

2013 Design Standards Update Training

John Mauthner, P.E. and
Patrick Overton, P.E.

Rebecca Hatton, Facilitator

Agenda

- ▶ General Design Standards Information
- ▶ Roadway Standards
 - Abbreviations
 - Drainage, Curbs Concrete Pavement and Sidewalks
 - Traffic Railings
 - General
 - Roadside Safety
 - ITS
 - Signing and Marking Standards
 - Maintenance of Traffic Standards (Index 600 Series)
- ▶ Structures Standards

General Design Standards Information

»» *2013 Design Standards*

General Design Standards Information

John Mauthner, P.E.

- ▶ 2013 Design Standards Cycle
- ▶ 2013 Design Standards Revision (DSR) Process
- ▶ 2014 Design Standards – Time Line
- ▶ 2014 Design Standards eBooklet – Due Dates

2013 Design Standards Cycle

- ▶ Annual e-Booklet
- ▶ Published and Released on July 2, 2012
 - 6 months prior to its effective date
- ▶ Effective for January 2013 LET Projects
 - Based on Calendar Year

2013 Design Standards Cycle

- ▶ Procedure (Topic No.: 625-010-003-j) signed by Secretary Prasad with Immediate Implementation (May 31, 2012)
- ▶ 2013 Design Standards Cycle
 - Published and Released – July 1, 2012
 - Effective Date – January 1, 2013
- ▶ FY 2013/2013 Design Standards
 - Effective from July 1, 2012 through December 31, 2012

Design Standard Revisions (DSR) Process

- ▶ Design Bulletin is Forthcoming
- ▶ Listed on the Contract Plans Lead Key Sheet
- ▶ All Revised Index Drawings to be included
behind the Roadway Plan Set
(see Sample Key Sheet Verbiage)

Sample Key Sheet Verbiage

GOVERNING STANDARDS AND SPECIFICATIONS:

Florida Department of Transportation;
2013 Design Standards,
2013 Standard Specifications for Road and Bridge
Construction,
and as amended by Contract Documents.

APPLICABLE DESIGN STANDARDS:

For Design Standards click on "Design Standards"
at the following website:

<http://www.dot.state.fl.us/rddesign/>

APPLICABLE DESIGN STANDARDS REVISIONS:

R2013-01 (7/31/2012) included behind the Roadway
Plan Set

General Design Standards Information

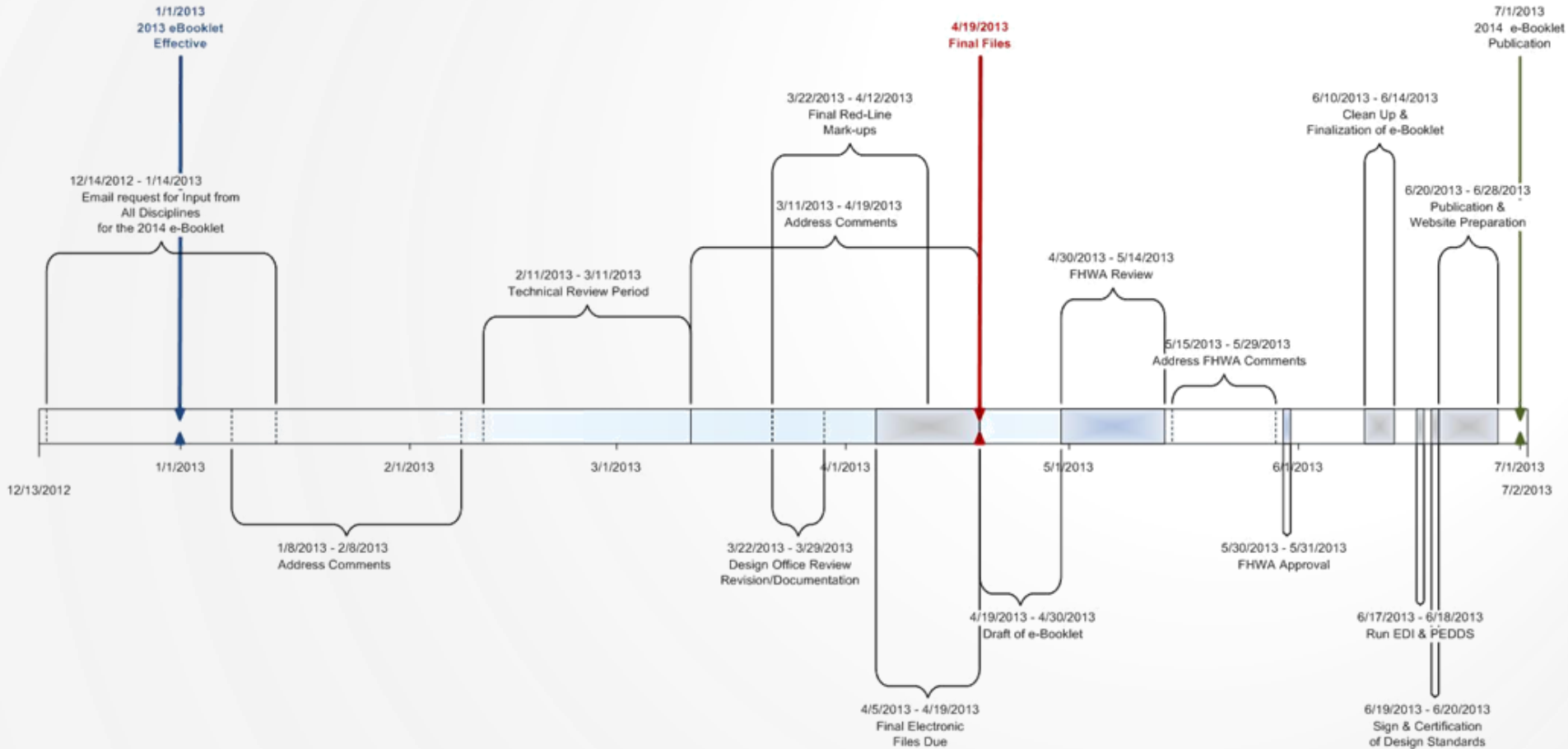
- ▶ 2014 Design Standards – Time Line
 - Based on Design Standards Development Process (DSDP)
 - Process is Continual (Ongoing) Throughout the Year
- ▶ 2014 Design Standards *eBooklet* – Due Dates
 - Request Final Discipline Input (12/14/2012 - 01/14/2013)
 - Technical Review Period (02/11/2013 – 03/11/2013)
 - Provide Final Red Line Mark-ups (03/22/2013 - 04/12/2013)
 - Design Office Review (03/22/2013 - 03/29/2013)

General Design Standards Information

- ▶ 2014 Design Standards *eBooklet* - Due Dates (Continued)
 - Deliver Final Electronic Files (04/05/2013 - **04/19/2013**)
 - Generate Draft eBooklet (04/19/2013 - 04/30/2013)
 - FHWA Review (04/30/2013 – 05/14/2013)
 - FHWA Approval Meeting (05/30/2013 – 05/31/2013)
 - Run EDI and PEDDS (06/17/2013 – 06/18/2013)
 - 2014 Design Standards Certification (06/19/2013 – 06/20/2013)
 - Prepare Website or Publication (06/20/2013 – 06/28/2013)
 - Release 2014 Design Standards eBooklet (**07/01/2013**)

2014 DESIGN STANDARDS TIME LINE

Thursday, July 26, 2012



2014 Design Standards – Time Line 2014 Design Standards eBooklet – Due Dates

General Design Standards Information

Patrick Overton, P.E.

- ▶ Historical Design Standards
- ▶ 2013 Design Standards
- ▶ Mobile Webpage Link

Historical Design Standards

http://www.dot.state.fl.us/rdesign/DesignStandards/Standards.shtm

FDOT - Roadway Design - ...

Florida Department Of Transportation

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August 1, 2012

Alert Today Alive Tomorrow - Safety Doesn't Happen by Accident.

Roadway Design Office

Roadway Design
Florida's Transportation Engineers

Design Standards

[Design Standards Procedure](#) (Topic Number: 625-010-003)

Current Design Standards

Year	Design Standards eBooklet	Design Standards Revisions	Developmental Design Standards	
2013	DSeB	DSR	DDS	New

Select the desired Current Design Standards eBooklet (DSeB), Design Standards Revisions (DSR) or Developmental Design Standards (DDS) by clicking on their underlined symbol.

Historical Design Standards

Fiscal Year	Design Standards eBooklet	Design Standards Revisions		
2012/13	DSeB	DSR		

Design Standards Modifications

Year	Design Standards Booklet	Design Interim Standards		Design Standards Modifications			
Select the desired Historical Standard Booklet, Interim Standards or Standards Modification by clicking on their underlined symbol.				The dates shown under Standards Modifications are the effective dates of the Modifications.			
2010	S	I	N/A	1-Jan-12	1-Jul-11	1-Jan-11	1-Jul-10
2008	S	I	N/A	1-Jan-10	1-Jul-09	1-Jan-09	1-Jul-08
2006	S	I	N/A	1-Jan-08 Eng	1-Jul-07 Eng	1-Jan-07 Eng	1-Jul-06 Eng
2004	S	I	N/A	1-Jan-06 English		1-Jul-05 English	
2002	S	I	N/A			N/A	
2000	S	I	N/A	1-Jan-06 Metric		1-Jul-05 Metric	

[Adobe PDF Reader](#) is necessary to view our documents.
This page was last modified on 07/23/2012.

Contact Us

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Tallahassee, FL 32399-0450
Office Phone: (850) 414-4310
Office FAX: (850) 414-5261

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FDOT Facilities

Airports
Bridges
Interstates
Rail
Rest Areas
Seaports
Service Plazas
Welcome Centers

Historical Design Standards

Roadway Design Office



Design Standards

[Design Standards Procedure](#) (Topic Number: 625-010-003)



Current Design Standards

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2013	DSeB	DSR	DDS		Select the desired Current Design Standards eBooklet (DSeB), Design Standards Revisions (DSR) or Developmental Design Standards (DDS) by clicking on their underlined symbol.

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2006	S	I	N/A	1-Jan-08 Eng	1-Jul-07 Eng	1-Jan-07 Eng	1-Jul-06 Eng	
2004	S	I	N/A		1-Jan-06 English		1-Jul-05 English	
2002	S	I	N/A			N/A		
2000	S	I	N/A	1-Jan-06 Metric			1-Jul-05 Metric	

Historical Design Standards

Fiscal Year	Design Standards eBooklet	Design Standards Revisions
2012/13	DSeB	DSR

Historical Design Standards

Fiscal Year	Design Standards eBooklet	Design Standards Revisions
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2008	S	I	N/A
2006	S	I	N/A
2004	S	I	N/A
2002	S	I	N/A
2000	S	I	N/A

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2006	S	I	N/A
2004	S	I	N/A
2002	S	I	N/A
2000	S	I	N/A

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2008	S	I	N/A
2006	S	I	N/A
2004	S	I	N/A
2002	S	I	N/A
2000	S	I	N/A

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1-Jan-08 Eng	1-Jul-07 Eng	1-Jan-07 Eng	1-Jul-06 Eng
1-Jan-06 English		1-Jul-05 English	
N/A			
1-Jan-06 Metric		1-Jul-05 Metric	

2013 Design Standards

[Roadway Design Office](#)




Design Standards

[Design Standards Procedure](#) (Topic Number: 625-010-003)



Current Design Standards

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Historical Design Standards

Fiscal Year	Design Standards eBooklet	Design Standards Revisions	
2012/13	DSeB	DSR	

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2006	IS	I	N/A	1-Jan-08_Eng	1-Jul-07_Eng	1-Jan-07_Eng	1-Jul-06_Eng
2004	IS	I	N/A	1-Jan-06_English		1-Jul-05_English	
2002	IS	I	N/A	N/A			
2000	IS	I	N/A	1-Jan-06_Metric		1-Jul-05_Metric	

2013 Design Standards

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2013 Design Standards


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[Design Standards Procedure](#) (Topic Number: 625-010-003)



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Mobile Webpage Link



Roadway Standards

»» *2013 Design Standards*

Index 001

Additions to the Standard Abbreviations

- PPP ▶ Polypropylene Pipe
- CJP ▶ Complete Joint Penetration weld
- LCD ▶ Longitudinal Channelizing Device

Index 201

Sheet 2

Chain Connection To Grate
4" Min. Embedment For Adhesive Bonded Anchor Option
Grate(s)
1/2" Chain & 1/2" Cold Shuts. See Table For Lengths. When Chaining Two Grates Together Provide Adequate Loop For Easy Handling.
Cold Shut
1/2" O x 1" Dia. J-Type Or Threaded Straight Eyebolt (Thru-Bolted Or Adhesive Bonded Anchor Installed Per Specification Section 416 Using Type HW Adhesive) Or Precaster OCP Approved Connector
Half To Two-Thirds Wall Thickness
Jam Nut, Nut And Washer On Straight Bolt

Brick Adjustment or Grade Ring Permitted (Min. 0" - Max. 12")
10° Draft
1/2" Optional Key

2" Dia. (1-Piece Cover)
3" Dia. (2-Piece Cover)
Concrete Or 8" Brick See Note 3
3'-6" Or 4" Dia.
2'-11 1/2" Riser
1" Min. 3" Max.
Brick Adjustment or Grade Ring Permitted (Min. 0" - Max. 12")
2" Dia. (1-Piece Cover)
3" Dia. (2-Piece Cover)
Tongue & Groove Joint To Match Riser
3'-6" Or 4" Dia.
1" Min. 3" Max.

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

MANHOLE TOPS

NOTES (TOPS)

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

Typical Location For Bottom Slab Without Sump
Weep Hole Dia. Varies (12" Std.)
Sump Depth Varies (4" Std.)
1/2" Galvanized Hardware Cloth
No. 4 Coarse Aggregate 2" x 2" x 2"
Filter Fabric

SUMP BOTTOM

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

12" (Min.)
Bituminous Coating On Face Of Concrete And Around Pipe
Masonry Seal for Precast Opening
Filter Fabric Wrap
See Inset A
Pipe To Be Placed In Approximate Center Of Opening.
Soil Compacted To Density Required In Specification Section 125 Described As Bedding Zone.
2" (Min.)
2" (Min.)

DESIGN NOTES

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

Bevel Cut Upper Stub To Match Forming For Apron Face Capping Or Plugging Of Upper Stub Not Required (Friable Base Material At Stub Opening Shall Be Removed To Permit Covering Of Opening With Structural Course Material)
Riprap Entrance
Top Of Subgrade
4" PVC Pipe, 45° Lateral And Stub
Grout Seal or Integral Cast

EYEBOLT AND CHAIN FOR LOCKING GRATES TO INLETS

Note: Cost of pipe, fittings and sandbagging to be included in the contract unit price for inlets.

Structure Wall
Mortar Per Specification Section 425
Brick Masonry Or Any Class Concrete Required For Gaps Greater Than 2 1/2"
Pipe Wall
1/2" Min.
1/2" Min.

TEMPORARY DRAINS FOR SUBGRADE AND BASE

FOR ALL STRUCTURES UNLESS EXCLUDED BY SPECIAL DETAIL ALL PIPE TYPES DRAINAGE STRUCTURE INVERT

INSET A

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

LAST REVISION	DESCRIPTION			
07/01/12				

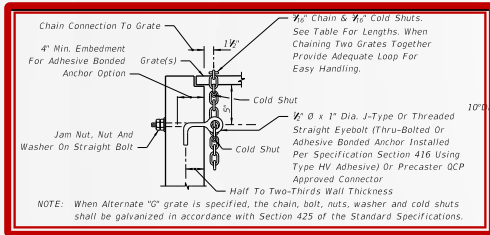
FDOT DESIGN STANDARDS
2013

SUPPLEMENTARY DETAILS FOR MANHOLES & INLETS

INDEX NO.	SHEET NO.
201	2

Index 201

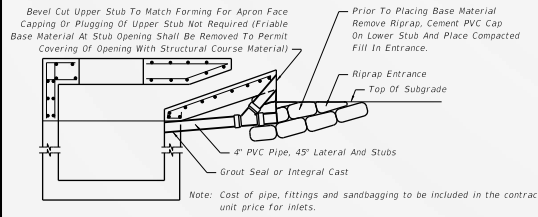
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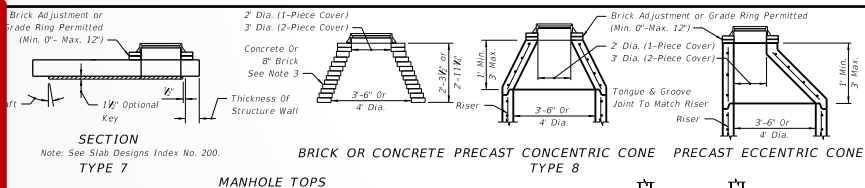
Lost of eyebolt and chain to be included in the contract unit price for inlets.

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

EYEBOLT AND CHAIN FOR LOCKING GRATES TO INLETS



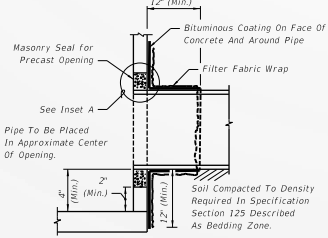
TEMPORARY DRAINS FOR SUBGRADE AND BASE



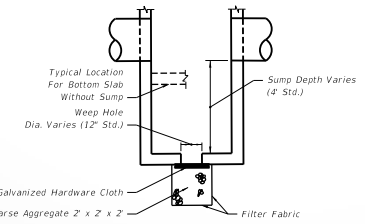
- NOTES (TOPS)**
- Manhole top Type 7 slabs shall be of Class II concrete. Concrete as specified in ASTM C478 may be used for precast units; see General Note No. 3.
 - Manhole top Type 7 slabs may be of cast-in-place or precast construction. The optional key is for precast tops and in lieu of dowels. Frame and slab openings are to be omitted when top is used over a junction box.
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DESIGN NOTES

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

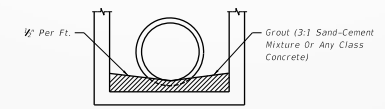


FILTER FABRIC WRAP ON GROUTED PIPE TO STRUCTURE JOINT

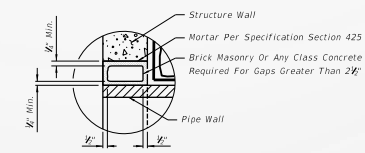


NOTE: Sump bottom appropriate for all manhole and inlet types. Sumps are to be constructed in inlet and manholes connected to French Drains unless excluded in the plans. At other locations, sump is to be constructed only where called for in the plans. Weep holes to be constructed in sump bottom only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

SUMP BOTTOM



FOR ALL STRUCTURES UNLESS EXCLUDED BY SPECIAL DETAIL ALL PIPE TYPES DRAINAGE STRUCTURE INVERT

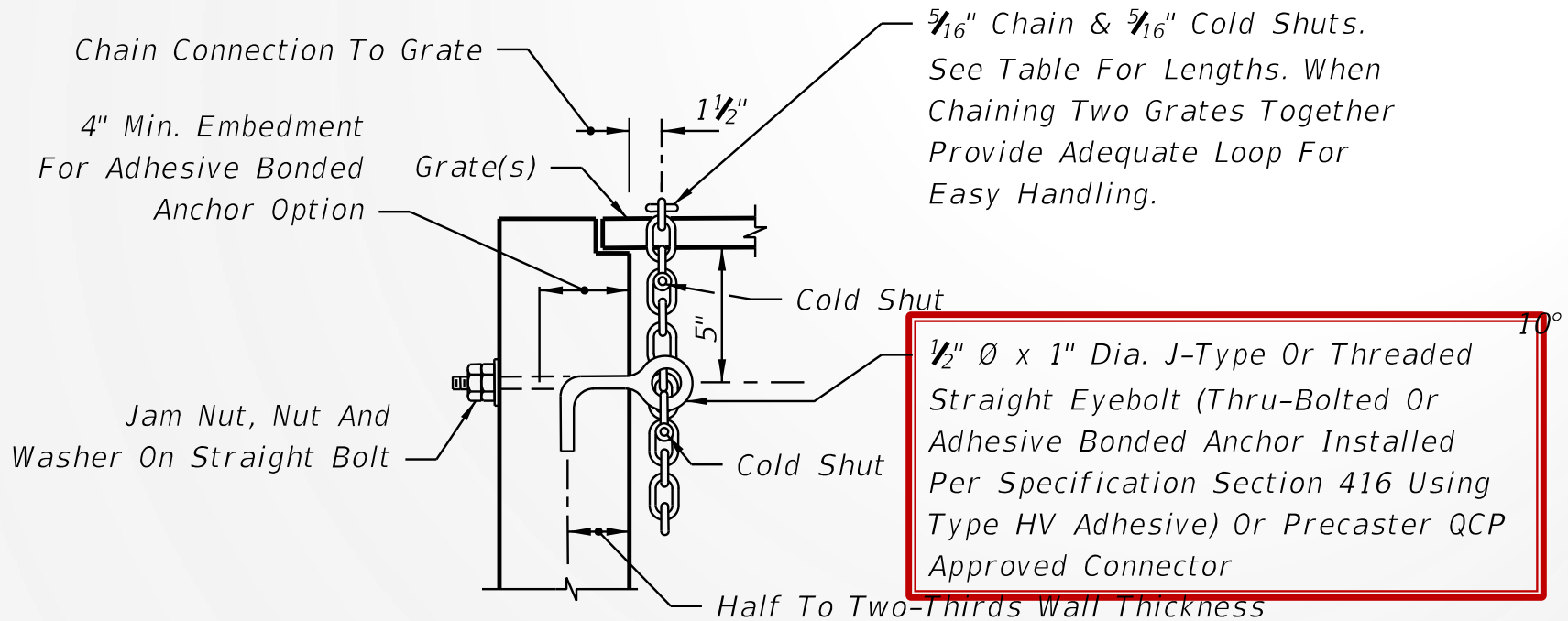


INSET A

LAST REVISION 07/01/12	DESCRIPTION	FDOT DESIGN STANDARDS 2013	SUPPLEMENTARY DETAILS FOR MANHOLES & INLETS	INDEX NO. 201	SHEET NO. 2
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Index 201

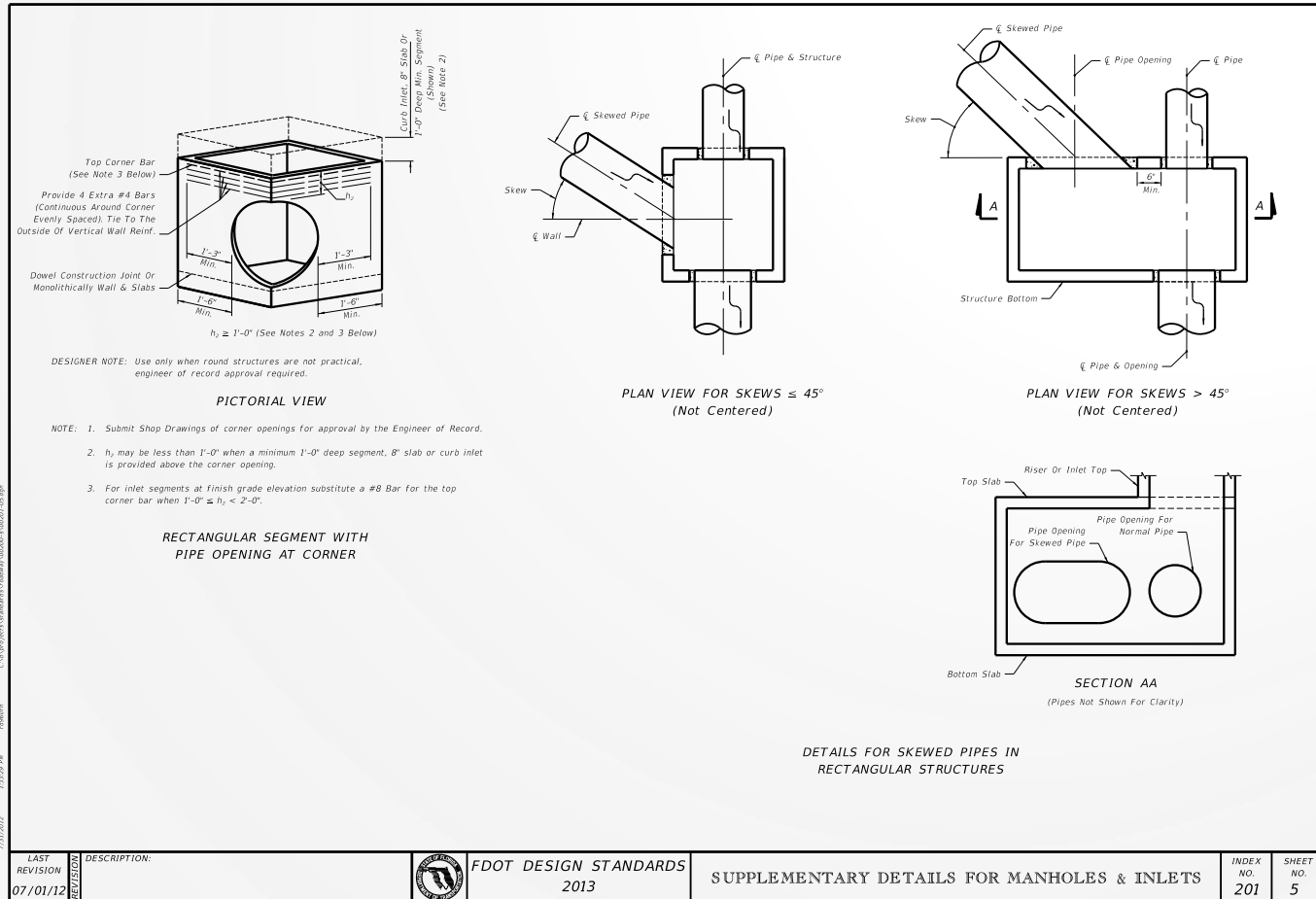
Sheet 2




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

Index 201

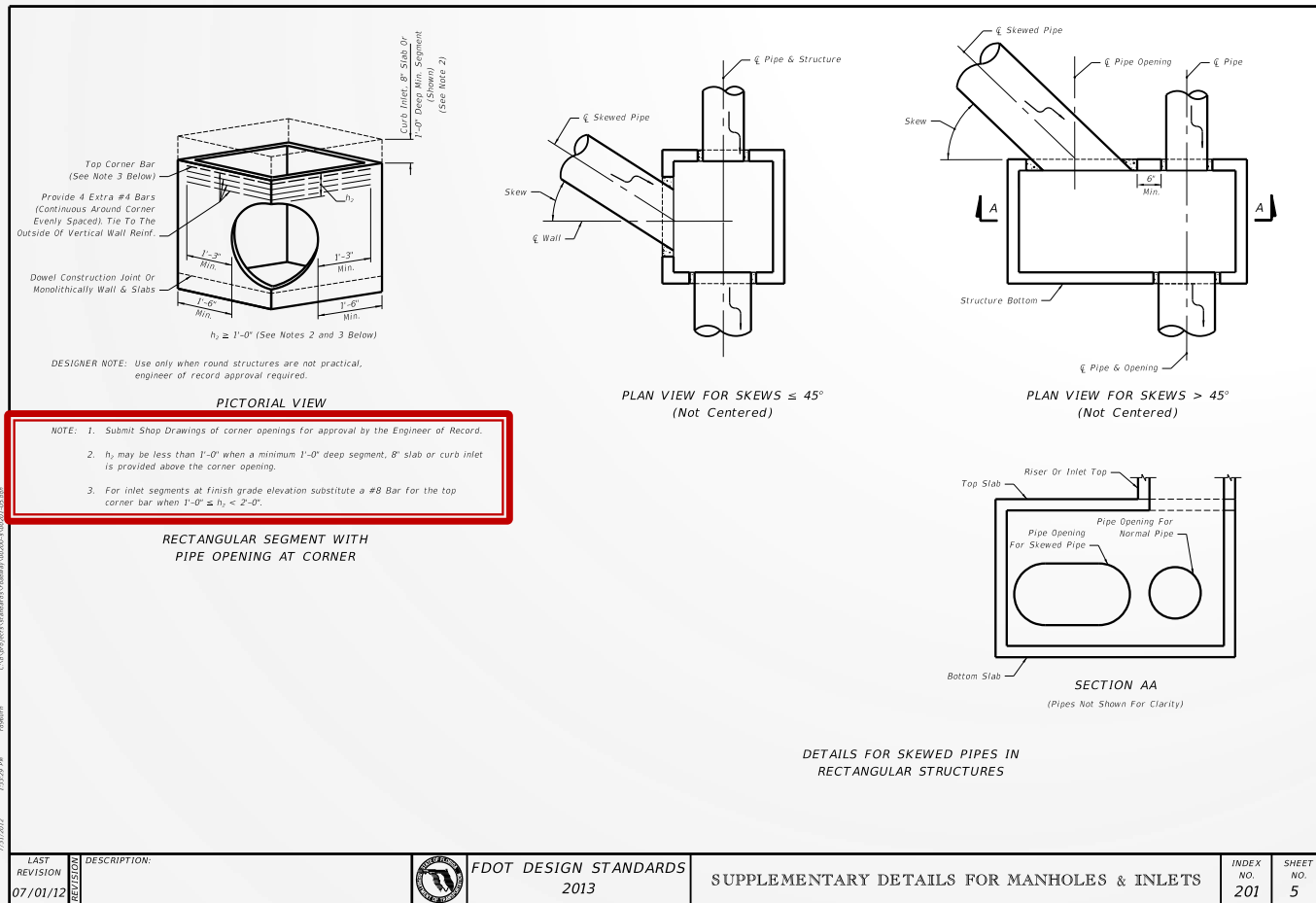
Sheet 5



LAST REVISION 07/01/12	DESCRIPTION:	 FDOT DESIGN STANDARDS 2013	SUPPLEMENTARY DETAILS FOR MANHOLES & INLETS	INDEX NO. 201	SHEET NO. 5
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Index 201

Sheet 5



LAST REVISION 07/01/12	DESCRIPTION:	FDOT DESIGN STANDARDS 2013	SUPPLEMENTARY DETAILS FOR MANHOLES & INLETS	INDEX NO. 201	SHEET NO. 5
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Index 201

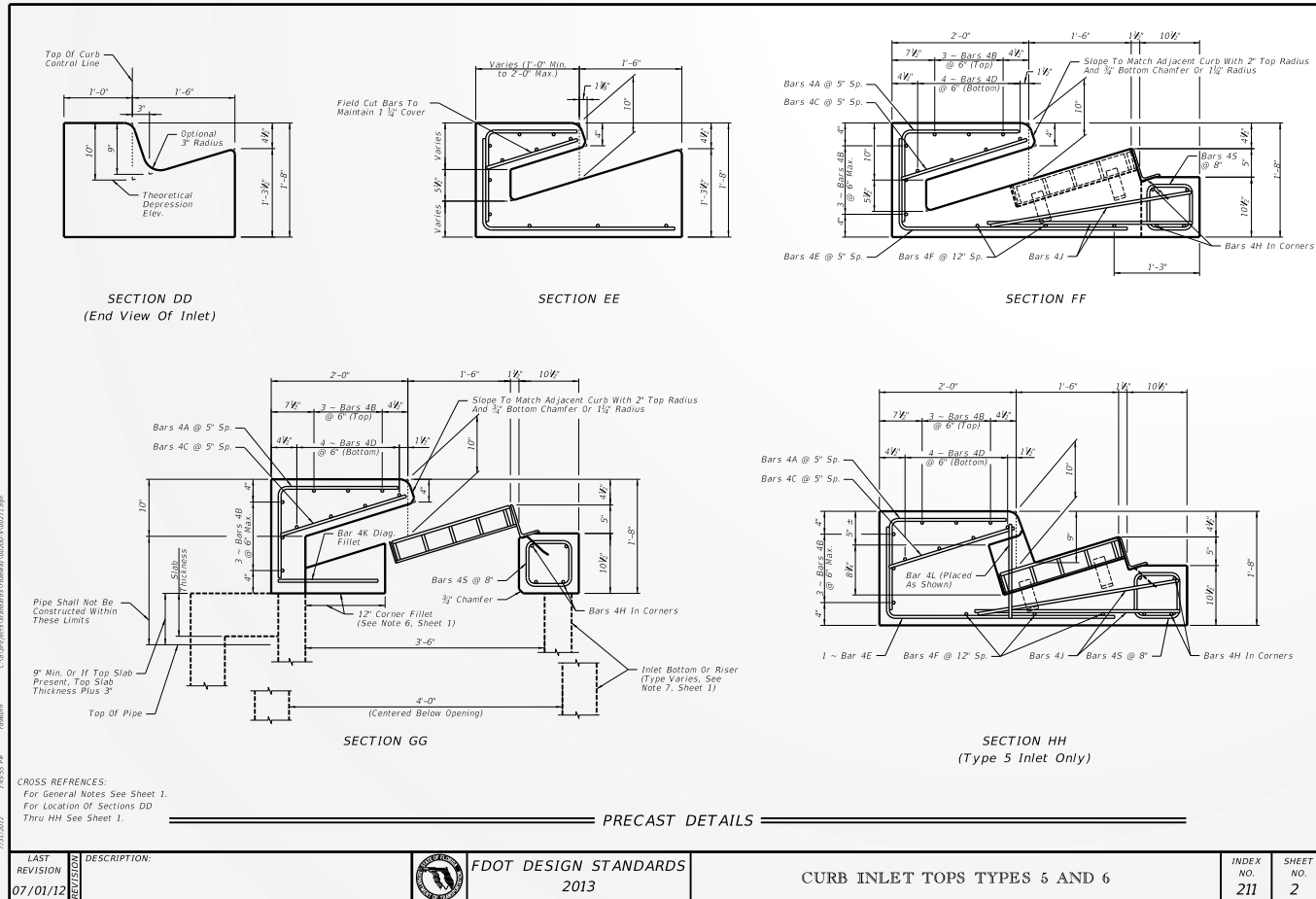
Sheet 5

NOTE: 1. Submit Shop Drawings of corner openings for approval by the Engineer of Record.

- 2. h_2 may be less than 1'-0" when a minimum 1'-0" deep segment, 8" slab or curb inlet is provided above the corner opening.*
- 3. For inlet segments at finish grade elevation substitute a #8 Bar for the top corner bar when $1'-0" \leq h_2 < 2'-0"$.*

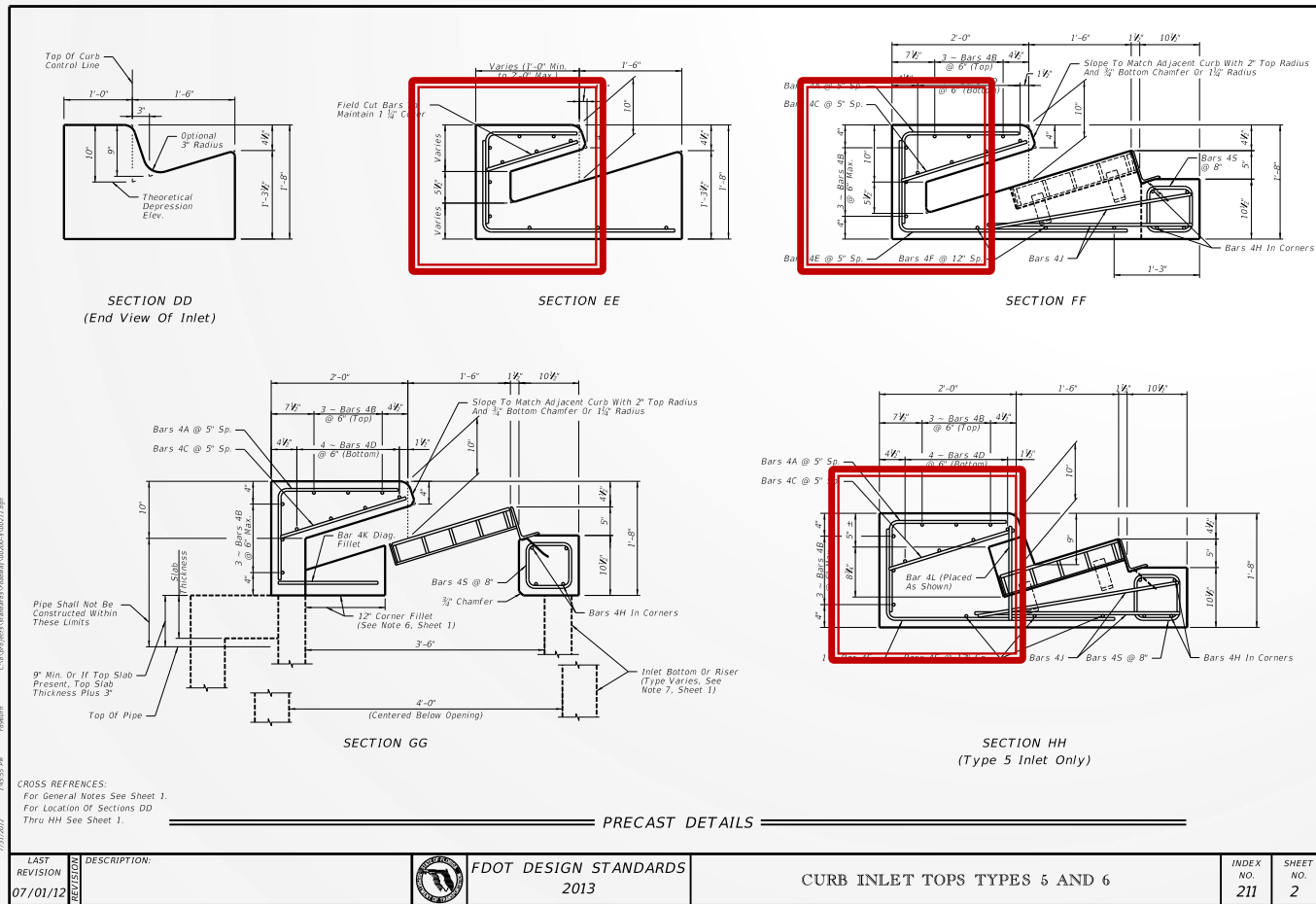
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Sheet 2



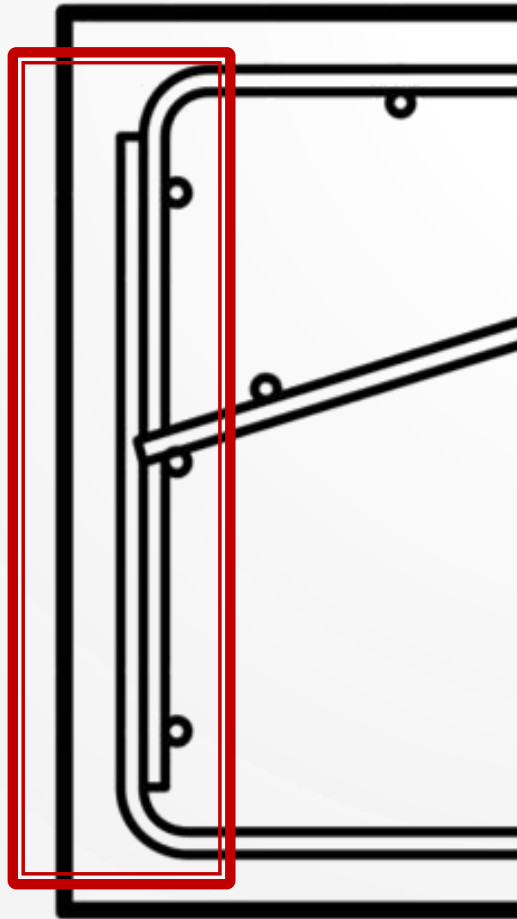
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Sheet 2



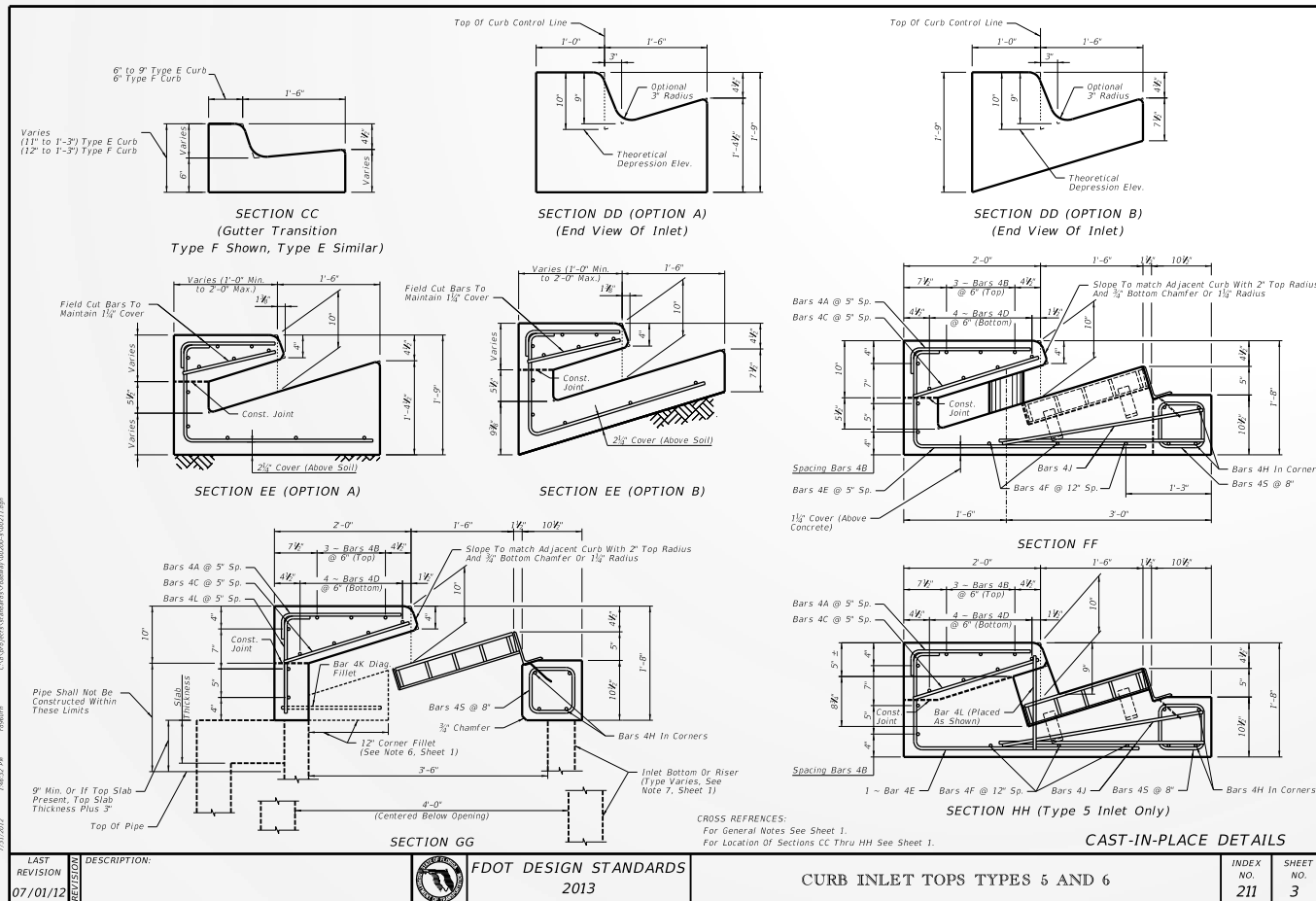
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Sheet 2



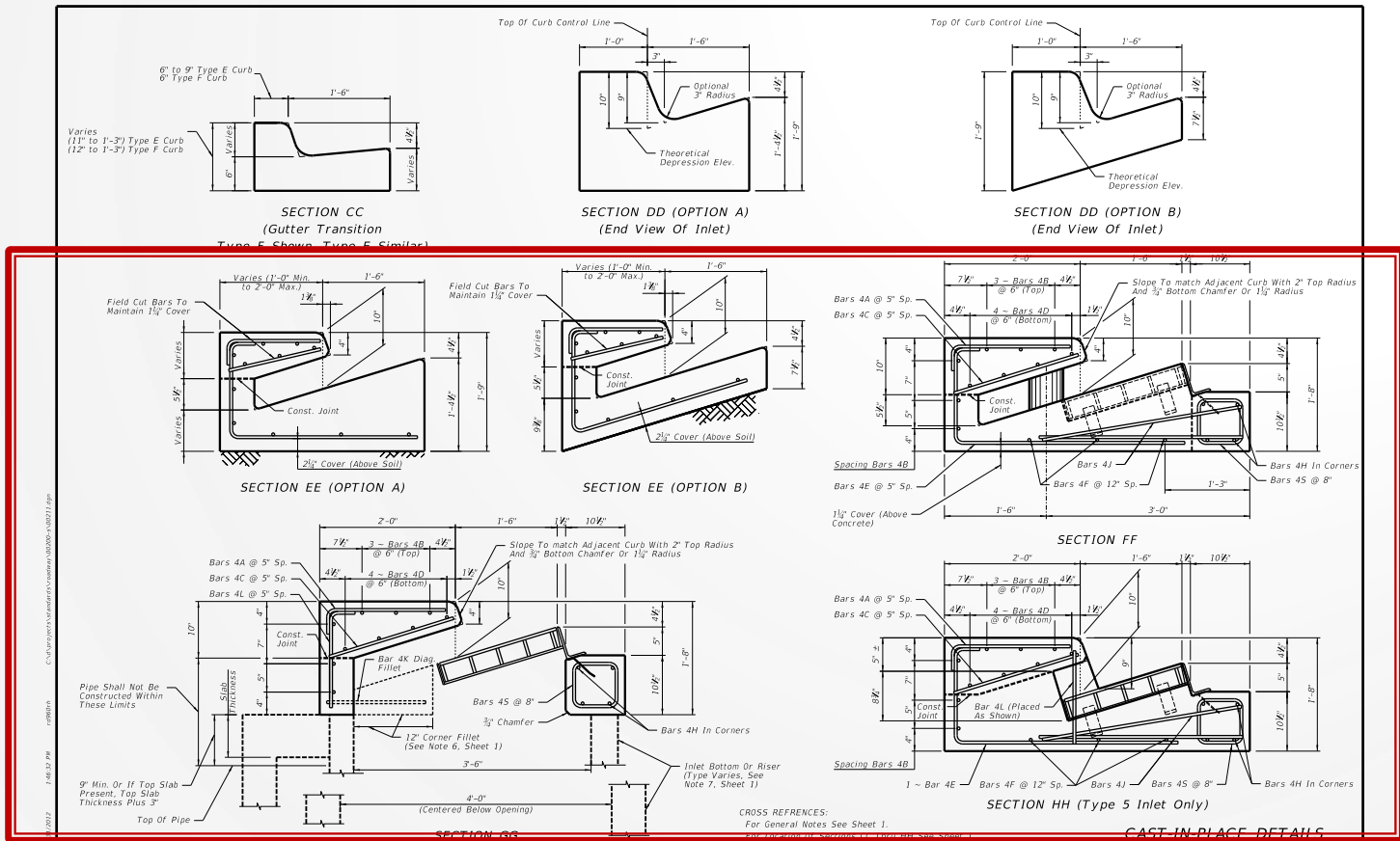
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Sheet 3



Index 211

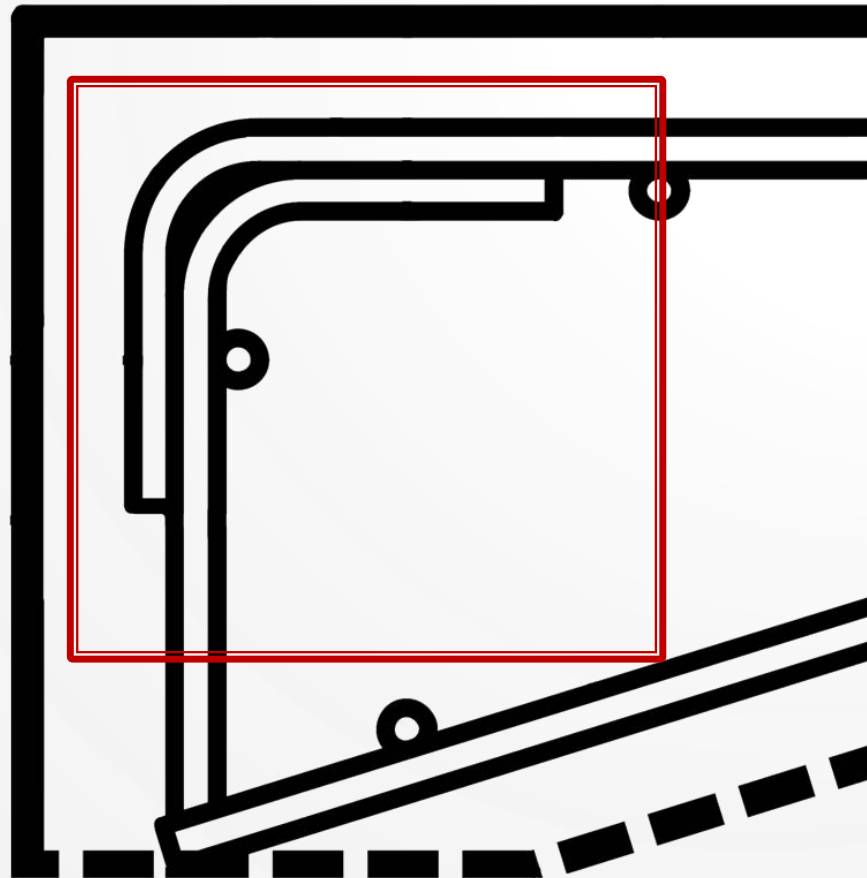
Sheet 3



REVISION	DESCRIPTION	FDOT DESIGN STANDARDS	CURB INLET TOPS TYPES 5 AND 6	INDEX NO.	SHEET NO.
07/01/12		2013		211	3

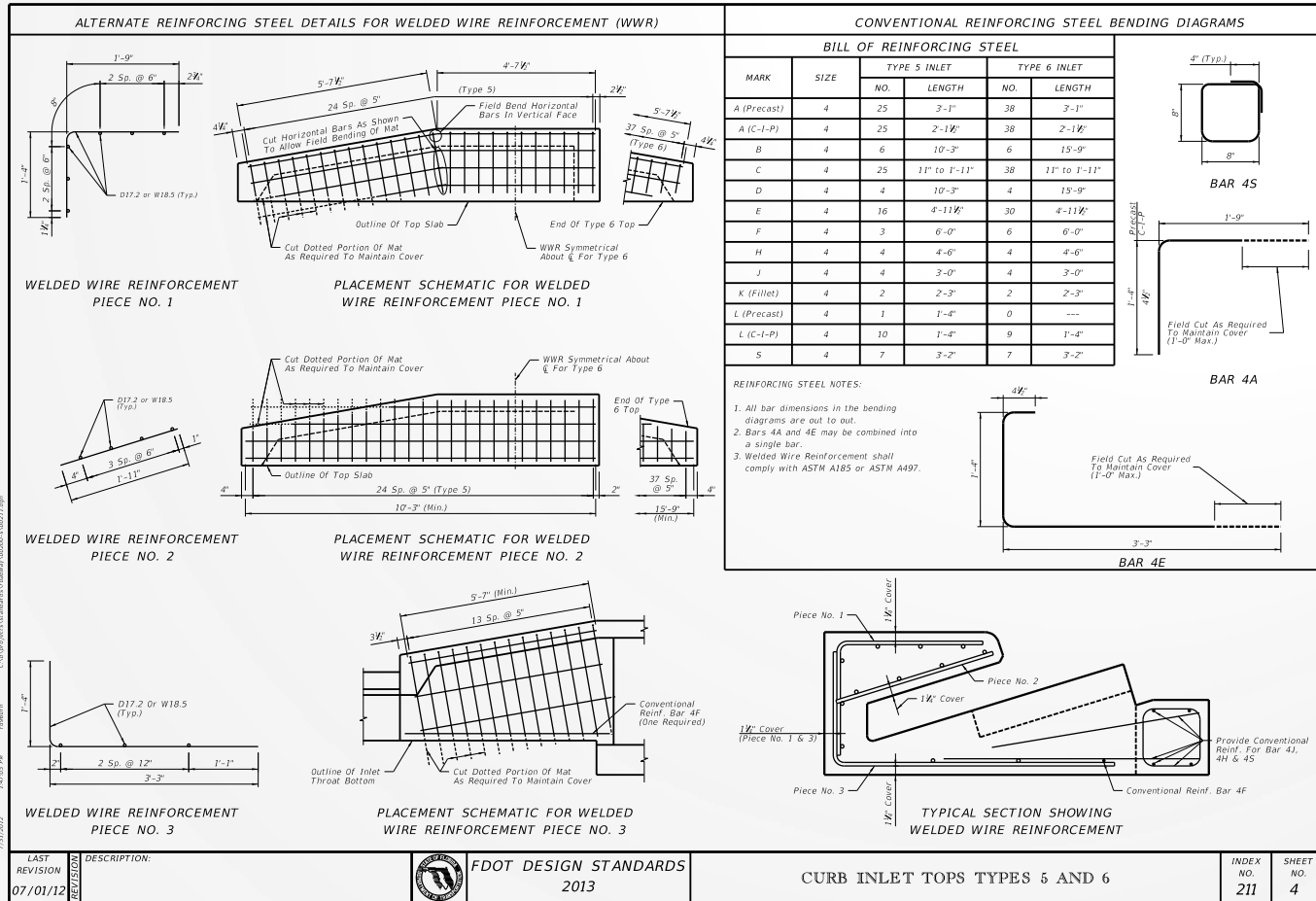
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Sheet 3



Index 211

Sheet 4



Index 211

Sheet 4

ALTERNATE REINFORCING STEEL DETAILS FOR WELDED WIRE REINFORCEMENT (WWR)

**WELDED WIRE REINFORCEMENT
PIECE NO. 1**

**PLACEMENT SCHEMATIC FOR WELDED
WIRE REINFORCEMENT PIECE NO. 1**

**WELDED WIRE REINFORCEMENT
PIECE NO. 2**

**PLACEMENT SCHEMATIC FOR WELDED
WIRE REINFORCEMENT PIECE NO. 2**

**WELDED WIRE REINFORCEMENT
PIECE NO. 3**

**PLACEMENT SCHEMATIC FOR WELDED
WIRE REINFORCEMENT PIECE NO. 3**

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

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

BILL OF REINFORCING STEEL

REINFORCING STEEL NOTES:

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

**TYPICAL SECTION SHOWING
WELDED WIRE REINFORCEMENT**

LAST REVISION: 07/01/12

FDOT DESIGN STANDARDS
2013

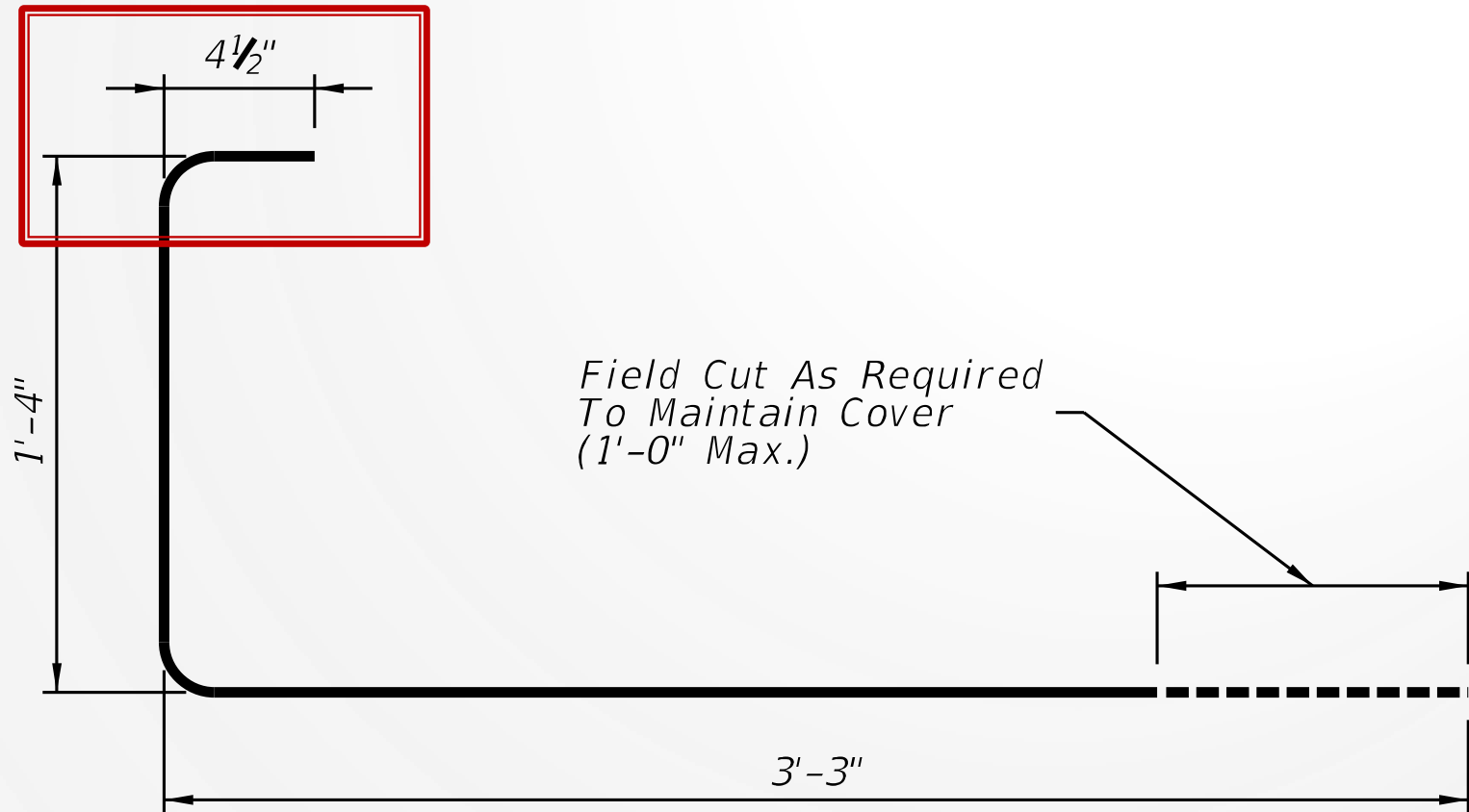
CURB INLET TOPS TYPES 5 AND 6

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Sheet 4



BAR 4E

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Sheet 4

BILL OF REINFORCING STEEL					
MARK	SIZE	TYPE 5 INLET		TYPE 6 INLET	
		NO.	LENGTH	NO.	LENGTH
A (Precast)	4	25	3'-1"	38	3'-1"
A (C-I-P)	4	25	2'-1½"	38	2'-1½"
B	4	6	10'-3"	6	15'-9"
C	4	25	11" to 1'-11"	38	11" to 1'-11"
D	4	4	10'-3"	4	15'-9"
E	4	16	4'-11½"	30	4'-11½"
F	4	3	6'-0"	6	6'-0"
H	4	4	4'-6"	4	4'-6"
J	4	4	3'-0"	4	3'-0"
K (Fillet)	4	2	2'-3"	2	2'-3"
L (Precast)	4	1	1'-4"	0	---
L (C-I-P)	4	10	1'-4"	9	1'-4"
S	4	7	3'-2"	7	3'-2"

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Sheet 4

ALTERNATE REINFORCING STEEL DETAILS FOR WELDED WIRE REINFORCEMENT (WWR)

**WELDED WIRE REINFORCEMENT
PIECE NO. 1**

**PLACEMENT SCHEMATIC FOR WELDED
WIRE REINFORCEMENT PIECE NO. 1**

**WELDED WIRE REINFORCEMENT
PIECE NO. 2**

**PLACEMENT SCHEMATIC FOR WELDED
WIRE REINFORCEMENT PIECE NO. 2**

**WELDED WIRE REINFORCEMENT
PIECE NO. 3**

**PLACEMENT SCHEMATIC FOR WELDED
WIRE REINFORCEMENT PIECE NO. 3**

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

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

REINFORCING STEEL NOTES:

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

REINFORCING STEEL NOTES:

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

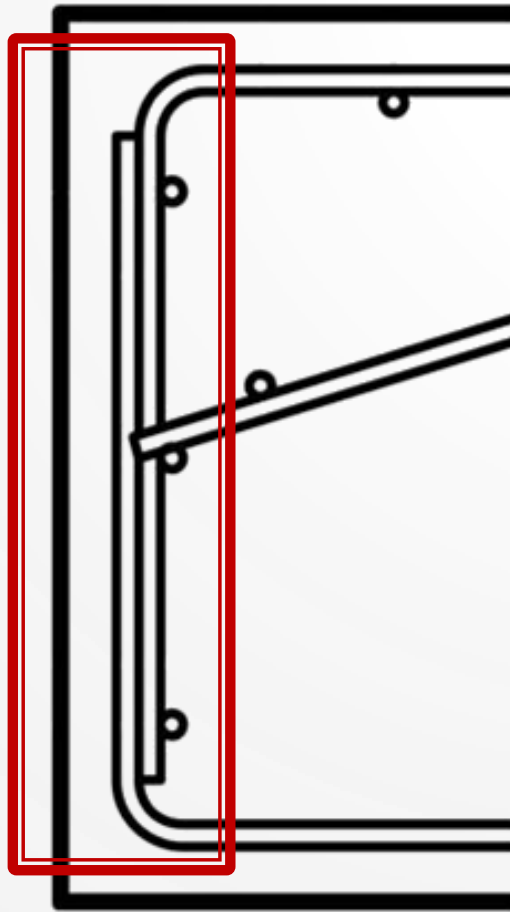
**TYPICAL SECTION SHOWING
WELDED WIRE REINFORCEMENT**

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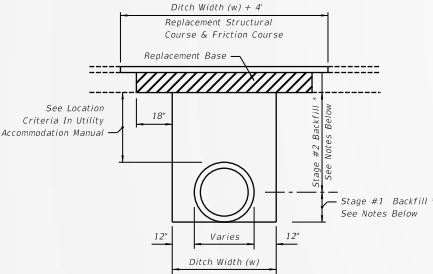
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Sheet 1



FLEXIBLE PAVEMENT NOTES

PAVEMENT REMOVAL AND REPLACEMENT
Pavement shall be mechanically sawed.

The replacement asphalt shall match the existing structural and Friction courses for type and thickness in accordance with current FDOT asphalt mix specifications.

The new base materials shall be either of the same type and composition as the materials removed or of equal or greater structural adequacy (See Index No. 514).

BACKFILL
COMPACTED AND STABILIZED FILL OPTION
Backfill material shall be placed in accordance with Section 125 of the Standard Specifications.

In Stage #1, construct compacted fill beneath the haunches of the pipe, using mechanical tamps suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe and above any bedding.

In Stage #2, construct compacted fill along the sides of the pipe and up to the bottom of the base, with the upper 12" receiving Type B Stabilization. In lieu of Type B Stabilization, the Contractor may construct using Optional Base Group 3.

*** FLOWABLE FILL OPTION**
If compaction can not be achieved through normal mechanical methods then Flowable Fill may be used.

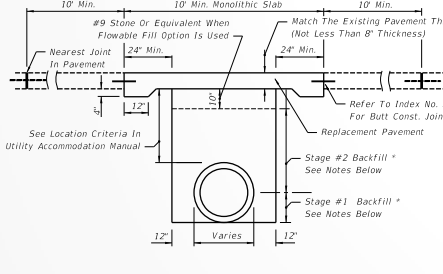
Flowable fill is to be placed in accordance with Section 121 of the Specifications, as approved by the Engineer.

Do not allow the utility being installed to float. If a method is provided to prevent flotation from occurring, Stages #1 and #2 can be combined, if approved by the Engineer.

In Stage #1, place flowable fill midway up on both sides of the utility. Allow to harden before placing Stage #2.

In Stage #2, place flowable fill to the bottom of the existing base course.

FLEXIBLE PAVEMENT CUT



RIGID PAVEMENT NOTES

PAVEMENT REMOVAL AND REPLACEMENT
High early strength cement concrete (3000 psi) meeting the requirements of Standard Specification 346 shall be used for rigid pavement replacement.

Pavement shall be mechanically sawed and restored to conform with existing pavement joints within 12 hours. (See Index No. 305)

GRANULAR BACKFILL
Any edgeline system that is removed shall be replaced with the same type materials. Any edgeline system that is damaged shall be repaired with methods approved by the Engineer.

Fill material shall be placed in accordance with the Standard Specifications. Fill material shall be special select soil in accordance with Index No. 505.

In Stage #1, construct compacted fill beneath the haunches of the pipe, using mechanical tamps suitable for this purpose. This compaction applies to the material placed beneath the haunches of the pipe and above any bedding.

In Stage #2, construct fill along the sides of the pipe and up to the bottom of replacement pavement.

*** FLOWABLE FILL OPTION**
If mechanical compaction can not be achieved through normal mechanical methods then Flowable Fill may be used.

Flowable fill is to be placed in accordance with Section 121 of the Specifications, as approved by the Engineer.

Do not allow the utility being installed to float. If a method is provided to prevent flotation from occurring, Stages #1 and #2 can be combined, if approved by the Engineer.

In Stage #1, place flowable fill midway up on both sides of the utility. Allow to harden before placing Stage #2.


In Stage #2, place flowable fill to the bottom of the stone layer.

RIGID PAVEMENT CUT

GENERAL NOTES

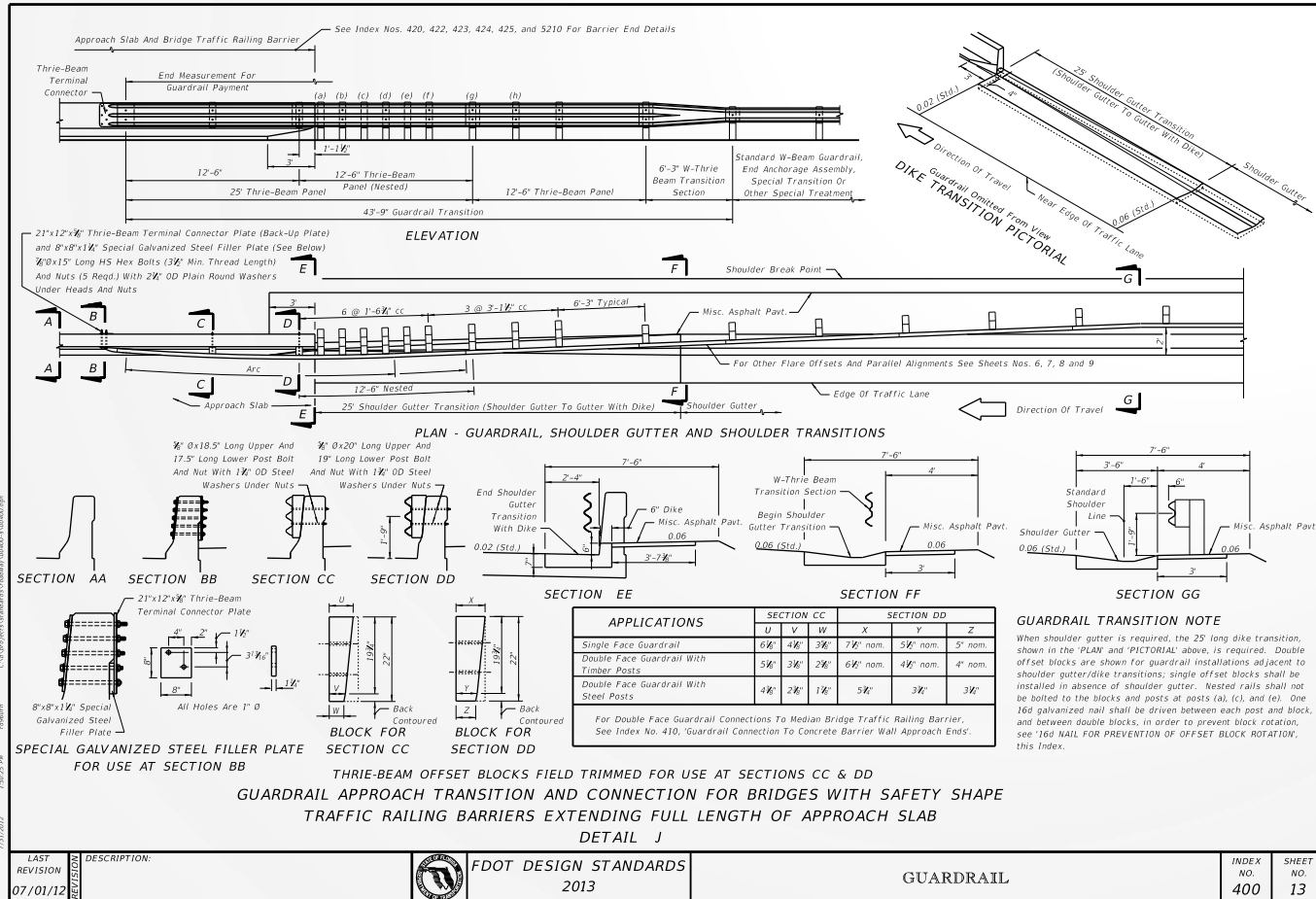
1. The details provided in this standard index apply to cases in which jack and bore or directional boring methods are not required by the Engineer.
2. Flowable fill shall not be placed directly over loose, or high plastic, or mucous material (see Index 505) which will cause settlement due to fill weight. Where highly compressible material exists, the amount, shape and depth of flowable fill must be engineered to prevent pavement settlement.
3. These details do not apply to utility cuts longitudinal to the centerline of the roadway which may require the additional use of geotextiles, special bedding and backfill, or other special requirements.
4. Method of construction must be approved by the Engineer.
5. Some pipe may require special granular backfill up to 6" above top of pipe. Geotextiles may be required to encapsulate the special granular material.
6. Where asphalt concrete overlays exist over full slab concrete pavement, the replacement pavement shall have an overlay constructed over the replacement slab. The overlay shall match the existing asphalt pavement thickness. The replacement friction course shall match the existing friction course, except structural course may be used in lieu of dense graded friction course.
7. All shoulder pavement, curb, curb and gutter, and their substructure disturbed by utility trench cut construction shall be restored in kind.
8. The use of flowable fill to reduce the time traffic is taken off a facility is acceptable but must have prior approval by the Engineer. Flowable fill use allowed only when properly engineered for pavement crossings, whether straight or diagonal, and shall not be installed for significant depths or lengths. The maximum length shall be fifty (50) feet and a maximum depth six (6) feet unless supported by an engineering document prepared by a registered professional engineer that specializes in soils engineering. The engineering document shall address the evaluation of local groundwater flow interruption and settlement potential.
9. Excavatable flowable fill is to be used when the flowable fill option is selected.

TRENCH CUTS AND RESTORATIONS ACROSS ROADWAYS

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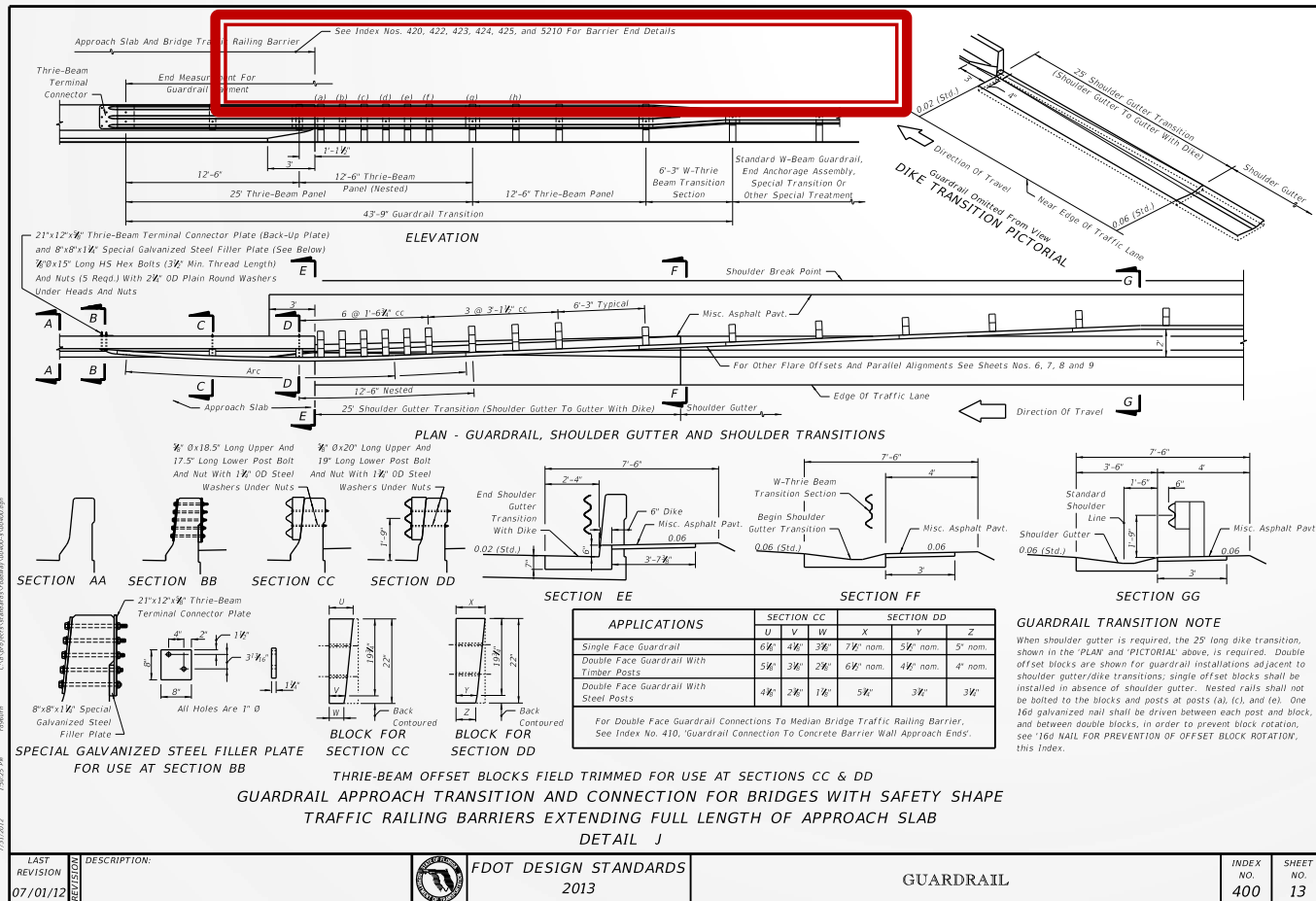
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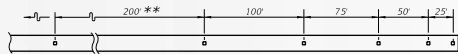
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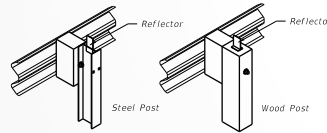
Sheet 17



Note: Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer. For minimum installations (length 62.5') provide one reflector at each end and one at the approximate center.

** For curves greater than 2" the spacing shall be reduced to 100' increments through the curve.

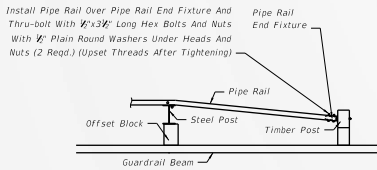
REFLECTOR ELEMENT SPACING



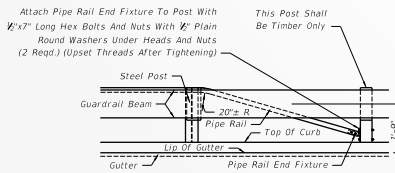
PICTORIAL VIEW REFLECTOR MOUNTING
REFLECTORS-DETAIL M

REFLECTOR NOTES

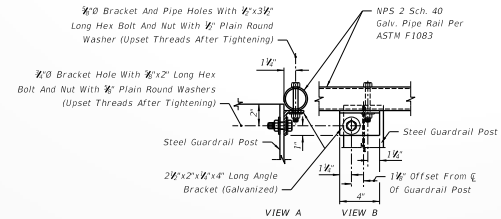
1. Reflectors shall conform to Section 993 of the Standard Specifications.
2. Reflector color (white or yellow) shall conform to the color of the near lane edge line.
3. Reflectors installed on median guardrail shall have retro-reflective sheeting on both sides of the reflector.
4. The cost for reflectors shall be included in the contract unit price for Guardrail.



PLAN



ELEVATION



PIPE RAIL MOUNTING

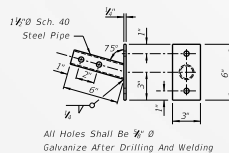
NOTES

1. Pipe Rail is required on steel guardrail posts when the front of sidewalks or shared use paths are located 4' or less from behind the back of the post. Pipe rail shall not extend beyond the last post of the approach end anchorage assembly. Begin and end the Pipe Rail in accordance with the PIPE RAIL END FIXTURE detail.

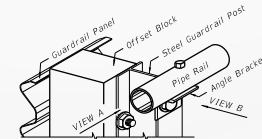
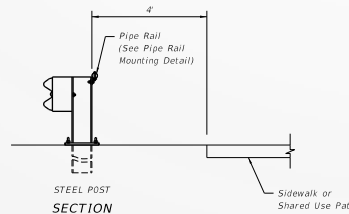
Refer to Sheet 1, GENERAL NOTE 6 for guardrail end treatment requirements.

2. When guardrail with timber posts are located with the back of post 4' or less from the near front of sidewalks or shared use paths, the bolt ends will require one of the following treatments:

- a. Trim back flush with the face of nut and metalize or
- b. Use post bolts 15' in length with washers and nuts counter sunk into sinks 1" to 1 1/2" deep or
- c. Use post bolts 15' in length with sleeve nuts and washers.



PIPE RAIL END FIXTURE



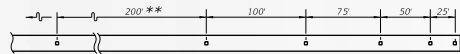
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FOR LOCATIONS USED BY PEDESTRIANS OR BICYCLISTS
PEDESTRIAN SAFETY TREATMENTS

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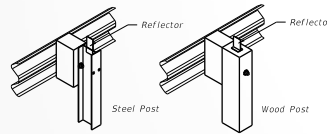
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Note: Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer. For minimum installations (length 62.5') provide one reflector at each end and one at the approximate center.

** For curves greater than 2" the spacing shall be reduced to 100' increments through the curve.

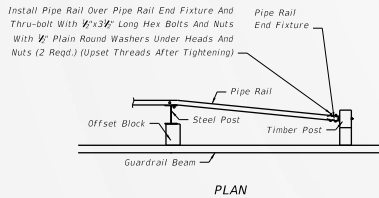
REFLECTOR ELEMENT SPACING



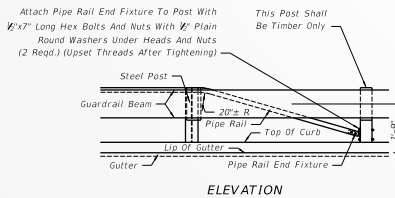
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REFLECTORS-DETAIL M

REFLECTOR NOTES

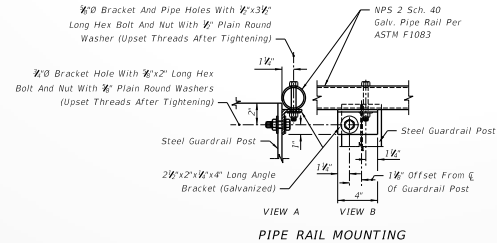
1. Reflectors shall conform to Section 993 of the Standard Specifications.
2. Reflector color (white or yellow) shall conform to the color of the near lane edge line.
3. Reflectors installed on median guardrail shall have retro-reflective sheeting on both sides of the reflector.
4. The cost for reflectors shall be included in the contract unit price for Guardrail.



PLAN



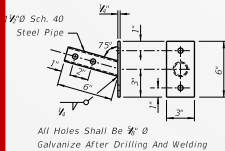
ELEVATION



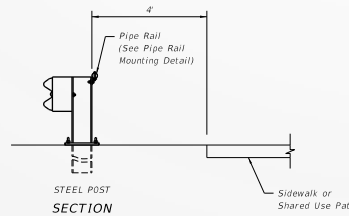
PIPE RAIL MOUNTING

NOTES

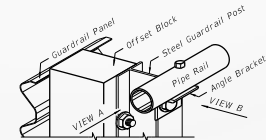
1. Pipe Rail is required on steel guardrail posts when the front of sidewalks or shared use paths are located 4' or less from behind the back of the post. Pipe rail shall not extend beyond the last post of the approach end anchorage assembly. Begin and end the Pipe Rail in accordance with the PIPE RAIL END FIXTURE detail.
2. When guardrail with timber posts are located with the back of post 4' or less from the near front of sidewalks or shared use paths, the bolt ends will require one of the following treatments:
 - a. Trim back flush with the face of nut and metalize or
 - b. Use post bolts 15" in length with washers and nuts counter sunk into sinks 1" to 1 1/2" deep or
 - c. Use post bolts 15" in length with sleeve nuts and washers.



PIPE RAIL END FIXTURE



STEEL POST SECTION



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FOR LOCATIONS USED BY PEDESTRIANS OR BICYCLISTS
PEDESTRIAN SAFETY TREATMENTS

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NOTES

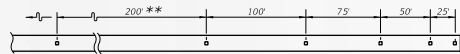
- 1. Pipe Rail is required on steel guardrail posts when the front of sidewalks or shared use paths are located 4' or less from behind the back of the post. Pipe rail shall not extend beyond the last post of the approach end anchorage assembly. Begin and end the Pipe Rail in accordance with the PIPE RAIL END FIXTURE detail.*

Refer to Sheet 1, GENERAL NOTE 6 for guardrail end treatment requirements.

- 2. When guardrail with timber posts are located with the back of post 4' or less from the near front of sidewalks or shared use paths, the bolt ends will require one of the following treatments:*
 - a. Trim back flush with the face of nut and metalize or*
 - b. Use post bolts 15" in length with washers and nuts counter sunk into sinks 1" to 1½" deep or*
 - c. Use post bolts 15" in length with sleeve nuts and washers.*

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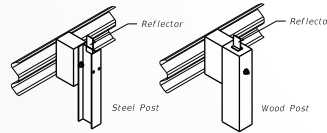
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Note: Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer. For minimum installations (length 62.5') provide one reflector at each end and one at the approximate center.

** For curves greater than 2" the spacing shall be reduced to 100' increments through the curve.

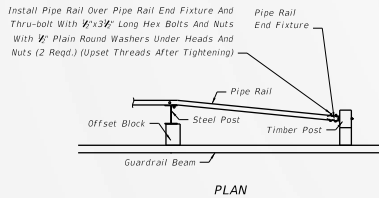
REFLECTOR ELEMENT SPACING



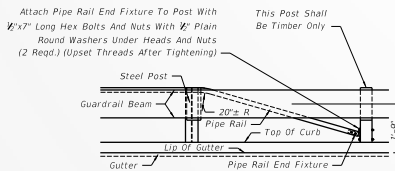
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REFLECTORS-DETAIL M

REFLECTOR NOTES

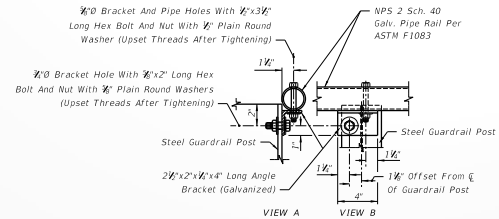
1. Reflectors shall conform to Section 993 of the Standard Specifications.
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3. Reflectors installed on median guardrail shall have retro-reflective sheeting on both sides of the reflector.
4. The cost for reflectors shall be included in the contract unit price for Guardrail.



PLAN



ELEVATION



PIPE RAIL MOUNTING

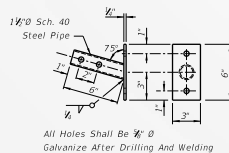
NOTES

1. Pipe Rail is required on steel guardrail posts when the front of sidewalks or shared use paths are located 4' or less from behind the back of the post. Pipe rail shall not extend beyond the last post of the approach end anchorage assembly. Begin and end the Pipe Rail in accordance with the PIPE RAIL END FIXTURE detail.

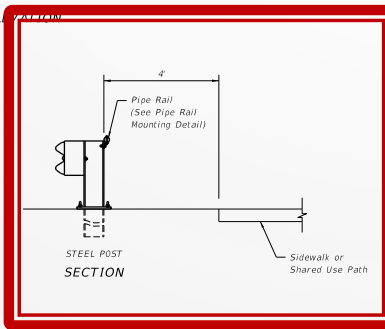
Refer to Sheet 1, GENERAL NOTE 6 for guardrail end treatment requirements.

2. When guardrail with timber posts are located with the back of post 4' or less from the rear front of sidewalks or shared use paths, the bolt ends will require one of the following treatments:

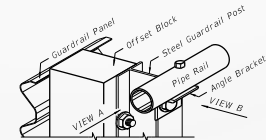
- a. Trim back flush with the face of nut and metalize or
- b. Use post bolts 15" in length with washers and nuts counter sunk into sinks 1" to 1 1/2" deep or
- c. Use post bolts 15" in length with sleeve nuts and washers.



PIPE RAIL END FIXTURE



FOR LOCATIONS USED BY PEDESTRIANS OR BICYCLISTS
PEDESTRIAN SAFETY TREATMENTS

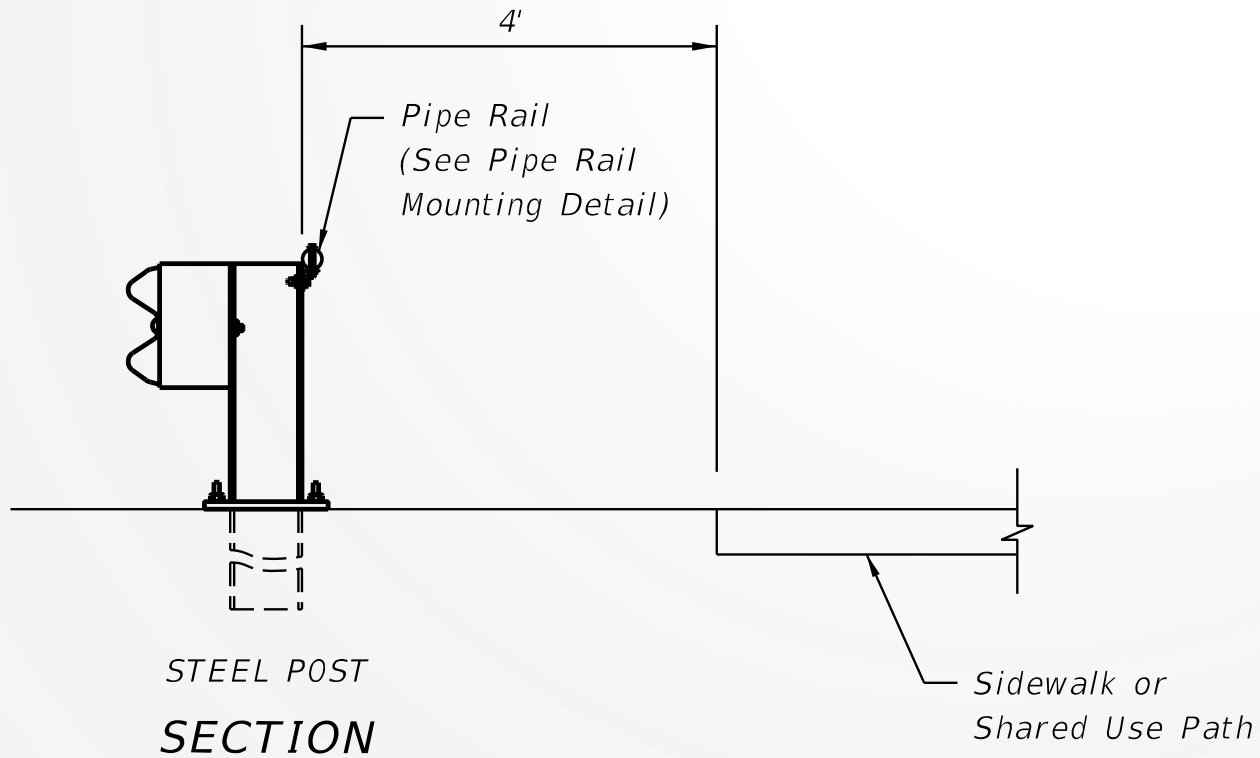


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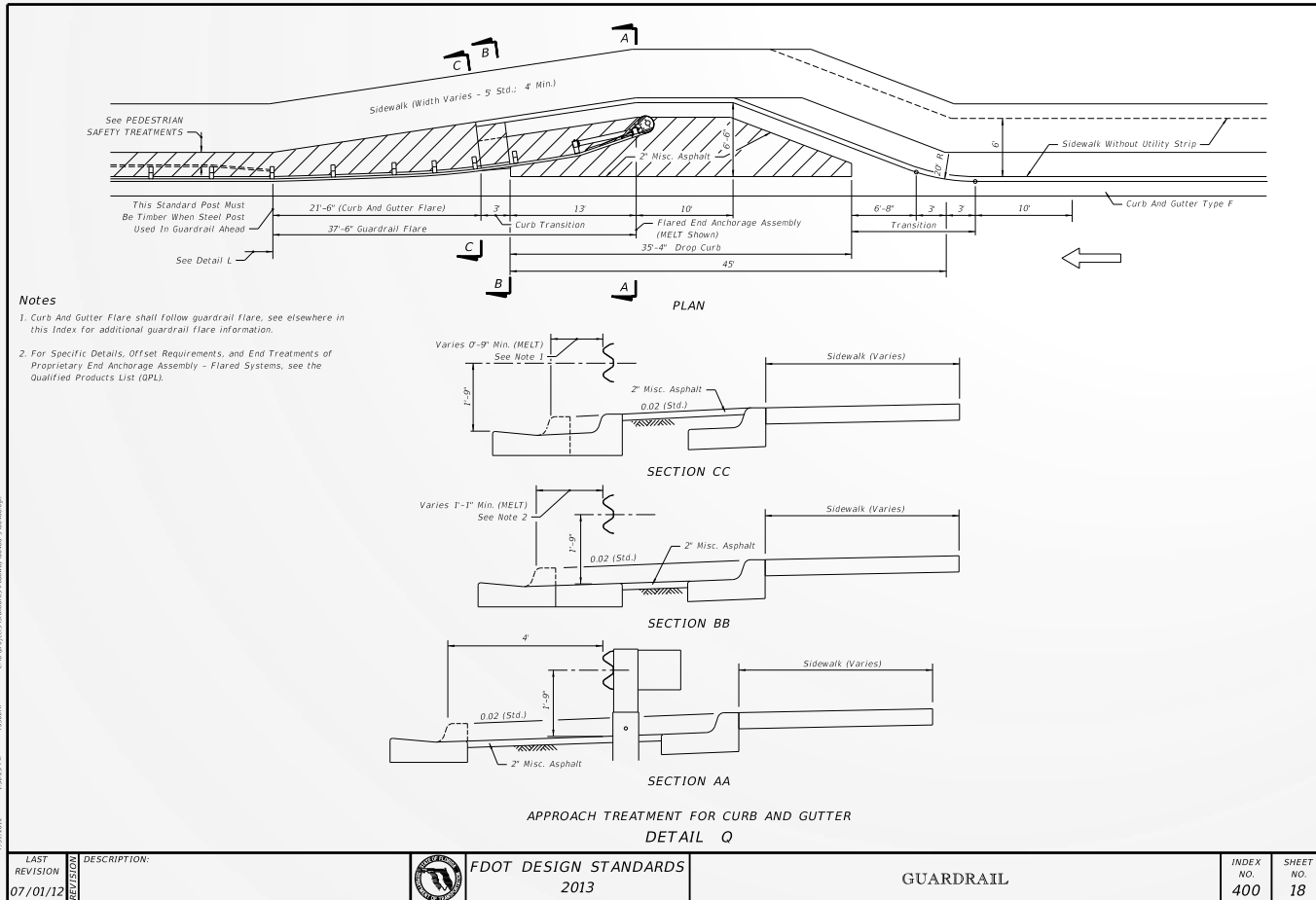
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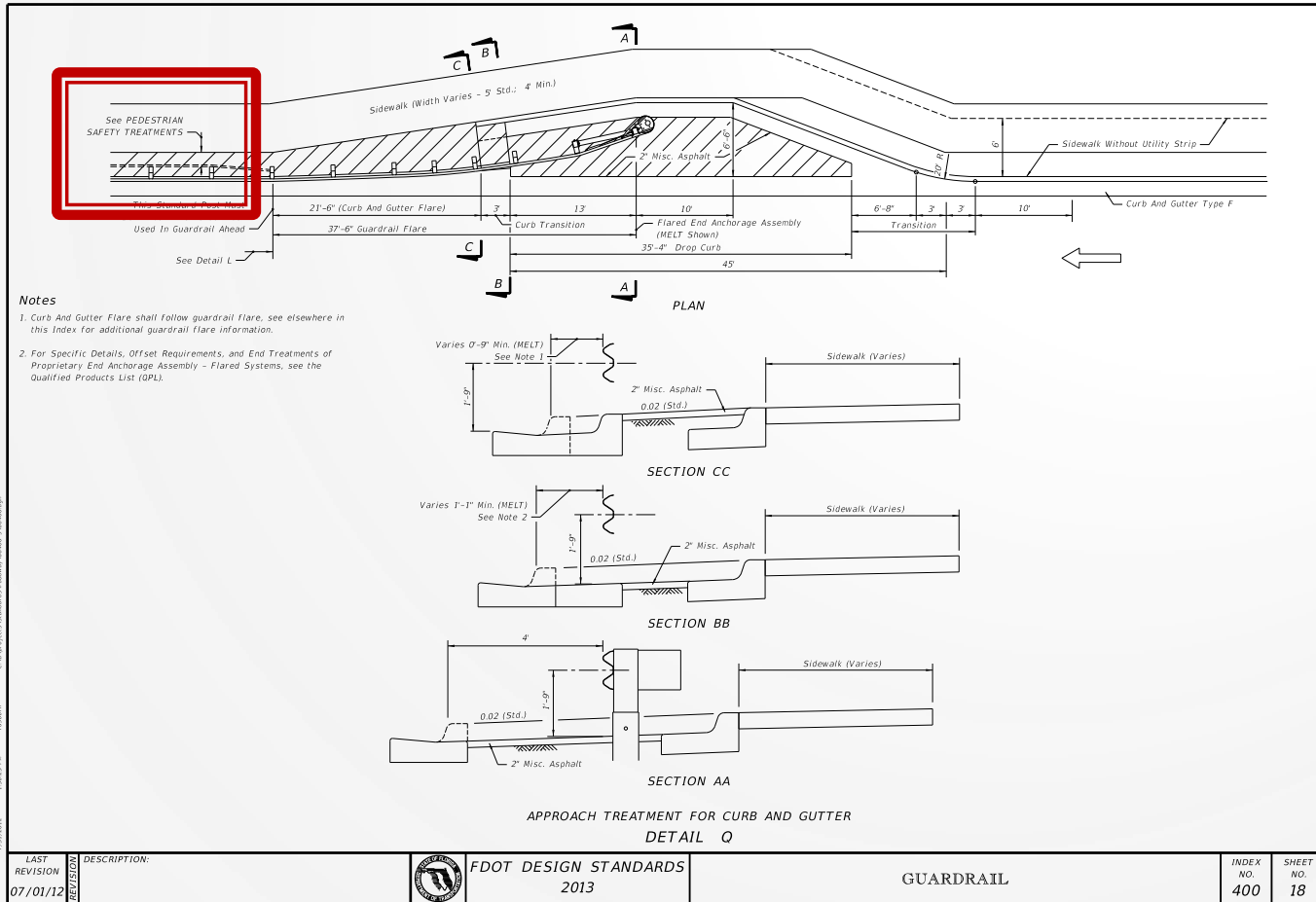
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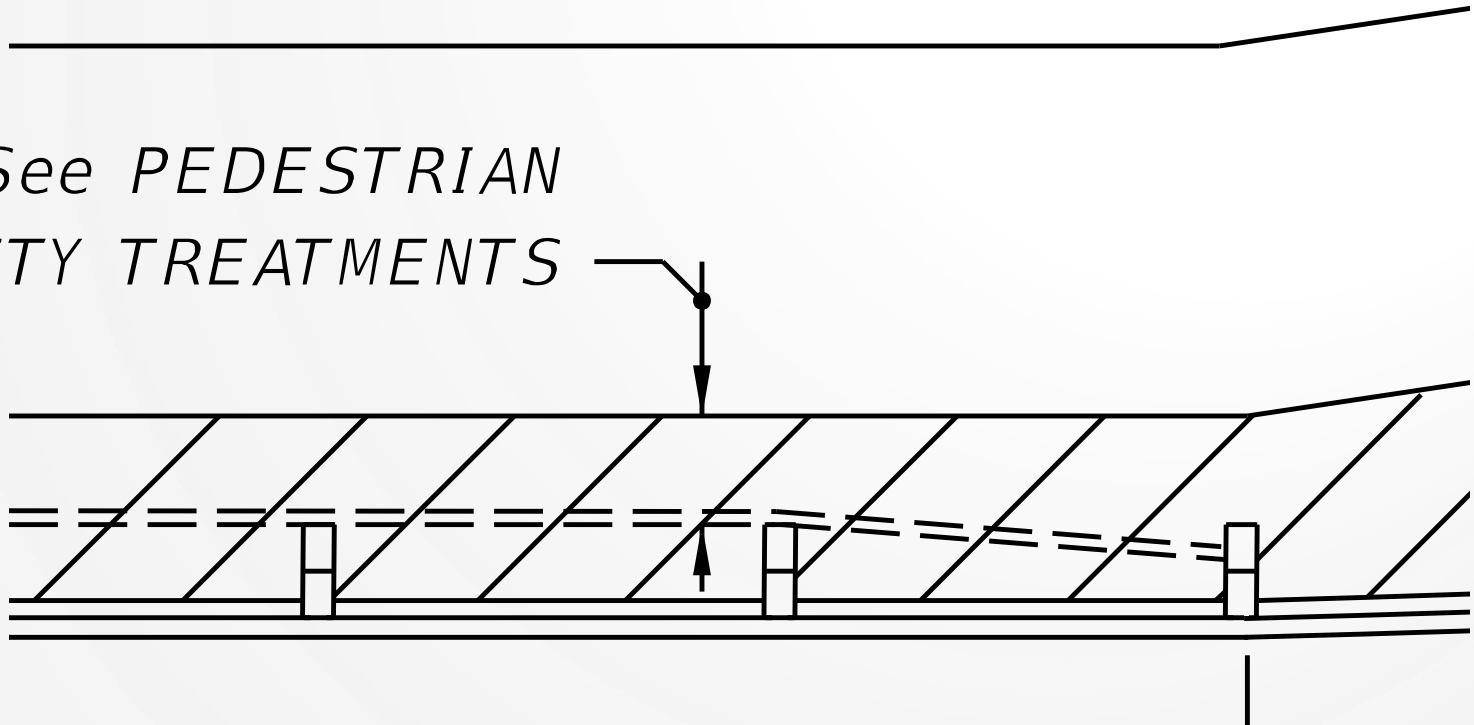
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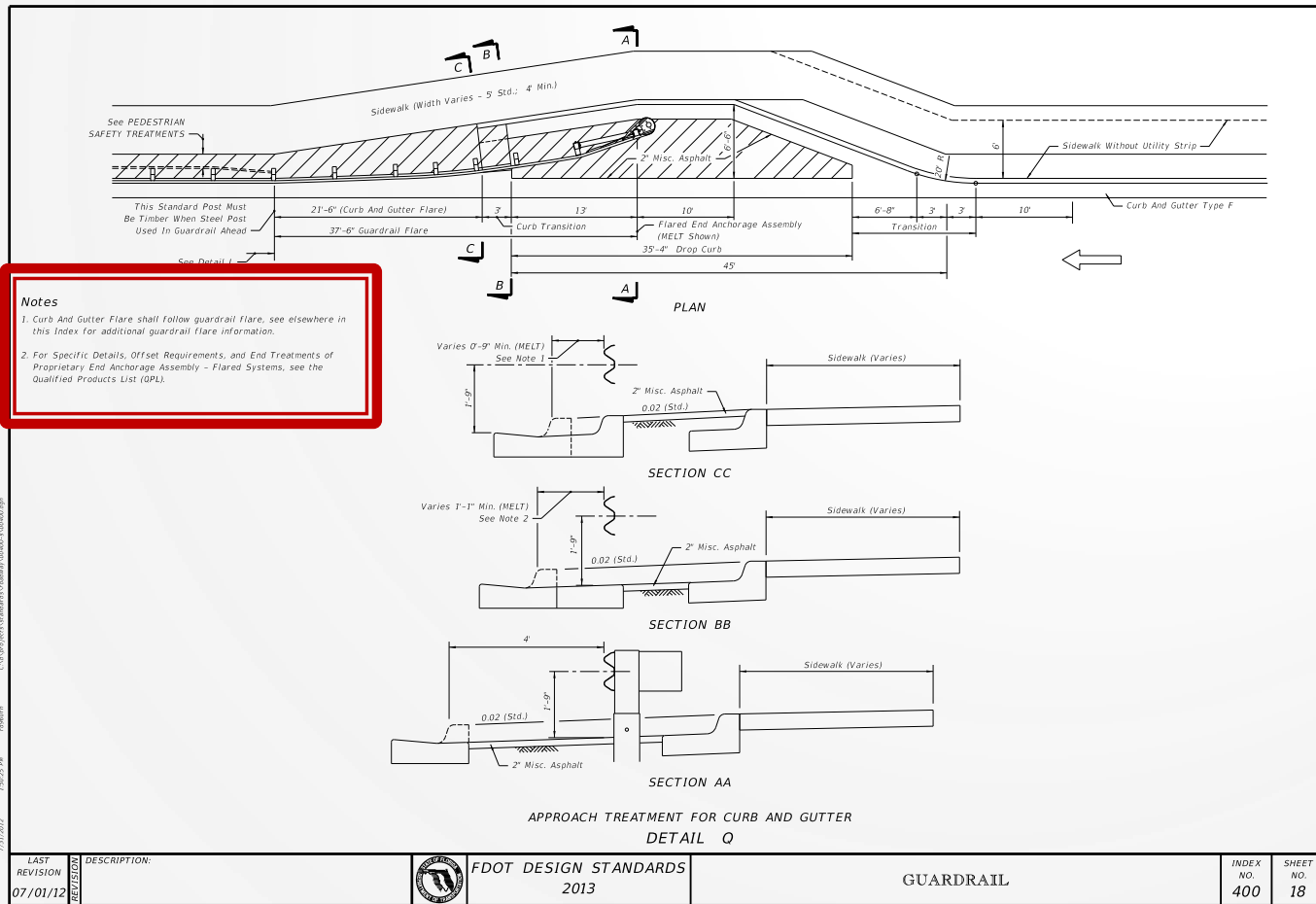
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See PEDESTRIAN
SAFETY TREATMENTS



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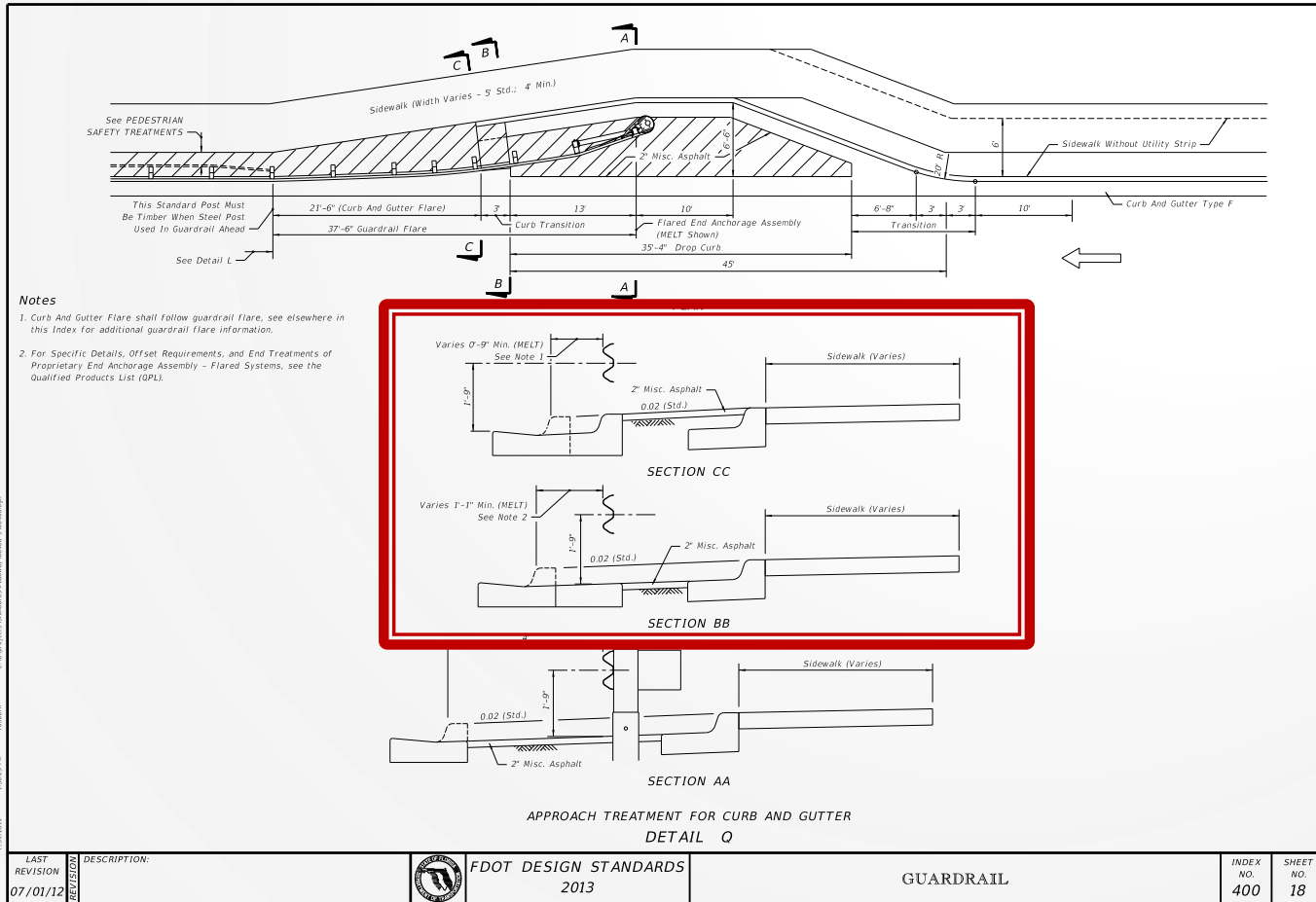
Sheet 18

Notes

- 1. Curb And Gutter Flare shall follow guardrail flare, see elsewhere in this Index for additional guardrail flare information.*
- 2. For Specific Details, Offset Requirements, and End Treatments of Proprietary End Anchorage Assembly - Flared Systems, see the Qualified Products List (QPL).*

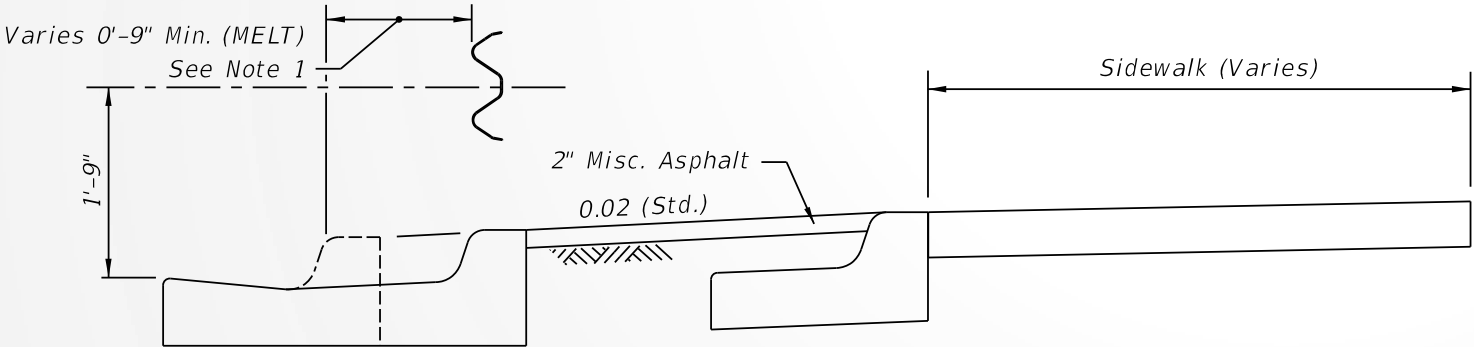
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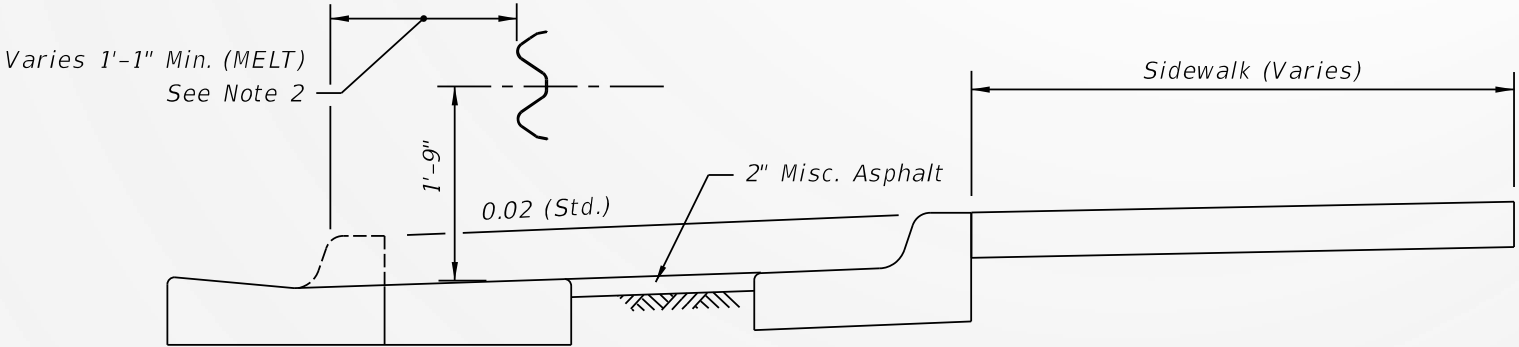


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Sheet 18



SECTION CC



SECTION BB

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Sheet 22

Notes:

- The locations shown for special posts mounted on inlets are to be used as guidelines for positioning the posts and for estimating the number of required posts.
- Special posts and their anchorages mounted on curb inlets shall be in accordance with special steel guardrail posts Sheet 21, and paid for under the contract unit price for Special Guardrail Post, EA.
- Variations shown for the locations of special posts mounted on inlets are established from standard post spacing (6'-3"); clearance of standard posts from inlets (4" min.); use of single and double offset blocks on standard posts adjacent to the inlets; optional flange mountings; and, concrete anchor edge distances (2" for grouted and 3½" for expansion anchors). The number of posts and their locations may vary by reducing post spacing and adjusting the length of rail panel (s).
- Encased guardrail posts shall conform in section to standard timber and steel posts, and be paid for under the contract unit price for Special Guardrail Post, EA. Payment shall include cost of foam wrap and concrete encasement.

SPECIAL POST LOCATIONS ON CURB INLETS

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Notes:

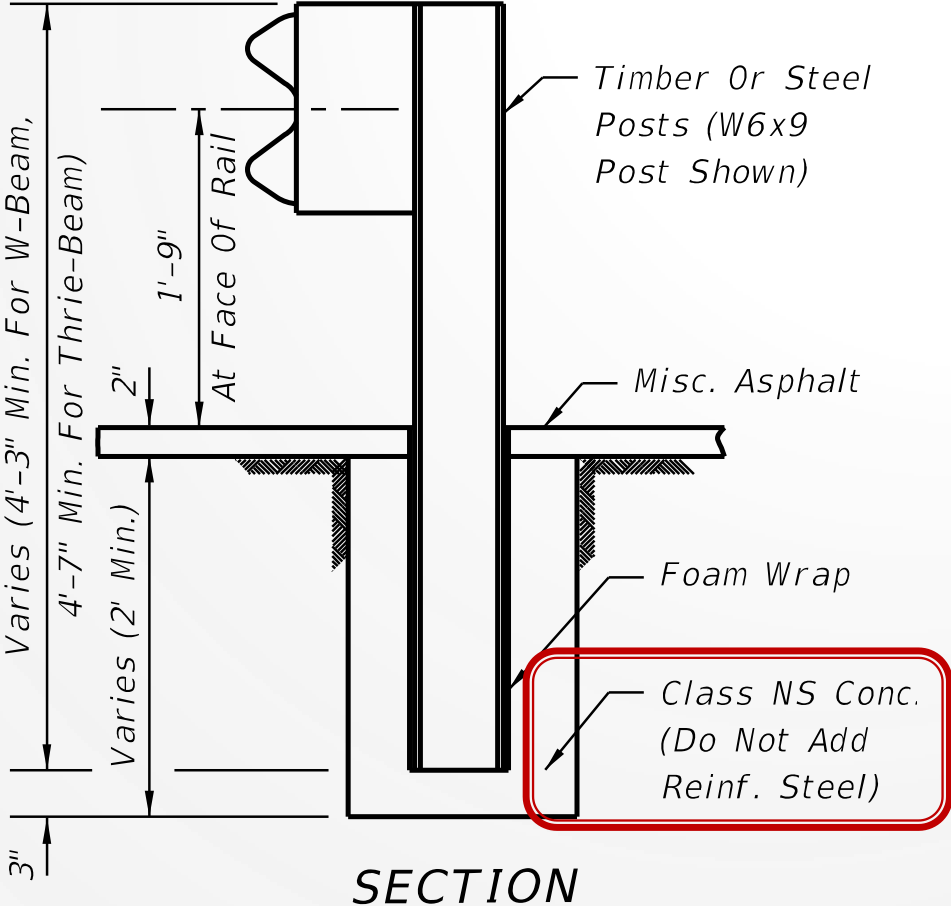
- The locations shown for special posts mounted on inlets are to be used as guidelines for positioning the posts and for estimating the number of required posts.
- Special posts and their anchorages mounted on curb inlets shall be in accordance with special steel guardrail posts Sheet 21, and paid for under the contract unit price for Special Guardrail Post, EA.
- Variations shown for the locations of special posts mounted on inlets are established from standard post spacing (6'-3"); clearance of standard posts from inlets (4" min.); use of single and double offset blocks on standard posts adjacent to the inlets; optional flange mountings; and, concrete anchor edge distances (2" for grouted and 3X_d for expansion anchors). The number of posts and their locations may vary by reducing post spacing and adjusting the length of rail panel (s).
- Encased guardrail posts shall conform in section to standard timber and steel posts, and be paid for under the contract unit price for Special Guardrail Post, EA. Payment shall include cost of foam wrap and concrete encasement.

SPECIAL POST LOCATIONS ON CURB INLETS

LAST REVISION 07/01/12	DESCRIPTION: REVISION		FDOT DESIGN STANDARDS 2013	GUARDRAIL	INDEX NO. 400	SHEET NO. 22
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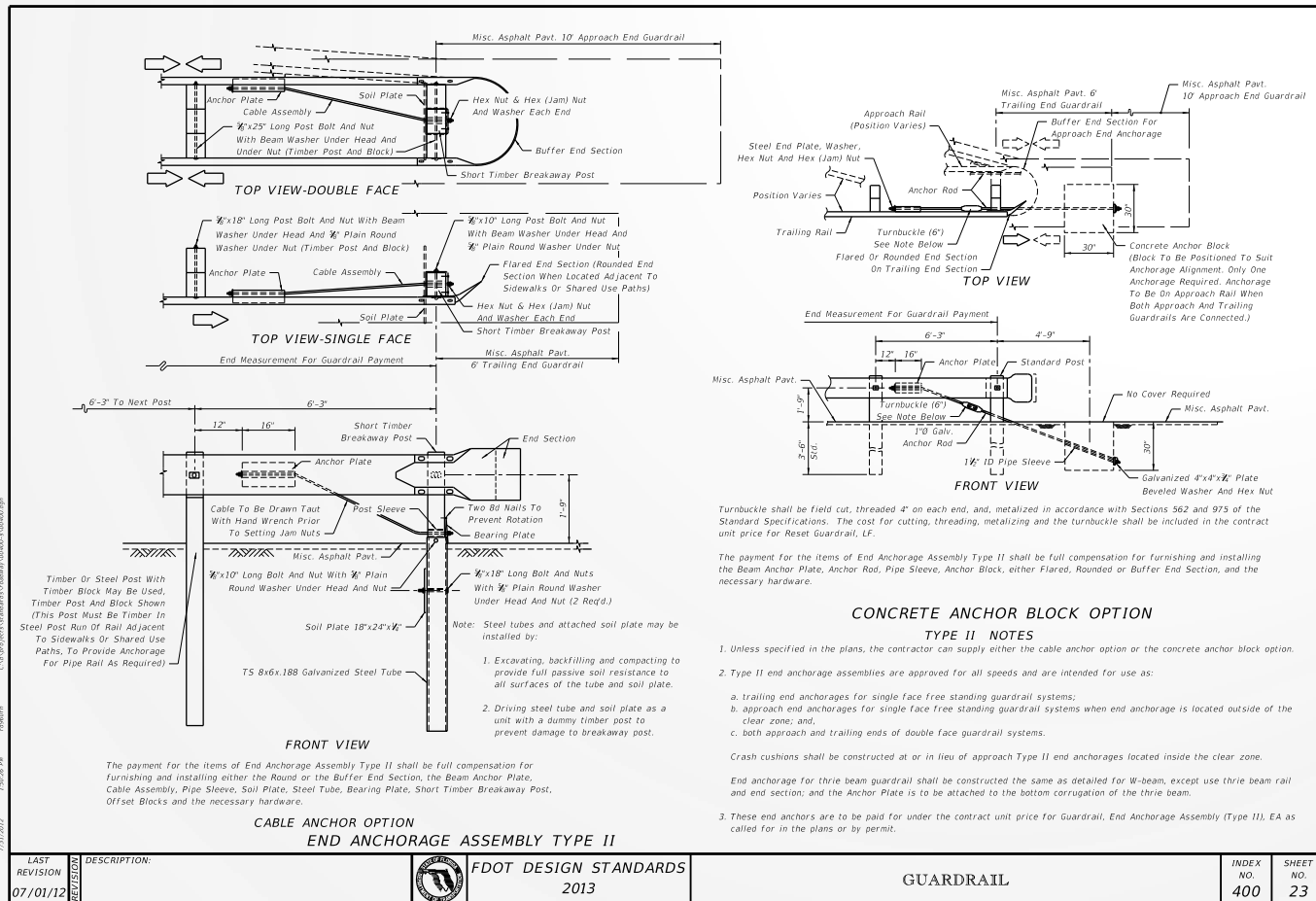
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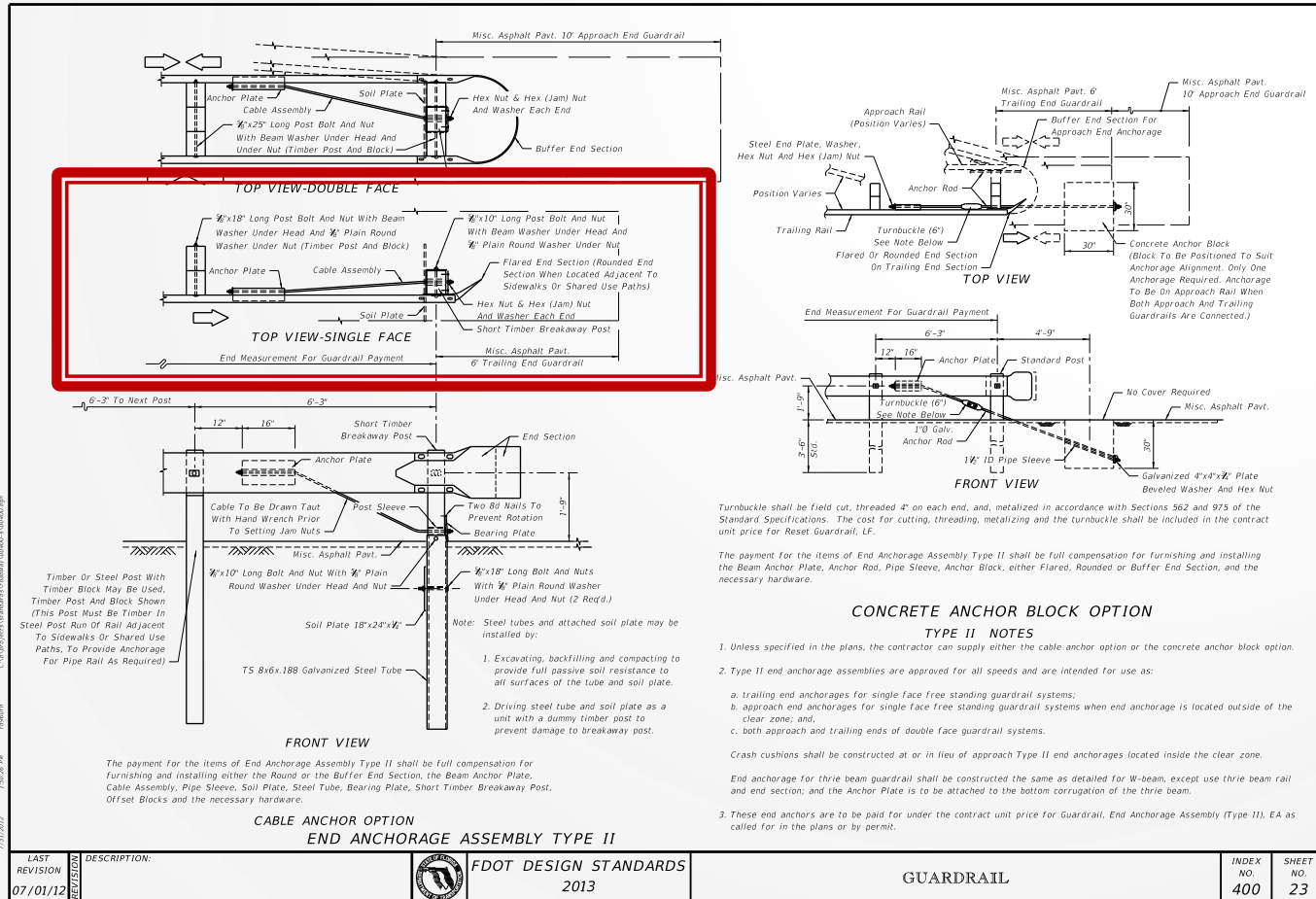
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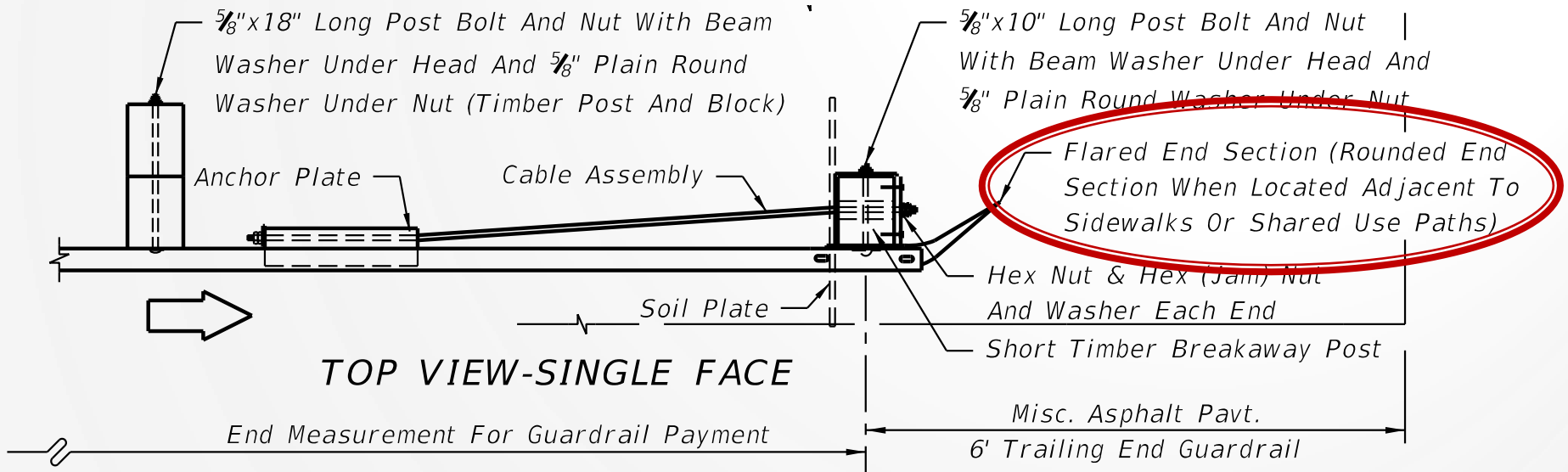
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Sheet 26

The diagrams show guardrail placement on median slopes (freeways) and outside slopes. The median slope diagram shows a 12'-0" total width with a 10'-0" section for the guardrail and a 2'-0" section for the shoulder. The outside slope diagram shows an 8'-0" total width with a 4'-0" section for the guardrail and a 4'-0" section for the shoulder. Both diagrams show a 1.6 slope, 12" height, and 1.5' spacing between posts. The guardrail is 4'-0" high and 12'-0" wide. The shoulder is 0.05 wide and the traffic lane is 0.02 wide.

LATERAL PLACEMENT ON SLOPES (FROM EDGE OF NEAR TRAFFIC LANE) ¹			
Slope	Standard Guardrail ²	Guardrail Not Recommended	Guardrail With Rub Rail ³
1:4	to 13'	14' to 27'	28' to 45'
1:5	to 14'	15' to 25'	26' to 45'
1:6	to 16'	17' to 22'	23' to 45'
1:7	to 20'	21' to 24'	25' to 45'
1:8	to 25'		26' to 45'
1:9	to 26'		27' to 45'
1:10	to 27'		28' to 45'

Notes:

- For shoulders less than 12' in width the tabulated values will be reduced by the difference between 12' and the shoulder width. Placement of guardrail on front slopes steeper than 1:4 not recommended.
- Standard guardrail; 1'-9" to ζ post bolt. Rub Rail is required on the median side when double face guardrail is used.
- Guardrail with Rub Rail; 2'-0" to ζ post bolt.

Notes:

- Typical placement shown. May be constructed at other locations as called for in the plans.
- Rub Rail is required on the median side or ditch side of the barrier.

MOUNTING HEIGHT FOR DOUBLE FACED GUARDRAIL ON MEDIAN SHOULDERS (FREEWAYS)

GUARDRAIL ON SLOPES

The diagrams show guardrail placement on median slopes and outside slopes. The median slope diagram shows a 12'-0" total width with a 10'-0" section for the guardrail and a 2'-0" section for the shoulder. The outside slope diagram shows an 8'-0" total width with a 4'-0" section for the guardrail and a 4'-0" section for the shoulder. Both diagrams show a 1.6 slope, 12" height, and 1.5' spacing between posts. The guardrail is 4'-0" high and 12'-0" wide. The shoulder is 0.05 wide and the traffic lane is 0.02 wide.

RUB RAIL TERMINATION

The diagram shows the termination of a rub rail. It connects the beginning of the rub rail to the backside of the last post of the end anchorage (first post of standard guardrail). The end anchorage is a flared end anchorage.

GUARDRAIL ON SLOPES

* C6x8.2, Plates And Fasteners or Bent Plate And Fasteners In Accordance With Standards RLR01 And RER01 OF AASHTO-AGC-ARTBA "A Guide To Standardized Highway Barrier Hardware"

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FDOT DESIGN STANDARDS 2013

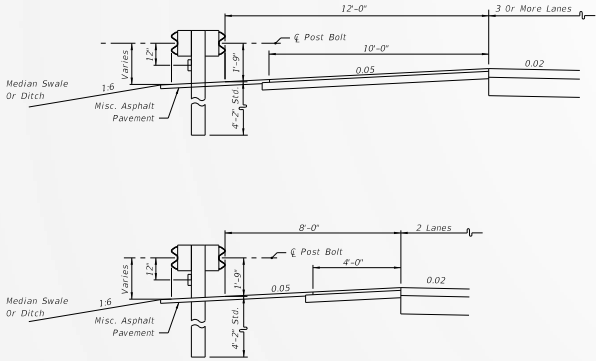
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Notes:

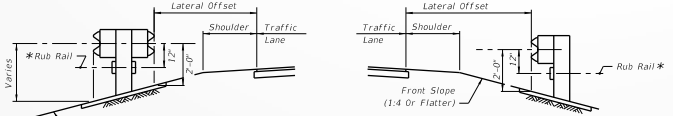
- Typical placement shown. May be constructed at other locations as called for in the plans.
- Rub Rail is required on the median side or ditch side of the barrier.

MOUNTING HEIGHT FOR DOUBLE FACED GUARDRAIL ON MEDIAN SHOULDERS (FREEWAYS)

LATERAL PLACEMENT ON SLOPES (FROM EDGE OF NEAR TRAFFIC LANE) ¹			
Slope	Standard Guardrail ²	Guardrail Not Recommended	Guardrail With Rub Rail ³
1:4	to 13'	14' to 27'	28' to 45'
1:5	to 14'	15' to 25'	26' to 45'
1:6	to 16'	17' to 22'	23' to 45'
1:7	to 20'	21' to 24'	25' to 45'
1:8	to 25'		26' to 45'
1:9	to 26'		27' to 45'
1:10	to 27'		28' to 45'

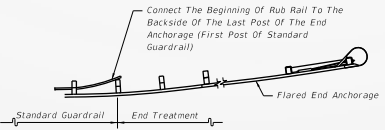
Notes:

- For shoulders less than 12' in width the tabulated values will be reduced by the difference between 12' and the shoulder width. Placement of guardrail on front slopes steeper than 1:4 not recommended.
- Standard guardrail; 1'-9" to ζ post bolt. Rub Rail is required on the median side when double face guardrail is used.
- Guardrail with Rub Rail; 2'-0" to ζ post bolt.




GUARDRAIL ON SLOPES

* C6x8.2, Plates And Fasteners or Bent Plate And Fasteners In Accordance With Standards RLR01 And RER01 OF AASHTO-AGC-ARTBA "A Guide To Standardized Highway Barrier Hardware"



RUB RAIL TERMINATION

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Notes:

- 1. For shoulders less than 12' in width the tabulated values will be reduced by the difference between 12' and the shoulder width. Placement of guardrail on front slopes steeper than 1:4 not recommended.*
- 2. Standard guardrail; 1'-9" to C post bolt. Rub Rail is required on the median side when double face guardrail is used.*
- 3. Guardrail with Rub Rail; 2'-0" to C post bolt.*

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Sheet 1

BASE THICKNESS AND OPTION CODES										
Base Group	Structural Range	Base Group Pay Item Number	Base Options							
			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 *	RAP Base
			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"	Δ 4"		<input type="checkbox"/> 5"
2	0.80-0.90	702	5"	5"	5"	5"	5½"	Δ 4"		
3	0.95-1.05	703	5½"	5½"	5½"	5½"	6½"	Δ 4"		
4	1.05-1.15	704	6"	6"	6"	6"	7½"	Δ 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"	0 13"	6½"	4½"	
11	2.05-2.15	711	12"	12"	12"	12"	0 14"	7"	5"	
12	2.20-2.30	712	12½"	12½"	12½"	12½"		7½"	5½"	
13	2.35-2.45	713	0 13½"	0 13½"	0 13½"	0 13½"		8"	6"	
14	2.45-2.55	714	0 14"	0 14"	0 14"	0 14"		8½"	6½"	
15	2.60-2.70	715						9"	7"	

GENERAL NOTES

1. On new construction and reconstruction projects, when an entirely new base is to be built, the design engineer may specify the Base Group and any unrestricted General Use Optional Base shown in that base group. 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 single base option will be bid and used as Optional Base.

* For granular subbase, the construction of both the subbase and Type B-12.5 will be bid and used as 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" minimum.

0 To be used for widening, three feet or less.

Δ Based on minimum practical thicknesses.

For restrictions on the use of RAP Base - see Specifications Section 283.

GENERAL USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS

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Sheet 1

BASE THICKNESS AND OPTION CODES										
Base Group	Structural Range	Base Group Pay Item Number	Base Options							
			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 *	RAP Base
			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"	Δ 4"		<input type="checkbox"/> 5"
2	0.80-0.90	702	5"	5"	5"	5"	5½"	Δ 4"		
3	0.95-1.05	703	5½"	5½"	5½"	5½"	6½"	Δ 4"		
4	1.05-1.15	704	6"	6"	6"	6"	7½"	Δ 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"	11"	Ø 13"	6½"	4½"
11	2.05-2.15	711	12"	12"	12"	12"	Ø 14"	7"	5"	
12	2.20-2.30	712	12½"	12½"	12½"	12½"		7½"	5½"	
13	2.35-2.45	713	Ø 13½"	Ø 13½"	Ø 13½"	Ø 13½"		8"	6"	
14	2.45-2.55	714	Ø 14"	Ø 14"	Ø 14"	Ø 14"		8½"	6½"	
15	2.60-2.70	715						9"	7"	

GENERAL NOTES

1. On new construction and reconstruction projects, when an entirely new base is to be built, the design engineer may specify the Base Group and any unrestricted General Use Optional Base shown in that base group. 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 single base option will be bid and used as Optional Base.

* For granular subbase, the construction of both the subbase and Type B-12.5 will be bid and used as 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" minimum.

Ø To be used for widening, three feet or less.

Δ Based on minimum practical thicknesses.

For restrictions on the use of RAP Base - see Specifications Section 283.

GENERAL USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS

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BASE THICKNESS AND OPTION CODES										
Base Group	Structural Range	Base Group Pay Item Number	Base Options							
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			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"	Δ 4"		<input type="checkbox"/> 5"
2	0.80-0.90	702	5"	5"	5"	5"	5½"	Δ 4"		
3	0.95-1.05	703	5½"	5½"	5½"	5½"	6½"	Δ 4"		
4	1.05-1.15	704	6"	6"	6"	6"	7½"	Δ 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"	0 13"	6½"	4½"	
11	2.05-2.15	711	12"	12"	12"	12"	0 14"	7"	5"	
12	2.20-2.30	712	12½"	12½"	12½"	12½"		7½"	5½"	
13	2.35-2.45	713	0 13½"	0 13½"	0 13½"	0 13½"		8"	6"	
14	2.45-2.55	714	0 14"	0 14"	0 14"	0 14"		8½"	6½"	
15	2.60-2.70	715						9"	7"	

GENERAL NOTES

1. On new construction and reconstruction projects, when an entirely new base is to be built, the design engineer may specify the Base Group and any unrestricted General Use Optional Base shown in that base group. Note, however, that some thick granular bases are limited to widening which prevents their general use.
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For restrictions on the use of RAP Base - see Specifications Section 283.

GENERAL USE OPTIONAL BASE GROUPS AND STRUCTURAL NUMBERS

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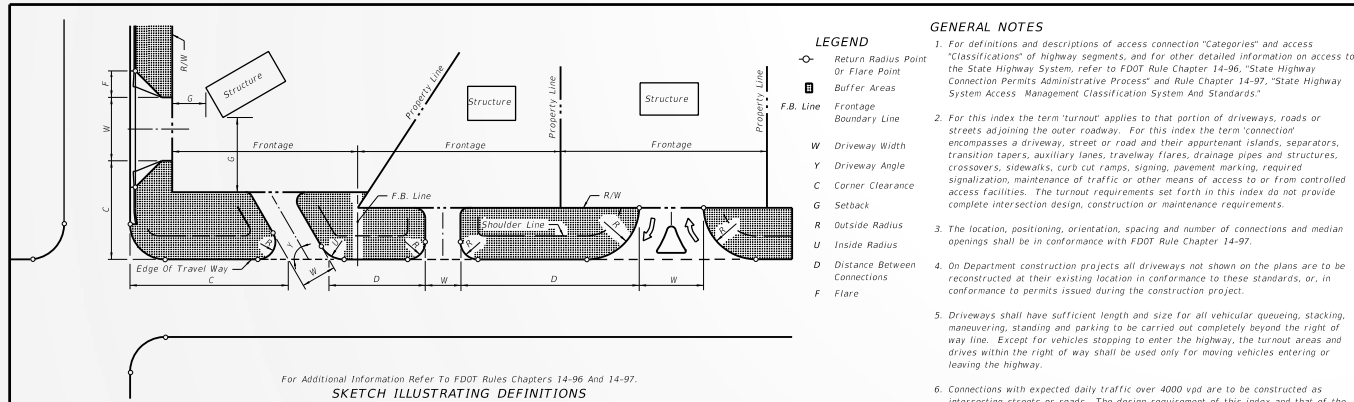
∅ To be used for widening, three feet or less.

△ Based on minimum practical thicknesses.

□ For restrictions on the use of RAP Base - see Specifications Section 283.

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For Additional Information Refer To FDOT Rules Chapters 14-96 And 14-97.
SKETCH ILLUSTRATING DEFINITIONS

GENERAL NOTES

- 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."
- 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.
- The location, positioning, orientation, spacing and number of connections and median openings shall be in conformance with FDOT Rule Chapter 14-97.
- 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.
- 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.
- 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.
- Any connection requiring or having a specified median opening with left turn storage and served directly by that opening shall have radii returns.
 - 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.
 - 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 radii returns and/or auxiliary lanes.
 - 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

- 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.

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
CONNECTION WIDTH W	12' Min. 24' Max.	24' Min. 36' Max. ◊	24' Min. 36' Max. ◊	12' Min. 24' Max.	24' Min. 36' Max. ◊	24' Min. 36' Max. ◊
FLARE (Drop Curb) F	10' Min.	10' Min.	N/A	N/A	N/A	N/A
RETURNS (Radius) R & U	N/A	Δ	25' Min. 50' Std. 75' Max.	15' Min. 25' Std. 50' Max.	25' Min. 50' Std. 75' Max.	25' Min. 50' Std. (Or 3-Centered Curves)
ANGLE OF DRIVE Y		60°-90°	60°-90°		60°-90°	60°-90°
DIVISIONAL ISLAND (Throat Median)		4'-22' Wide	4'-22' Wide		4'-22' Wide	4'-22' Wide
SETBACK G	12' Min., All Categories. See General Note No. 5.					

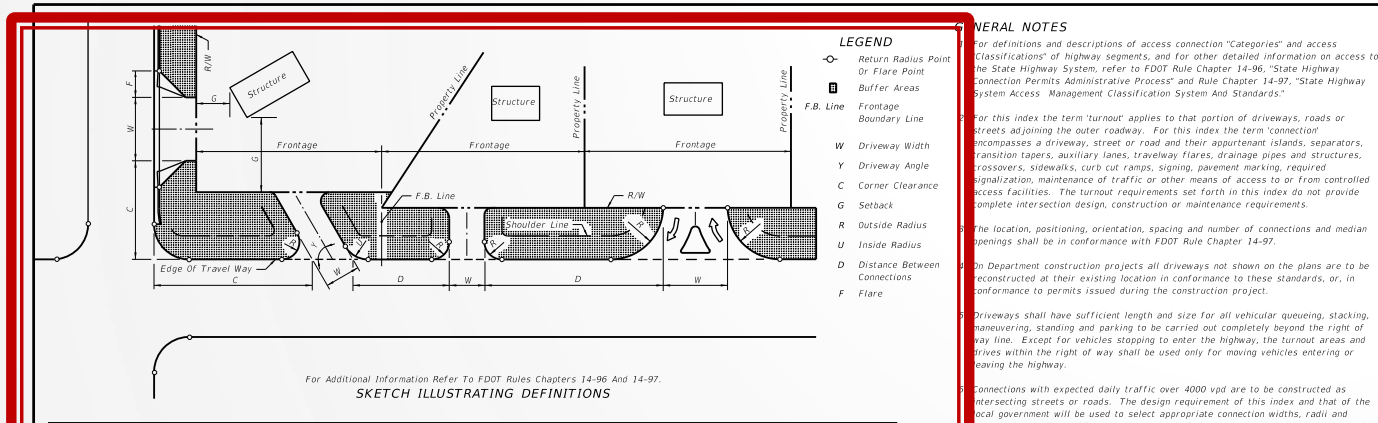
Street or road intersection design, with possible auxiliary lanes and channelization, may be necessary. Intersection design, with possible auxiliary lanes and channelization, should be considered for connections with more than 4000 trips/days.
 ◊ "2-Way" refers to one "in" movement and one "out" movement i.e., not exclusive left or right turn lanes on the connection.
 ◊ 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.
 Δ Small radii may be used in lieu of flares as approved by the Department.
 DESIGN NOTE: 1-Way connections will be designed to effectively eliminate unpermitted movements.

NOT INTENDED FOR FULL INTERSECTION DESIGN
SUMMARY OF GEOMETRIC REQUIREMENTS FOR TURNOUTS

LAST REVISION 07/01/12	DESCRIPTION:	FDOT DESIGN STANDARDS 2013	TURNOUTS	INDEX NO. 515	SHEET NO. 1
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Index 515

Sheet 1



For Additional Information Refer To FDOT Rules Chapters 14-96 And 14-97.
SKETCH ILLUSTRATING DEFINITIONS

- LEGEND**
- Return Radius Point Or Flare Point
 - Buffer Areas
 - F.B. Line Frontage Boundary Line
 - W Driveway Width
 - Y Driveway Angle
 - C Corner Clearance
 - G Setback
 - R Outside Radius
 - U Inside Radius
 - D Distance Between Connections
 - F Flare

- GENERAL NOTES**
1. For definitions and descriptions of access connection "Categories" and access "Classifications" of highway segments, and for other detailed information on access to the State Highway System, refer to FDOT Rule Chapter 14-96, "State Highway Connection Permits Administrative Process" and Rule Chapter 14-97, "State Highway System Access Management Classification System And Standards."
 2. For this index the term "turnout" applies to that portion of driveways, roads or streets adjoining the outer roadway. For this index the term "connection" encompasses a driveway, street or road and their appurtenant islands, separators, transition tapers, auxiliary lanes, travelway flares, drainage pipes and structures, crossovers, sidewalks, curb cut ramps, signing, pavement marking, required signalization, maintenance of traffic or other means of access to or from controlled access facilities. The turnout requirements set forth in this index do not provide complete intersection design, construction or maintenance requirements.
 3. The location, positioning, orientation, spacing and number of connections and median openings shall be in conformance with FDOT Rule Chapter 14-97.
 4. On Department construction projects all driveways not shown on the plans are to be reconstructed at their existing location in conformance to these standards, or, in conformance to permits issued during the construction project.
 5. Driveways shall have sufficient length and size for all vehicular queuing, stacking, maneuvering, standing and parking to be carried out completely beyond the right of way line. Except for vehicles stopping to enter the highway, the turnout areas and drives within the right of way shall be used only for moving vehicles entering or leaving the highway.
 6. Connections with expected daily traffic over 4000 vpd are to be constructed as intersecting streets or roads. The design requirement of this index and that of the local government will be used to select appropriate connection widths, radii and intersection design, subject to the approval of the Department. For connections with expected daily traffic less than 4000 vpd, the Department will determine if drop curbs or radius returns are required in accordance with existing or planned connections. Where radius returns apply, the design requirements of this index and that of the local government will be used to select appropriate connection widths, radii and intersection design, subject to the approval of the Department.
 7. 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.
 8. Any connection requiring or having a specified median opening with left turn storage and served directly by that opening shall have a median return.
 9. 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.
 10. 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.
 11. The responsibility for the cost of construction or alteration to an access connection shall be in accordance with FDOT Rule Chapter 14-96.

ELEMENT DESCRIPTION	URBAN FLARED TURNOUT			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
CONNECTION WIDTH W	12 Min. 24 Max.	24 Min. 36 Max. ◊	24 Min. 36 Max. ◊	12 Min. 24 Max.	24 Min. 36 Max. ◊	24 Min. 36 Max. ◊
FLARE (Drop Curb) F	10' Min.	10' Min.	N/A	N/A	N/A	N/A
RETURNS (Radius) R & U	N/A	Δ	25' Min. 50' Std. 75' Max.	15' Min. 25' Std. 50' Max.	25' Min. 50' Std. 75' Max.	25' Min. 50' Std. (Or 3-Centered Curves)
ANGLE OF DRIVE Y		60°-90°	60°-90°		60°-90°	60°-90°
DIVISIONAL ISLAND (Throat Median)		4'-22' Wide	4'-22' Wide		4'-22' Wide	4'-22' Wide
SETBACK G	12' Min., All Categories. See General Note No. 5.					

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.
 "2-Way" refers to one "in" movement and one "out" movement i.e., not exclusive left or right turn lanes on the connection.
 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.
 Small radii may be used in lieu of flares as approved by the Department.
DESIGN NOTE: 1-Way connections will be designed to effectively eliminate unpermitted movements.



**NOT INTENDED FOR FULL INTERSECTION DESIGN
 SUMMARY OF GEOMETRIC REQUIREMENTS FOR TURNOUTS**

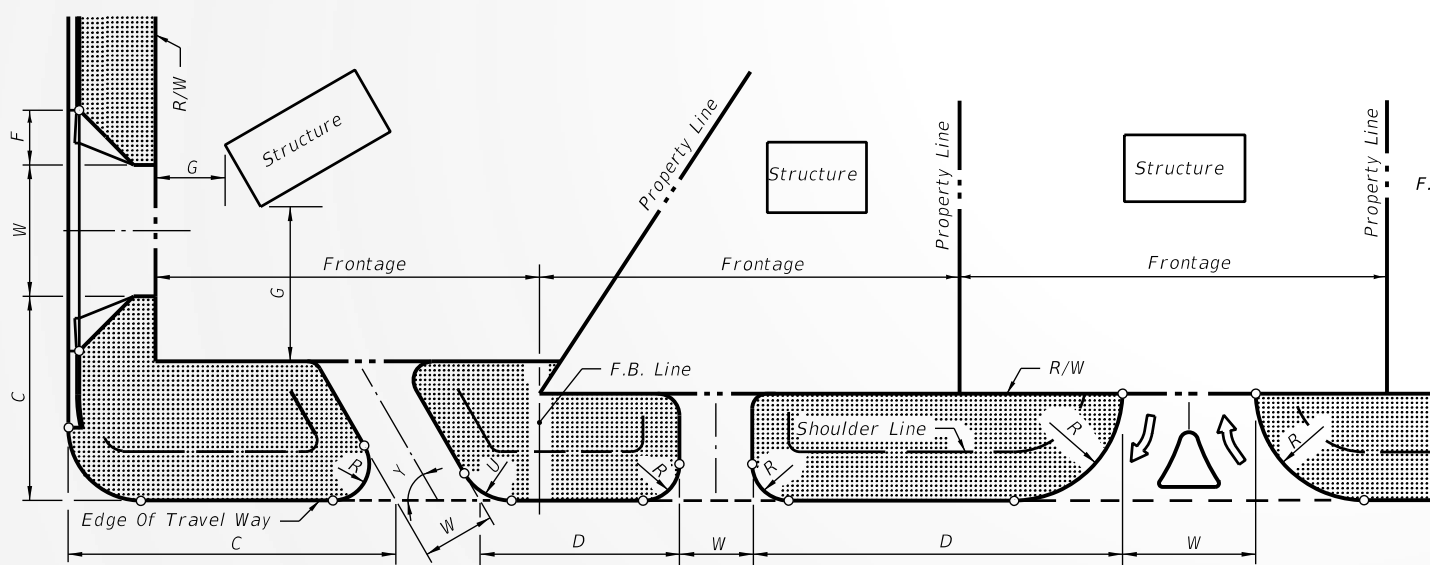
LAST REVISION 07/01/12	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TURNOUTS	INDEX NO. 515	SHEET NO. 1
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Index 515

Sheet 1

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



For Additional Information Refer To FDOT Rules Chapters 14-96 And 14-97.

SKETCH ILLUSTRATING DEFINITIONS

Index 515

Sheets 2-4 & 7

Footnotes:

- All $\frac{1}{2}$ " joints shall be constructed with preformed joint filler.
- $\frac{1}{2}$ " Open Joints placed at equal (20' max.) intervals for driveways over 20' wide. Joints in curb and gutter to match joints in driveways.
- When connecting to sidewalk curb and gutter sections, the no drop curb limits should extend back to the sidewalk radius point. With or without curb and gutter, no driveway should encroach on the corner radius.
- Driveways (6" concrete) shall be of a uniform width (W) to the right of way line.
- Alpha-numeric identification of a flared driveway type specifically called for in the plans, see sheets 3 and 4.

PLAN C
TURNOUT WITHOUT SIDEWALK

PLAN B
TURNOUT WITH SIDEWALK AND UTILITY STRIP (10' OR GREATER)

PLAN A
TURNOUT WITH SIDEWALK AND UTILITY STRIP (LESS THAN 10')

SPECIAL NOTES FOR URBAN FLARED TURNOUTS

- 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.
- For details of drop curb and public sidewalk curb ramps refer to Index Nos. 300 and 304 respectively.
- 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.
- Cost for preformed joint filler shall be included in the cost for the concrete pavement (Concrete Sidewalk, 6" Thick).
- 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".
- Department maintenance of pavement shall extend out to the right of way or 2' back of sidewalk, whichever distance is less.
- 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.
- Turnouts will be paid for under the contract unit price for Concrete Sidewalk (6" Thick), 5Y.
- All sidewalk surfaces crossing driveways with a cross slope shown in this Index to be 0.02 shall be 0.02 Maximum.

DESIGN NOTES FOR URBAN FLARED TURNOUTS

- 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 super-elevated 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 super-elevation conditions.
- 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.
- 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

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Index 515

Sheet 2

Footnotes:

- All $\frac{1}{2}$ " joints shall be constructed with preformed joint filler.
- $\frac{1}{2}$ " Open Joints placed at equal (20' max.) intervals for driveways over 20' wide. Joints in curb and gutter to match joints in driveways.
- When connecting to sidewalk curb and gutter sections, the no drop curb limits should extend back to the sidewalk radius point. With or without curb and gutter, no driveway should encroach on the corner radius.
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TURNOUT WITHOUT SIDEWALK

TURNOUT WITH SIDEWALK AND UTILITY STRIP (10' OR GREATER)

TURNOUT WITH SIDEWALK AND UTILITY STRIP (LESS THAN 10')

SPECIAL NOTES FOR URBAN FLARED TURNOUTS

- 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.
- For details of drop curb and public sidewalk curb ramps refer to Index Nos. 300 and 304 respectively.
- 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.
- Cost for preformed joint filler shall be included in the cost for the concrete pavement (Concrete Sidewalk, 6" Thick).
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- 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.
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- All sidewalk surfaces crossing driveways with a cross slope shown in this Index to be 0.02 shall be 0.02 Maximum.

DESIGN NOTES FOR URBAN FLARED TURNOUTS

- 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 super-elevated 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 super-elevation conditions.
- 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.
- When specific flare type driveways are to be constructed, the type shall be designated in the plans using the assigned alpha-numeric designation.

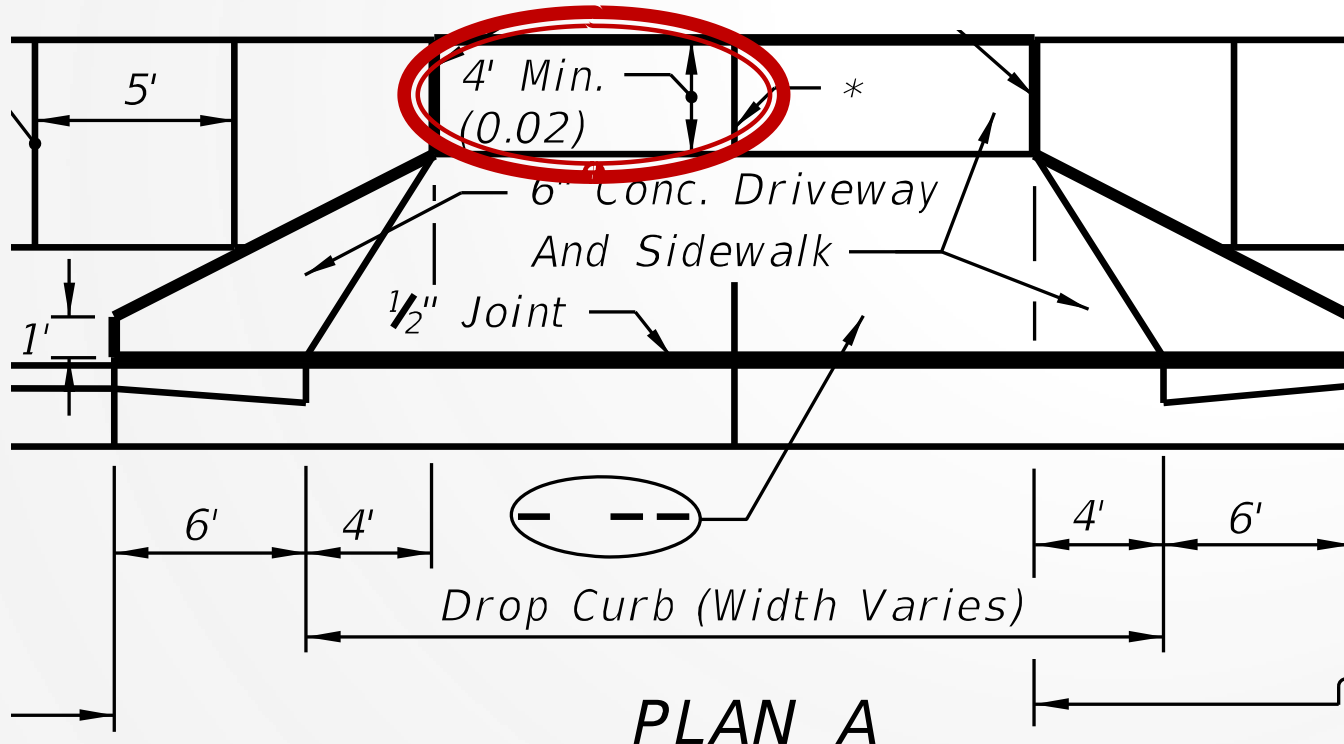
Note: See sheet 1 for 'GENERAL NOTES'

URBAN FLARED TURNOUTS

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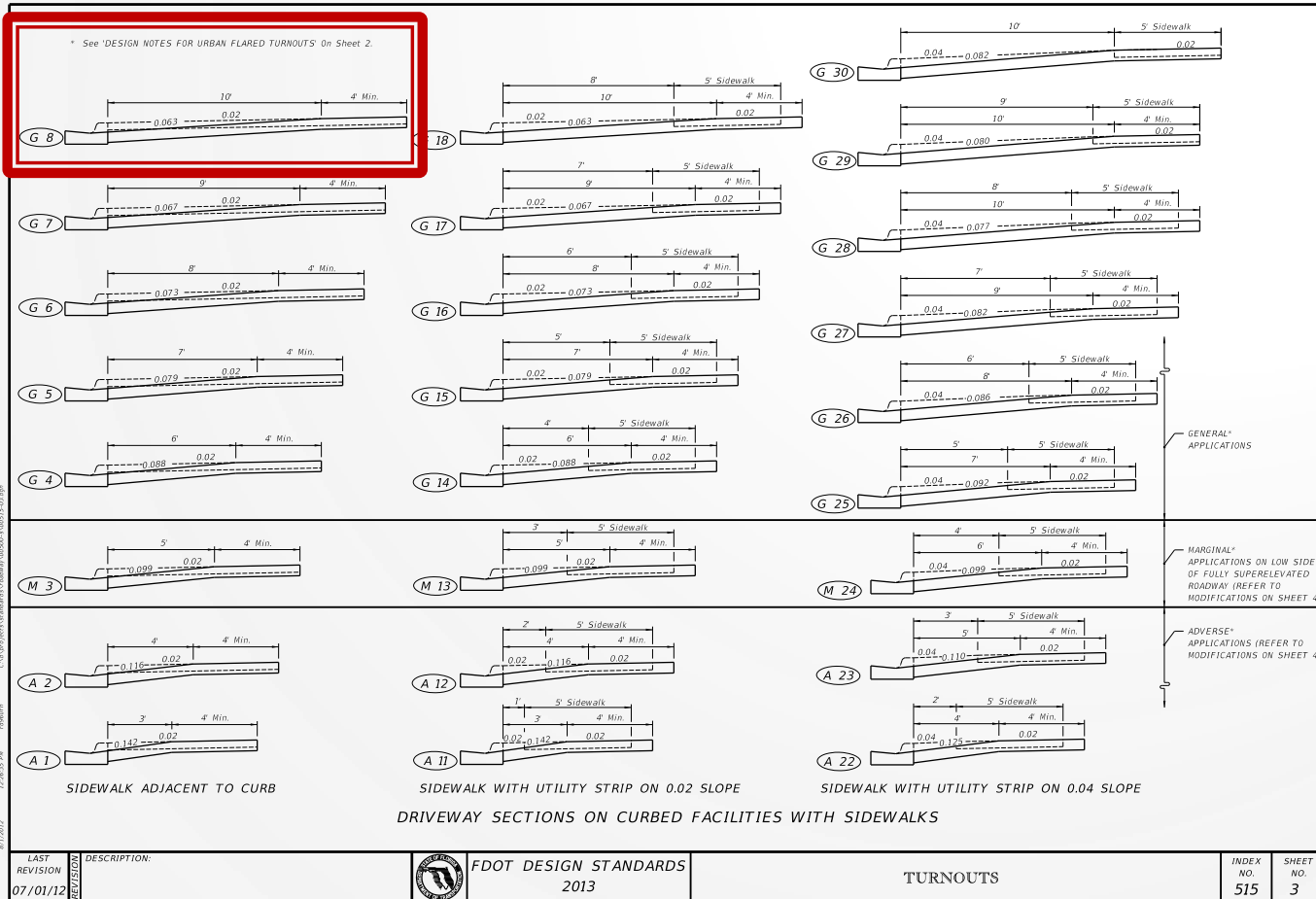
Sheet 2



**TURNOUT WITH SIDEWALK AND
UTILITY STRIP (LESS THAN 10')**

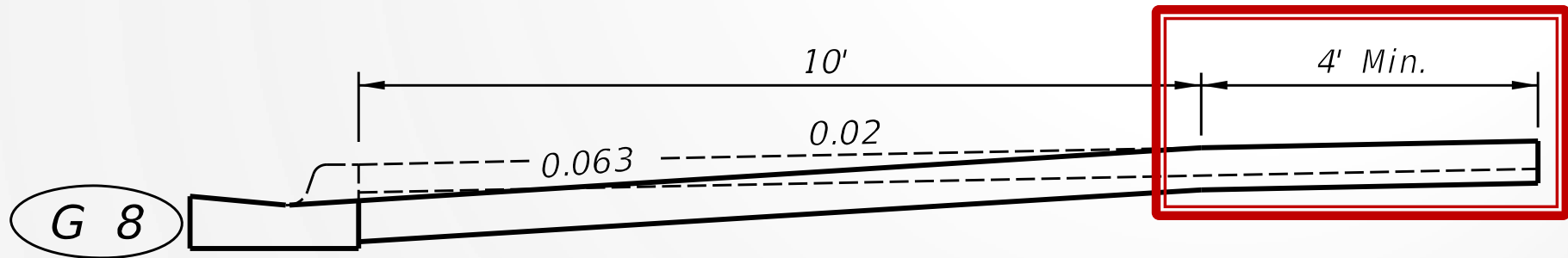
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Sheet 3



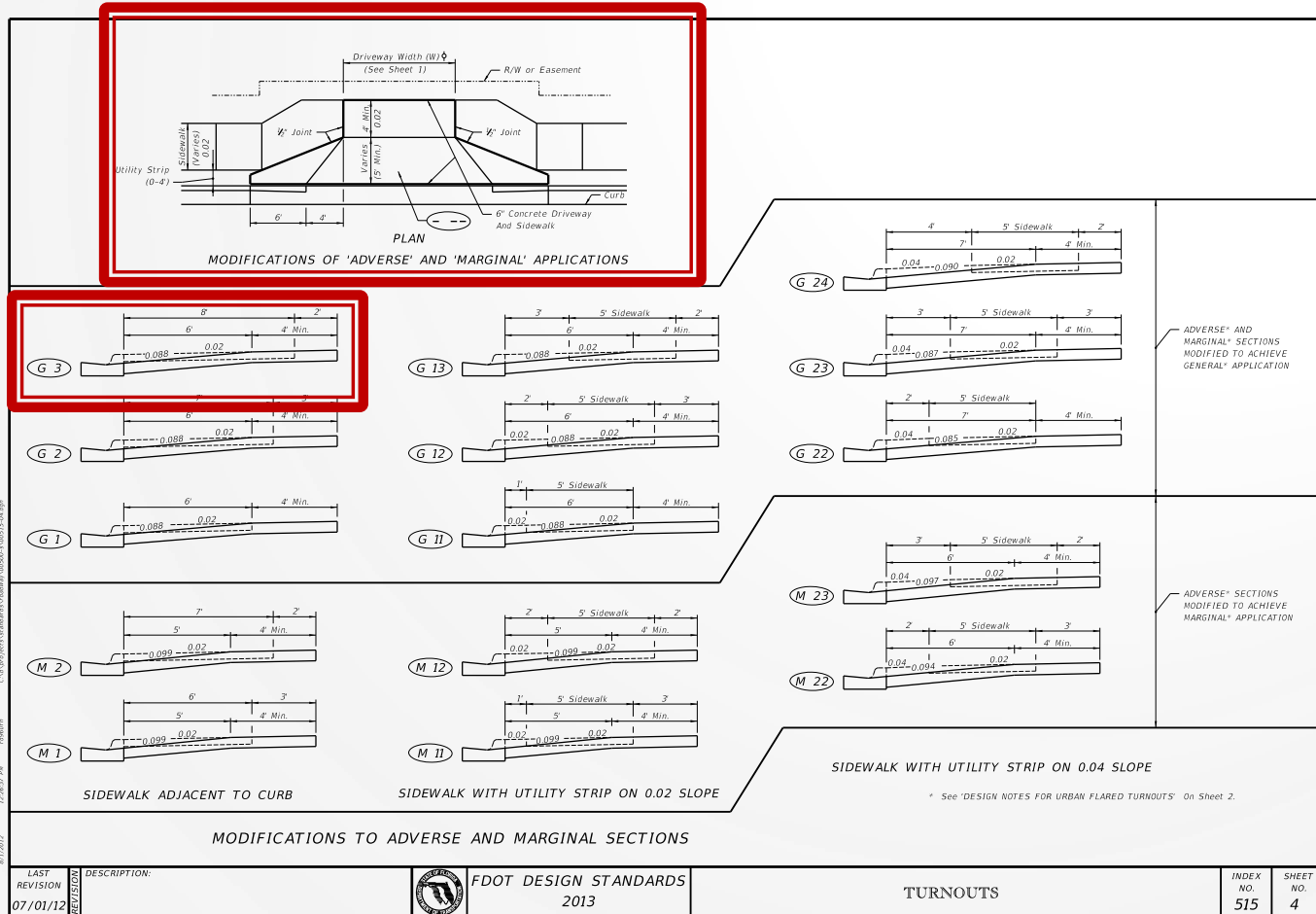
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Sheet 3



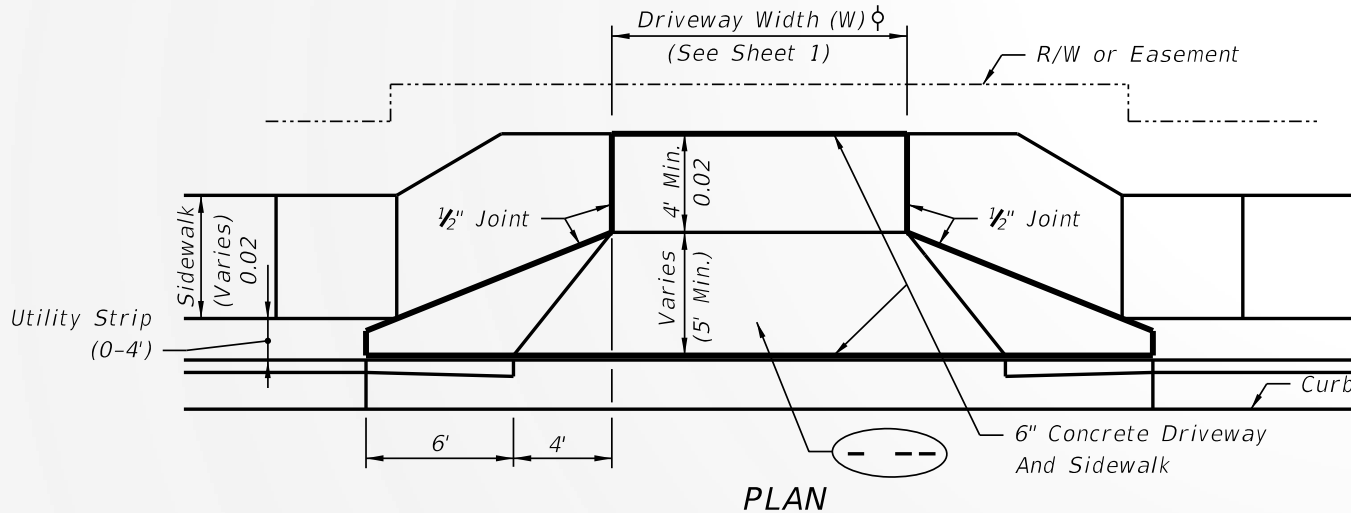
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Sheet 4

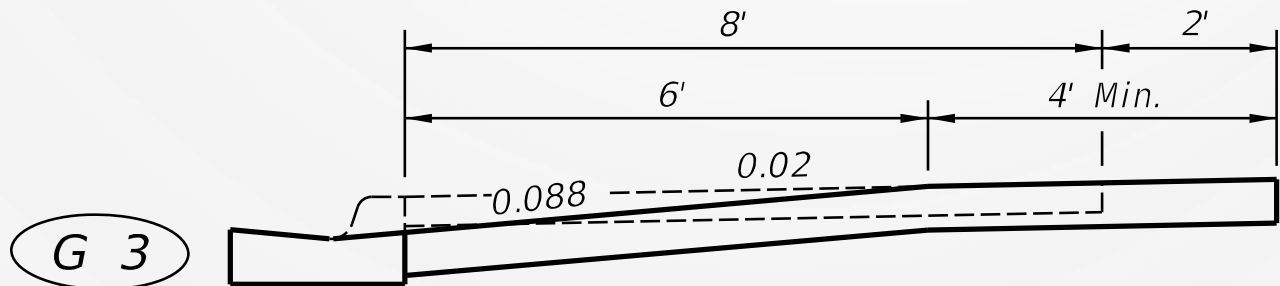


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Sheet 4

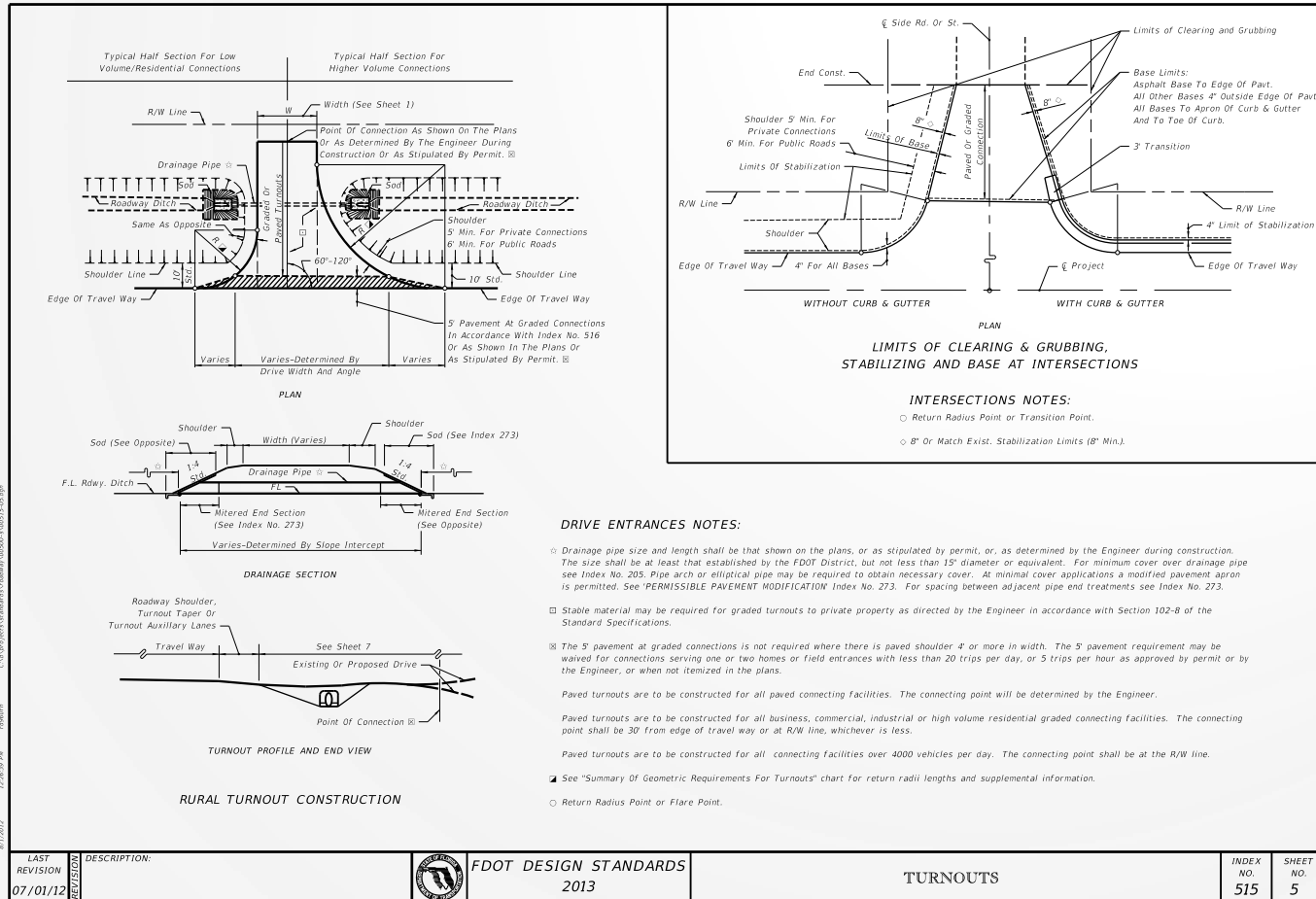


MODIFICATIONS OF 'ADVERSE' AND 'MARGINAL' APPLICATIONS



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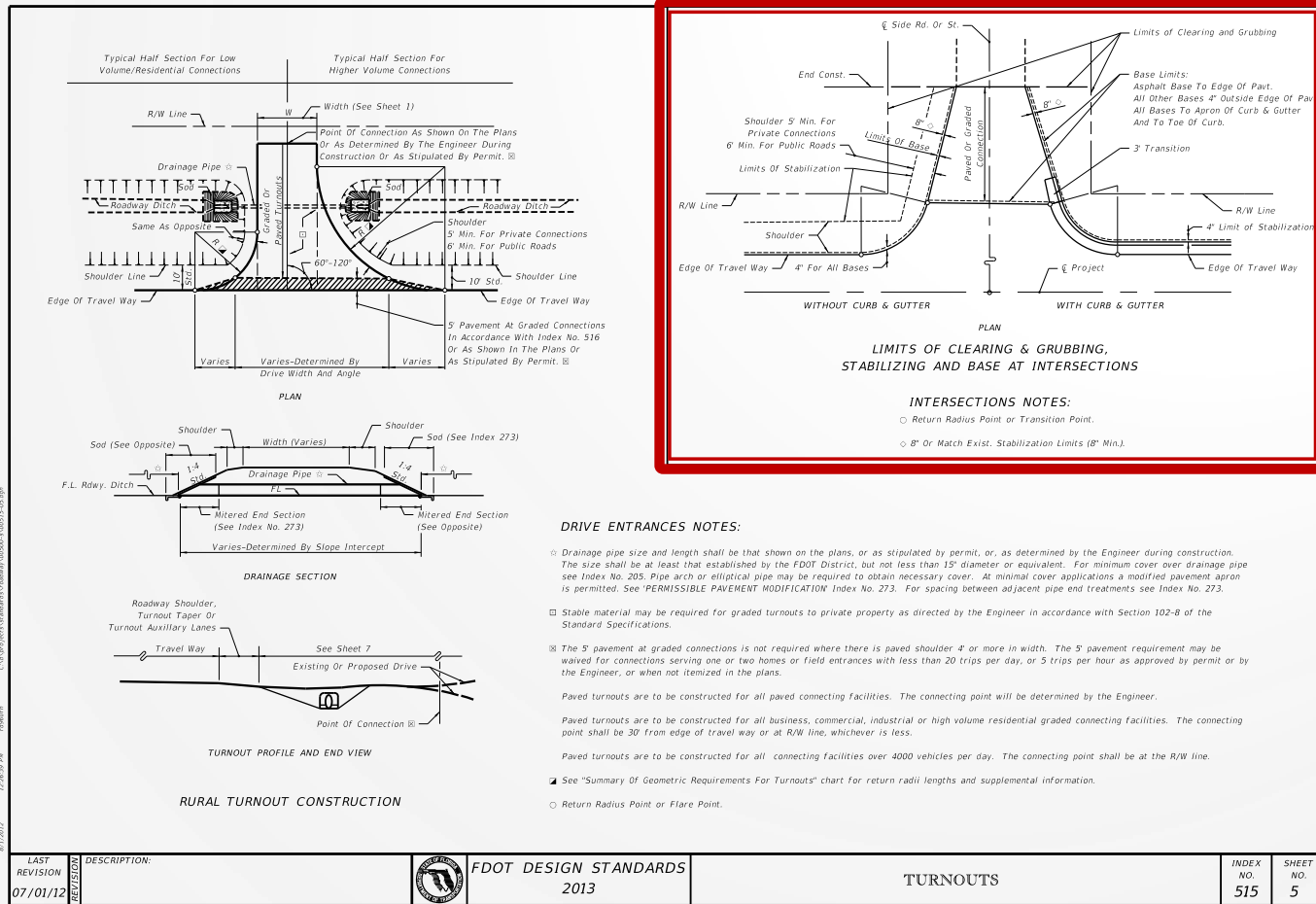
Sheet 5



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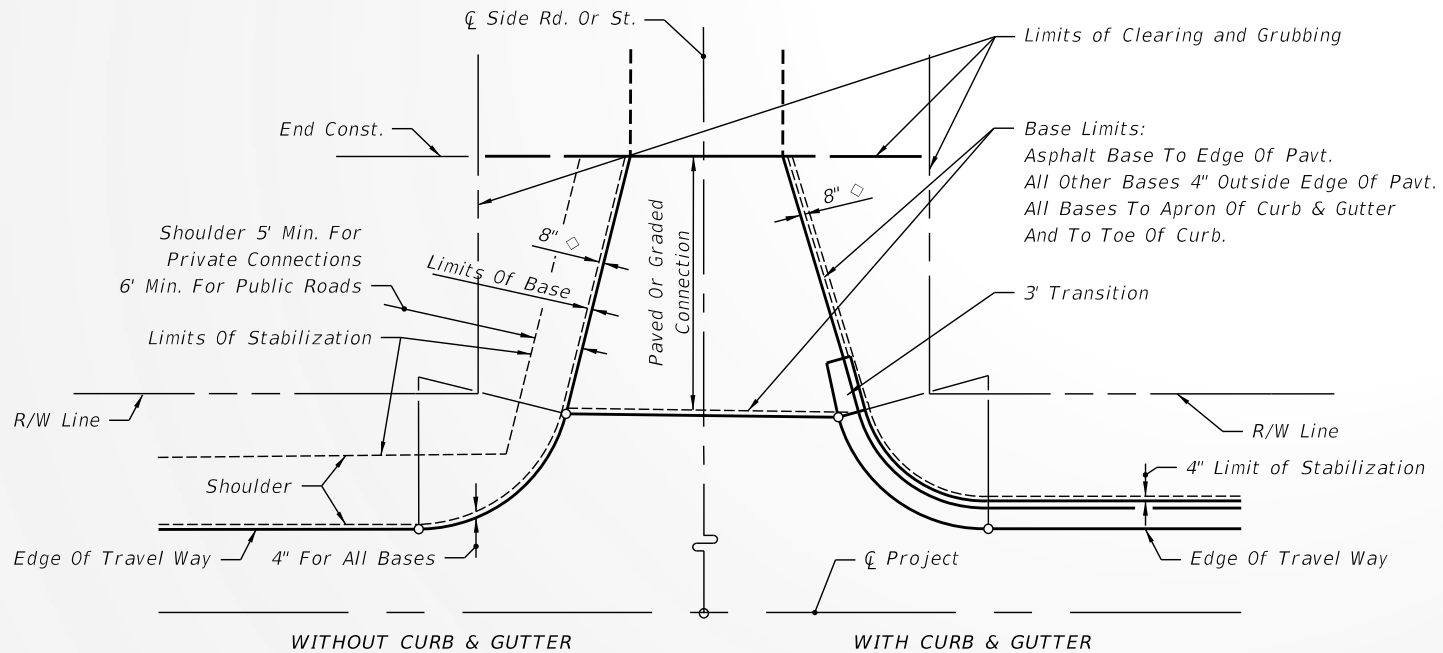
Sheet 5



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Sheet 5



PLAN

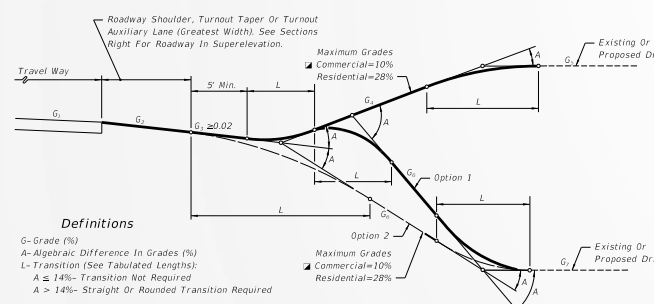
LIMITS OF CLEARING & GRUBBING, STABILIZING AND BASE AT INTERSECTIONS

INTERSECTIONS NOTES:

- Return Radius Point or Transition Point.
- ◇ 8" Or Match Exist. Stabilization Limits (8" Min.).

Index 515

Sheet 7



RURAL TURNOUT PROFILES

Utility Strip
Drop Curb
Sidewalk
Travel Way

Maximum Grades
Commercial=10%
Residential=28%

Existing Or Proposed Drive

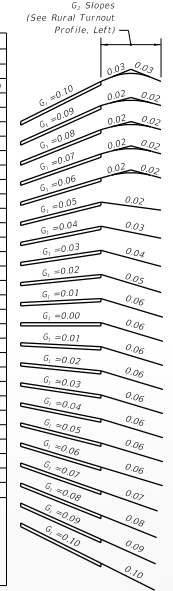
Definitions
G-Grade (%)
A-Algebraic Difference In Grades (%)
L-Transition (See Tabulated Lengths)
A ≥ 14% - Transition Not Required
A > 14% - Straight Or Rounded Transition Required

A	LENGTHS (L) (FT.)							
	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

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

STORMWATER RUNOFF AND PROFILE OPTION NOTES

- 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.
- 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.



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

TURNOUT PROFILES

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 adverse roadway operational or safety impacts. This shall be approved by the District Design Engineer and supported by documented site specific findings.

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2013

TURNOUTS

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Sheet 7

RURAL TURNOUT PROFILES

Utility Strip
Drop Curb
Travel Way
Sidewalk
4' Min.
0.02

Maximum Grades
Commercial=10%
Residential=28%

Maximum Grades
Commercial=10%
Residential=28%

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

Utility Strip
Drop Curb
Travel Way
Sidewalk
4' Min.
0.02

Maximum Grades
Commercial=10%
Residential=28%

Maximum Grades
Commercial=10%
Residential=28%

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

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 adverse roadway operational or safety impacts. This shall be approved by the District Design Engineer and supported by documented site specific findings.

A	LENGTHS (L) (FT.)							
	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 are recommended where practical for flatter and smoother profile.)
Minimum: Absolute minimum lengths

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

STORMWATER RUNOFF AND PROFILE OPTION NOTES

- 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.
- 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.

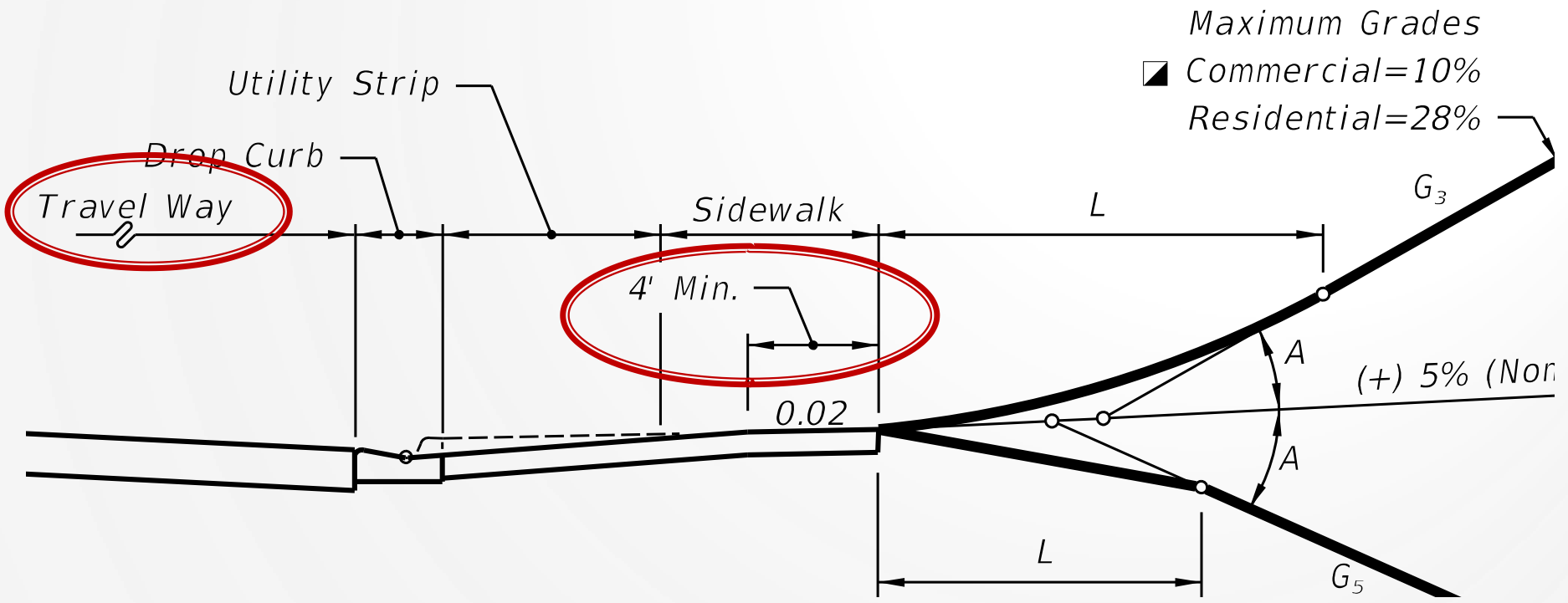
ROADWAY PAVEMENT SLOPES AND SLOPES OF ABUTTING RURAL TURNOUT SURFACES (G₂) SUPERELEVATION SECTIONS

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Sheet 7



Index 516

Sheet 1

Existing Drive

Existing Graded Connections To Be Paved In Accordance With Index No. 515. Existing Paved Connections To Be Paved With A Structural Course To The Limits Specified For "Rural Turnout Construction" Index No. 515, Unless Otherwise Called For In The Plans Or Directed By Engineer.

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

See "Summary Of Geometric Requirements For Turnouts" Index No. 515 For Return Radii Lengths.

Edge of Travel Way

15' Varies - Determined By Drive Width & Skew 21'

TYPE I TURNOUT
Typical Half-Section
For Automobile Traffic

TYPE II TURNOUT
Typical Half-Section
For Truck-Trailer Traffic

TURNOUT CONSTRUCTION

SECTION AA WITH WIDENING

5' Slope To Be Same As Shoulder Slope

TURNOUT CONSTRUCTION

SECTION AA

5' Slope To Be Same As Shoulder Slope

RESURFACING EXISTING TURNOUT

SECTION AA

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

Course	Material	Minimum Thickness
Structural	Asphaltic Concrete	1"
Base	Optional Base (See Index No. 514)	O.B.G. 1

Notes:

- 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.
- Any Department approved pavement structure equivalence may be used at the discretion of the Engineer.
- Additional structural strength may be required if heavy truck loads are anticipated.

GENERAL NOTES

- Turnouts are to be constructed or resurfaced for low volume (single family, duplex, farm, etc.) residential connections as directed by the Engineer.
- Turnout construction is not required for low volume residential connections where roadway shoulders are paved.
- Connections outside the 5' limit are to be constructed as directed by the Engineer.
- The contract unit price for Turnout Construction includes the cost for excavation and base.
- Payment for structural course is to be included in roadway resurfacing pay item.
- 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.

LAST REVISION	DESCRIPTION:
07/01/12	

	FDOT DESIGN STANDARDS
	2013

TURNOUTS RESURFACING PROJECTS	
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Index 516

Sheet 1

Existing Drive

Existing Graded Connections To Be Paved In Accordance With Index No. 515.
Existing Paved Connections To Be Paved With A Structural Course To The Limits Specified For "Rural Turnout Construction" Index No. 515, Unless Otherwise Called For In The Plans Or Directed By Engineer.

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

Edge of Travel Way

15' Varies- Determined By Drive Width & Skew 21'

TYPE I TURNOUT
Typical Half-Section
For Automobile Traffic

TYPE II TURNOUT
Typical Half-Section
For Truck-Trailer Traffic

TURNOUT CONSTRUCTION

SECTION AA WITH WIDENING

TURNOUT CONSTRUCTION

SECTION AA

RESURFACING EXISTING TURNOUT

SECTION AA

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
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Course	Material	Minimum Thickness
Structural	Asphaltic Concrete	1"
Base	Optional Base (See Index No. 514)	O.B.G. 1

Notes:

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- Additional structural strength may be required if heavy truck loads are anticipated.

GENERAL NOTES

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- Turnout construction is not required for low volume residential connections where roadway shoulders are paved.
- Connections outside the 5' limit are to be constructed as directed by the Engineer.
- The contract unit price for Turnout Construction includes the cost for excavation and base.
- Payment for structural course is to be included in roadway resurfacing pay item.
- 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.

LAST REVISION	DESCRIPTION:
07/01/12	

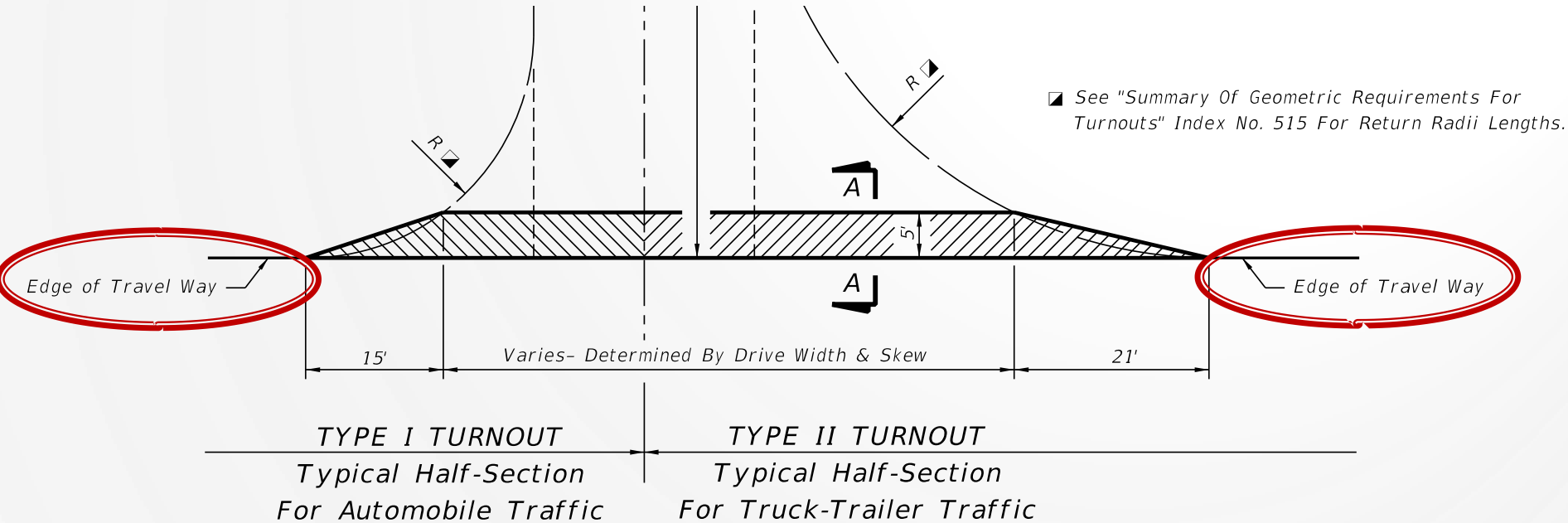
	FDOT DESIGN STANDARDS
	2013

TURNOUTS RESURFACING PROJECTS	
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Index 516

Sheet 1



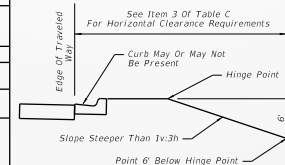
Index 700

Sheet 2

		TABLE C		
Item No.	OBJECTS, OBSTRUCTIONS OR CONDITIONS	HORIZONTAL CLEARANCE REQUIREMENTS		
		Restricted	Nonrestricted	
GENERAL	1	Above ground fixed hazards: All roadside objects, obstructions or conditions other than those listed below that exceed 4 inches in height and pose a hazard to errant vehicles and vehicle occupants.	Locate as close to the Right Of Way as practical and not less than 4 feet from face of curb.	Locate outside the clear zone as close to the Right Of Way as practical.
	2	All FDOT approved guardrails, crash cushions, permanent or temporary concrete barriers, and guardrail end terminals.	Locate as shown in the Design Standards.	Locate as shown in the Design Standards.
	3	Drop-off hazards: Any point along a roadside slope steeper than 1v:3h that is deeper than 6 feet below the hinge point. See Figure 2.	Locate the point that is 6 feet below the hinge point no less than 22 feet from the traveled way.	Treat as roadside slopes in accordance with Design Standard 400.
	4	Mailboxes not shown in Design Standard 532.	Not to be used.	Not to be used.
	5	Mailboxes shown in Design Standard 532.	Locate in accordance with Design Standard 532.	Locate in accordance with Design Standard 532.
ROADWAY	6	Trees expected to become greater than 4 inches in diameter measured 6 inches above the ground.	Outside roadways: Locate no less than 4 feet from face of curb in accordance with Design Standard 546. Inside medians: Locate no less than 6 feet from the edge of traffic lane and in accordance with Design Standard 546.	Locate outside the clear zone as close to the Right Of Way as practical and in accordance with Design Standard 546.
	7	Trees not expected to become greater than 4 inches in diameter measured 6 inches above the ground.	Locate in accordance with Design Standard 546.	Locate in accordance with Design Standard 546.
	8	Canals behind guardrail.	Locate no less than 5 feet from the back of the guardrail post.	Locate no less than 5 feet from the back of the guardrail post.
	9	Canals without guardrail.	Locate as close to the Right Of Way as practical and not less than 40 feet from the traveled way.	Design speeds of 50 mph and greater: Locate as close to the Right Of Way as practical and not less than 60 feet from the traveled way. Design speeds less than 50 mph: Locate as close to the Right Of Way as practical and not less than 50 feet from the traveled way.
	10	Culvert wing wall, endwall, retaining walls and flared end sections less than 6 feet deep.	Locate no less than 4 feet from face of curb.	Locate outside the clear zone.
	11	Culvert wing wall, endwall, retaining walls and flared end sections 6 feet and greater in depth.	Treat as drop-off hazard; See Item No. 3.	Treat as drop-off hazard; See Item No. 3.
	12	Mitered end sections.	Locate as shown in Design Standards 272 and 273.	Locate as shown in Design Standards.
	13	Frangible sign supports.	Locate no less than 4 feet from face of curb and in accordance with Design Standard 17302.	Locate in accordance with Design Standard 17302.
	TRAFFIC CONTROL DEVICES	14	Overhead sign supports and other nonfrangible signs.	Locate no less than 4 feet from face of curb.
15		Signal controller cabinets, signal poles, strain poles and mast arms.	Locate no less than 4 feet from face of curb and not in medians.	Locate outside the clear zone and not in medians.
16		Conventional lighting (frangible and nonfrangible).	Locate no less than 4 feet from face of curb and not in medians.	Locate 20 feet from travel lanes or 14 feet from auxiliary lanes. Not in medians. May be clear zone width when the clear zone is less than 20 feet.
LIGHTING	17	Highmast lighting.	Not applicable.	Locate outside the clear zone.
	18	Bridge piers and abutments: Above ground vertical structures.	Locate no less than 16 feet from edge of travel lane.	Locate outside the clear zone.
STRUCT.	19	Fire hydrants with bases no higher than 4 inches above the ground.	Locate no less than 2 feet from face of curb.	Locate as close to the Right Of Way as practical.
UTILITIES	20	Utility installations: All above ground fixed objects.	Locate as close to the Right Of Way as practical and not less than 4 feet from face of curb and not in medians.	Locate outside the clear zone as close to the Right Of Way as practical and not within limited access facilities. May be placed 4 feet behind the back of shields that have been justified for other reasons.
	RAILROADS	21	Railroad crossing traffic control devices.	Locate in accordance with Design Standard 17882.

GENERAL NOTES

- When shielding an object and sidewalks are present, an unobstructed sidewalk width of at least 4 feet must be provided.
- When site specific conditions prohibit meeting the horizontal clearance requirements in TABLE C, the object, obstruction or condition must be mitigated, possibly by shielding. Otherwise, the Plans Preparation Manual, Volume 1, Chapters 2, 4, 21 and 25, or the Utility Accommodation Manual must be researched to determine viable alternatives. The minimum requirements in these manuals can only be reduced when a Design Variation or Design Exception has been approved in accordance with Chapter 23 of the Plans Preparation Manual, Volume 1 or a Utility Exception has been approved in accordance with the Utility Accommodation Manual.



DROP-OFF HAZARDS
FIGURE 2

LAST REVISION	DESCRIPTION:	 FDOT DESIGN STANDARDS 2013	ROADSIDE OFFSETS	INDEX NO.	SHEET NO.
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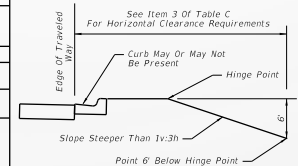
Index 700

Sheet 2

		TABLE C		
Item No.	OBJECTS, OBSTRUCTIONS OR CONDITIONS	HORIZONTAL CLEARANCE REQUIREMENTS		
		Restricted	Nonrestricted	
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	2	All FDOT approved guardrails, crash cushions, permanent or temporary concrete barriers, and guardrail end terminals.	Locate as shown in the Design Standards.	Locate as shown in the Design Standards.
	3	Drop-off hazards: Any point along a roadside slope steeper than 1v:3h that is deeper than 6 feet below the hinge point. See Figure 2.	Locate the point that is 6 feet below the hinge point no less than 22 feet from the traveled way.	Treat as roadside slopes in accordance with Design Standard 400.
	4	Mailboxes not shown in Design Standard 532.	Not to be used.	Not to be used.
	5	Mailboxes shown in Design Standard 532.	Locate in accordance with Design Standard 532.	Locate in accordance with Design Standard 532.
ROADWAY	6	Trees expected to become greater than 4 inches in diameter measured 6 inches above the ground.	Outside roadways: Locate no less than 4 feet from face of curb in accordance with Design Standard 546. Inside medians: Locate no less than 6 feet from the edge of traffic lane and in accordance with Design Standard 546.	Locate outside the clear zone as close to the Right Of Way as practical and in accordance with Design Standard 546.
	7	Trees not expected to become greater than 4 inches in diameter measured 6 inches above the ground.	Locate in accordance with Design Standard 546.	Locate in accordance with Design Standard 546.
	8	Canals behind guardrail.	Locate no less than 5 feet from the back of the guardrail post.	Locate no less than 5 feet from the back of the guardrail post.
	9	Canals without guardrail.	Locate as close to the Right Of Way as practical and not less than 40 feet from the traveled way.	Design speeds of 50 mph and greater: Locate as close to the Right Of Way as practical and not less than 60 feet from the traveled way. Design speeds less than 50 mph: Locate as close to the Right Of Way as practical and not less than 50 feet from the traveled way.
	10	Culvert wing wall, endwall, retaining walls and flared end sections less than 6 feet deep.	Locate no less than 4 feet from face of curb.	Locate outside the clear zone.
	11	Culvert wing wall, endwall, retaining walls and flared end sections 6 feet and greater in depth.	Treat as drop-off hazard; See Item No. 3.	Treat as drop-off hazard; See Item No. 3.
	12	Mitered end sections.	Locate as shown in Design Standards 272 and 273.	Locate as shown in Design Standards.
	13	Frangible sign supports.	Locate no less than 4 feet from face of curb and in accordance with Design Standard 17302.	Locate in accordance with Design Standard 17302.
	14	Overhead sign supports and other nonfrangible signs.	Locate no less than 4 feet from face of curb.	Locate outside the clear zone.
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UTILITIES	19	Fire hydrants with bases no higher than 4 inches above the ground.	Locate no less than 2 feet from face of curb.	Locate as close to the Right Of Way as practical.
	20	Utility installations: All above ground fixed objects.	Locate as close to the Right Of Way as practical and not less than 4 feet from face of curb and not in medians.	Locate outside the clear zone as close to the Right Of Way as practical and not in medians, and not within limited access facilities. May be placed 4 feet behind the back of shields that have been justified for other reasons.
RAILROADS	21	Railroad crossing traffic control devices.	Locate in accordance with Design Standard 17882.	Locate in accordance with Design Standard 17882.

GENERAL NOTES

- When shielding an object and sidewalks are present, an unobstructed sidewalk width of at least 4 feet must be provided.
- When site specific conditions prohibit meeting the horizontal clearance requirements in TABLE C, the object, obstruction or condition must be mitigated, possibly by shielding. Otherwise, the Plans Preparation Manual, Volume 1, Chapters 2, 4, 21 and 25, or the Utility Accommodation Manual must be researched to determine viable alternatives. The minimum requirements in these manuals can only be reduced when a Design Variation or Design Exception has been approved in accordance with Chapter 23 of the Plans Preparation Manual, Volume 1 or a Utility Exception has been approved in accordance with the Utility Accommodation Manual.



DROP-OFF HAZARDS
FIGURE 2

LAST REVISION 07/01/12	DESCRIPTION: REVISION		FDOT DESIGN STANDARDS 2013	ROADSIDE OFFSETS	INDEX NO. 700	SHEET NO. 2
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Sheet 2

GENERAL NOTES

1. *When shielding an object and sidewalks are present, an unobstructed sidewalk width of at least 4 feet must be provided.*
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Index 18204

Sheet 1

- ▶ Index deleted
 - Replaced by Index 17700—

Pull, Splice and Junction Box

Design Standards Team

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