

## Chapter 21

### Transportation Design for Livable Communities

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## Chapter 21

# Transportation Design for Livable Communities

Modification for Non-Conventional Projects:

Delete *PPM* Chapter 21 and see RFP for requirements.

### 21.1 General

It is the policy of the Department to consider Transportation Design for Livable Communities (TDLC) features on the State Highway System when such features are desired, appropriate and feasible. This involves providing a balance between mobility and livability. TDLC features should be based on consideration of the following principles:

1. Safety of pedestrians, bicyclists, motorists and public transit users.
2. Balancing community values and mobility needs.
3. Efficient use of energy resources.
4. Protection of the natural and manmade environment.
5. Coordinated land use and transportation planning.
6. Local and state economic development goals.
7. Complementing and enhancing existing Department standards, systems and processes.

## **21.2 Planning**

TDLC features are to be considered when they are desired, appropriate and feasible. Incorporating TDLC features are contingent upon involvement of the local stakeholders in the planning and project development processes. Therefore, it is essential that all stakeholders are included from the initial planning phase of the project through design, construction and maintenance.

During the initial planning and scoping phases it is important to identify and assess the desires and willingness of the community or stakeholder to accept all of the ramifications of TDLC, including funding allocations and maintenance agreements of the TDLC features included in a project.

## 21.3 Application

A team approach is recommended to evaluate TDLC projects or features. Depending on the complexity and/or potential for controversial proposed TDLC features and the district resources available, the team may include representation from Planning, Traffic Operations, Environmental Management, Roadway Design, Right of Way, Public Transportation, Maintenance, Safety, and the Pedestrian/Bicycle and Community Impact Assessment Coordinators. This team should also include the respective Metropolitan Planning Organization(s), local governments/agencies, transit agencies, citizen groups and any others affected by the proposed projects or features.

TDLC projects require documentation of the desired project features determined to be appropriate and feasible for implementation and the respective responsibilities of all involved stakeholders. Documentation may be stand-alone or placed in the design documentation.

TDLC features can be incorporated into new construction, reconstruction, and resurfacing, restoration and rehabilitation (RRR) projects using existing design standards and criteria found in **Chapters 2, 8** and **25** of this volume. When documentation identifies TDLC features for a project or segments of a project, the criteria provided in this chapter may be used with the approval of the District Design Engineer.

## 21.4 Techniques

Selected TDLC techniques applied by type of highway system are shown in **Exhibits 21-A, B, C and D** at the end of this chapter. These techniques are intended as guidance for balancing the need for mobility and the desire for livable communities, and not as standards, policies or procedures of the Department.

## 21.5 Design Criteria

The criteria in this chapter meets or exceeds **AASHTO** minimums. All TDLC projects are subject to the requirements for Design Exceptions and Design Variations found in **Chapter 23** of this volume.

### 21.5.1 Design Speed

Recommended design speeds are found in **Section 1.9** of this volume.

### 21.5.2 Number of Lanes

In developed urban areas, reducing the number of lanes may provide space for pedestrians, bicycles, parking, landscaping etc. This technique may be appropriate depending on volume and character of traffic, availability of right of way, function of the street, existing or planned level of pedestrian, bicycling and transit activity, intensity of adjacent land use, and availability of alternate routes.

The decision to reduce the number of lanes on a project shall be supported by an appropriate traffic capacity study. If transit vehicles and school busses are currently operating in the area of the project, appropriate local agencies should be consulted.

### 21.5.3 Lane Widths

Minimum lane widths for TDLC projects or segments are shown in **Table 21.1**.

**Table 21.1 Lane Widths**

Lane Types	Width (feet)
Through Lanes	11 <sup>1</sup>
Turn Lanes	11 <sup>1</sup>
Parking Lanes (parallel)	8 <sup>2</sup>
Bicycle Lanes	4 <sup>3</sup>

1. May be reduced to 10 feet in highly restricted areas with design speeds  $\leq$  35 mph. having little or no truck traffic.
2. May be reduced to 7 feet (measured from face of curb) in residential areas.
3. 5 feet adjacent to on-street parking.

## 21.5.4 Horizontal Alignment

A curvilinear alignment can be used to control vehicle speed by introducing a bend or curve on a tangent roadway. Design should meet criteria in **Chapter 2** of this volume.

## 21.5.5 Medians

Requirements for medians are provided in **Section 2.2** of this volume. Where continuous raised medians are not provided, such as on 5-lane sections, refuge areas should be provided at appropriate locations. These locations are typically near high pedestrian generators such as schools, park entrances, transit stops and parking lots. Refuge Islands must provide a large enough area for several pedestrians at once while at the same time be of sufficient size and spacing as to not create a hazard. For wheelchair accessibility, it is preferable to provide at-grade cuts rather than ramps.

For landscaping in medians see **Section 21.5.10**.

## 21.5.6 Horizontal Clearance

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 highways. Horizontal clearance requirements vary depending on design speed, whether rural or urban with curb, traffic volumes, lane type, and the object or feature.

Rural highways with flush shoulders and highways 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 21.6**. The procedure for determining required clear zone widths is further described in **Chapter 4** of this volume.

In urban areas, horizontal clearance based on clear zone requirements for rural highways should be provided wherever practical. However, urban areas are typically characterized with lower speed (Design Speed  $\leq 45$  mph) 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. Highways 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 highways, they are based on clearances for normal operation and not based on maintaining a clear roadside for errant vehicles. It should be noted that curb has no redirection 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 **Tables 21.2** through **Table 21.5** and objects that are not crashworthy are to be as close to the right of way line as practical and no closer than the requirements listed in **Tables 21.2** through **Table 21.5**.

**Table 21.2 Horizontal Clearance for Aboveground Fixed Utilities**

Aboveground fixed utilities are objects owned by a public or private utility agency that are more than four (4) inches above the grade and are not accepted by FDOT as crashworthy (such as strain poles, down guys, telephone load pedestals, temporary supports, etc.). Control Zones are not applicable to AFUs.	
<b>NEW ABOVEGROUND FIXED UTILITIES (AFUs)</b>  <b>Other than mid-span poles</b>	For urban roadways with curb or curb and gutter with design speeds less than or equal to 45 mph, new AFUs shall not be placed closer than 1.5 feet from the face of curb and as close to the R/W as practical.  For all other roadways the AFUs are to be outside the Clear Zones established using <b>Table 21.6 Recoverable Terrain</b> and as close to the R/W line as practical.
<b>NEW ABOVEGROUND FIXED UTILITIES (AFUs)</b>  <b>Mid-span poles</b>	Mid-span poles are new poles being installed as part of and within the alignment of an existing pole line. When the existing alignment crosses an intersecting roadway, the mid-span pole is to be placed as follows:  For intersecting roadways that are urban with curb or curb and gutter with design speeds less than or equal to 45 mph, mid-span poles shall not be placed closer than 4 feet from the face of curb.  For all other intersecting roadways, mid-span poles are to be outside the Clear Zones established for new poles appropriate for the intersecting roadway.
<b>EXISTING ABOVEGROUND FIXED UTILITIES (AFUs)</b>	For urban roadways with curb or curb and gutter with design speeds less than or equal to 45 mph, existing AFUs closer than 1.5 feet from the face of curb shall be relocated as close to the R/W line as practical.  For all other roadways, existing AFUs within the Clear Zones established using <b>Table 21.6 Recoverable Terrain</b> shall be relocated as close to the R/W line as practical.

**Table 21.3 Horizontal Clearance to Trees**

<p>Minimum horizontal clearance for new plantings where the diameter is or is expected to be greater than 4 inches (measured 6 inches above the ground) shall be located outside the clear zone except as follows:</p> <p>Urban Curb or Curb and Gutter (Design Speed <math>\leq</math> 45 mph):                  4 feet from face of outside curb and 6 feet from edge of inside traffic lane. In areas where the border width or median width are constrained and this criteria cannot be met, this horizontal clearance may be reduced to 1.5 feet from face of outside curb and 3 feet from edge of inside traffic lane.</p> <p>On existing roadways, the minimum horizontal clearance to existing trees where the diameter is or is expected to be greater than 4 inches (measured 6 inches above the ground) shall be located outside the clear zone except as follows:</p> <p>Urban Curb or Curb and Gutter (Design Speed <math>\leq</math> 45 mph):                  1.5 feet from the face of outside curb and 3 feet from the edge of the inside traffic lane.</p>
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**Table 21.4 Horizontal Clearance to Canal and Drop-off Hazards**

<p>See <b>Chapter 4</b> of this Volume for horizontal clearance criteria for canal and drop-off hazards.</p>
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**Table 21.5 Horizontal Clearance to Other Roadside Obstacles**

<p>Shall be located outside the clear zone except as follows:</p> <p>Urban Curb or Curb and Gutter (Design Speed <math>\leq</math> 45 mph):                  Shall be located no closer than 1.5 feet from face of curb.</p>
<p>Note: Horizontal clearance to mailboxes is specified in the construction details contained in the <b>Design Standards, Index 532</b>.</p>
<p>Note: Transit and school bus shelters shall be placed in accordance with <b>Rule Chapter 14-20.003, Florida Administrative Code</b>. Transit bus benches shall be placed in accordance with <b>Rule Chapter 14-20.0032, F.A.C.</b>.</p>

**Table 21.6 TDLC Recoverable Terrain**

Design Speed (mph)	(feet)
$\leq$ 30	12
35	14
40	16

## 21.5.7 Intersections

Intersection designs must adequately meet the needs of motorists, transit riders, bicyclists and pedestrians. Large return radii increases the crossing distance for pedestrians while small return radii decreases a vehicle's ability to negotiate the turn. Return radii must balance the needs of the pedestrian and the design vehicle. See **Figure 21.1**.

## 21.5.8 Lighting

Lighting requirements are discussed in **Chapters 2** and **7** of this volume.

## 21.5.9 Traffic Control

Where traffic volumes are high enough to require traffic signals, they should be placed to allow good progression of traffic from signal to signal. Optimal spacing of signals depends on vehicle operating speeds and signal cycle lengths. At speeds of 35 mph and standard cycle lengths, signals must be at least a fourth of a mile apart. Such spacing is consistent with FDOT's requirements for state highways, and with its recommended minimums for local arterials and collectors.

Where traffic volumes are not high enough to warrant traffic signals, 4-way stop signs and roundabouts should be considered. Four-way stops are considered to have a traffic calming effect and cause minimal delays under light traffic conditions. Roundabouts allow traffic from different directions to share space in the intersection, while signals require traffic to take turns.

Where traffic volumes are high enough to warrant traffic signals but does not require them, roundabouts should also be considered. If Roundabouts are being considered in a TDLC project, refer to **NCHRP Report 672, Roundabouts: An Informational Guide**, adopted by FHWA.

## 21.5.10 Landscaping

Landscaping on a TDLC project can be provided when a local agency or organization agrees to assume the maintenance of the landscaped area in accordance with all Department requirements. See **Chapter 9** of this volume and the **Florida Highway Landscape Guide** for landscape requirements.

Landscaping shall not interfere with the visibility of “permitted” outdoor advertising in accordance with **Rule 14-40** of the **Florida Administrative Code**. Landscaping shall provide required sight distances in accordance with the **Design Standards, Index 546**. Landscaping shall also comply with the horizontal clearance requirements found in **Section 21.5.6** of this chapter, and **Chapters 2, 4, and 25** of this volume.

Community Aesthetic Features placed in the right of way to represent the community are discussed in **Section 9.3** of this volume.

### **21.5.11 Parking**

When parking is incorporated on a TDLC project, several parking configurations may be considered (parallel, front-in angled and back-in angled). The design of parking facilities should be coordinated with local transit agencies and consistent with state and local laws (including **Section 316.195, Florida Statutes**). For parking lane widths see **Table 21.1**.

### **21.5.12 Alternative Roadway Paving Treatments**

Alternative paving treatments such as patterned pavement may be used to accent the roadway in accordance with the **Standard Specifications**. Architectural pavers, however, shall not be used on the traveled way of the State Highway System. See **Section 2.1.6.1** for additional requirements.

### **21.5.13 Conversion to/from One-Way Street Pairs**

Converting one-way pairs to two-way streets or two-way streets to one-way pairs may be appropriate on TDLC projects. These techniques require a great deal of consideration, planning and public involvement. Some considerations include: safety of pedestrians, bicyclists and motorists, traffic capacity, on-street parking, signal progression along the corridor and transit facilities.

## 21.6 Pedestrian and Bicycle Considerations

### 21.6.1 Sidewalks

For criteria refer to **Chapter 2, Section 2.1.4** and **Chapter 8** of this volume.

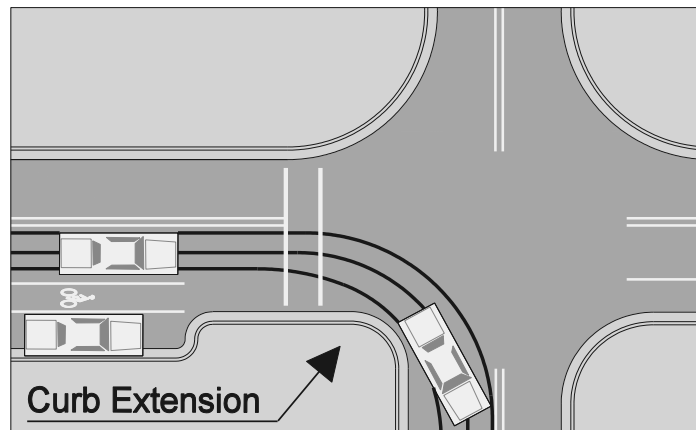
### 21.6.2 Crosswalks

Marked crosswalks should be provided at signalized intersections. Marked crosswalks should also be provided at mid-block crossing locations that are controlled by traffic signals and pedestrian signals, and school crossing locations that are controlled by guards during school crossing periods. The use of uncontrolled crosswalks should be carefully considered. Refer to **Section 8.3.3** for further guidance on designing crosswalks.

### 21.6.3 Curb Extensions (Bulb-Outs)

Curb extensions, sometimes called bulb-outs, may be used at intersections, or at mid-block locations where there is a crosswalk, provided there is adequate width for existing traffic movements. Curb extensions shorten the crossing distance, and provide additional space at intersections allowing pedestrians to see and be seen before entering a crosswalk. The design of curb extensions must take into consideration the needs of transit vehicles, drainage and bicyclists. See **Figure 21.1**.

**Figure 21.1 Curb Extension**



## 21.6.4 Personal Security and Safety Amenities

Personal security and safety is promoted by maximizing visibility in and along parking areas, building entrances, transit stops, sidewalks and roadways. This can be provided by the following techniques:

1. Providing lighting.
2. Lowering vegetation heights.
3. Removing hiding places.

Examples for designing safer communities can be found in The National Crime Prevention Council's publication: ***Crime Prevention Through Environmental Design***.

## 21.6.5 Bicycle Facilities

Refer to ***Chapter 8*** of this volume for design of bicycle facilities.

## 21.7 Transit-Systems and Amenities

Transit accommodations should be developed in cooperation with the local jurisdictions and transit agencies. Refer to ***Chapter 8*** of this volume and [\*\*\*Accessing Transit, Design Handbook for Florida Bus Passenger Facilities, Version 2, 2008\*\*\*](#) for additional information on the design of transit facilities.

### Exhibit 21-A Corridor Techniques

TECHNIQUE	FIHS/SIS		SHS URBAN	SHS RURAL	NON-SHS
	LIMITED ACCESS	CONTROLLED ACCESS			
Improved location, oversized or redundant directional signs	A	A	M	M	M
Use of route markings/ signing for historical and cultural resources	M	A	A	A	A
Increased use of variable message signing	A	A	M	M	M
Landscaping	M	M	M	M	M
Sidewalks or wider sidewalks	NA	M	A	M	M
Street furniture	NA	M	M	M	M
Bicycle lanes	NA	M	M	M	M
Shared Use Paths	NA	M	M	M	M
Conversion to/from one-way street pairs	NA	M	M	NA	M
Alternative paving materials	NA	NA	M	NA	M
Pedestrian signals, midblock crossings, median refuge areas	NA	M	A	M	M
Parking modifications or restoration	NA	NA	M	M	M
Safety and personal security amenities	M	M	M	M	M
Street mall	NA	NA	NA	NA	M

- A "Appropriate"--Techniques which should be included on all TDLC projects unless there are compelling reasons not to do so.
- M "May be Appropriate"--Techniques which should be employed, but must be evaluated relative to context of the particular project.
- NA "Not Appropriate"--Techniques which need not be considered for TDLC projects.

**Exhibit 21-B Techniques To Reduce Speed Or Traffic Volume**

TECHNIQUE	FIHS/SIS		SHS URBAN	SHS RURAL	NON-SHS
	LIMITED ACCESS	CONTROLLED ACCESS			
Lower speed limits	NA	NA	NA	NA	N
Increase use of stop or multi-way stop signs	NA	NA	NA	NA	N
Speed humps/tables	NA	NA	NA	NA	M
On-street parking to serve as buffer between travel lanes and pedestrian areas	NA	NA	M	M	M
Curb bulb-outs at ends of blocks	NA	NA	M	M	M
Traffic “chokers” oriented to slowing traffic	NA	NA	NA	NA	M
“Compact” intersections	NA	A	A	A	A
Traffic roundabouts to facilitate intersection movement	NA	M	M	M	M
Curvilinear alignment (with redesign, chicanes, winding paths, etc.)	NA	NA	M	NA	M
Street closing or route relocation	NA	NA	M	NA	M

- A “Appropriate” --Techniques which should be included on all TDLC projects unless there are compelling reasons not to do so.
- M “May be Appropriate”--Techniques which should be employed, but must be evaluated relative to context of the particular project.
- NA “Not Appropriate”--Techniques which need not be considered for TDLC projects.



### Exhibit 21-C Techniques to Encourage Multimodal Travel

TECHNIQUE	FIHS/SIS		SHS URBAN	SHS RURAL	NON-SHS
	LIMITED ACCESS	CONTROLLED ACCESS			
Sidewalks	NA	M	A	M	M
Pedestrian friendly intersection design	NA	M	A	M	M
Midblock pedestrian crossings	NA	M	M	M	M
Illuminated pedestrian crossings	NA	M	M	M	M
Bicycle lanes/paved shoulders	NA	M	A	A	M
Independent Shared Use Path	NA	M	M	M	M
Bicycle friendly design and parking	NA	M	A	A	A
Transit system amenities	NA	M	A	M	M
Transit user amenities	NA	M	A	M	M
Exclusive transit lanes	M	M	M	M	M
Linking modal facilities	A	A	A	A	A
Lower speed limits	NA	NA	NA	NA	NA
Removal of street parking	NA	NA	M	M	M

- A “Appropriate” --Techniques which should be included on all TDLC projects unless there are compelling reasons not to do so.
- M “May be Appropriate” --Techniques which should be employed, but must be evaluated relative to context of the particular project.
- NA “Not Appropriate” --Techniques which need not be considered for TDLC projects.

### Exhibit 21-D Network Techniques

TECHNIQUE	FIHS/SIS		SHS URBAN	SHS RURAL	NON- SHS
	LIMITED ACCESS	CONTROLLED ACCESS			
Design the street network with multiple connections and relatively direct routes	NA	NA	A	M	M
Space through-streets no more than a half mile apart.	NA	NA	A	M	M
Use traffic calming measures	NA	M	M	M	M
Limit local speed to 20 mph	NA	NA	NA	NA	M
Limit lanes	M	M	M	M	M
Align streets to give buildings energy-efficient orientations	NA	NA	M	NA	M
Avoid using traffic signals wherever possible. Space them for good traffic progression	NA	M	M	M	M
Incorporate pedestrian and bicyclist design features	NA	A	A	A	A
Incorporate transit-oriented design	M	A	A	A	A
Design attractive greenway corridors	A	A	A	A	A
Design attractive storm water facilities	A	A	A	A	A

- A “Appropriate”--Techniques which should be included on all TDLC projects unless there are compelling reasons not to do so.
- M “May be Appropriate”--Techniques which should be employed, but must be evaluated relative to context of the particular project.
- NA “Not Appropriate”--Techniques which need not be considered for TDLC projects.