

Memorandum

DATE: October 1, 2013

TO: City Council

THROUGH: City Manager Judie Zimomra

FROM: Public Works Director Keith Williams

RE: Adopt Resolution No. 13-081, A resolution establishing a crosswalk policy including procedures, standards and factors for consideration and establishment of marked crosswalks within the City of Sanibel

The current crosswalk resolutions for the City of Sanibel date back to 1996 and 1997. In February 2013, City Council authorized staff to work with Kittelson and Associates, a transportation planning and engineering consultant, to review the City's current policies and propose revisions and updated guidance for crosswalk treatments and installation criteria.

City of Sanibel staff worked with Kittelson and Associates to review the City's current crosswalk resolutions, evaluate state and federal laws and rules applicable to Sanibel's roadways and cooperatively constructed a guidance document for crosswalk treatments and installation criteria.

The crosswalk policy guidance document, exhibit A from resolution No.13-081, addresses a series of crosswalk oriented topics applicable to the operation of the City. The initial topic is oriented toward goals and objectives in relation to the establishment of future marked crosswalks. This section addresses each of the three types of marked crosswalks: controlled crosswalks at intersections, uncontrolled crosswalks at intersections, and mid-block crosswalks and offers criteria for utilization when considering the merits of a potential crosswalk. Included within the consideration criteria are connection to existing or proposed facilities, proximity/spacing between nearby crosswalks, adjacent land uses and subject road classification.

The following section of the guidance document, Appendix A, relates to minimum crosswalk standards, these include standards set forth by Florida Statutes, *The Florida Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways* (a.k.a. The Florida Green Book) and the Americans with Disabilities Act.

The final section, Appendix B, of the guidance document discusses crosswalk treatments, ranging from pavement markings and signage to additional supplemental treatments that can be considered on a case-by-case basis. Within this section, the document notes that the FHWA *Manual on Uniform Traffic Control Devices* (MUTCD) offers guidance to utilize yellow warning signage for advanced notice of an approaching crosswalk, while it has been Sanibel's practice to use black and white regulatory signage to indicate approaches to crosswalks. Additionally, the guidance document notes, in relation to pavement markings, that the Florida Green Book requires stop bars or yield lines adjacent to

all marked crosswalks. In practice, Sanibel has historically provided stop bars where appropriate, but yield lines have not been installed in such situations.

The guidance document also addresses further crosswalk treatments that are not typically components of a standard crossing, but could be considered for implementation in case specific situations. These treatments include raised crosswalks, median refuge islands, electronic crossing aids and crosswalk illumination. In regards to each of these crosswalk treatments, the guidance document provides insight into conditions in which each of these may be considered for maximum effectiveness. For the most part these crosswalk treatments are considered discretionary and are not mandated for inclusion by any applicable rule or law. The one exception, though, relates to illumination of a mid-block crosswalk. The Florida Green Book states that mid-block crosswalks should be illuminated. The Green Book does not address crosswalk illumination at controlled or uncontrolled intersections, and it also does not elaborate on any manner, means, standards or criteria by which a mid-block crosswalk should be illuminated, or to what degree. Historically, the City of Sanibel has opted to not provide dedicated roadway illumination; as a result, staff recommends consideration for crosswalk illumination should occur only after existing use and historical data reflects a direct need for such.

Staff recommends City Council adopt Resolution No. 13-081, a resolution establishing a crosswalk policy including procedures, standards and factors for consideration and establishment of marked crosswalks within the City of Sanibel.

cc: City Attorney Ken Cuyler
Finance Director Sylvia Edwards

CITY OF SANIBEL

RESOLUTION NO. 13-081

A RESOLUTION ESTABLISHING A CROSSWALK POLICY INCLUDING PROCEDURES, STANDARDS AND FACTORS FOR CONSIDERATION AND ESTABLISHMENT OF MARKED CROSSWALKS WITHIN THE CITY OF SANIBEL; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, the City of Sanibel may, from time to time, require the evaluation of marked crosswalks for roadways within the City; and

WHEREAS, it is necessary to take into account state and federal guidance for locating marked crosswalks within the City; and

WHEREAS, there are standards for establishment of marked crosswalks as developed by the profession of traffic engineering and traffic safety; and

WHEREAS, a crosswalk policy, including procedures, standards and factors for consideration as to whether to establish marked crosswalks are necessary due to the unique characteristics of the City of Sanibel and for the health, safety and welfare of the public;

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Sanibel, Florida:

SECTION 1. The Council hereby establishes the following crosswalk policy for the consideration and establishment of marked crosswalks within the City of Sanibel:

- a. The attached document entitled Crosswalk Policy, Pages 1-6, is hereby adopted as the City of Sanibel Crosswalk Policy. Appendix A (Pages 7-10) and Appendix B (Pages 11-17) of the attached document are explanatory and supplemental consultant-prepared support materials, but are not included within or made part of the City of Sanibel Crosswalk Policy.
- b. All requests for establishment of a marked crosswalk by any party other than the City of Sanibel shall be filed with the Sanibel City Manager. Requests may also be originated on behalf of the City of Sanibel by the City Council or City Manager for marked crosswalks to be established within the City.
- c. The City Manager, through the City Engineer, will evaluate the proposed crosswalk and make a recommendation to the City Council as to whether a marked crosswalk should be established at the location proposed.
- d. The City Council will make a determination as to whether a marked crosswalk should be established at the location proposed after receiving public input and taking into consideration the City Manager's recommendation.

SECTION 2. The Council hereby adopts the City of Sanibel Crosswalk Policy as the guidance document for the standards and factors to be applied in considering the establishment of a marked crosswalk.

SECTION 3. In applying the guidance set forth in the City of Sanibel Crosswalk Policy, the following factors, to the extent applicable, should be taken into account:

- a. Any standards or factors which may be adopted by federal or state governmental entities;
- b. Any standards or factors which may be adopted or accepted within the traffic engineering and traffic safety profession; and
- c. Any traffic flow or safety issues or other special features which may exist at, or relate to, the proposed crosswalk location, as identified by the City Engineer or Police Chief.

SECTION 4. The City Council hereby repeals Resolution 96-230 and Resolution 97-91.

SECTION 5. Effective Date

This resolution shall take effect immediately upon adoption.

DULY PASSED AND ENACTED by the Council of the City of Sanibel, Florida, this 1st day of October, 2013.

AUTHENTICATION:

Kevin Ruane, Mayor

Pamela Smith, City Clerk

APPROVED AS TO FORM:

Kenneth B. Cuyler
Kenneth B. Cuyler, City Attorney

9/26/13
Date

Vote of Council Members:

Ruane _____
Congress _____
Denham _____
Harrity _____
Jennings _____

Date filed with City Clerk: _____

CROSSWALK POLICY

INTRODUCTION

Sanibel Island is a sanctuary island community off of the west coast of Lee County, Florida. In addition to the City's residents and businesses, the Island's quality as a sanctuary and as a community attracts large numbers of tourists and visitors who walk and bike once they are situated on the Island. All streets and roadways on the Island are two-lane roads. Separate shared use paths are provided within the road rights-of-way for the City's arterial roads and for most of its collector roads. As a transportation policy, the City has determined to preserve the sanctuary island character and natural habitat qualities of the Island by not expanding the auto-roadway system or implementing traffic signal control on the Island. At the same time, the City desires to enhance pedestrian/bicycle safety and access for non-automobile modes of travel on the Island. The purpose of this document is to define a crosswalk policy based on recent updates to State standards and national guidance for determining the need and properly installing marked crosswalks. Crosswalks and intersections are defined by Florida Statutes (F.S) 316.003 in the following manner:

(6) *CROSSWALK.—*

(a) That part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway, measured from the curbs or, in the absence of curbs, from the edges of the traversable roadway.

(b) Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface.

(17) *INTERSECTION.—*

(a) The area embraced within the prolongation or connection of the lateral curblines; or, if none, then the lateral boundary lines of the roadways of two highways which join one another at, or approximately at, right angles; or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict.

(53) *STREET OR HIGHWAY.—*

(a) The entire width between the boundary lines of every way or place of whatever nature when any part thereof is open to the use of the public for purposes of vehicular traffic;

(b) The entire width between the boundary lines of any privately owned way or place used for vehicular travel by the owner and those having express or implied permission from the owner, but not by other persons, or any limited access road owned or controlled by a special district, whenever, by written agreement entered into under s. 316.006(2)(b) or (3)(b), a county or municipality exercises traffic control jurisdiction over said way or place

From the Florida Statute defining an intersection as the crossing of two highways and the definition of highway being either a publicly or privately owned way, it appears references to intersections in the Florida Statutes also implies driveway connections.

This memorandum includes background on the City's current policy, existing guidance on crossing treatments from state and national documentation, and suggestions to revise the City's policies for marked crosswalks at the following types of locations:

- Controlled crosswalks, where vehicular traffic is regulated by a traffic control device. As Sanibel does not have traffic signals on the Island, this refers to intersection approaches controlled by a stop sign.
- Uncontrolled crosswalks at intersections, where vehicular traffic does not stop as a matter of course.
- Midblock crosswalks, which are crossing locations not at an intersection and are typically uncontrolled but may be controlled.

STANDARDS, GOALS, AND OBJECTIVES

The following provides minimum standards and goals and objectives for marked crosswalk installations at controlled intersection approaches, uncontrolled intersection approaches, and mid-block locations on Sanibel Island. The minimum standards are based upon Florida Statute, the Florida Greenbook and Federal ADA requirements and must be adhered to if a crosswalk is provided (see Appendix A for minimum standards). The goals, objectives and additional guidance are provided based on standard practices and with consideration to Sanibel's unique context.

Goals and Objectives

The City establishes the following goals and objectives with regard to marked crosswalks. This section also provides guidance as to what circumstances warrant a marked crosswalk. Roadway volumes utilized in this guidance is Annual Average Daily Traffic (AADT). Pedestrian/bicycle thresholds discussed in this guidance are based on pedestrian/bicycle demand during the normal time periods in the City. Data collected during a given month of the year should be annualized using the values in **Table 1**, which were developed from 2011-2012 Sanibel Causeway toll data.

Table 1: Seasonal Factors for Sanibel

Month	Average Monthly Volume	Average Daily Traffic (ADT)	Adjustment Factor for Annualization
January	265,421	8,562	0.95
February	286,728	10,061	0.81
March	337,348	10,882	0.75
April	286,163	9,539	0.86
May	243,098	7,842	1.04
June	221,909	7,397	1.10
July	237,705	7,668	1.06
August	209,081	6,745	1.21
September	186,500	6,217	1.31
October	218,967	7,063	1.15
November	241,418	8,047	1.01
December	246,925	7,965	1.02

* Volumes based on Sanibel Causeway toll data from 2011 and 2012, when AADTs were 8,092 and 8,221, respectively.

* Multiply data collected in a given month by the monthly Adjustment Factor to estimate the annualized value.

Each location identified for a potential marked crosswalk installation should be considered by the City using this guidance; however, the City retains the final authority to approve or deny the installation of marked crosswalk at a given location within City rights-of-way.

Controlled crosswalks at intersections

An intersection approach controlled by a traffic control device (such as a stop sign) is referred to as a controlled intersection approach. It is recommended to provide a marked crosswalk at all stop-controlled intersection approaches on public roads meeting the following conditions:

- There are existing or planned walkway facilities (including the Island’s shared use paths) on both sides of the minor road
- Exceptions to installing crosswalks should occur if there is inadequate stopping sight distance

Marked crosswalks at controlled intersection approaches should be installed using Special Emphasis markings (Continental or Ladder) and should minimize crossing distances and maximize sight distances. A minimum separation distance of 4 feet should be provided between the roadway stop bar for the automobile and the nearest edge of the crosswalk. A marked crosswalk using standard or special emphasis markings may also be considered at major driveways serving more than 500 vehicles per day.

Uncontrolled crosswalks at intersections

An intersection approach which is not controlled by a traffic control device (such as a stop sign) and operates in free-flow is referred to as an uncontrolled intersection approach. The installation of a marked crosswalk across an uncontrolled intersection approach should be carefully considered. A marked crosswalk may be installed on at least one uncontrolled approach of an intersection providing for the following conditions:

- There are existing or planned walkway facilities (including the Island's shared use paths) on both sides of the main road
- There is not a controlled crosswalk on the main road within 300 feet of the proposed crosswalk
- There is or is projected to be sufficient pedestrian/bicycle demand. This can be determined either by the surrounding land uses or by the current demand, as follows:
 - The crossing is a direct route connecting land uses generating pedestrian/bicycle demand. These include concentrated areas of residential, commercial, office, civic facilities, schools, parks, institutional uses, recreational areas, as well as parking areas and trails connecting to land uses, or;
 - Current demand is 20 pedestrians/cyclists in an hour or 60 pedestrians/cyclists over four single hours (not necessarily consecutive)
- Exceptions to installing crosswalks should occur if there is inadequate sight distance

Marked crosswalks at uncontrolled intersection approaches should be installed using special emphasis markings (ladder is preferred) and should minimize crossing distances and maximize sight distances. Advance yield pavement markings and corresponding signage should be required for marked crosswalks at uncontrolled locations.

Other crosswalk treatments, as listed in the Crossing Treatment section (Appendix B), may be considered to enhance pedestrian safety and maximize driver compliance at uncontrolled intersection crossings. Active treatments such as Rectangular Rapid Flashing Beacons (RRFBs) may be considered to maximize driver compliance at uncontrolled locations meeting the following conditions:

- Periwinkle Way between Tarpon Bay Road and Causeway Road
 - Daily traffic volumes in excess of 12,000 AADT
 - Hourly pedestrian/bicycle demand in excess of 50 pedestrians/cyclists per hour for any 4 hours of the day
- Sanibel-Captiva Road between Blind Pass Bridge and Tarpon Bay Road
 - Daily traffic volumes in excess of 6,700 AADT
 - Hourly pedestrian/bicycle demand in excess of 20 pedestrians/cyclists per hour for any 4 hours of the day
 - Observed 85th percentile speeds greater than 35 mph

As the proliferation of RRFB installations may decrease its effectiveness, the RRFB should be treated as a special crosswalk enhancement and not as a standard installation. Specific locations on

Periwinkle Way and Sanibel-Captiva Road should be considered on an individual basis, and an RRFB should not be installed at an intersection that is operated with the aide of police control.

Midblock crossings

Generally, motorists do not expect or anticipate marked crosswalks between intersections. Therefore, in the interest of public safety, the decision to install a midblock crossing should be carefully considered. Marked crosswalk installations may be considered at mid-block locations meeting the following criteria:

- There is or is projected to be sufficient pedestrian/bicycle demand. This can be determined either by the surrounding land uses, trail or shared use path volumes, or current demand.
 - The crossing is a trail/shared use path connection, or;
 - The crossing is in a school zone providing a direct connection to land uses, or;
 - The crossing is a direct route connecting land uses generating pedestrian/bicycle demand. These include concentrated areas of residential, commercial, office, civic facilities, schools, parks, institutional uses, recreational areas, as well as parking areas and trails connecting to land uses, or;
 - Minimum demand (existing or potential) of 20 pedestrians/cyclists in an hour or 60 pedestrians/cyclists over four single hours (not necessarily consecutive)
- The roadway is a two-lane arterial road as identified by the Sanibel Plan's Existing and Future Circulation Map
- The minimum distance between the midblock crosswalk and an adjacent marked crosswalk is 500 feet
- The crossing distance is 60 feet or less, or else a median crossing refuge island is provided
- Sight distance for pedestrians/cyclists and motorists are adequate

Marked crosswalks at mid-block locations should be installed using special emphasis markings (ladder is preferred) and should minimize crossing distances and maximize sight distances. Advance yield pavement markings and corresponding signage should be required at mid-block crossings. Illumination of a mid-block crosswalk should be considered only after a determination is made based on existing and historical crosswalk use as well as record of need for lighting. Favorable options include a pedestrian-activated (ADA compliant) illumination design providing adequate illumination to the crosswalk while minimizing the crosswalk's lighting impacts on the surrounding environ. Additional guidance on the recommended illumination level is provided in Table 7.3.1 of the FDOT PPM.

Other crosswalk treatments, as listed in the Crossing Treatment section (Appendix B), may be considered to enhance pedestrian safety and maximize driver compliance at mid-block crossings. Active treatments such as RRFBs may be considered to maximize driver compliance at midblock crossing locations meeting the following conditions:

- Periwinkle Way between Tarpon Bay Road and Causeway Road

- Daily traffic volumes in excess of 12,000 AADT
- Hourly pedestrian/bicycle demand in excess of 50 pedestrians/cyclists per hour for any 4 hours of the day
- Sanibel-Captiva Road between Blind Pass Bridge and Tarpon Bay Road
 - Daily traffic volumes in excess of 6,700 AADT
 - Hourly pedestrian/bicycle demand in excess of 20 pedestrians/cyclists per hour for any 4 hours of the day
 - Observed 85th percentile speeds greater than 35 mph

As the proliferation of RRFB installations may decrease its effectiveness, the RRFB should be treated as a special crosswalk enhancement and not as a standard installation. Specific locations on Periwinkle Way and Sanibel-Captiva Road should be considered only on an individual basis.

Minimum Standards

Where a crosswalk is provided, the crosswalk should be designed based on the following requirements per the Florida Greenbook:

- Crosswalks should be placed at locations with ample sight distances
- At crossings, the roadway should be free from changes in alignment or cross section
- The entire length of the crosswalk shall be visible to drivers at a sufficient distance to allow a stopping maneuver
- Stop bars or yield markings, in conjunction with the appropriate signing, shall be provided at all marked crosswalks
- All crosswalks shall be easily identified and clearly delineated using signage and/or other traffic control devices, in accordance with the *Manual on Uniform Traffic Control Devices* (MUTCD) (Rule 14-15.010).

A marked crosswalk shall not be provided at any location (intersection or mid-block) where roadway alignments or other obstructions exist such that the sight distance is limited between a motorist and a pedestrian/cyclist at that location.

New installations of marked crosswalks shall be accompanied with curb ramps connecting the roadway to the pedestrian/cyclist facility (or shared-use path) in compliance with ADA ramp grades, cross-slopes and detectable warning treatments. Additional minimum standard guidance can be found in Appendix A.

APPENDIX A: MINIMUM CROSSWALK STANDARDS

Minimum crosswalk standards applicable to the City of Sanibel are established in three documents. These are explained below and contain the following:

- Florida Statutes
- *Florida Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways* (known as the Florida Greenbook)
- Americans with Disability Act (ADA) guidelines

Florida Statutes

The legal framework by which pedestrians/cyclists and motorists interact within one another at crosswalks is established in F.S. 316. Motorists are to stop for pedestrians within a crosswalk at an intersection that has a traffic control signal or at any crosswalk where signage so indicates [316.130(7)(a),(b)]. Elsewhere, motorists shall yield the right-of-way to pedestrians in crosswalks [316.130(7)(c)]. Pedestrians crossing a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield right-of-way to all vehicles upon the roadway [316.130(10)].

On sidewalks and within crosswalks, state law grants cyclists the same rights and duties of pedestrians. A person propelling a vehicle by human power upon and along a sidewalk, or across a roadway upon and along a crosswalk, has all the rights and duties applicable to a pedestrian under the same circumstances [316.2065(9)]. Similarly, the rights and duties of pedestrians apply to a person upon roller skates, or those riding by means of any coaster, toy vehicle or similar device [316.2065(11)].

Florida Greenbook

The *Florida Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways* (also known as the Florida Greenbook) is applicable to all streets and highways in the State of Florida (including locally owned and maintained roadways) and provides guidance on crosswalks in Chapter 8, Section F. According to the Florida Greenbook, crosswalks should be designed based on the following requirements:

- Crosswalks should be placed at locations with ample sight distances
- At crossings, the roadway should be free from changes in alignment or cross section
- The entire length of the crosswalk shall be visible to drivers at a sufficient distance to allow a stopping maneuver
- Stop bars or yield markings, in conjunction with the appropriate signing, shall be provided at all marked crosswalks
- All crosswalks shall be easily identified and clearly delineated, in accordance with the *Manual on Uniform Traffic Control Devices (MUTCD)* (Rule 14-15.010)

According to the Florida Greenbook, marked crosswalks shall not be installed in an uncontrolled environment (without signals, stop signs, or yield signs) in either of the following conditions:

- If the posted speeds are greater than 40 mph, or
- On multilane roads where traffic volumes exceed 12,000 vpd (without raised median) or 15,000 vpd (with raised median)

There are no multilane roads or roads with posted speeds greater than 40 mph in the City.

For marked crosswalks at midblock locations (between intersections), the Florida Greenbook states midblock crossings help meet crossing needs within an area and may be used where intersections are spaced relatively far apart or substantial pedestrian generators are located between intersections. Midblock crossings are located according to a number of factors, including:

- pedestrian volume,
- traffic volume,
- roadway width,
- traffic speed and type,
- desired paths for pedestrians,
- land use, and
- to accommodate transit connectivity

Since midblock crossings are not generally expected by motorists, the Greenbook states that they should be well signed and marked.

- Midblock crossings should not be installed where sight distance or sight lines are limited for either motorist or pedestrian
- Midblock crossings should be illuminated, marked and outfitted with advanced warning signs or warning flasher in accordance with the MUTCD (It should be noted that illumination of a crosswalk, in reference to the Florida Green Book, falls under roadway illumination in which there are no specific illumination levels or criteria, only the guidance that the City should consider roadway illumination consistent with need and resources).

No specifics on the above factors (such as minimum pedestrian volume) are provided in the Florida Greenbook; however, additional guidance is provided in the Florida Department of Transportation's (FDOT) *Plans Preparation Manual (PPM)* and FDOT's *Traffic Engineering Manual (TEM)*.

ADA Guidance

The Federal Rehabilitation Act of 1973 (Section 504) and Title II of the Americans with Disability Act of 1990 (ADA) require State and local governments to provide pedestrian access for persons with disabilities within public rights-of-way and facilities. These statutes require local governments and agencies to provide pedestrian access for persons with disabilities to the public streets and sidewalks,

whenever a pedestrian facility exists. Regulations implement this requirement by imposing standards for accessible features (such as curb cuts, ramps, continuous sidewalks, and detectable warnings) on all new construction and alterations of existing facilities (maintenance of existing facilities not included).

In 1993, the US Department of Justice made a ruling regarding ADA modification requirements on roadway resurfacing projects (*Kinney v. Yerusalim*). The issue was whether milling and resurfacing the roadway can be considered maintenance or an alteration. The court ruled that roadway was being rehabilitated not maintained. Therefore, some ADA enhancements are required. FDOT has worked with FHWA to determine minimum requirements to meet ADA standards include installing handicapped ramps and the ramps must have detectable warning devices where sidewalks are present. If there are no sidewalks, then there is no requirement to add them or the ramps.

New crosswalks and/or alterations to existing crosswalks require accessibility for persons with disabilities in the form of curb ramps, connecting the pedestrian facility to the street, and detectable warning strips. If push buttons are to be utilized for active pedestrian treatments, the push buttons must be accessible to persons with disabilities. ADA standards include maximum ramp and cross-slope grades and detectable warning specifications. According to the MUTCD, detectable warning surfaces contrast visually with adjacent walking surfaces, either light-on-dark or dark-on-light. Specifications for design and placement of detectable warning surfaces are contained in the *Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities* (ADAAG), Section 1A.11.

ADDITIONAL GUIDANCE

The FDOT PPM has a chapter on Pedestrian, Bicycle, and Public Transit Facilities, including crosswalk guidance at intersections and mid-block locations. It advises providing marked crosswalks across all side streets (i.e. controlled approaches) at intersections. The PPM does not provide particular guidance for the uncontrolled approaches (i.e. major road approaches), but does refer the reader to FDOT's TEM. Additional treatments suggested by the TEM include beacons, curb extensions, median refuges, raised traffic islands, and overhead lighting.

For the installation of new mid-block crossings, FDOT's PPM and TEM have the following guidance conditions:

- Land uses generating significant pedestrian activity (high densities of residential, commercial, office, or recreational land uses)
- Minimum demand (existing or potential)
 - 20 pedestrians in an hour, or
 - 60 pedestrians over four single hours (does not need to be consecutive),
 - school zones are not subject to the minimum demand criteria
- A minimum vehicular volume of 2,000 Average Daily Traffic (ADT) along the roadway segment

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- Spacing between adjacent intersections is more than 660 feet
 - The distance between the midblock crosswalk and adjacent crossing location is more than 300 feet
 - The crossing distance is 60 feet or less, or else a median crossing refuge is provided
 - Sight distances for pedestrians and motorists are adequate
 - Americans with Disabilities Act (ADA) requirements must be met
 - Adequate illumination of the crosswalk is provided

Additional guidance on the design of pedestrian ramps to meet ADA requirements is provided in the FDOT Design Standards, Index No. 304.

APPENDIX B: CROSSING TREATMENTS AND THEIR RELATION TO SANIBEL

This section discusses treatments aiding pedestrian/bicycle crossings and their potential application in Sanibel's unique context. Much of the guidance here and in the policy section is based on the following sources.

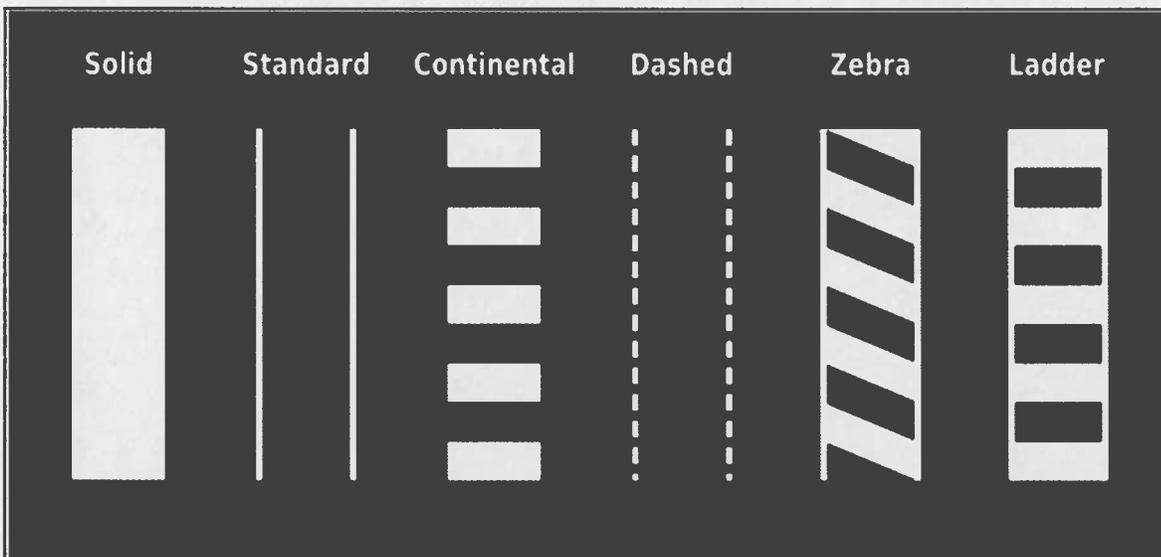
- FDOT publications discussed above
- Manual on Uniform Traffic Control Devices (MUTCD), Edition 2009
- NCHRP 562: *Improving Pedestrian Safety at Unsignalized Crossings*, 2006
- FHWA's *Safety Effects of Marked Versus Unmarked Crosswalks at Uncontrolled Locations*, 2005
- Uncontrolled Crossings Toolkit for Santa Rosa, CA, Kittelson & Associates, 2013
- City of Sacramento's Pedestrian Safety Guidelines, 2003
- Los Angeles County Model Design Manual for Living Streets, 2011

Marked crosswalks

Marked crosswalks are pavement markings delineating the area for pedestrians/cyclists to cross. **Figure 1** shows the different types of crosswalk markings. The State of Florida typically uses Standard, Continental or Ladder, and the latter two are referred to as Special Emphasis markings for higher visibility. FDOT is currently evaluating continued use of the Continental marking and likely will soon only use the Standard and Ladder markings.

Historically, the City has used both Standard and Continental markings for crosswalks.

Figure 1: Crosswalk Markings



Standard Crosswalk Marking Patterns

Image source: FHWA, Planning and Designing for Pedestrian Safety Course, 2008

Pavement legends

Pavement legends are painted or thermoplastic wording installed on the roadway. Examples include “Ped Xing” and “School Xing” legends. They can be installed whenever there are sight distance issues with a pedestrian crossing, but removing or relocating the crossing is not feasible.

The City’s practice has been to use the “Ped Xing” pavement legend on the roadway at uncontrolled/mid-block crossings and to use a “Stop” pavement legend on the shared use path at major crossings.

Signs

Signs are installed on the side of the roadway to warn motorists of the presence of pedestrians and/or bicyclists. These signs include W11-2 (Pedestrian Crossing) and W11-15 (Trail Crossing), as shown in Figure 2: W11-2 and W11-15 Warning Signs. They may be placed wherever a marked crosswalk is installed at an uncontrolled crossing. The MUTCD provides the option of using a W11-2 (or W11-15) sign in advance of the crosswalk with the supplemental “AHEAD” or “XX FEET” plaque.

Figure 2: W11-2 and W11-15 Warning Signs



*A fluorescent yellow-green background color may be used for this sign or plaque

Source: MUTCD, 2009 Edition, Figure 5C-2

It has been the practice of the City to use a series of three signs on approach to mid-block crosswalks, each with the following message/notification:

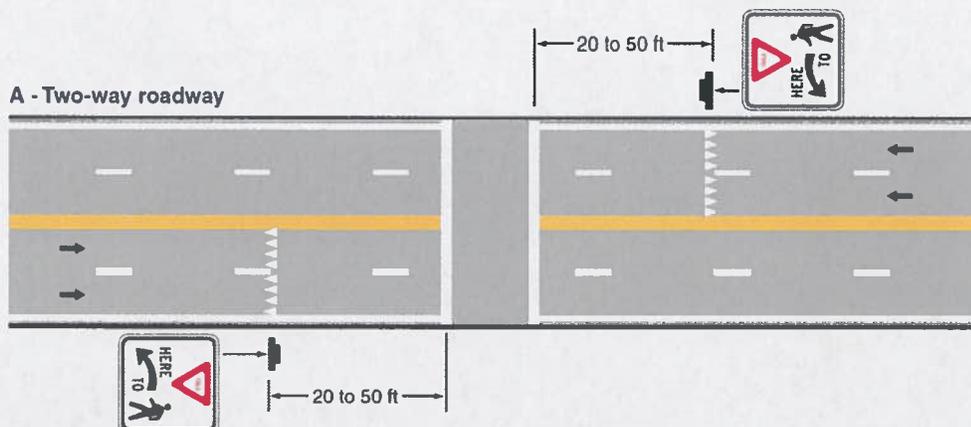
- 1. The first sign, located 250 feet ahead of the crosswalk, notifies drivers to yield to pedestrians/cyclists in the crosswalk. This is a black-on-white sign, meaning it is a regulatory sign (not a warning sign).*
- 2. The second is a black-on-white regulatory sign and notifies drivers of Florida law to yield to pedestrians/cyclists, along with an associated fine.*
- 3. The third sign, located at the crosswalk, is the standard yellow pedestrian crosswalk caution sign (W11-2) with an arrow pointing diagonally downward to the crosswalk marking.*

The City's practice does not correspond directly with the MUTCD guidance, which is to provide a crosswalk caution sign (W11-2 or W11-15) in advance of the marked crosswalk, in addition to the crosswalk caution sign at the marked crosswalk. The City's advance sign is a regulatory sign and not a caution sign.

Stop bars and advanced yield lines

Stop bars are used at controlled intersection approaches to indicate the place where motorists should stop in advance of the crosswalk. Advanced yield lines consist of a set of isosceles triangles and are typically installed at uncontrolled locations, including mid-block crosswalks. According to the Greenbook, stop bars or yield lines are required in conjunction with appropriate signage at all marked crosswalks. Figure 3 shows the standard installation of yield lines and corresponding yield signage (R1-5) in advance of a marked crosswalk. In addition to the R1-5 sign at the yield markings, W11-2 or W11-15 signs should be used in advance of and at the marked crosswalk.

Figure 3: Advance yield lines and signage



Note: If Stop Here for Pedestrians signs are used instead of Yield Here to Pedestrians signs, stop lines shall be used instead of yield lines

Source: MUTCD 2009 Edition, Figure 3B-17

The City uses stop bars in front of crosswalks on stop-controlled approaches but does not use yield lines at crosswalks in uncontrolled locations. It is recommended the City use the following signage for marked crosswalks at uncontrolled locations.

- 1. A post-mounted W11-15 warning sign located 250 feet in advance of the marked crosswalk, supplemented with a plaque with the legend "250 FEET", to inform road users they are approaching a point where crossing activity might occur.*
- 2. A post-mounted R1-5 regulatory sign located adjacent to the yield line, which should be provided 20 to 50 feet in advance of the marked crosswalk.*
- 3. A post-mounted W11-15 warning sign located adjacent to the marked crosswalk, with a diagonal downward pointing arrow (W16-7P) plaque mounted below the sign.*

Raised crosswalk

Raised crosswalks serve to improve visibility between motorists and pedestrians while also acting as traffic calming. They may be installed at midblock crossings on two-lane roads where pedestrian crossing volumes are or will be 50 or more pedestrians per hour and speed control is needed. Raised crosswalks should have a minimum width of 10 feet and may be considered where vehicle speeds are maintained at or below 25 mph. Traffic calming features that may be used in the vicinity of a raised crosswalk should be applied at the crosswalk, so that the motorists' gaze is directed at the crosswalk and not elsewhere. Pavement markings and advanced warning signage should accompany raised crosswalk, and guidance is provided in Figures 3B-30 and 3B-31 of the MUTCD.

Potential applications of raised crosswalks in Sanibel include locations with high pedestrian/bicycle crossing volumes (50 pedestrians/cyclists per hour or more) and low vehicular speeds (25 mph or less).

Median refuge islands

Median refuge islands are used to break up the crossing into two sections for pedestrians and provide a place for pedestrians to safely wait in the median, as shown in Figure 4. They are suggested at locations where vehicle platooning or multi-lane facilities cause excessive pedestrian delay or create a daunting crossing environment. In particular, they can be placed at locations where crossing volumes are or will be 20 or more pedestrians per hour and vehicle AADTs are 12,000 or more.

Figure 4: Median pedestrian refuge



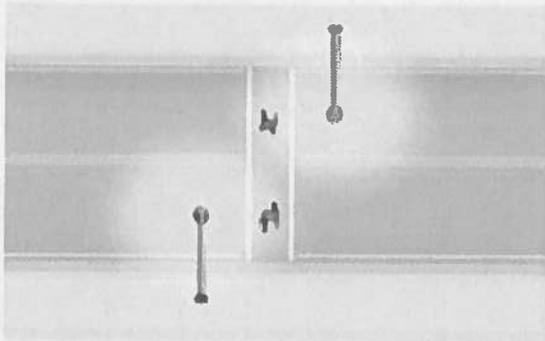
Source: FHWA, safety.fhwa.dot.gov

Applications on Sanibel should be considered at crossing locations experiencing a combination of high traffic volumes (12,000 AADT or more) and high crossing volumes (50 pedestrians/cyclists per hour for any four hours of the day) and have more than one lane in each direction (i.e. a through lane and a turn lane). These conditions are likely limited to certain locations on Periwinkle Way and Causeway Road. Additional considerations should include available right-of-way, roadway geometry, and the ability to provide a minimum recommended island width of 8 feet to adequately store small groups of cyclists.

Illumination

Lighting at crosswalks within the City of Sanibel should be carefully evaluated. Because the City does not illuminate roadways, consideration for illumination of a crosswalk should occur only if existing use and historical data reflects a clear need for such action. If, through evaluation, it is determined that a crosswalk should be illuminated, then options exist in which the illumination may be carried out. In isolated instances, unrelated outdoor lighting may already properly illuminate the crosswalk. If not, pedestrian-scaled lighting may merit consideration for installation, as indicated in **Figure 5**. The Florida Green Book states that mid-block crosswalks should be illuminated. The Green Book, however, does not address illumination at other crosswalk locations, nor does it provide guidance for means, methods or criteria for crosswalk illumination. The Green Book additionally states that roadway (which includes crosswalks) illumination should be considered on a basis consistent with need and resources.

Figure 5: Crosswalk illumination



Source: Los Angeles County Model Design Manual for Living Streets

In Sanibel, illumination design at crosswalks, if deemed necessary, should provide visibility of pedestrians/cyclists at the crosswalk while conforming to Sanibel's Dark Skies ordinance (Sanibel Code Sections 126-996, 126-997). The purpose of the Dark Skies ordinance is:

"to set outdoor lighting standards that will minimize glare, light trespass, and sky glow; conserve energy while maintaining nighttime safety, security, and productivity; protect the privacy of residents; minimize disturbance of wildlife; enhance the ambiance of the community; and ensure optimal viewing of spectacular night skies above Sanibel."

Exemptions to the Dark Skies ordinance include:

"lighting for public streets, roads, and rights-of-way, except that such lighting shall be reviewed in accordance with section 78-7, applying the policies set forth in Ordinance No. 00-10, as well as general policy 9 in the Plan for Scenic Preservation of the Sanibel Plan: 'In order to maintain the dark sky of this nonurban community, minimize outdoor lighting.'"

Some crosswalk illumination schemes are available where the pedestrian lighting is activated for a short period by a pedestrian push button or by automated (passive) detection. Automated

detection options include bicycle loop detectors or automated pedestrian detection (APD) technologies such as infrared, microwave, video, and others. The lighting technology in this scheme should be capable of immediate illumination (no warm-up period), such as LED. This type of pedestrian-activated treatment, along with properly-oriented light fixtures, could provide illumination to the crosswalk as needed while minimizing the outdoor lighting impacts of the crosswalk. If utilized at a location, impacts to driver expectancy should also be considered during design. Other options include adaptive street lighting at the crosswalk, which allows adjustable lighting levels based on desired performance corresponding with known or projected demand.

Electronic crossing aids

Electronic crossing aids consist of Rectangular Rapid Flashing Beacons (RRFB), in-crosswalk flashers, and actuated flashing beacons. Examples of these treatments are shown in **Figure 6: Electronic Crossing Aids**.

Figure 6: Electronic Crossing Aids



RRFB, Source: MUTCD, 2009 Edition



In-Crosswalk Flashers, Source: Thomas Burnham, Spot Devices, Inc



Actuated Overhead Beacon in Santa Rosa, CA, Source: Quality Counts

These enhancements provide greater visibility of pedestrians at crossings under both daytime and nighttime conditions and have been shown to increase driver compliance at uncontrolled crosswalk locations. RRFBs in particular have been shown to increase driver compliance upwards of 75 to nearly 100 percent at a relatively low cost. Based on state and national guidance, RRFBs may be installed at uncontrolled locations under the following conditions:

- Posted vehicle speed limit is 40 mph or less;
- Crossing volumes are or will be 20 pedestrians per hour or greater; and
- Pedestrian delay is high or there is a history of pedestrian-involved crashes.

In-crosswalk flashers or actuated flashing beacons can be installed using the same conditions as above but where there is little to no history of pedestrian-involved crashes. FHWA noted the following in the Interim Approval for Optional Use of RRFBs:

The FHWA believes that the RRFB has a low risk of safety or operational concerns. However, because proliferation of RRFBs in the roadway environment to the point that they become ubiquitous could decrease their effectiveness, use of RRFBs should be limited to locations with the most critical safety concerns, such as pedestrian and school crosswalks across uncontrolled approaches, as tested in the experimentation.

All roads on Sanibel Island have a posted speed less than 40 mph. Given Sanibel's unique context, staff recommends uncontrolled crosswalk locations (including mid-block) within the following areas and meeting the following thresholds qualify for consideration for RRFB implementation on an individual basis:

- ***Periwinkle Way between Tarpon Bay Road and Causeway Road***
 - *Daily traffic volumes in excess of 12,000 AADT*
 - *Hourly pedestrian/bicycle demand in excess of 50 pedestrians/cyclists per hour for any 4 hours of the day*
- ***Sanibel-Captiva Road between Blind Pass Bridge and Tarpon Bay Road***
 - *Daily traffic volumes in excess of 6,700 AADT*
 - *Hourly pedestrian/bicycle demand in excess of 20 pedestrians/cyclists per hour for any 4 hours of the day*
 - *Observed 85th percentile speeds greater than 35 mph*

Staff concurs with FHWA's expressed concern that the proliferation of RRFB installations may decrease its effectiveness, and therefore we recommend that RRFBs be treated as a special crosswalk enhancement and not as a standard installation. Specific locations on Periwinkle Way and Sanibel-Captiva Road should be considered on an individual basis. An RRFB should not be installed at an intersection that is operated with the aide of police control.