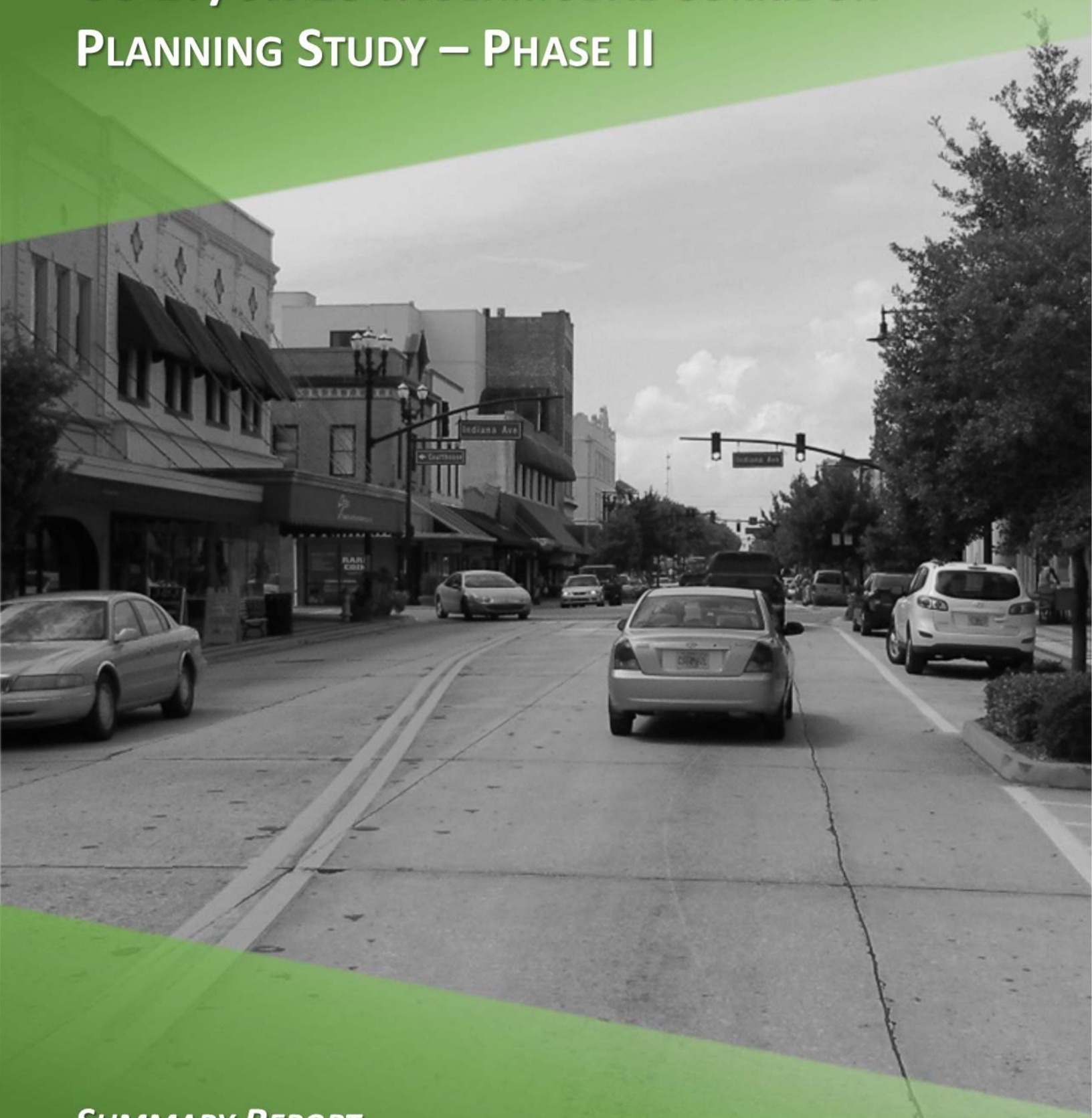
US 17/SR 15 Multimodal Corridor Planning Study – Phase II



Summary Report

August 2016

RIVER TO SEA Transportation Planning Organization
VISION - PLAN - IMPLEMENT
TPO

River to Sea Transportation Planning Organization

Corridor Improvement Program

US 17/SR 15 Multi-Modal Planning Study – Phase II

Task Work Order TOA-4

Summary Report

August 2016

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Technical Memorandum – Alternatives to Improve Mobility and Safety

INTRODUCTION

Phase II of the US 17/SR 15 Multimodal Corridor Planning Study Phase II (hereinafter referred to as the US 17 Corridor Study) is intended to identify ways to maintain and improve safety and mobility while identifying opportunities to create a more safe and comfortable environment for all users of the US 17 corridor. Building on the findings of the Phase I Study, this Phase will help to determine the most effective way for US 17 to serve all users and modes of transportation within the corridor. Ultimately, Phase II of the US 17 Corridor Study, will identify and develop a set of recommendations intended to improve the safety and mobility of all users in the corridor to help ensure a balanced transportation system across all travel modes.

BACKGROUND AND HISTORY

The US 17/SR 15 corridor has been the subject of many studies and plans. The previously completed *Corridor Improvement Program (CIP) Phase I: Assessment of US 17-92* was primarily a data collection effort that involved the compilation of studies, plans, projects, and discussions with stakeholders to identify goals and objectives for the corridor and potential issues and opportunities to address in the Phase II study. Representatives from the River to Sea Transportation Planning Organization (R2CTPO), Florida Department of Transportation (FDOT), Volusia County, Votran, local jurisdictions, and various stakeholders worked together to identify a set of themes and guiding principles to reflect the desire and direction for the US 17 corridor from the standpoint of the communities it serves. Some of the common themes from the Phase I study include the widespread interest in modifying US 17 to function as a "complete street", with improved pedestrian, bicycle, and transit mobility as well as the desire to coordinate planning and construction of transportation improvements to support local development and redevelopment efforts.

STUDY AREA

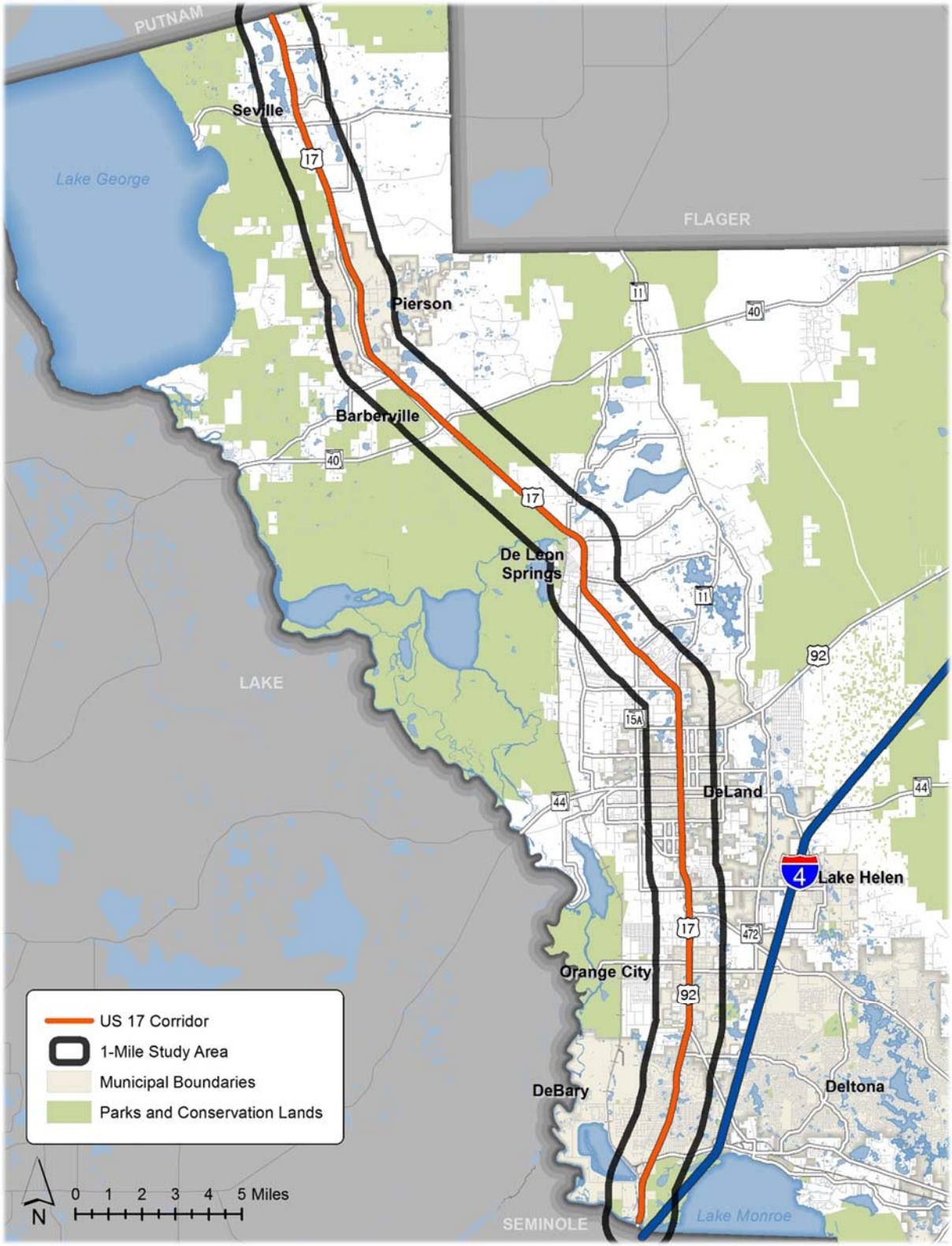
The US 17 study corridor is approximately 41 miles long and extends from the Seminole County line in the south, north to the Putnam County line. The corridor traverses through the cities of DeBary, Orange City, and DeLand, the Town of Pierson, the unincorporated areas of DeLeon Springs, Barberville, and Seville, along with portions of unincorporated Volusia County. For the purposes of this study, the US 17 corridor includes the areas and roadways within an approximate 1-mile buffer of US 17. Map 1 depicts the general study area of the US 17 Corridor Study.

STUDY PROCESS

The US 17 Corridor study was completed through a process that evaluated existing and projected conditions along the corridor, included the engagement of various stakeholders through group and individual engagement opportunities, the development of character districts that helped identify and frame the mobility goals and needs of different locations along the corridor, the development of corridor-wide and site specific alternative recommendations, and an evaluation of the recommendations to determine how well they meet the criteria and measures that were also established as part of this study. This summary report provides an overview of the US 17 Corridor Study within the following sections:

- Baseline Conditions
- Public Engagement
- Corridor Character Districts
- Alternative Recommendations
- Evaluation of Alternative Recommendations
- Action Plan

For a more detailed review of the various study parts reference the multiple technical memorandums and supporting documents that were developed as part of the overall study effort.



Map 1: US 17 Corridor Study Area

BASELINE CONDITIONS

An evaluation of baseline conditions was conducted as a means to identify and document the existing and projected conditions within the US 17 corridor. This assessment provided a better understand of the multimodal infrastructure and traffic operating conditions within the corridor, as well as a further understanding of the land use and socioeconomic context of the corridor. When appropriate and applicable, data and information from the Phase I Study was integrated into the evaluation. The data and information documented within the baseline condition memorandum served as the basis for the definition of corridor context/character districts and in the development of the alternative recommendations. The elements of the baseline conditions evaluation were organized into the following sections:

- Roadway and Traffic Conditions
- Multimodal Network Evaluation
- Transit Service Evaluation
- Crash History Analysis
- Land Use/Socioeconomic Evaluation

A summary of the baseline conditions evaluation is provided within this summary report, Technical Memorandum #1 contains a much more in-depth look at the herein presented information.

Roadway and Traffic Conditions

The roadway and traffic conditions assessment provided a summary of roadway designations, including functional classification, access management classification, speed limit, and SIS designation along with an evaluation of roadway conditions (i.e., typical cross-sections, AADTs, volume-capacity ratios, truck volumes, daily traffic patterns, intersection turning movement counts, travel flows, and planned roadway improvements).

Roadway Sections

The Phase I Study identified 19 differing sections along the corridor; these sections were identified based on the function of the roadway and identification of transit and other modes of travel. Even though it was known that the corridor differed as you move along the corridor, this exercise emphasized the differences in the physical and functional characteristics of the corridor. To better understand the physical differences of US 17 along the corridor typical roadway cross-sections were developed; Figure 1 through Figure 3 provide an example of how the corridor's typical roadway cross-section varies from the southern end in DeBary, DeLand, and the northern portion in Pierson.

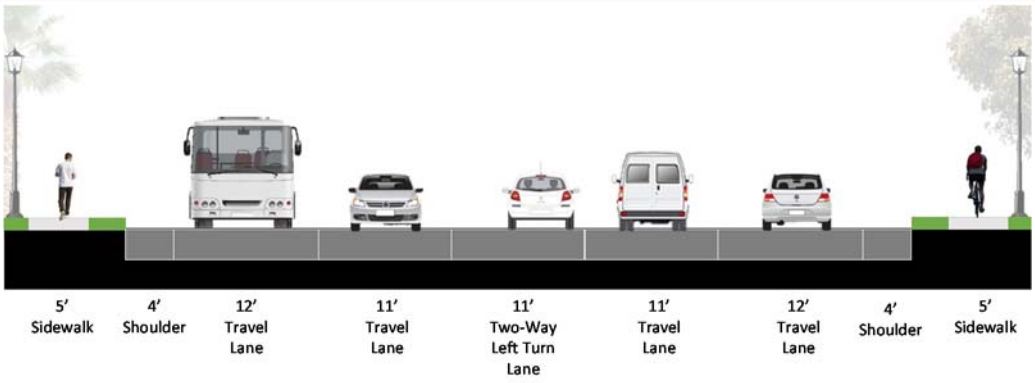


Figure 1: US 17 Typical Section – south of Highbanks Rd (DeBary)

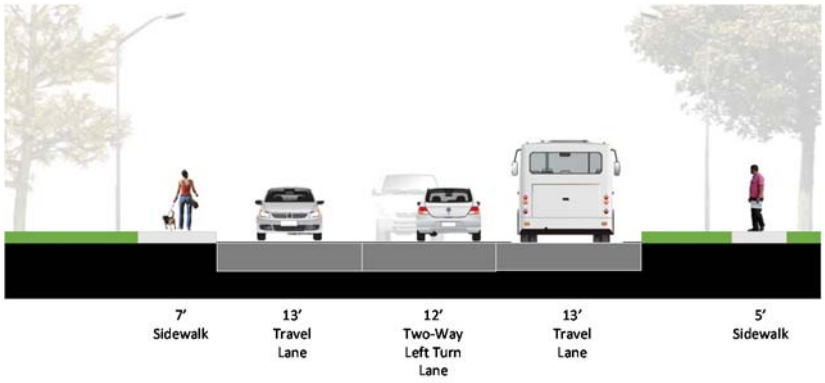


Figure 2: US 17 Typical Section – north of Beresford Ave (DeLand)

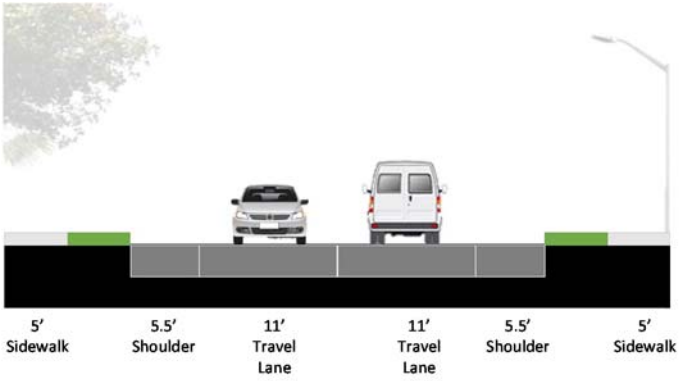
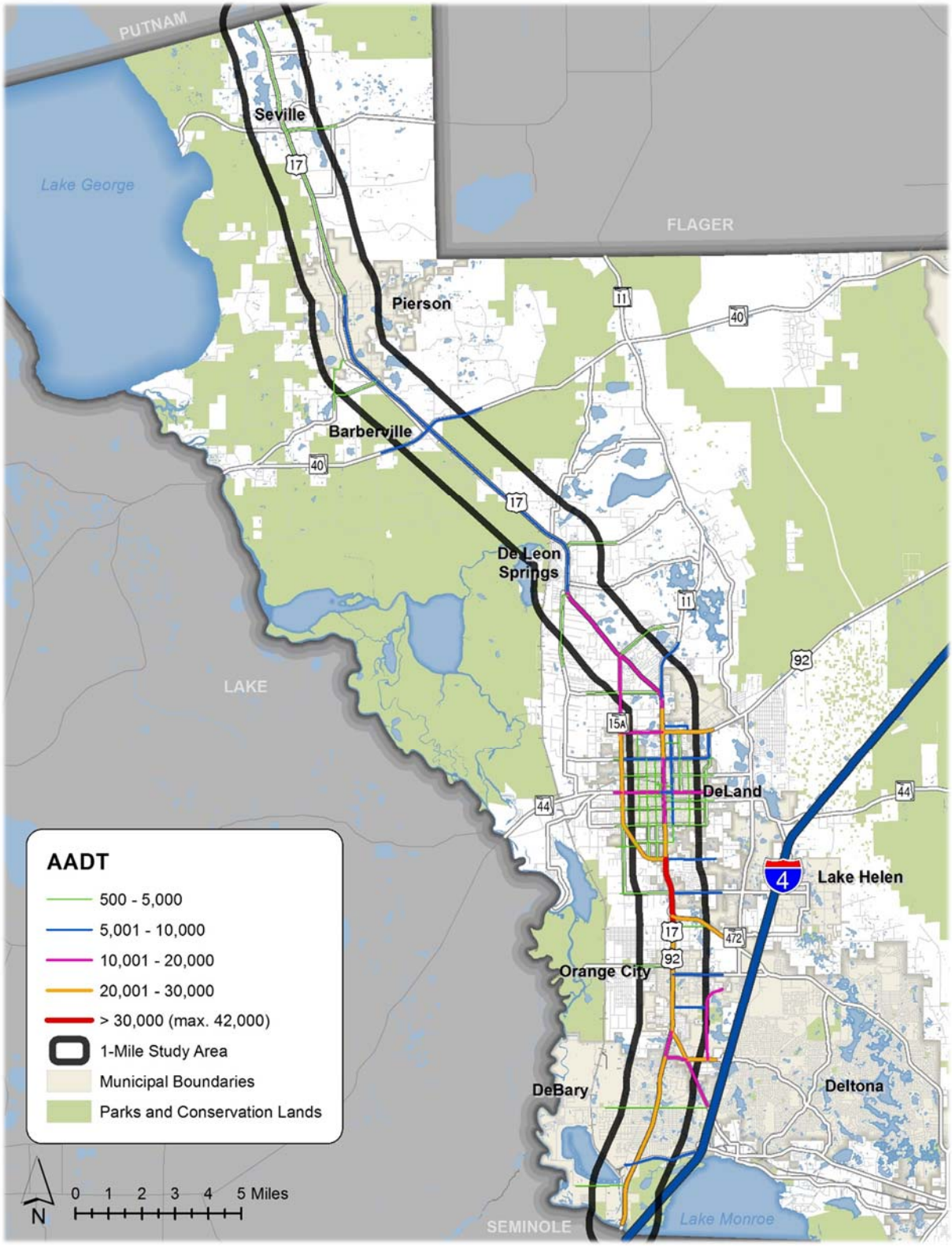


Figure 3: US 17 Typical Section – between 2nd Ave and 1st Ave (Pierson)

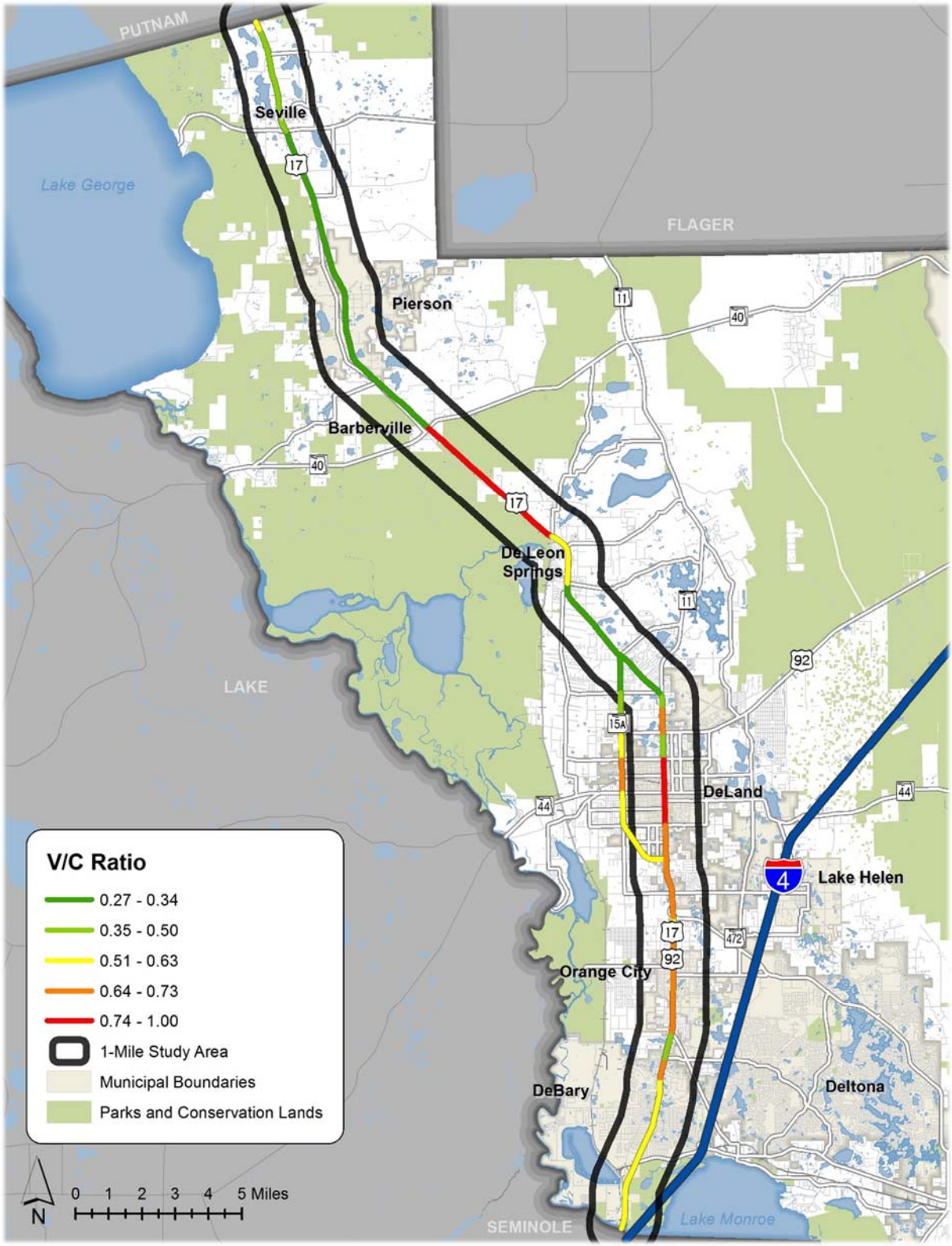
Traffic Conditions

A review of traffic volumes along the corridor included a review of existing AADTs, daily directional travel patterns, existing volume-to-capacity (V/C) ratios and projected volume-to-capacity ratios. Maps 2 and 3 show the existing traffic volumes within the study area and the existing V/C ratios along the corridor.



Data Source: FDOT Traffic Statistics Office

Map 2: US 17 Existing Traffic Volume (AADT)

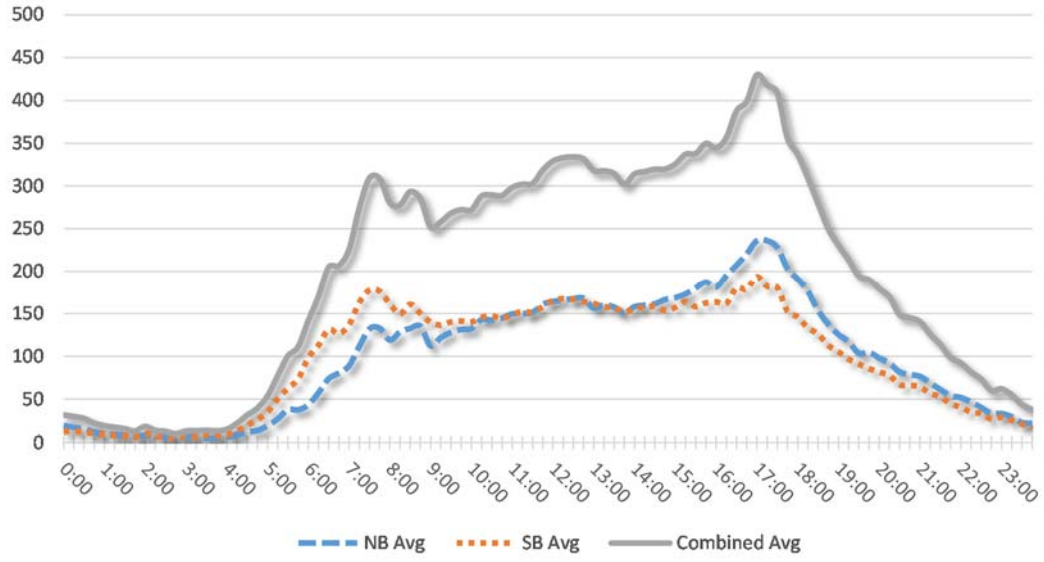


Data Source: Volusia County 2014 AADT Report

Map 3: US 17 Existing Volume-to-LOS Capacity Ratios

Travel Patterns

AADTs provide a sense of the overall daily traffic demand of a roadway; however, to better understand the daily traffic volume patterns within the corridor, traffic volume counts, collected in 15-minute intervals, were charted and analyzed. Figure 4 shows the composite average daily traffic volumes (northbound, southbound, and total). As shown, typically along the corridor the highest traffic volumes are experienced during the PM peak-period between 4:45 PM and 5:45 PM, with the northbound movement being slightly heavier than the southbound traffic movement. The composite average provides a general sense of daily traffic flows along the corridor, but there are variation along different segments of the corridor that were explored in more depth within the Baseline Conditions technical memorandum.



Data Source: FDOT Florida Traffic Online 2014 Synopsis Reports

Figure 4: Daily Traffic Volume – US 17 Composite Average

Capital Projects

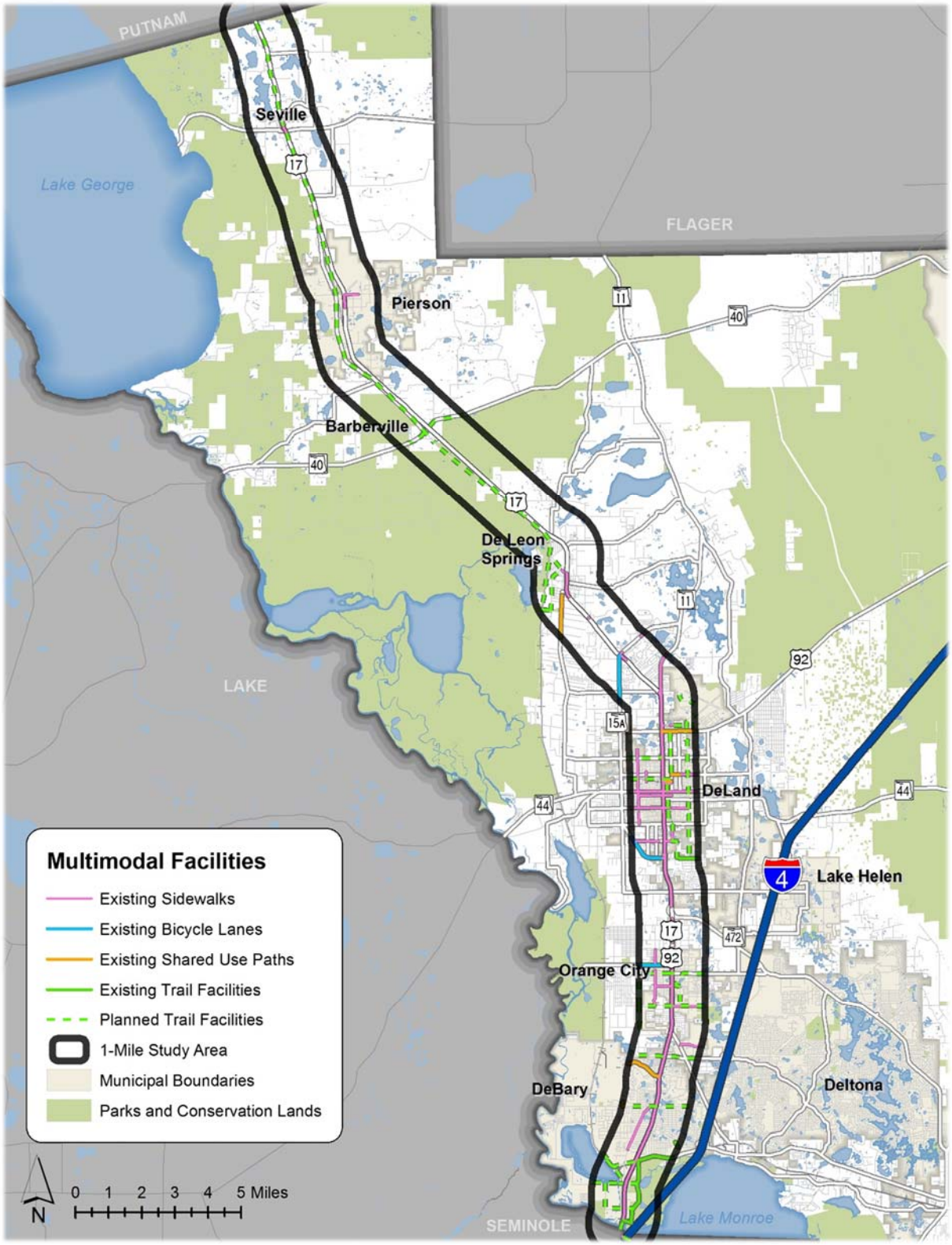
A review of the most current FDOT work program and local capital improvement programs was conducted to identify any programed improvements within the corridor. One of the more significant projects identified within the corridor was the FDOT project along US 17 between DeLeon Springs Blvd and SR 40; currently the only funding for this project is for the acquisition of right-of-way, but the project will eventually widen this portion of US 17 from its current two-lanes to a four-lane divided rural typical section, as shown in Figure 5. In addition to this roadway widening, a multi-use pathway is expected to be constructed along the east side of US 17 as part of the widening project.

Data Source: SR 15 Ponce DeLeon Springs Boulevard to State Road 40 Preliminary Engineering Report (Alternative 1)

Figure 5: Potential Future Alignment Typical Section, US 17 from DeLeon Springs Blvd to SR 40

Multimodal Network Evaluation

An inventory of existing multimodal facilities (sidewalks, bicycle lanes, and trails) within the study area was compiled using information from the Phase I study and other available data sources. Map 4 shows the existing sidewalk coverage, bicycle lanes, shared-use paths, and trail facilities (including planned facilities) within the corridor. As shown, much of the urban portions of the corridor (south of SR 11) has sidewalk coverage, with a notable exception being from Wisconsin Ave to north of SR 472 in the Orange City/DeLand area. North of SR 11, there are only a few locations along the corridor with existing sidewalk coverage. While there are multiple parallel bicycle facilities and unmarked (paved) shoulders, there are only few locations directly along US 17 with a designated bicycle facility.



Data Source: FDOT Transportation Statistics Office and Volusia County GIS

Map 4: Existing Multimodal Facilities

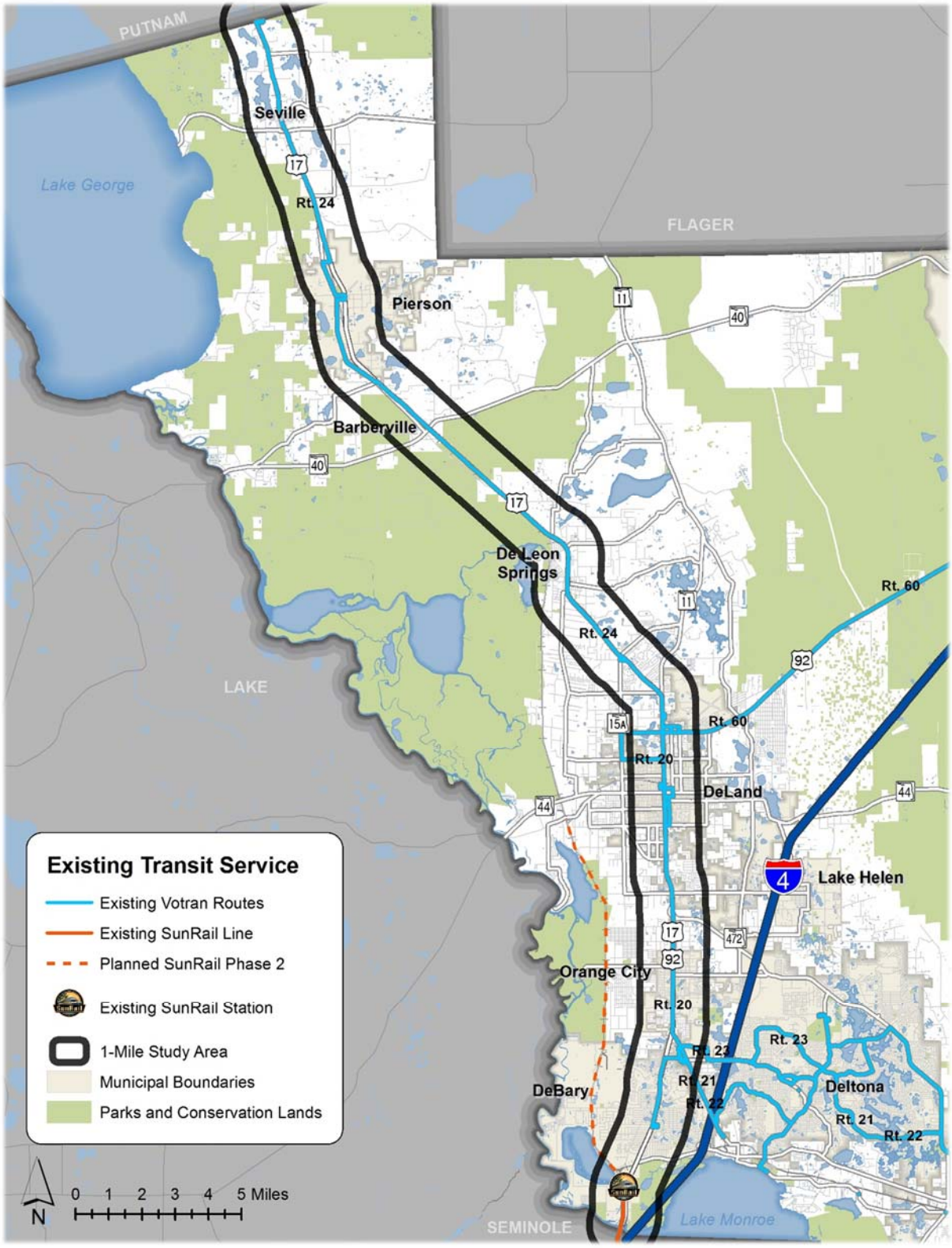
Transit Service Evaluation

Transit service along the US 17 corridor is provided by Volusia County's Public Transportation System (Votran). Currently there are six local fixed routes that serve the corridor in some manner. In addition to these routes there are three routes that provide AM and PM bus service to/from the DeBary SunRail station. The primary routes that serve the US 17 corridor are routes 20 and 24. Route 20 is one of Votran's top ridership routes and provides service along the US 17 corridor from Saxon Boulevard to the Walmart north of US 92/International Speedway Boulevard. Table 1 is an overview of the operating service and monthly ridership of the routes along the corridor. In addition to the Votran routes, SunRail provides weekday commuter rail service from the DeBary station to Orlando; rail service is provided every 30 minutes during the AM and PM peak periods and every two hours throughout the remainder of the day. Map 5 shows the alignment of the existing transit service within the corridor.

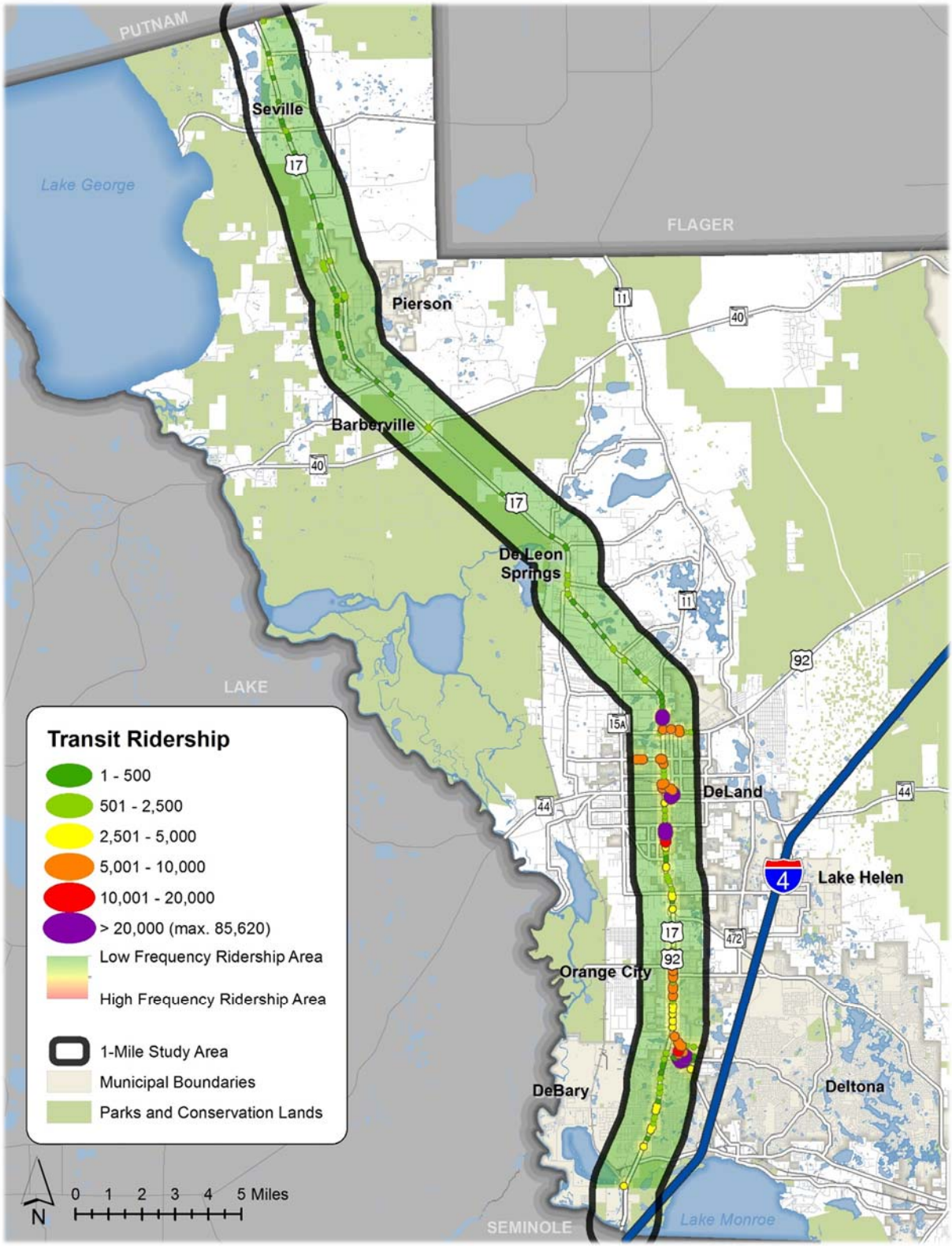
Table 1: Corridor Transit Route Service Information

Route	Route Description	Weekday Service		Average Monthly Ridership (Jan - July 2014)
		Frequency (minutes)	Span (hours)	
20	DeLand - Deltona	60	13	17,038
21	Deltona	120	14	3,948
22	Deltona	120	12	3,571
23	Orange City	60	12	3,740
24	Pierson - Seville	360	12	1,251
60	East West Connector	60	13	15,725
Routes Serving DeBary SunRail Station (AM and PM service)				
31	SunRail - US 17-92	30	4	529
32	SunRail - Deltona	60	6	496
33	SunRail - Dupont Lakes Express	60	4	433

Based on available bus stop-level ridership data, between October 2013 and September 2014, there were over 450,000 bus stop boardings and alightings within the corridor; this equates to approximately 1,200 riders getting on or off of a bus on the average weekday. Map 6 illustrates the location and annual ridership statistic of the bus stops within the corridor.



Map 5: Existing Transit Routes



Data Source: VOTRAN FY 2014 APC Data

Map 6: Stop-Level Transit Ridership, Annual Figures, FY 2014

Crash History Analysis

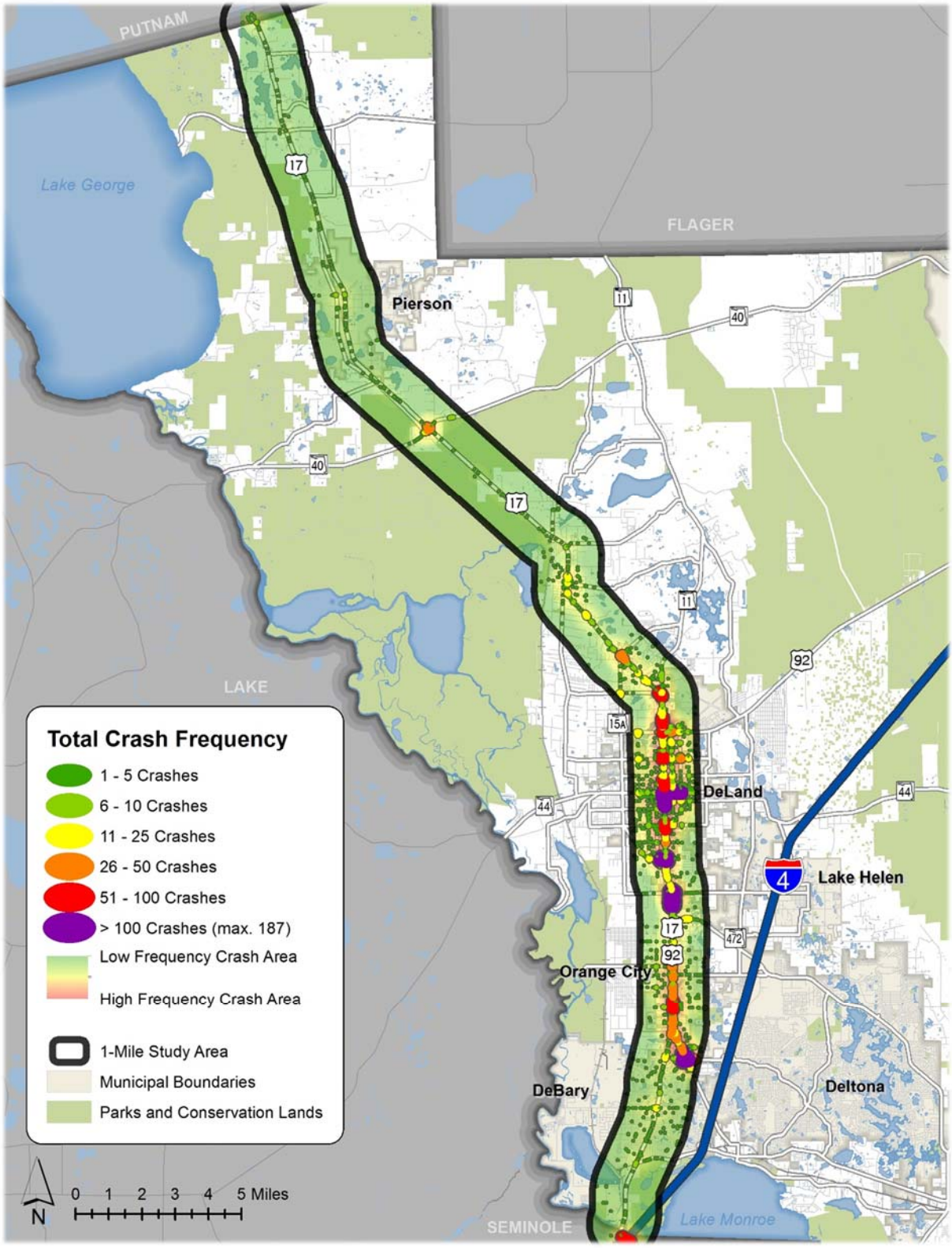
A five-year (2010—2014) crash history within the corridor was analyzed using crash data extracted from Signal Four Analytics web-based crash system. During this five-year period, there were over 4,800 reported crashes within the corridor study area. Map 7 shows the location and frequency of total crashes within the corridor. The concentrations of crashes shown in Map 7 were created by grouping clusters of crashes within 100 feet of each other. While there are crash locations throughout the corridor, there are a few locations that stand out as having a higher frequency of crashes. These include the area along US 17 and SR 44/New York Ave in downtown DeLand, US 17 at SR 15A/Taylor Rd, and US 17 at Orange Camp Rd. Table 2 provides a list of the highest frequency crash intersections within the corridor.

In addition to looking at the location of crashes, attributes related to time of day, annual distribution, monthly distribution, lighting conditions, injury severity, and crash type were also evaluated. Figure 6 shows a distribution of total crashes by crash type; as shown, rear-end crashes are the most frequent crash type at 24.4 percent of the total crashes. Following rear-end crashes, the crash types with the next highest frequency of crashes within the corridor are other/unknown crashes (19.7%), angle/left turn crashes (19%), head-on crashes (13.7%), and run-off-road crashes (11%).

Table 2: Highest Frequency Crash Locations, 2010—2014

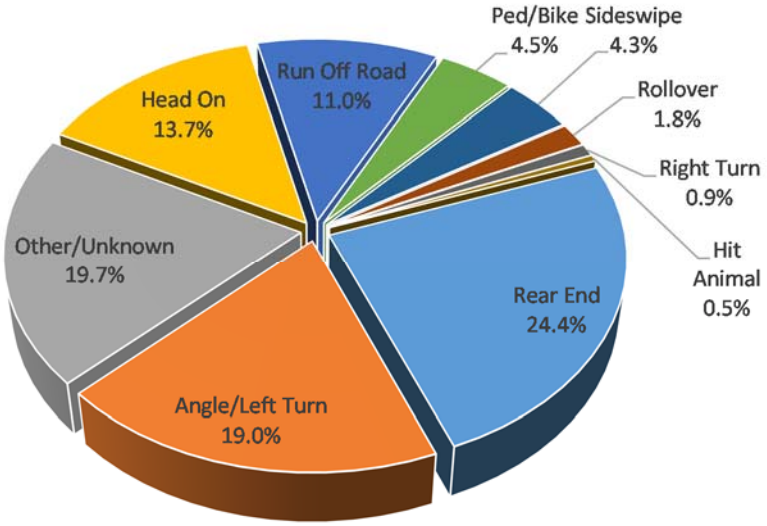
Rank	Intersection - US 17 at	Crashes
1	SR 15A	106
2	Beresford Ave	76
3	Orange Camp Rd	69
4	US 92/International Speedway Blvd	68
5	SR 44/New York Ave	63
5	Plymouth Ave	63
7	Violetwood Rd	49
7	Glenwood Rd	49
9	Firehouse Rd	48
10	Rhode Island Ave	36
10	Enterprise Rd	36
12	French Ave	34

Data Source Signal Four Analytics Data Extract



Data Source Signal Four Analytics Data Extract

Map 7: Total Crashes, 2010—2014

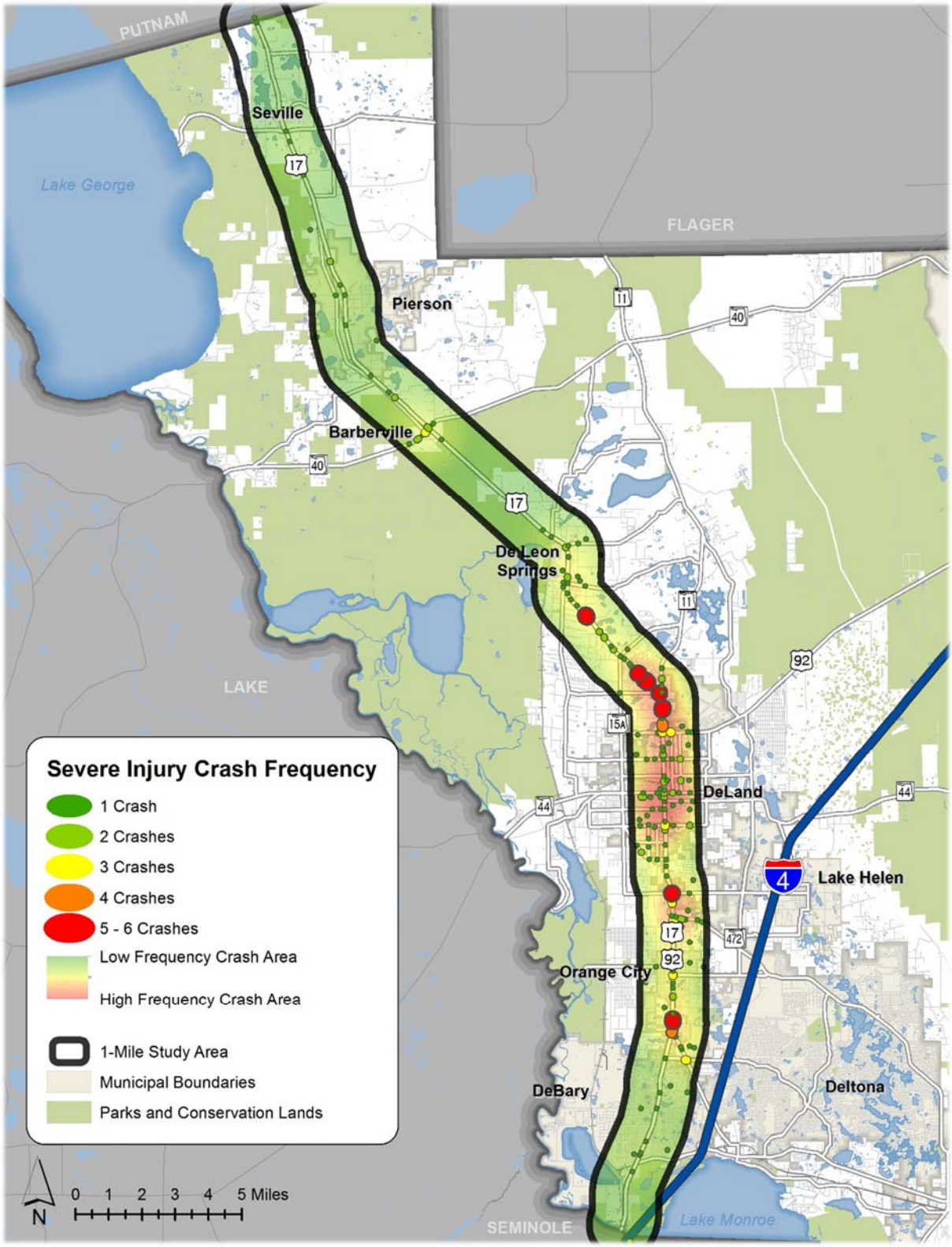


Data Source Signal Four Analytics Data Extract

Figure 6: Total Crashes by Crash Type, 2010—2014

Severe Injury Crashes

While it is important to understand factors related to overall crashes, it is also important to understand where the most severe injury crashes (including incapacitating injury and fatalities) are occurring and what is causing them. Understanding the cause and location of severe injury crashes will help to identify and prioritize safety concerns within the corridor. Between 2010 and 2014 there were 259 severe injury crashes. Like total crashes the severe injury crashes were further examined to better understand the causes of the most severe injury crashes within the corridor. Looking at crash types associated with severe injury crashes showed that angle/left turn crashes are the most frequent severe injury crash type at 28.2 percent, compared to 19 percent of the total crashes. The crash type with the second highest frequency of severe injury crashes within the corridor is pedestrian and bicycle crashes, they accounted for 17 percent or the severe injury crashes compared to just 4.5 percent of the total crashes. Map 8 show the location and frequency of severe injury crashes within the corridor.



Data Source Signal Four Analytics Data Extract

Map 8: Severe Injury Crashes, 2010-2014

Land Use/Socioeconomic Evaluation

An evaluation of key land use, socioeconomic, and demographic indicators, including existing land use, future land use, population and employment statistics, commuting patterns, income, and age was completed. Land use, socioeconomic, and demographic indicators often provide a good indication of where multimodal activity might be expected and where there are special populations that could require particular mobility considerations.

Existing Land Use

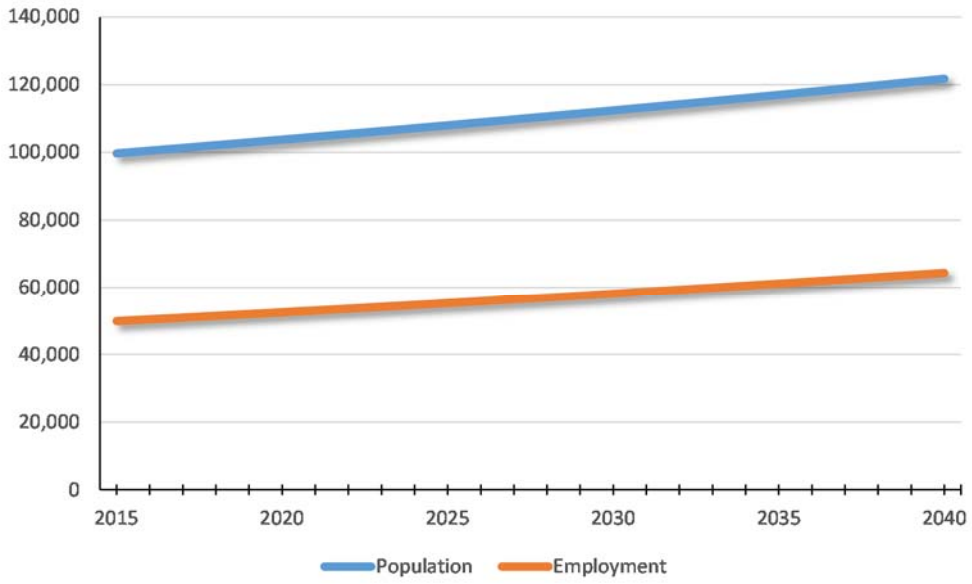
An analysis of existing land uses was conducted to understand the make-up and diversity of uses within and along the corridor. Within the corridor study area a majority of the land area is dedicated to residential uses and agricultural use. However, directly along the US 17 corridor, the uses with the most land coverage are commercial/retail/office uses and vacant non-residential uses.

Future Land Use

Overall the future land uses along the corridor are not expected to vary much from the existing land use conditions. Similar to the existing land use distribution, residential uses are expected to comprise the majority of the land within the corridor, with agricultural uses expecting to comprise the second highest amount of land acreage within the corridor. Much of the non-residential commercial/retail/office development is expected to remain directly along the US 17 corridor; one note is that the future land use does recognize a mixed-use category in many locations that are currently commercial/retail uses. In addition to future land use category a review of special plan areas was also conducted, these included the DeBary Transit-Oriented Development area, and the community redevelopment area (CRA) plans in Orange City and DeLand.

Population and Employment Statistics

An evaluation of existing and projected population and employment densities was conducted for the corridor. Between 2015 and 2040 the population within the US 17 corridor is projected to increase by approximately 22,000 people, equating to an average annual growth rate of 0.80 percent. During this same time period, employment with the corridor projected to increase by more than 14,500 employees, equating to an average annual growth rate of 1.03 percent. Figure 7 illustrates the projected population and employment growth for the corridor. When the average annual growth rates for the corridor are compared to the countywide rates it is noticed that population growth within the corridor is projected to grow at a rate higher than the countywide average, while employment is projected to grow at a rate slightly slower than the countywide average.

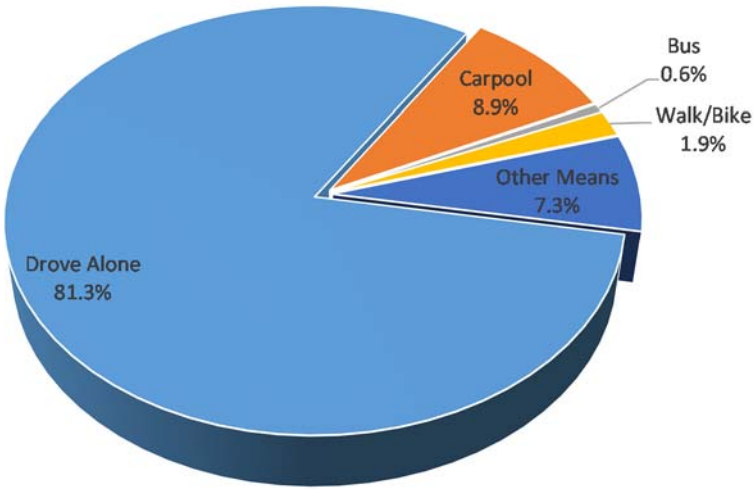


Data Source: R2CTPO/Central Florida Regional Planning Model

Figure 7: Projected Population and Employment Growth (2015—2040)

Means of Travel to Work

Data reflecting the existing means of transportation to work for workers living within the census block groups along the corridor were evaluated using data from the 2013 ACS. Figure 8 shows a break-down of the means of transportation for workers along the corridor. As illustrated, a majority of the workers (81.3 percent) who live within the corridor drive alone as their primary means of transportation to and from work. Within Volusia County the percent of worker who drive alone to work is 82.1 percent.



Data Source: U.S. Census Bureau 2013 5-Year ACS

Figure 8: Means of Transportation to Work

Per Capita Income

In 2013, the average income per capita within the corridor area was $21,674; which was lower than the average income per capita within Volusia County ($23,904). Often times there is a correlation between areas with lower incomes and higher use of alternative transportation modes such as walking, bicycling, and/or using transit. According to the data, there are a few concentrated areas along the corridor with below average per capita income, specifically the areas within central DeLand and central Orange City.

Older Populations

Older populations can also be indicative of a higher need for alternative transportation modes due to driving difficulties and/or limitations that come with age. These difficulties and/or limitations often require people to seek alternative transportation options to fulfill their mobility needs. Within the corridor area the average percent of the population that is age 65 and over is 21.1 percent; within Volusia County the percent of the population age 65 and over is 23.2 percent. Even though the percent of the population that is age 65 and over within the corridor area is lower than the countywide average, there are locations along the corridor that have a high percentage of older populations.

PUBLIC ENGAGEMENT

The primary purpose of the public engagement efforts for this phase of the US 17 Study was to promote broad-reaching, critical review, engagement of stakeholders in the discussion of transportation improvements, and to achieve a higher degree of interest in and understanding of these options for more meaningful and informed decision making. Public engagement was achieved through a series of stakeholder group meetings and through individual stakeholder interviews.

Stakeholder Group Meetings

Three stakeholder group meetings were conducted as part of the US 17 Corridor Study process. The stakeholders, identified by R2CTPO staff, were provided opportunities to provide input, comments, and engage in general discussions related to the study at various points throughout the study process. The first stakeholder group meeting discussed the history of the planning efforts within the corridor, the objective of this study, and reviewed the results of the baseline assessment. The second stakeholder group meeting mainly focused on the development of the corridor character districts, the mobility goals and needs associated with each character district, and the proposed recommendation criteria and measures. The third stakeholder group meeting provided an overview of the proposed alternative recommendations and provided the stakeholders with an opportunity to provide initial input and comments on the proposed alternatives.

Stakeholder Interviews

Working with R2CTPO staff a list of select stakeholders were identified as interview candidates. The stakeholder interviews provided stakeholders (representing local governments and business/community groups) the opportunity to engage the study team in discussions related to traffic safety, multimodal opportunities, perception of traffic/multimodal level-of-service, barriers to mobility and modal choice, community visions, aesthetics, impacts of land use, and economic development potential. Some of the common themes that were discussed during the stakeholder interviews were a desire to improve cross-corridor connections (getting people across US 17), traffic calming, and a desire for the corridor to not only match the current context and character of the surrounding areas, but recognize and support the envisioned and desired context and character. In general, similar to the Phase I effort, many of the comments and discussions centered on how US 17 could become more of a “complete street” that aligned with the visions of the communities along the corridor.

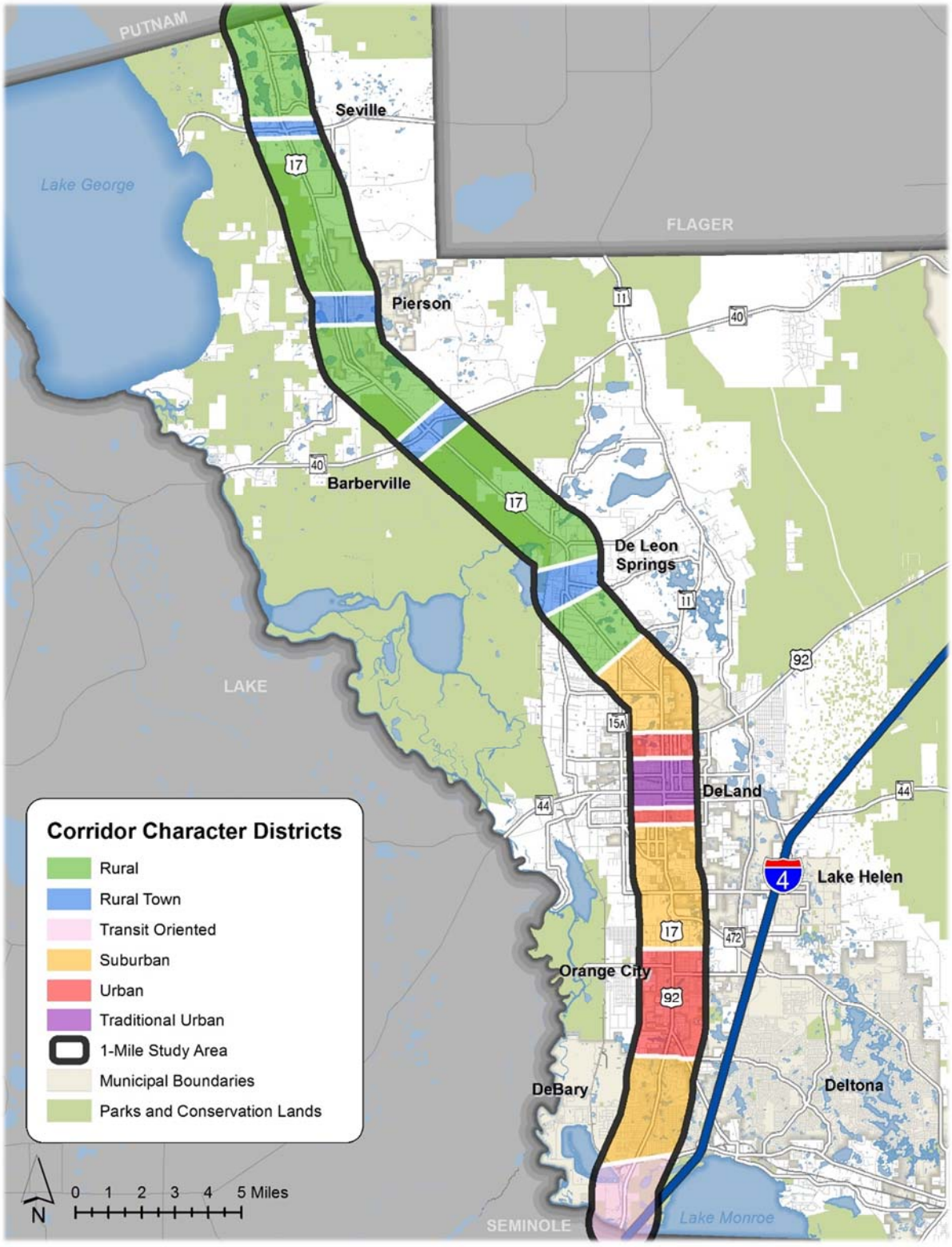
CORRIDOR CHARACTER DISTRICTS

The Corridor Character Districts for the US 17 corridor were developed to acknowledge that as one moves along the corridor, the land use, transportation needs, and general character of the corridor are different. Due to the variations along the corridor, identifying character districts helped in defining what the general mobility needs and goals are for different parts of the corridor. The intent is that the character districts could become a guide for establishing future roadway design elements and strategies aimed at improving multimodal mobility and safety along the corridor. However, the districts are not intended to be restrictive and should be viewed as flexible districts that could change over time.

Building on previous efforts six character district types were identified for the corridor. These were then applied to the corridor by studying characteristics such as existing and planned transportation infrastructure, land use, mobility needs based on socioeconomic/demographic data, and input from the study stakeholders. The six corridor character district types for the US 17 corridor are:

- Rural
- Rural Town
- Suburban
- Urban
- Traditional Urban
- Transit Oriented

The following pages describe the characteristics, mobility goals, and mobility needs for each of the identified character district types, and Map 9 illustrates how the character districts were applied to the corridor. More detail on the development, identification, and application of corridor character districts can be found in Technical Memorandum #2 – Corridor Character Districts and Evaluation Criteria.



Map 9: Corridor Character Districts

Rural Character Districts

General Characteristics

Rural districts are characterized largely by agricultural, conservation, and/or undeveloped land with some sparsely-located residences and businesses. The typical land uses within these districts include primarily agricultural or conservation with some low-density residential and non-residential uses. Rural districts are located within the northern portions of the US 17 corridor. Within these districts, US 17 serves primarily longer vehicle-based trips and serves as a key north-south regional connector. The physical characteristics of US 17 within these districts consist of a typical "rural roadway" cross-section with limited existing multimodal facilities. Due to the distance between destinations and the regional demand along these sections of US 17, there is an increased need for efficient and higher-speed travel through the Rural districts.

District Mobility Goals

The goals for Rural districts focus on enhancing the safe and efficient movement of people and goods through the region while retaining the rural character of the districts. Although it is important to explore and encourage opportunities to provide for enhanced pedestrian, bicycle, and transit connections, especially for connections that support recreational and destination based trips (e.g., multi-use trails), the primary mobility focus within the Rural districts, due to the type and length of many of the trips, is to support and improve the efficiency and safety of longer-distance vehicle trips.

District Mobility Needs

- Maintain levels of efficient regional movement of people and goods.
- Opportunities for regional and destination based multimodal facilities (e.g., multi-use trails)

Rural Town Districts

General Characteristics

Rural Town districts of the US 17 corridor are identified as unique areas, located within Rural districts, that are generally characterized by small clusters of businesses and homes. These districts include pockets of low-density residential and light commercial and institutional (i.e., schools) land uses that are within relative close proximity to each other. The physical character of US 17 through these districts resembles a more urban-like cross-section (curb and gutter), with some existing pedestrian and bicycle facilities. Like Rural districts, the primary mobility characteristics within Rural Town districts are vehicle-based. However, due to the presence of more multimodal facilities, proximity of land uses, and a grid-like pattern of streets within the districts, the propensity for non-vehicle trips within the Rural Town districts is much higher than that of Rural districts.

District Mobility Goals

The mobility goals for Rural Town districts are similar to those of Rural districts in that a primary focus is to enhance the efficiency and safety of vehicle traffic. However, compared to Rural districts, there should be a larger emphasis on promoting and encouraging multimodal modes, especially for local trip purposes, by ensuring that basic multimodal amenities and connections are provided. Also, as much as practical, the look and feel of US 17 within these districts should alert drivers that they are in an area that could, and often does, have more multimodal activity; this could be accomplished through roadway design treatments, gateway elements, or some combination of both.

District Mobility Needs

- Promote a sense of place; could be achieved through traffic calming techniques and/or gateway features.
- Encourage appropriate travel speeds within Rural Town districts.
- Provide basic pedestrian and bicycle infrastructure to support local trips.
- Provide regional multimodal connections (e.g., multi-use trails, sidepaths, and/or connections to existing trail facilities).

Suburban Districts

General Characteristics

Suburban districts of the US 17 corridor exhibit a more traditional suburban (post World War II) development pattern and roadway network (less street connectivity, cul-de-sacs, etc.). These districts tend to have a more auto-oriented development pattern with a high presence of larger off-street parking lots adjacent to the corridor, greater distances between intersections, fewer roadway connections, and, when present, multimodal facilities that are fairly basic. Land uses directly adjacent to US 17 within Suburban districts resemble more strip-style commercial development with some larger big-box-anchored shopping centers, office uses, and multi-family residential development, but primarily low- to medium-density single-family residential located behind the commercial frontage. There are some undeveloped or less intense land uses (i.e., parks, golf courses, etc.), but, for the most part, these districts are stable and relatively built-out.

District Mobility Goals

Given the character of the land uses and existing travel patterns within Suburban districts, the mobility goals mainly focus on the ability to enhance or, at a minimum, maintain vehicle movements by improving safety and connectivity while also identifying opportunities to improve the attractiveness of the multimodal environment. Much of the multimodal enhancement should focus on providing and improving connections and improving safety at key intersections within the districts.

District Mobility Needs

- Ensure basic/adequate pedestrian and bicycle infrastructure (sidewalks and bike lanes).
- Explore opportunities for regional multimodal connections and enhance connections to existing trail facilities.
- Identify opportunities to enhance the pedestrian and bicycle environment and user comfort through safety enhancements, particularly at signalized intersections (e.g., marked crosswalks, enhanced lighting, reduced crossing distances, appropriate traffic calming techniques, etc.).
- Promote transit use by ensuring adequate pedestrian and bicycle connections along US 17 and to/from key destinations, including convenient and safe bus stop placement.
- Identify opportunities to enhance transit service through technology (transit signal priority) and/or operations (queue jumps).
- Identify opportunities to enhance general traffic safety and efficiency, specifically at signalized intersection locations.
- Explore opportunities to reduce the number of driveway cuts along US 17; explore opportunities for driveway consolidation, shared-driveway uses, connections between adjacent land uses, and/or side or rear site access strategies.

Urban Districts

General Characteristics

Urban districts exhibit a more intense land use development pattern along with a tighter (shorter blocks) grid-like street pattern. Urban districts have a greater mix of land uses that include more intense commercial retail, office, and institutional uses located directly along the corridor, surrounded by a mix of medium-density multi-family and single-family residential uses. The uses directly adjacent to US 17 typically are set closer to the roadway, and although there may be parking between the roadway and building, much of it is provided either along the side of or behind the buildings. US 17 through these districts exhibits an urban cross-section, with sidewalks and bike lanes or adjacent bike facilities typically present. Travel speeds through these districts are slower than Rural, Rural Town, or Suburban districts, which is indicative of roadway design and increasing levels of traffic congestion. The greater mix and density of land uses, greater presence of multimodal facilities, overall street pattern make Urban districts more conducive to using multimodal modes for a wider range of trip purposes.

District Mobility Goals

The mobility goals for Urban districts mainly focus on encouraging multimodal travel by emphasizing the enhancement of multimodal facilities and connections, especially at signalized intersections. Although there are still regional transportation needs to be met along US 17, much of the emphasis through Urban districts is on serving the more local trip needs and improving the safety and general feel (public realm) of the corridor. In addition to these focuses, parts of the Urban districts have been targeted for redevelopment and reinvestments, so it is also important that the infrastructure within Urban districts is supportive and accommodating of any potential land use changes that may occur.

District Mobility Needs

- Ensure pedestrian and bicycle connections (appropriate to the context of the roadway) along US 17 and along connecting cross streets.
- Enhance the safety and comfort of the pedestrian and bicycle environment through intersection enhancements, enhanced bicycle facilities (including buffered bike lanes, sidepaths, and trails), wider sidewalks, roadway and crosswalk lighting (including pedestrian scale lighting), landscaping, and appropriate traffic calming techniques.
- Ensure adequate pedestrian and bicycle connections to/from transit facilities, including addressing bus stop placement, connections to/from key destinations and generators, and improved connections across US 17.
- Explore transit strategies to improve operations, including transit signal priority (TSP) technology and queue jump opportunities.
- Explore site access strategies aimed at reducing the number of driveway cuts along the corridor; could include driveway consolidation, driveway sharing, connections between adjacent sites, and/or allowing rear/side street site access.

Traditional Urban District

General Characteristics

The Traditional Urban district encompasses the downtown DeLand area along with the portions of US 17 through Stetson University. This area could be characterized as quaint and highly walkable, with enhanced multimodal facilities that help to encourage non-single-occupancy vehicle travel modes. There are closely-set multi-story buildings that abut wide sidewalks, on-street parking, street furniture, landscaping, a tight street grid that improves connectivity, and slower travel speeds that promote walkability within this district. The diverse mix of land uses within the Traditional Urban district includes commercial retail, office, restaurants, government, institutional, and parks that enhance the overall character and feel of the district.

District Mobility Goals

The mobility goals for the Traditional Urban district are to retain and promote the existing character of the district while continuing to improve safety and multimodal access where needed. Continuing to encourage a diverse mix of travel modes by maintaining slower travel speeds and enhanced facilities will allow this district to continue to serve its multimodal needs and demands.

District Mobility Needs

- Continue to support and encourage multimodal activity throughout this district.
- Explore opportunities for enhanced east-west multimodal connections, particularly on-street bicycle facilities.
- Identify opportunities to further integrate transit and transit connections throughout this district.
- Monitor traffic circulation patterns to determine if modifications to existing turn restrictions are needed.

Transit-Oriented District

General Characteristics

The Transit Oriented district of the corridor includes the area around the existing SunRail commuter rail station in southern DeBary. Today, this district portrays many of the characteristics of Rural districts, but the key differences are the presence of the SunRail station and DeBary's transit-oriented development (TOD) overlay planning area. The TOD planning efforts within this district have identified a desire for a more diverse mix and density of land uses that will support and be supportive of multiple transportation modes.

District Mobility Goals

The Transit Oriented district is an emerging district that is currently working on defining its development and multimodal goals. The mobility goals for this district should be to balance existing regional mobility needs with a need to support proposed local multimodal travel demands. Ultimately, this district should support the desired mobility needs and demands that are identified through the TOD planning process and enhance the access and connectivity to the existing SunRail station.

District Mobility Needs

- Identify opportunities to expand and enhance multimodal connections along and across US 17; could include exploring opportunities for additional cross-corridor connections, new and/or enhanced facilities/service along US 17, identifying appropriate traffic calming techniques (i.e., landscaping and reducing travel lane widths), and improved connections to the US 17 corridor.
- Identify opportunities to enhance the overall multimodal (pedestrian, bicycle, and transit) connections to the existing DeBary SunRail station.
- Coordinate transportation and land use planning to promote and support multimodal transportation options.
- Develop a multimodal "vision" for the US 17 corridor through this district.

ALTERNATIVES DEVELOPMENT

As previously stated the primary objective of the US 17 Corridor Study is to identify and develop a set of recommendations aimed at improving the safety and mobility of all users within the US 17 corridor. This section provides an overview of the identified alternative recommendations for the US 17 corridor. This alternatives development section has been divided into two parts, the first part identifies and addresses systemic corridor-wide practices that could be considered throughout the corridor, the second part looks at site specific considerations. Technical Memorandum #3 – Alternatives to Improve Mobility and Safety contains a more detailed description of the alternatives highlighted within this summary report.

Corridor-Wide Strategies/Alternatives

Many of the strategies within this section focus on systemic improvements that could be applied through the corridor, where feasible, or incorporated into future projects within the corridor.

Crosswalk markings – Crosswalks are a vital part of the pedestrian network; they define the designated crossing area for pedestrians and alert drivers to the likelihood of pedestrians.

Roadway and Intersection/Crosswalk Lighting – Roadway and intersection/crosswalk lighting is a critical component of roadway safety and should be designed to provide adequate illumination for all roadway users.

Signage – Signs can be used to warn drivers and other roadway users of potential threats and can also serve as visual reminders on how drivers are required to act in specific circumstances.

Flashing Yellow Arrow – Studies by the Federal Highway Administration show that the flashing yellow arrow reduces crashes at intersections by providing a clear distinction between when left turning vehicles are protected from oncoming traffic and when they must yield.

Modern Right-Turn Channelization Island – At intersections where a wide curb radius is necessary to accommodate heavy vehicles or skewed geometries, consideration should be given to installing right-turn islands to better separate vehicle-pedestrian conflicts and reduce pedestrian exposure.

Pedestrian Channelization – Pedestrian channelization is a technique that uses some form of physical barrier to encourage pedestrians to cross at nearby marked crosswalks.

Bus Stop Siting – Bus stops should be positioned to minimize the extent to which pedestrians traveling to or from the bus stop conflict with motor-vehicle traffic and encourage patrons to use existing facilities to cross major roadways.

Transit Signal Priority – Transit signal priority (TSP) refers to various operational techniques that use technology to improve transit service and reduce (transit) delay by, in general terms, holding green lights longer or shortening red lights.

Bus Right-Turn Queue Jumps – Bus queue jump lanes can reduce operating delay, resulting in run-time savings and increased reliability of transit service.

Right-Turn-on-Red Restrictions – Prohibiting right-turns on red may be considered an option in helping to mitigate conflicts between crossing pedestrians and turning vehicles, especially in locations with higher volumes of pedestrians.

Traffic Signal Backplates – Backplates are added to traffic signals to improve the visibility of the illuminated face of the signal.

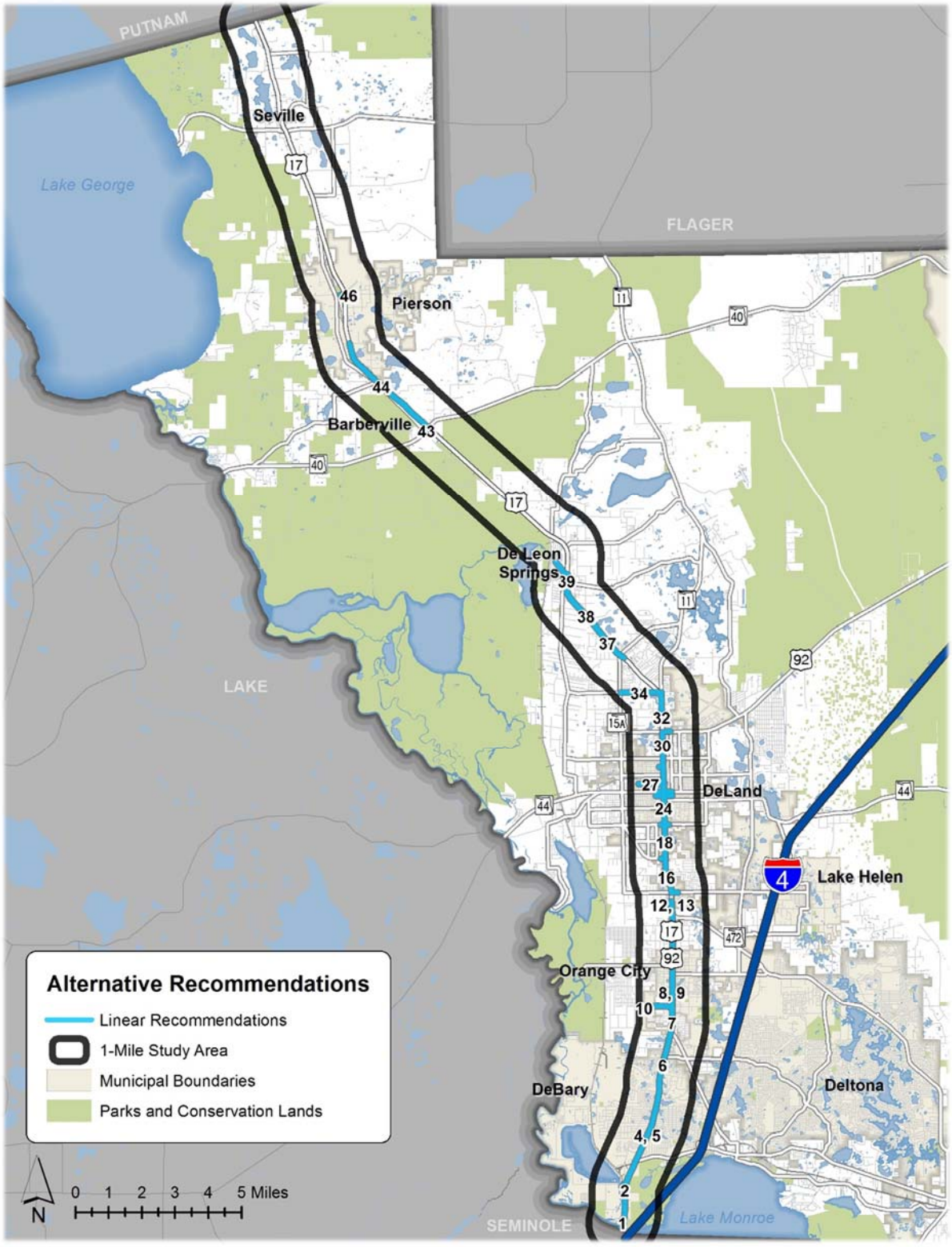
Landscaping – Street landscaping can provide an enhanced street environment for both vehicular and non-vehicular modes, but may not be appropriate in all locations.

Driveway Consolidation – Consolidating driveways can improve traffic flow and safety (vehicle, pedestrian, and bicycle) along a roadway by reducing the number of potential conflict points along the roadway.

Site Specific Alternatives

Based on the input from the study stakeholders and previously completed study efforts, a list of potential alternative recommendations was developed with the goal of improving multimodal mobility and safety along the US 17 corridor. One important note about the recommended alternatives in this study is that while work was done to try to identify fatal flaws that would prohibit the type of improvements being recommended, it is recommended that necessary engineering, survey, and/or design work be completed prior to commencing any of the recommended alternatives identified in this report. Also, most of the identified alternatives were developed to avoid major right-of-way impacts and to avoid/minimize major reconstruction of the roadway, curb, and drainage structures. However, there may be some instances that may require additional right-of-way or partial reconstruction of portions of the roadway.

Because of the range of project types and mixture of linear (along stretches of the corridor) and point recommendations (specific location) along the corridor, grouping and prioritizing the recommended alternatives is an imperfect process that will continue to evolve as project recommendations move into the implementation phase. Although alternatives may be regrouped as specific design and contracting approaches are refined, “linear” alternatives are presented here in terms of the roadway segments and are ordered from south to north along the corridor and are presented in Map 10 and Table 3. Recommended alternatives that do not correspond with any of the linear alternatives, or point recommendations, are grouped separately by (nearest) intersection, ordered along the corridor from south to north, and are presented in Map 11 and Table 4.



Map 10: Location of Linear Alternative Recommendations

Table 3: Linear Alternative Recommendations

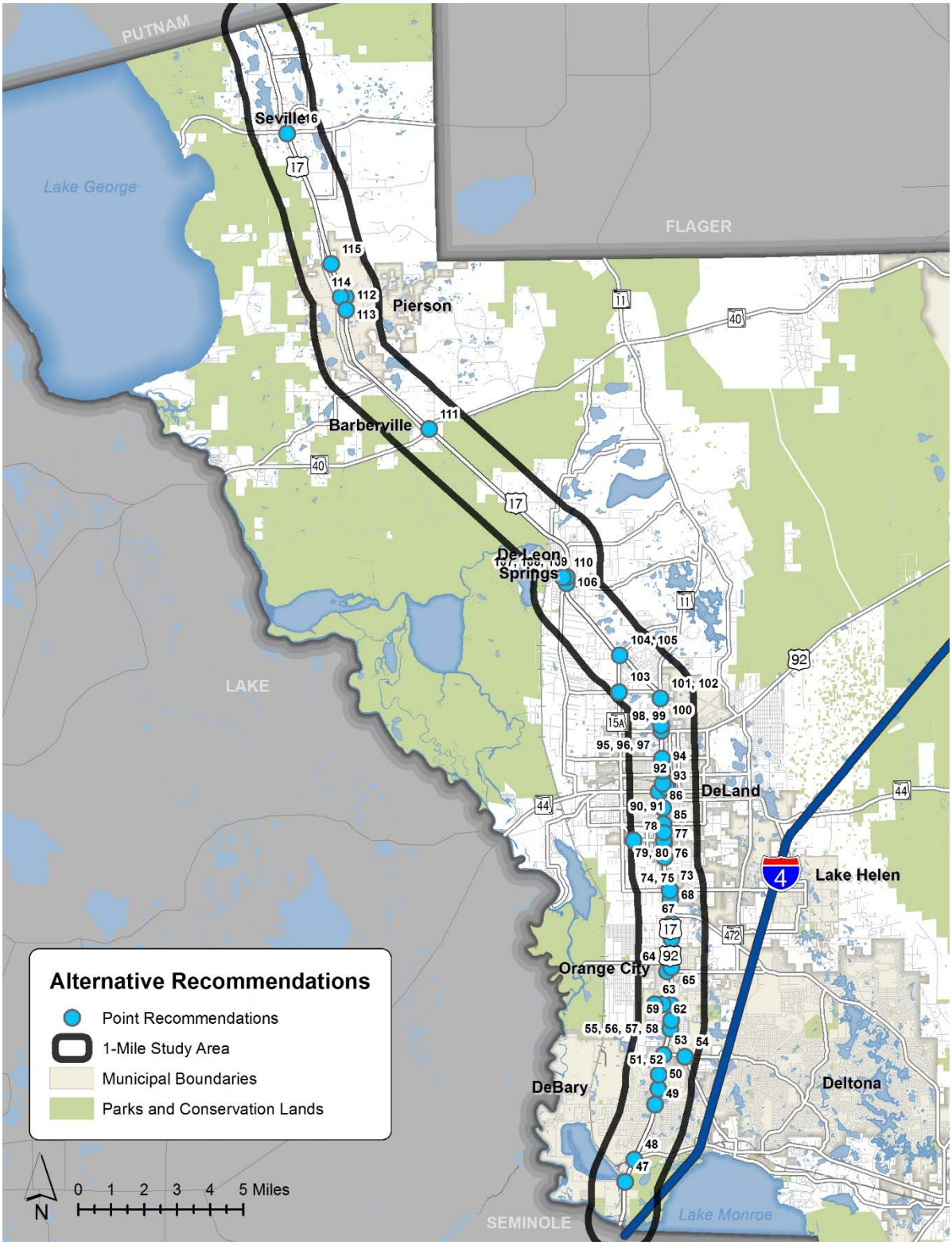
ID#	On Street	From - To	Recommendation	Category	Location	Jurisdiction
1	US 17/92	Benedict Bridge (N. of Lake Monroe Wayside Park entrance to S. of Lake Monroe Park Cir)	Consider evaluating modifying the lane and shoulder widths along the bridge to accommodate a minimum 10' barrier-separated trail (per R2CTPO Resolution 2015-20).	Pedestrian and Bicycle	DeBary	FDOT
2	US 17/92	Lake Monroe Park Cir to Dirksen Dr	Consider replacing the existing sidewalk with a wide sidewalk or sidepath along the east side of US 17/92. Coordinate with the City of DeBary and their Transit Oriented Development Overlay planning process.	Pedestrian and Bicycle	DeBary	FDOT
3	Ft Florida Rd	SunRail Park-and-Ride Driveway to US 17	Consider installing a pedestrian/bicycle facility along the south side of Ft Florida Rd between the SunRail Park-and-Ride driveway and US 17.	Pedestrian and Bicycle	DeBary	DeBary
4	US 17/92	Dirksen Dr to Highbanks Rd	Consider conducting a study to evaluate providing pedestrian crossing enhancements.	Typical Section and Operational	DeBary	FDOT
5	US 17/92	Barwick Rd to Highbanks Rd	Consider narrowing the existing travel lanes, to 11', to accommodated a marked (buffered) bike lane. Alternatively, it appears that the existing paved shoulder may be wide enough for a marked bike lane, if currently wide enough consider providing bike lane markings (symbol and arrow) through this section.	Pedestrian and Bicycle	DeBary	FDOT
6	US 17/92	Highbanks Rd to Enterprise Rd	Consider reducing the existing travel lane widths to 11' to accommodate a min. 5' marked bicycle lane.	Typical Section, Pedestrian, and Bicycle	DeBary and Orange City	FDOT
7	US 17/92	Enterprise Rd to Elm Dr	The southbound lanes of US 17/92 has a wide paved should, it is currently unclear if this is just a shoulder of if it is an unmarked turn lane. Consider providing pavement markings to better define the purpose of this area. Consider providing marked bike lanes (min. 5') through this section. Additionally, consider options to address safety concerns relating to the merging of westbound traffic on Enterprise Rd with the northbound traffic on US 17/92 (e.g., intersection design modifications).	Operational	Orange City	FDOT
8	US 17/92	Gardenia Dr to Wisconsin Ave	Consider conducting a study to evaluate providing pedestrian crossing enhancements.	Typcial Section and	Orange City	FDOT
9	US 17/92	Gardenia Dr to Wisconsin Ave	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian and Bicycle	Orange City	FDOT
10	Rhode Island Ave	West Side Pkwy to US 17/92	Evaluate existing paved shoulder widths for potential to provide a marked bicycle lane. Rhode Island Ave provides a connection to Manatee Cove Elementary, River Springs Middle, and University High Schools.	Pedestrian and Bicycle	Orange City	Orange City
11	French Ave	US 17/92 to approx. 165' east of US 17/92	Consider installing a sidewalk along the south side of French Ave between US 17/92 and the existing sidewalk approximately 165' east of the intersection.	Pedestrian and Bicycle	Orange City	Orange City
12	US 17/92	Wisconsin Ave to Firehouse Rd (N. of SR 472)	There are no sidewalks along US 17/92 through this section, consider evaluating the potential to provide sidewalks along both sides of US 17/92.	Pedestrian and Bicycle	Orange City, Volusia County, and DeLand	FDOT
13	US 17/92	Wisconsin Ave to Firehouse Rd (N. of SR 472)	Consider restriping the roadway in order to provide for marked bicycle lanes.	Pedestrian and Bicycle	Orange City, Volusia County, and DeLand	FDOT
14	Orange Camp Rd	US 17/92 to Dyson Dr	Consider installing a sidewalk along the south side of Orange Camp Rd to the existing sidewalk at Dyson Dr.	Pedestrian and Bicycle	DeLand	DeLand
15	Orange Camp Rd	US 17/92 to Approx. 205' east of US 17/92	Consider completing the sidewalk along the north side of Orange Camp Rd between US 17/92 and the recently complete sidewalk approximately 250' east of US 17/92.	Pedestrian and Bicycle	DeLand	DeLand
16	US 17/92	Orange Camp Rd/McGregor Rd to Taylor Rd/SR 15A	Consider reducing the existing travel lane widths (to 11') to accommodate marked (buffered) bicycle lanes (min. 5', preferred 7').	Pedestrian and Bicycle	DeLand	FDOT
17	Taylor Rd/SR 15A	Florida Ave to US 17/92	Consider installing a sidewalk along the south side of Taylor Rd/SR 15A from the existing sidewalk east of Florida Ave to the intersection of US 17/92. Explore opportunities to include this with the right-turn lane enhancements proposed by FDOT.	Pedestrian and Bicycle	DeLand	FDOT
18	US 17/92	Taylor Rd/SR 15A to Beresford Ave	Consider modifying existing travel lane widths to 11' to accommodate marked (buffered) bicycle lanes (min. 5'). Evaluate if there is enough existing pavement to provide a marked southbound bike lane south of New Hampshire Ave, the southbound lanes and pavement width appears to be narrower south of New Hampshire Ave.	Pedestrian and Bicycle	DeLand and Volusia County	FDOT
19	New Hampshire Ave	US 17/92 to Amelia Ave	Consider installing a sidewalk along the north side of New Hampshire Ave. This would provide an additional connection to DeLand Middle School.	Pedestrian and Bicycle	DeLand	DeLand
20	New Hampshire Ave	Florida Ave to US 17/92	Consider installing a sidewalk along the south side of New Hampshire Ave from the existing sidewalk west of Florida Ave to the intersection	Pedestrian and Bicycle	DeLand	DeLand

Table 3: Linear Alternative Recommendations (continued)

ID#	On Street	From - To	Recommendation	Category	Location	Jurisdiction
21	Beresford Ave	Florida Ave to US 17/92	Consider completing the sidewalk gap (~390') along the north side of Beresford Ave between Florida Ave and the existing sidewalk west of US 17/92.	Pedestrian and Bicycle	DeLand	DeLand
22	Beresford Ave	US 17/92 to E. of Alabama Ave	Consider providing a wide sidewalk or sidepath along the north side of Beresford Ave from US 17 to the DeLand Greenway east of Alabama Ave.	Pedestrian and Bicycle	DeLand	DeLand
23	US 17/92	Beresford Ave to Howry Ave	Consider conducting a study to evaluate providing pedestrian crossing enhancements.	Typcial Section and Operational	DeLand	FDOT
24	US 17/92	Beresford Ave to Wisconsin Ave	Consider providing shared lane markings through this section. This could help to serve more localized trips that may not be attracted to the trail along Alabama Ave and could help with the lateral positioning of bicycles in the adjacent on-street parking lanes through parts of this section.	Pedestrian and Bicycle	DeLand	FDOT
25	Howry Ave	Clara Ave to Amelia Ave	Consider providing marked bicycle lanes (symbol and arrow). There appears to be sufficient pavement width to accommodate marked bike lanes (min. 5') through this section.	Pedestrian and Bicycle	DeLand	DeLand
26	SR 44/New York Ave	Clara Ave to Amelia Ave	Consider installing shared lane markings.	Pedestrian and Bicycle	DeLand	FDOT
27	Wisconsin Ave	Stone St to US 17/92	Consider installing shared lane markings.	Pedestrian and Bicycle	DeLand	DeLand
28	US 17/92	Wisconsin Ave to Plymouth Ave	Consider providing shared lane markings through this section.	Pedestrian and Bicycle	DeLand	FDOT
29	Pennsylvania Ave	Florida Ave to US 17/92	Evaluate the potential to complete the sidewalk along the south side of Pennsylvania Ave from either Florida Ave or Palmetto Ct to the existing sidewalk west of US 17/92.	Pedestrian and Bicycle	DeLand	DeLand
30	US 17/92	Plymouth Ave to US 92/International Speedway Blvd	Consider reducing the existing travel lane widths (to 11') to accommodate a minimum 5' marked bicycle lane in each direction.	Pedestrian and Bicycle	DeLand	FDOT
31	US 92/International Speedway Blvd	Alabama Ave to Amelia Ave	Consider extending the sidewalk along the south side of US 92/International Speedway Blvd from Alabama Ave to the signalized intersection of Amelia Ave.	Pedestrian and Bicycle	DeLand	FDOT
32	US 17	Violetwood Rd/Walmart to Glenwood Rd	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian and Bicycle	DeLand and Volusia County	FDOT
33	US 17	SR 11 Junction to Glennwood Rd/SR 11	Consider providing a sidewalk along the east side of US 17 from the northbound junction with SR 11 to the intersection of Glenwood Rd; this should include providing a marked crossing across the northbound lane of SR 11 with appropriate warning signage and adequate lighting.	Pedestrian and Bicycle	Volusia County	FDOT
34	Glenwood Rd	SR 15A to US 17	Evaluate installing a sidewalk along Glenwood Rd (potentially along the north side) between SR 15A and US 17.	Pedestrian and Bicycle	Volusia County	Volusia
35	Glenwood Rd	US 17 to SR 11	Consider providing sidewalk connections from the intersections (US 17 and SR 11) to the existing sidewalk along the south side of Glenwood Rd.	Pedestrian and Bicycle	Volusia County	Volusia
36	US 17	Williamsburg Rd to Spring Garden Ave/SR 15A	Consider installing a sidewalk along the west side of US 17 from Williamsburg Rd north to the existing sidewalk at Spring Garden Ave/SR 15A.	Pedestrian and Bicycle	Volusia County	FDOT
37	US 17	Spring Garden Ave/SR 15A to S. of Katrina St	Consider providing a sidewalk along the west side of US 17.	Pedestrian and Bicycle	Volusia County	FDOT
38	US 17	Spring Garden Ave/SR 15A to N. of Baxter St	Evaluate providing a wide sidewalk/multi-use path (min. 10') along the east side of US 17. This could tie into the trail that is being proposed along the east side of US 17 from N. of Baxter St to SR 40 as part of the planned widening project.	Pedestrian and Bicycle	Volusia County	FDOT
39	US 17	Katrina St to Baxter St	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian and Bicycle	Volusia County	FDOT
40	Reynolds Rd	Grand Ave to US 17	Consider providing a sidewalk connection from the Spring to Spring Trail to US 17.	Pedestrian and Bicycle	Volusia County	Volusia
41	Baxter St	Grand Ave to US 17	Consider providing a wide sidewalk/multi-use path connection along the north side of Baxter St from Grand Ave to US 17 to connect the Spring to Spring Trail to US 17.	Pedestrian and Bicycle	Volusia County	Volusia
42	Ponce Deleon Blvd	DeLeon Springs State Park Entrance to US 17	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian and Bicycle	Volusia County	Volusia
43	SR 40	CR 3 to US 17	Consider installing a sidewalk along the south side of SR 40 between CR 3 and US 17.	Pedestrian and Bicycle	Volusia County	FDOT
44	US 17	SR 40 to Hagstrom Rd	Consider evaluating (impact to drainage) constructing a multi-use trail along the east side of US 17 from SR 40 to Hagstrom Rd. As an intermediate option consider (depending on impacts to drainage) widening the shoulder to provide for buffered bike lanes through this section.	Pedestrian and Bicycle	Volusia County and Pierson	Volusia

Table 3: Linear Alternative Recommendations (continued)

ID#	On Street	From - To	Recommendation	Category	Location	Jurisdiction
45	Washington Ave	Chipper Jones Ln to US 17	Evaluate installing a sidewalk along the south side of Washington Ave (mostly along the school property). The impacts to drainage will need to be evaluated to determine the feasibility of providing a sidewalk.	Pedestrian and Bicycle	Pierson	Pierson/Volusia
46	Washington Ave	US 17 to Frederick St	A previously completed safety and traffic study recommended installing a sidewalk along the south side of Washington Ave to the entrance of Taylor High School. Consider evaluating the feasibility (impact to drainage) of a sidewalk along the south side of Washington Ave.	Pedestrian and Bicycle	Pierson	Pierson/Volusia



Map 11: Location of Point Alternative Recommendations

Table 4: Point Alternative Recommendations

ID#	Intersection	Recommendation	Category	Location	Jurisdiction
47	US 17/92 at Ft Florida Rd	Consider continued coordination with the City of DeBary's TOD planning efforts to identify opportunities to enhance east-west connections at this location.	Operational	DeBary	FDOT
48	Dirksen Dr at US 17/92	Consider conducting a study to evaluate installing a raised median island east of the intersection (at the back of the left turn queue) to delineate the beginning of the westbound to southbound left turn lane from the center two-way left turn lane section.	Operational	DeBary	DeBary
49	US 17/92 at Highbanks Rd	Evaluate available right-of-way and possibility of providing a right-turn channelization island for the eastbound right turn movement; if an island is installed consider realigning the crosswalks within the western and southern legs of the intersection to the island.	Geometric	DeBary	FDOT
50	US 17/92 at Pine Meadow Dr	Consider realigning the existing crosswalks to provide shorter crossing distances; will require pulling the stop bars back from their existing location.	Geometric, Pedestrian and Bicycle	DeBary	FDOT
51	US 17/92 at Debary Plantation Blvd	Evaluate pulling the northbound stop bar back in order to provide a marked crosswalk along the southern leg of the intersection. The location of the existing drainage inlet could be challenging; this may require looking at realigning the crosswalk along the west side of the intersection to provide space for a ramp for the potential crossing along the south side of the intersection.	Pedestrian and Bicycle	DeBary	FDOT
52	US 17/92 at Debary Plantation Blvd	If a crosswalk is not installed along the southern leg of the intersection consider relocating the existing bus stop to the immediate far-side of the intersection, closer to the existing marked crosswalk. If stop remains where it is consider providing an ADA accessible landing pad at the bus stop.	Transit	DeBary	VOTRAN
53	US 17/92 at Saxon Blvd	Consider evaluating providing a raised right-turn channelization island for the westbound right turn movement on Saxon Blvd and realign the crosswalk along the east side of the intersection.	Geometric	DeBary	FDOT
54	Saxon Blvd at Enterprise Rd	Evaluate opportunities to improve the visibility of crossing pedestrians to right-turning drivers; could potential include the evaluation of installing raised channelized right-turn islands within the northeast and southwest quadrants of the intersection and realigning the crosswalks across Enterprise Rd.	Geometric, Pedestrian, and Bicycle	Orange City	FDOT
55	US 17/92 at Enterprise Rd	Consider realigning the existing crosswalk across the northbound right-turn lane to reduce crossing distance/exposure and improve driver visibility of crossing pedestrians. Also, consider enhancing the crossing with signage (W11-2) and evaluating existing crosswalk lighting levels - enhance if necessary.	Geometric, Pedestrian, and Bicycle	Orange City	FDOT
56	US 17/92 at Enterprise Rd	Consider providing a marked crosswalk along the southern leg of the intersection.	Pedestrian and Bicycle	Orange City	FDOT
57	US 17/92 at Enterprise Rd	Consider relocating the existing crosswalk across the right-turn lane from Enterprise Rd to northbound US 17/92 to the southeast of its existing location - moving the crosswalk southeast of its existing location would eliminate potential driveway conflicts and would position the crosswalk closer to the existing overhead street light. In addition to relocating the crossing consider enhancing with advance yield pavement markings.	Pedestrian and Bicycle	Orange City	FDOT
58	US 17/92 at Enterprise Rd	Currently local fixed-route transit routes along US 17/92 (Routes 23 and 20) deviate off of US 17/92 between Saxon Blvd and Enterprise Rd to serve transfers at the Market Place Shopping Center. If a decision is made to provide northbound transit service along US 17/92 from Saxon Blvd through Enterprise Rd consider utilizing the existing right-turn lane as a queue jump lane and reconfiguring the channelized island on the far-side (north side) of the intersection to accommodate an open bus bay and stop.	Transit	Orange City	FDOT
59	US 17/92 at Holly Dr	Consider studying the existing median opening (particularly the southbound direction) for potential modifications.	Geometric	Orange City	FDOT
60	US 17/92 at Rhode Island Ave	If a marked bike lane is provided on Rhode Island Ave (west of US 17/92) provide a bike lane keyhole for the right-turn lane.	Pedestrian and Bicycle	Orange City	FDOT
61	US 17/92 at Rhode Island Ave	Evaluate providing a right-turn channelization island for the eastbound right turn movement; this is dependent upon what the currently hashed-out lane adjacent to the right-turn lane on Rhode Island Ave is intended to be used for.	Geometric	Orange City	FDOT
62	Rhode Island Ave at Carpenter Ave	Consider realigning the existing crosswalk (to the west) to improve accessibility of the pedestrian curb ramp and shorten crossing distance and pedestrian exposure.	Pedestrian and Bicycle	Volusia County	FDOT
63	Rhode Island Ave at Sparkman Ave	Consider realigning the existing crosswalk (~10'-15' to the west) to improve accessibility of the pedestrian curb ramp and shorten crossing distance and pedestrian exposure. Alternatively evaluate expanding the pedestrian landing area within the northwest quadrant to provide better crosswalk access.	Pedestrian and Bicycle	Orange City	Orange City
64	Graves Ave at Park Ave	The existing crosswalk markings are showing wear, consider rehabbing the crosswalk markings and enhancing to a ladder style marking and installing supplemental pedestrian crosswalk (W11-2) signage.	Pedestrian and Bicycle	Orange City	Orange City
65	US 17/92 at University Ave	Consider conducting a study to evaluate the potential to provide enhancements to the existing mid-block/school crossing.	Pedestrian and Bicycle	Orange City	FDOT

Table 4: Point Alternative Recommendations (continued)

ID#	Intersection	Recommendation	Category	Location	Jurisdiction
66	US 17/92 at New York Ave	Evaluate extending the eastbound right-turn lane; there appears to be evidence of tire marks and wear on the approach to the existing turn lane that indicated that drivers are using the right-of-way to bypass queues in the thru/left turn lane.	Geometric	Orange City	FDOT
67	US 17/92 at Minnesota Ave	Consider evaluating the intersection to determine if providing marked crosswalks on all legs of the intersection is appropriate at this currently signalized intersection.	Pedestrian and Bicycle	Orange City	FDOT
68	US 17/92 at Firehouse Rd (N. of SR 472)	Consider providing a marked crosswalk along the northern leg of the intersection.	Pedestrian and Bicycle	DeLand	FDOT
69	US 17/92 at Orange Camp Rd/McGregor Rd	Consider providing a marked crosswalk along the southern leg of the intersection.	Pedestrian and Bicycle	DeLand	FDOT
70	US 17/92 at Orange Camp Rd/McGregor Rd	Consider evaluating extending the curb within the southwest corner of the intersection to reduce the turning radius, slow turning traffic, and reduce pedestrian crossing distances and exposure.	Geometric	DeLand	FDOT
71	US 17/92 at Orange Camp Rd/McGregor Rd	Evaluate the need to provide supplemental near-side traffic signal heads for the westbound approach; the existing signal heads appear to be approx. 185' from the existing westbound stop bar; the MUTCD's sight distance requirements for approaching drivers establishes a maximum of 180' from stop bar to signal head.	Operational	DeLand	FDOT
72	US 17/92 at Orange Camp Rd/McGregor Rd	Consider pulling back the existing westbound stop bar (~20' to just past the existing median nose) and realign the crosswalk along the east side of the intersection to reduce pedestrian crossing distance and exposure, and to increase the visibility of crossing pedestrians.	Pedestrian and Bicycle	DeLand	FDOT
73	McGregor Rd at US 17/92	Consider closing the first median opening west of US 17/92 and providing a raised median island/left turn separator. Left turns from the shopping center could be accommodated from adjacent driveways located to the west.	Operational	DeLand	DeLand
74	US 17/92 at Taylor Rd/SR 15A	Consider providing a marked crosswalk along the southern leg of the intersection in conjunction with the proposed FDOT intersection enhancements.	Pedestrian and Bicycle	DeLand	FDOT
75	US 17/92 at Gilbert St	Consider conducting a study to evaluate eliminating the left turn movements from Gilbert St and the shopping center and providing a raised left turn channelization island for left turn from US 17/92 only. Left turns from Gilbert St and the shopping center could be accommodated at either New Hampshire Ave or to the south at Andover St.	Operational	DeLand	FDOT
76	US 17/92 at New Hampshire Ave	Consider realigning the crosswalk along the northern leg of the intersection to improve the visibility of pedestrians within the northwest quadrant and reduce pedestrian crossing distance and exposure.	Pedestrian and Bicycle	DeLand	FDOT
77	SR 15A at New Hampshire Ave	The existing marked mid-block crosswalk is used as a school crossing; consider conducting a study to evaluate opportunities to enhance the crossing (raised median islands, RRFBs, HAWK, lighting, etc.) to better accommodated non-school crossings.	Pedestrian and Bicycle	Volusia County	FDOT
78	US 17/92 at Lisbon Pkwy	Provide an ADA compliant pedestrian curb ramp and defined sidewalk connection along the east side of US 17/92 south of Lisbon Pkwy.	Pedestrian and Bicycle	DeLand	FDOT
79	US 17/92 at Lisbon Pkwy	Consider building-up the abandoned driveway to provide for an ADA compliant landing pad at the bus stop along the east side of US 17/92 north of Lisbon Pkwy.	Transit	DeLand	FDOT
80	US 17/92 at Beresford Ave	US 17/92 begins to narrow just south of Beresford Ave, which would cause the potential marked bike lane to end before the intersection; consider transitioning the northbound bike lane to the sidewalk using a roundabout-style bike ramp treatment that would provide bicyclists with the option to continue using the travel lane or to use the sidewalk.	Pedestrian and Bicycle	DeLand	FDOT
81	US 17/92 at Beresford Ave	Consider enhancing the existing crosswalk markings to a high-emphasis/ladder style crosswalk marking.	Pedestrian and Bicycle	DeLand	FDOT
82	US 17/92 at Beresford Ave	Consider evaluating modifications to the eastbound approach to provide a thru-left lane and a right-turn only; concurrently, evaluate extending the length of the existing thru-right lane.	Operational and Geometric	DeLand	DeLand/FDOT
83	US 17/92 at Beresford Ave	Evaluate the feasibility of a modern roundabout application at this intersection. Further analysis would be needed to determine the feasibility of a roundabout.	Operational and Geometric	DeLand	FDOT
84	US 17/92 at Euclid Ave	Consider conducting a pedestrian crossing enhancement study between Beresford Ave and Voorhis Ave.	Pedestrian and Bicycle	DeLand	FDOT
85	Rich Ave at Hayden Ave	Consider providing a marked crosswalk along the northern leg of the intersection.	Pedestrian and Bicycle	DeLand	DeLand
86	Rich Ave at Hayden Ave	Consider extending the curb (bulb-out) within the southwest corner of the intersection.	Geometric	DeLand	DeLand
87	Rich Ave at Hayden Ave	Consider enhancing the existing marked mid-block crosswalk (east of Hayden Ave) with high-emphasis ladder style crosswalk markings and evaluate existing crosswalk lighting levels and enhance if necessary.	Pedestrian and Bicycle	DeLand	DeLand

Table 4: Point Alternative Recommendations (continued)

ID#	Intersection	Recommendation	Category	Location	Jurisdiction
88	Chruch St at Hayden Ave	Consider providing crosswalk signage at the existing crosswalk east of Hayden Ave and consider removing the legacy pedestrian curb ramp along the south side of Church St east of Hayden Ave.	Pedestrian and Bicycle	DeLand	DeLand
89	Hayden Ave at Church St	Consider providing crosswalk signage (W11-2) at the existing crosswalk north of Church St.	Pedestrian and Bicycle	DeLand	DeLand
90	Hayden Ave at Wisconsin Ave	Consider providing a marked crosswalk across Hayden Ave north of Wisconsin Ave.	Pedestrian and Bicycle	DeLand	DeLand
91	Wisconsin Ave at US 17/92	Check to see if crossing ~330' east of US 17/92 has been maintained after the recent resurfacing along Wisconsin Ave; if crossing remains, consider adding pedestrian (W11-2) or trail crossing (W11-15) signage on the approaches to the crossing.	Pedestrian and Bicycle	DeLand	DeLand
92	US 17/92 at University Ave	Consider enhancing the existing marked mid-block crosswalk/school crossing. Enhancements could potentially include a raised median island, pedestrian curb ramps, and potentially RRFBs (if minimum requirements are met). Also, consider evaluating existing crosswalk lighting levels and enhance if necessary.	Pedestrian and Bicycle	DeLand	FDOT
93	US 17/92 at Plymouth Ave	Evaluate the potential to extend the curb (bulb-out) within the NW quadrant, the location of the existing drainage inlet may be a challenge for this. So, alternatively evaluate the potential to provide a right-turn channelization island. Also, in either scenario consider realigning the crosswalks on the northern and western legs of the intersection to reduce the crossing distances and exposure.	Geometric	DeLand	FDOT
94	US 17/92 at Plymouth Ave	Evaluate the potential to extend the curb within the southwest quadrant to reduce the existing turn radius and reduce/remove the taper south of the intersection.	Geometric	DeLand	FDOT
95	US 17/92 at Plymouth Ave	Evaluate the eastbound left turn lane queues (demand and capacity), it appears, from limited review, that the left turn lane queues are extending into and blocking the thru-right-turn lane. If it is confirmed that there may be left turn lane capacity issues consider evaluating widening the portion of Plymouth Ave between Florida Ave and US 17/92 to accommodate a second left turn lane. In addition to this a review of the signal timing should be conducted to ensure that the phase for a dual left turn lane from eastbound Plymouth Ave to northbound US 17/92 could be accommodated.	Operational and Geometric	DeLand	FDOT
96	US 17 at US 92/International Speedway Blvd	Consider modifying/extending the sidewalk within the southeast quadrant; there is a visible path where people have been walking to the intersection from the existing sidewalk.	Pedestrian and Bicycle	DeLand	FDOT
97	US 17 at US 92/International Speedway Blvd	Evaluate extending the curb line within the southwest quadrant and realigning the crosswalk on the west side of the intersection.	Geometric	DeLand	FDOT
98	US 17 at Old Daytona Rd	Evaluate the need for extending the southbound left turn lane to better accommodate larger vehicles (trucks).	Geometric	DeLand	FDOT
99	US 17 at SR 11/Glenwood Rd	Evaluate reprofiling the southeast quadrant to provide for a channelized right-turn lane and raised island that could accommodate pedestrian facilities.	Geometric	Volusia County	FDOT
100	US 17 at SR 11/Glenwood Rd	If a right-turn island is installed consider installing a marked crosswalk along the south and east legs of the intersection utilizing the right-turn island.	Pedestrian and Bicycle	Volusia County	FDOT
101	SR 15A at Glenwood Rd	Consider wrapping the sidewalk/pedestrian landing area around the corner within each quadrant and then realigning the crosswalks to provide shorter crossing distances, bring the crossings closer to the intersection, and eliminate the angle in the crossing along the northern leg of the intersection. Also, when realigning the crosswalks consider extending the median nose (could be with paint) on the north side of the intersection and moving the southbound stop bar closer to the intersection. Additionally, consider extending the sidewalk in the northeast quadrant to provide access to the existing bus stop..	Pedestrian, Bicycle, and Geometric	Volusia County	FDOT
102	US 17 at Spring Garden Ave/SR 15A	Consider evaluating the impacts of a marked crosswalk across the northern leg of the intersection to the existing traffic signal timing/phasing. If no/minor impacts, consider providing a marked crosswalk across the northern leg of the intersection.	Pedestrian and Bicycle	Volusia County	FDOT
103	US 17 at Reynolds Rd	Consider providing a marked crosswalk across the eastern leg of the intersection.	Pedestrian and Bicycle	Volusia County	FDOT
104	US 17 at Baxter St/Ponce Deleon Blvd	Consider providing enhancements to the existing school crossing; could include evaluating existing lighting levels, evaluation of need for additional signage, and evaluate potential to enhance with side/overhead mounted RRFBs.	Pedestrian and Bicycle	Volusia County	FDOT
105	US 17 at Baxter St/Ponce Deleon Blvd	Consider evaluating reconfiguring the northbound left turn lane to eliminate northbound left turns onto Baxter St and reconstructing the raised median separator to the north to the intersection with Ponce Deleon Blvd.	Operational	Volusia County	FDOT
106	US 17 at Baxter St/Ponce Deleon Blvd	Consider evaluating the potential feasibility for a modern 5-legged roundabout at this location. Further engineering analysis would be needed to determine feasibility.	Geometric and Operational	Volusia County	FDOT

Table 4: Point Alternative Recommendations (continued)

ID#	Intersection	Recommendation	Category	Location	Jurisdiction
107	Baxter St at Grand Ave	Consider providing a marked crossing across Baxter St from the Spring to Spring Trail to the sidewalk along the north side of Baxter St. This could help increase the visibility of the trail crossing and could help guide trail users to US 17 via the sidewalk along Baxter St.	Pedestrian and Bicycle	Volusia County	Volusia
108	US 17 at SR 40	Consider installing a marked crosswalk (and pedestrian countdown signals) along the northern leg of the intersection in advance of the planned US 17 roadway widening project; may require right-of-way or the reprofiling of the driveways to the existing gas station within the northwest quadrant of the intersection.	Pedestrian and Bicycle	Volusia County	FDOT
109	US 17 at 2nd Ave	Consider evaluating the potential for a modern roundabout. Further engineering analysis would be needed to determine feasibility. This intersection has been identified as a critical intersection for the Town of Pierson in previous planning efforts; a roundabout at this location in conjunction with a potential roundabout at US 17 and Washington Ave could help to calm traffic through Pierson and could serve as potential gateway features.	Geometric and Operational	Pierson	FDOT
110	US 17 at Washington Ave	Consider evaluating the potential for a modern roundabout. Further engineering analysis would be needed to determine feasibility.	Geometric and Operational	Pierson	FDOT
111	Washington Ave at Chipper Jones Ln	If a sidewalk is constructed along the south side of Washington Ave evaluate installing a marked crossing across Washington Ave from the sidewalk to the entrance of the park/Chipper Jones Ln.	Pedestrian and Bicycle	Pierson	Pierson/Volusia
112	US 17 at Palmetto Ave	Monitor the development of relocating Pierson Elementary School and consider exploring opportunities to provide multimodal connections to the school site (e.g., sidewalk or multi-use trail connections along US 17 from Washington Ave to the school site entrance).	Pedestrian and Bicycle	Pierson	FDOT
113	US 17 at Clayton Ave/Bunnell Rd	Consider evaluating providing marked crosswalks along US 17 across Clayton Ave/Bunnell Rd. There is a flashing yellowing traffic signal for the north/south traffic along US 17, traffic along Clayton Ave/Bunnell Rd have a stop sign along with a flashing red traffic signal.	Pedestrian and Bicycle	Volusia County	FDOT

EVALUATION CRITERIA

A planning-level evaluation of each recommended alternative was performed to determine the relative priority of each potential alternative based on the criteria and measures that were presented in the second technical memorandum (Corridor Character Districts and Evaluation Criteria). To compare the various alternatives against each other a point system for the evaluation criteria and measures was developed, but based on discussions with the study stakeholders it was determined that a simplified evaluation of the alternatives based on implementation factors (timeframe, level of effort, magnitude of cost) would be appropriate for this stage of the recommendation development. One of the main reasons for this determination is that due to the range of project types and mixture of linear and point recommendations, the evaluation of the alternatives is an imperfect process and one that should evolve as the recommendations begin to move into engineering, design, and implementation phases. Further, note that it is also possible that various recommendations could be regrouped and combined as specific design and contracting approaches are advanced, and that this could impact the scoring and evaluation of the identified recommended alternatives. Ultimately the prioritization of the recommendations as projects should be done through the TPO's formal project prioritization process after projects have been submitted to the TPO. More information on the evaluation process, criteria and measures, and evaluation results can be found in both Technical Memorandum #2 and #3.

ACTION PLAN

This section is focused on potential implementation steps for the identified alternative recommendations. This section suggests strategies to move identified alternatives forward into the implementation phase. The study's alternative recommendations primarily focused on mobility and safety enhancements for pedestrians, bicyclists, transit users, and motorists. With a few exceptions most of the recommendations from the study could be considered shorter-term projects that were conceived in such a manner as to require little or no right-of-way acquisitions or environmental impacts. If upon further evaluation it is established that significant right-of-way acquisitions or environmental impact analyses are needed, the feasibility and/or priority of the recommendations may be impacted and may need to be considered as more of a longer-term option.

Corresponding with the flow-chart shown in Figure 9, the action/implementation process for the alternative recommendations incorporates the following steps:

Verify Project Extents and Grouping – There may be opportunities to regroup and/or combine recommendations for more efficient implementation. For example, "spot" signage and pavement marking upgrades included in a "linear" project could also be implemented using state or local agency maintenance contracts with a follow-on project to complete a sidewalk or bike lane component of the recommendation. It may also be expedient to combine multiple similar projects under one work program item to reduce administrative overhead associated with project design, construction contracting, and project management. It is anticipated that FDOT, the TPO, and the local agencies will coordinate to determine appropriate recommendation (re)grouping.

Determination of Implementation Mechanism – As previously suggested, some recommendations may not require a formal design phase and could be implemented using maintenance forces or "push-button" contracts. Push-button contracts are pre-existing construction contracts that provide for construction of a narrow range of items on a work-order basis using pre-negotiated bid item prices. Examples of work that could be completed using maintenance or push-button contracts include bus stop relocation or shelter installation, spot lighting enhancements, and sign and pavement marking upgrades. Signal timing/phasing adjustments can also be accomplished through work-orders (provided the existing signal infrastructure can support the recommended modifications).

Preliminary Project Report and LRE Cost Estimate – Generally, the next step for projects that cannot be implemented using maintenance or push-button mechanisms is to perform a field review and develop a Preliminary Project Report (PPR) that will identify fatal flaws, general project parameters, need for design standard variances or exceptions, recommended community engagement process, and potential drainage and environmental permitting requirements. As part of the PPR, FDOT (or other responsible

agency) would also prepare a more specific cost estimate, preferably using FDOT's Long Range Estimating (LRE) system. The LRE uses estimated quantities for various construction bid-items and is more accurate than other planning cost estimate tools.

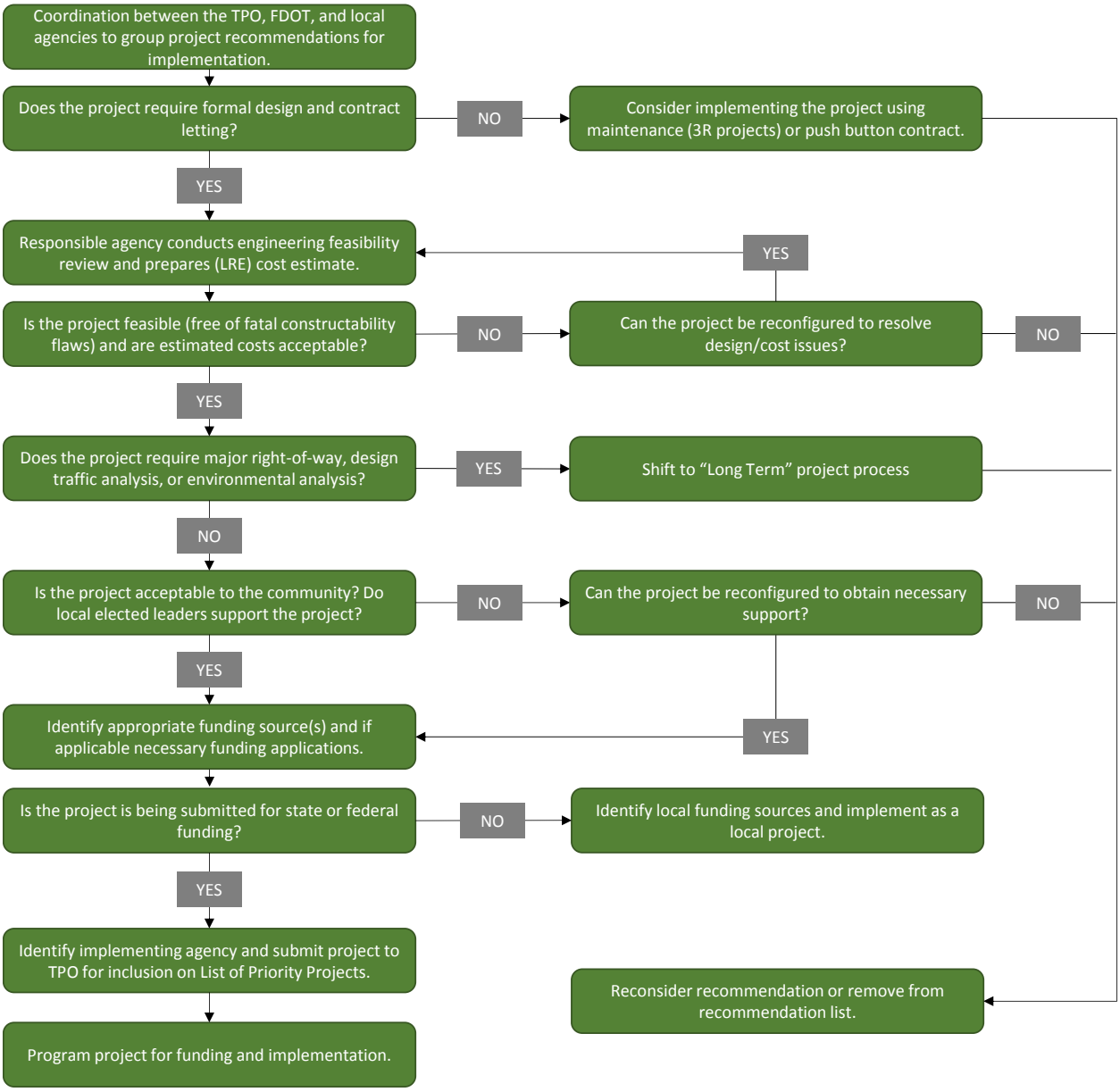


Figure 9: Example Action/Implementation Process

Determination of Project Feasibility and Acceptable Cost – Based on the PPR and LRE cost estimates, issues may be identified that were not apparent in the conceptual project development process. These could include significant drainage or sub-surface utility impacts, unforeseen impacts to canopy trees, or right-of-way needs that will incur total takings or business damages. While no project is "unbuildable," significant feasibility issues may impact project cost and complexity to the extent that a determination may be made on the part of the TPO, in conjunction with FDOT and the subject local agency, that pursuing the recommended project is not an appropriate use of resources. In this event, it may be necessary to either modify the project to eliminate the feasibility issue, move the project into a longer-term category for evaluation in the future, or remove the project from the list.

Determination of Project Complexity – Some projects may be cost-feasible in general, but through the PPR process, it may be determined that additional study or analysis is necessary before the project can be programmed. For example, if a recommended project requires significant right-of-way acquisition (that cannot be assembled up-front by the local partner), cannot be processed through NEPA as a categorical exclusion (will require an Environmental Assessment), or will require significant design traffic or traffic operational analysis, then the action or implementation task should be subsequent analysis or documentation rather than implementation of the recommended project.

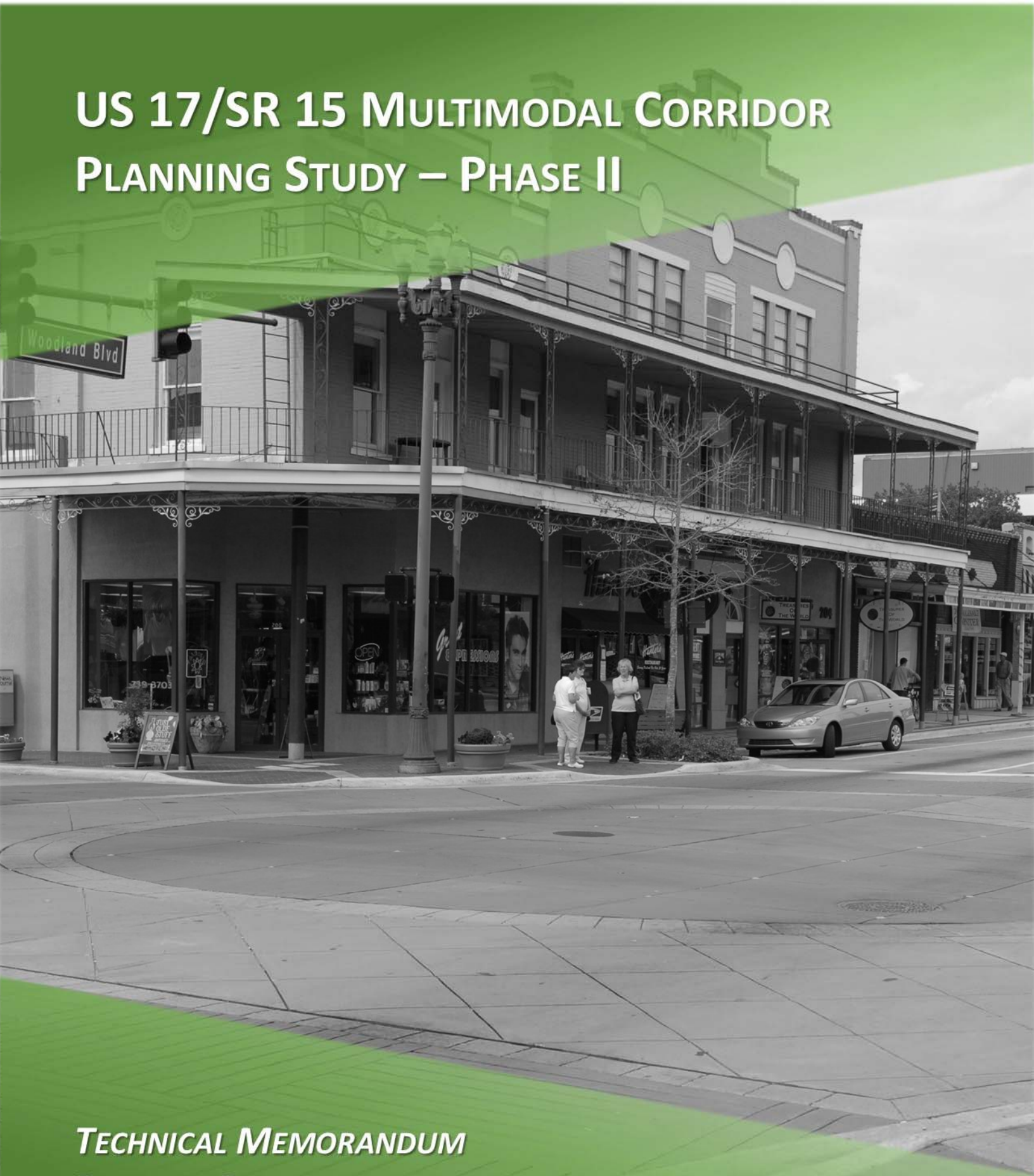
Determination of Community Support – If a project is generally feasible and does not require significant additional preliminary engineering/analysis work, then the next step in the implementation process is to verify that the recommended project is acceptable to the public and to the elected leadership of the subject community, it is generally recommended that project-specific coordination takes place prior to expending funds necessary to design and construct the project recommendations. As part of the PPR process, a community awareness plan should be developed that should include a determination of who (which agency) will be responsible for public outreach, what sort of public outreach activities shall be completed, and what sort of formal action shall be required from any local agency (board, council, commission, etc.) prior to programming the project for design and construction. In most circumstances, a project that is not supported by the community and its elected officials should not be the subject of additional project development effort; however, there may be instances when a project is sufficiently important to the region as a whole that further project development and public engagement work may be merited despite initial opposition.

Project Funding and Programming – Once a project has been vetted for constructability/cost-feasibility and accepted by the community, the next step is to identify potential funding sources for the project and prepare and submit any necessary funding applications. If the project is to be funded using local funds then appropriate funds should be identified and the project scheduled for specific implementation phases.

If the project is to be funded using state or federal funds the project would need to be submitted to the TPO as a candidate for inclusion on the TPO's List of Priority Projects (LOPP). Once included on the LOPP, the next step is to establish the project as a specific funded project in FDOT's 5-year work program. As part of establishing the project in the District Work Program, specific schedule points for formal scoping, design, and letting for construction will be established and can be updated and monitored as needed.

Determination of Production Approach and Final Disposition of the Project – If the project is on a State highway right-of-way, then FDOT will be responsible for project implementation. If the project is on a city or county road right-of-way, then the appropriate agency will be responsible for any needed coordination and/or agreements to move the recommendation towards implementation, this could include coordination with FDOT to enter into a LAP agreement. Finally, the project should be programmed for funding and implementation by either FDOT or the appropriate local agency, if for some reason the project is determined not suitable for project implementation then the project should either be reconsidered, saved for a later date, or eliminated from the recommended alternatives list.

US 17/SR 15 Multimodal Corridor Planning Study – Phase II



Technical Memorandum

Baseline Conditions

August 2016

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TECHNICAL MEMORANDUM #1 – BASELINE CONDITIONS

INTRODUCTION

Phase II of the US 17/SR 15 Multimodal Corridor Planning Study (hereinafter referred to as the US 17 Corridor Study) is intended to identify ways to maintain and improve safety and mobility while identifying opportunities to create a more secure and comfortable environment for all users of the US 17 corridor. Building on the findings of the Phase I Study, this Phase will help to determine the most effective way for US 17 to serve all users and modes of transportation within the corridor. Phase II will help to ensure the transportation investments best position the Florida Department of Transportation (FDOT) to address local government challenges in incorporating livability and sustainability as critical considerations in transportation planning and decision-making. Ultimately, Phase II of the US 17 Corridor Study, will identify and develop a set of recommendations intended to improve the safety and mobility of all users in the corridor.

Purpose of this Technical Memorandum

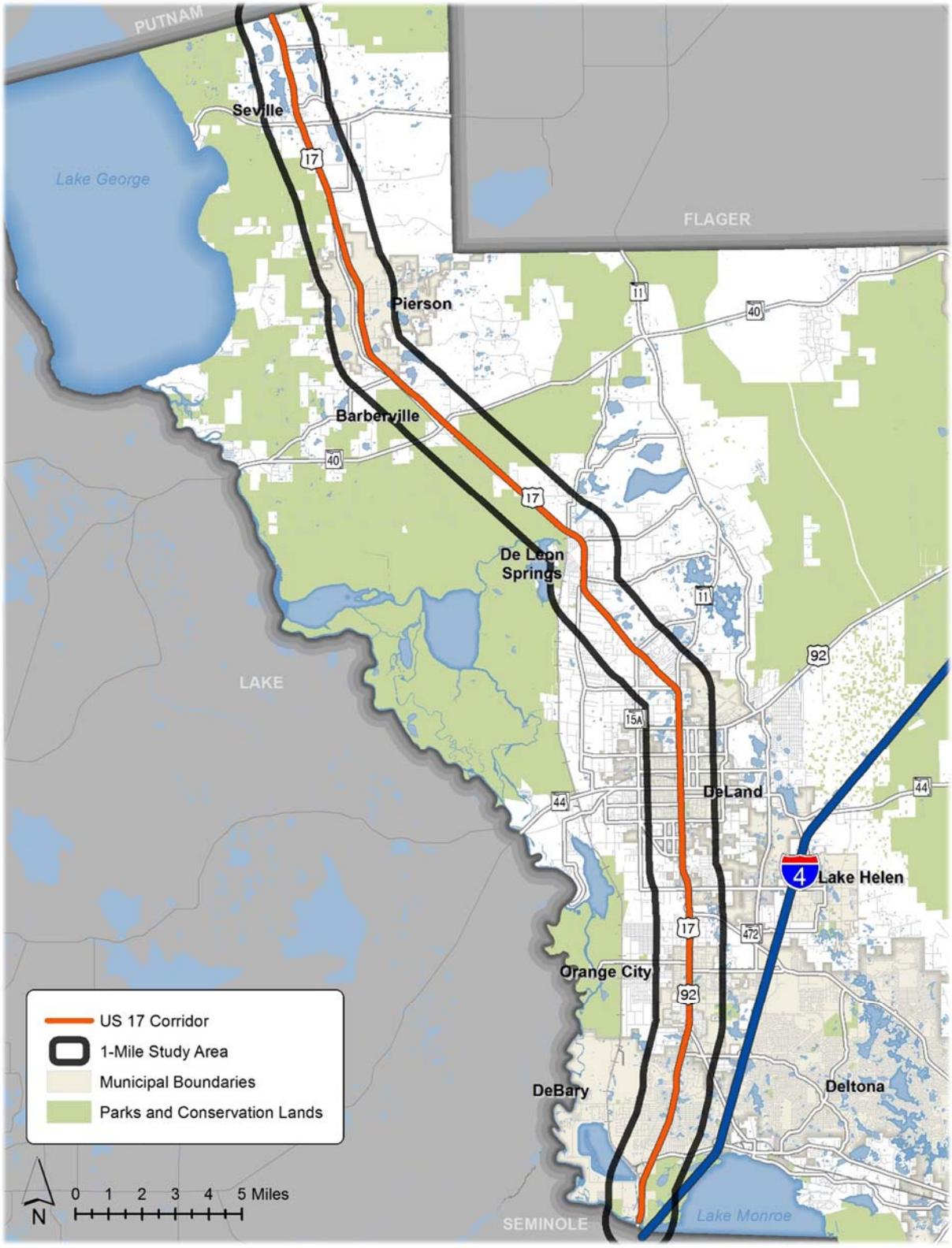
This technical memorandum serves as a means to identify and document the existing and projected conditions within the US 17 corridor, and where applicable will integrate the data and information compiled from the Phase I Study. The data and information provided within this memorandum will serve as the basis for the definition of corridor context/character districts and for the development of alternatives to improve safety and mobility later in the study process.

An evaluation of the existing conditions within the US 17 corridor was undertaken to better understand the multimodal infrastructure and operating conditions, as well as the land use and socioeconomic context within the corridor. The elements of this evaluation have been organized into the following sections:

- Roadway and Traffic Conditions
- Multimodal Network Evaluation
- Transit Service Evaluation
- Crash History Analysis
- Land Use/Socioeconomic Evaluation

Study Area

The US 17 corridor is approximately 41 miles long and extends from the Seminole County line north to the Putnam County line. The corridor traverses through the cities of DeBary, Orange City, DeLand, and Pierson as well as through portions of unincorporated Volusia County, including DeLeon Springs, Barberville, and Seville. For the purposes of this study, the US 17 corridor will include the areas and roadways within an approximate 1-mile buffer of US 17. Map 1 depicts the general study area for Phase II of the US 17 Corridor Study.



Map 1: US 17 Corridor Study Area

ROADWAY AND TRAFFIC CONDITIONS

The roadway and traffic conditions described in this section provide a summary of the following characteristics and conditions along the US 17 corridor:

- Roadway Designations
- Roadway Sections
- Traffic Conditions

Roadway Designations

Functional Classification

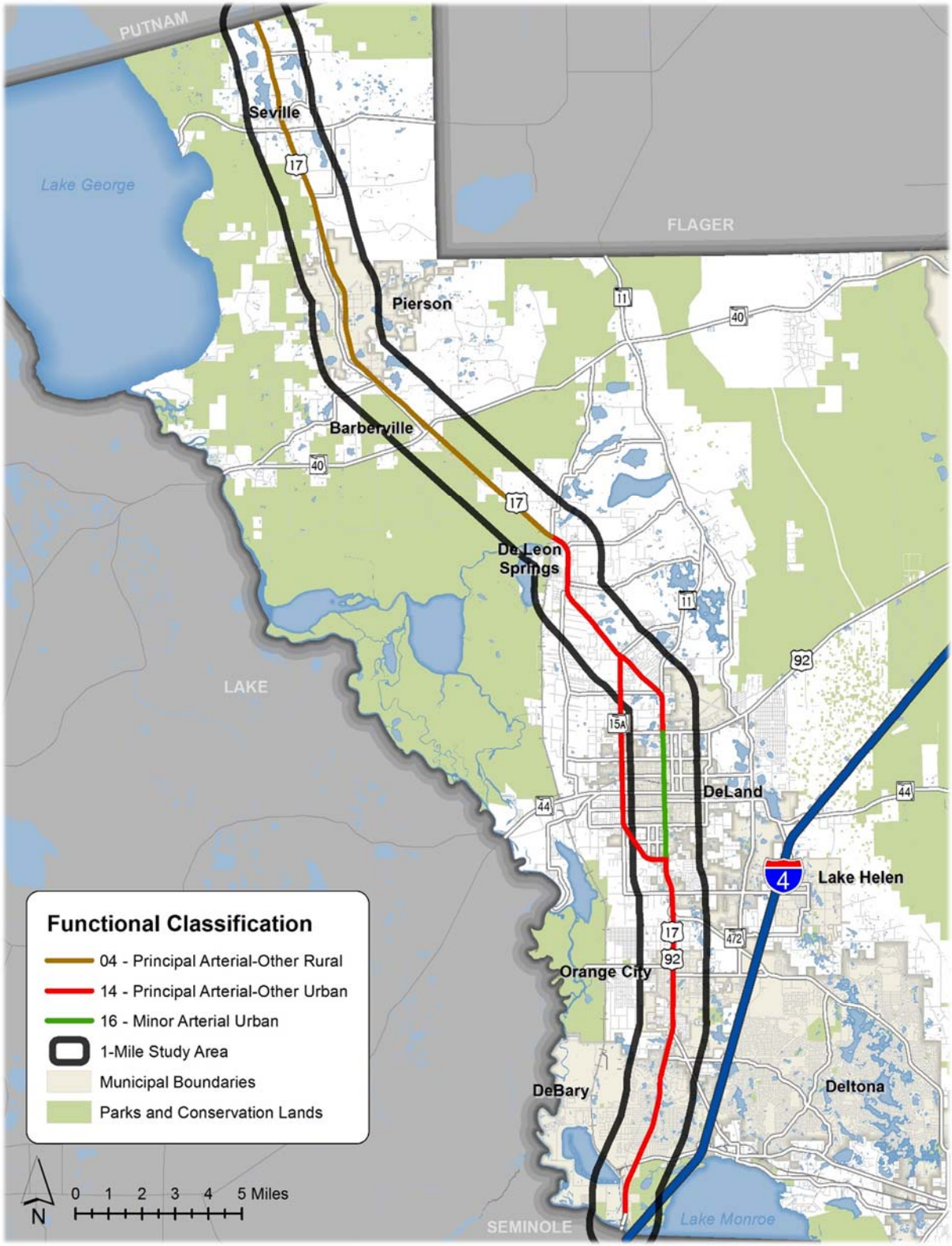
The primary purpose of roadway functional classification is to establish the relative importance of a roadway in the overall hierarchy of roadways.[1] Roadways are periodically grouped into classes according to the character of service that they provide. Map 2 illustrates the current functional classification of US 17 throughout the corridor study area. As shown, US 17 is divided into the following three classifications:

- Urban Principal Arterial – serve the major centers of activity of a metropolitan area, have the highest traffic volume corridors, and the longest trip desires; and should carry a high portion of the total urban area travel on a minimum of mileage. They carry most trips entering and leaving urban areas, and provide continuity for rural principal arterials that intercept urban boundaries.
- Rural Principal Arterial – typically link nonadjacent urbanized areas and provide an integrated network of continuous routes without stub connections (dead ends).
- Urban Minor Arterial – typically provides service for trips of moderate length and at a lower level of through traffic movement than principal arterials. They connect with urban principal arterial roads and rural collector routes

Access Classification, Speed Limit, and SIS Designation

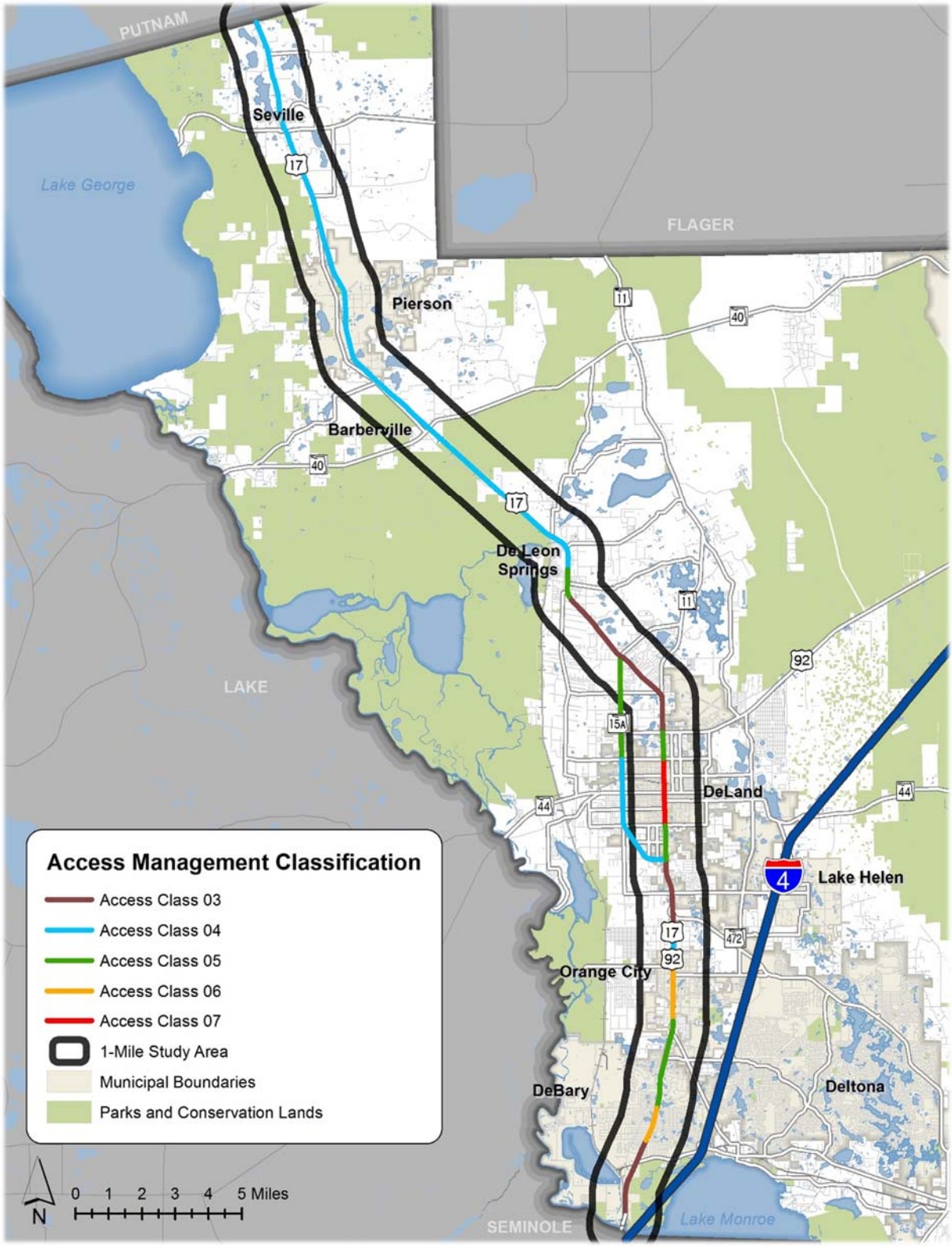
The Phase I Study identifies and discusses the many of the other various roadway designations along the US 17 corridor. Included in Phase I is a detailed review of access management standards, posted speed limit, and a detailed discussion on strategic intermodal system (SIS) designations and planning for SIS facilities. Map 3 through Map 5 provide an overview of these designations.

[1] FDOT Urban Boundary and Functional Classification Handbook. February 2013



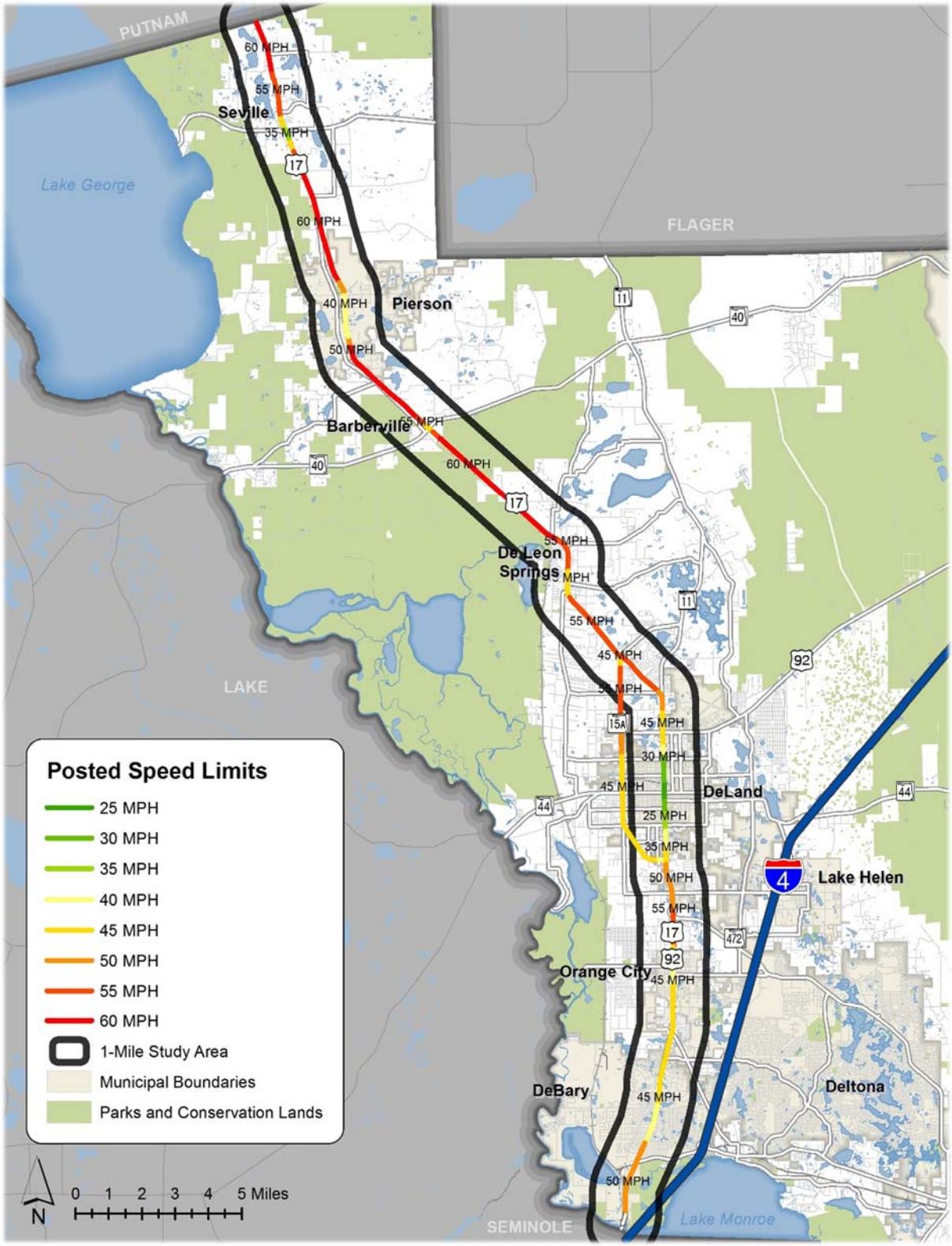
Data Source: FDOT Traffic Statistics Office

Map 2: US 17 Roadway Functional Classification



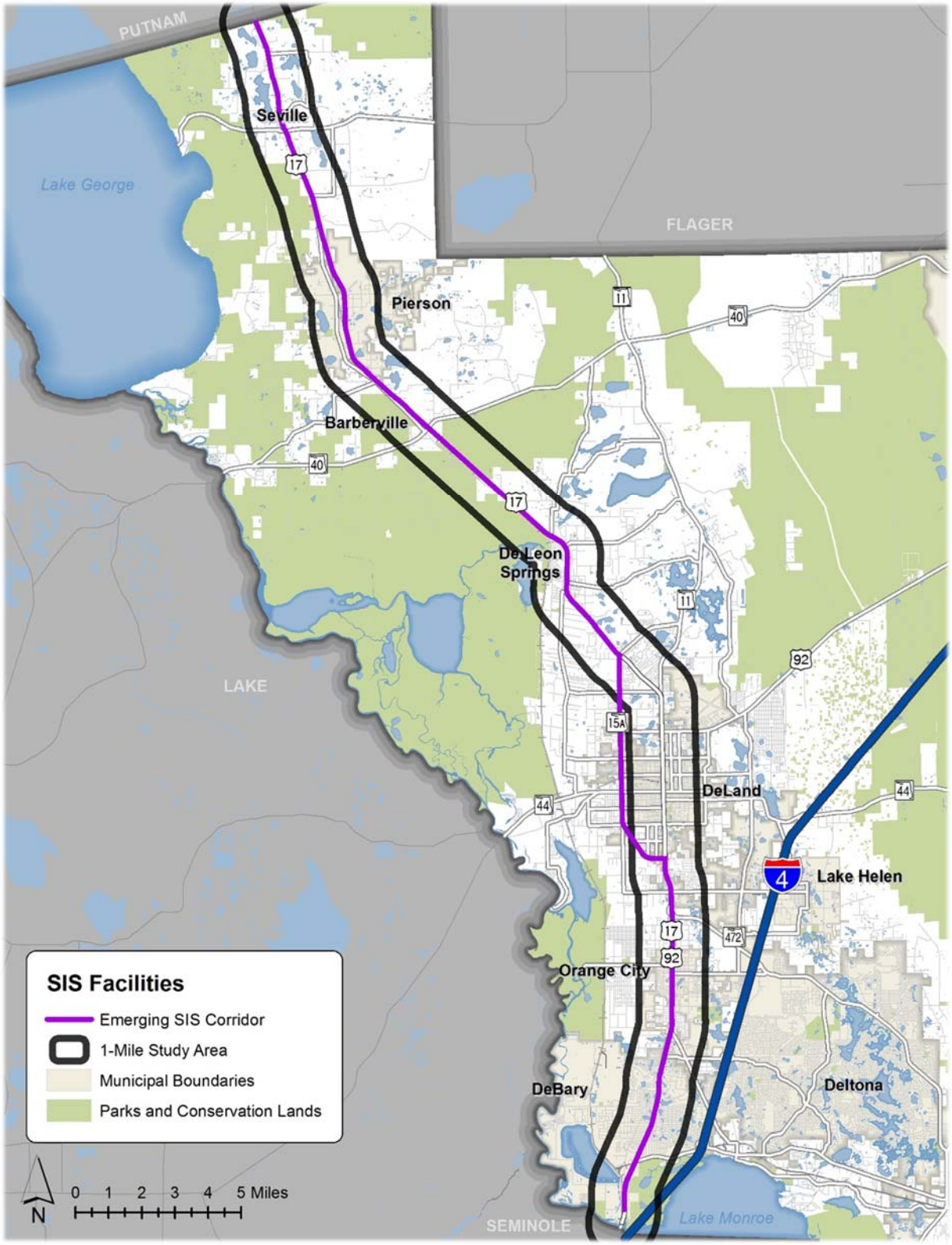
Data Source: FDOT Traffic Statistics Office

Map 3: US 17 Roadway Access Classification



Data Source: FDOT Traffic Statistics Office

Map 4: US 17 Posted Speed Limit



Data Source: FDOT Traffic Statistics Office

Map 5: SIS Designation

Roadway Sections

The Phase I Study identified 19 differing sections along the corridor; these sections were identified based on the function of the roadway and identification of transit and other modes of travel. Map 6 illustrates these 19 different sections along the corridor. The Phase I Study identified and documented the existing conditions for each of these 19 segments and recognized that the corridor is far from uniform in character. Figure 1 through Figure 3 provide an example of how the corridor's typical roadway cross-section varies from the southern end in DeBary, DeLand, and the northern portion in Pierson. Appendix A contains existing typical roadway cross-section for each of the 19 roadway sections identified in the Phase I Study.

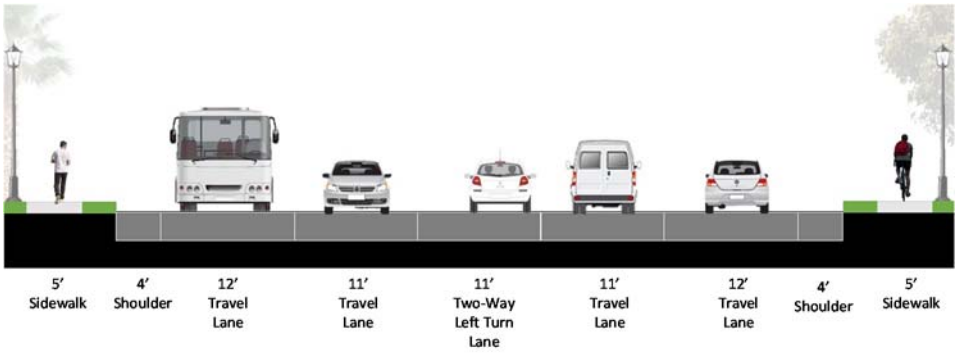


Figure 1: US 17 Typical Section – south of Highbanks Rd (DeBary)

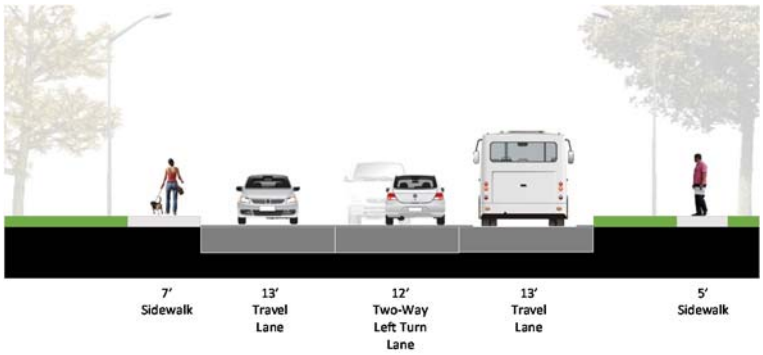


Figure 2: US 17 Typical Section – north of Beresford Ave (DeLand)

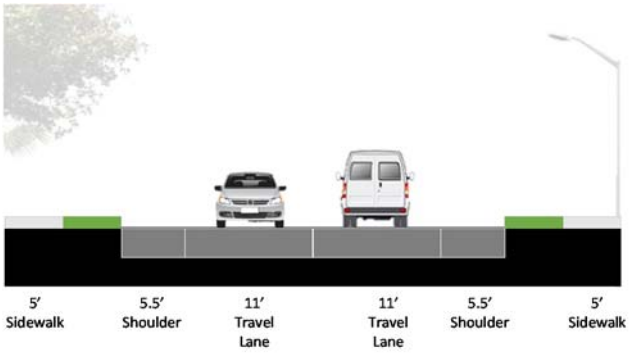
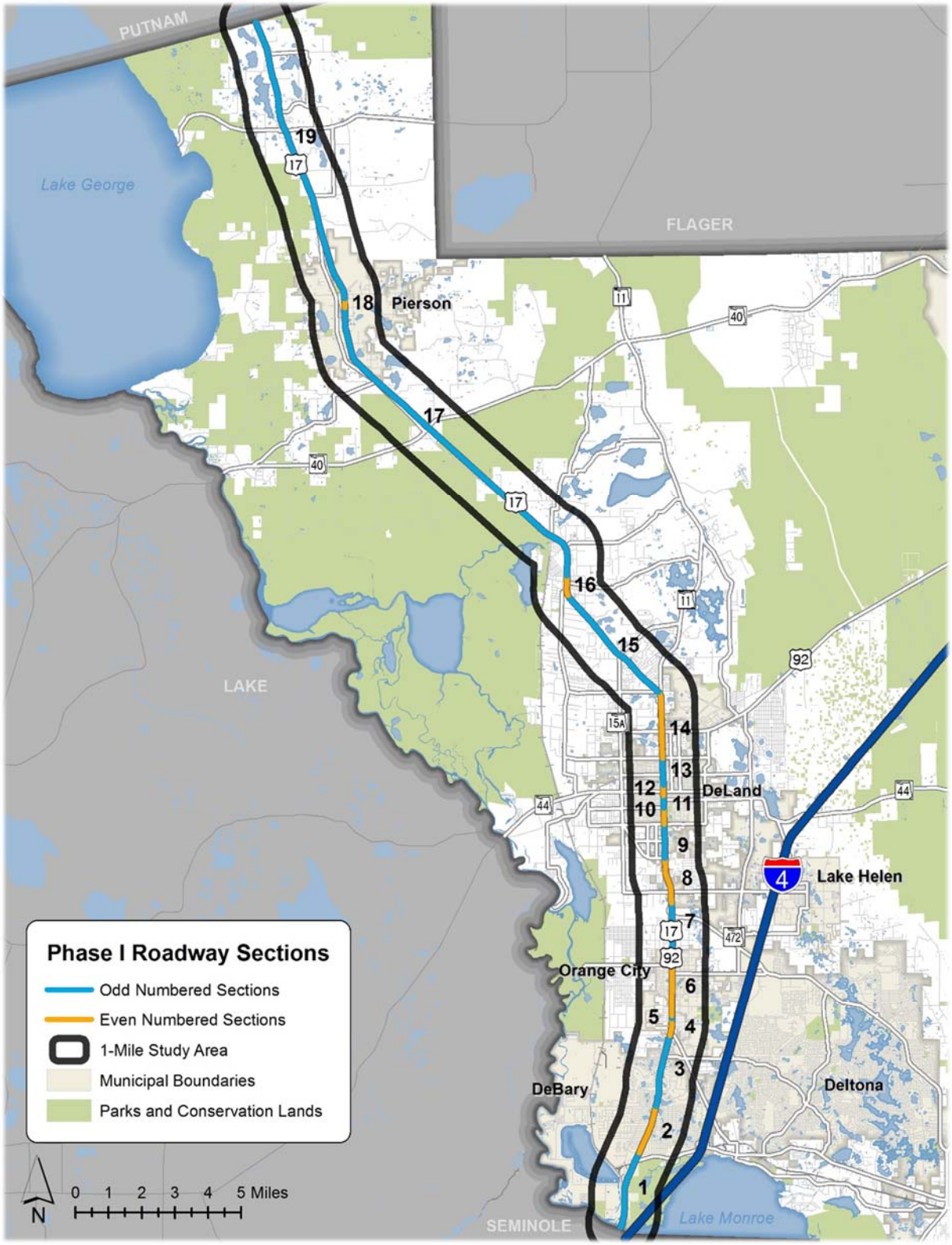


Figure 3: US 17 Typical Section – between 2nd Ave and 1st Ave (Pierson)



Map 6: US 17 Phase I Study Roadway Sections

Traffic Conditions

A comprehensive review of traffic volumes along the corridor was performed. Map 7 shows the existing Annual Average Daily Traffic (AADT) volumes along the corridor. The AADTs in Map 7 represent 2014 values obtained from the FDOT Transportation Statistics Office (TSO). Appendix B contains a series of graphs showing the historical AADT volumes for many corridor segments; these figures provide insight into the change in traffic volumes along the corridor.

Existing volume-to-capacity (V/C) ratios along the corridor were analyzed using data from Volusia County's 2014 Average Annual Daily Traffic and Historical Counts report. V/C is a measure that compares roadway demand (volume) with roadway supply (capacity) and is used to reflect mobility and quality of travel; Table 1 shows how V/C ratios generally relate to level of service (LOS). Map 8 illustrates the existing V/C ratios along the corridor. As shown, the roadway sections with the highest existing V/C ratios are the portion through central DeLand and the section between Lake Winona Road and SR 40 in the Barberville area. Table 2 is a summary of the existing (2014) AADTs, V/C Ratios, and LOS for select locations along the corridor. Note that capacity and LOS are calculated based on the adopted LOS capacity (which incorporates factors such as area type and facility type) of the roadway and that this does not necessarily reflect actual physical capacity.

Table 1: Volume-to-Capacity Definitions

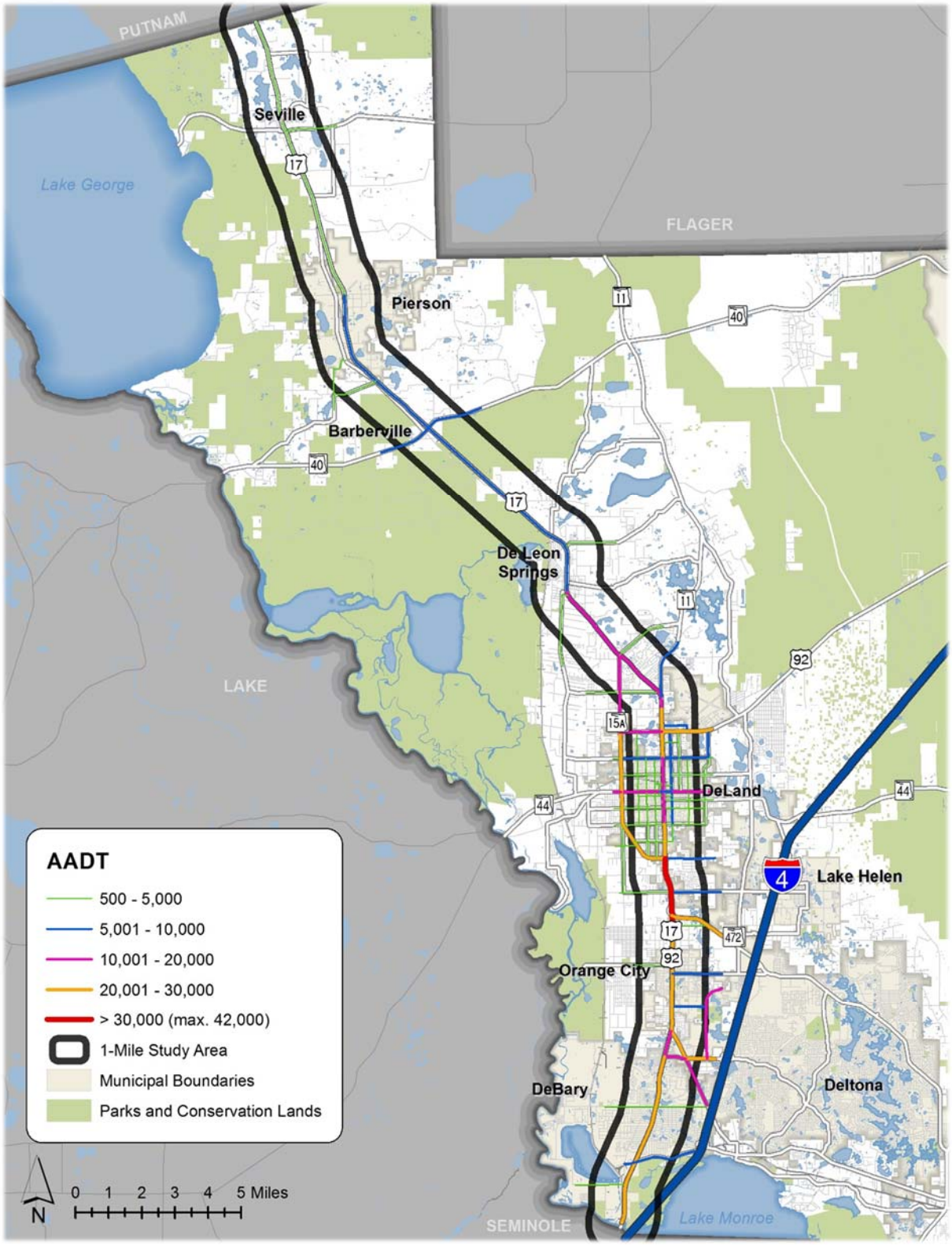
V/C Ratio	Definition	LOS
0.0 - 0.34	Free-flow conditions.	A
0.35 - 0.50	Stable flow, operating speeds begin to be restricted.	B
0.51 - 0.74	Stable flow, operating speeds and maneuverability becoming restricted; occasional backups.	C
0.75 - 0.89	Approaching unstable flow; speeds are tolerable, but maneurverability is restricted; some drivers may experience intersection delay.	D
0.90 - 0.99	Approaching capacity; unstable flow with stoppages of momentary duration; maneuverability severely limited.	E
> 1.00	Forced flow conditions; stoppages for long periods; low operating speeds.	F

Table 2: 2014 Traffic Count Summary

Roadway Segment	Number of Lanes	AADT	Allowable LOS	LOS Capacity	V/C Ratio	LOS
US 17/92, Seminole Co. to Barwick Rd	4	22,500	D	37,900	0.59	C
US 17/92, Barwick Rd to Ft Florida Rd	4	22,500	D	37,900	0.59	C
US 17/92, Ft Florida Rd to Dirksen Dr	4	24,000	D	37,900	0.63	C
US 17/92, Dirksen Dr to Valencia Rd	4	21,000	D	37,900	0.55	C
US 17/92, Valencia Rd to Highbanks Rd	4	21,500	D	37,900	0.57	C
US 17/92, Highbanks Rd to DeBary Plantation Blvd	4	23,000	D	37,900	0.61	C
US 17/92, DeBary Plantation Blvd to Saxon Blvd	4	25,500	D	37,900	0.67	C
US 17/92, Saxon Blvd to Enterprise Rd	4	18,600	D	39,800	0.47	C
US 17/92, Enterprise Rd to Rhode Island Ave	4	29,000	D	39,800	0.73	C
US 17/92, Rhode Island Ave to Graves Ave	4	27,500	D	39,800	0.69	C
US 17/92, Graves Ave to New York Ave	4	27,500	D	39,800	0.69	C
US 17/92, New York Ave to SR 472	4	25,000	D	39,800	0.63	C
US 17/92, SR 472 to SR 15A/Taylor Rd	6	42,000	D	59,900	0.70	C
US 17/92, SR 15A/Taylor Rd to Beresford Ave	4	27,500	E	42,190	0.65	C
US 17/92, Beresford Ave to Euclid Ave	2	16,400	E	16,380	1.00	F
US 17/92, Euclid Ave to SR 44/New York Ave	2	14,800	E	15,600	0.95	D
US 17/92, SR 44/New York Ave to Plymouth Ave	2	15,500	NA	19,150	0.81	NA
US 17/92, Plymouth Ave to US 92/Int'l Spdwy Blvd	4	21,000	E	42,190	0.50	C
US 17, US 92/Int'l Spdwy Blvd to Mercers Ferney Rd	4	29,000	E	42,190	0.69	C
US 17, Mercers Ferney Rd to Glenwood Rd	4	19,500	D	39,800	0.49	C
US 17, Glenwood Rd to SR 15A/CR 15A	4	13,500	D	39,800	0.34	C
US 17, SR 15A/CR 15A to Reynolds Rd	4	16,200	D	51,800	0.31	B
US 17, Reynolds Rd to Spring Garden Ranch Rd	2	10,000	D	17,000	0.59	C
US 17, Spring Garden Ranch Rd to Lake Winona Rd	2	7,400	D	12,750	0.58	B
US 17, Lake Winona Rd to SR 40	2	7,400	C	8,400	0.88	C
US 17, SR 40 to Washington Ave	2	5,500	C	16,400	0.34	B
US 17, Washington Ave to CR 305/Lake George Rd	2	4,400	C	16,400	0.27	B
US 17, CR 305/Lake George Rd to Putnam County	2	4,200	C	8,400	0.50	B
US 17, N. of Volusia/Putnam Co. Line	2	5,100	C	8,400	0.61	C
SR 15A, US 17/92 to New Hampshire Ave	4	21,000	D	37,900	0.55	C
SR 15A, New Hampshire Ave to Beresford Ave	4	20,100	D	37,900	0.53	C
SR 15A, Beresford Ave to SR 44/New York Ave	4	22,000	D	37,900	0.58	C
SR 15A, SR 44/New York Ave to Plymouth Ave	4	25,000	D	37,900	0.66	C
SR 15A, Plymouth Ave to CR 92	4	20,800	D	37,900	0.55	C
SR 15A, CR 92 to Glenwood Rd	4	13,400	D	37,900	0.35	C
SR 15A, Glenwood Rd to US 17	4	10,500	D	37,900	0.28	C

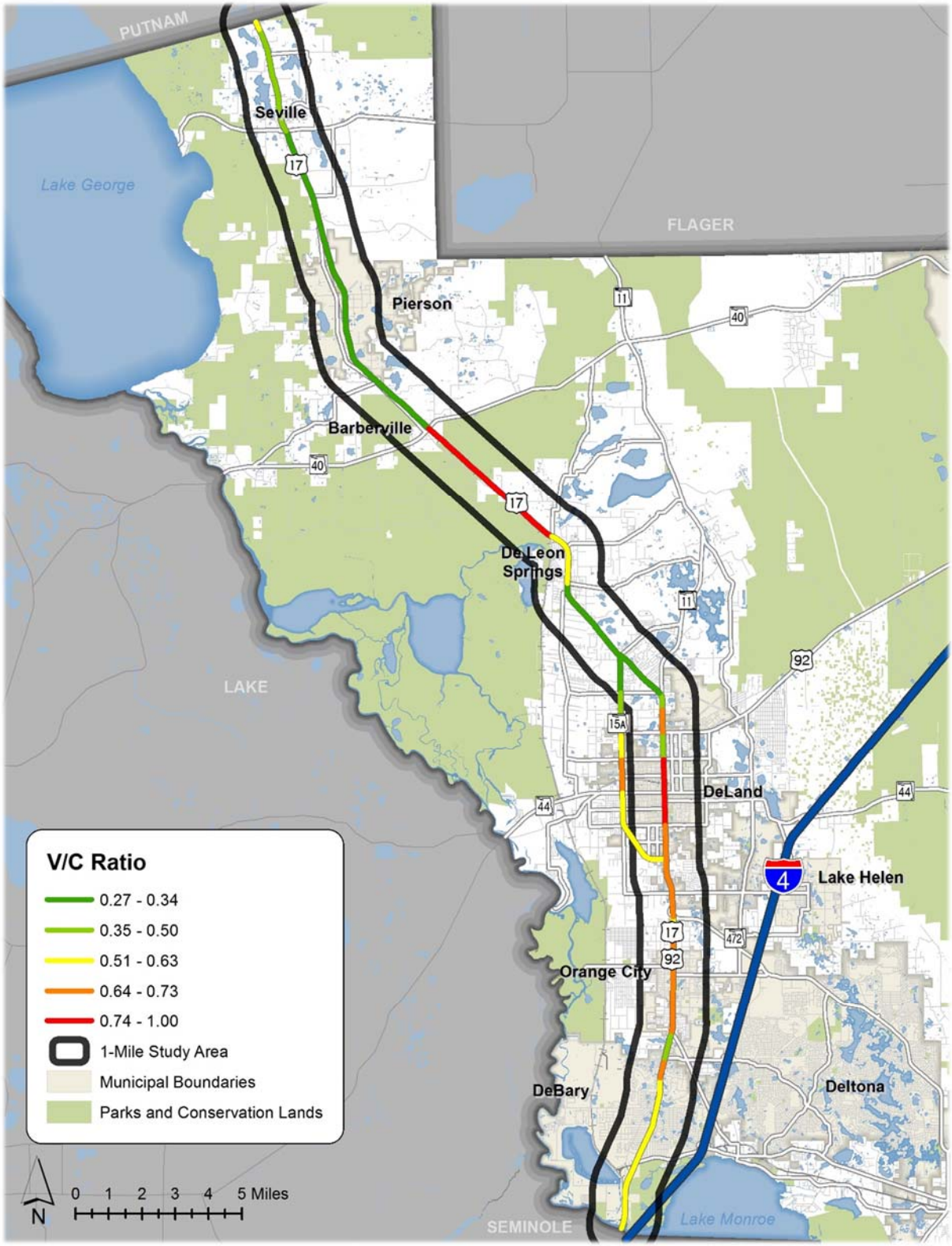
Data Source: Volusia County 2014 Average Annual Daily Traffic & Historical Counts Report

Future V/C ratios along the corridor were calculated using projected traffic volumes and capacities from the 2040 Long Range Transportation Planning (LRTP) transportation model. Map 9 shows the projected 2040 V/C ratios along the corridor. As evident, the sections of US 17 from DeLand south are projected to see an increase in V/C ratios, with many segments approaching or exceeding a V/C ratio of 1.00.



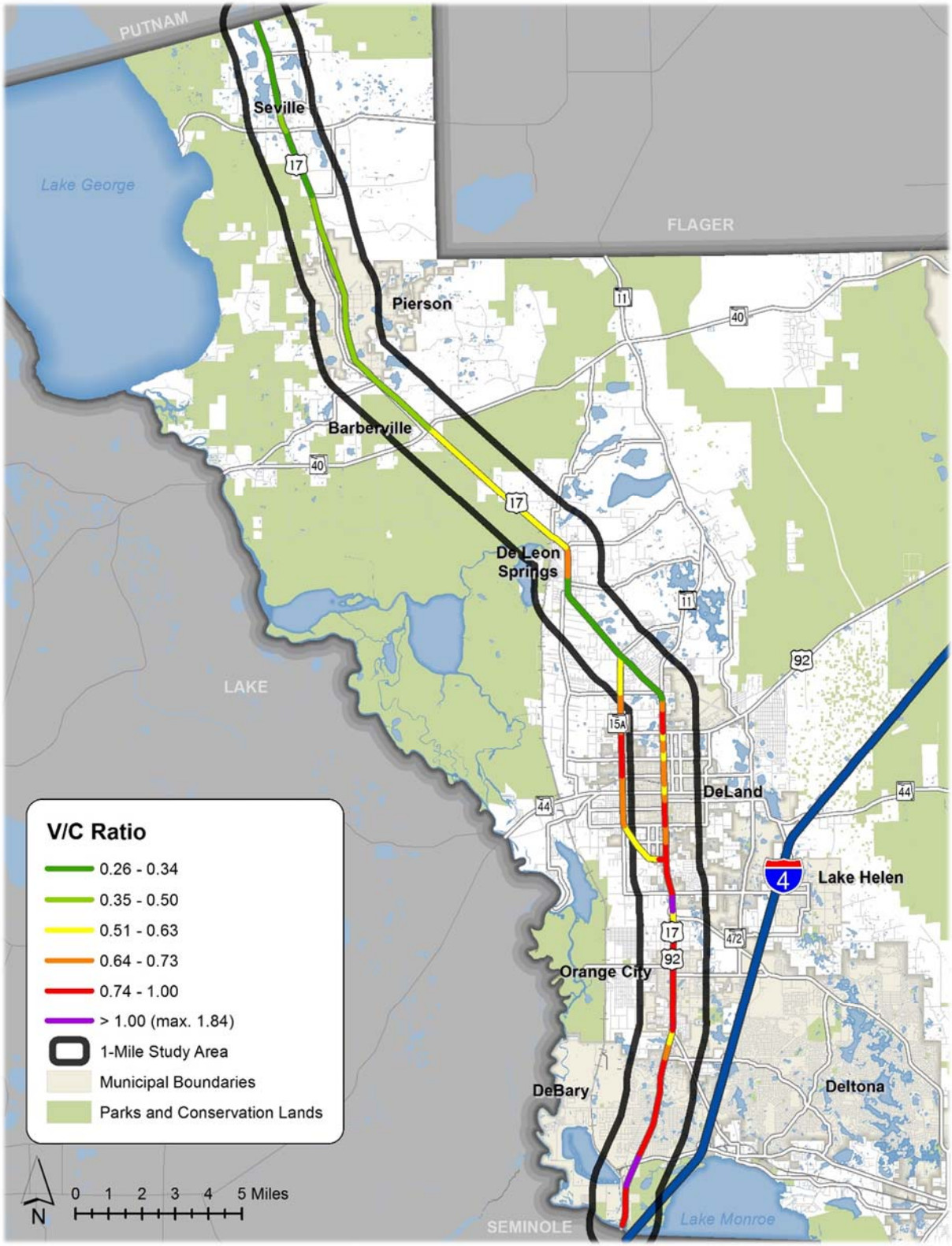
Data Source: FDOT Traffic Statistics Office

Map 7: US 17 Existing Traffic Volume (AADT)



Data Source: Volusia County 2014 AADT Report

Map 8: US 17 Existing Volume-to-LOS Capacity Ratios

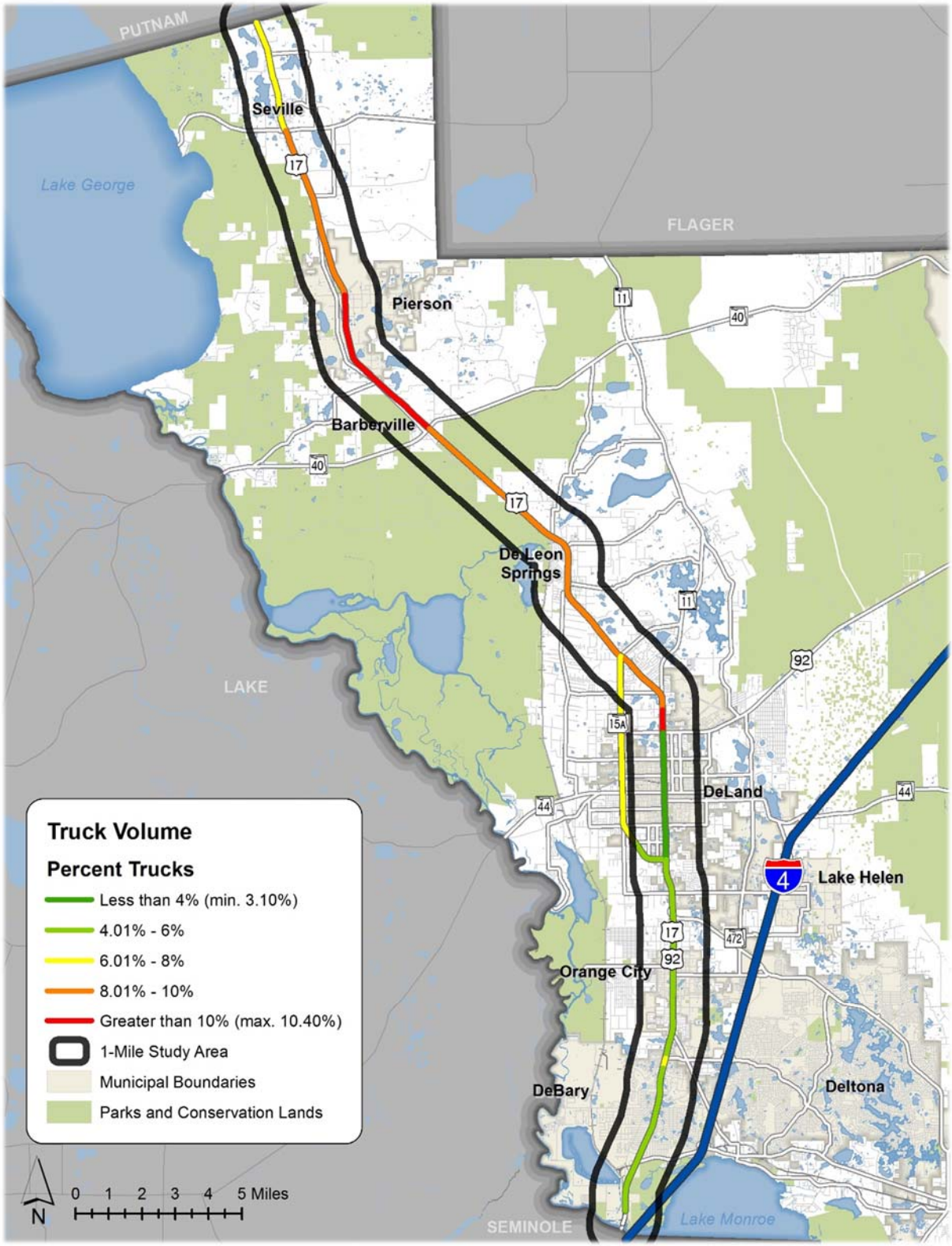


Data Source: R2CTPO

Map 9: US 17 Projected 2040 Volume-to-LOS Capacity Ratios

Truck Traffic

The US 17 corridor has long been recognized as a key corridor for truck/freight traffic, especially within the northern portions of the corridor. While accommodating larger vehicles should always be a consideration, because of the importance of the corridor to truck traffic, it is important to recognize the needs of larger vehicles when considering multimodal enhancement strategies and options. To better understand the amount of truck traffic within the corridor the percentage of total traffic (AADT) that is from larger trucks is shown in Map 10. Statewide along non-interstate arterial roadways, like the US 17 corridor, the average percentage of truck traffic is typically somewhere between 5 and 6 percent, as shown in Map 10 there are portions of the corridor that have higher than average percent truck traffic, with the segments between US 92/International Speedway Boulevard and Mercers Fernery Road and SR 40 and Washington Avenue (in Pierson) having the highest percentage of truck traffic at 10.4 percent.



Data Source: FDOT Traffic Statistics Office

Map 10: Percent Truck Traffic

Intersection Operations

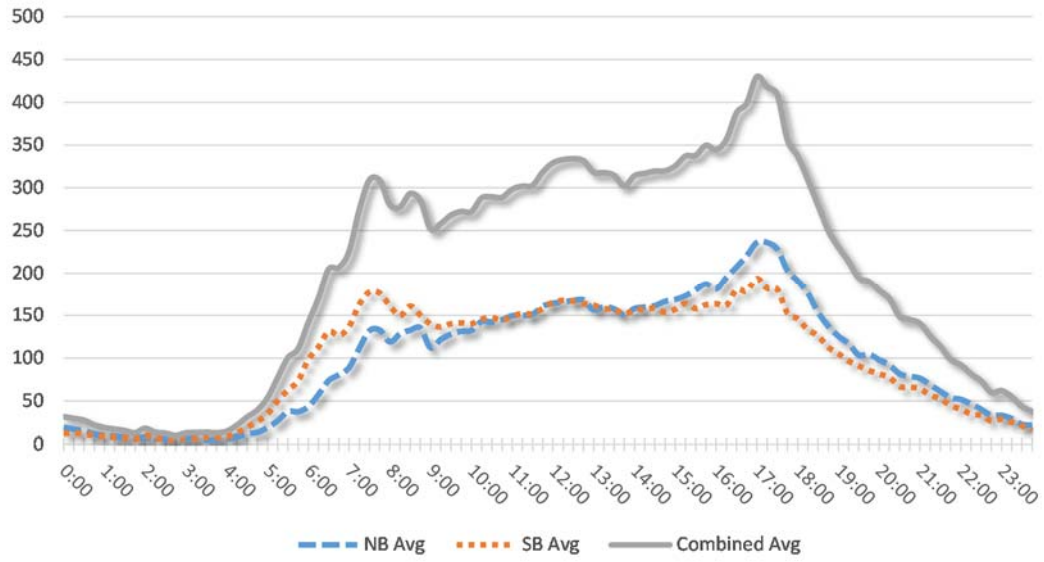
Along with looking at the operation of traffic along the corridor it is important to understand traffic operations at the intersections along the corridor. To better understand the operation of traffic, turning movement counts (TMCs) were collected at five intersections along the corridor. Table 3 provides a summary of the collected TMCs. In addition to these five intersections, recent TMCs provided by the R2CTPO were reviewed and included as part of this study process.

Table 3: Turning Movement Count Summary

Time	Northbound					Southbound					Eastbound					Westbound					Total
Begin/End	LT	Thru	RT	U-Turn	TOT	LT	Thru	RT	U-Turn	TOT	LT	Thru	RT	U-Turn	TOT	LT	Thru	RT	U-Turn	TOT	
US 17/92 at Ft Florida Road - 4/28/2016																					
7 - 8 AM	32	427	0	2	**461**	0	1,864	26	0	**1,890**	14	0	36	0	**50**	0	0	0	0	**0**	**2,401**
8 - 9 AM	18	454	0	1	**473**	0	1,378	29	0	**1,407**	21	0	41	0	**62**	0	0	0	0	**0**	**1,942**
4 - 5 PM	45	1,572	0	4	**1,621**	0	692	41	3	**736**	29	0	36	0	**65**	0	0	0	0	**0**	**2,422**
5 - 6 PM	82	2,009	0	3	**2,094**	0	735	52	1	**788**	34	0	42	0	**76**	0	0	0	0	**0**	**2,958**
Total	**177**	**4,462**	**0**	**10**	**4,649**	**0**	**4,669**	**148**	**4**	**4,821**	**98**	**0**	**155**	**0**	**253**	**0**	**0**	**0**	**0**	**0**	**9,723**
US 17/92 at Dirkson Drive - 4/28/2016																					
7 - 8 AM	59	307	65	4	**435**	68	1,400	46	1	**1,515**	20	29	66	0	**115**	464	76	45	0	**585**	**2,650**
8 - 9 AM	46	379	68	4	**497**	62	1,110	15	1	**1,188**	15	26	67	0	**108**	300	52	74	0	**426**	**2,219**
4 - 5 PM	41	1,194	360	2	**1,597**	65	513	19	1	**598**	35	68	60	0	**163**	139	44	88	0	**271**	**2,629**
5 - 6 PM	20	1,449	529	1	**1,999**	105	547	10	3	**665**	38	91	50	0	**179**	113	51	80	0	**244**	**3,087**
Total	**166**	**3,329**	**1,022**	**11**	**4,528**	**300**	**3,570**	**90**	**6**	**3,966**	**108**	**214**	**243**	**0**	**565**	**1,016**	**223**	**287**	**0**	**1,526**	**10,585**
US 17/92 at Plymouth Avenue - 4/28/2016																					
7 - 8 AM	39	221	28	1	**289**	78	390	159	1	**628**	152	252	36	0	**440**	44	177	49	0	**270**	**1,627**
8 - 9 AM	62	326	12	0	**400**	72	371	143	0	**586**	164	133	48	0	**345**	46	176	39	0	**261**	**1,592**
4 - 5 PM	70	556	22	3	**651**	131	375	219	7	**732**	249	191	50	0	**490**	51	184	67	0	**302**	**2,175**
5 - 6 PM	55	578	29	1	**663**	121	378	165	6	**670**	265	226	48	0	**539**	49	199	116	0	**364**	**2,236**
Total	**226**	**1,681**	**91**	**5**	**2,003**	**402**	**1,514**	**686**	**14**	**2,616**	**830**	**802**	**182**	**0**	**1,814**	**190**	**736**	**271**	**0**	**1,197**	**7,630**
US 17 at Baxter Street - 4/28/2016																					
7 - 8 AM	20	316	22	0	**358**	19	473	1	0	**493**	3	0	16	0	**19**	10	2	11	0	**23**	**893**
8 - 9 AM	27	307	15	3	**352**	12	397	4	1	**414**	2	6	15	0	**23**	9	0	2	0	**11**	**800**
4 - 5 PM	43	462	30	3	**538**	2	474	1	0	**477**	4	4	20	0	**28**	33	4	2	0	**39**	**1,082**
5 - 6 PM	25	534	15	5	**579**	4	363	0	0	**367**	3	5	20	0	**28**	30	3	3	0	**36**	**1,010**
Total	**115**	**1,619**	**82**	**11**	**1,827**	**37**	**1,707**	**6**	**1**	**1,751**	**12**	**15**	**71**	**0**	**98**	**82**	**9**	**18**	**0**	**109**	**3,785**
US 17 at Washington Avenue - 4/28/2016																					
7 - 8 AM	11	87	89	0	**187**	96	173	34	0	**303**	18	89	78	0	**185**	81	100	32	0	**213**	**888**
8 - 9 AM	13	89	29	0	**131**	19	163	15	0	**197**	10	35	15	0	**60**	30	18	18	0	**66**	**454**
4 - 5 PM	34	184	35	0	**253**	24	122	8	0	**154**	11	26	16	0	**53**	51	28	32	0	**111**	**571**
5 - 6 PM	42	236	42	0	**320**	28	121	7	0	**156**	7	31	17	0	**55**	53	32	20	0	**105**	**636**
Total	**100**	**596**	**195**	**0**	**891**	**167**	**579**	**64**	**0**	**810**	**46**	**181**	**126**	**0**	**353**	**215**	**178**	**102**	**0**	**495**	**2,549**

Travel Patterns

AADTs provide a sense of the overall daily traffic demand of a roadway; however, to better understand the daily traffic volume patterns within the corridor, traffic volume counts, collected in 15-minute intervals, were charted and analyzed. Figure 4 shows the composite average daily traffic volumes (northbound, southbound, and total). As shown, typically along the corridor the highest traffic volumes are experienced during the PM peak-period between 4:45 PM and 5:45 PM, with the northbound movement being slightly heavier than the southbound traffic movement. The composite average provides a general sense of daily traffic flows along the corridor, but there are variation along different segments of the corridor; Appendix C contains charted daily traffic volumes for many of the roadway segments along US 17.



Data Source: FDOT Florida Traffic Online 2014 Synopsis Reports

Figure 4: Daily Traffic Volume – US 17 Composite Average

In addition to the daily traffic volume analysis, an analysis of where people work and where workers live was conducted using the U.S. Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) OnTheMap tool. Map 11 shows where people who reside within the corridor study area work and Map 12 shows where people who are employed within the corridor live. As shown in Table 4, approximately 32 percent of the workers who live within the corridor travel less than 10 miles to work, but nearly 25 percent of the workers travel more than 50 miles to work, and approximately 39 percent of the people who work within the corridor travel less than 10 miles to work with about 15 percent traveling more than 50 miles.

Table 4: Jobs by Distance

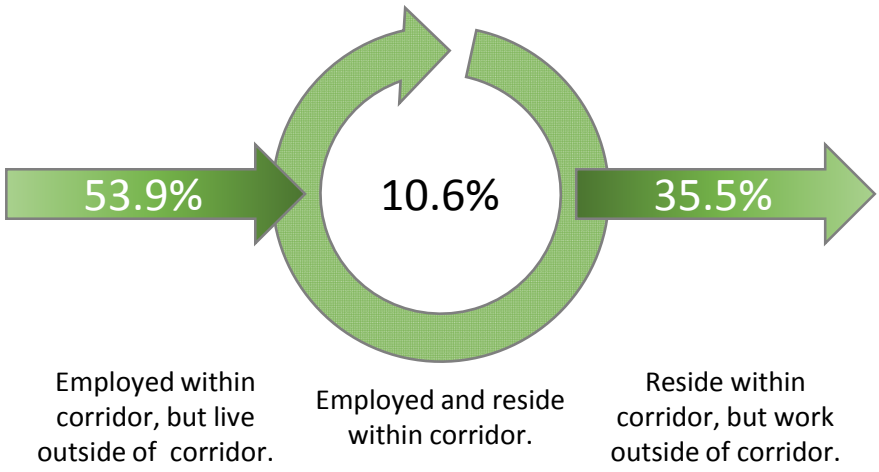
Distance	Home to Work[1]	Work to Home[2]
Less than 10 Miles	32.4%	39.0%
10 to 24 Miles	24.6%	32.8%
25 to 50 Miles	18.2%	12.7%
Greater than 50 Miles	24.7%	15.4%

[1]Workers who "reside" within the corridor.

[2]Workers who "work" within the corridor.

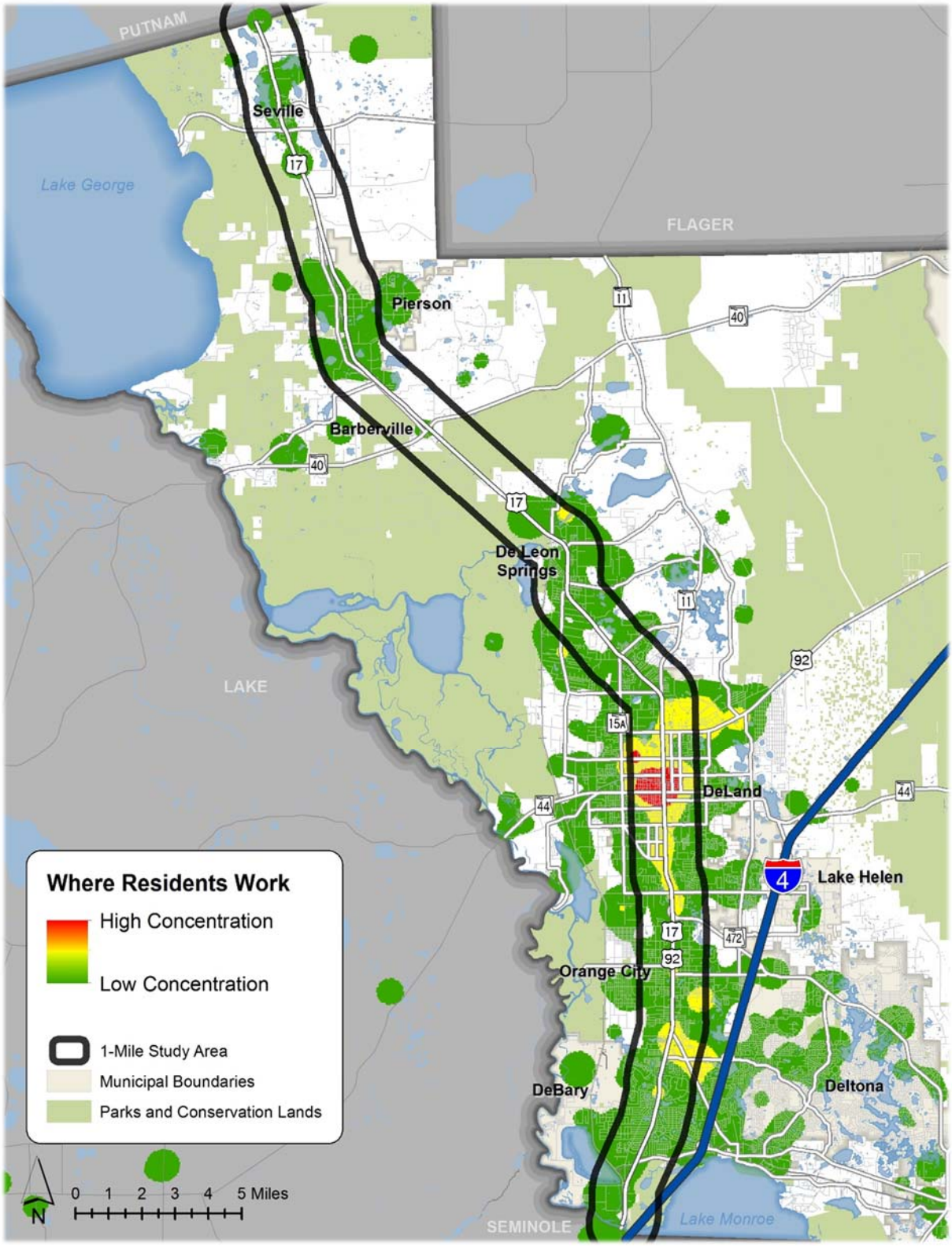
Data Source: U.S. Census Bureau LEHD

Figure 5 illustrates the observed inflow/outflow of employees who work, live, or work and live in the corridor. Of all the people who live and/or work within the corridor, 53.9 percent work within the corridor, but live outside of the corridor, 35.5 percent live within the corridor, but work outside of the corridor, and 10.6 percent both live and work within the corridor.



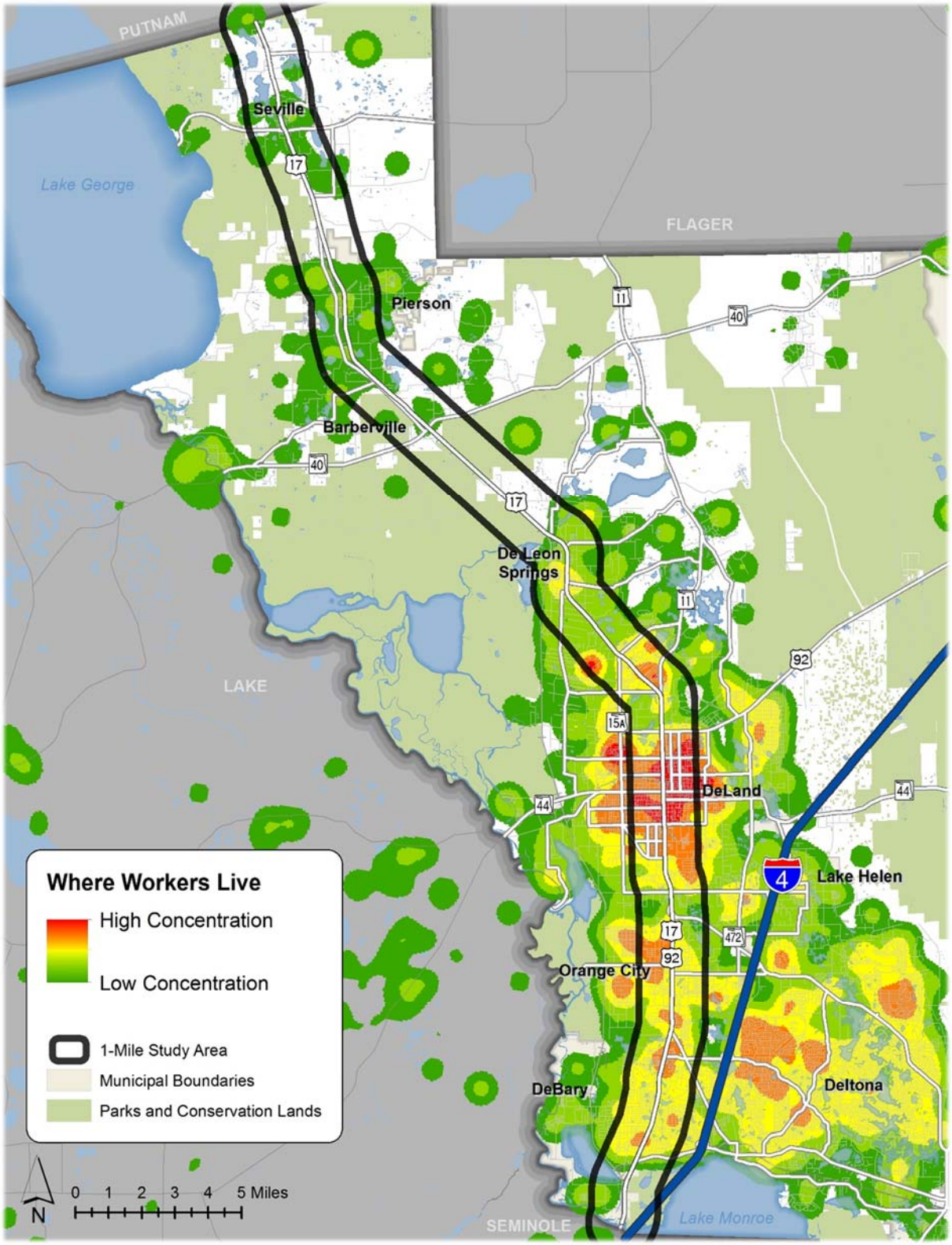
Data Source: U.S. Census Bureau LEHD

Figure 5: US 17 Corridor Employment Inflow/Outflow



Data Source: U.S. Census Bureau LEHD

Map 11: Home to Work – Where People Who Reside within the Corridor Work



Data Source: U.S. Census Bureau LEHD

Map 12: Work to Home – Where People Who Work within the Corridor Reside

Capital Projects

A review of the most current FDOT work program was conducted to identify any programed improvements within the corridor. Table 5 and Map 13 provide a summary of the identified FDOT work program projects within the study corridor. One of the more significant projects identified within the corridor is the project along US 17 between DeLeon Springs Blvd and SR 40; currently the only funding for this project is for the acquisition of right-of-way, but the project will eventually widen this portion of US 17 from its current two-lanes to a four-lane divided rural typical section, as shown in Figure 6.

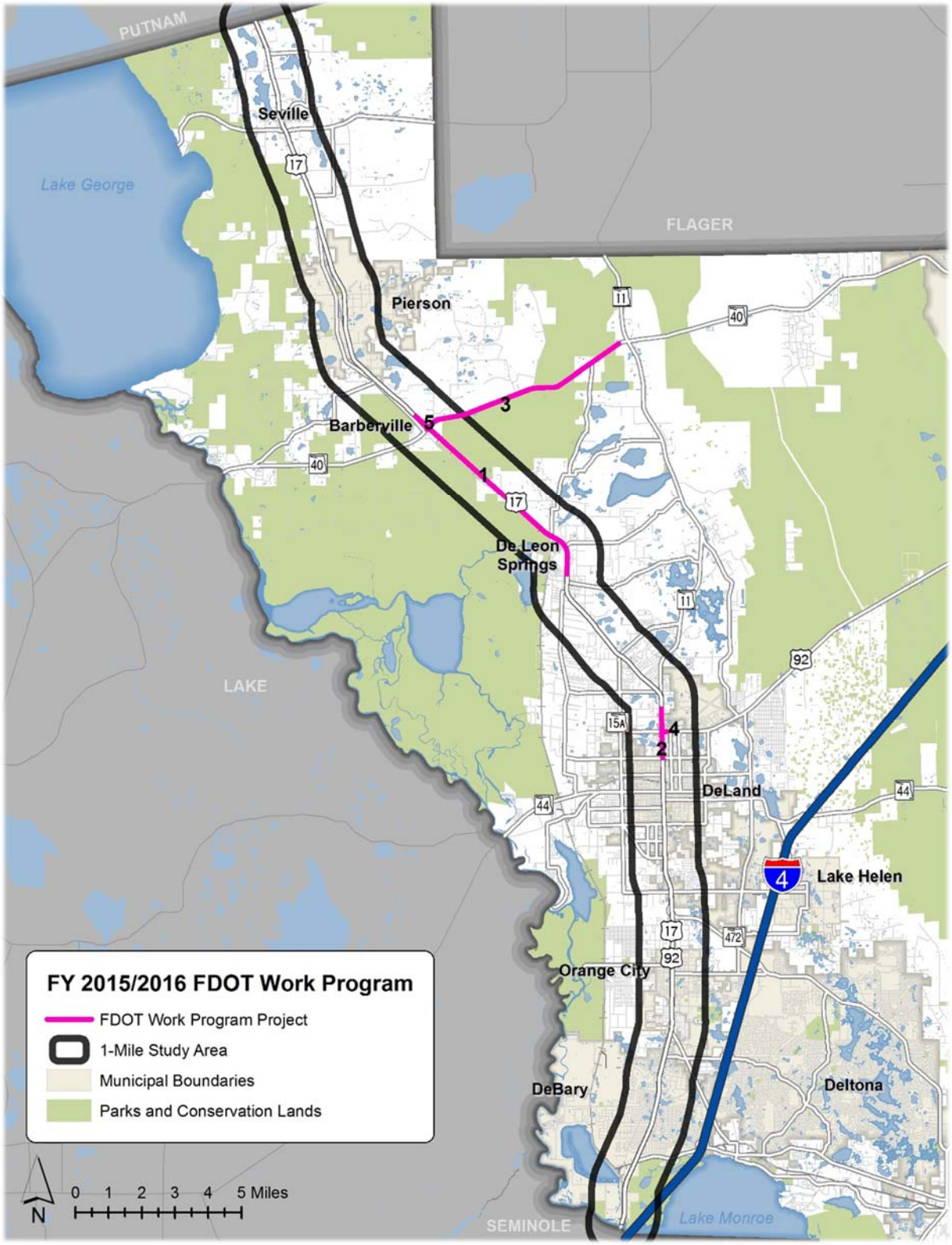
Table 5: US 17 Corridor FDOT Work Program Items

Map ID	FM #	Description	Project Type / Phase	Fiscal Year	Section # / Mile Post
1	410251	SR 15 (US 17) From DeLeon Springs Blvd to SR 40	Add Lanes & Reconstruct	2016 - 2020	79050000
			ROW		5.844 - 12.692
2	437054	SR 15/600 (US 17-92) From East Plymouth Ave to Mercers Fernery Rd	Lighting	2016	79050000
			Construction		0.000 - 15.172
3	240836	SR 40 From SR 15 (US 17) to SR 11	Add Lanes & Reconstruct	2017	79100000
			Environmental		6.543 - 13.200
4	432441	SR 600 (US 92) from US 17 to East of Alabama Ave	Resurfacing	2016	79060000
			Construction		0.000 - 0.147
5	436918	SR 40 Railroad Crossing #621284-W	Rail Safety Project	2016	79100000
			Railroad & Utilities		6.370 - 6.394

Data Source: FDOT FY 2015/2016 5-Year Work Program

Data Source: SR 15 Ponce DeLeon Springs Boulevard to State Road 40 Preliminary Engineering Report (Alternative 1)

Figure 6: Potential Future Alignment Typical Section, US 17 from DeLeon Springs Blvd to SR 40



Data Source: FDOT FY 2015/2016 5-Year Work Program

Map 13: Roadway Improvements

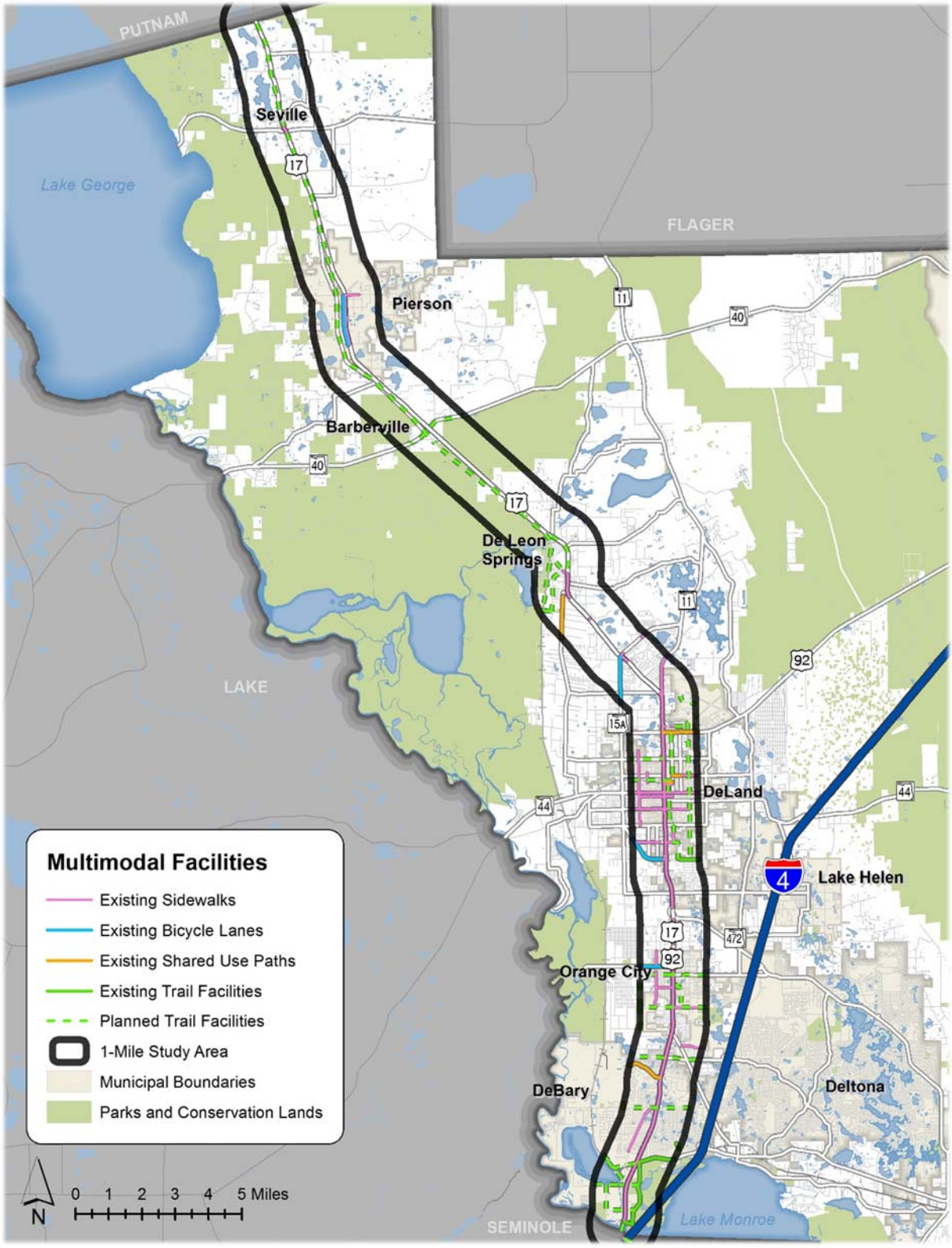
MULTIMODAL NETWORK EVALUATION

An inventory of existing multimodal facilities (sidewalks, bicycle lanes, and trails) within the study area was compiled using information from the Phase I study and other available data sets. Map 14 shows the existing sidewalk coverage, bicycle lanes, shared-use paths, and trail facilities (including planned facilities) within the corridor. As shown in Map 14, much of the urban portion of the corridor, south of SR 11, has sidewalk coverage, with a notable exception being from Wisconsin Avenue to north of SR 472. North of SR 11, there are only a few locations along the corridor with existing sidewalk coverage. While there are parallel bicycle facilities, there are no bicycle lanes, trails, or shared-use paths directly along the US 17 corridor. In addition reviewing the data shown in Map 14 a review of FDOT District 5's sidewalk gap map was conducted to ensure data consistency.

To better understand pedestrian and bicycle demand along the corridor pedestrian and bicycle volume counts were conducted at four locations along the corridor. A summary of the results of these counts is provided in Table 6.

Table 6: Pedestrian and Bicycle Volume Count Summary

Time/Count	7-8 AM	8-9 AM	11-12 PM	12-1 PM	4-5 PM	5-6 PM	Total
US 17/92 between University Avenue and Central Avenue (Orange City)							
Ped	5	2	1	2	2	5	**17**
Bike	0	0	0	0	0	0	**0**
Total	**5**	**2**	**1**	**2**	**2**	**5**	**17**
US 17/92 between Euclid Avenue and Walts Avenue							
Ped	3	3	3	3	2	5	**19**
Bike	0	3	3	1	5	2	**14**
Total	**3**	**6**	**6**	**4**	**7**	**7**	**33**
US 17/92 between Minnesota Avenue and University Avenue (DeLand)							
Ped	18	13	5	34	13	12	**95**
Bike	0	1	2	0	1	1	**5**
Total	**18**	**14**	**7**	**34**	**14**	**13**	**100**
US 17 between Sago Palm and Wildwood Road							
Ped	1	0	0	4	0	0	**5**
Bike	2	0	2	3	1	1	**9**
Total	**3**	**0**	**2**	**7**	**1**	**1**	**14**



Data Source: FDOT Transportation Statistics Office and Volusia County GIS

Map 14: Existing Multimodal Facilities

TRANSIT SERVICE EVALUATION

Transit service along the US 17 corridor is provided by Volusia County's Public Transportation System (Votran). Currently there are six local fixed routes that serve the corridor in some manner. In addition to these routes there are three routes that provide AM and PM bus service to/from the DeBary SunRail station. The primary routes that serve the US 17 corridor are routes 20 and 24. Route 20 is one of Votran's top ridership routes and provides service along the US 17 corridor from Saxon Boulevard to the Walmart north of US 92/International Speedway Boulevard. Table 7 is an overview of the operating service and monthly ridership of the routes along the corridor. In addition to the Votran routes, SunRail provides weekday commuter rail service from the DeBary station to Orlando; rail service is provided every 30 minutes during the AM and PM peak periods and every two hours throughout the remainder of the day. Map 15 shows the alignment of the existing transit service within the corridor.

Table 7: Corridor Transit Route Service Information

Route	Route Description	Weekday Service		Average Monthly Ridership (Jan - July 2014)
		Frequency (minutes)	Span (hours)	
20	DeLand - Deltona	60	13	17,038
21	Deltona	120	14	3,948
22	Deltona	120	12	3,571
23	Orange City	60	12	3,740
24	Pierson - Seville	360	12	1,251
60	East West Connector	60	13	15,725
Routes Serving DeBary SunRail Station (AM and PM service)				
31	SunRail - US 17-92	30	4	529
32	SunRail - Deltona	60	6	496
33	SunRail - Dupont Lakes Express	60	4	433

Data Source: Votran

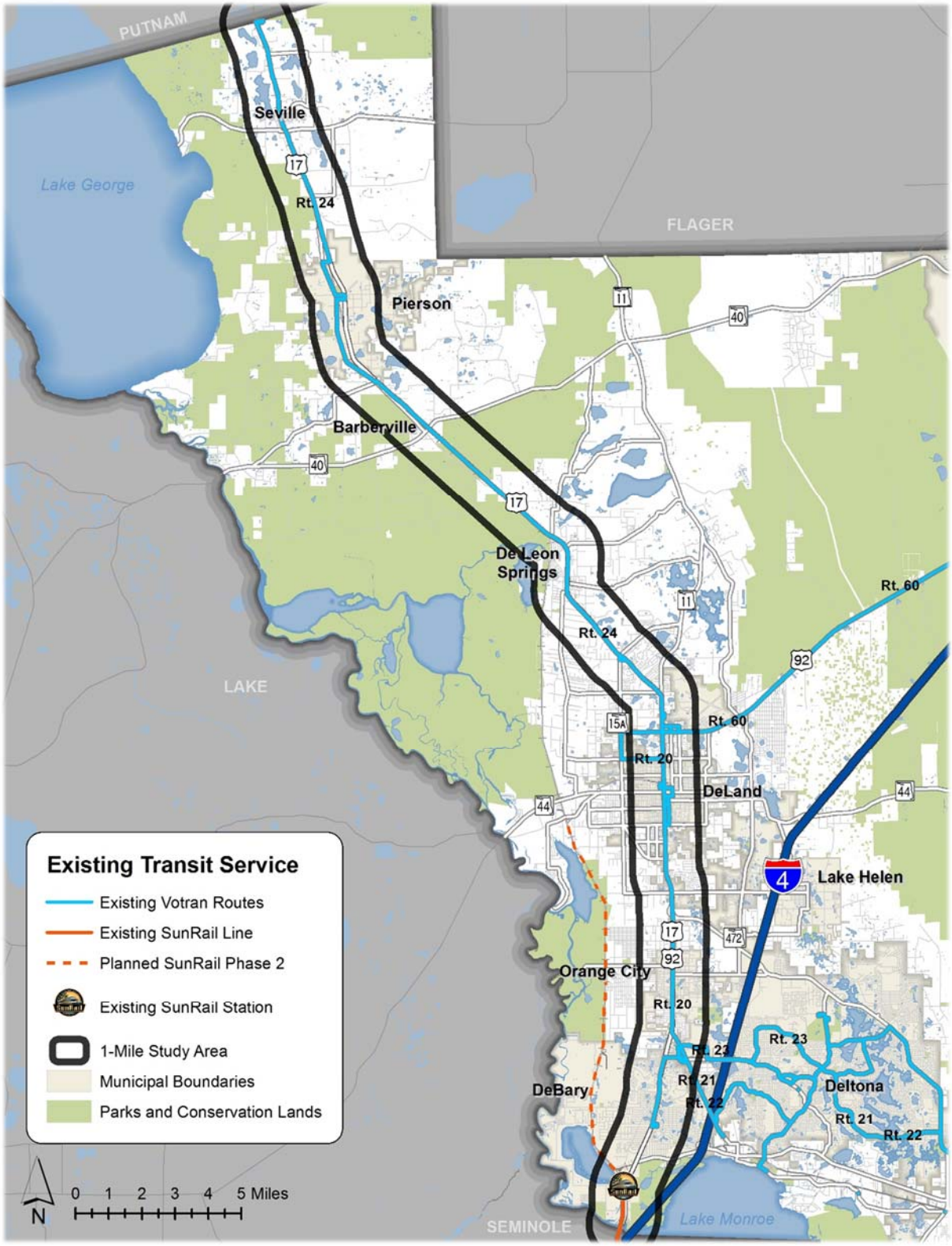
Based on available bus stop-level ridership data, between October 2013 and September 2014, there were over 450,000 boardings and alightings within the corridor, which equates to about 1,200 riders on the average weekday. Table 8 lists the locations within the study area with the highest ridership in terms of boardings and alightings. Map 16 illustrates the location and annual ridership statistic of the bus stops along the corridor. The areas of bus stop ridership were created by grouping bus stops that were within 250 feet of each other, in addition to these bus stop clusters, Map 16 shows ridership frequency using a raster technique in a geographic information system (GIS) to show areas that might have higher ridership even if the groups of stops do not have relatively high ridership numbers.

Table 8: Highest Frequency Bus Stop Activity Locations

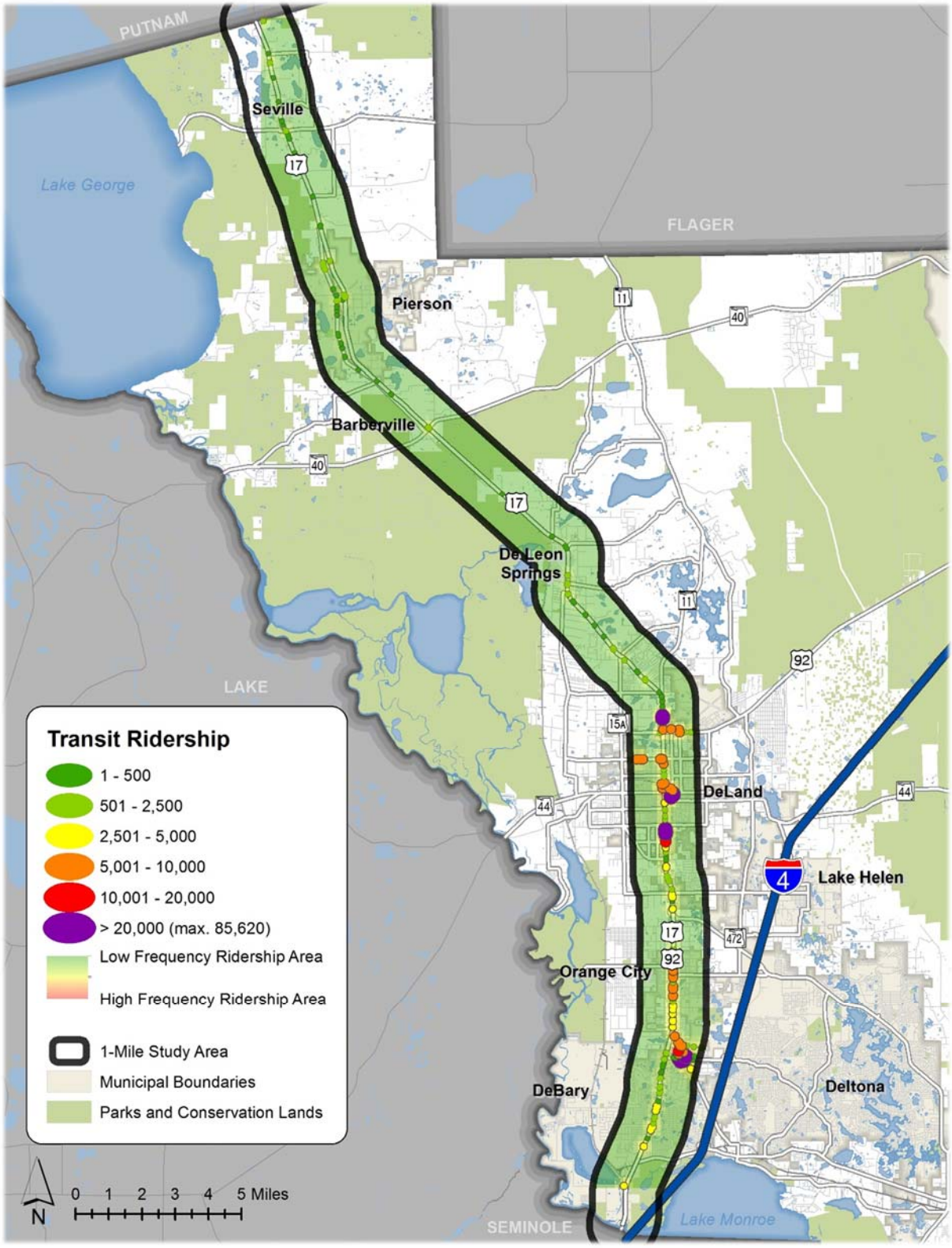
High Frequency Transit Ridership Locations
Saxon Blvd at Enterprise Rd
SR 44/New York Ave at Amelia Ave
US 17 at Violetwood Rd/DeLand Walmart
US 17 at Carroll Ave (S. of Beresford Ave)
US 17 at New Hampshire Ave
US 17 at US 92
US 17 at Plymouth Ave
US 17 at Rich Ave
Plymouth Ave at Stone St
US 92/International Speedway Blvd at Garfield Ave
US 17 at Wisconson Ave
US 17 at Graves Ave
US 17 at Ohio Ave
US 92/International Speedway Blvd at Amelia Ave
US 17 at French Ave
US 17 at Blue Springs Ave

Data Source: Votran

Moving forward, it is anticipated that transit will play a larger role in providing mobility for people within the US 17 corridor. Votran's transit development plan (TDP) identified several potential transit enhancements within the corridor. Many of these enhancements focus on providing service and better connectivity to the existing DeBary SunRail station and the anticipated DeLand station, and improving the service (span, frequency, days) of the existing routes within the corridor. Other future transit enhancements could include looking at the operation of some kind of enhanced bus service either within the I-4 corridor or potentially within the US 17 corridor.



Map 15: Existing Transit



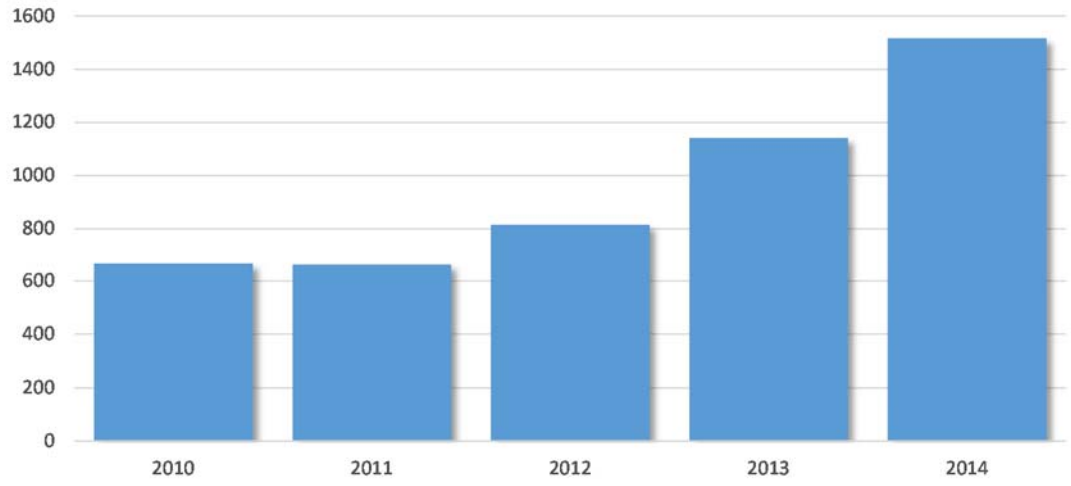
Data Source: VOTRAN FY 2014 APC Data

Map 16: Stop-Level Transit Ridership, Annual Figures, FY 2014

CRASH HISTORY ANALYSIS

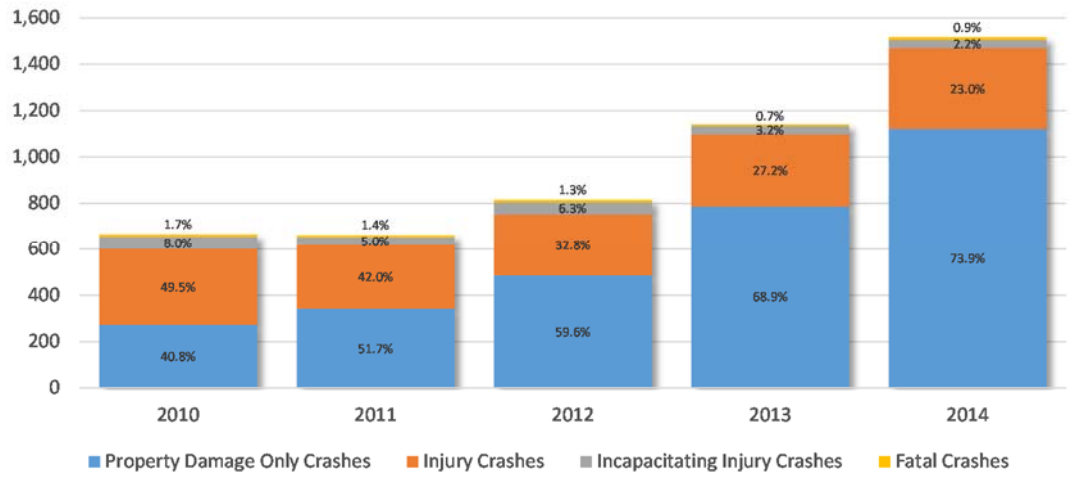
Total Crashes

A five-year (2010—2014) crash history within the corridor was analyzed using crash data extracted from Signal Four Analytics web-based crash system. During this five-year period, there were over 4,800 reported crashes within the corridor study area. Figure 7 shows the annual distribution of total crashes within the corridor. Please note, that effective on July 1, 2012 Florida Statute 316.066 was amended by the Florida Legislature to require all law enforcement agencies to report additional crashes to the Department of Highway Safety and Motor Vehicles which the agencies were not previously required to submit. This statutory change has resulted in more crash reports being received at the state level. So, while data from 2012, 2013, and 2014 appears to reflect a significant increase in total crashes, a majority of this is the result of the statutory change that resulted in an increase in the number of reported crashes, and should not be taken as an indicator of a significant increase in crashes compared to previous years. Also, note that the statutory change mostly resulted in an increase of property damage only (non-injury) crashes and did not affect the reporting of more serious (injury and fatal) crashes, see Figure 8 and Figure 9. Furthermore, it is important to recognize that while the statutory requirements for reporting crashes officially changed in 2012, there was a time period lag from when the statute was changed to when all agencies were consistently reporting crashes in accordance with the new requirements; this can be reflected in the increase between 2013 and 2014.



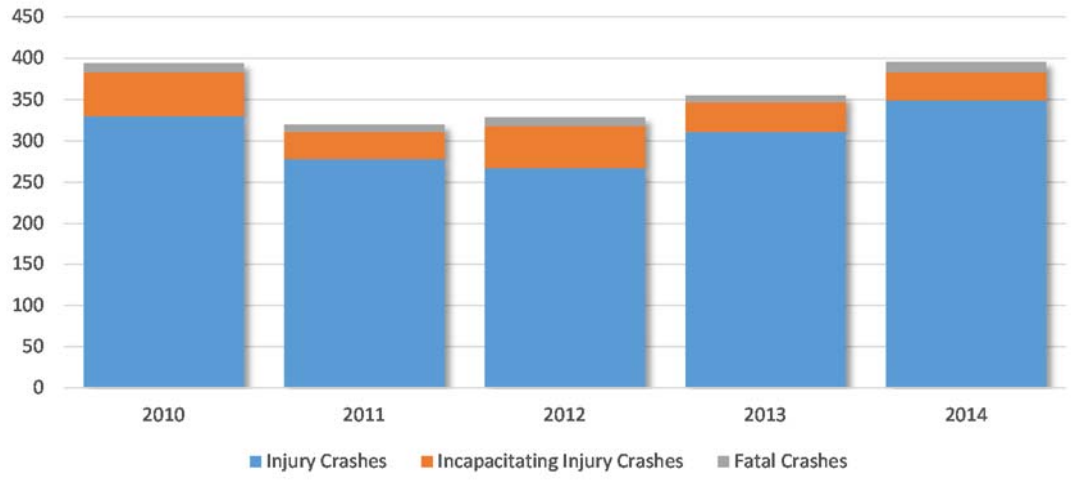
**2012, 2013, and 2014 totals reflect statutory changes that have resulted in an increase of reported crashes being received at the state level.*

Figure 7: Annual Distribution of Total Crashes



**2012, 2013, and 2014 totals reflect statutory changes that have resulted in an increase of reported crashes being received at the state level.*

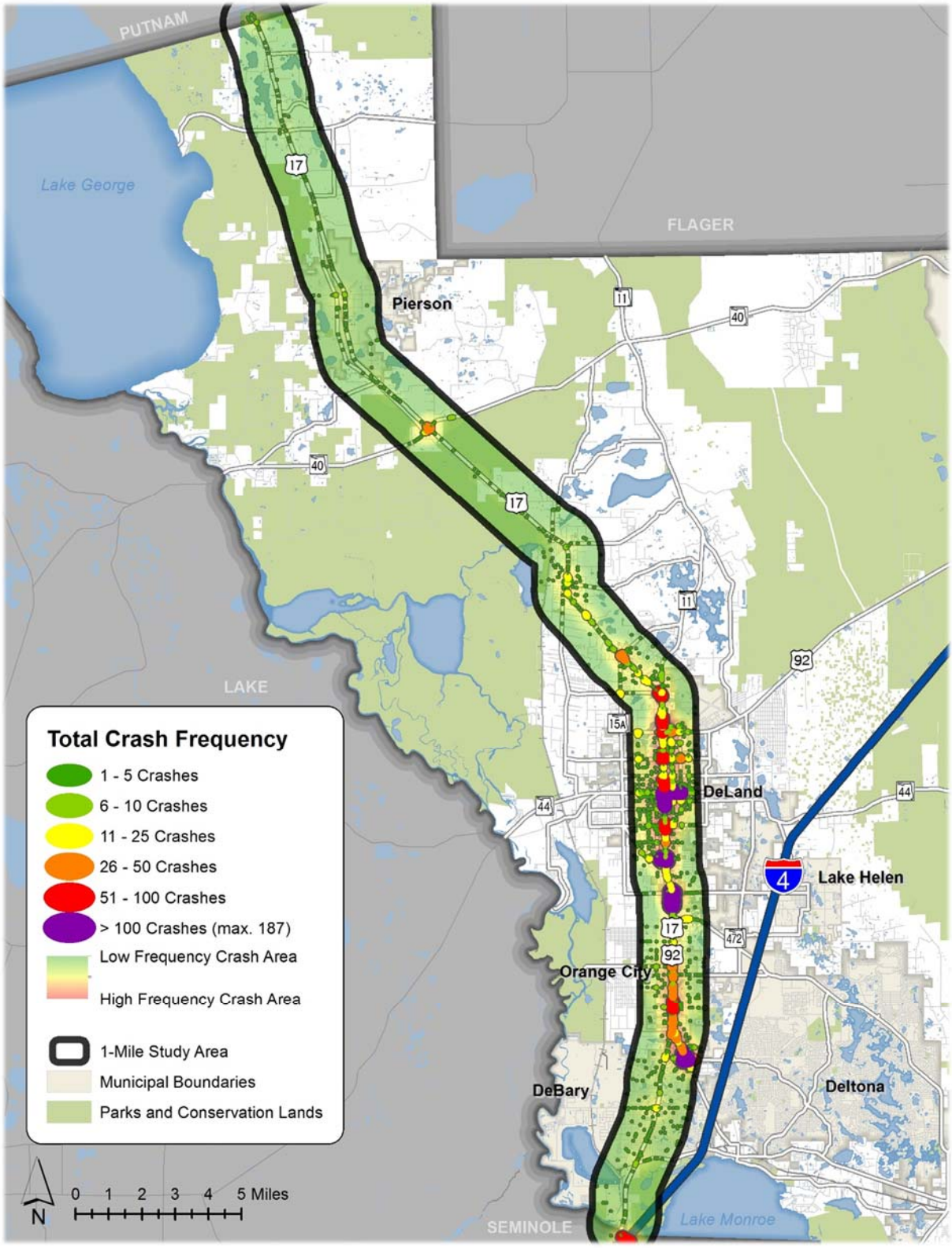
Figure 8: Annual Distribution of Total Crashes by Crash Severity



Data Source Signal Four Analytics Data Extract

Figure 9: Annual Distribution of Total Crashes with Property Damage Only Crashes Omitted

Map 17 shows the location and frequency of total crashes within the corridor. The concentrations of crashes shown in Map 17 were created by grouping clusters of crashes within 100 feet of each other. While there are crash locations throughout the corridor, there are a few locations that stand out as having a higher frequency of crashes. These include the area along US 17 and SR 44/New York Ave in downtown DeLand, US 17 at SR 15A/Taylor Rd, and US 17 at Orange Camp Rd. Table 9 provides a list of the highest frequency crash intersections within the corridor.



Data Source Signal Four Analytics Data Extract

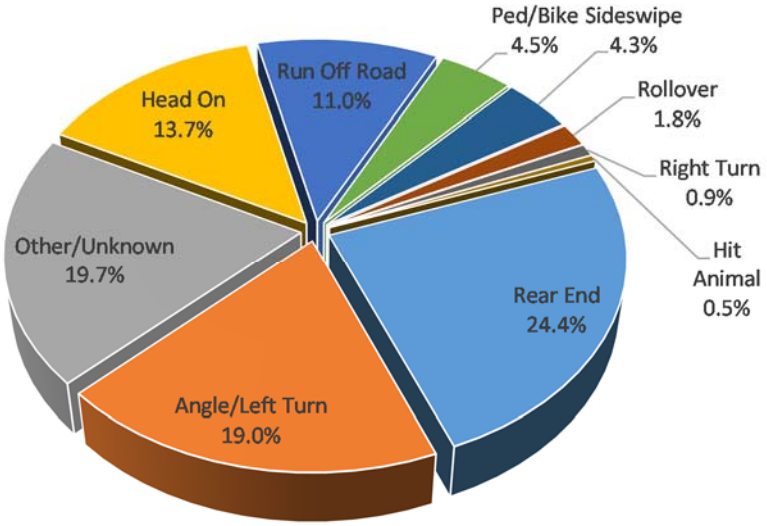
Map 17: Total Crashes, 2010—2014

Table 9: Highest Frequency Crash Locations, 2010—2014

Rank	Intersection - US 17 at	Crashes
1	SR 15A	106
2	Beresford Ave	76
3	Orange Camp Rd	69
4	US 92/International Speedway Blvd	68
5	SR 44/New York Ave	63
5	Plymouth Ave	63
7	Violetwood Rd	49
7	Glenwood Rd	49
9	Firehouse Rd	48
10	Rhode Island Ave	36
10	Enterprise Rd	36
12	French Ave	34

Data Source Signal Four Analytics Data Extract

Figure 10 summarizes the distribution of crash types for all crashes within the corridor. As, shown, rear-end crashes are the most frequent crash type at 24.4 percent of the total crashes, countywide rear-end crashes account for 26 percent of the total crashes. Following rear-end crashes, the crash types with the next highest frequency of crashes within the corridor are other/unknown crashes (19.7%), angle/left turn crashes (19%), head-on crashes (13.7%), and run-off-road crashes (11%). Table 10 compares the percentage of crash types within the corridor to their respective percentage of crashes within Volusia County during the same period of time. As shown, angle/left turn, head-on, and pedestrian/bicycle crashes account for a larger percentage of crashes within the corridor compared to the countywide percentages.



Data Source Signal Four Analytics Data Extract

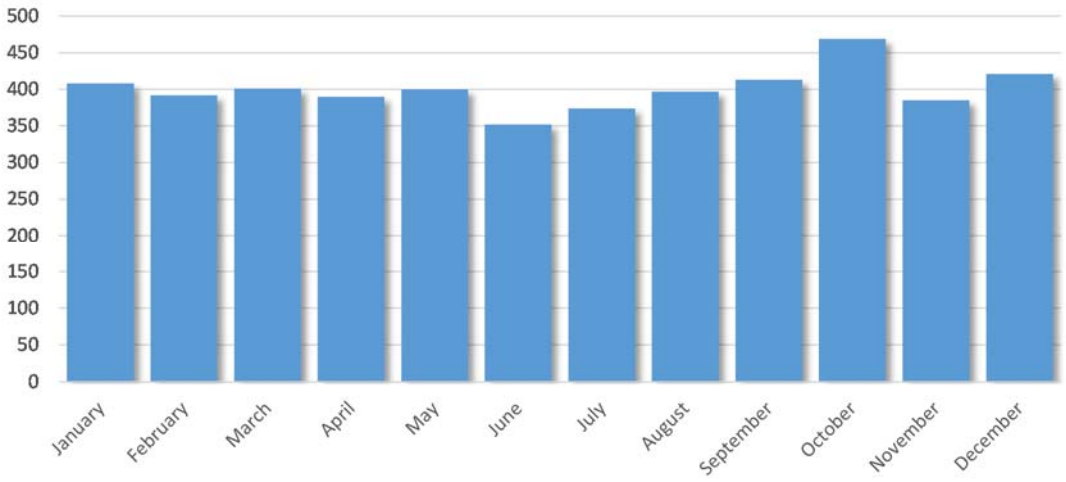
Figure 10: Total Crashes by Crash Type, 2010—2014

Table 10: Crash Type Comparison, Total Crashes

Crash Type	Corridor Crash Percent	Countywide Crash Percent
Rear End	24.4%	26.2%
Angle/Left Turn	19.0%	12.7%
Other/Unknown	19.7%	27.3%
Head On	13.7%	4.6%
Run Off Road	11.0%	14.2%
Ped/Bike	4.5%	4.1%
Sideswipe	4.3%	6.3%
Rollover	1.8%	2.9%
Right Turn	0.9%	0.9%
Hit Animal	0.5%	0.8%

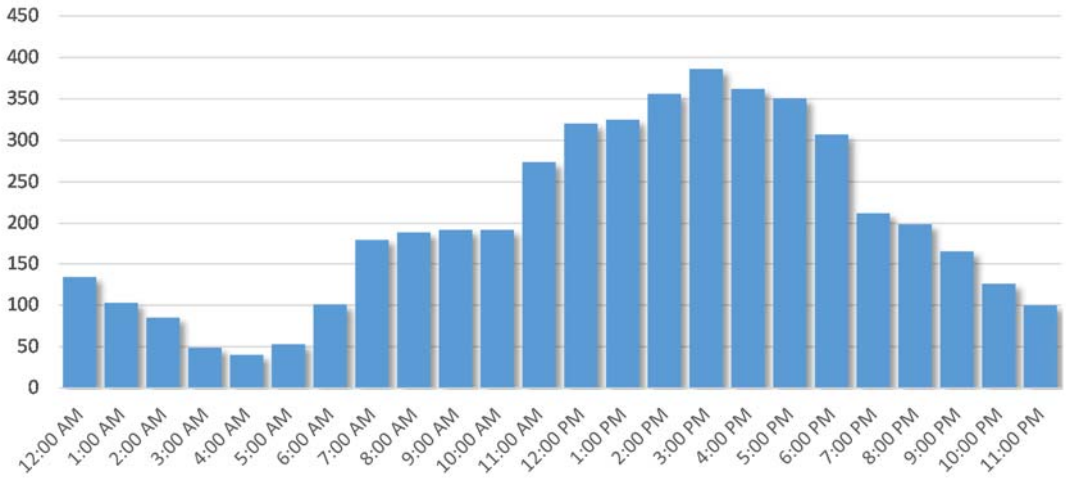
Data Source Signal Four Analytics Data Extract

Additional factors such as month of occurrence, time of day, location type, lighting conditions, and crash severity were also analyzed to identify potential trends in crashes along the corridor. As shown in Figure 11 through Figure 15, October averaged the most number of crashes, nearly one-third of all crashes occurred between 2:00 PM and 7:00 PM, one-third of the crashes occurred at an intersection or were within the influence area of an intersection, nearly 60 percent of the crashes occurred during daylight hours, and nearly 63 percent of the crashes were categorized as property damage only crashes.



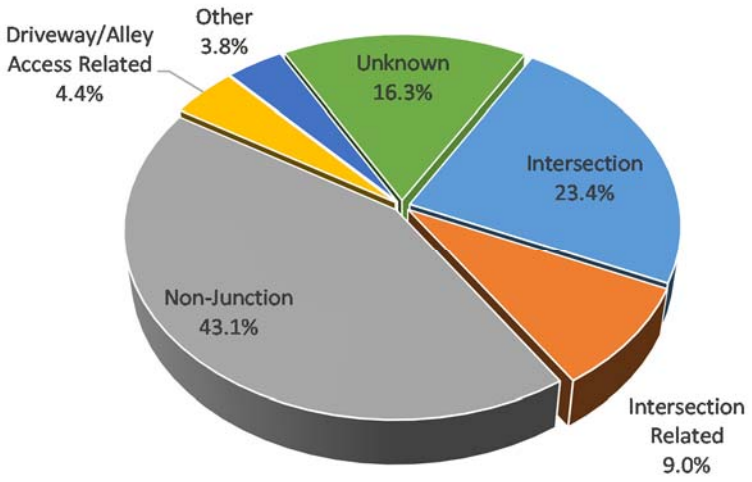
Data Source Signal Four Analytics Data Extract

Figure 11: Total Crashes by Month, 2010—2014



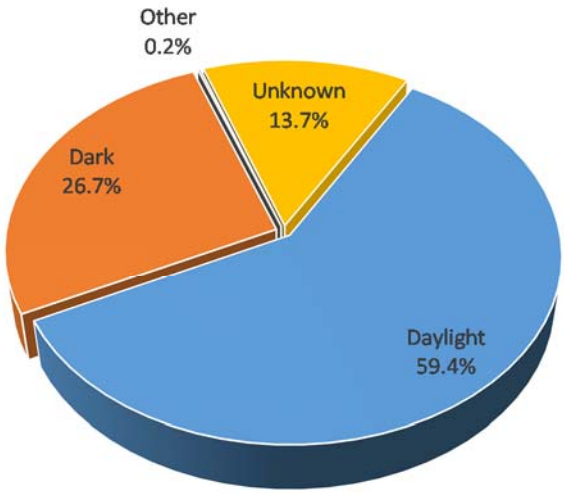
Data Source Signal Four Analytics Data Extract

Figure 12: Total Crashes by Time of Day, 2010—2014



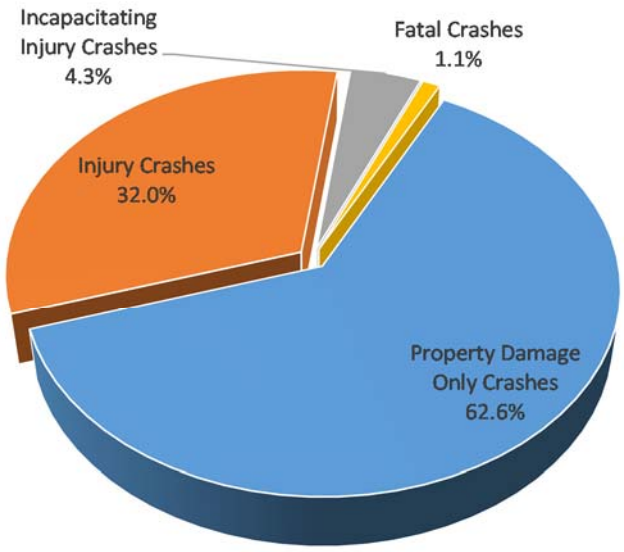
Data Source Signal Four Analytics Data Extract

Figure 13: Total Crashes by Location Type, 2010—2004



Data Source Signal Four Analytics Data Extract

Figure 14: Total Crashes by Lighting Condition, 2010—2014



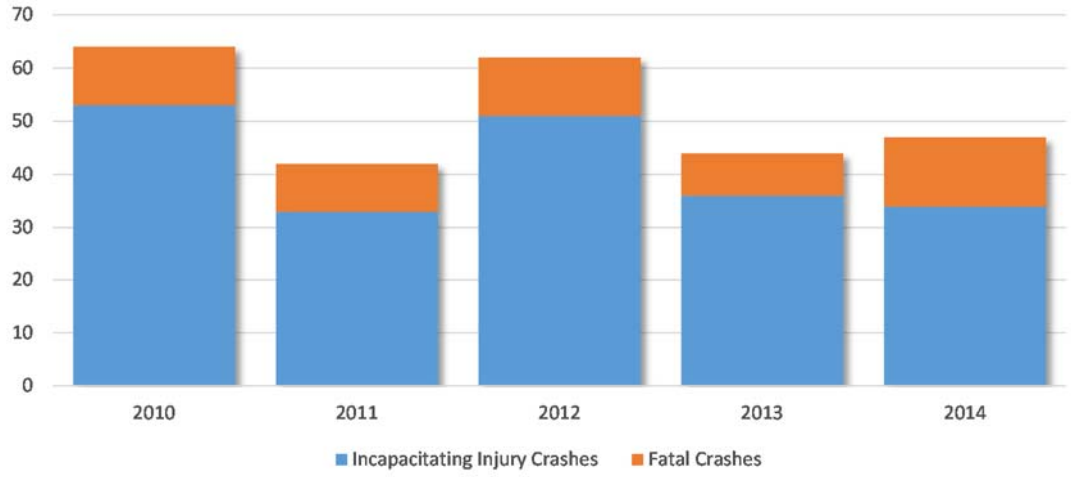
Data Source Signal Four Analytics Data Extract

Figure 15: Total Crashes by Crash Severity, 2010--2014

Severe Injury Crashes

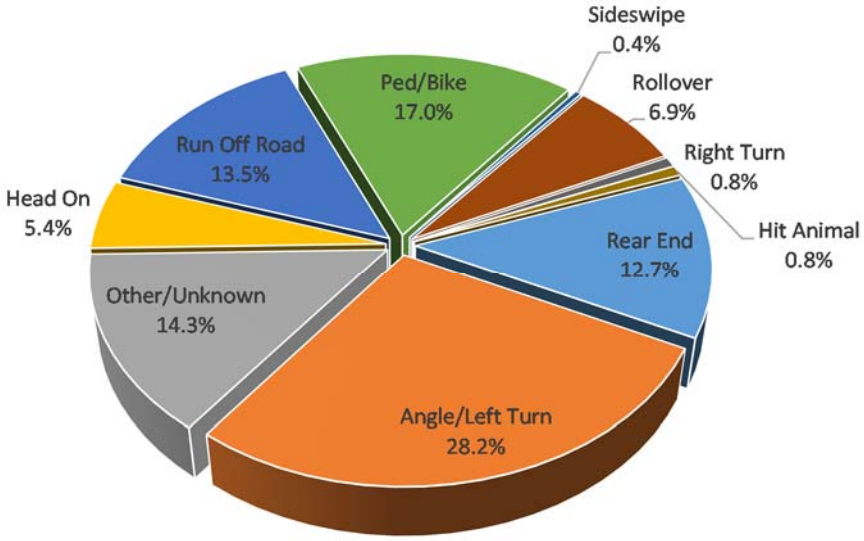
While it is important to understand factors related to overall crashes, it is also important to understand where the most severe injury crashes (including incapacitating injury and fatalities) are occurring and what is causing them. Understanding the cause and location of severe injury crashes will help to identify and prioritize safety concerns within the corridor. Figure 16 shows the annual distribution of severe injury crashes within the corridor. Between 2010 and 2014 there were 259 severe injury crashes. There has been a decrease in the annual number of severe injury crashes, in 2010, there were 64 severe injury crashes within the corridor and in 2014 the number of severe injury crashes was 47.

The severe injury crashes were also examined to better understand what type of crashes are causing the most severe injuries and fatalities. As shown in Figure 17, angle/left turn crashes are the most frequent severe injury crash type at 28.2 percent, compared to 19 percent of the total crashes. The second most frequent severe injury crash type within the corridor is pedestrian/bicycle crashes which account for 17 percent of all severe injury crashes; this stands out since pedestrian/bicycle crashes only account for 4.5 percent of the total crashes within the corridor. Table 11 provides a comparison of the crash types for severe injury crashes within the corridor and the county. As, shown, angle/left turn and pedestrian/bicycle crashes account for a larger percentage of crashes within the corridor compared to the countywide severe injury crash figures.



Data Source Signal Four Analytics Data Extract

Figure 16: Annual Distribution of Severe Injury Crashes, 2010—2014



Data Source Signal Four Analytics Data Extract

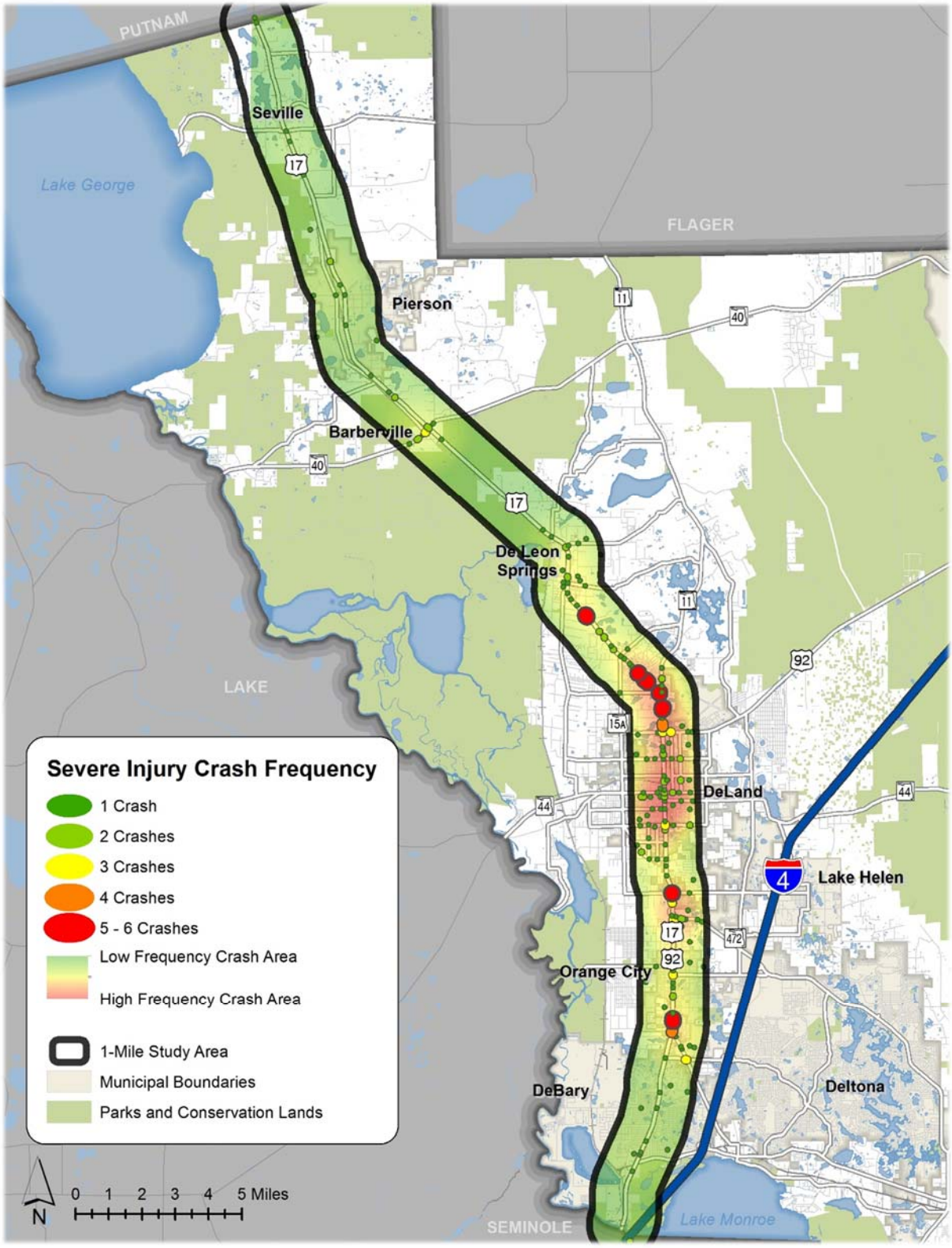
Figure 17: Severe Injury Crashes by Crash Type, 2010—2014

Table 11: Crash Type Comparison, Severe Injury Crashes

Crash Type	Corridor Crash Percent	Countywide Crash Percent
Rear End	12.7%	17.6%
Angle/Left Turn	28.2%	19.5%
Other/Unknown	14.3%	14.5%
Head On	5.4%	3.7%
Run Off Road	13.5%	18.3%
Ped/Bike	17.0%	13.5%
Sideswipe	0.4%	2.9%
Rollover	6.9%	8.9%
Right Turn	0.8%	0.6%
Hit Animal	0.8%	0.6%

Data Source Signal Four Analytics Data Extract

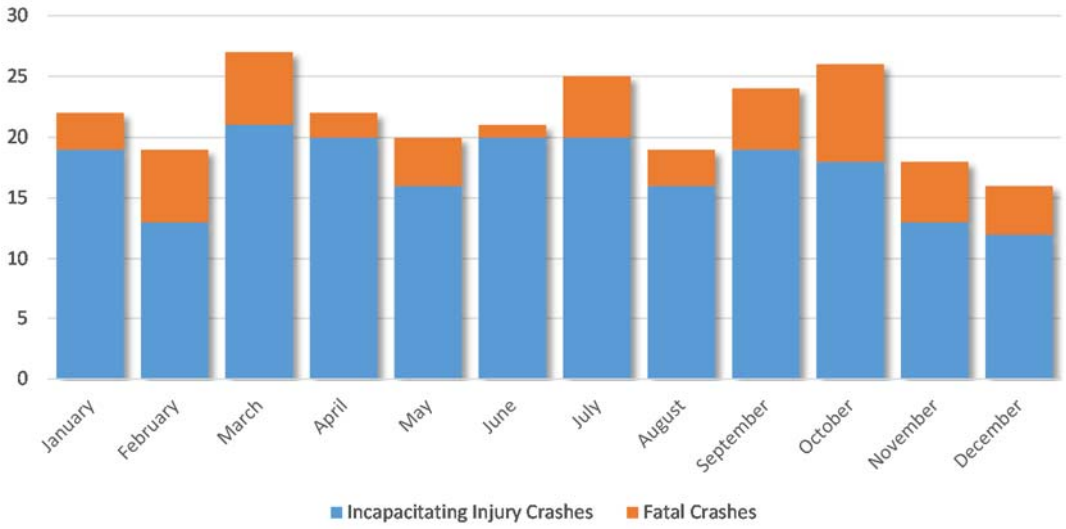
Map 18 illustrates the frequency of severe injury crashes within the corridor. The crash groups shown in Map 18 were created by grouping severe injury crashes that occurred within 200 feet of each other. Since there are fewer severe injury crashes than total crashes, a distance of 200 feet was used to group the crashes in place of the 100 foot distance used to create the total crash groups. As illustrated in the map, there is a concentration of severe injury crashes along US 17 between US 92/International Speedway Blvd and SR 15A/Spring Garden Ave, north of DeLand.



Data Source Signal Four Analytics Data Extract

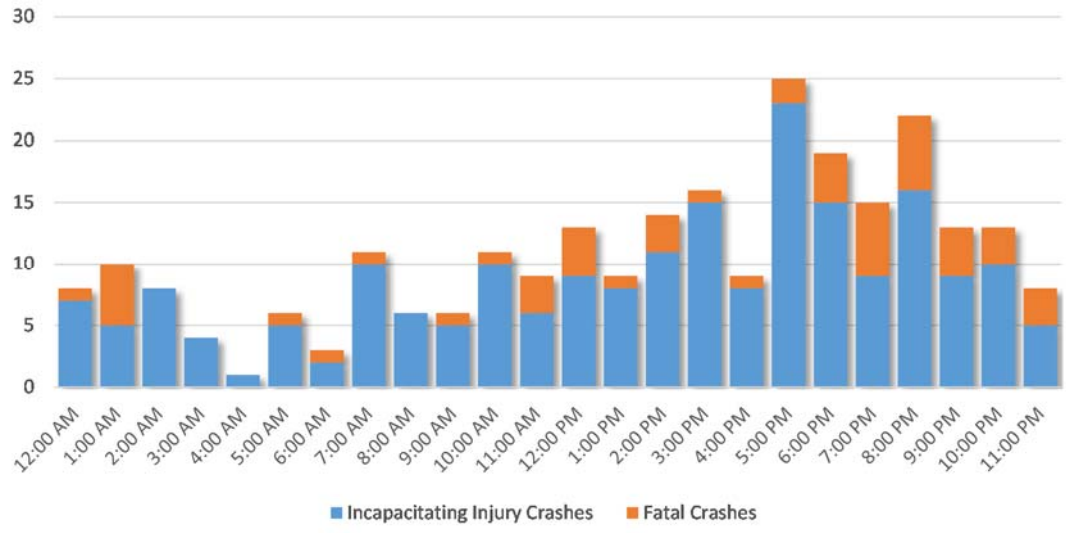
Map 18: Severe Injury Crashes, 2010-2014

Similar to looking at total crashes, additional factors including month of occurrence, time of day, location type, and lighting conditions were analyzed to identify potential trends in severe injury crashes along the corridor. As shown in Figure 18 through Figure 21, March averaged the most number of crashes, nearly one-third of the severe injury crashes occurred between 5:00 PM and 9:00 PM, nearly half of the crashes occurred away from an intersection or driveway crashes, and were pretty much evenly split between daylight and dark conditions.



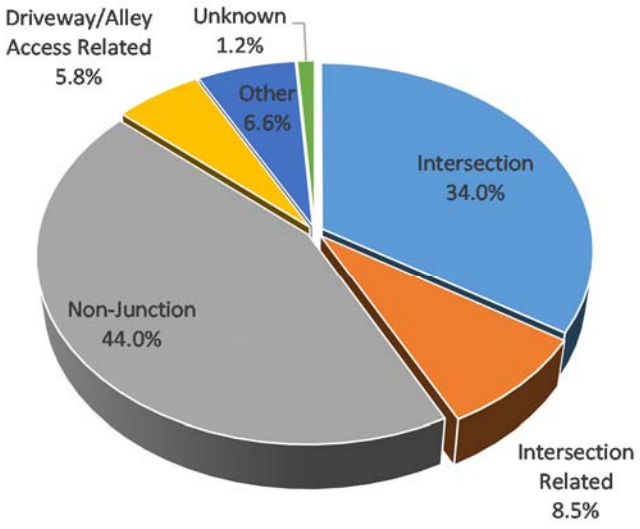
Data Source Signal Four Analytics Data Extract

Figure 18: Severe Injury Crashes by Month, 2010—2014



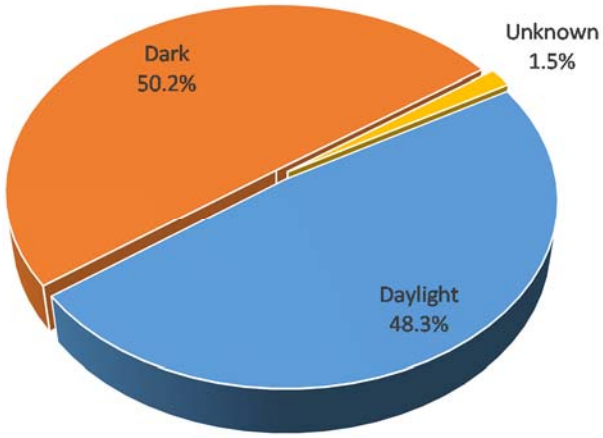
Data Source Signal Four Analytics Data Extract

Figure 19: Severe Injury Crashes by Time of Day, 2010—2014



Data Source Signal Four Analytics Data Extract

Figure 20: Severe Injury Crashes by Location Type, 2010—2014



Data Source Signal Four Analytics Data Extract

Figure 21: Severe Injury Crashes by Lighting Condition, 2010—2014

Severe Injury Crash Types

A more in-depth analysis of the two most frequent severe injury crash types (angle/left turn crashes and pedestrian/bicycle crashes) was conducted to better understand and trends and locational patterns of these crash types.

Angle/Left Turn Crashes

Figure 22 illustrates the annual distribution of all angle/left turn crashes during the five-year period. The annual number of angle/left turn crashes remained fairly constant between 2010 and 2012, but there has been a significant increase in the total number of angle/left turn crashes since 2013. While the total number of angle/left turn crashes has increased, there has been a decrease in the annual number of severe injury angle/left turn crashes; in 2010 there were 18 severe injury angle/left turn crashes within the corridor, in 2014 that number decreased to 11. It is assumed, similar to the increase in total crashes, that the increase in the total number of reported angle/left turn crashes is a result of the legislative changes in the way that crashes are report to the state.

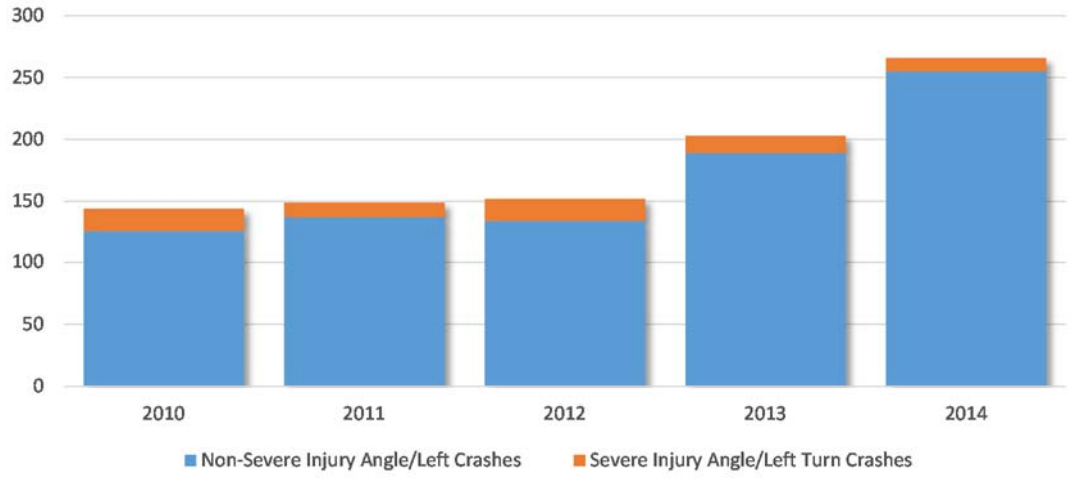
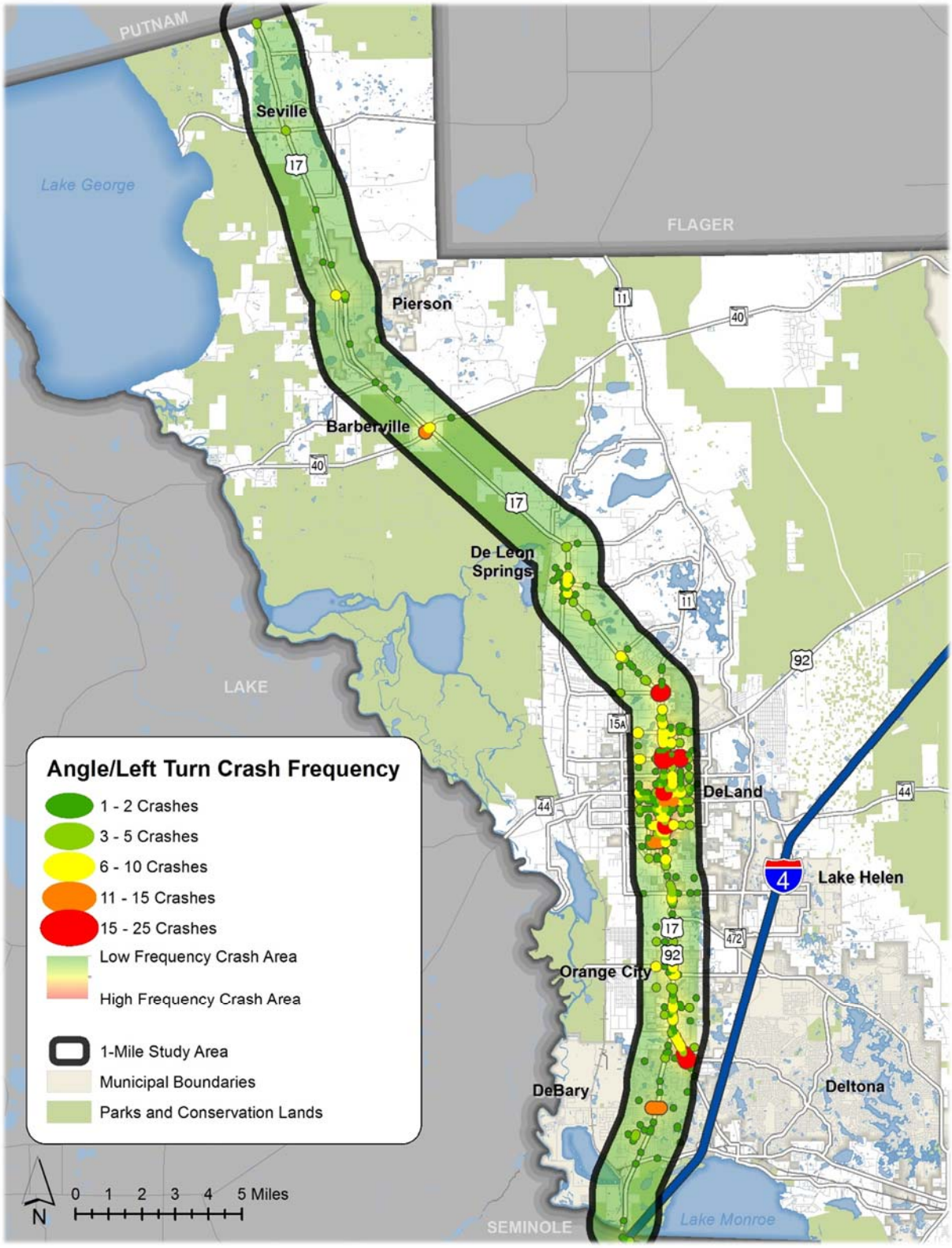


Figure 22: Annual Distribution of Angle/Left Turn Crashes

Map 19 illustrates the frequency and location of angle/left turn crashes within the corridor. As shown, most of the higher frequency angle/left turn crash areas are located within the City of DeLand, specifically US 17 at Beresford Avenue, US 17 at Plymouth Ave, US 17 at SR 11/Glenwood Rd, and US 17 at SR 44/New York Ave.



Data Source Signal Four Analytics Data Extract

Map 19: Angle/Left Turn Crashes, 2010—2014

Pedestrian and Bicycle Crashes

Figure 23 illustrates the annual distribution of pedestrian and bicycle crashes within the corridor. Since 2010, there has been a slight increase in the total number of pedestrian and bicycle crashes within the corridor. While the number of pedestrian and bicycle crashes, as a group, have increased there has been a decrease in the number of bicycle crashes; 22 in 2010 and 17 in 2014. Conversely, pedestrian crashes have increased from 20 in 2010 to 28 in 2014; 2012 had the largest number of pedestrian crashes with 32.

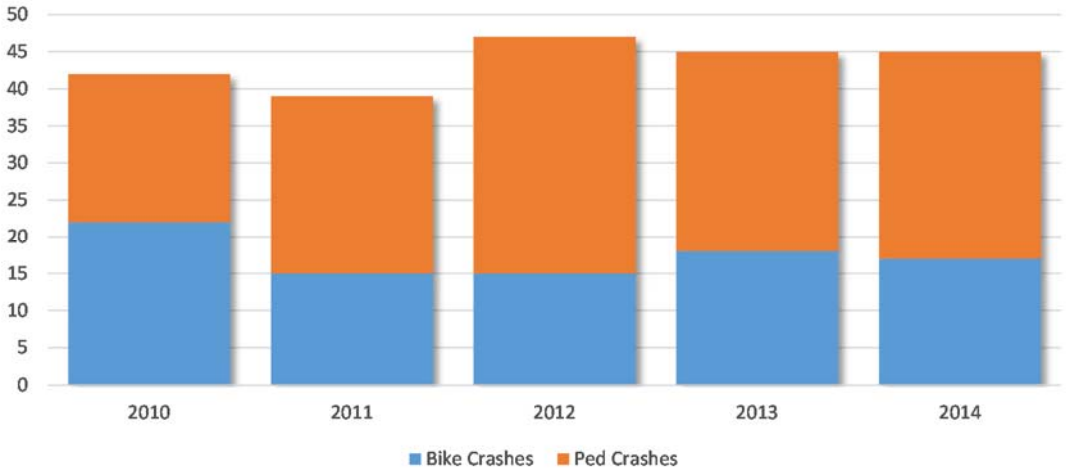
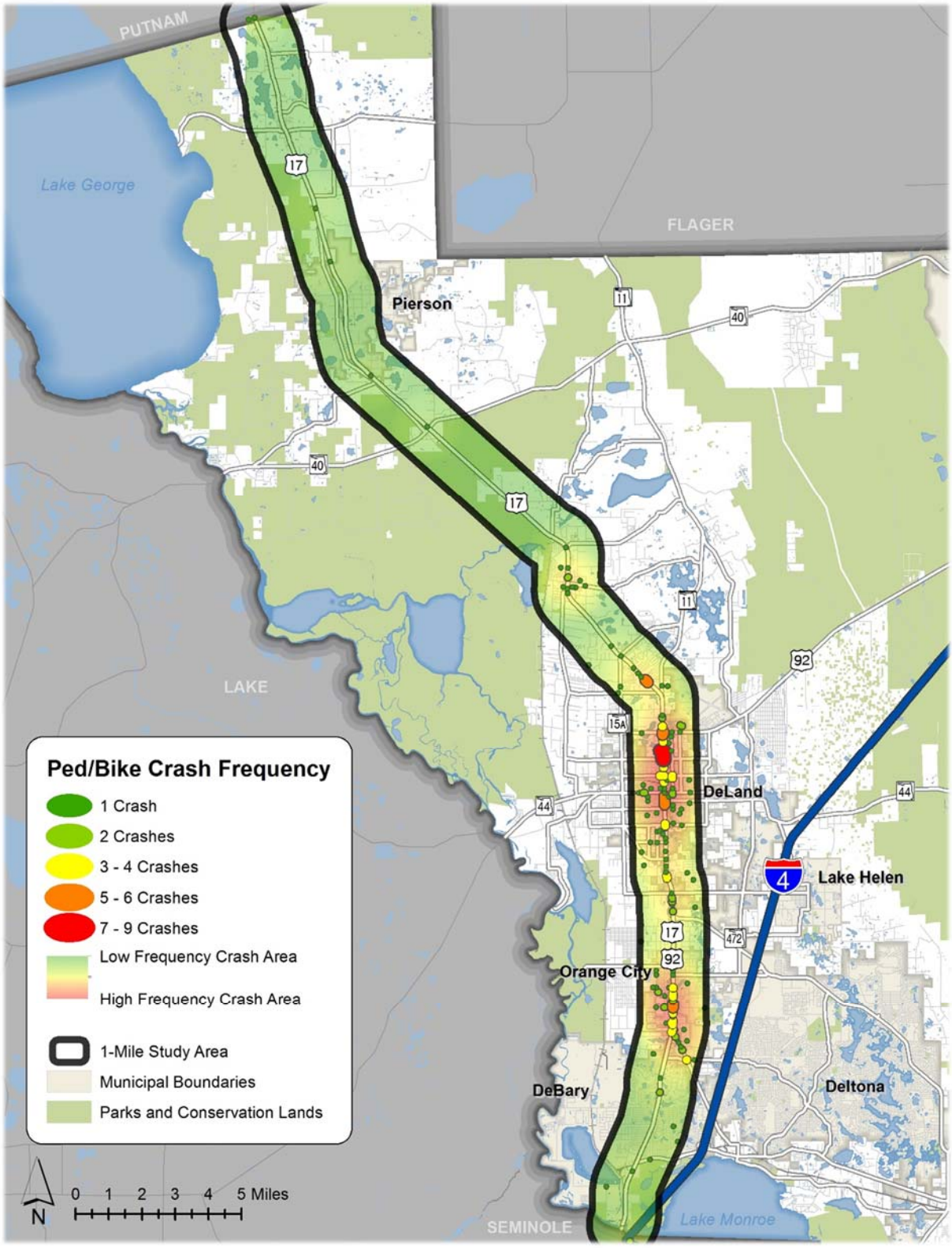


Figure 23: Annual Distribution of Pedestrian and Bicycle Crashes

Map 20 illustrates the frequency and location of pedestrian and bicycle crashes within the corridor. There are a few locations within the corridor that have a higher concentration of pedestrian and bicycle crashes; specifically near the intersection of US 17 and Plymouth Ave in DeLand, US 17 south of SR 44/New York Ave in downtown DeLand, and around the intersection of US 17 and Rhode Island Ave in Orange City.



Data Source Signal Four Analytics Data Extract

Map 20: Pedestrian and Bicycle Crashes, 2010-2014

LAND USE/SOCIOECONOMIC EVALUATION

Existing Land Use

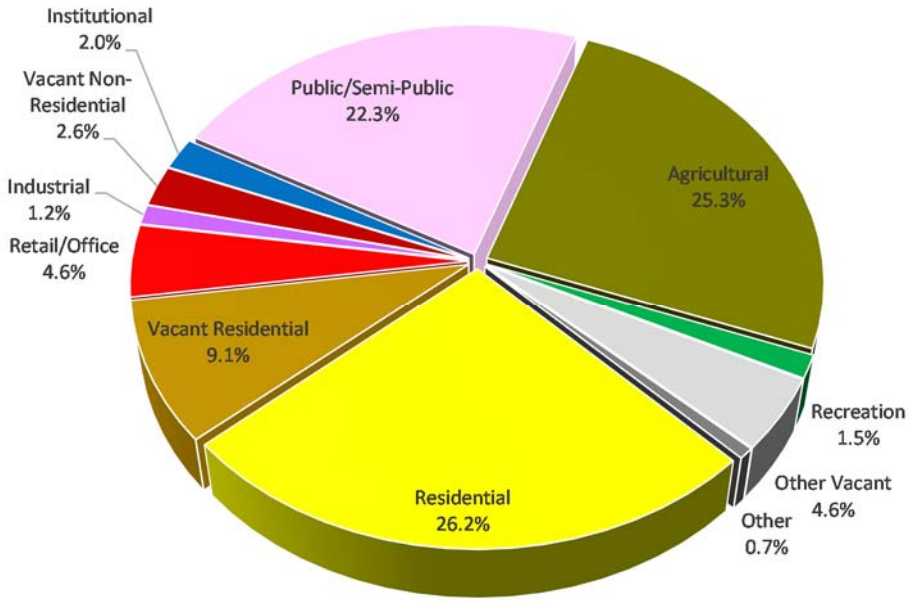
An analysis was conducted to understand the make-up and diversity of existing land uses within the corridor. As displayed in Figure 24 and Map 21, a majority of land area within the corridor study area is comprised of residential uses. After residential uses, agricultural, public/semi-public (government uses), and vacant residential make-up the majority of the corridor study area; combined these top four categories account for nearly 83 percent of the land area within the corridor study area.

Examining the properties that directly front US 17 highlights some diversity of land uses along the corridor. Table 12 summarizes the existing land use of properties that directly front US 17. As shown, Retail/Office uses make-up the largest number of frontage properties at 45 percent, followed by vacant non-residential uses and public/semi-public uses.

Future Land Use

Figure 25 shows the distribution of land uses within the corridor study area based on generalized future land use designations. Similar to the existing land use distribution, residential uses are expected to comprise the majority of acreage within the corridor with a combined percentage of 37.2 percent. Also similar to the existing land use distribution, is that agricultural uses are expected to comprise the second highest amount of acreage within the corridor at 20.3 percent of the land area. Again, similar to the existing land use pattern, and as shown in Map 22, most of the non-residential and non-agricultural uses either front US 17 or are located adjacent to US 17 along intersecting roadways, and that the majority of the agricultural uses are located in the northern portion of the corridor study area.

In addition to looking at future land use patterns, a review of some of the existing “plan areas” along the corridor was conducted. These areas included the DeBary Transit Oriented Development Plan, Orange City Community Redevelopment Plan, and the DeLand 2050 Plan. The reviewed documents stressed the importance of the relationship between land use and transportation and identified several strategies to encourage and improve multimodal travel, in which many are specific to the US 17 corridor. Map 23 shows the identified plan areas along the corridor.



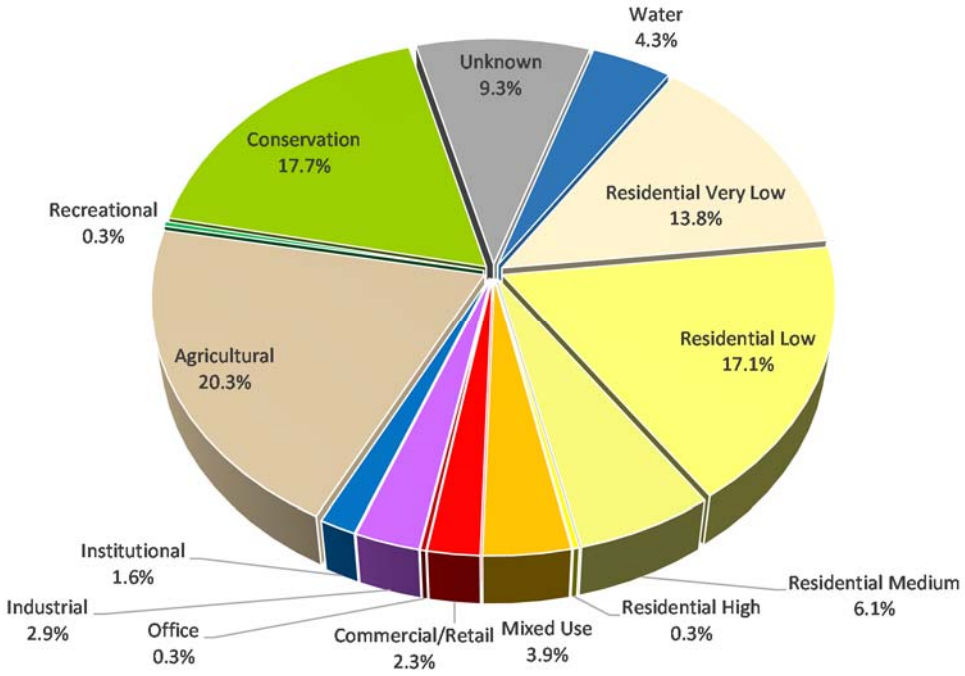
Data Source: University of Florida GeoPlan Center

Figure 24: Distribution of Existing Land Uses (Total Acreage)

Table 12: Existing Land Use Composition of Properties Fronting US 17

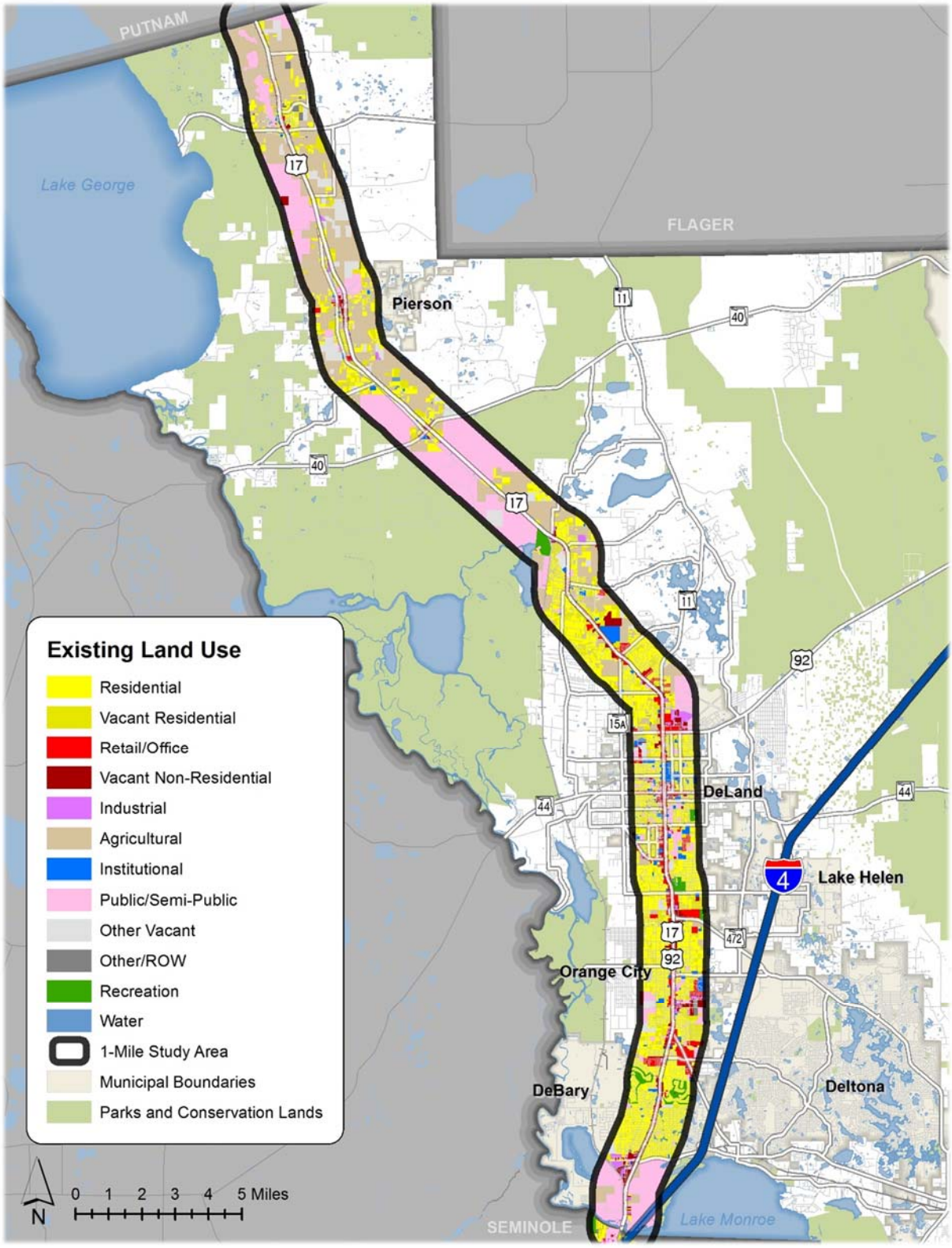
Existing Land Use Category	% of Total Parcels (count)
Residential	6.6%
Vacant Residential	5.6%
Retail/Office	45.0%
Industrial	4.8%
Vacant Non-Residential	20.5%
Institutional	4.6%
Public/Semi-Public	6.7%
Agricultural	4.1%
Recreation	0.1%
Other Vacant	1.5%
Other	0.4%

Data Source: University of Florida GeoPlan Center



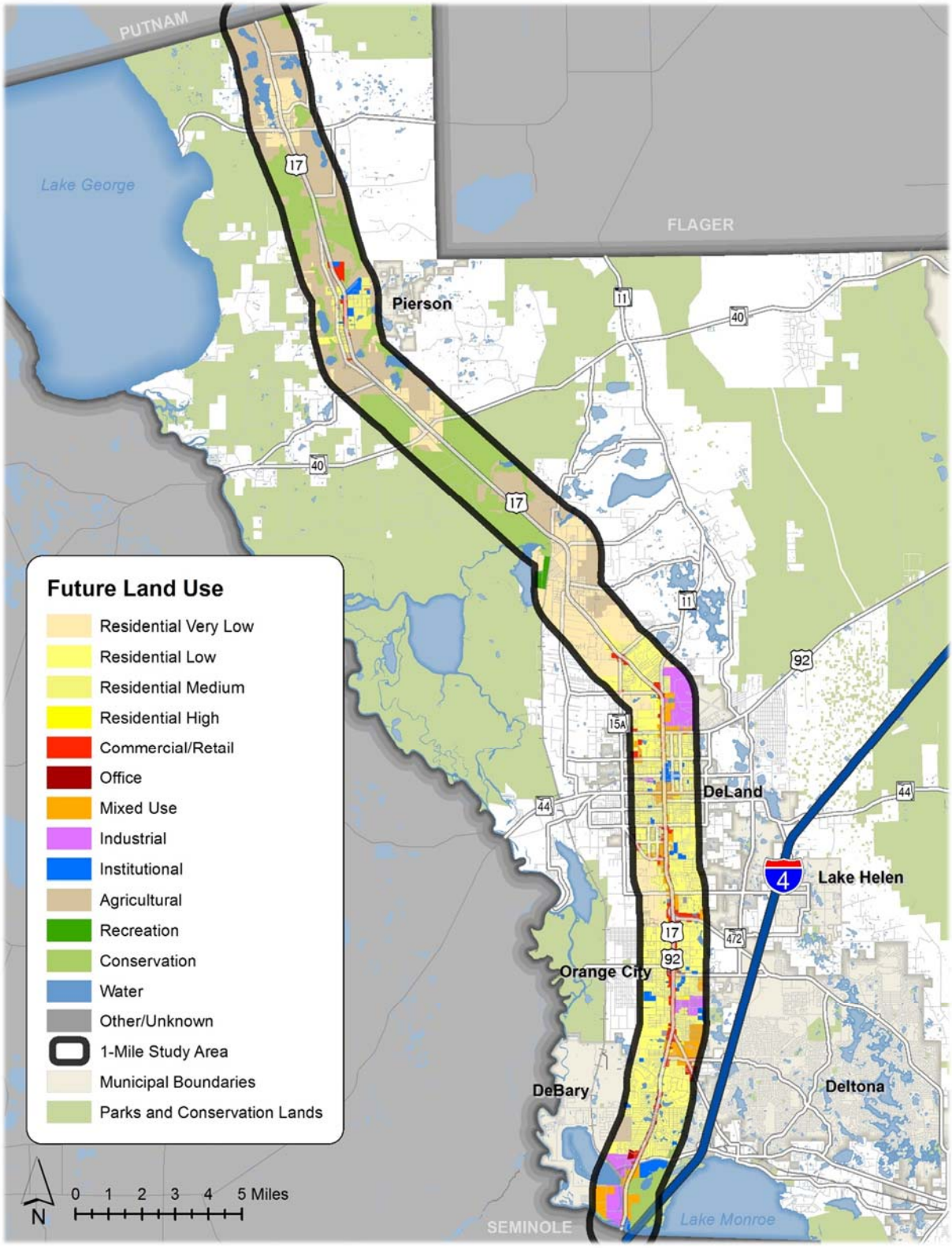
Data Source: East Central Florida Regional Planning Council - CFGIS

Figure 25: Distribution of Future Land Uses (Total Land Area)



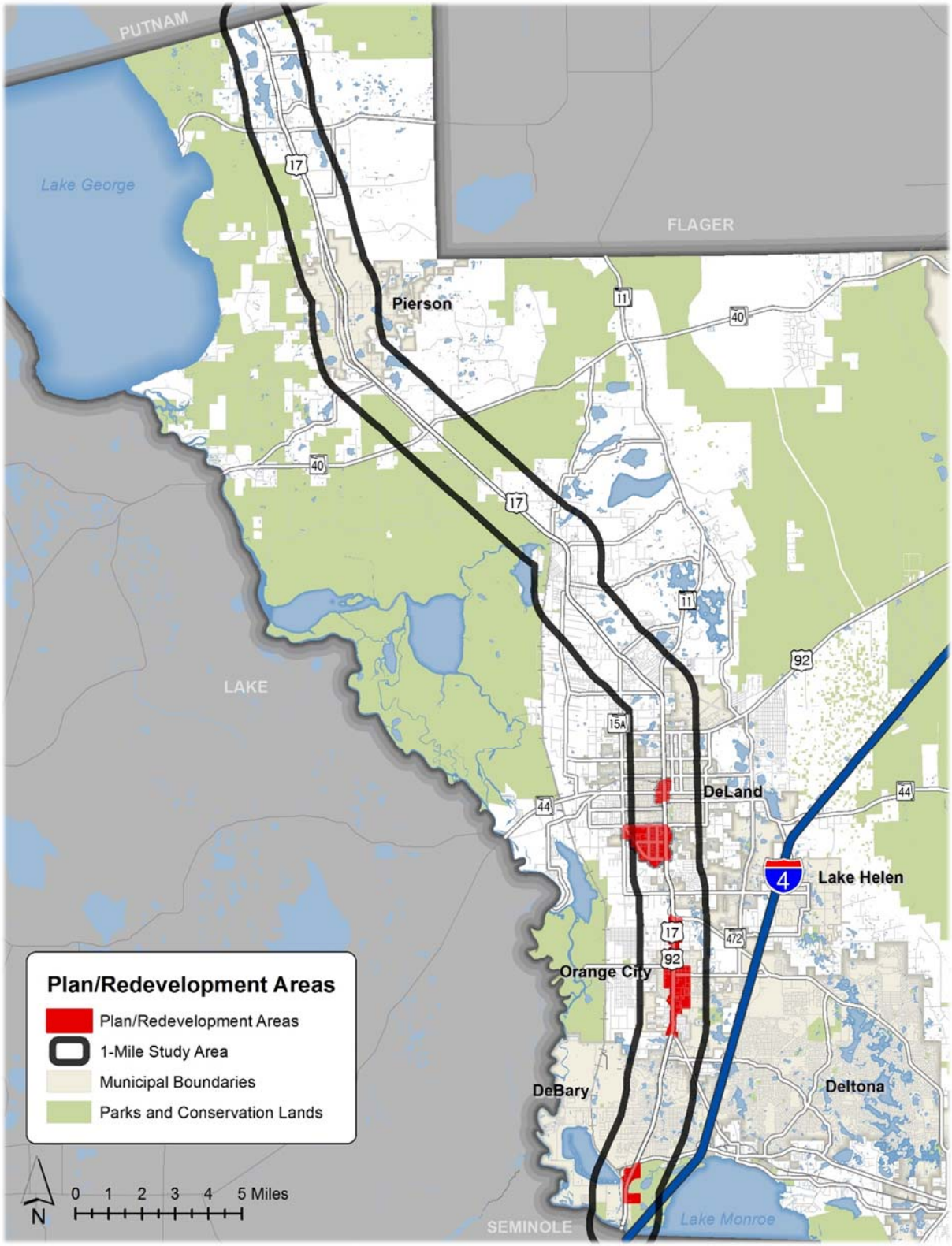
Data Source: University of Florida GeoPlan Center

Map 21: Generalized Existing Land Use



Data Source: East Central Florida Regional Planning Council - CFGIS

Map 22: Generalized Future Land Use



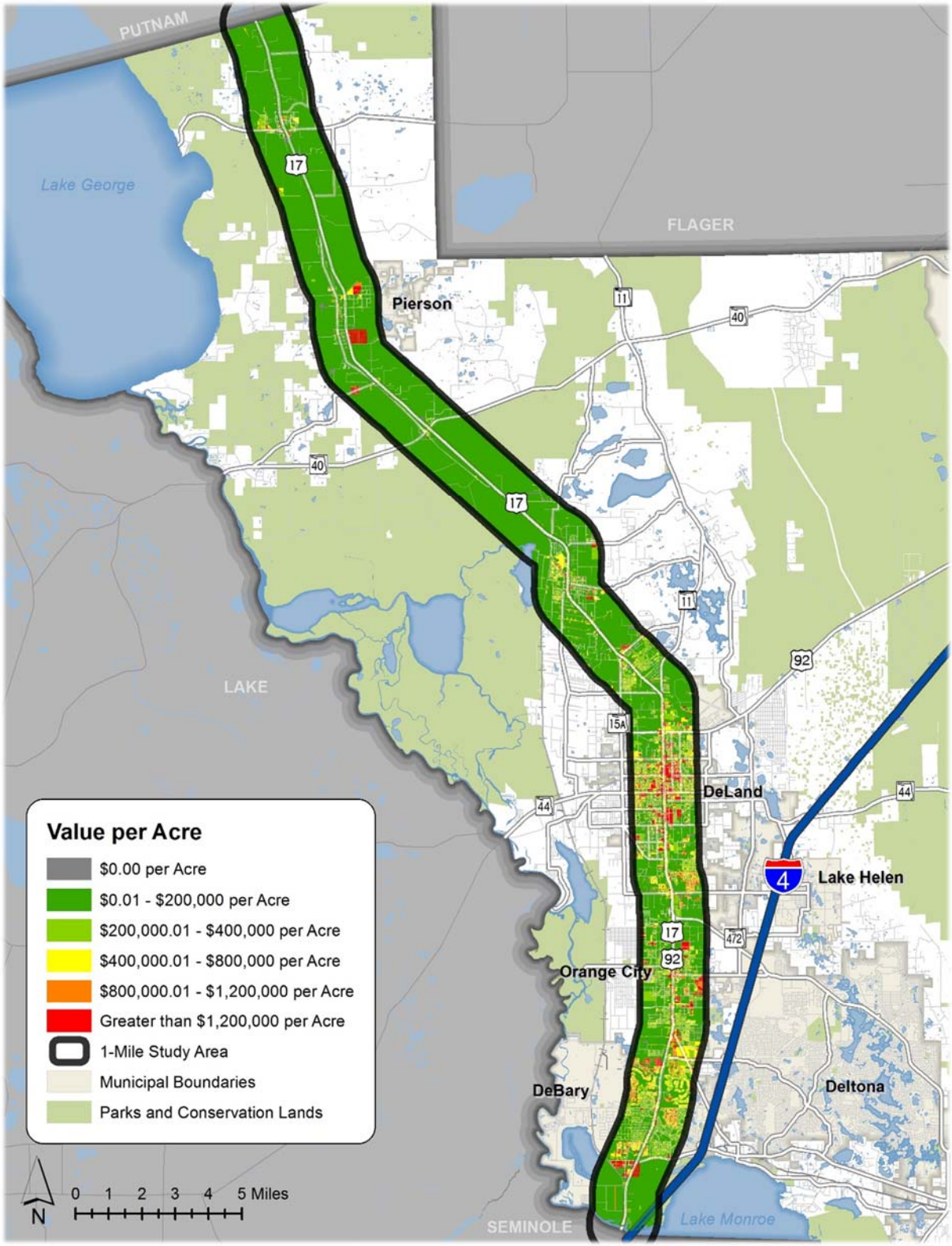
Map 23: Plan/Redevelopment Areas

Property Value Evaluation

Evaluating the market value of properties within an area can help in understanding the basic economic market of that area, which can help in identifying areas that may be ideal for reinvestment or redevelopment and could change the mobility demand for that area. Using parcel data from the Volusia County Property Appraiser, an analysis of current property values was completed for parcels within the corridor study. The results of this analysis is illustrated in Map 24. There are some clusters of higher-valued properties within the corridor, but overall most of the properties are modestly valued, with nearly 55 percent of the properties having a market value of under $400,000 per acre, which equates to $100,000 for a quarter-acre property.

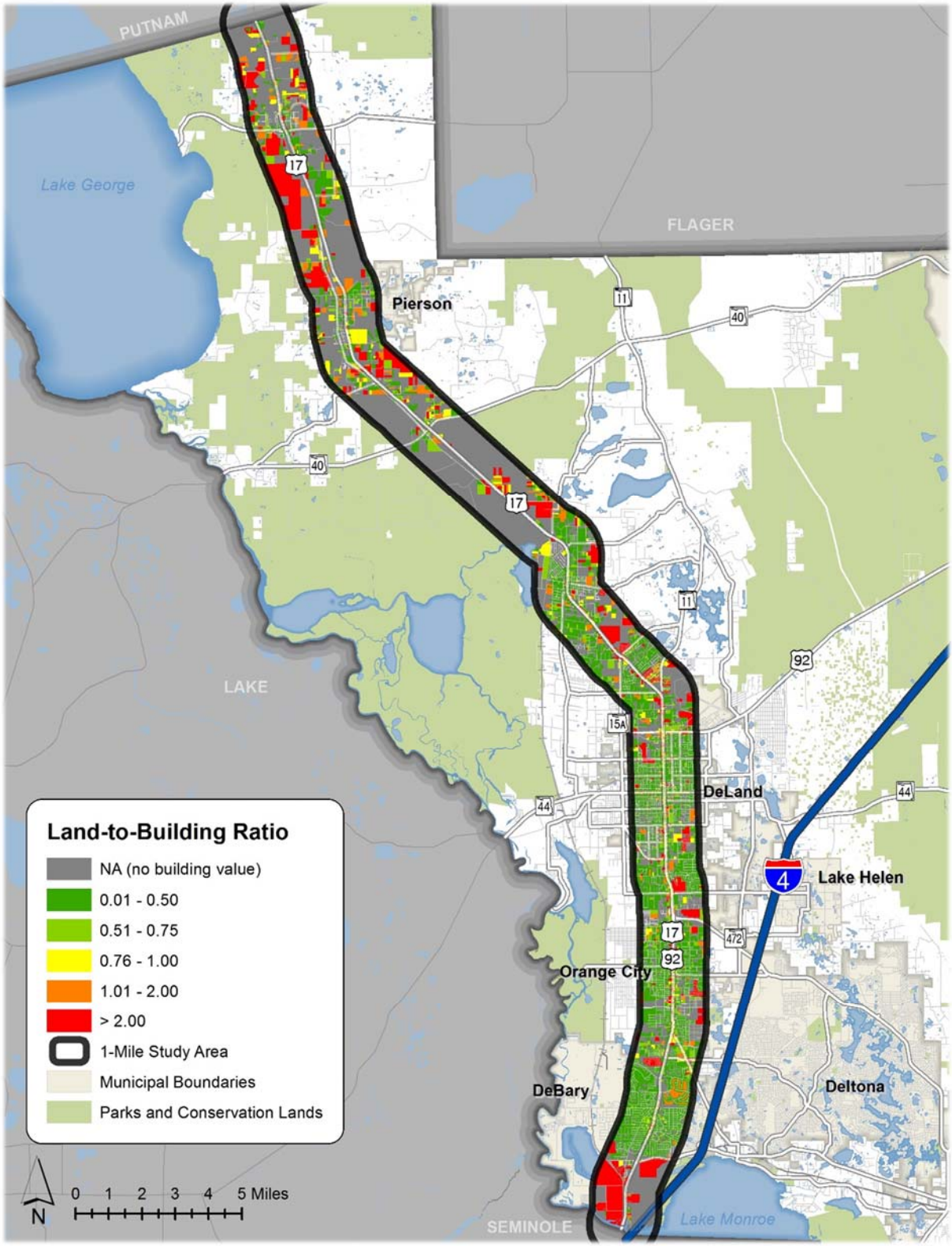
In addition to examining the current market value per acre, an evaluation of the ratio of land-to-building value was conducted. The land-to-building value ratio is a good indicator for identifying properties that may be underperforming economically. Properties with a land-to-building value ratio greater than 1.0 means that the value of the structure is less than the value of the land and signifies that the site may be prime for rehabilitation, redevelopment, or reinvestment of some kind. However, when evaluating land-to-building value ratios, it is important to note that the ratio is less sensitive to higher land values that might be based on geographic location (e.g., downtown properties and waterfront properties) and may not provide a clear picture of the economic value of some properties. As a general rule, it is best to use land-to-building value ratios to identify general patterns or larger sub-areas where undervalued structures may be located, particularly when combined with other economic indicators.

Map 25 shows the land-to-building value ratio for properties along the corridor. There are some locations throughout the corridor with higher land-to-building value ratios, but overall, the majority of properties within the study corridor exhibit lower land-to-building value ratios, which is a general indicator of relative market stability within the area.



Data Source: Volusia County Property Appraiser Parcel Database August 2015

Map 24: Market/Just Value per Acre

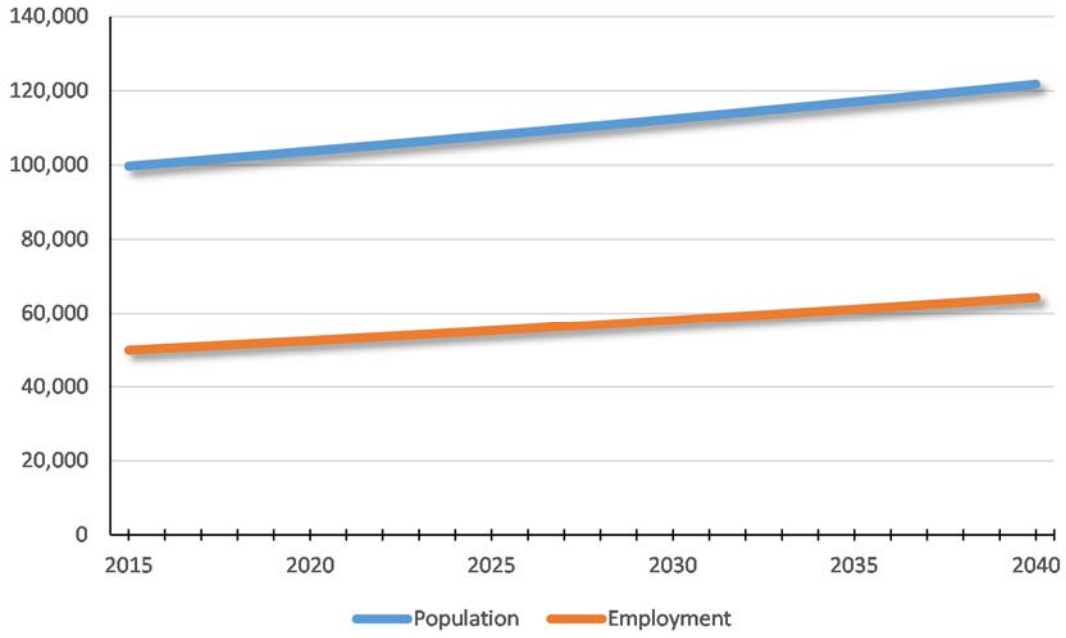


Data Source: Volusia County Property Appraiser Parcel Database August 2015

Map 25: Land-to-Building Value Ratio

Population and Employment Statistics

An evaluation of existing and projected population and employment densities was conducted for the corridor using data developed for the R2CTPO's latest long range transportation plan (LRTP).. Higher population and employment densities are often associated with a higher percentage of alternative mode share. However, this information is primarily being used to identify areas along the corridor that are projected to experience significant growth. Between 2015 and 2040, the population within the US 17 corridor is projected to increase by approximately 22,000 people, equating to an average annual growth rate of 0.80 percent. During this same time period, employment within the corridor is projected to increase by more than 14,500 employees, equating to an average annual growth rate of 1.03 percent. For comparison purposes, the average annual countywide population growth rate for Volusia County between 2015 and 2040 is projected at 0.60 percent and the annual employment growth rate is projected at 1.24 percent. So, when compared to the countywide projections, population growth within the corridor is project to grow at a rate higher than the countywide average and employment is projected to grow at a rate slower than the projected countywide average. Figure 26 illustrates the projected population and employment growth for the corridor. One note on the population and employment projections is that the current projections do not include the potential population and employment changes associated with potential future development within the City of DeBary's Transit Oriented Development master plan area, therefore projections within this area may be lower than expected.



Data Source: R2CTPO/Central Florida Regional Planning Model

Figure 26: Projected Population and Employment Growth (2015—2040)

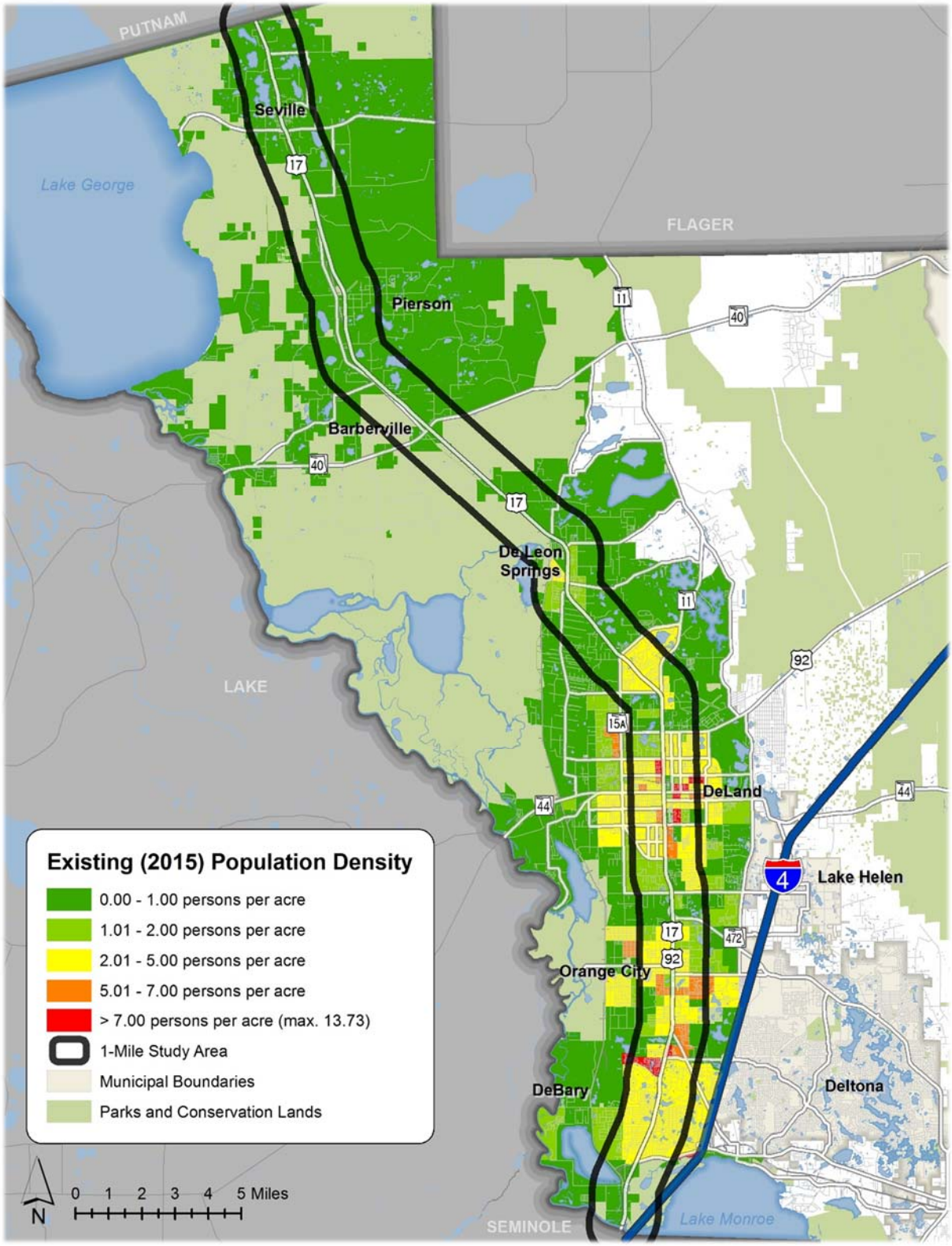
Population Density

Map 26 and Map 27 illustrate the existing and projected population densities (population per acre) for the Traffic Analysis Zones (TAZ) within the corridor. For the purposes of these maps the acreage calculation for the TAZs does not include acreage categorized as bodies of water, parks, or conservation land. As illustrated in both the existing and projected population density maps the areas with the highest density of population are, and are projected to be, the areas along the corridor within central DeLand (between Beresford Avenue and Plymouth Avenue), Orange City south of Graves Avenue, and in DeBary south of Saxon Boulevard.

Map 28 shows the projected percent change in population by TAZ within the corridor. As illustrated, some of the areas along the corridor with the highest projected percent population growth include, the area around US 17 and US 92/International Speedway Blvd, US 17 and SR 472, US 17 and Enterprise Boulevard. In addition to these areas there are a few locations along the periphery of the study area that are also projected to experience significant percent population growth, including the Victoria Park area in southeast DeLand, the area around the planned DeLand SunRail station, and in southern DeBary near the existing SunRail station.

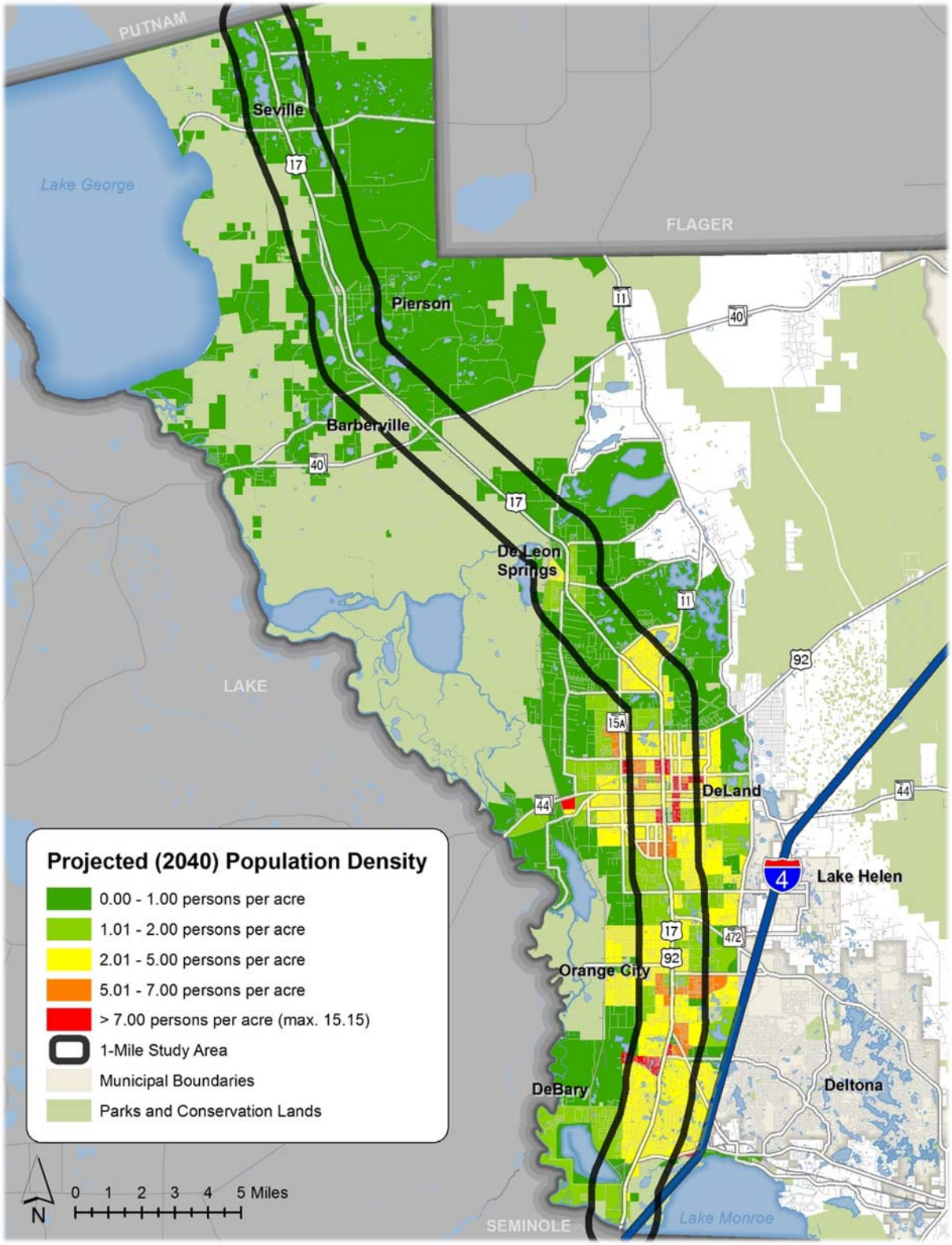
Employment Density

Map 29 and Map 30 illustrate the existing and projected employment densities (employees per acre) for the TAZs within the corridor. As with population density, acreage categorized as bodies of water, parks, and conservation land, were omitted from the density calculation. As illustrated in both the existing and projected employment density maps there is projected to be little change in the density and concentration of employment within the corridor. The locations with the highest density of employment are, and are projected to be, the downtown DeLand area, the area around the intersection of US 17 and US 92/International Speedway Boulevard, and the area around US 17, Enterprise Boulevard, and Saxon Boulevard in DeBary. Map 31 shows the projected percent change in employment within the corridor. As shown, along the corridor the areas with the highest projected percent employment change are near the areas of US 17 and SR 472, US 17 and Graves Avenue, US 17 near Dirksen Drive, and US 17 near SR 11/Spring Garden Avenue.



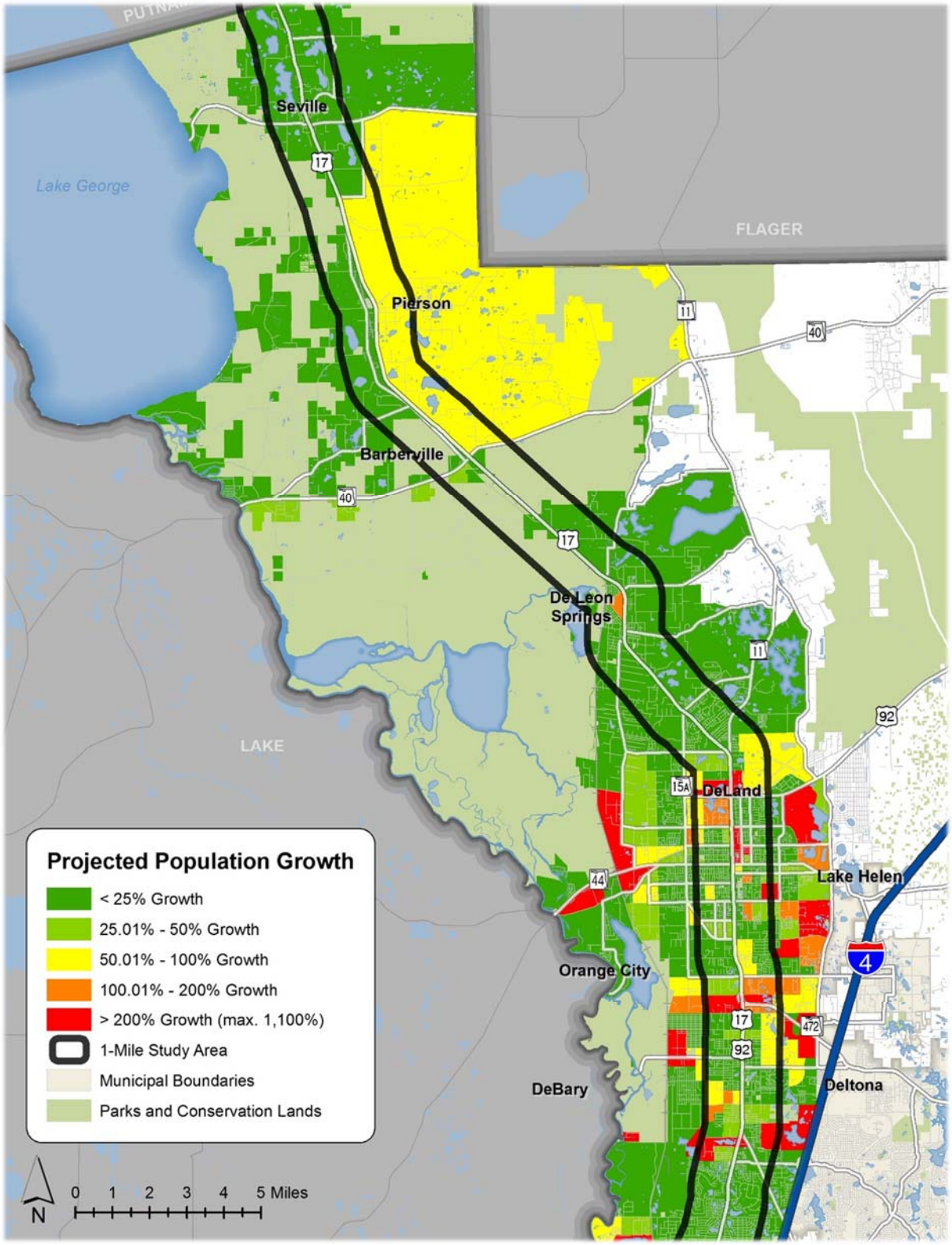
Data Source: Central Florida Regional Planning Model

Map 26: Existing Population Density (2015)



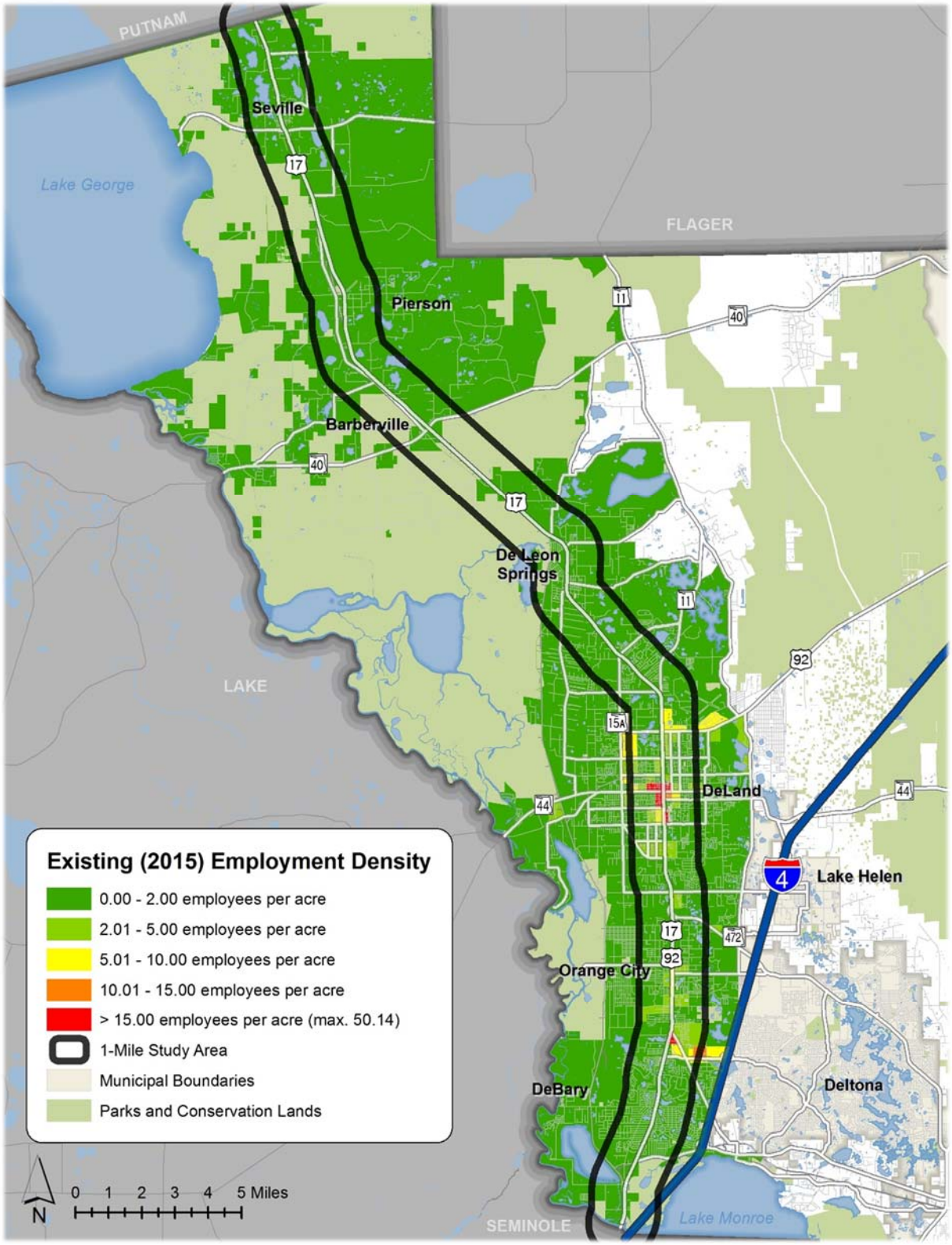
Data Source: Central Florida Regional Planning Model

Map 27: Projected Population Density (2040)



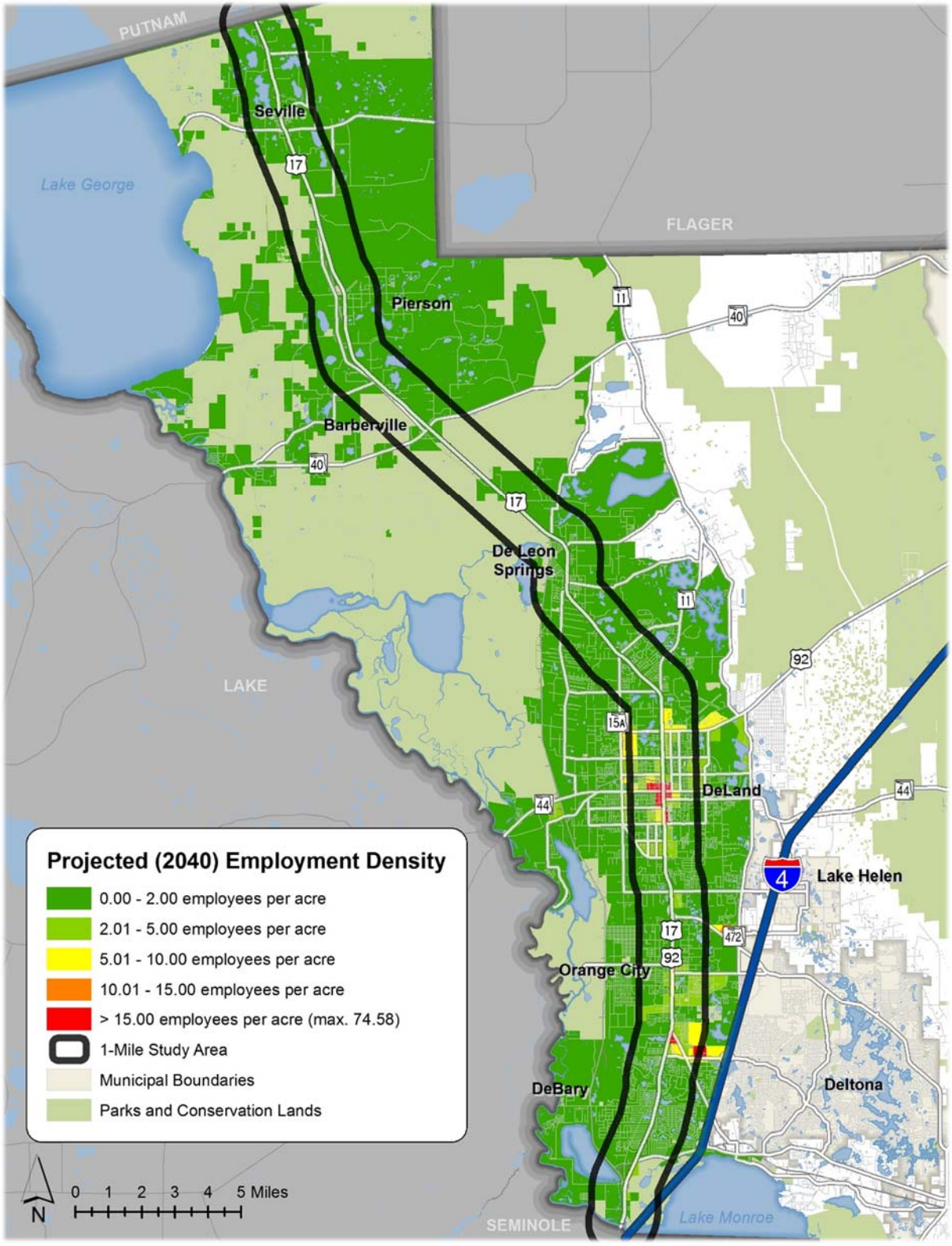
Data Source: Central Florida Regional Planning Model

Map 28: Projected Population Growth (2015—2040)



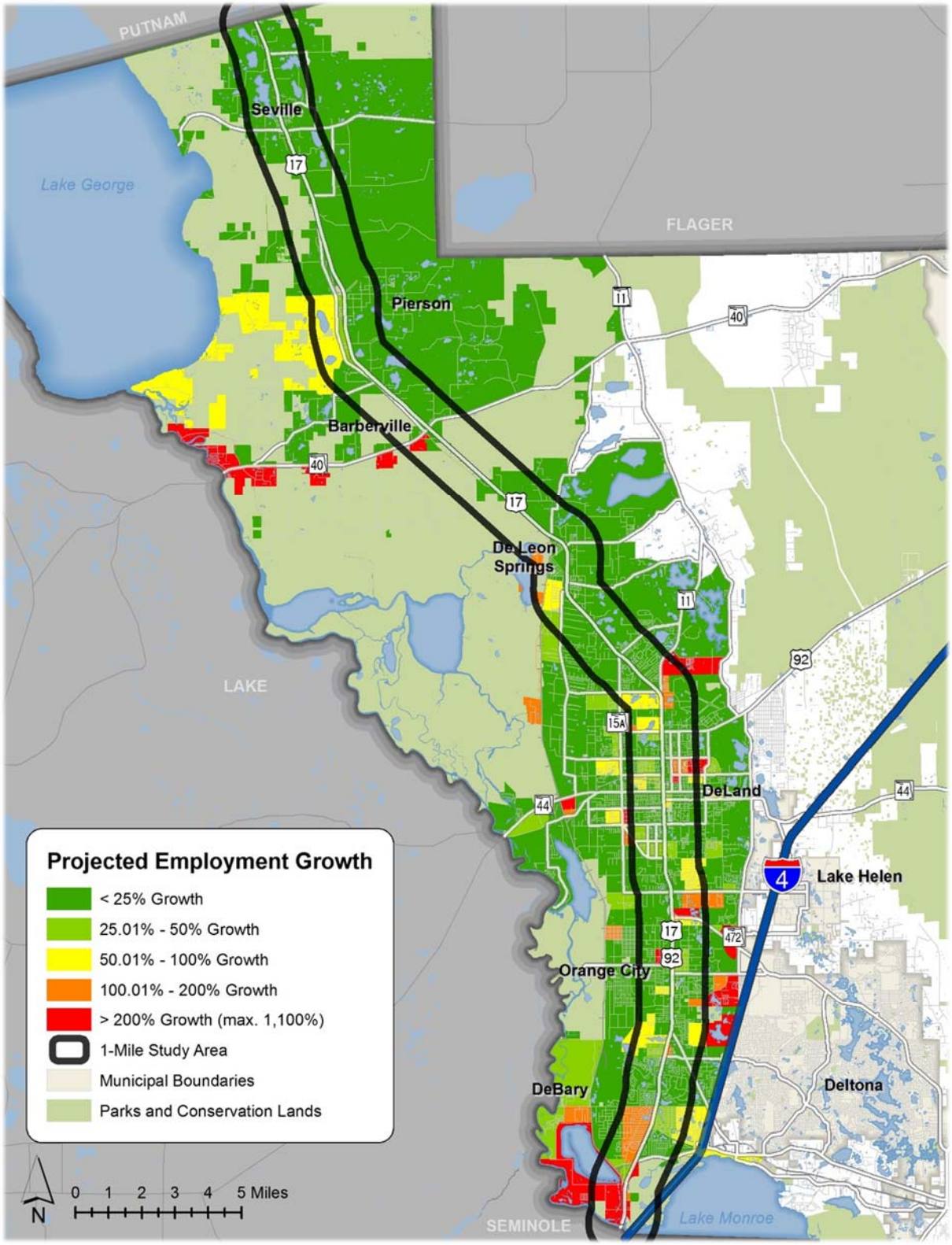
Data Source: Central Florida Regional Planning Model

Map 29: Existing Employment Density (2015)



Data Source: Central Florida Regional Planning Model

Map 30: Projected Employment Density (2040)



Data Source: Central Florida Regional Planning Model

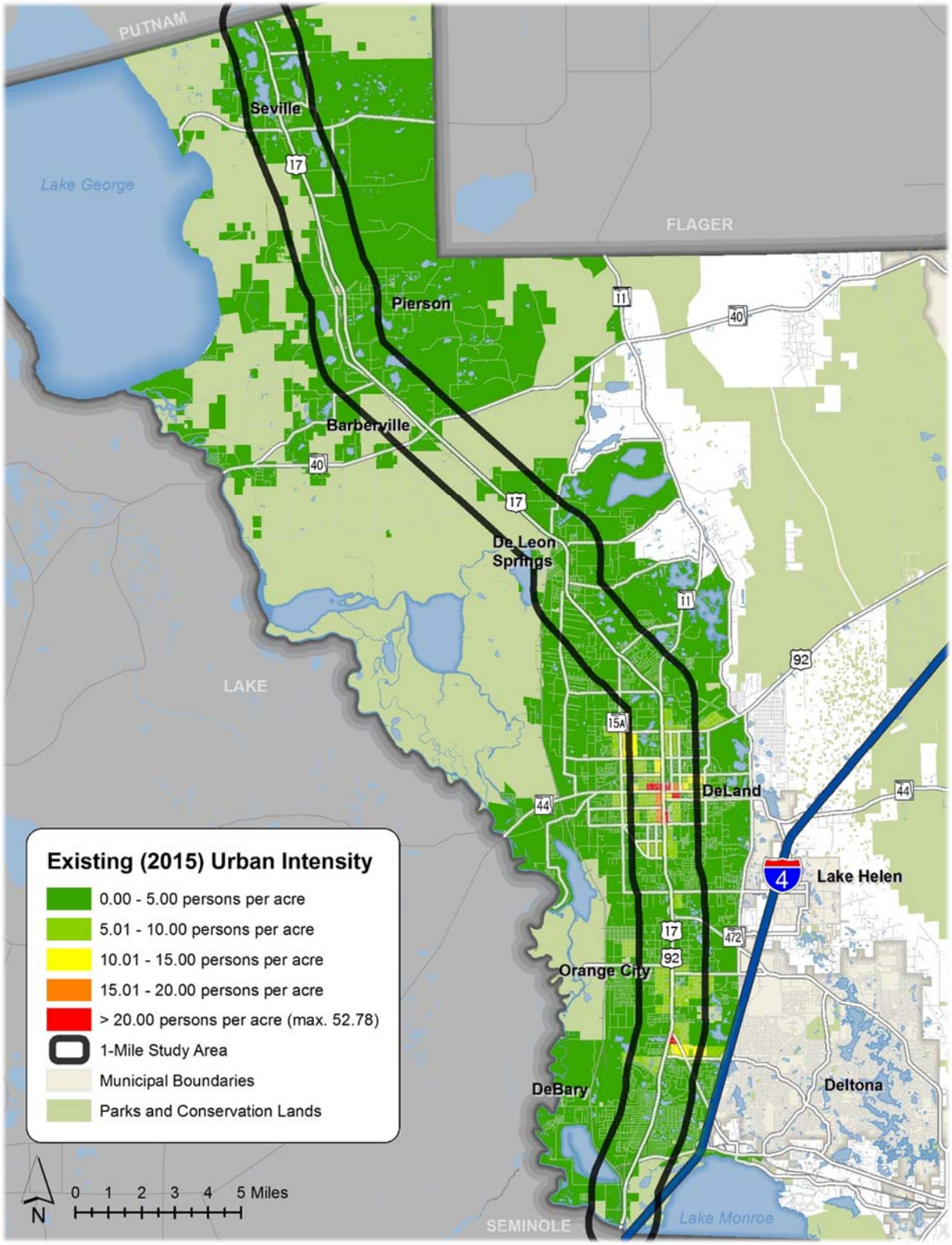
Map 31: Projected Employment Growth (2015—2040)

Urban Intensity

Another measure that can be used to gauge multimodal tendencies is urban intensity, or the density of population plus employment. Research shows there is a fundamental urban intensity threshold of approximately 14 persons per acre where automobile dependency begins to be significantly reduced.[2] The 14-person per acre figure corresponds to about 7 dwelling units per acre, which is often noted as being a critical threshold for basic transit supportiveness. Research suggests that at this level of urban intensity (14 persons per acre), an area starts to become less automobile-depended and walking, biking, and transit become more viable transportation options. Below this threshold the physical constraints of distance and time often dictate the necessity for automobile use over other modes. However, it is important to note that, while urban intensity is one indicator of multimodal potential, it does not necessarily dictate the need or attractiveness for other multimodal options, as these are often predicated on a number of factors and conditions.

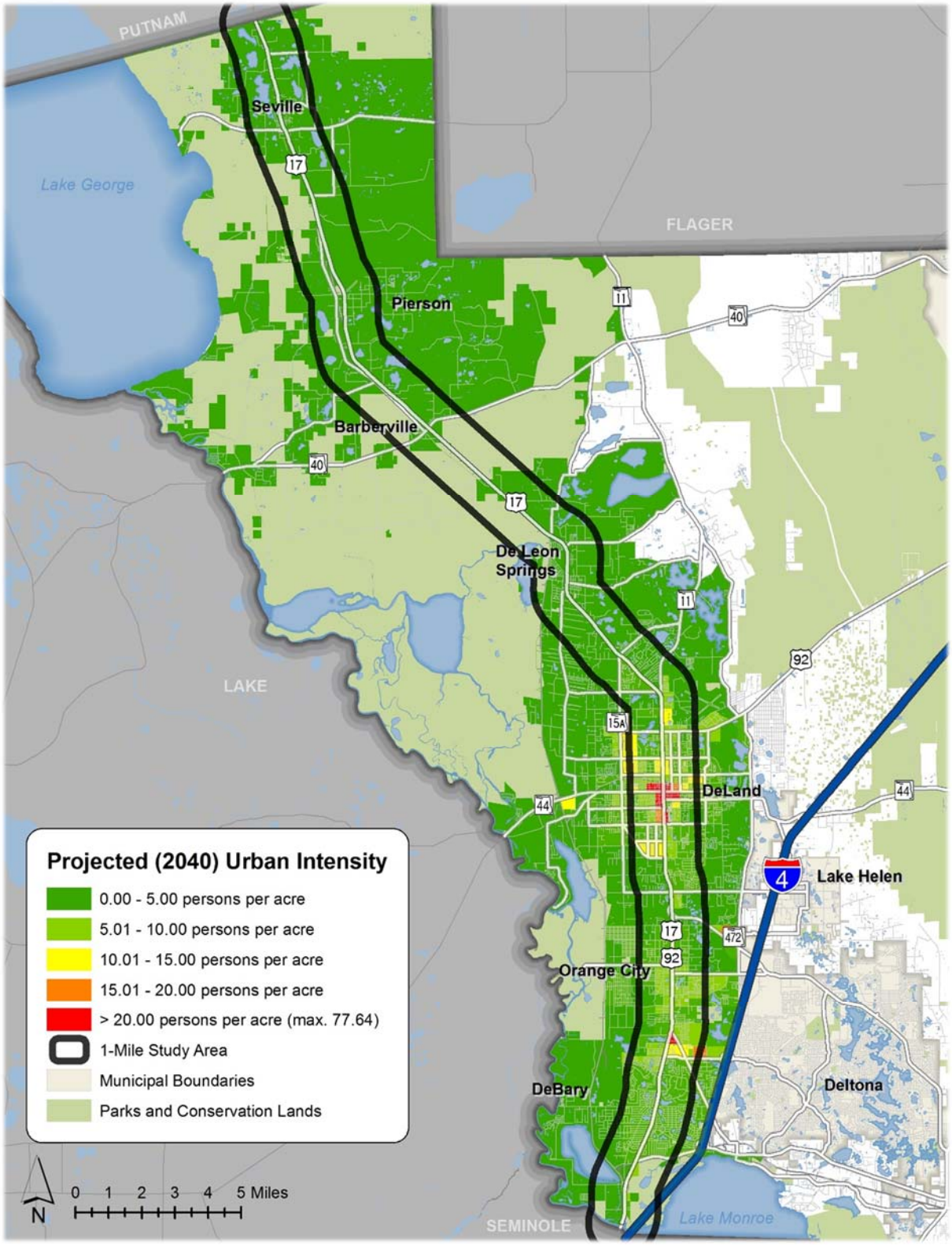
As illustrated in Map 32, there are currently only a few locations along the corridor that are near or greater than the 14-persons per acre threshold. These include areas within downtown and central DeLand and in DeBary where US 17 and Enterprise Rd intersect. Examining the future urban intensity map (Map 33) shows some increase in areas that are near the 14-persons per acre threshold, but that for the most part the areas along the corridor are projected to remain relatively the same, in terms of urban intensity. Map 34 shows the projected percent urban intensity change within the corridor. Even though there is little projected change in actual urban intensity within the corridor, as illustrated in Map 34, there are areas along the corridor (especially along the periphery) that are projected to experience a significant (percentage) change in urban intensity.

[2] Newman and Kenworthy (2006), "Urban Design to Reduce Automobile Dependence."



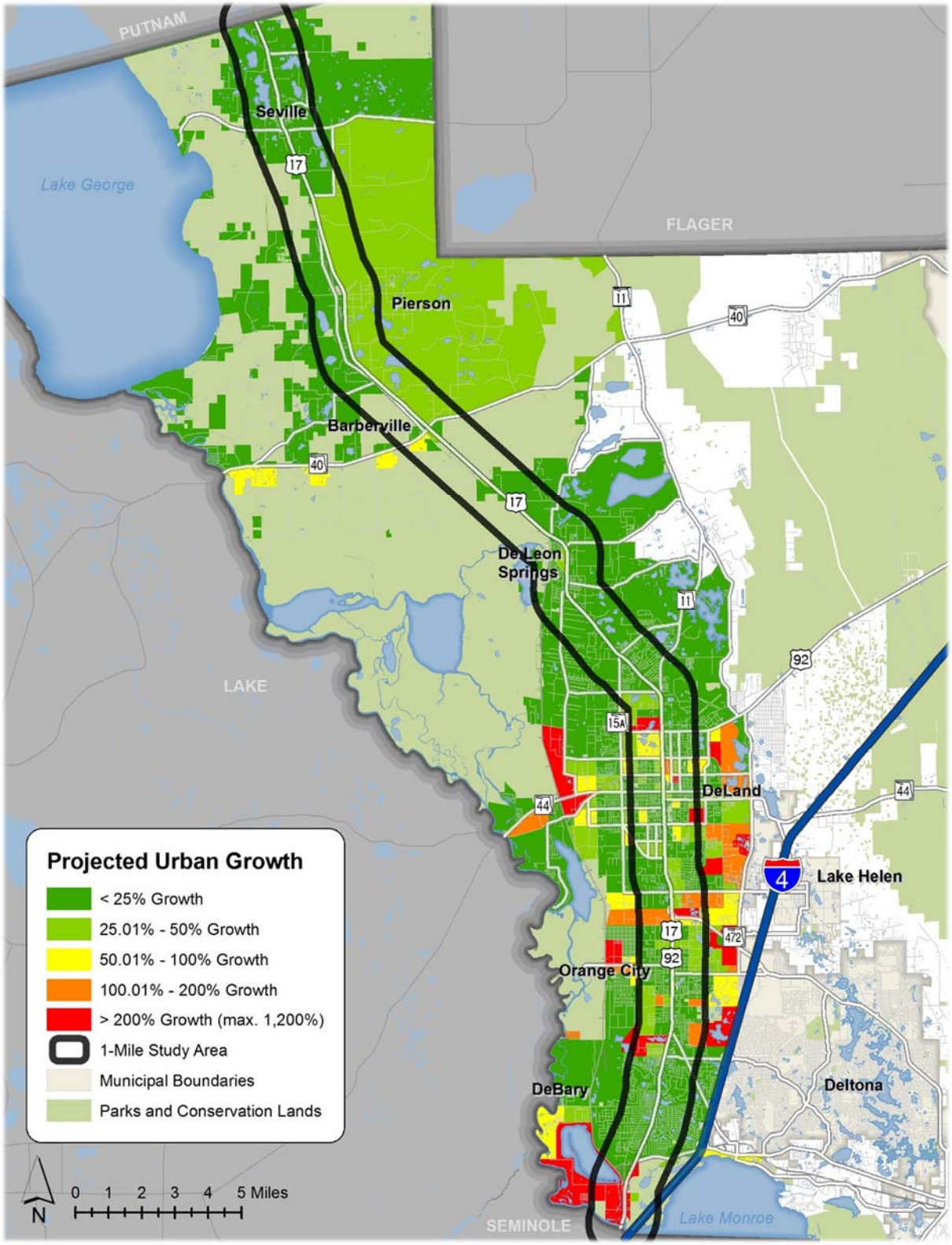
Data Source: Central Florida Regional Planning Model

Map 32: Existing Urban Intensity (2015)



Data Source: Central Florida Regional Planning Model

Map 33: Project Urban Intensity (2040)



Data Source: Central Florida Regional Planning Model

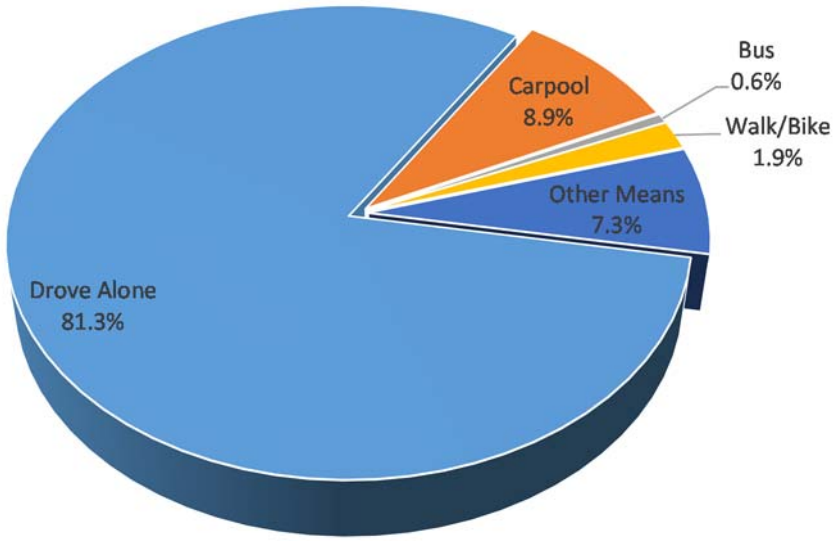
Map 34: Project Urban Intensity Growth (2015—2040)

Socioeconomic Evaluation

An evaluation of key socioeconomic and demographic indicators including commuting patterns, income, and age was completed using data from the U.S. Census Bureau's 2013 Five-Year American Community Survey (ACS). Socioeconomic indicators often provide a good indication of where multimodal activity might be expected and where there are special populations that could require particular mobility considerations.

Means of Travel to Work

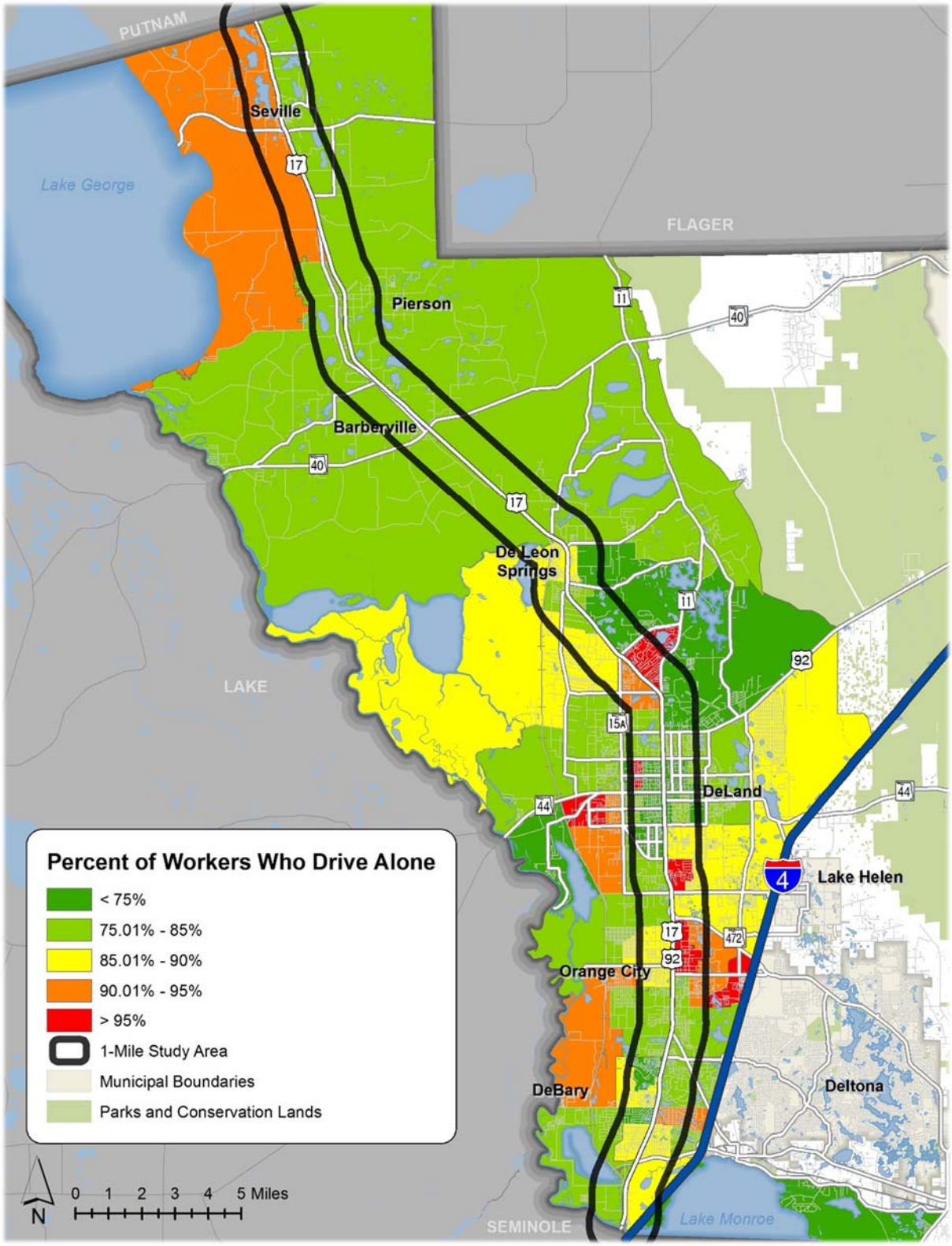
Data reflecting the existing means of transportation to work for workers living within the census block groups along the corridor were evaluated using data from the 2013 ACS. Figure 27 shows a break-down of the means of transportation for workers along the corridor. As illustrated, a majority of the workers (81.3 percent) who live within the corridor drive alone as their primary means of transportation to and from work. Within Volusia County the percent of worker who drive alone to work is 82.1 percent.



Data Source: U.S. Census Bureau 2013 5-Year ACS

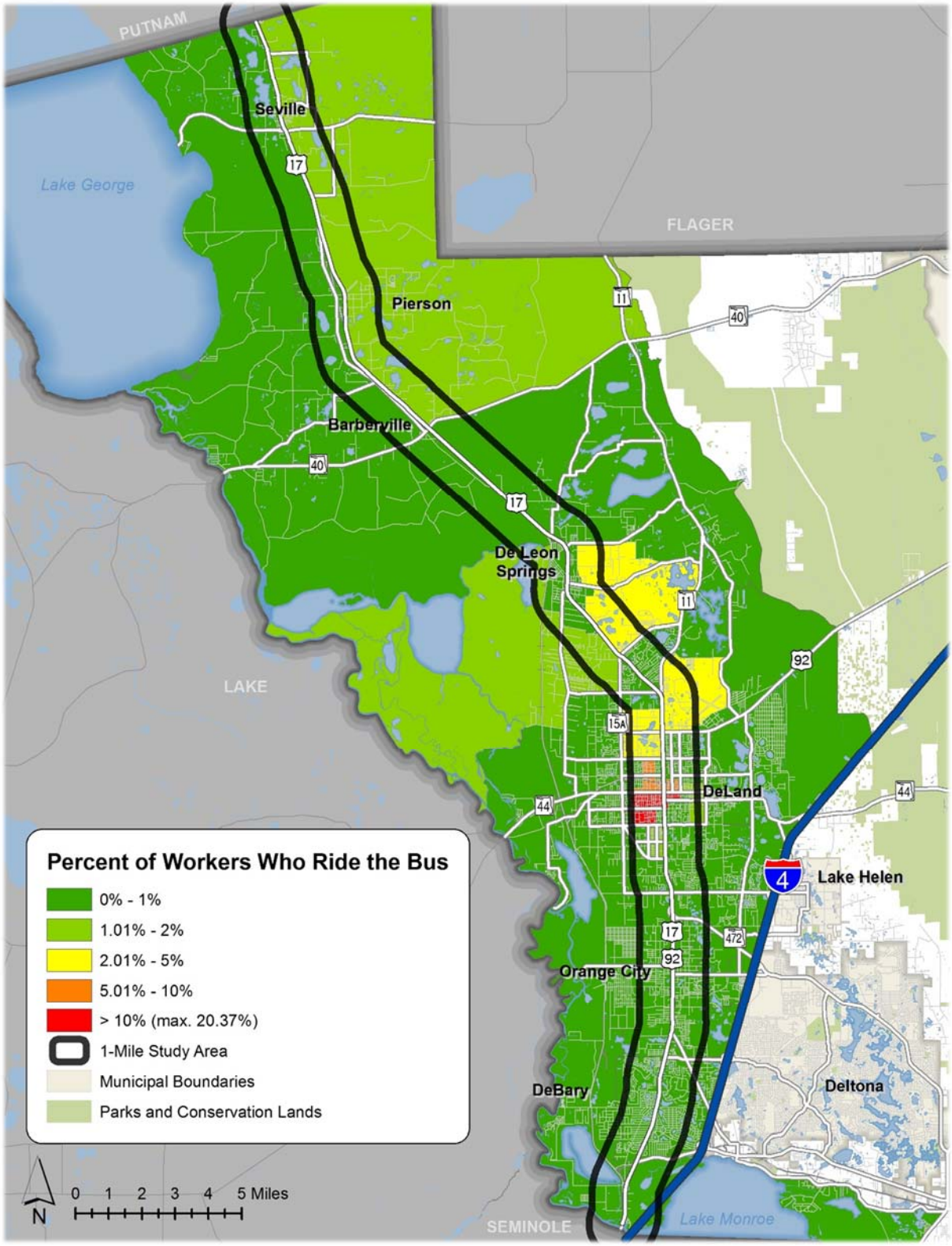
Figure 27: Means of Transportation to Work

Map 35 through Map 36 illustrate, by census block group, the percent of worker along the corridor who either drive alone, use public transportation (the bus), or walk/bike as their primary means of travel to work. As illustrated in Map 36 and Map 37, there is a concentration of block groups in and around downtown DeLand have a higher percentage of workers who ride the bus, walk, or bike as their primary means of travel to work. Countywide approximately 0.9 percent of workers use public transportation and 2.23 percent walk or bike to work.



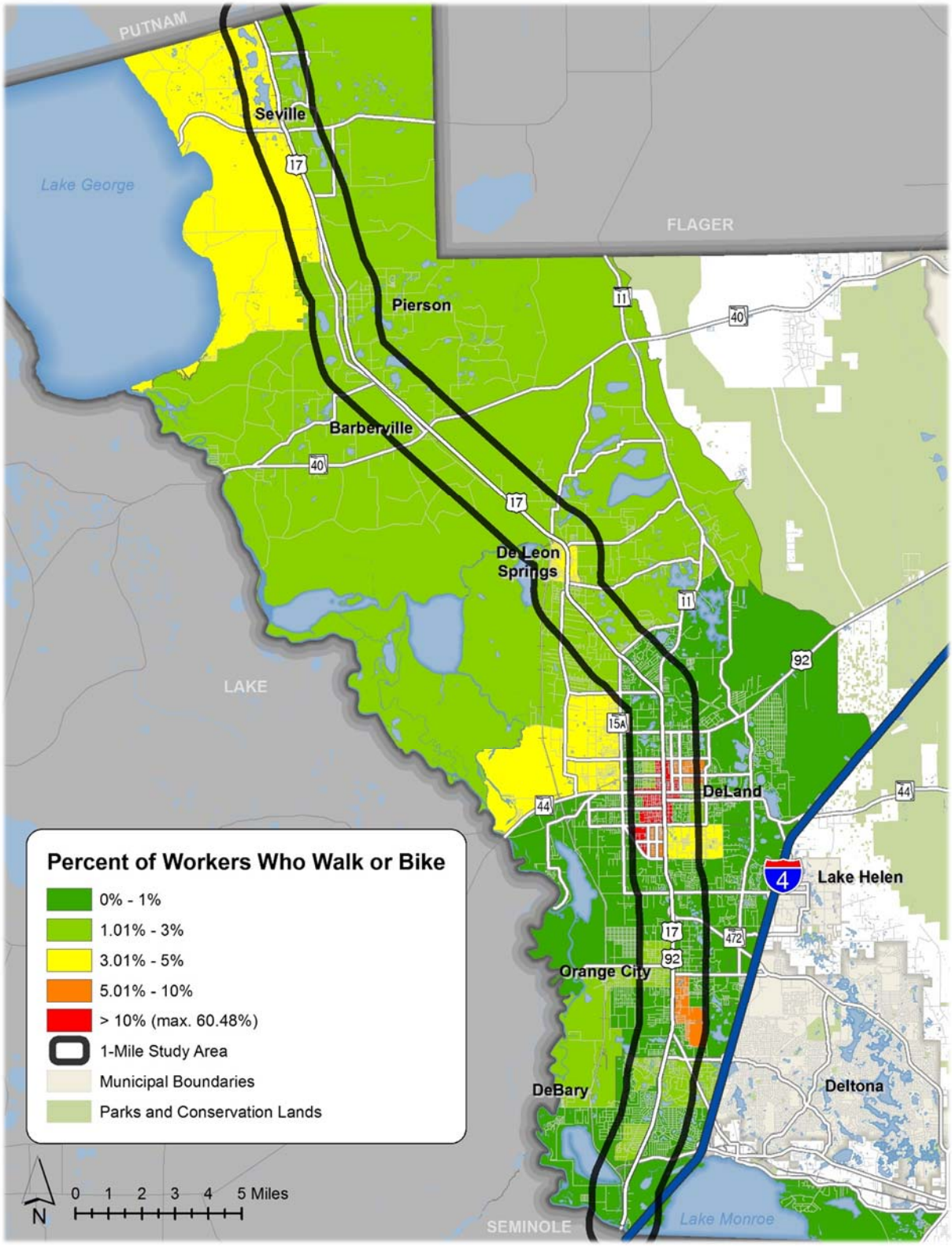
Data Source: U.S. Census Bureau 2013 5-Year ACS

Map 35: Percent of Workers Who Drive Alone to Work



Data Source: U.S. Census Bureau 2013 5-Year ACS

Map 36: Percent of Workers Who Use Public Transportation (Bus) to Work



Data Source: U.S. Census Bureau 2013 5-Year ACS

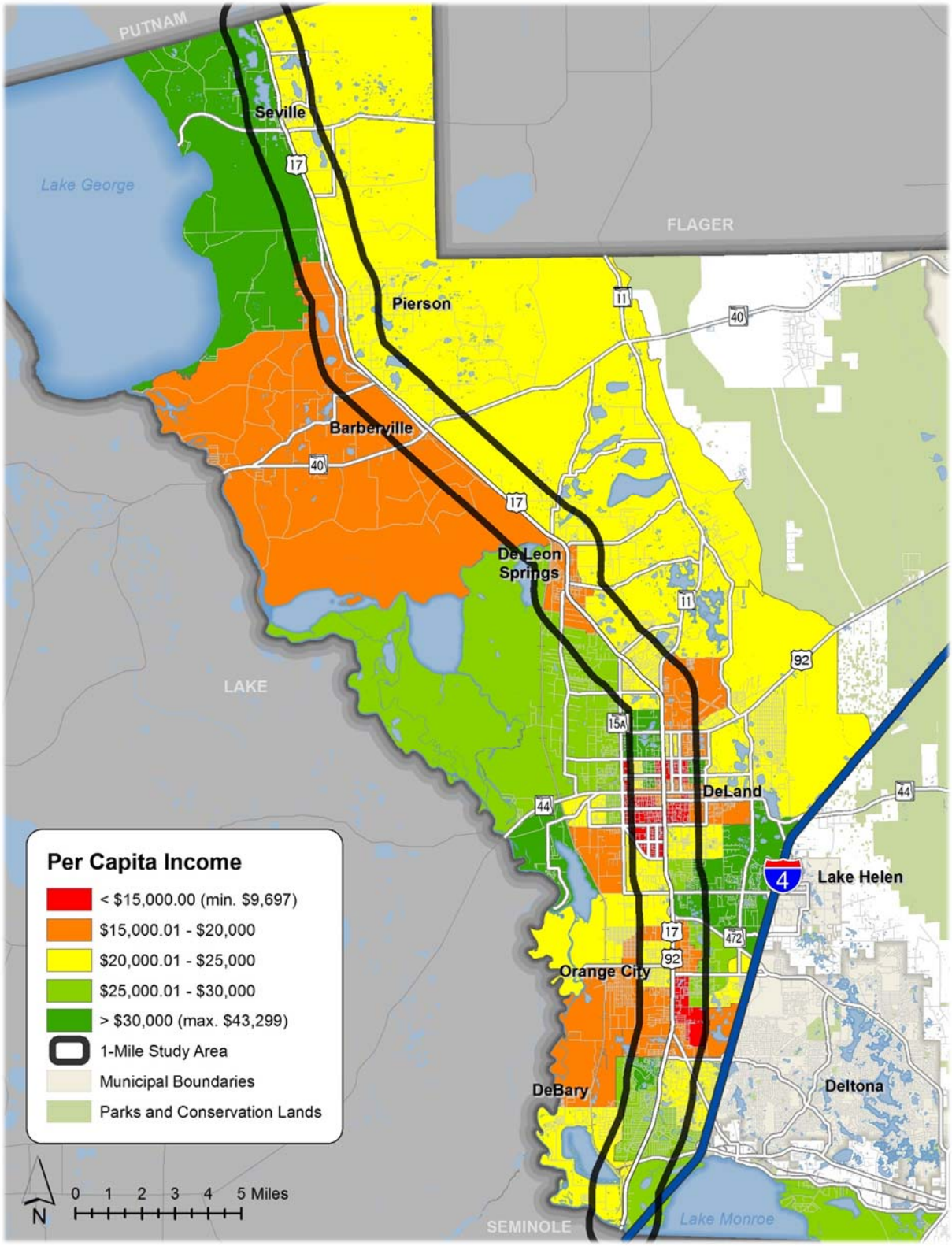
Map 37: Percent of Worker Who Walk or Bike to Work

Per Capita Income

Map 38 illustrates the average per capita income of the census block groups along the corridor. In 2013, the average income per capita within the corridor area is $21,674; which is lower than the average income per capita within Volusia County ($23,904). Often times there is a correlation between areas with lower incomes and higher use of alternative transportation modes such as walking, bicycling, and/or using transit. According to the data in Map 38 there are a few concentrated areas with below average per capita income, specifically within central DeLand and in Orange City.

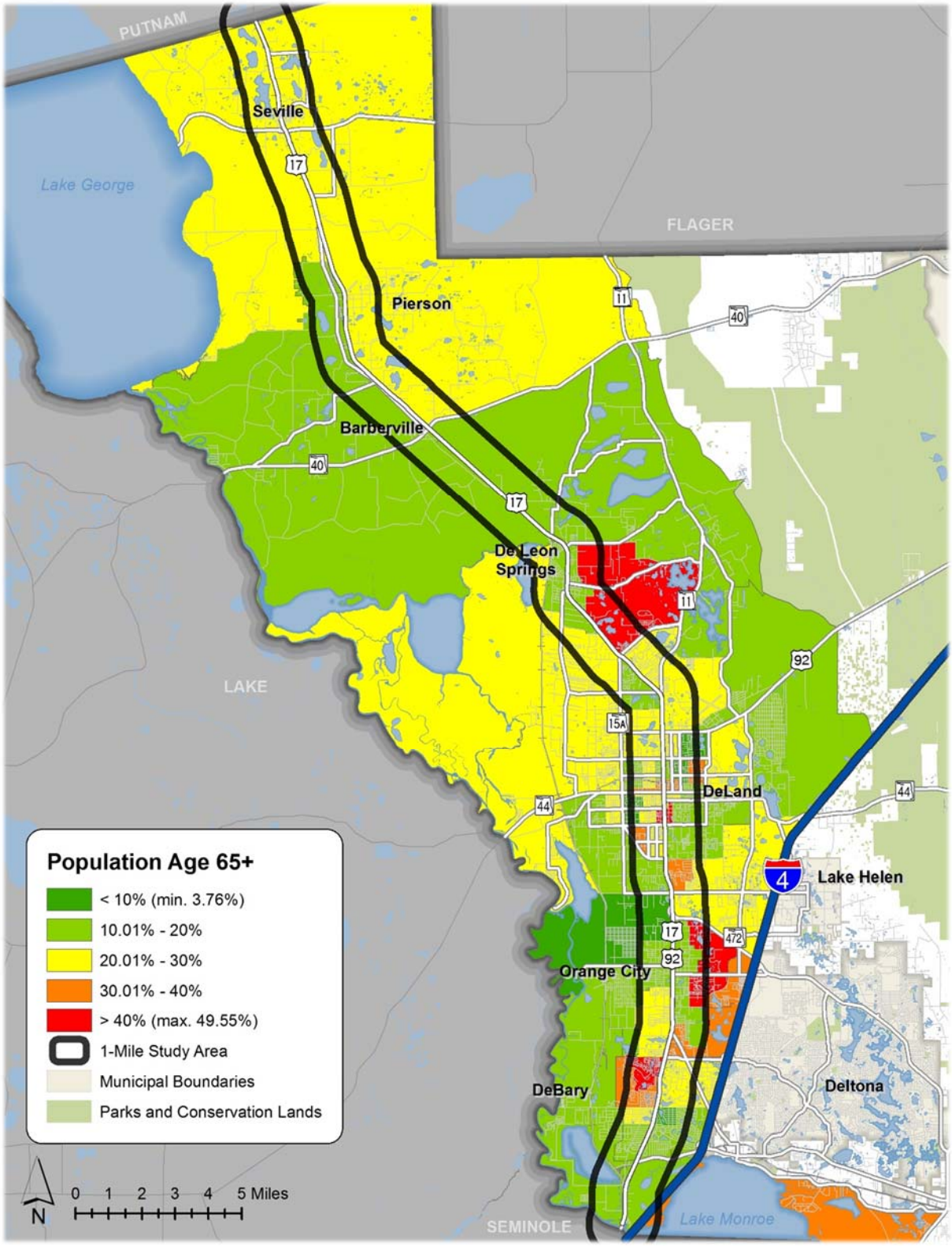
Older Populations

Older populations can also be indicative of a higher need for alternative transportation modes due to driving difficulties and/or limitations that come with age. These difficulties and/or limitations often require people to seek alternative transportation options to fulfill their mobility needs. Map 39 illustrates the percent of the population that is age 65 and over. Within the corridor area the average percent of the population that is age 65 and over is 21.1 percent; within Volusia County the percent of the population age 65 and over is 23.2 percent. So, while the percent of the population that is age 65 and over within the corridor area is lower than the countywide average, there are locations along the corridor that have a high percentage of older populations.



Data Source: U.S. Census Bureau 2013 5-Year ACS

Map 38: Average per Capita Income



Data Source: U.S. Census Bureau 2013 5-Year ACS

Map 39: Percent of Population Age 65 and Over

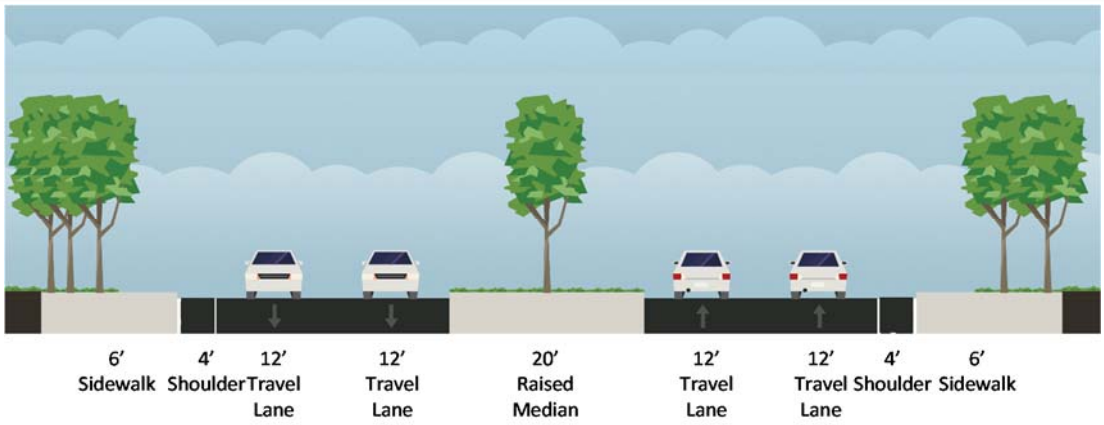
NEXT STEPS

One of the primary objectives of the Phase II Study is to help determine the most effective way to have the US 17 corridor serve all users and modes of transportation along the corridor. In order to accomplish this objective, the data and information presented in this technical memorandum will be used to define corridor context/character districts and will be used in the development and evaluation of project alternatives designed at improving mobility and safety along the corridor.

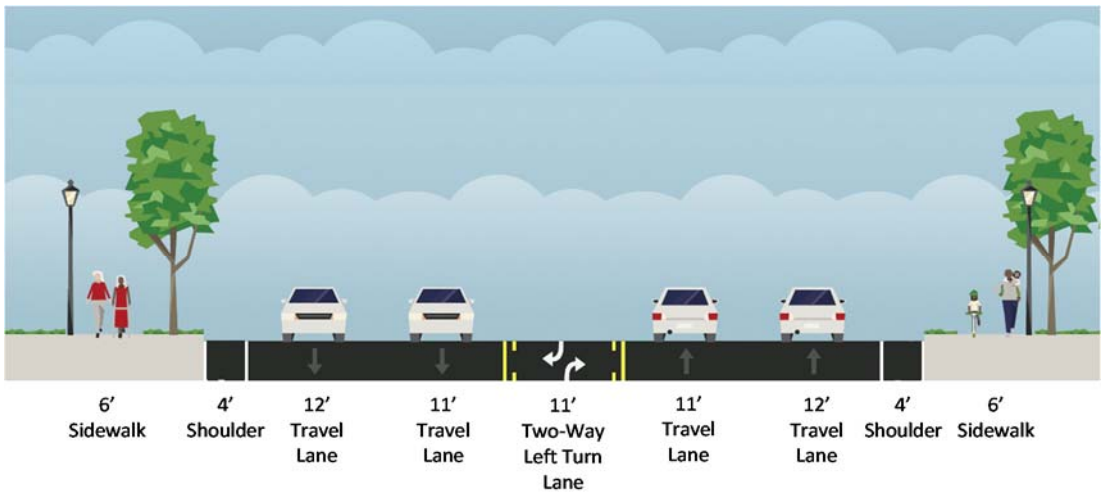
The corridor context/character districts will be developed using information from the Phase I Study and this technical memorandum. The corridor districts will be used to establish preliminary corridor segment purpose, need, and function. The districts will be used as the basis for establishing future roadway design elements and characteristics that reflect and support the future desired character of the US 17 corridor.

Project alternatives aimed at improving mobility and modal choice, accessibility, and safety of the US 17 corridor will be developed based on the compiled data and identification of corridor districts. It is anticipated that the alternatives will mainly focus on identifying potential safety and operational improvements with pedestrian/bicycle safety/mobility at the forefront; although the type of recommendations may vary depending upon the needs and values of the defined character districts. Finally, the alternatives will be evaluated using a high level screening process to identify the feasibility, costs (planning level), and benefits of the proposed project alternatives. This evaluation process will take place through a series of qualitative and quantitative criteria that will be applied to the proposed project alternatives.

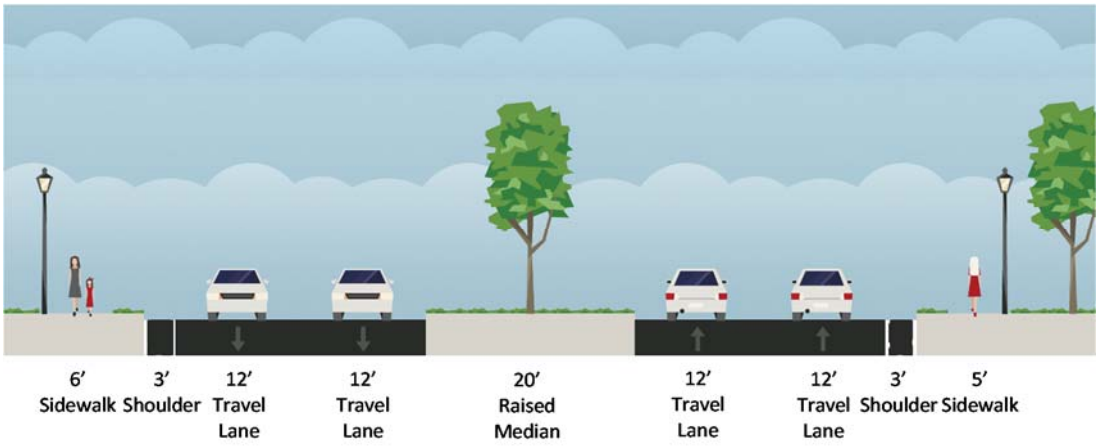
APPENDIX A EXISTING TYPICAL CROSS-SECTIONS



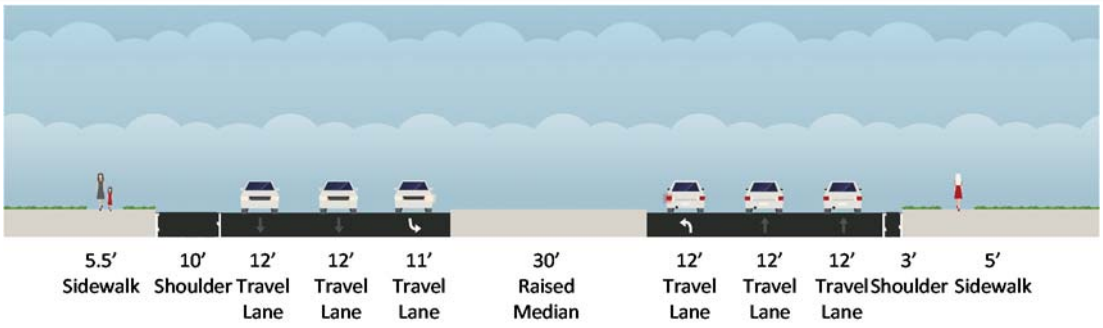
1 –US 17, Seminole/Volusia County Line to Spring Vista Drive



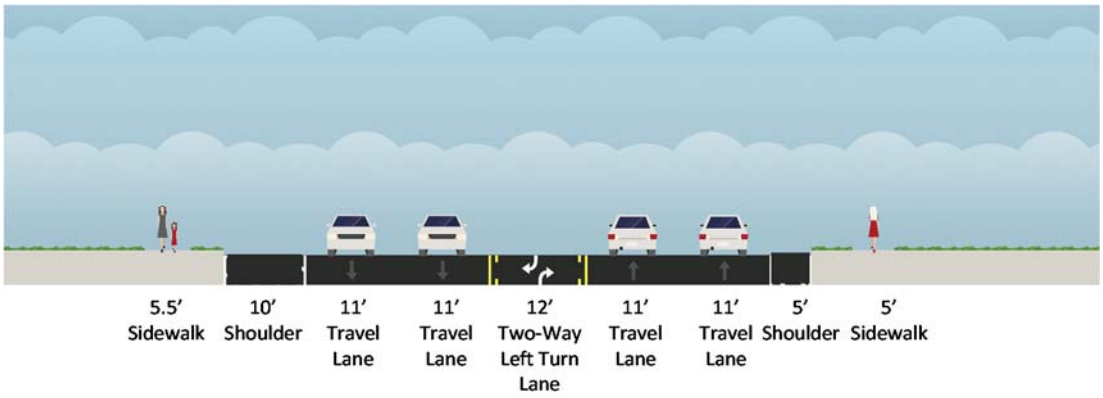
2 – US 17, Spring Vista Drive to Highbanks Road



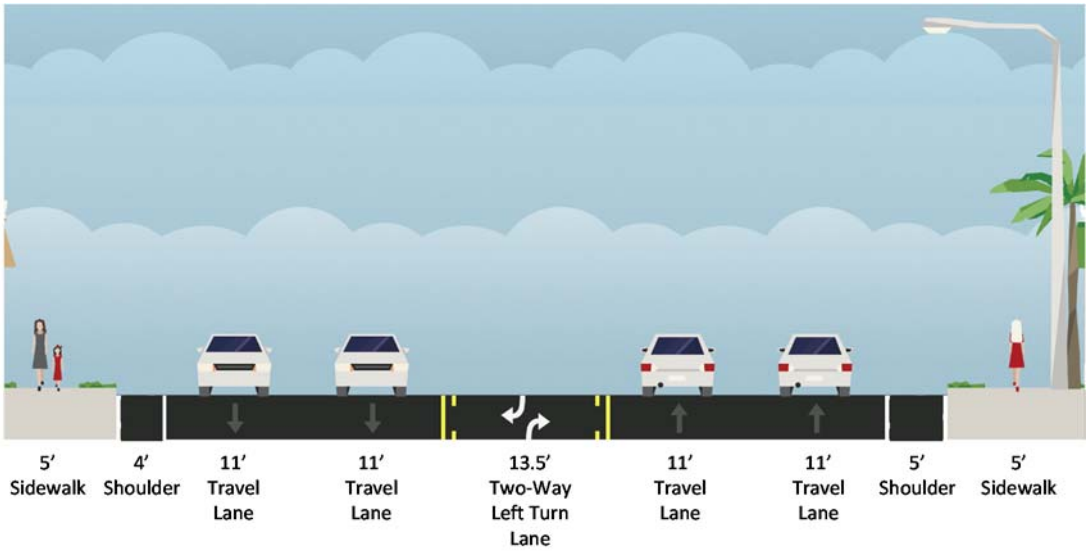
3 – US 17, Highbanks Road to Miller Road



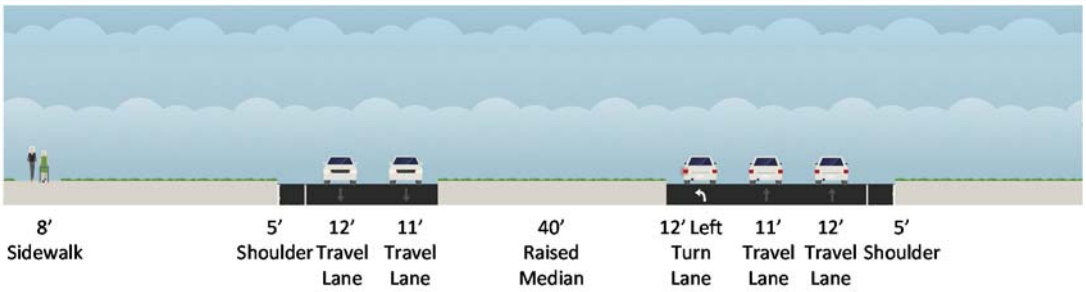
4 – US 17, Miller Road to East Gardenia Drive



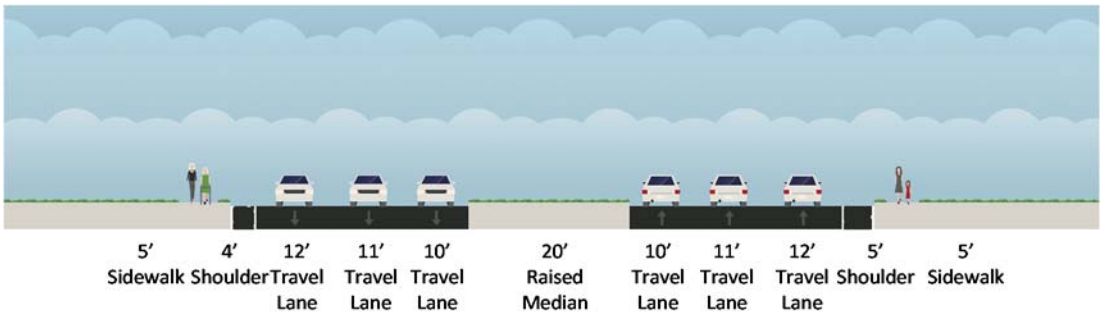
5 – US 17, East Gardenia Drive to Elm Drive



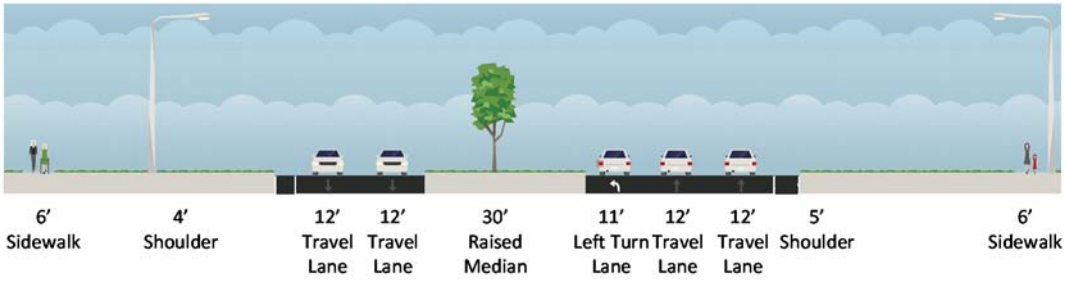
6 – US 17, Elm Drive to Wisconsin Avenue



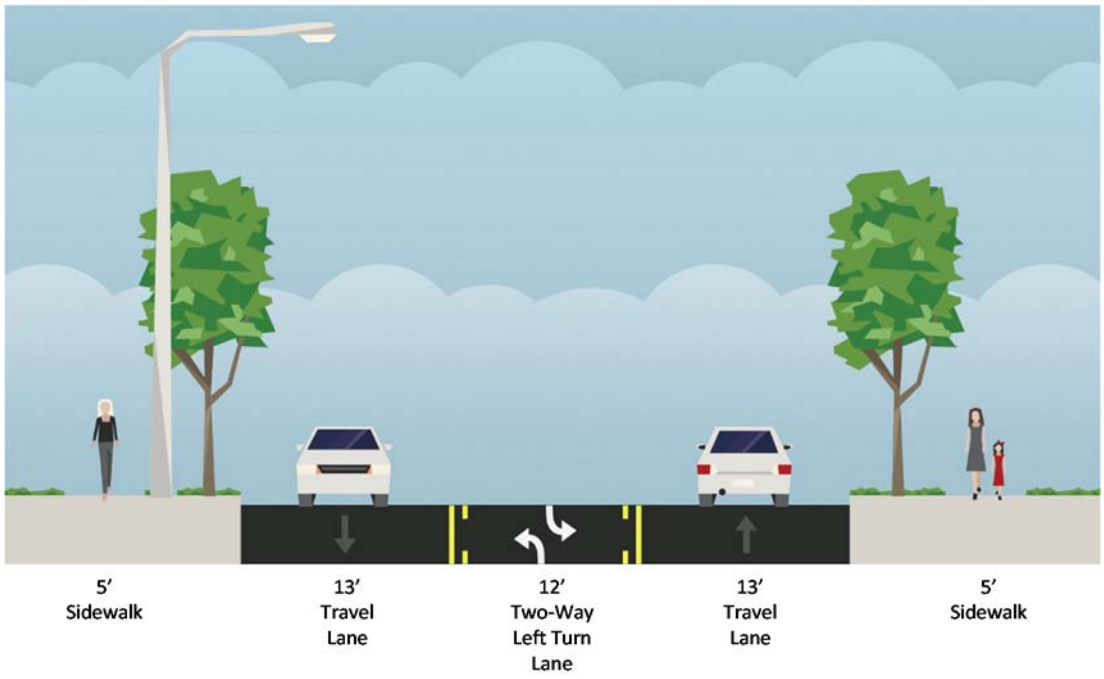
7 – US 17, Wisconsin Avenue to North of SR 472 Overpass



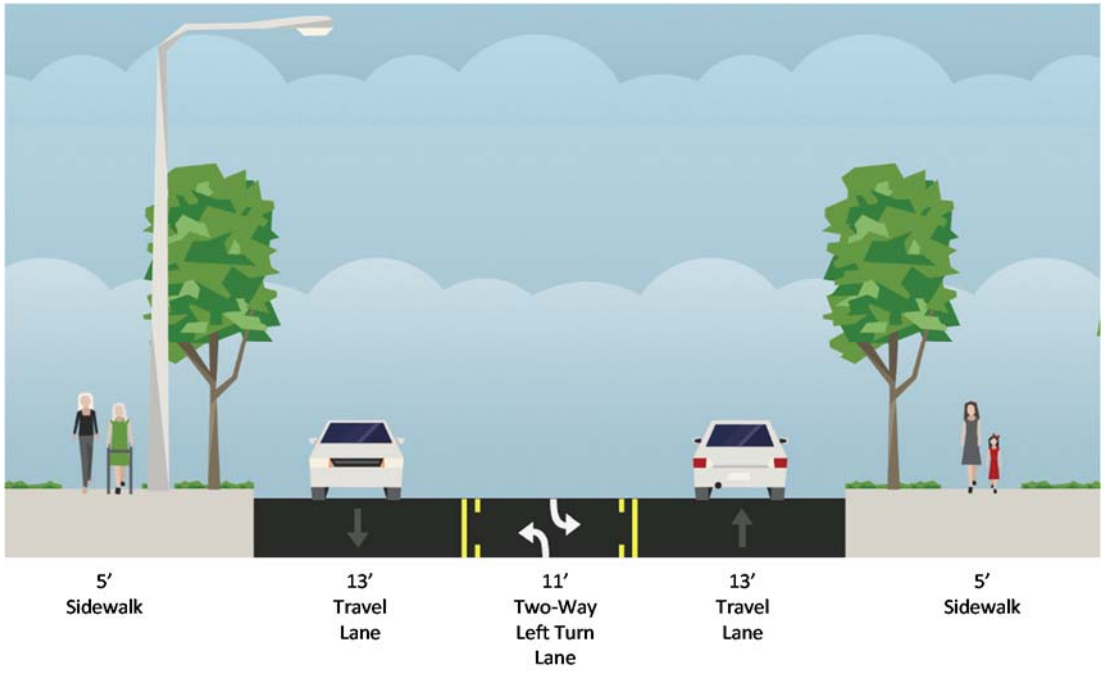
8 – US 17, North of SR 472 Overpass to SR 15A/Taylor Road



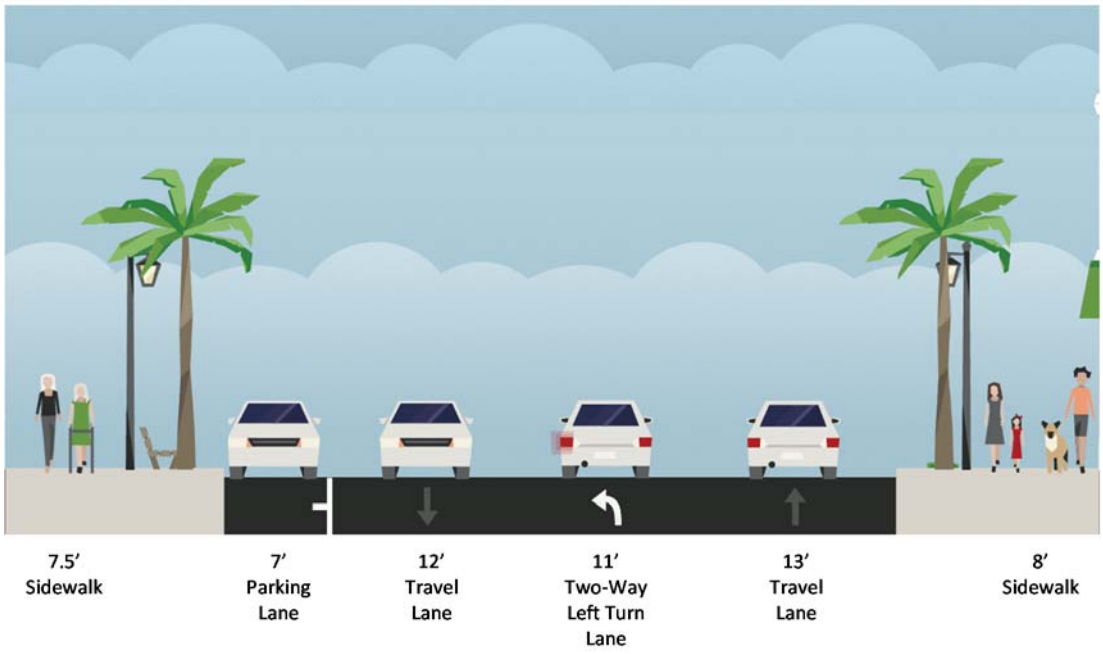
9 – US 17, SR 15A/Taylor Road to Beresford Avenue



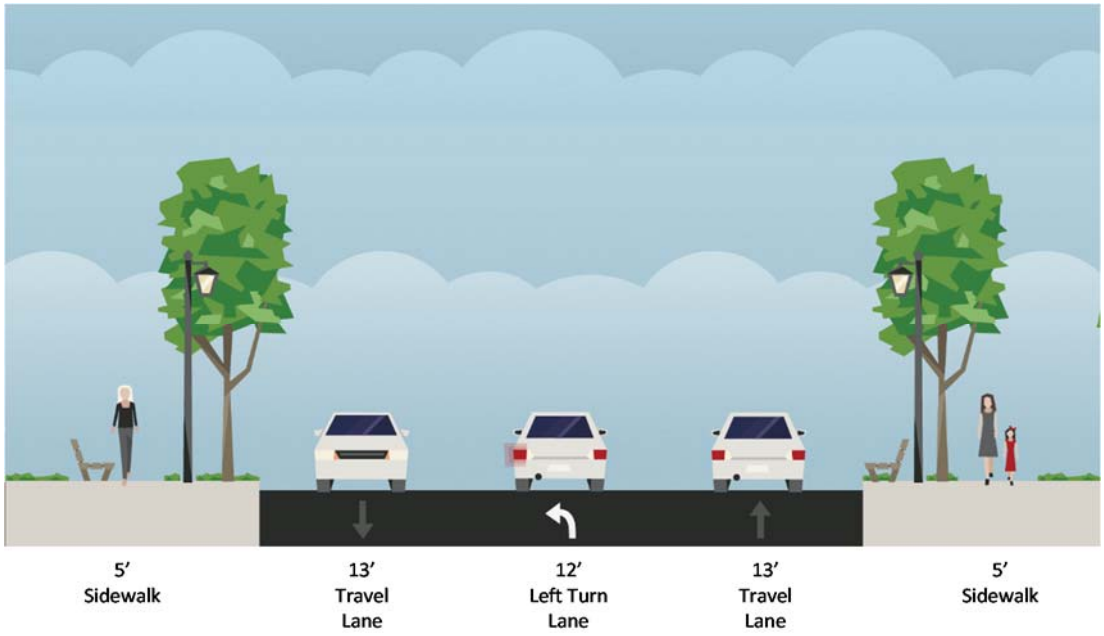
10 – US 17, Beresford Avenue to Euclid Avenue



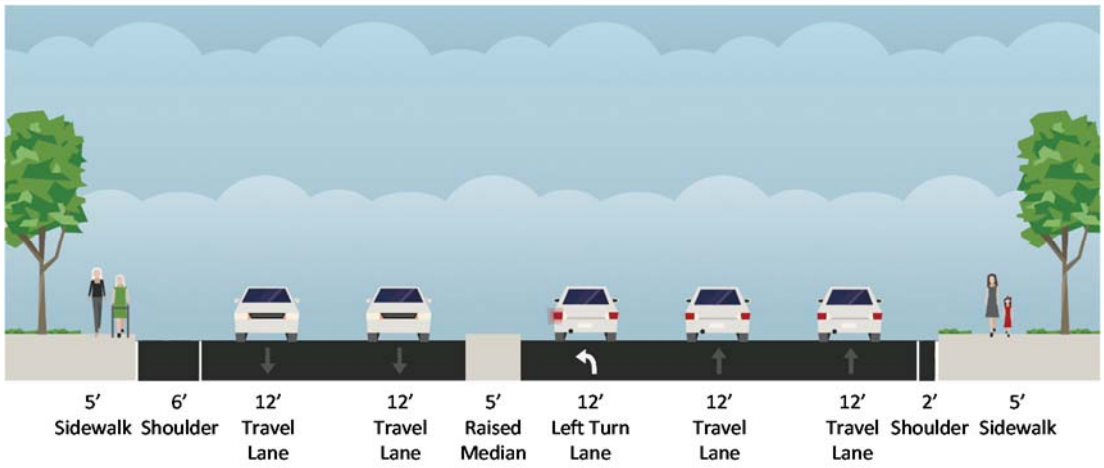
11 – US 17, Euclid Avenue to Howry Avenue



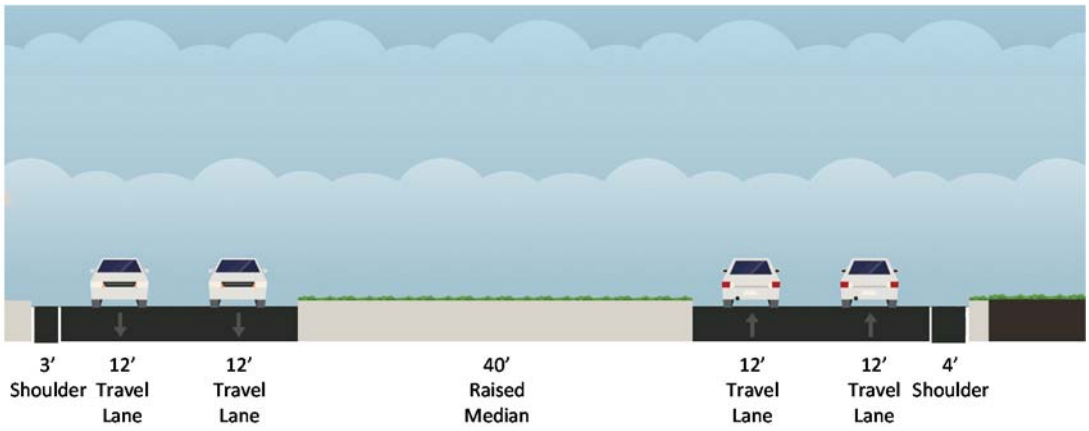
12 – US 17, Howry Avenue to Church Street



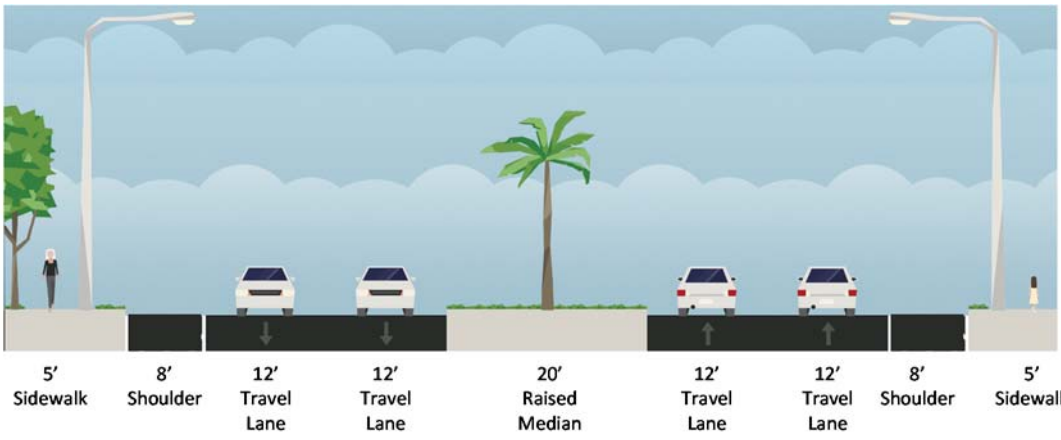
13 – US 17, Church Street to Plymouth Avenue



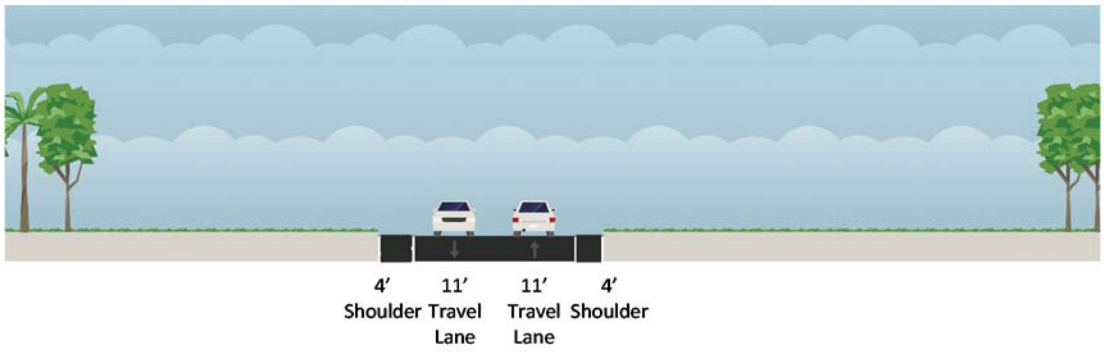
14 – US 17, Plymouth Avenue to Glenwood Road



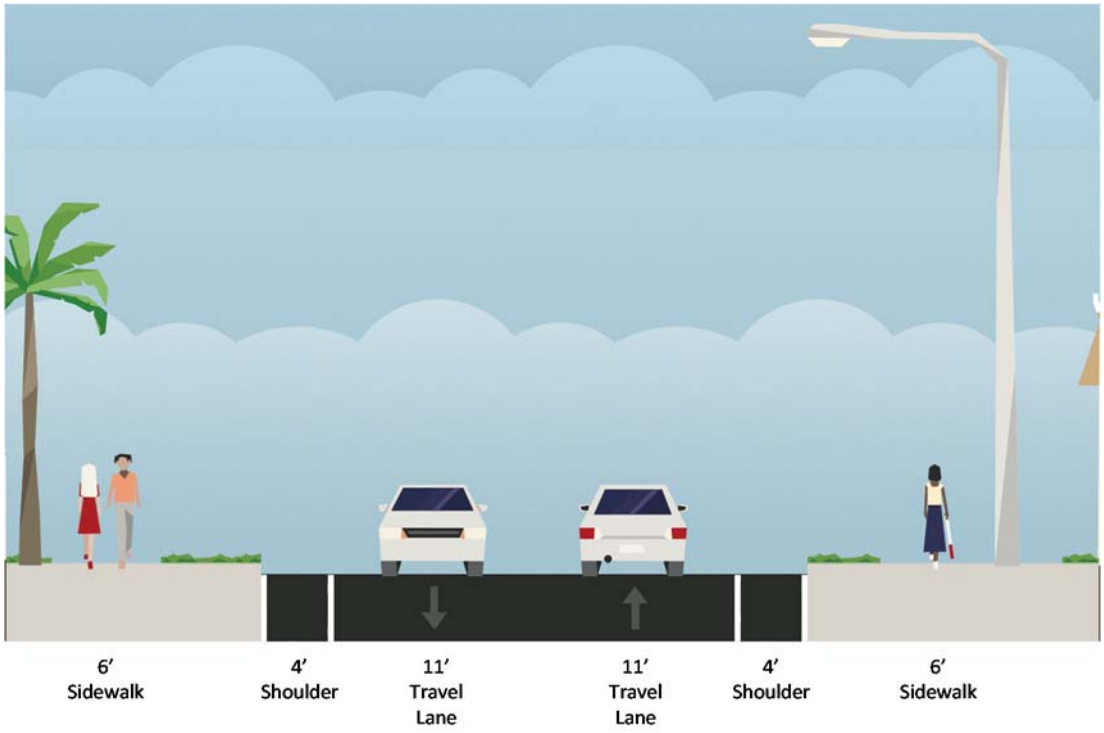
15 – US 17, Glenwood Road to Katrina Street



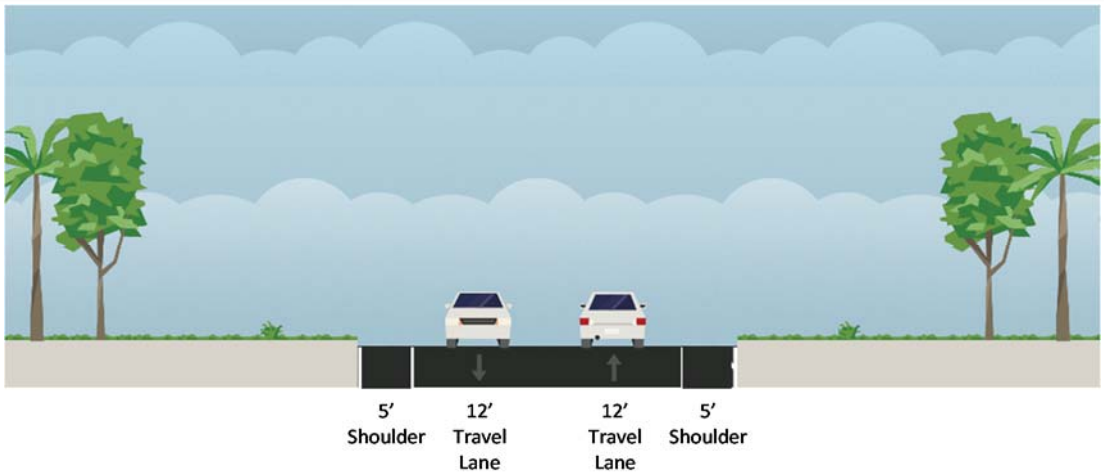
16 – US 17, Katrina Street to Ponce DeLeon Boulevard



17 – US 17, CR 3/Ponce DeLeon Boulevard to Second Avenue

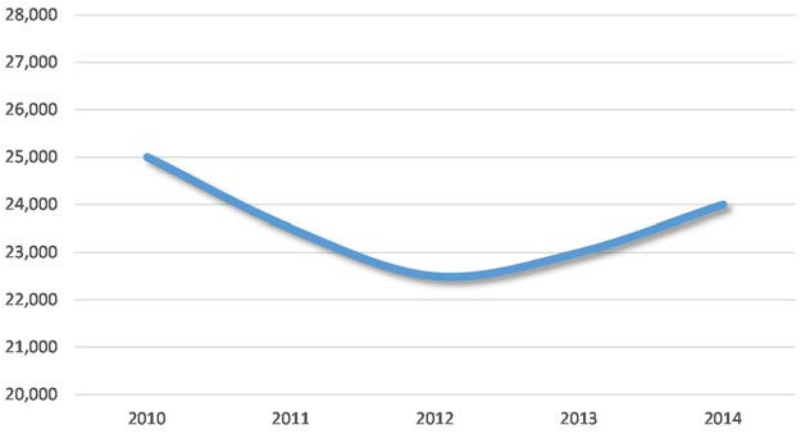


18 – US 17, Second Avenue to First Avenue



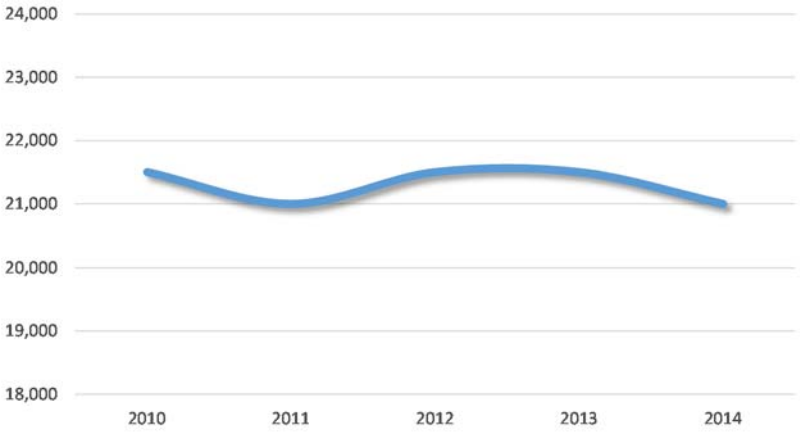
19 – US 17, First Avenue to Volusia/Putnam County Line

APPENDIX B HISTORICAL AADTS



Data Source: Florida Traffic Online Synopsis Reports, Count Station 0101

US 17/92 South of Dirksen Dr



Data Source: Florida Traffic Online Synopsis Reports, Count Station 0479

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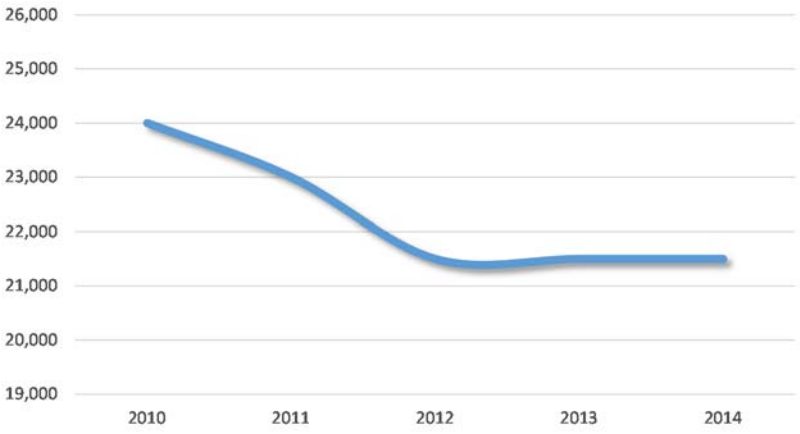
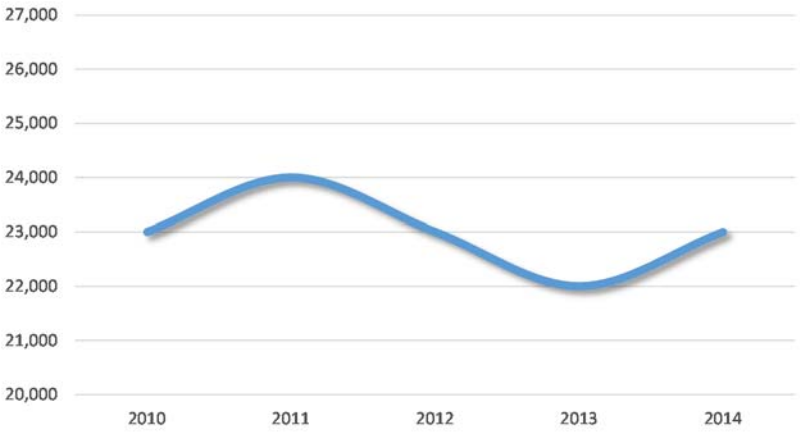


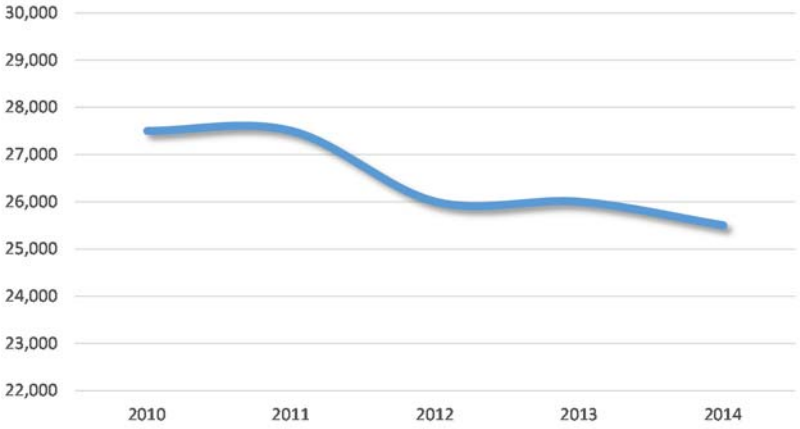
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0007

US 17/92 North of Sunset Dr



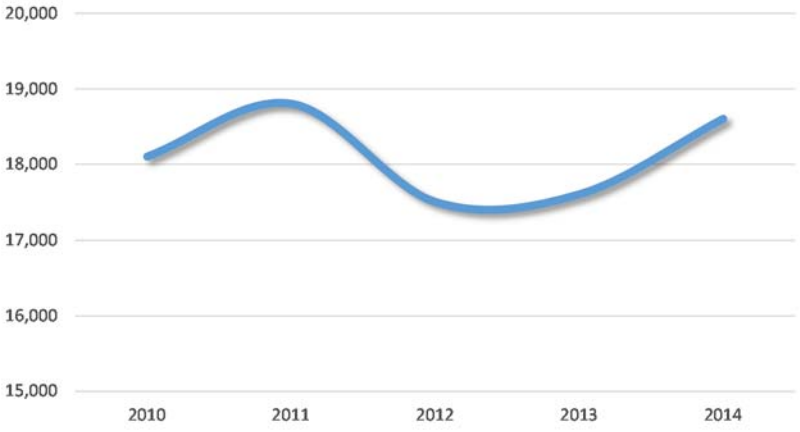
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0008

US 17/92 North of Dogwood Tr



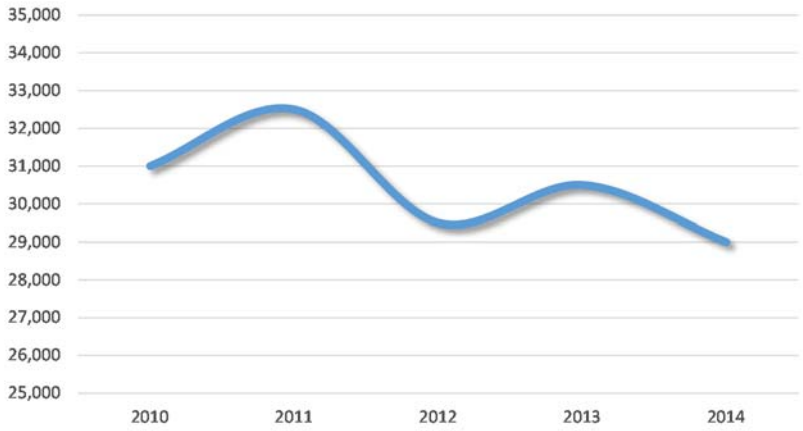
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0509

US 17/92 South of Saxon Blvd



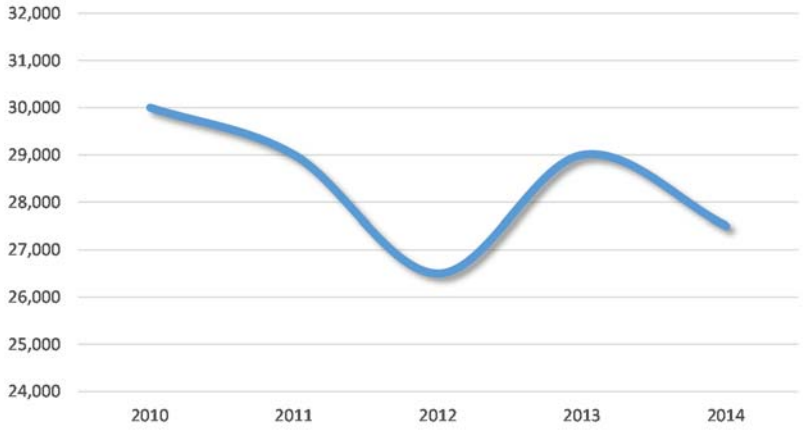
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0539

US 17/92 North of Saxon Blvd



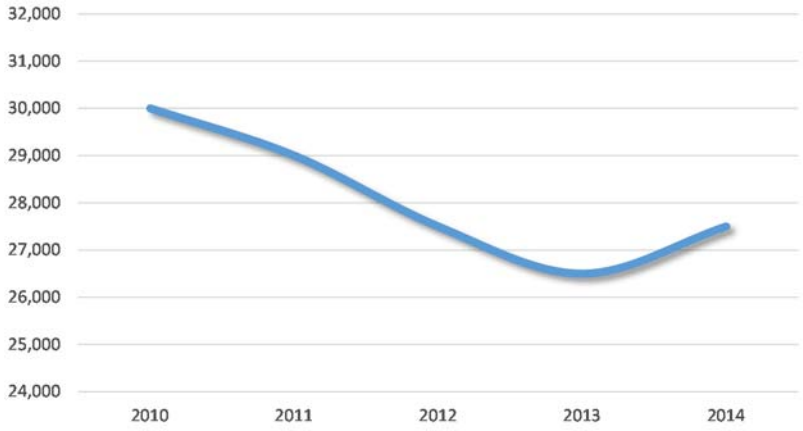
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0444

US 17/92 South of Graves Ave (approximately ¾ mile south)



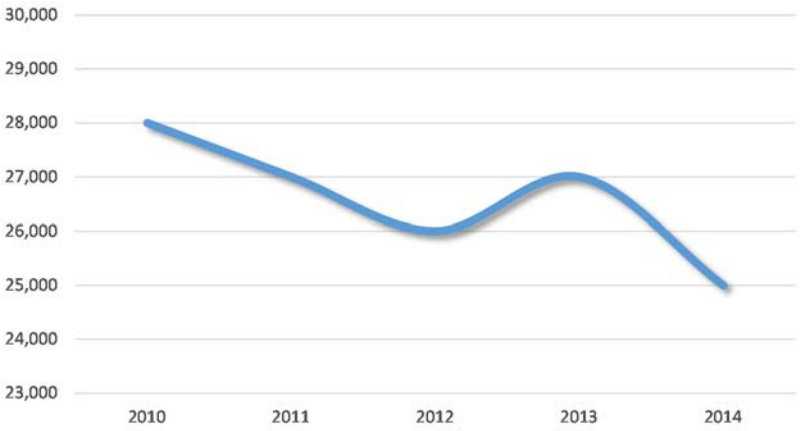
Data Source: Florida Traffic Online Synopsis Reports, Count Station 5165

US 17/92 South of Graves Ave



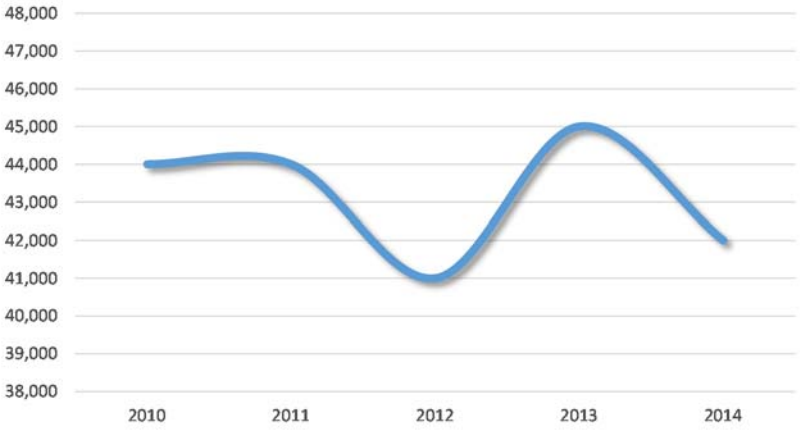
Data Source: Florida Traffic Online Synopsis Reports, Count Station 5166

US 17/92 North of Graves Ave



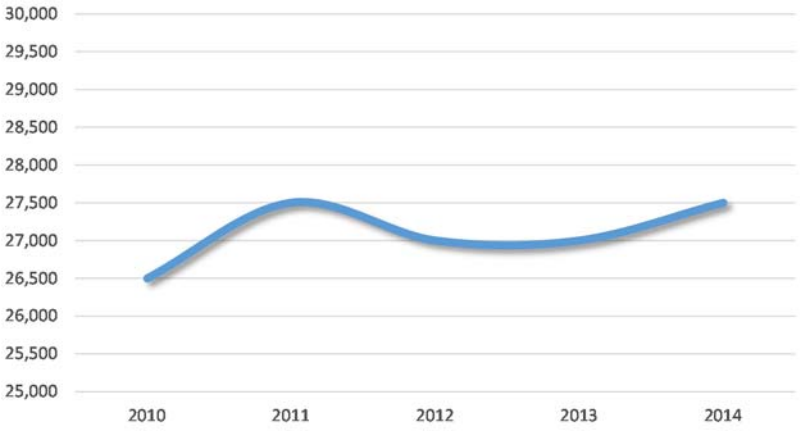
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0445

US 17/92 South of New York Ave



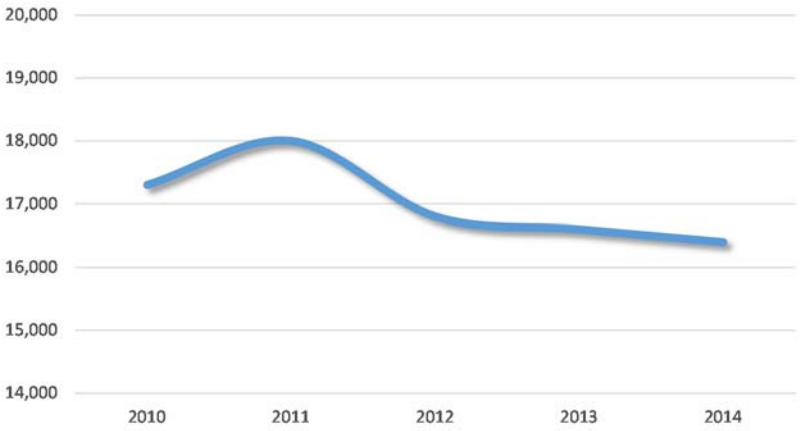
Data Source: Florida Traffic Online Synopsis Reports, Count Station 1004

US 17/92 North of Golf Club Dr



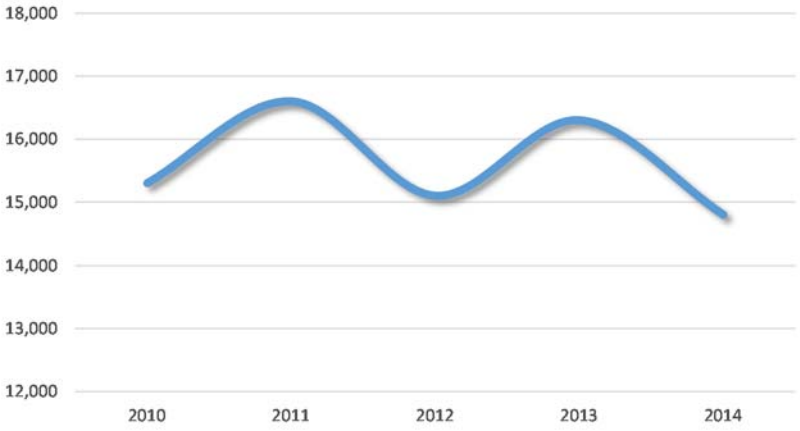
Data Source: Florida Traffic Online Synopsis Reports, Count Station 1006

US 17/92 North of SR 15A



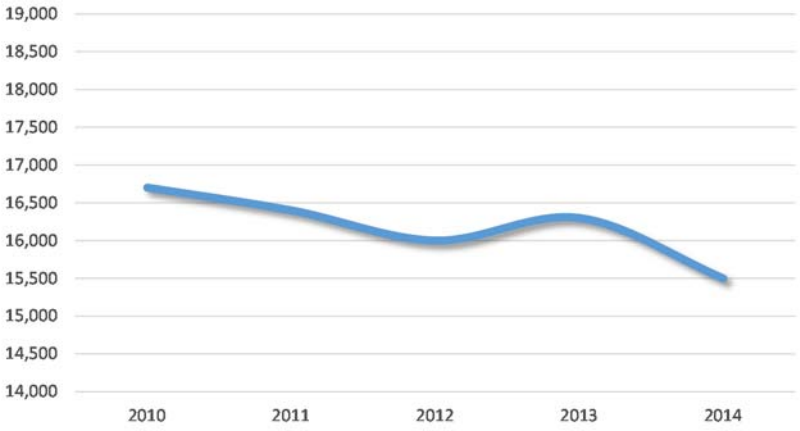
Data Source: Florida Traffic Online Synopsis Reports, Count Station 5173

US 17/92 North of Beresford Ave



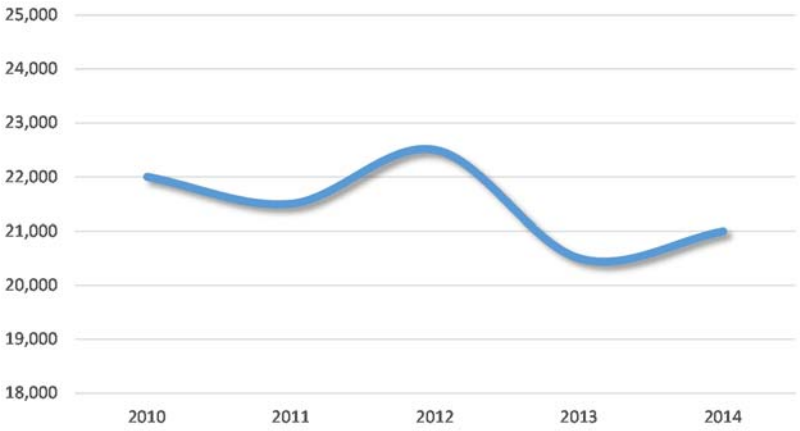
Data Source: Florida Traffic Online Synopsis Reports, Count Station 5004

US 17/92 South of SR 44



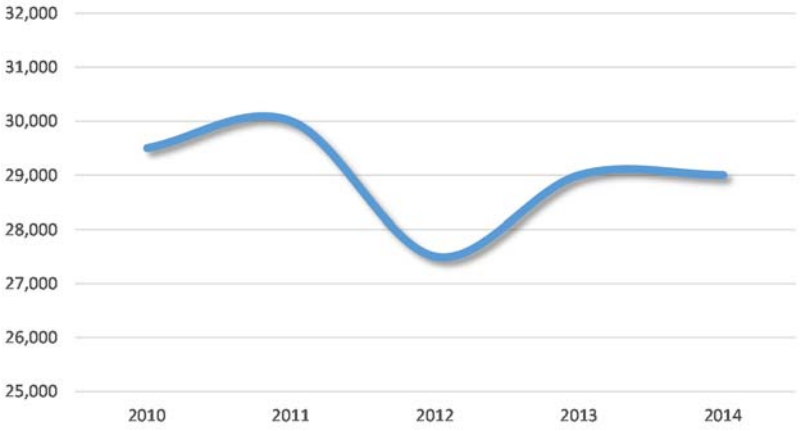
Data Source: Florida Traffic Online Synopsis Reports, Count Station 5008

US 17/92 North of SR 44



Data Source: Florida Traffic Online Synopsis Reports, Count Station 0066

US 17/92 South of US 92



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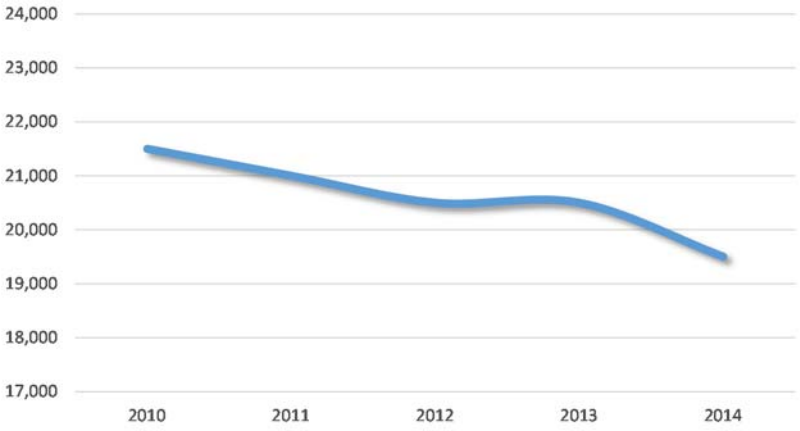
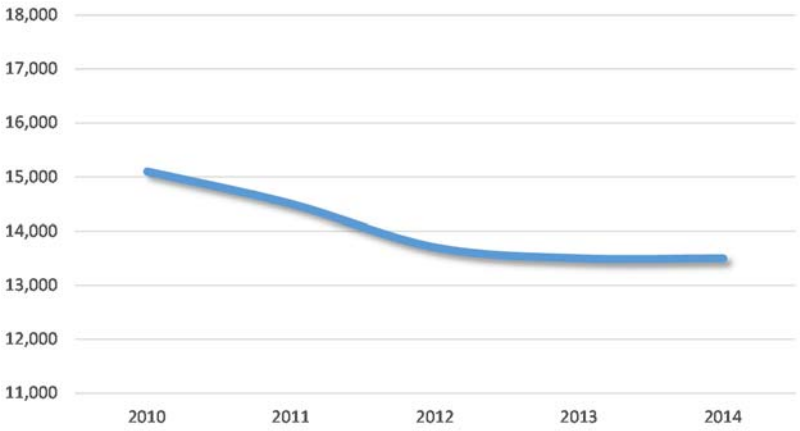
US 17 North of US 92



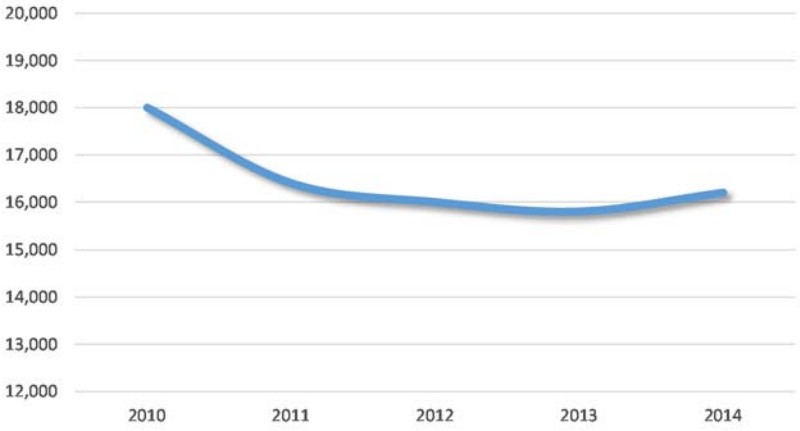
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0069

US 17 South of SR 11



Data Source: Florida Traffic Online Synopsis Reports, Count Station 0236

US 17 North of Glenwood Rd



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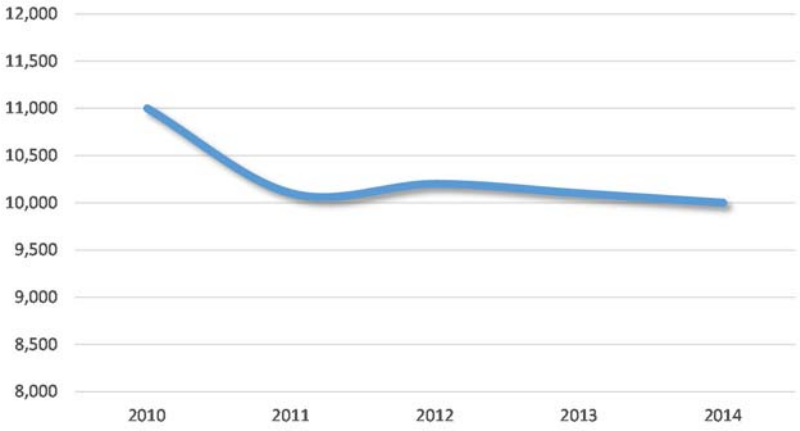
US 17 Northwest of SR 15A



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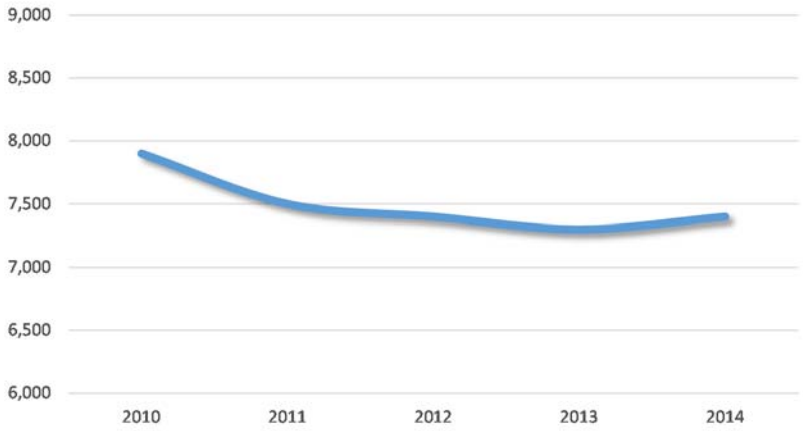
US 17 North of SR 15A



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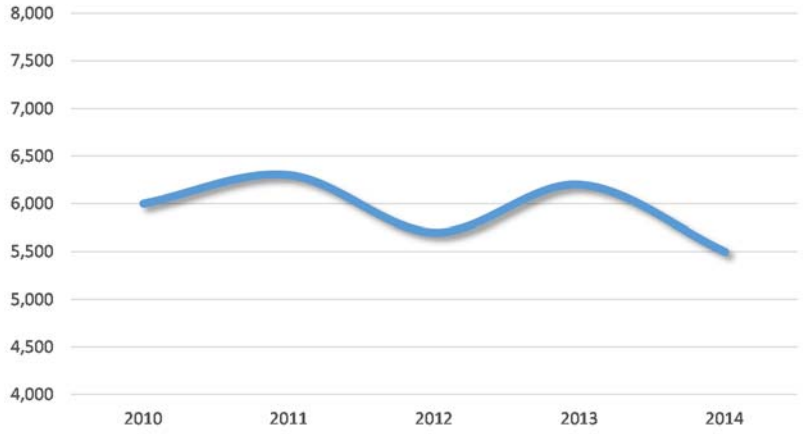
US 17 South of SR 40



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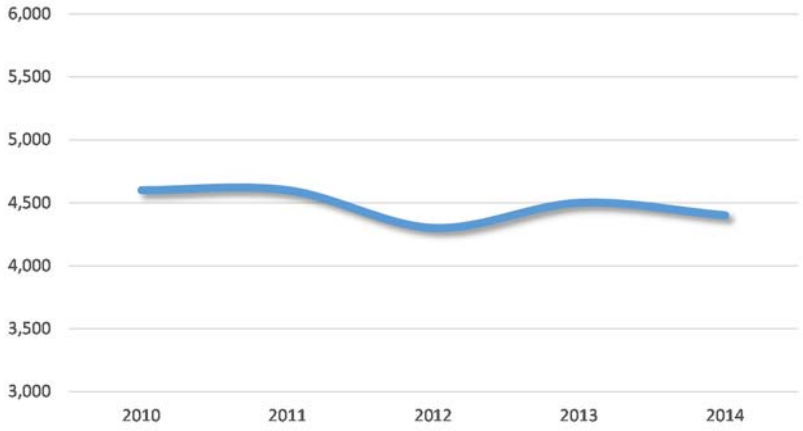
US 17 North of SR 40



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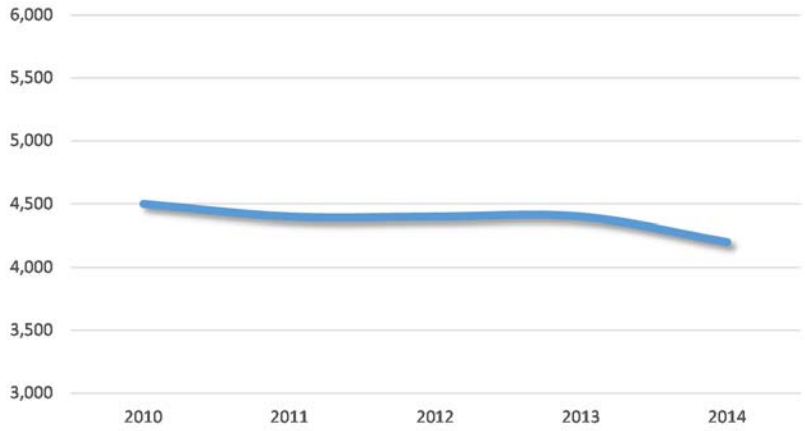
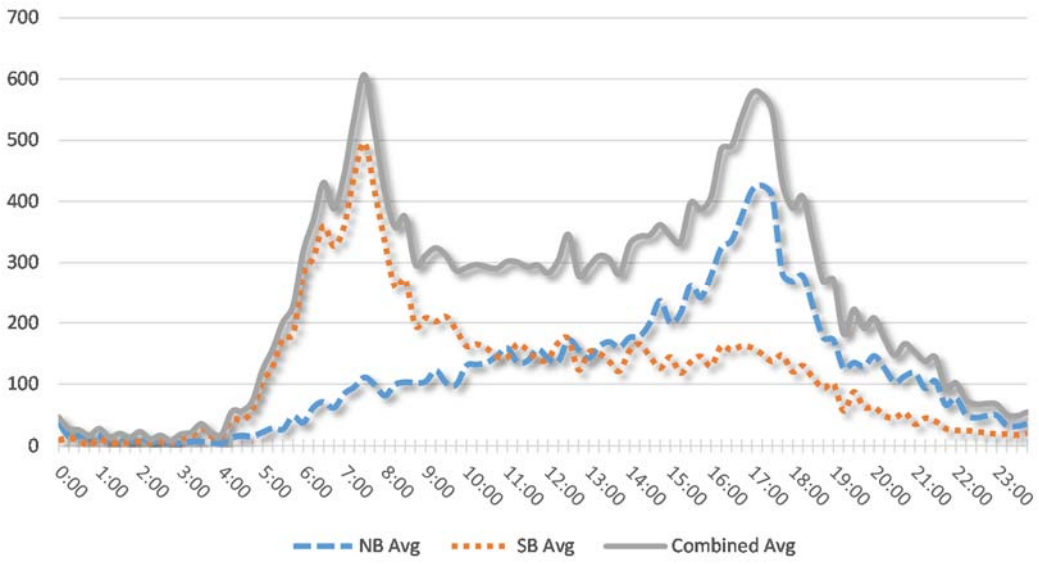
US 17 South of CR 3



Data Source: Florida Traffic Online Synopsis Reports, Count Station 0280

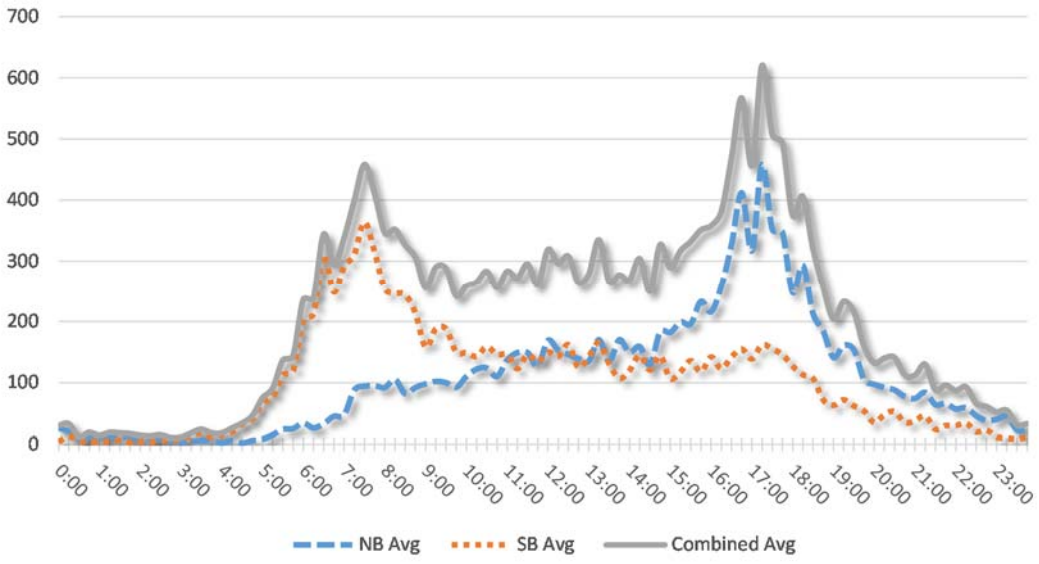
US 17 South of McBride Rd

APPENDIX C DAILY VOLUME COUNTS



Data Source: Florida Traffic Online Synopsis Reports, Count Station 0101

US 17/92 South of Dirksen Dr



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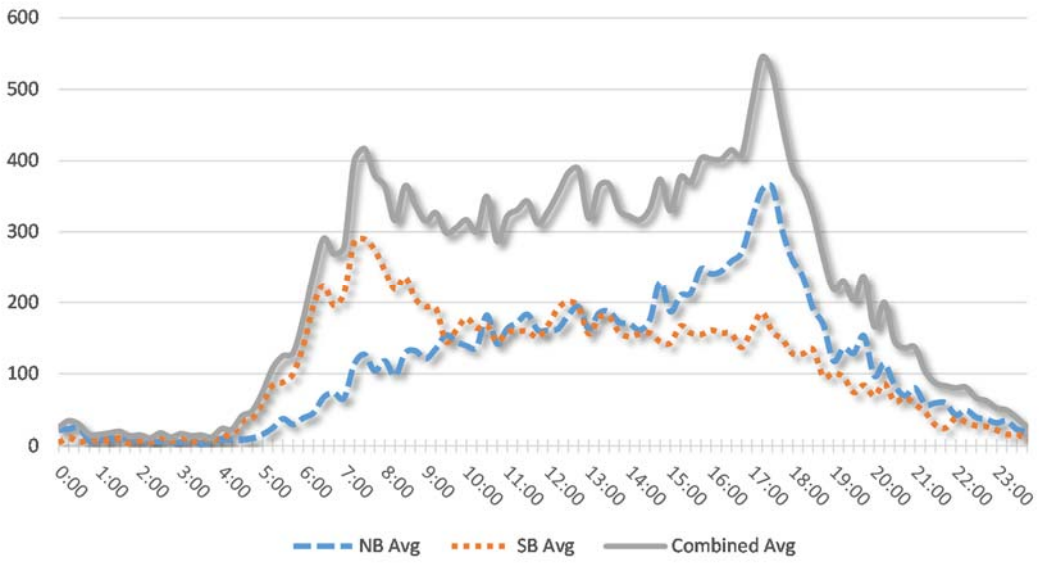
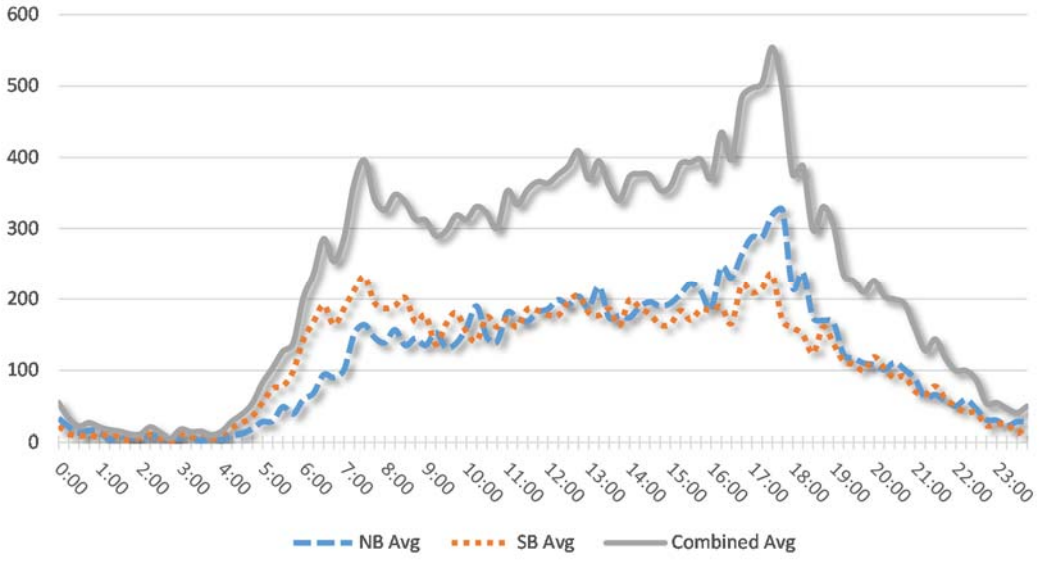
US 17/92 North of Dirksen Dr



Data Source: Florida Traffic Online Synopsis Reports, Count Station 0007

US 17/92 North of Sunset Dr



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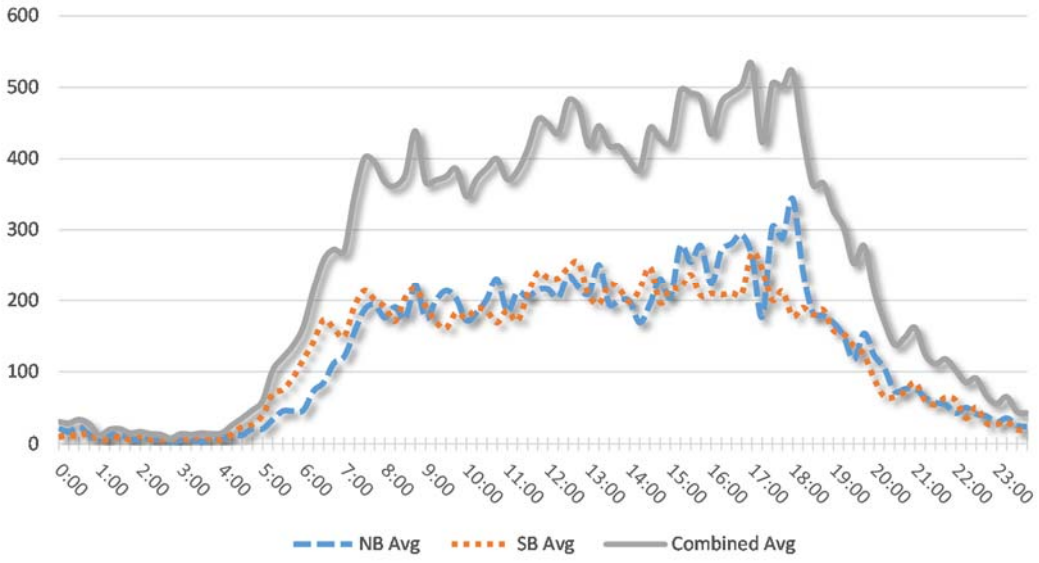
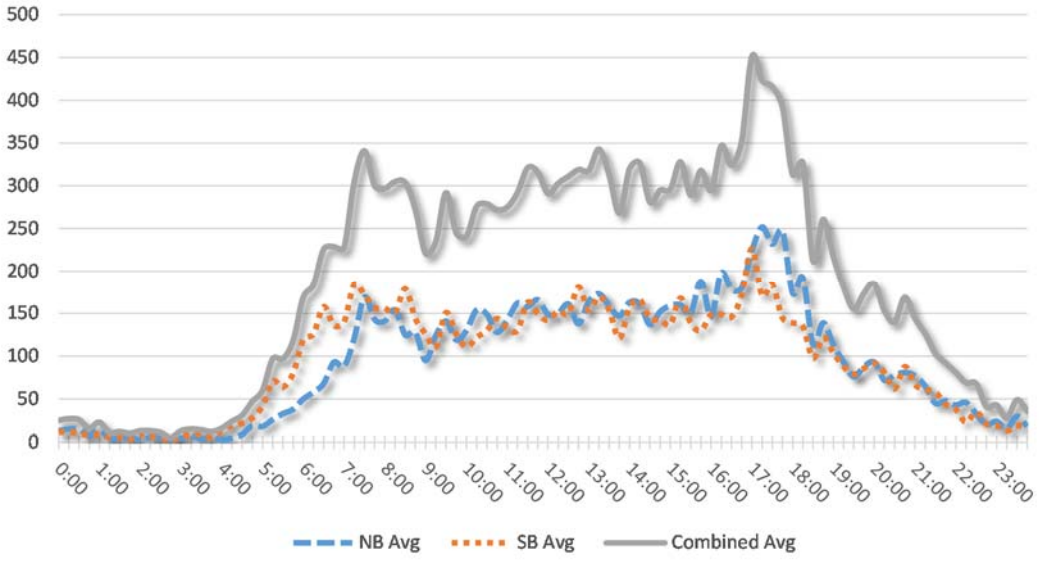
US 17/92 North of Dogwood Tr



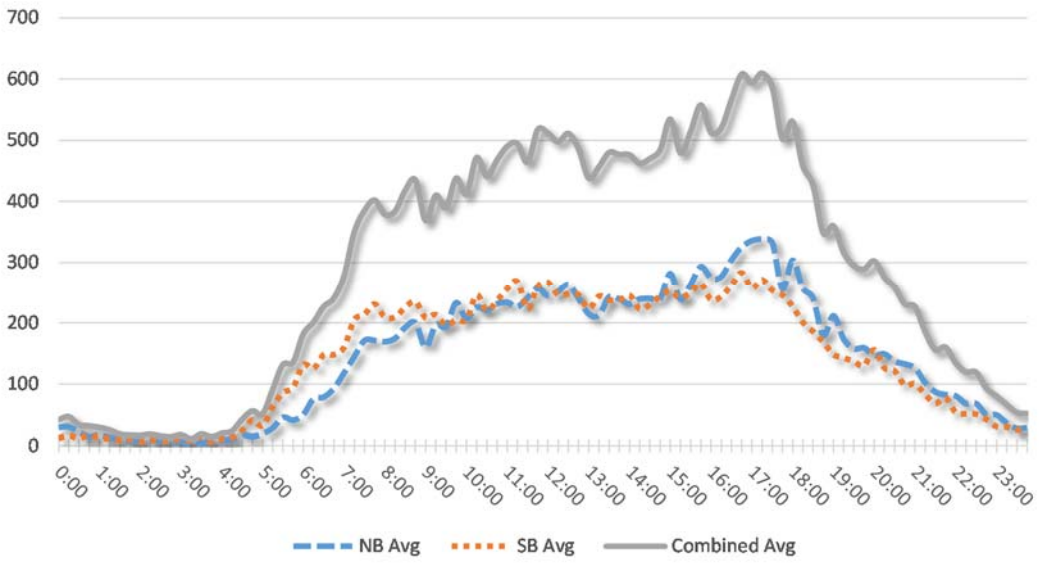
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0509

US 17/92 South of Saxon Blvd



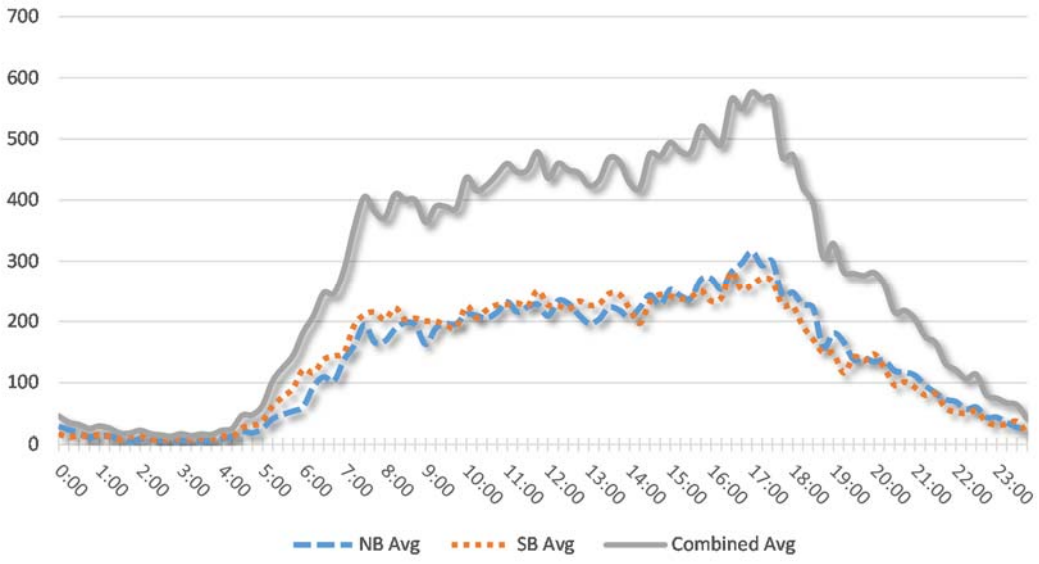
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0539

US 17/92 North of Saxon Blvd



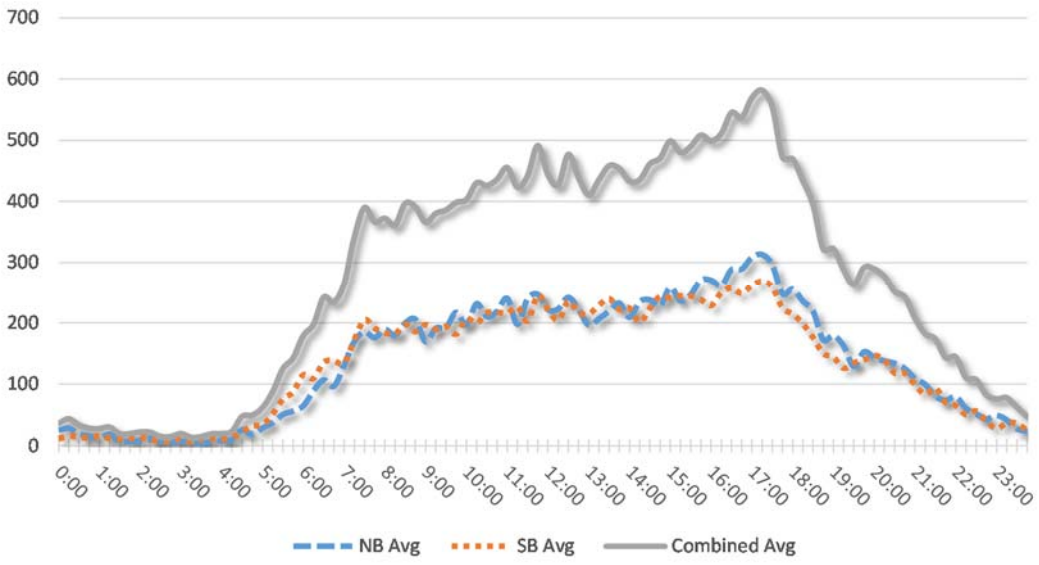
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0444

US 17/92 South of Graves Ave (approximately ¾ mile south)



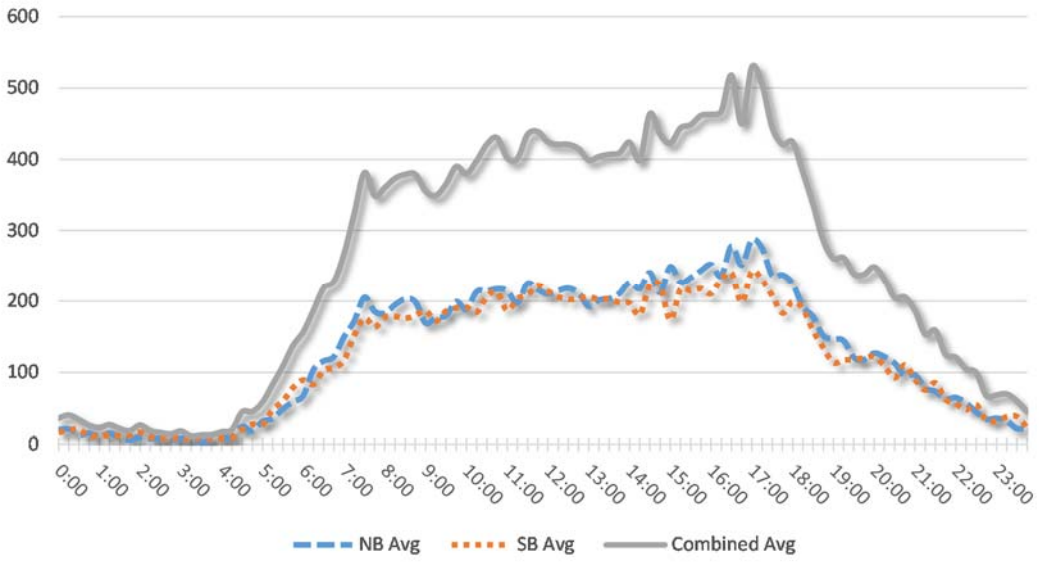
Data Source: Florida Traffic Online Synopsis Reports, Count Station 5165

US 17/92 South of Graves Ave



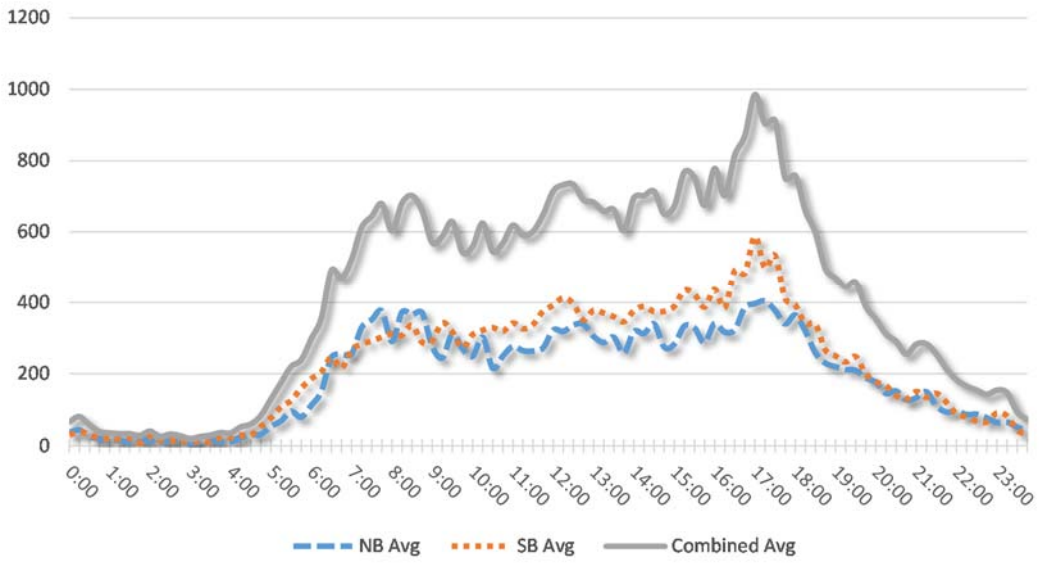
Data Source: Florida Traffic Online Synopsis Reports, Count Station 5166

US 17/92 North of Graves Ave



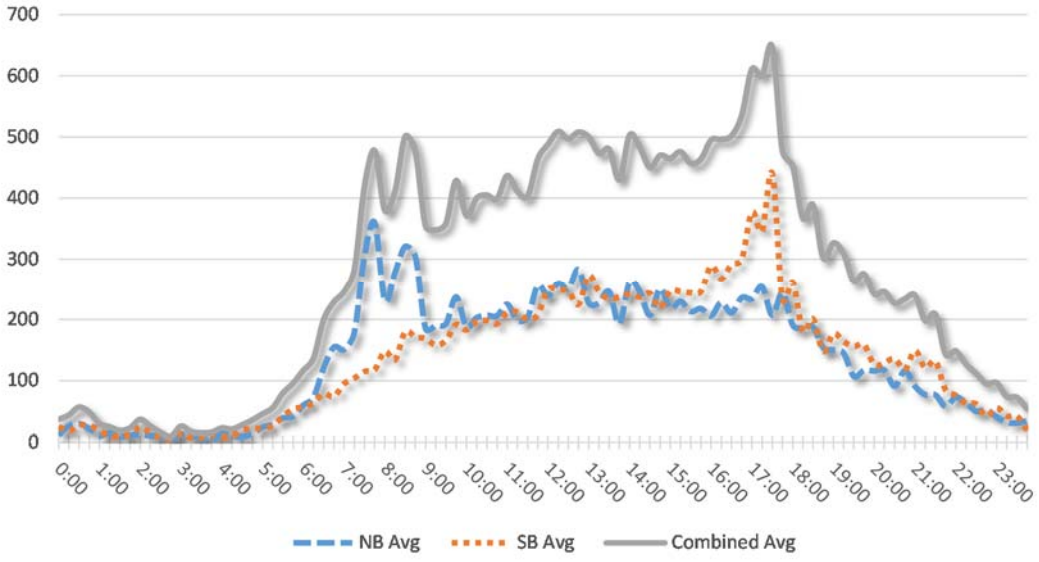
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0445

US 17/92 South of New York Ave



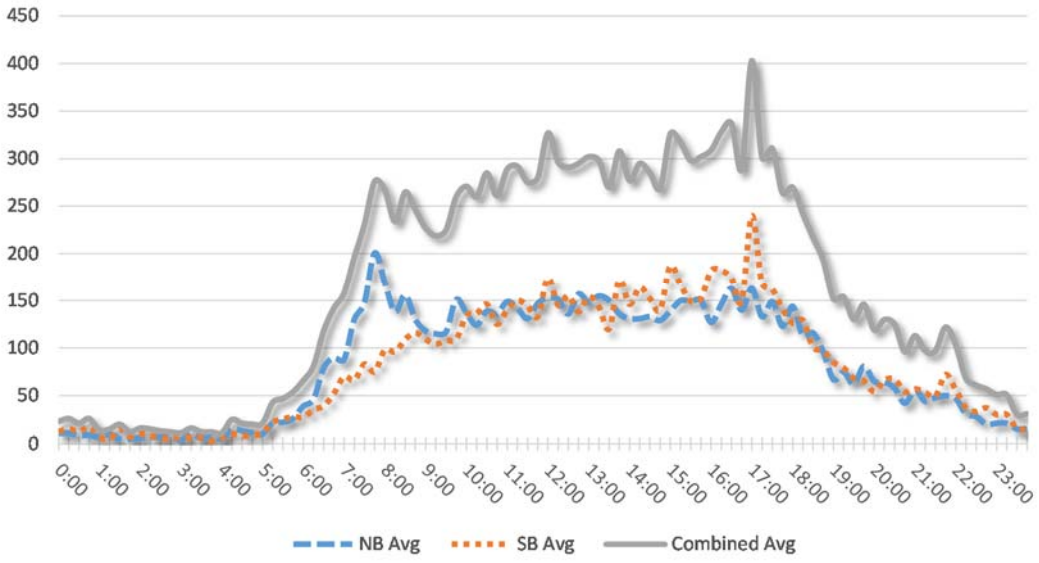
Data Source: Florida Traffic Online Synopsis Reports, Count Station 1004

US 17/92 North of Golf Club Dr



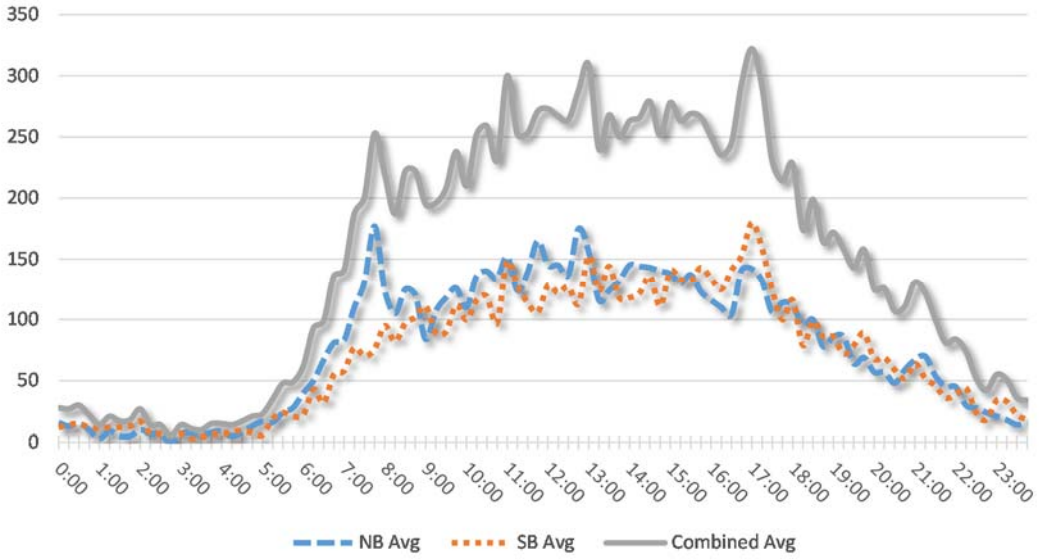
Data Source: Florida Traffic Online Synopsis Reports, Count Station 1006

US 17/92 North of SR 15A



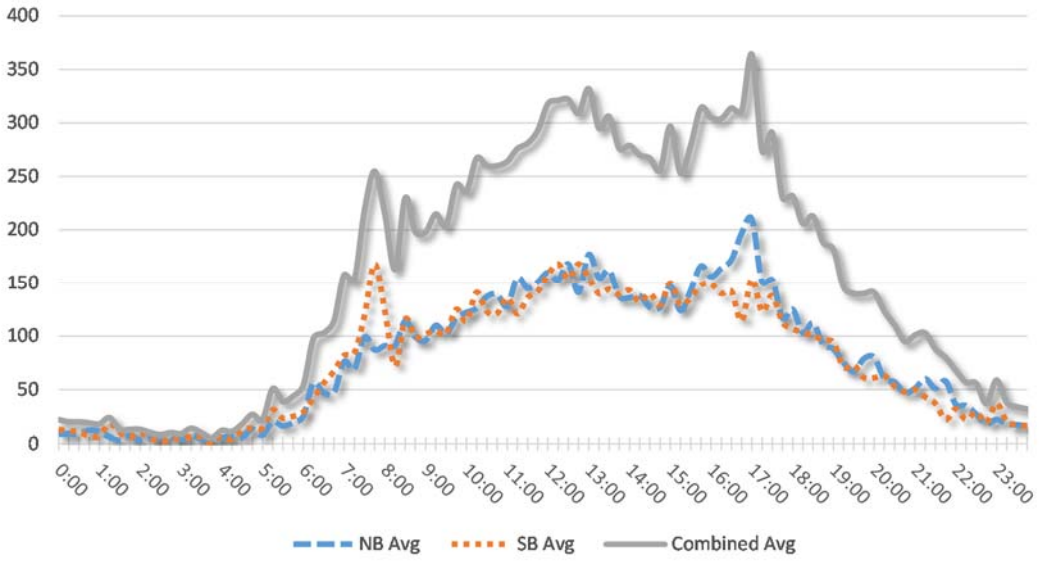
Data Source: Florida Traffic Online Synopsis Reports, Count Station 5173

US 17/92 North of Beresford Ave



Data Source: Florida Traffic Online Synopsis Reports, Count Station 5004

US 17/92 South of SR 44



Data Source: Florida Traffic Online Synopsis Reports, Count Station 5008

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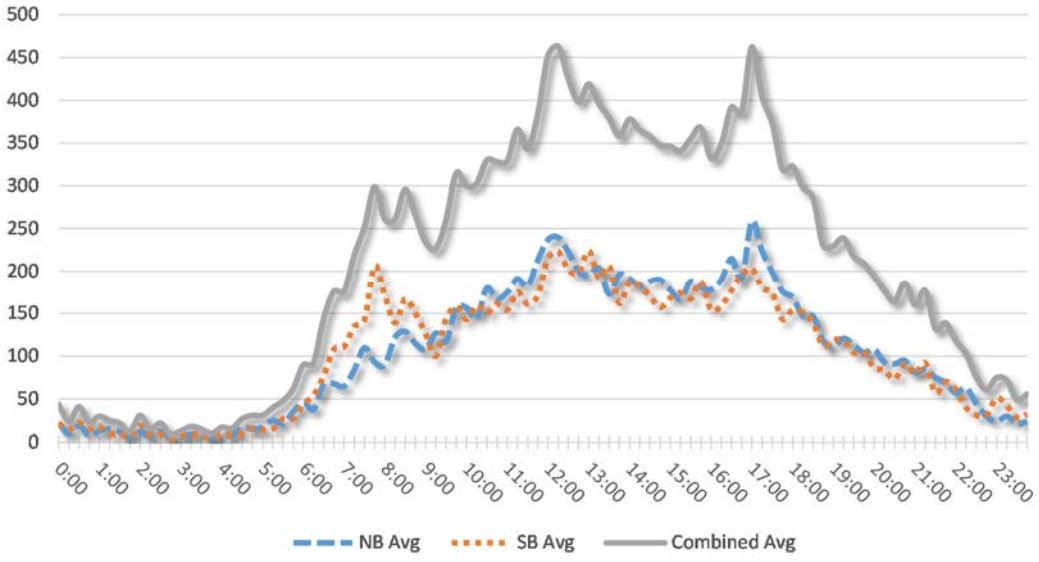
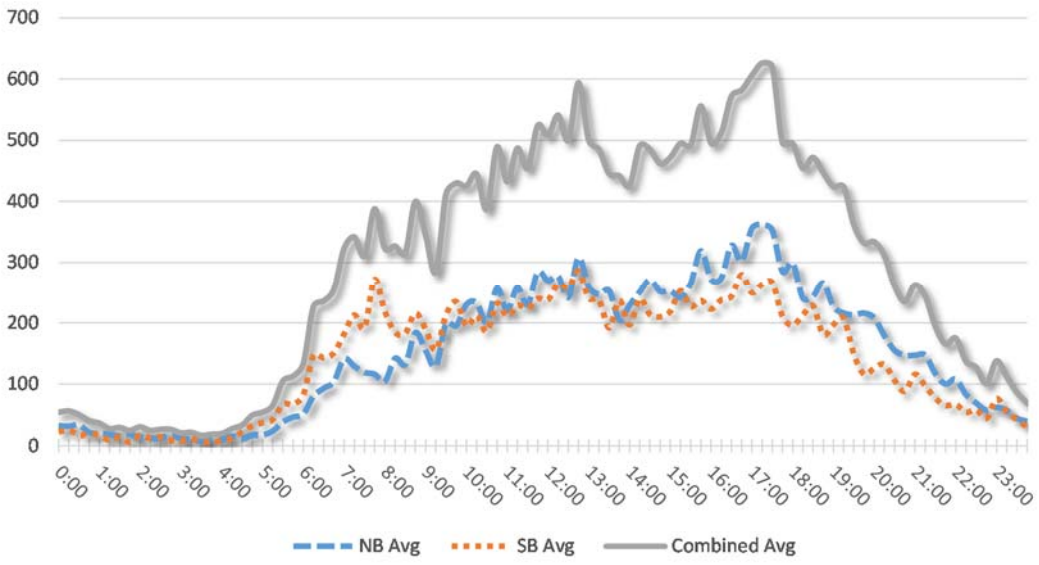


Data Source: Florida Traffic Online Synopsis Reports, Count Station 0066

US 17/92 South of US 92



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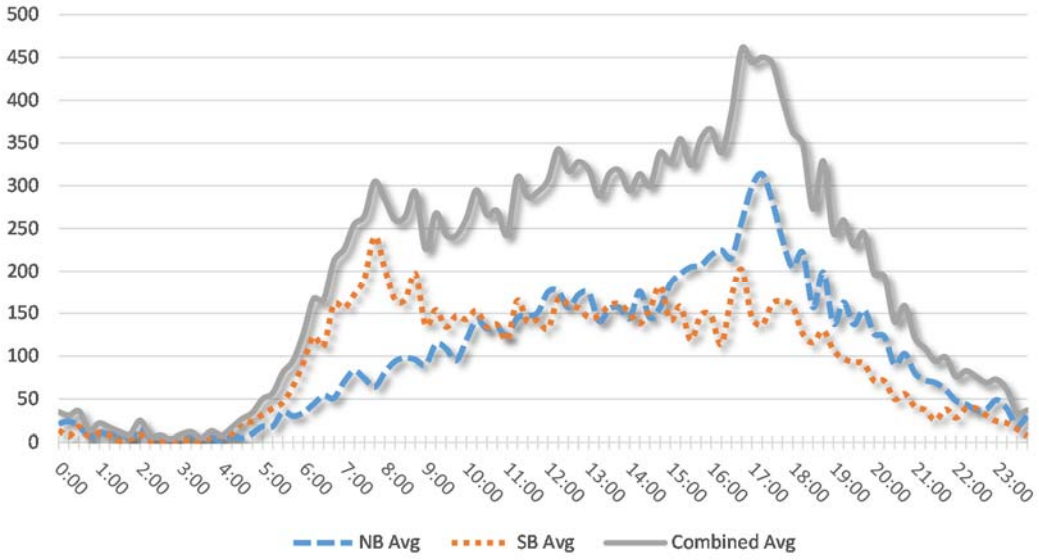
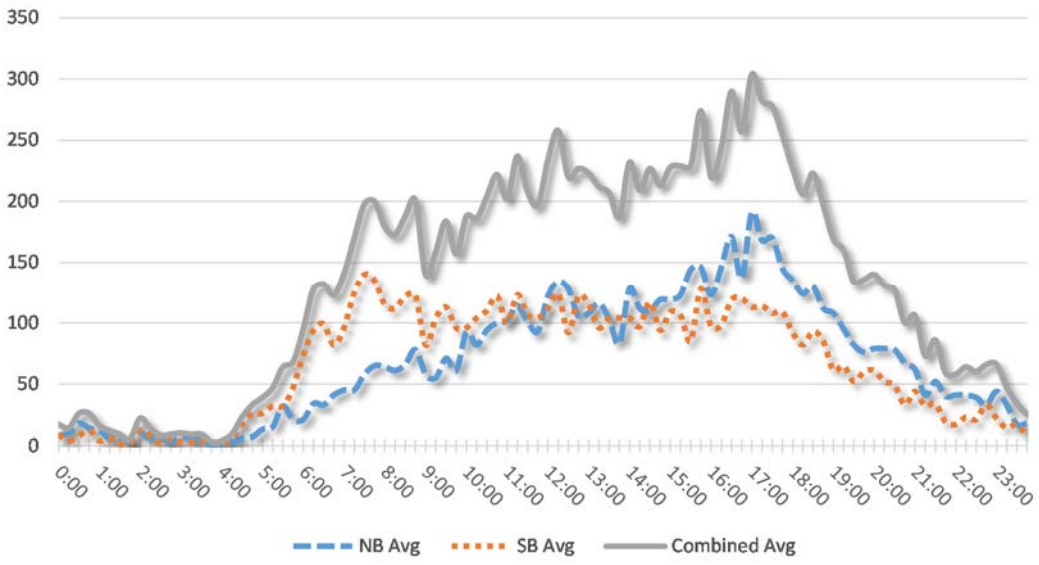
US 17 North of US 92



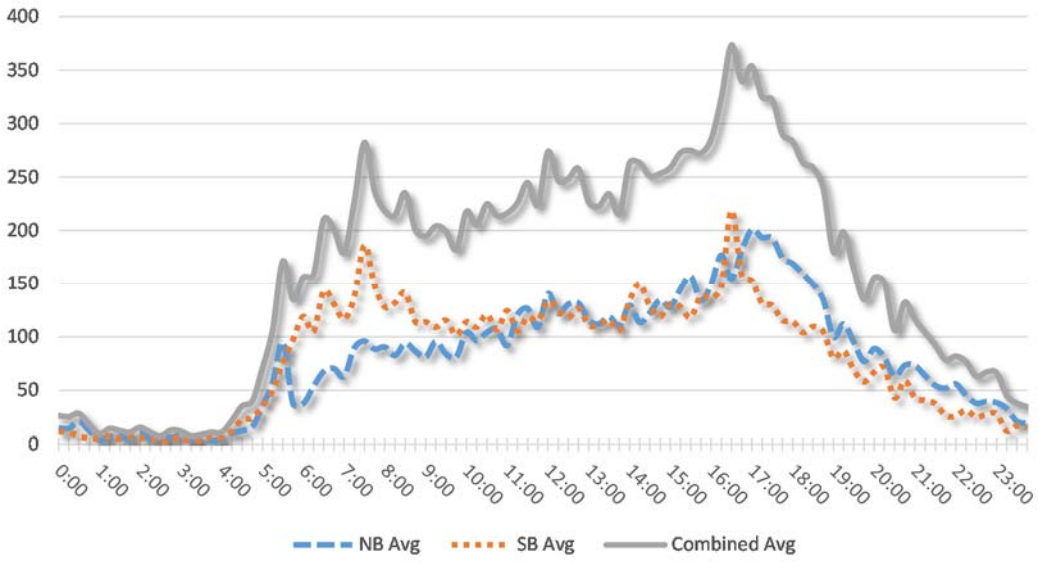
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0069

US 17 South of SR 11



Data Source: Florida Traffic Online Synopsis Reports, Count Station 0236

US 17 North of Glenwood Rd



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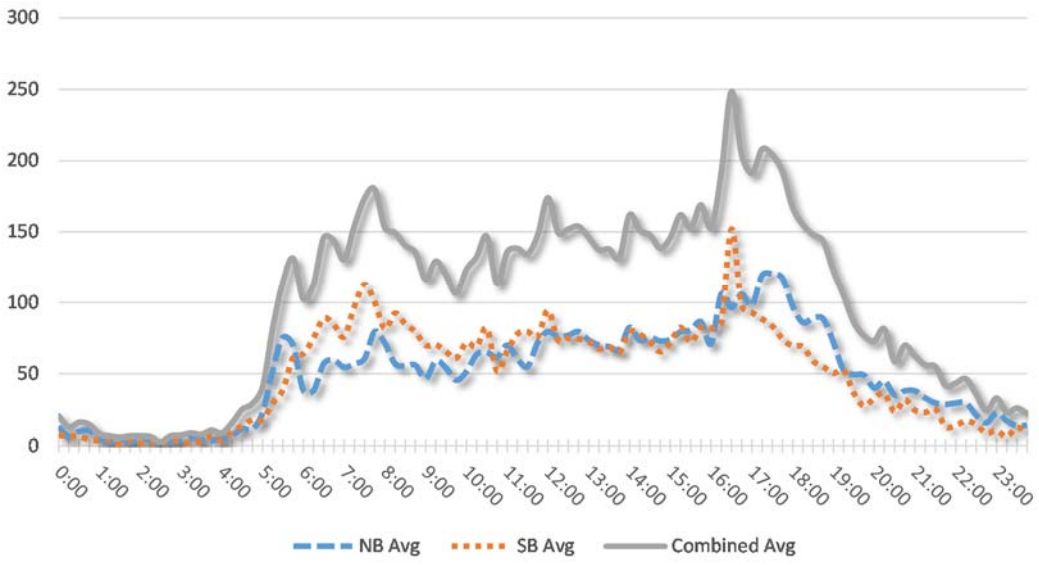
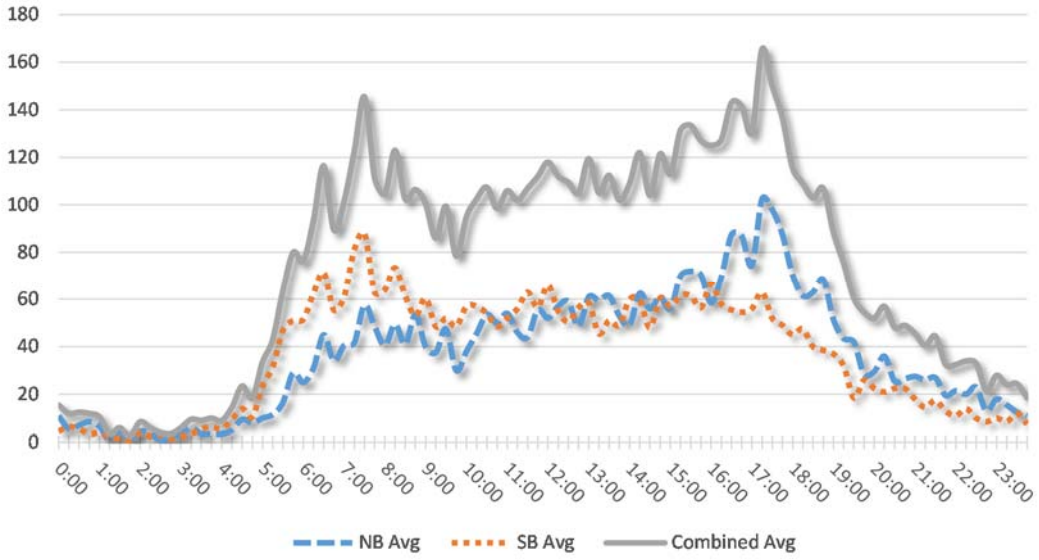
US 17 Northwest of SR 15A



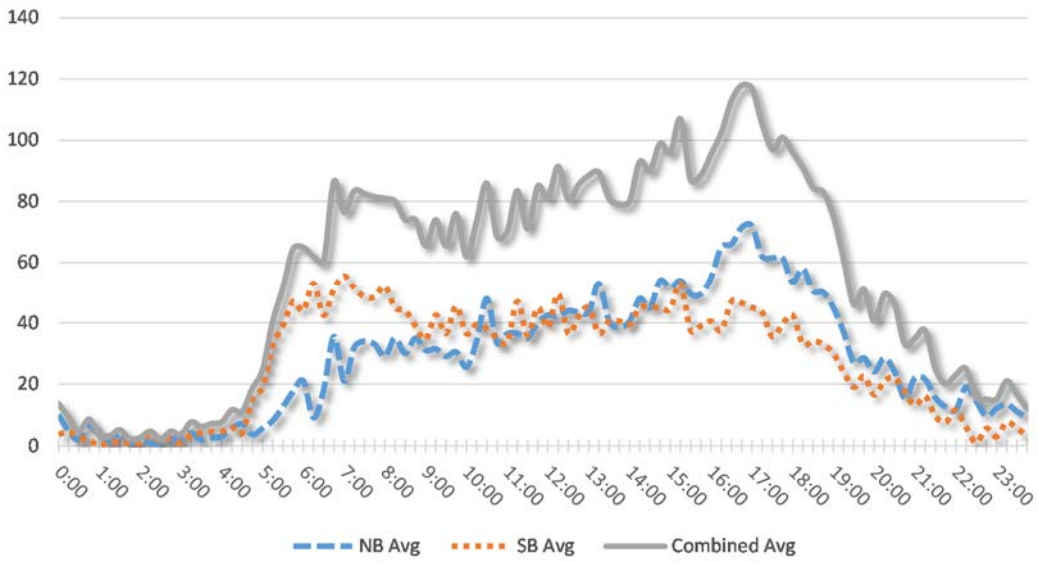
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0519

US 17 North of SR 15A



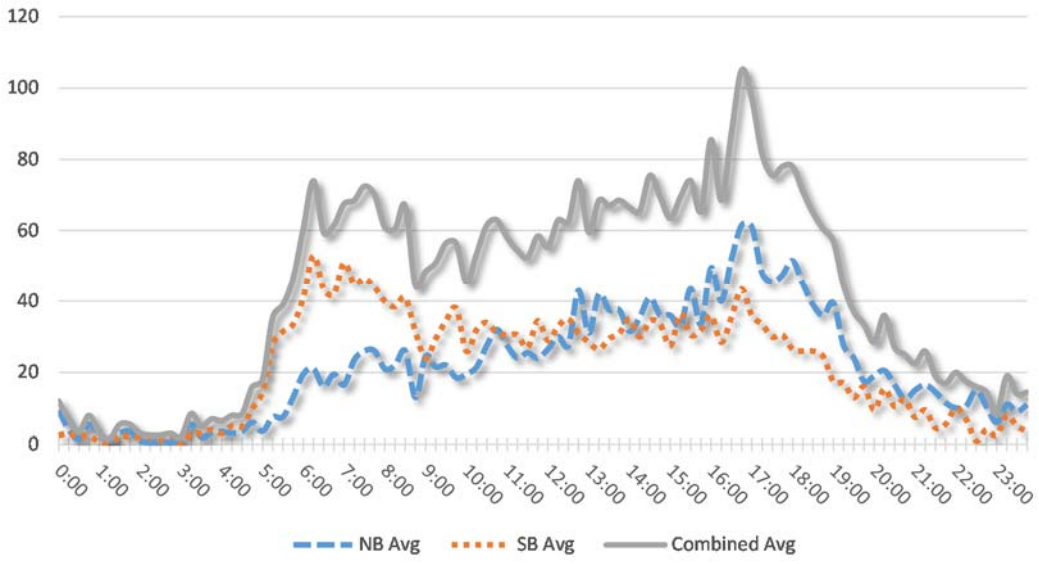
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0104

US 17 South of SR 40



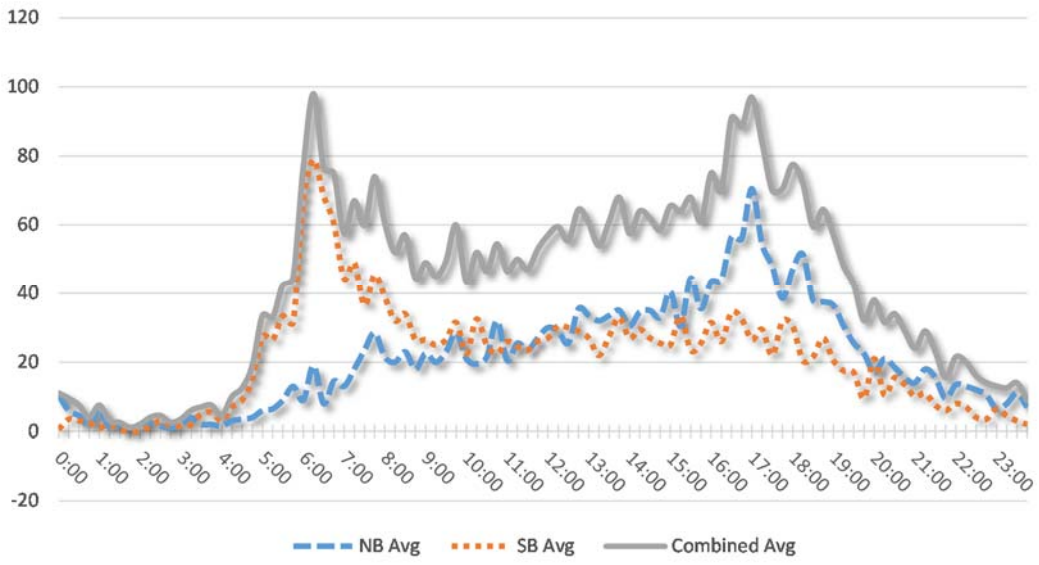
Data Source: Florida Traffic Online Synopsis Reports, Count Station 0448

US 17 North of SR 40



Data Source: Florida Traffic Online Synopsis Reports, Count Station 0046

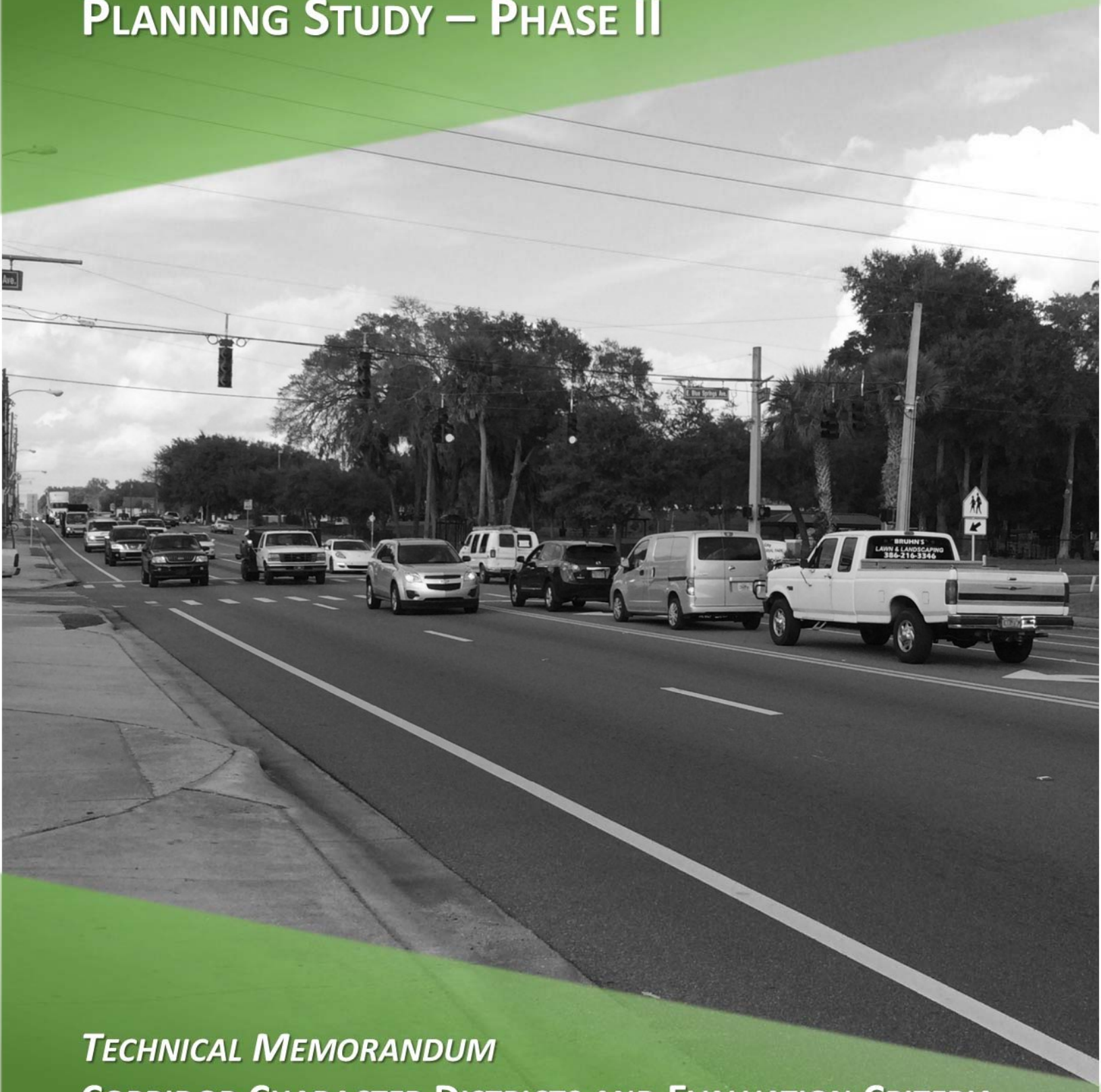
US 17 South of CR 3



Data Source: Florida Traffic Online Synopsis Reports, Count Station 0280

US 17 South of McBride Rd

US 17/SR 15 Multimodal Corridor Planning Study – Phase II



Technical Memorandum

Corridor Character Districts and Evaluation Criteria

August 2016

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INTRODUCTION

Phase II of the US 17/SR 15 Multimodal Corridor Planning Study (hereinafter referred to as the US 17 Corridor Study) is intended to identify ways to maintain and improve safety and mobility while identifying opportunities to create a more safe and comfortable environment for all users of the US 17 corridor. Building on the findings of the Phase I Study, this Phase will help to determine the most effective way for US 17 to serve all users and modes of transportation within the corridor. Phase II will help to ensure the transportation investments best position the Florida Department of Transportation (FDOT) to address local government challenges in incorporating livability and sustainability as critical considerations in transportation planning and decision-making. Ultimately, Phase II of the US 17 Corridor Study, will identify and develop a set of recommendations intended to improve the safety and mobility of all users in the corridor.

PURPOSE

This technical memorandum serves to identify and define the Corridor Context/Character Districts for the US 17 corridor. The development of the character districts was primarily based on the evaluation of existing and planned future conditions and input from Study stakeholders. The character districts are intend to serve as a guide in defining the multimodal goals, needs, and tools to meet those needs for the varying character districts along the corridor. Ultimately the character districts along the corridor could be used as the basis for establishing future roadway design characteristics and elements that reflect and support the future desired character of the US 17 corridor. In addition to defining the corridor character districts this memorandum identifies the proposed criteria and measures that will be used for the evaluation of alternatives, to be developed later in the study process, aimed at improving safety and mobility within the US 17 corridor.

This technical memorandum has been organized into the following sections:

- Corridor Character Districts
- Evaluation Criteria
- Next Steps

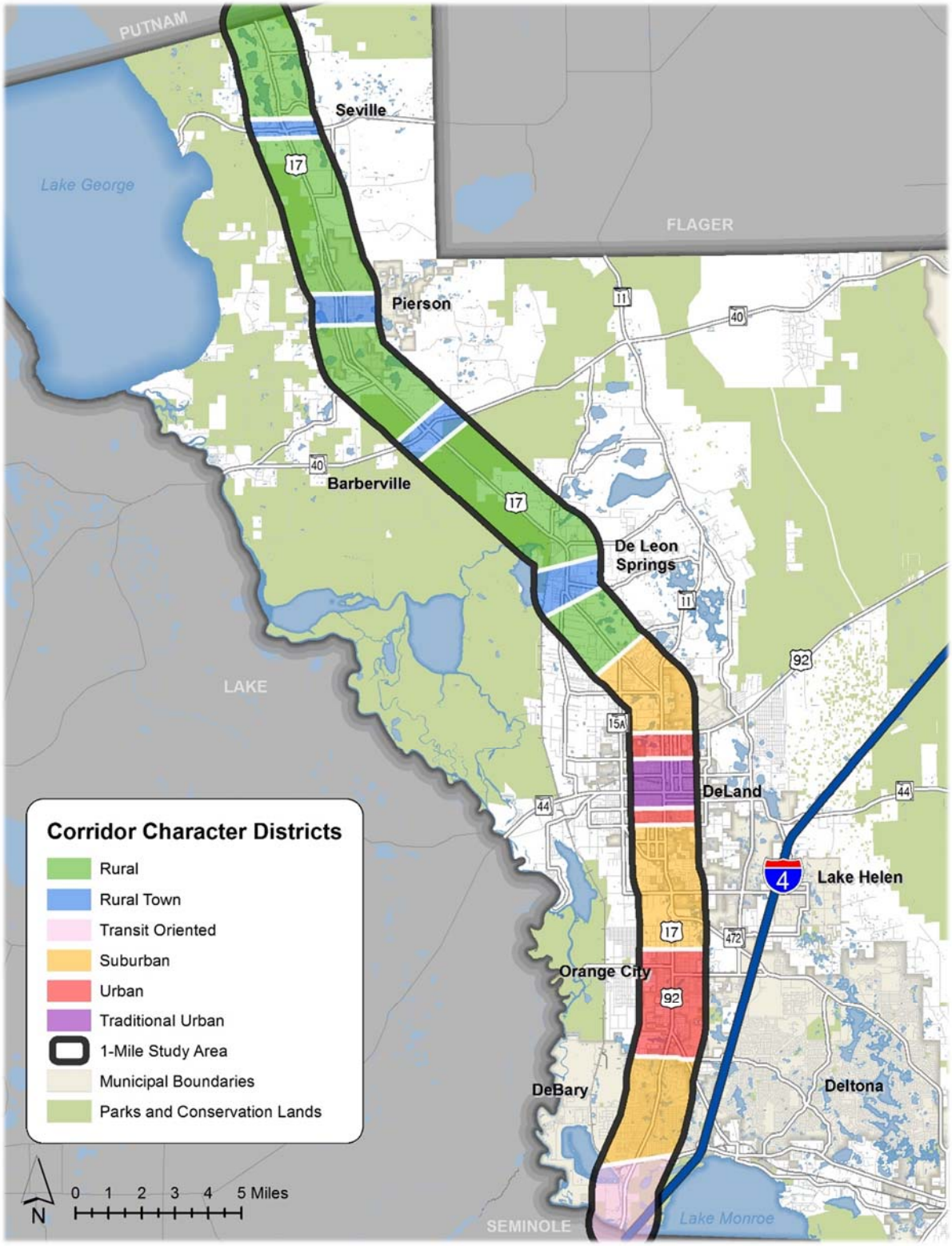
CORRIDOR CHARACTER DISTRICTS

The Corridor Character Districts for the US 17 corridor were developed to acknowledge that as one moves along the corridor, the land use, transportation needs, and general character of the corridor are different. Due to the variations along the corridor, identifying character districts will help in defining what the general mobility needs and goals are for different parts of the corridor. The intent is that the character districts could become a guide for establishing future roadway design elements and strategies aimed at improving multimodal mobility and safety along the corridor. However, the districts are not intended to be restrictive and should be viewed as flexible districts that could change over time.

Building on the efforts of the Phase I Study and the previous efforts of this study, six character district types were identified for the corridor. These were then applied to the corridor by studying characteristics such as existing and planned transportation infrastructure, land use, mobility needs, and input from stakeholders. The six corridor character district types for the US 17 corridor are:

- Rural
- Rural Town
- Suburban
- Urban
- Traditional Urban
- Transit Oriented

The following pages describe the characteristics, mobility goals, and mobility needs for each of the identified character district types, and Map 1 illustrates how the character districts were applied to the corridor.



Map 1: Corridor Character Districts

Rural Character Districts

General Characteristics

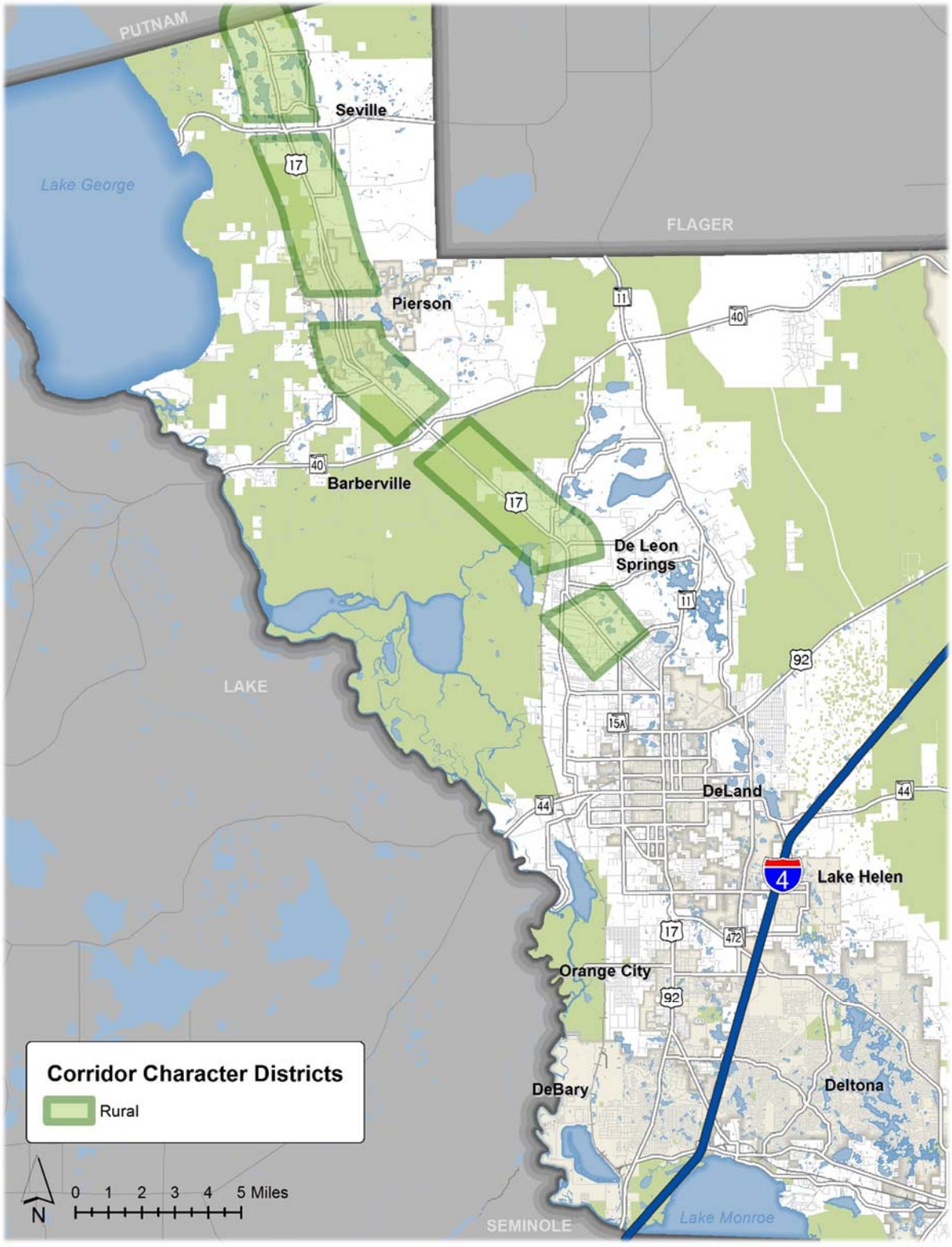
Rural districts are characterized largely by agricultural, conservation, and/or undeveloped land with some sparsely-located residences and businesses. The typical land uses within these districts include primarily agricultural or conservation with some low-density residential and non-residential uses. Rural districts are located within the northern portions of the US 17 corridor. Within these districts, US 17 serves primarily longer vehicle-based trips and serves as a key north-south regional connector. The physical characteristics of US 17 within these districts consist of a typical "rural roadway" cross-section with limited existing multimodal facilities. Due to the distance between destinations and the regional demand along these sections of US 17, there is an increased need for efficient and higher-speed travel through the Rural districts.

District Mobility Goals

The goals for Rural districts focus on enhancing the safe and efficient movement of people and goods through the region while retaining the rural character of the districts. Although it is important to explore and encourage opportunities to provide for enhanced pedestrian, bicycle, and transit connections, especially for connections that support recreational and destination based trips (e.g., multi-use trails), the primary mobility focus within the Rural districts, due to the type and length of many of the trips, is to support and improve the efficiency and safety of longer-distance vehicle trips.

District Mobility Needs

- Maintain levels of efficient regional movement of people and goods.
- Opportunities for regional and destination based multimodal facilities (e.g., multi-use trails)



Map 2: Rural Character Districts

Rural Town Districts

General Characteristics

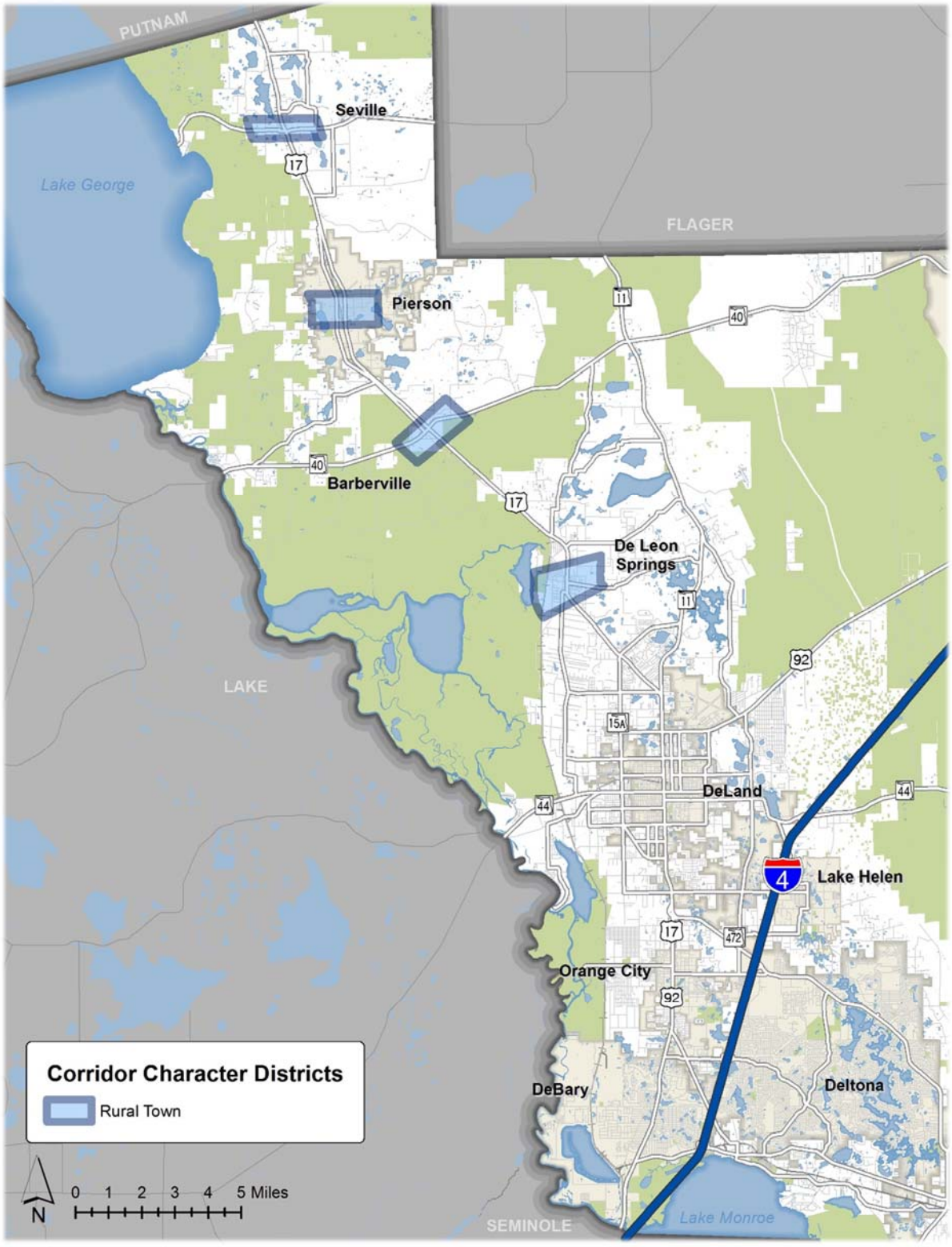
Rural Town districts of the US 17 corridor are identified as unique areas, located within Rural districts, that are generally characterized by small clusters of businesses and homes. These districts include pockets of low-density residential and light commercial and institutional (i.e., schools) land uses that are within relative close proximity to each other. The physical character of US 17 through these districts resembles a more urban-like cross-section (curb and gutter), with some existing pedestrian and bicycle facilities. Like Rural districts, the primary mobility characteristics within Rural Town districts are vehicle-based. However, due to the presence of more multimodal facilities, proximity of land uses, and a grid-like pattern of streets within the districts, the propensity for non-vehicle trips within the Rural Town districts is much higher than that of Rural districts.

District Mobility Goals

The mobility goals for Rural Town districts are similar to those of Rural districts in that a primary focus is to enhance the efficiency and safety of vehicle traffic. However, compared to Rural districts, there should be a larger emphasis on promoting and encouraging multimodal modes, especially for local trip purposes, by ensuring that basic multimodal amenities and connections are provided. Also, as much as practical, the look and feel of US 17 within these districts should alert drivers that they are in an area that could, and often does, have more multimodal activity; this could be accomplished through roadway design treatments, gateway elements, or some combination of both.

District Mobility Needs

- Promote a sense of place; could be achieved through traffic calming techniques and/or gateway features.
- Encourage appropriate travel speeds within Rural Town districts.
- Provide basic pedestrian and bicycle infrastructure to support local trips.
- Provide regional multimodal connections (e.g., multi-use trails, sidepaths, and/or connections to existing trail facilities).



Map 3: Rural Town Character Districts

Suburban Districts

General Characteristics

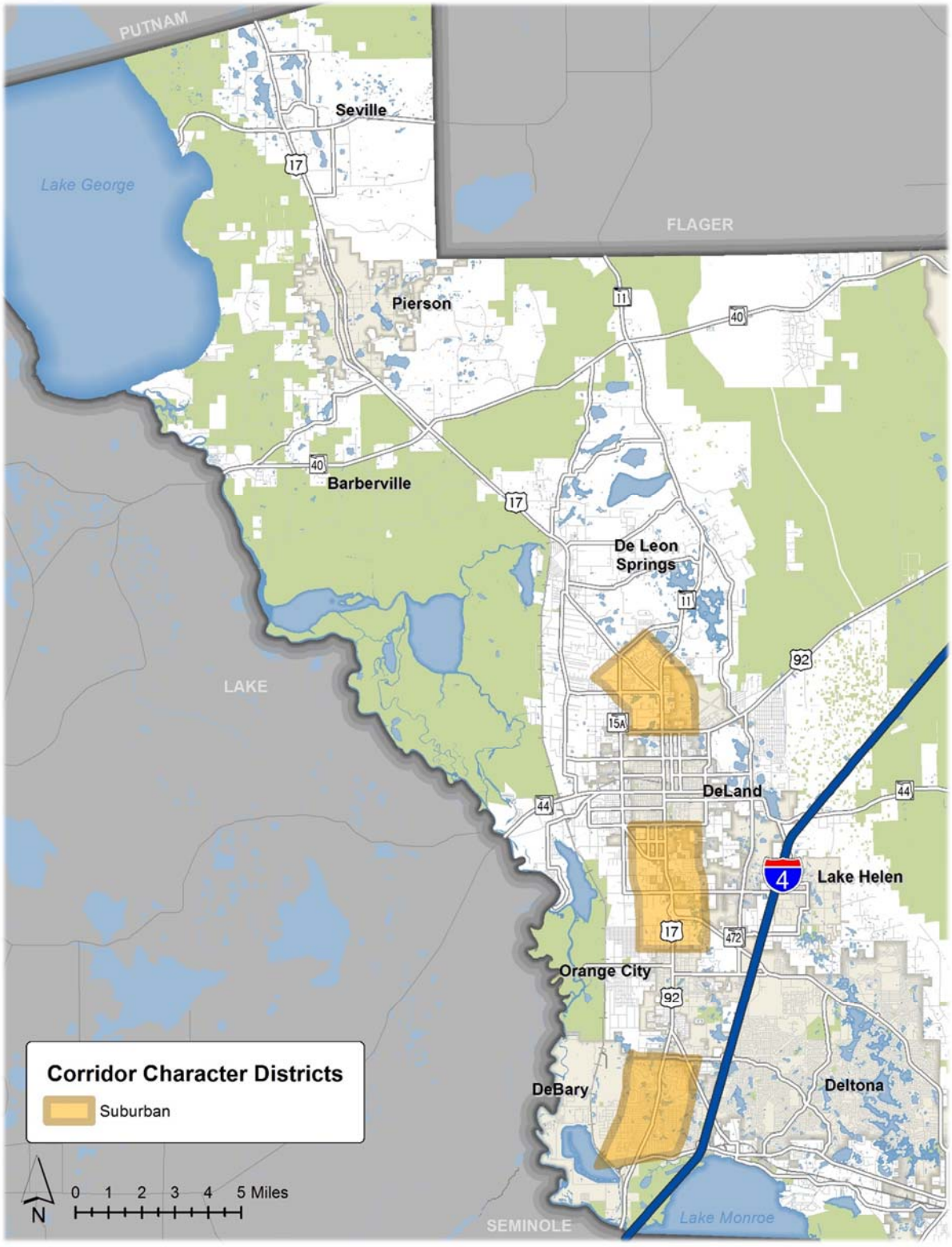
Suburban districts of the US 17 corridor exhibit a more traditional suburban (post World War II) development pattern and roadway network (less street connectivity, cul-de-sacs, etc.). These districts tend to have a more auto-oriented development pattern with a high presence of larger off-street parking lots adjacent to the corridor, greater distances between intersections, fewer roadway connections, and, when present, multimodal facilities that are fairly basic. Land uses directly adjacent to US 17 within Suburban districts resemble more strip-style commercial development with some larger big-box-anchored shopping centers, office uses, and multi-family residential development, but primarily low- to medium-density single-family residential located behind the commercial frontage. There are some undeveloped or less intense land uses (i.e., parks, golf courses, etc.), but, for the most part, these districts are stable and relatively built-out.

District Mobility Goals

Given the character of the land uses and existing travel patterns within Suburban districts, the mobility goals mainly focus on the ability to enhance or, at a minimum, maintain vehicle movements by improving safety and connectivity while also identifying opportunities to improve the attractiveness of the multimodal environment. Much of the multimodal enhancement should focus on providing and improving connections and improving safety at key intersections within the districts.

District Mobility Needs

- Ensure basic/adequate pedestrian and bicycle infrastructure (sidewalks and bike lanes).
- Explore opportunities for regional multimodal connections and enhance connections to existing trail facilities.
- Identify opportunities to enhance the pedestrian and bicycle environment and user comfort through safety enhancements, particularly at signalized intersections (e.g., marked crosswalks, enhanced lighting, reduced crossing distances, appropriate traffic calming techniques, etc.).
- Promote transit use by ensuring adequate pedestrian and bicycle connections along US 17 and to/from key destinations, including convenient and safe bus stop placement.
- Identify opportunities to enhance transit service through technology (transit signal priority) and/or operations (queue jumps).
- Identify opportunities to enhance general traffic safety and efficiency, specifically at signalized intersection locations.
- Explore opportunities to reduce the number of driveway cuts along US 17; explore opportunities for driveway consolidation, shared-driveway uses, connections between adjacent land uses, and/or side or rear site access strategies.



Map 4: Suburban Character Districts

Urban Districts

General Characteristics

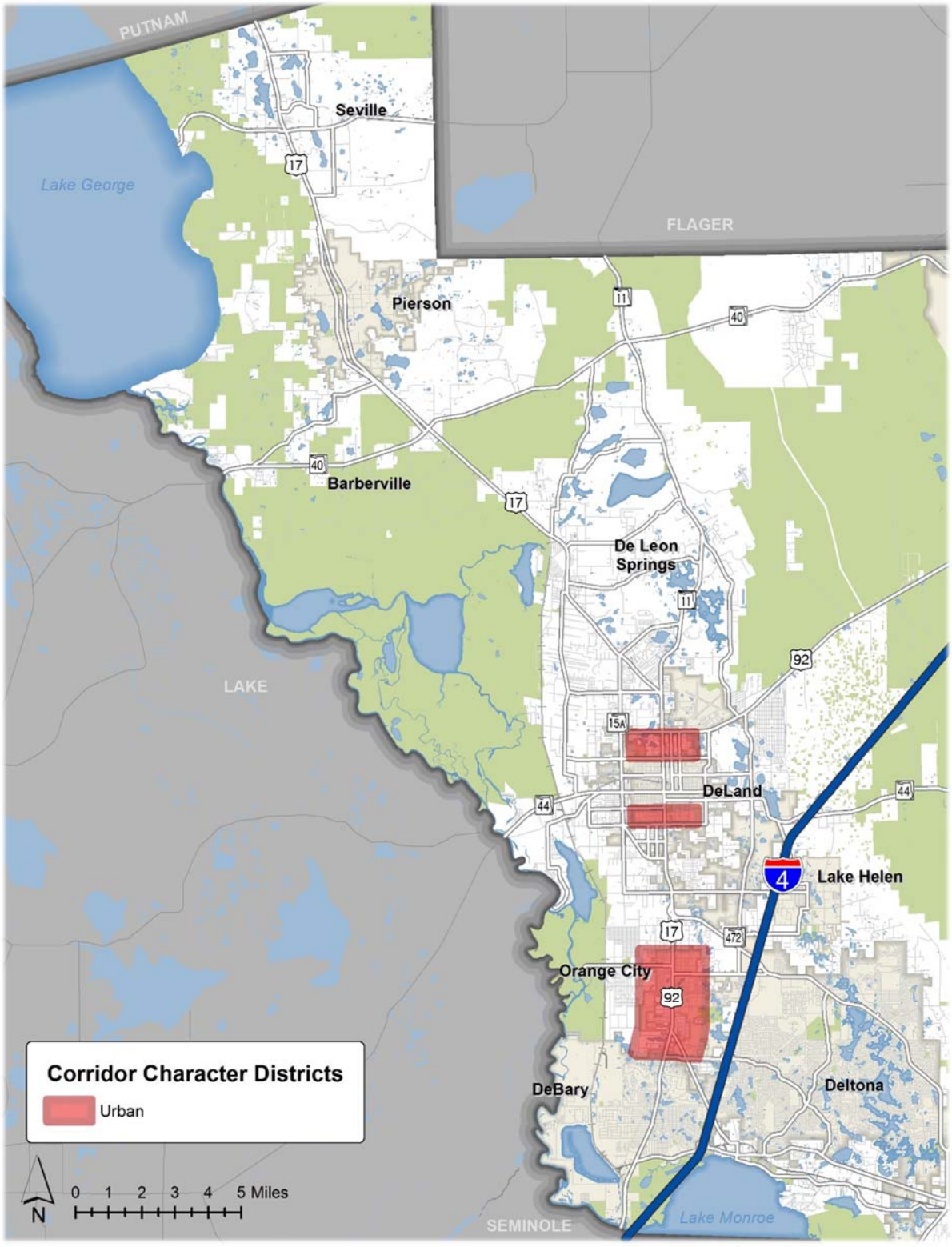
Urban districts exhibit a more intense land use development pattern along with a tighter (shorter blocks) grid-like street pattern. Urban districts have a greater mix of land uses that include more intense commercial retail, office, and institutional uses located directly along the corridor, surrounded by a mix of medium-density multi-family and single-family residential uses. The uses directly adjacent to US 17 typically are set closer to the roadway, and although there may be parking between the roadway and building, much of it is provided either along the side of or behind the buildings. US 17 through these districts exhibits an urban cross-section, with sidewalks and bike lanes or adjacent bike facilities typically present. Travel speeds through these districts are slower than Rural, Rural Town, or Suburban districts, which is indicative of roadway design and increasing levels of traffic congestion. The greater mix and density of land uses, greater presence of multimodal facilities, overall street pattern make Urban districts more conducive to using multimodal modes for a wider range of trip purposes.

District Mobility Goals

The mobility goals for Urban districts mainly focus on encouraging multimodal travel by emphasizing the enhancement of multimodal facilities and connections, especially at signalized intersections. Although there are still regional transportation needs to be met along US 17, much of the emphasis through Urban districts is on serving the more local trip needs and improving the safety and general feel (public realm) of the corridor. In addition to these focuses, parts of the Urban districts have been targeted for redevelopment and reinvestments, so it is also important that the infrastructure within Urban districts is supportive and accommodating of any potential land use changes that may occur.

District Mobility Needs

- Ensure pedestrian and bicycle connections (appropriate to the context of the roadway) along US 17 and along connecting cross streets.
- Enhance the safety and comfort of the pedestrian and bicycle environment through intersection enhancements, enhanced bicycle facilities (including buffered bike lanes, sidepaths, and trails), wider sidewalks, roadway and crosswalk lighting (including pedestrian scale lighting), landscaping, and appropriate traffic calming techniques.
- Ensure adequate pedestrian and bicycle connections to/from transit facilities, including addressing bus stop placement, connections to/from key destinations and generators, and improved connections across US 17.
- Explore transit strategies to improve operations, including transit signal priority (TSP) technology and queue jump opportunities.
- Explore site access strategies aimed at reducing the number of driveway cuts along the corridor; could include driveway consolidation, driveway sharing, connections between adjacent sites, and/or allowing rear/side street site access.



Map 5: Urban Character Districts

Traditional Urban District

General Characteristics

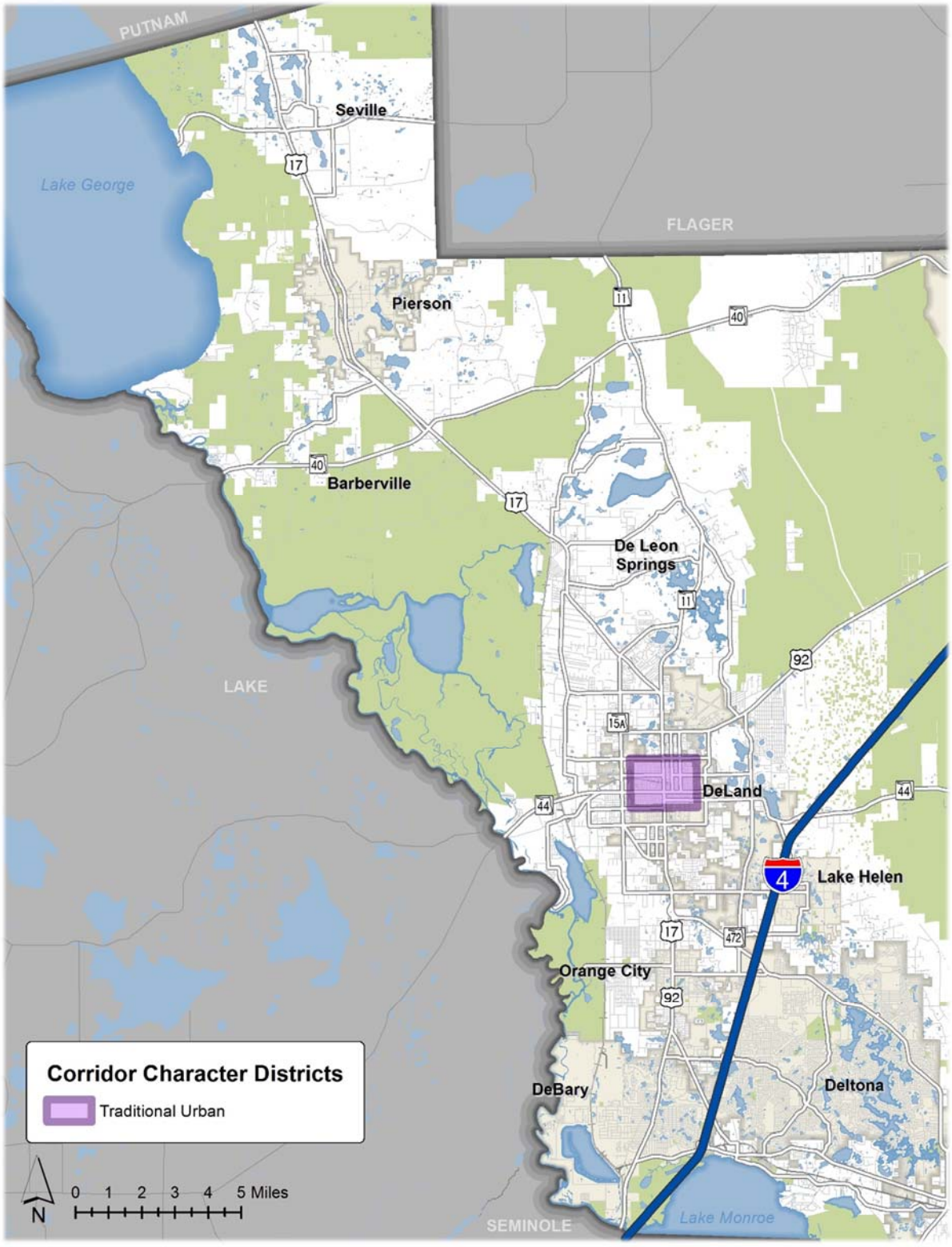
The Traditional Urban district encompasses the downtown DeLand area along with the portions of US 17 through Stetson University. This area could be characterized as quaint and highly walkable, with enhanced multimodal facilities that help to encourage non-single-occupancy vehicle travel modes. There are closely-set multi-story buildings that abut wide sidewalks, on-street parking, street furniture, landscaping, a tight street grid that improves connectivity, and slower travel speeds that promote walkability within this district. The diverse mix of land uses within the Traditional Urban district includes commercial retail, office, restaurants, government, institutional, and parks that enhance the overall character and feel of the district.

District Mobility Goals

The mobility goals for the Traditional Urban district are to retain and promote the existing character of the district while continuing to improve safety and multimodal access where needed. Continuing to encourage a diverse mix of travel modes by maintaining slower travel speeds and enhanced facilities will allow this district to continue to serve its multimodal needs and demands.

District Mobility Needs

- Continue to support and encourage multimodal activity throughout this district.
- Explore opportunities for enhanced east-west multimodal connections, particularly on-street bicycle facilities.
- Identify opportunities to further integrate transit and transit connections throughout this district.
- Monitor traffic circulation patterns to determine if modifications to existing turn restrictions are needed.



Map 6: Traditional Urban Character District

Transit-Oriented District

General Characteristics

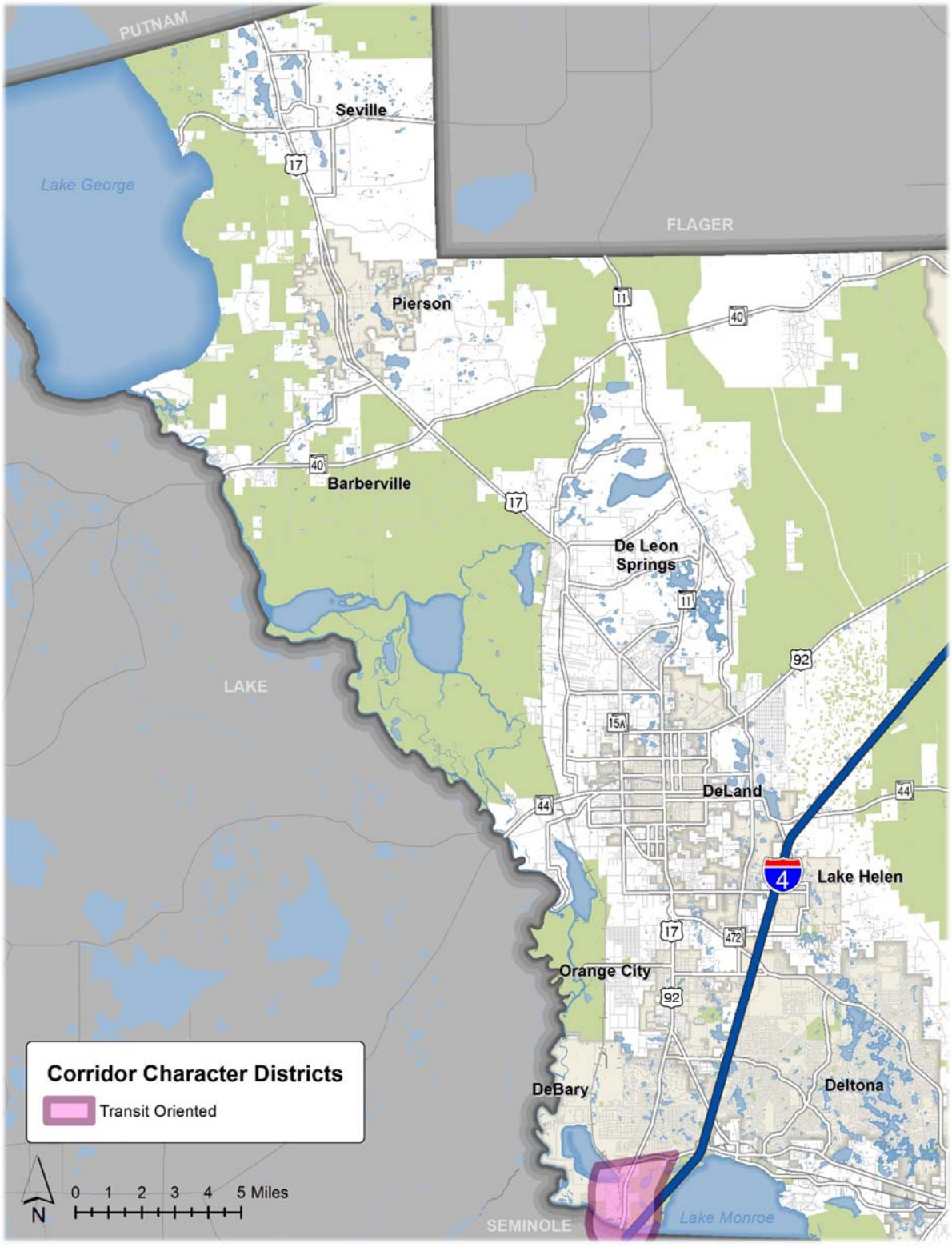
The Transit Oriented district of the corridor includes the area around the existing SunRail commuter rail station in southern DeBary. Today, this district portrays many of the characteristics of Rural districts, but the key differences are the presence of the SunRail station and DeBary's transit-oriented development (TOD) overlay planning area. The TOD planning efforts within this district have identified a desire for a more diverse mix and density of land uses that will support and be supportive of multiple transportation modes.

District Mobility Goals

The Transit Oriented district is an emerging district that is currently working on defining its future development and multimodal potential. The mobility goals for this district should focus on creating a balance between existing regional mobility needs, a need to support proposed local multimodal travel demands, and enhanced assess and connections to the existing SunRail station. Ultimately, this district should support the mobility needs defined by the City of DeBary through transportation improvements based upon the City's adopted TOD Master Plan.

District Mobility Needs

- Identify opportunities to expand and enhance multimodal connections along and across US 17; could include exploring opportunities for additional cross-corridor connections, new and/or enhanced facilities/service along US 17, identifying appropriate traffic calming techniques (i.e., landscaping and reducing travel lane widths), and improved connections to the US 17 corridor.
- Identify opportunities to enhance the overall multimodal (pedestrian, bicycle, and transit) connections to the existing DeBary SunRail station.
- Coordinate transportation and land use planning to promote and support multimodal transportation options.
- Continue to develop the multimodal "vision" for the US 17 corridor through this district as part of the continued TOD planning efforts within this district.



Map 7: Transit Oriented Character District

EVALUATION CRITERIA

This section provides a summary of the criteria and measures that have been established as a guide to evaluate the potential multimodal alternatives that will developed for the US 17 corridor as part of this study effort. Using this set of criteria and measures will allow the study to objectively evaluate each of the alternatives on how they relate to the following evaluation criteria. The following contains an overview of the criteria and measures that have been identified for the evaluation of the potential alternatives.

Traffic Characteristics and Quality of Existing Multimodal Facilities

Alternatives to provide sidewalks, marked bike lanes, or multi-use paths along roadways with no existing pedestrian or bicycle facilities are prioritized above projects to enhance roadways with complete or partial facilities (e.g., wide outside lanes for cyclists or sidewalks along one side of a street), all else being equal. The measures that will be used to evaluate this criterion include:

- Roadway classification
  - Arterial
  - Collector
  - Local
- Existing pedestrian facilities
  - Sidewalk
  - Multi-use trail
- Existing bicycle facilities
  - Marked bike lane
  - Paved shoulder, not a bike lane
  - Multi-use trail (limited hours vs. along roadway)

Safety

Alternatives that directly address a documented traffic crash issue are a higher priority than projects that implement safety best practices or are not relevant to improving safety for all road users. The measures that will be used to evaluate this criterion include:

- Addresses documented safety issue
- Safety best practice

Connectivity

Alternatives that provide for multimodal connectivity or address congestion issues where alternative routes are not available are a higher priority than enhancements that complement adequate existing routes. The measures that will be used to evaluate this criterion include:

- Provides connections across major roadways
- Provides connections along major highways
- Provides connections to destinations (e.g., parks, schools, neighborhoods)
- Enhances existing connections

Support Density

Alternatives in higher-density areas that provide access to higher-frequency transit routes are more likely to provide a congestion management/livability benefit than projects that serve lower-density areas and do not connect to transit. The measures that will be used to evaluate this criteria include:

- Density (persons per acre) of the location near the recommended alternative:
    - High density: > 10 persons per acre
    - Medium density: 5–10 persons per acre
    - Low density: 2-5 persons per acre
    - Very low density: <2 persons per acre

Local Compatibility

Alternatives that have their genesis in local plan documents or respond to an identified local need for the communities along the corridor are considered a higher priority compared to alternatives that are not supportive of or based on existing planning documents. The measures that will be used to evaluate this criterion include:

- Supports local plans/goals/visions

Implementation

The time frame, level of effort, and planning level order of magnitude cost associated with implementing the potential alternatives will be evaluated as follows:

- Timeframe
    - Short-term: 0–2 years
    - Mid-term: 0–5 years
    - Long-term: 5+ years
- Level of Effort
    - Low: Requires limited or no right-of-way, no environmental review, minimal design work, and does not impact utilities, signal, or drainage structures. Generally, may be implemented through push-button or maintenance contracts. Examples include signage and pavement markings with little or no resurfacing or impacts to curbs.

  - Medium: Minor design required. May require limited right-of-way (e.g., corner clips) and minimal environmental review. May include some impacts to utilities, signals, or drainage structures. Examples include construction of sidewalk segments within the right-of-way or reconstruction of curb radii to improve geometry for pedestrians.
  - High: Requires significant engineering and design, environmental review, potential right-of-way, and evaluation of utility impacts. Examples include construction of a multi-use path or roundabout.
- Magnitude of Cost
  - Low: Less than $250,000
  - Medium: Less than $500,000
  - High: Greater than $500,000

It is anticipated that the identified alternatives to improve mobility and safety will be evaluated and ranked using a point system based on the criteria and measures identified in this section. Table 1 provides a summary of the evaluation criteria and measures. As the alternative recommendations are developed and evaluated, it is anticipated that these evaluation criteria will be able to serve as a system to rank and prioritize the identified alternatives.

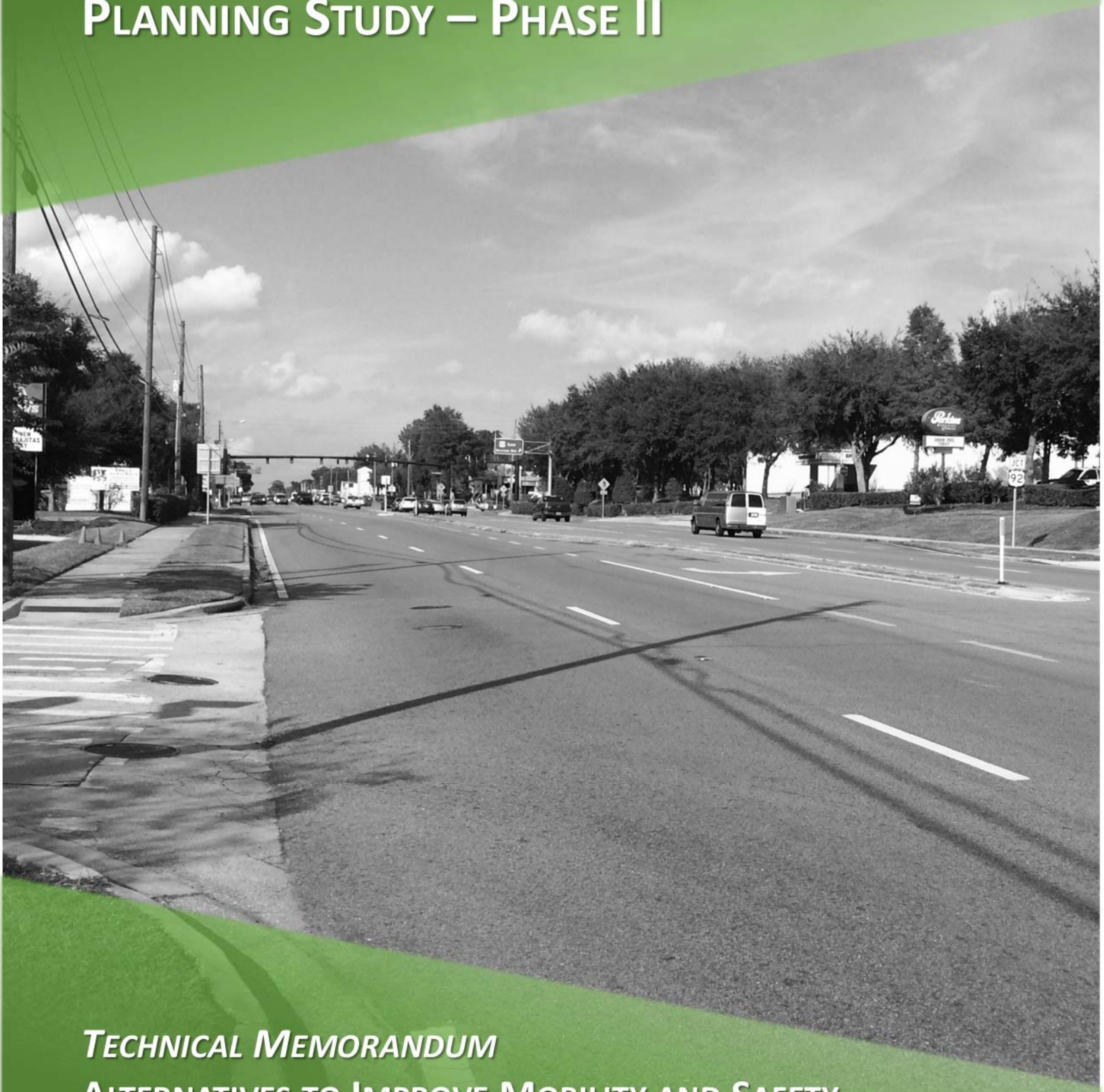
Table 1: Evaluation Criteria and Measures

Criteria		Measures	
Traffic Characteristics and Quality of Existing Multimodal Facilities	Roadway	Arterial Street	
		Higher-Volume Collector (>5,000 ADT)	
		Lower-Volume Collector (<5,000 ADT)	
		Local (Residential) Street	
	Pedestrian	No Sidewalk	
		Some sidewalk, but significant gaps	
		Complete sidewalk on one-side only	
		Trail/Multi-use Pathway	
		Complete sidewalk along both sides	Could be improved based on existing conditions
			Adequate for existing conditions
	Bicycle	No Bicycle Facilities	
		Un-Marked Paved Shoulder	
		Trail (limited hours)	
		Multi-use Pathway	Along roadway
			Along parallel roadway/facility
		Marked Bicycle Lanes	
Safety		Address documented safety/crash issue	
		Safety Best Practice - Arterial Street	
		Safety Best Practice - Collector Street	
		Safety Best Practice - Local Street	
Connections		Provides connection across major highway	
		Provides connection along a major highway	
		Provides connection to schools/parks	
		Provides neighborhood connectivity	
		Enhances existing connection	
		None - Facility complemented by other routes	
Support Density		Higher (>10 persons per acre)	
		Medium (5-10 persons per acre)	
		Low (2-5 persons per acre)	
		Very Low (<2 persons per acre)	
Local Compatibility		Supports local plan/goals/vision	
		Partially supports local plans/goals/vision	
		Does not support local plans/goals/vision	
Implementation	Timeframe	Short-Term	
		Mid-Term	
		Longer-Term	
	Level of Effort	Low	
		Medium	
		High	
	Magnitude of Cost	Low	
		Medium	
		High	

NEXT STEPS

As previously mentioned, one of the primary objectives of the Phase II Study is to help identify ways that the US 17 corridor can serve all users and modes of transportation in a safe and efficient manner. To accomplish this objective, project alternatives aimed at improving mobility and modal choice, accessibility, and safety along the US 17 corridor will be developed based on the data compiled during the baseline assessment and the character districts identified herein. It is anticipated that the alternatives will focus primarily on identifying potential safety and operation improvements, with pedestrian/bicycle safety and mobility at the forefront. After developing the potential alternatives, a high-level evaluation screening based on the criteria and measures identified will be conducted for each potential alternative in an effort to assess and prioritize the potential alternatives.

US 17/SR 15 Multimodal Corridor Planning Study – Phase II



Technical Memorandum

Alternatives to Improve Mobility and Safety

August 2016

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TECHNICAL MEMORANDUM #3 – DEVELOPMENT AND EVALUATION OF ALTERNATIVES TO IMPROVE MOBILITY AND SAFETY

INTRODUCTION

Phase II of the US 17/SR 15 Multimodal Corridor Planning Study (hereinafter referred to as the US 17 Corridor Study) is intended to identify ways to maintain and improve safety and mobility while identifying opportunities to create a more safe and comfortable environment for all users of the US 17 corridor. Building on the findings of the Phase I Study, this Phase will help to determine the most effective way for US 17 to serve all users and modes of transportation within the corridor. Phase II will help to ensure the transportation investments best position the Florida Department of Transportation (FDOT) to address local government challenges in incorporating livability and sustainability as critical considerations in transportation planning and decision-making. Ultimately, Phase II of the US 17 Corridor Study, will identify and develop a set of recommendations intended to improve the safety and mobility of all users in the corridor.

PURPOSE

This technical memorandum introduces the proposed recommended alternatives to improve the multimodal mobility and safety of the US 17 corridor. The memorandum identifies and addresses systemic corridor-wide practices that should be considered throughout the corridor, along with some potential site specific alternative recommendations. Finally, this memorandum will summarize the results of the planning-level evaluation, based on the criteria and measures identified in Technical Memorandum #2, for each site specific recommendation that were identified within the US 17 corridor.

This technical memorandum has been organized into the following sections:

- Corridor Wide Strategies/Alternatives
- Site Specific Alternatives
- Alternatives Evaluation

CORRIDOR-WIDE STRATEGIES/ALTERNATIVES

This section identifies some of the best practice strategies/alternatives that should be considered throughout the entire US 17 corridor. Many of these strategies focus on systemic improvements that should be applied throughout the corridor, where feasible, or incorporated into future projects along the corridor. Some of the site specific alternatives make reference to the strategies identified in this section, but for the most part locations where these strategies should be applied are not specifically identified.

Crosswalk Markings

Crosswalks are a vital part of the pedestrian network; they define the designated crossing area for pedestrians and alert drivers to the likelihood of pedestrians. There are many different types of acceptable crosswalk markings/treatments, but the ladder crosswalk marking (Figure 1) often is considered the preferred treatment for intersection crossings. The longitudinal markings and the parallel edge-line markings of the ladder crosswalk provide more surface area to be seen by drivers and are more visible from further distances compared to other crosswalk treatments. Marked and well distinguished crosswalks help to discourage drivers from encroaching on the crosswalk area and can help pedestrians assert their right-of-way when dealing with left- and right-turning traffic. Note, along roadways, at non-intersection locations, the FDOT preferred crosswalk treatment is the standard crosswalk marking.

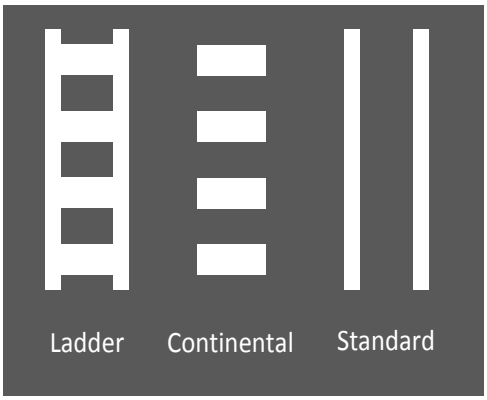


Figure 1: Common Crosswalk Markings

Roadway and Intersection/Crosswalk Lighting

Roadway lighting is a critical component of roadway safety and should be designed to provide adequate illumination for all roadway users. Many factors affect roadway lighting and its effectiveness in increasing safety, including location, orientation, intensity, color, ambient light, technology (e.g., LED lights), etc. Recent research on the placement of lighting in relationship to an intersection and crosswalks is summarized in the Federal Highway Administration's *Informational Report on Lighting Design for Midblock Crosswalks* report. Figure 2 provides an example of the preferred lighting location at an intersection. This lighting layout, with the overhead luminaire located in advance of the crosswalk, allows the light to provide a positive contrast of the pedestrian by illuminating the driver approach side of any crossing pedestrians.

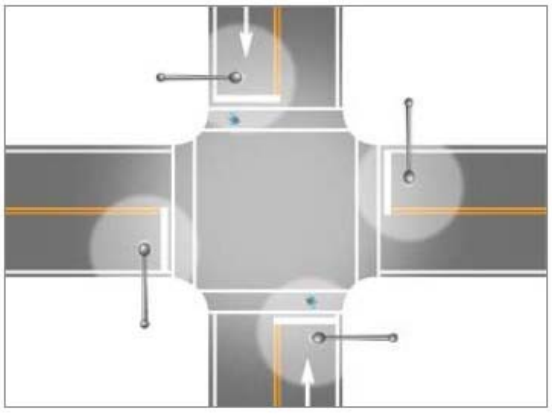


Figure 2: Intersection/Crosswalk Lighting Layout Design

Signage

Signs can be used to warn drivers and other roadway users of potential threats and can also serve as visual reminders on how driver are required to act in specific circumstances. Signs like the MUTCD R10-15 sign (Figure 3) remind turning drivers of their responsibility to yield to pedestrians. However, the placement of signs should be done with care; too many signs could result in drivers becoming desensitized and could lead to noncompliance. To prevent overuse, it is typically recommended that the R10-15 signs be considered in locations where high-speed/high volume right turns are likely or where there is a documented pedestrian-right-turn crash issue. Examples of these locations include where intersection skew allows for higher-speed turning movements or where free-flow or dual right-turn lanes are provided.

Figure 3: R10-15 Turning Vehicle Yield to Pedestrian Sign

Flashing Yellow Arrow

Flashing yellow arrow (FYA) traffic signal for left turns (Figure 4) are a relatively new option for indicating protected/permissive left turns at signalized intersections. Studies by the Federal Highway Administration (FHWA) show that the FYA reduces crashes at intersections by providing a clear distinction between when left turning vehicles are protected from oncoming traffic and when they must yield. The FYA also provides options for flexibility in how left turn phases are controlled, one of the options that is being explored is tying the protected/permissive left turn phase into pedestrian pushbutton actuation; the idea then is that the left turn signal phase could be switched to protected-only if the conflicting pedestrian pushbutton is activated.

Figure 4: Flashing Yellow Arrow

Modern Right-Turn Channelization Island

At intersections where a wide curb radius is necessary to accommodate heavy vehicles or skewed geometries, consideration should be given to installing right-turn islands to better separate vehicle-pedestrian conflicts and reduce pedestrian exposure. If used, channelization islands should be designed in a matter that discourages higher-speed turning movements and properly aligns the approaching driver's field of view with the crosswalk area (Figure 5).

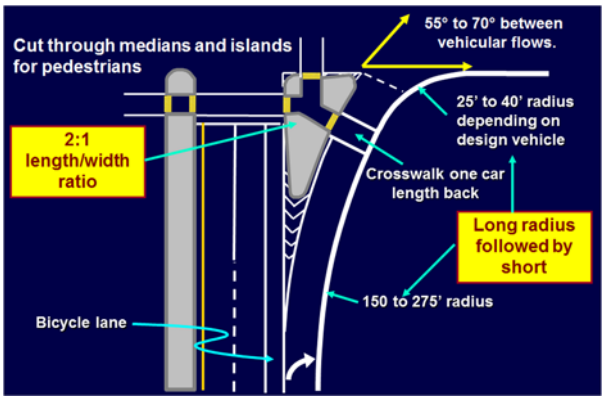


Figure 5: Right-Turn Island/Slip Lane Design Details

Pedestrian Channelization

Pedestrian channelization is a technique that uses some form of physical barrier (i.e., pedestrian fence or dense landscape vegetation) to encourage pedestrians to cross at nearby marked crosswalks. Pedestrian channelization should only be considered in combination with proper intersection safety enhancements and when the distances between crossings is relatively reasonable.

Figure 6: Example of Median Pedestrian Channelization

Bus Stop Siting

In addition to being comfortable, secure, and ADA-accessible, bus stops should be positioned to minimize the extent to which pedestrians traveling to or form the bus stop conflict with motor-vehicle traffic. A critical aspect of this principle is avoiding bus stop placement that "encourages" pedestrians to cross major roadways within the influence area of major intersections rather than at the crosswalk. Other important, but secondary, considerations include how the position of the bus stop will affect bus-vehicle interactions, how stop placement will influence bus running time, and the extent to which the stop is convenient to major trip generators.

Source: pedbikesafe.org

Figure 7: Bus Stop Placement near a Crosswalk

Transit Signal Priority (TSP)

TSP is a general term given to various operational techniques that use technology integrated into traffic signals to improve transit service and reduce delay by, in general terms, holding green lights longer or shortening red lights. The benefits of TSP include reduced transit travel times, improved schedule adherence, improved transit efficiency, and increased road network efficiency as measured by person mobility. There are many types of active and passive TSP strategies that can be applied either throughout a corridor or at individual intersections, so it is important that these techniques and strategies are evaluated and monitored to determine the most appropriate approaches. The Federal Transit Administration (FTA) notes the distinction between TSP and signal pre-emption in the TSP Planning and Implementation Handbook as signal priority modifies the normal signal operation process to better accommodate transit vehicles, while pre-emption interrupts the normal process for special events such as a responding fire engine.

Bus Right-Turn Queue Jumps

A queue jump is a function that allows the bus to by-pass (jump) stopped traffic to get ahead of waiting queues of traffic. The queue jump lane can be a right-turn only lane that permits straight-through movements for buses only or depending on the length, demand, and design of the right-turn lane, a special queue jump lane can be installed between the right-turn and through lanes. Also, depending on the location a special bus-only signal may be required. If applied systematically, queue jump lanes can reduce (operating) delay, resulting in run-time savings and increased reliability.

Figure 8: Example Signage for Right-Turn Queue Jumps

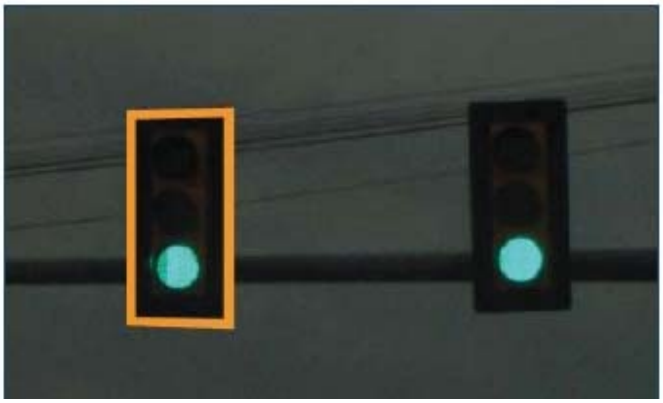
Right-Turn-On-Red Restrictions

Although state law requires drivers to come to a full stop and yield to cross-traffic and pedestrians prior to turning right on red, many drivers do not fully comply with this regulation or often are so intent on looking for traffic approaching to their left that they may not be alert to pedestrians approaching on their right. In locations where high volumes of pedestrians are present, prohibiting right turns on red may be considered an option in helping to mitigate conflicts between crossing pedestrians and turning vehicles. The use of LED blank-out signs (Figure 9) to indicate when a right turn on red is prohibited can provide some flexibility in the application of the restriction; for example, right-turns on red may need to be prohibited only during the busiest pedestrian times or could be connected to a pedestrian pushbutton and activated only when the pushbutton has been actuated.

Figure 9: Variable LED No Right-Turn on Red Sign

Traffic Signal Backplates

Backplates are added to traffic signals to improve the visibility of the illuminated face of the signal, especially for east/west approaches that can be impacted by sun glare. A retroreflective boarder framing the backplate can add to their effectiveness and has been recognized by FHWA as a proven countermeasure used to improve safety at signalized intersections. Before installing backplates the structural capacity of the signal infrastructure, either span wire or mast arm, needs to be properly evaluated to determine the structural integrity of the traffic signal assembly.



Source: safety.fhwa.dod.gov

Figure 10: Retroreflective Traffic Signal Backplates

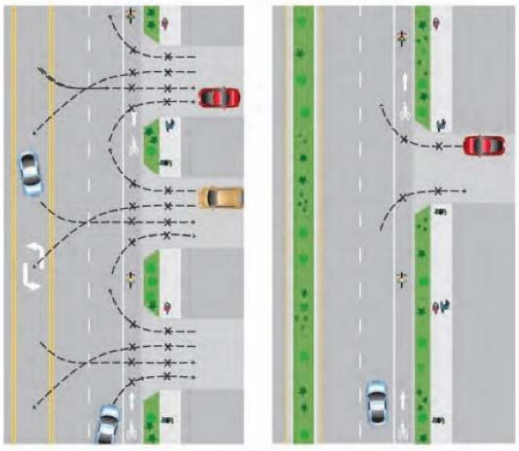
Landscaping

While not necessarily appropriate in all locations due to limited space, sightlines, and various other reasons, street landscaping can provide an enhanced street environment. By creating a visual narrowing of the roadway and by changing the character of the street, landscaping can be an effective strategy at calming traffic. Street landscaping can also provide an enhanced pedestrian environment by providing shade and/or a physical separation between pedestrians and the vehicles on the roadway. While there are many benefits of street landscaping there are some consideration that need to be taken with the installation of landscaping. Landscaping need to adhere to rules regarding setbacks and obstruction to sight lines for both drivers and pedestrians. Low-growing shrubs should be used and any trees should be trimmed to at least 8-10 feet to ensure that adequate sight lines and clearance is maintained. Likewise, consistent with FDOT design requirements, the crash-worthiness of landscape elements should be considered. Finally, issues related to maintenance, choosing plants that are easily maintained and fit the character of the area, and responsibility of maintenance (who will take care of the landscaping) should be addressed prior to the installation of landscaping.

Figure 11: Example of Roadway Median Landscaping

Driveway Consolidation

Driveway consolidation is the process of reducing the density of driveways along a roadway by closing driveways, creating alternative access points, creating shared driveways, relocating entrances to side streets, and/or promoting cross access between properties. Consolidating driveways can improve traffic flow and safety (vehicle, pedestrian, and bicycle) along a roadway by reducing the number of potential conflict points along the roadway. The consolidation of driveways could be addressed through either roadway access management strategies or through land use/site planning strategies.



Source: Living Streets (pedbikesafe.org)

Figure 12: Example of Driveway Consolidation

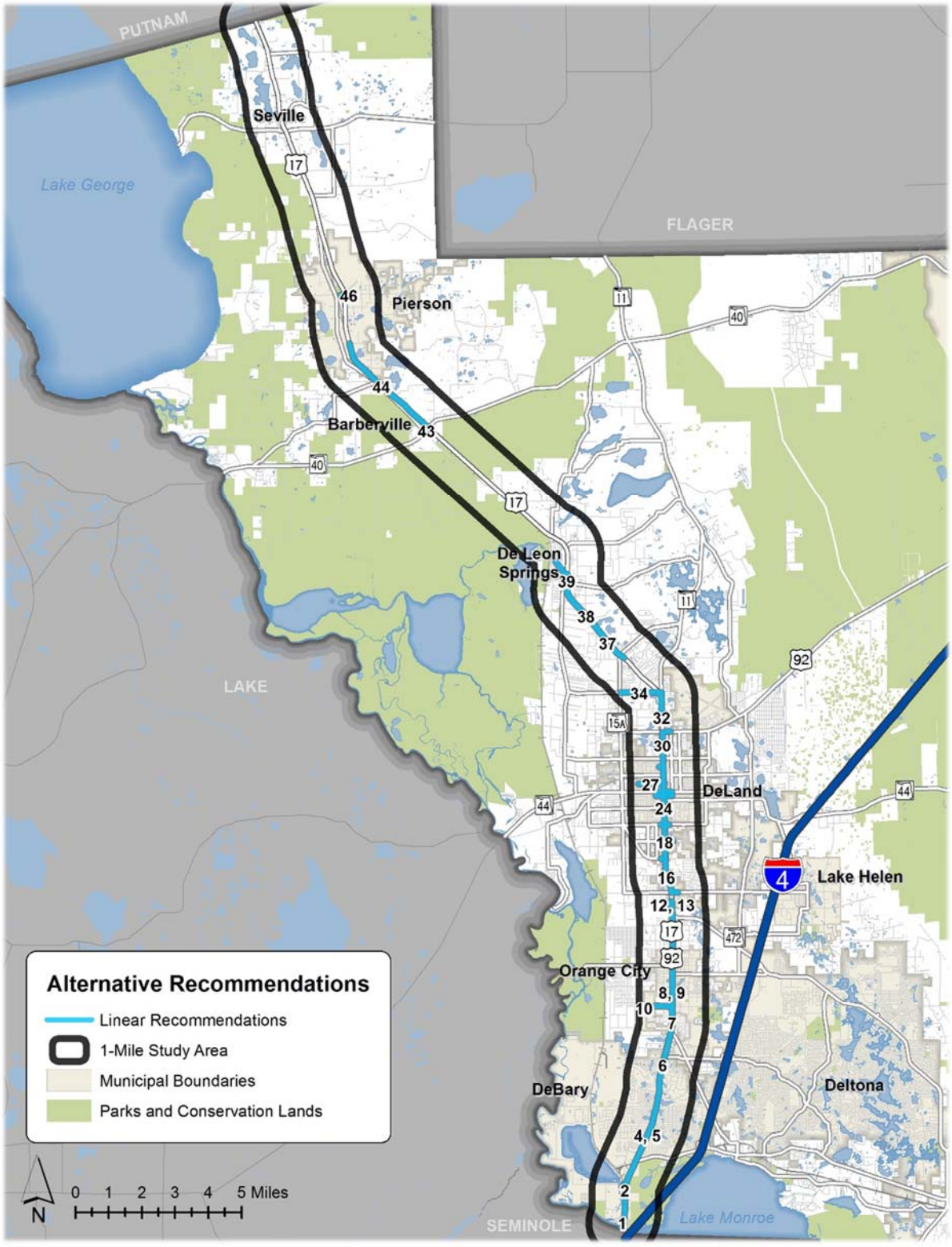
SITE SPECIFIC ALTERNATIVES

Based on input from the study stakeholders and previously completed study efforts the following alternatives were developed with the goal of improving multimodal mobility and safety along the US 17 corridor. Many of the recommended alternatives address multiple mobility and safety issues and/or needs, but for the most part the majority of the recommended alternative can be classified into one or more of the following categories:

- Roadway Typical Section Enhancements
- Geometric Improvements
- Operation Improvements
- Pedestrian and Bicycle Access Improvements
- Transit Improvements

One important note about the recommended alternatives in this study is that while work was done to try to identify fatal flaws that would prohibit the type of improvements being recommended it is recommended that necessary engineering, survey, and/or design work be completed prior to commencing any of the recommended alternatives identified in this Study. Most of the identified alternatives were developed to avoid major right-of-way impacts and to avoid/minimize major reconstruction of the roadway, curb, and drainage structures. However, there are some instances that may require additional right-of-way or partial reconstruction of portions of the roadway.

Because of the range of project types and mixture of linear and point recommendations along the corridor, grouping and prioritizing the recommended alternatives is an imperfect process that will continue to evolve as project recommendations move into the implementation phase. Although alternatives may be regrouped as specific design and contracting approaches are refined, “linear” alternatives are presented here in terms of the roadway segments and are ordered from south to north along the corridor and are presented in Map 1 and Table 1. Recommended alternatives that do not correspond with any of the linear alternatives, or point recommendations, are grouped separately by (nearest) intersection, ordered along the corridor from south to north, and are presented in Map 2 and Table 2.



Map 1: Location of Linear Alternative Recommendations

Table 1: Linear Alternative Recommendations

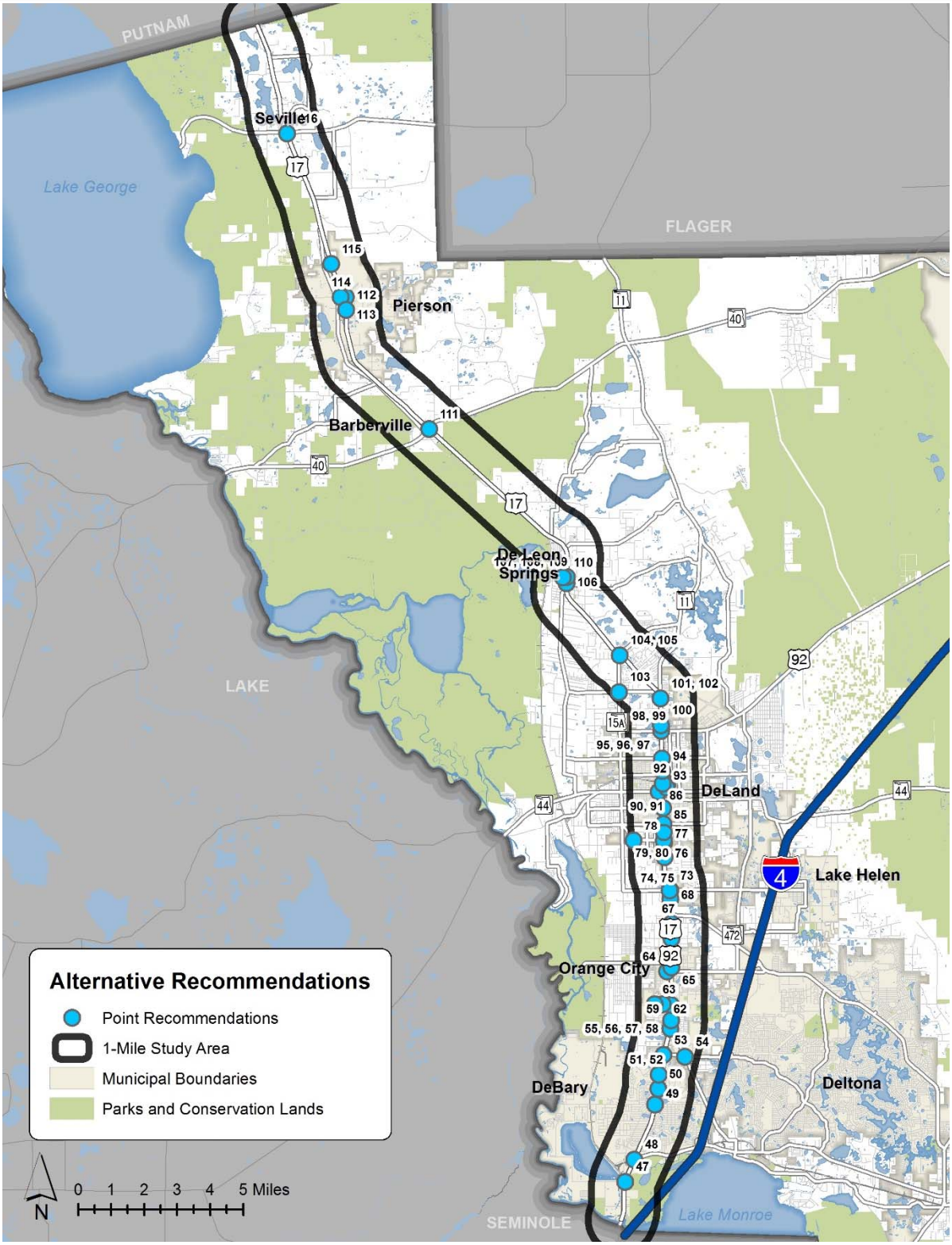
ID#	On Street	From - To	Recommendation	Category
1	US 17/92	Benedict Bridge (N. of Lake Monroe Wayside Park entrance to S. of Lake Monroe Park Cir)	Consider evaluating modifying the lane and shoulder widths along the bridge to accommodate a minimum 10' barrier-separated trail (per R2CTPO Resolution 2015-20).	Pedestrian and Bicycle
2	US 17/92	Lake Monroe Park Cir to Dirksen Dr	Consider replacing the existing sidewalk with a wide sidewalk or sidepath along the east side of US 17/92. Coordinate with the City of DeBary and their Transit Oriented Development Overlay planning process.	Pedestrian and Bicycle
3	Ft Florida Rd	SunRail Park-and-Ride Driveway to US 17	Consider installing a pedestrian/bicycle facility along the south side of Ft Florida Rd between the SunRail Park-and-Ride driveway and US 17.	Pedestrian and Bicycle
4	US 17/92	Dirksen Dr to Highbanks Rd	Consider conducting a study to evaluate providing pedestrian crossing enhancements.	Typical Section and Operational
5	US 17/92	Barwick Rd to Highbanks Rd	Consider narrowing the existing travel lanes, to 11', to accommodated a marked (buffered) bike lane. Alternatively, it appears that the existing paved shoulder may be wide enough for a marked bike lane, if currently wide enough consider providing bike lane markings (symbol and arrow) through this section.	Pedestrian and Bicycle
6	US 17/92	Highbanks Rd to Enterprise Rd	Consider reducing the existing travel lane widths to 11' to accommodate a min. 5' marked bicycle lane.	Typical Section, Pedestrian, and Bicycle
7	US 17/92	Enterprise Rd to Elm Dr	The southbound lanes of US 17/92 has a wide paved should, it is currently unclear if this is just a shoulder of if it is an unmarked turn lane. Consider providing pavement markings to better define the purpose of this area. Consider providing marked bike lanes (min. 5') through this section. Additionally, consider options to address safety concerns relating to the merging of westbound traffic on Enterprise Rd with the northbound traffic on US 17/92 (e.g., intersection design modifications).	Operational
8	US 17/92	Gardenia Dr to Wisconsin Ave	Consider conducting a study to evaluate providing pedestrian crossing enhancements.	Typcial Section and
9	US 17/92	Gardenia Dr to Wisconsin Ave	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian and Bicycle
10	Rhode Island Ave	West Side Pkwy to US 17/92	Evaluate existing paved shoulder widths for potential to provide a marked bicycle lane. Rhode Island Ave provides a connection to Manatee Cove Elementary, River Springs Middle, and University High Schools.	Pedestrian and Bicycle
11	French Ave	US 17/92 to approx. 165' east of US 17/92	Consider installing a sidewalk along the south side of French Ave between US 17/92 and the existing sidewalk approximately 165' east of the intersection.	Pedestrian and Bicycle
12	US 17/92	Wisconsin Ave to Firehouse Rd (N. of SR 472)	There are no sidewalks along US 17/92 through this section, consider evaluating the potential to provide sidewalks along both sides of US 17/92.	Pedestrian and Bicycle
13	US 17/92	Wisconsin Ave to Firehouse Rd (N. of SR 472)	Consider restriping the roadway in order to provide for marked bicycle lanes.	Pedestrian and Bicycle
14	Orange Camp Rd	US 17/92 to Dyson Dr	Consider installing a sidewalk along the south side of Orange Camp Rd to the existing sidewalk at Dyson Dr.	Pedestrian and Bicycle
15	Orange Camp Rd	US 17/92 to Approx. 205' east of US 17/92	Consider completing the sidewalk along the north side of Orange Camp Rd between US 17/92 and the recently complete sidewalk approximately 250' east of US 17/92.	Pedestrian and Bicycle
16	US 17/92	Orange Camp Rd/McGregor Rd to Taylor Rd/SR 15A	Consider reducing the existing travel lane widths (to 11') to accommodate marked (buffered) bicycle lanes (min. 5', preferred 7').	Pedestrian and Bicycle

Table 1: Linear Alternative Recommendations (continued)

ID#	On Street	From - To	Recommendation	Category
17	Taylor Rd/SR 15A	Florida Ave to US 17/92	Consider installing a sidewalk along the south side of Taylor Rd/SR 15A from the existing sidewalk east of Florida Ave to the intersection of US 17/92. Explore opportunities to include this with the right-turn lane enhancements proposed by FDOT.	Pedestrian/Bicycle
18	US 17/92	Taylor Rd/SR 15A to Beresford Ave	Consider modifying existing travel lane widths to 11' to accommodate marked (buffered) bicycle lanes (min. 5'). Evaluate if there is enough existing pavement to provide a marked southbound bike lane south of New Hampshire Ave, the southbound lanes and pavement width appears to be narrower south of New Hampshire Ave.	Pedestrian/Bicycle
19	New Hampshire Ave	US 17/92 to Amelia Ave	Consider installing a sidewalk along the north side of New Hampshire Ave. This would provide an additional connection to DeLand Middle School.	Pedestrian/Bicycle
20	New Hampshire Ave	Florida Ave to US 17/92	Consider installing a sidewalk along the south side of New Hampshire Ave from the existing sidewalk west of Florida Ave to the intersection	Pedestrian/Bicycle
21	Beresford Ave	Florida Ave to US 17/92	Consider completing the sidewalk gap (~390') along the north side of Beresford Ave between Florida Ave and the existing sidewalk west of US 17/92.	Pedestrian/Bicycle
22	Beresford Ave	US 17/92 to E. of Alabama Ave	Consider providing a wide sidewalk or sidepath along the north side of Beresford Ave from US 17 to the DeLand Greenway east of Alabama Ave.	Pedestrian/Bicycle
23	US 17/92	Beresford Ave to Howry Ave	Consider conducting an access management study to determine the feasibility of providing raised median islands through this section.	Typical Section and Operational
24	US 17/92	Beresford Ave to Wisconsin Ave	Consider providing shared lane markings through this section. This could help to serve more localized trips that may not be attracted to the trail along Alabama Ave and could help with the lateral positioning of bicycles in the adjacent on-street parking lanes through parts of this section.	Pedestrian/Bicycle
25	Howry Ave	Clara Ave to Amelia Ave	Consider providing marked bicycle lanes (symbol and arrow). There appears to be sufficient pavement width to accommodate marked bike lanes (min. 5') through this section.	Pedestrian/Bicycle
26	SR 44/New York Ave	Clara Ave to Amelia Ave	Consider installing shared lane markings.	Pedestrian/Bicycle
27	Wisconsin Ave	Stone St to US 17/92	Consider installing shared lane markings.	Pedestrian/Bicycle
28	US 17/92	Wisconsin Ave to Plymouth Ave	Consider providing shared lane markings through this section.	Pedestrian/Bicycle
29	Pennsylvania Ave	Florida Ave to US 17/92	Evaluate the potential to complete the sidewalk along the south side of Pennsylvania Ave from either Florida Ave or Palmetto Ct to the existing sidewalk west of US 17/92.	Pedestrian/Bicycle
30	US 17/92	Plymouth Ave to US 92/International Speedway Blvd	Consider reducing the existing travel lane widths (to 11') to accommodate a minimum 5' marked bicycle lane in each direction.	Pedestrian/Bicycle
31	US 92/International Speedway Blvd	Alabama Ave to Amelia Ave	Consider extending the sidewalk along the south side of US 92/International Speedway Blvd from Alabama Ave to the signalized intersection of Amelia Ave.	Pedestrian/Bicycle
32	US 17	Violetwood Rd/Walmart to Glenwood Rd	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian/Bicycle
33	US 17	SR 11 Junction to Glenwood Rd/SR 11	Consider providing a sidewalk along the east side of US 17 from the northbound junction with SR 11 to the intersection of Glenwood Rd; this should include providing a marked crossing across the northbound lane of SR 11 with appropriate warning signage and adequate lighting.	Pedestrian/Bicycle
34	Glenwood Rd	SR 15A to US 17	Evaluate installing a sidewalk along Glenwood Rd (potentially along the north side) between SR 15A and US 17.	Pedestrian/Bicycle
35	Glenwood Rd	US 17 to SR 11	Consider providing sidewalk connections from the intersections (US 17 and SR 11) to the existing sidewalk along the south side of Glenwood Rd.	Pedestrian/Bicycle

Table 1: Linear Alternative Recommendations (continued)

ID#	On Street	From - To	Recommendation	Category
36	US 17	Williamsburg Rd to Spring Garden Ave/SR 15A	Consider installing a sidewalk along the west side of US 17 from Williamsburg Rd north to the existing sidewalk at Spring Garden Ave/SR 15A.	Pedestrian/Bicycle
37	US 17	Spring Garden Ave/SR 15A to S. of Katrina St	Consider providing a sidewalk along the west side of US 17.	Pedestrian/Bicycle
38	US 17	Spring Garden Ave/SR 15A to N. of Baxter St	Evaluate providing a wide sidewalk/multi-use path (min. 10') along the east side of US 17. This could tie into the trail that is being proposed along the east side of US 17 from N. of Baxter St to SR 40 as part of the planned widening project.	Pedestrian/Bicycle
39	US 17	Katrina St to Baxter St	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian/Bicycle
40	Reynolds Rd	Grand Ave to US 17	Consider providing a sidewalk connection from the Spring to Spring Trail to US 17.	Pedestrian/Bicycle
41	Baxter St	Grand Ave to US 17	Consider providing a wide sidewalk/multi-use path connection along the north side of Baxter St from Grand Ave to US 17 to connect the Spring to Spring Trail to US 17.	Pedestrian/Bicycle
42	Ponce Deleon Blvd	DeLeon Springs State Park Entrance to US 17	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian/Bicycle
43	SR 40	CR 3 to US 17	Consider installing a sidewalk along the south side of SR 40 between CR 3 and US 17.	Pedestrian/Bicycle
44	US 17	SR 40 to Hagstrom Rd	Consider evaluating (impact to drainage) constructing a multi-use trail along the east side of US 17 from SR 40 to Hagstrom Rd. As an intermediate option consider (depending on impacts to drainage) widening the shoulder to provide for buffered bike lanes through this section.	Pedestrian/Bicycle
45	Washington Ave	Chipper Jones Ln to US 17	Evaluate installing a sidewalk along the south side of Washington Ave (mostly along the school property). The impacts to drainage will need to be evaluated to determine the feasibility of providing a sidewalk.	Pedestrian/Bicycle
46	Washington Ave	US 17 to Frederick St	A previously completed safety and traffic study recommended installing a sidewalk along the south side of Washington Ave to the entrance of Taylor High School. Consider evaluating the feasibility (impact to drainage) of a sidewalk along the south side of Washington Ave.	Pedestrian/Bicycle



Map 2: Location of Point Alternative Recommendations

Table 2: Point Alternative Recommendations

ID#	Intersection	Recommendation	Category
47	US 17/92 at Ft Florida Rd	Consider evaluating if the intersection currently meets traffic signal warrants. Alternatively, continue coordination with the City of DeBary's TOD planning efforts to identify longer-term enhancements for the intersection.	Operational
48	Dirksen Dr at US 17/92	Consider installing a raised median island east of the intersection (at the back of the left turn queue) to delineate the beginning of the westbound to southbound left turn lane from the center two-way left turn lane section.	Operational
49	US 17/92 at Highbanks Rd	Evaluate providing a right-turn channelization island for the eastbound right turn movement; if an island is installed consider realigning the crosswalks within the western and southern legs of the intersection to the island.	Geometric
50	US 17/92 at Pine Meadow Dr	Consider realigning the existing crosswalks to provide shorter crossing distances; will require pulling the stop bars back from their existing location.	Geometric and Pedestrian/Bicycle
51	US 17/92 at Debary Plantation Blvd	Evaluate pulling the northbound stop bar back in order to provide a marked crosswalk along the southern leg of the intersection. The location of the existing drainage inlet could be challenging; this may require looking at realigning the crosswalk along the west side of the intersection to provide space for a ramp for the potential crossing along the south side of the intersection.	Pedestrian/Bicycle
52	US 17/92 at Debary Plantation Blvd	If a crosswalk is not installed along the southern leg of the intersection consider relocating the existing bus stop to the immediate far-side of the intersection, closer to the existing marked crosswalk. If stop remains where it is consider providing an ADA accessible landing pad at the bus stop.	Transit
53	US 17/92 at Saxon Blvd	Consider providing a raised right-turn channelization island for the westbound right turn movement on Saxon Blvd and realign the crosswalk along the east side of the intersection.	Geometric
54	Saxon Blvd at Enterprise Rd	Evaluate installing raised channelized right-turn islands within the northeast and southwest quadrants of the intersection and realigning the crosswalks across Enterprise Rd to improve the visibility of crossing pedestrians to right-turning drivers from Saxon Blvd.	Geometric and Pedestrian/Bicycle
55	US 17/92 at Enterprise Rd	Consider realigning the existing crosswalk across the northbound right-turn lane to reduce crossing distance/exposure and improve driver visibility of crossing pedestrians. Also, consider enhancing the crossing with signage (W11-2) and evaluating existing crosswalk lighting levels - enhance if necessary.	Pedestrian/Bicycle and Geometric
56	US 17/92 at Enterprise Rd	Consider providing a marked crosswalk along the southern leg of the intersection.	Pedestrian/Bicycle
57	US 17/92 at Enterprise Rd	Consider relocating the existing crosswalk across the right-turn lane from Enterprise Rd to northbound US 17/92 to the southeast of its existing location - moving the crosswalk southeast of its existing location would eliminate potential driveway conflicts and would position the crosswalk closer to the existing overhead street light. In addition to relocating the crossing consider enhancing with advance yield pavement markings.	Pedestrian/Bicycle
58	US 17/92 at Enterprise Rd	Currently transit routes along US 17/92 (Routes 23 and 20) deviate off of US 17/92 between Saxon Blvd and Enterprise Rd to serve transfers at the Market Place Shopping Center. If a decision is made to provide northbound transit service along US 17/92 from Saxon Blvd through Enterprise Rd consider utilizing the existing right-turn lane as a queue jump lane and reconfiguring the channelized island on the far-side (north side) of the intersection to accommodate an open bus bay and stop.	Transit
59	US 17/92 at Holly Dr	Consider reconfiguring the median to provide for a southbound left turn lane/deceleration lane.	Geometric
60	US 17/92 at Rhode Island Ave	If a marked bike lane is provided on Rhode Island Ave (west of US 17/92) provide a bike lane keyhole for the right-turn lane.	Pedestrian/Bicycle
61	US 17/92 at Rhode Island Ave	Evaluate providing a right-turn channelization island for the eastbound right turn movement; this is dependent upon what the currently hashed-out lane adjacent to the right-turn lane on Rhode Island Ave is intended to be used for.	Geometric
62	Rhode Island Ave at Carpenter Ave	Consider realigning the existing crosswalk (to the west) to improve accessibility of the pedestrian curb ramp and shorten crossing distance and pedestrian exposure.	Pedestrian/Bicycle

Table 2: Point Alternative Recommendations (continued)

ID#	Intersection	Recommendation	Category
63	Rhode Island Ave at Sparkman Ave	Consider realigning the existing crosswalk (to the west) to improve accessibility of the pedestrian curb ramp and shorten crossing distance and pedestrian exposure.	Pedestrian/Bicycle
64	Graves Ave at Park Ave	The existing crosswalk markings are showing wear, consider rehabbing the crosswalk markings and enhancing to a ladder style marking and installing supplemental pedestrian crosswalk (W11-2) signage.	Pedestrian/Bicycle
65	US 17/92 at University Ave	Evaluate installing side and overhead RRFBs or HAWKs at this existing marked mid-block crossing location if minimum pedestrian demand levels are met. Additionally, evaluate existing crosswalk lighting levels and enhance if necessary.	Pedestrian/Bicycle
66	US 17/92 at New York Ave	Evaluate extending the eastbound right-turn lane; there appears to be evidence of tire marks and wear on the approach to the existing turn lane that indicated that drivers are using the right-of-way to bypass queues in the thru/left turn lane.	Geometric
67	US 17/92 at Minnesota Ave	Consider providing marked crosswalks on all legs of the intersection; this is a signalized intersection with no existing crosswalk markings.	Pedestrian/Bicycle
68	US 17/92 at Firehouse Rd (N. of SR 472)	Consider providing a marked crosswalk along the northern leg of the intersection.	Pedestrian/Bicycle
69	US 17/92 at Orange Camp Rd/McGregor Rd	Consider providing a marked crosswalk along the southern leg of the intersection.	Pedestrian/Bicycle
70	US 17/92 at Orange Camp Rd/McGregor Rd	Consider evaluating extending the curb within the southwest corner of the intersection to reduce the turning radius, slow turning traffic, and reduce pedestrian crossing distances and exposure.	Geometric
71	US 17/92 at Orange Camp Rd/McGregor Rd	Evaluate the need to provide supplemental near-side traffic signal heads for the westbound approach; the existing signal heads appear to be approx. 185' from the existing westbound stop bar; the MUTCD's sight distance requirements for approaching drivers establishes a maximum of 180' from stop bar to signal head.	Operational
72	US 17/92 at Orange Camp Rd/McGregor Rd	Consider pulling back the existing westbound stop bar (~20' to just past the existing median nose) and realign the crosswalk along the east side of the intersection.	Pedestrian/Bicycle
73	McGregor Rd at US 17/92	Consider closing the first median opening west of US 17/92 and providing a raised median island/left turn separator. Left turns from the shopping center could be accommodated from adjacent driveways located to the west.	Operational
74	US 17/92 at Taylor Rd/SR 15A	Consider providing a marked crosswalk along the southern leg of the intersection in conjunction with the proposed FDOT intersection enhancements.	Pedestrian/Bicycle
75	US 17/92 at Taylor Rd/SR 15A	Evaluate the distance between the southbound stop bar and the southbound traffic signal heads; the proposed FDOT intersection enhancements concept plan shows the traffic signal mast arm being relocated to a channelized right-turn island which would meet the MUTCD's sight distance requirements. If the FDOT intersection enhancements are not completed consider providing supplemental near-side traffic signal heads if the existing distance exceeds MUTCD requirements.	Operational
76	US 17/92 at Gilbert St	Consider eliminating the left turn movements from Gilbert St and the shopping center and providing a raised left turn channelization island for left turn from US 17/92 only. Left turns from Gilbert St and the shopping center could be accommodated at either New Hampshire Ave or to the south at Andover St.	Operational
77	US 17/92 at New Hampshire Ave	Consider realigning the crosswalk along the northern leg of the intersection to improve the visibility of pedestrians and reduce pedestrian crossing distance and exposure.	Pedestrian/Bicycle
78	SR 15A at New Hampshire Ave	The existing marked mid-block crosswalk is used as a school crossing; evaluate opportunities to enhance the crossing (raised median islands, RRFBs, HAWK, lighting, etc.) to better accommodated non-school crossings.	Pedestrian/Bicycle
79	US 17/92 at Lisbon Pkwy	Provide an ADA compliant pedestrian curb ramp and defined sidewalk connection along the east side of US 17/92 south of Lisbon Pkwy.	Pedestrian/Bicycle
80	US 17/92 at Lisbon Pkwy	Consider building-up the abandoned driveway to provide for an ADA compliant landing pad at the bus stop along the east side of US 17/92 north of Lisbon Pkwy.	Transit

Table 2: Point Alternative Recommendations (continued)

ID#	Intersection	Recommendation	Category
81	US 17/92 at Beresford Ave	US 17/92 begins to narrow just south of Beresford Ave, which would cause the potential marked bike lane to end before the intersection; consider transitioning the northbound bike lane to the sidewalk using a roundabout-style bike ramp treatment.	Pedestrian/Bicycle
82	US 17/92 at Beresford Ave	Consider enhancing the existing crosswalk markings to a high-emphasis/ladder style crosswalk marking.	Pedestrian/Bicycle
83	US 17/92 at Beresford Ave	Consider evaluating modifications to the eastbound approach to provide a thru-left lane and a right-turn only; concurrently, evaluate extending the length of the existing thru-right lane.	Operational and Geometric
84	US 17/92 at Beresford Ave	Evaluate the feasibility of a modern roundabout application at this intersection. Further analysis would be needed to determine the feasibility of a roundabout.	Operational and Geometric
85	US 17/92 at Euclid Ave	Evaluate the feasibility of a designated mid-block crossing north of Euclid Ave near the DeLand Intermodal Center. Evaluate pedestrian crossing volumes.	Pedestrian/Bicycle
86	New York Ave/SR 44 at Florida Ave	Consider extending the curb (bulb-out) within the southwest corner of the intersection and then realigning the crosswalk along the western leg of the intersection.	Pedestrian/Bicycle and Geometric
87	Rich Ave at Hayden Ave	Consider providing a marked crosswalk along the northern leg of the intersection.	Pedestrian/Bicycle
88	Rich Ave at Hayden Ave	Consider extending the curb (bulb-out) within the southwest corner of the intersection.	Geometric
89	Rich Ave at Hayden Ave	Consider enhancing the existing marked mid-block crosswalk (east of Hayden Ave) with high-emphasis ladder style crosswalk markings and evaluate existing crosswalk lighting levels and enhance if necessary.	Pedestrian/Bicycle
90	Church St at Hayden Ave	Consider providing crosswalk signage at the existing crosswalk east of Hayden Ave and consider removing the legacy pedestrian curb ramp along the south side of Church St east of Hayden Ave.	Pedestrian/Bicycle
91	Hayden Ave at Church St	Consider providing crosswalk signage (W11-2) at the existing crosswalk north of Church St.	Pedestrian/Bicycle
92	Hayden Ave at Wisconsin Ave	Consider providing a marked crosswalk across Hayden Ave north of Wisconsin Ave.	Pedestrian/Bicycle
93	Wisconsin Ave at US 17/92	Check to see if crossing ~330' east of US 17/92 has been maintained after the recent resurfacing along Wisconsin Ave; if crossing remains, consider adding pedestrian (W11-2) or trail crossing (W11-15) signage on the approaches to the crossing.	Pedestrian/Bicycle
94	US 17/92 at University Ave	Consider enhancing the existing marked mid-block crosswalk with a raised median island, pedestrian curb ramps, and potentially RRFBs (if minimum requirements are met). Also, consider evaluating existing crosswalk lighting levels and enhance if necessary.	Pedestrian/Bicycle
95	US 17/92 at Plymouth Ave	Evaluate the potential to extend the curb (bulb-out) within the NW quadrant, the location of the existing drainage inlet may be a challenge for this. So, alternatively evaluate the potential to provide a right-turn channelization island. Also, in either scenario consider realigning the crosswalks on the northern and western legs of the intersection to reduce the crossing distances and exposure.	Geometric
96	US 17/92 at Plymouth Ave	Evaluate the potential to extend the curb within the southwest quadrant to reduce the existing turn radius and reduce/remove the taper south of the intersection.	Geometric
97	US 17/92 at Plymouth Ave	Evaluate the eastbound left turn lane queues (demand and capacity), it appears, from limited review, that the left turn lane queues are extending into and blocking the thru-right-turn lane. If it is confirmed that there may be left turn lane capacity issues consider evaluating widening the portion of Plymouth Ave between Florida Ave and US 17/92 to accommodate a second left turn lane. In addition to this a review of the signal timing should be conducted to ensure that the phase for a dual left turn lane from eastbound Plymouth Ave to northbound US 17/92 could be accommodated.	Operational/Geometric

Table 2: Point Alternative Recommendations (continued)

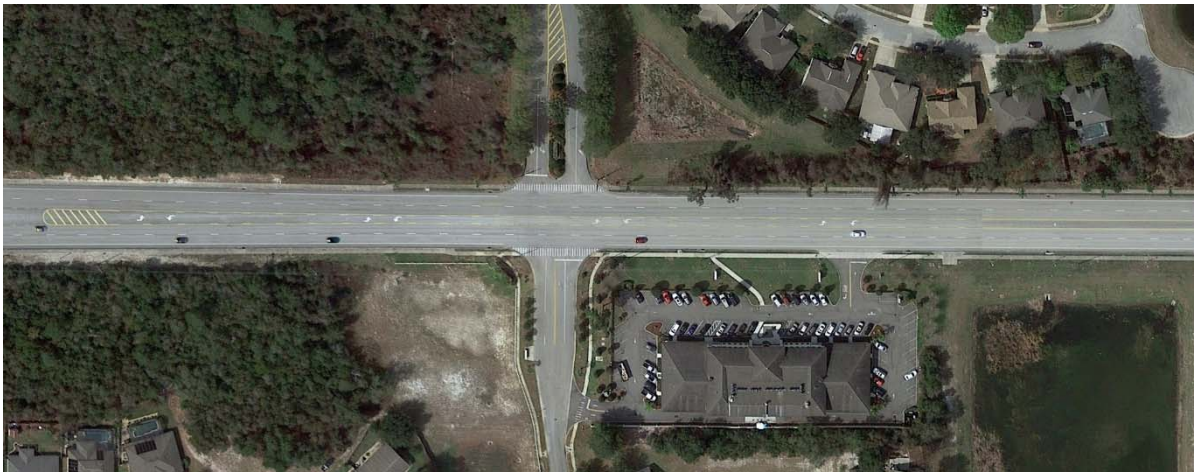
ID#	Intersection	Recommendation	Category
98	US 17 at US 92/International Speedway Blvd	Consider modifying/extending the sidewalk within the southeast quadrant; there is a visible path where people have been walking to the intersection from the existing sidewalk.	Pedestrian/Bicycle
99	US 17 at US 92/International Speedway Blvd	Evaluate extending the curb line within the southwest quadrant and realigning the crosswalk on the west side of the intersection.	Geometric
100	US 17 at Old Daytona Rd	Evaluate the need for extending the southbound left turn lane to better accommodate larger vehicles (trucks).	Geometric
101	US 17 at SR 11/Glenwood Rd	Evaluate reprofiling the southeast quadrant to provide for a channelized right-turn slip-lane and raised island.	Geometric
102	US 17 at SR 11/Glenwood Rd	If a right-turn island is installed consider installing a marked crosswalk along the south and east legs of the intersection utilizing the right-turn island.	Pedestrian/Bicycle
103	SR 15A at Glenwood Rd	Consider wrapping the sidewalk/pedestrian landing area around the corner within each quadrant and then realigning the crosswalks to provide shorter crossing distances, bring the crossings closer to the intersection, and eliminate the angle in the crossing along the northern leg of the intersection. Also, when realigning the crosswalks consider extending the median nose (could be with paint) on the north side of the intersection and moving the southbound stop bar closer to the intersection.	Pedestrian/Bicycle and Geometric
104	US 17 at Spring Garden Ave/SR 15A	Consider extending the sidewalk within the northwest quadrant approximately 40' to the north; realign the crosswalk closer to the beginning of the turn and reconfigure the sidewalk within the channelization island to accommodate the reconfigured crossing.	Pedestrian/Bicycle and Geometric
105	US 17 at Spring Garden Ave/SR 15A	Consider providing a marked crosswalk across the northern leg of the intersection.	Pedestrian/Bicycle
106	US 17 at Reynolds Rd	Consider providing a marked crosswalk across the eastern leg of the intersection.	Pedestrian/Bicycle
107	US 17 at Baxter St/Ponce Deleon Blvd	Evaluate existing pedestrian/bicycle crossing demand at the existing marked (school) crossing. If crossing levels meet minimum requirements consider enhancing the crossing with side/overhead mounted RRFBs or HAWKs. Additionally, consider evaluating existing crosswalk lighting levels and enhance if necessary.	Pedestrian/Bicycle
108	US 17 at Baxter St/Ponce Deleon Blvd	Consider reconfiguring the northbound left turn lane to eliminate northbound left turns onto Baxter St and reconstructing the raised median separator to the north to the intersection with Ponce Deleon Blvd.	Operational
109	US 17 at Baxter St/Ponce Deleon Blvd	Consider evaluating the potential feasibility for a modern 5-legged roundabout at this location. Further engineering analysis would be needed to determine feasibility.	Geometric and Operational
110	Baxter St at Grand Ave	Consider providing a marked crossing across Baxter St from the Spring to Spring Trail to the sidewalk along the north side of Baxter St.	Pedestrian/Bicycle
111	US 17 at SR 40	Consider installing a marked crosswalk (and pedestrian countdown signals) along the northern leg of the intersection in advance of the planned US 17 roadway widening project.	Pedestrian/Bicycle
112	US 17 at 2nd Ave	Consider evaluating the potential for a modern roundabout. Further engineering analysis would be needed to determine feasibility.	Geometric and Operational
113	US 17 at Washington Ave	Consider evaluating the potential for a modern roundabout. Further engineering analysis would be needed to determine feasibility.	Geometric and Operational
114	Washington Ave at Chipper Jones Ln	If a sidewalk is constructed along the south side of Washington Ave consider installing a marked crossing across Washington Ave from the sidewalk to the entrance of the park/Chipper Jones Ln.	Pedestrian/Bicycle
115	US 17 at Palmetto Ave	Monitor the development of relocating Pierson Elementary School and consider exploring opportunities to provide multimodal connections to the school site (e.g., sidewalk or multi-use trail connections along US 17 from Washington Ave to the school site entrance).	Pedestrian/Bicycle
116	US 17 at Clayton Ave/Bunnell Rd	Consider providing marked crosswalks along US 17 across Clayton Ave/Bunnell Rd.	Pedestrian/Bicycle

Conceptual Renderings of Select Alternative Recommendation

The conceptual graphics on the following pages are provided to assist in the visualization of some of the potential alternatives, they are for illustrative purpose only and are not intended to serve as design level drawings or necessarily be an accurate representation of the recommendation.

Figure 13: Alt. #4 Concept – US 17/92 from Dirksen Dr to Highbanks Rd (at Glen Forest Blvd)

Existing Condition:

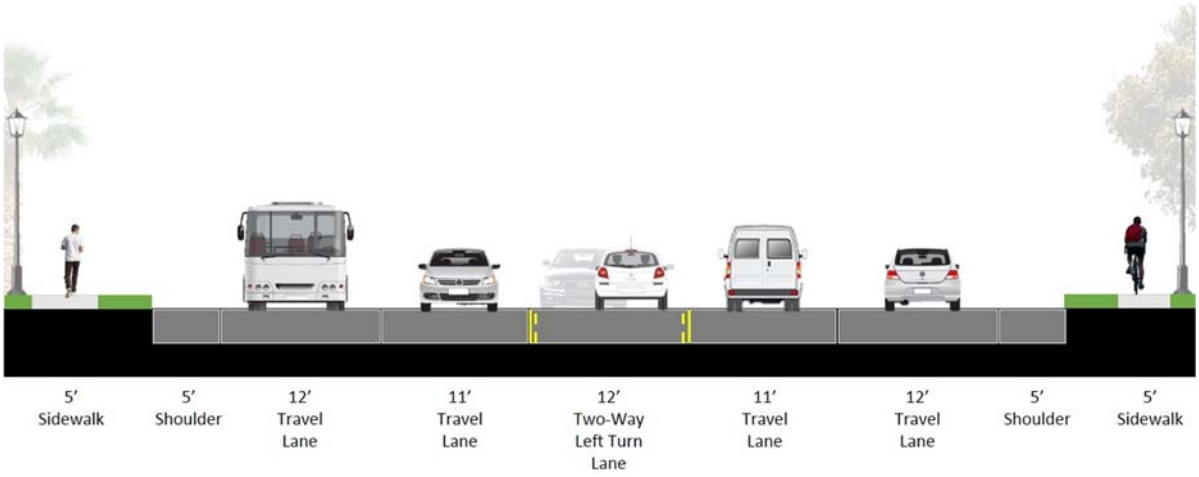


Conceptual Median Revision Treatment:

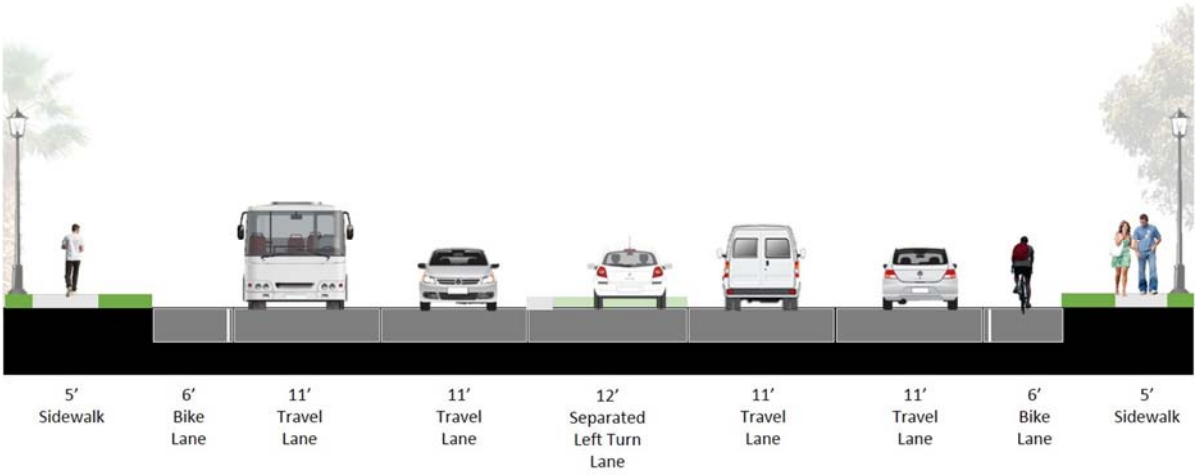
Recommendation for Consideration
Consider conducting an access management study to look at converting the existing two-way center turn lane into a median separated section with left turns, at a minimum consider providing raised median islands at strategic locations.

Figure 14: Alt. #5 Concept – US 17/92 from Dirksen Dr to Highbanks Rd

Existing Cross-Section:



Conceptual Potential Cross-Section:



Recommendation for Consideration
Consider narrowing the existing outside travel lane to accommodate a marked (buffered) bike lane. Additionally, it appears that the existing paved shoulder is wide enough to accommodate a marked bike lane, at a minimum consider providing bike lane markings (symbol and arrows) within the paved shoulder.

Figure 15: Alt. #55-58 Concept – US 17/92 at Enterprise Rd

Existing Condition:

Conceptual Proposed Alternative:

Recommendation for Consideration
55. Consider realigning the crosswalk across the northbound right-turn lane to reduce pedestrian crossing distance and exposure and to also improve the visibility of crossing pedestrians to right-turning drivers. Also, consider enhancing the crossing with supplemental signage (W11-2) and evaluating existing crosswalk lighting levels, enhance if necessary. 56. Consider providing a marked crosswalk along the southern leg of the intersection. 57. Consider relocating the existing crosswalk across the right-turn lane from Enterprise Rd to northbound US 17/92 to the southeast of its existing location; moving the crossing would eliminate potential driveway conflicts and would position the crossing closer to the existing overhead street light. In addition to relocating the crossing consider enhancing the crossing with advance yield pavement markings and supplemental signage. 58. Currently there is no northbound transit service through this intersection. If transit routes are realigned to stay along US 17/92 through this intersection in the future consider evaluating the potential for a right-turn bus queue jump and modifying the raised island within the northeast quadrant to accommodate an open bus bay.

Figure 16: Alt. #7 Concept – US 17/92 from Enterprise Rd to Elm Dr

Existing Condition:

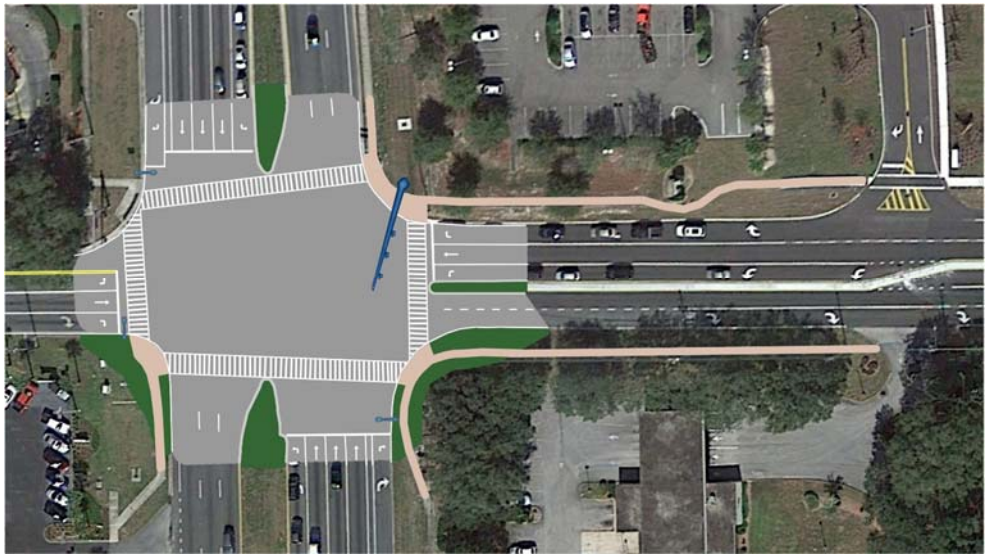
Conceptual Proposed Alternative:

Recommendation for Consideration
The southbound lanes along US 17/92 have a wide paved shoulder, it is currently unclear if this is just a shoulder or if it is an unmarked turn lane. Consider providing pavement markings to better define/delineate this area.

Figure 17: Alt. #14, 15, & 69-72 Concept – US 17/92 at Orange Camp Rd

Existing Condition:

Conceptual Proposed Alternative:

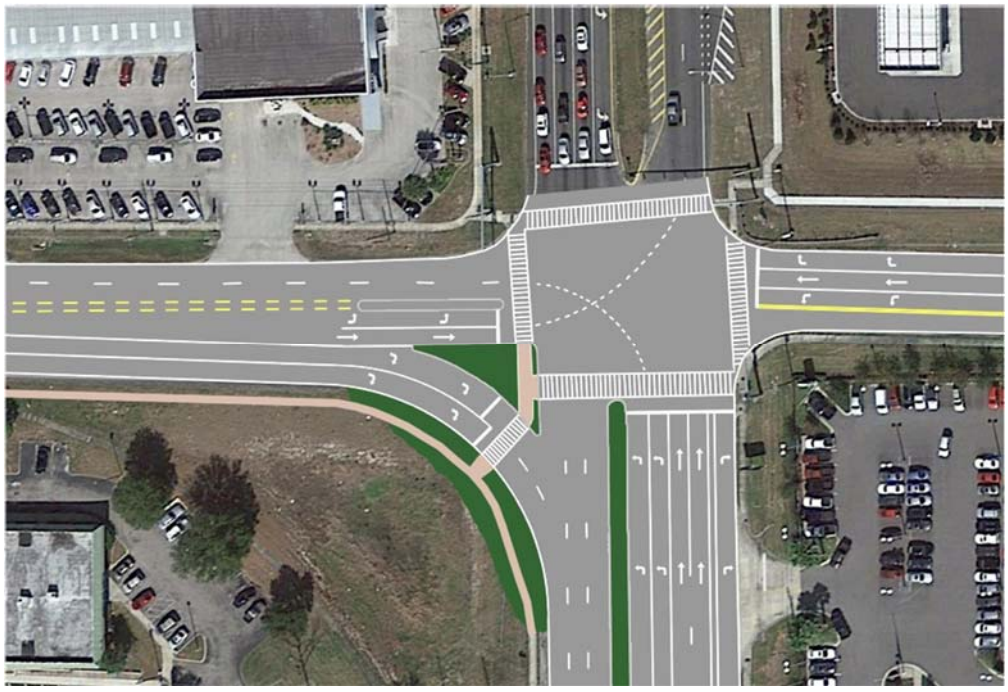


Recommendation for Consideration
14. US 17/92 to Dyson Dr – Consider installing a sidewalk along the south side of Orange Camp Rd. 15. Consider completing the sidewalk along the north side of Orange Camp Rd between US 17/92 and the recently installed sidewalk approximately 205' east of US 17/92. 69. Consider providing a marked crosswalk along the southern leg of the intersection. 70. Consider extending the curb within the southwest quadrant to reduce the turning radius and reduce pedestrian crossing distances and exposure. 71. Evaluate the need to provide supplemental near-side traffic signal heads for the westbound approach. 72. Consider pulling back the existing westbound stop bar (approximately 20' to just past the existing median nose) and realign the crosswalk along the east side of the intersection.

Figure 18: Alt. #17 & 74 Concept – US 17/92 at SR 15A/Taylor Rd

Existing Condition:

Conceptual Proposed Alternative:



Recommendation for Consideration
Consider providing a marked crosswalk along the southern leg of the intersection and provide a sidewalk connection to the intersection from the existing sidewalk within the southwest quadrant in conjunction with the proposed FDOT intersection enhancement project – depicted in conceptual rendering.

Figure 19: Alt. #78 Concept – SR 15A at New Hampshire Ave

Existing Condition:

Conceptual Proposed Alternative:

Recommendation for Consideration
The existing marked mid-block crosswalk is used currently used as a school crossing; evaluate opportunities to enhance the crossing (raised median islands, RRFBs or HAWK, lighting, signage, etc.) to better accommodate crossings occurring during times when a school crossing guard is not present.

Figure 20: Alt. #82 & 83 Concept – US 17/92 at Beresford Ave

Existing Condition:

Conceptual Proposed Alternative:

Recommendation for Consideration
Consider evaluating modifications to the eastbound approach; the current eastbound lane configuration consists of a thru-right and left turn only lane, evaluate changing this to provide for a thru-left lane and a right-turn only lane; concurrently/alternatively, evaluate extending the length of the existing thru-right lane. Currently, approximately 52% of the approaching eastbound traffic in the PM peak is continuing straight through the intersection, approximately 36% turn right, and 12% turn left turn – the existing thru-right lane accommodates approximately 88% of the traffic in the PM peak. The length of the existing thru-right lane is less than 100', which causes queues to block access to the left-turn lane, changing the lane operations could allow for additional storage capacity for the thru movement. Also, it appears that the signal currently operates on a split left-turn phase, so while further evaluation is needed to determine the impacts, it appears that the thru-left and right-turn operation would have minimal impacts on existing signal operations.

Figure 21: Alt. #84 Concept – US 17/92 at Beresford Ave

Existing Condition:

Conceptual Proposed Alternative:

Recommendation for Consideration
Consider evaluating the feasibility of a modern roundabout at this intersection. Based on parcel and aerial reviews it appears that there may be sufficient right-of-way to accommodate an urban single-lane roundabout (corner clips may be required). This intersection had the highest frequency of angle and left turn crashes within the corridor during the analysis period (2010-2014), modern roundabouts are a proven countermeasure for mitigating these types of crashes. Additionally, a roundabout feature could serve as a gateway into the more urban and traditional urban character districts along the corridor.

Figure 22: Alt. #95-97 Concept – US 17/92 at Plymouth Ave

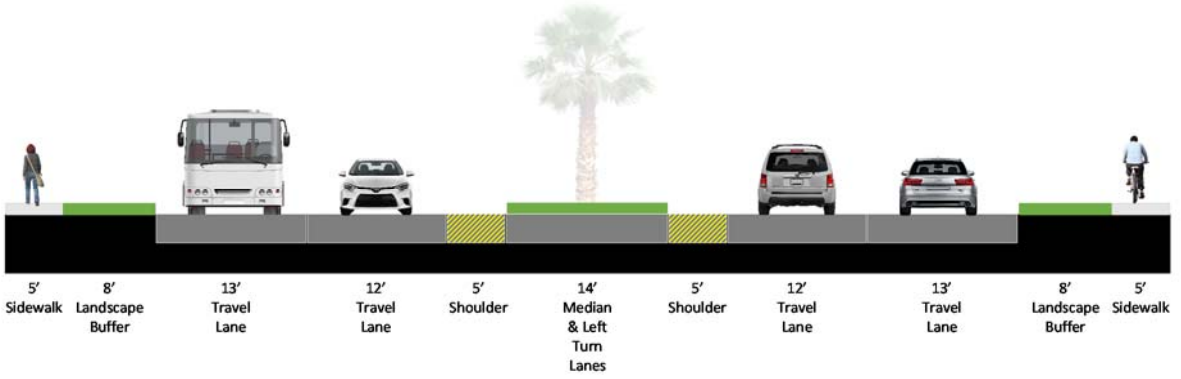
Existing Condition:

Conceptual Proposed Alternative:

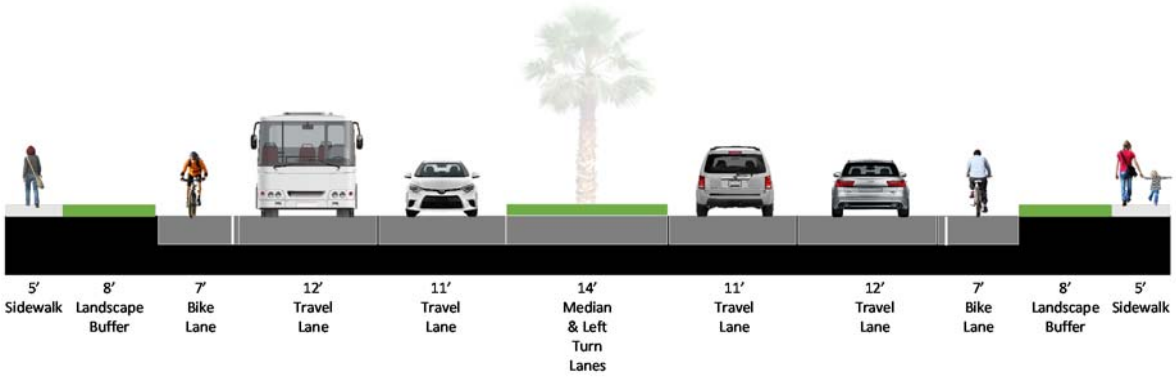
Recommendation for Consideration
95. Evaluate the impacts of extending the curb (bulb-out) within the northwest quadrant, particularly the impacts to drainage. Alternatively, evaluate the potential to provide a channelized right-turn island. In both scenarios, consider realigning the crosswalks on the northern and western legs of the intersection to reduce pedestrian crossing distance and exposure. 96. Evaluate the potential to extend the curb within the southwest quadrant to reduce the existing turn radius and reduce/remove the existing taper south of the intersection. 97. Evaluate the eastbound left turn lane queues (demand and capacity), it appears, from limited review, that the left turn lane queues are extending into and blocking the thru-right movements. If additional left turn capacity is needed, consider evaluating widening the portion of Plymouth Ave between Florida Ave and US 17/92 to accommodate a second left turn lane – additionally, a review of traffic signal timings should be completed to ensure that a dual left turn phase could be accommodated.

Figure 23: Alt. #30 Concept – US 17/92 from Plymouth Ave to US 92/International Speedway Blvd

Existing Cross-Section:



Conceptual Potential Cross-Section:



Recommendation for Consideration
Consider reducing the existing travel lane widths to 11' and removing the striped inside shoulder to accommodate marked (buffered) bike lanes, minimum 5' width, preferred 7'.

Figure 24: Alt. #33-35 & 101-103 Concept – US 17 at SR 11/Glenwood Rd

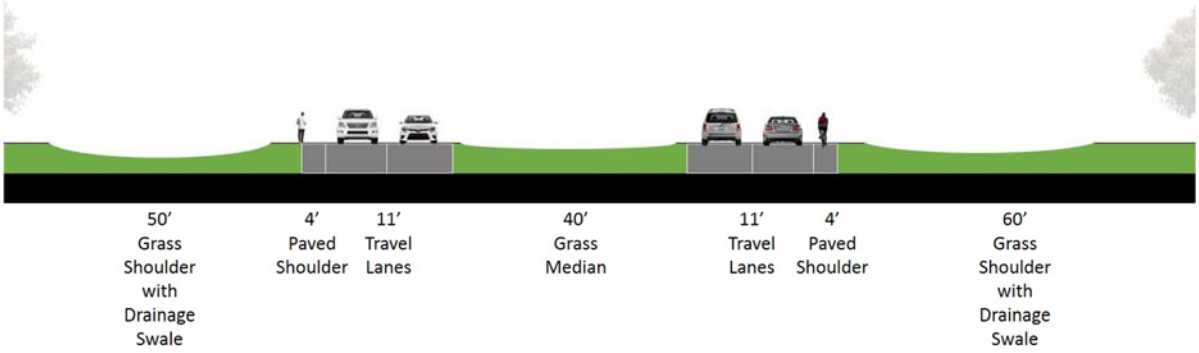
Existing Condition:

Conceptual Proposed Alternative:

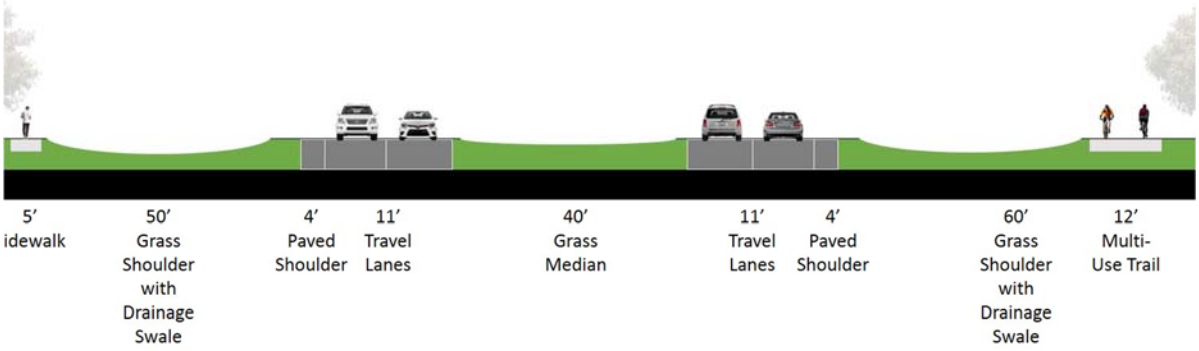
Recommendation for Consideration
33. Consider providing a sidewalk along the east side of US 17 from the northbound junction with SR 11 to the intersection of Glenwood Rd/SR 11; this should include providing a marked crossing across the northbound lane of SR 11 along with appropriate signage, advance pavement markings, and lighting. 34. Evaluate installing a sidewalk along Glenwood Rd (potentially along the north side) between SR 15A and US 17. 35. Consider providing sidewalk connections from the intersection to the existing sidewalk along the south side of Glenwood Rd east of US 17. 101. Evaluate re-profiling the southeast quadrant to provide for a channelized right-turn slip-lane and raised island. 102. If a channelized right-turn island is installed consider installing a marked crosswalk along the southern leg of the intersection utilizing the right-turn island. 103. Consider wrapping the sidewalk/pedestrian landing area around the corner within each quadrant and then realigning the crosswalks to provide shorter crossing distances, bring the crossings closer to the intersection, and eliminate the angle in the crossing along the northern leg of the intersection. Also, when realigning the crosswalks consider extending the median nose (could be with paint) on the north side of the intersection and moving the southbound stop bar closer to the intersection. Additionally, consider extending the sidewalk in the northeast quadrant to provide access to the existing bus stop.

Figure 25: Alt. #37 & 38 Concept – US 17 from SR 15A/Spring Garden Ave to N. of Baxter St

Existing Cross-Section:



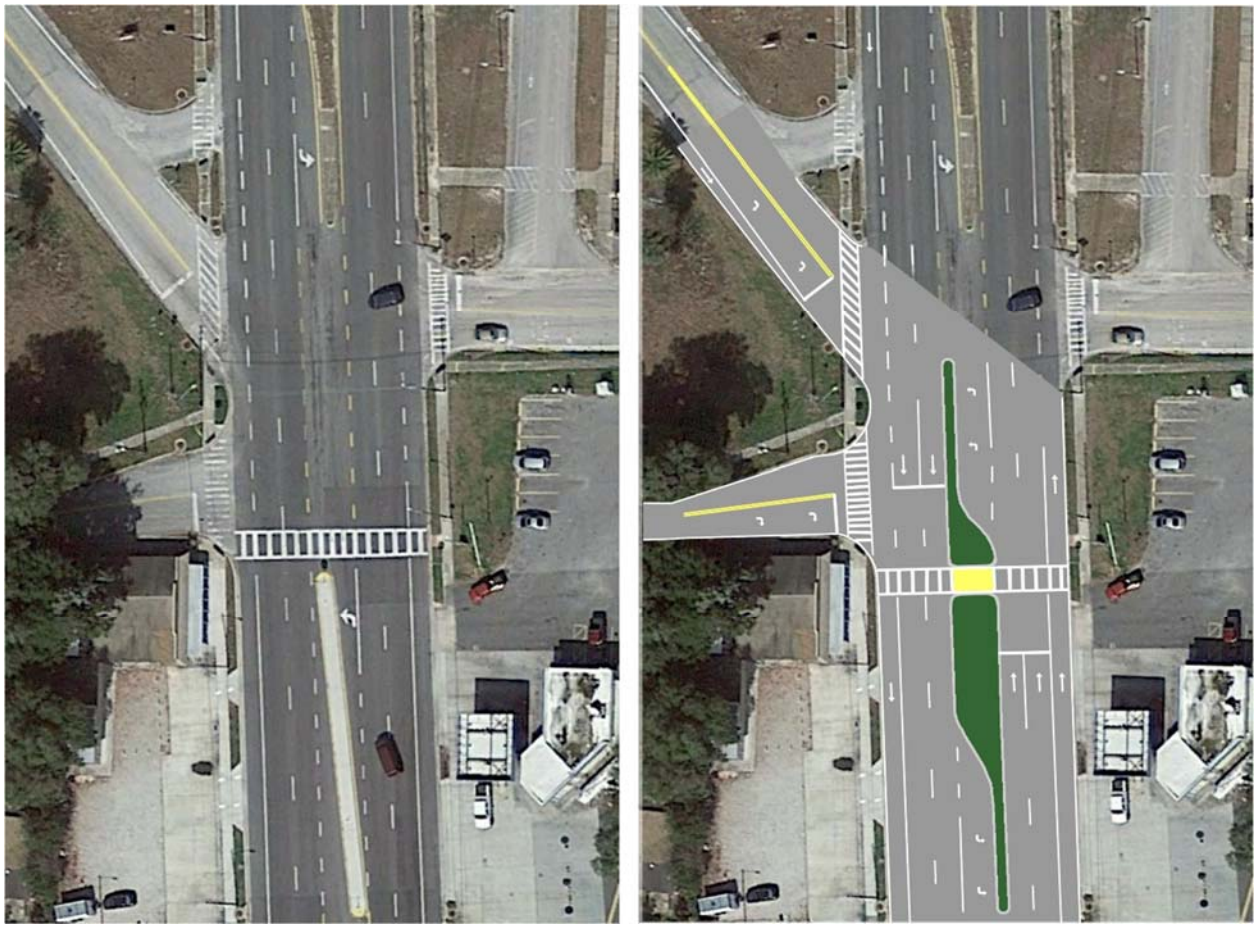
Conceptual Potential Cross-Section:



Recommendation for Consideration
Evaluate providing a wide sidewalk/multi-use pathway along the east side of US 17. This facility could tie into the multi-use trail that is proposed, as part of the planned roadway widening project, for the east side of US 17 from north of Baxter St to SR 40. Also, consider providing a sidewalk along the west side of US 17 from SR 15A/Spring Garden Ave to the existing sidewalk at Katrina St.

Figure 26: Alt. #107 & 108 Concept – US 17 at Baxter St/Ponce Deleon Blvd

Existing Condition: *Conceptual Proposed Alternative:*



Recommendation for Consideration
108. Consider/evaluate reconfiguring the northbound left turn lane to eliminate northbound left turns onto Baxter St by reconstructing the raised median separator to accommodate left turns at Ponce Deleon Blvd. Left turns from Baxter St and Ponce Deleon Blvd could be accommodated by performing a right-turn onto US 17 and then conducting a U-turn at either Spring St or Berlin St. 107. Evaluate existing pedestrian/bicycle crossing demand at the existing marked school crossing. If crossing levels meet minimum requirements consider enhancing the crossing with appropriate supplemental signage and pavement markings along with potential side and overhead mounted RRFBs or HAWKs. Additionally, consider evaluating existing crosswalk lighting levels and enhance if necessary.

Figure 27: Alt. #113 Concept – US 17 at Washington Ave

Existing Condition:

Conceptual Proposed Alternative:

Recommendation for Consideration
Consider evaluating the feasibility of a modern roundabout at this intersection. This potential roundabout along with another one potentially located at 2nd Ave could serve as gateway features for the Town of Pierson.

EVALUATION OF ALTERNATIVES

A planning-level evaluation of each recommended alternative was performed to determine the relative priority of each potential alternative based on the criteria and measures that were presented in Technical Memorandum #2 (Corridor Character Districts and Evaluation Criteria) of this Study. In order to compare and prioritize the various alternatives a point system for the evaluation criteria and measures was developed. Table 3 shows the evaluation criteria and measures along with the point schema that was developed; for each recommended alternative there is a maximum of 50 (unweighted) possible points.

Again, it is important to mention that due to the range of project types and mixture of linear and point recommendations, the prioritization of projects is an imperfect process and one that should evolve as the recommendations begin to move into the engineering, design, and implementation phases. Also, note that it is possible that various recommendations could be regrouped and combined as specific design and contracting approaches are advanced, and that this could impact the scoring and prioritization of the identified recommended alternatives.

After deliberation with the study's stakeholder group and project management team it was determined that while there is value in looking at the entire range of evaluation criteria and measures that the most value from an initial priority standpoint would be gained be looking at the alternatives based on just the implementation measures of expected timeframe, level of effort, and magnitude of cost. Table 4 provides a summary of the recommended alternatives with just the implementation measures from the evaluation criteria table. Appendix A of this memorandum provides a more detailed tabulation of all of the evaluation criteria and measure scoring for each recommended alternative.

Table 3: Evaluation Criteria and Measures Points Schema

Criteria		Measures		Points	Max.
Traffic Characteristics and Quality of Existing Multimodal Facilities	Roadway	Arterial Street		5	5
		Higher-Volume Collector (>5,000 ADT)		3	
		Lower-Volume Collector (<5,000 ADT)		2	
		Local (Residential) Street		1	
	Pedestrian	No Sidewalk		5	5
		Some sidewalk, but significant gaps		4	
		Complete sidewalk on one-side only		3	
		Trail/Multi-use Pathway		2	
		Complete sidewalk along both sides	Could be improved based on existing conditions	1	
			Adequate for existing conditions	0	
	Bicycle	No Bicycle Facilities		5	5
		Un-Marked Paved Shoulder		4	
		Trail (limited hours)		3	
		Multi-use Pathway	Along roadway	2	
			Along parallel roadway/facility	1	
		Marked Bicycle Lanes		0	
Safety		Address documented safety/crash issue		5	5
		Safety Best Practice - Arterial Street		3	
		Safety Best Practice - Collector Street		2	
		Safety Best Practice - Local Street		1	
Connections		Provides connection across major highway		5	5
		Provides connection along a major highway		4	
		Provides connection to schools/parks		3	
		Provides neighborhood connectivity		2	
		Enhances existing connection		1	
		None - Facility complemented by other routes		0	
Support Density		Higher (>10 persons per acre)		5	5
		Medium (5-10 persons per acre)		3	
		Low (2-5 persons per acre)		2	
		Very Low (<2 persons per acre)		1	
Local Compatibility		Supports local plan/goals/vision		5	5
		Partially supports local plans/goals/vision		3	
		Does not support local plans/goals/vision		0	
Implementation	Timeframe	Short-Term		5	5
		Mid-Term		3	
		Longer-Term		1	
	Level of Effort	Low		5	5
		Medium		3	
		High		1	
	Magnitude of Cost	Low		5	5
		Medium		3	
		High		1	
Total Possible Points				**50**	

Table 4: Summary of Evaluation Results

ID#	On Street	From - To	Recommendation	Category	Point Total
1	US 17/92	Benedict Bridge (N. of Lake Monroe Wayside Park entrance to S. of Lake Monroe Park Cir)	Consider evaluating modifying the lane and shoulder widths along the bridge to accommodate a minimum 10' barrier-separated trail (per R2CTPO Resolution 2015-20).	Pedestrian/Bicycle	36
2	US 17/92	Lake Monroe Park Cir to Dirksen Dr	Consider replacing the existing sidewalk with a wide sidewalk or sidepath along the east side of US 17/92. Coordinate with the City of DeBary and their Transit Oriented Development Overlay planning process.	Pedestrian/Bicycle	38
3	Ft Florida Rd	SunRail Park-and-Ride Driveway to US 17	Consider installing a pedestrian/bicycle facility along the south side of Ft Florida Rd between the SunRail Park-and-Ride driveway and US 17.	Pedestrian/Bicycle	37
4	US 17/92	Dirksen Dr to Highbanks Rd	Consider conducting a study to evaluate providing pedestrian crossing enhancements.	Typical Section and Operational	29
5	US 17/92	Dirksen Dr to Highbanks Rd	Consider narrowing the existing travel lanes, to 11', to accommodated a marked (buffered) bike lane. Alternatively, it appears that the existing paved shoulder may be wide enough for a marked bike lane, if currently wide enough consider providing bike lane markings (symbol and arrow) through this section.	Pedestrian/Bicycle	37
6	US 17/92	Highbanks Rd to Enterprise Rd	Consider reducing the existing travel lane widths to 11' to accommodate a min. 5' marked bicycle lane.	Typical Section and Pedestrian/Bicycle	35
7	US 17/92	Enterprise Rd to Elm Dr	The southbound lanes of US 17/92 has a wide paved should, it is currently unclear if this is just a shoulder of if it is an unmarked turn lane. Consider providing pavement markings to better define the purpose of this area. Consider providing marked bike lanes (min. 5') through this section. Additionally, consider options to address safety concerns relating to the merging of westbound traffic on Enterprise Rd with the northbound traffic on US 17/92 (e.g., intersection design modifications).	Operational	33
8	US 17/92	Gardenia Dr to Wisconsin Ave	Consider conducting a study to evaluate providing pedestrian crossing enhancements.	Typcial Section and Operational	29
9	US 17/92	Gardenia Dr to Wisconsin Ave	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian/Bicycle	37
10	Rhode Island Ave	West Side Pkwy to US 17/92	Evaluate existing paved shoulder widths for potential to provide a marked bicycle lane. Rhode Island Ave provides a connection to Manatee Cove Elementary, River Springs Middle, and University High Schools.	Pedestrian/Bicycle	29
11	French Ave	US 17/92 to approx. 165' east of US 17/92	Consider installing a sidewalk along the south side of French Ave between US 17/92 and the existing sidewalk approximately 165' east of the intersection.	Pedestrian/Bicycle	37
12	US 17/92	Wisconsin Ave to Firehouse Rd (N. of SR 472)	There are no sidewalks along US 17/92 through this section, consider evaluating the potential to provide sidewalks along both sides of US 17/92.	Pedestrian/Bicycle	31
13	US 17/92	Wisconsin Ave to Firehouse Rd (N. of SR 472)	Consider restriping the roadway in order to provide for marked bicycle lanes.	Pedestrian/Bicycle	37
14	Orange Camp Rd	US 17/92 to Dyson Dr	Consider installing a sidewalk along the south side of Orange Camp Rd to the existing sidewalk at Dyson Dr.	Pedestrian/Bicycle	39
15	Orange Camp Rd	US 17/92 to Approx. 205' east of US 17/92	Consider completing the sidewalk along the north side of Orange Camp Rd between US 17/92 and the recently complete sidewalk approximately 250' east of US 17/92.	Pedestrian/Bicycle	39
16	US 17/92	Orange Camp Rd/McGregor Rd to Taylor Rd/SR 15A	Consider reducing the existing travel lane widths (to 11') to accommodate marked (buffered) bicycle lanes (min. 5', preferred 7').	Pedestrian/Bicycle	34
17	Taylor Rd/SR 15A	Florida Ave to US 17/92	Consider installing a sidewalk along the south side of Taylor Rd/SR 15A from the existing sidewalk east of Florida Ave to the intersection of US 17/92. Explore opportunities to include this with the right-turn lane enhancements proposed by FDOT.	Pedestrian/Bicycle	42
18	US 17/92	Taylor Rd/SR 15A to Beresford Ave	Consider modifying existing travel lane widths to 11' to accommodate marked (buffered) bicycle lanes (min. 5'). Evaluate if there is enough existing pavement to provide a marked southbound bike lane south of New Hampshire Ave, the southbound lanes and pavement width appears to be narrower south of New Hampshire Ave.	Pedestrian/Bicycle	39

Table 4: Summary of Evaluation Results (continued)

ID#	On Street	From - To	Recommendation	Category	Point Total
19	New Hampshire Ave	US 17/92 to Amelia Ave	Consider installing a sidewalk along the north side of New Hampshire Ave. This would provide an additional connection to DeLand Middle School.	Pedestrian/Bicycle	36
20	New Hampshire Ave	Florida Ave to US 17/92	Consider installing a sidewalk along the south side of New Hampshire Ave from the existing sidewalk west of Florida Ave to the intersection	Pedestrian/Bicycle	37
21	Beresford Ave	Florida Ave to US 17/92	Consider completing the sidewalk gap (~390') along the north side of Beresford Ave between Florida Ave and the existing sidewalk west of US 17/92.	Pedestrian/Bicycle	38
22	Beresford Ave	US 17/92 to E. of Alabama Ave	Consider providing a wide sidewalk or sidepath along the north side of Beresford Ave from US 17 to the DeLand Greenway east of Alabama Ave.	Pedestrian/Bicycle	33
23	US 17/92	Beresford Ave to Howry Ave	Consider conducting an access management study to determine the feasibility of providing raised median islands through this section.	Typcial Section and Operational	31
24	US 17/92	Beresford Ave to Wisconsin Ave	Consider providing shared lane markings through this section. This could help to serve more localized trips that may not be attracted to the trail along Alabama Ave and could help with the lateral positioning of bicycles in the adjacent on-street parking lanes through parts of this section.	Pedestrian/Bicycle	39
25	Howry Ave	Clara Ave to Amelia Ave	Consider providing marked bicycle lanes (symbol and arrow). There appears to be sufficient pavement width to accommodate marked bike lanes (min. 5') through this section.	Pedestrian/Bicycle	34
26	SR 44/New York Ave	Clara Ave to Amelia Ave	Consider installing shared lane markings.	Pedestrian/Bicycle	39
27	Wisconsin Ave	Stone St to US 17/92	Consider installing shared lane markings.	Pedestrian/Bicycle	35
28	US 17/92	Wisconsin Ave to Plymouth Ave	Consider providing shared lane markings through this section.	Pedestrian/Bicycle	40
29	Pennsylvania Ave	Florida Ave to US 17/92	Evaluate the potential to complete the sidewalk along the south side of Pennsylvania Ave from either Florida Ave or Palmetto Ct to the existing sidewalk west of US 17/92.	Pedestrian/Bicycle	36
30	US 17/92	Plymouth Ave to US 92/International Speedway Blvd	Consider reducing the existing travel lane widths (to 11') to accommodate a minimum 5' marked bicycle lane in each direction.	Pedestrian/Bicycle	36
31	US 92/International Speedway Blvd	Alabama Ave to Amelia Ave	Consider extending the sidewalk along the south side of US 92/International Speedway Blvd from Alabama Ave to the signalized intersection of Amelia Ave.	Pedestrian/Bicycle	37
32	US 17	Violetwood Rd/Walmart to Glenwood Rd	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian/Bicycle	37
33	US 17	SR 11 Junction to Glennwood Rd/SR 11	Consider providing a sidewalk along the east side of US 17 from the northbound junction with SR 11 to the intersection of Glenwood Rd; this should include providing a marked crossing across the northbound lane of SR 11 with appropriate warning signage and adequate lighting.	Pedestrian/Bicycle	40
34	Glenwood Rd	SR 15A to US 17	Evaluate installing a sidewalk along Glenwood Rd (potentially along the north side) between SR 15A and US 17.	Pedestrian/Bicycle	35
35	Glenwood Rd	US 17 to SR 11	Consider providing sidewalk connections from the intersections (US 17 and SR 11) to the existing sidewalk along the south side of Glenwood Rd.	Pedestrian/Bicycle	35
36	US 17	Williamsburg Rd to Spring Garden Ave/SR 15A	Consider installing a sidewalk along the west side of US 17 from Williamsburg Rd north to the existing sidewalk at Spring Garden Ave/SR 15A.	Pedestrian/Bicycle	44
37	US 17	Spring Garden Ave/SR 15A to S. of Katrina St	Consider providing a sidewalk along the west side of US 17.	Pedestrian/Bicycle	30
38	US 17	Spring Garden Ave/SR 15A to N. of Baxter St	Evaluate providing a wide sidewalk/multi-use path (min. 10') along the east side of US 17. This could tie into the trail that is being proposed along the east side of US 17 from N. of Baxter St to SR 40 as part of the planned widening project.	Pedestrian/Bicycle	30
39	US 17	Katrina St to Baxter St	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian/Bicycle	36
40	Reynolds Rd	Grand Ave to US 17	Consider providing a sidewalk connection from the Spring to Spring Trail to US 17.	Pedestrian/Bicycle	34

Table 4: Summary of Evaluation Results (continued)

ID#	On Street	From - To	Recommendation	Category	Point Total
41	Baxter St	Grand Ave to US 17	Consider providing a wide sidewalk/multi-use path connection along the north side of Baxter St from Grand Ave to US 17 to connect the Spring to Spring Trail to US 17.	Pedestrian/Bicycle	34
42	Ponce Deleon Blvd	DeLeon Springs State Park Entrance to US 17	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian/Bicycle	35
43	SR 40	CR 3 to US 17	Consider installing a sidewalk along the south side of SR 40 between CR 3 and US 17.	Pedestrian/Bicycle	40
44	US 17	SR 40 to Hagstrom Rd	Consider evaluating (impact to drainage) constructing a multi-use trail along the east side of US 17 from SR 40 to Hagstrom Rd. As an intermediate option consider (depending on impacts to drainage) widening the shoulder to provide for buffered bike lanes through this section.	Pedestrian/Bicycle	31
45	Washington Ave	Chipper Jones Ln to US 17	Evaluate installing a sidewalk along the south side of Washington Ave (mostly along the school property). The impacts to drainage will need to be evaluated to determine the feasibility of providing a sidewalk.	Pedestrian/Bicycle	30
46	Washington Ave	US 17 to Frederick St	A previously completed safety and traffic study recommended installing a sidewalk along the south side of Washington Ave to the entrance of Taylor High School. Consider evaluating the feasibility (impact to drainage) of a sidewalk along the south side of Washington Ave.	Pedestrian/Bicycle	33

ID#	Intersection	Recommendation	Category	Point Total
47	US 17/92 at Ft Florida Rd	Consider evaluating if the intersection currently meets traffic signal warrants. Alternatively, continue coordination with the City of DeBary's TOD planning efforts to identify longer-term enhancements for the intersection.	Operational	41
48	Dirksen Dr at US 17/92	Consider installing a raised median island east of the intersection (at the back of the left turn queue) to delineate the beginning of the westbound to southbound left turn lane from the center two-way left turn lane section.	Operational	29
49	US 17/92 at Highbanks Rd	Evaluate providing a right-turn channelization island for the eastbound right turn movement; if an island is installed consider realigning the crosswalks within the western and southern legs of the intersection to the island.	Geometric	34
50	US 17/92 at Pine Meadow Dr	Consider realigning the existing crosswalks to provide shorter crossing distances; will require pulling the stop bars back from their existing location.	Geometric and Pedestrian/Bicycle	35
51	US 17/92 at Debary Plantation Blvd	Evaluate pulling the northbound stop bar back in order to provide a marked crosswalk along the southern leg of the intersection. The location of the existing drainage inlet could be challenging; this may require looking at realigning the crosswalk along the west side of the intersection to provide space for a ramp for the potential crossing along the south side of the intersection.	Pedestrian/Bicycle	40
52	US 17/92 at Debary Plantation Blvd	If a crosswalk is not installed along the southern leg of the intersection consider relocating the existing bus stop to the immediate far-side of the intersection, closer to the existing marked crosswalk. If stop remains where it is consider providing an ADA accessible landing pad at the bus stop.	Transit	36
53	US 17/92 at Saxon Blvd	Consider providing a raised right-turn channelization island for the westbound right turn movement on Saxon Blvd and realign the crosswalk along the east side of the intersection.	Geometric	37
54	Saxon Blvd at Enterprise Rd	Evaluate installing raised channelized right-turn islands within the northeast and southwest quadrants of the intersection and realigning the crosswalks across Enterprise Rd to improve the visibility of crossing pedestrians to right-turning drivers from Saxon Blvd.	Geometric and Pedestrian/Bicycle	40
55	US 17/92 at Enterprise Rd	Consider realigning the existing crosswalk across the northbound right-turn lane to reduce crossing distance/exposure and improve driver visibility of crossing pedestrians. Also, consider enhancing the crossing with signage (W11-2) and evaluating existing crosswalk lighting levels - enhance if necessary.	Pedestrian/Bicycle and Geometric	39
56	US 17/92 at Enterprise Rd	Consider providing a marked crosswalk along the southern leg of the intersection.	Pedestrian/Bicycle	44
57	US 17/92 at Enterprise Rd	Consider relocating the existing crosswalk across the right-turn lane from Enterprise Rd to northbound US 17/92 to the southeast of its existing location - moving the crosswalk southeast of its existing location would eliminate potential driveway conflicts and would position the crosswalk closer to the existing overhead street light. In addition to relocating the crossing consider enhancing with advance yield pavement markings.	Pedestrian/Bicycle	39

Table 4: Summary of Evaluation Results (continued)

ID#	Intersection	Recommendation	Category	Point Total
58	US 17/92 at Enterprise Rd	Currently transit routes along US 17/92 (Routes 23 and 20) deviate off of US 17/92 between Saxon Blvd and Enterprise Rd to serve transfers at the Market Place Shopping Center. If a decision is made to provide northbound transit service along US 17/92 from Saxon Blvd through Enterprise Rd consider utilizing the existing right-turn lane as a queue jump lane and reconfiguring the channelized island on the far-side (north side) of the intersection to accommodate an open bus bay and stop.	Transit	31
59	US 17/92 at Holly Dr	Consider reconfiguring the median to provide for a southbound left turn lane/deceleration lane.	Geometric	34
60	US 17/92 at Rhode Island Ave	If a marked bike lane is provided on Rhode Island Ave (west of US 17/92) provide a bike lane keyhole for the right-turn lane.	Pedestrian/Bicycle	31
61	US 17/92 at Rhode Island Ave	Evaluate providing a right-turn channelization island for the eastbound right turn movement; this is dependent upon what the currently hashed-out lane adjacent to the right-turn lane on Rhode Island Ave is intended to be used for.	Geometric	26
62	Rhode Island Ave at Carpenter Ave	Consider realigning the existing crosswalk (to the west) to improve accessibility of the pedestrian curb ramp and shorten crossing distance and pedestrian exposure.	Pedestrian/Bicycle	30
63	Rhode Island Ave at Sparkman Ave	Consider realigning the existing crosswalk (to the west) to improve accessibility of the pedestrian curb ramp and shorten crossing distance and pedestrian exposure.	Pedestrian/Bicycle	30
64	Graves Ave at Park Ave	The existing crosswalk markings are showing wear, consider rehabbing the crosswalk markings and enhancing to a ladder style marking and installing supplemental pedestrian crosswalk (W11-2) signage.	Pedestrian/Bicycle	29
65	US 17/92 at University Ave	Evaluate installing side and overhead RRFBs or HAWKs at this existing marked mid-block crossing location if minimum pedestrian demand levels are met. Additionally, evaluate existing crosswalk lighting levels and enhance if necessary.	Pedestrian/Bicycle	34
66	US 17/92 at New York Ave	Evaluate extending the eastbound right-turn lane; there appears to be evidence of tire marks and wear on the approach to the existing turn lane that indicated that drivers are using the right-of-way to bypass queues in the thru/left turn lane.	Geometric	27
67	US 17/92 at Minnesota Ave	Consider providing marked crosswalks on all legs of the intersection; this is a signalized intersection with no existing crosswalk markings.	Pedestrian/Bicycle	44
68	US 17/92 at Firehouse Rd (N. of SR 472)	Consider providing a marked crosswalk along the northern leg of the intersection.	Pedestrian/Bicycle	40
69	US 17/92 at Orange Camp Rd/McGregor Rd	Consider providing a marked crosswalk along the southern leg of the intersection.	Pedestrian/Bicycle	40
70	US 17/92 at Orange Camp Rd/McGregor Rd	Consider evaluating extending the curb within the southwest corner of the intersection to reduce the turning radius, slow turning traffic, and reduce pedestrian crossing distances and exposure.	Geometric	30
71	US 17/92 at Orange Camp Rd/McGregor Rd	Evaluate the need to provide supplemental near-side traffic signal heads for the westbound approach; the existing signal heads appear to be approx. 185' from the existing westbound stop bar; the MUTCD's sight distance requirements for approaching drivers establishes a maximum of 180' from stop bar to signal head.	Operational	31
72	US 17/92 at Orange Camp Rd/McGregor Rd	Consider pulling back the existing westbound stop bar (~20' to just past the existing median nose) and realign the crosswalk along the east side of the intersection.	Pedestrian/Bicycle	36
73	McGregor Rd at US 17/92	Consider closing the first median opening west of US 17/92 and providing a raised median island/left turn separator. Left turns from the shopping center could be accommodated from adjacent driveways located to the west.	Operational	31
74	US 17/92 at Taylor Rd/SR 15A	Consider providing a marked crosswalk along the southern leg of the intersection in conjunction with the proposed FDOT intersection enhancements.	Pedestrian/Bicycle	40
75	US 17/92 at Taylor Rd/SR 15A	Evaluate the distance between the southbound stop bar and the southbound traffic signal heads; the proposed FDOT intersection enhancements concept plan shows the traffic signal mast arm being relocated to a channelized right-turn island which would meet the MUTCD's sight distance requirements. If the FDOT intersection enhancements are not completed consider providing supplemental near-side traffic signal heads if the existing distance exceeds MUTCD requirements.	Operational	37
76	US 17/92 at Gilbert St	Consider eliminating the left turn movements from Gilbert St and the shopping center and providing a raised left turn channelization island for left turn from US 17/92 only. Left turns from Gilbert St and the shopping center could be accommodated at either New Hampshire Ave or to the south at Andover St.	Operational	34

Table 4: Summary of Evaluation Results (continued)

ID#	Intersection	Recommendation	Category	Point Total
77	US 17/92 at New Hampshire Ave	Consider realigning the crosswalk along the northern leg of the intersection to improve the visibility of pedestrians and reduce pedestrian crossing distance and exposure.	Pedestrian/Bicycle	38
78	SR 15A at New Hampshire Ave	The existing marked mid-block crosswalk is used as a school crossing; evaluate opportunities to enhance the crossing (raised median islands, RRFBs, HAWK, lighting, etc.) to better accommodated non-school crossings.	Pedestrian/Bicycle	36
79	US 17/92 at Lisbon Pkwy	Provide an ADA compliant pedestrian curb ramp and defined sidewalk connection along the east side of US 17/92 south of Lisbon Pkwy.	Pedestrian/Bicycle	39
80	US 17/92 at Lisbon Pkwy	Consider building-up the abandoned driveway to provide for an ADA compliant landing pad at the bus stop along the east side of US 17/92 north of Lisbon Pkwy.	Transit	36
81	US 17/92 at Beresford Ave	US 17/92 begins to narrow just south of Beresford Ave, which would cause the potential marked bike lane to end before the intersection; consider transitioning the northbound bike lane to the sidewalk using a roundabout-style bike ramp treatment.	Pedestrian/Bicycle	40
82	US 17/92 at Beresford Ave	Consider enhancing the existing crosswalk markings to a high-emphasis/ladder style crosswalk marking.	Pedestrian/Bicycle	37
83	US 17/92 at Beresford Ave	Consider evaluating modifications to the eastbound approach to provide a thru-left lane and a right-turn only; concurrently, evaluate extending the length of the existing thru-right lane.	Operational and Geometric	38
84	US 17/92 at Beresford Ave	Evaluate the feasibility of a modern roundabout application at this intersection. Further analysis would be needed to determine the feasibility of a roundabout.	Operational and Geometric	27
85	US 17/92 at Euclid Ave	Evaluate the feasibility of a designated mid-block crossing north of Euclid Ave near the DeLand Intermodal Center. Evaluate pedestrian crossing volumes.	Pedestrian/Bicycle	41
86	New York Ave/SR 44 at Florida Ave	Consider extending the curb (bulb-out) within the southwest corner of the intersection and then realigning the crosswalk along the western leg of the intersection.	Pedestrian/Bicycle and Geometric	37
87	Rich Ave at Hayden Ave	Consider providing a marked crosswalk along the northern leg of the intersection.	Pedestrian/Bicycle	27
88	Rich Ave at Hayden Ave	Consider extending the curb (bulb-out) within the southwest corner of the intersection.	Geometric	27
89	Rich Ave at Hayden Ave	Consider enhancing the existing marked mid-block crosswalk (east of Hayden Ave) with high-emphasis ladder style crosswalk markings and evaluate existing crosswalk lighting levels and enhance if necessary.	Pedestian/Bicycle	27
90	Chruch St at Hayden Ave	Consider providing crosswalk signage at the existing crosswalk east of Hayden Ave and consider removing the legacy pedestrian curb ramp along the south side of Church St east of Hayden Ave.	Pedestrian/Bicycle	27
91	Hayden Ave at Church St	Consider providing crosswalk signage (W11-2) at the existing crosswalk north of Church St.	Pedestrian/Bicycle	27
92	Hayden Ave at Wisconsin Ave	Consider providing a marked crosswalk across Hayden Ave north of Wisconsin Ave.	Pedestrian/Bicycle	30
93	Wisconsin Ave at US 17/92	Check to see if crossing ~330' east of US 17/92 has been maintained after the recent resurfacing along Wisconsin Ave; if crossing remains, consider adding pedestrian (W11-2) or trail crossing (W11-15) signage on the approaches to the crossing.	Pedestrian/Bicycle	30
94	US 17/92 at University Ave	Consider enhancing the existing marked mid-block crosswalk with a raised median island, pedestrian curb ramps, and potentially RRFBs (if minimum requirements are met). Also, consider evaluating existing crosswalk lighting levels and enhance if necessary.	Pedestrian/Bicycle	37
95	US 17/92 at Plymouth Ave	Evaluate the potential to extend the curb (bulb-out) within the NW quadrant, the location of the existing drainage inlet may be a challenge for this. So, alternatively evaluate the potential to provide a right-turn channelization island. Also, in either scenario consider realigning the crosswalks on the northern and western legs of the intersection to reduce the crossing distances and exposure.	Geometric	33
96	US 17/92 at Plymouth Ave	Evaluate the potential to extend the curb within the southwest quadrant to reduce the existing turn radius and reduce/remove the taper south of the intersection.	Geometric	37

Table 4: Summary of Evaluation Results (continued)

ID#	Intersection	Recommendation	Category	Point Total
97	US 17/92 at Plymouth Ave	Evaluate the eastbound left turn lane queues (demand and capacity), it appears, from limited review, that the left turn lane queues are extending into and blocking the thru-right-turn lane. If it is confirmed that there may be left turn lane capacity issues consider evaluating widening the portion of Plymouth Ave between Florida Ave and US 17/92 to accommodate a second left turn lane. In addition to this a review of the signal timing should be conducted to ensure that the phase for a dual left turn lane from eastbound Plymouth Ave to northbound US 17/92 could be accommodated.	Operational/Geometric	30
98	US 17 at US 92/International Speedway Blvd	Consider modifying/extending the sidewalk within the southeast quadrant; there is a visible path where people have been walking to the intersection from the existing sidewalk.	Pedestrian/Bicycle	32
99	US 17 at US 92/International Speedway Blvd	Evaluate extending the curb line within the southwest quadrant and realigning the crosswalk on the west side of the intersection.	Geometric	35
100	US 17 at Old Daytona Rd	Evaluate the need for extending the southbound left turn lane to better accommodate larger vehicles (trucks).	Geometric	36
101	US 17 at SR 11/Glenwood Rd	Evaluate reprofiling the southeast quadrant to provide for a channelized right-turn slip-lane and raised island.	Geometric	31
102	US 17 at SR 11/Glenwood Rd	If a right-turn island is installed consider installing a marked crosswalk along the south and east legs of the intersection utilizing the right-turn island.	Pedestrian/Bicycle	40
103	SR 15A at Glenwood Rd	Consider wrapping the sidewalk/pedestrian landing area around the corner within each quadrant and then realigning the crosswalks to provide shorter crossing distances, bring the crossings closer to the intersection, and eliminate the angle in the crossing along the northern leg of the intersection. Also, when realigning the crosswalks consider extending the median nose (could be with paint) on the north side of the intersection and moving the southbound stop bar closer to the intersection. Additionally, consider extending the sidewalk in the northeast quadrant to provide access to the existing bus stop..	Pedestrian/Bicycle and Geometric	35
104	US 17 at Spring Garden Ave/SR 15A	Consider extending the sidewalk within the northwest quadrant approximately 40' to the north; realign the crosswalk closer to the beginning of the turn and reconfigure the sidewalk within the channelization island to accommodate the reconfigured crossing.	Pedestrian/Bicycle and Geometric	35
105	US 17 at Spring Garden Ave/SR 15A	Consider providing a marked crosswalk across the northern leg of the intersection.	Pedestrian/Bicycle	42
106	US 17 at Reynolds Rd	Consider providing a marked crosswalk across the eastern leg of the intersection.	Pedestrian/Bicycle	42
107	US 17 at Baxter St/Ponce Deleon Blvd	Evaluate existing pedestrian/bicycle crossing demand at the existing marked (school) crossing. If crossing levels meet minimum requirements consider enhancing the crossing with side/overhead mounted RRFBs or HAWKs. Additionally, consider evaluating existing crosswalk lighting levels and enhance if necessary.	Pedestrian/Bicycle	33
108	US 17 at Baxter St/Ponce Deleon Blvd	Consider reconfiguring the northbound left turn lane to eliminate northbound left turns onto Baxter St and reconstructing the raised median separator to the north to the intersection with Ponce Deleon Blvd.	Operational	34
109	US 17 at Baxter St/Ponce Deleon Blvd	Consider evaluating the potential feasibility for a modern 5-legged roundabout at this location. Further engineering analysis would be needed to determine feasibility.	Geometric and Operational	21
110	Baxter St at Grand Ave	Consider providing a marked crossing across Baxter St from the Spring to Spring Trail to the sidewalk along the north side of Baxter St.	Pedestrian/Bicycle	26
111	US 17 at SR 40	Consider installing a marked crosswalk (and pedestrian countdown signals) along the northern leg of the intersection in advance of the planned US 17 roadway widening project.	Pedestrian/Bicycle	42
112	US 17 at 2nd Ave	Consider evaluating the potential for a modern roundabout. Further engineering analysis would be needed to determine feasibility.	Geometric and Operational	18
113	US 17 at Washington Ave	Consider evaluating the potential for a modern roundabout. Further engineering analysis would be needed to determine feasibility.	Geometric and Operational	19
114	Washington Ave at Chipper Jones Ln	If a sidewalk is constructed along the south side of Washington Ave consider installing a marked crossing across Washington Ave from the sidewalk to the entrance of the park/Chipper Jones Ln.	Pedestrian/Bicycle	33
115	US 17 at Palmetto Ave	Monitor the development of relocating Pierson Elementary School and consider exploring opportunities to provide multimodal connections to the school site (e.g., sidewalk or multi-use trail connections along US 17 from Washington Ave to the school site entrance).	Pedestrian/Bicycle	35
116	US 17 at Clayton Ave/Bunnell Rd	Consider providing marked crosswalks along US 17 across Clayton Ave/Bunnell Rd.	Pedestrian/Bicycle	35

APPENDIX A – DETAILED ALTERNATIVES EVALUATION RESULTS

Alternatives Information					Evaluation Measures										
ID#	On Street	From - To or Intersection	Recommendation	Category	Roadway	Pedestrian	Bicycle	Safety	Connections	Support Density	Local Compatibility	Timeframe	Level of Effort	Magnitude of Cost	Point Total
1	US 17/92	Benedict Bridge (N. of Lake Monroe Wayside Park entrance to S. of Lake Monroe Park Cir)	Consider evaluating modifying the lane and shoulder widths along the bridge to accommodate a minimum 10' barrier-separated trail (per R2CTPO Resolution 2015-20).	Pedestrian/Bicycle	5	5	5	3	4	2	3	3	3	3	36
2	US 17/92	Lake Monroe Park Cir to Dirksen Dr	Consider replacing the existing sidewalk with a wide sidewalk or sidepath along the east side of US 17/92. Coordinate with the City of DeBary and their Transit Oriented Development Overlay planning process.	Pedestrian/Bicycle	5	5	5	3	4	2	3	3	3	5	38
3	Ft Florida Rd	SunRail Park-and-Ride Driveway to US 17	Consider installing a pedestrian/bicycle facility along the south side of Ft Florida Rd between the SunRail Park-and-Ride driveway and US 17.	Pedestrian/Bicycle	2	4	5	2	3	3	3	5	5	5	37
4	US 17/92	Dirksen Dr to Highbanks Rd	Consider conducting a study to evaluate providing pedestrian crossing enhancements.	Typical Section and Operational	5	0	4	3	0	3	3	5	3	3	29
5	US 17/92	Dirksen Dr to Highbanks Rd	Consider narrowing the existing travel lanes, to 11', to accommodated a marked (buffered) bike lane. Alternatively, it appears that the existing paved shoulder may be wide enough for a marked bike lane, if currently wide enough consider providing bike lane markings (symbol and arrow) through this section.	Pedestrian/Bicycle	5	0	4	3	4	3	3	5	5	5	37
6	US 17/92	Highbanks Rd to Enterprise Rd	Consider reducing the existing travel lane widths to 11' to accommodate a min. 5' marked bicycle lane.	Typical Section and Pedestrian/Bicycle	5	0	4	3	4	5	3	5	5	1	35
7	US 17/92	Enterprise Rd to Elm Dr	The southbound lanes of US 17/92 has a wide paved should, it is currently unclear if this is just a shoulder of if it is an unmarked turn lane. Consider providing pavement markings to better define the purpose of this area. Consider providing marked bike lanes (min. 5') through this section. Additionally, consider options to address safety concerns relating to the merging of westbound traffic on Enterprise Rd with the northbound traffic on US 17/92 (e.g., intersection design modifications).	Operational	5	0	4	3	4	3	5	3	3	3	33
8	US 17/92	Gardenia Dr to Wisconsin Ave	Consider conducting a study to evaluate providing pedestrian crossing enhancements.	Typcial Section and Operational	5	0	4	3	0	3	3	5	3	3	29
9	US 17/92	Gardenia Dr to Wisconsin Ave	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian/Bicycle	5	0	4	3	4	3	3	5	5	5	37
10	Rhode Island Ave	West Side Pkwy to US 17/92	Evaluate existing paved shoulder widths for potential to provide a marked bicycle lane. Rhode Island Ave provides a connection to Manatee Cove Elementary, River Springs Middle, and University High Schools.	Pedestrian/Bicycle	1	0	4	2	3	3	3	5	5	3	29
11	French Ave	US 17/92 to approx. 165' east of US 17/92	Consider installing a sidewalk along the south side of French Ave between US 17/92 and the existing sidewalk approximately 165' east of the intersection.	Pedestrian/Bicycle	2	3	5	1	3	5	3	5	5	5	37
12	US 17/92	Wisconsin Ave to Firehouse Rd (N. of SR 472)	There are no sidewalks along US 17/92 through this section, consider evaluating the potential to provide sidewalks along both sides of US 17/92.	Pedestrian/Bicycle	5	5	4	3	4	2	3	1	1	3	31
13	US 17/92	Wisconsin Ave to Firehouse Rd (N. of SR 472)	Consider restriping the roadway in order to provide for marked bicycle lanes.	Pedestrian/Bicycle	5	5	4	3	4	2	3	3	5	3	37
14	Orange Camp Rd	US 17/92 to Dyson Dr	Consider installing a sidewalk along the south side of Orange Camp Rd to the existing sidewalk at Dyson Dr.	Pedestrian/Bicycle	5	4	5	2	2	3	3	5	5	5	39
15	Orange Camp Rd	US 17/92 to Approx. 205' east of US 17/92	Consider completing the sidewalk along the north side of Orange Camp Rd between US 17/92 and the recently complete sidewalk approximately 250' east of US 17/92.	Pedestrian/Bicycle	5	4	5	2	2	3	3	5	5	5	39
16	US 17/92	Orange Camp Rd/McGregor Rd to Taylor Rd/SR 15A	Consider reducing the existing travel lane widths (to 11') to accommodate marked (buffered) bicycle lanes (min. 5', preferred 7').	Pedestrian/Bicycle	5	0	4	3	4	2	3	5	5	3	34
17	Taylor Rd/SR 15A	Florida Ave to US 17/92	Consider installing a sidewalk along the south side of Taylor Rd/SR 15A from the existing sidewalk east of Florida Ave to the intersection of US 17/92. Explore opportunities to include this with the right-turn lane enhancements proposed by FDOT.	Pedestrian/Bicycle	5	3	4	3	4	5	3	5	5	5	42
18	US 17/92	Taylor Rd/SR 15A to Beresford Ave	Consider modifying existing travel lane widths to 11' to accommodate marked (buffered) bicycle lanes (min. 5'). Evaluate if there is enough existing pavement to provide a marked southbound bike lane south of New Hampshire Ave, the southbound lanes and pavement width appears to be narrower south of New Hampshire Ave.	Pedestrian/Bicycle	5	0	4	3	4	5	3	5	5	5	39

Alternatives Information					Evaluation Measures										
ID#	On Street	From - To or Intersection	Recommendation	Category	Roadway	Pedestrian	Bicycle	Safety	Connections	Support Density	Local Compatibility	Timeframe	Level of Effort	Magnitude of Cost	Point Total
19	New Hampshire Ave	US 17/92 to Amelia Ave	Consider installing a sidewalk along the north side of New Hampshire Ave. This would provide an additional connection to DeLand Middle School.	Pedestrian/Bicycle	2	3	5	2	3	3	3	5	5	5	36
20	New Hampshire Ave	Florida Ave to US 17/92	Consider installing a sidewalk along the south side of New Hampshire Ave from the existing sidewalk west of Florida Ave to the intersection	Pedestrian/Bicycle	2	4	5	2	3	3	3	5	5	5	37
21	Beresford Ave	Florida Ave to US 17/92	Consider completing the sidewalk gap (~390') along the north side of Beresford Ave between Florida Ave and the existing sidewalk west of US 17/92.	Pedestrian/Bicycle	2	3	5	2	3	5	3	5	5	5	38
22	Beresford Ave	US 17/92 to E. of Alabama Ave	Consider providing a wide sidewalk or sidepath along the north side of Beresford Ave from US 17 to the DeLand Greenway east of Alabama Ave.	Pedestrian/Bicycle	2	0	5	2	3	5	3	5	5	3	33
23	US 17/92	Beresford Ave to Howry Ave	Consider conducting an access management study to determine the feasibility of providing raised median islands through this section.	Typcial Section and Operational	5	0	2	3	0	5	3	5	3	5	31
24	US 17/92	Beresford Ave to Wisconsin Ave	Consider providing shared lane markings through this section. This could help to serve more localized trips that may not be attracted to the trail along Alabama Ave and could help with the lateral positioning of bicycles in the adjacent on-street parking lanes through parts of this section.	Pedestrian/Bicycle	5	0	2	5	4	5	3	5	5	5	39
25	Howry Ave	Clara Ave to Amelia Ave	Consider providing marked bicycle lanes (symbol and arrow). There appears to be sufficient pavement width to accommodate marked bike lanes (min. 5') through this section.	Pedestrian/Bicycle	2	0	5	2	2	5	3	5	5	5	34
26	SR 44/New York Ave	Clara Ave to Amelia Ave	Consider installing shared lane markings.	Pedestrian/Bicycle	5	0	5	3	3	5	3	5	5	5	39
27	Wisconsin Ave	Stone St to US 17/92	Consider installing shared lane markings.	Pedestrian/Bicycle	2	0	5	2	3	5	3	5	5	5	35
28	US 17/92	Wisconsin Ave to Plymouth Ave	Consider providing shared lane markings through this section.	Pedestrian/Bicycle	5	0	5	3	4	5	3	5	5	5	40
29	Pennsylvania Ave	Florida Ave to US 17/92	Evaluate the potential to complete the sidewalk along the south side of Pennsylvania Ave from either Florida Ave or Palmetto Ct to the existing sidewalk west of US 17/92.	Pedestrian/Bicycle	1	4	5	1	2	5	3	5	5	5	36
30	US 17/92	Plymouth Ave to US 92/International Speedway Blvd	Consider reducing the existing travel lane widths (to 11') to accommodate a minimum 5' marked bicycle lane in each direction.	Pedestrian/Bicycle	5	0	5	5	4	3	3	5	3	3	36
31	US 92/International Speedway Blvd	Alabama Ave to Amelia Ave	Consider extending the sidewalk along the south side of US 92/International Speedway Blvd from Alabama Ave to the signalized intersection of Amelia Ave.	Pedestrian/Bicycle	5	3	1	3	4	3	3	5	5	5	37
32	US 17	Violetwood Rd/Walmart to Glenwood Rd	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian/Bicycle	5	0	4	3	4	3	3	5	5	5	37
33	US 17	SR 11 Junction to Glennwood Rd/SR 11	Consider providing a sidewalk along the east side of US 17 from the northbound junction with SR 11 to the intersection of Glenwood Rd; this should include providing a marked crossing across the northbound lane of SR 11 with appropriate warning signage and adequate lighting.	Pedestrian/Bicycle	5	3	4	3	4	3	3	5	5	5	40
34	Glenwood Rd	SR 15A to US 17	Evaluate installing a sidewalk along Glenwood Rd (potentially along the north side) between SR 15A and US 17.	Pedestrian/Bicycle	2	5	5	2	2	3	3	5	5	3	35
35	Glenwood Rd	US 17 to SR 11	Consider providing sidewalk connections from the intersections (US 17 and SR 11) to the existing sidewalk along the south side of Glenwood Rd.	Pedestrian/Bicycle	2	3	5	2	2	3	3	5	5	5	35
36	US 17	Williamsburg Rd to Spring Garden Ave/SR 15A	Consider installing a sidewalk along the west side of US 17 from Williamsburg Rd north to the existing sidewalk at Spring Garden Ave/SR 15A.	Pedestrian/Bicycle	5	5	4	5	4	3	3	5	5	5	44
37	US 17	Spring Garden Ave/SR 15A to S. of Katrina St	Consider providing a sidewalk along the west side of US 17.	Pedestrian/Bicycle	5	5	4	3	4	1	3	1	3	1	30
38	US 17	Spring Garden Ave/SR 15A to N. of Baxter St	Evaluate providing a wide sidewalk/multi-use path (min. 10') along the east side of US 17. This could tie into the trail that is being proposed along the east side of US 17 from N. of Baxter St to SR 40 as part of the planned widening project.	Pedestrian/Bicycle	5	5	4	3	4	1	3	1	3	1	30
39	US 17	Katrina St to Baxter St	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian/Bicycle	5	0	4	3	4	2	3	5	5	5	36
40	Reynolds Rd	Grand Ave to US 17	Consider providing a sidewalk connection from the Spring to Spring Trail to US 17.	Pedestrian/Bicycle	1	5	5	1	2	2	3	5	5	5	34
41	Baxter St	Grand Ave to US 17	Consider providing a wide sidewalk/multi-use path connection along the north side of Baxter St from Grand Ave to US 17 to connect the Spring to Spring Trail to US 17.	Pedestrian/Bicycle	1	5	5	1	2	2	3	5	5	5	34
42	Ponce Deleon Blvd	DeLeon Springs State Park Entrance to US 17	Consider providing marked bicycle lanes (bike symbol and arrow) within the existing paved shoulder.	Pedestrian/Bicycle	2	4	4	2	3	2	3	5	5	5	35

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43	SR 40	CR 3 to US 17	Consider installing a sidewalk along the south side of SR 40 between CR 3 and US 17.	Pedestrian/Bicycle	5	5	4	3	4	1	3	5	5	5	40
44	US 17	SR 40 to Hagstrom Rd	Consider evaluating (impact to drainage) constructing a multi-use trail along the east side of US 17 from SR 40 to Hagstrom Rd. As an intermediate option consider (depending on impacts to drainage) widening the shoulder to provide for buffered bike lanes through this section.	Pedestrian/Bicycle	5	5	5	3	4	1	3	1	3	1	31
45	Washington Ave	Chipper Jones Ln to US 17	Evaluate installing a sidewalk along the south side of Washington Ave (mostly along the school property). The impacts to drainage will need to be evaluated to determine the feasibility of providing a sidewalk.	Pedestrian/Bicycle	2	3	5	2	3	1	3	3	3	5	30
46	Washington Ave	US 17 to Frederick St	A previously completed safety and traffic study recommended installing a sidewalk along the south side of Washington Ave to the entrance of Taylor High School. Consider evaluating the feasibility (impact to drainage) of a sidewalk along the south side of Washington Ave.	Pedestrian/Bicycle	2	4	5	2	3	1	3	5	3	5	33
47	US 17/92 at Ft Florida Rd		Consider evaluating if the intersection currently meets traffic signal warrants. Alternatively, continue coordination with the City of DeBary's TOD planning efforts to identify longer-term enhancements for the intersection.	Operational	5	4	5	3	5	3	3	5	5	3	41
48	Dirksen Dr at US 17/92		Consider installing a raised median island east of the intersection (at the back of the left turn queue) to delineate the beginning of the westbound to southbound left turn lane from the center two-way left turn lane section.	Operational	5	0	1	2	0	3	3	5	5	5	29
49	US 17/92 at Highbanks Rd		Evaluate providing a right-turn channelization island for the eastbound right turn movement; if an island is installed consider realigning the crosswalks within the western and southern legs of the intersection to the island.	Geometric	5	0	5	3	1	2	3	5	5	5	34
50	US 17/92 at Pine Meadow Dr		Consider realigning the existing crosswalks to provide shorter crossing distances; will require pulling the stop bars back from their existing location.	Geometric and Pedestrian/Bicycle	5	1	5	3	1	2	3	5	5	5	35
51	US 17/92 at Debary Plantation Blvd		Evaluate pulling the northbound stop bar back in order to provide a marked crosswalk along the southern leg of the intersection. The location of the existing drainage inlet could be challenging; this may require looking at realigning the crosswalk along the west side of the intersection to provide space for a ramp for the potential crossing along the south side of the intersection.	Pedestrian/Bicycle	5	1	5	3	5	3	3	5	5	5	40
52	US 17/92 at Debary Plantation Blvd		If a crosswalk is not installed along the southern leg of the intersection consider relocating the existing bus stop to the immediate far-side of the intersection, closer to the existing marked crosswalk. If stop remains where it is consider providing an ADA accessible landing pad at the bus stop.	Transit	5	1	5	3	1	3	3	5	5	5	36
53	US 17/92 at Saxon Blvd		Consider providing a raised right-turn channelization island for the westbound right turn movement on Saxon Blvd and realign the crosswalk along the east side of the intersection.	Geometric	5	0	5	3	1	5	3	5	5	5	37
54	Saxon Blvd at Enterprise Rd		Evaluate installing raised channelized right-turn islands within the northeast and southwest quadrants of the intersection and realigning the crosswalks across Enterprise Rd to improve the visibility of crossing pedestrians to right-turning drivers from Saxon Blvd.	Geometric and Pedestrian/Bicycle	5	1	5	5	1	5	3	5	5	5	40
55	US 17/92 at Enterprise Rd		Consider realigning the existing crosswalk across the northbound right-turn lane to reduce crossing distance/exposure and improve driver visibility of crossing pedestrians. Also, consider enhancing the crossing with signage (W11-2) and evaluating existing crosswalk lighting levels - enhance if necessary.	Pedestrian/Bicycle and Geometric	5	0	5	5	1	5	3	5	5	5	39
56	US 17/92 at Enterprise Rd		Consider providing a marked crosswalk along the southern leg of the intersection.	Pedestrian/Bicycle	5	1	5	5	5	5	3	5	5	5	44
57	US 17/92 at Enterprise Rd		Consider relocating the existing crosswalk across the right-turn lane from Enterprise Rd to northbound US 17/92 to the southeast of its existing location - moving the crosswalk southeast of its existing location would eliminate potential driveway conflicts and would position the crosswalk closer to the existing overhead street light. In addition to relocating the crossing consider enhancing with advance yield pavement markings.	Pedestrian/Bicycle	5	0	5	5	1	5	3	5	5	5	39

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58	US 17/92 at Enterprise Rd	Currently transit routes along US 17/92 (Routes 23 and 20) deviate off of US 17/92 between Saxon Blvd and Enterprise Rd to serve transfers at the Market Place Shopping Center. If a decision is made to provide northbound transit service along US 17/92 from Saxon Blvd through Enterprise Rd consider utilizing the existing right-turn lane as a queue jump lane and reconfiguring the channelized island on the far-side (north side) of the intersection to accommodate an open bus bay and stop.	Transit	5	0	5	3	1	5	3	3	3	3	31
59	US 17/92 at Holly Dr	Consider reconfiguring the median to provide for a southbound left turn lane/deceleration lane.	Geometric	5	0	4	5	0	2	3	5	5	5	34
60	US 17/92 at Rhode Island Ave	If a marked bike lane is provided on Rhode Island Ave (west of US 17/92) provide a bike lane keyhole for the right-turn lane.	Pedestrian/Bicycle	1	0	5	1	3	3	3	5	5	5	31
61	US 17/92 at Rhode Island Ave	Evaluate providing a right-turn channelization island for the eastbound right turn movement; this is dependent upon what the currently hashed-out lane adjacent to the right-turn lane on Rhode Island Ave is intended to be used for.	Geometric	1	0	5	1	0	3	3	3	5	5	26
62	Rhode Island Ave at Carpenter Ave	Consider realigning the existing crosswalk (to the west) to improve accessibility of the pedestrian curb ramp and shorten crossing distance and pedestrian exposure.	Pedestrian/Bicycle	1	0	4	1	3	3	3	5	5	5	30
63	Rhode Island Ave at Sparkman Ave	Consider realigning the existing crosswalk (to the west) to improve accessibility of the pedestrian curb ramp and shorten crossing distance and pedestrian exposure.	Pedestrian/Bicycle	1	0	4	1	3	3	3	5	5	5	30
64	Graves Ave at Park Ave	The existing crosswalk markings are showing wear, consider rehabbing the crosswalk markings and enhancing to a ladder style marking and installing supplemental pedestrian crosswalk (W11-2) signage.	Pedestrian/Bicycle	1	0	5	1	1	3	3	5	5	5	29
65	US 17/92 at University Ave	Evaluate installing side and overhead RRFBs or HAWKs at this existing marked mid-block crossing location if minimum pedestrian demand levels are met. Additionally, evaluate existing crosswalk lighting levels and enhance if necessary.	Pedestrian/Bicycle	5	0	4	3	1	5	3	5	5	3	34
66	US 17/92 at New York Ave	Evaluate extending the eastbound right-turn lane; there appears to be evidence of tire marks and wear on the approach to the existing turn lane that indicated that drivers are using the right-of-way to bypass queues in the thru/left turn lane.	Geometric	2	3	5	1	0	2	3	5	3	3	27
67	US 17/92 at Minnesota Ave	Consider providing marked crosswalks on all legs of the intersection; this is a signalized intersection with no existing crosswalk markings.	Pedestrian/Bicycle	5	4	5	3	5	2	5	5	5	5	44
68	US 17/92 at Firehouse Rd (N. of SR 472)	Consider providing a marked crosswalk along the northern leg of the intersection.	Pedestrian/Bicycle	5	1	5	3	5	3	3	5	5	5	40
69	US 17/92 at Orange Camp Rd/McGregor Rd	Consider providing a marked crosswalk along the southern leg of the intersection.	Pedestrian/Bicycle	5	1	5	3	5	3	3	5	5	5	40
70	US 17/92 at Orange Camp Rd/McGregor Rd	Consider evaluating extending the curb within the southwest corner of the intersection to reduce the turning radius, slow turning traffic, and reduce pedestrian crossing distances and exposure.	Geometric	5	1	5	3	1	3	3	3	3	3	30
71	US 17/92 at Orange Camp Rd/McGregor Rd	Evaluate the need to provide supplemental near-side traffic signal heads for the westbound approach; the existing signal heads appear to be approx. 185' from the existing westbound stop bar; the MUTCD's sight distance requirements for approaching drivers establishes a maximum of 180' from stop bar to signal head.	Operational	5	1	5	3	0	3	3	5	3	3	31
72	US 17/92 at Orange Camp Rd/McGregor Rd	Consider pulling back the existing westbound stop bar (~20' to just past the existing median nose) and realign the crosswalk along the east side of the intersection.	Pedestrian/Bicycle	5	1	5	3	1	3	3	5	5	5	36
73	McGregor Rd at US 17/92	Consider closing the first median opening west of US 17/92 and providing a raised median island/left turn separator. Left turns from the shopping center could be accommodated from adjacent driveways located to the west.	Operational	2	3	5	1	0	2	3	5	5	5	31
74	US 17/92 at Taylor Rd/SR 15A	Consider providing a marked crosswalk along the southern leg of the intersection in conjunction with the proposed FDOT intersection enhancements.	Pedestrian/Bicycle	5	1	5	3	5	5	3	3	5	5	40
75	US 17/92 at Taylor Rd/SR 15A	Evaluate the distance between the southbound stop bar and the southbound traffic signal heads; the proposed FDOT intersection enhancements concept plan shows the traffic signal mast arm being relocated to a channelized right-turn island which would meet the MUTCD's sight distance requirements. If the FDOT intersection enhancements are not completed consider providing supplemental near-side traffic signal heads if the existing distance exceeds MUTCD requirements.	Operational	5	1	5	3	0	5	3	5	5	5	37

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76	US 17/92 at Gilbert St		Consider eliminating the left turn movements from Gilbert St and the shopping center and providing a raised left turn channelization island for left turn from US 17/92 only. Left turns from Gilbert St and the shopping center could be accommodated at either New Hampshire Ave or to the south at Andover St.	Operational	1	0	5	5	0	5	3	5	5	5	34
77	US 17/92 at New Hampshire Ave		Consider realigning the crosswalk along the northern leg of the intersection to improve the visibility of pedestrians and reduce pedestrian crossing distance and exposure.	Pedestrian/Bicycle	5	1	5	3	1	5	3	5	5	5	38
78	SR 15A at New Hampshire Ave		The existing marked mid-block crosswalk is used as a school crossing; evaluate opportunities to enhance the crossing (raised median islands, RRFBs, HAWK, lighting, etc.) to better accommodated non-school crossings.	Pedestrian/Bicycle	5	1	5	3	1	5	3	5	5	3	36
79	US 17/92 at Lisbon Pkwy		Provide an ADA compliant pedestrian curb ramp and defined sidewalk connection along the east side of US 17/92 south of Lisbon Pkwy.	Pedestrian/Bicycle	5	1	5	3	4	3	3	5	5	5	39
80	US 17/92 at Lisbon Pkwy		Consider building-up the abandoned driveway to provide for an ADA compliant landing pad at the bus stop along the east side of US 17/92 north of Lisbon Pkwy.	Transit	5	1	5	3	1	3	3	5	5	5	36
81	US 17/92 at Beresford Ave		US 17/92 begins to narrow just south of Beresford Ave, which would cause the potential marked bike lane to end before the intersection; consider transitioning the northbound bike lane to the sidewalk using a roundabout-style bike ramp treatment.	Pedestrian/Bicycle	5	0	5	3	4	5	3	5	5	5	40
82	US 17/92 at Beresford Ave		Consider enhancing the existing crosswalk markings to a high-emphasis/ladder style crosswalk marking.	Pedestrian/Bicycle	5	0	5	3	1	5	3	5	5	5	37
83	US 17/92 at Beresford Ave		Consider evaluating modifications to the eastbound approach to provide a thru-left lane and a right-turn only; concurrently, evaluate extending the length of the existing thru-right lane.	Operational and Geometric	2	3	5	5	0	5	3	5	5	5	38
84	US 17/92 at Beresford Ave		Evaluate the feasibility of a modern roundabout application at this intersection. Further analysis would be needed to determine the feasibility of a roundabout.	Operational and Geometric	5	0	5	5	1	5	3	1	1	1	27
85	US 17/92 at Euclid Ave		Evaluate the feasibility of a designated mid-block crossing north of Euclid Ave near the DeLand Intermodal Center. Evaluate pedestrian crossing volumes.	Pedestrian/Bicycle	5	0	5	3	5	5	3	5	5	5	41
86	New York Ave/SR 44 at Florida Ave		Consider extending the curb (bulb-out) within the southwest corner of the intersection and then realigning the crosswalk along the western leg of the intersection.	Pedestrian/Bicycle and Geometric	5	0	5	3	1	5	3	5	5	5	37
87	Rich Ave at Hayden Ave		Consider providing a marked crosswalk along the northern leg of the intersection.	Pedestrian/Bicycle	1	0	1	1	1	5	3	5	5	5	27
88	Rich Ave at Hayden Ave		Consider extending the curb (bulb-out) within the southwest corner of the intersection.	Geometric	1	0	1	1	1	5	3	5	5	5	27
89	Rich Ave at Hayden Ave		Consider enhancing the existing marked mid-block crosswalk (east of Hayden Ave) with high-emphasis ladder style crosswalk markings and evaluate existing crosswalk lighting levels and enhance if necessary.	Pedestian/Bicycle	1	0	1	1	1	5	3	5	5	5	27
90	Chruch St at Hayden Ave		Consider providing crosswalk signage at the existing crosswalk east of Hayden Ave and consider removing the legacy pedestrian curb ramp along the south side of Church St east of Hayden Ave.	Pedestrian/Bicycle	1	0	1	1	1	5	3	5	5	5	27
91	Hayden Ave at Church St		Consider providing crosswalk signage (W11-2) at the existing crosswalk north of Church St.	Pedestrian/Bicycle	1	0	1	1	1	5	3	5	5	5	27
92	Hayden Ave at Wisconsin Ave		Consider providing a marked crosswalk across Hayden Ave north of Wisconsin Ave.	Pedestrian/Bicycle	2	0	1	1	3	5	3	5	5	5	30
93	Wisconsin Ave at US 17/92		Check to see if crossing ~330' east of US 17/92 has been maintained after the recent resurfacing along Wisconsin Ave; if crossing remains, consider adding pedestrian (W11-2) or trail crossing (W11-15) signage on the approaches to the crossing.	Pedestrian/Bicycle	5	0	1	1	0	5	3	5	5	5	30
94	US 17/92 at University Ave		Consider enhancing the existing marked mid-block crosswalk with a raised median island, pedestrian curb ramps, and potentially RRFBs (if minimum requirements are met). Also, consider evaluating existing crosswalk lighting levels and enhance if necessary.	Pedestrian/Bicycle	5	0	5	3	1	5	3	5	5	5	37
95	US 17/92 at Plymouth Ave		Evaluate the potential to extend the curb (bulb-out) within the NW quadrant, the location of the existing drainage inlet may be a challenge for this. So, alternatively evaluate the potential to provide a right-turn channelization island. Also, in either scenario consider realigning the crosswalks on the northern and western legs of the intersection to reduce the crossing distances and exposure.	Geometric	5	0	5	5	1	5	3	3	3	3	33

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96	US 17/92 at Plymouth Ave		Evaluate the potential to extend the curb within the southwest quadrant to reduce the existing turn radius and reduce/remove the taper south of the intersection.	Geometric	5	0	5	5	1	5	3	3	5	5	37
97	US 17/92 at Plymouth Ave		Evaluate the eastbound left turn lane queues (demand and capacity), it appears, from limited review, that the left turn lane queues are extending into and blocking the thru-right-turn lane. If it is confirmed that there may be left turn lane capacity issues consider evaluating widening the portion of Plymouth Ave between Florida Ave and US 17/92 to accommodate a second left turn lane. In addition to this a review of the signal timing should be conducted to ensure that the phase for a dual left turn lane from eastbound Plymouth Ave to northbound US 17/92 could be accommodated.	Operational/Geometric	3	0	5	5	0	5	3	3	3	3	30
98	US 17 at US 92/International Speedway Blvd		Consider modifying/extending the sidewalk within the southeast quadrant; there is a visible path where people have been walking to the intersection from the existing sidewalk.	Pedestrian/Bicycle	5	1	1	3	1	3	3	5	5	5	32
99	US 17 at US 92/International Speedway Blvd		Evaluate extending the curb line within the southwest quadrant and realigning the crosswalk on the west side of the intersection.	Geometric	5	0	5	3	1	3	3	5	5	5	35
100	US 17 at Old Daytona Rd		Evaluate the need for extending the southbound left turn lane to better accommodate larger vehicles (trucks).	Geometric	5	0	5	3	0	5	3	5	5	5	36
101	US 17 at SR 11/Glenwood Rd		Evaluate reprofiling the southeast quadrant to provide for a channelized right-turn slip-lane and raised island.	Geometric	5	3	5	3	0	3	3	3	3	3	31
102	US 17 at SR 11/Glenwood Rd		If a right-turn island is installed consider installing a marked crosswalk along the south and east legs of the intersection utilizing the right-turn island.	Pedestrian/Bicycle	5	3	5	3	5	3	3	3	5	5	40
103	SR 15A at Glenwood Rd		Consider wrapping the sidewalk/pedestrian landing area around the corner within each quadrant and then realigning the crosswalks to provide shorter crossing distances, bring the crossings closer to the intersection, and eliminate the angle in the crossing along the northern leg of the intersection. Also, when realigning the crosswalks consider extending the median nose (could be with paint) on the north side of the intersection and moving the southbound stop bar closer to the intersection. Additionally, consider extending the sidewalk in the northeast quadrant to provide access to the existing bus stop..	Pedestrian/Bicycle and Geometric	5	1	0	3	5	3	3	5	5	5	35
104	US 17 at Spring Garden Ave/SR 15A		Consider extending the sidewalk within the northwest quadrant approximately 40' to the north; realign the crosswalk closer to the beginning of the turn and reconfigure the sidewalk within the channelization island to accommodate the reconfigured crossing.	Pedestrian/Bicycle and Geometric	5	1	5	3	1	2	3	5	5	5	35
105	US 17 at Spring Garden Ave/SR 15A		Consider providing a marked crosswalk across the northern leg of the intersection.	Pedestrian/Bicycle	5	4	5	3	5	2	3	5	5	5	42
106	US 17 at Reynolds Rd		Consider providing a marked crosswalk across the eastern leg of the intersection.	Pedestrian/Bicycle	5	4	5	3	5	2	3	5	5	5	42
107	US 17 at Baxter St/Ponce Deleon Blvd		Evaluate existing pedestrian/bicycle crossing demand at the existing marked (school) crossing. If crossing levels meet minimum requirements consider enhancing the crossing with side/overhead mounted RRFBs or HAWKs. Additionally, consider evaluating existing crosswalk lighting levels and enhance if necessary.	Pedestrian/Bicycle	5	0	4	3	1	2	3	5	5	5	33
108	US 17 at Baxter St/Ponce Deleon Blvd		Consider reconfiguring the northbound left turn lane to eliminate northbound left turns onto Baxter St and reconstructing the raised median separator to the north to the intersection with Ponce Deleon Blvd.	Operational	5	0	4	5	0	2	3	5	5	5	34
109	US 17 at Baxter St/Ponce Deleon Blvd		Consider evaluating the potential feasibility for a modern 5-legged roundabout at this location. Further engineering analysis would be needed to determine feasibility.	Geometric and Operational	5	0	4	3	1	2	3	1	1	1	21
110	Baxter St at Grand Ave		Consider providing a marked crossing across Baxter St from the Spring to Spring Trail to the sidewalk along the north side of Baxter St.	Pedestrian/Bicycle	1	1	2	1	1	2	3	5	5	5	26
111	US 17 at SR 40		Consider installing a marked crosswalk (and pedestrian countdown signals) along the northern leg of the intersection in advance of the planned US 17 roadway widening project.	Pedestrian/Bicycle	5	5	5	3	5	1	3	5	5	5	42
112	US 17 at 2nd Ave		Consider evaluating the potential for a modern roundabout. Further engineering analysis would be needed to determine feasibility.	Geometric and Operational	5	0	0	3	1	1	5	1	1	1	18

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113	US 17 at Washington Ave		Consider evaluating the potential for a modern roundabout. Further engineering analysis would be needed to determine feasibility.	Geometric and Operational	5	1	0	3	1	1	5	1	1	1	19
114	Washington Ave at Chipper Jones Ln		If a sidewalk is constructed along the south side of Washington Ave consider installing a marked crossing across Washington Ave from the sidewalk to the entrance of the park/Chipper Jones Ln.	Pedestrian/Bicycle	2	3	5	1	3	1	3	5	5	5	33
115	US 17 at Palmetto Ave		Monitor the development of relocating Pierson Elementary School and consider exploring opportunities to provide multimodal connections to the school site (e.g., sidewalk or multi-use trail connections along US 17 from Washington Ave to the school site entrance).	Pedestrian/Bicycle	5	5	4	3	3	1	3	3	5	3	35
116	US 17 at Clayton Ave/Bunnell Rd		Consider providing marked crosswalks along US 17 across Clayton Ave/Bunnell Rd.	Pedestrian/Bicycle	5	0	4	3	4	1	3	5	5	5	35