


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	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."
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.	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."
104	2 of 2	RURAL DIVIDED detail, changed "5' Shoulder Pavement" to "4' Shoulder Pavement".	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."
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" "	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."
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)".	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."
	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."	260	1 of 1	"GENERAL NOTES" Note 3 changed "Specification Section 962" to "Specification Section 975".
	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."	261	1 of 3	"GENERAL NOTES" Note 4 changed "Specification Section 962" to "Specification Section 975".
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 "	264	1 thru 2	Index was expanded due to font size change. General note 3 changed.
205	1 of 6	Changed maximum size of allowed PVC pipe to 36".	270	1 of 1	"GENERAL NOTES" Note 2 changed "Specification Section 941-1.5" to "Specification Section 449". Changed Note 3.
	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.	272	6 of 6	Reordered "GENERAL NOTES" and changed "Class I concrete" to "Class NS concrete".
	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.	273	1 thru 7	Index was expanded due to font size change.
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".		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."
			288	1 thru 4	Sheet 3 is new. Renumbered other sheets.
			289	1 of 4	Changed all 3 occurrences of "Class I concrete" to "Class NS concrete".
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.	288	1 of 1	New Index added "DEEP WELL INJECTION BDX".
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.)".	289	6 of 7	Changed "FLARED ENDWALL" to "FLARED WINGWALL" and "STRAIGHT ENDWALL" to "STRAIGHT WINGWALL".
232	1 thru 7	Index was expanded due to font size change.	291	1 of 5	Changed "Class I Concrete" to "Class NS".
				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" ".
	2 of 2	CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM, added Bars 5E, 5F and 4G for Index No. 484			POST AND FOUNDATION TABLE FOR WORK ZONE SIGNS, expanded Note 2 by adding: "unless otherwise specified in the vendor drawing on the QPL."
484	1-10 of 10	New Index added TRAFFIC RAILING (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH			POST MOUNTED SIGN NOTES, added new notes 1 and 12.
500	2 of 2	"HALF SECTION" detail, deleted "Storm Sewer Mains" replaced with "Storm Drain Trunk Lines"		7 of 13	Added new sheet showing Project Information Sign and renumbered index.
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."
	4 of 9	Updated values for COMTRAC 70.70; Deleted AMOCD 2006, 2016 & 2044; Added GEOTEX 315ST, 2x2HF, 4x4, 3x3HF, 4x4HF & 4x6 woven geogrids.			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.
	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.
				5 of 8	Modified "DRIVEN POST DETAIL IN CONCRETE".
			17302	1 of 1	CASE II, and CASE VIII dimensions and notes revised.
			17328	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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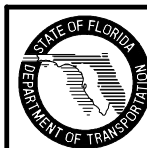
2010 FDOT Design Standards

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	Mtd.	Mounted	Pkg.	Parking
GFI	Ground Fault Interrupter			MUTCD	Manual On Uniform Traffic Control Device	Pkwy.	Parkway
GIP	Galvanized Iron Pipe	L	Length, Length Of Curve, Liter, Left	MUTS	Manual On Uniform Traffic Studies	PL or \bar{P}	Property Line or Plate
GM	Gas Main	2-L	Two-Lane			PM	12:00 Noon Until 11:59 Midnight
GP	Grade Point	2L1W	Two-Lane One-Way	N	North or Newton	POC	Point On Curve
Gr.	Grade, Guardrail or Grate	2L2W	Two-Lane Two-Way	N/m	Newtons Per Meter	PDST	Point On Semi-Tangent
Gr. or Gro.	Gross	LA or L/A	Limited Access	N/m ²	Newtons Per Square Meter	POT	Point On Tangent
GRC	Galvanized Rigid Steel Conduit	Lat.	Lateral or Latitude	N/m ³	Newtons Per Cubic Meter	PP	Power Pole
Grd.	Ground	Lb.	Pound	N/mm ²	Newtons Per Square Millimeter	PPB	Pier Protection Barrier
GRI	Geosynthetic Research Institute	LBS.	Pounds	NA or N/A	Not Available or Not Applicable	Pr.	Pair
gross km	Gross Kilometer	lb/sy	Pounds Per Square Yard	N & C	Nail & Cap	PRC	Point Of Reverse Curvature
Gr. Wt. or gr. wt.	Gross Weight	LBR	Limerock Bearing Ratio	N & D	Nail & Disk	Prct.	Precast
Gttr.	Gutter	LC	Long Chord	NAVD	National American Vertical Datum	Prest.	Prestressed
		LED	Law Enforcement With Flashing Lights And Radar	NB	Northbound	Prob.	Probability
H	Henry	LFD	Load Factor Design	NC	National Coarse or Normal Crown	Prod.	Product, Production, Producer or Produced
h	Hour or Hecto	Lgth.	Length	NCHRP	National Cooperative Research Program	Prog.	Program or Progression
ha	Hectare	Lin.	Linear	NDCBU	Neighborhood Delivery And Collection Box Unit	Proj.	Project or Projection
HAR	Highway Advisory Radio	lm	Lumen	NE	Northeast	PRM	Permanent Reference Monument
HB	Hay Bales	Lmrk.	Limerock	net km	Net Kilometer	Prop.	Proposed
HC	Horizontal Clearance	LDS	Limit Of Clear Sight	NEMA	National Electrical Manufacturers Association	Prov.	Provisions
HD	High Density or Heavy Duty	Loc., LD	Location	NGVD	National Geodetic Vertical Datum of 1929	PRS	Portable Regulatory Sign
HD or Hd.	Head	Long.	Longitude	NGS	National Geodetic Survey	PS & E	Plans, Specifications And Estimates
HDPE	High Density Polyethylene	LRFD	Load Resistance Factor Design	NHS	National Highway System	PSF or psf	Pounds Per Square Foot
Hdl.	Headwall	LS	Length Of Spiral	NHW	Normal High Water	PSI or psi	Pounds Per Square Inch
HH	Heavy Hex	LT	Left Turn	NIC	Not In Contract	PT	Point Of Tangency or Pressure Treated
Hndrl	Handrail	Lt.	Left	NJ	New Jersey	PVC	Polyvinyl Chloride
HDA	Hand/Off/Automatic	Ltd.	Lighted or Limited			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

Q	Peak Discharge or Flow Volume
QPL	Qualified Products List
R	Right
R or Rad.	Radius
R or Rng.	Range
rad	Radian
rad/s	Radian Per Second
RBAC	Rock Base Asphaltic Concrete
RBST	Rock Base Surface Treatment
RC	Reverse Crown
RCP	Reinforced Concrete Pipe
RCPA	Reinforced Concrete Pipe Arch
Rd.	Road or Round
Rdsd.	Roadside
Rdwy.	Roadway
Rec.	Recovery
Rect.	Reticuline or Rectangular
Ref.	Reference
Refl.	Reflective
Reg.	Region, Regular, Registered or Regulation
Reinf.	Reinforced or Reinforcing
Rejuv.	Rejuvenation
Reloc.	Relocated
Rem.	Removal
Repl.	Replace
Req. or Reqd.	Required
Res.	Residence or Residential
RGS	Rigid Galvanized Steel
RHW	Insulation (Moisture & Heat Resistant Rubber)
RM	Reference Monument
r/min	Revolution Per Minute
RP	Reference Point
rpm	Revolution Per Minute
RPM	Raised Reflective Pavement Markers
r/s	Revolution Per Second
RR	Railroad
RSDU	Radar Speed Display Unit
Rsf.	Resurface
Rt.	Right
RU	Rack Unit
R/W, RDW	Right Of Way
RX	Receive
S or s	Speed, South, Siemens, Or Second
SAHM	Sand-Asphalt Hot Mix
SAN or San.	Sanitary
SB	Southbound
SBAC	ShellBase Asphaltic Concrete
SBRM	Sand Bituminous Road Mix
SBST	ShellBase Surface Treatment
SC	Seal Coat or Spiral To Curve
Sch.	Schedule
SCST	Sand-Clay Surface Treatment
SD	Side Drain, Storm Drain
SE	Southeast
Sec.	Second
Sect.	Section
Sed.	Sediment
Sep.	Separator
Seq.	Sequential
Serv.	Service
SF	Adjustment Factor In Percent, Silt Fence
SG	Subgrade
SG	Specific Gravity
Sh. or Sht.	Sheet
Shldr.	Shoulder
SHW	Seasonal High Water
SIP	Stay In Place
SP	Superpave
Spa.	Space
Spcg. or Sp.	Spacing
Spec.	Specification
SPT	Standard Penetration Test
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

SRASP	Spiral Rib Aluminized Steel Pipe
SRCP	Steel Reinforced Concrete Pipe
SRD	State Road Department
SRSP	Spiral Rib Steel Pipe
SS	Sanitary Sewer
SSMD	Solid State Modular Design
ST	Surface Treatment or Spiral To Tangent
St. or ST.	Street
Sta.	Station
Stab.	Stability or Stabilization
STB	Staked Turbidity Barrier
Std.	Standard
Stg.	Strong
Stge.	Storage
Stl.	Steel
Str.	Structure
Sty.	Story
SU	Single Unit Trucks
Sub. or Subs.	Subsoil
Sub. or Subst.	Substitute
Subgr.	Subgrade
Suppts.	Supports
SUR or Sur.	Survey
Surf.	Surface
SW	Southwest
SW or Swk.	Sidewalk
Sys. or Syst.	System
Sv	Sievert
Sym.	Symmetrical
T	Tangent, Length Of Curve, Percent Trucks, Tesla,
T, TWP or Twp.	Township
t	Metric Ton
tan.	Tangent
TBM	Temporary Bench Mark
TC	Tangent To Curve
TCB	Temporary Concrete Barrier
TCE	Temporary Construction Easement
TCP	Terra Cotta Pipe
TCZ	Traffic Control Zone
TDLC	Transportation Design For Livable Communities
Tel.	Telephone
Temp.	Temperature or Temporary
Theo.	Theoretical
THRMP LSTC	Thermoplastic
THW or THWN	Insulation (Flame Retardant, Moisture And Heat Resistant Thermoplastic)
Thick.	Thickness
Tk	Thick, Thickness or Truck
Tn.	Ton
Traf.	Traffic
Trans.	Transition, Transverse, Translate or Transportation
Treat.	Treatment
TS	Tangent To Spiral
TSC	Length Of Tangent (Spiral Curve)
TTC	Temporary Traffic Control
TVSS	Transient Voltage Surge Suppression
TX	Transmit
Typ.	Typical
Upass.	Underpass
UG	Underground
UL	Underwriters Laboratories
Ult.	Ultimate
Ultd.	Unlimited
Unddr.	Underdrains
Undrdwy.	Underroadway
UNL or Undl.	Unloaded
Untr.	Untreated
UPS	Uninterruptible Power Supply
USC & GS	US Coast and Geodetic Survey (now National Geodetic Survey)
USGS	US Geological Survey
USPS	United States Postal Service
Util.	Utilities
UV	Ultraviolet

V	Volt, Velocity, Volume or Hourly Volume
Var.	Varies, Variable or Variance
VC	Vertical Curve
VCP	Vitrified Clay Pipe
VECP	Value Engineering Change Proposal
Veh.	Vehicle
Vert.	Vertical
VF	Vertical Foot
Vh	Verified Horizontal Location
VMS	Variable Message Sign
Vol.	Volume
VP	Vertical Panel
VPD or Vpd.	Vehicles Per Day
VPH or Vph.	Vehicles Per Hour
VPHPL or Vphpl.	Vehicles Per Hour Per Lane
VRMS	Volts Root Mean Square
Vv	Verified Vertical Elevation
Vvh	Verified Vertical Elevation And Horizontal Location
VW	Variable Width
W	Width, Wide, West or Watt
W/C	Water-Cement Ratio
WB	Westbound
Wb.	Weber
WB40	Intermediate Semi Trailer
WB50	Large Semi Trailer
WB62	Interstate Semi Trailer
WB67D	Tandem Semi Trailer
WM	Water Main
W.P.I.	Work Program Item
WT	Water Table Or Weight
WWF	Welded Wire Fabric
WWR	Welded Wire Reinforcing
X	Coordinate Value (East-West Direction) or Extra
X Rd.	Cross Road
Xing.	Crossing
Xsec.	Cross Section
Y	Coordinate Value (North-South Direction)
Yd.	Yard
Yr.	Year


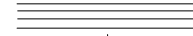

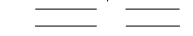
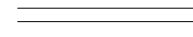

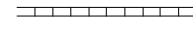
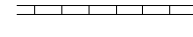

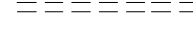
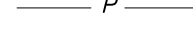
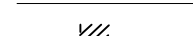

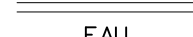

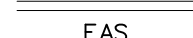
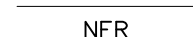
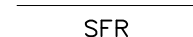
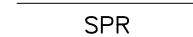

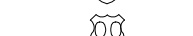
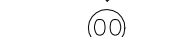
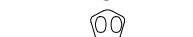



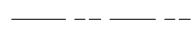
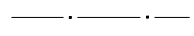
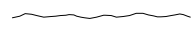
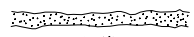







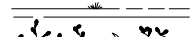
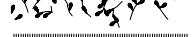






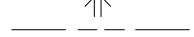
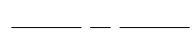

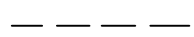
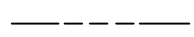



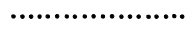
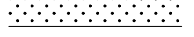
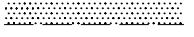
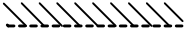
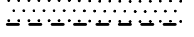
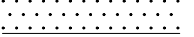















































UNITS OF MEASURE

US MEASUREMENT	
AC	Acre
AS	Assembly
BU	Bushel
CF	Cubic Foot
CO	Cleanout
CY	Cubic Yard
EA	Each
ED	Each Day
GA	Gallon
GM	Gross Mile
LB	Pound
LF	Linear Foot
LM	Lane Mile
LO	Per Location
LS	Lump Sum
LU	Luminaire
MB	Thousand Board Measure
MG	Thousand Gallons
MH	Man Hour
NM	Net Mile
PA	Per Analysis
PB	Per Building
PE	Pile
PI	Per Intersection
PL	Plant
PM	Per Mile
PS	Per Set
PW	Per Well
SI	Square Inch
SF	Square Foot
SY	Square Yard
TN	Ton
METRIC MEASUREMENT	
AS	Assembly
CO	Cleanout
DA	Day
EA	Each
ED	Each Day
GK	Gross Kilometer
HA	Hectare
HR	Hour
KG	Kilogram
KL	Kiloliter
KM	Kilometer
LI	Liter
LK	Lane Kilometer
LO	Per Location
LS	Lump Sum
LS/AS	Lump Sum Per Assembly
LS/DA	Lump Sum Per Day
LS/EA	Lump Sum Per Each
LS/HA	Lump Sum Per Hectare
LS/KG	Lump Sum Per Kilogram
LS/LS	Lump Sum Per Lump Sum
LS/MT	Lump Sum Per Metric Ton
LS/MI	Lump Sum Per Linear Meter
LS/M2	Lump Sum Per Square Meter
LU	Luminaire
MH	Man Hour
MO	Month
MT	Metric Ton
M1	Meter
M2	Square Meter
M3	Cubic Meter
NK	Net Kilometer
PA	Per Analysis
PB	Per Building
PI	Per Intersection
PL	Plant
PW	Per Well

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.



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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
	Borrow Pit
	Church
	Store
	RES Residence
	B Barn
	S 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	
		Manhole			Water Main
		Fire Hydrant			Non Potable Water
		Meter (Type)			Sanitary Sewer
		Valve (Type)			Gas
		Valve Box (Type)			Roof Drain
		Valve Cover (Type)			Petroleum
		Vent (Type)			Steam
		Pump Station			Casing
		Sewage Pump Station			Duct
		Cleanout			Buried Electric
		Cable TV Service Box			Overhead Electric
		Power Pole			Buried Cable Television
		Telephone Pole			Overhead Cable Television
		Combination Pole			Buried Telephone
		Guy Wire And Anchor Pin			Overhead Telephone
		Guy Pole Deadman			Buried Fiber Optic
		Tower			Overhead Fiber Optic
		Light Pole			
		Transformer			

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

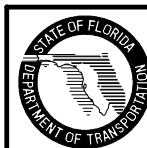
LIGHTING SYMBOLS

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

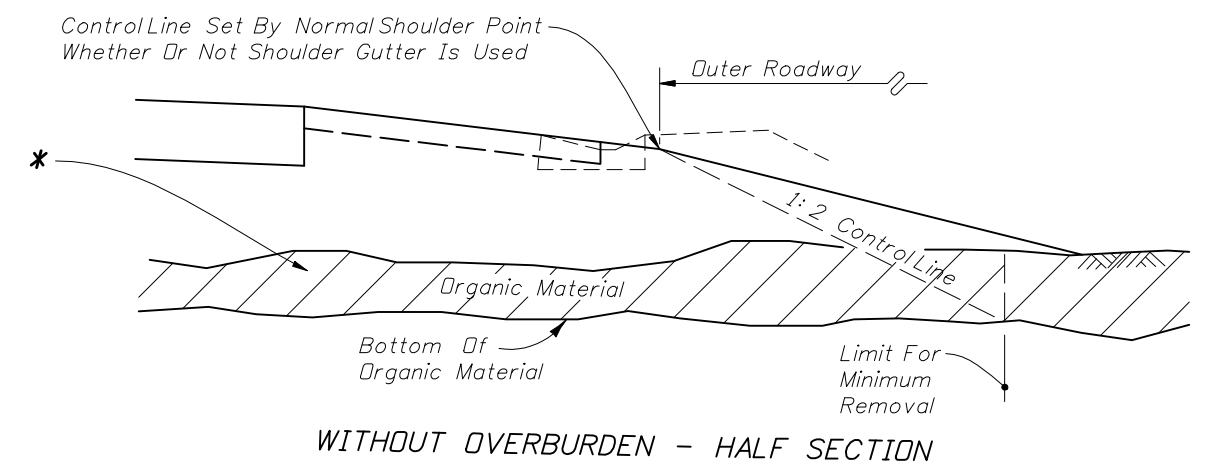
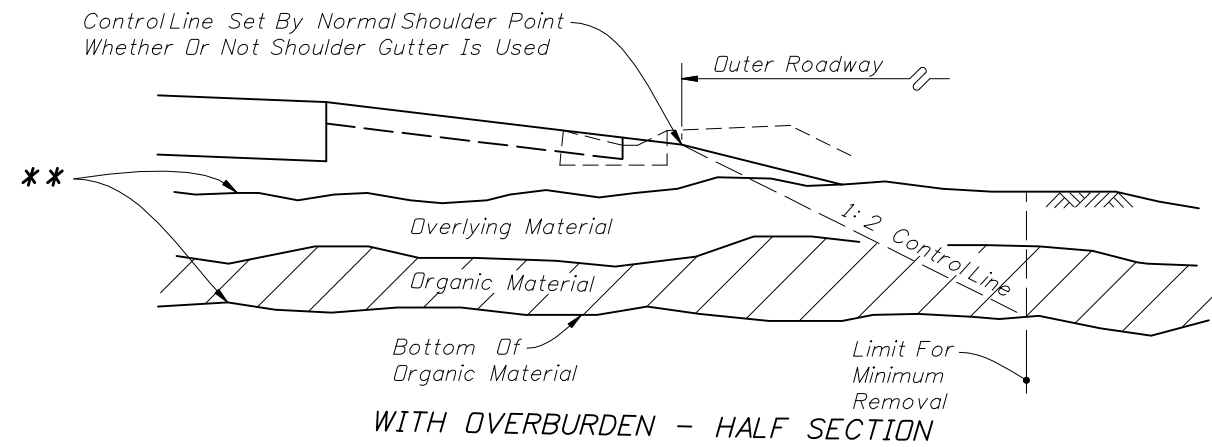
See General Note, Sheet 1 of 3



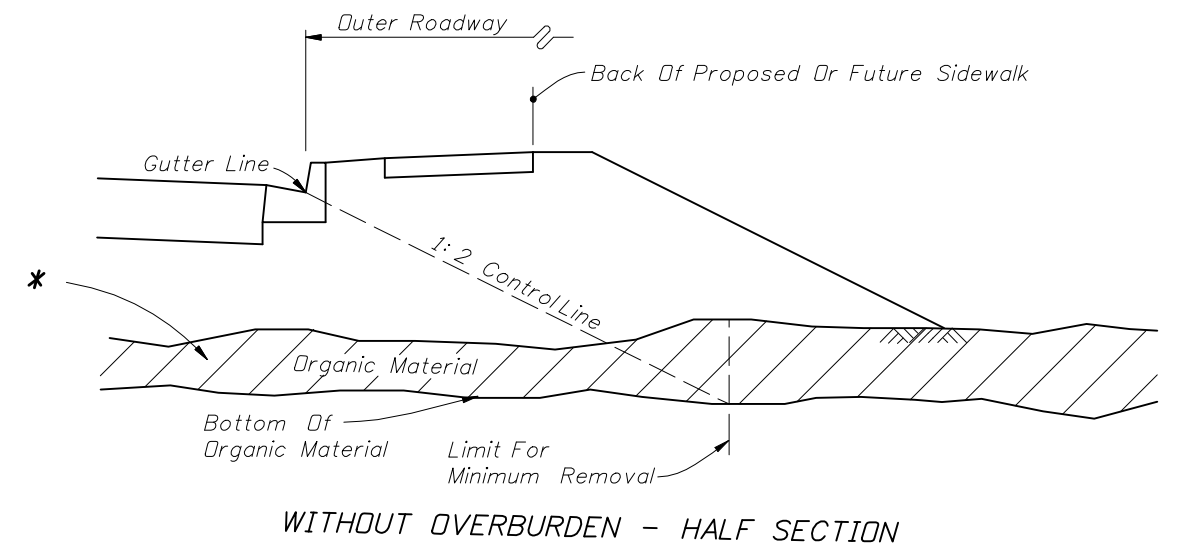
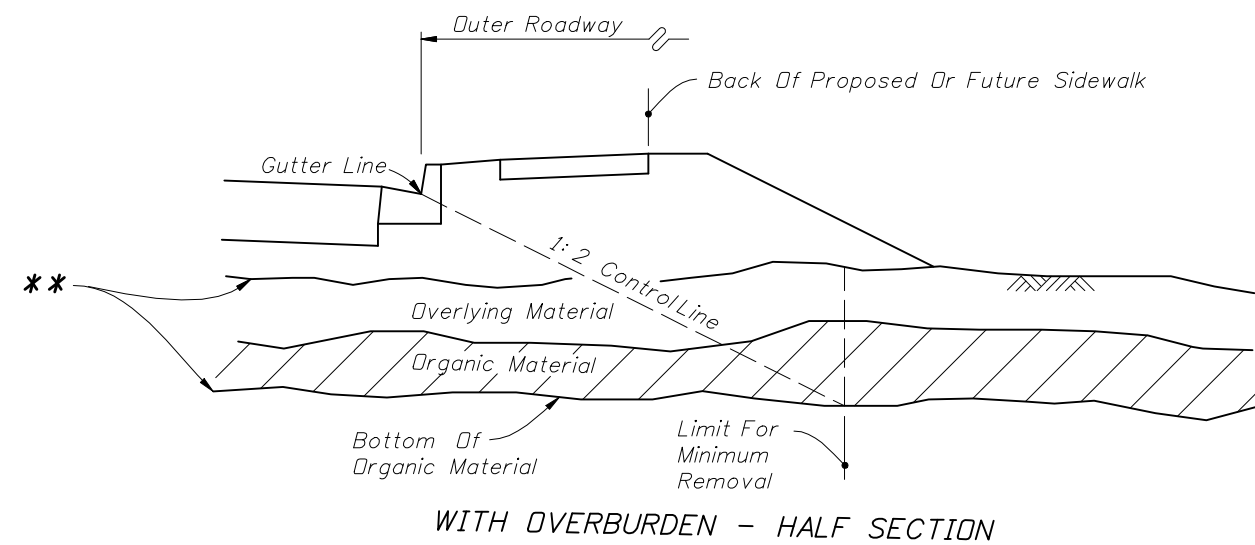
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STANDARD SYMBOLS

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IN RURAL CONSTRUCTION



IN URBAN 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.

* 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

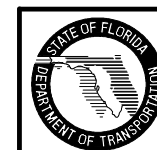
REMOVAL OF ORGANIC MATERIAL

DESIGN 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.

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.
- 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.

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.

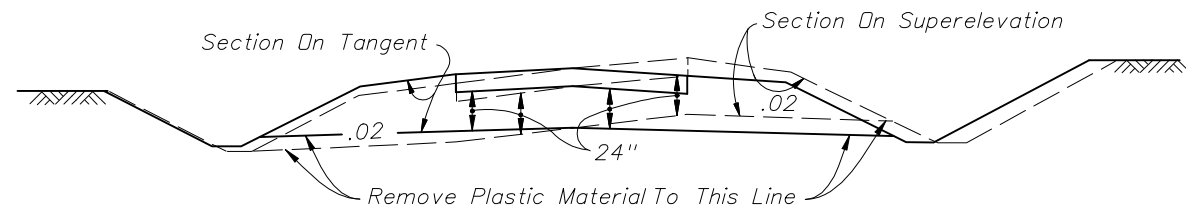


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REMOVAL OF ORGANIC AND PLASTIC MATERIAL

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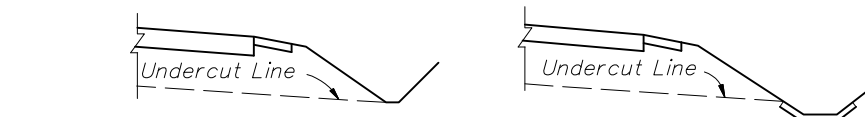
Index No.
500



TYPICAL CUT SECTION

Note: When this detail is applied to minor collectors and local facilities, the undercut may be reduced to 18".

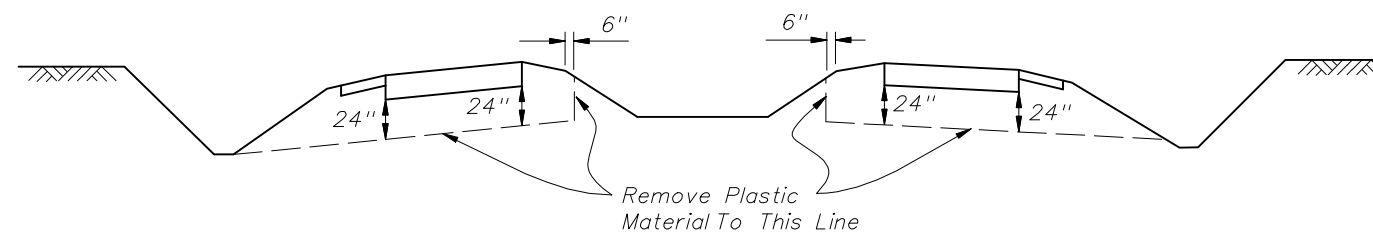
REMOVAL OF PLASTIC MATERIAL ON DIVIDED FREEWAYS, ARTERIALS AND MAJOR COLLECTORS HAVING FLUSH MEDIANS, AND, ON UNDIVIDED ARTERIALS AND MAJOR COLLECTORS



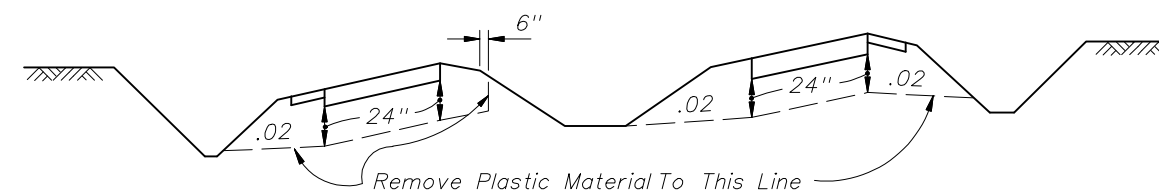
At locations where plastic material is being removed, the side ditches must be at least as deep as the undercut plane.

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.

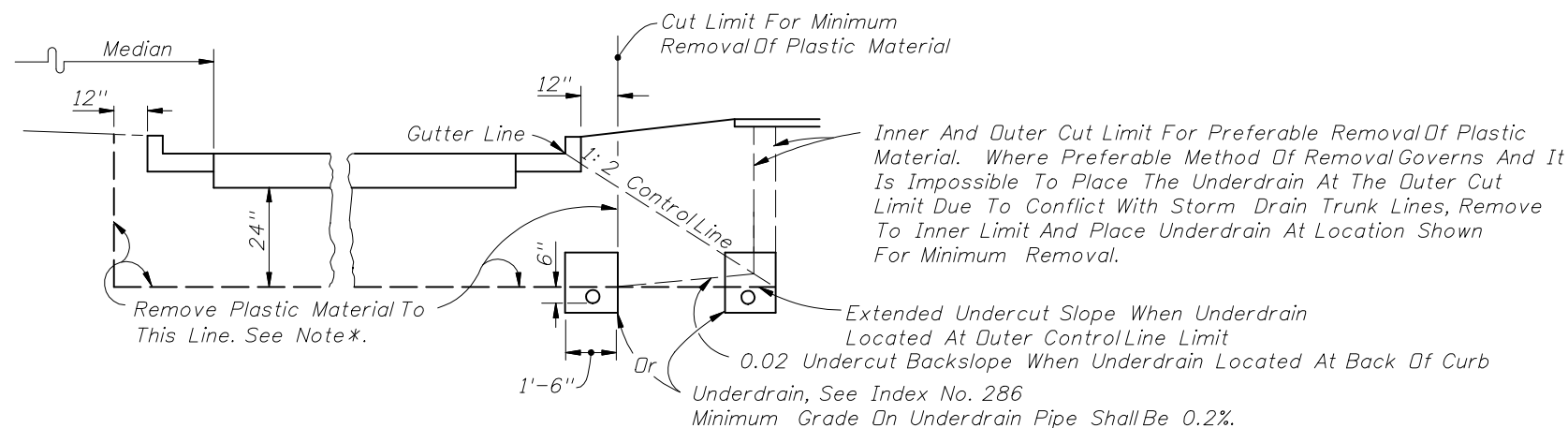
MISCELLANEOUS DETAILS



TYPICAL CUT SECTION ON TANGENT



TYPICAL CUT SECTION ON SUPERELEVATION



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.

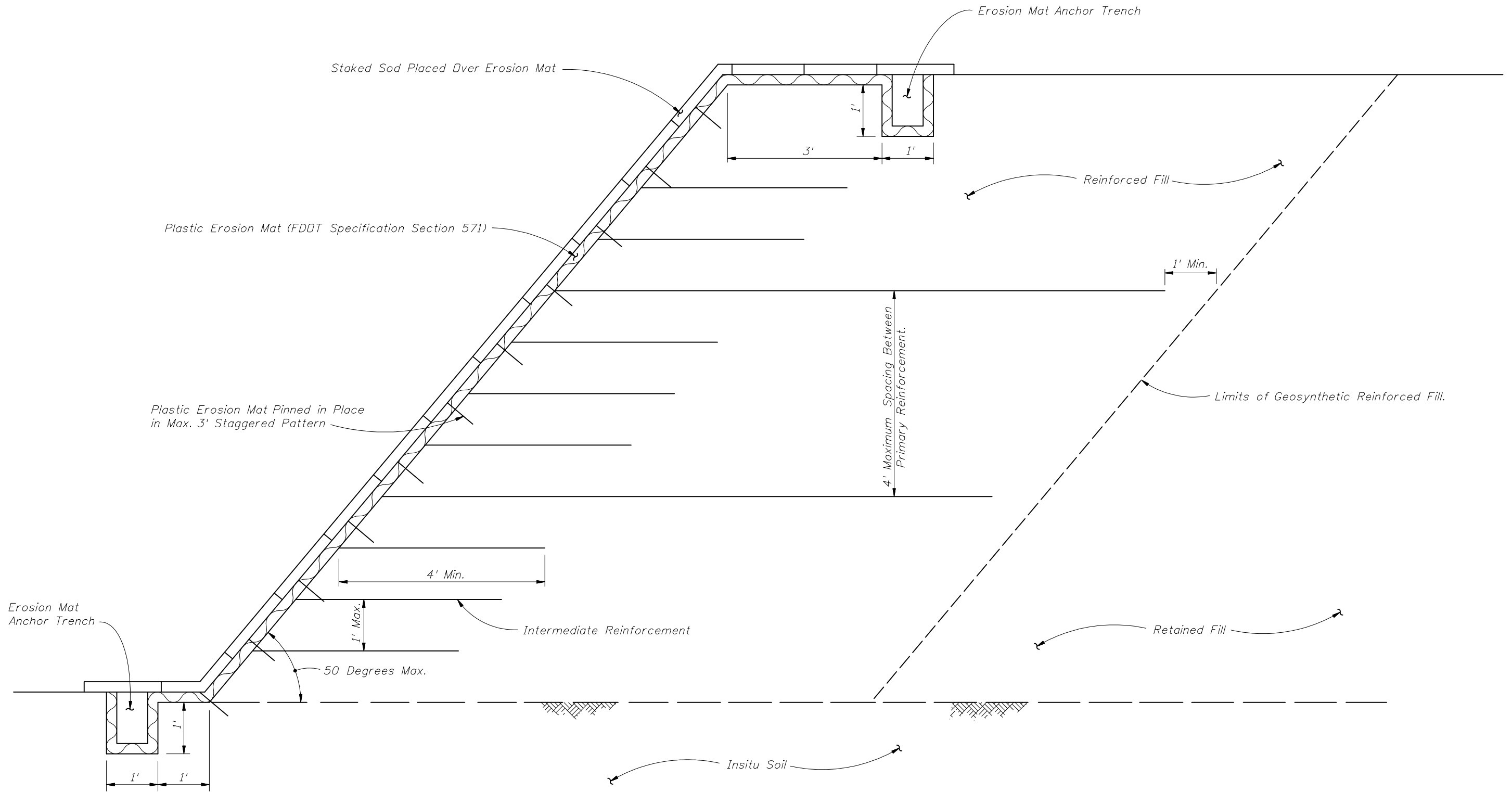
REMOVAL OF PLASTIC MATERIAL ON INTERSTATE FACILITIES, FREEWAYS, DIVIDED ARTERIALS AND MAJOR COLLECTORS HAVING DEPRESSED MEDIANS



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REMOVAL OF ORGANIC AND PLASTIC MATERIAL

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GEOSYNTHETIC REINFORCED SOIL SLOPES

GENERAL NOTES

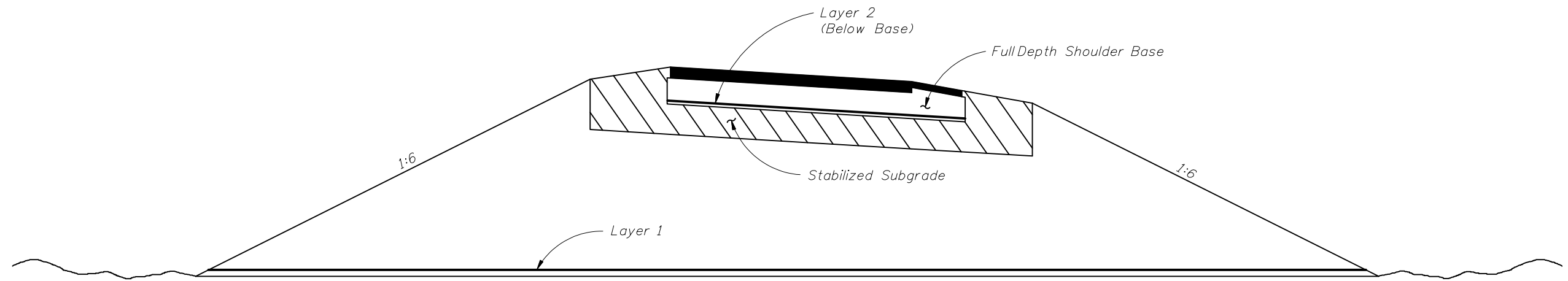
1. All Designs shall meet the requirements shown on this sheet and the contract documents.
2. $T_a = \frac{T_{ult}}{RF_c RF_d RF_j CRF}$
3. Intermediate reinforcement shall be rolled out parallel to slope face.



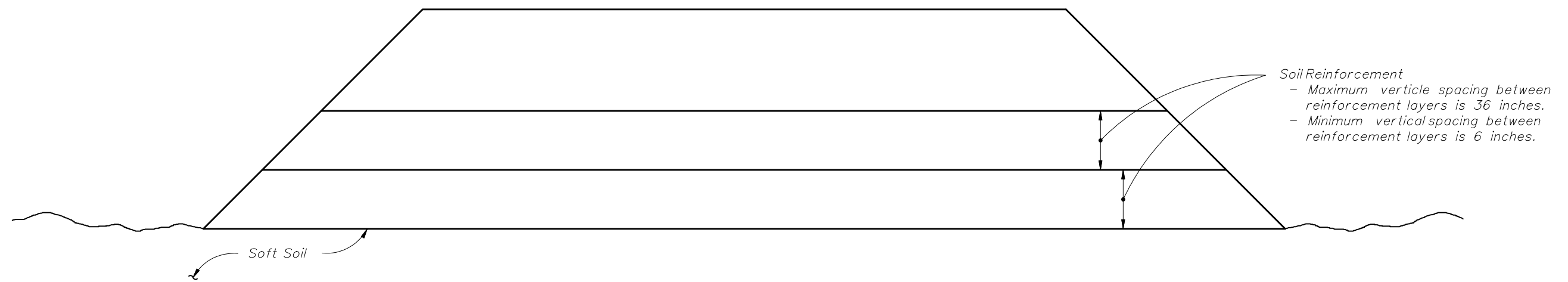
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GEOSYNTHETIC REINFORCED SOILS

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REINFORCED EMBANKMENT



GEOSYNTHETIC REINFORCED FOUNDATIONS CONSTRUCTED ON SOFT SOILS



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GEOSYNTHETIC REINFORCED SOILS

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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

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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 GEODRID)
 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
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APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEODRID)
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GEOSYNTHETIC REINFORCED SOILS

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TABLE OF WOVEN GEODRID VALUES

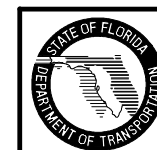
PROPERTY		REQUIRED TEST METHOD	SYNTEEN SF 11	SYNTEEN SF 12	SYNTEEN SF 20	SYNTEEN SF 35	SYNTEEN SF 40	SYNTEEN SF 50	SYNTEEN SF 55	SYNTEEN SF 80	SYNTEEN SF 110
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%
Tensile Strength (lb./ft.)		ASTM D 6637									
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
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* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
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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



2010 FDOT Design Standards

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:
 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
 (EXTRUDED GEOGRID)
 APPLICATION AND PROPERTIES



2010 FDOT Design Standards

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
 2 = Reinforcement of Foundations over Soft Soils
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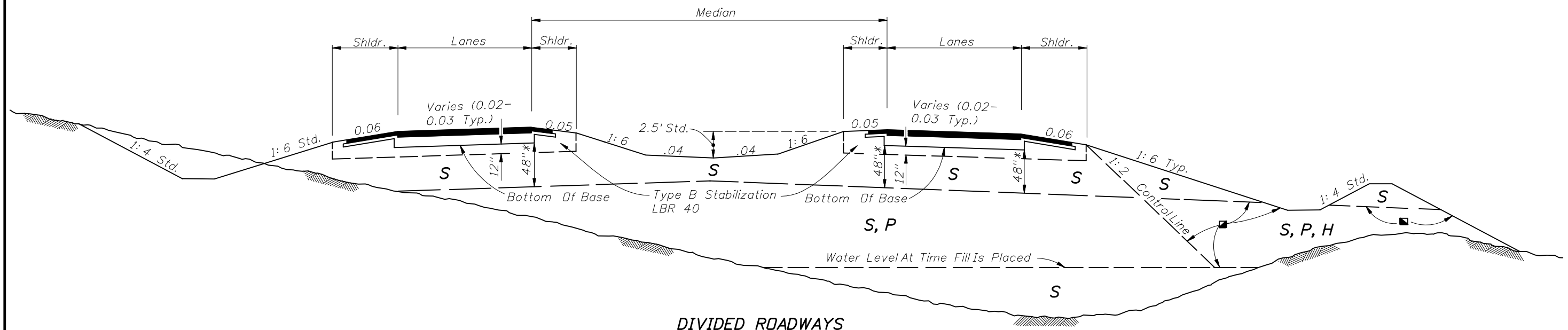
APPROVED GEOSYNTHETIC PRODUCTS
 (EXTRUDED GEOGRID)
 APPLICATION AND PROPERTIES



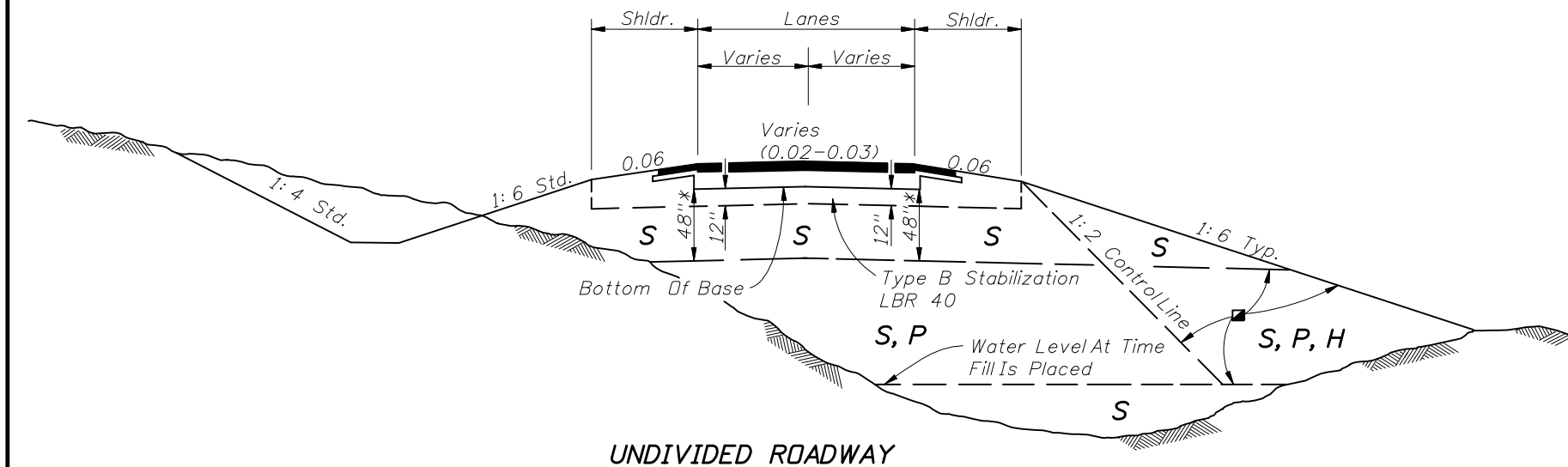
2010 FDOT Design Standards

GEOSYNTHETIC REINFORCED SOILS

Last Revision: 01/01/09
 Sheet No. 9 of 9
 Index No. 501



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.

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.

<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".

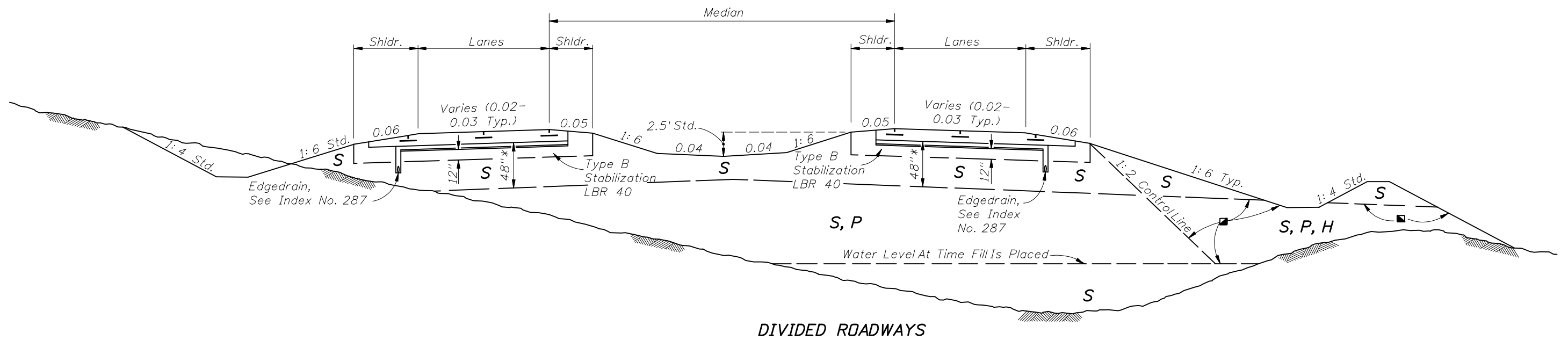
FLEXIBLE PAVEMENT



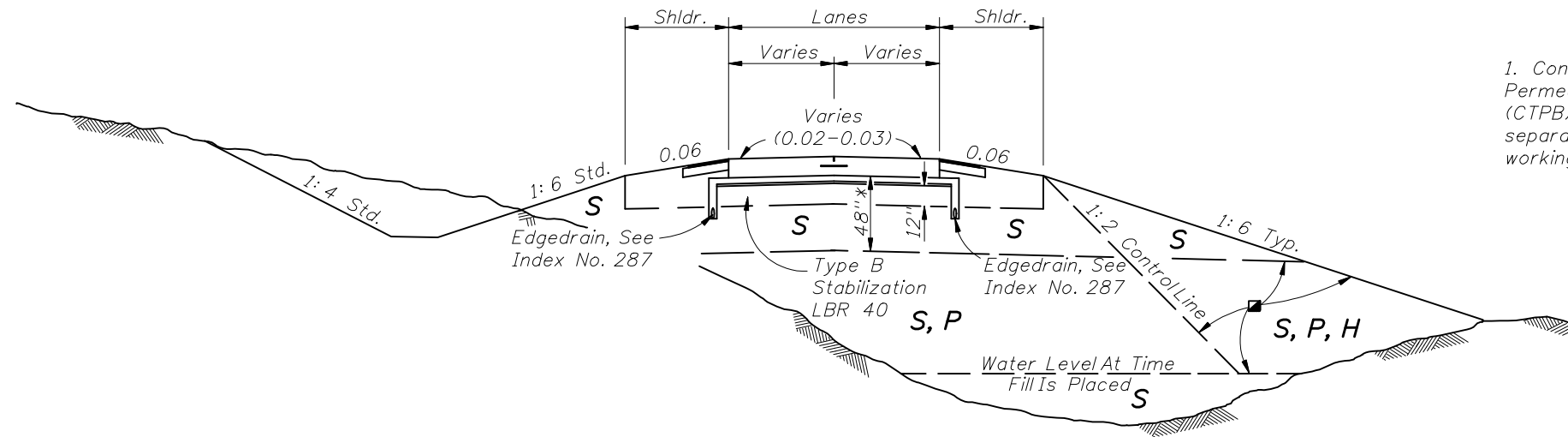
2010 FDOT Design Standards

EMBANKMENT UTILIZATION

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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

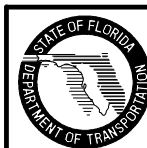
Classification listed left to right in order of preference.

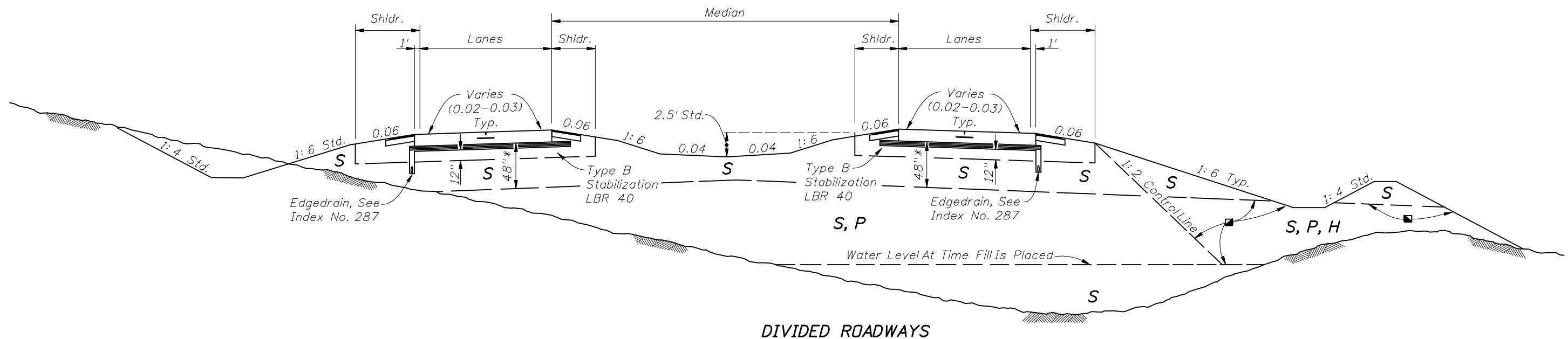
■ See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.

** 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.

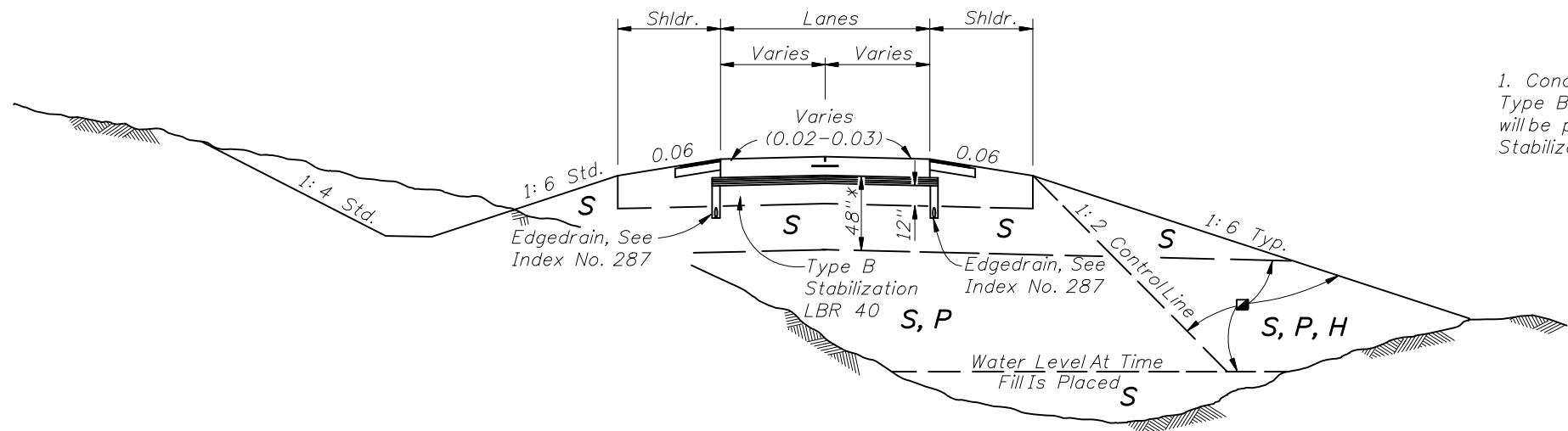
* For cut sections this dimension may be reduced to 24"; see Index No. 500. For minor collectors and local facilities this dimension may be reduced to 18".

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.

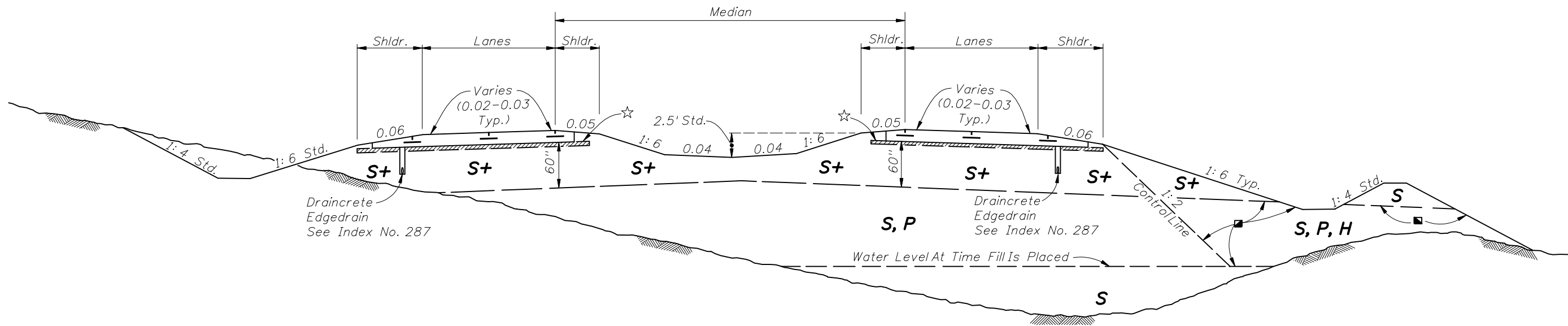
<u>SYMBOL</u>	<u>SOIL</u>	<u>CLASSIFICATION (AASHTO M 145)</u>
S	Select	A-1, A-3, A-2-4**
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL < 50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL > 50)
M	Muck	A-8

Classification listed left to right in order of preference.

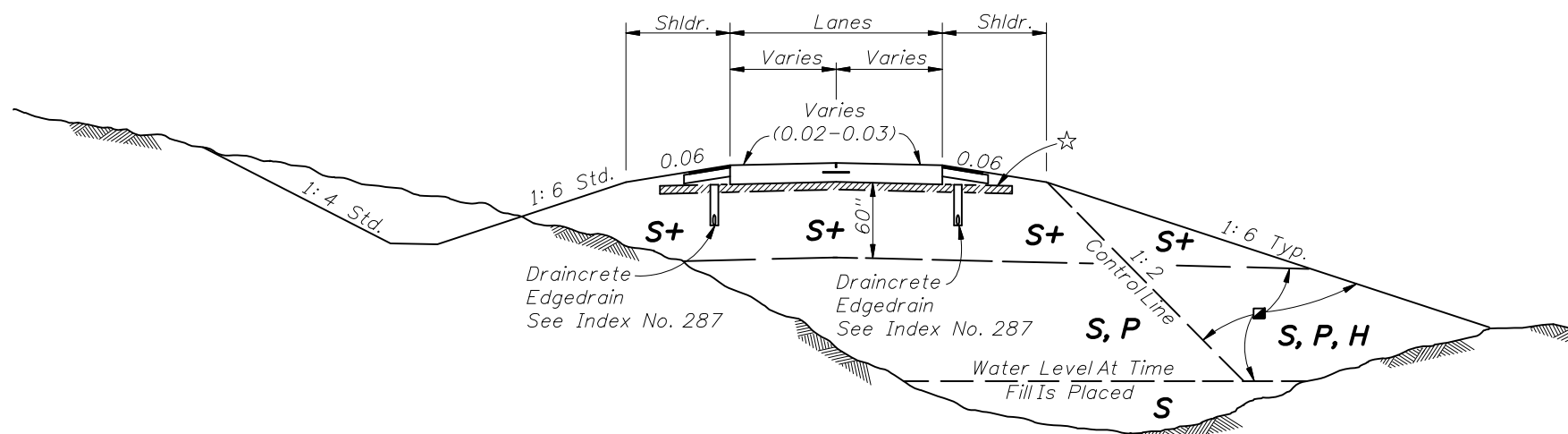
- See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.
- ** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. 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.

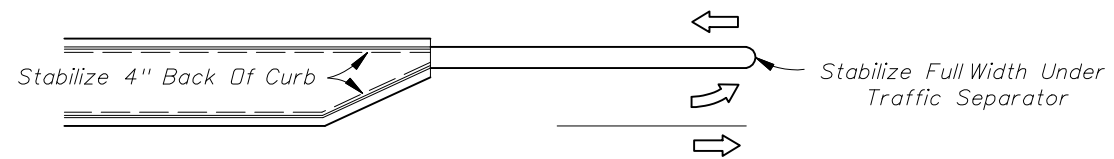
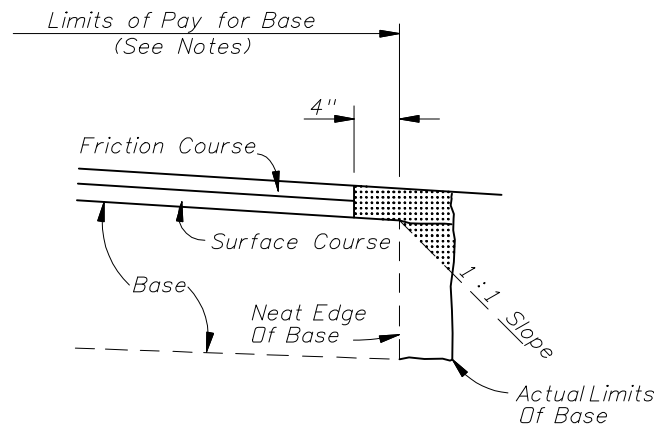
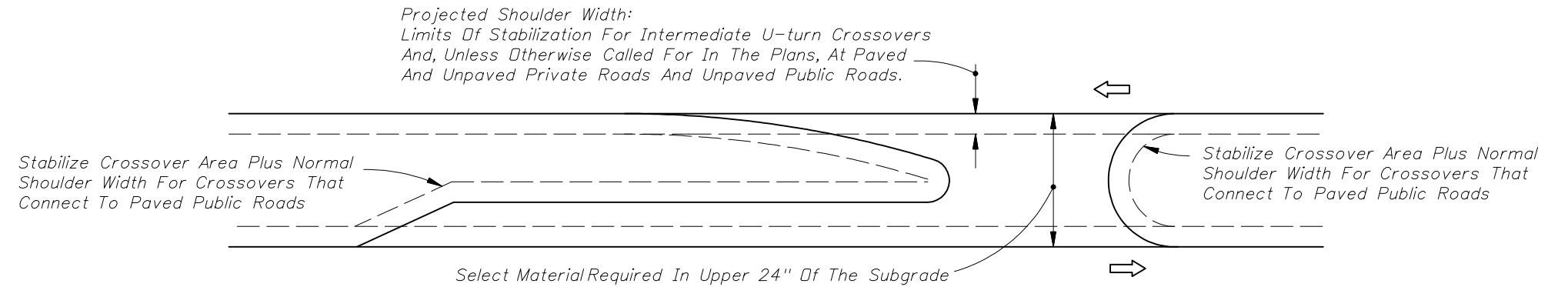
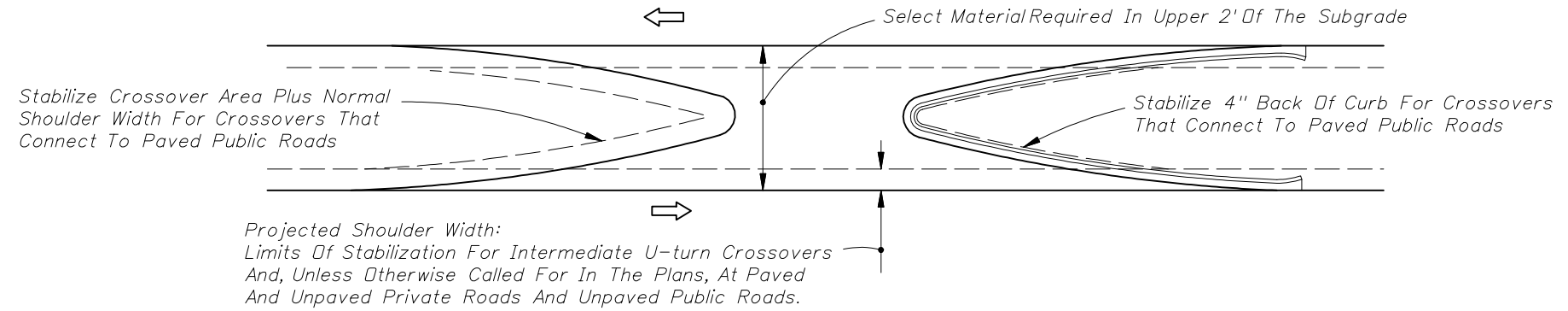
RIGID PAVEMENT – SPECIAL SELECT SOIL OPTION



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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".

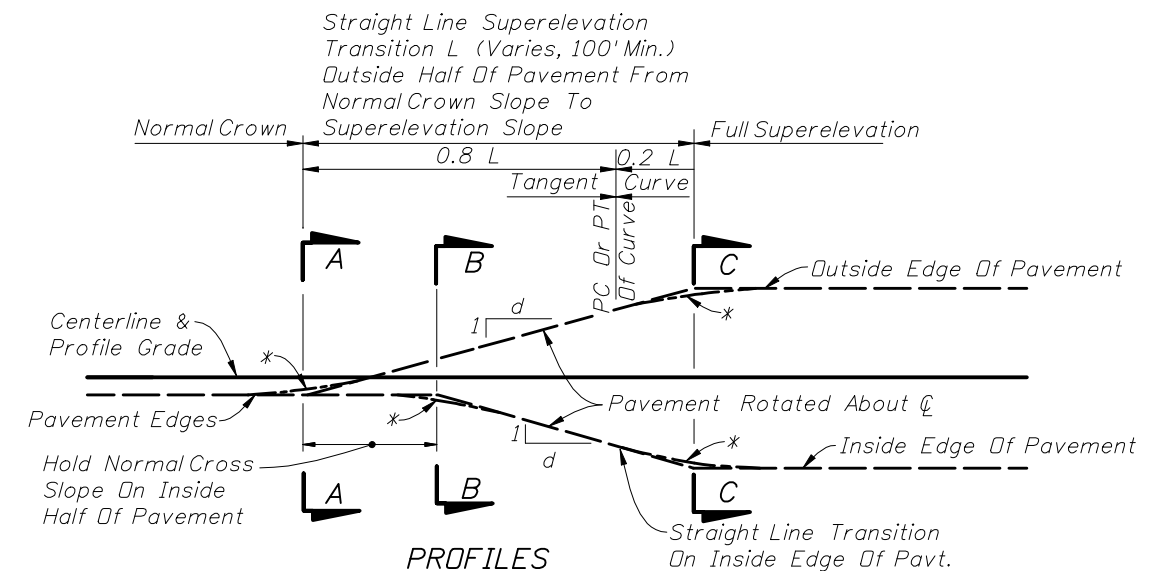
MEDIAN STABILIZING DETAILS



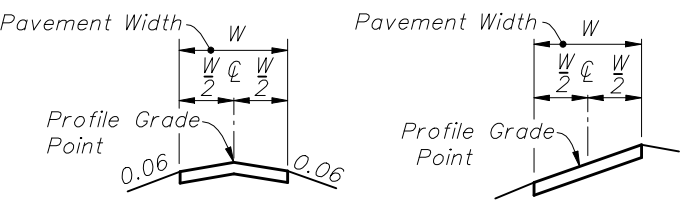
SLOPE RATIOS FOR SUPERELEVATION TRANSITIONS			
SECTION	DESIGN SPEED, MPH		
	45-50	55-60	65-70
	i: d		
2 Lane & 4 Lane	1: 200	1: 225	1: 250
6 Lane	1: 160	1: 180	1: 200
8 Lane	1: 150	1: 170	1: 190

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.

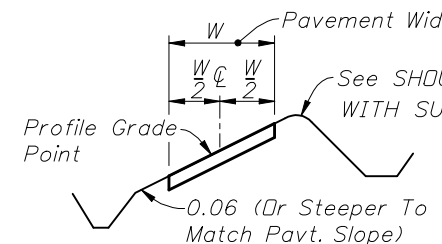
*Short Vertical Curves Are To Be Used On Construction To Avoid Angular Breaks In Edge Profiles



PROFILES



NORMAL CROWN SECTION AA
REVERSE CROWN SECTION BB
2-LANE, 4-LANE OR 6-LANE PAVEMENT, NO MEDIAN

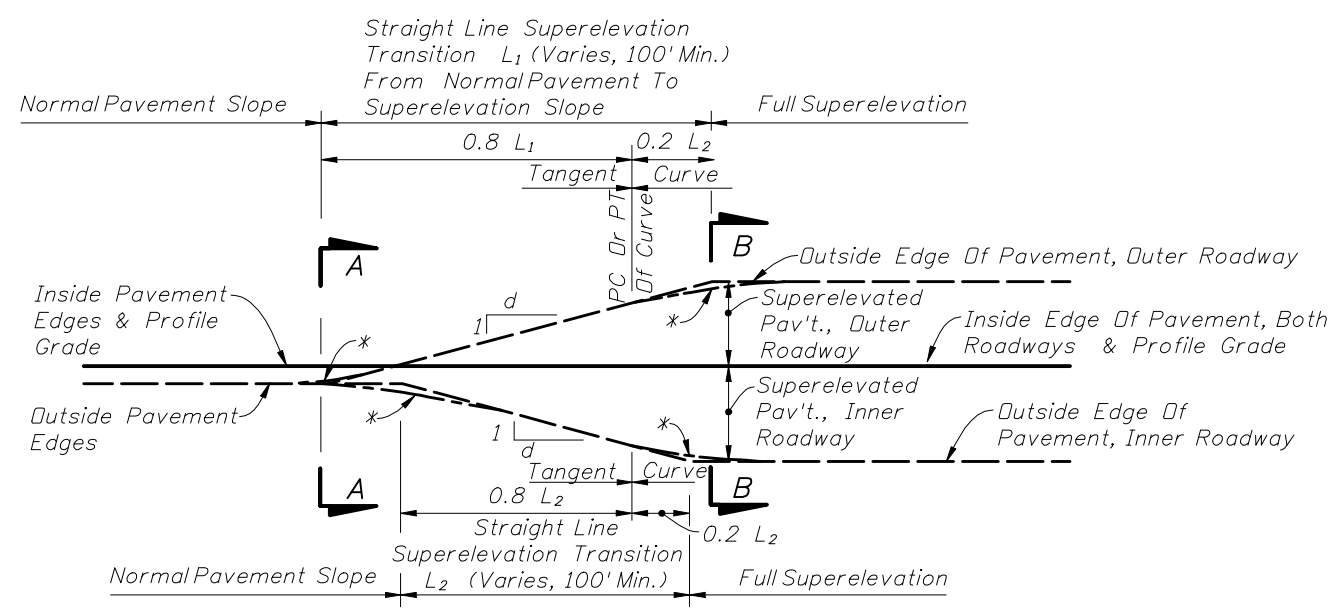


FULLY SUPERELEVATED SECTION CC

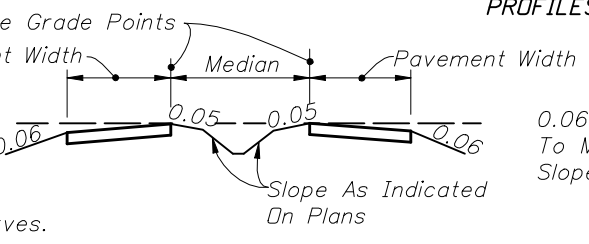
- THESE TRANSITION DETAILS ARE TO APPLY IN ALL IN ALL CASES, EXCEPT UNDER THE FOLLOWING CONDITIONS:
1. Curves of insufficient length.
 2. Insufficient tangent length between curves.
 3. Deficient transition distance between a curve and other control point(s).
 4. At PCC's or PRC's (Runoff rates are applicable).

Transitions for these exceptions are to be as detailed in the plans.

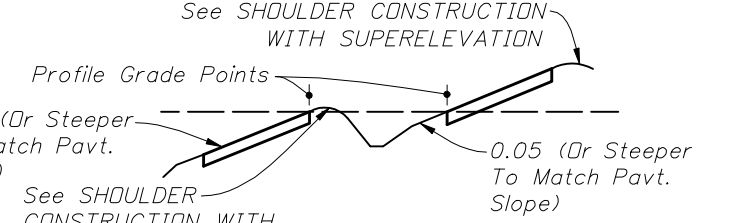
SUPERELEVATION TRANSITIONS



PROFILES



NORMAL SECTION AA



FULLY SUPERELEVATED SECTION BB

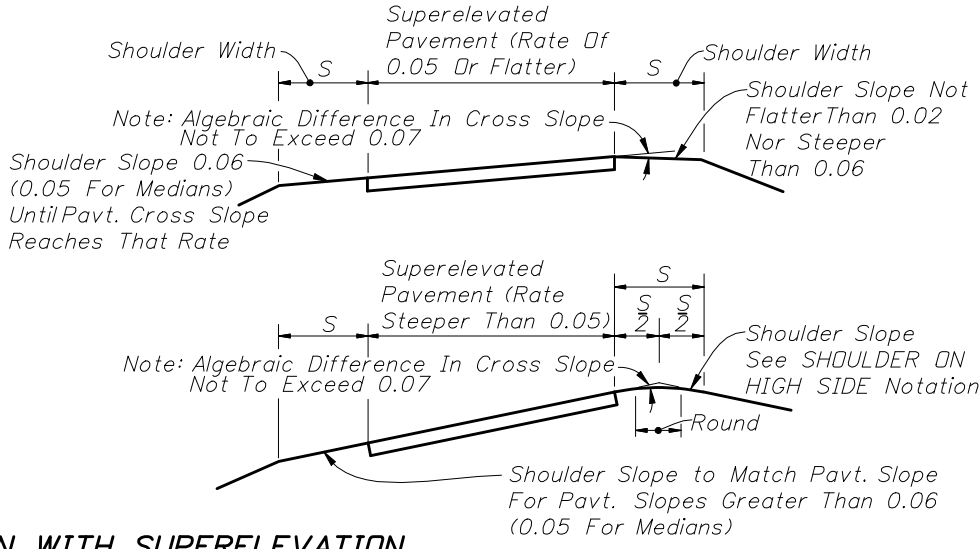
4-LANE OR 6-LANE PAVEMENT WITH MEDIAN

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.

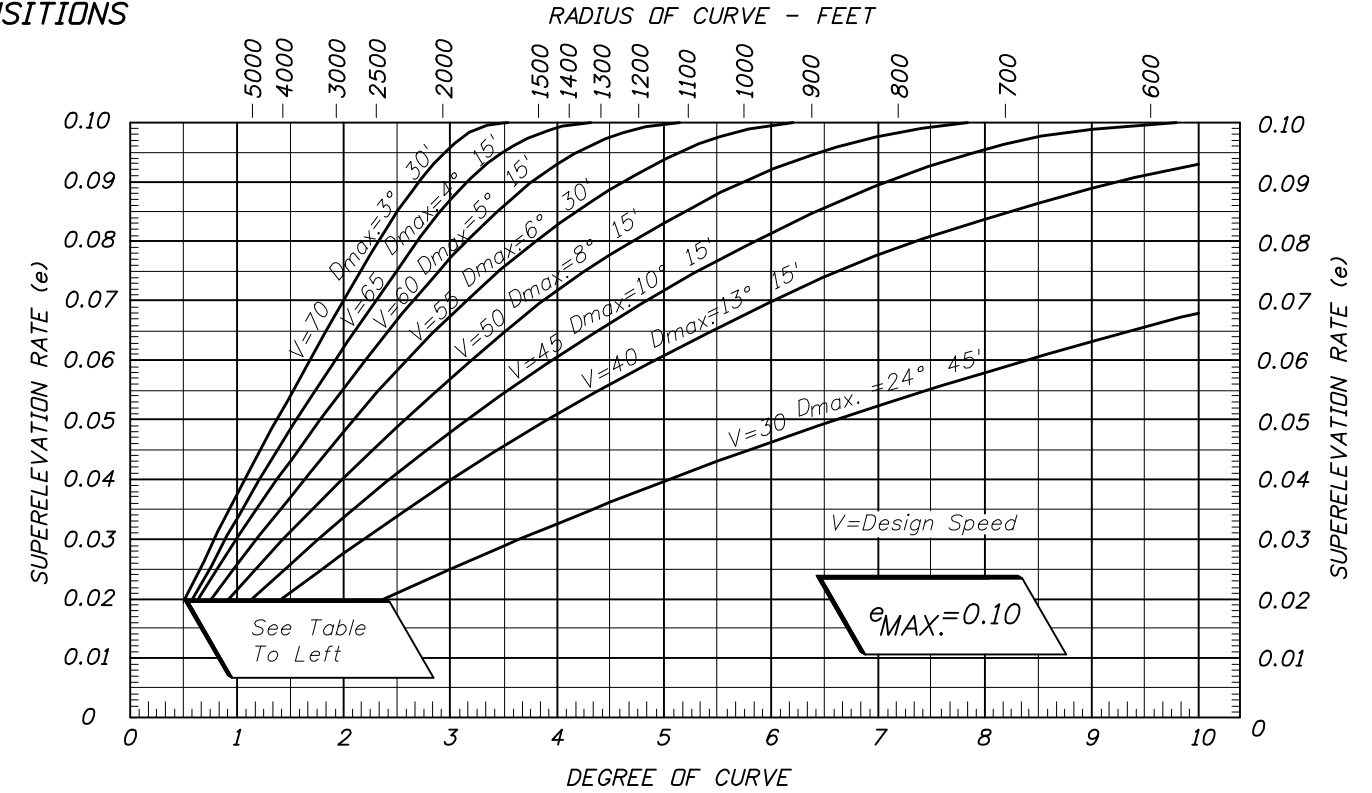
NOTE:
These details apply to both paved and grassed shoulders. For median shoulders use 0.05 in lieu of 0.06.



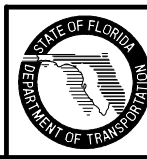
SHOULDER CONSTRUCTION WITH SUPERELEVATION

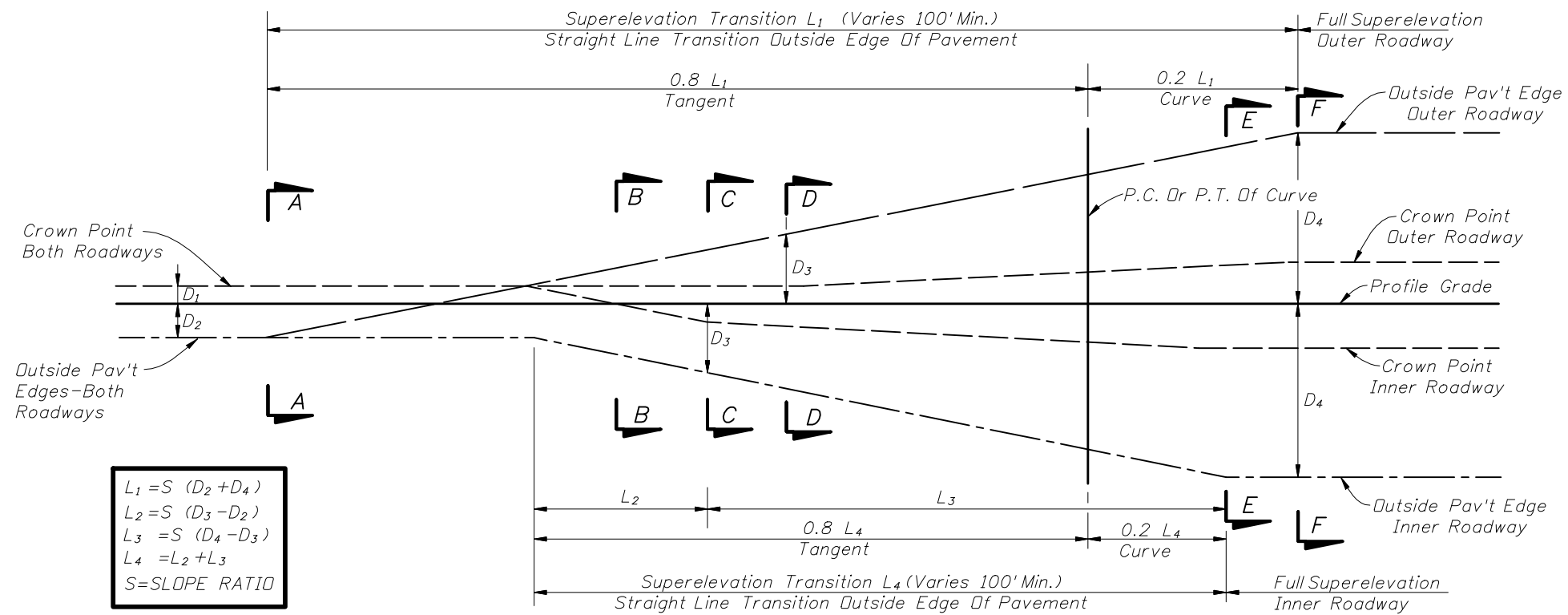
DESIGN SUPERELEVATION RATES FOR RURAL HIGHWAYS, URBAN FREEWAYS AND HIGH SPEED URBAN HIGHWAYS

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.





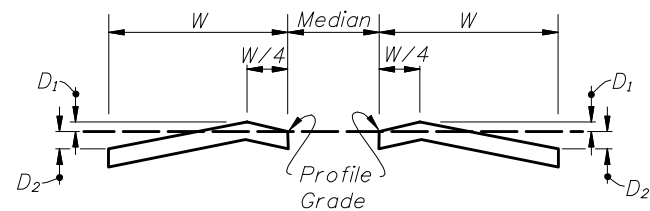
$$L_1 = S (D_2 + D_4)$$

$$L_2 = S (D_3 - D_2)$$

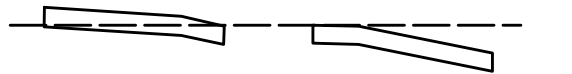
$$L_3 = S (D_4 - D_3)$$

$$L_4 = L_2 + L_3$$

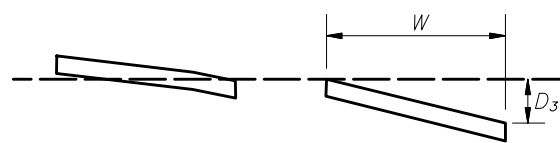
$$S = \text{SLOPE RATIO}$$



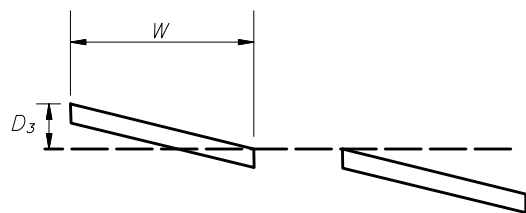
SECTION A-A
NORMAL CROWNED SECTION



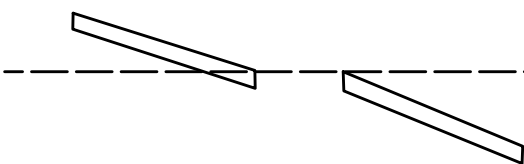
SECTION B-B
SUPERELEVATION SECTION LT. & RT.



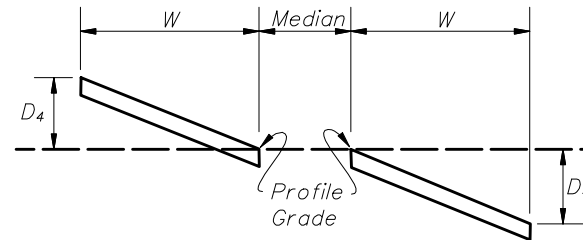
SECTION C-C
SUPERELEVATION SECTION LT.
PLANE INCLINED SECTION RT.



SECTION D-D
PLANE INCLINED SECTION LT.
SUPERELEVATION TRANSITION RT.

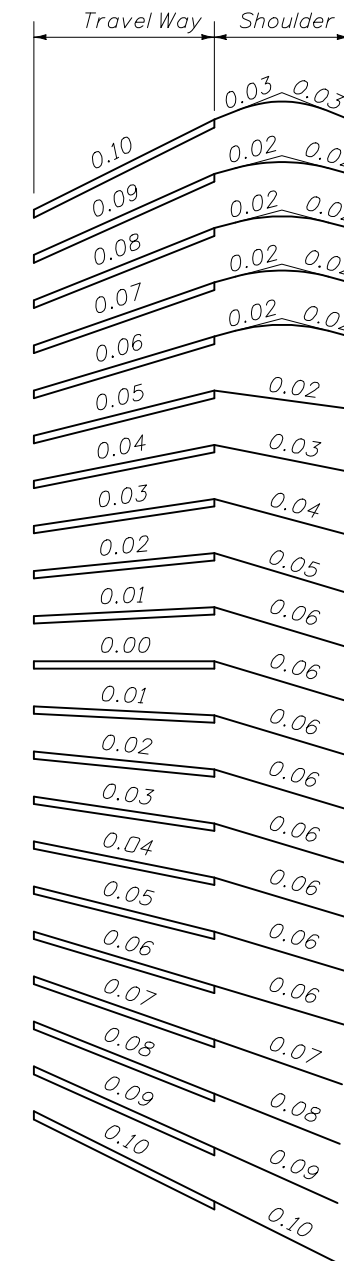


SECTION E-E
SUPERELEVATION TRANSITION LT.
FULL SUPERELEVATION RT.



SECTION F-F
FULL SUPERELEVATION LT. & RT.

8-LANE PAVEMENT WITH ONE LANE SLOPED TO MEDIAN



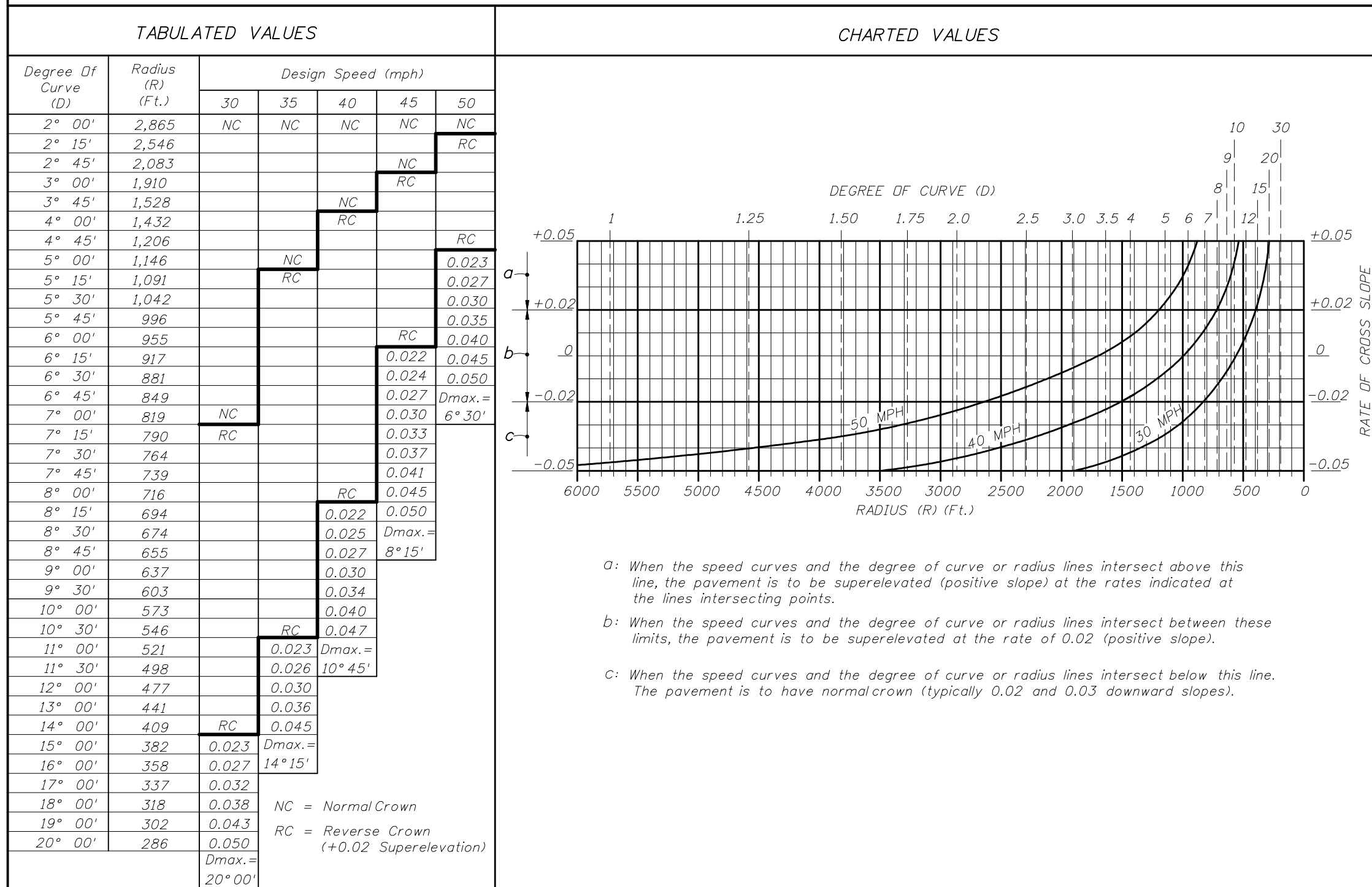
SLOPES OF TRAVELED WAY
AND ABUTTING SHOULDERS

SHOULDER SLOPES ON
SUPERELEVATION SECTIONS



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

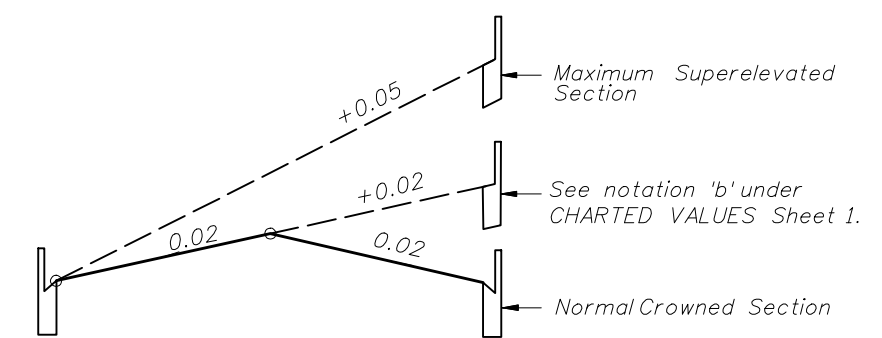


2010 FDOT Design Standards

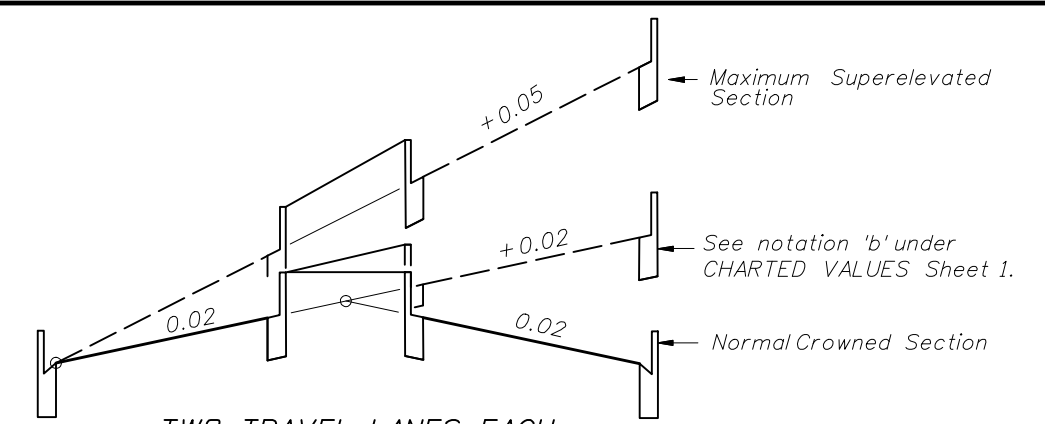
**SUPERELEVATION
URBAN HIGHWAYS AND STREETS**

Last Revision 00 Sheet No. 1 of 3

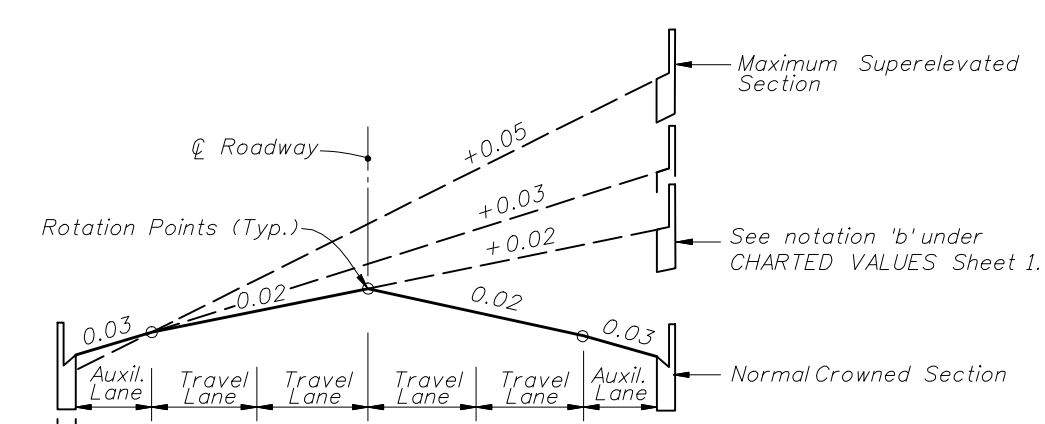
Index No.
511



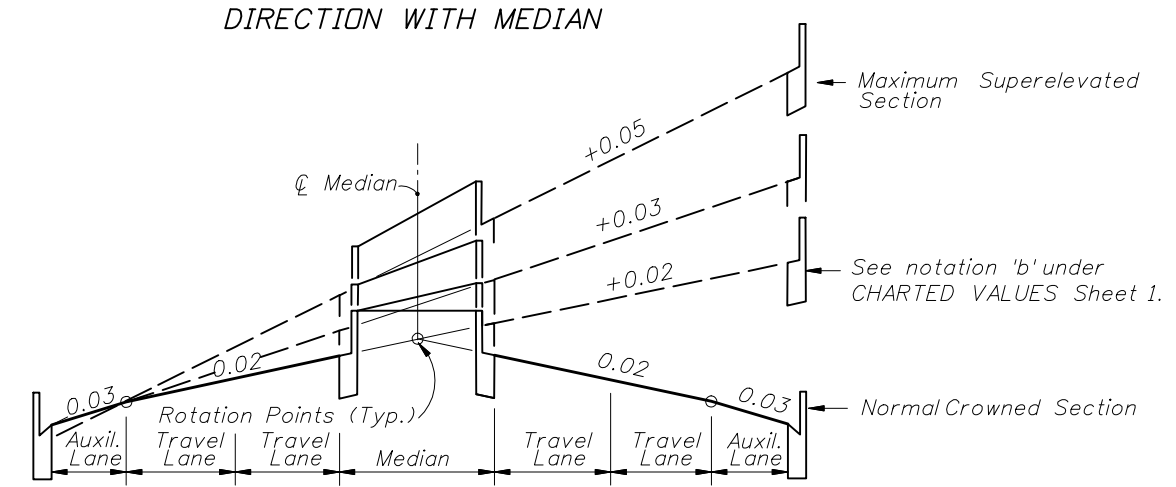
TWO TRAVEL LANES EACH DIRECTION



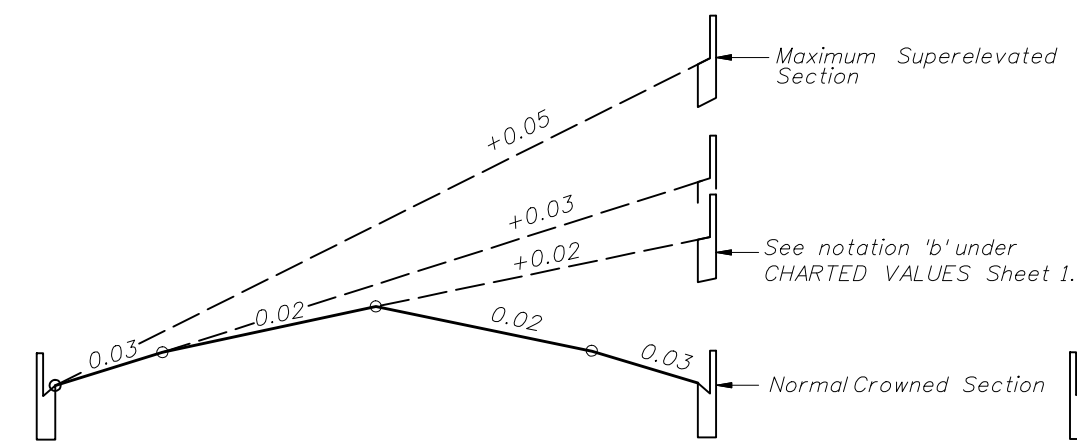
TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN



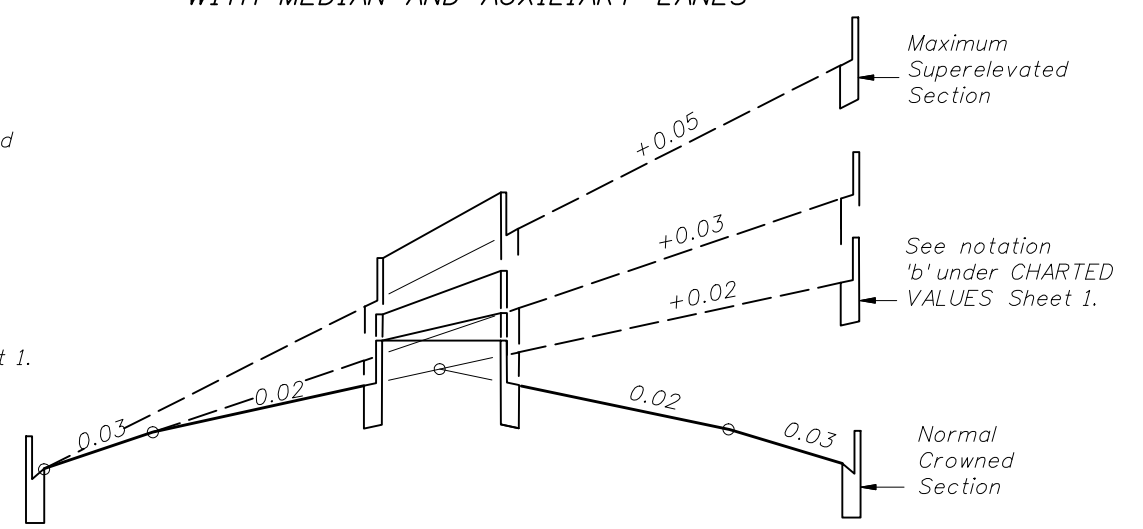
TWO TRAVEL LANES EACH DIRECTION WITH AUXILIARY LANES



TWO TRAVEL LANES EACH DIRECTION WITH MEDIAN AND AUXILIARY LANES

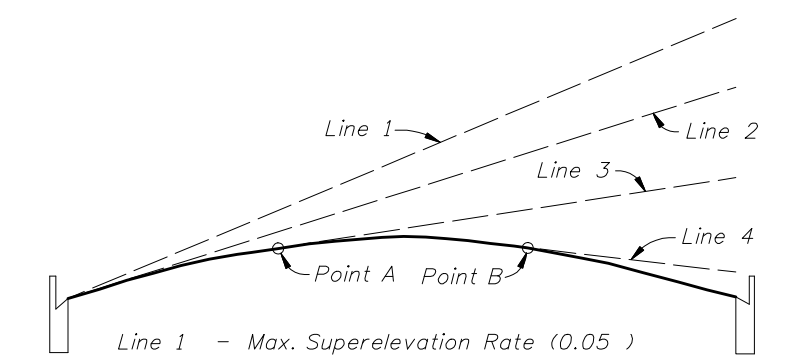


UNDIVIDED FACILITIES



THREE TRAVEL LANES EACH DIRECTION WITH MEDIAN

DIVIDED FACILITIES



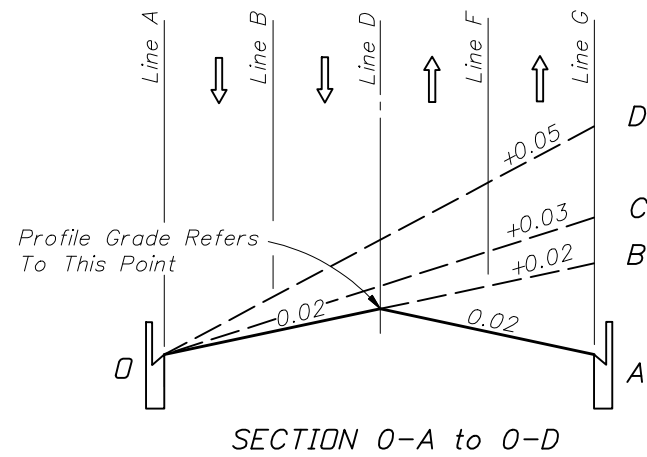
- Line 1 - Max. Superelevation Rate (0.05)
- Line 2 - Slope of Parabola at Inside Edge of Pavt.
- Line 3 - Positive Superelevation Rate Less Than Max. Slope of Parabola.
- Line 4 - Adverse Superelevation.

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

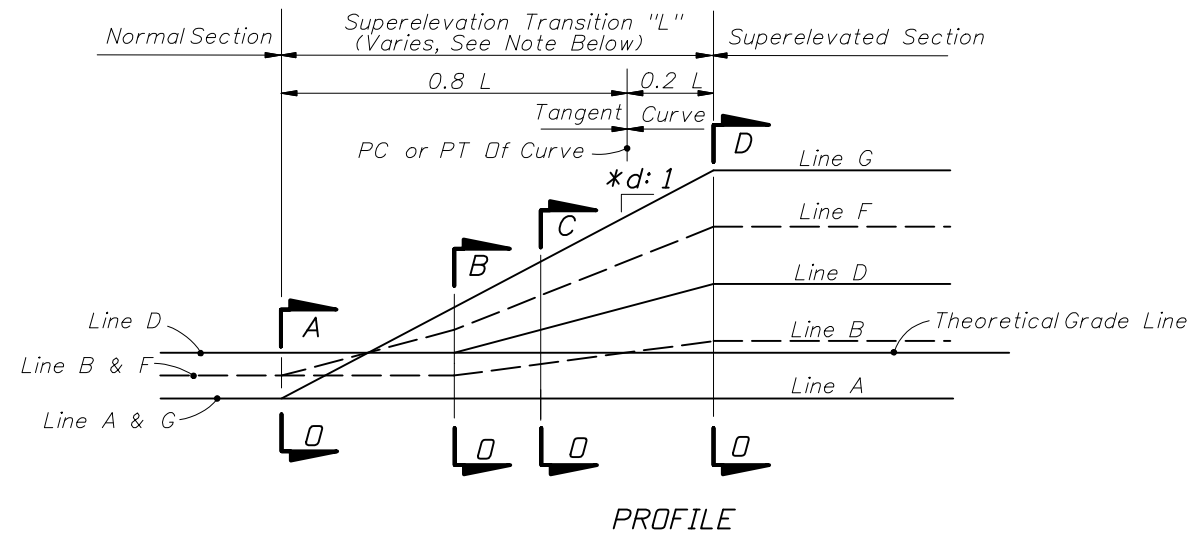
**SUPERELEVATION TRANSITION SECTIONS
FOR URBAN HIGHWAYS AND HIGH SPEED URBAN STREETS**





SECTION 0-A to 0-D

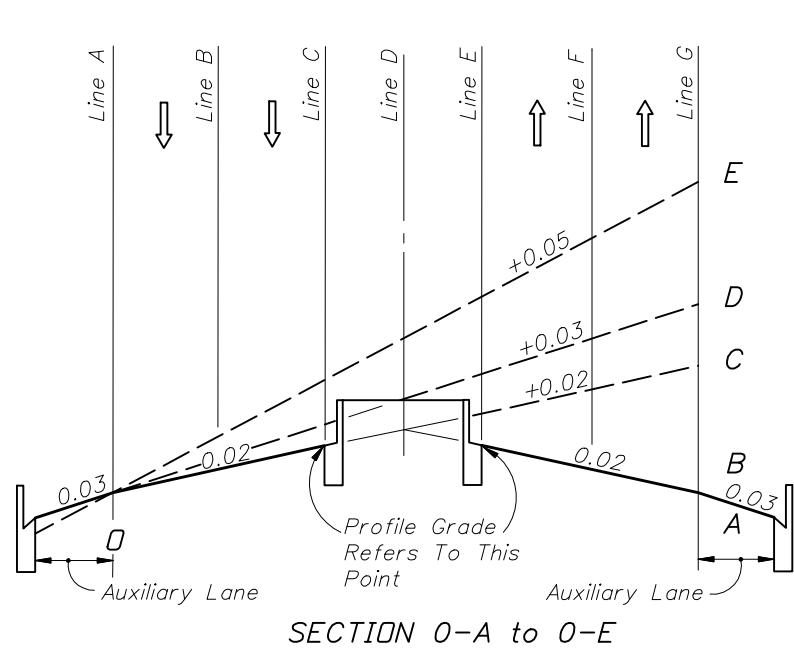
TWO LANES EACH DIRECTION



PROFILE

LINE	DESCRIPTION
A	Inside Travel Lane
B	Inside Lane Line
C	Inside Median Edge Pavement
D	℄ Construction
E	Outside Median Edge Pavement
F	Outside Lane Line
G	Outside Travel Lane

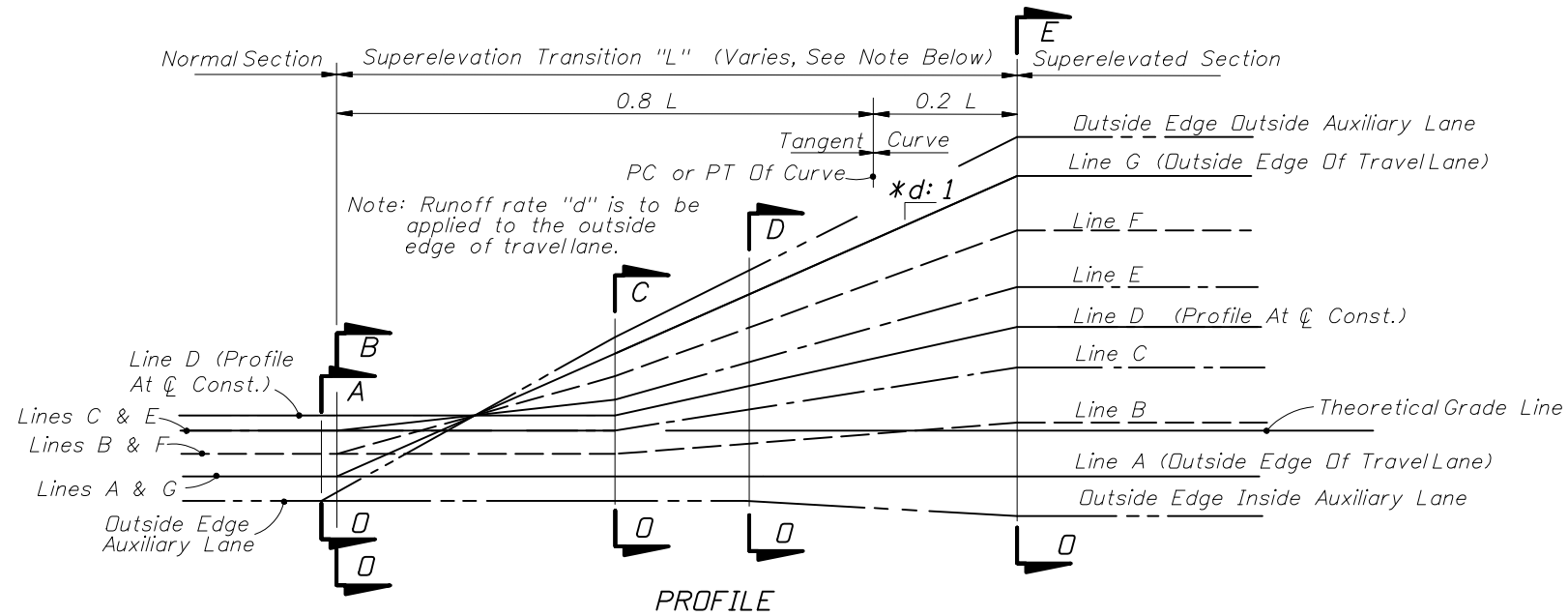
Inside And Outside Are Relative To Curve Center



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.

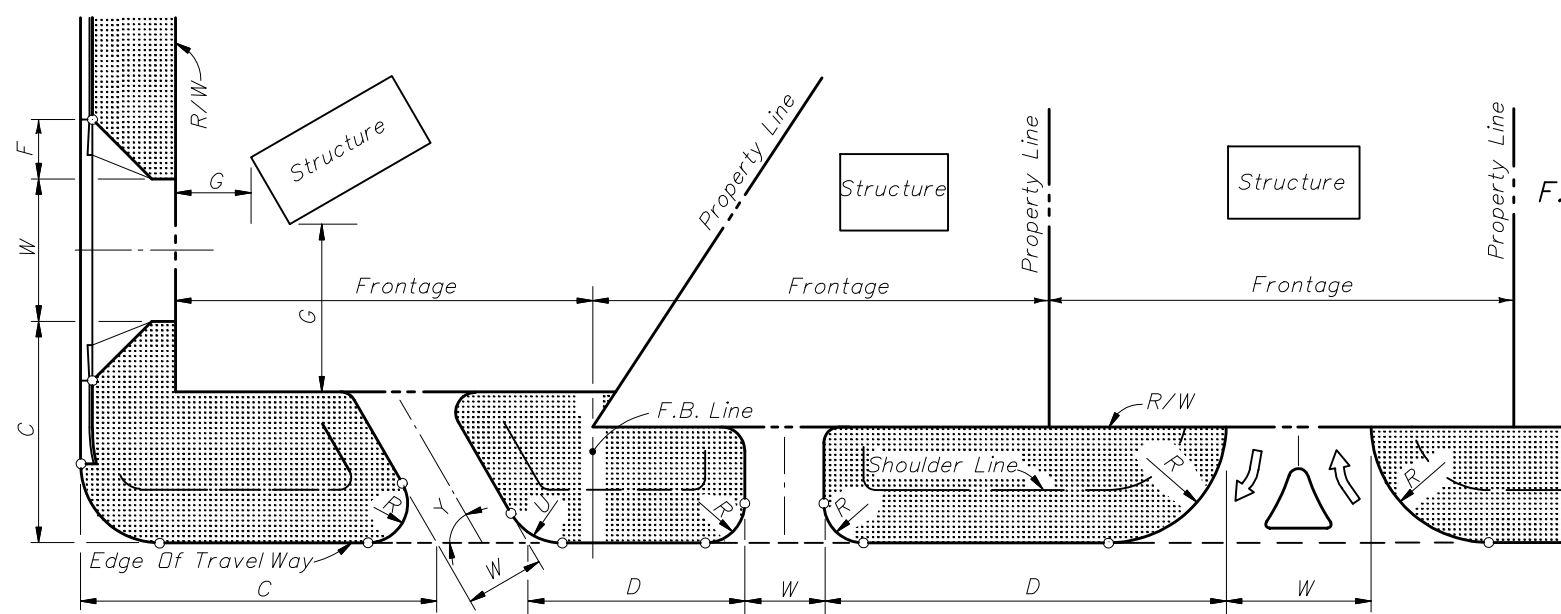
GENERAL USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS



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.

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	△	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>△ 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>						

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 connections that are intended to daily accommodate either multi-unit vehicles or single unit vehicles exceeding 30' in length, returns with 50' radii are to be used, unless otherwise called for in the plans or otherwise stipulated by permit. Where large numbers of multi-unit vehicles will use the connection, the connection width and radii are to be increased and auxiliary lanes, tapers, lane flares, separators and/or islands constructed, as determined by the Department to be necessary for safe turning movements.

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.

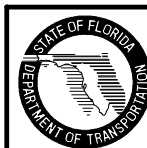
9. For new connections and for connections on all new construction and reconstruction projects, pavement materials and thicknesses shall meet the requirements applicable to either that detailed for "Urban Flared Turnouts", or, that described in "Table 515-1" for connections with radial returns and/or 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.

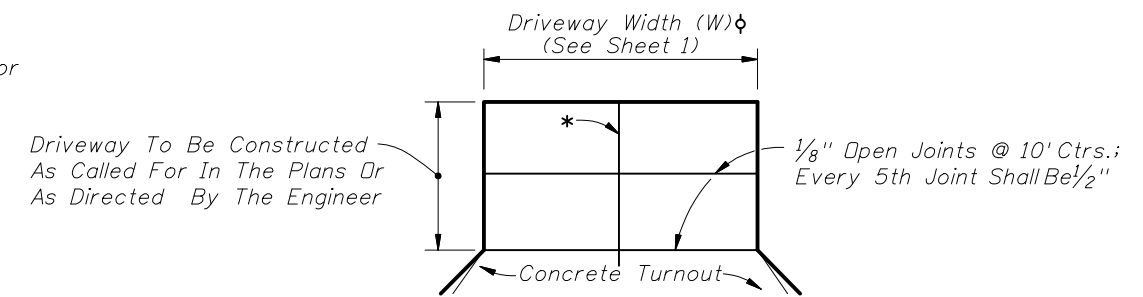
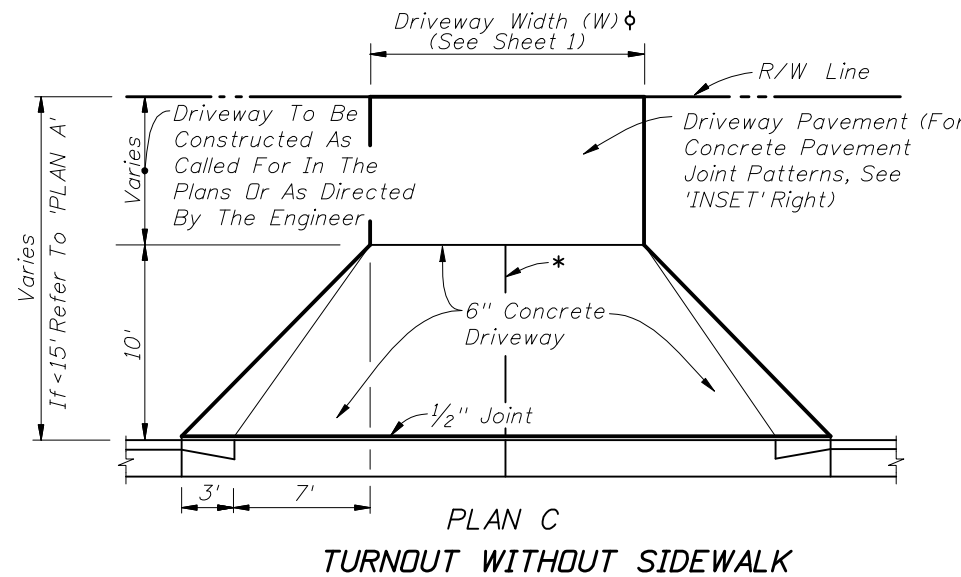
* 1/8" Open joints placed at equal (20' max.) intervals for driveways over 20' wide. Joints in curb and gutter to match joints in driveways.

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.

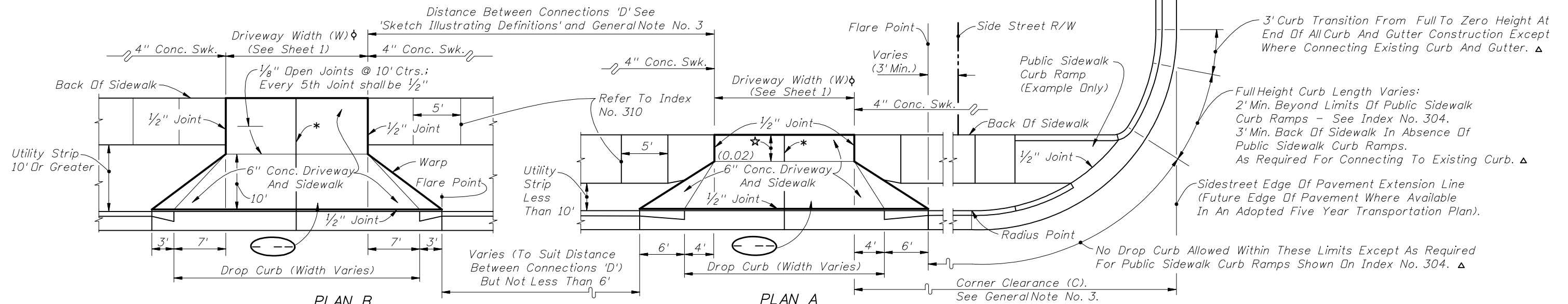
φ Driveways (6" concrete) shall be of a uniform width (W) to the right of way line.

☆ 4' Min., May be reduced to 3' Min. in restricted conditions when approved by the Engineer.

⊖ Alpha-numeric identification of a flared driveway type specifically called for in the plans, see sheets 3 and 4.



JOINT PATTERN WHEN CONCRETE DRIVE CONSTRUCTED INSET



**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



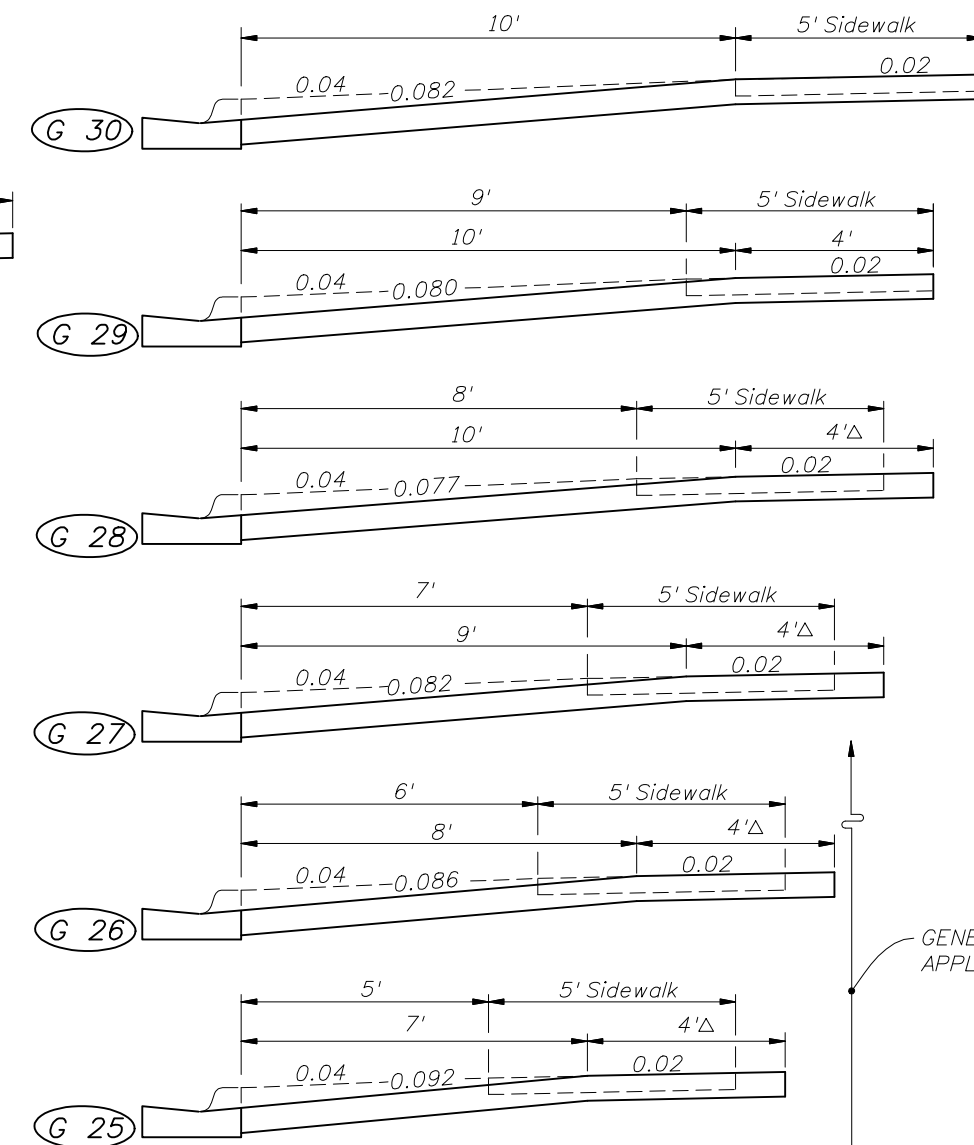
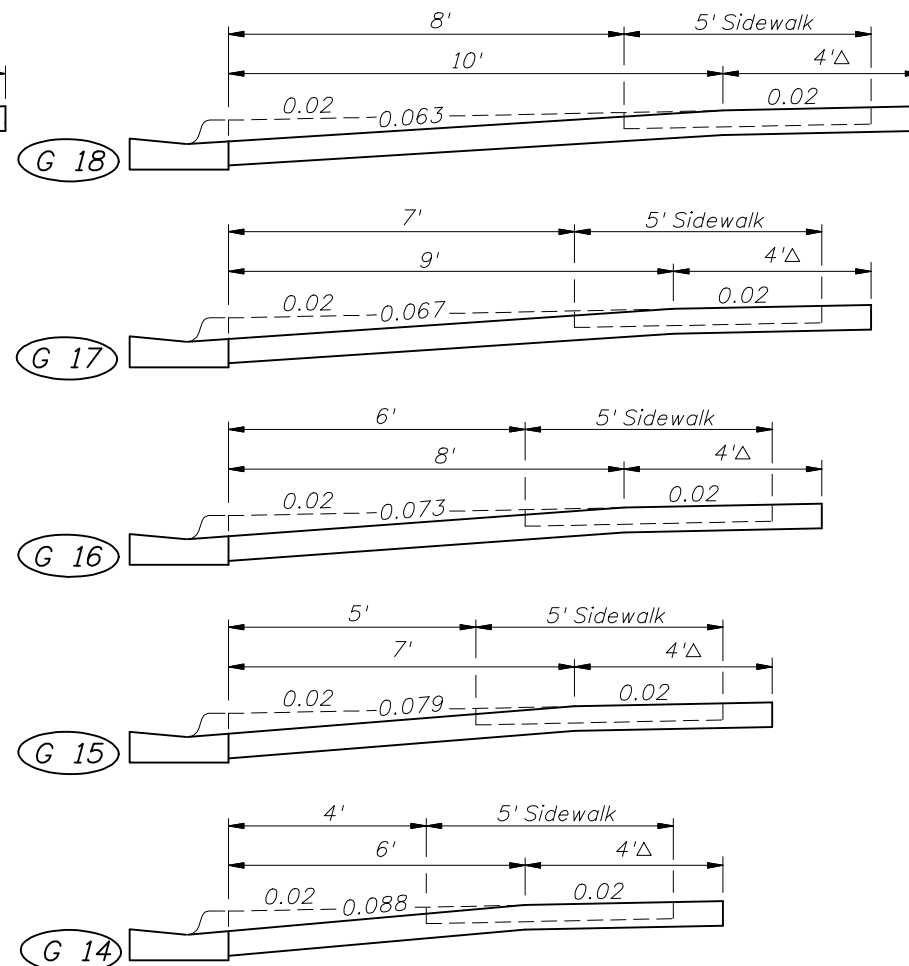
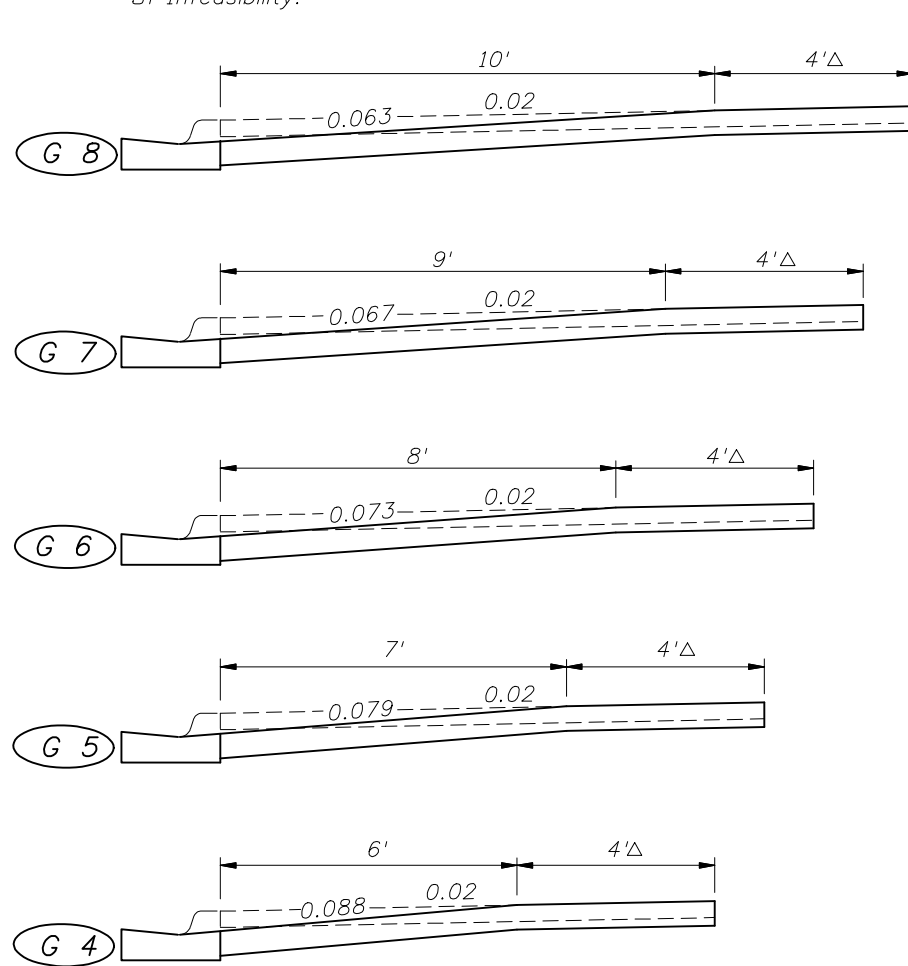
2010 FDOT Design Standards

TURNOUTS

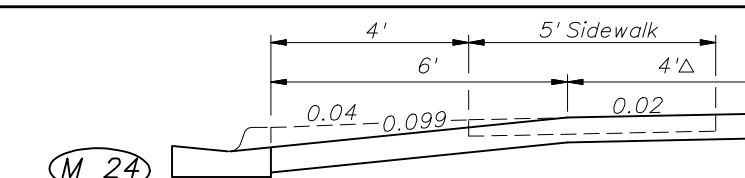
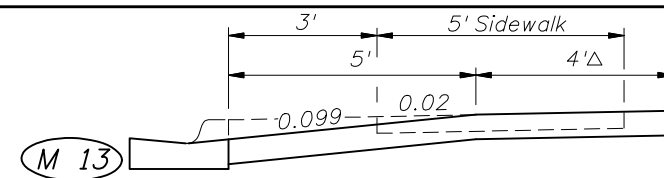
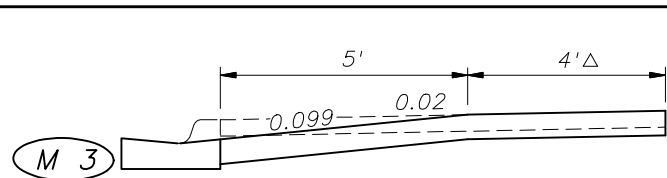
Last Revision	Sheet No.
07/01/05	2 of 7
Index No.	
515	

* See 'DESIGN NOTES FOR URBAN FLARED TURNOUTS' On Sheet 2.

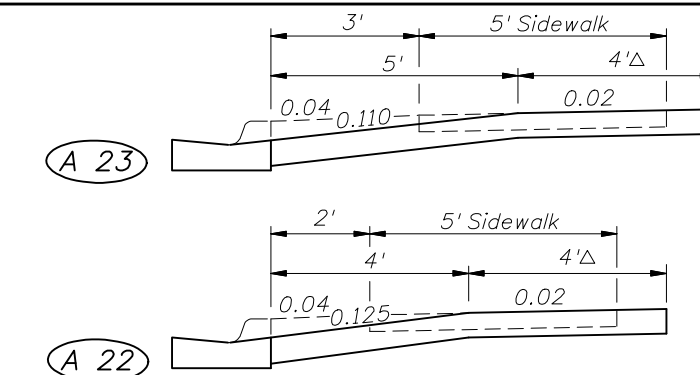
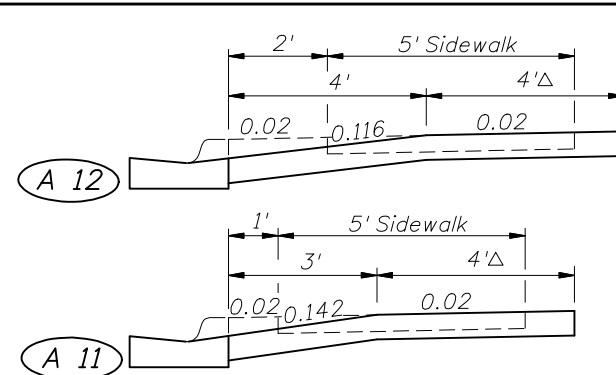
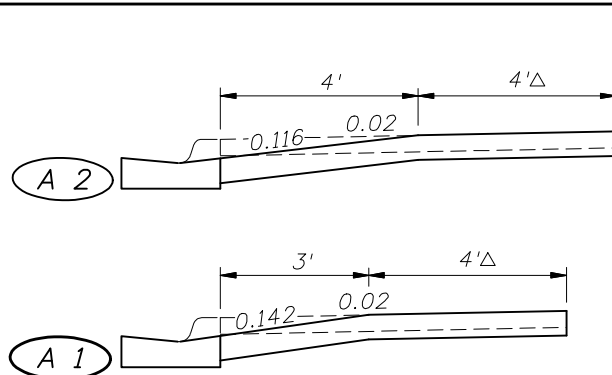
△ May Be Reduced To 3' Min. In Restricted Conditions When Approved By The Engineer. Depth Less Than 3' Allowable Only Under Findings Of Infeasibility.



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)

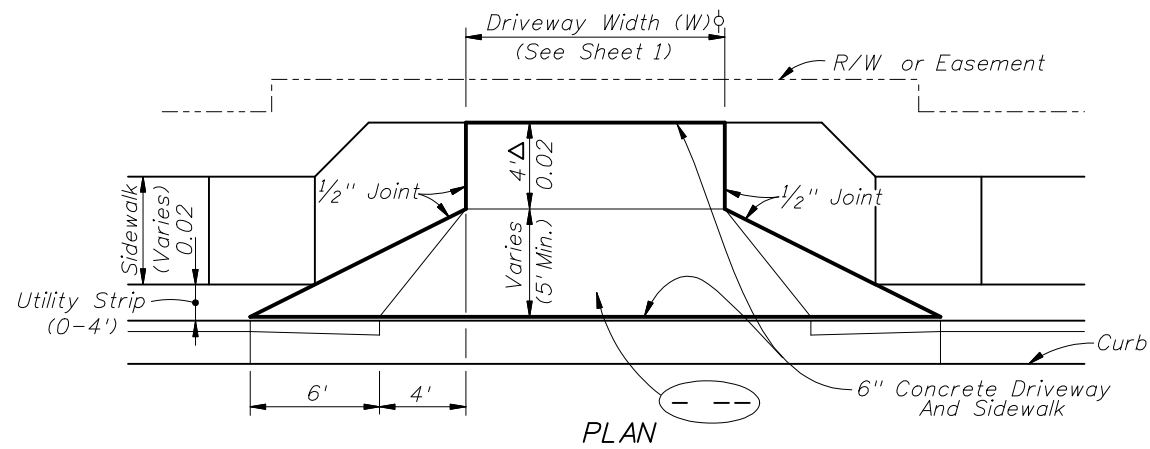
SIDEWALK ADJACENT TO CURB

SIDEWALK WITH UTILITY STRIP ON 0.02 SLOPE

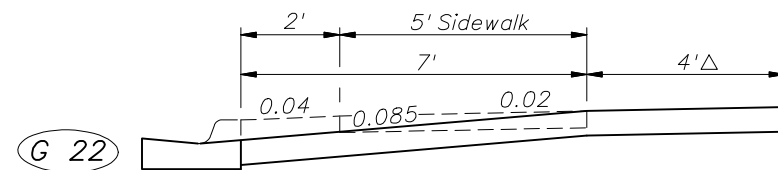
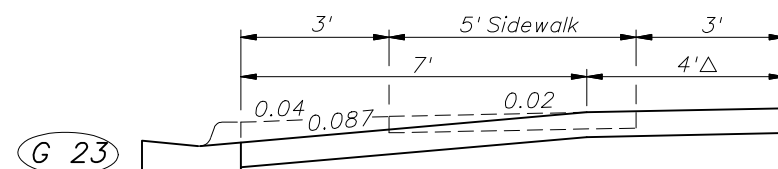
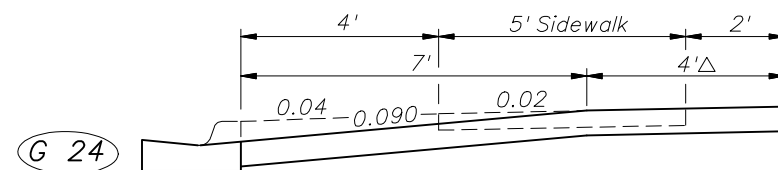
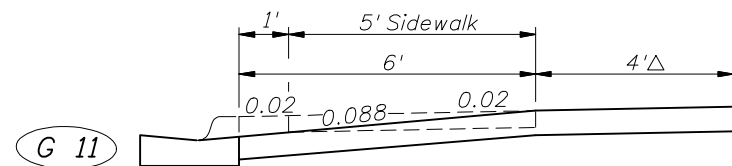
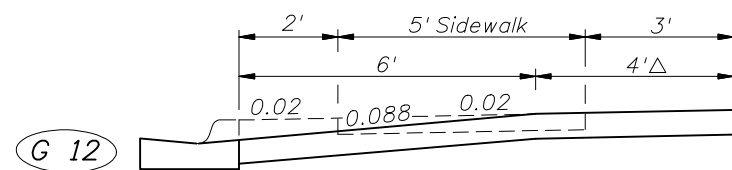
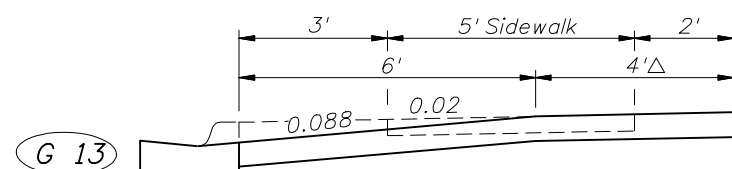
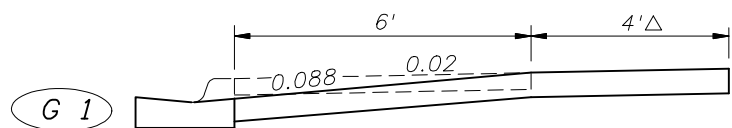
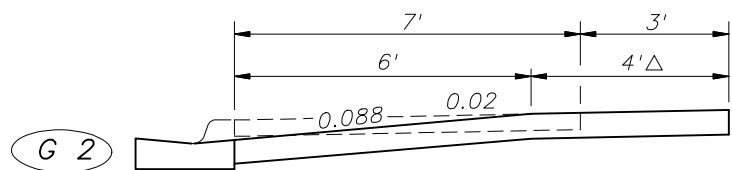
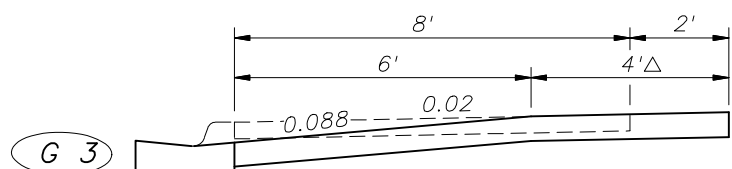
SIDEWALK WITH UTILITY STRIP ON 0.04 SLOPE

DRIVEWAY SECTIONS ON CURBED FACILITIES WITH SIDEWALKS

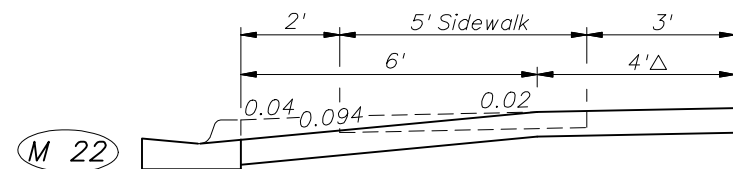
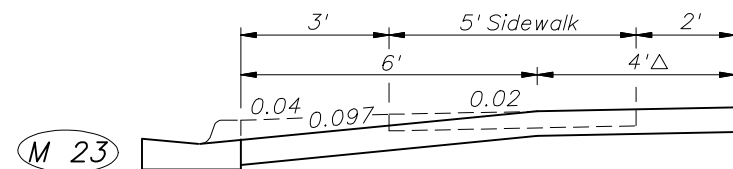
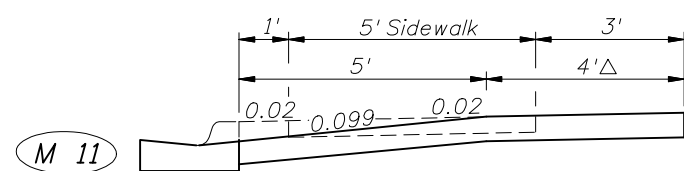
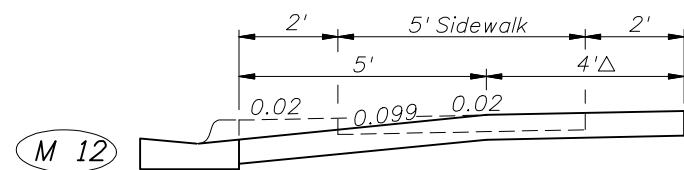
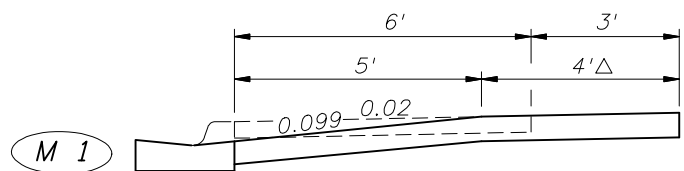
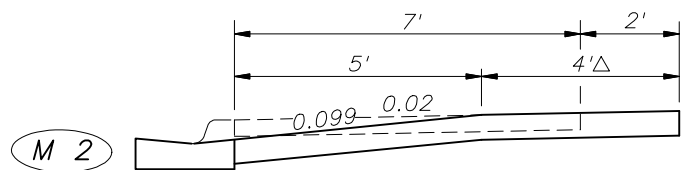




MODIFICATIONS OF 'ADVERSE' AND 'MARGINAL' APPLICATIONS



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

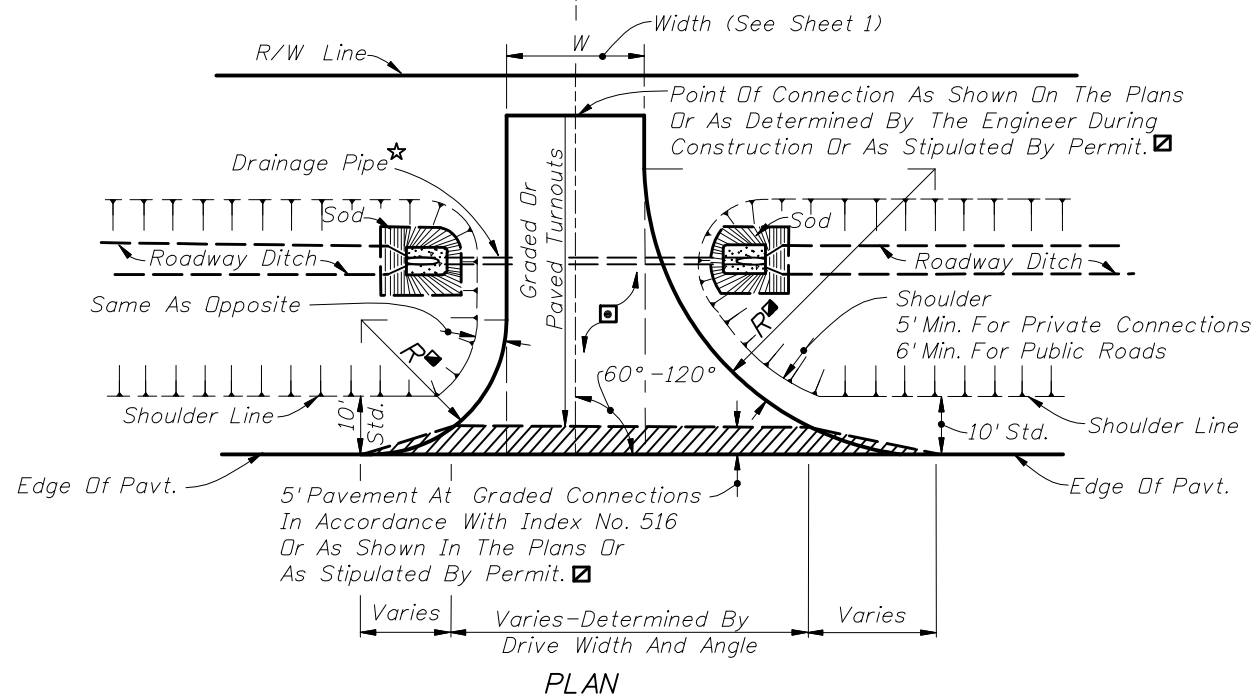
MODIFICATIONS TO ADVERSE AND MARGINAL SECTIONS

* 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.

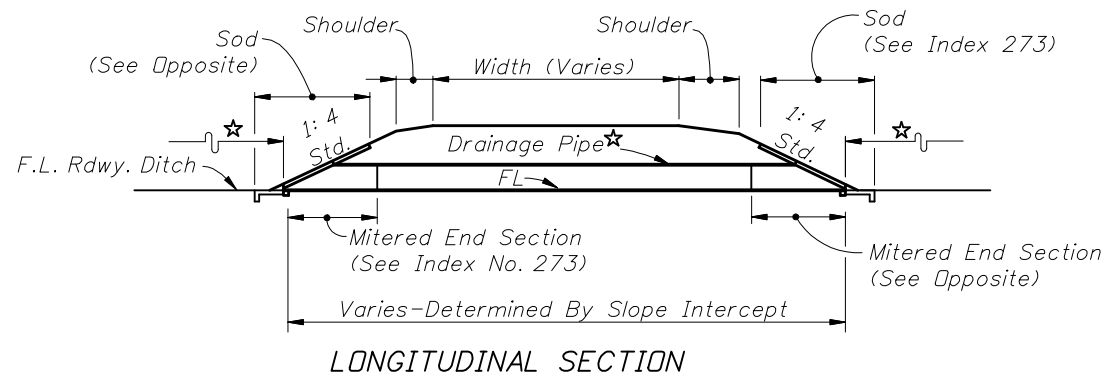


Typical Half Section For Low Volume/Residential Connections

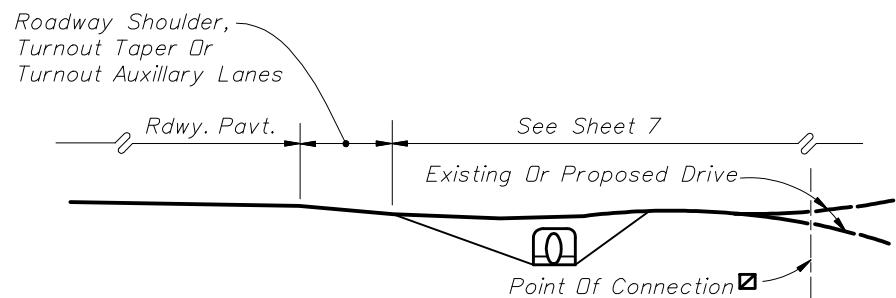
Typical Half Section For Higher Volume Connections



PLAN

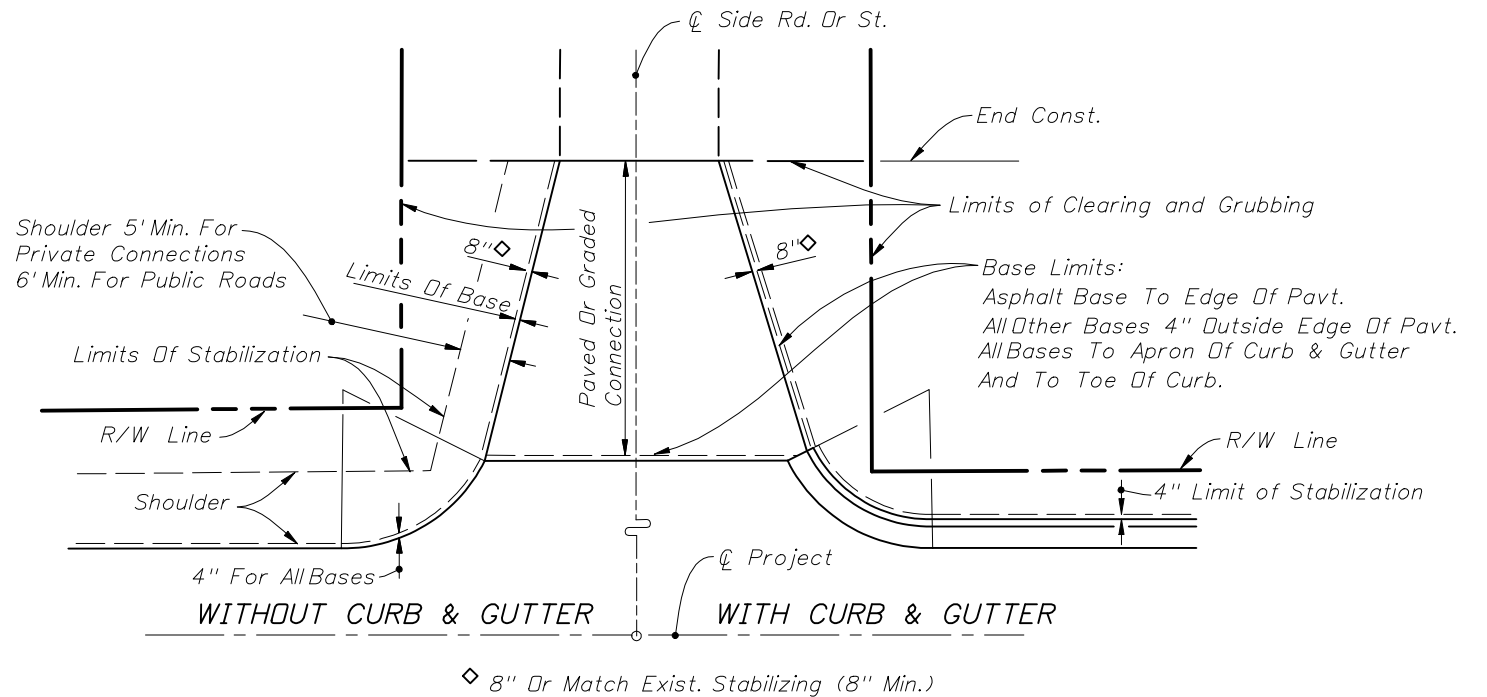


LONGITUDINAL SECTION



PROFILE AND END VIEW

RURAL TURNOUT CONSTRUCTION



LIMITS OF CLEARING & GRUBBING, STABILIZING AND BASE AT INTERSECTIONS

★ 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.



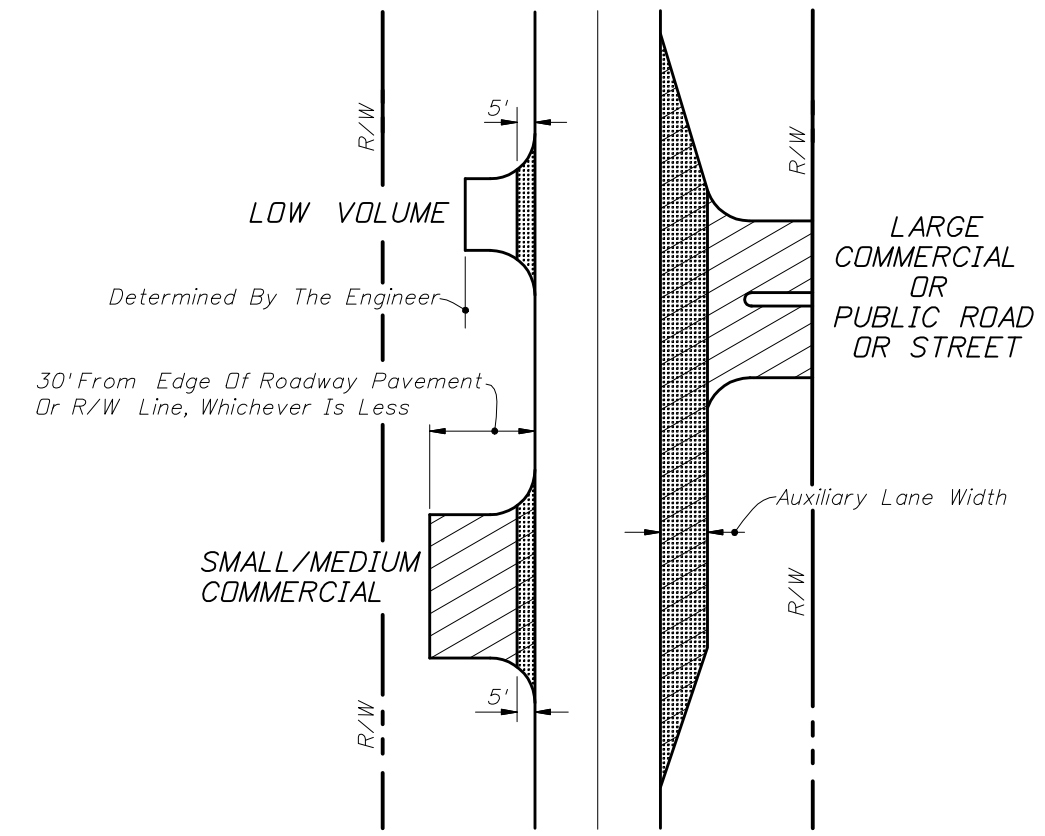
MATERIAL TYPES AND THICKNESSES IN DRIVING AREAS FOR RURAL AND URBAN CONNECTIONS			
Course	Materials ^②	Thickness (in.) ^①	
		Connections ^③	Roadway ^④
Structural	Asphaltic Concrete	1"	1½"
Bases	Optional Base (See Index No. 514)	O.B.G. 1	O.B.G. 3

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**



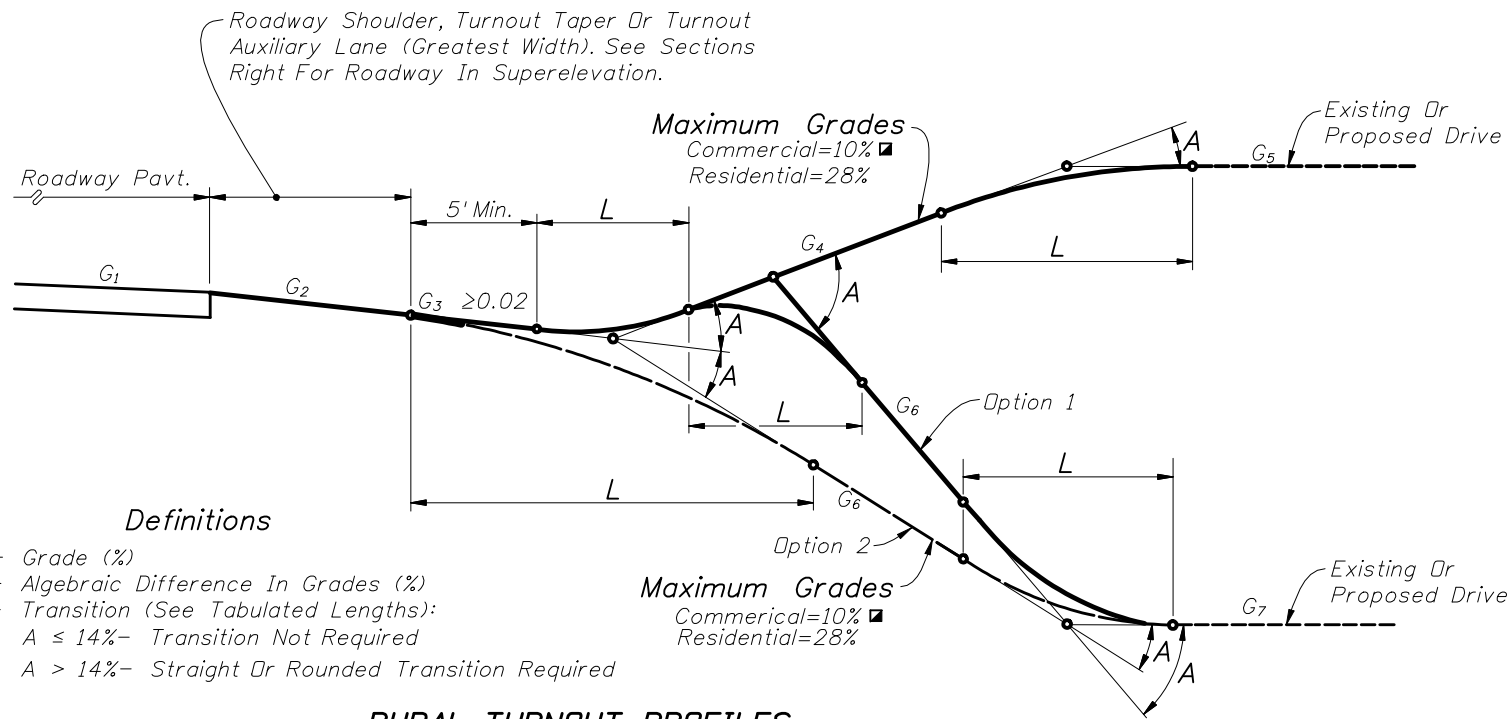
LEGEND

- Graded Or Paved
- Required Paving
- Limits Of Department Maintenance

- 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**

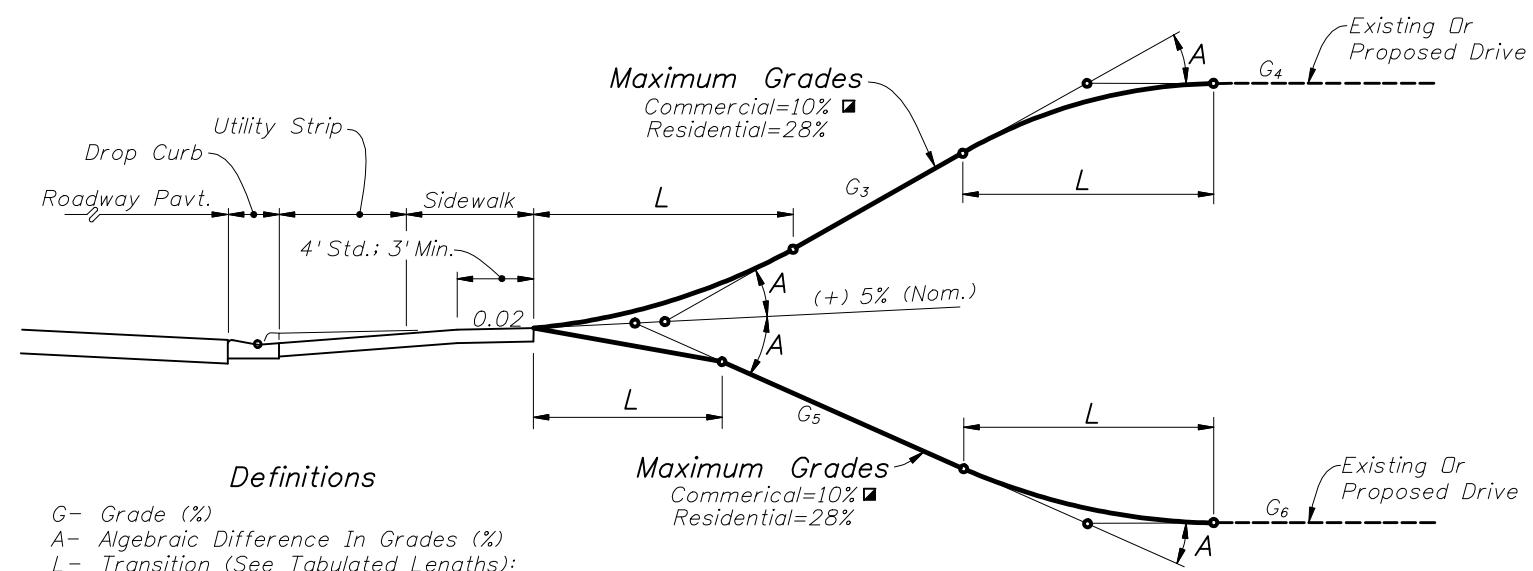




Definitions

- 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.

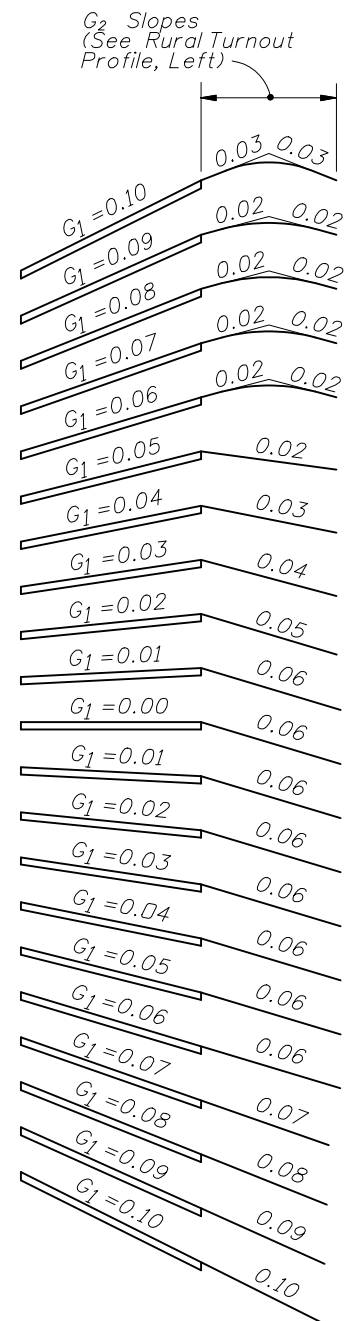
Desirable: Desirable minimum lengths. } Greater lengths than minimum and desirable
Minimum: Absolute minimum lengths. } are recommended where practical for flatter and smoother profile.

RECOMMENDED TURNOUT PROFILE TRANSITION LENGTHS (L) (FT.)

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.

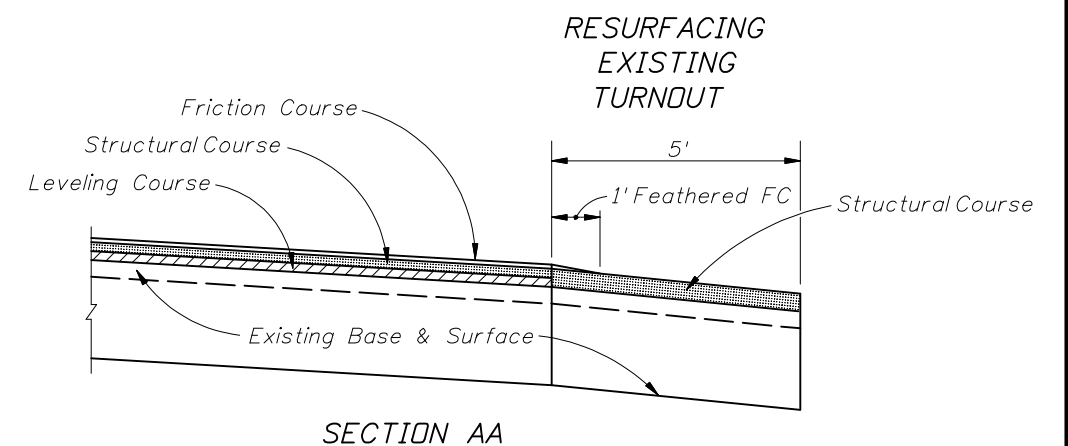
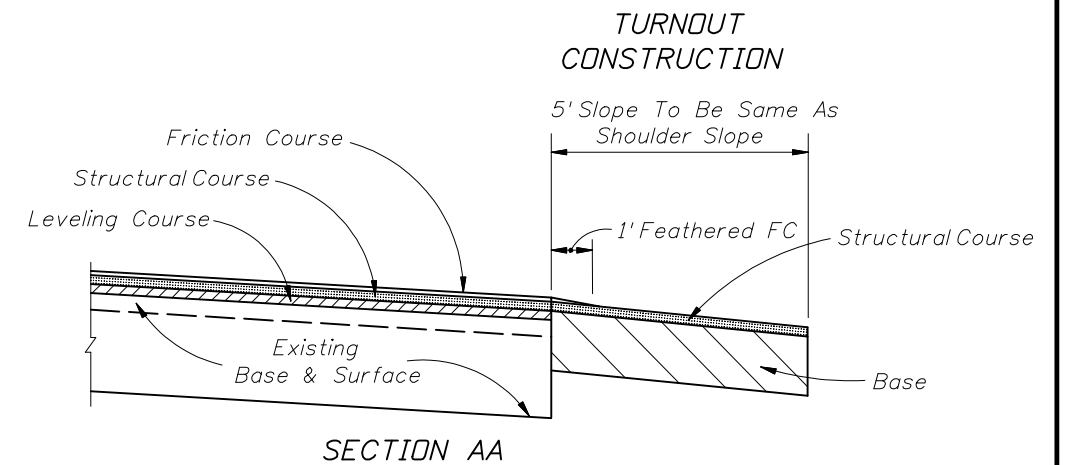
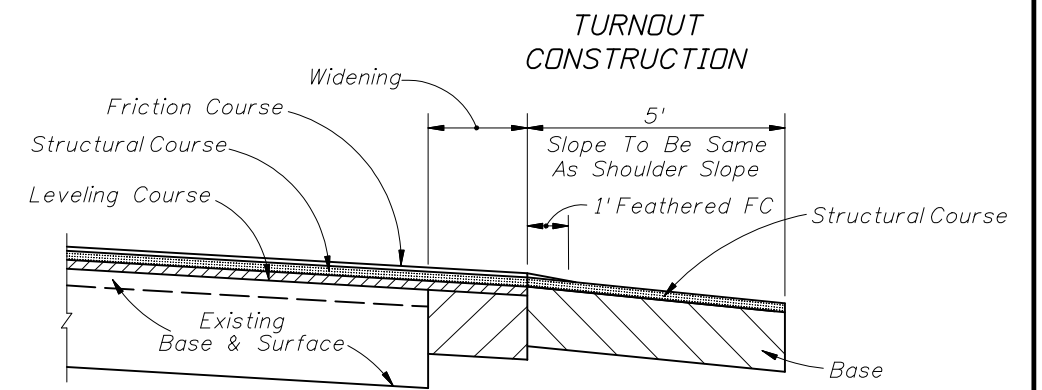
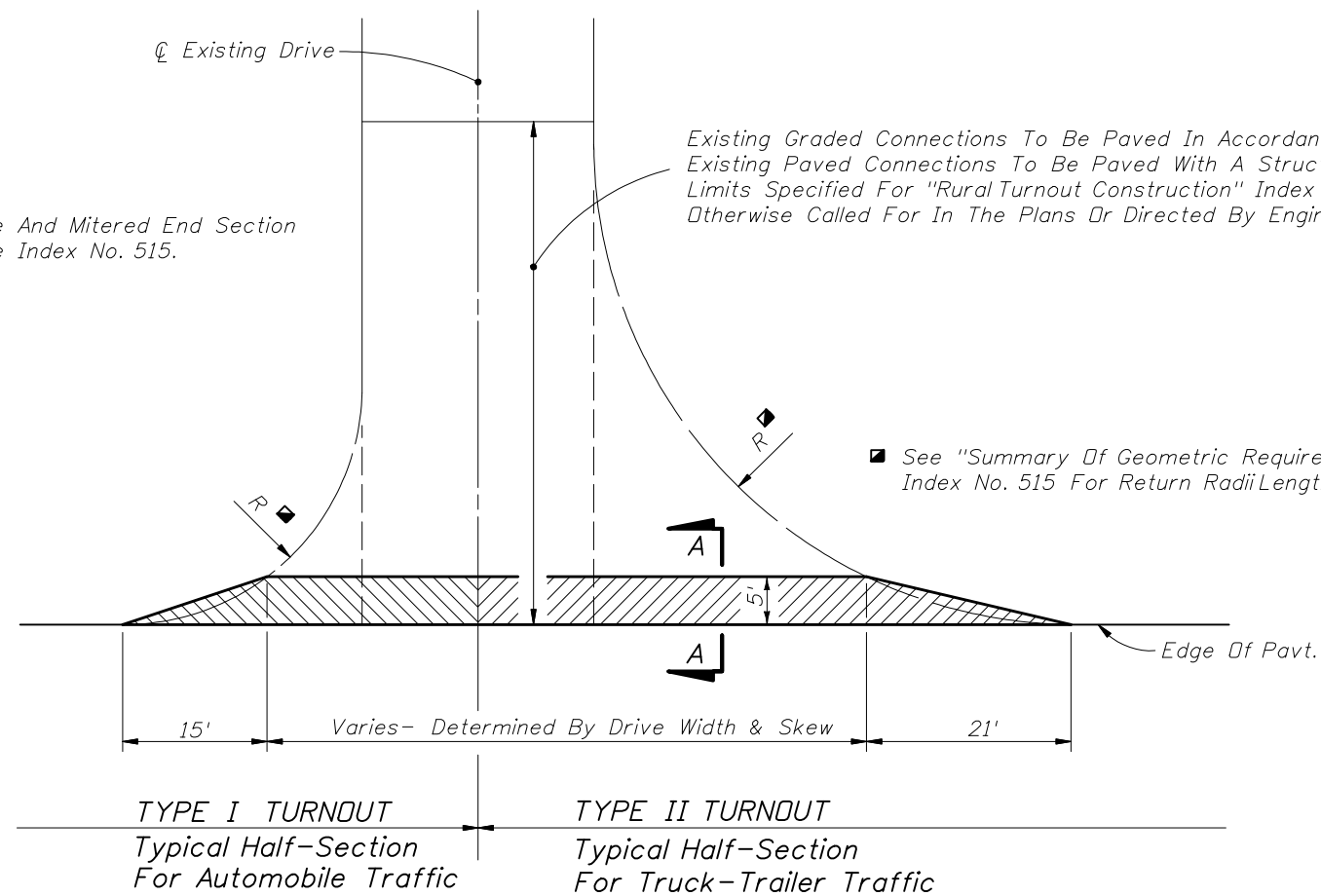
TURNOUT PROFILES



ROADWAY PAVEMENT SLOPES AND SLOPES OF ABUTTING RURAL TURNOUT SURFACES (G_2) SUPERELEVATION SECTIONS



For Drainage Pipe And Mitered End Section Requirements See Index No. 515.



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

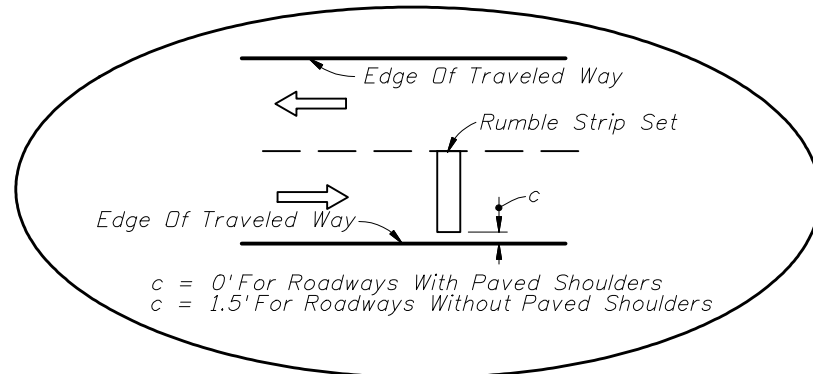
Notes:

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

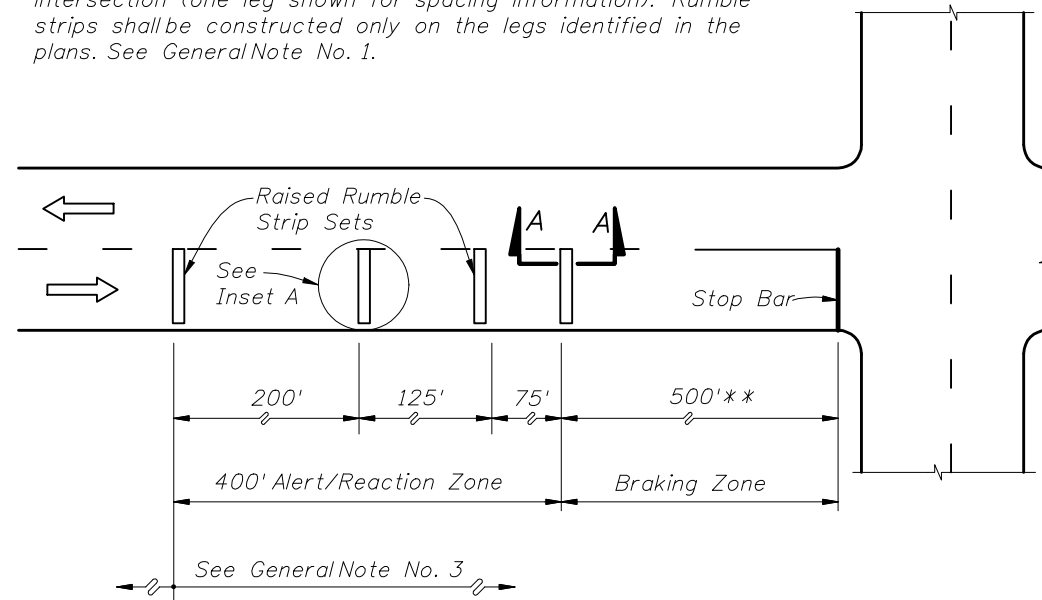
1. Raised rumble strips shall be constructed on all paved shoulders approaching structures, where the structure shoulder width is less than the usable shoulder width of the approach roadway. Raised rumble strips at intersections shall be constructed only when specified in the plans.
See Index 17359 for 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

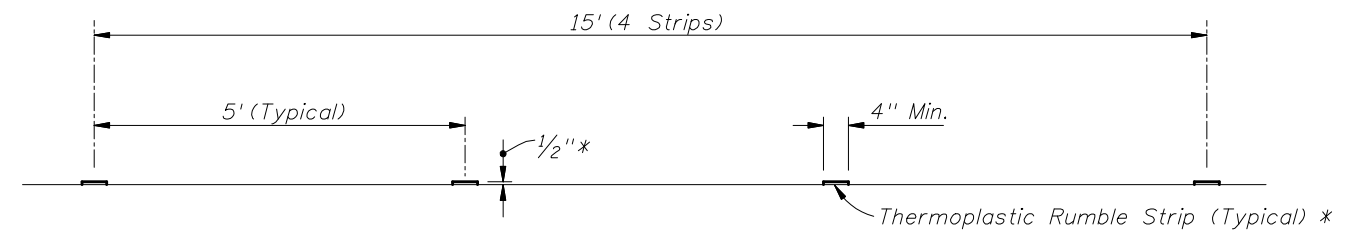
INSET A

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.



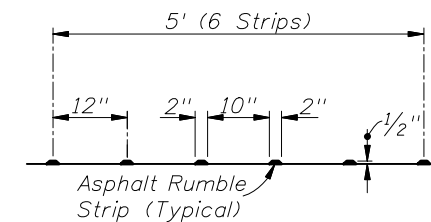
** May be decreased in urban areas with low operating speeds.

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.

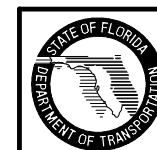
THERMOPLASTIC SET



ASPHALT SET

SECTION AA • FOR THERMOPLASTIC AND ASPHALT RUMBLE STRIP SETS

RAISED RUMBLE STRIPS AT INTERSECTIONS

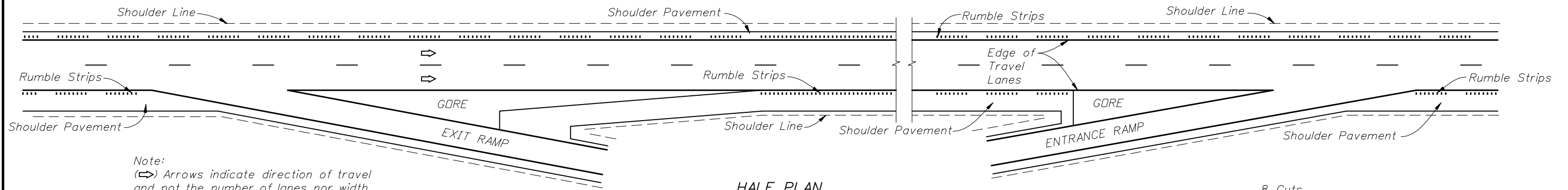


2010 FDOT Design Standards

RUMBLE STRIPS

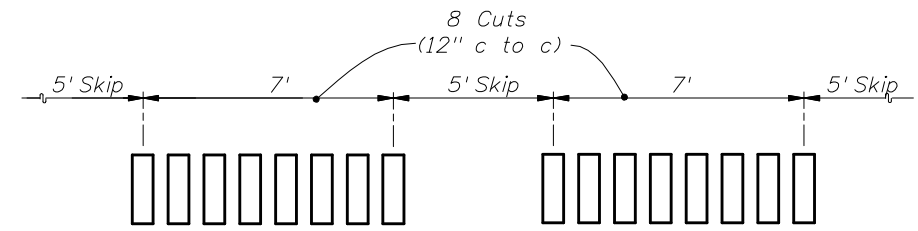
Last Revision 07/01/09 Sheet No. 1 of 3

Index No. 518



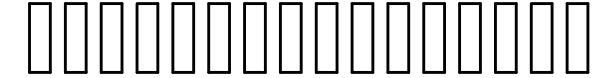
Note:
 (⇒) Arrows indicate direction of travel and not the number of lanes nor width of median shoulder pavement.

HALF PLAN
 LIMITED ACCESS FACILITIES
 SHOULDER GROUND-IN RUMBLE STRIP PLACEMENT



SKIP ARRAY

Continuous Cuts (12" c to c)



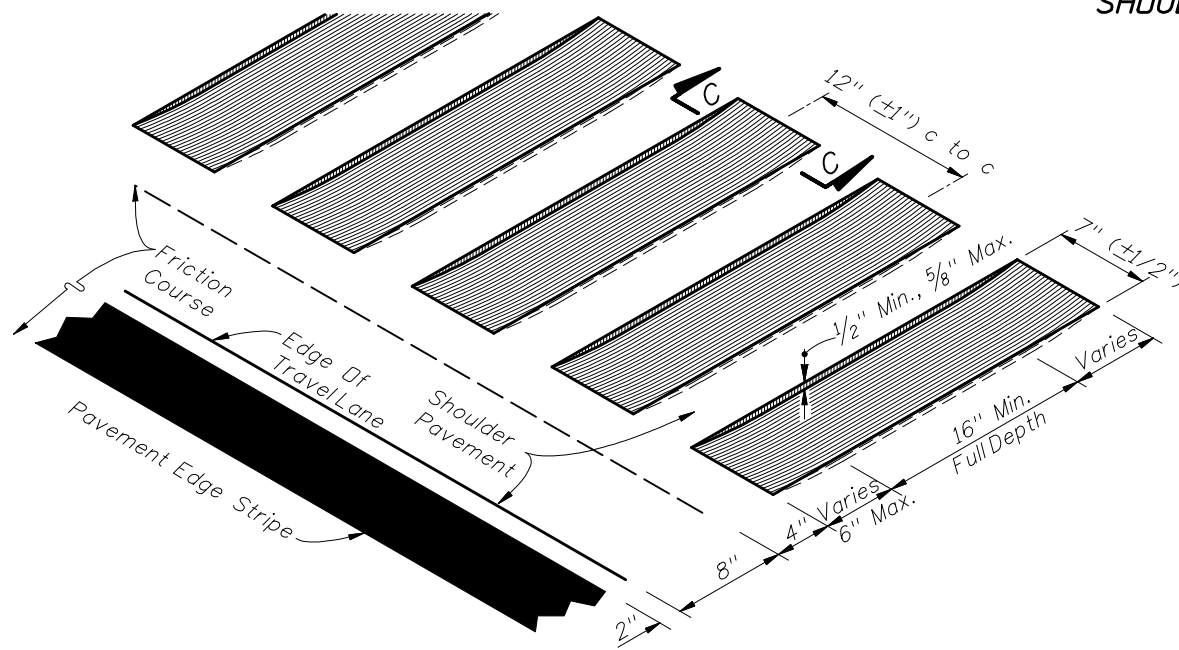
CONTINUOUS ARRAY
 ARRAYS

GENERAL NOTES FOR
 SHOULDER GROUND-IN RUMBLE STRIPS

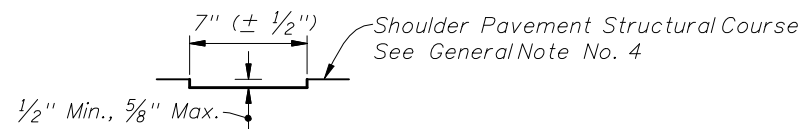
1. Ground-in rumble strips shall be constructed on limited access facilities.
2. The skip array is the standard array. The continuous array shall be constructed in advance of bridge ends for a distance of 1000', or back to the gore recovery area for mainline interchange bridges; and constructed at other 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

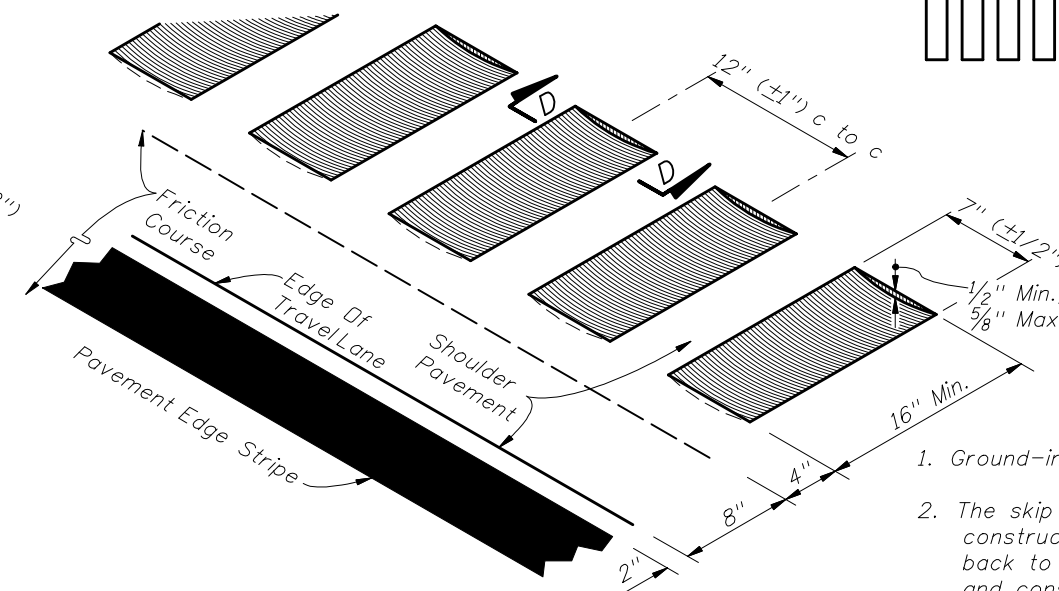
1. The rumble strips described on this sheet are intended for use on flexible pavement shoulders. When constructing ground-in rumble strips on existing rigid (concrete) shoulders, no rumble strips shall be located closer than 6" from any pavement joint. When specifying ground-in rumble strips on existing 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.



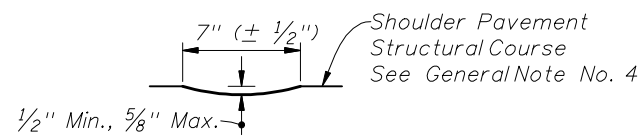
ISOMETRIC - TRANSVERSE CUT



SECTION CC
 TRANSVERSE CUT



ISOMETRIC - LONGITUDINAL CUT

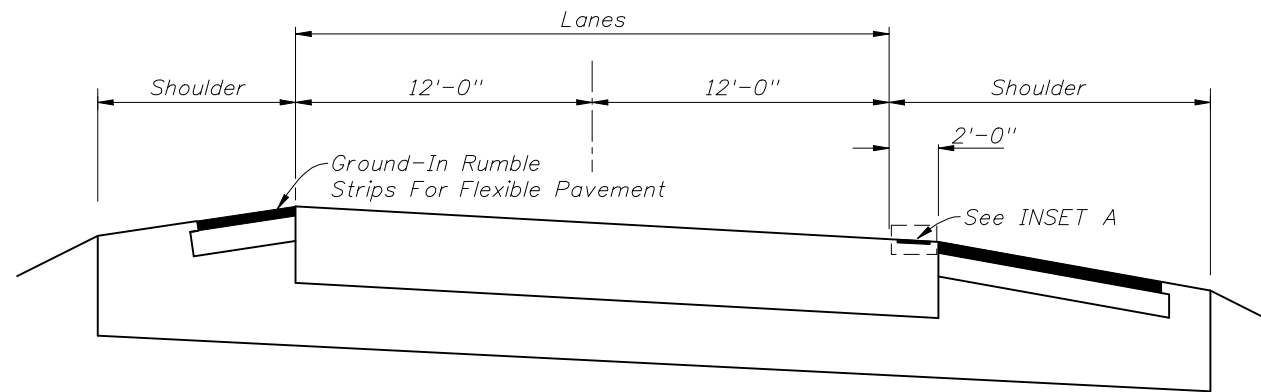


SECTION DD
 LONGITUDINAL CUT

LOCATION ALONG SHOULDER (FLEXIBLE PAVEMENT)

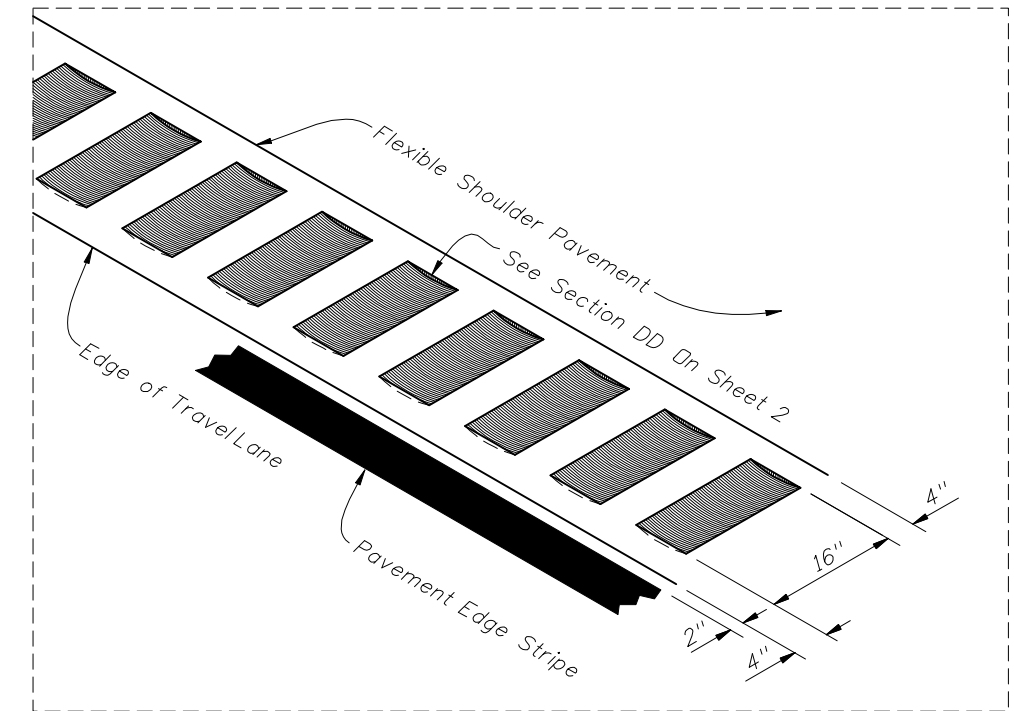
SHOULDER GROUND-IN RUMBLE STRIPS





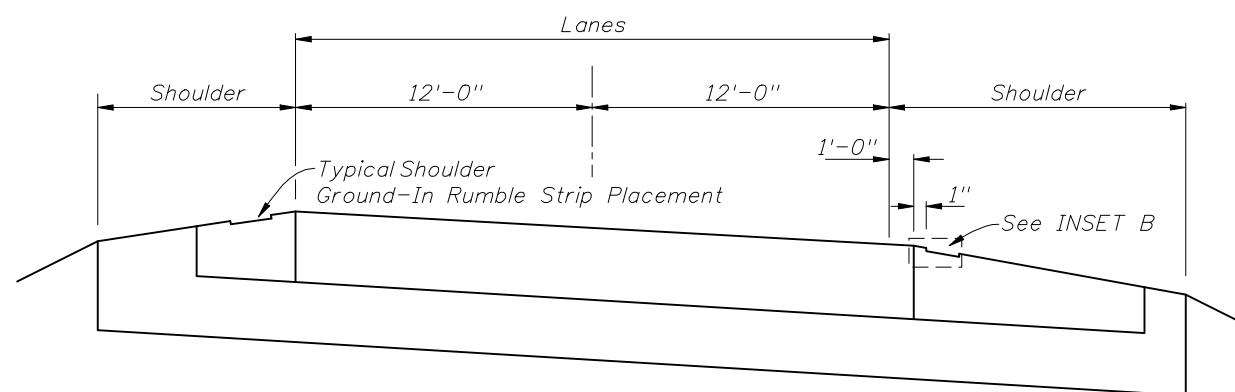
NTS

RIGID PAVEMENT WITH FLEXIBLE PAVEMENT SHOULDER



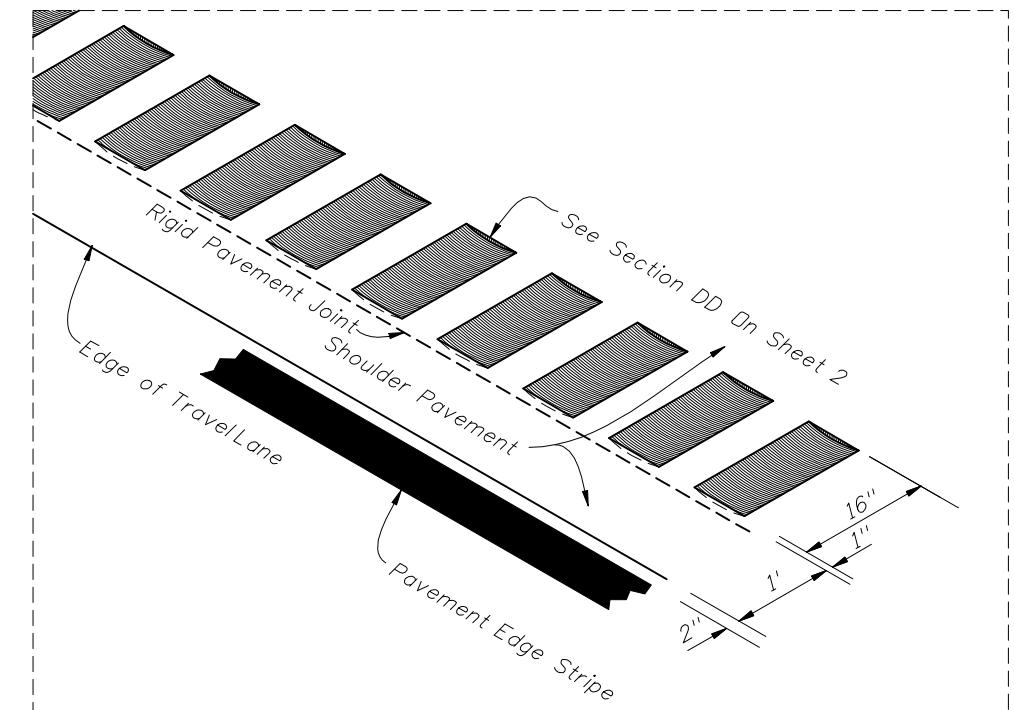
ISOMETRIC - LONGITUDINAL CUT

INSET A



NTS

RIGID PAVEMENT WITH RIGID PAVEMENT SHOULDER



ISOMETRIC - LONGITUDINAL CUT (RIGID PAVEMENT)

INSET B



DESIGN NOTES

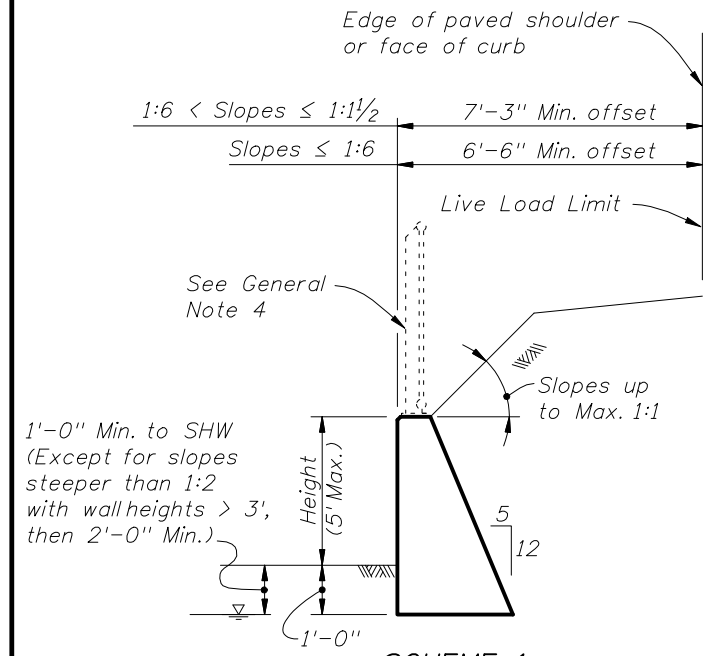
- Gravity wall design is based on the following soil criteria which covers the majority of soil types found in Florida:
 Classification = Cohesionless (Fine Sand)
 Friction Angle = 30 Degrees
 Moist Unit Weight of Backfill = 120 lbs./cu. ft.
 Presumptive Allowable Bearing Pressure:
 = 2,500 psf for slopes 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

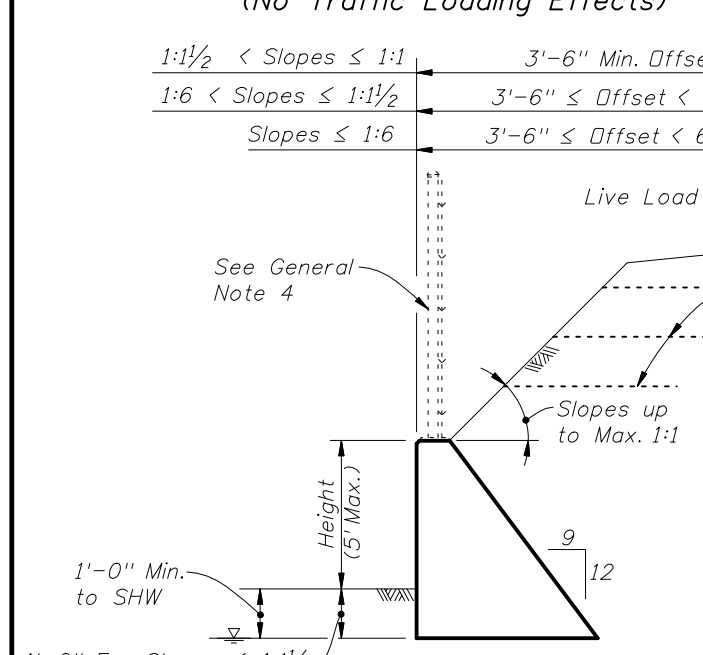
- Gravity walls constructed as extensions of reinforced concrete retaining walls, except walls of proprietary designs, shall have the same face texture and finish as the reinforced concrete retaining wall.
- Concrete for Gravity Wall shall be Class NS per Section 347. Concrete for Scheme 3 Junction Slab 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			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

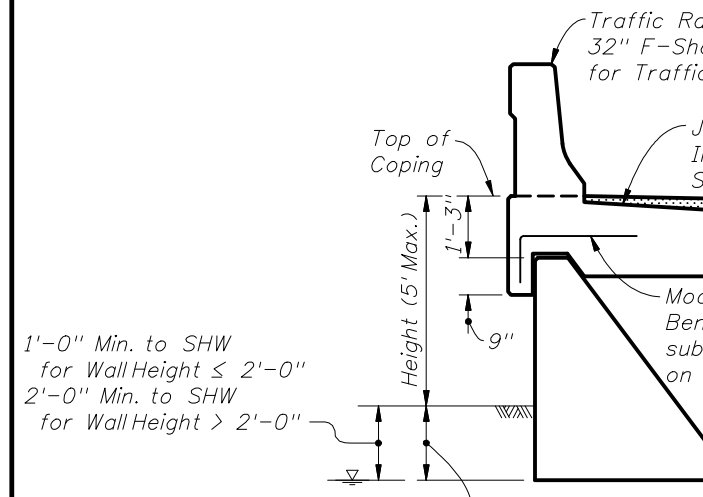
ESTIMATED QUANTITIES NOTES:
 For Scheme 3 Junction Slab and Traffic Railing see the referenced Design Standards for estimated quantities.
 * For 2'-0" Toe Depth in Scheme 2.



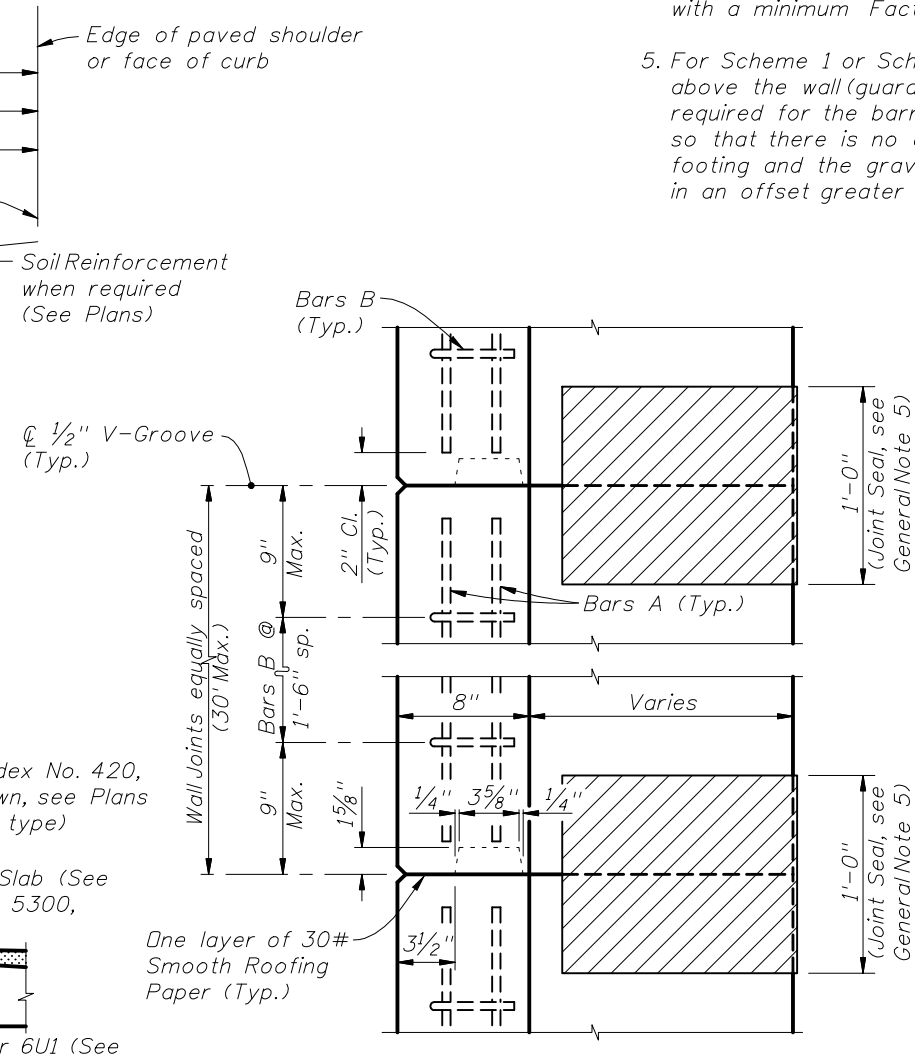
SCHEME 1
(No Traffic Loading Effects)



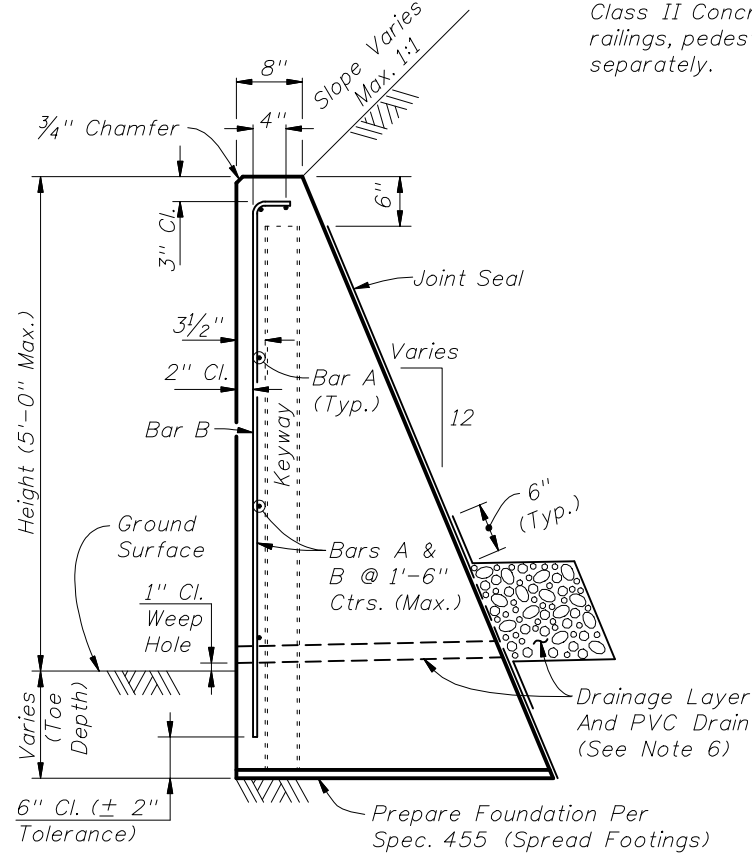
SCHEME 2
(With Traffic Loading or Slopes > 1:1½)



SCHEME 3
(With Traffic Railing)

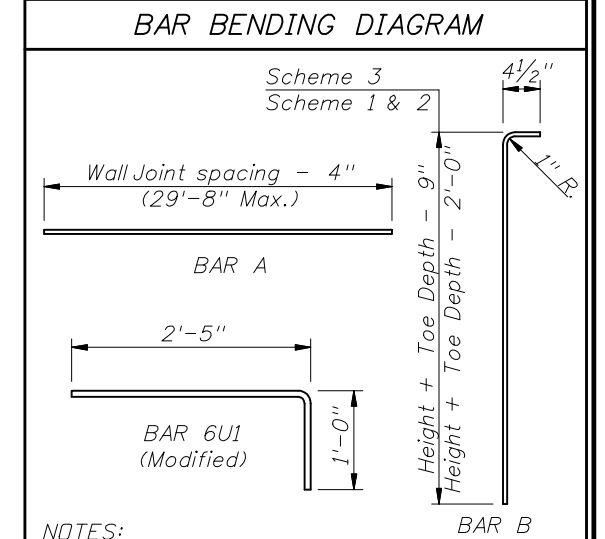


KEYWAY & WALL JOINT DETAIL
(TOP VIEW)

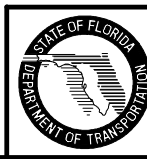


TYPICAL SECTION

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
A	4	As Reqd.
B	4	As Reqd.
UI (Mod.)	6	3'-5"



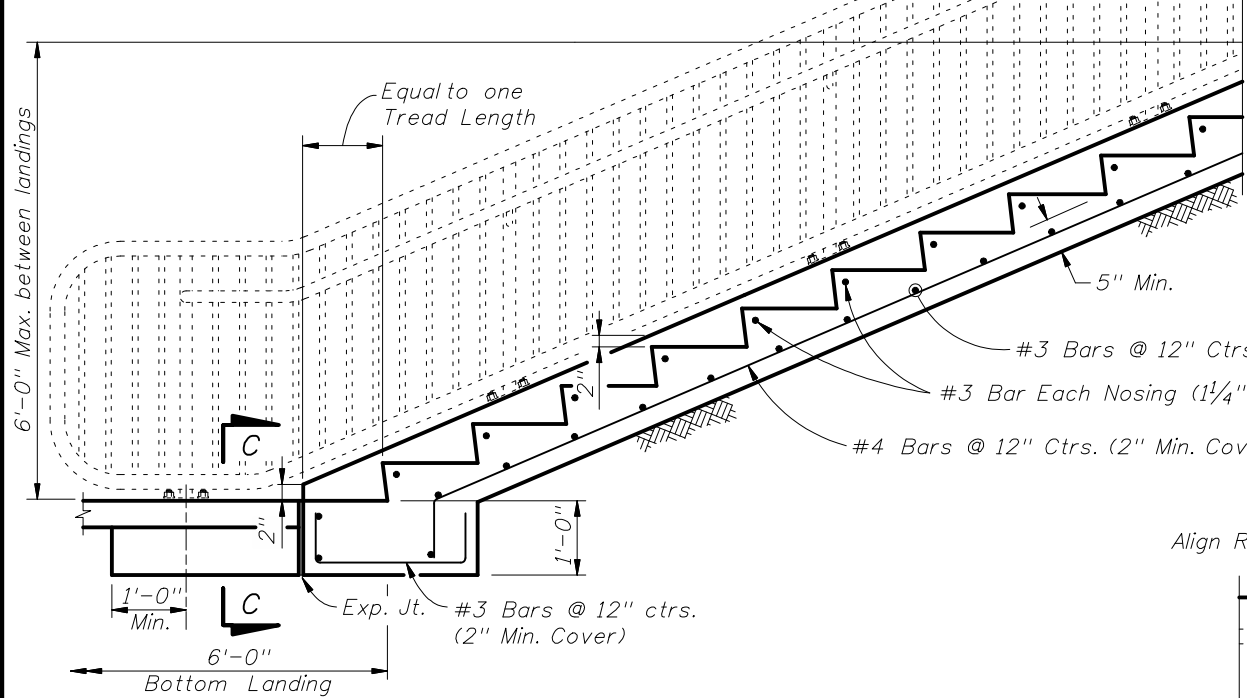
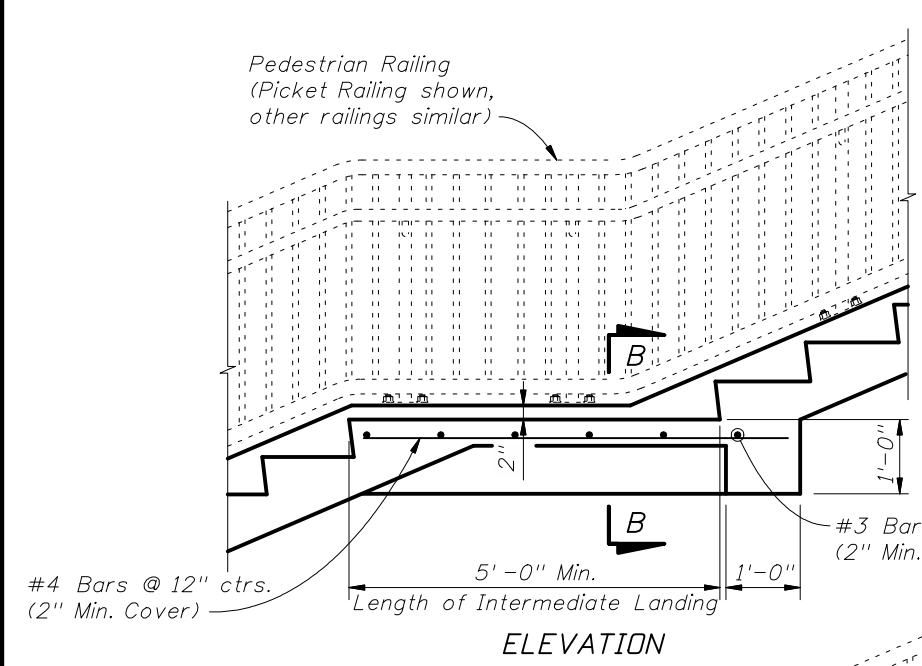
NOTES:
 1. All bar dimensions are out to out.
 2. Lap splices for Bars A must be a minimum of 1'-6".



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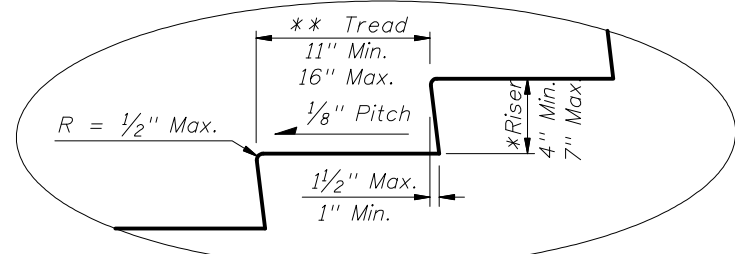
GRAVITY WALL

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 Sheet No. 1 of 1
 Index No. 520



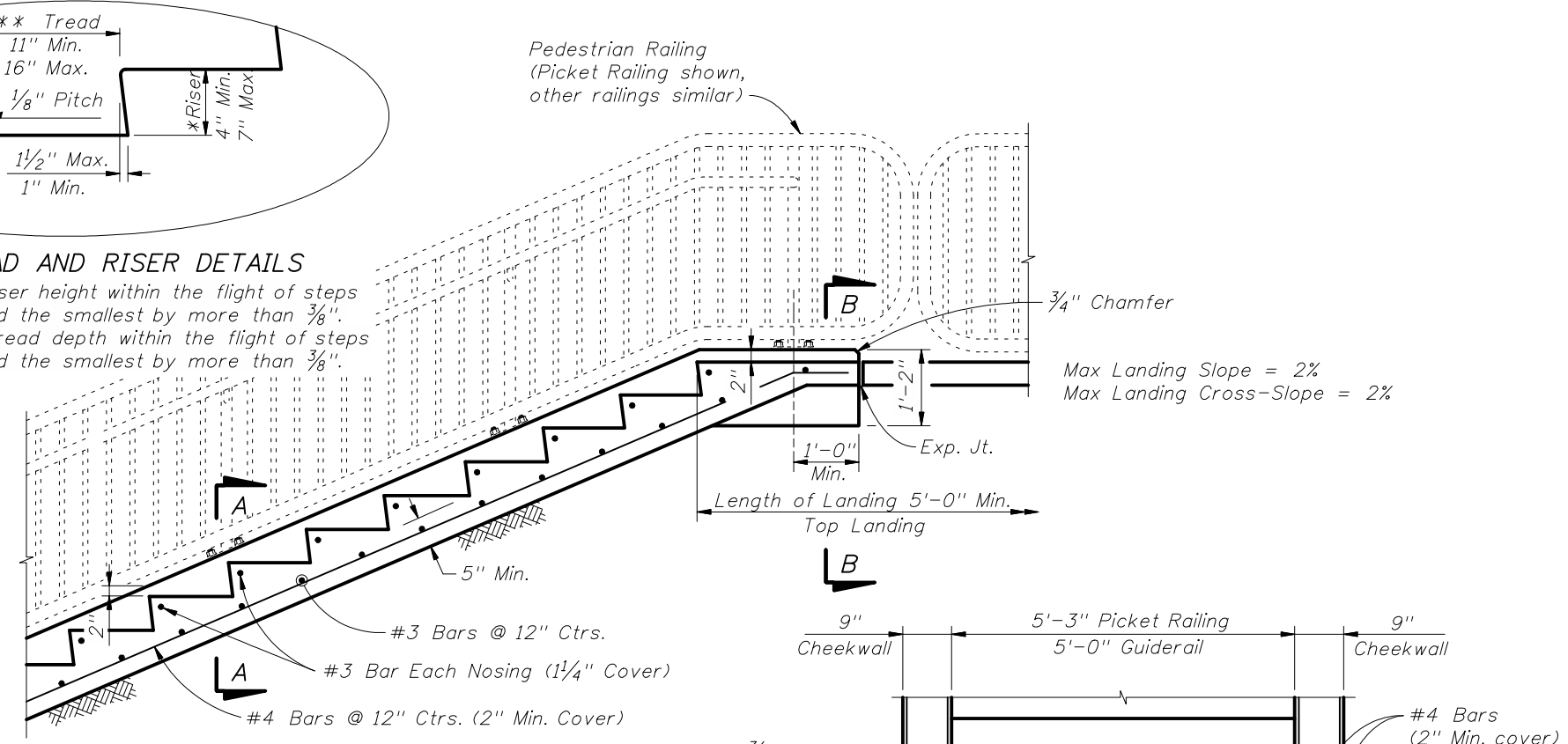
Max Landing Slope = 2%
Max Landing Cross-Slope = 2%

- 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.

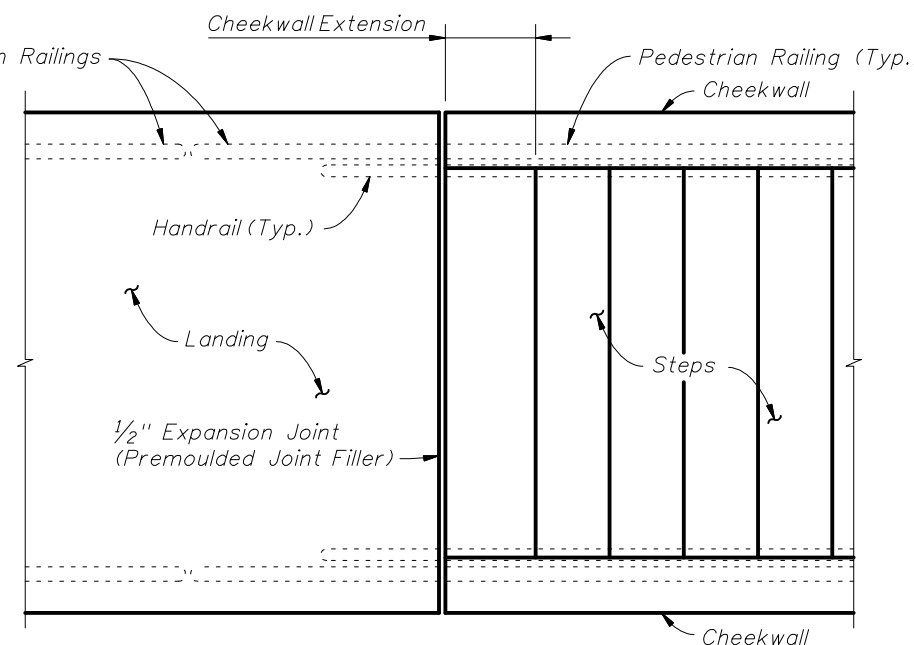


STAIR TREAD AND RISER DETAILS

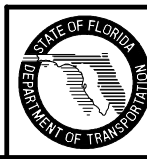
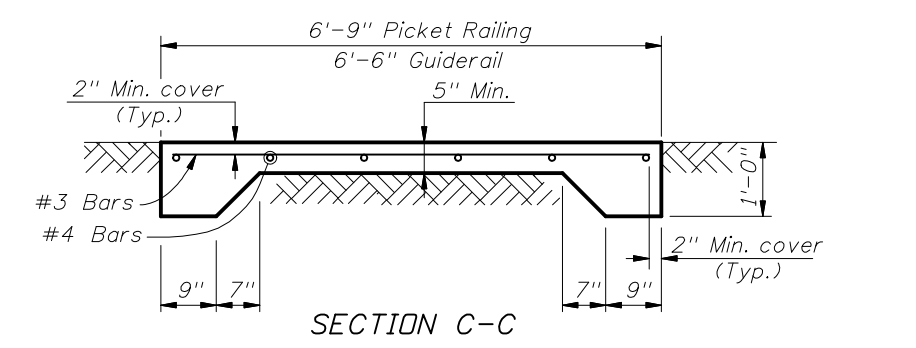
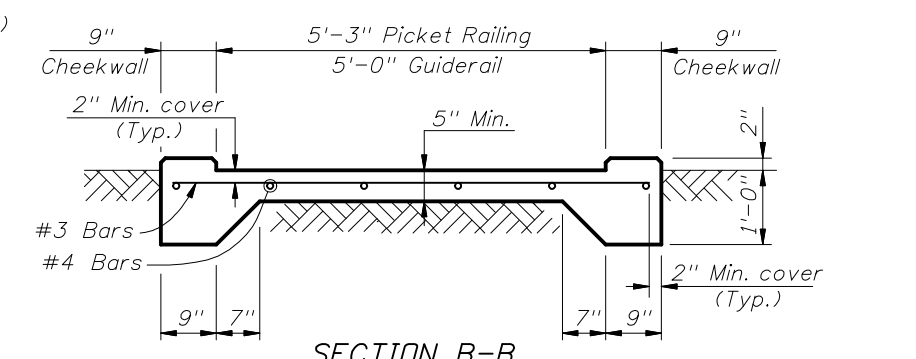
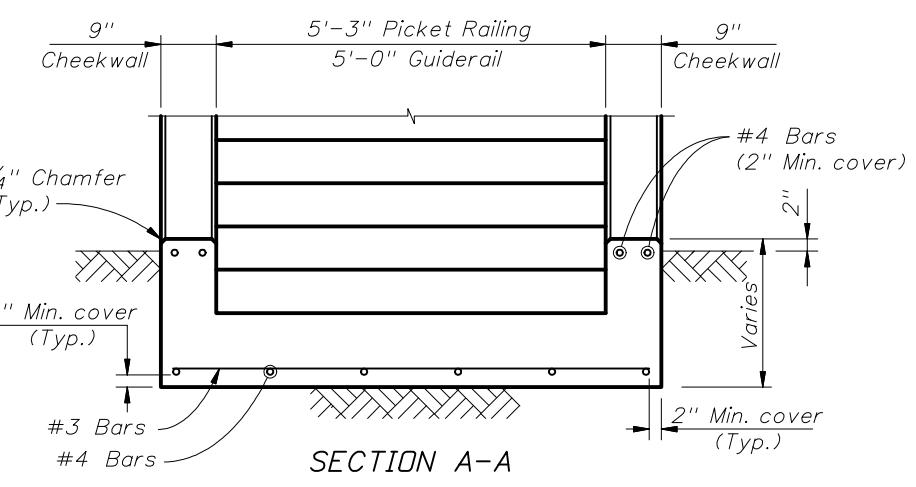
- * The greatest riser height within the flight of steps shall not exceed the smallest by more than 3/8".
- ** The greatest tread depth within the flight of steps shall not exceed the smallest by more than 3/8".



NOTE: Provide a maximum of 12 risers between landings.



PLAN AT JUNCTION OF STEPS & LANDING
(Bottom Landing shown, Top Landing similar)

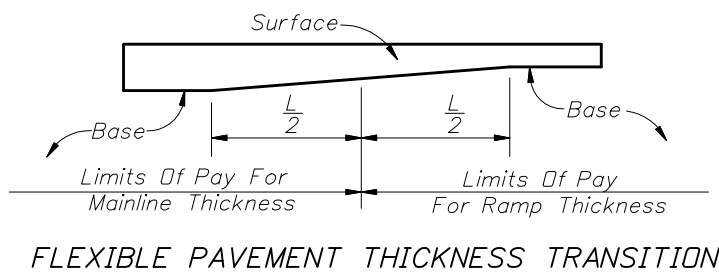
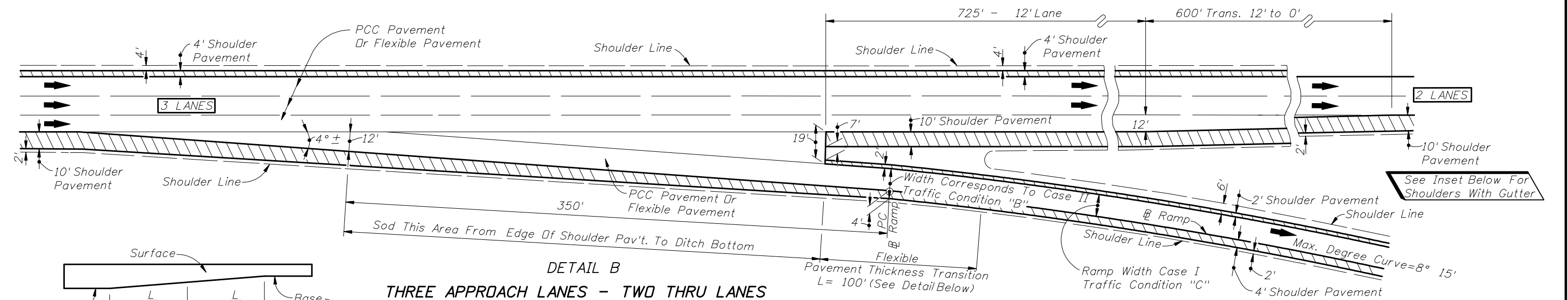
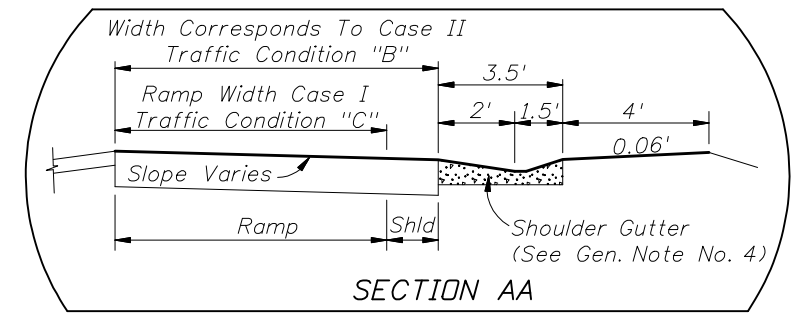
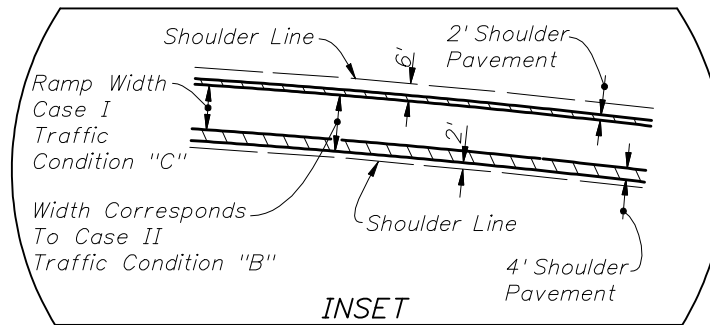
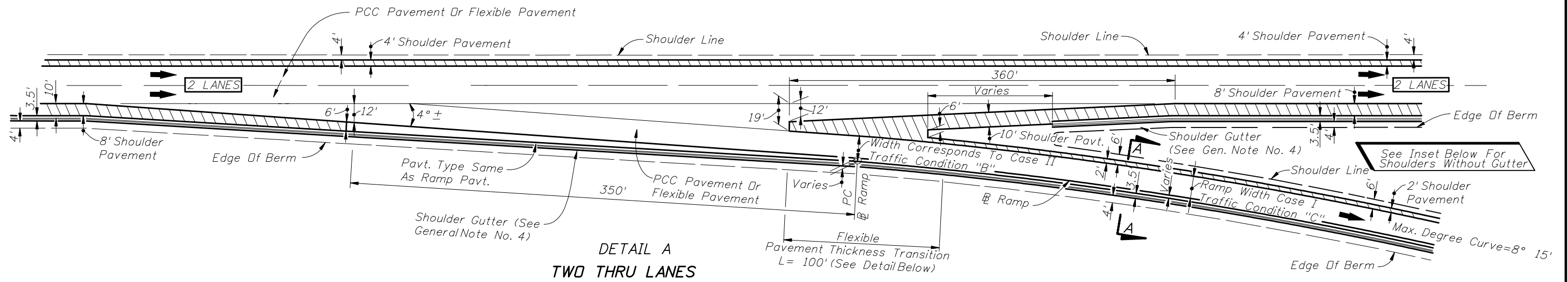


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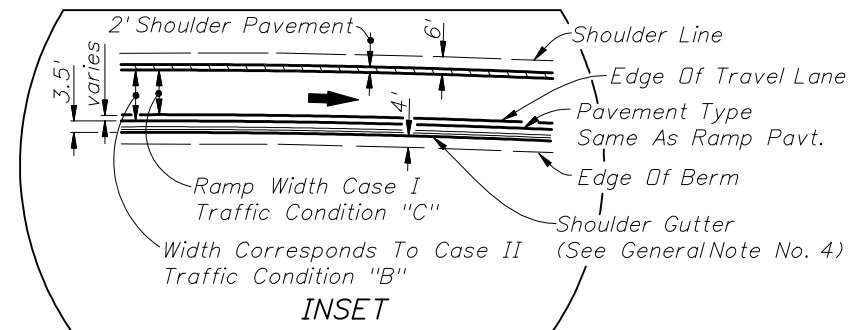
CONCRETE STEPS

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



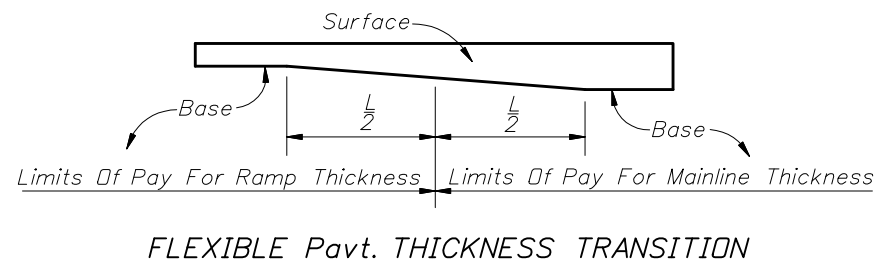
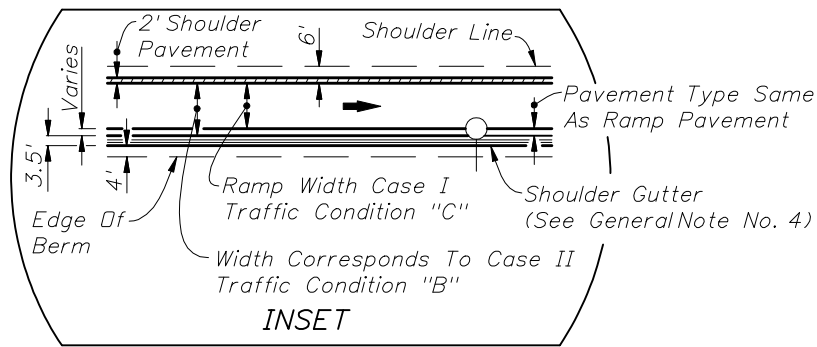
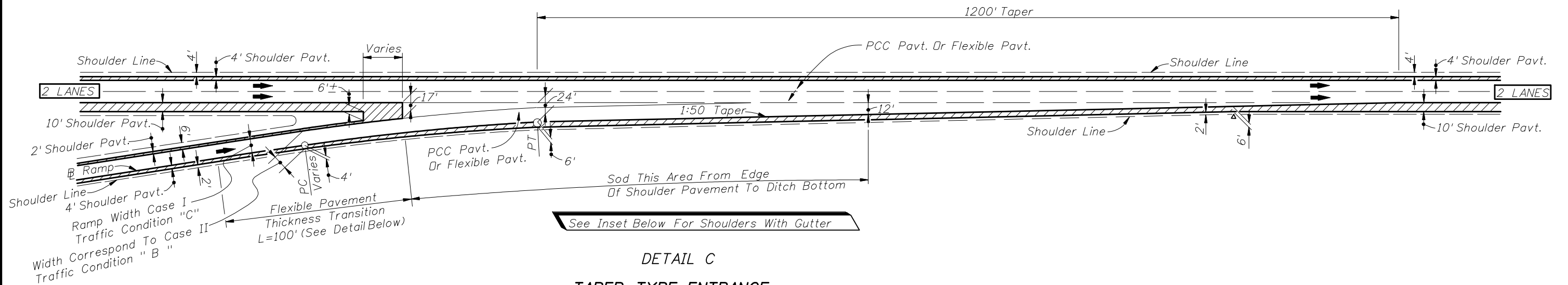
2010 FDOT Design Standards

RAMP TERMINALS

Last Revision
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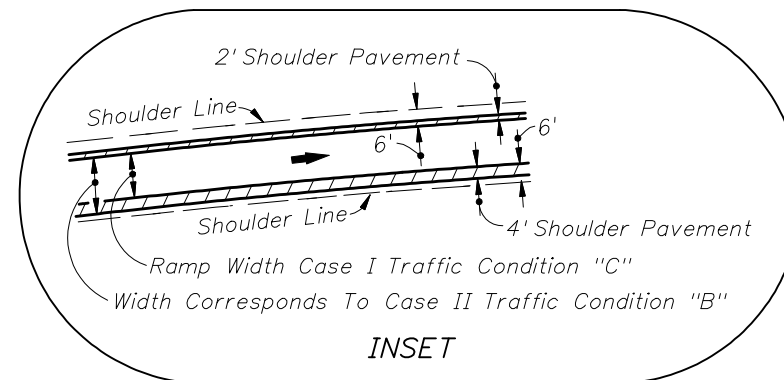
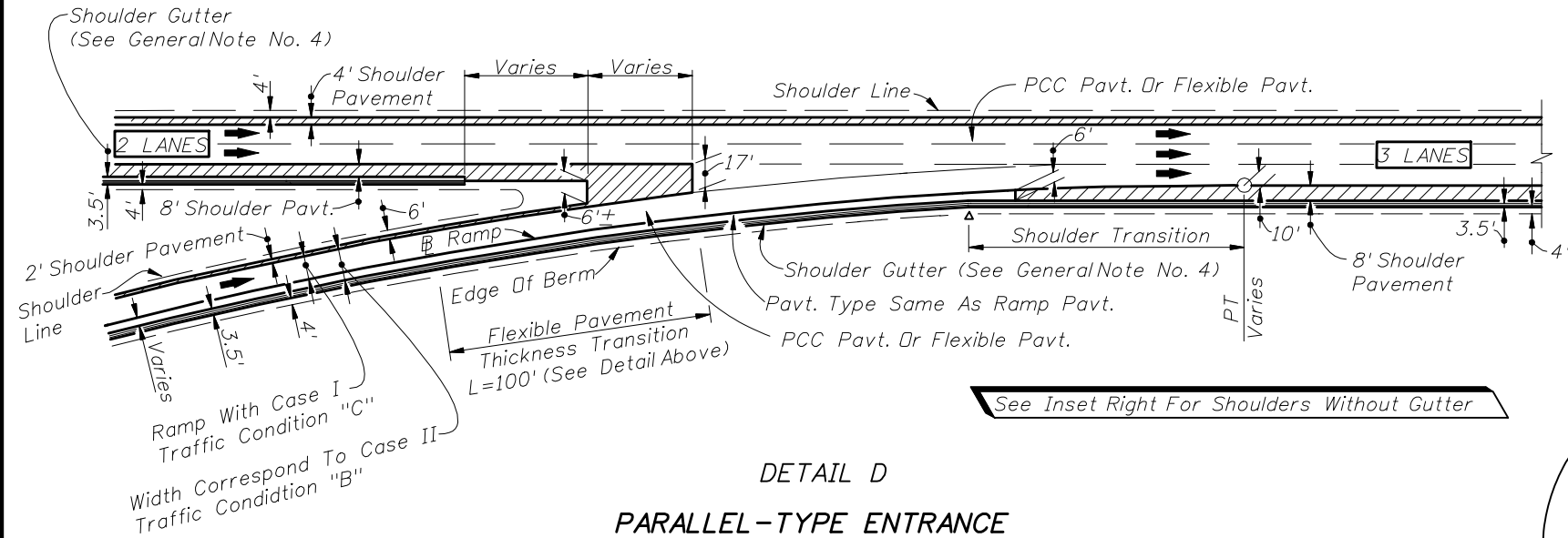
Sheet No.
1 of 5

Index No.
525

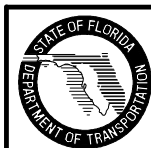


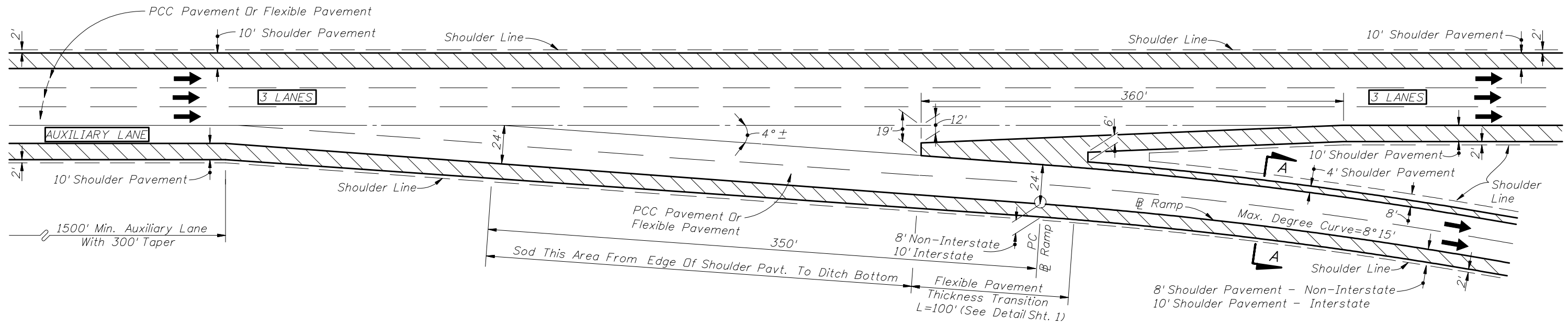
GENERAL NOTES

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.



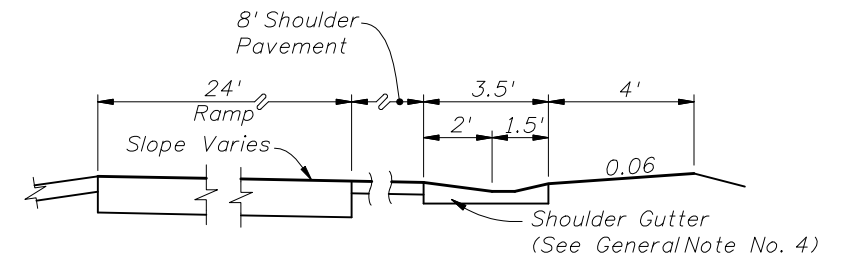
ENTRANCE TERMINALS
SINGLE-LANE RAMPS





THREE THRU LANES - APPROACH AUXILIARY LANE

EXIT TERMINALS
TWO-LANE RAMPS



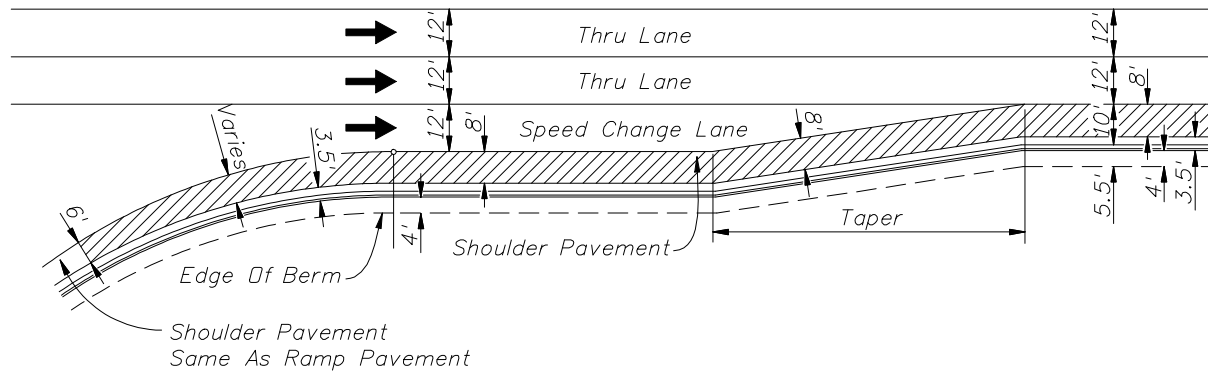
SECTION WHEN SHOULDER GUTTER USED
SECTION AA



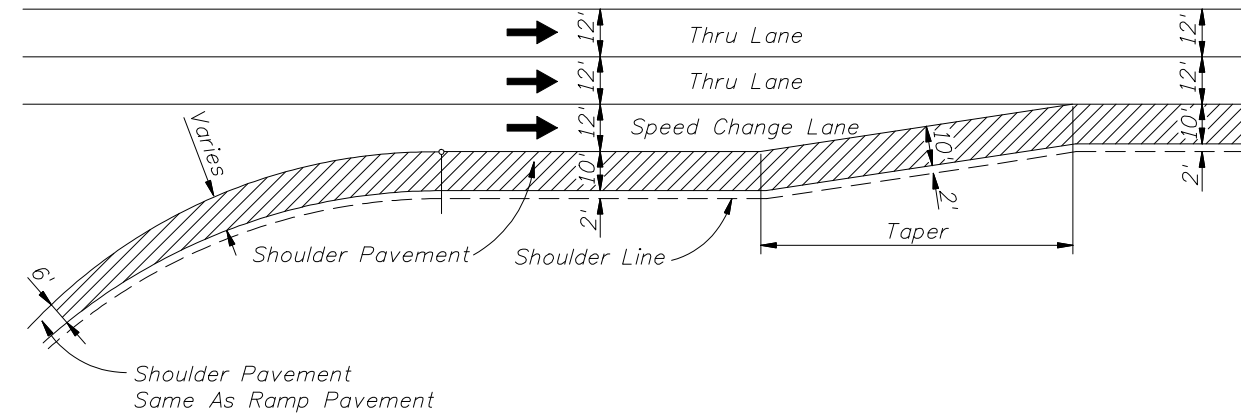
2010 FDOT Design Standards

RAMP TERMINALS

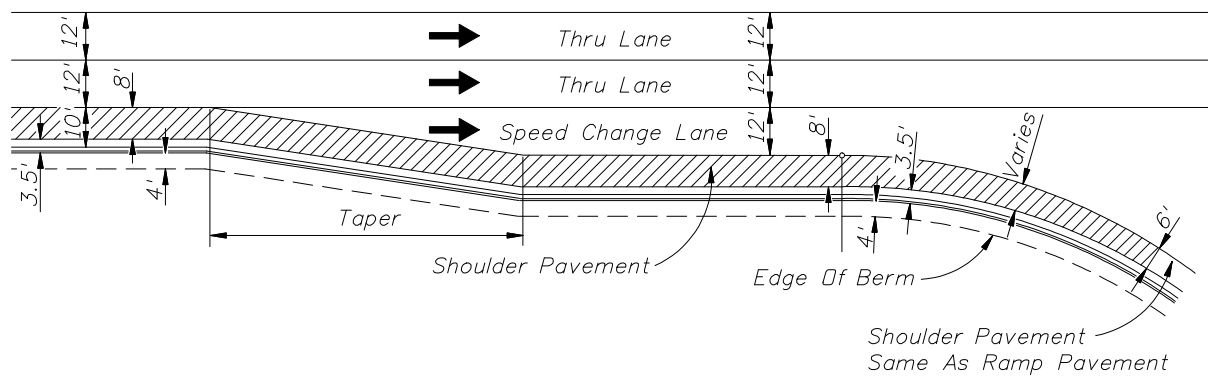
Last Revision	Sheet No.
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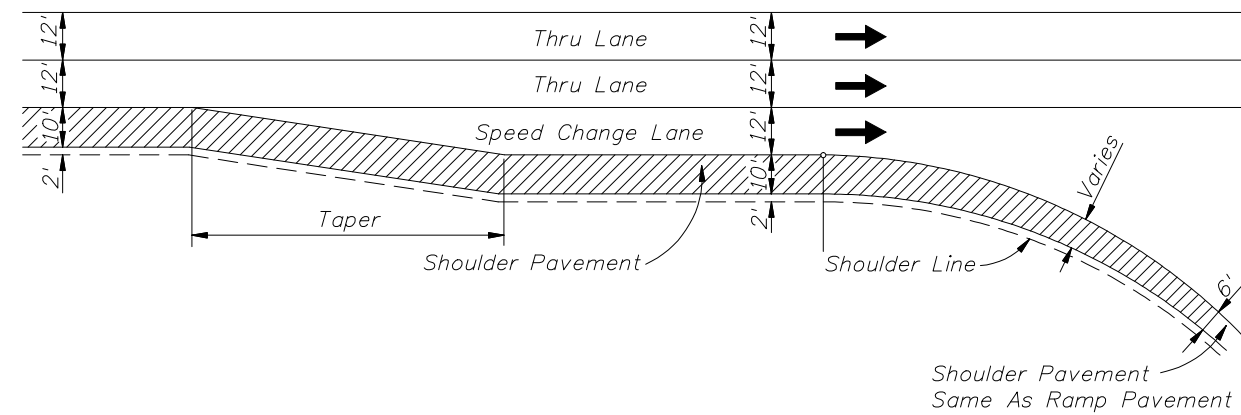
ACCELERATION LANE WITH SHOULDER GUTTER



ACCELERATION LANE WITHOUT SHOULDER GUTTER



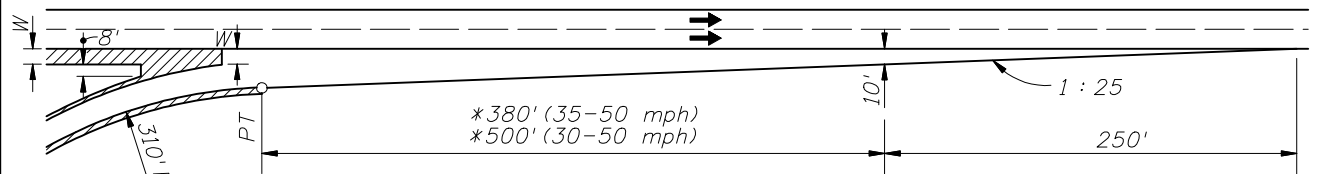
DECELERATION LANE WITH SHOULDER GUTTER



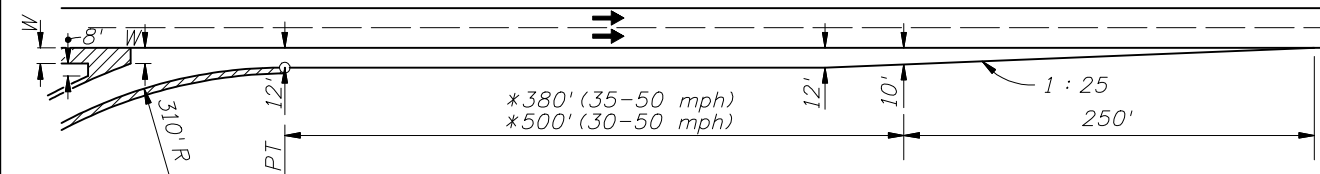
DECELERATION LANE WITHOUT SHOULDER GUTTER

SHOULDER TREATMENT
 AT SPEED CHANGE LANES AT FREEWAY RAMP TERMINALS
 FREEWAY RAMP TERMINALS



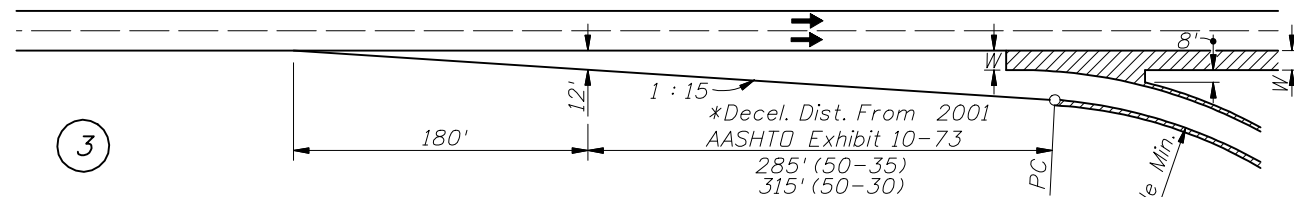


Standard cross road entrance terminals. To be used when roadway alignment is tangent and no bridges are located within the merging lane.

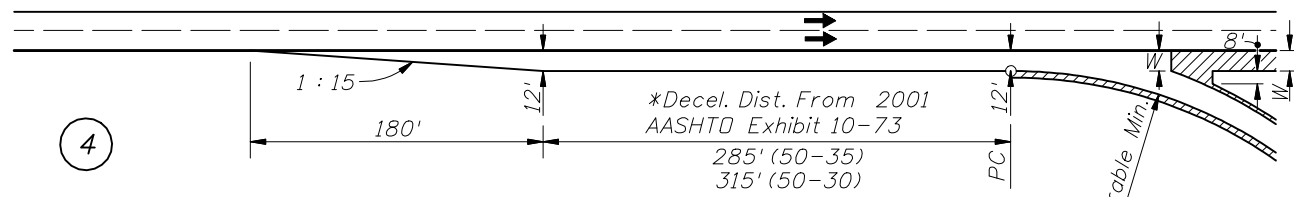


Parallel cross road entrance terminals. Recommended when a bridge is located within the merging lane, turning roadway speed is less than 60% of thru roadway speed or for the combinations of horizontal alignment shown elsewhere on this sheet.

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

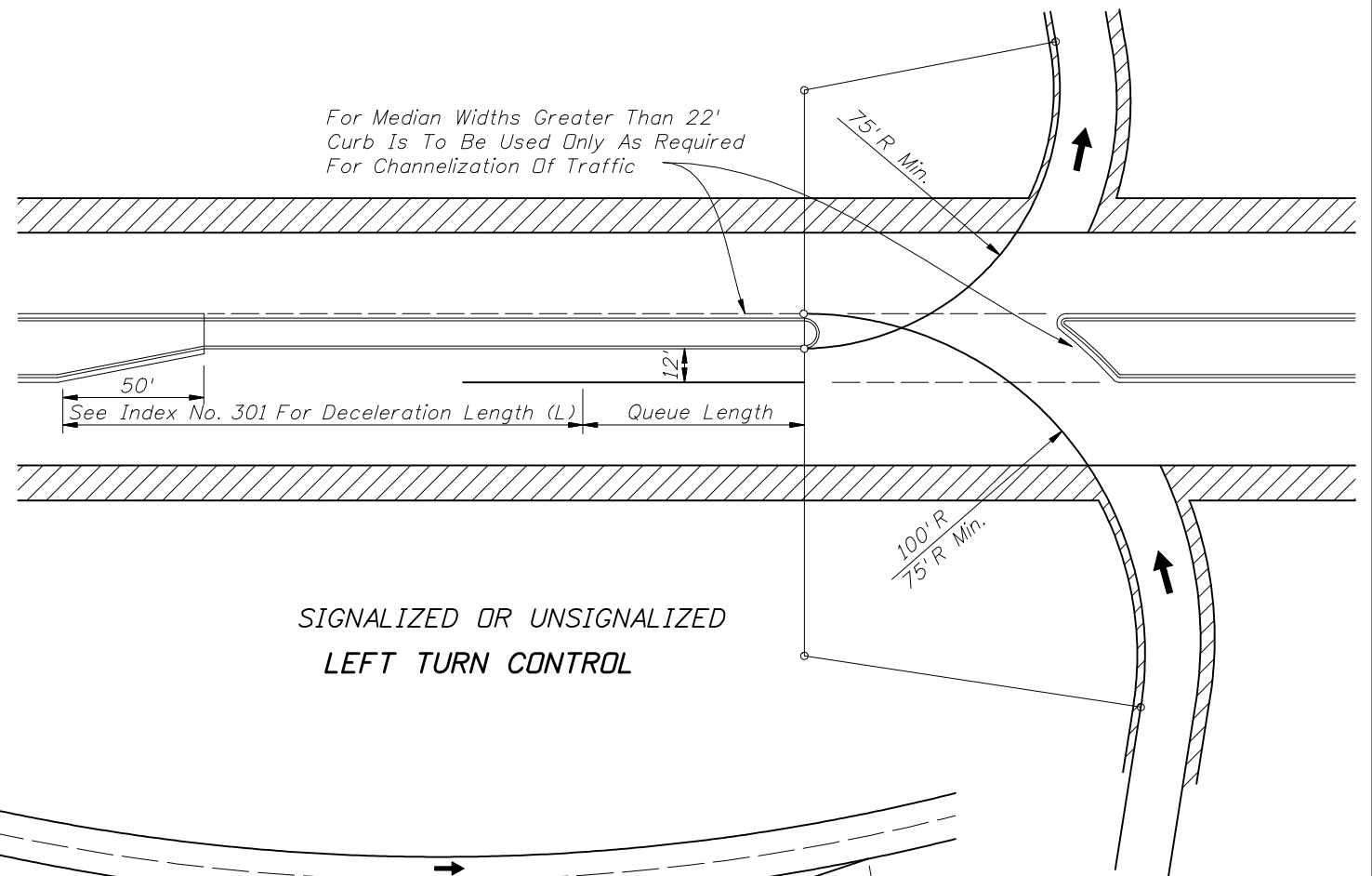
FOOTNOTES:

W Normal shoulder pavement width.

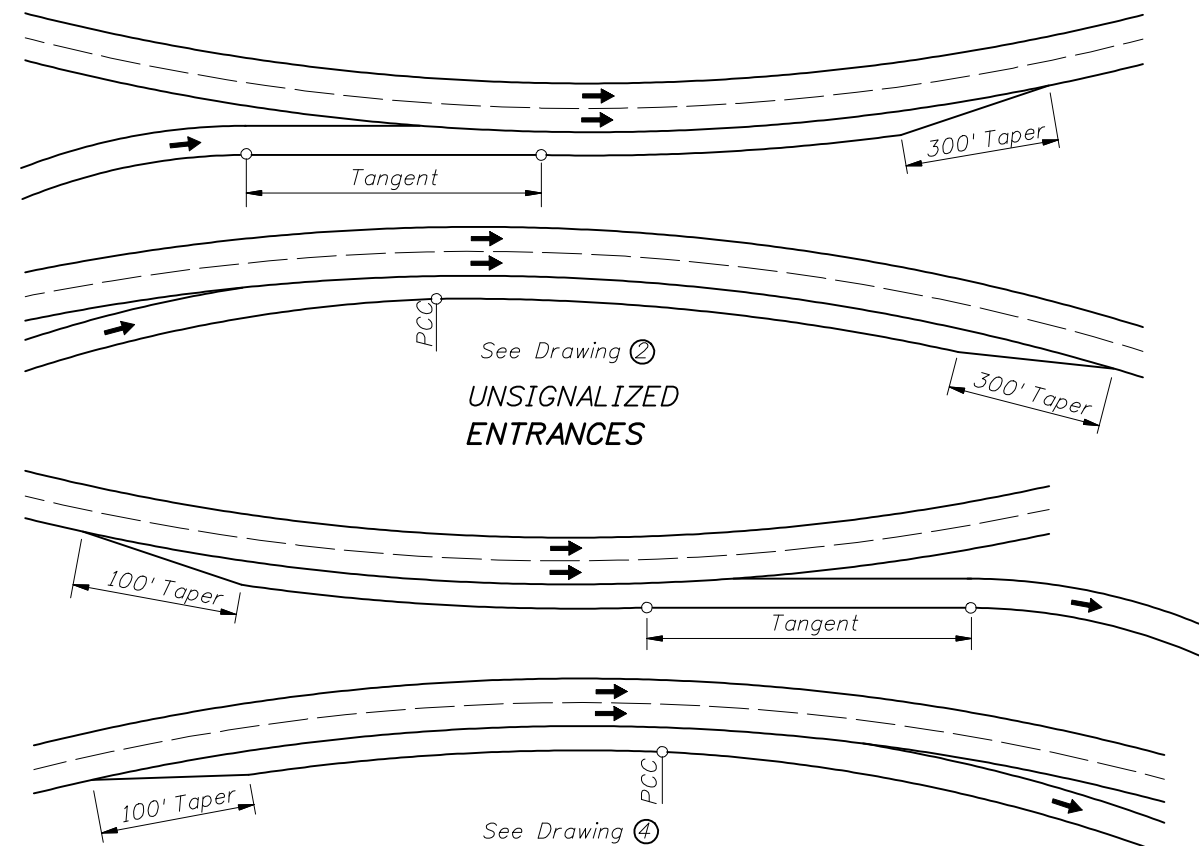
* Adjust for grades if greater than 2% (See Exhibit 10-71, AASHTO).

RAMP TERMINALS

CROSSROAD TERMINALS



SIGNALIZED OR UNSIGNALIZED LEFT TURN CONTROL



NOTE: Ramp terminals on curves should be avoided when possible.

RAMP TERMINALS ON CURVES

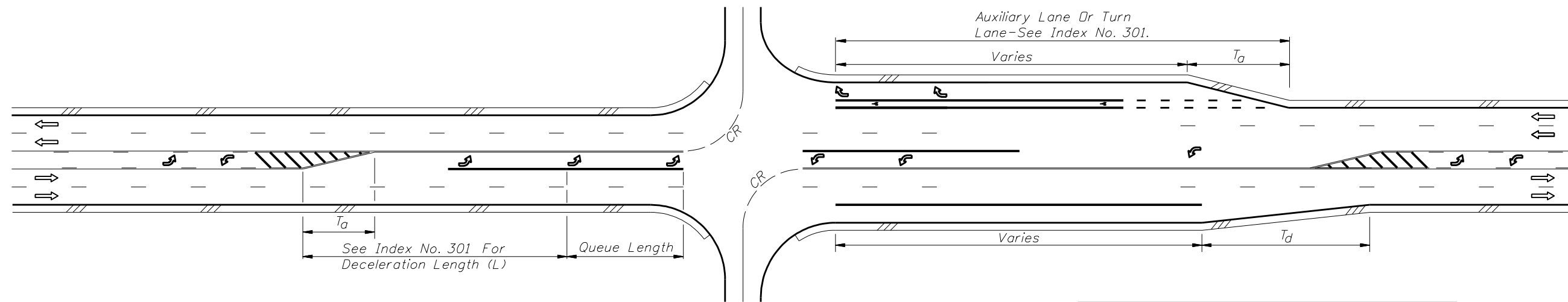


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RAMP TERMINALS

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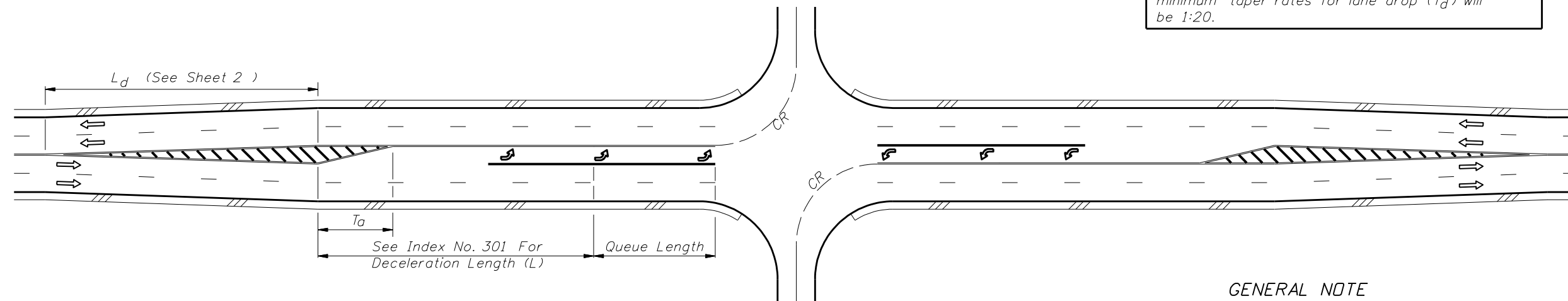
Index No. 525



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.

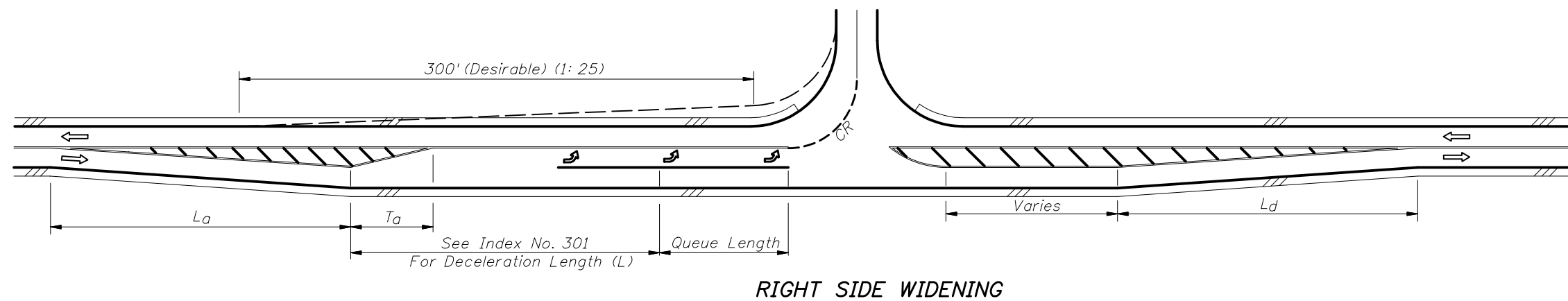
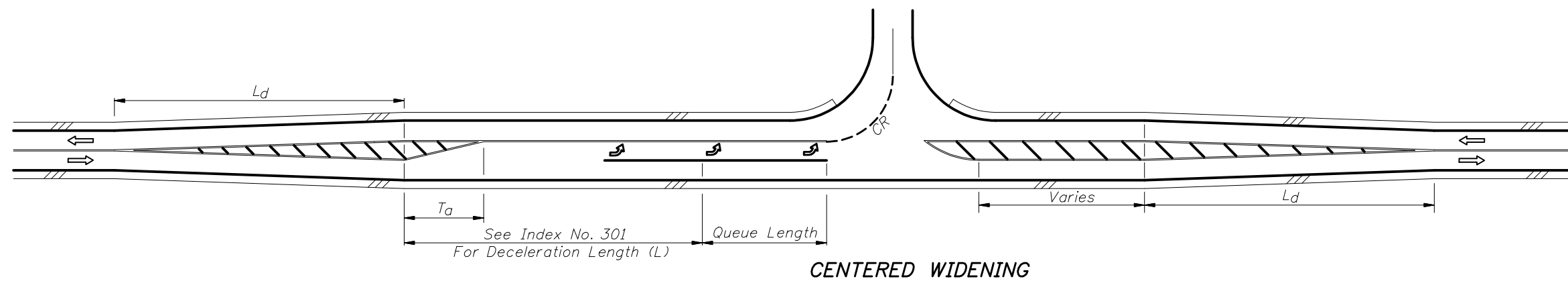
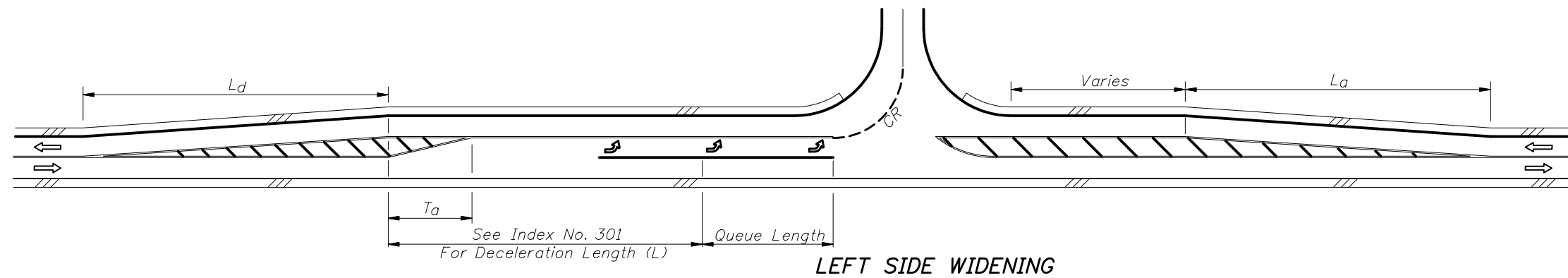


4-LANE UNDIVIDED FLARED - SYMMETRICAL

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

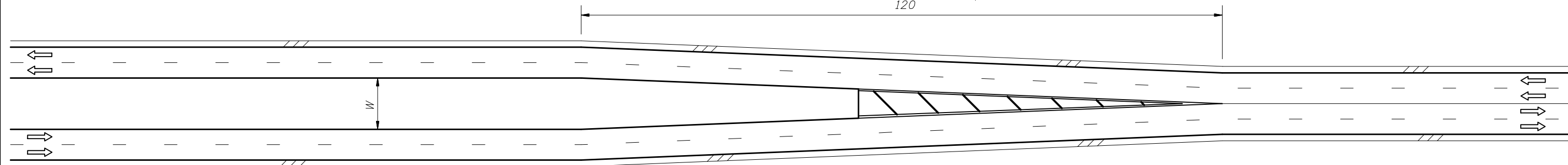
DESIGN SPEED (mph)	L_a (Ft.)	
	STANDARD	MINIMUM UNDER RESTRAINTS
30	180	120
40	320	150
50	500	180
60	720	240

(mph)	L_d (Ft.)	
30	180	120
40	240	150
50	360	180
60	480	240



$$L = \frac{WS}{2} \geq 45 \text{ mph}$$

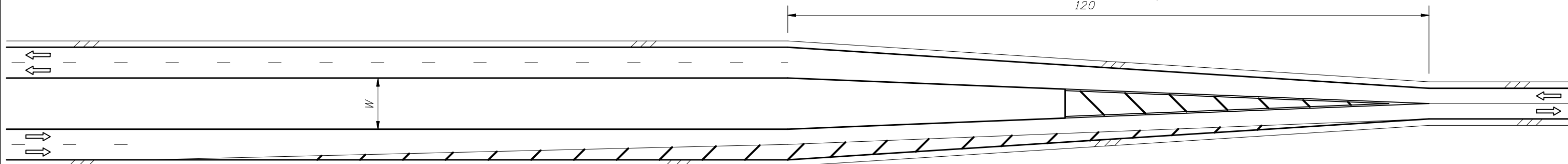
$$L = \frac{WS^2}{120} < 45 \text{ mph}$$



4-LANE DIVIDED TO 4-LANE UNDIVIDED

$$L = \frac{WS}{2} \geq 45 \text{ mph}$$

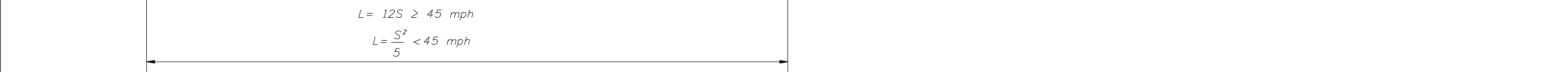
$$L = \frac{WS^2}{120} < 45 \text{ mph}$$



4-LANE DIVIDED TO 2-LANE UNDIVIDED

$$L = 12S \geq 45 \text{ mph}$$

$$L = \frac{S^2}{5} < 45 \text{ mph}$$

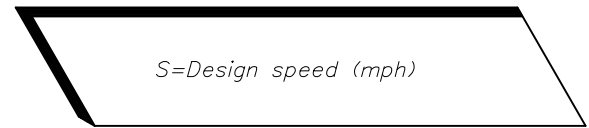


$$L = 12S \geq 45 \text{ mph}$$

$$L = \frac{S^2}{5} < 45 \text{ mph}$$

4-LANE UNDIVIDED TO 2-LANE UNDIVIDED

LANE DIVERGENCE AND CONVERGENCE FOR CENTERED ROADWAYS



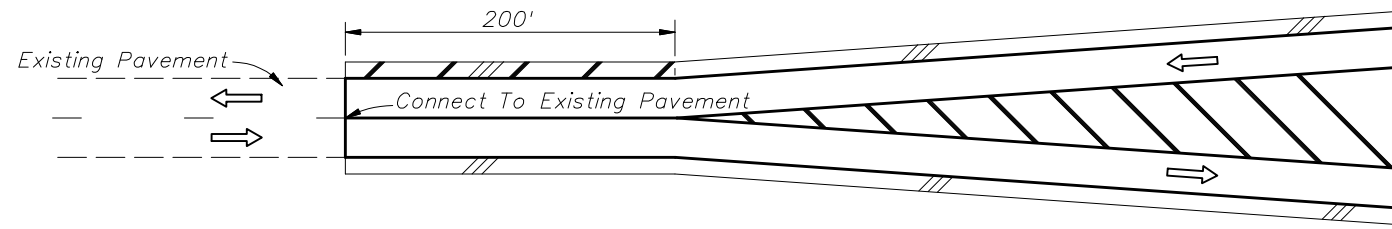
2010 FDOT Design Standards

ROADWAY TRANSITIONS

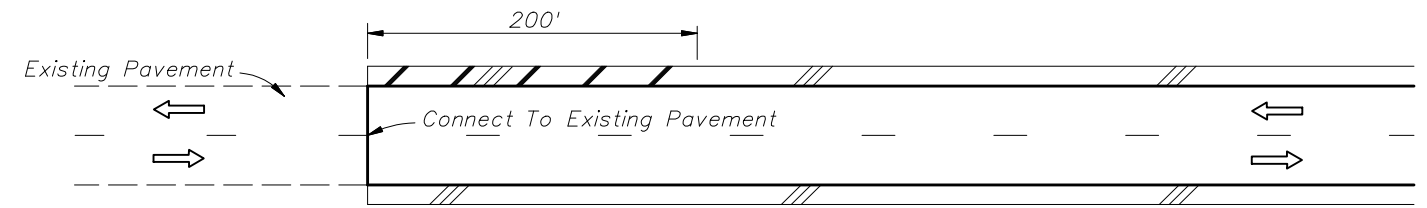
Last Revision
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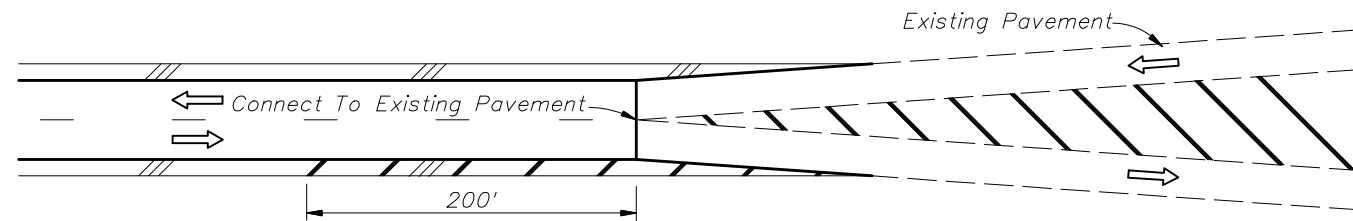
Index No.
526



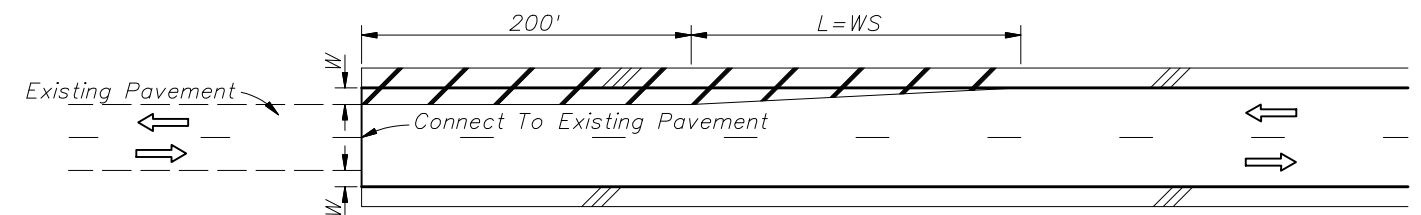
CONNECTING FLARE WITH PAVED SHOULDERS TO EXISTING ROADWAY WITHOUT PAVED SHOULDERS



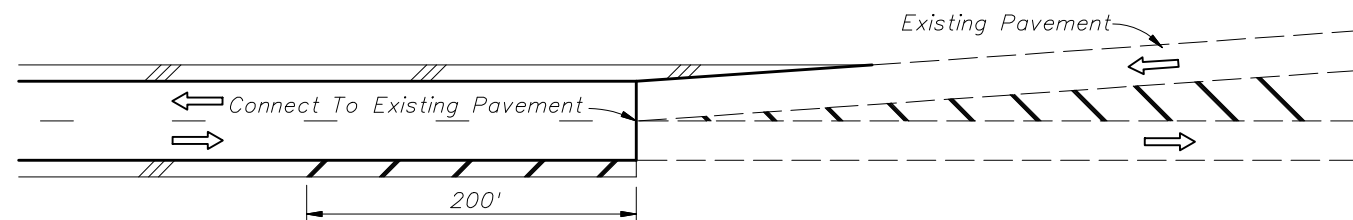
CONNECTING SIMILAR WIDTH PAVEMENTS



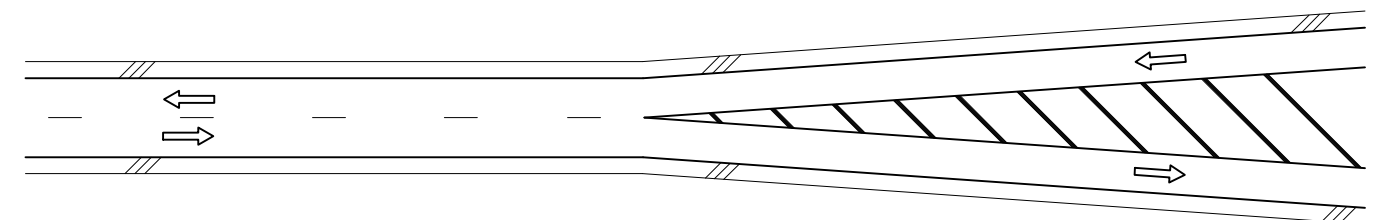
CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING SYMMETRICAL FLARE WITHOUT PAVED SHOULDERS



CONNECTING DIFFERENT WIDTH PAVEMENTS



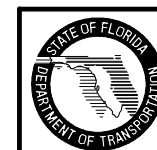
CONNECTING ROADWAY WITH PAVED SHOULDERS TO EXISTING ASYMMETRICAL FLARE WITHOUT PAVED SHOULDERS



FLARED - PAVED SHOULDERS

$S = \text{Design speed (mph)}$

PAVED SHOULDER TREATMENT AT TRANSITIONS AND CONNECTIONS

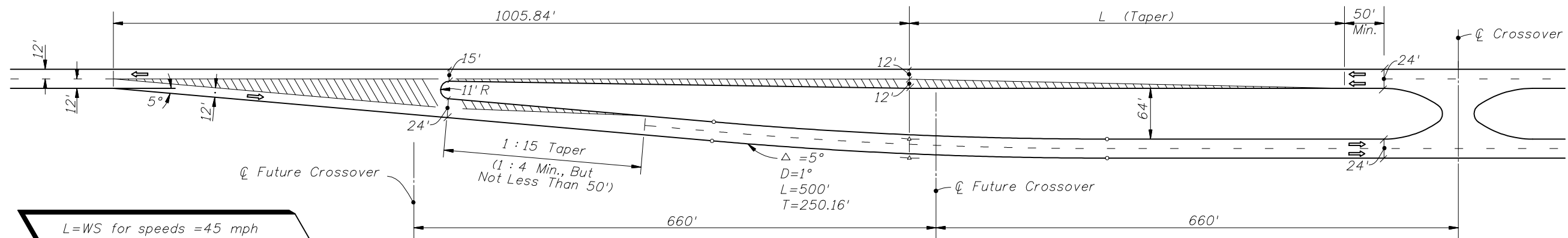
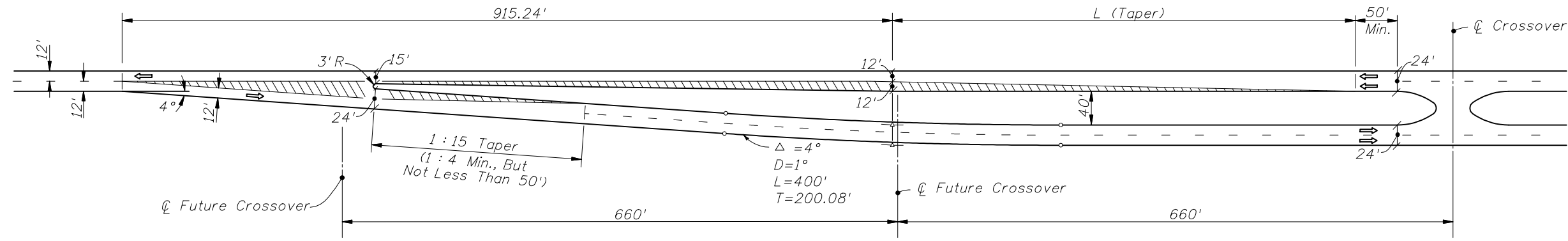
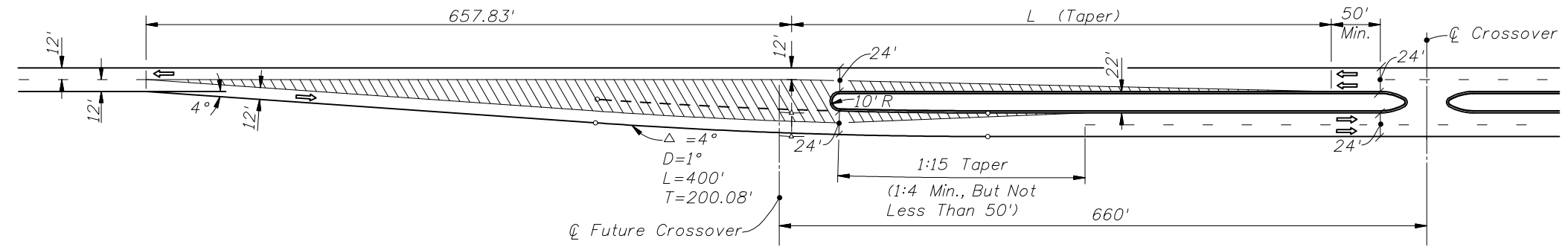


2010 FDOT Design Standards

ROADWAY TRANSITIONS

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$L = WS$ 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**

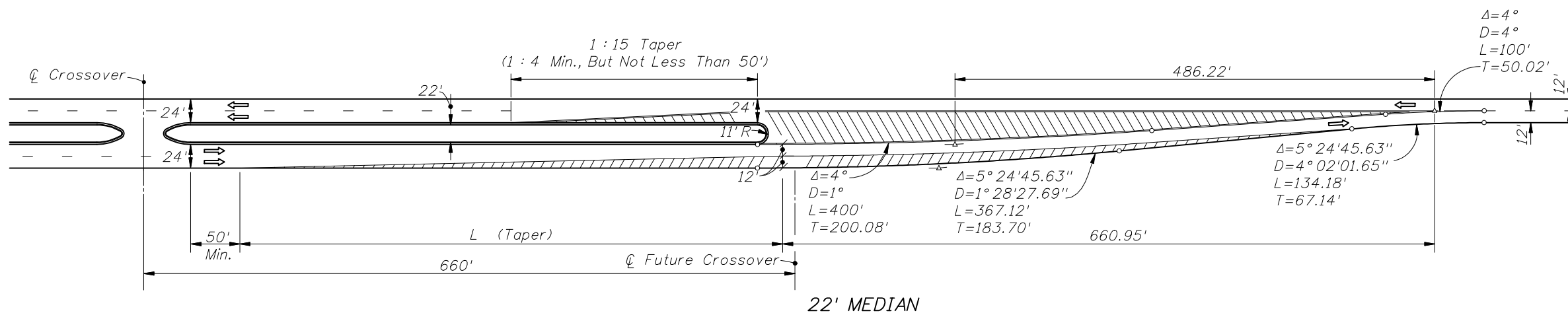


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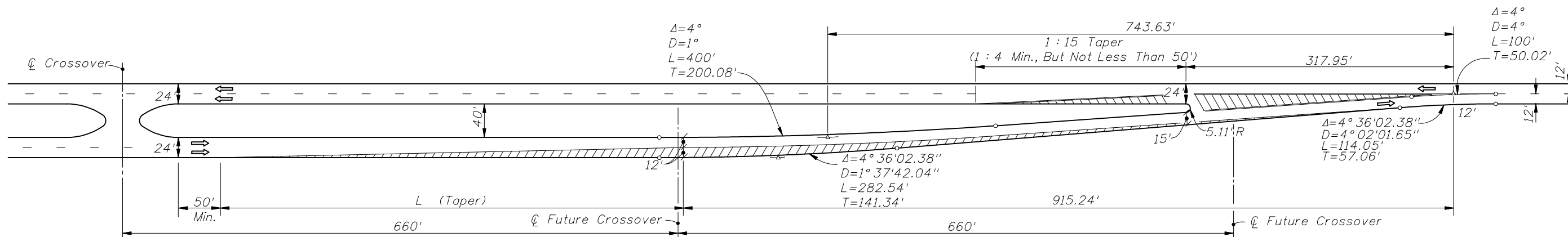
ROADWAY TRANSITIONS

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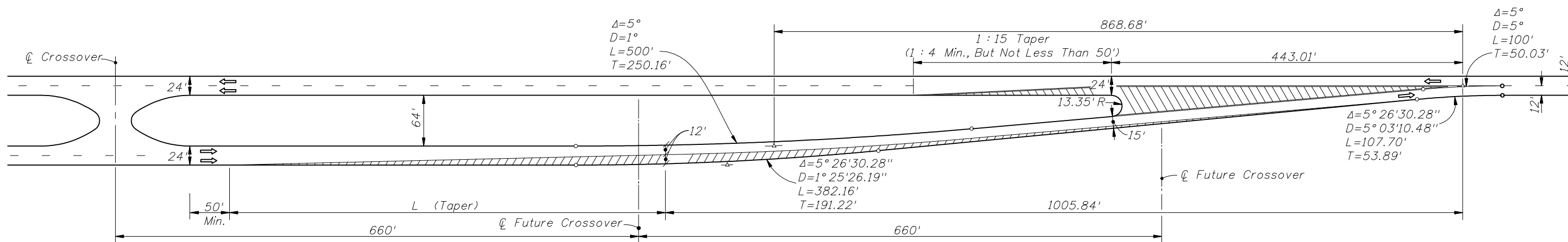
Index No. 526



22' MEDIAN



40' MEDIAN

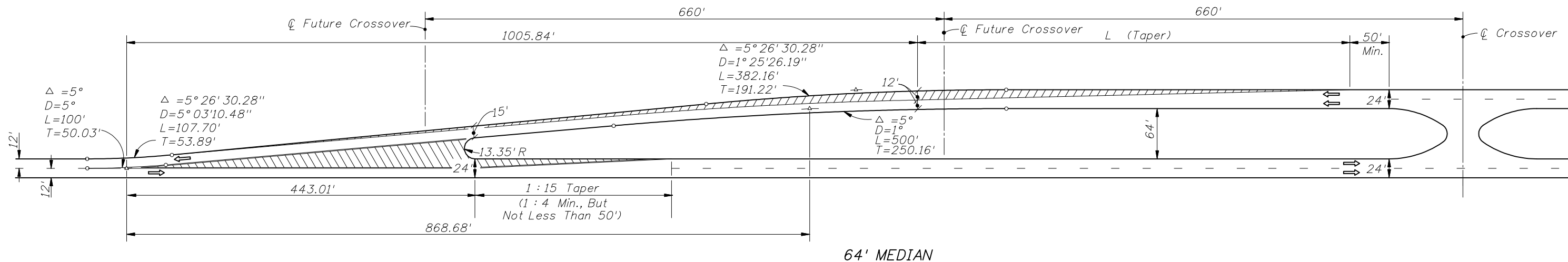
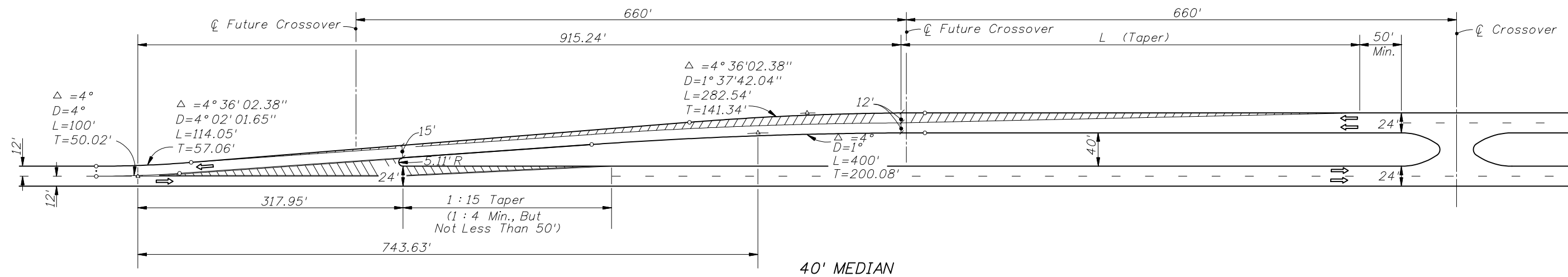
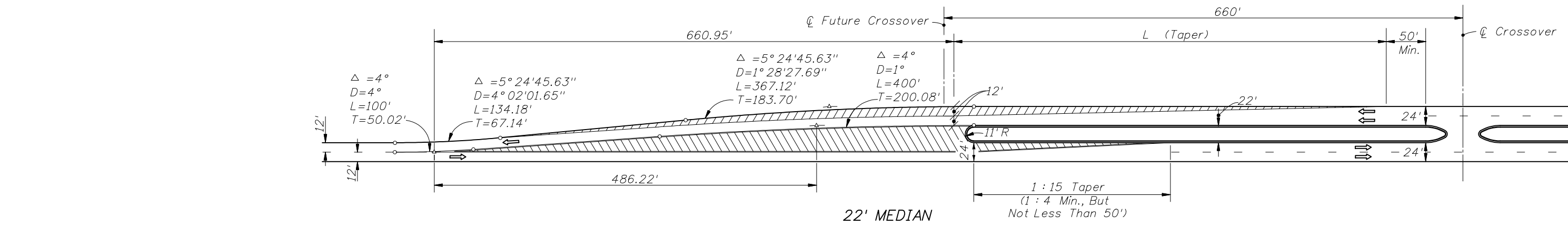


64' MEDIAN

LEFT ROADWAY CENTERED ON THRU ROADWAY
FOUR LANE TO TWO LANE TRANSITION

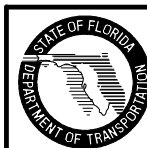
$L = WS$ for speeds = 45 mph
 $L = \frac{WS^2}{60}$ for speeds ≤ 40 mph
 Where:
 W=Width of lateral transition in feet.
 S=Design speed.





$L = WS$ for speeds = 45 mph
 $L = \frac{WS^2}{60}$ for speeds ≤ 40 mph
 Where:
 W = Width of lateral transition in feet.
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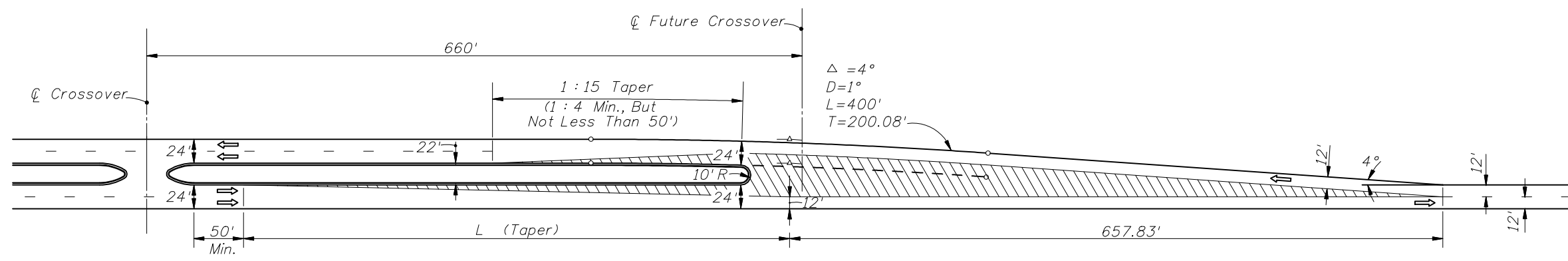
RIGHT ROADWAY CENTERED ON APPROACH ROADWAY
 TWO LANE TO FOUR LANE TRANSITION



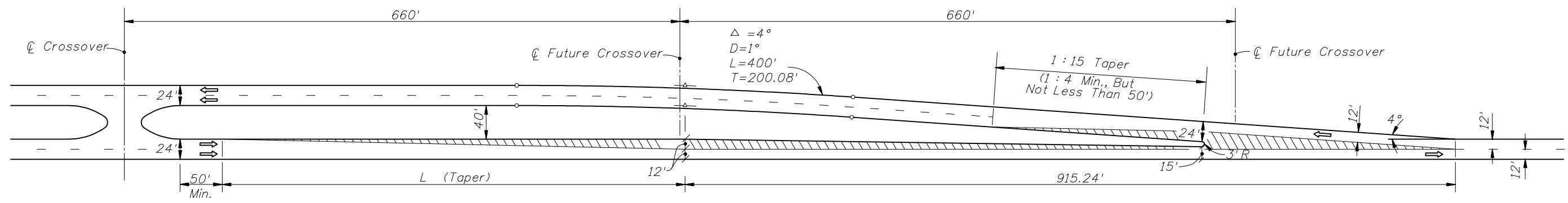
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ROADWAY TRANSITIONS

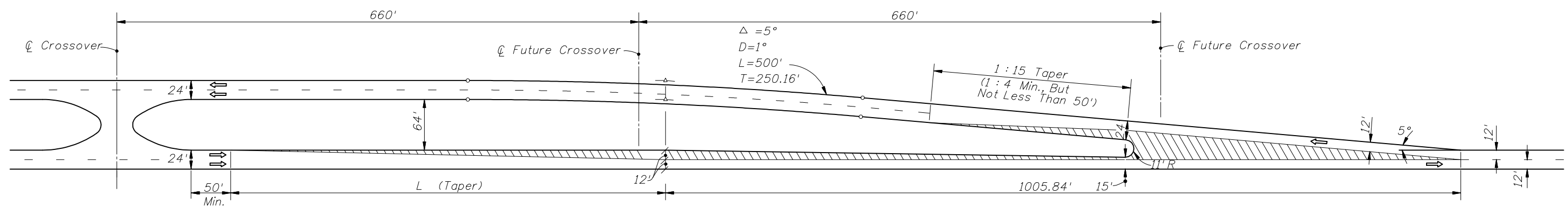
Last Revision	00	Sheet No.	7 of 8
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22' MEDIAN



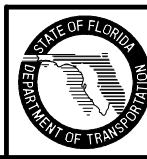
40' MEDIAN

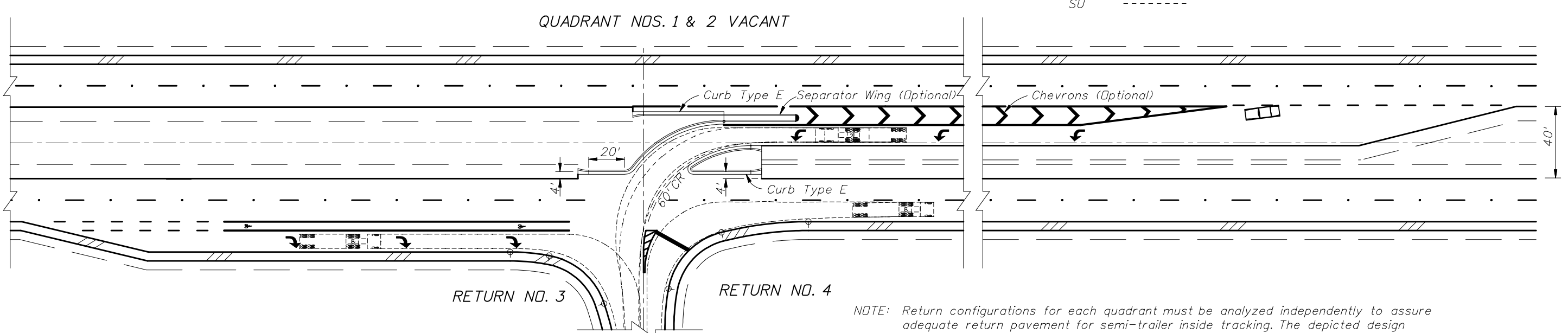
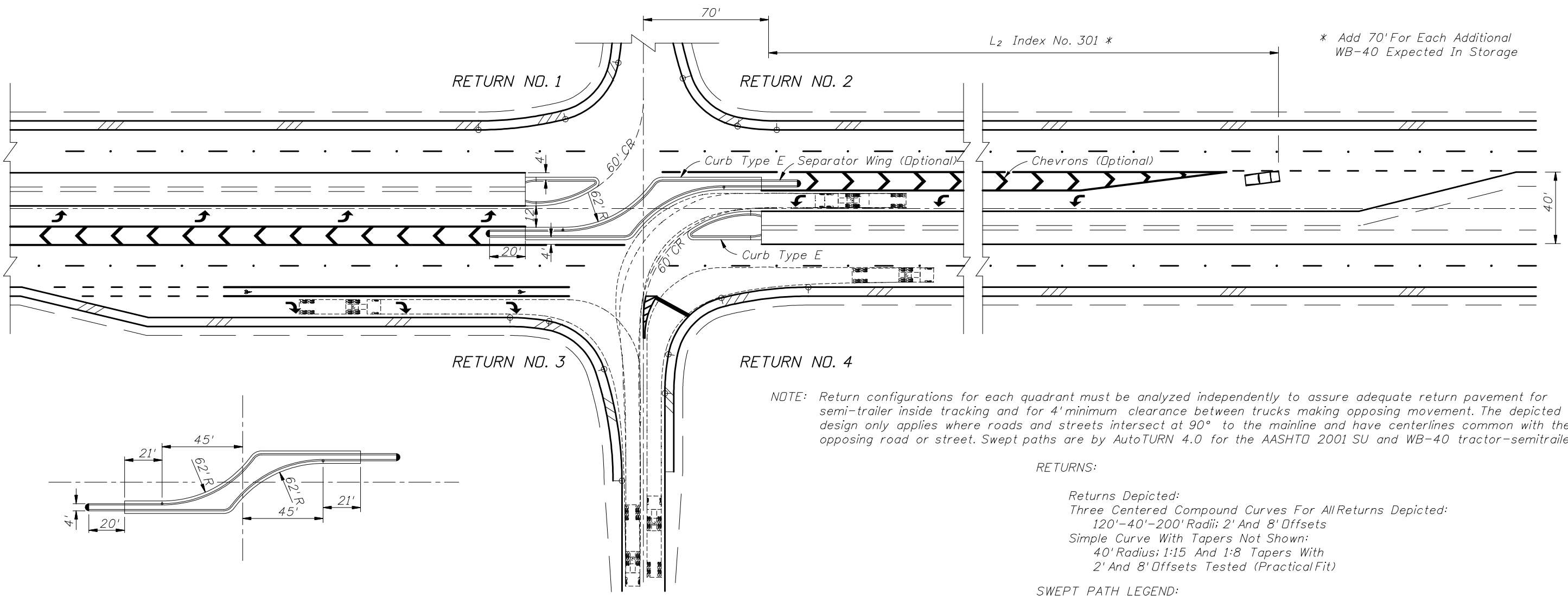


64' MEDIAN

$L = WS$ for speeds = 45 mph
 $L = \frac{WS^2}{60}$ for speeds ≤ 40 mph
 Where:
 W=Width of lateral transition in feet.
 S=Design speed.

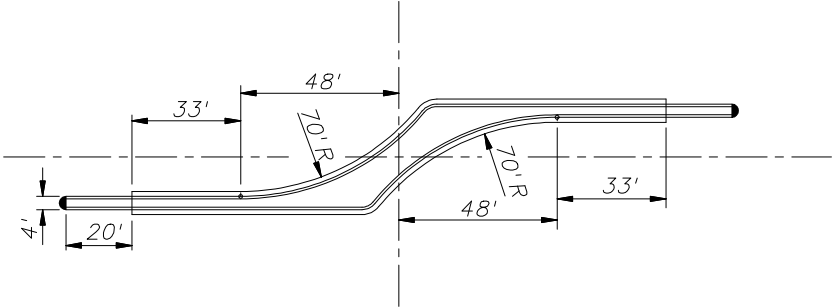
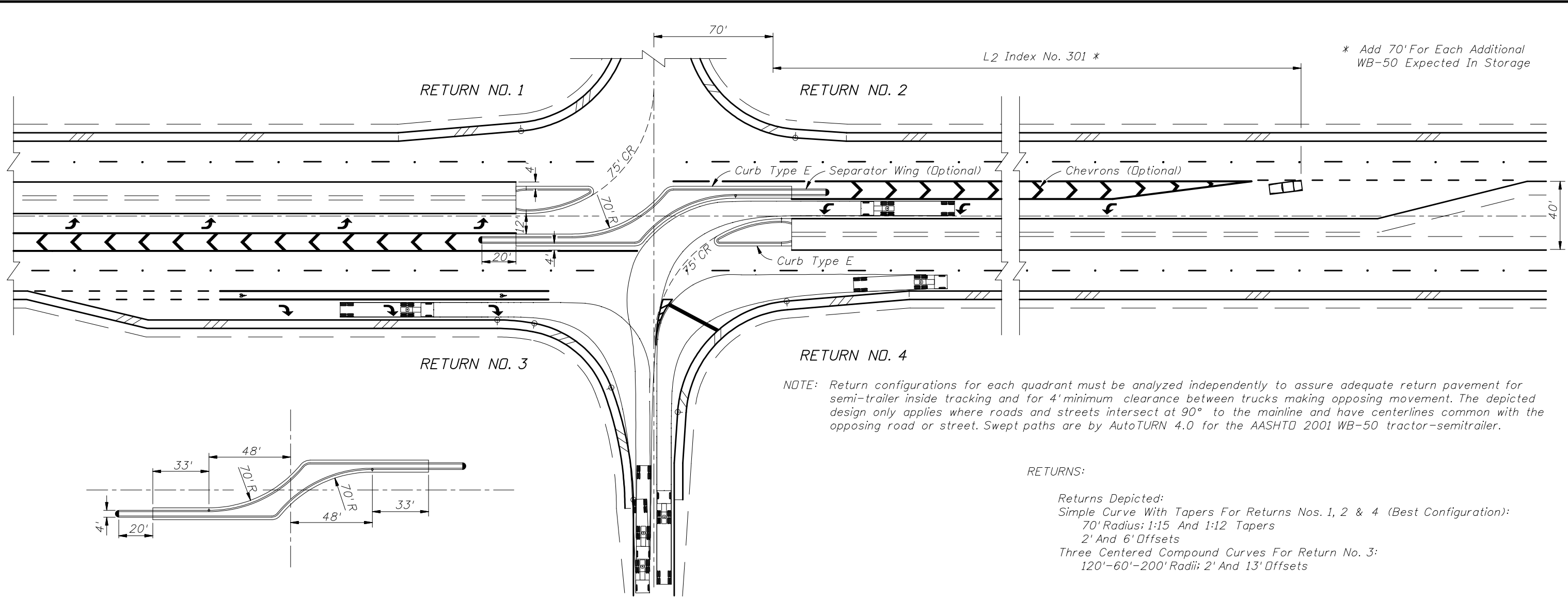
RIGHT ROADWAY CENTERED ON THRU ROADWAY
 FOUR LANE TO TWO LANE TRANSITION





40' MEDIAN • 4-LANE DIVIDED • PARALLEL TURN BAY •
 2001 AASHTO SU & WB-40

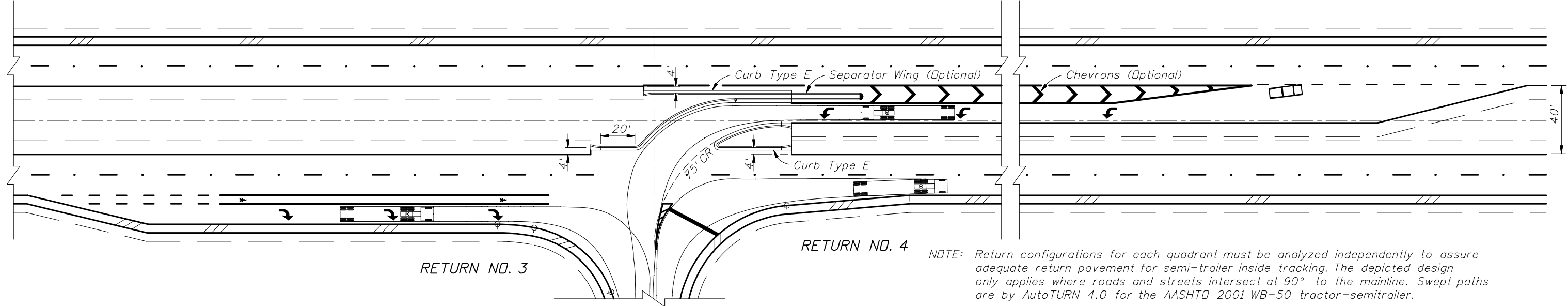




NOTE: Return configurations for each quadrant must be analyzed independently to assure adequate return pavement for semi-trailer inside tracking and for 4' minimum clearance between trucks making opposing movement. The depicted design only applies where roads and streets intersect at 90° to the mainline 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.

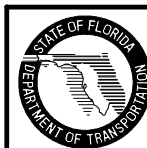
RETURNS:
 Returns Depicted:
 Simple Curve With Tapers For Returns Nos. 1, 2 & 4 (Best Configuration):
 70' Radius; 1:15 And 1:12 Tapers
 2' And 6' Offsets
 Three Centered Compound Curves For Return No. 3:
 120'-60'-200' Radii; 2' And 13' Offsets

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.

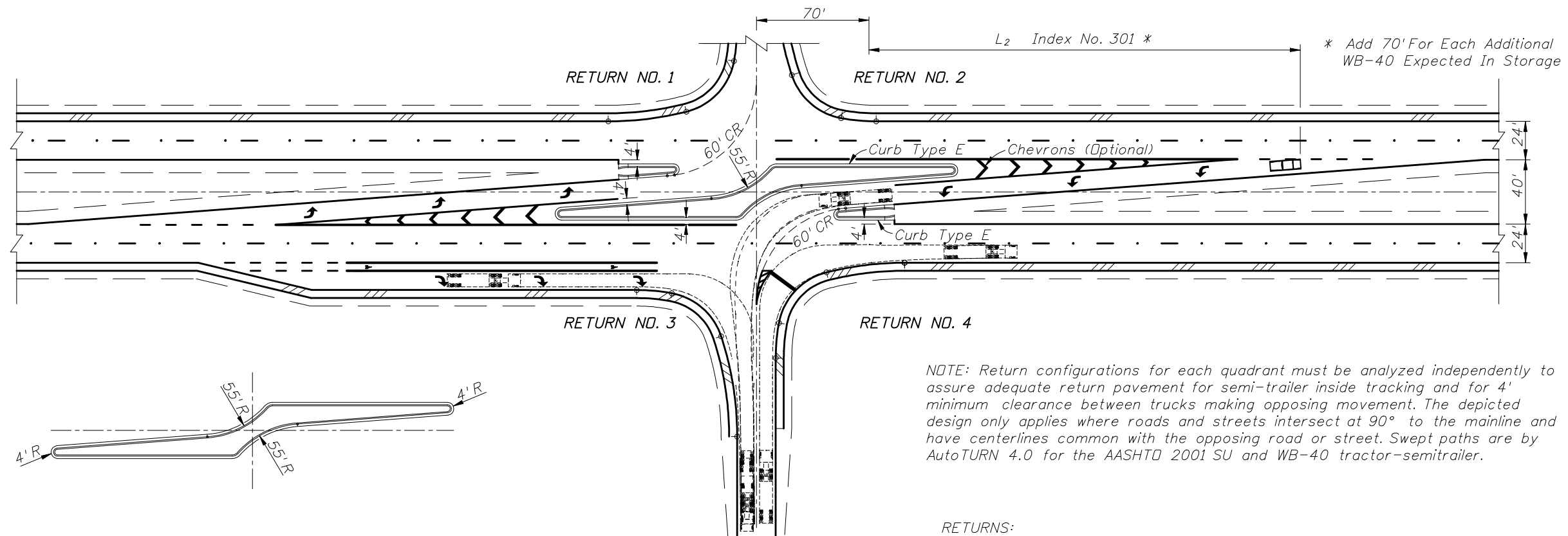
40' MEDIAN 4-LANE DIVIDED • PARALLEL TURN BAY • 2001 AASHTD WB-50



2010 FDOT Design Standards

DIRECTIONAL MEDIAN OPENINGS

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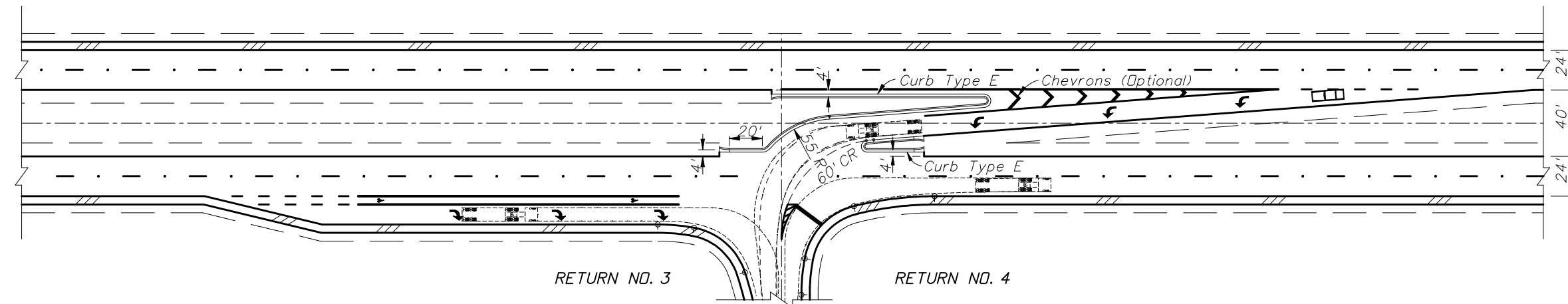


QUADRANT NOS. 1 & 2 VACANT

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

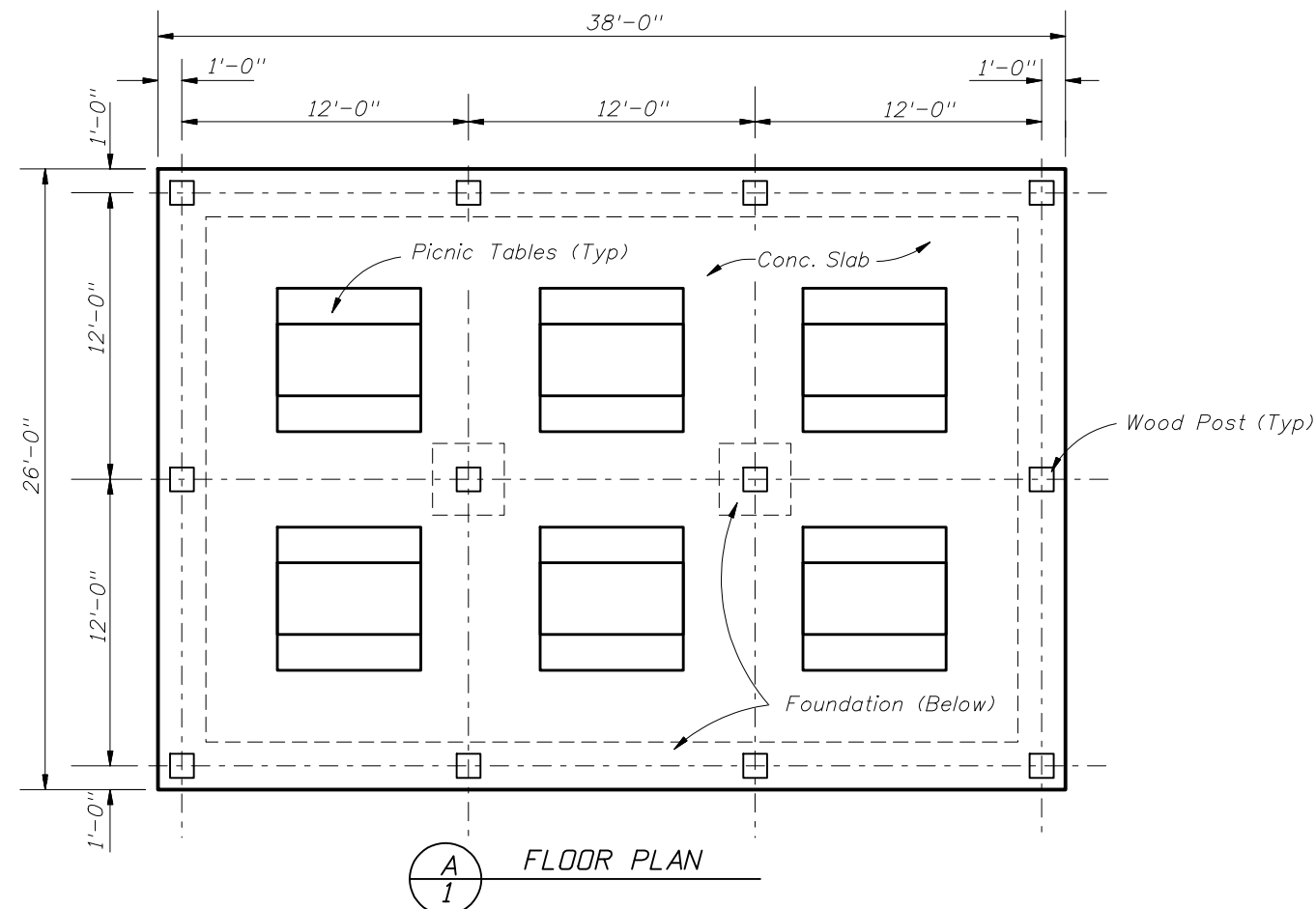


2010 FDOT Design Standards

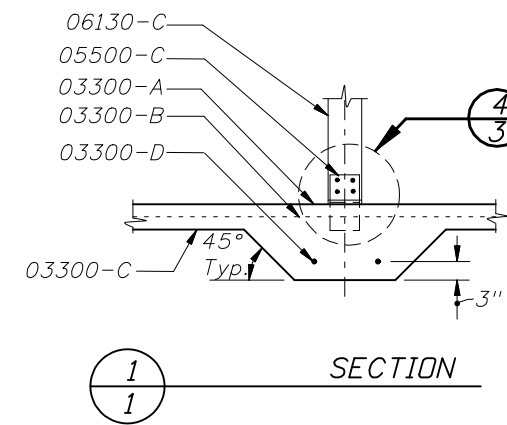
DIRECTIONAL MEDIAN OPENINGS

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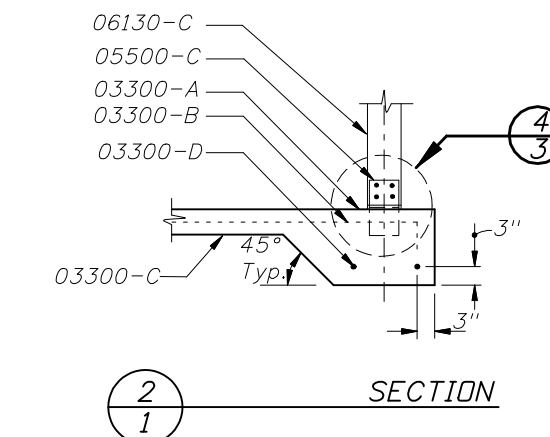
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LARGE PAVILION



SECTION 1-1



SECTION 2-1

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.

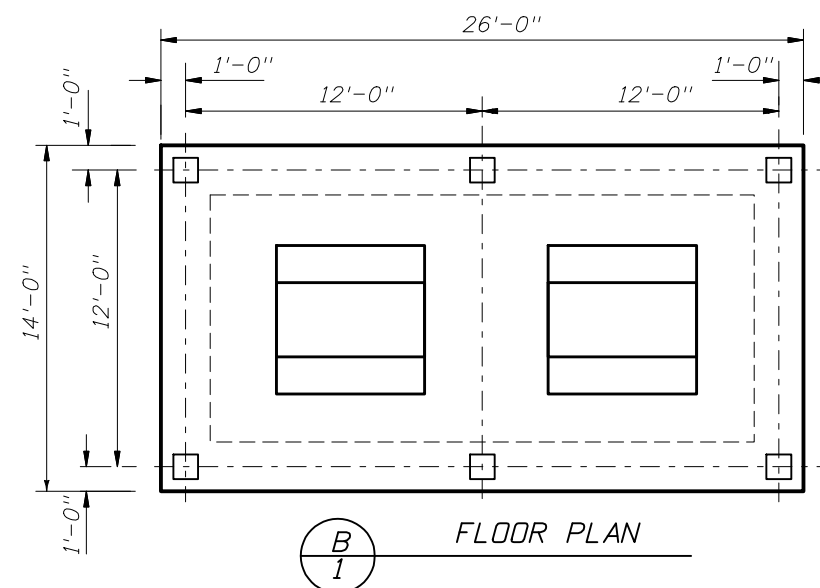
Standing Seam Metal Roof (24 GA
Steel Or 0.032 Alum.) w/ Kynar 500
Finish.

Structure, Decking And Roofing Shall Be
Designed To Withstand 130 mph Wind
Load.

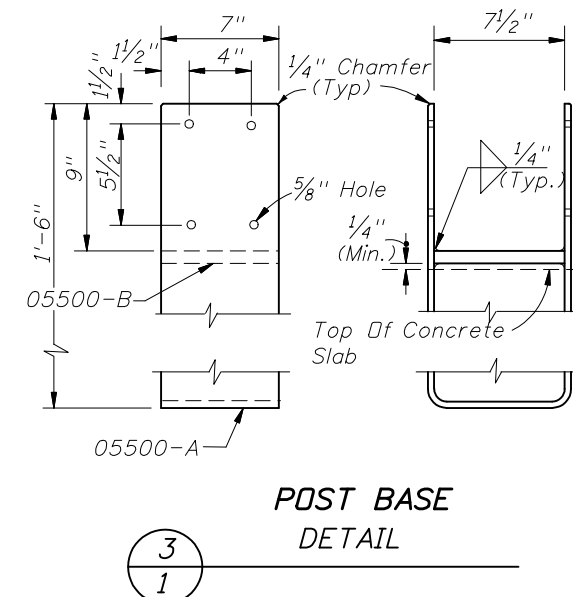
BUILDING CODE

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



SMALL PAVILION



POST BASE
DETAIL 3-1

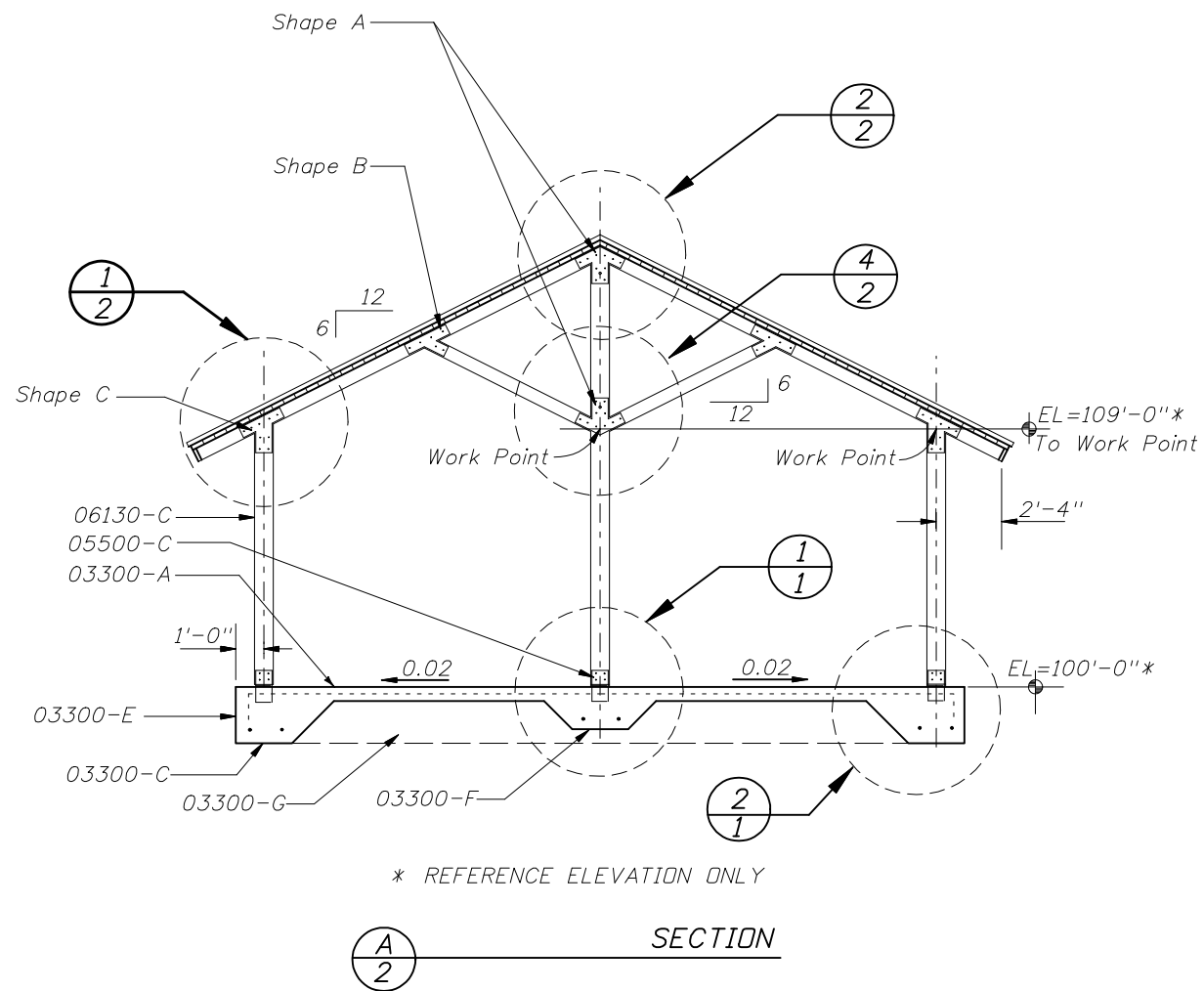


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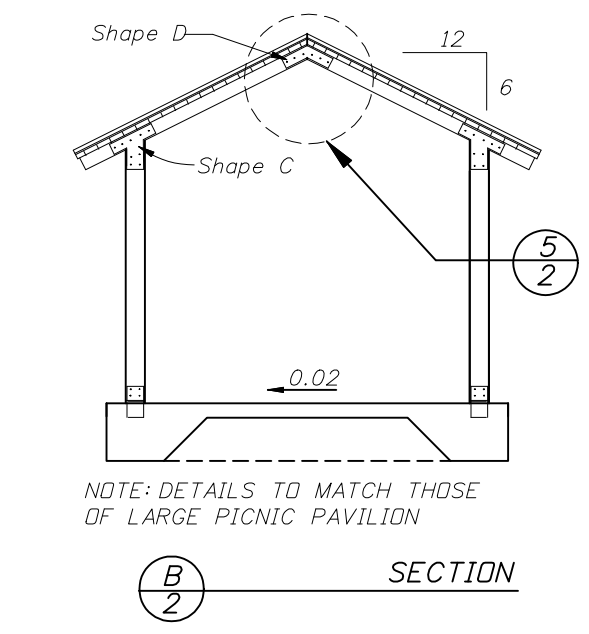
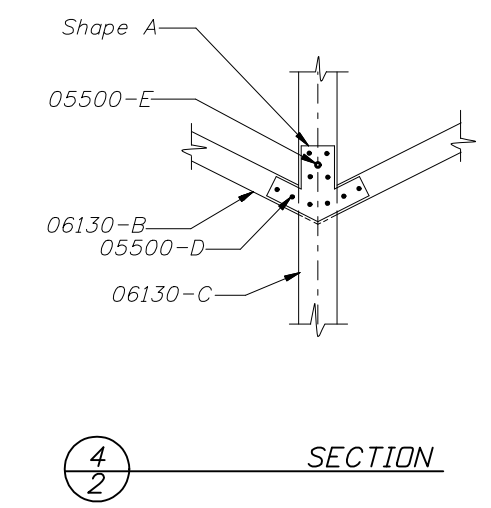
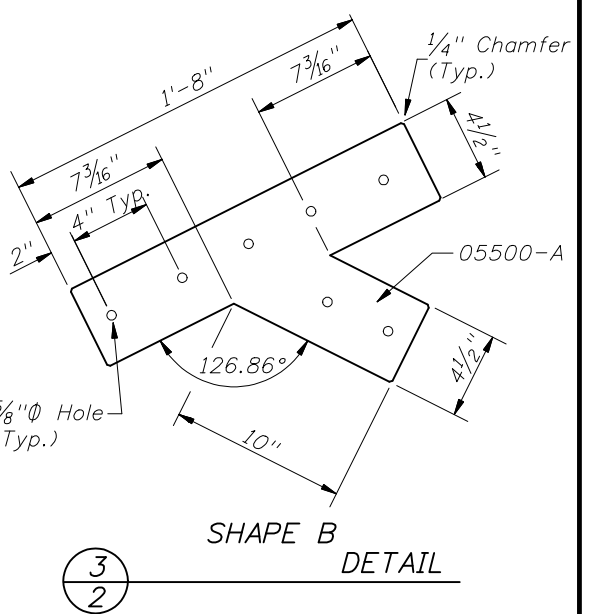
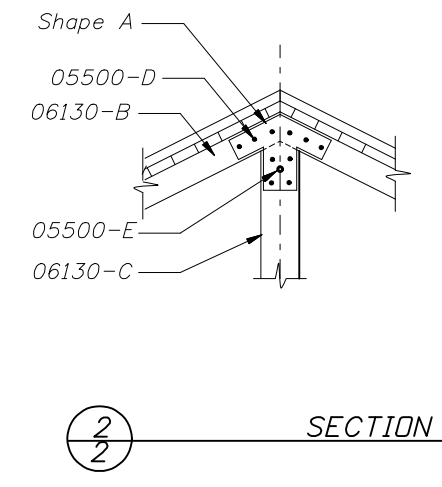
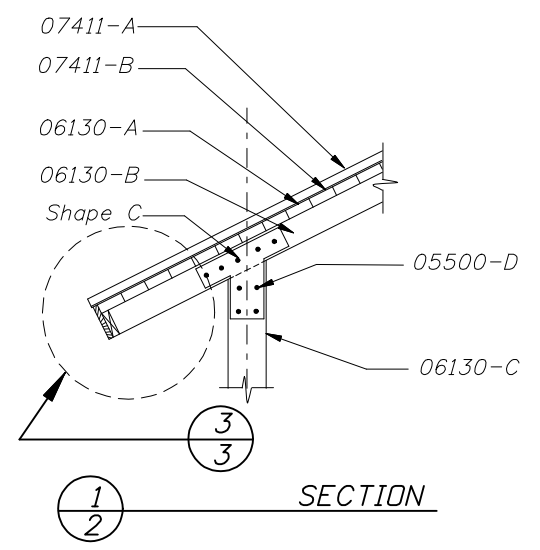
REST AREA EQUIPMENT

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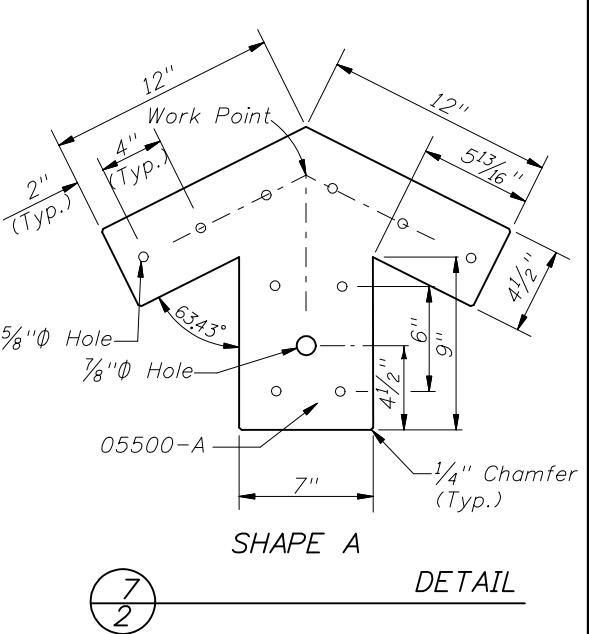
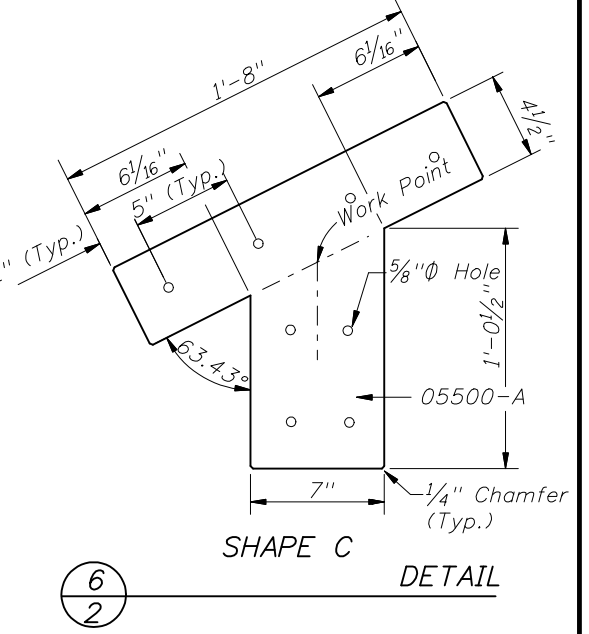
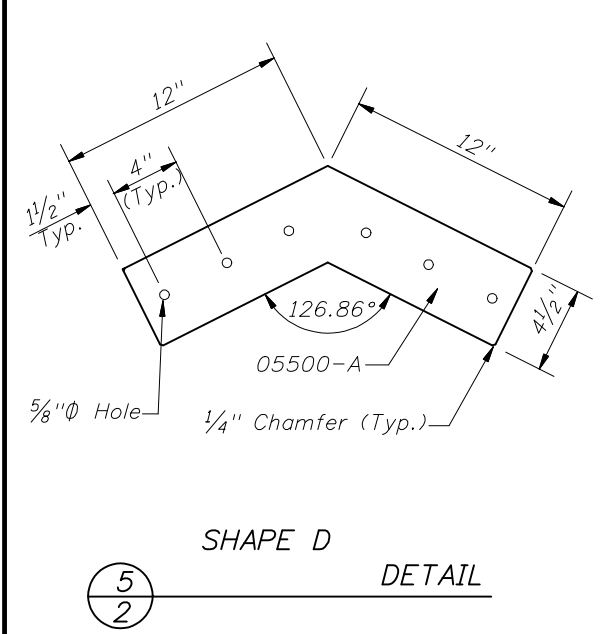
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* REFERENCE ELEVATION ONLY



NOTE: DETAILS TO MATCH THOSE OF LARGE PICNIC PAVILION



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.

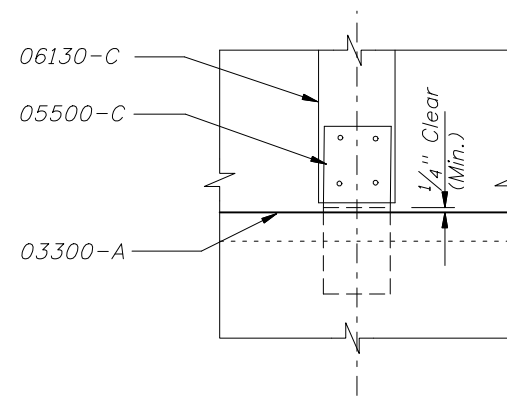
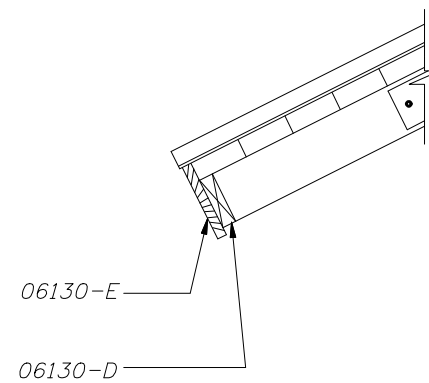
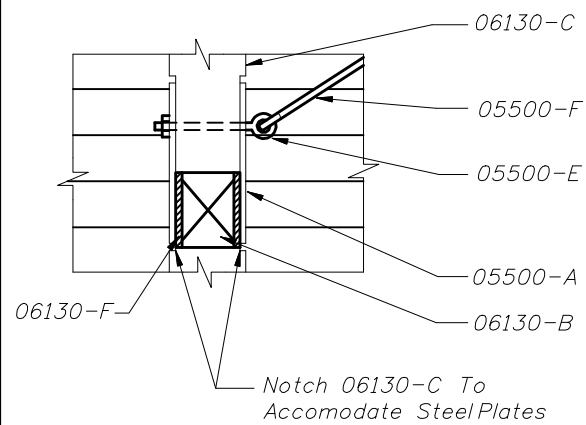
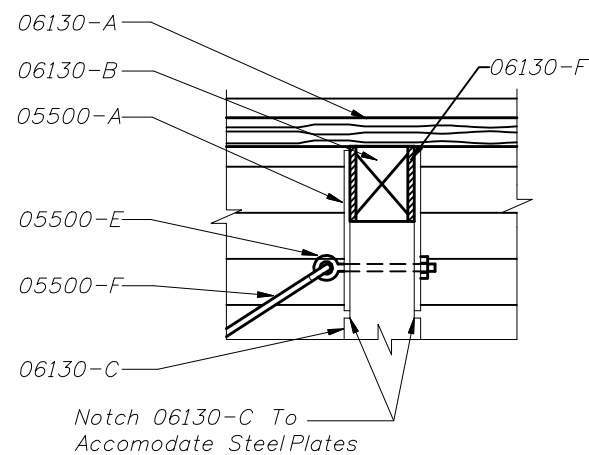
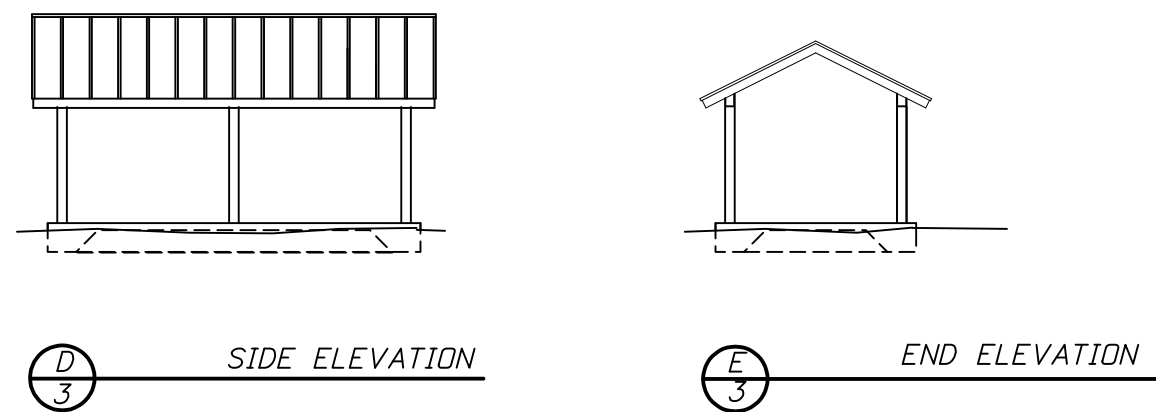
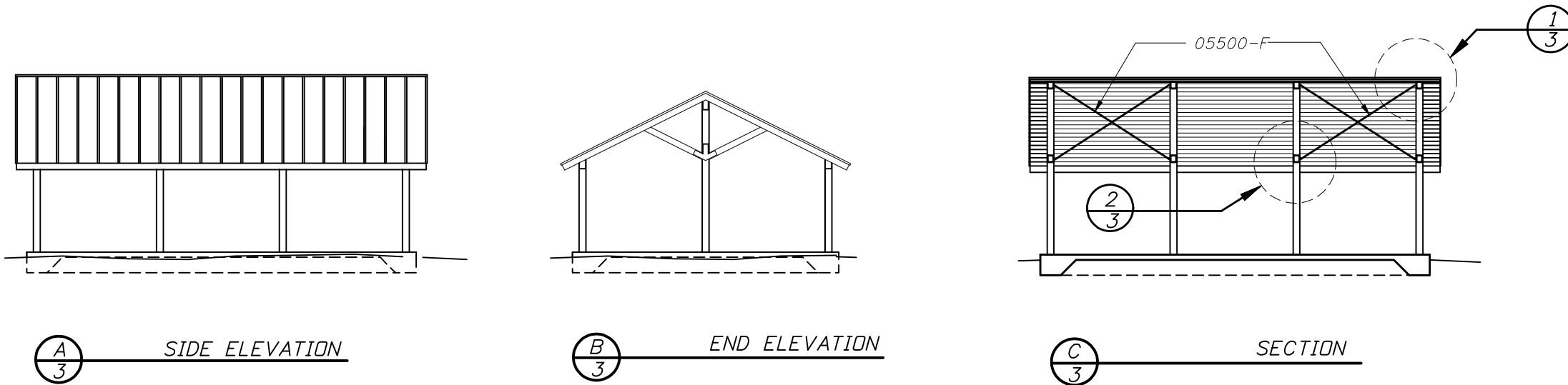
PICNIC PAVILIONS



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: Predrill 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.

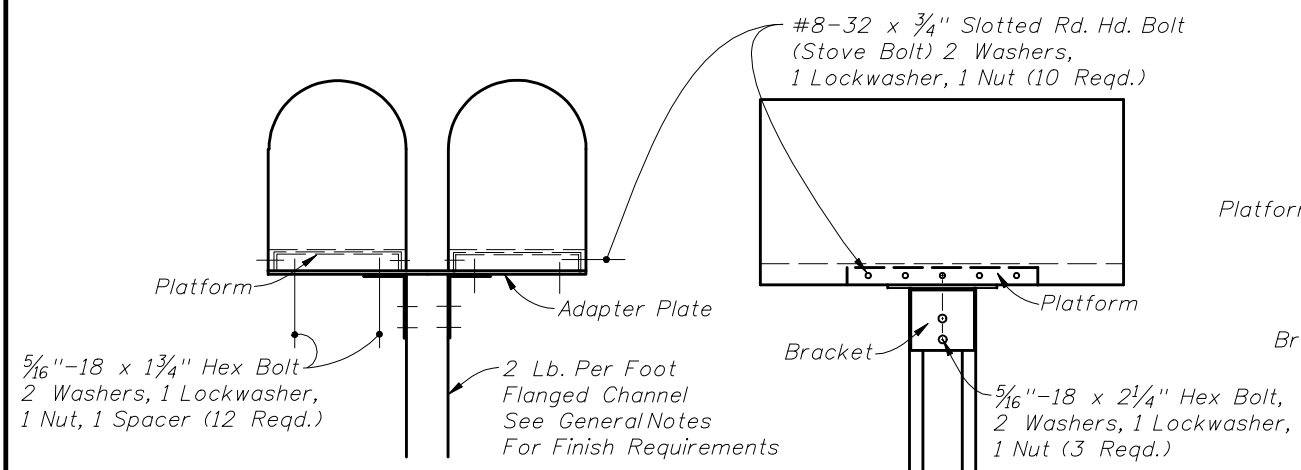
12. Mailboxes shall be paid for under the contract unit price for Mailboxes, Each. Payment shall be full compensation for boxes, posts and accessory items essential for installation in accordance with this standard; erection; adjustments to suit construction needs; and, for identification letters and 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.

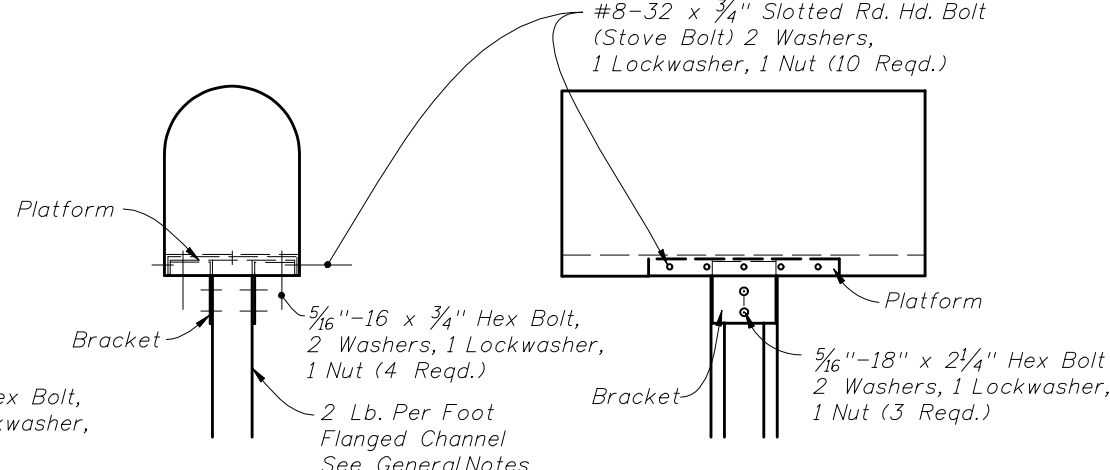




FRONT VIEW

SIDE VIEW

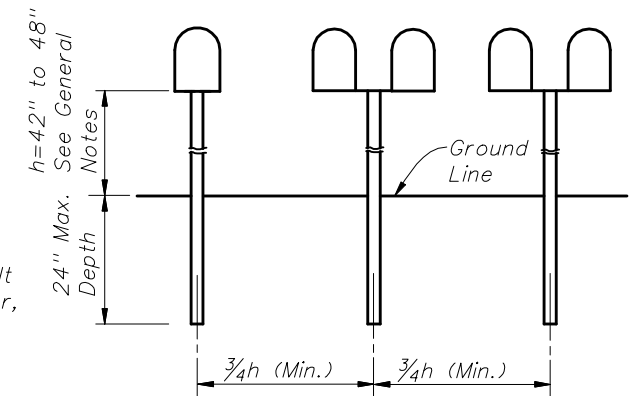
FLANGED CHANNEL



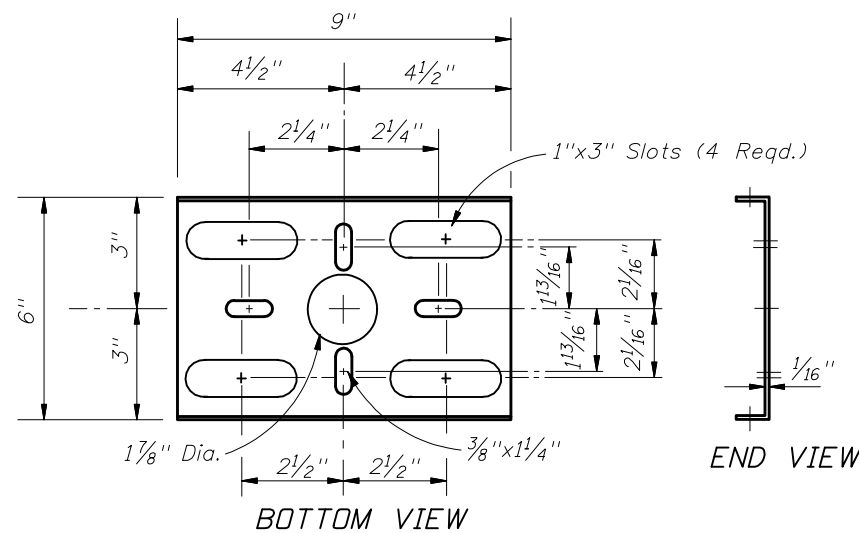
FRONT VIEW

SIDE VIEW

FLANGED CHANNEL

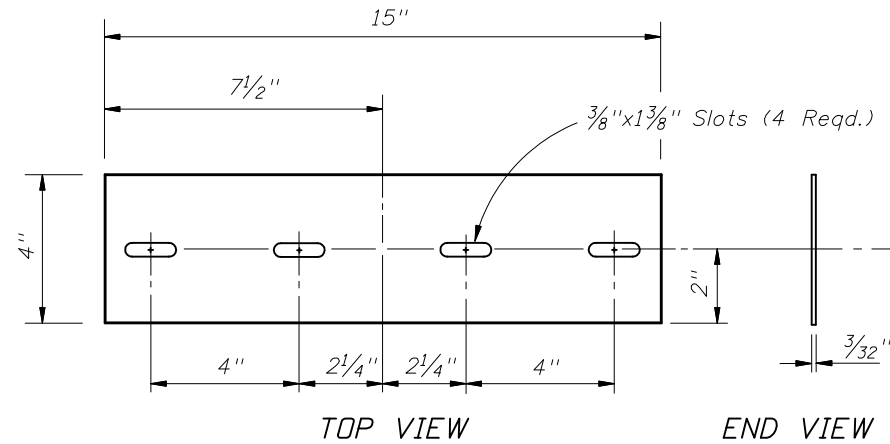


ELEVATION
SINGLE OR COMBINED WOOD, FLANGED CHANNEL
OR PIPE POST TYPES SHOWN ON THIS INDEX
POST SPACING



BOTTOM VIEW

END VIEW

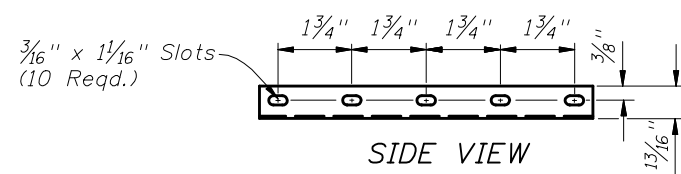


TOP VIEW

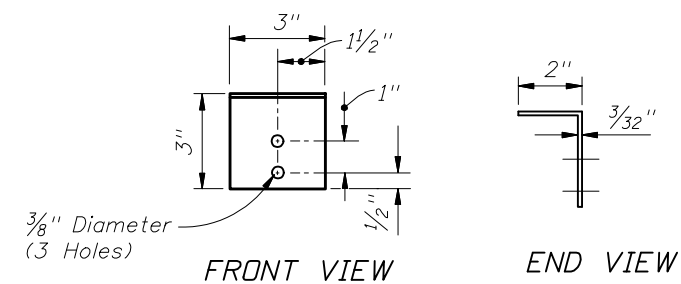
END VIEW

STEEL ADAPTER PLATE

Note: See General Notes for finish requirements.



STEEL PLATFORM

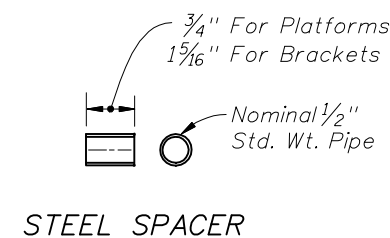


FRONT VIEW

END VIEW

TOP VIEW

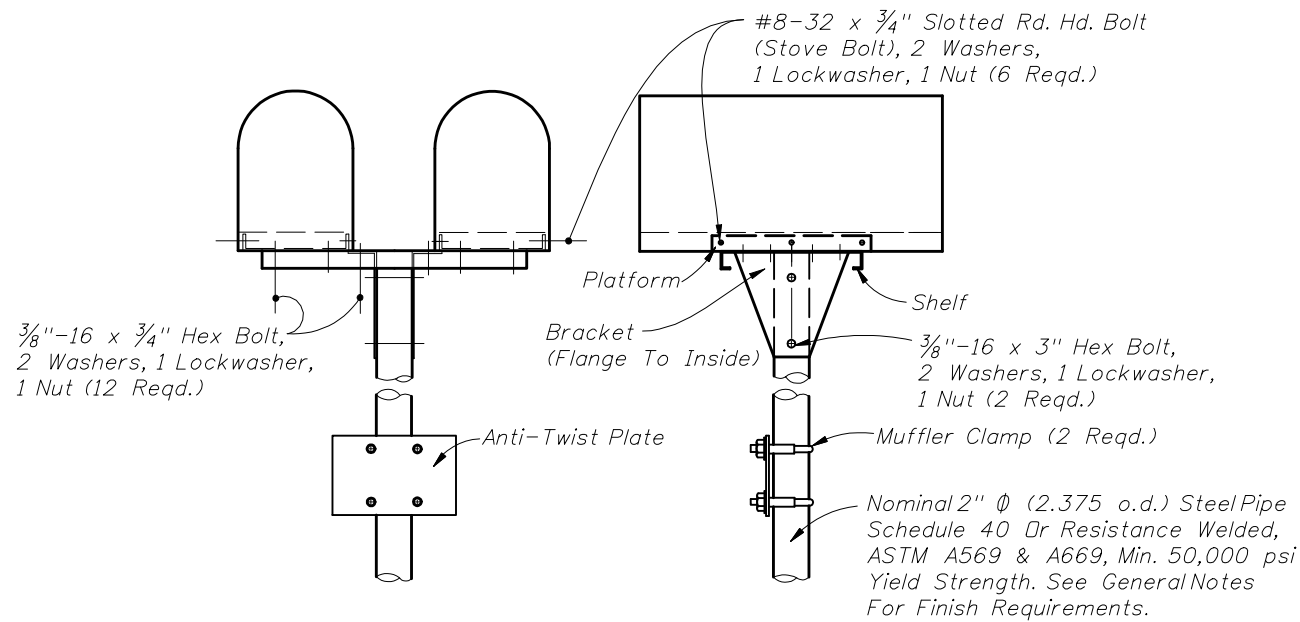
STEEL BRACKET



STEEL SPACER

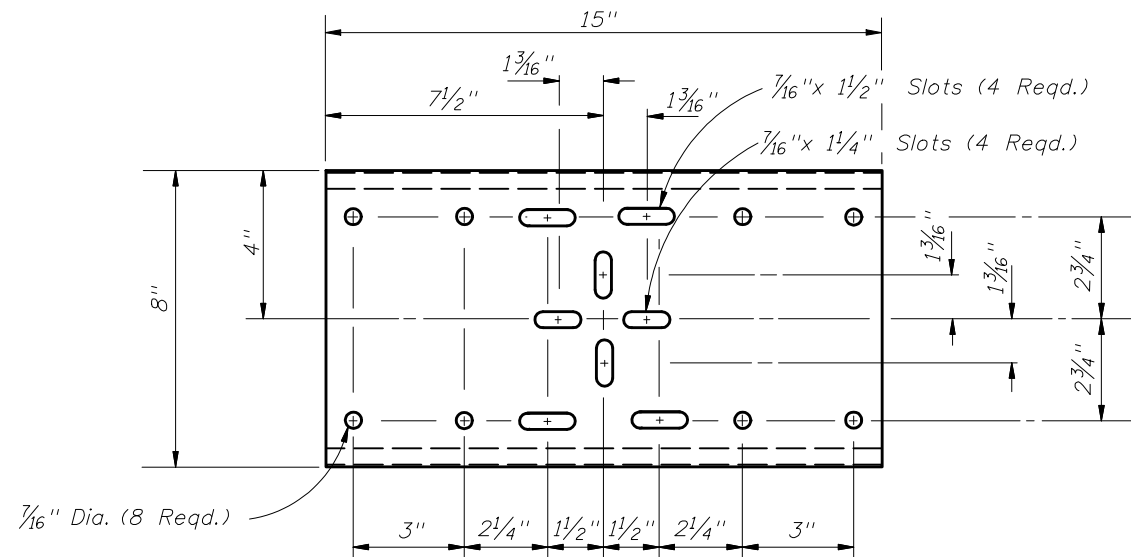
STEEL FLANGED CHANNEL SUPPORT POSTS



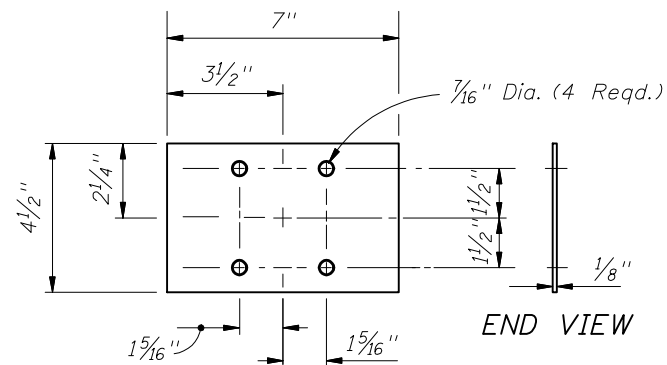


FRONT VIEW SIDE VIEW

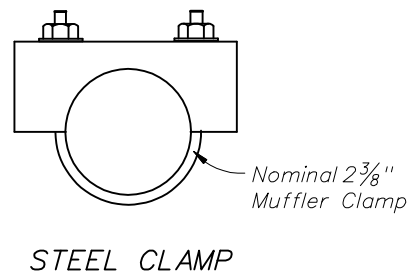
2" Ø PIPE POST



TOP VIEW
STEEL SHELF

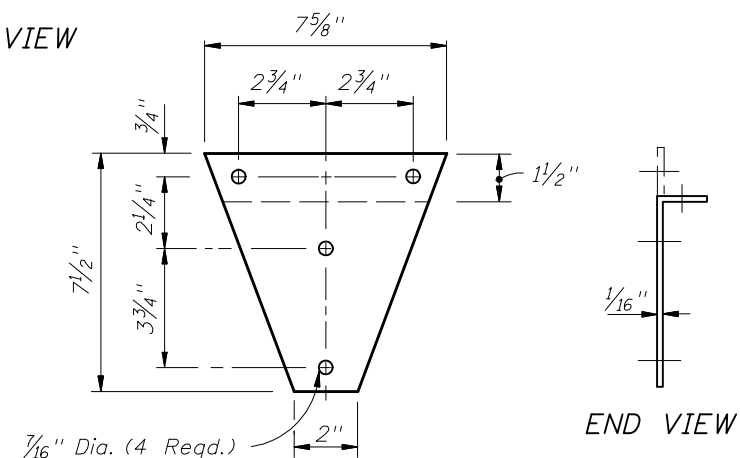


FRONT VIEW
STEEL ANTI-TWIST PLATE

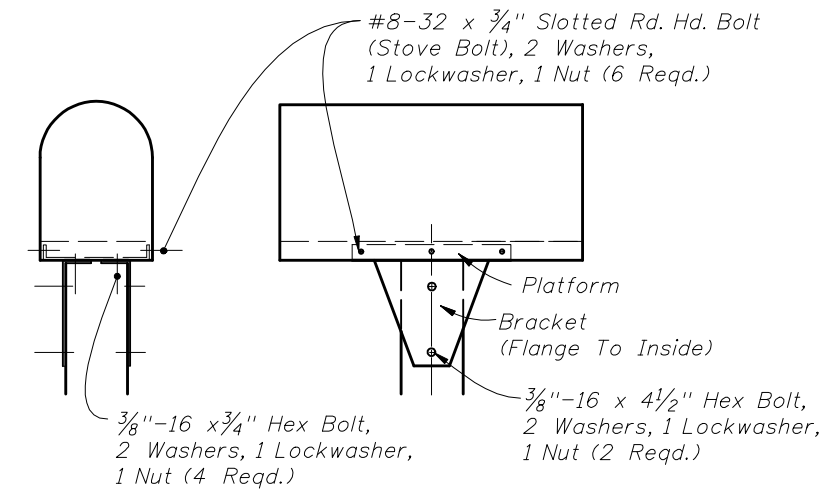


STEEL CLAMP

END VIEW

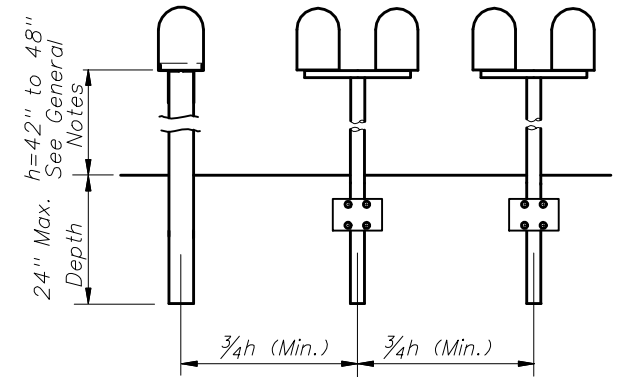


SIDE VIEW
STEEL BRACKET



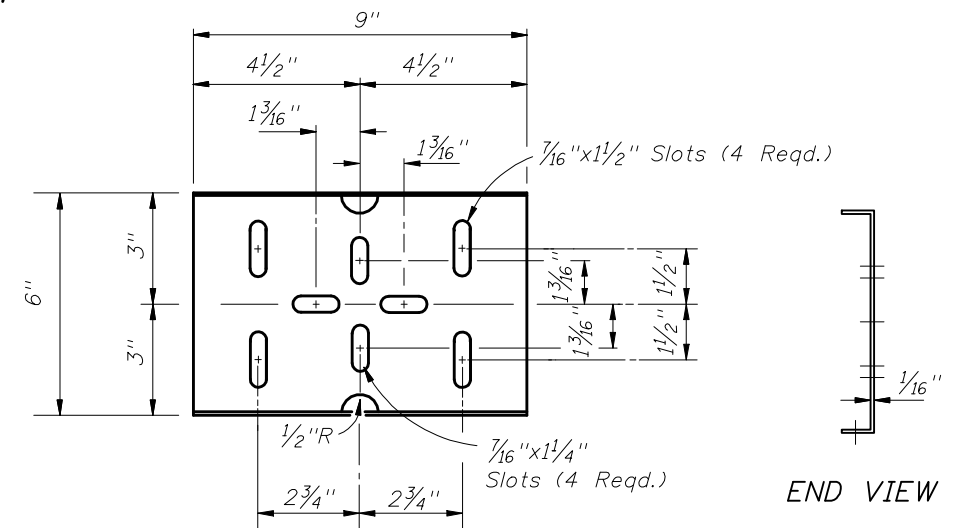
FRONT VIEW SIDE VIEW

4" X 4" WOOD POST



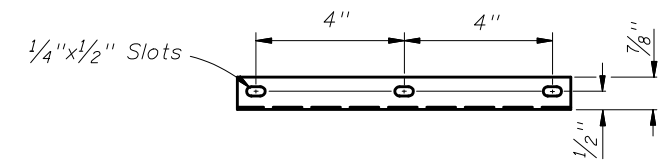
ELEVATION

SINGLE OR COMBINED WOOD, FLANGED CHANNEL OR PIPE POST TYPES SHOWN ON THIS INDEX
POST SPACING



BOTTOM VIEW

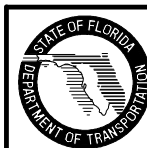
END VIEW



SIDE VIEW
STEEL PLATFORM

Note: See General Notes for finish requirements

STEEL PIPE AND WOOD SUPPORT POSTS

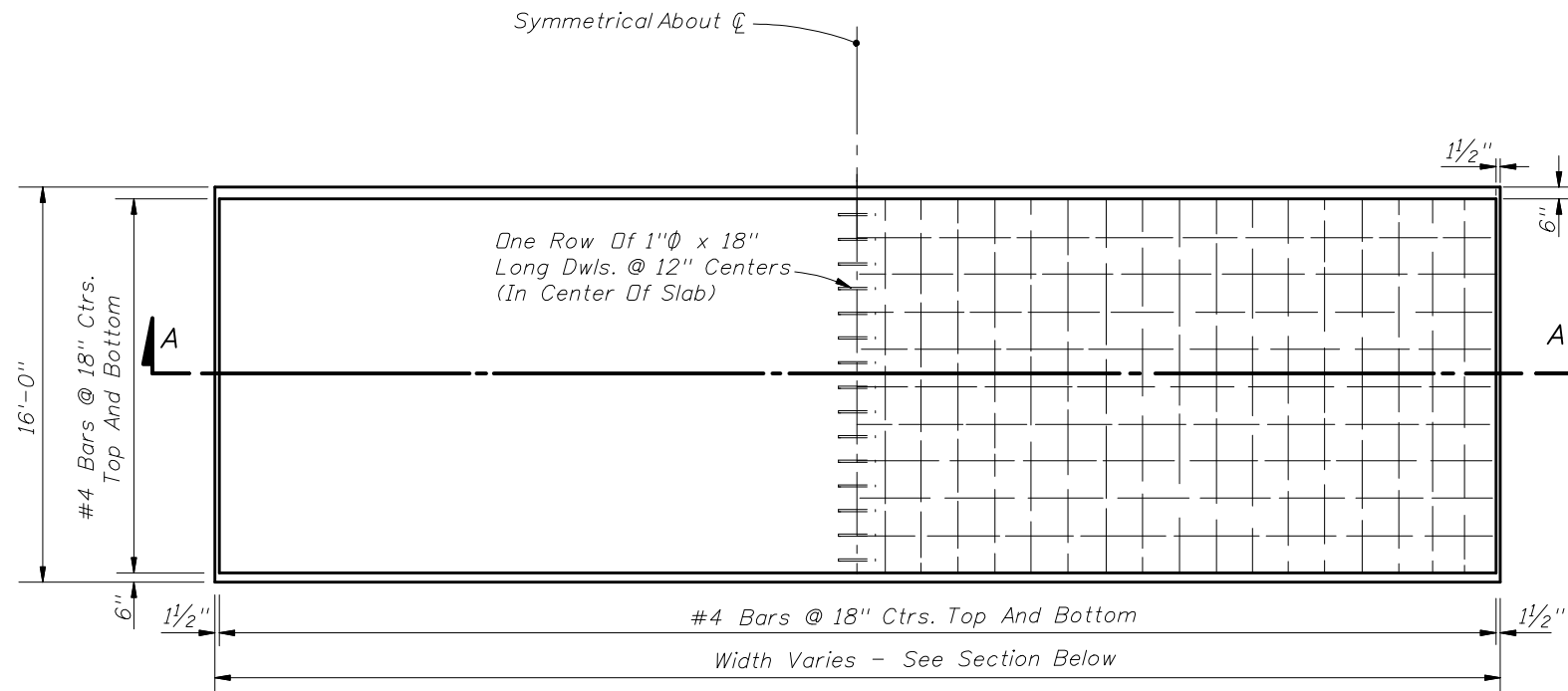


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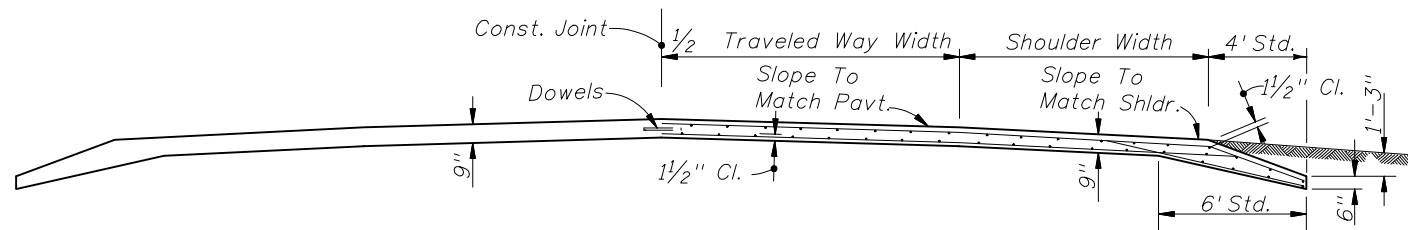
MAILBOXES

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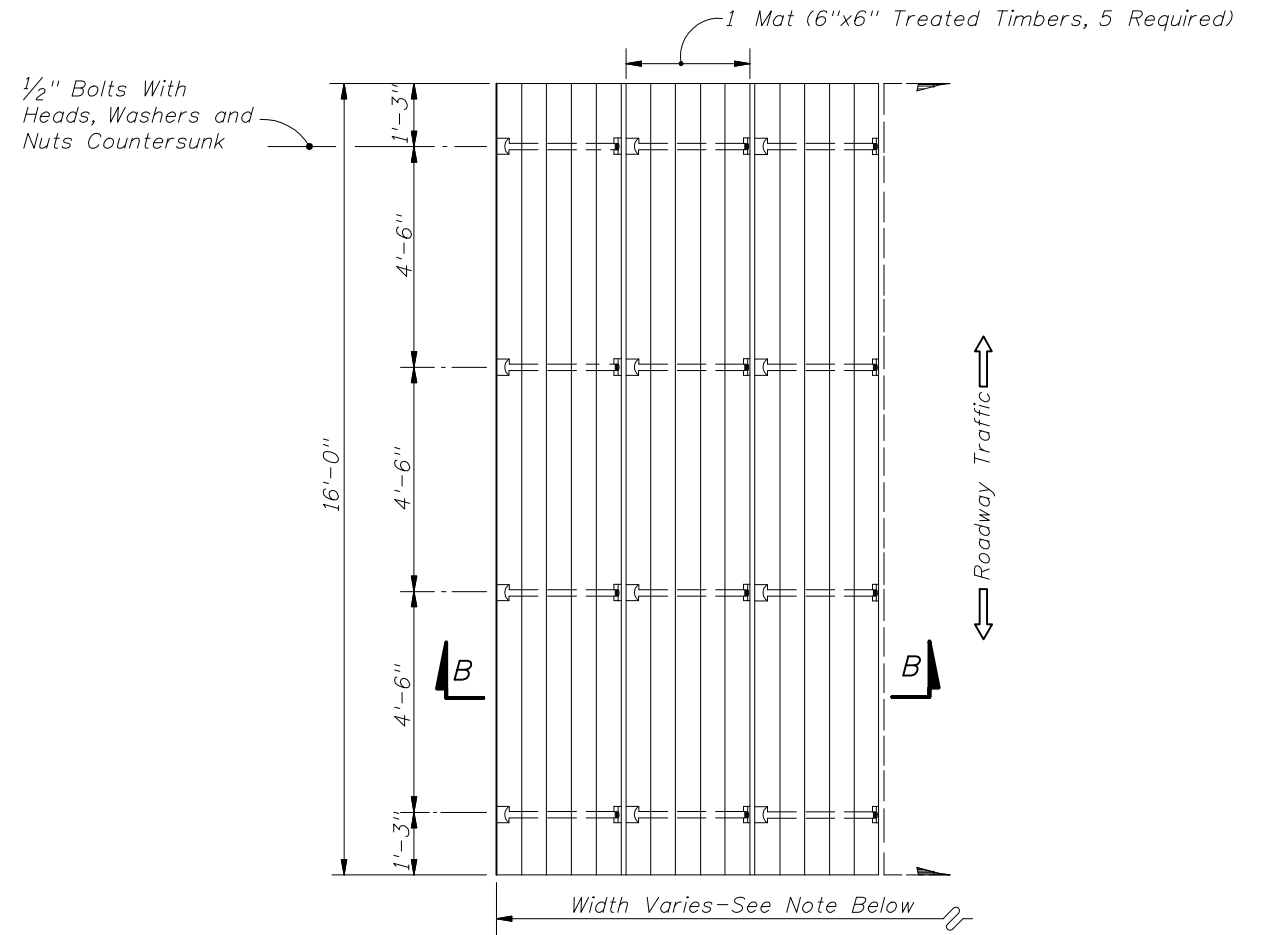
PLAN



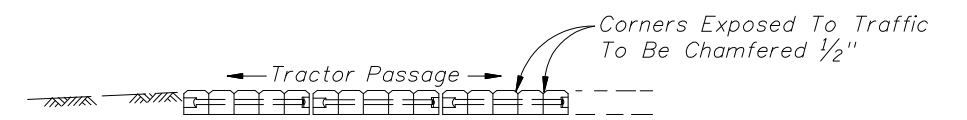
SECTION AA

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.

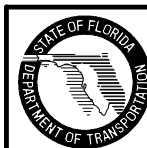
The number of mats required will vary with the pavement width. A sufficient number of mats will be used so that the tractor crossing will extend a minimum of four feet (4') beyond roadway shoulders.

TREATED TIMBER
TYPE B

GENERAL NOTES

1. Tractor crossing shall be paid for under the contract unit price for Tractor Crossing, EA.

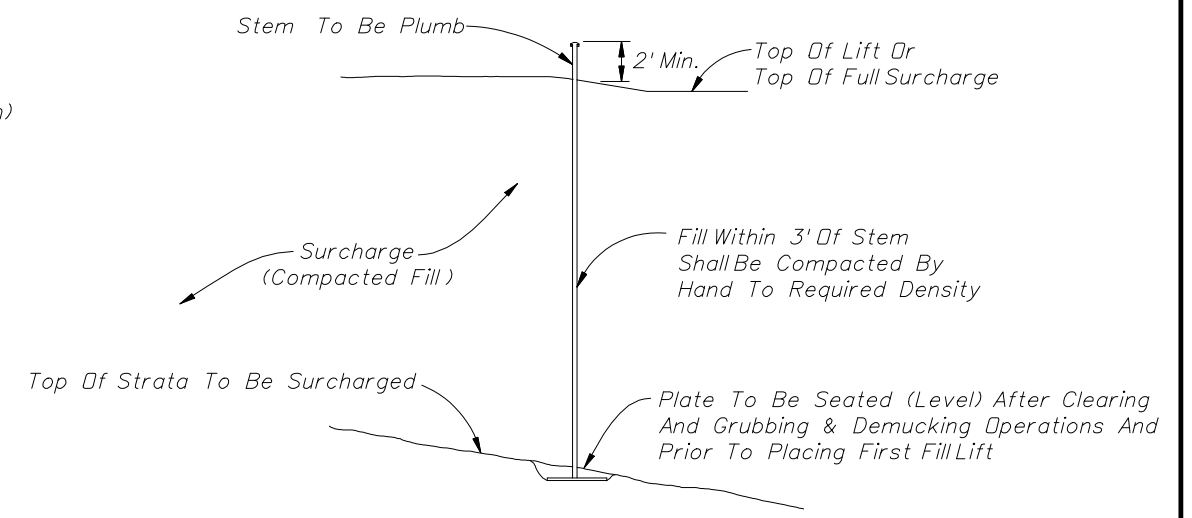
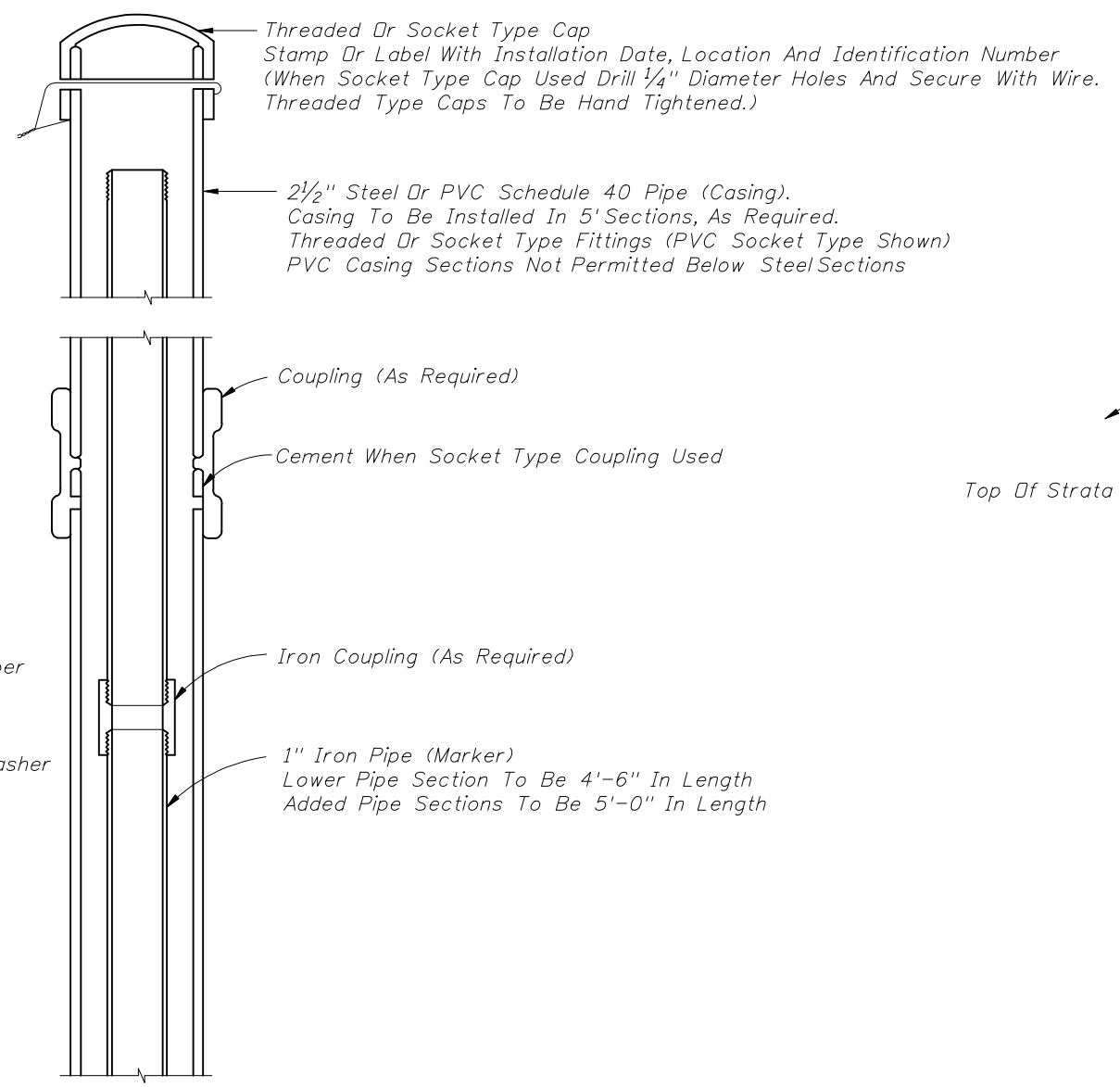
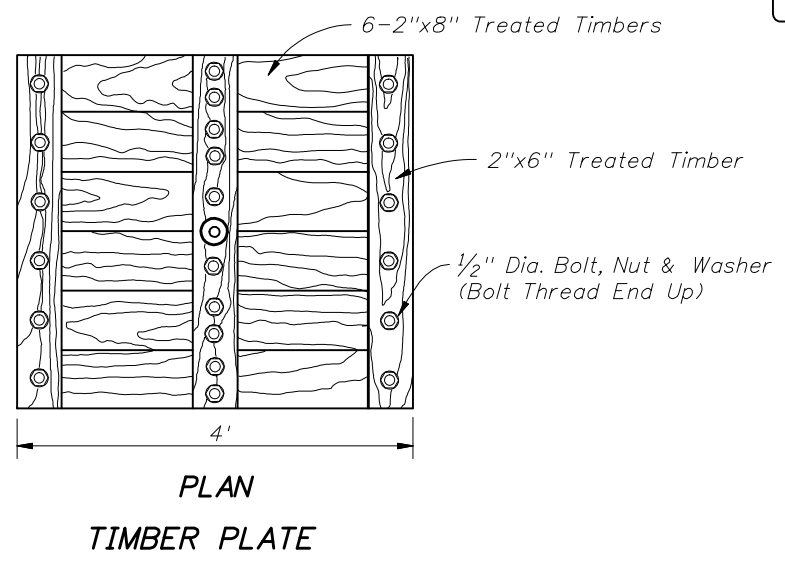
TRACTOR CROSSINGS



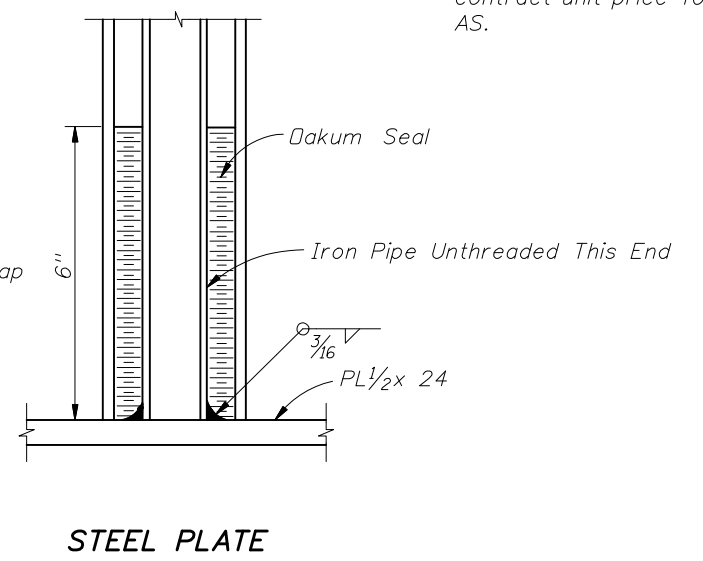
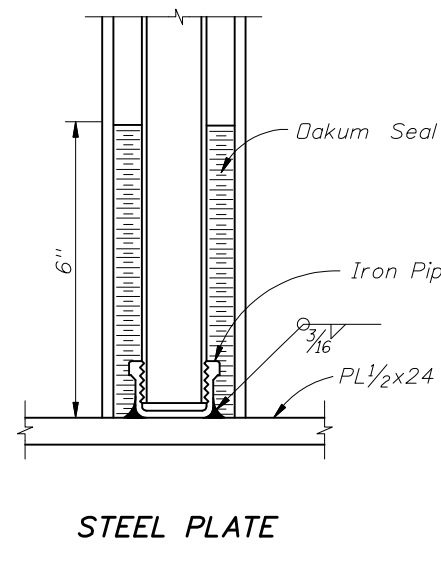
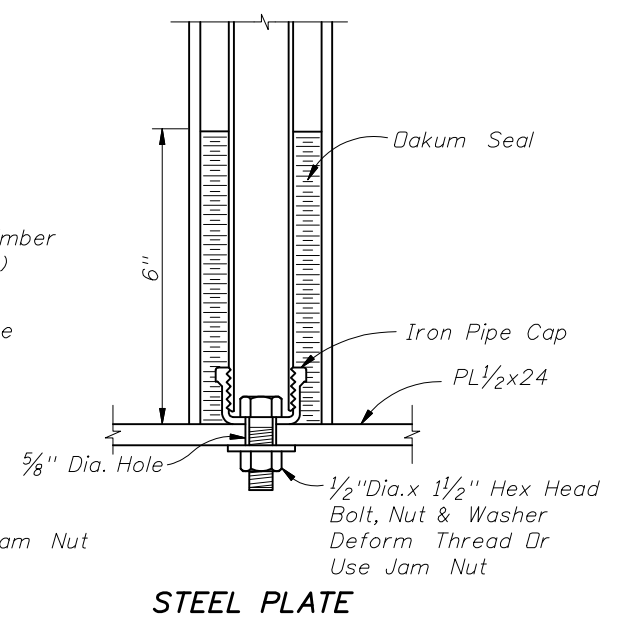
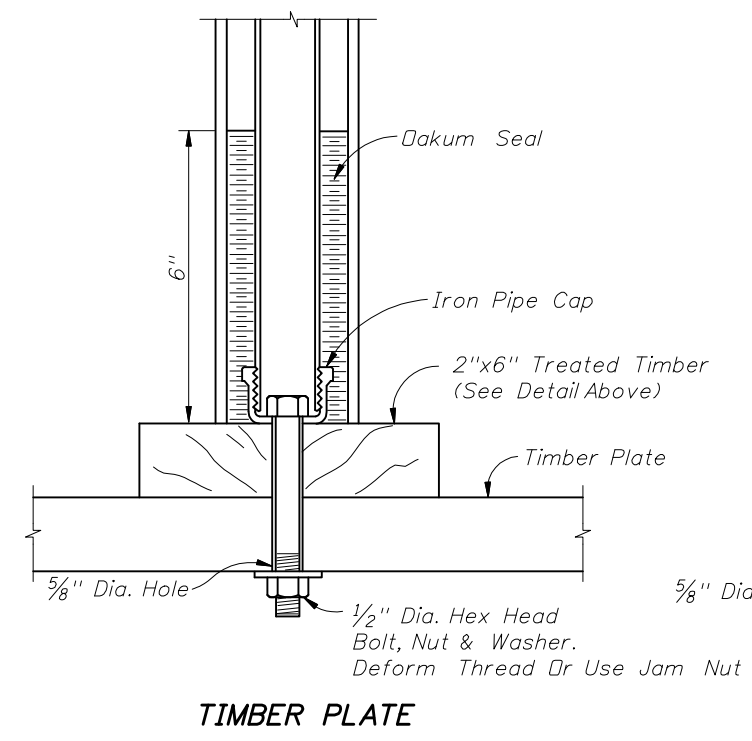
2010 FDOT Design Standards

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.



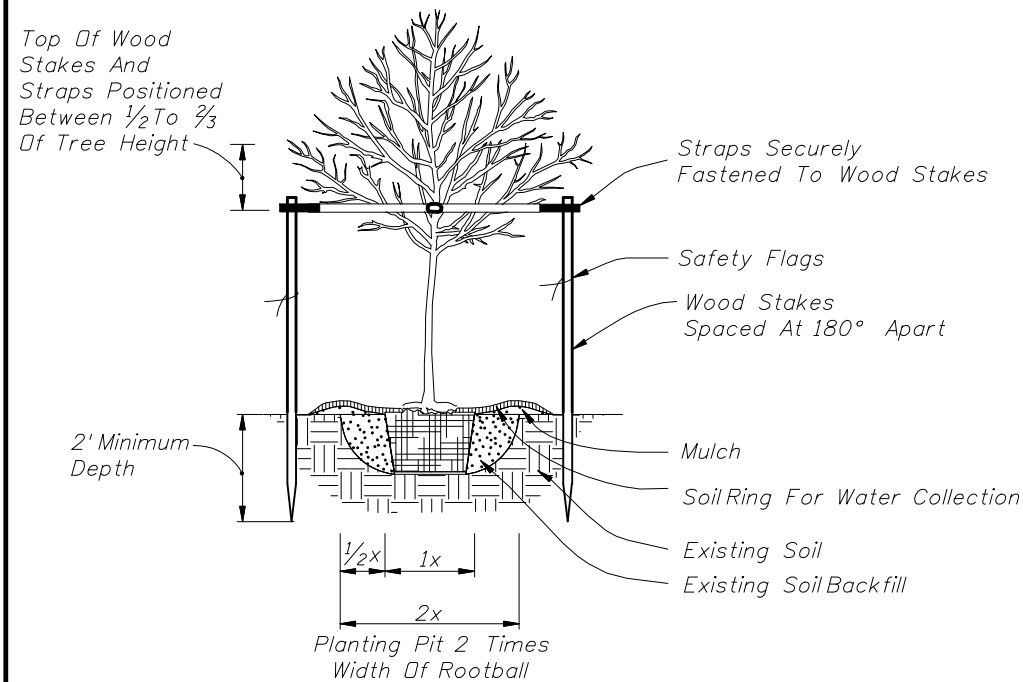
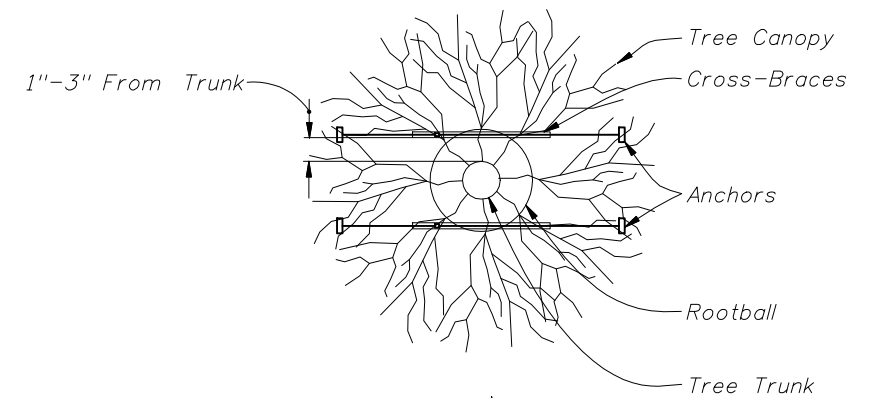
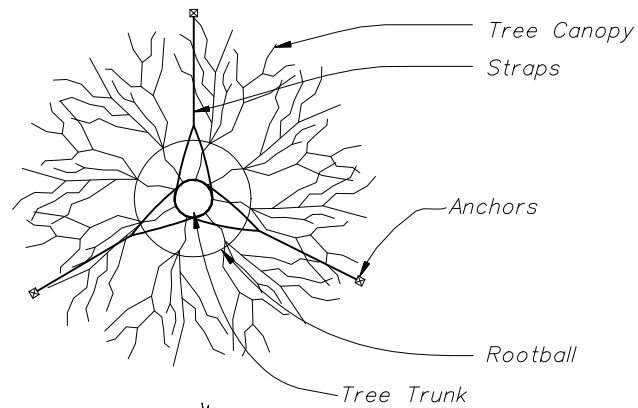
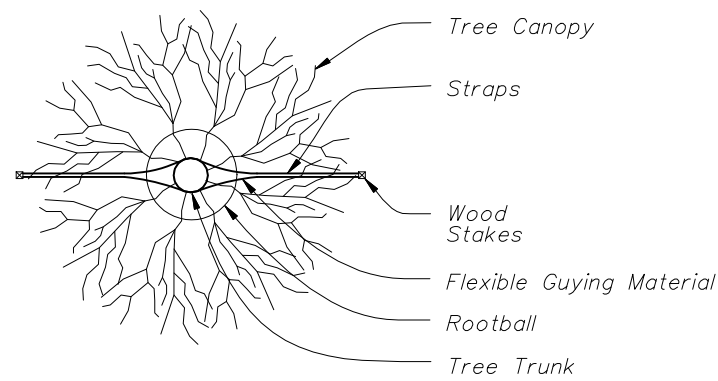
STEM AND PLATE OPTIONS



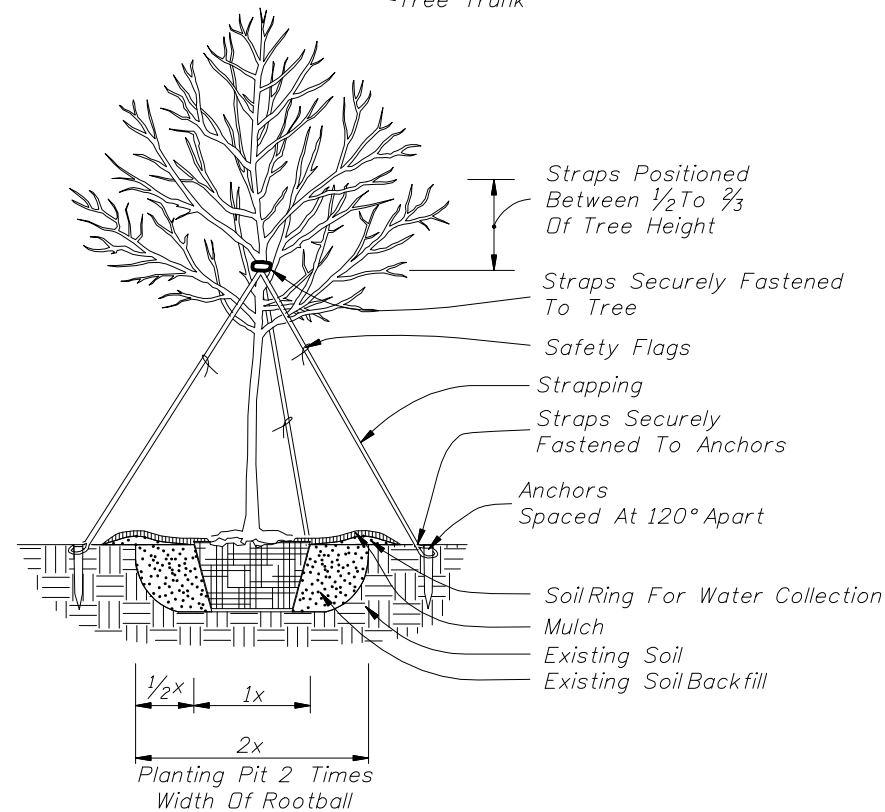
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SETTLEMENT PLATE

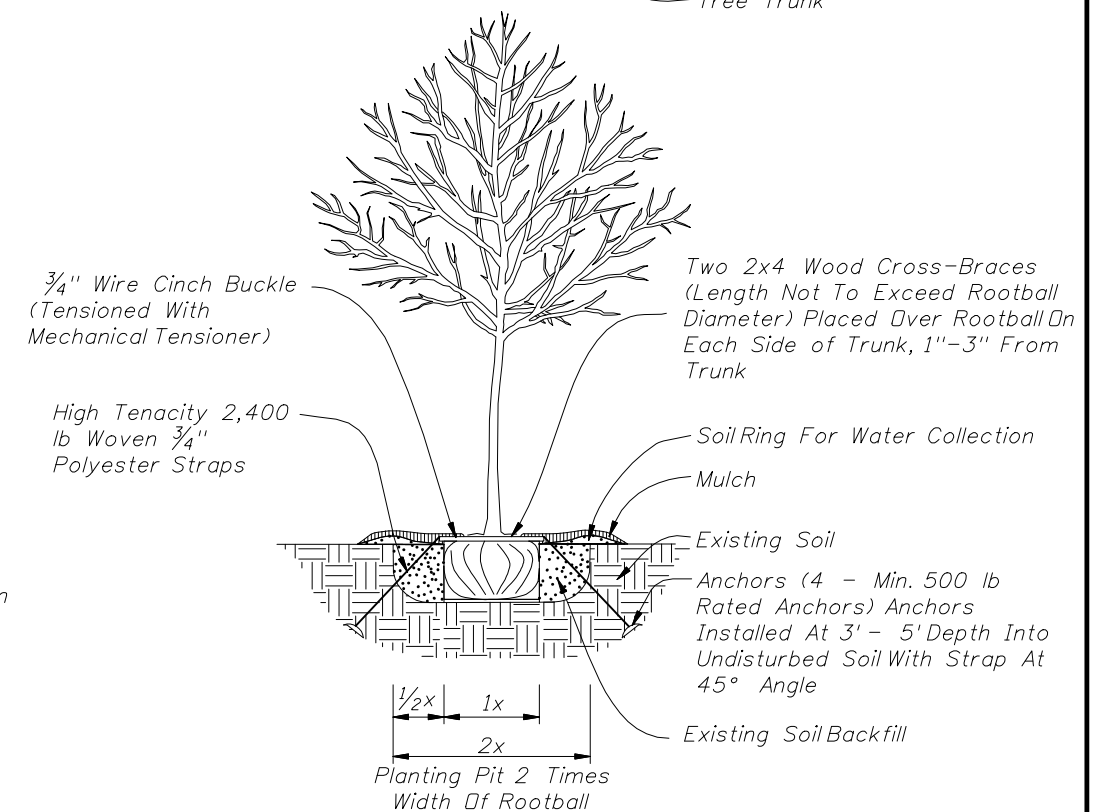
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1" - 3 1/2" CALIPER TREE PLANTING



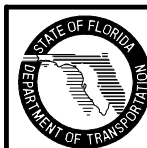
4" AND LARGER CALIPER TREE PLANTING



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.

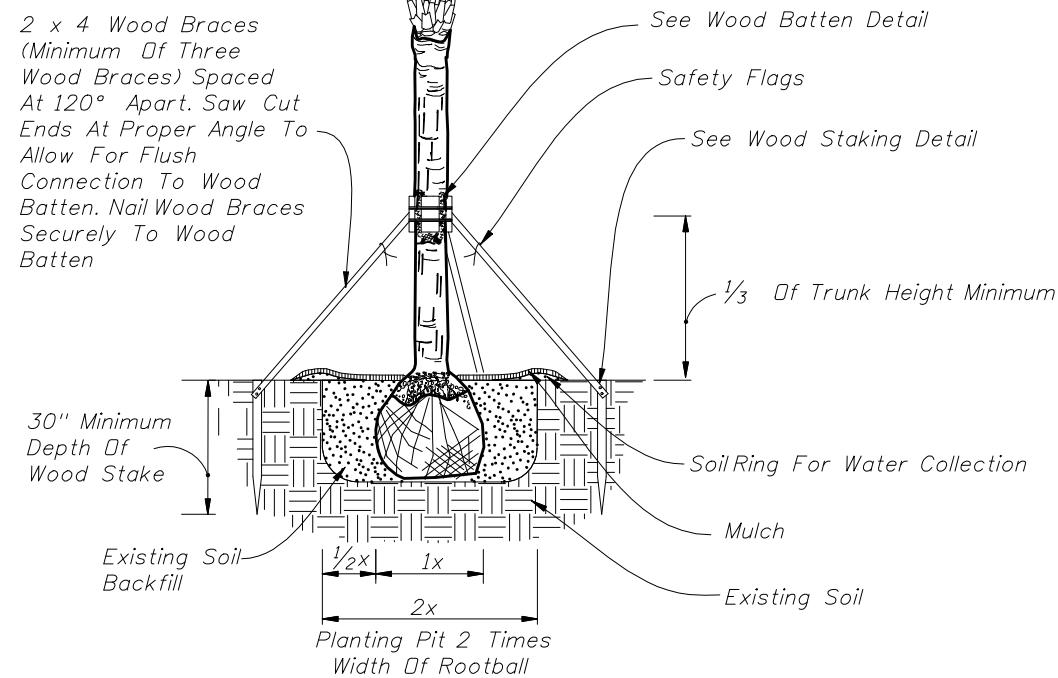


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LANDSCAPE INSTALLATION

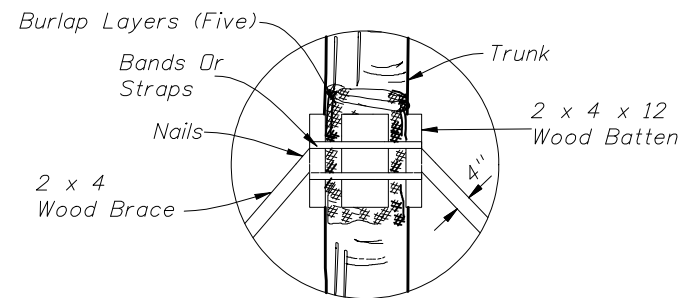
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544	

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

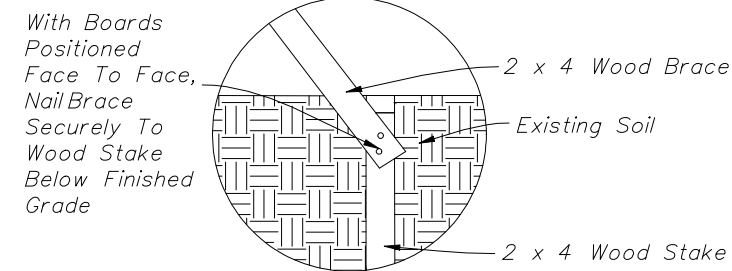


NOTE: For All Other Palms, Use Detail Provided By Landscape Architect In Contract Plans.

CABBAGE PALM PLANTING FOR UP TO 24' CLEAR TRUNK

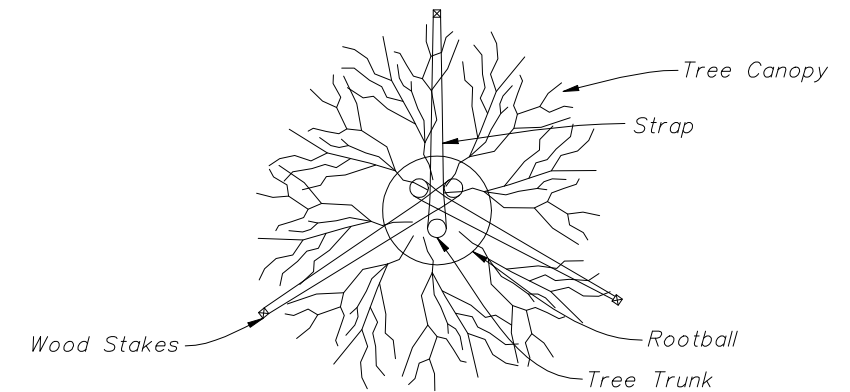


WOOD BATTEN DETAIL

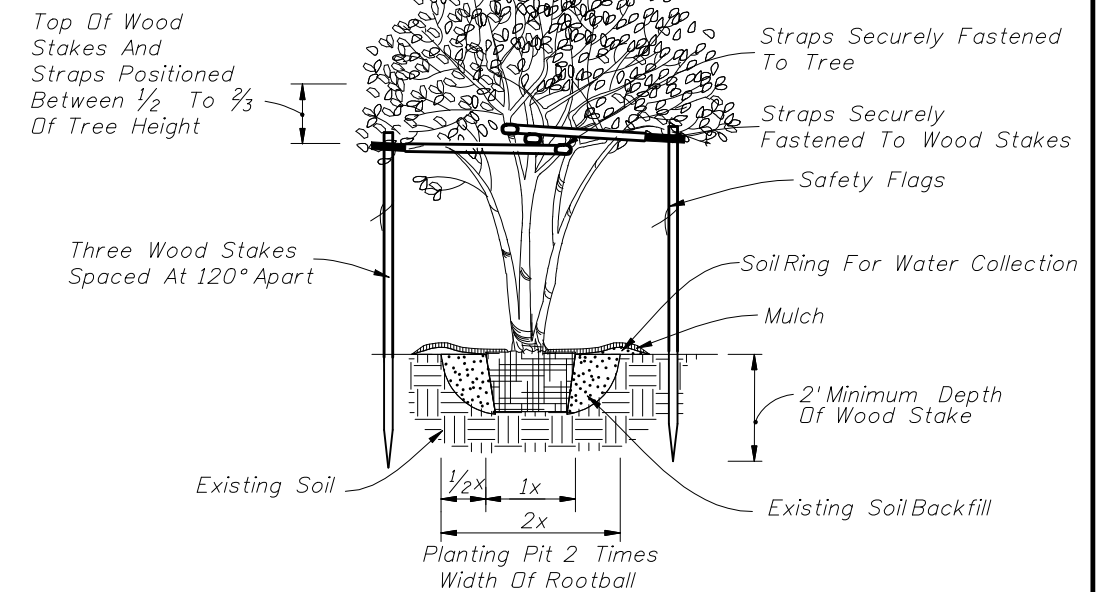


NOTE: Stake Into Firm, Existing Soil.

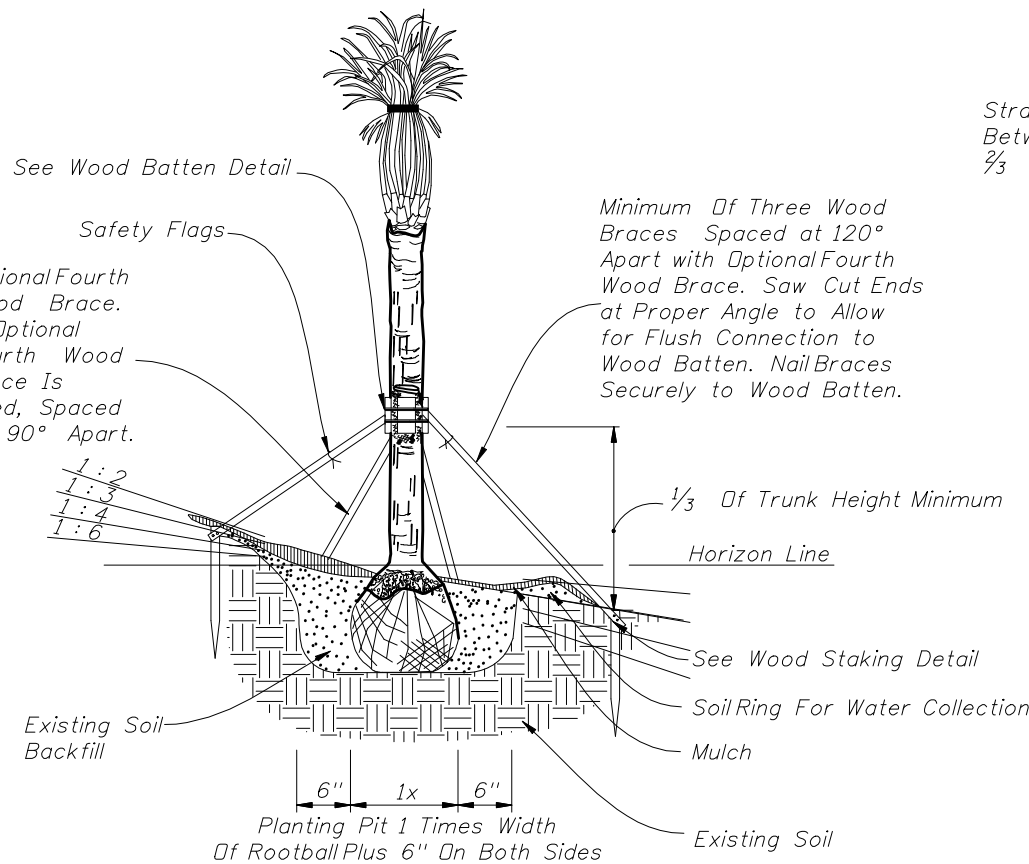
WOOD STAKING DETAIL



Top Of Wood Stakes And Straps Positioned Between 1/2 To 2/3 Of Tree Height

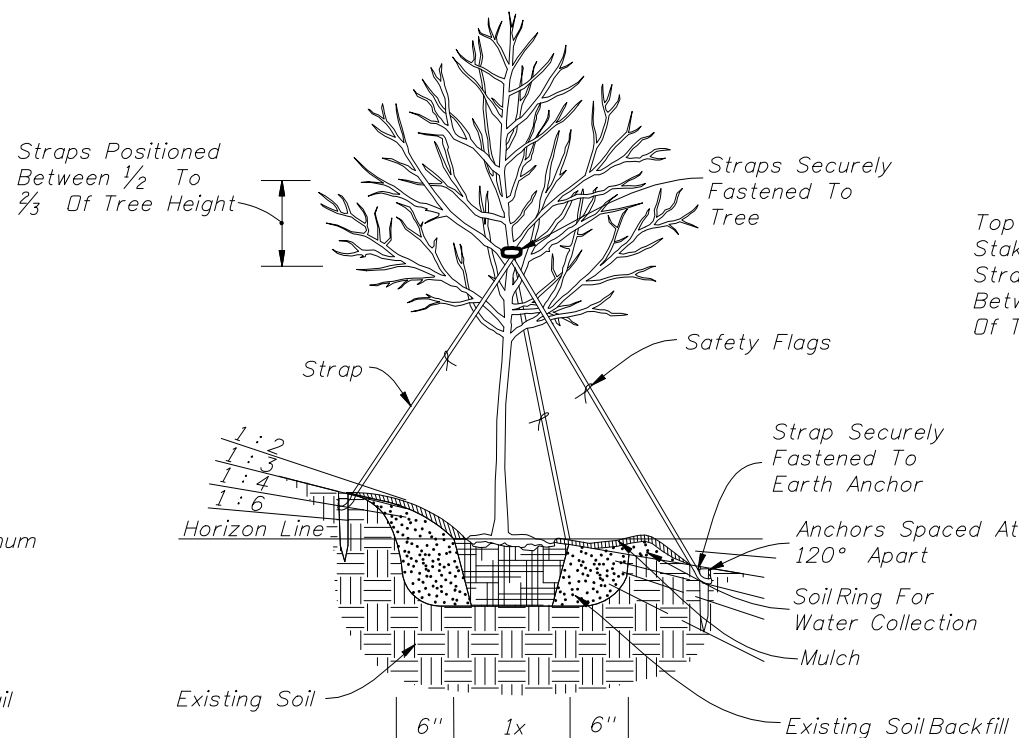


MULTI-TRUNK TREE PLANTING



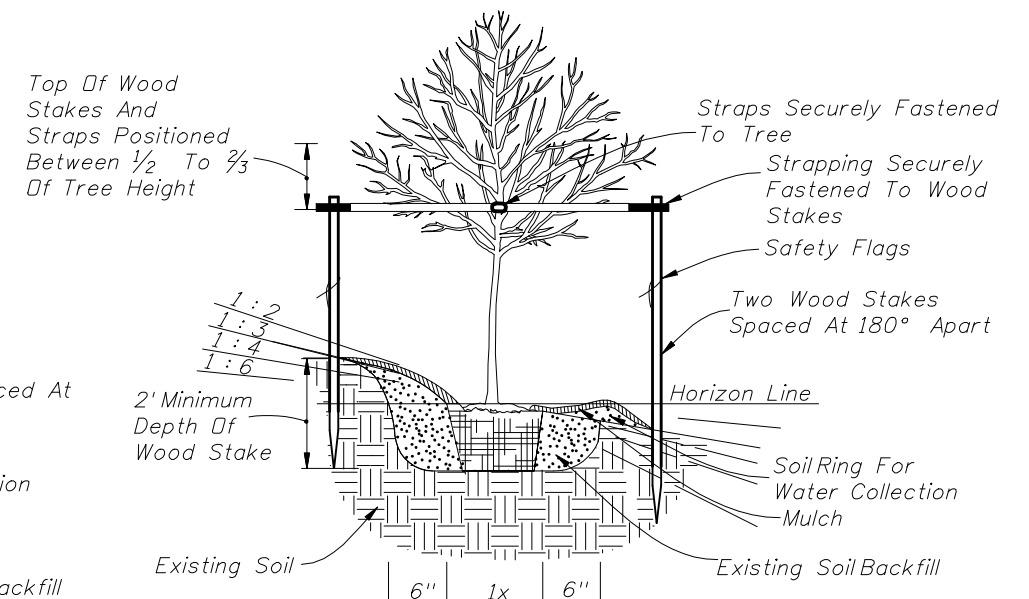
NOTES: Slope Provided As Rise:Run. For All Other Palms, Use Detail Provided By Landscape Architect In Contract Plans.

CABBAGE PALM PLANTING ON SLOPE FOR UP TO 24' CLEAR TRUNK



NOTE: Slope Provided As Rise:Run.

4" AND LARGER CALIPER TREE PLANTING ON SLOPE



NOTE: Slope Provided As Rise:Run.

1" - 3 1/2" CALIPER TREE PLANTING ON SLOPE

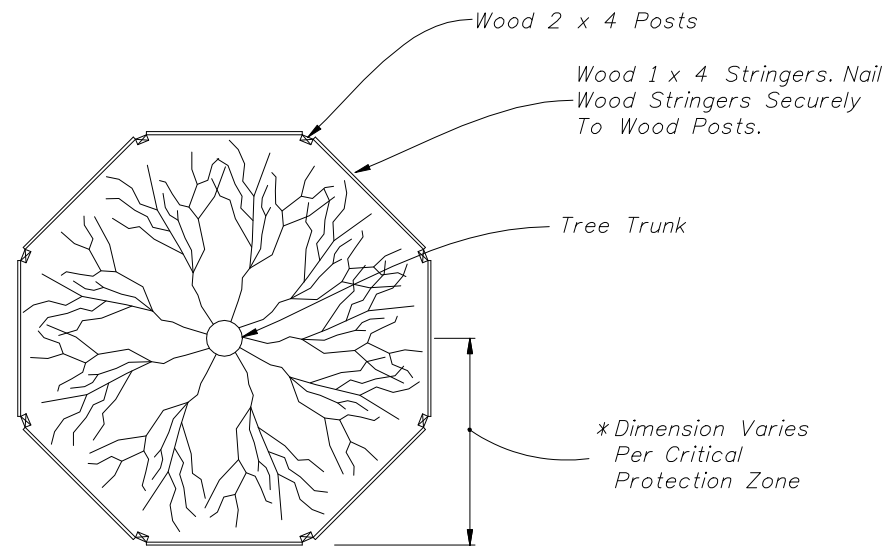


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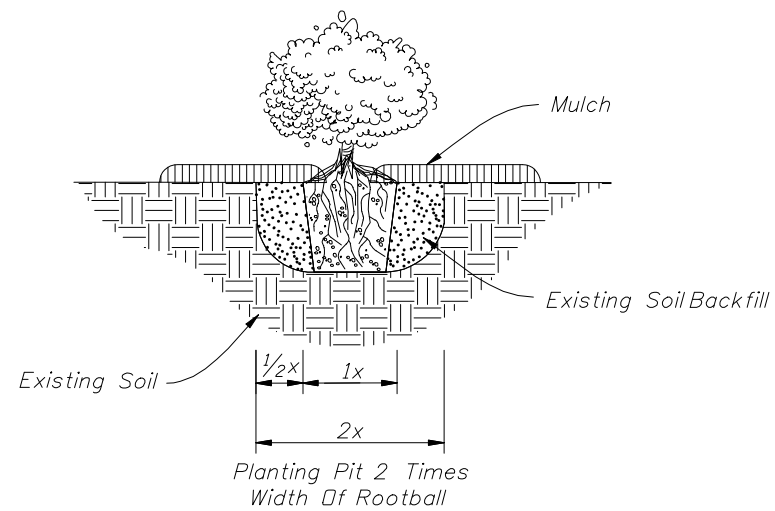
LANDSCAPE INSTALLATION

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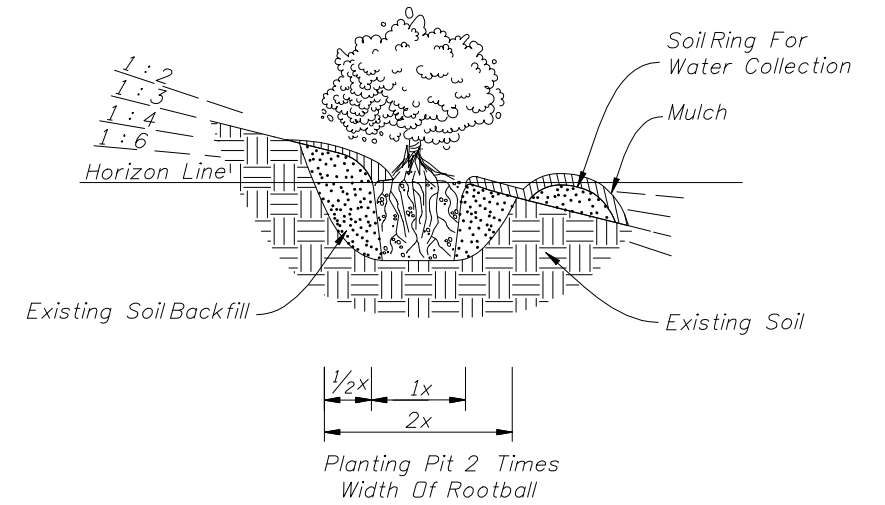
Index No. 544



NOTE: For Groups Of Trees, Place Barricades Between Trees And Construction Activity.

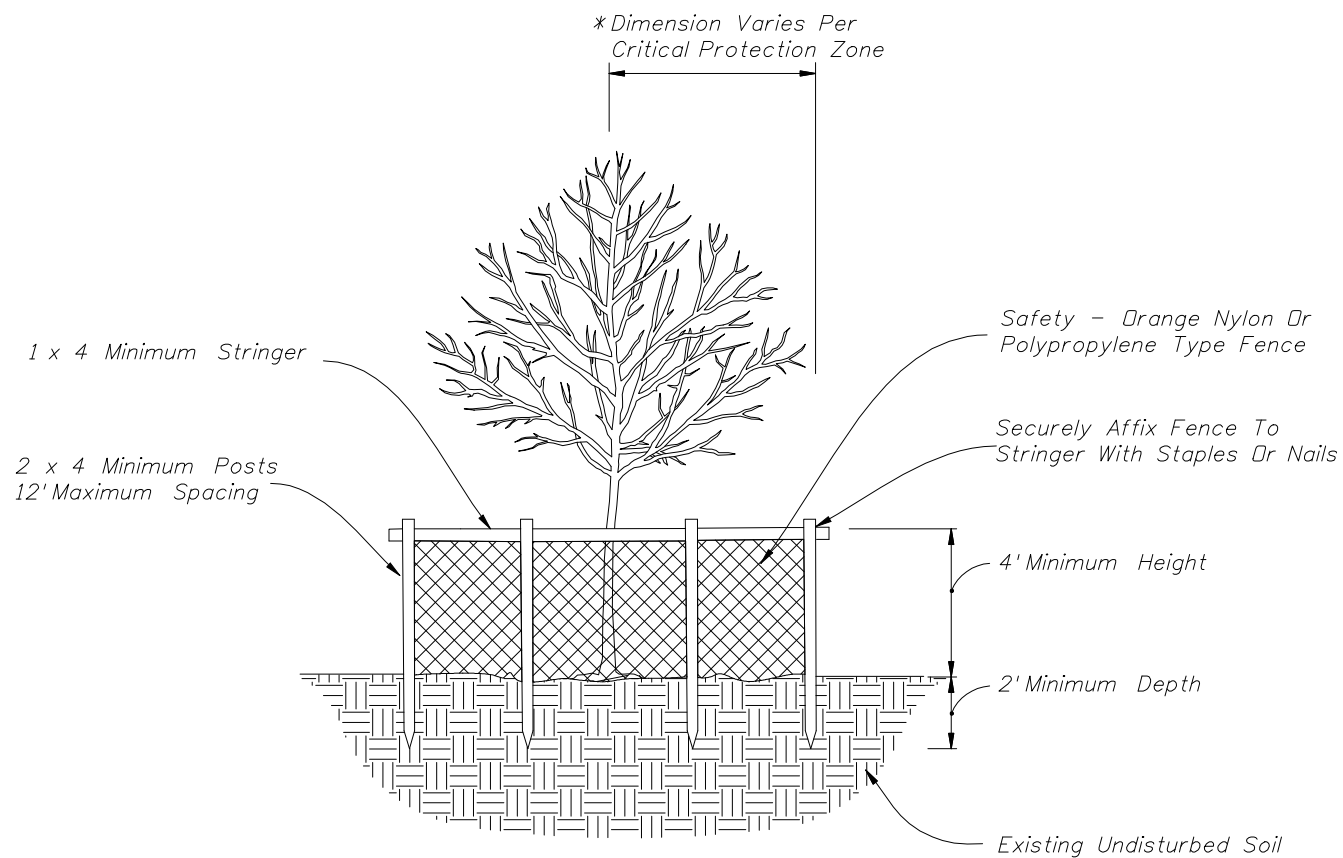


GROUND COVER/SHRUB PLANTING



NOTE: Slope Provided As Rise:Run.

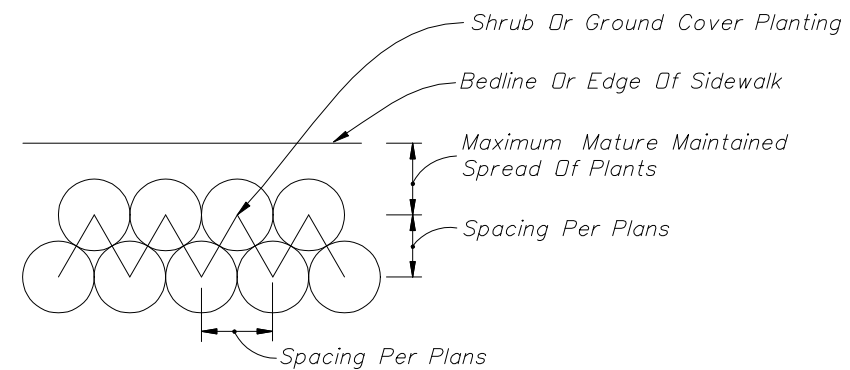
GROUND COVER/SHRUB PLANTING ON SLOPE



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

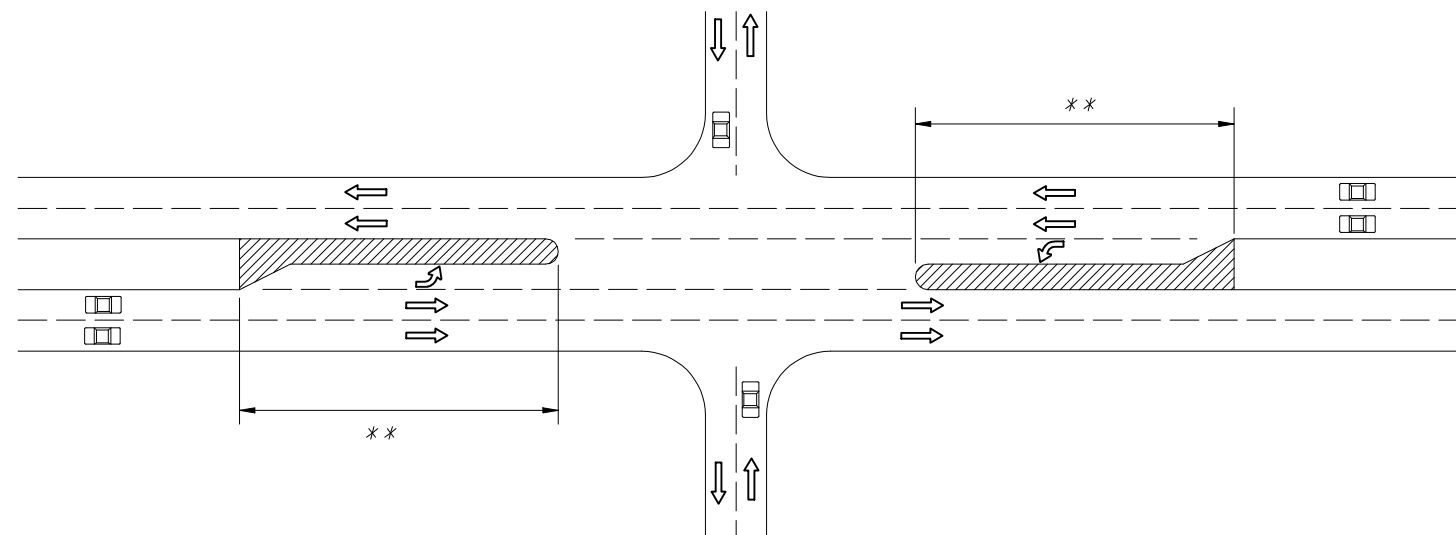
Sizes and spacings are based on the following conditions:

- (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.

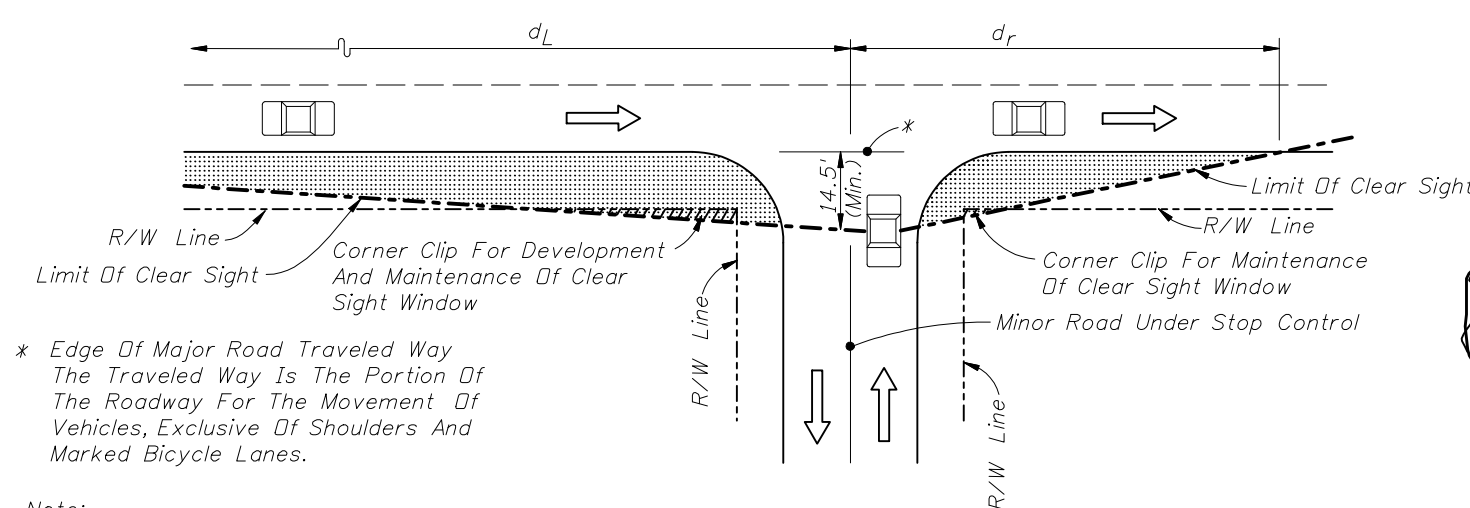


PLAN

Special Areas Limited to Ground Cover

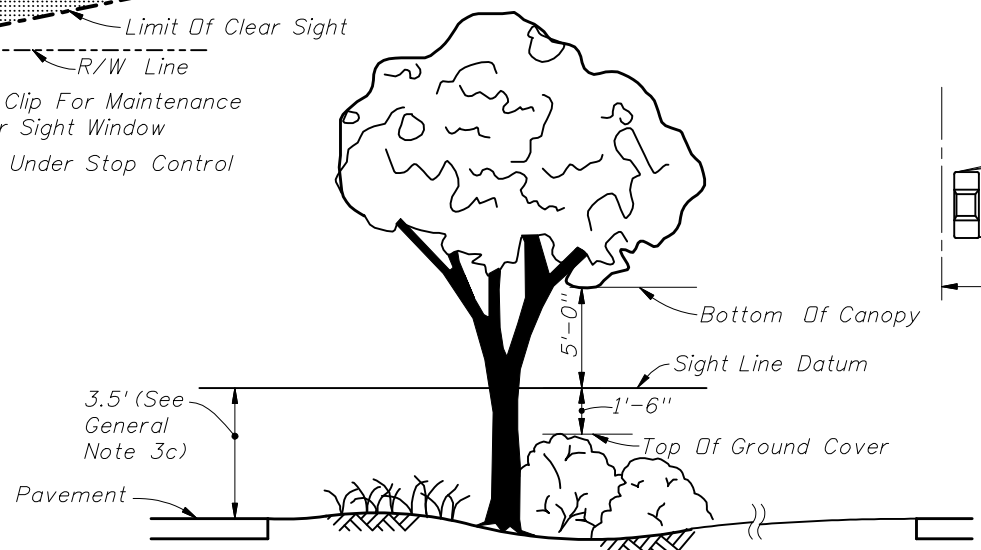
** For Signalized and unsignalized intersections, the median area along left turn lanes, including the taper, shall be limited to ground cover with height not greater than 18" below the sight line datum regardless of whether or not the area is within the limit of clear sight.





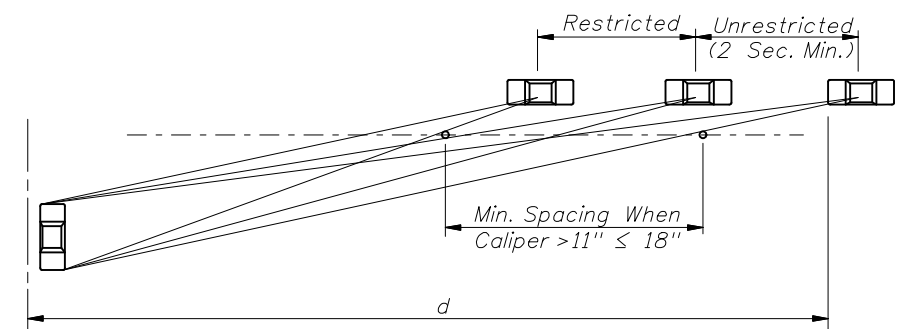
Note:
Lines For 'Limit Of Clear Sight' Are Opposite Hand When Major Road Near Lane Traffic Moving Left (e.g., One-Way Left).

PICTORIAL
ORIGIN OF CLEAR SIGHT LINE
ON MINOR ROAD

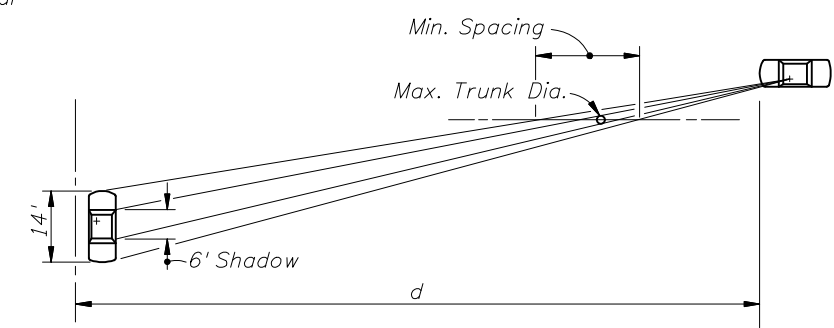


The Intent Of This Standard Is To Provide A Window With Vertical Limits Of Not Less Than 5' Above And 1'-6" Below The Sight Line Datum, And Horizontal Limits Defined By The Limits Of Clear Sight.

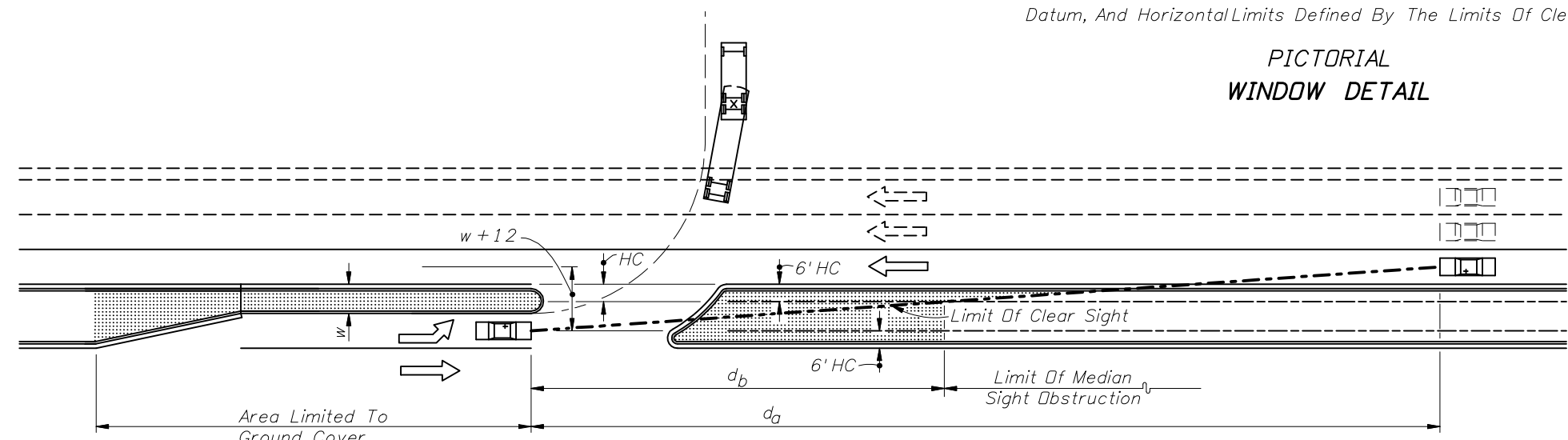
PICTORIAL
WINDOW DETAIL



PERCEPTION DIAGRAM
SETTING SABAL PALM (STATE TREE) SPACING



SHADOW DIAGRAM



PICTORIAL

LEGEND

Areas Free Of Sight Obstructions

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

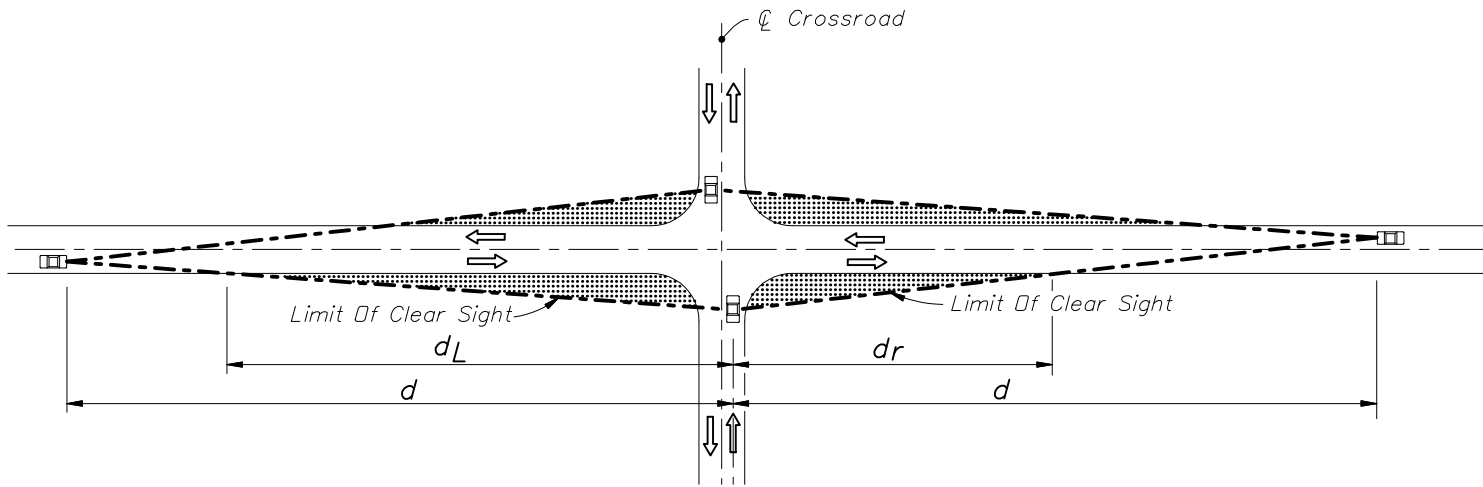
★ See Note.

★ 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





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

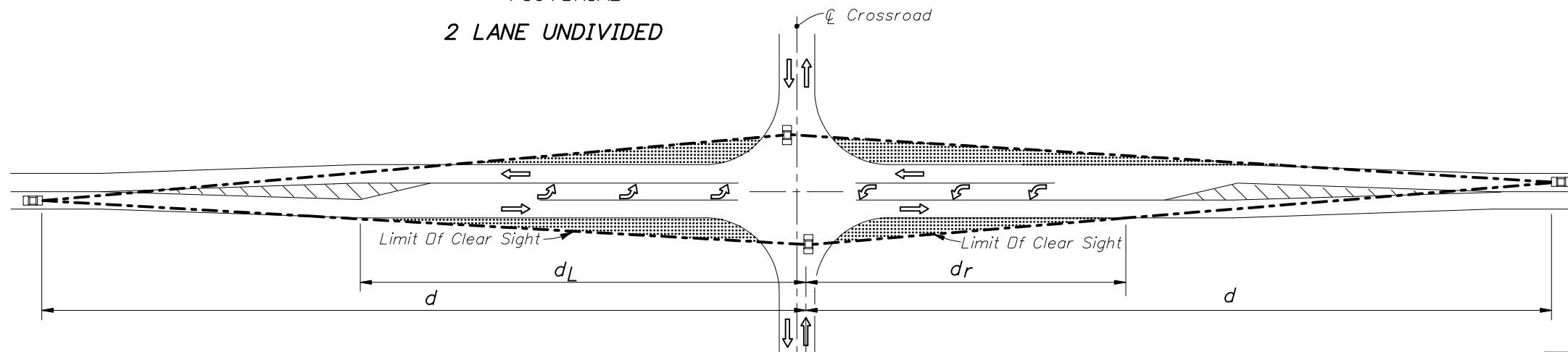
Design Speed	d	d _L	d _r
30	510	360	225
35	595	420	265
40	680	480	305
45	765	540	340
50	845	600	375
55	930	660	415
60	1015	720	450
65	1100	780	490

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

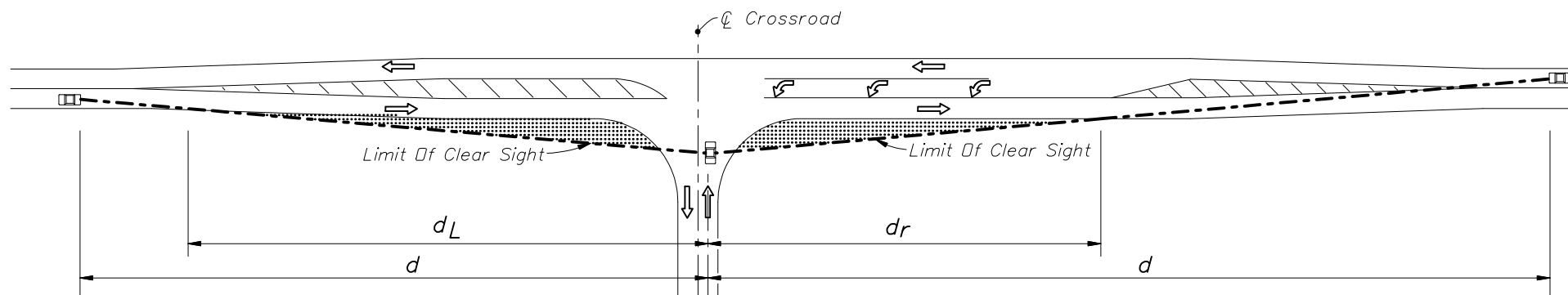
SU Vehicle

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

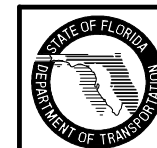


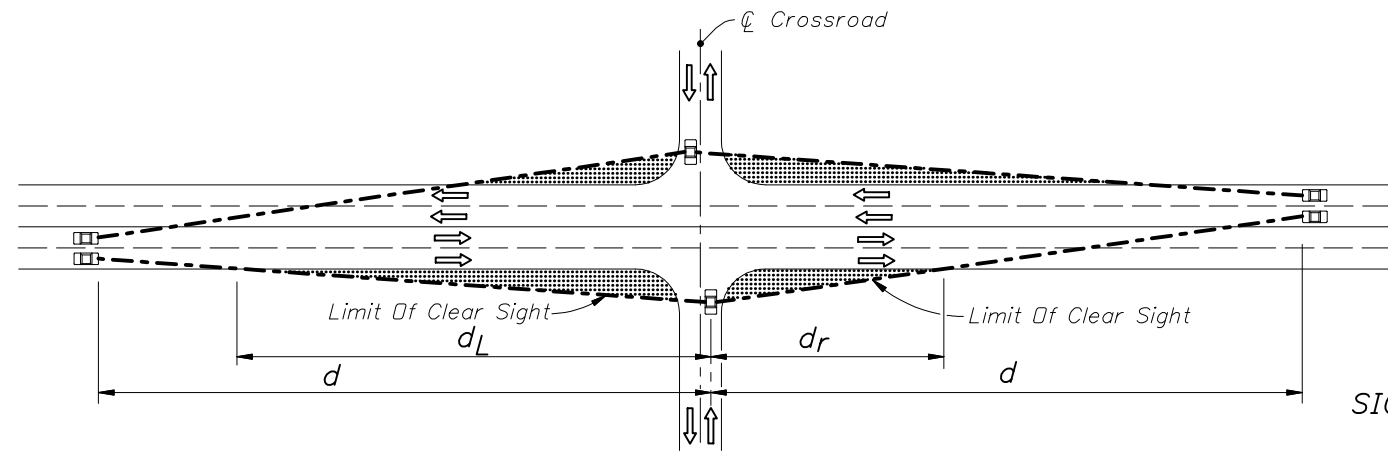
PICTORIAL
2 LANE 2 WAY • FLARED FOR SINGLE SIDE LEFT TURN CENTERED ON ALIGNMENT

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

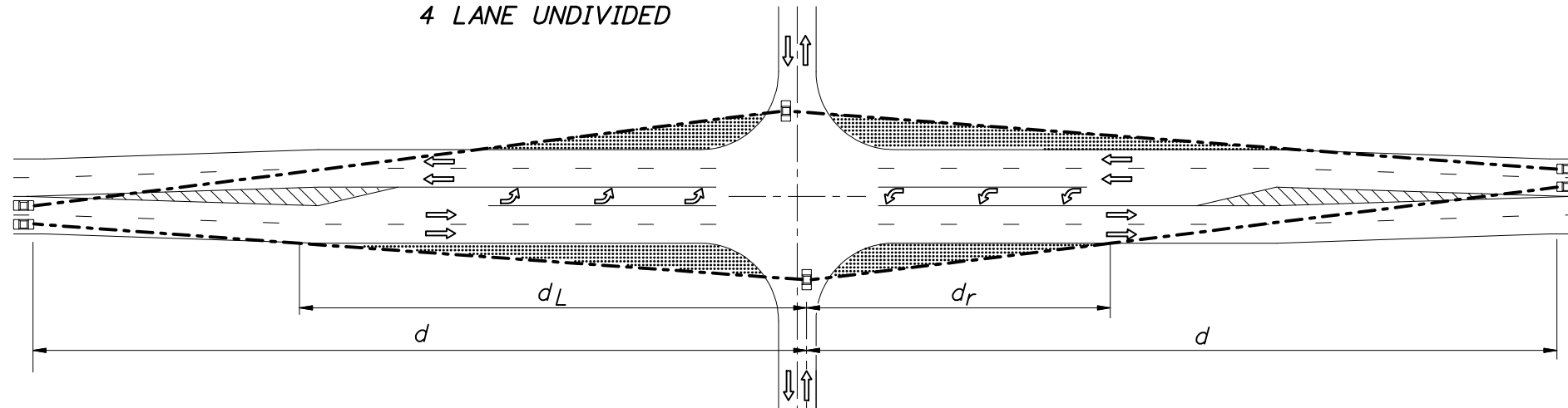
SU Vehicle

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

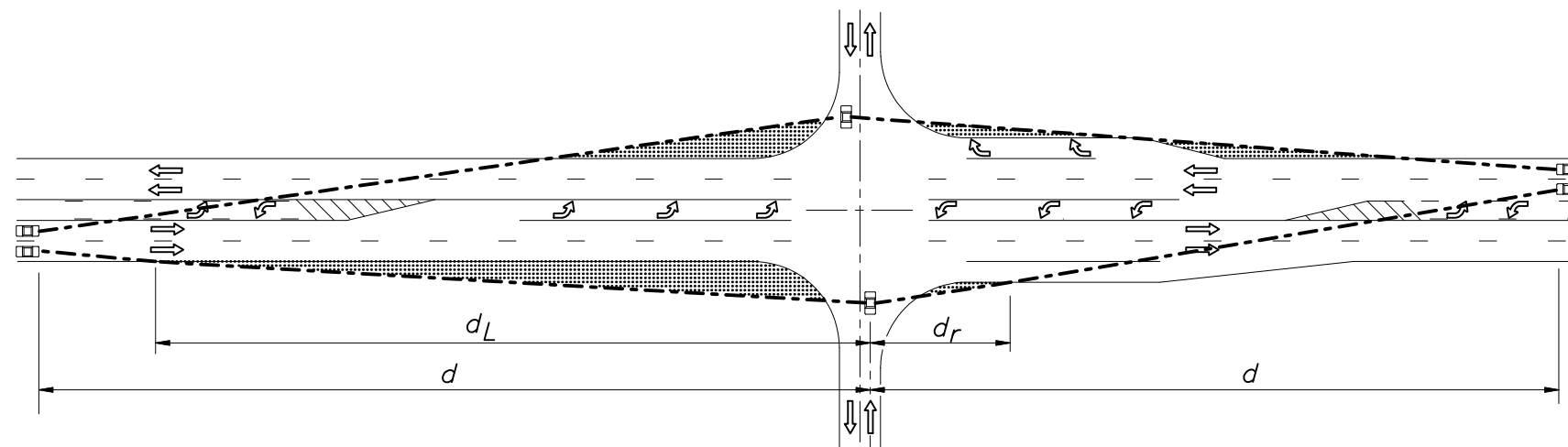
Design Speed	d	d _L	d _r
30	480	220	155
35	560	255	180
40	640	290	210
45	720	330	235
50	800	365	260
55	880	400	285
60	960	440	310
65	1040	480	340

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

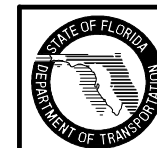
Combination Vehicle

SIGHT DISTANCE (d) AND RELATED DISTANCES (d_L, d_r) (FEET)
4 LANE UNDIVIDED WITH OPTIONAL LANE

LEGEND

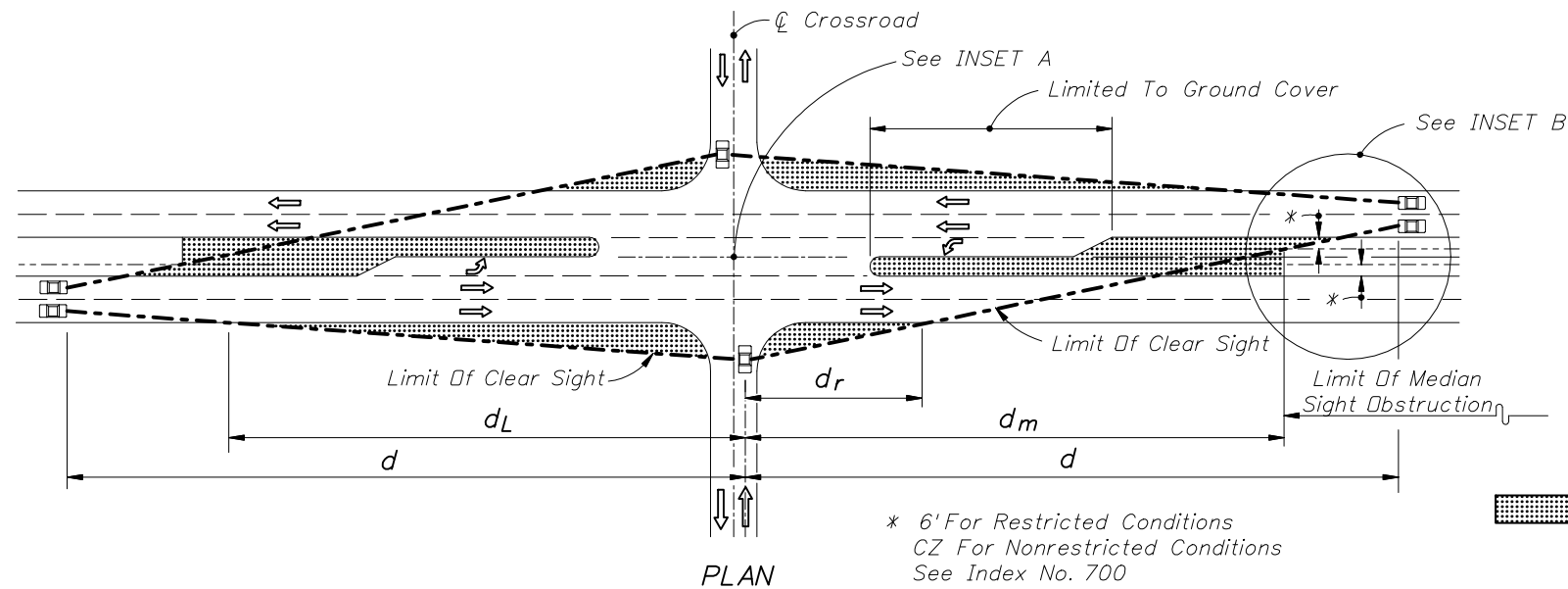
Areas Free Of Sight Obstructions

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



* 6' For Restricted Conditions
CZ For Nonrestricted Conditions
See Index No. 700

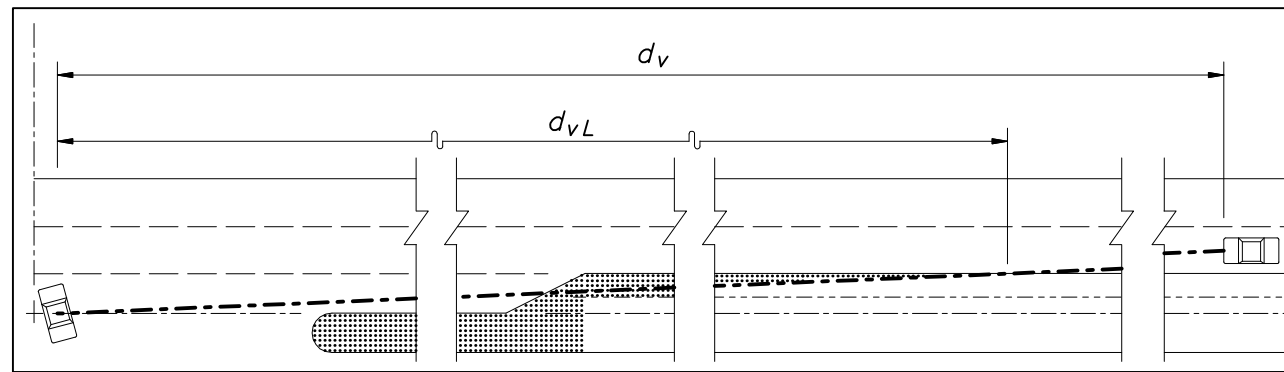
LEGEND

Areas Free Of Sight Obstructions

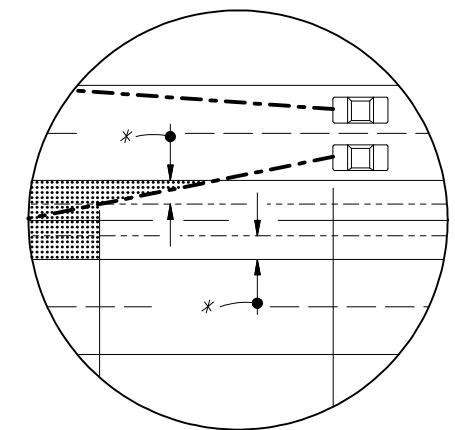
PASSENGER VEHICLE (P)

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

INTERMEDIATE SEMI-TRAILERS (WB-40 & WB-50)

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.'

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

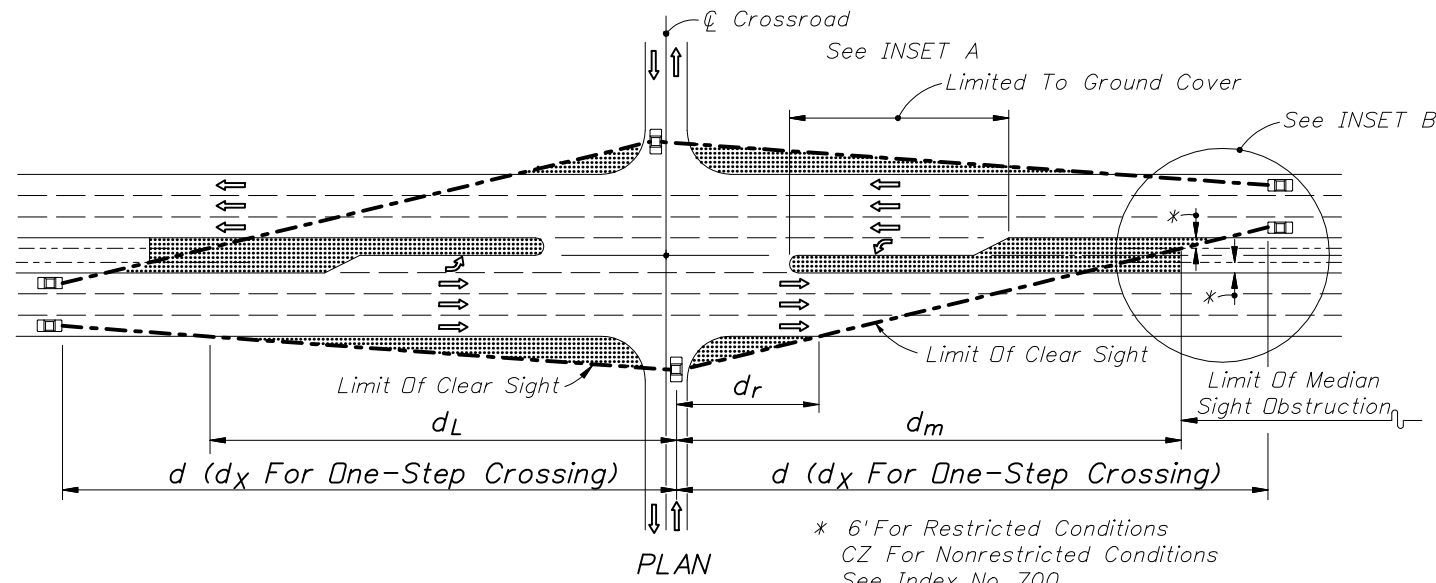
35'-50' MEDIAN				
Design Speed	d_x	d_L	d_r	d_m
30	720	510	100	640
35	830	590	110	740
40	950	670	130	840
45	1070	760	150	950
50	1190	840	160	1060
55	1310	930	180	1160
60	1430	1010	190	1270
65	1550	1100	210	1380

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)

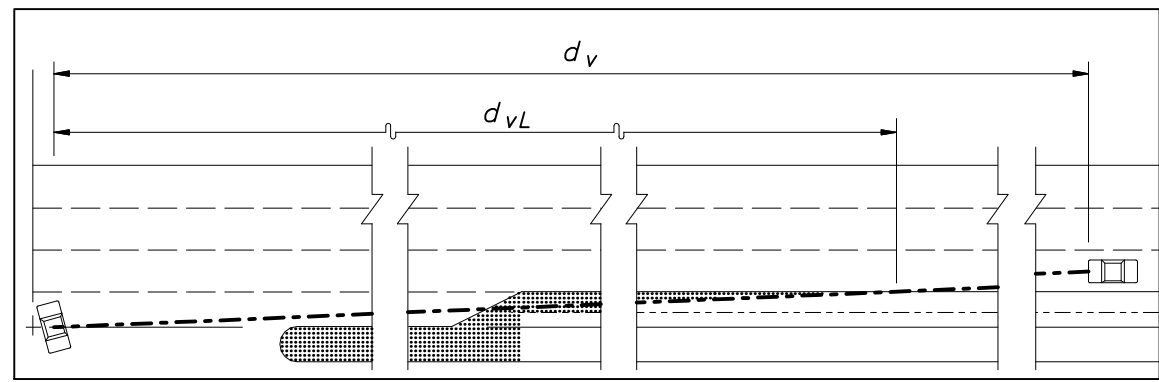
SIGHT DISTANCES (d), (d_v) & (d_x) AND RELATED DISTANCES (d_L , d_r , d_m & d_{vL}) (FEET)

6 LANE DIVIDED



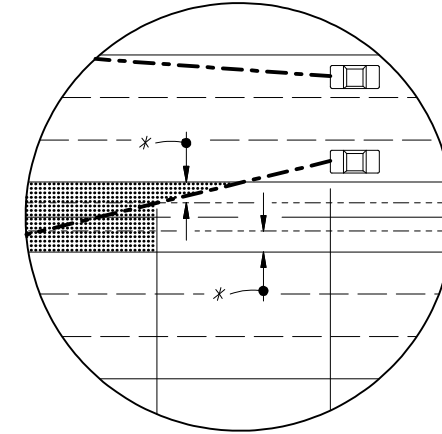
PICTORIAL

LEGEND
 Areas Free Of Sight Obstructions



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.

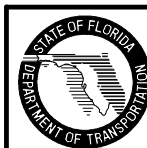
INSET A



INSET B

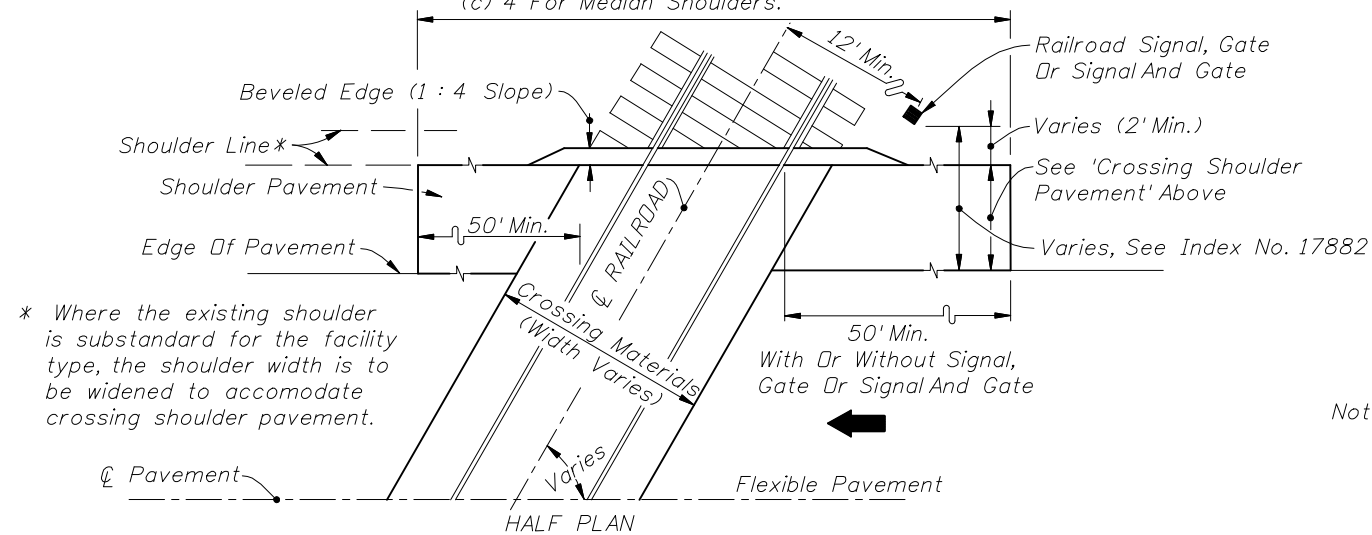
NOTES FOR 6-LANE DIVIDED ROADWAY

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.'



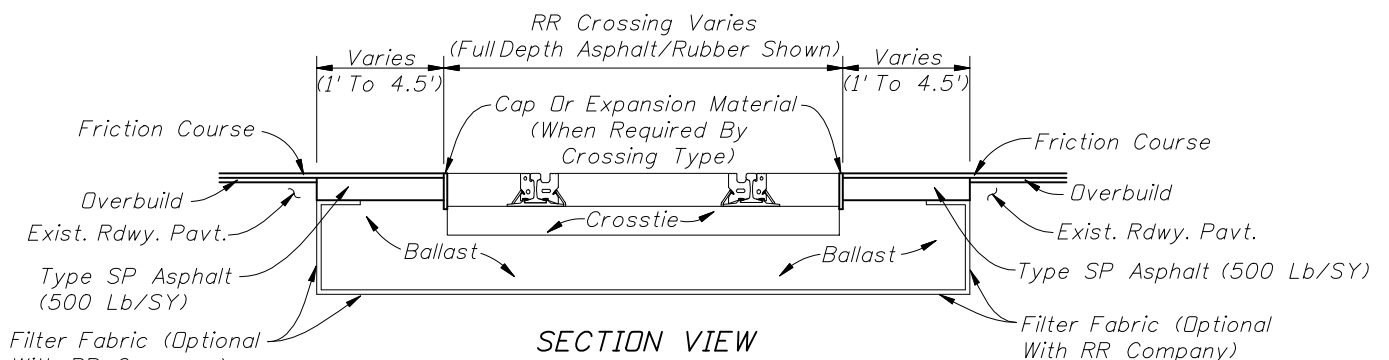
Crossing Shoulder Pavement (Except Area Occupied By Crossing Surfacing Material):

- (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

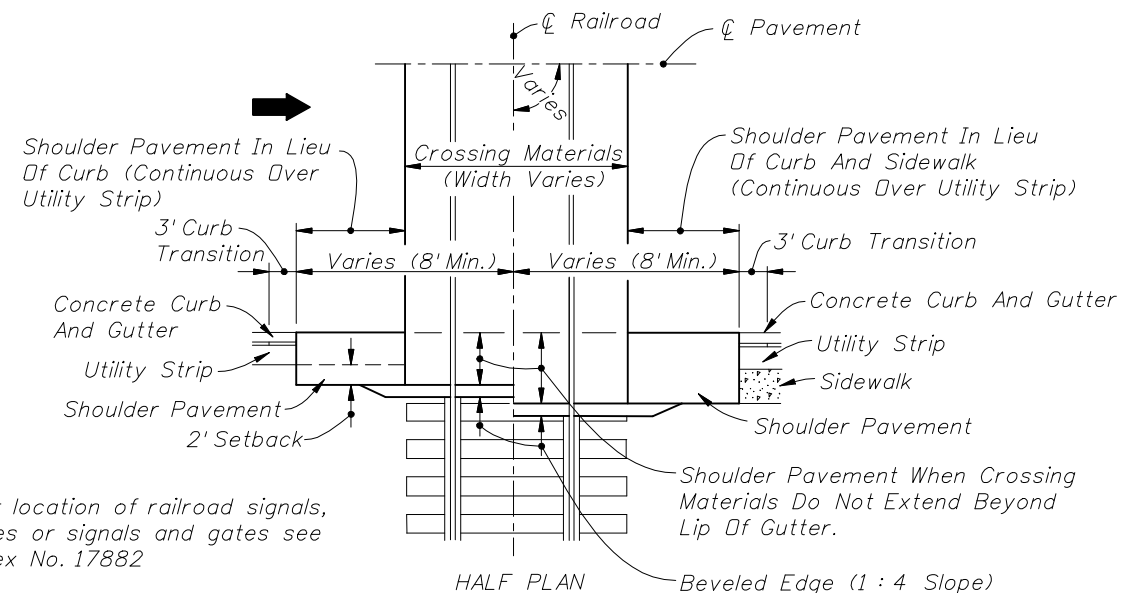


TYPICAL CROSSING MATERIAL REPLACEMENT AT RR CROSSINGS

CROSSING SURFACES	
Type	Definition
C	Concrete
R	Rubber
RA	Rubber/Asphalt

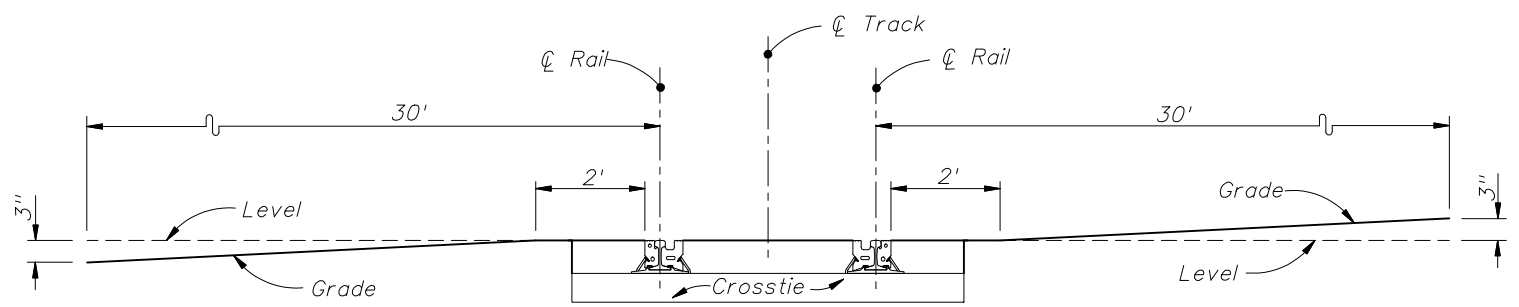
STOP ZONE FOR RUBBER CROSSING	
Design Speed (mph)	Zone Length (Distance From Stop)
45 Or Less	250'
50 - 55	350'
60 - 65	500'
70	600'

- 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

Last Revision 04	Sheet No. 1 of 1
Index No. 560	