



Florida Department of Transportation

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ROADWAY DESIGN BULLETIN 14-13

(FHWA Approved: June 20, 2014)

DATE: June 20, 2014

TO: District Directors of Transportation Operations, District Directors of Transportation Development, District Design Engineers, District Construction Engineers, District Geotechnical Engineers, District Structures Design Engineers, and Program Management Engineers

FROM: Michael A. Shepard, P. E., State Roadway Design Engineer

A handwritten signature in blue ink that reads "Michael Shepard".

COPIES: Brian Blanchard, Tom Byron, Duane Brautigam, Robert Robertson, David Sadler, Tim Lattner, Mark Wilson, Bruce Dana, John Krause, Greg Schiess, Trey Tillander, Rudy Powell, Nick Finch (FHWA), Chad Thompson (FHWA) and Felix Delgado (FHWA)

SUBJECT: **Guardrail Systems**

This bulletin provides revisions and additional requirements for guardrail systems.

REQUIREMENTS

1. The following *Design Standards Revisions (DSR)* are released:
 - A. Revised Index 400 (Guardrail) is released.
 - B. The new IDS-400 (Guardrail) is released.
2. Delete Item 2 under "Shielding drop-off hazards for vehicle occupants:" in *Plans Preparation Manual*, Volume 1, Section 4.2.2 and replace it with the following:

When a drop-off is to be shielded with guardrail, a minimum of 62.5 feet of guardrail is required to develop proper ribbon strength. A minimum clear area 5'-0" wide from the face of the guardrail is to be provided behind the standard W-beam guardrail to allow for dynamic deflection when impacted. Alternates shown in Table 4.3.1 may be used to allow for a clear area less than 5'-0" wide. A minimum distance of 2'-0" shall be provided from the back face of the guardrail posts to the shoulder slope break in order to provide proper soil bearing resistance for the posts.

3. Delete the last paragraph in *Plans Preparation Manual*, Volume 1, Section 4.3.2 and replace it with the following:

Most guardrail installations will be blocked-out W-beam on wood or steel posts. The use of alternatives shown in Table 4.3.1 should be considered when reduced deflection is needed. The use of thrie-beam guardrail should be considered when additional rail depth is needed because of a potential to under-ride the rail. Other barrier designs may be required by specific site conditions. Site specific conditions are identified and detailed in the plans on a project-by-project basis.

4. Delete *Plans Preparation Manual*, Volume 1, Chapter 4 – Table 4.3.1 and replace it with the following:

**Table 4.3.1 Minimum Offsets of Barriers
 (Measured from the face of the barrier)**

BARRIER TYPE	OFFSET
W-Beam with Post Spacing @ 6'-3"	5'-0"
W-Beam with Post Spacing @ 3'-1½"	3'-10"
W-Beam with Post Spacing @ 1'-6¾"	3'-2"
Thrie-Beam with Post Spacing @ 6'-3"	3'-10"
Thrie-Beam with Post Spacing @ 3'-1½"	3'-2"
Thrie-Beam with Post Spacing @ 1'-6¾"	2'-10"
Concrete Barrier Wall	*
Double W-Beams (Nested) with Post Spacing @ 3'-1½"	3'-0"
Double W-Beams (Nested) with Post Spacing @ 1'-6¾"	2'-8"
Double Thrie-Beams (Nested) with Post Spacing @ 3'-1½"	2'-10"
Double Thrie-Beams (Nested) with Post Spacing @ 1'-6¾"	2'-6"

* These offsets are specifically provided in the *Design Standards*.

For additional information on offsets to barriers see *Section 7.1.2*.

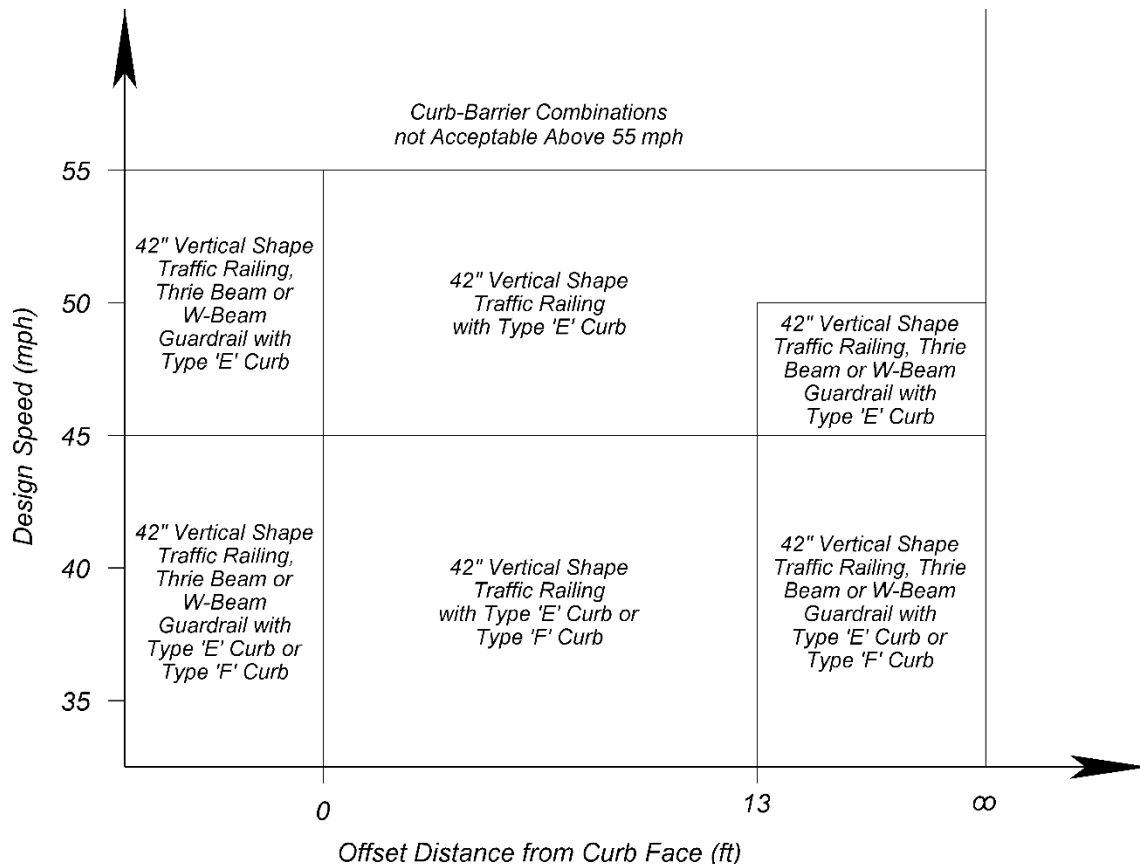
5. Delete the seventh and eighth paragraphs in *Plans Preparation Manual*, Volume 1, Section 4.3.5 and replace it with the following:

A single W-beam guardrail at a 1'-9" mounting height was tested in the study used to develop the design chart in Figure 4.3.1. This design chart has been updated for 42" Vertical Shape Traffic Railing, Thrie-beam guardrail and W-beam guardrail at a 2'-1" mounting height. Within the design chart, there is a region between 0 feet and 13 feet (approx. 4 m) behind the face of the curb where guardrail should not be located. A 42" vertical shape traffic railing (See *Design Standards* Indexes

422 and 6120) may be used in any of the locations applicable to Figure 4.3.1. The preferred configuration is to place barriers at the face of curb.

6. Delete *Plans Preparation Manual*, Volume 1, Chapter 4 – Figure 4.3.1 and replace it with the following:

Figure 4.3.1 Placement of Curb-Barrier Combinations



7. Add the following to the end of *Plans Preparation Manual*, Volume 1, Section 4.3.6:

For existing end treatments and bridge transitions with a 1'-9" mounting height W-beam guardrail system that does not meet the requirements of the 2013 *Design Standards*, upgrade the system to bring it into compliance with the 2013 *Design Standards*.

Where an existing system with 1'-9" mounting height guardrail meeting the requirements of the 2013 *Design Standards* is to be extended, the decision of extending the section in-kind or replacing the entire run with a 2'-1" mounting height is at the discretion of the District.

8. Add the following to the end of *Plans Preparation Manual*, Volume 1, Section 4.3.6.1:

When resetting existing guardrail, the guardrail shall be reset at the 2'-1" mounting height reusing existing posts and guardrail panels as shown in the current *Design Standards*.

9. Delete the first paragraph in *Plans Preparation Manual*, Volume 1, Section 25.4.25.1 and replace it with the following:

Existing longitudinal guardrail sections that do not conform to the current *Design Standards* must be upgraded or replaced, with the following exceptions:

1. Existing W-beam guardrail with 1'-9" mounting height with timber, composite or steel offset blocks and conforming to the 2013 *Design Standards*, is not required to be upgraded or replaced.

10. Delete Item 1 in *Plans Preparation Manual*, Volume 1, Section 25.4.25.2 and replace it with the following:

1. For approach ends of existing standard New Jersey Shape and F Shape bridge traffic railings:
 - a. The nested thrie-beam approach transition shown as **Detail J** in the current *Design Standards* or the 2013 *Design Standards*, Index 400.
 - b. For retrofitted installations, the appropriate nested thrie-beam transition shown in the current *Design Standards* or the 2013 *Design Standards*, Index 402.
 - c. The nested W-beam approach transition shown as **Detail J** in the 1998 edition of the *Roadway and Traffic Design Standards*, Index 400, Sheet 7 of 21. This detail is also shown in the 2000 edition of the *Roadway and Traffic Design Standards*, Index 401, Sheet 1 of 9.

All guardrail replacements and new installations connecting to standard New Jersey Shape and F Shape bridge traffic railings shall conform to the current *Design Standards* or the 2013 *Design Standards*, Index 400. For guardrail retrofits connecting to existing bridge traffic railings, see the current *Design Standards* or the 2013 *Design Standards* (as appropriate), Indexes 402 or 477 and the associated *Instructions for Design Standards*.

11. Delete both paragraphs in *Plans Preparation Manual*, Volume 1, Section 25.4.25.3 and replace them with the following:

Existing guardrail terminals must be upgraded or replaced unless they conform to one of the systems identified in the current *Design Standards* or the 2013 *Design Standards*. As an exception, existing Type MELTs on high speed facilities are not required to be replaced.

All replacements shall conform to the current *Design Standards* or the 2013 *Design Standards*. All new installations shall conform to the current *Design Standards*.

COMMENTARY

The *Plans Preparation Manual* has been updated to clarify guidance on guardrail system designs.

A new *Instructions for Design Standards (IDS)*, IDS-400, has been released to provide clear and consistent instructions on how to calculate the length of Guardrail in the plans. Additional information will be added to this IDS in the future.

Revisions to *Design Standards*, Index 400 “Guardrail” reflects:

- For standard W-Beam guardrail, revised the minimum offset from above ground rigid hazard from 4’ to 5’.
- Revised the table of minimum offsets for single faced W-Beam and Thrie-Beam guardrail.
- Clarifies material requirements for the W-Thrie Beam Transition Panels.
- Added “Redirective Median End Anchorage Assemblies” as an alternative to Crash Cushions for double faced W-Beam guardrail median end treatments.

Revisions to *Design Standards*, Index 400 “Guardrail” are based on information contained in the 2011 *AASHTO Roadside Design Guide*:

- Table 5-4. MGS Design Applications with Pickup Truck Impact Performance
- Table 5-6. Summary of Maximum Deflections
- Table 8-2. Terminals for W-Beam Guardrail Systems
- Table 8-3. Terminals for Median W-Beam Guardrail Systems

Summary of Major Changes to Index 400, “GUARDRAIL”			
Criteria	Existing	New	Sheet Number(s)
Minimum Offset for Standard W-Beam Guardrail	4’	5’	Sheet 1 of 26 (Note 7), Sheet 5
Double Faced W-Beam Guardrail Median End Treatment Designation	“Crash Cushion”	“Crash Cushion or Redirective Median End Anchorage Assembly”	Sheet 1 of 26 (Note 14), Sheet 5 of 26 and Sheets 8 through 11 of 26
W-Thrie Beam Transition Panel	Note addresses only “Class A” for standard panels	Note includes “Class B” for W-Thrie Beam Transition Panels	Sheet 1 of 26 (Note 15)
Table of Minimum Offsets for Single Faced Guardrail (Ft.)	Based on the 2006 AASHTO Roadside Design Guide, Table 5.4	Based on the 2011 AASHTO Roadside Design Guide, Table 5-4 and Table 5-6	Sheet 19 of 26

Separate Qualified Products List (QPL) numbers have been assigned to all Test Level 2 (TL-2) and Test Level 3 (TL-3) crash tested and approved products for the new 2'-1" mounting height end anchorage assembly lengths.

IMPLEMENTATION

The Requirements of this bulletin are effective immediately on all design-bid-build projects in Phase I or Phase II design development (less than 60% complete). These requirements may be implemented immediately on all design-bid-build projects either in Phase III or Phase IV at the discretion of the District.

All of the Requirements of this bulletin are effective immediately on all design-build projects for which the final RFP has not been released. Design build projects for which the final RFP has been released are exempt from these requirements unless otherwise directed by the District.

A District Construction Engineers Memo will be released in the coming weeks to address projects Let without the requirements of this bulletin included in the plans.

To meet the requirements of this bulletin, when guardrail is to be used on the project insert revised *Design Standards* Index drawings in the Plans as described in the *PPM, Vol. 2, Section 3.6.1*.

CONTACT

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Link to Design Standards Revisions: <http://www.dot.state.fl.us/rddesign/DS/14/Rev.shtm>