Design Standards Update
2014 eBooklet

Design Update Training
Darren Martin
Design Standards Specialist
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NEW FOR 2014

Criteria and Standards

Roadside Barriers

Roadway Design http://www.dot.state.fl.us/rddesign/cs/cs.shtm

Topics
- Bicycle and Pedestrians
- Design Bulletins
- Florida Greenbook
- Florida Intersection Design Guide
- Lighting
- Maintenance of Traffic Plans Preparation Manual
- Roadside Barriers
- Signalization and ITS
- Signing and Pavement Marking

Other Links of Interest
- ADA Public Rights of Way
- Construction Office
- Design Standards
- Drainage Section
- Driveway Information Guide - 2008
- Engineering CADD (ECSO)
- MUTCD
- Specifications - Estimates
- Structures Design Office
- Traffic Engineering Office

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- Henson, Chester (850) 414-4117
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Design Standards Engineer
- Prytyka, Gregory (850) 414-4782

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Roadside Barriers

Roadway Departure Technical Briefs

Florida’s Roadside Safety Field Guide

FHWA Resource Charts

Roadway Departure Technical Briefs
- TB1 Roadside Safety Systems Pro-Installation Field Review Check List
- TB2 Guardrail Installations at Intersections, Side Roads and Driveways
- TB3 Roadside Safety Systems Damage Assessment
- TB4 Midwest Guardrail System (MGS)
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Florida’s Roadside Safety Field Guide
June 2013 Release

FHWA Resource Charts
- Small Format: Complete Resource Charts (11x17 Printing Size)
  - Aesthetic (24x36 Print Size)
  - Cable (24x20 Print Size)
  - Concrete (24x40 Print Size)
- Large Format: Crash Cushions (24x36 Print Size)
  - Median Terminal (24x24 Print Size)
  - Roadside Post and Beam (24x60 Print Size)
  - Roadside Terminal (24x50 Print Size)

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Roadway Departure Technical Briefs

Design

Objective

Methodology

Roadway Departure Technical Brief No. 1
Roadside Safety Systems
Pre-Installation Field Review Check List

Florida

CATEGORY: Design

ISSUE: When roadside safety systems such as traffic barriers and terminals are installed exactly as shown on project plans or replaced in kind after a crash, the end result can be an installation that may not effectively shield the primary hazard, may be too short or too long, may not shield obvious “secondary” hazards in its immediate vicinity, or may not be needed at all.

OBJECTIVE: Provide guidelines to enable a pre-installation review team to recognize and make needed adjustments to the design to guarantee an optimal installation.

METHODOLOGY: The pre-installation review team should conduct a field review of each planned installation and consider, at a minimum, the issues and factors described below. After these issues and factors have been considered, the review team should document any findings, including justification for any recommended modifications to the design, and process them through existing agency procedures. For additional information please see the FHWA website at http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware and AASHTO’s Task Force 13 website at www.aashtof13.org.
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Roadway Departure Technical Briefs

Need

Placement

Length

The pre-installation field review should consider the following issues:

Need, Placement, and Length

- Installing and maintaining roadside safety systems can be costly and, if installed incorrectly, can become an additional hazard in a serious crash, as shown in Photograph A. If running off the roadway at that location is clearly less hazardous than striking a guardrail, or if the hazardous feature can be removed, relocated, or redesigned, barrier should not be used. Be certain there is a clear and justifiable barrier warrant before installing guardrail.

- The clear zone distances used by most State DOTs to determine if a hazard warrants shielding are minimum distances based on relatively limited data. While there are hazards adjacent to virtually every roadway, special attention should be given to man-made fixed objects such as bridge piers, culverts, and large sign or light supports. Such fixed objects may be considered for shielding if there is a reasonable expectation that an errant motorist may strike them even if they are outside the design clear zone. Some agencies measure the clear zone from the edge of the nearest through traffic lane. Thus, bridge piers next to auxiliary lanes (Photograph B) are often left unshielded — in spite of the fact that vehicle speeds may equal through lane speeds and traffic conflicts are more likely because of slowing and/or merging traffic.

- To check the barrier length of need (LON) in the field, one needs only pace off the appropriate distance (starting on the shoulder opposite the upstream edge of the hazard), then turn and look at the back of the hazard. If the barrier intersects this line of sight, the LON is probably adequate. The barrier shown in Photograph C may be longer than needed since the area behind the bridge pier is traversable.

- When verifying the correct LON required to shield a primary hazard, one must note other significant hazards immediately in the vicinity of the barrier terminal that could be effectively shielded by extending the barrier. While such secondary hazards (such as the concrete footing in Photograph C) may not normally warrant shielding on their own, it is best to avoid a situation where a motorist strikes an end terminal and is then seriously injured in a collision with a secondary hazard that could easily have been shielded. Judgment must be used when these secondary hazards (such as a solid line of trees, which would not normally be shielded) extend a significant distance upstream from the primary hazard.

- Before barrier layout is finalized, all underground utilities must be located and marked, especially in areas where there are street lights, traffic signals,
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Roadway Departure Technical Briefs

Topography

End Terminals

and electrical/gas lines to residences. The location of any such utilities may require modifications to barrier placement or design, such as lateral placement or post location adjustments. If modifications are necessary, it is critical that the barrier effectively shield the hazard and still function as intended.

Topography

- State DOT policy is typically to design each barrier installation based on the lateral distance to the back of the identified hazard and the appropriate length based on traffic volume and design speed. This procedure, however, assumes a relatively flat and traversable area from the point where a vehicle leaves the roadway to the back side of the hazard. As shown in Photograph E, many barrier runs intended to shield steep embankments are too short to do so effectively.

- For best performance when struck, an impacting vehicle must be stable at the moment of impact. When barrier is placed down a slope, a vehicle leaving the roadway at speed will become partially airborne and may strike the barrier too high. Rather than be redirected by the guardrail, the vehicle may override it and strike whatever object the barrier was intended to shield. Full-scale tests have resulted in specific guidelines for placing barriers on slopes. These must be followed if the guardrail is to function as intended. Transitioning a barrier from one side of a median to the other (Photograph F) can result in a section that is too low relative to the roadway.

- Installing guardrail behind curbs creates a concern similar to installing barrier on a slope. Because curbs do not have significant redirection capabilities, tire impact with a curb tends to raise a vehicle's bumper height, again resulting in a higher-than-normal impact into a guardrail. If the barrier is installed with its face directly above the curb and is stiffened to limit its deflection when struck, a curb/barrier combination poses only a slight risk of an override. However, installing a W-beam guardrail beyond a 6-inch concrete curb, as shown in Photograph G, is an invitation to an override. Of greater concern, however, is the actual need for any barrier at this particular location.

End Terminals

- There are two basic terminal designs in use at present: non energy-absorbing, and energy-absorbing. Non energy-absorbing designs do not significantly reduce vehicle speed in a near-end-on hit. They are best specified when there is a clear and traversable area behind them parallel to the guardrail installation, such as is often found in a freeway median. Energy absorbing terminals have been shown to stop an impacting vehicle in about 50 feet when struck end-on and thus are best suited to locations that do not have much traversable area behind the barrier installation. A non-energy absorbing terminal should not be used directly in front of a fixed object as seen in Photograph H.
A terminal struck by a stable vehicle, i.e., a vehicle that has its suspension neither compressed nor extended and has minimal roll, pitch, and yaw angles, will result in the best terminal performance possible. If a graded terminal “platform” was constructed, it must be smoothly blended into the existing roadside embankments so a motorist has an opportunity to return to the roadway without striking the terminal or losing control of the vehicle by dropping off the edge of a platform like the one shown in Photograph I. Many grading platforms can be eliminated either by extending the barrier a short distance to reach a flatter roadside area or reduced in size by specifying a non-flared end treatment to reduce the required width of the platform.

Impacting a terminal, even when it is installed on flat ground, induces some instability in most vehicles. When the area immediately behind a terminal is steep or non-traversable, a vehicle can overturn after breaking through the terminal. A minimal traversable runout area behind the terminal is an essential part of good barrier design. A field check to determine if a minimal runout area exists is to see if a passenger-type vehicle can be safely driven and parked behind the terminal, parallel to the barrier. If so, one may assume that a minimal runout area is available. Another check is to observe whether or not the area behind the terminal is at least as clear and unobstructed as the unshielded area immediately upstream of the terminal. If not, extending the barrier a greater distance may be warranted. In Photograph J, the area beyond the terminal is readily traversable but the length of need (LON) may be excessive.

The terminals shown in Photographs K and L is an energy absorbing design, but any impact into the end at an angle will most likely lead quickly to a secondary impact in to the water behind it. This barrier was installed primarily to shield a structure and is effective for that purpose, but it should have been designed to keep motorists out of the canal as well. In this case, the LON may be too short.

Documentation

Review findings should be documented in writing and signed by all members of the review team. Minor revisions can be processed through the project contract procedures. Major modifications (e.g., a different barrier type than originally specified) can also be processed through existing agency procedures but should be extremely rare.
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Roadside Barriers

Florida’s Roadside Safety field Guide

Roadway Departure Technical Briefs
- TB1 Roadside Safety Systems Pre-Installation Field Review Check List
- TB2 Guardrail Installations at Intersections, Side Roads and Driveways
- TB3 Roadside Safety Systems Damage Assessment
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Florida’s Roadside Safety Field Guide
June 2013 Release

FHWA Resource Charts

<table>
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<tr>
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<td>Median Terminal (24x24 Print Size)</td>
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<td>Roadside Post and Beam (24x60 Print Size)</td>
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<tr>
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Florida’s
Roadside Safety Field Guide
Guidelines for the Installation and Maintenance of Roadside Safety Hardware.

June 2013
Clear Zone

The term “clear zone” is used to designate an area bordering the roadway, starting at the edge of the traveled way, which is available for safe use by errant vehicles. Safe use generally means the slope is flat enough and free of fixed object hazards so a motorist leaving the road is able to stop and return to the roadway safely.

The clear zone distances shown below represent minimum recommended distances and are based on limited data. The best answer to the question “How wide should the clear zone be?” is “As wide as practical in each situation – but at least as wide as the distances, shown in the Table below”.

<table>
<thead>
<tr>
<th>Design Speed (mph)</th>
<th>Greater than 1500ADT</th>
<th>Less than 1500ADT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Travel Lanes &amp; Multilane Ramps (feet)</td>
<td>Auxiliary Lanes &amp; Single Lane Ramps (feet)</td>
</tr>
<tr>
<td>less than 45 mph</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>45 mph</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>50 mph</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>55 mph</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>greater than 55 mph</td>
<td>36</td>
<td>24</td>
</tr>
</tbody>
</table>
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Florida’s Roadside Field Guide

Semi-Rigid Systems

- **Strong-Steel or Wood Post W-Beam with wood or plastic block-outs**
  - Test Level: NCHRP 350/MASH TL-3
  - Post: W6 x 9 or W6 x 8.5 x 6.5 ft. Steel or timber post
  - Post Spacing: 6’-3”
  - Block-outs: 6” wide x 8” x 14” routed (w/steel post) timber or plastic block-outs. Double block-outs can be used.

- **Thrie Beam with wood or plastic block-outs**
  - Test Level: NCHRP 350 TL-3
  - Post: W6 x 9 or W6 x 8.5 x 6’-6” Steel Post
  - Post Spacing: 6’-3”
  - Block-outs: 6” wide x 8” x 21.75” routed timber or plastic block-outs can be used.

- **Modified Thrie-beam with steel block-outs**
  - Test Level: NCHRP 350: TL-3 and TL-4
  - Post: W6 x 9 or W6 x 8.5 x 6’-9” Steel Post
  - Post Spacing: 6’-3”
  - Block-outs: W14x22x17” long steel block. Steel block-out with a triangular notch cut from its web.
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Florida’s Roadside Field Guide

Flexible Systems:

- High Tension Cable Barriers (Propriety Systems) are installed with a significantly greater tension in the cables than generic, low-tension, three-cable systems. The deflection of these systems depends on the type of system and the post spacing. The high-tension systems also result in less damage to the barrier and usually the cables remain at the proper height after an impact which damages several posts. Note that the cable heights above ground may vary by manufacturer and by test level.

  All of these systems have been tested successfully on slopes as steep as 1V:4H, but lateral placement must follow manufacturer’s recommendations. FDOT restricts the use of cable barrier to slopes of 1V:6H or flatter.

  NOTE: FDOT limits maximum post spacing to 16 ft.

Brifen Wire Rope Safety Fence (WRSF) by Brifen USA
  http://www.brifenusa.com/

  Post: Z-shaped post, can be driven or socketed
  Cable: 3 or 4 cable combination. Top cable is placed in a center slot at top of the post and cables 2 and 3 are weaved around post. Cables are interwoven around posts.
  Typical Post Spacing: 10.5 to 21 ft.

Gibraltar
  http://www.gibraltartx.com/

  Post: C-channel post, can be driven or socketed
  Cable: 3 or 4 cable combination. Cables are attached using a single hair pin and are placed on alternate sides of adjacent posts.
  Typical Post Spacing: 10 to 30 ft.
Crash Cushions

Crash cushions are generally used to shield hazards in freeway gore areas or the ends of permanent or temporary traffic barriers.

Types of Crash Cushions

Crash cushions are classified based on their expected impact performance. Non-Gating, Redirective Crash Cushions - will contain a vehicle and keep it in the roadway for most impacts.

Many different crash cushions are commonly used throughout the United States. For national crash cushion designs, go to the FHWA website at http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/barriers/index.cfm

Non-Gating, Redirective Crash Cushions

- Used to shield concrete median barrier, double-faced guardrail, and rigid point obstructions.
- Used in narrow or wide roadway medians.
- Redirection begins at approach end.
- Can be used for permanent or temporary applications.

Trinity Attenuating Crash Cushion (TRACC)

Test Level: NCHRP 350 TL-2 and TL-3

How it works: Consists of a series of w-beam fender panels and an impact face which absorbs energy by cutting metal plates on the top sides of the guidance tracks when forced backward in an end on impact.

Requires Paved Pad.

Locations: Median or shoulder protection. Gore two-side protection.

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**Florida’s Roadside Field Guide**

## Maintenance & Repair

### Summary of W-beam barrier repair thresholds

<table>
<thead>
<tr>
<th>Damage Mode</th>
<th>Repair Threshold</th>
<th>Relative Priority</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post and Rail Deflection</td>
<td>One or more of the following thresholds:</td>
<td>High</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>• More than 9 inches of lateral deflection anywhere over a 25 ft length of rail.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Top of rail height 2 or more inches lower than original top of rail height.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6-9 inches lateral deflection anywhere over a 25 ft length of rail.</td>
<td>Medium</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td></td>
<td>Less than 6 inches of lateral deflection over 25 ft length of rail.</td>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>

#### Rail Deflection Only

<table>
<thead>
<tr>
<th>Rail Deflection Only</th>
<th>6-9 inches of lateral deflection between any two adjacent posts.</th>
<th>Medium</th>
<th><img src="image3.png" alt="Image" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: For deflection over 9 inches, use post/rail deflection guidelines.</td>
<td><img src="image4.png" alt="Image" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 6 inches of lateral deflection between any two adjacent posts.</td>
<td><img src="image5.png" alt="Image" /></td>
<td>Low</td>
<td></td>
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Roadside Barriers

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# FHWA Roadside Terminals

<table>
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<tr>
<th>NAME</th>
<th>MANUFACTURER</th>
<th>PERFORMANCE CHARACTERISTICS</th>
<th>TEST LEVEL</th>
<th>DISTINGUISHING CHARACTERISTICS</th>
<th>LOCATIONS CAN BE USED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vermont DT-1</td>
<td>Generic</td>
<td>X</td>
<td>TL-2</td>
<td>No impact head. Shop-bent W-beam 5 ft flare. Concrete anchor block with steel rod connecting at post 3.</td>
<td>Driveway terminals</td>
</tr>
<tr>
<td>Modified Eccentric Loader Terminal (MELT)</td>
<td>Generic</td>
<td>X</td>
<td>TL-2</td>
<td>No impact head. Rail installed on parabolic curve. Strut between the steel tube foundation for the two end posts to act together to resist the cable loads. All wood posts.</td>
<td>Should be installed at locations where runout area exists behind and downstream of the terminal. End of W-beam rail with offset of 4'-0&quot;.</td>
</tr>
<tr>
<td>Buried-in Backslope Terminal</td>
<td>Generic</td>
<td>X</td>
<td>TL-3</td>
<td>No impact head. Height of W-beam rail should be held constant in relation to the roadway shoulder elevation and barrier tapers to the ditch bottom. Rubber should be added below the W-beam.</td>
<td>Cut sections of a roadway. When the road transitions from a cut to a fill.</td>
</tr>
<tr>
<td>Eccentric Loader Terminal (ELT)</td>
<td>Generic</td>
<td>X</td>
<td>TL-3</td>
<td>End consists of a fabricated steel element inside a section of corrugated steel pipe. Rail installed on parabolic curve. Strut between the steel tube foundation for the two end posts to act together to resist the cable loads. All wood posts.</td>
<td>Should be installed at locations where runout area exists behind and downstream of the terminal. End of W-beam rail with offset of 4'-0&quot;.</td>
</tr>
<tr>
<td>Battered Rail Terminal (BRT-350)</td>
<td>Trinity Highway Products, LLC</td>
<td>X</td>
<td>TL-3</td>
<td>No impact head. Longitudinal slots on W-beam rail element. Strut and cable anchor bracket between post 1 and 2 act together to resist the cable loads. Slot guards on downstream end of slots. Steel and wood post options available. Parabolic flare on wood post.</td>
<td>Should be installed at locations where runout area exists behind and downstream of the terminal. End of W-beam rail with offset of 4'-0&quot;. Wood post option has 3'-0&quot; to 4'-0&quot; offset.</td>
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### New for 2014

**Criteria and Standards**

**Design Standards**

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**Roadway Design**

**Criteria and Standards**

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Design Standards

INDUSTRY REVIEW

Origination Form
Instructions
Example

Current Submittals
Under Review

Submittal History
NEW FOR 2014

ORIGINATION FORM

CONTACT

Date: 
Name: 
Phone: 
Email: 

DESIGN STANDARDS

Index No.: 
Title: 
Sheet No.: 

COMMENTARY

BACKGROUND

IMPLEMENTATION

☐ Immediate deployment via a Roadway Design Bulletin (Virtual Implementation), allowing use on projects with lettings beginning in ____.

OR

☐ Deployment of index ____ will be accomplished for the ____ Design Standards e-Booklet, allowing use on projects with lettings beginning January 1, ____.

A Roadway Design Bulletin will be required to release the ____ Design Standards.
NEW FOR 2014

ORIGINATION FORM

OTHER AFFECTED DOCUMENTS

1. Other Design Standards – N/A
2. Utility Accommodation Manual – N/A
3. Plans Preparation Manual – N/A
4. Basis of Estimates Manual – N/A
5. Standard Specifications – N/A
6. Other – N/A

ORIGINATION PACKAGE

- This origination package includes:
  - Design Standards - Origination Form,
  - Proposed Index Drawing(s),
  - Revised Index Drawing(s),
  - Proposed IDS,
  - Revised IDS,
  - Red-line Mark-ups,
  - Other Support Documents.

Origination Form Contacts

- Roadway, ITS, Planning, and Landscape:
  - (850) 414-4824 Darren Martin
  - (850) 414-4348 Patrick Overton

- Structures:
  - (850) 414-4304 James Frederick
  - (850) 414-4284 Kevin McDaniel

NOTE:
Clicking SEND will create an Origination e-mail.
Please, attach all supporting documents to complete the Origination Package.

Send
NEW FOR 2014

ORIGINATION FORM

e-mail

Attach All Documents to Complete the Origination Package

Indicate Index Number in the subject line of the e-mail
INDUSTRY REVIEW

Origination Form

Instructions

Examples
NEW FOR 2014

Origination Form

Instructions

DESIGN STANDARDS - ORIGINATION FORM

CONTACT
Date: Date of Origination (m/d/yyyy) - (This date does not change).
Name: Name of the Person Hosting the Revision or New Index. This Host will be the key contact person for questions, comments and responses related to the index.
Phone: Phone Number of the Host. (10 digits and Enter)
Email: Host email Address.

DESIGN STANDARDS
Index No.: Only one (1) Index Number per Revised Index Drawing(s) Origination Form.
When establishing a New Index, list the Proposed Index Number. Coordinate with the Design Standards Manager to Establish the New Index Number.
Title: List the existing Index Title; or the Proposed Index Title of a New Index.
Sheet No.: List the Sheet Number(s) Affected by the Revision or list the Number of Sheets for the New Index.

COMMENTARY
Describe the need for hosting a revision to this design standard. This description should be no more than one or two sentences long. Commentary on new indexes; this section provides the essential technical support behind the new requirement. It includes references to literature (both pro and con), directives, studies, research findings and other information that influences the decision to create a new index.

BACKGROUND
This section discusses the circumstances that prompted the revision or new index. It does not duplicate the commentary section. It should simply facilitate the reader’s understanding of the issue or situation that occurred and adequate responses to such issues. The background includes the history of a practice, problem, issue, concern, reference, sources of information, etc.

IMPLEMENTATION
Virtual implementation revisions will be issued without restriction on an “as needed” basis to effect changes which require immediate implementation (affect safety) or are cost effective to implement immediately (cost savings to Design, Construction, or Maintenance). This section specifies the method of deployment. In any case, an immediate deployment for Virtual Implementation candidates involves issuing a Roadway Design Bulletin with appropriate timeline for implementation.

- Immediate deployment via a Roadway Design Bulletin (Virtual implementation), allowing use on projects with lettings beginning in MONTH, 20XX.

Deployment of Index ###### will be accomplished for the 20XX Design Standards e-Booklet, allowing use on projects with lettings beginning January 1, 20XX. A Roadway Design Bulletin will be required to release the 20XX Design Standards. Choose the applicable deployment method (select only one).
**NEW FOR 2014**

**INDUSTRY REVIEW**

*Origination Form*

*Instructions*

*Examples*
NEW FOR 2014

Origination Form
Examples

Design Standards - Origination Form

Contact
Date: April 19, 2013
Name: John Mauthner, P.E. – Design Standards Manager
Phone: (850) 414-4334
Email: John.Mauthner@dot.state.fl.us

Design Standards
Index No.: 304
Title: Detectable Warnings and Sidewalk Curb Ramps
Sheet No.: 1-7 (New Sheets)

Commentary
This revision is based on the redevelopment of Index 304.

Background
Over the last 30 months calls and comments have been received in the Criteria and Standards Office with the following request: In Index 304 the curb ramp design details are not buildable and lack sufficient detail. The Construction Office received multiple requests from Contractors to generate a “Summary of Detectable Warnings” table which quantify the area of detectable warnings for typical curb ramp applications. In order to provide adequate resolve the Design Standards Office, Central Office ADA Coordinator, and the Construction Office hosted revisions to the redevelopment of Design Standard, Index 304.

Implementation
☐ Immediate deployment via a Roadway Design Bulletin (Virtual Implementation), allowing use on projects with lettings beginning in

OR

☑ Deployment of Index 304 will be accomplished for the 2014 Design Standards e-Booklet, allowing use on projects with lettings beginning January 1, 2014. A Roadway Design Bulletin will be required to release the 2014 Design Standards.
**NEW FOR 2014**

**INDUSTRY REVIEW**

Current Submittals Under Review

---

### Design Standards

#### INDUSTRY REVIEW

<table>
<thead>
<tr>
<th>Year</th>
<th>eBooklet</th>
<th>Revised Index Drawings</th>
<th>Developmental Design Standards</th>
<th>Design Standards Procedure</th>
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<tbody>
<tr>
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<td>RID</td>
<td>DDS</td>
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#### HISTORICAL

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#### Design Standards Modifications

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<th>Design Interim Standards</th>
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<td>2010</td>
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</table>
## Industry Review

**Current Submittals Under Review**

There are the following files in the developmental process and are posted for review. If you have comments, please use the comments section below. To track the history of proposed revisions, go to the [track the status of proposed revisions](#) page. The sizes range from 23 to 30 KB.

<table>
<thead>
<tr>
<th>Design Standard</th>
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</table>

Select the Design Standard you want to comment on.

Hit the [track the status of proposed revisions](#) page. Your comments are in the space provided below.

Note: Email addresses in 20 minutes. If you are unsure of the length of time to enter your comments, please type your comments in another application, then copy and paste below.

### Contact Information

Name: 
Phone: 
E-Mail: 
Confirm E-Mail: 

Please contact me as soon as possible regarding this matter.

Enter the following characters, then click "Submit" to send your Comments.
# NEW FOR 2014

## INDUSTRY REVIEW

Submittal History

### Current Submittals Under Review

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<th>Year</th>
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### Historical

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Select the desired Historical Standard Booklet, Interim Standards or Standards Modification by clicking on their underlined symbol.

The dates shown under Design Standards Modifications are the effective dates of the Modifications with detailed content.
**NEW FOR 2014**

**Design Standards**

**CURRENT**

- eBooklet 2014
- Revised Index Drawings

**Developmental Design Standards**

**Design Standards Procedures**

---

**INDUSTRY REVIEW**

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<td>I</td>
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<td>I</td>
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<tr>
<td>2000</td>
<td>S</td>
<td>I</td>
<td>N/A 1-Jan-06 Metric 1-Jul-05 Metric</td>
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</table>
**DRAINAGE (D)**

- **D-2**
  - **Artificial Block***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Woven Monofilament 248, Other Geotextiles: Elongation 50%, 315, 60%, 203
  - **Mechanically Stabilized Retaining Wall Supporting Spreading Trench Foundations***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Woven Monofilament 248, Other Geotextiles: Elongation 50%, 315, 60%, 203
- **D-3**
  - **Underdrain***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
  - **Shovel Fill Filter***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
  - **Concrete Placement Subbase***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
- **D-4**
  - **Ditch Pavement (Sand-Cement)***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
  - **Ditch Pavement (Concrete)***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
- **D-5**
  - **Mechanically Stabilized Retaining Wall***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
- **D-6**
  - **Shape Pavement (Concrete)***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
  - **Ditch Pavement (Concrete)***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
- **E-1**
  - **Staked Silt Fence***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
- **E-2**
  - **Silt Screen***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
- **E-3**
  - **Plastic Erosion Mat (Turf Reinforcement Mat) (Type 1)***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
  - **Plastic Erosion Mat (Turf Reinforcement Mat) (Type 2)***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203
  - **Plastic Erosion Mat (Turf Reinforcement Mat) (Type 3)***
    - **Soil**: % Soil Passing No. 200 sieve 95%, 55% 0.1, 65% 0.2, 70% 0.3
    - **Geotextile**: Elongation 50%, 315, 60%, 203

**GENERAL NOTES**

1. Specifications for geotextiles are in Section 985. Physical criteria for each application is provided by this standard, in conjunction with these sections.
2. All values except ADS are MINIMUM AVERAGE ROLL VALUES in the nearest principal direction. Values for ADS are MAXIMUM AVERAGE ROLL VALUES.
3. Test soft or fill material adjacent to the geotextile for gradation to select values for permeability and ADS. GEOTEXTILE CRITERIA INDEX NO. 199

**TABLE 1**

<table>
<thead>
<tr>
<th>Test</th>
<th>Unit</th>
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<tbody>
<tr>
<td>Permeability</td>
<td>SC&lt;sup&gt;†&lt;/sup&gt;</td>
<td>ASTM-D-4491</td>
</tr>
<tr>
<td>ADS</td>
<td>US Stone No.</td>
<td>ASTM-D-4851</td>
</tr>
<tr>
<td>Elongation</td>
<td>%</td>
<td>ASTM-D-4852</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>lb</td>
<td>ASTM-D-4833</td>
</tr>
<tr>
<td>Width Tensile Strength</td>
<td>lb/ft</td>
<td>ASTM-D-4855</td>
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<tr>
<td>Maximum Design Velocity</td>
<td>mph</td>
<td>See Rate 8</td>
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<tr>
<td>Savage Strength</td>
<td>lb/ft</td>
<td>ASTM-D-4844</td>
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<tr>
<td>Penetration</td>
<td>lb</td>
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<tr>
<td>Tensile Tear</td>
<td>lb</td>
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<tr>
<td>Ultraviolet Resistance</td>
<td>% Remaining In Strength</td>
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<tr>
<td>Nutrient Efficiency</td>
<td>%</td>
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<tr>
<td>Flow Rate</td>
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**FDOT 2014 DESIGN STANDARDS**

<table>
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<td>Structure Bottoms - Type J &amp; P</td>
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<tr>
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NEW FOR 2014

Design Standards

Revised Index Drawings
### Developmental Design Standards

#### For Developmental Design Standards Process — Click Here

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<th>Instructions for Developmental Design Standards (PDF)</th>
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<tr>
<td>D477</td>
<td>Three-Beam Panel Retrofit (Concrete Handrail) (NOTE: Migrated to the Design Standards effective for lettings beginning January 2014 - See Index 477 in the current Design Standards eBooklet)</td>
<td>Govin McDaniel</td>
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<td>D590</td>
<td>Irrigation Installation</td>
<td>Jeff Caster</td>
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<td>D6025</td>
<td>GRS-IBS</td>
<td>Larry Jones</td>
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<td>D17749</td>
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<td>D20310</td>
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NEW FOR 2014

Design Standards

Design Standards Procedure

DESIGN STANDARDS

PURPOSE:

The Design Standards (Standard Indexes) are a dated set of pre-approved standard drawings, compiled into electronic booklet (e-Booklet) format. These standard drawings, known as standard indexes, illustrate accepted practices based on policy and design criteria of the Department. Assembly of the Design Standards e-Booklet is coordinated and maintained, by the State Roadway Design Office. The Design Standards are intended to support the various engineering processes for design, construction, maintenance and utility operations on the State Highway System. They are established to ensure uniform application of acceptable engineering standards, designs and details in the preparation of contract plans for roadways and structures.

AUTHORITY:

Sections 20.23(4)(a) and 334.048(3), Florida Statutes (F.S.)

SCOPE:

This procedure impacts those preparing roadway or structures construction plans for the Department or constructing or maintaining Department facilities.

1. APPROVAL

Individual Design Standards drawings are prepared by various functional areas within the Department. Record copies are filed and maintained by the State Roadway Design Office. Incorporation of new Design Standards drawings into the Design Standards e-Booklet requires submission to and certification by the discipline specific responsible professional, followed by final approval of the Federal Highway Administration.

The Design Standards will include a CERTIFICATION STATEMENT sheet signed, dated and sealed by the discipline specific responsible professional. This sheet will identify the individual Design Standards number(s) certified by each responsible professional. The official certified and approved Design Standards e-Booklet is posted online at:

http://www.dot.state.fl.us/rddesign/DesignStandards/Standards.shtml
NEW FOR 2014

Design Standards

HISTORICAL
eBooklet 2013

eBooklet Fiscal Year 2012/2013

eBooklet 2010 through 2000
NEW FOR 2014

Roadway Design http://www.dot.state.fl.us/rrdesign/cs/cs.shtm

Criteria and Standards

Topics
- Bicycle and Pedestrians
- Design Bulletins
- Florida Greenbook
- Florida Intersection Design Guide
- Lighting
- Maintenance of Traffic
- Plans Preparation Manual
- Roadside Barriers
- Signalization and ITS
- Signing and Pavement Marking

Other Links of Interest
- ADA Public Rights of Way
- Construction Office
- Design Standards
- Drainage Section
- Driveway Information Guide - 2008
- Engineering CADD (ECSD)
- MUTCD
- Specifications - Estimates
- Structures Design Office
- Traffic Engineering Office

Contact Us

Roadway Design Administrator
- Sullivan, Frank (850) 414-4324
- Benguelli, Ezzedin (850) 414-4352
- Gerrill, Benjamin (850) 414-4318
- Henson, Chester (850) 414-4317
- Irizarry, Maria (850) 414-4321
- Koos, Mary Anne (850) 414-4339
- Lewis, Christopher (850) 414-4824
- Martin, Darren (850) 414-4334
- Mauthnor, John (850) 414-4340
- Overton, Patrick (850) 414-4792
- Prytyka, Gregory

Many links on our site are PDF files and best viewed with Adobe Acrobat Reader®.

Design Update Training
THE END

Please visit us at:
http://www.dot.state.fl.us/rddesign/cs/cs.shtm

or

contact me
Darren Martin
Design Standards Specialist
(850) 414 - 4824
Darren.Martin@dot.state.fl.us