Corridor Safety Analysis Projects

SPACE COAST
TRANSPORTATION PLANNING
ORGANIZATION

SPACE COAST TPO

TAC/CAC/TPO Meetings | April, 2016

Agenda

Overview of Projects

Crash Data Collection

Study Corridors

Analysis, Findings, and Suggestions

Next Steps

OVERVIEW OF PROJECTS

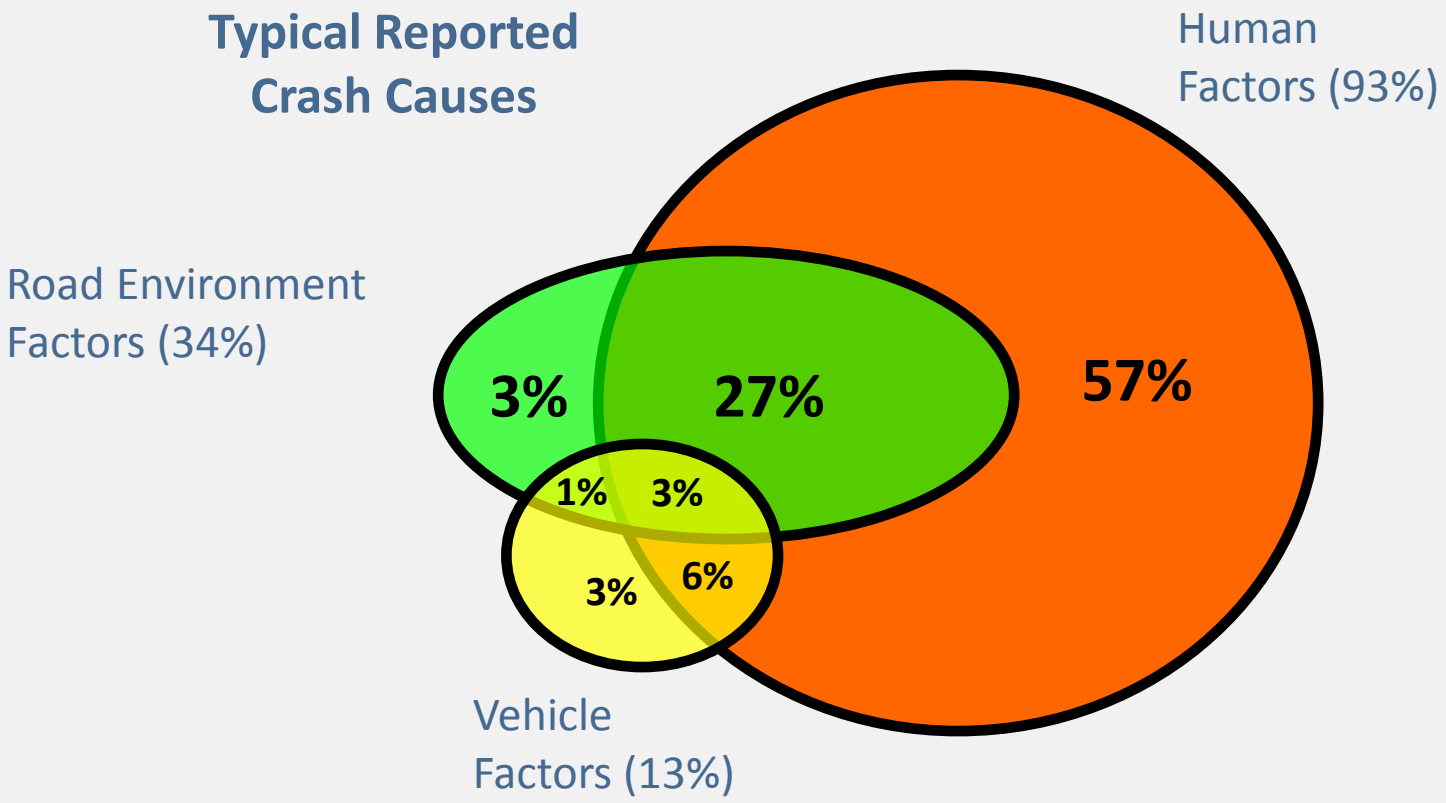
Overview of Projects

Background

- Spring 2015 – Countywide Safety Report Presented
- Report identified high crash locations across Brevard County that could be analyzed in further detail
- Spring 2015 – TPO approved work orders to conduct two safety analysis projects:
  - Pedestrian/Bicycle Safety Action Plan (focus on pedestrian/bicycle safety)
  - High Crash Corridors Analysis (focus on vehicular, pedestrian, and bicycle safety)

Overview of Projects

Why do we need Safety Field Reviews?



Source: HSM Chapter 3 Figure 3-3

Overview of Projects

Goal of Safety Field Reviews

- Suggest safety improvements/countermeasures on specific high crash corridors, relating to both pedestrian/bicycle safety and vehicular safety

- Pedestrian/Bicycle Safety Action Plan also included:
  - Identification of countermeasures to be applicable Countywide (systemic)
  - Suggestions included engineering safety improvements and education/enforcement programs

Overview of Projects

General Approach to Reach Goals

- Identified Project Steering Committee (Pedestrian/Bicycle Safety Action Plan only)
- Collected and mapped crash data Countywide to determine high crash locations/corridors (network screening)
- Performed historical crash analysis and safety field reviews on selected high crash locations/corridors
- Identified engineering, education, and enforcement countermeasures for each location/corridor based on research and current education/enforcement efforts
- Generated systemic countermeasure matrix (Action Plan only)
- Conducted Steering Committee workshop to review systemic countermeasure matrix (Action Plan only)

CRASH DATA COLLECTION

Crash Data Collection

Pedestrian/Bicycle Safety Action Plan

- Utilized two database sets to compile crash history:
  - FDOT Crash Analysis Reporting System (CARS) for state roadway data
  - Signal4 Analytics for county/local roadway data and to supplement state roadway data
- Years compiled: 2009-2014
- Total pedestrian/bicycle crashes in Brevard County: 1,539
  - Pedestrian: 688 (73 fatal, 502 injury, 113 property damage only)
  - Bicycle: 851 (20 fatal, 645 injury, 186 property damage only)

Crash Data Collection

High Crash Corridors Analysis

- Utilized same two database sets as Safety Action Plan to compile crash history – FDOT CARS and Signal4 Analytics
- Years compiled: 2009-2014
- Total crashes (vehicular, pedestrian, and bicycle) in Brevard County: 45,641
    - 311 fatal (1% of total crashes)
    - 14,319 injury (31% of total crashes)
    - 31,011 property damage only (68% of total crashes)

STUDY CORRIDORS

Study Corridors

Overview

- Sorted corridors by crash **frequency** and **severity**; reviewed the top 30 for each sorted list
- Narrowed lists and chose corridors by:
  - Identifying corridors present on both lists
  - Removing corridors with ongoing studies or construction projects (FDOT currently conducting six corridor planning studies)
  - Removing corridors with redundant roadway characteristics, area types

Study Corridors

Pedestrian/Bicycle Safety Action Plan Study Corridors

Corridor	Roadway	To/From	Length (mi.)	Total Crashes	Pedestrian Crashes	Bicycle Crashes	Fatal Crashes	Injury Crashes
1	Palm Bay Rd.	Babcock-Lipscomb	1.00	18	8	10	3	12
2	US 1	University-New Haven	1.15	12	4	8	3	9
3	SR A1A	Fisher-Columbia	0.95	33	18	15	1	26
3	SR A1A	McKinley-Atlantic	0.95	25	6	19	2	11
4	Clearlake Rd.	Dixon-Michigan	1.05	31	13	18	2	24
5	US 1	Broadway-Fay	1.25	12	9	3	6	4

Note: Corridors listed from south to north

Study Corridors

High Crash Corridors Analysis Study Corridors

Corridor	Roadway	To/From	Length (mi.)	Total Crashes	Fatal Crashes	Injury Crashes
1	Malabar Rd.	Jupiter-Minton Emerson-San Filippo	1.50 0.85	700	0	190
2	Babcock St.	Malabar-Palm Bay	2.50	732	0	203
3	Emerson Dr. Minton Rd. Palm Bay Rd.	Jupiter-Minton Emerson-Palm Bay Minton-Culver	1.50 0.25 0.55	735	1	165
4	SR A1A	US 192-Eau Gallie	3.40	439	4	172
5	Wickham Rd.	Sarno-Parkway	2.50	1,376	7	349

Note: Corridors listed from south to north

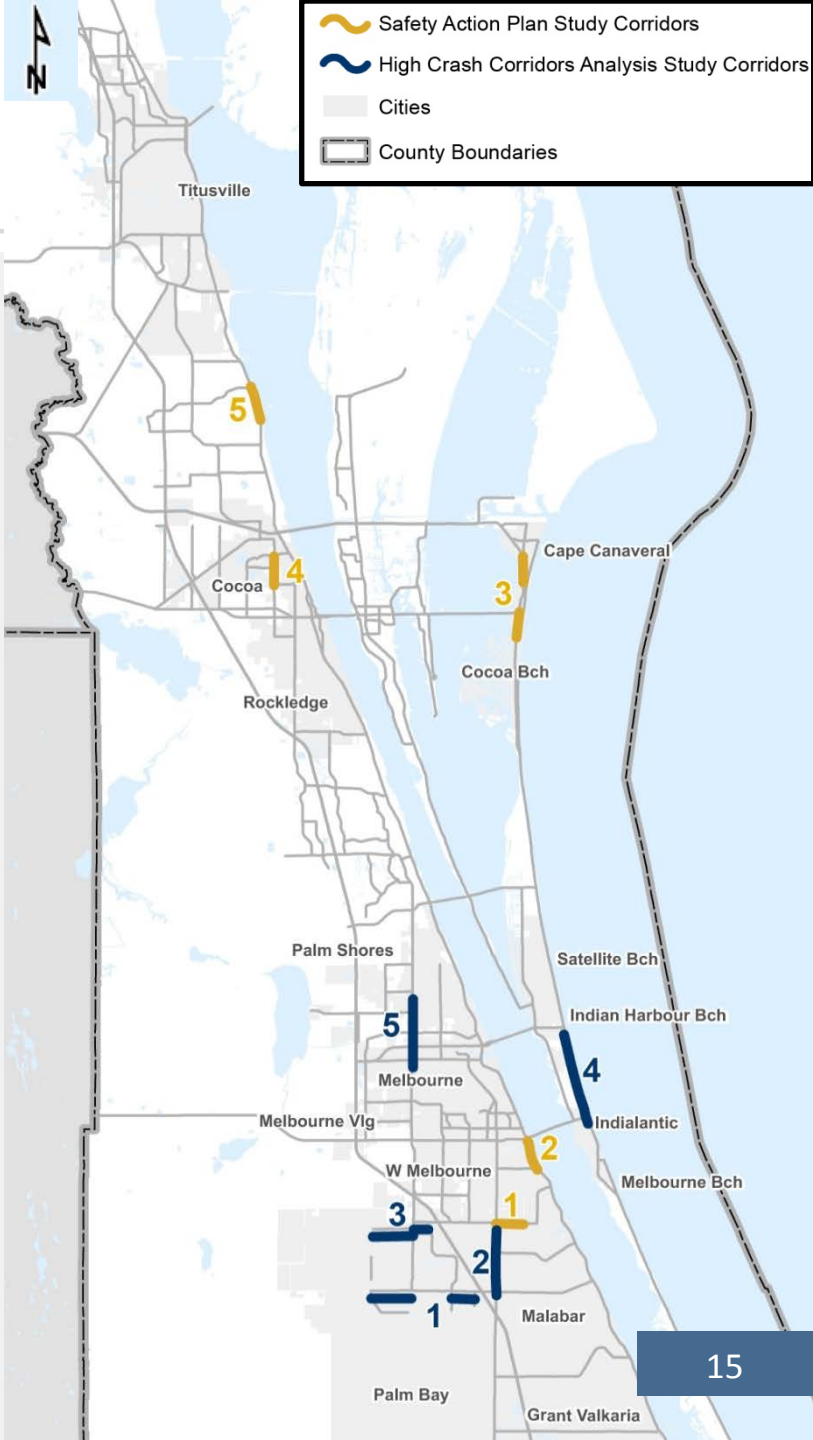
Study Corridors

Pedestrian/Bicycle Safety Action Plan Study Corridors

1. Palm Bay Rd.
2. US 1 Melbourne
3. SR A1A (Cocoa Beach/Cape Canaveral)
4. Clearlake Rd.
5. US 1 North

High Crash Corridors Analysis Study Corridors

1. Malabar Rd.
2. Babcock St.
3. Emerson Dr./Minton Rd./Palm Bay Rd.
4. SR A1A
5. Wickham Rd.

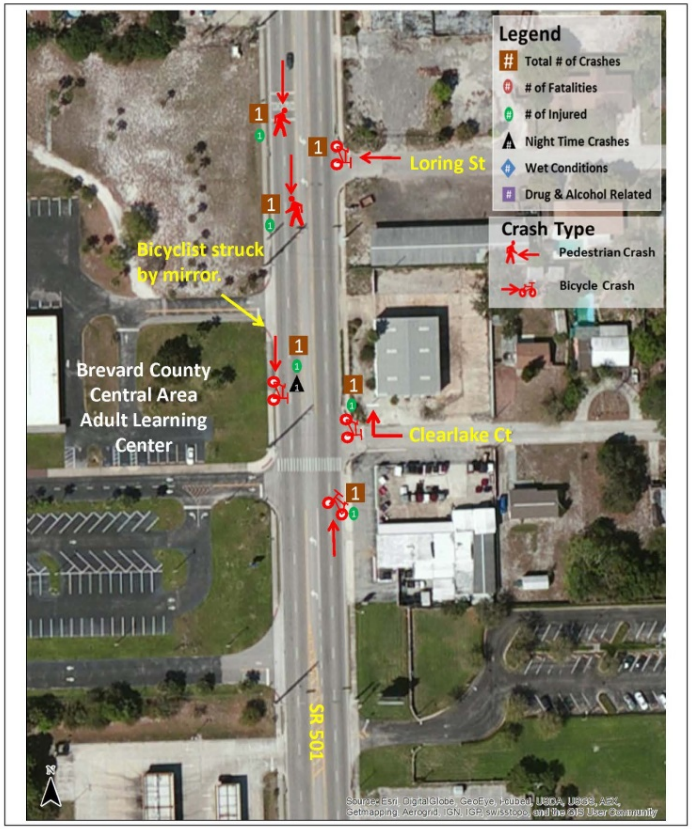


ANALYSIS, FINDINGS, AND SUGGESTIONS

Corridor Analysis

Created Collision Diagrams

Pedestrian/Bicycle Safety Action Program



SR 501 Ped/Bike Field Review
Collision Diagram (2009 – 2014)
Car Wash Driveway to Loring Street

Figure 2

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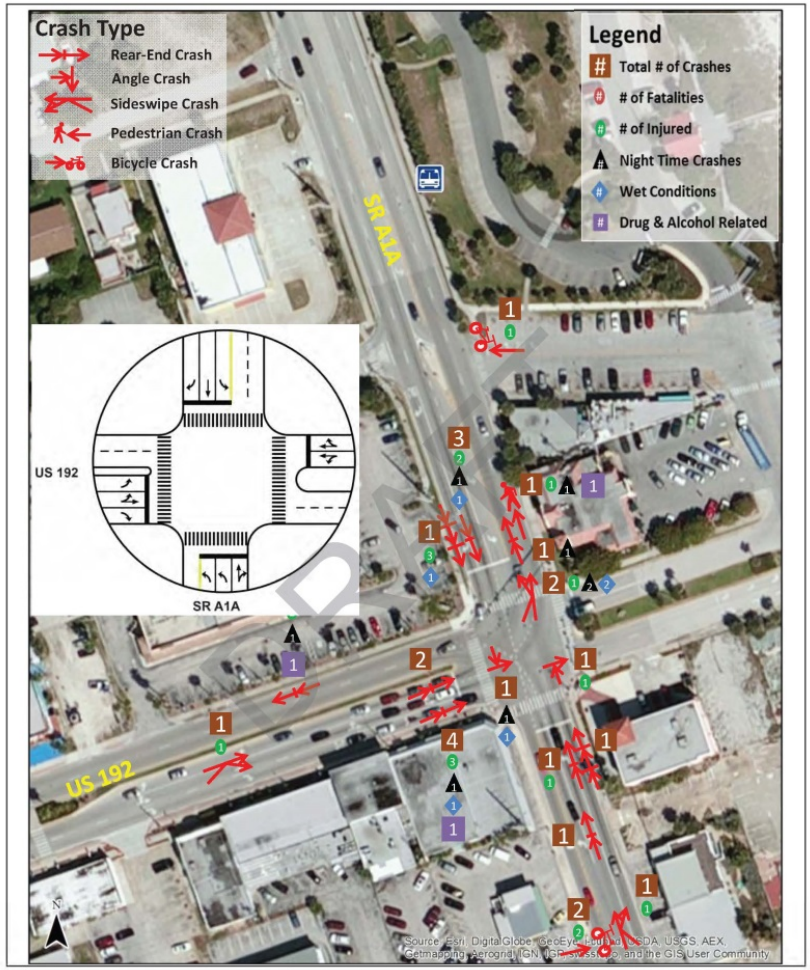
SR A1A from US 192 to SR 518 /Eau Gallie Boulevard– Road Safety Audit



SR A1A (US 192 to SR 518) RSA
Collision Diagram (2009 – 2014)
Intersection 1: SR A1A @ US 192

Figure 5

KITTELSON & ASSOCIATES, INC.
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Corridor Analysis

Two-Day Field Reviews

Safety Action Plan Study Corridors

1. Palm Bay Rd.: August 19-20, 2015
2. US 1 Melbourne: August 25-26, 2015
3. SR A1A (Cocoa Beach/Cape Canaveral): June 30-July 1, 2015
4. Clearlake Rd.: September 1-2, 2015
5. US 1 North: July 13-14, 2015

High Crash Corridors Analysis Study Corridors

1. Malabar Rd.: October 27-28, 2015
2. Babcock St.: December 1-2, 2015
3. Emerson Dr./Minton Rd./Palm Bay Rd.: January 26-27, 2016
4. SR A1A: November 17-18, 2015
5. Wickham Rd.: September 30-October 1, 2015

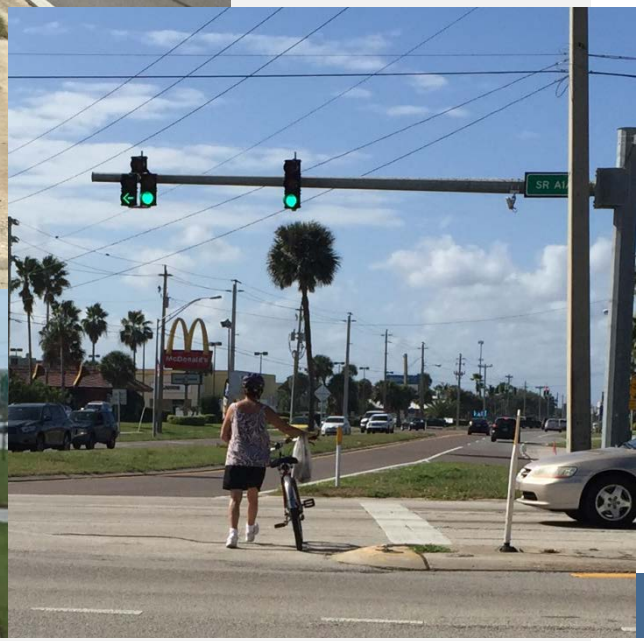
Corridor Analysis

Agency Team Members

CITY OF
CAPE
CANAVERAL

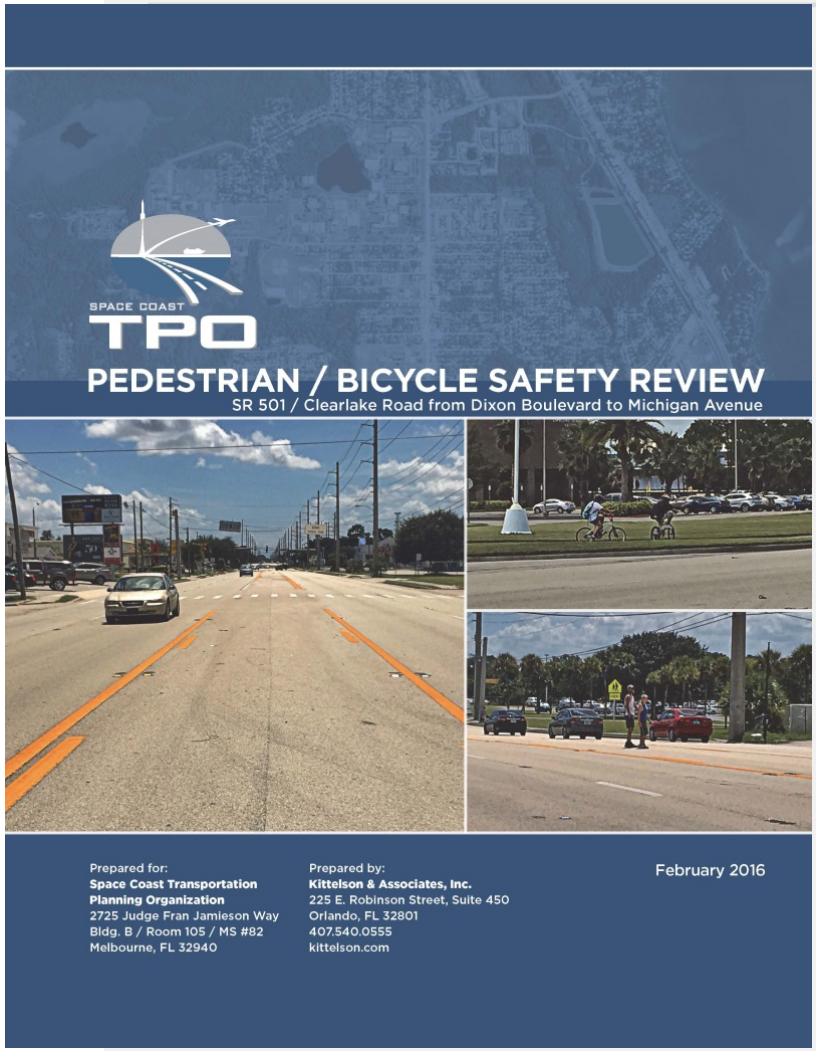
Corridor Analysis

Field Reviews



Corridor Analysis

Corridor Reports



- After reviews completed, field review team wrote individual corridor reports identifying issues and improvement suggestions

Findings

Overview

- Sorted findings and suggestions into four (4) categories:
  - Transit: If transit route present along corridor, cross-referenced SCAT ADA Bus Stop Assessment findings
  - Maintenance: to be addressed by public agency staff on a short timeframe at a relatively low cost
  - Near Term: within 3-5 years – could incorporate into upcoming project
  - Long Term: 5+ years – incorporate into upcoming projects or may require programming as separate project

Findings

Final Lists of Issues/Suggestions from 10 Corridors Studied

- Identified 190 issues/suggestions from the 5 pedestrian/bicycle corridors studied (37 pertain to transit stops)
- Identified 248 issues/suggestions from the 5 high crash corridors studied (54 pertain to transit stops)
- Issues will be provided to the roadway maintaining agency (FDOT, Brevard County, local city)
- SCTPO will coordinate with each maintaining agency on plan to address suggestions and actions to be taken
- SCAT working through transit stop improvements

Findings

Example of Transit Findings from SR A1A

Location	Issue Number	Issue	Suggestion
TRANSIT RELATED - NORTH SECTION			
Holman Avenue Southbound	N/A	Bus Stop	Remove the pavement at the existing B&A area and repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area. Stripe a crosswalk at the nearby intersection.
Cleveland Avenue Northbound	N/A	Bus Stop	Move the stop 325' south. Remove the pavement at the existing B&A area and repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area.
E Grant Avenue Northbound	N/A	Bus Stop	Remove the pavement at the existing B&A area and repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area. Add detectable warnings to the nearby curb ramps. Stripe a crosswalk at the nearby intersection. Move the pole with the bus schedule adjacent to the pavement to make it accessible.
Cocoa Palms Drive Southbound	N/A	Bus Stop	Remove the pavement at the existing B&A area and repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area. Stripe a crosswalk at the nearby intersection.
E Grant Avenue Northbound and Cocoa Palms Drive Southbound	31	Bus Stop	Consider moving these bus stops approximately 200' south to align with the proposed mid-block crossing.
Pierce Avenue Northbound	N/A	Bus Stop	Remove the pavement at the existing B&A area and repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area. Move the pole with the bus schedule flush with the sidewalk. Stripe a crosswalk at the nearby intersection. Add detectable warnings to the nearby curb ramps. Replace the drainage grates, located in the sidewalk, with ones with ADA compliant openings.
Fillmore Avenue Southbound	N/A	Bus Stop	Remove the pavement at the existing B&A area and repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area.
Tyler Avenue Southbound	N/A	Bus Stop	Remove the pavement at the existing B&A area and repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area. Move the pole with the bus schedule adjacent to the pavement to make it accessible and located on the far side of the B&A area.
Tyler Avenue Southbound	31	Bus Stop	Consider moving this bus stop approximately 300' north to align with the proposed mid-block crossing.
International Drive Southbound	N/A	Bus Stop	Consider relocating the bus stop outside of the center of the intersection. Remove the pavement at the existing B&A area and repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area. Make sure the cross slope at the B&A area is <=2%. Add a curb ramp and detectable warnings. Stripe a crosswalk at the nearby intersection.

Findings

Example of Maintenance Findings from Wickham Road

Location	Issue Number	Issue	Suggestion
MAINTENANCE			
Corridor Wide	4	Observed ADA Issues	The RSA team suggests conducting a formal ADA evaluation along the corridor, but highlights the following typical maintenance-type improvements for consideration to address the ADA issues: o Consider replacing/installing detectable warning surfaces per FDOT standard index 304 at all signalized intersections, except Sarno Road. o Consider replacing railing support on the east side of Wickham Road, in front of Chili's. o Consider reconstructing the sidewalk on the north side of Sarno Road east of the intersection with Wickham Road to repair section with cracked concrete. o Consider widening sidewalk around the utility pole on the west side of Wickham Road, approximately 100' north of Sarno Road. o Consider grinding the sidewalk to provide flush surfaces throughout the study corridor.
Sarno Road Intersection	9	Pedestrian Signal Head and Push Button Signage	As a maintenance improvement, consider replacing the pedestrian signal head and push button signage.
Melbourne Greyhound Park Intersection	11	Maintenance to Remove Sign	Maintenance crews are suggested to remove this sign and its posts to reduce driver distraction.
Aurora Road Intersection	17	Westbound Through Movement Alignment	As a maintenance type improvement, consider dotted guide line striping between the westbound left-turn lane and westbound through/right lane (east leg) to tie in between the eastbound left-turn lane and westbound receiving lane (west leg) along the Aurora Road approach. Consider using 2' to 4' dotted guide line striping consistent with sheet 1 of the FDOT Design Standard Index 17346. An example of the striping location is illustrated in Figure 98.
Between Aurora Road and Lake Washington Road	18	Lighting	As a maintenance type improvement, consider contacting the operator/maintainer to repair/replace the light bulbs at applicable street lights between Aurora Road and Lake Washington Road.
Lake Washington Road Intersection	21	Westbound Lane Drop	As a maintenance-type project, consider installing advance warning signage, striping additional right-turn arrows, and including ONLY pavement markings in addition to the arrows to warn drivers of the lane drop as they approach the intersection (see sheet 6 of the FDOT Design Standard Index 17346 and the MUTCD Section 3B.20).

Findings

Example of Maintenance Findings from Wickham Road

Location	Issue Number	Issue	Suggestion
MAINTENANCE			
Sarno Road Intersection	9	Pedestrian Signal Head and Push Button Signage	As a maintenance improvement, consider replacing the pedestrian signal head and push button signage.

Findings

Example of Near Term Findings from US 1 Melbourne

Location	Issue Number	Issue	Suggestion
NEAR-TERM PRIORITY			
Corridor Wide	1	Seven Lane Cross Section	Consider a study to review potential locations for spot medians. Consider reviewing how driveways are utilized along the corridor, especially at abandoned property locations or locations where properties have multiple driveways, as this may increase the number of potential locations for spot medians.
Corridor Wide	3	Sidewalk Walkability	In lieu of regular sidewalk maintenance by a local jurisdiction, local businesses along the corridor could apply for the FDOT Adopt-A-Highway program (found at http://www.dot.state.fl.us/statemaintenanceoffice/aah.shtm).
Corridor Wide	6	Off Peak Signal Cycle Lengths	Consider signal timing adjustments to better serve pedestrians attempting to cross SR A1A by treating the pedestrian call as a side street call and force the intersection to gap out when the major movement has a gap. The signal timing would remain the same as existing during peak periods.
Corridor Wide	7	Lighting	Consider a lighting uniformity study to review lighting consistency along the corridor.
University Boulevard Intersection	8	Pedestrian Facilities	Consider striping the south leg crosswalk with Special Emphasis markings. When the south leg crosswalk is striped, corresponding pedestrian features (pedestrian countdown signal and push buttons) should also be installed. Consider installing TURNING VEHICLES YIELD TO PEDESTRIANS (R10-15) on the mast arm and on a single post for the west leg approach. Consider having the pedestrian call on the south leg only activate with the westbound movement.
University Boulevard Intersection	8	Pedestrian Facilities	Consider constructing a separate curb ramp on the northwest corner for the north leg crosswalk and re-aligning the crosswalk slightly to match the new curb ramp. Consider relocating the curb ramp on the northeast corner approximately 5' north so the ramp aligns with the crosswalk.
Line Street Intersection	10	Intersection Lighting	Consider upgrading the lighting at the intersection to meet the requirements of section 7.3.2.2 in Volume 1 of the FDOT Plans Preparation Manual (PPM). This may require the existing lighting to be replaced.
Line Street Intersection	12	Slope from Sidewalk to Curb	Consider reviewing locations based on FDOT Plans Preparation Manual (PPM) Figure 8.8.1. If railing is needed, install the railing just off the east edge of the sidewalk to prevent pedestrians/bicyclists from falling off the sidewalk into the roadway.
Prospect Avenue Intersection	14	No Left Turn Phasing	Mast arms are currently in design for the intersection. As part of this design, consider making the northbound and southbound left turns protected/permissive signal phasing. Consider the flashing yellow arrow signal head configuration, which has a green arrow for the protected left turn phase but goes to a flashing yellow arrow for the permissive phase.
Prospect Avenue Intersection	15	Pedestrian Signage	As discussed in **Issue #14: No Left Turn Phasing**, mast arms are currently in design for the intersection. As part of this design, consider relocating the traffic controller cabinet so as to remove the sight distance obstruction on the southeast corner.
Prospect Avenue Intersection	16	Intersection Lighting	Consider upgrading the lighting at the intersection to meet the requirements of section 7.3.2.2 in Volume 1 of the FDOT Plans Preparation Manual (PPM). This may require the existing lighting to be replaced.
New Haven Avenue Intersection	18	Intersection Lighting	Consider upgrading the lighting at the intersection to meet the requirements of section 7.3.2.2 in Volume 1 of the FDOT Plans Preparation Manual (PPM). This may require the existing lighting to be replaced. As part of the corridor wide lighting uniformity study discussed in **Issue #7: Lighting**, review the area on the west side of US 1 just south of the New Haven intersection to the north side of the bridge over the Indian River Lagoon.

Findings

Example of Near Term Findings from US 1 Melbourne

Location	Issue Number	Issue	Suggestion
NEAR-TERM PRIORITY			
Line Street Intersection	12	Slope from Sidewalk to Curb	Consider reviewing locations based on FDOT Plans Preparation Manual (PPM) Figure 8.8.1. If railing is needed, install the railing just off the east edge of the sidewalk to prevent pedestrians/bicyclists from falling off the sidewalk into the roadway.

Steep slope areas

Findings

Example of Long Term Findings from Clearlake Road

Location	Issue Number	Issue	Suggestion
LONG-TERM PRIORITY			
Corridor Wide	1	Corridor Lighting	Consider conducting field measurements of existing lighting levels in the areas along the corridor with existing lighting to evaluate any lighting uniformity level problems that may exist and add lighting where necessary. Consider conducting a lighting justification study to determine if additional lighting is justified along the length of the study limits.
Corridor Wide	4	Two-Way Left-Turn Lane	Consider conducting a study to evaluate opportunities to install raised medians providing pedestrian refuge at select locations along the corridor. A raised center median provides a safer refuge for pedestrians than the existing center TWLTL. The raised medians could be implemented in phases: • Long-term – Convert to a 4-lane divided roadway
Corridor Wide	5	Driveway Density	Consider opportunities to consolidate driveways to reduce the number of vehicle-pedestrian/bicycle interactions along the corridor. The City and County should review its land use and zoning requirements and consider cross-access requirements for the future redevelopment of adjacent properties within the same block.
Mid-Block between Furnari Street and Fay Street	17	Driveway Cross Slopes	Consider rebuilding the driveways to provide a level path during the roadway's next 3R project. It appears these improvements can be done without negatively impacting parking or site circulation on the subject parcels.

Findings

Example of Long Term Findings from Clearlake Road

Location	Issue Number	Issue	Suggestion
LONG-TERM PRIORITY			
Corridor Wide	4	Two-Way Left-Turn Lane	Consider conducting a study to evaluate opportunities to install raised medians providing pedestrian refuge at select locations along the corridor. A raised center median provides a safer refuge for pedestrians than the existing center TWLTL. The raised medians could be implemented in phases: • Long-term – Convert to a 4-lane divided roadway

Findings – Systemic Pedestrian/Bicycle Issues Observed

Corridor Lighting

Findings – Systemic Pedestrian/Bicycle Issues Observed

Minor Street Pedestrian Facilities

Findings – Systemic Pedestrian/Bicycle Issues Observed

Lack of Formal Bicycle Facilities/Bicyclists Utilizing Sidewalk

Findings – Systemic Pedestrian/Bicycle Issues Observed

Roadways with Center Two-Way Left-Turn Lane

US 1 Melbourne

SR A1A Cape Canaveral

Clearlake Road

Suggestions – Pedestrian/Bicycle Safety Action Plan

Systemic Countermeasure Matrix

- Reduced the 190 issues identified along the 5 study corridors to 30 pedestrian and 13 bicycle systemic issues
- Developed systemic countermeasures to address common issues

Pedestrian Issues and Countermeasures					
Location	**General Issue**	**Specific Issue**	**Countermeasure**	**Potential Implementation Timeframe**	**Relative Cost**
Minor Street Intersection	Vehicular Sight Distance	Vehicle cannot see pedestrian utilizing sidewalk at current stop bar location	Trim/remove shrubbery, if located on private property work with property owner to trim/remove the shrubbery	Maintenance	$
			Perform a study to review sight distance triangle at the intersection, remove obstructions within sight triangle or move the stop bar closer to the street	Maintenance/Near Term	$
	No Crosswalk Markings	No marked crosswalk present at minor street	Add standard or special emphasis crosswalk markings (determined on case-by-case basis) across the minor street consistent with sheet 9 of the FDOT Design Standard Index 17346	Maintenance	$
	Conflicts between Pedestrians and Vehicles	Minor streets with pedestrian crash history	Add pedestrian warning signage that would draw the motorist's attention to the presence of pedestrians on the sidewalk in both directions	Maintenance	$
	Missing Detectable Warning Surfaces	Detectable warning surfaces for vision impaired pedestrians damaged/missing	Install/replace detectable warning surfaces per FDOT Design Standard Index 304	Maintenance	$
	No Sidewalks	No sidewalk connectivity from major street back to businesses/neighborhoods along minor street	Construct sidewalks on minor streets where missing to provide connectivity into neighborhoods and commercial developments	Near/Long Term	$-$$$

Suggestions – Pedestrian/Bicycle Safety Action Plan

Stakeholder Workshop

- 1 ½ day workshop
- Initial meeting to discuss 5 pedestrian/bicycle safety field reviews performed and review the systemic countermeasure matrix
- Performed field reviews to “truth check” the systemic matrix
- Follow up meeting to review/refine systemic matrix based on field observations
    - Discussed enforcement and education countermeasures
    - Discussed tools to identify countermeasure implementation locations
    - Discussed various implementation strategies

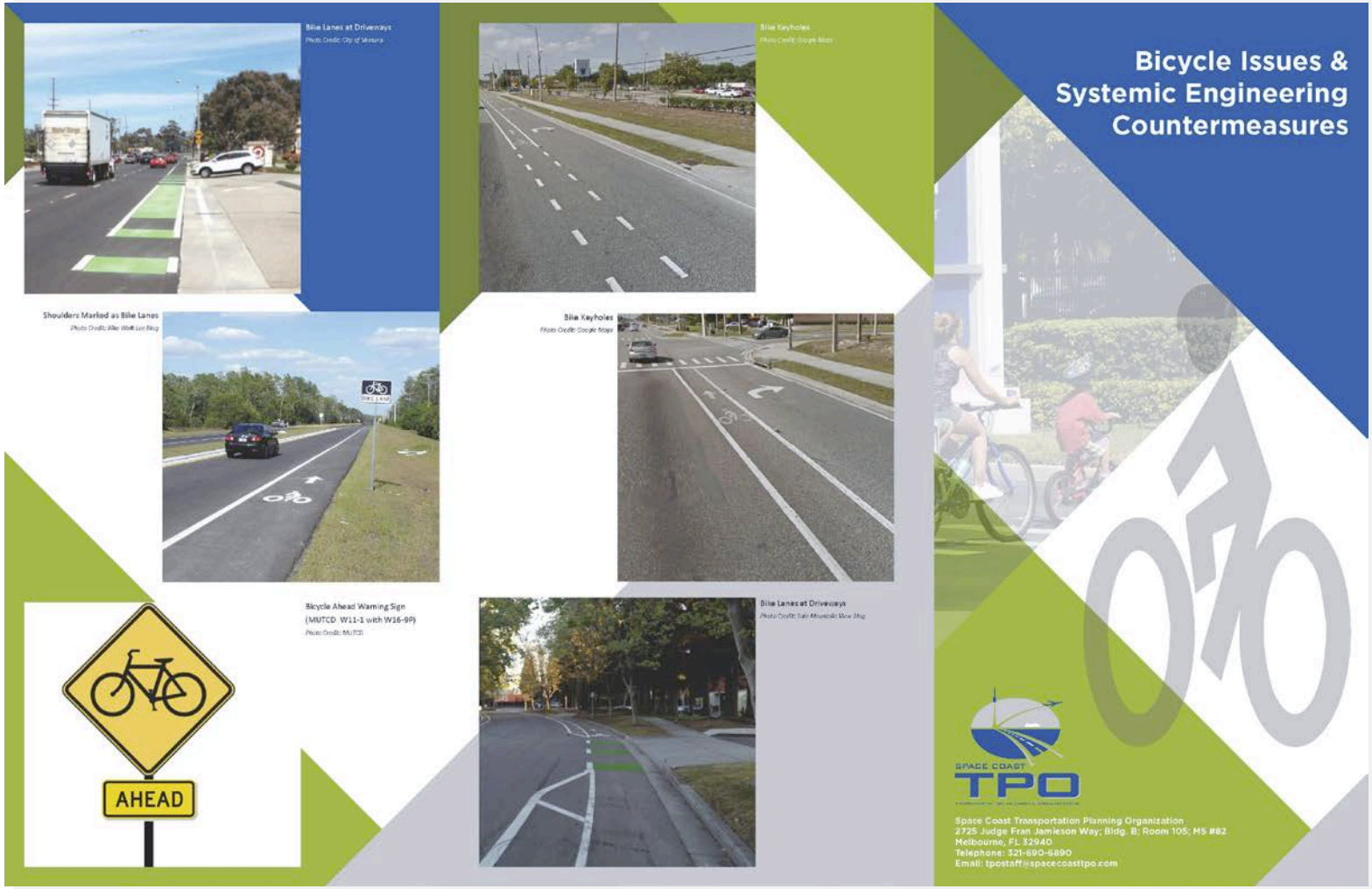
Suggestions – Pedestrian/Bicycle Safety Action Plan

Pedestrian/Bicycle Safety Action Plan Brochures

Location	General Issue	Specific Issue	Countermeasure	Implementation Time frame	Cost
Signalized Intersection	→ Continued from front				
	Intersection Lighting	Burnt out light bulbs	Contact the owner/maintainer of the lighting system to replace burnt out bulbs	Maintenance	$
		No lighting at intersections or inadequate lighting at all marked crosswalks	Add/upgrade intersection lighting (FDOT Plans Preparation Manual Section 7.3.2.2)	Near Term	$$
	General ADA Issues	Push button pole not accessible or more than 10' away from curb ramp	Install pole that is accessible or less than 10' from curb ramp (2009 MUTCD Section 4E.08)	Maintenance/Near Term	$-$$
		Detectable warning surfaces for vision impaired pedestrians damaged/missing	Install/replace detectable warning surfaces (FDOT Design Standard Index 304) 	Maintenance	$
		Need for accessible (audible) pedestrian signals	Install accessible (audible) pedestrian signals (ADA PROWAG guidance Section R209) or (FDOT Traffic Engineering Manual Section 3.7)	Maintenance/Near Term	$-$$
		Pedestrian clearance time does not meet the minimum time	Increase the pedestrian clearance time based on a 3.5 feet/second walking speed (2009 MUTCD Section 4E.06)	Maintenance	$
		Crosswalk is not perpendicular to roadway or multiple crosswalks may come to the same curb ramp which is pointing to the middle of the intersection	Make crosswalks perpendicular to the roadway, reducing the crossing distance for pedestrians	Maintenance/Near Term	$-$$
		Multiple crosswalks come to the same curb ramp which is pointing to the middle of the intersection	Reconstruct separate curb ramps for each of the crosswalks, perpendicular to the roadway, providing a clear walking direction for visually impaired pedestrians	Maintenance/Near Term	$-$$
	No Protected Left Turn Phasing	Permitted only left turn from major roadway conflicts with pedestrians crossing side street	Change the left turn phasing from permitted only to protected/ permitted (FDOT Traffic Engineering Manual Section 3.2.2(2))	Near Term	$
	Pedestrians Waiting to Cross Major Roadway	2+ minutes wait time to cross major roadway at signalized intersections during off peak periods	Adjust the signal timings so that when a pedestrian is present and requests to cross, the major movement would be cut short if the volumes are low	Near Term	$
Minor Street Intersection	Vehicular Sight Distance	Vehicle cannot see pedestrian utilizing sidewalk at current stop bar location	Trim/remove shrubbery, if located on private property work with property owner	Maintenance	$
			Study to review sight distance triangle at the intersection, remove obstructions within sight triangle or move the stop bar closer to the street	Maintenance/Near Term	$
	No Crosswalk Markings	No marked crosswalk present at minor street	Add standard or special emphasis crosswalk markings across the minor street (FDOT Design Standard Index 17346 Sheet 9) 	Maintenance	$
	Conflicts between Pedestrians and Vehicles	Minor streets with pedestrian crash history	Add pedestrian warning signage on the sidewalk in both directions	Maintenance	$
	Missing Detectable Warning Surfaces	Detectable warning surfaces for vision impaired pedestrians damaged/missing	Install/replace detectable warning surfaces (FDOT Design Standard Index 304) 	Maintenance	$
	No Sidewalks	No sidewalk connectivity from major street back to businesses/neighborhoods along minor street	Construct sidewalks on minor streets where missing to provide connectivity into neighborhoods and commercial developments	Near/Long Term	$-$$$
Driveway	No Crosswalk Markings	No marked crosswalk at driveways with high pedestrian activity or crash history/frequency	Add standard or special emphasis crosswalk markings across the minor street (FDOT Design Standard Index 17346 Sheet 9) 	Maintenance	$
	Conflicts between Pedestrians and Vehicles	Driveways with high pedestrian activity or crash history/frequency	Add pedestrian warning signage on the sidewalk in both directions	Maintenance	$
	Vehicular Sight Distance	Vehicle cannot see pedestrian utilizing sidewalk at current stop bar location	Trim/remove shrubbery, if located on private property work with property owner	Maintenance	$
			Study to review sight distance triangle at the intersection, remove obstructions within sight triangle or move the stop bar closer to the street	Maintenance/Near Term	$
	Fast Turning Vehicles	Vehicles not slowing down enough to see pedestrians/ bicyclists on sidewalk	Perform driveway reconstruction during the roadway's next 3R project to reduce curb return radii	Near/Long Term	$-$$$
	Pedestrian Exposure on Sidewalk	Wide driveways	Perform driveway reconstruction during the roadway's next 3R project to reduce the driveway widths to 36' maximum (FDOT Standard Index 515)	Near/Long Term	$-$$$
		High driveway frequency	Perform driveway consolidation during potential redevelopment or during the roadway's next 3R project	Near/Long Term	$-$$$
	Sidewalk Slope Across Driveway	Substandard sidewalk slope merges with the slope of the driveway	Reconstruct driveway during the roadway's next 3R project to provide a level sidewalk and meet ADA guidance	Near/Long Term	$$-$$$

Suggestions – Pedestrian/Bicycle Safety Action Plan

Pedestrian/Bicycle Safety Action Plan Brochures



Suggestions – Pedestrian/Bicycle Safety Action Plan

Engineering Implementation Strategies

- Citizen complaint/CTST identified issue can utilize matrix and/or brochure to identify potential countermeasures

- Use the matrix and/or brochure as a “checklist” to incorporate countermeasures for design/3R projects currently underway or upcoming
  - $$ already coming to a roadway, great time to incorporate ped/bike safety enhancements
  - Review pedestrian/bicycle improvements within the design at the 30% to 60% level – changes can still be made!

Suggestions – Pedestrian/Bicycle Safety Action Plan

Education Implementation Strategies

- Increase in professional development opportunities for transportation professionals and law enforcement personnel
- Limited funding sources available for pedestrian/bicycle education programs
- FHWA Grants - http://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.cfm
  - Funding opportunities targeted at providing safety brochures/books, safety education positions, and training

Suggestions – Pedestrian/Bicycle Safety Action Plan

Education Implementation Strategies

SafeRoutes
National Center for Safe Routes to School

Suggestions – Pedestrian/Bicycle Safety Action Plan

Enforcement Implementation Strategies

- HVE – High Visibility Enforcement Overtime
- Pedestrian stings/decoy operations
- Progressive enforcement (educate, warn, cite)
- Positive enforcement – hand out coupons for good pedestrian/bicycle behavior
- Work with high schools to teach class on how to drive/be aware of pedestrians/bicyclists on roadway

316.003 (6) Crosswalk (definition)
316.003 (6)(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.
316.003 (6)(b) Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface.

316.003 (47) Sidewalk (definition)
That portion of a street between the curbline, or the lateral line, of a roadway and the adjacent property lines, intended for use by pedestrians.

316.075 Traffic control signal devices
316.075 (1)(a) Green — Vehicles shall yield the right-of-way to other vehicles and pedestrians lawfully within the intersection or an adjacent crosswalk.
316.075 (1)(b) Steady yellow — No pedestrian shall start to cross the roadway.
316.075 (1)(c) Steady red — Vehicles shall stop before entering the crosswalk. After stopping on red, a driver making a permitted right turn must yield to pedestrians crossing as directed by the signal. Pedestrians shall not enter the roadway on red, unless otherwise directed by a pedestrian signal.

316.123 Vehicle entering stop or yield intersection
Drivers shall stop at marked stop line, but if none, before entering the crosswalk or, if none, then where the driver has a view of approaching traffic on the intersecting roadway before entering the intersection.

316.125 Vehicle entering highway from private road or driveway or emerging from alley, driveway or building
Vehicles shall stop prior to driving onto a sidewalk or onto the sidewalk area extending across the alley, building entrance, road or driveway, and shall yield to all vehicles and pedestrians which are so close thereto as to constitute an immediate hazard.

www.alerttodayflorida.com
www.dot.state.fl.us/safety
www.cutr.usf.edu
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316.130 Pedestrian regulations
316.130 (1) Obey traffic control devices unless otherwise directed by a police officer.
316.130 (2) Shall be subject to traffic control signals at intersections, but at all other places pedestrians shall be accorded the privileges and be subject to the restrictions stated in this chapter.
316.130 (3) No walking on roadway where sidewalks are provided, unless required by other circumstances.
316.130 (4) Walk on the left side of the roadway where sidewalks are not provided.
316.130 (5) No standing in the roadway to solicit a ride, employment, or business.
316.130 (6) No soliciting the watching or guarding of any vehicle parked on a roadway.
316.130 (7) Driver shall yield, and stop if need be to yield, to a pedestrian in a crosswalk when the pedestrian is upon the half of the roadway upon which the vehicle is traveling or is approaching so closely from the opposite half of the roadway as to be in danger.
316.130 (8) No pedestrian shall suddenly leave a curb or other place of safety and walk or run into the path of a vehicle which is so close that it is impossible for the driver to yield.
316.130 (9) No passing any vehicle stopped at any crosswalk to permit a pedestrian to cross.
316.130 (10) Pedestrians crossing at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield to vehicles.
316.130 (11) Between adjacent intersections at which traffic control signals are in operation, pedestrians shall not cross at any place except in a marked crosswalk.
316.130 (12) No pedestrian shall, except in a marked crosswalk, cross a roadway at any other place than by a route at right angles to the curb or by the shortest route to the opposite curb.
316.130 (13) Pedestrians shall move, whenever practicable, upon the right half of crosswalks.
316.130 (14) No pedestrian shall cross a roadway intersection diagonally unless authorized by traffic control devices.
316.130 (15) Drivers shall exercise due care to avoid colliding with any pedestrian or any person propelling a human-powered vehicle.
316.130 (16) Pedestrians shall obey railroad grade crossing and bridge signals, not pass beyond gate or barrier.
316.130 (17) No jumping or diving from a publicly owned bridge.
316.130 (18) No pedestrians on limited access facilities or ramps.

316.1301 Traffic regulations to assist blind persons
316.1301 (1) Only a blind person may carry a white cane or walking stick in a raised or extended position.
316.1301 (2) Drivers shall stop and avoid injuring pedestrians crossing a public street or highway guided by a guide dog or carrying in a raised or extended position a white cane or walking stick.

316.1303 Traffic regulations to assist mobility-impaired persons
316.1303 (1) Drivers shall stop and take precautions necessary to avoid injuring mobility-impaired pedestrians in the process of crossing a public street or highway with the assistance of a service animal, walker, crutch, orthopedic cane, or wheelchair.
316.1303 (2) Motorized wheelchair may use the roadway to avoid a potential conflict.

316.1305 No fishing from bridges where posted
316.1575 Obedience to traffic control devices at railroad-highway grade crossings
316.1945 No stopping, standing, or parking on a sidewalk, on a crosswalk, or on a bicycle path
316.1995 No driving upon sidewalk or bicycle path
316.2045 Obstruction of public streets
316.2061 Stop when traffic obstructed
No driver shall enter an intersection or a marked crosswalk unless there is sufficient space on the other side of the intersection or crosswalk to accommodate the vehicle the driver is operating without obstructing the passage of other vehicles or pedestrians, notwithstanding any traffic control signal indication to proceed.

Disclaimer: refer to original laws for complete text
http://www.leg.state.fl.us/Statutes
(Title XXII, Chapter 316)

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FLORIDA PEDESTRIAN LAWS SYNOPSIS

Suggestions – Safety Action Plan and High Crash Corridors

Highway Safety Improvement Program (HSIP) Funding

- HSIP funding can be used on state and local roadways
- Study will be required to further analyze identified countermeasures
- Suggested countermeasures would have to have a positive net present value (NPV) (greater than $0) or a benefit/cost (B/C) ratio >1.0
    - For pedestrian/bicycle suggestions, limited number of pedestrian/bicycle crash modification factors (CMFs) available for NPV or B/C analysis
- Local match would be needed for local roadway HSIP projects (sometimes up to 50%)

NEXT STEPS

Next Steps

- TPO to work with FDOT this summer to identify possible HSIP projects from lists of identified improvements
- Projects not meeting HSIP guidance will go into next year's project priorities
- Final reports for each corridor along with countermeasure brochure for Pedestrian/Bicycle Safety Action Plan will be available for download from TPO's website: http://spacecoasttpo.com/