UNIVERSITY BLVD
SAFETY STUDY

University Boulevard

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NORTH FLORIDA TPO

July 2025

University Boulevard Safety Study

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Acronyms

AADT	Annual Average Daily Traffic
ADA	Americans with Disabilities Act
COJ	City of Jacksonville
CRA	Community Redevelopment Area
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
JTA	Jacksonville Transportation Authority
LF	Linear Feet
LPI	Leading Pedestrian Interval
PDO	Property Damage Only
RRFB	Rectangular Rapid Flashing Beacon
SR	State Road
TPO	Transportation Planning Organization
VPD	Vehicles Per Day

1.0 Introduction

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University Boulevard serves as a key connection within the region, accommodating significant vehicular traffic, as well as a growing number of people walking, biking, and using transit. Ensuring safety for all who travel this corridor is both a critical need and a priority within the City of Jacksonville and the North Florida Transportation Planning Organization (TPO).

Recent crash data and community feedback have highlighted safety challenges including conflicts between different modes of transportation, pedestrian and bicycle vulnerabilities, and roadway design that may contribute to unsafe behaviors. These concerns emphasize the importance of a comprehensive evaluation to identify and address the underlying safety issues.

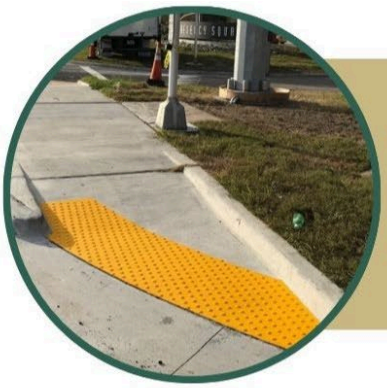
Therefore, the ***University Boulevard Corridor Safety Study*** was funded by the North Florida TPO and is being conducted in partnership with the City of Jacksonville and AtkinsRéalis to address safety concerns along a vital and heavily traveled segment of University Boulevard, stretching from San Jose Boulevard to Fort Caroline Road - a distance of 11 miles.

This study utilizes the Federal Highway Administration's (FHWA) **Safe Systems** approach, a forward-thinking methodology designed to eliminate serious injuries and fatalities. Recognizing that human error is inevitable, the Safe Systems framework seeks to minimize the consequences of those errors by creating safer road systems. Through a detailed assessment of existing conditions and the development of targeted recommendations, this study aims to transform University Boulevard into a safer, more accessible, and more equitable corridor for all users.

This study is organized into the following sections:

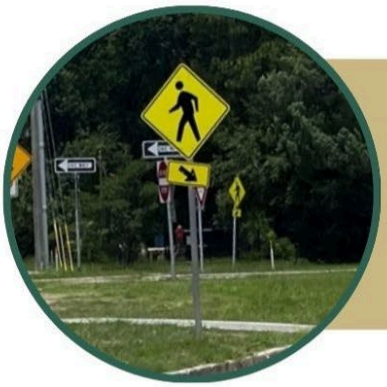
- **Section 1**: Introduction
- **Section 2**: Existing Conditions
- **Section 3:** Data Collection
- **Section 4:** Recommendations

The results of this study yielded recommendations that relate to four primary categories:



Americans with Disabilities Act (ADA) and Connectivity - Recommendations referring to potential projects that, when implemented, would decrease the number of gaps in the sidewalk network along the project corridor and improve access for individuals with disabilities though compliance with ADA.

6 Recommendations



Signs, Signals, and Pavement Marking - Recommendations consisting of improvements involving the addition or modification of roadway communication features. Visibility, consistency, and clarity are vital to good roadway design and safe travel for all roadway users.

15 Recommendations

Pedestrian Safety - Recommendations referring to roadway enhancements specifically geared towards safer pedestrian access and mobility.

14 Recommendations

Roadway Design - Recommendations referring to potential projects that would modify the roadway to encourage safer vehicular and multi-modal travel.

18 Recommendations

1.1 Study Limits

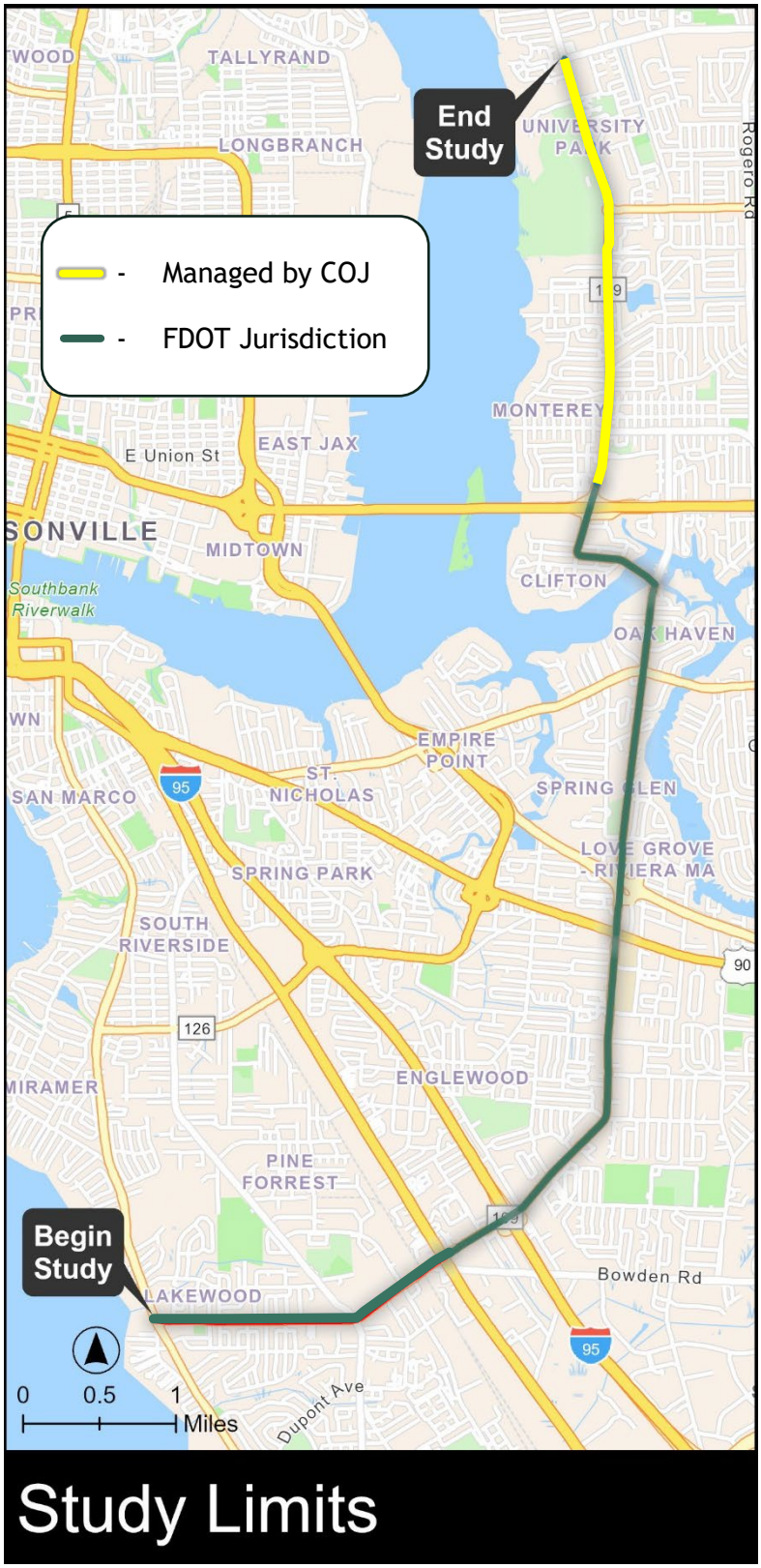
The study limits extend approximately 8.74 miles along University Boulevard, starting from San Jose Boulevard (SR 13) to the south to Fort Caroline Road to the north (see **Figure 1-1**).

University Boulevard is managed by two different agencies along the study limits. The segment from San Jose Boulevard (SR 13) to the Arlington Expressway is managed by the Florida Department of Transportation (FDOT), while the segment from the Arlington Expressway to Fort Caroline Road is managed by the City of Jacksonville.

Given the involvement of multiple agencies, coordination will be essential to ensure consistency in safety improvements, operational strategies, and long-term maintenance.

This study will consider existing management agreements, roadway characteristics, and any planned improvements by both agencies to develop cohesive recommendations that align with the corridor's overall transportation goals.

FIGURE 1-1 STUDY LIMITS



1.2 Study Segments

Segment 1: San Jose to US 1 (1.75 miles). This segment primarily consists of commercial and residential developments, with multiple access points and signalized intersections that contribute to congestion and potential conflict points.

Segment 2: US 1 to Spring Park Road (0.51 miles). A shorter segment characterized by a mix of commercial establishments and higher pedestrian activity. This area includes several key intersections that experience peak-hour congestion and turning movement challenges.

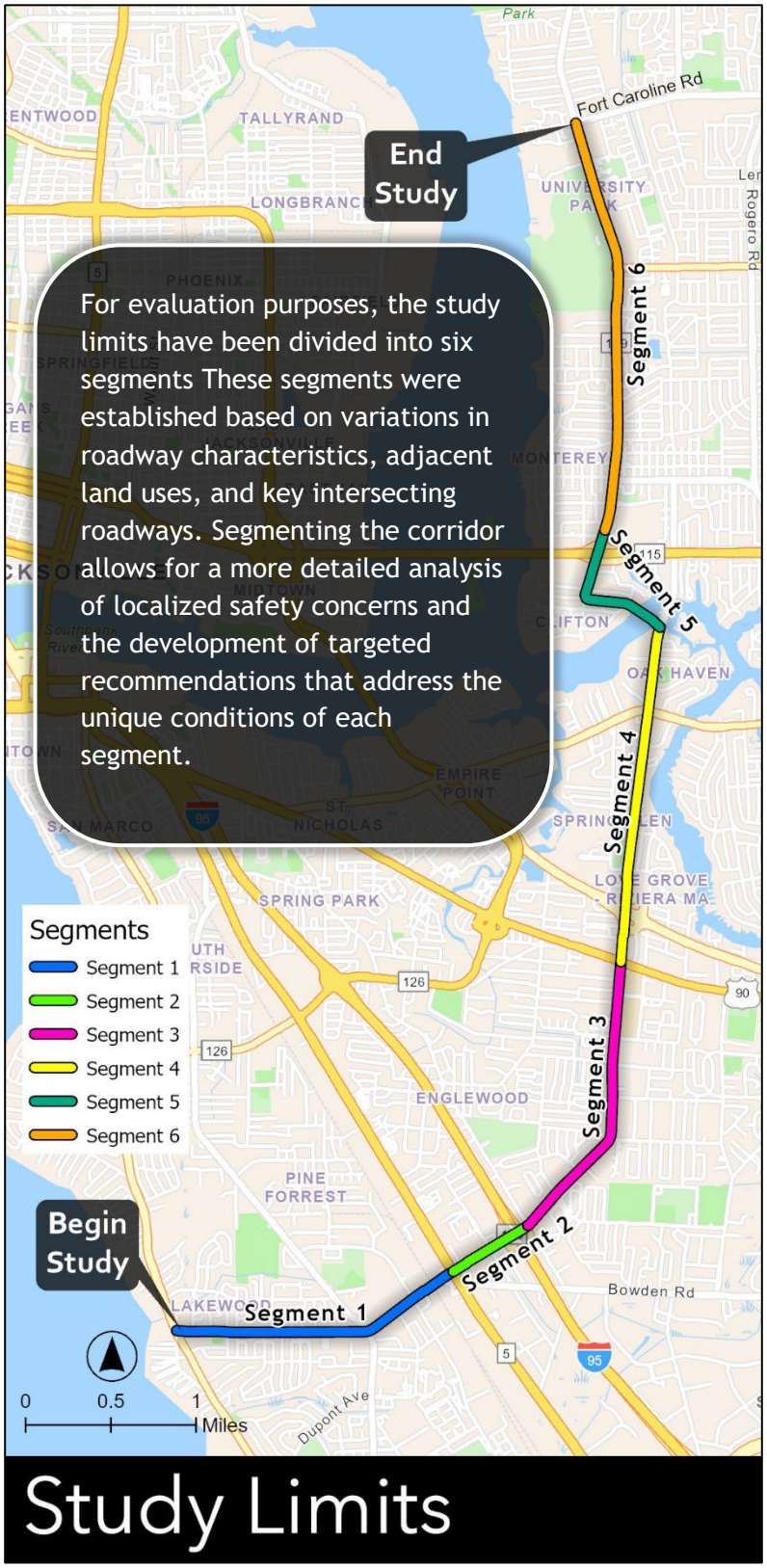
Segment 3: Spring Park Road to Beach Boulevard (1.74 miles). This segment serves as a critical connection to Beach Boulevard (US 90), a major east-west corridor. The presence of high-speed traffic and frequent access points increases the potential for conflicts among different road users.

Segment 4: Beach Boulevard to Cesery Boulevard (1.98 miles). This is a mixed-use corridor with commercial centers, schools, and transit routes. This section has potential multimodal safety concerns due to the presence of bicyclists and transit riders.

Segment 5: Cesery Boulevard to Arlington Expressway (0.9 miles). A transitional segment leading to the expressway, characterized by higher speeds and limited pedestrian infrastructure. Potential safety concerns include merging conflicts and accessibility challenges.

Segment 6: Arlington Expressway to Fort Caroline Road (1.74 miles). This northernmost segment, managed by the City of Jacksonville, features a mix of residential neighborhoods and commercial corridors. Potential safety improvements should focus on enhancing connectivity and addressing localized crash patterns.

FIGURE 1-2 STUDY SEGMENTS



1.3 Concurrent/Previous Studies

There are three concurrent studies being conducted along portions of University Boulevard within the study limits. The Florida Department of Transportation (FDOT) completed a previous safety study in 2022(see **Figure 1-3**).

Concurrent Studies

Three concurrent studies are being conducted by either the City of Jacksonville (COJ) or the Jacksonville Transportation Authority (JTA). The studies consist of three phases:

- **Phase 1**: Arlington Expressway to north of Arlington Road (JTA)
- **Phase 2**: North of Arlington Road to south of Merrill Road roundabout (COJ)
- **Phase 3**: Merrill Road from University Boulevard to Townsend Boulevard
- Renew Arlington Community Redevelopment Area (CRA)

Communication was maintained throughout the study process between the study team and the teams working on the concurrent studies to avoid repetition between the studies and maintain consistency.

Previous Study

A previous safety study was conducted by FDOT in 2022 along University Boulevard from San Jose Boulevard (SR 13) to US 1 (SR 5).

Results and recommendations from the FDOT Safety Study informed the recommendations for this current study.

FIGURE 1-3 CONCURRENT/PREVIOUS STUDIES

FDOT Projects

Five (5) FDOT projects are either currently being completed or will begin in the near future and will have an impact on safety and operations. These projects include:

- **Project 209683-1**: Traffic signal updates along University Boulevard from SR 13 to Cesery Boulevard.

- **Project 447125-1**: Resurfacing from San Jose Boulevard to I-95 and also includes curb and gutters, sidewalks, signing and pavement markings, signalization, lighting and other incidental construction. Median modifications at Chester Avenue and Richard Street are also included.

- **Project 445427-1:** Milling and resurfacing 1.8 miles of roadway, pavement and curb reconstruction, signage, pavement markings, concrete sidewalks, guardrail replacement, pier protection, ADA detectable warning devices, stormwater drainage, signalization and lighting/light pole installation between Cruz Road and Wateredge Lane.

- **Project 432259-2**: An FDOT Planning, Design and Environmental study to address existing and future congestion, improve regional mobility for the delivery of goods and services, decrease emergency and hurricane clearance times, and to improve overall safety of the I-95 corridor.

- **Project 430718-2**: An intersection improvement project on the Arlington Expressway from the Southside Connector to University Boulevard. Included in this project is the construction of a roundabout on the northern portion of the intersection of the Arlington Expressway and University Boulevard.

Construction on University Boulevard east of Philips Highway.
Source: Project Team.

2.0 Existing Conditions

2.0 Existing Conditions

Corridor existing conditions analysis includes general roadway attributes, bicycle and pedestrian facilities, transit infrastructure, key community features, and planned improvements outlined in the 2024 FDOT work program. These elements affect the corridor's safety and will help guide the development of targeted strategies and recommendations to enhance safety and accessibility for all corridor users.

2.1 General Roadway Characteristics

The following outlines key features of the corridor, including its functional classification, physical attributes, traffic operations, and multimodal accommodations. These features are further detailed in this section.

- **Posted Speed**: Ranges from 30 mph to 40 mph.
- **Functional Classification**: Minor Arterial or Major Collector, depending on the segment.
- **Context Classification**: Mostly C3C – Suburban Commercial with some C4 – Urban General.
- **Typical Section**: Generally consists of 4 travel lanes with a center turn lane.
- **Traffic Volumes**: Ranges from a low of 19,000 in Segment 5 to 44,000 in Segment 2.
- **Intersections and Access Points:** Multiple signalized and unsignalized intersections as well as frequent driveways providing access to businesses, schools, and residential areas.
- **Bicycle and Pedestrian Facilities:** Existing sidewalks and crosswalks throughout the length of the corridor. There are limited dedicated bicycle facilities.
- **Transit Service:** Transit service is provided by the Jacksonville Transportation Authority (JTA), providing local and regional transit routes with bus stops along the corridor. Transit facilities may include shelters, benches, and pedestrian connections.
- **Roadway Conditions:** There are varying pavement conditions with some areas requiring maintenance or resurfacing. Draining and lighting vary in effectiveness along the corridor.
- **Community Features**: The corridor largely consists of commercial, residential, and institutional uses with the presence of schools, shopping centers, and medical facilities.

TABLE 2.1 ROADWAY CHARACTERISTICS BY SEGMENT

Roadway Characteristic	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Segment 6
Posted Speed	35-40 mph	40 mph			30-35 mph	40 mph
Functional Classification	Minor Arterial				Major Collector	Major Collector/ Minor Arterial
Context Class.	C3C				C4	C3C/C4
AADT (2023)	29,000	44,000	35,500	29,000	19,000	23,000
Sidewalks	Yes – Both Sides				Yes - partial on one side	Yes – Both Sides
Bike Lanes	No				Partial	Partial
JTA Bus Stops	14	2	16	13	0	21

2.2 Posted Speed Limit

The posted speed limit along the corridor ranges from 30 to 40 mph, with the majority of the corridor having a posted speed limit of 40 mph.

There are two roadway segments with a posted speed of 35 mph:

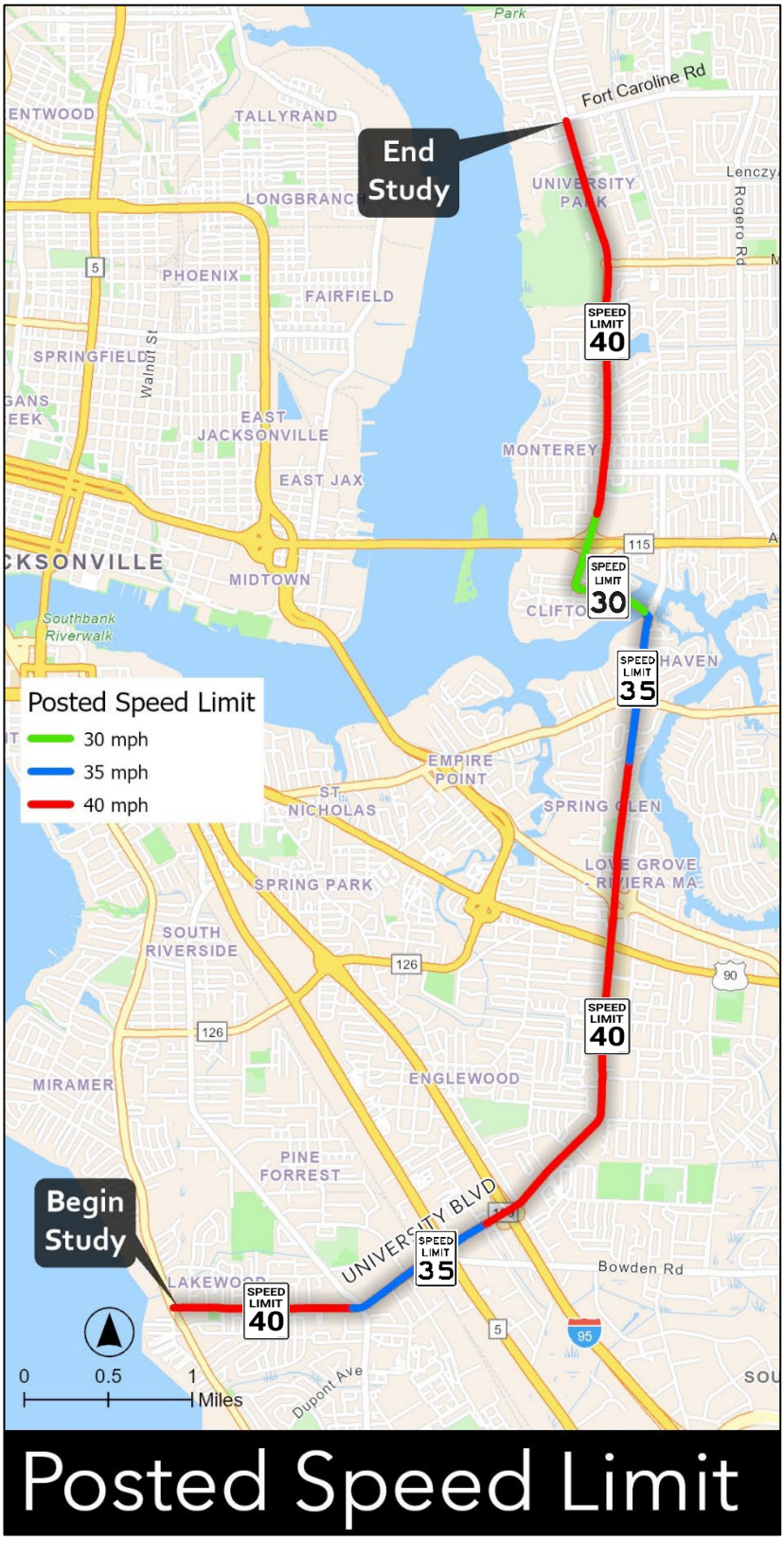
- West of Saint Augustine Road to east of Richard Street (within Study Segments 1 and 2)
- South of Saint Cecilia Road to Cesery Boulevard (within Study Segment 4)

There is one roadway segment with a posted speed of 30 mph:

- Cesery Boulevard to North of the Arlington Expressway, through the Clifton neighborhood (within Study Segment 5).

40 mph speed limit sign on University Boulevard south of Jack Road. Source: Project Team.

FIGURE 2-1 POSTED SPEED LIMIT



Source: Google Street View imagery, April 2024.

2.3 Functional Classification

Functional classification is a system that groups roads into classes based on the services they provide. Functional classes are defined as either Arterials, Collectors, or Local, and then as either Urban (within an urbanized area) or Rural (not within an urbanized area).

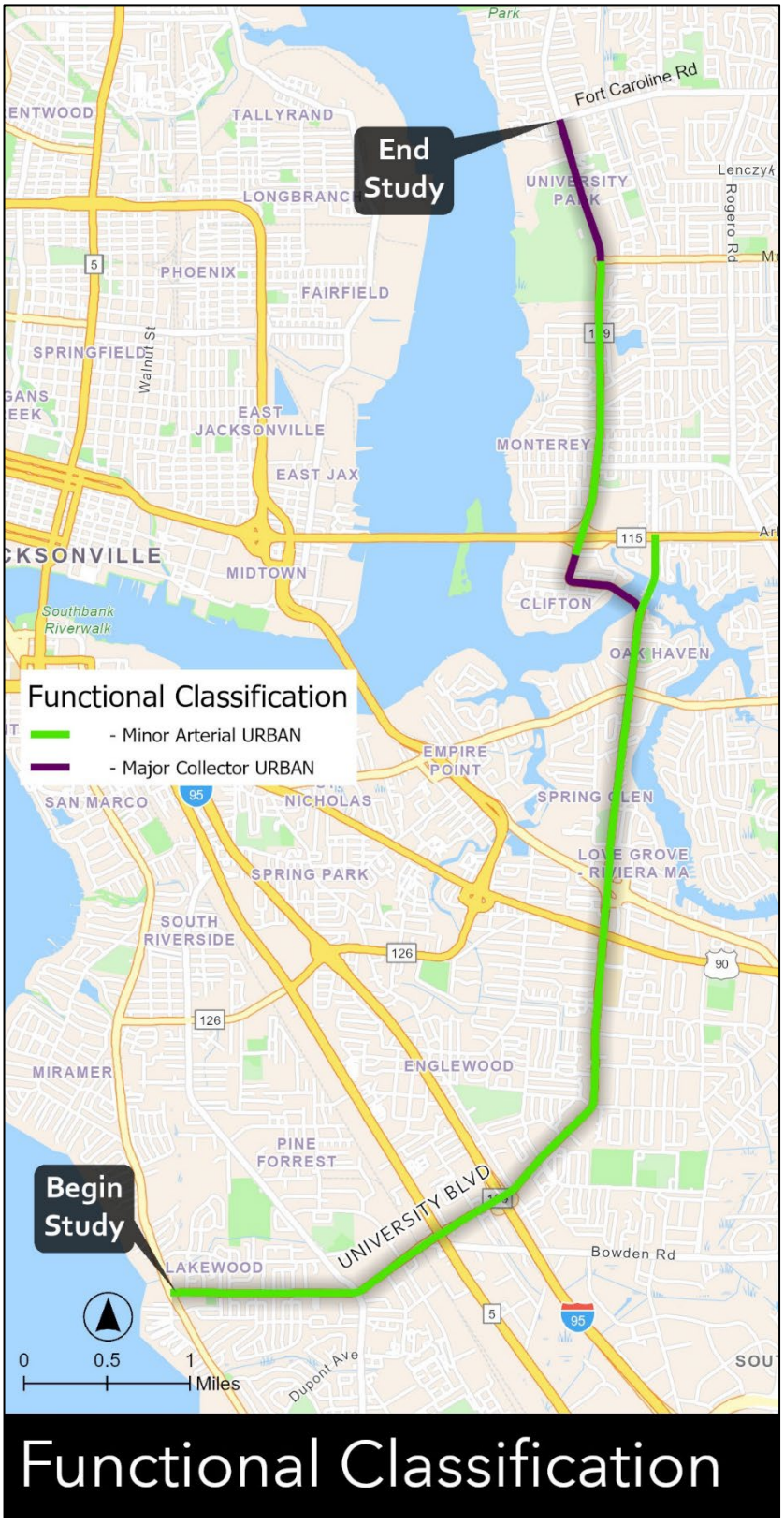
The project corridor is functionally classified by FDOT as either Minor Arterial URBAN or Major Collector URBAN. As most of the corridor is classified as a Minor Arterial, this means University Boulevard primarily functions as a key regional connector, managing significant traffic volumes while still allowing access to surrounding properties.

The study segments functionally classified as Minor Arterial include Segments 1 through 4, and portions of Segment 6 (south of Merrill Road).

The Major Collector segments play a supporting role in linking local traffic to the arterial network.

The study segments functionally classified as Major Collector are Segment 5 and Segment 6 north of Merrill Road.

FIGURE 2-2 FUNCTIONAL CLASSIFICATION



Source: FDOT's Functional_Classification_TDA shapefile obtained from ArcGIS Online, February 2025.

2.4 Context Classification

FDOT's Context Classification system categorizes roadways based on surrounding land use and development patterns, helping to guide roadway design and operational decisions that align with the area's character. University Boulevard is categorized into two primary classifications within the study area: C4 - Urban General and C3 – Suburban.

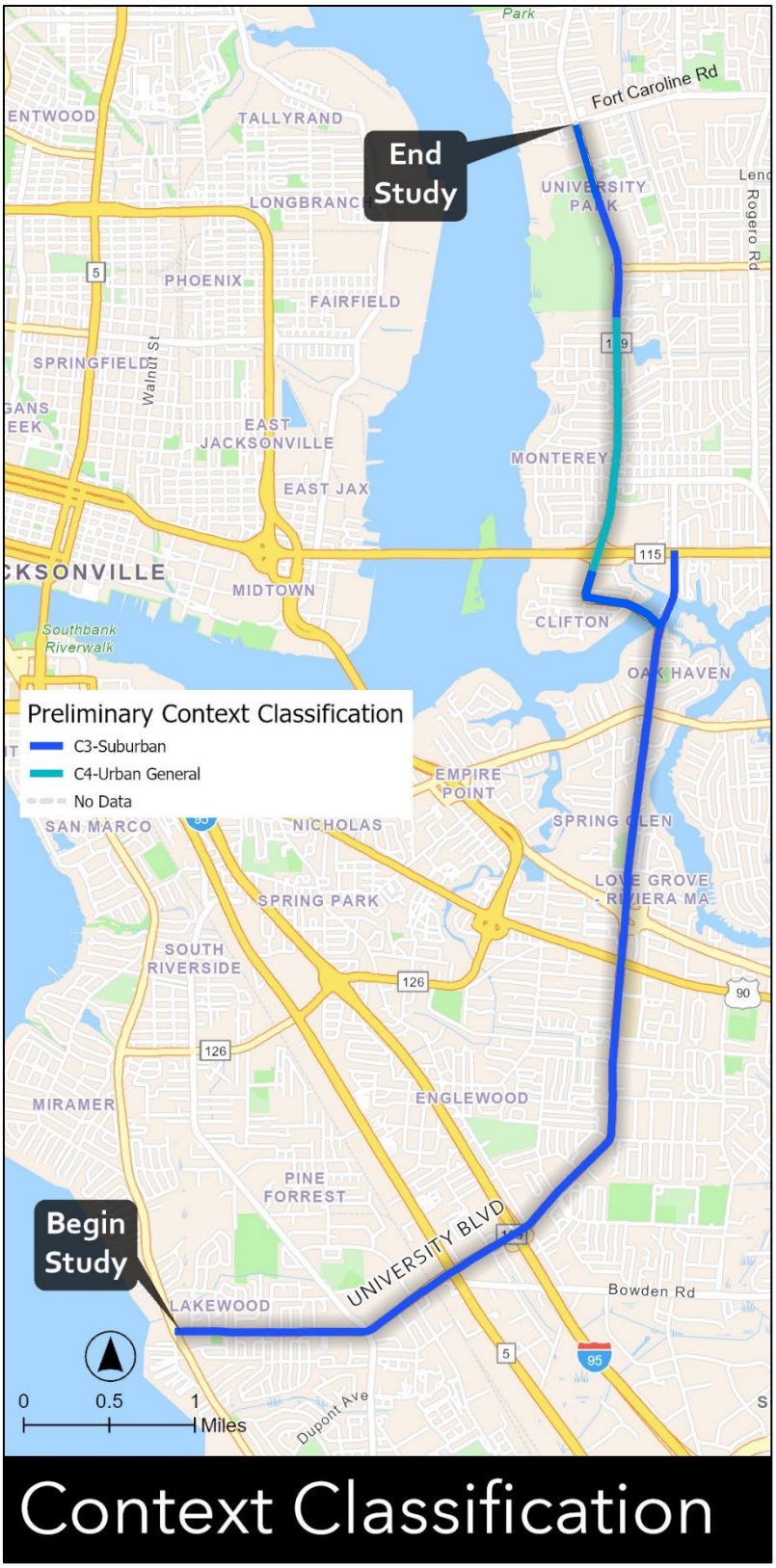
C4 -Urban General

The majority of the study area has a preliminary context classification of C4 – Urban General, which represents a mix of commercial, institutional, and residential land uses with moderate development densities. Study Segments 1-4 and portions of Segment 5 are classified in this category.

C3 – Suburban

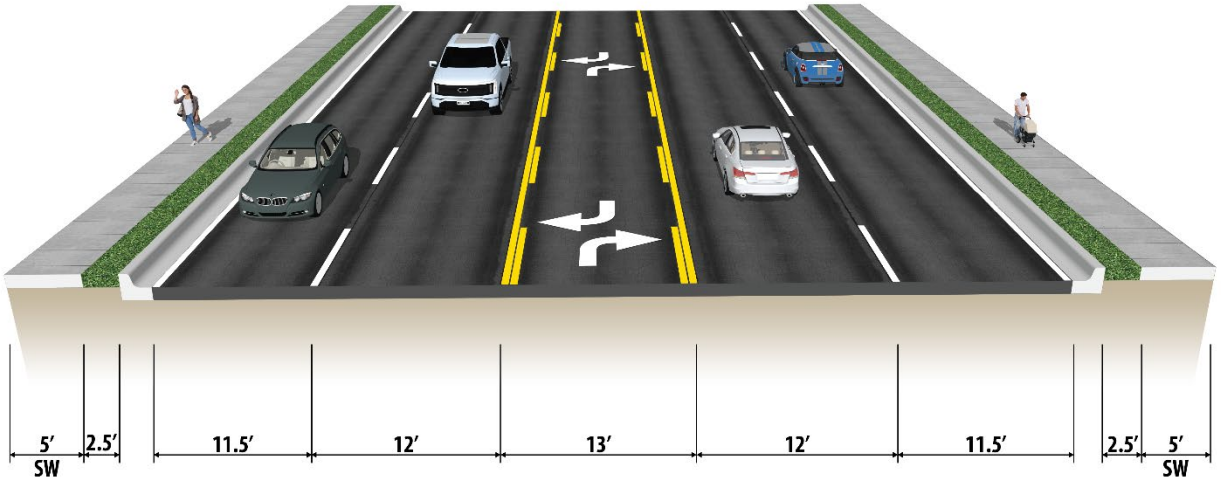
This classification is characterized by lower density development with larger setbacks and more auto-oriented environment. The southern portion of Segment 5 to Jacksonville University (JU) is classified in this category.

FIGURE 2-3 CONTEXT CLASSIFICATION

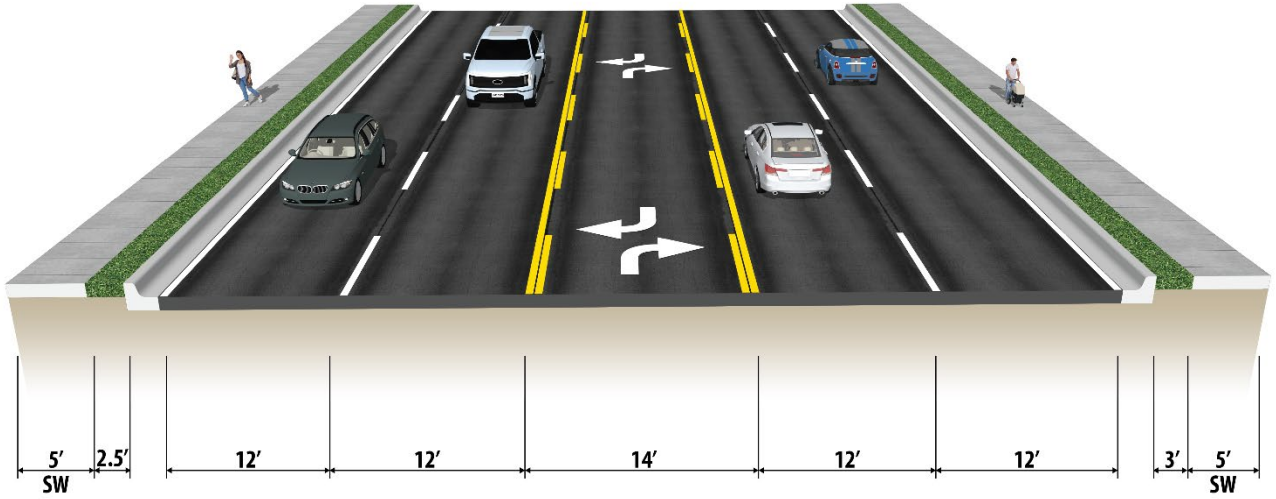


Source: FDOT's Preliminary_Context_Classification_TDA shapefile obtained from ArcGIS Online, February 2025.

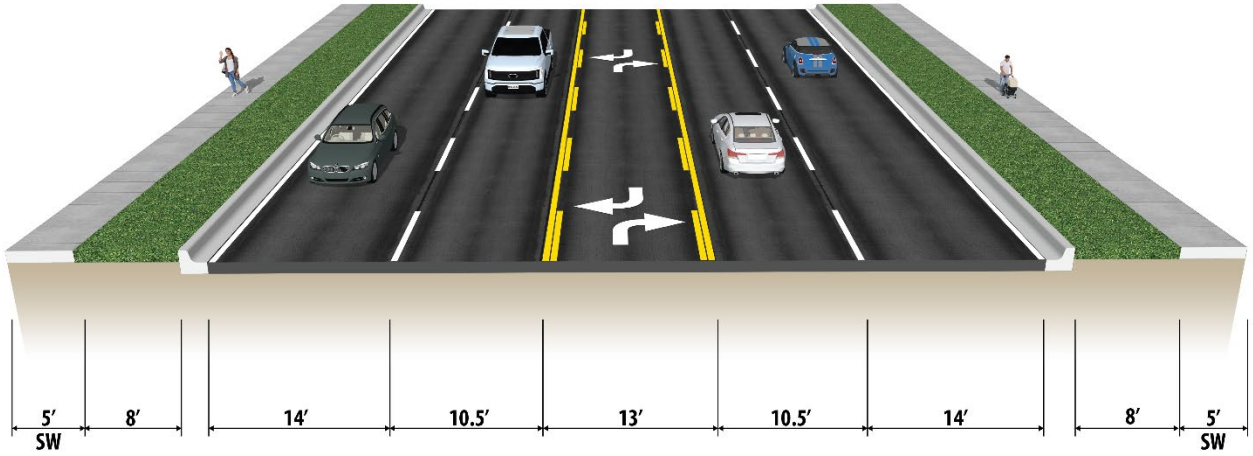
2.5 Typical Sections



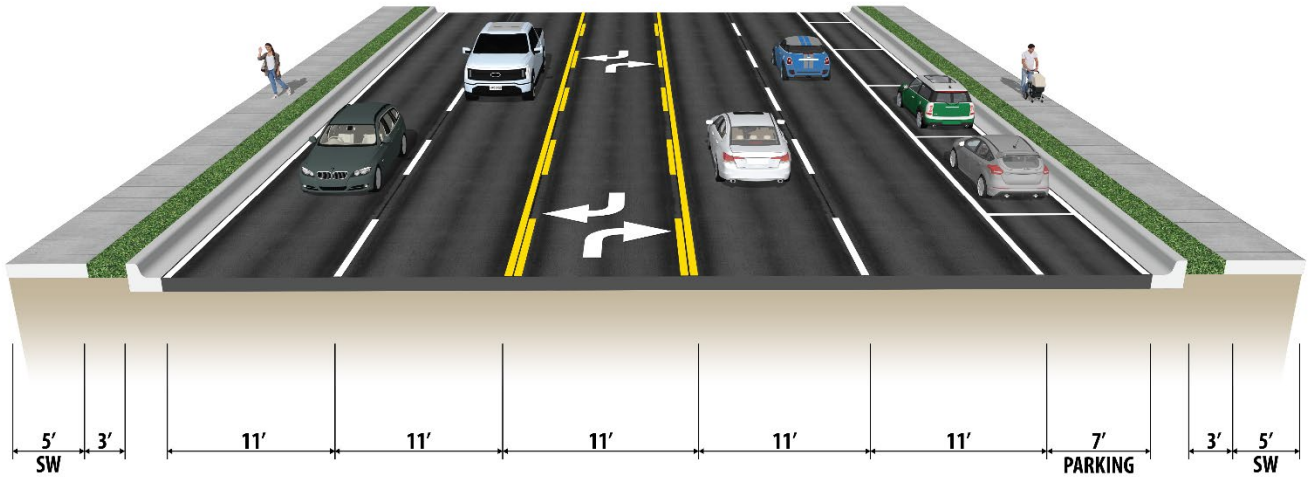
Segment 1: San Jose Boulevard to Philips Highway



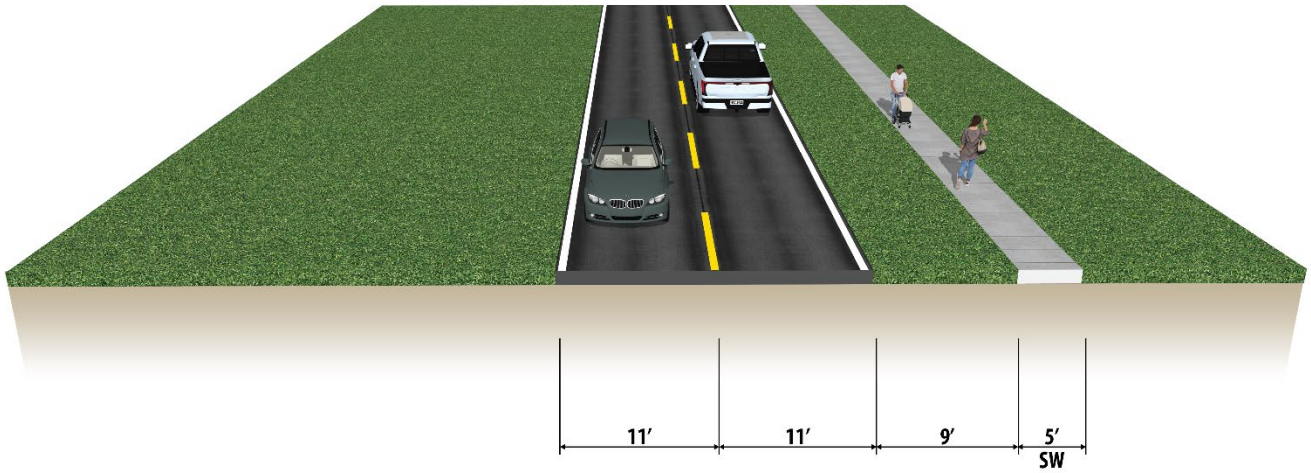
Segment 2: Philips Highway to I-95



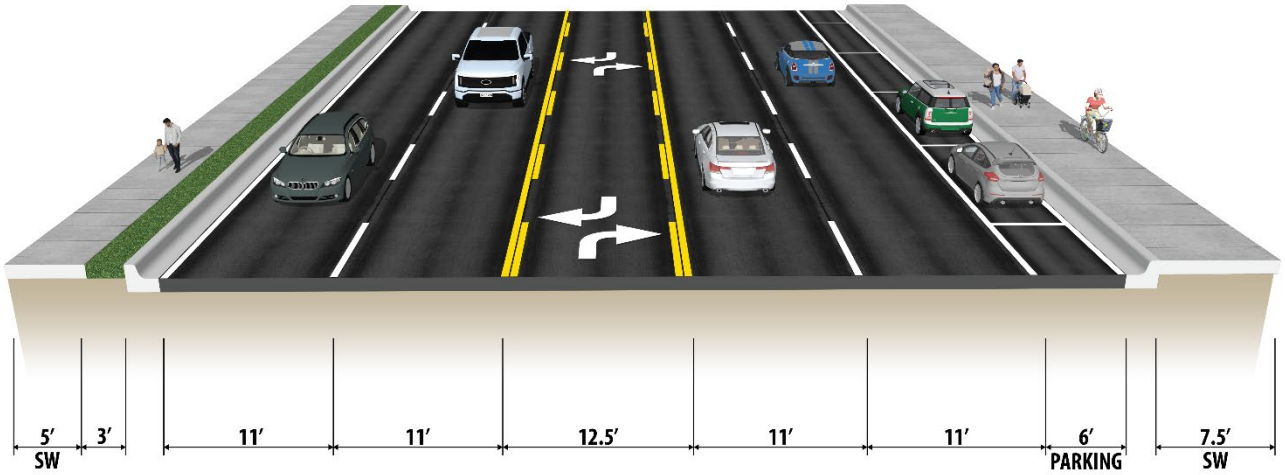
Segment 3: I-95 to Beach Boulevard



Segment 4: Beach Boulevard Cesery Boulevard



Segment 5: Cesery Boulevard to Arlington Expressway



Segment 6: Arlington Expressway to Fort Caroline Road

2.6 Traffic Volumes

Annual Average Daily Traffic (AADT) represents the estimated number of vehicles traveling along a roadway segment on an average day. Understanding traffic volumes helps to identify capacity constraints, operational challenges, and potential safety concerns.

Along the University Boulevard corridor, AADT varies significantly, reflecting differences in land use, roadway design, and regional connectivity.

Based on the most recent available data from FDOT, the 2023 AADT traffic volumes range from 9,600 vehicles per day (vpd) at the western end near San Jose Boulevard (Segment 1) and 10,500 vpd in Segment 4, to approximately 50,000 vpd near US 1 and I-95, where the highest volumes were observed.

For much of the corridor, AADT generally falls between 24,000 and 32,000 vpd, indicating consistent demand across key segments.

FIGURE 2-4 ANNUAL AVERAGE DAILY TRAFFIC

Source: FDOT's Annual_Average_Daily_Traffic_TDA shapefile obtained from ArcGIS Online, February 2025.

2.7 Signalized Intersections

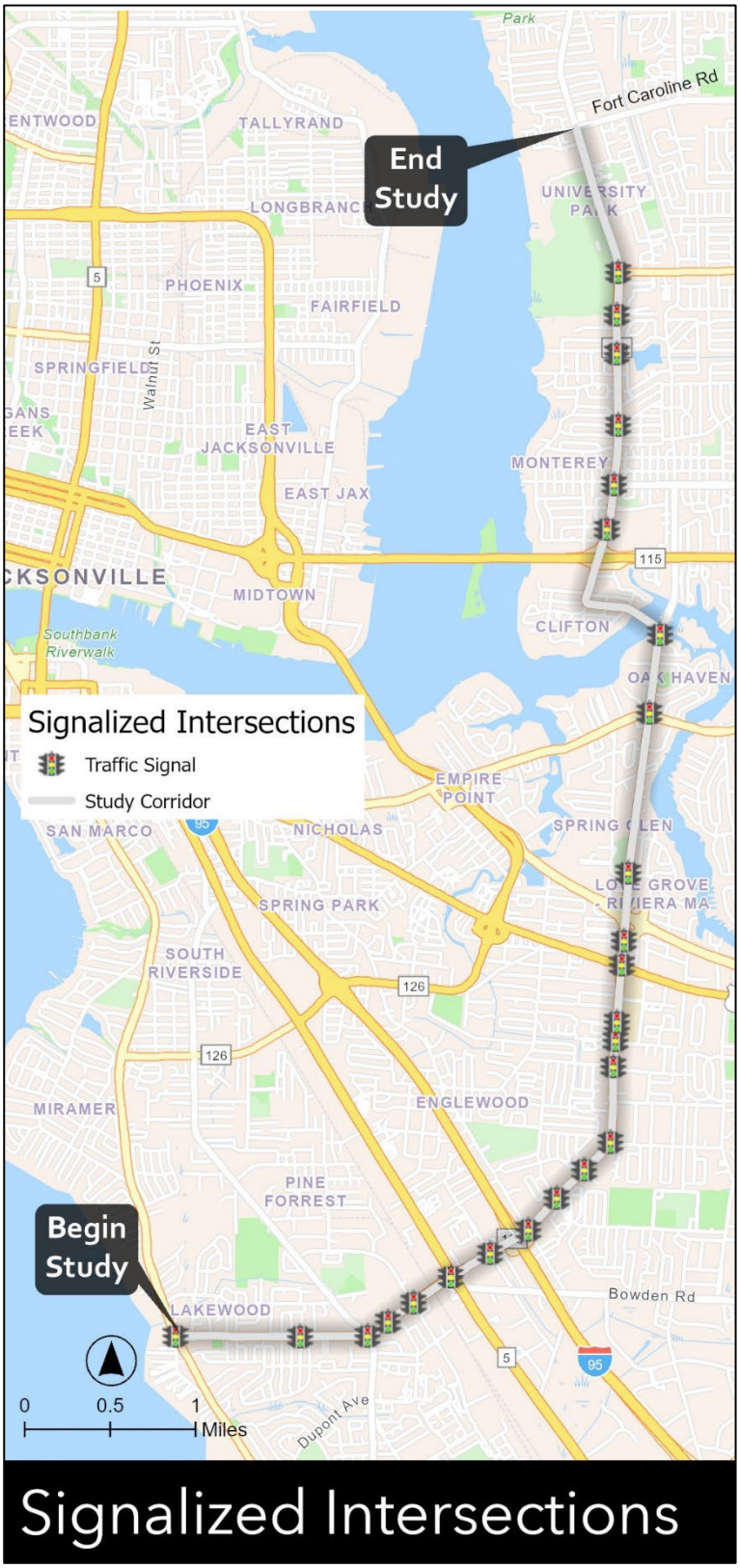
There are 25 signalized intersections along the study corridor, all of which have signalized crosswalks and curb ramps.

All 25 signalized intersections have at least one marked crosswalk across University Boulevard with more than half having four marked crosswalks.

Signalized intersections from south to north are as follows:

- San Jose Blvd.
- Suwanee Rd.
- St. Augustine Rd.
- Shopping Center
- Powers Ave.
- Phillips Hwy.
- Richard St.
- Spring Park Rd.
- Barnes Rd. S.
- Mt. Carmel Ter.
- Beney Rd./Terry Rd.
- Kennerly Rd.
- Harvin Rd.
- Booth Rd.
- Beach Blvd.
- Coronet Ln.
- Bartram Rd. S.
- Atlantic Blvd.
- Cesery Blvd./University Blvd. N.
- Los Santos Way
- Arlington Rd.
- Wiltshire St./Michigan Ave./Gable Ln.
- Burdette Rd.
- River Rd.
- Merrill Rd.

FIGURE 2-5 SIGNALIZED INTERSECTIONS



Source: FDOT's Traffic_Signal_Locations_TDA shapefile obtained from ArcGIS Online, February 2025.

2.8 Bike/Ped Facilities

There are consistent pedestrian facilities along the corridor, with sidewalks on both sides of the roadway in Study Segments 1, 2, 3, 4, and 6. Segment 5 has sidewalks on both sides of the roadway at the northern limit, but only on one side at the southern limit of the Segment.

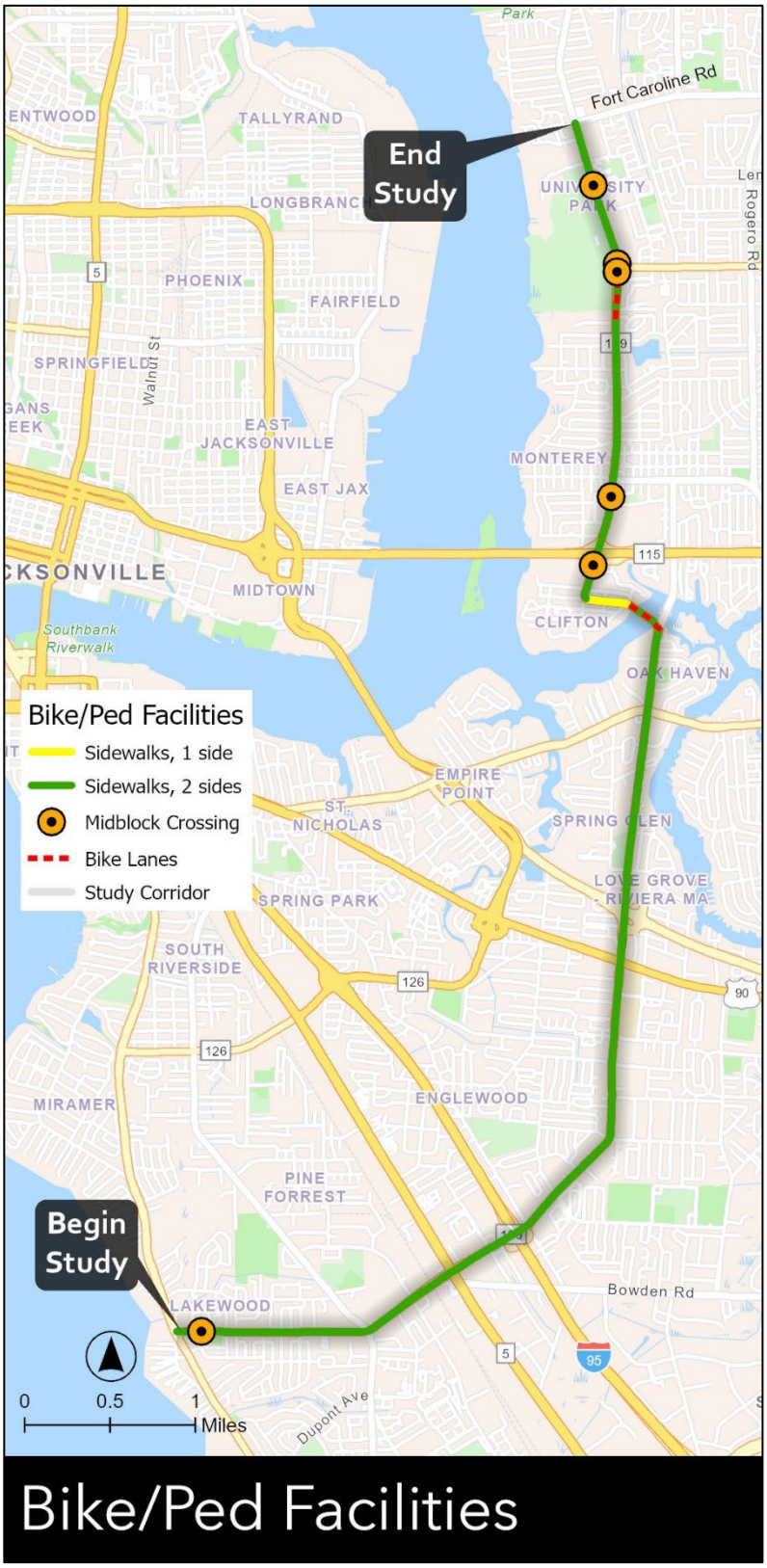
In addition, there are six midblock crossing locations along the corridor at the following locations:

- West of Auburn Road (near SR 13/San Jose Boulevard) -RRFB with overhead
- South of the Arlington Expressway – pavement striping
- Arlington Elementary School - static
- South of Merrill roundabout - RRFB
- North of Merrill roundabout -RRFB
- South of Alumni Drive - RRFB

There are limited bicycle facilities along the corridor. There are no dedicated off-road or protected bicycle facilities within any of the study segments. There are two small segments of bicycle lanes; one segment is along the Pottsburg Creek Bridge and a short segment south of the Merrill roundabout.

Bike lane south of Merrill roundabout. Source: Google Maps imagery, April 2024.

FIGURE 2-6 BIKE/PED FACILITIES



Source: Desktop review from the project team via Google Maps imagery, February 2025.

2.9 Transit Facilities

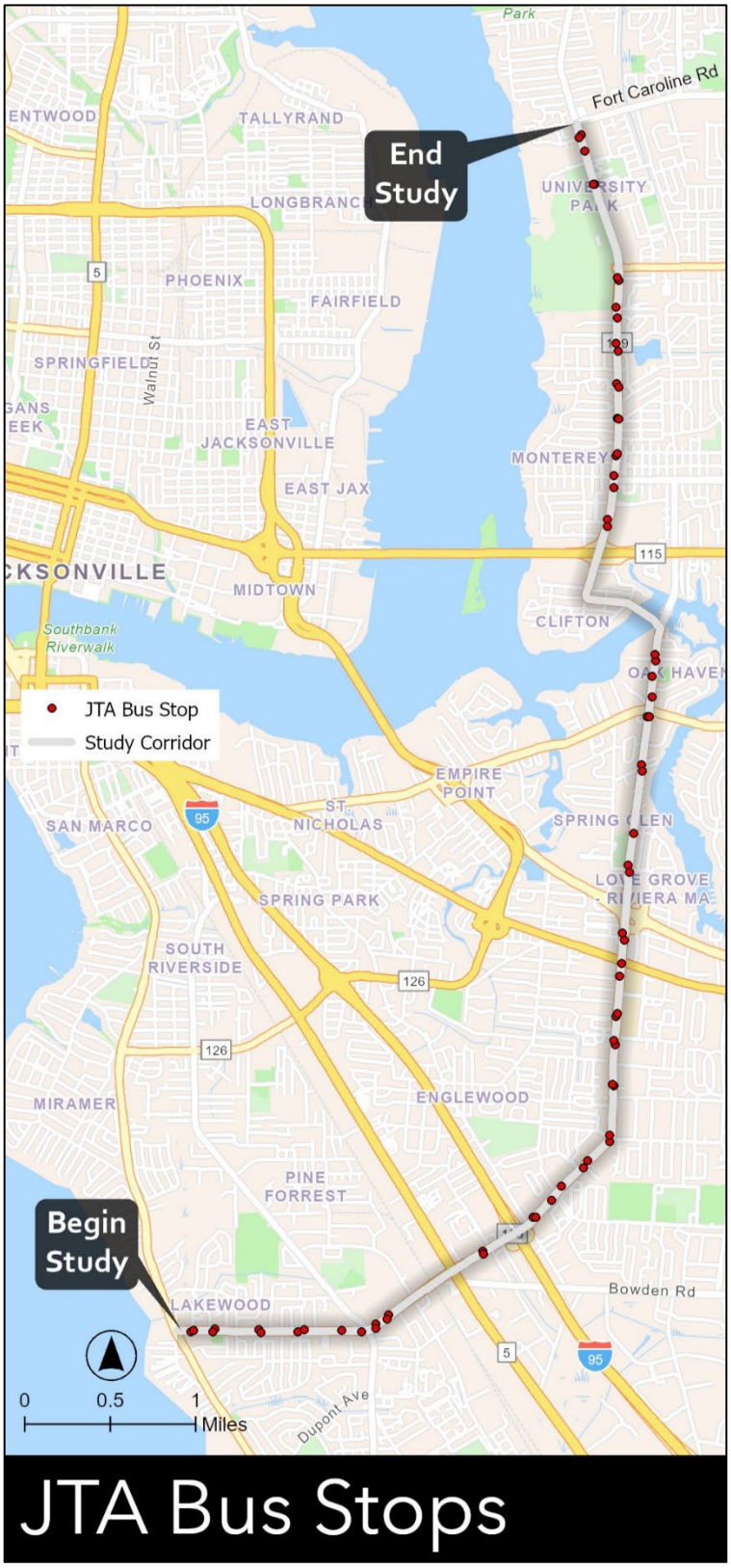
The Jacksonville Transportation Authority (JTA) provides transit service along University Boulevard, with 66 bus stops located along the corridor. These stops are served by multiple fixed-route bus routes, connecting University Boulevard to key destinations within Jacksonville.

The primary routes traveling along University Boulevard are:

- Route 50 (University)
- Route 25 (San Jose/University Hub)
- Route 19 (Arlington)

JTA bus stop on University Boulevard near Jacksonville University. Source: Project Team.

FIGURE 2-7 TRANSIT FACILITIES



Source: JTA ActiveStops_20231219 shapefile.

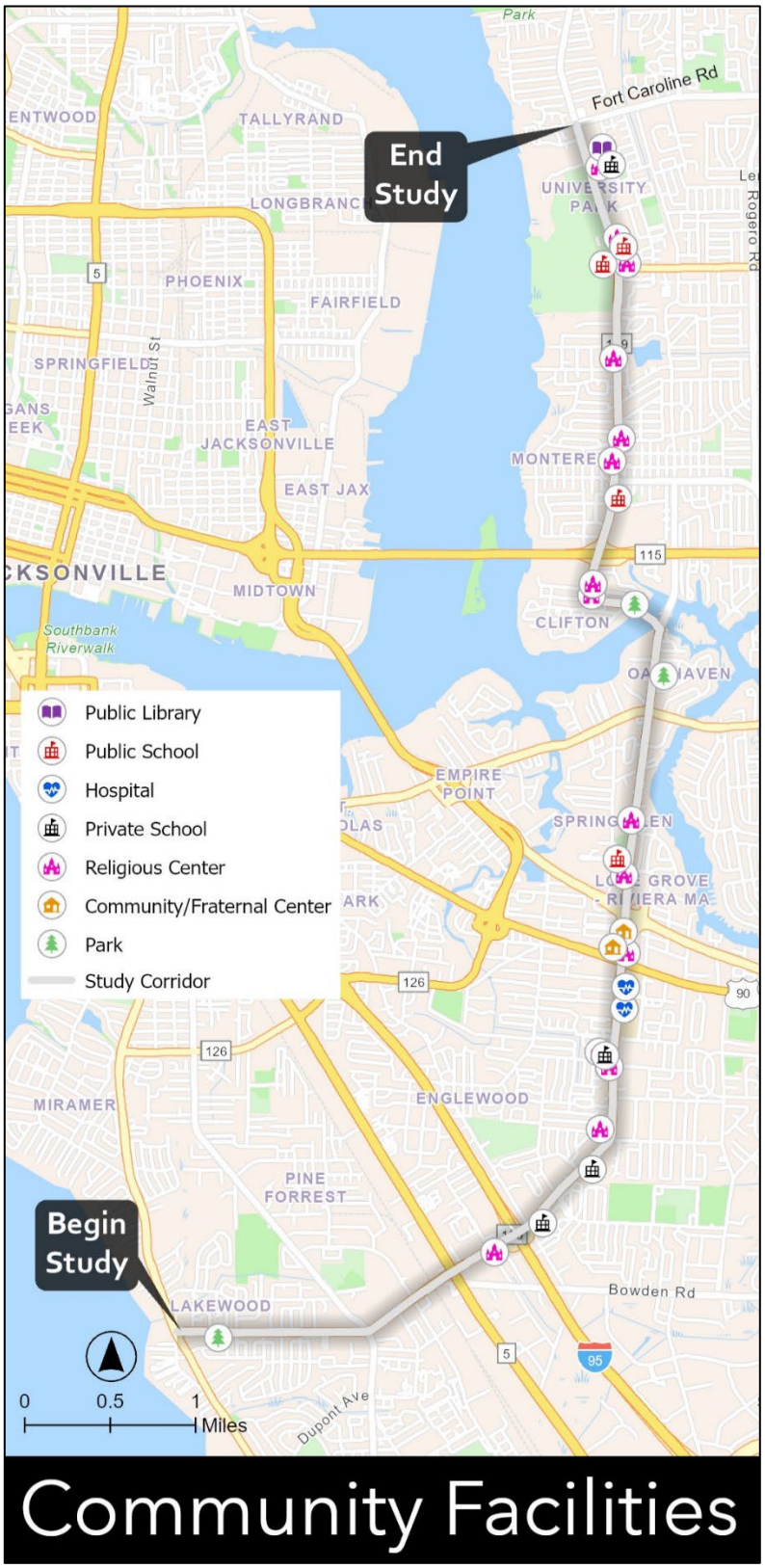
2.10 Community Features

University Boulevard serves various community facilities throughout the study corridor. These community facilities include libraries, public and private schools, hospitals, religious centers, community and fraternal centers, as well as parks and recreational facilities. **Figure 2-8** identifies the community facilities on the corridor.

Certain study segments have a higher concentration of community features, which can influence pedestrian activity and overall multimodal safety needs:

- Segment 6 has the highest concentration of community features, including a library, three public schools, one private school, and six religious centers.
- Segment 3 is notable due to the presence of two hospitals, which increase emergency vehicle traffic and accessibility needs, three private schools, and three religious centers.
- Segment 4 contains the most diversified collection of community facilities, including a public school, two community/fraternal centers, and a park.

FIGURE 2-8 COMMUNITY FEATURES



Source: Various community features shapefiles from FGDL's database, obtained in February 2025.

The full list of community facilities is described below and displayed in **Table 2-2**.

- **Public Libraries:** Along the corridor, there is one library located in Segment 6, serving as a key resource for nearby residents and students.
- **Public Schools**: There are four public schools located along the corridor, with one located in Segment 4 and three in Segment 6.
- **Private Schools**: There are four private schools along University Boulevard, concentrated in Segments 3 (3 schools) with one school in Segment 6.
- **Hospitals:** Hospitals and medical facilities generate significant traffic from patients, visitors, and staff. There are two hospitals along the corridor, both located in Segment 3.
- **Religious Centers:** Religious institutions serve as community gathering places. There are 16 religious centers distributed along the corridor, with the highest concentration in Segment 6 with six.
- **Community and Fraternal Centers:** Community and fraternal organizations support local engagement, hosting various activities and services. Two of these centers are located in Segment 4.
- **Parks and Recreation Facilities**: Parks and recreation spaces provide open areas for residents and visitors, encouraging outdoor activities. There are three parks and recreational facilities along the corridor, located in Segments 1, 4, and 5.

TABLE 2-2 COMMUNITY FACILITIES BY SEGMENT

Community Facility	Study Segment					
	1	2	3	4	5	6
Public Libraries	0	0	0	0	0	1
Public Schools	0	0	0	1	0	3
Hospitals	0	0	2	0	0	0
Private Schools	0	0	3	0	0	1
Religious Centers	1	1	3	3	2	6
Community/Fraternal Centers	0	0	0	2	0	0
Parks	1	0	0	1	1	0

2.11 Existing Land Use and Overlay Districts

Existing Land Use

The generalized land use along the corridor consists primarily of commercial land uses directly adjacent to University Boulevard, with some residential, institutional, and industrial scattered throughout.

The generalized land use is displayed in **Figure 2-9.**

Overlay Districts

The entirety of Segment 6 is located within the Renew Arlington Community Redevelopment Area (CRA) district. The CRA is working to implement the Renew Arlington CRA Redevelopment Plan, which was most recently updated in 2015.

Notably, the redevelopment plan includes the consolidation of commercial driveways along Segment 6, relocation of electrical services, and stormwater improvements.

When implementing transportation improvements or planning along Segment 6, coordination with the Renew Arlington CRA will be required to ensure consistency and compliance.

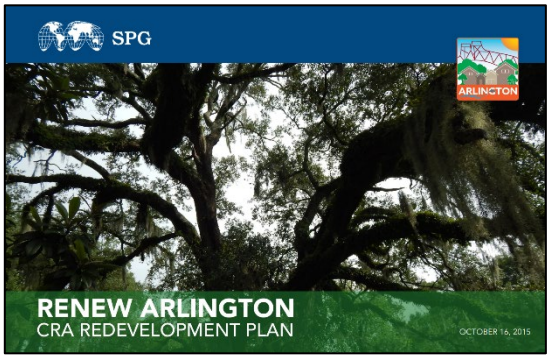
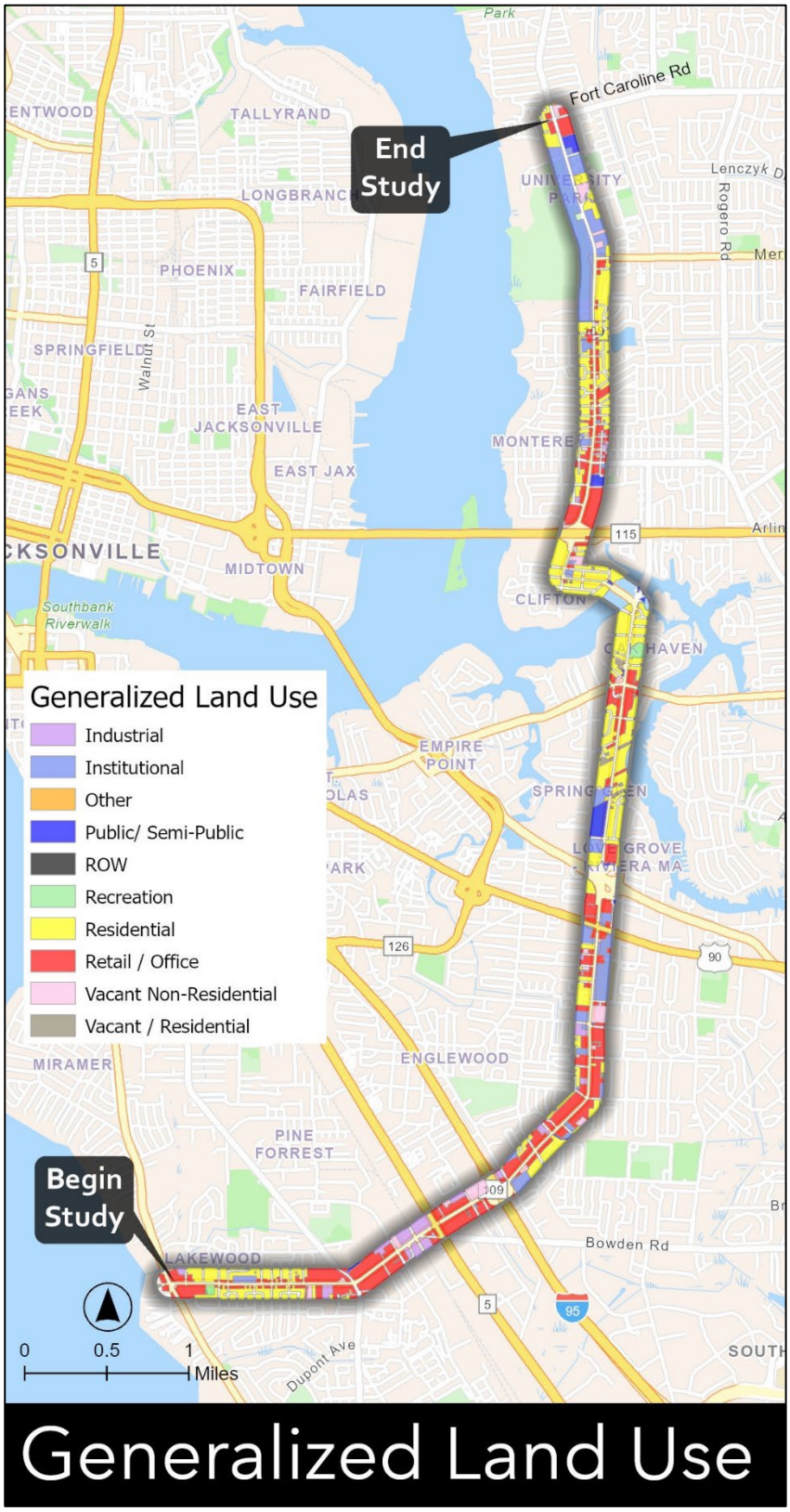


FIGURE 2-9 GENERALIZED LAND USE



Source: FGDL's lu_gen_2017 shapefile.

3.0 Data Collection

3.0 Data Collection

3.1 Field Review

A field review was conducted on March 12th, 2025 to assess the existing conditions of the project corridor. The field review was carried out by the project team and was aided by the presence of project stakeholders including Matt Fall – City of Jacksonville Bike and Pedestrian Coordinator and Thalia Fusté – North Florida Transportation Planning Organization (TPO) planner. During the field review, the field review group made stops within the boundaries of each study segment, evaluating traffic patterns, pedestrian movement, existing facilities, and discussing potential recommendations. Photos of existing facilities and potential hazards were collected at multiple locations along the project corridor.

Segment 1

Segment 1 begins at San Jose Boulevard and ends at US 1 (approximately 1.75 miles). This segment has two major intersections: St. Augustine Road and Powers Avenue. Starting at San Jose Boulevard, the project team walked east to St. Augustine Road, stopping frequently to assess pedestrian facilities and take photos. Segment 1 consisted of a four-lane roadway with sidewalks on both sides. A newly installed pedestrian crossing is located across from the Winn-Dixie near San Jose Boulevard, but the project team recorded multiple instances of pedestrians crossing the roadway further east not using the crosswalk, possibly to access Crabtree Park.

Pedestrian Crossing near San Jose Boulevard Source: Project Team

Segment 2

Segment 2 stretches from US 1 to Spring Park Road (approximately 0.51 miles). Sidewalks line both sides of this four-lane roadway and vehicle travel speeds are very high in this area. Much of Segment 2 was under construction during the field visit, making both walking and driving this Segment a precarious task.

Existing Construction on University Boulevard near Philips Highway Source: Project Team

Segment 3

Segment 3 stretches from Spring Park Road to Beach Boulevard (approximately 1.74 miles). The study team noted that vehicle speeds are high for the existing curve design. There is also evidence of multiple "band aid" solutions like chevron signs, a concrete barrier wall, and concrete bollards to protect the building that abuts the sharpest part of the curve prone to crashes.

High Conflict Curve Location North of Terry Road
Source: Project Team

Segment 4

Segment 4 begins at Beach Boulevard and ends at Cesery Boulevard (approximately 1.98 miles). This segment is characterized primarily by residential properties directly abutting the roadway. The project team noted the inconsistency of sidewalk quality along Segment 4 and the discontinuation of sidewalk leading up to the intersection of Cesery and University Boulevard. At this intersection there is an existing north/south crosswalk but lacks in an east/west crosswalk for pedestrians.

Sidewalk Ends south of Cesery/University Boulevard Intersection Source: Project Team

Segment 5

Segment 5 spans from Cesery Boulevard to Arlington Expressway (approximately 0.9 miles) and traverses through the small neighborhood of Clifton. The majority of this segment has a sidewalk on the north side of the roadway, and sidewalks on both sides of the roadway begin at the Sandra Road. There is potential for a pedestrian crossing around the Sandra Road curve but it would need to be strategically placed to ensure pedestrian safety and visibility for drivers.

Top Photo: at Sandra Road Curve, Bottom Photo: Tear Drop Roundabout at Colcord Avenue
Source: Project Team

Segment 6

Segment 6 is at the northern end of the project corridor and extends from Arlington Expressway to Fort Caroline Road (approximately 1.74 miles). This segment is characterized by high vehicle travel speeds, a four-lane roadway, and sidewalks on both sides of the roadway. The field review group observed multiple school bus stops within Segment 6, with many school-aged children living adjacent to the project corridor.

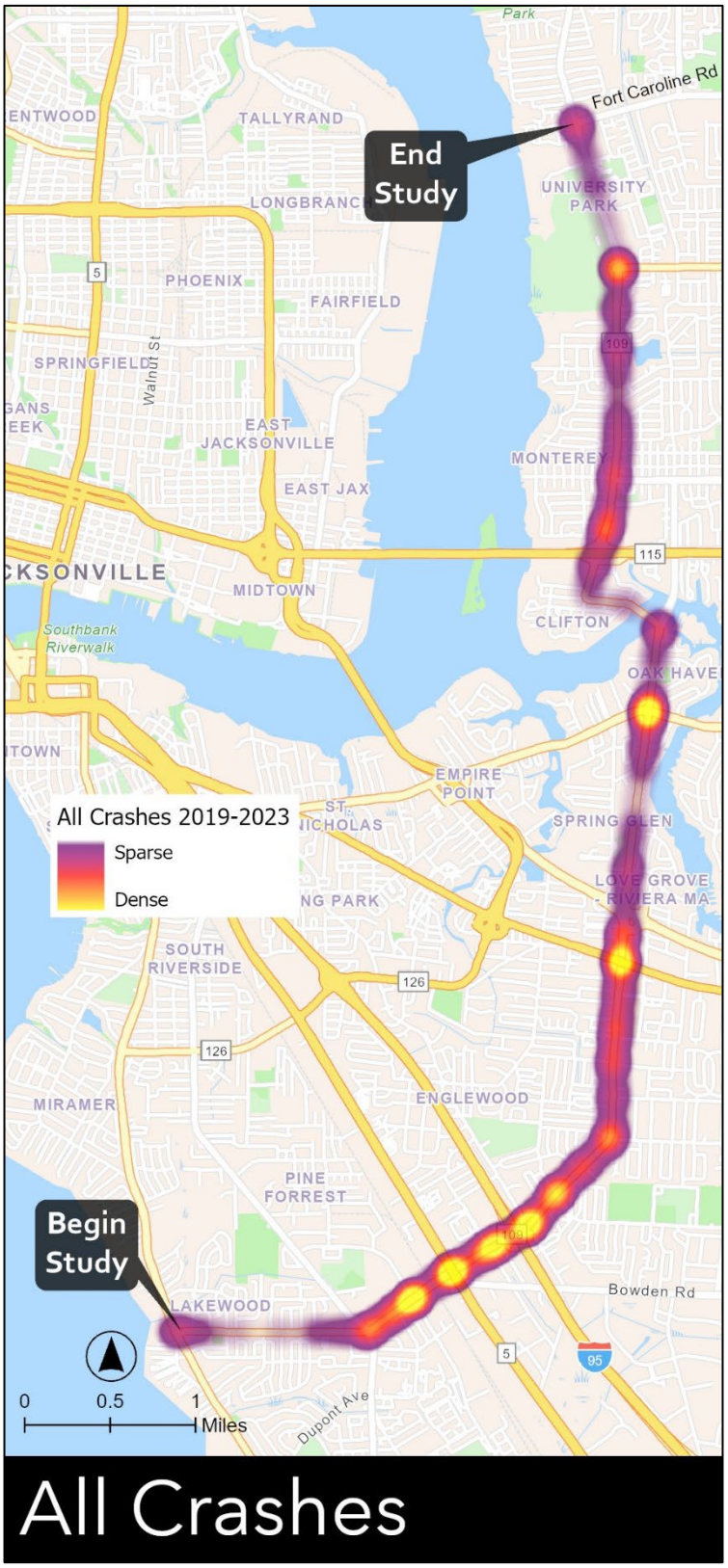
Top Photo: Roundabout at Merrill Road, Bottom Photo: Typical Section for Segment 6
Source: Project Team

3.2 Crash Analysis

A crash analysis was conducted using the Signal 4 Analytics[1] crash database for the most recent five-year period available (2019-2023). **Figure 3-1** displays a heat map of the crash locations along the corridor. A summary of the general crash trends is described below.

- There were **4,148** total crashes.
- Crashes are increasing every year, with **2023** being the highest year with **862 crashes**.
- 20 crashes resulted in a fatality, and 45 in serious injuries. 71% of crashes were property damage only (PDO).
- More than half of the fatal crashes involved a bicycle or pedestrian.
- Rear end is the most common crash type (39%).
- Crashes peak in **October**, and trend highest during winter months(January-March) and lowest through the summer months.
- Most occurred during clear weather conditions (79%), in the daylight (73%), on dry roads (86%).
- Nearly 40% of crashes were either at an intersection or were intersection-related.

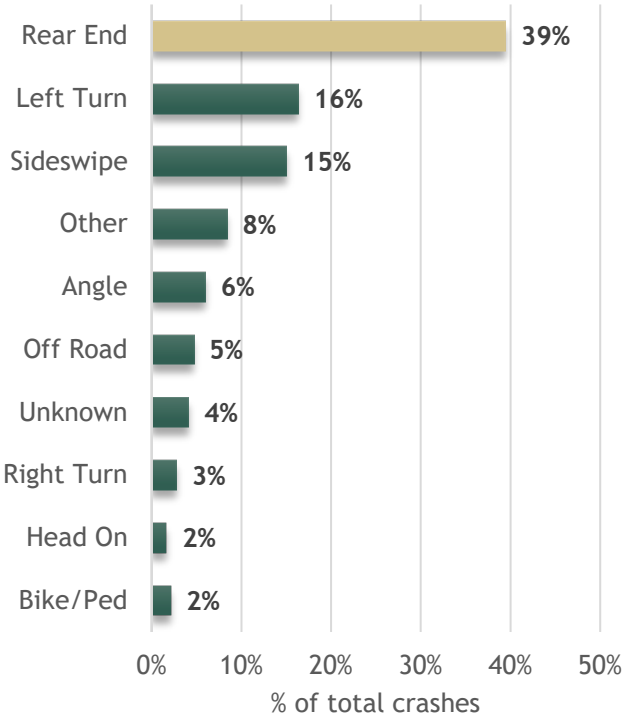
FIGURE 3-1 CRASH HEAT MAP



[1] *Signal Four Analytics* is an interactive, web-based system designed to support the crash mapping and analysis needs of law enforcement, traffic engineering, transportation planning agencies, and research institutions in the state of Florida.

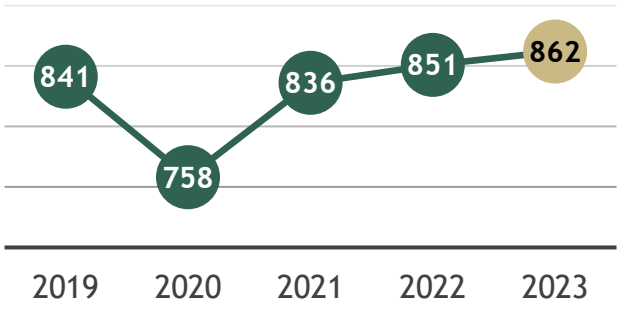
Crash Type

The most common crash types were Rear End (39%), Left Turn (16%), and Sideswipe (15%). Bicycle and pedestrian crashes accounted for approximately 2% of the crashes.



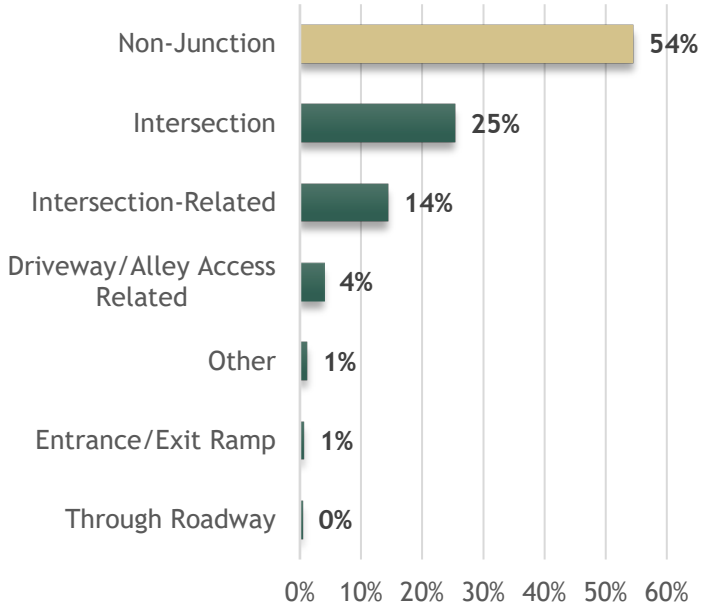
Crash Year

Crashes are trending up each year, with 2023 experiencing the highest number of crashes (21% of total crashes, 862 crashes). The year 2020 experienced the fewest number of crashes (758), which is interpreted to be influenced by COVID.



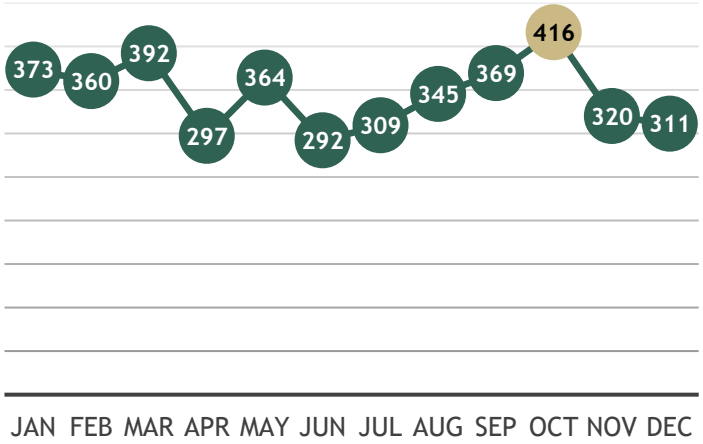
Junction Type

A majority of the crashes occurred at a Non-Junction locations (54%). Approximately 25% of the crashes occurred at an intersection, and an additional 14% were classified as Intersection-Related.



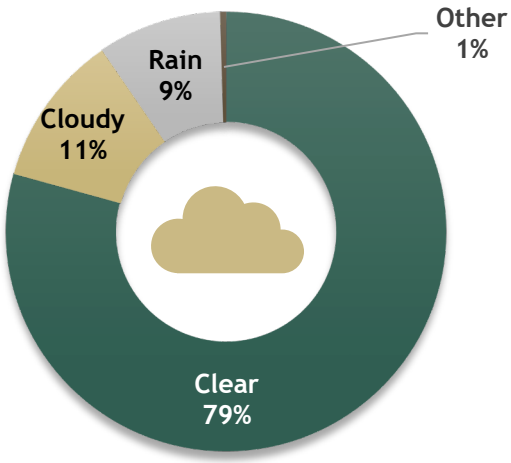
Crashes by Month

Crashes peak in October (416 total, 10%), and trend highest during winter months (January-March). Crashes trended lower through the summer months.



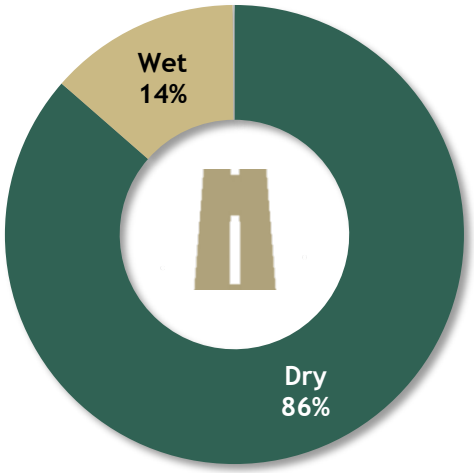
Weather Conditions

Most of the crashes (79%) occurred during clear weather conditions. The remaining crashes occurred during cloudy conditions (11%), rainy conditions (8%), or Other (1%).



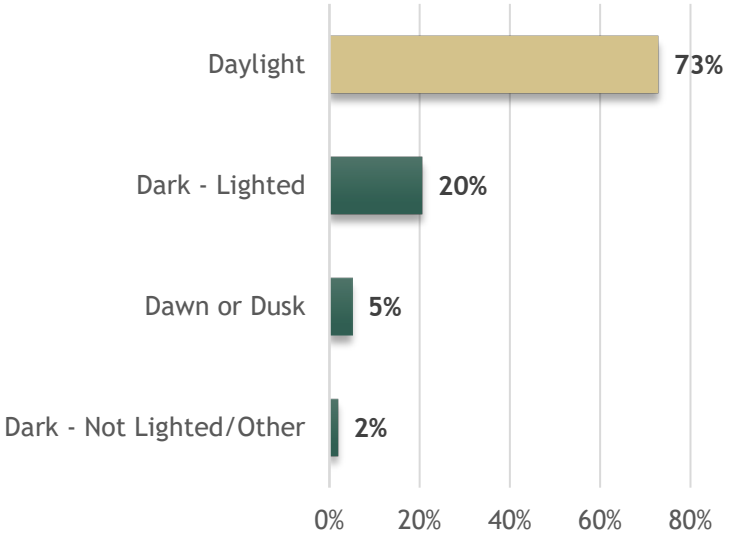
Roadway Conditions

A majority of the crashes occurred during Dry roadway conditions (86%). The remaining crashes occurred during Wet roadway conditions (14%).



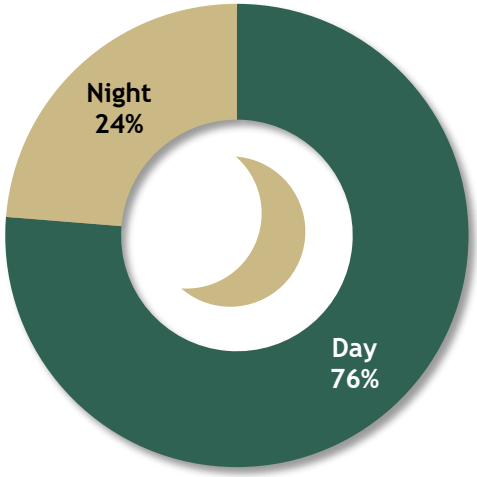
Light Conditions

A majority of the crashes occurred during Daylight conditions (73%). Approximately 20% of the crashes occurred during Dark – Lighted Conditions and 5% occurred at Dawn or Dusk. The remaining 2% of the crashes occurred during Dark – Not Lighted Conditions/Other.



Day vs. Night

Most of the crashes occurred during the Day (76%). The remaining 24% of the crashes occurred at Night.



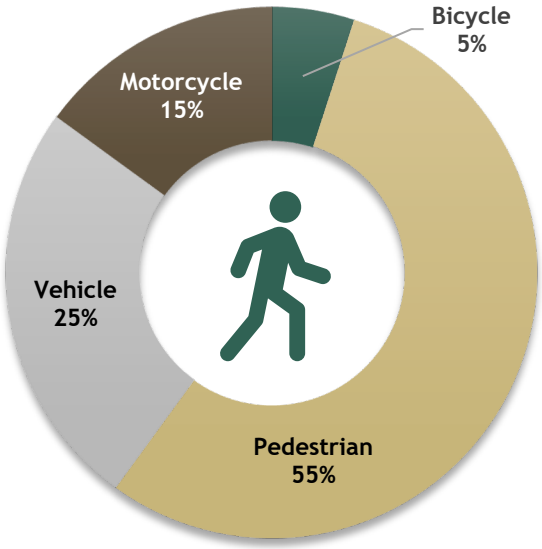
Crash Severity

There were 20 crashes along the project corridor that resulted in fatalities (less than 1% of total crashes), and 45 crashes that resulted in a serious injury (approximately 1%). The remaining crashes either resulted in an injury (27%), with a majority of the crashes resulting in property damage only (PDO).

Severity	# Crashes	Crash %
Fatality	20	<1%
Serious Injury	45	1%
Injury	1,127	27%
PDO	2,956	71%
Grand Total	**4,148**	100%

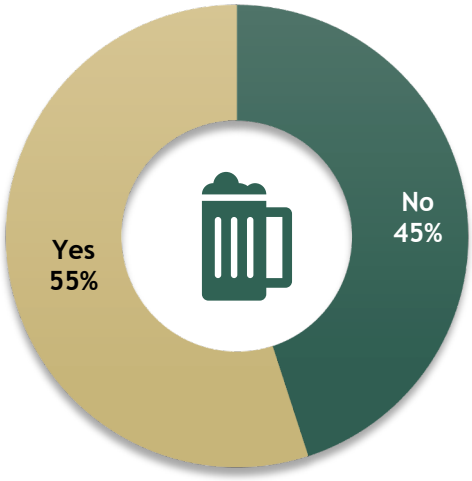
Fatal Crash Type

The most common fatal crash type was pedestrian, accounting for 55% of the fatal crashes. The remaining crashes were either Vehicle (25%), Motorcycle (15%), or Bicycle (5%).



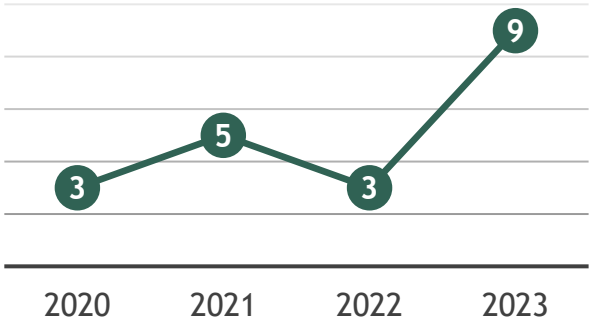
Fatal Crash: Drugs/Alcohol

More than half of the fatal crashes (55%) were influenced by drugs/alcohol. The remaining 45% of the crashes were not classified as being influenced by drugs/alcohol.



Fatal Crash Year

Fatal crashes tripled from 2022 to 2023, with 2023 experiencing 9 fatal crashes (45% of all fatal crashes within the five-year period). There were no fatal crashes along the corridor reported in 2019.

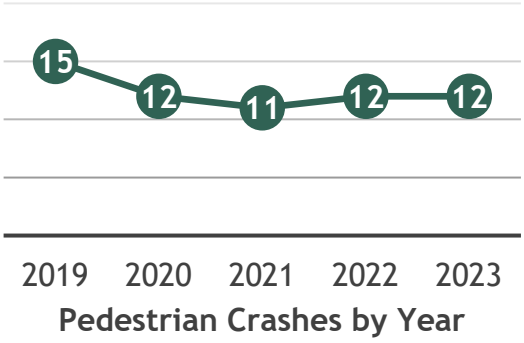


Bicycle and Pedestrian Crashes

There were 62 pedestrian crashes and 26 bicycle crashes along the project corridor within the five-year period. The locations of the crashes are displayed in **Figure 3-2** and further detailed below.

Pedestrian Crashes

The number of pedestrian crashes each year has remained relatively constant since 2020, with 11 to 12 crashes occurring the past four years. Of the 62 pedestrian crashes, 11 resulted in a fatality (18%) and 7 resulted in serious injury (11%).



Bicycle Crashes

Contrastingly, the number of bicycle crashes each year has been increasing, with a peak of 9 bicycle crashes in 2022 and 8 crashes in 2023. The years 2020 and 2021 experienced the fewest bicycle crashes, with 2 crashes each. Of the 26 bicycle crashes, one resulted in a fatality and 2 resulted in serious injury.

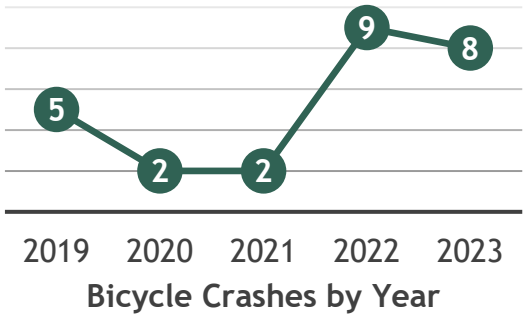
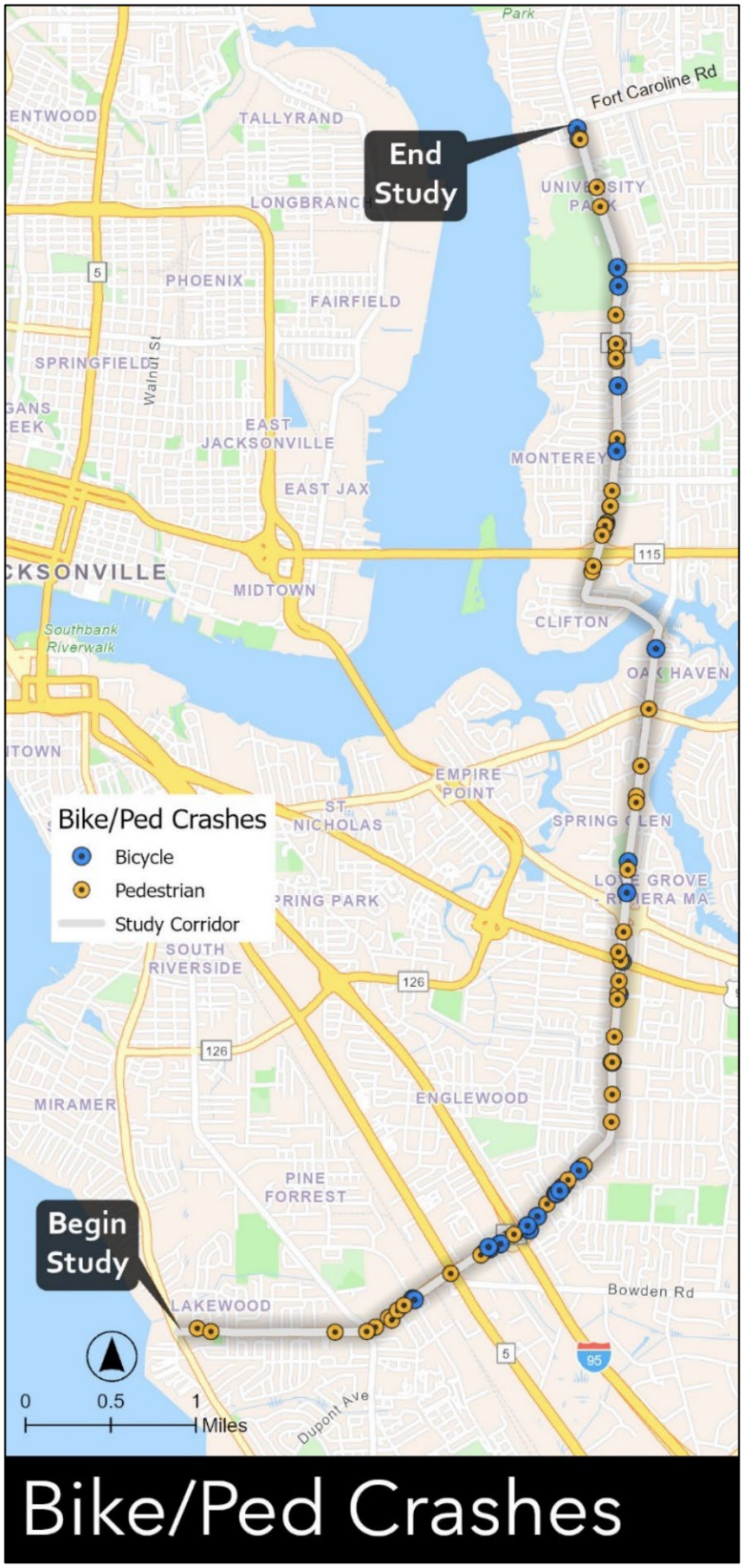


FIGURE 3-2 BIKE/PED CRASHES



4.0 Recommendations

4.0 Recommendations

With 55% of all fatal crashes along the project corridor being pedestrian crashes, the recommendations for safety improvements along University Boulevard are primarily focused around increasing safe travel for pedestrians and bicyclists. Some recommendations are related to roadway design and addressing vehicular safety, traffic flow, and roadway effects on pedestrian safety. Recommendations for this study were assessed at a project-wide level and grouped into four categories discussed in the following sections:

- **4.1 ADA and Connectivity**
- **4.2 Signs, Signals, and Pavement Marking**
- **4.3 Pedestrian Safety**
- **4.4 Roadway Design**

A table summarizing all of the recommendations is provided in **Section 4.5.** Data and statistics included in this section were derived from the US Department of Transportation Federal Highway Administration. Costs are planning level estimates based on the Florida Department of Transportation's 2024/25 Historical Item Average Cost Report. Plan sheets are provided in **Section 4.6 (Sheets 1-34)** and visually display proposed recommendations.

There has also been an expressed interest in the opportunity for road diet and further evaluation of operations in a portion of Segment 6 from Merrill Road to Fort Caroline Road. This improvement was not included in this study's scope of recommendations but should be highlighted as an opportunity area in future safety and roadway planning efforts.

4.1 ADA and Connectivity

ADA and Connectivity recommendations refer to potential projects that would decrease the number of gaps in the sidewalk network along the project corridor, improving access for individuals with disabilities and increasing ADA (Americans with Disabilities Act) compliance.

Detectable Warning Pads near Regency Mall Source: www.roadwayconcepts.com

Remove Trees and Other Obstructions

Location(s): Between Harris Avenue and Arlington Road

Description: Removing obstacles in the pedestrian walkway is necessary for sidewalk connectivity, ADA accessibility, and overall pedestrian safety. Obstacles or landscaping placed on the inside of the sidewalk also force pedestrians to navigate closer to the roadway, thus decreasing the feeling of safety while walking.

Effectiveness: The removal of obstacles and landscaping will increase accessibility and safety along the roadway. The ADA requires a minimum of 36" of travel space uninhibited by obstacles to meet compliance standards. By removing obstacles, pedestrians of varying abilities will be able to traverse the sidewalk safely and efficiently.

Timeframe: Short-Term

Cost: $1,000 - $5,000

Street tree obstructions at Arlington Elementary School Source: Project Team

Extend Sidewalks

Location(s): East side of University Boulevard at Cesery Boulevard from north of Wateredge Lane to traffic signal

Description: A connected network of sidewalks and paths for pedestrian travel increases accessibility for non-motorized travel modes. Having safe and accessible paths for pedestrians can also encourage mobility and better future health outcomes.

Effectiveness: Extending sidewalks is an effective way to provide pedestrians with a safe route to travel while keeping them separated or maintaining separation from the roadway.

Timeframe: Mid-Term

Cost: $700 per 10 LF (one side)

Sidewalk extension at Cesery Boulevard
Source: Project Team

Add Tactile Pads

Location(s):

- Spring Park Road
- Between Harris Avenue and Arlington Road
- University Boulevard and Arlington Road
- Arlington Elementary School Mid-Block Crossing

Description: Detectable warning pads, or tactile pads, are required at roadway crossings with slopes into the street. They should have visual contrast with the adjacent walking surfaces and should be placed at the low part of the ramp.

Effectiveness: Detectable warning pads are vital for visually impaired individuals, as they help locate potentially dangerous roadway crossings. Implementing tactile pads creates safety and consistency in travel for the visually impaired.

Timeframe: Short-Term

Cost: $50 - $100 per pad

Existing Tactile Pad at St. Augustine Road near Auburn Road Source: Project Team

Widen Sidewalks

Location(s): Spring Park Road to Barnes Road

Description: For compliance with ADA accessibility standards City of Jacksonville Design Guidelines, sidewalks must have a minimum width of 5 feet when right-of-way constraints are present, but ideally, City of Jacksonville Design Guidelines recommend 6-foot sidewalks at minimum.

Effectiveness: Wider sidewalks increase pedestrians' actual and perceived safety as it allows for space away from the roadway. Wider sidewalks are also more accessible for disabled persons, giving more space to turn and travel.

Timeframe: Mid-Term

Cost: $700 per 10 LF (one side)

Sidewalk recommended for widening adjacent to University Christian
Source: Project Team

4.2 Signs, Signals, and Pavement Marking

Signs, Signals, and Pavement Marking recommendations consist of improvements involving the addition or modification of roadway communication features. Visibility, consistency, and clarity are vital to good roadway design and safe travel for all roadway users.


Left: Typical Crosswalk Middle: No Right Turn on red signal Right: High-Emphasis Crosswalk
Source: www.pedbikeimages.org

Leading Pedestrian Interval

Location(s):

- Beach Boulevard
- Atlantic Boulevard

Description: Leading Pedestrian Interval (LPI) signals are installed at intersection crosswalks for pedestrian use to increase the visibility of crossing pedestrians and reduce the risk of conflicts between vehicles and pedestrians.

Effectiveness: LPIs are highly effective in increasing the visibility of pedestrians within the crosswalks, especially for turning vehicles. LPIs can reduce pedestrian crashes by up to 35%, according to the FHWA. Pedestrian signals can also improve pedestrian confidence by providing clear information to pedestrians.

Timeframe: Mid-Term

Cost: $1,000

Pedestrian walk signal Source:
www.pedbikeimages.org

Add Pedestrian Warning Signs

Location(s):

- I-95 Interchange
- Hart/Commodore Expressway
- Arlington Elementary School

Description: Pedestrian warning signs can be static or dynamic in the case of Rectangular Rapid Flashing Beacons (RRFBs). Static pedestrian warning signs to not have flashing lights but are still effective in improving safety for pedestrians crossing the road. RRFBs increase driver awareness at uncontrolled marked crosswalks and help drivers visibly locate crossing locations in order to adequately yield.

Effectiveness: RRFBs can reduce pedestrian crashes up to 47% and increase motorist yielding rates up to 98% (depending on speed limit, number of lanes, crossing distance, and time of day). They are most effective at multi-lane crossings where speed limits are less than 40 mph.

Timeframe: Mid-Term

Cost: $1,800 for static signs, $16,000 for RRFBs

Pedestrian Warning signs Source: Project Team

Add "Left Lane Must Turn Left" Sign

Location(s): Railroad overpass west of US-1

Description: A sign indicating that the left lane must turn left can assist in accident prevention and improved traffic flow.

Effectiveness: A "Left Lane Must Turn Left" traffic sign alerts drivers ahead of time that they must stay in their lane. Dedicated turn lanes can provide storage for vehicles that are stopped and waiting to turn, thus decreasing traffic back up at intersections. Left-Turn Lanes have been shown to reduce total crashes by 28-48%.

Timeframe: Short-Term

Cost: $200 (sign plus install)

Left Lane Must Turn Left Sign Source: www.mikeontraffic.com

Repaint/Restripe

Location(s):

- Powers Avenue
- Railroad overpass west of US-1
- Philips Highway
- Richard Street
- I-95 Interchange
- Barnes Road
- Arlington Elementary School

Description: High visibility crosswalks use pavement marking patterns that are visible to both pedestrians and motorists from farther away compared to traditional transverse line crosswalks.

Effectiveness: High-visibility crosswalks can reduce pedestrian injury crashes up to 40%. High-visibility crosswalks should be considered at midblock crossings as well as uncontrolled intersections. At typical controlled intersections, crosswalk striping can help pedestrians and motorists identify the crosswalk in dark and low-visibility conditions.

Timeframe: Mid-Term

Cost: $1,800 for standard crosswalk with ADA pads, $5,600 for high-emphasis four-way intersection

High Emphasis Crosswalk Source: www.pedbikeimages.org

Modify Traffic Signal to Accommodate Pedestrian Crossing

- **Location(s):** Cesery Boulevard

Description: Currently there is no crosswalk or pedestrian signal at the intersection of University Boulevard and Cesery Boulevard. A high visibility crosswalk in conjunction with the installation of a pedestrian signal is recommended to allow for pedestrians to safely cross University Boulevard at this location.

Effectiveness: Crosswalks can reduce pedestrian injury crashes by up to 40%. At typical controlled intersections, crosswalk striping can help pedestrians and motorists identify the crosswalk in dark and low-visibility conditions.

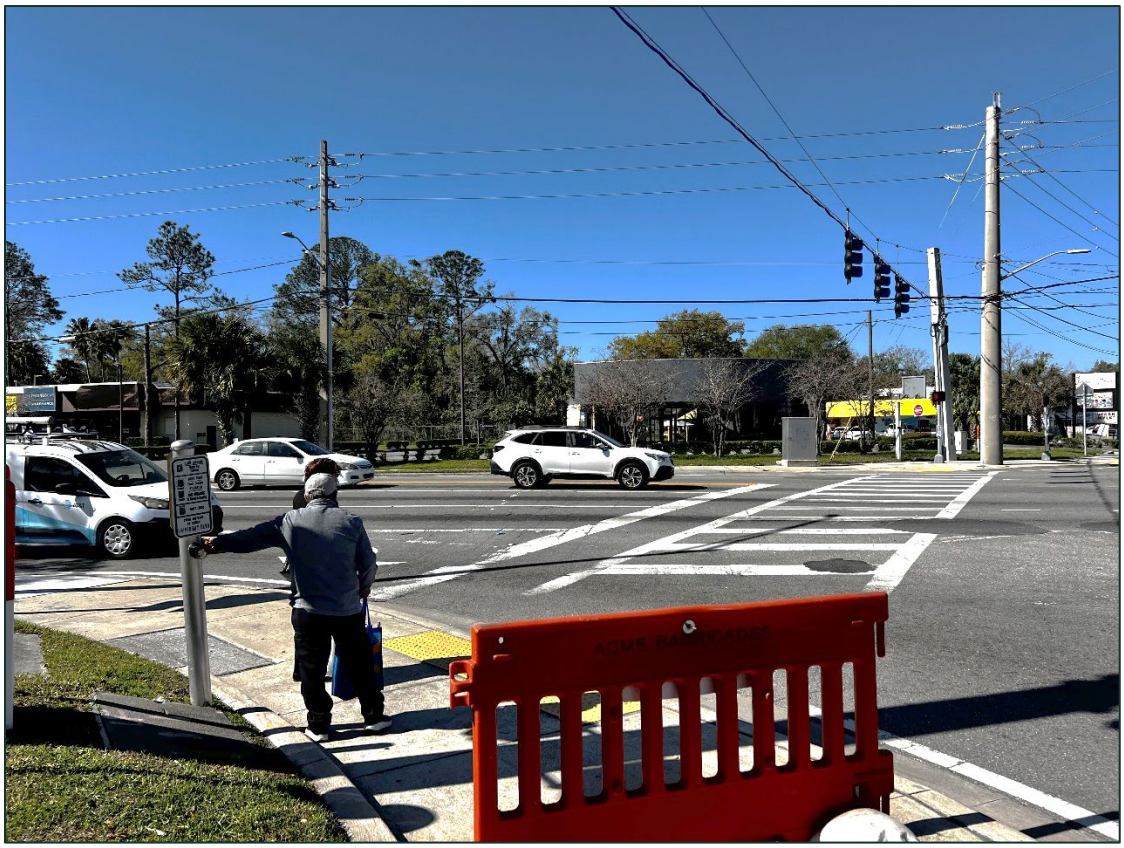
Timeframe: Short-Term

Cost: $75,000

Pedestrians walk signal button and crosswalk at Coronet Lane. Source: Project Team

4.3 Pedestrian Safety

Pedestrian safety recommendations refer to roadway enhancements specifically geared towards safer pedestrian access and mobility.



Pedestrians waiting to cross St. Augustine Road Source: Project Team

Crosswalks

Location(s):

- Richard Street
- Harvin Road
- Coronet Lane
- Hart/Commodore Point Expressway
- University Boulevard at Cesery Boulevard
- Arlington Road
- Michigan Avenue
- Burdette Road
- JU South Entrance
- River Road

Description:

High visibility crosswalks use pavement marking patterns that are visible to both pedestrians and motorists from farther away compared to traditional transverse line crosswalks.

Existing Crosswalk at Fort Caroline Road Source: Project Team

Effectiveness: High-visibility crosswalks can reduce pedestrian injury crashes up to 40%. High-visibility crosswalks should be considered at midblock crossings as well as uncontrolled intersections. At typical controlled intersections, crosswalk striping can help pedestrians and motorists identify the crosswalk in dark and low-visibility conditions.

Timeframe: Mid-Term

Cost: $1,800 for standard crosswalk with ADA pads, $5,600 for high-emphasis four-way intersection

Midblock Crossings

Location(s):

- Lakewood Presbyterian Church
- Publix Shopping Center west of St. Augustine Road
- North of Floral Avenue
- Between Oliver Street and North Dickson Road

Description: Midblock crossings are at non-intersection locations, often used in the space between intersections when they are far apart. Midblock crossings can shorten the distance pedestrians need to travel to safely cross a roadway.

Effectiveness: In 2019, over 80% of pedestrian fatalities occurred at unmarked midblock locations. Enhancing safety at midblock crossings through lighting, signage (RRFBs), and striping can help reduce crashes by 23-48%.

Timeframe: Long-Term

Cost: $175,000

Mid-Block Crosswalk at Arlington Elementary School
Source: Project Team

4.4 Roadway Design

Roadway design recommendations refer to potential projects that would modify the roadway to encourage safer vehicular and multi-modal travel.

Narrow Lanes

Location(s): Spring Park Road to Barnes Road

Description: Narrow traffic lanes are travel lanes with a smaller width than traditional travel lanes (> 12 ft). Narrowing lanes can be an effective tool to slow traffic speeds and give more space to pedestrian facilities.

Effectiveness: Narrow lanes can lower vehicle speeds and reduce pedestrian conflicts. Drivers are traveling at slower speeds meaning that their attention toward pedestrians is heightened.

Timeframe: Long-Term

Cost: $30,000 - $60,000 per mile for restripe only, $5 million + per mile for road diet

Road Diet Source: www.pedbikeimages.org

Construct Medians

Location(s):

- Between Barnes Road and Terry Road
- East of Terry Road
- East of Bennett Road
- North of Commerce Street in front of Love Grove Elementary
- Between Kellow Drive and River Hills Drive
- Between Allen Place and Robbins Circle North
- Arlington Elementary School
- Between Macy Avenue and Windermere Drive
- Between Oliver Street and North Dickson Road
- Lake Lucina Drive/Burdette Road
- JU South entrance (extend median)

Description: A median is the area between opposing lanes of traffic. They can be open medians with pavement markings only or channelized using raised medians or islands. Medians are used to separate various road users.

Effectiveness: Medians are ideal for multi-lane roadways as they encourage pedestrians to focus on one flow of traffic at a time with a place for rest and refuge in between. Medians can reduce motor vehicle crashes by 15%, reduce vehicle speeds on the roadway, provide space for landscaping, increase roadway capacity by >30%, and decrease delays for motorists by >30%.

Timeframe: Long-Term

Cost: $600,000 - $1 million per mile

Traffic Separators on Dunn Avenue Source: Project Team

Construct Traffic Separators

Location(s): Groove Avenue/Sandra Road

Description: Traffic separators can be physical or visual demarcations on roadways.

Effectiveness: Traffic separators significantly enhance roadway safety and traffic flow by clearly delimitating lanes and restricting lane changes. They also reduce the risk of accidents and improve visual clarity.

Timeframe: Short-Term

Cost: $600,000 per mile

Reconstruct Curb/Adjust Access Management

Location(s):

- Curve East of Terry Road
- Arlington Elementary School
- Safeco

Description: Curb extensions can be used to narrow the street width and improve sight distance between the driver and pedestrian. Curb adjustments can also help slow the speed of turning vehicles. Access spacing such as driveway spacing can help separate motor vehicle and pedestrian conflicts.

Effectiveness: Curbs and access management can reduce the number of conflict points between pedestrians and vehicles.

Timeframe: Mid-Term

Cost: $5,000 - $20,000

Potential Access Management location at Safeco Source: Google Street View

Lane Elimination

Location(s):

- San Jose Boulevard to St. Augustine Road

Description: Lane elimination consists in the reduction in number of travel lanes on a roadway and reconfiguring the existing road cross-section to allow other users and travel modes. Eliminating a travel lane can also free up space for additional bicycle and pedestrian facilities.

Effectiveness: Lane eliminations can help slow travel speeds and add more space to bicycle and pedestrian facilities, making the roadway safer for all users.

Timeframe: Mid-Term

Cost: $30,000 - $60,000 per mile for restripe only, $5 million + per mile for road diet

Lane Elimination completed on Edgewood Avenue in 2024 Source: Project Team

4.5 Recommendation Table

TABLE 4-1 RECOMMENDATION SUMMARY TABLE

Remediation Type	Proposed Remediation	Location	Safety Benefits	Cost
ADA and Connectivity	Remove trees/obstructions	• Between Harris Avenue and Arlington Road	ADA compliance, free flow pedestrian movement, increase space on sidewalk for multiple modes of travel	$1,000 - $5,000
	Extend sidewalks	• East side of University Boulevard at Cesery Boulevard from north of Wateredge Lane to traffic signal	increase connectivity, safe pedestrian mobility	$700 per 10 LF (one side)
	Add tactile pads	• Spring Park Road • Between Harris Avenue and Arlington Road • University Boulevard and Arlington Road	compliance with ADA standards, improves walkability and safety for low-vision/blind individuals	$50 - $100 per pad
	Widen sidewalks	• Spring Park Road to Barnes Road	compliance with ADA standards, increases accessibility for multiple modes of transportation, increases feeling of safety, can help pedestrians feel separated from roadway	$700 per 10 LF (one side)
Signs, Signals, and Pavement Markings	Leading Pedestrian Interval (LPI	• Beach Boulevard • Atlantic Boulevard	increase pedestrian visibility to turning cars, LPI gives pedestrians 3-7 second head start, enhances pedestrian safety	$1,000 (one way)

Remediation Type	Proposed Remediation	Location	Safety Benefits	Cost
Signs, Signals, and Pavement Markings	Add pedestrian warning signs	• I95 interchange • Hart/Commodore Expressway • Arlington Elementary School (RRFB)	reduce pedestrian crashes, increase driver yield rate, most effective at multi-lane crossings	$1,800 for static signs, $16,000 for RRFBs
	"Left Turn Must Turn Left" (auxiliary turn lane) sign	• Railroad overpass west of Philips Highway	increases driver awareness of upcoming turn, enforces traffic procedure	$200 (sign plus install)
	Repaint/Restripe	• Powers Avenue and University Boulevard • Railroad overpass west of Philips Highway • Philips Highway and University Boulevard • Richard Street • I95 interchange • Barnes Road • Arlington Elementary School	lead pedestrians to a safe crossing area, alert drivers of approaching pedestrian crossing, reflective paint is visible in dark and wet conditions	$1,800 for standard crosswalk with ADA pads, $5,600 for high-emphasis four-way intersection
	Modify traffic signal to accommodate pedestrian crossing	• University Boulevard at Cesery Boulevard	reduce pedestrian injury crashes, helps with crosswalk identification for pedestrians and vehicles	$75,000

Remediation Type	Proposed Remediation	Location	Safety Benefits	Cost
Pedestrian Safety	Crosswalks	• Richard Street • Harvin Road • Coronet Lane • Hard/Commodore Point Expressway • University Boulevard at Cesery Boulevard • University Boulevard and Arlington Road • University Boulevard and Michigan Avenue • Burdette Road • JU South entrance (all approaches)	reduce pedestrian injury crashes, helps with crosswalk identification for pedestrians and vehicles	$1,800 for standard crosswalk with ADA pads, $5,600 for high-emphasis four-way intersection
	Midblock Crossing	• Lakewood Presbyterian Church • Publix Shopping Center west of St. Augustine Road • North of Floral Avenue • Between Oliver Street and North Dickson Road	increases pedestrian mobility, when paired with RRFBs - increases crossing visibility	$175,000
Roadway Design	Narrow Lanes	• Spring Park Road to Barnes Road	slows traffic speeds and increases driver awareness	$30,000 - $60,000 per mile for restripe only, $5 million + per mile for road diet

Remediation Type	Proposed Remediation	Location	Safety Benefits	Cost
Roadway Design	Construct medians/traffic separators	• Between Barnes Road and Terry Road • East of Terry Road, East of Bennett Road • North of Commerce Street in front of Love Grove Elementary School • Between Kellow Drive and River Hills Drive • Between Allen Place and Robbins Circle North • Arlington Elementary School • Between Macy Avenue and Windermere Drive • Between Oliver Street and North Dickson Road • Lake Lucina Drive/Burdette Road • JU South entrance (extend median)	reduces likelihood of head-on collisions and minimizes severity of accidents, reduce conflicts, can be used to designate turn lanes, offer refuge for pedestrians crossing	$600,000 - $1 million per mile
	Reconstruct Curb/adjust access management	• Curve east of Terry Road • Arlington Elementary School • Safeco	clearly separates road from sidewalk, can potentially slow traffic speeds	$5,000 - $20,000
	Reconstruct traffic separator	• University Boulevard/Groove Avenue/Sandra Road	manage lanes, reduce risks of conflict, improve visual clarity, enhance vehicle flow	$15,000

Remediation Type	Proposed Remediation	Location	Safety Benefits	Cost
Roadway Design	Lane elimination	• San Jose Blvd and St. Augustine Road	slow travel speeds, add more space for bicycle and pedestrian facilities	$30,000 - $60,000 per mile for restripe only, $5 million + per mile for road diet

4.6 Proposed Improvement Sheets

FIGURE 4-1 PROPOSED IMPROVEMENTS SHEET 1

FIGURE 4-2 PROPOSED IMPROVEMENTS SHEET 2

FIGURE 4-3 PROPOSED IMPROVEMENTS SHEET 3

FIGURE 4-4 PROPOSED IMPROVEMENTS SHEET 4

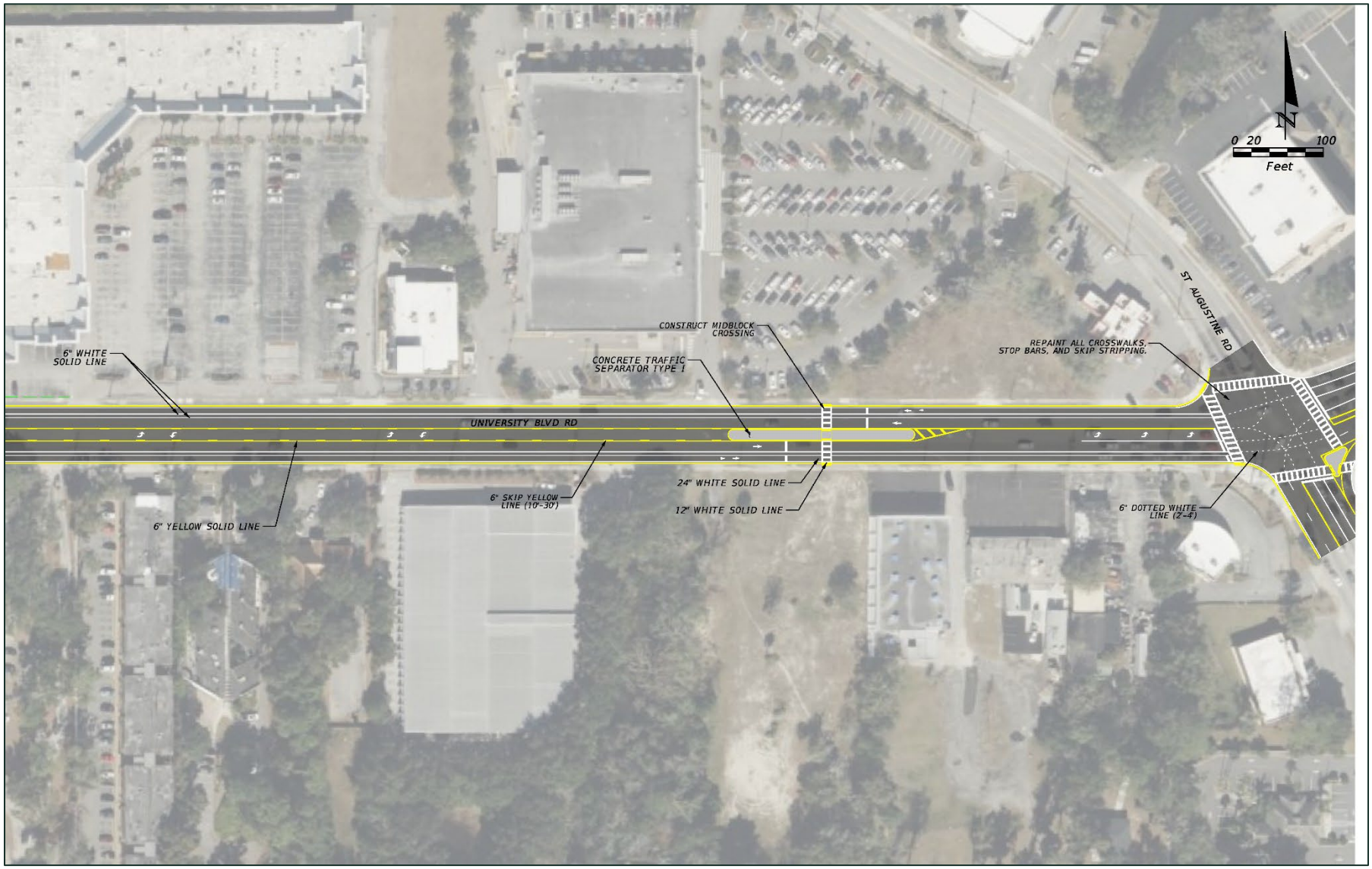


FIGURE 4-5 PROPOSED IMPROVEMENTS SHEET 5

FIGURE 4-6 PROPOSED IMPROVEMENTS SHEET 6

FIGURE 4-7 PROPOSED IMPROVEMENTS SHEET 7

FIGURE 4-8 PROPOSED IMPROVEMENTS SHEET 8

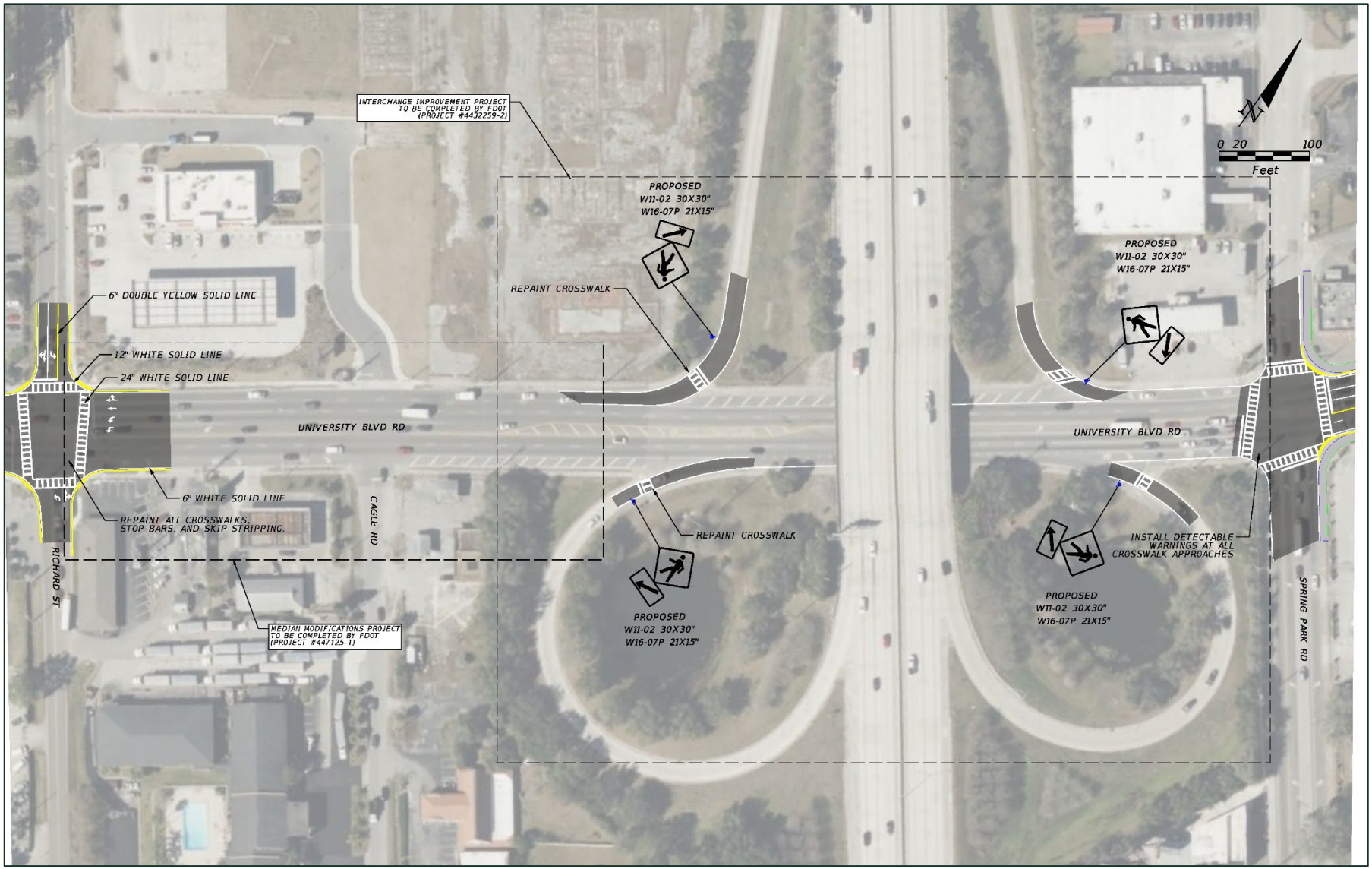


FIGURE 4-9 PROPOSED IMPROVEMENTS SHEET 9

FIGURE 4-10 PROPOSED IMPROVEMENTS SHEET 10

FIGURE 4-11 PROPOSED IMPROVEMENTS SHEET 11

FIGURE 4-12 PROPOSED IMPROVEMENTS SHEET 12

FIGURE 4-13 PROPOSED IMPROVEMENTS SHEET 13

FIGURE 4-14 PROPOSED IMPROVEMENTS SHEET 14

FIGURE 4-15 PROPOSED IMPROVEMENTS SHEET 15

FIGURE 4-16 PROPOSED IMPROVEMENTS SHEET 16

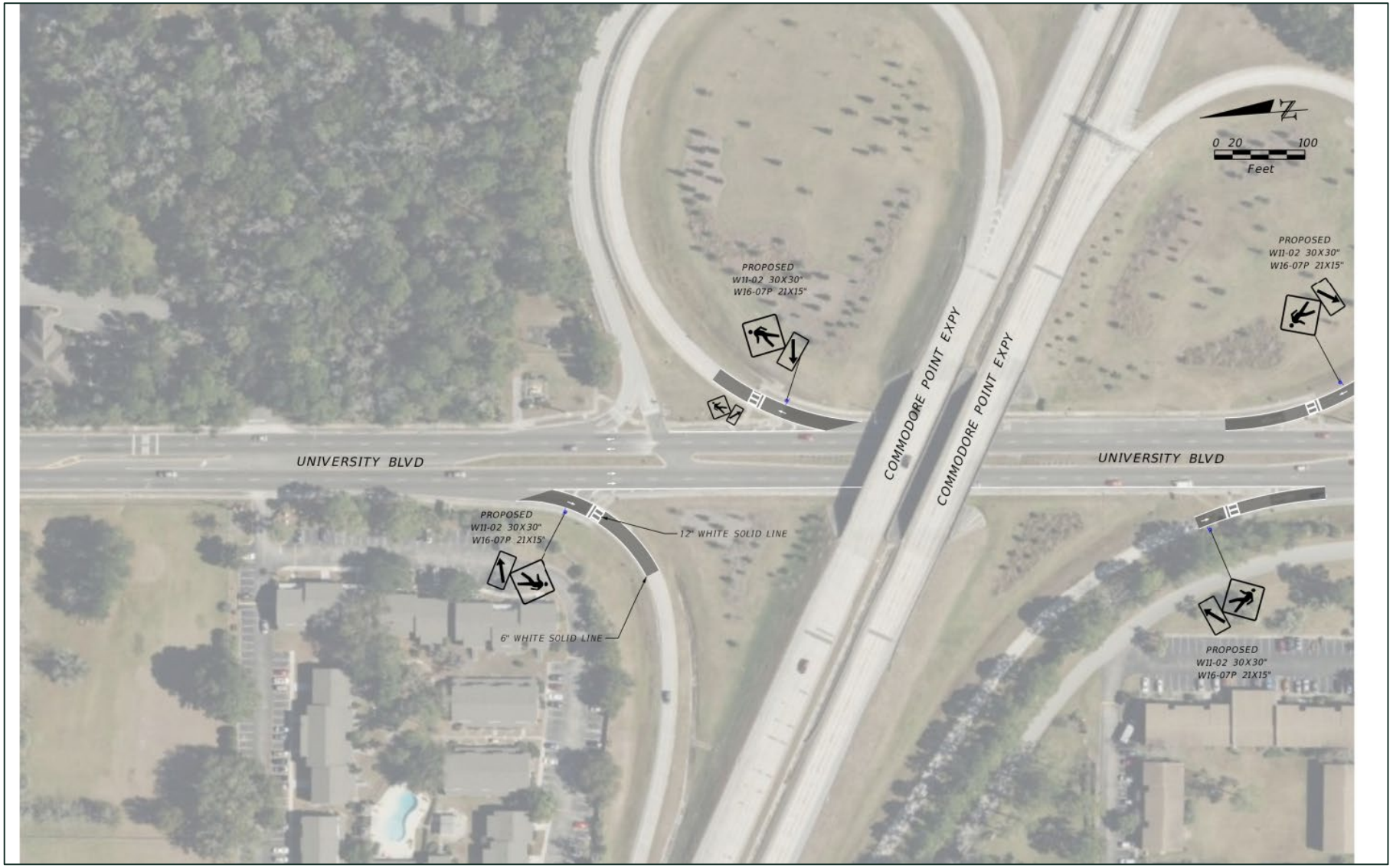


FIGURE 4-17 PROPOSED IMPROVEMENTS SHEET 17

FIGURE 4-18 PROPOSED IMPROVEMENTS SHEET 18

FIGURE 4-19 PROPOSED IMPROVEMENTS SHEET 19

FIGURE 4-20 PROPOSED IMPROVEMENTS SHEET 20

FIGURE 4-21 PROPOSED IMPROVEMENTS SHEET 21

FIGURE 4-22 PROPOSED IMPROVEMENTS SHEET 22

FIGURE 4-23 PROPOSED IMPROVEMENTS SHEET 23

FIGURE 4-24 PROPOSED IMPROVEMENTS SHEET 24

FIGURE 4-25 PROPOSED IMPROVEMENTS SHEET 25

FIGURE 4-26 PROPOSED IMPROVEMENTS SHEET 26

FIGURE 4-27 PROPOSED IMPROVEMENTS SHEET 27

FIGURE 4-28 PROPOSED IMPROVEMENTS SHEET 28

FIGURE 4-29 PROPOSED IMPROVEMENTS SHEET 29

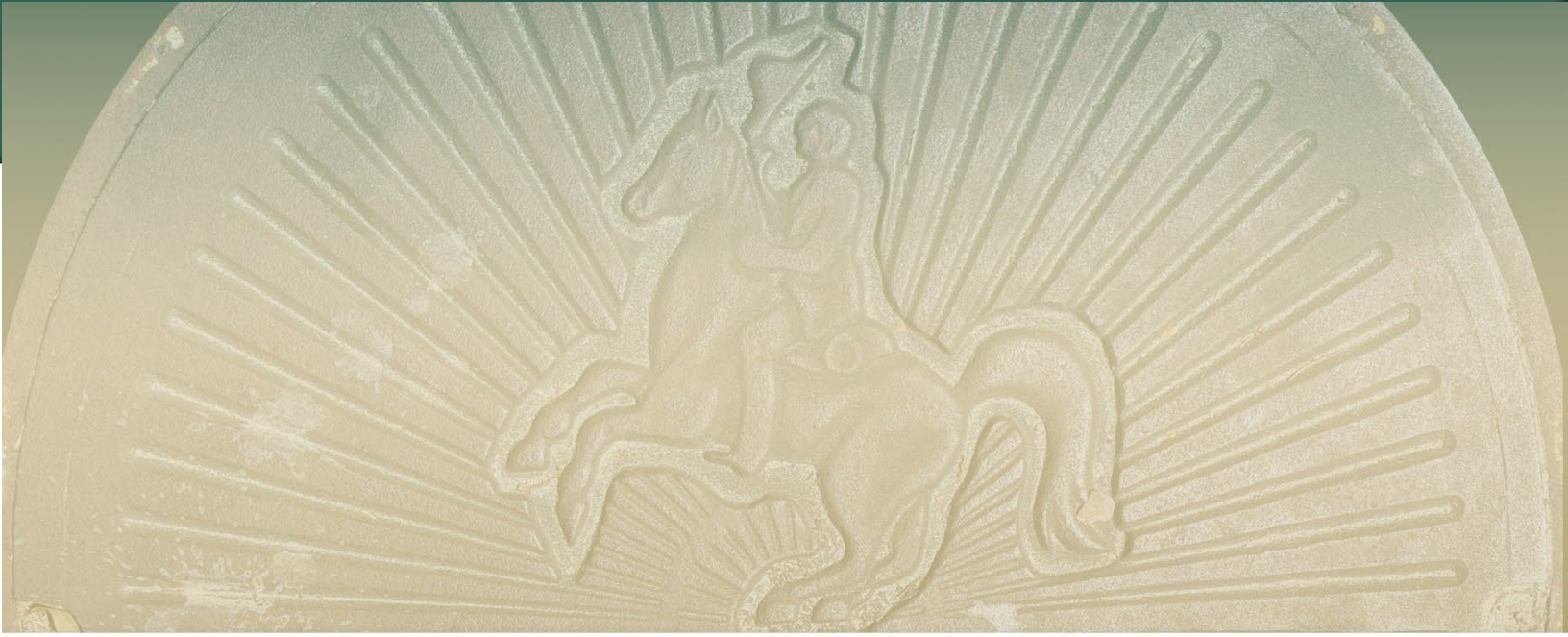
FIGURE 4-30 PROPOSED IMPROVEMENTS SHEET 30

FIGURE 4-31 PROPOSED IMPROVEMENTS SHEET 31

FIGURE 4-32 PROPOSED IMPROVEMENTS SHEET 32

FIGURE 4-33 PROPOSED IMPROVEMENTS SHEET 33

FIGURE 4-34 PROPOSED IMPROVEMENTS SHEET 34

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