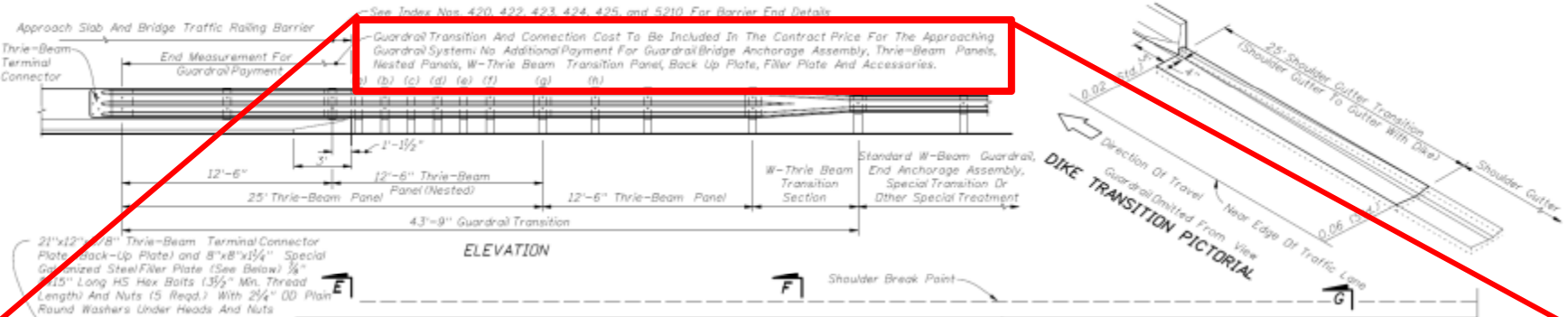


# **LESS Session**

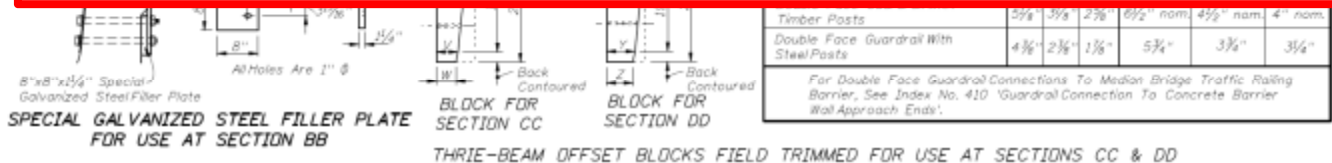
## **Guardrail and Cable Issues**

### **FTBA Construction Conference 2010**

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605 Suwannee Street  
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**Guardrail Transition And Connection Cost To Be Included In The Contract Price For The Approaching Guardrail System; No Additional Payment For Guardrail Bridge Anchorage Assembly, Thrie-Beam Panels, Nested Panels, W-Thrie Beam Transition Panel, Back Up Plate, Filler Plate And Accessories.**

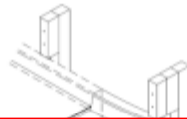


When double face guardrail installations adjacent to shoulder gutter/dike transitions, single offset blocks shall be installed in absence of shoulder gutter. Nested rails shall not be bolted to the blocks and posts at posts (a), (c), and (e). One 16d galvanized nail shall be driven between each post and block, and between double blocks, in order to prevent block rotation, see '16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION', this Index.

**INDEX 400 Detail J**  
 APPROACH TRANSITION AND CONNECTION FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIERS EXTENDING FULL LENGTH OF APPROACH SLAB  
 DETAIL J

Sheet 13 of 26  
 (New Bridge Rails)

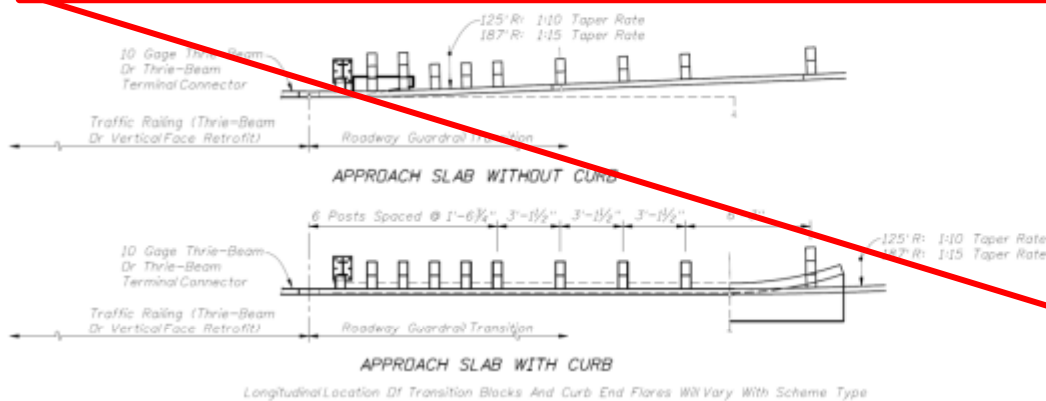
	2010 FDOT Design Standards	Last Revision 07/01/07	Sheet No. 13 of 26
	GUARDRAIL	Index No. 400	



**GENERAL NOTES**

1. This index provides thrie-beam transition and connection details for approach end guardrail on existing bridges, and anchorage details for trailing end traffic railing retrofits and safety shapes on existing bridges. Sheets 1 through 23 apply to bridges with retrofitted traffic railings. (Sheet 23 shows the trailing end guardrail connections). Sheet 24 applies to bridges with safety shaped traffic railing.

**6. Payment for connections to traffic railing vertical face retrofits are to be made under the contract unit price for Bridge Anchorage Assembly, EA, and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate and bolts, nuts and washers.**



ASTM A194. Anchor studs and nuts shall be hot-dip zinc coated in accordance with the Specifications. After the nuts have been snug tightened, the anchor stud threads shall be single punch distorted immediately above the top nuts to prevent loosening of the nuts. Distorted threads shall be coated with a galvanizing compound in accordance with the Specifications.

Adhesive bonding materials systems for anchors shall comply with Specification Section 937 and be installed in accordance with Specification Section 416.4. Nested beam extensions and points for terminal connector attachments will vary for traffic railing barrier vertical face retrofits. The plan views for the vertical face retrofit barriers show the primary configurations for each particular scheme. The associated pictorial views show the variations.

5. For installing thrie-beam terminal connector to traffic railing vertical face retrofits, see notations on Sheets 12 through 15 and the flag notation on Sheet 23.

6. Payment for connections to traffic railing vertical face retrofits are to be made under the contract unit price for Bridge Anchorage Assembly, EA, and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate and bolts, nuts and washers.

**DESIGN NOTES FOR GUARDRAIL TRANSITIONS CONNECTING TO TRAFFIC RAILING RETROFITS ON EXISTING BRIDGES**

1. For selection of an appropriate transition scheme, see the Structures Manual for instructions to the Structures and Roadway engineers.

Longitudinal Location Of Transition Blocks And Curb End Flores Will Vary With Scheme Type

**PLAN VIEWS**

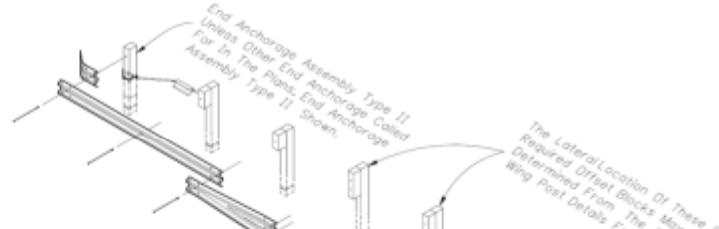
**ALIGNMENTS FOR BRIDGE THRIE-BEAM AND VERTICAL FACE TRAFFIC RAILING RETROFIT**

**INDEX 402**  
Sheet 1 of 24  
**(Vertical Face Retrofit)**

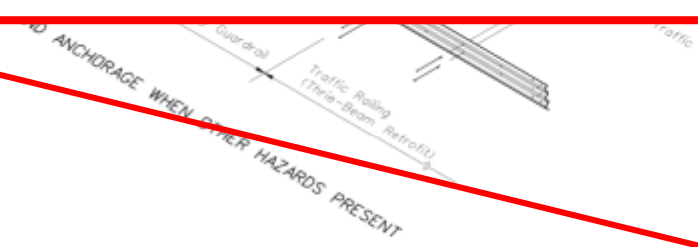


2010 FDOT Design Standards	
GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	

Last Revision	Sheet No.
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402	



**3. Payment For connecting Trailing End Special End Shoes and Thrie-Beam Terminal Connectors To Traffic Railing Vertical Face Retrofits Will Be Made Under The Contract Unit Price For Bridge Anchorage Assembly, EA.**



**VERTICAL FACE RETROFITS**

- Where Guardrail Extensions Are Required Beyond The Trailing End Of Bridges With Traffic Railing Vertical Face Retrofits, Guardrail Connections To The Bridge Railing Will Be By SPECIAL END SHOE For W-Beam Guardrail Extensions And By THRIE-BEAM TERMINAL CONNECTOR For Thrie-Beam Guardrail Extensions.
- Install W-Beam Special End Shoes and Thrie-Beam Terminal Connectors With Back-Up Plates, And  $\frac{3}{8}$ "  $\emptyset$  HS Hex Bolts And Nuts (12" Long) With 2 1/4"  $\emptyset$  Plain Round Washers Under Heads And Nuts (4 Required For Special End Shoes And 5 Required For Thrie-Beam Terminal Connectors). Back-Up Plates For Special End Shoes Are 12"x12"x $\frac{3}{8}$ " And For Terminal Connector 21"x12"x $\frac{3}{8}$ ".
- Payment For Connecting Trailing End Special End Shoes And Thrie-Beam Terminal Connectors To Traffic Railing Vertical Face Retrofits Will Be Made Under The Contract Unit Price For Guardrail Bridge Anchorage Assembly, EA.

**THRIE-BEAM RETROFIT NOTES**

- See indexes for bridge thrie-beam traffic railing retrofits.
- Trailing end guardrail to be paid for under the contract unit price for the parent roadway guardrail; end measure includes length of end anchorage assembly; additional payment made for end anchorage assembly. No additional payment for connecting roadway thrie-beam to bridge thrie-beam retrofit.

**INDEX 402**  
Sheet 23 of 24  
**(Retrofits – Trailing End)**

**GUARDRAIL AND ANCHORAGE FOR BRIDGE TRAFFIC RAILING (THRIE BEAM RETROFITS)**

	2010 FDOT Design Standards		Last Revision 07/01/07	Sheet No. 23 of 24
	<b>GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES</b>			Index No. <b>402</b>



**2. Trailing end guardrail to be paid for under the contract unit price for the parent roadway guardrail: end measure includes length of end anchorage assembly: additional payment made for end anchorage assembly. No additional payment for connecting roadway thrie-beam to bridge thrie-beam retrofit.**



**THRIE-BEAM RETROFIT NOTES**

1. See indexes for bridge thrie-beam traffic railing retrofits.
2. Trailing end guardrail to be paid for under the contract unit price for the parent roadway guardrail: end measure includes length of end anchorage assembly: additional payment made for end anchorage assembly. No additional payment for connecting roadway thrie-beam to bridge thrie-beam retrofit.

1. Where Guardrail Extensions Are Required Beyond The Trailing End Of Bridge With Traffic Railing Vertical Face Retrofits, Guardrail Connections To The Bridge Railing Will Be By SPECIAL END SHOE For W-Beam Guardrail Extensions And By THRIE-BEAM TERMINAL CONNECTOR For Thrie-Beam Guardrail Extensions.

2. Install W-Beam Special End Shoes and Thrie-Beam Terminal Connectors With Back-Up Plates, And 3/8" Ø MS Nuts And Nuts (12" Long) With 2 3/4" Ø Plain Round Washers Under Head And Nuts (4 Required For Special End Shoes And 5 Required For Thrie-Beam Terminal Connectors). Back-Up Plates For Special End Shoes Are 12"x12"x3/8" And For Terminal Connector 21"x12"x3/8".

Payment For Connecting Trailing End Special End Shoes And Thrie-Beam Terminal Connectors To Traffic Railing Vertical Face Retrofits Will Be Made Under The Contract Unit Price For Guardrail Bridge Anchorage Assembly, EA.

**INDEX 402**  
Sheet 23 of 24  
**(Retrofits – Trailing End)**

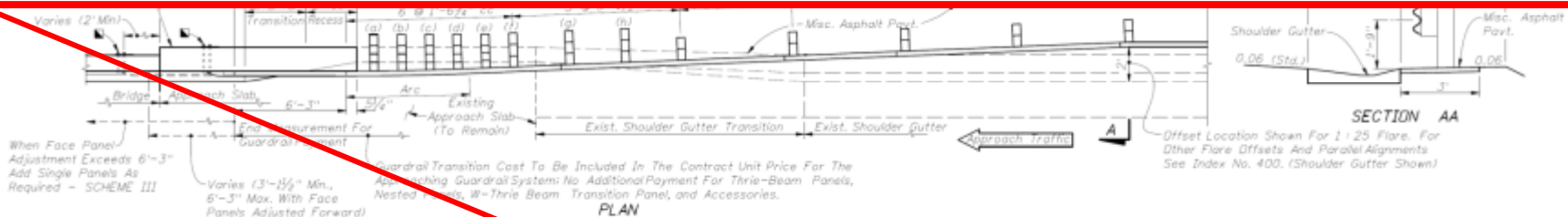
**GUARDRAIL AND ANCHORAGE FOR BRIDGE TRAFFIC RAILING (THRIE BEAM RETROFITS)**



2010 FDOT Design Standards  
**GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES**

Last Revision	Sheet No.
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**2. When retrofitting thrie-beam guardrail to existing wing posts or existing bridge safety shape traffic railing, attachment construction to be paid for under the contract unit price for Guardrail Bridge Anchorage Assembly, EA, and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate(s) and bolts, nuts and washers.**



When Face Panel Adjustment Exceeds 6"-3" Add Single Panels As Required - SCHEME III

Varies (3'-1 1/2" Min., 6'-3" Max. With Face Panels Adjusted Forward) SCHEME III

Guardrail Transition Cost To Be Included In The Contract Unit Price For The Approaching Guardrail System; No Additional Payment For Thrie-Beam Panels, Nested Panels, W-Thrie Beam Transition Panel, and Accessories.

PLAN

2 1/2" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 3/8" x 1 1/2" Long [15" Long With 3/8" Min. Thread Length For Bridge Safety Shape Rolling] HS Hex Bolts And Nuts (5 Required With 2 1/2" OD Plain Round Washers Under Heads And Nuts. (When Attaching Guardrail To Existing Wing Posts Or Bridge Rails, Care Should Be Exercised To Avoid Damaging Conduits And Their Utilities That May Be Routed Through Wing Posts Or Bridge Rails. When Conduits And Their Utilities Are Encountered, At Least Five 3/8" HS Bolts Shall Be Installed In Any Of The Seven Holes Provided In The Thrie-Beam Terminal Connector.)

**NOTES FOR GUARDRAIL TRANSITIONS TO SAFETY SHAPE TRAFFIC RAILINGS ON EXISTING BRIDGES**

- When the existing wing post is to be replaced with a bridge traffic railing in accordance with the Structures Manual, the existing wing post shall be replaced with a bridge traffic railing in accordance with the Structures Manual.
- When retrofitting thrie-beam guardrails to existing wing posts or existing bridge safety shape traffic railing, attachment construction to be paid for under the contract unit price for Guardrail Bridge Anchorage Assembly, EA, and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate(s) and bolts, nuts and washers.

**INDEX 402**  
Sheet 24 of 24  
**(Connections for Exist. Bridges)**

CONNECTIONS FOR EXISTING FLAT SLAB, PRESTRESSED BEAM AND GIRDER BRIDGES  
TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

	2010 FDOT Design Standards		Last Revision 07/01/07	Sheet No. 24 of 24
	<b>GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES</b>			
	Index No. <b>402</b>			

# W-Beam Guardrail - Standard Height



2/24/2010

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# W-Beam Guardrail – Height 3” Low



2/24/2010

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2010

8

**Possible Edit under Consideration:**

**“For guardrail placed on slopes beyond the shoulder point, there shall be no deviation more than 1” below to 3” above the desired height within any 25 foot section of guardrail.”**

5. Guardrail mounting height for the W-beam without rubrail and for three-beam is 1'-9" to the center of beam, and for W-beam with rubrail 2'-0" to center of beam. Modified three-beam shall be mounted at a height of 2'-0" to center of beam. The height is critical and shall be attained in all cases: a tolerance of 3" above and 1" below the standard mounting heights is permissible over necessary surface irregularities (e.g., across shoulder gutters, inlets and roadway surface break lines).

**4. Guardrail mounting height for the W-beam without rubrail and for three-beam is 1'-9" to the center of the beam, and for W-beam with rubrail 2'-0" to center of beam. Modified three-beam shall be mounted at a height of 2'-0" to center of beam. The height is critical and shall be attained in all cases: a tolerance of 3" above and 1" below the standard mounting heights is permissible over necessary surface irregularities (e.g., across shoulder gutters, inlets and roadway surface break lines).**

For guardrail to concrete barrier wall connections see Index No. 410. For existing bridges receiving retrofit traffic railing barriers see Index No. 402.

**INDEX 400**  
Sheet 1 of 26  
**(Guardrail General Notes)**

be used on the State Highway System where traffic railing barriers, to concrete and a continuous barrier when called for this Index, and Index Nos. 402, 410 and 414. semi-rigid system) may be considered anticipated or exist.

	2010 FDOT Design Standards		Last Revision	Sheet No.
	GUARDRAIL		07/01/09	1 of 26
			Index No.	400

SUMMARY OF GUARDRAIL

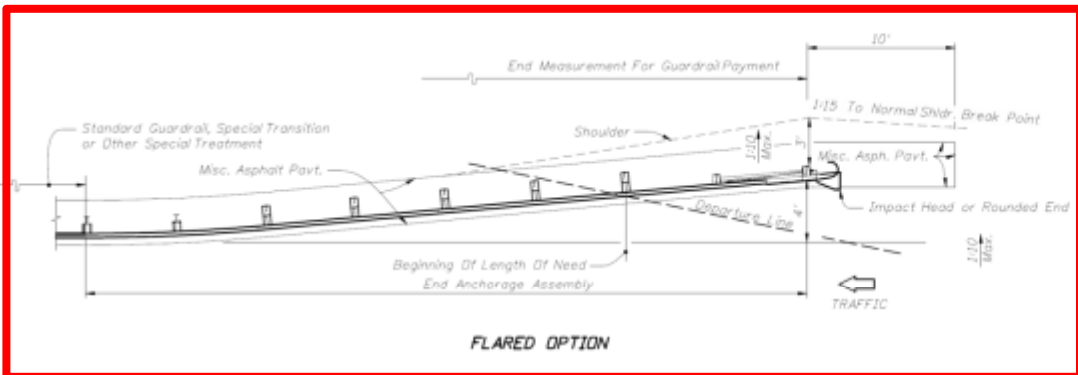
LOCATION		GUARDRAIL (LF)								END ANCHORAGE ASSEMBLIES (EA)								REMARKS	FIELD BOOK REFERENCE		
STATION	SIDE	ROADWAY						PEDESTRIAN SAFETY TREATMENT		RUB RAIL		FLARED		PARALLEL		TYPE II				TYPE CRT	
		ROADWAY		DOUBLE FACE		MOD. THRIE BEAM DOUBLE FACE		P	F	P	F	P	F	P	F	P	F			P	F
		P	F	P	F	P	F														
FROM 600+50	Rt.	87.5						FROM		FROM 600+70											
TO 601+37								TO		TO 601+20											
FROM 600+10	Lt.	125.0						FROM		FROM											
TO 601+35								TO		TO											
FROM 602+25	Rt.	100.0						FROM 602+30		FROM											
TO 603+25								TO 603+00		TO											
FROM 600+50	Med.			275.0				FROM		FROM											
TO 603+25								TO		TO											
FROM 604+25	Rt.	60.5						FROM		FROM											

LOCATION		GUARDRAIL (LF)							
STATION	SIDE	ROADWAY						PEDESTRIAN SAFETY TREATMENT	
		ROADWAY		DOUBLE FACE		MOD. THRIE BEAM DOUBLE FACE		P	F
		P	F	P	F	P	F		
FROM 600+50	Rt.	87.5						FROM	
TO 601+37								TO	
FROM 600+10	Lt.	125.0						FROM	
TO 601+35								TO	
FROM 602+25	Rt.	100.0						FROM 602+30	
TO 603+25								TO 603+00	
FROM 600+50	Med.			275.0				FROM	
TO 603+25								TO	

WHEN A PEDESTRIAN SAFETY TREATMENT, AND/OR RUB RAIL TREATMENT, IS TO BE PROVIDED FOR A RUN OF GUARDRAIL, THE BEGINNING AND END STATION IS TO BE NOTED AS SHOWN IN THE SUMMARY OF GUARDRAIL ABOVE. OTHERWISE, THESE COLUMNS MAY BE DELETED.

WHEN A PEDESTRIAN SAFETY TREATMENT, AND/OR RUB RAIL TREATMENT, IS TO BE PROVIDED FOR A RUN OF GUARDRAIL, THE BEGINNING AND END STATION IS TO BE NOTED AS SHOWN IN THE SUMMARY OF GUARDRAIL ABOVE. OTHERWISE, THESE COLUMNS MAY BE DELETED.

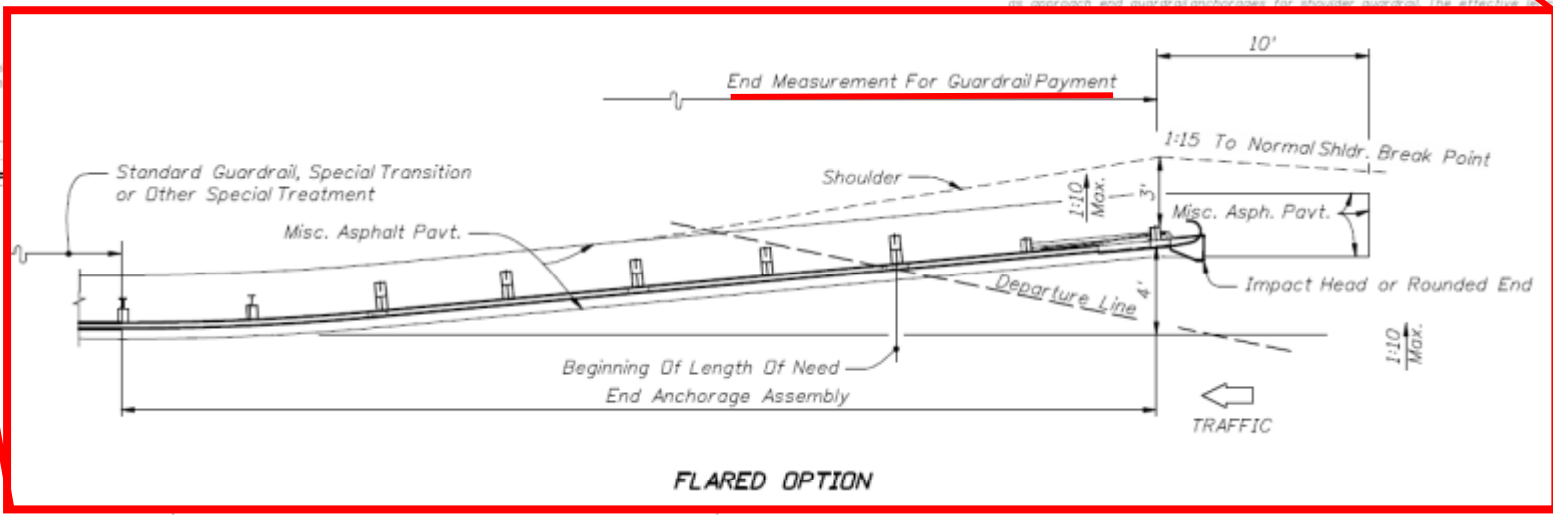
**Plans Prep Manual  
Summary of Guardrail  
Exhibit SQ-3**



FLARED OPTION

**GENERAL NOTES**

1. These drawings are representative of the various proprietary guardrail end anchorage assemblies listed on the Department's Qualified Products List (QPL). For specific details and requirements see the vendor drawings on the QPL at [www.dot.state.fl.us/specifications/](http://www.dot.state.fl.us/specifications/)
2. These drawings present the general guidelines to show the limits of payment for guardrail and end anchorage assemblies, modifications to the shoulder and placement of the miscellaneous asphalt mix strips.
3. These drawings, along with the various vendor drawings on the QPL, are intended to show sufficient details for installation of the end anchorage assemblies and their connection to shoulder guardrail. This precludes the requirement for shop drawing submittals unless otherwise called for in the plans. The various end anchorage assemblies shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.
4. The various proprietary end treatments listed on the QPL are intended for use as research and guardrail end treatments for shoulder guardrail. The effective length of



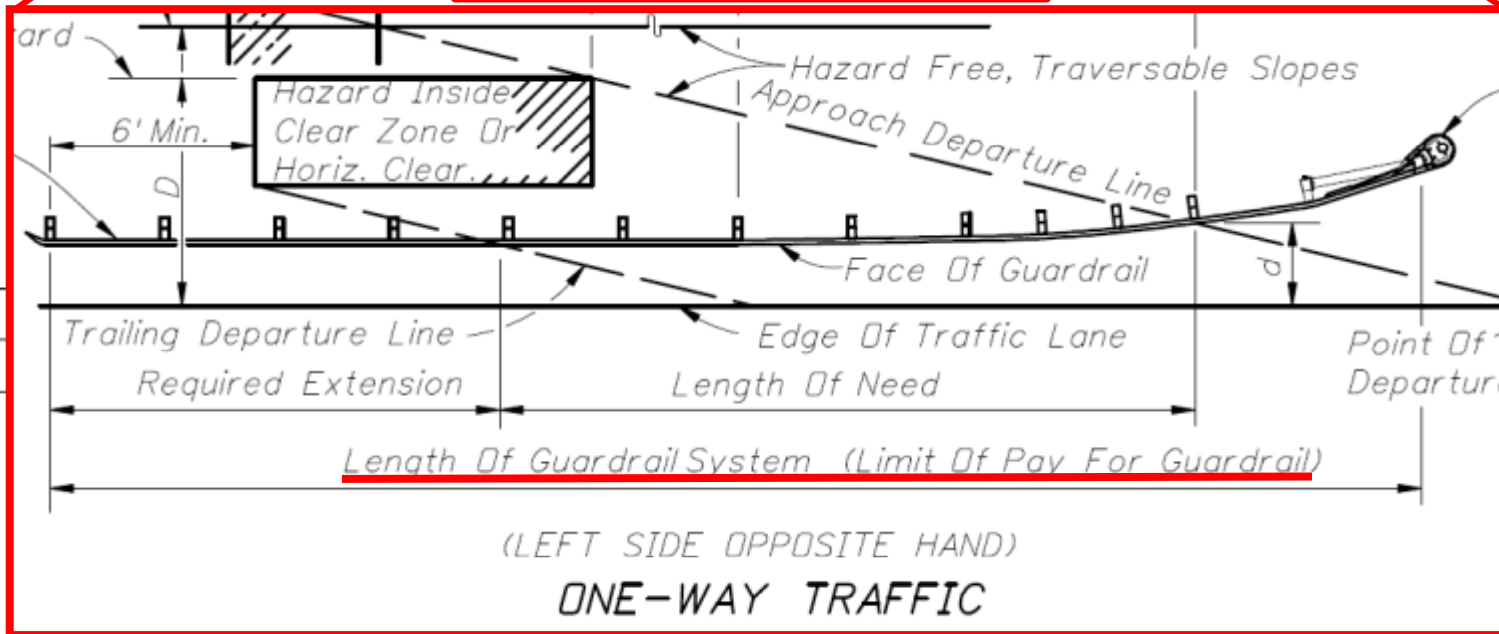
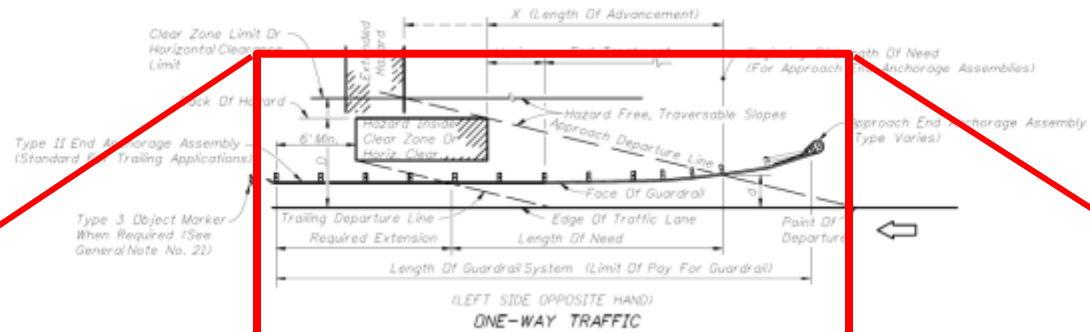
FLARED OPTION

**INDEX 400**  
Sheet 2 of 26  
**(End Anchorage Details)**

OPTION AT CURBED LOCATIONS

APPROACH END ANCHORAGE DETAILS

	2010 FDOT Design Standards	Last Revised 07/01/08	Sheet No. 2 of 26
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**(Location Details)**



2010 FDOT Design Standards

GUARDRAIL

Last Revision 07/01/05	Sheet No. 4 of 26
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**1. Pipe Rail Required on steel guardrail posts...  
Pipe rail shall not extend beyond the last post of  
the approach end anchorage assemblies.**

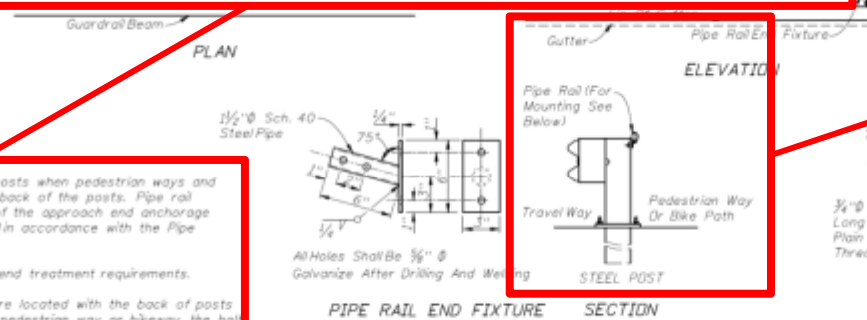
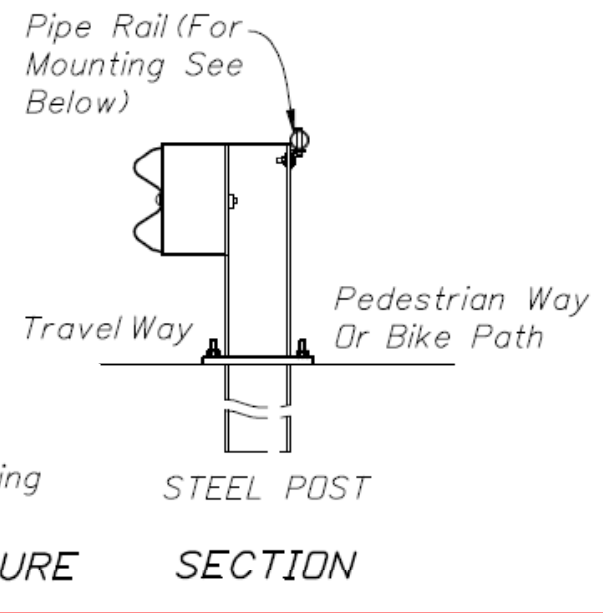
**Refer to Sheet 1, Note 6 for guardrail end treatment  
requirements.**

**2. When guardrails with timber posts... ...the bolt  
ends will require one of the following treatments**

- (a) Trimming flush with face of nut and metalizing or**
- (b) ...post bolts 15" ...washers and nuts countersunk or**
- (c) ...post bolts 15" ... ..with sleeve nuts and washers.**

**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.



- NOTES**
1. Pipe Rail required on steel guardrail posts when pedestrian ways and bikeways are located 4' or less from back of the posts. Pipe rail shall not extend beyond the last post of the approach end anchorage assemblies. Begin and end the pipe rail in accordance with the Pipe Rail End detail.
  - Refer to Sheet 1, Note 6 for guardrail end treatment requirements.
  2. When guardrails with timber posts are located with the back of posts 4' or less from the near edge of the pedestrian way or bikeway, the bolt ends will require one of the following treatments:
    - (a) Trimming back flush with the face of nut and metalizing or
    - (b) Use of post bolts 15" in length with the washers and nuts countersunk into sink 1" to 1 1/2" deep or
    - (c) Use of post bolts 15" in length with sleeve nuts and washers.
  3. The cost for Pipe Rail, mounting components and installation shall be included in the contract unit price for guardrail. Bolt end treatment for timber post shall be included in the contract unit price for guardrail.

FOR LOCATIONS USED BY PEDESTRIANS OR CYCLISTS  
PEDESTRIAN SAFETY TREATMENTS

**INDEX 400**  
Sheet 17 of 26  
**(Pedestrian Safety Treatments)**

	2010 FDOT Design Standards	Last Revision 07/01/09	Sheet No. 17 of 26
	GUARDRAIL	Index No. <b>400</b>	

GENERAL NOTES

- 1. The illustrations for guardrail applications are standard configurations; adjustments are to be made as required by site specific conditions to attain optimum design for function, economy and serviceability.
- 2. The beginning of guardrail need shall be at the greatest of the upstream distances from the hazard, as determined from Figures 1 and 2, and other application details of this Index.
- 3. One Panel (i.e., panel length) equals 12'-6". Guardrail shall be constructed with rail elements 12'-6" in length except where 25'-0" elements are called for by this and other standards (Indexes) or specifically called for in the plans.

continued ...

- (c) Vehicle overridding W-beam is probable.
- (d) Drainage will be impeded or blocked by the use of concrete barrier walls (subject to deflection space requirements).
- (e) High frequency of repairs to W-beam.
- (f) Spandrelbeam with low deflection needed around unrelocatable structure.
- (g) Accommodating passenger vehicles heavier or larger than the standard passenger car (e.g., passenger vans and small buses).

# Under General Note 6....

## When an end treatment is attached to guardrail with Pedestrian Safety Treatment, only end treatment systems with timber posts are to be used.

If the plans call for end anchorage assembly "panels" and does not identify the specific systems to be used, the contractor has the option to construct any FDOT approved panel assembly provided in this Index or identified on the OPL, subject to the conditions identified in the approved Index drawings, or OPL drawings if applicable.

If the plans call for a specific end anchorage assembly, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. Approved substitutions will not be eligible for VECP consideration.

When an end treatment is attached to guardrail with Pedestrian Safety Treatment, only end treatment systems with timber posts are to be used.

Proprietary end anchorage systems must be identified on the OPL. Manufacturers seeking approval of proprietary end anchorage systems for inclusion on the OPL must submit application along with design documentation showing the end anchorage system is crash tested to NCHRP Report 350 Test Level 3 criteria, is accepted by FHWA for use as a guardrail end anchorage system, and is compatible with FDOT guardrail systems. System approvals will be contingent on FDOT's evaluation of crash test performance results for consistency with FDOT guardrail application and use. If approved, installation drawings signed and sealed by a professional engineer licensed in the State of Florida will be required.

- 7. At above ground rigid hazards where the face of guardrail is offset from the hazard less than the 4' minimum for standard W-beam, other guardrail configurations may be applicable; see General Note No. 11 and the minimum offset table on Sheet 19. For guardrail with post spacing less than 6'-3" the reduced spacing should extend a minimum of one panel in advance of the hazard. When minimum offset cannot be attained safety shape concrete barrier shall be used unless other shielding is approved by the Engineer of Record. See Index No. 410 for safety shape concrete barriers and typical applications, and the plans for special barrier shapes and applications.
- 8. In addition to use at roadside hazards or other areas where the Engineer has deemed guardrail necessary, guardrail should be considered on flush shoulder sections where fill slopes are steeper than 1:3 within the clear zone and fill heights are 6' or greater. Curbed sections where fill slopes are steeper than 1:3 and fill heights are 6' or greater within 22' of the traveled way should be evaluated for installation of guardrail. Additional guidance for evaluating the need for guardrail can be found in the Plans Preparation Manual.
- 9. The guardrail to bridge connections contained in this Index are for bridges with Test Level 4 traffic railing barriers. For guardrail to concrete barrier wall connections see Index No. 410. For existing bridges receiving retrofit traffic railing barriers see Index No. 402.
- 10. The W-beam guardrail system in this Index is the standard system to be used on the State Highway System where

Recycled beams: used Class A guardrail beams that have been refurbished to condition new (AASHTO M280) may be used for both construction of new guardrail and maintenance of existing guardrail. Refurbishing shall include stripping of the existing galvanizing, restoration of the base metal in section and straightness, repair of any bending and deformation, and regalvanizing to AASHTO Type II specifications. Refurbished beams shall not contain ruptured holes, gashes or tears and will not be accepted.

- 16. Steel offset blocks other than standard three-beam offset blocks are not permitted for new guardrail construction. Existing steel offset blocks may remain throughout the service life of the existing guardrail. Permissible post and offset block combinations are tabulated on Sheet 16.
- 17. Where necessary to enlarge or add holes to galvanized guardrail, the work will be done by drilling or reaming. Damaged galvanized guardrail will be metalized in accordance with Sections 562 and 975 of the Standard Specifications. No burning of holes will be permitted.
- 18. For guardrail reflector details see Sheet 17.
- 19. Any run of guardrail with existing concrete posts that is being reset under a construction or maintenance contract shall be reset using timber or steel posts. Repair within a run of guardrail with existing concrete posts can be made with either steel, timber, sound salvaged concrete posts; replacement in kind of damaged posts is to be made when like posts are on hand at time of repair.
- 20. Substitutions between three-beam guardrail and concrete barrier walls are not eligible for VECP consideration.
- 21. On roadways designated for reverse laning, all downstream ends of guardrail that are not shielded or that are not designed as approach end terminals shall be marked with post-mounted Type 3 Object Markers. Trailing bridge ends and trailing shoulder concrete barrier walls shall be marked with Type 3 Object Markers except where there is trailing end guardrail. Object markers to be installed facing reverse laning traffic. The cost of the object marker shall be included in the cost of the guardrail.

**INDEX 400**  
Sheet 1 of 26  
**(General Notes)**

transitions to bridge traffic railing barriers, to concrete and steel cushions and as a continuous barrier when called for in this Index, and Index Nos. 402, 410 and 414. Steel offset blocks (Test Level 3 semi-rigid system) may be considered where conditions are anticipated or exist.

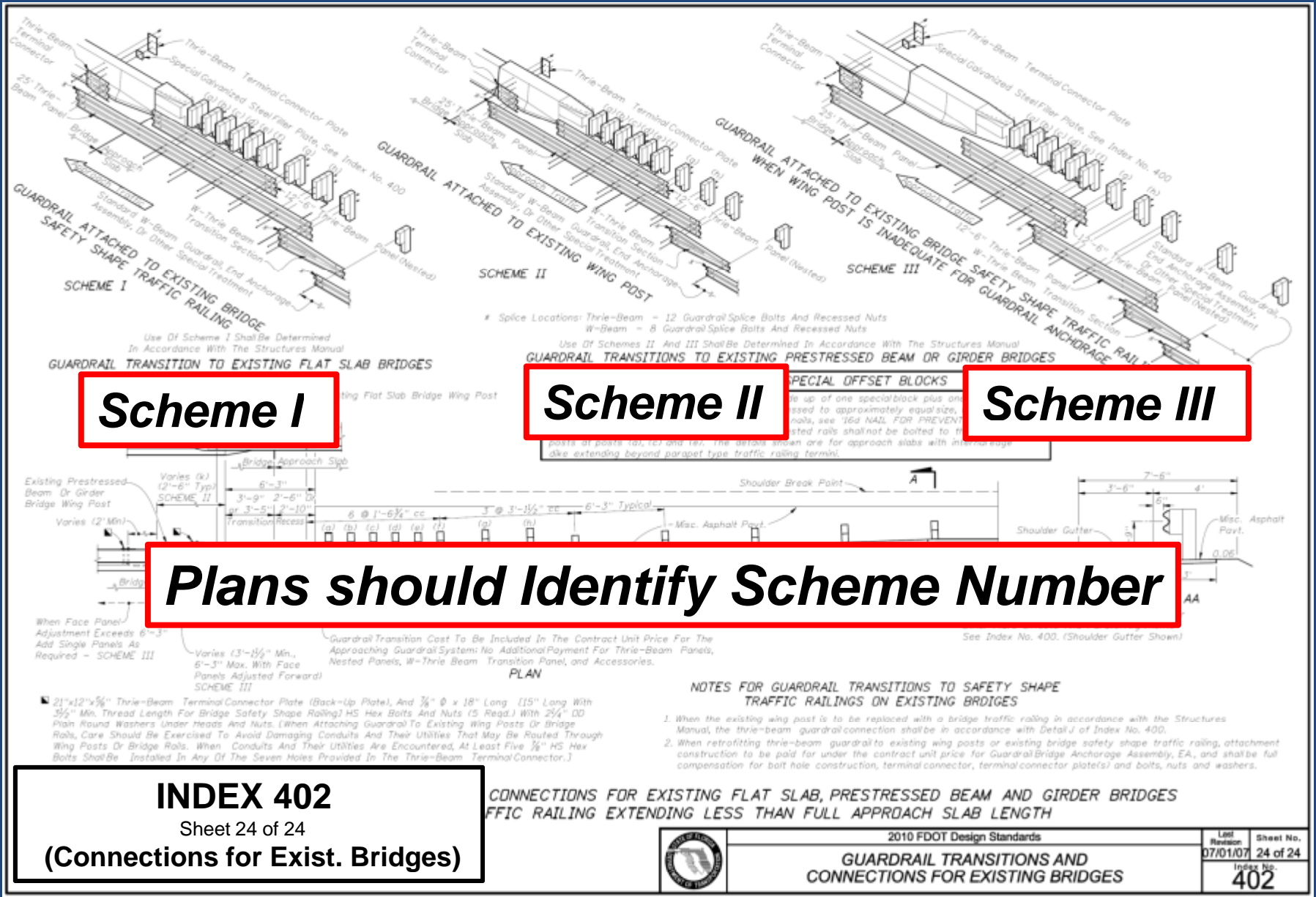
Scient, continued ...

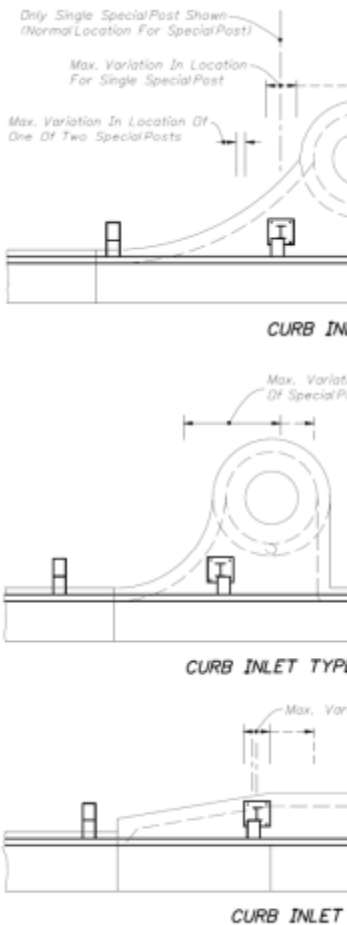


2010 FDOT Design Standards

GUARDRAIL

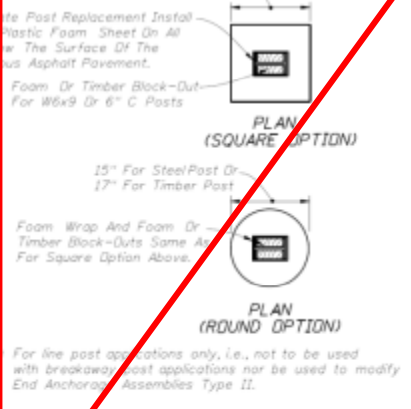
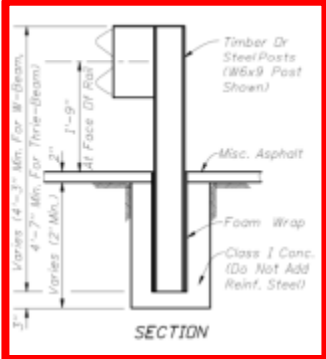
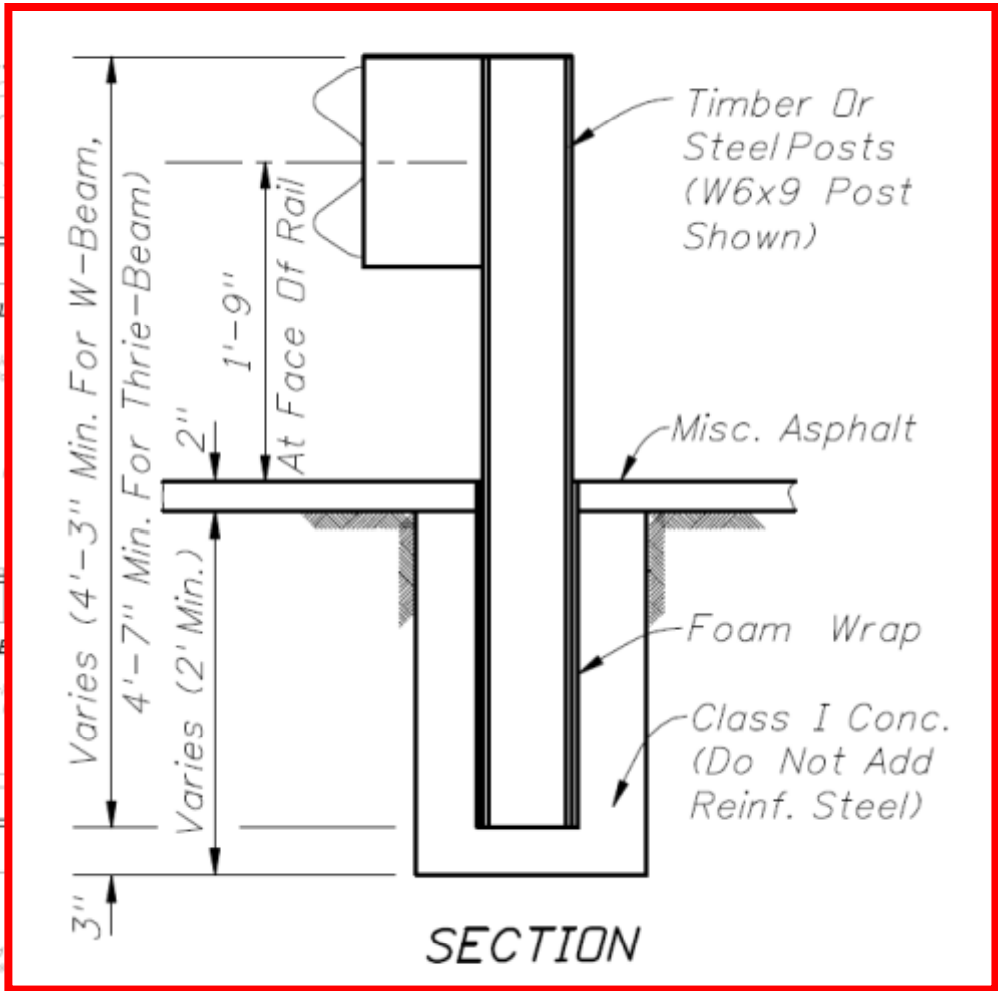
LAST Revision 07/01/09	Sheet No. 1 of 26
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**Notes:**

1. The locations shown for special posts mounted on curb inlets shall be used as guidelines for positioning the posts and for erecting required posts.
2. Special posts and their anchorages mounted on curb inlets shall be in accordance with the following specifications:



For line post applications only, i.e., not to be used with breakaway post applications nor be used to modify End Anchorage Assemblies Type II.

TO BE USED PRINCIPALLY OVER SHALLOW UTILITIES

**ENCASED GUARDRAIL POST**

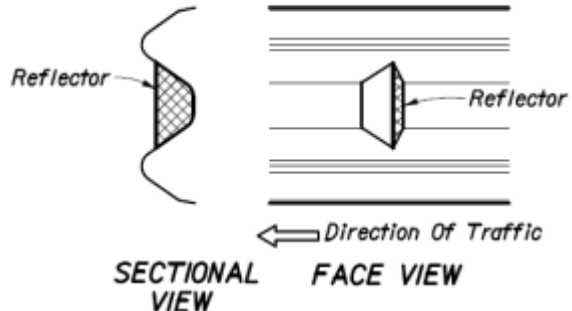
**LEGEND**  
 Location Of Special Post:  
 (Set Block(s) On Adjacent Standard Post(s))  
 Expanded Location By Using Double Offset Block(s) On Adjacent Standard Post(s)

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**(Encased Guardrail Post)**

3. 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.
4. 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.

**NOTATIONS ON CURB INLETS**

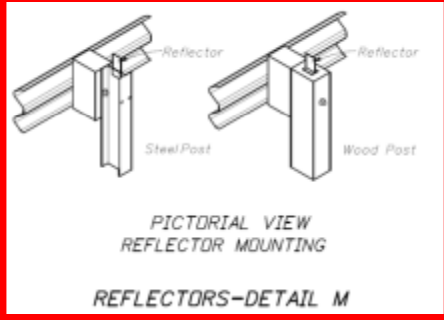
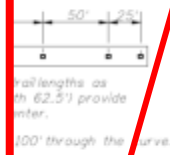
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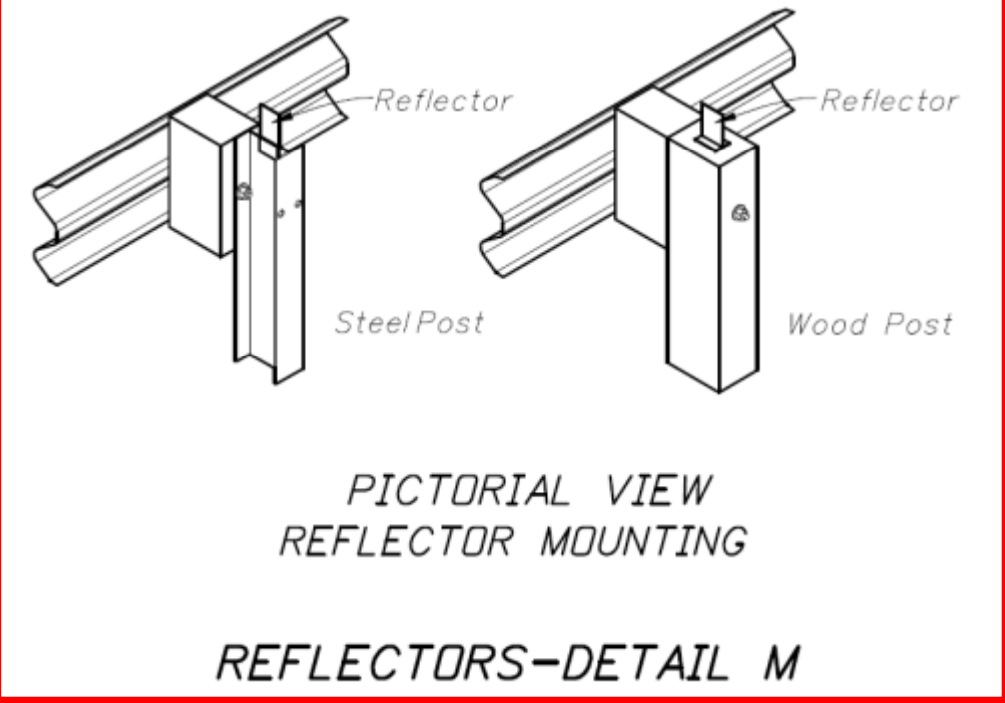
Reflectors shall be centered in the channel of W-beam and in the top channel of three-beam.

**REFLECTOR MOUNTING**

**Old Detail – Do Not Use**



- REFLECTOR NOTES**
1. Reflectors shall conform to Section 993 of the Standard Specifications.
  2. Reflector color (silver or yellow) shall conform to the color of the near lane edge.
  3. Reflectors installed on multi-beam 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.



- NOTES**
1. Pipe Rail required on steel guardrail posts when pedestrian ways and bikeways are located 4' or less from back of the posts. Pipe rail shall not extend beyond the last post of the approach end anchorage assemblies. Begin and end the pipe rail in accordance with the Pipe Rail End detail.
  - Refer to Sheet 1, Note 6 for guardrail end treatment requirements.
  2. When guardrails with timber posts are located with the back of posts 4' or less from the near edge of the pedestrian way or bikeway, the bolt ends will require one of the following treatments:
    - (a) Trimming back flush with the face of nut and metalizing or
    - (b) Use of post bolts 15" in length with the washers and nuts counter sunk into sinks 1" to 1 1/2" deep or
    - (c) Use of post bolts 15" in length with sleeve nuts and washers.
  3. The cost for Pipe Rail, mounting components and installation shall be included in the contract unit price for guardrail. Bolt end treatment for timber post shall be included in the contract unit price for guardrail.

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**(Reflector Details)**

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# Pay Items

## Bridge Thrie Beam Retrofit

- **Pay Item 460-71-1 Metal Traffic Railing Thrie Beam Retrofit**

Use with Indexes 470 thru 476

- **Pay Item 536-1-6 Guardrail Bridge Thrie Beam**

**??Old Pay Item to be Deleted??**

# Cable Barrier Specification 540

- [Dev540.pdf](#)

# LESS Session



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