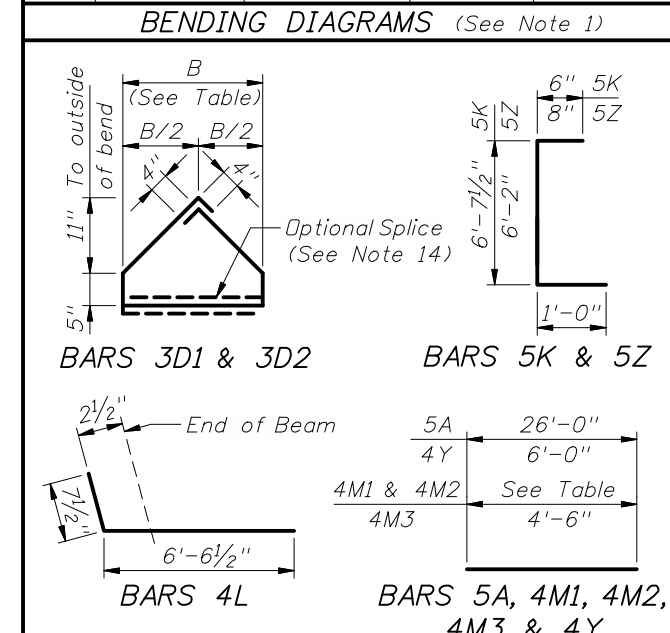


END VIEW

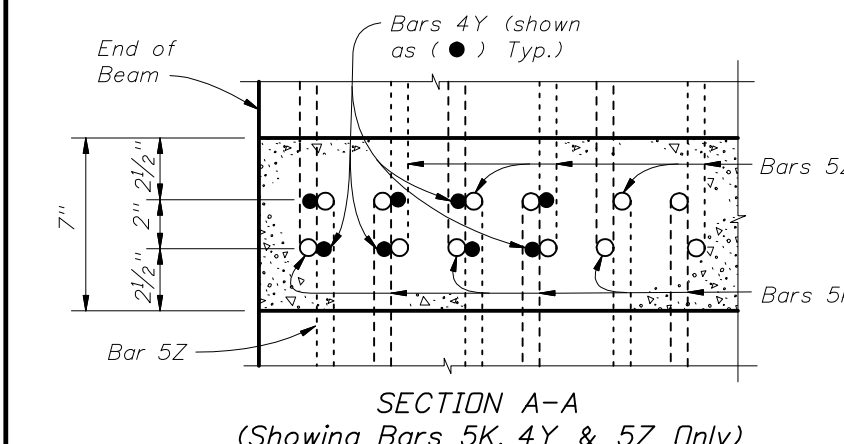
ELEVATION AT END OF BEAM
(Flanges Not Shown For Clarity)

**BILL OF REINFORCING STEEL
FOR ONE BEAM ONLY**

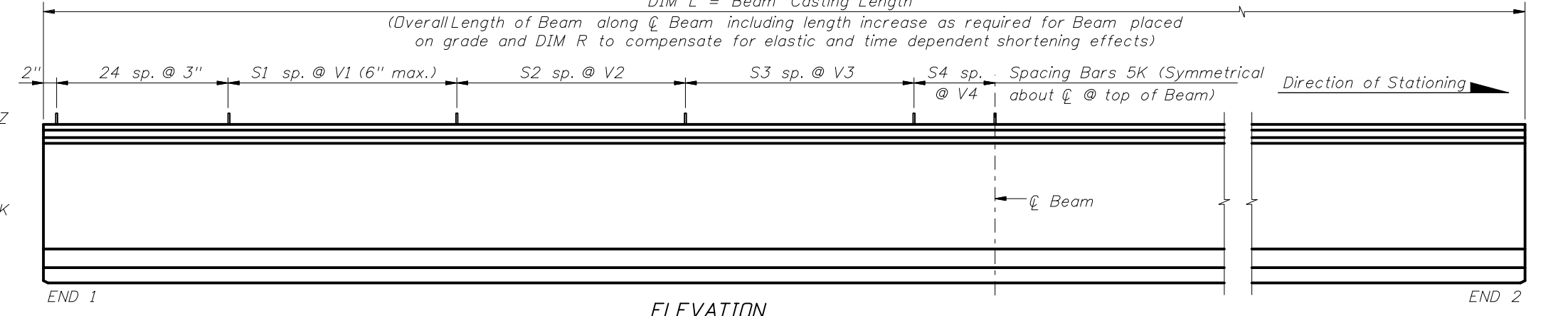
MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	8	26'-0"
D1	9, 11 & 14	3	24	See Table
D2	9, 11 & 14	3	24	See Table
K	2, 9, 11 & 13	5	See Table	8'-2"
L	3 & 4	4	30	7'-2"
M1	9 & 10	4	17	See Table
M2	9 & 10	4	17	See Table
M3	9	4	See Table	4'-6"
N	5	3/8" Ø Strand	4	DIM L+5"
Y	9 & 11	4	16	6'-0"
Z	2, 9, 11 & 13	5	12	7'-10"



NOTES:
 Work this Index with Index No. 20110 - Typical AASHTO and Bulb-T Beam Details and Notes and the Florida Bulb-T 78 Beam - Table of Beam Variables in Structures Plans.
 For referenced notes, see Index No. 20110.
 For Dimensions L, R, V1 thru V4 and number of spaces S1 thru S4, see Florida Bulb-T 78 Beam - Table of Beam Variables.

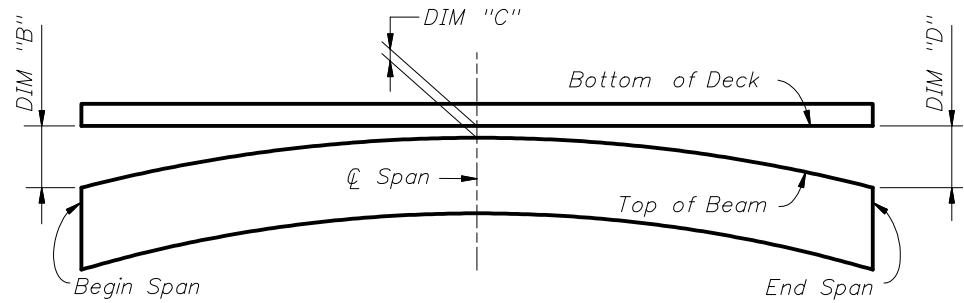


SECTION A-A
(Showing Bars 5K, 4Y & 5Z Only)

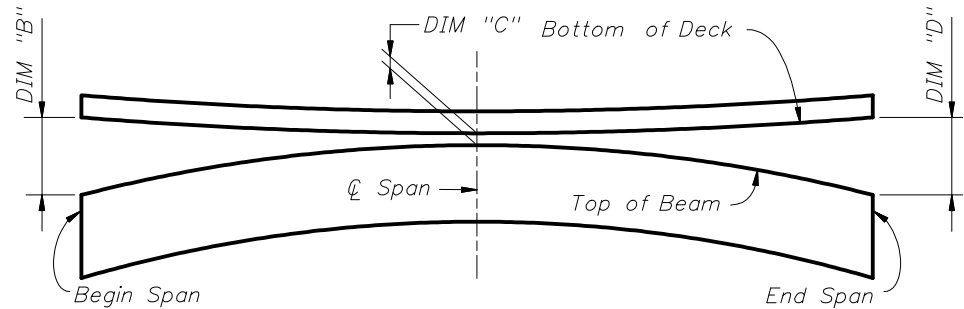


ELEVATION

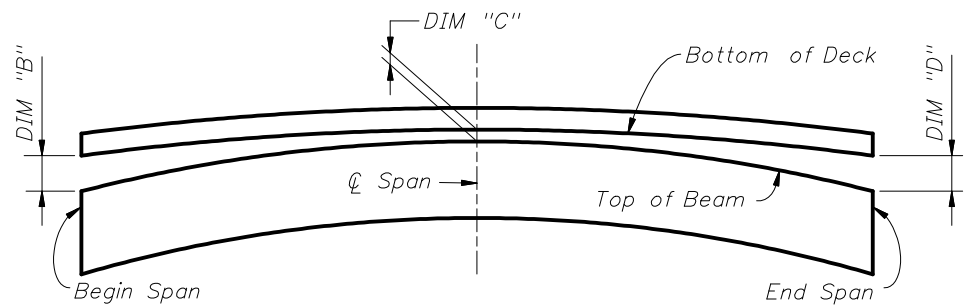




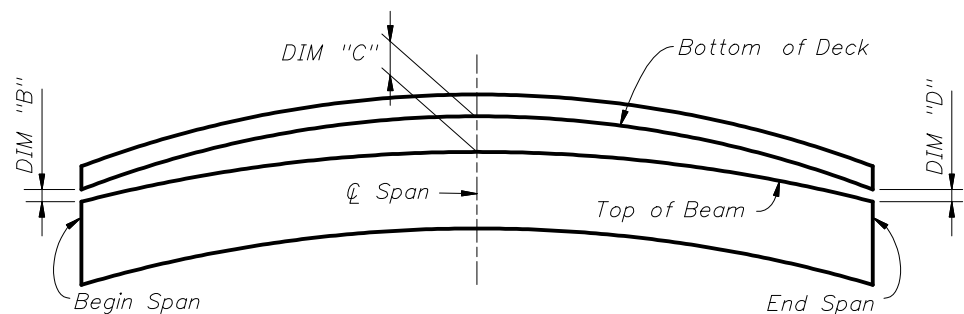
BUILD-UP DIAGRAM FOR TANGENT SPANS
(ALONG C BEAM) (CASE 1)



BUILD-UP DIAGRAM FOR SAG VERTICAL CURVE SPANS
(ALONG C BEAM) (CASE 2)



BUILD-UP DIAGRAM FOR CREST VERTICAL CURVE SPANS
- CONTROL AT C SPAN
(ALONG C BEAM) (CASE 3)

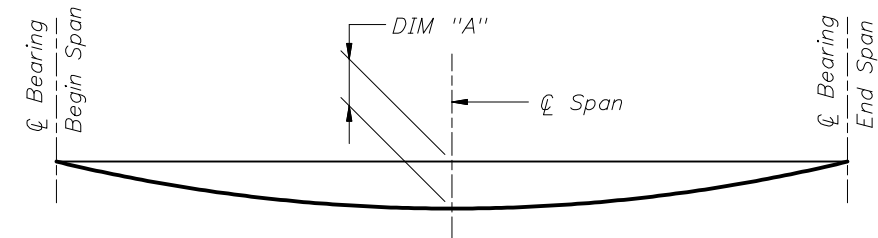


BUILD-UP DIAGRAM FOR CREST VERTICAL CURVE SPANS
- CONTROL AT BEGIN OR END SPAN
(ALONG C BEAM) (CASE 4)

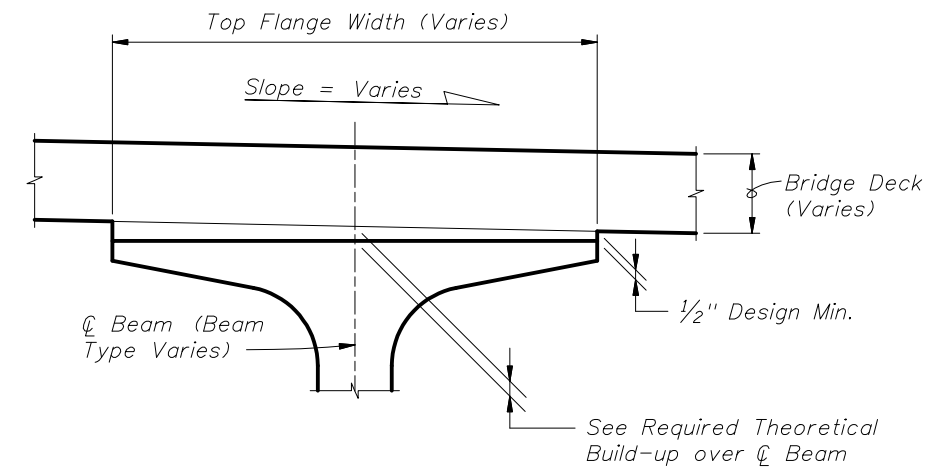
BEAM CAMBER AND BUILD-UP NOTES:

The build-up values given in the table are based on theoretical beam cambers. The Contractor shall monitor beam cambers for the purpose of predicting camber values at the time of the deck pour. If the predicted cambers based on field measurements differ more than $\pm 1/2$ " from the theoretical "Net Beam Camber @ 120 Days" shown in the Data Table, obtain approval from the Engineer to modify the build-up dimensions as required. When the measured beam cambers create a conflict with the bottom mat of deck steel, notify the Engineer a minimum a 21 days prior to casting.

DIM "A" includes the weight of the Stay-In-Place Formwork.



DEAD LOAD DEFLECTION DIAGRAM



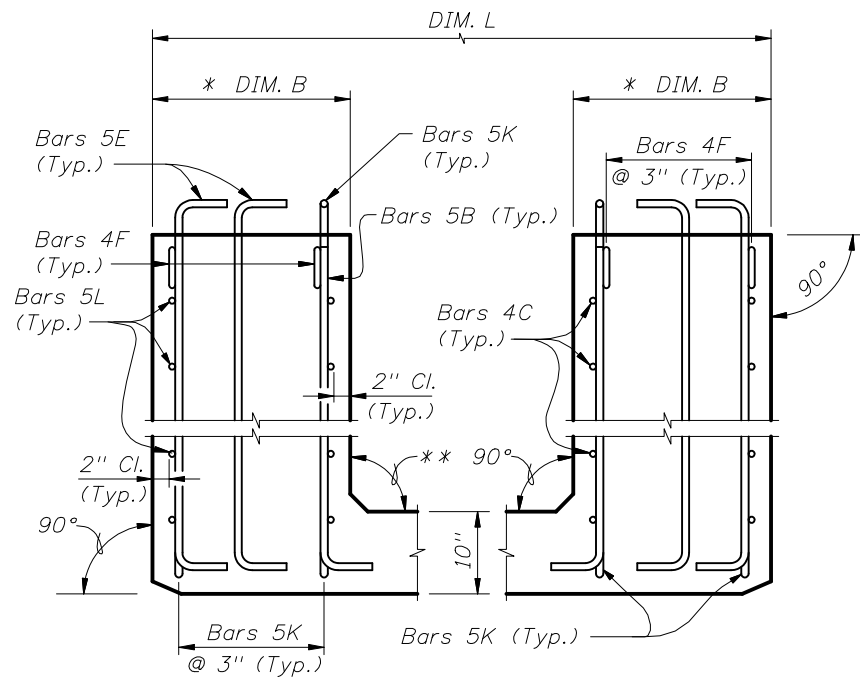
BUILD-UP OVER BEAMS

INSTRUCTIONS TO DESIGNER:

Although not shown here in the Diagrams or Notes, the effect of Horizontal Curvature, when present, needs to be considered for the Build-up Calculations.

NOTE:
Work this Index with the Build-up and Deflection Data Table for AASHTO and Bulb-T Beams in Structures Plans.

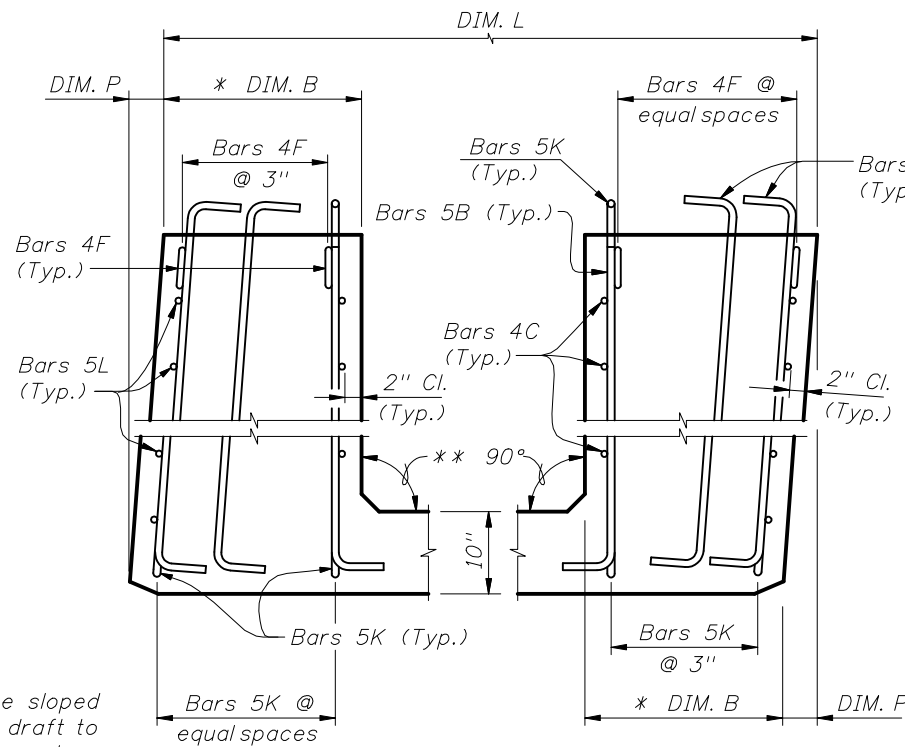




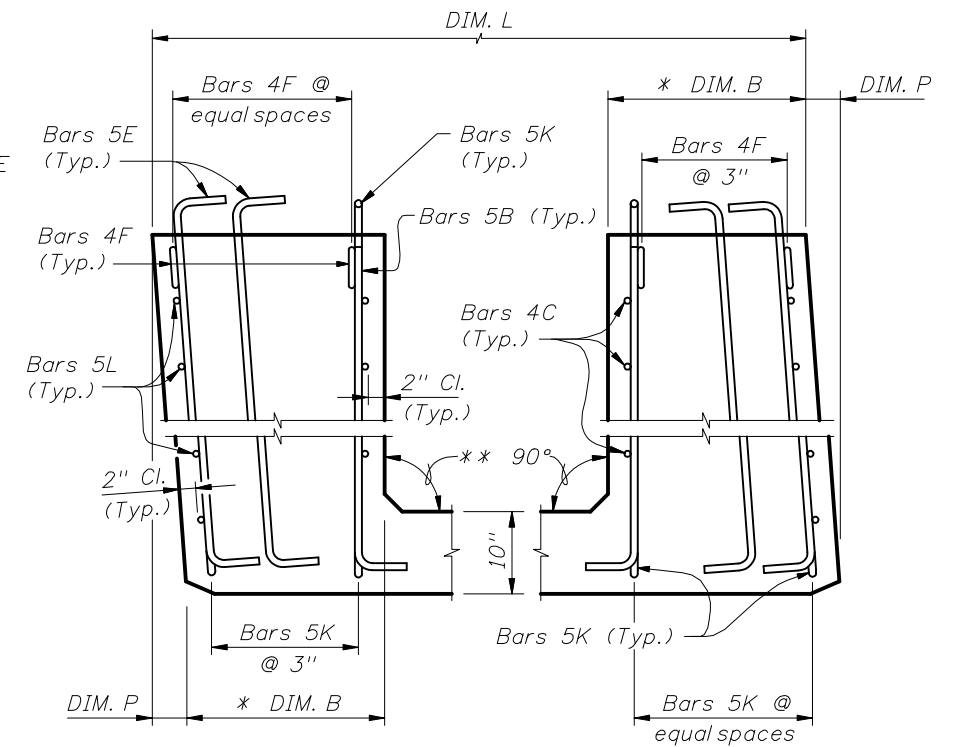
* DIM. B is 1'-6" for Florida U 48 and 54 Beams and 2'-0" for Florida U 63 and 72 Beams.

CONDITION 1
(P = 0.0)

** Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.

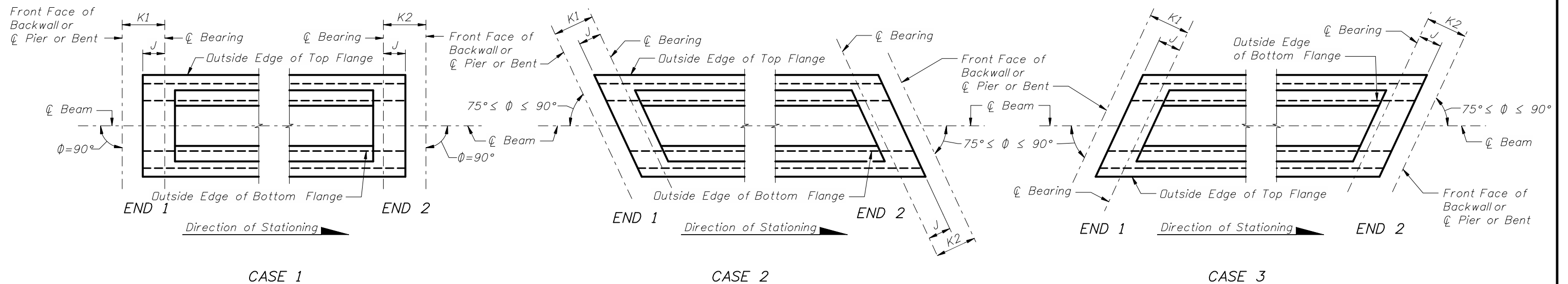


CONDITION 2



CONDITION 3

SCHMATIC END ELEVATIONS OF BEAMS
(Showing Vertical Bevel of Beam End)



CASE 1

CASE 2

CASE 3

SCHMATIC PLAN VIEWS AT BEAM ENDS

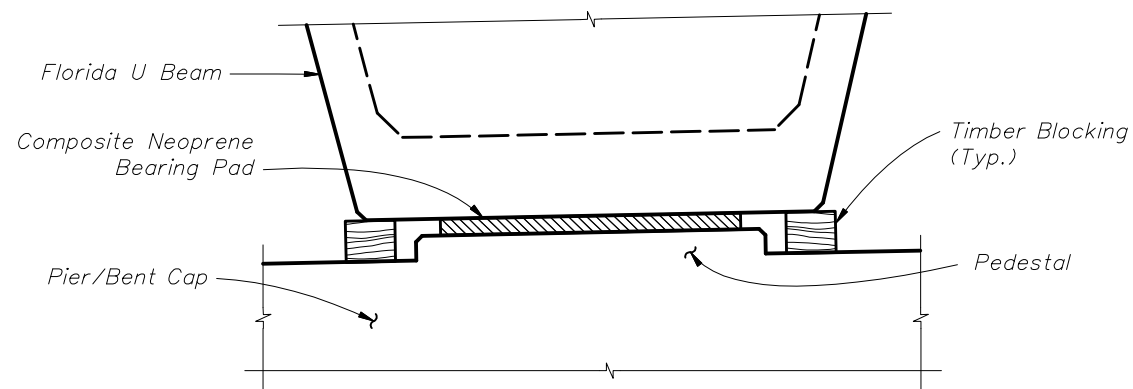
NOTE:
Work this Index with Florida U Beam - Table of Beam Variables in Structures Plans.



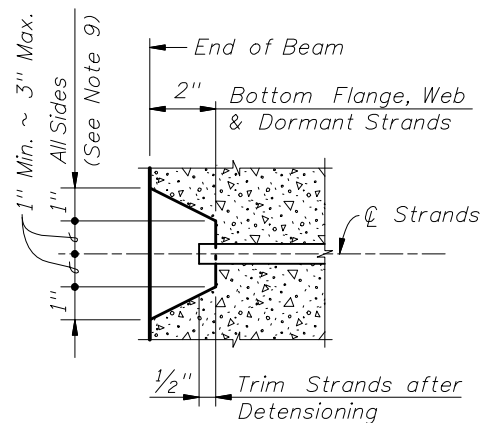
2010 FDOT Design Standards

TYPICAL FLORIDA U BEAM DETAILS AND NOTES

Last Revision	Sheet No.
07/01/05	1 of 2
Index No.	
20210	



TEMPORARY BLOCKING OF BEAM ENDS



TYPICAL STRAND BLOCKOUT DETAIL

BEAM NOTES

1. All bar dimensions are out-to-out.
2. Strands N (Dormant Strands) shall be either ASTM A416, Grade 250 or Grade 270, seven-wire strands $\frac{3}{8}$ " ϕ or larger, stressed to 10,000 lbs. each.
3. Unless otherwise noted in Structures Plans, the minimum concrete cover for reinforcing steel shall be 2".
4. At the option of the Contractor and with the Engineer's Approval, deformed welded wire reinforcement may be used in lieu of Bars 6A1, 4A2, 5B, 4C, 3D, 5E, 4F, 4G, 4H, 5K, 5L and 4M except as noted below in note 7, provided the wire sizes and spacing match those shown on the Standard Beam Detailsheets for these bars. Welded wire reinforcement shall conform to ASTM A497.
5. Place $2\frac{1}{2}$ " NPS x 5" PVC Sch. 40 Safety Sleeve with cap in both top flanges spaced on 8'-0" (Max.) centers. Shift Bars 5K & 4M locally to allow placement. Holes shall be free of debris and water prior to casting deck.
6. For Beams with vertically beveled end conditions when "DIM. P" exceeds 1", Bars 5E and the first Bars 4F and 5K shall be placed parallel to the end of the beam. The remaining Bars 4F and 5K within the limits of "DIM. B" shall be fanned at equal spaces.
7. Welded deformed wire reinforcement shall not be used for the end reinforcement (Bars 5B, 4C, 3D, 5E, 4F, 5K, and 5L) for beams with skewed end conditions or vertically beveled end conditions when "DIM. P" exceeds 1".
8. Bars 5K shall be placed and tied to the fully bonded strands in the bottom row (see "STRAND PATTERN" in Structures Plans).
9. Strand Protection at beam ends shall consist of a 2" deep recess formed around all strands (including dormant) or strand groups. Extend recess to face of web and bottom of flange for bottom row of strands. After detensioning, cut strands $\frac{1}{2}$ " from recessed surface and fill the recess with a Type F-2 or Q Epoxy Compound in accordance with Section 926 of the Specifications.
10. The Contractor shall use Size No. 67 maximum sized aggregate.
11. Stay-in-Place metal deck forms shall be used inside the beams.
12. The Contractor shall evaluate the need for temporary bracing between U Beams, based on the selected deck forming system and concrete placement sequence. In addition, timber blocking shall be placed beneath the exterior face of the webs at the both ends of all beams, prior to deck casting. Blocking shall be left in place for at least 4 days after deck casting and afterwards removed at the Contractor's convenience.
13. For referenced Dimensions, Angles and Case Numbers see Table of Beam Variables in Structures Plans.

INSTRUCTIONS TO DESIGNER:

To limit vertical splitting forces in the ends of beams, the maximum prestress force at beam ends from fully bonded strands must be limited to the following:

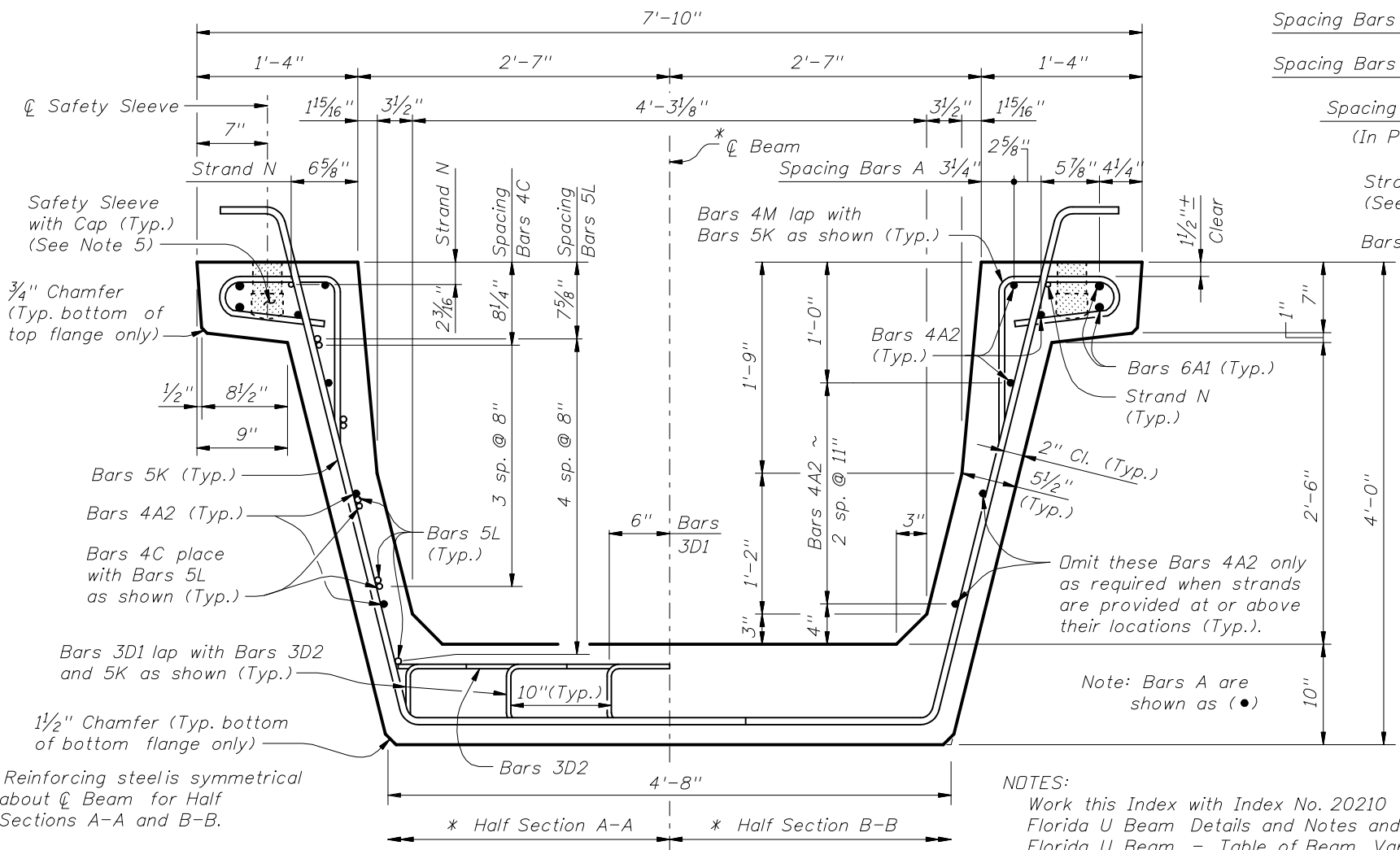
Beam Type	Max. Bonded Prestress Force	Index No.	Issue Date
Florida U48 & U54	2790 Kips	20248 & 20254	07/01/05
Florida U63 & U72	3070 Kips	20263 & 20272	07/01/05

No losses shall be applied when calculating the Bonded Prestress Force. The reinforcing in the ends of the beams must not be modified without the approval of the State Structures Design Engineer.

NOTE:

Work this Index with Florida U Beam - Table of Beam Variables in Structures Plans.

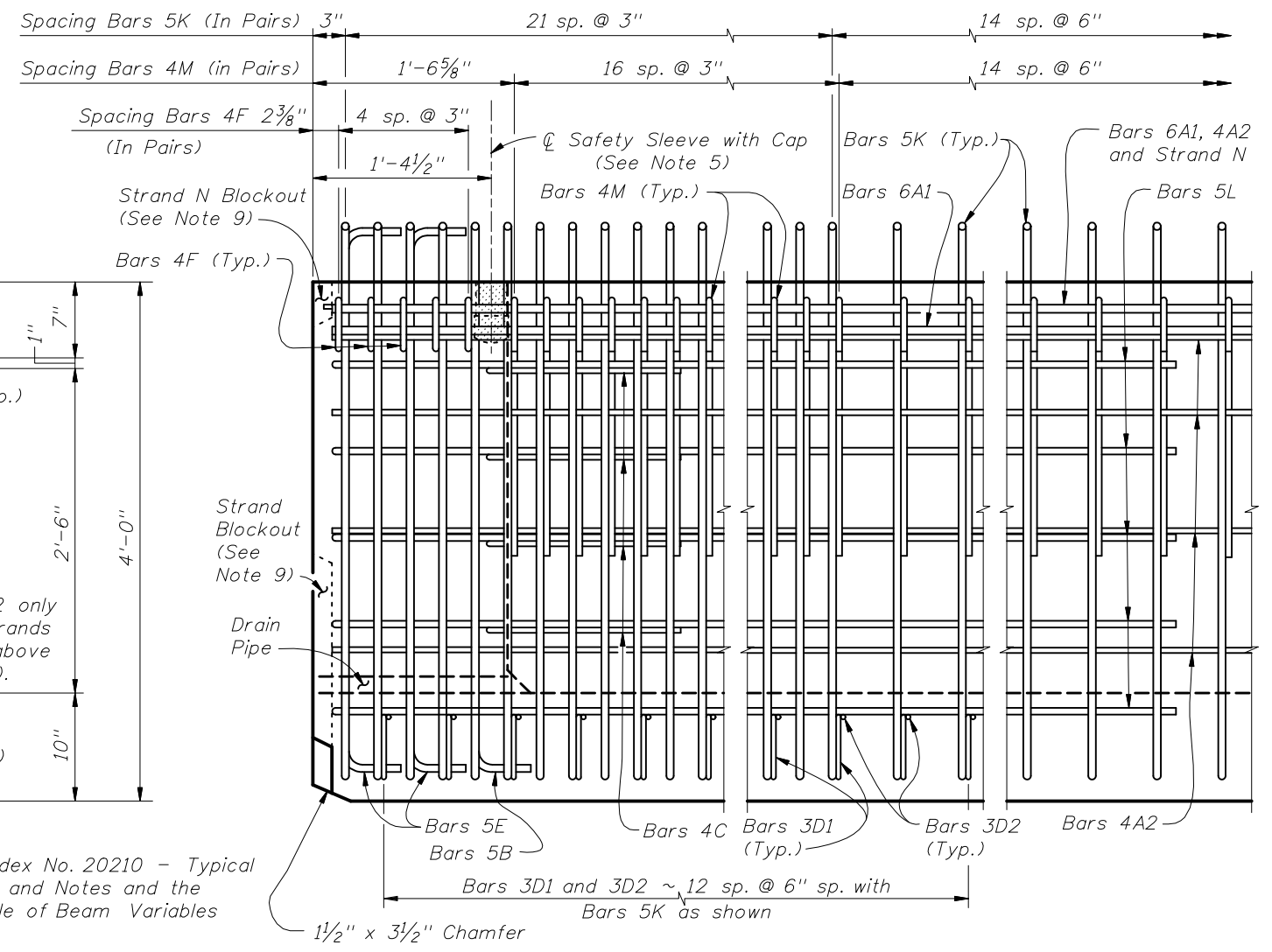




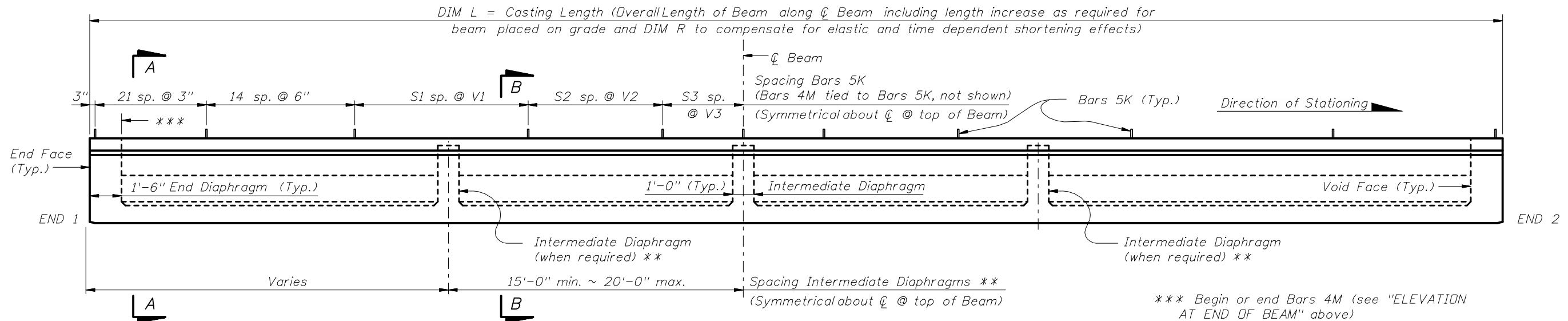
- * Reinforcing steel is symmetrical about \varnothing Beam for Half Sections A-A and B-B.
- ** Intermediate Diaphragms shall be provided:
 - (1) - At midspan.
 - (2) - At 20'-0" max. from midspan when beam length (L) exceeds 60 ft.

TYPICAL SECTION

NOTES:
 Work this Index with Index No. 20210 - Typical Florida U Beam Details and Notes and the Florida U Beam - Table of Beam Variables in Structures Plans.
 For referenced notes see Index No. 20210.

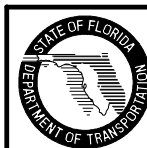


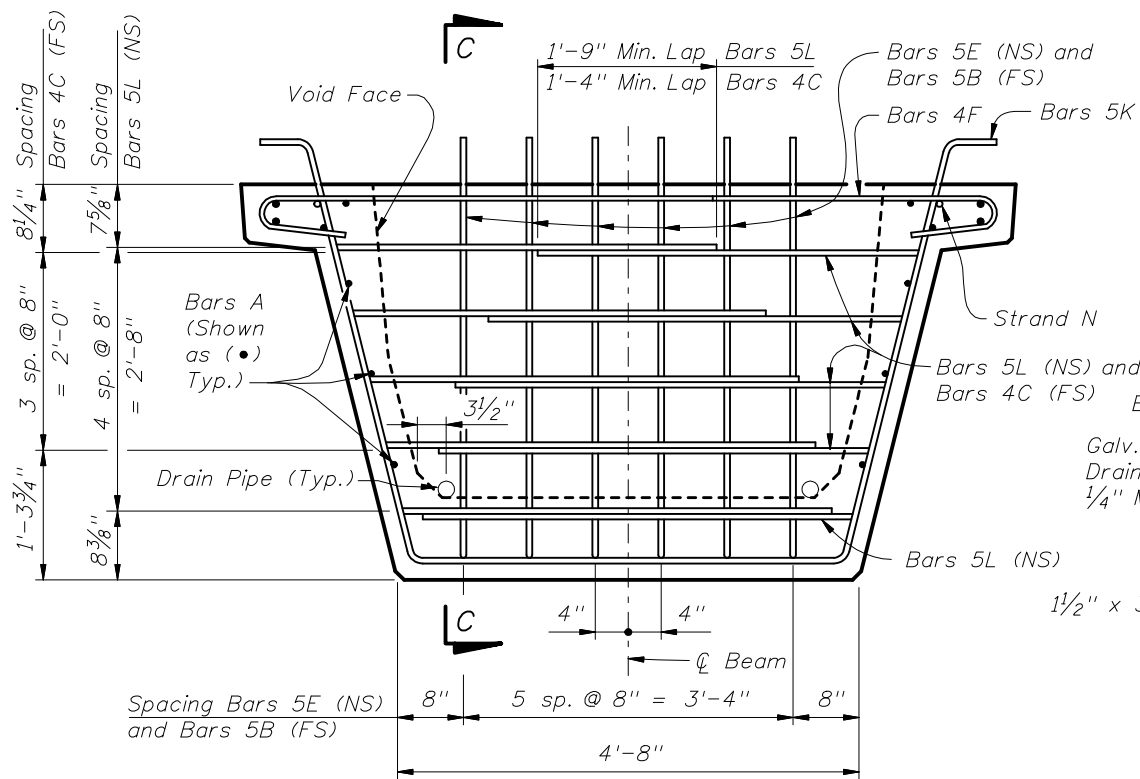
ELEVATION AT END OF BEAM



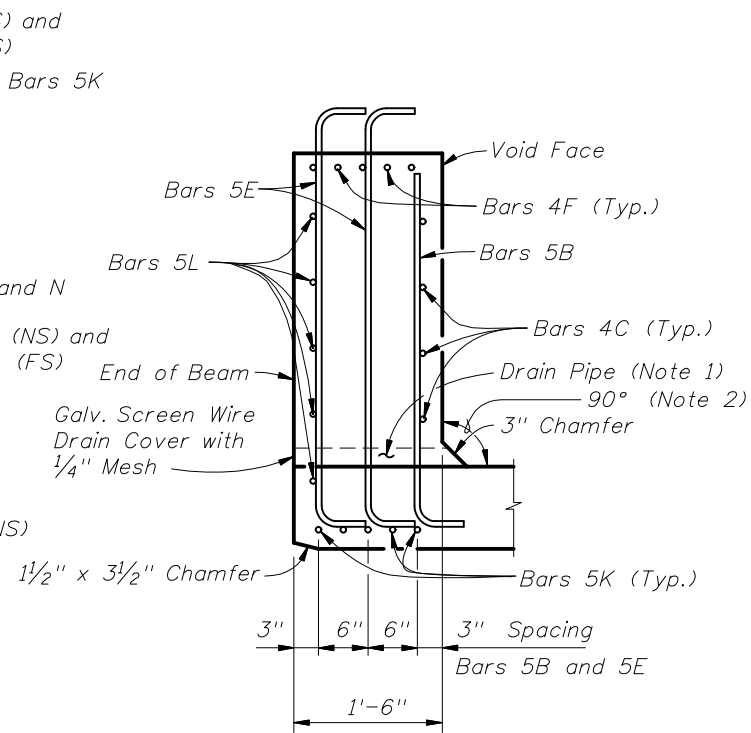
ELEVATION

*** Begin or end Bars 4M (see "ELEVATION AT END OF BEAM" above)

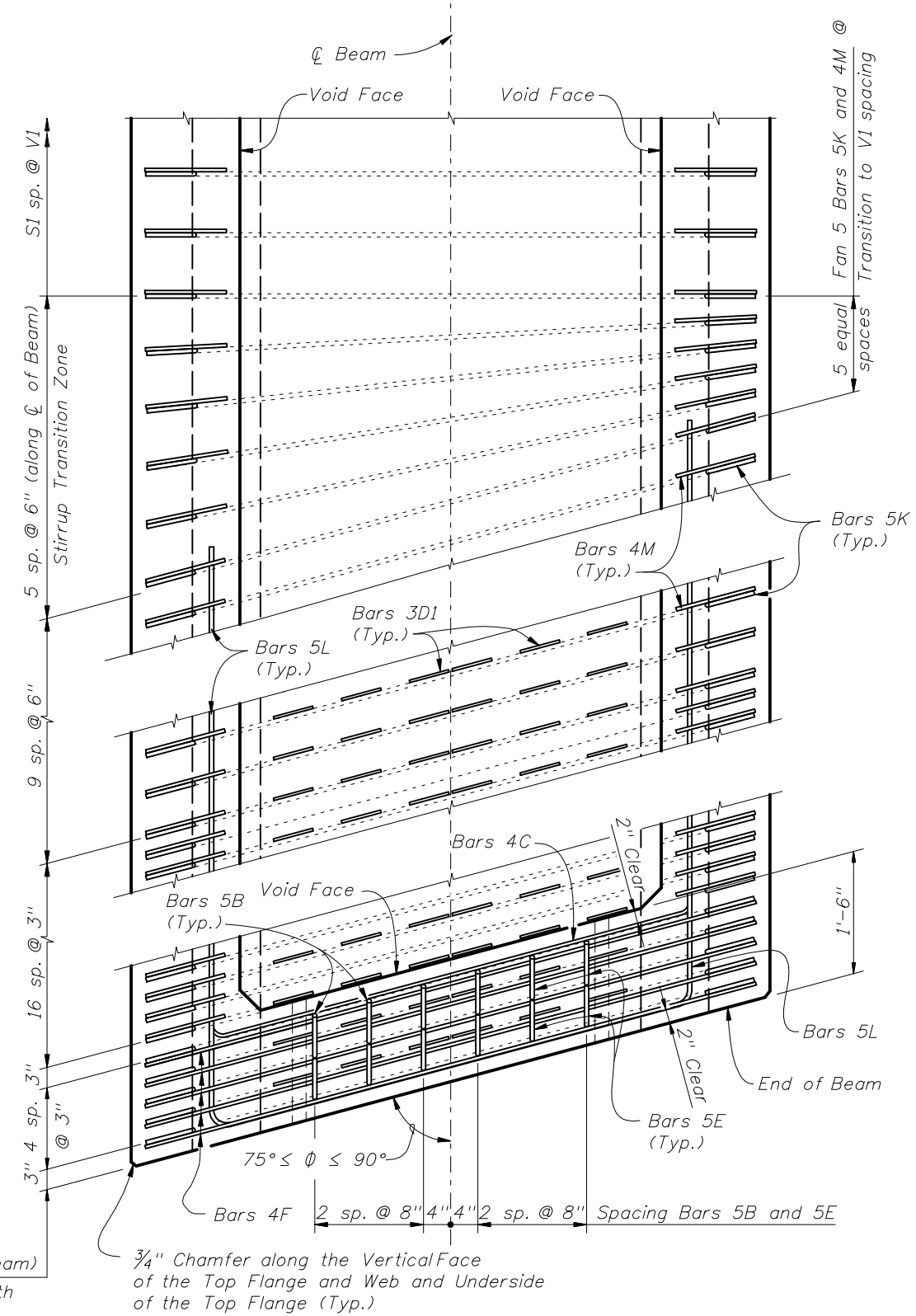




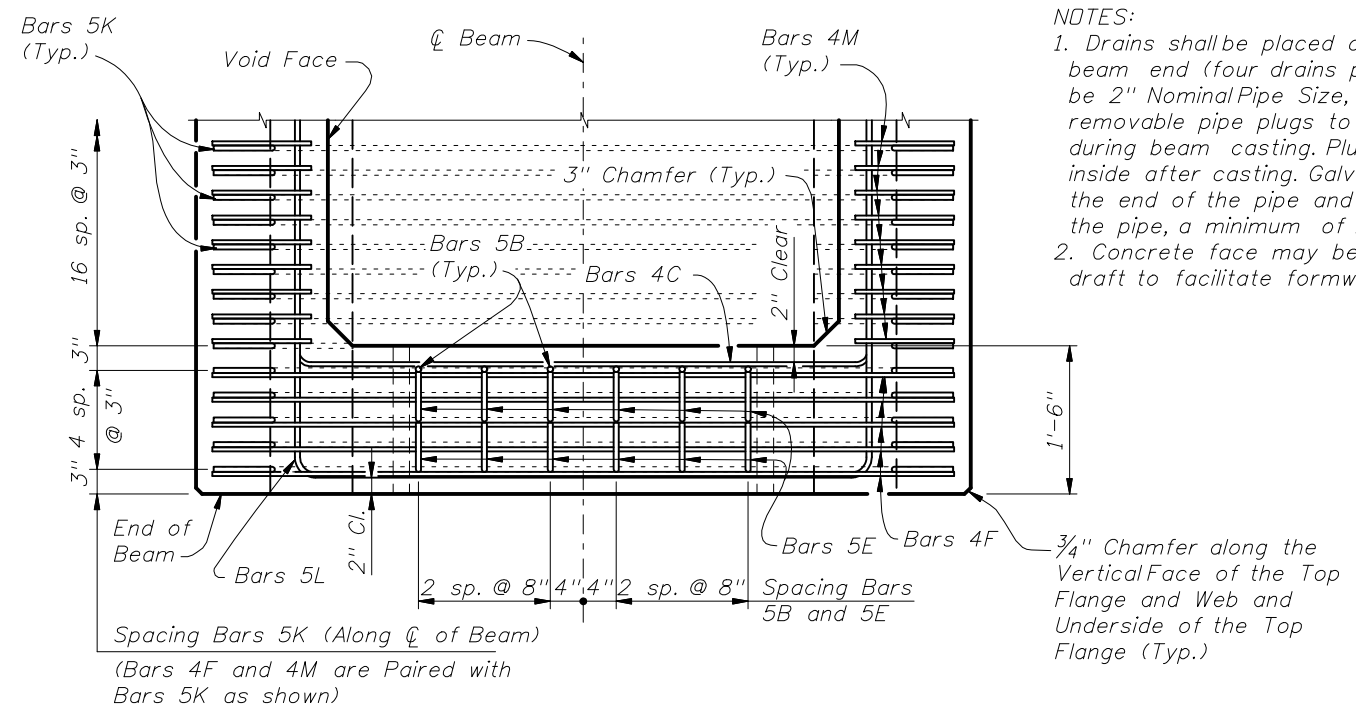
END VIEW AT END DIAPHRAGM



SECTION C-C



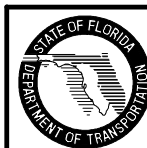
TOP VIEW OF SKEWED END DIAPHRAGM AND STIRRUP TRANSITION ZONE (Bars 3D2 Not Shown For Clarity)

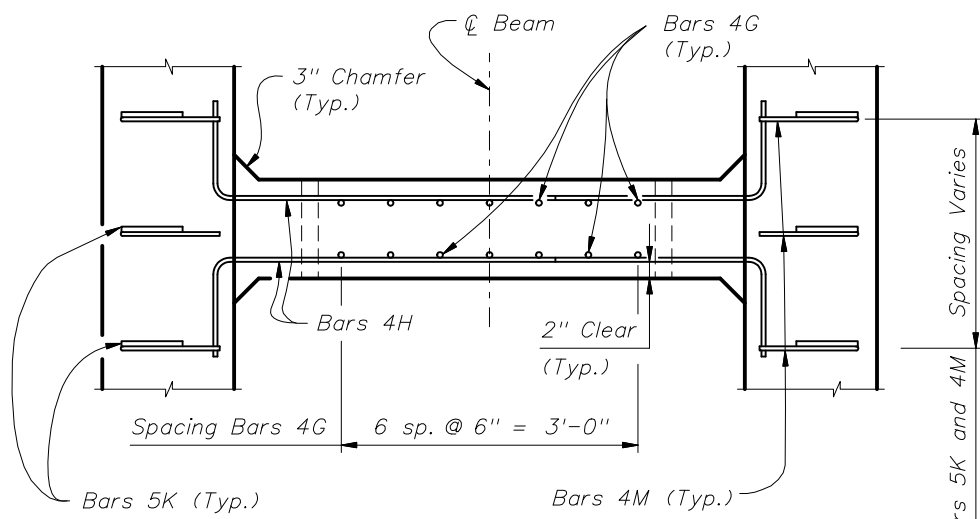


TOP VIEW OF END DIAPHRAGM (Bars 3D1 And 3D2 Not Shown For Clarity)

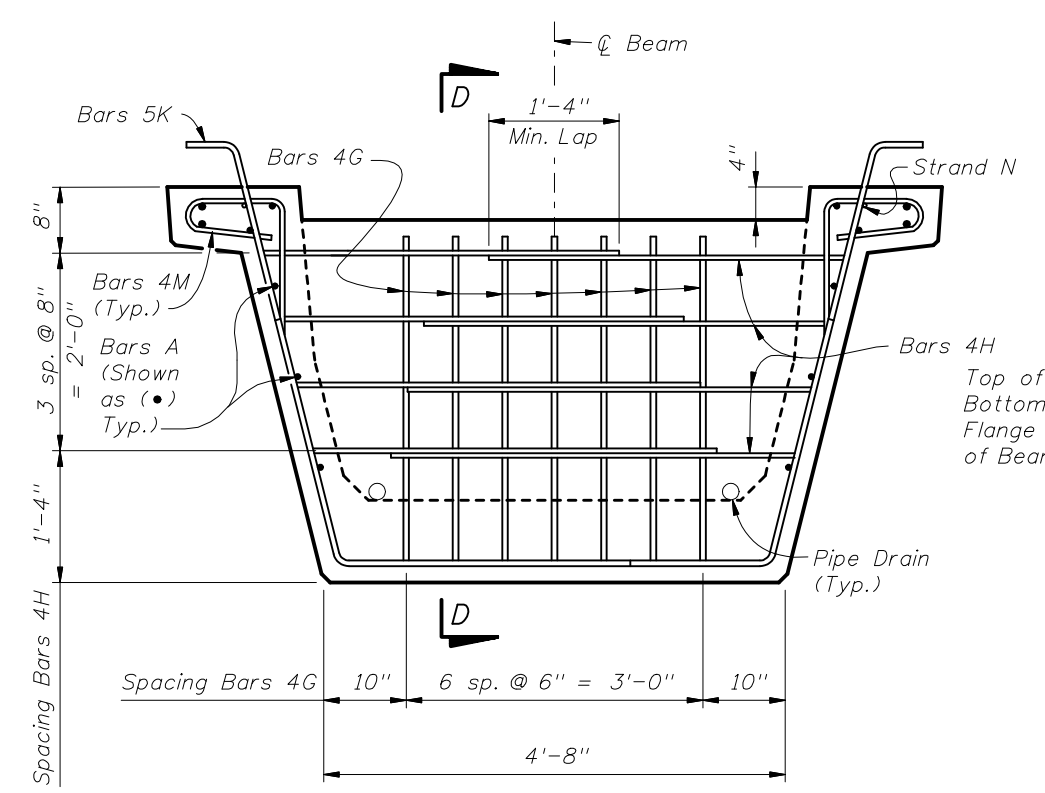
NOTES:
 1. Drains shall be placed adjacent to each web at each beam end (four drains per beam). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting. Galvanized screen wire shall cover the end of the pipe and bent down around the sides of the pipe, a minimum of 1" and secured prior to casting.
 2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.

Spacing Bars 5K (Along ϕ of Beam) (Bars 4F and 4M are Paired with Bars 5K as shown)



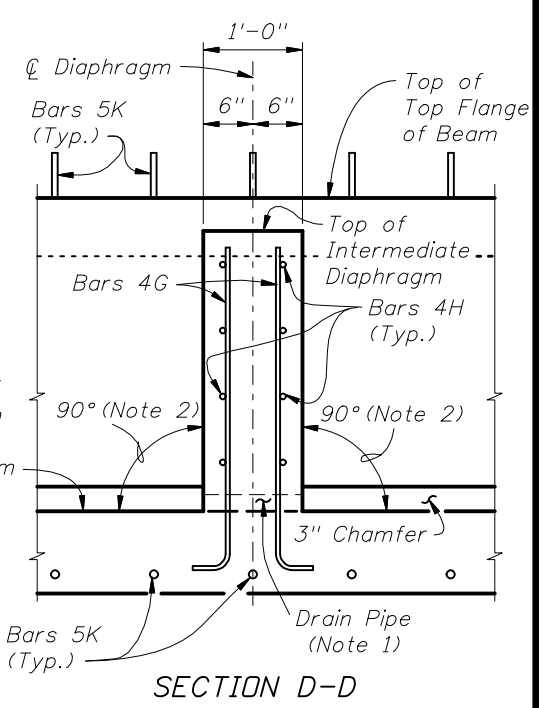


TOP VIEW OF INTERMEDIATE DIAPHRAGM



SECTION AT INTERMEDIATE DIAPHRAGM

- NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm (two drains per intermediate diaphragm). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
 2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
 3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.

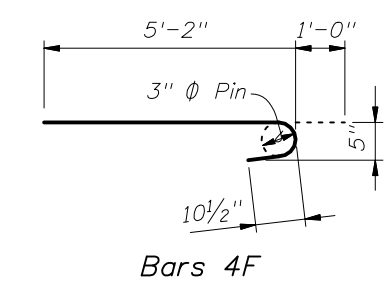
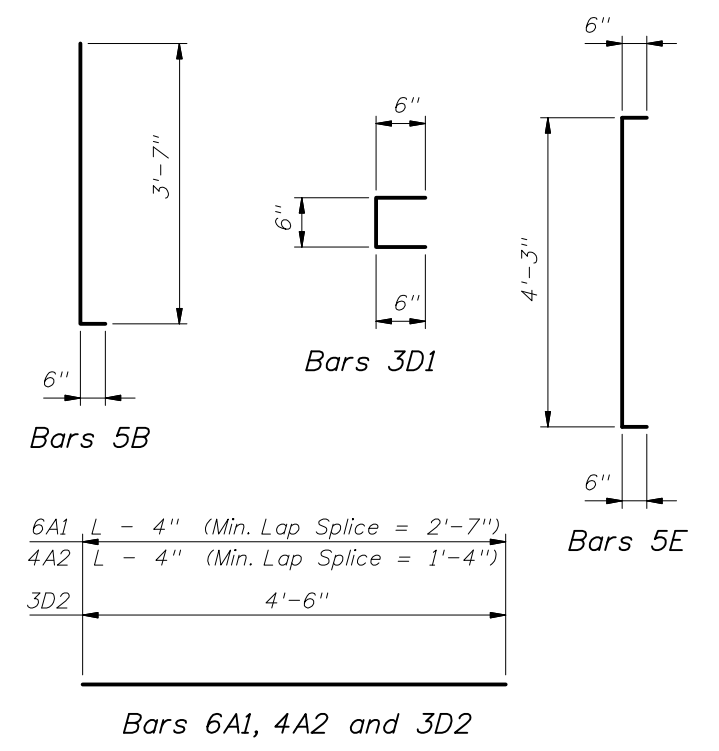


SECTION D-D

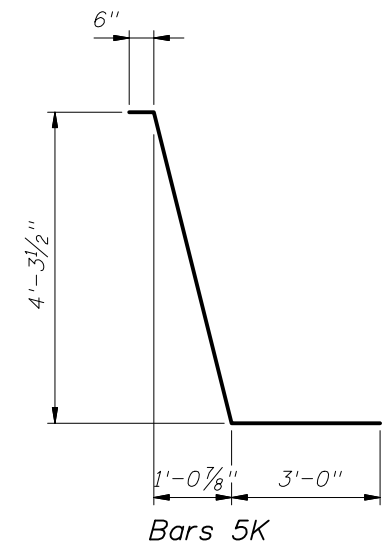
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

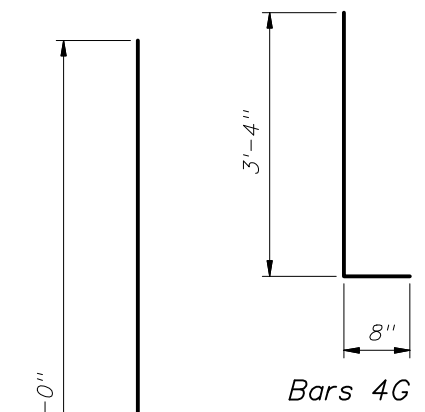
MARK	SIZE	NO. REQD.	LENGTH
A1	6	4	DIM L - 4"
A2	4	10	DIM L - 4"
B	5	12	4'-1"
C	4	16	5'-1"
D1	3	228	1'-6"
D2	3	38	4'-6"
E	5	24	5'-3"
F	4	20	6'-2"
G	4	See Table	4'-0"
H	4	See Table	4'-7"
K	5	See Table	8'-0"
L	5	20	14'-0"
M	4	See Table	3'-11"
N	3/8" Ø Strand	2	DIM L - 3"



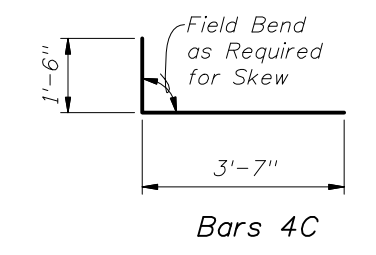
Bars 4F



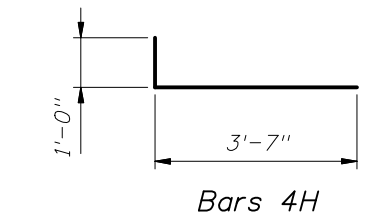
Bars 5K



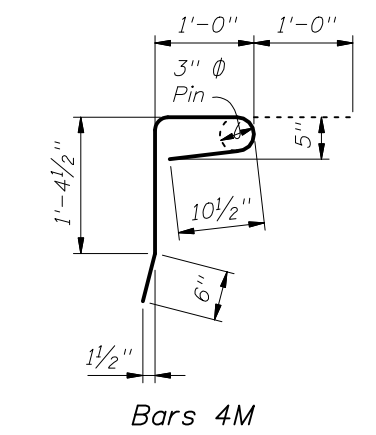
Bars 4G



Bars 4C

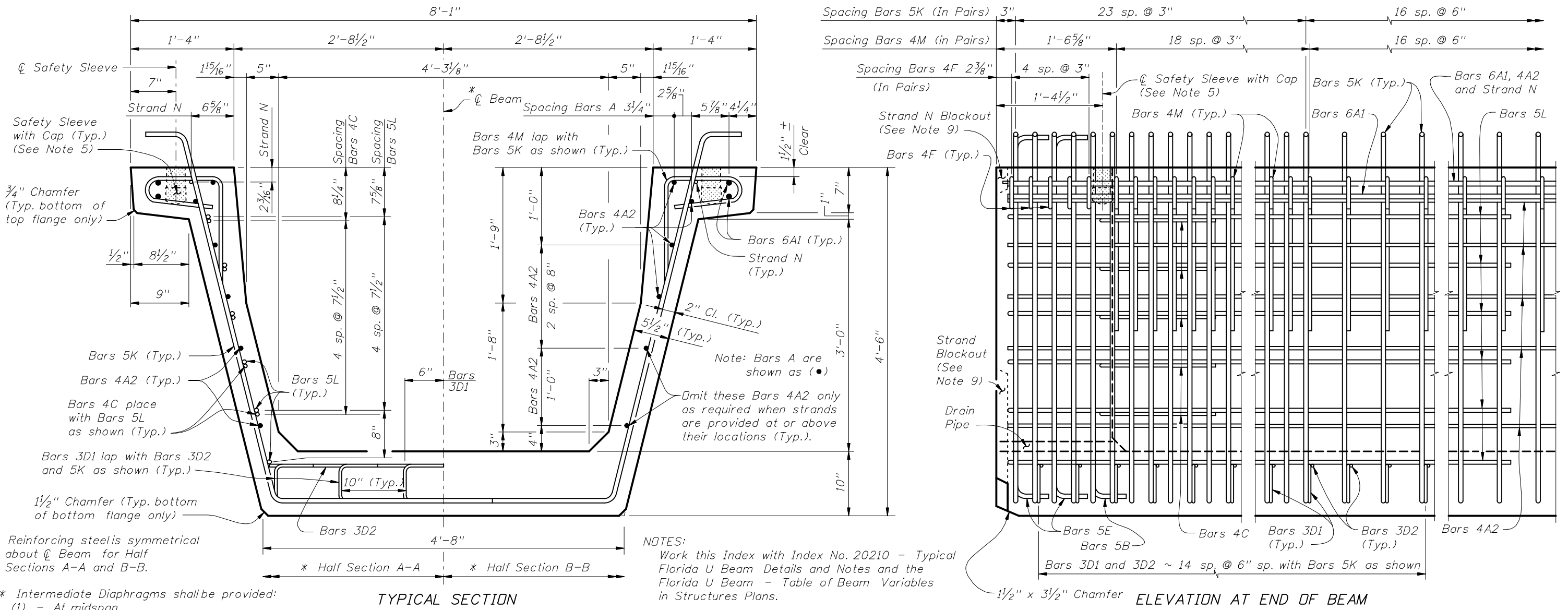


Bars 4H



Bars 4M

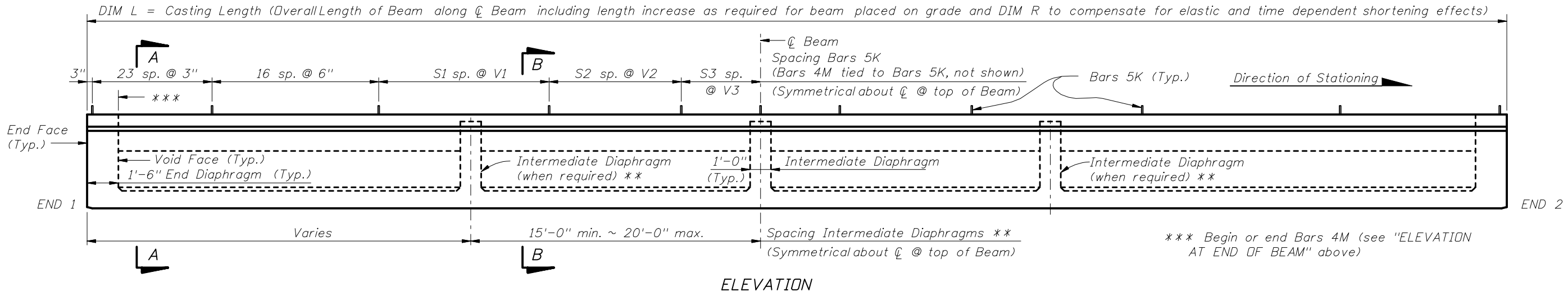


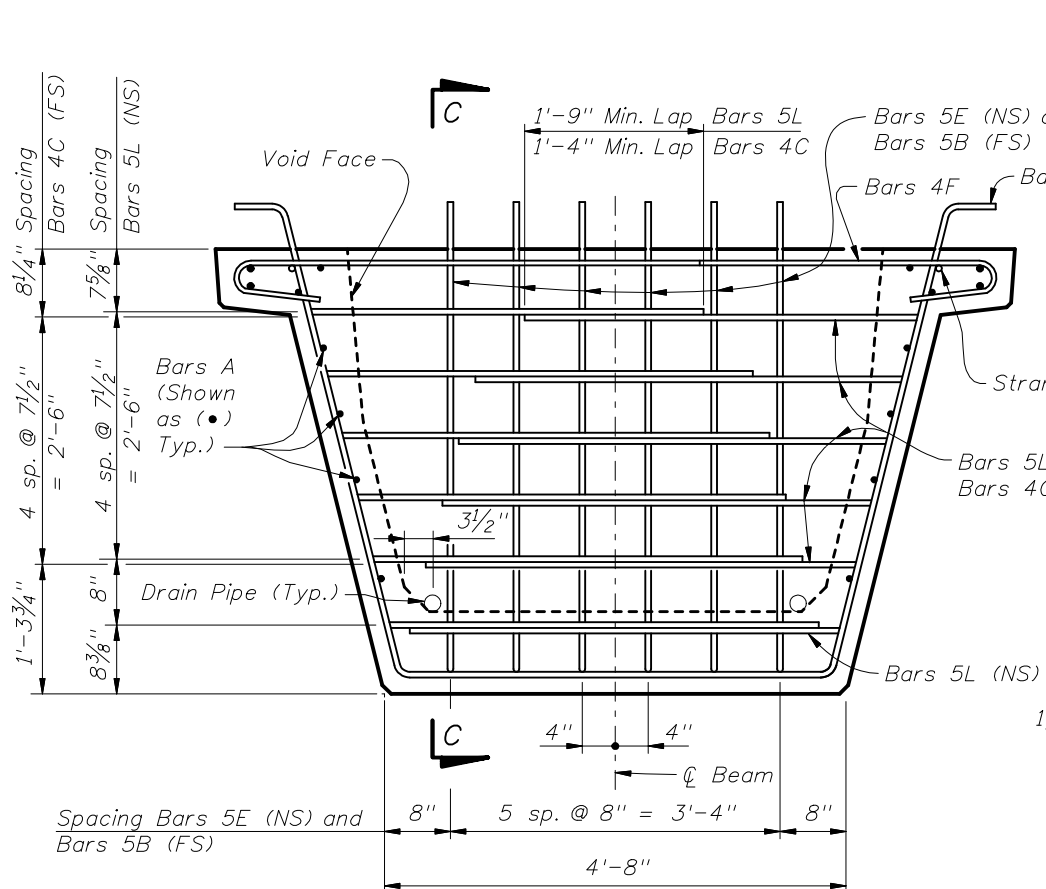


* Reinforcing steels symmetrical about \bar{C} Beam for Half Sections A-A and B-B.

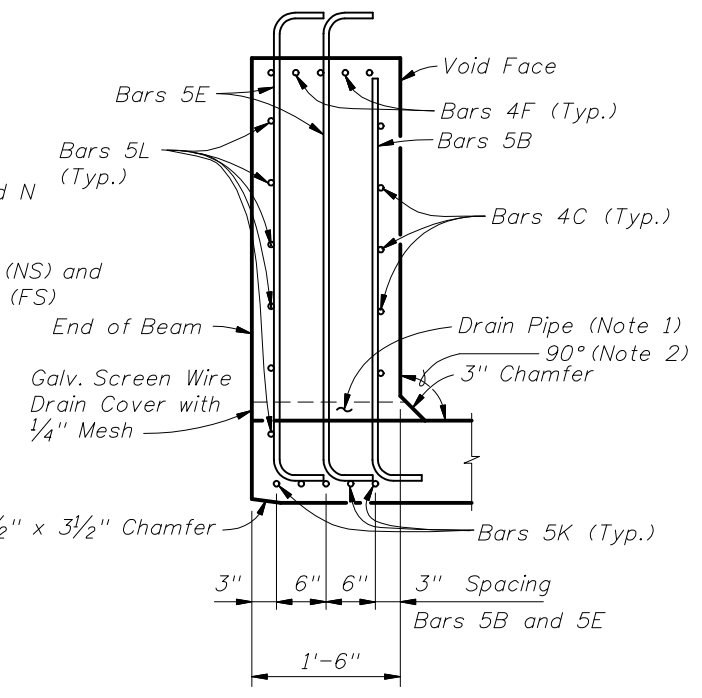
** Intermediate Diaphragms shall be provided:
 (1) - At midspan.
 (2) - At 20'-0" max. from midspan when beam length (L) exceeds 60 ft.

*** Begin or end Bars 4M (see "ELEVATION AT END OF BEAM" above)

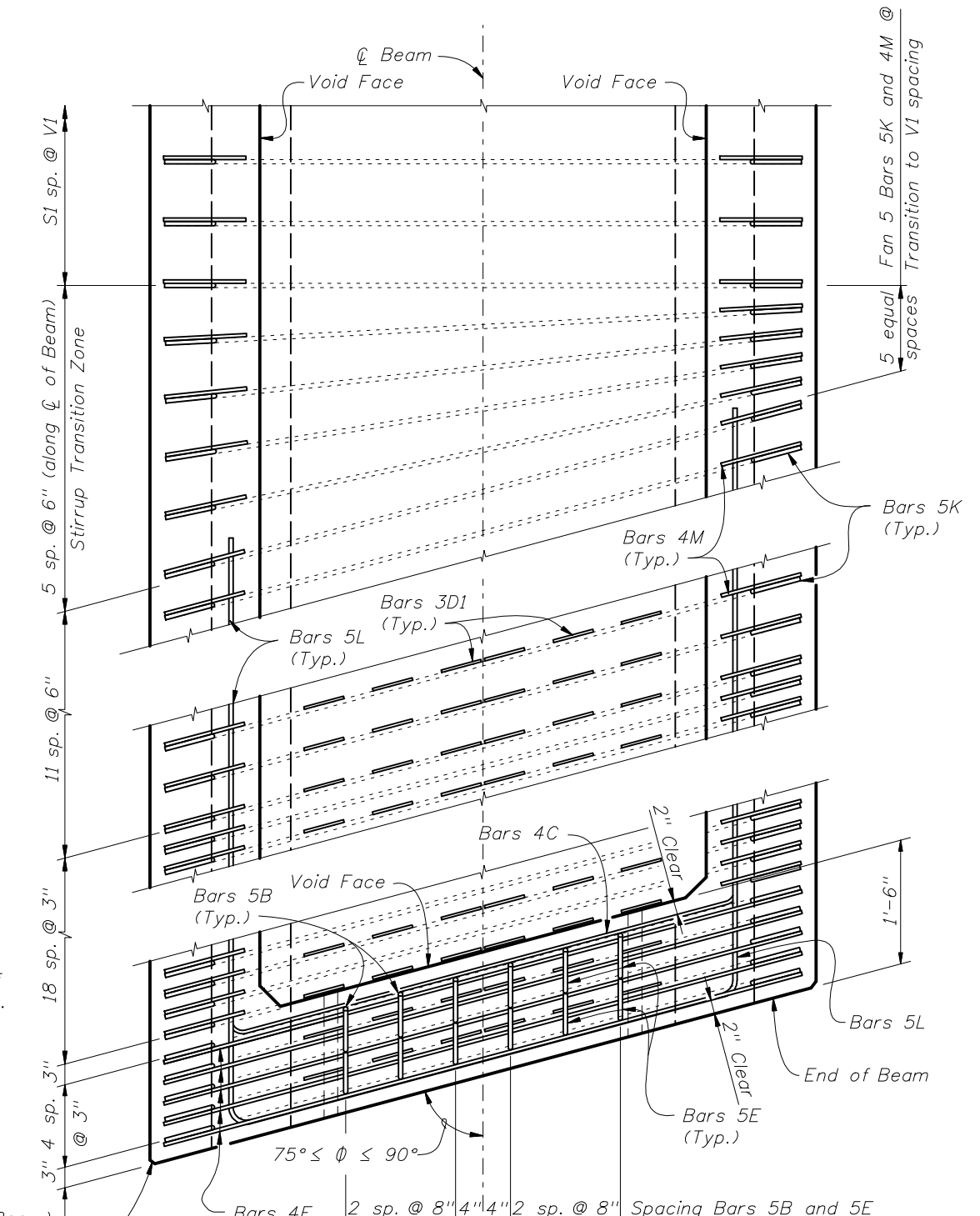




END VIEW AT END DIAPHRAGM

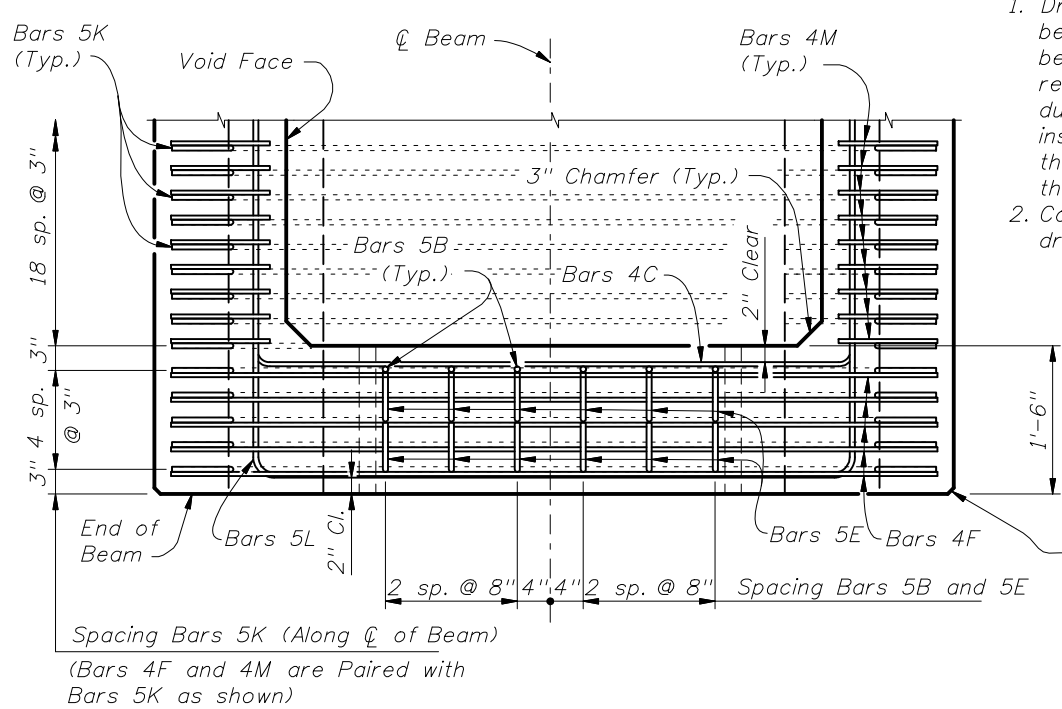


SECTION C-C



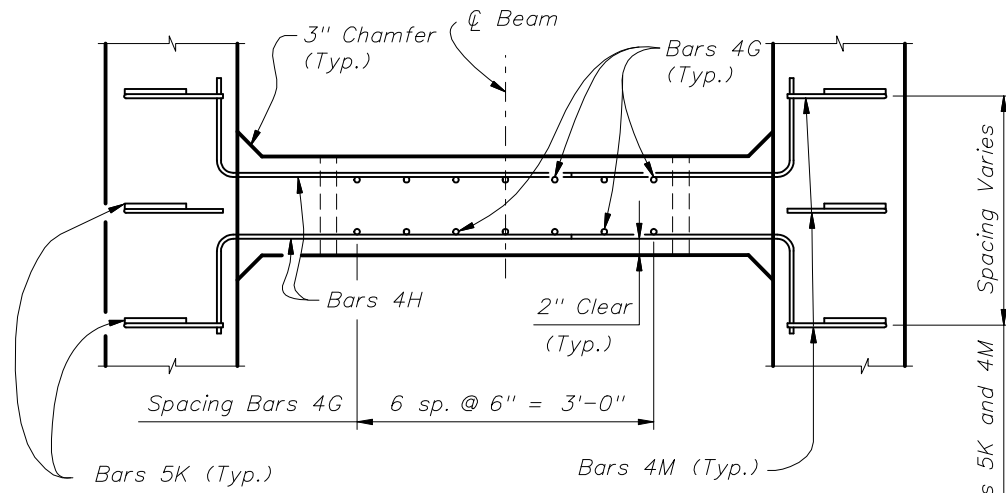
TOP VIEW OF SKEWED END DIAPHRAGM AND STIRRUP TRANSITION ZONE (Bars 3D2 Not Shown For Clarity)

- NOTES:
1. Drains shall be placed adjacent to each web at each beam end (four drains per beam). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting. Galvanized screen wire shall cover the end of the pipe and bent down around the sides of the pipe, a minimum of 1" and secured prior to casting.
 2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.

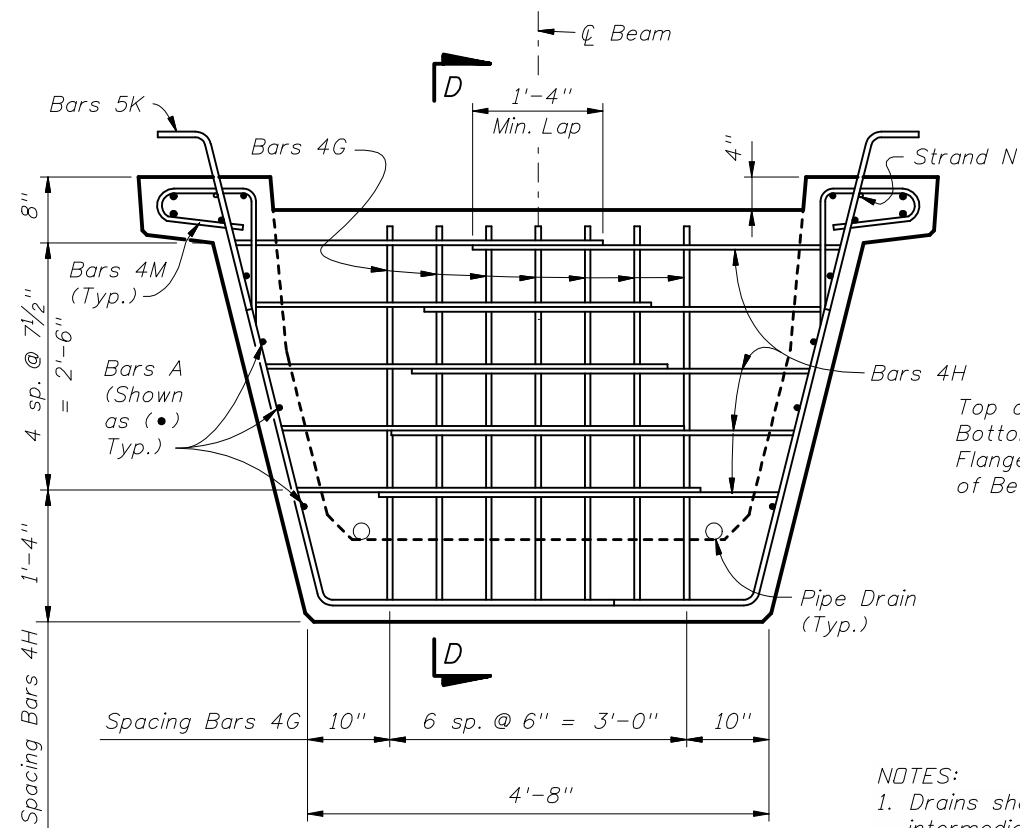


TOP VIEW OF END DIAPHRAGM (Bars 3D1 And 3D2 Not Shown For Clarity)

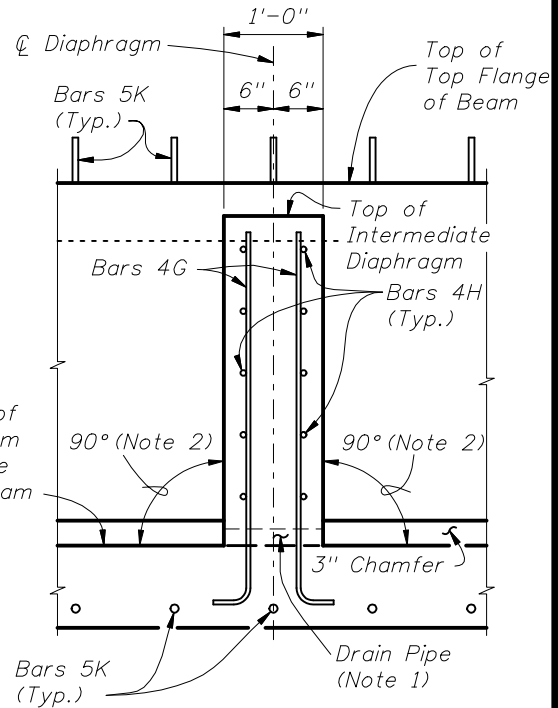




TOP VIEW OF INTERMEDIATE DIAPHRAGM



SECTION AT INTERMEDIATE DIAPHRAGM



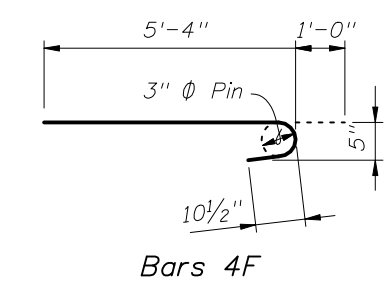
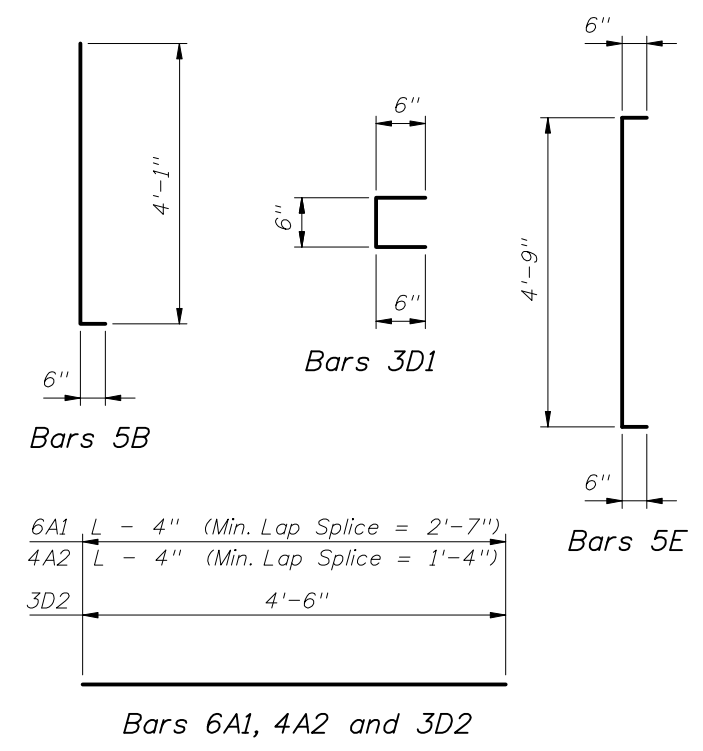
SECTION D-D

- NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm (two drains per intermediate diaphragm). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
 2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
 3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.

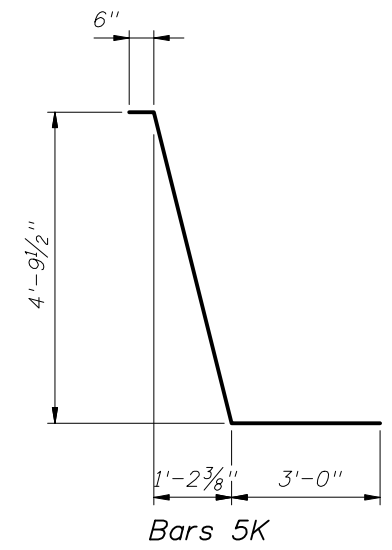
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

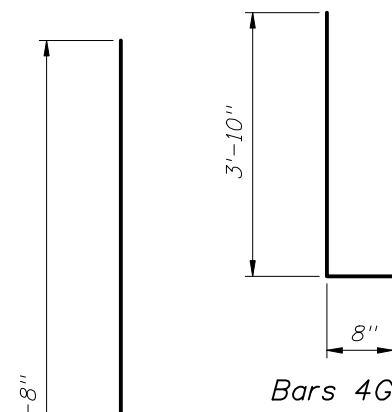
MARK	SIZE	NO. REQD.	LENGTH
A1	6	4	DIM L - 4"
A2	4	12	DIM L - 4"
B	5	12	4'-7"
C	4	20	5'-3"
D1	3	228	1'-6"
D2	3	38	4'-6"
E	5	24	5'-9"
F	4	20	6'-4"
G	4	See Table	4'-6"
H	4	See Table	4'-9"
K	5	See Table	8'-6"
L	5	24	16'-2"
M	4	See Table	3'-11"
N	3/8" Φ Strand	2	DIM L - 3"



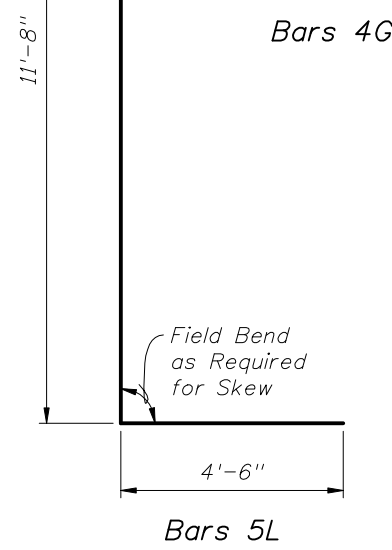
Bars 4F



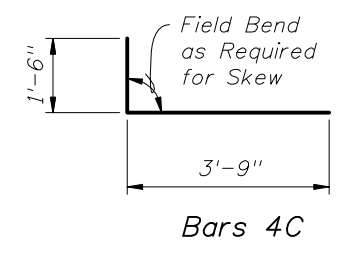
Bars 5K



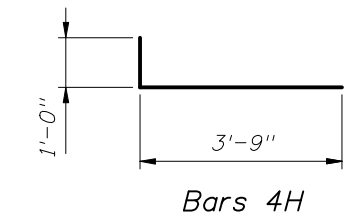
Bars 4G



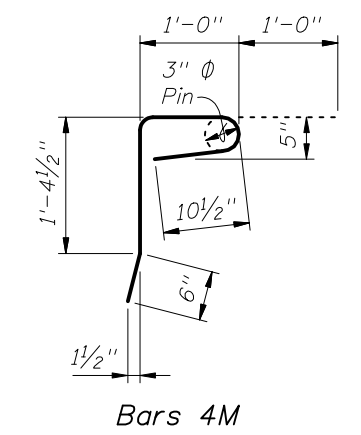
Bars 5L



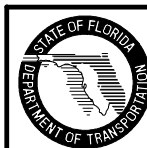
Bars 4C



Bars 4H



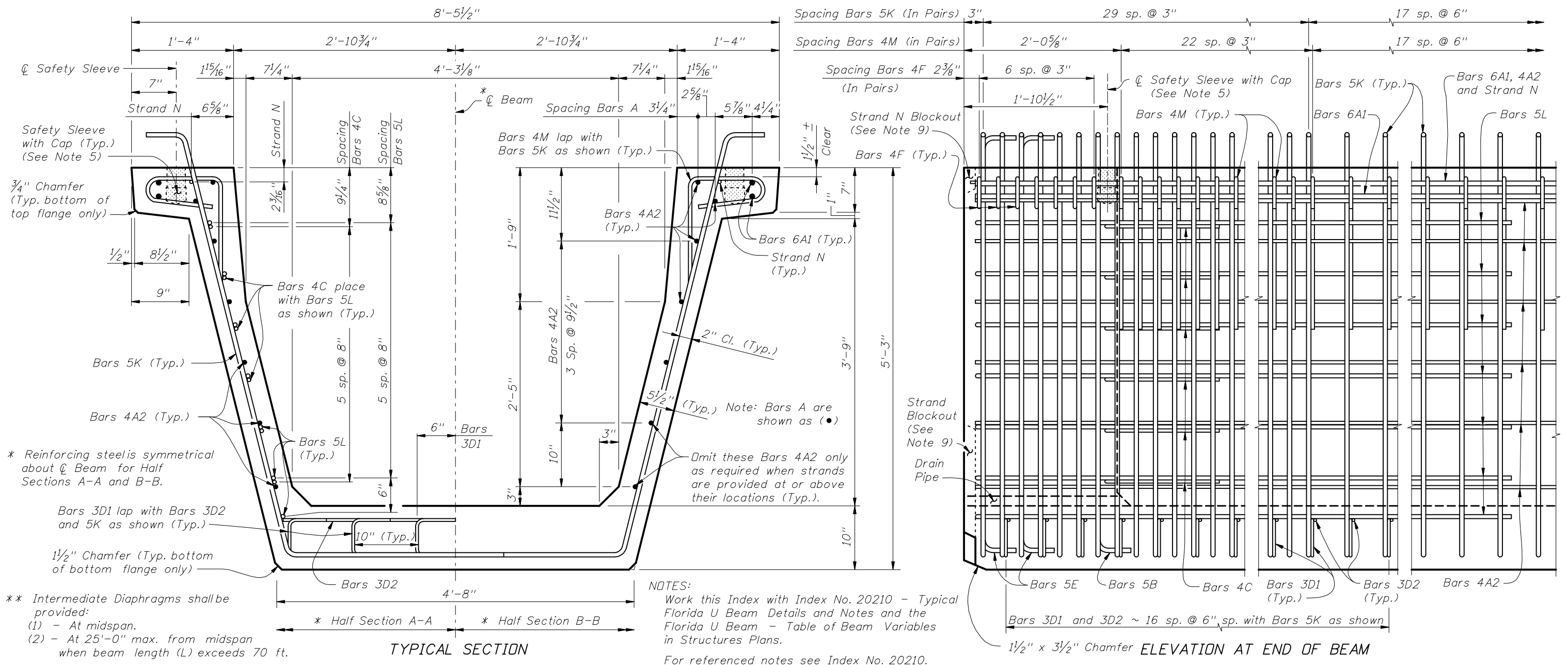
Bars 4M



2010 FDOT Design Standards

FLORIDA U 54 BEAM - STANDARD DETAILS

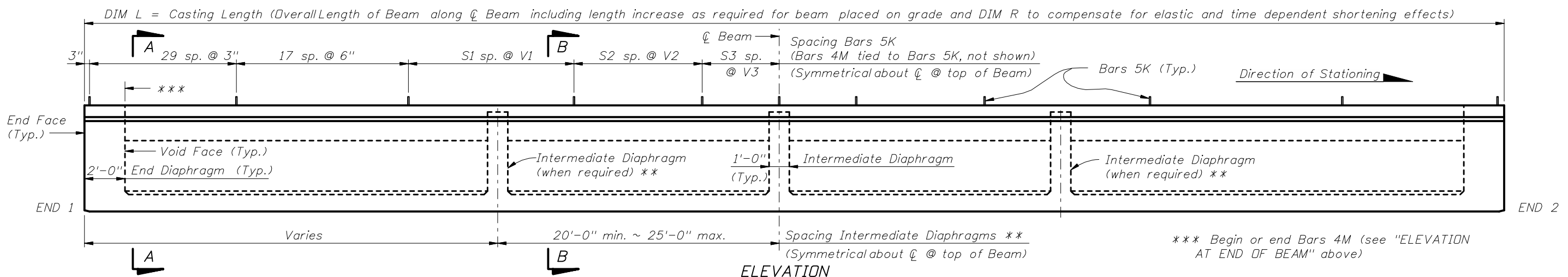
Last Revision 07/01/05
 Sheet No. 3 of 3
 Index No. 20254

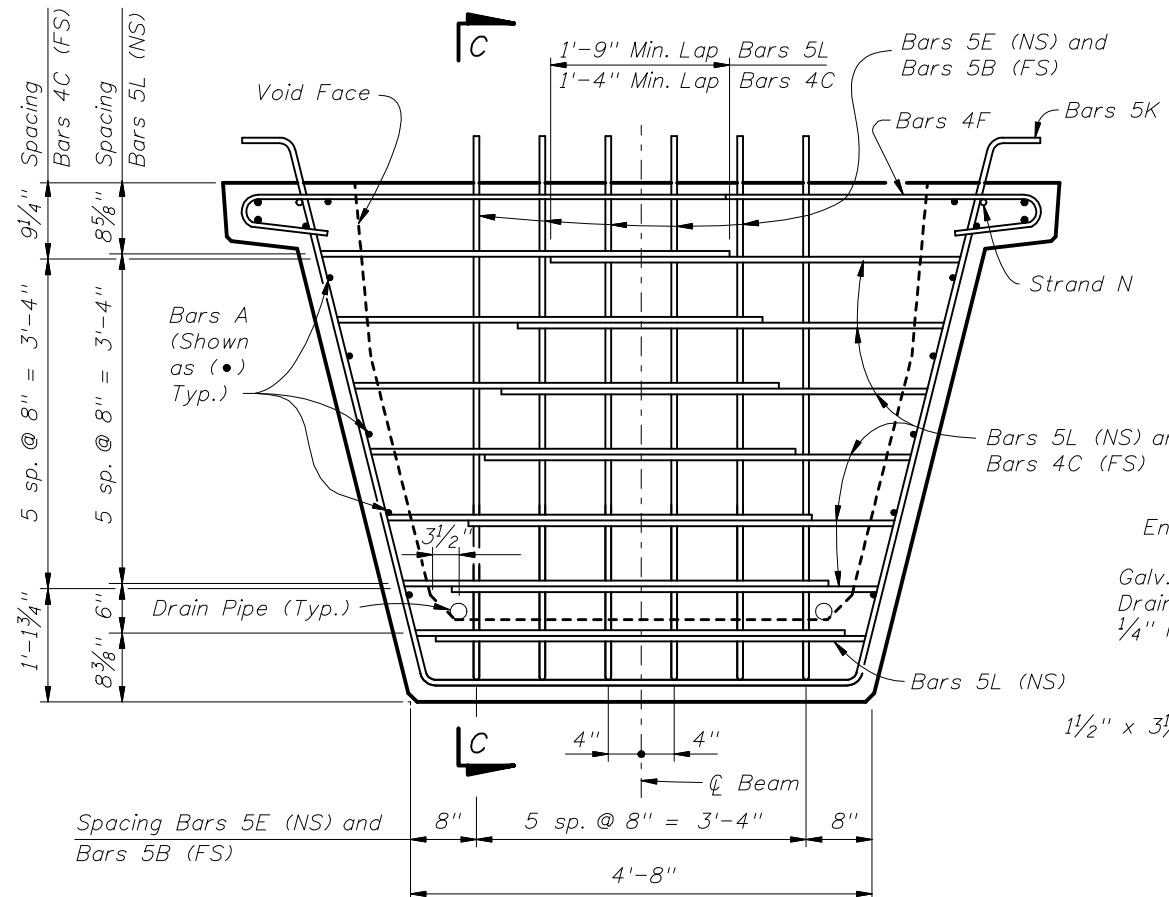


* Reinforcing steel is symmetrical about \bar{C} Beam for Half Sections A-A and B-B.

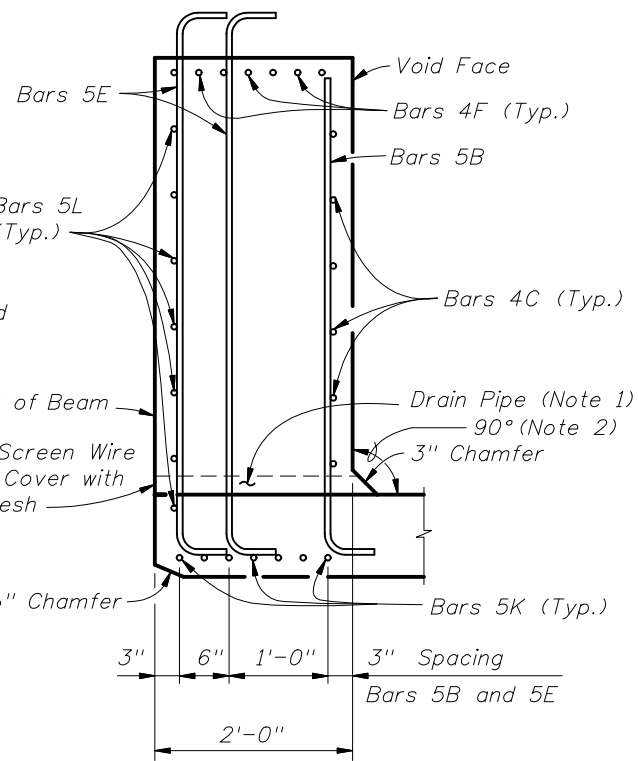
** Intermediate Diaphragms shall be provided:
 (1) - At midspan.
 (2) - At 25'-0" max. from midspan when beam length (L) exceeds 70 ft.

NOTES:
 Work this Index with Index No. 20210 - Typical Florida U Beam Details and Notes and the Florida U Beam - Table of Beam Variables in Structures Plans.
 For referenced notes see Index No. 20210.



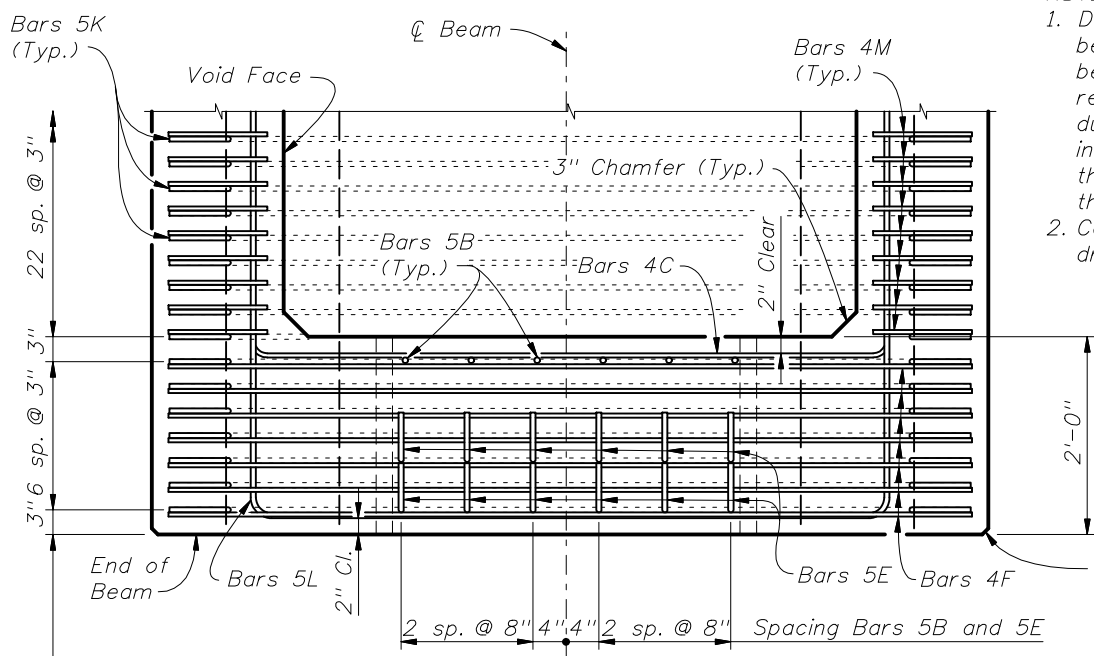


END VIEW AT END DIAPHRAGM

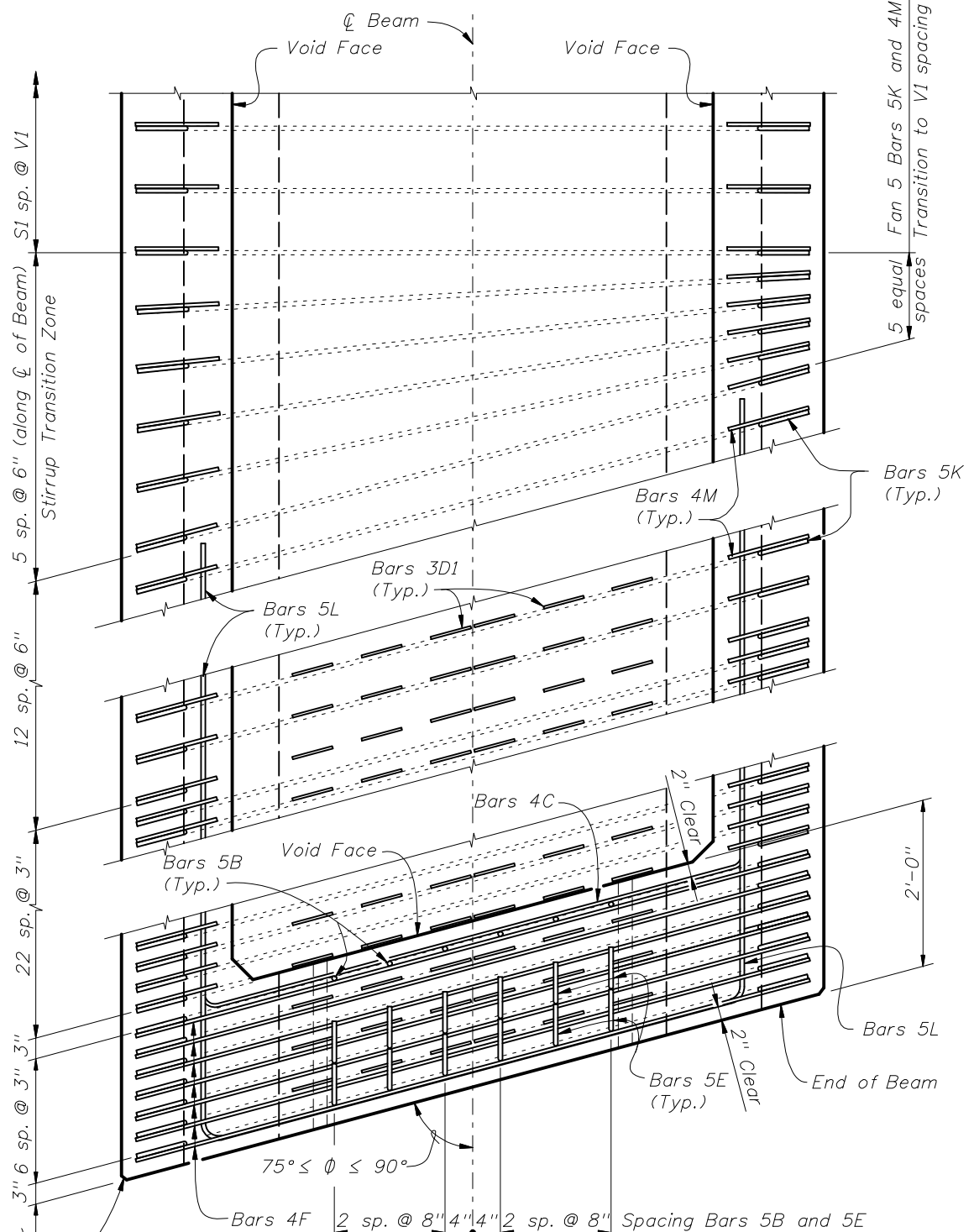


SECTION C-C

- NOTES:
1. Drains shall be placed adjacent to each web at each beam end (four drains per beam). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting. Galvanized screen wire shall cover the end of the pipe and bent down around the sides of the pipe, a minimum of 1" and secured prior to casting.
 2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.

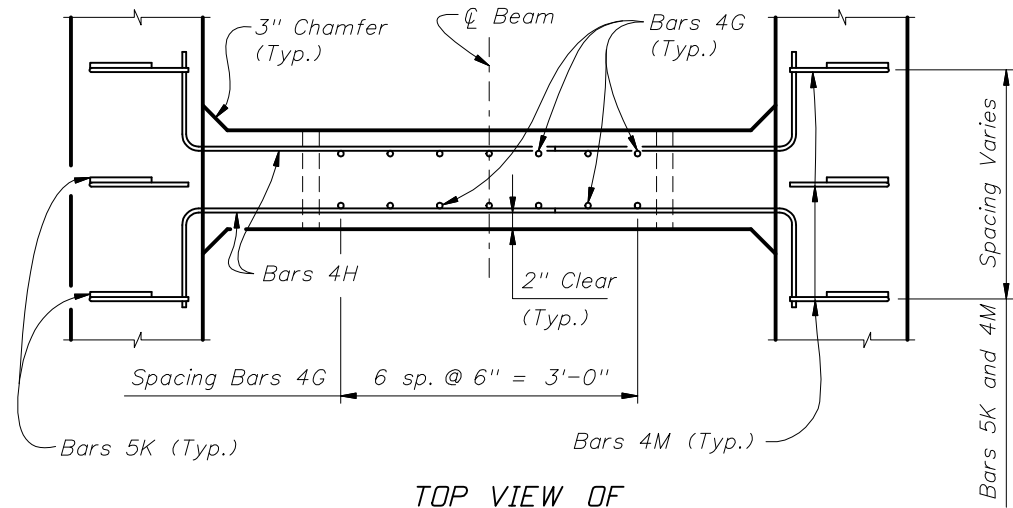


TOP VIEW OF END DIAPHRAGM
(Bars 3D1 And 3D2 Not Shown For Clarity)

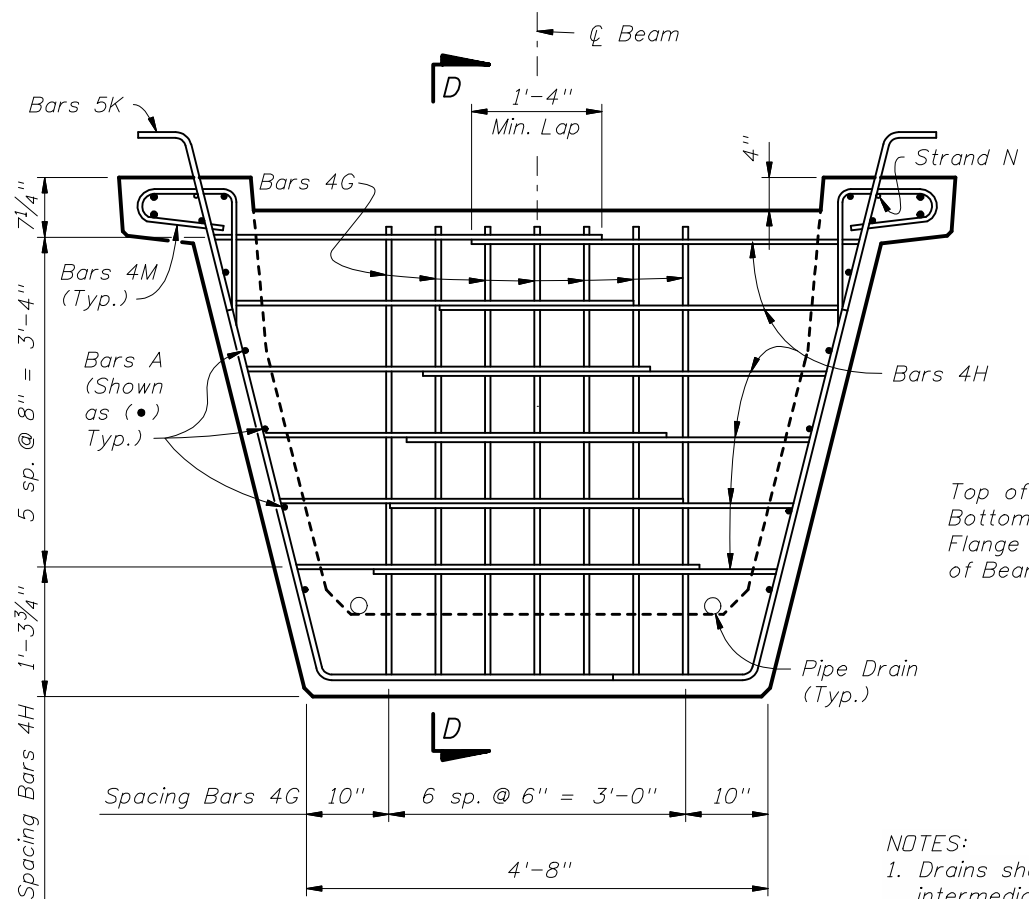


TOP VIEW OF SKEWED END DIAPHRAGM AND STIRRUP TRANSITION ZONE
(Bars 3D2 Not Shown For Clarity)

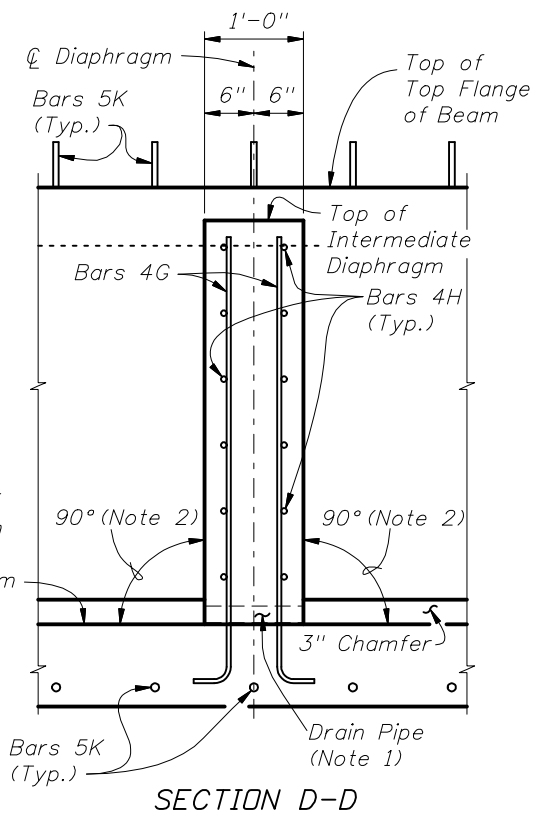




TOP VIEW OF INTERMEDIATE DIAPHRAGM



SECTION AT INTERMEDIATE DIAPHRAGM



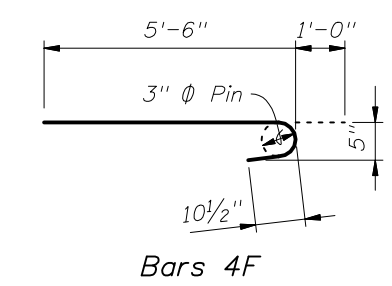
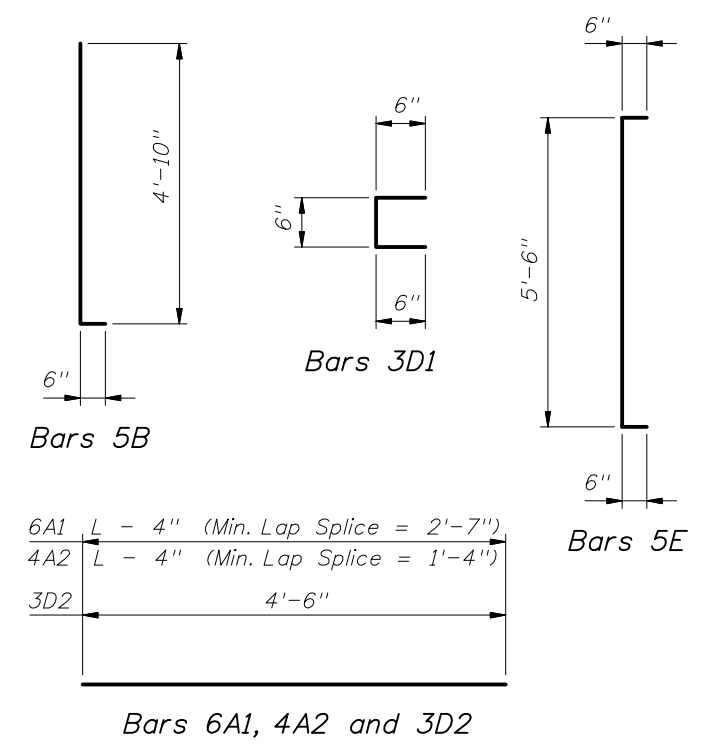
SECTION D-D

- NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm (two drains per intermediate diaphragm). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
 2. Concrete face may be sloped with a maximum 1:24 draft to facilitate formwork removal.
 3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.

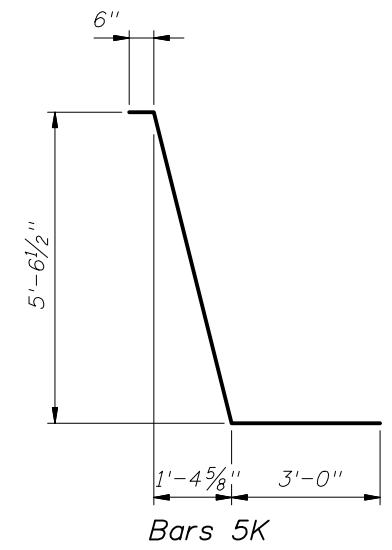
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

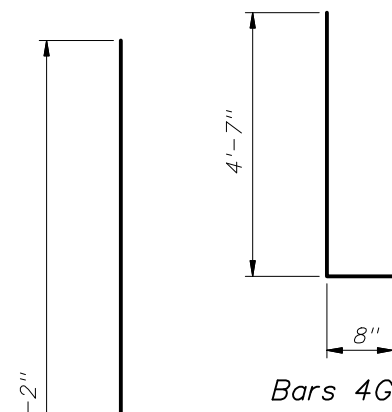
MARK	SIZE	NO. REQD.	LENGTH
A1	6	4	DIM L - 4"
A2	4	12	DIM L - 4"
B	5	12	5'-4"
C	4	24	5'-5"
D1	3	228	1'-6"
D2	3	38	4'-6"
E	5	24	6'-6"
F	4	28	6'-6"
G	4	See Table	5'-3"
H	4	See Table	4'-11"
K	5	See Table	9'-2 1/2"
L	5	28	17'-8"
M	4	See Table	3'-11"
N	3/8" ϕ Strand	2	DIM L - 3"



Bars 4F

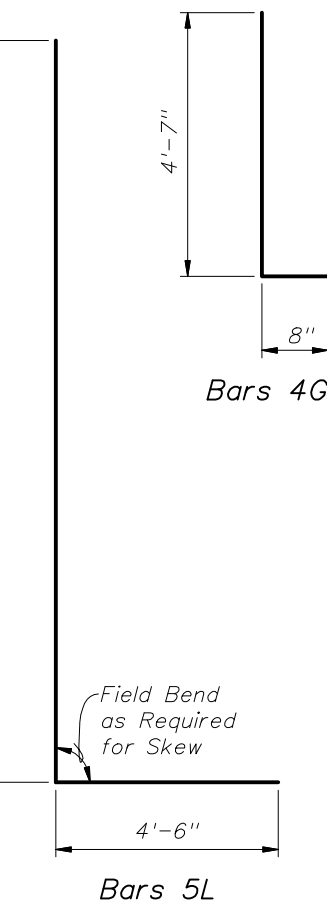


Bars 5K

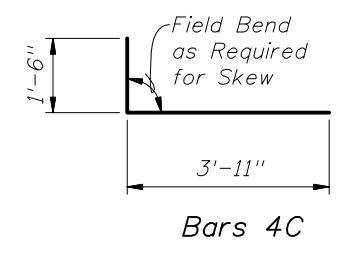


Bars 4G

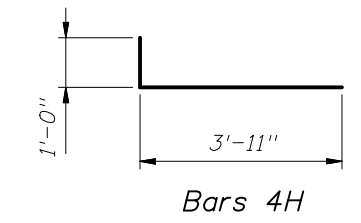
13'-2"



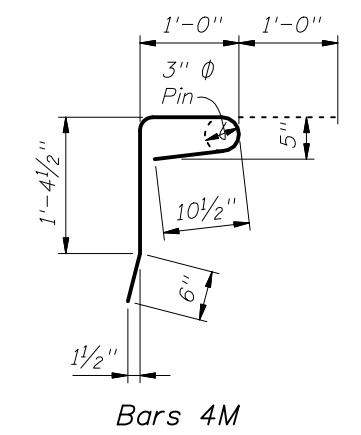
Bars 5L



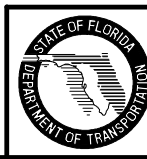
Bars 4C



Bars 4H



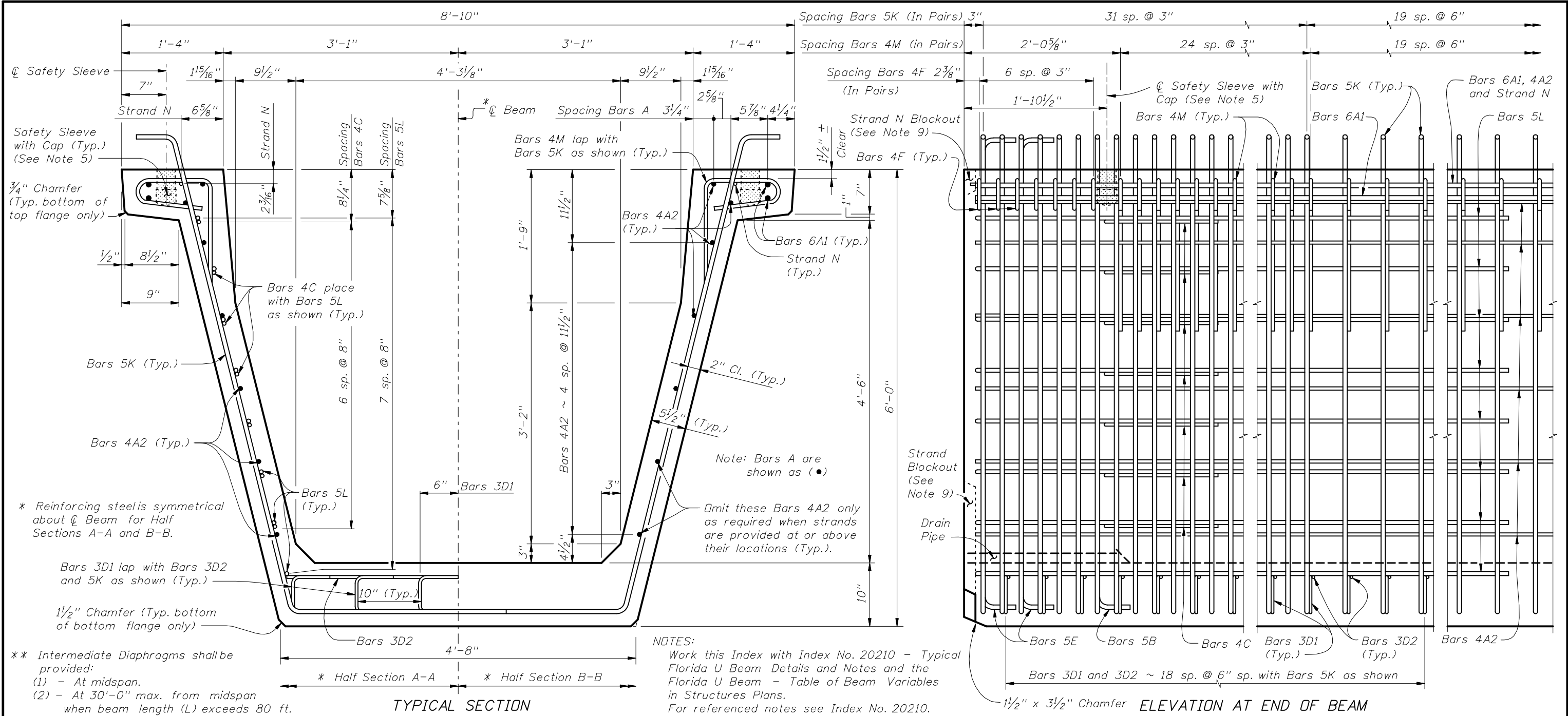
Bars 4M



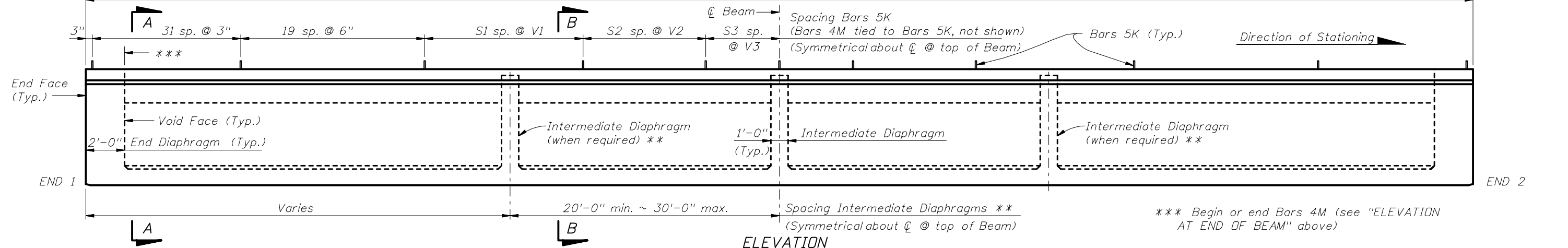
2010 FDOT Design Standards

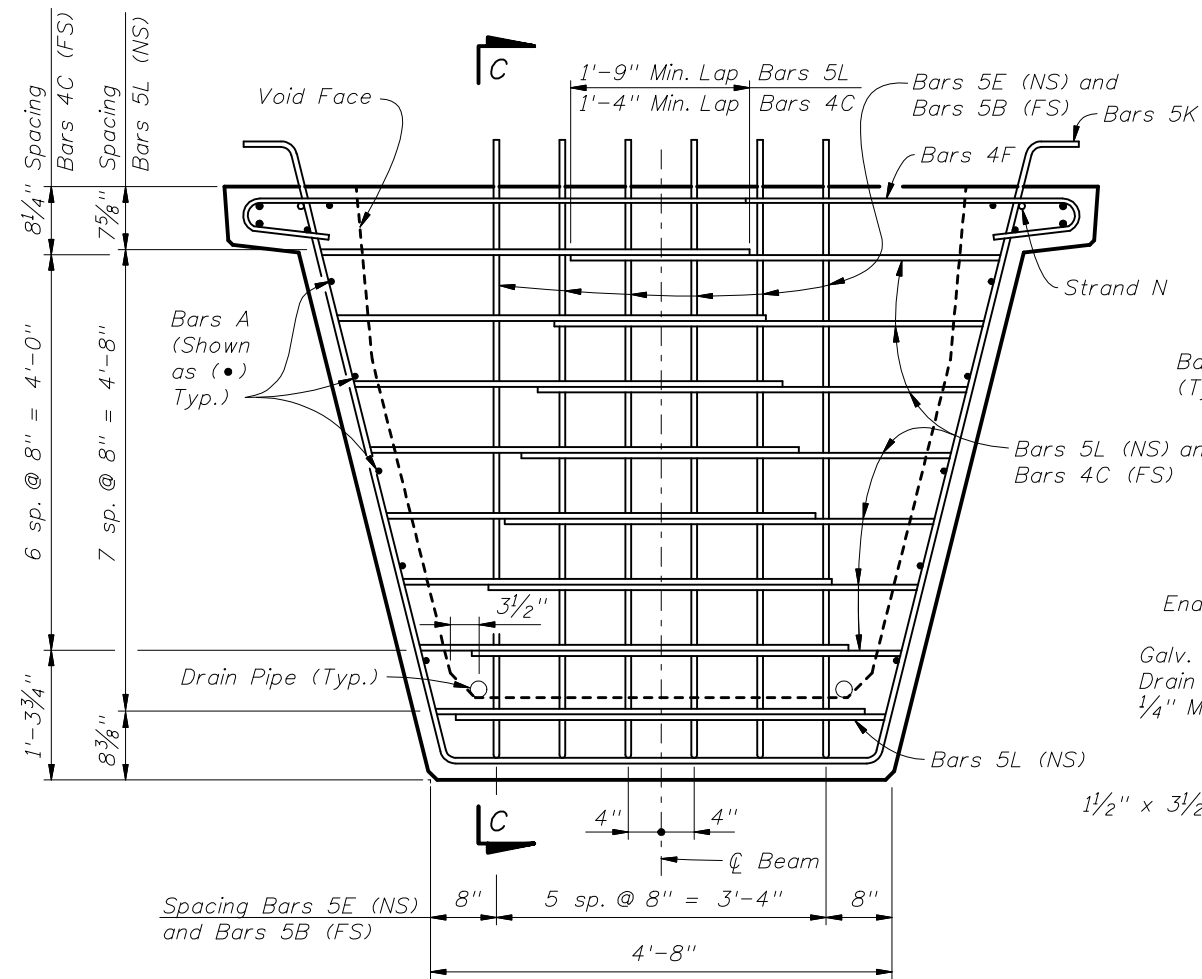
FLORIDA U 63 BEAM - STANDARD DETAILS

Last Revision 07/01/05
 Sheet No. 3 of 3
 Index No. 20263

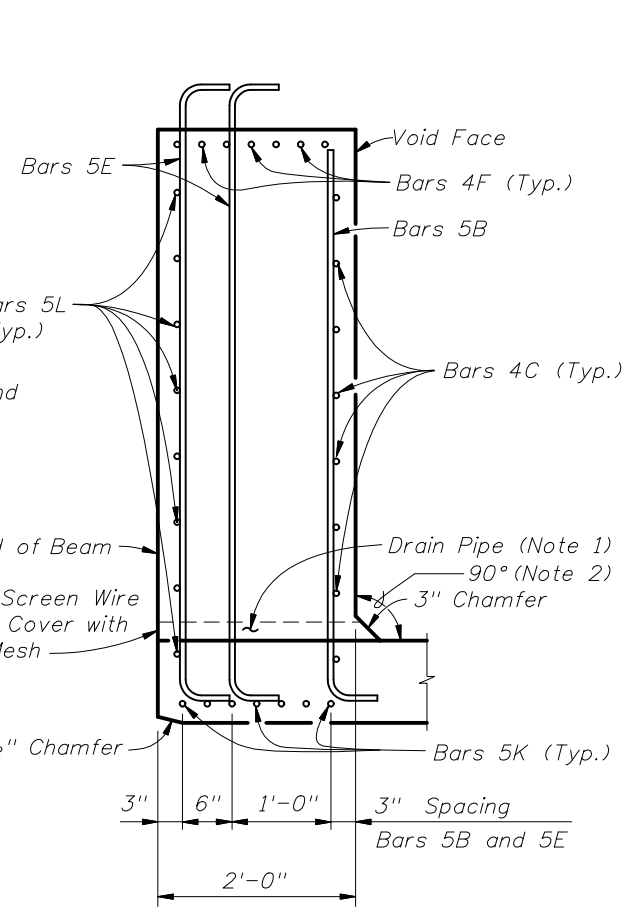


DIM L = Casting Length (Overall Length of Beam along \bar{C} Beam including length increase as required for beam placed on grade and DIM R to compensate for elastic and time dependent shortening effects)





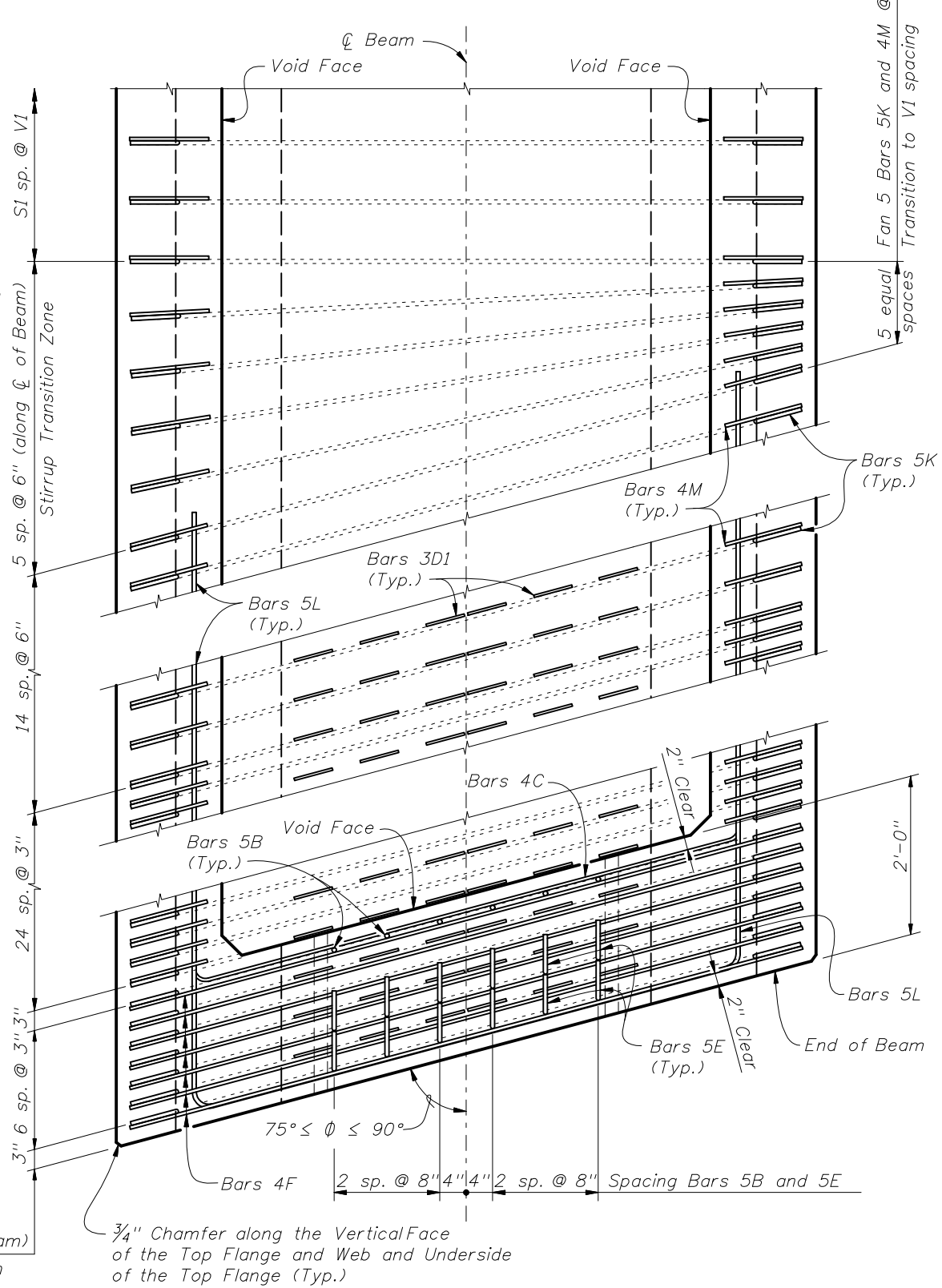
END VIEW AT END DIAPHRAGM



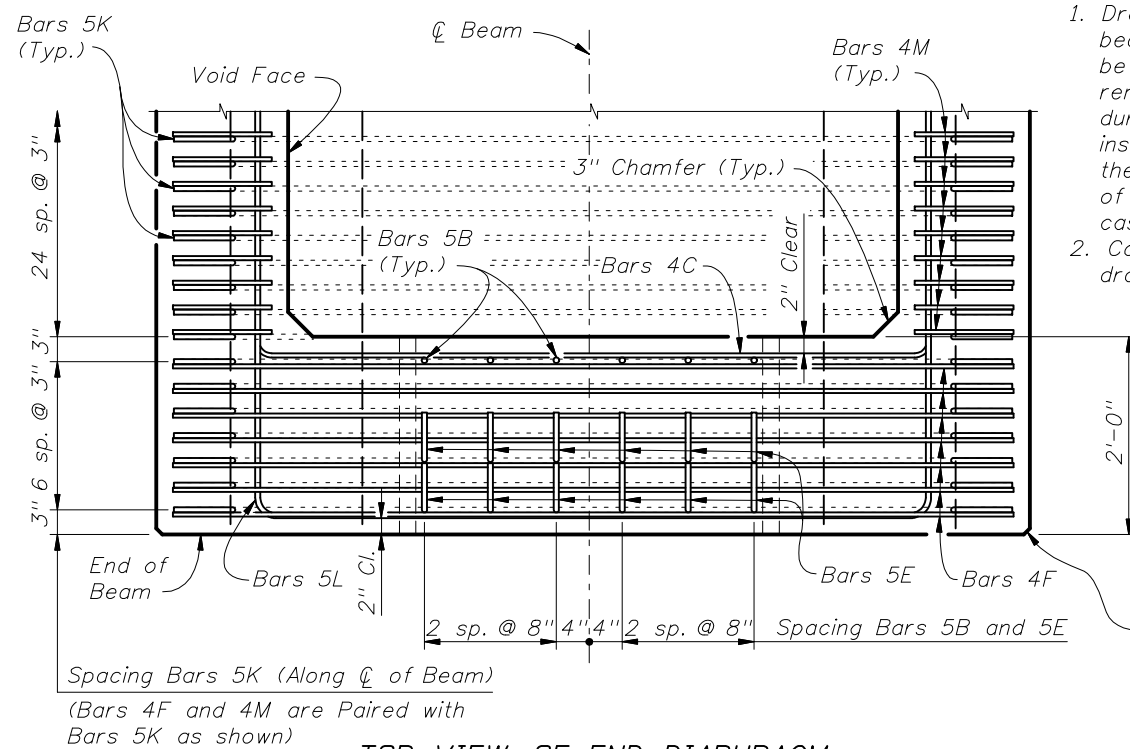
SECTION C-C

NOTES:

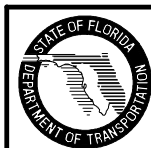
1. Drains shall be placed adjacent to each web at each beam end (four drains per beam). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting. Galvanized screen wire shall cover the end of the pipe and bent down around the sides of the pipe, a minimum of 1" and secured prior to casting.
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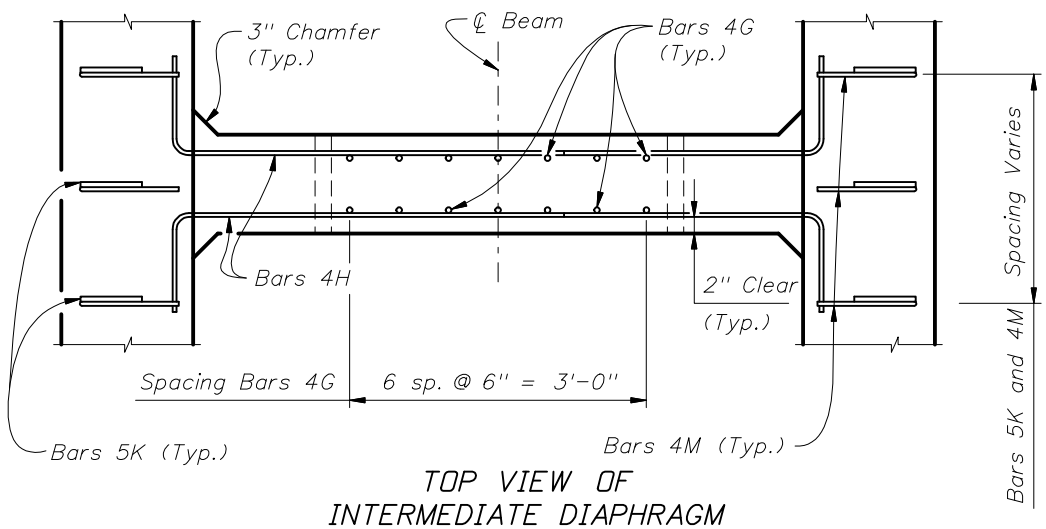


TOP VIEW OF SKEWED END DIAPHRAGM AND STIRRUP TRANSITION ZONE (Bars 3D2 Not Shown For Clarity)

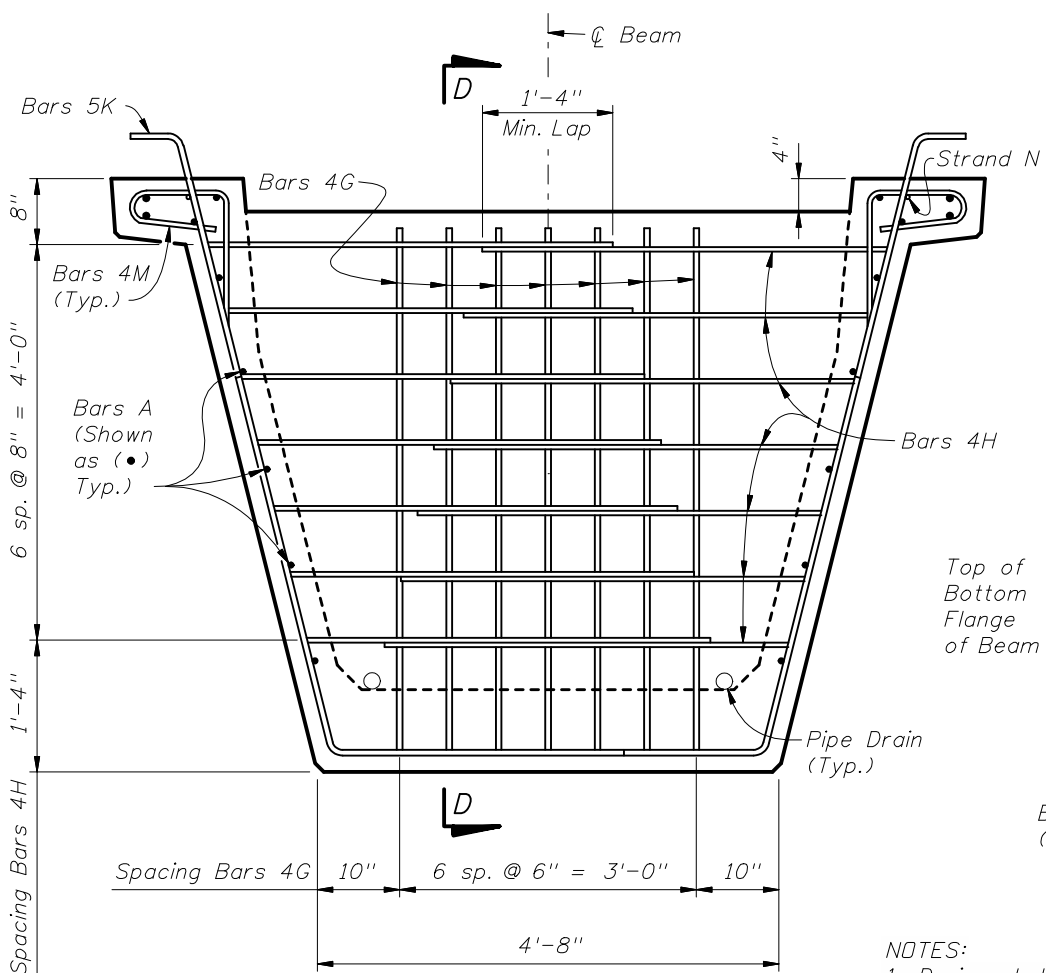


TOP VIEW OF END DIAPHRAGM (Bars 3D1 And 3D2 Not Shown For Clarity)

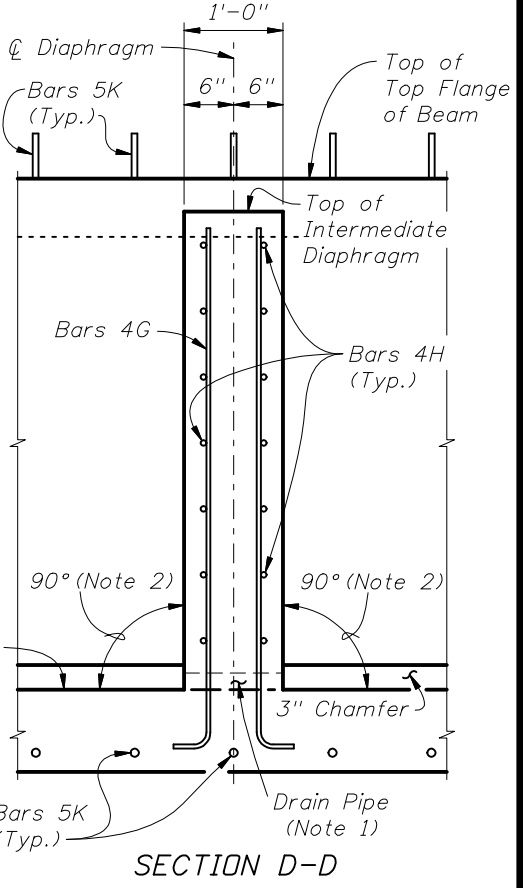




TOP VIEW OF INTERMEDIATE DIAPHRAGM



SECTION AT INTERMEDIATE DIAPHRAGM



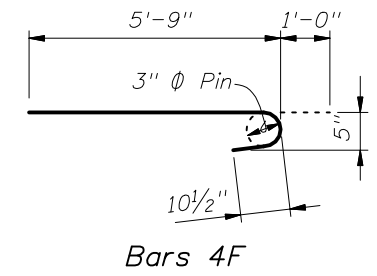
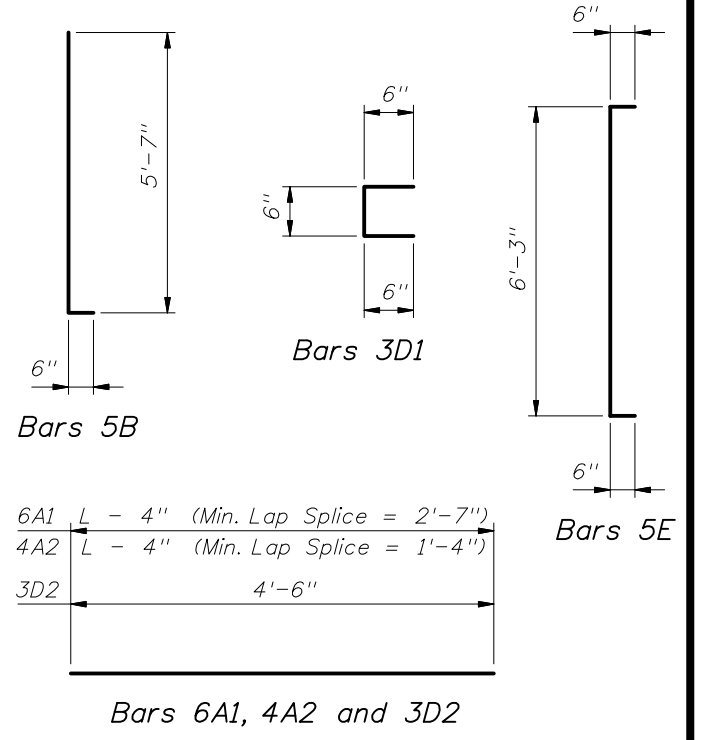
SECTION D-D

- NOTES:
1. Drains shall be placed adjacent to each web at each intermediate diaphragm (two drains per intermediate diaphragm). Drain Pipe shall be 2" Nominal Pipe Size, Schedule 80 PVC. Provide removable pipe plugs to prevent concrete entrance during beam casting. Plugs to be removed from the inside after casting.
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 3. Intermediate diaphragms must be cast and concrete release strength obtained prior to removing beam from casting bed.

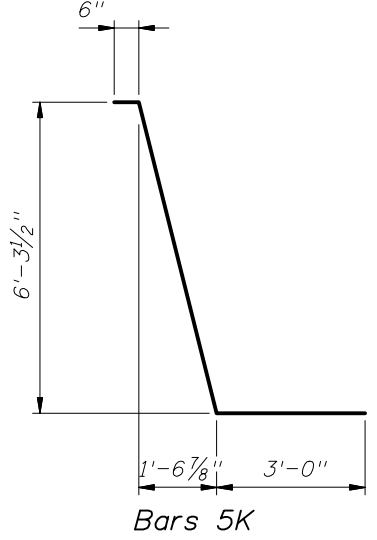
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

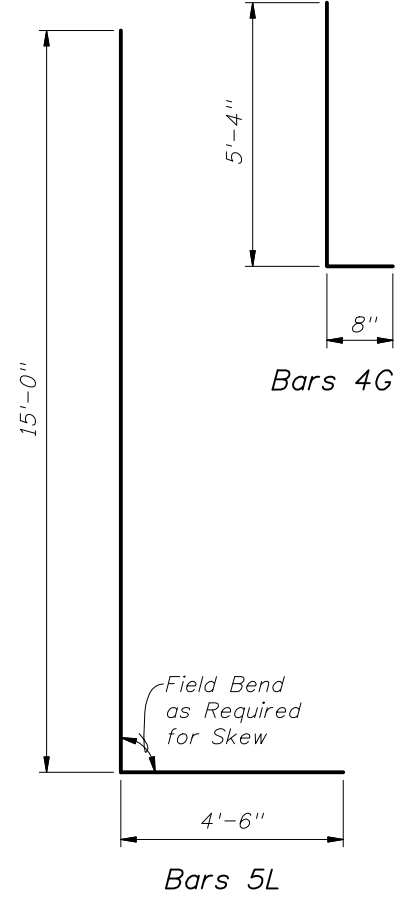
MARK	SIZE	NO. REQD.	LENGTH
A1	6	4	DIM L - 4"
A2	4	14	DIM L - 4"
B	5	12	6'-1"
C	4	28	5'-7"
D1	3	228	1'-6"
D2	3	38	4'-6"
E	5	24	7'-3"
F	4	28	6'-9"
G	4	See Table	6'-0"
H	4	See Table	5'-1"
K	5	See Table	10'-0"
L	5	32	19'-6"
M	4	See Table	3'-11"
N	3/8" Ø Strand	2	DIM L - 3"



Bars 4F

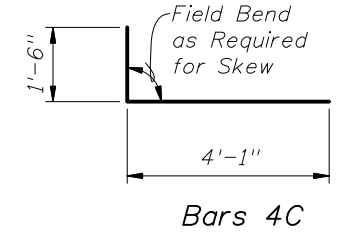


Bars 5K

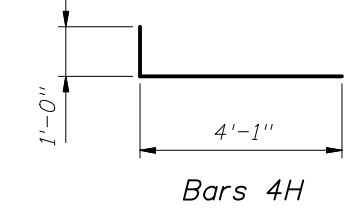


Bars 4G

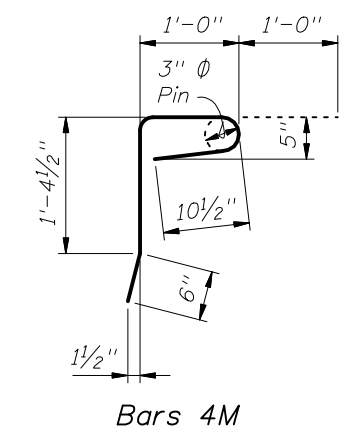
Bars 5L



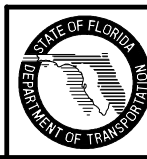
Bars 4C

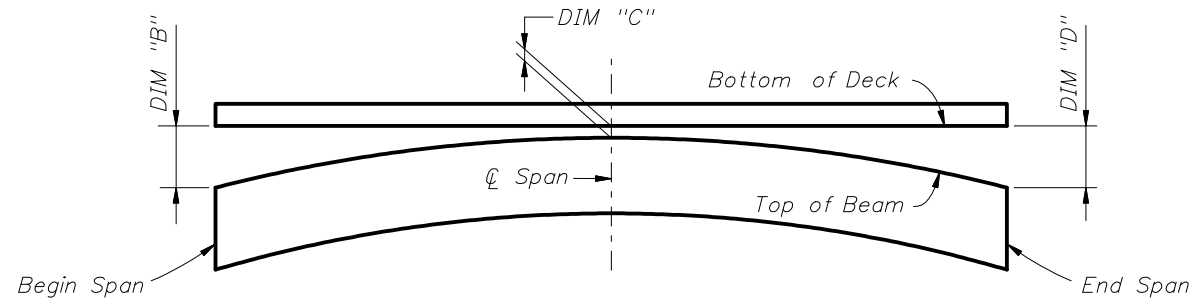


Bars 4H

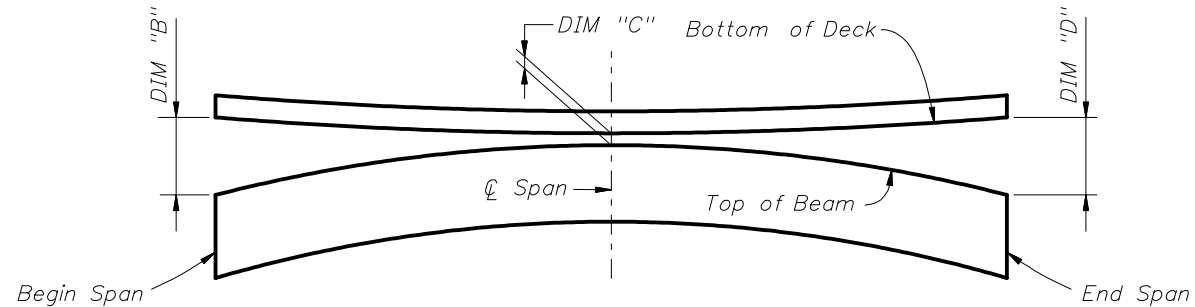


Bars 4M

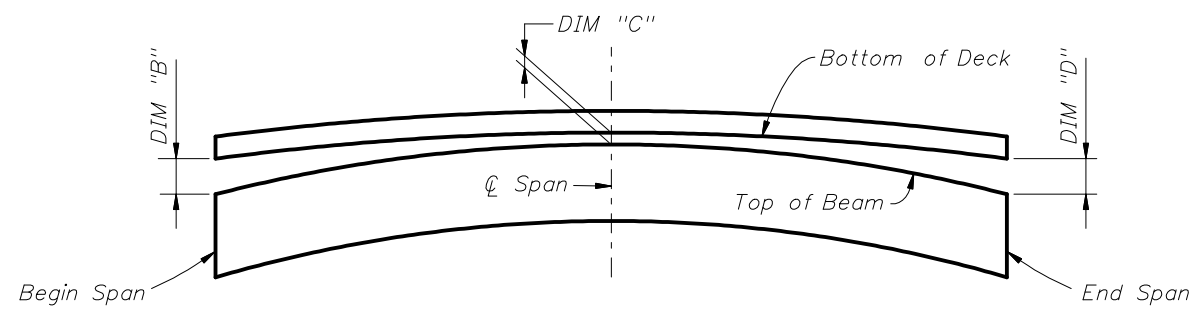




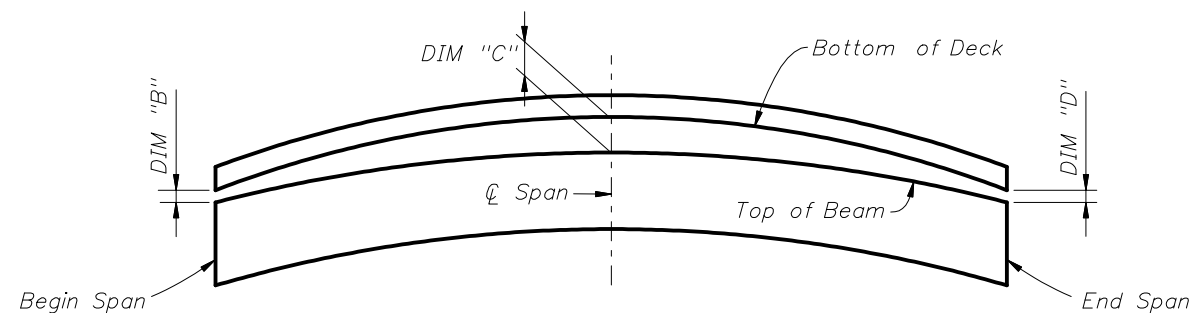
BUILD-UP DIAGRAM FOR TANGENT SPANS
(ALONG CL FLANGE) (CASE 1)



BUILD-UP DIAGRAM FOR SAG VERTICAL CURVE SPANS
(ALONG CL FLANGE) (CASE 2)



BUILD-UP DIAGRAM FOR CREST VERTICAL CURVE SPANS
- CONTROL AT CL SPAN
(ALONG CL FLANGE) (CASE 3)



BUILD-UP DIAGRAM FOR CREST VERTICAL CURVE SPANS
- CONTROL AT BEGIN OR END SPAN
(ALONG CL FLANGE) (CASE 4)

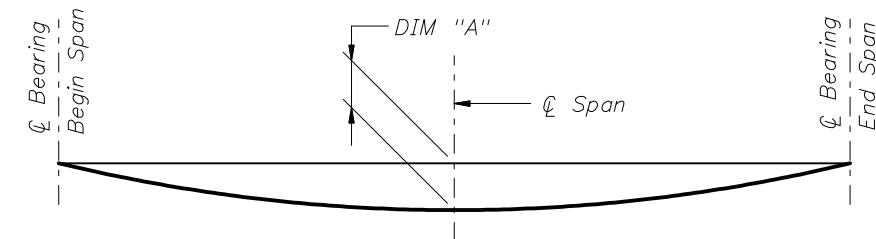
BEAM CAMBER AND BUILD-UP NOTES:

The build-up values given in the table are based on theoretical beam cambers. The Contractor shall monitor beam cambers for the purpose of predicting camber values at the time of the deck pour. If the predicted cambers based on field measurements differ more than $\pm 1/2$ " from the theoretical "Net Beam Camber @ 120 Days" shown in the Data Table, obtain approval from the Engineer to modify the build-up dimensions as required. When the measured beam cambers create a conflict with the bottom mat of deck steel, notify the Engineer a minimum of 21 days prior to casting.

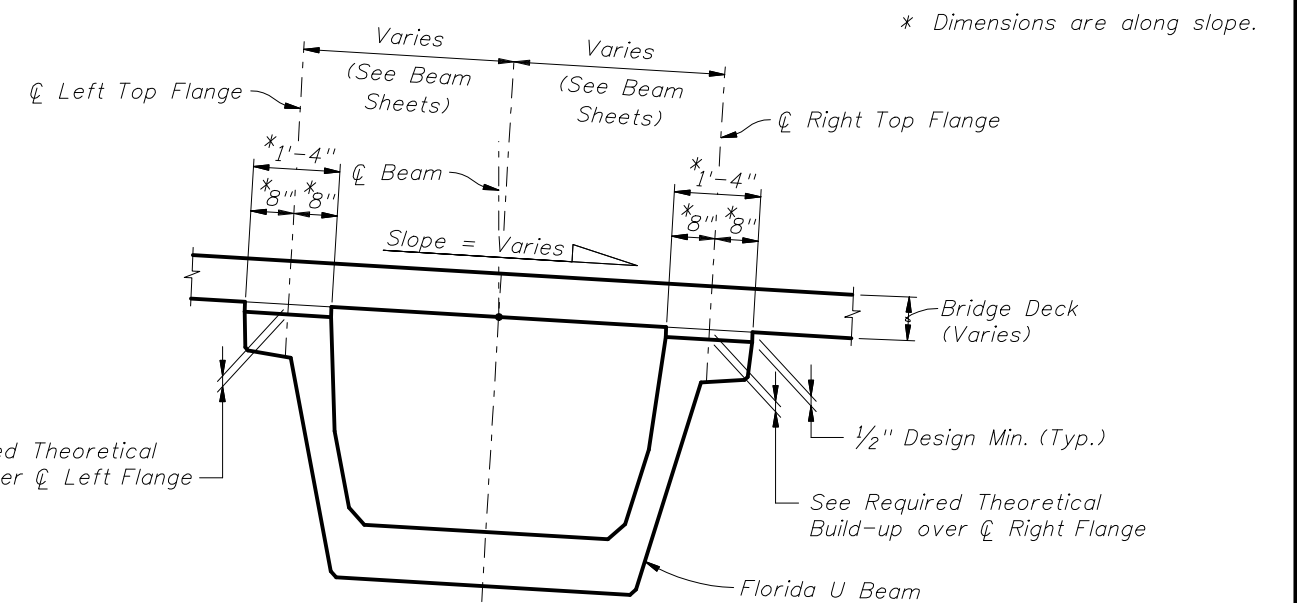
DIM "A" includes the weight of the Stay-In-Place Formwork.

INSTRUCTIONS TO DESIGNER:

Although not shown here in the Diagrams or Notes, the effect of Horizontal Curvature, when present, needs to be considered for the Build-up Calculations.



DEAD LOAD DEFLECTION DIAGRAM
(ALONG CL BEAM)



See Required Theoretical Build-up over CL Left Flange

1/2" Design Min. (Typ.)

See Required Theoretical Build-up over CL Right Flange

BUILD-UP OVER BEAMS
(LOOKING AHEAD STATION)

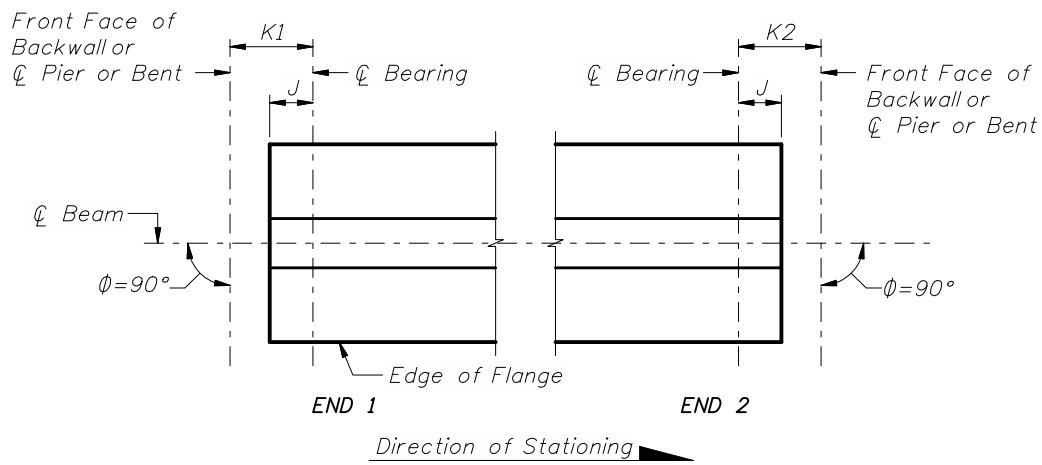
NOTE:
Work this Index with the Build-up and Deflection Data Table for Florida U Beams in Structures Plans.



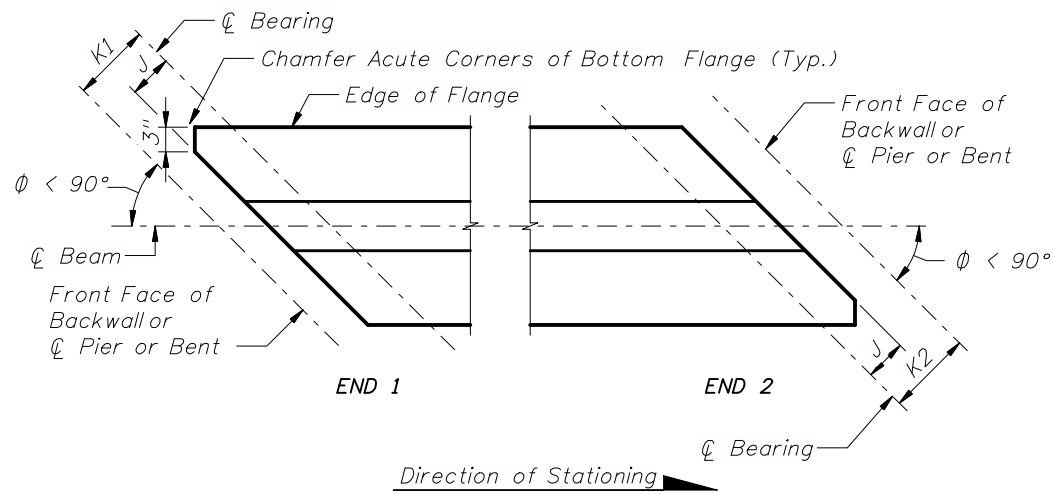
2010 FDOT Design Standards

BUILD-UP & DEFLECTION DATA FOR
FLORIDA U BEAMS

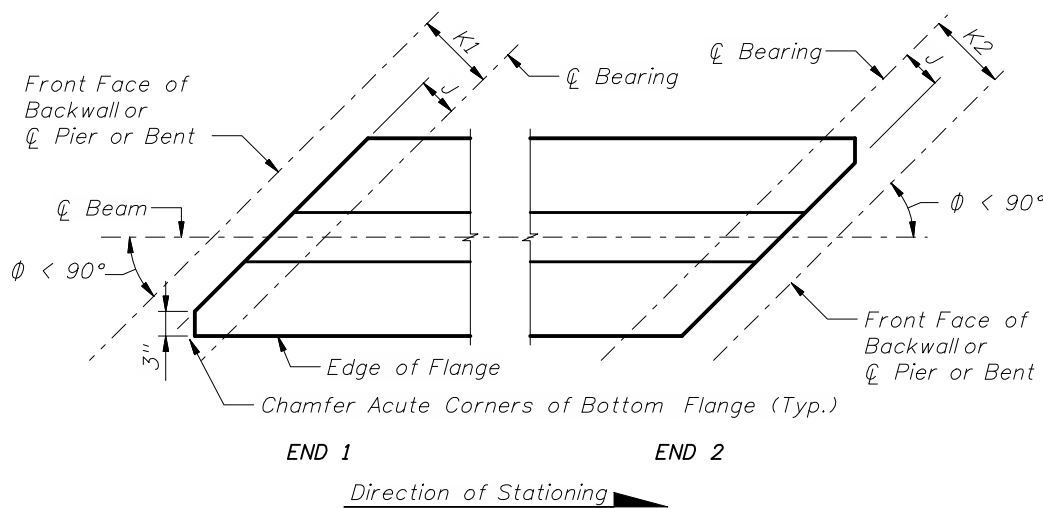
Last Revision	Sheet No.
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20299	



CASE 1



CASE 2



CASE 3

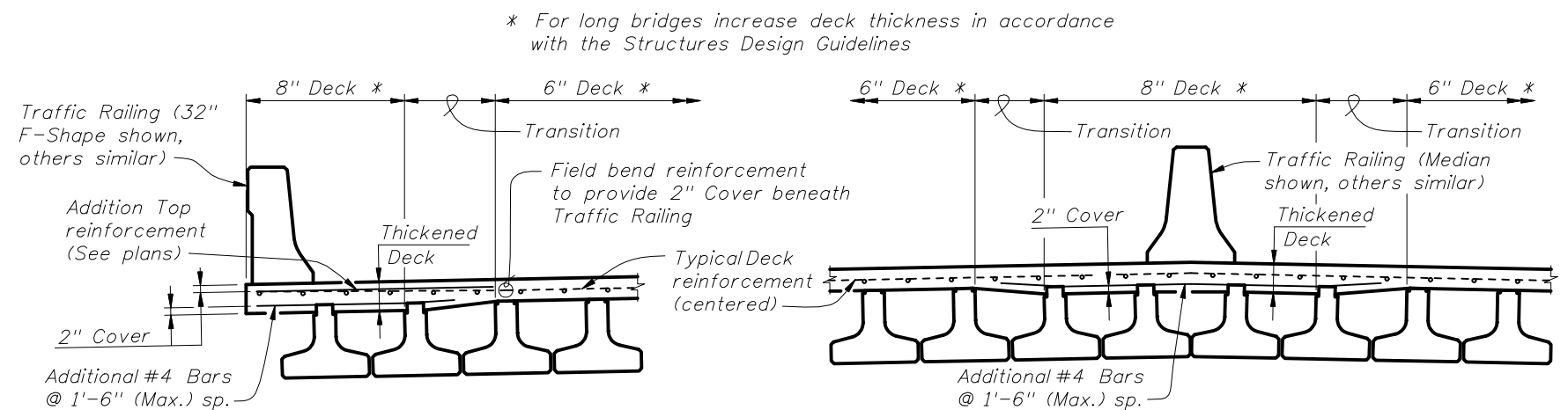
== SCHEMATIC PLAN VIEWS AT BEAM ENDS ==

BEAM NOTES

1. All bar dimensions are out-to-out.
2. Place two (2) Bars 5Z at each end, and then one (1) Bar 4K each location as detailed alternating the direction of the ends for each bar (see "ELEVATION AT END OF BEAM").
3. Bars 4L shall be bent prior to the beam leaving the prestressing yard. Bars 4L shall be bent parallel to the ends of the beams.
4. Caution should be used with Bars 4L in the ends of exterior beams to assure the bent portion of the bar is properly oriented so that the bar will be embedded in the diaphragm concrete.
5. Strand N shall be either ASTM A416, Grade 250 or Grade 270, seven-wire strands $\frac{3}{8}$ " ϕ or larger, stressed to 10,000 lbs.
6. Unless otherwise noted, the minimum concrete cover for reinforcing steel shall be 2".
7. At option of the Contractor, welded deformed wire reinforcement may be used in lieu of Bars 3D, 4K and 4L except as noted below for skewed end conditions. The wire sizes and spacing shall match those shown on the Standard Beam Details sheet for these bars. In this event, Bars 4K may be fabricated with the omission of the lower outstanding leg provided that two longitudinal wires are placed (welded) at the lower end of the bar. The first (lower) wire shall be located 1" from the end of Bars 4K and the second wire 2" minimum from the first wire, but no less than $\frac{1}{4}$ of the beam depth from mid-depth of the beam. Welded wire reinforcement shall conform to ASTM A497. When welded deformed wire reinforcement is used, the end Bars 5Z shall remain conventional mild reinforcing.
8. For beams with skewed end conditions, welded deformed wire reinforcement shall not be used in the ends of beams within the limits of Bars 3D. The end reinforcement, defined as Bars 3D1, 3D2, 4K and 5Z placed within the limits of the spacing for Bars 3D (approximately 1.5 times the overall beam depth) in "ELEVATION AT END OF BEAM", shall be placed parallel to the skewed end of the beam. Bars 4K located beyond the limits of Bars 3D shall be placed perpendicular to the longitudinal axis of the beam. Placement of Bars 3D1 and 3D2 correspond to END 1 and END 2 respectively, as shown in the beam "ELEVATION". For Bars 3D1 and 3D2, Dimension B and the overall length shall be adjusted to fit the width of the bottom flange measured parallel to the skew.
9. Bars 4K and 5Z shall be placed and tied to the fully bonded strands (see "STRAND PATTERN").
10. Bars 3D shall be bent around a 1" diameter pin.
11. For Bearing and Framing Details, see Structures Plans.
12. For Camber and Build-up Details, see Structures Plans.
13. For referenced Dimensions, Angles and Case Numbers see Inverted-T Beam - Table of Beam Variables in Structures Plans.
14. For thickened decks beneath Traffic Railings and Parapets increase Optional Deck Forming Notch to provide the deck thickness shown in the Structures Plans.

INSTRUCTIONS TO DESIGNER:

To limit vertical splitting forces in the webs of beams, the maximum prestress force at beam ends from fully bonded strands is limited to 310 Kips. No losses shall be applied when calculating the Bonded Prestress Force. The reinforcing in the ends of the beams must not be modified without the approval of the State Structures Design Engineer.



EXTERIOR TRAFFIC RAILING

INTERIOR TRAFFIC RAILING

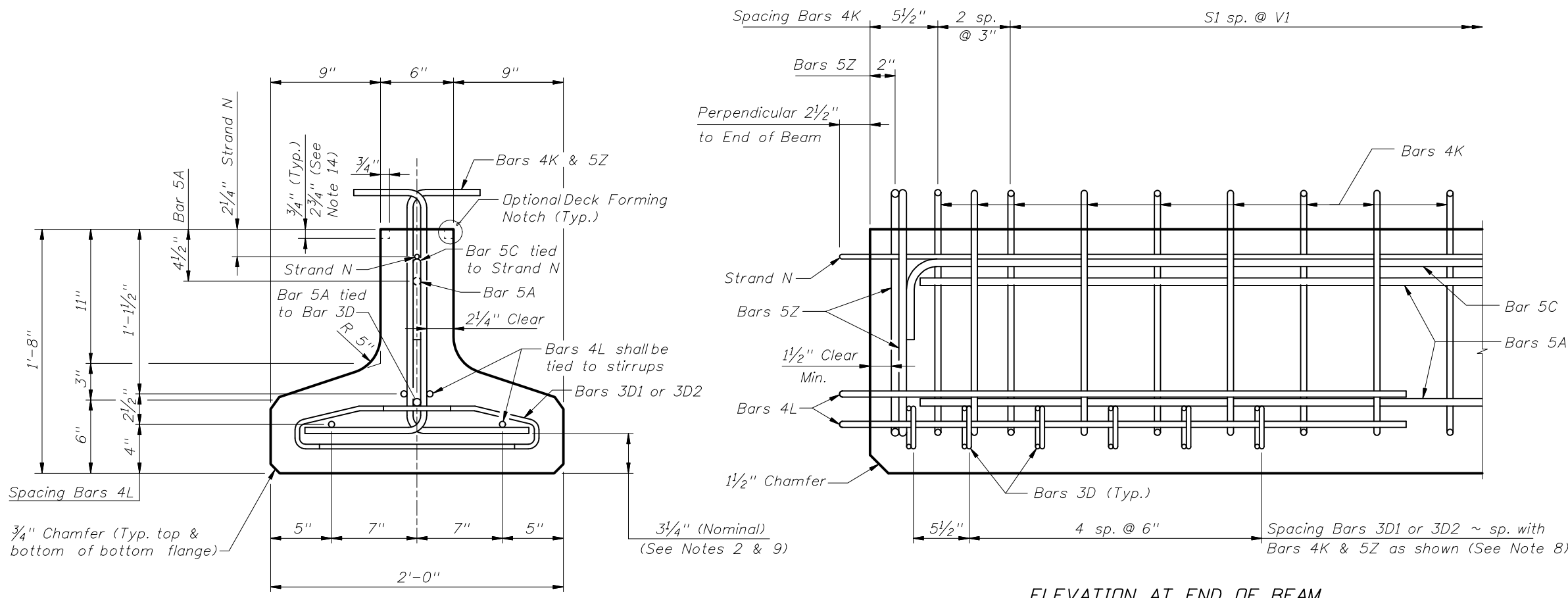
== SCHEMATIC SECTIONS FOR DECK THICKENING BENEATH TRAFFIC RAILINGS ==



2010 FDOT Design Standards

TYPICAL INVERTED-T BEAM DETAILS AND NOTES

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20310	



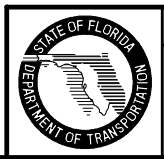
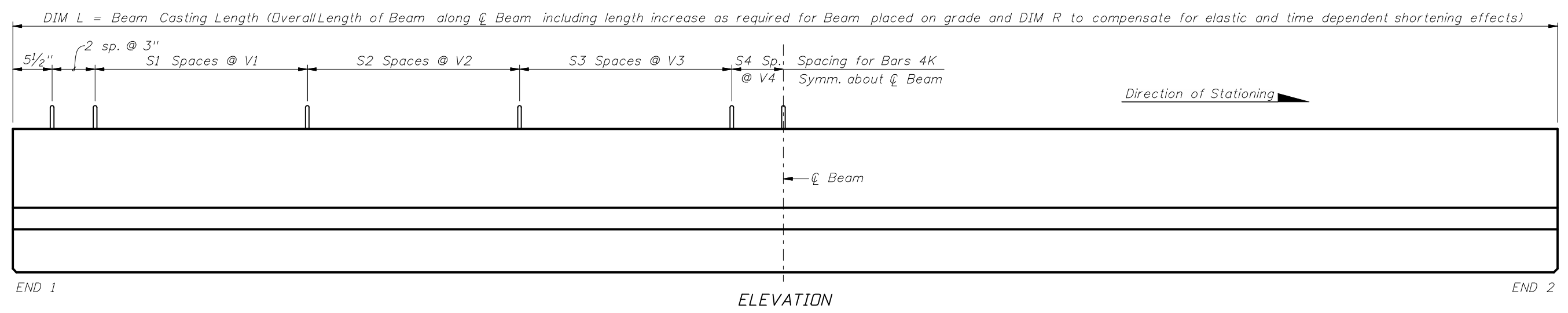
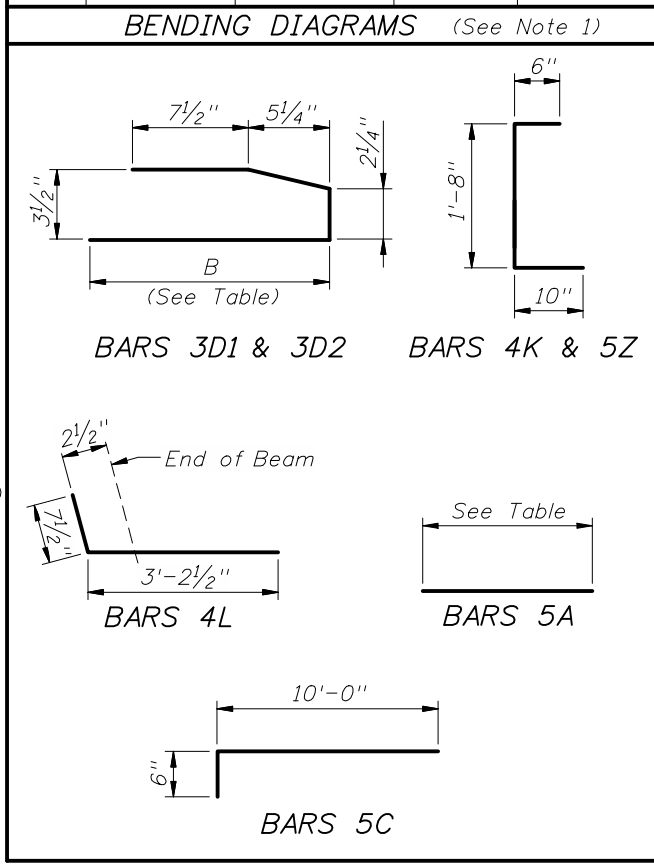
END VIEW

NOTES:
 Work this Index with Index No. 20310 - Typical Inverted-T Beam Details and Notes and the Inverted-T Beam - Table of Beam Variables in Structures Plans.
 For referenced notes, see Index No. 20310.
 For Dimensions L, R, V1 thru V4 and number of spaces S1 thru S4, see Inverted-T Beam Table of Beam Variables.

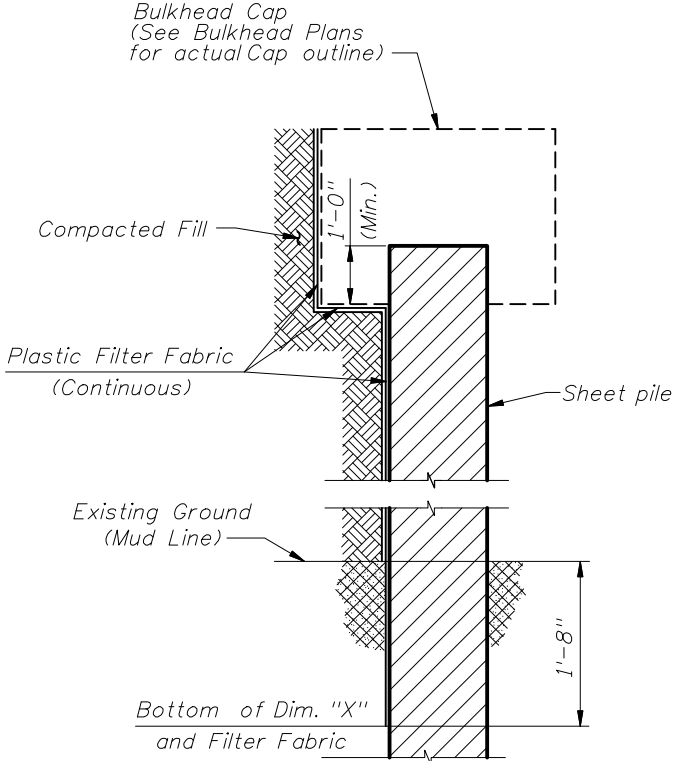
ELEVATION AT END OF BEAM
 (Flange Not Shown For Clarity)

BILL OF REINFORCING STEEL FOR ONE BEAM ONLY

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	4	See Table
C	—	5	2	10'-6"
D1	7, 8 & 10	3	12	See Table
D2	7, 8 & 10	3	12	See Table
K	2, 7, 8 & 9	4	See Table	3'-0"
L	3, 4 & 7	4	8	3'-10"
N	5	3/8" Ø Strand	1	DIM L+5"
Z	2, 8 & 9	5	4	3'-0"

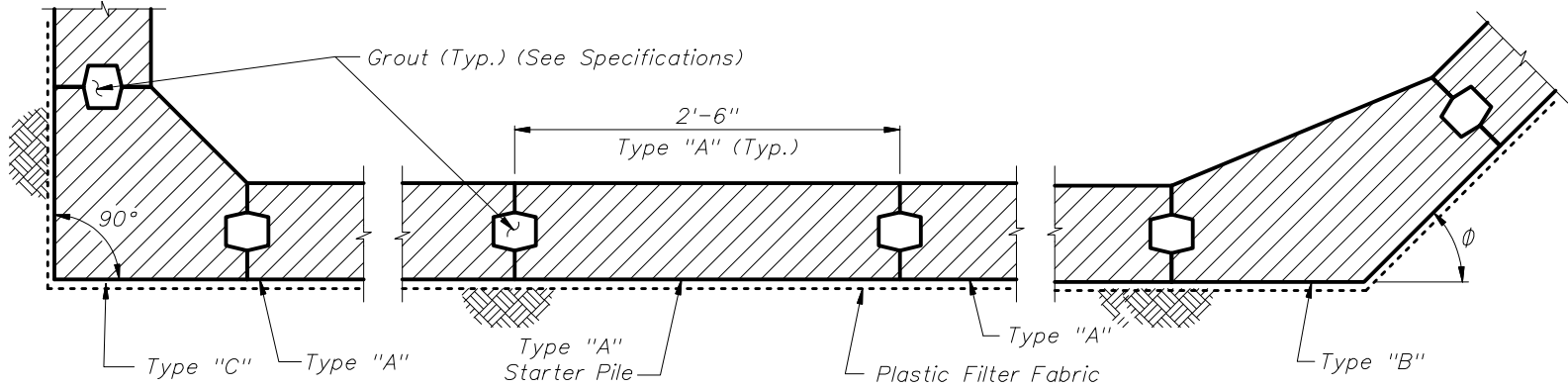


INSTRUCTION TO DESIGNER:
 The bottom of the "X" dimension shall be 1'-8" below the mud line.
 The tip elevation of Concrete Sheet Piles shall be determined by the Geotechnical Engineer.



SECTION THRU BULKHEAD
 (Showing Plastic Filter Fabric)

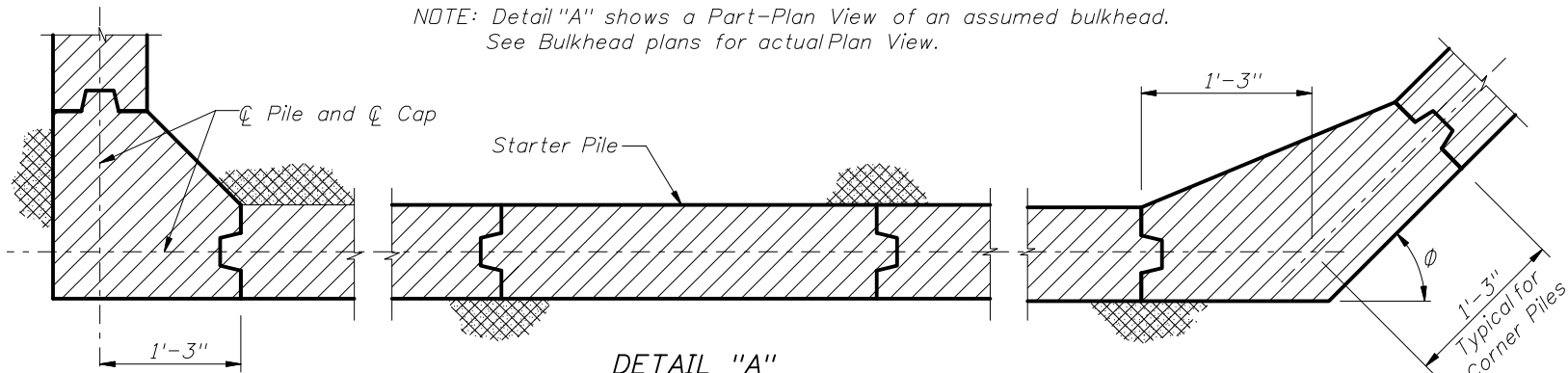
CROSS REFERENCES:
 For Dimensions L and X see Sheet Pile Data Table in Structures Plans.



DETAIL "A"

(Cap and Anchoring System Not Shown)
 (Section Taken Above Dimension "X")

NOTE: Detail "A" shows a Part-Plan View of an assumed bulkhead. See Bulkhead plans for actual Plan View.



DETAIL "A"

(Section Taken Below Dimension "X")

DESCRIPTION:
 Design Standards Index Series No. 20400 include details for three types of piles with two thicknesses. Types "B" and "C" piles (corner piles) are of reinforced concrete construction, and Type "A" is of prestressed concrete construction. The piles shall be manufactured, cured and installed in accordance with the requirements of the contract documents.

MATERIALS: (for materials not listed refer to the Specifications)
CONCRETE
 Class: V (Special) for slightly and moderately aggressive environments
 V (Special w/ Silica Fume) for extremely aggressive environment
 Unit weight: 150 pcf
 Modulus of Elasticity: Based on the use of Florida limerock concrete

REINFORCING STEEL
 Grade: 60,000 psi ASTM A615

PRESTRESSING STEEL
 Grade: 270,000 psi (Low-Relaxation Strand)

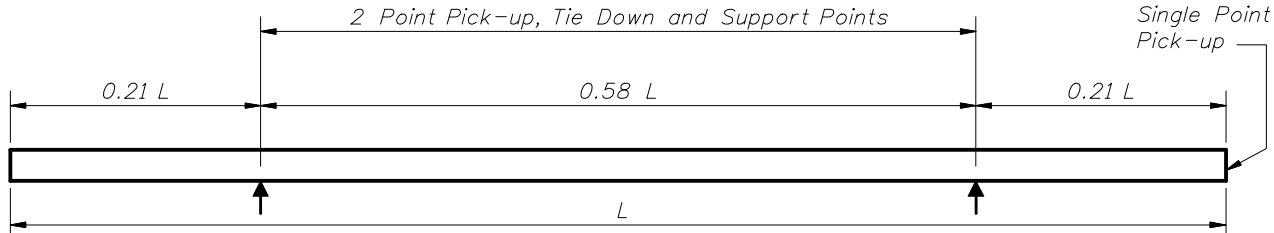
DESIGN PARAMETERS:
 Type "A"
 Concrete Compressive Strength at release of prestressing: 4000 psi minimum
 Uniform compression after prestressing losses: 1000 psi minimum
 Pick-up, Storage and Transportation: 0.0 psi tension with 1.5 times pile self weight
 Types "B" & "C"
 Pick-up, Storage and Transportation: Minimum compressive strength $f'_{ci} \geq 4000$ psi required.

ENVIRONMENT:
 The pile designs are applicable to all Environments.

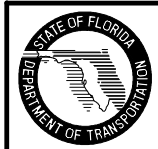
PLASTIC FILTER FABRIC:
 The plastic filter fabric shall extend to the bottom of the "X" dimension.

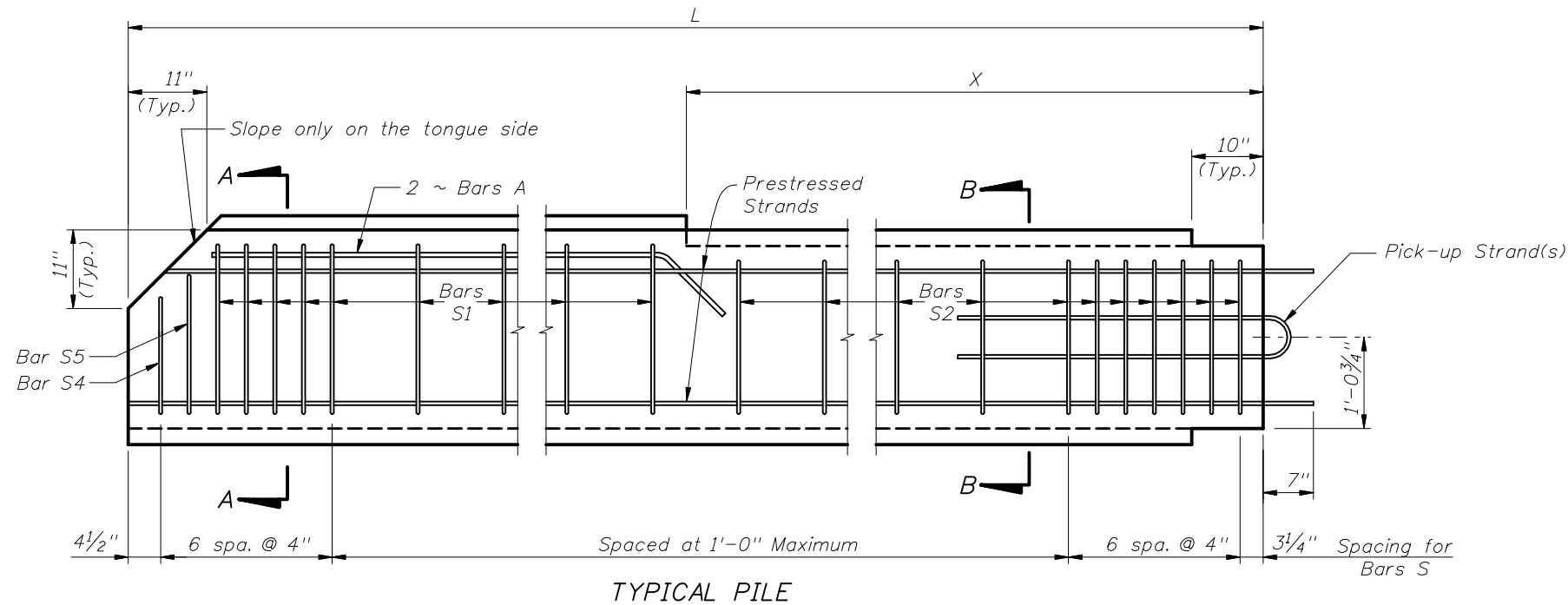
PILE PICK-UP AND HANDLING:
 Type "A"
 Pick-up of pile may be either a single point pick-up or a two point pick-up as shown below.
 Types "B" & "C"
 Two point pick-up for lifting out of forms & two point support for storage & transportation.
 Single point pick-up for installation only.

PILE FIT-UP:
 The 2'-6" Sheet Pile dimension is nominal. This dimension may be shortened by the Manufacturer up to 1/2" to allow for Sheet Pile fit-up in its final position. Minimum Sheet Pile width is 2'-5 1/2". No changes shall be made to the tongues or grooves.

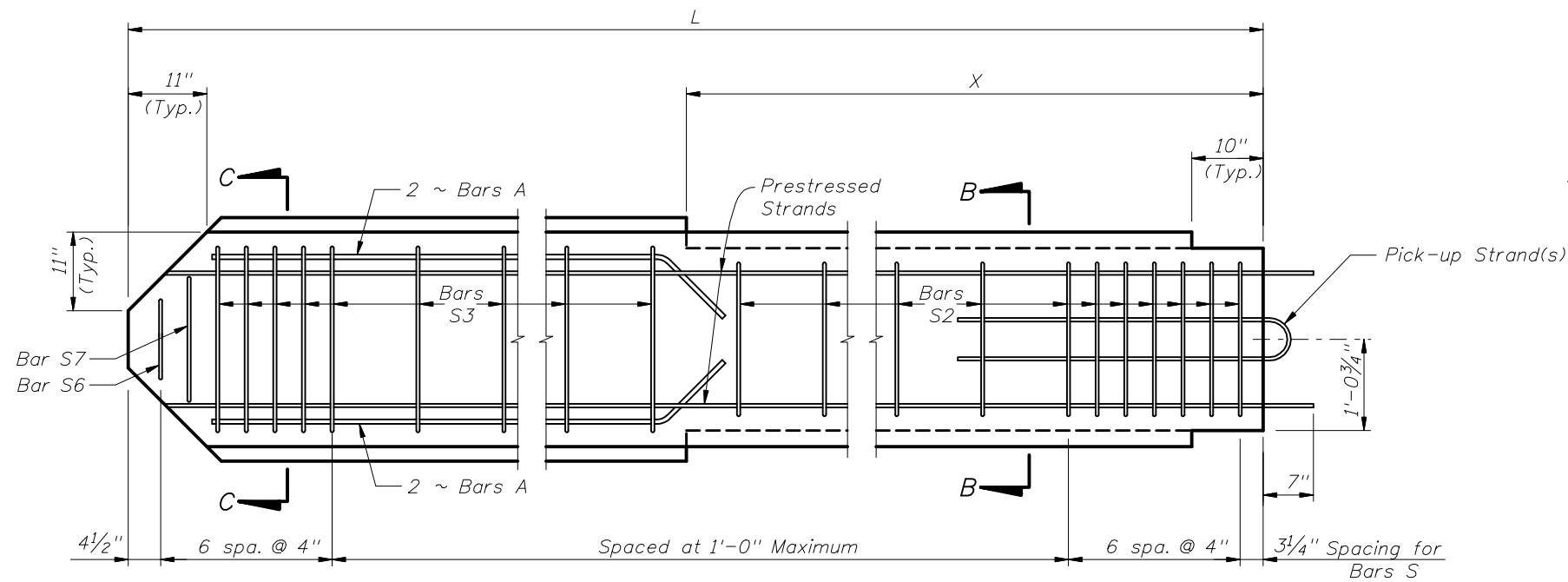


PILE STORAGE AND TRANSPORTATION SUPPORT DETAILS





TYPICAL PILE

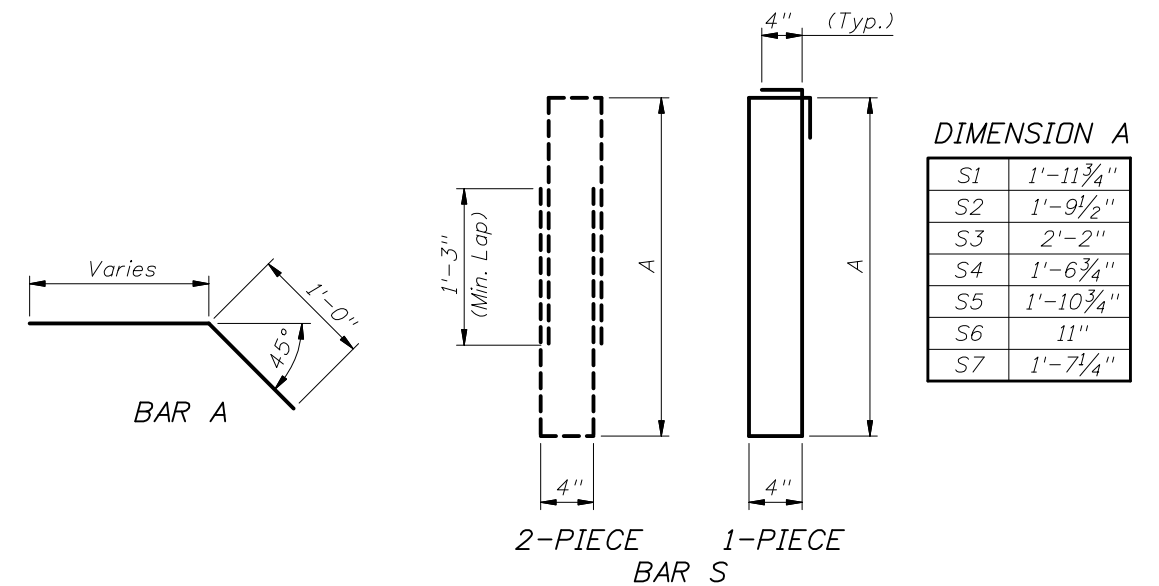


STARTER PILE

STRAND DIA. (in.)	MAXIMUM L	n	D (in.)	TOTAL # OF STRANDS	SECTION MODULUS (in. ³)	*STRESS (PSI)
0.5	28'-0"	6	3 1/4	14	500	1150
0.6	27'-0"	4	5	10	500	1160

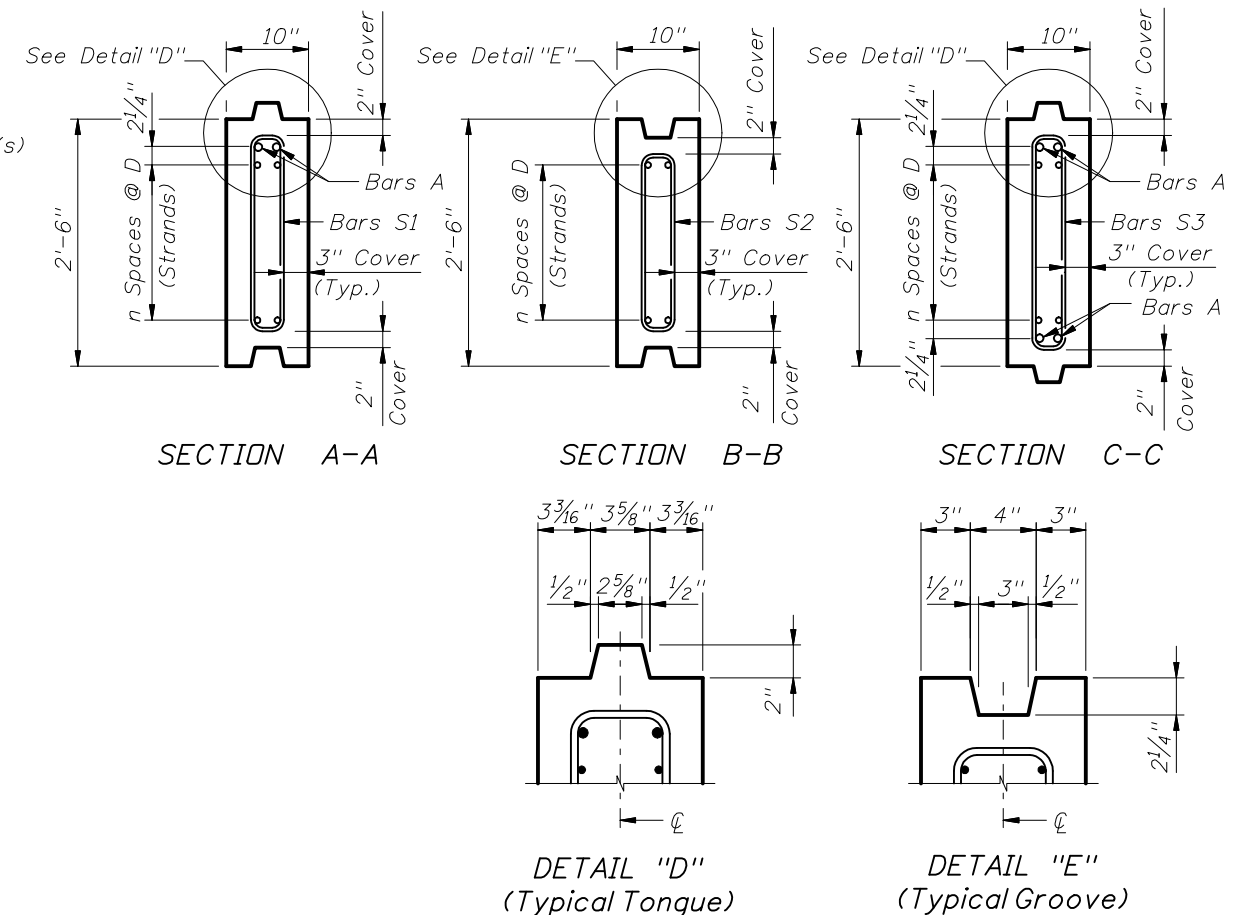
* Unit Prestress after losses.

BAR BENDING DIAGRAMS



NOTES:

1. Work this Standard with Index No. 20400.
2. Intermediate Prestress Strands not shown in Elevations and Sections.
3. All bar dimensions are out-to-out.
4. Bars A are #5 and Bars S are #4.
5. At the Contractor's option Bars S may be fabricated as a two piece bar as shown in the Bar Bending Diagram.
6. The Contractor may use Deformed Welded Wire Reinforcement conforming to specification ASTM A497 in lieu of Bars A and Bars S if the wire size and spacing provide the same area of reinforcing steel per foot as the Bars shown.
7. For Dimensions L and X see Sheet Pile Data Table in Structures Plans.

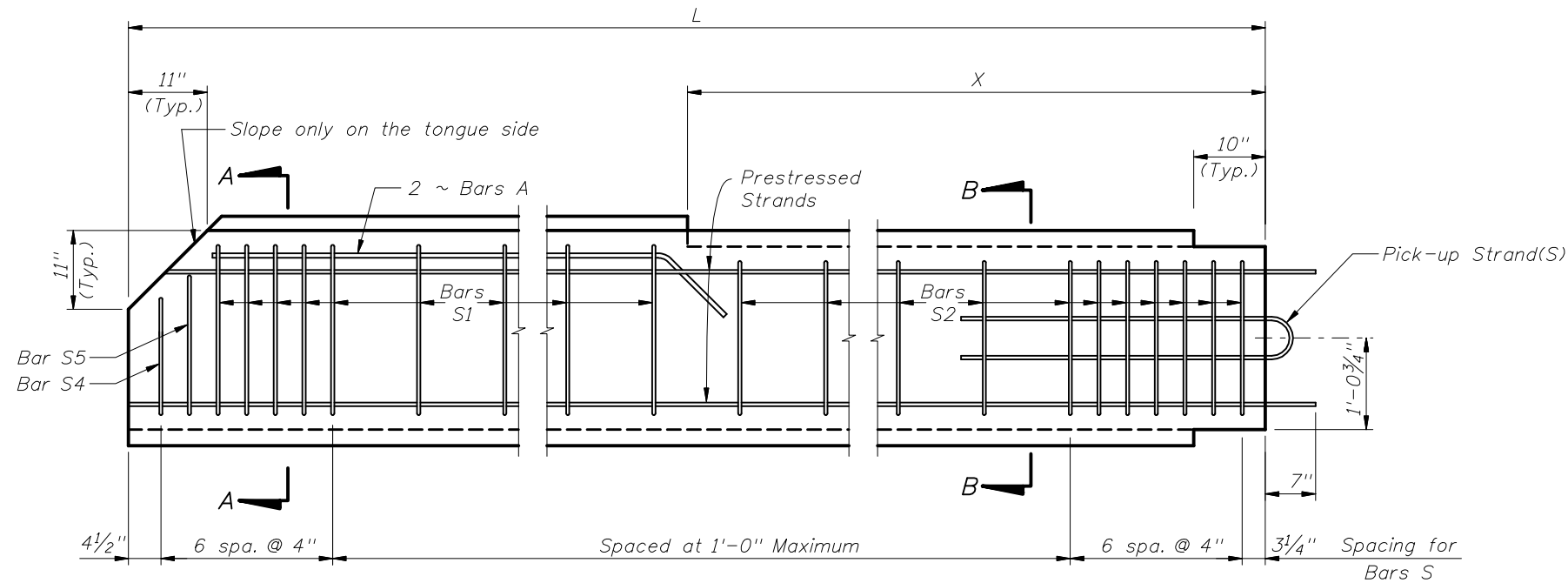


2010 FDOT Design Standards

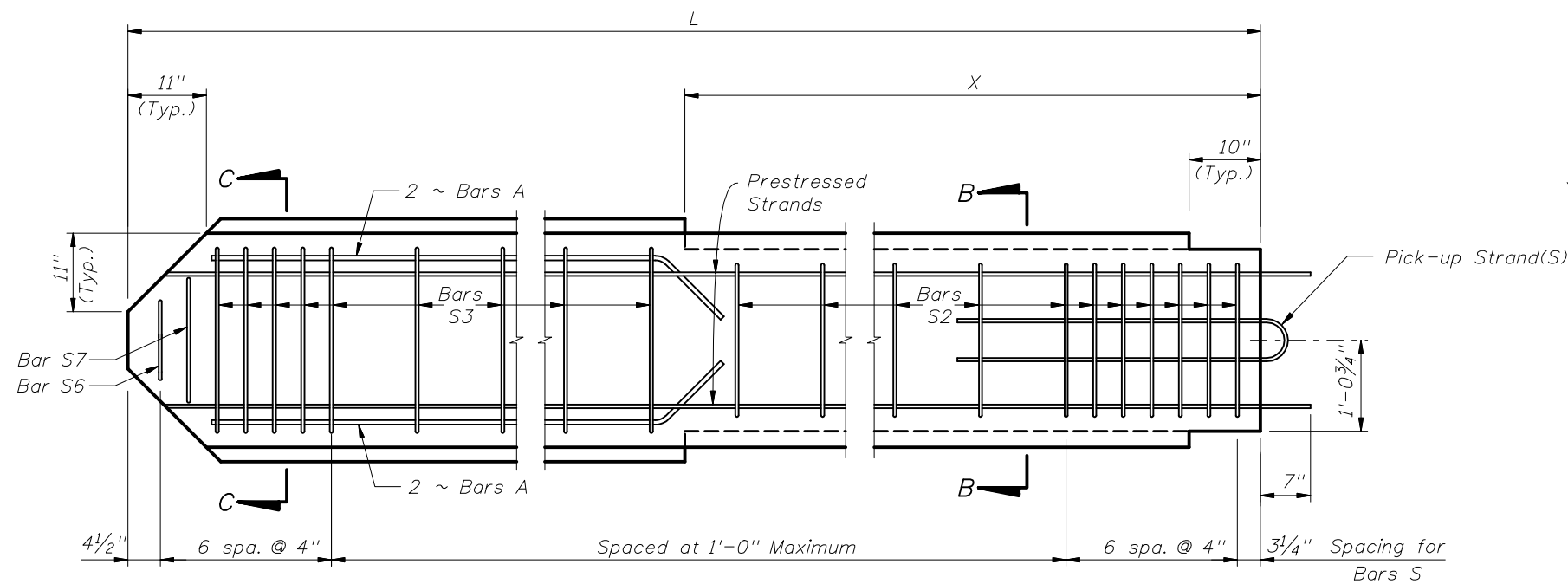
PRECAST CONCRETE SHEET PILE
TYPE "A" - 10 INCH THICK

Last Revision 07/01/07
Sheet No. 1 of 1

Index No. 20410



TYPICAL PILE

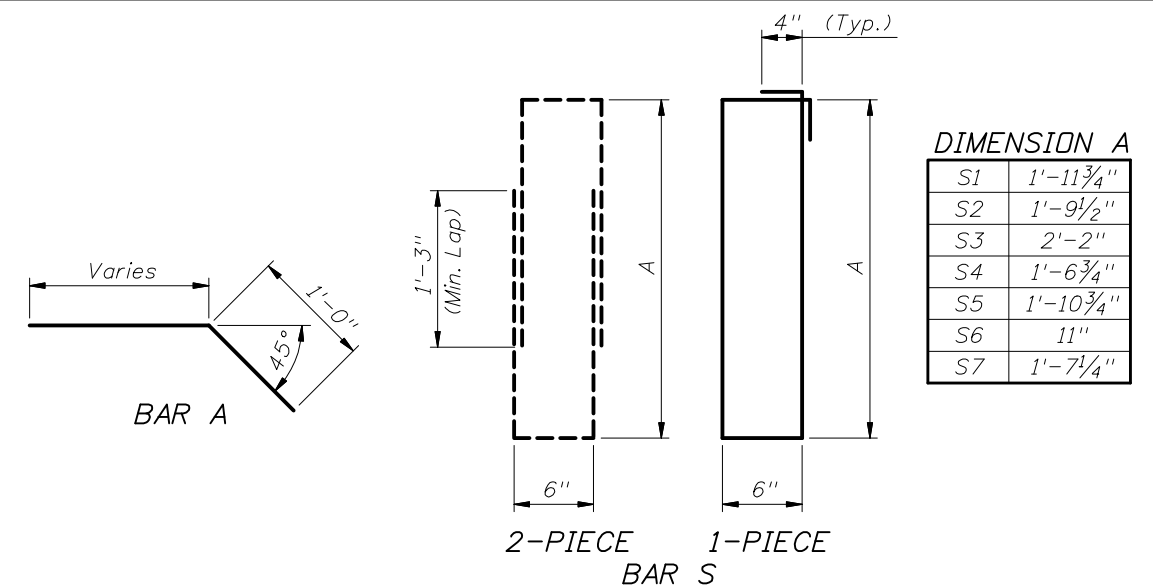


STARTER PILE

STRAND DIA. (in.)	MAXIMUM L	n	D (in.)	TOTAL # OF STRANDS	SECTION MODULUS (in. ³)	* STRESS (PSI)
0.5	31'-0"	7	2 7/8	16	720	1100
0.6	30'-0"	5	4	12	720	1160

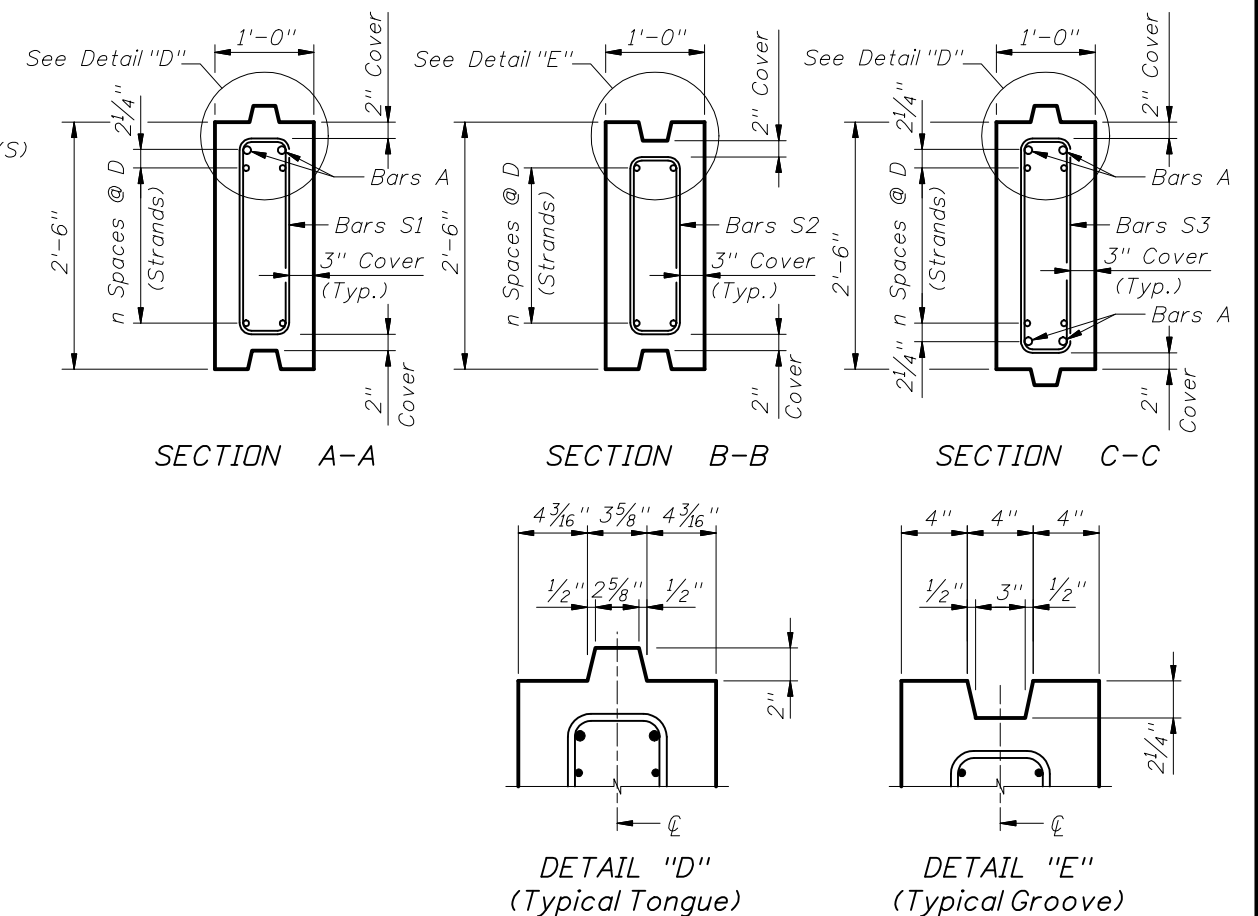
* Unit Prestress after losses.

BAR BENDING DIAGRAMS



NOTES:

1. Work this Standard with Index No. 20400.
2. Intermediate Prestress Strands not shown in Elevations and Sections.
3. All bar dimensions are out-to-out.
4. Bars A are #5 and Bars S are #4.
5. At the Contractor's option Bars S may be fabricated as a two piece bar as shown in the Bar Bending Diagram.
6. The Contractor may use Deformed Welded Wire Reinforcement conforming to specification ASTM A497 in lieu of Bars A and Bars S if the wire size and spacing provide the same area of reinforcing steel per foot as the Bars shown.
7. For Dimensions L and X see Sheet Pile Data Table in Structures Plans.

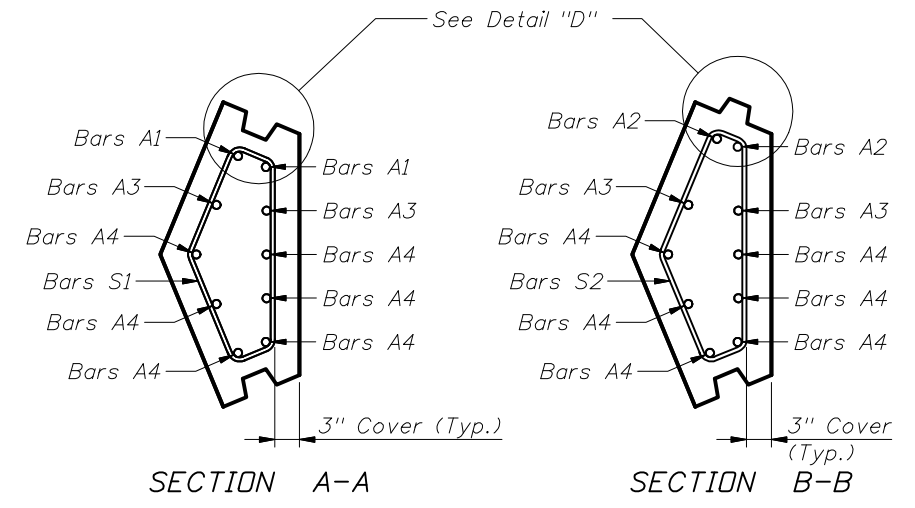
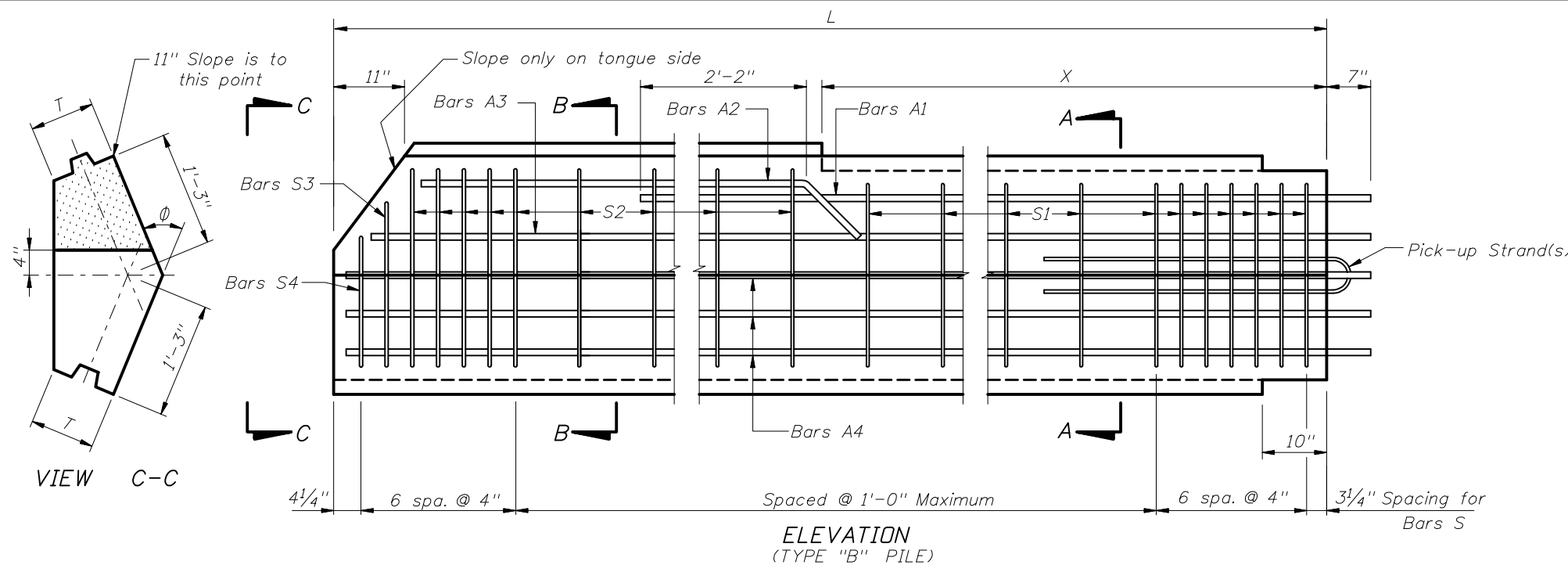


2010 FDOT Design Standards

PRECAST CONCRETE SHEET PILE
TYPE "A" - 12 INCH THICK

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Sheet No. 1 of 1

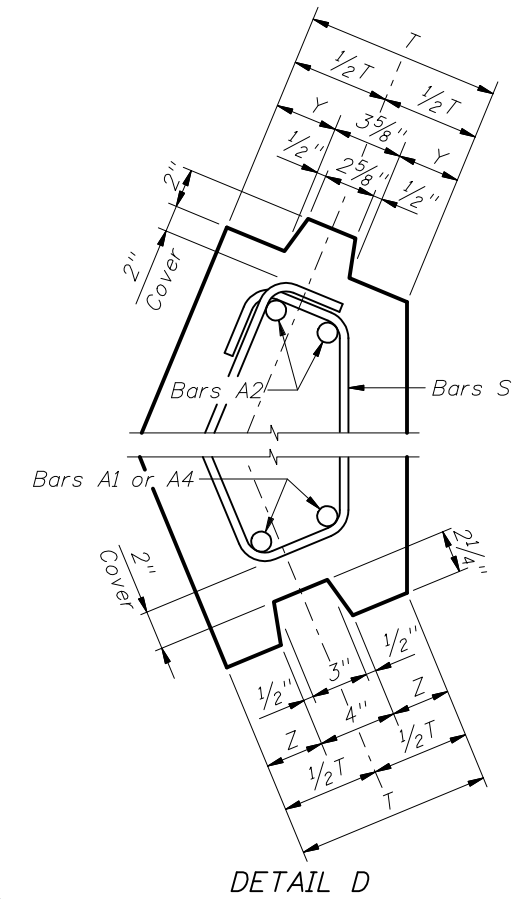
Index No. 20412



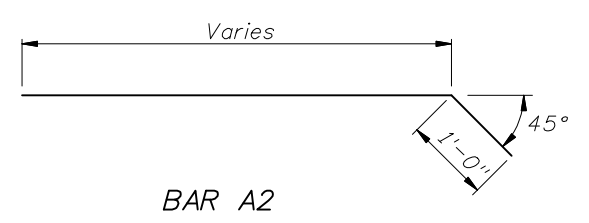
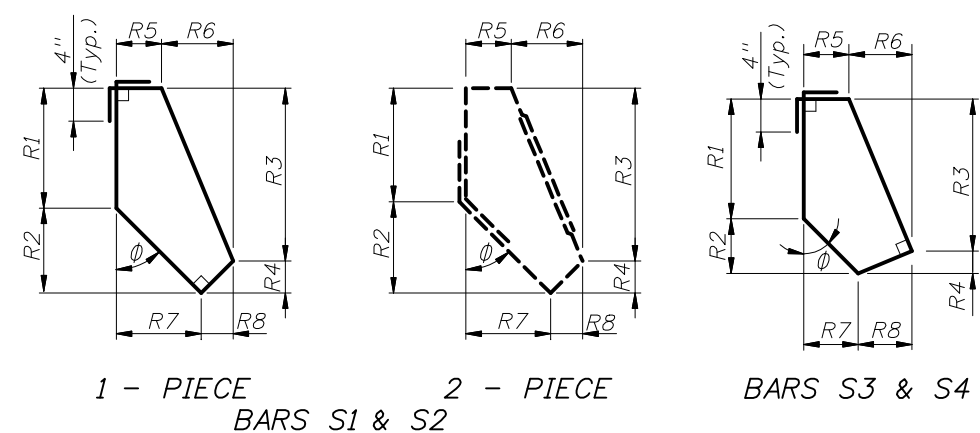
BAR BENDING DIAGRAMS

STIRRUP DIMENSIONS (T = 10")									
Ø	BAR MARK	R1	R2	R3	R4	R5	R6	R7	R8
30°	S1	11 1/4"	9 3/4"	1'-6 1/2"	2 1/2"	5"	4 3/4"	5 1/2"	4 1/4"
	S2	1'-1 1/2"	9 3/4"	1'-8 3/4"	2 1/2"	4 1/2"	5 1/2"	5 3/4"	4 1/4"
	S3	11 1/4"	8"	1'-6"	1 1/4"	5"	4 1/2"	4 1/2"	5"
	S4	11 1/4"	4 1/4"	1'-1 3/4"	1 3/4"	5"	3 3/4"	2 1/2"	6 1/4"
45°	S1	11 1/2"	8"	1'-4"	4"	5 1/2"	6 1/2"	8"	4"
	S2	1'-1 3/4"	8"	1'-5 3/4"	4"	4 1/2"	7 1/2"	8"	4"
	S3	11 1/2"	6 3/4"	1'-4"	2 1/4"	5 1/2"	6 3/4"	6 3/4"	5 1/2"
	S4	11 1/2"	3 1/2"	1'-0"	3"	5 1/2"	5"	3 1/2"	7"
60°	S1	1'-0"	6"	1'-0 3/4"	5 1/4"	6"	7 1/4"	10 1/4"	3"
	S2	1'-2"	6"	1'-2 3/4"	5 1/4"	4 3/4"	8 3/4"	10 1/2"	3"
	S3	1'-0"	4 3/4"	1'-1 1/2"	3 1/4"	6"	8"	8 3/4"	5 1/4"
	S4	1'-0"	2 1/2"	10"	4 1/2"	6"	5 3/4"	4"	7 1/2"

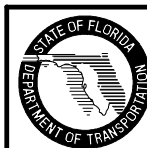
STIRRUP DIMENSIONS (T = 12")									
Ø	BAR MARK	R1	R2	R3	R4	R5	R6	R7	R8
30°	S1	11 1/2"	10"	1'-6"	3 1/2"	7"	4 3/4"	5 3/4"	6"
	S2	1'-1 3/4"	10"	1'-8 1/4"	3 1/2"	6 1/2"	5 1/4"	5 3/4"	6"
	S3	11 1/2"	8 1/4"	1'-5 3/4"	2"	7"	4 3/4"	4 1/2"	7 1/4"
	S4	11 1/2"	4"	1'-1 1/4"	2 1/4"	7"	3 3/4"	2 1/2"	8 1/4"
45°	S1	1'-0"	8 1/2"	1'-3 1/4"	5 1/4"	7 1/2"	6 1/4"	8 1/2"	5 1/4"
	S2	1'-2 1/4"	8 1/2"	1'-5 1/2"	5 1/4"	6 1/2"	7 1/4"	8 1/2"	5 1/4"
	S3	1'-0"	7"	1'-4"	3"	7 1/2"	6 3/4"	7"	7 1/4"
	S4	1'-0"	3 1/2"	11 3/4"	3 3/4"	7 1/2"	5"	3 1/2"	9"
60°	S1	1'-0 1/2"	6 1/4"	11 3/4"	7"	8"	6 3/4"	10 3/4"	4"
	S2	1'-2 3/4"	6 1/4"	1'-2"	7"	6 3/4"	8"	10 3/4"	4"
	S3	1'-0 1/2"	5"	1'-1 1/2"	4"	8"	8"	9"	7"
	S4	1'-0 1/2"	2 1/2"	9 1/2"	5 1/2"	8"	5 1/2"	4 1/4"	9 1/4"

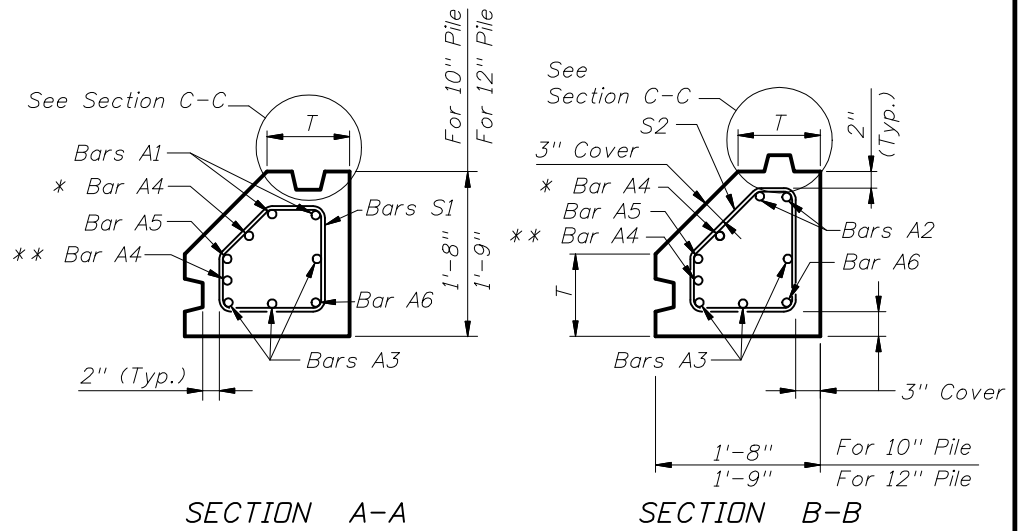
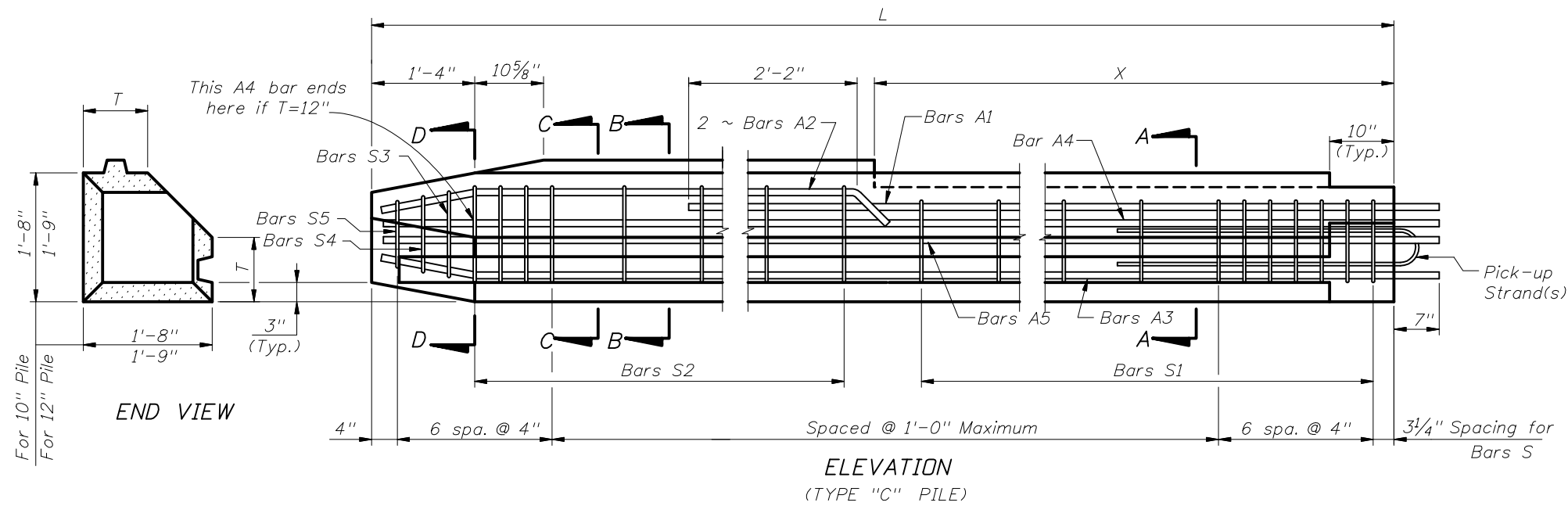


SHEET PILE DIMENSIONS		
T (in.)	10	12
Y (in.)	3 3/16	4 3/16
Z (in.)	3	4



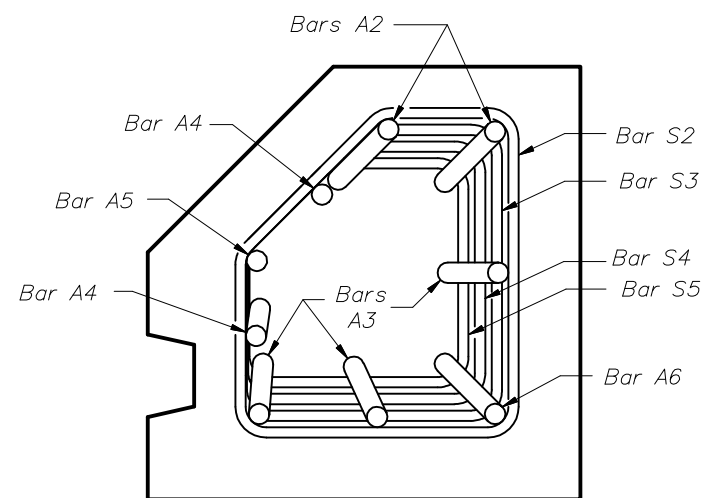
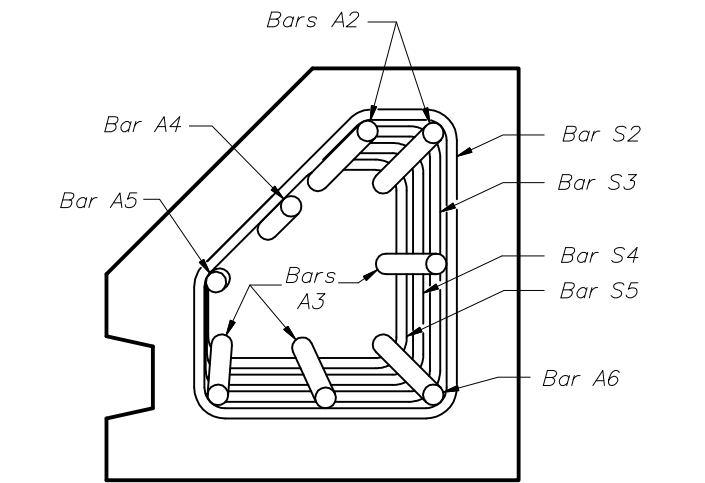
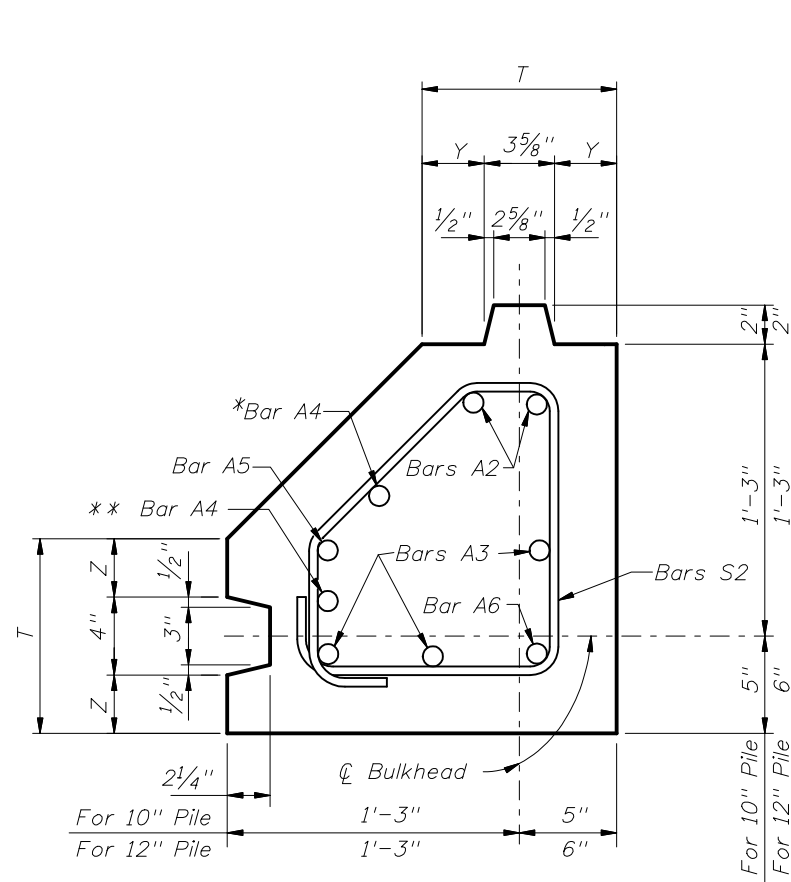
- NOTES:**
1. Work this standard with Index No. 20400.
 2. This drawing includes details for precast concrete corner piles for 10" and 12" thick sheet pile systems. The details apply equally to both thicknesses.
 3. The bar configurations shown in Sections A-A and B-B shall be used for Ø angles between 15° and 75°. For Ø angles not shown, the reinforcing bar dimensions may be interpolated or extrapolated from the stirrup dimensions shown.
 4. All bar dimensions are out-to-out.
 5. Bars A are #8 and Bars S are #4.
 6. Values for Stirrup Dimensions are shown for Ø equal to 30°, 45° & 60° only.
 7. At the Contractor's option Bars S may be fabricated as a 2 piece bar with a minimum lap length of 1'-6", as shown in Bar Bending Diagrams.
 8. If Type "B" pile is used as a Starter Pile show tongue on both sides of pile from Dim. "X" down. Show dimensions for Bars S2, S3 & S4 in shop drawings.
 9. If tongue must be on the opposite side from that shown all dimensions and Bars A, S2, S3 and S4 will be the same but opposite hand.
 10. For Dimensions L, X and Ø Angle see Sheet Pile Data Table in Structures Plans.





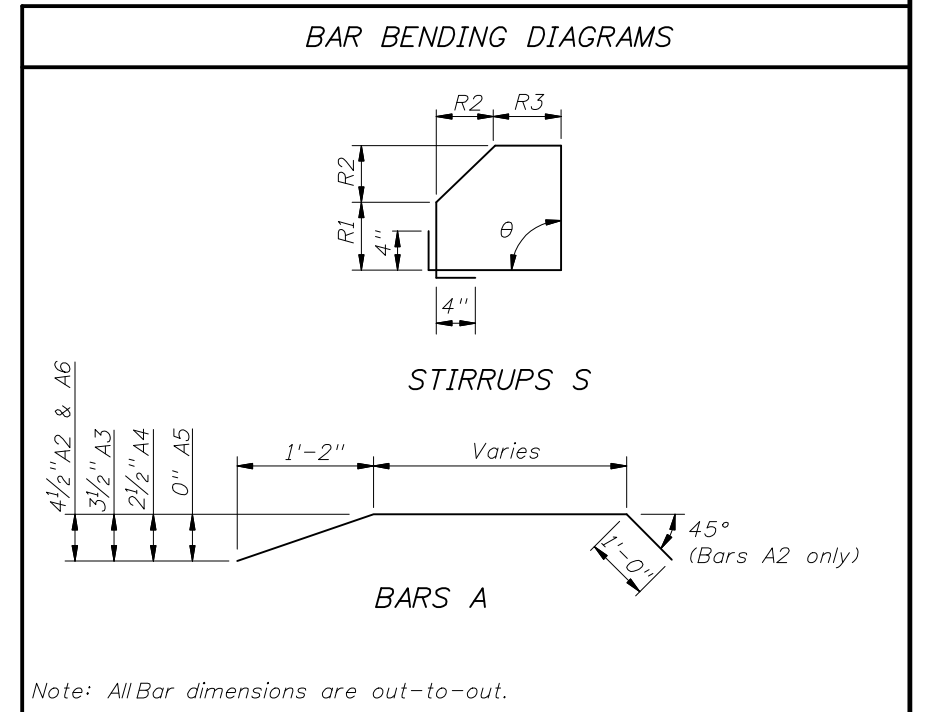
* This Bar A4 shall be 1'-2" shorter than other A4 bars for $T = 12"$.

** This Bar A4 (not shown in elevation) is included only if $T = 12"$.

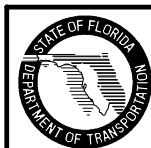


STIRRUP DIMENSIONS					
θ	T (in.)	BAR MARK	R1	R2	R3
90°	10	S1	7"	$5\frac{3}{4}"$	7"
		S2	7"	8"	$4\frac{3}{4}"$
		S3	$6\frac{1}{4}"$	$7\frac{1}{4}"$	$4\frac{3}{4}"$
		S4	$5\frac{1}{2}"$	$6\frac{1}{2}"$	$4\frac{3}{4}"$
		S5	$4\frac{3}{4}"$	$5\frac{3}{4}"$	$4\frac{3}{4}"$
90°	12	S1	9"	$4\frac{3}{4}"$	9"
		S2	9"	7"	$6\frac{3}{4}"$
		S3	$8\frac{1}{4}"$	$6\frac{1}{4}"$	$6\frac{3}{4}"$
		S4	$7\frac{1}{2}"$	$5\frac{1}{2}"$	$6\frac{3}{4}"$
		S5	$6\frac{3}{4}"$	$4\frac{3}{4}"$	$6\frac{3}{4}"$

SHEET PILE DIMENSIONS		
T (in.)	10	12
Y (in.)	$3\frac{3}{16}$	$4\frac{3}{16}$
Z (in.)	3	4



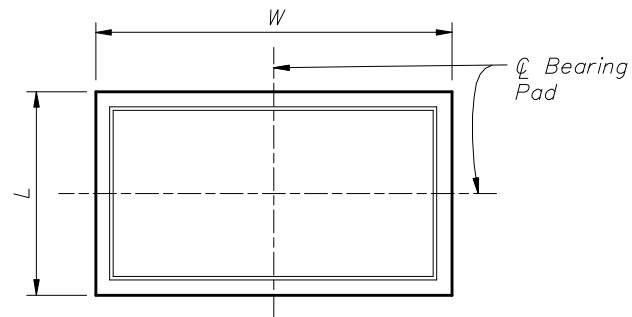
- NOTES:**
1. Work this standard with Index No. 20400.
 2. All bar dimensions are out-to-out.
 3. Bars A are #8 and Bars S are #4.
 4. This drawing includes information for precast Corner Piles for 10" and 12" thick Sheet Pile systems. The details apply to both thicknesses but the bar configurations change slightly according to the thickness values used.
 5. If Type "C" pile is used as a Starter Pile show tongue on both sides of pile from Dim. "X" down. Show dimensions for Bars S2, S3, S4 & S5 in shop drawings.
 6. If tongue must be on opposite side (Groove Side) from that shown, all dimensions and reinforcement shall follow the corresponding Tongue or Groove side.
 7. For Dimensions L and X see Sheet Pile Data Table in Structures Plans.



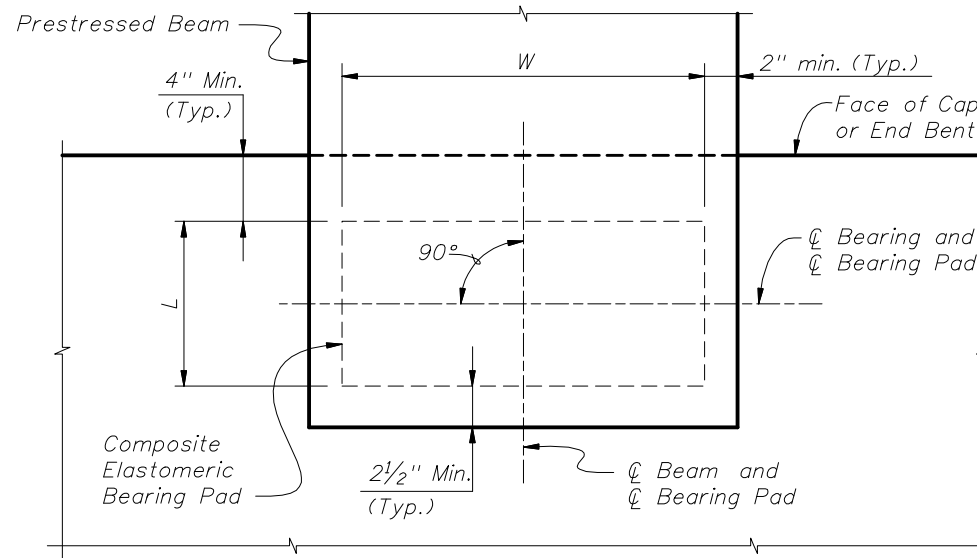
2010 FDOT Design Standards

**PRECAST CONCRETE SHEET PILE
TYPE "C" - RIGHT ANGLE CORNER PILE**

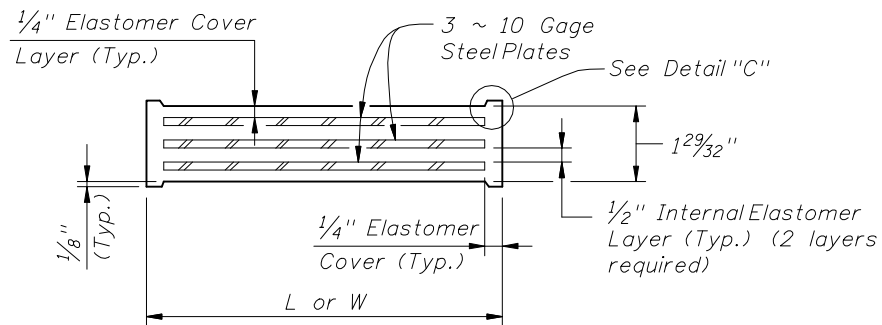
Last Revision: 07/01/07
Sheet No. 1 of 1
Index No. 20440



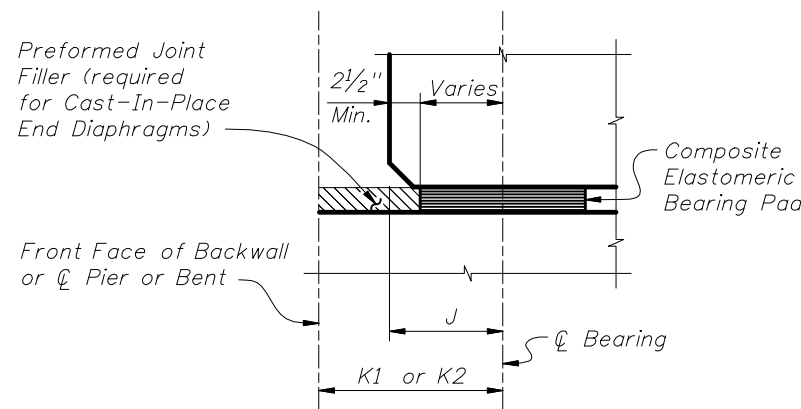
PLAN



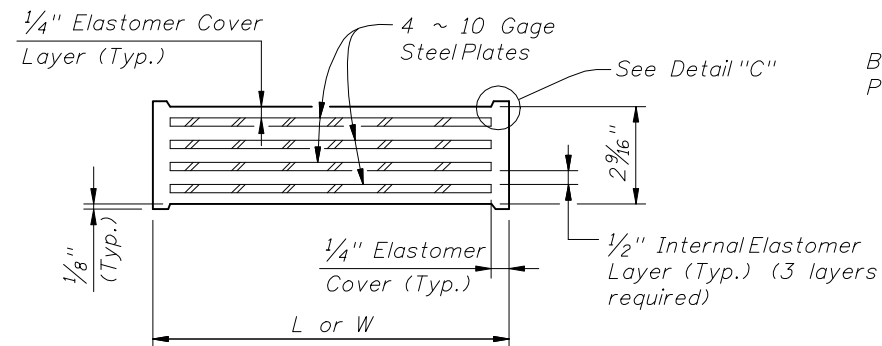
PARTIAL PLAN (Skew = 0°)



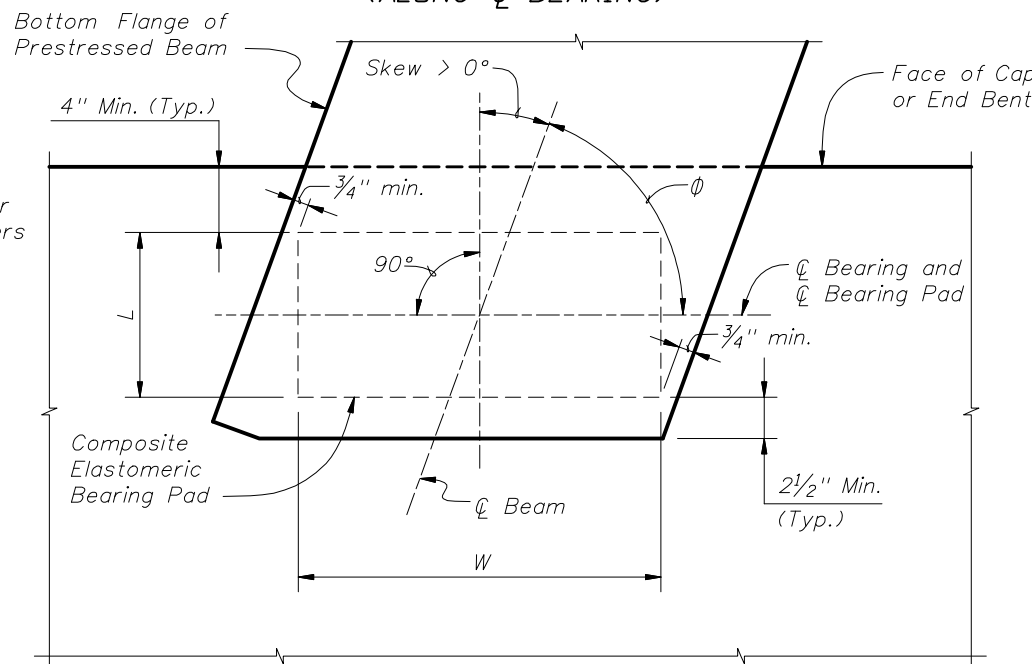
TYPICAL SECTION TYPE A PAD



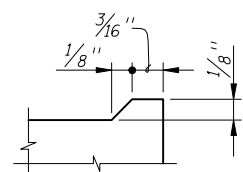
PARTIAL SIDE ELEVATION (ALONG CL BEARING)



TYPICAL SECTION TYPE B AND TYPE C PAD



PARTIAL PLAN (Skew > 0°)



DETAIL "C"

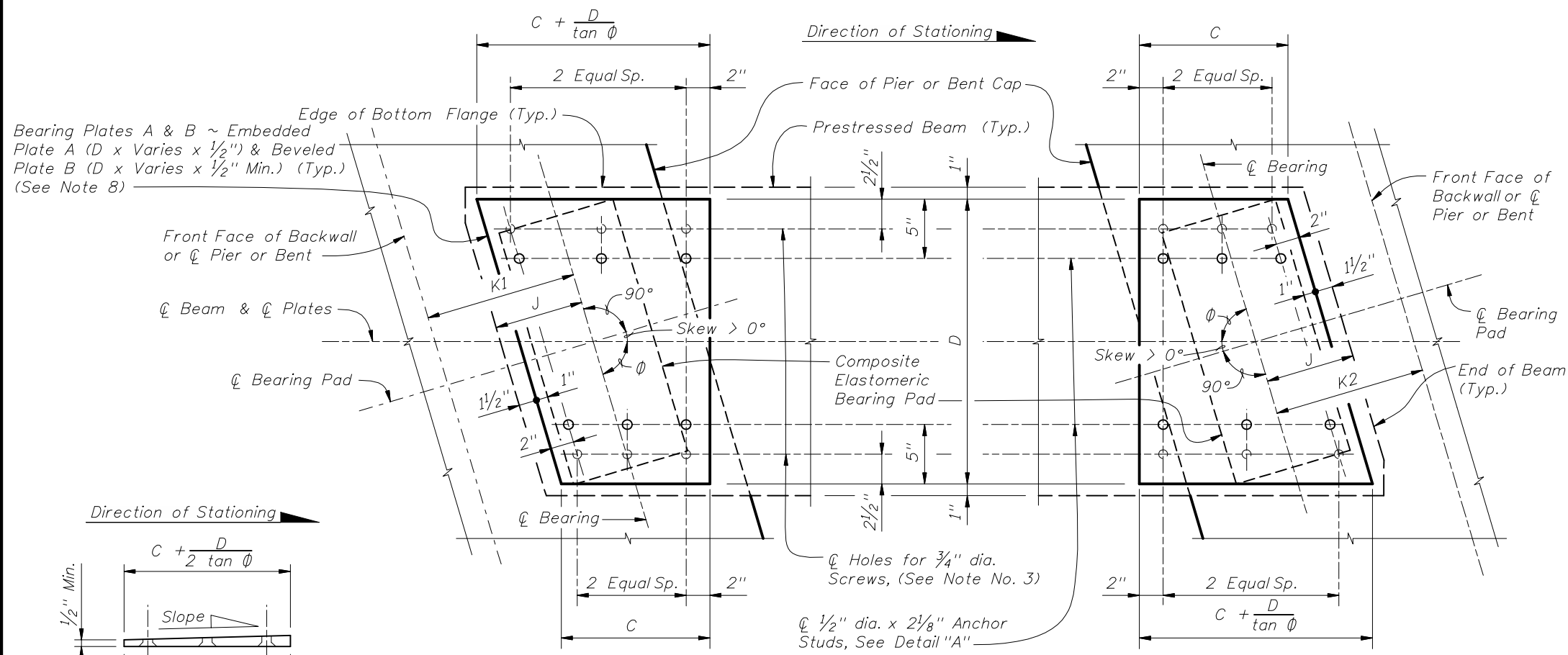
PAD TYPE (See Note 1)	BEAM TYPE	BEARING PAD DIMENSIONS		*BEARING PLATE DIMENSIONS	
		L	W	C	D
A (G=110psi)	II (AASHTO)	1'-0"	1'-2"	1'-2"	1'-4"
	III (AASHTO)	10"	1'-6"	1'-0"	1'-8"
	IV AASHTO)	10"	1'-10"	1'-0"	2'-0"
	V & VI (AASHTO) & FLORIDA BULB-T 78	11"	2'-0"	1'-1"	2'-2"
	FLORIDA BULB-T 72			1'-1"	2'-4"
B (G=110psi)	II (AASHTO)	1'-4"	1'-2"	1'-6"	1'-4"
	III (AASHTO)	1'-2"	1'-6"	1'-4"	1'-8"
	IV AASHTO)	1'-0"	1'-10"	1'-2"	2'-0"
	V & VI (AASHTO) & FLORIDA BULB-T 78	1'-2"	2'-0"	1'-4"	2'-2"
	FLORIDA BULB-T 72			1'-4"	2'-4"
C (G=150psi)	II (AASHTO)	1'-0"	1'-0"	1'-2"	1'-4"
	III (AASHTO)	1'-0"	1'-4"	1'-2"	1'-8"
	IV AASHTO)	10"	1'-9"	1'-0"	2'-0"
	V & VI (AASHTO) & FLORIDA BULB-T 78	1'-0"	1'-11"	1'-2"	2'-2"
	FLORIDA BULB-T 72			1'-2"	2'-4"

* Work this sheet with Index No. 20501 - Bearing Plate Details when beveled or embedded bearing pads are required. See 'TABLE OF BEAM VARIABLES' on Beam Sheets for locations where bearing plates are required.

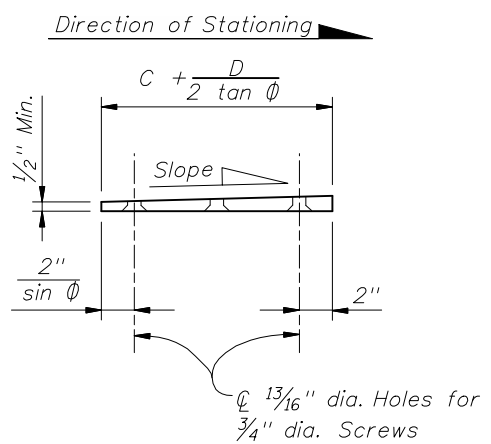
BEARING PAD NOTES:

1. Neoprene in Type A or B bearing pads shall have a shear modulus (G) of 110 psi. Neoprene in Type C bearing pads shall have a shear modulus (G) of 150 psi.
2. Steel Plates in bearing pads shall conform to ASTM A1011 Grade 36, Type 1.
3. Variations in pad dimensions will be allowed provided the revised pads meet the Specifications, meet the requirements of this index, and are approved by the Engineer.
4. For beam grades less than or equal to 2% finish the Beam Seat parallel to the bottom of the beam. For beam grades greater than 2% finish the Beam Seat level and provide Beveled Bearing Plates.
5. See Bid Item Notes for quantities of Type A, B, and/or C Bearing Pads.



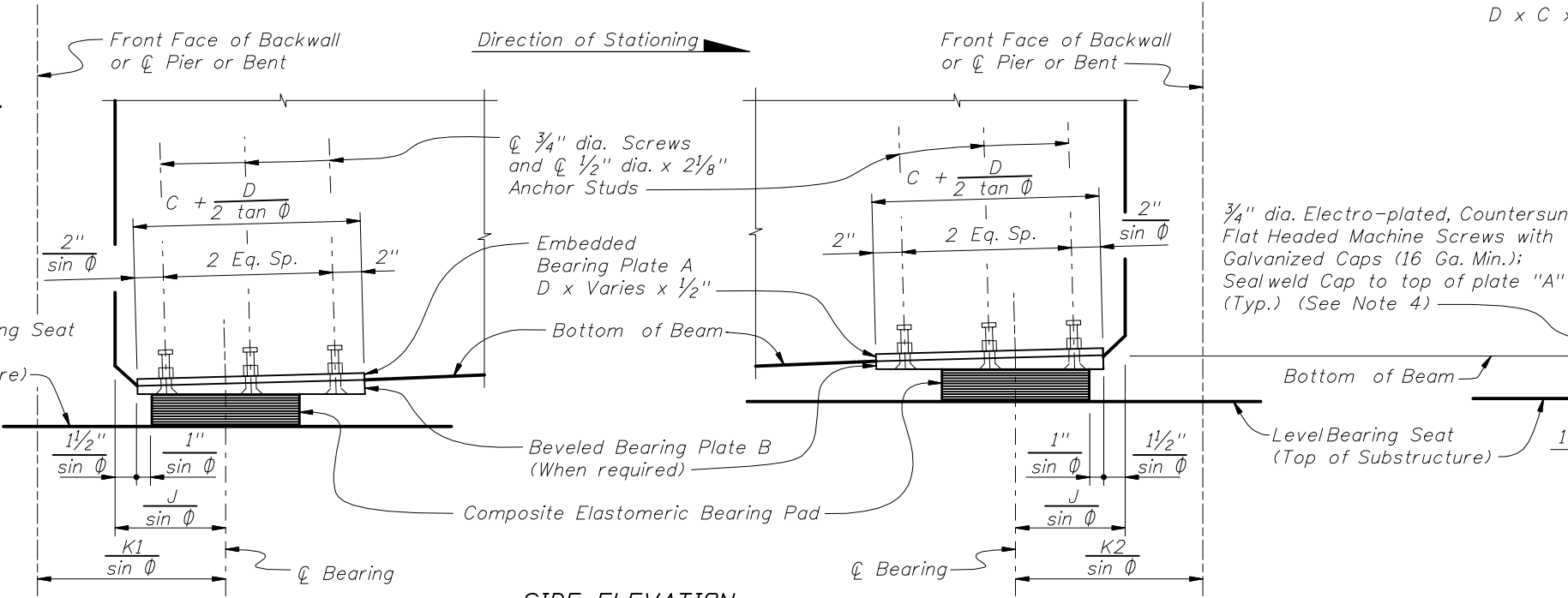


PLAN
(0° < Skew ≤ 30° shown, Skew = 0° Similar)

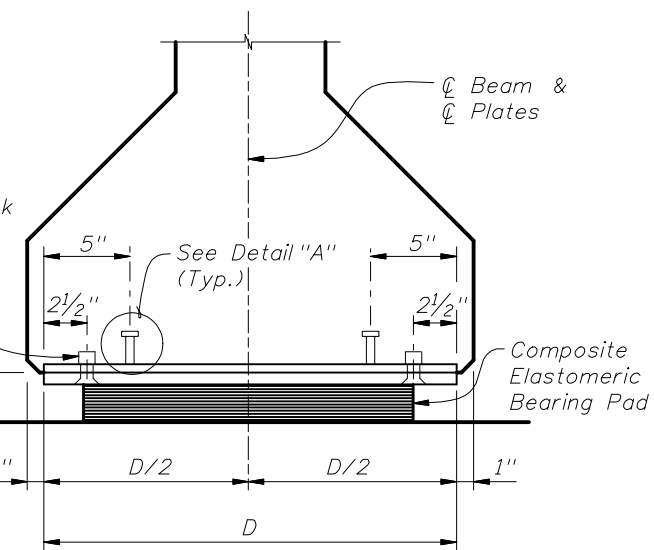


- NOTES:
1. Work this sheet with the following drawings:
Index No. 20500 - Composite Elastomeric Bearing Pads.
 2. Embedded Bearing Plates A are required for all AASHTO Type V, VI and Florida Bulb-T beams. Beveled Bearing Plates B with Embedded Bearing Plates A are required for beams only as scheduled in the 'TABLE OF BEAM VARIABLES' on Beam Sheets.
 3. Hot-dip galvanized Bearing Plates A & B after fabrication except that Galvanized Caps may be welded in place after hot-dip galvanizing. Drill Bearing Plates A and B as an assembled unit, thread Bearing Plate A only. Holes are not required in Plate A when Plate B is not required. Drill and thread holes perpendicular to the bottom of Plate B and prior to plates being galvanized (ASTM A 123).
 4. Provide Electroplated, Flat Countersunk Head Cap Screws in accordance with ASTM F 835. Electroplating shall be ASTM B 633, SC 2, Type 1. Provide screws long enough to maintain a 3/4" minimum embedment into Embedded Bearing Plate A and Galvanized Cap. Provide steel Galvanized Caps with 1/2" min. to 1 1/2" max. height and nominal 1" inside diameter.
 5. Include the cost of Beveled Bearing Plates in the pay item for Prestressed Concrete Beams.
 6. For Dimensions C and D, see 'BEARING PLATE DIMENSIONS' on Index No. 20500 and the 'BEVELED BEARING PLATE DATA TABLE' in the Structures Plans. For Dimensions J, K1 and K2, see 'TABLE OF BEAM VARIABLES' on Beam Sheets.
 7. All details and dimensions shown are along ϕ Beam, except for dimensions to 3/4" dia. Screws and 1/2" dia. x 2 1/8" Anchor Studs, which are along ϕ Screws or ϕ Anchor Studs. Positive Slope shown, Negative Slope similar.
 8. When Skew = 0°, dimensions for Embedded Bearing Plate A are D x C x 1/2" and for Beveled Plate B are D x C x 1/2" Min.

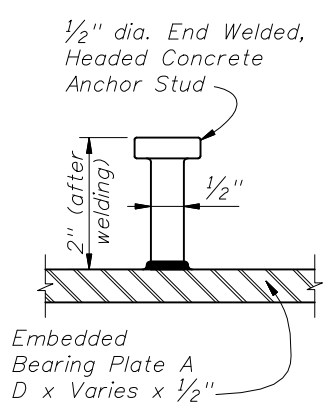
BEVELED BEARING PLATE B
(Along ϕ Beam)
(Positive Slope, Begin Bearing shown;
Negative Slope, End Bearing similar)



SIDE ELEVATION
(Along ϕ Beam) (See Note 7)

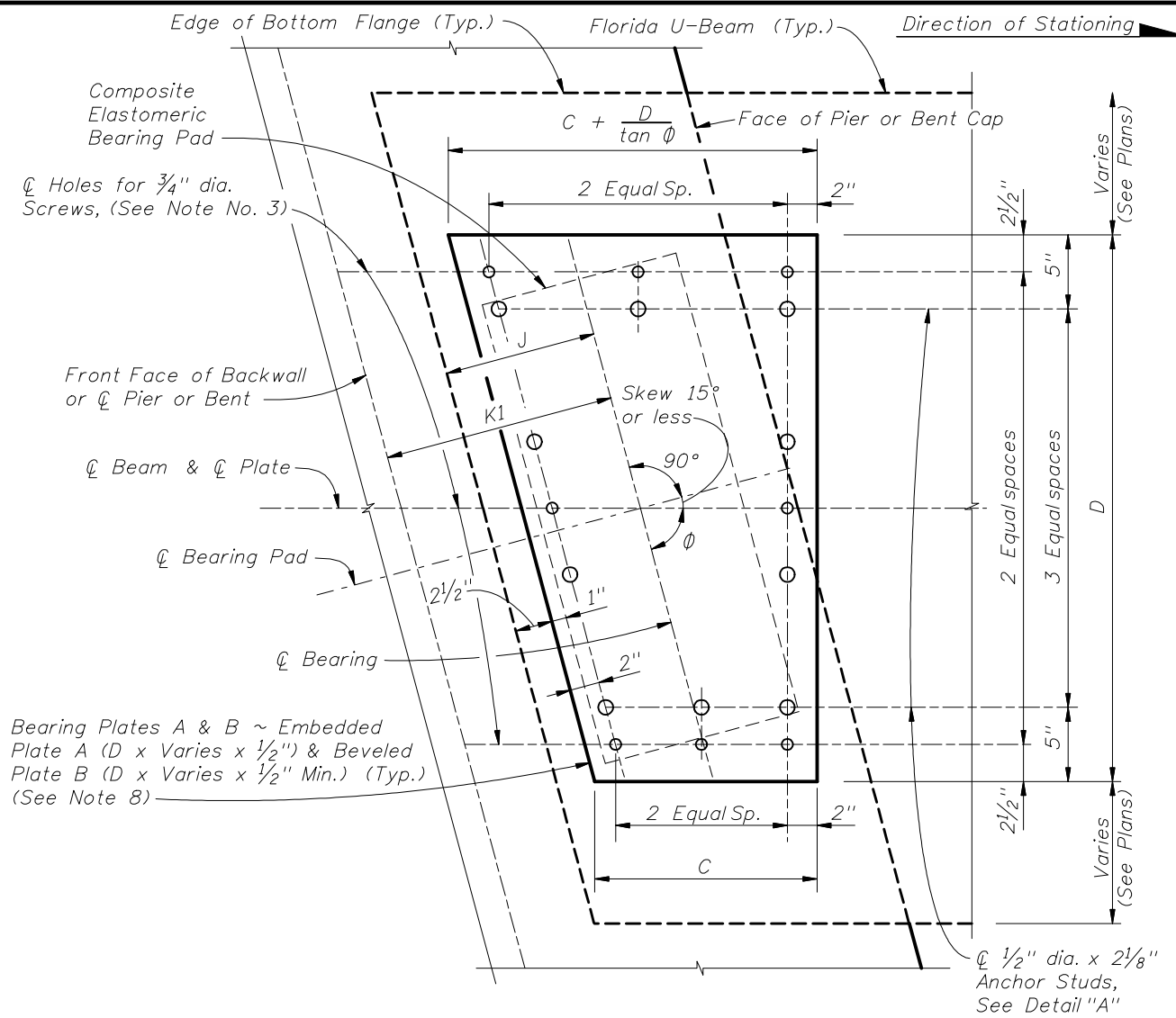


END ELEVATION

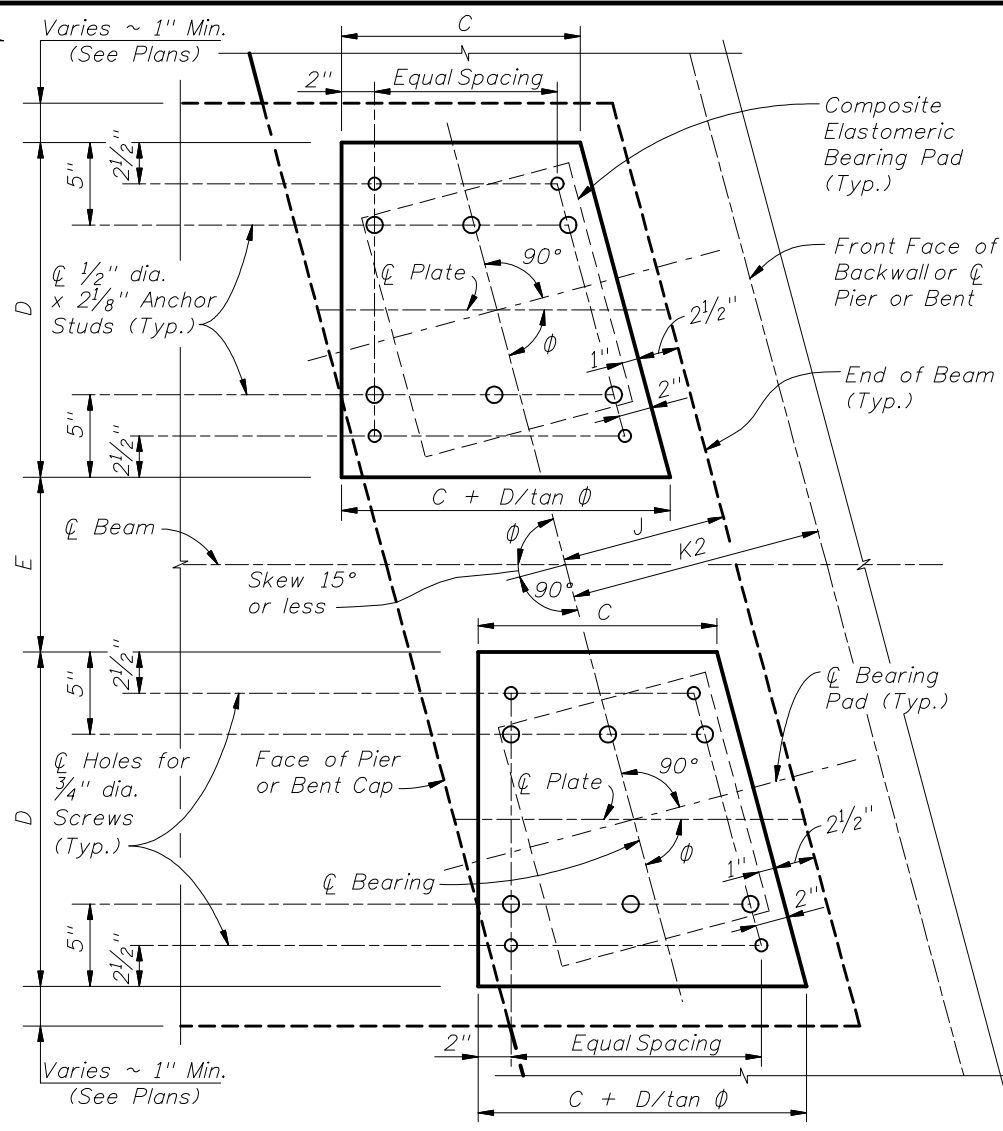


DETAIL "A"





PLAN VIEW OF TYPICAL SINGLE BEARING

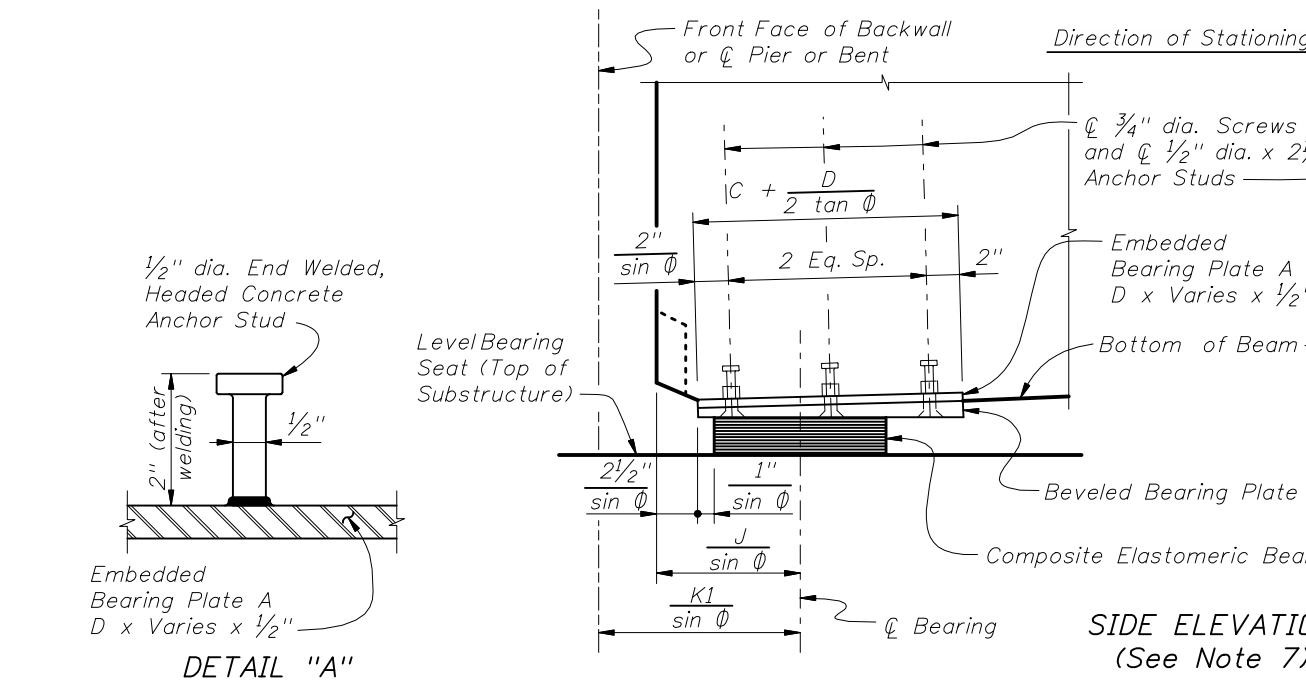


PLAN VIEW OF TYPICAL DOUBLE BEARING

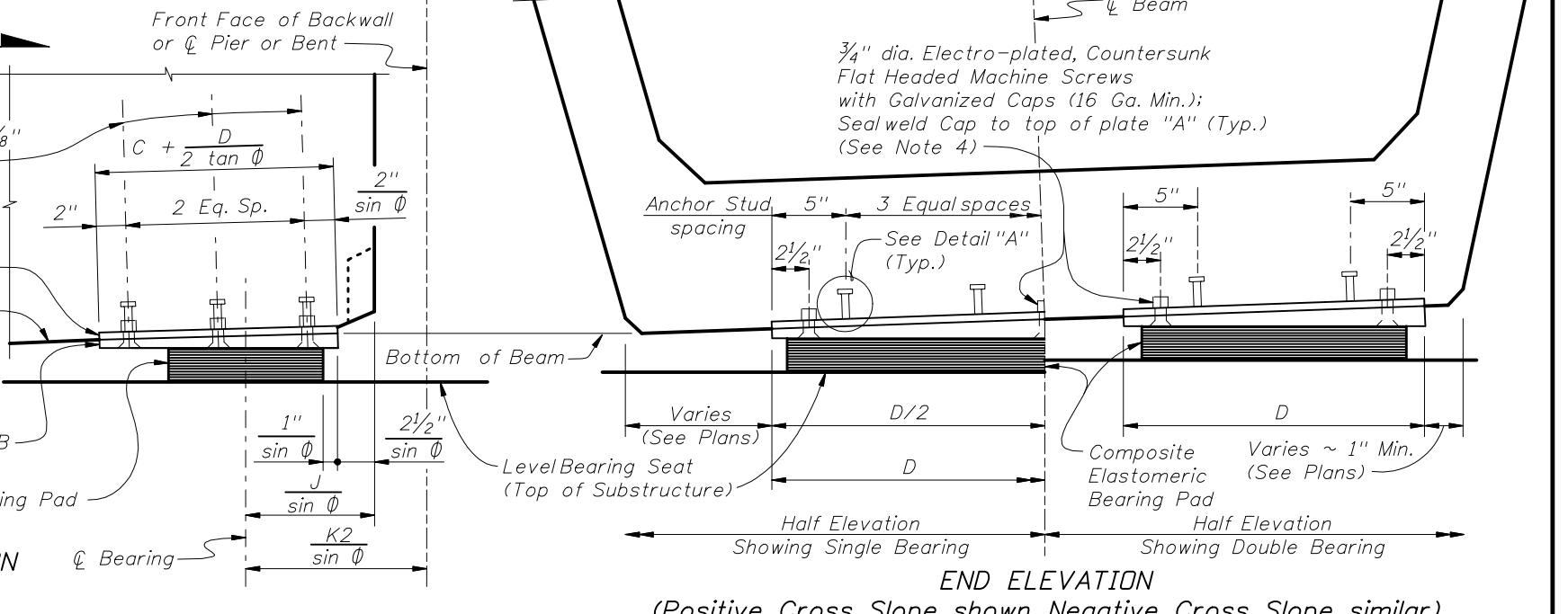
NOTES:

1. Work this sheet with the 'BEVELED BEARING PLATE DATA TABLE' in the plans.
2. Beveled Bearing Plates B with Embedded Bearing Plates A are required for beams only as scheduled in the 'TABLE OF BEAM VARIABLES' on Beam Sheets.
3. Hot-dip galvanized Bearing Plates A & B after fabrication except Galvanized Caps may be welded in place after hot-dip galvanizing. Drill Bearing Plates A and B as an assembled unit, thread Bearing Plate A only. Drill and thread holes perpendicular to bottom of Plate B and prior to plates being galvanized (ASTM A 123).
4. Provide Electroplated, Flat Countersunk Head Cap Screws in accordance with ASTM F 835. Electroplating shall be ASTM B 633, SC 2, Type 1. Provide screws long enough to maintain a 3/4" minimum embedment into Embedded Bearing Plate A and Galvanized Cap. Provide steel Galvanized Caps with 1/2" min. to 1 1/2" max. height and nominal 1" inside diameter.
5. Include the cost of Beveled Bearing Plates in the pay item for Prestressed Beams (Florida U-Beams).
6. For Dimensions C and D, see 'BEVELED BEARING PLATE DATA TABLE' in the Structures Plans. For Dimensions J, K1 and K2, see 'TABLE OF BEAM VARIABLES' on Beam Sheets.
7. All details and dimensions shown are along ϕ Beam for single bearings or ϕ Plate parallel to ϕ Beam for double bearings, except for dimensions to 3/4" dia. Screws and 1/2" dia. x 2 1/8" Anchor Studs, which are along ϕ Screws or ϕ Anchor Studs. Positive Slope shown, Negative Slope similar.
8. When Skew = 0°, dimensions for Embedded Bearing Plate A are $D \times C \times 1/2"$ and for Beveled Plate B are $D \times C \times 1/2"$ Min.

(0° < Skew ≤ 15° shown, Skew = 0° Similar)

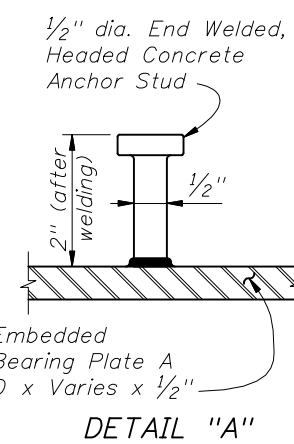


SIDE ELEVATION (See Note 7)

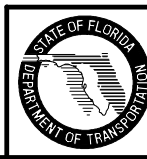


END ELEVATION

(Positive Cross Slope shown, Negative Cross Slope similar)



DETAIL "A"



2010 FDOT Design Standards

BEVELED BEARING PLATE DETAILS - PRESTRESSED FLORIDA U-BEAMS

Last Revision	Sheet No.
01/01/08	1 of 1
Index No.	
20502	

PRESTRESSED CONCRETE PILE NOTES:

DESIGN SPECIFICATIONS:

Florida Department of Transportation (FDOT) "Structures Design Guidelines", current edition.

American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", current edition.

DESIGN PARAMETERS:

Square Prestressed Concrete Section: Designed for 1,000 psi uniform compression after prestress losses without loads.

Pick-up, Storage, and Transportation: 0.0 psi tension using a factor of 1.5 times pile self weight.

SPIRAL TIES:

Each wrap of spirals shall be tied to at least two corner strands. One turn required for spiral splices.

CONCRETE CLASS:

Concrete for all piles shall be Class V (Special) except designated High Capacity Piles shall be Class VI.

Concrete for the High Capacity Collar Splice shall be Class V (Special).

See "GENERAL NOTES" in Structures Plans for any specific locations where the use of Silica Fume is required.

CONCRETE STRENGTH:

The pile cylinder strength shall be 6,000 psi minimum at 28 days and 4,000 psi minimum at time of transfer of the Prestressing Force. The cylinder strength for designated High Capacity Piles shall be 8,500 psi minimum at 28 days and 6,500 psi minimum at time of transfer of the Prestressing Force.

SPLICE BONDING MATERIAL:

The material to fill dowelholes and form the joint between pile sections shall be a Type B Epoxy Compound in accordance with Section 926 of the Specifications and shall be contained on the Qualified Products List (QPL). Use Epoxy Bonding Compound or Epoxy Mortar as recommended by the Manufacturer. For Epoxy Mortar only use sand or other filler material supplied by the manufacturer and in the proportions recommended.

PICK-UP POINTS:

Piles shall be marked at the pick-up points to indicate proper points for attaching handling lines.

REINFORCING STEEL:

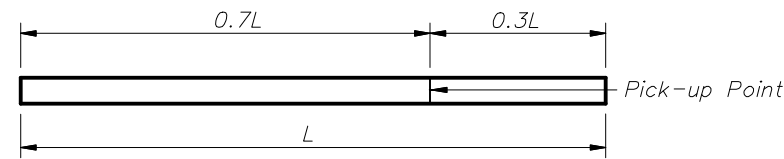
All reinforcing steel shall be Grade 60, except that spiral ties shall be manufactured from cold-drawn steel wire meeting the requirements of ASTM A82.

PRESTRESSING STEEL:

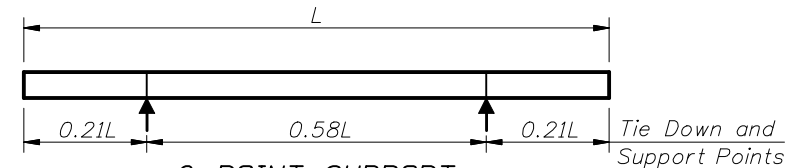
Prestressing steel shall be seven-wire strand, Grade 270 or 250 as noted.

SR = Stress Relieved Strand

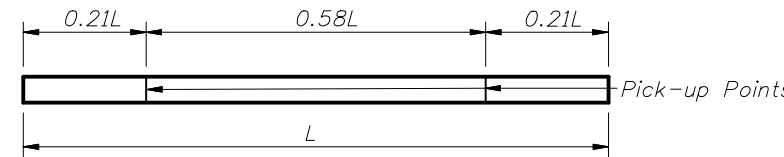
LRS = Low-Relaxation Strand



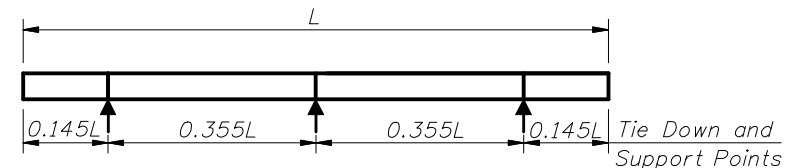
1-POINT PICK-UP



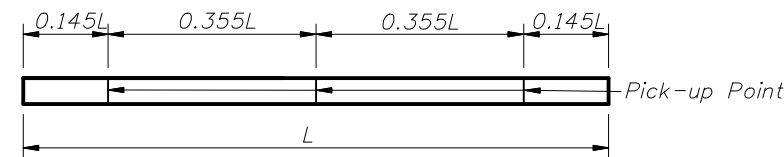
2-POINT SUPPORT



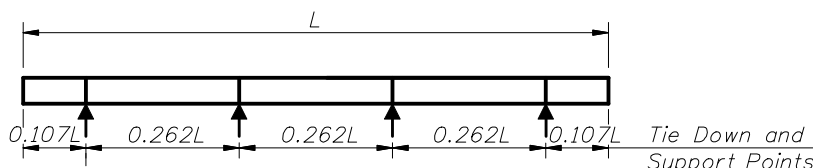
2-POINT PICK-UP



3-POINT SUPPORT



3-POINT PICK-UP

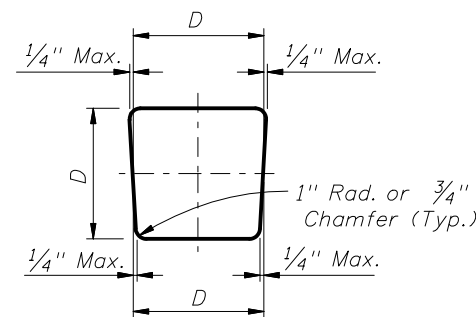


4-POINT SUPPORT

PILE PICK-UP DETAILS

STORAGE AND TRANSPORTATION SUPPORT DETAILS

TABLE OF MAXIMUM PILE PICK-UP AND SUPPORT LENGTHS								
	D = Square Pile Size (inches)						Required Storage and Transportation Detail	Pick-Up Detail
	12	14	18	20	24	30		
Maximum Pile Length (Feet)	48	52	59	62	68	87	2, 3, or 4 point	1 Point
	69	75	85	89	98	124	2, 3, or 4 point	2 Point
	99	107	121	128	140	178	3 or 4 point	3 Point



TYPICAL PILE SHAPE FOR MOLD FORMS



DETAIL SHOWING TYPICAL COVER



2010 FDOT Design Standards

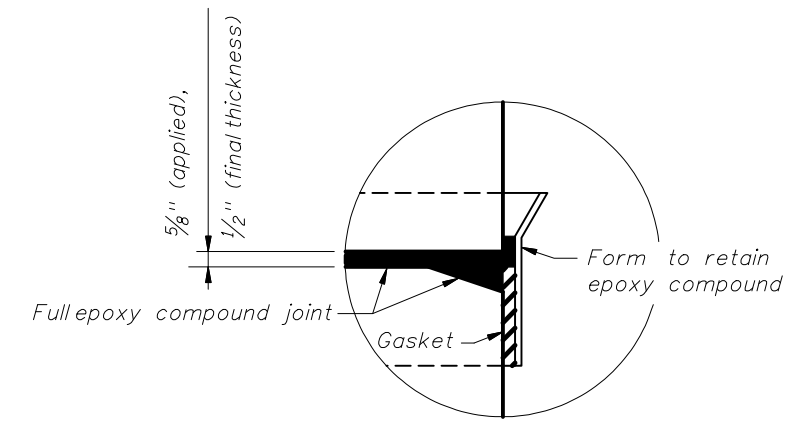
NOTES AND DETAILS FOR SQUARE PRESTRESSED CONCRETE PILES

Last Revision 07/01/07 Sheet No. 1 of 1

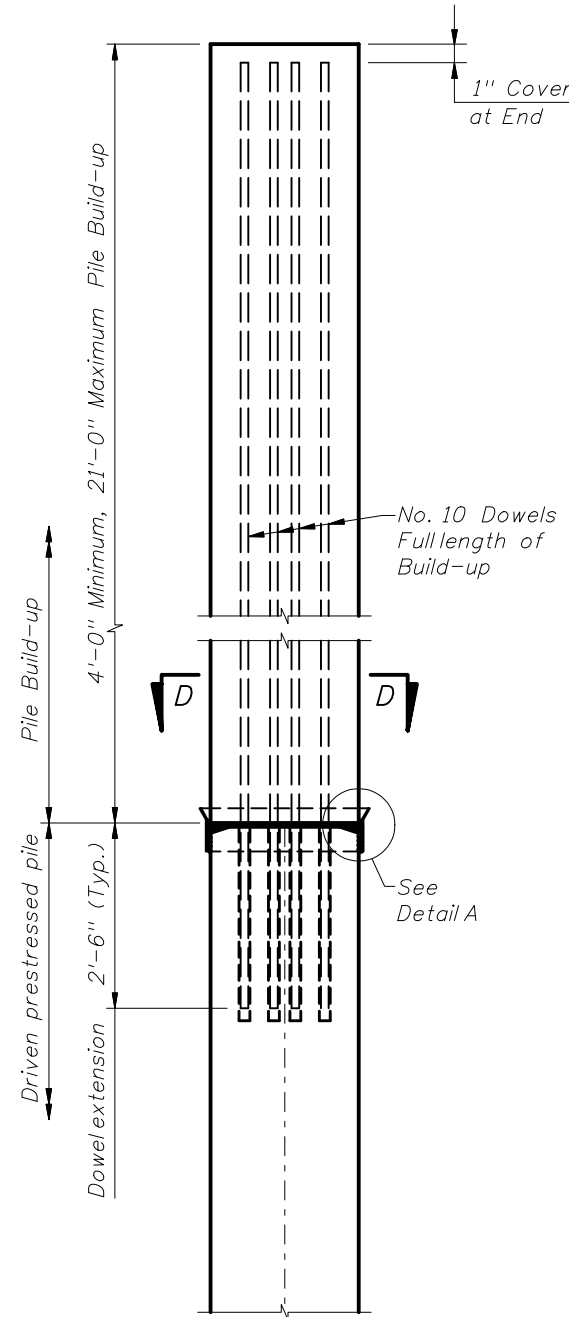
Index No. 20600

NOTES:

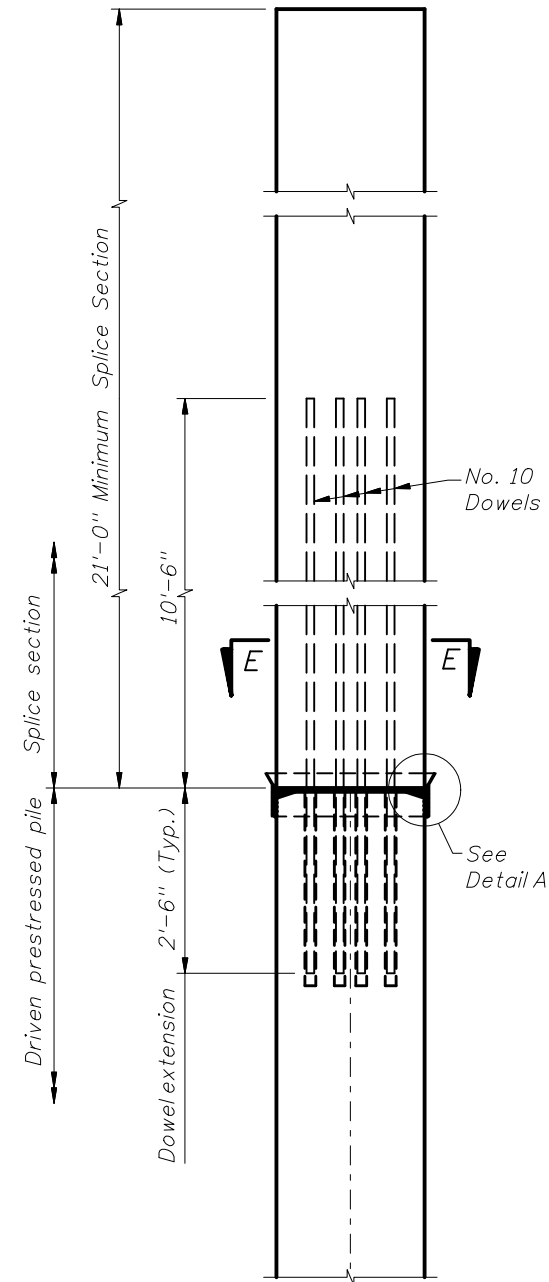
1. For Sections D-D, E-E, & F-F see Index Nos. 20612, 20614, 20618, 20620, 20624 or 20630 for applicable concrete pile size.
2. Prestressing strands, spiral ties and/or reinforcement are not shown for clarity.
3. In cases where pile splices are desired due to length limitations in shipping and/or handling, the "Drivable Preplanned Prestressed Precast Splice Detail" shall be used. Mechanical Pile Splices contained on the Qualified Products List (QPL) may also be used.
4. When preformed dowelholes are utilized, the 1" spiral tie pitch shall be continued to 4'-0" below the head of the pile, and the preforming material shall be removed. See Index Nos. 20618, 20620 & 20624.



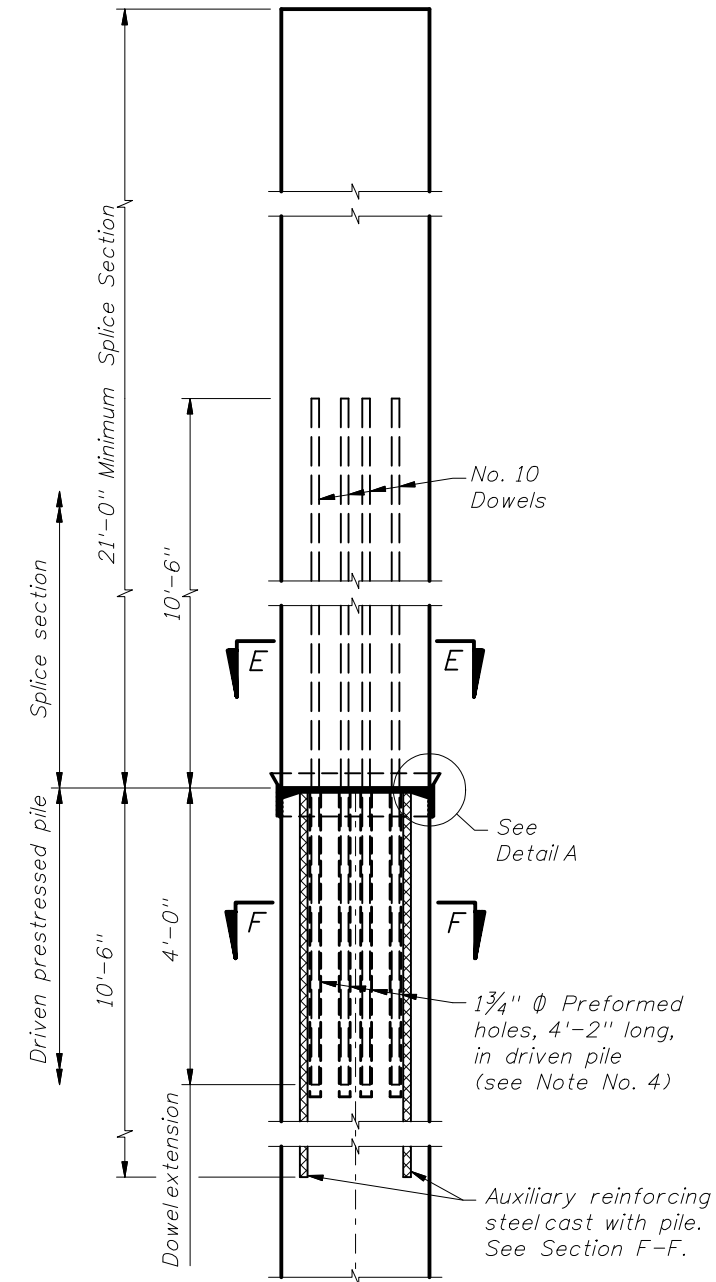
DETAIL A



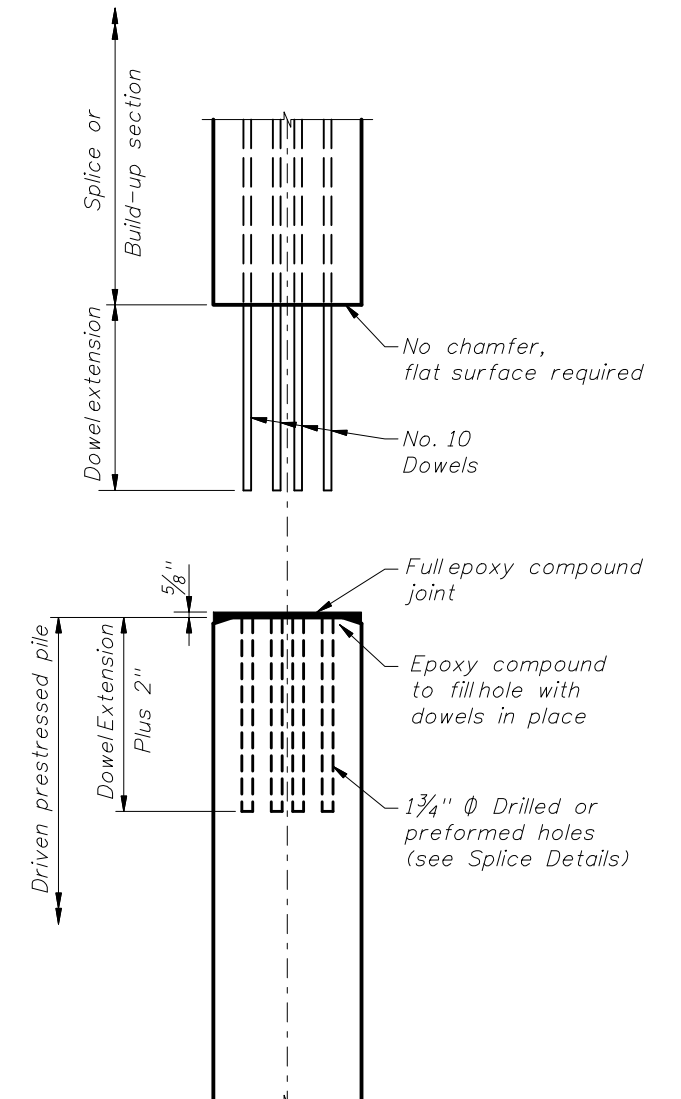
NONDRIVABLE UNFORESEEN REINFORCED PRECAST PILE BUILD-UP DETAIL



DRIVABLE UNFORESEEN PRESTRESSED PRECAST PILE SPLICE DETAIL

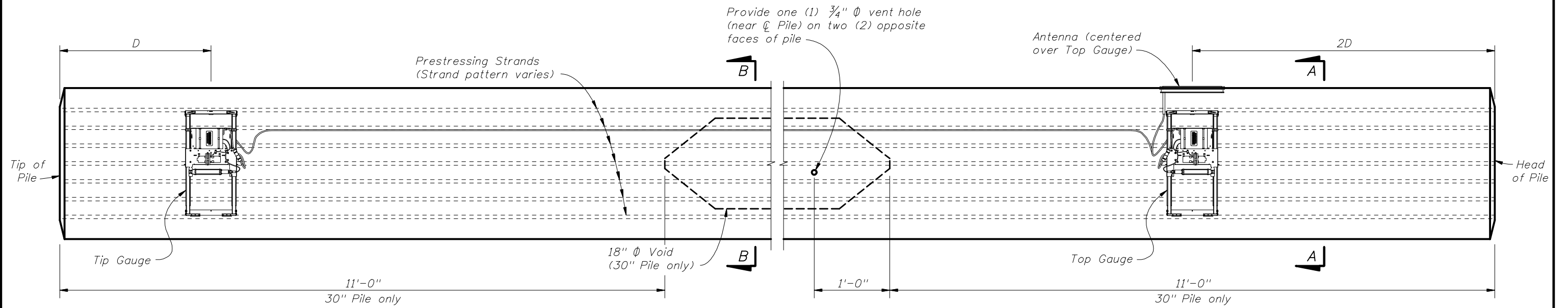


DRIVABLE PREPLANNED PRESTRESSED PRECAST PILE SPLICE DETAIL

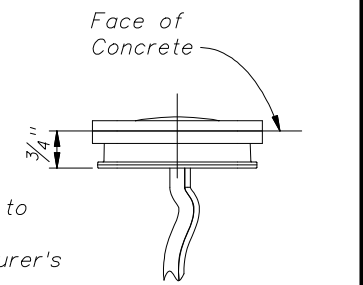
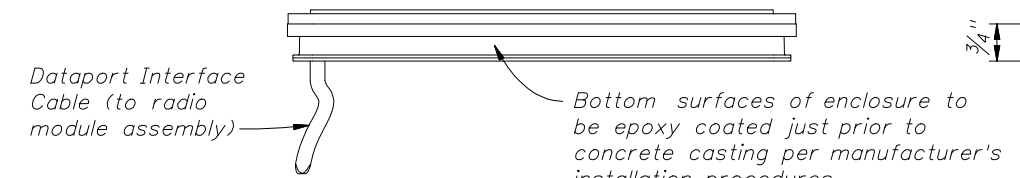
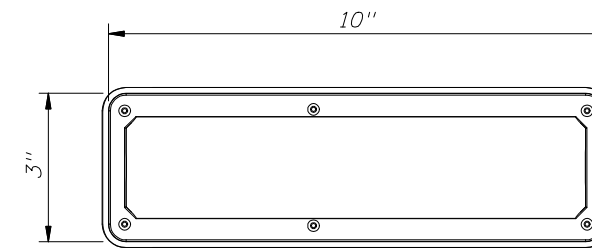
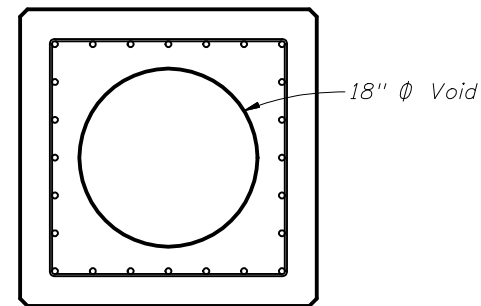
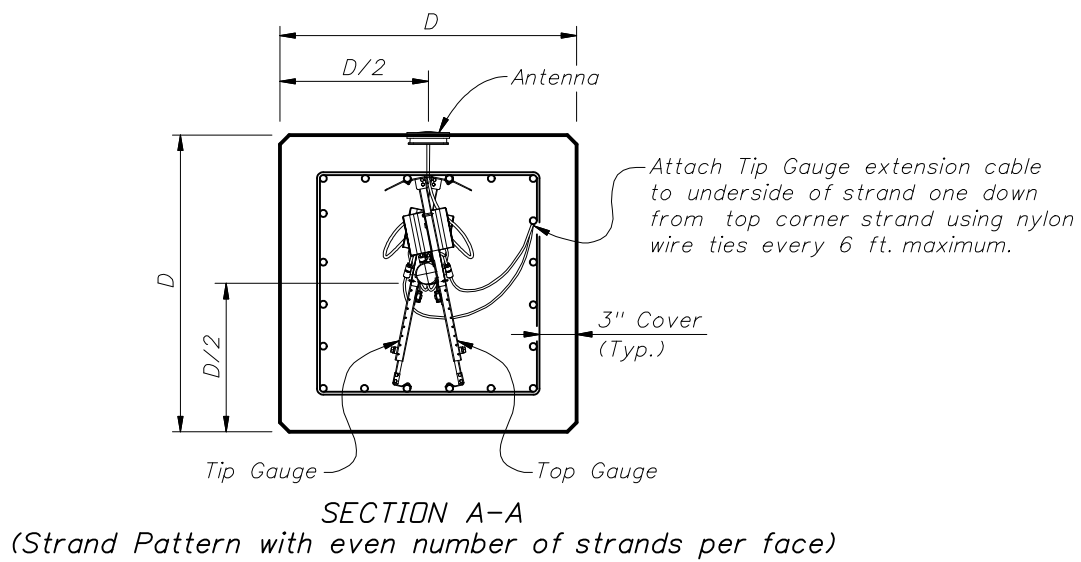
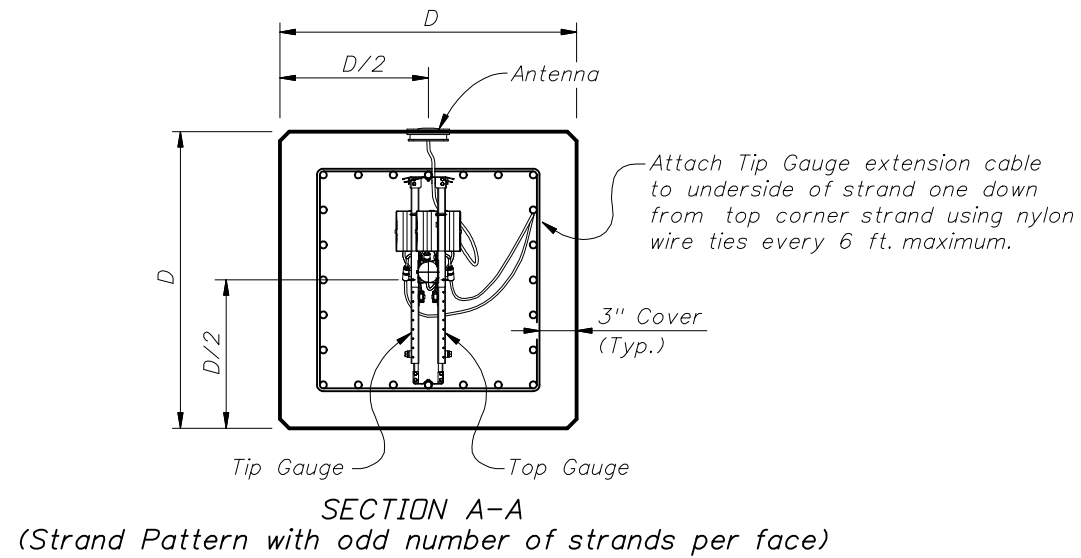


TYPICAL SPLICE BEFORE BONDING



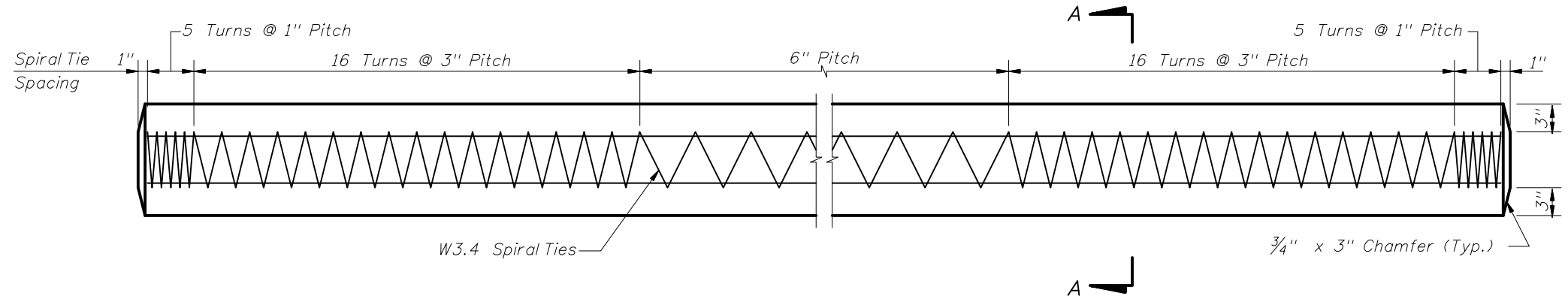


ELEVATION

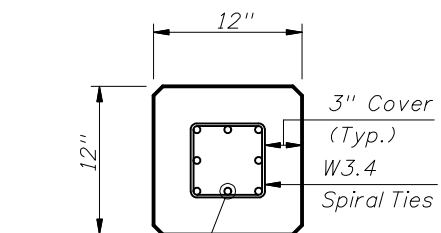


Work this sheet with
 Index No. 20618 for 18" square piles,
 Index No. 20624 for 24" square piles,
 Index No. 20630 for 30" square piles.





ELEVATION

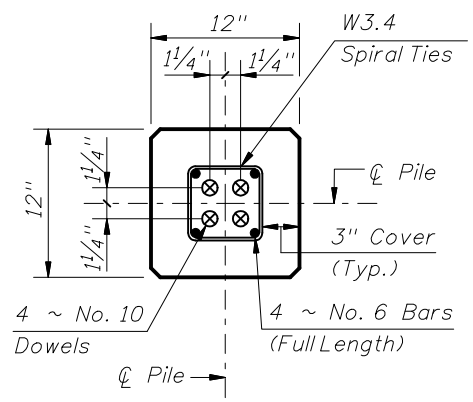


See Alternate Strand Patterns
SECTION A-A

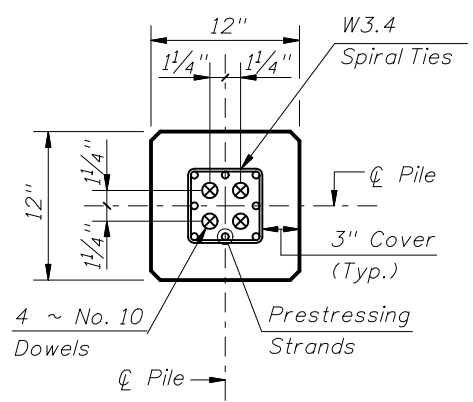
ALTERNATE STRAND PATTERNS

- 4 ~ 0.6" Φ , Grade 270 LRS, at 44 kips
- 8 ~ 7/16" Φ , Grade 270 LRS, at 23.3 kips
- 8 ~ 1/2" Φ , Grade 250 SR, at 24.1 kips
- 12 ~ 3/8" Φ , Grade 270 LRS, at 17.2 kips
- 12 ~ 7/8" Φ , Grade 270 SR, at 15.6 kips

NOTE:
Any of the given Alternate Strand Patterns may be utilized.
The strands shall be located as follows:
Place one strand at each corner and place the remaining strands equally spaced between the corner strands.
The total strand pattern shall be concentric with the nominal concrete section of the pile.



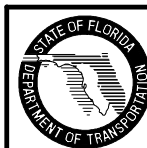
SECTION D-D
(See Non-drivable Unforeseen Reinforced Precast Pile Splice Detail)

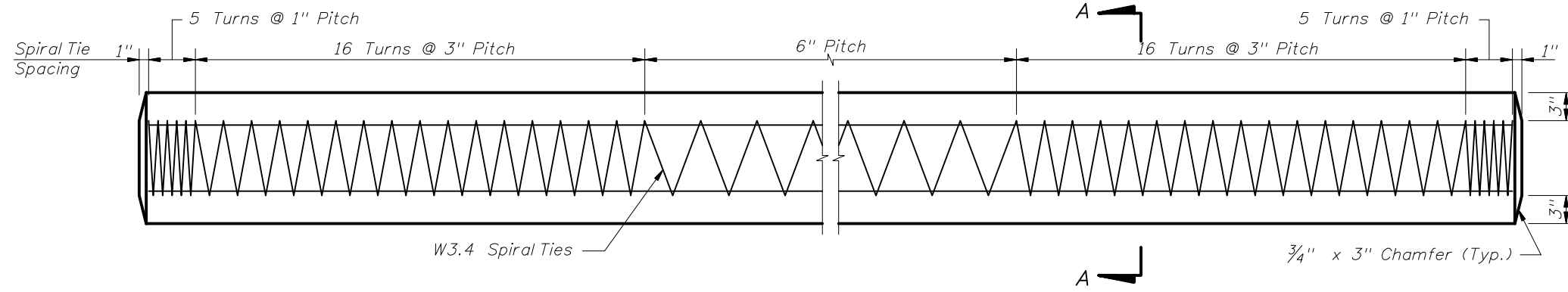


SECTION E-E
(See Drivable Unforeseen Prestressed Precast Pile Splice Detail)

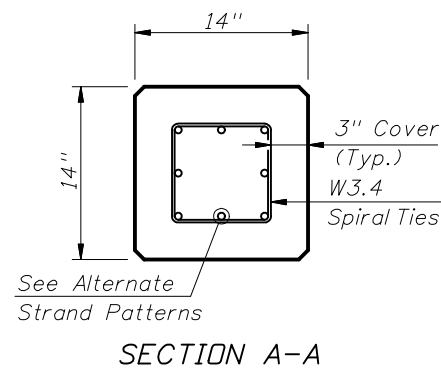
PILE SPLICE REINFORCEMENT DETAILS

NOTE:
Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.





ELEVATION

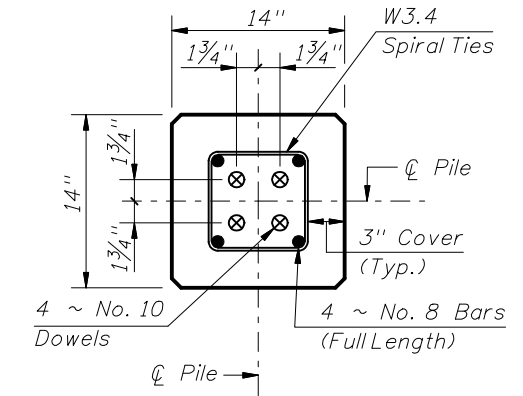


ALTERNATE STRAND PATTERNS

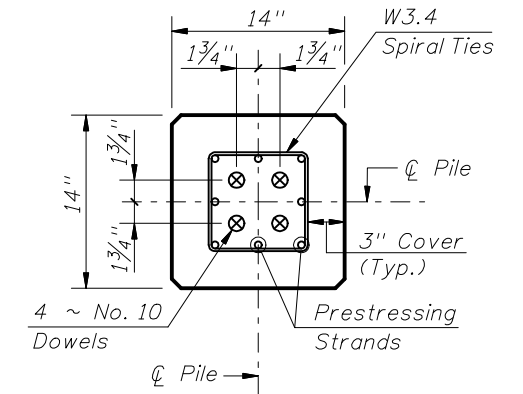
- 8 ~ 0.6" Φ , Grade 270 LRS, at 35.2 kips
- 8 ~ 1/2" Φ , Grade 270 (Spec) LRS, at 31.6 kips
- 8 ~ 1/2" Φ , Grade 270 (Spec) SR, at 31.6 kips
- 8 ~ 1/2" Φ , Grade 270 LRS, at 31.0 kips
- 12 ~ 7/16" Φ , Grade 270 SR, at 21.2 kips
- 12 ~ 1/2" Φ , Grade 250 SR, at 22.6 kips
- 16 ~ 3/8" Φ , Grade 270 SR, at 16.1 kips

NOTE:

Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows:
Place one strand at each corner and place the remaining strands equally spaced between the corner strands.
The total strand pattern shall be concentric with the nominal concrete section of the pile.



SECTION D-D
(See Non-drivable Unforescen Reinforced Precast Splice Detail)

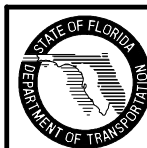


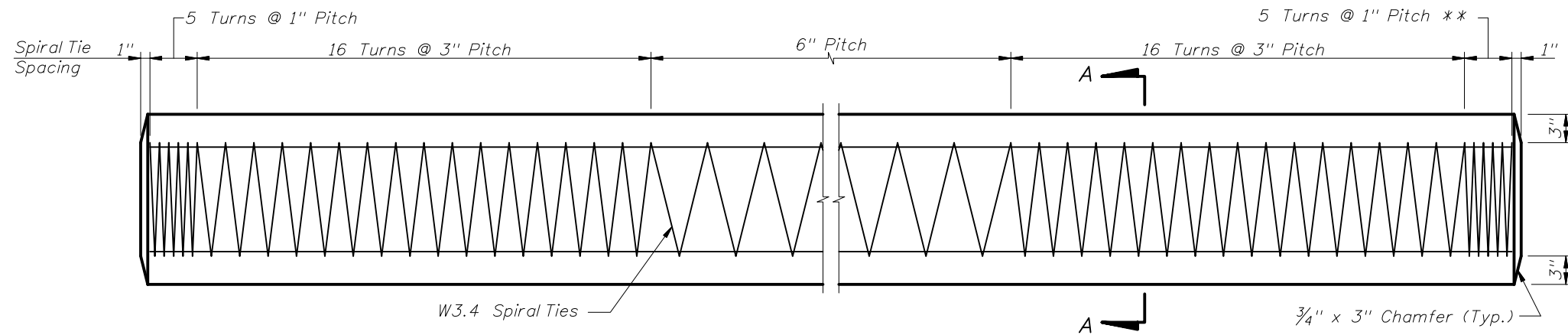
SECTION E-E
(See Drivable Unforescen Prestressed Precast Splice Detail)

PILE SPLICE REINFORCEMENT DETAILS

NOTE:

Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.





ELEVATION

** See Note No. 4 on Index No. 20601

ALTERNATE STRAND PATTERNS

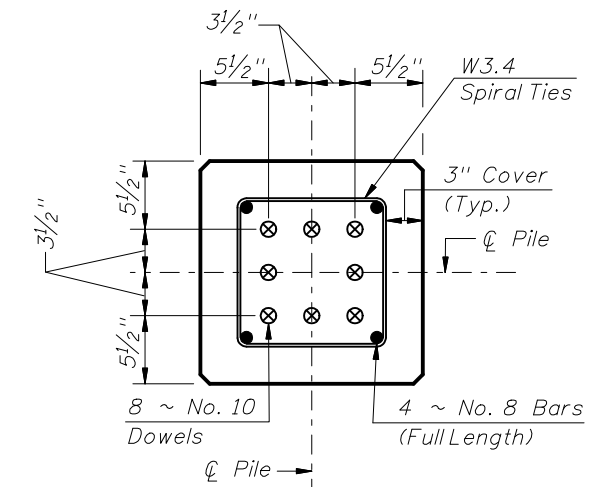
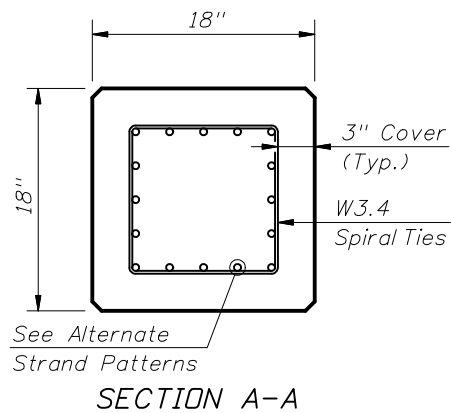
- 12 ~ 0.6" Φ , Grade 270 LRS, at 38.1 kips
- 12 ~ 1/2" Φ , Grade 270 (Spec) LRS, at 34.0 kips
- 12 ~ 9/16" Φ , Grade 270 SR, at 35.1 kips
- 16 ~ 1/2" Φ , Grade 270 SR, at 26.8 kips
- 20 ~ 7/16" Φ , Grade 270 SR, at 21.8 kips
- 20 ~ 7/16" Φ , Grade 270 LRS, at 21.1 kips
- 24 ~ 3/8" Φ , Grade 270 LRS, at 17.3 kips

NOTE:

Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows: Place one strand at each corner and place the remaining strands equally spaced between the corner strands. The total strand pattern shall be concentric with the nominal concrete section of the pile.

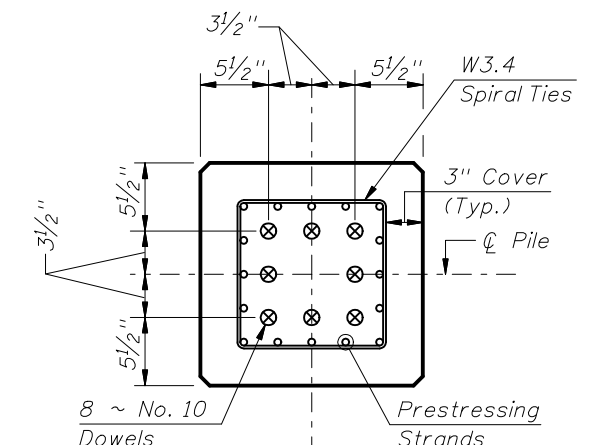
NOTE:

Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.



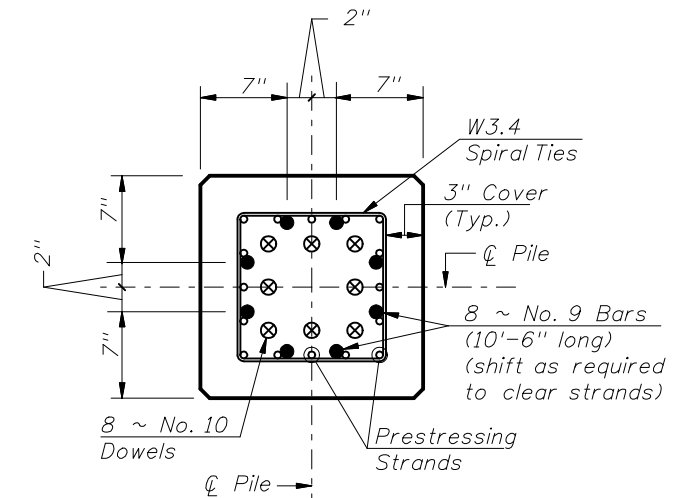
SECTION D-D

(See Nondrivable Unforeseen Reinforced Precast Splice Detail)



SECTION E-E

(See Drivable Prestressed Precast Splice Detail)

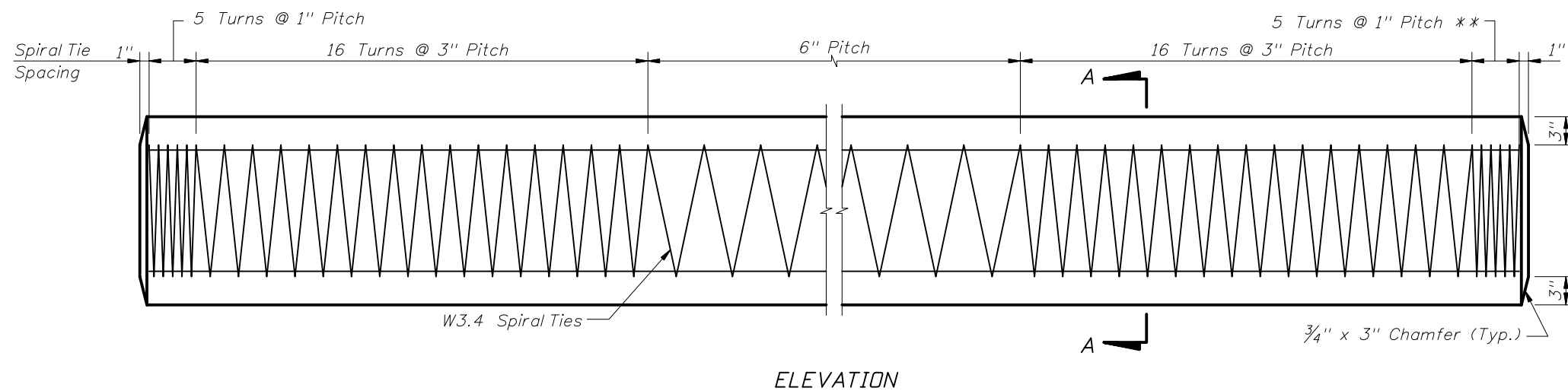


SECTION F-F

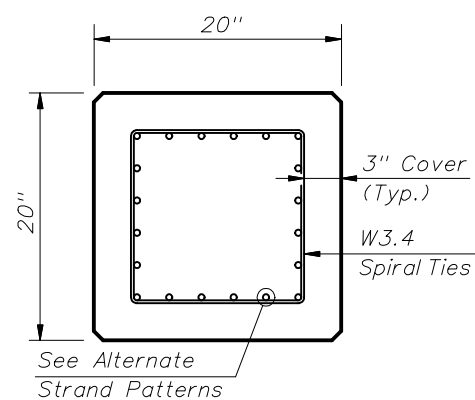
(See Drivable Preplanned Splice Detail)

PILE SPLICE REINFORCEMENT DETAILS





** See Note No. 4 on Index No. 20601

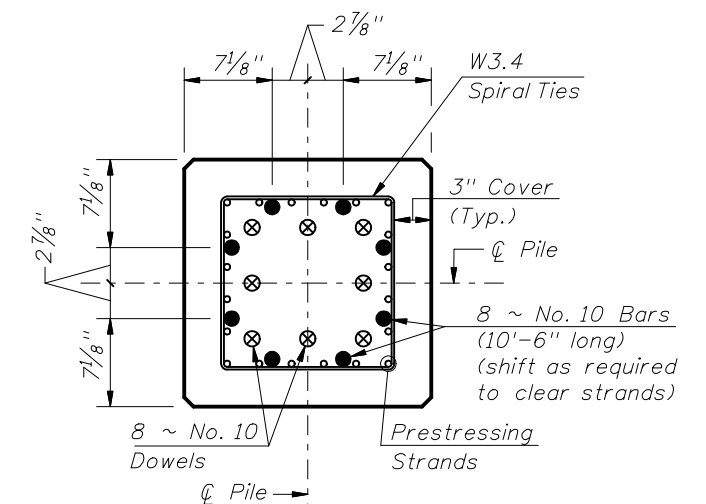
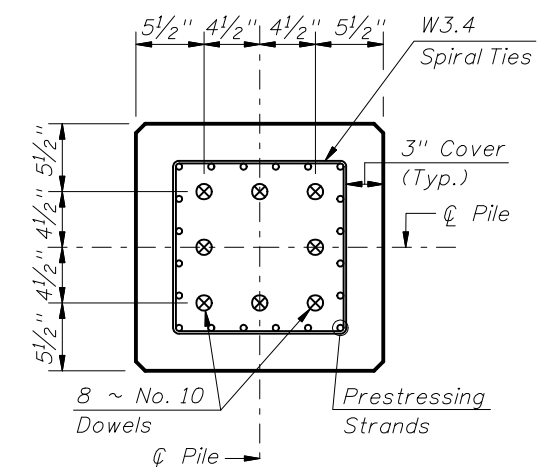
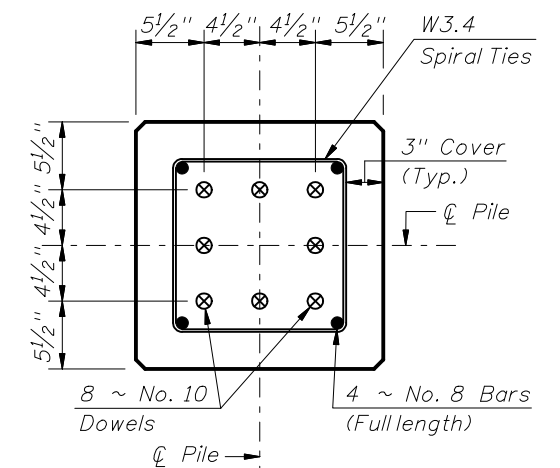


ALTERNATE STRAND PATTERNS

- 12 ~ 0.6" Φ , Grade 270 LRS, at 44 kips
- 16 ~ 1/2" Φ , Grade 270 LRS, at 31.0 kips
- 16 ~ 1/2" Φ , Grade 270 (Spec) SR, at 34.0 kips
- 20 ~ 1/2" Φ , Grade 270 SR, at 26.5 kips
- 24 ~ 7/16" Φ , Grade 270 LRS, at 21.7 kips
- 24 ~ 7/16" Φ , Grade 270 SR, at 21.7 kips

NOTE:
Any of the given Alternate Strand Patterns may be utilized.
The strands shall be located as follows:
Place one strand at each corner and place the remaining strands equally spaced between the corner strands.
The total strand pattern shall be concentric with the nominal concrete section of the pile.

NOTE:
Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.



PILE SPLICE REINFORCEMENT DETAILS

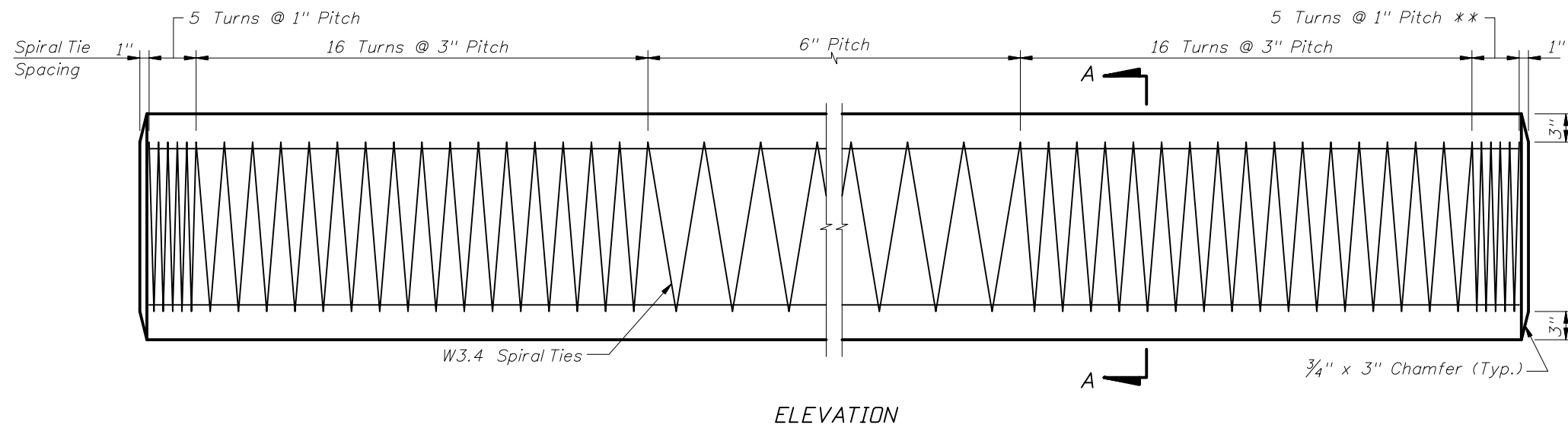


2010 FDOT Design Standards

20" SQUARE PRESTRESSED CONCRETE PILE

Last Revision 07/01/05 Sheet No. 1 of 1

Index No. 20620



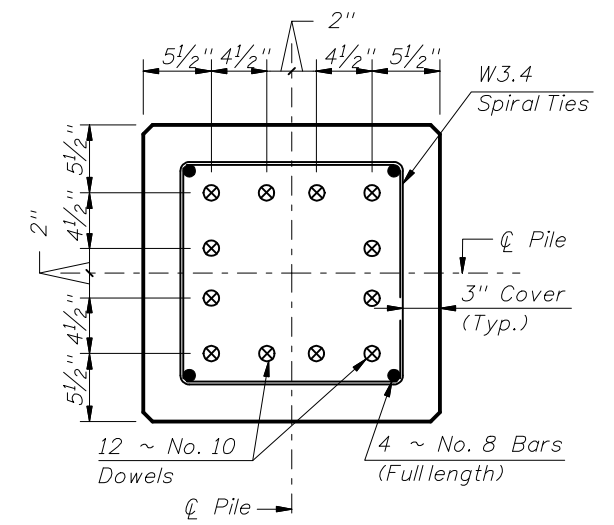
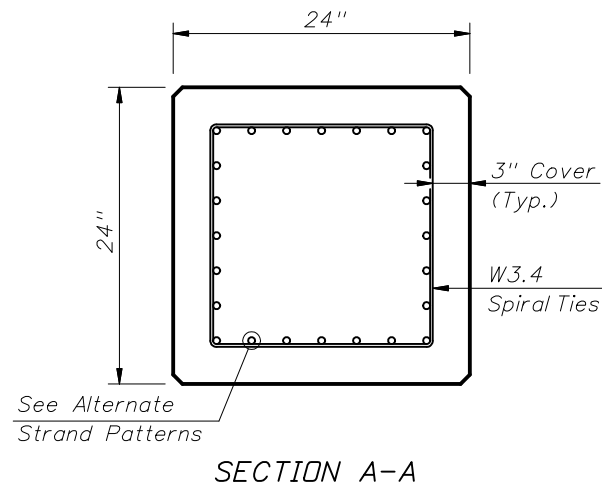
** See Note No. 4 on Index No. 20601

ALTERNATE STRAND PATTERNS

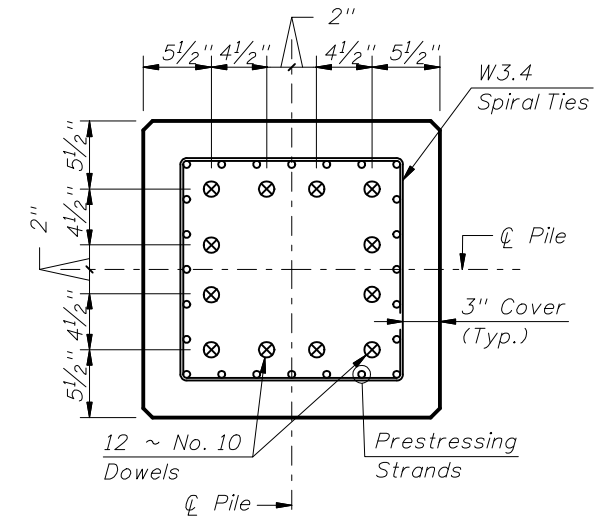
- 16 ~ 0.6" Φ , Grade 270 LRS, at 44 kips
- 20 ~ 1/2" Φ , Grade 270 (Spec) LRS, at 34.0 kips
- 20 ~ 9/16" Φ , Grade 270 SR, at 39.0 kips
- 20 ~ 9/16" Φ , Grade 270 (Spec) SR, at 37.1 kips
- 24 ~ 1/2" Φ , Grade 270 LRS, at 31.0 kips
- 24 ~ 1/2" Φ , Grade 270 (Spec) SR, at 31.6 kips

NOTE:
Any of the given Alternate Strand Patterns may be utilized.
The strands shall be located as follows:
Place one strand at each corner and place the remaining strands equally spaced between the corner strands.
The total strand pattern shall be concentric with the nominal concrete section of the pile.

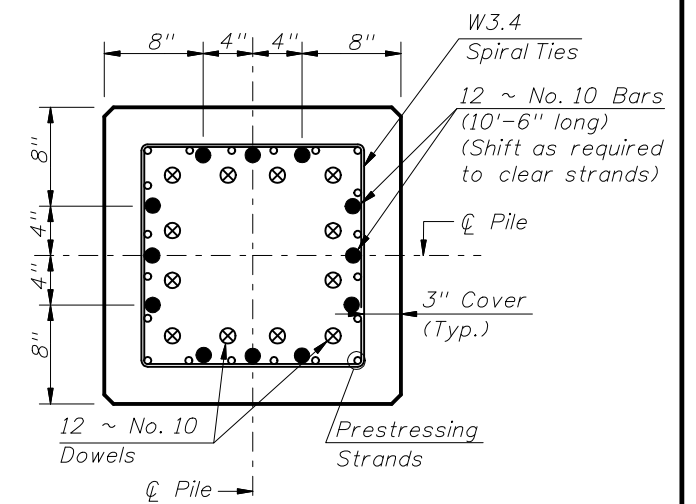
NOTE:
Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.



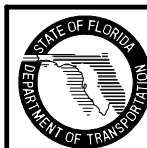
(See Nondrivable Unforeseen Reinforced Precast Pile Splice Detail)



(See Drivable Prestressed Precast Pile Splice Detail)



(See Drivable Preplanned Pile Splice Detail)

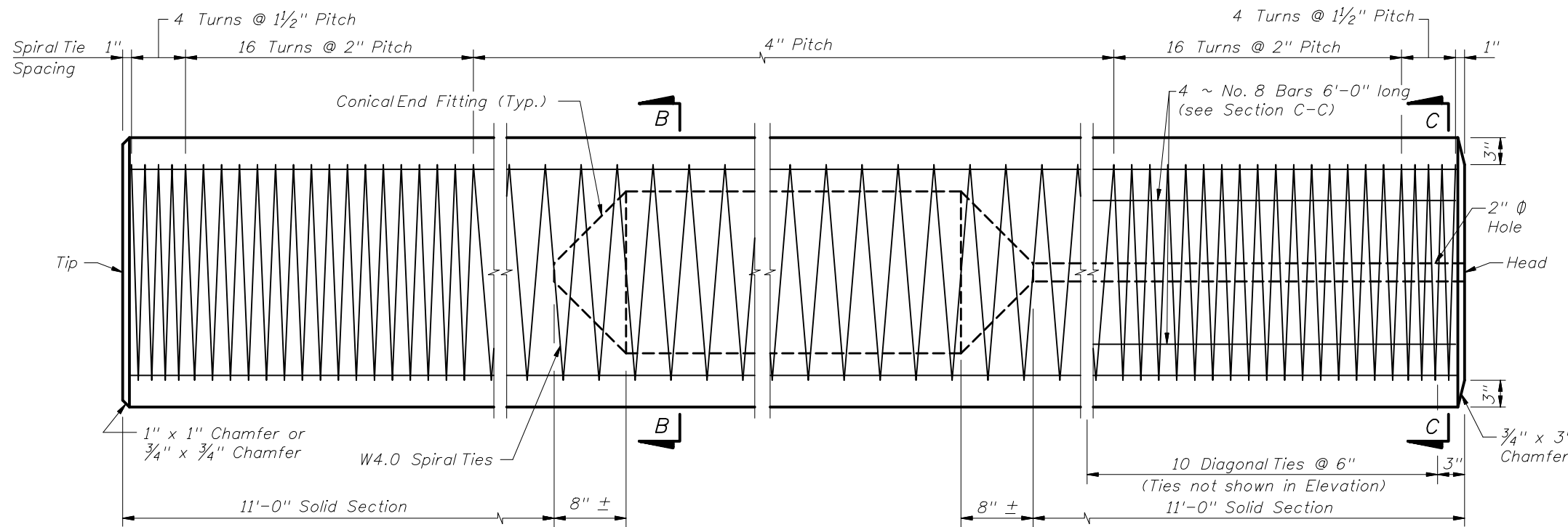


2010 FDOT Design Standards

24" SQUARE PRESTRESSED CONCRETE PILE

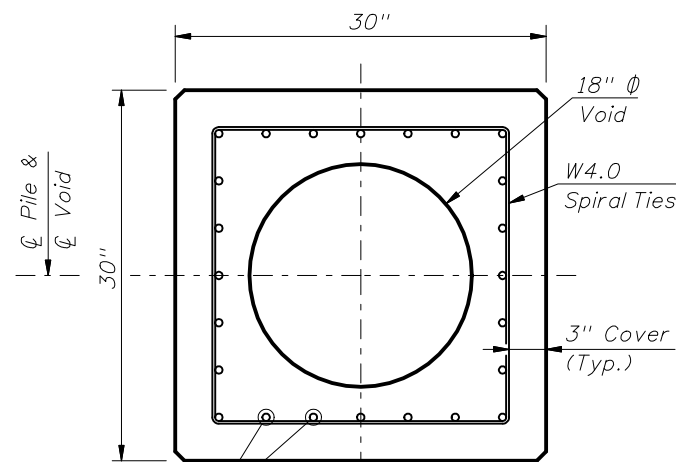
Last Revision 07/01/05 Sheet No. 1 of 1

Index No. 20624

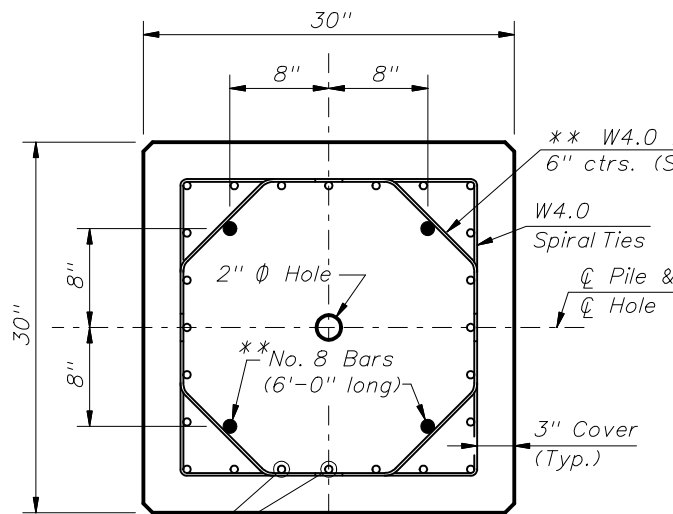


NOTE:
Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.

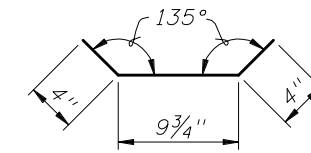
ELEVATION



SECTION B-B
(See Pile Splice Reinforcement Details)



SECTION C-C
(See Pile Splice Reinforcement Details)



W4.0 DIAGONAL TIE DETAIL

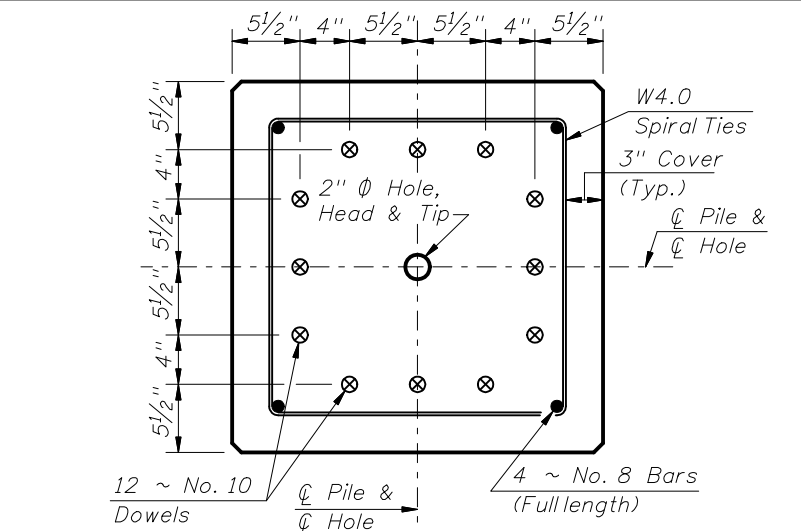
** Omit 4 ~ No. 8 Bars and Diagonal Ties in pre-planned mechanical splice.

NOTES:

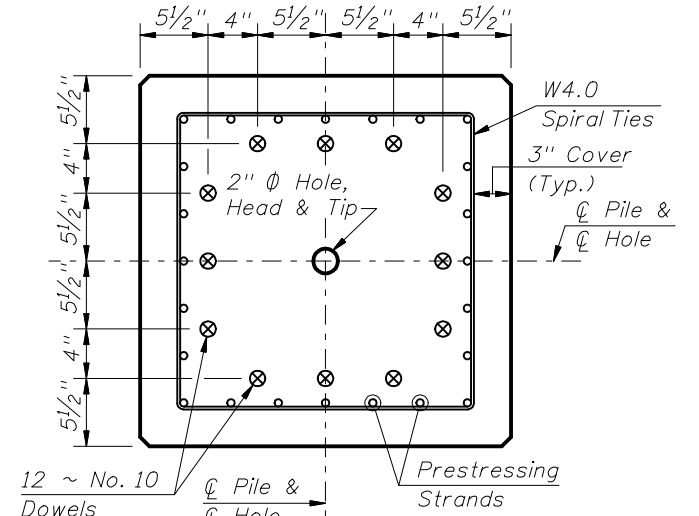
- Venting shall be provided by the use of a 1" Φ PVC conduit through a substructure cap or column. Voids between segments of spliced piles shall be connected by 2" Φ hole(s).
- Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows: Place one strand at each corner and place the remaining strands equally spaced between the corner strands. The total strand pattern shall be concentric with the nominal concrete section of the pile.
- CONTRACTOR OPTION: The 30" pile may be cast SOLID by omitting the 18" Φ void and the 2" Φ vent hole. In this event, the Contractor shall submit calculations for approval and a proposed strand configuration that provide net prestressing after losses equal to 1000 psi. Alternate configurations for the Diagonal Ties, to maintain the position of the 4 ~ No. 8 Bars, may be approved by the Engineer.

ALTERNATE STRAND PATTERNS

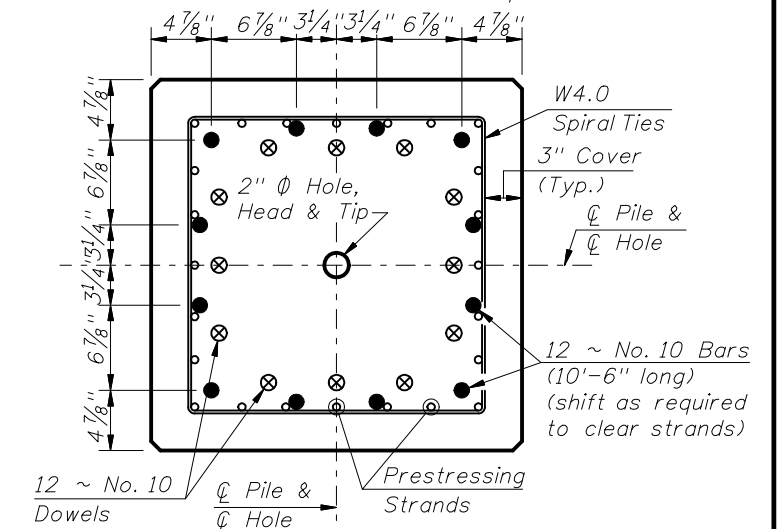
- 20 ~ 3/16" Φ , Grade 270 (Spec) LRS, at 39.7 kips
- 20 ~ 3/16" Φ , Grade 270 LRS, at 39.0 kips
- 20 ~ 0.6" Φ , Grade 270 LRS, at 41 kips
- 24 ~ 1/2" Φ , Grade 270 (Spec) LRS, at 34.0 kips
- 24 ~ 3/16" Φ , Grade 270 SR, at 35 kips
- 24 ~ 3/16" Φ , Grade 270 (Spec) SR, at 35.2 kips
- 28 ~ 1/2" Φ , Grade 270 LRS, at 29.0 kips
- 28 ~ 1/2" Φ , Grade 270 (Spec) SR, at 30.2 kips



SECTION D-D
(See Nondrivable Unforeseen Reinforced Precast Pile Splice Detail)



SECTION E-E
(See Drivable Prestressed Precast Pile Splice Detail)



SECTION F-F
(See Drivable Preplanned Pile Splice Detail)

PILE SPLICE DETAILS

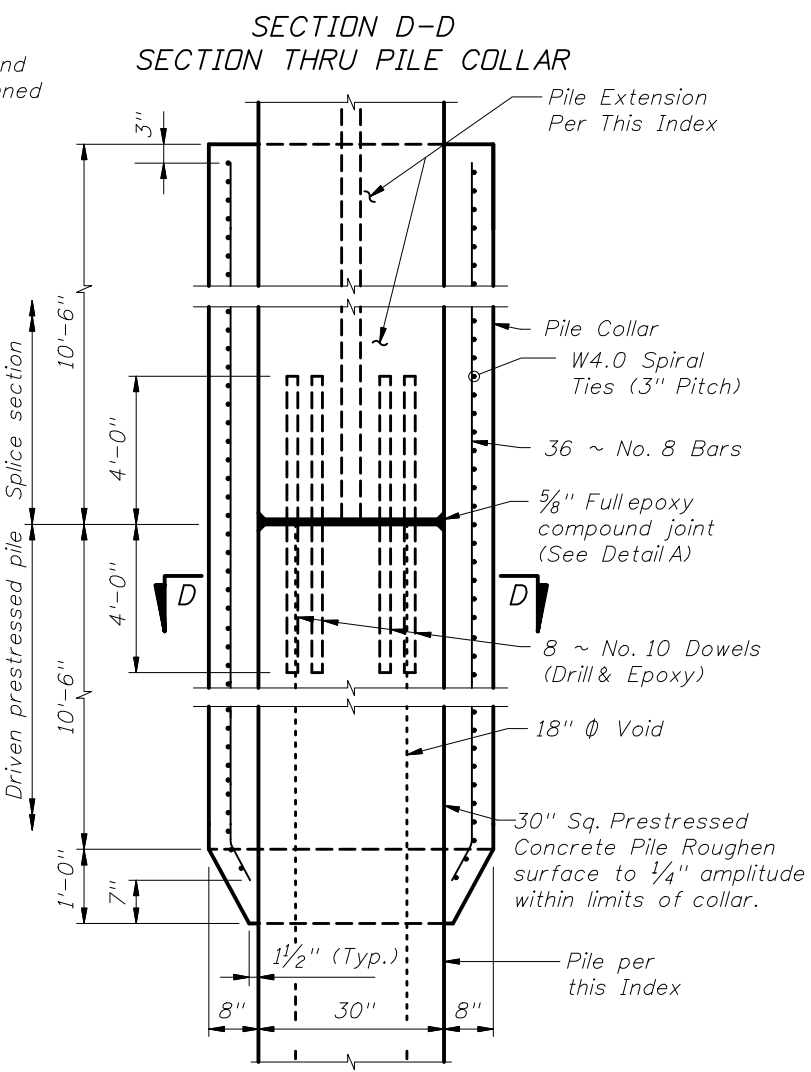
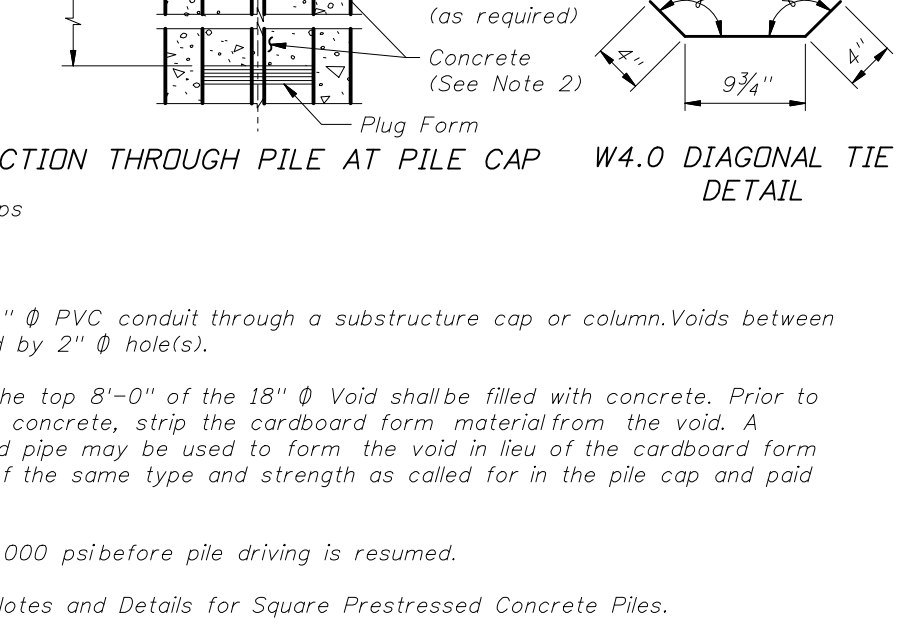
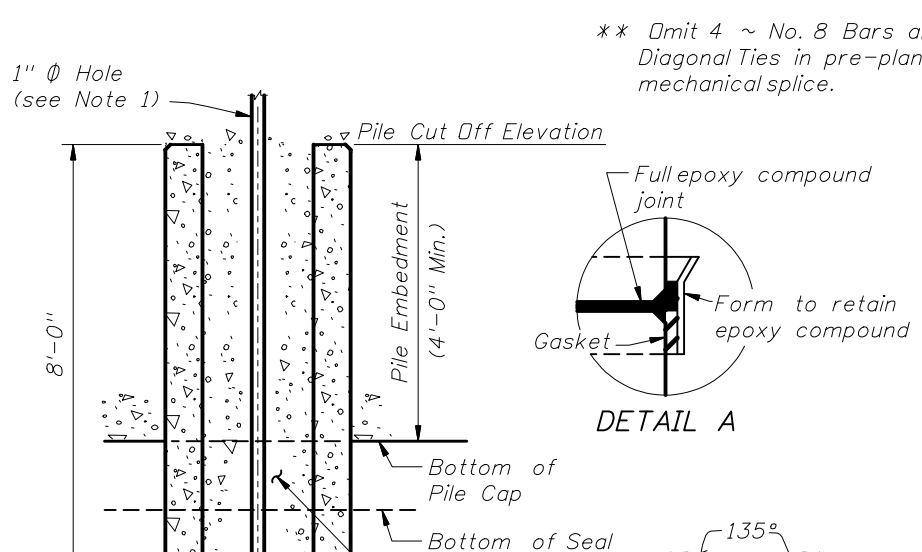
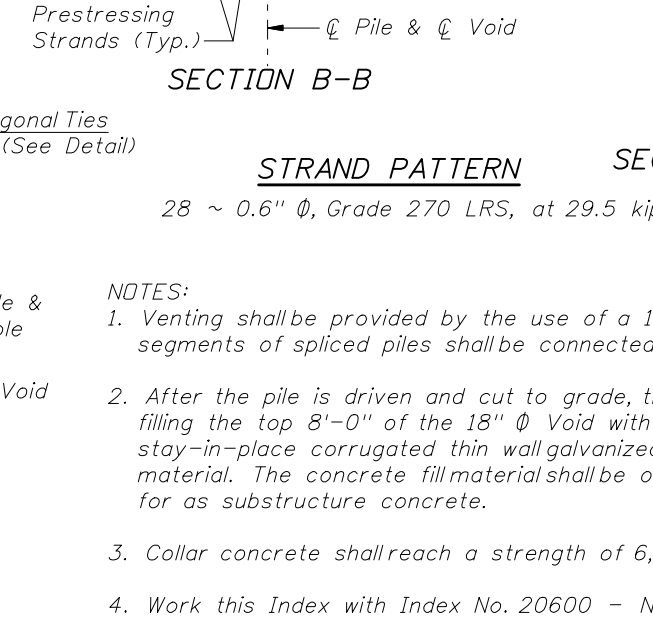
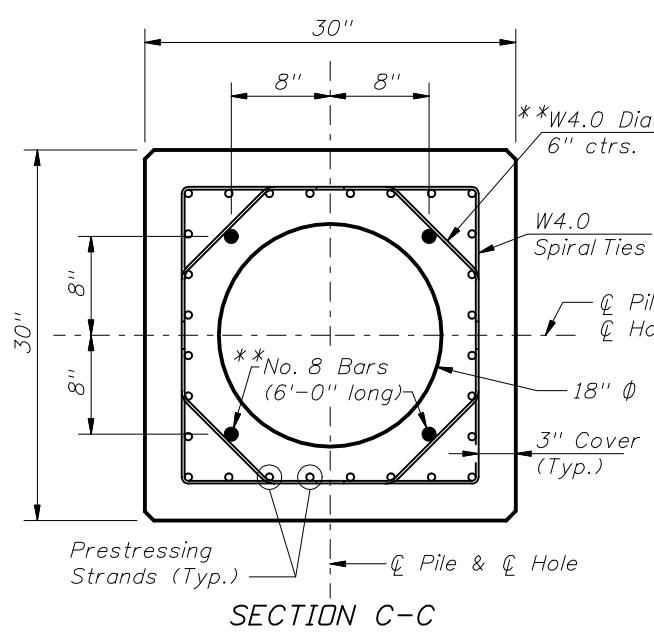
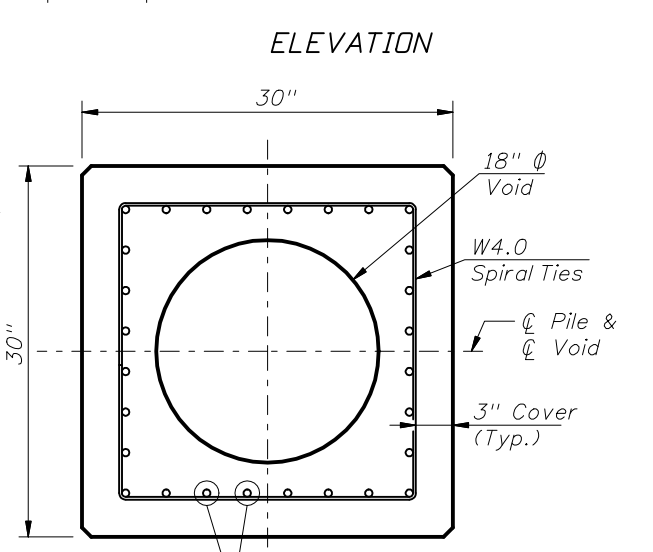
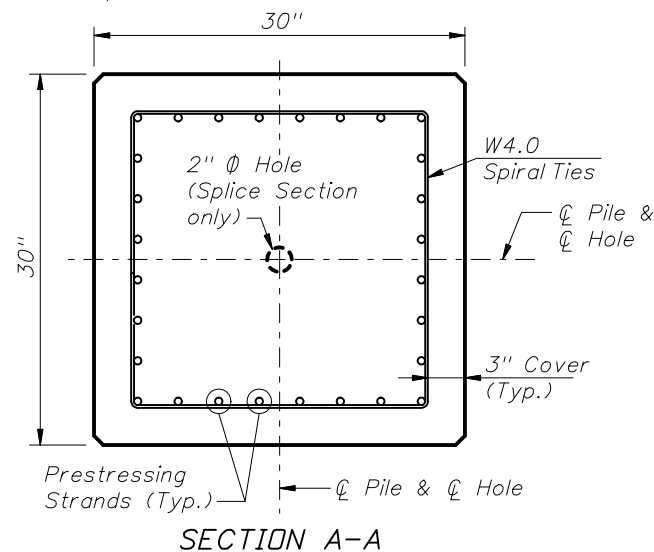
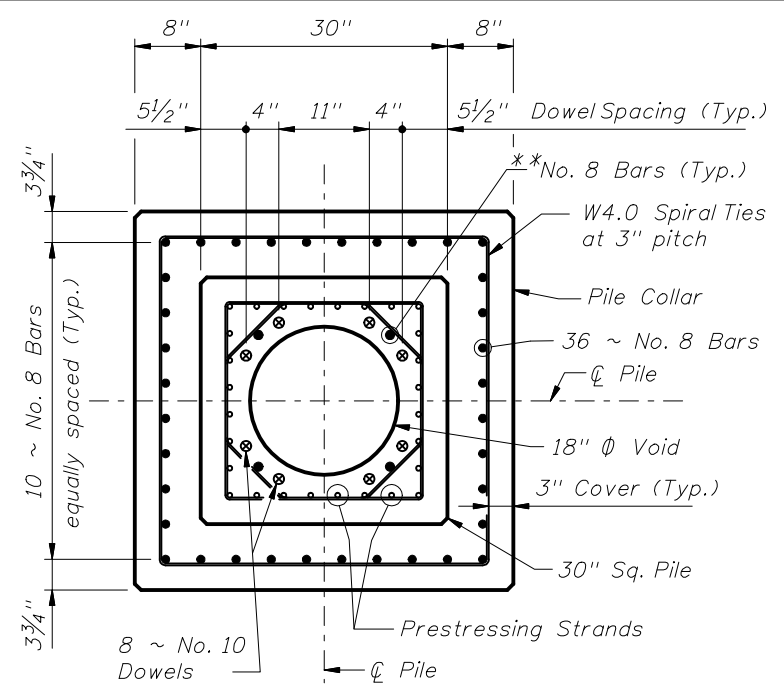
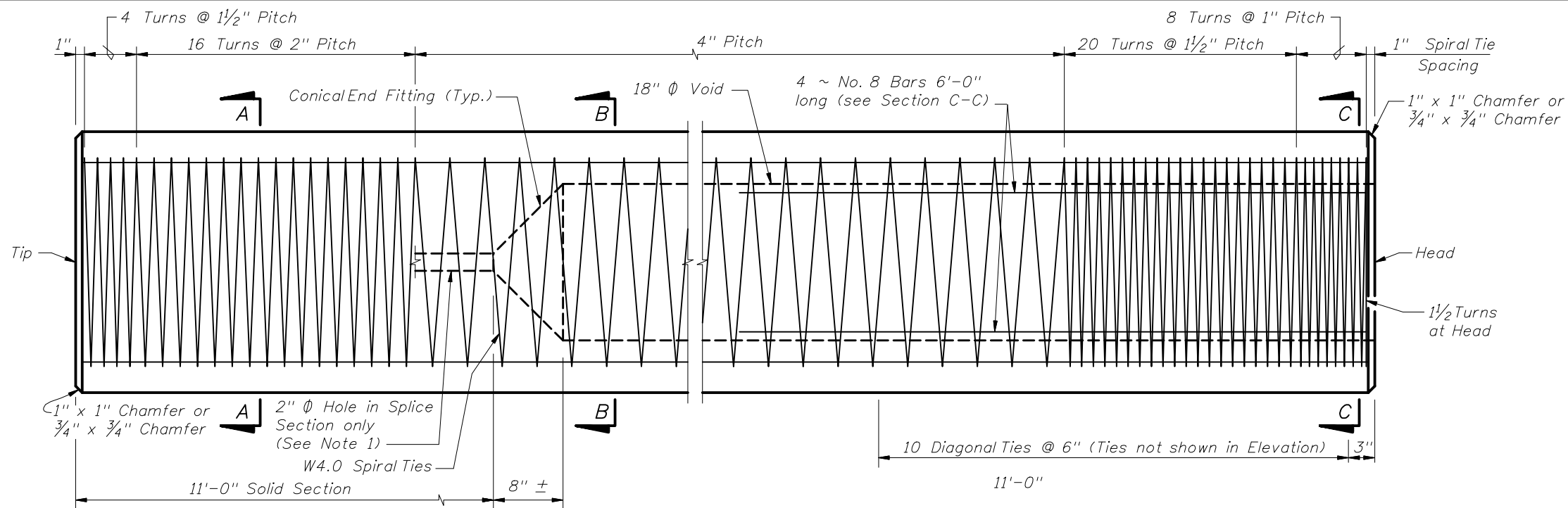


2010 FDOT Design Standards

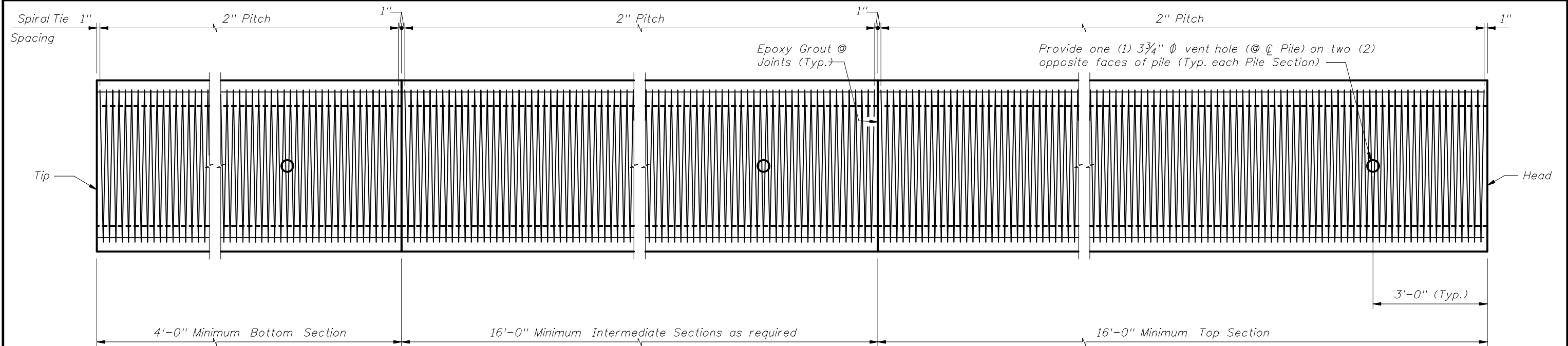
30" SQUARE PRESTRESSED CONCRETE PILE

Last Revision 07/01/07
Sheet No. 1 of 1

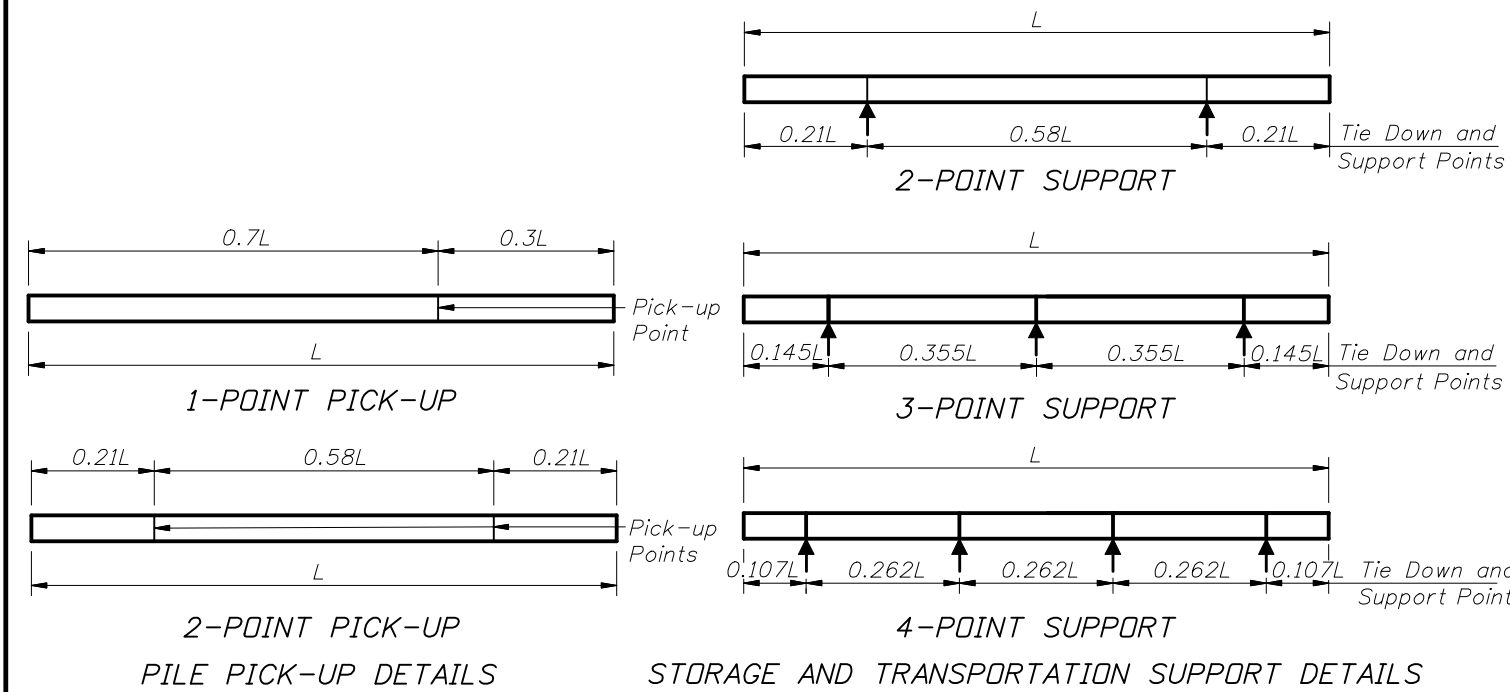
Index No. 20630



- NOTES:**
- Venting shall be provided by the use of a 1" ϕ PVC conduit through a substructure cap or column. Voids between segments of spliced piles shall be connected by 2" ϕ hole(s).
 - After the pile is driven and cut to grade, the top 8'-0" of the 18" ϕ Void shall be filled with concrete. Prior to filling the top 8'-0" of the 18" ϕ Void with concrete, strip the cardboard form material from the void. A stay-in-place corrugated thin wall galvanized pipe may be used to form the void in lieu of the cardboard form material. The concrete fill material shall be of the same type and strength as called for in the pile cap and paid for as substructure concrete.
 - Collar concrete shall reach a strength of 6,000 psi before pile driving is resumed.
 - Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles.



ELEVATION



NOTES

DESIGN SPECIFICATIONS:
 Florida Department of Transportation (FDOT) "Structures Design Guidelines", Current Edition.
 American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Current Edition.

DESIGN PARAMETERS:
 Prestressed Cylinder Concrete Section: 1,000 psi minimum uniform compression after prestress losses without loads.
 Pick-up, Storage, and Transportation: 0.0 psi tension w/1.5 times pile self weight.

SPIRAL TIES:
 One full wrap of spirals is required at both the head and tip of pile. One half turn required for spiral splices.

CONCRETE CLASS:
 Concrete for all piles shall be Class V (Special). Concrete for pile splices shall be Class IV. See "GENERAL NOTES" in Structures Plans for any specific locations where the use of Silica Fume is required.

CONCRETE STRENGTH:
 The cylinder strength shall be 6,000 psi minimum at time of transfer of the Prestressing Force.

SPLICE BONDING MATERIAL:
 The material to form the joint between pile sections shall be a Type B Epoxy Compound in accordance with Section 926 of the Specifications. The bonding agent used on internal pile surfaces shall be a Type A Epoxy Compound in accordance with Section 926 of the Specifications. Epoxy Compounds used shall be contained on the Qualified Products List (QPL). Use Epoxy Bonding Compound or Epoxy Mortar as recommended by the Manufacturer. For Epoxy Mortar only use sand or other filler material supplied by the manufacturer and in the proportions recommended.

PICK-UP POINTS:
 Piles shall be marked at the pick-up points to indicate proper points for attaching handling lines.

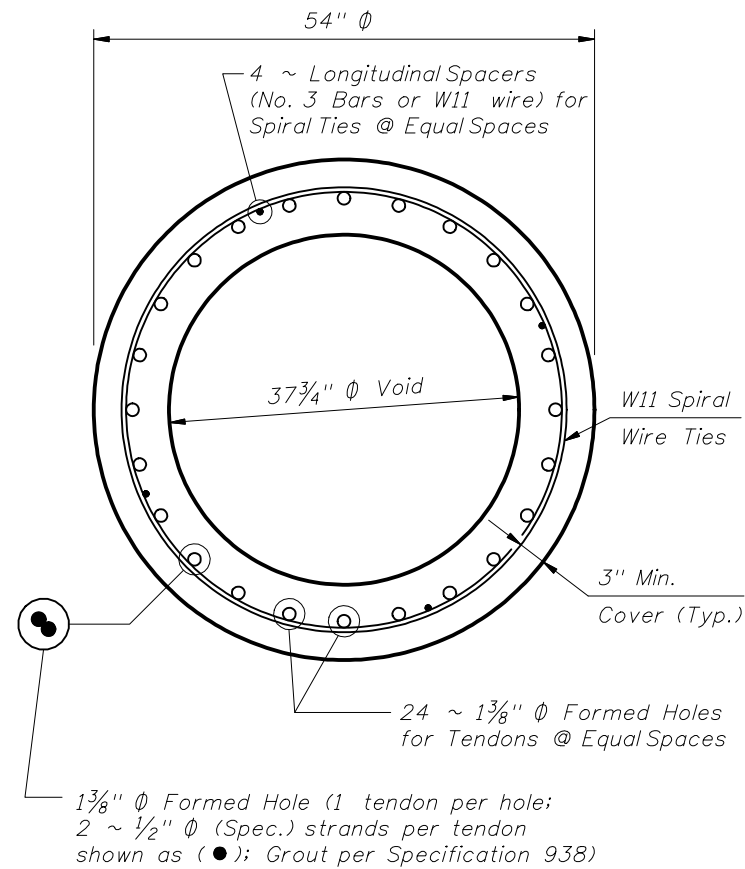
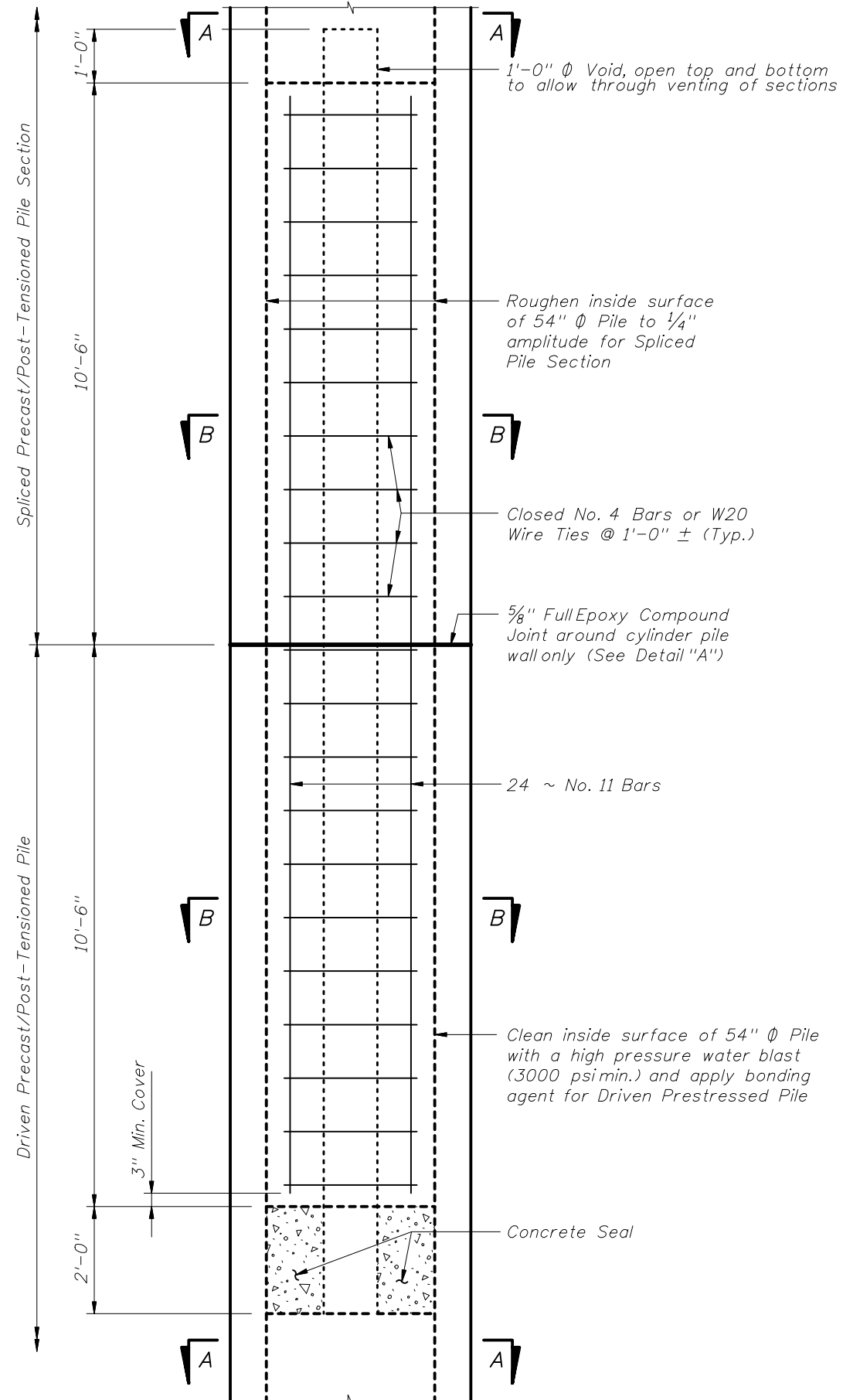
REINFORCING STEEL:
 All reinforcing steel shall be Grade 60, except that smooth steel wire (W11 spiral ties and longitudinal spacers and W20 ties) shall be manufactured from cold drawn steel wire meeting the requirements of ASTM A82.

PRESTRESSING STEEL:
 Prestressing tendons shall be made up of two seven-wire strands. Prestressing strands shall be 1/2" Ø (Spec.), Grade 270 low relaxation, at 33.8 kips.

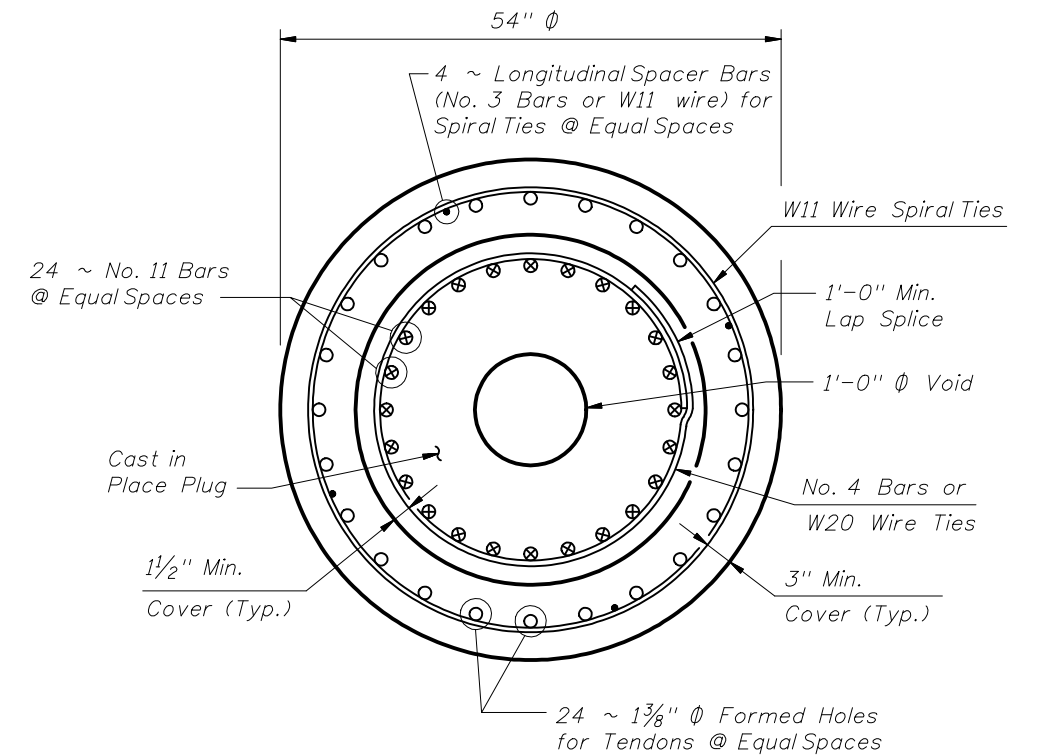
PILE DRIVING AFTER SPLICING:
 Pile splices shall reach a minimum strength of 5500 psi before driving is resumed.

Maximum Pile Length (Feet)	Required Storage and Transportation Detail	Pick-Up Detail
119	2, 3, or 4 point	1 Point
170	2, 3, or 4 point	2 Point

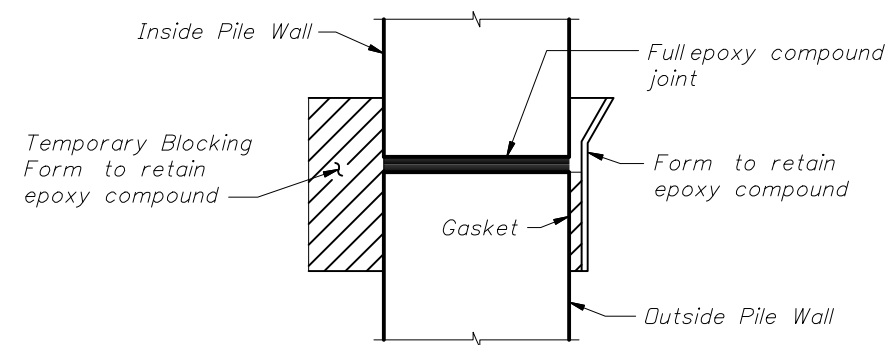




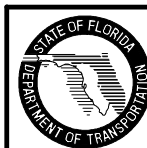
SECTION A-A



SECTION B-B



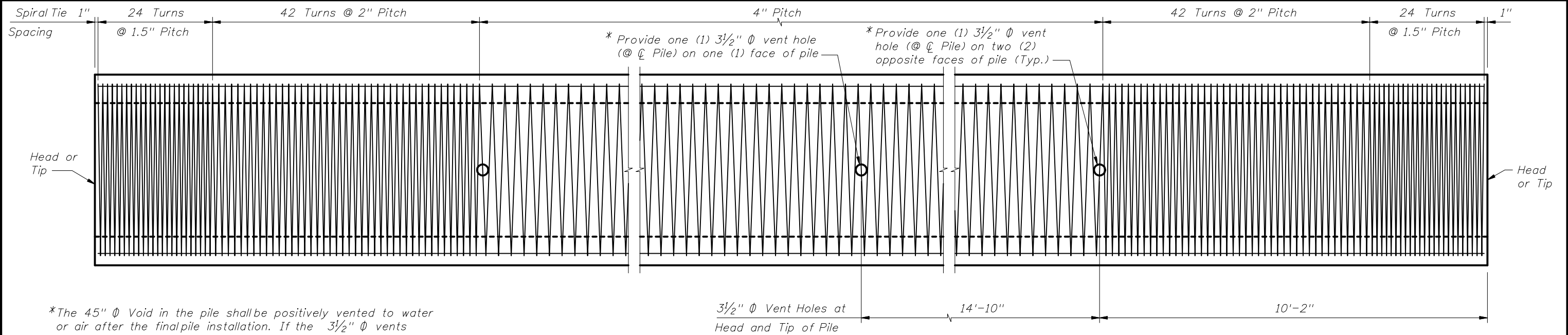
DETAIL "A"



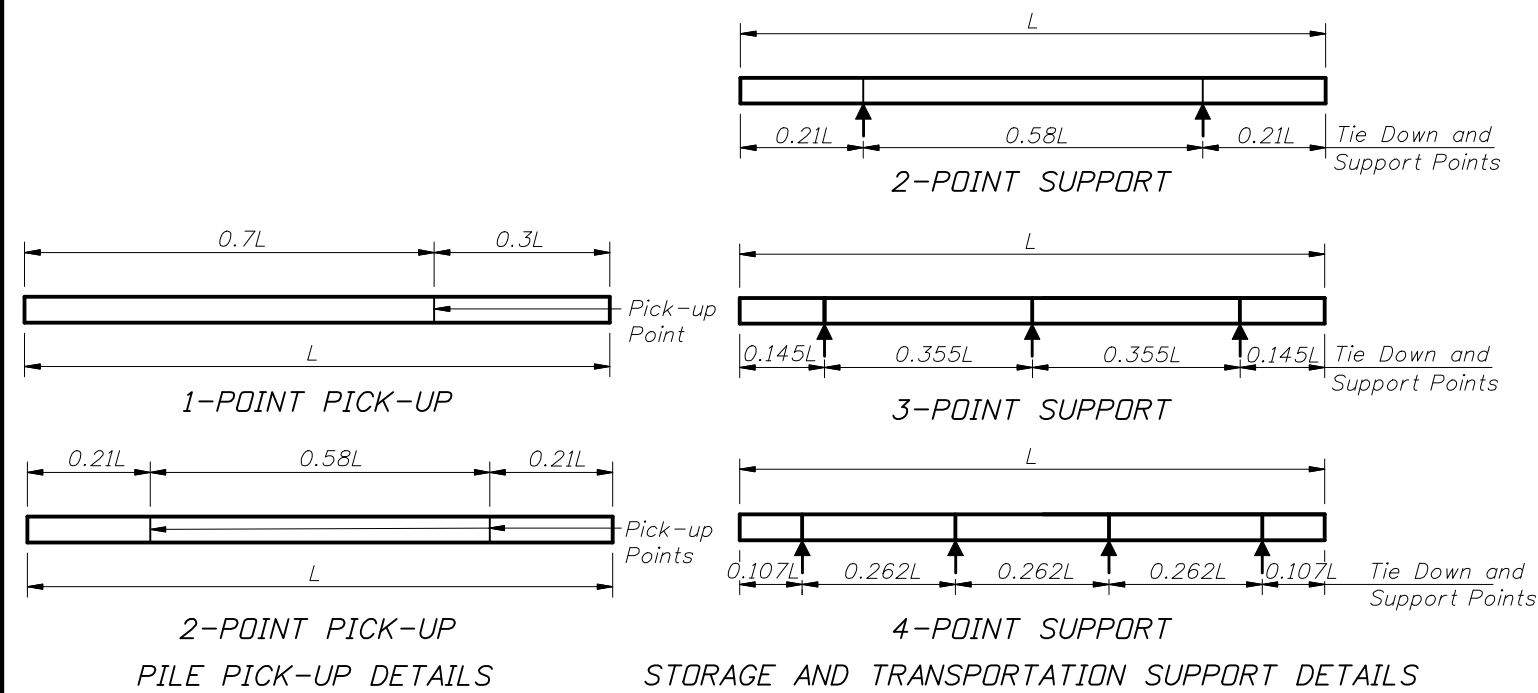
2010 FDOT Design Standards

54" PRECAST/POST-TENSIONED CONCRETE CYLINDER PILE

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20654	



*The 45" Φ Void in the pile shall be positively vented to water or air after the final pile installation. If the 3 1/2" Φ vents are included in the pile cut-off section, then venting shall be provided by the use of a 1" Φ PVC conduit through the substructure cap or column.



Maximum Pile Length (Feet)	Required Storage and Transportation Detail	Pick-Up Detail
122	2, 3, or 4 point	1 Point
174	2, 3, or 4 point	2 Point

NOTES

DESIGN SPECIFICATIONS:
 Florida Department of Transportation (FDOT) "Structures Design Guidelines", Current Edition.
 American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Current Edition.

DESIGN PARAMETERS:
 Prestressed Cylinder Concrete Section: 1,000 psi minimum uniform compression after prestress losses without loads.
 Pick-up, Storage, and Transportation: 0.0 psi tension w/1.5 times pile self weight.

SPIRAL TIES:
 One full wrap of spirals is required at both the head and tip of pile. One half turn required for spiral splices.

CONCRETE CLASS:
 Concrete for all piles shall be Class V (Special). Concrete for pile splices shall be Class IV. See "GENERAL NOTES" in Structures Plans for any specific locations where the use of Silica Fume is required.

CONCRETE STRENGTH:
 The cylinder strength shall be 4,000 psi minimum at time of transfer of the Prestressing Force.

SPLICE BONDING MATERIAL:
 The material to form the joint between pile sections shall be a Type B Epoxy Compound in accordance with Section 926 of the Specifications. The bonding agent used on internal pile surfaces shall be a Type A Epoxy Compound in accordance with Section 926 of the Specifications. Epoxy Compounds used shall be contained on the Qualified Products List (QPL). Use Epoxy Bonding Compound or Epoxy Mortar as recommended by the Manufacturer. For Epoxy Mortar only use sand or other filler material supplied by the manufacturer and in the proportions recommended.

PICK-UP POINTS:
 Piles shall be marked at the pick-up points to indicate proper points for attaching handling lines.

REINFORCING STEEL:
 All reinforcing steel shall be Grade 60, except that smooth steel wire (W11 spiral ties and W20 ties) shall be manufactured from cold drawn steel wire meeting the requirements of ASTM A82.

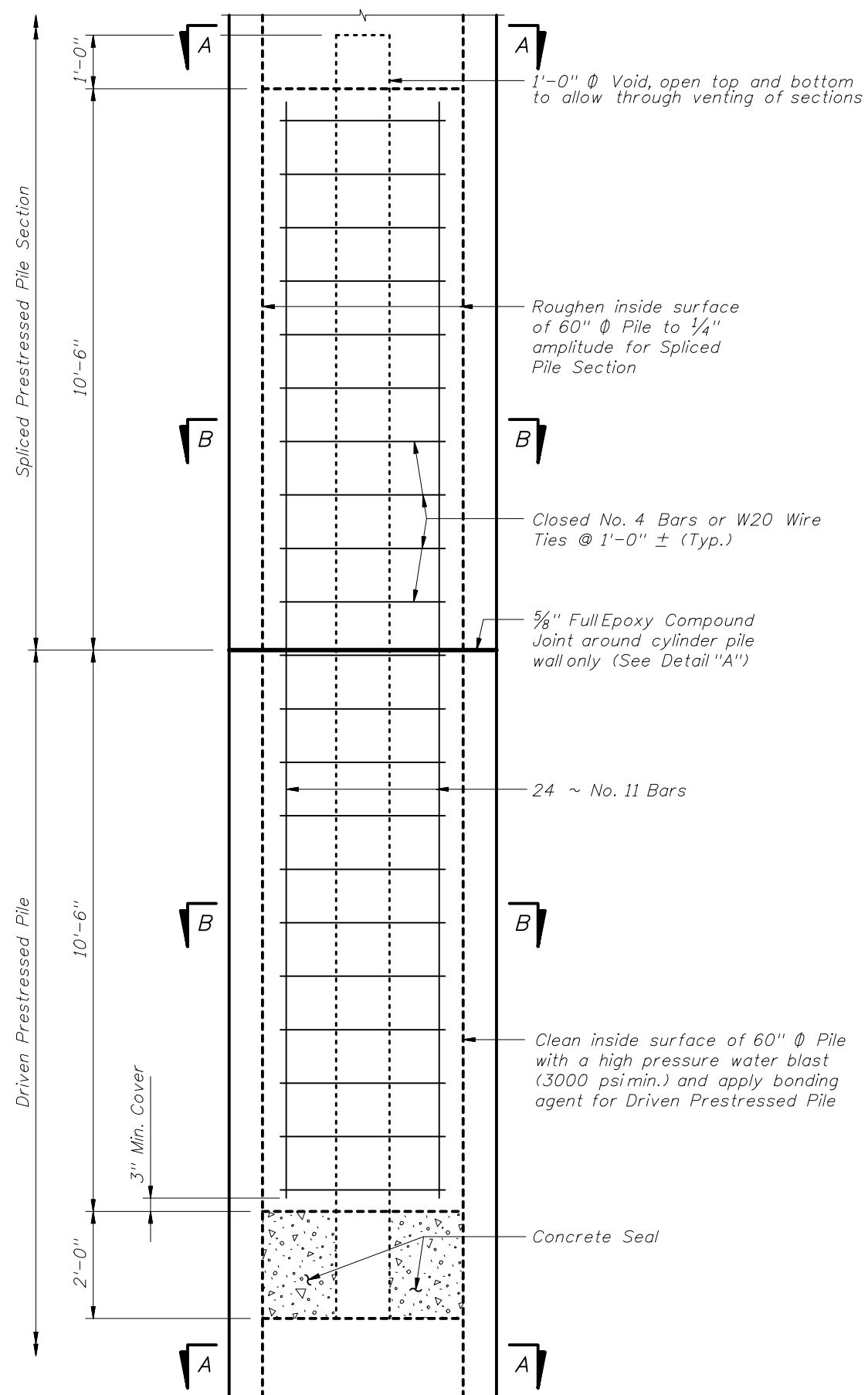
PRESTRESSING STEEL:
 Prestressing steel shall be 0.6" Φ seven-wire strand, Grade 270 low relaxation, at 44.0 kips.

PILE DRIVING AFTER SPLICING:
 Pile splices shall reach a minimum strength of 5500 psi before driving is resumed.

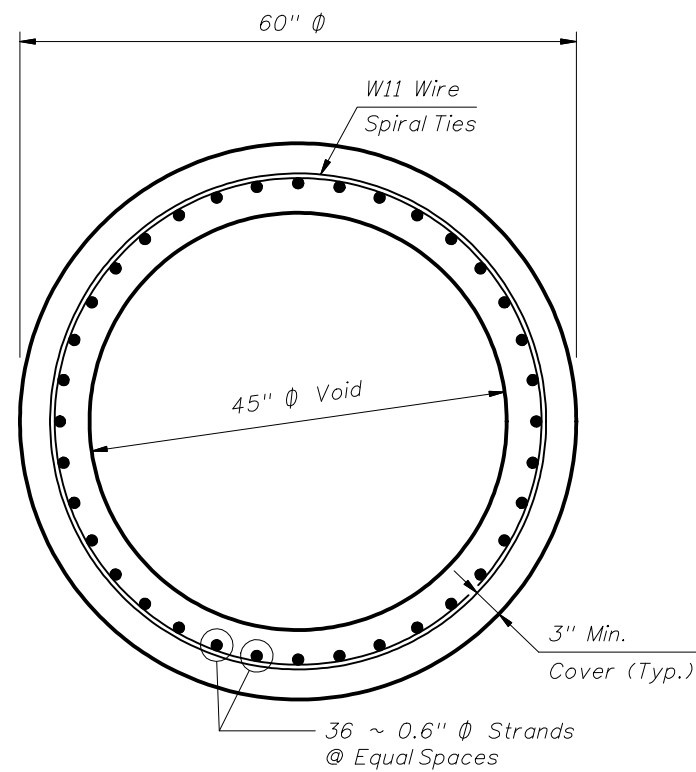


Spliced Prestressed Pile Section

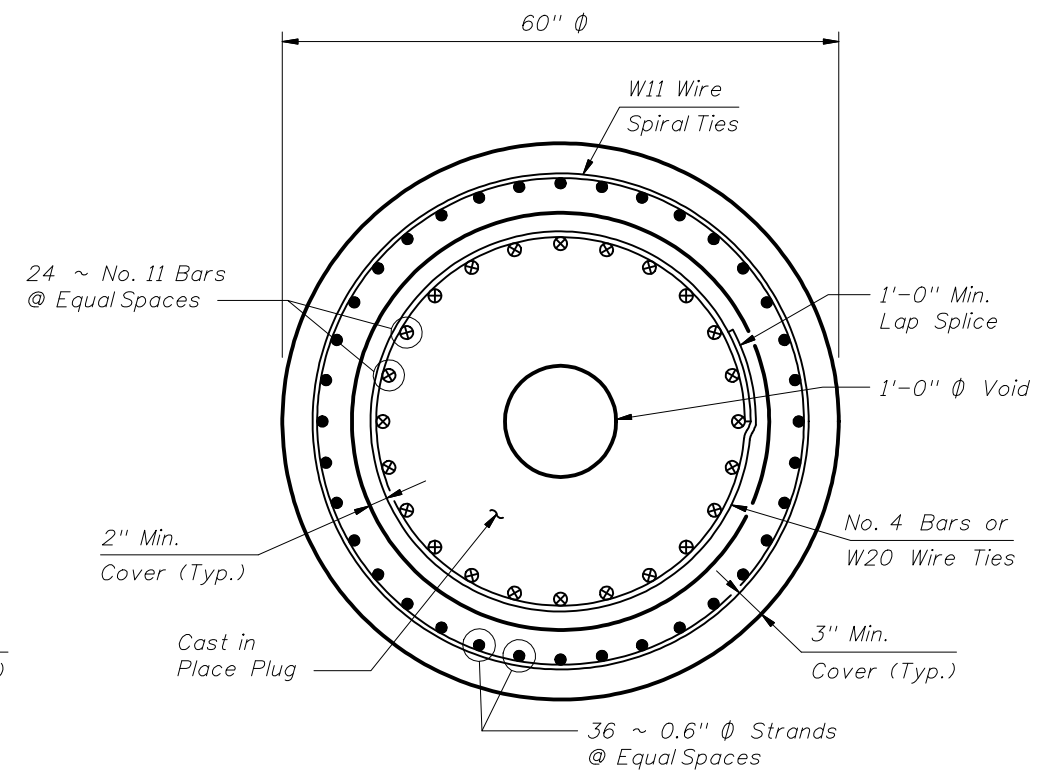
Driven Prestressed Pile



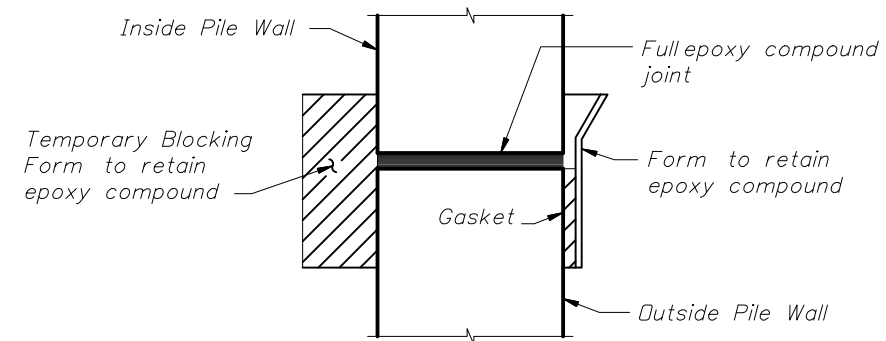
DRIVABLE UNFORESEEN FIELD SPLICE DETAIL
(Cast in Place Plug)



SECTION A-A



SECTION B-B



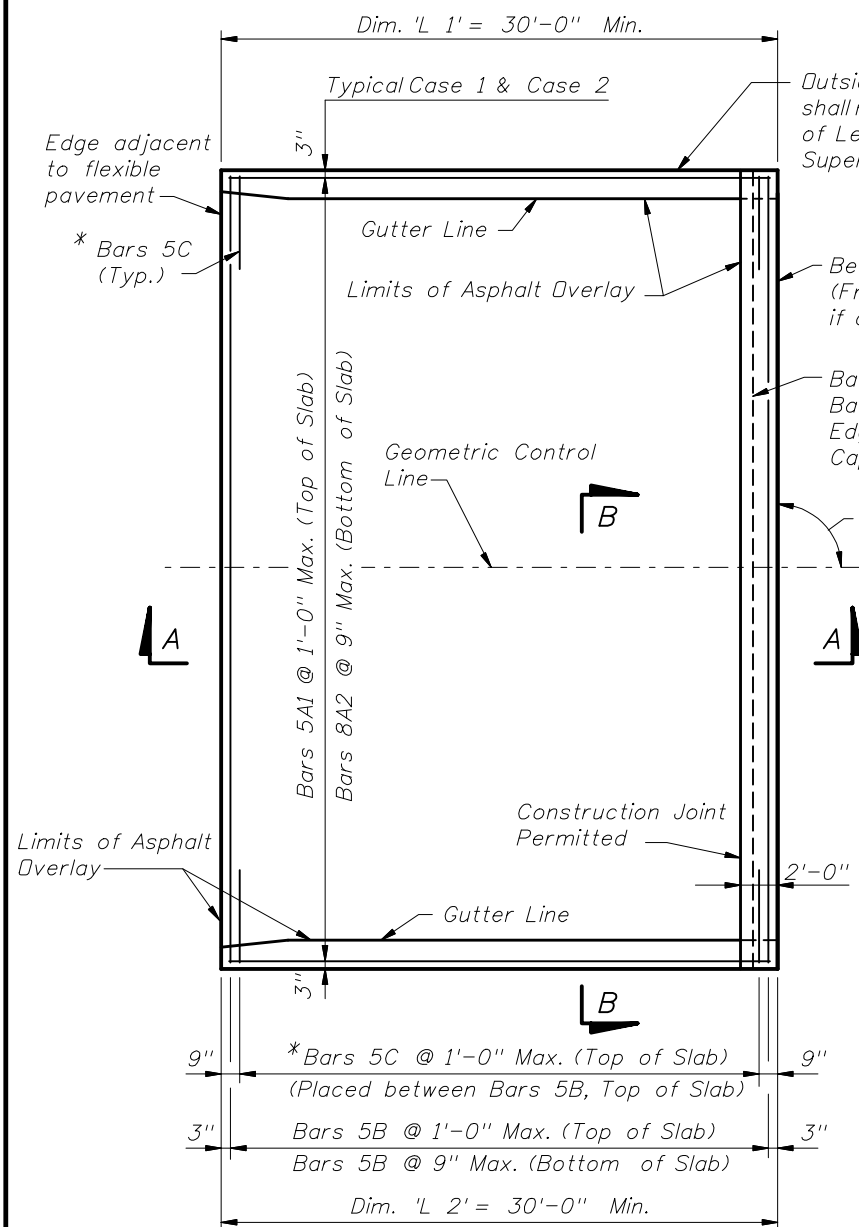
DETAIL "A"



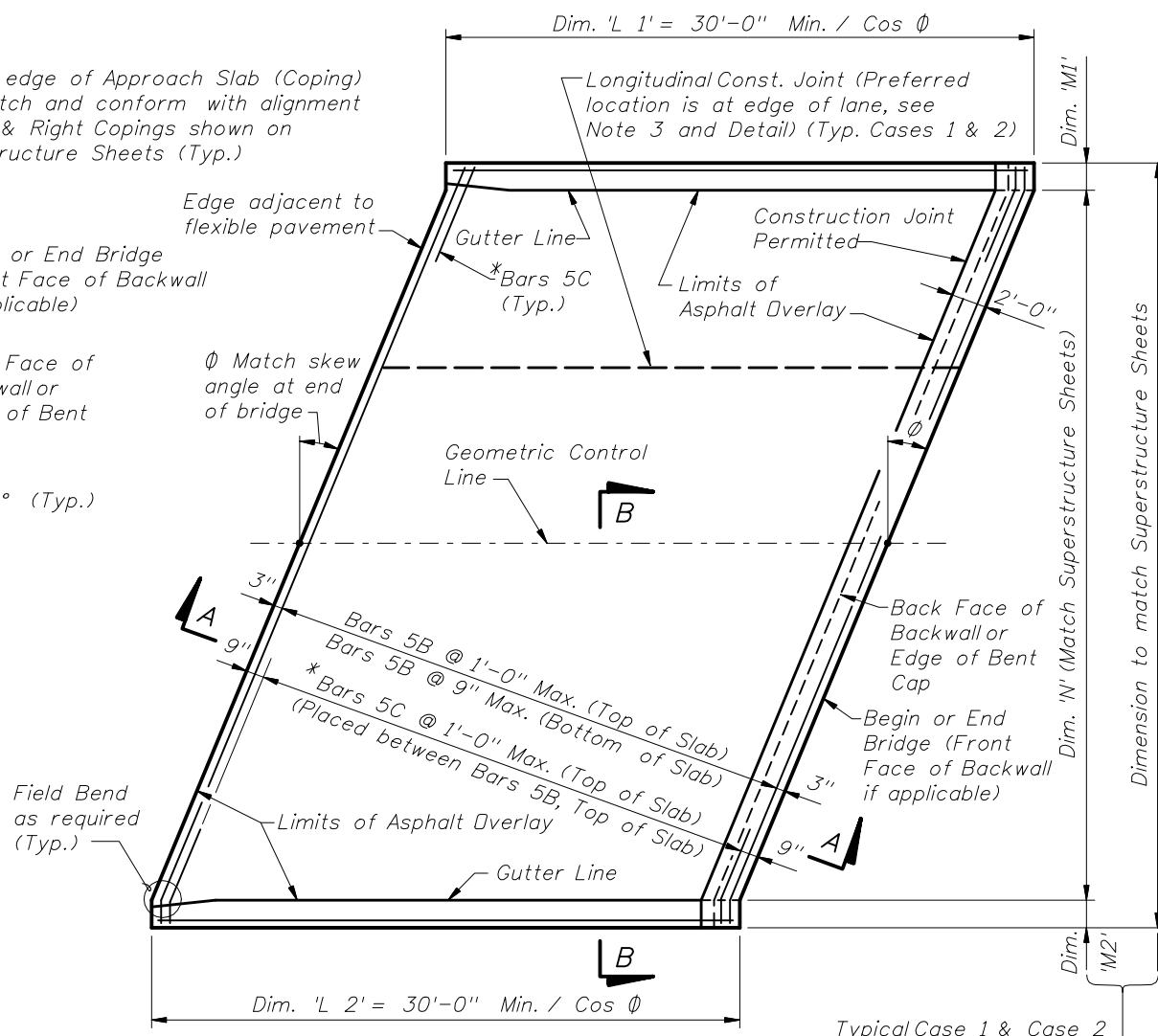
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60" PRESTRESSED CONCRETE CYLINDER PILE

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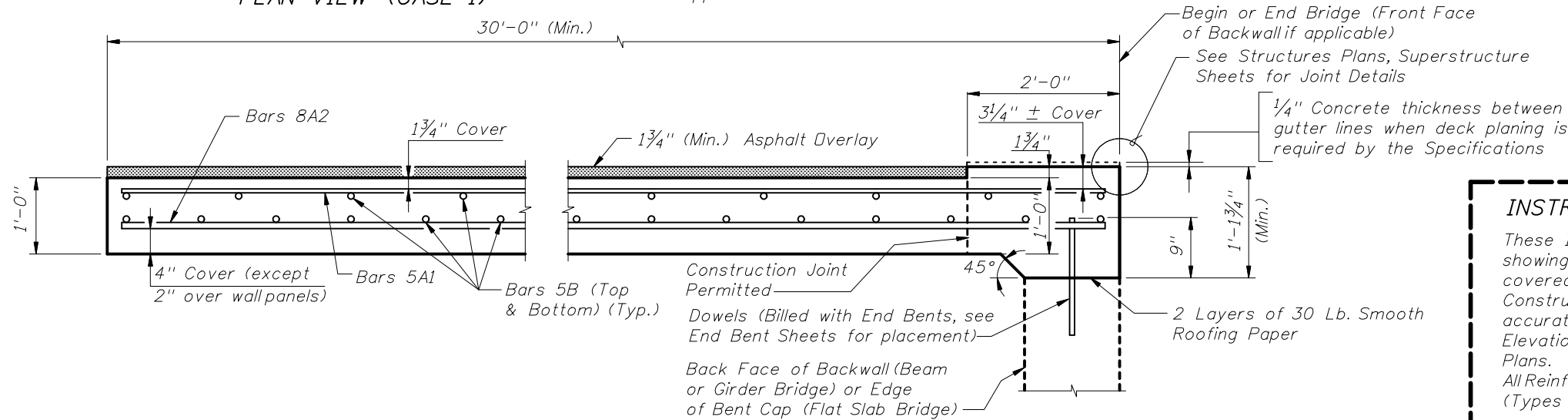


PLAN VIEW (CASE 1)



PLAN VIEW (CASE 2)

*NOTE: Bars 5C are required as shown when either the 32" or 42" F-Shape Traffic Railings or the Traffic Railing/Sound Barrier are used at the edge of the Approach Slab.



SECTION A-A

GENERAL NOTES

1. SURFACE TREATMENT: As an option to Class 4 Floor Finish (Bridge Floor Grooving) per Section 400 a hand tined or heavy broomed finish may be permitted on the concrete portion of the riding surface. Sidewalk areas shall receive a broomed finish. The top surface of the concrete beneath the asphalt overlay shall be raked.
2. UTILITIES: If required, see Structures Plans, Utility Conduit Detail Sheets for details.
3. When a longitudinal construction joint is necessary or allowed by the Engineer, the transverse steel shall be extended as shown in the Longitudinal Construction Joint Detail.
4. The plan view for CASE 1 applies when the skew angle (Φ) = 0°.
5. The plan view for CASE 2 applies where the skew angle (Φ) is > 0°. The slab shown represents a skew to the right for an approach slab at begin bridge; approach slab at the end of bridge or a left skew shall be treated similarly.
6. Railings, parapets and traffic separators shall be provided as shown in Structures Plans. Payment for these items shall be included in the pay item for the required item. Raised sidewalks shall be provided as shown in the Structures Plans. Payment shall be included in the pay items for approach slab concrete and reinforcement. Welded Wire Reinforcement for the edge of Approach Slabs on retaining wall is not included in the estimated quantity for reinforcing steel and is considered incidental to the work. Welded Wire Reinforcement shall conform to ASTM A185.
7. ASPHALT OVERLAY: Payment for asphalt overlay items is included in Roadway Pay Items. Continue the asphalt pavement over the approach slab and match the friction course type used on the roadway. For FC-5, place the final structural course 1.0" thick and the friction course 0.75" thick. For FC-9.5, place the final structural course 0.75" thick and the friction course 1.0" thick. For FC-12.5, place the friction course in one layer 1.75" thick.
8. Approach slabs shown in Plan View Cases 1 and 2 represent a typical approach slab with edge barriers and no sidewalks. See additional approach slab sheets for sidewalk and other pertinent details.
9. CONCRETE: Provide Class II (Bridge Deck) concrete for approach slabs.

CROSS REFERENCES:

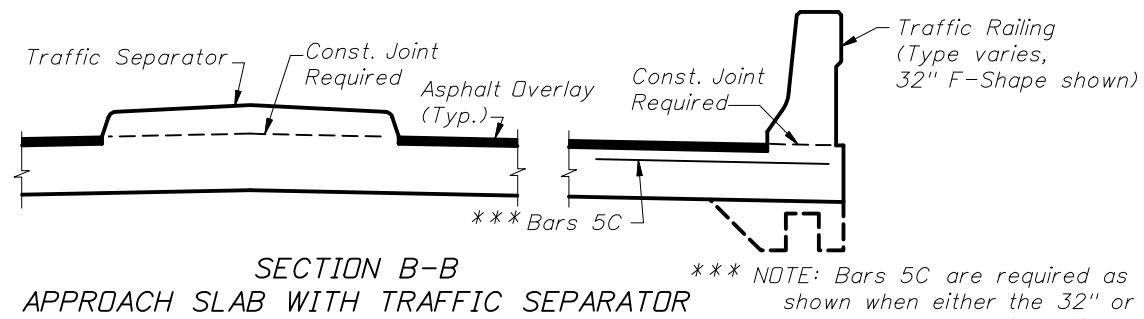
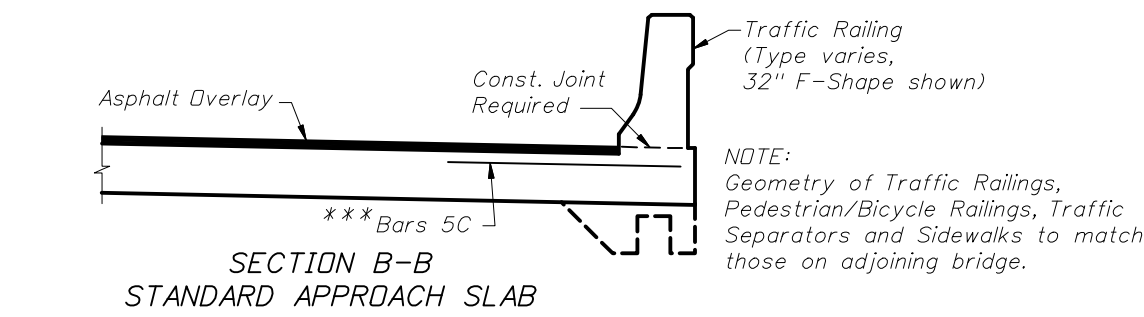
For Section B-B, Longitudinal Construction Joint Detail and Approach Slab Details see Sheet 2.

For Estimated Quantities see Structures Plans.

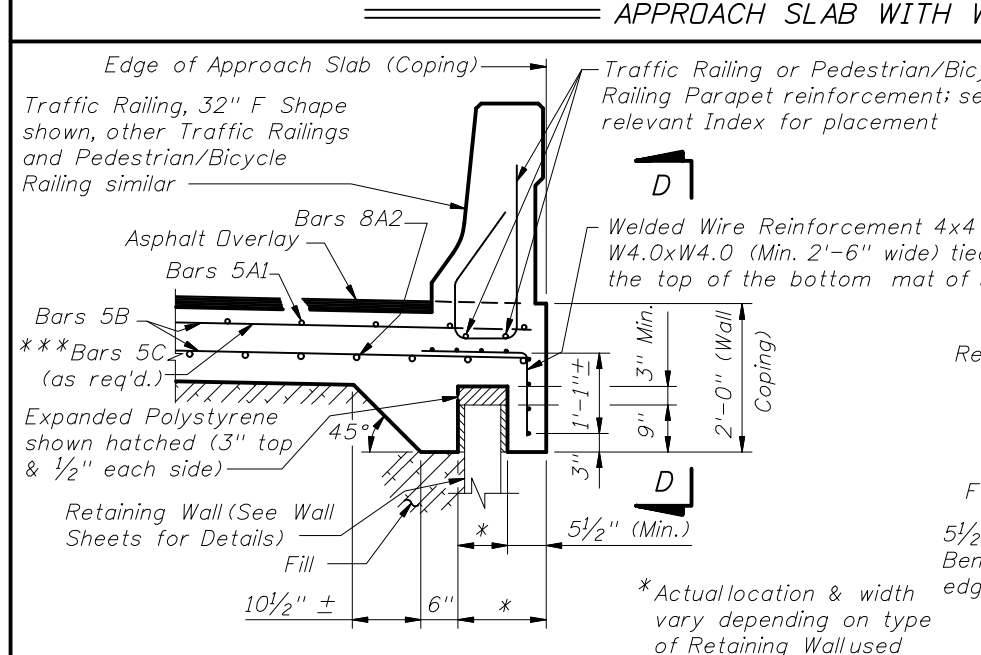
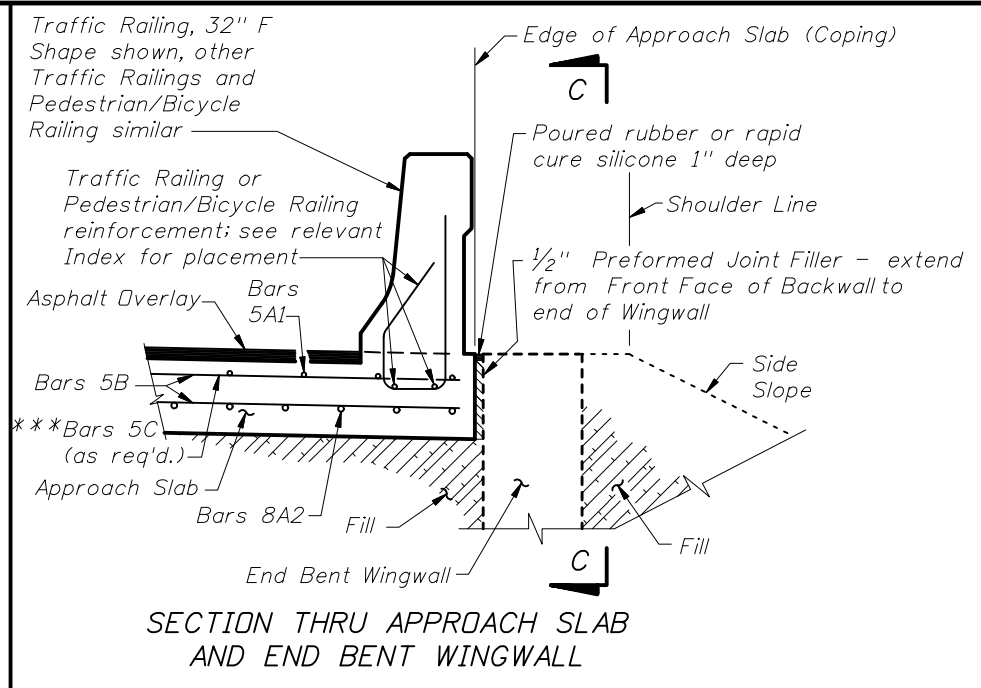
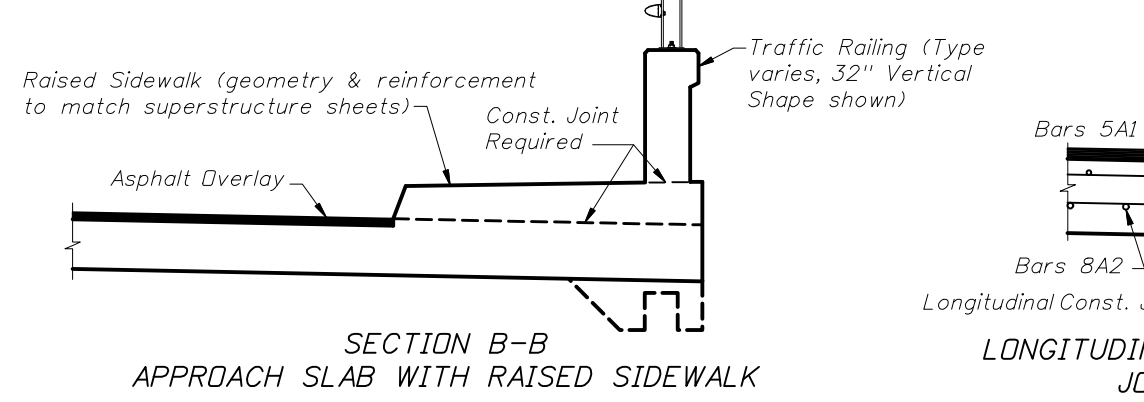
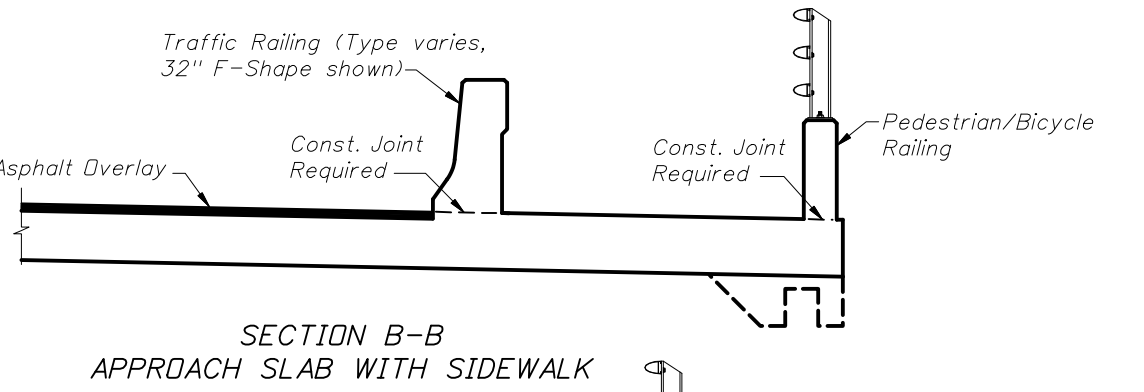
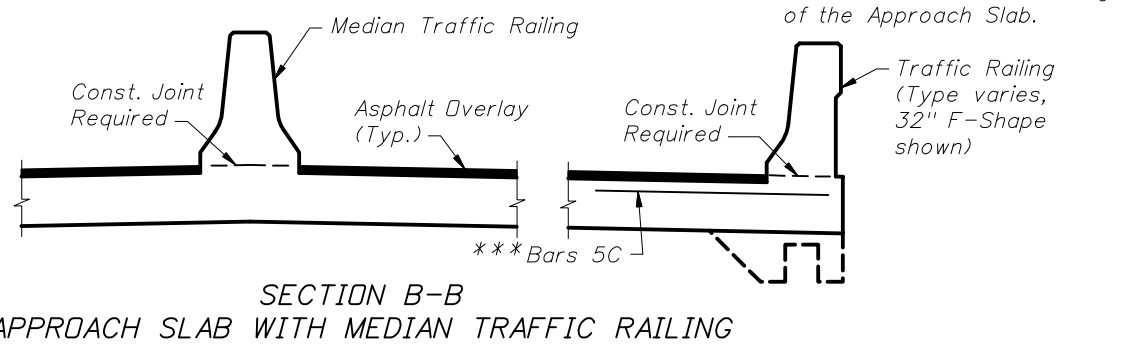
INSTRUCTIONS TO DESIGNER:

These Indexes shall be supplemented in Structures Plans with additional sheets showing as a minimum a Plan View with geometry and pertinent information not covered by these Indexes e.g. Survey Lines, PGL, Direction of Stationing, Phase Construction Joints, Raised Sidewalks and any other information necessary to accurately complete detailing of the Approach Slabs. Approach Slab Finish Grade Elevations shall be included with the Bridge Finish Grade Elevations in the Structures Plans. All Reinforcing bars are to be shown in the Reinforcing Steel List as straight bars (Types 1 and 2). Bars 5C are 5'-0" long.

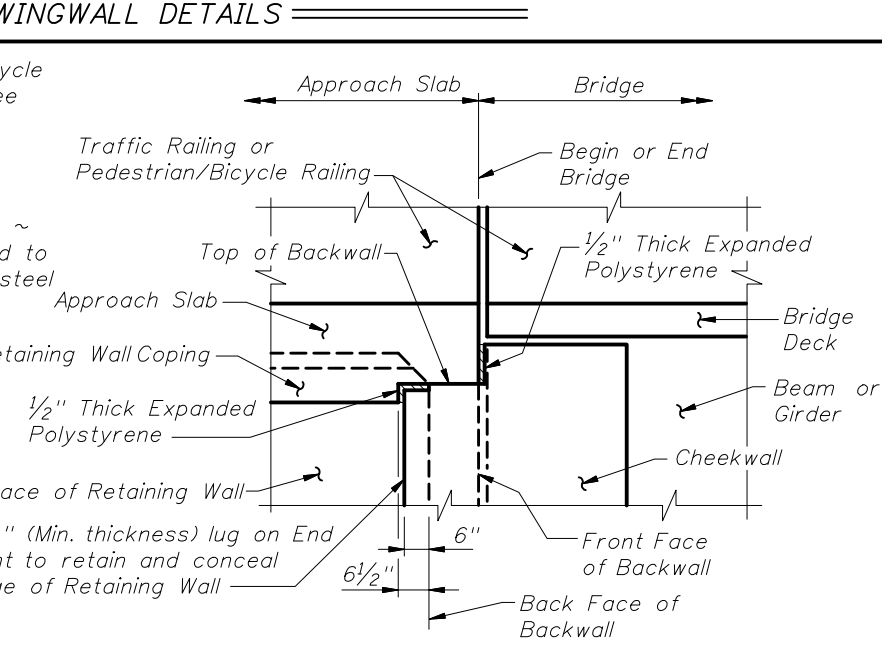
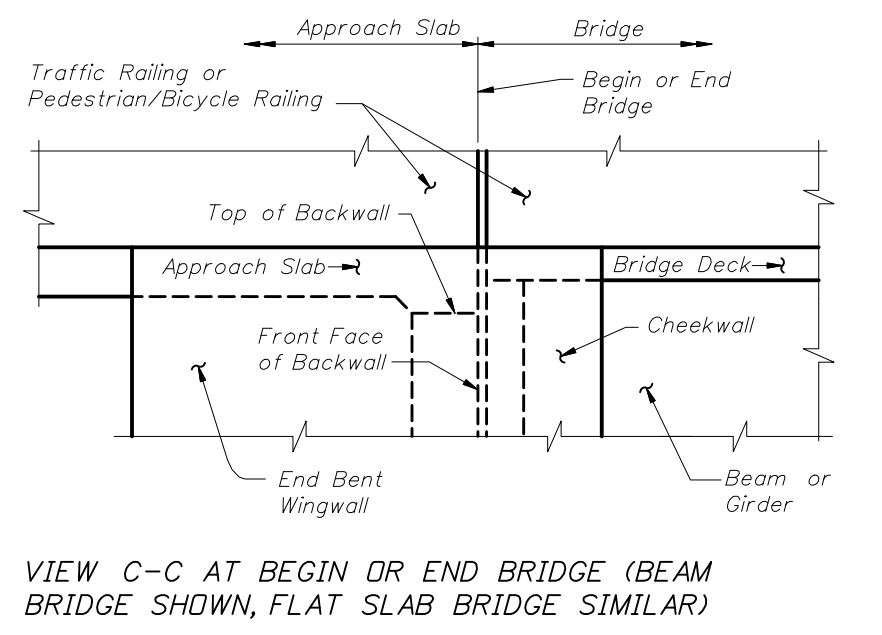
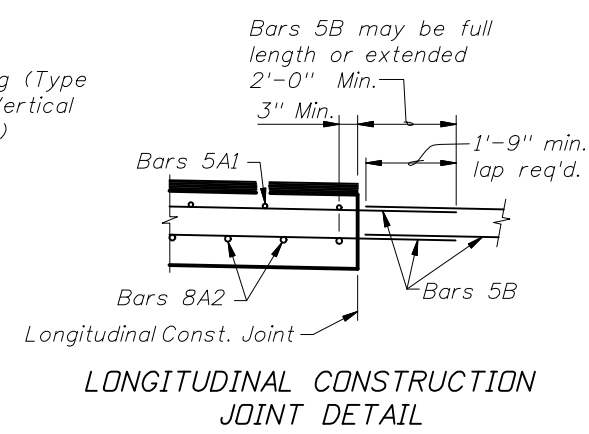




*** NOTE: Bars 5C are required as shown when either the 32" or 42" F-Shape Traffic Railing or the Traffic Railing/Sound Barrier are used at the edge of the Approach Slab.

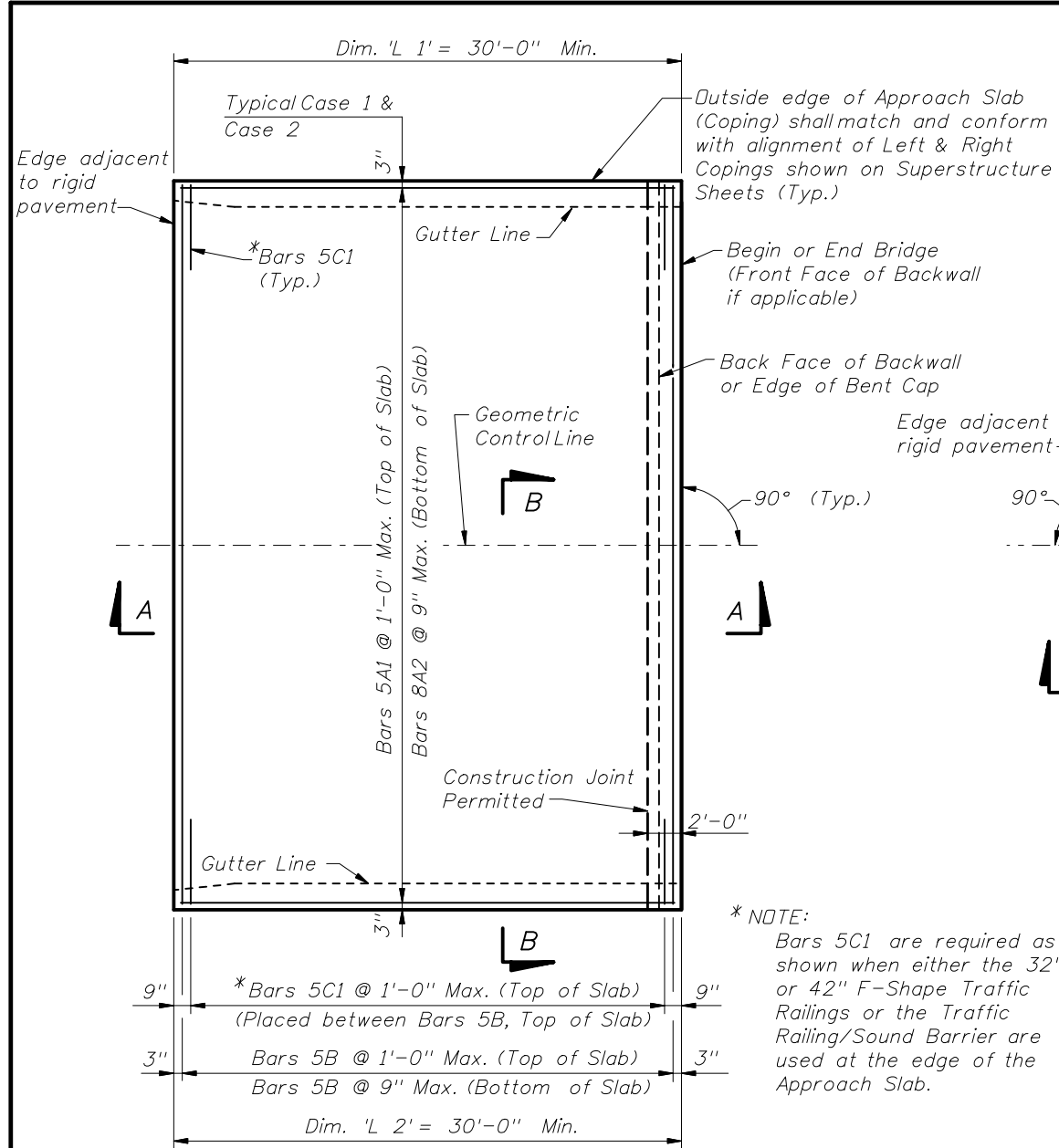


SECTION THRU APPROACH SLAB AND RETAINING WALL
 APPROACH SLAB WITH RETAINING WALL DETAILS

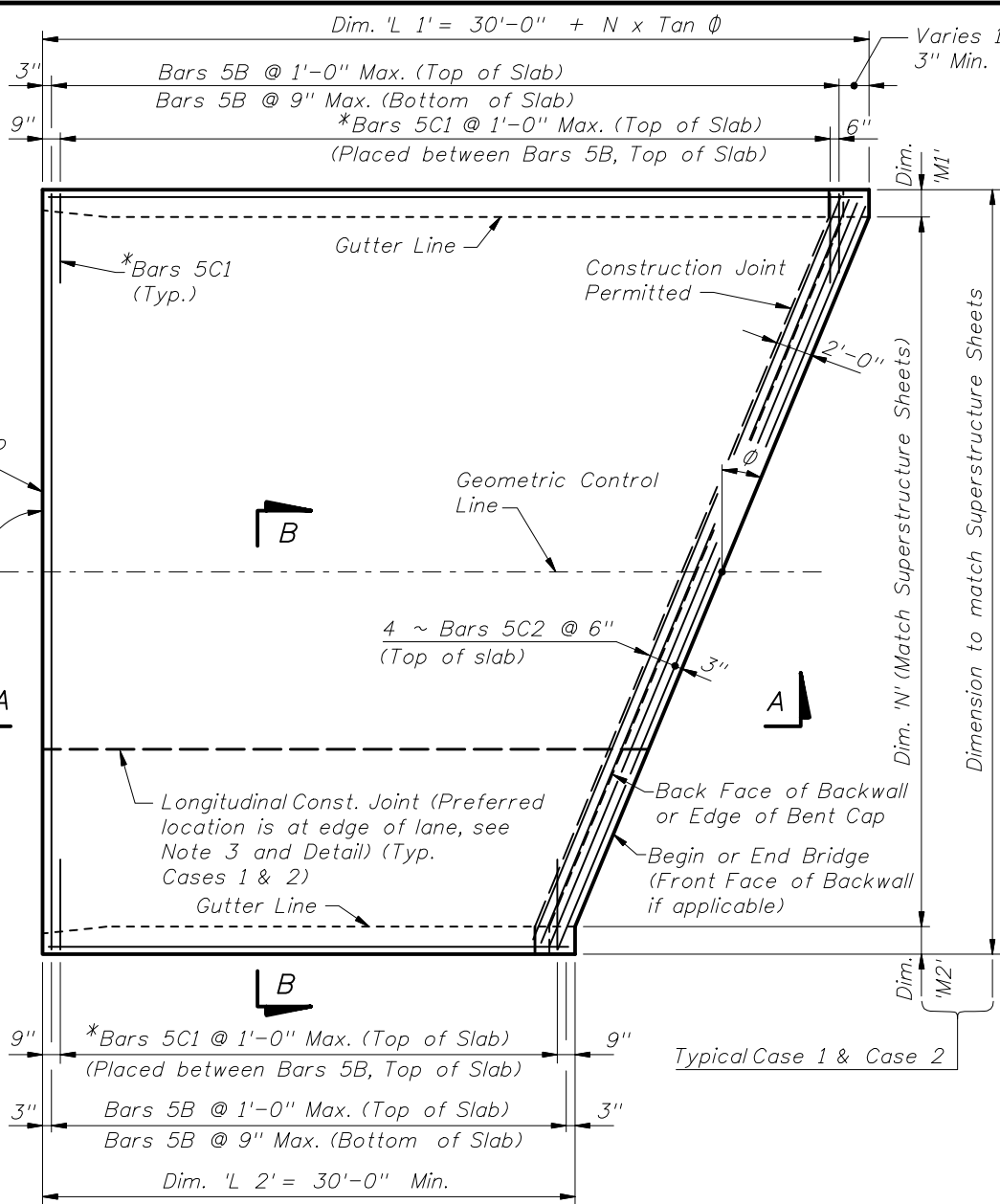


VIEW D-D AT BEGIN OR END BRIDGE (BEAM BRIDGE SHOWN, FLAT SLAB BRIDGE SIMILAR)
 APPROACH SLAB WITH RETAINING WALL DETAILS

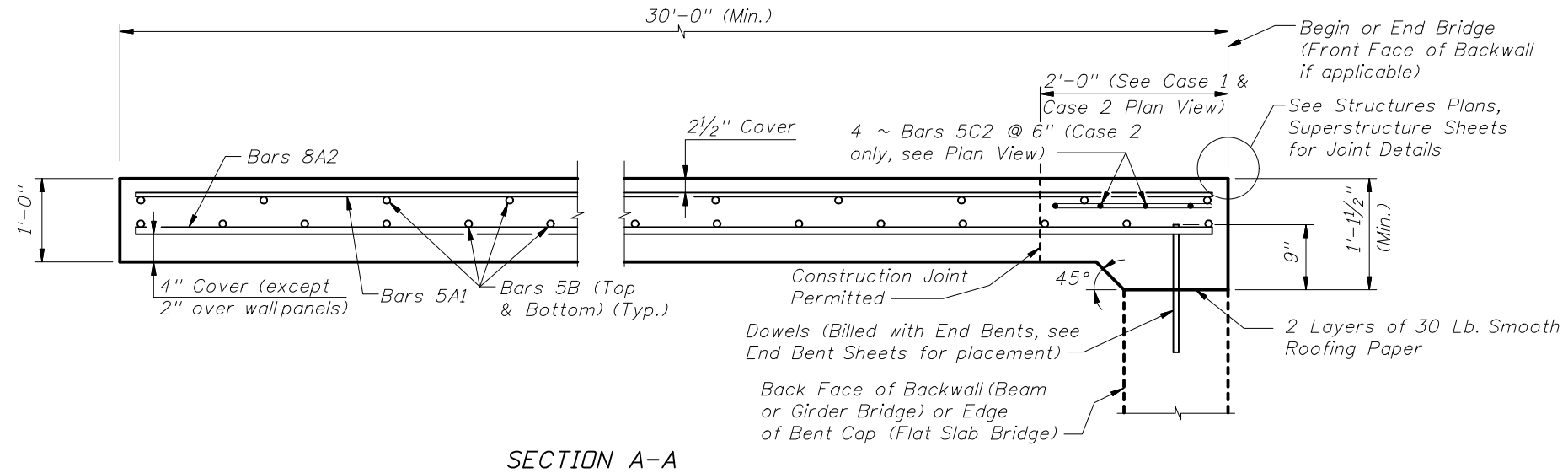
CROSS REFERENCES:
 For location of Section B-B and Longitudinal Construction Joint Detail see Index No. 20900, Sheet 1.



PLAN VIEW (CASE 1)



PLAN VIEW (CASE 2)



SECTION A-A

GENERAL NOTES

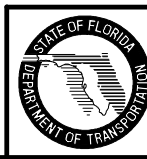
1. SURFACE TREATMENT: Apply a Class 4 Floor Finish (Grooved) to the riding surface from begin or end approach slab joint to begin or end bridge. See Bid Item Notes. Apply a broomed finish to sidewalk areas.
2. UTILITIES: If required, see Structures Plans, Utility Conduit Detail Sheet for details.
3. When a longitudinal construction joint is necessary or allowed by the Engineer, the transverse steel shall be extended as shown in the Longitudinal Construction Joint Detail.
4. The plan view for CASE 1 applies when the skew angle (ϕ) = 0°. Relevant details also apply to CASE 2.
5. The plan view for CASE 2 applies where the skew angle (ϕ) is > 0°. The slab shown represents a skew to the right for an approach slab at begin bridge; approach slab at the end of bridge or a left skew shall be treated similarly. The shown reinforcement shall be utilized, and Dowels shall be provided in accordance with Index Nos. 305 and 306.
6. Railings, parapets and traffic separators shall be provided as shown in Structures Plans. Payment for these items shall be included in the pay item for the required item. Raised sidewalks shall be provided as shown in Structures Plans. Payment shall be included in the pay items for approach slab concrete and reinforcement. Welded Wire Reinforcement for the edge of Approach Slabs on retaining wall is not included in the estimated quantity for reinforcing steel and is considered incidental to the work. Welded Wire Reinforcement shall conform to ASTM A185.
7. PROFILOGRAPH: If profilograph requirements apply, planing may be required. The permitted construction joint shown in Section A-A will facilitate the placement of the expansion joint.
8. Approach slabs shown in Plan View Cases 1 and 2 represent a typical approach slab with edge barriers and no sidewalks. See additional approach slab sheets for sidewalk and other pertinent details.
9. CONCRETE: Provide Class II (Bridge Deck) concrete for approach slabs.

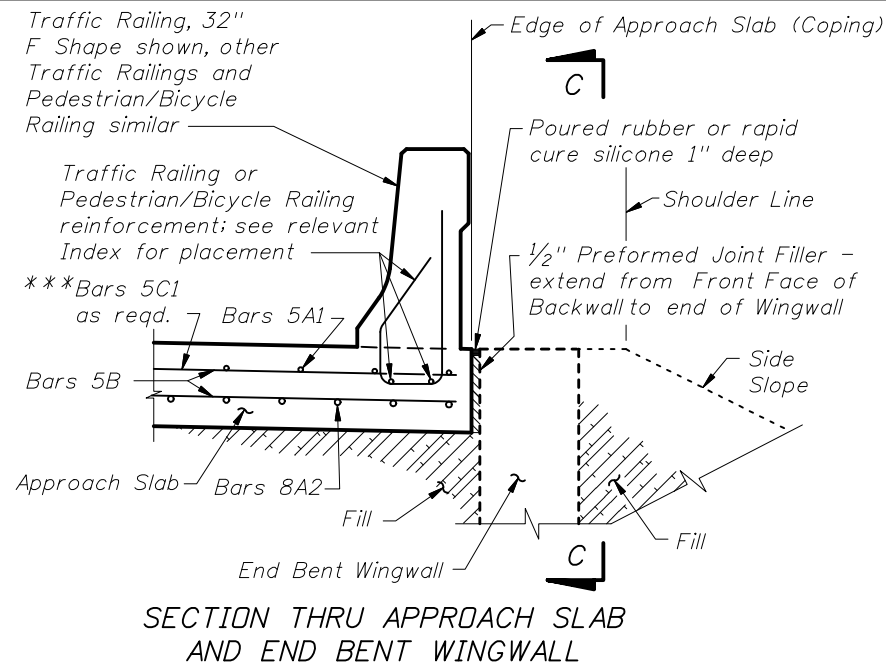
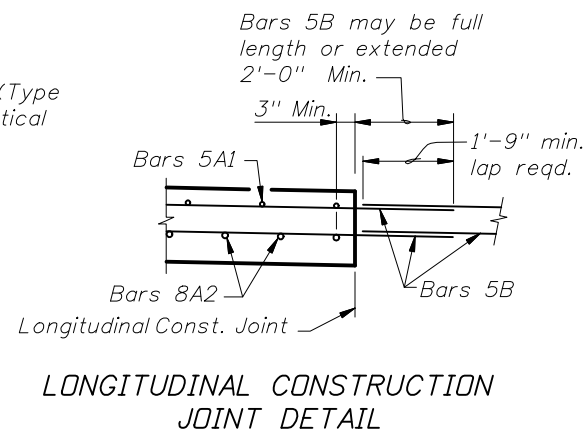
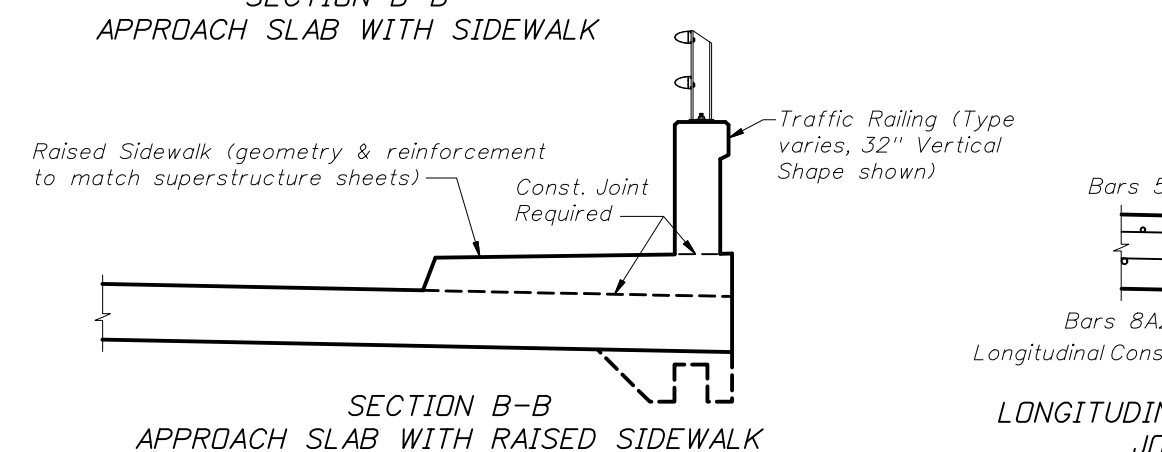
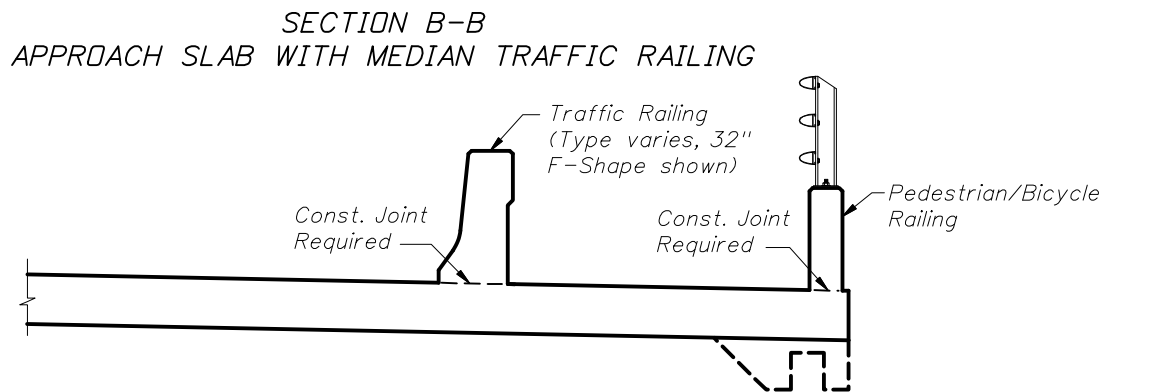
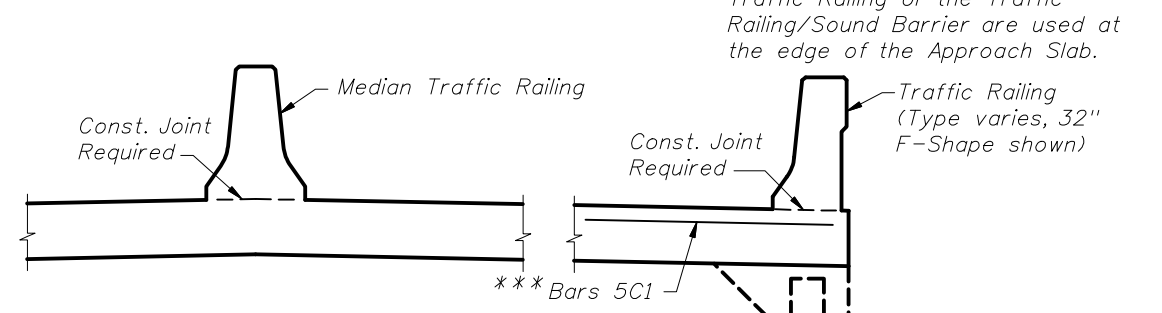
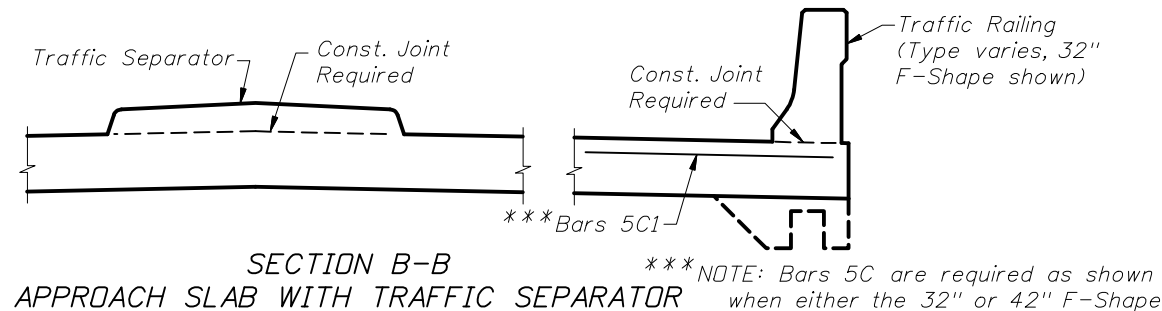
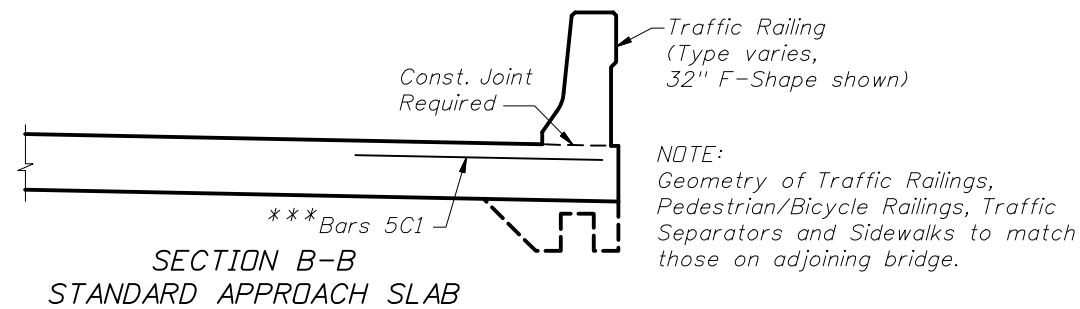
CROSS REFERENCES:

For Section B-B, Longitudinal Construction Joint Detail and Approach Slab Details see Index No. 20910, Sheet 2.

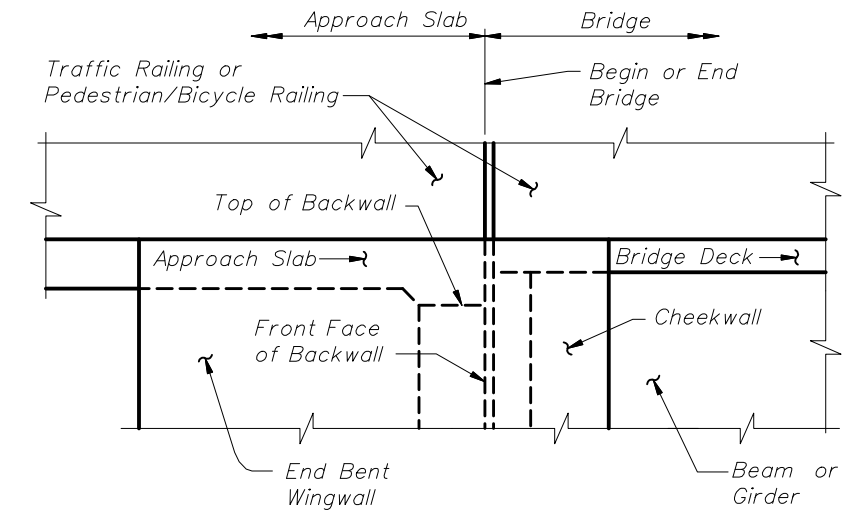
For Estimated Quantities see Structures Plans.

INSTRUCTIONS TO DESIGNER:
 These Indexes shall be supplemented in Structures Plans with additional sheets showing as a minimum a Plan View with geometry and pertinent information not covered by these Indexes e.g., Survey Lines, PGL, Direction of Stationing, Phase Construction Joints, Raised Sidewalks and any other information necessary to accurately complete detailing of the Approach Slabs. Approach Slab Finish Grade Elevations shall be included with the Bridge Finish Grade Elevations in the Structures Plans.
 All Reinforcing bars are to be shown in the Reinforcing Steel List as straight bars (Types 1 and 2). Bars 5C are 5'-0" long.



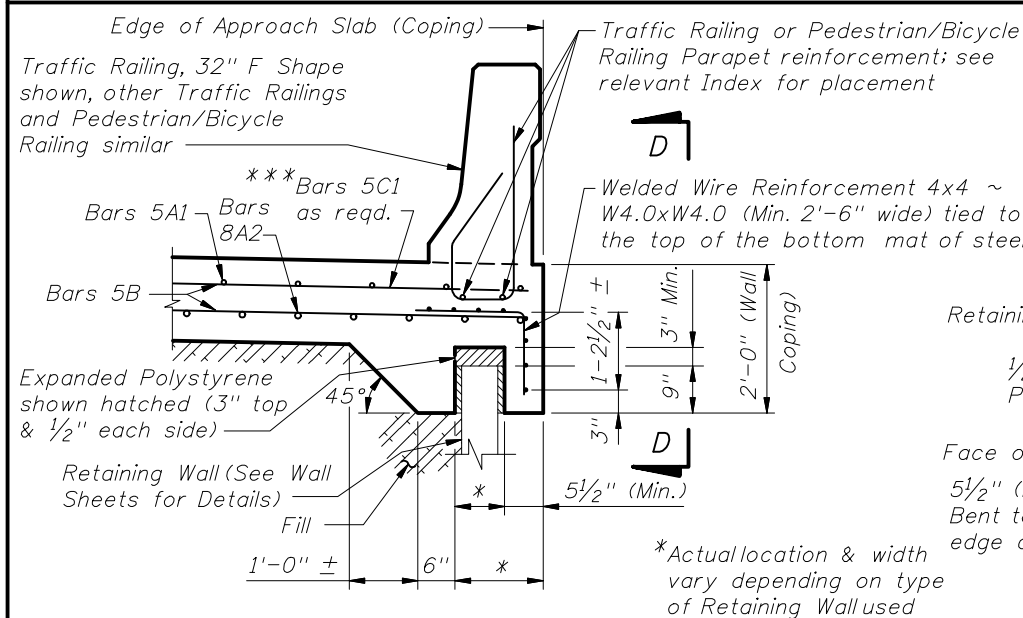


SECTION THRU APPROACH SLAB AND END BENT WINGWALL

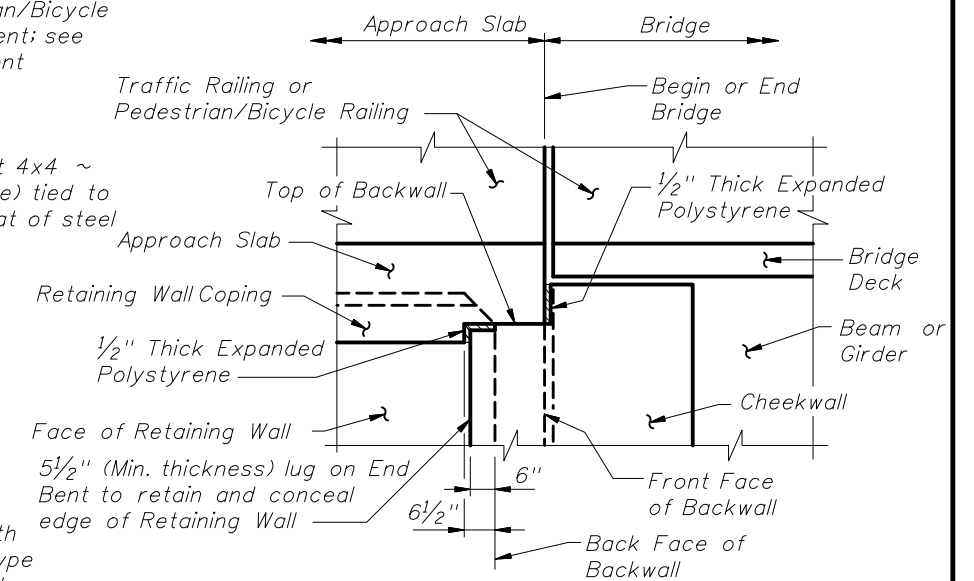


VIEW C-C AT BEGIN OR END BRIDGE (BEAM BRIDGE SHOWN, FLAT SLAB BRIDGE SIMILAR)

APPROACH SLAB WITH WINGWALL DETAILS



SECTION THRU APPROACH SLAB AND RETAINING WALL

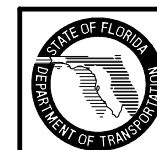


VIEW D-D AT BEGIN OR END BRIDGE (BEAM BRIDGE SHOWN, FLAT SLAB BRIDGE SIMILAR)

APPROACH SLAB WITH RETAINING WALL DETAILS

CROSS REFERENCES:

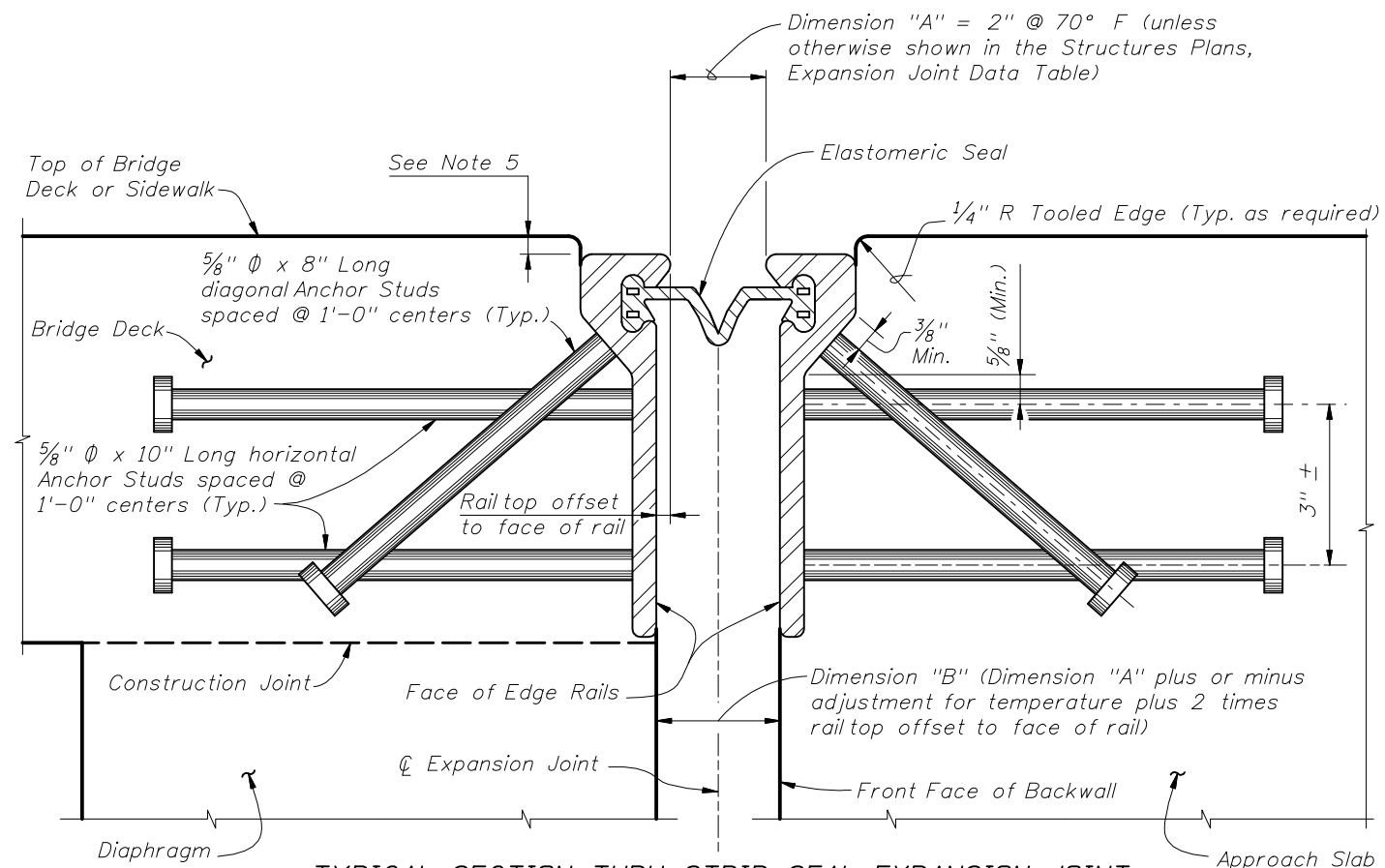
For location of Section B-B and Longitudinal Construction Joint Detail see Index No. 20910, Sheet 1.



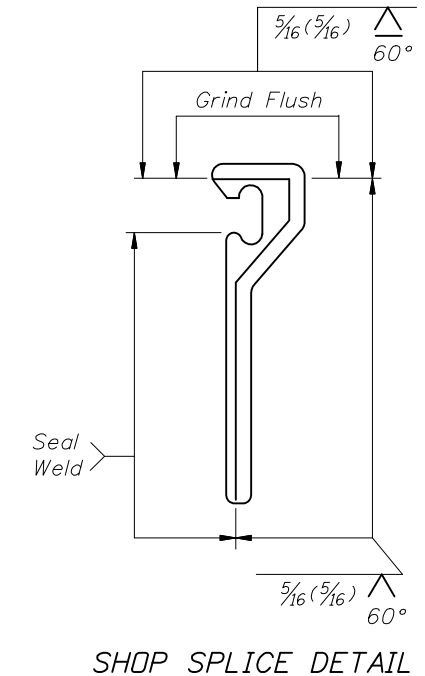
2010 FDOT Design Standards

APPROACH SLABS
(RIGID PAVEMENT APPROACHES)

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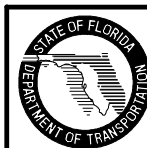
TYPICAL SECTION THRU STRIP SEAL EXPANSION JOINT
 (Begin or End Concrete Girder Bridge shown, Intermediate Supports and Steel Girder Bridge similar. Reinforcing Steel and Girder details not shown for clarity.)

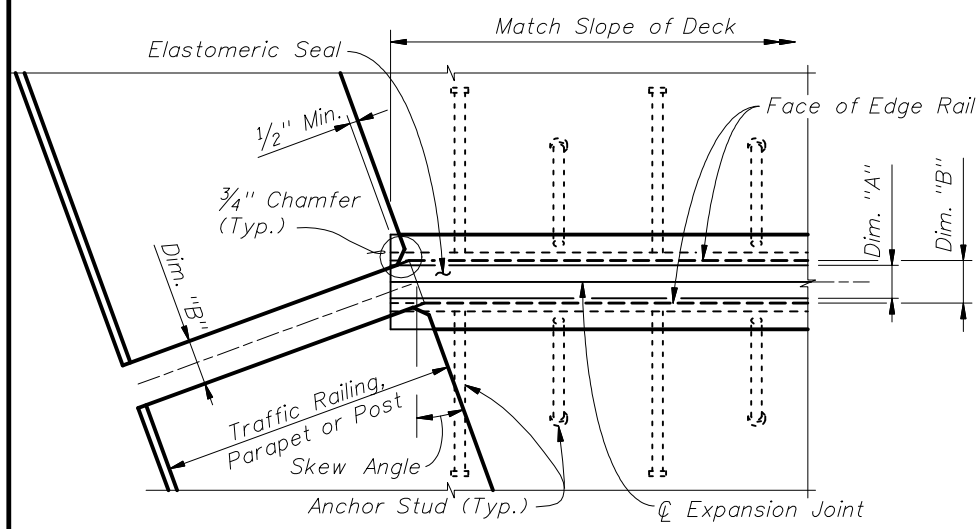


INSTRUCTIONS TO DESIGNER:
 Complete the Expansion Joint Data Table in Structures Plans with project specific information.

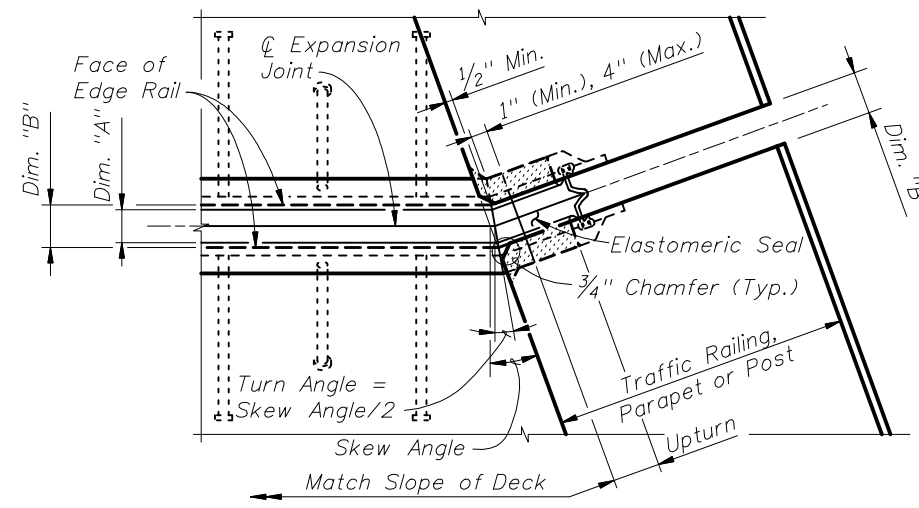
GENERAL NOTES:

1. Furnish Strip Seal Expansion Joint Systems in accordance with Specification Section 458, ASTM D5973 and the AASHTO LRFD Bridge Design Specifications.
2. Furnish solid steel Edge Rails in accordance with ASTM A709, Grade 36, 50 or 50(W) that are extruded, hot rolled and or machined. Furnish Edge Rails with a minimum mass of 19.2 lb/ft excluding studs, a minimum height of 8", a minimum thickness of 1/2" and a maximum top surface (riding surface) width of 2". Shape of Edge Rail shown is representative, minor variations depending on manufacturer are permitted. Edge Rails manufactured from bent plate or built up pieces are not acceptable.
3. Furnish Anchor Studs in accordance with ASTM A108. Electric arc end-weld Anchor Studs with complete fusion. Anchor Studs may be piggy backed to achieve required lengths.
4. When required, furnish 1/4" thick slip resistant steel Sidewalk Cover Plates in accordance with ASTM A709, Grade 36 or 50, with a minimum coefficient of friction on the top surface of 0.8 in a dry condition as determined by ASTM F1677 or F1679 and 0.68 or 0.52 in a wet condition as determined by ASTM F1679 or ASTM F1677 (respectively); that incorporate an anti-slip steel surface consisting of a random hatch matrix or other suitable pattern. Do not use diamond plate or surface applied slip resistant tapes, films, nonmetallic coatings or other similar materials. Furnish flat head Stainless Steel Sleeve Anchors in accordance with ASTM F593 Group 1 Alloy 304 for attaching Sidewalk Cover Plates. Install Sleeve Anchors in accordance with manufacturer's recommendations.
5. Recess the Edge Rail below the concrete surface in accordance with Specification Section 458.
6. Refer to Specification 458 and the Expansion Joint Data Table in the Structures Plans for installation and fabrication requirements and adjustments to Dimension "A".
7. Manufacturers seeking approval of Strip Seal Expansion Joint Systems for inclusion on the Qualified Products List as pre-approved designs must submit application along with design documentation showing the expansion joint meets the specification, geometric and material requirements specified herein. Include installation details consisting of temporary or sacrificial support brackets, bolts, clamps, etc. that are compatible with decks constructed with or without blockouts.

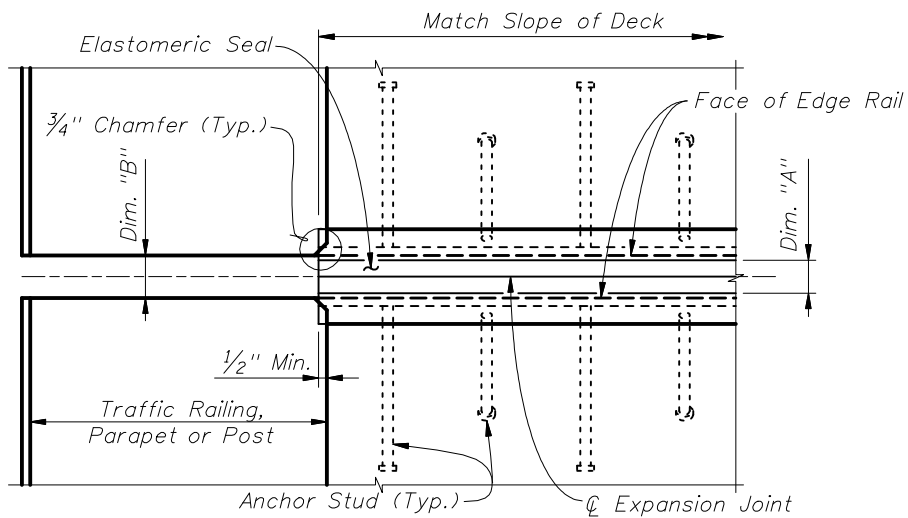




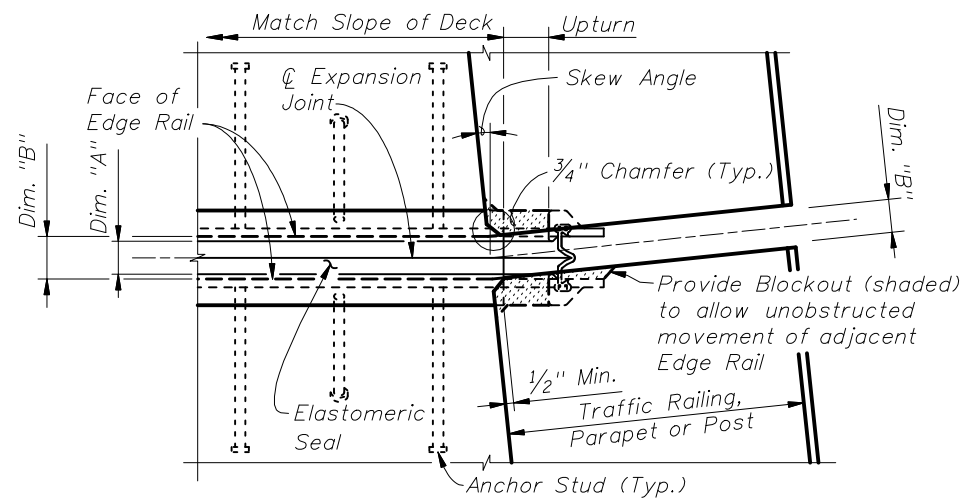
PARTIAL PLAN VIEW OF SKEWED JOINTS



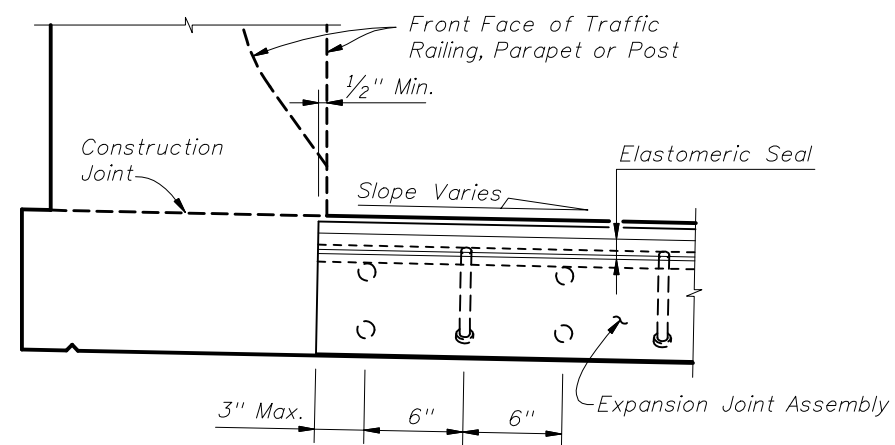
PARTIAL PLAN VIEW OF JOINTS SKEWED GREATER THAN 6°



PARTIAL PLAN VIEW OF NONSKEWED JOINTS

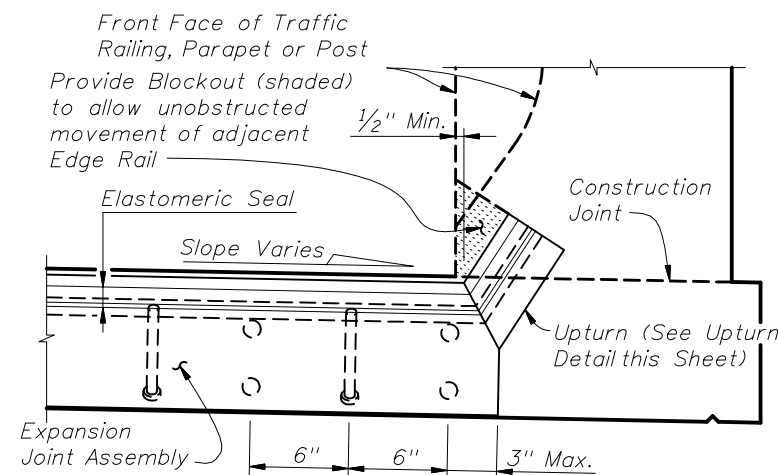


PARTIAL PLAN VIEW OF NONSKEWED JOINTS & JOINTS SKEWED 6° OR LESS



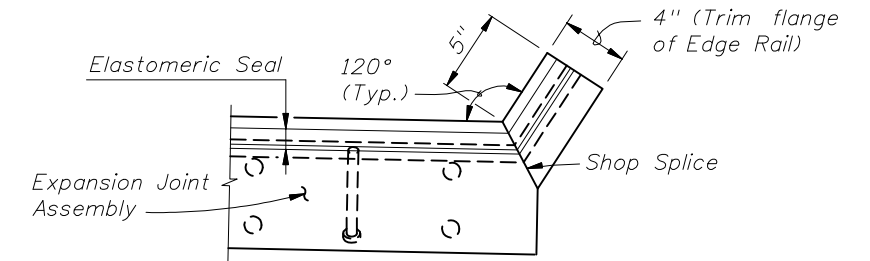
PARTIAL SECTION ALONG Q JOINT

JOINT TREATMENT AT HIGH SIDE OF DECK WITH SLOPE $\geq 2\%$
(Sidewalk Cover Plate where applicable not shown for clarity)

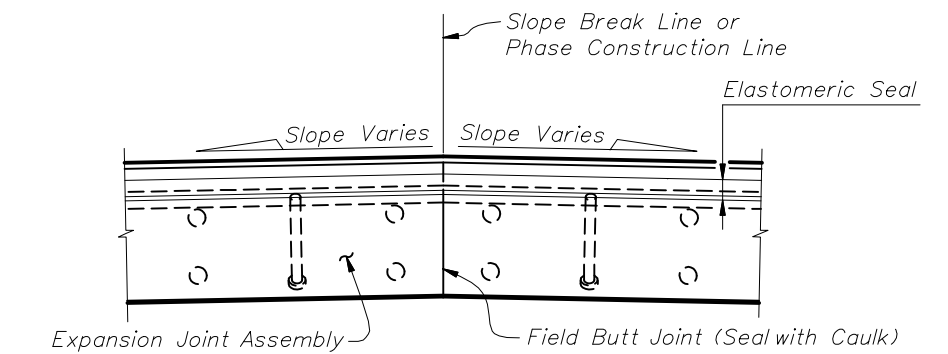


PARTIAL SECTION ALONG Q JOINT

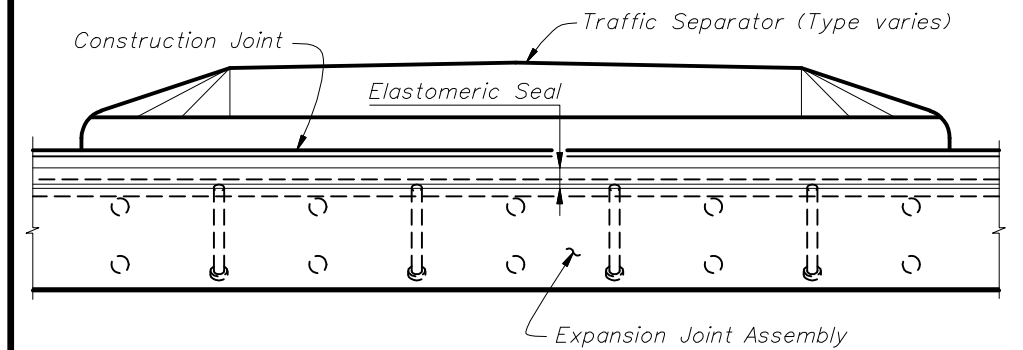
JOINT TREATMENT AT LOW SIDE OF DECK & HIGH SIDE OF DECK WITH SLOPE $< 2\%$
(Sidewalk Cover Plate where applicable not shown for clarity)



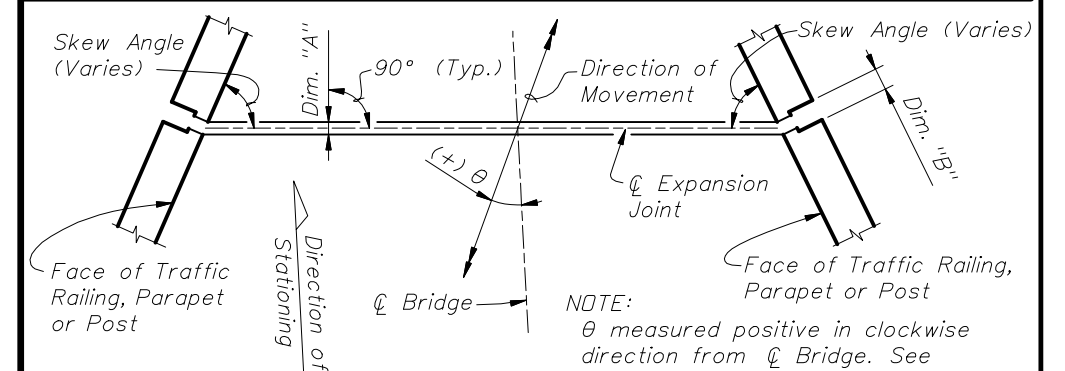
UPTURN DETAIL
(TYPICAL AT TRAFFIC BARRIERS AND PARAPETS)



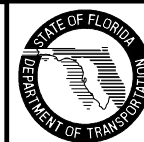
PARTIAL SECTION ALONG Q JOINT AT FIELD BUTT JOINT LOCATION
(CROWNED DECK OR SLAB SHOWN)

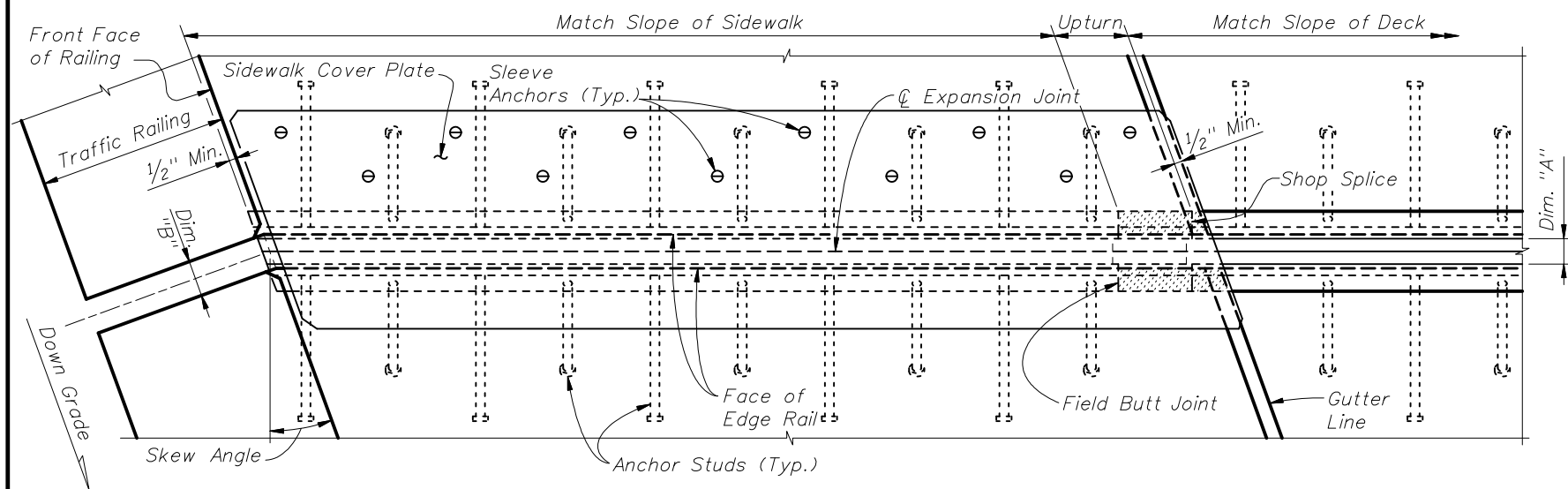


PARTIAL SECTION ALONG Q JOINT THRU TRAFFIC SEPARATOR

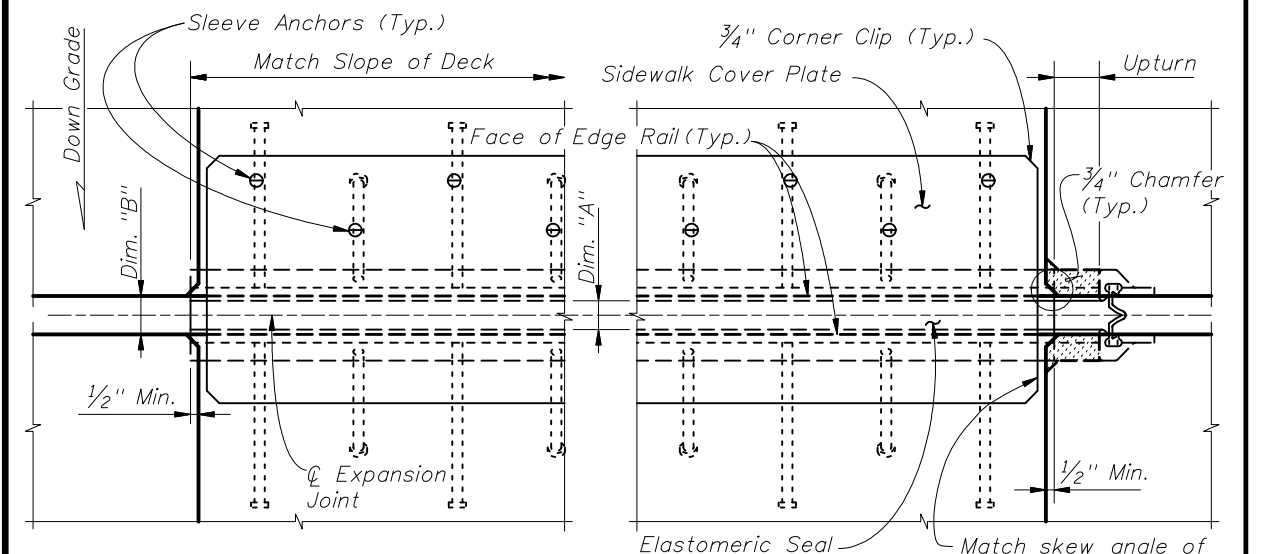


MOVEMENT SCHEMATIC

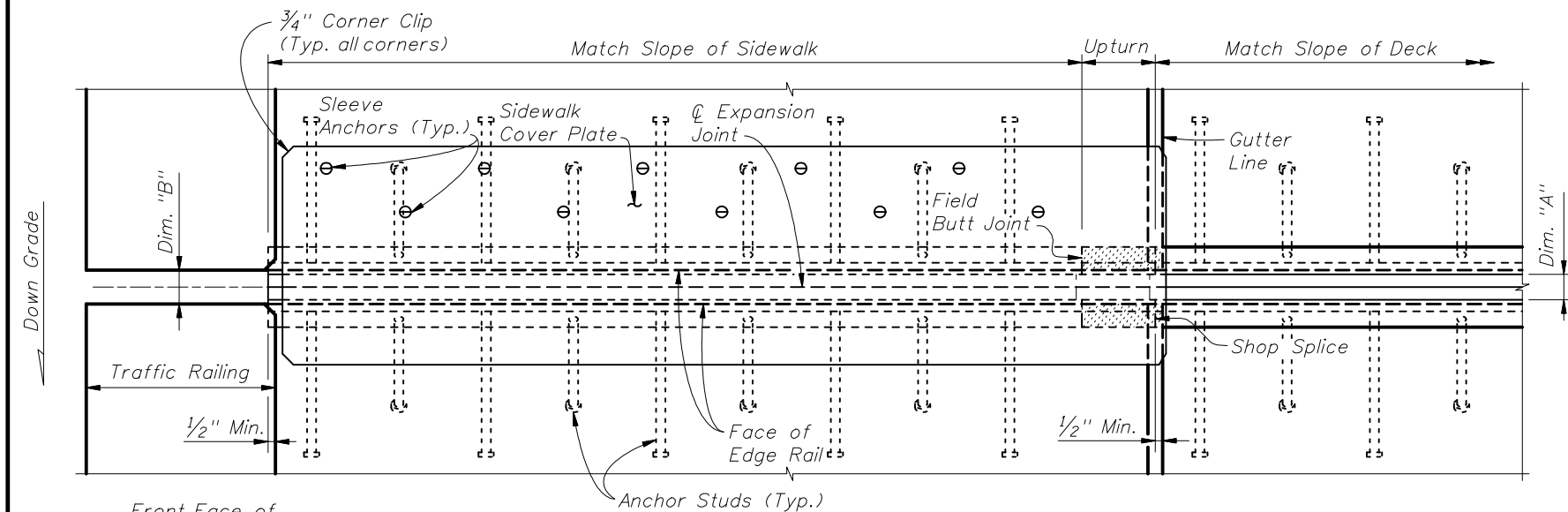




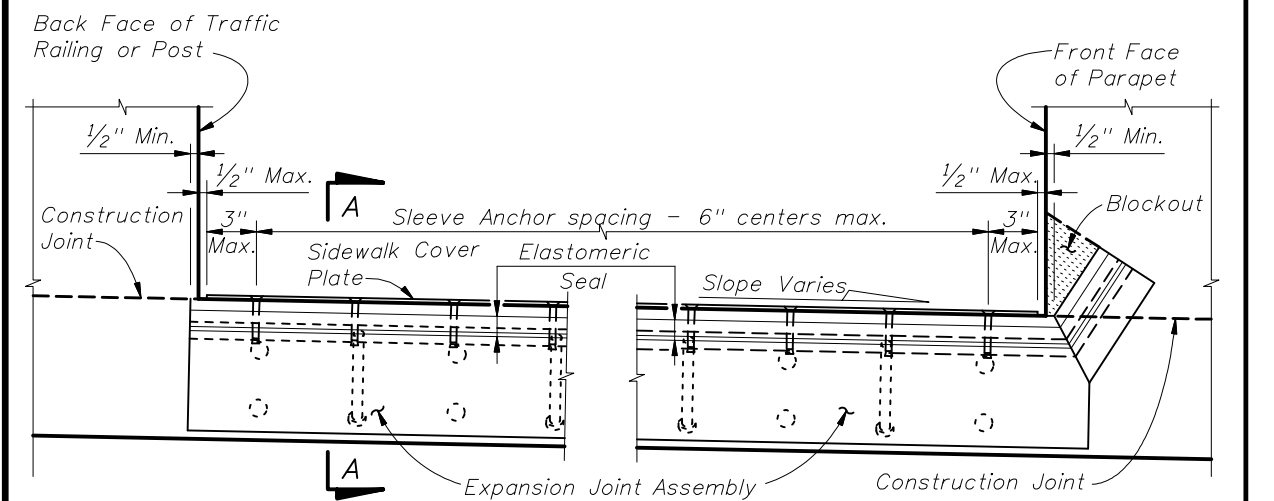
PARTIAL PLAN VIEW OF SKEWED JOINTS



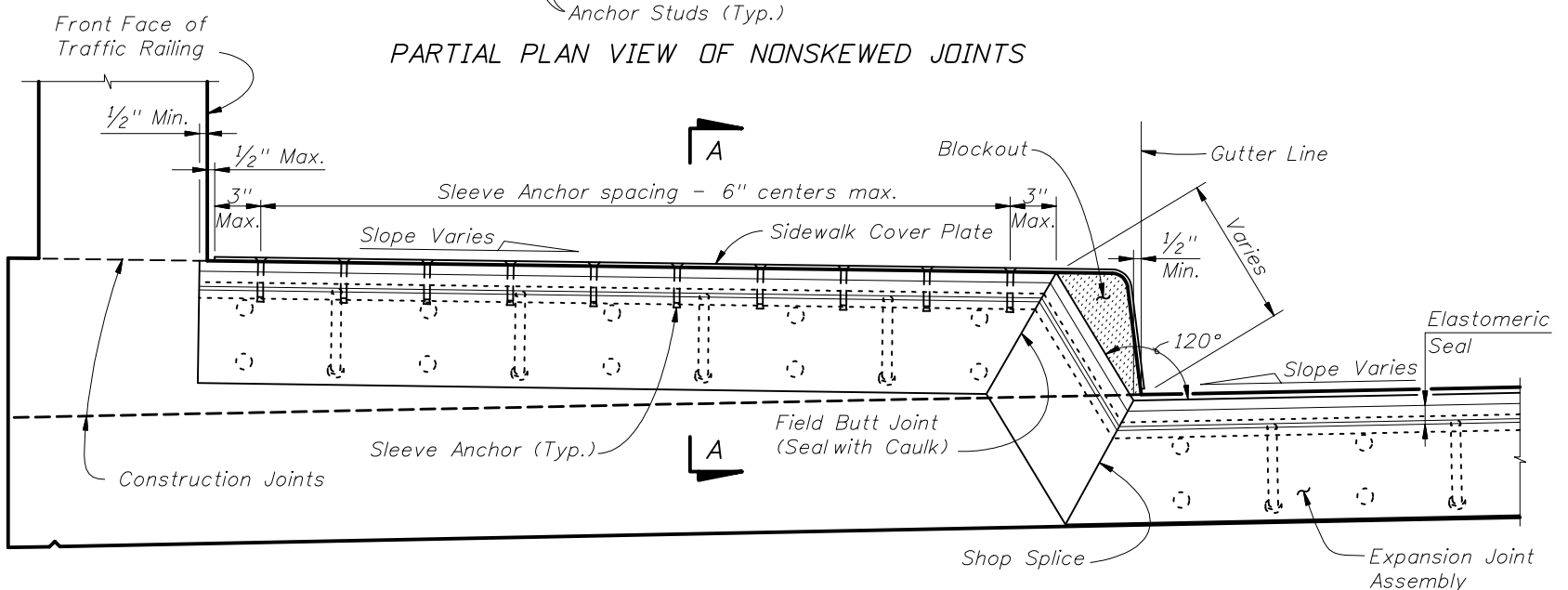
PARTIAL PLAN VIEW



PARTIAL PLAN VIEW OF NONSKEWED JOINTS



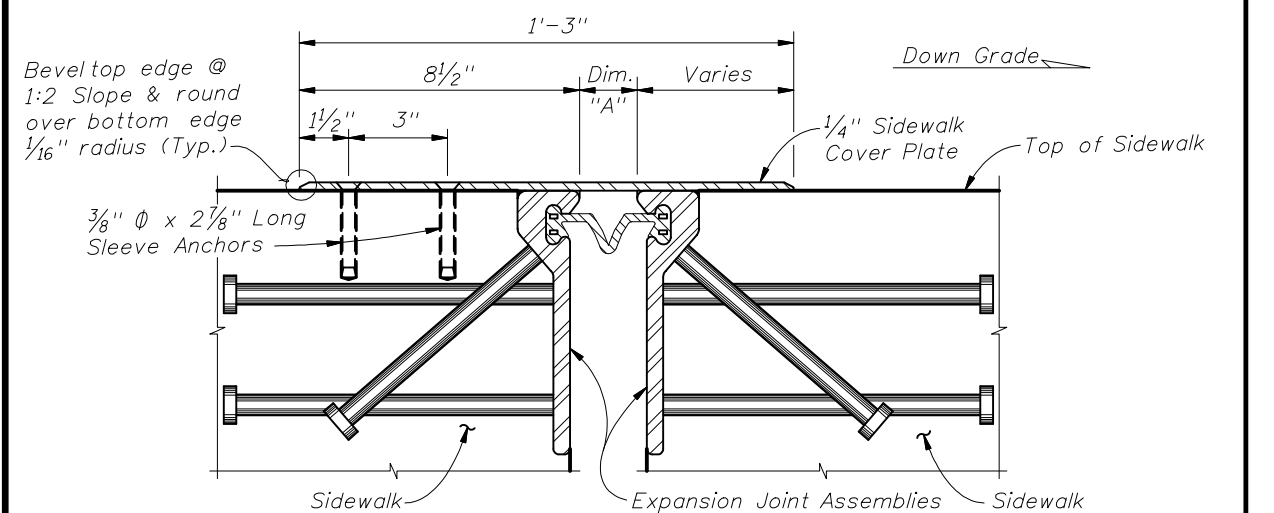
PARTIAL SECTION ALONG Q JOINT



PARTIAL SECTION ALONG Q JOINT

RAISED SIDEWALK DETAIL

FLUSH SIDEWALK DETAIL

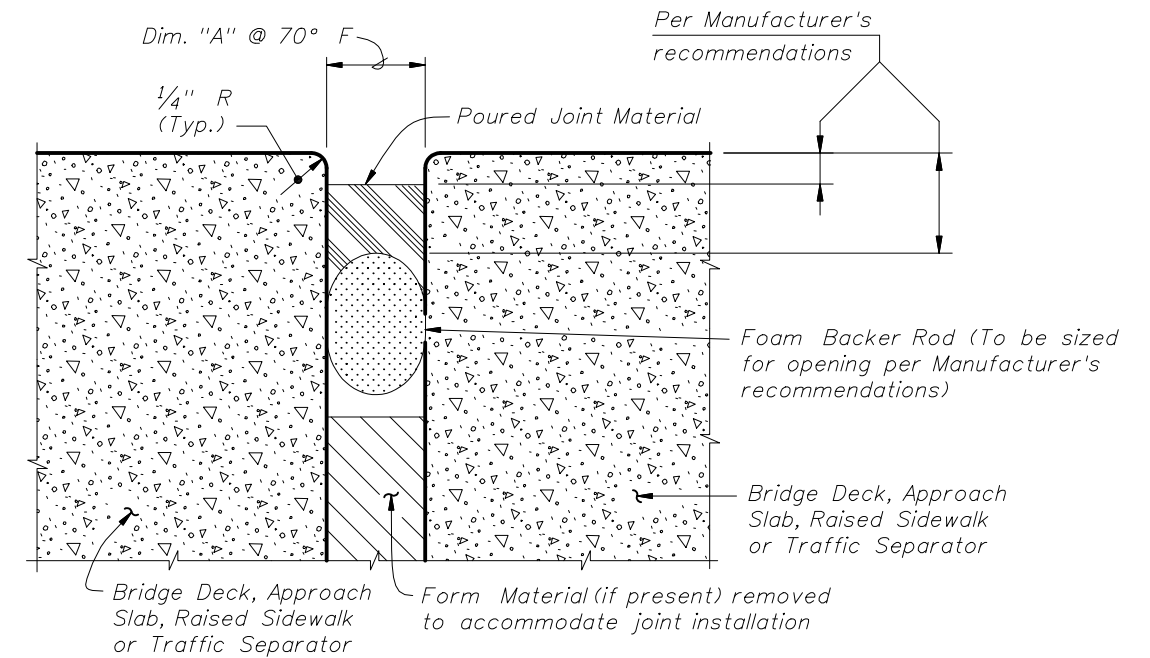


SECTION A-A

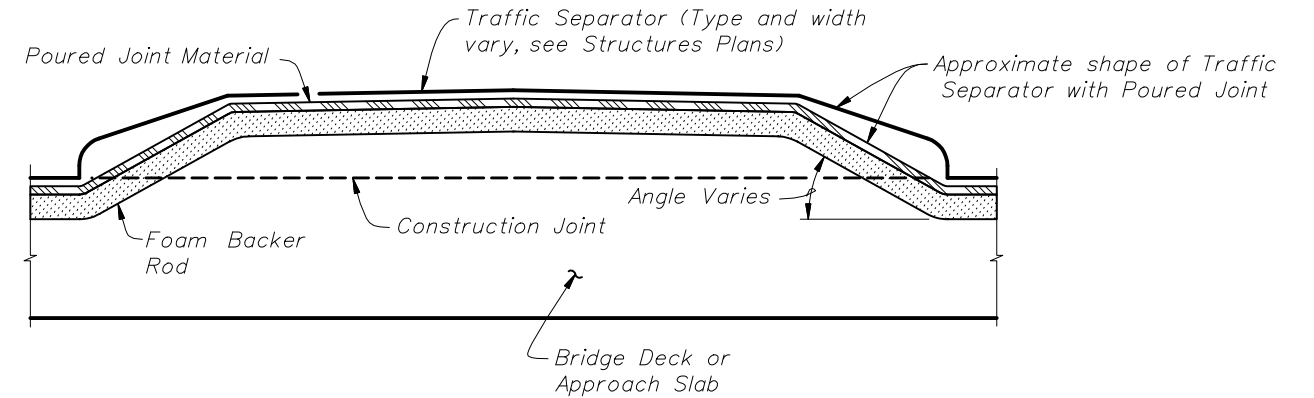


GENERAL NOTES:

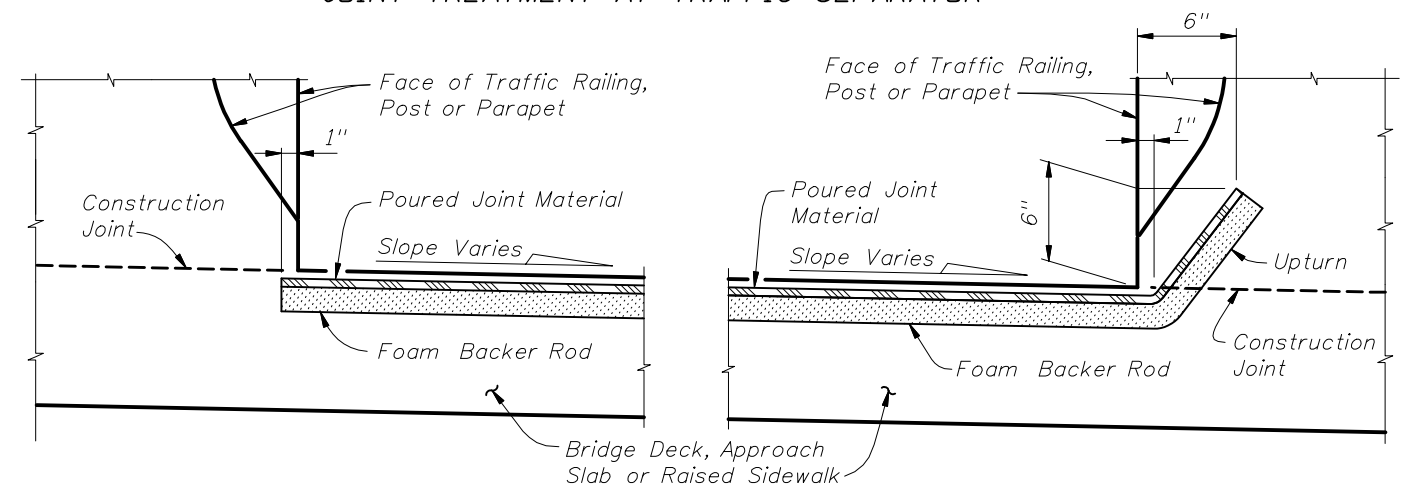
1. Furnish Poured Joint With Backer Rod Expansion Joint Systems in accordance with Specification Section 458 and 932. Furnish joint systems consisting of Poured Joint Material, Foam Backer Rods, Sidewalk Cover Plates (as required) and all associated miscellaneous components.
2. When required, furnish 1/4" thick slip resistant steel Sidewalk Cover Plates in accordance with ASTM A709, Grade 36 or 50, with a minimum coefficient of friction after galvanizing on the top surface of 0.8 in a dry condition as determined by ASTM F1677 or F1679 and 0.68 or 0.52 in a wet condition as determined by ASTM F1679 or ASTM F1677 (respectively); that incorporate an anti-slip steel surface consisting of a random hatch matrix or other suitable pattern. Do not use diamond plate or surface applied slip resistant tapes, films, nonmetallic coatings or other similar materials. Furnish flat head Stainless Steel Sleeve Anchors in accordance with ASTM F593 Group 1 Alloy 304 for attaching Sidewalk Cover Plates. Install Sleeve Anchors in accordance with manufacturer's recommendations.
3. Hot-dip galvanize Sidewalk Cover Plates after shop fabrication in accordance with Section 962 of the Specifications and manufacturer's recommendations.
4. Submit shop drawings for Sidewalk Cover Plates (as required) showing all materials and project specific details and dimensions.
5. Manufacturers seeking approval of Poured Joint with Backer Rod Expansion Joint Systems for inclusion on the Qualified Products List as pre-approved designs must submit application along with design documentation showing the expansion joint meets the specification, geometric and material requirements specified herein.
6. Refer to Specification Section 458 for installation and construction requirements.
7. Refer to the Structures Plans, Poured Expansion Joint Data Table for Dim. "A" @ 70° F.



TYPICAL SECTION THRU JOINT



PARTIAL SECTION ALONG ϕ JOINT, JOINT TREATMENT AT TRAFFIC SEPARATOR



PARTIAL SECTION ALONG ϕ JOINT JOINT TREATMENT AT HIGH SIDE OF DECK WITH SLOPES 2% OR GREATER

PARTIAL SECTION ALONG ϕ JOINT JOINT TREATMENT AT LOW SIDE OF DECK OR HIGH SIDE OF DECK WITH SLOPES < 2%

INSTRUCTIONS TO DESIGNER:

Allow for a minimum (fully closed) opening of 50% of Dimension "A" and a maximum opening of 3" (measured in the direction of travel).



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POURED JOINT WITH BACKER ROD EXPANSION JOINT SYSTEM

Last Revision

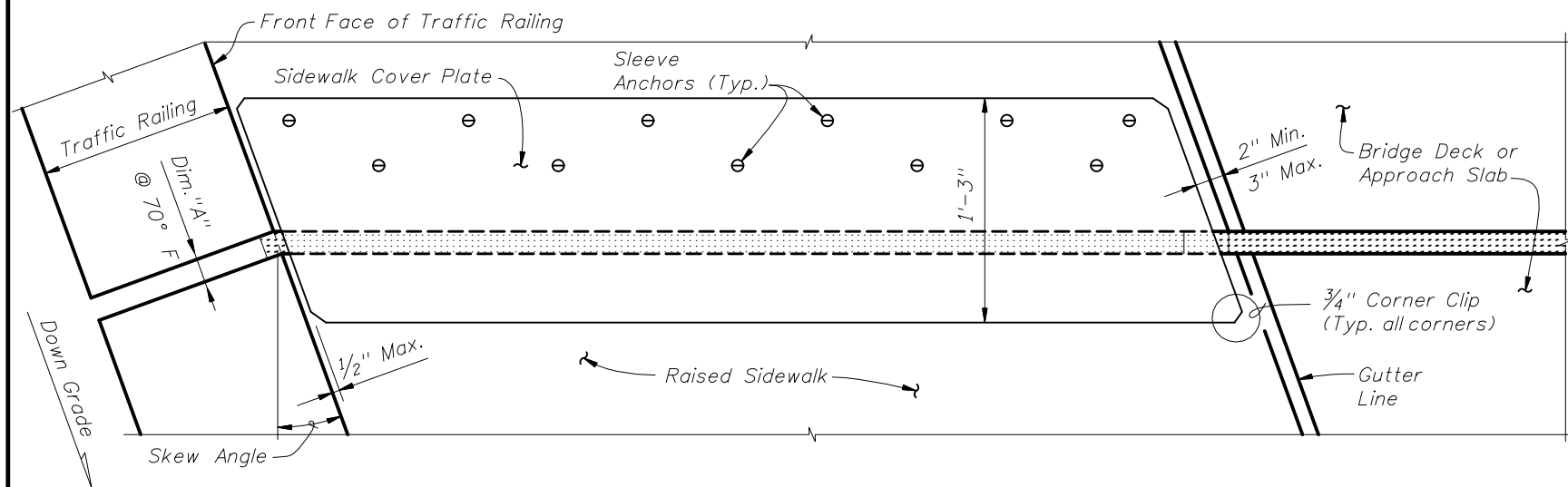
01/01/09

Sheet No.

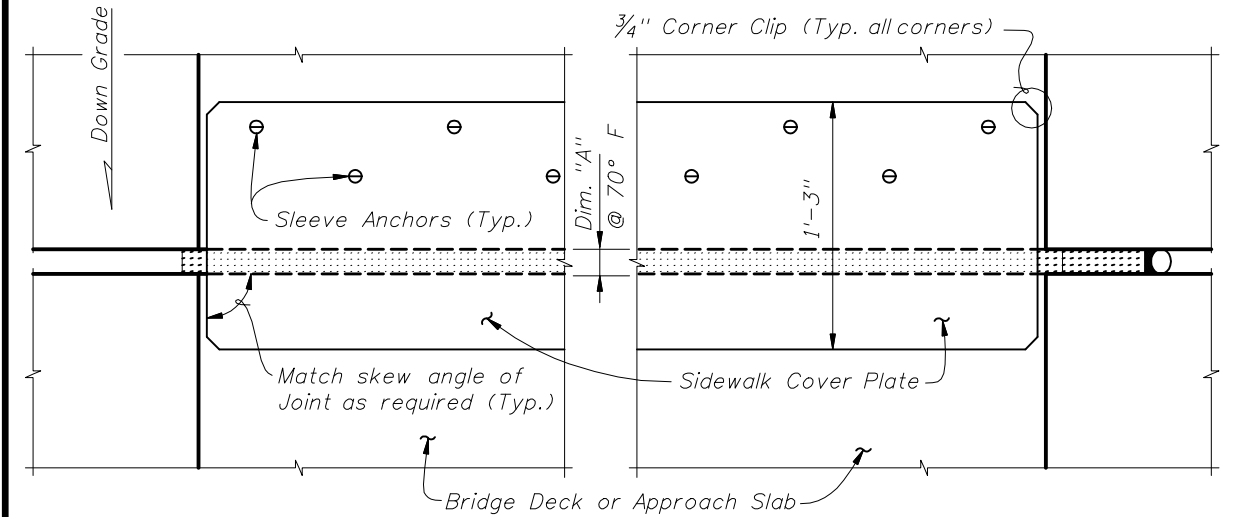
1 of 2

Index No.

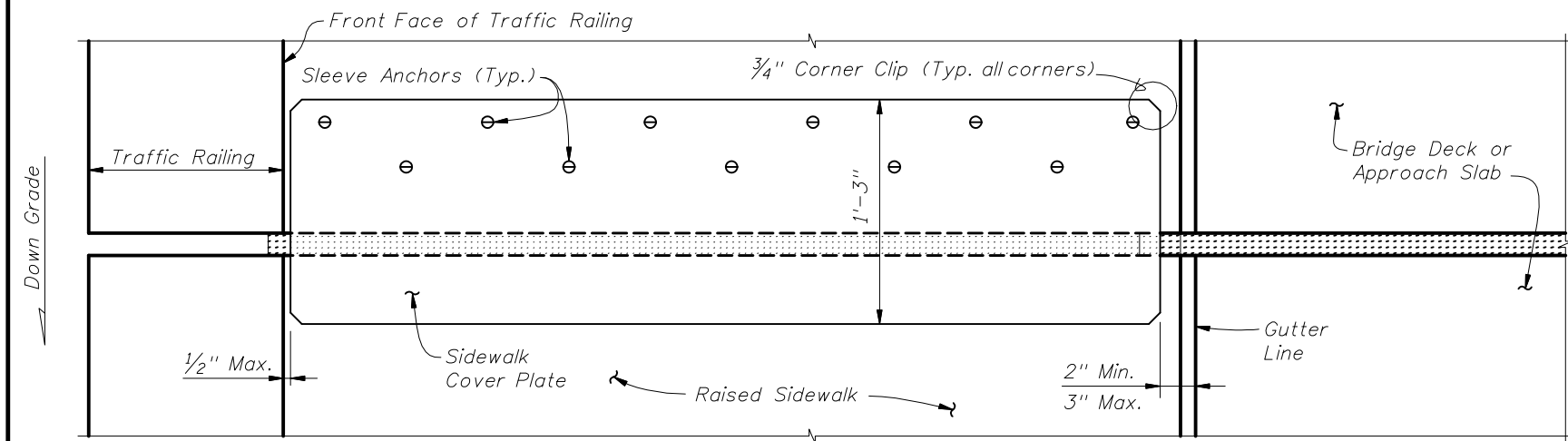
21110



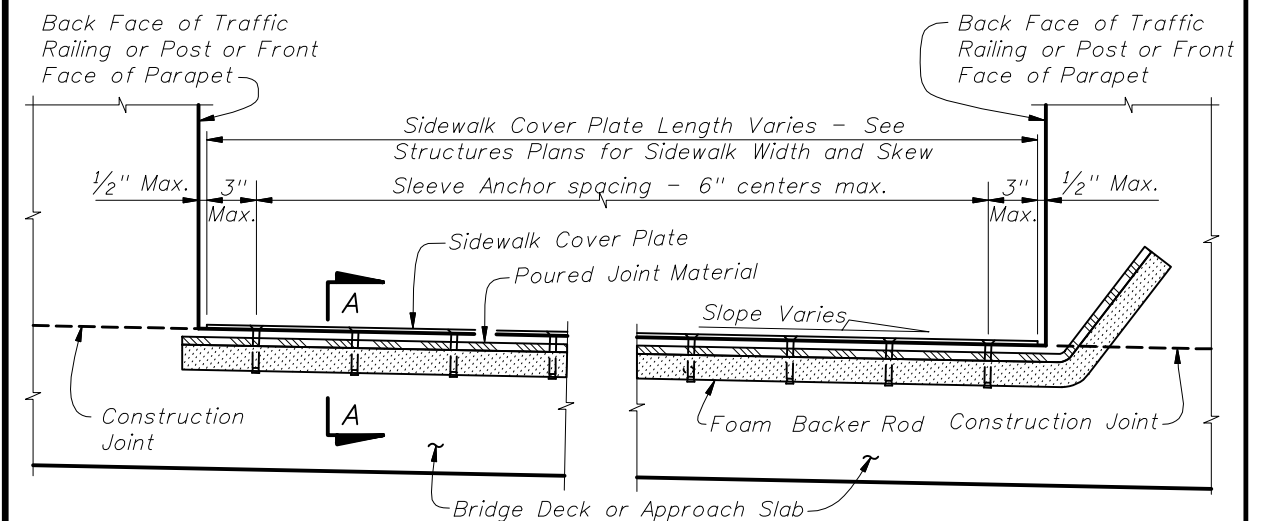
PARTIAL PLAN VIEW OF SKEWED JOINTS



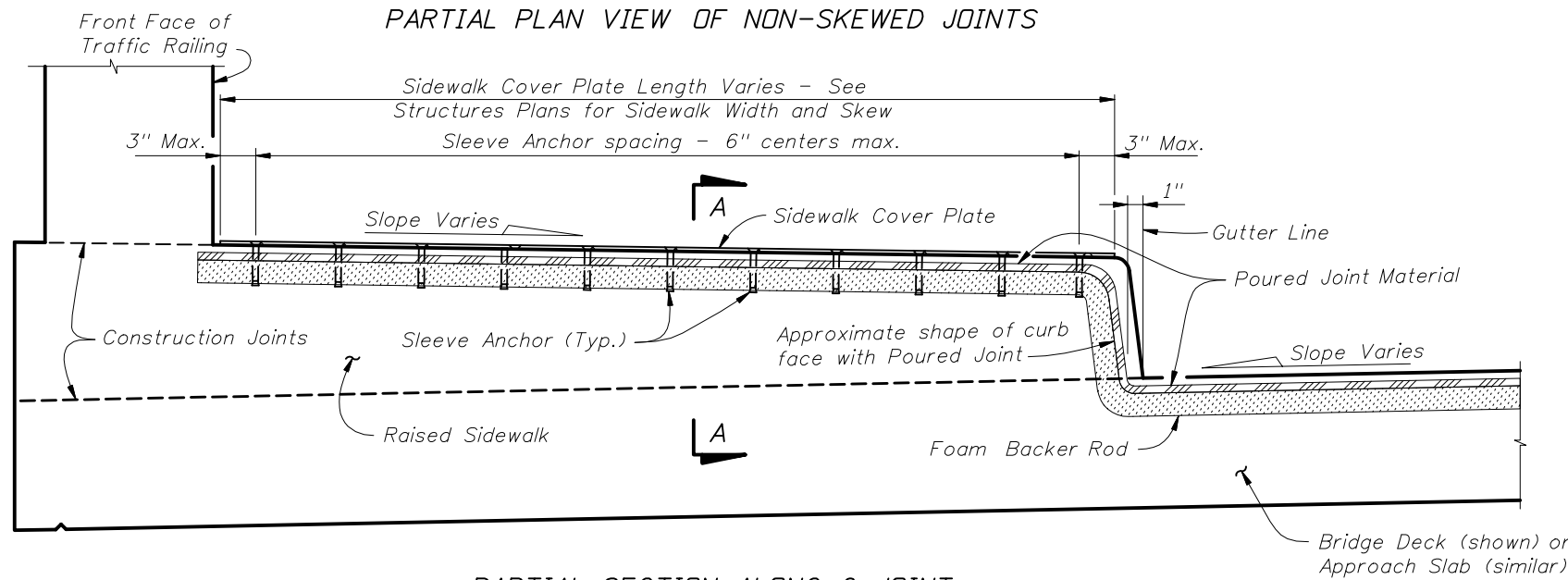
PARTIAL PLAN VIEW



PARTIAL PLAN VIEW OF NON-SKEWED JOINTS



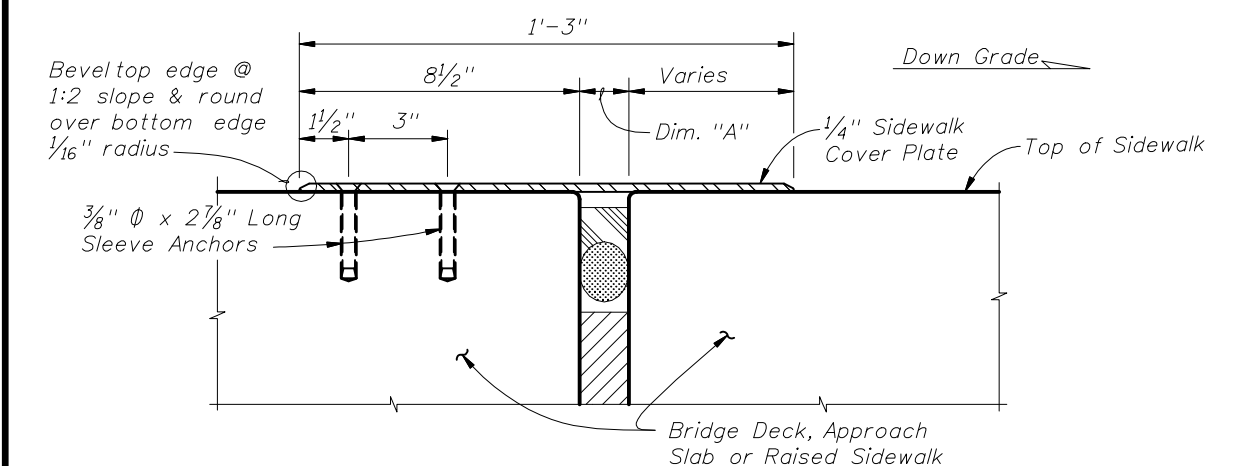
PARTIAL SECTION ALONG Q JOINT



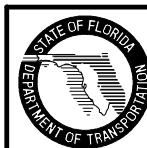
PARTIAL SECTION ALONG Q JOINT

RAISED SIDEWALK DETAIL

FLUSH SIDEWALK DETAIL



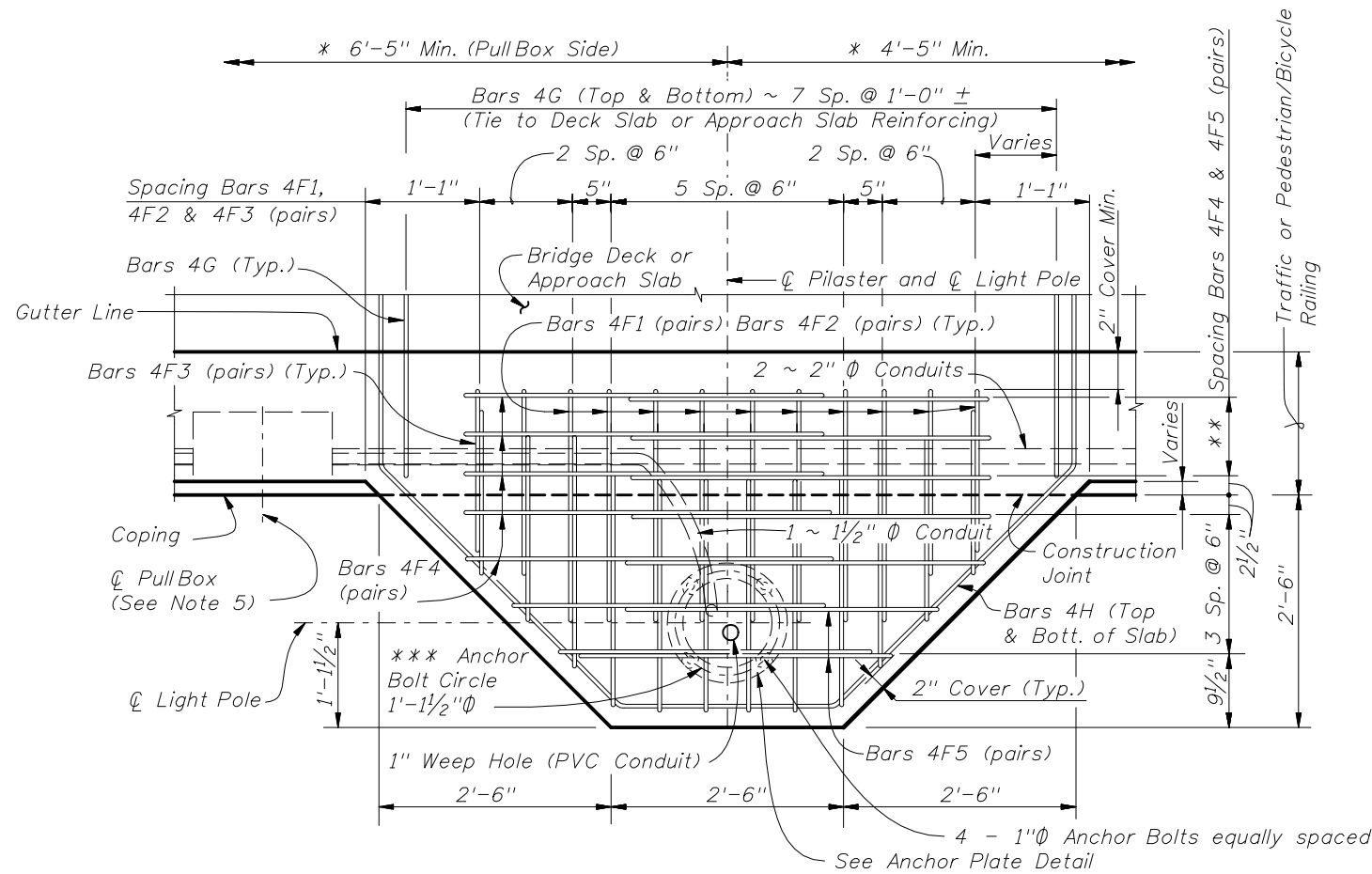
SECTION A-A



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**POURED JOINT WITH BACKER ROD
EXPANSION JOINT SYSTEM**

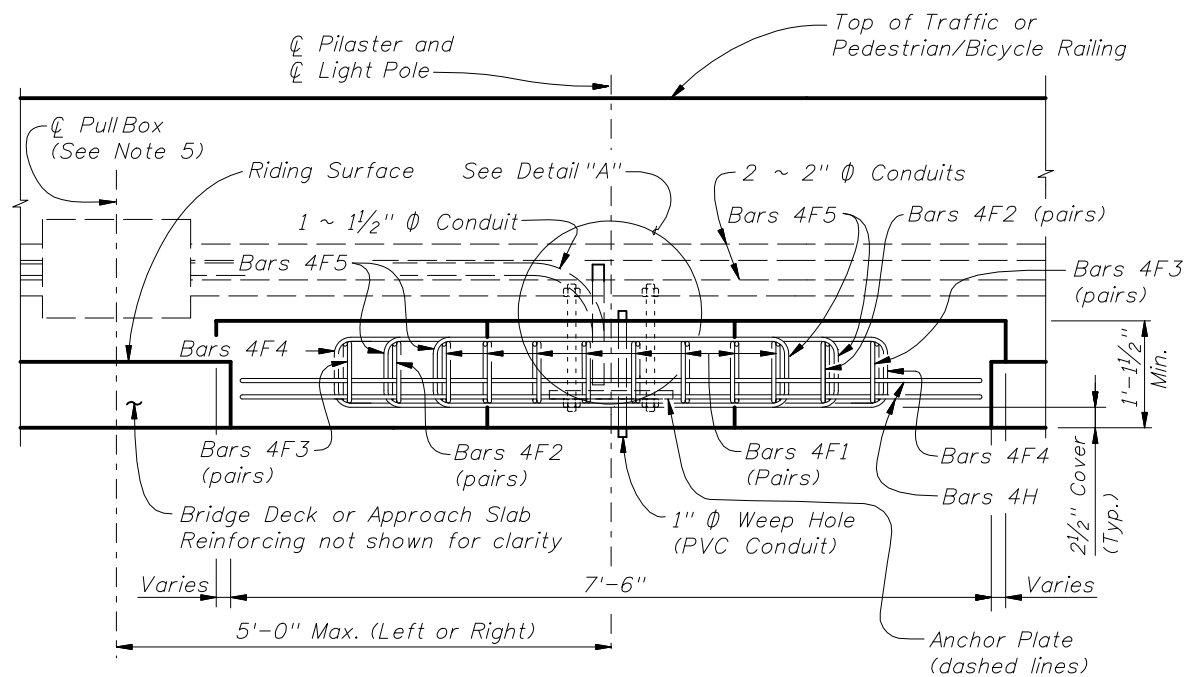
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* Slip Forming Method of Construction is not allowed within the limits shown.
 ** For Index No. 820 - Pedestrian/Bicycle Railing, this dimension is 4 1/2". For all other Railings, this dimension is 2 Eq. Sp. @ 6" Max.
 *** Anchor Bolt pattern orientation shall be as shown.

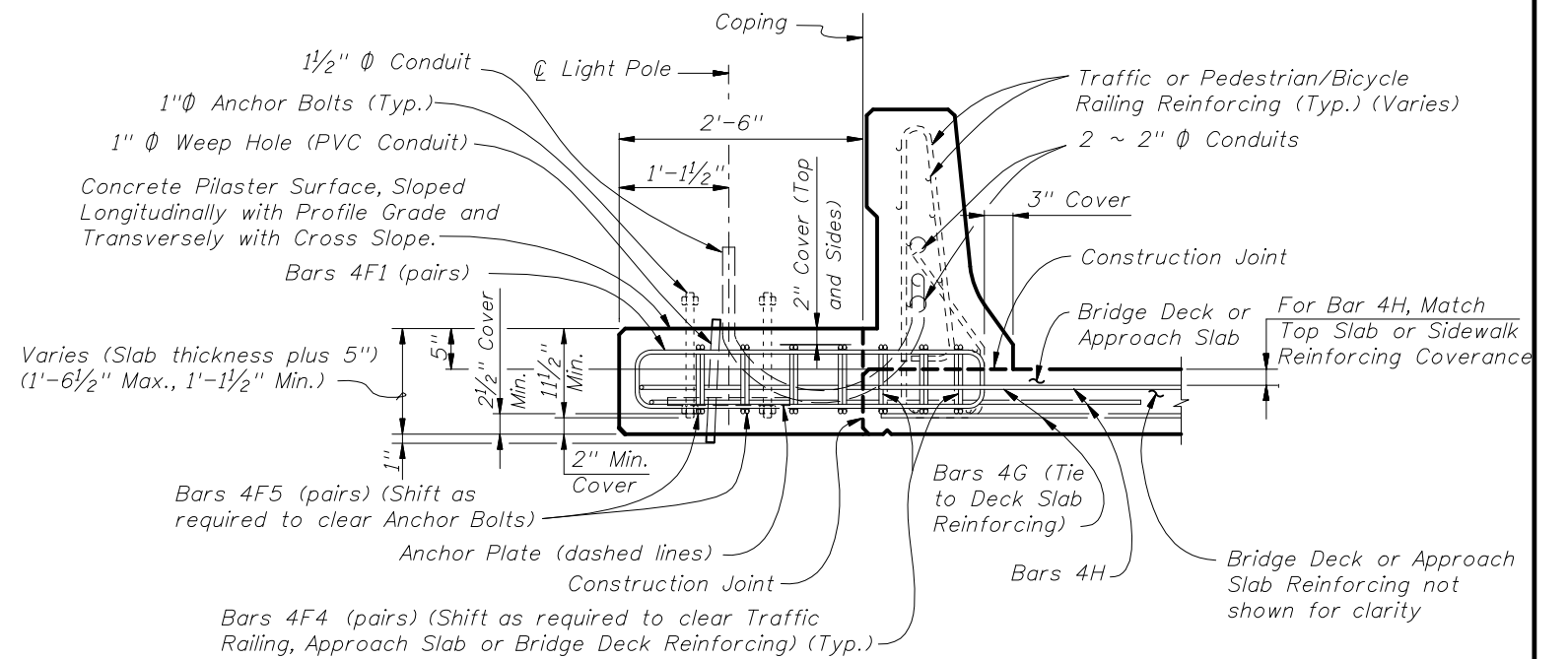
PLAN VIEW

(Anchor Plate not shown for clarity)

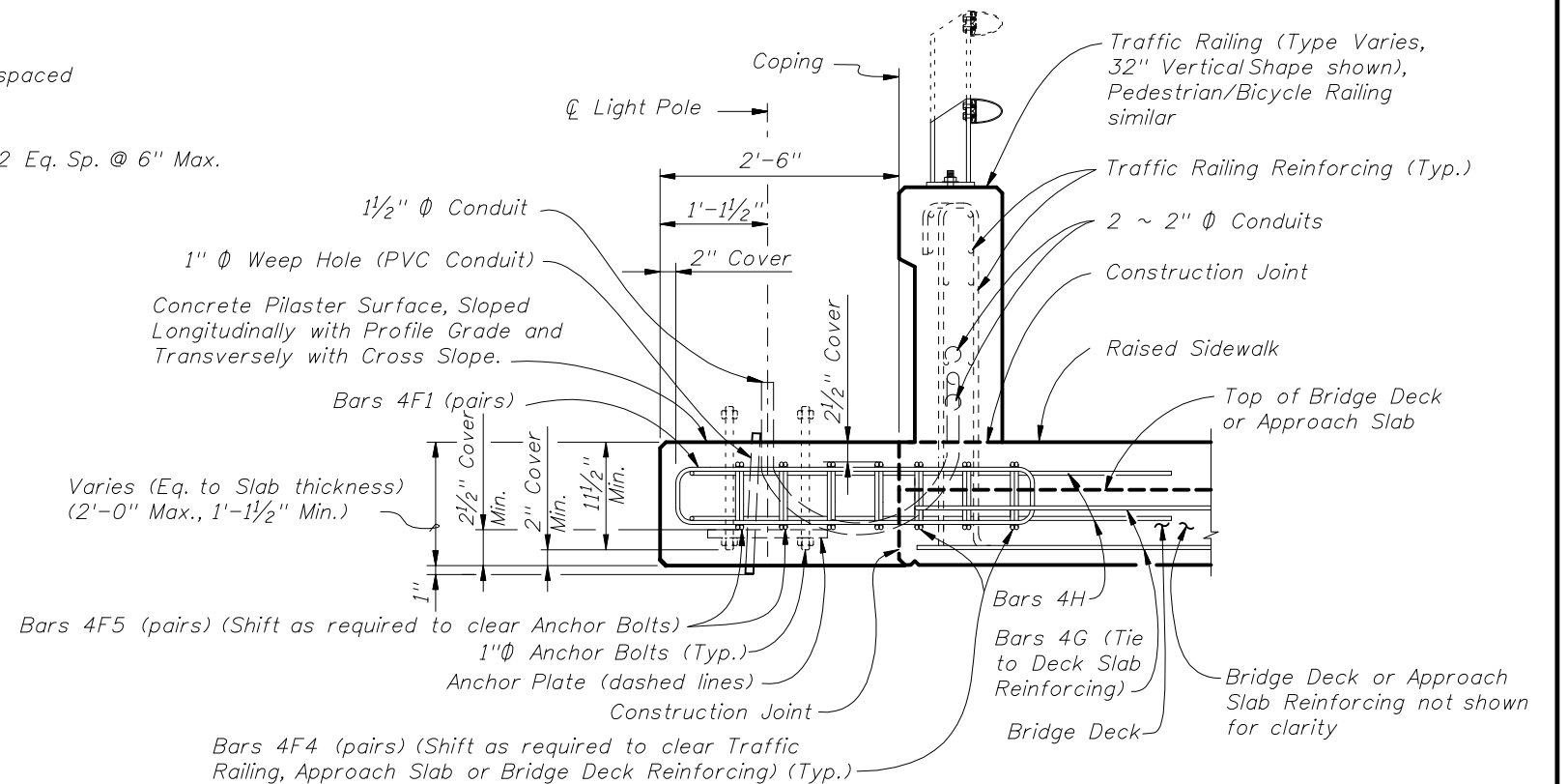


ELEVATION VIEW

(Bars 4G not shown for clarity)



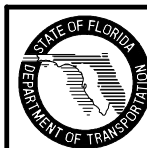
TYPICAL SECTION AT LIGHT POLE PILASTER FOR APPROACH SLAB OR BRIDGE DECK THICKNESS LESS THAN 1'-1 1/2".



TYPICAL SECTION AT LIGHT POLE PILASTER FOR APPROACH SLAB OR BRIDGE DECK THICKNESS 1'-1 1/2" OR GREATER

CROSS REFERENCE: For Detail "A", Anchor Plate Detail and Light Pole Pilaster Notes, see Sheet 2.

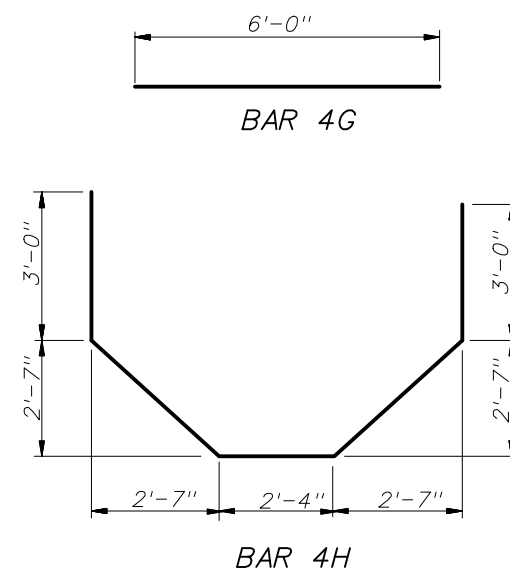
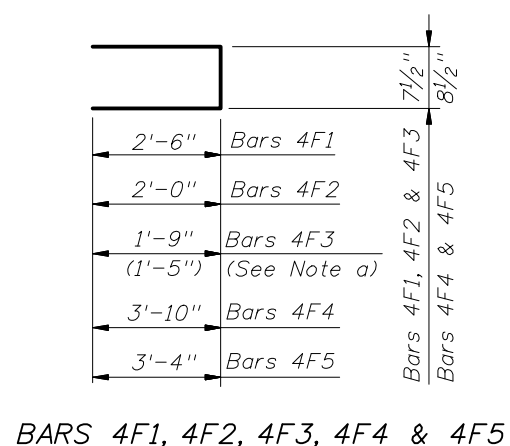
NOTE: Anchor Bolt, Nuts, Washers and Anchor Plate are dashed for clarity.



CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

REINFORCING STEEL NOTES:

- a. When Pilaster is attached to Pedestrian/Bicycle Railing - Index No. 820 and the Bridge Deck or Approach Slab thickness is less than 1'-1 1/2", Bars 4F3 shall have leg length and bar length shown in parentheses.
- b. The number of bars shown in parentheses is for Bars 4F4 when Pilaster is attached to Pedestrian/Bicycle Railing - Index No. 820, and the Bridge Deck or Approach Slab thickness is less than 1'-1 1/2".
- c. Lap Splices for Bars 4F1, 4F2 & 4F3 shall be a minimum of 1'-4". Lap Splices for Bars 4F4 & 4F5 shall be minimum of 1'-8".
- d. All bar dimensions in the bending diagrams are out to out.



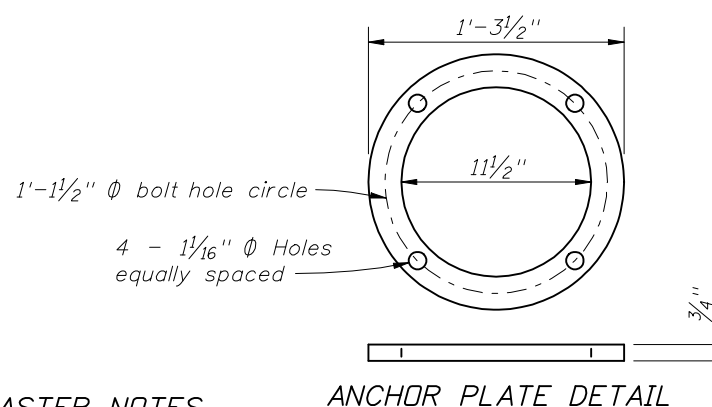
BILL OF REINFORCING STEEL				
MARK	SIZE	NO. REQD.	LENGTH	NOTES
F1	4	16	5'-8"	c
F2	4	4	4'-8"	c
F3	4	4	4'-2" (3'-6")	a, c
F4	4	10 (8)	8'-5"	b, c
F5	4	4	7'-5"	c
G	4	16	6'-0"	-
H	4	2	15'-8"	-

INSTRUCTIONS TO DESIGNER:

In order to minimize vibration of Light Poles due to traffic, locate pilasters near substructure supports.

Locate ϕ Pilaster minimum 3'-10" away from ϕ Traffic Railing Open Joint and edge of End Bent Wingwall.

Design of the additional Bridge Deck Reinforcement is based on the minimum transverse top slab reinforcing required by Structures Design Guidelines.



ESTIMATED LIGHT POLE PILASTER QUANTITIES PER LIGHT POLE PILASTER		
ITEM	UNIT	QUANTITY
Concrete Per Pilaster Thickness	CY/In.	0.040
Reinforcing Steel	Lb.	244.16 (231.19)

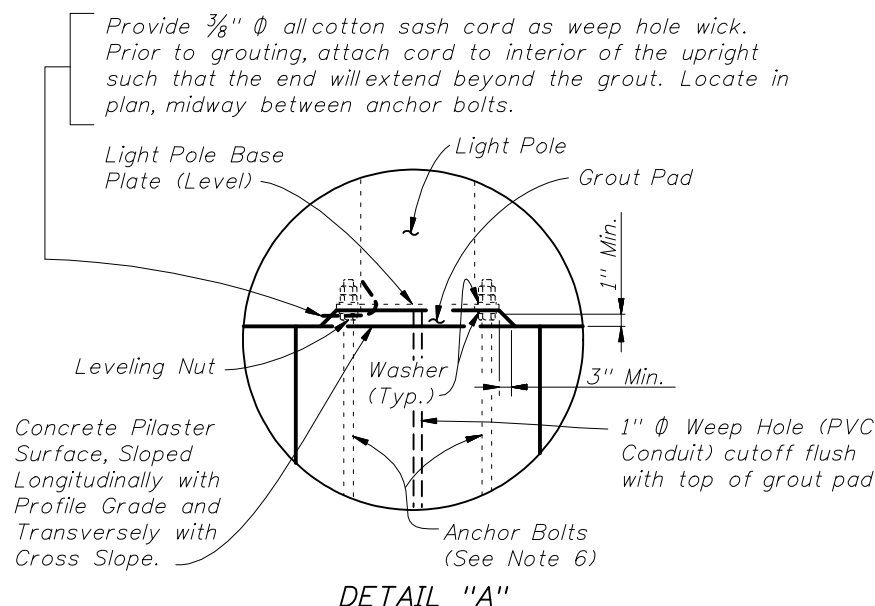
(The Reinforcing Steel quantity shown in parenthesis is for a Pilaster attached to Pedestrian/Bicycle Railing - Index No. 820 with Bridge Deck or Approach Slab thinner than 1'-1 1/2")

LIGHT POLE PILASTER NOTES

- Concrete and Reinforcing Steel required for the construction of the Pilaster shall meet the same requirements as the Traffic Railing or Pedestrian/Bicycle Railing the Pilaster is attached to. Grout shall comply with Specification Section 934.
- Light Pole Pilaster may be used with the following:
 - Index No. 420 - Traffic Railing (32" F Shape),
 - Index No. 422 - Traffic Railing (42" Vertical Shape),
 - Index No. 423 - Traffic Railing (32" Vertical Shape),
 - Index No. 424 - Traffic Railing (Corral Shape),
 - Index No. 425 - Traffic Railing (42" F Shape),
 - Index No. 820 - Pedestrian/Bicycle Railing,
 - Index No. 821 - Aluminum Pedestrian/Bicycle Bullet Railing for Traffic Railing (32" F Shape), or
 - Index No. 5210 - Traffic Railing /Sound Barrier (Bridge).
 Unless otherwise noted, Traffic Railing (32" F Shape) is shown in all Views and Sections on Sheet 1 of 2. The Pilaster details for other Traffic Railings or Pedestrian/Bicycle Railing are similar.
- The Pilaster and Deck are designed to resist the following Working Loads from the Light Pole applied at the top of the Pilaster:

Axial Dead Load	=	1.560 Kip
Wind Load Moment about Transverse Axis	=	40.60 Kip-Ft.
Wind Load Moment about Longitudinal Axis	=	28.30 Kip-Ft.
Deadload Moment about Longitudinal Axis	=	1.690 Kip-Ft.
Maximum Shear	=	1.380 Kip
Torsion about Pole Axis	=	3.560 Kip-Ft.
- Materials:
 - Anchor Bolts: ASTM F1554 Grade 55.
 - Nuts: ASTM A563 Grade a Heavy-Hex.
 - Washers: ASTM F436 Type 1.
 All Nuts, Bolts and Washers shall be galvanized by ASTM F2329.

Anchor Plate: ASTM A 709 Grade 36 or ASTM A36.
- For Conduit, Pull Box, Expansion/Deflection Fitting and adjacent Reinforcing Steel Details, see Utility Conduit Detail Sheets.
- Anchor Bolts must be installed plumb.
- PAYMENT: The cost of Anchor Bolts, Nuts, Washers and Anchor Plates shall be included in the Bid Price for Light Poles. The cost of all Labor, Concrete and Reinforcing Steel required for the Construction of the Pilasters, Grout Pads, Pull Boxes, and Miscellaneous Hardware required for the completion of the Electrical System, shall be included in the Bid Price for the Traffic Railing or Pedestrian/Bicycle Railing the Pilaster is attached to.



DETAIL "A"

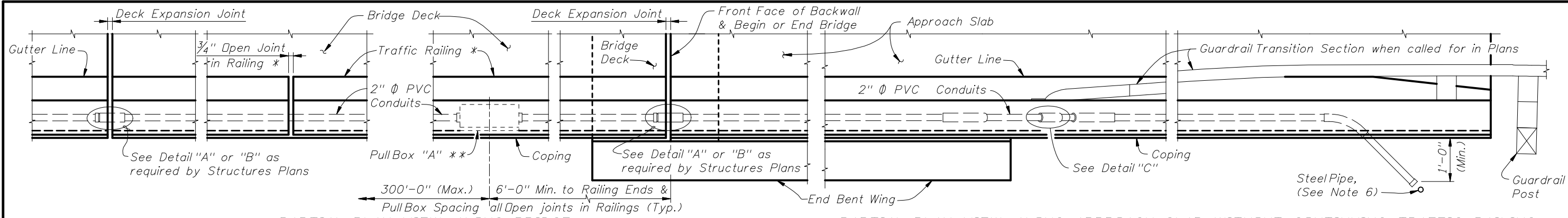
CROSS REFERENCE:
For location of Detail "A" see Sheet 1.



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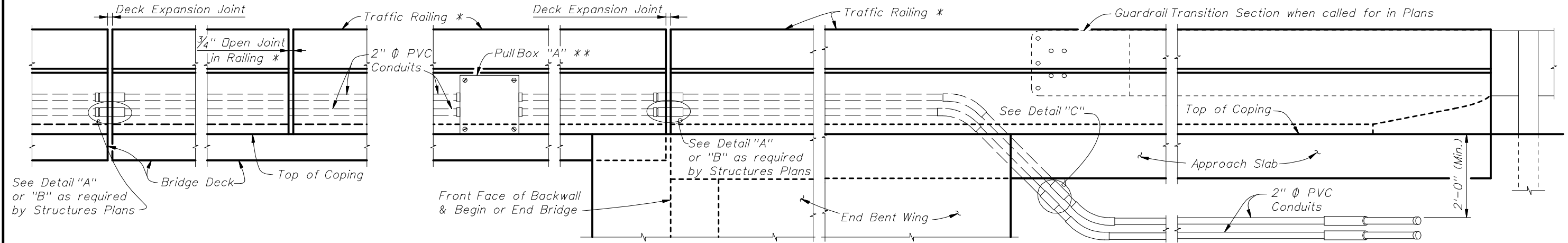
LIGHT POLE PILASTER

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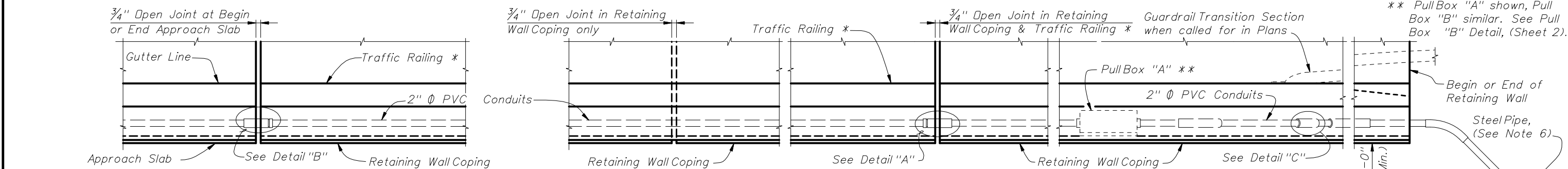
PARTIAL PLAN VIEW ALONG BRIDGE

PARTIAL PLAN VIEW ALONG APPROACH SLAB WITHOUT CONTINUING TRAFFIC RAILING



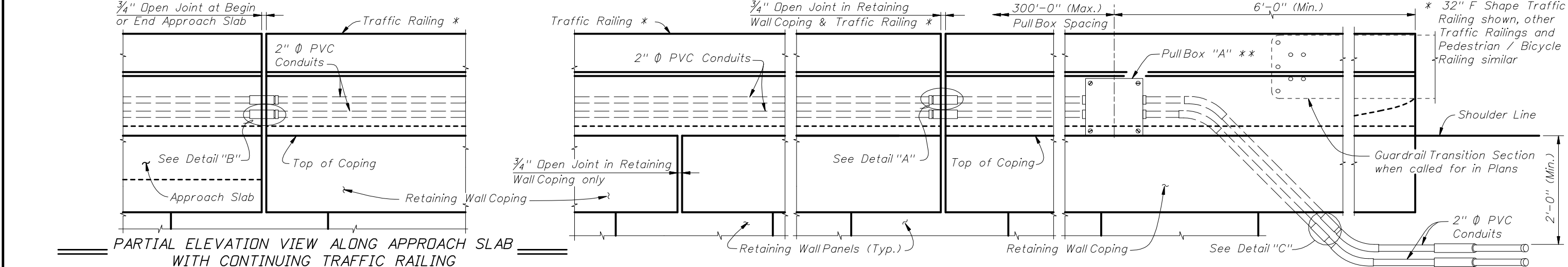
PARTIAL ELEVATION VIEW ALONG BRIDGE

PARTIAL ELEVATION VIEW ALONG APPROACH SLAB WITHOUT CONTINUING TRAFFIC RAILING



PARTIAL PLAN VIEW ALONG APPROACH SLAB WITH CONTINUING TRAFFIC RAILING

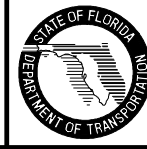
PARTIAL PLAN VIEW ALONG RETAINING WALL



PARTIAL ELEVATION VIEW ALONG APPROACH SLAB WITH CONTINUING TRAFFIC RAILING

PARTIAL ELEVATION VIEW ALONG RETAINING WALL

(Retaining Wall Mounted Traffic Railing shown, Roadway Concrete Barrier similar)



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UTILITY CONDUIT DETAILS

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UTILITY CONDUIT GENERAL NOTES:

1. Furnish and install approved Conduits and Fittings in accordance with the Specifications, this Standard, the National Electric Code (NEC) and as directed by the Engineer.
2. Furnish Schedule 80 PVC Rigid Nonmetallic Conduits in accordance with NEMA TC-2 and UL Standard 651 and Fittings in accordance with NEMA TC-3 and UL Standard 514b. Furnish conduit and fittings with UL labels: Conduit - on each 10 foot length; Fittings - stamped or molded on each fitting. Connect Conduit and Fittings using solvent cement in accordance with manufacturer's recommendations.
3. Furnish and install NEMA Type 4X non-metallic, or galvanized steel PullBoxes sized in accordance with NEC requirements and the maximum limits shown. Provide gasketed weatherproof covers for the PullBoxes. Permanently label the covers of the PullBoxes to indicate the utility contained within. Letters and symbols shall be a minimum of 0.5" tall and may be stamped or molded into PullBox covers. Install PullBoxes adjacent to Begin and End Bridges, Begin and End Retaining Walls and at additional locations as required. Omit PullBoxes at Begin or End Retaining Walls adjacent to bridges. Position PullBox openings as shown, do not place PullBox openings on the traffic face of Traffic Railings.
4. Furnish and install Expansion Fittings at locations shown in the Plans. Certify that Expansion Fittings used at a given location are rated to accommodate the anticipated movement at that location: along bridge decks - see Structures Plans, Expansion Joint Data Table; along retaining walls and other unspecified locations - 2" minimum.
5. Furnish and install Expansion / Deflection Fittings at locations shown in the Plans. Certify that Expansion / Deflection Fittings used at a given location are rated to accommodate a minimum rotation of 30 degrees and the anticipated movement at that location: along bridge decks - see Structures Plans, Expansion Joint Data Table; along retaining walls and other unspecified locations - 0.7" minimum.
6. Stub out and cap conduits and drive steel pipe to permanently locate ends as shown unless otherwise shown in Plans.
7. Shift vertical railing reinforcement symmetrically to provide 2" clearance to PullBoxes. Space shifted vertical reinforcement at 3" centers minimum. Cut horizontal railing reinforcement to provide 2" clearance to PullBoxes and provide supplemental reinforcement as shown. Shift a maximum of 1" but do not cut railing reinforcement to facilitate conduit, Expansion Fitting and Expansion / Deflection Fitting placement. Do not bundle conduits or conduits and horizontal reinforcement.
8. Unless otherwise shown in the Plans, include the cost of furnishing and installing Conduit, PullBoxes, Expansion and Expansion / Deflection Fittings and all associated hardware required to complete the installation in the cost for the Traffic Railing or Pedestrian Railing (Parapet) that the conduit is installed in.

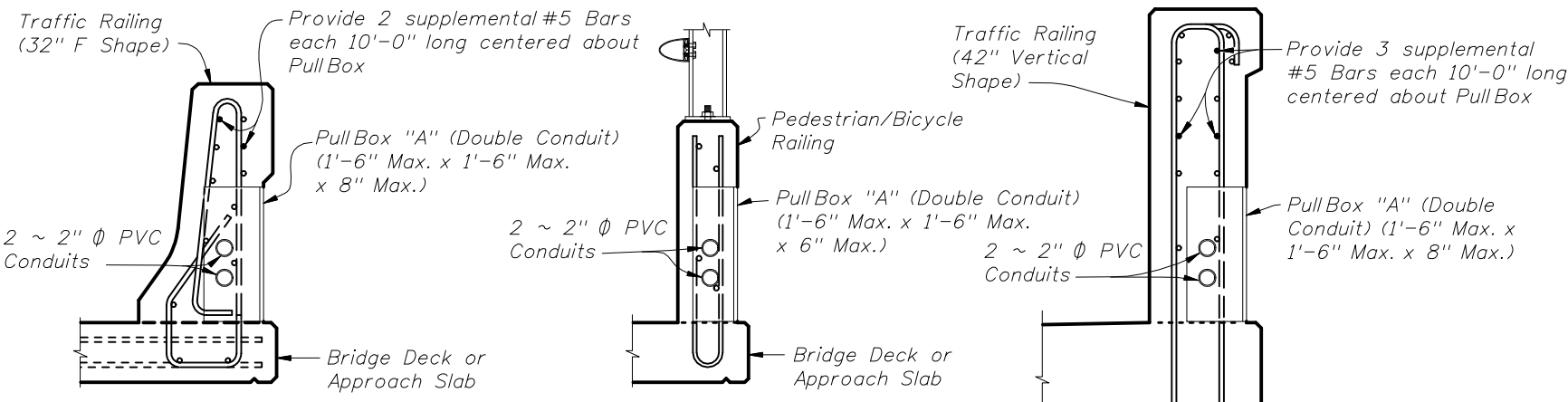
INSTRUCTIONS TO DESIGNER:

Verify the applicability of this Standard for a given project. Coordinate with the District Utility Coordinator to determine the present and future utility requirements at the project location. Provide supplemental designs, notes, details, wiring diagrams and wiring specifications in the Plans as required to complement this Standard.

Specify in the Structures Plans the type of PullBoxes required: PullBox "A" - multiple raceways; PullBox "B" - single raceways. Generally, multiple raceway PullBoxes can be used where utilities contained within individual raceways (conduits) can share a common PullBox. Single raceway PullBoxes should be used where it is desirable or required that utilities contained within individual raceways (conduits) be isolated from each other.

Specify the type of fittings required at Expansion Joint locations on bridges: Expansion Fittings or Expansion / Deflection Fittings. Generally, Expansion Fittings can be typically used for bridges on tangent or large radius curved alignments where little or no transverse movement is expected at Expansion Joints. Expansion / Deflection Fittings are typically required for bridges on curved alignments or combined curved and tangent alignments where transverse movement is expected at Expansion Joints.

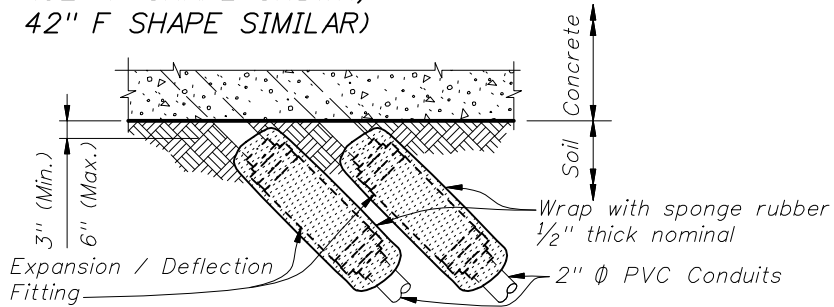
For electrical service, specify the use of THWN or XHHW conductors only.



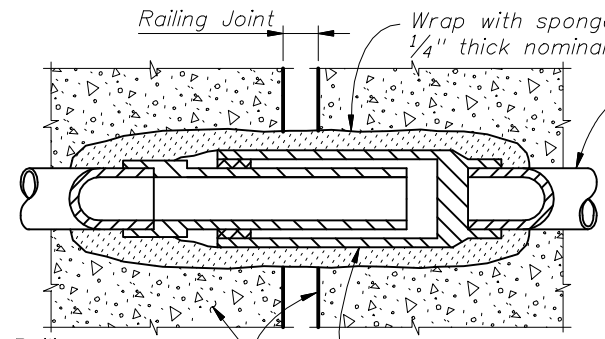
SECTION THRU TRAFFIC RAILING AT PULL BOX (32" F SHAPE SHOWN, 42" F SHAPE SIMILAR)

SECTION THRU PEDESTRIAN / BICYCLE RAILING AT PULL BOX

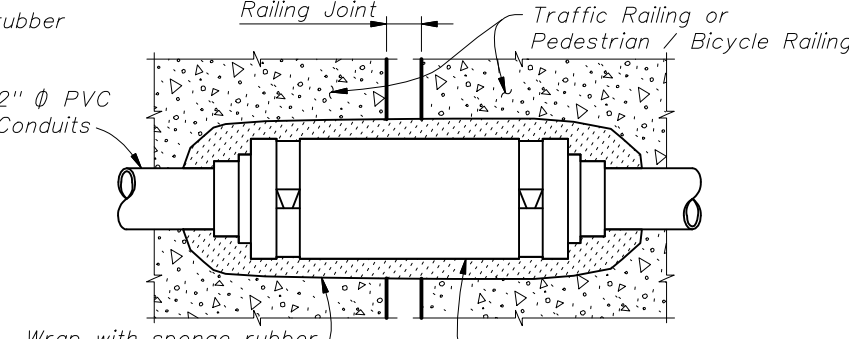
SECTION THRU TRAFFIC RAILING AT PULL BOX (42" VERTICAL SHAPE SHOWN, 32" VERTICAL SHAPE SIMILAR)



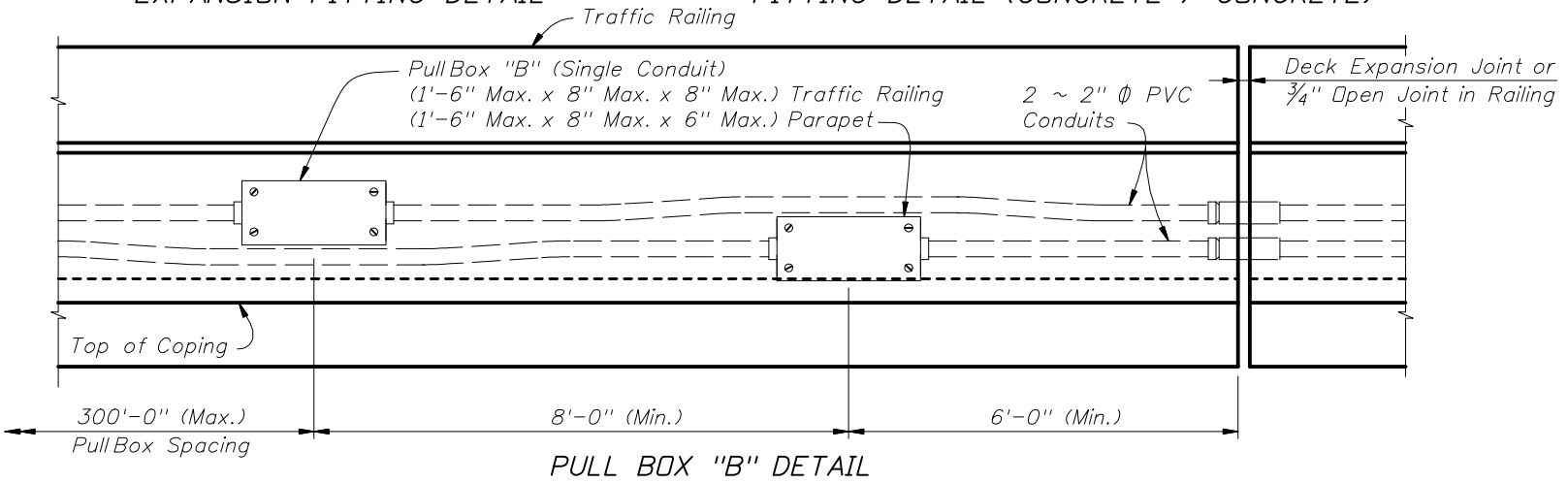
DETAIL "C" EXPANSION / DEFLECTION FITTING DETAIL (CONCRETE / SOIL)



DETAIL "A" EXPANSION FITTING DETAIL

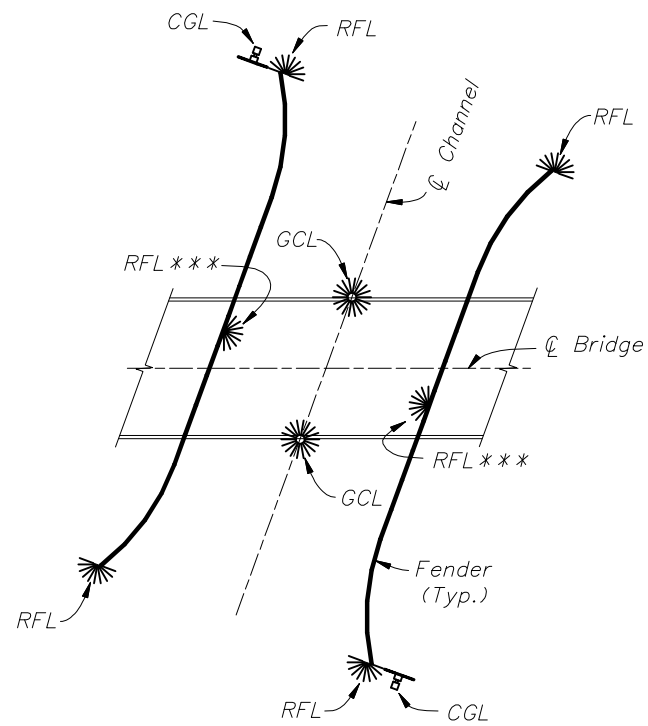


DETAIL "B" EXPANSION / DEFLECTION FITTING DETAIL (CONCRETE / CONCRETE)

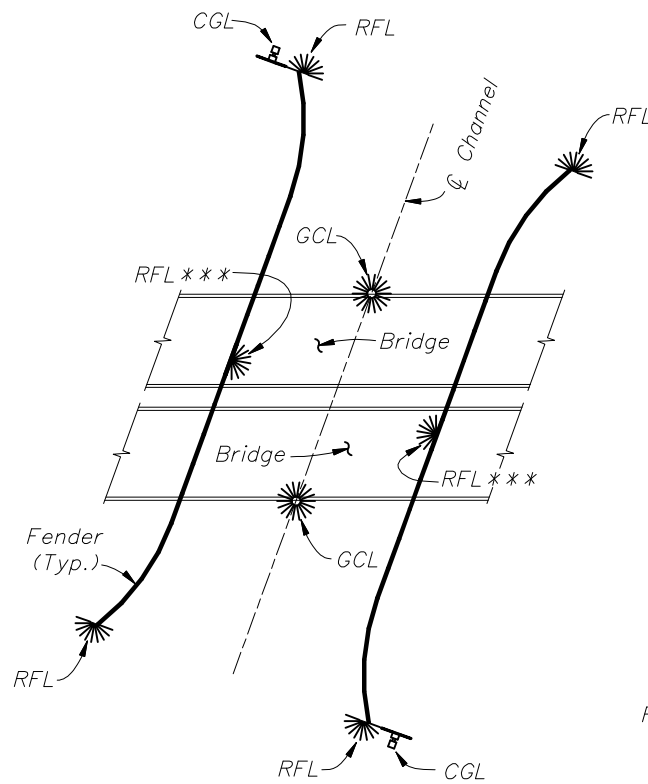


PULL BOX "B" DETAIL

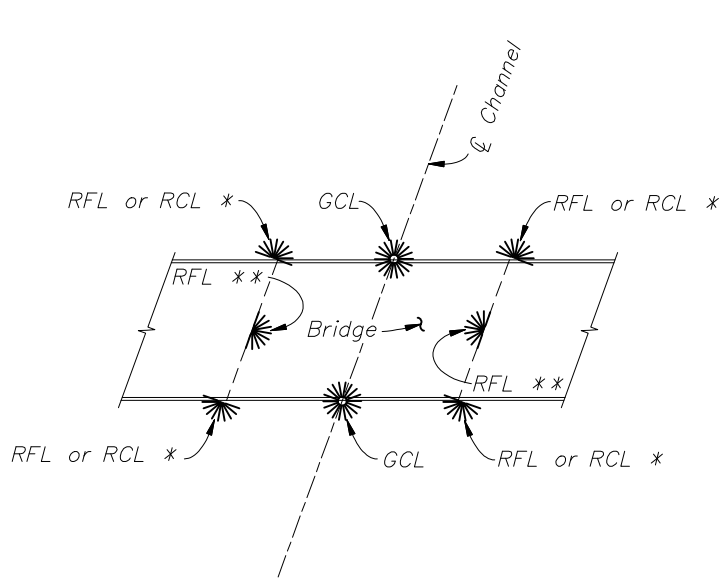




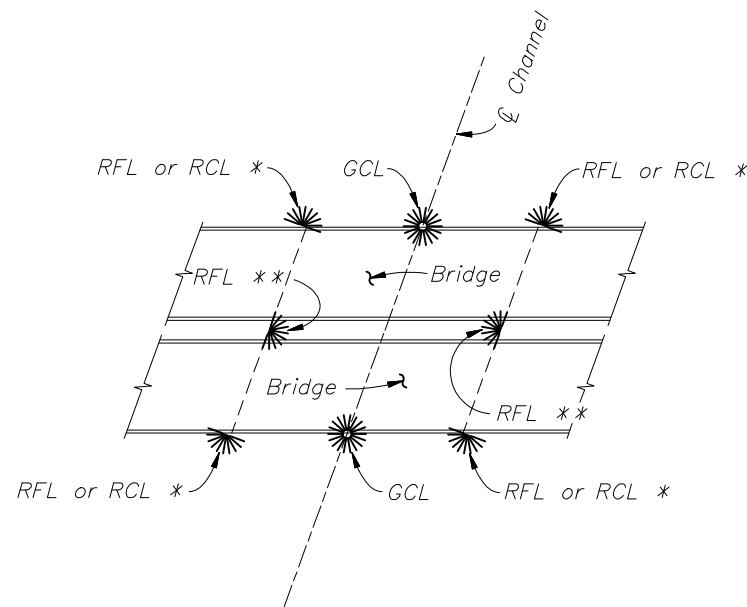
NAVIGATION LIGHT SYSTEM SCHEMATIC FOR SINGLE BRIDGE WITH FENDERS



NAVIGATION LIGHT SYSTEM SCHEMATIC FOR DUAL BRIDGES WITH FENDERS



NAVIGATION LIGHT SYSTEM SCHEMATIC FOR SINGLE BRIDGE WITHOUT FENDERS

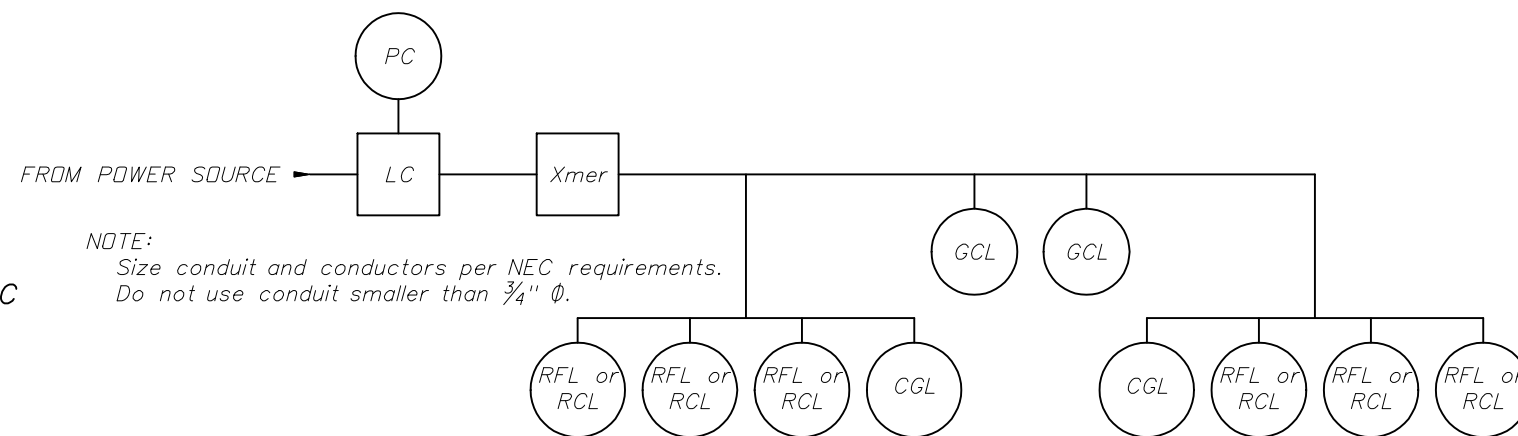


NAVIGATION LIGHT SYSTEM SCHEMATIC FOR DUAL BRIDGES WITHOUT FENDERS

* Use RFL when Pier is at Channel Edge and see CFR, Title 33, part 118 for Mounting Height restrictions. Use RCL otherwise.
 ** Mounted only on the Pier that defines CM, otherwise does not apply.
 *** RFL to be located at mid length of straight portion of fender.

NAVIGATION LIGHT NOTES:

1. Provide Navigation Light System in compliance with Specifications Section 510.



NOTE:
 Size conduit and conductors per NEC requirements.
 Do not use conduit smaller than 3/4" Ø.

TYPICAL ELECTRICAL SCHEMATIC DIAGRAM

POWER CONDUCTORS			
DISTANCE (feet)	VOLTS	CONDUCTOR	TRANSFORMER
0 - 75	120	#12 AWG	N/A
75 - 500	120 or 240	#10 AWG	N/A
500-1000	240	#10 AWG	N/A
1000-2000	480	#10 AWG	2 KVA
2000-5000	480	#8 AWG	2 KVA
5000-10000	480	#6 AWG	2 KVA
over 10000	480	#4 AWG	2 KVA

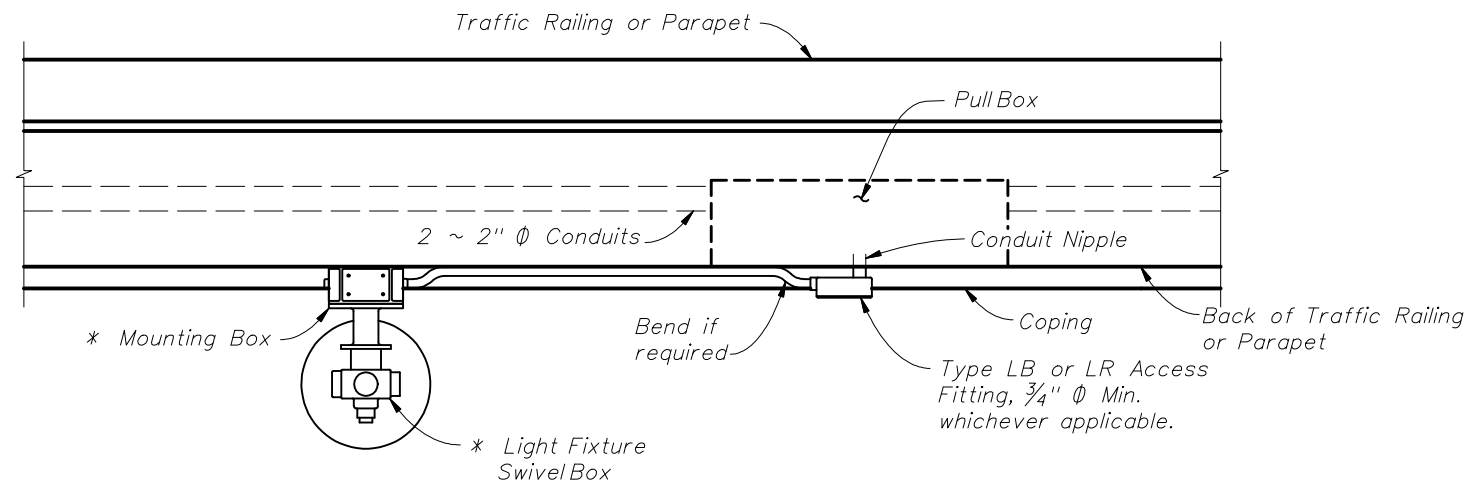
LEGEND

SYMBOL	DESCRIPTION
LC	Lighting Contactor
PC	Photocell Control
Xmer	Transformer (If Required)
	RFL Red Pier/Fender Light or RCL Red Channel Margin Light
	GCL Green Center Channel Light
	CGL Clearance Gauge Light
CM	Channel Margin or Pier inner surface whichever defines Channel Edge.

INSTRUCTIONS TO DESIGNER:

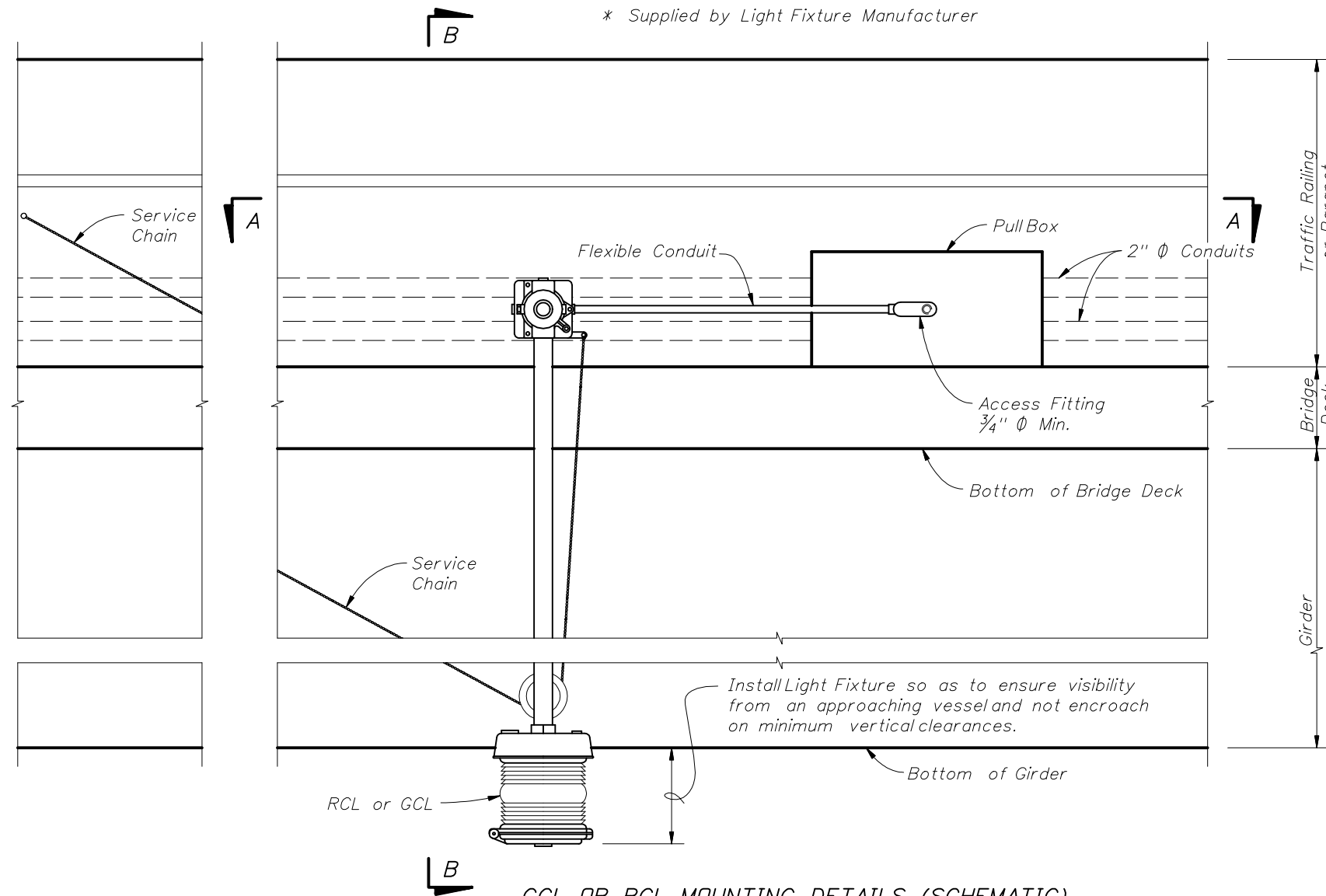
1. Provide design of GCL locations, configurations and its supporting structures.
2. Provide design of RFL locations and configurations in Fender System drawings if applicable.
3. If actual conditions differ from the typical configurations shown on this sheet, design Navigation Light System to comply with Code of Federal Regulations Title 33, Chapter 1, Part 118.
4. Provide automatic lock positions for service and operating.
5. Specify Service Chain mounting location.



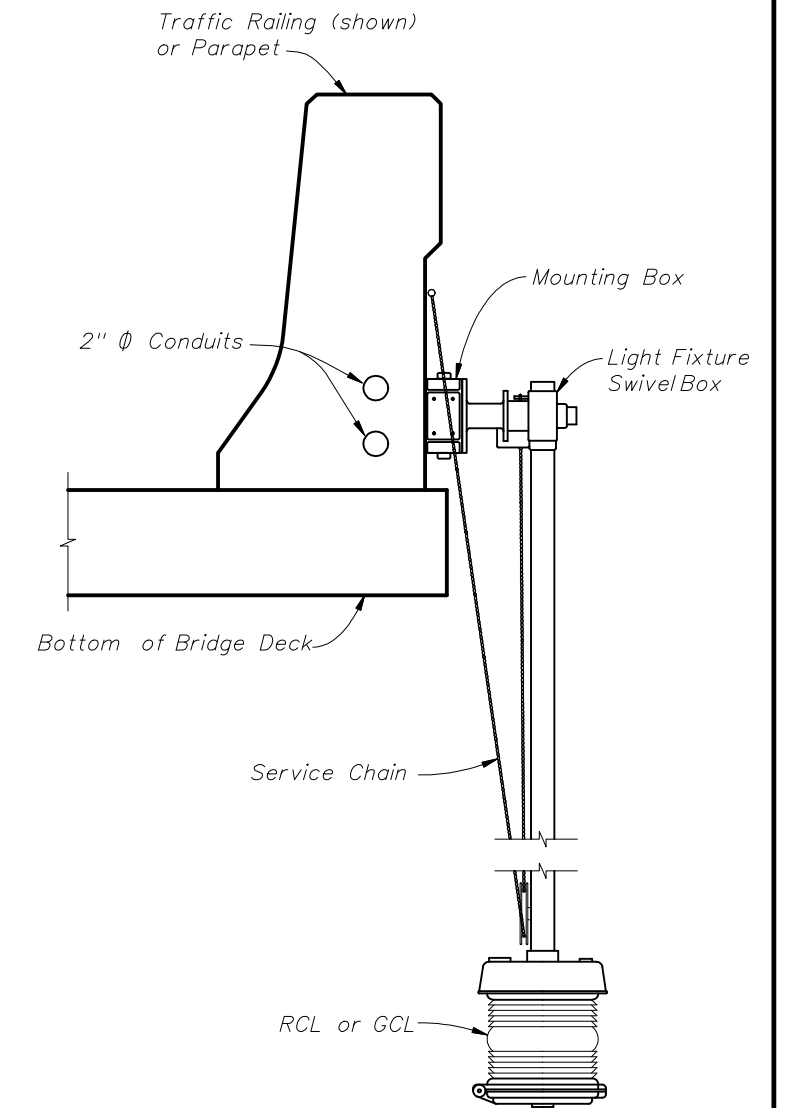


CROSS REFERENCES:
 1. For Navigation Light System notes and legend, see Sheet 1.
 2. See Utility Conduit Detail sheets for pull box dimensions & locations.

GCL OR RCL MOUNTING DETAILS (SCHEMATIC)
 VIEW A-A
 (Traffic Railing - 32" F Shape shown, other railings similar)
 * Supplied by Light Fixture Manufacturer



GCL OR RCL MOUNTING DETAILS (SCHEMATIC)
 ELEVATION VIEW
 (Traffic Railing (32" F Shape) shown, other railings similar)



SECTION B-B
 TYPICAL POSITION OF RCL OR GCL
 RELATIVE TO SUPERSTRUCTURES



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NAVIGATION LIGHT SYSTEM DETAILS
 (FIXED BRIDGES)

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BOX GIRDER MAINTENANCE LIGHTING NOTES:

1. Submit shop drawings to the Engineer detailing the layout of the maintenance lighting system for the entire structure. The shop drawings must include, but not be limited to, the following items:
 - a. Conduit layout and installation details through diaphragms, around post-tensioning (PT) ducts, lateral bracing and cross frames as necessary.
 - b. Conduit access through box girder end diaphragms with minimum 1" clearance in all directions.
 - c. Conduit expansion fitting details.
 - d. Fastener details for the interior electrical system.
 - e. Single line diagram showing minipower centers, switches, contactors, timers, etc.
 - f. Minipower center details including circuit breaker details.
 - g. Minipower center mounting details if required.
 - h. Feeder schedule.
2. Ensure installation meets all requirements of the latest edition of the National Electrical Code (NEC) and local ordinances. Install grounding in accordance with NEC Article 250. Maintain separation between 480V and 120V Conductors / Conduits throughout.
3. Furnish all labor, equipment, materials, and incidentals required for a complete and functional installation.
4. Use only new, unused and Underwriters Laboratories (UL) listed equipment and materials for outdoor use.
5. Furnish and install polyvinyl chloride (PVC) conduit in conformance with UL Section 651, NEC Section 347 and NEMA TC-2, UV-resistant and schedule 80. Bend conduits as necessary to connect to loads.
6. Provide PVC sleeve 2" bigger in diameter than conduit to accommodate construction tolerance.
7. Install a UL labeled expansion fitting for specified PVC conduit at all structure expansion joints. Provide certification that the expansion fitting meets the following minimum requirements: Compatibility with the connected conduits, waterproof, UV protected and allows longitudinal movement equal to that of the Expansion Joint.
8. Use only Alloy 316 stainless steel supporting hardware. Provide minimum $\frac{3}{16}$ " \emptyset fasteners. For concrete or SIP form mounting, provide anchor bolts (expansion, drop-in or adhesive) suitable for dynamic loading (due to vibration caused by traffic). Install fasteners to avoid conflicts with reinforcing steel and PT ducts. For structural steel mounting, do not attach fasteners to main members, i.e. webs and flanges.
9. Furnish power distribution at 480V AC, 1 phase, with step down transformers at regular intervals. Furnish 7.5 KVA mini power center with eight 20A breakers as the step down transformer, feeding a maximum of 20 lamps and 20 receptacles. Each minipower center will provide power to no more than 1000' of bridge, preferably 500' on each side of the minipower center. 480V top feed, 120V bottom feed to maintain separation.
10. Furnish and install lighting contactors to switch the 480V AC feeding the minipower centers.
11. Furnish and install copper conductors, Type XHHW. Do not use any conductor larger than #4 AWG.
12. Provide enough slack in all interior cable terminations to allow for minor shifting of the structure.
13. Furnish and install National Electric Manufacturers Association (NEMA) Type 4X (non-metallic) surface mounted boxes sized in conformance with the NEC.
14. Furnish and install 120V duplex receptacles (GFI, NEMA Type 5-20R), in non-metallic outlet boxes at 50' maximum on centers. Provide each receptacle with a gasketed weather-protective outdoor plate. Maximum wire size to connect to receptacles is #12 AWG.
15. Furnish and install surface mounted, fully enclosed, incandescent light fixtures with gasketed clear globes and wire guards at 50' maximum on centers. Provide 100 watt, 130 volt, vibration resistant and brass base incandescent lamps.
16. Locate switches at each end of each span and at every access door.
17. Provide six hour reset timers for each circuit to turn off the lighting system automatically.
18. Include the cost of the box maintenance lighting system in the pay item for Lighting - Inside Box Girder. Tabulate items in the plans.

INSTRUCTIONS TO DESIGNER:

1. This Standard does not show all structure elements and is not intended to show the exact location of conduit runs. Coordinate these with the other trades to avoid conflicts. Coordinate all lighting fixtures and equipment locations with the Structure Plans.
2. Tabulate in the plans and include in the TRNS*PDRT, for bid purposes, the pay items for the maintenance lighting system such as conductors, conduit, electrical work, etc.

CROSS REFERENCES:

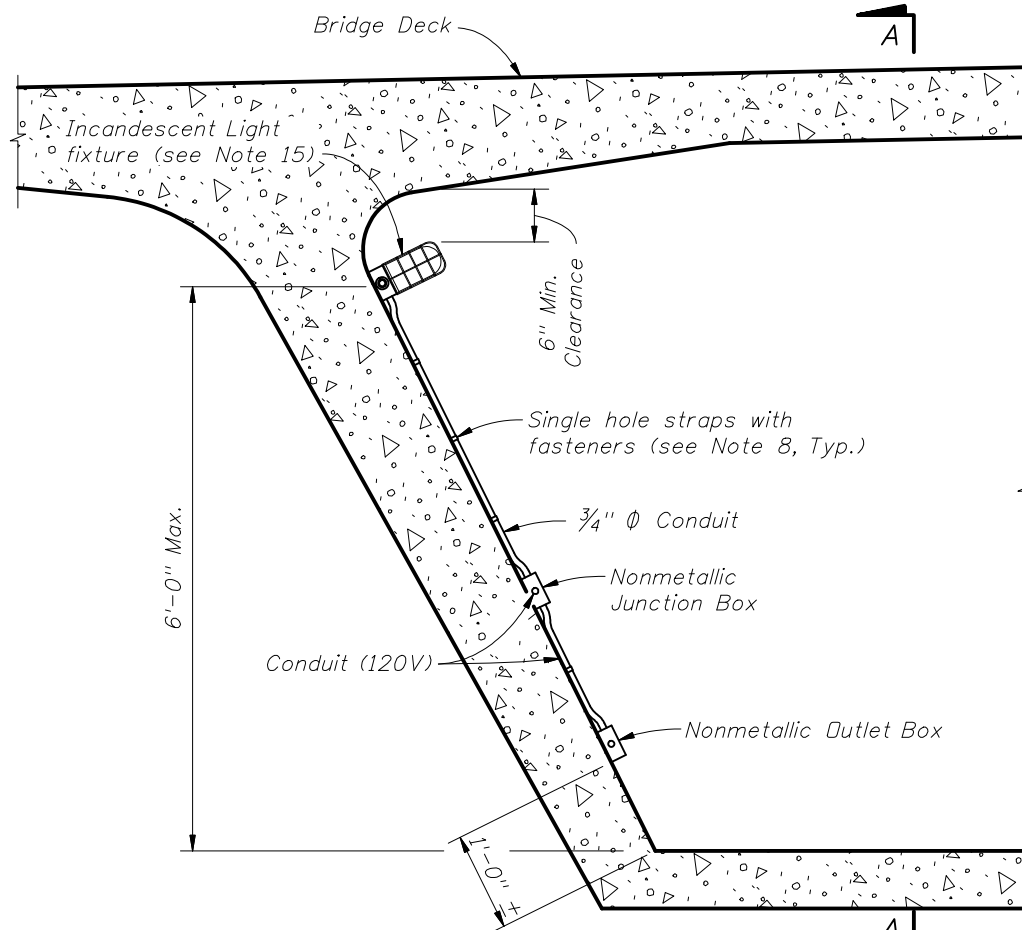
1. For Maintenance Light Details, see Sheet 2.
2. For actual bridge section, see Structures Plans.



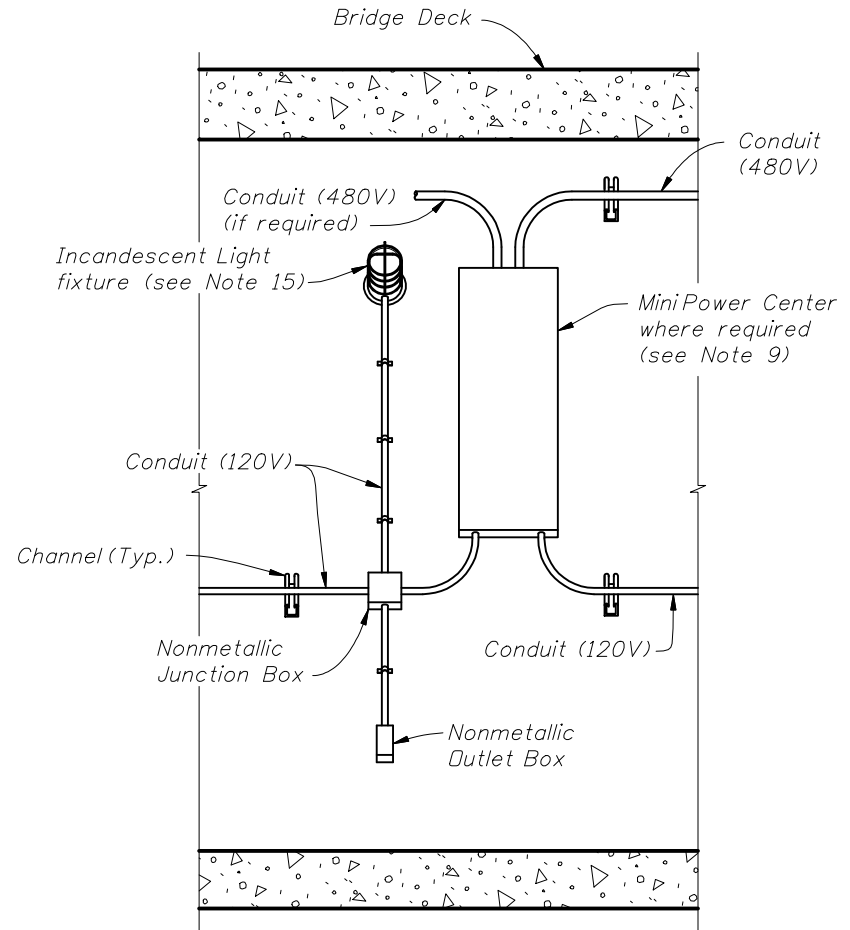
2010 FDOT Design Standards

MAINTENANCE LIGHTING FOR BOX GIRDERS

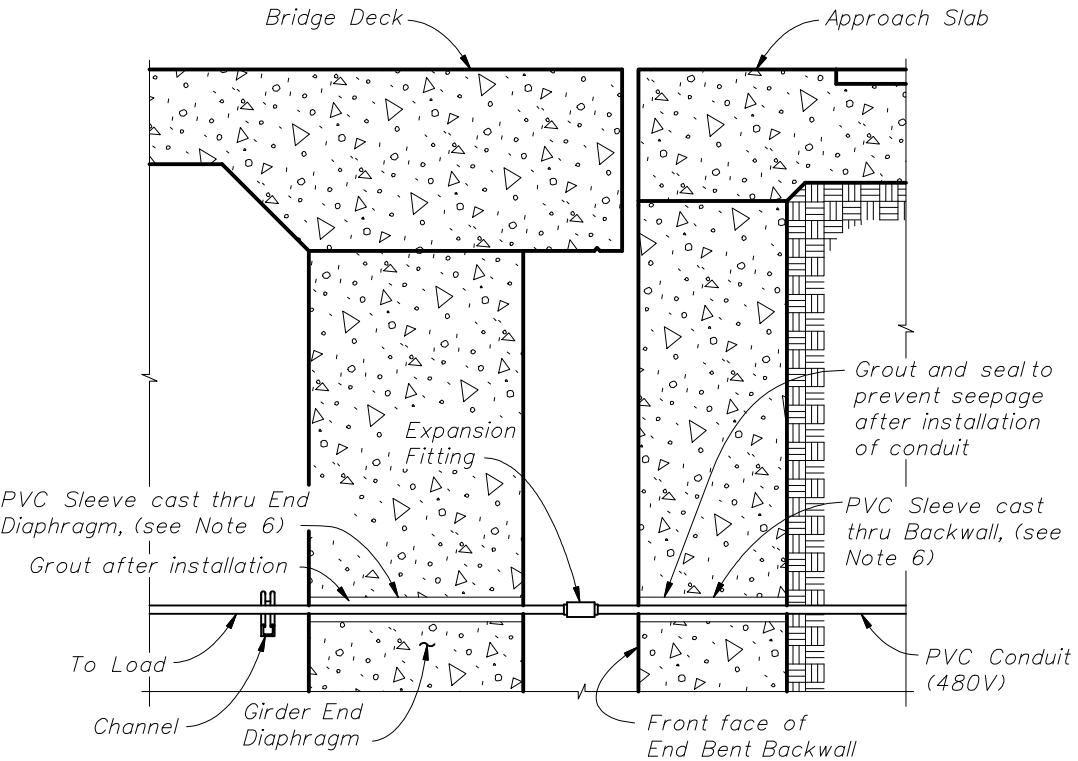
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LIGHTING DETAILS FOR CONCRETE BOX GIRDER BRIDGE

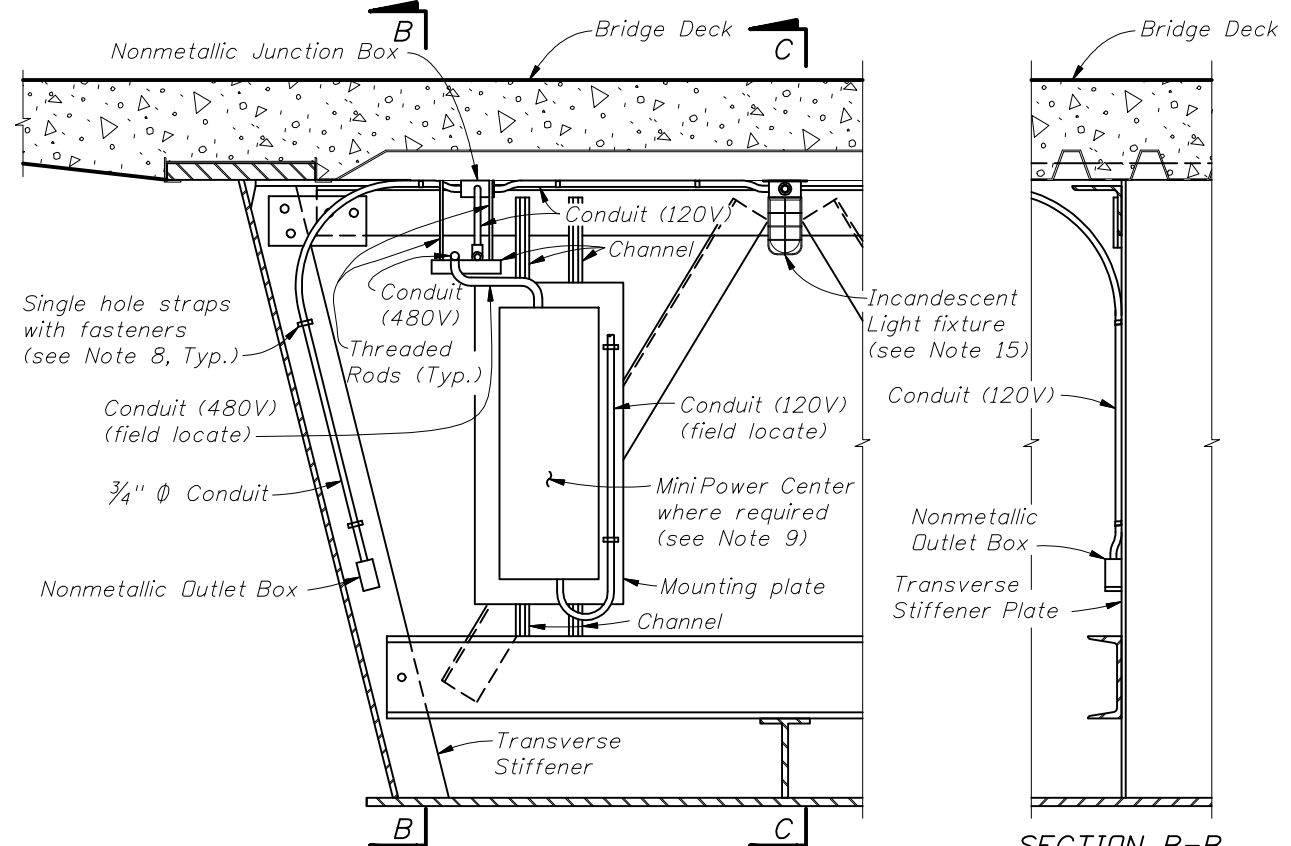


SECTION A-A



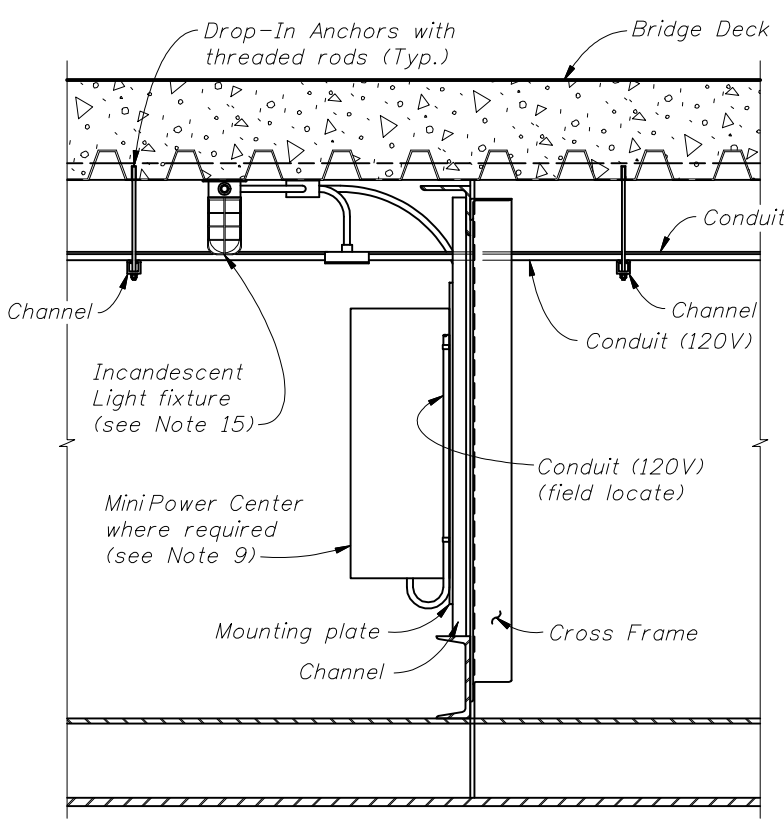
CONCRETE BOX GIRDER BRIDGE SECTION THRU END BENTS

CROSS REFERENCE:
1. For Box Girder Maintenance Lighting Notes see Sheet 1.

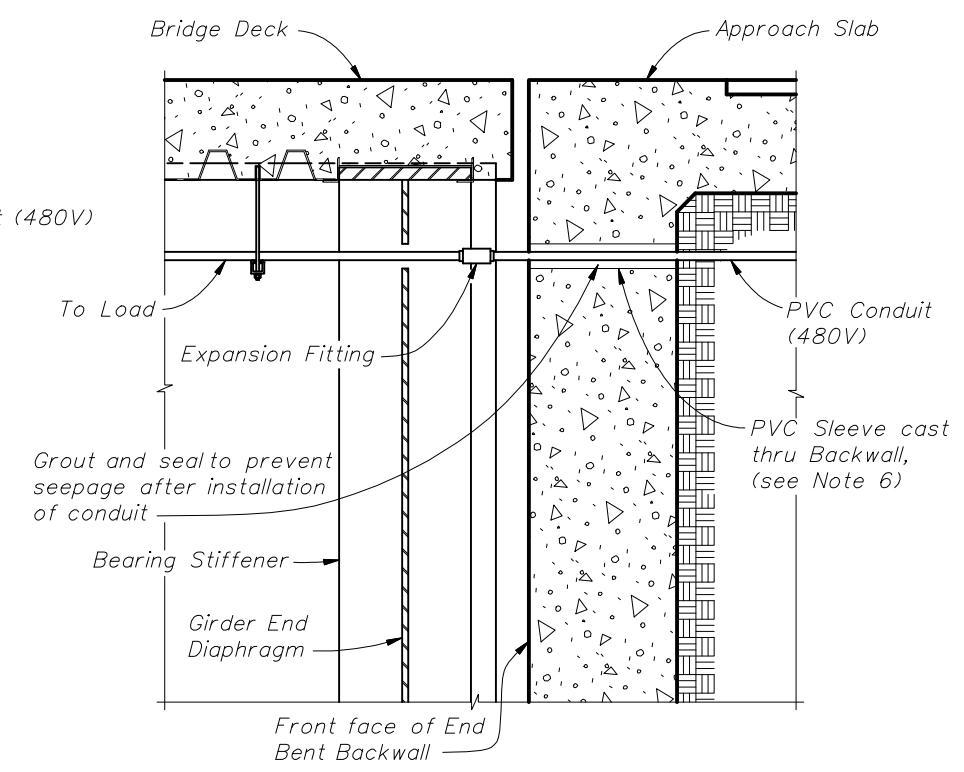


LIGHTING DETAILS FOR STEEL BOX GIRDER BRIDGE
(Cross Frame section shown, other Transverse Stiffener sections similar)

SECTION B-B

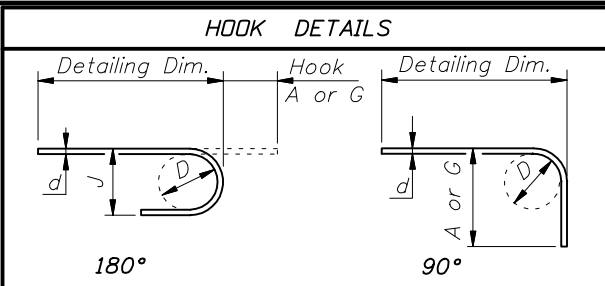
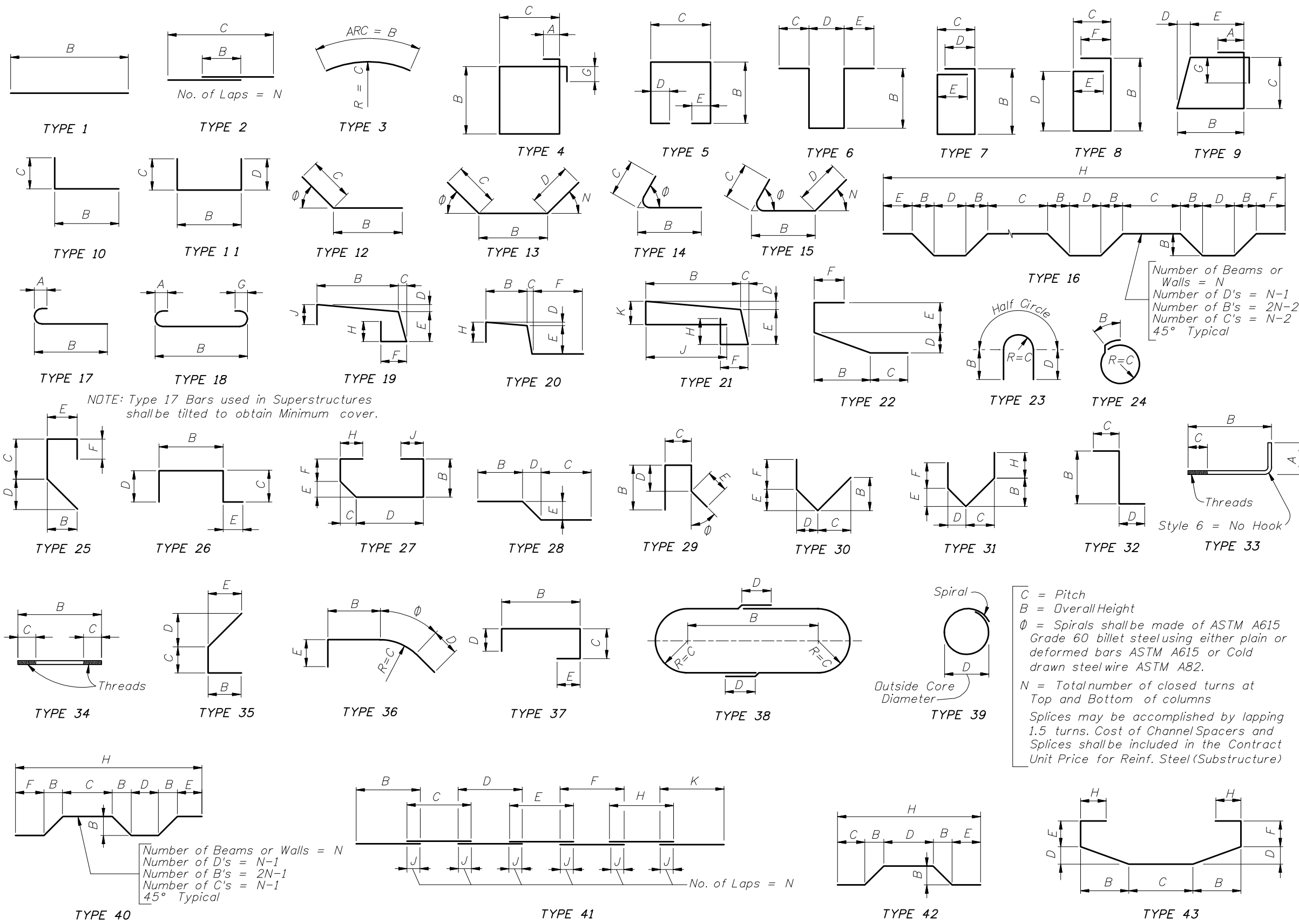


SECTION C-C

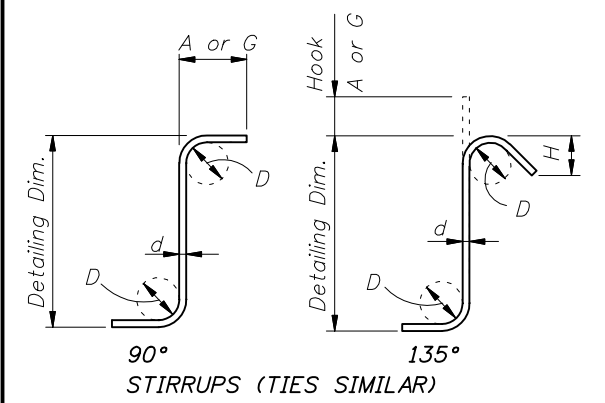


STEEL BOX GIRDER BRIDGE SECTION THRU END BENTS





BAR SIZE	D	180° HOOKS		90° HOOKS	
		A OR G	J	A OR G	
#3	2 1/4"	5"	3"	6"	
#4	3"	6"	4"	8"	
#5	3 3/4"	7"	5"	10"	
#6	4 1/2"	8"	6"	1'-0"	
#7	5 1/4"	10"	7"	1'-2"	
#8	6"	11"	8"	1'-4"	
#9	9 1/2"	1'-3"	11 3/4"	1'-7"	
#10	10 3/4"	1'-5"	1'-1 1/4"	1'-10"	
#11	12"	1'-7"	1'-2 3/4"	2'-0"	
#14	18 1/4"	2'-3"	1'-9 3/4"	2'-7"	
#18	24"	3'-0"	2'-4 1/2"	3'-5"	
STYLE		1		3	



BAR SIZE	D	90° HOOKS		135° HOOKS	
		A or G	A or G	H*	
#3	1 1/2"	4"	4"	2 1/2"	
#4	2"	4 1/2"	4 1/2"	3"	
#5	2 1/2"	6"	5 1/2"	3 3/4"	
#6	4 1/2"	1'-0"	8"	4 1/2"	
#7	5 1/4"	1'-2"	9"	5 1/4"	
#8	6"	1'-4"	10 1/2"	6"	
STYLE		4		5	

STYLE 6 = NO HOOK

* Dimension is approximate.
Hook Styles Detailed on this sheet are for Illustration Only.
Actual Hook Style for any particular bar will be shown under A or G Heading on REINFORCING BAR LIST sheet(s) in Structures Plans.
All Dimensions are out-to-out.

C = Pitch
B = Overall Height
Ø = Spirals shall be made of ASTM A615 Grade 60 billet steel using either plain or deformed bars ASTM A615 or Cold drawn steel wire ASTM A82.
N = Total number of closed turns at Top and Bottom of columns
Splices may be accomplished by lapping 1.5 turns. Cost of Channel Spacers and Splices shall be included in the Contract Unit Price for Reinf. Steel (Substructure)

NOTE: For Bar Dimensions See REINFORCING BAR LIST Sheet(s) in Structures Plans.



GENERAL NOTES:

Work this Standard with Index Nos. 21610, 21620 and 21630.

STRUCTURAL STEEL:

Steel Plates and Rolled Sections shall be ASTM A 709 Grade 36.
Pipe piles shall be ASTM A 252 Grade 2, Fy = 35 ksi.

BOLTS, LAG SCREWS AND THREADED BOLT STOCK:

Furnish high strength bolts in accordance with ASTM A325. Furnish Threaded Stock in accordance with ASTM A36. Furnish Lag Screws in accordance with ASTM A307. Furnish steel washers and nuts compatible with Bolts, Threaded Stock and Lag Screws.

TIMBER AND LAGGING:

Timber and Lagging shall be No. 1 Southern Yellow Pine.

BACKWALL BENT PILES:

Timber Piles:
10' Minimum Embedment into compacted backfill or into soil having a blow count greater than 6 (N>6).
Ultimate Capacity greater than 18 tons.
Splices are not allowed on any timber piles.

H-Piles:

12' Minimum Embedment into compacted backfill or into soil having a blow count greater than 6 (N>6).
Ultimate Capacity greater than 18 tons.

Shims admissible between backwall pile and cap.
Test piles are not required for backwall piles.

EXPANSION BEARINGS:

Inspect the PTFE (Teflon) layer and stainless steel plate prior to installation. Do not use bearings that have a severely damaged or unbonded PTFE layer. Clean PTFE of all grit and grime prior to installation. Clean Stainless steel plate of all grit and grime prior to installation and finish to a smooth buffed surface.

DISTRIBUTING BEAMS:

Longitudinal stops restraining the distributing beams may be lengthened or shortened to center the distributing beam bearing on the cap beam.
The longitudinal stops are to bear on the distributing beam end frame.

EXPANSION JOINT SETTINGS:

Install the expansion joint considering the total continuous bridge length, location of fixed bearings and ambient temperature at the time of installation, assume a 1" expansion joint opening at 70 degrees F.

STORAGE FACILITY:

Contact
FDOT Statewide Aluminum Shop
2590 Camp Rd.
Oviedo, Fl.
407-977-6520

For shipping weights and dimensions of Temporary Bridge elements.

SHIPPING WEIGHTS AND DIMENSIONS:

Decking Sizes:

Type	Length	Width	Weight (lbs.)
Curb	5'	6'-9"	800
Curb	10'	6'-9"	1420
Curb	15'	6'-9"	2200
Curb	20'	6'-9"	2800
NonCurb	5'	5'-3"	650
NonCurb	10'	5'-3"	1000
NonCurb	15'	5'-3"	1600
NonCurb	20'	5'-3"	2100

Shipping weights and dimensions of other bridge components can be referenced in "Acrow Panel Bridging, Series 300, Technical Handbook".

INSTRUCTIONS TO DESIGNER:

Establish temporary bridge length to accommodate project geometric needs, environmental permits, drainage requirements, etc., using the following span length and arrangement criteria. Details presented in this Standard are for a Double Single configuration and incorporating the Double Wide Light Transom as shown in the "Acrow Panel Bridging Technical Handbook"

Variation in span lengths in increments of 10'

30' minimum span length

60' maximum span length

For continuous spans the ratio of the end span length to the adjacent span length shall not be less than 6:10 to prevent the shorter span from lifting off its bearings under live load

Limit continuous length of bridge to 360'

Specify Distributing beams for all span lengths. Details presented assume use of continuous spans.

Design the pile cap connection to pile assuming the truss reaction with a minimum of 3" eccentricity. Design of this connection details is the responsibility of the Engineer of Record.

Select the pile type considering the driving capacity requirements of the production piles on the permanent bridge, free standing height, water levels if present and soil conditions.

Refer to "Acrow Panel Bridging Series 300 Technical Handbook" for temporary bridge dimensions and capacities.

These Standards are based on the FDOT current inventory of temporary bridge elements which are manufactured in accordance with Acrow Series 300 Double Wide design.

The Approach span and Ramp span are to be simple spans, each 5'-0" in length, to eliminate Live Load uplift at backwall bent and grade beam support.

Do not place the temporary bridge on a vertical curve. A constant grade is acceptable. Refer to "Acrow Panel Bridging Technical Handbook" for maximum grade and elevation tolerance from constant grade (Bent to Bent and Cross-Slope) for final cap elevations.

The temporary bridge is to have a zero cross-slope. Provide asphalt buildup transitions to a zero cross slope outside the limits of the temporary bridge.

Design the foundations according to current AASHTO LRFD Bridge Design Specifications.

For Substructure Design use the following:

Dead Load Factor = 1.25

Live Load Factor = 1.35

SERVICE LEVEL LOADS:

Calculate reactions using superstructure dead load unit weight = 1.26 Kip/Ft.

Include a concentrated dead load = 250 Lbs. per truss plane at abutments. This load accounts for 1 end post and 1 bearing per truss plane.

Calculate wind force on superstructure using basic wind force of 0.45 Kip/Ft.

Ratio the above loading using wind pressures in Table 3.8.1.2.2-1 of AASHTO LRFD Bridge Design Specifications.

Example-

For wind skew of 30°

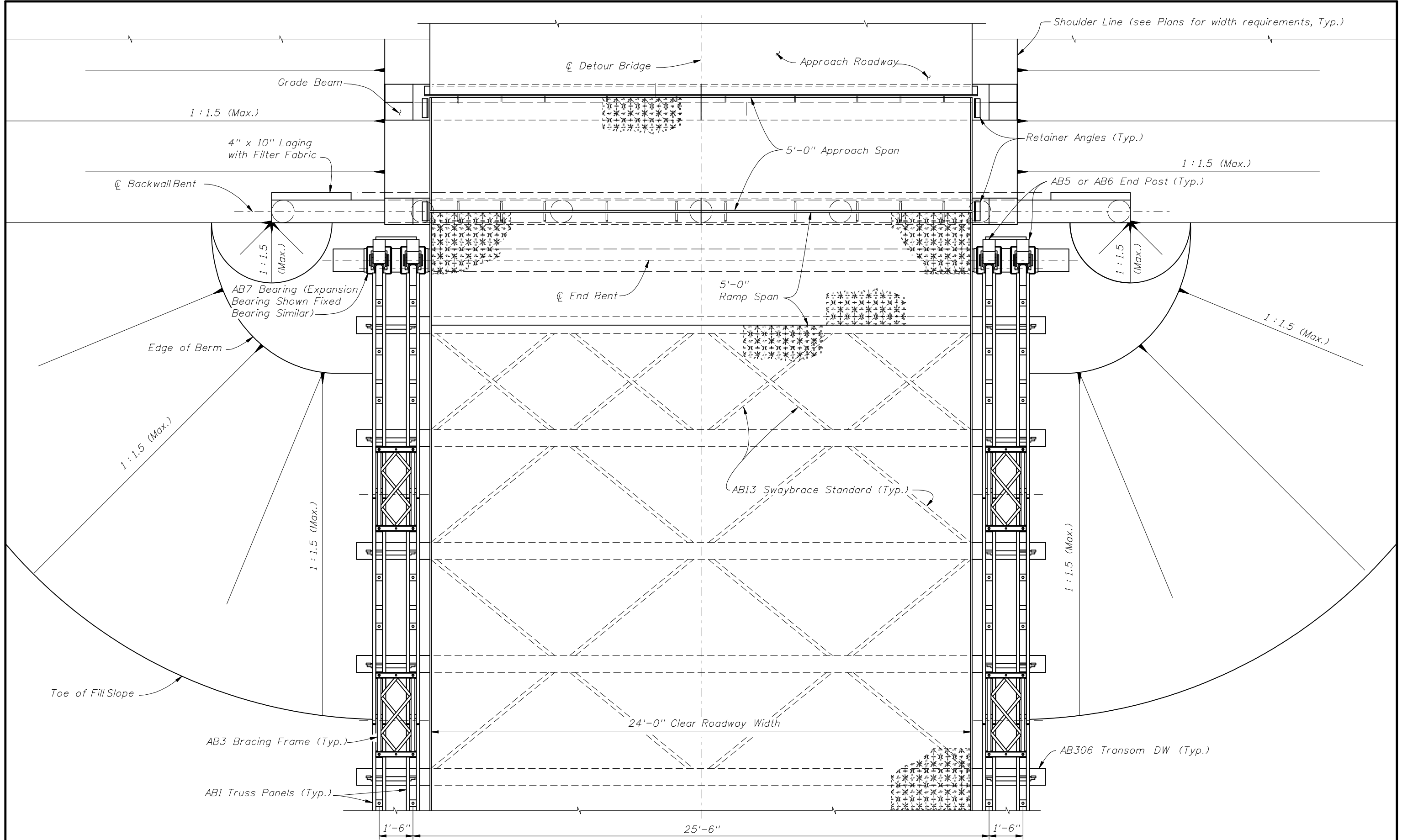
W Lateral = 0.45 (0.065/0.075) = 0.39 Kip/Ft.

W Longitudinal = 0.45 (0.028/0.075) = 0.17 Kip/Ft.

Plans for temporary bridge shall, as a minimum, cover the following:

1. General Note Sheet.
2. Simple span bearing details if noncontinuous spans are selected.
3. Grade change details at the extremities of the bridge.
4. Plan and elevation sheets with span lengths, stationing, alignment, grade and boring locations.
5. Foundation layout sheet including pile spacing & bent stationing.
6. Pile data table showing pile type, size, cut off elevations, capacity & estimated lengths.
7. Bent detail sheet.





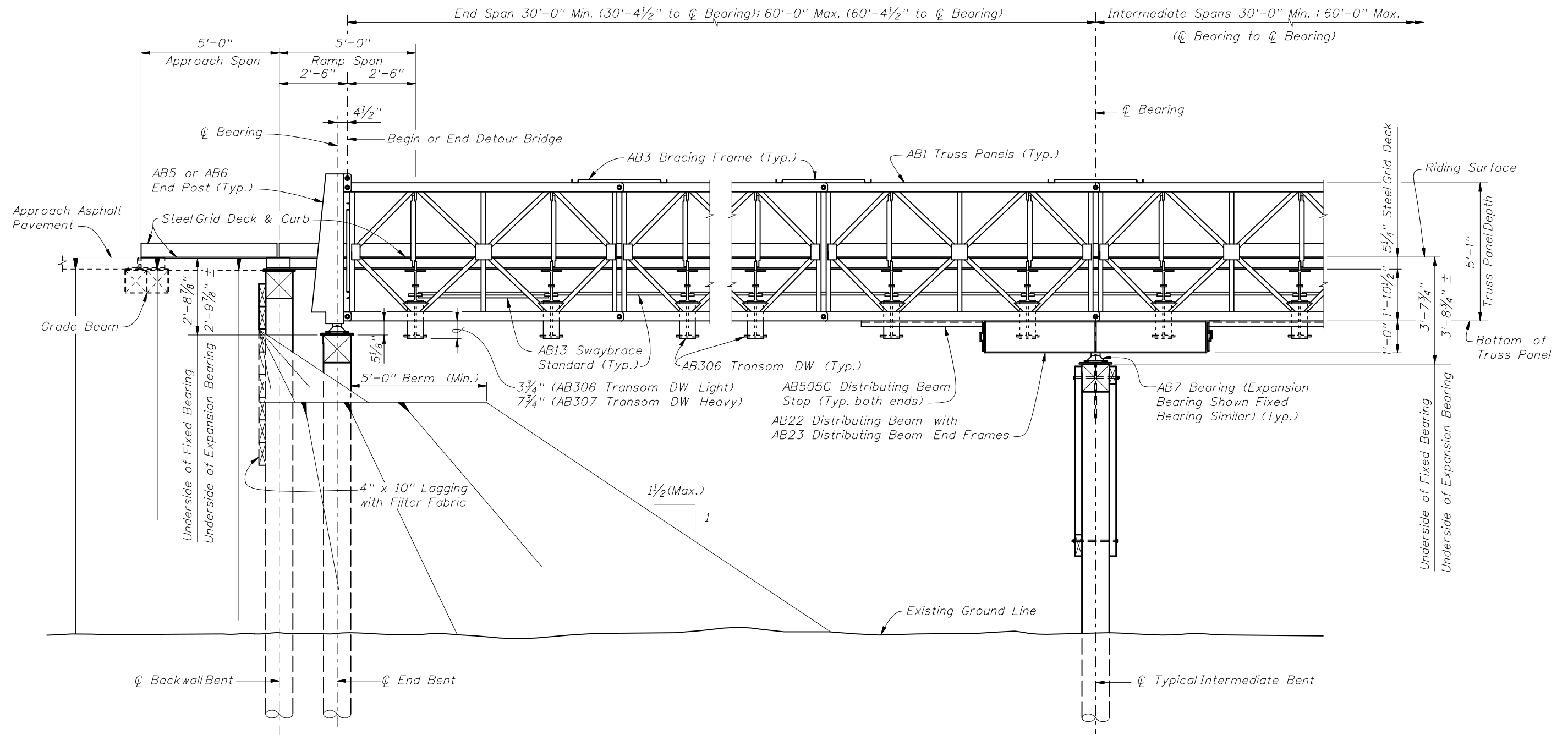
TYPICAL PLAN VIEW OF DETOUR BRIDGE
 (TIMBER PILE SHOWN, STEEL H PILES AND STEEL PIPE PILES SIMILAR)



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**TEMPORARY DETOUR BRIDGE
 GENERAL NOTES AND DETAILS**

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ELEVATION VIEW
 (TIMBER PILES SHOWN, STEEL H PILES AND STEEL PIPE PILES SIMILAR)



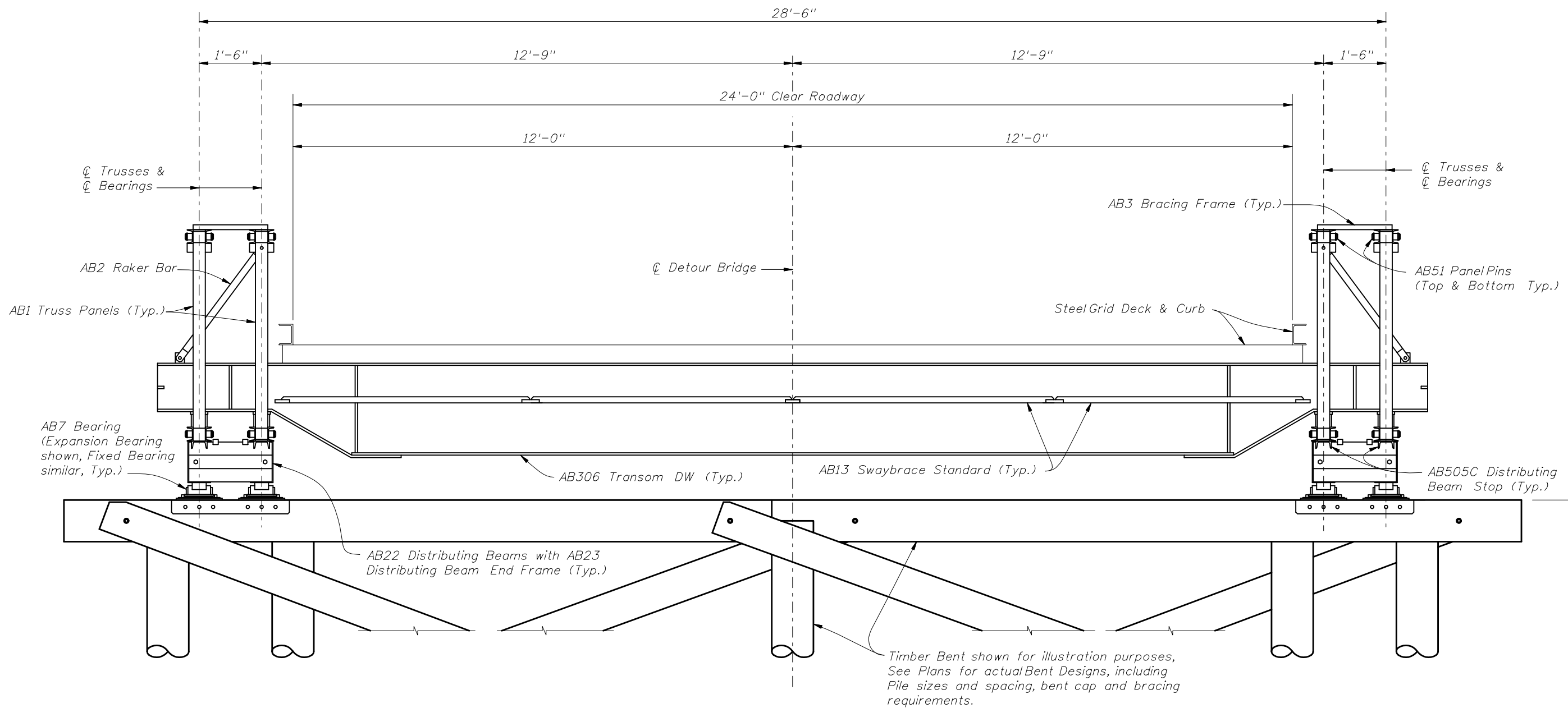
2010 FDOT Design Standards

TEMPORARY DETOUR BRIDGE
 GENERAL NOTES AND DETAILS

Last Revision
 01/01/08

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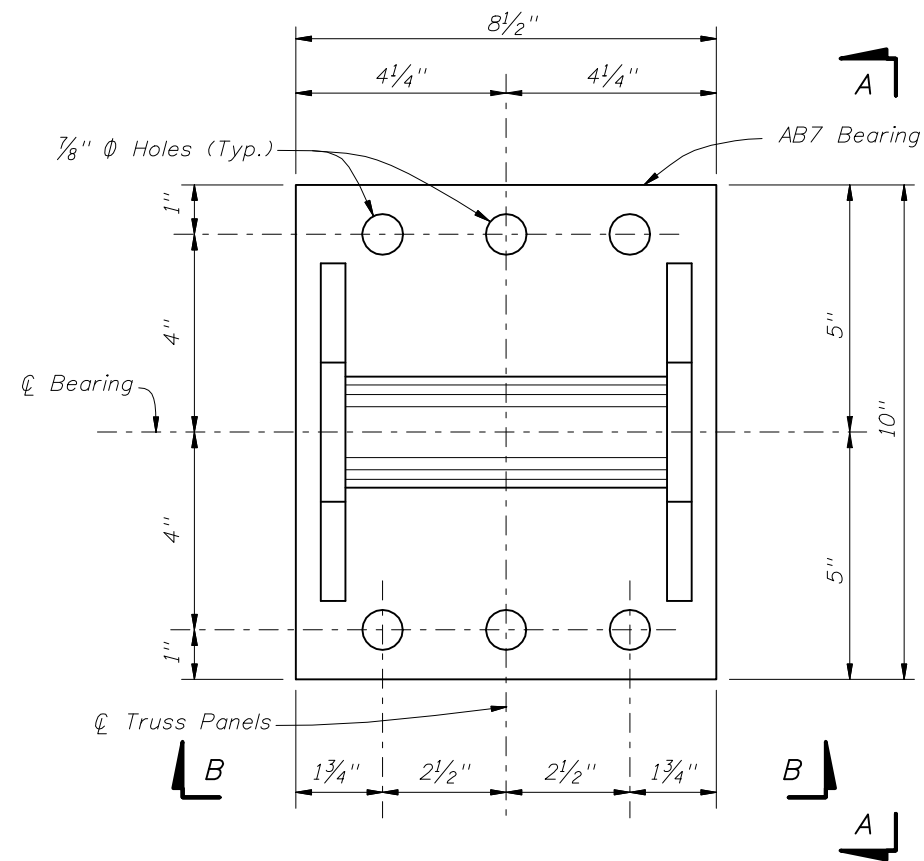
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 21600



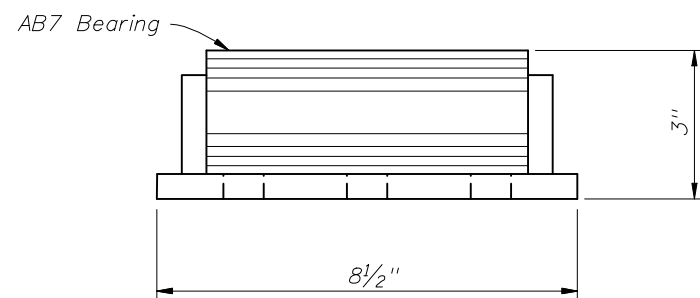
TYPICAL SECTION THRU DETOUR BRIDGE AT INTERIOR BENTS (TYPICAL SECTION AT END BENTS SIMILAR WITHOUT DISTRIBUTING BEAMS)
 (TIMBER PILE SHOWN, STEEL H PILES AND STEEL PIPE PILE SIMILAR)

Contractor supplied foundations components, including Bearing Saddle Plates, Keeper Bars & Shimms.
 FDOT supplies Temporary Bridge Components including Fixed & Expansion Bearings

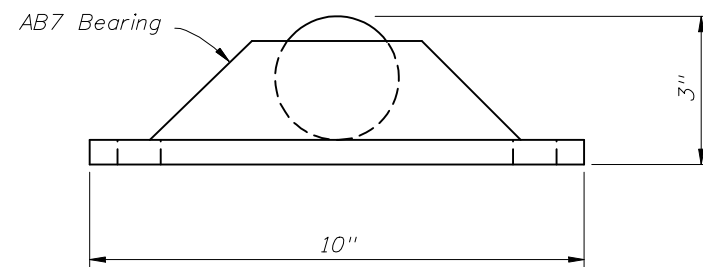




PLAN VIEW

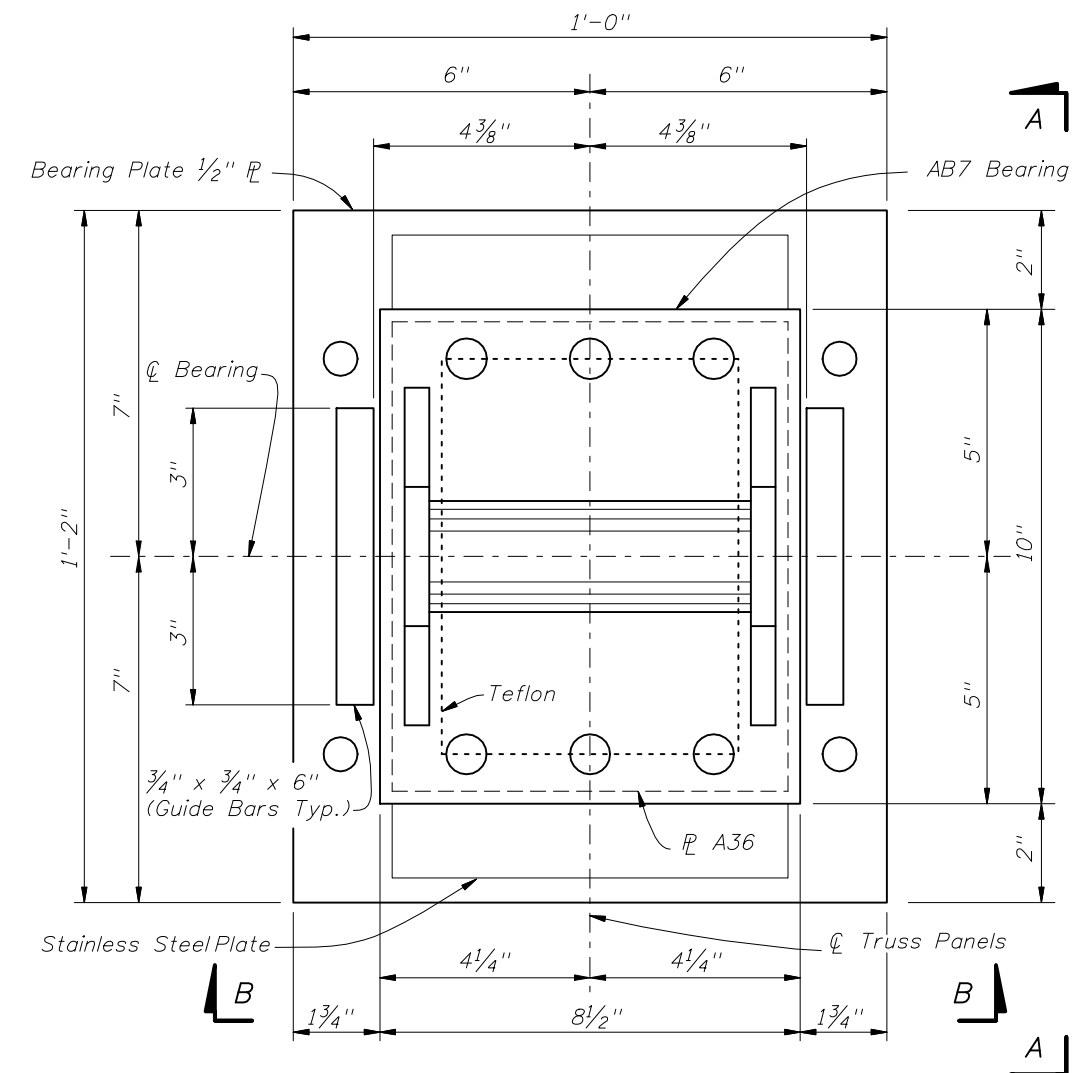


VIEW A-A

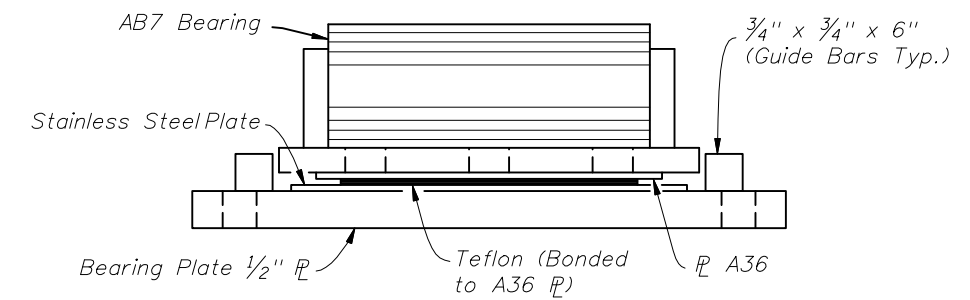


VIEW B-B

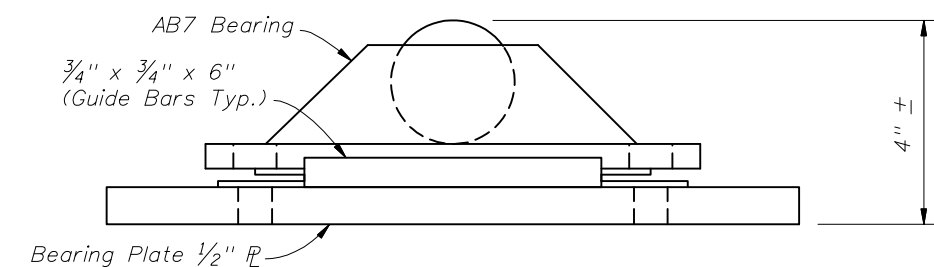
== DETAILS FOR FDOT SUPPLIED FIXED BEARINGS ==



PLAN VIEW

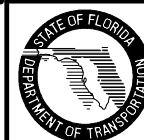


VIEW A-A



VIEW B-B

== DETAILS FOR FDOT SUPPLIED EXPANSION BEARINGS ==



2010 FDOT Design Standards

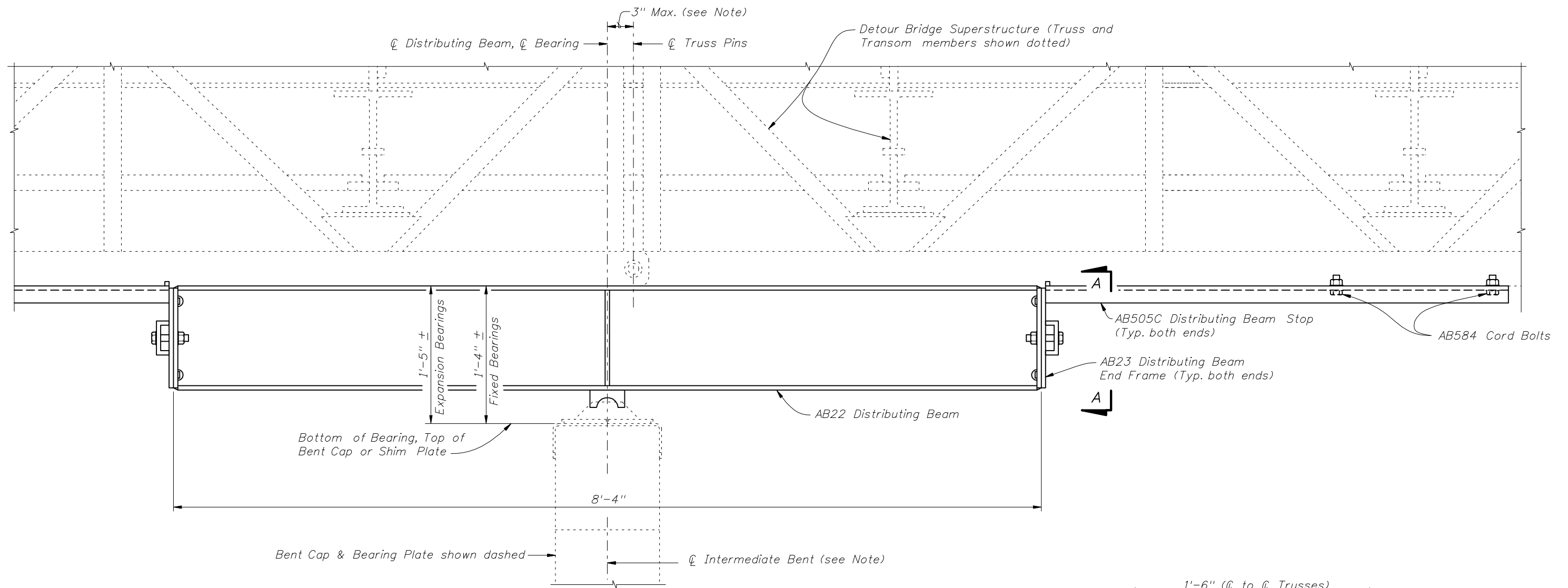
TEMPORARY DETOUR BRIDGE
GENERAL NOTES AND DETAILS

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Sheet No. 5 of 7

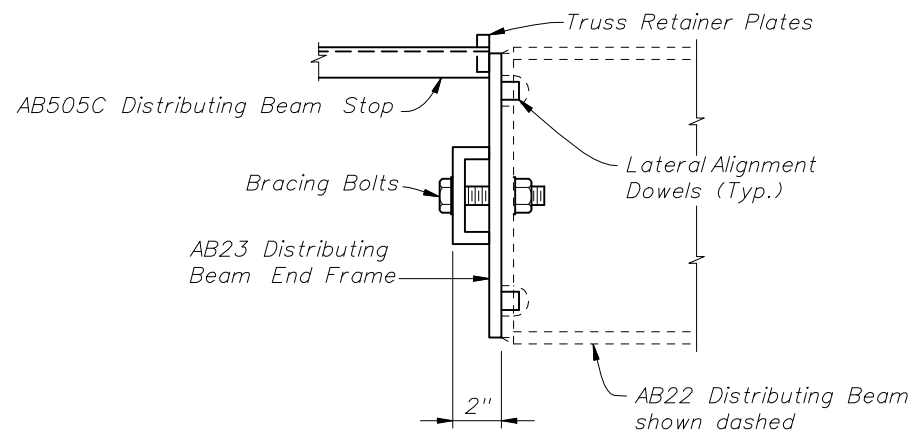
Index No.

21600

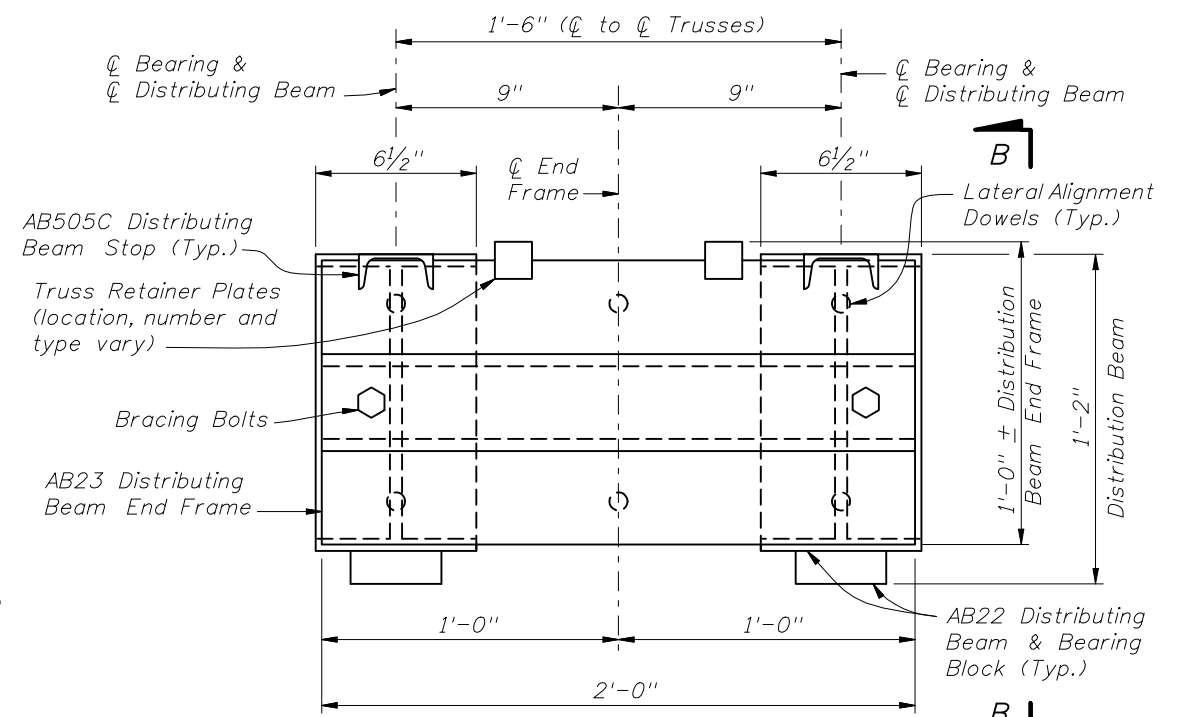


ELEVATION VIEW OF DISTRIBUTING BEAM
 (FIXED BEARING SHOWN, EXPANSION BEARING SIMILAR)
 (Timber Intermediate Bent shown, Steel H Pile and Steel Pipe Pile Intermediate Bents similar)

Note:
 Bearing may be shifted from Truss Pins as shown, Intermediate Bent may be shifted from Bearing an additional 3" to allow for pile placement tolerances.



VIEW B-B



END VIEW A-A
 DISTRIBUTING BEAM END FRAME DETAIL

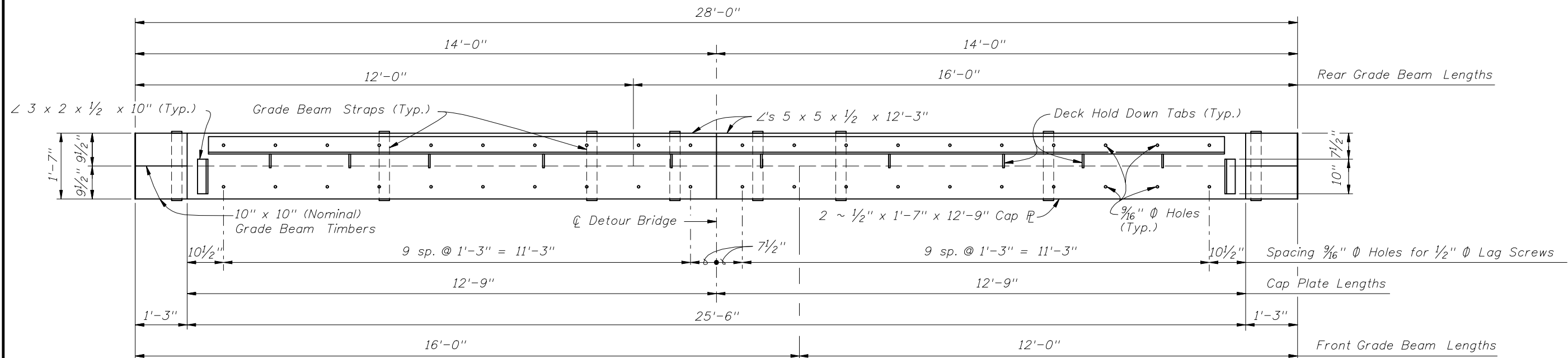


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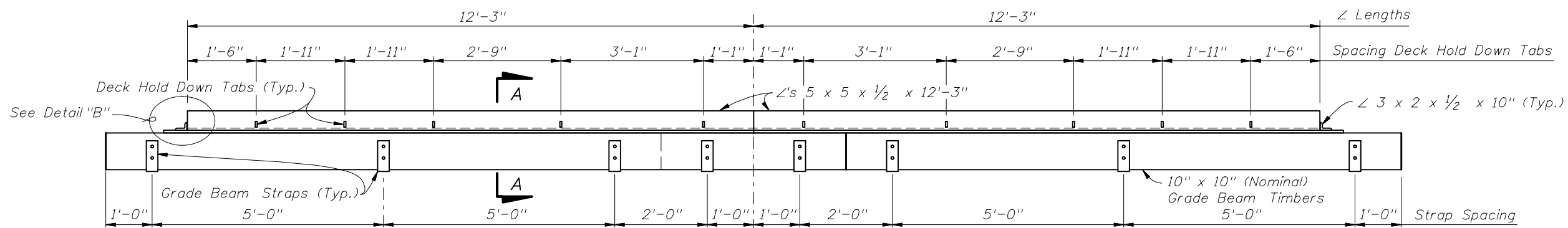
TEMPORARY DETOUR BRIDGE
GENERAL NOTES AND DETAILS

Last Revision 07/01/06 Sheet No. 6 of 7

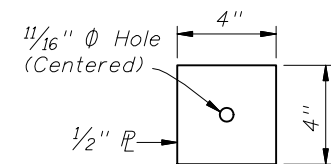
Index No. **21600**



PLAN VIEW

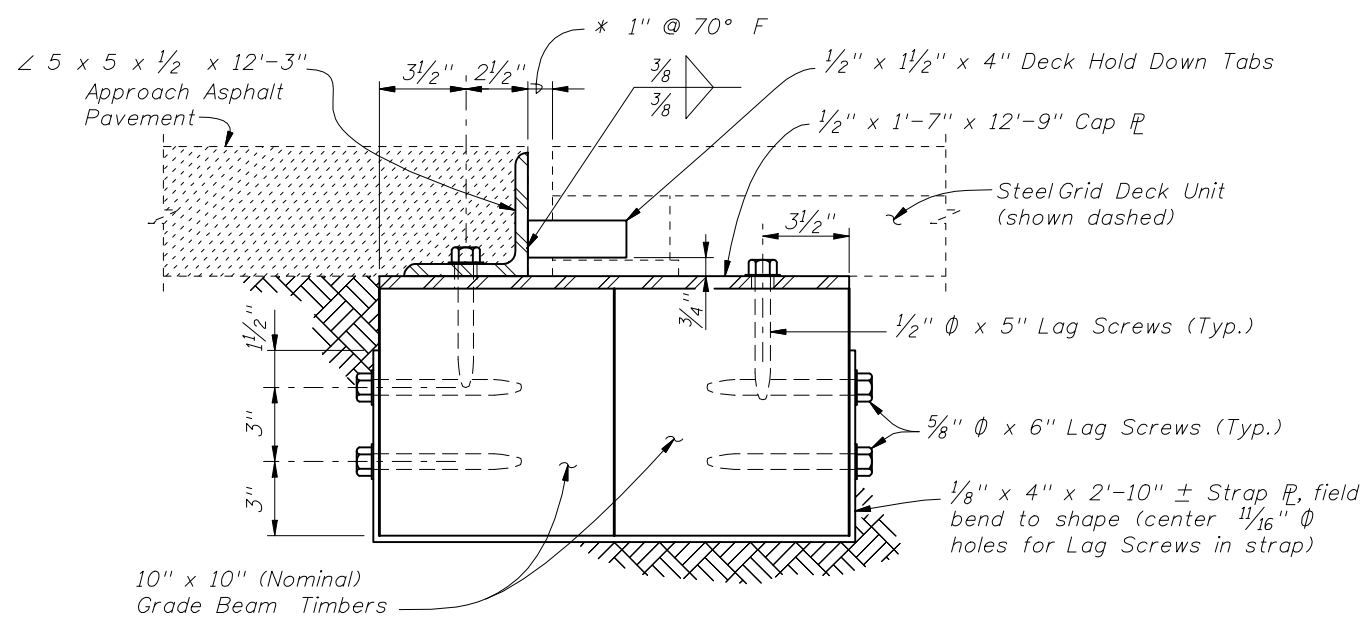


ELEVATION VIEW

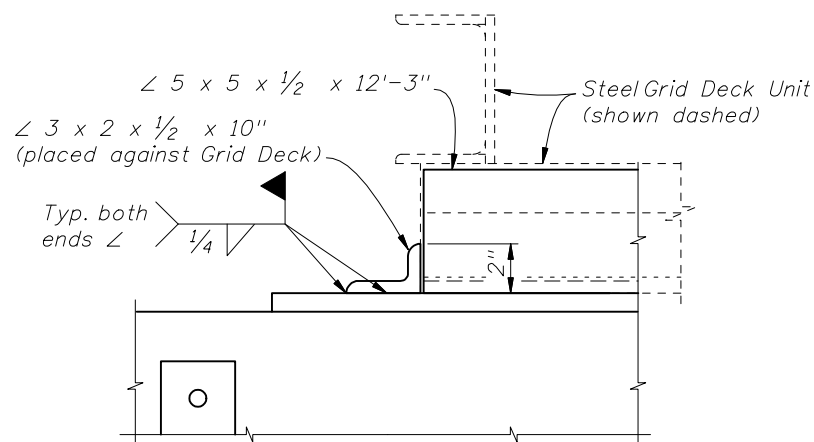


ANCHOR PLATE DETAIL

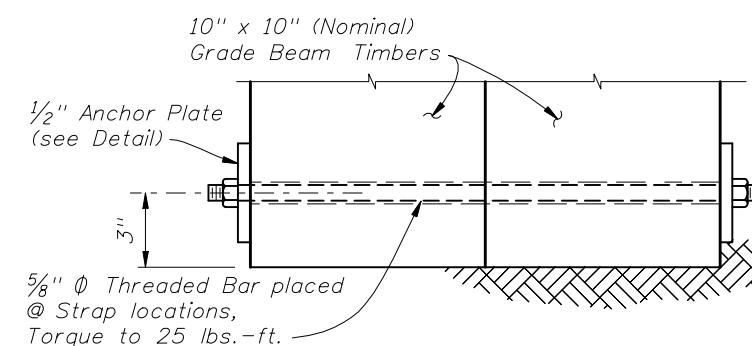
* See General Notes for setting widths other than 70° F.



SECTION A-A



DETAIL "B"



OPTIONAL THROUGH BOLT DETAIL (MAY BE USED IN LIEU OF STRAPS)

GRADE BEAM DETAILS



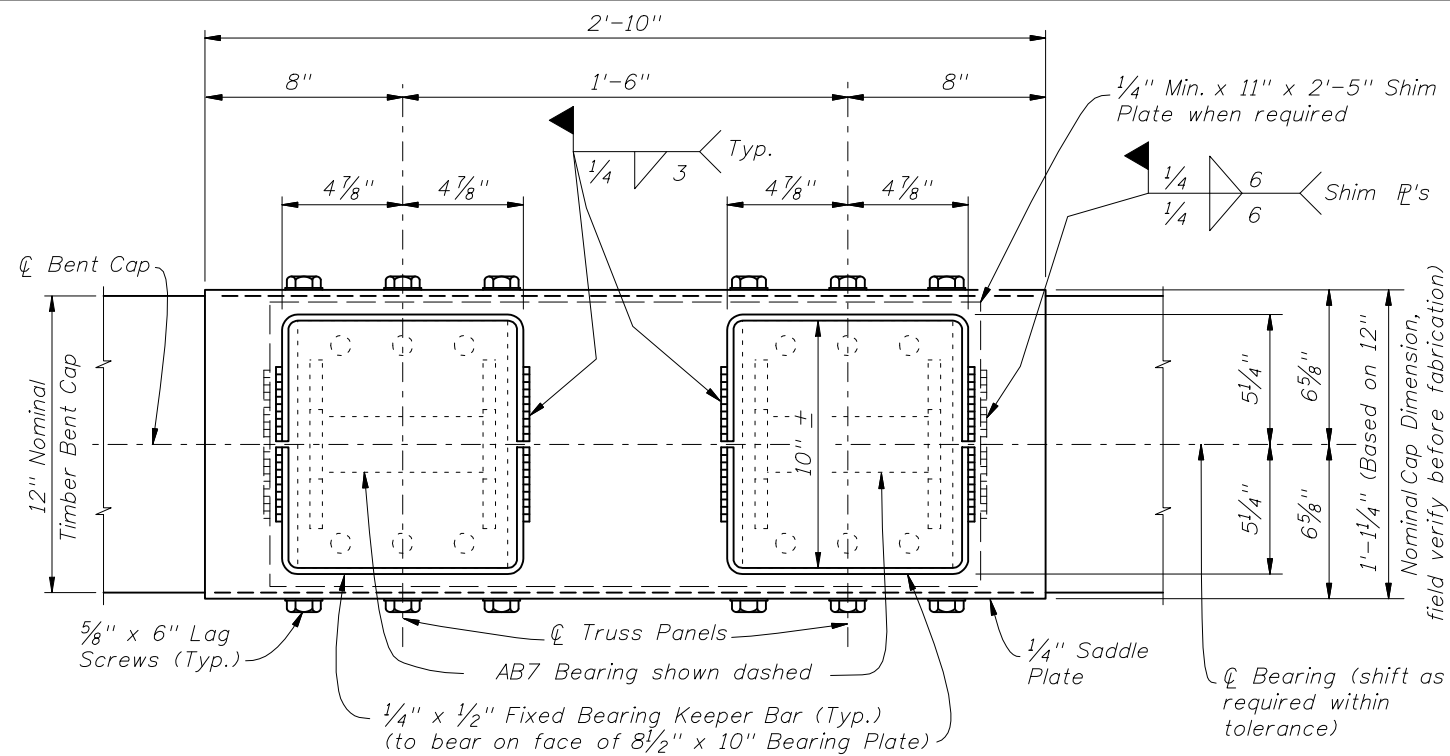
2010 FDOT Design Standards

TEMPORARY DETOUR BRIDGE
GENERAL NOTES AND DETAILS

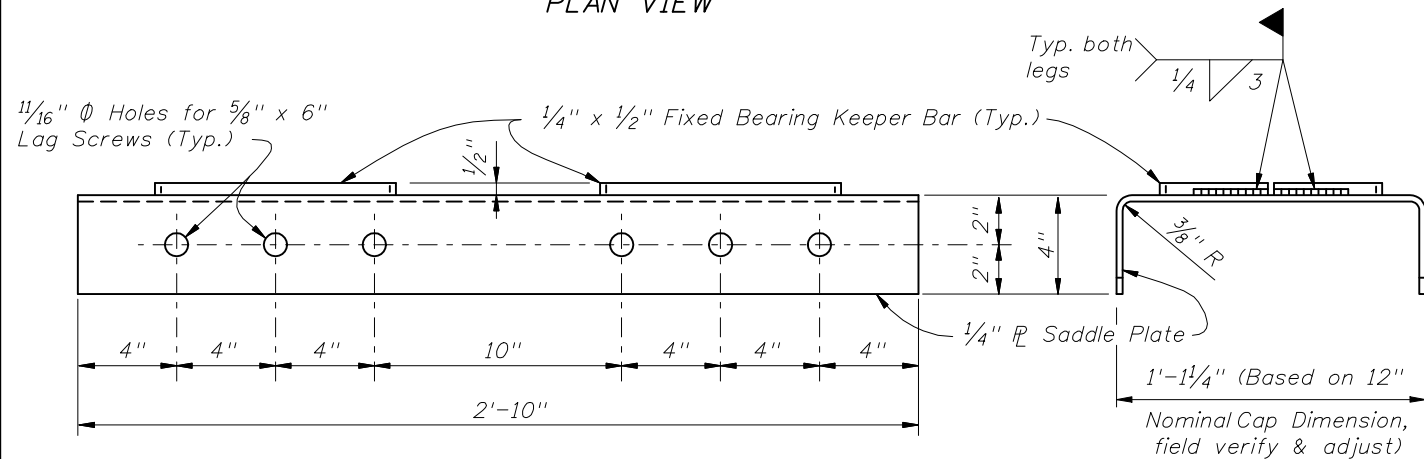
Last Revision
07/01/06

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7 of 7

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21600

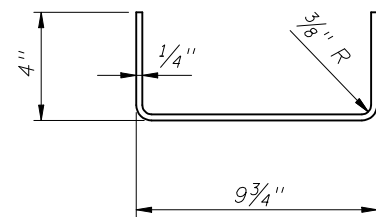


PLAN VIEW



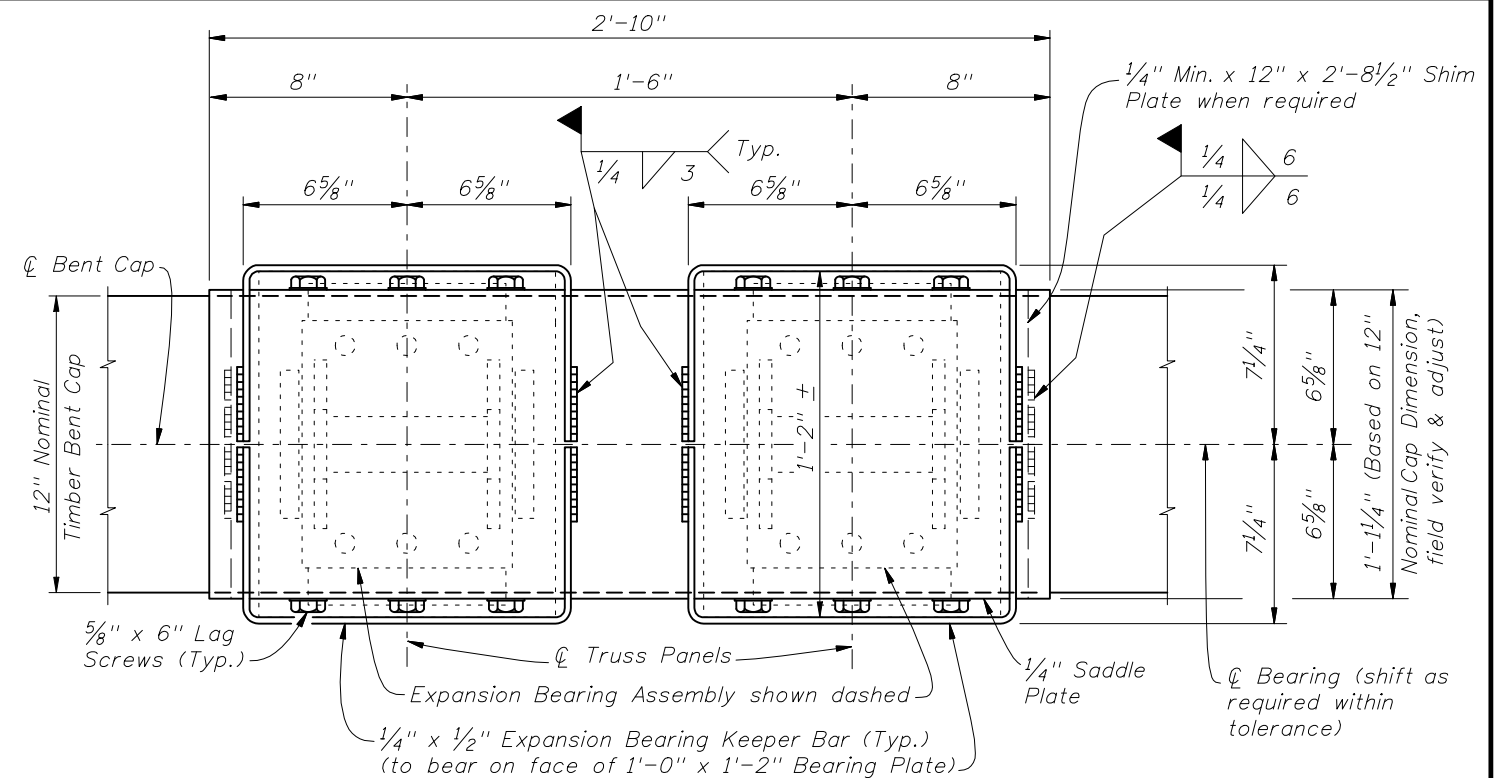
ELEVATION VIEW OF SADDLE PLATE

END VIEW

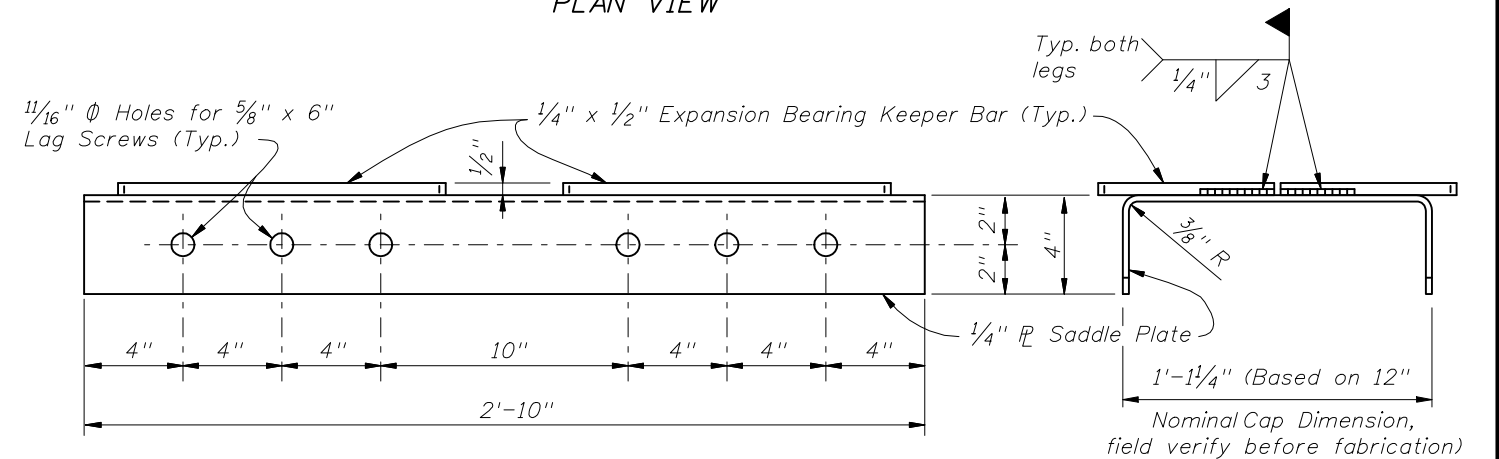


FIXED BEARING
KEEPER BAR DETAIL

===== FIXED BEARING DETAILS =====

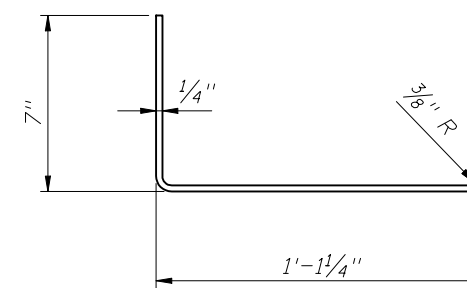


PLAN VIEW



ELEVATION VIEW OF SADDLE PLATE

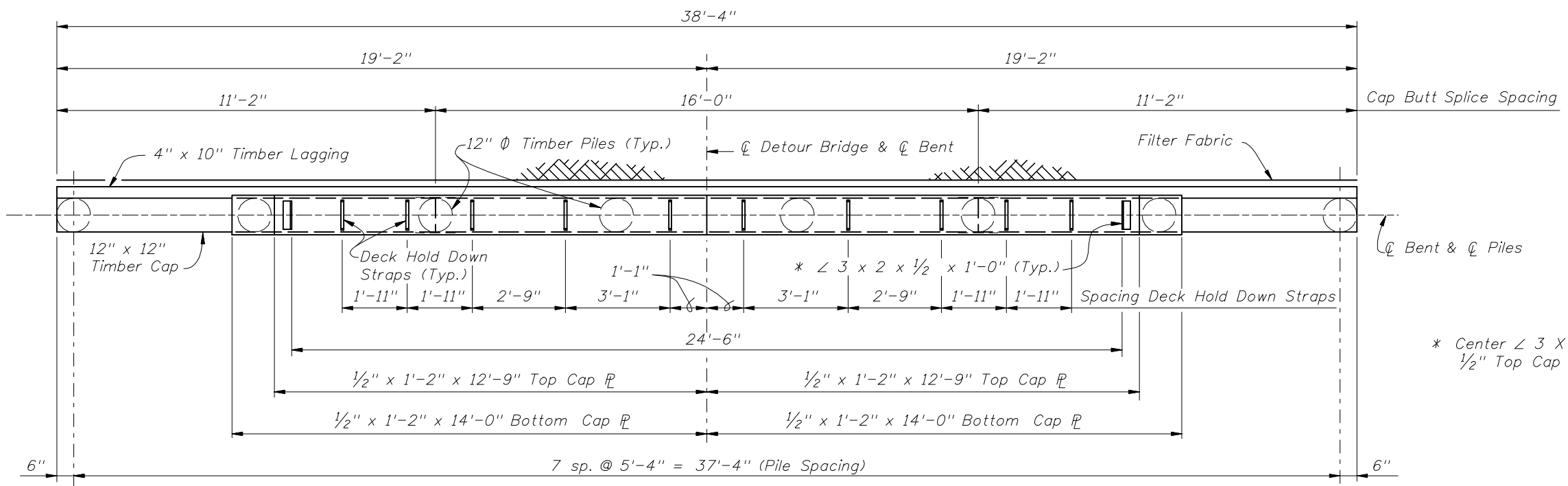
END VIEW



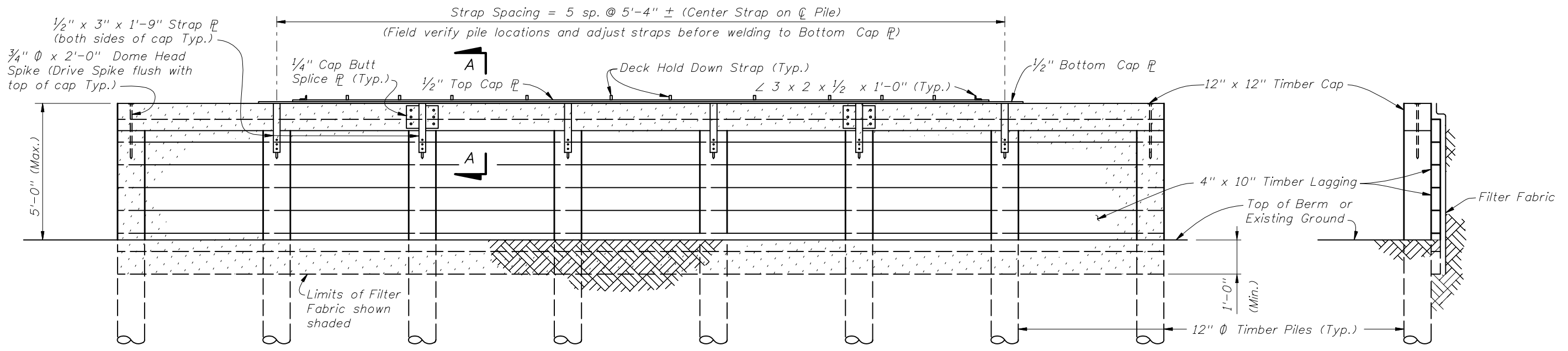
EXPANSION BEARING
KEEPER BAR DETAIL

===== EXPANSION BEARING DETAILS =====





PLAN VIEW

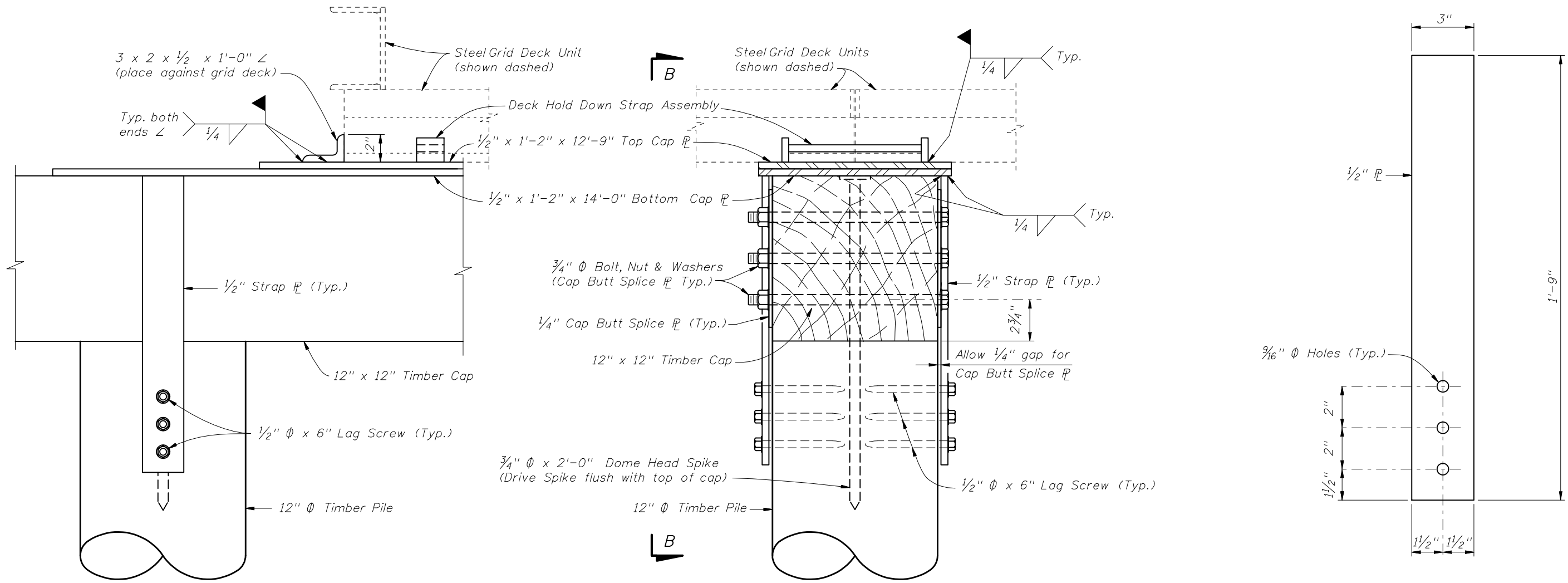


ELEVATION VIEW

END VIEW

BACKWALL BENT DETAILS

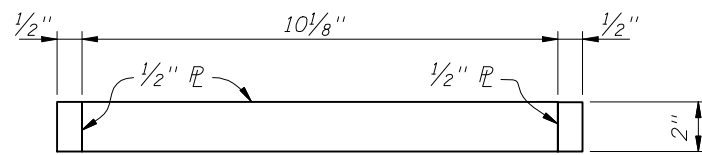




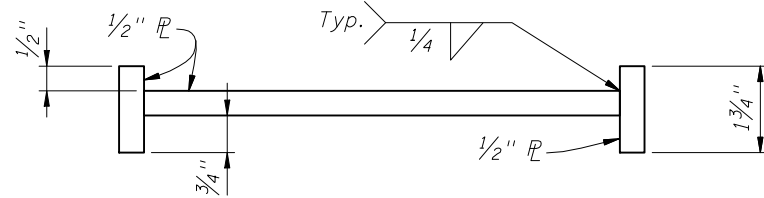
VIEW B-B
(SHOWING END OF CAP PLATES)

SECTION A-A

STRAP PLATE DETAIL

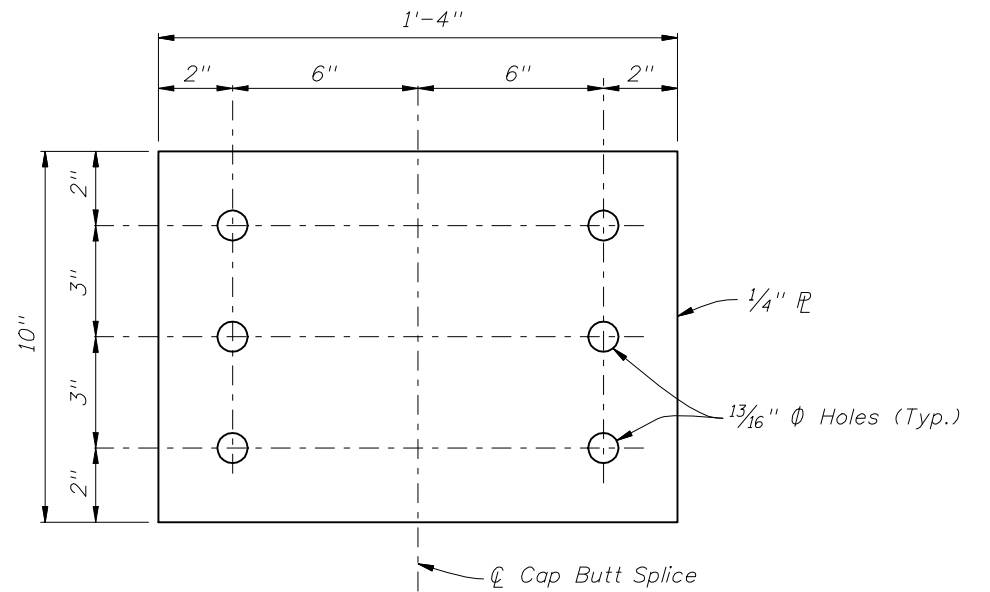


PLAN VIEW



ELEVATION VIEW

==== HOLD DOWN STRAP ASSEMBLY DETAIL ====



CAP BUTT SPLICE PLATE DETAIL

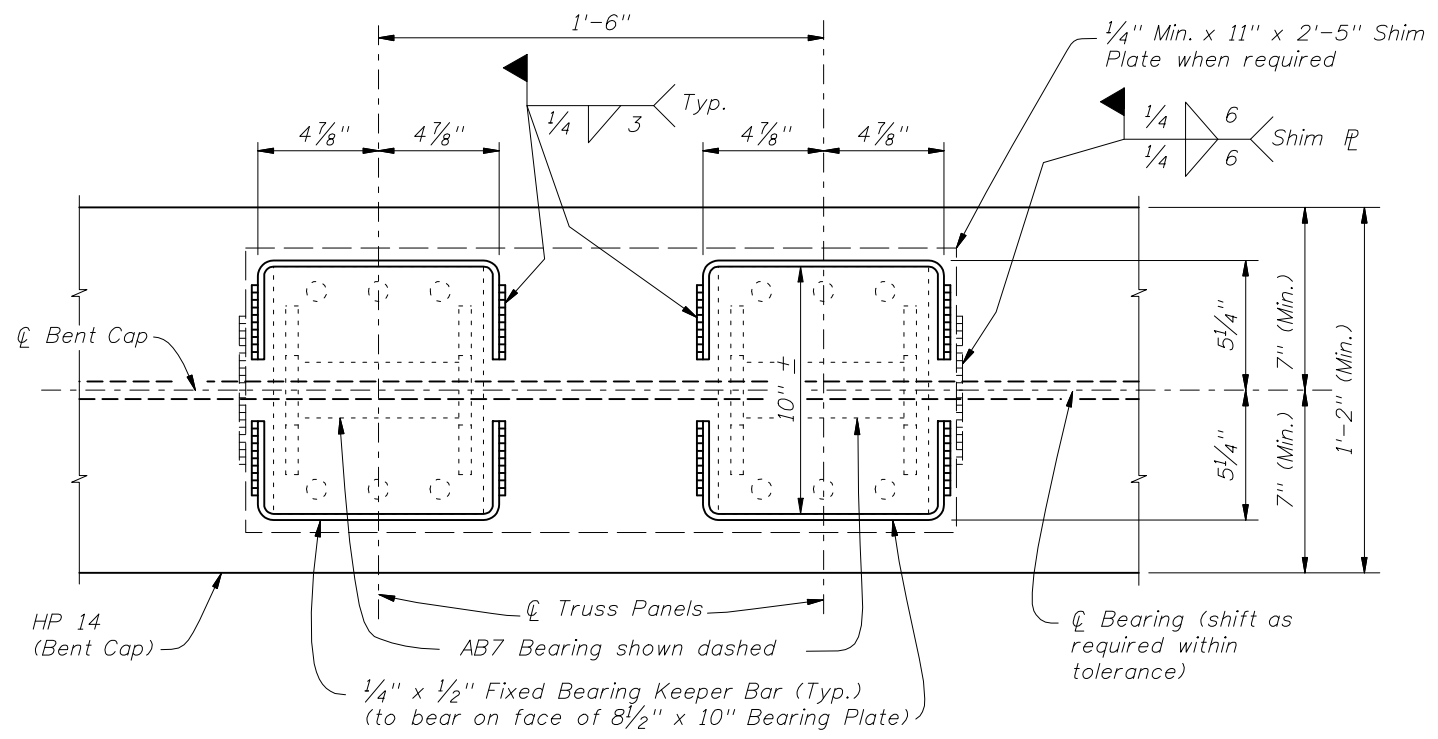
==== BACKWALL BENT DETAILS ====



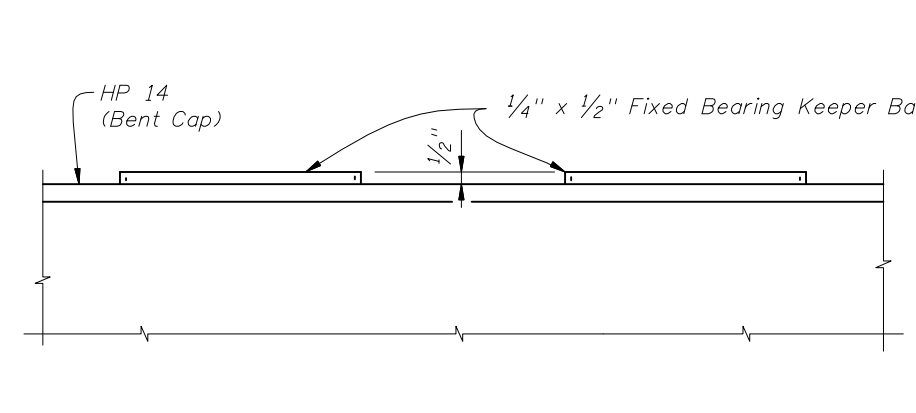
2010 FDOT Design Standards

TEMPORARY DETOUR BRIDGE DETAILS
TIMBER PILE FOUNDATIONS

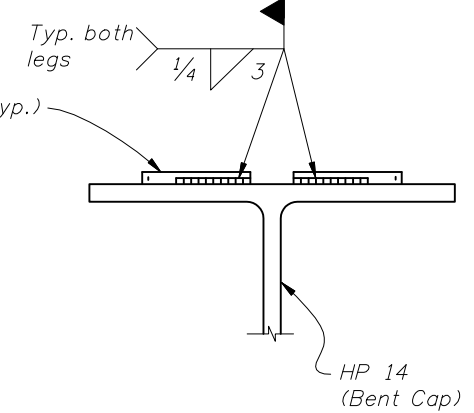
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21610	



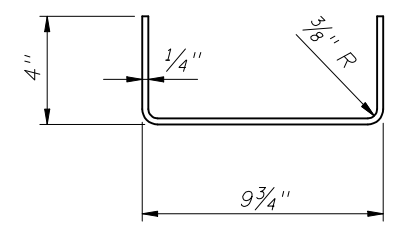
PARTIAL PLAN VIEW



PARTIAL ELEVATION VIEW

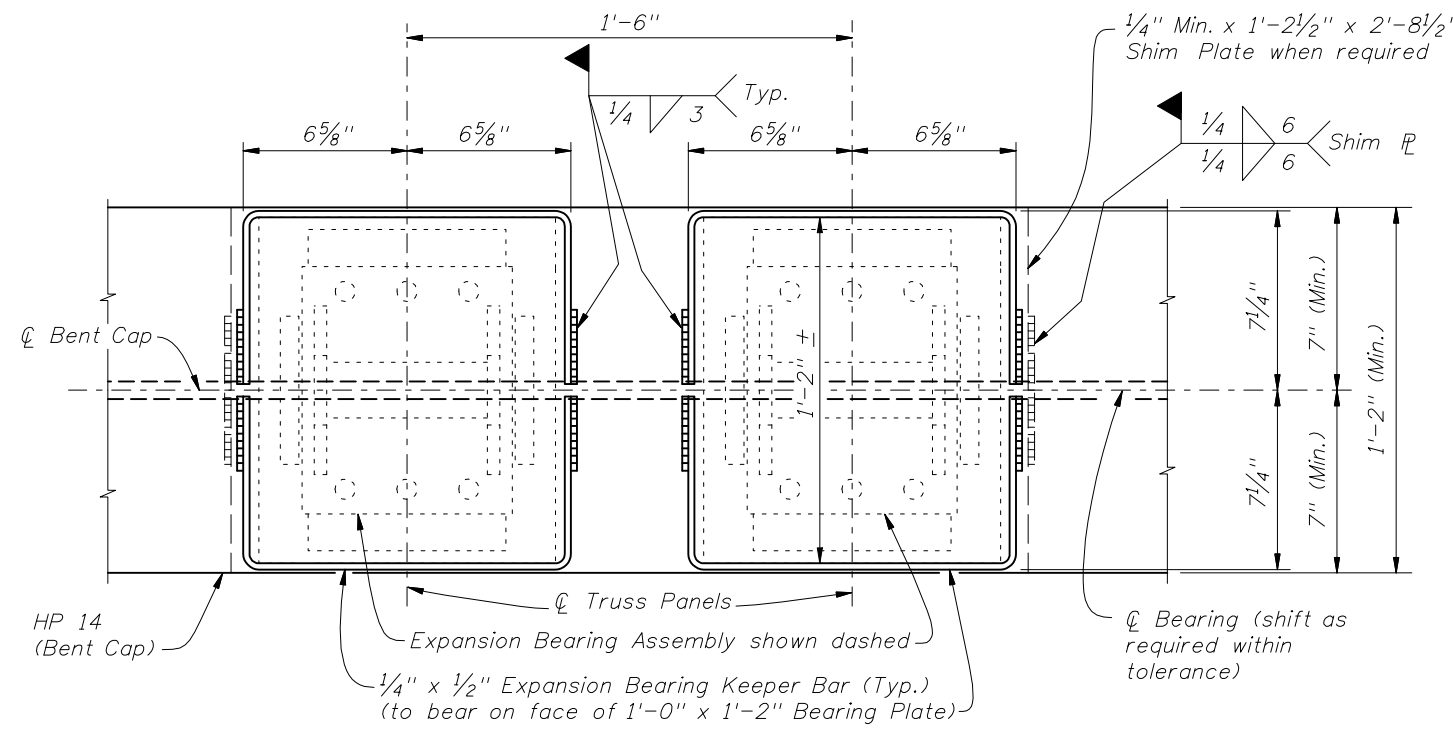


END VIEW

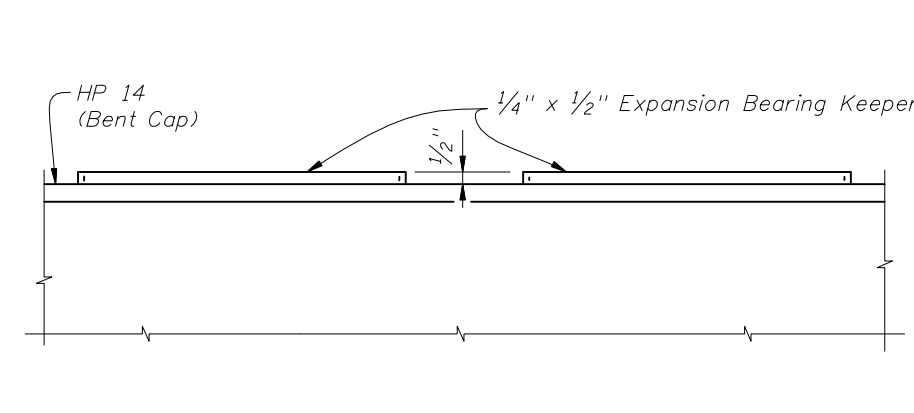


FIXED BEARING KEEPER BAR DETAIL

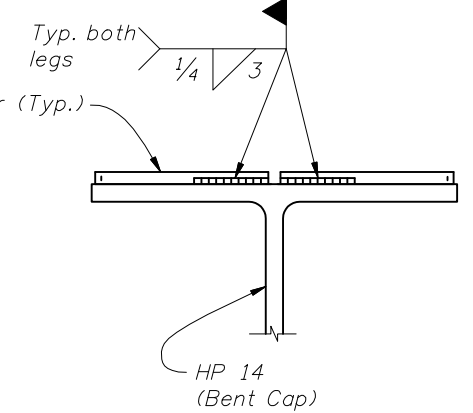
FIXED BEARING DETAILS



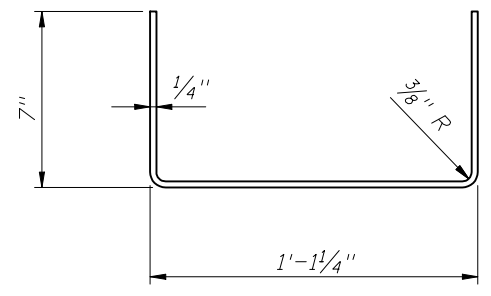
PARTIAL PLAN VIEW



PARTIAL ELEVATION VIEW



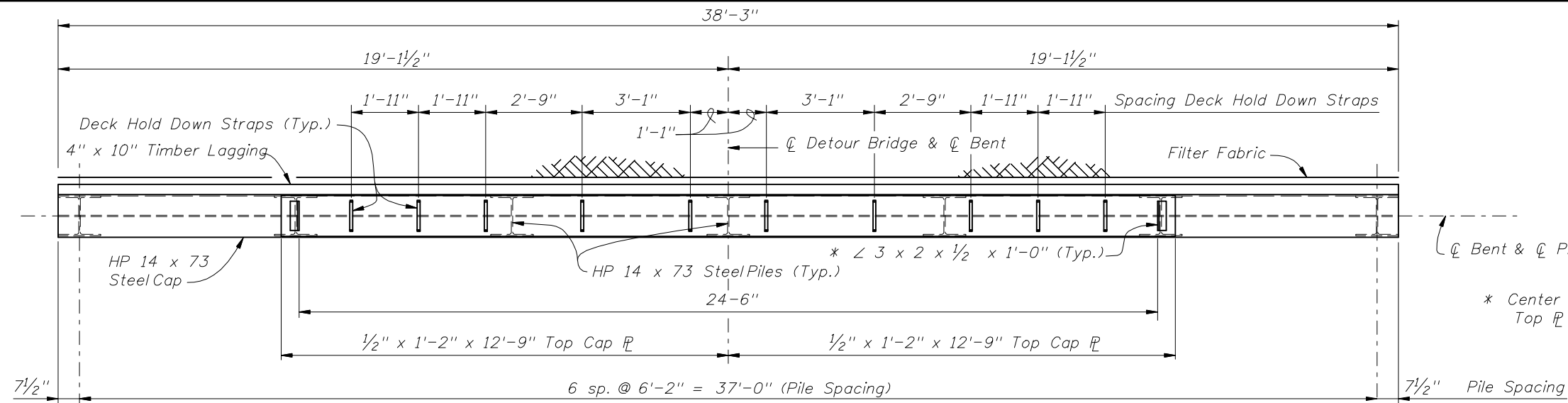
END VIEW



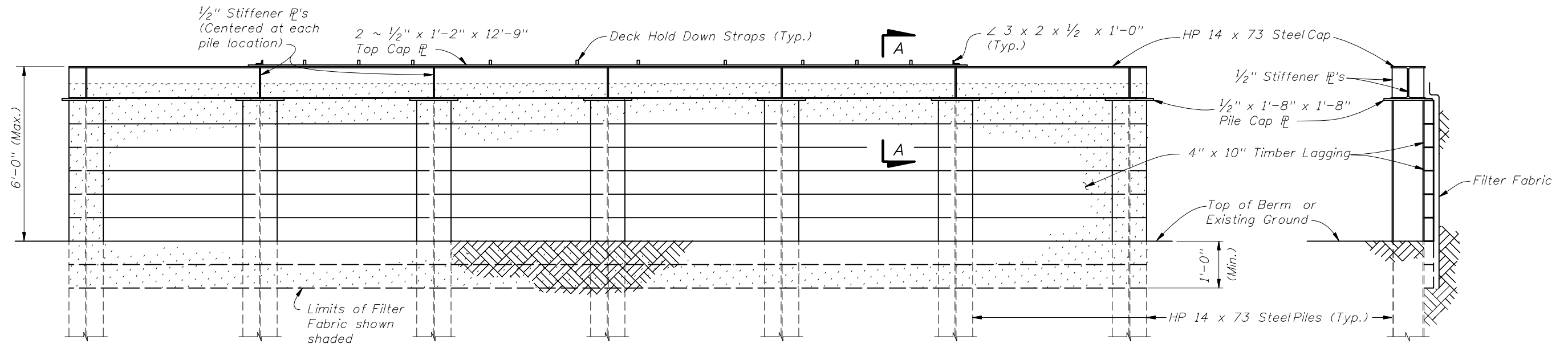
EXPANSION BEARING KEEPER BAR DETAIL

EXPANSION BEARING DETAILS



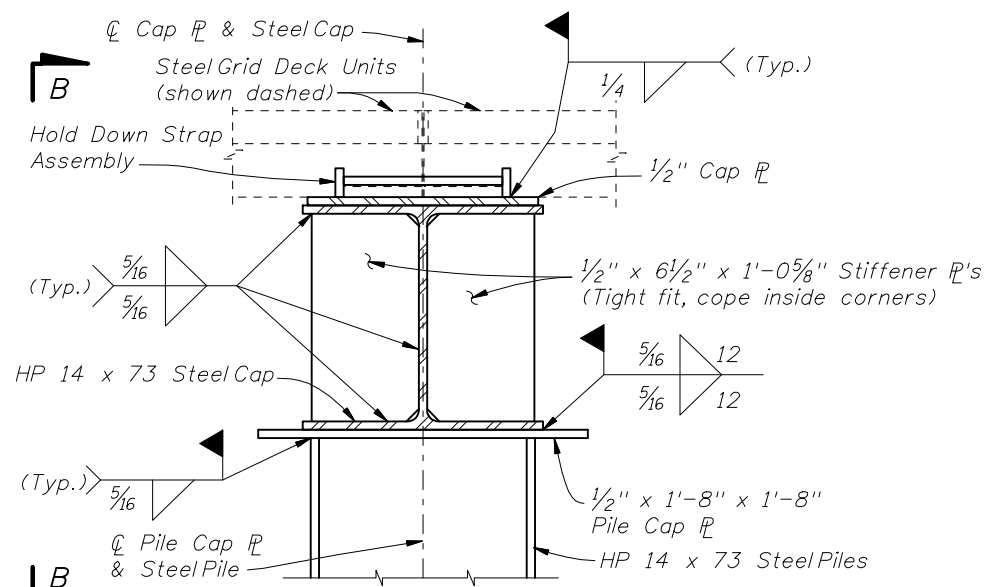


PLAN VIEW

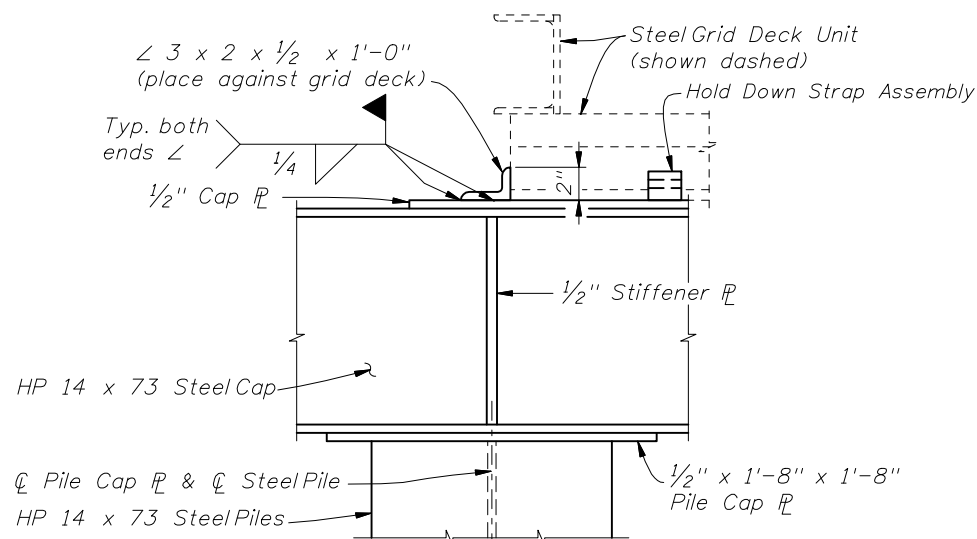


ELEVATION VIEW

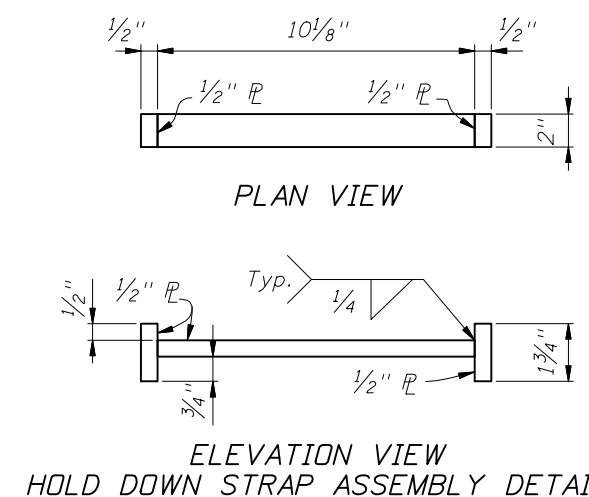
END VIEW



SECTION A-A
(LAGGING NOT SHOWN FOR CLARITY)

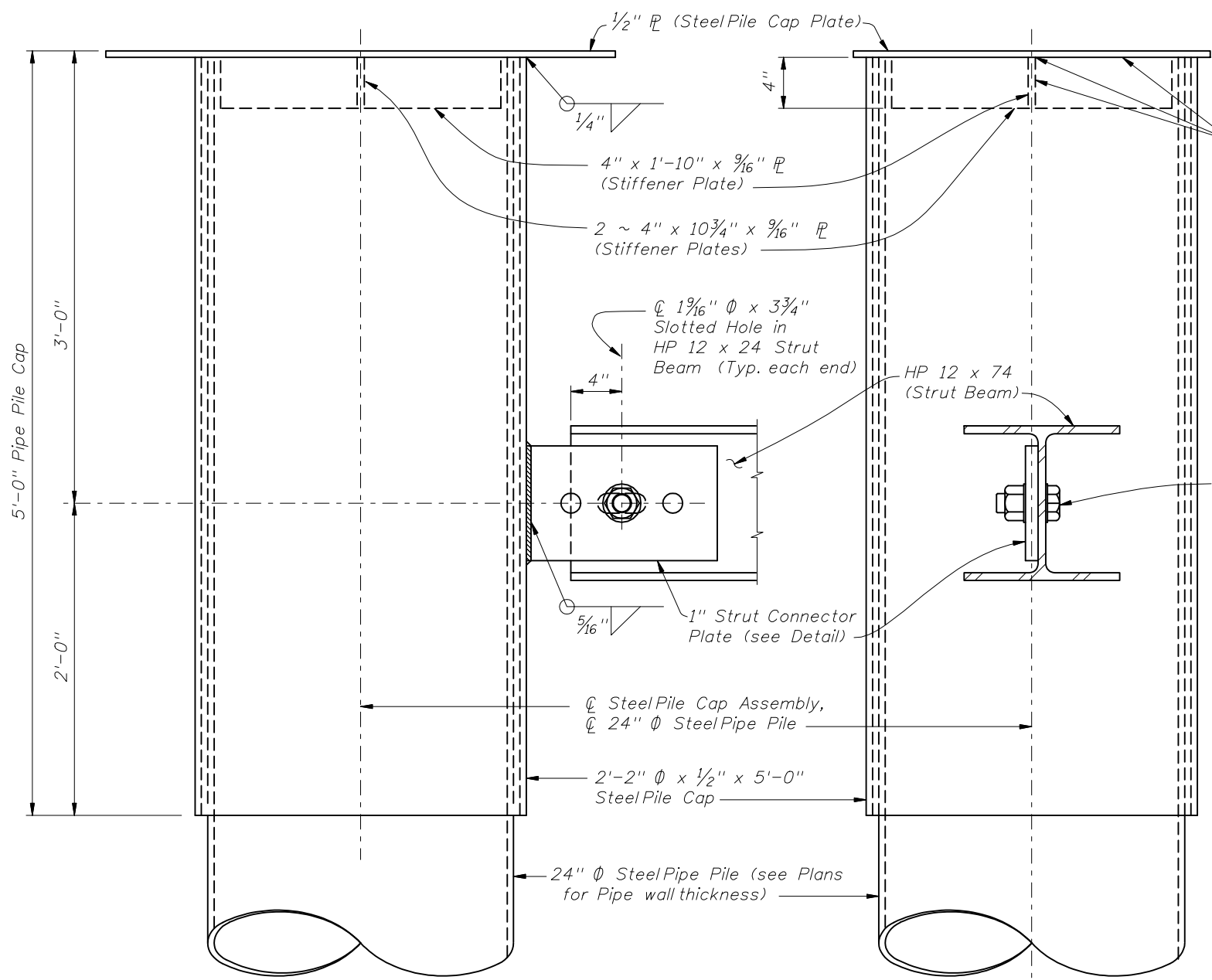


VIEW B-B

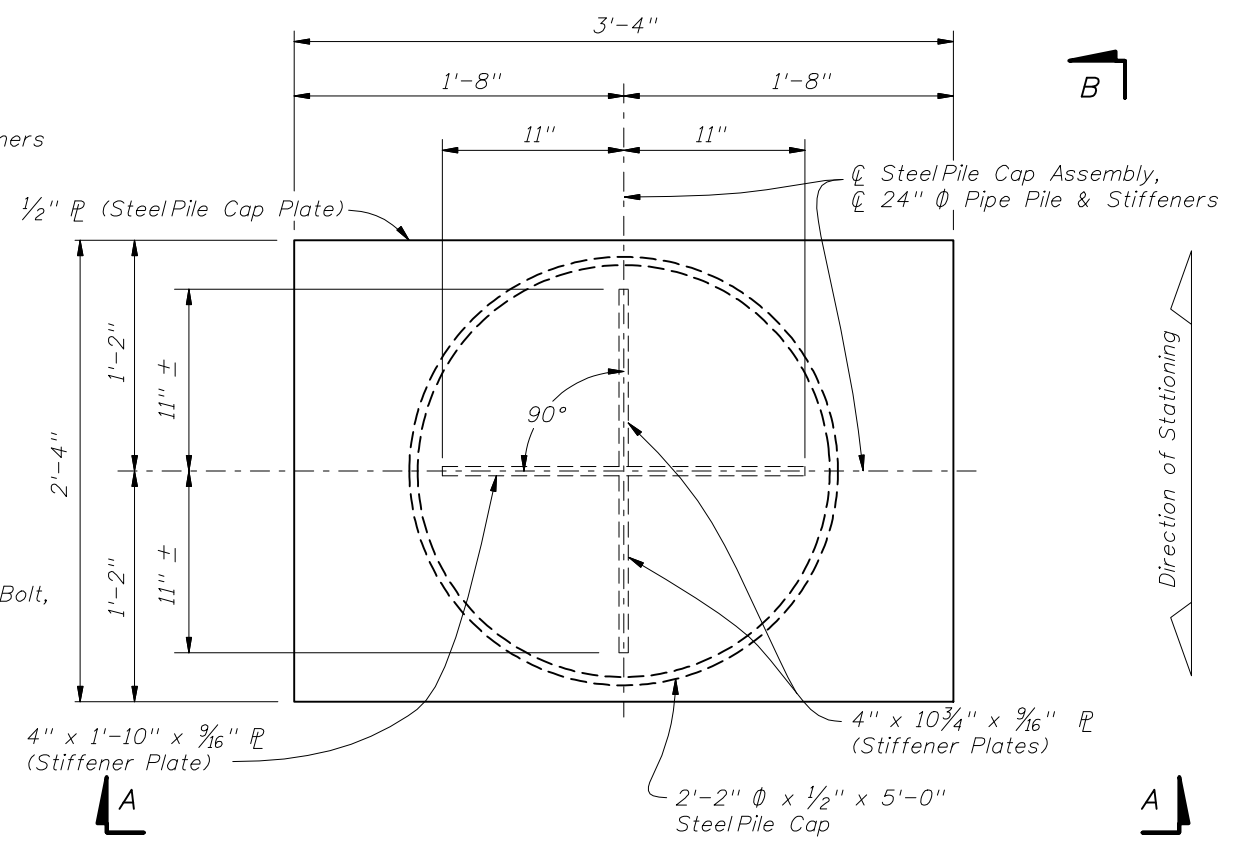


BACKWALL BENT DETAILS

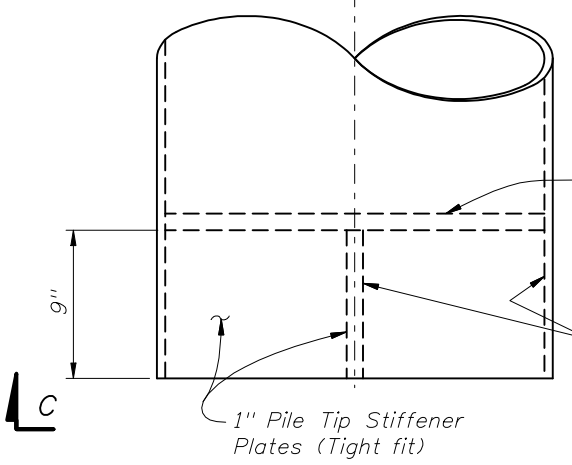




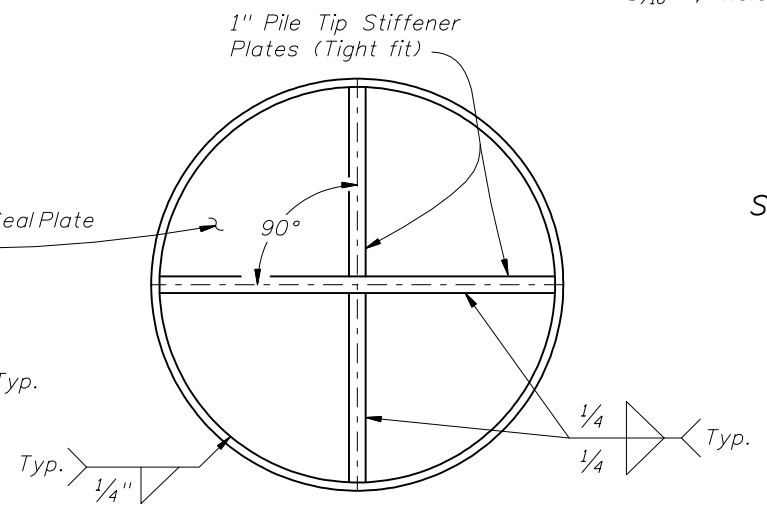
PARTIAL VIEW A-A



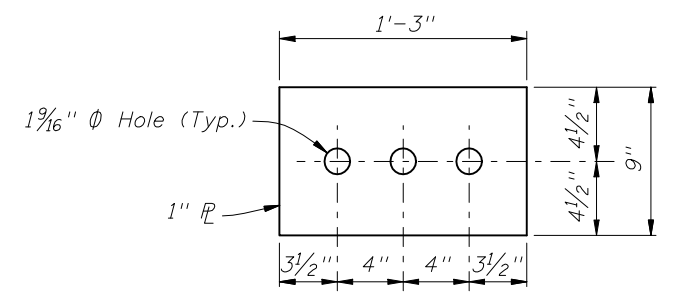
PLAN VIEW STEEL PILE CAP ASSEMBLY
(Bearing Plates and Bearing Keeper Bars not show for clarity)



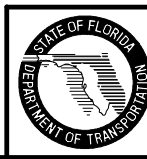
VIEW B-B

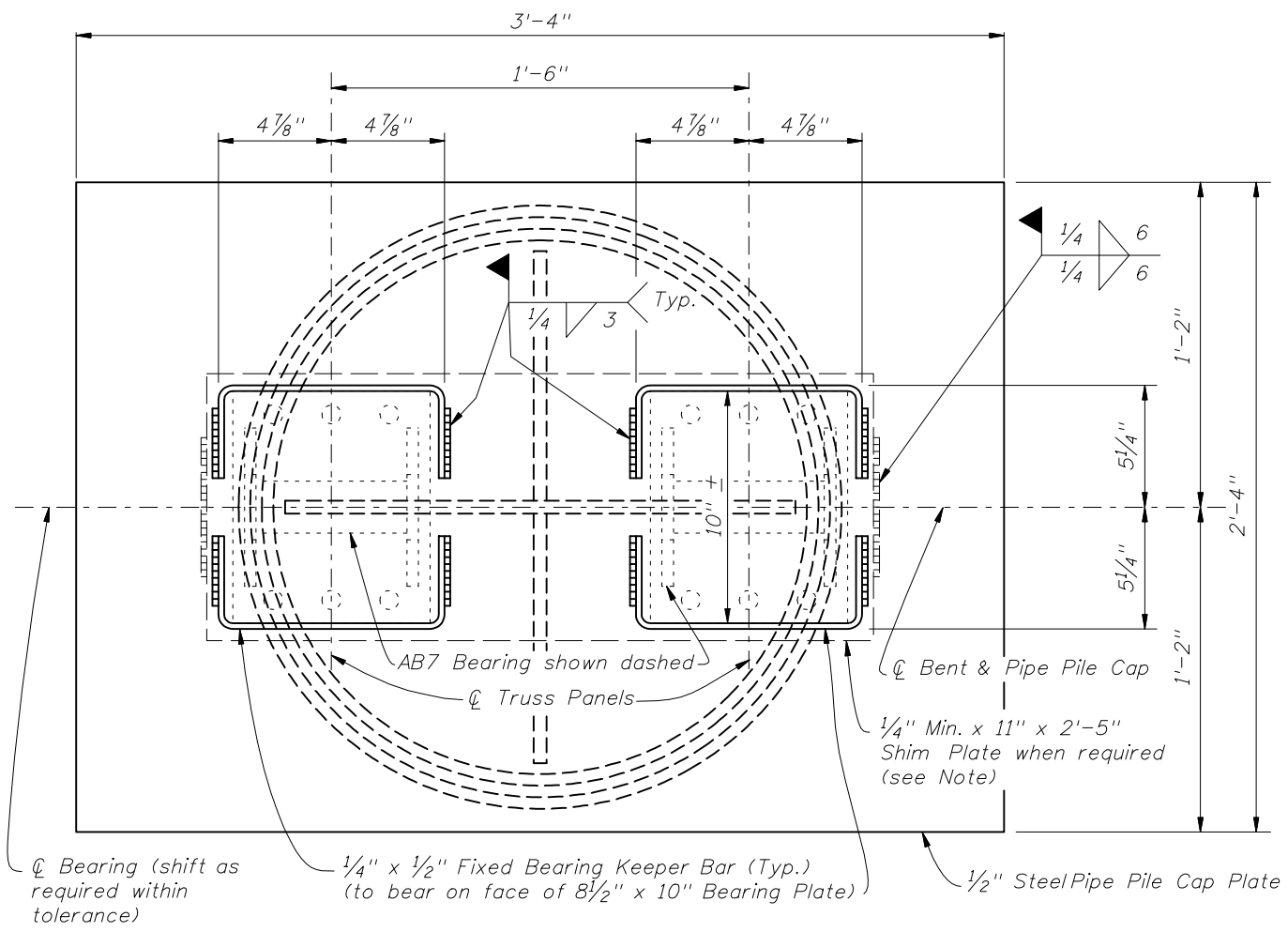


VIEW C-C
PILE TIP DETAIL

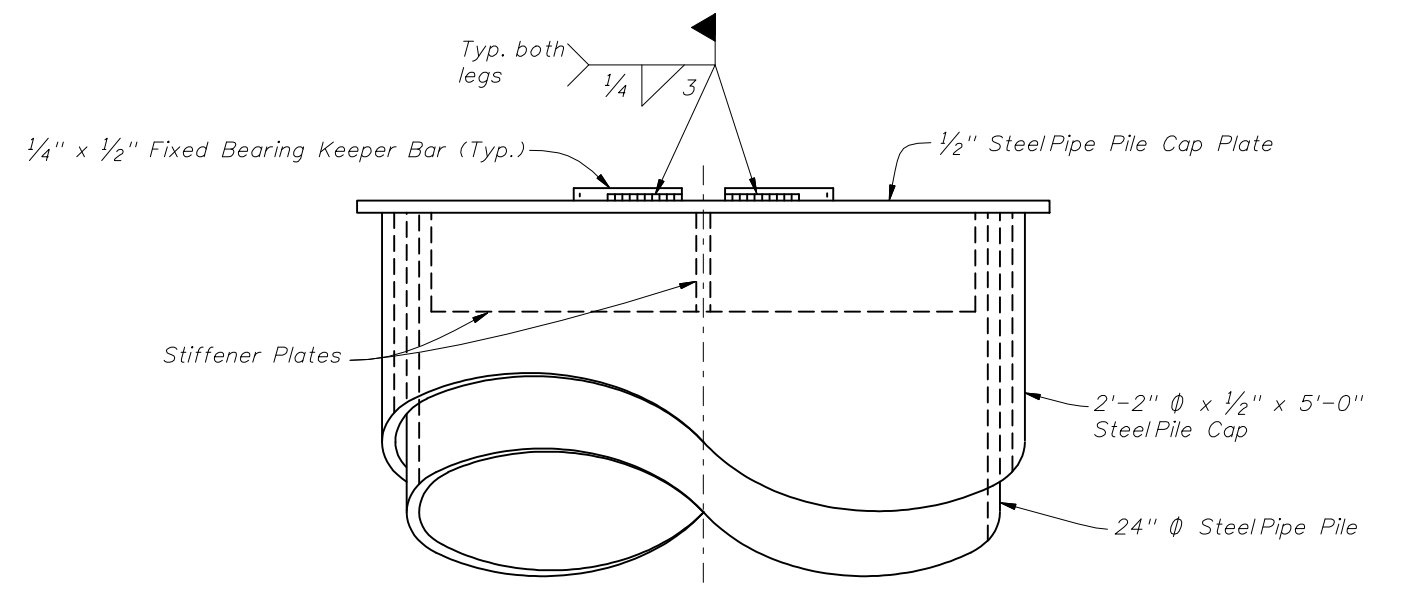


STRUT CONNECTOR PLATE DETAIL



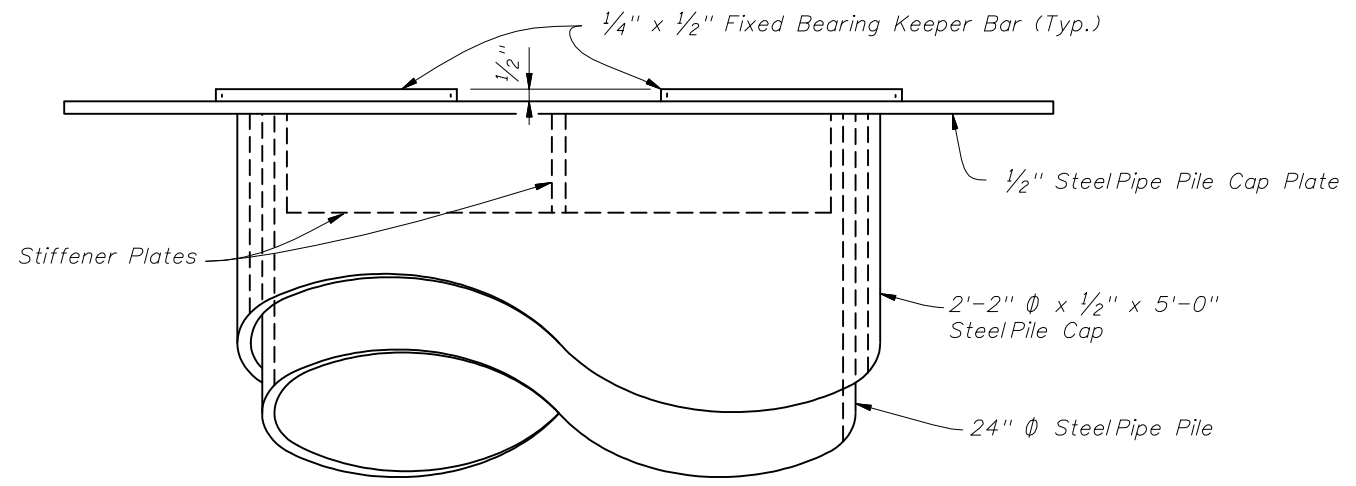


PARTIAL PLAN VIEW

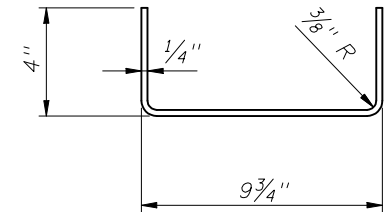


END VIEW

Note:
Use Shim Plates as required to provide equal bearing seat elevations across the bent. Vary thickness of Shim Plate across the pile cap plate to provide a level bearing area in the transverse direction.



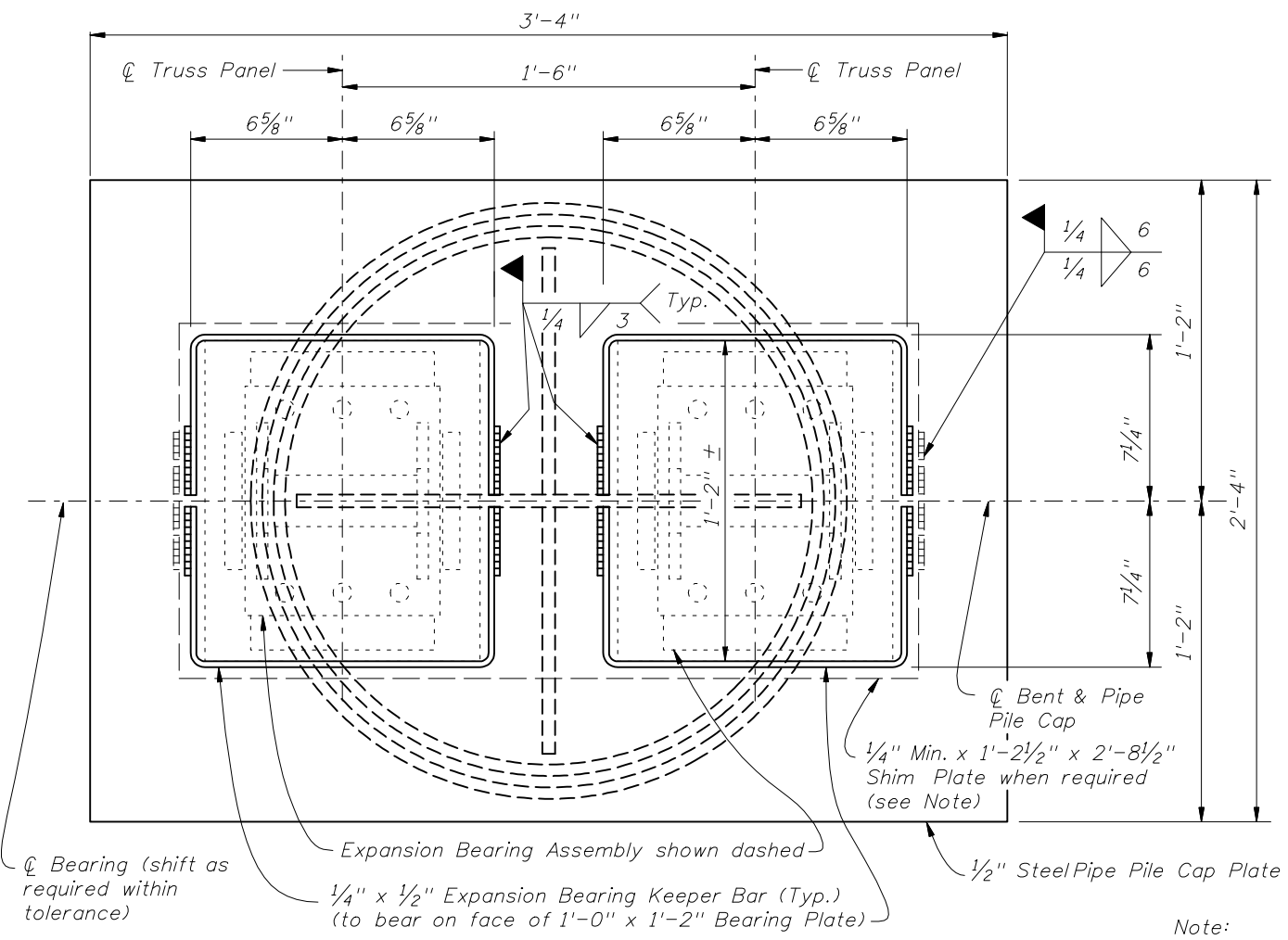
PARTIAL ELEVATION VIEW



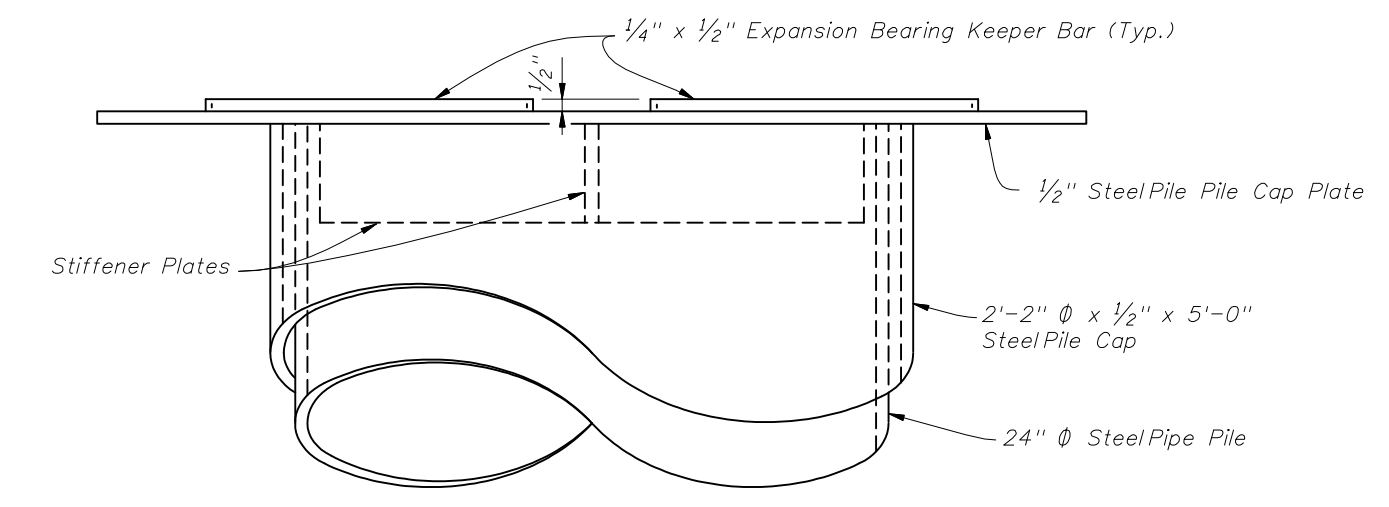
FIXED BEARING KEEPER BAR DETAIL

FIXED BEARING DETAILS

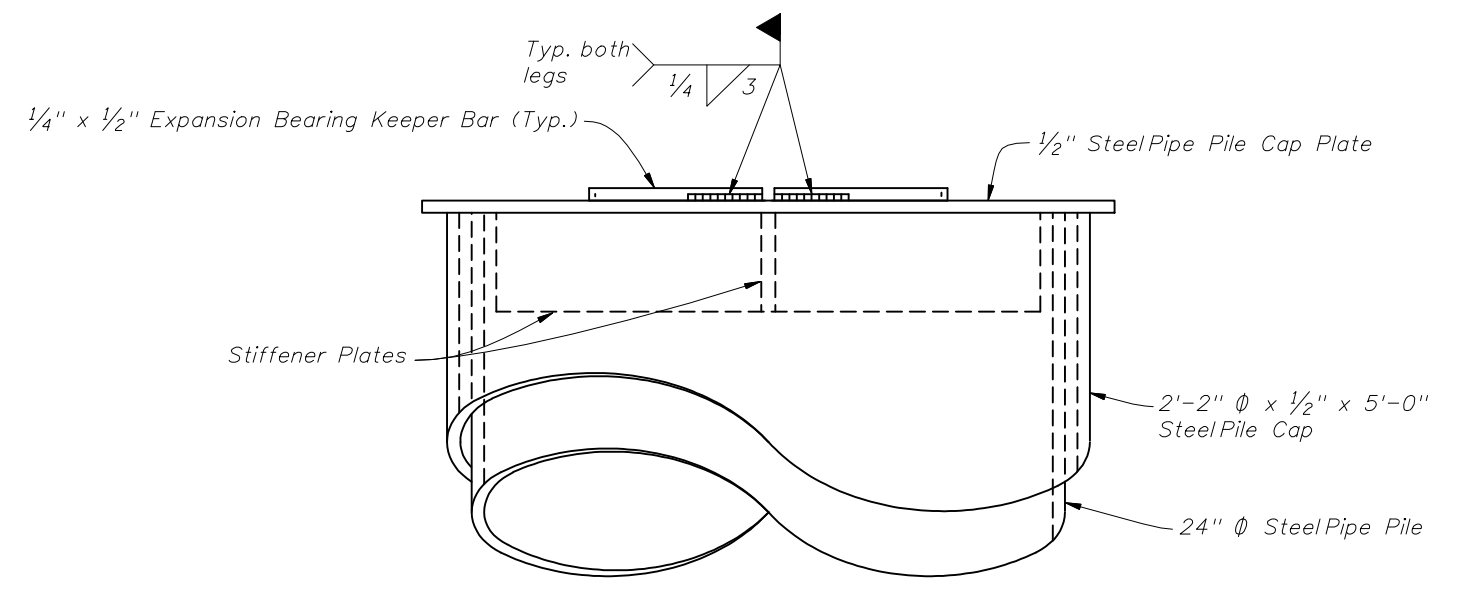




PARTIAL PLAN VIEW

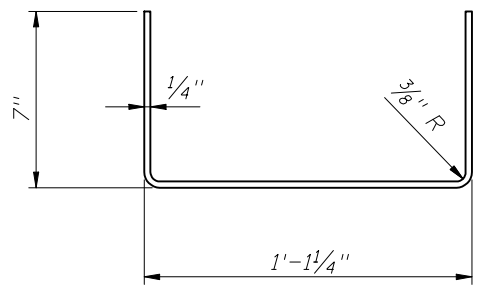


PARTIAL ELEVATION VIEW



END VIEW

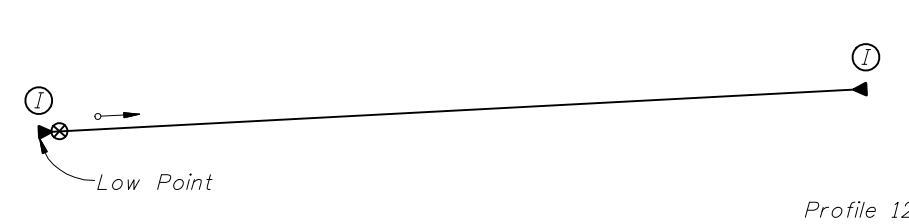
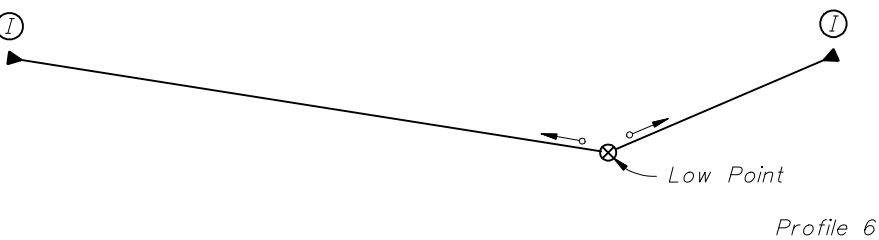
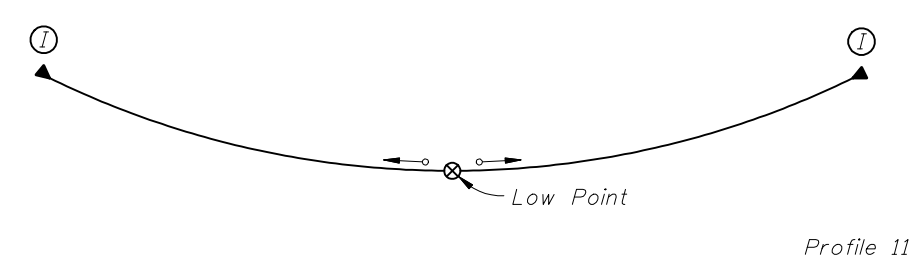
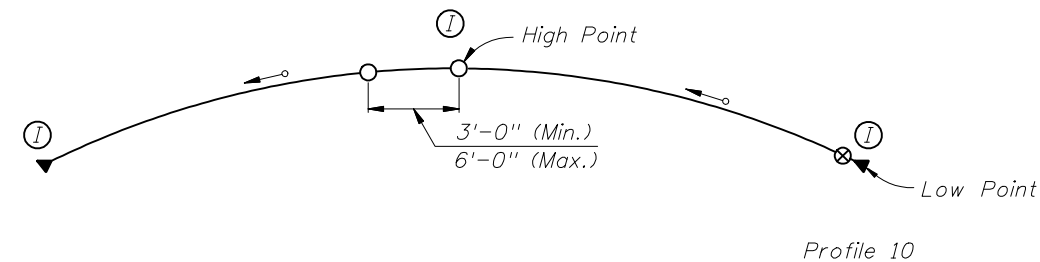
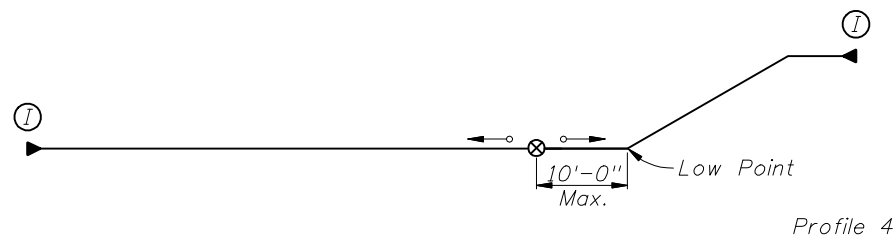
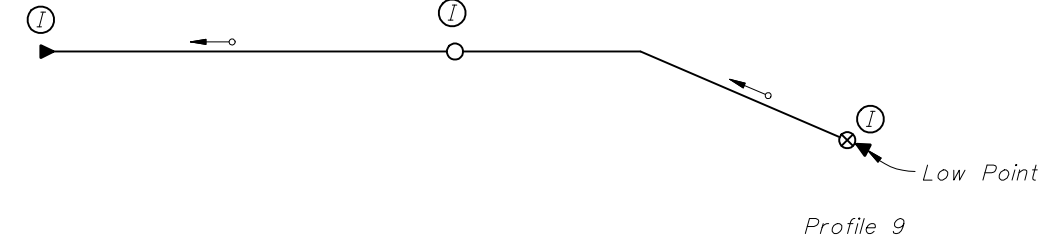
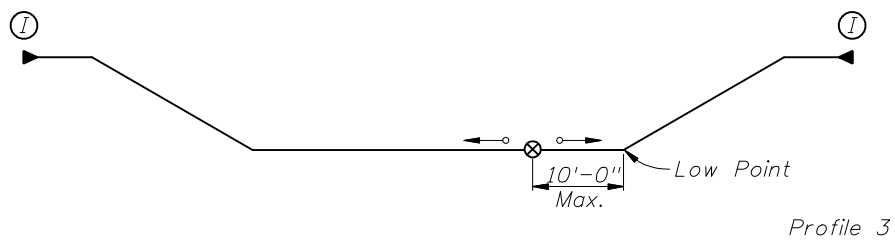
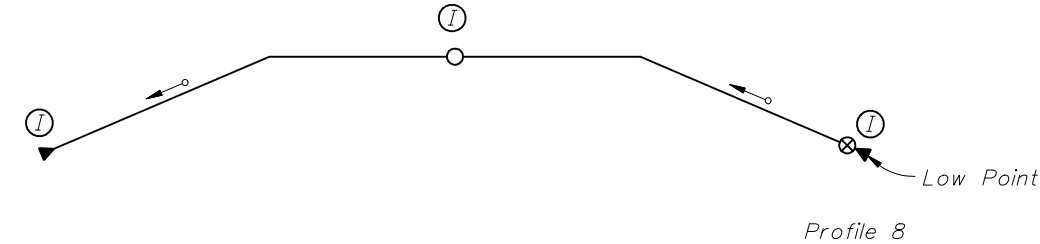
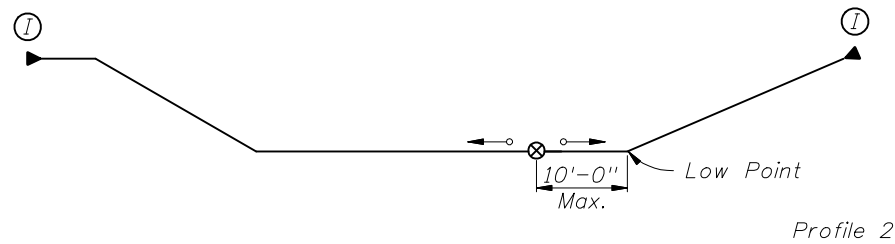
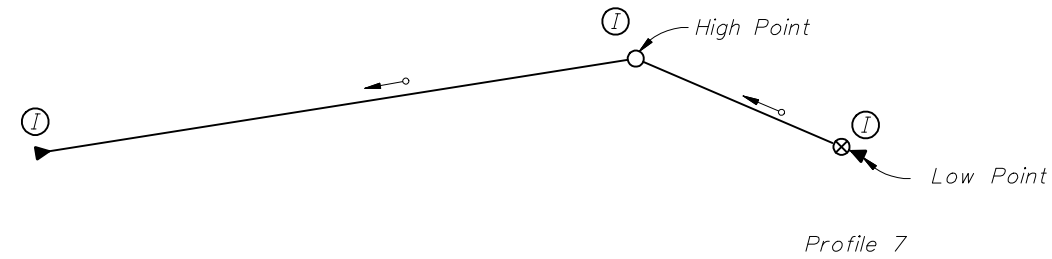
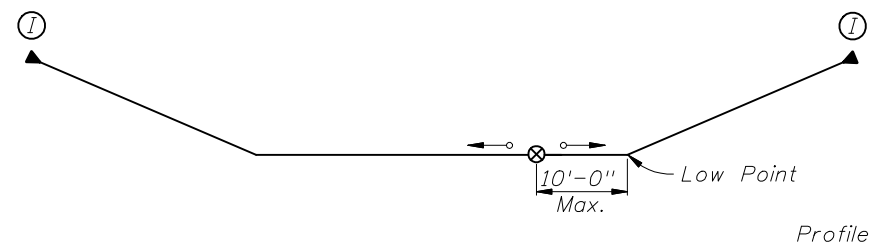
Note:
Use Shim Plates as required to provide equal bearing seat elevations across the bent. Vary thickness of Shim Plate across the pile cap plate to provide a level bearing area in the transverse direction.



EXPANSION BEARING KEEPER BAR DETAIL

ABUTMENT AND INTERMEDIATE EXPANSION BEARING DETAILS





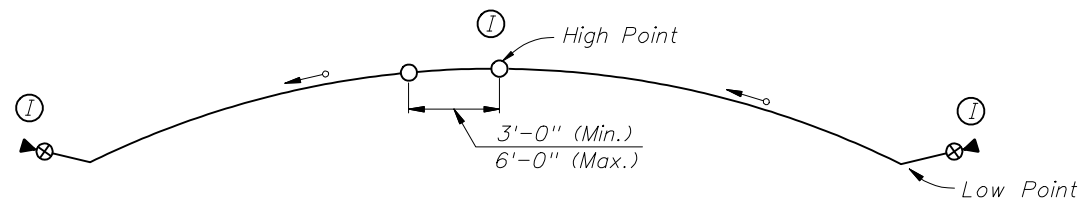
General Notes:

1. The details shown on Indices No. 21801, 21802, and 21803 depict the final condition of the post-tensioning system. The standards assume certain methods to obtain the required final condition. The Contractor may elect to modify these methods with the approval of the Engineer of Record provided the post-tensioning system is protected from contamination during all intermediate steps and the final condition conforms with the requirements of the Contract Documents.
2. See Specifications for grouting procedures, and post-tensioning systems.
3. See Specifications for surface preparation and other details of the epoxy grout pour-backs (Post-Tensioning).
4. See Specifications for surface preparation and other details of the elastomeric coating (Elastomeric Coating System).
5. See Specifications for surface preparation and other details of the Magnesium Ammonium Phosphate Concrete (Magnesium Ammonium Phosphate Concrete) (MAPC).
6. If deviations from these standard methods are proposed, the Contractor shall demonstrate through a mock-up or other methods that his proposed grouting plan adequately fulfills the requirement of fully grouted tendons.
7. The Contractor shall attach pressure gauges to all grout inlets during the grouting operation. Locations of all pressure gauges shall be noted on the grouting operations plan.
8. The grout outlets shown shall be adjusted to accommodate the true high point of the tendon in the completed structure.
9. All grout inlets / outlets are to be sealed using threaded plugs with the exception of inlets / outlets exiting to a vertical face or exiting from the bottom of the bottom soffit.
10. All grout inlets / outlets exiting on vertical surfaces shall be directed toward the inside face of exterior girders or toward the interior of cellular boxes.
11. See Index No. 21802 for "POST-TENSIONING ANCHORAGE PROTECTION".
12. See Index No. 21803 for "POST-TENSIONING ANCHORAGE AND GROUTING DETAILS".

Legend:

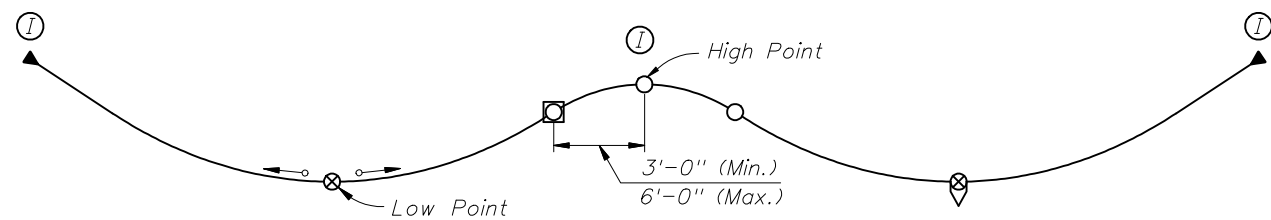
- | | | | |
|---|------------------------------|---|-------------------------|
| — | Strand Tendon | ⊗ | Optional Grout Outlet |
| ▶ | End Anchor with Grout Outlet | ⊕ | Drain / Grout Inlet |
| ⊗ | Grout Inlet | → | Direction of Grout Flow |
| ○ | Grout Outlet | Ⓢ | Inspection Location |



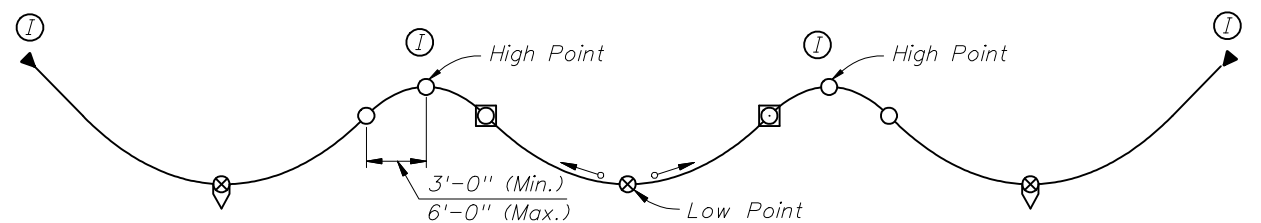


Profile 13

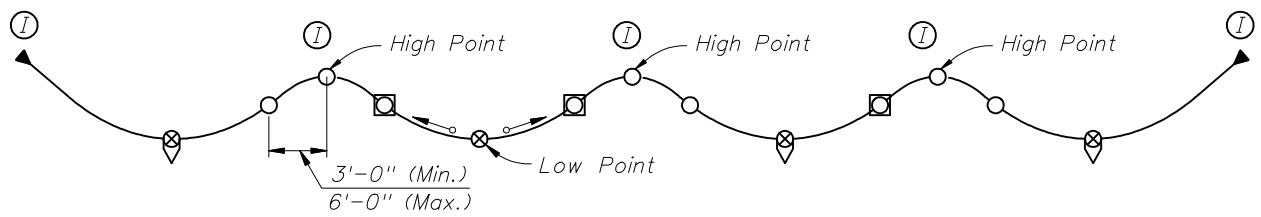
Post-Tensioning Vertical Profiles for Staged Grouting
(Simultaneous Low Point Grouting through a Manifold is not Permitted)



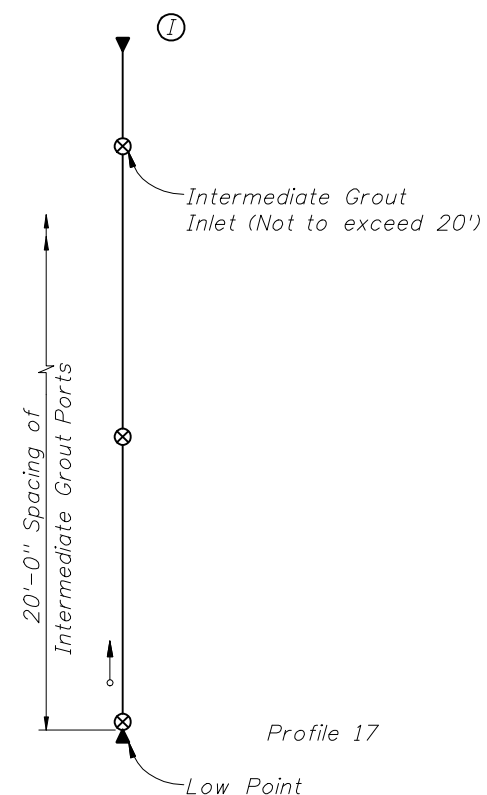
Profile 14



Profile 15



Profile 16



Profile 17

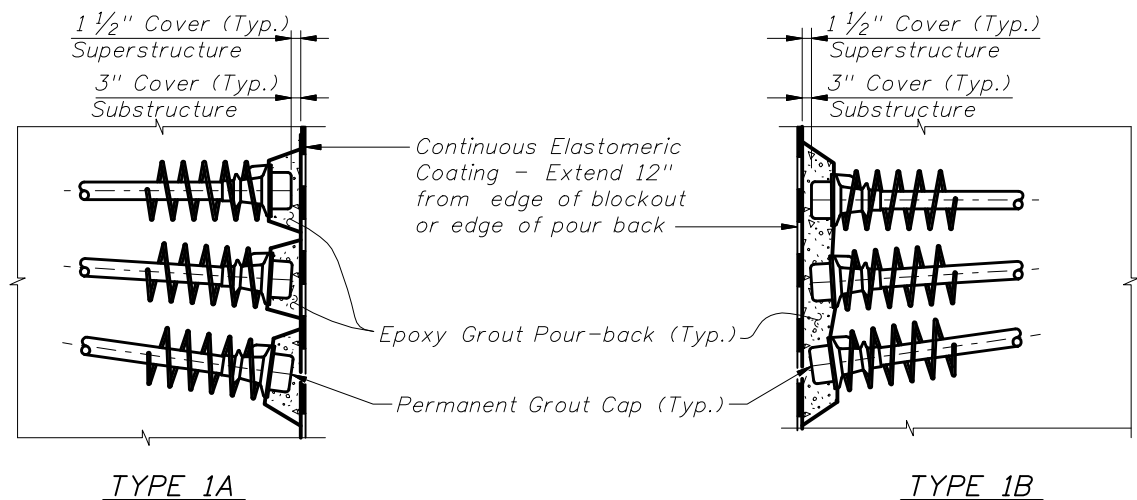
NOTES: Grouting Procedures

1. Take into account longitudinal grade, if any, and establish direction of grouting.
2. Orient end anchors so that grout outlet is at the top.
3. Provide grout outlets at all anchors.
4. Provide grout inlet at low point of all tendon profiles.
5. For tendons longer than 150 feet, additional grout outlets are required.
6. Incorporate the information on these drawings into the grouting operations plan.
7. In the grouting plan, show
 - a. Direction of grouting
 - b. Locations of grout inlets & outlets
 - c. Staged grouting operations
 - d. Sequence of opening & closing vents
 - e. Procedures for time delayed grout phasing of the tendons.
8. After grouting, inspect all anchors and high points for voids.
9. Vacuum grout voids and seal post-tensioning system in accordance with the specifications.

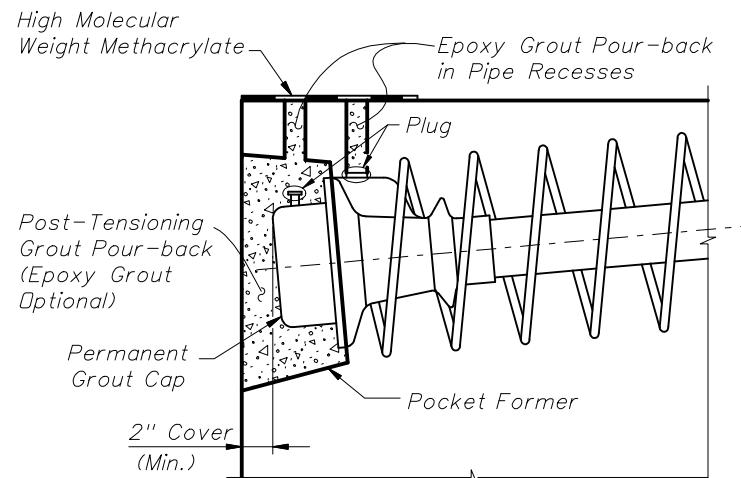
Legend:

- | | | | |
|---|------------------------------|---|------------------------------|
| — | Strand Tendon | □ | Optional Grout Outlet |
| ▶ | End Anchor with Grout Outlet | ⊕ | Drain / Optional Grout Inlet |
| ⊗ | Grout Inlet | → | Direction of Grout Flow |
| ○ | Grout Outlet | Ⓢ | Inspection Location |

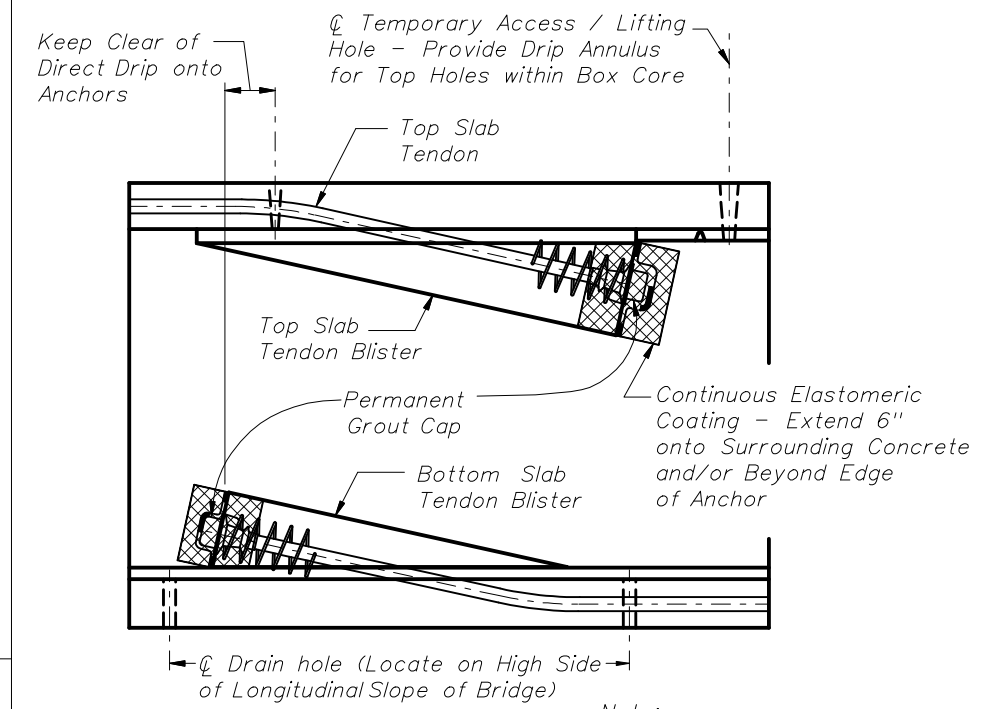




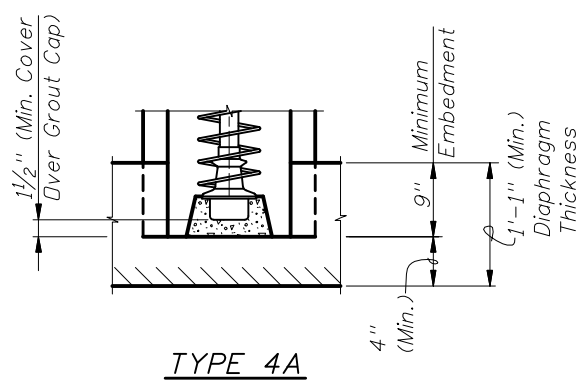
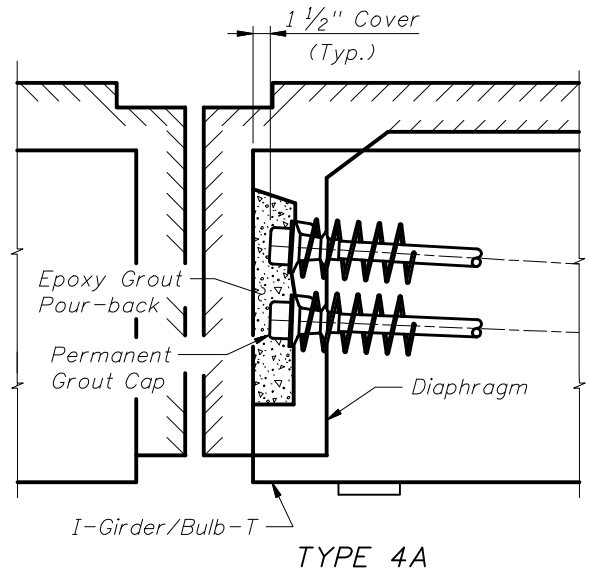
TYPE 1A **TYPE 1B**
TYPICAL ALTERNATE POUR-BACK TREATMENTS FOR ANCHOR PROTECTION ON EXPOSED SURFACES AND EXPANSION JOINTS



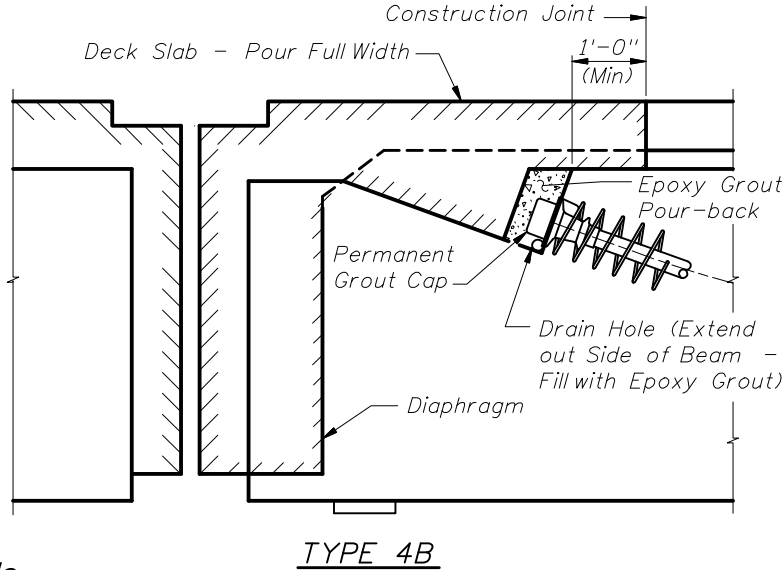
TYPE 2
TOP INSPECTED ANCHOR PROTECTION



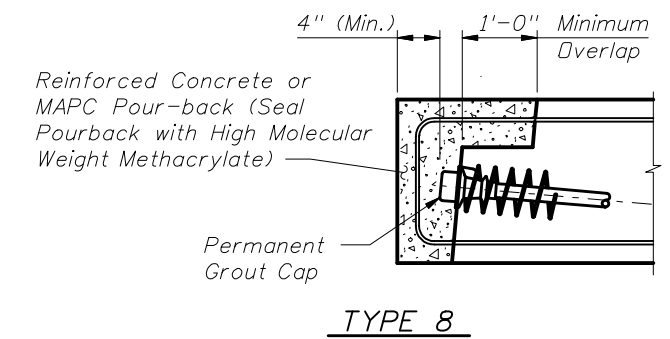
TYPE 3
ANCHOR PROTECTION FOR INTERIOR ANCHORS IN CELLULAR BOXES ON BLISTERS OR PIER SEGMENTS (NOT FOR USE IN EXPANSION JOINTS)



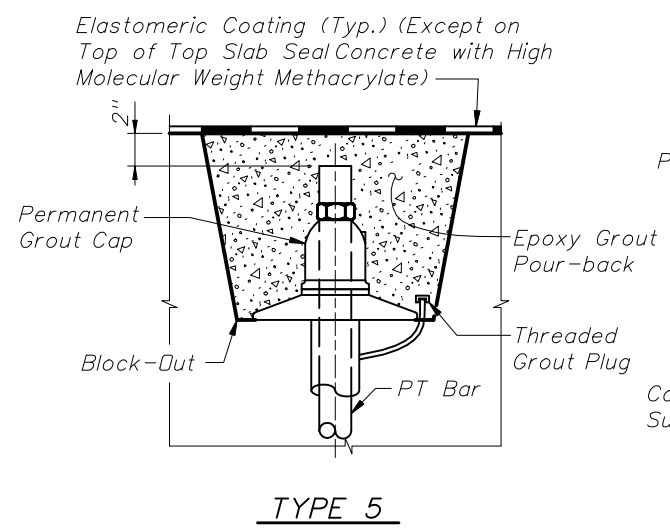
TYPE 4A
ANCHOR PROTECTION FOR POST-TENSIONED I-GIRDERS & BULB-T'S



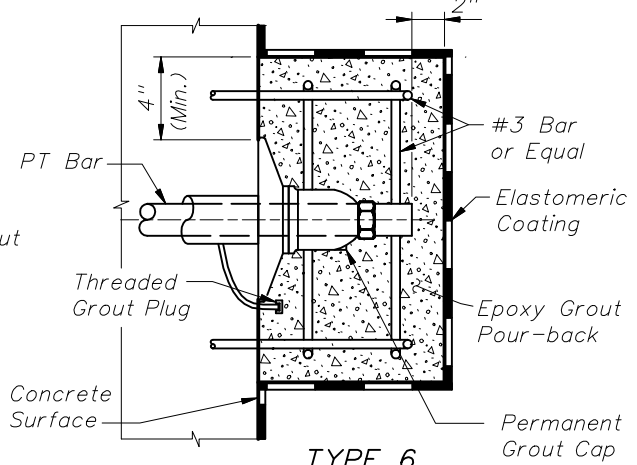
TYPE 4B



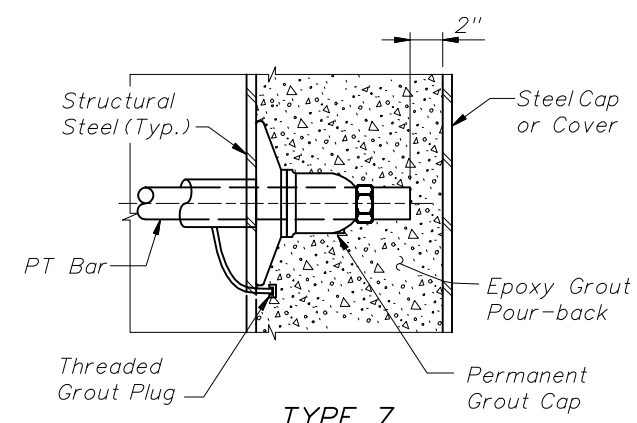
TYPE 8
FLAT SLAB ANCHOR PROTECTION



TYPE 5

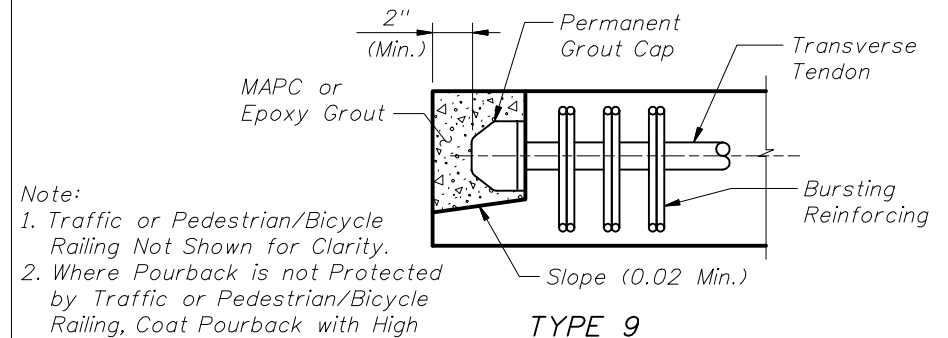


TYPE 6
ANCHOR PROTECTION FOR PT BARS



TYPE 7

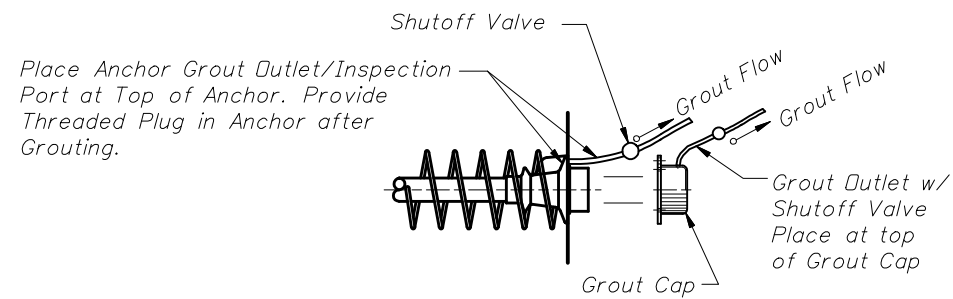
Note: Extend elastomeric coating 12" onto concrete edges or 12" beyond edge of anchor pour-back.



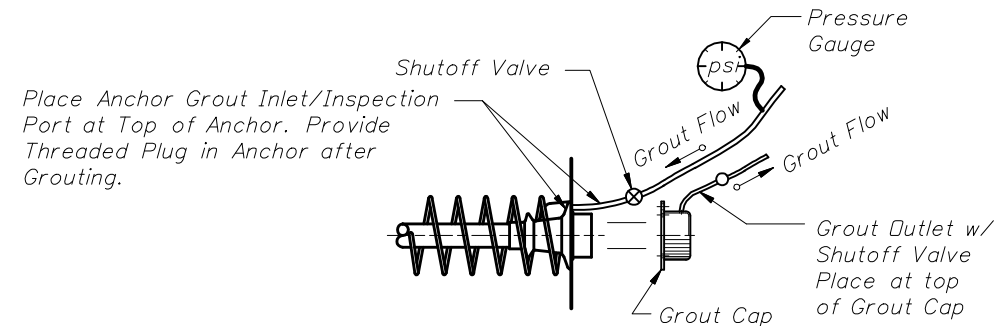
Note:
 1. Traffic or Pedestrian/Bicycle Railing Not Shown for Clarity.
 2. Where Pourback is not Protected by Traffic or Pedestrian/Bicycle Railing, Coat Pourback with High Molecular Weight Methacrylate.

TYPE 9
TRANSVERSE TENDON ANCHOR PROTECTION

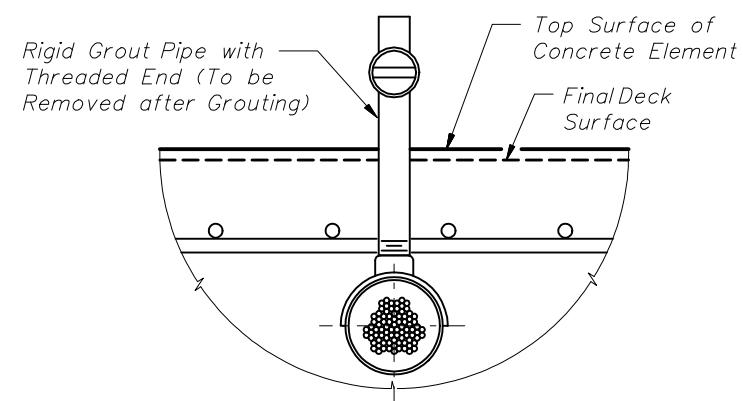




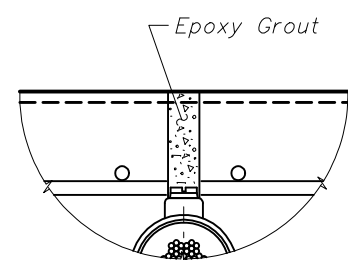
DETAIL A - FACE INSPECTED ANCHOR WITH GROUT OUTLET



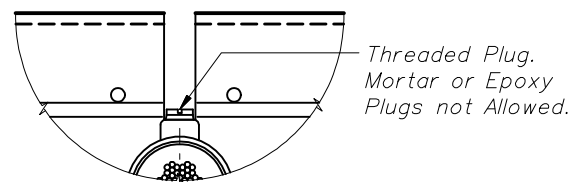
FACE INSPECTED ANCHOR WITH GROUT INLET



1 GROUT OUTLET CONNECTION TO TENDON



3 FILLING POCKET

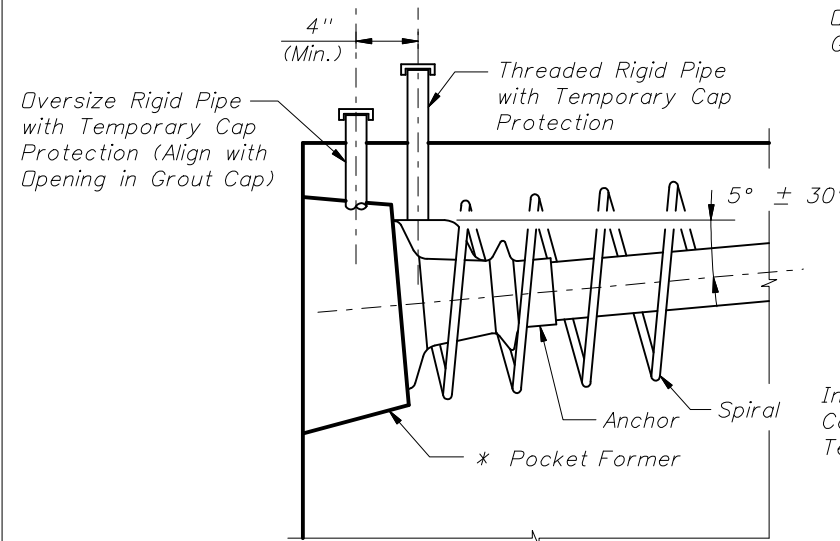


2 POCKET PREPARATION

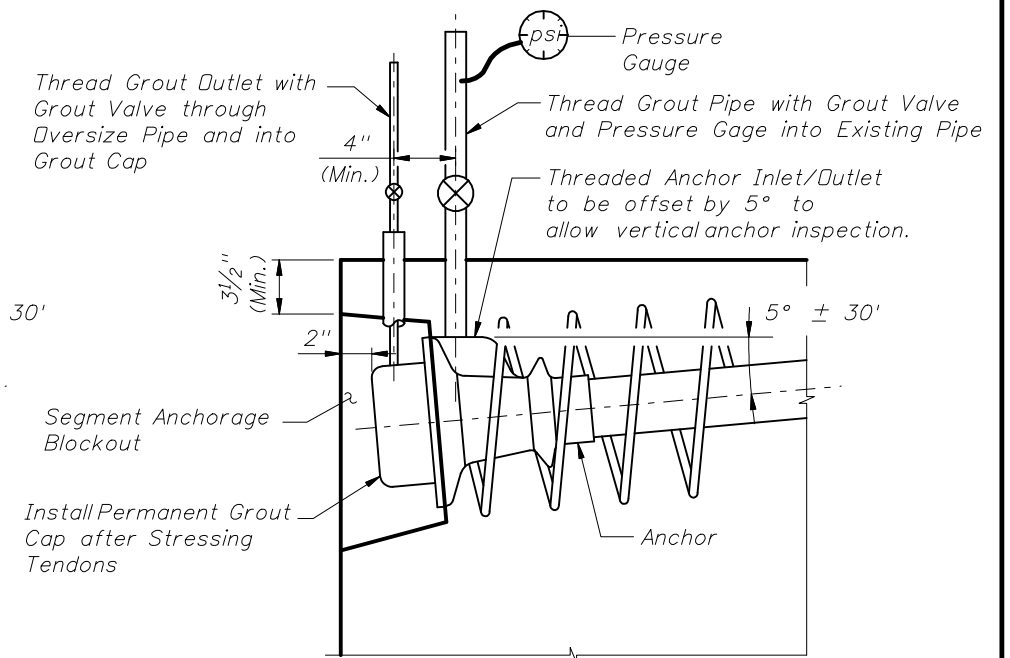
PROCEDURE

1. Remove Rigid Grout Pipe.
2. Inspect Tendon for Voids as Necessary.
3. Vacuum Grout as Required and Allow Grout to Cure. Remove Pipe used for Vacuum Grouting.
4. Clean Threads and Rethread as Required.
5. Install Threaded Plug into Outlet to Form a Tight Fit.
6. Over-Ream Hole (1/4" ϕ Over-Ream) Clean and Roughen Sides.
7. Fill Pocket with Epoxy Grout.

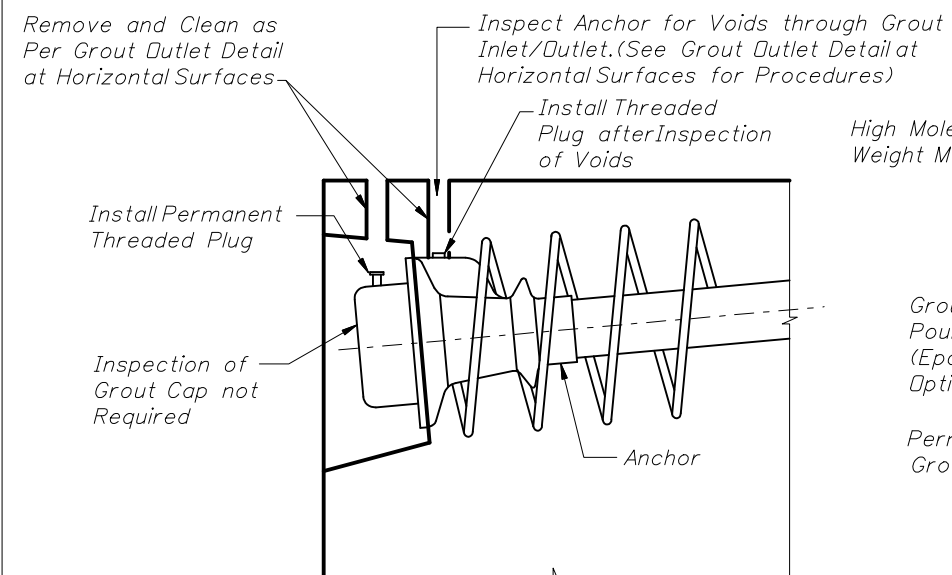
GROUT OUTLET DETAIL AT HORIZONTAL SURFACES



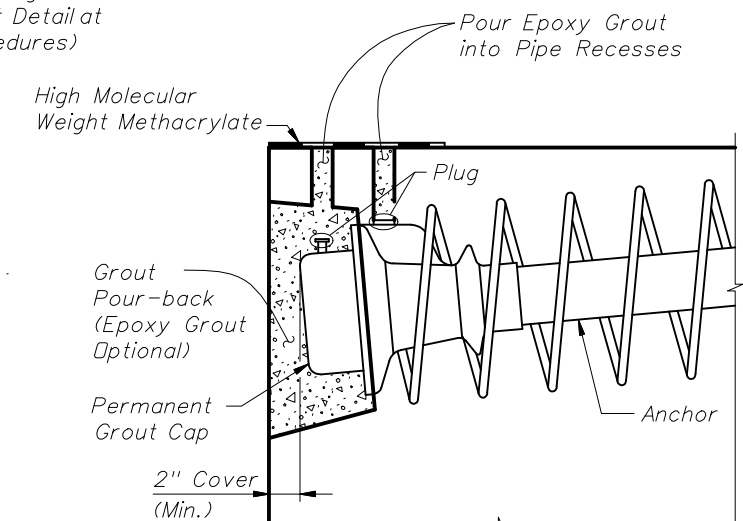
1 INSTALLATION & SHIPPING



2 GROUTING



3 INSPECTION



4 PROTECTION

NOTES

1. Holes used for the Inspection and Grout Inlets/Outlets may be Formed using Tapered Pipes or Mandrels.

TOP INSPECTED ANCHOR WITH GROUT INLET INSTALLATION, GROUTING, INSPECTION & PROTECTION

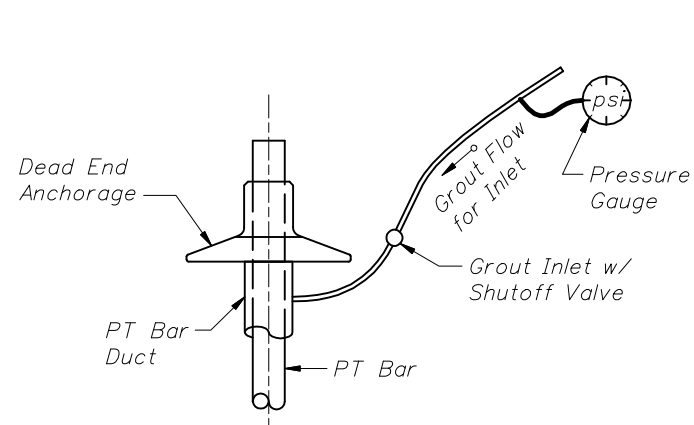
- * Round Pocket Former - Gravity Fed Placement of Grout Acceptable
- Modified Square Pocket Former - Gravity Fed Placement of Grout Acceptable
- Square Pocket Former - Vacuum Grouting Required



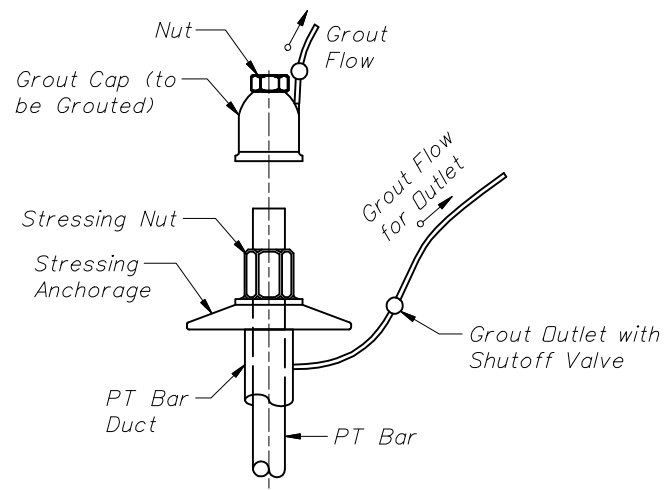
2010 FDOT Design Standards

POST-TENSIONING ANCHORAGE AND GROUTING DETAILS

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Sheet No. 1 of 3
Index No. 21803

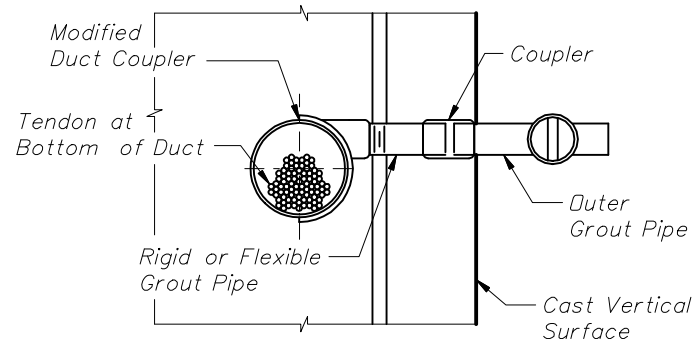


PT BAR ANCHORAGE NON-STRESSING END

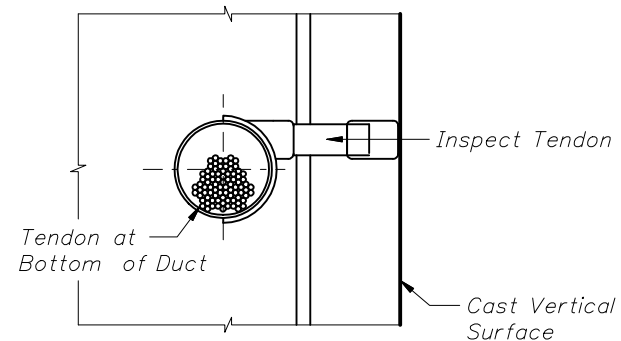


PT BAR ANCHORAGE STRESSING END

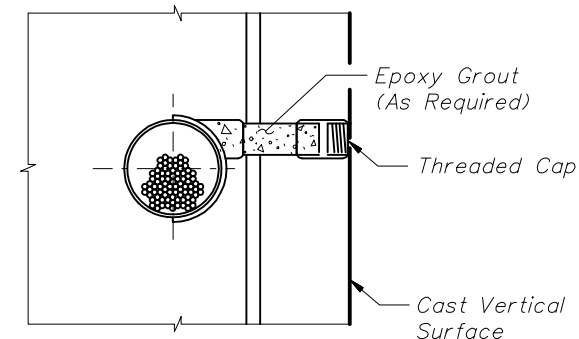
NOTE:
Stressing Anchorage or Nut to allow for Flow of Grout into Cap.



1 GROUT OUTLET CONNECTION TO TENDON



2 POCKET PREPARATION

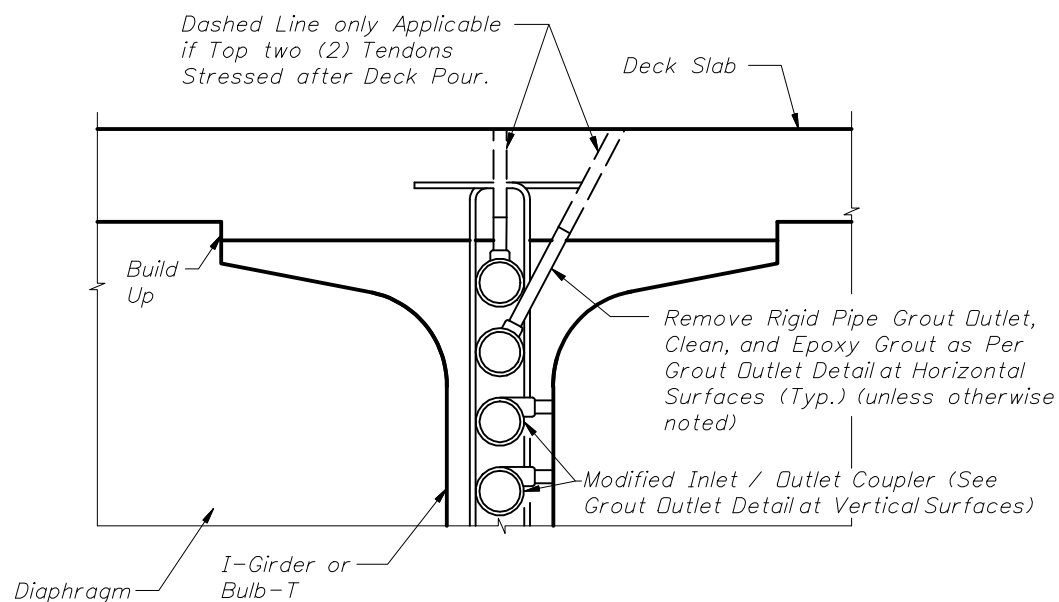


3 FILLING POCKET

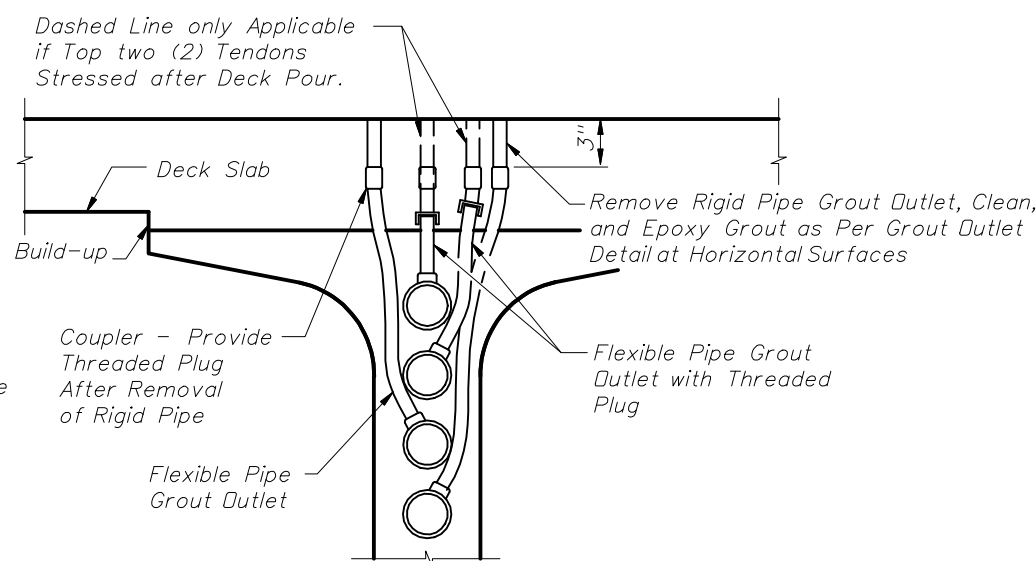
PROCEDURE

1. Remove Rigid Grout Pipe. or Drill Grout in Flexible Pipe.
2. Inspect Tendon for Voids as Necessary.
3. Vacuum Grout as Required and Allow Grout to Cure for 24 hr. (min.). Remove Pipe used for Vacuum Grouting.
4. Plug Recess with Threaded Cap on Inside Surfaces of Box Sections and Inside (nonfascia) Surfaces of I-Girders. For all other Surfaces, Plug Recess with both Threaded Cap and Epoxy Grout.

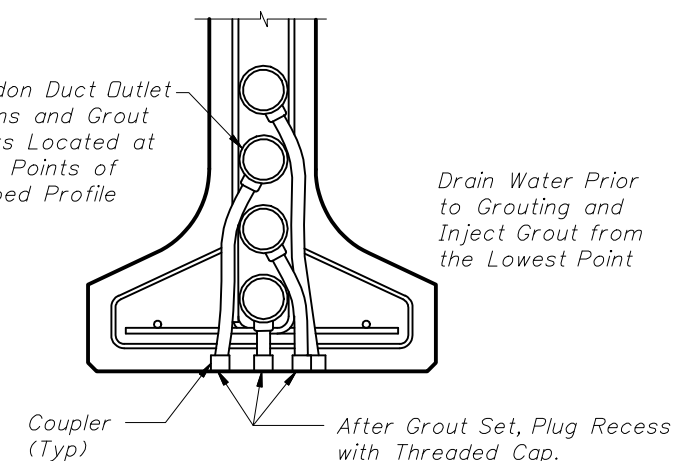
GROUT OUTLET DETAIL AT VERTICAL SURFACES



HIGH POINT INSPECTION LOCATION AT GROUT OUTLET



TENDONS AT 3' TO 6' FROM HIGH POINTS (GROUT OUTLET)



TENDONS AT LOW POINTS (GROUT INLET / DRAIN)

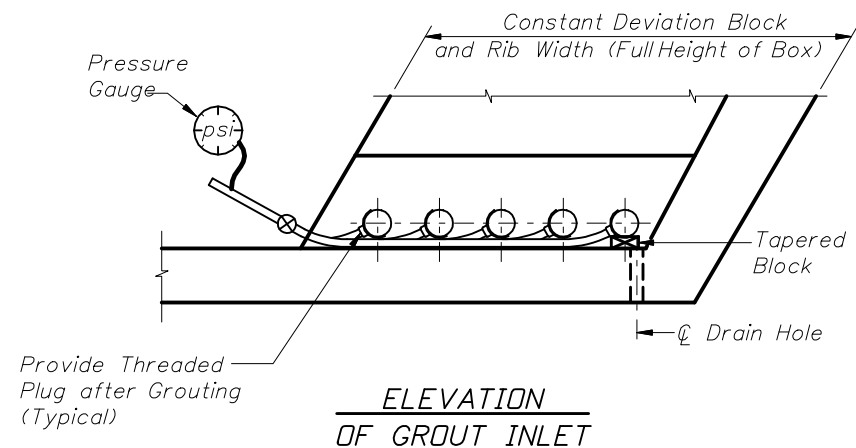
Details Shown for I-Girders/Bulb-T's - Details for C.I.P. Boxes with Internal Tendons Similar



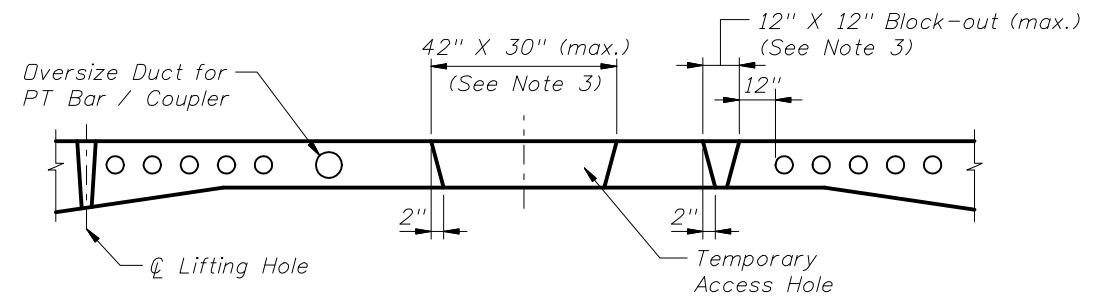
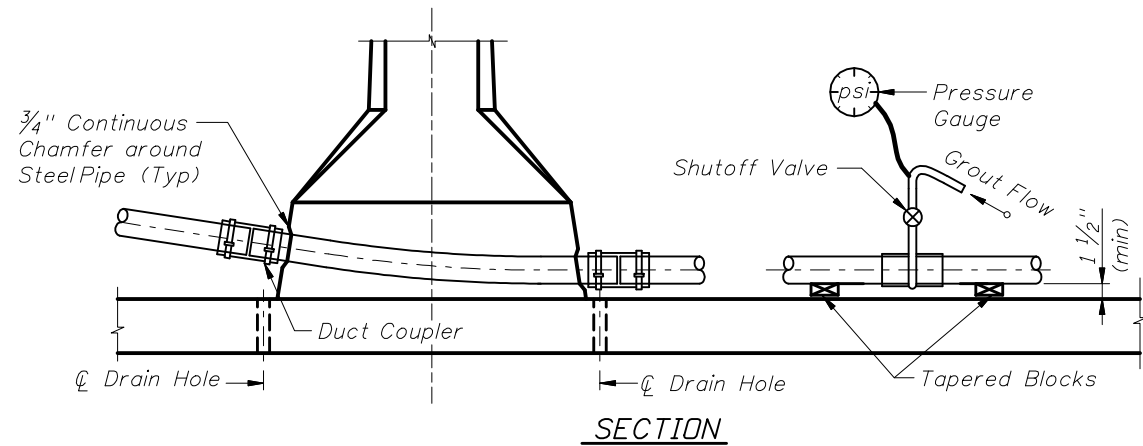
2010 FDOT Design Standards

POST-TENSIONING ANCHORAGE AND GROUTING DETAILS

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NOTES:
 Place Tapered Blocks Under Each Tendon to be Grouted to Raise Duct off Tendon Strands. Center Strands within Duct before Grouting. Blocks Shall be Removed after Grout has Set. Blocks Shall not Damage or Permanently Deform Duct.

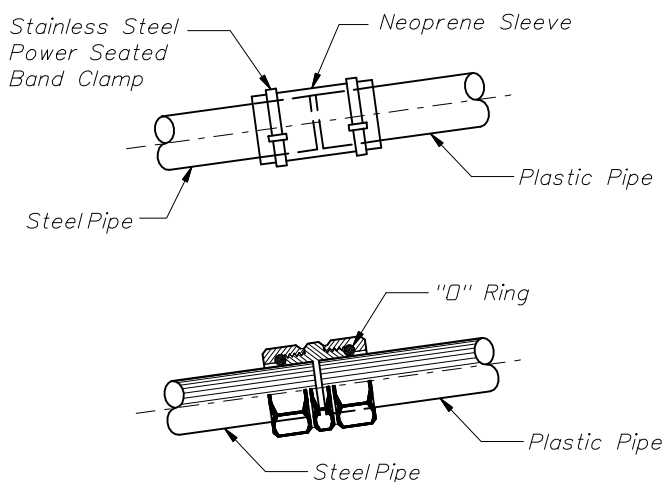


Notes: Temporary Access Holes

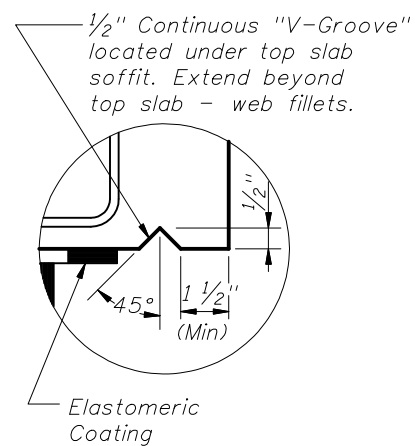
1. Temporary access holes to facilitate access for erection, jacking and grouting operations inside the box during construction are allowed. The access holes shall be limited to a maximum size of 42" wide x 30" long and shall be limited to (1) per span.
2. Slab block-outs for temporary / permanent longitudinal post-tensioning bars are not allowed. Temporary / permanent PT bars in the top slab shall be placed in oversized ducts in the slab to accommodate both the bar and coupler.
3. In lieu of (1) 42" x 30" temporary access hole, a maximum of 2 top slab blockouts (12" x 12" (max.)) between the webs is allowed for construction per span. Block-outs shall be a minimum of 12" from the nearest duct or anchor and shall be located as to prevent direct drip onto bottom slab anchors.

Notes: Repair of Temporary Access Holes, Block-outs, and Lifting Holes

1. Form all large blockouts with tapered sides.
2. Immediately before casting the concrete, mechanically clean the mating concrete surfaces to remove any laitance and to expose small aggregate.
3. Repair all holes and blockouts with Magnesium Ammonium Phosphate Concrete within 24 hours of cleaning concrete.
4. After completion of the deck grooving, coat the repaired and surrounding concrete surfaces with High Molecular Weight Methacrylate.
5. Alternately, epoxy grout may be used to repair holes. High Molecular Weight Methacrylate is not required with epoxy grout.



DUCT COUPLER DETAIL
 Use Approved Duct Couplers with Post-Tensioned System



DETAIL OF DRIP
 LEDGE AT ABUTMENTS AND EXPANSION JOINTS FOR SEGMENTAL AND CAST-IN-PLACE BOX CONSTRUCTION



GENERAL NOTES:

Work this Standard with Index Nos. 21910, 21920 and 21930.

U.S. COAST GUARD NOTIFICATION: Notify the local office of the U.S. Coast Guard at least 30 days prior to beginning of construction of the Fender System.

16" DIAMETER COMPOSITE PLASTIC PILES – INDEX NOS. 21910 AND 21920 ONLY: Provide 16" Diameter Composite Plastic Piles in accordance with Specification Section 973. Provide piles of sufficient length to achieve a minimum embedment of 24' into soil having a blow count greater than 6 ($N > 6$). Pile splices and build-ups are not permitted. Installation shall be in accordance with manufacturer's recommendations.

14" SQUARE PRESTRESSED CONCRETE PILES – INDEX NO. 21930 ONLY: Provide 14" Square Prestressed Concrete Piles of sufficient length to achieve a minimum embedment of 20' into soil having a blow count greater than 6 ($N > 6$). Pile splices and build-ups are not permitted. Use only 14" Square Prestressed Concrete Piles with 8 – 1/2" diameter Low Relaxation Strands fabricated in accordance with Index No. 20614.

PLASTIC LUMBER AND STRUCTURAL COMPOSITE LUMBER WALES: Provide Plastic Lumber and Structural Composite Lumber Wales in accordance with Specification Section 973. Wales shall be continuous and spliced only at locations shown on the plans.

PLASTIC LUMBER DECKING FOR CATWALKS: Provide Plastic Lumber decking for catwalks when called for in the Plans in accordance with Specification Section 973.

Install Plastic Lumber Decking according to manufacturer's recommendations using stainless steel #10 x 3" (minimum) deck screws.

FIBERGLASS OPEN GRATING FOR CATWALKS: Provide Fiberglass Open Grating for catwalks when called for in the Plans. Fiberglass Open Grating shall be a heavy duty design suitable for exterior installations. Maximum gap opening on the walkway surface shall be 1/2". Design live loads and deflections shall be a 50 psf uniformly distributed load with a maximum deflection of 3/8" or L/120 at the center of a simple span or a concentrated load of 250 pounds with a maximum deflection of 1/4" at the center of a simple span. Color of Fiberglass Open Grating shall be gray or black.

Install Fiberglass Open Grating according to manufacturer's recommendations using stainless steel hardware, screws, bolts, nuts and washers. Attach Fiberglass Open Grating to Wales and Deck Supports at a 2'-0" maximum spacing so as to resist pedestrian live loads and uplift forces from wind, buoyancy and wave action.

CLEARANCE GAUGE AND LIGHT: Clearance Gauge to be furnished by the FDOT and erected by the Contractor. Clearance Gauge width and numeral height is dependant on visibility distance. The required visibility distance shall be determined by the United States Coast Guard District Commander. Provide and install Clearance Gauge Light in accordance with Specification Section 510 and Index No. 21220.

NAVIGATION LIGHTS: Provide and install Navigation Lights in accordance with Specification Section 510, Index No. 21220 and/or project specific details. Provide and maintain Temporary Navigation Lights during construction until permanent Navigation Lights are operational.

BOLTS, THREADED BARS, NUTS, SCREWS AND WASHERS: Furnish stainless steel Bolts in accordance with ASTM F593 Type 316. Furnish stainless steel Threaded Bars in accordance with ASTM A193 Grade B8M. Furnish stainless steel Nuts in accordance with ASTM F594 Type 316. Furnish stainless steel Screws in accordance with ASTM F593 Type 305. Furnish stainless steel Washers compatible with Bolts, Threaded Rods and Nuts under heads and nuts. Torque Nuts on 1" diameter Bolts and Threaded Bars to 150 lb-ft. Keep threads on Bolts, Threaded Bars and Nuts free from dirt, coarse grime and sand to prevent galling and seizing during tightening.

SPLICE PLATES: Furnish Splice Plates in accordance with ASTM A240 Type 316.

WIRE ROPE – INDEX NO. 21930 ONLY: Furnish Wire Rope in accordance with Specification Section 936.

INSTRUCTIONS TO DESIGNER:

Design Standards Index Series 21900 includes designs and details for Heavy, Medium and Light Duty Fender Systems. Refer to Florida Department of Transportation (FDOT) "Structures Design Guidelines", current edition, for Fender System design criteria and the selection of the appropriate standard Fender System for use at a given site. Design project specific Fender Systems for sites that do not, as a minimum, satisfy the design criteria which was used to develop these standards. Utilize standardized details and components as appropriate for project specific designs.

Complete the "Fender System Table of Variables", the "Estimated Bill of Materials" and the "Estimated Quantities" table and include them in the Plans.

Designate in the Plans the type of decking material to be used for catwalks: 2" x 12" Plastic Lumber or Fiberglass Open Grating. Catwalk decking material shall be determined by the District.

Prepare and include in the Plans supplemental project specific designs and details for the following items:

- Electrical service for navigation lights including conduit path from bridge to fender system and identification of service point. Coordinate design with Index No. 21220 and Specification Section 510.
- Access ladders and catwalks from bridge to fender system are optional and may be included at the discretion of the District.



2010 FDOT Design Standards

FENDER SYSTEM
GENERAL NOTES AND LAYOUT

Last
Revision

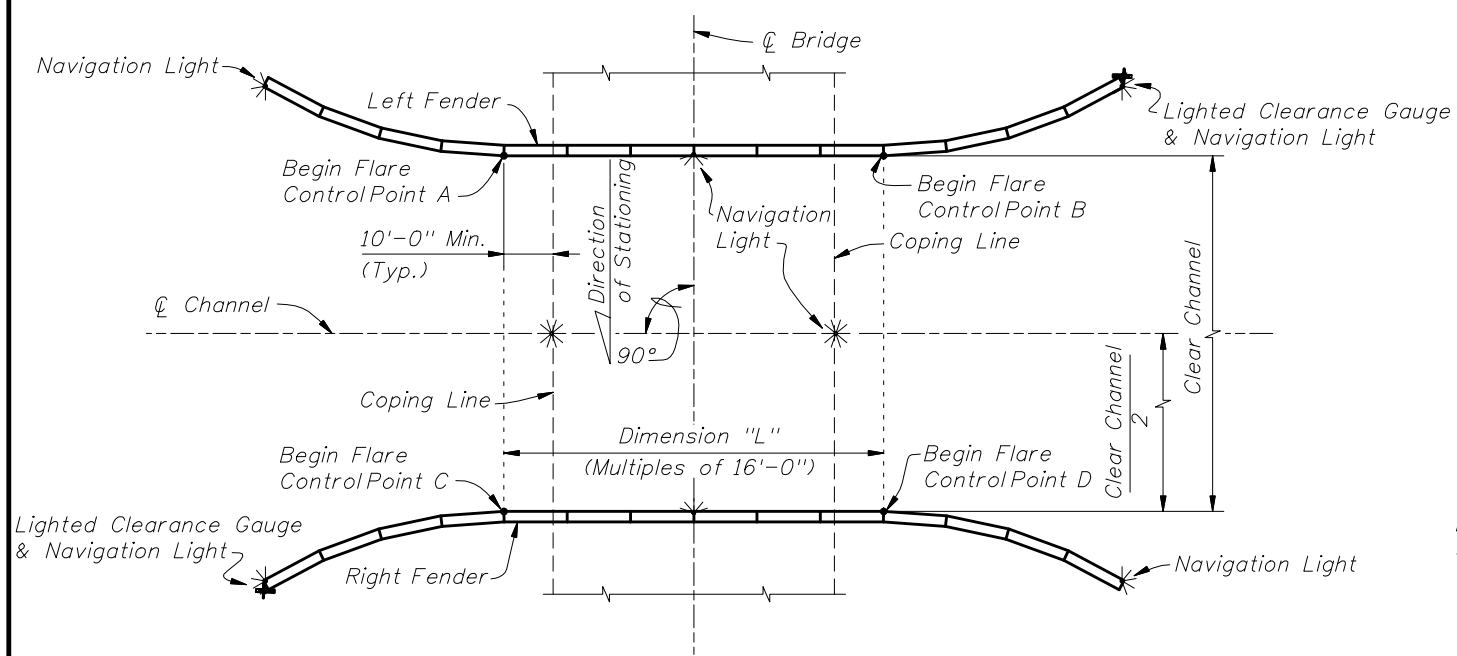
01/01/07

Sheet No.

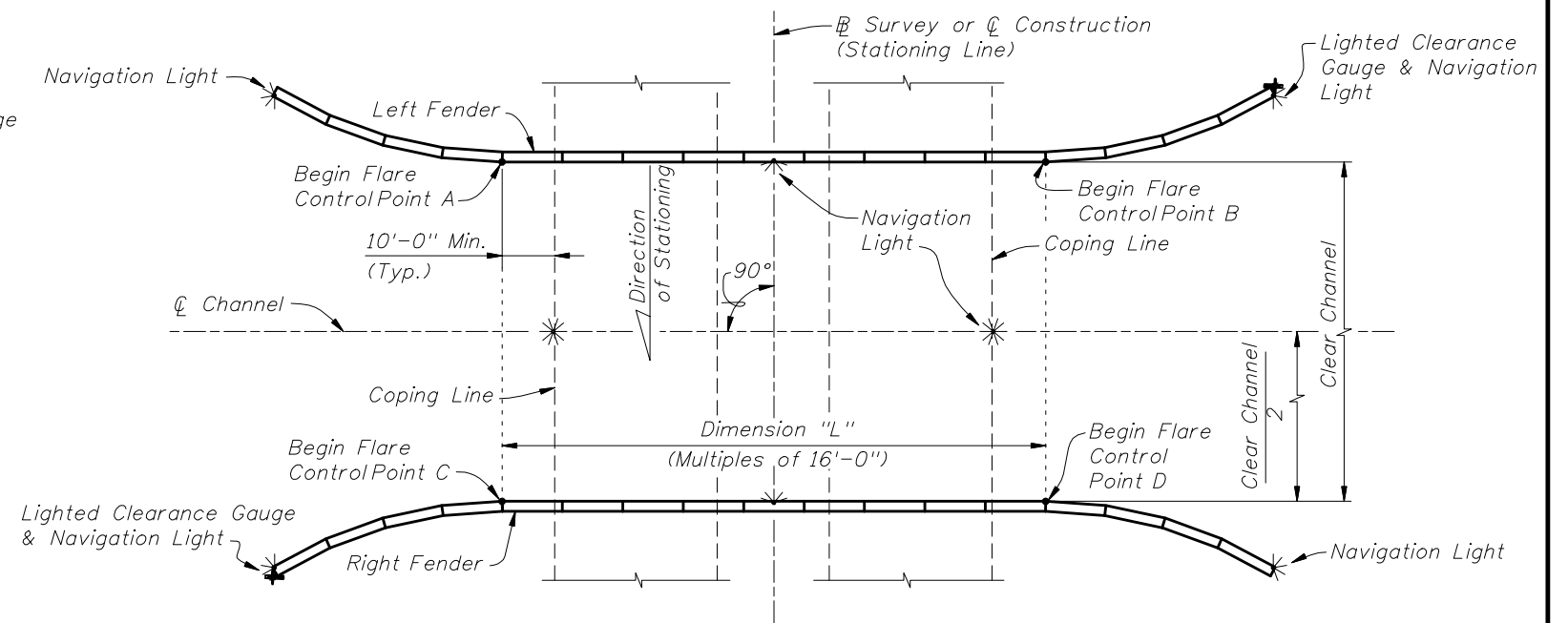
1 of 2

Index No.

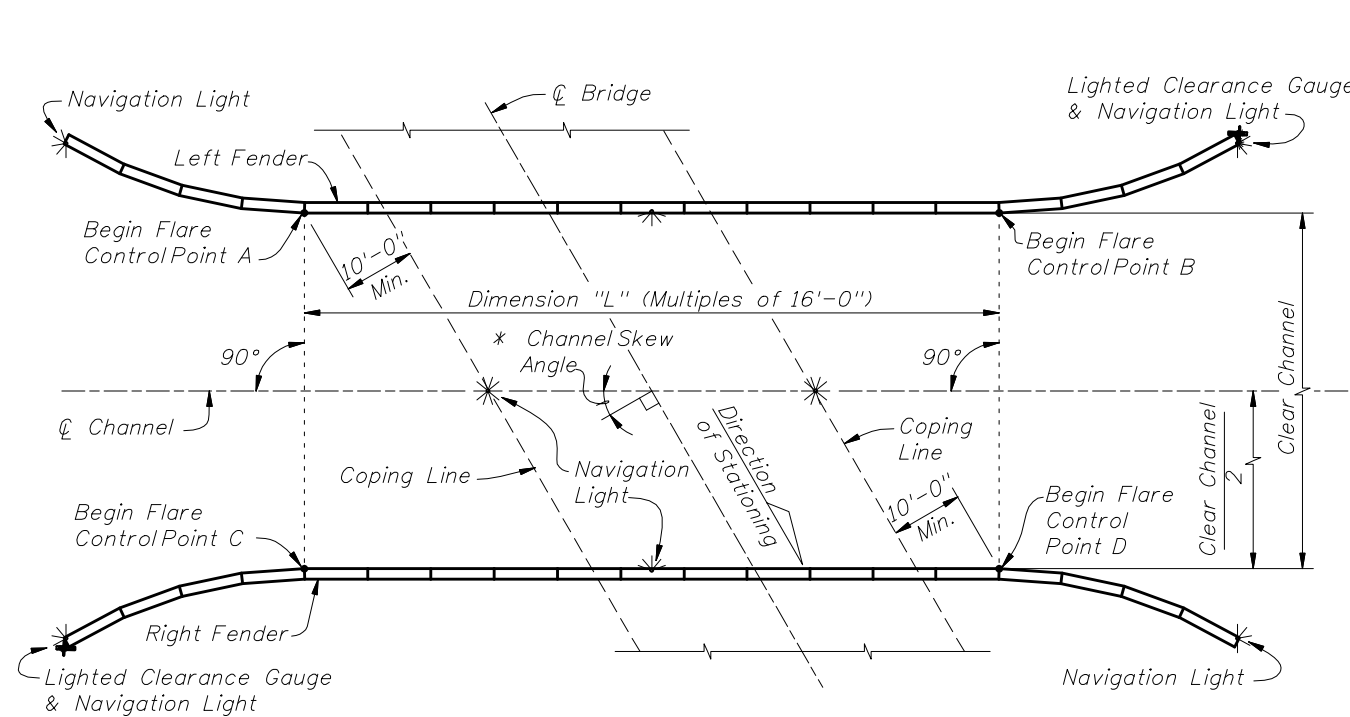
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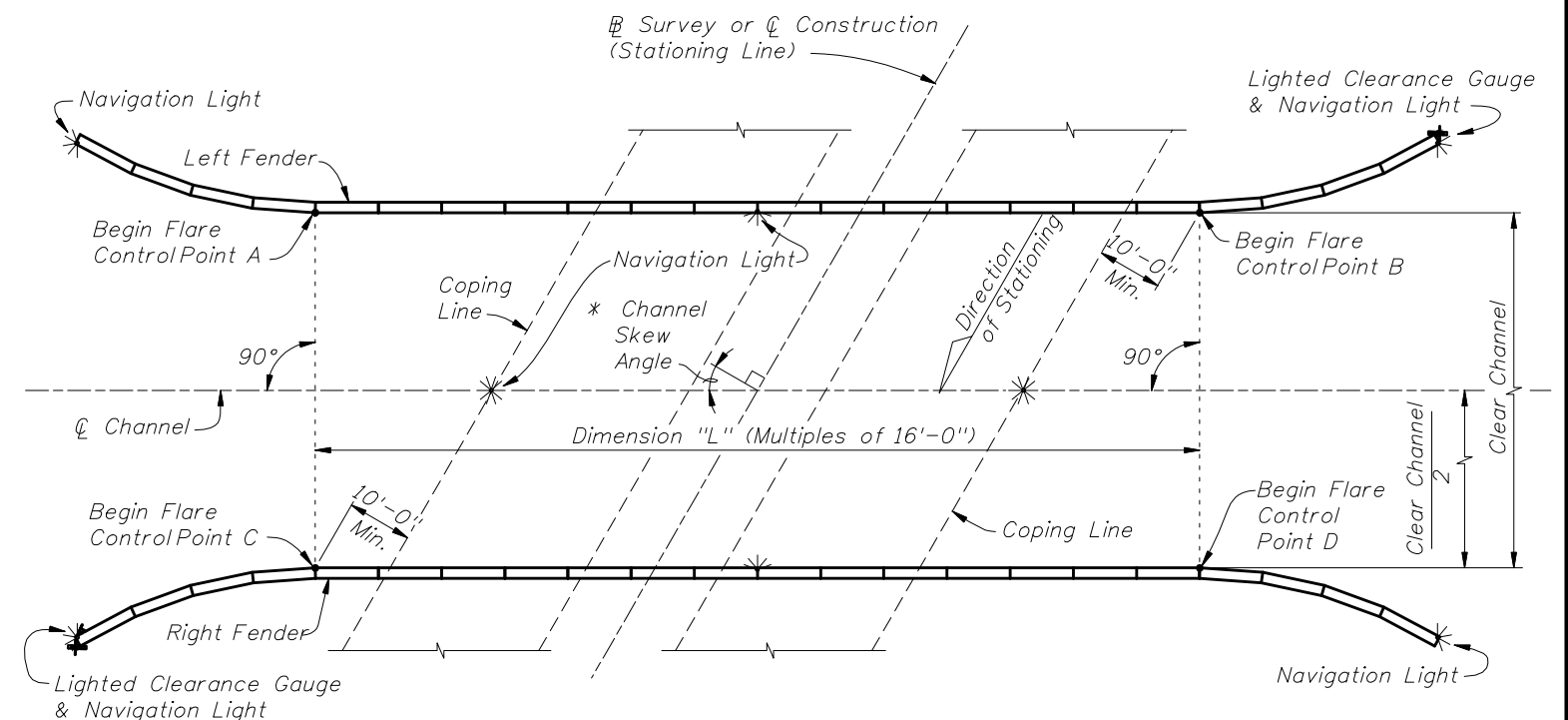
SCHMATIC OF FENDER SYSTEM SHOWING TREATMENT OF SINGLE BRIDGE WITH NONSKEWED CHANNEL



SCHMATIC OF FENDER SYSTEM SHOWING TREATMENT OF DUAL BRIDGES WITH NONSKEWED CHANNEL (PARALLEL DUAL BRIDGES SHOWN, NONPARALLEL DUAL BRIDGES SIMILAR)



SCHMATIC OF FENDER SYSTEM SHOWING TREATMENT OF SINGLE BRIDGE WITH SKEWED CHANNEL



SCHMATIC OF FENDER SYSTEM SHOWING TREATMENT OF DUAL BRIDGES WITH SKEWED CHANNEL (PARALLEL DUAL BRIDGES SHOWN, NONPARALLEL DUAL BRIDGES SIMILAR)

* See Structures Plans, Plan and Elevation and Foundation Layout Sheets for magnitude and orientation of Channel Skew Angle.

CROSS REFERENCES:

For Stations and Offsets of referenced Control Points A, B, C and D, Dimension "L" and Clear Channel Width see Fender System Table of Variables in Structures Plans.
For Navigation Light Details see Design Standards Index 21220.



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FENDER SYSTEM
GENERAL NOTES AND LAYOUT

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21900

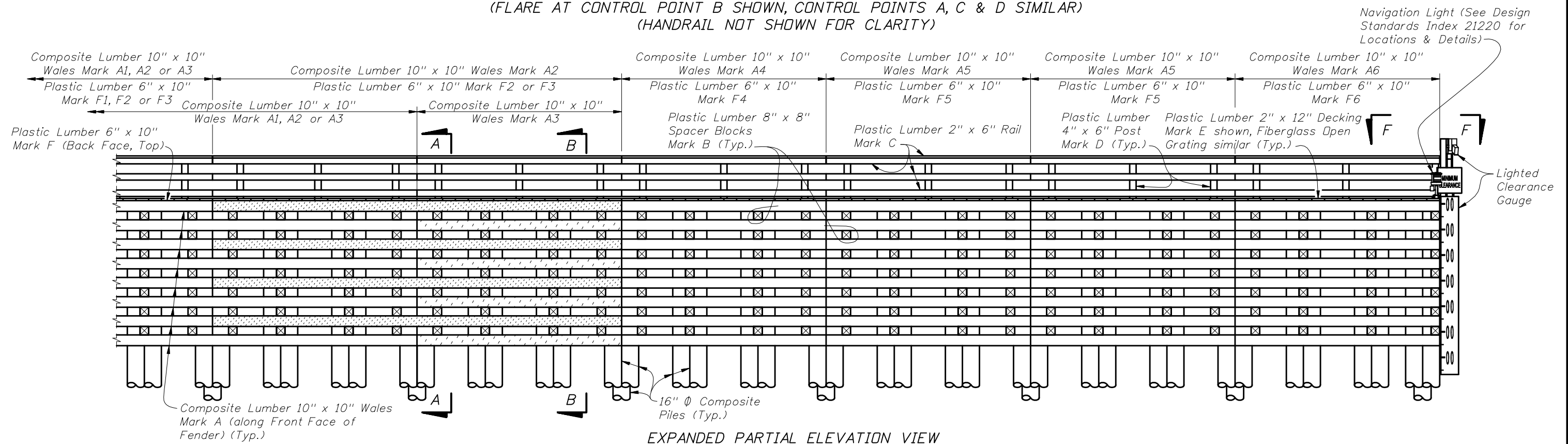
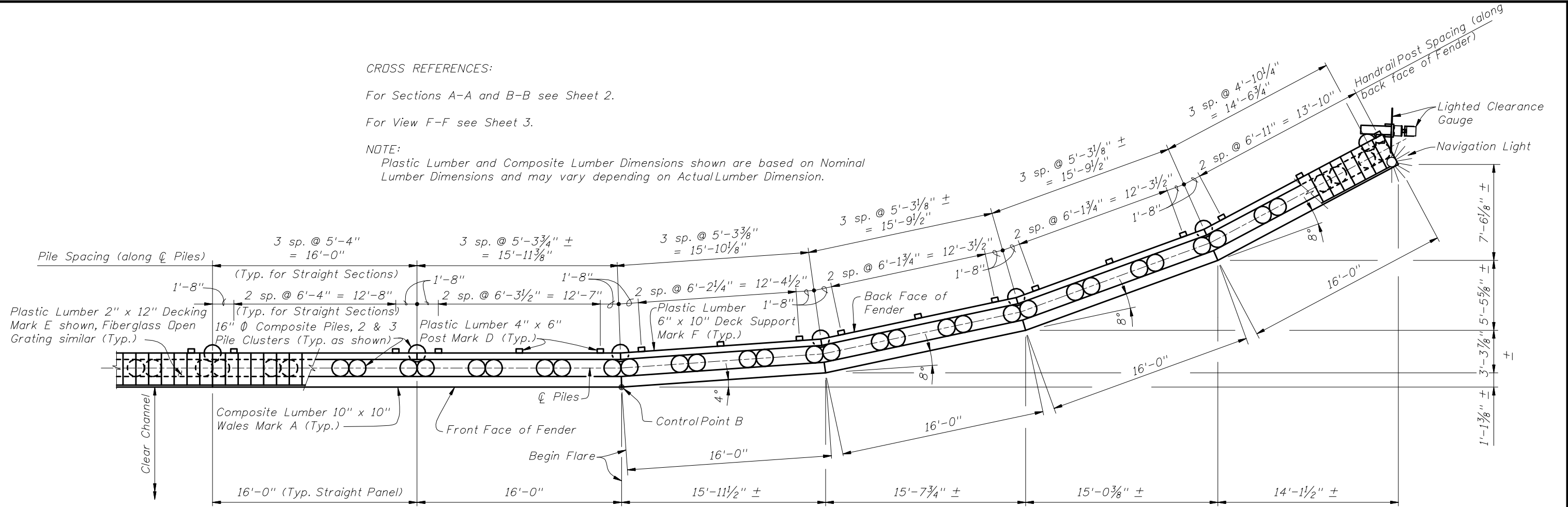
CROSS REFERENCES:

For Sections A-A and B-B see Sheet 2.

For View F-F see Sheet 3.

NOTE:

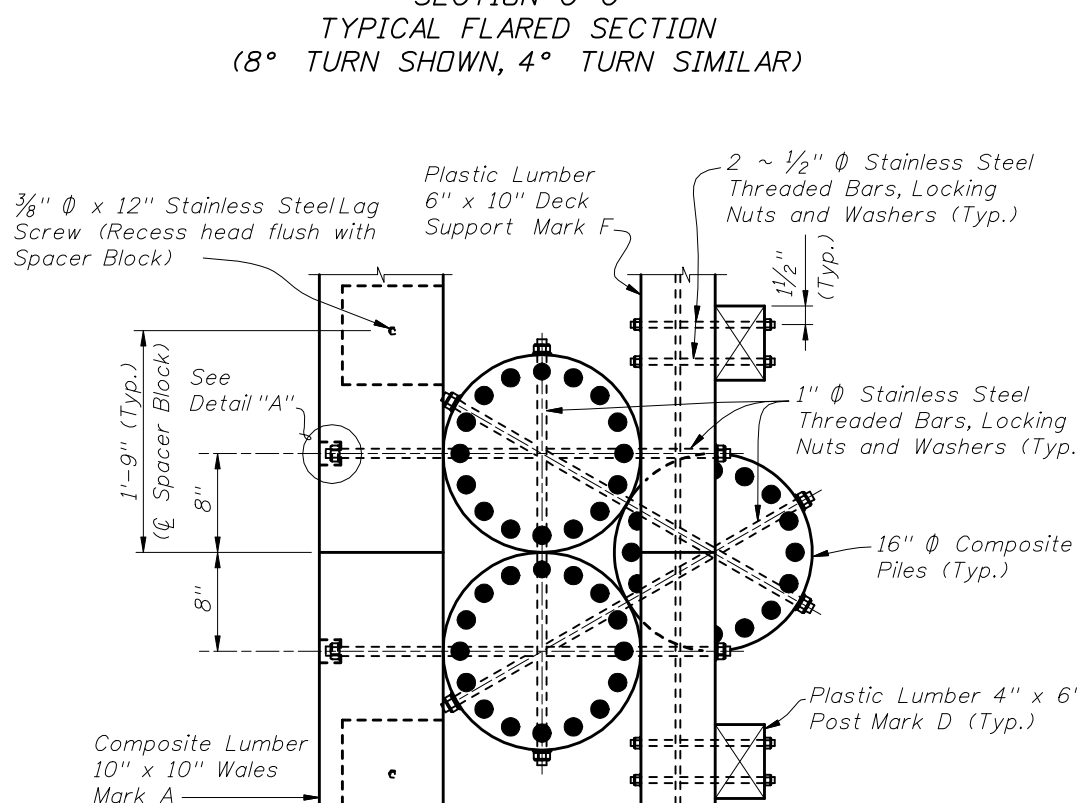
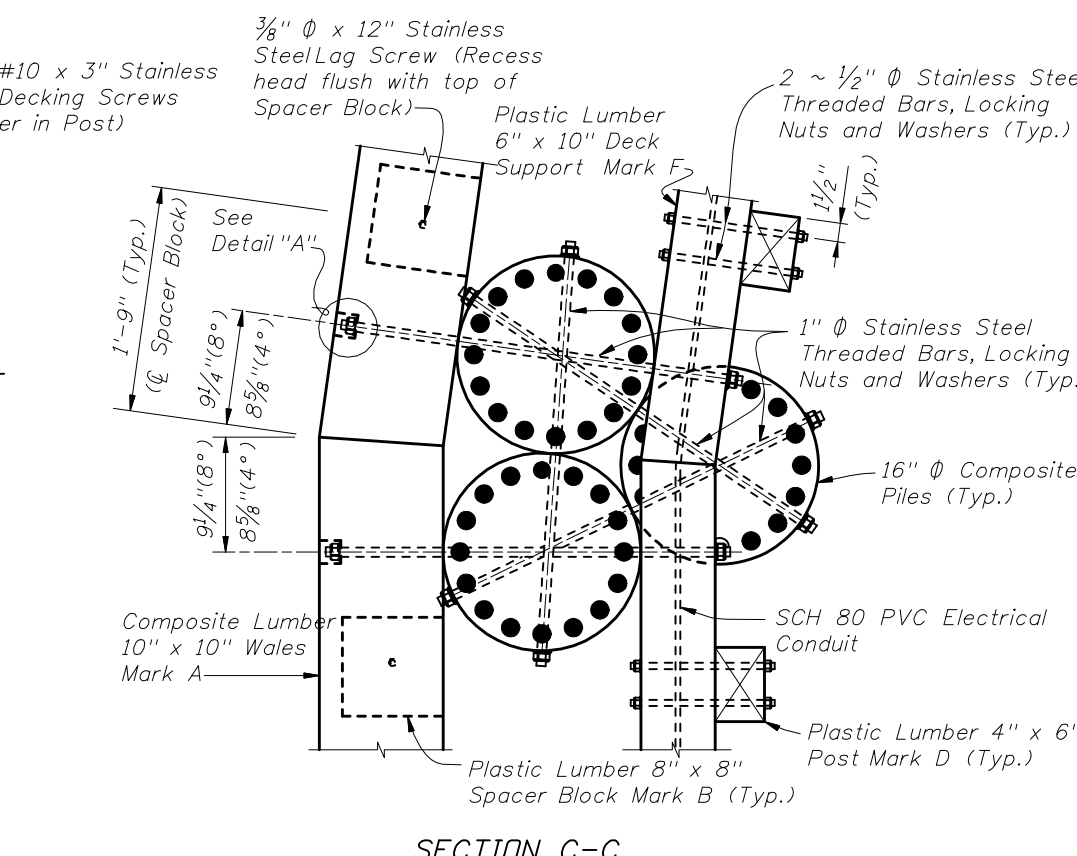
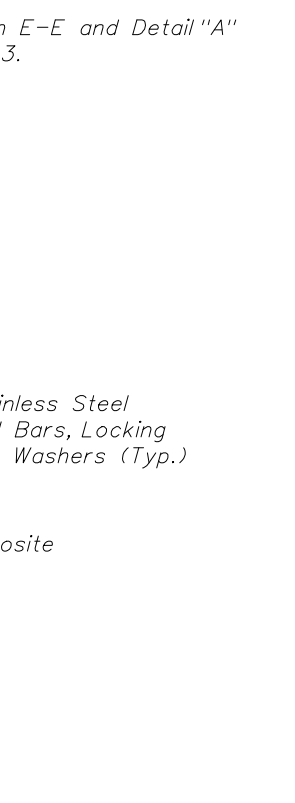
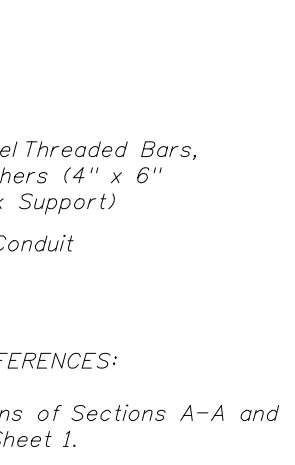
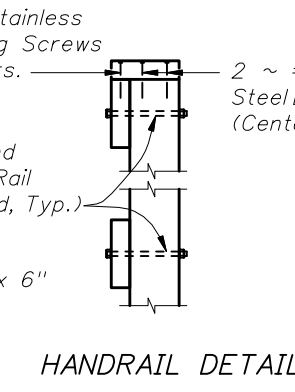
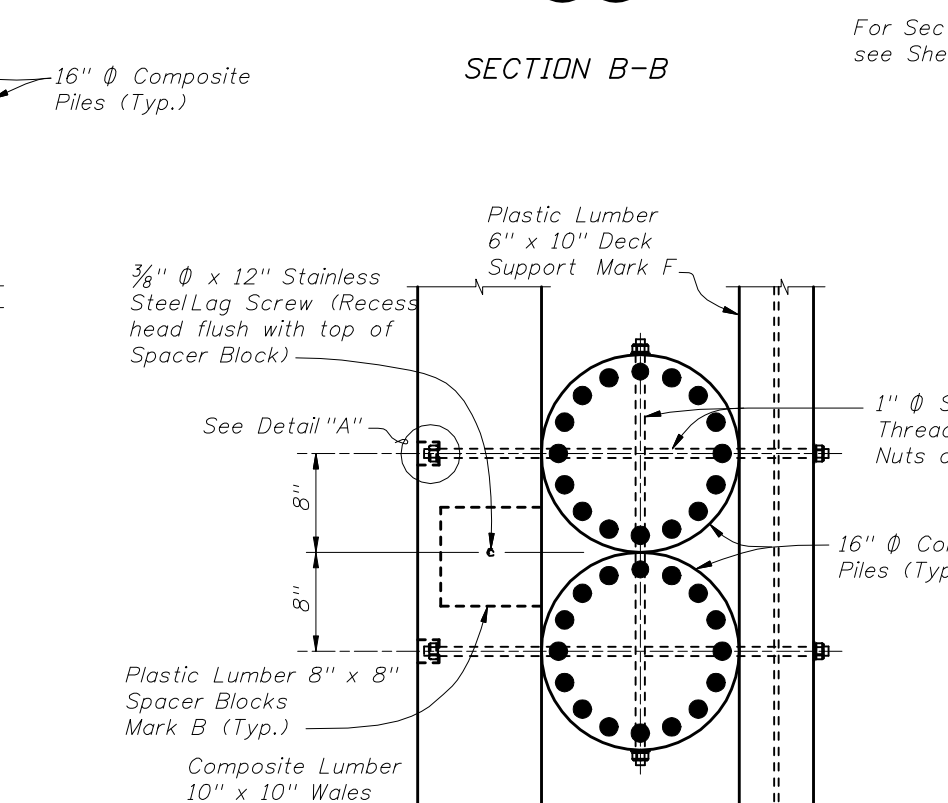
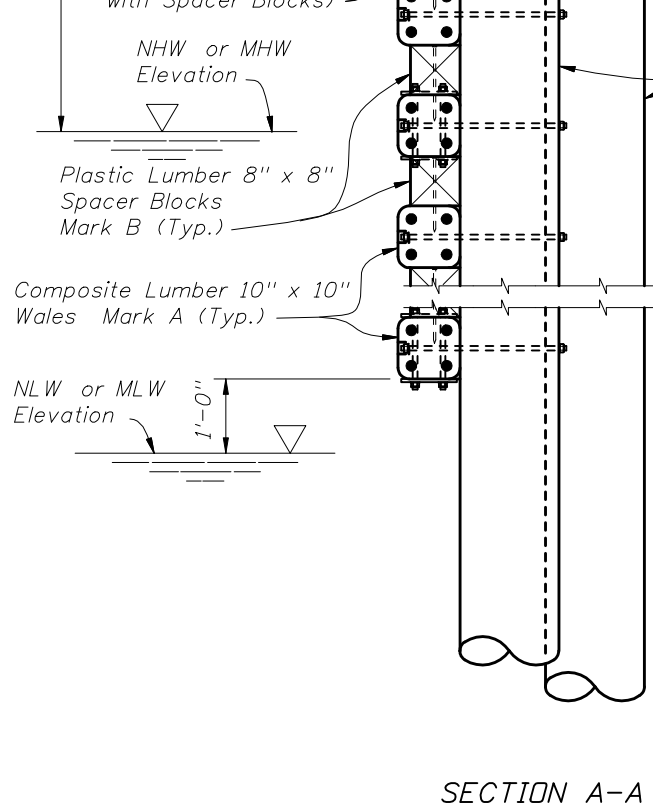
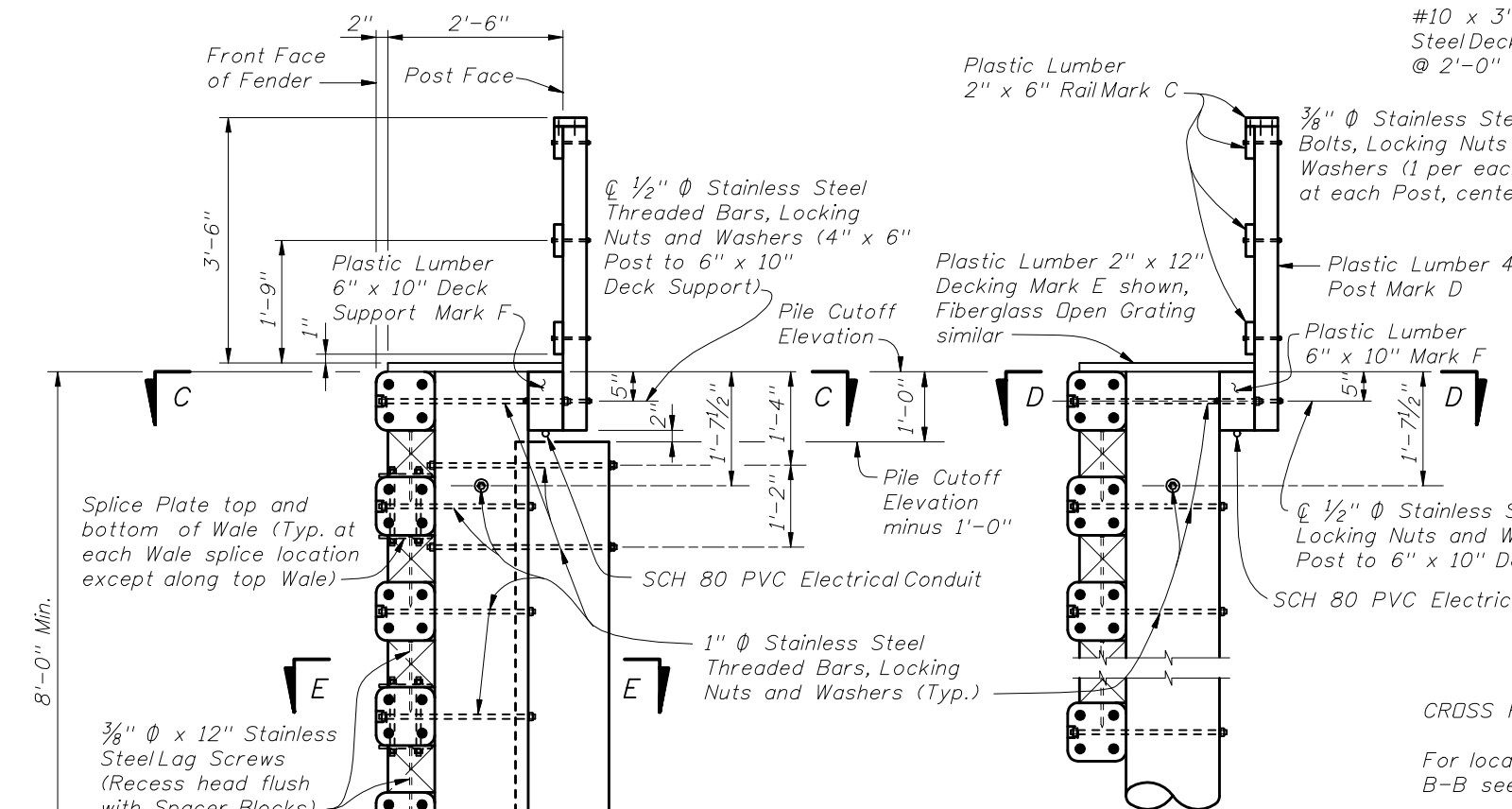
Plastic Lumber and Composite Lumber Dimensions shown are based on Nominal Lumber Dimensions and may vary depending on Actual Lumber Dimension.



2010 FDOT Design Standards

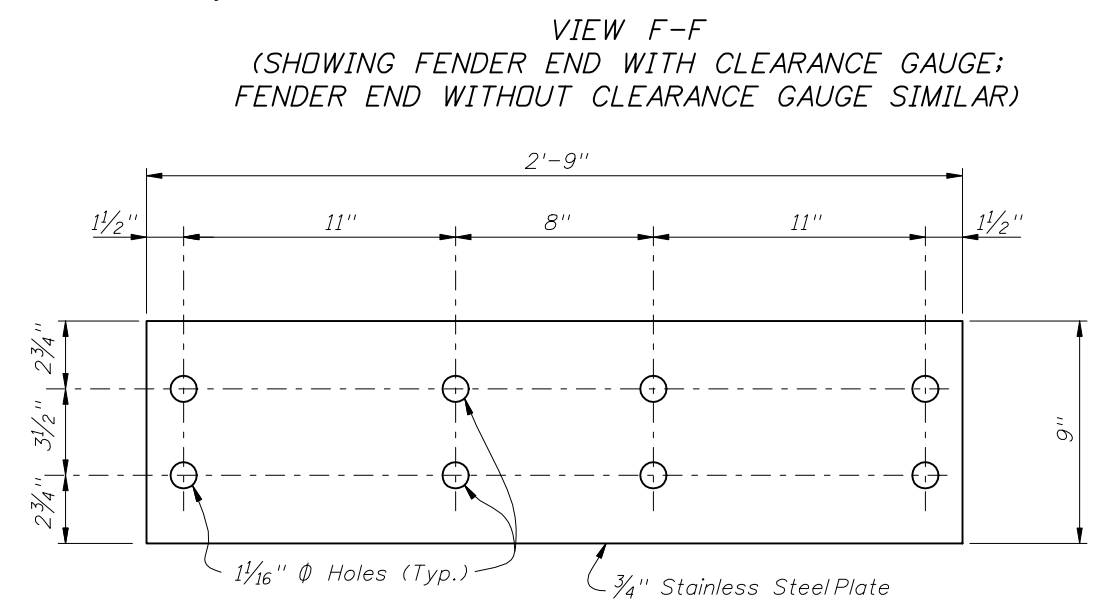
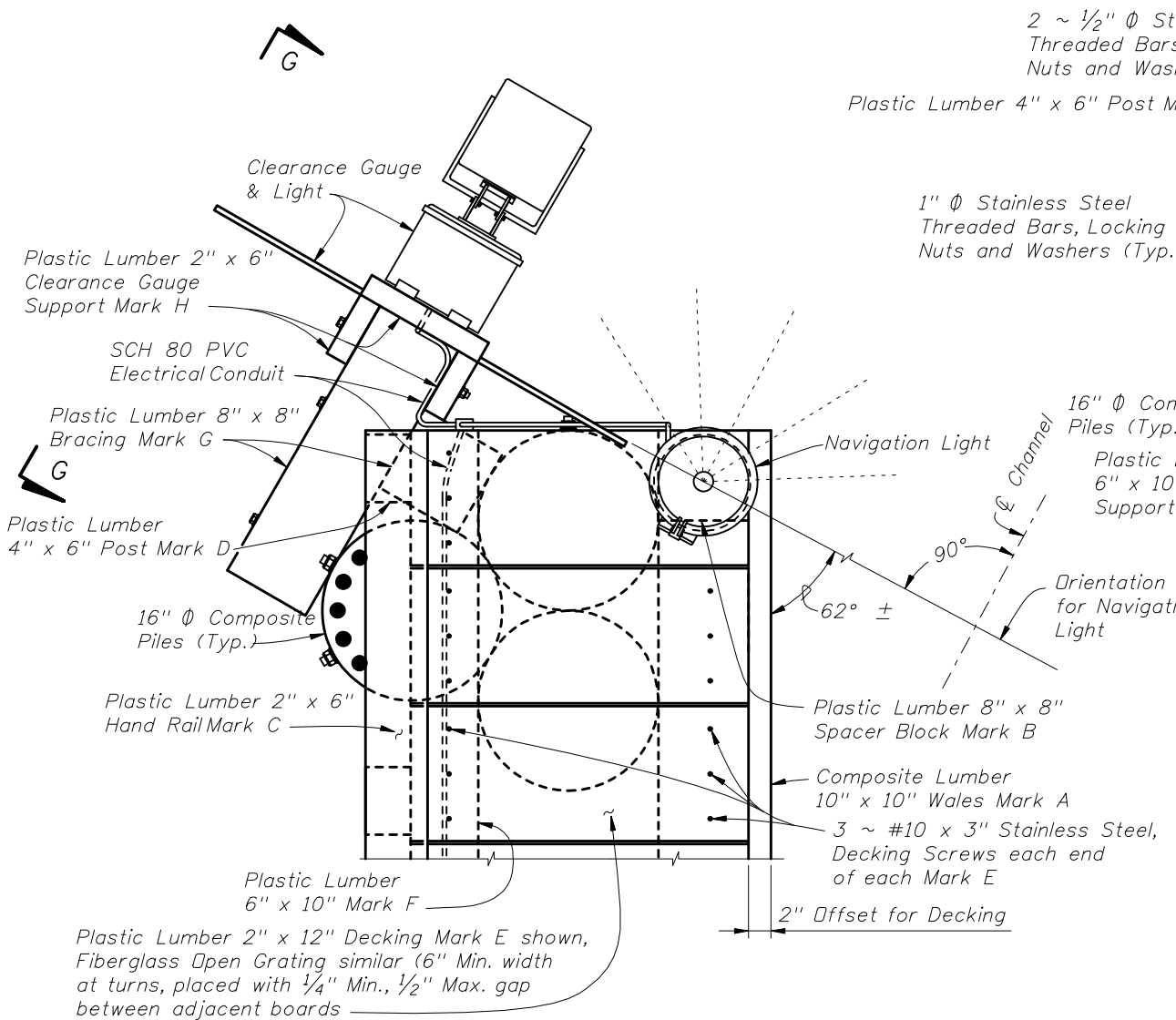
FENDER SYSTEM - HEAVY DUTY

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21910	

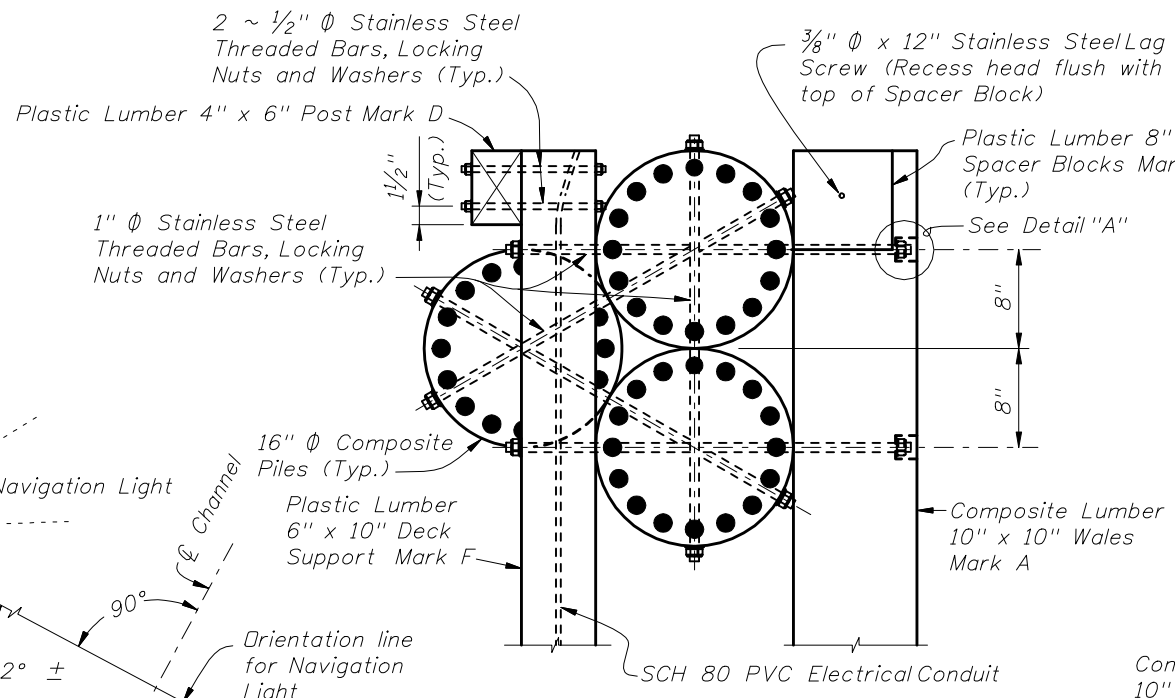


CROSS REFERENCES:
 For locations of Sections A-A and B-B see Sheet 1.
 For Section E-E and Detail "A" see Sheet 3.

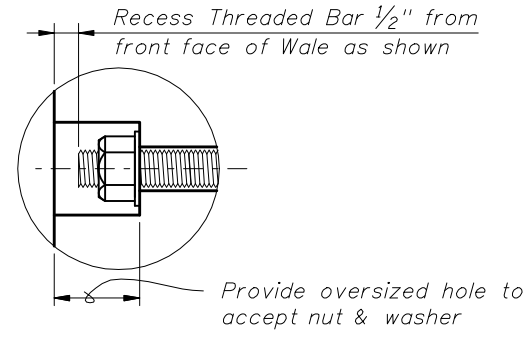




SPLICE PLATE DETAIL

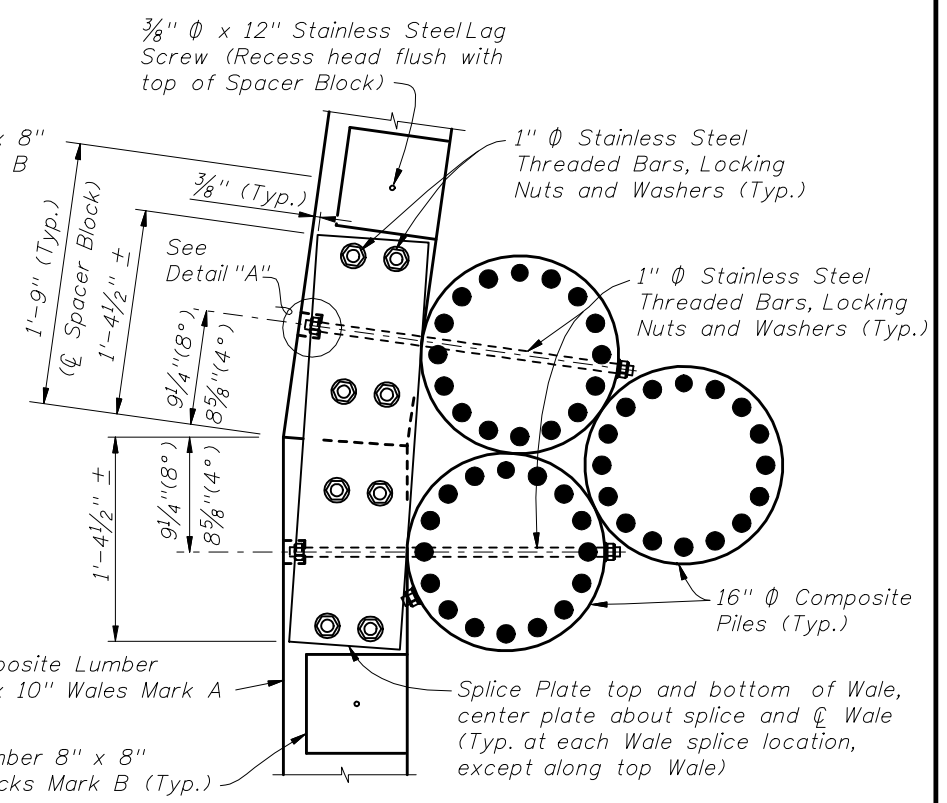


VIEW F-F
(SHOWING FENDER END; DECKING,
HANDRAIL AND CLEARANCE GAUGE
NOT SHOWN FOR CLARITY)

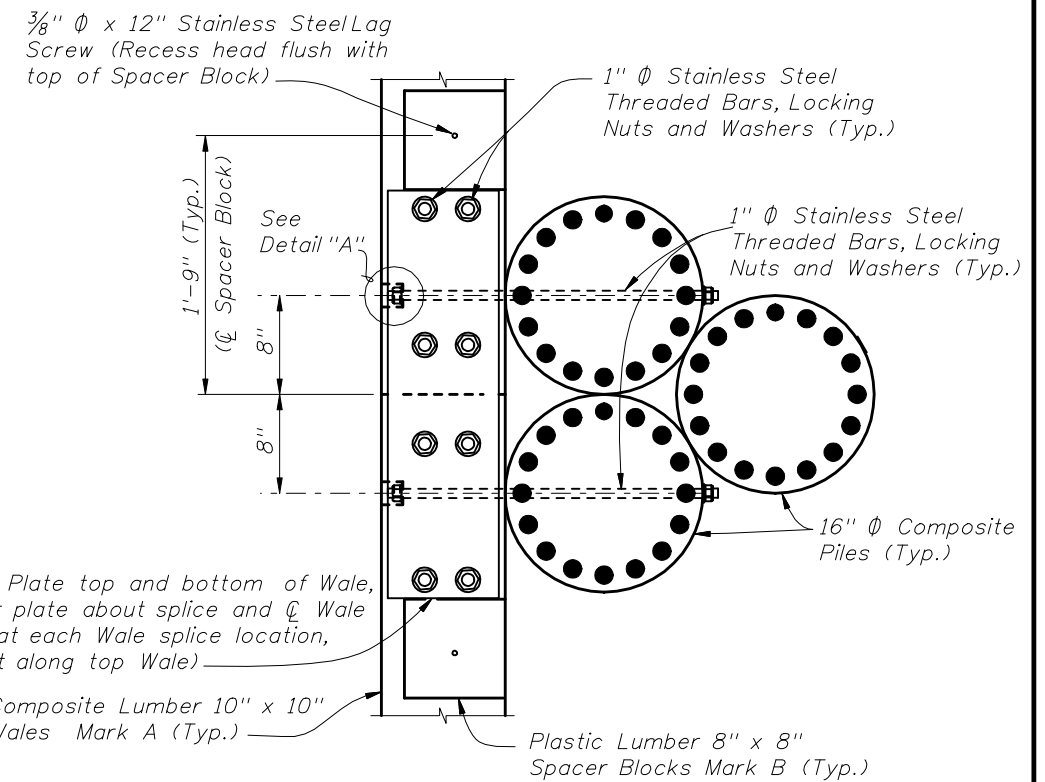


DETAIL "A"

CROSS REFERENCES:
 For Navigation Lights and SCH 80 PVC Electrical Conduit Details see Design Standard Index 21220.
 For Clearance Gauge Details and View G-G see Sheet 4.
 For location of View F-F see Sheet 1.
 For location of Section E-E see Sheet 2.

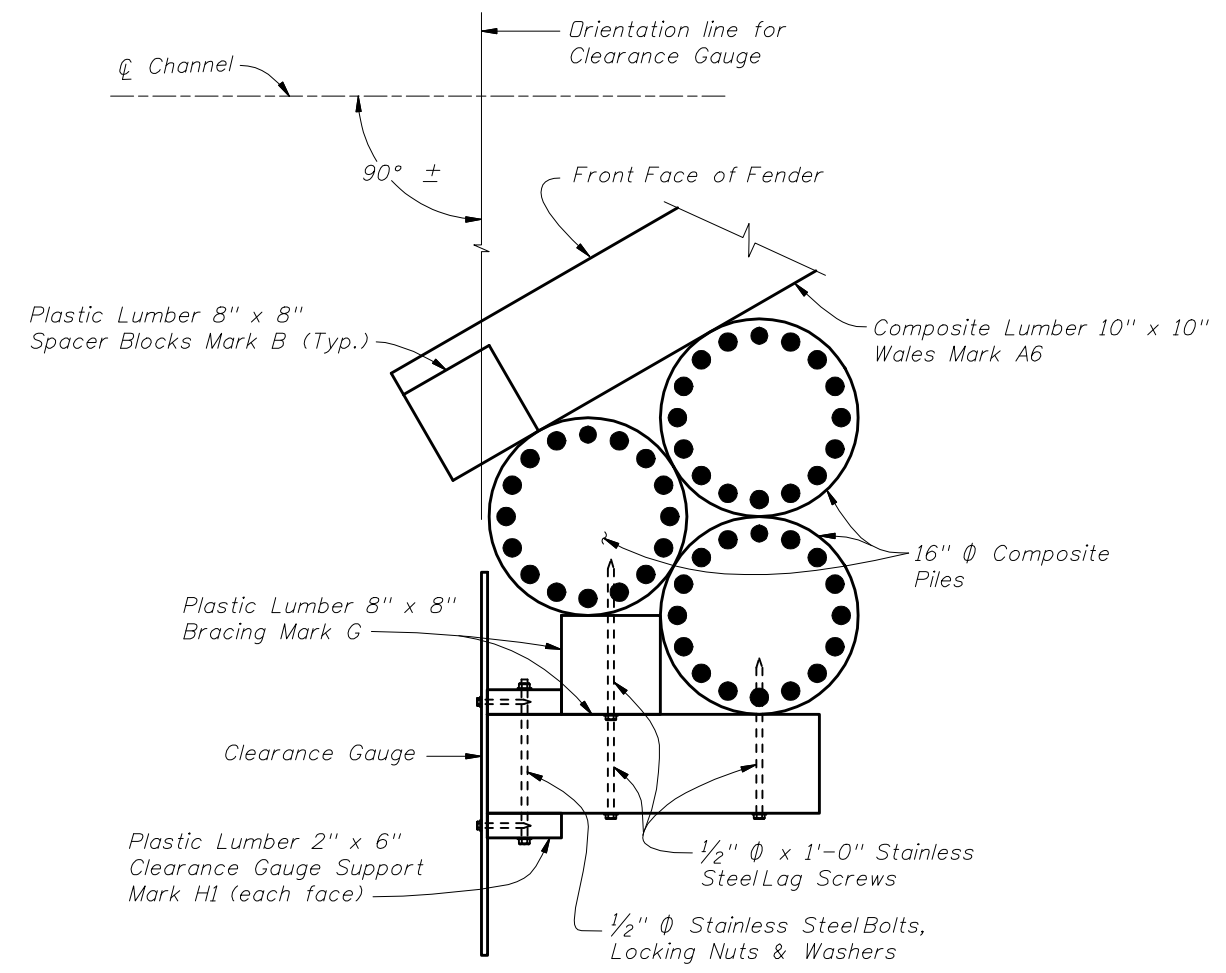
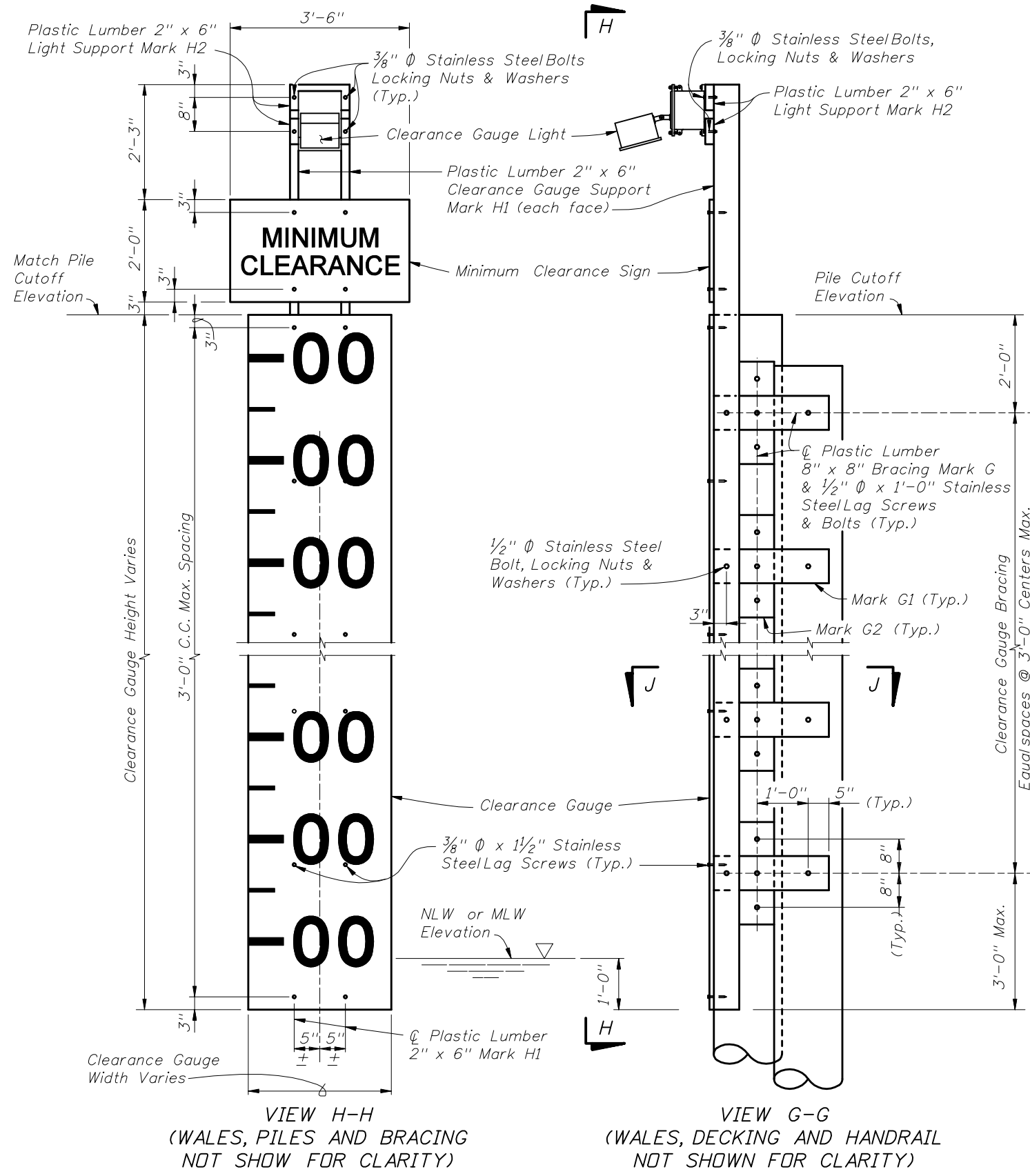


SECTION E-E
TYPICAL FLARED SECTION
(8° TURN SHOWN, 4° TURN SIMILAR)



SECTION E-E
TYPICAL STRAIGHT SECTION



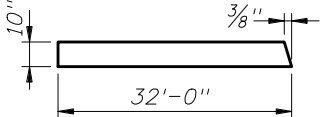
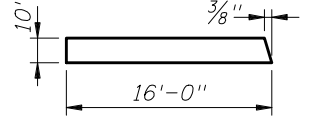
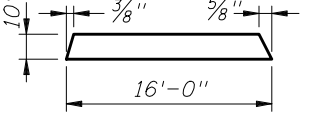
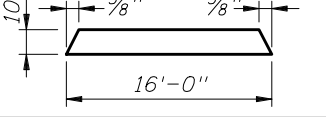
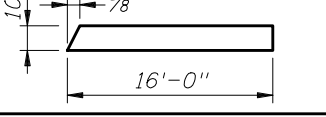


CROSS REFERENCES:

For Structural Composite and Plastic Lumber Bill of Materials Quantities and Fender System Table of Variables see Structures Plans.

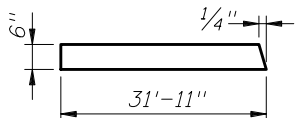
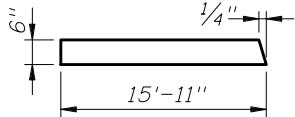
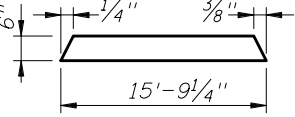
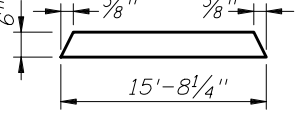
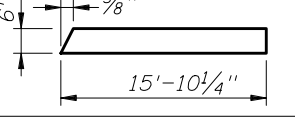
For location of View G-G see Sheet 3.

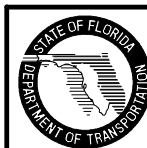


* STRUCTURAL COMPOSITE LUMBER BILL OF MATERIALS					
MARK	SIZE (NOMINAL)	DIMENSIONS	BOARD FT. PER EACH	NO. REQD.	QUANTITY
A1	10" X 10" COMPOSITE LUMBER	32'-0" (STRAIGHT)	266.6	See Estimated Structural Composite and Plastic Lumber Bill of Materials Table in Structures Plans	
A2	10" X 10" COMPOSITE LUMBER		266.6		
A3	10" X 10" COMPOSITE LUMBER		133.3		
A4	10" X 10" COMPOSITE LUMBER		133.3		
A5	10" X 10" COMPOSITE LUMBER		133.3		
A6	10" X 10" COMPOSITE LUMBER		133.3		

* All Plastic Lumber and Composite Lumber Dimensions and Quantities shown are based on Nominal Lumber Dimensions and may vary depending on Actual Lumber Dimension.

** Provide Fiberglass Open Grating in lieu of 2" X 12" Plastic Lumber when called for in the Plans. Mounting hardware shall be Stainless Steel, install per Manufacturer's recommendations. See Index No. 21900 and Structures Plans for Notes and Details.

* PLASTIC LUMBER BILL OF MATERIALS					
MARK	SIZE (NOMINAL)	DIMENSIONS	BOARD FT. PER EACH	NO. REQD.	QUANTITY
B	8" X 8" PLASTIC LUMBER	8" (STRAIGHT)	3.6	See Estimated Structural Composite and Plastic Lumber Bill of Materials Table in Structures Plans	
C	2" X 6" PLASTIC LUMBER	16'-0" (STRAIGHT) (Trim & Miter Ends as required)	16.0		
D	4" X 6" PLASTIC LUMBER	4'-4" (STRAIGHT)	8.7		
** E	2" X 12" PLASTIC LUMBER	2'-6" (STRAIGHT) (Miter as required)	5.0		
F1	6" X 10" PLASTIC LUMBER	32'-0" (STRAIGHT)	160.0		
F2	6" X 10" PLASTIC LUMBER		159.6		
F3	6" X 10" PLASTIC LUMBER		79.6		
F4	6" X 10" PLASTIC LUMBER		78.8		
F5	6" X 10" PLASTIC LUMBER		78.4		
F6	6" X 10" PLASTIC LUMBER		79.2		
G1	8" X 8" PLASTIC LUMBER	2'-3" (STRAIGHT)	12.0		
G2	8" X 8" PLASTIC LUMBER	2'-0" (STRAIGHT)	10.7		
H1	2" X 6" PLASTIC LUMBER	PILE CUTOFF ELEV. MINUS NLW OR MLW ELEV. PLUS 5'-6" (STRAIGHT)	1.0 PER LF EACH		
H2	2" X 6" PLASTIC LUMBER	1'-0" (STRAIGHT)	1.0		



CROSS REFERENCES:

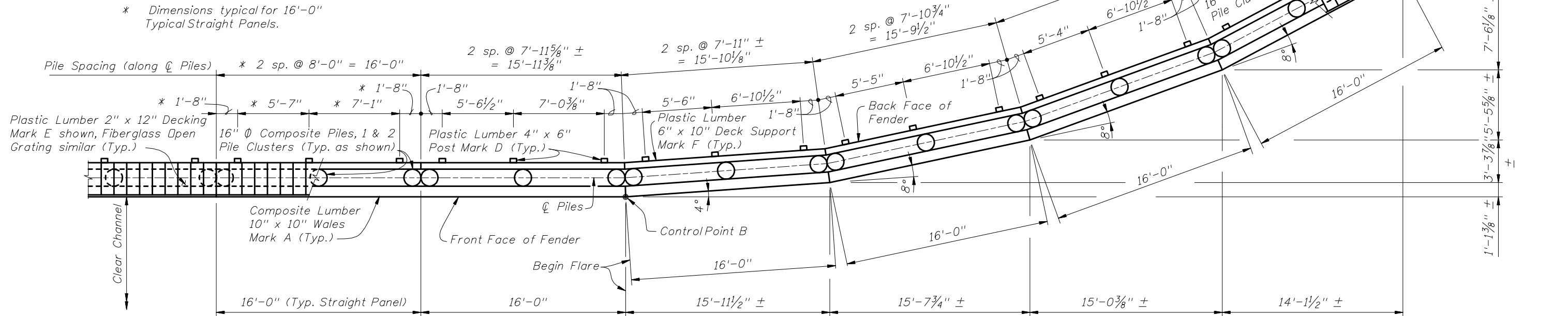
For Sections A-A and B-B see Sheet 2.

For View F-F see Sheet 3.

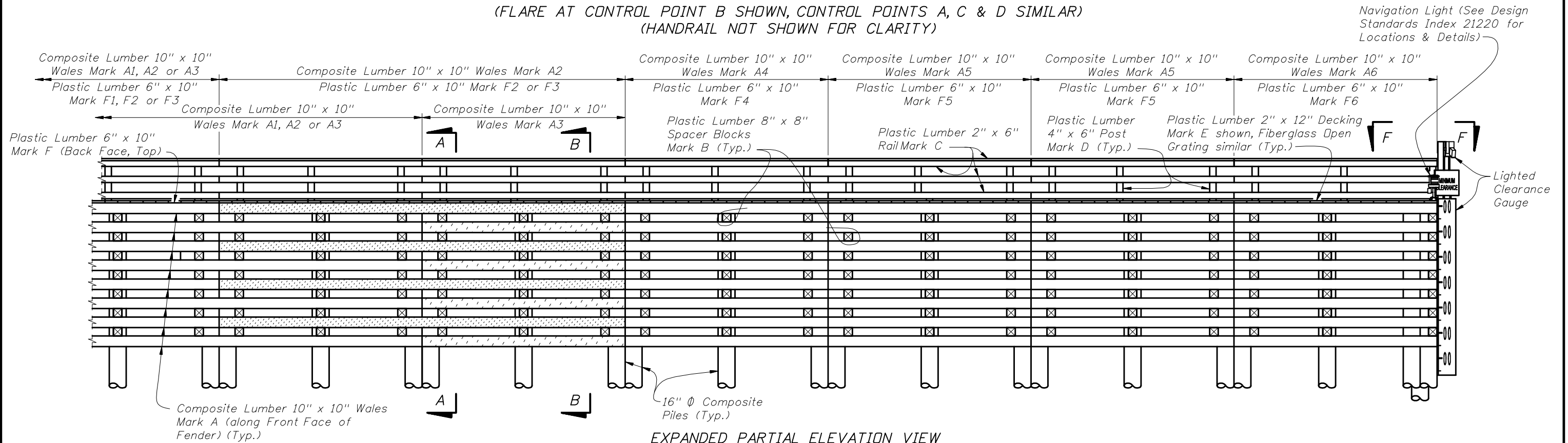
NOTE:

Plastic Lumber and Composite Lumber Dimensions shown are based on Nominal Lumber Dimensions and may vary depending on Actual Lumber Dimension.

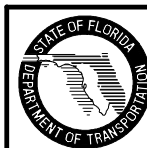
* Dimensions typical for 16'-0" Typical Straight Panels.



PARTIAL PLAN VIEW (TYPICAL FLARE)
(FLARE AT CONTROL POINT B SHOWN, CONTROL POINTS A, C & D SIMILAR)
(HANDRAIL NOT SHOWN FOR CLARITY)



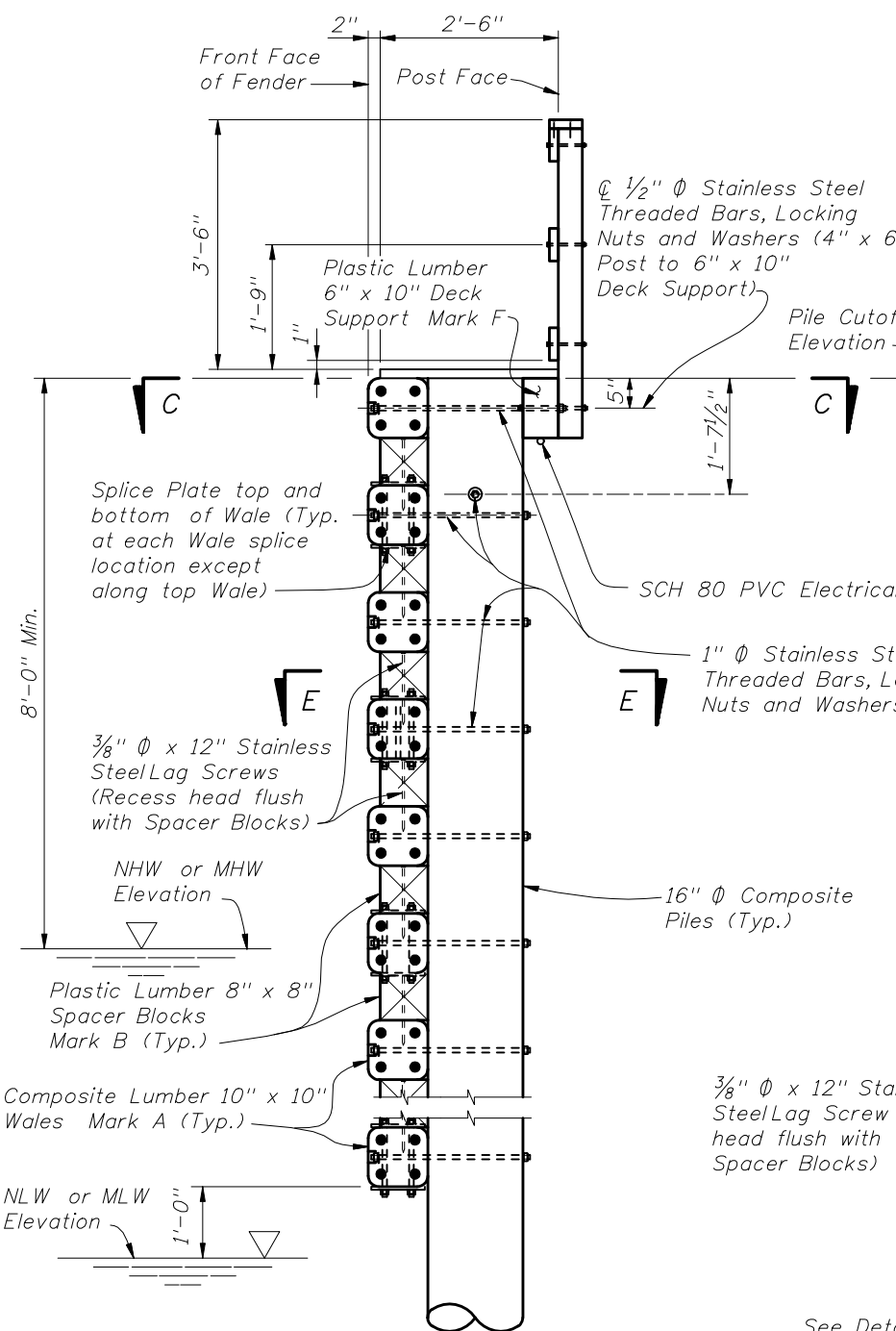
EXPANDED PARTIAL ELEVATION VIEW



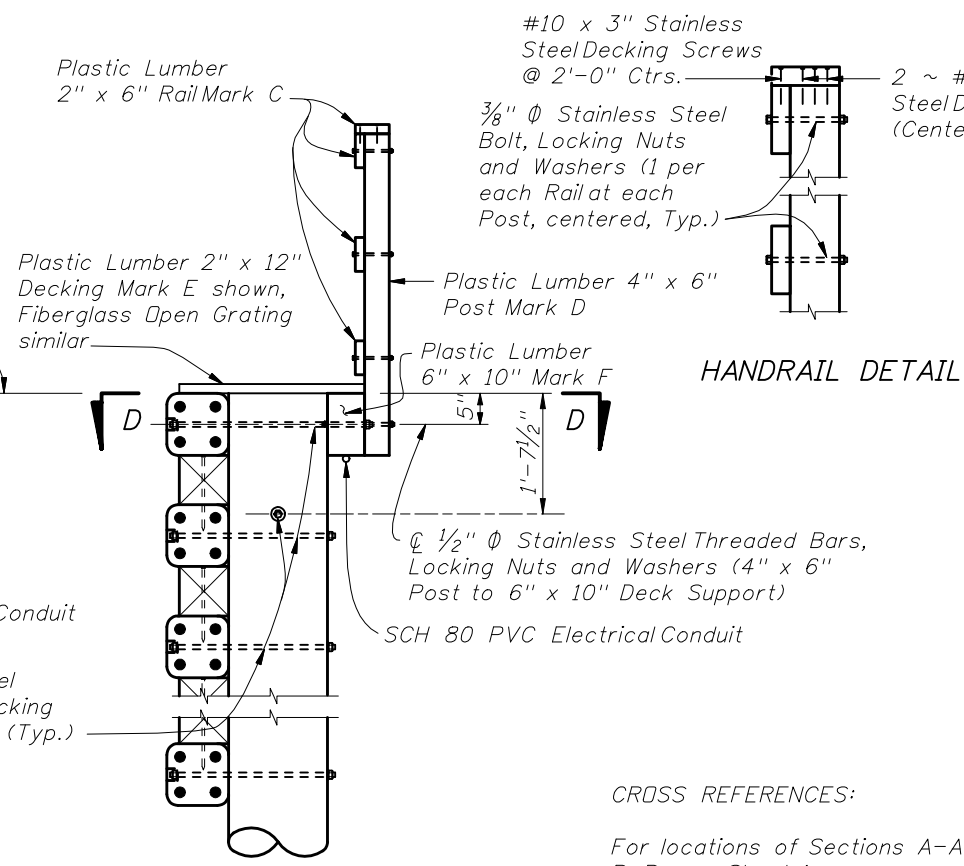
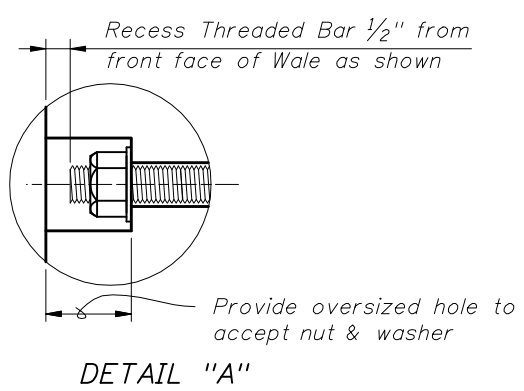
2010 FDOT Design Standards

FENDER SYSTEM - MEDIUM DUTY

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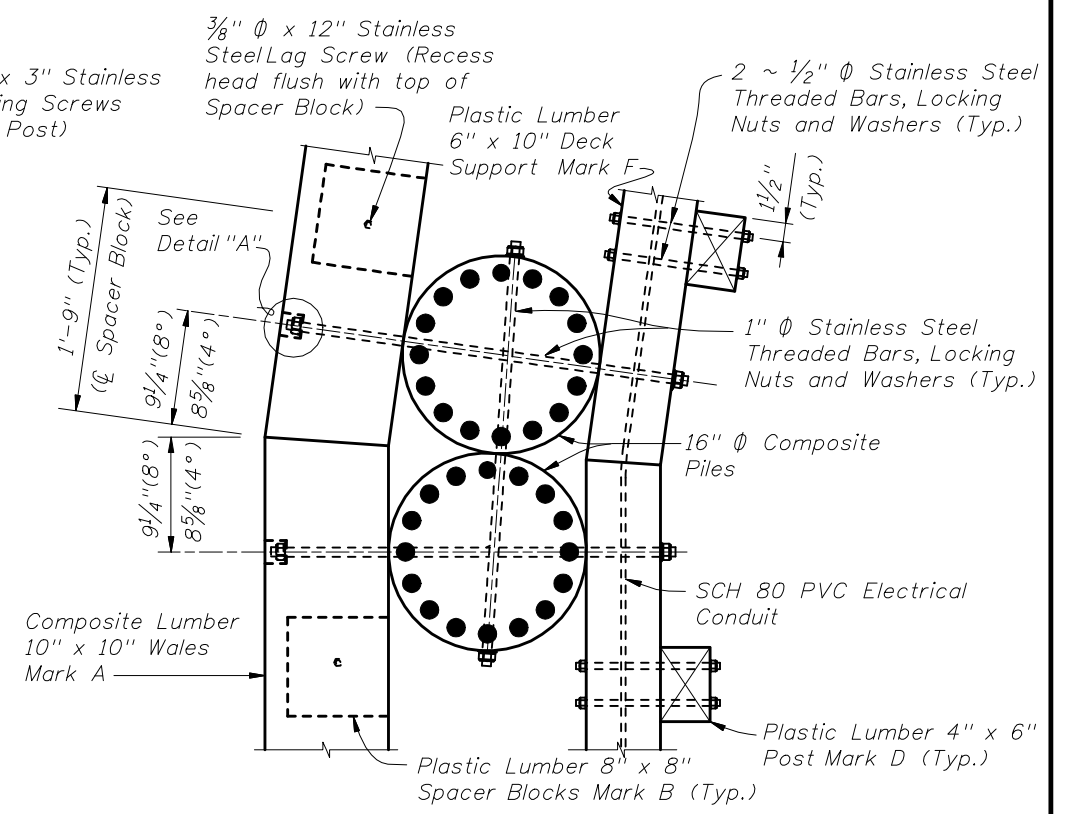


SECTION A-A

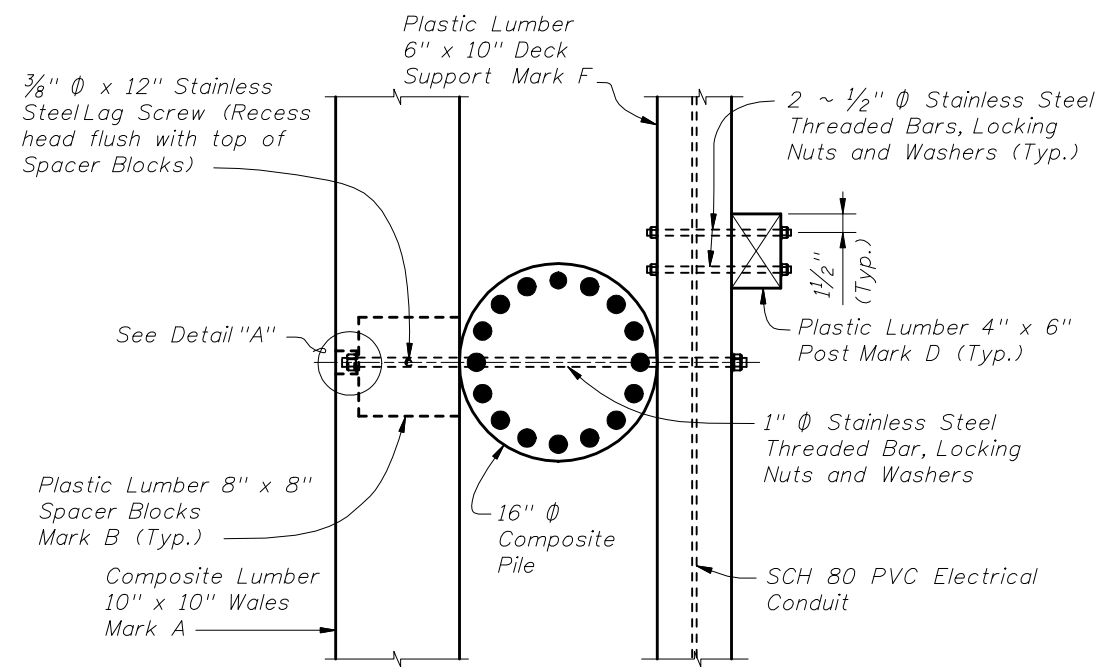


SECTION B-B

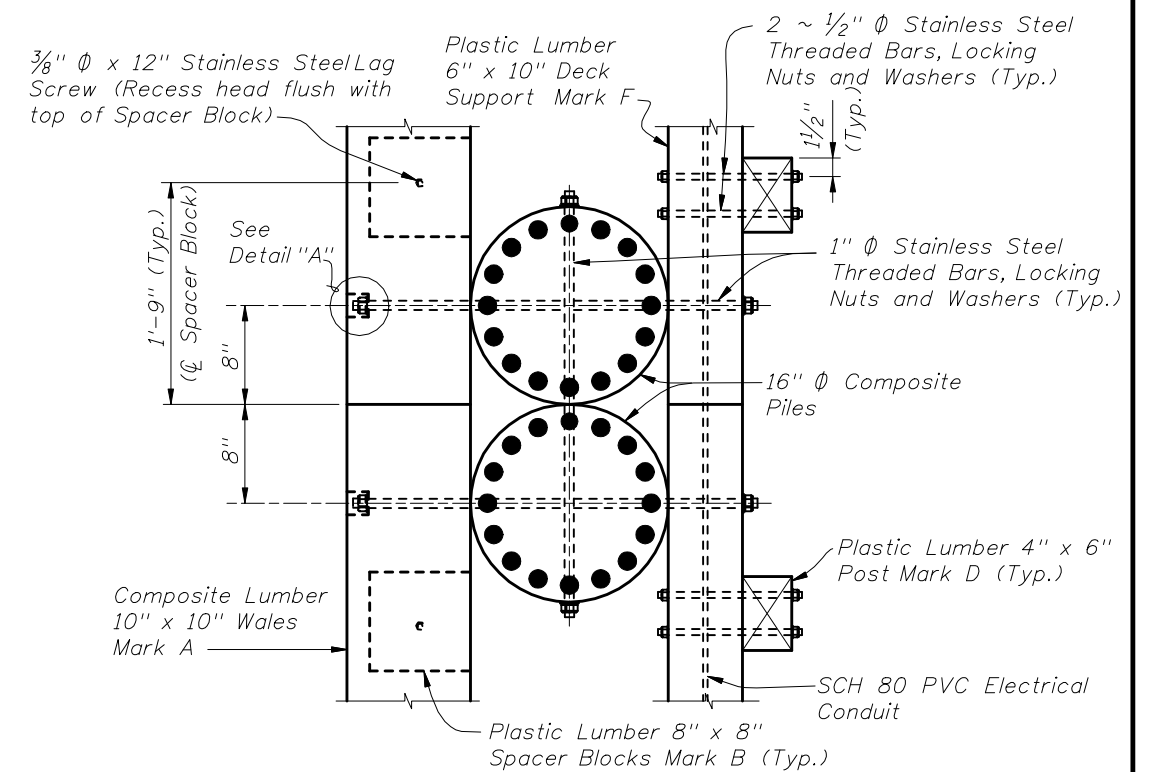
CROSS REFERENCES:
 For locations of Sections A-A and B-B see Sheet 1.
 For Section E-E see Sheet 3.



SECTION C-C
 TYPICAL FLARED SECTION
 (8° TURN SHOWN, 4° TURN SIMILAR)



SECTION D-D
 TYPICAL AT INTERMEDIATE PILES



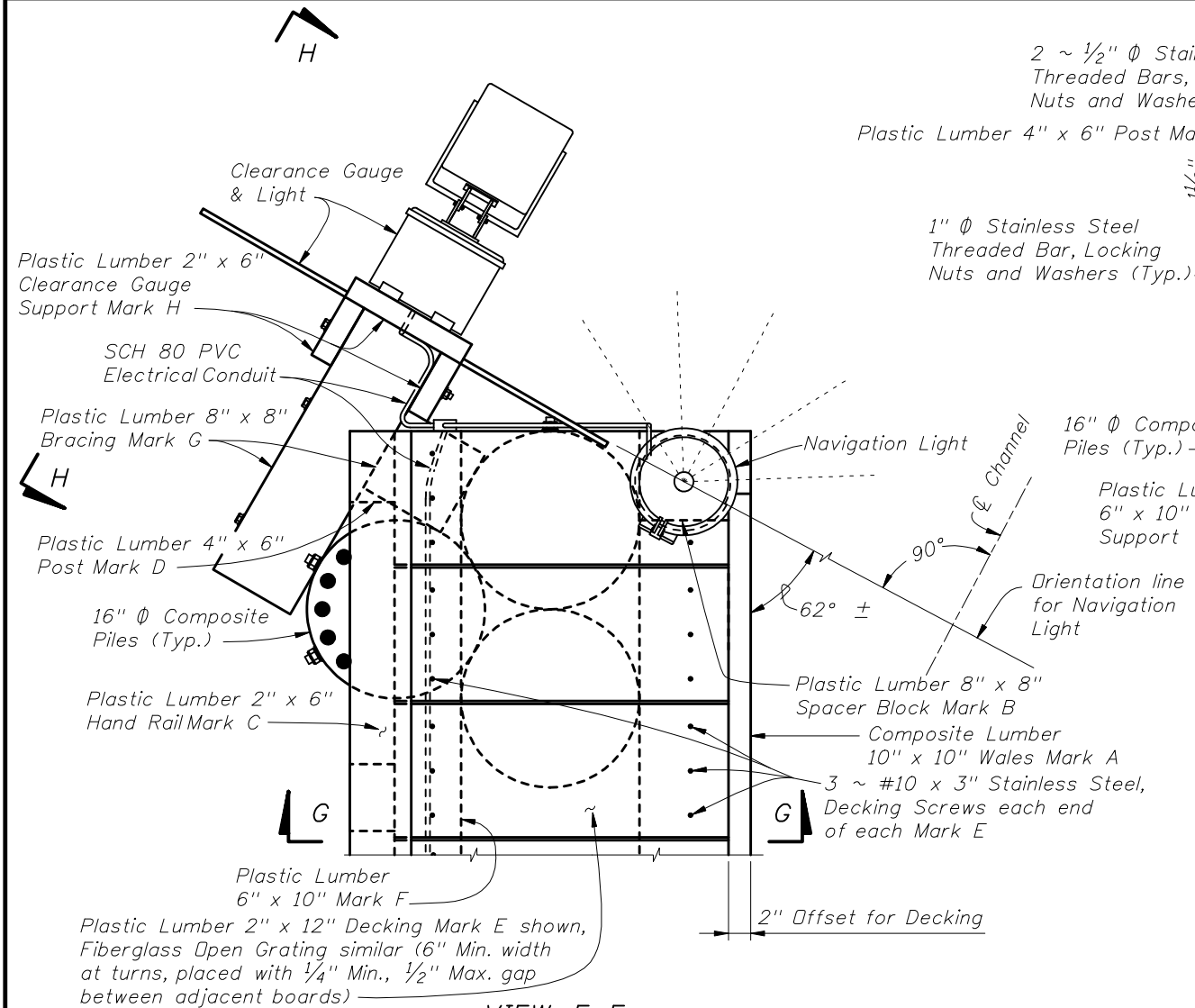
SECTION C-C
 TYPICAL STRAIGHT SECTION



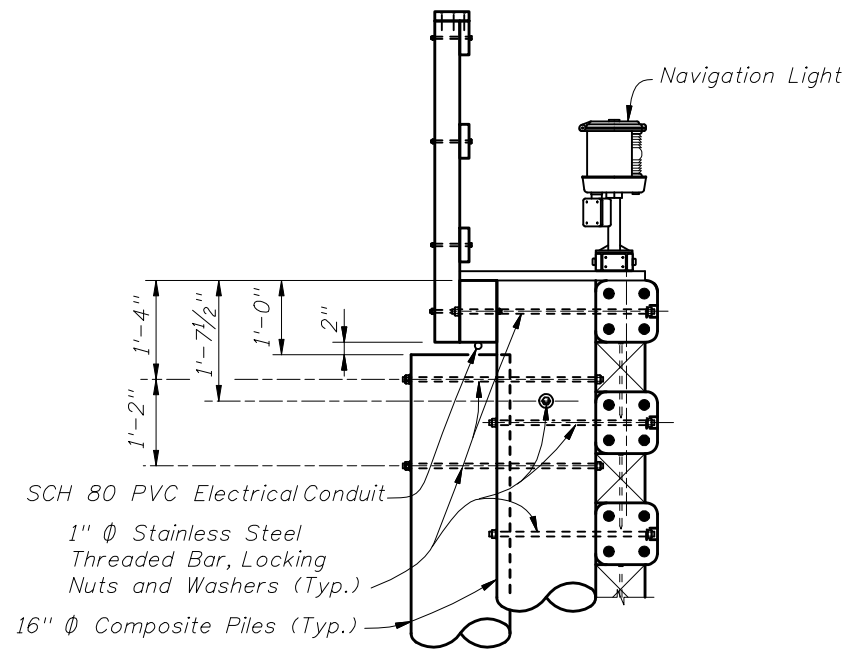
2010 FDOT Design Standards

FENDER SYSTEM - MEDIUM DUTY

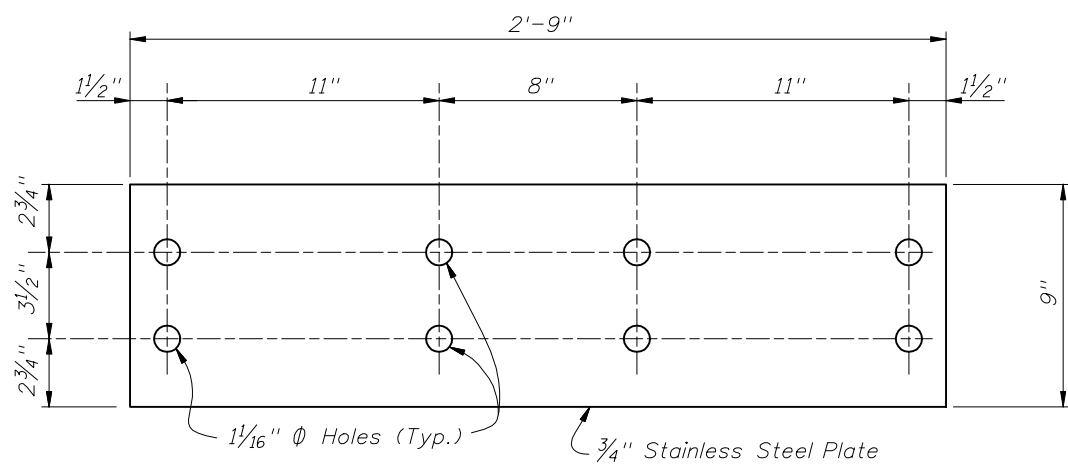
Last Revision	Sheet No.
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21920	



VIEW F-F
(SHOWING FENDER END WITH CLEARANCE GAUGE)



SECTION G-G
(CLEARANCE GAUGE NOT SHOWN FOR CLARITY)

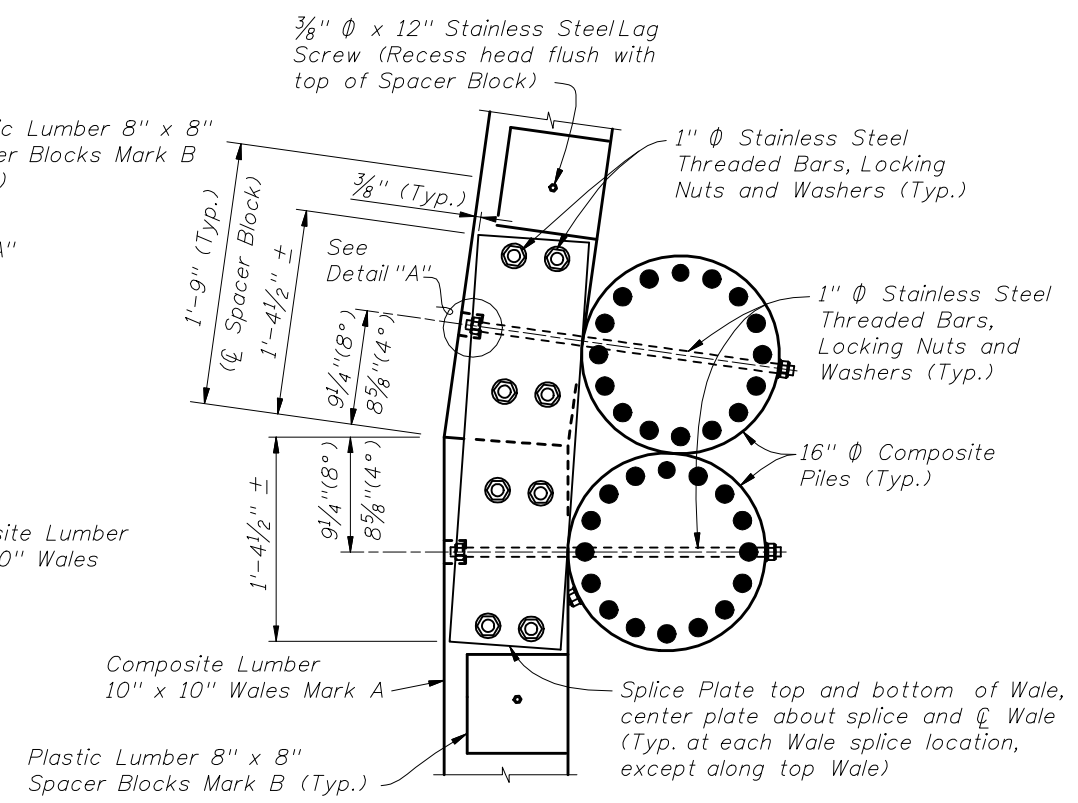


SPLICE PLATE DETAIL

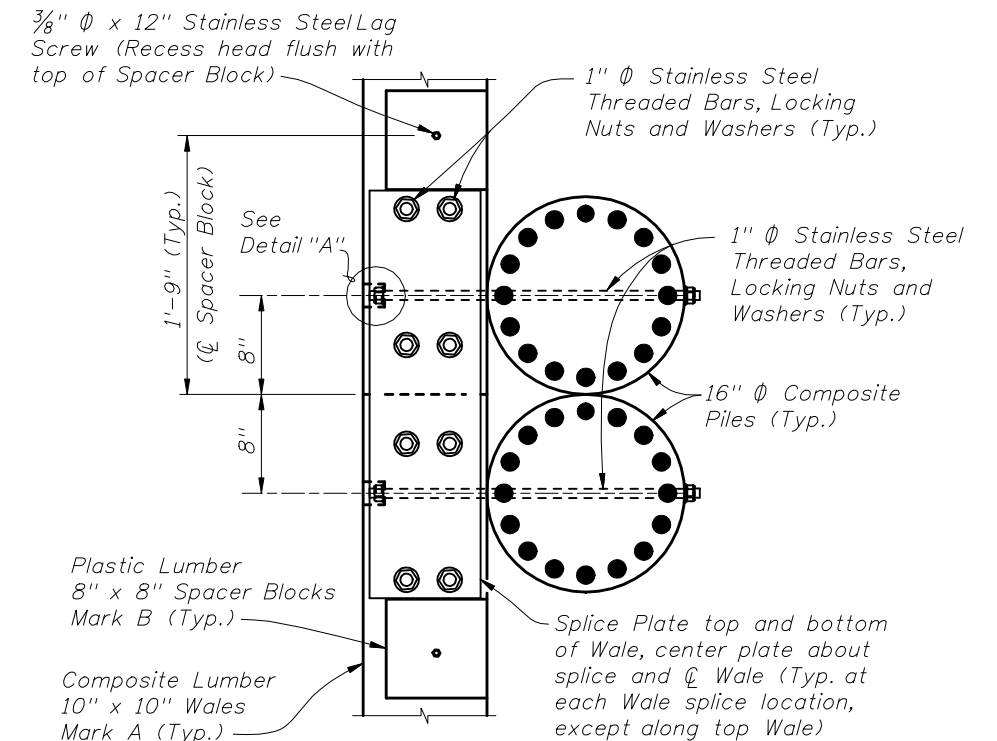
CROSS REFERENCES:

- For Navigation Lights and SCH 80 PVC Electrical Conduit Details see Design Standard Index 21220.
- For Clearance Gauge Details and View H-H see Sheet 4.
- For Detail "A" and location of Section E-E see Sheet 2.
- For location of View F-F see Sheet 1.

VIEW F-F
(SHOWING FENDER END; DECKING, HANDRAIL AND CLEARANCE GAUGE NOT SHOWN FOR CLARITY)

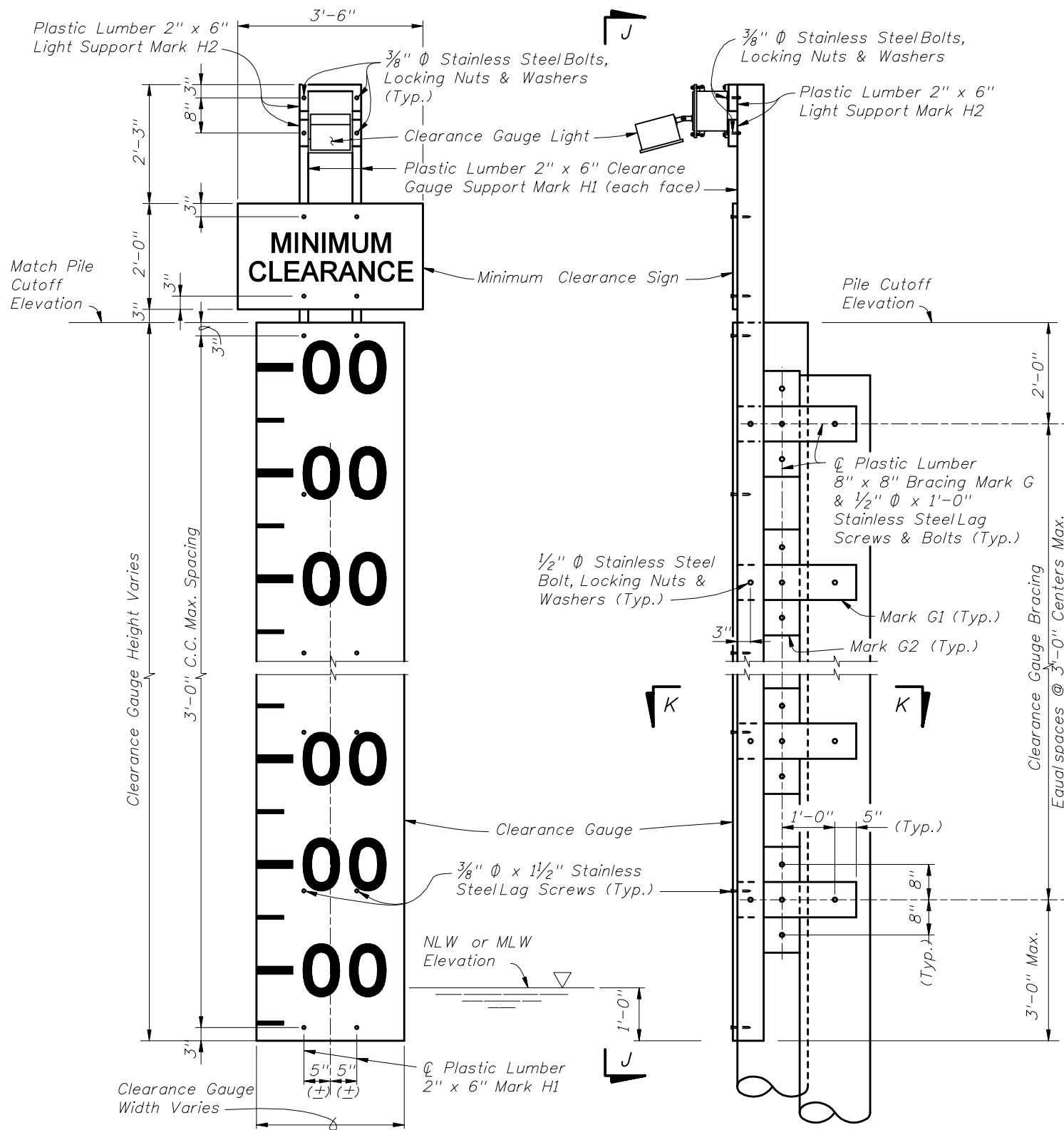


SECTION E-E
TYPICAL FLARED SECTION
(8° TURN SHOWN, 4° TURN SIMILAR)



SECTION E-E
TYPICAL STRAIGHT SECTION

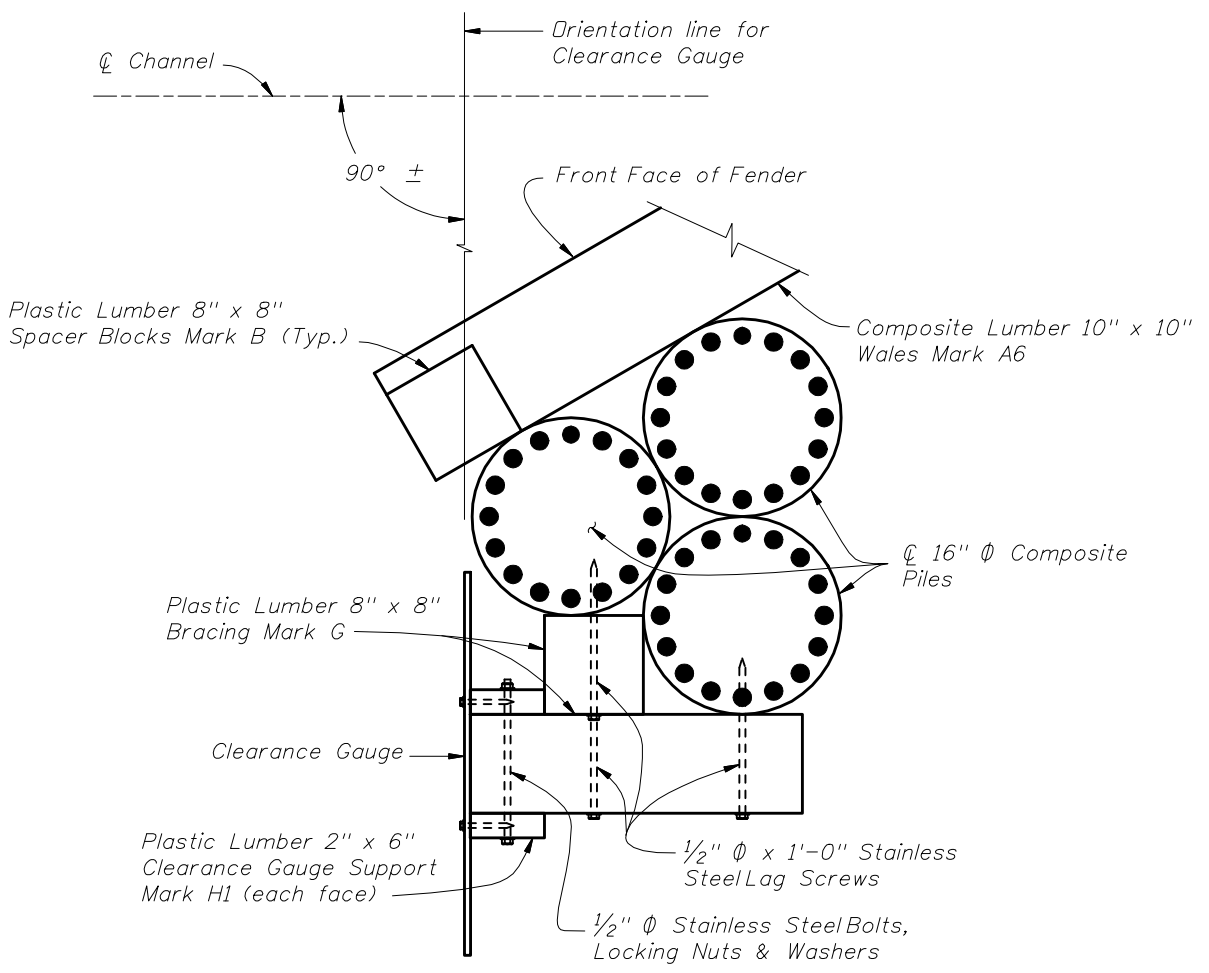




VIEW J-J
(WALES, PILES AND BRACING
NOT SHOWN FOR CLARITY)

VIEW H-H
(WALES, DECKING AND HANDRAIL
NOT SHOWN FOR CLARITY)

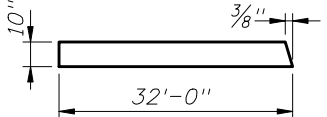
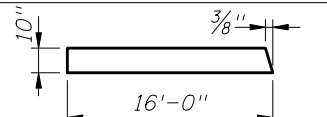
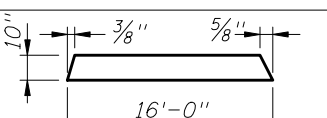
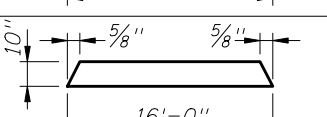
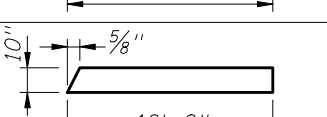
CLEARANCE GAUGE DETAILS



SECTION K-K

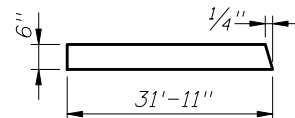
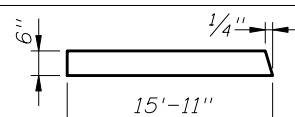
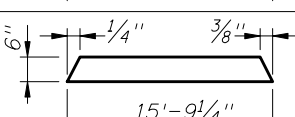
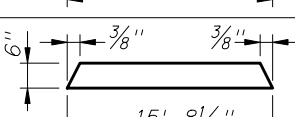
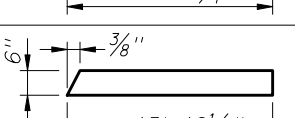
CROSS REFERENCES:
For Structural Composite and Plastic Lumber Bill of Materials Quantities and Fender System Table of Variables see Structures Plans.



* STRUCTURAL COMPOSITE LUMBER BILL OF MATERIALS					
MARK	SIZE (NOMINAL)	DIMENSIONS	BOARD FT. PER EACH	NO. REQD.	QUANTITY
A1	10" X 10" COMPOSITE LUMBER	32'-0" (STRAIGHT)	266.6	See Estimated Structural Composite and Plastic Lumber Bill of Materials Table in Structures Plans	
A2	10" X 10" COMPOSITE LUMBER		266.6		
A3	10" X 10" COMPOSITE LUMBER		133.3		
A4	10" X 10" COMPOSITE LUMBER		133.3		
A5	10" X 10" COMPOSITE LUMBER		133.3		
A6	10" X 10" COMPOSITE LUMBER		133.3		

* All Plastic Lumber and Composite Lumber Dimensions and Quantities shown are based on Nominal Lumber Dimensions and may vary depending on Actual Lumber Dimension.

** Provide Fiberglass Open Grating in lieu of 2" X 12" Plastic Lumber when called for in the Plans. Mounting hardware shall be Stainless Steel, install per Manufacturer's recommendations. See Index No. 21900 and Structures Plans for Notes and Details.

* PLASTIC LUMBER BILL OF MATERIALS					
MARK	SIZE (NOMINAL)	DIMENSIONS	BOARD FT. PER EACH	NO. REQD.	QUANTITY
B	8" X 8" PLASTIC LUMBER	8" (STRAIGHT)	3.6	See Estimated Structural Composite and Plastic Lumber Bill of Materials Table in Structures Plans	
C	2" X 6" PLASTIC LUMBER	16'-0" (STRAIGHT) (Trim & Miter Ends as required)	16.0		
D	4" X 6" PLASTIC LUMBER	4'-4" (STRAIGHT)	8.7		
** E	2" X 12" PLASTIC LUMBER	2'-6" (STRAIGHT) (Miter as required)	5.0		
F1	6" X 10" PLASTIC LUMBER	32'-0" (STRAIGHT)	160.0		
F2	6" X 10" PLASTIC LUMBER		159.6		
F3	6" X 10" PLASTIC LUMBER		79.6		
F4	6" X 10" PLASTIC LUMBER		78.8		
F5	6" X 10" PLASTIC LUMBER		78.4		
F6	6" X 10" PLASTIC LUMBER		79.2		
G1	8" X 8" PLASTIC LUMBER	2'-3" (STRAIGHT)	12.0		
G2	8" X 8" PLASTIC LUMBER	2'-0" (STRAIGHT)	10.7		
H1	2" X 6" PLASTIC LUMBER	PILE CUTOFF ELEV. MINUS NLW OR MLW ELEV. PLUS 5'-6" (STRAIGHT)	1.0 PER LF EACH		
H2	2" X 6" PLASTIC LUMBER	1'-0" (STRAIGHT)	1.0		



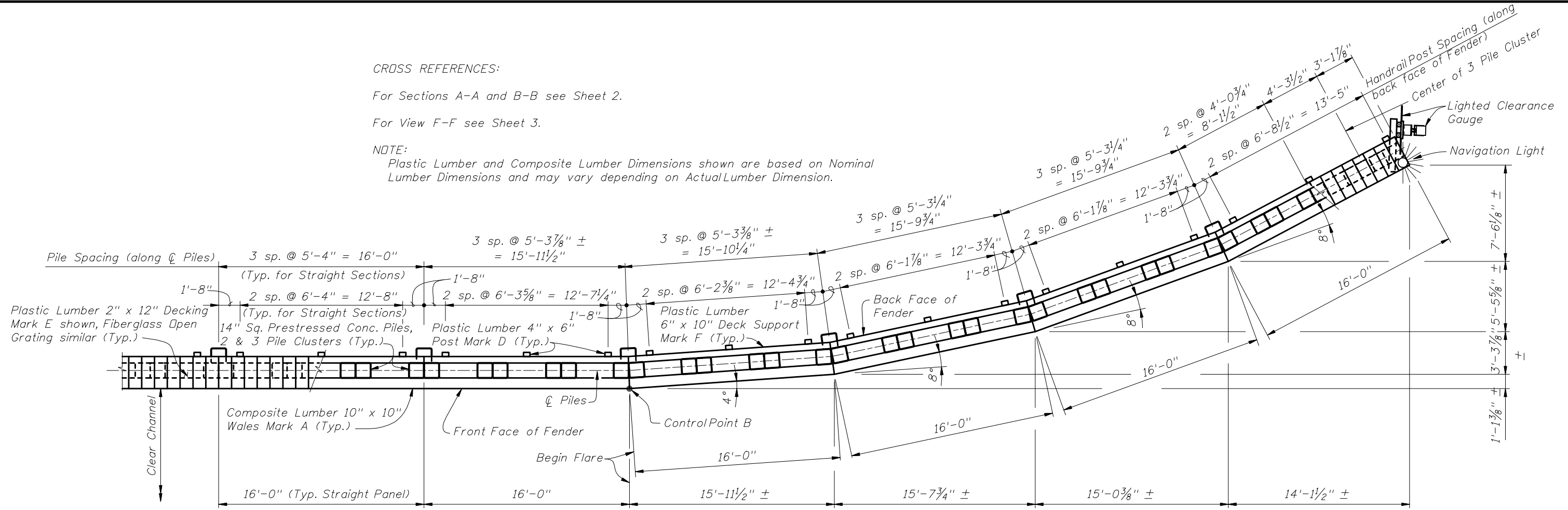
CROSS REFERENCES:

For Sections A-A and B-B see Sheet 2.

For View F-F see Sheet 3.

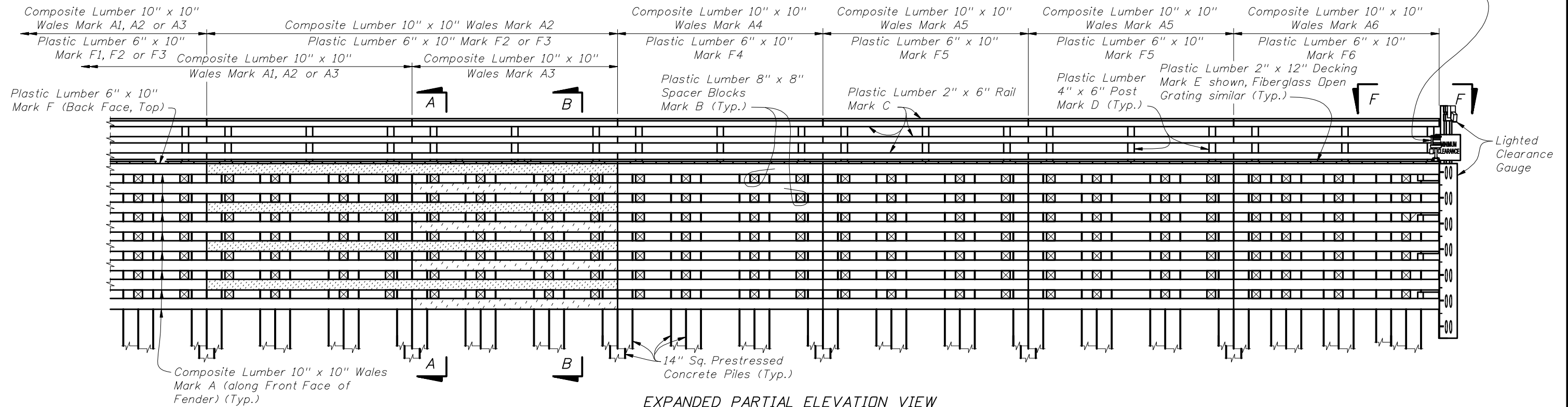
NOTE:

Plastic Lumber and Composite Lumber Dimensions shown are based on Nominal Lumber Dimensions and may vary depending on Actual Lumber Dimension.

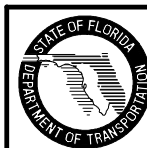


PARTIAL PLAN VIEW (TYPICAL FLARE)
(FLARE AT CONTROL POINT B SHOWN, CONTROL POINTS A, C & D SIMILAR)
(HANDRAIL NOT SHOWN FOR CLARITY)

Navigation Light (See Design Standards Index 21220 for locations & Details)



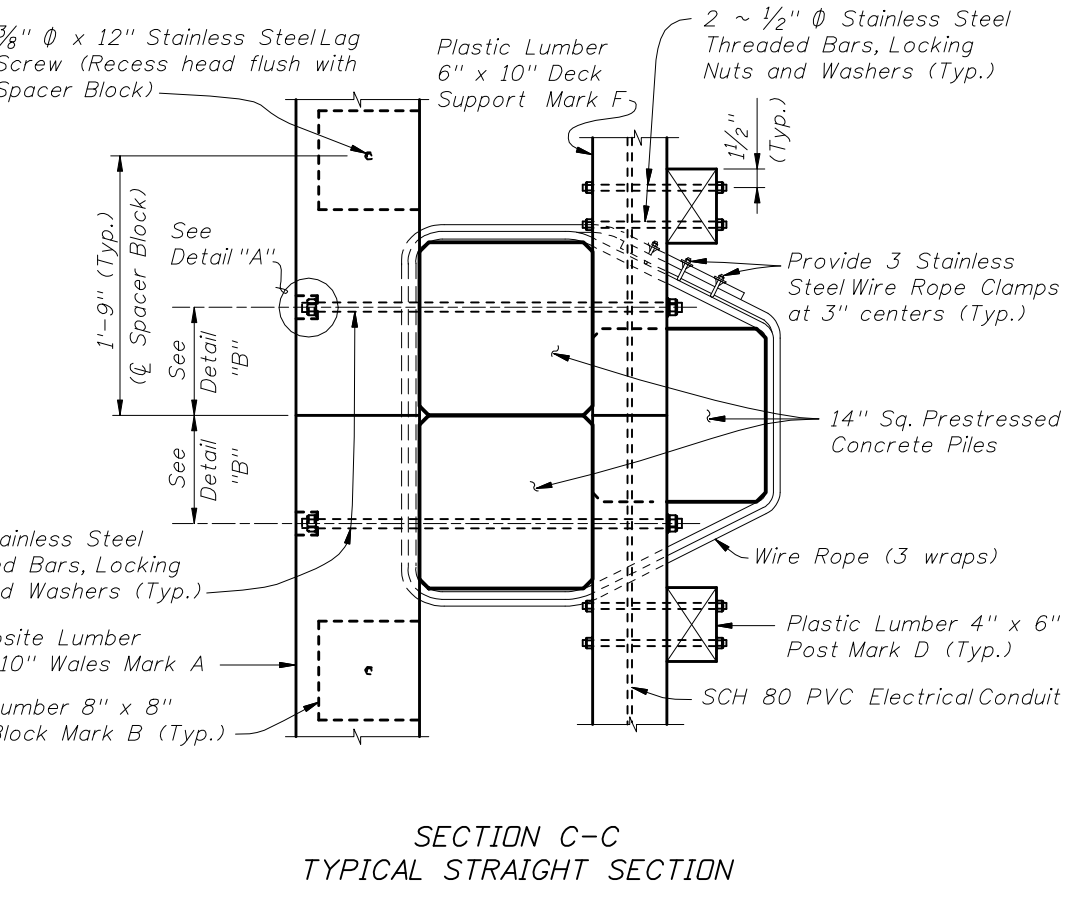
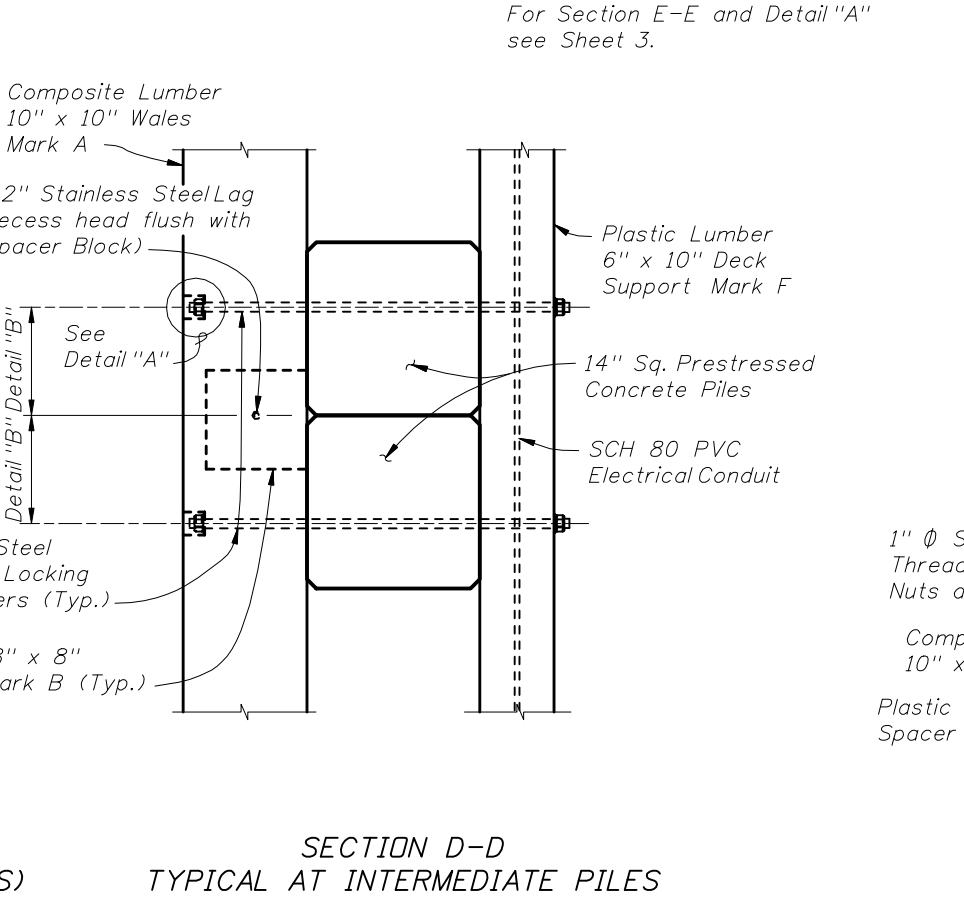
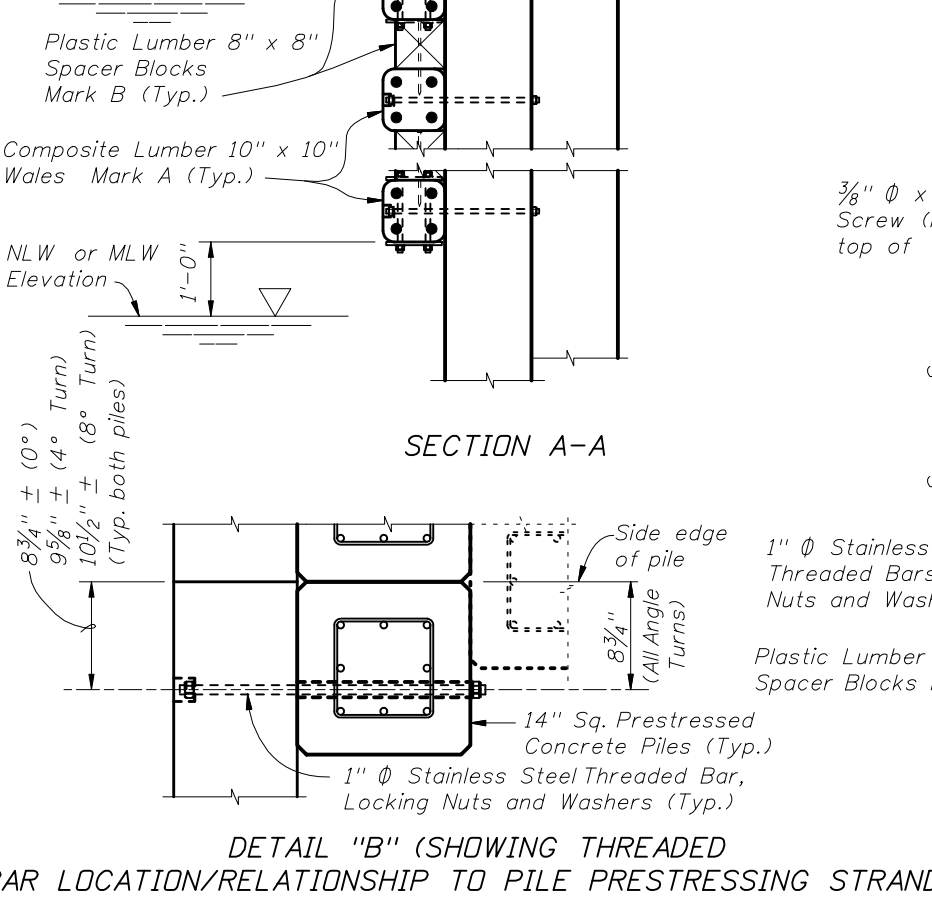
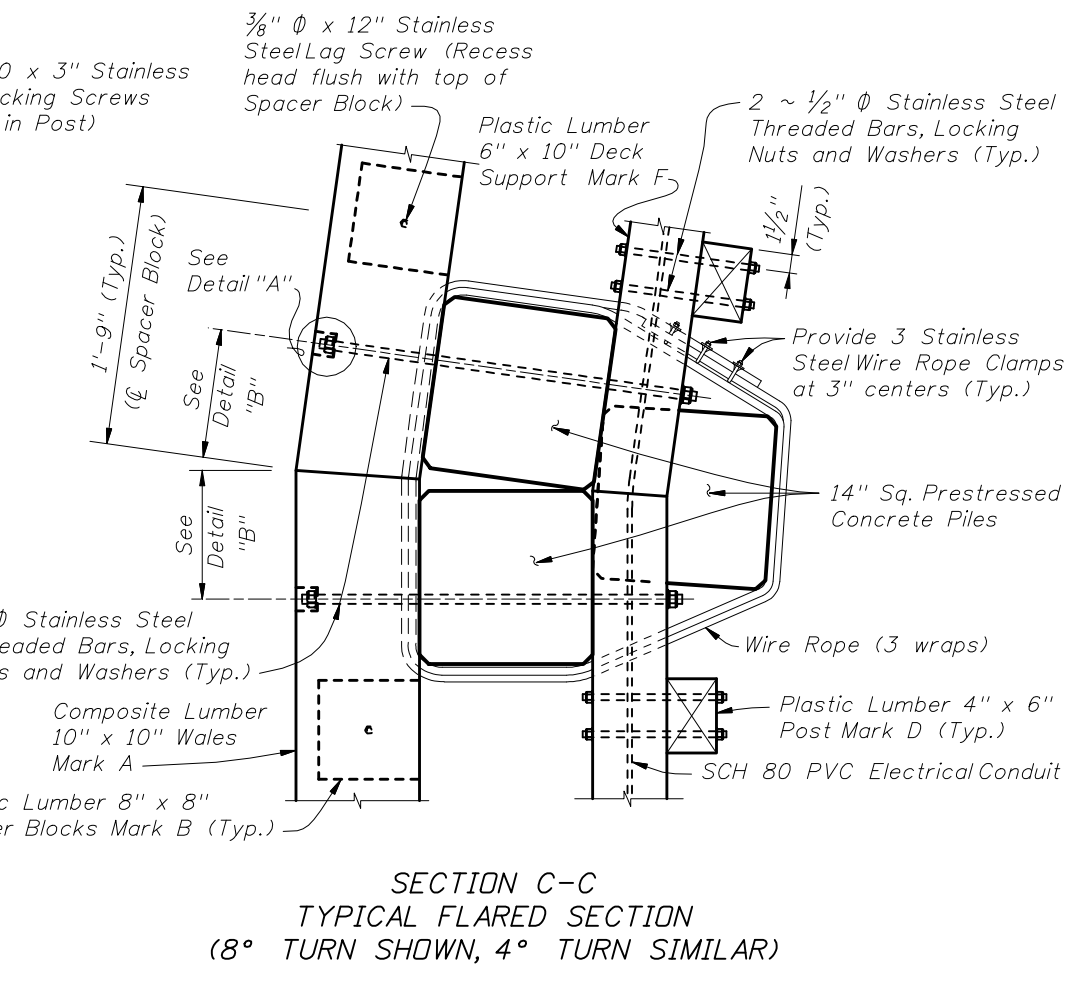
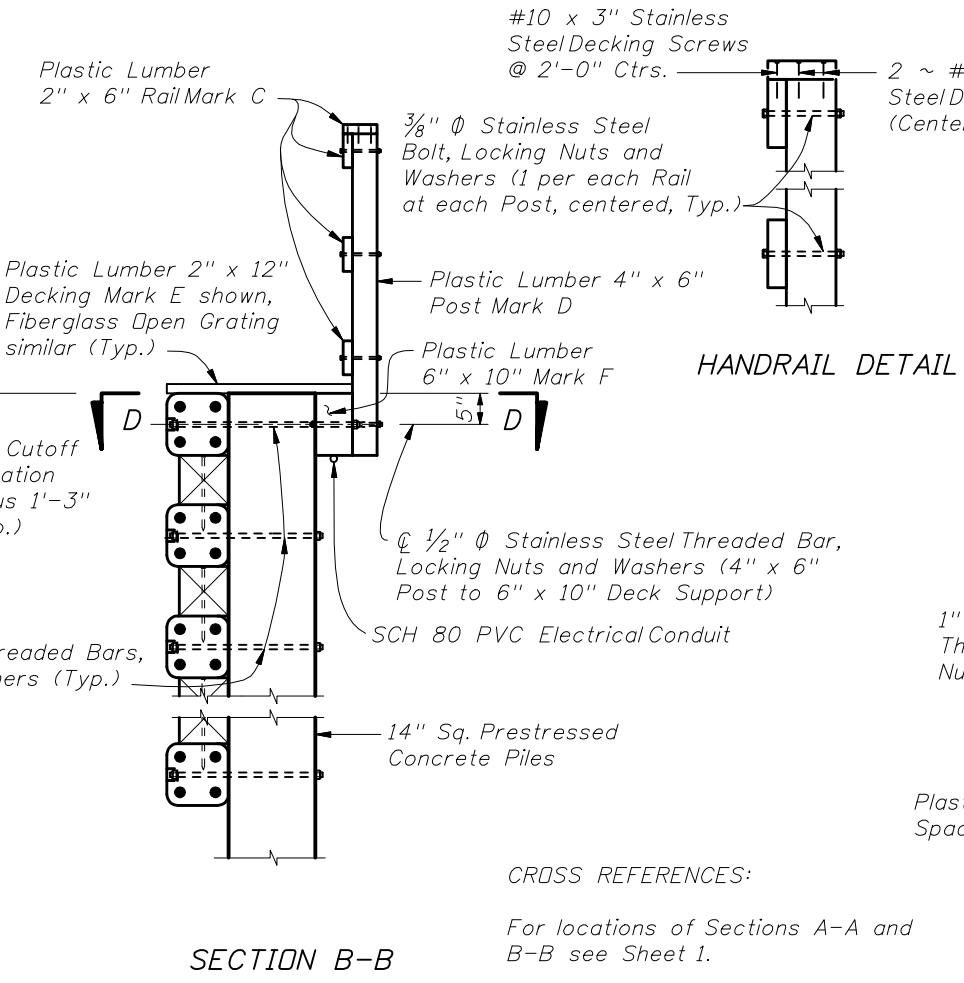
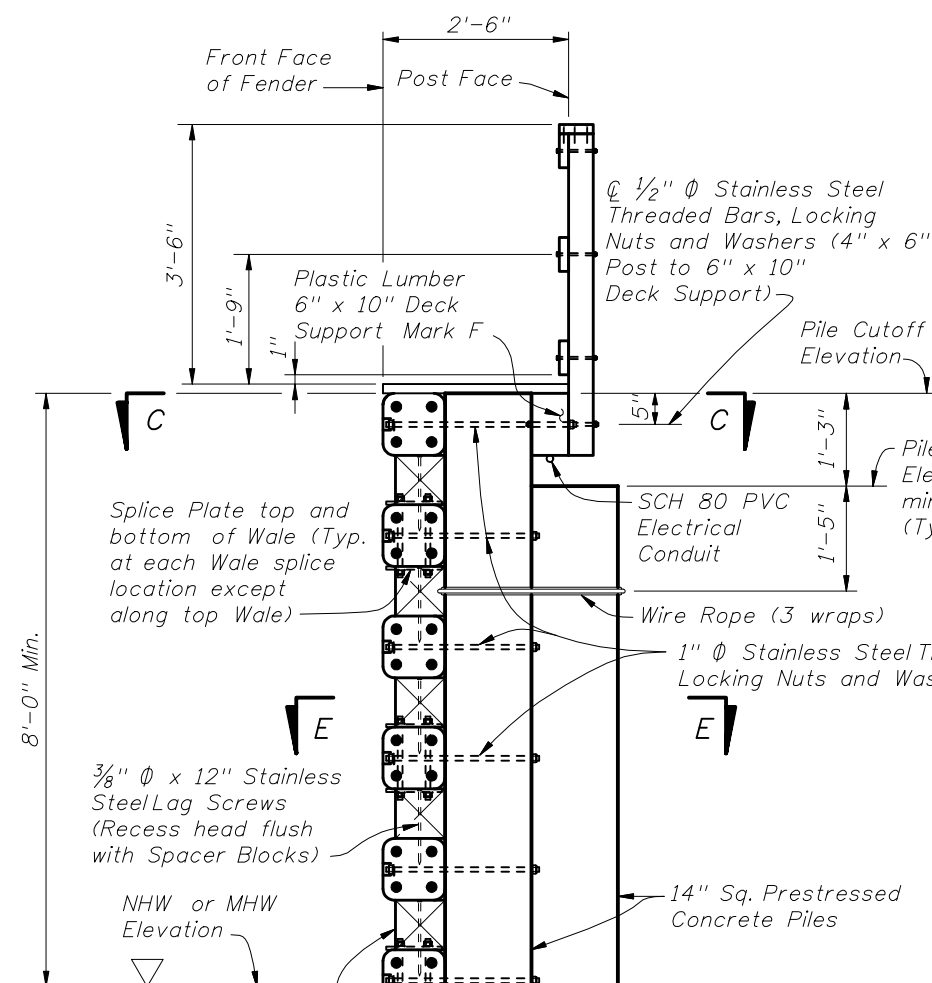
EXPANDED PARTIAL ELEVATION VIEW



2010 FDOT Design Standards

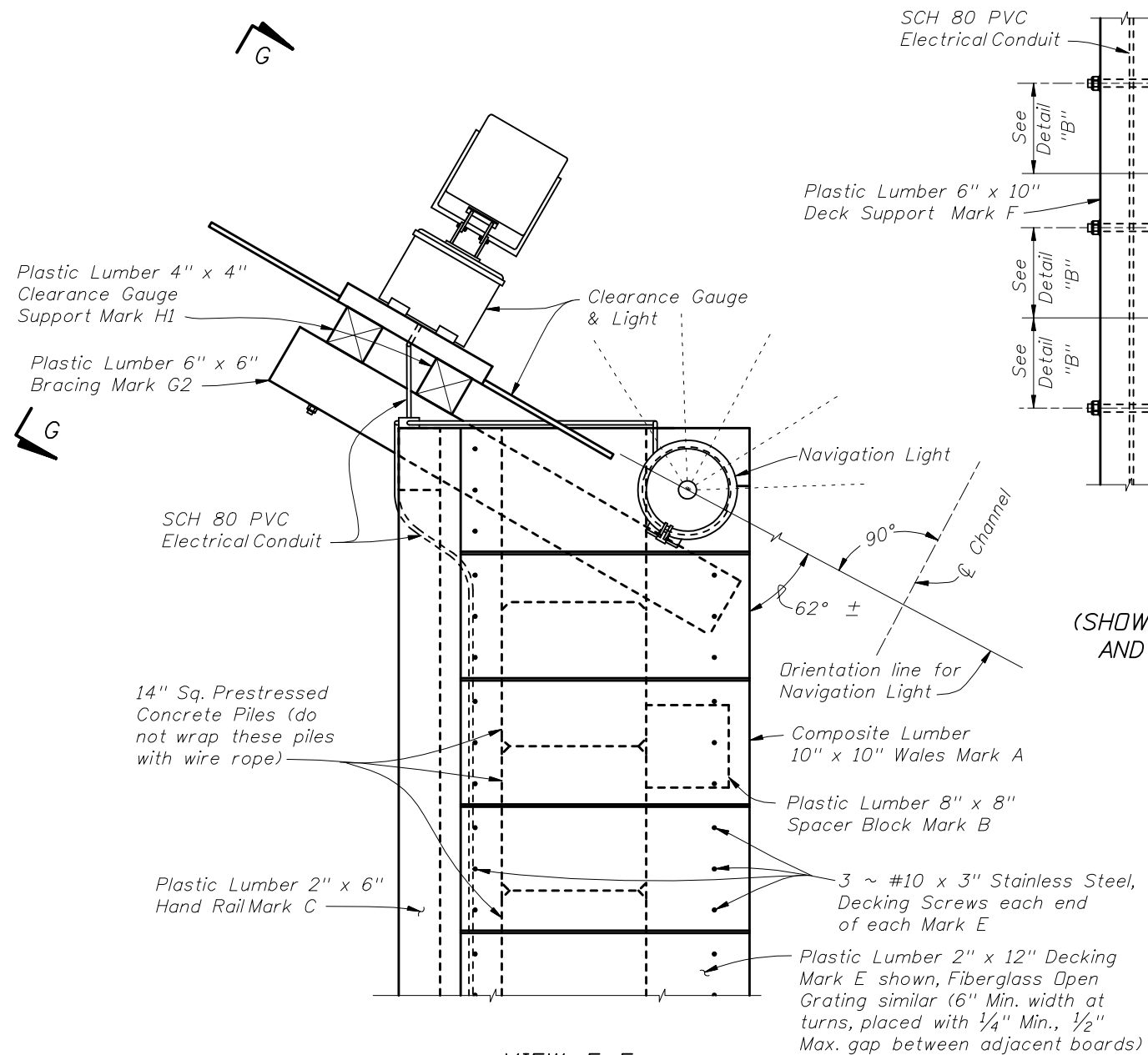
FENDER SYSTEM - LIGHT DUTY

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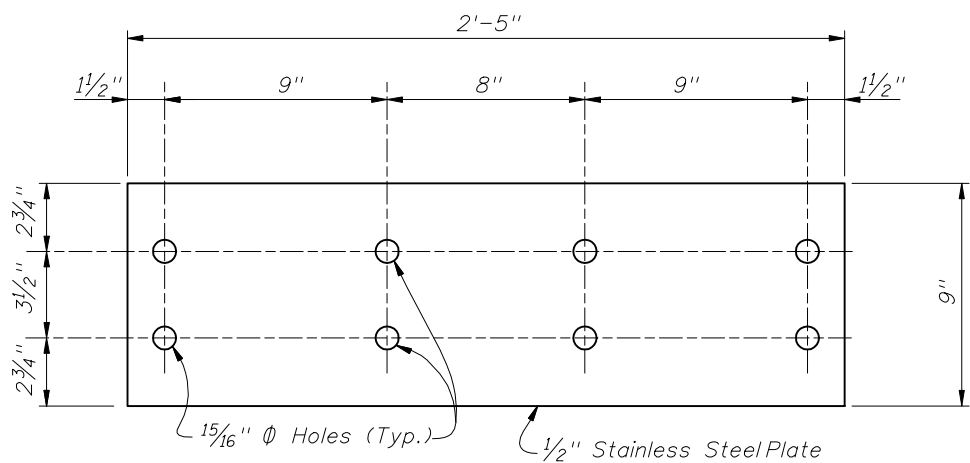


CROSS REFERENCES:
For locations of Sections A-A and B-B see Sheet 1.
For Section E-E and Detail "A" see Sheet 3.





VIEW F-F
(SHOWING FENDER END WITH CLEARANCE GAUGE)



SPLICE PLATE DETAIL

CROSS REFERENCES:

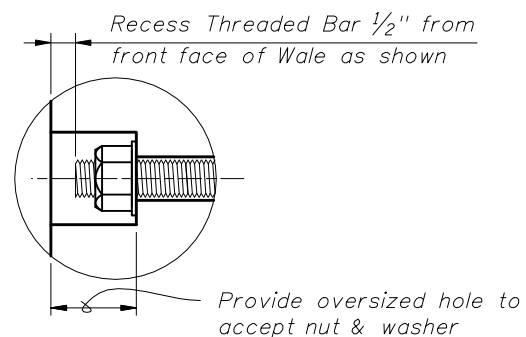
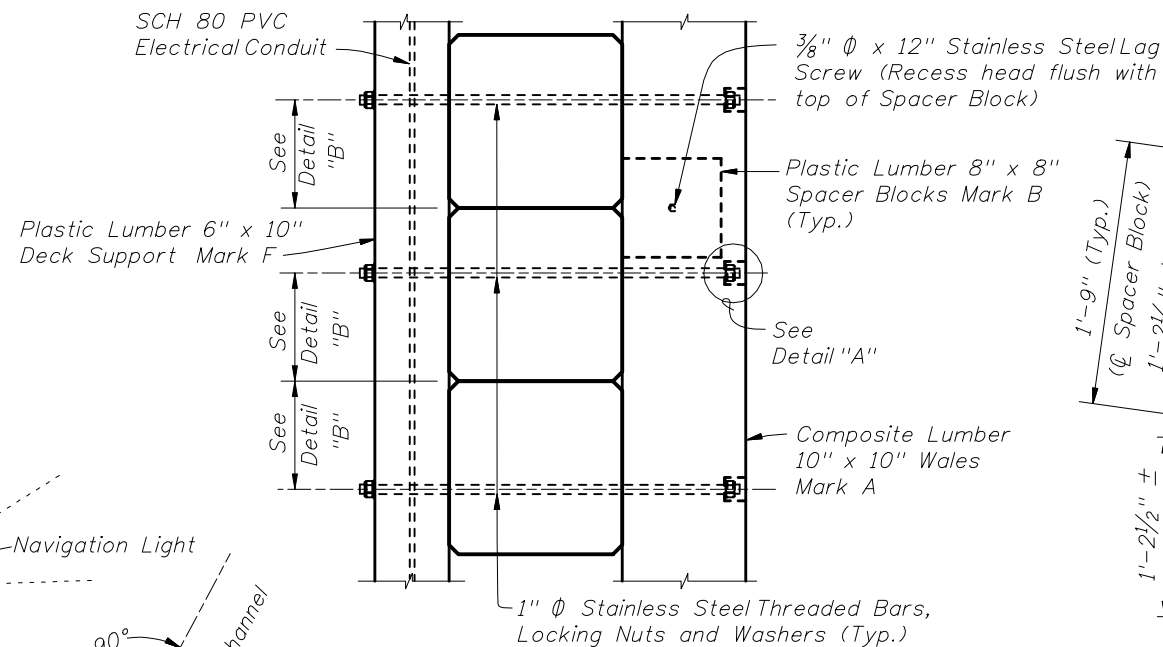
For Navigation Lights and SCH 80 PVC Electrical Conduit Details see Design Standard Index 21220.

For View G-G and Clearance Gauge Details see Sheet 4.

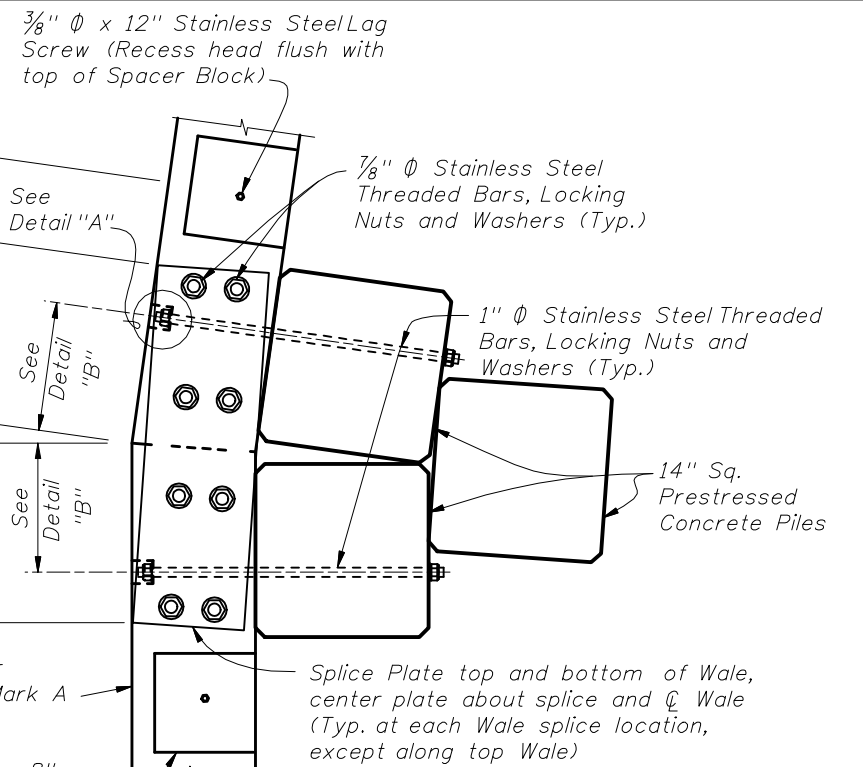
For Detail "B" and location of Section E-E see Sheet 2.

For location of View F-F see Sheet 1.

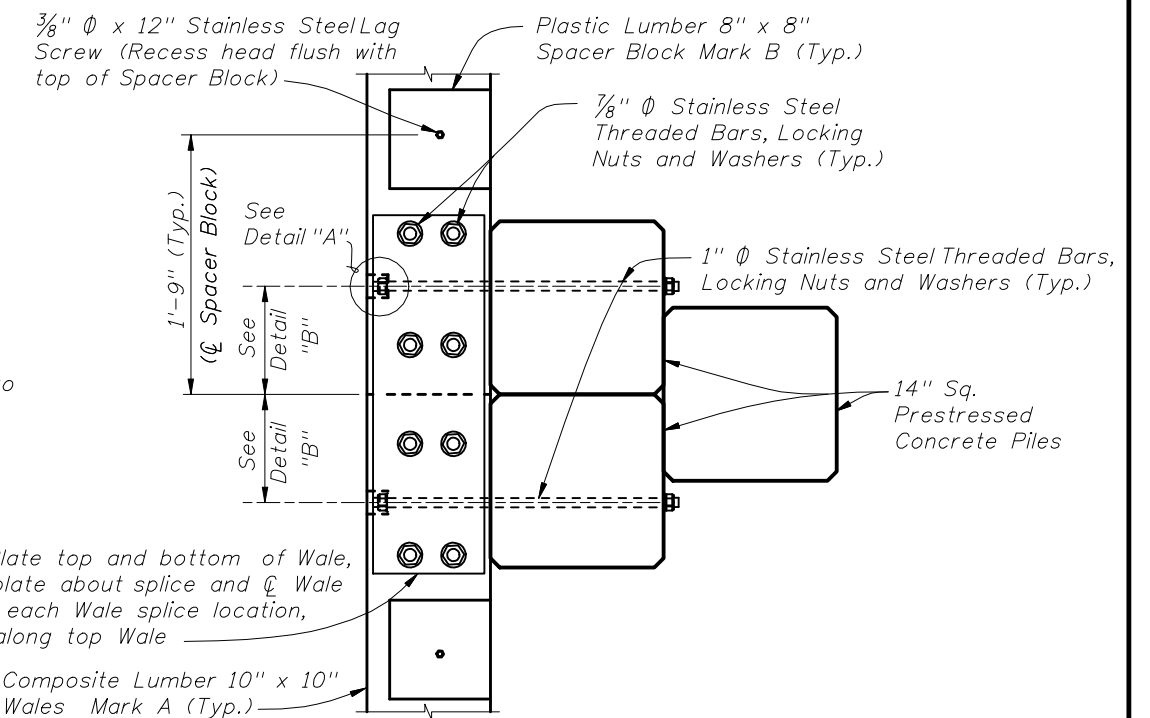
PARTIAL VIEW F-F
(SHOWING FENDER END; DECKING AND HANDRAIL NOT SHOWN FOR CLARITY)



DETAIL "A"

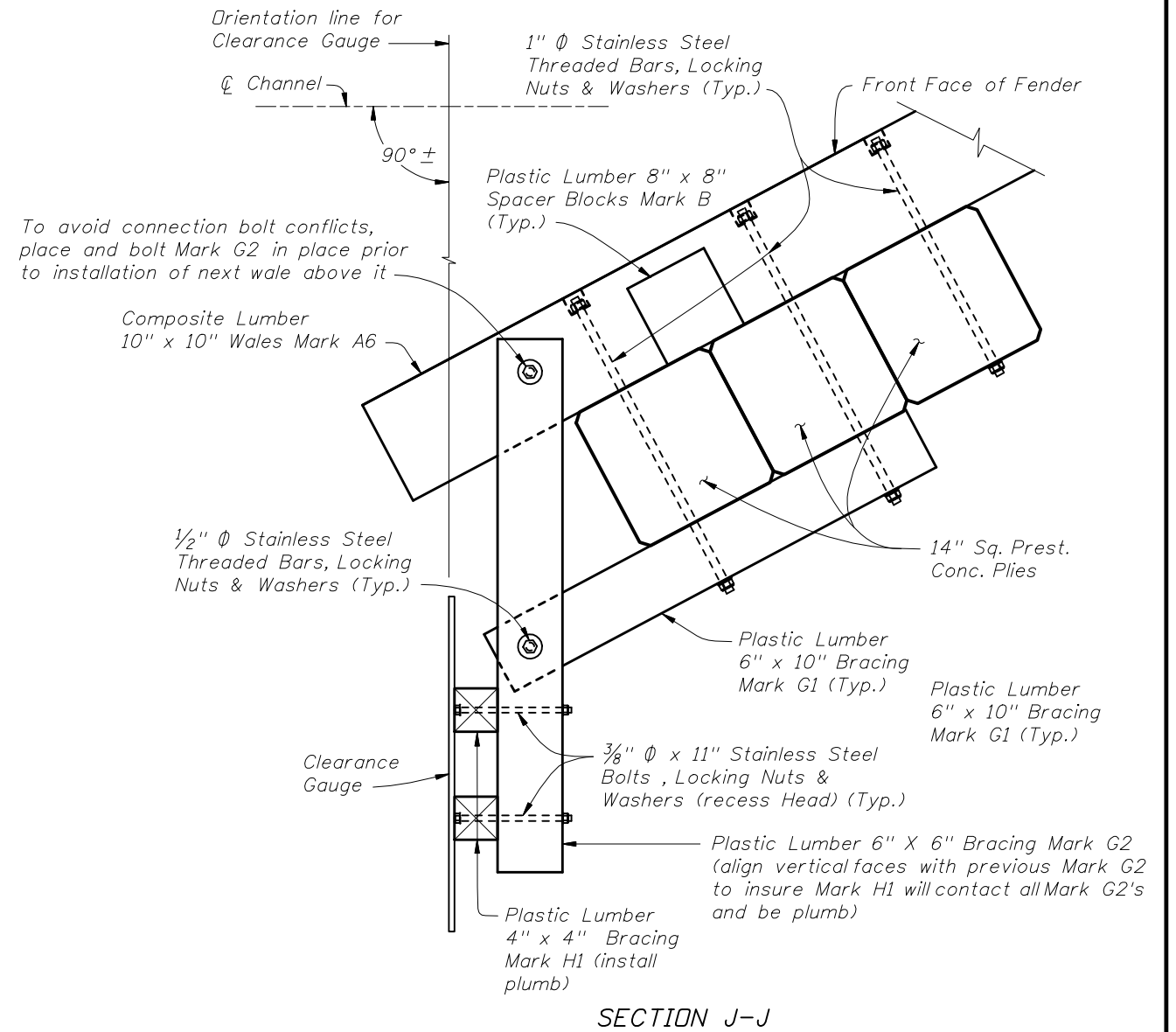
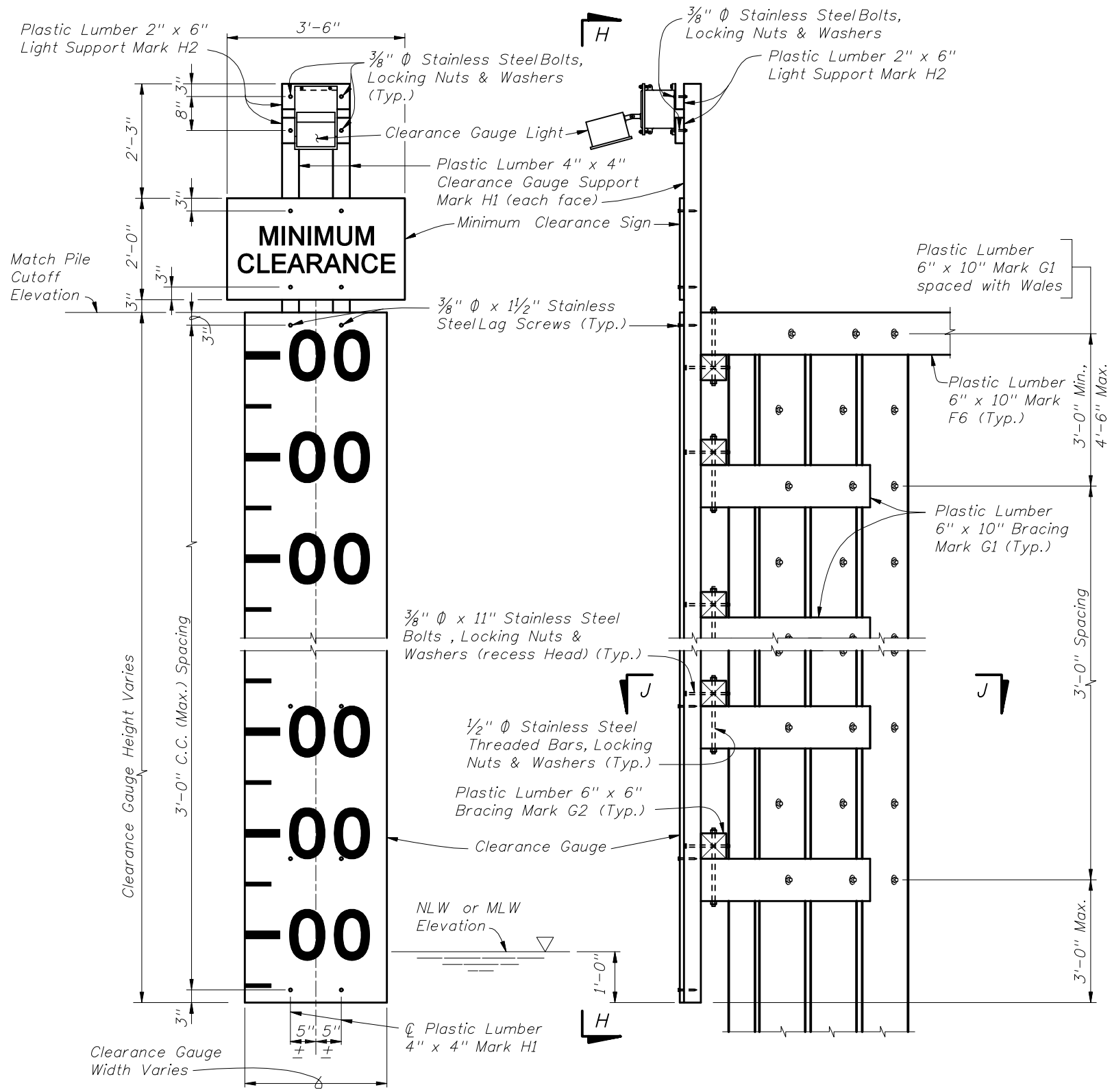


SECTION E-E
TYPICAL FLARED SECTION
(8° TURN SHOWN, 4° TURN SIMILAR)



SECTION E-E
TYPICAL STRAIGHT SECTION

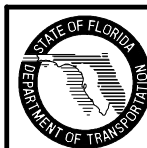


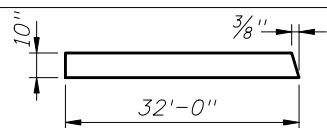
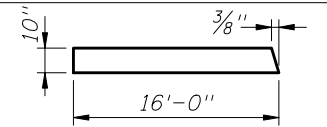
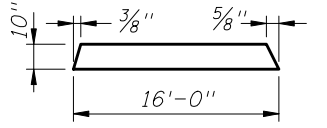
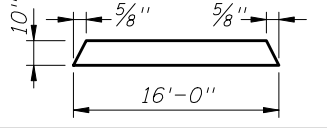
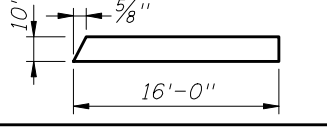


CROSS REFERENCES:

For Estimated Structural Composite and Plastic Lumber Bill of Materials Quantities and Fender System Table of Variables see Structures Plans.

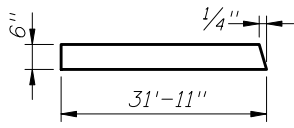
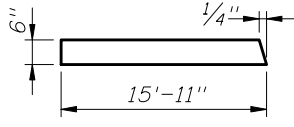
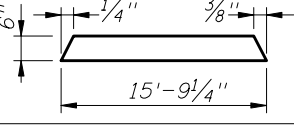
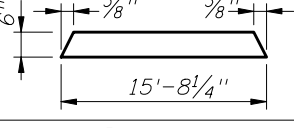
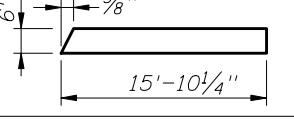
For location of View G-G see Sheet 3.



* STRUCTURAL COMPOSITE LUMBER BILL OF MATERIALS					
MARK	SIZE (NOMINAL)	DIMENSIONS	BOARD FT. PER EACH	NO. REQD.	QUANTITY
A1	10" X 10" COMPOSITE LUMBER	32'-0" (STRAIGHT)	266.6	See Estimated Structural Composite and Plastic Lumber Bill of Materials Table in Structures Plans	
A2	10" X 10" COMPOSITE LUMBER		266.6		
A3	10" X 10" COMPOSITE LUMBER		133.3		
A4	10" X 10" COMPOSITE LUMBER		133.3		
A5	10" X 10" COMPOSITE LUMBER		133.3		
A6	10" X 10" COMPOSITE LUMBER		133.3		

* All Plastic Lumber and Composite Lumber Dimensions and Quantities shown are based on Nominal Lumber Dimensions and may vary depending on Actual Lumber Dimension.

** Provide Fiberglass Open Grating in lieu of 2" X 12" Plastic Lumber when called for in the Plans. Mounting hardware shall be Stainless Steel, install per Manufacturer's recommendations. See Index No. 21900 and Structures Plans for Notes and Details.

* PLASTIC LUMBER BILL OF MATERIALS					
MARK	SIZE (NOMINAL)	DIMENSIONS	BOARD FT. PER EACH	NO. REQD.	QUANTITY
B	8" X 8" PLASTIC LUMBER	8" (STRAIGHT)	3.6	See Estimated Structural Composite and Plastic Lumber Bill of Materials Table in Structures Plans	
C	2" X 6" PLASTIC LUMBER	16'-0" (STRAIGHT) (Trim & Miter Ends as required)	16.0		
D	4" X 6" PLASTIC LUMBER	4'-4" (STRAIGHT)	8.7		
** E	2" X 12" PLASTIC LUMBER	2'-6" (STRAIGHT) (Miter as required, 6" min. width)	5.0		
F1	6" X 10" PLASTIC LUMBER	32'-0" (STRAIGHT)	160.0		
F2	6" X 10" PLASTIC LUMBER		159.6		
F3	6" X 10" PLASTIC LUMBER		79.6		
F4	6" X 10" PLASTIC LUMBER		78.8		
F5	6" X 10" PLASTIC LUMBER		78.4		
F6	6" X 10" PLASTIC LUMBER		79.3		
G1	6" X 10" PLASTIC LUMBER	3'-8" (STRAIGHT)	18.3		
G2	6" X 6" PLASTIC LUMBER	4'-1" (STRAIGHT)	12.3		
H1	4" X 4" PLASTIC LUMBER	PILE CUTOFF ELEV. MINUS NLW OR MLW ELEV. PLUS 5'-6" (STRAIGHT)	1.3 PER LF EACH		
H2	2" X 6" PLASTIC LUMBER	1'-2" (STRAIGHT)	1.2		

