



# PEDESTRIAN / BICYCLE SAFETY REVIEW

SR 501 / Clearlake Road from Dixon Boulevard to Michigan Avenue



Prepared for:  
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February 2016

# **Pedestrian/Bicycle Safety Action Plan**

## **Pedestrian/Bicycle Safety Review Report for SR 501/Clearlake Road from Dixon Boulevard to Michigan Avenue**

Section Number: 70011000

Mile Post: 1.193 – 2.235

Brevard County

Prepared for:



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## **Project Title: SR 501/Clearlake Road Pedestrian/Bicycle Safety Review**

**Field Review Dates:** September 1<sup>st</sup> and 2<sup>nd</sup>, 2015 (daytime/nighttime reviews and follow up meeting)

### **Participants:**

Ryan Cunningham – Kittelson & Associates, Inc. – Team Leader  
Laura Carter – Space Coast Transportation Planning Organization  
Georganna Gillette – Space Coast Transportation Planning Organization  
Steven Bostel – Space Coast Transportation Planning Organization  
Joan Carter – Florida Department of Transportation, District 5  
Kevin Marquez – Florida Department of Transportation, District 5  
Conroy Jacobs – Brevard County  
Devin Swanson – Brevard County  
Ed Wegerif – City of Cocoa  
Officer Bob Wehner – Cocoa Police Department  
Joe Chagnon – Space Coast Area Transit  
Michael Eagle – Kittelson & Associates, Inc.

### **Project Characteristics:**

Field Review Type: Pedestrian, Bicycle, Existing Road  
Adjacent Land Use: Urban, Commercial, Institutional, Residential  
Posted Speed Limit: 45 miles per hour (mph) along the length of the study corridor  
Opposite Flow Separation: Center Two-Way Left-Turn Lane (TWLTL)  
Service Function: Urban Minor Arterial  
Terrain: Flat  
Climatic Conditions: Sunny, Hot

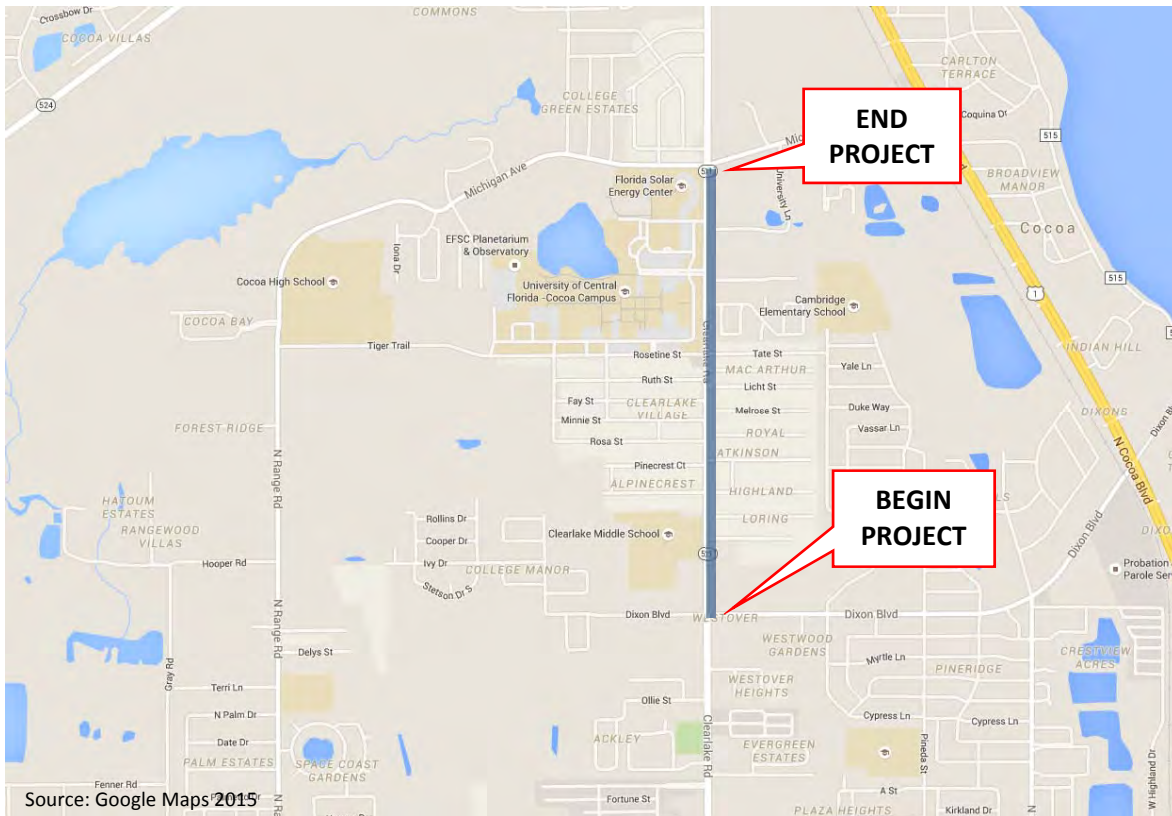


Figure 1 – SR 501/Clearlake Road Study Corridor

## Background

In late 2014, the Florida Department of Transportation (FDOT) released its Pedestrian and Bicycle Focused Initiative for 2015 and identified Brevard County as a Top 15 High Priority County. The goal of the Pedestrian/Bicycle Safety Action Plan is to generate a list of suggested improvements at high crash locations to address the growing need for improved pedestrian/bicycle safety in Brevard County. SR 501/Clearlake Road from Dixon Boulevard to Michigan Avenue (**Figure 1**), a 1.04 mile corridor in central Brevard County was identified as one of these high crash locations. In order to suggest improvements along this high crash corridor, the crash history was evaluated and a field review was conducted.

This pedestrian/bicycle safety review was commissioned by the Space Coast Transportation Planning Organization (SCTPO) to develop maintenance-type, near-term, and long-term suggestions to improve pedestrian and bicyclist safety within the study limits.

The pedestrian/bicycle safety review process involves multi-disciplinary representatives from various stakeholders, potentially including representatives from transportation planning, traffic operations, roadway design, safety, and law enforcement. Pedestrian/bicycle safety reviews are conducted to identify potential safety issues and provide improvement suggestions in a team collaborative environment. This safety review is limited in scope and should not be construed as a comprehensive safety study; nor is it a formal Road Safety Audit. It is intended to identify potential operational and safety improvements related to pedestrians and bicyclists to be considered by SCTPO staff and partner agencies (i.e. FDOT District Five (D5), Brevard County, City of Cocoa, SCAT, local law enforcement). Some

improvements presented in this report may be implemented as maintenance-type activities while other suggested safety improvements may be considered for future study.

Each suggestion identified in this study is classified into one of three categories:

- Maintenance – issues identified for maintenance may be addressed by public agency staff on a short timeframe and at a relatively low cost.
- Near-Term Improvement (within 3 to 5 years) – activities that may be incorporated into an upcoming construction project in the area, including 3R milling and resurfacing projects.
- Long-Term Improvement (5+ years) – activities that may be incorporated into upcoming construction projects and may need to be programmed for funding as separate projects.

The issues and suggested improvements reflect the consensus of the pedestrian/bicycle safety review team and not necessarily that of the SCTPO.

The field review was conducted on Tuesday September 1<sup>st</sup>, 2015. The team met in the morning at the Cocoa Agriculture Center to discuss the study corridor and crash history. After lunch, the study team drove the entire corridor, south to north then north to south, to gain an understanding of the facility characteristics from a driver's perspective. The team was divided up to walk the length of sidewalk along both sides of the roadway. The team reassembled in the evening, after sunset, to make observations in nighttime conditions. A follow-up debrief meeting was held at the Cocoa Agriculture Center the following morning (September 2<sup>nd</sup>) to discuss the corridor's issues and potential improvements identified by the team. Study corridor characteristics are reviewed below:

- Dixon Boulevard to Michigan Avenue – 1.04 miles;
- The posted speed along the study corridor is 45 mph;
- SR 501 is a five-lane facility with a center two-way left-turn lane;
- No bicycle lanes present along the length of the study corridor;
- Type F curb along the length of the study corridor;
- Continuous sidewalks on the east and west side of the roadway;
- Intermittent highway lighting is provided on both sides of SR 501 throughout the study limits;
- Three (3) signalized intersections at Dixon Boulevard, Rosetine Street, and Michigan Avenue:
  - Dixon Boulevard:
    - One northbound left-turn lane operating under protected-permitted phasing;
    - One southbound left-turn lane operating under protected-permitted phasing;
    - One eastbound left-turn lane operating under protected-permitted phasing;
    - One westbound left-turn lane operating under protected-permitted phasing;
    - Old version of special emphasis crosswalks on all four legs;
    - Standard School Crossing Assembly (S1-1 and W16-7P) located at the crosswalk on the north and south legs;
    - School sign (S1-1) located at the crosswalk on the east and west legs;
    - All crosswalks include pedestrian actuated signals with push buttons and countdown timers;
    - Continuous sidewalks in all directions;
    - Overhead street lighting is present at the intersection.
  - Rosetine Street/Tate Street:
    - One northbound left-turn lane operating under protected phasing;

- One southbound left-turn lane operating under protected phasing;
  - Old version of special emphasis crosswalks on the north, east, and west legs;
  - Standard School Crossing Assembly (S1-1 and W16-7P) located at the crosswalk on the north and west legs;
  - All crosswalks include pedestrian actuated signals with push buttons and countdown timers;
  - Continuous sidewalks along both sides of SR 501 (north and south legs), and sidewalks along the north side Rosetine Street/Tate Street (east and west legs);
  - Overhead street lighting is present at the intersection.
- Michigan Avenue:
  - One northbound left-turn lane operating under protected phasing;
  - One southbound left-turn lane operating under protected phasing;
  - One eastbound left-turn lane and one eastbound shared through/left-turn lane operating under split phasing;
  - One westbound left-turn lane operating under split phasing;
  - Special emphasis crosswalk markings on all four legs of the intersection;
  - Standard School Crossing Assembly (S1-1 and W16-7P) located at the crosswalk on the south leg;
  - School sign (S1-1) located at the crosswalk on the west leg;
  - All crosswalks include pedestrian actuated signals with push buttons and countdown timers;
  - Continuous sidewalks along both sides of south leg (SR 501); continuous sidewalk on the west side of north leg (SR 501); continuous sidewalks along the south side of east and west legs (Michigan Ave);
  - Overhead street lighting is present at the intersection.
- The Brevard County Central Area Adult Education Center (BCCAEC) is located on the west side of SR 501, approximately 0.15 miles north of Dixon Boulevard:
  - Clearlake Middle School used to occupy this location and closed in 2013;
  - The students transitioned to Cocoa High School; and
  - 20 MPH When Flashing overhead school zone signage (FTP-31-06) is located on both the north and south approaches; however, the flashing beacons are no longer active.
- The unsignalized intersection at SR 501 and Clearlake Court, in the vicinity of the BCCAEC, has a crosswalk with the old special emphasis markings on the uncontrolled, south leg:
  - Standard School Crossing Assemblies (S1-1 and W16-7P) are located along the northbound and southbound approaches of SR 501.
- Cocoa High School is located approximately 0.75 miles to the west of SR 501 (along Rosetine Street/Tiger Trail):
  - School hours: 8:40 AM – 3:30 PM;
  - Early Release on Wednesdays at 2:15 PM; and
  - 15 MPH school zone from 8:15-8:45 AM and 3:00-3:30 PM signage (FTP-35-06 and FTP-30-06).
- Cambridge Elementary School is approximately 0.25 miles to the east of SR 501 off Tate Street:
  - School hours: 7:30 AM – 3:00 PM ;
  - Early Release on Wednesdays at 1:30 PM; and
  - 15 MPH school zone from 7:00-8:00 AM and 2:25-2:55 PM signage (FTP-35-06 and FTP-30-06).
- Eastern Florida State College is located on the west side of SR 501, approximately 0.25 miles south of Michigan Avenue:

- A southbound bus pullout is provided adjacent to the southbound lanes along SR 501 (approximately 600 feet in length).
- Residential areas (single family homes, apartments, etc.) are present within the immediate vicinity of the study corridor.

### Crash History (2009 – 2014)

Six (6) years of available pedestrian and bicycle related crash data, 2009 to 2014, were utilized for the SR 501 crash analysis. Crash data was obtained from two sources: 1. The FDOT Crash Analysis Reporting System (CARS) database from 2009 to 2013 and 2. The Signal Four Analytics database, maintained by University of Florida from 2009 to 2014. The 2014 CARS data was not yet FDOT certified at the time this study was initiated, thus the reason for six years of crash data instead of the traditional five. The 2014 FDOT CARS data was approved in Summer 2015. The additional crashes from the Signal Four database supplemented the CARS data along SR 501. Collision diagrams were created along the corridor to summarize the pedestrian/bicycle-related crash history. The collision diagrams are included in **Appendix A**.

Thirty-one (31) pedestrian or bicycle-related crashes were reported over the six-year study period, 42 percent of which involved pedestrians (13 crashes) and 58 percent of which involved bicyclists (18 crashes). Of the 31 pedestrian and bicycle crashes, there were two (2) fatal crashes (10 percent) and 24 injury crashes (81 percent). Of the 24 injury crashes, 14 were bicycle and 10 were pedestrian related. The two (2) fatal pedestrian crashes (both during dark non-lighted conditions) are summarized below (summarized from south to north):

- Crash Number 837291430
  - On December 12, 2013 at 8:10 PM, a crash involving a pedestrian and two vehicles occurred near the intersection of SR 501 and Melrose Street under dark non-lighted conditions. The pedestrian was attempting to cross SR 501 from east to west at a non-signalized intersection with no marked pedestrian crossing. Two vehicles were travelling north on SR 501 in the inside lane at approximately 45 miles per hour and collided with the pedestrian. The first vehicle struck the pedestrian, knocking him to the ground. The second vehicle that was behind the first vehicle drove over the pedestrian. The pedestrian suffered fatal injuries due to impact of the crash. There was no suspected alcohol or drug use by either of the drivers. The deceased pedestrian's toxicology reports revealed a blood alcohol content (BAC) of 0.21.
- Crash Number 837123520
  - On April 3, 2014 at 10:05 PM a crash involving a pedestrian and a vehicle occurred south of Rosetine Street under dark non-lighted conditions. Two pedestrians were attempting to cross SR 501 from west to east at an unmarked mid-block crossing. The vehicle was travelling north on SR 501 in the outside lane at approximately 45 miles per hour and collided with one of the pedestrians. The deceased pedestrian's toxicology reports indicated a BAC of 0.22 and also tested positive for drug use.

The reported crashes are displayed by different measures of time (such as year, month, day, and hour) in **Figure 2** to **Figure 5**.

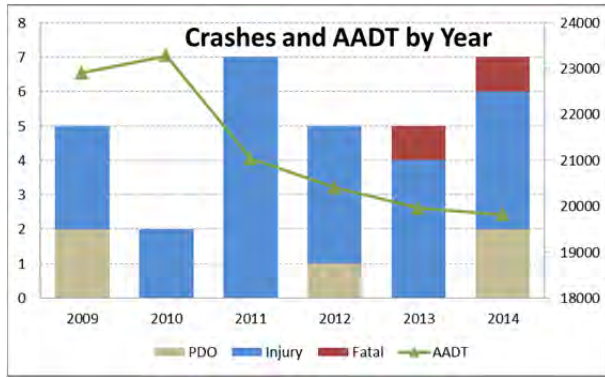


Figure 2

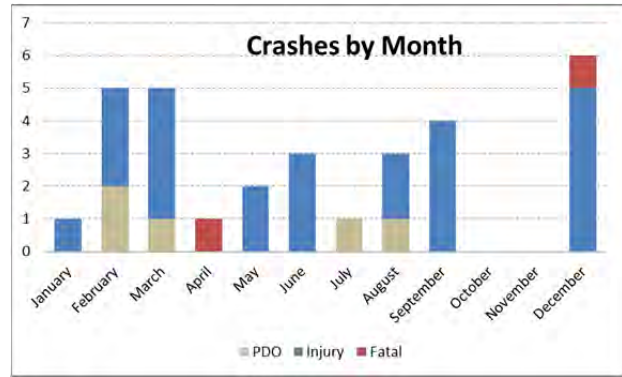


Figure 3

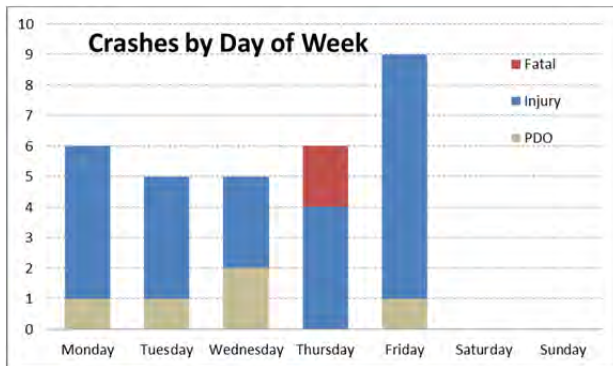


Figure 4

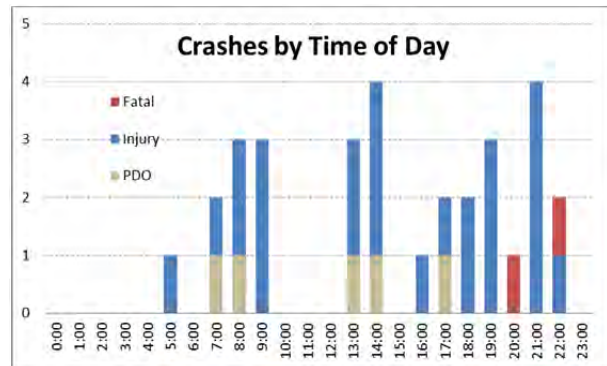


Figure 5

Overall, the number of pedestrian and bicycle crashes per year varied between two (2) crashes and seven (7) crashes. Over the six-year time period, crashes have remained steady or slightly increased while the Average Annual Daily Traffic (AADT) along the corridor has decreased. Eighteen (18) crashes (58 percent) occurred between the months of December and March. All pedestrian and bicycle crashes occurred on weekdays, with no reported crashes on Saturday or Sunday. The corridor’s two (2) fatal crashes occurred in the evening between 8:00 PM - 10:00 PM.

The reported crashes are displayed by lighting condition and by alcohol or drug involvement in **Figure 6** and **Figure 7**. Approximately 65 percent of crashes (20) occurred under normal daylight conditions, and 32 percent under dark conditions (six crashes with street lights, four under dark non-lighted conditions). One (1) crash occurred at dusk. Two (2) crashes involved alcohol and one crash involved both alcohol and drugs. Of the two (2) alcohol-related crashes, one involved a bicycle (injury crash) and one involved a pedestrian (fatal crash). The crash involving alcohol and drugs was a pedestrian crash resulting in one fatality.



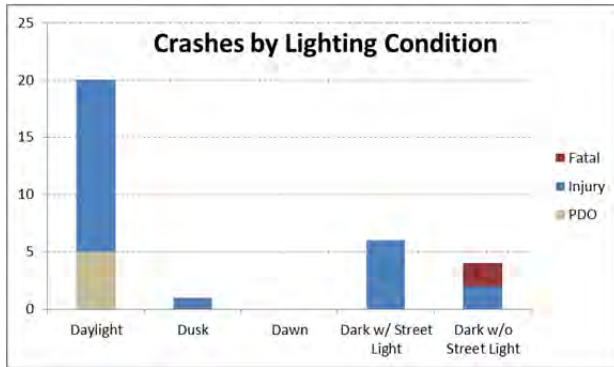


Figure 6

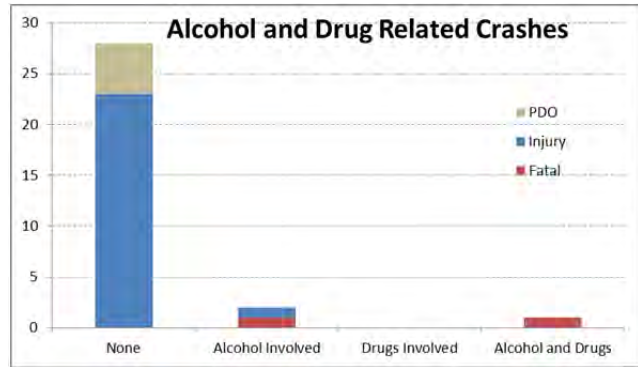


Figure 7

A few other crash statistics worthy to note:

- 18 bicycle crashes:
  - Ten (10) crashes involved bicycles traveling against the flow of traffic on the sidewalk and were struck by a vehicle leaving the side street;
  - Nine (9) of the bicycle crashes involved bicyclists 21 years old or younger; and
  - In 10 of the 18 bicycle crashes, the bicycle had the right-of-way.
- 13 pedestrian crashes
  - Six (6) of the 13 pedestrian crashes involved pedestrians 21 years old or younger; and
  - In two (2) of 13 pedestrian crashes, the pedestrian had the right-of-way; and
- Thirteen (13) of 31 crashes occurred at signalized intersections, while the remaining 18 crashes occurred at unsignalized intersections or mid-block locations.

The locations of reported crashes are shown in the collision diagrams (see **Appendix A**) and are summarized as follows:

- Signalized Intersections – Thirteen (13) crashes occurred at signalized intersections.
  - Dixon Boulevard
    - One (1) pedestrian crash
      - Pedestrian was walking westbound in north leg's crosswalk and struck by a right-turning vehicle. The pedestrian had the right-of-way in the incident. No injuries or fatalities were reported.
  - Rosetine Street/Tate Street
    - Three (3) pedestrian crashes
      - One (1) pedestrian crash occurred outside of a marked crosswalk to the south of Rosetine Street. The pedestrian attempted to cross SR 501 from the west and was struck in the outside northbound lane. The pedestrian was under the influence at the time of the incident. The crash resulted in a fatality.
      - One (1) pedestrian was walking southbound in the east crosswalk on Tate Street at night and was struck by a westbound right-turning vehicle. The incident resulted in an injury and the pedestrian involved was 19 years old.
      - One (1) pedestrian crash occurred mid-block just north of Rosetine Street when a pedestrian attempted to cross SR 501 from the east side

- at night. The pedestrian was struck in the southbound left-turn lane. This incident resulted in an injury.
- Three (3) bicyclist crashes
    - Two (2) crashes involved a bicyclist riding southbound along the sidewalk, against the flow of traffic. The bicyclists were struck by westbound right-turning vehicles along Tate Street. Both incidents resulted in injury and involved bicyclists 21 years old or younger.
    - One (1) crash involved a westbound vehicle, just west of the SR 501 along Rosetine Street. A bicyclist was riding northbound across Rosetine Street and was struck by the westbound vehicle, resulting in an injury.
  - Michigan Avenue
    - Three (3) pedestrian crashes
      - One (1) crash involved a northbound pedestrian attempting to cross Michigan Avenue in the crosswalk on the east side of the intersection. The pedestrian was struck by a southbound vehicle attempting a left-turn onto Michigan Avenue. The vehicle had the right-of-way at the time of the collision. The incident occurred at night and resulted in one injury. The pedestrian involved was 20 years old.
      - One (1) crash involved an eastbound pedestrian crossing in the crosswalk on the south leg and was struck by an eastbound vehicle attempting to make a right-turn onto SR 501. The pedestrian had the right-of-way at the time of the incident. The crash occurred at night and resulted in one injury.
      - Pedestrian was jogging southbound across the east leg of Michigan Avenue and was struck by a westbound vehicle. The police report does not indicate whether or not the pedestrian was jogging within the crosswalk. Incident resulted in injury.
    - Three (3) bicyclist crashes
      - One (1) crash occurred when a bicyclist was traveling southbound in the northbound travel lanes of SR 501 and was struck by a westbound vehicle attempting a right-turn onto SR 501. The crash resulted in injury.
      - One (1) crash involved a bicyclist traveling northbound. The bicyclist ran into a westbound vehicle making a right-turn onto SR 501 struck the vehicle on the driver side door. The crash occurred at night and resulted in one injury.
      - Bicyclist was riding northbound along SR 501's east sidewalk and was struck by a right-turning vehicle exiting a gas station parking lot. Incident resulted in injury and occurred at night. The bicyclist was 14 years old.
  - Segments – The remaining eighteen (18) crashes occurred at unsignalized intersections or at mid-block locations. Mid-block locations with more than one (1) crash or that involved a pedestrian or bicyclist under the age of 21 are further detailed below (locations shown from south to north):
    - Clearlake Middle School area (South of Clearlake Court to Loring Street)
      - Four (4) bicycle crashes

- Two (2) bicycle crashes where the bicycle was riding southbound against the flow of traffic on the east sidewalk along SR 501. The bicycle was struck by a vehicle leaving the side street. One of these crashes resulted in injury and involved a 13 year old bicyclist.
- One (1) bicycle crash involved a bicyclist traveling southbound on the western sidewalk along SR 501 and was struck by a mirror of southbound vehicle. This crash occurred at night and resulted in one injury.
- One (1) bicycle crash occurred just south of Clearlake Court and involved a northbound bicyclist traveling on the eastern sidewalk along SR 501. The bicyclist left the sidewalk and traveled into the northbound travel lanes of SR 501 and was struck by a vehicle. This incident resulted in one injury and involved a 13 year old bicyclist.
- Two (2) pedestrian crashes
  - One (1) pedestrian crash occurred just north of Loring Street and involved a pedestrian attempting to cross SR 501. The pedestrian's direction of travel is unknown and the vehicle fled the scene. The incident resulted in one injury. The pedestrian involved was 14 years old.
  - One (1) pedestrian crash occurred in the area of Clearlake Middle School (exact location is unknown) and involved a pedestrian attempting to cross SR 501 from the east side of the road and was struck by a southbound vehicle in the inside lane. The crash resulted in one injury. The pedestrian involved was 21 years old.
- Near Highland Court
  - Two (2) pedestrian crashes
    - One (1) pedestrian crash occurred just north of Highland Court and involved a pedestrian attempting to cross SR 501 mid-block from the west side of the roadway in a motorized wheel chair. The pedestrian was struck by southbound vehicles in the inside lane. This crash resulted in an injury.
    - One pedestrian crash involved a four year old attempting to board a bus at the bus stop just south of Highland Court. The bus driver did not see the boy and closed the door and drug the child approximately three feet along the side of the bus. The incident resulted in an injury.
- Mid-block near Licht Street
  - One (1) pedestrian crash
    - The pedestrian darted out from the center median turn lane of SR 501 (eastbound) just south of Licht Street. A northbound vehicle struck the pedestrian in the outside lane.
    - The crash occurred under wet roadway surface conditions and resulted in one injury.
    - The pedestrian was four years old.
  - One (1) bicycle crash
    - The bicyclist attempted to cross SR 501 from the east side of the roadway just north of Ruth Street. A southbound vehicle struck the bicyclist in the inside lane.

- The incident resulted in one injury.
- Clearlake Village Apartment Complex (1514 Clearlake Road)
  - Two (2) bicycle crashes
    - Both crashes occurred when bicyclist was travelling against the flow of traffic on east sidewalk along SR 501 and struck by vehicle exiting the apartment complex.
    - No injuries or fatalities were reported in these incidents. One crash involved a 13 year old bicyclist and one involved an 18 year old bicyclist.
- University Lane
  - One (1) bicycle crash
    - The bicyclist attempted to cross SR 501 from the west side of the roadway near University Lane. A southbound vehicle struck the bicyclist with its right front bumper. The exact lane where the collision occurred is unknown. The bicyclist was 14 years old and was not injured as a result of the incident.
- Speedway Gas Station, just north of University Lane
  - Three (3) bicycle crashes
    - All three crashes occurred when bicyclists were travelling southbound against the flow of traffic on SR 501's east sidewalk and struck by a right-turning vehicle exiting one of the driveways.
    - One crash occurred at night and all three crashes resulted in one injury each.
    - One crash involved a 20 year old bicyclist.

## PEDESTRIAN/BICYCLE FIELD REVIEW FINDINGS

### Transit Related Improvements

Space Coast Area Transit (SCAT) recently completed the Bus Stop Americans with Disabilities Act (ADA) Assessment Report for every transit stop within their network. The Clearlake Road study corridor has seven transit stops reviewed as part of this assessment. The recommendations from the ADA report are summarized below:

#### Highland Court Southbound

- Pave a level 5'x2' slab between the curb and sidewalk to complete a 5'x8' boarding and alighting (B&A) area; and
- Consider relocating the bus stop approximately 600' south based upon the suggestion included in **Issue #15** (SCAT ADA study recommended relocation 550' south).

#### Highland Court Northbound

- Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area;
- Locate the pole with the bus schedule adjacent to the pavement so it is accessible; and
- Consider relocating the bus stop approximately 600' south based upon the suggestion included in **Issue #15** (SCAT ADA study recommended relocation 480' south).

#### Minnie Street Southbound

- Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area;
- Locate the pole with the bus schedule adjacent to the pavement so it is accessible;
- Add detectable warnings to the nearby curb ramps; and
- Stripe a crosswalk at the nearby intersection.

#### Melrose Street Northbound

- Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area;
- Move the bench so that it is flush with the edge of the sidewalk and outside of the B&A area; and;
- Stripe a crosswalk at the nearby intersection.

#### Eastern Florida State College Northbound

- Pave a level 5'x2' slab between the curb and sidewalk and a 5'x1' slab behind the sidewalk to complete a 5'x8' B&A area;
- Move the bench so that it is flush with the edge of the sidewalk and outside of the B&A area;
- Add detectable warnings to the nearby curb ramp; and
- Consider relocating the bus stop 180' south based upon the suggestion included as part of **Issue #20** (SCAT ADA study recommended relocation of the northbound stop 900' south).

### Michigan Avenue Southbound

- Move the stop 50' north;
- Pave a level 5'x8' for the B&A area and connect to the existing sidewalk; and
- Move the bench so that it is flush with the edge of the sidewalk and outside of the B&A area.

### Michigan Avenue Northbound

- Move the stop 50' north; and
- Pave a level 5'x2' slab between the curb and sidewalk and a 5'x1' slab behind the sidewalk to complete a 5'x8' B&A area.

The detailed ADA bus stop sheets from the assessment report are located in **Appendix B**.

Location: Corridor-Wide

**Issue #1: Corridor Lighting**



Figure 8



Figure 9

**Description of Issue:**

The crash statistics showed 35 percent of the pedestrian/bicycle crashes, including both fatal pedestrian crashes, occurred during non-daylight conditions. Intermittent corridor lighting is provided along SR 501's west side only between Dixon Avenue and the Brevard County Central Area Adult Education Center (BCCAAEC), and between Rosetine Street to Michigan Avenue. Corridor lighting is not provided between BCCAAEC and Rosetine Street (Brevard County jurisdiction). During the nighttime field review, the study team observed inconsistent lighting levels along the corridor, making it difficult to see pedestrians or bicyclists along the corridor at night, especially those wearing dark clothing. **Figure 8** and **Figure 9** illustrate the lighting conditions the field review team observed. Ambient lighting from businesses on the corners contributed to the lighting conditions at the signalized intersections.

**Suggestions for Improvement:**

The following are considerations for lighting along the corridor:

- Consider upgrading the lighting at the signalized intersections to meet the requirements of section 7.3.2.2 in Volume 1 of the FDOT PPM. This may require the existing lighting to be replaced.
- Consider conducting field measurements of existing lighting levels in the areas along the corridor with existing lighting to evaluate lighting uniformity levels and add lighting where necessary.
- Consider conducting a lighting justification study along unlit portions of the corridor to determine if additional lighting is justified.

Currently there are no projects programmed in the FDOT 5-year Work Program along the study limits of SR 501.

Location: Corridor-Wide

**Issue #2: Crosswalk Markings**



Figure 10



Figure 11



Figure 12



Figure 13

**Description of Issue:**

Marked crosswalks are not included along any of the minor street approaches at the unsignalized intersections throughout the corridor (see **Figure 10** and **Figure 11**). This was observed along the east and west sides of the study corridor. Inclusion of standard crosswalks at the unsignalized intersections and major driveways may give better indication to drivers that pedestrians may be present.

Crosswalk markings at some signalized intersections are beginning to wear (illustrated in **Figure 12**). The crosswalks at the signalized intersections south of Michigan Avenue (Dixon Boulevard and Rosetine/Tate Street) are marked with the old standard emphasis markings (shown in **Figure 13**).

**Suggestions for Improvement:**

Consider marking all minor street approaches at unsignalized intersections along the corridor. Standard crosswalk markings as shown on sheet 9 of the FDOT Design Standard Index 17346 should be used for the unsignalized crossings. Special emphasis markings as shown on sheet 9 of Design Index 17346 should be used for the signalized crossings at Dixon Boulevard and Rosetine/Tate Street.



Location: Corridor-Wide

**Issue #3: Detectable Warning Surfaces**



Figure 14



Figure 15



Figure 16



Figure 17

**Description of Issue:**

The detectable warning surfaces appear to be nailed down into the concrete. As a result, many of the surfaces have been displaced from the curb ramps at both signalized and unsignalized intersection locations. These displacements and absences of the detectable warning surfaces are shown in **Figure 14** through **Figure 17**.

The pedestrian facilities at the intersection of SR 501 at Michigan Avenue were upgraded in 2012. Crosswalks were added to the north and east legs of the intersection. As part of the pedestrian facilities improvements, new detectable warning surfaces were installed. An example of an installed detectable warning surface at the Michigan Avenue intersection is shown in **Figure 18**.



**Figure 18**

**Suggestions for Improvement:**

Consider replacing/installing detectable warning surfaces per FDOT standard index 304 at both the signalized and unsignalized crossings south of the Michigan Avenue intersection.

**Location: Corridor-Wide****Issue #4: Two-Way Left-Turn Lane****Figure 19****Description of Issue:**

A 12-foot center two-way left-turn lane (TWLTL) is provided along the length of SR 501. The center two-way left-turn lane is an area of conflict between pedestrians/bicyclist and vehicles as pedestrians and bicyclists were observed using the center TWLTL as a refuge to cross SR 501 (**Figure 19**). This creates issues when drivers utilize the center TWLTL.

**Suggestions for Improvement:**

Consider conducting a study to evaluate opportunities to install raised medians providing pedestrian refuge at select locations along the corridor. A raised center median would provide a safer refuge for pedestrians than the existing center TWLTL. The raised medians could be implemented in phases:

- Near-term – Select locations with a raised median in the TWLTL
- Long-term – Convert the road to a 4-lane divided cross-section

**Location: Corridor-Wide**

**Issue #5: Driveway Density**



**Figure 20**

**Description of Issue:**

In some cases, businesses have multiple driveways facilitated by the TWLTL (**Figure 20**). The high driveway density increases exposure of sidewalk users to conflicts with turning vehicles.

**Suggestions for Improvement:**

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.

Location: Corridor-Wide

**Issue #6: Bicycle Lanes**



Figure 21



Figure 22



Figure 23



Figure 24

**Description of Issue:**

Over half of the bicycle crashes involved bicyclist riding along the sidewalk and against the flow of traffic. Most bicyclists observed in the field were riding along the sidewalks. Examples of the observed bicycle activity are illustrated in **Figure 21** and **Figure 22**. No bicycle lanes are provided along the length of the corridor as shown in **Figure 23** and **Figure 24**. No paved shoulders are provided as curb and gutter is present along the length of the corridor. Bicyclists may not feel safe or comfortable riding in the travel lanes as the posted speed is 45 mph.

**Suggestions for Improvement:**

The existing cross section includes two 12-foot northbound and southbound travel lanes and one 12-foot center TWLTL (60 total feet of pavement). Section 8.4.1 of the FDOT *Plans Preparation Manual (PPM)* states that travel lanes shall be 11 feet with 7-foot buffered bike lanes along divided roadways  $\leq 45$  mph in or within one mile of an urban area. Based upon the existing pavement, there is not adequate width to accommodate buffered bike lanes in addition to the four 11-foot travel lanes and center TWLTL without adjusting the existing curb line.

The following options were discussed by the safety review team:

- Four-Lane Undivided Road – remove the 12-foot median and establish four 11.5-foot lanes with 7-foot buffered bike lanes.
- Lane Elimination – reduce the cross-section to a two-lane, divided road with buffered bike lanes and wider sidewalks.
- Bus-Bike Lane – repurpose the outside lane to be a dedicated bus-bike lane.
- Road Widening – widen the road to provide four lanes divided by a raised median with buffered bike lanes.

Each of these options discussed has its pros and cons when considering safety and operations. There are many trip attractors along the SR 501 corridor and removing the center TWLTL will likely increase left-turn and rear-end crashes for vehicles along SR 501.

In 2014, the AADT along SR 501 to the south of Michigan Avenue was 20,000 and the corridor has seen a historical high AADT of 26,500. Based upon the Federal Highway Administration's (FHWA) *Road Diet Informational Guide*, it is suggested that roadways with an ADT of 20,000 or less may be good candidates for a Road Diet and should be evaluated for feasibility. Feasibility is also less likely from an operational perspective if the peak hour peak directional volume is greater than 875 vehicles. The peak hour peak directional volume along SR 501 would exceed this threshold, which also suggests that reduced arterial LOS is expected during the peak hour.

A PD&E study is under way along SR 501 to the north of Michigan Avenue proposing widening to a four lane divided facility with a 22' center median and buffered bike lanes. Cross-section continuity with the section to the north should be considered and first three options discussed by the group will not provide corridor continuity nor maintain driver expectancy along the SR 501 corridor to the north and south of Michigan Avenue. In order to provide buffered bike lanes and adequate median widths, a study should be considered to evaluate the feasibility of widening the road to provide enhanced access management, upgraded pedestrian/bicycle facilities, and corridor continuity with the SR 501 project to the north of Michigan Avenue.

Location: Corridor-Wide

**Issue #7: Pedestrian and Bicyclist Education**



Figure 25

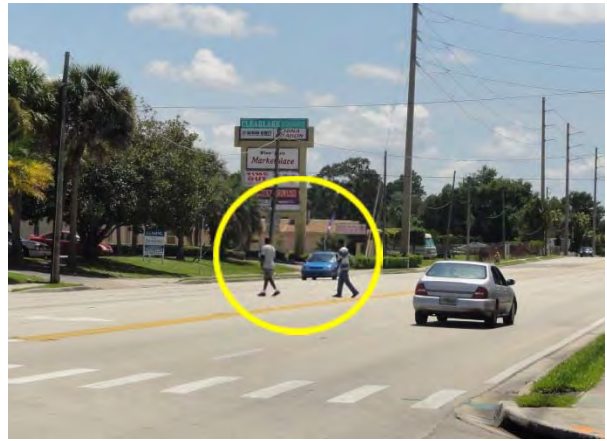


Figure 26



Figure 27

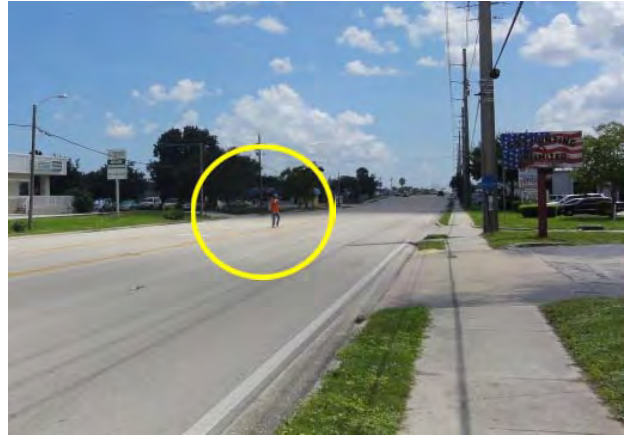


Figure 28

**Description of Issue:**

The field review team observed several instances where pedestrians chose to cross SR 501 at an unmarked and unsignalized location. As shown in **Figure 25** and **Figure 26** the pedestrians were observed crossing the south leg of the intersection of SR 501 and Dixon Boulevard less than 150 feet south of the marked signalized crosswalk location. In other instances, pedestrians were not as close to a signalized crosswalk and were observed crossing SR 501 and utilizing the center TWLTL as a pedestrian refuge (**Figure 27** and **Figure 28**).

During the nighttime review, the field review team observed bicyclists traveling without the use of helmets, lights, or reflectors. In some spots where corridor or intersection lighting is limited, it was difficult to see the bicyclists.

**Suggestions for Improvement:**

Consider opportunities to educate both pedestrians and bicyclists. A pedestrian and bicycle outreach program could be created to educate pedestrians and bicyclists about utilizing marked crosswalks, signalized crossings, legal crossing locations, helmets, etc. The safety review team discussed a potential

opportunity to use Space Coast Area Transit's (SCAT) Cocoa bus transfer station. Bicycle reflectors could be passed out and installed at the transfer station. Flyers could also be passed out to encourage good pedestrian and bicycle safety practices.



**Location: Corridor-Wide****Issue #8: Sidewalk/Landscape Maintenance****Figure 29****Figure 30****Description of Issue:**

There were instances where dirt from the adjacent landscaping had washed out onto the sidewalk, completely covering the concrete surface. This was observed on the east sidewalk on the northeast corner of the intersection of SR 501 and Dixon Boulevard. The material washed away from the slope in front of Walgreens. This also occurred on the east sidewalk on the northeast corner of the intersection of SR 501 and Clearlake Court (illustrated in **Figure 29**). A palm tree was observed encroaching over the sidewalk on the east side of SR 501 near the car wash.

The wooden retaining wall in front of the used car dealership on the northeast corner of the intersection of SR 501 and Melrose Street is falling apart and encroaching onto the sidewalk (shown in **Figure 30**).

**Suggestions for Improvement:**

Consider cleaning the sidewalk surfaces, trimming trees, and working with the FDOT and/or local business owners to replace/upgrade the landscaping slopes and retaining wall so that the sidewalk will remain free of debris. Coordination with FDOT is suggested to determine if the landscaping slopes and wooden walls are within the FDOT right-of-way. If the landscaping is within the FDOT right-of-way, coordination between FDOT and local business owners should occur to better maintain landscaping.

Location: Dixon Boulevard Intersection

**Issue #9: Crosswalk Alignment**



Figure 31



Figure 32

**Description of Issue:**

The crosswalk on the west leg does not connect to the pedestrian ramp on the northwest corner. Instead, the crosswalk connects to the drainage inlet on the northwest corner. This issue is shown in **Figure 31** and **Figure 32**.

**Suggestions for Improvement:**

Consider moving the eastbound stop bar back and restripe the crosswalk on the west leg so that the crosswalk directs pedestrians/bicyclists to the appropriate curb ramps.

**Location: Dixon Boulevard Intersection****Issue #10: Pedestrian Clearance Time****Description of Issue:**

The pedestrian clearance time is not adequate based upon the current *Manual on Uniform Traffic Control Devices (MUTCD)* guidance crossing the north, east, and south legs. According to the Brevard County signal timings for this intersection, 18 seconds of pedestrian clearance time is provided for all four crossings. These pedestrian clearance times were verified by the field review team.

Using the recommended walking speed of 3.5 feet per second as included in paragraph 7 of section 4E.06 of the *MUTCD*, a pedestrian clearance interval needs to be 18.6 seconds to accommodate a pedestrian walking across the 65 feet crossing on the east and south legs. A pedestrian clearance interval of 20 seconds is necessary to accommodate the 70 foot crossing distance on the north leg.

**Suggestions for Improvement:**

Consider altering the signal timings at the intersection to provide adequate pedestrian clearance times for the north, east, and south legs. According to the Brevard County signal timings, the maximum split time for the eastbound and westbound is 30 seconds. The combination of the pedestrian walk interval, suggested pedestrian clearance interval, yellow, and all red phases would exceed 30 seconds. Increasing the pedestrian clearance time for the crossings associated with the north and south legs will require an increase in the eastbound and westbound splits when the pedestrian phase is called.

The pedestrian clearance interval for the east leg should not require an increase in the overall split as the sum of the existing walk interval, suggested pedestrian clearance interval, yellow, and all red phases will not exceed the 50 second split provided for the northbound phase.

Location: School Zone Area in front of BCCAEC

**Issue #11: Overhead School Zone Structures**



Figure 33



Figure 34



Figure 35



Figure 36

**Description of Issue:**

The poles associated with the overhead signage/beacon for the School Zone and End of School Zone just south of Loring Street are both located within the sidewalk (**Figure 33** and **Figure 34**). The pole on the east side of SR 501 at the southernmost limits of the School Zone is also located within the sidewalk, limiting the effective sidewalk width at those locations.

The overhead School Zone signs and flashing beacon assembly previously served Clearlake Middle School. However, the school was closed in 2013 and replaced by the Brevard County Central Area Adult

Education Center (BCCAAEC). The overhead School Zone signage and flashing beacon assembly are still hanging on the span wire, as illustrated in **Figure 35** and **Figure 36**, but are not longer active. The presence of the inactive school zone may deliver an inconsistent expectation to pedestrians and motorists in the area.

**Suggestions for Improvement:**

Consider removing the poles and the associated School Zone signage, beacons, and pavement markings to increase effective sidewalk widths and improve pedestrian and driver expectancy within the area. The County is planning on removing the span wire and inactive beacons; however, the further coordination with the County and FDOT will be needed to remove the poles.

Location: Clearlake Court Intersection

**Issue #12: Mid-Block Crosswalk**



Figure 37

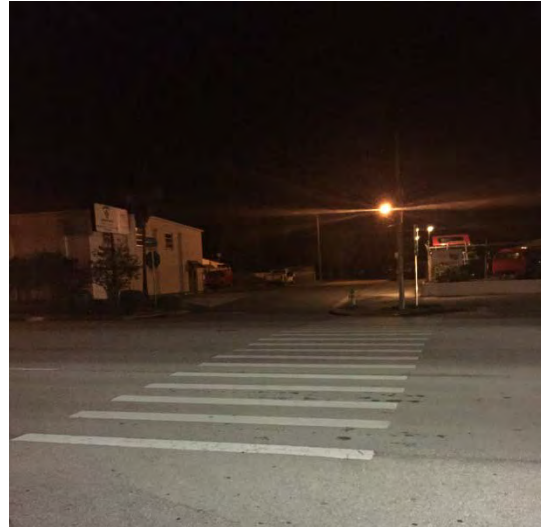


Figure 38

**Description of Issue:**

A mid-block crosswalk is present at the entrance to the BCCAEC, on the south side of the Clearlake Court intersection. The crosswalk is no longer attended by a crossing guard and would no longer be considered a school crossing once the school zone signs and pavement markings are removed. Pedestrian crossing activity was observed in the vicinity during the field review (**Figure 37**). **Figure 38** illustrates the lighting conditions at the crosswalk under night conditions. The fate of the mid-block crosswalk will need to be determined as part of the school zone removal (refer to **Issue #11: Overhead School Zone Structures**).

**Suggestions for Improvement:**

The team discussed allowing the mid-block crosswalk to remain to serve the existing crossing demand, but the following safety enhancements should be considered:

- Conduct a mid-block crossing study per Section 3.8 of the FDOT *Traffic Engineering Manual (TEM)* to evaluate if the crosswalk is still warranted based upon existing demands.
- Provide an active warning device, such as Rapid Rectangular Flashing Beacons (RRFB), at the crosswalk. RRFBs may also be used on the advance crosswalk signs per FHWA's interim approval memorandum. In-roadway warning lights activated by the RRFB may be considered as well. Standards and guidance from section 4N.02 in the *MUTCD* should be reviewed when considering in-roadway lights.
- Provide a median refuge island for pedestrians in the TWLTL.
- Install lighting on the crosswalk's west and east sides.
- Restripe the crosswalk with Special Emphasis Crosswalk markings consistent with sheet 10 of the FDOT Design Index 17346.

Location: Clearlake Court Intersection

**Issue #13: Sight Distance**



Figure 39



Figure 40



Figure 41

**Description of Issue:**

The existing landscaping (trees and bushes) on the northeast corner of the intersection blocks the available sight distance for vehicles attempting a westbound left-turn (Figure 39 and Figure 40). Vehicles

have to pull past the stop bar to look north to see past the landscaping. One related bicycle crash occurred at this location involving a westbound vehicle and a bicycle riding southbound along the east sidewalk (against the direction of traffic). Vehicles parked perpendicular to SR 501 in the parking area associated with the business on the southeast corner of the intersection block the available sight distance for westbound vehicles attempting a left-turn or right-turn onto SR 501. This is illustrated in **Figure 41**. Vehicles parking at the business were parked in the northernmost parking spaces and obstructed the view of drivers at the stop bar.

**Suggestions for Improvement:**

Trim the bushes and trees back within the existing FDOT right-of-way so that adequate sight distance is provided for westbound vehicles along Clearlake Court. Coordination with property owners should occur to trim or remove any landscaping outside of the existing FDOT right-of-way. Coordinate with the business to consider restricting or removing parking spaces on the northern end of the property to accommodate intersection sight distance.



**Location: Highland Court Intersection**

**Issue #14: Sight Distance**



**Figure 42**



**Figure 43**

**Description of Issue:**

The fence lines along SR 501 from Loring Street to Paradise Lane are directly adjacent to the sidewalk as shown in **Figure 42**. In most cases the fences are transparent enough that sight distance is not an issue. However, the fence on the southeast corner of the Highland Court intersection is not transparent and inhibits the available sight distance for westbound vehicles looking south and can be seen in **Figure 43**.

**Suggestions for Improvement:**

Consider conducting a sight distance evaluation at the intersection to determine the available sight distance at the intersection. Also, determine if the fence is on private property or within the FDOT right-of-way. If adequate sight distance is not provided, coordinate with the appropriate owner (FDOT or the land owner) to consider replacement, relocation, or removal of the fence. Sight distance could be improved with transparent fence materials.

**Location: Highland Court Intersection**

**Issue #15: Bus Stop Locations**



**Figure 44**



**Figure 45**

**Description of Issue:**

Bus stops are located near the northeast and southwest corners of the Highland Court intersection (shown in **Figure 44** and **Figure 45**, respectively). Pedestrian crossings were observed at this location associated with the transit stops. Pedestrians look for vehicle gaps to make their crossing and use the TWLTL as a refuge. However, the vertical curve of the roadway at this location limits sight distance for pedestrians crossing the street. Two pedestrians were hit near Highland Court and two near Loring Street (immediately to the south). All four pedestrian crossing crashes occurred during the day, involved southbound vehicles, and resulted in injury.

**Suggestions for Improvement:**

Consider relocating the bus stops at Highland Court approximately 600 feet south near Clearlake Court. This would improve pedestrian safety by putting the bus stops near a marked crosswalk and at a place with improved sight distance (further removed from the vertical curve). This suggestion is consistent with the SCAT ADA assessment but relocates the bus stops 100 to 200 feet further south than the existing report to take advantage of the existing mid-block crosswalk.

Location: Mid-Block between Furnari Street and Rosetine Street

**Issue #16: Loose Wiring**



Figure 46



Figure 47

**Description of Issue:**

Loose wiring associated with the pole on the northeast corner of the intersection of SR 501 at Furnari Street is rolled up on the ground adjacent to the sidewalk and man hole, posing a trip hazard to pedestrians at the intersection. This tripping hazard is illustrated in **Figure 47**.

**Suggestions for Improvement:**

Coordinate with the utility provider to remove the trip hazard.

Location: Mid-Block between Furnari Street to Rosetine Street

**Issue #17: Driveway Cross Slopes**



Figure 48



Figure 49

**Description of Issue:**

Level paths (i.e. cross slopes less than two percent) are not provided across the driveways along the west side of SR 501. The field review team measured driveways along this segment and most exceeded the maximum two percent cross slope per ADA requirements. Examples of driveways measured in the field are shown in **Figure 48** and **Figure 49**.

**Suggestions for Improvement:**

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.

**Location: Rosetine Street/Tate Street Intersection**

**Issue #18: Crosswalk**



**Figure 50**



**Figure 51**

**Description of Issue:**

No crosswalk is provided along the south leg of the intersection as shown in **Figure 50** and **Figure 51**. A fatal crash occurred on the intersection's south side when a pedestrian crossing the street at night was struck by a northbound vehicle. There is a drainage inlet on the southeast and southwest corners of the intersection. No sidewalks are provided along the south sides of the Rosetine Street/Tate Street.

The crosswalk on the north leg of the intersection is a designated school crosswalk and the existing markings do not meet the standard for school crosswalks as provided in the FDOT Design Index 17344. Cocoa High School is located to the west of SR 501 along Rosetine Street and Cambridge Elementary School is located to the east of SR 501 along Tate Street.

**Suggestions for Improvement:**

Consider moving the northbound stop bar back from the intersection to accommodate a crosswalk on the south leg of the intersection. The crosswalk could be angled to minimize impacts to the drainage inlets on the southeast and southwest corners of the intersection. If crosswalk is installed, provide the appropriate pedestrian facilities such as pedestrian signal heads with countdown times, push buttons, signage, etc. Should a crosswalk be installed on the south leg, consider installing sidewalks along the south side of Rosetine/Tate Street to provide better pedestrian connectivity. Restripe the north crosswalk (school crossing) in accordance with FDOT Design Indices 17344 and 17346.

Location: Rosetine Street/Tate Street Intersection

**Issue #19: Intersection Lighting**



Figure 52



Figure 53

**Description of Issue:**

Intersection lighting is provided on the northwest corner of the intersection. **Figure 52** and **Figure 53** show the intersection lighting conditions at night. Three of the six pedestrian and bicycle-related crashes occurred at night and all three crashes resulted in at least one injury and one involved a fatality.

**Suggestions for Improvement:**

Consider upgrading the lighting at the intersection to meet the requirements of section 7.3.2.2 in Volume 1 of the FDOT PPM. This may require the existing lighting to be replaced.

**Location: South of the Eastern Florida State College (EFSC) Main Entrance**

**Issue #20: Mid-Block Crosswalk**



**Figure 54**



**Figure 55**

**Description of Issue:**

An intersection study was conducted by FDOT in September 2014 at the intersection of SR 501 at EFSC. There is high pedestrian activity due to interactions between the residential land uses on the east side of SR 501, the college, and a major transit stop. A recommendation from the study was to install a marked mid-block crosswalk with a refuge island approximately 170' south of the main entrance to the EFSC. **Figure 54** and **Figure 55** illustrate SR 501 in the vicinity of the proposed crosswalk location. It was also recommended the transit stop on the north side of the Longwood Apartments be relocated to the proposed crosswalk location to encourage transit riders to utilize the crosswalk. A draft concept of the proposed crosswalk is included in **Appendix C**.

**Suggestions for Improvement:**

Coordinate with FDOT to determine the progress of this project. FDOT has mentioned that there are potential issues with the proposed location due to queue spillback from the northbound left-turn movement at the entrance to the college. The field review team noted some pedestrians crossing in the vicinity of this location and a marked crosswalk in this area may facilitate safer opportunities to cross for pedestrians, bicyclists, and transit users.

The team identified an alternative location approximately 400 feet south of the college entrance, just south of the Clearlake Village residential driveway. This location would minimize impacts to left-turn queues by removing the proposed crosswalk from active left-turn lanes (northbound and southbound). To accommodate this location, the existing southbound bus stop and shelter should be relocated 180 feet to the south, the northbound bus stop should be relocated 400 feet to the south, and a sidewalk connection from the relocated southbound bus stop into the campus should be provided. The City of Cocoa mentioned the potential development of the vacant parcel on the east side of the campus entrance and potential signalization of the intersection in the future. This location would also allow the mid-block crossing to remain if the main entrance to the campus were signalized in the future, as it would be more than 300 feet from adjacent crosswalks to the north or south. The potential mid-block location and bus stop relocation is illustrated in **Figure 56**.



Figure 56



Location: Michigan Avenue Intersection

**Issue #21: Intersection Lighting**



Figure 57

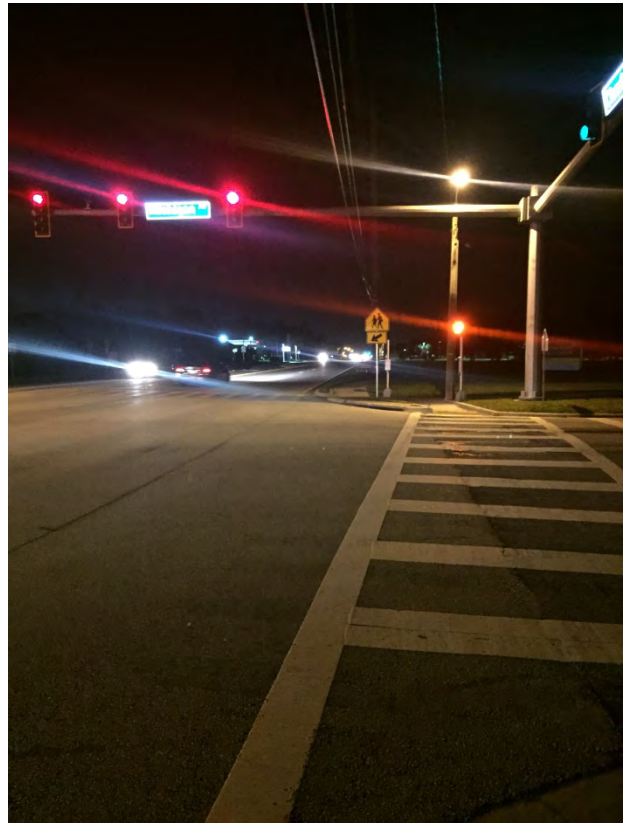


Figure 58

**Description of Issue:**

The intersection was recently upgraded from span wire to mast arms in addition to pedestrian facility upgrades. There was a light pole on the southwest corner of the intersection before the upgrades were made. Upon installation of the mast arm on the southwest corner, the light on that corner is blocked by the mast arm. **Figure 57** and **Figure 58** illustrate the location of the light pole and mast arm during daylight and nighttime conditions, respectively.

**Suggestions for Improvement:**

Consider upgrading the lighting at the intersection to meet the requirements of section 7.3.2.2 in Volume 1 of the FDOT PPM. This may require the existing lighting to be replaced.

**Location: Michigan Avenue Intersection**

**Issue #22: Pedestrian Countdown Signal Heads**

**Description of Issue:**

The field review observed the countdown pedestrian signals on the northeast corner of the intersection are not functioning properly. The walk indication is properly illuminated; however, the countdown numbers did not illuminate when crossing northbound on the east leg and when crossing eastbound along the north leg.

**Suggestions for Improvement:**

Dispatch a signal technician to review if all pedestrian countdown signals are working properly.

**Location: Michigan Avenue Intersection**

**Issue #23: Pedestrian Push Button Signage**

**Description of Issue:**

The field review observed a missing screw for the push button signage on the southwest corner of the intersection.

**Suggestions for Improvement:**

Replace the bottom screw on the push button signage on the southwest corner.

**Location: Michigan Avenue Intersection****Issue #24: Pedestrian Signal Timing/Phasing****Description of Issue:**

The walk phase associated with crossing the east and west legs of Michigan Avenue coincide with the SR 501 northbound/southbound phases. The pedestrian clearance interval terminates before the end of the northbound/southbound phases and the walk phase will not reactivate even if there is sufficient green time remaining on the northbound/southbound phase to allow for another pedestrian phase. As a result, pedestrians arriving after the start of green for the northbound/southbound phases experienced unnecessary delay. The maximum split time for the northbound/southbound phases is 60 seconds with 20 seconds of pedestrian clearance time needed.

**Suggestions for Improvement:**

Consider options to improve the response of walk phases during the northbound and southbound phases. Options to consider include:

- Reprogram the pedestrian phase times to take the full northbound/southbound phase; or
- Allow the Walk phase to activate after the start of green and extend the northbound/southbound phase to accommodate the pedestrian clearance time, if needed.

## Summary of Suggestions

This pedestrian/bicycle safety review considers operational and safety related issues for pedestrians and bicyclists on SR 501/Clearlake Road from Dixon Boulevard to Michigan Avenue. This study was commissioned by the SCTPO to develop suggestions to improve the safety of pedestrians and bicyclists within the study limits. Each suggestion identified in this study is classified into one of three categories:

- Maintenance – issues identified for maintenance may be addressed by public agency staff on a short timeframe and at a relatively low cost.
- Near-Term Improvement (within 3 to 5 years) – activities that may be incorporated into an upcoming construction project in the area, including 3R milling and resurfacing projects.
- Long-Term Improvement (5+ years) – activities that may be incorporated into upcoming construction projects and may need to be programmed for funding as separate projects.

A table containing the transit related improvements is provided on the next page. The tables following the transit table summarize the corridor suggestions by priority (maintenance, near-term, or long-term) of this study.

| Location                                 | Issue Number | Issue    | Suggestion   |
|--|--------------|----------|--|
| <b>TRANSIT RELATED</b>                   |              |          |  |
| Highland Court Intersection              | 15           | Bus Stop | Consider relocating the bus stops at Highland Court approximately 600 feet south near Clearlake Court. This would improve pedestrian safety by putting the bus stops near a marked crosswalk and at a place with improved sight distance (further removed from the vertical curve). This suggestion is consistent with the SCAT ADA assessment but relocates the bus stops 100 to 200 feet further south than the existing report to take advantage of the existing mid-block crosswalk. |
| Highland Court Southbound                | N/A          | Bus Stop | Pave a level 5'x2' slab between the curb and sidewalk to complete a 5'x8' boarding and alighting (B&A) area; and Consider relocating the bus stop south based upon the recommendation included in <b>Issue #15</b> (ADA study recommended relocation 550' south).  |
| Highland Court Northbound                | N/A          | Bus Stop | Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area; Locate the pole with the bus schedule adjacent to the pavement so it is accessible; and Consider relocating the bus stop south based upon the recommendation included in Issue #15 (ADA study recommended relocation 480' south).  |
| Minnie Street Southbound                 | N/A          | Bus Stop | Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area; Locate the pole with the bus schedule adjacent to the pavement so it is accessible; Add detectable warnings to the nearby curb ramps; and Stripe a crosswalk at the nearby intersection.   |
| Melrose Street Northbound                | N/A          | Bus Stop | Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area; Move the bench so that it is flush with the edge of the sidewalk and outside of the B&A area; and; Stripe a crosswalk at the nearby intersection.  |
| Eastern Florida State College Northbound | N/A          | Bus Stop | Pave a level 5'x2' slab between the curb and sidewalk and a 5'x1' slab behind the sidewalk to complete a 5'x8' B&A area; Move the bench so that it is flush with the edge of the sidewalk and outside of the B&A area; and Add detectable warnings to the nearby curb ramps; and Consider relocating the bus stop south based upon the recommendation included as part of Issue #20 (ADA study recommended relocation of the northbound stop 900' south).                                |
| Michigan Avenue Southbound               | N/A          | Bus Stop | Move the stop 50' north; Pave a level 5'x8' for the B&A area and connect to the existing sidewalk; and Move the bench so that it is flush with the edge of the sidewalk and outside of the B&A area.   |
| Michigan Avenue Northbound               | N/A          | Bus Stop | Move the stop 50' north; and Pave a level 5'x2' slab between the curb and sidewalk and a 5'x1' slab behind the sidewalk to complete a 5'x8' B&A area.  |

| Location  | Issue Number | Issue                             | Suggestion   |
|---|--------------|-----------------------------------|--|
| MAINTENANCE                                     |              |                                   |  |
| Corridor Wide                                   | 2            | Crosswalk Markings                | Consider marking all minor street approaches at unsignalized intersections along the corridor. Standard crosswalk markings as shown on sheet 9 of the FDOT Design Standard Index 17346 should be used for the unsignalized crossings. Special emphasis markings as shown on sheet 9 of Design Index 17346 should be used for the signalized crossings at Dixon Boulevard and Rosetine/Tate Street.   |
| Corridor Wide                                   | 3            | Detectable Warning Surfaces       | Consider replacing/installing detectable warning surfaces per FDOT standard index 304 at both the signalized and unsignalized crossings south of the Michigan Avenue intersection.   |
| Corridor Wide                                   | 8            | Sidewalk/Landscaping Maintenance  | Consider cleaning the sidewalk surfaces, trimming trees, and working with the FDOT and/or local business owners to replace/upgrade the landscaping slopes and retaining wall so that the sidewalk will remain free of debris. Coordination with FDOT is recommended to determine if the landscaping slopes and wooden walls are within the FDOT right-of-way. If the landscaping is within the FDOT right-of-way, coordination between FDOT and local business owners should occur to better maintain landscaping.                               |
| Dixon Boulevard Intersection                    | 9            | Crosswalk Alignment               | Consider moving the eastbound stop bar back and restripe the crosswalk on the west leg so that the crosswalk directs pedestrians/bicyclists to the appropriate curb ramps.   |
| Dixon Boulevard Intersection                    | 10           | Pedestrian Clearance Times        | Consider altering the signal timings at the intersection to provide adequate pedestrian clearance times for the north, east, and south legs. Using the recommended walking speed of 3.5 feet per second as included in paragraph 7 of section 4E.06 of the MUTCD, a pedestrian clearance interval needs to be 18.6 seconds to accommodate a pedestrian walking across the 65 feet crossing on the east and south legs. A pedestrian clearance interval of 20 seconds is necessary to accommodate the 70 foot crossing distance on the north leg. |
| Clearlake Court Intersection                    | 13           | Sight Distance                    | Trim the bushes and trees back within the existing FDOT right-of-way so that adequate sight distance is provided for westbound vehicles along Clearlake Court. Coordination with property owners should occur to trim or remove any landscaping outside of the existing FDOT right-of-way. Coordinate with the business to consider restricting or removing parking spaces on the northern end of the property to accommodate intersection sight distance.   |
| Highland Court Intersection                     | 14           | Sight Distance                    | Consider conducting a sight distance evaluation at the intersection to determine the available sight distance at the intersection. Also, determine if the fence is on private property or within the FDOT right-of-way. If adequate sight distance is not provided, coordinate with the appropriate owner (FDOT or the land owner) to consider replacement, relocation, or removal of the fence. Sight distance could be improved with transparent fence materials.  |
| Mid-Block between Furnari Street and Fay Street | 16           | Loose Wiring                      | Coordinate with the utility provider to remove the trip hazard.  |
| Michigan Avenue Intersection                    | 22           | Pedestrian Countdown Signal Heads | Dispatch a signal technician to review if all pedestrian countdown signals are working properly.   |
| Michigan Avenue Intersection                    | 23           | Pedestrian Push Button Signage    | Replace the bottom screw on the push button signage on the southwest corner.   |

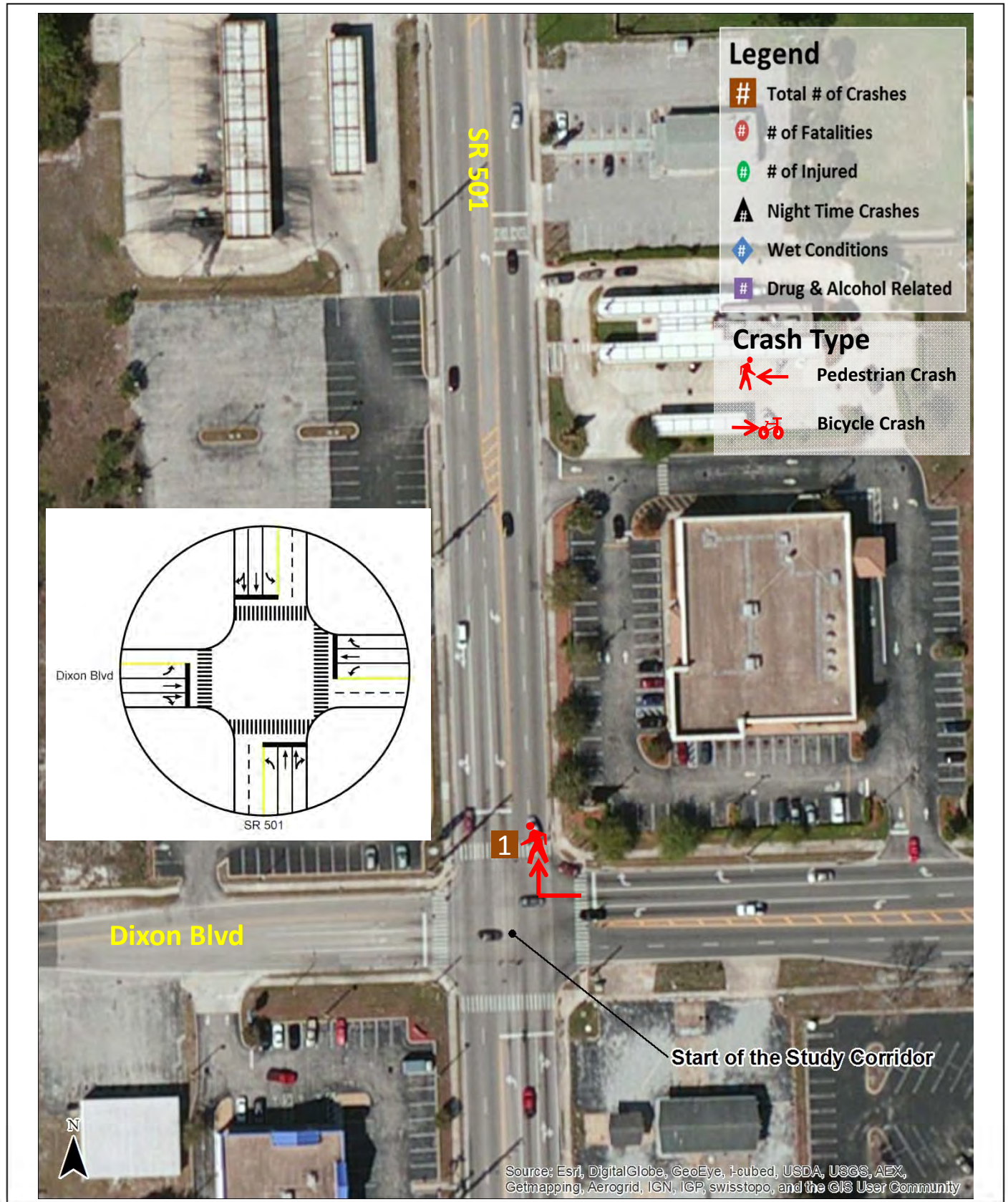
| Location                     | Issue Number | Issue                              | Suggestion  |
|------------------------------|--------------|------------------------------------|---|
| NEAR-TERM PRIORITY           |              |                                    |   |
| Corridor Wide                | 1            | Corridor Lighting                  | Consider upgrading the lighting at the signalized intersections along the corridor to meet the requirements of section 7.3.2.2 in Volume 1 of the FDOT PPM. This may require the existing lighting to be replaced.  |
| 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: <ul style="list-style-type: none"> <li>• Near-term – Select locations with a raised median</li> </ul>   |
| Corridor Wide                | 6            | Bicycle Lanes                      | A PD&E study is under way along SR 501 to the north of Michigan Avenue that is proposing widening to a four lane divided facility with a 22' center median and buffered bike lanes. Cross-section continuity with the section to the north should be considered. In order to provide buffered bike lanes and adequate median widths, a study should be considered that evaluates the feasibility of widening the road to provide access management, upgraded pedestrian/bicycle facilities, and corridor continuity with the SR 501 project to the north of Michigan Avenue.  |
| Corridor Wide                | 7            | Pedestrian and Bicyclist Education | Consider opportunities to educate both pedestrians and bicyclists. A pedestrian and bicycle outreach program could be created to educate pedestrians and bicyclists about utilizing marked crosswalks, signalized crossings, legal crossing locations, helmets, etc. The safety review team discussed a potential opportunity to use Space Coast Area Transit's (SCAT) Cocoa bus transfer station. Bicycle reflectors could be passed out and installed at the transfer station. Flyers could also be passed out to encourage good pedestrian and bicycle safety practices.   |
| School Zone Area             | 11           | Overhead School Zone Structures    | Consider removing the poles and the associated School Zone signage, beacons, and pavement markings to increase effective sidewalk widths and improve pedestrian and driver expectancy within the area. The County is planning on removing the span wire and inactive beacons; however, the further coordination with the County and FDOT will be needed to remove the poles.  |
| Clearlake Court Intersection | 12           | Mid-Block Crosswalk                | The team discussed allowing the mid-block crosswalk to remain to serve the existing crossing demand, but the following safety enhancements should be considered: <ul style="list-style-type: none"> <li>• Conduct a mid-block crossing study per Section 3.8 of the FDOT Traffic Engineering Manual (TEM) to evaluate if the crosswalk is still warranted based upon existing demands.</li> <li>• Provide an active warning device, such as RRFB, at the crosswalk. RRFBs may also be used on the advance crosswalk signs per FHWA's interim approval memorandum. In-roadway warning lights activated by the RRFB may be considered as well. Standards and guidance from section 4N.02 in the MUTCD should be reviewed when considering in-roadway lights.</li> <li>• Provide a median refuge island for pedestrians in the TWLTL.</li> <li>• Install lighting on the crosswalk's west and east sides.</li> <li>• Restripe the crosswalk with Special Emphasis Crosswalk markings consistent with sheet 10 of the FDOT Design Index 17346.</li> </ul> |



| Location   | Issue Number | Issue                            | Suggestion   |
|--|--------------|----------------------------------|--|
| NEAR-TERM PRIORITY                                       |              |                                  |  |
| Rosetine Street/Tate Street Intersection                 | 18           | Crosswalk                        | Consider moving the northbound stop bar back from the intersection to accommodate a crosswalk on the south leg of the intersection. The crosswalk could be angled to minimize impacts to the drainage inlets on the southeast and southwest corners of the intersection. If crosswalk is installed, provide the appropriate pedestrian facilities such as pedestrian signal heads with countdown times, push buttons, signage, etc. Should a crosswalk be installed on the south leg, consider installing sidewalks along the south side of Rosetine/Tate Street to provide better pedestrian connectivity. Restripe the north crosswalk (school crossing) in accordance with FDOT Design Indices 17344 and 17346. |
| Rosetine Street/Tate Street Intersection                 | 19           | 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 PPM. This may require the existing lighting to be replaced.  |
| South of the Eastern Florida State College Main Entrance | 20           | Mid-Block Crosswalk              | Coordinate with FDOT to determine the progress of this project. FDOT has mentioned that there are potential issues with the proposed location due to queue spillback from the northbound left-turn movement at the entrance to the college. Refer to <b>Issue #20</b> in the text for another potential crosswalk location. Consider relocating the northbound bus stop 400' south and the southbound bus stop and shelter 180' south.   |
| Michigan Avenue Intersection                             | 21           | 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 PPM. This may require the existing lighting to be replaced.  |
| Michigan Avenue Intersection                             | 24           | Pedestrian Signal Timing/Phasing | Consider options to improve the response of Walk phases during the northbound/southbound phases. Options to consider are to reprogram the pedestrian phase times to take the full northbound/southbound phase or allow the Walk phase to activate after the start of green and extend the northbound/southbound phase to accommodate the recommended pedestrian clearance time, if needed.   |

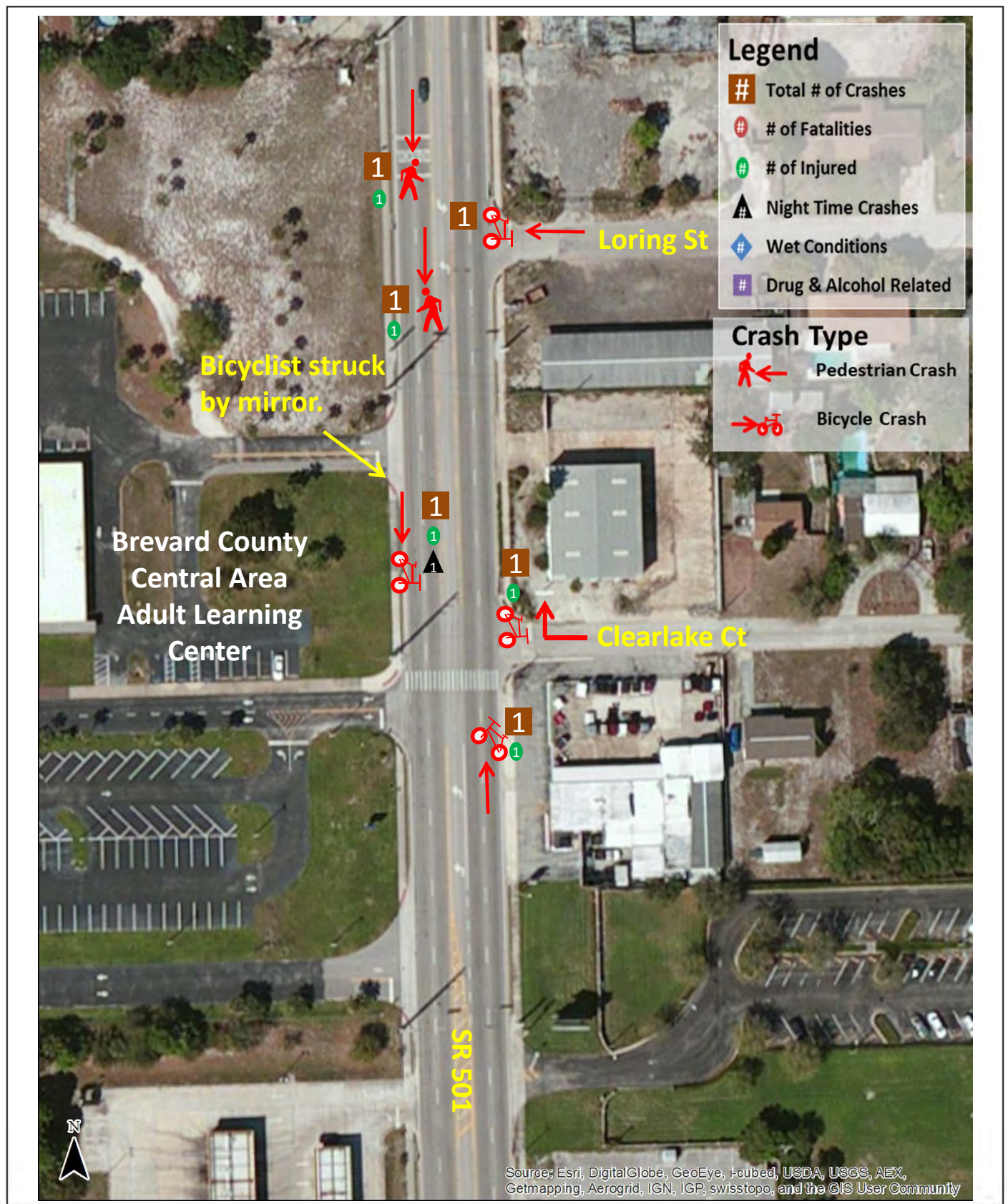
| Location  | Issue Number | Issue                  | Suggestion   |
|---|--------------|------------------------|--|
| LONG-TERM PRIORITY                              |              |                        |  |
| Corridor Wide                                   | 1            | Corridor Lighting      | 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.<br>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:<br><ul style="list-style-type: none"> <li>• Long-term – Convert to a 4-lane divided roadway</li> </ul> |
| 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.   |

# Appendix A – Collision Diagrams



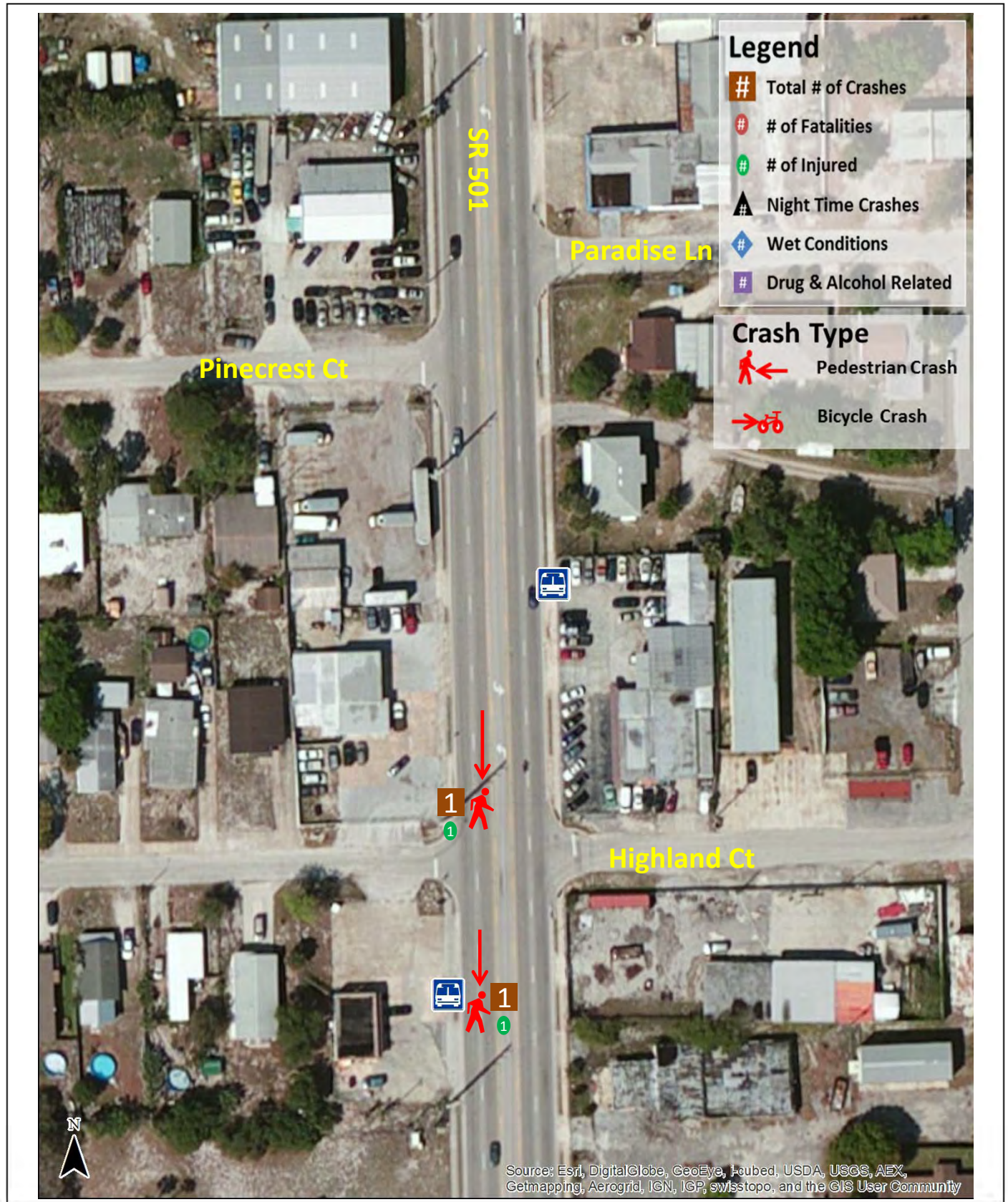
**SR 501 Ped/Bike Field Review  
Collision Diagram (2009 – 2014)  
Dixon Boulevard and SR 501 Intersection**

**Figure  
1**



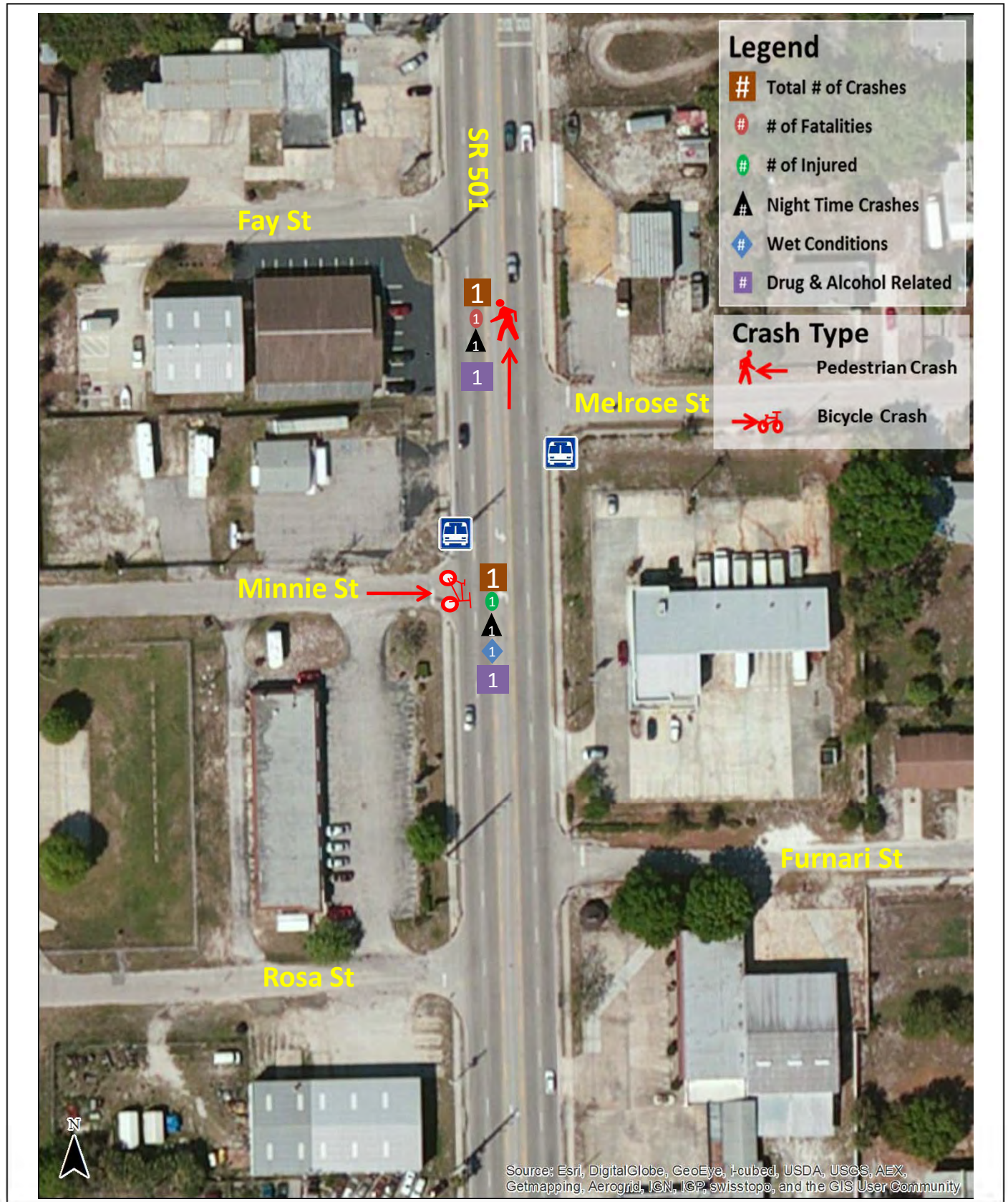
**SR 501 Ped/Bike Field Review  
Collision Diagram (2009 – 2014)  
Car Wash Driveway to Loring Street**

**Figure  
2**



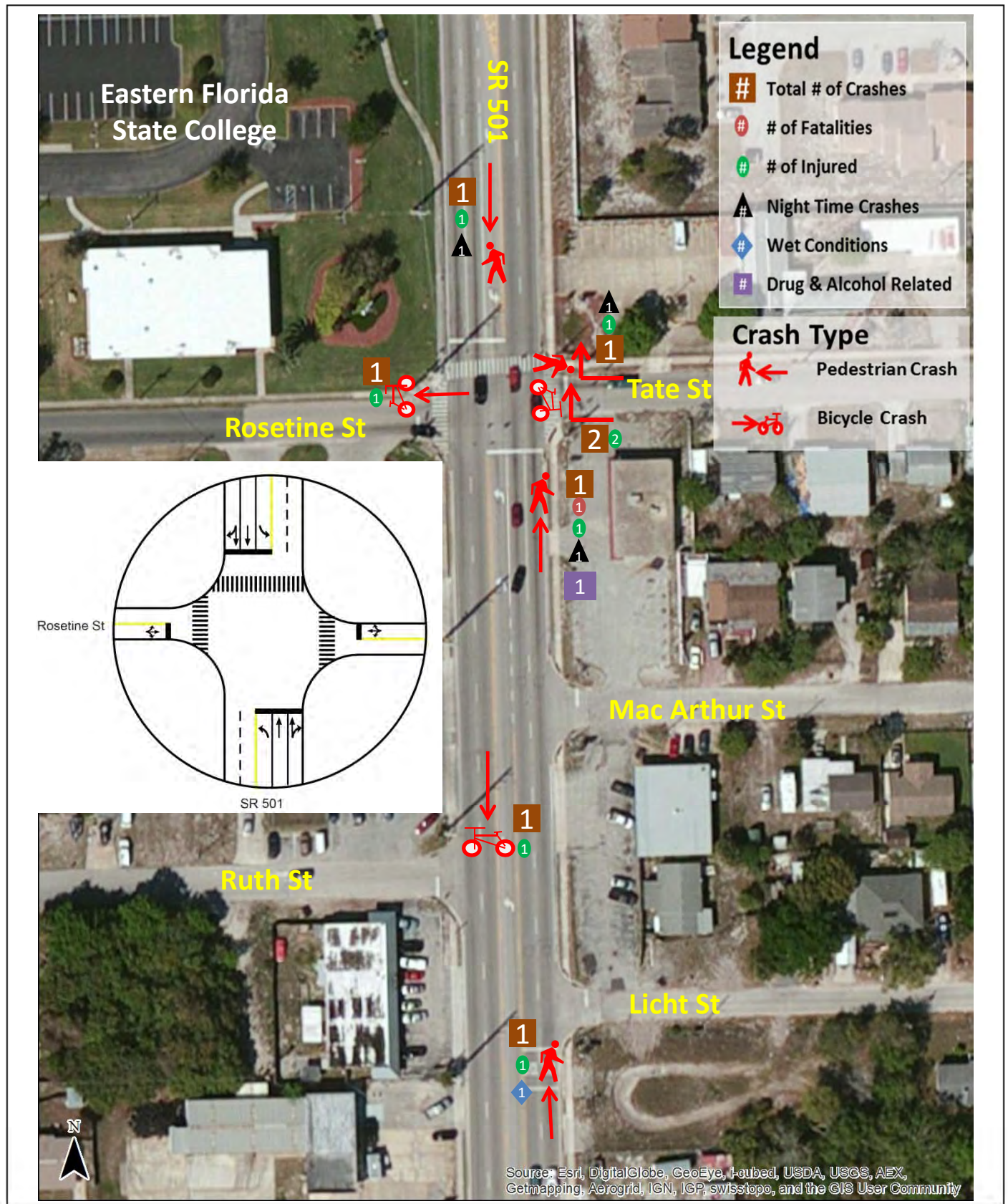
**SR 501 Ped/Bike Field Review  
Collision Diagram (2009 – 2014)  
North of Loring Street to Paradise Lane**

**Figure  
3**



**SR 501 Ped/Bike Field Review  
Collision Diagram (2009 – 2014)  
North of Paradise Lane to Fay Street**

**Figure  
4**



**SR 501 Ped/Bike Field Review  
Collision Diagram (2009 – 2014)  
North of Fay Street to Rosetine Street/Tate Street**

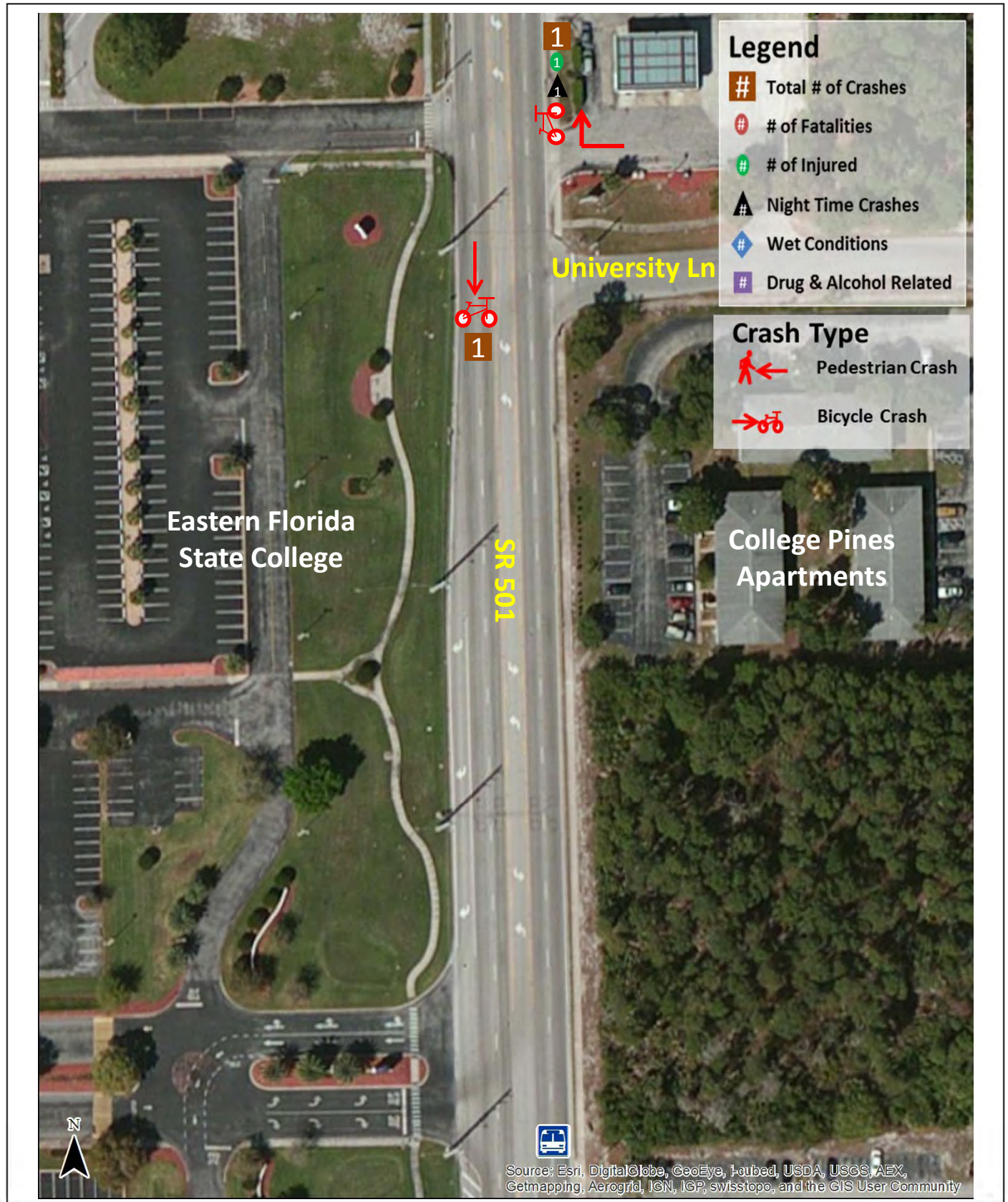
**Figure  
5**





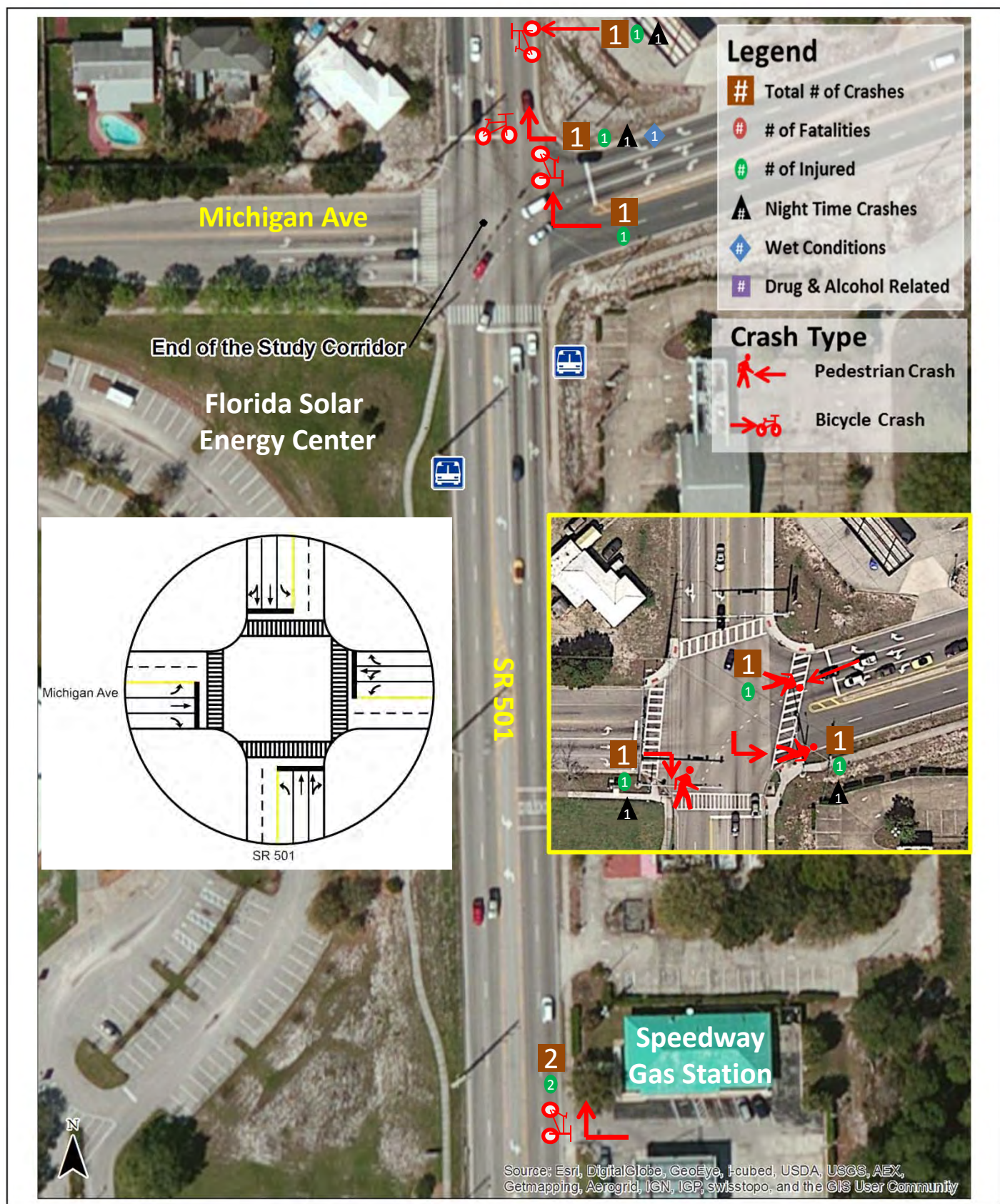
**SR 501 Ped/Bike Field Review  
Collision Diagram (2009 – 2014)  
North of Rosetine Street to Longwood Apartments Driveway**

Figure  
**6**



**SR 501 Ped/Bike Field Review  
Collision Diagram (2009 – 2014)  
University Lane and SR 501 Intersection**

**Figure  
7**



SR 501 Ped/Bike Field Review  
Collision Diagram (2009 – 2014)  
Michigan Avenue and SR 501 Intersection

Figure  
8

# Appendix B – SCAT ADA Assessment Bus Stop Sheets

**Location:** CLEARLAKE RD & HIGHLAND CT **ID:** 550

**Quick Fix:** No **ADA Compliant:** No **Direction:** Southbound

**Quick Fix Items:**

**Non-Compliant Features:** Boarding and alighting area not compliant

**Average Ridership per Run:** 0

**Scoring:** Accessibility: 3 Safety 7 Operational: 4 Cost: 5 Rideship: 0 Total: 19

**Rank: 258 Total Cost: \$2,800**

**Stop Location:** On the sidewalk (adjacent to the street with a raised curb)

**Bus Location:** In a travel-thru lane

**Releation to Intersection:** At street, on far side of intersection

**Hazards:** None

**Curb Type/Height:** Type F-6 **Signage:** Standard bus stop sign post

**Amenities:** None **Sign Mounted Correctly:** Yes

**Bench Accessible:** N/A **Bench Obstruction:** N/A

**Trashcan Accessible:** **Trashcan Obstruction:**

**Schedule Accessible:**

**Is there a B&A area:** Yes **Max Clear Space:**

**What prevents a B&A area:**

**Is the B&A 5'x8':** **B&A Materials:** Partially Paved

**Is the B&A Safe:** Yes **B&A Condition:** Surface not firm, stable, or slip r

**Running Slope (%):** 0.1 **Cross Slope (%):** 0.9

**B&A Obstructions:** No obstruction

**B&A Barriers:** No barriers

**Sidewalk Connection:** Yes **1/4" Change in Elevation:** No

**Sidewalk Width (feet):** 5

**Marked Crosswalk:** No **Protected Crosswalk:** Yes

**Detectable Warning:** Yes **Detectable Warning Condition:** Fair

**Detectable Full Width:** Yes **24" Detectable Warning:** Yes

**Curb Ramp:** Yes **Smooth Transition at Curb Ramp:** Yes

**Curb Ramp Slope:** Yes **Curb Ramp Surface:** Yes

**Shelter:** No **Shelter Condition:** **Wheelchair Into:**

**Distance from Curb (inches):** **Accessible Connection:**

**Trip Generators:** Retail

**Recommendations:** Move the stop 550' south. Pave a level 5'x2' slab between the curb and sidewalk to complete a 5'x8' B&A area.



Northbound



Southbound



Supplemental Photo



Eastbound



Westbound

**Location:** CLEARLAKE RD & HIGHLAND CT **ID:** 588

**Quick Fix:** No **ADA Compliant:** No **Direction:** Northbound

**Quick Fix Items:**

**Non-Compliant Features:** Boarding and alighting area not compliant, Schedule not accessible

**Average Ridership per Run:** 2

**Scoring:** Accessibility: 5 Safety: 7 Operational: 2 Cost: 5 Rideship: 4 Total: 23

**Rank: 173** **Total Cost: \$2,900**

**Stop Location:** On the sidewalk (adjacent to the street with a raised curb)

**Bus Location:** In a travel-thru lane

**Releation to Intersection:** At street, on nearside of intersection

**Hazards:** None

**Curb Type/Height:** Type F-6 **Signage:** Standard bus stop sign post

**Amenities:** Bus Schedule **Sign Mounted Correctly:** Yes

**Bench Accessible:** N/A **Bench Obstruction:** N/A

**Trashcan Accessible:** **Trashcan Obstruction:**

**Schedule Accessible:** No

**Is there a B&A area:** Yes **Max Clear Space:**

**What prevents a B&A area:**

**Is the B&A 5'x8':** **B&A Materials:** Partially Paved

**Is the B&A Safe:** Yes **B&A Condition:** Surface not firm, stable, or slip r

**Running Slope (%):** 1.2 **Cross Slope (%):** 0.6

**B&A Obstructions:** No obstruction

**B&A Barriers:** No barriers

**Sidewalk Connection:** Yes **1/4" Change in Elevation:** No

**Sidewalk Width (feet):** 5

**Marked Crosswalk:** No **Protected Crosswalk:** Yes

**Detectable Warning:** Yes **Detectable Warning Condition:** Good

**Detectable Full Width:** Yes **24" Detectable Warning:** Yes

**Curb Ramp:** Yes **Smooth Transition at Curb Ramp:** Yes

**Curb Ramp Slope:** Yes **Curb Ramp Surface:** Yes

**Shelter:** No **Shelter Condition:** **Wheelchair Into:**

**Distance from Curb (inches):** **Accessible Connection:**

**Trip Generators:** Office/Commercial, Residential, Retail

**Recommendations:** Move the stop 480' south. Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area. Make sure the pole with the bus schedule is located adjacent to the pavement so it is accessible.



Northbound



Southbound



Supplemental Photo



Eastbound



Westbound

**Location:** CLEARLAKE RD & MELROSE ST **ID:** 549

**Quick Fix:** Yes      **ADA Compliant:** No      **Direction:** Northbound

**Quick Fix Items:** Relocate Bench

**Non-Compliant Features:** Bench not accessible, Boarding and alighting area not compliant

**Average Ridership per Run:** 2

**Scoring:** Accessibility: 4      Safety: 7      Operational: 2      Cost: 5      Rideship: 4      Total: 22

**Rank: 188      Total Cost: \$2,600**

**Stop Location:** On the sidewalk (adjacent to the street with a raised curb)

**Bus Location:** In a travel-thru lane

**Releation to Intersection:** At street, on nearside of intersection

**Hazards:** None

**Curb Type/Height:** Type F-6      **Signage:** Standard bus stop sign post

**Sign Mounted Correctly:** Yes

**Amenities:** Bench (3rd Party)

**Bench Accessible:** No      **Bench Obstruction:** No

**Trashcan Accessible:**      **Trashcan Obstruction:**

**Schedule Accessible:**

**Is there a B&A area:** Yes      **Max Clear Space:**

**What prevents a B&A area:**

**Is the B&A 5'x8':**      **B&A Materials:** Partially Paved

**Is the B&A Safe:** Yes      **B&A Condition:** Surface not firm, stable, or slip r

**Running Slope (%):** 0.3      **Cross Slope (%):** 0.3

**B&A Obstructions:** No obstruction

**B&A Barriers:** No barriers

**Sidewalk Connection:** Yes      **1/4" Change in Elevation:** No

**Sidewalk Width (feet):** 5

**Marked Crosswalk:** No      **Protected Crosswalk:** Yes

**Detectable Warning:** Yes      **Detectable Warning Condition:** Fair

**Detectable Full Width:** Yes      **24" Detectable Warning:** Yes

**Curb Ramp:** Yes      **Smooth Transition at Curb Ramp:** Yes

**Curb Ramp Slope:** Yes      **Curb Ramp Surface:** Yes

**Shelter:** No      **Shelter Condition:**      **Wheelchair Into:**

**Distance from Curb (inches):**      **Accessible Connection:**

**Trip Generators:** Medical/Rehab, Residential, Retail

**Recommendations:** Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area. Move the bench so that it is flush with the edge of the sidewalk and outside of the B&A area. Stripe a crosswalk at the nearby intersection.



Northbound



Southbound



Supplemental Photo



Eastbound



Westbound

**Location:** CLEARLAKE RD & MINNIE ST **ID:** 570

**Quick Fix:** No **ADA Compliant:** No **Direction:** Southbound

**Quick Fix Items:**

**Non-Compliant Features:** Boarding and alighting area not compliant, Schedule not accessible, Detectable Warnings

**Average Ridership per Run:** 2

**Scoring:** Accessibility: 3 Safety: 7 Operational: 2 Cost: 5 Rideship: 4 Total: 21

**Rank: 211** **Total Cost: \$2,800**

**Stop Location:** On the sidewalk (adjacent to the street with a raised curb)

**Bus Location:** In a travel-thru lane

**Releation to Intersection:** At street, on nearside of intersection

**Hazards:** None

**Curb Type/Height:** Type F-6 **Signage:** Standard bus stop sign post

**Amenities:** Bus Schedule **Sign Mounted Correctly:** Yes

**Bench Accessible:** N/A **Bench Obstruction:** N/A

**Trashcan Accessible:** **Trashcan Obstruction:**

**Schedule Accessible:** **No**

**Is there a B&A area:** Yes **Max Clear Space:**

**What prevents a B&A area:**

**Is the B&A 5'x8':** **B&A Materials:** Partially Paved

**Is the B&A Safe:** Yes **B&A Condition:** Surface not firm, stable, or slip r

**Running Slope (%):** 0.2 **Cross Slope (%):** 0.6

**B&A Obstructions:** No obstruction

**B&A Barriers:** No barriers

**Sidewalk Connection:** Yes **1/4" Change in Elevation:** No

**Sidewalk Width (feet):** 5

**Marked Crosswalk:** **No** **Protected Crosswalk:** Yes

**Detectable Warning:** Yes **Detectable Warning Condition:** **Fair**

**Detectable Full Width:** Yes **24" Detectable Warning:** Yes

**Curb Ramp:** Yes **Smooth Transition at Curb Ramp:** Yes

**Curb Ramp Slope:** Yes **Curb Ramp Surface:** Yes

**Shelter:** No **Shelter Condition:** **Wheelchair Into:**

**Distance from Curb (inches):** **Accessible Connection:**

**Trip Generators:** Retail

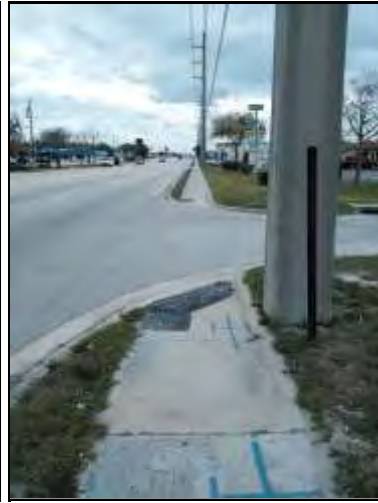
**Recommendations:** Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area. Make sure the pole with the bus schedule is located adjacent to the pavement so it is accessible. Add new detectable warnings to the nearby curb ramps. Stripe a crosswalk at the nearby intersection.



Northbound



Southbound



Supplemental Photo



Eastbound



Westbound



**Location:** CLEARLAKE RD & BCC **ID:** 25

**Quick Fix:** Yes **ADA Compliant:** No **Direction:** Northbound

**Quick Fix Items:** Relocate Bench

**Non-Compliant Features:** Bench not accessible, Boarding and alighting area not compliant, Detectable Warnings

**Average Ridership per Run:** 1

**Scoring:** Accessibility: 4 Safety: 6 Operational: 4 Cost: -20 Rideship: 0 Total: -6

**Rank: 786** **Total Cost: \$7,900**

**Stop Location:** On the sidewalk (adjacent to the street with a raised curb)

**Bus Location:** In a travel-thru lane

**Releation to Intersection:** At street, on far side of intersection

**Hazards:** None

**Curb Type/Height:** Type F-6 **Signage:** Standard bus stop sign post

**Amenities:** Bench (3rd Party), Bus Schedule **Sign Mounted Correctly:** Yes

**Bench Accessible:** No **Bench Obstruction:** No

**Trashcan Accessible:** **Trashcan Obstruction:**

**Schedule Accessible:** Yes

**Is there a B&A area:** Yes **Max Clear Space:**

**What prevents a B&A area:**

**Is the B&A 5'x8':** **B&A Materials:** Partially Paved

**Is the B&A Safe:** Yes **B&A Condition:** Surface not firm, stable, or slip r

**Running Slope (%):** 0.3 **Cross Slope (%):** 0.3

**B&A Obstructions:** No obstruction

**B&A Barriers:** No barriers

**Sidewalk Connection:** Yes **1/4" Change in Elevation:** No

**Sidewalk Width (feet):** 5

**Marked Crosswalk:** No **Protected Crosswalk:** Yes

**Detectable Warning:** No **Detectable Warning Condition:**

**Detectable Full Width:** **24" Detectable Warning:**

**Curb Ramp:** Yes **Smooth Transition at Curb Ramp:** Yes

**Curb Ramp Slope:** Yes **Curb Ramp Surface:** Yes

**Shelter:** No **Shelter Condition:** **Wheelchair Into:**

**Distance from Curb (inches):** **Accessible Connection:**

**Trip Generators:** Medical/Rehab, Office/Commercial, Residential, Retail

**Recommendations:** Move the bus stop ~900' south. Pave a level 5'x2' slab between the curb and sidewalk and a level 5'x1' slab behind the sidewalk to complete a 5'x8' B&A area. Move the bench so that it is flush with the edge of the sidewalk and outside of the B&A area. Add detectable warnings to the nearby curb ramps.



Northbound



Southbound



Supplemental Photo



Eastbound



Westbound

**Location:** CLEARLAKE RD & MICHIGAN AVE **ID:** 576

**Quick Fix:** Yes **ADA Compliant:** No **Direction:** Southbound

**Quick Fix Items:** Relocate Bench

**Non-Compliant Features:** Bench not accessible, Boarding and alighting area not compliant

**Average Ridership per Run:** 1

**Scoring:** Accessibility: 8 Safety 9 Operational: 5 Cost: -5 Rideship: 0 Total: 17

**Rank: 311 Total Cost: \$4,100**

**Stop Location:** On the sidewalk (adjacent to the street with a raised curb)

**Bus Location:** In a travel-thru lane

**Releation to Intersection:** At street, on far side of intersection

**Hazards:** None

**Curb Type/Height:** Type F-6 **Signage:** Standard bus stop sign post

**Sign Mounted Correctly:** Yes

**Amenities:** Bench (3rd Party)

**Bench Accessible:** No **Bench Obstruction:** No

**Trashcan Accessible:** **Trashcan Obstruction:**

**Schedule Accessible:**

**Is there a B&A area:** Yes **Max Clear Space:**

**What prevents a B&A area:**

**Is the B&A 5'x8':** **B&A Materials:** Partially Paved

**Is the B&A Safe:** Yes **B&A Condition:** Surface not firm, stable, or slip r

**Running Slope (%):** 0.2 **Cross Slope (%):** 0.6

**B&A Obstructions:** No obstruction

**B&A Barriers:** No barriers

**Sidewalk Connection:** Yes **1/4" Change in Elevation:** No

**Sidewalk Width (feet):** 5

**Marked Crosswalk:** Yes **Protected Crosswalk:** Yes

**Detectable Warning:** Yes **Detectable Warning Condition:** Excellent

**Detectable Full Width:** Yes **24" Detectable Warning:** Yes

**Curb Ramp:** Yes **Smooth Transition at Curb Ramp:** Yes

**Curb Ramp Slope:** Yes **Curb Ramp Surface:** Yes

**Shelter:** No **Shelter Condition:** **Wheelchair Into:**

**Distance from Curb (inches):** **Accessible Connection:**

**Trip Generators:** Office/Commercial, Residential, School/Day Care

**Recommendations:** Move the stop 50' north. Pave a level 5'x8' slab for the B&A area and connect to the existing sidewalk. Move the bench and schedule so they are flush with the edge of the sidewalk and outside of the B&A area.



Northbound



Southbound



Supplemental Photo



Eastbound



Westbound

**Location:** CLEARLAKE RD & MICHIGAN AVE **ID:** 580

**Quick Fix:** No **ADA Compliant:** No **Direction:** Northbound

**Quick Fix Items:**

**Non-Compliant Features:** Boarding and alighting area not compliant

**Average Ridership per Run:** 2

**Scoring:** Accessibility: 7 Safety 9 Operational: 3 Cost: 0 Rideship: 4 Total: 23

**Rank: 182 Total Cost: \$3,400**

**Stop Location:** On the sidewalk (adjacent to the street with a raised curb)

**Bus Location:** In a travel-thru lane

**Releation to Intersection:** At street, on nearside of intersection

**Hazards:** None

**Curb Type/Height:** Type F-6 **Signage:** Standard bus stop sign post

**Amenities:** None **Sign Mounted Correctly:** Yes

**Bench Accessible:** N/A **Bench Obstruction:** N/A

**Trashcan Accessible:** **Trashcan Obstruction:**

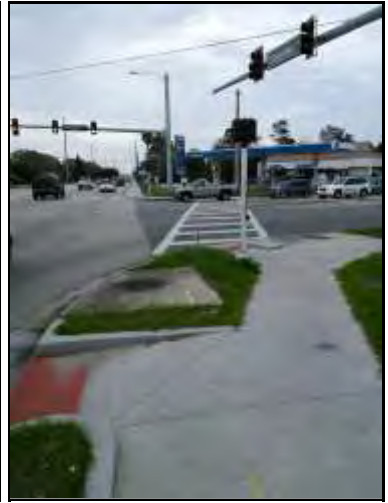
**Schedule Accessible:**



Northbound



Southbound



Supplemental Photo

**Is there a B&A area:** Yes **Max Clear Space:**

**What prevents a B&A area:**

**Is the B&A 5'x8':** **B&A Materials:** Partially Paved

**Is the B&A Safe:** Yes **B&A Condition:** Surface not firm, stable, or slip r

**Running Slope (%):** 0.3 **Cross Slope (%):** 0.5

**B&A Obstructions:** No obstruction

**B&A Barriers:** No barriers

**Sidewalk Connection:** Yes **1/4" Change in Elevation:** No

**Sidewalk Width (feet):** 5

**Marked Crosswalk:** Yes **Protected Crosswalk:** Yes

**Detectable Warning:** Yes **Detectable Warning Condition:** Excellent

**Detectable Full Width:** Yes **24" Detectable Warning:** Yes

**Curb Ramp:** Yes **Smooth Transition at Curb Ramp:** Yes

**Curb Ramp Slope:** Yes **Curb Ramp Surface:** Yes

**Shelter:** No **Shelter Condition:** **Wheelchair Into:**

**Distance from Curb (inches):** **Accessible Connection:**

**Trip Generators:** Office/Commercial, Residential, Retail, School/Day Care

**Recommendations:** Move the stop 30' north. Pave a level 5'x2' slab between the curb and sidewalk and a level 5'x1' slab behind the sidewalk to complete a 5'x8' B&A area.



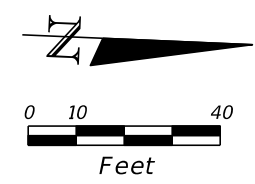
Eastbound



Westbound

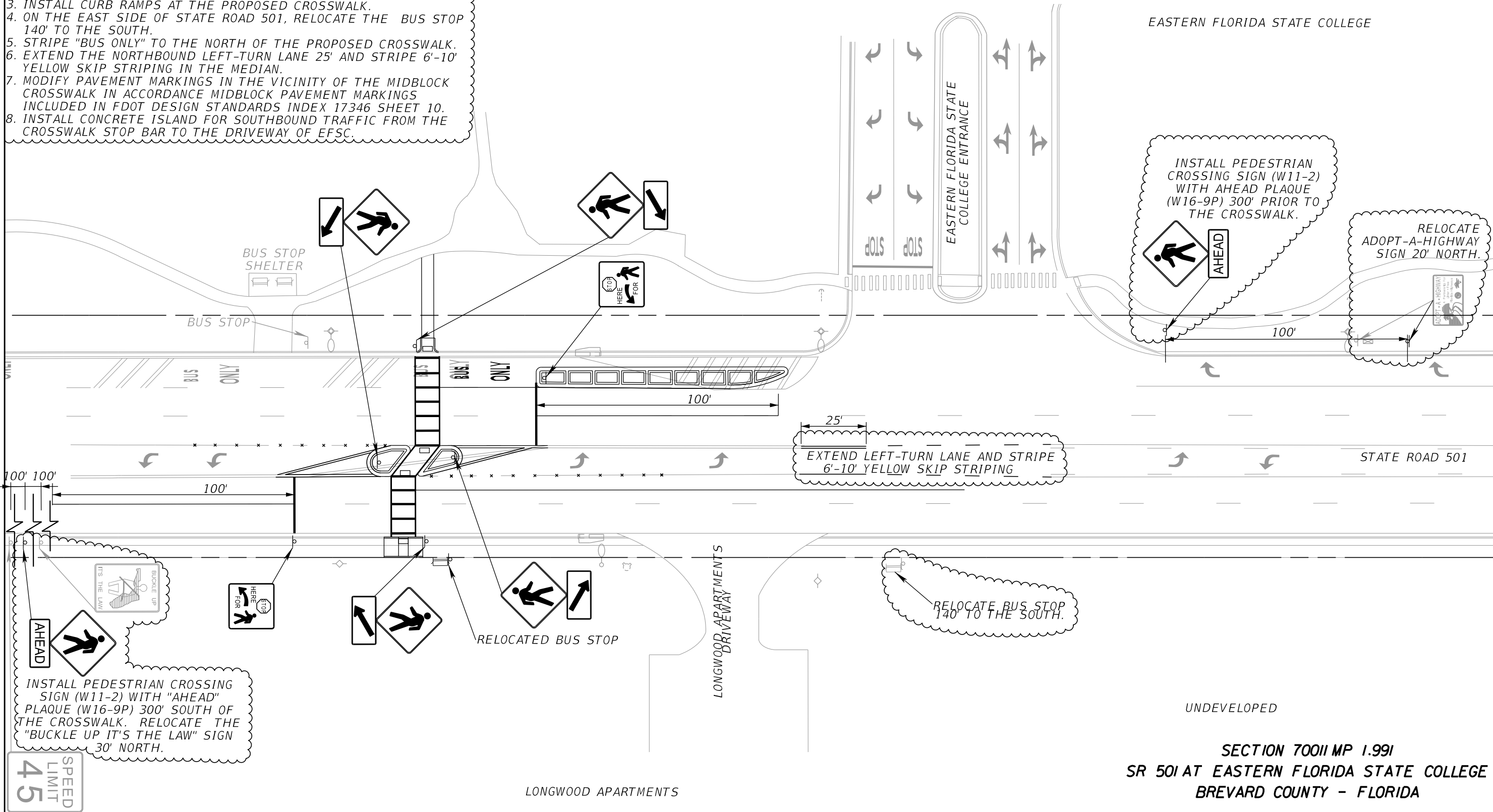
# Appendix C – FDOT Mid-Block Crossing Improvement Concept

1. INSTALL 10' HIGH EMPHASIS MIDBLOCK CROSS- WALK WITH REFUGE ISLAND APPROXIMATELY 170 FEET SOUTH OF THE ENTRANCE TO EFSC AND INSTALL PEDESTRIAN SIGNS PER FDOT DESIGN STANDARDS INDEX 17346 SHEET 10 SCHEME 2 INCLUDING "STOP HERE FOR PEDESTRIANS" SIGNS (R1-5), AND PEDESTRIAN CROSSING SIGNS (W11-2) WITH DIAGONAL ARROWS (W16-7).
2. COORDINATE WITH EFSC TO INSTALL A SIDEWALK FROM THE MIDBLOCK CROSSWALK TO THE EXISTING SIDEWALK.
3. INSTALL CURB RAMP AT THE PROPOSED CROSSWALK.
4. ON THE EAST SIDE OF STATE ROAD 501, RELOCATE THE BUS STOP 140' TO THE SOUTH.
5. STRIPE "BUS ONLY" TO THE NORTH OF THE PROPOSED CROSSWALK.
6. EXTEND THE NORTHBOUND LEFT-TURN LANE 25' AND STRIPE 6'-10' YELLOW SKIP STRIPING IN THE MEDIAN.
7. MODIFY PAVEMENT MARKINGS IN THE VICINITY OF THE MIDBLOCK CROSSWALK IN ACCORDANCE MIDBLOCK PAVEMENT MARKINGS INCLUDED IN FDOT DESIGN STANDARDS INDEX 17346 SHEET 10.
8. INSTALL CONCRETE ISLAND FOR SOUTHBOUND TRAFFIC FROM THE CROSSWALK STOP BAR TO THE DRIVEWAY OF EFSC.



EASTERN FLORIDA STATE COLLEGE

EASTERN FLORIDA STATE COLLEGE



**45**  
SPEED  
LIMIT

SECTION 70011 MP 1.991  
SR 501 AT EASTERN FLORIDA STATE COLLEGE  
BREVARD COUNTY - FLORIDA

|   |  |  |   |  |   |                               |
|---|--|--|---|--|---|-------------------------------|
| <ul style="list-style-type: none"> <li>Utility Pole</li> <li>Traffic Sign</li> <li>Luminaire</li> </ul> | <p>Symbols:</p> <ul style="list-style-type: none"> <li>Traffic Controller Cabinet</li> <li>Ditch Bottom Inlet</li> </ul> | <ul style="list-style-type: none"> <li>Signal Pole</li> <li>Pedestrian Signal Pole</li> <li>Mitered End Section</li> </ul> | <p>Traffic Engineering Data Solutions, Inc.<br/>80 Spring Vista Drive<br/>DelBary, FL 32715<br/>Phone: 386.753.0558<br/>Fax: 386.753.0778</p> | <p>STATE OF FLORIDA<br/>DEPARTMENT OF TRANSPORTATION</p> | <p>FIGURE 7<br/>IMPROVEMENT DIAGRAM</p> | <p>PAGE NO.<br/><b>18</b></p> |
|---|--|--|---|--|---|-------------------------------|