







Prepared for:

Space Coast Transportation

Planning Organization

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June 2016

High Crash Corridors Analysis

Road Safety Audit Report for Wickham Road from Sarno Road to Parkway Drive

City of Melbourne

Prepared for:



Space Coast Transportation Planning Organization 2725 Judge Fran Jamieson Way, Building B, Room 105 Melbourne, FL 32940

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June 2016

Project Title: Wickham Road Safety Audit - Sarno Road to Parkway Drive

Field Review Date: September 30th and October 1st, 2015 (AM/PM/afternoon/nighttime reviews and follow-up meeting)

Participants:

Casey Bergh – formerly with 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
Devin Swanson – Brevard County
Michael Jarusiewicz – City of Rockledge
Todd Corwin – City of Melbourne
Officer Marty Miller – Melbourne Police Department (only present September 30th)
Michael Eagle – Kittelson & Associates, Inc.

Project Characteristics:

Field Review Type:

• All Users (Vehicular, Pedestrian, Bicycle, Transit)

Adjacent Land Use:

• Urban – Commercial, Residential

Posted Speed Limit:

- 35 miles per hour (mph) from Sarno Road to Dusa Drive; and
- 40 mph from Dusa Drive to Parkway Drive.

Opposite Flow Separation:

Center Two-Way Left-Turn Lane (TWLTL)

Service Function:

Urban Principal Arterial

Terrain:

Flat

Climatic Conditions:

• Sunny, Hot

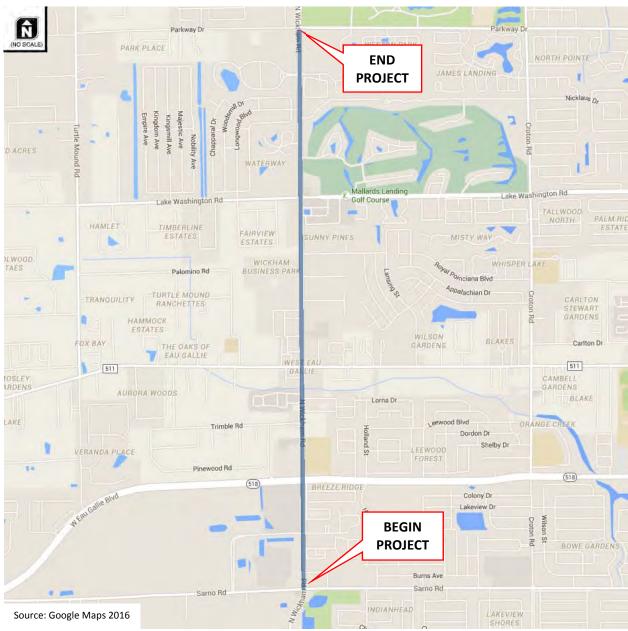


Figure 1 - Wickham Road Study Corridor

Background

In December 2014, the Space Coast Transportation Planning Organization (TPO) released the 2014 Annual Countywide Safety Report. The results identified high crash segments and intersections based on various crash metrics. The goal of the High Crash Corridors project is to generate a list of suggested improvements along five (5) high crash frequency corridors to address the growing need for vehicular safety in Brevard County:

- Wickham Road from Sarno Road to Parkway Drive;
- Malabar Road from Jupiter Boulevard to Minton Road and Emerson Drive to San Filippo Drive;

- SR A1A from US 192 to Eau Gallie Boulevard;
- Emerson Drive/Minton Road/Palm Bay Road from Jupiter Boulevard to Culver Drive; and
- Babcock Street from Malabar Road to Palm Bay Road.

Wickham Road, from Sarno Road to Parkway Drive in Melbourne (**Figure 1**), was identified as one of the high crash corridors. In order to suggest improvements along this corridor, crash history was evaluated and a Road Safety Audit (RSA) was conducted. This RSA was commissioned by the Space Coast Transportation Planning Organization (SCTPO) to identify maintenance-type, near-term, and long-term suggestions to be considered by SCTPO staff and partner agencies (i.e., Brevard County, City of Melbourne, City of Rockledge, local law enforcement). This report summarizes the evaluation of the Wickham Road corridor.

The RSA process involves multi-disciplinary representatives from various stakeholders, including representatives from transportation planning, traffic operations, roadway design, safety, and law enforcement, as needed. RSAs are conducted to identify potential safety issues and provide improvement suggestions in a team collaborative environment. Some improvements presented in this report may be implemented through 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 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 RSA team and not necessarily that of the SCTPO.

The RSA team met in the morning on Wednesday, September 30, 2015 at the Brevard County Government Center to discuss the study corridor and crash history. Starting at 1:00 PM, the RSA 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 then divided into three groups:

- 1. Walked east and west sides from Sarno Road to Sabal Elementary School;
- 2. Walked east side from Sabal Elementary School to Parkway Drive; and
- 3. Drove signalized intersections and side streets from Sabal Elementary School to Parkway Drive.

Once the afternoon observations were completed, the RSA team observed weekday PM peak hour observations at the signalized intersections. The team reassembled in the evening, after sunset, to make observations in nighttime conditions. The following day (Thursday October 1st), the RSA team observed weekday AM peak hour observations at the signalized intersections. A follow-up debrief meeting was held at the Brevard County Government Center once the AM observations were completed to discuss the corridor's issues and potential improvements.

Study Corridor Characteristics

- Length: Sarno Road to Parkway Drive 2.5 miles.
- Posted speed limits:
 - Wickham Road from Sarno Road to Dusa Drive = 35 MPH; and
 - Wickham Road from Dusa Drive to Parkway Drive = 40 MPH.
- 5-lane cross section: center TWLTL, two northbound lanes and two southbound lanes.
- No bicycle lanes.
- Type F curb and gutter along both sides of Wickham Road.
- Sidewalks are present at the following locations:
 - East and west sides of Wickham Road from Sarno Road to north (approximately 600 feet) of Eau Gallie Boulevard; and
 - East side of Wickham Road from north of Eau Gallie Boulevard to Parkway Drive (along this section of the corridor there are some portions of sidewalks on the west side).
- Street lighting is present along the east side of Wickham Road.
- The land uses along Wickham Road are primarily residential and commercial.
- Sabal Elementary School is located on the east side of Wickham Road, north of Eau Gallie Boulevard:
 - o School hours: 8:00 AM 2:30 PM
 - o Early release schedule on Wednesdays: 8:00 AM 1:15 PM
 - School zone with overhead structure: 15 mph school zone when flashing
- One marked unsignalized crosswalk is present at the south side of Trimble Road.
- Space Coast Area Transit (SCAT) bus route 28 serves the Wickham Road corridor.
- Seven (7) signalized intersections as detailed below:
 - o Wickham Road/Sarno Road:
 - Special emphasis crosswalk markings on all legs of the intersection;
 - All crosswalks include audible pedestrian actuated signals with push buttons;
 - Continuous sidewalks in all directions. Sidewalk on the west side of Wickham Road terminates about 150 feet south of the intersection;
 - Bicycle lanes are present along the north and south side of Sarno Road, west of Wickham Road;
 - Intersection lighting is present at all four corners of the intersection;
 - South leg has horizontal curvature; and
 - Protected-permissive left-turn phasing with a "doghouse" five-section signal head on all approaches.
 - Wickham Road/Melbourne Greyhound Park:
 - Old version of special emphasis crosswalk markings on south, west and east legs;
 - All crosswalks include pedestrian actuated signals with push buttons;
 - The west leg leads to the Melbourne Greyhound Park;
 - The east leg leads to a residential neighborhood;
 - Bus stops are located on the near side of the northbound and southbound approaches;
 - Continuous sidewalks present along both sides of Wickham Road;
 - Intersection lighting is only present at the southeast corner of the intersection;
 - Protected-permissive left-turn phasing with a "doghouse" five-section signal head on the northbound/southbound approaches; and

- Split phasing on the eastbound/westbound approaches.
- Wickham Road/Eau Gallie Boulevard:
 - Old version of the special emphasis crosswalk markings on all four legs of the intersection;
 - Bus stop is located on the near side of the westbound approach;
 - All crosswalks include pedestrian actuated signals with push buttons;
 - Continuous sidewalks in all directions;
 - Intersection lighting is present at all four corners of the intersection;
 - Protected-permissive left-turn phasing with a "doghouse" five-section signal head on the northbound/southbound approaches; and
 - Protected only left-turn phasing for the eastbound /westbound approaches.
- Wickham Road/Aurora Road:
 - Old version of the special emphasis crosswalk markings on north and west legs of the intersection;
 - North and west crosswalks include pedestrian actuated signals with push buttons;
 - Bus stops are located on the near side of the northbound, southbound and eastbound approaches;
 - Sidewalks present on west and east sides of the north leg;
 - Intersection lighting is present at the northeast and southeast corners of the intersection; and
 - Protected-permissive left-turn phasing with a "doghouse" five-section signal head on all approaches.
- Wickham Road/Northgate Plaza:
 - The west leg is a driveway to the parking lot and entrance to the Northgate Plaza and there is no east leg (T-intersection);
 - No crosswalks are provided at the intersection;
 - Continuous sidewalks only present along the east side of Wickham Road;
 - No intersection lighting is present; and
 - Protected-permissive left-turn phasing for the northbound approach only.
- Wickham Road/Lake Washington Road:
 - Old version of the special emphasis crosswalk markings on north and east legs of the intersection;
 - North and east crosswalks include pedestrian actuated signals with push buttons;
 - Continuous sidewalks as follows:
 - North and south legs east side of Wickham Road
 - West leg north side of Lake Washington Road
 - East leg both sides of Lake Washington Road
 - Bus stop is located on the far side of the southbound approach in front of the Boston Market restaurant.
 - Intersection lighting is present on all corners except the northwest corner of the intersection; and
 - Protected-permissive left-turn phasing with a "doghouse" five-section signal head on all approaches.

- o Wickham Road/Parkway Drive:
 - Old version of special emphasis crosswalk markings without standard markings on the south and east legs of the intersection;
 - All crosswalks include pedestrian actuated signals with push buttons and countdown timers;
 - Near- and far-side bus stops on the south leg;
 - Continuous sidewalks as follows:
 - South leg west and east sides of Wickham Road
 - North leg east side of Wickham Road
 - West leg south side of Parkway Drive
 - East leg both sides of Parkway Drive
 - Intersection lighting is present on the northeast and southeast corners of the intersection; and
 - Protected-permissive left-turn phasing with a "doghouse" five-section signal head on all approaches

Crash History (2009 – 2014)

Six (6) full calendar years (January to December) of available vehicular related crash data, 2009 to 2014, were utilized for the Wickham Road 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 the University of Florida from 2009 to 2014. Because Wickham Road is a county maintained facility, the Signal Four database was primarily utilized for this corridor, but was supplemented by the CARS data at intersections with state maintained roadways. The CARS data was not yet certified for 2014 when this project began, thus the reason for six years of Signal Four Analytics crash data instead of the traditional five.

1,376 vehicular crashes were reported over the six-year study period. A map displaying the locations of crashes along the Wickham Road corridor is located in **Appendix A** along with a map showing the signal spacing along the corridor. Of the 1,376 crashes reported during the study period, there were:

- Seven (7) fatal crashes (<1 percent);
- 349 injury crashes (25 percent); and
- 1,020 property damage only (PDO) crashes (74 percent).

Collision diagrams (located in **Appendix A**) for the corridor include the following crashes:

- At signalized intersections;
- Fatal crash locations;
- Head-on crash locations;
- Pedestrian crash locations; and
- Bicycle crash locations.

Fatal Crash Details

The seven fatal crashes are summarized below (in order from south to north):

• Crash Number 737386630 (vehicle-pedestrian)

On June 3, 2011 at 11:05 PM a crash involving a pedestrian and a passenger vehicle occurred at the intersection of Eau Gallie Boulevard and Wickham Road under dark-lighted and dry roadway surface conditions. The passenger vehicle was travelling southbound along Wickham Road approaching the intersection when the pedestrian stepped into the roadway (from the west sidewalk) and was then struck by the vehicle. The pedestrian was transported to the hospital and was later pronounced deceased. The crash report indicates suspected alcohol use by the driver, but was pending drug and alcohol test results at the time of the crash report.

Crash Number 847977360 (vehicle-vehicle)

On August 2, 2014 at 11:25 PM an angle crash involving two passenger vehicles occurred at the intersection of Eau Gallie Boulevard and Wickham Road under dark-lighted and dry roadway surface conditions. Vehicle 1 was traveling westbound at an estimated speed of 90 mph along Eau Gallie Boulevard approaching the intersection in the outside lane, while Vehicle 2 was traveling northbound in the outside lane along Wickham Road. Both vehicles entered the intersection at the same time with Vehicle 1 running the red light. The front of Vehicle 1 struck the right front of Vehicle 2. Upon collision, Vehicle 2 spun out of control and came to rest west of the intersection, while Vehicle 1 continue westbound and collided with the traffic signal pole on the northwest corner of the intersection. Both drivers were pronounced deceased as a result of the collision. The crash report also indicates suspected alcohol used by the driver of Vehicle 1 and was pending test results at the time of the crash report.

• Crash Number 829845070 (single vehicle-fixed object)

On April 7, 2012 at 11:49 PM a crash involving a passenger vehicle occurred at the intersection of Aurora Road and Wickham Road under dark-lighted and dry roadway surface conditions. The vehicle was traveling northbound along Wickham Road at an estimated speed of 80 mph approaching the intersection. The vehicle left the roadway colliding with a concrete utility pole on the southwest corner of the intersection. There was no evidence of the driver attempting to slow down or avoid the collision. The driver was transported to the hospital and was later pronounced deceased. According to the crash report, drug and alcohol tests were to be conducted during the autopsy.

• Crash Number 901337090 (vehicle-pedestrian)

On October 29, 2009 at 8:23 PM a crash involving a pedestrian and a passenger occurred on Wickham Road north of Northgate Street under dark-lighted and dry roadway surface conditions. The passenger vehicle was traveling northbound along Wickham Road and struck the pedestrian crossing mid-block from west to east near the Wendy's access.

• Crash Number 829872420 (vehicle-bicycle, drug-involved)

On June 30, 2013 at 4:32 PM a crash involving a bicycle and a passenger vehicle occurred just north of the intersection of Lake Washington Road and Wickham Road under daylight and dry roadway surface conditions. The passenger vehicle was traveling southbound along Wickham Road near the access to the Sun Trust Bank and struck the bicycle crossing Wickham Road from west to east. Upon the collision, the driver left the crash scene making a southbound left-turn at the intersection, but was later arrested. A drug test administrated to the driver came out positive. The bicyclist was transported to the hospital and was later pronounced deceased.

Crash Number 738013310 (vehicle-motorcycle)

On May 12, 2011 at 3:49 PM a left-turn crash involving a motorcycle and a passenger vehicle occurred at the intersection of Parkway Drive and Wickham Road under daylight and dry roadway surface conditions. The motorcycle was traveling northbound along Wickham Road through the intersection. The passenger vehicle was making a southbound left-turn onto Parkway Drive and failed to yield the right-of-way to the motorcycle. The motorcycle was struck by the southbound left-turning vehicle. Upon collision, the driver of the motorcycle was ejected. The driver of the motorcycle was transported to the hospital and was later pronounced deceased.

• Crash Number 901324840 (single-vehicle road departure)

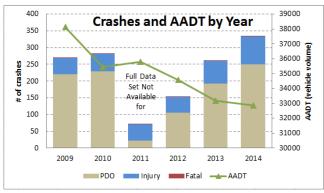
On August 31, 2010 at 2:20 AM a crash involving a passenger vehicle occurred on Wickham Road approximately 180 feet south of Parkway Drive under dark-lighted and dry roadway surface conditions. The passenger vehicle was traveling southbound along Wickham Road at an estimated speed of 85 mph when the right wheel struck the west side curb. The vehicle continued traveling over the curb into a ditch and impacted a culvert at the north access of Calvary Baptist Church. The vehicle further lost control, struck a stop sign on the south side of the access point, and landed south of the driveway striking the sign in front of the church. The driver of the vehicle was pronounced deceased within 30 days of the crash. The crash report indicates that drug and alcohol test results were pending.

Corridor Wide Crash Trends

The reported corridor crashes are displayed by different key crash trends such as measures of time (year, month, day, and hour), crash types, lighting conditions, and alcohol/drugs. Overall, the number of crashes has increased between 2009 and 2014. In 2011 and 2012, the Signal Four dataset displayed approximately 30 to 65 percent lower crashes than in the other years due to the availability of city or county crash records. Over this same six-year time period, there has been a slight decline in the Average Annual Daily Traffic (AADT) along the corridor. Key crash trends include:

Time (Figure 2 through Figure 5)

- December (150 crashes) and August (128 crashes) were the highest crash months during the year while Friday (248 crashes) and Thursday (241 crashes) were the highest crash days.
- Fifty-six (56) percent of all crashes (772 crashes) occurred between 12:00 PM and 6:00 PM.





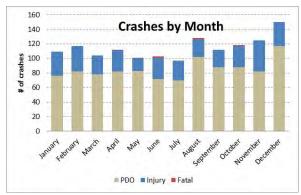
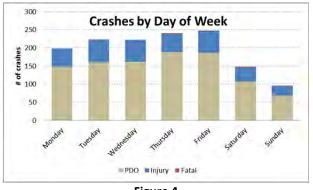


Figure 3



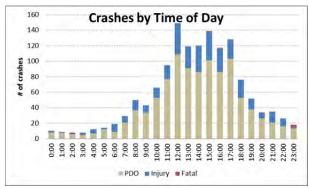


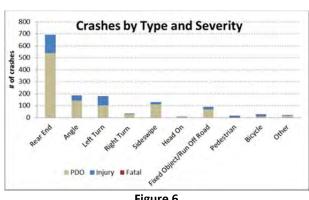
Figure 4

Figure 5

Crash Type and Lighting (Figure 6 and Figure 7)

- Fifty (50) percent (692 crashes) were rear-end;
- 13 percent (182 crashes) were angle;
- 13 percent (178 crashes) were left-turn;
- 9 percent (129 crashes) were sideswipe crashes; and
- Twenty (20) percent of crashes occurred under dark lighting conditions (dawn, dusk, darklighted, and dark-unlighted).

1200



Crashes by Lighting Condition 1000 800 # of crashes 600 400 200 0 Daylight Dusk Dark w/ Street Dark w/o Street Dawn ■PDO ■Injury ■Fatal

Figure 6

Figure 7

Alcohol and Drugs

Alcohol and/or drugs were involved in 51 crashes (4 percent) throughout the corridor.

Intersection Crash Statistics

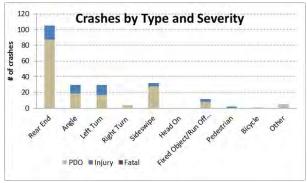
Of the 1,376 total crashes along the Wickham Road corridor, 920 crashes (67 percent) occurred at the seven signalized intersections. The individual crash statistics for each of those intersections is detailed as follows:

- Wickham Road at Sarno Road (221 crashes 16 percent)
- Wickham Road at Melbourne Greyhound Park (30 crashes 2 percent)
- Wickham Road at Eau Gallie Boulevard (198 crashes 14 percent)
- Wickham Road at Aurora Road (185 crashes 13 percent)

- Wickham Road at Northgate Plaza (13 crashes 1 percent)
- Wickham Road at Lake Washington Road (167 crashes 12 percent)
- Wickham Road at Parkway Drive (106 crashes 8 percent)

Wickham Road at Sarno Road (221 total crashes)

- 24 percent (52 crashes) were injury-related and 76 percent (169 crashes) were PDO. No fatal crashes occurred at this intersection during the analysis period.
- 48 percent (105 crashes) were rear-end, 15 percent (32 crashes) were sideswipe, 14 percent (30 crashes) were angle, and 14 percent (30 crashes) were left-turn (**Figure 8**).
 - Rear-end crashes:
 - 21 of the 105 rear-end crashes occurred in the northbound direction.
 - 43 of the 105 rear-end crashes occurred in the southbound direction.
 - Sideswipe crashes:
 - 6 of the 32 sideswipe crashes occurred in the northbound direction.
 - 16 of the 32 sideswipe crashes occurred in the southbound direction.
 - Angle crashes:
 - 17 of the 30 angle crashes occurred at unsignalized driveways within the influence area of the signal.
 - 11 occurred west of Wickham Road
 - 2 occurred east of Wickham Road
 - 4 occurred north of Sarno Road
 - Left-turn crashes:
 - 26 left-turn crashes occurred at the signalized intersection.
 - 12 involved northbound left-turning vehicles
 - 6 each involved southbound and westbound left-turning vehicles
 - 2 involved eastbound left-turning vehicles
- 2 pedestrian crashes occurred at or near the intersection:
 - o 1 on the south leg crosswalk struck by westbound left-turn vehicle.
 - o 1 crossing mid-block, west of the intersection, struck by southbound left-turn vehicle out of PNC Bank access.
- 1 bicycle crash occurred on the south leg crosswalk. Bicyclist struck northbound right-turn vehicle.
- 18 percent (39 crashes) occurred in non-daylight conditions.
- October (26 crashes) was the highest crash month (Figure 9).
- Thursday and Friday (39 crashes) were the highest crash days (Figure 10).
- 43 percent (96 crashes) occurred between 2:00 PM and 6:00 PM (Figure 11).
- Alcohol was involved in 6 crashes (3 percent):
 - o 2 rear-end
 - o 2 angle
 - o 1 left-turn
 - 1 fixed object/run off the road
- Drugs were involved in 2 crashes (1 percent):
 - o 1 rear-end
 - 1 fixed object/run off the road



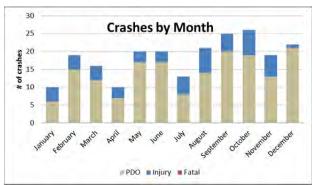
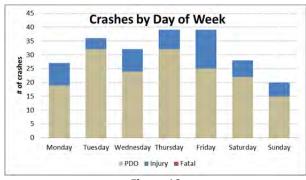


Figure 8

Figure 9





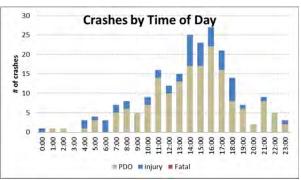
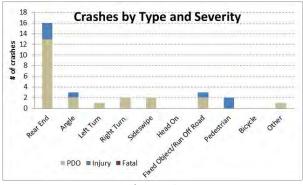


Figure 11

Wickham Road at Melbourne Greyhound Park (30 total crashes)

- 23 percent (7 crashes) were injury-related and 77 percent (23 crashes) were PDO. No fatal crashes occurred at this intersection during the analysis period.
- 53 percent (16 crashes) were rear-end, and 10 percent (3 crashes) were angle (Figure 12).
 - Rear-end crashes:
 - 6 of the 15 rear-end crashes occurred in the northbound direction.
 - 8 of the 15 rear-end crashes occurred in the southbound direction.
- 2 pedestrian crashes occurred with the south leg's crosswalk. Pedestrians struck by vehicles making a westbound left-turn. One (1) of the pedestrian was under the influence of alcohol.
- 17 percent (5 crashes) occurred in non-daylight conditions (dark-lighted and dusk).
- December (5 crashes) was the highest crash month (Figure 13), and Friday (8 crashes) was the highest crash day (Figure 14).
- 30 percent (9 crashes) occurred between 11:00 AM and 2:00 PM and 27 percent (8 crashes) occurred between 5:00 PM and 7:00 PM (Figure 15).
- Alcohol was involved in 2 crashes (7 percent):
 - 1 pedestrian
 - o 1 rear-end
- Alcohol and drugs were involved in 1 fixed object/run off the road crash (3 percent).



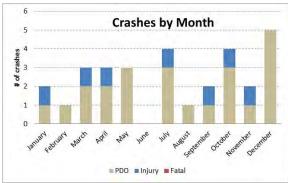
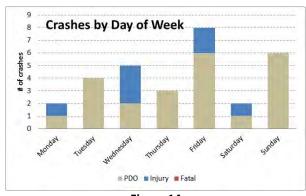


Figure 12

Figure 13



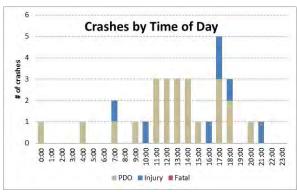


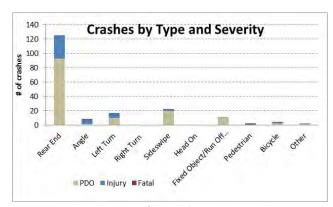
Figure 14

Figure 15

Wickham Road at Eau Gallie Boulevard (198 total crashes)

- 1 percent (2 crashes) was fatal, 27 percent (54 crashes) were injury-related, and 72 percent (142 crashes) were PDO.
 - o 1 fatal angle crash and 1 fatal pedestrian crash.
- 63 percent (125 crashes) were rear-end, 12 percent (23 crashes) were sideswipe, 9 percent (17 crashes) were left-turn, and 5 percent (9 crashes) were angle (**Figure 16**).
 - o Rear-end crashes:
 - 40 of the 125 rear-end crashes occurred in the northbound direction.
 - 34 of the 125 rear-end crashes occurred in the southbound direction.
 - 1 of the 125 rear-end crashes occurred in the dual westbound left-turn lanes.
 - 8 of the 125 rear-end crashes occurred in the dual eastbound left-turn lanes.
 - Sideswipe crashes:
 - 2 of the 23 sideswipe crashes occurred in the northbound direction.
 - 6 of the 23 sideswipe crashes occurred in the southbound direction.
 - 2 of the 23 sideswipe crashes were in opposite directions north of the intersection.
- All 17 left-turn crashes occurred at the signalized intersection.
- 7 angle crashes occurred at the signalized intersection.
- 3 pedestrian crashes occurred at or near the intersection:
 - 1 involved an officer directing traffic in the middle of the intersection and a northbound through vehicle.

- 1 mid-block collision north of the intersection. Pedestrian stepped into the roadway and was struck by southbound vehicle. Pedestrian was fatally injured. Crash report indicates suspected alcohol used by the driver, and pending drug and alcohol test results.
- 1 crossing the access to Walgreen's north of the intersection struck by vehicle exiting the driveway.
- 5 bicycle crashes occurred at or near the intersection:
 - 2 on the east leg's crosswalk struck by westbound right-turning vehicles.
 - o 1 on the south leg's crosswalk struck by an eastbound right-turning vehicle.
 - o 1 crossing the driveway to Walgreen's west of the intersection struck by vehicle exiting the driveway.
 - 1 crossing the driveway to Applebee's west of the intersection struck by vehicle exiting the driveway.
- 31 percent (62 crashes) occurred in non-daylight conditions (dawn, dusk, dark-lighted, and dark-unlighted).
- November (25 crashes) was the highest crash month (Figure 17), and Tuesday (37 crashes) was the highest crash days (Figure 18).
- 24 percent (48 crashes) occurred between 11:00 AM and 2:00 PM and 21 percent (42 crashes) occurred between 4:00 PM and 7:00 PM (Figure 19).
- Both fatal crashes occurred between 11:00 PM and 12:00 AM.
- Alcohol was involved in 6 crashes (3 percent):
 - o 1 rear-end, angle, pedestrian, fixed object/run off the road
 - 2 sideswipe
- Drugs were involved in 2 crashes (1 percent):
 - o 1 sideswipe and 1 rear-end
- Alcohol and drugs were involved in 2 crashes (1 percent):
 - o 1 right-turn and 1 fixed object/run off the road



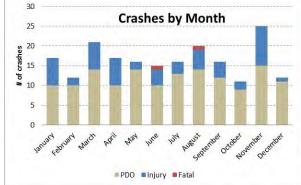
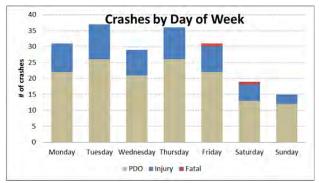


Figure 16

Figure 17



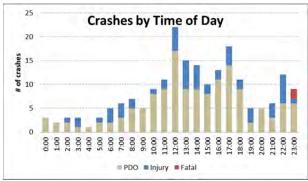


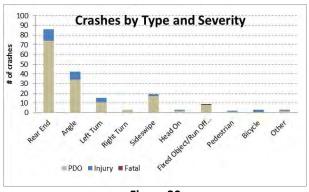
Figure 18

Figure 19

Wickham Road at Aurora Road (185 crashes)

- <1 percent (1 crash) were fatal, 17 percent (32 crashes) were injury-related and 82 percent (152 crashes) were PDO.
 - o Fatal crash involved vehicle colliding with a utility pole on southwest corner of intersection.
- 47 percent (86 crashes) were rear-end, 22 percent (42 crashes) were angle, 10 percent (19 crashes) were sideswipe, and 8 percent (15 crashes) were left-turn (**Figure 20**).
 - o Rear-end crashes:
 - 28 of the 86 rear-end crashes occurred in the northbound direction.
 - 32 of the 86 rear-end crashes occurred in the southbound direction.
 - Angle crashes:
 - 11 of the 42 angle crashes occurred at the signalized intersection.
 - 31 of the 42 angle crashes occurred at unsignalized driveways within the influence area of the signal.
 - 6 angle crashes occurred south of Aurora Road.
 - 8 angle crashes occurred north of Aurora Road.
 - 12 angle crashes occurred east of Wickham Road.
 - 5 angle crashes occurred west of Wickham Road.
 - Left-turn crashes:
 - 12 of the 15 left-turn crashes occurred at the signalized intersection.
 - 6 involved southbound left-turning vehicles.
 - 4 involved northbound left-turning vehicles.
 - 2 (1 each) involved eastbound and westbound left-turning vehicles.
- 2 pedestrian crashes occurred at or near the intersection:
 - 1 on the north leg's crosswalk struck by a westbound right-turning vehicle.
 - o 1 north of the intersection involving a southbound vehicle that backed into a passenger who had gotten out of a vehicle to retrieve an item dropped on the roadway.
- 3 bicycle crashes occurred near the intersection:
 - o 2 crossing mid-block, north of the intersection.
 - One (1) involved a bicyclist striking a southbound vehicle and the other a bicyclist striking both northbound and southbound vehicles.
 - o 1 crossing mid-block, east of the intersection.
- 12 percent (23 crashes) occurred in non-daylight conditions (dark-lighted and dark-unlighted).

- August (21 crashes) was the highest crash month (Figure 21), and Thursday (35 crashes) was the highest crash day (Figure 22).
- 25 percent (46 crashes) occurred between 11:00 AM and 2:00 PM and 30 percent (55 crashes) occurred between 3:00 PM and 6:00 PM (**Figure 23**).
- Alcohol was involved in 2 crashes (1 percent):
 - 1 rear-end and 1 fixed object/run off the road.
- Alcohol and drugs were involved in 1 head-on crash (half a percent).



Crashes by Month

Crashes by Month

The state of the stat

Figure 20

Figure 21

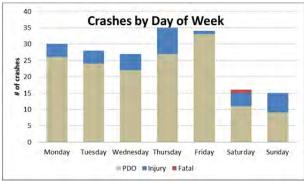


Figure 22

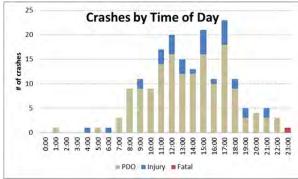
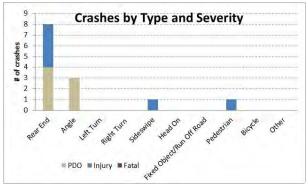


Figure 23

Wickham Road at Northgate Plaza (13 crashes)

- 6 crashes were injury-related and 7 crashes were PDO. No fatal crashes occurred at this intersection during the analysis period.
- 62 percent (8 crashes) were rear-end, and 23 percent (3 crashes) were angle (Figure 24).
 - o All rear-end crashes occurred in the southbound direction.
- 1 pedestrian crash occurred mid-block south of the intersection. The pedestrian was struck by a northbound vehicle.
- Only 1 crash occurred in non-daylight conditions.
- December (4 crashes) was the highest crash month (Figure 25), and Friday (5 crashes) was the highest crash day (Figure 26).
- No crashes occurred between 5:00 PM and 6:00 PM or between 7:00 PM and 8:00 AM (Figure 27).



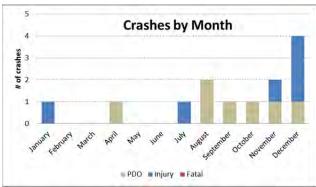
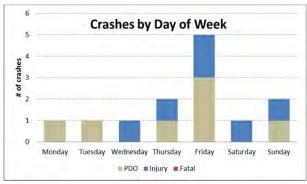


Figure 24

Figure 25



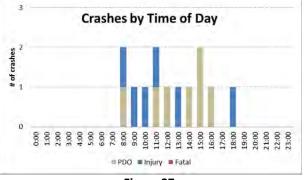


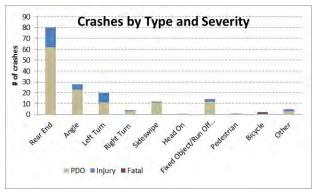
Figure 26

Figure 27

Wickham Road at Lake Washington Road (167 crashes)

- < 1 percent (1 crash) were fatal, 24 percent (40 crashes) were injury-related and 75 percent (126 crashes) were PDO.
 - 1 fatal bicycle crash.
- 48 percent (80 crashes) were rear-end, 17 percent (28 crashes) were angle, and 12 percent (20 crashes) were left-turn (**Figure 28**).
 - o Rear-end crashes:
 - 47 of the 80 rear-end crashes occurred in the northbound direction.
 - 25 of the 80 rear-end crashes occurred in the southbound direction.
 - Angle crashes:
 - 5 of the 28 angle crashes occurred at the signalized intersection.
 - 23 of the 28 angle crashes occurred at unsignalized driveways within the influence area of the signal.
 - 13 angle crashes occurred south of Lake Washington Road.
 - 5 angle crashes occurred north of Lake Washington Road.
 - 5 angle crashes occurred to the west of Wickham Road.
 - Left-turn crashes:
 - 17 of the 20 left-turn crashes occurred at the signalized intersection.
 - 9 involved northbound left-turning vehicles.
 - 6 involved southbound left-turning vehicles.
 - 2 involved westbound left-turning vehicles.
- 1 pedestrian crash occurred on the west leg (no crosswalk). Pedestrian struck by northbound left-turn vehicle.

- 2 bicycle crashes occurred crossing mid-block, north of the intersection. One (1) involved a bicyclist struck by southbound vehicle; pedestrian was fatally injured and driver was found under the influence of drugs. The other crash involved a bicyclist striking a southbound vehicle.
- 20 percent (34 crashes) occurred in non-daylight conditions (dusk and dark-lighted).
- June (19 crashes) was the highest crash month (Figure 29).
- Monday, Tuesday, and Thursday (28 crashes) were the highest crash days (Figure 30).
- 29 percent (32 crashes) occurred between 11:00 AM and 2:00 PM and 32 percent (53 crashes) occurred between 3:00 PM and 6:00 PM (Figure 31).
- Alcohol was involved in 3 crashes (2 percent):
 - o 1 rear-end, 1 head-on, and 1 bicycle.
- Drugs were involved in 2 crashes (1 percent):
 - o 1 bicycle and 1 vehicle overturn.



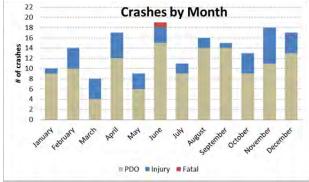


Figure 28

Figure 29

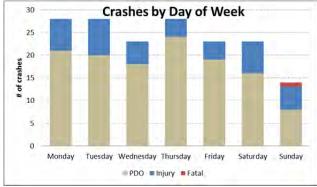


Figure 30

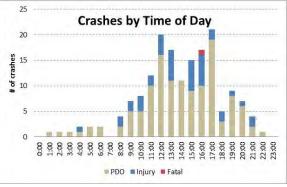
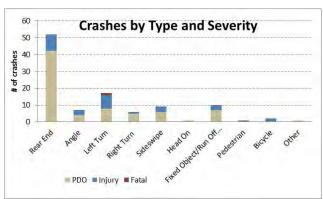


Figure 31

Wickham Road at Parkway Drive (106 crashes)

- < 1 percent (1 crash) were fatal, 29 percent (31 crashes) were injury-related, and 70 percent (74 crashes) were PDO.
 - o 1 fatal left-turn crash.
- 49 percent (52 crashes) were rear-end, and 16 percent (17 crashes) were left-turn (Figure 32).
 - Rear-end crashes:
 - 23 of the 52 rear-end crashes occurred in the northbound direction.
 - 23 of the 52 rear-end crashes occurred in the southbound direction.
 - Left-turn crashes:

- 16 of the 17 left-turn crashes occurred at the signalized intersection.
 - 13 involved southbound left-turning vehicles.
 - 2 involved northbound left-turning vehicles.
 - 1 involved a westbound left-turning vehicle.
- 1 pedestrian crash occurred on the south leg crosswalk. Pedestrian struck by northbound vehicle. Crash report indicates pedestrian had been drinking.
- 2 bicycle crashes occurred on the east leg crosswalk, 1 struck by a northbound right-turning vehicle and the other by a westbound right-turning vehicle.
- 20 percent (21 crashes) occurred in non-daylight conditions (dusk, dark-lighted, and dark-unlighted).
- February and October (14 crashes each) were the highest crash months (Figure 33).
- Thursday (24 crashes) was the highest crash day (Figure 34).
- 46 percent (49 crashes) occurred between 12:00 PM and 5:00 PM (Figure 35).
- Alcohol was involved in 7 crashes (7 percent):
 - o 2 rear-end
 - o 1 angle, 1 left-turn, 1 pedestrian, 1 vehicle overturn, and 1 fixed object/run off the road
- Alcohol and drugs were involved in 1 fixed object/run off the road crash (1 percent).



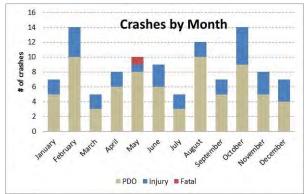
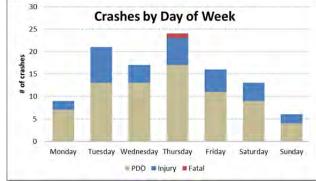


Figure 32

Figure 33



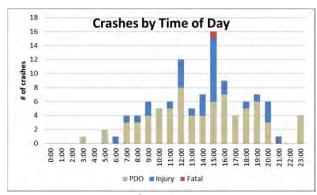


Figure 34

Figure 35

Segment and Unsignalized Intersection Crash Statistics

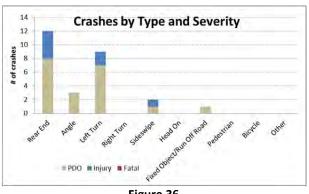
There were a total of 456 segment crashes during the analysis period. The following summarizes the total number of crashes for each segment:

- Segment 1 Sarno Road to Melbourne Greyhound Park (84 crashes over 0.11 miles)
- Segment 2 Melbourne Greyhound Park to Eau Gallie Boulevard (52 crashes over 0.11 miles)
- Segment 3 Eau Gallie Boulevard to Aurora Road (95 crashes over 0.32 miles)
- Segment 4 Northgate Plaza to Lake Washington Road (141 crashes over 0.50 miles)
- Segment 5 Lake Washington Road to Parkway Drive (84 crashes over 0.60 miles)

The 456 segment crashes were reviewed by locations to identify any additional trends or high crash locations. The individual crash statistics for each of the locations reviewed is detailed as follows:

Walmart Access (27 crashes)

- 26 percent of crashes (7 crashes) were injury-related and 74 percent (20 crashes) were PDO.
- Some of the most common crash types were rear-end crashes (12), left-turn crashes (9), and angle crashes (3) (Figure 36).
- 37 percent (10 crashes) at this location occurred between 12:00 PM and 2:00 PM (Figure 37).
- 93 percent (25 crashes) occurred during daylight conditions.
- Drugs were involved in one rear-end crash at this location.
- No crashes occurred on the weekend at this location.



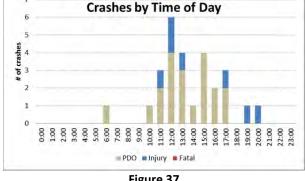


Figure 36

Figure 37

Regency Drive (32 crashes)

- 28 percent (9 crashes) were injury-related and 72 percent (23 crashes) were PDO.
- There were 27 rear-end crashes, 4 angle crashes, and 1 fixed object/run off the road crash (Figure 38).
- 88 percent (28 crashes) occurred during daylight conditions.
- 10 of the 32 crashes (31 percent) occurred on Friday. No crashes occurred on Saturday.
- Alcohol was involved in the fixed object/run off the road crash.

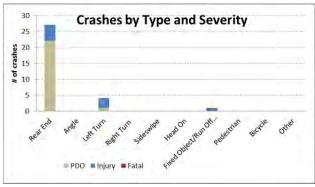
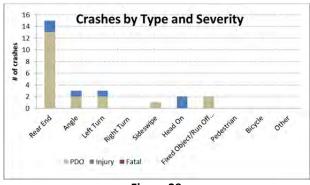


Figure 38

Melbourne Village (26 crashes)

- 23 percent of crashes (6 crashes) were injury-related and 77 percent (20 crashes) were PDO.
- Some of the most common crash types were rear-end crashes (15), angle crashes (3), and leftturn crashes (3) (Figure 39).
- 77 percent (20 crashes) at this location occurred between 11:00 AM and 6:00 PM (Figure 40).
- 81 percent (21 crashes) occurred during daylight conditions.
- Alcohol and drugs were involved in one fixed object/run off the road crash at this location.
- No crashes occurred on Saturday at this location.



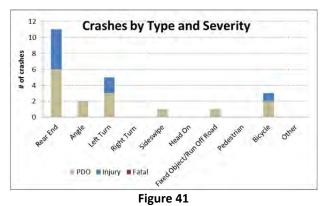
Crashes by Time of Day # of crashes 11:00 13:00 ■ PDO ■ Injury ■ Fatal

Figure 39

Figure 40

Kingston Lane (23 crashes)

- 35 percent (8 crashes) were injury-related and 65 percent (15 crashes) were PDO.
- Some of the most common crash types were rear-end crashes (11), left-turn crashes (5), bicyclerelated crashes (3), and angle crashes (2) (Figure 41).
- 34 percent (8 crashes) at this location occurred between 11:00 AM and 2:00 PM and 39 percent (9 crashes) occurred between 3:00 PM and 6:00 PM (Figure 42).
- 87 percent (20 crashes) occurred during daylight conditions.
- Alcohol and drugs were not a factor at this location.
- No crashes occurred on Sunday at this location.



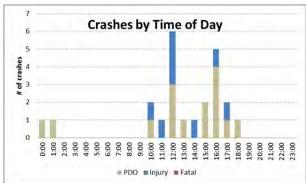


Figure 42

Northgate Plaza to Electronics Drive (66 crashes)

- 2 percent (1 crash) were fatal, 30 percent (20 crashes) were injury-related and 68 percent (45 crashes) were PDO.
- Some of the most common crash types were rear-end crashes (27), left-turn crashes (14), angle crashes (7), and sideswipe crashes (6) (Figure 43).
- 36 percent (24 crashes) at this location occurred between 11:00 AM and 2:00 PM and 20 percent (13 crashes) occurred between 4:00 PM and 7:00 PM (Figure 44).
- 29 percent (19 crashes) occurred during dark lighting conditions (dawn, dark, dark-lighted, and dark-unlighted) (Figure 45).
- Alcohol and/or drugs were involved in two fixed object/run off the road crashes.
- 25 crashes were in the vicinity of the unsignalized intersection Wickham Road and Northgate Street.

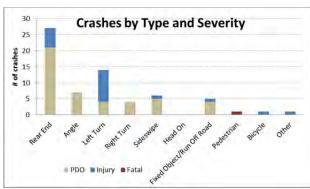


Figure 43

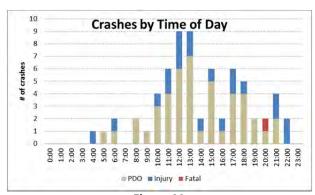


Figure 44

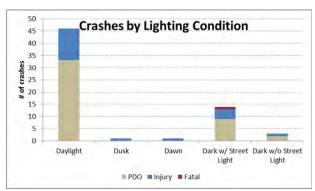


Figure 45

Lansing Street (17 crashes)

- 29 percent (5 crashes) were injury-related and 71 percent (12 crashes) were PDO.
- Some of the most common crash types were rear-end crashes (3), left-turn crashes (3), and right-turn crashes (3) (Figure 46).
- 82 percent (14 crashes) occurred during daylight conditions.
- 24 percent (4 crashes) each occurred between 9:00 AM and 11:00 AM and 3:00 PM and 5:00 PM (Figure 47).
- No crashes occurred on Sunday at this location.
- Alcohol and drugs were not a factor at this location.

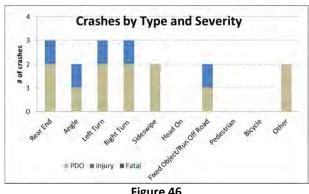


Figure 46

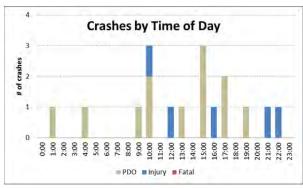
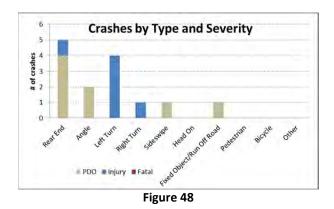


Figure 47

Weston Drive (14 crashes)

- 43 percent (6 crashes) were injury-related and 57 percent (8 crashes) were PDO.
- Some of the most common crash types were rear-end crashes (5), left-turn crashes (4), and angle crashes (2) (Figure 48).
- 79 percent (11 crashes) occurred during daylight conditions.
- 50 percent (7 crashes) each occurred between 3:00 PM and 7:00 PM (Figure 49).
- Alcohol was involved in the right-turn crash.
- No crashes were reported on Friday and Saturday at this location.



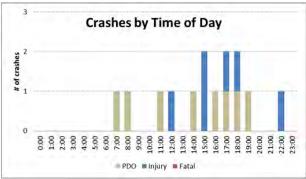


Figure 49

Pedestrian and Bicycle Crash Statistics

There were a total of 41 pedestrian and bicycle crashes (15 pedestrian-related and 26 bicycle-related) along the corridor. Seven (7) percent (3 crashes) were fatal, 71 percent (29 crashes) were injury-related and 22 percent (9 crashes) were PDO. Thirty-nine (39) percent of the crashes occurred during non-daylight conditions. November (8 crashes) was the highest pedestrian/bicycle crash month, while Tuesday and Wednesday (8 crashes) were the highest crash days. Over 40 percent (17 crashes) occurred between 3PM and 6 PM. Sixty-one (61) percent (25 crashes) occurred at intersections, while 39 percent (16 crashes) occurred along corridor segments. The following bullets further summarized the pedestrian and bicycle crashes distribution along the corridor:

<u>Intersections</u>

- Wickham Road/Sarno Road 2 pedestrian and 1 bicycle
- Wickham Road/Melbourne Greyhound Park 2 pedestrian
- Wickham Road/Eau Gallie Boulevard 3 pedestrian and 5 bicycle
- Wickham Road/Aurora Road 2 pedestrian and 3 bicycle
- Wickham Road/Northgate Plaza 1 pedestrian
- Wickham Road/Lake Washington Road 1 pedestrian and 2 bicycle
- Wickham Road/Parkway Drive 1 pedestrian and 2 bicycle

Segments

- Melbourne Greyhound Park to Eau Gallie Boulevard 1 bicycle
- Eau Gallie Boulevard to Orange Manor Drive 1 pedestrian and 5 bicycle
- Northgate Plaza to Lake Washington Square 1 pedestrian and 4 bicycle
- Lake Washington Road to Parkway Drive 1 pedestrian and 3 bicycle

ROAD SAFETY AUDIT FINDINGS

Transit Related Improvements

SCAT completed the Bus Stop Americans with Disabilities Act (ADA) Assessment Report for every transit stop within their network in early 2015. The Wickham Road study corridor has 16 transit stops reviewed as part of this assessment. The recommendations from the ADA report are summarized for each stop below:

Brunswick Harbor Lanes Northbound

- Remove the pavement at the existing boarding and alighting (B&A) area;
- Repave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area;
- Add detectable warnings to the nearby curb ramps;
- Move the bench so it is not blocking the path to the sidewalk; and
- Move the pole with the bus schedule adjacent to the pavement to make it accessible.

Melbourne Village Northbound

- Move the stop 450' north;
- Pave a level 5'x8' slab with a raised 6" curb for the B&A area and connect to the adjacent sidewalk:
- Add detectable warnings to the nearby curb ramps; and
- Move the pole with the bus schedule adjacent to the pavement to make it accessible.

Eau Gallie Boulevard Westbound

- Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area; and
- Add detectable warnings to the nearby curb ramps.

Aldi's Southbound

- Pave a level 5'x2' slab behind the sidewalk to complete a 5'x8' B&A area; and
- Extend the detectable warning at the nearby curb ramps.

Pine Hill Drive Northbound

- Move the bus stop 175' south;
- Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area; and
- Add detectable warnings to the nearby curb ramps.

Orange Manor Drive Southbound

- Move stop 145' north;
- Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area;
- Repave the cracks in the sidewalk; and
- Repave the existing curb ramp and add detectable warnings.

Aurora Road Northbound

- Move the bus stop 380' north;
- Pave a level 5'8' slab for the B&A area;
- Add a 10' path from the B&A area to the sidewalk; and
- Add detectable warnings to the nearby curb ramps.

Aurora Road/CVS Southbound

- Pave a level 5'x6' slab between the curb and sidewalk to complete a 5'x8' B&A area;
- Add detectable warnings to the nearby curb ramps; and
- Move the pole with the bus schedule adjacent to the pavement to make it accessible.

Lake Washington Road Southbound

- Pave a level 5'x8' slab for the B&A area;
- Move the pole with the bus schedule adjacent to the pavement to make it accessible;
- Add a 100' path to connect the north;
- Construct a curb ramp with a slope ≤8.3%;
- Add detectable warnings to the nearby curb ramps; and
- Add a crosswalk at the intersection.

Checkers Northbound

- Move the stop 310' south;
- Resurface the B&A area to have a cross slope of ≤2%;
- Pave a level 5'x8' slab for the B&A area;
- Add a 7' path to connect the B&A area to the existing sidewalk;
- Add detectable warnings to the nearby curb ramps; and
- Resurface the sidewalk to remove the change in elevation.

Portofino Villas Southbound

- Move the stop 5' south;
- Resurface the B&A area to have a cross slope of ≤2%;
- Pave a level 5'x8' slab for the B&A area;
- Pave a 5' sidewalk to connect to the intersection to the south;
- Construct a curb ramp with a slope ≤8.3%; and
- Add detectable warnings to the curb ramp.

Harbor Sun Green Road Northbound

- Move the stop 20' south;
- Add a culvert and pave a level 5'x8' slab for the B&A area;
- Add a 4' path to connect the B&A to the existing sidewalk; and
- Add detectable warnings to the nearby curb ramps.

Preakness Place/Lake Point Apartments Southbound

- Add a culvert to the drainage area;
- Pave a level 5'x8' slab with a raised 6" curb for the B&A area;
- Pave a path from the B&A area to the nearby driveway;
- Add a curb ramp and detectable warning; and
- Move the pole with the bus schedule adjacent to the pavement to make it accessible.

Weston Drive Northbound

- Pave a level 5'x4' slab between the curb and sidewalk to complete a 5'x8' B&A area;
- Add detectable warnings to the nearby curb ramps; and
- Move the pole with the bus schedule adjacent to the pavement to make it accessible.

CVS Southbound

- Move the stop 115' north;
- Pave a level 5'x8' slab for the B&A area;
- Add a 3' path to connect the B&A area to the existing sidewalk;
- Add detectable warnings to the nearby curb ramps; and
- Move the pole with the bus schedule adjacent to the pavement to make it accessible.

Parkway Drive Northbound

- Pave a level 5'x8' slab for the B&A area;
- Add a 5' path to connect the B&A to the existing sidewalk; and
- Add detectable warnings to the nearby curb ramps.

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

Summary of Safety Issues

The RSA team identified and categorized corridor-wide and location-specific safety issues based on a qualitative risk scale. For the purposes of this RSA, risk is defined as a function of exposure, probability, and consequence. *Exposure* reflects the number of roadway users that could be influenced by the design feature. *Probability* reflects the likelihood of a crash influenced by the identified design feature. The *consequence* reflects the severity of a crash, if one occurs.

The RSA team assigned the qualitative risk rating of safety issues identified within the Wickham Road study corridor relative to all other issues observed. *Category III* issues have potentially the greatest risk compared to the other observed issues; they are associated with higher exposure, probability, and/or consequence than other issues. *Category II* issues indicate higher risk than some issues and lower risk relative to other observed safety issues. *Category I* issues indicate the least risk compared to the other observed issues; they are associated with lower exposure, probability, and/or consequence.

Category III issues identified by the RSA team:

- North/South Left-Turn Movements at Signalized Intersections: Page 28
- Right-Turn Phase Conflict with Pedestrian Crossing at Eau Gallie Boulevard: Page 50
- Unsignalized Crosswalk at Trimble Road: Page 54
- Incomplete Pedestrian Facilities at Aurora Road: Page 57
- Incomplete Pedestrian Facilities at Lake Washington Road: Page 67
- Incomplete Pedestrian Facilities at Parkway Drive: Page 70

Category II issues identified by the RSA team:

- Lack of Right-Turn Lanes at Signalized Intersections: Page 30
- Intersection Crossing Markings: Page 32
- Lack of Sidewalks along Wickham Road: Page 38
- Left-Turn Crashes at Sarno Road: Page 41
- Walmart Gas Station Driveway on Sarno Road: Page 43
- Walmart Driveway on Wickham Road: Page 46
- Lighting from Aurora Road to Lake Washington Road: Page 60
- No Pedestrian Crossings at Northgate Plaza Signal: Page 62
- Pedestrian Crossing Alignment on Southbound Approach at Lake Washington Road: Page 68
- Exposed Drainage Inlet Adjacent to Sidewalk: Page 69

Category I issues identified by the RSA team:

- Observed ADA Issues: Page 34
- Street Name Sign Visibility: Page 40
- Pedestrian Signal Head and Push Button Signage at Sarno Road: Page 45
- Eastbound Right-Turn Curb Radius at Eau Gallie Boulevard: Page 49
- School Zone Extents: Page 52
- Westbound Through Movement Alignment on Aurora Road: Page 59
- Driveway Turn Movement Conflicts South of Lake Washington Road: Page 64
- Westbound Lane Drop on Lake Washington Road: Page 66

Location: Corridor-Wide

Issue #1: North/South Left-Turn Movements at Signalized Intersections



Figure 50 Aerial Photo of Wickham Road/Eau Gallie Boulevard Intersection

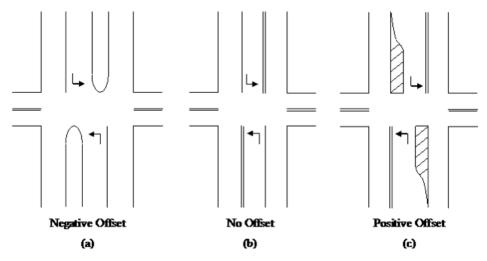


Figure 51 Illustration of Negative, No, and Positive Offset Left-turn Lanes (Source: FHWA Safety Evaluation of Offset Improvements for Left-Turn Lanes)

Description of Issue:

Wickham Road has exclusive left-turn lanes on the north and south approaches at all signalized intersections along the study corridor (Eau Gallie Boulevard shown in Figure 50) and in all cases, the left-turn phase is protected-permissive with a "doghouse" five-section signal head. The turn lanes also have a negative offset, as illustrated in Case "a" in Figure 51. The negative offset limits sight distance for northbound/southbound left-turn vehicles during the permissive left-turn phase by opposing left-turn vehicles. Left-turn crashes represent 13 percent of all crashes within the study area and are primary crash types at the following signalized intersections:

- Sarno (26 left-turn crashes reported, 18 northbound/southbound);
 - The southbound left-turn sight distance of northbound through traffic is further limited by the horizontal curvature (south of the intersection)
- Eau Gallie (17 left-turn crashes reported, 13 northbound/southbound);
- Aurora (12 left-turn crashes reported, 10 northbound/southbound);
- Lake Washington Road (17 left-turn crashes reported, 15 northbound/southbound); and
- Parkway Drive (16 left-turn crashes reported, 13 southbound/northbound).

Table 1. Qualitative Risk Rating for North/South Left-Turn Movements at Signalized Intersections

Function	Classification	Reasoning
Exposure	Category II	During permissive phase
Probability	Category III	71 northbound/southbound left-turn crashes at signalized intersections
Consequence	Category III	Severe injury crash types
Overall	Category III	-

Suggestions for Improvement:

The RSA team suggests the TPO consider the following countermeasures to address the issues described above:

- In the near-term, replace "doghouse" five-section signal displays with 4-section flashing yellow arrow (FYA) protected/permissive left-turn display.
 - If the left-turn phasing is converted to a FYA display, consider providing protected only left-turn phasing during peak periods and allow the protected-permissive phasing during the off-peak periods.
- In the longer term, realign the northbound and southbound approaches to provide a positive offset to improve sight distance.
 - On the Wickham Road approaches to Eau Gallie Boulevard, shift the median to the right-hand side of the left-turn lane, as shown in **Figure 51(c)**.

Location: Corridor-Wide

Issue #2: Lack of Right-Turn Lanes at Signalized Intersections



Figure 52 No Right-Turn Lanes at Wickham Road/ Eau Gallie Boulevard

Figure 53 No Right-Turn Lanes on 3 of 4 Approaches at Wickham Road/Sarno Road

Source: Google Earth

Description of Issue:

Due to the lack of right-turn lanes at signalized intersections, right-turning vehicles slow in the through lanes to make right-turns. **Figure 52** and **Figure 53** illustrate the existing lane configurations at the Eau Gallie Boulevard and Sarno Road intersections, respectively. When vehicles slow to make turns, the speed differential between the through and right-turning vehicles leads to the potential for rear-end crashes. Rear-end crashes represented 50 percent (692 crashes) of all reported crashes during the study period.

Table 2. Qualitative Risk Rating for Lack of Right-Turn Lanes at Signalized Intersections

Function	Classification	Reasoning
Exposure	Category II	Right-turns occur from the through lane creating conflicts
Probability	Category II	Speed differential between through and turning vehicles leads to potential rear-end crashes; rear-end crashes represent most frequent crash type along the corridor
Consequence	Category I	Potential for rear-ends typically result in PDO or minor injury
Overall	Category II	-

Suggestions for Improvement:

In the near-term, consider evaluating right-turn lane warrants for right-turn lanes at the following intersections and approaches:

- Sarno Road (Southbound, Eastbound, Westbound)
- Greyhound Park (Southbound)

- Eau Gallie Boulevard (Southbound)¹
- Aurora Road (Northbound and Southbound)
- Lake Washington Road (Northbound and Southbound)
- Parkway Drive (Northbound and Southbound)

Based on the analysis results, consider constructing right-turn lanes where warrants are met. Priority should be given to approaches with the highest right-turn volumes.

-

 $^{^{\}rm 1}$ A northbound right-turn lane is planned at Eau Gallie Boulevard.

Location: Corridor-Wide

Issue #3: Intersection Crosswalk Markings





Figure 54







Figure 56

Figure 57

Description of Issue:

Crosswalk markings are inconsistent throughout the study corridor. Most signalized intersections are marked with old special emphasis crosswalk markings (example shown in **Figure 54**) while the intersection at Sarno Road is marked with current special emphasis crosswalk marking (see **Figure 55**).

The crosswalks at the following signalized intersections are marked with the old standard emphasis crosswalk markings:

- Melbourne Greyhound Park (south, west, and east legs)
- Eau Gallie Boulevard (all legs)
- Aurora Road (north and west legs)
- Lake Washington Road (north and east legs)
- Parkway Drive (south and east legs)

Marked crosswalks are not included along many of the minor street approaches at the unsignalized intersections throughout the corridor (see **Figure 56**). In some locations, the existing crosswalk markings are beginning to fade (illustrated in **Figure 57**). This was observed along the east and west sides of the study corridor.

Table 3. Qualitative Risk Rating for Intersection Crosswalk Markings

Function	Classification	Reasoning
Exposure	Category I	Conflicts only exist during pedestrian crossing events
Probability	Category I	Markings are not the only indication to yield to pedestrians
Consequence	Category III	Potential for pedestrian/bicycle crash types
Overall	Category II	-

Suggestions for Improvement:

In the near-term, special emphasis crosswalk markings, as shown on sheet 9 of FDOT Design Standard Index 17346, should be re-striped at the following signalized crossings:

- Melbourne Greyhound Park (south, west, and east legs)
- Eau Gallie Boulevard (all legs)
- Aurora Road (north and west legs)
- Lake Washington Road (north and east legs)
- Parkway Drive (south and east legs)

Also in the near-term, consider marking all minor street approaches at unsignalized intersections along the corridor with standard crosswalk markings, as shown on sheet 9 of the FDOT Design Standard Index 17346.

Location: Corridor-Wide

Issue #4: Observed ADA Issues



Figure 58



Figure 60



Figure 59



Figure 61



Figure 62



Figure 63



Figure 64



Figure 65



Figure 66



Figure 67

Description of Issue:

The intent of the RSA is to consider safety for all user groups based on both crash data and risk factors. There may not be crash data supporting the noted design deficiencies, but the RSA team conducted a risk-based assessment and identified the locations to address potential safety issues based on risk. The RSA team noted several ADA issues that are summarized below. These may not represent a complete list, but identify typical issues along the corridor.

- With the exception of Sarno Road, no detectable warning surfaces were present at any signalized intersection curb ramps, as illustrated in **Figure 58**.
- An existing railing support (shown in **Figure 59**) is missing on the east side of Wickham Road, in front of Chili's. If the rail was relied upon by a pedestrian, it may not support the weight of the pedestrian and not provide the protection it was intended to provide when it was installed.
- The effective width of sidewalk in front of Sabal Elementary School is reduced to less than four feet due to a drainage issue that has resulted in regular ponding, as shown in **Figure 60**.
- The sidewalk is cracking and could present a barrier for a wheelchair pedestrian on the north side of Sarno Road, and east of the intersection with Wickham Road, as shown in **Figure 61**.
- The sidewalk was cut to accommodate a utility pole (shown in **Figure 62**) on the west side of Wickham Road, approximately 100' north of Sarno Road. The effective width is less than the minimum of 4'. ADA PROWAG section R302.3 specifies the continuous clear width of pedestrian access routes shall be 4' minimum, exclusive of the width of the curb.
- In the northwest corner of the primary driveway to Melbourne Village Plaza (460' south of Eau Gallie Boulevard), the downward slope of the curb ramp begins at the back of the sidewalk leaving no turning space at the top of the ramp (shown in **Figure 63**). According to section R304.2.1 of the ADA PROWAG, a turning space of 4' minimum by 4' minimum shall be provided at the top of the curb ramp.
- As illustrated in **Figure 64** to **Figure 67**, the RSA team observed several locations along the corridor where the sidewalk was not flush, creating trip hazards. In some cases, drainage inlet structures were either slightly raised above or depressed below the sidewalk surface.

Table 4. Qualitative Risk Rating for Observed ADA Issues

Function	Classification	Reasoning
Exposure	Category I	Impacts pedestrians and individuals with disabilities
Probability	Category I	Issues may not directly contribute to injury, but does limit connectivity and access
Consequence	Category I	ADA issues may not lead to crashes between non- motorists and vehicles
Overall	Category I	-

The RSA team suggests conducting a formal ADA evaluation along the corridor, but highlights the following typical improvements for consideration to address the ADA issues described above:

- Maintenance-type improvements:
 - Consider replacing/installing detectable warning surfaces per FDOT Design Standard Index 304 at all signalized intersections, except Sarno Road.
 - o Consider replacing railing support on the east side of Wickham Road, in front of Chili's.
 - o Consider reconstructing the sidewalk on the north side of Sarno Road east of the intersection with Wickham Road to repair section with cracked concrete.
 - o Consider widening sidewalk around the utility pole on the west side of Wickham Road, approximately 100' north of Sarno Road.
 - Consider grinding the sidewalk to provide flush surfaces throughout the study corridor.
- Near-term improvements:
 - Evaluate drainage issue that restricts effective sidewalk width in front of Sabal Elementary School.
 - Consider rebuilding the curb ramps in the northwest corner of the primary driveway to Melbourne Village Plaza (460' south of Eau Gallie Boulevard) to provide a 4'x4' turning space needed at the top of the curb ramp.

Location: Corridor-Wide

Issue #5: Lack of Sidewalks along Wickham Road



Figure 68 Pedestrian Path on West Side near Orange Manor Drive



Figure 69 Pedestrian Path on West Side in Front of Auto Zone



Figure 70 Discontinuous Sidewalk on the East Side near Aurora Road Intersection



Figure 71



Figure 72

Description of Issue:

The intent of the RSA is to consider safety for all user groups based on both crash data and risk factors. There may not be crash data supporting the noted design deficiencies, but the RSA team conducted a risk-based assessment and identified the locations to address potential safety issues based on risk.

No sidewalk is provided on the west side of the roadway from north of Sabal Elementary School to Parkway Drive. Pedestrian usage of the shoulder on the west side of Wickham Road is evidenced by the pedestrian foot path (shown in **Figure 68** and **Figure 69**).

Sidewalk on the east side of Wickham Road is discontinuous on the south leg of the Aurora Road intersection, as shown in the aerial in **Figure 70**. The sidewalk terminates into a parking lot and pedestrians must travel through the parking lot to continue along the east side of Wickham Road. Examples of the termination of the sidewalk are displayed in **Figure 71** and **Figure 72**.

Table 5. Qualitative Risk Rating for Lack of Sidewalk along Wickham Road

Function	Classification	Reasoning
Exposure	Category II	Pedestrians need to use discontinuous sidewalk on the east side
Probability	Category I	No pedestrian/bicycle crashes reported due to this issue
Consequence	Category III	Potential for pedestrian/bicycle crash types
Overall	Category II	-

Suggestions for Improvement:

In the near-term, consider a feasibility study for installation of sidewalks on the west side of Wickham Road. Utility poles, drainage, and minimal right-of-way are major factors to consider. As part of this study, assess the feasibility of filling gaps in sidewalk on east side of Wickham Road.

Location: Corridor-Wide

Issue #6: Street Name Signage Visibility





Figure 73

Figure 74

Description of Issue:

Street name signage (**D3-1**) is difficult to see at night due to size, inconsistent location, and limited retroreflectivity, as illustrated in **Figure 73** and **Figure 74**. This issue applies at the study signalized intersections and unsignalized minor-street approaches. Increasing the distance from which a driver can see the street signs may reduce potential for rear-end crashes associated with sudden deceleration from turning vehicles.

Table 6. Qualitative Risk Rating for Street Name Sign Visibility

Function	Classification	Reasoning
Exposure	Category I	Not usually an issue for local drivers
Probability	Category I	No crashes reported due to this issue
Consequence	Category I	Potential for rear-ends typically result in PDO or minor injury
Overall	Category I	-

Suggestions for Improvement:

In the near-term, consider replacing street name signage (**D3-1**) with new retro-reflective signs using applicable font size following the guidance provided in section 2D-43 of the 2009 *Manual on Uniform Traffic Control Devices (MUTCD)*. Table I-2 specifies 6" letter height on post mounted street signs at intersections along roadways with a posted speed of 40 mph or less. Consider interior illuminated, overhead LED street name signs at the signalized locations, per Table 2A-1 of the MUTCD.

Location: Sarno Road Intersection

Issue #7: Left-Turn Crashes





Figure 75

Figure 76



Figure 77

Description of Issue:

Over the crash analysis period, there were 26 left-turn crashes with the following distributions on each leg:

- 12 involved northbound left-turning vehicles
- 6 involved southbound left-turning vehicles
- 6 involved westbound left-turning vehicles
- 2 involved eastbound left-turning vehicles

Figure 75 shows an aerial of the lane configurations at the intersection. A protected/permissive mode with a "doghouse" five-section signal display is currently in use and the number of left-turn crashes caused by left-turn drivers at the intersection has exceeded six per year in 2009 and 2013. This situation allows for consideration of protected left-turn phasing per the Florida Traffic Engineering Manual (Section 3.2.2). **Figure 76** illustrates the permissive left-turn phase along the southbound approach of Wickham Road.

Long queues were observed along the northbound approach in the peak hours as shown in **Figure 77**. The operations of the intersection may be encouraging drivers to accept smaller gaps during the permissive left-turn phases as suggested by the crash history at the intersection.

Table 7. Qualitative Risk Rating for Left-Turn Crashes

Function	Classification	Reasoning
Exposure	Category II	Moderate volume of left-turns
Probability	Category II	Represents 25 percent of reported injury crashes at intersection
Consequence	Category III	43 percent of left-turn crashes resulted in injury
Overall	Category II	-

Suggestions for Improvement:

In the near-term, consider converting from protected/permissive to protected-only left-turn phasing to reduce left-turn crash potential. By removing the permissive phase, the conflict between left-turning vehicles and opposing through movements is eliminated and could reduce the frequency of left-turn crashes. However, removing the permissive phase may have a negative impact on the overall operations at the intersection.

In addition, the agency may consider converting the existing protected/permissive "doghouse" five-section signal displays to a protected/permissive flashing yellow arrow signal displays. With this display, the agency may operate protected left-turn phases during specific time periods, but still allow permissive left-turns during off-peak periods. A feasibility study could be conducted to evaluate the operational impacts of the left-turn signal phasing conversion. Adjustments to the cycle length, splits, etc. could also be evaluated.

Location: Sarno Road Intersection

Issue #8: Walmart Gas Station Driveway on Sarno Road

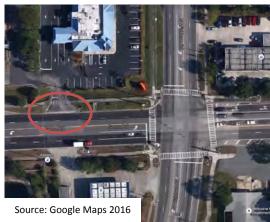


Figure 78 Location of Walmart Fuel Station
Driveway on Sarno Road



Figure 79 Vehicle Waiting from Walmart Fuel Station
Driveway to East



Figure 80 Vehicle Exiting from Walmart Fuel Station Driveway to East

Description of Issue:

A full-access driveway on the north side of Sarno Road, approximately 160 feet west of Wickham Road, serves PNC Bank, a fuel station, and Walmart (see **Figure 78**). During peak periods, the eastbound left-turn and through queues from the Wickham Road/Sarno Road intersection extend past the driveway. Drivers were observed making southbound left-turn movements from the driveway and queued in the westbound Sarno Road travel lanes effectively blocking traffic along Sarno Road until they can find a gap in the eastbound queue (see **Figure 79** and **Figure 80**).

Table 8. Qualitative Risk Rating for Walmart Gas Station Driveway on Sarno Road

Function	Classification	Reasoning
Exposure	Category II	During periods when westbound left-turn queues extend beyond driveway
Probability	Category I	No reported crashes
Consequence	Category III	Potential for angle crash type
Overall	Category II	-

In the near-term, consider restricting the driveway to right-in/right-out only by constructing concrete median to enforce the restriction. This would require more traffic to use the main Walmart entrance/exit driveway approximately 700 feet west of the Wickham Road/Sarno Road intersection.

Location: Sarno Road Intersection

Issue #9: Pedestrian Signal Head and Push Button Signage





Figure 81

Figure 82

Description of Issue:

The pedestrian signal head on the northeast corner is crooked as shown in **Figure 81**. The pedestrian signal head has been struck and is cracked. The push button signage on the same pole has been scratched off as illustrated in **Figure 82**.

Table 9. Qualitative Risk Rating for Pedestrian Signal Head and Push Button Signage

Function	Classification	Reasoning
Exposure	Category I	Impacts pedestrians only
Probability	Category I	Few users will notice this issue
Consequence	Category I	ADA issues may not lead to crashes between non- motorists and vehicles
Overall	Category I	-

Suggestions for Improvement:

As a maintenance improvement, consider replacing the pedestrian signal head and push button signage.

Location: Mid-Block between Sarno Road to Melbourne Greyhound Park

Issue #10: Walmart Driveway on Wickham Road





Figure 84

Figure 83

Description of Issue:

A full-access driveway on the west side of Wickham Road, approximately 500 feet north of Sarno Road, serves Walmart and several other retailers (shown in **Figure 83**). The eastbound left-turn movement onto Wickham Road conflicts with the northbound left-turn into the driveway. Given that northbound left-turns have right-of-way, the delay to exiting traffic at the driveway is heavily influenced by the northbound left-turn demand. Drivers were observed taking short gaps in traffic after having been delayed at this driveway. Some drivers were observed using the center TWLTL as a refuge before pulling into the northbound lanes, while some drivers were observed waiting for a simultaneous gap in both northbound and southbound traffic. **Figure 84** shows the eastbound approach at the driveway.

Table 10. Qualitative Risk Rating for Walmart Driveway on Wickham Road

Function	Classification	Reasoning
Exposure	Category II	During peak periods only
Probability	Category I	No reported crashes
Consequence	Category III	Potential for angle crash type
Overall	Category II	-

In the near-term, consider restricting the driveway to left-in/right-in/right-out only by constructing a concrete directional median to restrict the eastbound left-turn at the driveway. This would require more traffic to use the Greyhound Park signal to go north on Wickham Road.

Location: Melbourne Greyhound Park

Issue #11: Maintenance to Remove Sign



Source: Google Earth

Figure 85

Description of Issue and Suggestion:

An old sign indicates END ROAD WORK, but no construction work is currently underway in the area (shown in **Figure 85**). Maintenance crews are suggested to remove this sign and its posts to reduce driver distraction.

Location: Eau Gallie Boulevard Intersection

Issue #12: Eastbound Right-Turn Curb Return Radius



Figure 86

Description of Issue:

A WB-62 truck could not make the eastbound right-turn without driving over the median on the northbound approach. **Figure 86** shows the existing intersection configuration. A truck making this wide turn could encroach into the northbound left-turn lane, or the truck may block the lane while waiting for the northbound left-turn to clear to provide adequate width for the turn.

Table 11. Qualitative Risk Rating for Eastbound Right-Turn Curb Return Radius

Function	Classification	Reasoning
Exposure	Category I	Applied only to large trucks
Probability	Category I	No reported crashes
Consequence	Category II	Potential for low-speed crashes
Overall	Category I	-

Suggestions for Improvement:

In the near-term, consider reconstructing the curb radius to accommodate a larger radius turn so that large trucks can turn without encroaching into the northbound left-turn lane. This could result in a longer crossing distance for pedestrians. Another option is to consider adjusting the median nose on the northbound concrete median. Both considerations will need to perform a swept-path design vehicle check to evaluate designs that accommodate the movement.

Location: Eau Gallie Boulevard Intersection

Issue #13: Right-Turn Phase Conflict with Pedestrian Crossing



Figure 87 Observed Pedestrian Crossing on East Approach of Eau Gallie Boulevard/Wickham Road Intersection



Figure 88 Observed Right-Turn Vehicle on South Approach of Eau Gallie Boulevard/Wickham Road Intersection

Description of Issue:

Through/right-turn traffic phase runs concurrent with the pedestrian phase on the perpendicular approach. The crossing guards from Sabal Elementary School indicated that right-turn traffic does not yield to pedestrians/bicyclists in the crosswalk. Drivers were observed making right-turns while pedestrians/bicyclists were in the adjacent lane of the exiting leg crosswalk. Also, some drivers made right-turns on red while pedestrians/bicyclists were in the crosswalk. Figure 87 and Figure 88 show examples of the pedestrian and vehicle activity at the intersection.

Table 12. Qualitative Risk Rating for Right-Turn Phase Conflict with Pedestrian Crossing

Function	Classification	Reasoning
Exposure	Category III	Observed high pedestrian/bicyclist volumes in proximity to school
Probability	Category III	Three crashes reported involving bicyclists and right-turn vehicles
Consequence	Category III	Pedestrian/bicycle crash types
Overall	Category III	-

In the near-term, the following are considerations for reducing conflicts between pedestrians/bicyclists and right-turning vehicles within the intersection influence area:

- Implement leading pedestrian phase intervals, delaying the through green phase until after pedestrians have had a chance to begin crossing.
- Install signage that reminds turning traffic to yield to pedestrians (see **R10-15** from the 2009 MUTCD shown in **Figure 89**).
- Restrict right-turns on red during school hours with a dynamic message sign (see example in **Figure 90**).



R10-15

★ A fluorescent yellow-green background color may be used instead of yellow for this sign.



Figure 89: R10-15 Signage from the MUTCD

Figure 90 Example of Dynamic Right-Turn Restriction Signage on Wickham Road

Location: Mid-Block between Eau Gallie Boulevard to Aurora Road

Issue #14: School Zone Extents



Figure 91 Aerial of School Zone for Sabal Elementary School



Figure 92 END SCHOOL ZONE Sign for Southbound Wickham Road

Description of Issue:

A School Zone is designated on Wickham Road in front of Sabal Elementary School (see **Figure 91**). The school zone for southbound traffic ends approximately 250 feet north of Eau Gallie Boulevard (shown in **Figure 92**). Drivers were observed accelerating after leaving the school zone up to the signal at Eau Gallie Boulevard to get through during the green phase. This behavior may contribute to rear-end crashes on the southbound approach at the signalized intersection where students cross Wickham Road.

Table 13. Qualitative Risk Rating for School Zone Extents

Function	Classification	Reasoning
Exposure	Category I	During school hours only
Probability	Category I	Conflicts exist when accelerating vehicle arrives during yellow or all-red phase
Consequence	Category II	Potential for rear-end crash types
Overall	Category I	-

In the near-term, consider extending the school zone to the Eau Gallie Boulevard intersection. This would reduce incentive for drivers to accelerate out of the school zone when the signal is only 250 feet downstream.

Location: Mid-Block between Eau Gallie Boulevard to Aurora Road

Issue #15: Unsignalized Crosswalk at Trimble Road





Figure 93

Figure 94

Description of Issue:

An uncontrolled pedestrian crossing at the Wickham Road/Trimble Road intersection is located approximately 475 feet north of Sabal Elementary School (shown in **Figure 93**). The crossing is marked with the old standard emphasis markings (**Figure 94**). Wickham Road has a 5-lane cross-section with no raised median at the crossing location and carries greater than 12,000 vehicles per day. Per the 2013 Traffic Control Device Handbook², "Marked crosswalks alone (without other substantial treatments) should not be installed across uncontrolled roadways" in these conditions.

Table 14. Qualitative Risk Rating for Unsignalized Crosswalk at Trimble Road

Function	Classification	Reasoning
Exposure	Category III	Crossing serves school and other pedestrians
Probability	Category II	Multilane crossing and posted speed of 35 mph
Consequence	Category III	Potential for pedestrian/bicycle crash types
Overall	Category III	-

² This guidance is provided in Chapter 13 of the TCD Handbook, but the exact wording in the 2009 MUTCD on this issue is currently worded slightly differently and is being considered for revision by FHWA.

In the near-term, consider low-cost enhancements to increase visibility of the pedestrian crossing, including:

- Special emphasis markings as shown on sheet 10 of the FDOT Design Standard Index 17346 should be used for the crossing.
- Construct raised median or crossing island on the north side of the intersection. If median is desired, the crossing should be moved to the north side of Trimble Road to avoid conflicts with the northbound left-turn. See the conceptual sketch in Figure 95.
- Enhance striping to include advance stop lines and solid striping between travel lanes to reduce lane changes.
 - Advance stop or yield lines encourage drivers to stop further back from the crosswalk, promoting better visibility between pedestrians and motorists, and helping to prevent multiple-threat crashes at uncontrolled crossings.
 - O A multiple-threat collision is a pedestrian crash that occurs when pedestrians have to cross more than one lane in each direction. A motor vehicle in one lane stops and provides a visual screen to the motorist in the adjacent lane. The motorist in the adjacent lane continues to move and hits the pedestrian.
 - o The 2009 MUTCD recommends that yield or stop lines used at uncontrolled multi-lane crossings be placed 20 to 50 feet in advance of the crosswalk; however, according to PEDSAFE 2013, a setback of 30 feet for the advance stop or yield lines (in advance of the crosswalk) has been found to be appropriate for most situations.
- Install Pedestrian-Activated Rectangular Rapid-Flashing Beacons (RRFBs)
 - o RRFBs are active warning devices used to alert motorists of crossing pedestrians at uncontrolled crossings. They remain dark until activated by pedestrians, at which point they emit a bright, rapidly flashing yellow LED light.
 - Studies suggest that RRFBs can significantly increase yielding rates compared to standard pedestrian warning signs alone. Results have shown that motorist yielding can be increased from baselines averaging 5 percent to 20 percent with the standard pedestrian warning sign treatment only to sustainable yielding rates of 80 percent or higher with this device.
 - RRFBs should be considered on both the right and left sides of both the southbound and northbound approaches. They are not currently included in the MUTCD, FDOT has obtained approval from FHWA, under the terms and conditions of Interim Approval II (see section IA.10 of the MUTCD).



Figure 95 Conceptual Sketch of Relocated Crossing with Pedestrian Refuge Island

Location: Aurora Road Intersection

Issue #16: Incomplete Pedestrian Facilities



Figure 96

Description of Issue:

As discussed in **Issue #5: Lack of Sidewalks along Wickham Road**, the sidewalk on the east side of Wickham Road terminates 425 feet south of the intersection, as shown in **Figure 96**, creating a gap in pedestrian routes. At the intersection, no marked crossings are provided to the southeast corner and no pedestrian signal equipment exists for these movements. Pedestrians with a destination in the southeast corner of the intersection must use judgment to identify an appropriate time to cross.

A marked crosswalk is provided on the west leg, but no sidewalks are provided along the west side of Wickham Road or along either side of Aurora Road. The lack of sidewalks requires pedestrians to walk on the shoulder or may serve as a barrier for walking as a mode of travel.

Wires for the push button on the northeast corner are exposed.

Table 15. Qualitative Risk Rating for Incomplete Pedestrian Facilities

Function	Classification	Reasoning
Exposure	Category I	Low pedestrian volumes observed
Probability	Category III	Pedestrians must judge gaps in traffic flow, introducing potential for human error
Consequence	Category III	Potential for pedestrian/bicycle crash types
Overall	Category II	-

In the near-term, the following considerations could help reduce risk to pedestrians at this intersection:

- Complete the segment of missing sidewalk on the east side of Wickham Road to the southeast corner of the intersection.
- Construct sidewalk on at least one side of Aurora Road.
- Provide marked crossings on the east and south legs of the intersection and install necessary pedestrian signal equipment.
- Cover up the exposed wires associated with the push button in the northeast corner.

Location: Aurora Road Intersection

Issue #17: Westbound Through Movement Alignment



Figure 97 Figure 98

Source: Google Earth

Description of Issue:

The westbound through lane aligns vehicles toward the northwest corner of the intersection, as shown in the street view image (**Figure 97**). The visibility of the roadway on the far side of the westbound approach is reduced at night.

Table 16. Qualitative Risk Rating for Westbound Through Movement Alignment

Function	Classification	Reasoning
Exposure	Category I	Applies to westbound through movements only
Probability	Category I	Local drivers expect alignment
Consequence	Category II	Potential for ingle-vehicle run-off road crashes
Overall	Category I	-

Suggestions for Improvement:

As a maintenance-type improvement, consider dotted guide line striping between the westbound left-turn lane and westbound through/right lane (east leg) to tie in between the eastbound left-turn lane and westbound receiving lane (west leg) along the Aurora Road approach. Consider using 2' to 4' dotted guide line striping consistent with sheet 1 of the FDOT Design Standard Index 17346. An example of the striping location is illustrated in **Figure 98**.

Location: Mid-Block between Aurora Road and Lake Washington Road

Issue #18: Lighting

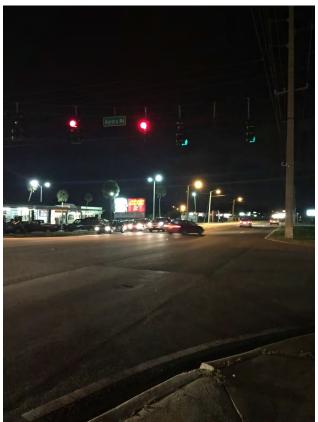


Figure 99

Description of Issue:

The majority of the corridor has illumination, except between Aurora Road and Lake Washington Road where several lights were out of service (see **Figure 99**). There were 154 reported crashes between Aurora Road and Lake Washington Road. The crash history indicated that 20 percent of the crashes along the corridor occurred under dark lighting conditions (dawn, dusk, dark-lighted, and dark-unlighted).

Table 17. Qualitative Risk Rating for Lighting

Function	Classification	Reasoning
Exposure	Category I	Limited to dark hours
Probability	Category II	Lack of illumination may create motor vehicle conflicts
Consequence	Category II	Potential for various crash types/severities
Overall	Category II	-

As a maintenance-type improvement, consider contacting the operator/maintainer to replace the luminaires at the following locations:

• Repair/replace applicable street lights between Aurora Road and Lake Washington Road

Location: Northgate Plaza Intersection

Issue #19: No Pedestrian Crossings at Northgate Plaza Signal





Figure 100

Figure 101

Description of Issue:

The existing signal to the Northgate Plaza does not provide pedestrian crossings to the sidewalk on the east side of Wickham Road as shown in **Figure 100**. Without a signalized crossing within the vicinity of the many commercial land uses, pedestrians are likely to cross at mid-block locations where drivers are not expecting pedestrians.

The RSA team identified that volumes have redistributed since the signal was installed and the highest turn movement volumes are at the north driveway to the Plaza or at Northgate Street (illustrated in **Figure 101**). These locations serve McDonald's, Goodwill, Krispy Kreme, and Fun Town. Relocating the signal to the Northgate Street intersection would provide a pedestrian crossing near the highest trip-generating uses.

Table 18. Qualitative Risk Rating for No Pedestrian Crossings at Northgate Plaza Signal

Function	Classification	Reasoning
Exposure	Category I	Low pedestrian volumes observed
Probability	Category I	Pedestrians must judge gaps in traffic flow, introducing potential for error
Consequence	Category III	Potential for pedestrian/bicycle crash types
Overall	Category II	-

In addition to markings that support pedestrian crossings at signals along the corridor, consider the following near-term improvements to provide pedestrian facilities at this intersection:

- Upgrade the existing signal to include a signalized crossing of Wickham Road, including pedestrian signals, accessible push buttons, and special emphasis crosswalk markings.
- Consider constructing sidewalks on the west side of Wickham Road and upgrade the existing signal to include a signalized crossing of the Northgate Plaza approach, including pedestrian signals, accessible push buttons, and standard special emphasis crosswalk markings.
- Consider completing a signal warrant analysis at the current Northgate Plaza signalized intersection and at the Northgate Street intersection.

Issue #20: Driveway Turn Movement Conflicts

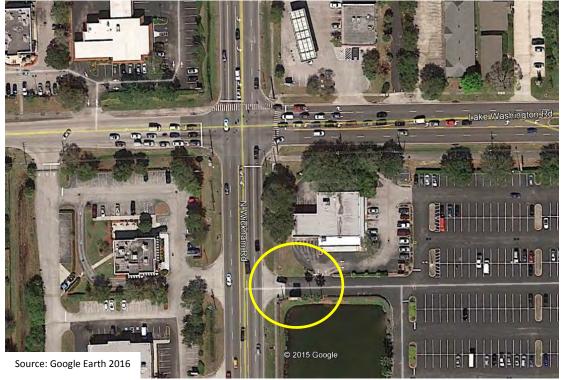


Figure 102



Figure 103

Description of Issue:

A driveway that serves the Lake Washington Plaza is located within 225 feet of the Lake Washington Road signal (shown in **Figure 102**). Outbound left-turns from the driveway conflict with northbound approach queues. Over the crash analysis period, 13 angle crashes were identified at the driveway

location denoted in **Figure 102**. Twenty-eight (28) angle crashes occurred at the Lake Washington Road intersection with 23 crashes occurring at a driveway within the influence area of the signal.

The RSA team observed queues frequently extending beyond the northernmost driveway to the Lake Washington Square in the southeast corner of the intersection as illustrated in **Figure 103**. Drivers are attempting to make a left-turn from the driveway to travel south along Wickham Road. Drivers exiting the driveway were observed traveling between queued northbound vehicles to access the southbound lanes.

Table 19. Qualitative Risk Rating for Driveway Turn Movement Conflicts

Function	Classification	Reasoning
Exposure	Category I	One of three driveways to the Plaza
Probability	Category I	Conflicts exist during peak periods
Consequence	Category III	Potential for angle or turning crashes which may lead to injury
Overall	Category II	-

Suggestions for Improvement:

In the near-term, consider restricting the northernmost driveway on the southeast corner of the intersection to right-in/right-out only by installing a "pork chop" island.

Issue #21: Westbound Lane Drop



Figure 104

Description of Issue:

The outside through lane becomes the westbound right-turn lane at the intersection. There are two right-turn arrows and a "Right Turn Lane Must Turn Right" sign approximately 200 feet east of the intersection (shown in **Figure 104**). This relatively short advanced warning distance could create lane shifts near the intersection.

Table 20. Qualitative Risk Rating for Westbound Lane Drop

Function	Classification	Reasoning
Exposure	Category I	Local drivers expect the lane drop
Probability	Category I	Failure to anticipate lane drop leads to a merge maneuver
Consequence	Category I	Potential for sideswipe crash types
Overall	Category I	-

Suggestions for Improvement:

As a maintenance-type improvement, consider installing advance warning signage, striping additional right-turn arrows, and including ONLY pavement markings in addition to the arrows to warn drivers of the lane drop as they approach the intersection (see sheet 6 of the FDOT Design Standard Index 17346 and the MUTCD Section 3B.20).

Issue #22: Incomplete Pedestrian Facilities





Figure 105

Figure 106

Description of Issue:

No marked crossings are provided to the southwest corner (see **Figure 105**) and no pedestrian signal equipment exists for these movements. Pedestrians with a destination in the southwest corner of the intersection must use judgment to identify an appropriate time to cross (as shown in **Figure 106**). Similar to other locations along the corridor, no sidewalks are present on the west side of Wickham Road in the vicinity of Lake Washington Road. The lack of sidewalks requires pedestrians to walk on the shoulder or may serve as a barrier for walking as a mode of travel.

Table 21. Qualitative Risk Rating for Incomplete Pedestrian Facilities

Function	Classification	Reasoning
Exposure	Category I	Low pedestrian volumes observed
Probability	Category III	Pedestrians must judge gaps in traffic flow, introducing potential for human error
Consequence	Category III	Potential for pedestrian/bicycle crash types
Overall	Category II	-

Suggestions for Improvement:

To reduce potential for pedestrian crashes on the south and west approaches, consider the following near-term improvements:

- Provide marked crossings on the west and south legs of the intersection and install necessary pedestrian signal equipment.
- Construct a sidewalk on the west side of Wickham Road in the vicinity of the intersection.

Issue #23: Pedestrian Crossing Alignment



Figure 107 Figure 108

Description of Issue:

The crosswalk on the north leg is aligned into the westbound right-turn lane. Examples of this are shown in **Figure 107** and **Figure 108**. The existing crossing markings do not guide pedestrians to the accessible ramp in the northeast corner.

Table 22. Qualitative Risk Rating for Pedestrian Crossing Alignment

Function	Classification	Reasoning
Exposure	Category I	Number of impaired pedestrians is low relative to number of other users
Probability	Category II	Applies to crossings from the NW corner to NE corner only
Consequence	Category III	Potential for pedestrian/bicycle crash types
Overall	Category II	-

Suggestions for Improvement:

In order to reduce risk of pedestrian crashes involving pedestrians crossing Wickham Road from the northwest to the northeast corner, consider realigning the crosswalk to align with the northeast corner curb ramp, and reconstruct the curb ramp to provide a pedestrian warning surface as a near-term improvement.

Location: Mid-Block between Lake Washington Road and Parkway Drive

Issue #24: Exposed Drainage Inlet Adjacent to Sidewalk





Figure 109

Figure 110

Description of Issue:

A drainage inlet is located between the eastern sidewalk and the northbound travel lanes to the north of Harbor Sun Green Road. There is a steep slope to the bottom of the drainage inlet structure and the edges of the structure are flush with the sidewalk (examples shown in **Figure 109** and **Figure 110**). This creates a potential hazard for pedestrians or bicyclists.

Table 23. Qualitative Risk Rating for Exposed Drainage Inlet Adjacent to Sidewalk

Function	Classification	Reasoning
Exposure	Category I	Impacts pedestrians or bicyclists on sidewalk
Probability	Category II	Does not impact pedestrians unless they need additional path width beyond current width.
Consequence	Category III	Potential for pedestrian/bicycle hazard
Overall	Category II	-

Suggestions for Improvement:

Due to the drop/steep slope between the sidewalk and drainage inlet, consider reviewing this location based on FDOT Plans Preparation Manual (PPM) Figure 8.8.1 to possibly install a railing in the near-term. If railing is needed, install the railing just off the west edge of the sidewalk to prevent pedestrians/bicyclists from falling off the sidewalk into the drainage ditch area.

Location: Parkway Drive Intersection

Issue #25: Incomplete Pedestrian Facilities



Figure 111 Aerial Photo Showing Existing Crosswalks at the Parkway Drive/Wickham Road Intersection

Description of Issue:

No marked crossings are provided to the northwest corner (see **Figure 111**) and no pedestrian signal equipment exists for these movements. Pedestrians with a destination in the northwest corner of the intersection must use judgment to identify an appropriate time to cross the north or west approaches. Sidewalks are present to the north side of the 7-11 driveway as shown in **Figure 111**; however, sidewalks are not present from the driveway to the northwest corner of the intersection. Open drainage exists adjacent to the southbound lanes on the north side of Parkway Drive.

Table 24. Qualitative Risk Rating of Incomplete Pedestrian Crossing Facilities

Function	Classification	Reasoning
Exposure	Category I	Low pedestrian volumes observed
Probability	Category III	Pedestrians must judge gaps in traffic flow, introducing potential for human error
Consequence	Category III	Potential for pedestrian/bicycle crash types
Overall	Category II	-

Suggestions for Improvement:

To reduce potential for pedestrian crashes on the north and west approaches, consider the following near-term improvements:

- Provide marked crossings on the north and west legs of the intersection and install necessary pedestrian signal equipment.
- Complete the segment of missing sidewalk on the west side of Wickham Road between the north side of the 7-11 driveway to the northwest corner of the intersection.
- Construct pedestrian ramps in the northwest corner of the intersection to connect to the gas station/convenience store in this quadrant of the intersection.

Summary of Suggestions

This RSA considers operational and safety related issues for vehicles, pedestrians, and bicyclists on Wickham Road from Sarno Road to Parkway Drive. This study was commissioned by the SCTPO to develop suggestions to improve the safety of motorists and non-motorists 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 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.

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

Location	Issue Number	Issue	Suggestion		
	TRANSIT RELATED				
			Remove the pavement at the existing boarding and alighting (B&A) area;		
Davings violation has a longer			Pave a level 5'x8' slab with a raised 6" curb to create a raised and level B&A area;		
Brunswick Harbor Lanes	N/A	Bus Stop	Add detectable warnings to the nearby curb ramps;		
Northbound			Move the bench so it is not blocking the path to the sidewalk; and		
			Move the pole with the bus schedule adjacent to the pavement to make it accessible.		
			Move the stop 450' north;		
Melbourne Village	N1 / A	Dua Cham	Pave a level 5'x8' slab with a raised 6" curb for the B&A area and connect to the adjacent sidewalk;		
Northbound	N/A	Bus Stop	Add detectable warnings to the nearby curb ramps; and		
			Move the pole with the bus schedule adjacent to the pavement to make it accessible.		
Eau Gallie Boulevard	N1 / A	Dua Chair	Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area; and		
Westbound	N/A	Bus Stop	Add detectable warnings to the nearby curb ramps.		
Aldila Cauthhaaad	N1 / A	Dua Chair	Pave a level 5'x2' slab behind the sidewalk to complete a 5'x8' B&A area; and		
Aldi's Southbound	N/A	Bus Stop	Extend the detectable warning at the nearby curb ramps.		
Pine Hill Drive			Move the stop 175' south;		
	N/A	Bus Stop	Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area;		
Northbound			Add detectable warnings to the nearby curb ramps.		
			Move the stop 145' north;		
Orange Manor Drive	N/A	Bus Stop	Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area;		
Southbound	N/A	Bus Stop	Repave the cracks in the sidewalk; and		
			Repave the existing curb ramp and add detectable warnings.		
		Bus Stop	Move the stop 380' north;		
Aurora Road Northbound	N/A		Pave a level 5'x8' slab for the B&A area;		
Autora Road Northbound	N/A		Add a 10' path from the B&A area to the sidewalk; and		
			Add detectable warnings to the nearby curb ramps.		
Aurora Road/CVS		Bus Stop	Pave a level 5'x6' slab between the curb and sidewalk to complete a 5'x8' B&A area;		
Southbound	N/A		Add detectable warnings to the nearby curb ramps; and		
Southbound			Move the pole with the bus schedule adjacent to the pavement to make it accessible.		
		Bus Stop	Pave a level 5'x8' slab for the B&A area;		
			Move the pole with the bus schedule adjacent to the pavement to make it accessible;		
Lake Washington Road	N/A		Add a 100' path to connect the north;		
Southbound	N/A		Construct a curb ramp with a slope less than 8.3%;		
			Add detectable warnings to the nearby curb ramps; and		
			Add a crosswalk at the intersection.		

Location	Issue Number	Issue	Suggestion		
	TRANSIT RELATED				
			Move the stop 310' south; Resurface the B&A area to have a cross slope of less than 2%; Pave a level 5'x8' slab for the B&A area;		
Checkers Northbound	N/A	Bus Stop	Add a 7' path to connect the B&A area to the existing sidewalk; Add detectable warnings to the nearby curb ramps; and Resurface the sidewalk to remove the change in elevation.		
Portofino Villas Southbound	N/A	Bus Stop	Move the stop 5' south; Resurface the B&A area to have a cross slope of less than 2%; Pave a level 5'x8' slab for the B&A area; Pave a 5' sidewalk to connect to the intersection to the south; Construct a curb ramp with a slope less than 8.3%; and Add detectable warnings to the curb ramps.		
Harbor Sun Green Road Northbound	N/A	Bus Stop	Move the stop 20' south; Add a culvert and pave a level 5'x8' slab for the B&A area; Add a 4' path to connect the B&A area to the existing sidewalk; and Add detectable warnings to the nearby curb ramps.		
Preakness Place/Lake Point Apartments Southbound	N/A	Bus Stop	Add a culvert to the drainage area; Pave a level 5'x8' slab with a raised 6" curb for the B&A area; Pave a path from the B&A area to the nearby driveway; Add a curb ramp and detectable warning; and Move the pole with the bus schedule adjacent to the pavement to make it accessible.		
Weston Drive Northbound	N/A	Bus Stop	Pave a level 5'x4' slab between the curb and sidewalk to complete a 5'x8' B&A area; Add detectable warnings to the nearby curb ramps; and Move the pole with the bus schedule adjacent to the pavement to make it accessible.		
CVS Southbound	N/A	Bus Stop	Move the stop 115' north; Pave a level 5'x8' slab for the B&A area; Add a 3' path to connect the B&A area to the existing sidewalk; Add detectable warnings to the nearby curb ramps; and Move the pole with the bus schedule adjacent to the pavement to make it accessible.		
Parkway Drive Northbound	N/A	Bus Stop	Pave a level 5'x8' slab for the B&A area; Add a 5' path to connect the B&A area to the existing sidewalk; and Add detectable warnings to the nearby curb ramps.		

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

Location	Issue Number	Issue	Suggestion		
	NEAR-TERM PRIORITY				
Corridor Wide	1	North/South Left-Turn Movements at Signalized Intersections	Consider replacing the "doghouse" five-section signal displays with 4-section flashing yellow arrow (FYA) protected/permissive left-turn display. If the left turn phasing is converted to a FYA display, consider providing protected only left-turn phasing during peak periods and allow the protected-permissive phasing during the off-peak periods.		
Corridor Wide	2	Lack of Right-Turn Lanes at Signalized Intersections	Consider evaluating right-turn lane warrants for right turn lanes at the following intersections and approaches: • Sarno Road (Southbound, Eastbound, Westbound) • Greyhound Park (Southbound) • Eau Gallie Boulevard (Southbound) • Aurora Road (Northbound and Southbound) • Lake Washington Road (Northbound and Southbound) • Parkway Drive (Northbound and Southbound) Based on the analysis results, consider constructing right-turn lanes where warrants are met. Priority should be given to approaches with the highest right-turn volumes.		
Corridor Wide	3	Intersection Crosswalk Markings	Special emphasis crosswalk markings, as shown on sheet 9 of Design Index 17346, should be re-striped at the following signalized crossings: • Melbourne Greyhound Park (south, west, and east legs) • Eau Gallie Boulevard (all legs) • Aurora Road (north and west legs) • Lake Washington Road (north and east legs) • Parkway Drive (south and east legs) Consider marking all minor street approaches at unsignalized intersections along the corridor with standard crosswalk markings, as shown on sheet 9 of the FDOT Design Standard Index 17346.		
Corridor Wide	4	Observed ADA Issues	The RSA team suggests conducting a formal ADA evaluation along the corridor, but highlights the following typical improvements for near term consideration to address the ADA issues: o Evaluate drainage issue that restricts effective sidewalk width in front of Sabal Elementary School. o Consider rebuilding the curb ramps in the northwest corner of the primary driveway to Melbourne Village Plaza (460' south of Eau Gallie Boulevard) to provide a 4'x4' turning space needed at the top of the curb ramp.		
Corridor Wide	5	Lack of Sidewalks along Wickham Road	Consider a feasibility study for installation of sidewalks on the west side of Wickham Road. Utility poles, drainage, and minimal right-of-way are major factors to consider. As part of this study, assess the feasibility of filling gaps in sidewalk on east side of Wickham Road.		
Corridor Wide	6	Street Name Signage Visibility	Consider replacing street name signage (D3-1) with new retro-reflective signs using applicable font size following the guidance provided in section 2D-43 of the 2009 Manual on Uniform Traffic Control Devices (MUTCD). Table I-2 specifies 6" letter height on post mounted street signs at intersections along roadways with a posted speed of 40 mph or less. Consider internally illuminated, overhead LED street name signs at the signalized locations, per Table 2A-1 of the MUTCD.		

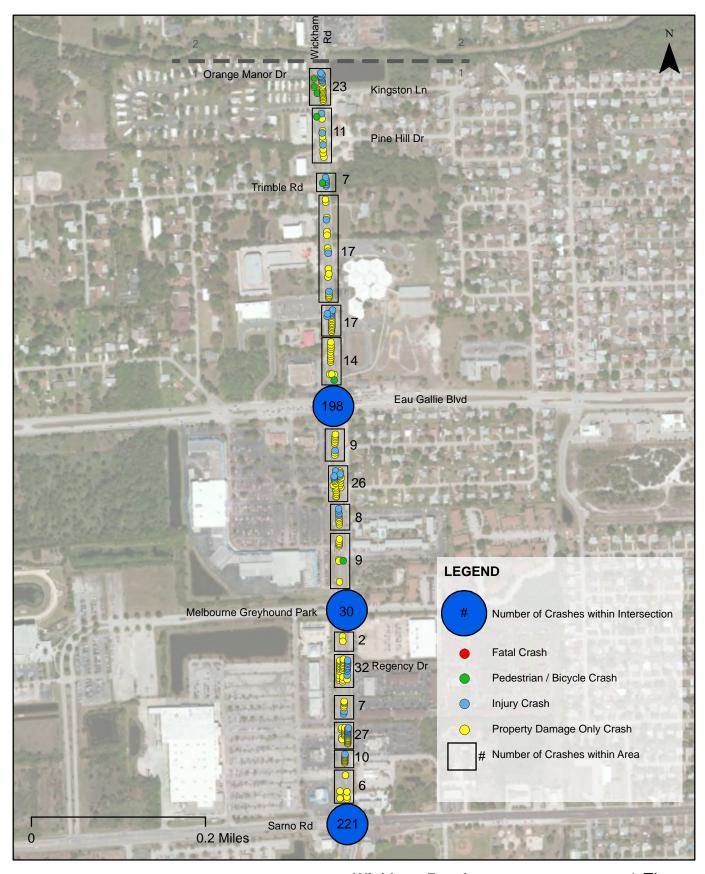
Location	Issue Number	Issue	Suggestion
			NEAR-TERM PRIORITY
Sarno Road Intersection	7	Left-Turn Crashes	Consider converting from protected/permissive to protected-only left-turn phasing to reduce left-turn crash potential. Consider converting the existing protected/permissive "doghouse" five-section signal displays to a protected/permissive flashing yellow arrow signal displays. With this display, the agency may operate protected left-turn phases during specific time periods, but still allow permissive left-turns during off-peak periods. A feasibility study could be conducted to evaluate the operational impacts of the left turn signal phasing conversion. Adjustments to the cycle length, splits, etc. could also be evaluated.
Sarno Road Intersection	8	Walmart Gas Station Driveway on Sarno Road	Consider restricting the driveway to right-in/right-out only by constructing concrete median to enforce the restriction.
Mid-Block between Sarno Road and Melbourne Greyhound Park	10	Walmart Driveway on Wickham Road	Consider restricting the driveway to left-in/right-in/right-out only by constructing a concrete directional median to restrict the eastbound left-turn at the driveway.
Eau Gallie Boulevard Intersection	12	Eastbound Right-Turn	Consider reconstructing the curb radius to accommodate a larger radius turn so that large trucks can turn without encroaching into the northbound left-turn lane. This could result in a longer crossing distance for pedestrians. Another option is to consider adjusting the median nose on the northbound concrete median. Both considerations will need to perform a swept-path design vehicle check to evaluate designs that accommodate the movement.
Eau Gallie Boulevard Intersection	13	Right-Turn Phase Conflict with Pedestrian Crossing	The following are considerations for reducing conflicts between pedestrians/bicyclists and right-turning vehicles within the intersection influence area: • Implement leading pedestrian phase intervals, delaying the through green phase until after pedestrians have had a chance to begin crossing. • Install signage that reminds turning traffic to yield to pedestrians (see R10-15 from the 2009 MUTCD). • Restrict right-turns on red during school hours with a dynamic message sign.
Mid-Block between Eau Gallie Boulevard and Aurora Road	14	School Zone Extents	Consider extending the school zone to the Eau Gallie Boulevard intersection.

Location	Issue Number	Issue	Suggestion			
	NEAR-TERM PRIORITY					
Mid-Block between Eau Gallie Boulevard and Aurora Road	15	Unsignalized Crosswalk at Trimble Road	Consider enhancements to increase visibility of the pedestrian crossing, including: Special emphasis markings as shown on sheet 10 of the FDOT Design Standard Index 17346 should be used for the crossing. Construct raised median or crossing island on the north side of the intersection. If median is desired, the crossing should be moved to the north side of Trimble Road to avoid conflicts with the northbound left-turn. See the conceptual sketch in Figure 95. Enhance striping to include advance stop lines and solid striping between travel lanes to reduce lane changes. O Advance stop or yield lines encourage drivers to stop further back from the crosswalk, promoting better visibility between pedestrians and motorists, and helping to prevent multiple-threat crashes at uncontrolled crossings. O A multiple-threat collision is a pedestrian crash that occurs when pedestrians have to cross more than one lane in each direction. A motor vehicle in one lane stops and provides a visual screen to the motorist in the adjacent lane. The motorist in the adjacent lane continues to move and hits the pedestrian. O The 2009 MUTCD recommends that yield or stop lines used at uncontrolled multi-lane crossings be placed 20 to 50 feet in advance of the crosswalk; however, according to PEDSAFE 2013, a setback of 30 feet for the advance stop or yield lines (in advance of the crosswalk) has been found to be appropriate for most situations. Install Pedestrian-Activated Rectangular Rapid-Flashing Beacons (RRFBs) O RRFBs are active warning devices used to alert motorists of crossing pedestrians at uncontrolled crossings. They remain dark until activated by pedestrians, at which point they emit a bright, rapidly flashing yellow LED light. O Studies suggest that RRFBs can significantly increase yielding rates compared to standard pedestrian warning signs alone. Results have shown that motorist yielding can be increased from baselines averaging 5 percent to 20 percent with the standard pedestrian warning sign treatment only to sustainab			
Aurora Road Intersection	16	Incomplete Pedestrian Facilities	 The following considerations could help reduce risk to pedestrians at this intersection: Complete the segment of missing sidewalk on the east side of Wickham Road to the southeast corner of the intersection. Construct sidewalk on at least one side of Aurora Road. Provide marked crossings on the east and south legs of the intersection and install necessary pedestrian signal equipment. Cover up the exposed wires associated with the push button in the northeast corner. 			

Location	Issue Number	Issue	Suggestion
			NEAR-TERM PRIORITY
Northgate Plaza Intersection	19	No Pedestrian Crossings at the Northgate Plaza Signal	In addition to markings suggested to support pedestrian crossings at all signals along the corridor, consider the following improvements to provide pedestrian facilities at this intersection: • Upgrade the existing signal to include a signalized crossing of Wickham Road, including pedestrian signals, accessible push buttons, and special emphasis crosswalk markings. • Consider constructing sidewalks on the west side of Wickham Road and upgrade the existing signal to include a signalized crossing of the Northgate Plaza approach, including pedestrian signals, accessible push buttons, and standard special emphasis crosswalk markings. • Consider completing a signal warrant analysis at the current Northgate Plaza signalized intersection and at the Northgate Street intersection.
Lake Washington Road Intersection	20	Driveway Turn Movement Conflicts	Consider restricting the northernmost driveway on the southeast corner of the intersection to right-in/right-out only by installing a "pork chop" island.
Lake Washington Road Intersection	22	Incomplete Pedestrian Facilities	To reduce potential for pedestrian crashes on the south and west approaches, consider the following improvements: • Provide marked crossings on the west and south legs of the intersection and install necessary pedestrian signal equipment. • Construct a sidewalk on the west side of Wickham Road in the vicinity of the intersection.
Lake Washington Road Intersection	23	Pedestrian Crossing Alignment	Consider realigning the crosswalk to align with the northeast corner curb ramp, and reconstruct curb ramp to provide a pedestrian warning surface.
Mid-Block between Lake Washington Road and Parkway Drive	24	Adjacent to Sidewalk	Due to the drop/steep slope between the sidewalk and drainage inlet, consider reviewing this location based on FDOT Plans Preparation Manual (PPM) Figure 8.8.1 to possibly install a railing in the near term. If railing is needed, install the railing just off the west edge of the sidewalk to prevent pedestrians/bicyclists from falling off the sidewalk into the drainage ditch area.
Parkway Drive Intersection	25	Incomplete Pedestrian Facilities	To reduce potential for pedestrian crashes on the north and west approaches, consider the following improvements: • Provide marked crossings on the north and west legs of the intersection and install necessary pedestrian signal equipment. • Complete the segment of missing sidewalk on the west side of Wickham Road between the north side of the 7-11 driveway to the northwest corner of the intersection. • Construct pedestrian ramps in the northwest corner of the intersection to connect to the gas station/convenience store in this quadrant of the intersection.

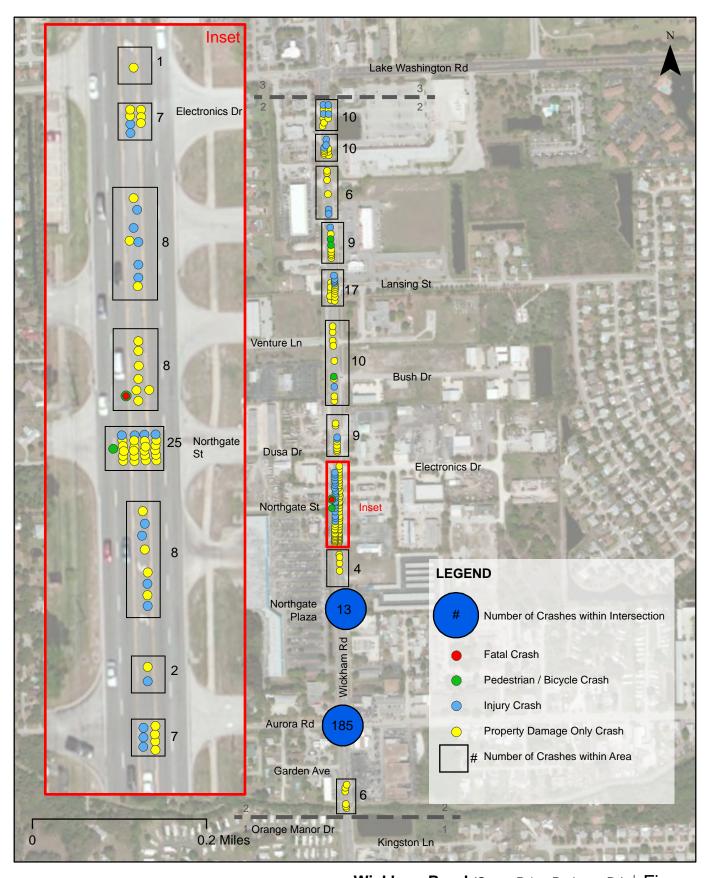
Location	Issue Number	Issue	Suggestion		
	LONG-TERM PRIORITY				
		North/South Left-Turn	Consider realigning the northbound and southbound approaches to provide a positive offset to improve sight distance. On the		
Corridor Wide	1	Movements at	Wickham Road approaches to Eau Gallie Boulevard, shift the median to the right-hand side of the left-turn lane, as shown in		
		Signalized Intersection	Figure 51(c).		

Appendix A – Crash Analysis Reference Materials



Wickham Road (Sarno Rd to Parkway Dr)

2009 - 2014 Crash Map Brevard County, Florida Figure



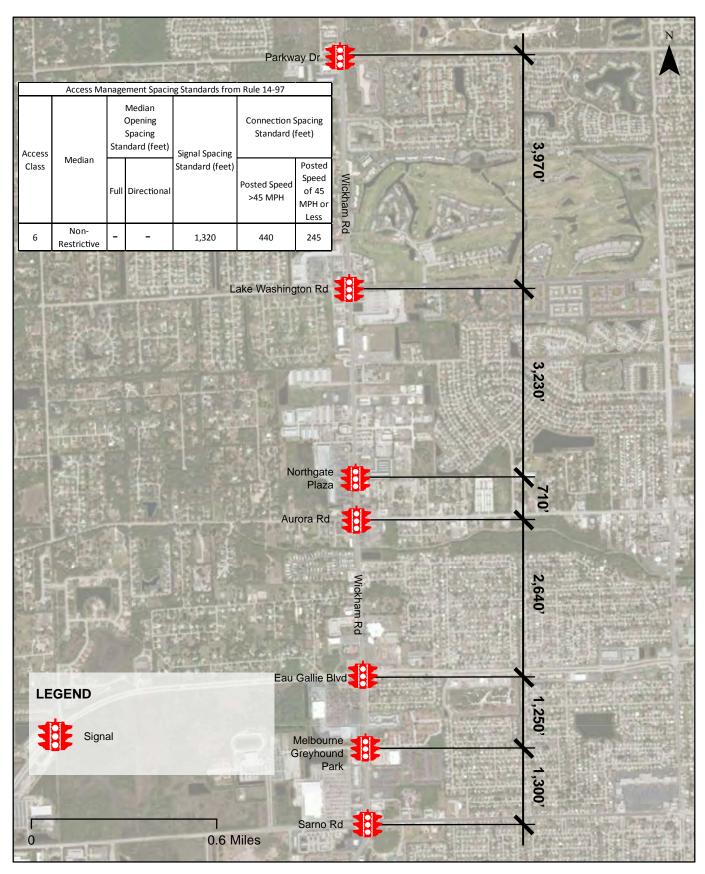
Wickham Road (Sarno Rd to Parkway Dr)

2009 - 2014 Crash Map Brevard County, Florida Figure



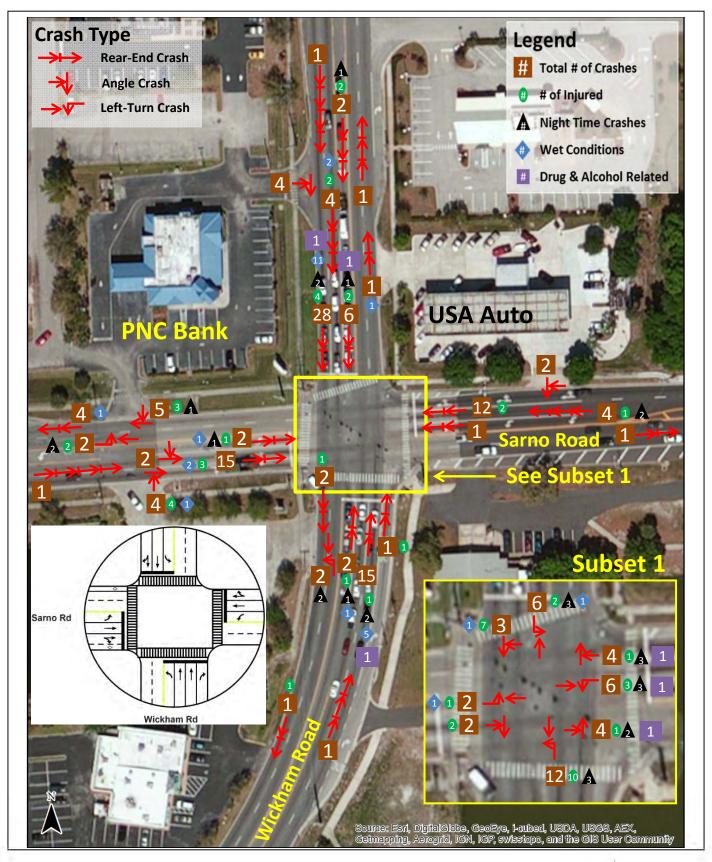
Wickham Road (Sarno Rd to Parkway Dr)

2009 - 2014 Crash Map Brevard County, Florida Figure



Wickham Road (Sarno Rd to Parkway Dr)

Access Management Map Brevard County, Florida Figure

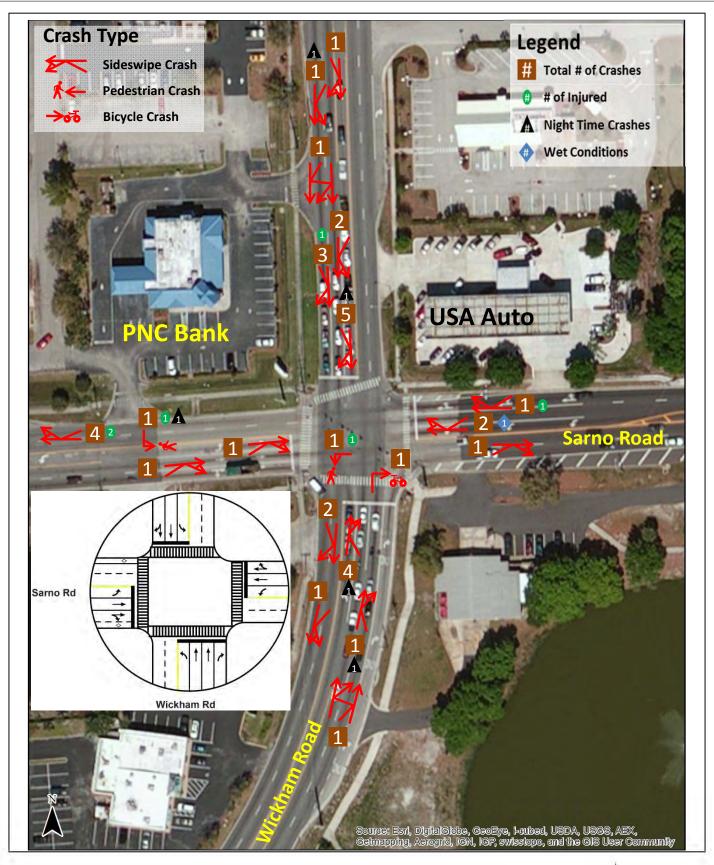


Wickham Road (Sarno Road to Parkway Drive) RSA
Collision Diagram (2009 – 2014)
Intersection 1: Wickham Road @ Sarno Road

Figure

5A





Wickham Road (Sarno Road to Parkway Drive) RSA Collision Diagram (2009 – 2014) Intersection 1: Wickham Road @ Sarno Road Figure

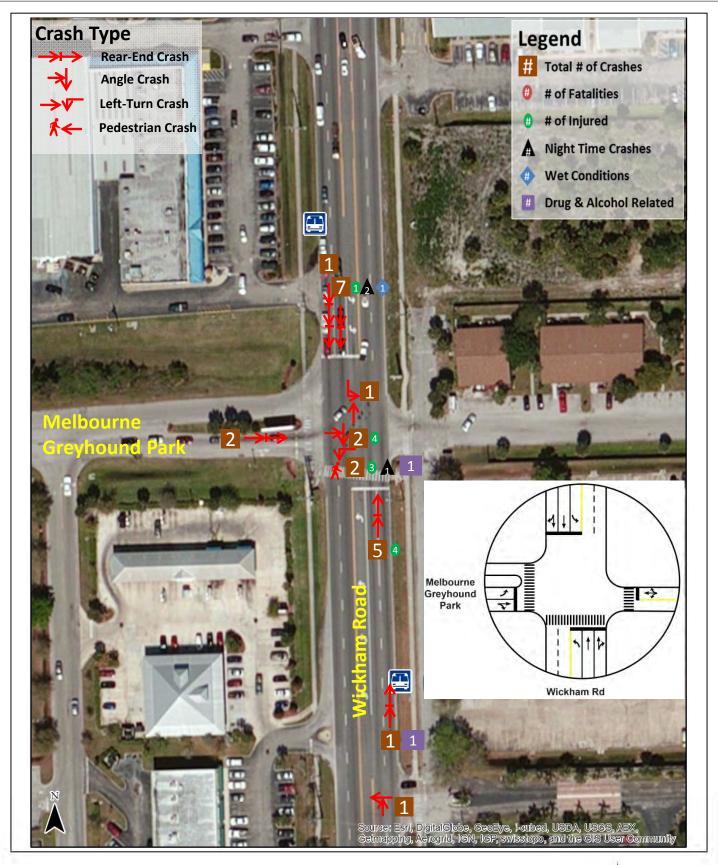
5B





Wickham Road (Sarno Road to Parkway Drive) RSA Collision Diagram (2009 – 2014) Segment 1: Sarno Road to Regency Drive Figure

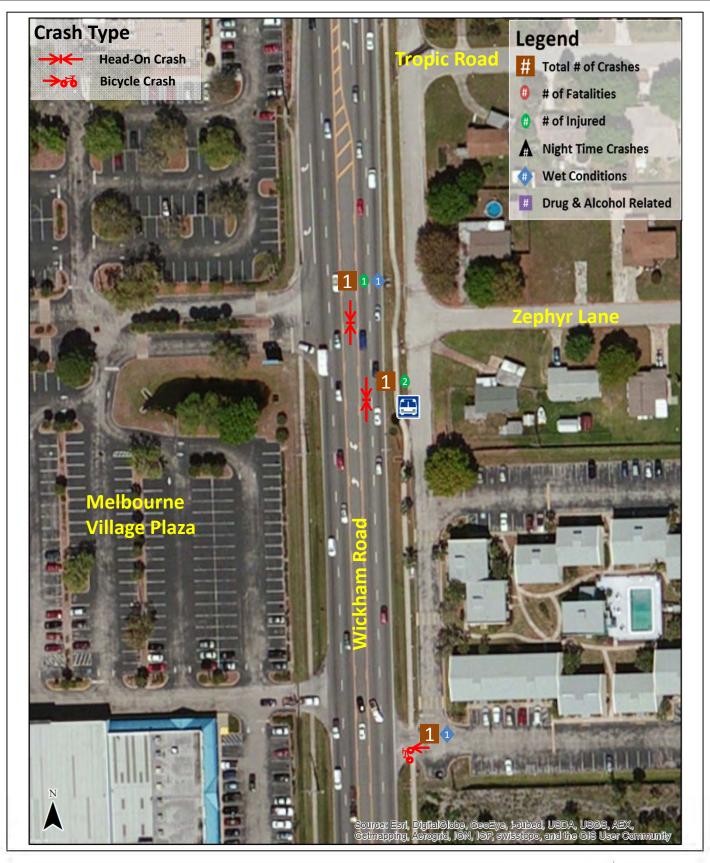




Wickham Road (Sarno Road to Parkway Drive) RSA
Collision Diagram (2009 – 2014)
Intersection 2: Wickham Road @ Melbourne Greyhound Park

Figure

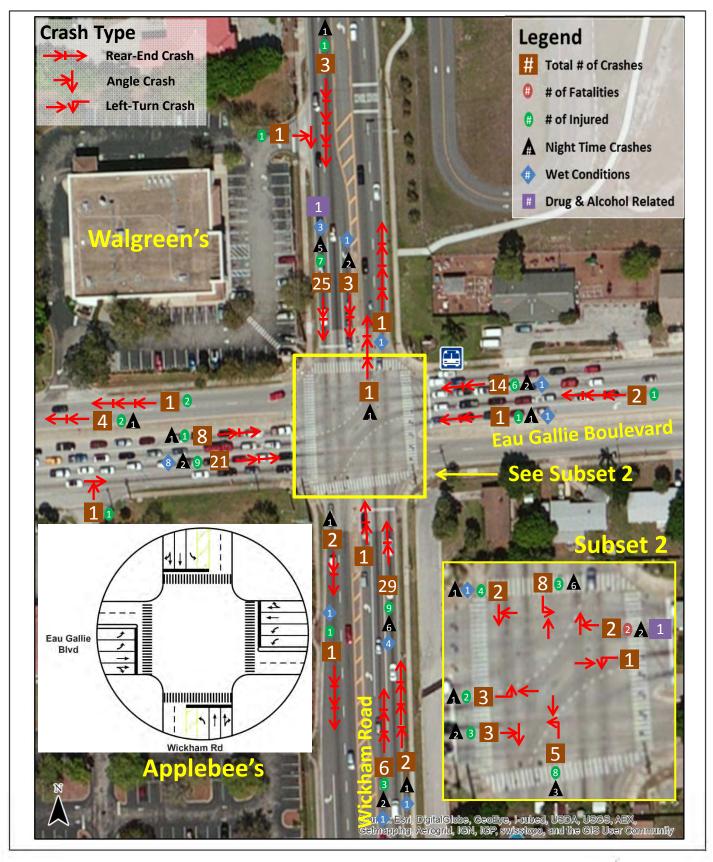




Wickham Road (Sarno Road to Parkway Drive) RSA
Collision Diagram (2009 – 2014)
Segment 2: Melbourne Greyhound Park to Eau Gallie Boulevard

Figure

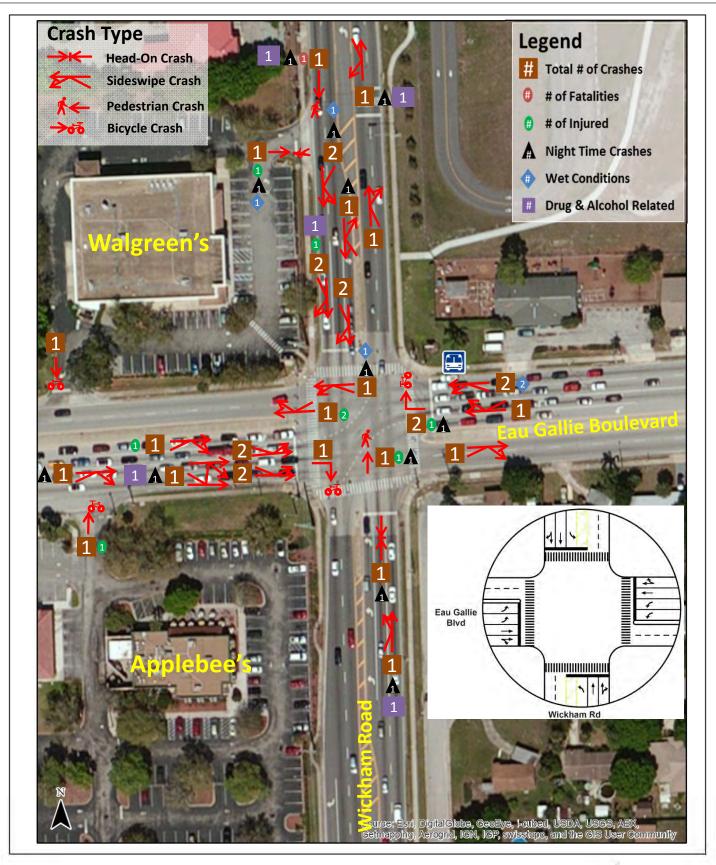




Wickham Road (Sarno Road to Parkway Drive) RSA Collision Diagram (2009 – 2014) Intersection 3: Wickham Road @ Eau Gallie Boulevard Figure

9A





Wickham Road (Sarno Road to Parkway Drive) RSA Collision Diagram (2009 – 2014) Intersection 3: Wickham Road @ Eau Gallie Boulevard Figure

9B





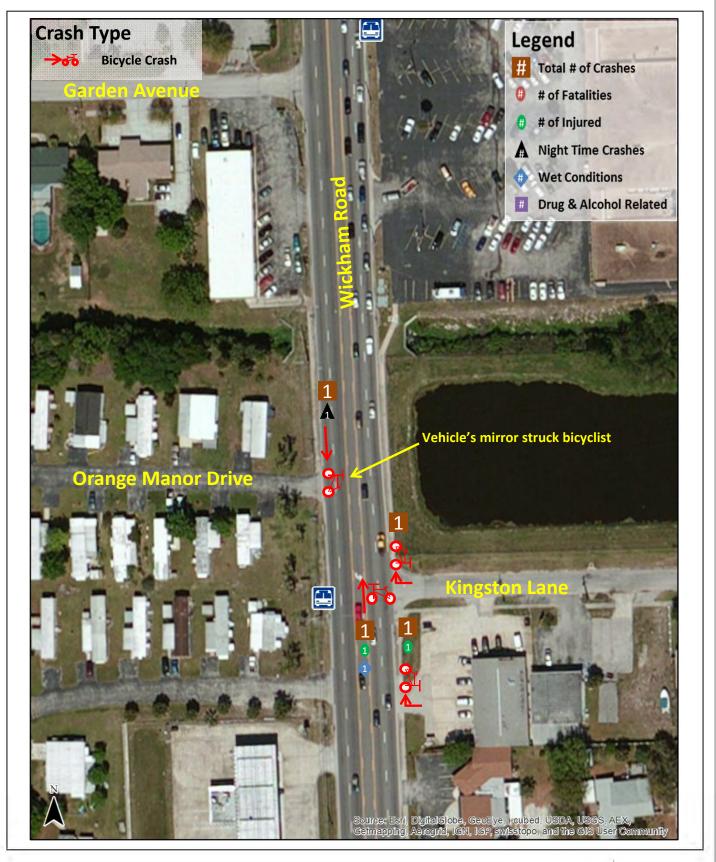
Wickham Road (Sarno Road to Parkway Drive) RSA Collision Diagram (2009 – 2014) Segment 3: Eau Gallie Boulevard to Aurora Road Figure





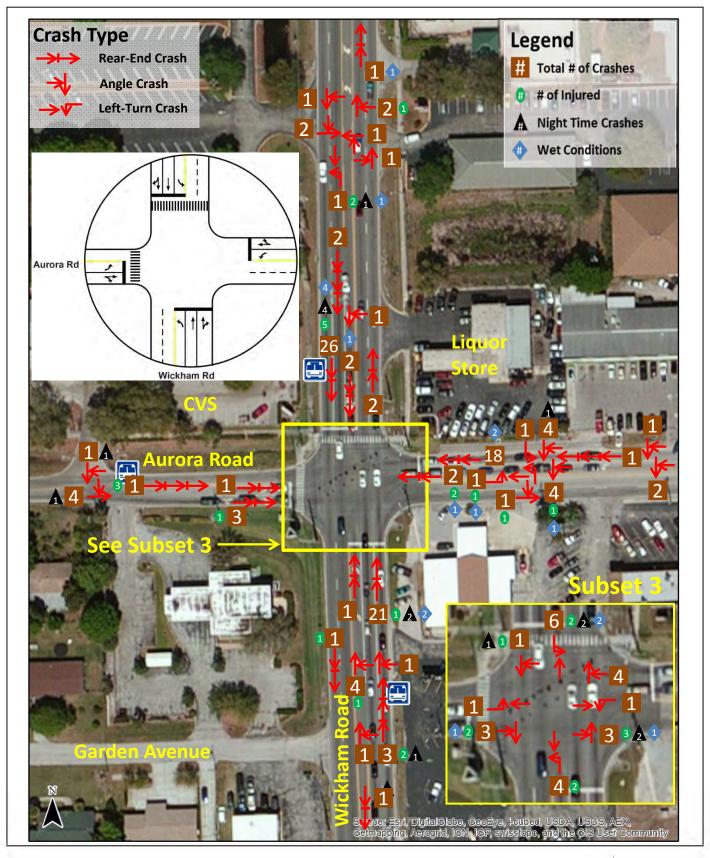
Wickham Road (Sarno Road to Parkway Drive) RSA Collision Diagram (2009 – 2014) Segment 3: Eau Gallie Boulevard to Aurora Road Figure





Wickham Road (Sarno Road to Parkway Drive) RSA Collision Diagram (2009 – 2014) Segment 3: Eau Gallie Boulevard to Aurora Road Figure



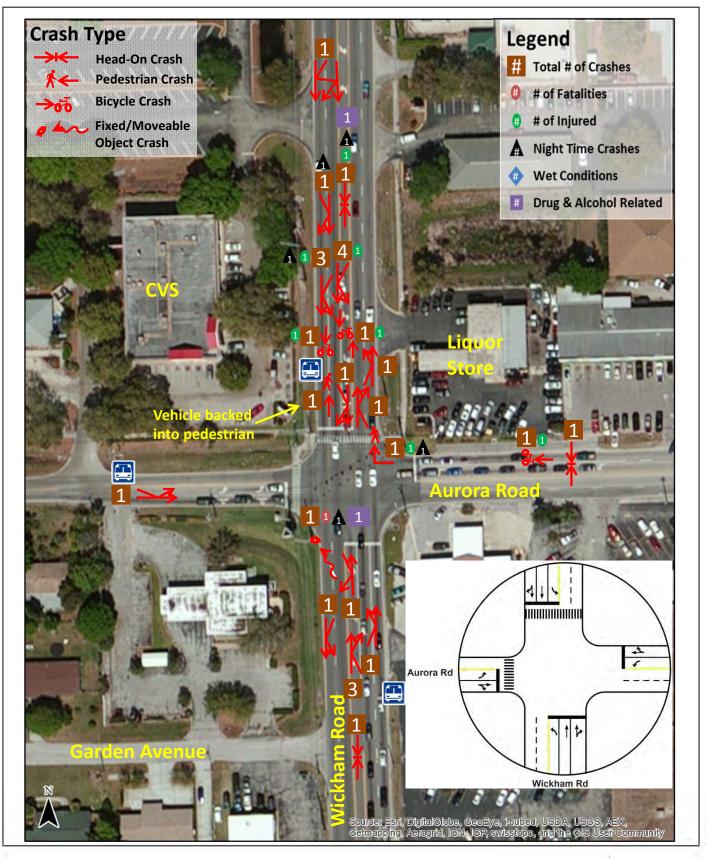


Wickham Road (Sarno Road to Parkway Drive) RSA
Collision Diagram (2009 – 2014)
Intersection 4: Wickham Road @ Aurora Road

Figure

13A



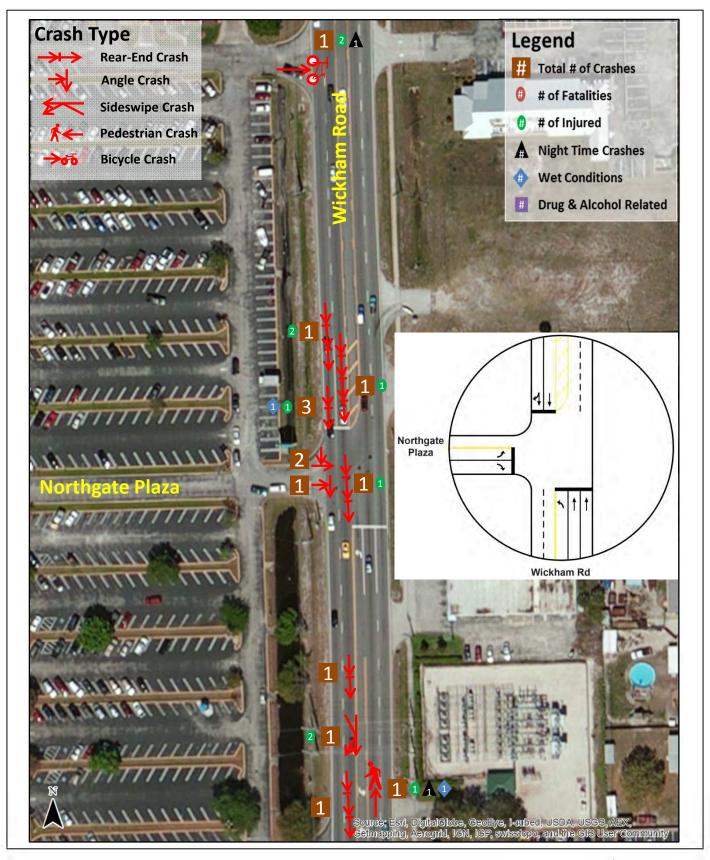


Wickham Road (Sarno Road to Parkway Drive) RSA
Collision Diagram (2009 – 2014)
Intersection 4: Wickham Road @ Aurora Road

Figure

13B





Wickham Road (Sarno Road to Parkway Drive) RSA Collision Diagram (2009 – 2014) Intersection 5: Wickham Road @ Northgate Plaza

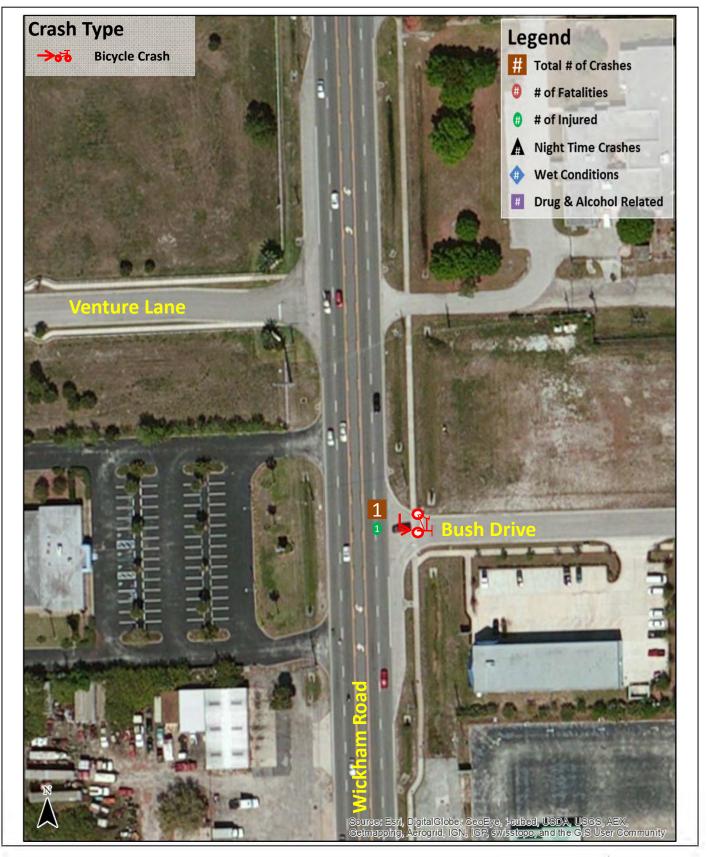
Figure





Figure





Figure





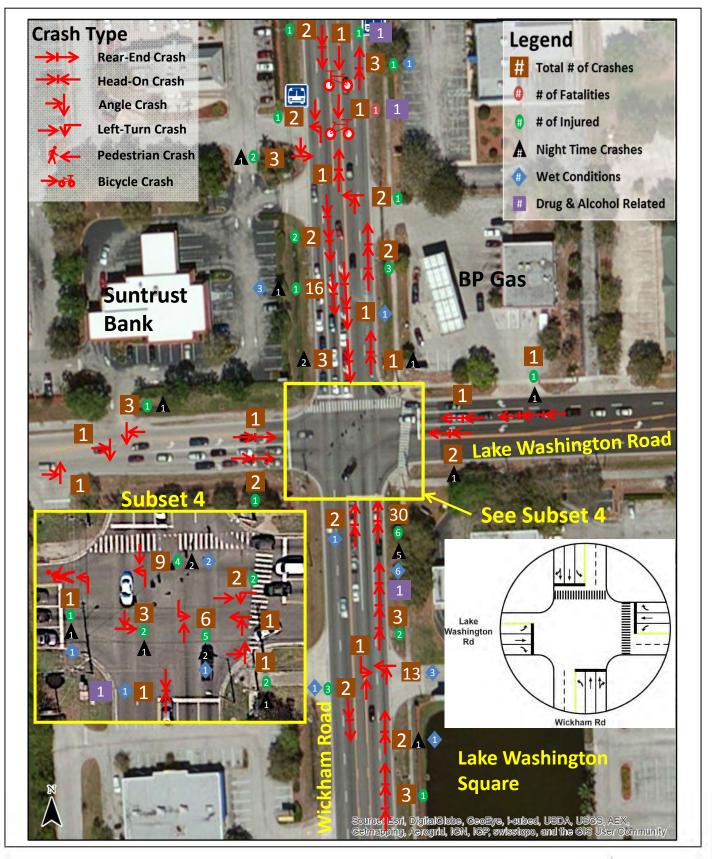
Figure





Figure

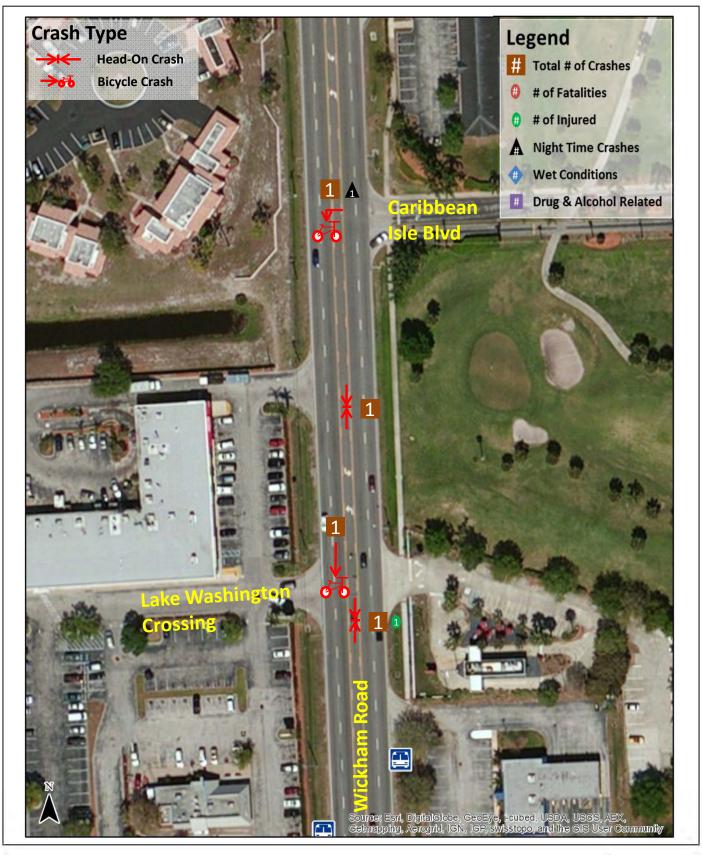




Wickham Road (Sarno Road to Parkway Drive) RSA
Collision Diagram (2009 – 2014)
Intersection 6: Wickham Road @ Lake Washington Road

Figure





Figure





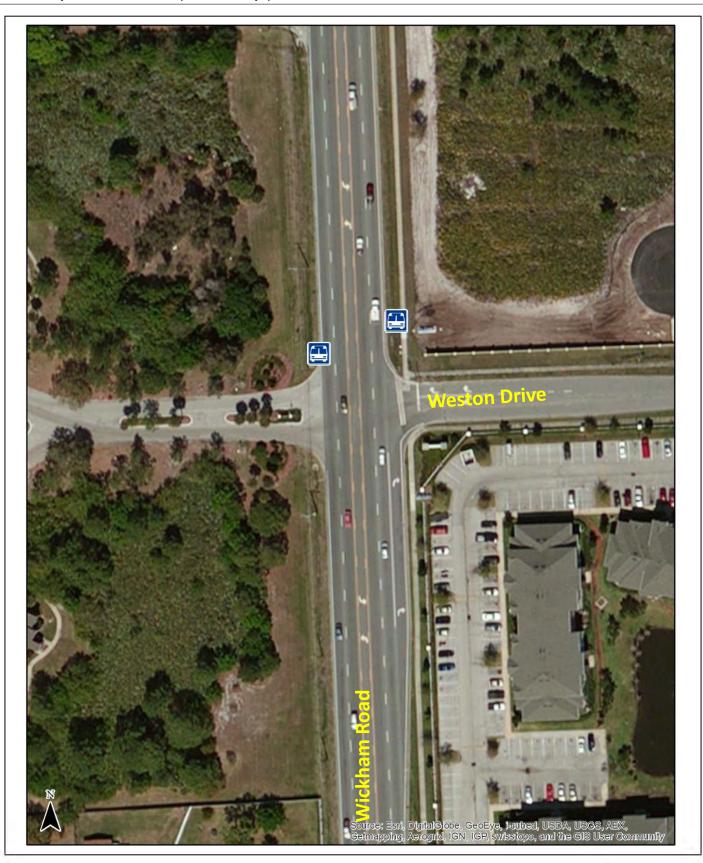
Figure





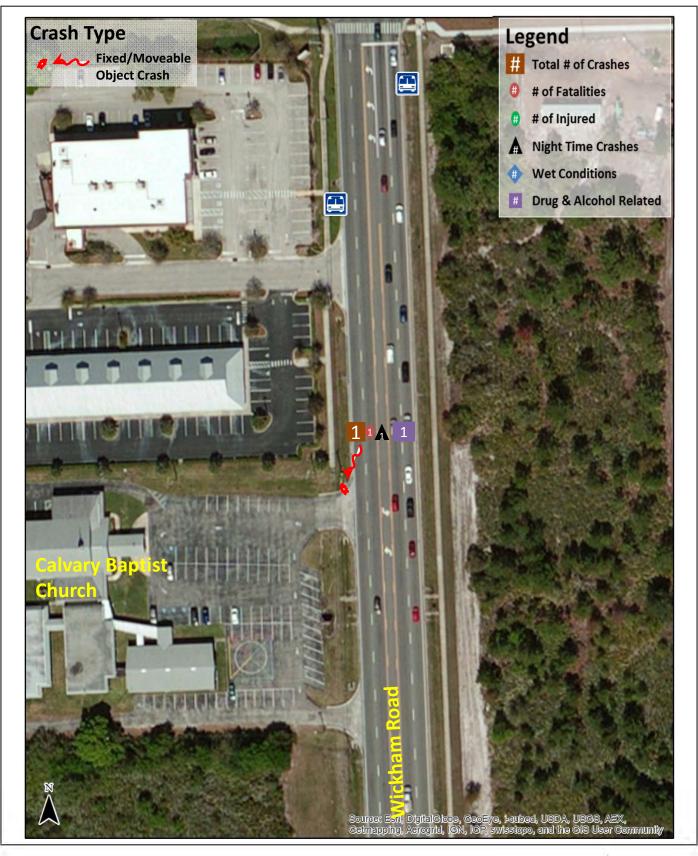
Figure





Figure



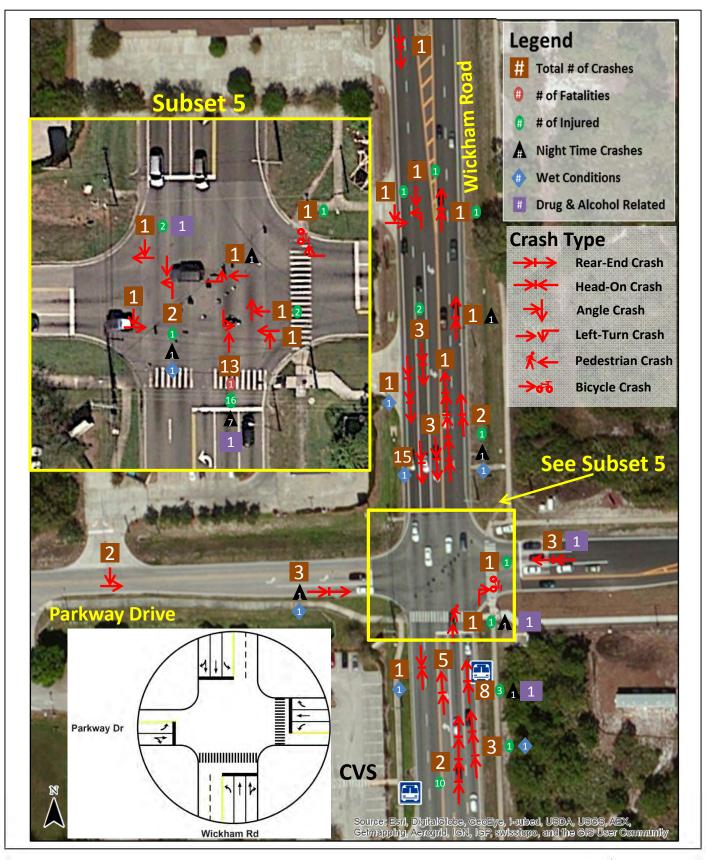


Wickham Road (Sarno Road to Parkway Drive) RSA Collision Diagram (2009 – 2014) Segment 5: Lake Washington Road to Parkway Drive

Figure

24





Wickham Road (Sarno Road to Parkway Drive) RSA
Collision Diagram (2009 – 2014)
Intersection 7: Wickham Road @ Parkway Drive

Figure

25



Appendix B – SCAT ADA Assessment Bus Stop Sheets

Location: NWICKHAM RD & ALDIS ID: 237

Quick Fix: No ADA Compliant: No Direction: Southbound

Quick Fix Items:

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

Average Ridership per Run: 0

Scoring: Accessibility: 7 Safety 6 Operational: 3 Cost: 5 Rideship: 0 Total: 21

Rank: 205 Total Cost: \$2,600







Northbound

Southbound

Supplemental Photo





Eastbound

Westbound

Page 206

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: None

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 (%): 0.2 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): 6

Marked Crosswalk: Yes Protected Crosswalk: No

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

Detectable Full Width: No 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, Retail

Recommendations: Pave a level 5'x2' slab behind the sidewalk to complete a 5'x8' B&A area.

Extend the detectable warning at the nearby curb ramps.



Location: WICKHAM RD & AURORA RD ID: 161

Quick Fix: No ADA Compliant: No Direction: Northbound

Quick Fix Items:

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

Average Ridership per Run: 0

Scoring: Accessibility: -4 Safety 0 Operational: 2 Cost: -5 Rideship: 0 Total: -7

Rank: 791 Total Cost: \$4,400







Northbound

Southbound

Supplemental Photo





Eastbound

Westbound



DRAFT 12/26/14

Stop Location: On an unpaved shoulder of roadway

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: None

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: Dirt/Grass

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

Running Slope (%): 0.2 Cross Slope (%): 1.6 B&A Obstructions: Utility pole or guide/tension wires

B&A Barriers: No barriers

Sidewalk Connection: No

1/4" Change in Elevation: No

Sidewalk Width (feet):

Marked Crosswalk: No Protected Crosswalk:

Detectable Warning: Detectable Warning Condition:
Detectable Full Width: 24" Detectable Warning:

tectable rull width: 24 Detectable warning:

Curb Ramp: No Smooth Transition at Curb Ramp:

Curb Ramp Slope: Curb Ramp Surface:

Shelter: No Shelter Condition: Wheelchair Into:

Distance from Curb (inches): Accessible Connection:

Trip Generators: Retail

Recommendations: Move the bus stop 380' north. Pave a level 5'x8' slab for the B&A area.

Add a 10' path from the B&A area to the sidewalk. Add detectable

warnings to the nearby curb ramps.



Location: N WICKHAM RD & AURORA RD / CVS ID: 273

Quick Fix: No ADA Compliant: No Direction: Southbound

Quick Fix Items:

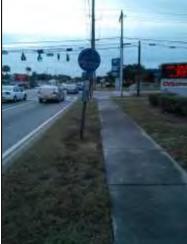
Non-Compliant Features: Boarding and alighting area not compliant, Schedule not accessible, Detectable Warnings

Average Ridership per Run: 0

Scoring: Accessibility: 5 Safety 8 Operational: 3 Cost: 0 Rideship: 0 Total: 16

Rank: 323 Total Cost: \$3,200







Northbound

Southbound

Supplemental Photo





Eastbound

Westbound

Page 323

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: Bus Schedule

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 (%): 0.3 Cross Slope (%): 1.3

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: Yes 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: Office/Commercial, Retail

Recommendations: Pave a level 5'x6' slab between the curb and sidewalk to complete a 5'x8'

B&A area. Add detectable warnings to the nearby curb ramps. Make sure the pole with the bus schedule is located adjacent to the pavement so it is

accessible.



Location: WICKHAM RD & BRUNSWICK HARBOR LANES ID: 189

Quick Fix: Yes ADA Compliant: No Direction: Northbound

Quick Fix Items: Relocate Bench

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

accessible, Detectable Warnings, No Raised Curb

Average Ridership per Run: 2

Scoring: Accessibility: 1 Safety 2 Operational: 5 Cost: -5 Rideship: 4 Total: 7

Rank: 526 Total Cost: \$4,300







Northbound

Southbound

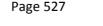
Supplemental Photo





Eastbound

Westbound



Stop Location: On a paved shoulder of roadway

Bus Location: In a travel-thru lane

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

Hazards None

Curb Type/Height: None **Signage:** Standard bus stop sign post

Sign Mounted Correctly: Yes

Amenities: Bench (Official), Bus Schedule, Trash Can

Bench Accessible: No Bench Obstruction: Yes
Trashcan Accessible: Yes Trashcan Obstruction: No

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: Concrete
Is the B&A Safe: Yes B&A Condition: No raised curb

Running Slope (%): 0.3 Cross Slope (%): 2.1

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: No

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: Retail

Recommendations: Remove the pavement at the existing B&A area and repave a level 5'x8'

slab with a raised 6" curb to create a raised and level B&A area. See note 1. Add detectable warnings to the nearby curb ramps. Move the bench so it is not blocking the path to the sidewalk. Move the pole with the bus schedule

adjacent to the pavement to make it accessible.



Location: N WICKHAM RD & CHECKERS ID: 969

Quick Fix: No ADA Compliant: No Direction: Northbound

Quick Fix Items:

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

Average Ridership per Run: 0

Scoring: Accessibility: 1 Safety 6 Operational: 2 Cost: -5 Rideship: 0 Total: 4

Rank: 605 Total Cost: \$4,700







Northbound

und Southbound

Supplemental Photo





Eastbound

Westbound

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Stop Location: On a raised curb (away from the sidewalk)

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: None

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: Dirt/Grass

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

Running Slope (%): 0.3 Cross Slope (%): 7.9

B&A Obstructions: No obstruction

B&A Barriers: No barriers

Sidewalk Connection: No

Sidewalk Width (feet): 5

1/4" Change in Elevation: Yes

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: Office/Commercial, Retail

Recommendations: Move the stop 310' south. Resurface the B&A area to have a cross slope of

<=2%. Pave a level 5'x8' slab for the B&A area. Add a 7' path to connect the B&A to the existing sidewalk. Add detectable warnings to the nearby curb ramps. Resurface the sidewalk to remove the change in elevation.



Location: N WICKHAM RD & CVS ID: 973

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

Ouick Fix Items:

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

Average Ridership per Run: 0

Total: 13 Scoring: Accessibility: 5 Safety 8 Operational: 5 Cost: -5 Rideship: 0

Rank: 407 Total Cost: \$4,600







Northbound

Southbound

Supplemental Photo





Eastbound

Westbound

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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: Bus Schedule

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:** Dirt/Grass

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

Running Slope (%): 0.4 Cross Slope (%): 2.5

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: 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: Retail

Recommendations: Move the stop 115' north. Pave a level 5'x8' slab for the B&A area. Add a 3'

path to connect the B&A to the existing sidewalk. Add detectable warnings to the nearby curb ramps. Make sure the pole with the bus schedule is

located adjacent to the pavement so it is accessible.



Location: EAU GALLIE BLVD & N WICKHAM RD ID: 173

Quick Fix: No Direction: Westbound ADA Compliant: No

Ouick Fix Items:

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

Average Ridership per Run: 2

Scoring: Accessibility: 5 Safety 8 Operational: 3 Total: 25 Cost: 5 Rideship: 4

Total Cost: \$2,900 Rank: 133







Northbound

Southbound

Supplemental Photo





Eastbound

Westbound

Page 133

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: None

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 (%): 0.3 Cross Slope (%): 2.1

B&A Obstructions: No obstruction

B&A Barriers: No barriers

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

Sidewalk Width (feet): 6

Marked Crosswalk: Yes 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 Surface: Yes Curb Ramp Slope: Yes

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

Distance from Curb (inches): Accessible Connection:

Trip Generators: Retail, School/Day Care

Recommendations: Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8'

B&A area. Add detectable warnings to the nearby curb ramps.



Location: N WICKHAM RD & SUN / GREEN CONDOS ID: 155

Quick Fix: No Direction: Northbound ADA Compliant: No

Ouick Fix Items:

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

Average Ridership per Run: 0

Scoring: Accessibility: 3 Safety 6 Operational: 2 Cost: -10 Rideship: 0 Total: 1

Rank: 671 Total Cost: \$5,400





Northbound Southbound





Eastbound

Westbound

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DRAFT 12/26/14

Supplemental Photo

Stop Location: On a raised curb (without a sidewalk)

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: On pole/post shared with other signs (traffic, dir

Sign Mounted Correctly: Yes

Amenities: None

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:** Dirt/Grass

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

Running Slope (%): 0.2 Cross Slope (%): 1.5

B&A Obstructions: No obstruction

B&A Barriers: Fencing, curbs, sign posts, etc.

Sidewalk Connection: No 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

Recommendations: Move stop 20' south. Add a culvert and pave a level 5'x8' slab for the B&A

area. Add a 4' path to connect the B&A to the existing sidewalk. Add

detectable warnings to the nearby curb ramps.



Location: N WICKHAM RD & LAKE WASHINGTON RD ID: 140

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

Ouick Fix Items:

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

Average Ridership per Run: 0

Scoring: Accessibility: -4 Safety 0 Operational: 4 Cost: -30 Rideship: 0 Total: -30

Rank: 848 Total Cost: \$11.300







Northbound

Southbound

Supplemental Photo





Eastbound

Westbound

Page 848

Stop Location: On an unpaved shoulder of roadway

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: Bus Schedule

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:** Dirt/Grass

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

Running Slope (%): 0.4 Cross Slope (%): 4.1

B&A Obstructions: No obstruction

B&A Barriers: No barriers

Sidewalk Connection: No Sidewalk Width (feet):

1/4" Change in Elevation: Yes

Marked Crosswalk: No Protected Crosswalk:

Detectable Warning: Detectable Warning Condition: Detectable Full Width: 24" Detectable Warning:

Curb Ramp: No **Smooth Transition at Curb Ramp:**

Curb Ramp Slope: Curb Ramp Surface:

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

Distance from Curb (inches): Accessible Connection:

Trip Generators: Retail

Recommendations: Pave a level 5'x8' slab for the B&A area. Make sure the pole with the bus

schedule is located adjacent to the pavement so it is accessible. Add a 100' path to connect the north. Construct a curb ramp with a slope <=8.3%. Add detectable warnings to the nearby curb ramps. Add a crosswalk at the

intersection.



Location: N WICKHAM RD & MELBOURNE VILLAGE ID: 213

Quick Fix: No Direction: Northbound ADA Compliant: No

Ouick Fix Items:

Non-Compliant Features: Boarding and alighting area not compliant, Schedule not accessible, Detectable Warnings, No Raised

Average Ridership per Run: 0

Scoring: Accessibility: 3 Safety 6 Operational: 2 Cost: -10 Rideship: 0 Total: 1

Rank: 670 Total Cost: \$5,200







Northbound Southbound





Eastbound Westbound

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Supplemental Photo

DRAFT 12/26/14

Stop Location: On the sidewalk (with no curb)

Bus Location: In a travel-thru lane

Releation to Intersection: At street, on nearside of intersection

Hazards None

Curb Type/Height: None Signage: Standard bus stop sign post

Sign Mounted Correctly: Yes

Amenities: Bus Schedule

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:** Dirt/Grass

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

Running Slope (%): 0.3 Cross Slope (%): 2.4

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: Residential, Retail

Recommendations: Move the bus stop ~450' north. Pave a level 5'x8' slab with a raised 6" curb

for the B&A area and connect to the adjacent sidewalk. See note 1. Add detectable warnings to the nearby curb ramps. Make sure the pole with the

bus schedule is located adjacent to the pavement so it is accessible.



Location: N WICKHAM RD & ORANGE MANOR DR ID: 278

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

Ouick Fix Items:

Non-Compliant Features: Boarding and alighting area not compliant

Average Ridership per Run: 0

Scoring: Accessibility: 1 Safety 6 Operational: 4 Cost: -5 Rideship: 0 Total: 6

Total Cost: \$4.800 Rank: 553







Northbound

Southbound

Supplemental Photo





Eastbound

Westbound

Page 555

Stop Location: On a raised curb (without a sidewalk)

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: None

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:** Dirt/Grass

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

Cross Slope (%): 0.8

Running Slope (%): 0.3

B&A Obstructions: 0 **B&A Barriers**: No barriers

Sidewalk Connection: Yes

Sidewalk Width (feet): 5

1/4" Change in Elevation: Yes

Marked Crosswalk: No Detectable Warning: No Protected Crosswalk: Yes **Detectable Warning Condition:**

Detectable Full Width: 24" Detectable Warning:

Curb Ramp: Yes Smooth Transition at Curb Ramp: No

Curb Ramp Slope: No **Curb Ramp Surface: No**

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

Distance from Curb (inches): Accessible Connection:

Trip Generators: Residential

Recommendations: Move stop 145' north. Pave a level 5'x3' slab behind the sidewalk to

complete a 5'x8' B&A area. Repave the cracks in the sidewalk. Repave the

existing curb ramp and add detectable warnings.



Location: WICKHAM RD & PARKWAY DR ID: 150

Quick Fix: No ADA Compliant: No Direction: Northbound

Quick Fix Items:

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

Average Ridership per Run: 2

Scoring: Accessibility: 5 Safety 8 Operational: 3 Cost: -5 Rideship: 4 Total: 15

Rank: 360 Total Cost: \$4,500







Northbound

Southbound

Supplemental Photo





Eastbound

Westbound

Page 360

DRAFT 12/26/14

Stop Location: On a raised curb (without a sidewalk)

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: None

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: Dirt/Grass

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

Running Slope (%): 0.2 Cross Slope (%): 14

B&A Obstructions: No obstruction

B&A Barriers: No barriers

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

Sidewalk Width (feet): 5

Marked Crosswalk: Yes 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: Office/Commercial, Residential, Retail

Recommendations: Pave a level 5'x8' slab for the B&A area. Add a 5' path to connect the B&A

to the existing sidewalk. Add detectable warnings to the nearby curb ramps.



Location: N WICKHAM RD & PINE HILL DR ID: 280

Quick Fix: No ADA Compliant: No Direction: Northbound

Quick Fix Items:

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

Average Ridership per Run: 1

Scoring: Accessibility: 5 Safety 5 Operational: 3 Cost: 0 Rideship: 0 Total: 13

Rank: 385 Total Cost: \$3,300







Northbound

Southbound

Supplemental Photo





Eastbound Westbound

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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: Bus Schedule

Bench Accessible: N/A Bench Obstruction: N/A 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 (%): 2.3

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: Yes Protected Crosswalk: No
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: Retail

Recommendations: Move the bus stop 175' south. Pave a level 5'x3' slab between the curb

and sidewalk to complete a 5'x8' B&A area. Add detectable warnings to the

nearby curb ramps.



Location: N WICKHAM RD & PORTOFINO VILLAS ID: 974

Quick Fix: No ADA Compliant: No Direction: Southbound

Quick Fix Items:

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

Average Ridership per Run: 0

Scoring: Accessibility: -1 Safety 3 Operational: 2 Cost: -10 Rideship: 0 Total: -6

Rank: 784 Total Cost: \$5,900







Northbound

Southbound

Supplemental Photo





Eastbound

Westbound

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DRAFT 12/26/14

Stop Location: On a raised curb (without a sidewalk)

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: None

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: Dirt/Grass

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

Running Slope (%): 0.2 Cross Slope (%): 4.8

B&A Obstructions: No obstruction

B&A Barriers: No barriers

Sidewalk Connection: No

Sidewalk Width (feet):

1/4" Change in Elevation: No

Marked Crosswalk: No Protected Crosswalk:

Detectable Warning: Detectable Warning Condition:

Detectable Full Width: 24" Detectable Warning:

Curb Ramp: No Smooth Transition at Curb Ramp:

Curb Ramp Slope: Curb Ramp Surface:

Shelter: No Shelter Condition: Wheelchair Into:

Distance from Curb (inches): Accessible Connection:

Trip Generators: Residential

Recommendations: Move the stop 5' south. Resurface the B&A area to have a cross slope of

<=2%. Pave a level 5'x8' slab for the B&A area. Pave a 5' sidewalk to connect to the intersection to the south. Construct a curb ramp with a

slope <=8.3%. Add detectable warnings to the curb ramp.



Location: N WICKHAM RD & PREAKNESS PL / LAKE POINT APT

Quick Fix: No ADA Compliant: No Direction: Southbound

Quick Fix Items:

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

Average Ridership per Run: 0

Scoring: Accessibility: -1 Safety 2 Operational: 2 Cost: -30 Rideship: 0 Total: -27

Rank: 844 Total Cost: \$9,900



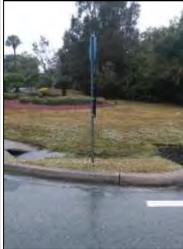




ID: 148

Northbound Southbound







Eastbound Westbound

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Bench Accessible: N/A

Curb Type/Height: Type F-6

Bus Location: In a travel-thru lane

Trashcan Accessible:

Schedule Accessible:

Amenities: None

Hazards None

Is there a B&A area: No Max Clear Space: 0

Stop Location: On a raised curb (without a sidewalk)

Releation to Intersection: At street, on nearside of intersection

What prevents a B&A area:

Is the B&A 5'x8': B&A Materials: Dirt/Grass

Is the B&A Safe: No B&A Condition: Surface not firm, stable, or slip r

Signage: Standard bus stop sign post

Sign Mounted Correctly: Yes

Bench Obstruction: N/A

Trashcan Obstruction:

Running Slope (%): 0.2 Cross Slope (%): 24.2

B&A Obstructions: No obstruction

B&A Barriers: Fencing, curbs, sign posts, etc.

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

Sidewalk Width (feet):

Marked Crosswalk: No Protected Crosswalk:

Detectable Warning: Detectable Warning Condition:
Detectable Full Width: 24" Detectable Warning:

tectable rull width. 24 Detectable warning.

Curb Ramp: No Smooth Transition at Curb Ramp:

Curb Ramp Slope: Curb Ramp Surface:

Shelter: No Shelter Condition: Wheelchair Into:

Distance from Curb (inches): Accessible Connection:

Trip Generators: Residential

Recommendations: Add a culvert to the drainage area. ■ave a level 5′x8′ slab with a raised 6″

curb for the B&A area. See note 1. Pave a path from the B&A area to the nearby driveway. Add a curb ramp and detectable warning. Make sure the pole with the bus schedule is located adjacent to the pavement so it is

accessible.



Location: N WICKHAM RD & WESTON DR ID: 970

Quick Fix: No ADA Compliant: No Direction: Northbound

Quick Fix Items:

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

Average Ridership per Run: 2

Scoring: Accessibility: 5 Safety 8 Operational: 2 Cost: 5 Rideship: 4 Total: 24

Rank: 153 Total Cost: \$2,900







Northbound

Southbound

Supplemental Photo





Eastbound

Westbound

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

Bus Location: In a right turn only 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: Bus Schedule

Bench Accessible: N/A Bench Obstruction: N/A
Trashcan Accessible: Trashcan Obstruction:

Schedule Accessible: No

Is there a B&A area: Yes

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

Max Clear Space:

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

B&A Obstructions: No obstruction

B&A Barriers: No barriers

Sidewalk Connection: Yes

Sidewalk Width (feet): 5

1/4" Change in Elevation: No

Marked Crosswalk: Yes

Detectable Warning: No

Detectable Full Width:

Protected Crosswalk: Yes

Detectable Warning Condition:

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: Residential

Recommendations: Pave a level 5'x4' slab between the curb and sidewalk to complete a 5'x8'

B&A area. Add detectable warnings to the nearby curb ramps. Make sure the pole with the bus schedule is located adjacent to the pavement so it is

accessible.