# MEETING MINUTES

1. David O'Hagan (Committee Chairperson / Florida Department of Transportation (FDOT) State Roadway Design Engineer) opened the meeting. He stated this meeting was being held under the Sunshine Law and minutes were being taken. David also mentioned the **Sign-In Sheet** was being passed around. David stated that there may be some changes to the **Agenda** depending on when Rick Renna is able to call in, since he was unable to travel to the meeting.

2. The meeting attendees introduced themselves.

3. David O'Hagan discussed **Committee Member Changes** (since last meeting): David Evans was replaced by Gene Howerton as the District 2 non-governmental representative. The vacant District 2 Rural Area position was filled by Kenneth Dudley of Taylor County (leaving only the District 2 Urban Area position vacant). ***{The District 2 vacancy has since been filled by David Cerlanek of Alachua County}***. Larry Kelley became the District 3 Secretary and Scott Golden became the District Design Engineer. David Ponitz was replaced by Charles Ramdatt of Orlando as the District 5 Urban Area member.

4. David O'Hagan said that everybody should have picked up a **Meeting Package**. He then asked that everybody turn to and review the **2007 Meeting Minutes**. One member questioned Item #18 and if the 4' width could be clarified. The committee agreed that it should be clarified to specify that the 4' is for the width of the accessible route. There were no other comments, and all were in favor to accept the minutes as amended.

5. Rob Quigley (FDOT Roadway Design) discussed Florida Greenbook ownership, FDOT's role and the committee's role and responsibilities. Rob also noted that active committee participation is essential and asked that each member participate in at least one subcommittee. Rob stated that participation is also measured by meeting attendance and that although attendance at every meeting is preferred, members that could not attend at least one annual meeting every three years would be questioned on whether or not they were able to remain on the committee.

6. Rob Quigley gave a brief overview of the **Rulemaking Process** in general and for the 2007 Florida Greenbook, which was effective October 16, 2007.

7. Rob Quigley briefly discussed the **Sunshine Law** and what is required during annual meetings and subcommittee meetings. These requirements were outlined in the **2006 Meeting Minutes**.

8. Joe Santos (FDOT Safety Office) gave a presentation on the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (**SAFETEA-LU**) and the Highway Safety Improvement Program. He gave an update on the tools that are in place to analyze Florida roads in an effort to improve safety. Joe also gave a presentation on the **Strategic Highway Safety Plan (SHSP)**. He discussed the plan, the priority areas, and the Safety Program Tracking page: **http://www2.dot.state.fl.us/safetyprogramtracking/** Joe also provided data from a Safety Belt Use study. For more information on these issues, please contact **Joe Santos**.

9. Chester Henson (FDOT Roadway Design) gave a presentation on **Audible and Vibratory Pavement Markings**. He gave examples of different types of markings as well as some recent test placement areas he has been involved in. Chester also discussed the Strategic Highway Safety Plan emphasis area on reducing lane departure crashes. He discussed FDOT's current policy for rumble strips and the proposed policies for audible and vibratory pavement markings. ***{The audible and vibratory pavement marking policy was since adopted and is covered in Roadway Design Bulletin 08-07 / Estimates Bulletin 08-05}.*** For more information on these issues, contact **Chester Henson**.

10. Mark Wilson (FDOT Traffic Operations) discussed the DRAFT Signing and Marking chapter (**Chapter 18**) proposed for inclusion in the next edition of the Florida Greenbook. Some discussion followed and the committee agreed that this chapter should include a link to the referenced MUTCD. The committee also agreed with the sections on advance street name signs, advance warning signs, street name signs, and pavement markings that have been proposed. Several comments were made at the meeting and any other comments on the proposed chapter should be forwarded to chapter author **Chester Henson**. When all comments are incorporated, the next draft of the chapter will be posted online on the Florida Greenbook Web Page for review **(http://www.dot.state.fl.us/rddesign/FloridaGreenbook/FGB.htm)**, and the committee will vote on approving the chapter at the 2009 meeting.

11. Jim Harrison (Orange County) discussed the subcommittee progress on the **Traditional Neighborhood Development (TND) Chapter**. A very preliminary draft of the proposed chapter was presented to the committee. Jim stated that the progress is not where they had hoped to be at this point in time, but this draft will be further reviewed with and edited by the subcommittee. Several comments were made at the meeting and any other comments on the proposed chapter should be forwarded to chapter author **Billy Hattaway**.

12. Harrison Higgins (Florida State University) gave a presentation on the proposed **Version 2 of the Accessing Transit Handbook** and discussed the changes. Electronic versions of the current edition are available on the FDOT Transit Web Page: **http://www.dot.state.fl.us/transit/**, and draft handbook will be posted on the Roadway Design Office FTP site (for approximately 2 weeks) once received: **ftp://ftp.dot.state.fl.us/fdot/co/roadway design/Permanent/FGBAC/** For more information on the handbook, or to request a copy, please contact **Amy Datz**.

13. ***Lunch Break***

14. Allen Schrumpf (Dyer, Riddle, Mills, & Precourt, Inc.) gave a presentation on the updates for **Chapter 11 – Work Zone Safety** which the Chapter 11 subcommittee has recommended. After the presentation, the committee reviewed the proposed updates to **Chapter 11**, and most of the comments made were related to existing text in the chapter. Allen said that he and the subcommittee will work on the chapter to address those comments and present their recommendations at the 2009 Committee Meeting.

15. Rob Quigley discussed new requirements for FDOT projects involving **Bridge Demolition**. These requirements ware added to the Department's Plans Preparation Manual and Project Management Handbook in response to Section 1805 of

the SAFETEA-LU Legislation, which requires the Department to make the debris from demolished bridges available to other government agencies for beneficial use. ***{Since the meeting, a Sample Agreement has been added to the Project Management Handbook: http://www.dot.state.fl.us/projectmanagementoffice/PMhandbook/P2_Ch03.pdf}***

16. Jim Mills (FDOT Roadway Design) discussed the preliminary draft of the **Horizontal Clearance** section of Chapter 3. These changes are intended to rewrite the current section on roadside clear zone. The committee gave some comments and agreed with the general concept of the proposed language. The committee asked that the proposed changes be worked out with the Chapter 3 subcommittee and their recommendations can be presented at the 2009 Committee Meeting.

17. Jim Mills discussed the draft recommendations made by Dean Perkins (Statewide ADA Coordinator) for **Chapters 3 and 8**. These proposed changes are based on the draft Public Rights of Way Guidelines. The committee provided some comments and agreed with the general concept of the proposed language however they did not feel that the changes to the new minimum values should be made as requirements (recommendations were acceptable) until the Access Board adopts the new Public Right Of Way Guidelines. The committee asked that the proposed changes be worked out with Dean Perkins the Chapter 3 and 8 subcommittees and their recommendations can be presented at the 2009 Committee Meeting.

18. Fred Schneider (Lake County) had originally brought up **Intersection Lighting** issues but was unable to attend, so Jim Davis (Indian River County) led the discussion. The issue was mainly the need to address spot lighting at rural intersections. The Chapter 6 subcommittee will work on addressing this and their recommendations can be presented at the 2009 Committee Meeting. George Webb (Palm Beach County) had a few other **Issues Related to Lighting** which he handed out and discussed.

19. Rob Quigley brought up a question received regarding **Lane Width**. The committee agreed that this issue should not be addressed in the Florida Greenbook since the project in question was not a new construction project; it is a Resurfacing, Restoration and Rehabilitation (RRR) project which the Florida Greenbook does not specifically address.

20. Gaspar Miranda (Miami-Dade County) gave a presentation discussing his recommendations regarding **Median Width**. This recommendation would allow a raised 10 foot median to be used when design speeds are 40mph or less. The committee agreed to adopt the recommended change.

21. Rick Renna (FDOT Drainage Design) via telephone discussed several current FDOT drainage design issues. The issues discussed included: The Department of Environmental Protection (DEP) Statewide Stormwater Treatment Rule and the Technical Advisory Committee (TAC) established to assist in this rule development (information on this is available on the DEP web page: **http://www.dep.state.fl.us/water/wetlands/erp/rules/sw_swt_rule_dvlpmt.htm**); The proposed Statewide Erosion and Sediment Control Manual for designers and reviewers (available on the FDOT web page: **http://www.dot.state.fl.us/rddesign/dr/Drainage.htm**); A brief update on High Density Polyethylene Pipe (HDPE). Rick also gave a brief

presentation of a recent study regarding the **Impacts of Drainage Inlets on Bicyclists**. For more information on these issues, contact **Rick Renna**.

22. Duane Brautigam (FDOT Specifications and Estimates) gave an update on the Local Agency Program (LAP) and the LAP Specifications for Landscape (580), Earthwork (120), Hot Mix Asphalt (334), and Concrete (344). Duane also discussed some additional guidelines for LAP projects on the State Highway System. The LAP Specifications and Guidelines are available on the Specifications web page: **http://www.dot.state.fl.us/specificationsoffice/.**

23. David O'Hagan had several more items for discussion with the group. He talked about **Section 120.69, Florida Statutes**, and described the Department's authority to enforce the Florida Greenbook. David also described a recent county project issue in which he became involved. Then David mentioned that the FDOT Driveway Handbook is being updated for 2008. A DRAFT is available on the FDOT FTP site (for approximately 2 weeks) at: **ftp://ftp.dot.state.fl.us/fdot/co/roadway%20design/Permanent/FGBAC/**, and the final should be ready mid-2008. Finally, David mentioned that the 2008 FDOT Design Update training would be available on the Design Office web page: **http://wbt.dot.state.fl.us/ois/UT2008/**

24. Open discussion :

    a. Ed Kant (Florida Transportation Technology Transfer Center ($T^2$)) mentioned that $T^2$ is developing an "Introduction to the Florida Greenbook" course. He expects the pilot to be a 2.5 day course, and they are looking for volunteers to review and give feedback on the sessions. Anyone interested can contact **Ed Kant**.

    b. Joe Santos mentioned that the SHSP is available online at: **http://www.dot.state.fl.us/safety/StrategicHwySafetyPlan.htm**

    c. Rick Hall (Hall Planning & Engineering) mentioned that some other information related to Traditional Neighborhood Developments could be found on the Congress for New Urbanism webpage: **http://www.cnuflorida.org/.** Also, those interested in a TND workshop can contact **Rick Hall**.

25. Rob Quigley asked the committee to review their **Member Information** and provide updates. **Updated Member Info is posted on the Florida Greenbook Web Page http://www.dot.state.fl.us/rddesign/FloridaGreenbook/FGB.htm**.

26. **Subcommittee membership** was briefly reviewed and updated as well**. Updated Subcommittee Membership information is posted on the Florida Greenbook Web Page: http://www.dot.state.fl.us/rddesign/FloridaGreenbook/FGB.htm**.

27. Travel Form Reminder. Contact **Rob Quigley** if you have any questions.

28. Meeting critique: Improvements were discussed for the next meeting: Suggestions included having a bit more table space and more elbow room. Other comments included extending future meetings to 1½ days for an agenda this size, and that this meeting was in a good location, but there was no wireless internet connectivity.

29. Meeting adjourned.

# Florida Greenbook Advisory Committee Meeting

## March 18, 2008

### Attendee Sign In

| # | Name | Representing | E-mail (if not on committee) |
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| 2 | Chester Henson | FDOT | |
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| 8 | Gaspar Miranda | MIAMIDADEPWD | GXM@MIAMIDADE.GOV |
| 9 | Harad Desdunes | FDOT | |
| 10 | Allen Schrumpf | Dyer, Riddle, Mills & Precourt | |
| 11 | GEORGE WEBB | PALM BEACH CO | GWEBB@PBCGOV.COM |
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| 16 | DAVID KUHLMAN | FPL | DAVID.F.KUHLMAN@FPL.COM |
| 17 | KENNETH DUDLEY | TAYLOR COUNTY | COUNTY.ENGINEER@TAYLORCOUNTYGOV.COM |
| 18 | Gene Howerton | Arcadis | gene.howerton@arcadis-us.com |
| 19 | Jim Pitman | FDOT-D2 | jimmy.pitman@dot.state.fl.us |
| 20 | Edward J. Kant | UF T² Center | ejkpe@comcast.net |
| 21 | STEVE NEFF | CITY OF CAPE CORAL | |
| 22 | Craig Batterson | Professional Engineering Consultants, Inc. | cbattersons@peconline.com |
| 23 | Joy Puerta | City of Boca Raton | jpuerta@myboca.us |
| 24 | SCOTT GOLDEN | FDOT-D3 | john.golden@dot.state.fl.us |
| 25 | Chuck Meister, P.E. | City of Destin | cmeister@cityofdestin.com |

# Florida Greenbook Advisory Committee Meeting
# March 18, 2008

## Attendee Sign In - Continued

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| 32 | Rob Quigley | FDOT-CO | ROBERT.QUIGLEY@DOT.STATE.FL.US |
| 33 | Rick Hall | HPE-Inc. | rickhall@hpe-inc.com |
| 34 | Jim Davis | Indian River Co. | JIMDAVIS@ircgov.com |
| 35 | Amy Datz | FDOT Transit-CO | Amy.Datz@dot.state.fl.us |
| 36 | Jim Harrison | Orange Co | |
| 37 | Harrison Higgins | FSU | hhiggins@fsu.edu |
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*March 18, 2008*

# *Florida Greenbook Advisory Committee Meeting*

# *Meeting Review Package*

## *Crowne Plaza Universal*
## *Orlando, Florida*

# *Agenda*

# REVISED AGENDA

## FLORIDA GREENBOOK ADVISORY COMMITTEE MEETING

**Tuesday, March 18, 2008 8:00am – 5:00pm**

**Crowne Plaza Universal, Orlando**
**7800 Universal Blvd.**
**Orlando, Florida 32819**
**(407) 355-0550**

| | |
|---|---|
| **8:00 – 8:15** | General Information (15min)<br>• Introductions (David O'Hagan)<br>• Committee Member Changes (David O'Hagan)<br>• Review March 2007 Meeting Minutes (David O'Hagan)<br>• Discuss Florida Greenbook Ownership (Rob Quigley)<br>• Rulemaking Process (Rob Quigley)<br>• Sunshine Law (Rob Quigley) |
| **8:15 – 8:45** | Strategic Highway Safety Plan (Joe Santos) (30min) |
| **8:45 – 9:30** | Signing, Marking & Signalization Issues (Chester Henson) (45min) |
| **9:30 – 10:00** | Signing & Marking Chapter Subcommittee Update (Mark Wilson) (30min) |
| **10:00 – 10:15** | ***Morning Break (15min)*** |
| **10:15 – 10:45** | Traditional Neighborhood Development (TND) Chapter Subcommittee Update (Jim Harrison) (30min) |
| **10:45 – 11:00** | Chapter 11 – Work Zone Safety – Proposed Edits (Allen Schrumpf) (15min) |
| **11:00 – 11:30** | Accessing Transit Update (Amy Datz/Harrison Higgins) (30min) |
| **11:30 – 12:30** | ***Lunch (1hr)*** |
| **12:30 – 2:30** | Design Issues (120min)<br>• Bridge Debris (Rob Quigley (15min)<br>• Horizontal Clearance (Jim Mills) (30min)<br>• ADA & Proposed Edits to Chapters 3 & 8 (Jim Mills) (25min)<br>• Lighting Issues (Fred Schneider) (20min)<br>• Lane Width (Rob Quigley) (10min)<br>• Median Width (Gaspar Miranda) (20min) |
| **2:30 – 2:45** | ***Afternoon Break (15min)*** |
| **2:45 – 2:55** | Section 120.69, F.S. (David O'Hagan) (10min) |
| **2:55 – 3:25** | LAP Program / Specifications (Duane Brautigam) (30min) |
| **3:25 – 4:15** | Drainage Issues (Including Bicycles & Inlets) (Rick Renna) (50min) |
| **4:15 – 4:45** | Roundtable Discussion / Committee Member Issues (Committee) (30min) |
| **4:45 – 5:00** | Closing Items (Rob Quigley) (15min)<br>• Review / Update Subcommittee Assignments<br>• Travel Form Reminder / Reimbursement Info<br>• Meeting Critique |

***Note: Any other handouts provided at the meeting will be posted with the Meeting Minutes at:***
**http://www.dot.state.fl.us/rddesign/FloridaGreenbook/FGB.htm**

# *Committee Member Information*

# FLORIDA GREENBOOK ADVISORY COMMITTEE

# 2007/2008 MEMBERSHIP CHANGES

## MEMBERS

**DISTRICT 2**
The vacant D-2 Rural Area Member position has been filled by **Kenneth Dudley**, the County Engineer for Taylor County.

Last year, **David Evans** moved to Georgia to work in HNTB's Atlanta office, leaving the D-2 Non-governmental Member position vacant. This position has been filled by **Gene Howerton,** Vice President for Arcadis, U.S., Inc. in Jacksonville.

The D-2 Urban Area Member position is still **VACANT.**

**DISTRICT 3**
Last Year, **Larry Kelley**, the D-3 District Design Engineer became the District Secretary. The District Design Engineer position was filled by **Scott Golden**.

**DISTRICT 5**
Last year, **David Ponitz** left the City of Daytona Beach, leaving the D-5 Urban Area Member position vacant. This position has been filled by **Charles Ramdatt,** the Division Manager for the City of Orlando Transportation Department.

# GREENBOOK COMMITTEE MEMBERS

# MAY – 2007

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# *March 2007 Meeting Minutes*

Florida Greenbook Advisory Committee Meeting
Hawthorn Suites – Orlando Airport, March 13, 2007

# MEETING MINUTES

1. David O'Hagan (Committee Chairperson / FDOT State Roadway Design Engineer) opened the meeting. He stated this meeting was being held under the Sunshine Law and minutes were being taken. David also asked that everybody fill in their information on the **sign-in sheet** that was being passed around. David stated that the **agenda** was very full and we would try to stay on schedule.

2. David O'Hagan discussed Committee Member changes (since last meeting): William "Bill" Lecher passed away earlier in the year, and Richard McCubbin left the City of Jacksonville (leaving the District 2 Rural and Urban area positions vacant). George Webb replaced Henry Cook as the District 4 Urban Area member. Also several associate member changes took place: Robert Robertson replaced William Nickas as the State Structures Engineer; and Gail Holley and Chester Henson were added at the last meeting.

3. The meeting attendees took turns introducing themselves.

4. David O'Hagan said that everybody should have picked up a **Meeting Package**. He then asked that everybody turn to and review the **2006 Meeting Minutes**. Rob Quigley (FDOT Roadway Design) noted that the minutes showed where a question was asked as to whether or not members could receive Professional Development Hour (PDH) credits for attending future meetings. Rob stated that this issue was researched and no PDH credits could be earned for attending this meeting. There were no other comments, and all were in favor to accept the minutes.

5. Rob Quigley (FDOT Roadway Design) discussed Florida Greenbook ownership, FDOT's role and the Committee's role and responsibilities. Rob also noted that active Committee participation is essential and asked that each member participate in at least one subcommittee. Rob also stated that participation is also measured by meeting attendance and that although attendance at every meeting is preferred, members that could not attend at least one annual meeting every three years would be questioned on whether or not they were able to remain on the committee.

6. Rob Quigley gave a brief overview of the **Rulemaking Process**.

7. Rob Quigley briefly discussed the **Sunshine Law** and what was required during annual meetings and subcommittee meetings. There requirements were outlined in the **2006 Meeting Minutes**.

8. Jim Mills (FDOT Roadway Design) discussed current FDOT design issues. These issues included a brief presentation on the Department's **Median Crossover Policy** and a brief presentation on **Cable Barrier**. For more information on these issues, contact **Jim Mills**.

   Chester Henson (FDOT Roadway Design) also discussed current FDOT design issues related to Traffic Design. He discussed the changes in wind speed requirements for signals, signing and lighting. He also talked about the single point signal connection and its advantages compared to a two cable system. For more information on these issues, contact **Chester Henson**.

9. Chester Henson and Gail Holley (FDOT Traffic Operations) discussed the DRAFT Signing and Marking chapter (**Chapter 18**) proposed for inclusion in the next edition of the Florida Greenbook after the 2007 edition. Chester discussed what was put into the chapter including information on signs, pavement markings and retro-reflective pavement markers (RPM's). Any comments on the proposed Chapter should be forwarded to **Chester Henson**. **When all comments are incorporated, the next draft of the chapter will be posted online on the Florida Greenbook Web Page for review (http://www.dot.state.fl.us/rddesign/FloridaGreenbook/FGB.htm), and the committee will vote on approving the chapter at the 2008 meeting**.

10. Billy Hattaway (Glatting Jackson Kercher Anglin) discussed the subcommittee progress on the Traditional Neighborhood Development (TND)chapter (which the subcommittee agreed needed to be a new Florida Greenbook chapter). The new chapter will address street development and land use. He made a presentation on **Traditional Neighborhood Development** that will be presented to different stakeholder groups to make sure they are aware of what's going on and give them an opportunity to comment. **Billy stated the subcommittee's goal is to have a chapter introduction (with definitions) ready in May 2007 and a draft chapter ready for the 2008 meeting**.

11. Duane Brautigam (FDOT Specifications) discussed the background and status of the Local Agency Program (LAP) Specifications which are still in DRAFT form: Landscape (580), Earthwork (120), Hot Mix Asphalt (334), and Concrete (344). **These are available for review and comment on the History of LAP Specifications web page: http://www.dot.state.fl.us/specificationsoffice/LapSpecs/HistoryofLAPSPECS.htm}** Duane discussed each of the Specifications, discussed the different categories of each, and also highlighted points of flexibility. **Duane asked the Greenbook Committee for endorsement and all were in favor to endorse these specifications.**

12. Ken Leuderalbert (FDOT Project Management) also gave an explanation of the **Local Agency Program Advisory Council**. He invited those interested to join this committee. For more information on this council, or to join, contact **Ken Leuderalbert**.

13. Amy Datz (FDOT Transit Office) discussed the **Accessing Transit** handbook. Electronic versions of the current edition are available on the **FDOT Transit Web Page (http://www.dot.state.fl.us/transit/)**, and copies of the hand book can be obtained by contacting Amy Datz. Amy also gave a presentation on **Version 2 of Accessing Transit**, and discussed the proposed revisions and timeline for completion.

14. Lunch Break

15. Marianne Trussell (FDOT Safety Office) discussed Florida's Strategic Highway Safety Plan and mentioned the Florida Safety Summit in Orlando that was taking place on March 12-13, 2007. Marianne gave an overview of the Plan, its development history, and emphasis areas. Details can be found on the Strategic Highway Safety Plan Web Page: **http://www.dot.state.fl.us/safety/StrategicHwySafetyPlan.htm**.

16. Jim Mills gave an overview of the **Federal Rule on Work Zone Safety and Mobility** and discussed how it applies to local agencies on projects of significant impact. Jim also covered the Transportation Management Plan (TMP), Temporary Traffic Control (TTC) Plan, and Training requirements of the Rule. Jim also mentioned the presentation on the Rule which was done for the **2007 FDOT Design Update Training by Cheryl Adams**. **This training is available online on the Design Update Training web page (under PPM Vol 1 Chapter 10) at: http://wbt.dot.state.fl.us/ois/UpdateTraining2007/ The Committee agreed that a reference to this rule be included in the 2007 edition of the Florida Greenbook.**

17. Allen Schrumpf (Dyer, Riddle, Mills, & Precourt, Inc.) discussed some potential areas of improvement for Chapter 11 – Work Zone Safety which were detailed in the **Memorandum to the Greenbook Committee and Cheryl Adams** which he handed out. **The Committee decided that these issues need to be discussed among the Chapter 11 Subcommittee and the Subcommittee recommendations can be presented at the 2008 Committee Meeting.**

18. Dwayne Kile (FDOT District Design Engineer – District 7) gave a presentation on the **Americans with Disabilities Act (ADA) and the Florida Accessibility Code**. He discussed the background of ADA and ADA Accessibility Guidelines (ADAAG) including proposed changes in the proposed Public Rights of Way Accessibility Guidelines. ***{CLARIFICATION: The 4' minimum width requirement discussed at the Greenbook meeting is being proposed, but HAS NOT YET BEEN ADOPTED by Federal Rule. FDOT has adopted 4' as a standard for new construction and reconstruction, but even FDOT still allows for reductions to current adopted minimums in ADAAG where space is constrained or restricted. For Utilities on the State Highway System, the minimums in the current UAM are still in effect (36" and 32").}*** Dwayne also discussed issues that have arisen in lawsuits and the efforts made to resolve those issues. For more information on these issues, contact **Dean Perkins** or **Dwayne Kile**.

19. Rick Renna (FDOT Drainage Design) discussed current FDOT drainage design issues. These issues included discussions on the High Density Polyethylene Pipe (HDPE), she proposed Statewide Erosion and Sediment Control Manual for designers and inspectors, and the proposed update of Rule 14-86. Rick also gave a brief update on Coastal Wave Research, Spiral Ribbed Aluminized Pipe, and Fiber Reinforced Concrete Pipe. For more information on these issues, contact **Rick Renna**.

20. Open discussion / Committee Member issues.

    a. Jim Davis offered several proposed changes to Chapter 2 – Land Development. These changes were accepted by the committee for the 2007 Florida Greenbook.

    b. Andre Pavlov identified the major changes for the update of Chapter 17, and mentioned some minor changes which were necessary for this update. These changes were accepted by the committee for the 2007 Florida Greenbook.

c. George Webb and Craig Batterson had some questions regarding the 14.5' driver's eye setback in Figure 3-8. Jim Mills referred to Section C.9.b.4.(a) of Chapter 3 for further information.

d. Joy Puerta asked about updating the Florida Greenbook to reflect 48" minimum sidewalk width rather than the current 36" minimum. Jim Mills suggested that we wait until he gets confirmation as to whether the new values have been adopted by Federal Rule yet. ***{See Clarification note in Item 17.}***

e. Gaspar Miranda had a question about Table 3-11. He asked if there can be a narrower width available for use for Urban Streets with design speeds of 45mph and less. **It was recommended that this issue be researched by the Chapter 3 Subcommittee.**

f. George Webb asked who approves off-system LAP Exceptions. The Maintaining Agency must approve those, and Ken Leuderalbert noted that it is covered in the LAP Manual.

21. David O'Hagan went through each of the chapters of the Florida Greenbook, highlighted the major changes, and asked the committee if they approve the changes to the document inclusive of the edits discussed at the meeting. All were in favor to approve the changes and proceed with Rulemaking.

22. Rob Quigley asked the committee to review their **member information** and provide updates. **Updated Member Info is posted on the Florida Greenbook Web Page http://www.dot.state.fl.us/rddesign/FloridaGreenbook/FGB.htm**.

23. **Subcommittee membership** was briefly reviewed and updated as well**. Updated Subcommittee Membership information is posted on the Florida Greenbook Web Page: http://www.dot.state.fl.us/rddesign/FloridaGreenbook/FGB.htm**.

24. Rob Quigley discussed the **Tentative Schedule** for the 2007 Florida Greenbook. Rob also mentioned that the tentative date of the 2008 meeting is March 11, 2008, and the location is yet to be determined.

25. Travel Form Reminder. Contact **Rob Quigley** if you have any questions.

26. Meeting critique: Improvements were discussed for the next meeting: Suggestions included having a slightly larger room with bigger tables. Other comments included that this meeting was in a good location, and some good information was provided.

27. Meeting adjourned.

# *Sunshine Law*

# A Summary of Florida's Government in the Sunshine Law

**September 22, 2005**

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## 1. Scope of the Sunshine Law

The Sunshine Law provides public access to governmental proceedings, including meetings of public boards or commissions. § 286.011, Fla. Stat. (2004)

Section 286.011, Florida Statutes, provides that 1) meetings of public boards or commissions must be open to the public, 2) reasonable notice of such meetings must be given; and 3) minutes of the meeting must be taken.

## 2. Definition of a Meeting

The Sunshine Law does not only apply to formal proceedings by boards and commissions. It applies to any gathering, casual or not, concerning matters upon which *foreseeable action* may be taken by the applicable agency or organization. *See Hough v. Stembridge*, 278 So. 2d 288 (Fla. 3d DCA 1973). Meetings in defiance of the Sunshine Law are those that are "violative of the statute's spirit, intent and purpose." *Id.*

Because the Sunshine Law applies to *any* gathering, formal or casual, concerning matters upon which action may be taken, the statute also applies to discussions over the telephone or communications via computer.

## 3. Individuals/Organizations Subject to the Sunshine Law

The Sunshine Law applies to any meeting between two or more members of "any board or commission of any state agency or authority or of any agency or authority of any county, municipal corporation, or political subdivision." *See* § 286.011, Fla. Stat. (2004). The courts have stated that it was the Legislature's intent to bind "every board or commission of the state, or of any county or political subdivision over which it has domain and control." *Times Publishing Company v. Williams*, 222 So. 2d 470 (Fla. 2d DCA 1969). All public agencies, including elected and appointed boards or commissions and even collegial bodies, are subject to the statute. The Florida Department of Transportation (the Department) is a public agency and thus falls under the authority of the Sunshine Law.

## 3(a). Advisory Boards or Committees

Advisory boards or committees appointed by public agencies are subject to the Sunshine Law, even if their recommendations are not acted upon. *See* AGO 82-35, *Town of Palm Beach v. Gradison*, 296 So. 2d 473 (Fla. 1974). A limited exception applies to committees established strictly for fact-finding such as information gathering and reporting.

### 3(b). Staff Members

The meetings of staff members of a board or commission covered by the Sunshine Law are generally not subject to the Sunshine law. This exception also applies to staff members of advisory boards or committees. *See* § 286.011, Fla. Stat., *Occidental Chemical Co. v. Mayo*, 351 So. 2d 336 (Fla. 1977). However, when a staff member ceases to function in a staff capacity and is appointed to a committee which is delegated authority to make recommendations to a board or official, the staff member loses his or her identity as staff while working on the committee and the Sunshine Law applies to the committee. Thus, it is the nature of the act performed, not the makeup of the committee or the proximity of the act to the final decision which determines whether a committee composed of staff is subject to the Sunshine Law.

### 3(c). Purchasing or Bid Evaluation Committees

Generally committees appointed by agencies subject to Sunshine Law to consider purchases or bids by contractors are themselves subject to the Sunshine Law. However, meetings involving confidential bid estimates are not subject to the Sunshine Law because the Department's contract award process has been adopted in recognition of Sunshine Law requirements.

### 4. Notice Requirements

As previously mentioned, meetings covered by the Sunshine Law require that "reasonable notice" be given beforehand. The Attorney General's Office has suggested notice guidelines, which include: 1) the notice should contain the time and place of the meeting and, if available, an agenda, 2) the notice should be prominently displayed in the area in the agency's office set aside for that purpose, 3) emergency sessions should be afforded the most effective notice under the circumstances and 4) effective methods include press releases, phone calls to wire services, and advertising in local newspapers of general circulation.

### 5. Consequences for Failure to Comply

The consequences for violation of the Sunshine Law vary. There can be criminal penalties if any board or commission member *knowingly* violates the Sunshine Law, including the possibility of a second degree misdemeanor charge (which can include imprisonment and/or a fine). Additional consequences include removal from office, non-criminal penalties such as fines, attorney's fees, and civil actions for injunctive or declaratory relief.

Violation of the Sunshine Law also renders actions taken by boards or commissions invalid. Section 286.011, Florida Statute provides that no resolution, rule, regulation or formal action shall be considered binding except as taken or made at an open meeting.

## 6. Conclusion

It is advisable to be well acquainted with Florida's Government-in-the-Sunshine Law. The overarching policy behind the law is very simple. Actions should be analyzed in light of the Sunshine Law's spirit and intent to provide the public a right of access to government proceedings.

# FLORIDA DEPARTMENT OF TRANSPORTATION
# GOVERNMENT IN THE SUNSHINE
### September 2005

**Caveat:** This briefing paper is intended as an overview of the complex legal issues involving Florida's Government in the Sunshine Law, Public Record Law, and Ethics Laws. Readers are cautioned that these laws contain traps for the unwary, which can cause seemingly innocent activities to become a crime. The advice of an attorney should he sought for their application to particular circumstances.

## OPEN MEETINGS

All meetings at which public business is discussed or transacted shall be duly noticed and open to the public.[1]

**YOU CANNOT:**

- Discuss with any other member any item that is under consideration by the authority, except at a duly noticed public meeting

**YOU CAN:**

- Discuss other matters with other members at any time.
- Discuss authority business with any person who is not a member, except that the person cannot act as a liaison between or among members.

A continuing concern is the sending of e-mail by a member to other members. An e-mail that states factual background material is permissible[2] so long as there is no interaction between or among members. E-mails that solicit comments from other members or that circulate responses from members are prohibited. [3]

Minutes of each meeting must be taken, which must include a record of all voting.[4]

## PUBLIC RECORDS

Records of "any board or commission of any state agency or authority of any agency or authority of any county, municipal corporation, or political subdivision," except those that are specifically exempted by statute, are public records and must be available for inspection and copying by any person at a reasonable place and time.[5]

A public record is defined very broadly and includes tape recordings, hand written notes, and information in a computer.[6] All materials made or received in connection with official business regardless of form are to be open for public review unless exempted by the legislature. This includes notes that are intended to be kept as a record or that are circulated or communicated to another.[7] However, notes prepared for personal use are not public records.[8]

Electronic mail comes within the public records law, and any e-mail sent or received relating to official business must be made available to the public if requested. As noted above, the Public Meeting Law prohibits interactive e-mail between or among members relating to official business of the authority.

## ETHICS

Certain provisions of the Florida Code of Ethics for Public Officers and Employees, Sections 112.311-112.326, Florida Statutes, apply. It is not the intent of this summary to cover the multifarious aspects of governmental ethics. For more information, visit the Commission of Ethics Website: http://ww.ethics.state.fl.us/ Certain key provisions are summarized below.

- Prohibited actions or conduct:[9] Solicitation or acceptance of gifts or unlawful compensation to influence official action; misuse of public position; or use of information not available to the public generally for personal pecuniary gain for themselves or anyone else. Note: For the gifts that are allowed by the statute,[10] the Governor's Code of Ethics places further restrictions.[11]

- Restricted business and contractual relationships:[12] Certain restrictions and prohibitions apply to members or their relatives.

- Voting Conflicts of Interest:[13] Persons present at a meeting are required to vote, unless the member has a voting conflict of interest, in which case the member may abstain from voting.[14] A voting conflict occurs when the measure being voted on inures to the private gain or loss of the member, a relative, the member's employer, or a client of the member. The member must disclose the conflict prior to participating in discussion or voting on the matter, or if unknown at the time, as soon as possible. The member must file Commission on Ethic's Form 8A[15] with the recording secretary within fifteen days of the vote.

**Reference Materials:**

Attorney General's Website: http://myfloridalegal.com/sunshine
*Government-in-the-Sunshine Manual,* First Amendment Foundation, Tallahassee, FL
First Amendment's Website: http://www.floridafaf.org/

ENDNOTES:

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[1] Article 1, Section 24(b), Florida Constitution, and Section 286.011, Florida Statutes (Florida Government in the Sunshine Law), apply to agencies of the state. Sections 343.80-343.89, Florida Statutes, created the Northwest Florida Transportation Corridor Authority as an agency of the state.
[2] Attorney General Opinion 2001-20, March 20, 2001.

[3] Attorney General Informal Opinion, October 31, 2000.
[4] Sections 286.011(2) and 286.012, Florida Statutes.

[5] Article I, Section 24(a), Florida Constitution; Section 119.07, Florida Statutes.
[6] Section 119.011(1), Florida Statutes; Orange County v. Florida Land Co., 450 So. 2d 341 (Fla. 5th DCA 1984).
[7] Shevin v. Byron, Harless, Schaffer, Reid & Assoc., Inc., 379 So. 2d 633 (Fla. 1980).
[8] Times Publishing Co. v. City of St. Petersburg, 558 So. 2d 487 (Fla. 2d DCA 1990).
[9] Section 112.313(7), Florida Statutes.
[10] Sections 112.312(12) and 112.313(2), Florida Statutes.
[11] Governor Bush's Code of Ethics, available at:
http://www.myflorida.com/myflorida/government/policies/ethicscode.html
[12] Sections 112.313(3), (7), and (12), Florida Statutes.
[13] Section 112.3143, Florida Statutes.
[14] Section 286.012, Florida Statutes.
[15] http://www.ethics.state.fl.us/forms/Form8a_2000.PDF.

# *Strategic Highway Safety Plan*

# SAFETEA-LU and Safety Data
# An FDOT Update

JOE SANTOS
FDOT SAFETY OFFICE

## Situation

**SAFETEA-LU**
**Highway Safety Improvement Program (HSIP)**

**Program Purpose**
The program authorizes a new core Federal-aid funding program beginning in FY 2006 to achieve a significant reduction in traffic fatalities and serious injuries on all public roads.

**Program Features**
The HSIP emphasizes a data-driven, strategic approach to improving highway safety that focuses on results.

*Strategic Highway Safety Plan (SHSP)*
*High Risk Rural Roads (HRRR)*
*5% Report*

## Task

Develop a statewide data-driven, strategic approach to analyze all roads in Florida to improve highway safety based on the common goals in the SHSP.

## Implementation

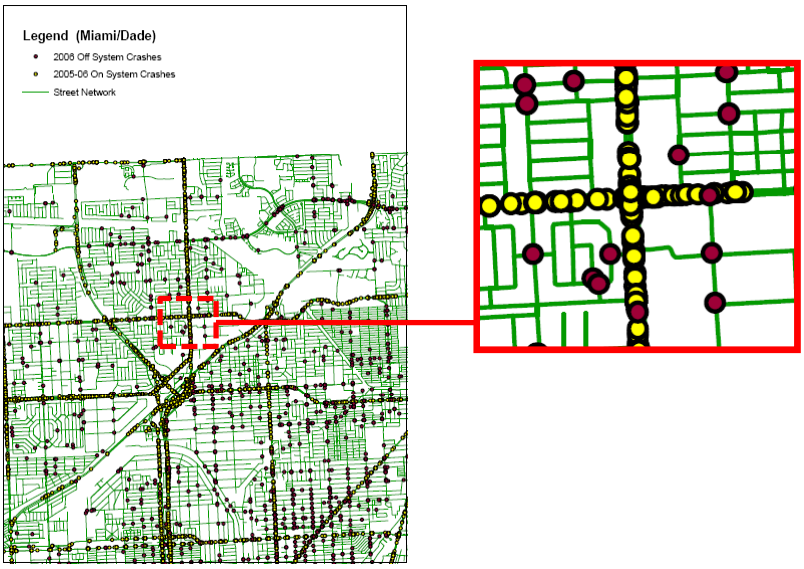
Year 1 (2007)
- Locate "Off System" crashes for 2006 and develop GIS maps showing the locations of serious and fatal crashes.

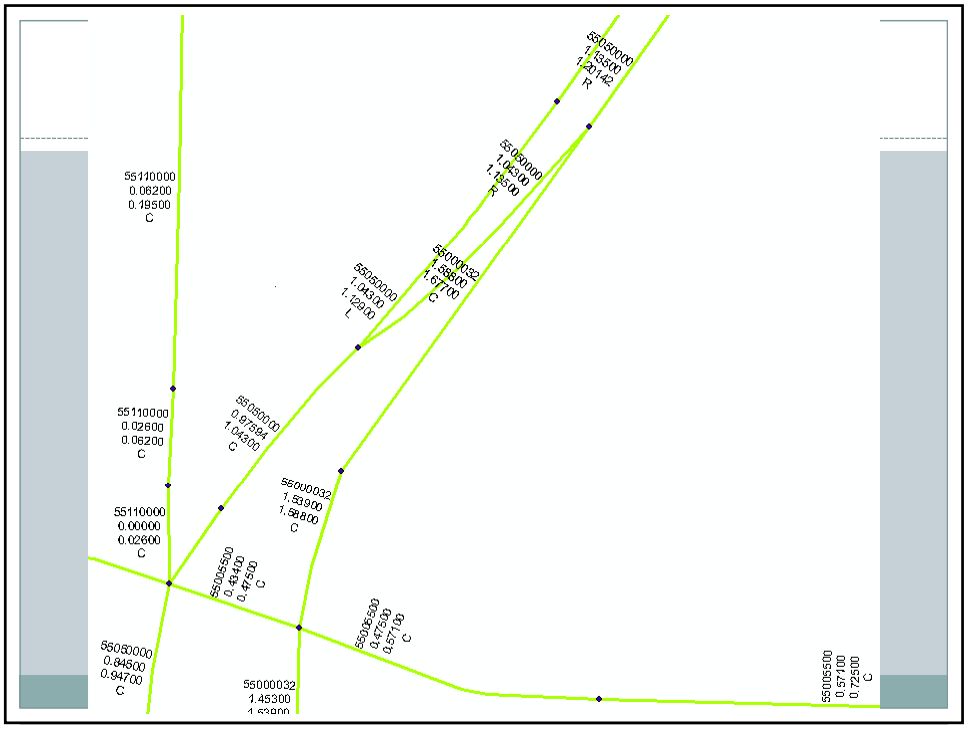
Year 2 (2008)
- Locate "Off System" crashes for 2007, 2008, and 2005.
- Develop a Linear Reference System (LRS) and standard roadway id and mile point.
- Develop a desktop application to use GIS and data to conduct analysis.

Year 3 (2009)
- Locate "Off System" crashes for 2009.
- Refine desktop application .

## Management

FDOT Safety Office manages this project using OPS and staff for crash location and developing the LRS. Use of 408 Grant funds used to develop the GIS desktop application to conduct analysis and provide GIS consultation and documentation.






# Questions?

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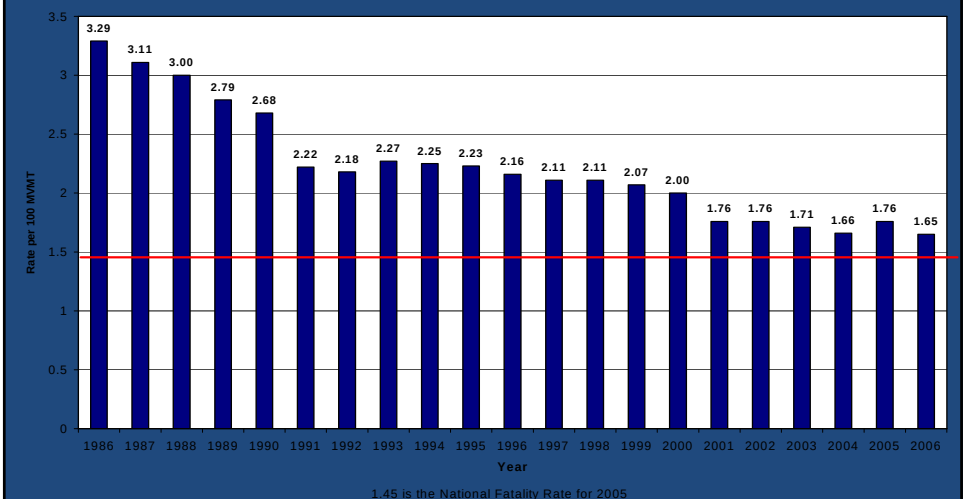
Joseph.Santos@dot.state.fl.us
(850) 245 – 1502 (work)

SAFETY is a Choice

# FLORIDA'S STRATEGIC HIGHWAY SAFETY PLAN

Florida Department of Transportation

# Florida's Challenge




1.45 is the National Fatality Rate for 2005

# STRATEGIC HIGHWAY SAFETY PLAN

## Four Emphasis Areas:

- Aggressive Driving
- Intersection Crashes
- Lane Departures
- Vulnerable Road Users (bicyclists, pedestrians, motorcyclists

## Three Continuing Priority Areas

- Occupant Protection
- Impaired Driving
- Data

## IMPLEMENTING THE PLAN

- Getting the word out
- Encouraging participation
- Need for tracking

## We Need you, and you, and you . . .

The 4Es of Enforcement, Engineering, Education, and Emergency Response need the 5th E –

Everyone Else

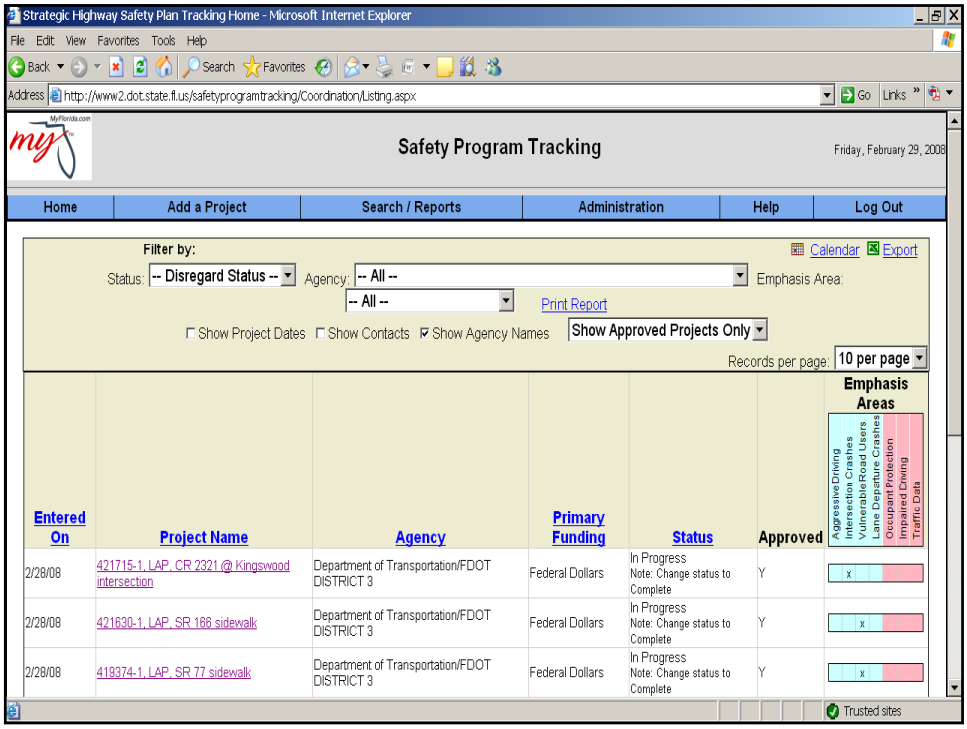
# What YOU Can Do

- promote the SHSP
- be aware of and involved in the SHSP and get others involved
- encourage and support projects that implement the SHSP
- when possible, provide funding for projects
- ensure projects are tracked so DOT can annually report to FHWA

www2.dot.state.fl.us/safetyprogramtracking

This internet site was created for all agencies/entities to enter their projects/activities that promote the SHSP.

It looks like this:

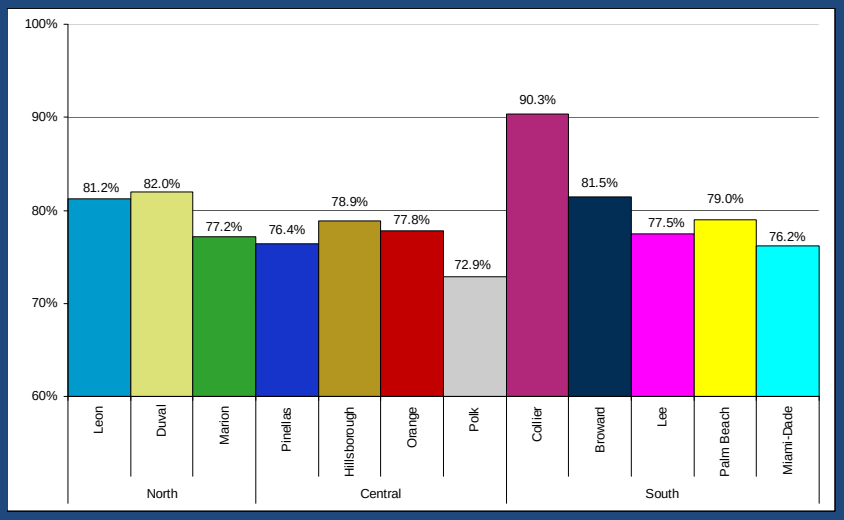



# Safety Belts Save Lives

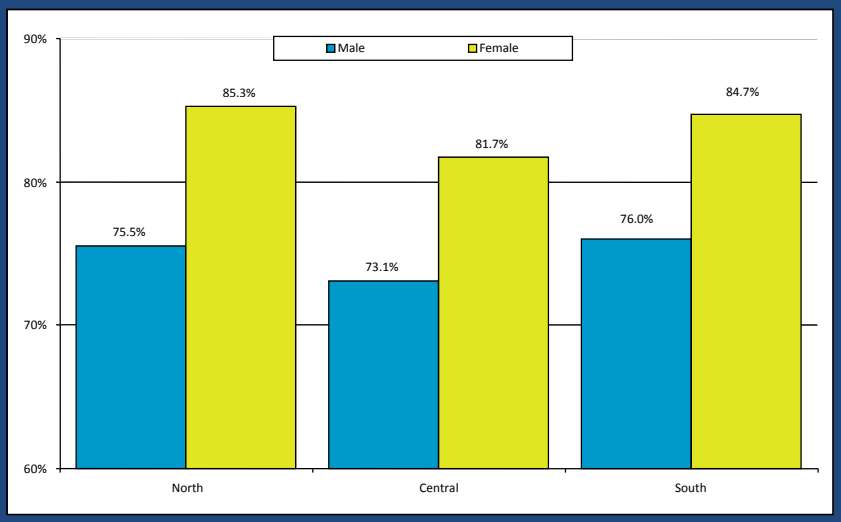
**2006 80.7%  2007 79.1%**

- Enforcement and media between May 9 and May 31
- 14 roundtable meetings between February 27 and April 3 - Sharing best practices
- Survey: May 31 – June 10; 12 survey counties
- 85% usage for two consecutive years would result in $35 million to DOT
- It's not about money – it's about lives saved

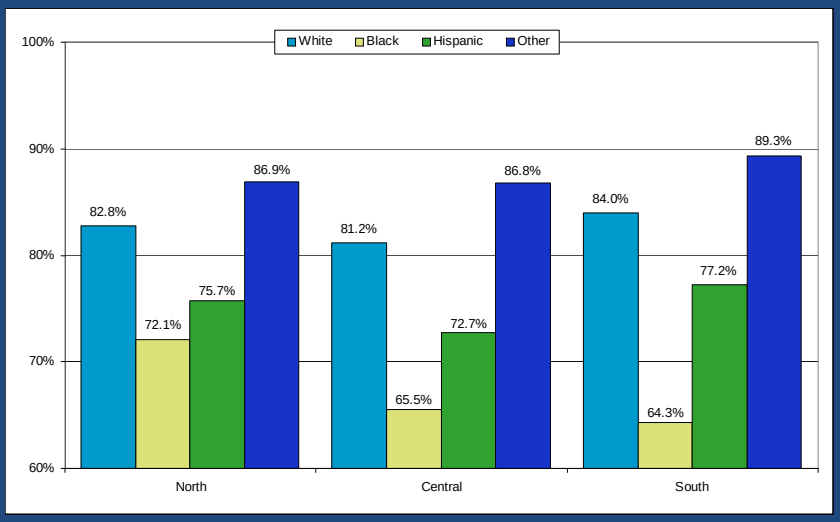
## Observed Safety Belt Use Rate by County and Region - 2007



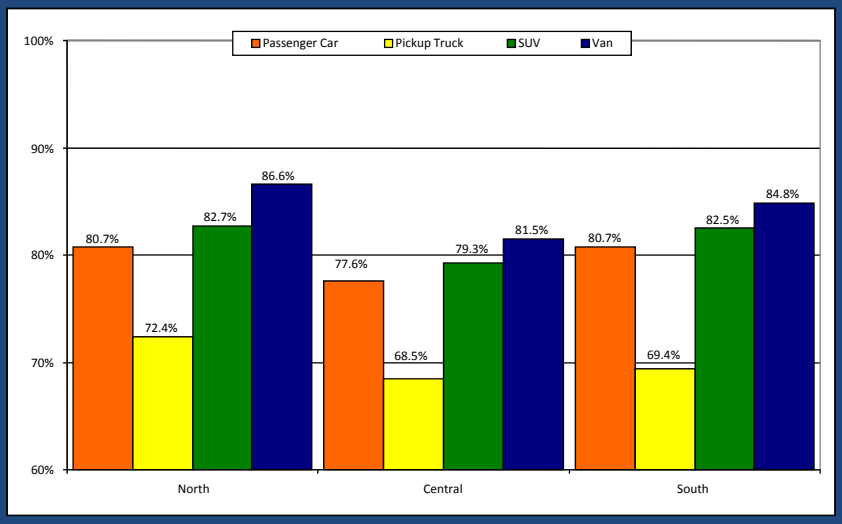

## Observed Safety Belt Use Rate by Gender of Occupant and Region - 2007



## Observed Safety Belt Use Rate by Race of Occupant and Region - 2007




## Observed Safety Belt Use Rate by Vehicle Type and Region - 2007



## Where Can I Learn More?

www.dot.state.fl.us

By clicking onto the safety website you will find:

The SHSP and updates

Details on DOT grant programs and the Safe Routes to School Program

Other useful information

## Need more?

Contact Marianne Trussell directly:

marianne.trussell@dot.state.fl.us
850-245-1504 (0)
850-933-1947 (cell)

# Audible & Vibratory Pavement Marking

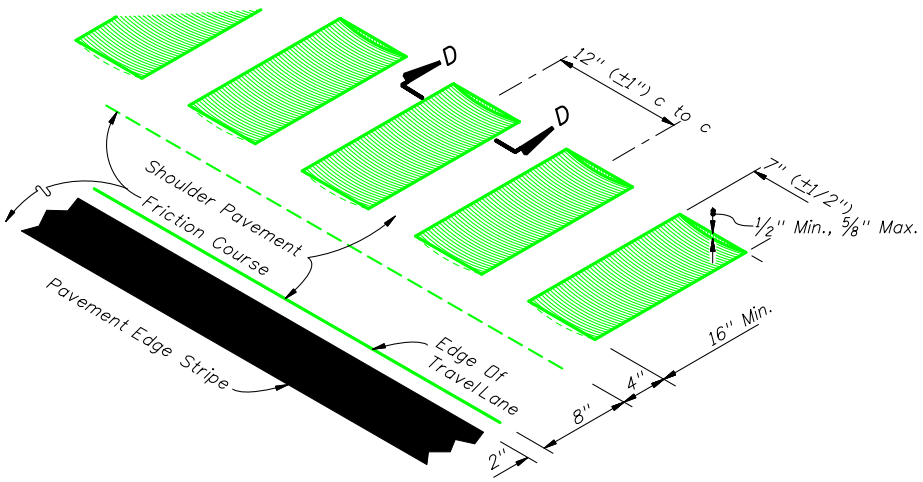
# Purpose of Markings

Alert motorists when the vehicle leaves the travel lane.

# Types of Audible & Vibratory Warnings

- Ground-in Rumble Strips
- Raised Audible Pavement Markings
- Rumble Stripe

# Ground-in Rumble Strip

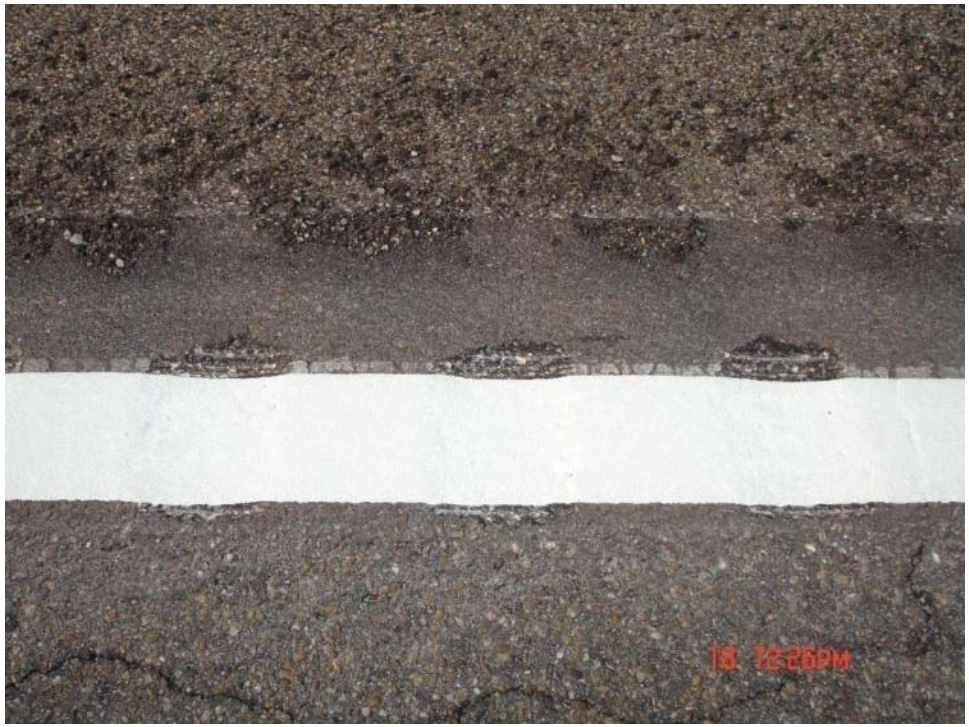



ISOMETRIC – LONGITUDINAL CUT

# Raised Audible Pavement Marking


# Raised Audible Pavement Marking

# Rumble Stripe



# Current Policy for Rumble Strips

## 2.3.2 Shoulder Warning Devices (Rumble Strips)

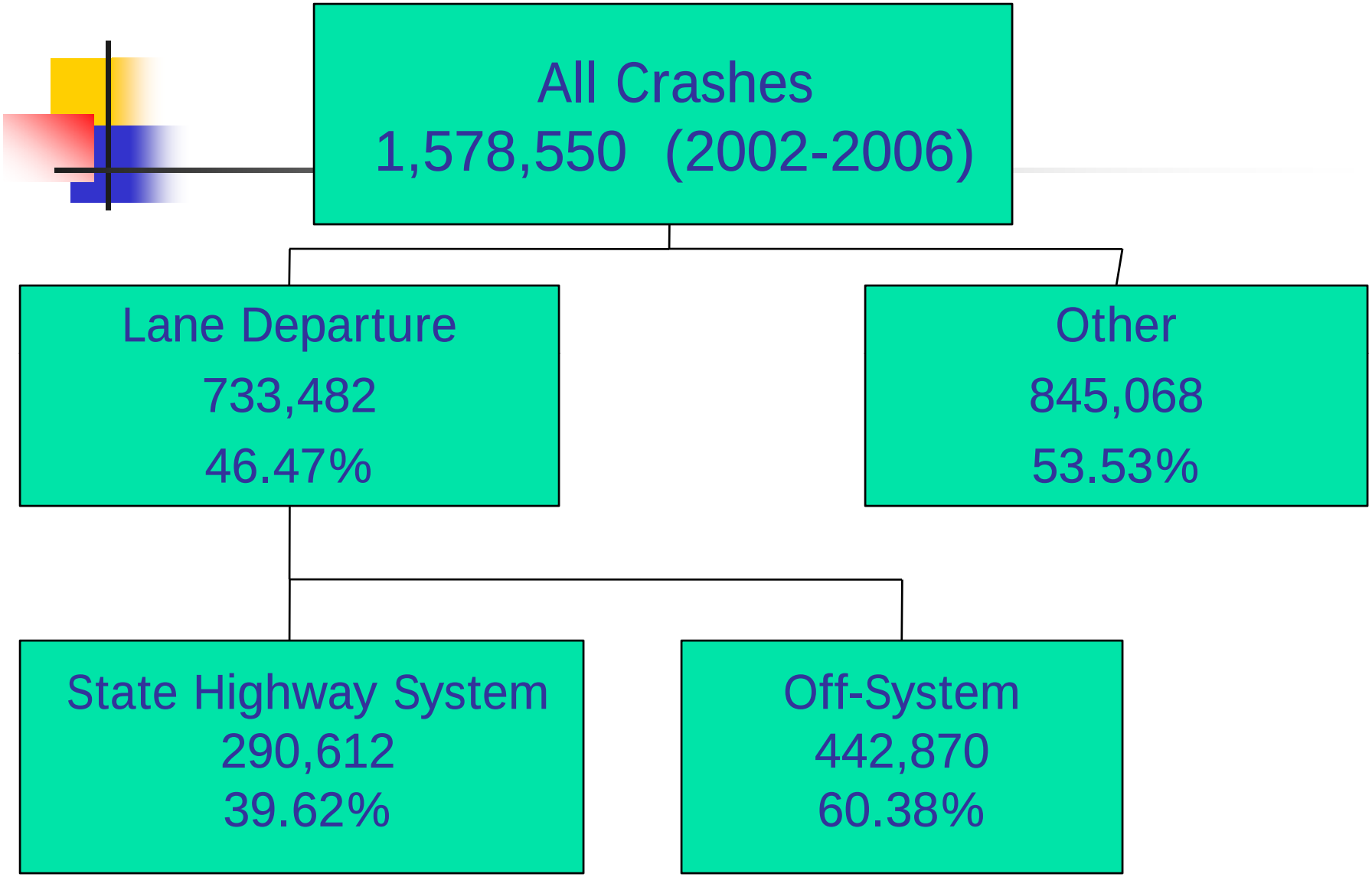
The safety of freeways and other limited access facilities on the State highway system is to be enhanced by the installation of shoulder warning devices in the form of rumble strips. Projects on limited access facilities shall include the construction of ground-in rumble strips. Several types of applications have been tested. The ground-in strips provide the desired warning to the driver and consistency in application has been possible using this construction process.

# Strategic Highway Safety Plan

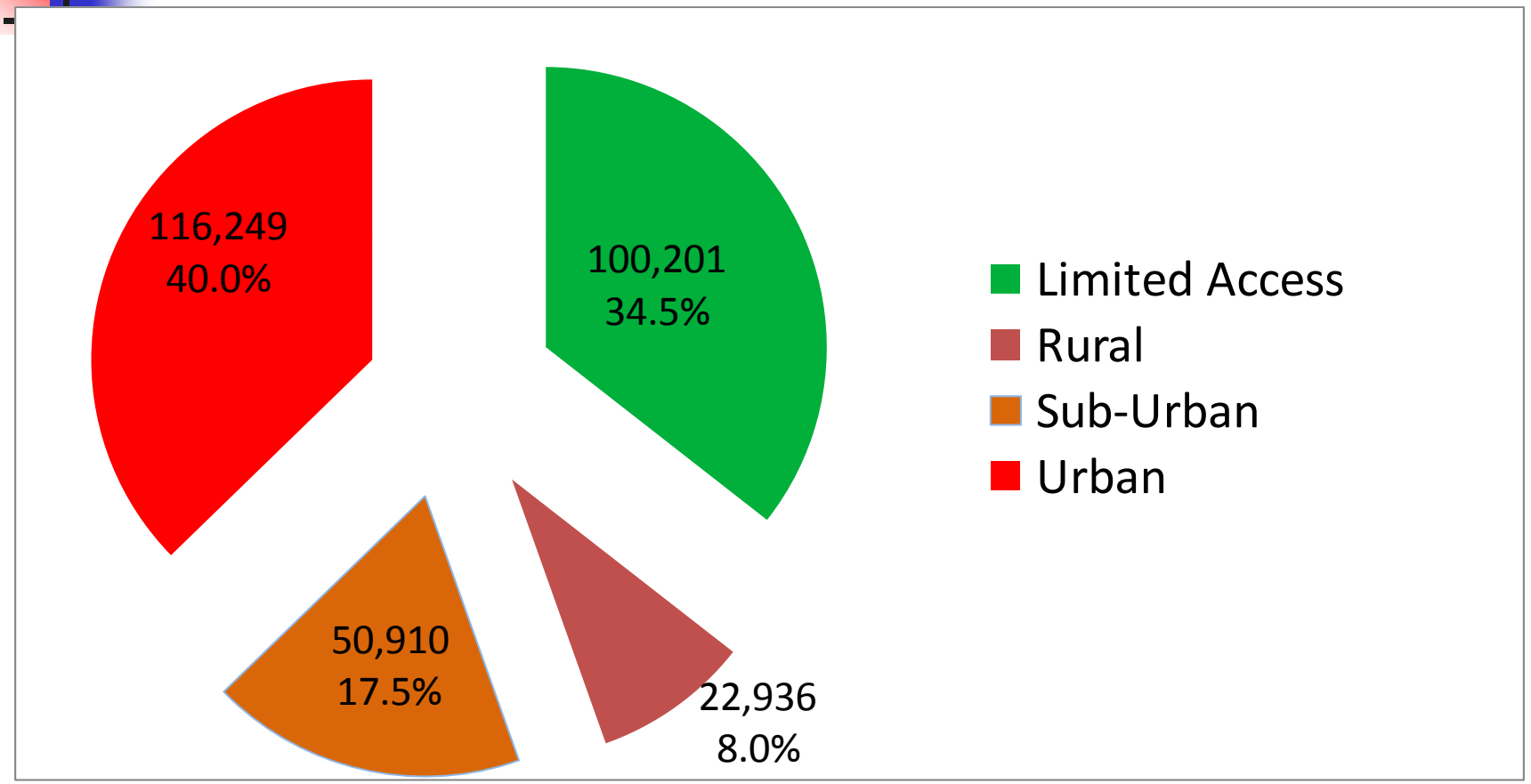
One of the four emphasis areas of the Strategic Highway Safety Plan is to reduce lane departure crashes on limited access and rural two-lane roadways

# Strategies in Lane Departure Emphasis Area

Beginning with an initial focus on rural, two-lane roadways, increase audibility and visibility of lane delineation in all weather conditions in conjunction with routine maintenance and other roadway repair and/or enhancement projects.


All Crashes
1,578,550 (2002-2006)
Lane Departure
733,482
46.47%
Other
845,068
53.53%
State Highway System
290,612
39.62%
Off-System
442,870
60.38%

# Lane Departure Crashes
# State Highway System
# 290,612 (2002-2006)

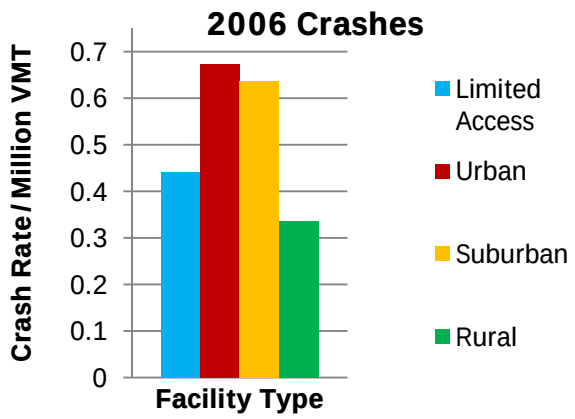


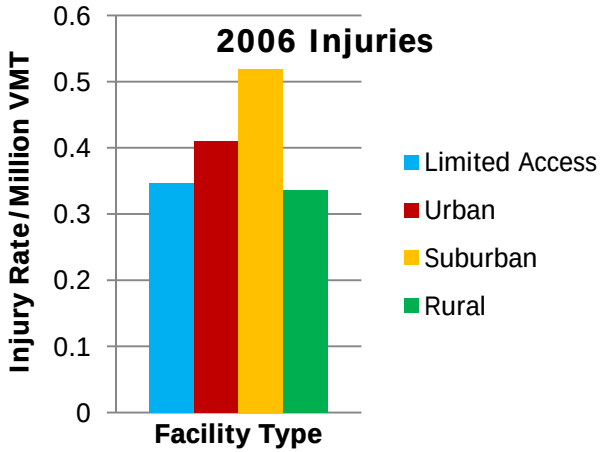

Suburban -

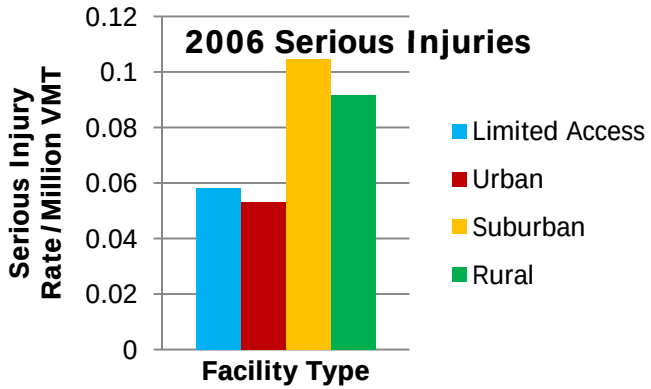
# Fatality Statistics

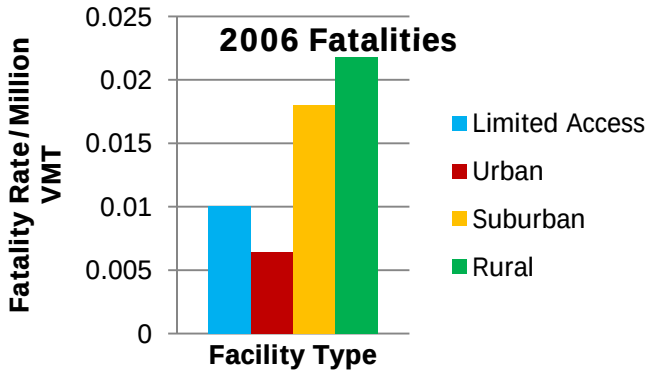
| Year | Total Fatalities | SHS Lane Departure Fatalities |
|---|---|---|
| 2002 | 3,142 | 1,220 |
| 2003 | 3,185 | 1,224 |
| 2004 | 3,260 | 1,262 |
| 2005 | 3,533 | 1,378 |
| 2006 | 3,365 | 1,282 |

# Crash Rate/Million VMT



# Audible & Vibratory Policy

- Edge lines on all two-lane and multi-lane rural and suburban roads

- On centerlines of only two-lane rural roads with history of centerline cross over crashes.

# 5 Yr. Resurfacing Mileage Versus State Highway Mileage

| | Resurfacing Program | | Highway System | |
|---|---|---|---|---|
| | 2-3 Lane | Multi-Lane | 2-3 Lane | Multi-Lane |
| Rural – | 1,099 | 303 | 4,245 | 902 |
| Urban 2 & 3 | 198 | 265 | 1,469 | 1,250 |
| Total | 1,297 | 568 | 5,714 | 2,152 |

# Crash Reduction Factors

Crash Reduction Factor: Shoulder Rumble Strips[1]

| | |
|---|---|
| Rural (Two Lane) > 4000 AADT | = 13% |
| Rural (All) | = 34% |
| Rural (Three Lane) | = 36% |
| Rural (Two Lane) | = 32% |

[1]Crash Reduction Factors (FHWA-SA-07-015), FHWA, 2007

[2] Highway Safety Improvement Guideline (HSIPG), FDOT Plans Preparation Manual

# Crash Reduction Factors

Crash Reduction Factor: Shoulder Rumble Strips[1]

| | |
|---|---|
| Rural Multilane Divided | = 16% |
| Rural Multilane Divided | = 10% |
| Rural Arterial | = 16% |
| Rural Multilane Divided | = 22% |

[1]Crash Reduction Factors (FHWA-SA-07-015), FHWA, 2007

# Cost of Audible & Vibratory Markings

- Cost Per of 6” Solid Thermoplastic
  $ 3,500 per Net Mile

- Cost of Audible & Vibratory Marking
  $ 6,500 per Net Mile

- Cost of Rumble Stripe
- $ 3,500 + $ 1500 = $ 5,000 per Net Mile

# Benefit of Audible & Vibratory Markings Rural (2-3 Lane)

- Reduction Rural Crashes (2-3 Lane) =
  0.70897 x 0.13 x 5 x 1098.87 = 506 Crashes / 5 Yrs.

- Reduction Rural Fatalities (2–3 Lane) =
  0.05276 x 0.13 x 5 x 1098.87 = 8 Fatalities / 5 Yrs.

- Reduction Rural Serious Injuries (2-3 Lane)=
  0.22241 x 0.13 x 5 x 1098.87 = 159 Serious Injuries / 5 Yrs.

- Benefit Cost Ratio = 506 x $218,900[1] = $ 110,763,400 ÷
  $6,000 x 1098.87 = $ 6,593,220 (17:1)

[1] Highway Safety Improvement Guideline (HSIPG), FDOT Plans Preparation Manual

# Benefit of Audible & Vibratory Markings Rural (4 -5 Lane)

- Reduction Rural Crashes (4-5 Lane) =
  1.67348 x 0.10 x 5 x 303.43 = 254 Crashes / 5 Yrs.

- Reduction Rural Fatalities (4-5 Lane) =
  0.09181 x 0.10 x 5 x 303.43 = 14 Fatalities / 5 Yrs.

- Reduction Rural Serious Injuries (4-5 Lane)=
  0.43667 x 0.10 x 5 x 303.43 = 66 Serious Injuries / 5 Yrs.

- Benefit Cost Ratio = 254 x $181,200[1] = $ 46,024,800 ÷
  $ 12,000 x 303.43 = $ 3,641,160 (13:1)

[1] Highway Safety Improvement Guideline (HSIPG), FDOT Plans Preparation Manual

# Benefit of Audible & Vibratory Markings Suburban (2-3 Lane)

- Reduction Suburban Crashes (2-3 Lane) =
  1.54901 x 0.13 x 5 x 197.51 = 199 Crashes / 5 Yrs.

- Reduction Suburban Fatalities (2–3 Lane) =
  0.05066 x 0.13 x 5 x 197.51 = 7 Fatalities / 5 Yrs.

- Reduction Suburban Serious Injuries (2-3 Lane)=
  0.29006 x 0.13 x 5 x 197.51 = 37 Serious Injuries / 5 Yrs.

- Benefit Cost Ratio = 199 x $218,900[1] = $ 43,561,100 ÷
  $ 6,000 x 197.51 = $ 1,185,060 (38:1)

[1] Highway Safety Improvement Guideline (HSIPG), FDOT Plans Preparation Manual

# Benefit of Audible & Vibratory Markings Suburban (4 -5 Lane)

- Reduction Suburban Crashes (4-5 Lane) =
  4.08073 x 0.10 x 5 x 264.82 = 540 Crashes / 5 Yrs.

- Reduction Suburban Fatalities (4-5 Lane) =
  0.10397 x 0.10 x 5 x 264.82 = 14 Fatalities / 5 Yrs.

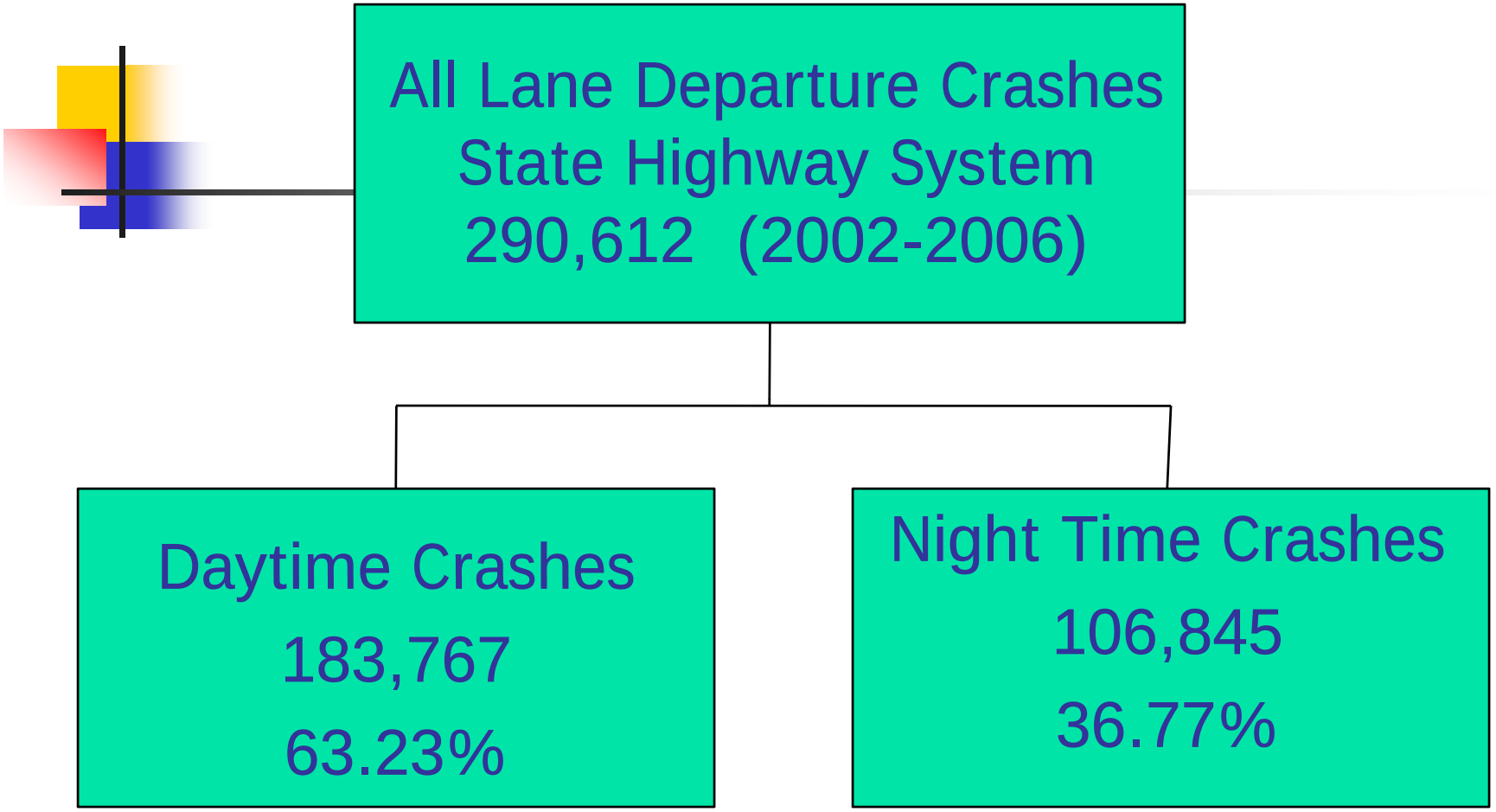
- Reduction Suburban Serious Injuries (4-5 Lane)=
  0.61116 x 0.10 x 5 x 264.82 = 81 Serious Injuries / 5 Yrs.

- Benefit Cost Ratio = 540 x $181,200[1] = $ 97,848,000 ÷
  $ 12,000 x 264.82 = $ 3,177,840 (31:1)

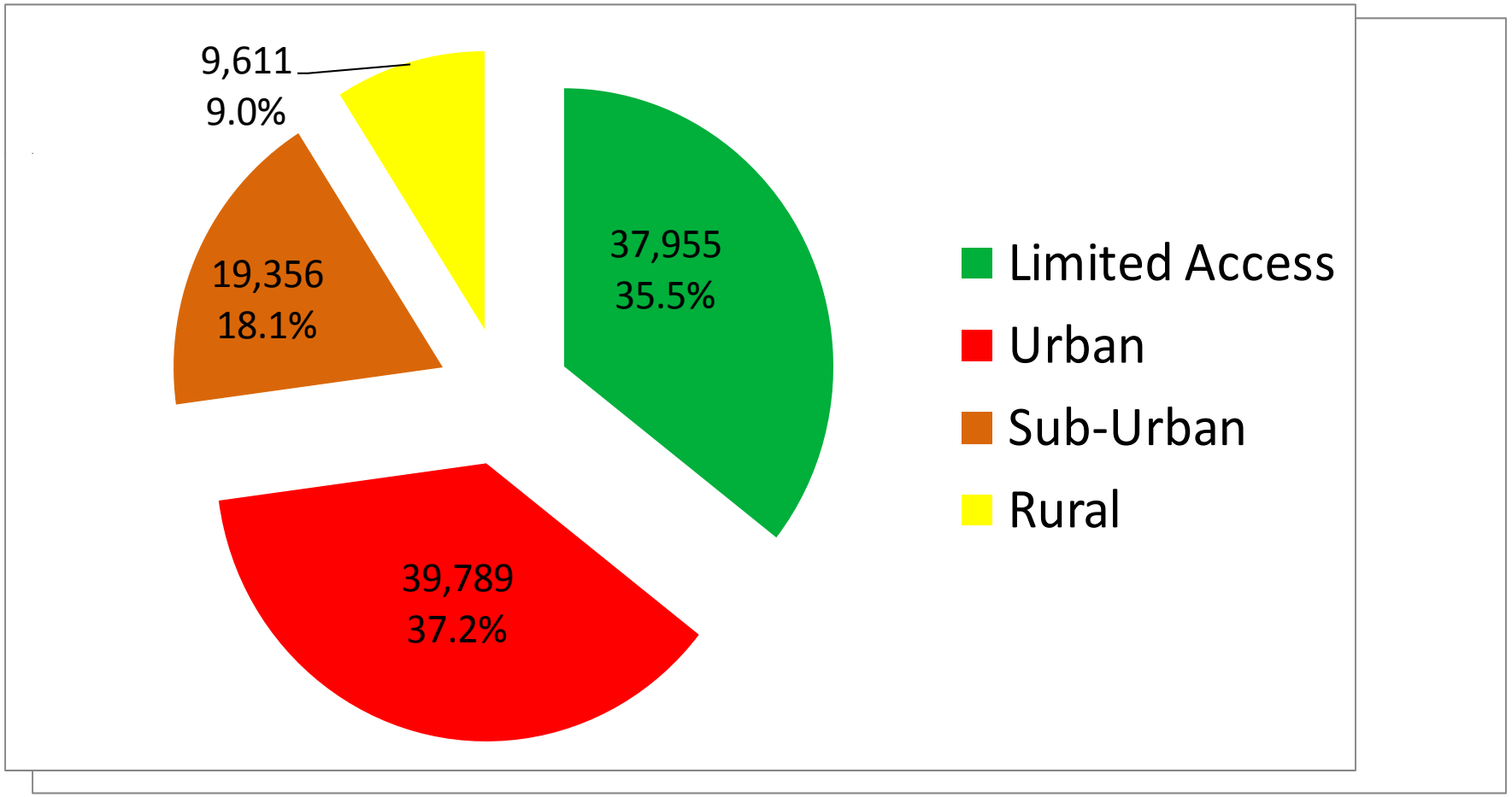
[1] Highway Safety Improvement Guideline (HSIPG), FDOT Plans Preparation Manual

# Resurfacing Program Impacts

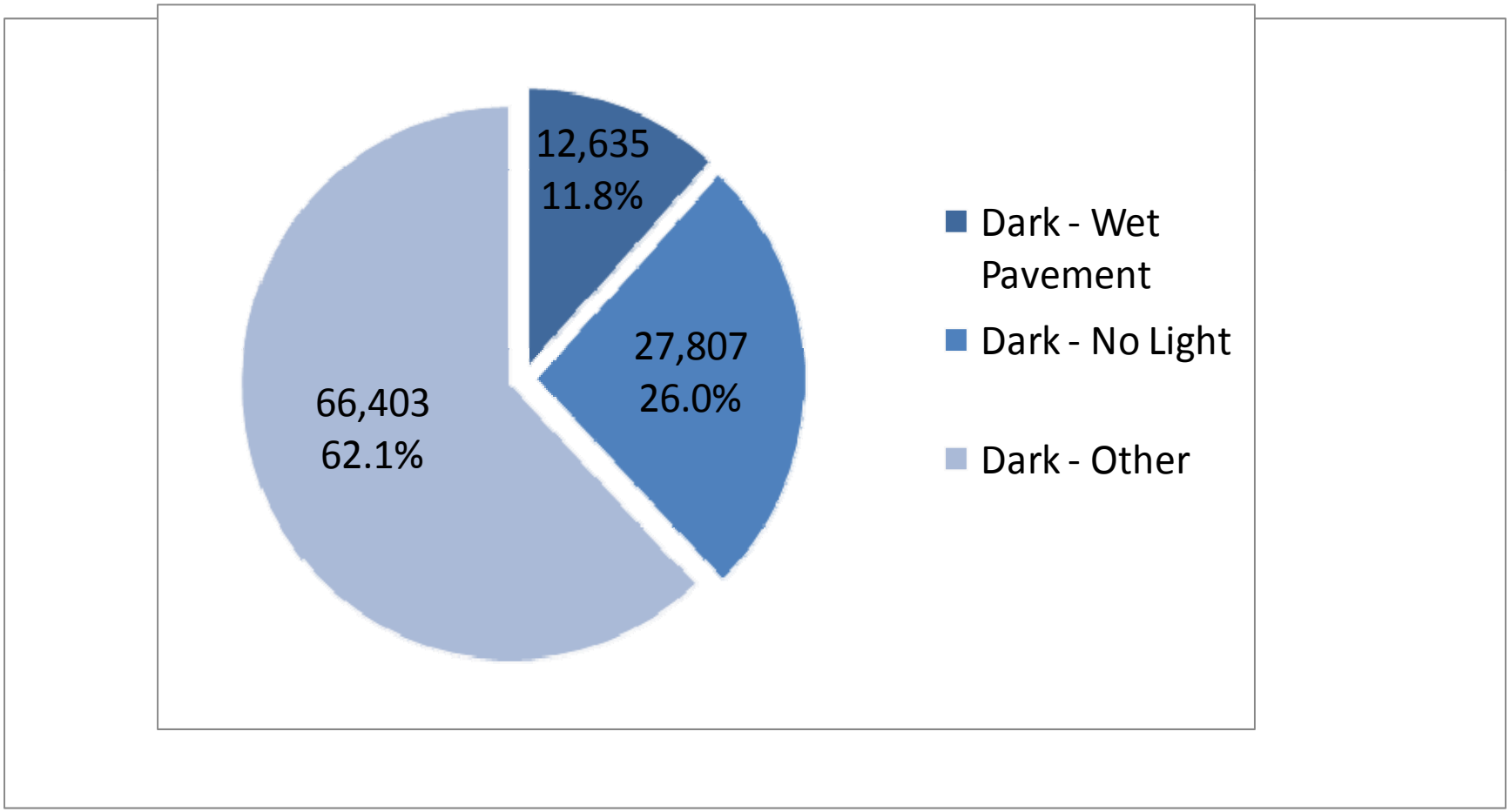
| Year | Additional Cost for Audible & Vibratory Marking | Budgeted Cost | Cost Increase |
|---|---|---|---|
| 2008 | $ 2,381,350 | $ 215,941,398 | 1.10% |
| 2009 | $ 3,016,021 | $ 349,653,112 | 0.86% |
| 2010 | $ 3,081,213 | $ 349,977,071 | 0.88% |
| 2011 | $ 1,964,508 | $ 257,877,716 | 0.76% |


All Lane Departure Crashes
State Highway System
290,612 (2002-2006)
Daytime Crashes
183,767
63.23%
Night Time Crashes
106,845
36.77%

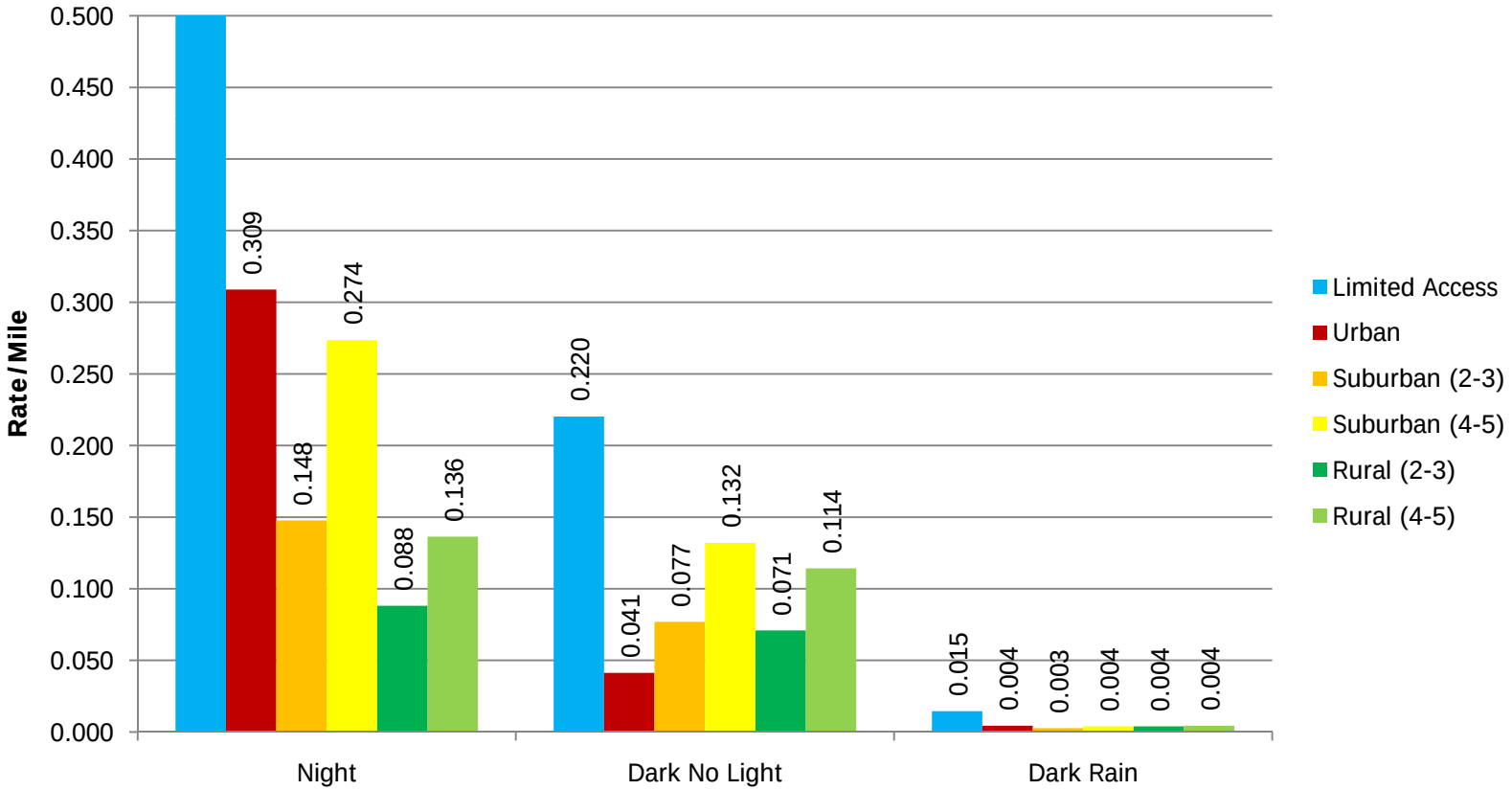
# Night Time Lane Departure Crashes
# State Highway System
# 106,845 (2002-2006)



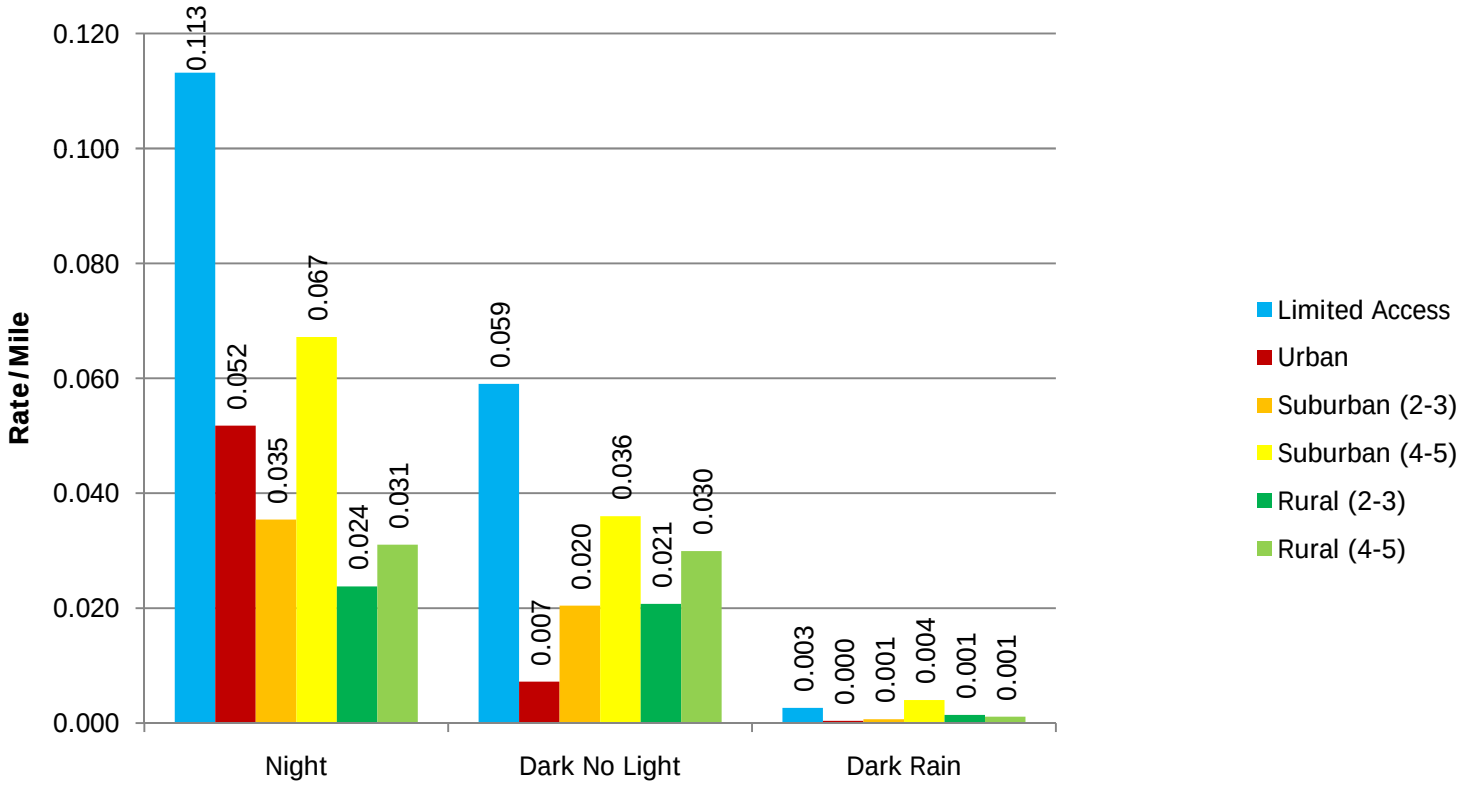
# Night Time Departure Crashes
# State Highway System
# 106,845 (2002-2006)



# Serious Injury Rates/Mile



# Fatality Rates/Mile



# Wet Weather Policy

- No specific policy at this time.
- Districts can use wet weather pavement markings for specific areas with history of wet weather crashes.

# Wet Weather Audible Markings

- No specific policy at this time.
- Districts can use wet weather audible pavement markings for specific areas with history of lane departures during rain events.

# *Proposed Chapter 18*
# *Signing & Marking*

# CHAPTER 18

# SIGNING AND MARKING

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# CHAPTER 18

# SIGNING AND MARKING

## A INTRODUCTION

Signing and pavement markings help improve highway safety by providing guidance information to road users. Both signs and pavement markings should provide sufficient visibility to meet the driver's needs. The design of signs and pavement markings should complement the basic highway design. Designers and engineers should also be aware of the capabilities and needs of senior drivers and consider appropriate measures to better meet their needs and capabilities.~~"~~

Section C~~B~~ and ~~C~~D of this chapter specifically discuss the traffic control devices for both signing and marking that accommodate not only the needs of drivers but also the special needs of senior drivers.

## B BACKGROUND

Section 316.0745, ~~of the~~ Florida Statutes, mandates the Department of Transportation compile and publish~~es~~ a manual of uniform traffic control devices for use on the streets and highways of the state. ~~which defines a uniform system.~~ To comply with this statute the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) has been adopted for use in the State of Florida by Rule 14-15.010, Florida Administrative Code (F.A.C.).

All references in this chapter are in conformance to the ~~current edition of the~~ MUTCD.

## C~~B~~ SIGNS

### C~~B~~.1 Advance Street Name Signs

The use of advance street name signs provides advance notification to drivers ~~in order~~ to assist them in making safe roadway decisions. Signs should be used ~~to identify critical or significant cross streets~~ at signalized or non-signalized intersections that are ~~,~~ classified as a minor arterial or higher, or a cross street that provides access to a traffic generator or possesses other comparable physical or traffic characteristics deemed to be critical or significant. ~~as defined in the MUTCD.~~

### ~~B~~C.1.a Standards

The word Street, Boulevard, Avenue, etc.~~,~~ may be abbreviated or deleted to conserve sign panel length. However, if confusion would result due to similar street names in the area,~~ than~~ this deletion should not be made.

Use of the local name is preferred on the advance street name sign.

When a cross street has a different name on each side of the intersection, both names shall be shown on the advance street name sign with an arrow beside each name to designate direction.

Additional legend such as NEXT SIGNAL or XX FEET may be added to the advance street name sign.

### C~~B~~.1.b Installation

Advance street name guide signs should be installed in advance of the intersection in accordance with the distances shown in “Condition A” of Table 2C-4 of the MUTCD. These distances are to be considered the minimum for a single lane change maneuver and should be measured from the Begin taper point for the longest auxiliary lane designed for the intersection. The degree of traffic congestion and the potential number of lane change maneuvers that may be required should also be considered when determining the advance placement distance.

### C~~B~~.1.c Sign Design

Advance street name signs shall be designed in accordance with Section 2D.39 of the MUTCD.

Letter height should conform to Table 18-1, Design Guidelines for Advance Street Name Signs.

**Table 18-1**
**Design Guidelines for Advance Street Name Signs**

| Posted Speed Limit (mph) | Letter Size (inches) Series E (upper case) | | Letter Size (inches) Series E Modified (upper case) | | Letter Size (inches) Series E Modified (lower case) | |
|---|---|---|---|---|---|---|
| | Rural | Urban | Rural | Urban | Rural | Urban |
| 30-35 | 6 | 6 | N/A | N/A | N/A | N/A |
| 40-45 | N/A | N/A | 8 | 8 | 6 | 6 |
| 50-55 | N/A | N/A | 10.67 | 8 | 8 | 6 |

## *Table 2C-4. Guidelines for Advance Placement of Warning Signs*

*(English Units)*

| Posted or 85th-Percentile Speed | Advance Placement Distance [1] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Condition A: Speed reduction and lane changing in heavy traffic[2] | Condition B: Deceleration to the listed advisory speed (mph) for the condition[4] | | | | | | | |
| | | 0[3] | 10 | 20 | 30 | 40 | 50 | 60 | 70 |
| 20 mph | 225 ft | N/A[5] | N/A[5] | — | — | — | — | — | — |
| 25 mph | 325 ft | N/A[5] | N/A[5] | N/A[5] | — | — | — | — | — |
| 30 mph | 450 ft | N/A[5] | N/A[5] | N/A[5] | — | — | — | — | — |
| 35 mph | 550 ft | N/A[5] | N/A[5] | N/A[5] | N/A[5] | — | — | — | — |
| 40 mph | 650 ft | 125 ft | N/A[5] | N/A[5] | N/A[5] | — | — | — | — |
| 45 mph | 750 ft | 175 ft | 125 ft | N/A[5] | N/A[5] | N/A[5] | — | — | — |
| 50 mph | 850 ft | 250 ft | 200 ft | 150 ft | 100 ft | N/A[5] | — | — | — |
| 55 mph | 950 ft | 325 ft | 275 ft | 225 ft | 175 ft | 100 ft | N/A[5] | — | — |
| 60 mph | 1100 ft | 400 ft | 350 ft | 300 ft | 250 ft | 175 ft | N/A[5] | — | — |
| 65 mph | 1200 ft | 475 ft | 425 ft | 400 ft | 350 ft | 275 ft | 175 ft | N/A[5] | — |
| 70 mph | 1250 ft | 550 ft | 525 ft | 500 ft | 425 ft | 350 ft | 250 ft | 150 ft | — |
| 75 mph | 1350 ft | 650 ft | 625 ft | 600 ft | 525 ft | 450 ft | 350 ft | 250 ft | 100 ft |

Notes:

[1] The distances are adjusted for a sign legibility distance of 175 ft for Condition A. The distances for Condition B have been adjusted for a sign legibility distance of 250 ft, which is appropriate for an alignment warning symbol sign.

[2] Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends. The distances are determined by providing the driver a PIEV time of 14.0 to 14.5 seconds for vehicle maneuvers (2001 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the legibility distance of 175 ft for the appropriate sign.

[3] Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Warning signs. The distances are based on the 2001 AASHTO Policy, Stopping Sight Distance, Exhibit 3-1, providing a PIEV time of 2.5 seconds, a deceleration rate of 11.2 ft/second$^2$, minus the sign legibility distance of 175 ft.

[4] Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 second PIEV time, a vehicle deceleration rate of 10 ft/second$^2$, minus the sign legibility distance of 250 ft.

[5] No suggested distances are provided for these speeds, as the placement location is dependent on site conditions and other signing to provide an adequate advance warning for the driver.

## Section 2D.39 Advance Street Name Signs (D3-2)

Support:

Advance Street Name (D3-2) signs (see Figure 2D-8) identify an upcoming intersection. Although this is often the next intersection, it could also be several intersections away in cases where the next signalized intersection is referenced.

**Standard:**

**Advance Street Name (D3-2) signs, if used, shall supplement rather than be used instead of the Street Name (D3-1) signs at the intersection.**

Option:

Advance Street Name (D3-2) signs may be installed in advance of signalized or unsignalized intersections to provide road users with advance information to identify the name(s) of the next intersecting street to prepare for crossing traffic and to facilitate timely deceleration and/or lane changing in preparation for a turn.

Guidance:

On arterial highways in rural areas, Advance Street Name signs should be used in advance of all signalized intersections and in advance of all intersections with exclusive turn lanes.

In urban areas, Advance Street Name signs should be used in advance of all signalized intersections on major arterial streets, except where signalized intersections are so closely spaced that advance placement of the signs is impractical.

The heights of the letters on Advance Street Name signs should be the same as those used for Street Name signs (see Section 2D.38)

**Standard:**

**If used, Advance Street Name signs shall have a white legend and border on a green background.**

**If used, Advance Street Name signs shall provide the name(s) of the intersecting street(s) on the top line(s) of the legend and the distance to the intersecting streets or messages such as NEXT SIGNAL, NEXT INTERSECTION, or directional arrow(s) on the bottom line of the legend.**

Option:

Directional arrow(s) may be placed to the right or left of the street name or message such as NEXT SIGNAL, as appropriate, rather than on the bottom line of the legend.

For intersecting crossroads where the same road has a different street name for each direction of travel, the different street names may be shown on the same Advance Street Name sign along with directional arrows.

In advance of two closely spaced intersections where it is not practical to install separate Advance Street Name signs, the Advance Street Name sign may include the street names for both intersections along with appropriate supplemental legends for both street names, such as NEXT INTERSECTION, 2ND INTERSECTION, or NEXT LEFT and NEXT RIGHT, or advance directional arrows.

An Advance Street Name (W16-8) plaque with black legend on a yellow background, installed supplemental to an Intersection (W2) or Advance Traffic Control (W3) series warning sign may be used instead of an Advance Street Name guide sign (see Section 2C.49).

## Section 2D.40 Parking Area Sign (D4-1)

Option:

The Parking Area (D4-1) sign (see Figure 2D-8) may be used to show the direction to a nearby public parking area.

**Standard:**

**If used, the sign shall be a horizontal rectangle with a standard size of 750 x 600 mm (30 x 24 in), or with a smaller size of 450 x 375 mm (18 x 15 in) for minor, low-speed streets. It shall carry the word PARKING, with the letter P five times the height of the remaining letters, and a directional arrow. The legend and border shall be green on a retroreflectorized white background.**

Guidance:

If used, the Parking Area sign should be installed on major thoroughfares at the nearest point of access to the parking facility and where it can advise drivers of a place to park. The sign should not be used more than four blocks from the parking area.

## C~~B~~.2 Advance Warning Signs

~~In accordance with Section 2C.29 of the MUTCD,~~ Advance Warning Signs, i.e., Stop Ahead (W3-1), Yield Ahead (W3-2), and Signal Ahead (W3-3) signs, shall be installed on an ~~the~~ approach to a primary traffic control device that is not visible for a sufficient distance to permit ~~allow~~ the driver to ~~properly~~ respond to the device. The visibility criteria for a traffic control device shall be based on having a continuous view of at least two signal faces for the distance specified in Table 4D-1 of the MUTCD.

**Comment [HF1]:** As recommended from 3/07 meeting deleted reference to MUTCD and used wording instead.

**Comment [HF2]:** This also comes from Section 2C.29 of the MUTCD. Does subcommittee think it need to be included?

Advance Warning Signs may also be used to provide advance notification to give drivers sufficient time to react to the upcoming primary traffic control device even when the visibility to the driver seems satisfactory.

## C~~B~~.3 Overhead Street Name Signs

The use of overhead street name signs with mixed-case lettering is recommended at major intersections as a supplement to post mounted street name signs.

### C~~B~~.3.a Standards

Overhead street name signs shall only be used to identify cross streets, not to identify destinations, such as cities or facilities.

The word Street, Boulevard, Avenue, etc., may be abbreviated or deleted to conserve sign panel length.

It is recommended that the border be eliminated on overhead street name signs to minimize sign panel size.

When a cross street is known by both route number and a local name, use of the local name is preferred.

When a cross street has dual local street name designations, both names may be used on the overhead street name sign.

When a cross street has a different name on each side of the intersection, both names shall be shown on the overhead street name sign. ~~two signs should be used with one on the left and one on the right side of the intersection.~~ When one sign panel is used, the names shall be separated with a border, with the left name displayed over the right. The display of

*Table 4D-1. Minimum Sight Distance*

| 85th-Percentile Speed (km/h) | Minimum Sight Distance (meters) |
|---|---|
| 30 | 50 |
| 40 | 65 |
| 50 | 85 |
| 60 | 110 |
| 70 | 140 |
| 80 | 165 |
| 90 | 195 |
| 100 | 220 |

| 85th-Percentile Speed (mph) | Minimum Sight Distance (feet) |
|---|---|
| 20 | 175 |
| 25 | 215 |
| 30 | 270 |
| 35 | 325 |
| 40 | 390 |
| 45 | 460 |
| 50 | 540 |
| 55 | 625 |
| 60 | 715 |

2. **Where the nearest signal face is located between 45 and 55 m (150 and 180 ft) beyond the stop line, engineering judgment of the conditions, including the worst-case visibility conditions, shall be used to determine if the provision of a supplemental near side signal face would be beneficial.**
3. **A signal face installed to satisfy the requirements for left-turn signal faces (see Section 4D.06) and right-turn signal faces (see Section 4D.07), and at least one and preferably both of the two signal faces required for the major movement on the approach shall be located no higher than at a maximum height to the top of the signal housing mounted over a roadway of 7.8 m (25.6 ft) above the pavement (see Section 4D.17). For viewing distances between 12 m (40 ft) and 16 m (53 ft) from the stop line, the maximum mounting height to the top of the signal housing shall be as shown on Figure 4D-1. (See Section 4D.17 for additional information regarding mounting heights.)**
4. **At least one and preferably both of the signal faces required by Item A in this Standard shall be located between two lines intersecting with the center of the approach at a point 3 m (10 ft) behind the stop line, one making an angle of approximately 20 degrees to the right of the center of the approach extended, and the other making an angle of approximately 20 degrees to the left of the center of the approach extended (see Figure 4D-2)**
5. **If both of the signal faces required by Item A in this Standard are post-mounted, they shall both be on the far side of the intersection, one on the right and one on the left of the approach lane(s).**

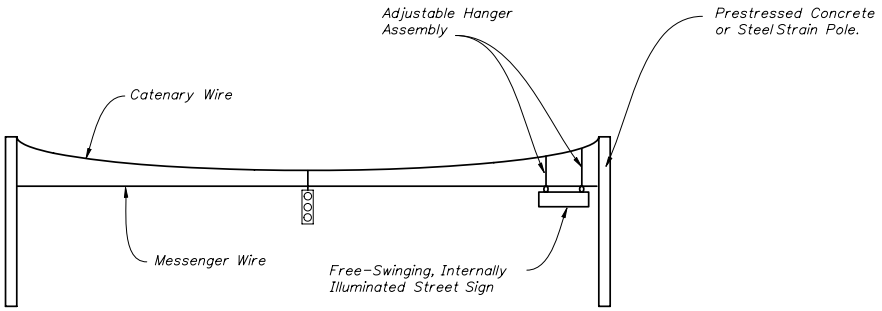
**E. If the minimum sight distance in Table 4D-1 cannot be met, a sign shall be installed to warn approaching traffic of the traffic control signal.**

**F. Required signal faces for through traffic on any one approach shall be located not less than 2.4 m (8 ft) apart measured horizontally perpendicular to the approach between the centers of the signal faces.**

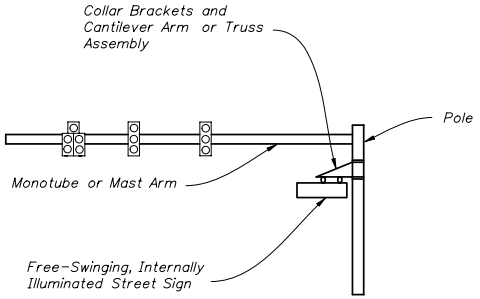
**G. If more than one turn signal face is provided for a protected-mode turn and if one or both of the signal faces are located over the roadway, the signal faces shall be located not less than 2.4 m (8 ft) apart measured horizontally perpendicular to the approach between the centers of the signal faces.**

**H. If supplemental signal faces are used, the following limitations shall apply:**

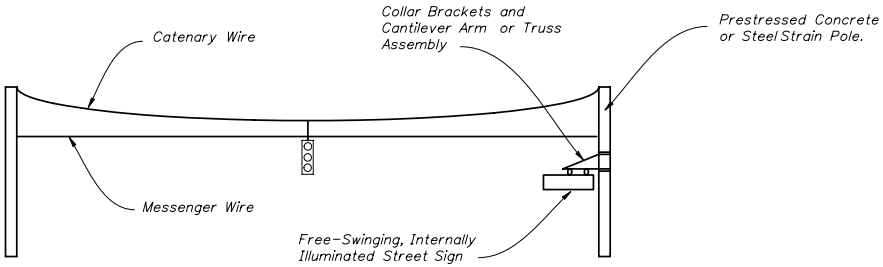
1. **Left-turn arrows shall not be used in near-right signal faces.**
2. **Right-turn arrows shall not be used in far-left signal faces. A far-side median-mounted signal face shall be considered a far-left signal for this application.**




OPTION 1
(For Span Wire Assembly)




OPTION 3
(For Mast Arm Assembly and Monotube Signal Structure)




OPTION 2
(For Span Wire Assembly)

NOTES:

1. Free-swinging, internally-illuminated street signs shall be installed on signal structures only at one of the optional locations shown on this drawing, unless a special design is completed for the support structure.
2. Free-swinging, internally-illuminated street signs shall meet the requirements of Section 699 of the Standard Specifications for Road and Bridge Construction.
3. Pole attachments and cantilever arm (or truss) assemblies may be accepted by Contractor certification provided the signs being supported meet the weight and area limitations included in Section 699 for "Acceptance by Certification".
4. Pole attachments and cantilever arm (or truss) assemblies supporting signs not meeting the weight or area limitations included in Section 699 for "Acceptance by Certification" require the submittal of structural calculations and Shop Drawings that have been prepared by and sealed by the Specialty Engineer.

| | 2008 FDOT Design Standards | Last Revision 07/01/02 | Sheet No. 1 of 1 |
|---|---|---|---|
| | **FREE - SWINGING, INTERNALLY - ILLUMINATED STREET SIGN ASSEMBLIES** | Index No. 17748 | |

block numbers is not required when two street names with arrows are provided on a single panel. When two signs are used, they should be installed with one sign panel on the left and one on the right side of the intersection.

Due to the possibility of hurricane strength winds, o~~OIn accordance with the Plans Preparation Manual, o~~verhead street name signs should not ~~are not to~~ be installed on span wire.

### C~~B~~.3.b Installation

The location of the overhead street name sign on a signal strain pole and/or mast arm may vary. However, it shall not interfere in any way with the motorist's view of the signal heads. The preferred location is shown in the Department's Design Standards, Index No. 17748. In the case of separate street names on each side of the street, one sign should be placed to the right of the centerline and signal heads and the other to the left side of the centerline and signal heads.

### C~~B~~.3.c Sign Design

On roadways with speeds 40 mph or above, at a minimum ~~Overhead street name signs should be designed in accordance with Section 2D.05 of the MUTCD. At a minimum,~~ the sign panel should be 24 inches in height with length determined by text. At a minimum, 8-inch upper and 6-inch lower case lettering for the street name and 6-inch all upper case lettering for the block numbering text on the second line shall be used. The preferred font is Series E-Modified; however, Series E may be used to accommodate the amount of legend ~~The minimum lettering size should be 8-inch upper case with 6-inch lower case lettering. The font used (either Series E Modified or Series E) may vary to accommodate the amount of text on the panel,~~ so as not to exceed the 96-inch maximum length.

Where structurally possible, overhead street name signs should be designed in compliance with the FHWA recommendations for older drivers using a ~~as shown in Section 2D.38 of the MUTCD. The~~ minimum lettering size of 12-inch upper case with 9-inch lower case.

## C~~B~~.4 Internally Illuminated Signs

It is recommended that internally illuminated overhead street names signs are the standard used ~~in order~~ to improve night-time visibility and to benefit older drivers.

~~When used, i~~Internally illuminated overhead street name signs should have a standardized height of 24-inches and length of 72-inches, with either Series E Modified or Series E font, which may vary to accommodate the amount of text on the panel. In extreme cases, a 96-inch maximum length sign may be used.

~~When used, the i~~Internally illuminated signs shall ~~must~~ be on the Florida Department of Transportation's Approved Products List in accordance with Section 316.0745, ~~of the~~ Florida Statutes.

### C~~B~~.5 Panel Size for Regulatory and Warning Signs

At a minimum, in order to increase visibility, it is recommended to use the Conventional Road size on~~f~~ all regulatory and warning signs. Reference ~~as shown in~~ Table 2B-1 for regulatory sign sizes and Table 2C-2 for warning sign sizes in ~~of~~ the MUTCD.

## D~~C~~ PAVEMENT MARKINGS

### C~~D~~.1 6-inch Pavement Markings

It is recommended that 6-inch pavement markings are used for all centerline pavement and edge line pavement markings. ~~that are placed in accordance with the MUTCD.~~

### D~~C~~.2 Reflective Pavement Markers

In order to provide greater emphasis and increase visibility, it is recommended that reflective (raised) pavement markers (RPM) be placed at 40 foot spacings along the centerline markings of ~~the~~ roadways with speeds 40 mph or above.

## *Table 2B-1. Regulatory Sign Sizes* (Sheet 1 of 5)

| Sign | MUTCD Code | Section | Conventional Road | Expressway | Freeway | Minimum | Oversized |
|---|---|---|---|---|---|---|---|
| Stop | R1-1 | 2B.04 | 750 x 750 (30 x 30) | 900 x 900 (36 x 36) | — | 600 x 600 (24 x 24) | 1200 x 1200 (48 x 48) |
| Yield | R1-2 | 2B.08 | 900 x 900 x 900 (36 x 36 x 36) | 1200 x 1200 x 1200 (48 x 48 x 48) | 1500 x 1500 x 1500 (60 x 60 x 60) | 750 x 750 x 750 (30 x 30 x 30) | — |
| To Oncoming Traffic | R1-2a | — | 600 x 300 (24 x 12) | — | — | — | — |
| 4-Way | R1-3 | 2B.04 | 300 x 150 (12 x 6) | — | — | — | — |
| All Way | R1-4 | 2B.04 | 450 x 150 (18 x 6) | — | — | — | — |
| Yield Here to Peds | R1-5 | 2B.11 | 450 x 450 (18 x 18) | — | — | — | — |
| Yield Here to Pedestrians | R1-5a | 2B.11 | 450 x 600 (18 x 24) | — | — | — | — |
| In-Street Ped Crossing | R1-6,6a | 2B.12 | 300 x 900 (12 x 36) | — | — | — | — |
| Speed Limit (English) | R2-1 | 2B.13 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| Speed Limit (Metric) | R2-1 | 2B.13 | 600 x 900 (24 x 36) | 900 x 1350 (36 x 54) | 1200 x 1650 (48 x 66) | — | — |
| Truck Speed Limit (English) | R2-2 | 2B.14 | 600 x 600 (24 x 24) | 900 x 900 (36 x 36) | 1200 x 1200 (48 x 48) | — | — |
| Truck Speed Limit (Metric) | R2-2 | 2B.14 | 600 x 750 (24 x 30) | 900 x 1050 (36 x 42) | 1200 x 1350 (48 x 54) | — | — |
| Night Speed Limit (English) | R2-3 | 2B.15 | 600 x 600 (24 x 24) | 900 x 900 (36 x 36) | 1200 x 1200 (48 x 48) | — | — |
| Night Speed Limit (Metric) | R2-3 | 2B.15 | 600 x 750 (24 x 30) | 900 x 1050 (36 x 42) | 1200 x 1350 (48 x 54) | — | — |
| Minimum Speed Limit (English) | R2-4 | 2B.16 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| Minimum Speed Limit (Metric) | R2-4 | 2B.16 | 600 x 900 (24 x 36) | 900 x 1350 (36 x 54) | 1200 x 1650 (48 x 66) | — | — |
| Combined Speed Limit (English) | R2-4a | 2B.16 | 600 x 1200 (24 x 48) | 900 x 1800 (36 x 72) | 1200 x 2400 (48 x 96) | — | — |
| Combined Speed Limit (Metric) | R2-4a | 2B.16 | 600 x 1350 (24 x 54) | 900 x 1950 (36 x 78) | 1200 x 2550 (48 x 102) | — | — |
| Fines Higher | R2-6 | 2B.17 | 600 x 600 (24 x 24) | 900 x 900 (36 x 36) | 1200 x 1200 (48 x 48) | — | — |
| Turn Prohibition | R3-1,2,3,4, 18 | 2B.19 | 600 x 600 (24 x 24) | 900 x 900 (36 x 36) | — | — | 1200 x 1200 (48 x 48) |
| Mandatory Movement Lane Control | R3-5 series | 2B.21 | 750 x 900 (30 x 36) | — | — | — | — |
| Optional Movement Lane Control | R3-6 | 2B.22 | 750 x 900 (30 x 36) | — | — | — | — |
| Mandatory Movement Lane Control | R3-7 | 2B.21 | 750 x 750 (30 x 30) | — | — | — | — |
| Advance Intersection Lane Control | R3-8,8a,8b | 2B.23 | variable x 750 (variable x 30) | — | — | — | — |
| Two-Way Left Turn Only (overhead mounted) | R3-9a | 2B.24 | 750 x 900 (30 x 36) | — | — | — | — |
| Two-Way Left Turn Only (ground mounted) | R3-9b | 2B.24 | 600 x 900 (24 x 36) | — | — | — | 900 x 1200 (36 x 48) |
| Reversible Lane Control (symbol) | R3-9d | 2B.25 | 2700 x 1200 (108 x 48) | — | — | — | — |
| Reversible Lane Control (ground mounted) | R3-9f | 2B.25 | 750 x 1050 (30 x 42) | — | — | — | — |
| Advance Reversible Lane Control Transition Signing | R3-9g,9h | 2B.25 | 2700 x 900 (108 x 36) | — | — | — | — |
| End Reverse Lane | R3-9i | 2B.25 | 2700 x 1200 (108 x 48) | — | — | — | — |
| Preferential Only Lane Ahead (ground mounted) | R3-10 series | 2B.26 | 750 x 1050 (30 x 42) | 900 x 1500 (36 x 60) | 1950 x 2400 (78 x 96) | — | — |
| Preferential Only Lane Operation (ground mounted) | R3-11 series | 2B.26 | 750 x 1050 (30 x 42) | — | 1950 x 2400 (78 x 96) | — | — |

## *Table 2B-1. Regulatory Sign Sizes* (Sheet 2 of 5)

| Sign | MUTCD Code | Section | Conventional Road | Expressway | Freeway | Minimum | Oversized |
|---|---|---|---|---|---|---|---|
| Preferential Only Lane Ends (ground mounted) | R3-12 series | 2B.26 | 750 x 1050 (30 x 42) | 900 x 1500 (36 x 60) | 1200 x 2100 (48 x 84) 1200 x 2400 (48 x 96) | — | — |
| Preferential Only Lane Ahead (overhead mounted) | R3-13 series | 2B.26 | 1650 x 900 (66 x 36) | 2100 x 1200 (84 x 48) | 3600 x 1950 (144 x 78) 3600 x 2400 (144 x 96) | — | — |
| Preferential Only Lane Operation (overhead mounted) | R3-14 series | 2B.26 | 1800 x 1500 (72 x 60) | 2400 x 1800 (96 x 72) | 3600 x 2650 (144 x 106) 3600 x 3100 (144 x 124) 3600 x 2250 (144 x 90) | — | — |
| HOV 2+ Lane Ends (overhead mounted) | R3-15 series | 2B.26 | 1650 x 900 (66 x 36) | 2100 x 1200 (84 x 48) | 2550 x 1500 (102 x 60) | — | — |
| Do Not Pass | R4-1 | 2B.29 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | 450 x 600 (18 x 24) | — |
| Pass With Care | R4-2 | 2B.30 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | 450 x 600 (18 x 24) | — |
| Slower Traffic Keep Right | R4-3 | 2B.31 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| Trucks Use Right Lane | R4-5 | 2B.32 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| Truck Lane XX Meters (XX Feet) | R4-6 | 2B.32 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| Keep Right | R4-7,7a,7b | 2B.33 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | 450 x 600 (18 x 24) | — |
| Keep Left | R4-8 | 2B.33 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | 450 x 600 (18 x 24) | — |
| Do Not Enter | R5-1 | 2B.34 | 750 x 750 (30 x 30) | 900 x 900 (36 x 36) | 1200 x 1200 (48 x 48) | — | — |
| Wrong Way | R5-1a | 2B.35 | 900 x 600 (36 x 24) | 900 x 600 (36 x 24) | 1050 x 750 (42 x 30) | — | — |
| No Trucks | R5-2,2a | 2B.36 | 600 x 600 (24 x 24) | 750 x 750 (30 x 30) | 900 x 900 (36 x 36) | — | 1200 x 1200 (48 x 48) |
| No Motor Vehicles | R5-3 | 2B.36 | 600 x 600 (24 x 24) | — | — | — | — |
| Commercial Vehicles Excluded | R5-4 | 2B.36 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| Vehicles with Lugs Prohibited | R5-5 | 2B.36 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| No Bicycles | R5-6 | 2B.36 | 600 x 600 (24 x 24) | 750 x 750 (30 x 30) | 900 x 900 (36 x 36) | — | 1200 x 1200 (48 x 48) |
| Non-Motorized Traffic Prohibited | R5-7 | 2B.36 | 750 x 600 (30 x 24) | 1050 x 600 (42 x 24) | 1200 x 750 (48 x 30) | — | — |
| Motor-Driven Cycles Prohibited | R5-8 | 2B.36 | 750 x 600 (30 x 24) | 1050 x 600 (42 x 24) | 1200 x 750 (48 x 30) | — | — |
| Pedestrians, Bicycles, Motor-Driven Cycles Prohibited | R5-10a | 2B.36 | 750 x 900 (30 x 36) | — | — | — | — |
| Pedestrians and Bicycles Prohibited | R5-10b | 2B.36 | 750 x 450 (30 x 18) | — | — | — | — |
| Pedestrians Prohibited | R5-10c | 2B.36 | 600 x 300 (24 x 12) | — | — | — | — |
| One Way | R6-1 | 2B.37 | 900 x 300 (36 x 12) | 1350 x 450 (54 x 18) | 1350 x 450 (54 x 18) | — | — |
| One Way | R6-2 | 2B.37 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 900 x 1200 (36 x 48) | 450 x 600 (18 x 24) | — |
| Divided Highway Crossing | R6-3,3a | 2B.38 | 750 x 600 (30 x 24) | 900 x 750 (36 x 30) | — | 600 x 450 (24 x 18) | — |

## *Table 2B-1. Regulatory Sign Sizes* (Sheet 3 of 5)

| Sign | MUTCD Code | Section | Conventional Road | Expressway | Freeway | Minimum | Oversized |
|---|---|---|---|---|---|---|---|
| No Parking | R7-1,2,2a,3, 4,5,6,7,8, 107,108 | 2B.39 | 300 x 450 (12 x 18) | — | — | — | — |
| Van Accessible | R7-8a,8b | 2B.40 | 450 x 225 (18 x 9) | — | — | 300 x 150 (12 x 6) | — |
| No Parking, Bike Lane | R7-9,9a | 9B.09 | 300 x 450 (12 x 18) | — | — | — | — |
| No Parking (with transit logo) | R7-107a | 2B.39 | 300 x 750 (12 x 30) | — | — | — | — |
| No Parking / Restricted Parking (combined sign) | R7-200 | 2B.40 | 600 x 450 (24 x 18) 300 x 750 (12 x 30) | — | — | — | — |
| Tow Away Zone | R7-201,201a | 2B.40 | 300 x 150 (12 x 6) | — | — | — | — |
| This Side of Sign | R7-202 | 2B.39 | 300 x 150 (12 x 6) | — | — | — | — |
| No Parking on Pavement | R8-1 | 2B.39 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| No Parking Except on Shoulder | R8-2 | 2B.39 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| No Parking | R8-3 | 2B.39 | 600 x 750 (24 x 30) | 900 x 900 (36 x 36) | 1200 x 1200 (48 x 48) | 450 x 600 (18 x 24) | — |
| No Parking (symbol) | R8-3a | 2B.39 | 600 x 600 (24 x 24) | 900 x 900 (36 x 36) | 1200 x 1200 (48 x 48) | 300 x 300 (12 x 12) | — |
| Emergency Parking Only | R8-4 | 2B.42 | 750 x 600 (30 x 24) | 750 x 600 (30 x 24) | 1200 x 900 (48 x 36) | — | — |
| No Stopping on Pavement | R8-5 | 2B.39 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| No Stopping Except on Shoulder | R8-6 | 2B.39 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| Emergency Stopping Only | R8-7 | 2B.42 | 750 x 600 (30 x 24) | 1200 x 900 (48 x 36) | — | — | — |
| Do Not Stop on Tracks | R8-8 | 2B.42 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | — | — | — |
| Tracks Out of Service | R8-9 | 8B.09 | 600 x 600 (24 x 24) | 900 x 900 (36 x 36) | — | 450 x 450 (18 x 18) | — |
| Stop Here When Flashing | R8-10 | 8B.10 | 600 x 900 (24 x 36) | — | — | 600 x 750 (24 x 30) | — |
| Walk on Left Facing Traffic | R9-1 | 2B.43 | 450 x 600 (18 x 24) | — | — | — | — |
| Cross Only at Crosswalks | R9-2 | 2B.44 | 300 x 450 (12 x 18) | — | — | — | — |
| No Pedestrian Crossing | R9-3 | 2B.44 | 300 x 450 (12 x 18) | — | — | — | — |
| No Pedestrian Crossing (symbol) | R9-3a | 2B.44 | 450 x 450 (18 x 18) | 600 x 600 (24 x 24) | 750 x 750 (30 x 30) | — | — |
| Use Crosswalk | R9-3b | 2B.44 | 450 x 300 (18 x 12) | — | — | — | — |
| No Hitch Hiking | R9-4 | 2B.43 | 450 x 600 (18 x 24) | — | — | 450 x 450 (18 x 18) | — |
| Hitch Hiking Prohibition (symbol) | R9-4a | 2B.43 | 450 x 450 (18 x 18) | — | — | — | — |
| Bicyclists (symbol) Use Ped Signal | R9-5 | 9B.10 | 300 x 450 (12 x 18) | — | — | — | — |
| Bicyclists (symbol) Yield to Peds | R9-6 | 9B.10 | 300 x 450 (12 x 18) | — | — | — | — |
| Keep Left/Right to Pedestrians & Bicyclists (symbols) – Travel-path Restriction | R9-7 | 9B.11 | 300 x 450 (12 x 18) | — | — | — | — |
| Pedestrian Crosswalk | R9-8 | 6F.12 | 900 x 450 (36 x 18) | — | — | — | — |
| Sidewalk Closed | R9-9 | 6F.13 | 750 x 450 (30 x 18) | — | — | — | — |

## *Table 2B-1. Regulatory Sign Sizes (Sheet 4 of 5)*

| Sign | MUTCD Code | Section | Conventional Road | Expressway | Freeway | Minimum | Oversized |
|---|---|---|---|---|---|---|---|
| Sidewalk Closed, Use Other Side | R9-10 | 6F.13 | 1200 x 600 (48 x 24) | — | — | — | — |
| Sidewalk Closed Ahead, Cross Here | R9-11 | 6F.13 | 1200 x 900 (48 x 36) | — | — | — | — |
| Sidewalk Closed, Cross Here | R9-11a | 6F.13 | 1200 x 600 (48 x 24) | — | — | — | — |
| Cross On Green Light Only | R10-1 | 2B.45 | 300 x 450 (12 x 18) | — | — | — | — |
| Pedestrian Traffic Signal Signs | R10-2, 2a,3,3a,3b, 3c,3d,4,4a,4b | 2B.45 | 225 x 300 (9 x 12) | — | — | — | — |
| Countdown Pedestrian Sign | R10-3e | 2B.45 | 225 x 375 (9 x 15) | — | — | — | — |
| Left on Green Arrow Only | R10-5 | 2B.45 | 600 x 750 (24 x 30) | — | — | — | 1200 x 1500 (48 x 60) |
| Stop Here on Red | R10-6 | 2B.45 | 600 x 900 (24 x 36) | — | — | — | — |
| Stop Here on Red | R10-6a | 2B.45 | 600 x 750 (24 x 30) | — | — | — | — |
| Do Not Block Intersection | R10-7 | 2B.45 | 600 x 750 (24 x 30) | — | — | — | — |
| Use Lane with Green Arrow | R10-8 | 2B.45 | 600 x 750 (24 x 30) | 900 x 1050 (36 x 42) | — | — | 1500 x 1800 (60 x 72) |
| Left (Right) Turn Signal | R10-10 | 2B.45 | 600 x 750 (24 x 30) | — | — | — | — |
| No Turn on Red | R10-11,11a | 2B.45 | 600 x 750 (24 x 30) | — | — | — | 1200 x 1200 (48 x 48) |
| No Turn on Red | R10-11b | 2B.45 | 600 x 600 (24 x 24) | — | — | — | 750 x 750 (30 x 30) |
| Left Turn Yield on Green | R10-12 | 2B.45 | 600 x 750 (24 x 30) | — | — | — | — |
| Emergency Signal | R10-13 | 2B.45 | 900 x 600 (36 x 24) | — | — | — | — |
| Turning Traffic Must Yield To Pedestrians | R10-15 | 2B.45 | 750 x 900 (30 x 36) | — | — | — | — |
| U-Turn Yield to Right Turn | R10-16 | 2B.45 | 750 x 900 (30 x 36) | — | — | — | — |
| Right on Red Arrow After Stop | R10-17a | 2B.45 | 750 x 900 (30 x 36) | — | — | — | — |
| Traffic Laws Photo Enforced | R10-18 | 2B.46 | 900 x 450 (36 x 18) | 1200 x 750 (48 x 30) | 1800 x 900 (72 x 36) | — | — |
| Photo Enforced | R10-19 | 2B.46 | 600 x 450 (24 x 18) | 900 x 750 (36 x 30) | 1200 x 900 (48 x 36) | — | — |
| MON—FRI (and times) (3 lines) | R10-20a | 2B.45 | 600 x 600 (24 x 24) | — | — | — | — |
| SUNDAY (and times) (2 lines) | R10-20a | 2B.45 | 600 x 450 (24 x 18) | — | — | — | — |
| Left Turn Signal— Yield on Green | R10-21 | 2B.45 | 750 x 900 (30 x 36) | — | — | — | — |
| Bike Actuation | R10-22 | 9B.12 | 300 x 450 (12 x 18) | — | — | — | — |

**Table 2B-1. Regulatory Sign Sizes** *(Sheet 5 of 5)*

| Sign | MUTCD Code | Section | Conventional Road | Expressway | Freeway | Minimum | Oversized |
|---|---|---|---|---|---|---|---|
| Keep Off Median | R11-1 | 2B.47 | 600 x 750 (24 x 30) | — | — | — | — |
| Road Closed | R11-2 | 2B.48 | 1200 x 750 (48 x 30) | — | — | — | — |
| Road Closed - Local Traffic Only | R11-3,3a, 3b,4 | 2B.48 | 1500 x 750 (60 x 30) | — | — | — | — |
| Weight Limit | R12-1,2 | 2B.49 | 600 x 750 (24 x 30) | 900 x 1200 (36 x 48) | — | — | 900 x 1200 (36 x 48) |
| Weight Limit | R12-3 | 2B.49 | 600 x 900 (24 x 36) | — | — | — | — |
| Weight Limit | R12-4 | 2B.49 | 900 x 600 (36 x 24) | — | — | — | — |
| Weight Limit | R12-5 | 2B.49 | 600 x 900 (24 x 36) | 900 x 1200 (36 x 48) | 1200 x 1500 (48 x 60) | — | — |
| Metric Plaque | R12-6 | 2B.49 | 600 x 225 (24 x 9) | — | — | — | — |
| Weigh Station | R13-1 | 2B.50 | 1800 x 1200 (72 x 48) | 2400 x 1650 (96 x 66) | 3000 x 1100 (120 x 84) | — | — |
| Truck Route | R14-1 | 2B.51 | 600 x 450 (24 x 18) | — | — | — | — |
| Hazardous Material | R14-2,3 | 2B.52 | 600 x 600 (24 x 24) | 750 x 750 (30 x 30) | 900 x 900 (36 x 36) | — | 1050 x 1050 (42 x 42) |
| National Network | R14-4,5 | 2B.53 | 600 x 600 (24 x 24) | 750 x 750 (30 x 30) | 900 x 900 (36 x 36) | — | 1050 x 1050 (42 x 42) |
| Railroad Crossbuck | R15-1 | 8B.03 | 1200 x 225 (48 x 9) | — | — | — | — |
| Look | R15-8 | 8B.16 | 900 x 450 (36 x 18) | — | — | — | — |

Notes:
1. Larger signs may be used when appropriate.
2. Dimensions are shown in millimeters followed by inches in parentheses and are shown as width x height.

## Section 2B.05 STOP Sign Applications

Guidance:

STOP signs should be used if engineering judgment indicates that one or more of the following conditions exist:

A. Intersection of a less important road with a main road where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law;
B. Street entering a through highway or street;
C. Unsignalized intersection in a signalized area; and/or
D. High speeds, restricted view, or crash records indicate a need for control by the STOP sign.

**Standard:**

**Because the potential for conflicting commands could create driver confusion, STOP signs shall not be installed at intersections where traffic control signals are installed and operating except as noted in Section 4D.01.**

**Portable or part-time STOP signs shall not be used except for emergency and temporary traffic control zone purposes.**

Guidance:

STOP signs should not be used for speed control.

STOP signs should be installed in a manner that minimizes the numbers of vehicles having to stop. At intersections where a full stop is not necessary at all times, consideration should be given to using less restrictive measures such as YIELD signs (see Section 2B.08).

## *Table 2C-2. Warning Sign Sizes*

| Description | | Conventional Road | Express-way | Freeway | Minimum | Oversized |
|---|---|---|---|---|---|---|
| Shape | Sign Series | | | | | |
| Diamond | W1, W2, W7, W8, W9, W11, W14, W15-1, W17-1 | 750 x 750 (30 x 30) | 900 x 900 (36 x 36) | 1200 x 1200 (48 x 48) | 600 x 600 (24 x 24) | ——— |
| | W1 Combination, W3, W4, W5, W6, W8-3, W10, W12 | 900 x 900 (36 x 36) | 1200 x 1200 (48 x 48) | 1200 x 1200 (48 x 48) | 750 x 750 (30 x 30) | ——— |
| Rectangular | W1 - Arrows | 1200 x 600 (48 x 24) | ——— | ——— | 900 x 450 (36 x 18) | 1500 x 750 (60 x 30) |
| | W1 - Chevron | 450 x 600 (18 x 24) | 750 x 900 (30 x 36) | 900 x1200 (36 x 48) | 300 x 450 (12 x 18) | ——— |
| | W7-4 | 1950 x 1200 (78 x 48) | 1950 x 1200 (78 x 48) | 1950 x 1200 (78 x 48) | ——— | ——— |
| | W7-4b, 4c | 1950 x 1500 (78 x 60) | 1950 x 1500 (78 x 60) | 1950 x 1500 (78 x 60) | ——— | ——— |
| | W10-9, 10 | 600 x 450 (24 x 18) | ——— | ——— | ——— | ——— |
| | W12-2p | 2100 x 600 (84 x 24) | 2100 x 600 (84 x 24) | 2100 x 600 (84 x 24) | ——— | ——— |
| | W13-2, 3, 5, W25 | 600 x 750 (24 x 30) | 900 x1200 (36 x 48) | 1200 x 1500 (48 x 60) | 600 x 750 (24 x 30) | 1200 x 1500 (48 x 60) |
| Pennant | W14-3 | 900 x 1200 x 1200 (36 x 48 x 48) | ——— | ——— | 750 x 1000 x 1000 (30 x 40 x 40) | 1200 x 1600 x 1600 (48 x 64 x 64) |
| Circular | W10-1 | 900 (36) Dia. | 1200 (48) Dia. | ——— | 750 (30) Dia. | 1200 (48) Dia. |

Notes: 1. Larger signs may be used when appropriate
2. Dimensions are shown in millimeters followed by inches in parentheses and are shown as width x height

## Section 2C.05 Placement of Warning Signs

Support:

For information on placement of warning signs, see Sections 2A.16 to 2A.21.

The total time needed to perceive and complete a reaction to a sign is the sum of the times necessary for Perception, Identification (understanding), Emotion (decision making), and Volition (execution of decision), and is called the PIEV time. The PIEV time can vary from several seconds for general warning signs to 6 seconds or more for warning signs requiring high road user judgment.

Table 2C-4 lists suggested sign placement distances for two conditions. This table is provided as an aid for determining warning sign location.

# *Proposed Chapter*
# *Traditional Neighborhood Development (TND)*

Topic # 625-000-015 May - 2008
Manual of Uniform Minimum Standards
for Design, Construction and Maintenance
for Streets and Highways

# CHAPTER 18

# TRADITIONAL NEIGHBORHOOD DESIGN

## A Introduction

Florida is a national leader in planning, design and construction of Traditional Neighborhood Development (TND) projects and in the renovation of downtown neighborhoods and business districts. The treatment of land use, development patterns, and transportation network necessary for successful TND projects is a major departure from those same elements currently utilized in the current Green Book which generally apply to Conventional Suburban Development (CSD) projects.

The design of TND projects requires a greater focus on supporting pedestrian, bicycle and transit activity, thereby putting motor vehicle movement in a less dominant position. A well designed TND is created using tools that many professionals are not accustomed to using, and therefore this chapter is intended to provide best practices to facilitate proper design of TND projects. Consequently, the emphasis varies from the rest of the Green Book where the focus is on establishing minimum standards. In order to provide a design that accomplishes the goals set out in this chapter, designers will be guided by providing design criteria based on the context of the built environment established for a portion of the community which has clearly defined characteristics necessary to achieve the goals for compact livable development patterns, also called “Smart Growth.”

This chapter is intended to provide guidance for planning and designing Greenfield (new), infill TND and urban renewal projects. It is also intended to clearly differentiate the differences between CSD and TND projects to maximize the possibility of proper design. This is important since the street geometry, adjacent land use, and other elements will either support transit, pedestrian and bicycle activity or create an environment that is not very supportive to those modes.

Subsequent sections in this chapter will help the professional understand why and how to apply design features.

Differences between Conventional and Traditional Neighborhood Development:

The characteristics of CSD typically include separated land uses, where housing, retail, office and industrial uses are isolated from one another. Housing is usually further

separated into neighborhoods such that apartments, condominiums and other higher density housing are separate from single family housing. Single family housing is often further separated into various price levels. Public services such as parks, schools, post offices, and health facilities are at such a large scale and separated from other uses that they can only be reached by motor vehicle.

In CSD, big box retail, office parks and other commerce can only be sustained in an auto dominant environment since they must have a regional market to succeed.

Finally, the roadway system is hierarchal and very much like a plumbing system where “local” streets with lower traffic volumes feed into “collector” streets with higher levels of traffic, then finally onto the “arterial”, where speeds and volumes are typically much higher. Block sizes are large to minimize the number of intersections. This type of roadway network puts essentially all trips onto the arterial with little to no alternate routes for travelers.

Design speeds are rarely less than 35 mph and may be as high as 50 mph. Thus longer distance through traffic is mixed with shorter trip traffic accessing local services. Higher volume, high speed streets fronted by the walls of subdivisions or surface parking lots of commercial developments result in a built environment that is hostile to pedestrian, transit and bicycle modes of transportation. See Figure 1 below for an illustration of conventional suburban development.

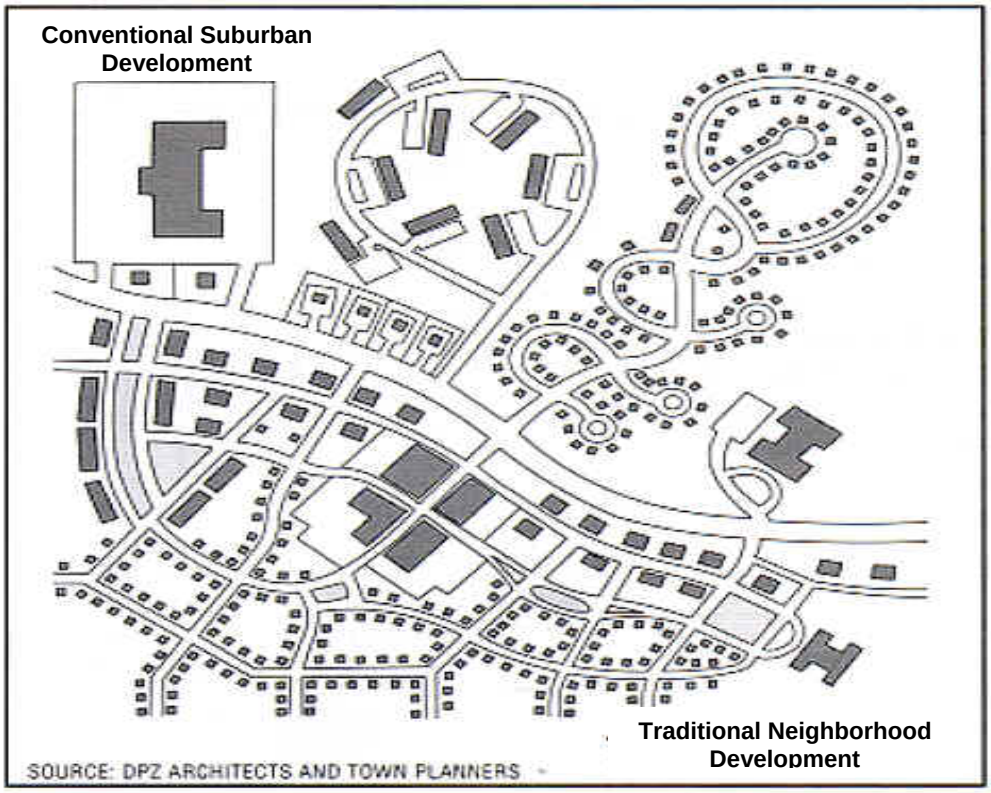



**Figure 1**

Traditional Neighborhood Development in contrast is very supportive to pedestrian, bicycle and transit modes. Land uses are mixed, with retail, office, civic buildings and residential interwoven throughout the community, and many times located in the same buildings. Block sizes are a smaller scale to improve walkability and to create a fine network of streets, providing a variety of routes for all users.

Multi-family and single family housing are located in close proximity or adjacent to each other, and homes of various size and price are mixed into neighborhoods. On street parking is favored over surface parking and one way streets are rarely used. Travel speeds for motor vehicles are ideally kept in the range of 20-35 mph. This creates and environment that is safer and more comfortable for pedestrians and bicyclists.

## B CONTEXT

Context is the environment the roadway is built in which includes buildings, adjacent land use, historic, cultural, and other characteristics that form the built and natural environment of a given place. The ITE Proposed Recommended Practice for Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities refers to as the Transect Zones used in this document as “Context Zones.” They are in fact the same.

In order to more clearly define the various contexts or transects used throughout the remaining portions of the document, the transects and their related characteristics are listed in Table 1 below and illustrated in Figure 2 below.

## Table 1

| Transect Zone | Distinguishing Characteristics | General Character | Building Placement | Frontage Types | Typical Building Height | Type of Public Open Space |
|---|---|---|---|---|---|---|
| T-1 Natural | Natural Landscape | Natural Features | N/A | N/A | N/A | Natural open space |
| T-2 Rural | Agricultural with scattered development | Agricultural activity and natural features | Large setbacks | N/A | N/A | Agricultural and natural |
| T-3 Suburban | Primarily single family residential with walkable development pattern and pedestrian facilities, dominant landscape pattern | Detached buildings and landscaped yards | Varying front and side yard setbacks | Lawns, porches, fences, naturalistic tree planting | 1 to 2 story with some 3 story | Parks, greenbelts |
| T-4 General Urban | Mix of housing types including attached units, with a range of commercial and civic activity at the neighborhood and community scale | Predominantly detached buildings, balance between landscape and buildings, presence of pedestrians | Shallow to medium front and side yard setbacks | Porches, fences | 2 to 3 story with some variation and few taller workplace buildings | Parks, greenbelts |
| T-5 Urban Center | Attached housing types such as townhouses, and apartments mixed with retail, workplace, and civic activities at the community or sub-regional scale | Predominately attached buildings, landscaping within the public right of way, substantial pedestrian activity | Small or no setbacks, buildings oriented to the street with placement and character defining a street wall | Stoops, dooryards, storefronts, arcaded walkways | 3 to 5 story with some variation | Parks, plazas, and squares, boulevard median landscaping |
| T-6 Urban Core | Highest intensity areas in sub-region or region, with high density residential and workplace uses, entertainment, civic and cultural uses | Attached buildings providing a sense of enclosure and continuous street wall, landscaping within the public right of way, highest pedestrian and transit activity | Small or no setbacks, buildings oriented to the street, placed at the front property line | Stoops, dooryards, forecourts, storefronts, arcaded walkways | 4+ story buildings with a few shorter buildings | Parks, plazas, and squares, boulevard median landscaping |
| Districts | To be designated and described locally, districts are areas that are single use or multi-use with low density development patterns. These may be large facilities such as airports, business parks, and industrial areas | | | | | |

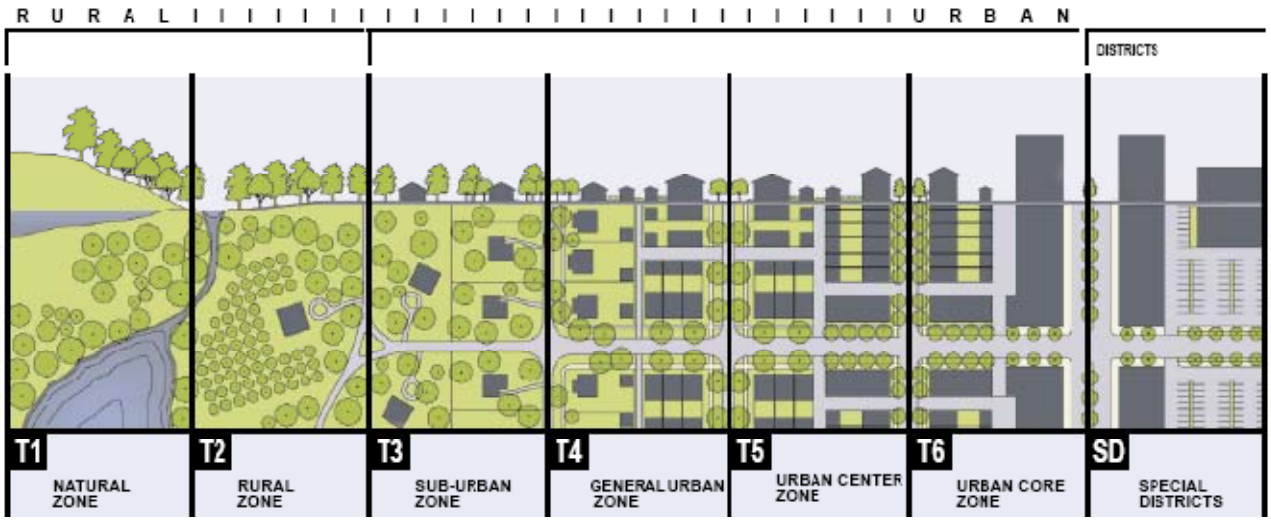



**Figure 2**

## C PLANNING CRITERIA

Planning for Traditional Neighborhood Development occurs at several levels, the region, the city/town, the community, the block and finally the building. Planning should be holistic, looking carefully at the relationship between land use, buildings and transportation in an integrated fashion. This approach and the use of form based codes can create development patterns that support more traditional development patterns that balance pedestrian, transit and bicycling with motor vehicle modes of transportation. The following sections help to define considerations for developing communities at different scales in order to increase the potential for creating traditional neighborhood development patterns.

The principles for defining or creating the context should be considered based on the scale of community that is being evaluated, developed or redeveloped.

### The City/Town – Guiding Principles

- The city should retain its natural infrastructure and visual character derived from its location and climate, including topography, landscape and coastline
- Growth strategies should encourage infill and redevelopment
- New development should be structured to reinforce a pattern of neighborhoods and urban centers, focused growth at transit nodes rather than along corridors.
- Transportation corridors should be planned and reserved in coordination with land use.
- Green corridors should be encouraged to enhance and connect the urbanized areas.
- The city should include a framework of transit, pedestrian, and bicycle systems that provide alternatives to automobile use.

- A diversity of land use should be distributed throughout the city to enable a variety of economic activity, workplace, residence, recreation and civic activity.
- Affordable and workforce housing should be distributed throughout the city to match job opportunities and to avoid concentrations of poverty.

**The Community - Guiding Principles**

- Neighborhoods and urban centers should be the preferred pattern of development and Transect Zones emphasizing single-use should be the exception.
- Neighborhoods and urban centers should be compact, pedestrian-oriented and mixed-use. Density and intensity of use should relate to degree of transit service.
- The ordinary activities of daily living should occur within walking distance of most dwellings, allowing independence to those who do not drive.
- Interconnected networks of thoroughfares should be designed to disperse and reduce the length of automobile trips and to encourage walking and bicycling. A range of open space, including parks, squares and playgrounds, should be distributed within neighborhoods and urban centers.
- Appropriate building densities and land uses should occur within walking distance of transit stops.
- Civic, institutional and commercial activity should be embedded in mixed-use urban centers, not isolated in remote single-use complexes.
- Schools should be located to enable children to walk or bicycle to them.
- Within neighborhoods, a range of housing types and price levels should accommodate diverse ages and incomes.

**The Block and the Building - Guiding Principles**

- Buildings and landscaping should contribute to the physical definition of thoroughfares as civic places.
- Development should adequately accommodate automobiles while respecting the pedestrian and the spatial form of public space.
- The design of streets and buildings should reinforce safe environments, but not at the expense of accessibility.
- Architecture and landscape design should grow from local climate, topography, history, and building practice.
- Buildings should allow their inhabitants to experience the geography and climate through energy efficient design.
- Civic buildings and public gathering places should be located to reinforce community identity and support self-government.

The following principles are intended to offer guidance on the most appropriate setting for the design principles of this chapter. The principles are not intended to be criteria, but it is recommended that at least seven of the principles or their intent be reflected in a project or community setting for it to be considered a TND.

***NOTE TO TEAM: Discussion needs to occur on the following principles since some of these should not be optional. Possibly establish those that are "non-negotiable" and allow flexibility with others.***

- Has a compact, pedestrian-oriented scale that can be traversed in a five to ten-minute walk from core to edge

- Is designed with low speed, low volume, interconnected streets with short block lengths that are between 150 to 400 feet and cul-de-sacs only where no alternative exists

- Orients buildings close to the street with off-street parking located to the side or back of buildings as not to interfere with pedestrian activity

- Has building designs that emphasize higher intensities, street frontages, connectivity of sidewalks and paths, and transit stops to promote pedestrian activity and accessibility

- Incorporates a continuous pedestrian network with wider sidewalks in commercial and core areas, but at a minimum has sidewalks of at least five feet that are on both sides of a street Accommodates pedestrians with short street crossings, which may include mid-block crossings, bulb-outs, raised crosswalks, specialty pavers, or pavement markings

- Uses on-street parking to buffer the sidewalk, calm traffic, and offer diverse parking options

- Is composed of a community core with moderate to high residential densities, at least ten percent of developed area for nonresidential uses, and civic uses and open spaces integrated into neighborhoods

- Varies residential densities, lot sizes, and housing types, while maintaining an average gross density of at least eight dwellings per acre and higher density in the core

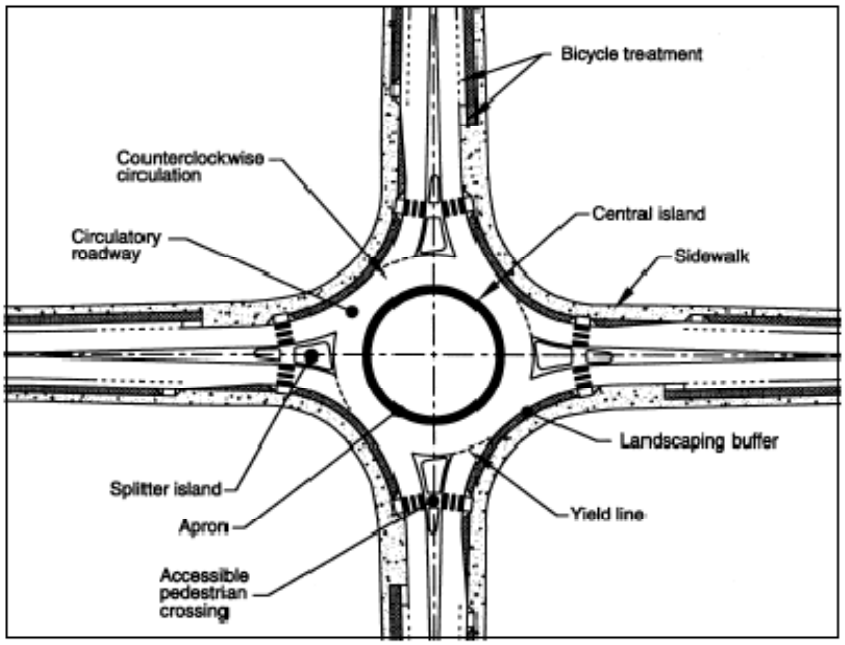
- Has only the minimum rights-of-way necessary for the street, median, planting strips, sidewalks, utilities, and maintenance and which are appropriate to adjacent land uses and building types

- Locates arterial highways, major collector roads, and other high-volume corridors at the edge of the TND, not through the TND

## C.1 Definitions

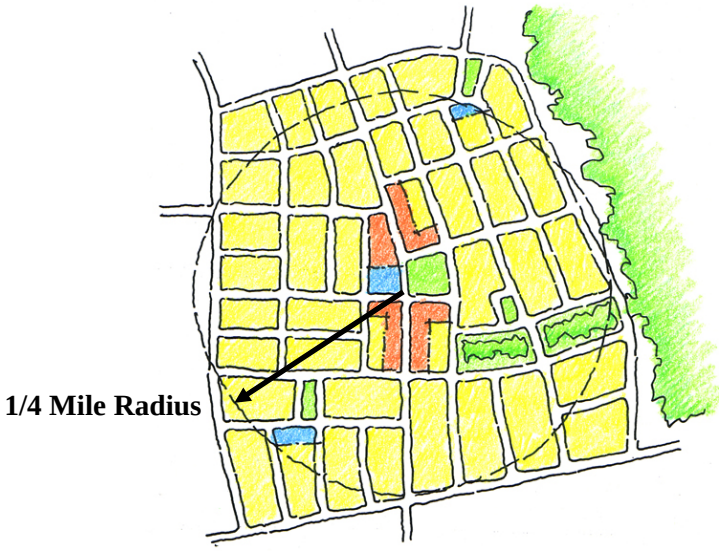
***NOTE TO TEAM: Should definitions be placed at beginning of section where text is first located or some other location?***

- Alley - A narrow street, especially one through the middle of a block giving access to the rear of lots or buildings.
- Avenue (AV) - a thoroughfare of high vehicular capacity and low speed. Avenues are short distance connectors between urban centers. Avenues may be equipped with a landscaped median. Avenues become collectors upon exiting urban areas.
- Boulevard - a boulevard is usually a thoroughfare, divided with a median down the center.
- Context – the financial, environmental, historical, cultural, land use types, activities and built environment which help to establish the configuration of roadways.
- Context sensitive solutions (CSS) - is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist.
- Design Speed - is the velocity at which a thoroughfare tends to be driven without the constraints of signage or enforcement.
- Human scale - describes buildings, block structure and other aspects of the built environment which are designed in consideration for pedestrians and bicyclists, their rate of travel and other physical needs
- Lane –
- Liner Building - a building specifically designed to mask a parking lot or a parking garage from the frontage.
- Live-Work - a dwelling unit that contains a commercial component in the unit.
- Mixed Use Development - the practice of allowing more than one type of use in a building or set of buildings. This can mean some combination of residential, commercial, industrial, office, institutional, or other land uses.
- Modern Roundabout - a circular intersection with specific design and traffic control features. These features include yield control of all entering traffic, channelized approaches, and appropriate geometric curvature to ensure that travel speeds on the circulatory roadway are typically less than 30 mph.




**Modern Roundabout**

- Neighborhood - an urbanized area at least 40 acres that is primarily residential. A Neighborhood shall be based upon a partial or entire Standard Pedestrian Shed.
- New Urbanism - a development philosophy based on the principles of traditional neighborhood development designed for the pedestrian and transit as well as the car; cities and towns should be shaped by physically defined and universally accessible public spaces and community institutions; urban places should be framed by architecture and landscape design that celebrate local history, climate, ecology, and building practice.
- Passage - a pedestrian connector passing between buildings, providing shortcuts through long blocks and connecting rear parking areas to frontages.
- Path - a pedestrian way traversing a park or rural area, with landscape matching the contiguous open space.
- Pedestrian Shed - An area, approximately circular, that is centered on a common destination. A Pedestrian Shed is applied to determine the approximate size of a Neighborhood. A Standard Pedestrian Shed is 1/4 mile radius or 1320 feet, about the distance of a five-minute walk at a leisurely pace.




Pedestrian Shed

- Private Frontage - the privately held area between the r/w line and the building facade.
- Public Frontage - the area between the curb of the thoroughfare and the r/w line. Elements of the public frontage include the type of curb, walk, planter, street tree and streetlight.
- Rear Alley/Lane - a vehicular driveway located to the rear of lots providing access to service areas and parking, and containing utility easements.
- Retail - premises available for the sale of merchandise and food service.
- Smart Growth - an urban planning and transportation theory that concentrates growth in the center of a city to avoid urban sprawl; and advocates compact, transit-oriented, walkable, bicycle friendly land use, including mixed used development with a range of housing choices.
- Road - a local, rural and suburban thoroughfare of low vehicular speed and capacity. Its public frontage consists of swales drained by percolation and a walking path or bicycle trail along one or both sides. This type is allocated to the more rural Transect Zones (T1-T3).
- Setback - the area of a lot measured from the r/w line to a building facade or elevation.
- Street - a local urban thoroughfare of low speed and capacity. This type is permitted within the more urban Transect Zones (T4-T6).
- Terminated Vista - a building or feature located at the end of a thoroughfare in a position of prominence.

Terminated Vista

- Thoroughfare: a corridor incorporating sidewalks, moving lanes and parking lanes within a right-of-way.
- TND or Traditional Neighborhood Development: a Community Type based upon a Standard Pedestrian Shed oriented toward a Common Destination consisting of a mixed-use center or corridor, and having a minimum developable area of 80 acres.
- Transit-Oriented Development - a regional center development with transit available or proposed. *NEEDS WORK*
- Town Center - the mixed-use center or main Commercial corridor of a community. A Town Center in a hamlet or small TND may consist of little more than a meeting hall, corner store, and main civic space.
- Transect - a system of ordering human habitats in a range from the most natural to the most urban. The SmartCode is based upon six Transect Zones which describe the physical character of place at any scale, according to the density and intensity of land use and urbanism.
- Transect Zone (T-Zone): Transect Zones are administratively similar to the land use zones in conventional codes, except that in addition to the usual building use, density, height, and setback requirements, other elements of the intended habitat are integrated, including those of the private lot and building and the adjacent public streetscape. The elements are determined by their location on the Transect scale. The T-Zones are: T1 Natural, T2 Rural, T3 Sub-Urban, T4 General Urban, T5 Urban Center, and T6 Urban Core

## C.2 Land Use

In addition to its importance in calculating trip generation, ITE recognizes land use as fundamental to establishing context, design criteria, cross-section elements, and right-of-way allocation. The pedestrian travel generated by the land uses also is important to the design process for various facilities.

Land use considerations for TNDs are outlined in the Planning Criteria section and are applied at a variety of scales. A well-integrated or “fine grained” land use mix within buildings and blocks is essential. These buildings and blocks

aggregate into neighborhoods, which should be designed with a mix of uses to form a comprehensive planning unit that aggregates into larger villages, towns, and regions. Except at the regional scale, each of these scales requires land uses to be designed at a pedestrian scale and to be served by “complete streets” that safely and attractively accommodate many modes of travel.

The proposed land uses, residential densities, building size and placement, proposed parking (on-street and off-street) and circulation, the location and use of open space, and the development phasing are all considerations in facility design for TNDs. ITE recommends a high level of connectivity, short blocks that provide many choices of routes to destinations, and a fine-grained urban land use and lot pattern. Higher residential density and nonresidential intensity, as measured by floor area ratios of building area to site area, are required for well-designed TNDs.

## C.3 Networks

Urban network types are frequently characterized as either traditional (a highly interconnected grid) or conventional (characterized by hierarchal, disconnected system). Traditional networks are typically characterized by a relatively non-hierarchical pattern of short blocks and straight streets with a high density of intersections which supports all modes of travel in a balance fashion. The typical conventional street network by contrast often includes a framework of widely-spaced arterial roads with limited connectivity provided by a system of large blocks, curving streets and a branching hierarchical pattern often terminating in cul-de-sacs and is characteristic of automobile dominant systems.

Traditional Network

Conventional Network

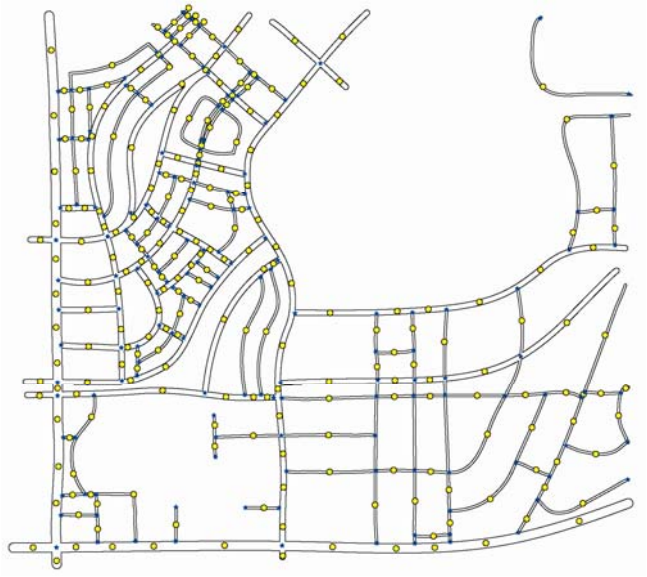
Traditional and conventional networks differ in three easily measurable respects: (1) block size, (2) degree of connectivity and (3) degree of curvature. While the last does not significantly impact network performance, block size and connectivity create very different characteristics.

Advantages of traditional networks include:

- Distribution of traffic over a network of streets, reducing the need to widen roads;
- A highly interconnected network providing a choice of multiple routes for travel for all modes, including emergency services;
- More direct routes between origin and destination points, which generate fewer vehicle miles of travel (VMT) than conventional suburban networks;
- Smaller block sizes in a network that is highly supportive to pedestrian, bicycle and transit modes of travel;
- A block structure that provides greater flexibility for land use to evolve over time.

It is important in TND networks to have a highly interconnected network of streets with smaller block sizes than in conventional networks. Two ways to ensure that these goals are achieved are have a Connectivity Index of at least 1.4, and creating block size with a perimeter of approximately 1,320 feet and block sides no longer than 500 feet. If a block side exceeds 600 feet, a mid-block pedestrian path should be provided.

The Connectivity Index is calculated by dividing the number of links by the number of nodes. All street intersections and cul-de-sacs count as nodes.



242 Links/146 Nodes = Connectivity Index of 1.66

## C.4 Thoroughfare Types

Section C Highway Function and Classification in Planning Chapter 1 contains the conventional classification system that is commonly accepted to define the function and operational requirements for roadways. These classifications are also used as the primary basis for geometric design criteria.

All of the factors, traffic volume, trip characteristics, speed and level of service, in the functional classification system are related to the mobility of motor vehicles; these factors do not provide for or address bicyclists or pedestrians; and do not consider the context or land use of the surrounding environment. This approach, while appropriate for high speed rural and suburban roadways, does not provide designers with guidance on how to design for a pedestrian supportive environment or in a context sensitive manner.

The thoroughfare types described here provide mobility for all modes of transportation with a greater focus on the pedestrian. The functional classification system can be generally applied to the thoroughfare types in this chapter. What designers should recognize is the need for greater flexibility in applying design criteria based more heavily on context and the need to create a safe environment for pedestrians, rather than strictly following the conventional application of functional classification in determining geometric criteria.

### General Principles

a. The Thoroughfares are intended for use by vehicular, transit, bicycle, and pedestrian traffic and to provide access to Lots and Open Spaces.
b. The Thoroughfares consist of vehicular lanes and Public Frontages. The lanes provide the traffic and parking capacity. Thoroughfares consist of vehicular lanes in a variety of widths for parked and for moving vehicles. The Public Frontages contribute to the character of the Transect Zone. They may include swales, sidewalks, curbing, planters, bicycle paths and street trees.
c. Thoroughfares should be designed in context with the urban form and desired design speed of the Transect Zones through which they pass. The Public Frontages that pass from one Transect Zone to another should be adjusted accordingly.

The terms for thoroughfare types that are used fin Traditional Neighborhood Design include:

**HW-Highway**
A Highway is a long-distance, high-capacity and high-speed thoroughfare that connect cities and towns. A Highway should have infrequent intersections and driveway entrances, and should have sidewalks and abutting buildings buffered by landscape where possible; otherwise it becomes strip development which interferes with traffic flow and pedestrian comfort.

Highway frontages may have curbs or open swales drained by percolation. They have no parking. Buildings may front a wide sidewalk or be set back. Highways can be rural linear parks, with a median and naturalistic landscaping and bicycle and pedestrian paths traversing the landscape independently.

**RD-Road**
A Road is a local, slow-movement thoroughfare suitable for less urban transect zones. Roads provide frontage for low-density buildings with a substantial setback. Roads have narrow pavement and open swales drained by percolation, with or without sidewalks. The landscaping may be informal with multiple species arrayed in naturalistic clusters.

**ST-Street**
A Street is a local, multi-movement thoroughfare suitable for all urbanized transect Zones and all frontages and uses. A Street is urban in character, with raised curbs, drainage inlets, wide sidewalks, parallel parking, and trees in individual or continuous planters aligned in an allee. Character may vary somewhat, however, responding to the commercial or residential uses lining the Street.

**DR-Drive**
A Drive is a local movement thoroughfare along the edge of a wide right-of-way or an open space. One side of a Drive may have the urban character of a Street or Boulevard with sidewalk and buildings; the other side may have the qualities of a parkway such as along a railroad track with naturalistic planting. Alternatively, a Drive may have an urban character with landscape and formal planting, such as along the bayfront or riverfront.

**AV-Avenue**
An Avenue is a limited distance, slow or free-movement thoroughfare connecting proximate locations within an urbanized area. Unlike a Boulevard, in its truest form, an avenue's length is finite and its axis is terminated. It always has a substantial planted median. An Avenue may be conceived as an elongated square.

The Avenue is appropriate for the approach to a civic building. At urban centers, the median may be wide enough to hold monuments and even buildings. In residential areas, the median may be planted naturalistically to become a parkway or green.

Avenue Frontages have raised curbs drained by inlets and wide sidewalks separated from the vehicular lanes by narrow continuous planters, preferably with parking on both sides. The landscaping consists of a single tree species aligned in a regularly spaced allee in individual or continuous planters.

**BV-Boulevard**

A Boulevard is a long-distance, high capacity multi-movement Thoroughfare, outside of neighborhoods and at neighborhood edges. A Boulevard may be lined by parallel parking, with wide sidewalks, and trees in continuous or individual planters.

Boulevards may have central or side medians with slip roads. Side medians segregate slower traffic and parking activity at the edges from through traffic at the center.

Boulevards have sidewalks with raised curbs along both sides, drainage by inlets, parallel parking, sidewalks, and trees aligned in a regularly spaced allee in individual or continuous planters.

**PP-Pedestrian Passage**
A Pedestrian Passage is a narrow connector restricted to pedestrian use and limited vehicular use that passes between buildings or between a building and a public open space. Passages provide shortcuts through long blocks and connect rear parking areas with frontages. In T3, Pedestrian Passages may be unpaved and informally landscaped. In T4, T5 and T6, they should be paved and landscaped and may provide limited vehicular access. When in civic zones, passages should correspond with their context and abutting transect zones.

**AL-Alley**
An Alley is a narrow vehicular access-way at the rear or side of buildings providing service and parking access, and utility easements. Alleys have no sidewalks, landscaping, or building frontage requirements. They accommodate trucks and dumpsters, and may be paved from building face to building face, with drainage by inverted concrete crown. In older residential neighborhoods Alleys may be unpaved.

***NOTE TO TEAM: Is more language needed in this section Planning, including a defined process for proper planning?***

## D DESIGN PRINCIPLES

[Discussion of the principles used in designing TND projects will be covered.]

### D.1 Introduction/Definitions

### D.2 Design Process

### D.3 Design Speed

Add introduction text.

Movement types describe the expected driver experience on a given thoroughfare. The design speed for pedestrian safety and mobility established for each of these movement types.

o

***NOTE TO TEAM: Please provide feedback on terms and speed ranges***

**Movement Types**

**Yield:** Drivers must proceed slowly and with extreme care and must yield in order to pass a parked car or approaching vehicle. Functional equivalent of traffic calming. Design speed of 20 mph or less; this type can accommodate bicycle routes.

**Slow:** Drivers can proceed carefully with an occasional stop to allow a pedestrian to cross or another car to park. Drivers should feel uncomfortable exceeding design speed due to presence of parked cars, enclosure, tight turn radii, and other design elements. Design speed of 20-25 mph; this type can accommodate bicycle routes.

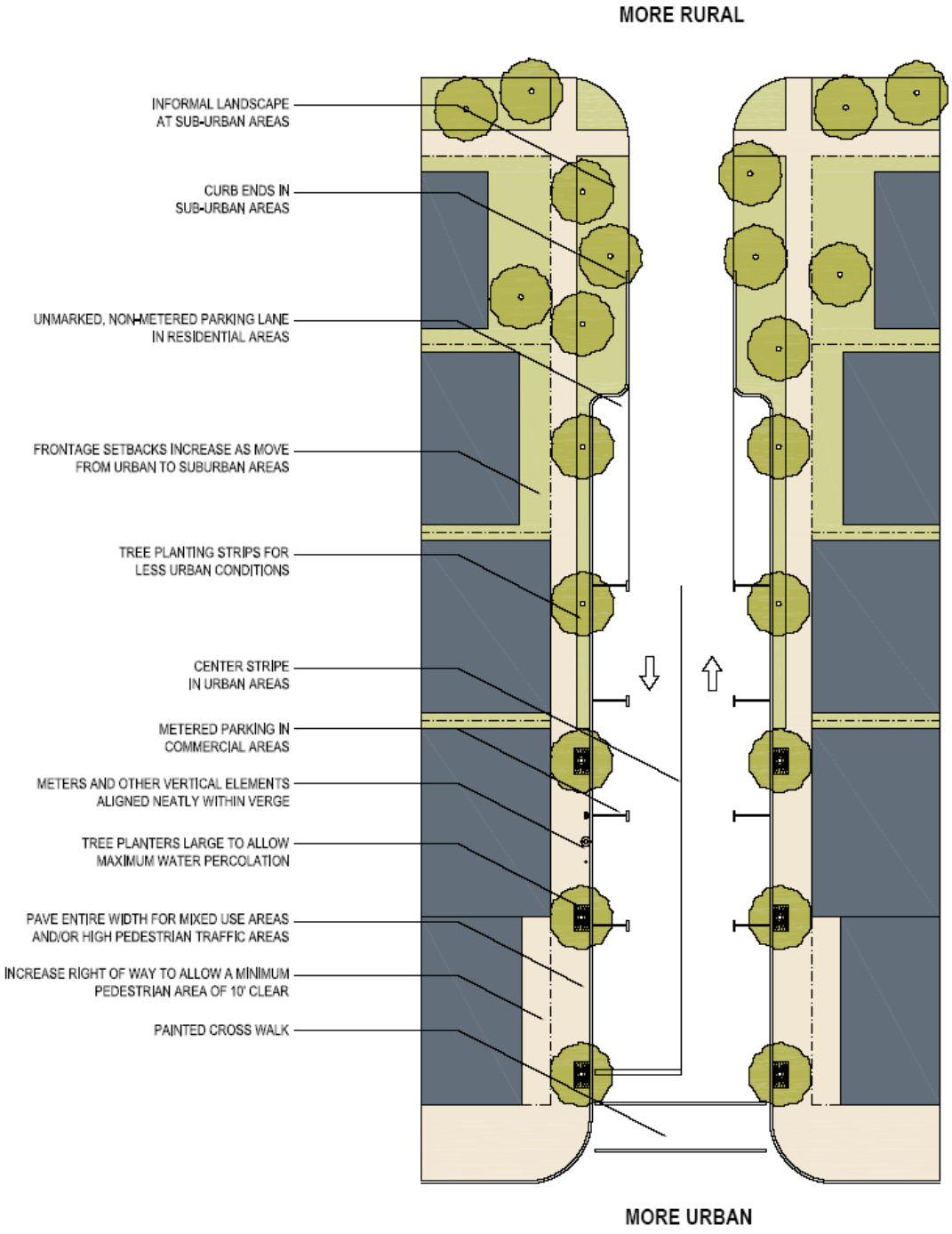
**Free:** Drivers can expect to travel generally without delay at the design speed; street design supports safe pedestrian movement at the higher design speed. This movement type is appropriate for Thoroughfares designed to traverse longer distances or that connect to higher intensity locations. Design speed of 25-30 mph; this type can accommodate bicycle routes.

**Speed:** Drivers can expect travel similar to conventional street design, but with continued emphasis on pedestrian safety and comfort. Design speed of 30-35 mph. Bicycle safety to be assessed by Thoroughfare.

**High**: Conventional street design in which drivers can expect a separation of modes--e.g. bike lanes, walking -- allowing automobile travel unimpeded by pedestrians or walkability concerns. This movement is rarely used in traditional town planning but may be needed when traveling outside of pedestrian areas. Bicycle safety to be assessed by Thoroughfare.

### D.4 Context Zone

Application of standards/criteria by Context Zone




## E URBAN ROADSIDE or PEDESTRIAN REALM

[Urban roadside is the space between the face of building or R/W line to the curb face, also known as “public frontage”.]

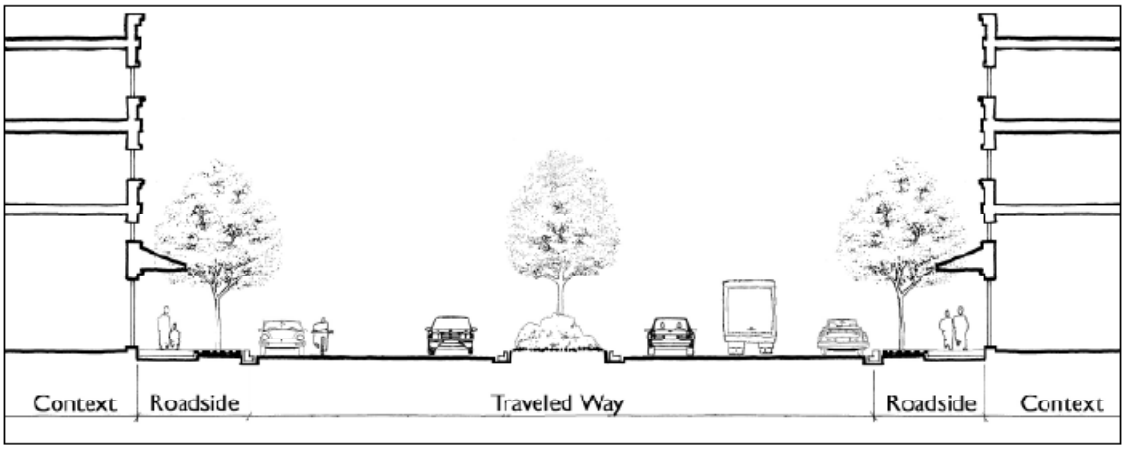
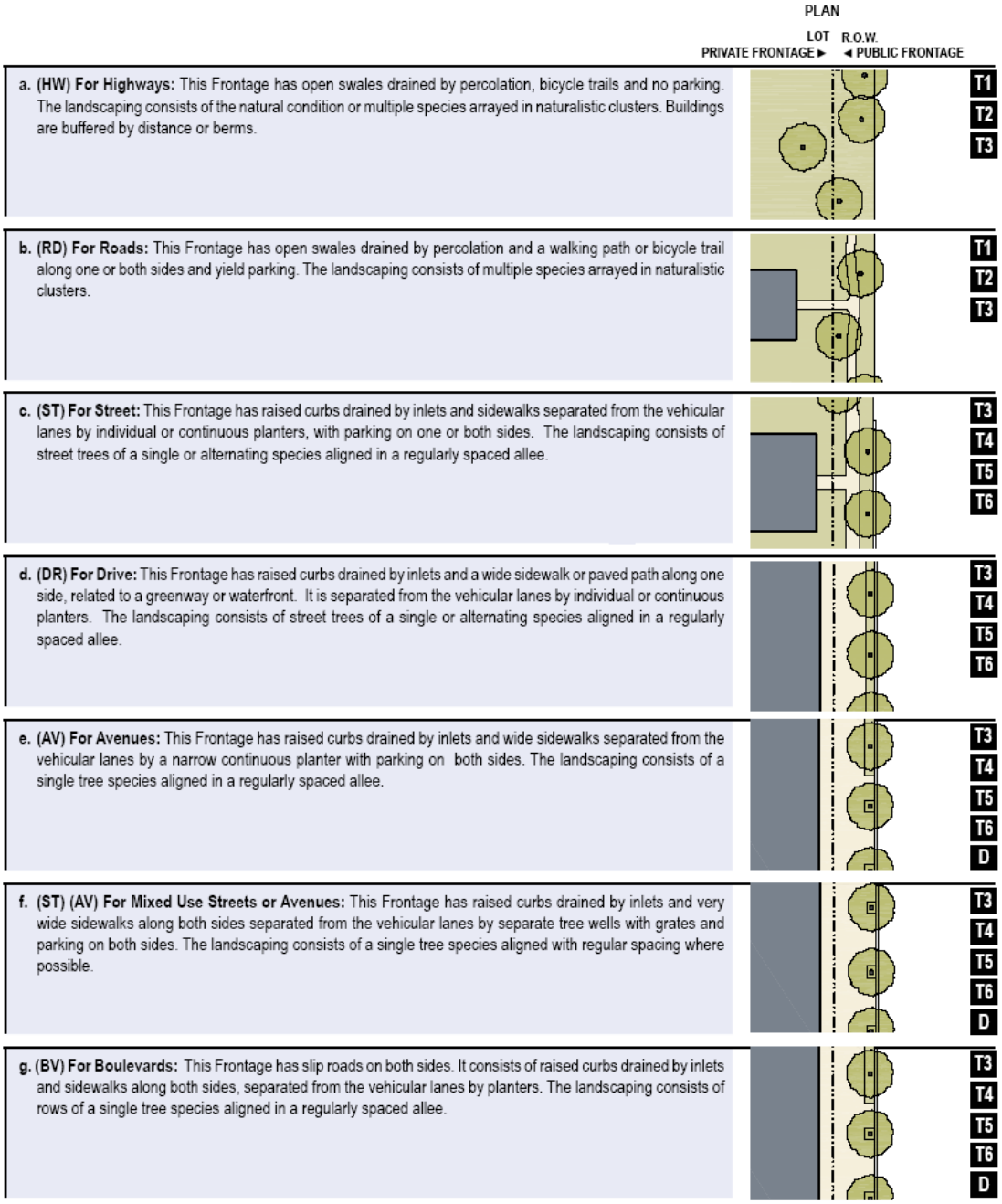



**Figure 5.1** Components of an urban thoroughfare. Source: Community, Design + Architecture.

## E.1 Introduction/Definitions


PLAN
LOT
R.O.W.
PRIVATE FRONTAGE ►
◄ PUBLIC FRONTAGE
a. (HW) For Highways: This Frontage has open swales drained by percolation, bicycle trails and no parking. The landscaping consists of the natural condition or multiple species arrayed in naturalistic clusters. Buildings are buffered by distance or berms.
T1
T2
T3
b. (RD) For Roads: This Frontage has open swales drained by percolation and a walking path or bicycle trail along one or both sides and yield parking. The landscaping consists of multiple species arrayed in naturalistic clusters.
T1
T2
T3
c. (ST) For Street: This Frontage has raised curbs drained by inlets and sidewalks separated from the vehicular lanes by individual or continuous planters, with parking on one or both sides. The landscaping consists of street trees of a single or alternating species aligned in a regularly spaced allee.
T3
T4
T5
T6
d. (DR) For Drive: This Frontage has raised curbs drained by inlets and a wide sidewalk or paved path along one side, related to a greenway or waterfront. It is separated from the vehicular lanes by individual or continuous planters. The landscaping consists of street trees of a single or alternating species aligned in a regularly spaced allee.
T3
T4
T5
T6
e. (AV) For Avenues: This Frontage has raised curbs drained by inlets and wide sidewalks separated from the vehicular lanes by a narrow continuous planter with parking on both sides. The landscaping consists of a single tree species aligned in a regularly spaced allee.
T3
T4
T5
T6
D
f. (ST) (AV) For Mixed Use Streets or Avenues: This Frontage has raised curbs drained by inlets and very wide sidewalks along both sides separated from the vehicular lanes by separate tree wells with grates and parking on both sides. The landscaping consists of a single tree species aligned with regular spacing where possible.
T3
T4
T5
T6
D
g. (BV) For Boulevards: This Frontage has slip roads on both sides. It consists of raised curbs drained by inlets and sidewalks along both sides, separated from the vehicular lanes by planters. The landscaping consists of rows of a single tree species aligned in a regularly spaced allee.
T3
T4
T5
T6
D

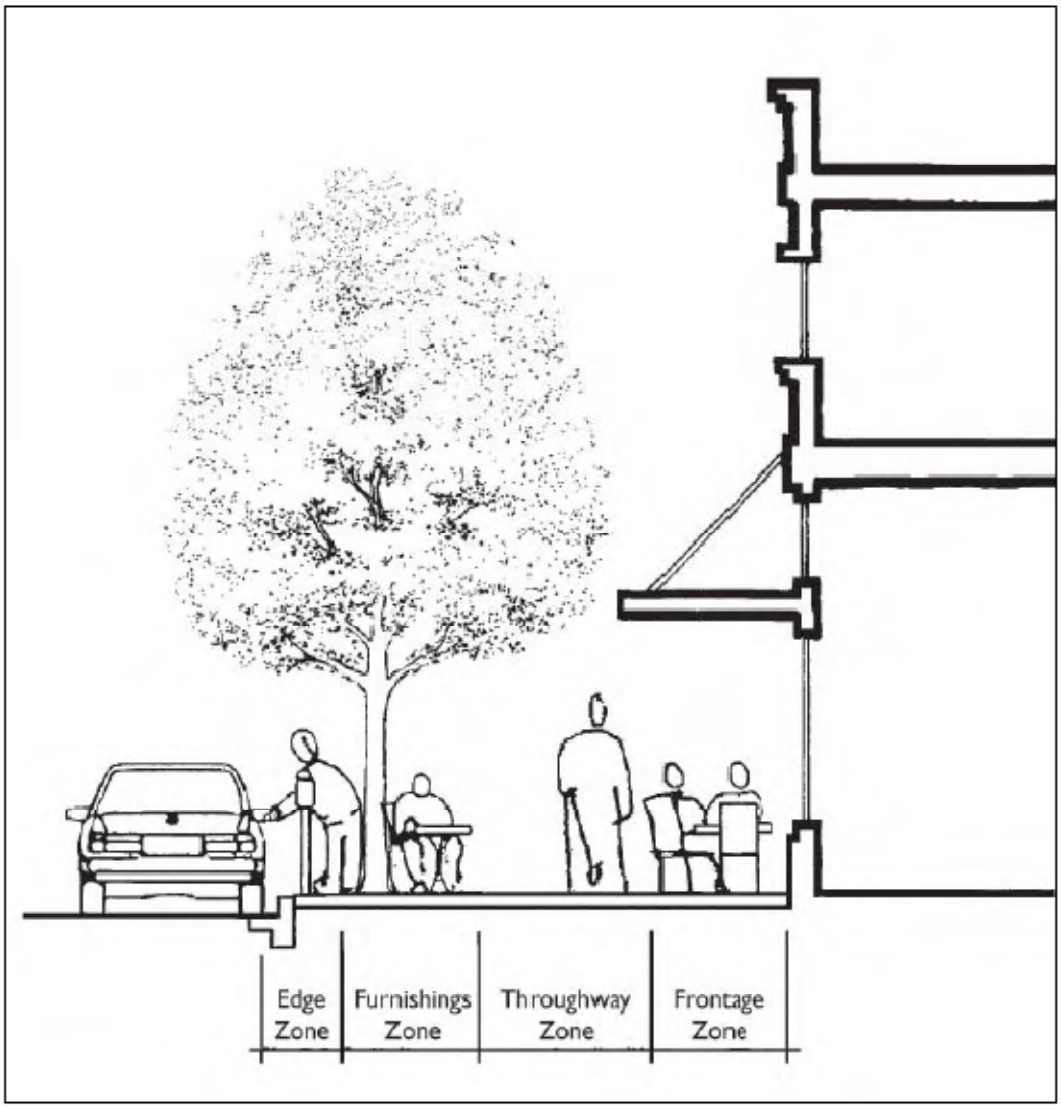



**Figure 8.1** ~~Roadside~~ zones. Source: Community, Design + Architecture.

## E.2 Edge Zone

## E.3 Furnishing Zone

## E.4 Walking/Pedestrian Zone

Reference CHAPTER 8 – PEDESTRIAN FACILITIES

Pedestrian comfort should be a primary consideration of Thoroughfare design and dimensions. Design conflict between vehicular, bicycle and pedestrian movement should be decided in favor of the pedestrian.

### E.5 Frontage Zone

CHAPTER 3 – GEOMETRIC DESIGN

## F TRAVELED WAY

[The traveled way is the central part of the thoroughfare between the curb faces where vehicle movement and on street parking occurs.]

### F.1 Introduction/ Definitions

### F.2 Travel Lanes

Adequate design to accommodate emergency services, waste collection, delivery trucks

Emergency response activities noted in D.3.d Emergency Response—CHAPTER 1 – PLANNING

Alleys and narrow roadways that act as shared spaces can have design speeds as low as 10 mph, as noted in CHAPTER 16 – RESIDENTIAL STREET DESIGN

| Movement Type | Design Speed | TRAVEL LANE WIDTH | T1 | T2 | T3 | T4 | T5 | T6 | D1 | D2 | CI | CS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YIELD | 20 mph or less | 8 feet | | | | | | | | | | |
| SLOW | 20-25 mph | 9 feet | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ |
| FREE | 25-30 mph | 10 feet | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ |
| SPEED | 30-35 mph | 11-12 feet | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ |
| HIGH SPEED | Above 35 mph | 12 feet | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ |

### F.3 Medians

(Pedestrian Refuge Islands)

### F.4 On Street Parking

Ensure that on street parking does not conflict with the placement of any neighborhood traffic control devices, as addressed in CHAPTER 15 – TRAFFIC CONTROL DEVICES.

| Movement Type | Design Speed | PARKING LANE WIDTH | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YIELD | 20 mph or less | (Parallel) 7 feet | | | | | | | ▪ | ▪ | ▪ | ▪ |
| YIELD, SLOW | 20-25 mph | (Parallel) 7 feet | | | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ |
| SLOW, FREE | 20-30 mph | (Parallel) 7 - 8 feet | | | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ |
| SLOW, FREE | 20-30 mph | (Angle) 18 feet | | | | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ |
| FREE, SPEED | 25-35 mph | (Parallel) 8 feet | | | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ |

### F.5 Mid-Block Crossings

### F.6 Access Management

### F.7 Design Vehicles

### F.8 Bike Lanes

Reference: CHAPTER 9 – BICYCLE FACILITIES

Bicycle use of thoroughfares should be as follows: Bicycles and vehicles may share use of lanes on Thoroughfares with design speed of twenty five (25) mph or less and should not share use of lanes on Thoroughfares with design speeds of more than 25 mph. Thoroughfares may include dedicated Bicycle Lanes. Greenways, waterfront walks and other Civic Spaces should include Bicycle Lanes.

Bicycle Lanes may be made part of Thoroughfares that have sufficient paving width to accommodate bicyclists' safety. A City-wide bicycle plan may designate an interconnected network serving bicyclists with a series of routes that include Bicycle Lanes as well as Bicycle Routes that give bicycles priority, such as those Thoroughfares which parallel major corridors and which can be reconfigured to limit conflicts between automobiles and bicycles.

## G INTERSECTIONS

### G.1 Introduction/Definitions

### G.2 Sight Distance

Reference CHAPTER 3 – GEOMETRIC DESIGN, Look at additional language from AASHTO 2004 Flexibility in Highway Design

### G.3 Curb Return Radii

| Movement Type | Design Speed | CURB RADIUS WITH PARKING* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| YIELD | 20 mph or less | 5-10 feet | | | | | | | | | |
| SLOW | 20-25 mph | 10-15 feet | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ |
| FREE | 25-30mph | 15-20 feet | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ | ▪ |
| SPEED | 30-35 mph | 20-30 feet | ▪ | ▪ | | | ▪ | ▪ | | | | |

* Dimensions with parking on each leg of intersection. Both tangent sections adjacent to the curb return must be parked, or else curb radii must be evaluated using "design vehicle" and AutoTurn or turning templates.

### G.4 Turn Lanes

### G.5 Cross Walks

Reference CHAPTER 8 – PEDESTRIAN FACILITIES

### G.6 Curb Extensions

## H GENERAL

Additional issues for further discussion and consideration, with examples of treatments, identify existing projects for review, pictures, graphics, and reference documents

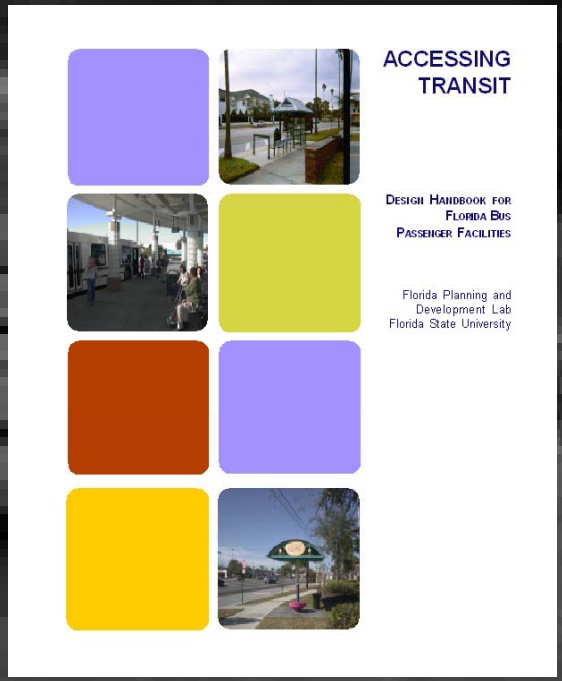
## I OTHER SOURCES

## REFERENCES

The following is a list of the publications used in the preparation of this chapter:

**Amy Datz**
Public Transit Office
Florida Department of Transportation

**Harrison Higgins**
**and**
**Ivonne Audirac**
Florida Planning and Development Lab
Florida State University




# Accessing Transit 2

## Design Handbook For Florida Bus Passenger Facilities

# Accessing  Transit 2

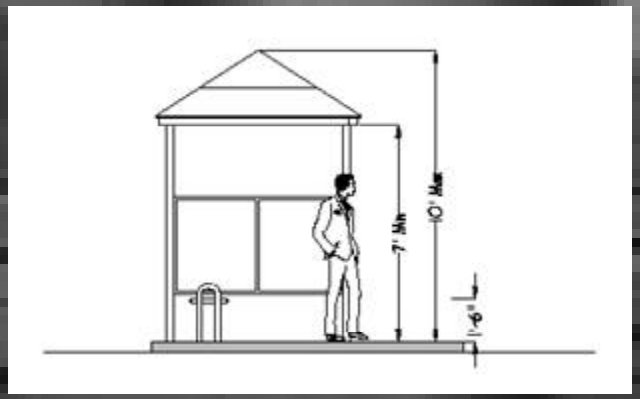
Transit Stop Kit of Parts.

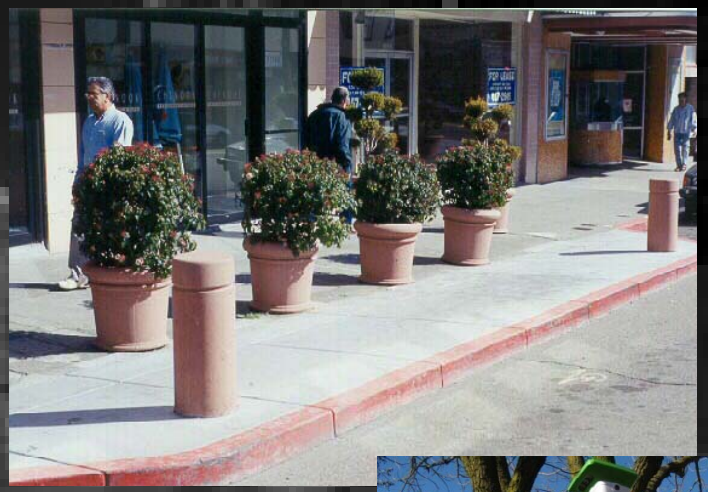
Guidelines can be used together or individually.

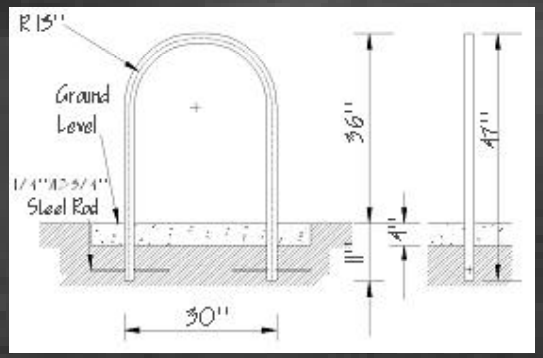
Can be combined in multiple ways to form site specific facilities to fit a variety of operational needs.

# Accessing Transit 2

## Transit Stop Kit of Parts






# Accessing  Transit 2

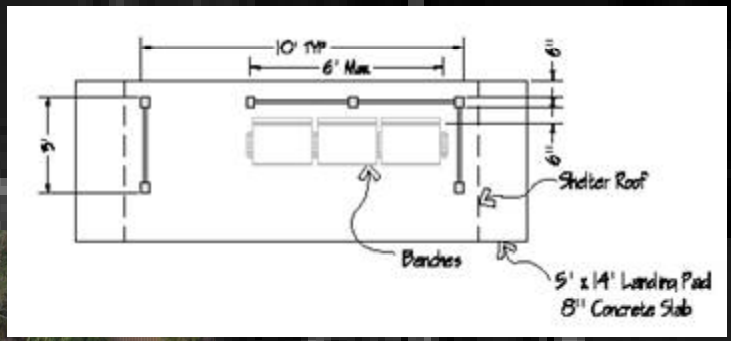
## Handbook Contents:

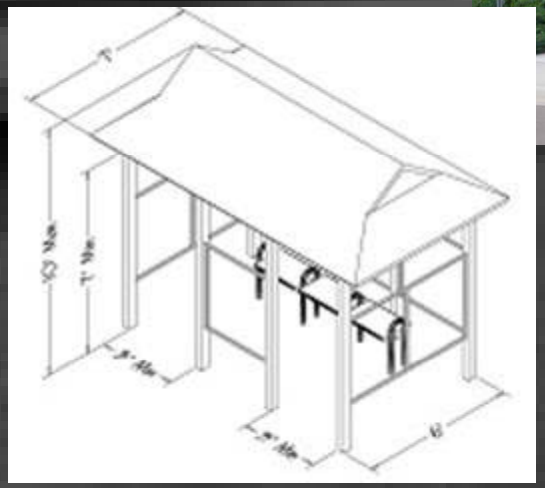
- Curb-Side Guidelines
- Streetside Guidelines
- Facility Prototypes
- Land Use Guidelines
- Safety
- Appendices

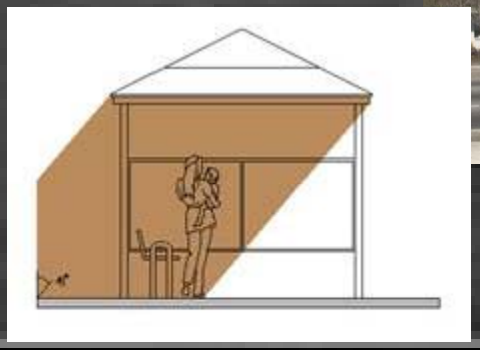
# Accessing Transit 2

## Curb-Side Guidelines

Bus Stop Shelters





# Accessing Transit 2

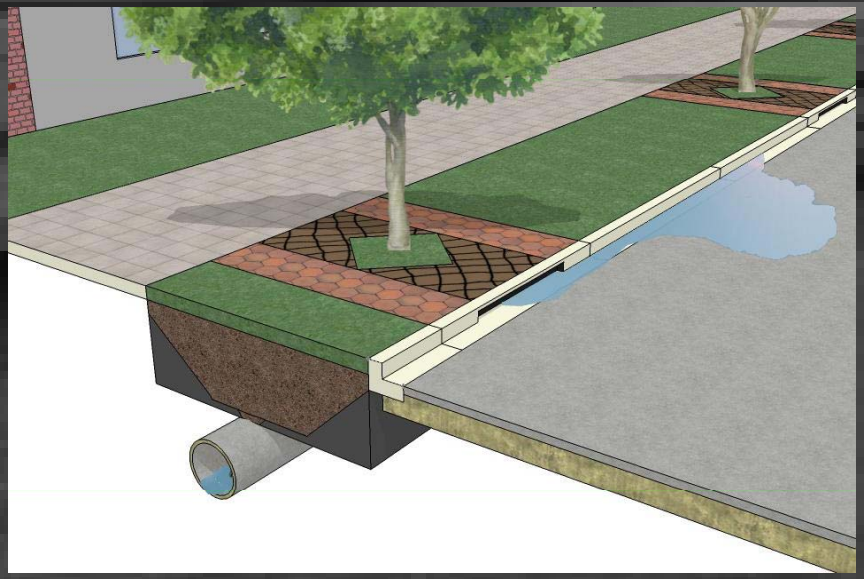
## Curb-Side Guidelines

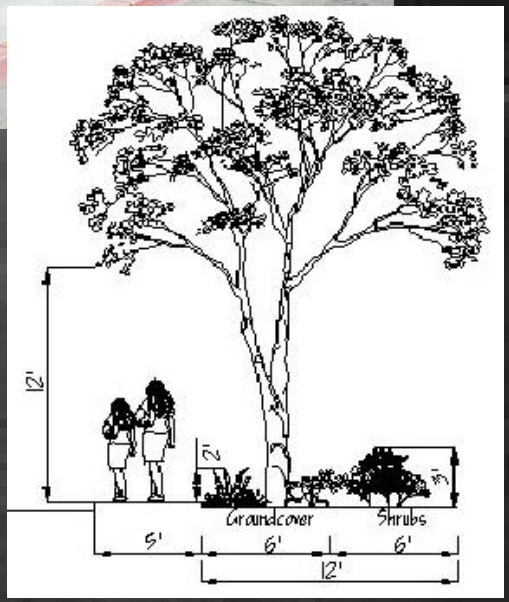
Passenger Amenities


# Accessing  Transit

## Curb-Side Guidelines

Landscaping

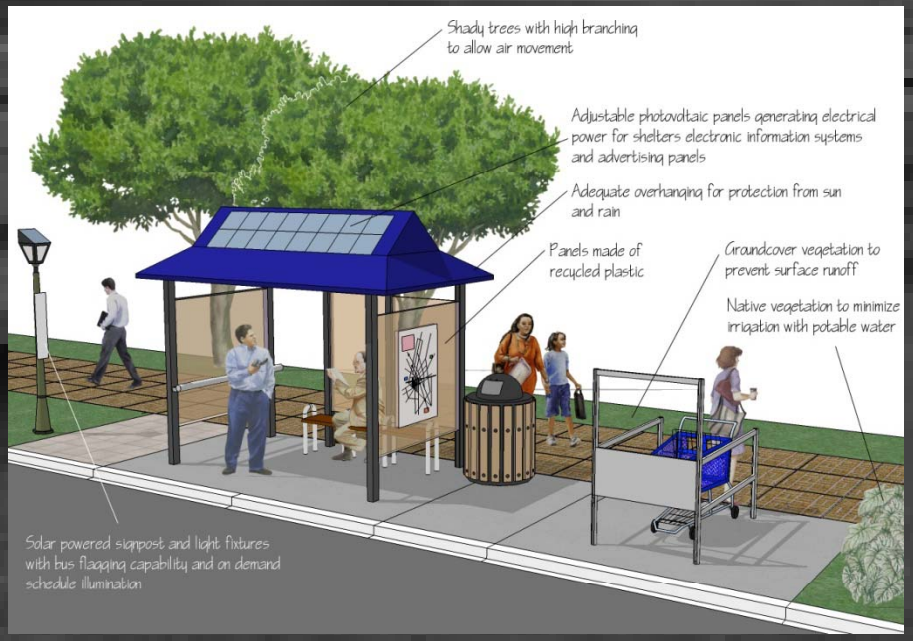




# Accessing Transit 2

## Curb-Side Guidelines

Renewable Energy Technologies

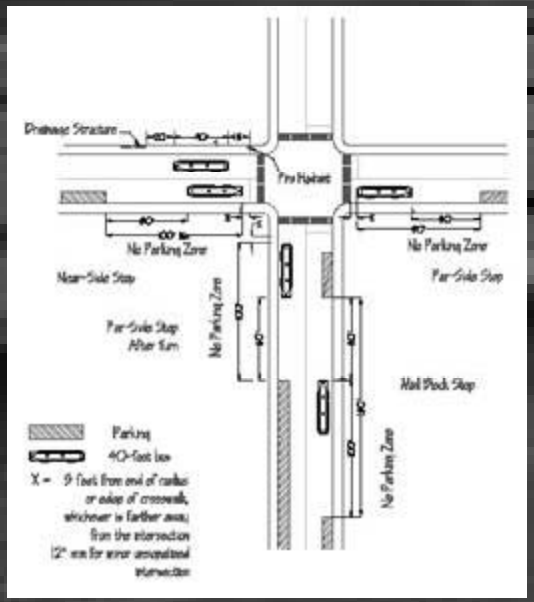


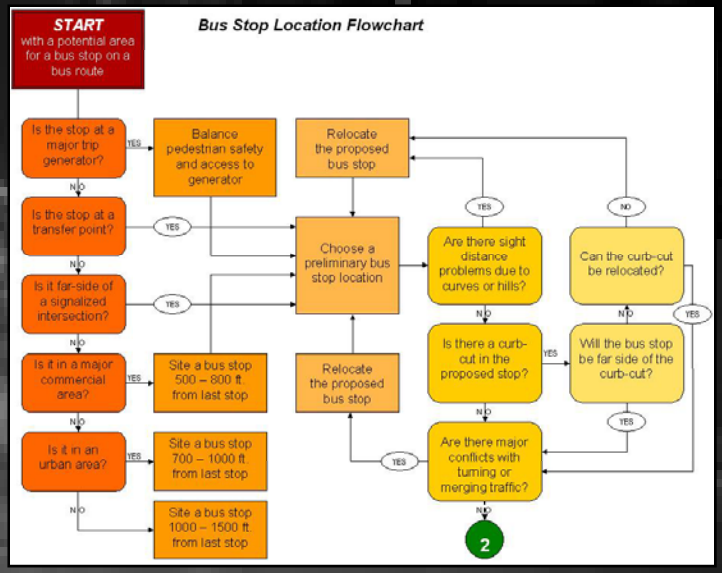


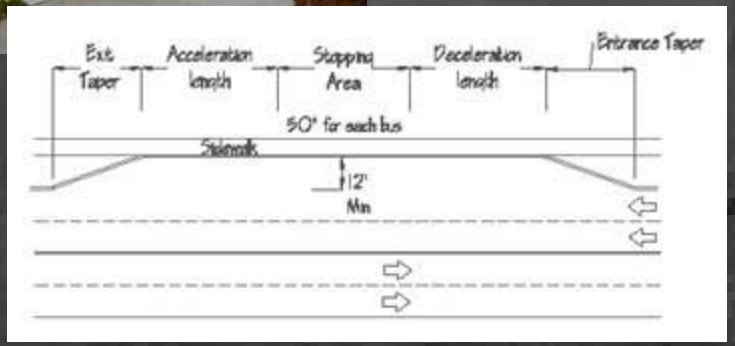

# Accessing Transit 2

## Streetside Guidelines

### Bus Stop Location



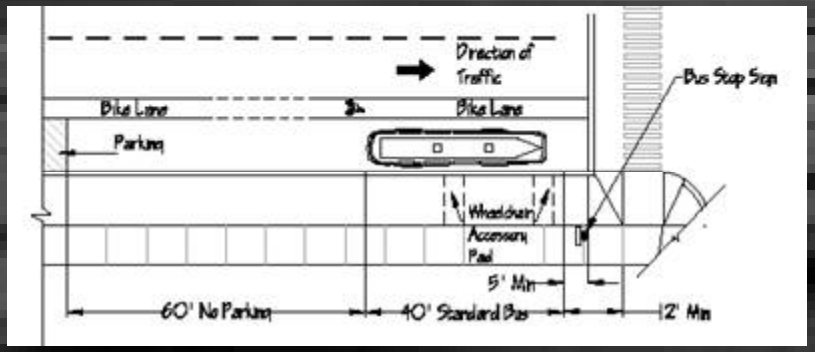



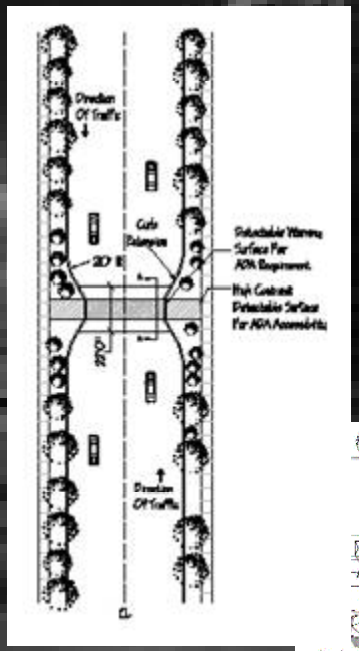



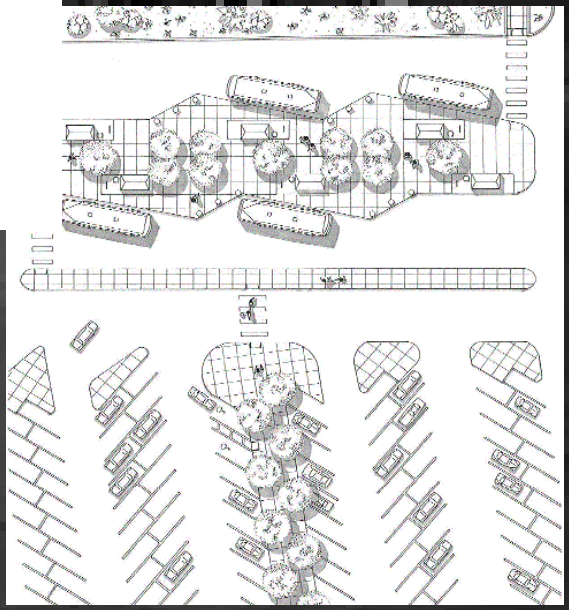

# Accessing Transit 2

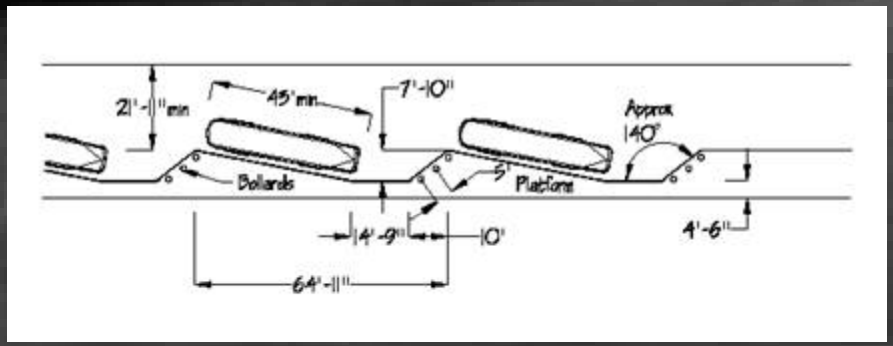
## Streetside Guidelines

Off-street Facilities



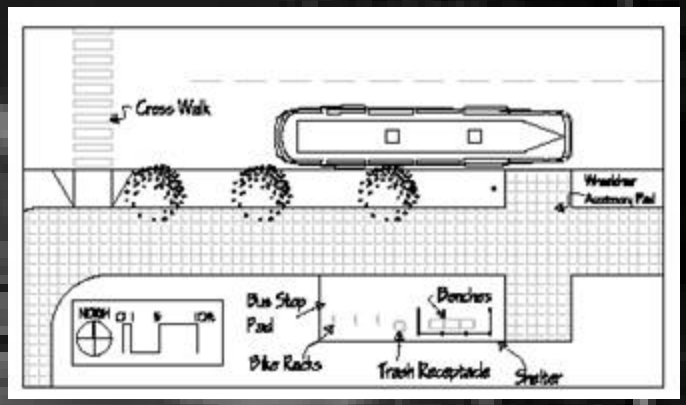





# Accessing Transit 2

## Facility Prototypes

Primary Stop




On-line Stop

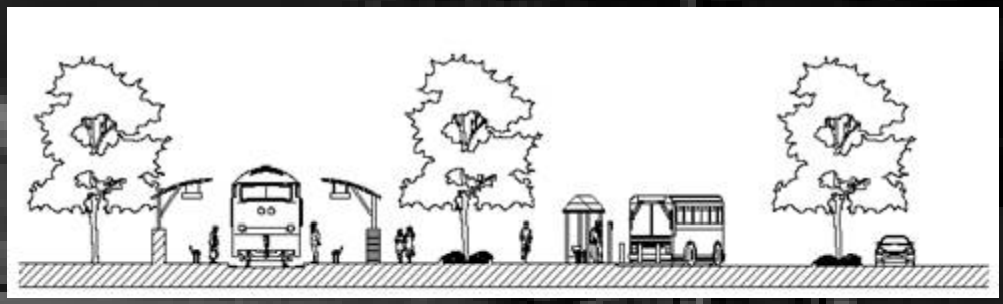
Transit Mall

Transfer Center

# Accessing Transit 2

## Facility Prototypes

Park and Ride



Rail-Bus Intermodal Transfer Center

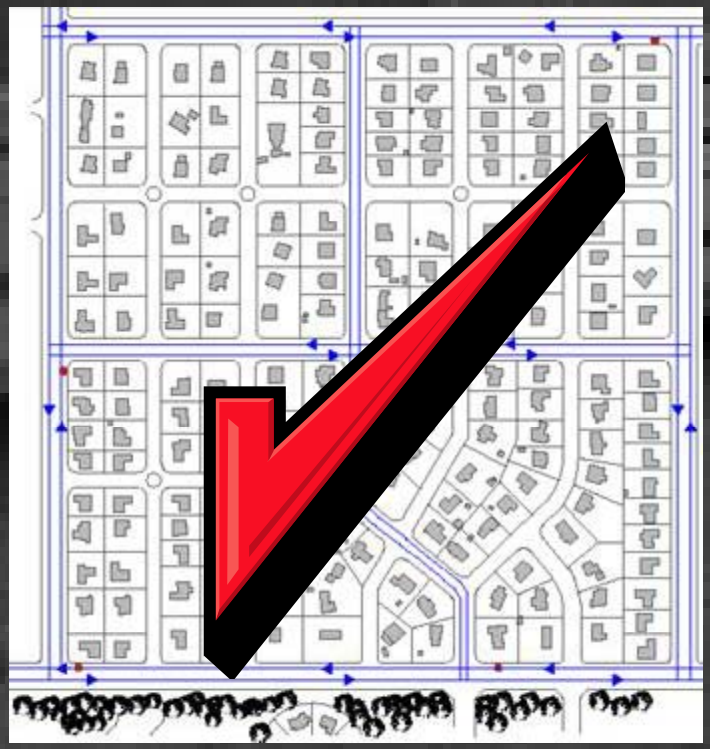
Air-Bus Intermodal Transfer Center

University Transfer Center

# Accessing Transit 2

## Land Use Guidelines

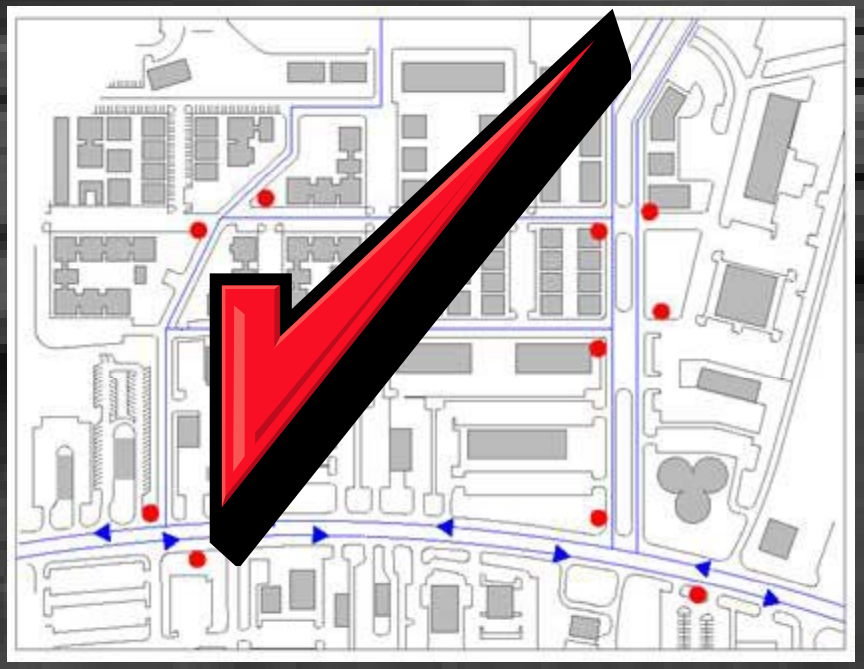
Transit Friendly Residential Development



# Accessing Transit 2

## Land Use Guidelines

Transit Friendly Mixed Use Development



# Accessing Transit 2

## Safety

Crime and Accident Prevention


# Accessing  Transit 2

## Appendices

- Glossary
- Development Planning and Regulation
  - Planning Procedures for Shelters
  - Zoning Review
  - Comprehensive Plan Language
  - Bus Facility Development Thresholds
  - Pedestrian Improvement Thresholds
- Passenger Facility Planning
  - Bus Stop Flow Chart
  - Accessibility Checklist
  - Bus Stop Evaluation Program RFP
  - Passenger Amenities
  - Shelter Manufacturers
  - Costs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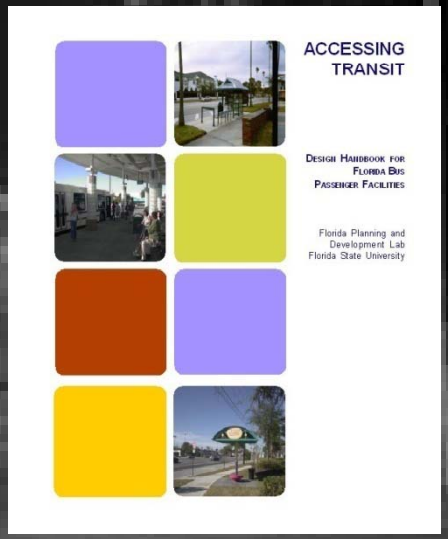
Design Office FTP site

# Accessing Transit 2

## How to get a Handbook

## After July 1, 2007

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Florida State University
http://www.fsu.edu/~fpdl/


Ride with us!

# *Proposed Chapter 11 Changes*
# *Work Zone Safety*

# Chapter 11 – Work Zone Safety Update

By
Chapter 11 Subcommittee
Allen Schrumpf - Author

## Chapter 11 Update

- Committee's Goals & Objectives
  - Complete Update by March, 2008 Meeting
  - Incorporate latest language of MUTCD
  - Retain flexibility for all Greenbook Users
  - Updated Chapter represents a combined effort of several agencies and persons

## Summary of Changes

- Consider Bicyclists, Pedestrians, ADA Needs
- Better Definition for the term "Access"
- Conform to new Federal Funding Requirements ($$$)
- Additional Coordination Needs

## Consider all types of users, not just drivers

- Added/strengthened language to consider non-driver users:
  - Bicyclists
  - Pedestrians
  - Disabled individuals

## Redefine "Access"

- Access has been redefined to offer clearer definition of issues
  - Access for pedestrians, bicyclists and vehicles
  - Access to adjacent properties
  - Access into and out of the work zone
  - Consider Transit Stops (passenger access issue)

## Add new Federal Policy when projects are Federally funded

- As discussed at last year's meeting, WHEN federal funds are part of the project, additional requirements the issue of Work Zone Traffic are involved.

*This was brought to you by CFR 23 630 Subpart J in last year's Greenbook.*

## Improve Coordination

- Added requirement for consideration or coordination with:
  - School Boards (adjust bus routes, walking patterns, etc.)
  - Transit Agencies (give them advance notice so their ridership can be informed)
  - Adjoining Businesses (for customers, employees & deliveries)

## Chapter 11 Update Team

- Allen Schrumpf – Consultant (Chair)
- Amy Datz – Central Office
- Cheryl Adams – Central Office
- Jim Mills – Central Office
- Rob Quigley – Central Office
- Harold Desdunes – District 4
- Andres Garaganta – Consultant
- Ramon Garavette – Highlands County
- Joy Puerta – Boca Raton
- Elyrosa Estavez - Miami


Questions ? ?

# CHAPTER 11

# WORK ZONE SAFETY

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# CHAPTER 11

# WORK ZONE SAFETY

## A INTRODUCTION

Construction, maintenance, and utility operations produce serious highway safety problems. The changes in normal traffic flow and the unexpected conditions at many work zones provide hazardous situations and serious traffic conflicts. A comprehensive plan for work zone safety is required to minimize the effects of these construction and maintenance operations.

## B OBJECTIVES

The general objective of a program of work zone safety is to protect workers, pedestrians, bicyclists, and motorists during construction and maintenance operations. This general objective may be achieved by meeting the following specific objectives:

- Provide adequate advance warning and information regarding upcoming work zones
- Provide the driver clear directions to understanding the situation he will be facing as he proceeds through or around the work zone
- Reduce the consequences of an out of control vehicle
- Provide safe access and storage for equipment and material
- Promote speedy completion of projects (including thorough cleanup of the site)
- Promote use of the appropriate traffic control and protection devices
- Provide safe passageways for pedestrians through, in, and/or around construction or maintenance work zones, including people with disabilities in accordance with the Americans with Disabilities Act of 1990.

# C POLICY

Each highway agency with responsibilities for construction, maintenance, and operation of streets and highways shall develop and maintain a program of work zone safety, as set forth in the MUTCD, (Rule 14-15.010) as published by the Federal Department of Transportation (Federal Highway Administration). All State and local governments that receive Federal-aid highway funding shall comply with 23 Code of Federal Regulations (CFR) 630 Subpart J, more commonly know as the Work Zone Safety and Mobility Rule. The provisions of this rule apply to all highway construction projects financed in whole or in part with Federal-aid highway funds.

# D PLANNING OF OPERATIONS

The achievement of work zone safety requires careful and complete planning prior to the initiation of any work project. The planning objective is to develop a complete operational plan which would include consideration of the following:

## D.1 Project Requirements

### D.1.a Type of Operation

Construction and maintenance projects may be classified as routine, emergency, or special operations.

#### D.1.a.1 Routine Operations

Routine operations would involve projects such as mowing, street cleaning, and preventive maintenance operations conducted on a regularly scheduled basis.

#### D.1.a.2 Emergency Operations

Emergency operations require prompt, efficient action to restore the roadway to a safe condition. These include operations such as clearing storm or crash debris, repairing or replacing damaged highway safety components and restoring inoperative traffic control devices.

### D.1.a.3 Special Operations

Special operations are defined as those projects neither routine nor emergency in nature, but are occasionally required to maintain or upgrade a street or highway. These include any construction, maintenance, utility, or other operation producing a hazard to workers, bicyclists, pedestrians, or motorists. Any activity involving encroachment upon the highway right of way by workers, equipment, or material storage and transfer shall be subjected to the requirements of work zone safety.

## D.1.b Nature of Work

The development of the operation plan for work zone safety should include consideration of the following factors:

- Time span required
- Requirements for continuous operation or occupation of the work zone
- Capability of clearing the site during cessation of work activity
- The various construction methods, equipment, and procedures that may be utilized. Evaluation of alternate methods should be undertaken to determine the safest and most efficient procedures
- The necessity for storing equipment or material in the highway right of way
- Operations that may expose workers to hazards from through traffic
- Hazards to out of control vehicles such as excavations or unguarded structures or equipment
- Site conditions that may be confusing or distracting to the driver, pedestrian or bicyclist or produce sight distance problems
- Particular problems associated with night safety
- Equipment inspection and preventive maintenance program

### D.1.c Nature of Work Zone

The nature of the work zone and the prevailing traffic conditions should, to a large degree, influence the procedures incorporated into the operation plan for work zone safety. A determination of the normal vehicle speeds and traffic volumes is essential. The distribution of traffic with respect to time (hour, day, etc.) types of traffic, and direction is also important for establishing traffic control procedures.

## D.2 Work Scheduling

Proper work scheduling and sequencing of operations will not only promote efficiency, but also improve the safety aspects of construction and maintenance operations. Where feasible, routine operations and special projects should be conducted during periods of low traffic volume to reduce conflicts. Projects that may be carried out concurrently at the same site should be scheduled simultaneously to eliminate successive disruptions of traffic. Major projects that impede or restrict traffic flow should be coordinated and sequenced with similar projects in adjacent areas, to produce a minimum of disruption to orderly traffic flow in the overall highway network. The scheduling of work at a given location should include consideration of traffic generation (including special events), as well as traffic restrictions by work activities on the surrounding highway network.

## D.3 Traffic Control and Protection

Plans for traffic control around or through work zones should be developed with safety receiving a high priority. Plans should include protection at work zones when work is in progress and when operations have been halted (such as during the night). Provisions for the protection of work crews, traffic control personnel, bicyclists, pedestrians (in areas of high pedestrian use, construction of temporary facilities should be considered), and motorists shall be included in the operation plans. In all cases, the operation plan for traffic control and protection shall include provisions for the following:

- Advance warning
- Clear view of work zone
- Roadway delineation
- Regulatory information

- Hazard warning
- Barriers
- Pedestrian and bicyclist safety
- Access for pedestrians, bicyclists and vehicles
- Access to adjacent properties by the public during construction
- Location of construction vehicles and equipment, including access into and out of the work zone
- Night safety (CHAPTER 6 - ROADWAY LIGHTING)
- Personnel training
- Traffic control and protective devices
- Transit Stops – including passenger access

## D.4 Coordination with Others ~~Agencies~~

To ensure safe and efficient construction and maintenance operations, the operation plan should be developed and executed in cooperation with all interested individuals and agencies including the following:

- Highway agencies
- Police agencies
- Emergency agencies
- Contractors
- Utilities
- Building departments
- Mass transit agencies
- Traffic generators
- Local residents and businesses
- Neighboring jurisdictions
- School Boards

# E WORK ZONE OPERATIONS

Construction and maintenance projects should follow the operation plan and should include:

## E.1 Public Information

All reasonable effort should be made to inform the public of the location, duration, and nature of impending construction of maintenance projects. Transit agencies should be given advanced notice of operations planned so they can be responsible for notifying their passengers.

## E.2 Contracts and Permits

For construction and reconstruction projects, the general work zone layout; traffic control and protection procedures; occupational safety and health requirements; and specific traffic control devices required should be incorporated in the contract plans and specifications.

New utility installations in public rights of way are prohibited unless a permit by the appropriate highway agency is issued. Permits for routine maintenance (e.g., deteriorated pole/equipment replacement), minor alterations (e.g., changes in cable, wire, or transformer size), service drops, or emergency work should generally not be required. Any construction by utility companies involving encroachment of the highway right of way by workers, equipment, material storage and transfer, or other hazardous conditions shall be conducted in accordance with the requirements for work zone safety and the Occupational Safety and Health Administration (OSHA).

## E.3 Inspection and Supervision

A regular program of inspection and supervision of all construction and maintenance projects shall be established and executed.

# F EVALUATION OF PROGRAM

The entire program for work zone safety should be periodically evaluated and revised to provide the safest practicable environment for workers, pedestrians, and motorists during construction, utility and maintenance operations.

# *Bridge Debris*

## USE OF DEBRIS FROM DEMOLISHED BRIDGES AND OVERPASSES

Pub. L. 109–59, title I, §1805, Aug. 10, 2005, 119 Stat. 1459, provided that:

"(a) IN GENERAL.—Any State that demolishes a bridge or an overpass that is eligible for Federal assistance under the highway bridge replacement and rehabilitation program under section 144 of title 23, United States Code, is directed to first make the debris from the demolition of such bridge or overpass available for beneficial use by a Federal, State, or local government, unless such use obstructs navigation.

"(b) RECIPIENT RESPONSIBILITIES.—A recipient of the debris described in subsection (a) shall—

"(1) bear the additional cost associated with having the debris made available;

"(2) ensure that placement of the debris complies with applicable law; and

"(3) assume all future legal responsibility arising from the placement of the debris, which may include entering into an agreement to hold the owner of the demolished bridge or overpass harmless in any liability action.

"(c) DEFINITION.—In this section, the term 'beneficial use' means the application of the debris for purposes of shore erosion control or stabilization, ecosystem restoration, and marine habitat creation."

## 13.5.2.3 Projects Involving Bridge Demolition

At or before the 30% plans phase, the Department shall determine if it has a need for the debris resulting from the demolition of a bridge. If no such need exists, and in response to ***Section 1805, SAFETEA-LU Legislation,*** the Department is then required to notify local, State and Federal government agencies of the availability of the bridge debris for their beneficial use (use as shore erosion control or stabilization, ecosystem restoration, and marine habitat restoration). For any projects that involve the complete demolition of a bridge, the Design Project Manager is required to notify these agencies of the availability of the resulting debris. The Bridge Development Report (BDR)/30% Structure Plans (see ***Chapter 26***) will include the approximate volume of debris and the estimated timeframe in which the material will be available.

The Design Project Manager must coordinate with the receiving agency and the District Construction Engineer to develop a Joint Project Agreement. The receiving agency will be responsible for all additional costs associated with the processing, delivery, placement and use of the material. The following items must be determined in order for the Joint Project Agreement to be developed:

1. The volume of raw (unprocessed) debris (a more detailed quantity than original estimate).
2. The estimated timeframe for the debris availability.
3. The location of the receiving agency's staging/storage site to which the raw debris is to be delivered. Any further work involving processing and/or final placement of the material is expected to be the responsibility of the receiving agency and not part of the FDOT's contract for bridge demolition.
4. An estimated cost to transport the debris to that site. This estimate will be amount the receiving agency must pay the FDOT.

Once this information is determined, the contract plans will include the instructions for the delivery of the debris.

If no agency expresses interest in the debris material, then the material will be disposed of in accordance with FDOT Specifications.

Requirements for the original notification to agencies (including a sample Notification Letter) and the resulting Joint Project Agreement are found in the ***Project Management Handbook, Chapter 3.***

- Utility easements or R/W requiring subordination are identified.
- Necessary easements are identified.

It should also be noted that the R/W acquisition process usually drives the project schedule once the R/W requirements have been defined. Therefore, the sooner these requirements are set, the sooner the entire project can be completed. The participation of the District Right of Way Office is particularly important on a design project with a compressed schedule. The right of way phase can be delayed if the design Project Manager does not identify the R/W requirements on schedule. R/W maps and documents also will be delayed. The right of way process is described in Part II, Chapter 4, of this handbook.

The R/W Office sometimes makes commitments (preservation of trees, driveway modifications, and so forth) to property owners during the R/W process. The designer must know about these commitments, and they must be reflected in the plans if appropriate.

**Structures.** The classification, development phases and responsibilities of the district and central office structures personnel can be found in *Chapter 26, PPM, Volume I*. An important step in the development of bridge plans is the Bridge Development Report (BDR), which is submitted with the Phase I (30%) plans. Part II, Chapter 7, in this handbook also describes the content and format of the BDR. Additional structure design information can be found in Chapters 27 through 32 of the *PPM, Volume I*. Other important structural design references can be found on the *Structures Design Office* website.

In response to section 1805 of the SAFETEA-LU legislation the Department must notify Federal, State and local governments as to the availability of bridge debris due to demolition for use as shore erosion control or stabilization, ecosystem restoration, and marine habitat restoration. This notification will take place after the completion of the BDR, or 30% plans. The notification will identify the quantity of debris and when the debris will be available (general time estimate, i.e. Fall, 2009). The Federal, State, or local government agency must reply within a reasonable time frame allowing for the development of a Joint Project Agreement (JPA). **It is important to include the District Construction Engineer in the development of the JPA to insure that the conditions of the agreement will not have a detrimental effect on the construction activities.** The results of this agreement will be included in the construction documentation as stated in Part 1, Chapter 13, Section 13.5.2.3 of the PPM. An example Notification Letter can be found at the end of this chapter. If no agency expresses an interest in the material, the Department will dispose of the material in accordance to standard specifications.

**Traffic Design.** In *Chapter 7 of the PPM, Volume 1*, the design of signs, markings, lighting and signals is explained. Turn lane requirements and lengths are usually established prior to the design phase of a project. Any changes need to be verified by performing a capacity analysis. It will determine if the changes will have an adverse effect on traffic flow. Additional information can be found on the *State Traffic Engineering and Operations Office* website.

**Agreements.** Agreements are used for:

- Utility relocation or construction of FDOT right of way.
- Local advance or partial funding of FDOT projects.

# Example Structures Debris Notification Letter

*(DATE)*

*Agency Name*
*Address*
*City, State*

SUBJECT: Use of Debris from Demolished Bridges and Overpasses
*Financial Project Number XXXXXXXXXXX*
*State Road 44 Bridge over the St. Johns River*
*Volusia County, Florida*

This notice is being sent to you as required by Public Law 109-59, Section 1805, which directs the Florida Department of Transportation (FDOT) to make debris from demolished bridges available for beneficial use by a local, State or Federal agency. Beneficial use is defined as the use of the debris for shore erosion control and stabilization, ecosystem restoration, and marine habitat creation.

The bridge to be demolished is the *State Road 44 Bridge over the St. Johns River* in *Volusia* County. The demolition of the *SR 44 Bridge* will result in *XXX* cubic yards of steel reinforced concrete debris. The project is scheduled for construction to begin in *December, 2009*. The demolition of the existing bridge should begin in the *Fall of 2010*. A detailed construction schedule will be developed once the contractor is named.

If your agency has an interest in the beneficial use of this material please contact *Mr. John Smith, FDOT Project Manager, at (District Mailing Address) by (2 months after the date of notice).* The FDOT will negotiate a Joint Project Agreement (JPA) with your agency that will describe the responsibilities of each party. Be advised that the FDOT will not accept any liability, nor any additional cost associated with your agency's use of this material.

If you need additional information, please contact me at the above address, or call me at *(555) 123-4567*.

Sincerely,

*John Smith*
FDOT Project Manager

# STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
## BRIDGE DEBRIS USE AGREEMENT

This Agreement has been entered into this _____ day of _____, _____, by and between the State of Florida Department of Transportation, hereinafter called the Department, and _____, hereinafter called the Agency.

WHEREAS, the Department through its Contractor will be demolishing the _____bridge at _____ (Project) resulting in approximately _____cubic yards of debris; and

WHEREAS, the Agency desires to use the bridge debris for shore erosion control and stabilization, ecosystem management, and / or marine habitat creation; and

WHEREAS, this Agreement has been entered into prior to the letting of the Department's Contract for the bridge work and this Agreement will be reflected in the Department's Contract and Specifications Package so that the Contractor's bid reflects knowledge of this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, the State of Florida Department of Transportation (Department) and _____ (Agency) agree as follows:

(1) General:

(a) The recitals hereinbefore set forth are true and correct.

(b) The Agency will provide a storage area or staging area (hereinafter the "storage area") of sufficient size to accommodate the delivery of all the bridge debris (Debris). The storage area must be outside the limits of the Project, and must not interfere with access to the Project or the work of the Department's Contractor.

(c) The Department will deliver the unprocessed bridge debris to the Agency's storage area The Agency will be responsible for all off-loading of the Debris at the storage area. The Agency may enter into a separate agreement with the Department's Contractor to perform this work.

(d) The Agency will be responsible for transporting the Debris from the storage area to the final location where the Debris will be used (final location).

(e) The Agency will be responsible for any and all processing, cleaning, environmental approvals, de-contamination, permitting, application fees, and for compliance with all applicable laws necessary to use the Debris, transport the Debris to the final location where the Debris will be used, and/or store the Debris at the storage area.

(f) The Agency will be responsible for all claims of the Department's Contractor related to or concerning delay claims, inefficiency claims, and/or claims for extra work incurred in off-loading and/or storing the Debris at the Agency's

storage area. The Agency will defend, and hold harmless FDOT from all such claims.

(g) The Agency shall comply with all applicable Federal, State, County, and Municipal laws in the performance of this Agreement, including those laws applicable to the transportation, storage, and/or use of the Debris.

(2) Indemnification and Insurance:

(a) To the extent provided by law, the Agency shall indemnify, defend, and hold harmless the Department and all of its officers, agents, and employees from any claim, loss, damage, cost, charge, or expense arising out of any act, error, omission, or negligent act by the Agency, its agents, or employees related to the use of the Debris, transport of the Debris to the final loaction, storage of the Debris at the storage area, and loading and off-loading of the Debris after arrival of the Debris at the storage area. When the Department receives a notice of claim for damages that may have been caused by the Agency or an agent or employee of the Agency, the Department will promptly forward the claim to the Agency. The Agency and the Department will evaluate the claim and report their findings to each other within fourteen (14) working days. The Agency agrees to provide independent counsel to the Department, at the Agency's expense, to defend such claims. The Department's failure to promptly notify the Agency of a claim shall not release the Agency of the above duty to indemnify, defend, and hold harmless.

(b) The Agency shall carry or cause its contractor/consultant to carry and keep in force for the duration of this Agreement, or until the Debris has been used as contemplated under this Agreement, or properly disposed of, whichever is later, public liability insurance protecting the Department and its agents and employees against any and all claims for injury and/or damage to persons and/or property, and for the loss of life or property occurring in, on, or about the storage area for the Debris, and the Debris arising out of the act, negligence, omission, nonfeasance, or malfeasance of the Agency, its agents, and/or employees occurring during or after off-loading of the Debris at the storage area. Such insurance shall be for a limit of not less than $5,000,000 for all damages arising out of bodily injuries to, or death of, one person and, subject to that limit for each person, a total limit of $10,000,000 for all damages arising out of bodily injuries to, or death of, two or more persons in any one occurrence, and not less than $500,000 for all damages arising out of injury to, or destruction of, property in any one occurrence. All such insurance policies shall be issued by companies licensed to do business in the State of Florida and all such policies shall contain a provision whereby the insurance policy cannot be canceled or modified unless the Department is given at least sixty (60) days prior written notice of such cancellation or modification. The Agency shall provide the Department with certificates showing such insurance to be in place and showing the Department as an additional named insured under the policy.

(3) Miscellaneous:

(a) This Agreement may be terminated immediately by the Department upon default by the Agency.

(b) This Agreement contains the complete understanding of the Department and the Agency with respect to the subject matter hereof. All prior understandings and agreements, oral or written, heretofore made between the Department and the Agency are merged into this Agreement, which alone, fully and completely expresses the intent and agreement between the Department and the Agency with respect to the subject matter hereof. No modification, waiver, or amendment of this

Agreement or any of its conditions or provisions shall be binding upon either the Department or the Agency unless in writing and signed by both parties. Nothing in this Agreement is intended nor shall it be construed to give any person or entity, other than the Department and the Agency any right, remedy, or claim under or by reason of this Agreement. Nothing in this Agreement is intended nor shall it be construed to give any member or members of the public any right, remedy, or claim under or by reason of this Agreement.

(c) This Agreement shall be governed by the laws of the State of Florida.

(d) All notices to the Department shall be sent to:

_____.

(e) All notices to the Agency shall be sent to:

_____.

(f) If any part of this Agreement is determined to be invalid in any court of law, the remaining provisions of this Agreement shall remain in full force and effect and may be enforced in accordance with the provisions hereof.

(g) This Agreement was jointly negotiated and drafted by the undersigned and shall not be construed by a court of law against either the Department or the Agency as the drafter thereof.

(h) The prevailing party in any litigation arising out of this Agreement shall be entitled to reasonable attorney's fees and expenses incurred in such litigation.

(i) The undersigned hereby acknowledge that they have read each page of this Agreement, they fully understand them, they agree to them, and voluntarily sign them.

IN WITNESS WHEREOF, the Department and the Agency have caused these presents to be executed, the day and year first above written.

| | |
|---|---|
| Agency: _____ | State of Florida, Department of Transportation |
| By: _____<br>Authorized Agent | By: _____<br>Authorized Agent |
| _____<br>Print Name | _____<br>Print Name |
| Title: _____ | Title: _____ |
| Attest: _____ (SEAL) | Legal Review: |
| _____<br>Print Name | _____ |
| Title: _____ | |

# *Horizontal Clearance*
# *DRAFT Chapter 3 Edits*

## C.7.f Horizontal Clearance~~Roadside Clear Zone~~

Horizontal clearance is the lateral distance from a specified point on the roadway such as the edge of travel lane or face of curb, to a roadside feature or object. Horizontal clearance applies to all roadways. Horizontal clearance requirements vary depending on design speed, whether rural or urban with curb, traffic volumes, lane type, and the object or feature.

Rural roadways with flush shoulders and roadways with curb or curb and gutter where right of way is not restricted have roadsides of sufficient widths to provide clear zones; therefore, horizontal clearance requirements for certain features and objects are based on maintaining a clear zone wide enough to provide the recoverable terrain in ***Table 3-12A***.

In urban areas, horizontal clearance based on clear zone requirements for rural roadways should be provided wherever practical. However, urban areas are typically characterized with lower speed, more dense abutting development, closer spaced intersections and accesses to property, higher traffic volumes, more bicyclists and pedestrians, and restricted right of way. In these areas, curb with closed drainage systems are often used to minimize the amount of right of way needed. Roadways with curb or curb and gutter in urban areas where right of way is restricted do not have roadsides of sufficient widths to provide clear zones; therefore, while there are specific horizontal clearance requirements for these roadways, they are based on clearances for normal operation and not based on maintaining a clear roadside for errant vehicles. These horizontal clearance requirements are shown in ***Table 3-12B***. These horizontal clearance requirements can only be applied if all of the following restricting conditions are met:

It should be noted that curb has no redirectional capabilities except at speeds less than the lowest design speeds used on the State Highway System. Therefore curb should not be considered effective in shielding a hazard. Curb is not to be used to reduce horizontal clearance requirements.

Crashworthy objects shall meet or exceed the offsets listed in either ***Table 3-12A*** or ***Table 3-12B*** depending on the condition. Objects that are not crashworthy are to be as close to the right of way as practical and no closer than the requirements listed in ***Table 3-12A*** and ***Table 3-12B.***

### C.7.f.1 Roadside Clear Zone

The roadside clear zone is that area outside the traveled way available for use by errant vehicles. Vehicles frequently leave the traveled way during avoidance maneuvers, due to loss of control by the driver (e.g., falling asleep) or due to collisions with other vehicles. The primary function of the clear zone is to allow space and time for the driver to retain control of his vehicle and avoid or reduce the consequences of collision with roadside objects. This area also serves as an emergency refuge location for disabled vehicles.

The design of the roadway must also provide for adequate drainage of the roadway. Drainage swales within the clear zone should be gently rounded and free of discontinuities. Where large volumes of water must be carried, the approach should be to provide wide, rather than deep drainage channels. Side slopes and drainage swales that lie within the clear zone should be free of protruding drainage structures (CHAPTER 4 - ROADSIDE DESIGN, D.6.c. Culverts).

In the design of the roadside, the designer should consider the consequences of a vehicle leaving the traveled way at any location. It should always be the policy that protection of vehicles and occupants shall take priority over the protection of roadside objects. Further criteria and requirements for safe roadside design are given in CHAPTER 4 - ROADSIDE DESIGN.

### C.7.f.2~~1~~ Roadside Clear Zone Width

The clear zone width is defined as follows:

- Rural sections - measured from the edge of the outside motor vehicular travel way
- Urban sections - measured from the face of the curb

- The clear zone must be wide enough so that the sum of all the recoverable terrain within is equal to or greater than the recoverable terrain value obtained in the appropriate ***Table 3-12A or Table 3-12B***. These are minimum values only and should be increased wherever practical. The process for determining the clear zone width is to

extend the clear zone width as shown in ***Figure 3-14*** and ***Figure 3-15*** until the recoverable terrain is obtained. If non-recoverable terrain is encountered before obtaining the full amount of recoverable terrain, then the remaining amount must be provided beyond the non-recoverable terrain. Where right of way permits, the portion of recoverable terrain provided beyond the non-recoverable terrain must be a minimum of 10 feet. The clear zone is to be free of hazardous objects, hazardous terrain, and non-traversable terrain. Also, clear zones may be widened based on crash history.

~~The minimum permitted widths are provided in Table 3 - 12. These are minimum values only and should be increased wherever practical.~~

In rural areas, it is desirable, and frequently economically feasible, to increase the width of the clear zone. Where traffic volumes and speeds are high, the width should be increased. The clear zone on the outside of horizontal curves should be increased due to the possibility of vehicles leaving the roadway at a steeper angle.

### C.7.f.3~~2~~ Roadside Slopes

The slopes of all roadsides should be as flat as possible to allow for safe traversal by out of control vehicles. A slope of 1:4 or flatter should be used. The transition between the shoulder and adjacent side slope should be rounded and free from discontinuities. The adjacent side slope, within the clear zone, shall not be steeper than 1:3. The side slopes should be reduced flatter on the outside of horizontal curves.

Where roadside ditches or cuts require backslope, these slopes should not exceed 1:3 in steepness within the clear zone. The desirable backslope is 1:4. Ditch bottoms should be at least 4 feet wide and can be flat or gently rounded.

### C.7.f.4~~3~~ Criteria for Guardrail

If space and economic constraints are severe, it is permissible, but not desirable, to use guardrails in lieu of the requirements for width and slope of clear zone. Where the previously described

## TABLE 3 – 12A
## MINIMUM WIDTH OF RECOVERABLE TERRAIN
## FOR DETERMINATION OF CLEAR ZONE

### Rural and Urban Flush Shoulder Roadways

| DESIGN SPEED (MPH) | | | | | | | |
|---|---|---|---|---|---|---|---|
| 25 and Below | 30 | 35 | 40 | 45 | 50 | 55 | 60 and Above |
| MINIMUM WIDTH OF RECOVERABLE TERRAIN -(FEET) (From edge of traveled way) | | | | | | | |
| 6 | 6 Local<br>10 Collectors<br>14 Arterials | 6 Local<br>10 Collectors<br>14 Arterials | 10 Collectors<br>14 Arterials | 14 Arterials and Collectors ADT < 1500<br>18 Arterials and Collectors ADT ≥ 1500 | 14 Arterials and Collectors ADT < 1500<br>18 Arterials and Collectors ADT ≥ 1500 | 18 Arterials and Collectors ADT < 1500<br>24 Arterials and Collectors ADT ≥ 1500 | 18 Arterials and Collectors ADT < 1500<br>30 Arterials and Collectors ADT ≥ 1500 |

Note: ADT in Table 3 - 12A refers to Design Year ADT.

## TABLE 3 – 12B
## MINIMUM HORIZONTAL CLEARANCE[1]

### Urban Curb or Curb and Gutter Roadways

| DESIGN SPEED[2] (MPH) | | | | |
|---|---|---|---|---|
| 25 and Below | 30 | 35 | 40 | 45 |
| MINIMUM HORIZONTAL CLEARANCE (FEET) (From face of curb) | | | | |
| 1.5 | 4[3] | 4[3] | 4[3] | 4[3] |

1. These horizontal clearance requirements can be applied only if all of the following conditions are met:
   - The facility is an urban facility.
   - The facility's design speed is 45 mph or less.
   - The facililty is predominantly a curbed facility.
   - Right of way is restricted.
2. Curb and gutter not to be used on facilities with design speed > 45mph
3. On projects where the 4-foot minimum offset cannot be reasonably obtained and other alternatives are deemed impractical, the minimum may be reduced to 1.5 feet.

DRAFT



## ~~TABLE 3 – 12~~
## ~~MINIMUM WIDTH OF CLEAR ZONE~~

| ~~Type of Facility~~ | ~~DESIGN SPEED (MPH)~~ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ~~25 and Below~~ | ~~30~~ | ~~35~~ | ~~40~~ | ~~45~~ | ~~50~~ | ~~55~~ | ~~60 and Above~~ |
| | ~~MINIMUM CLEAR ZONE (FEET)~~ | | | | | | | |
| ~~Rural~~ * | ~~6~~ | ~~6 Local~~<br>~~10 Collectors~~<br>~~14 Arterials~~ | ~~6 Local~~<br>~~10 Collectors~~<br>~~14 Arterials~~ | ~~10 Collectors~~<br>~~14 Arterials~~ | ~~14 Arterials and Collectors ADT < 1500~~<br>~~18 Arterials and Collectors ADT ≥ 1500~~ | ~~14 Arterials and Collectors ADT < 1500~~<br>~~18 Arterials and Collectors ADT ≥ 1500~~ | ~~18 Arterials and Collectors ADT < 1500~~<br>~~24 Arterials and Collectors ADT ≥ 1500~~ | ~~18 Arterials and Collectors ADT < 1500~~<br>~~30 Arterials and Collectors ADT ≥ 1500~~ |
| ~~Urban~~ * | ~~1 ½~~ | ~~4~~ ** | ~~4~~ ** | ~~4~~ ** | ~~4~~ ** | ~~N/A~~ ** | ~~N/A~~ ** | ~~N/A~~ ** |

* ~~From face of curb~~

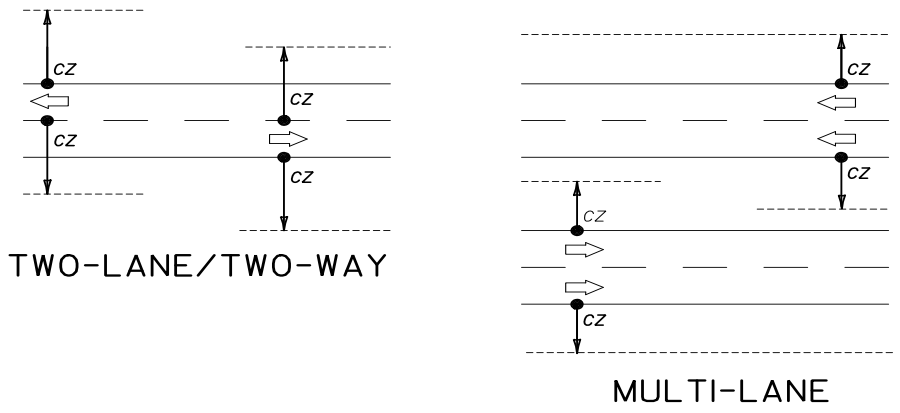
** ~~On projects where the 4 foot minimum offset cannot be reasonably obtained and other alternatives are deemed impractical, the minimum may be reduced to 1 ½'.~~

* ~~Use rural for urban facilities when no curb and gutter is present. Measured from the edge of through travel lane on rural section.~~

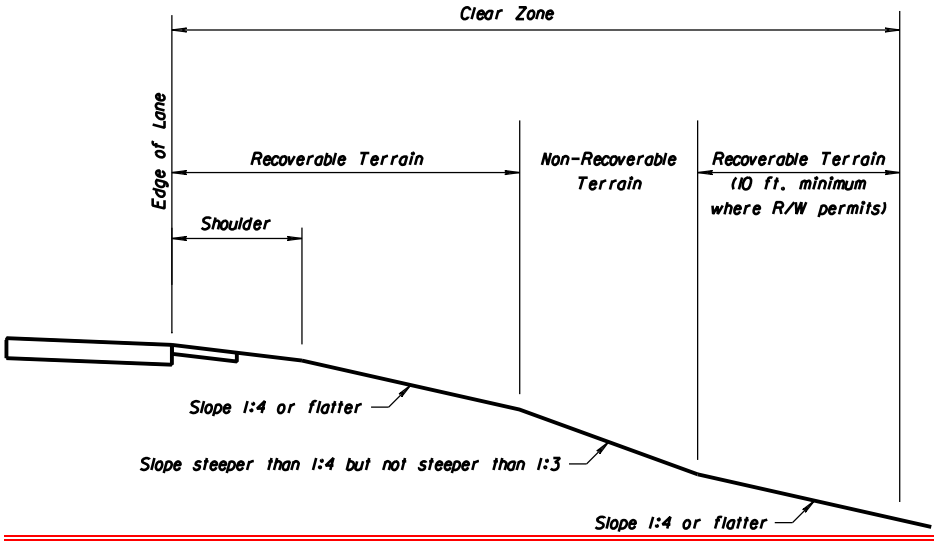
** ~~Curb and gutter not to be used on facilities with design speed > 45mph.~~

~~NOTE: ADT in Table 3 - 12 refers to Design Year ADT.~~

## Figure 3-14 Clear Zone Plan View




## Figure 3-15 Clear Zone Cross Section




Note: Roadside Terrain includes all surfaces along the roadway other than Travel Lanes, Auxiliary Lanes, and Ramps. For the purpose of establishing Clear Zones, Roadside Terrain is defined as recoverable, non-recoverable, non-traversable, and hazardous as follows:

1. Recoverable when it is safely traversable and on a slope that is 1:4 or flatter.
2. Non-recoverable when it is safely traversable and on a slope that is steeper than 1:4 but not steeper than 1:3.
3. Non-traversable when it is not safely traversable or on a slope that is steeper than 1:3.
4. Hazardous when a slope is steeper than 1:3 and deeper than 6 feet.

# *ADA & Proposed Edits to Chapters 3 & 8*

### C.10.a.1 Policy and Objectives - New Facilities

The planning and design of new streets and urban highways shall include provisions for the safe orderly movement of pedestrian traffic. Provisions for pedestrian travel outside of the highway right of way should be considered.

The overall objective is to provide a safe, secure, continuous, convenient, and comfortable trip continuity and access environment for pedestrian traffic.

### C.10.a.2 Accessibility Requirements

Pedestrian facilities, such as walkways and sidewalks, must be designed to accommodate physically disabled persons whose mobility is dependent on wheelchairs and other devices. Note: Design shall be in compliance with the ADA Accessibility Guidelines (as described in the Federal Register), and the Florida Accessibility Code For Building Construction (Rule 9B-7.0042). Complete design criteria can be found in this publication.

### C.10.a.3 Sidewalks

Sidewalks should provide a safe, comfortable space for pedestrians. The width of sidewalks is dependent upon the roadside environment; volume of pedestrians; and the presence of businesses, schools, parks, and other pedestrian attractors. The minimum width for sidewalks is 4 feet. Where sidewalks are placed adjacent to the curb, the walkway widths should be approximately 2 feet wider. To ensure compliance with the ADA Accessibility Guidelines (as described in the Federal Register), and the Florida Accessibility Code For Building Construction, sidewalk design shall meet the following criteria:

| | | |
|---|---|---|
| Minimum clear width | - | ~~36~~ 48 inches[1, 2] |
| Maximum cross slope | - | 0.02% |
| Maximum slope | - | 1:~~20~~[3] 12[3] |

[1] Sidewalks less than 60 inches wide must have passing spaces at least 60 inches by 60 inches at intervals not to exceed 200 feet.
[2] The minimum clear width may be reduced to 32 inches for a short distance. This distance must be less than 24 inches long and separated by 5-foot long sections with 36 inches of clear width.
[3] Slopes greater than 1:20 are considered ramps and must be designed as such.

If the sidewalk is a ramp (slope greater than 1:20), it must include the provision of level landings every 30" of rise if the sidewalk is separated from the curb by a utility strip. For ramps, handrails must also be provided on both sides if the sidewalk/ramp is outside the clear zone.

Sidewalks 5 feet wide or wider will provide for two adults to walk comfortably side by side.

### C.10.a.4 Curb Ramps

In areas with sidewalks, curb ramps must be incorporated at locations where crosswalks adjoin the sidewalks. The basic curb ramp type and design application depends on the geometric characteristics of the intersection or other crossing location.

Typical curb ramp width shall be a minimum of ~~3~~ 4 feet with 1:12 curb transitions on each side when pedestrians must walk across the ramp. Ramp slopes shall not exceed 1:12 and shall have a slip resistant surface texture. Ramp widths equal to crosswalk widths are encouraged.

Curb ramps at marked crossings shall be wholly contained within the crosswalk markings excluding any flared sides.

If diagonal ramps must be used, any returned curbs or other well-defined edges shall be parallel to the pedestrian flow. The bottom of diagonal curb ramps shall have 48-inch minimum clear space within the crosswalk. If diagonal curb ramps have flared sides, they shall also have at least a 24-inch long segment of straight curb located on each side of the curb ramp and within the marked crossing.

It is important to visually impaired persons using the sidewalk that the location of the ramps be as uniform as possible. A contrasting surface texture should be used. On sections without curb and gutter, a contrasting surface texture should be used on the approach to crosswalks.

The Department's Design Standards, Index 304, which addresses the design of curb ramps, may be considered. Designers should keep in

mind there are many variables involved making each street intersection a special problem. For this reason, standard guidelines will not fit all situations and cannot replace the need for the use of sound engineering judgment in the design of curb ramps.

Two ramps per corner are preferred to minimize the problems with entry angle and to decrease the delay to people in wheel chairs or visually impaired pedestrians entering and exiting the roadway.

Each curb ramp or flush transition with the roadway shall be delineated with detectable warnings in compliance with the Americans with Disabilities Act Accessibility Guidelines made up of 'truncated domes' in an aligned pattern. The detectable warning must start at the back of curb or roadway edge and project 24" perpendicular to the curbline. Detectable warnings must be placed the full width of the curb ramp or flush transition. The Department's Design Standards, Index 304, provides details for the design, layout installation of detectable warnings.

### C.10.a.5 Additional Considerations

For additional information on pedestrian facilities design, including physical separation from the roadway, over- and underpasses, pedestrian crossings, traffic control, sight distance and lighting, refer to CHAPTER 8 – PEDESTRIAN FACILITIES.

## C.10.b Bicycle Facilities

Provisions for bicycle traffic should be incorporated into the original highway design. All new roadways and major corridor improvements, except limited access highways, should be designed and constructed under the assumption they will be used by bicyclists. Roadway conditions should be favorable for bicycling. This includes safe drainage grates, pavement markings, and railroad crossings, smooth pavements, and signals responsive to bicycles. In addition, facilities such as bicycle lanes, bicycle routes, and shoulder improvements, should be included to the fullest extent feasible. All rural arterial and collector sections should be given consideration for the construction of 4-foot or 5-foot paved shoulders. In addition, all urban arterial and collector sections should be given consideration for either undesignated or designated 4-foot bike lanes.

DRAFT



# CHAPTER 8

# PEDESTRIAN FACILITIES

## A INTRODUCTION

All new highways, except limited access highways, should be designed and constructed under the assumption they will be used by pedestrians. Provisions for pedestrian traffic should be incorporated into the original highway design.

In addition to providing pedestrian facilities on new projects, each highway agency responsible for maintaining or operating streets and urban highways should establish and maintain a program of pedestrian facilities implementation, maintenance and safety for the urban highway network.

For additional information concerning the design of sidewalks, refer to Section C.7.d of CHAPTER 3 – GEOMETRIC DESIGN.

For information concerning the design of shared use paths, refer to CHAPTER 9 - BICYCLE FACILITIES.

## B Disability Considerations

Pedestrian facilities must be designed in accordance with ADA to accommodate physically and visually challenged citizens whose mobility is dependent on wheelchairs or other devices. In areas with sidewalks, curb ramps shall be incorporated at locations where a marked crosswalk adjoins the sidewalk. Pull boxes, manholes, and other types of existing surface features in the location of a proposed curb ramp should be relocated when feasible. When relocation is not feasible, the feature shall be adjusted to the new ramp to meet the ADA requirements for surfaces (including the provision of a non-slip top surface, and adjustment to be flush with and at the same slope as the curb ramp).

To assist pedestrians who are visually or mobility impaired, curb ramps should be parallel to the crossing. By providing ramps parallel to the crossing, the pedestrian is directed into the crossing. At intersections where more than one road is crossed, each crossing should have a separate curb ramp. Under no circumstance shall a curb ramp be installed allowing a pedestrian to enter a crossing without providing a curb ramp (or at-grade sidewalk if no curb is present) on the opposite side of the crossing.

# *Lighting Issues*

# Street Lighting of Rural Intersections
# Streets and Highways other than Freeways
### Discussion with regard to standards and criteria

**Intersection Crashes–A Large Part of the Problem**
Intersections constitute only a small part of the overall highway system, yet intersection-related crashes constitute more than 50 percent of all crashes in urban areas and more than 30 percent in rural areas. Nearly 36 percent of crashes at unsignalized intersections involve injuries and 9 percent involve fatalities.

**The question is**: What document definitively states that spot lighting (one or two streetlights) is a reasonable approach to lighting a rural intersection? What criteria can be used on Non-State or State Roadways in Florida?

References

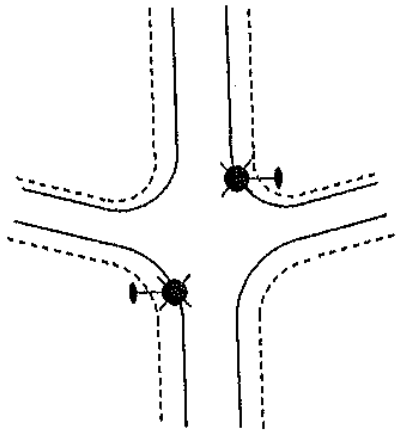
- Florida GreenBook Chapter 6 – Roadway Lighting
- Florida Intersection Design Guide
- AASHTO Roadway Lighting Design Guide
- FDOT Plans Preparation Manual
- FDOT Manual of Uniform Traffic Studies
- MUTCD
- Minnesota DOT/ FHWA Study: Safety Impact of Street Lighting at Isolated Rural Intersections
- NCHRP 500 Strategy 17.1 E2 and Strategy 17.2D provide safety at intersections with street lighting
- Other Agencies
- Proposed Rural Intersection Street Lighting Layout

**GreenBook Chapter 6:** Roadway Lighting Current Criteria calls for levels of illumination to meet the Guidelines in the AASHTO Roadway Lighting Design Guide. Warranting conditions are fairly general in nature based upon, crash history, glare, roadway geometry, pedestrian issues, etc.

**Florida Intersection Design Guide** Primary use is for construction on the State Highway System. References AASHTO Roadway Lighting Design Guide as the principal document governing intersection lighting. Also references NCHRP Report 152 for Warrants for Highway Lighting (preferred method in Lake County). FDOT uses the Illuminance Technique for design guidelines and are also in Plans Preparation Manual.

**AASHTO Roadway Lighting Design Guide** This is the basic guide for highway lighting. It includes information on warranting conditions and design criteria. Warranting Conditions: Similar to Florida Greenbook. However it also states " Lighting of Spot Locations in Rural areas should be considered whenever the driver is required to pass

through a section of road with complex geometry or raised channelization. The lighting design treatment is typically similar to that for freeway ramp terminals." The document in section 3.3, figure 3.2 shows a simple crossroad ramp terminal with two street lights.



"C" - SIMPLE CROSSROAD-
RAMP TERMINALS

**FDOT Plans Preparation Manual** This document again references the *Roadway Lighting Design Guide, AASHTO and the FDOT Design Standards* - These indexes are composed of a number of standard drawings or indexes which address specific situations that occur on a large majority of construction projects. The PPM provides illumination and uniformity levels required for a street lighting project.

**FDOT Manual of Uniform Traffic Studies** This document sets the criteria for when a highway on the State System warrants street lighting. The analysis performed is on the basis of Cost / Benefit Ratio. Counties and Cities typically do not evaluate street lighting based on this criteria. (may be currently under review by FDOT)

**MUTCD** The Manual on Uniform Traffic Control Devices is a FHWA standard and adopted by FDOT as a State Standard. Very little if anything is mentioned about street lighting requirements.

**Minnesota DOT/ FHWA Study: Safety Impact of Street Lighting at Isolated Rural Intersections** Recent Report (Dec. 2004) on the effectiveness of street lighting at rural intersections

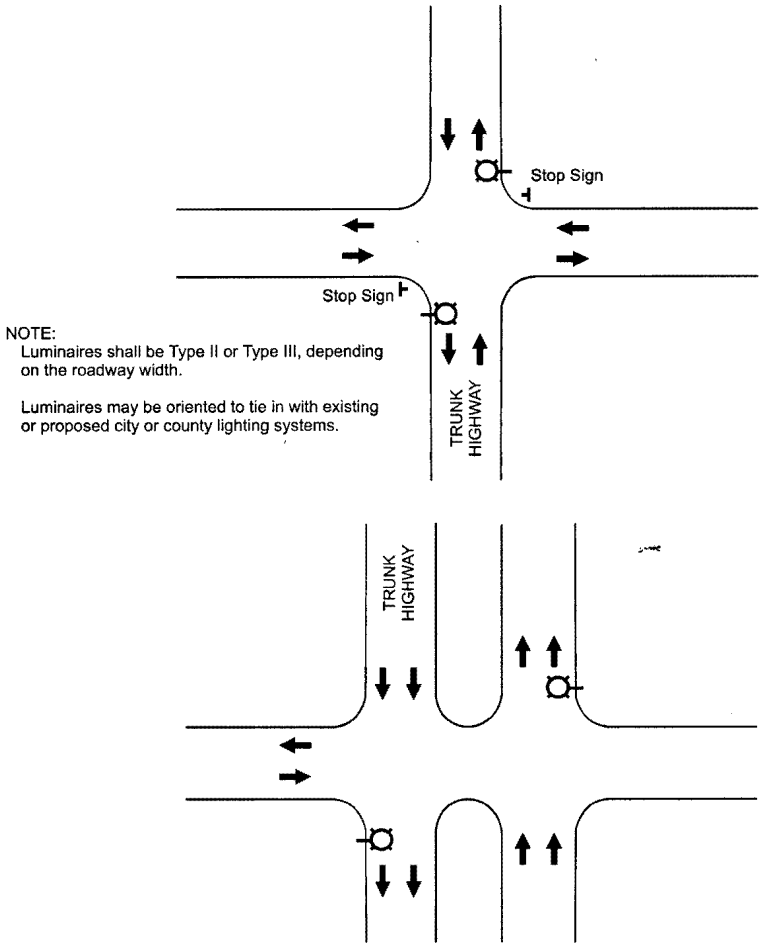
**NCHRP 500 Strategy 17.1 E2—Improve Visibility of the Intersection by Providing Lighting (P)** Providing lighting at the intersection itself, or both at the intersection and on its approaches, can make drivers aware of the presence of the intersection and reduce nighttime crashes. The target for this strategy should be unsignalized, unlit intersections with substantial patterns of nighttime crashes. In particular, patterns of rear-end, right-angle, or turning collisions on the major-road approaches to an unsignalized intersection

may indicate that approaching drivers are unaware of the presence of the intersection. Minnesota evaluated the effectiveness of installing streetlights at rural intersections. As part of the evaluation, Minnesota conducted a literature review and found that previously published research reported 25 to 50 percent reductions in the nighttime crash/total crash ratio due to the installation of intersection lighting (Preston and Schoenecker, 1999b).

Based upon a comparative crash analysis and a before-after evaluation, Minnesota concluded that the installation of streetlights reduced nighttime accidents at rural intersections and would be more effective in reducing nighttime crashes than either rumble strips or overhead flashing beacons. From an economic standpoint, Minnesota indicated that the benefits associated with the installation of streetlights at rural intersections outweigh the costs by a margin of 15 to 1. Based upon the Minnesota study and previous studies, providing lighting at an intersection improves the safety of an intersection during nighttime conditions by (1) making drivers more aware of the intersection, which improves drivers' perception-reaction times, (2) enhancing drivers' available sight distances, and (3) improving the visibility of nonmotorists.

The keys to the success of this strategy are (1) identifying sites where a lack of lighting is truly a significant factor in the nighttime crash experience and (2) developing an appropriate lighting system following AASHTO and the Illuminating
Engineering Society of North America (IESNA) criteria. Nighttime crash frequency and severity, by type, are key safety effectiveness measures. The ratio of nighttime to daytime crashes, by type, is also a useful measure for determining safety effectiveness.

**Committee :** Does the existing literature utilized in the State of Florida allow minimal street lighting at intersections? Should additional criteria and direction be provided by the Florida Greenbook? There are a number of other agencies which appear to allow spot lighting (one or two lights) at intersections being Texas, Kentucky, Minnesota to name a few.




NOTE:
Luminaires shall be Type II or Type III, depending on the roadway width.

Luminaires may be oriented to tie in with existing or proposed city or county lighting systems.

**Standard Illumination Plan for Intersections**

## Quigley, Robert

**Subject:** FW: NEW DATE - March 2008 Florida Greenbook Advisory Committee Meeting

From: Schneider, Fred [mailto:FSchneider@lakecountyfl.gov]
Sent: Thursday, February 14, 2008 2:33 PM
To: Masing, Bernie A; Quigley, Robert
Subject: RE: NEW DATE - March 2008 Florida Greenbook Advisory Committee Meeting

Thank you. I am trying to gather and do as much research as I can before the meeting. CTRE at Iowa State University did the study for Michigan DOT. www.ctre.iastate.edu/reports/rural_lighting.pdf
Thanks,

Fred

---

The Texas Highway Illumination Manual is also a source for spot lighting.

ftp://ftp.dot.state.tx.us/pub/txdot-info/gsd/manuals/hwi.pdf

Thanks,

Fred

---

Rob: One issue that is affecting Lake County is the subject of street lighting. The Florida Greenbook Chapter 6 suggests using AASHTO guidelines for level of illumination. The following study link is an evaluation by the State of Kansas regarding lighting of intersections.
http://www.lfucg.com/trafficinfo/documents/KTC_03_12_Roadway_Lighting.pdf

I believe it would be a good idea to discuss the subject. One the one hand, we are being told by consultants that we must light a significant length of road way approaching the intersection But, this study calls for only one or two poles at the intersection. This has the potential to save County's and Cities a lot of money and at the same time reduce light pollution. I am copying Bernie Masing as chapter author.

I am not sure if the Florida Greenbook allows us to use one or two light sources at an intersection or whether we have to extend farther out.

Thank you,

Fred Schneider, P.E.
Director of Engineering
Lake County Public Works
437 Ardice Ave.
Eustis, FL 32726
352-483-9040

U. S. Department
of Transportation
**Federal Highway
Administration**

Publication No. FHWA-NHI-05-148
October 2005

## NHI Course No. 380077

# Intersection Safety Workshop

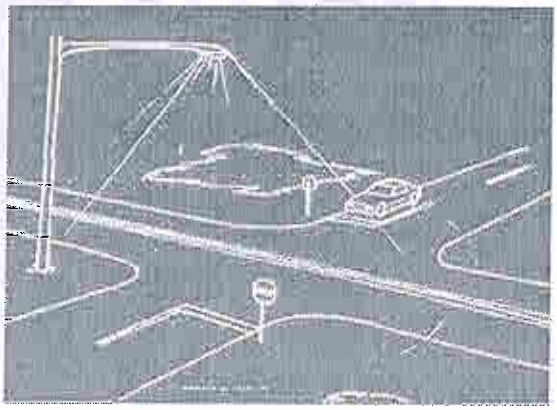
# Participant Workbook

NATIONAL HIGHWAY INSTITUTE

## Intersection Safety Workshop

# Intersection Lighting Counter-measures

– Session #7



7-1

## Intersection Lighting Countermeasures

**Outcomes:**

➔List Lighting Countermeasures with Safety Benefits

➔Illustrate Lighting Countermeasures

7-2

## Intersection Lighting Countermeasures

**New Tools:**

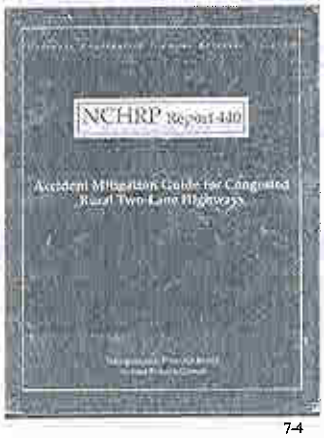
1. **AASHTO Strategic Plan 17-18 (3) Implementation Guide – NCHRP 500 Volume 5 – A Guide for Addressing Unsignalized Intersection Collisions**


7-3

## Intersection Lighting Countermeasures

**New Tools:**

2. **NCHRP 440 – *Accident Mitigation Guide for Congested Rural Two-Lane Highways***




7-4

# Intersection Lighting Countermeasures

## 1. Lighting

**Proven**

- Lighting has the highest benefit to cost ratio of any of the traffic safety countermeasures
- **CRF for Intersections = 50%**

Typical Benefit / Cost (B/C) Ratios for Various Improvements (1974 - 1993)

| RANK | CONSTRUCTION CLASSIFICATION | B/C RATIO |
|---|---|---|
| 1. | ILLUMINATION | 21.0 |
| 2. | RELOCATED BREAKAWAY UTILITY POLES | 17.2 |
| 3. | TRAFFIC SIGNS | 16.3 |
| 4. | UPGRADE MEDIAN BARRIER | 13.7 |
| 5. | NEW TRAFFIC SIGNALS | 8.3 |
| 6. | NEW MEDIAN BARRIER | 8.3 |
| 7. | REMOVE OBSTACLES | 8.1 |
| 8. | IMPACT ATTENUATORS | 7.8 |
| 9. | UPGRADE GUARDRAIL | 7.6 |
| 10. | UPGRADED TRAFFIC SIGNALS | 7.4 |
| 11. | UPGRADE BRIDGE RAIL | 7.1 |
| 12. | SIGHT DISTANCE IMPROVEMENTS | 7.0 |
| 13. | GROOVE PAVEMENT FOR SKID RESISTANCE | 5.6 |
| 14. | REPLACE OR IMPROVE MINOR STRUCTURE | 5.2 |
| 15. | TURNING LANES AND TRAFFIC SEPARATION | 4.4 |
| 16. | NEW RR CROSSING GATES | 3.9 |
| 17. | CONSTRUCT MEDIAN FOR TRAFFIC SEPARATION | 3.3 |
| 18. | NEW RR CROSSING FLASHING LIGHTS | 3.2 |
| 19. | NEW RR FLASHING LIGHTS & GATES | 3.0 |
| 20. | UPGRADE RR FLASHING LIGHTS | 2.9 |
| 21. | PAVEMENT MARKING AND DELINATIONS | 2.6 |
| 22. | FLATTEN SIDE SLOPES | 2.5 |
| 23. | NEW BRIDGE | 2.2 |
| 24. | WIDEN OR IMPROVE SHOULDER | 2.1 |
| 25. | WIDEN OR MODIFY BRIDGE | 2.0 |
| 26. | RE-ALIGN ROADWAY | 2.0 |
| 27. | OVERLAY FOR SKID TREATMENT | 1.9 |

7-5

## Intersection Lighting Countermeasures

### 1. Lighting

-Installation of lighting of rural intersections reduced crashes by 25 to 50% - MN study
- Highest Benefit to Cost of any Safety Measure

**Proven**

NCHRP 500, Strategy 17.1 E2-Improve Visibility of Intersection by Providing Lighting (P)

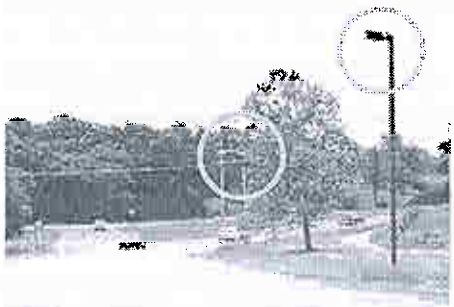
7-6

## Intersection Lighting Countermeasures

### 1. Lighting

**Proven**

**CRF = 18-70%**
**Night Time Crashes**



NCHRP 500, Strategy 17.1 E2-Improve Visibility of Intersection by Providing Lighting (P)

7-7

# Intersection Lighting Countermeasures

## 1. Lighting

Proven

| Treatment | Finding |
|---|---|
| Add lighting (132) | 30% reduction in all collisions.<br>50% reduction in nighttime collisions. |
| Add lighting (137) | 43% reduction in fatal crashes.<br>17% reduction in injury crashes. |

? Not sure why Landmarks?

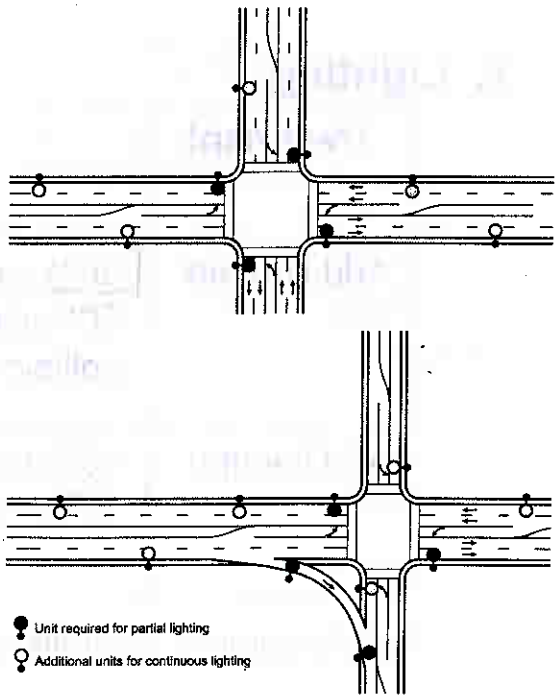
*High-Volume Signalized Intersection Handbook

7-8

# Intersection Lighting Countermeasures

## 1. Lighting

**RP-8-00 lighting design examples with and without channelized right turn lanes**

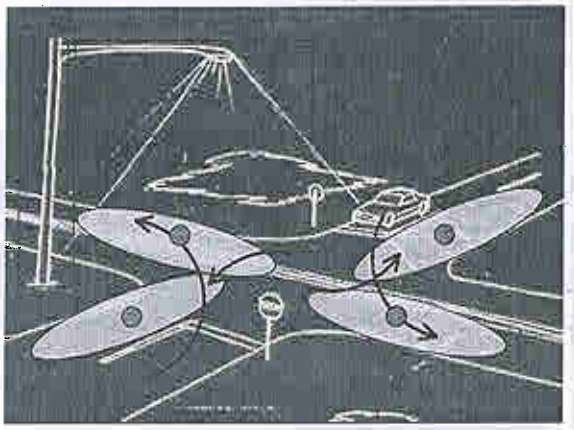



7-9

## Intersection Lighting Countermeasures

1. Lighting

- "Probe" Lighting Design



Light highest intensity @ Exit doors

7-10

## Intersection Lighting Countermeasures

**Case Study G – Hillside at Loomis**

- ❑ **4 crashes in a 15 month period into the house**
- ❑90 degree turn with 48 foot radius
- ❑195 watt Incandescent Street Light


7-11

## Intersection Lighting Countermeasures

### Case Study G – Hillside at Loomis

Intersection Lighting Added – 250 watt HPS – Type II Distribution on 32 foot poles

NCHRP 500, Strategy 17.1 E2- Improve Visibility of Intersection by Providing Lighting (P)


7-12

## Intersection Lighting Countermeasures – Exercise F:

### IL 104 and Triopia Intersection

- ❑High Crash Location of two State Routes – 5 year period
  - ❑ 5 fatalities
  - ❑ 16 injury crashes
  - ❑ 42 total crashes
  - ❑ All fatalities were at night; 72% of all crashes at night


7-13

## Intersection Lighting Countermeasures - Exercise F:

Discussion

- For Route 104 and Triopia Intersection, What countermeasure would you suggest?
- What is the Predicted Safety Benefit of this countermeasure?

7-14

## Intersection Lighting Countermeasures – Exercise F:

**IL 104 and Triopia Intersection**

- Next 5 years after lighting improvement
- 0 fatalities
- 2 injury crashes
- 16 total crashes
- Nighttime crashes were 5 or 31%


7-15

## Intersection Lighting Countermeasures

**Outcomes:**

- ➔ **Listed Lighting Countermeasures with Safety Benefits**
- ➔ **Illustrated Lighting Countermeasures**

7-16

## Intersection Lighting Countermeasures:

***Review***

*Questions?*

7-17

**From:** Amy Harris
**To:** McConnell, Tanya; Webb, George
**Date:** 3/17/2008 10:44:10 AM
**Subject:** Fwd: March 2008 Florida Greenbook Advisory Committee Meeting

>>> Amy Harris 02/14/08 9:17 AM >>>
We have a number of issues we struggle with that we would appreciate some discussion on at the meeting if possible. They are in order of priority:

1) Copper Theft- we need design standards developed, to assist us in prevention of this expensive maintenance issue. Some ideas include a device called a "Copper keeper", locking pull box lids, and any other device to secure the copper from being clipped and then removed. Another alternative might be to not use copper, but to consider aluminum which is what FPL uses. See attached letter I sent to FDOT and their response regarding our most recent episode.

2) Mast Arm Signal design-Standard Index # 17743/17745 only has a provision for mounting height of 40' for luminaries. In many cases, luminaries are not being implemented at locations because they can not meet that high of a standard with too many overhead conflicts. Many signalized intersections are now dark. Highest conflict point on the road with vehicles and pedestrians that can't be seen at night. Propose lower MH options on mast arms for 200-250W fixtures. This would be consistent with what we have used on strain pole signal installations in the past.

3) We have turned down inquires from developments to put in pedestrian lighting along walkways on major thoroughfare roads without including lighting the roadway as well. All the research I have done with various lighting standard organizations do not clearly spell it out, but elude to the fact that roadway lighting is the focus of design information then pedestrians are supplemented after that. We could use some clarification of this issue as a standard.

4) Median Landscape and it's effect on photometrics with one sided lighting systems. This is a state wide issue we are aware of. We have driven through areas in which mature landscaping precludes lighting from reaching the other side of the roadway, especially the inside lane closest to the median. Also, if landscaping is added after the fact, or grows to a height to cause this, should the lighting be readdressed?

5) Electrical Connections "pigtails" need to have a standard such that they are required to be placed high enough off the ground. Our Traffic Operations maintenance staff claims that too many are installed low in the pole base, as well as pull boxes in low areas of the swales, therefore getting wet, and regularly shorting out. They are another expensive maintenance item that are continually having to be replaced.

Should you need additional details, please let me know.

>>> George Webb 01/30/08 12:46 PM >>>
street lighting to be discussed - any thoughts or comments after reading attached?

**Department of Engineering and Public Works**

P.O. Box 21229

West Palm Beach, FL 33416-1229

(561) 684-4000

www.pbcgov.com



January 17, 2008

Mr. Pete Nissen, P.E., District Construction Engineer
Florida Department of Transportation District IV
3400 West Commercial Boulevard
Fort Lauderdale, FL 33309-3421

**RE: VANDALISM PREVENTION ON STREETLIGHTING SYSTEMS**

Dear Pete:

As you may know, there was recent vandalism and theft of copper wiring from the FDOT Streetlighting Project #229499-1-52-01 (SR 80 from the Turnpike to Haverhill Road). The repair costs are estimated at nearly $60,000 including materials and labor.

We have similar concerns about potential future occurrences on the remaining SR 80 projects currently under construction, specifically the easily accessible copper in the standard pull box. We are hesitant to accept any further lighting installations given the potential vulnerability that would accompany them.

Our thought is that preventative design/construction modifications should be implemented to avoid similar significant losses in the future. Please advise us of considerations about preventative or corrective measures towards this end regarding the remaining SR 80 projects currently under construction, as well as design standard revisions for future projects.

If I can be of any further assistance, please contact me at 561-684-4030.

Sincerely,

A. Harris

Amy Harris, P.E.
Special Projects Manager - Traffic Division

AH:rwr
cc: John Thompson, Project Manager, FDOT
Bernard Freeman, Project Manager, FDOT
Hesham Ali, Director of Transportation Operations, FDOT
Melvin Pollock, Director of Palm Beach Operations, FDOT
Edgard Mora, CEI, Tampa Bay Engineering
Tanya McConnell, Deputy County Engineer
Dan Weisberg, Director, Palm Beach County Traffic Engineering

File: General Streetlights 2008
SL – 2008 SL
SL – SR80 – Haverhill to Turnpike
N:\TRAFFIC\RWR\2008\2008 STREETLIGHTS\FDOT SL vandalism.doc

# Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

Palm Beach Operations
7900 Forest Hill Blvd.
West Palm Beach, FL 33413
TELEPHONE: (561) 432-4966; FAX: (561) 432-4642

STEPHANIE C. KOPELOUSOS
SECRETARY

February 4, 2008

Ms. Amy Harris, P.E., Special Projects Manager
Palm Beach County Engineering – Traffic Division
P.O. Box 21229
West Palm Beach, FL 33416-1229

Re: Vandalism Prevention on Street Lighting Systems

Dear Ms. Harris:

We are in receipt of your letter dated January 17, 2008, which requests that the Department review the recent vandalism and theft of copper wiring associated with the completed SR 80 project, located from the Turnpike to Haverhill Road.

We are reviewing the issue in our Lighting Design Office to determine what effective solutions exist. The remaining SR 80 active construction projects are within 3-4 months of completion, and may not provide the ability to incorporate any developed improvements. The lighting maintenance agreements for these projects are executed, and we appreciate the county's cooperation in meeting the agreement terms. Future projects will allow further input during the design review phase, where the county can recommend items that not only meet deterrence needs, but are also functional and maintainable.

Theft of infrastructure items that have salvageable value continues to be an issue throughout the state. Any assistance that the county can provide via law enforcement, investigation and prosecution of material theft is appreciated.

Please do not hesitate to contact me or Bernard Freeman at (954) 777-4476, should you have further comments or questions.

Sincerely,

Mel Pollock, P.E.
Operations Engineer
Palm Beach Operations

Cc: Peter Nissen, P.E., District Construction Engineer
Cleo Marsh, P.E., District Maintenance Engineer
Howard Webb, P.E., District Design Engineer
Dan Weisberg, P.E., Director, PBC Traffic Engineering
Tanya McConnell, P.E., Deputy County Engineer

# *Lane Width Question*

## Quigley, Robert

**Subject:** FW: Florida Greenbook Lane Widths

-----Original Message-----
From: Robert Quigley
Sent: Tuesday, July 10, 2007 4:39 PM
To: Thomas Driscoll <ThomasD@jupiter.fl.us>
Subject: RE: Florida Greenbook Lane Widths

Mr. Driscoll,

I have added your request to our list of items for review and discussion at our next meeting. Thanks.

Rob

-----Original Message-----
Thomas Driscoll <ThomasD@jupiter.fl.us>
07/09/2007 02:36 PM

To <howard.webb@dot.state.fl.us>

RE: Florida Greenbook Lane Widths

Thanks for the response. Based on your comment, I went back and reviewed the 2007 Draft and the conditions for applying 10 FT lanes. For the most part, the volumes on collector roadways are greater than 750 VPD and therefore (and if I am interpreting and applying the conditions correctly) these conditions would not apply.

Our thought is to allow a narrowing to 10 FT through lanes when accompanied by an F curb and gutter or paved shoulders as either designated or undesignated bicycle lanes. Therefore, where 24 FT of pavement may exist on an existing collector roadway, in some instances we can widen to one side of the roadway and be able to accommodate 20 FT for motor vehicles and 8 FT for bicyclists. For these type of improvements, it reduces the cost of the project and allows us to provide facilities to both users.

Thanks again for your response and if you need additional information, please let me know.

-----Original Message-----
From: howard.webb@dot.state.fl.us [mailto:howard.webb@dot.state.fl.us]
Sent: Monday, July 09, 2007 1:43 PM
To: Thomas Driscoll
Cc: Doug Koennicke; jim.mills@dot.state.fl.us;
robert.quigley@dot.state.fl.us
Subject: Re: Florida Greenbook Lane Widths

Tom

I have copied Jim Mills and Rob Quigley of the Criteria and Standards Section in Central Office.

Please note that the Green Book currently allows 10 lanes under some conditions.

Thanks
Howard A. Webb

-----Original Message-----

To <howard.webb@dot.state.fl.us>

07/09/2007 01:05

Subject Florida Greenbook Lane Widths

We would like to recommend inclusion of narrower lane widths for local collector roadways. Our suggested minimum width would be 10 FT for low speed local collector roadways. Please advise on the submittal format to the Greenbook Committee for this request.

# *Median Width Question*

REQUEST TO GREENBOOK COMMITTEE:

# TO CONSIDER REDUCING MINIMUM MEDIAN WIDTHS

FOR URBAN STREETS WHEN DESIGN SPEEDS ARE 40 M.P.H. OR LESS (TABLE 3-11)

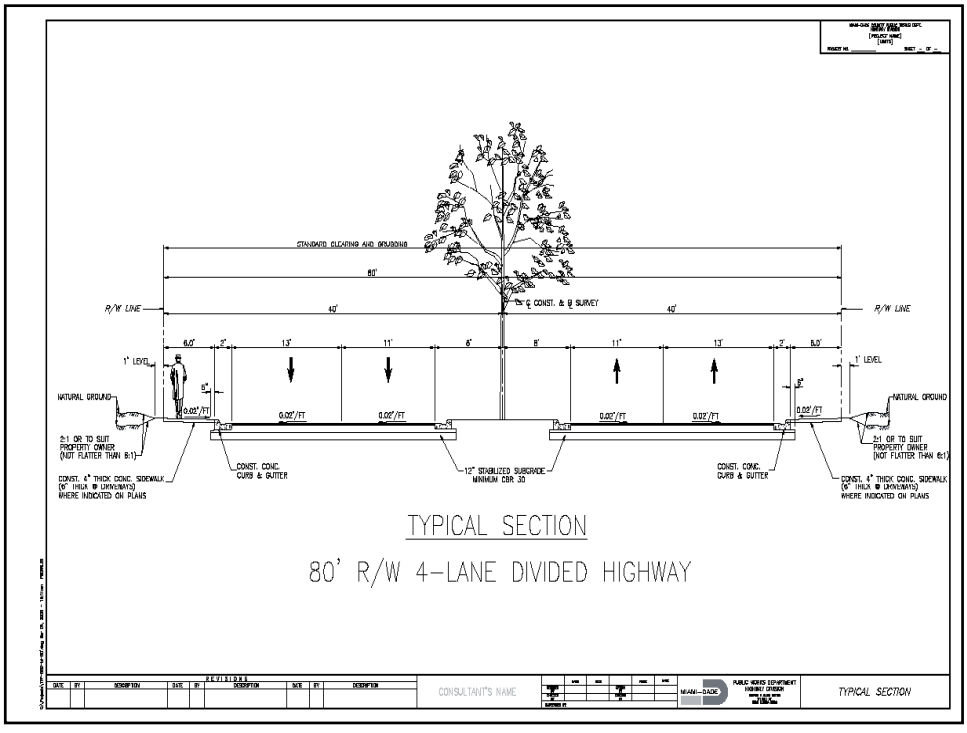
Presented by Gaspar Miranda, P.E.
Assistant Director
Miami-Dade County Public Works Dept.

## History

- Current Florida 'Greenbook' requires a minimum 15.5 ft raised median width
- 15.5 ft provides a raised, bull nosed traffic separator at left turn lanes
- Current Florida 'Greenbook' requires a minimum 10 ft paved median width where design speeds are 40 mph or less

# Existing Standard 80' Miami Dade Arterial Roadways

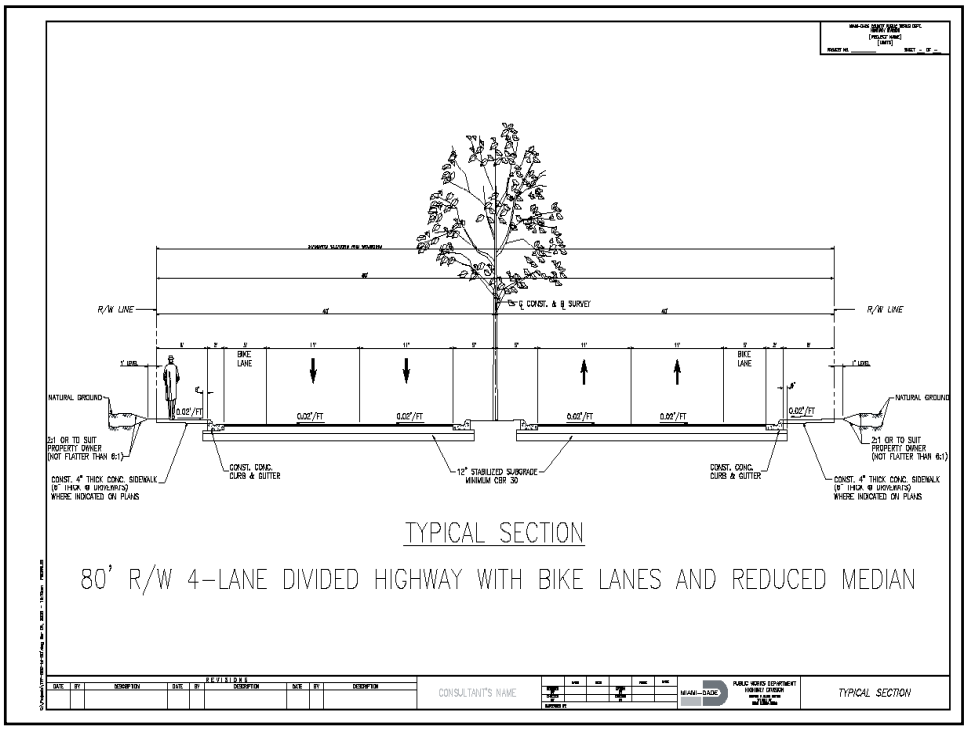
- Accommodate:
  - 4 traffic lanes with outside wide curb lanes (13')
  - 16' wide landscaped median
  - 6' wide sidewalks
  - No designated bicycle facilities



# Potential Transit Corridors within 80' Limited Right-of-Way with Reduced Median Width

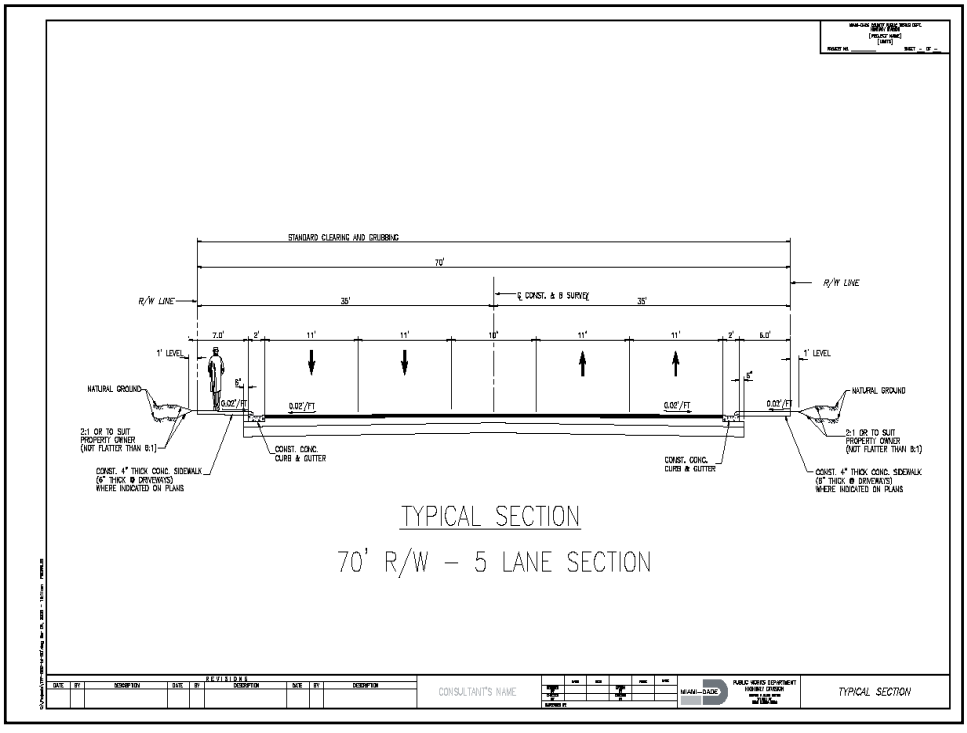
- 80' Right-of-Way Accommodates:
  - 4-11' wide traffic lanes
  - 10' wide landscaped center median with double yellow line at left turn bay
  - Choice of 4' or 5' wide bicycle facilities
  - Choice of 6' or 7' wide sidewalk depending on width of bicycle facility chosen

MIAMI-DADE COUNTY



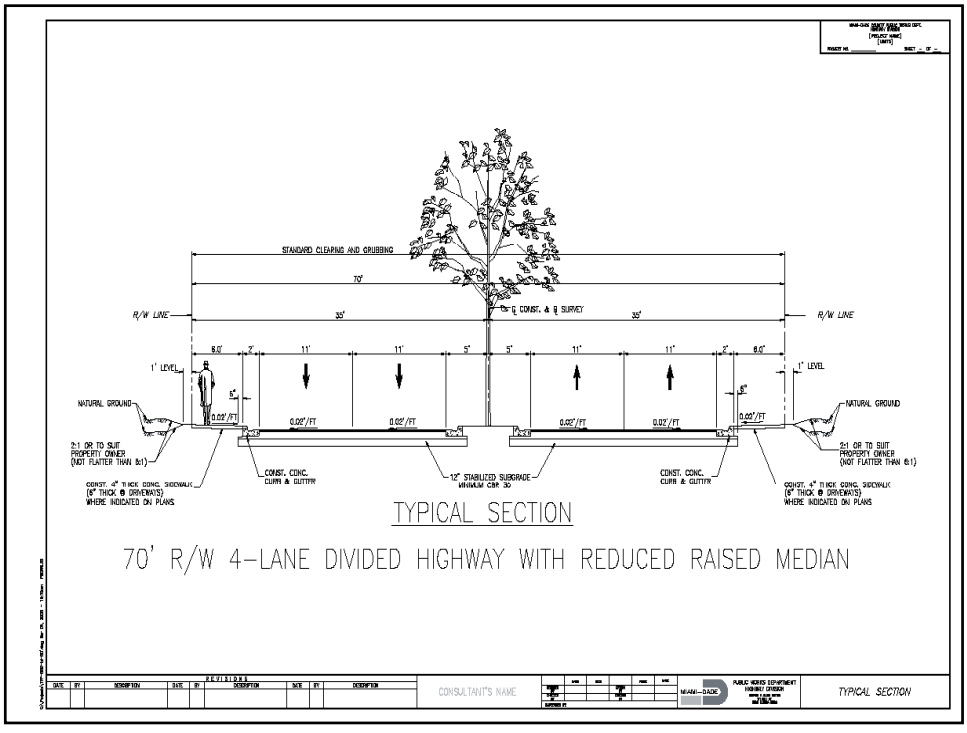
# Existing Standard 70' Miami-Dade Arterial Roadways

- Accommodate:
  - 5 undivided traffic lanes
  - 6' wide sidewalks
  - No bicycle facilities



# Potential Transit Corridors with in 70' Limited Right-of-Way with Reduced Median Width

- 70' Right-of-Way Accommodates:
  - 4 traffic lanes
  - 10' wide landscaped center median with double yellow line at left turn bay
  - 6' wide sidewalks



## Arguments Against 10' Raised Median

- High Speed Traffic with no separation from on-coming traffic at left turns
- Porous left turn bay with traffic cutting through double yellow line

## Response to Arguments

- 10' landscaped medians is only recommended on corridors with design speeds of 40 mph or less
- Porous left turn bays may be mitigated with "pork-chop" directional design where existing driveways are too close to an intersection

# Request for New Language

Modify existing language which reads:

- "Paved medians with minimum width of 10' may be used for two-way turn lanes and painted medians when design speeds are 40 mph or less"

To:

- "Paved medians with minimum width of 10' may be used for two-way turn lanes and painted **or raised** medians when design speeds are 40 mph or less"

MIAMI-DADE COUNTY

## TABLE 3-11
## MEDIAN WIDTH FOR URBAN STREETS

| DESIGN SPEED (MPH) | MINIMUM WIDTH (FEET) |
|---|---|
| 50 | 19.5 |
| 45 OR LESS | 15.5 |

Paved medians with minimum width of 10' may be used for two-way turn lanes and painted **or raised** medians when design speeds are 40 mph or less

MIAMI-DADE COUNTY

## Quigley, Robert

**Subject:** FW: NEW DATE - March 2008 Florida Greenbook Advisory Committee Meeting

From: Webb, Howard
Sent: Friday, February 08, 2008 5:33 PM

Gaspar

As pointed out in a previous email, a 10' wide painted median is allowed for design speeds of 40 mph or less. FDOT's plans preparation manual encourages raised islands in painted medians, where appropriate. I did not see (I may have missed it) any mention of islands in the Green Book, but it seems like a combination of painted median (already allowed) and islands where appropriate would be the solution for your issue.

Howard A. Webb
District Design Engineer
FDOT - District 4
Phone: (954) 777-4439
Fax: (954) 777-4439
howard.webb@dot.state.fl.us

-----Original Message-----
From: Miranda, Gaspar (PWD) [mailto:gxm@miamidade.gov]
Sent: Friday, February 08, 2008 11:53 AM

Howard:

We agree that the point of the 15.5 ft is to provide a raised, bullnosed traffic separator alongside a left turn lane to prevent left turns. And on major high speed highways, there is no question as to the need to keep traffic on their side of the road, even into left turn bays.

Our suggestion is rooted more towards lower speed urban streets, thus what we are looking for would be along the lines of a modification of the footnote to Table 3-11 (added language inside >> <<):

"Paved medians with a minimum width of 10 feet may be used for two-way turn lanes and painted >>or raised<< medians when design speeds are 40 mph or less."

We are completely amenable to the permissibility of a narrower median being tied explicitly to lower speed roads, as that is where we would like to use this design.

As the Urbanism trend has been making significant inroads into roadway design, we find that major streets transition into "main streets," with lower speeds and more mixed use of bicycles and pedestrians. Our older arterial roadway infrastructure is generally trapped within a right of way width of no more than 70 or 80 ft.

Under current rules, we could tear the 15.5 ft wide median out completely and replace it with a painted 10 ft wide median, and pull the through lanes inward to provide space for wider sidewalks or bike lanes or swales/parkways.

This, however, makes the center of the road completely porous to left turns, which is directly related to your point. We think our suggestion would be an improvement to this option.

If we could replace the portion of the painted median that is not being used for left turns with a raised median, we would be able to control the unwanted midblock left turns. And, since the median bullnose would be at the beginning of left turn lanes rather than at the end, the left turn would be separated from oncoming traffic by a double yellow line.
Since this would be the only area where driveway left turns might occur, the roadway design should take into account other mitigation such as triangular porkchops at the driveway mouths to force right turns.
Porkchop guidance in FDOT's Driveway Handbook (p. 49) supports this:
"The pork-chop design might also be useful on an undivided roadway where the driveway is so close to an intersection that the left turn would be unsafe at any time."

For your use, we're attaching a PDF to illustrate cross-sections.

Thanks, Gaspar

-----Original Message-----
From: Webb, Howard [mailto:Howard.Webb@dot.state.fl.us]
Sent: Monday, January 28, 2008 7:16 PM

Gaspar

Something to consider:

15.5' is the minimum dimension that will allow a 10' turn lane with a 4' traffic separator. Without a traffic separator, you would loose the physical deterent to left turns across the turn lane that a raised median provides.
Howard Webb
District Design Engineer
FDOT - District 4
(954) 777-4439
Sent from my Blackberry

----- Original Message -----
From: Miranda, Gaspar (PWD) <gxm@miamidade.gov>
Sent: Mon Jan 28 17:40:51 2008

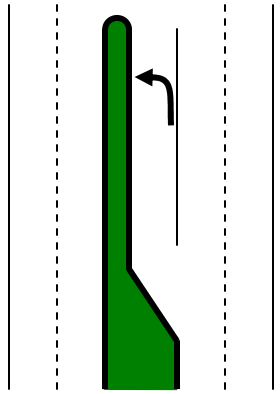
Please advise of the possibility of reducing the Minimum Raised Median Width for Urban Streets from the required 15.5 feet to 10 feet (see table 3-11) order to accommodate other amenities within the existing right-of-way i.e.

* Bike lanes,
* Increase the width of the sidewalks to 8 feet in some locations in order to provide enough space for bus shelters
* ADA issues
* Etc.

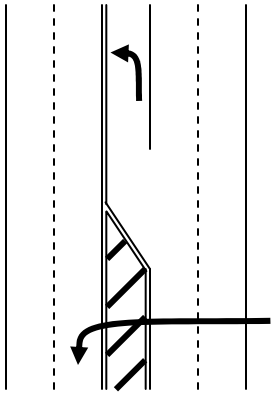
Thank you,

Gaspar

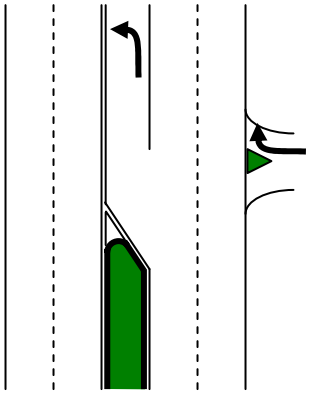
Allowable Raised Median on Divided Road



Allowable Painted Median




Proposed Raised Median on Lower Speed Urban Streets



# *Drainage Issues*

# Impacts of Drainage Inlets on Bicyclists Study

## Inlet Study Team

- Includes representatives from FDOT's Roadway Design, (Criteria and Standards, Drainage) Construction, Maintenance, and Safety Offices, and Midway Operations Center.

## West Pensacola Street (SR 366), Tallahassee, FL

- Approved claim based upon damage to rear wheel and tire of bicycle, no injury to cyclist.
- Grate retrofit by welding angle iron to north and south sides of grate (east-west road) to close gap parallel with direction of travel.
- All 6 grates in this section of Pensacola Street were retrofit at same time.

## SR 59 at Bond Street, Lloyd, FL

- Approved claim for damage to bicycle wheel and frame. Cyclist also suffered broken collar bone but did not claim medical reimbursement.
- On popular route for cyclists from Tallahassee area and part of statewide event rides (Bike Florida, Bike South)

## SR 59 at Bond Street, Lloyd, FL

- Grate retrofit first developed here, utilizing 2" angle iron welded to edge of reticuline grate.
- Grate has shifted towards center of roadway, resulting in reopening of gap.

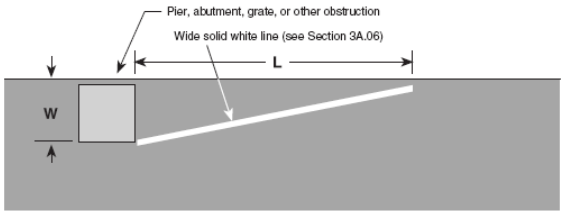
## Bond Street (CR 158), Lloyd, FL

- Inlet with large gap on popular cycling route east of Tallahassee, County Road.
- No known crashes.

## MUTCD Inlet Pavement Marking

- Propose to add into Design Standards with dimensions to help cyclists anticipate grates, especially in low light conditions.

*Figure 9C-8. Example of Obstruction Pavement Marking*




**For metric units:**
L = 0.6 WS , where S is bicycle approach speed in kilometers per hour

**For English units:**
L = WS , where S is bicycle approach speed in miles per hour

## US 90, Chattahoochee, FL

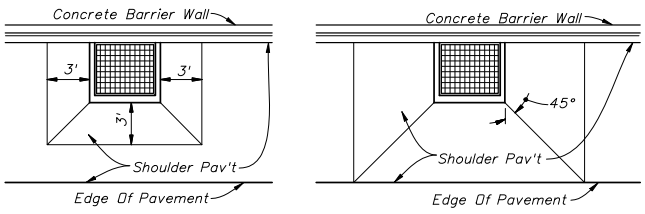

- Approach to Apalachicola River bridge down very steep grade.
- On Southern Tier Tour, a popular transcontinental bicycle route.
- At top of hill have a standard paved shoulder which transitions into a typical section with valley gutter separating shoulder from travel lane with inlets in shoulder.
- Older grates with large slot openings.


## US 90, Chattahoochee, FL

- Site of bicycle crash with serious injury when cyclist was not able to leave shoulder due to gutter, unable to stop in rain on hill.
- Front wheel of bicycle was trapped in slot opening of grate.
- Retrofit by welding thin strips of iron to grate top perpendicular with direction of travel.
- All grates in this section have been retrofit, plans are to replace grates in next resurfacing with bicycle safe grates.

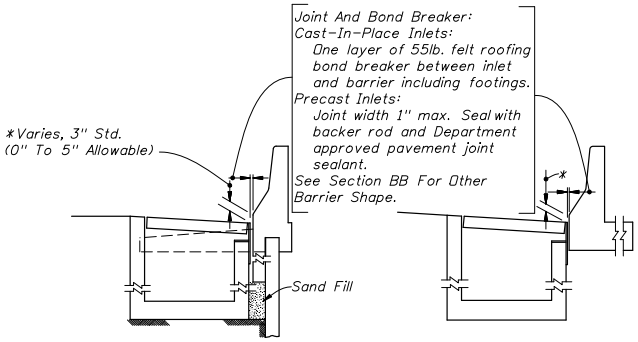
## Mahan Drive (US 90) Fallschase Permit Project

- Drainage Inlet properly relocated out of the travel lane when right turn lane was added.
- Note short slots in grate top.



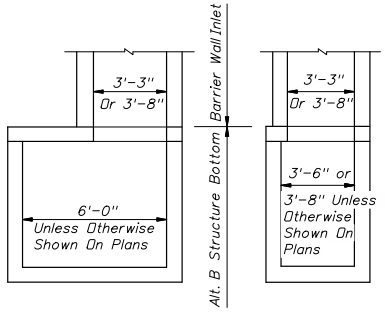

LOW SIDE SUPERELEVATION HIGH SIDE TRANSITION

PAVEMENT WARP FOR SHOULDERS IN SUPERELEVATION



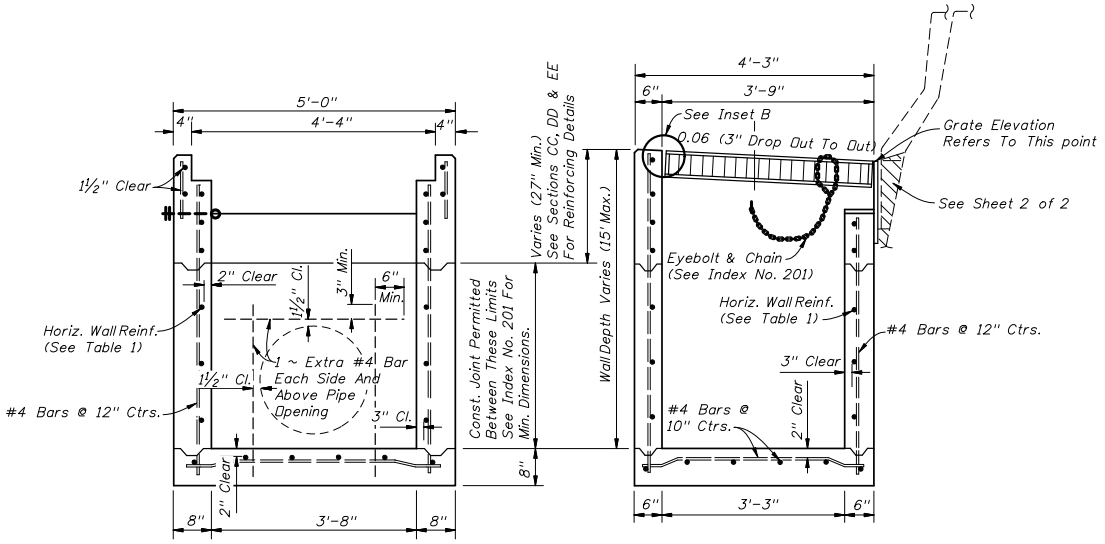

BARRIER WALL / RETAINING WALL SINGLE FACE ROADWAY BARRIER

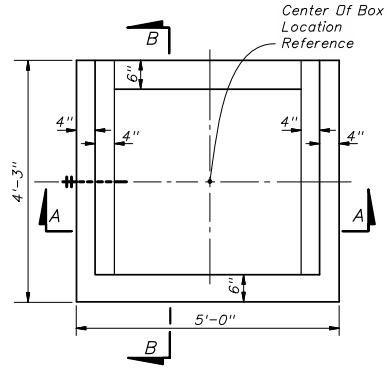
INLET SECTION AT WALLS




Note: Alt. B Structure Bottom Only. See Index No. 200.

INLET WITH STRUCTURE BOTTOM




TOP VIEW (WITHOUT GRATE)

GENERAL NOTES

1. This inlet is primarily intended for use adjacent to concrete barrier walls on paved shoulders. Use of the inlet adjacent to other wall types shall be approved by the Drainage Engineer. The inlet is suitable for bicycle and occasional pedestrian traffic, but should not be placed in a designated pedestrian travel way. It is not intended for use in curb and gutter or other areas where throated inlets are required, nor areas subject to high debris.
2. Inlets located in embankments constructed with earth anchored retaining wall shall be designed with minimum depths to reduce adverse impact on the anchorage system. Runs of pipe parallel to and near anchored wall shall be avoided wherever practical. Special coordination must be exercised during the design and construction of storm water systems within anchored wall systems.
3. Inlet bottoms and/or tops may be either precast or cast-in-place. Whether cast as a single unit or as multiple segments, and whether precast or cast-in-place, the upper 2'-3" of the inlet shall be reinforced in accordance with sections CC, DD and EE.
4. All exposed edges and corners shall be ¾" chamfer or tooled to ¼" radius.
5. When Alternate G grate is specified in the plans, the grate is to be hot-dip galvanized after fabrication. Field installation of the filler bar called for in Inset B will not be permitted, thereby requiring tolerance adjustment during fabrication and/or casting, or, matching grate to structure prior to galvanizing.
6. All reinforcing is Grade 60 bars. See Index No. 201 for equivalent area of welded wire fabric.
7. All dimensions are for both precast and cast-in-place inlets unless otherwise noted.
8. For supplemental details see Index Nos. 200 and 201.
9. Inlets to be paid for under the contract unit for Inlets (Barrier Wall), Each.

HORIZONTAL WALL REINFORCING SCHEDULE (TABLE 1)

| WALL DEPTH | SCHEDULE | AREA (in.²/ft.) | MAX. SPACING BARS | MAX. SPACING WWF |
|---|---|---|---|---|
| 0'-5' | A12 | 0.20 | 12" | 8" |
| 5'-10' | A6 | 0.20 | 6" | 5" |
| 10'-15' | A4 | 0.20 | 4" | 3" |
| 10'-15' | B5.5 | 0.24 | 5½" | 5" |

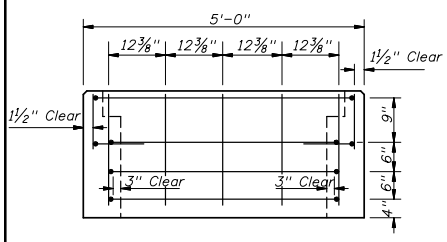
2008 FDOT Design Standards

BARRIER WALL INLET

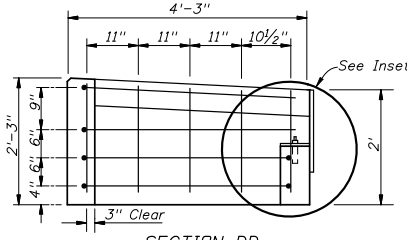
Last Revision 07/01/05

Sheet No. 1 of 2

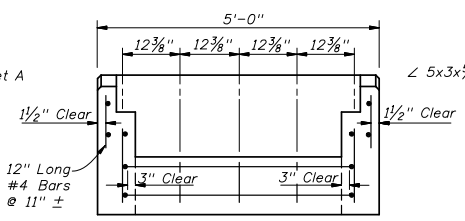
Index No. 218



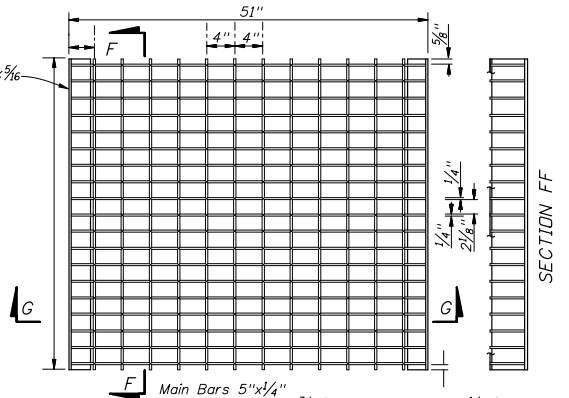

SECTION CC



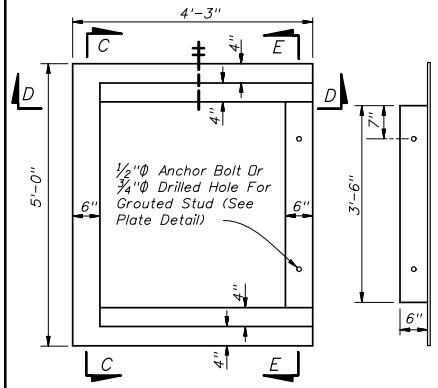

SECTION DD




SECTION EE

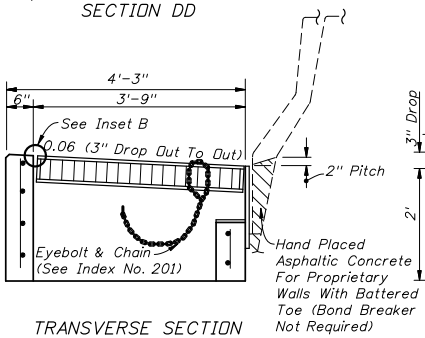



TOP VIEW

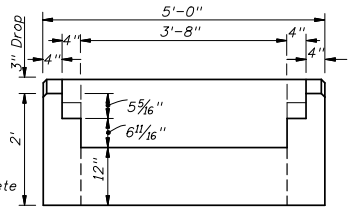



TOP VIEW OF INLET WITHOUT GRATE

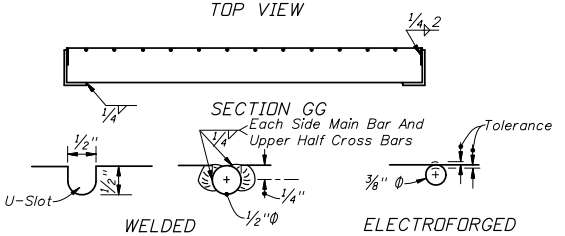
TOP VIEW OF METAL PLATE




TRANSVERSE SECTION WITH GRATE & PLATE

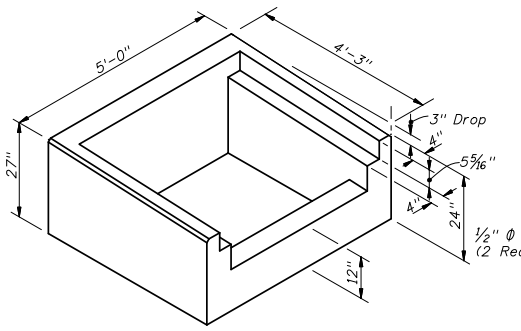



BACK VIEW WITHOUT BACK PLATE

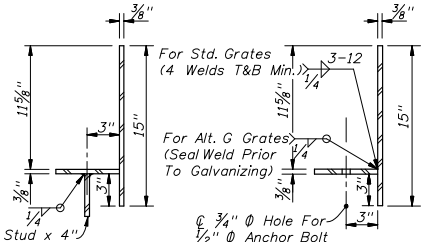



CROSS BAR OPTIONS

STEEL GRATE



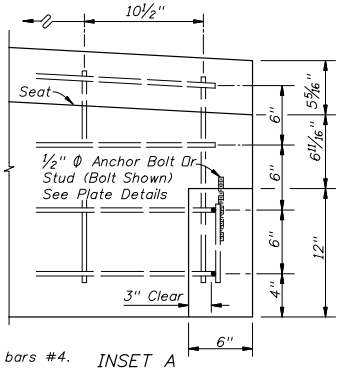

PICTORIAL VIEW OF INLET COLLAR




OPTION FOR GROUT STUD

OPTION FOR ANCHOR BOLT

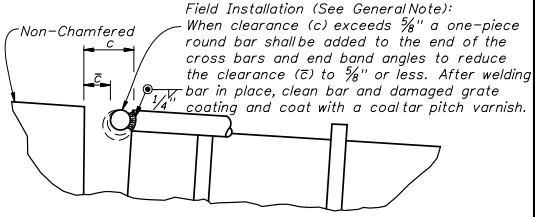
TRANSVERSE SECTIONS THRU BACKWALL PLATE




INSET A

NOTES:

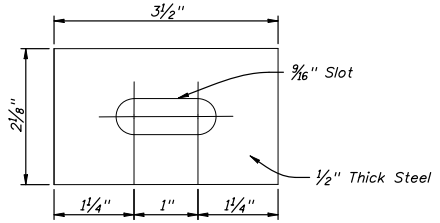
1. All bars #4.



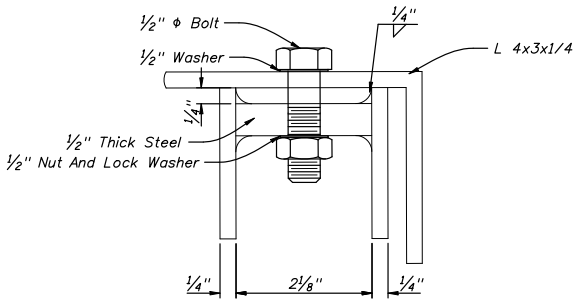

INSET B

2. Anchor bolts shall be either ASTM A307 hex head bolts cast-in-place, or ASTM A36 or F1554 (Grade 36) galvanized fully threaded rod, adhesive bonded anchors installed in accordance with Specification Section 416. Bolts or rods shall be 6" long (4" min. embedment) with one heavy hex head nut (ASTM 194 or A563) and one flat washer (ASTM F436) each. All anchor bolts, nuts and washers shall be hot-dip galvanized.

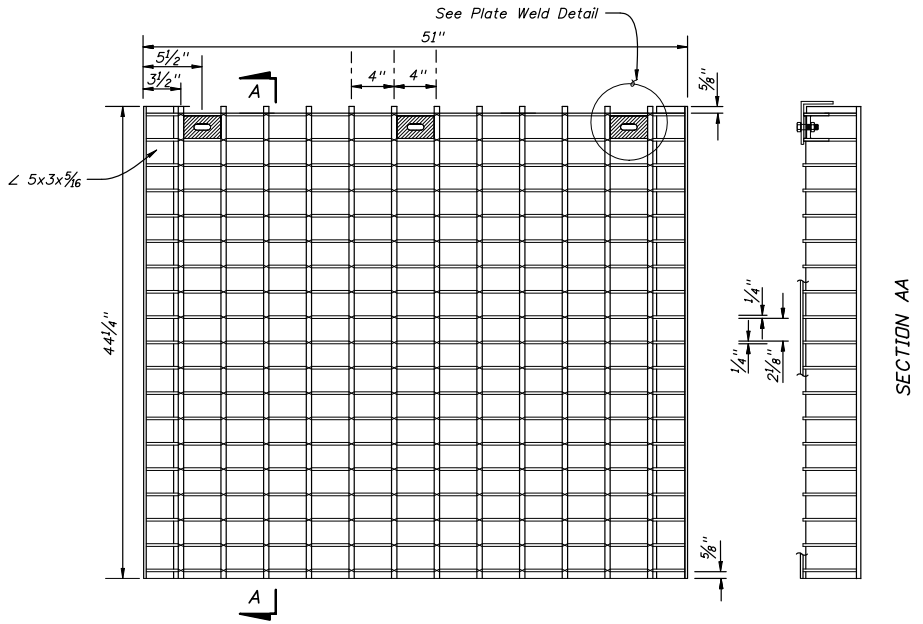
| 2008 FDOT Design Standards | Last Revision 07/01/07 | Sheet No. 2 of 2 |
|---|---|---|
| **BARRIER WALL INLET** | Index No. 218 | |



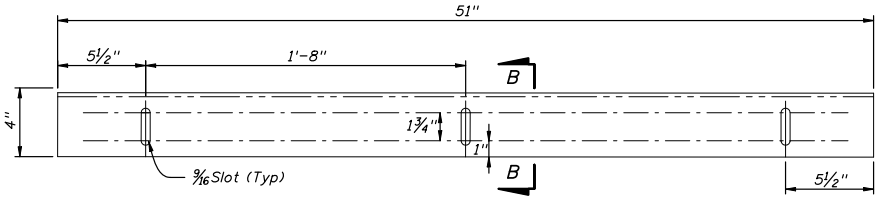

WELD PLATE
(3 pcs.)




SECTION BB




TOP VIEW




L 4x3x1/4

STEEL GRATE MODIFICATION

| | | | |
|---|---|---|---|
| | ##STANDARD YEAR## | #Label1# #Label2# 07/01/07 | Sheet No. ? of ? |
| | ??? | | Index No. ? |

# *Section 120.69, Florida Statutes*

Select Year: 2007 Go

# The 2007 Florida Statutes

| Title X | Chapter 120 | View Entire Chapter |
|---|---|---|
| PUBLIC OFFICERS, EMPLOYEES, AND RECORDS | ADMINISTRATIVE PROCEDURE ACT | |

**120.69 Enforcement of agency action.**--

(1) Except as otherwise provided by statute:

(a) Any agency may seek enforcement of an action by filing a petition for enforcement, as provided in this section, in the circuit court where the subject matter of the enforcement is located.

(b) A petition for enforcement of any agency action may be filed by any substantially interested person who is a resident of the state. However, no such action may be commenced:

1. Prior to 60 days after the petitioner has given notice of the violation of the agency action to the head of the agency concerned, the Attorney General, and any alleged violator of the agency action.

2. If an agency has filed, and is diligently prosecuting, a petition for enforcement.

(c) A petition for enforcement filed by a nongovernmental person shall be in the name of the State of Florida on the relation of the petitioner, and the doctrines of res judicata and collateral estoppel shall apply.

(d) In an action brought under paragraph (b), the agency whose action is sought to be enforced, if not a party, may intervene as a matter of right.

(2) A petition for enforcement may request declaratory relief; temporary or permanent equitable relief; any fine, forfeiture, penalty, or other remedy provided by statute; any combination of the foregoing; or, in the absence of any other specific statutory authority, a fine not to exceed $1,000.

(3) After the court has rendered judgment on a petition for enforcement, no other petition shall be filed or adjudicated against the same agency action, on the basis of the same transaction or occurrence, unless expressly authorized on remand. The doctrines of res judicata and collateral estoppel shall apply, and the court shall make such orders as are necessary to avoid multiplicity of actions.

(4) In all enforcement proceedings:

(a) If enforcement depends on any facts other than those appearing in the record, the court may

ascertain such facts under procedures set forth in s. 120.68(7)(a).

(b) If one or more petitions for enforcement and a petition for review involving the same agency action are pending at the same time, the court considering the review petition may order all such actions transferred to and consolidated in one court. Each party shall be under an affirmative duty to notify the court when it becomes aware of multiple proceedings.

(c) Should any party willfully fail to comply with an order of the court, the court shall punish that party in accordance with the law applicable to contempt committed by a person in the trial of any other action.

(5) In any enforcement proceeding the respondent may assert as a defense the invalidity of any relevant statute, the inapplicability of the administrative determination to respondent, compliance by the respondent, the inappropriateness of the remedy sought by the agency, or any combination of the foregoing. In addition, if the petition for enforcement is filed during the time within which the respondent could petition for judicial review of the agency action, the respondent may assert the invalidity of the agency action.

(6) Notwithstanding any other provision of this section, upon receipt of evidence that an alleged violation of an agency's action presents an imminent and substantial threat to the public health, safety, or welfare, the agency may bring suit for immediate temporary relief in an appropriate circuit court, and the granting of such temporary relief shall not have res judicata or collateral estoppel effect as to further relief sought under a petition for enforcement relating to the same violation.

(7) In any final order on a petition for enforcement the court may award to the prevailing party all or part of the costs of litigation and reasonable attorney's fees and expert witness fees, whenever the court determines that such an award is appropriate.

**History.**--s. 1, ch. 74-310; s. 766, ch. 95-147; s. 36, ch. 96-159.

# *Chapter Subcommittee Assignments*

Updated March 13, 2008

# CHAPTER SUBCOMMITTEES

| Chapter | | Chapter Author |
|---|---|---|
| 1. | Planning | Jim Harrison |
| 2. | Land Development | Jim Davis |
| 3. | Geometric Design | Chuck Meister |
| 4. | Roadside Design | Jim Harrison |
| 5. | Pavement Design and Construction | Dwayne Kile |
| 6. | Roadway Lighting | Bernie Masing |
| 7. | Rail-Highway Grade Crossings | Jimmy Pitman |
| 8. | Pedestrian Facilities | Joy Puerta |
| 9. | Bicycle Facilities | Joy Puerta |
| 10. | Maintenance | ~~David Ponitz~~ |
| 11. | Work Zone Safety | Allen Schrumpf |
| 12. | Construction | Tanzer Kalayci |
| 13. | Public Transit | Annette Brennan |
| 14. | Design Exceptions | Ramon Gavarrete |
| 15. | Traffic Calming | Fred Schneider |
| 16. | Residential Street Design | Jim Harrison |
| 17. | Bridges and Other Structures | Andre Pavlov |

# OTHER SUBCOMMITTEES

| | |
|---|---|
| Local Specifications Subcommittee | Tanzer Kalayci |
| Traditional Neighborhood Development | Billy Hattaway |
| Signing and Marking | Chester Henson |

Updated March 13, 2008

# Chapter 1 - Planning

| Name | Involvement | Email |
|---|---|---|
| Jim Harrison | Author | Jim.Harrison@ocfl.net |
| Rick Hall | Co-author | rickhall@hpe-inc.com |
| Melanie Weaver Carr | Member | melanie.carr@dot.state.fl.us |
| Joy Puerta | Member | jpuerta@ci.boca-raton.fl.us |

# Chapter 2 - Land Development

| Name | Involvement | Email |
|---|---|---|
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Updated March 13, 2008

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