Transit Concept and Alternatives Review



FINAL

JTA SKYWAY SYSTEM EXPANSION



MARCH 2020

ULTIMATE URBAN CIRCULATOR

JACKSONVILLE TRANSPORTATION AUTHORITY

FDOT

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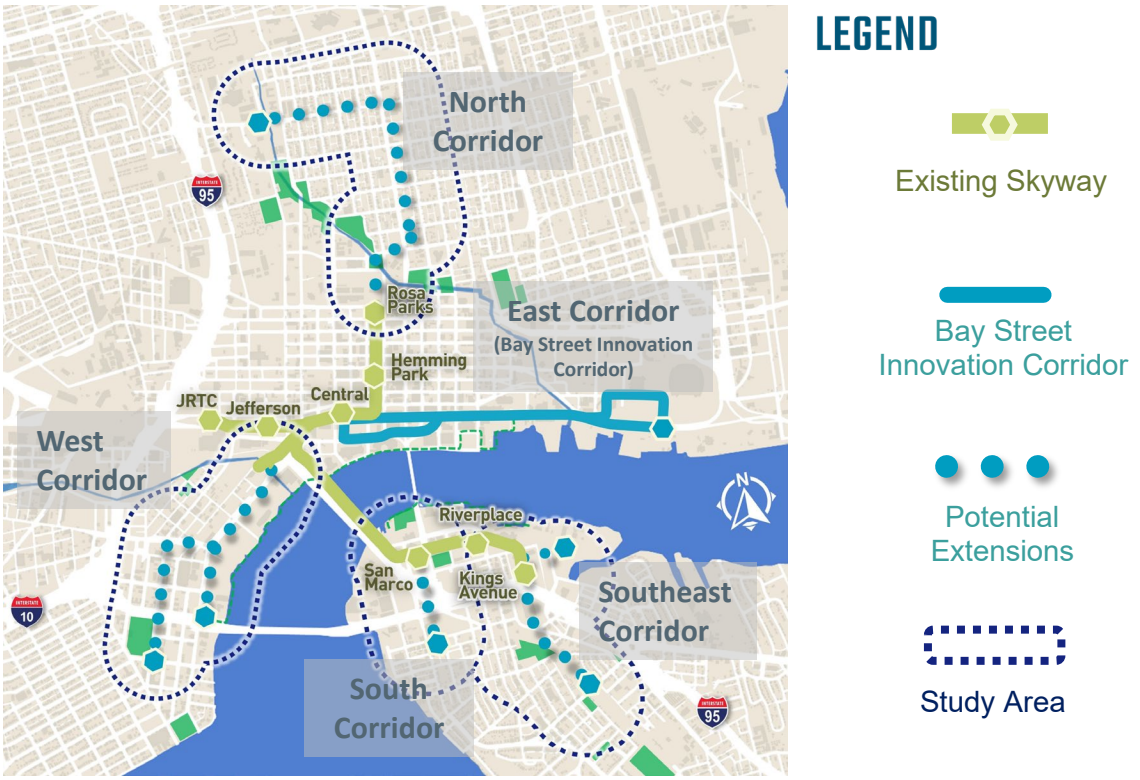
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Executive Summary

This report, **Transit Concept and Alternatives Review** for the Skyway System Expansion (TCAR 2), documents existing and future conditions along four corridors, with an evaluation of alternatives to expand the existing Skyway system illustrated in *Figure 1: System Expansion Study Areas*. This report is a companion to the initial Skyway Conversion and Brooklyn Extension Study (TCAR 1) that summarized alternatives for conversion of the existing 2.5-mile Skyway system to accommodate emerging autonomous vehicle technology. A fifth corridor, the East Corridor, currently advanced by means of a Better Utilizing Investment Leveraging Development (BUILD) Grant award, would extend the system to a total length of approximately 10 miles as envisioned for the Skyway Expansion or Ultimate Urban Circulator (U^2C) Program.

Figure 1: System Expansion Study Areas



The following narrative summarizes conditions and considerations evaluated through the study process.

Section 1 provides the purpose and need for the project along with supporting plans and studies.

Section 2 documents existing conditions along the corridors including demographics, land use, existing transportation system, crash analysis along with environmental considerations. While each of the corridors have unique considerations, all are predominantly within the limits of the urban downtown area with primarily commercial and residential uses. Opportunities for development or redevelopment are found in all corridors.

Section 3 identifies future needs in Jacksonville's urban core which continues to grow with expected growth in population and employment for all corridors. Major developments and redevelopment opportunities include The Shipyards, The District, Baptist Health Expansion, and LaVilla Redevelopment. Additional mobility projects include the Emerald Necklace, the I-95 Shared-Use Path/Riverwalk Expansion, and Springfield's Main Street Complete Street. As the urban core continues to grow an efficient transportation is essential to provide mobility and maintain the quality of life in our community.

The development of potential route alternatives followed a two-step process as described in **Section 4**. First was the development of initial route alternatives within the corridor study area; and second, the selection of a preferred route alternative within each corridor for further evaluation. The key destinations for the expansion of the Skyway system were developed in earlier studies and considered community input regarding where the new system should go. The corridors limits are defined in *Table 1: U²C/Skyway System Corridor Extensions* and illustrated in *Figure 1: System Expansion Study Areas*.

Table 1: U²C/Skyway System Corridor Extensions

Corridor	From	To
North (UF Health)	Rosa Parks Station	UF Health
West (Riverside	Brooklyn Station	Riverside
South (Medical Complex)	San Marco Station	Medical Complex
Southeast (San Marco)	Kings Avenue Station	San Marco East
East* (Bay Street Innovation)	Central Station	Sports/Entertainment Complex

*Previously evaluated; extension advanced through the Bay Street Innovation Corridor.

The initial routes within the study area for each corridor were evaluated based on operational, physical and other factors such as complexity, accessibility, customer service and relative cost. A preferred route within each corridor was selected for further evaluation.

Each of the preferred route alternatives for each corridor were further evaluated using the conceptual typical sections or infrastructure design options presented in *Table 2: Infrastructure Options* and detailed in **Section 5**. Infrastructure options were considered for elevated, or at-grade scenarios. At-grade (or street level) options included a dedicated lane for the autonomous vehicles or operating in mixed traffic. The elevated and unconstrained options would have the largest impact on right of way and would be the highest cost. The evaluation of the preferred alternatives also considered customer safety, potential ridership, connectivity to other transit services or travel modes, support to economic development and community input.

The elevated option would offer the best service. However, it would be the most infrastructure intensive and therefore will have the highest cost. The dedicated lane options would be less reliable than the elevated option but would offer better reliability than operations in mixed traffic. Developing dedicated lanes will result in impacts to existing travel and/or parking lane usage and possibly require additional right of way. The mixed traffic option would have the least infrastructure and right of way impacts and cost as the majority of infrastructure needed would be related to traffic signal, supervisory systems, and stations only. However, this option offers the least reliability, particularly during peak traffic hours.

Table 2: Infrastructure Options

Option	Extension Description
Elevated	Elevated generally consistent with existing Skyway
At-Grade	
Dedicated Lane	Autonomous transit vehicles operate in a designated lane.
Constrained with Curb Stops	AV lanes along curb within the limits of existing curbs; travel lanes and or parking lanes reduced or eliminated.
Constrained with Median Stops	AV lanes adjacent to median within the existing curbs; median added and travel and or parking lanes reduced or eliminated.
Unconstrained with Curb Stops	AV Lanes added along curb, existing travel lanes maintained and widening and right of way acquisition as needed. Existing parking lanes could be used for the AV Lane.
Unconstrained with Median Stops	AV Lanes adjacent to median, travel lanes maintained and widening and right of way acquisition as needed. Existing parking lanes could be used for the AV Lane.
Mixed Traffic	Autonomous vehicles operate in mixed traffic with curbside stops.

Section 6 summarizes public involvement at each phase of study, where the community was afforded the opportunity to review project maps and materials to be a part of the decision-making process. From August 2019 through February 2020, the project team participated in six community events, conducted eight presentations to various organizations, held three pop up displays and hosted a public Open House event. An online survey, via the link https://www.jtafla.com/skywaysurvey, received more than 1,000 comments from the community.

Order of magnitude cost estimates were developed using historical cost data for each option in each corridor and are intended to enable comparison of the different alternatives are included in **Section 7**. It is possible that actual costs could vary significantly, higher or lower and will depend on a variety of factors including final scope of the project and market at time of implementation.

The estimated capital cost for the entire proposed system ranges from approximately $100 million for the mixed traffic option to $400 million for the elevated system option. For the at-grade dedicated lane options the estimated total system cost ranges from $125 million for the constrained (within existing right of way) to $360 million for the unconstrained (widening to develop dedicated lane).

The U^{2}C Program funding will likely consist of a combination of federal state and local sources and possibly private partnerships. Options for funding are described in Section 7 of the report. The East Corridor has been partially funded through the BUILD grant program and consequently, will be the first corridor to be advanced in project development.

Section 8 includes an overall summary and recommended next steps. It is recommended that JTA prioritize and continue development of each potential corridor, working with local partners to meet the future needs of the community and the demands of continuing development in Jacksonville's urban core by requesting entry into FDOT and FTA's project development process.

An Initial prioritization was developed, considering relative ridership, public input and cost, and the ranking indicates that North Corridor is the preferred corridor to be advanced into project Development followed by the West, South and Southeast. Also, it is recommended that the corridors be advanced assuming operation in mixed traffic like the Bay Street Innovation Corridor.

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1 Introduction

1.1 Context



The iconic, and at one time considered futuristic, Automated People Mover, known as the Skyway, is an important community asset for Downtown Jacksonville. The Skyway is a 2.5-mile, fully automated, elevated, bi-directional monorail system with eight stations, ten two-car trains and a 25,000 square-foot operations and maintenance center. After more than 25 years of service as a downtown circulator, carrying approximately 5,000 trip per day; the Skyway is facing multiple challenges and needs modernization.

While the infrastructure remains sound, the most significant issues facing the Skyway involve the condition of the vehicles and operating system. The operating system requires upgrades. The vehicles are due for overhaul but are no longer supported by the original manufacturer, thereby complicating efforts to find replacement parts and keep the trains operating.



Following a series of technical studies to address options for overhauling the system, a Transit Concept and Alternatives Review (TCAR) Study was conducted to evaluate options to modernize the Skyway, specifically the consideration of a comprehensive system conversion by removing the existing guidebeam and creating a smooth running surface. The new surface would accommodate autonomous shuttles which would ultimately be able to operate on the existing elevated infrastructure or at the street level. The initial TCAR Study titled *Skyway System Conversion and Brooklyn Extension (Also referred to as TCAR 1)* was completed in January 2019. Additional details and recommendations of this study are discussed in Section 1.4.

The conversion of the Skyway presents a unique opportunity for the City of Jacksonville, the Jacksonville Transportation Authority (JTA) and the Florida Department of Transportation (FDOT) to transform the aging system and modernize with emerging autonomous vehicle technology.

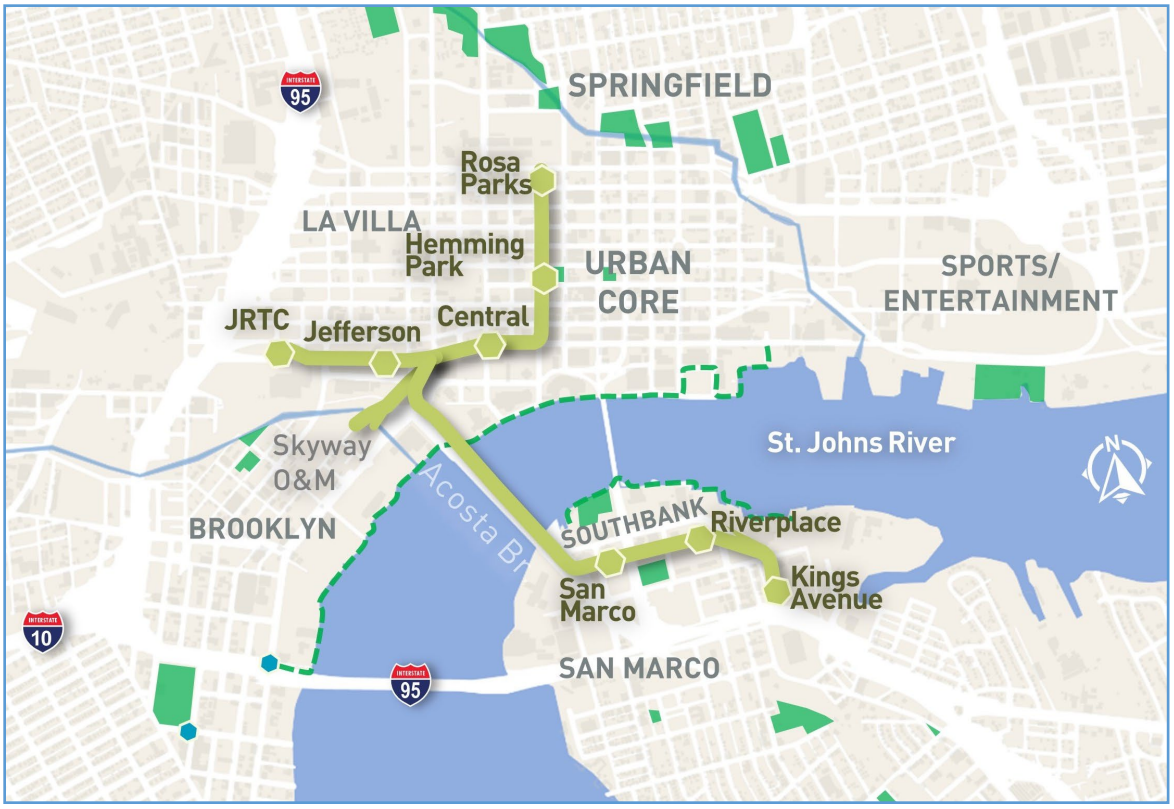
The modernization and desired expansion of the Skyway is known as the Ultimate Urban Circulator (U^2C) Program. As the modernization and conversion of the existing Skyway system remains under engineering evaluation, this second TCAR Study, *U^2C/Skyway System Expansion Study* focuses on potential alternatives to expand the system using autonomous vehicle shuttles to provide service to key destinations on the periphery of Downtown, making connections to the street level and operating on the existing road network. The system expansion options include staying elevated or transitioning from the elevated system to the street level extending the limits of the downtown circulator – making new connections and providing more mobility options.

1.2 Purpose and Need

Connectivity. Mobility. Accessibility.

Spanning the scenic St. Johns River, the Skyway, shown in Figure 1.2.1, links the North and South banks of Downtown Jacksonville and connects key destinations in the urban core such as City Hall, Central Business District, the growing medical complex in San Marco, LaVilla, and the Prime Osborn Convention Center. However, the Skyway was not built to the original vision and connections to adjacent activity centers near the sports complex and thriving and historic neighborhoods near downtown, such as Riverside and Springfield, were never constructed. Early proposals recommended a more expansive 4-mile system that would connect with adjacent neighborhoods and the Sports Complex (formerly the Gator Bowl), however, the project's route and scope were reduced to meet budget constraints and federal parameters. As a result, the approved program established the 2.5-mile system in place today.

Figure 1.2.1: Existing Skyway Map



Provide mobility options and modal connectivity.

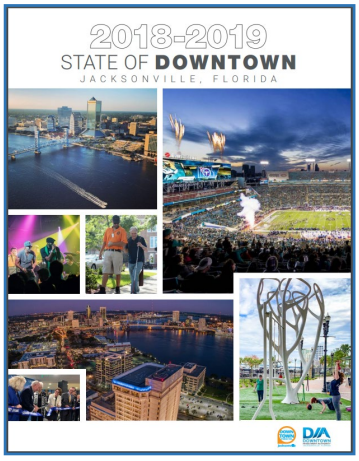
The Skyway is an integral part of the transportation system as it also connects to regional services and soon will serve the new Jacksonville Regional Transportation Center (JRTC) at LaVilla under construction on the west end of downtown. The linkages to regional, local, and intercity transportation services are important to serve the needs of workers, residents and visitors. Years of studies and surveys continue to document the desire for parking once and using other transportation options to move around downtown. Beginning in the spring of 2020, the JRTC will

enable passengers to connect the JTA's local bus, paratransit, regional express services, First Coast Flyer bus rapid transit (BRT), as well as intercity bus services, such as Greyhound and Megabus. JTA's regional partners representing Baker, Clay, Nassau, Putnam, and St. Johns Counties will have the ability to make connections for regional services at this location.

New rapidly developing technologies offer greater flexibility for public transit to improve mobility and make more cost-effective investments. Through the modernization of the Skyway, the JTA will build upon existing assets, creating a more accessible, versatile, and demand-responsive system to more fully connect downtown with nearby urban neighborhoods. The U²C Program's future system will provide connectivity, mobility, and support sustained economic growth to achieve its vision for a vibrant downtown and improve the quality of life in Jacksonville.

Support revitalization and economic development.

Downtown Jacksonville is experiencing an exciting renaissance in the demand for downtown living and employment, concurrent with redevelopment and revitalization in multiple core areas. Transforming downtown mobility and creating a more accessible, versatile, public transportation system supports the City of Jacksonville's plans to create a more vibrant and livable downtown.



2018-2019 State of Downtown

- $1 billion projects under construction
- 7.4 million square feet of commercial office space
- 3 *Fortune 500* corporate headquarters
- 9 million+ visits annually
- 5 major sports teams
- 96% average residential occupancy rate
- 90% of residents like or love living Downtown
- 2.8 miles of Riverwalk public park promenade

Source: Downtown Investment Authority

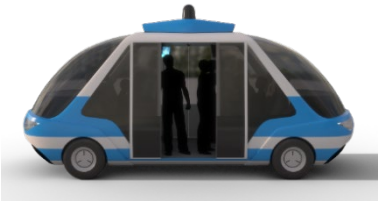
The modern Skyway is envisioned to not only provide first and last mile connections as originally conceived, but also provide off peak hour trips during the weekday, late night, and weekends and to create a system that meets the needs of residents, visitors and workers who live, work, and play in the downtown area and adjacent neighborhoods. As population and employment grows in the Skyway's service area, additional capacity will be needed. A modernized and expanded Skyway system will provide additional capacity and more reliable and accessible service.

The initial Skyway Conversion Study included an evaluation of an extension from the elevated system at the Operations and Maintenance (O&M) Center, to the Brooklyn/Riverside area, staying within JTA property limits. Brooklyn's strategic location between revitalization efforts underway in Downtown and in the Riverside/Five Points area to the immediate south has resulted in substantial private investment and redevelopment. The proposed Brooklyn extension would link nearly 600 market-rate and affordable multi-family units and over 70,000 square feet of commercial/retail/office uses. This U²C/Skyway System Expansion Study (hereinafter referred to

as System Expansion Study) continues the evaluation of this important connection beyond the limits of the existing JTA property.

Expansion of the Skyway system and creating the U²C System will address existing and future mobility needs by providing additional, accessible transportation options to get people where they want to go. The System Expansion Study considers the following community and mobility goals based on needs identified in previous Skyway planning studies, communicated by agency partners, and defined through ongoing public outreach:

- Connect residential, employment and retail.
- Connect to the larger transit system.
- Support reliable and convenient access to employment and educational centers.
- Support economic development and accessibility.
- Improve Downtown quality of life and mobility.



1.3 Project Description

The Skyway is located within the limits of the City of Jacksonville, Duval County, Florida, in the heart of the Northeast Florida region. The City of Jacksonville encompasses more than 840 square miles, with the St. Johns River bisecting downtown as it connects to the Intracoastal Waterway and the Atlantic Ocean to the east. Jacksonville is a gateway to Florida with the intersection of Interstates 10 and 95 in close proximity to Jacksonville's Central Business District.

This System Expansion Study focuses on potential alternatives to expand the future Skyway service beyond the limits of the current elevated infrastructure, using autonomous vehicle shuttles to serve key destinations on the periphery of Downtown. The system expansion corridors are focused initially on the termini of the existing Skyway system and consider both elevated and street level options for the system extension. The goal of this study is to determine a preferred alignment for more detailed study, design and ultimately, implementation within each corridor.

1.3.1 System Expansion Corridors

In earlier Skyway studies, five potential expansion corridors, depicted in *Figure 1.3.1: Project Location Map*, were defined based on analysis, community feedback and connecting to key destinations. The East Corridor, extending from the existing Central Skyway Station east to Sports/Entertainment District, has been advanced through a separate, concurrent project known as the Bay Street Innovation Corridor. The Bay Street Innovation Corridor is referenced in the system analysis discussed later in this report.

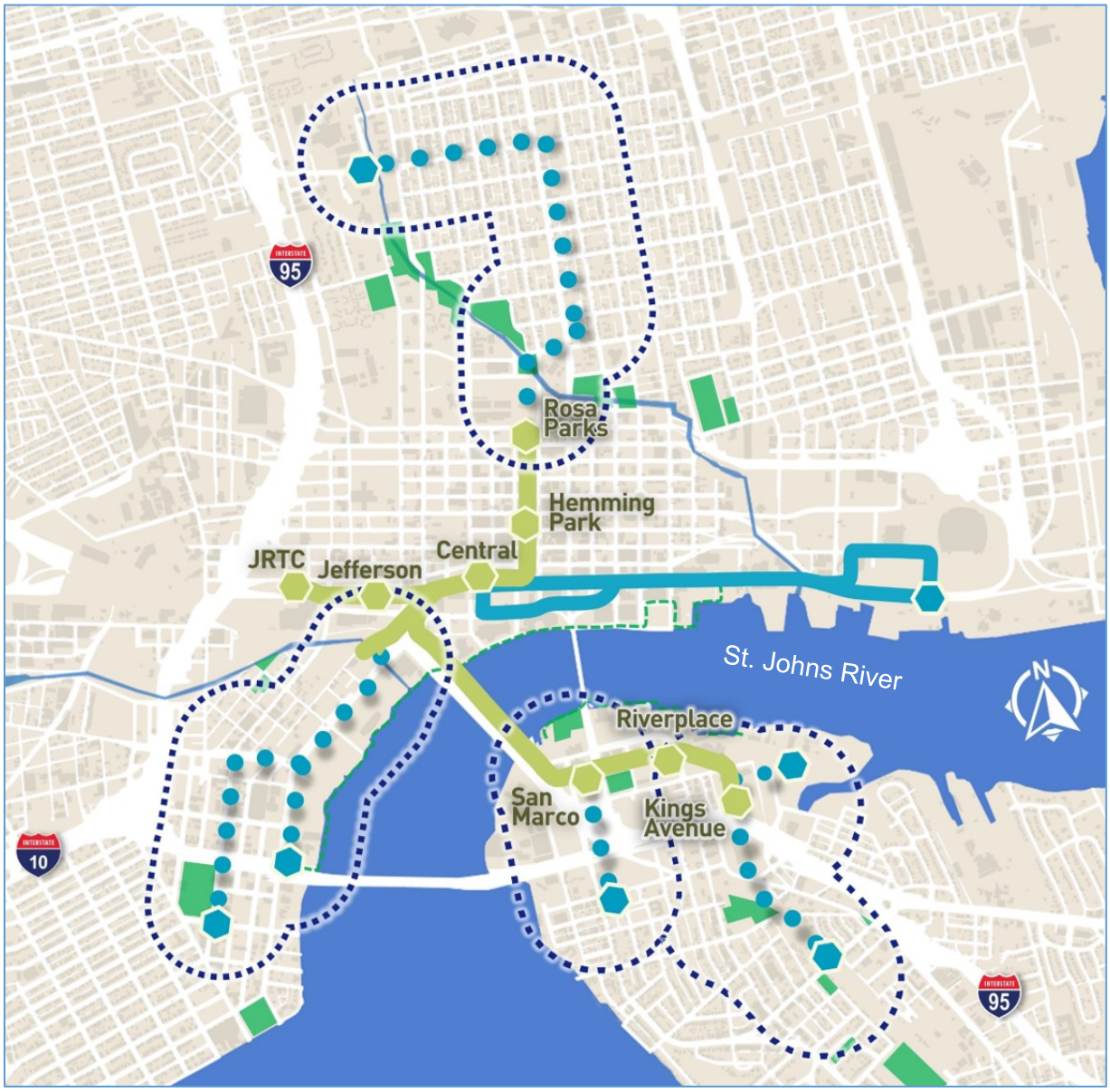
Four expansion corridors studied in this report include:

- North Extension (UF Health) Corridor – extends from the Rosa Parks Transit Station, through the Springfield Historic District to the UF Health Medical Center on 8th Street.
- West Extension (Riverside) Corridor – extends from the Skyway Operations and Maintenance facility, through the Brooklyn area and into the Riverside/Five Points area.
- South Extension (Medical Complex) – extends from the existing San Marco Skyway Station south to the expanding Medical Complex.

- Southeast Extension (San Marco) Corridor – From the existing Kings Avenue Skyway Station and garage to the San Marco East area and to the planned community, The District, on the Southbank of the St. Johns River.

The proposed system, as envisioned with the expansion segments would create a 10-mile autonomous vehicle system.

Figure 1.3.1: Project Location Map

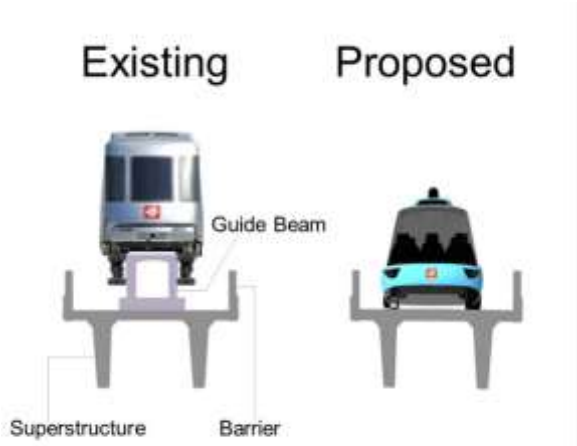


1.3.2 Existing Skyway Station

The proposed system expansion improvements require modifications to the existing Skyway station platforms to accommodate the connection or transition to street level operations.

The transition from elevated to at-grade (street level) will consider the following:

- Extension of the elevated infrastructure.
- Transition to street level via a ramp or separate vehicle and/or passenger elevators.
- Adjustments to power systems, including the possible addition of charging stations.
- Additional structure to accommodate vehicle crossovers and charging.
- Upgrades to passenger information systems, including information kiosks, real time arrival and departure information.
- Upgrades to ticketing equipment.
- Upgrades to other features such as elevators, escalators, signage, etc.



Existing vs. Proposed Skyway

1.3.3 Vehicles and Supervisory System

The JTA has identified Autonomous Vehicle (AV) technology as the mode of choice to expand the existing Skyway. Emerging connected and automated vehicle technology and the evolving needs of Jacksonville's downtown have presented a unique opportunity to expand the reach and capacity of this system by deploying automated shuttle technology and updating the corresponding supervisory system.

As noted, this report builds upon the results of the first phase of the program Skyway Conversion Study (TCAR 1). The proposed extensions will operate using similar autonomous vehicles and systems outlined in the TCAR 1. Since the time the TCAR 1 report was published, JTA has continued the development of the basic requirements for the U^{2}C vehicles and systems in separate reports for the following components:

- Autonomous Transit Vehicles
- Supervisory System
- Operations and Maintenance
- Cybersecurity
- Security

An overview of the system basic requirements and these reports is presented below. These reports are also included as reference documents to this report.

Vehicle

JTA has developed the following list of the 22 critical needs/capabilities for autonomous transit vehicles as documented in the JTA Golden 20 memorandum:

1. *Full ADA Compliance*
2. *Buy America/Buy American Compliance*
3. *Cybersecurity*
4. *Remote Route Programming with Low Latency*
5. *NHTSA Approval to operate on Public Roads*
6. *Vehicle to Infrastructure and V2X Capabilities (DSRC & 5G)*
7. *Traverse Slope of ± 12 Degrees w/ Full Passenger load (Sustained Acceleration/Deceleration)*
8. *Operate bidirectionally up to 35 MPH*
9. *≥12 hours of battery life*
10. *Operate at speeds of 15 MPH within ± 1 foot of Stationary Object*
11. *Operate at speeds of 15 MPH within ± 3 feet of Moving Object*
12. *May Operate during Inclement Weather (Rain, Fog, Wind, and Extreme Heat)*
13. *Internal Cab – Environment control with Rapid Cool capability*
14. *& Sustained temperature with Full Passenger Load*
15. *Ability to be towed; Push/Pull and Steer AV Manually or towed via another AV*
16. *Crash Worthy up to 35 MPH*
17. *Ability for Fast Charge/Opportunity Charging*
18. *Ability to regulate passenger capacity*
19. *System for recording/storing video for at least 30 days (Black Box)*
20. *Emergency button to contact Authority/Agency control center*
21. *Remote command & control operations of vehicles with low latency*
22. *Complete Vehicle Monitoring system, including health monitoring*



AV at JTA Test Track

JTA has an on-going Test and Learn Program in which vehicles and autonomous technology from various manufacturers are performance tested on a test track. The testing facility is available for the community to ride, learn more about autonomous vehicles and provide feedback to JTA. The input will be used to guide the selection of the vehicle(s) to be deployed for the U²C System.

Supervisory System

The autonomous vehicle system will require command and control, or a supervisory system to safely operate and monitor the system. It is envisioned that the U²C System will have a control center with a communication network that will provide communication and remote monitoring of the entire system. An overriding goal for the system is that it be developed to be interoperable with vehicles and supporting equipment from various manufacturers.

The following key requirements for the U²C Supervisory System have been identified:

- Modern, modular state-of-the-art system that is easily adaptable and expandable.
- Interoperable and to avoid vendor lock, use widely supported and consensus-based standards for its key interfaces, especially vehicle to vehicle (V2V) and vehicle to infrastructure (V2I).
- Compliant with existing USDOT standards for Cooperative Intelligent Transportation Systems as applicable to Connected and Automated Vehicles (C/AV).
- Capable to operate a variety of autonomous vehicles on the converted JTA elevated skyway as well as public at-grade roadways.
- Offer a pleasant, safe and secure passenger experience, utilizing mobile applications for reserving rides, receiving status updates, and easy payments of autonomous vehicle fares.
- Seamless integration with existing and new JTA Enterprise system.
- Automation of key functions, providing an efficient and cost-effective system.
- Hardened to provide a high-level of cybersecurity.

The supervisory system will include a control center at its core with communication to vehicles, roadside infrastructure, JTA enterprise systems and the customer.

Operations & Maintenance

JTA has developed basic requirements for operations and maintenance responsibilities for the U²C System. These components are outlined in more detail in the U²C Operations & Maintenance (O&M) Basic Requirements, included as a reference document in Appendix A.

In general, the following categories are under consideration:

- Staffing
- Operating plans
- Vehicle maintenance
- Fare collection
- CCTV/security
- Training and certifications
- Maintenance of roadway/guideway
- Maintenance of stations/hubs
- Maintenance of O&M facilities

Cybersecurity

The U²C Program's autonomous vehicle network will be highly technology driven. The threat of cyber-based disruption and unauthorized system intrusion demands that the program's cybersecurity planning takes place prior to the insertion of assets into the autonomous vehicle network. The community of designers, manufacturers, suppliers, and other industry key contributors that collaborate with the JTA on the U²C Program autonomous vehicle network must uphold these cybersecurity efforts.

The U²C Program will be a Cyber-Physical System (CPS). CPSs are real-time and robust independent and interdependent systems with high performance requirements. Cybersecurity attacks are major threats to CPSs, as there are complexity and interdependencies among various system components (physical and cyber), communication integration, computing, and control technology. The U²C Program Cybersecurity and Cyber Resilience Requirements are coordinated with and comply with the JTA Board-approved Digital Security Program and Vendor Cybersecurity Compliance Policy.

Security

There are many challenges that may affect security of the U²C System that will need to be considered as the project progresses. These challenges may include:

- Security of the riders – lack of operators will reduce the "eyes" on the system.
- Access control to the system – transition from the elevated platforms to street level will allow access to the guideway.
    - Elevated platform controls to prevent unauthorized entry.
    - Security measures such as CCTV coverage, lighting, and access control to facility.
    - Credentialing of all persons with access to include computers and software.
    - Storage of vehicles and vehicle entrance to building.

The agency is developing a system-level and enterprise-level set of security requirements by stakeholders, categories and stages. Short-term, medium-term, and long-term considerations being developed for the following categories:

- U2C Program System
- Operations & Maintenance
- Information Technology
- Procurement
- Compliance
- Communications

JTA is in the process of building upon the basic requirements outlined in Section 1.3.3 and developing functional requirements to be incorporated into detailed scope and technical specifications for inclusion in procurement documents.

1.4 Related Plans and Studies

This section of the report documents the related studies beginning with the TCAR 1 Study and continuing with relevant studies that have been initiated or completed since the TCAR 1 Study was completed in January 2019. The following studies (with excerpts found in Appendix A: Related Studies) are summarized below highlighting specific relevance to the Skyway and U²C Program.

- JTA Skyway Conversion and Brooklyn Extension (TCAR 1) Report (January 2019)
- JTA Mobility Optimized through Vision and Excellence Plan (MOVE) (September 2018)
- JTA Transit Development Plan Update (August 2019)

- Path Forward 2045 (November 2019)
- Northeast Florida Coordinated Mobility Plan (December 2019)
- Duval County Transportation Disadvantaged Service Plan (May 2019)

Skyway Conversion and Brooklyn Extension Study (TCAR 1) (January 2019)

The TCAR 1 Report represented the culmination of several years of planning efforts to define the need and future of the Skyway. The TCAR 1 Report serves as the basis for this System Expansion Study, also known as TCAR 2. The TCAR 1 Report established the need to **Keep, Modernize and Expand** the 30-year-old Skyway and branding the modernization, the U²C Program.

Through a series of studies and outreach, the study concluded that autonomous vehicles would provide the most flexibility for the expansion of the system and be more adaptable to changing development patterns to better serve the Jacksonville community. Table 1.4.1 summarizes the multiple studies and corresponding conclusions leading up to U²C Program.

Table 1.4.1: Summary of Skyway System Study Options

Summary of Skyway Studies and Relevant Conclusions	
Skyway Technology Assessment (2014-15)	Recommended additional citizen and stakeholder input to analyze three options: Option 1: Overhaul of the Skyway Monorail Operating System Option 2: Like-kind replacement of the Skyway Monorail Vehicles Option 3: Replacement of the Skyway vehicles with new Vehicles
Skyway Advisory Group/ Subcommittee (2016)	Four options were identified for consideration by the Subcommittee and Advisory Group including: Option 1: Overhaul vehicles Option 2: Replace vehicles Option 3: Decommission and replace Skyway with Streetcar, Trolley, Bus Rapid Transit (BRT) or Personal Rapid Transit (PRT) Option 4: Repurpose Skyway infrastructure as an elevated bicycle and pedestrian path
Skyway Modernization Program (2016-17)	The Summary Report documents the research, exploration and investigation into vehicle options including: Option 1: Rehabilitation of existing vehicle Option 2: Replace with similar type of vehicle on guidebeam Option 3: Replace with vehicle without the guidebeam Option 4: New technology – Autonomous Vehicle
Inspection of Bridge Structures (2017)	Inspection findings indicate that overall, the structure is in good condition with a few deficiencies: • The concrete sections are in overall good condition however cracks at the dapped beam sections at supports were noted. • Steel superstructure is in overall good condition however rust occurs at several locations and entire steel superstructure should be re-painted. • Deck / Guidebeam – Overall deck is in good condition; however, most joints are deteriorated and in need of replacement.

Summary of Skyway Studies and Relevant Conclusions	
Skyway/U^{2}C Infrastructure Assessment (2017-18)	Alternative 1: Remove existing guidebeam, build up the superstructure at stations only to facilitate level boarding, and retain the barrier wall. Alternative 2: Remove guidebeam, provide new superstructure at stations and retain barrier wall. Alternative 3: Remove guidebeam, provide new superstructure at stations, and replace barrier wall. Alternative 4: New superstructure throughout system, retain existing piers.

In addition to addressing infrastructure modifications, the TCAR 1 Study included an operations analysis and the development of ridership forecasts. Several operating scenarios were defined for a future operating system providing increased service frequency. The modeling process relies on data related to future development, as well as population and employment growth. With the addition of a new connection in Brooklyn, and improved headways, daily ridership increased from current conditions under the projected future year scenarios. It estimated annual operations and maintenance cost of $8.25 to $9.50 million and daily ridership of 8,000 by the year 2030.

The project goals and objectives listed in Table 1.4.2 were developed from the recommendations of the *Skyway Modernization Report* and the *JTA Infrastructure Assessments*, both completed in 2017.

Table 1.4.2: Evaluation Criteria, Goals and Objectives

Criteria	Goals	Objectives
Operations & Safety	Level of Service / Capacity	Provide high frequency service to improve customer experience and reduce overall trip times.
	Speed	Maintain service reliability and avoid critical ground constraints.
	Safety	Improve safety within the corridor.
	Flexibility	Allow greatest flexibility for operations, vehicle type and size.
	Operations	Respond to changing demands in service.
Constructability & Feasibility	Feasibility	Technical feasibility of alternative considering safety and constructability.
	Ability to accommodate variety of vehicles	Maximize ability to accommodate various types and sizes of vehicles from different manufacturers.
	Maximize use of existing infrastructure	Minimize cost and minimize modifications to existing infrastructure.
	Constructability	Ability to minimize construction risks.
	Continuity of Service	Minimize impacts to existing service during infrastructure conversion.
	Damage during Demolition/ Construction	Minimal risk of damage to existing structure.

Criteria	Goals	Objectives
Community Impact	Connectivity	Provide safe multimodal access to the transit system.
	Economic Development	Provide convenient and accessible transit service to areas with economic development potential.
	Aesthetics	Provide comprehensive update of system that is safe, convenient, and attractive to downtown workers, residents, and visitors.
Cost	Construction Cost	Cost of modifying existing infrastructure to accommodate a new vehicle.
	Service Life / Operations and Maintenance	Cost to maintain structure.

The four alternatives proposed in the 2017 Skyway Infrastructure Assessment were evaluated against the project goals and objectives listed in Table 1.4.2. These alternatives and their assessments include:

- **Alternative 1** involves removing the concrete guidebeam on the existing Skyway, retaining the barrier walls and existing superstructure, and building up the guideway at the station to allow for level boarding.

  Assessment: While Alternative 1 is the least costly alternative, it would likely have the most limitations and must be proven to be feasible through further engineering analysis, specifically the ability to retain the existing barrier wall and for the vehicles to safely and efficiently operate within the existing width (9 foot-7 inches) of the alignment. The narrow operating width limits the size of the vehicle that can operate on the guideway.

- **Alternative 2** requires removal of the guidebeam, retaining the barrier walls, retaining the infrastructure along the guideway, however, new superstructure would be provided at the stations.

  Assessment: Alternative 2 would remove the superstructure at the stations only. While costlier than Alternative 1, it has many of the same limitations related to operations and the ability for vehicles to operate on the guideway. Reconstruction at the stations may be necessary for potential structural limitations of the existing station areas, however additional engineering analysis would be needed to determine if the existing station areas would need to be rebuilt.

- **Alternative 3** includes new superstructure at stations, removal of the guide beam, and replacement of the barrier walls.

  Assessment: Alternative 3 would replace the barrier walls and the superstructure at stations. Costlier than Alternatives 1 and 2, this option may be necessary if it is determined that the crash worthiness of the existing barriers is deemed insufficient. This alternative may also provide slightly more flexibility in terms of vehicle size and operating characteristics.

- **Alternative 4** requires the construction of new superstructure throughout the corridor, however, the concrete piers would remain. New barrier walls and a wider running way would be provided, allowing for two-way operations throughout.

  Assessment: Alternative 4 would provide new superstructure throughout the Skyway System, while retaining the existing piers. It is the costliest option but allows for the most flexibility in terms of vehicle size and operating characteristics. It would also allow for side by side operations and a wider guideway.

The TCAR 1 Report concluded that Alternative 4 would provide the best fit in terms of the stated goals of the U²C Program purpose and need. However, it also recommended that Alternatives 1-3 be further evaluated to develop a plan that will achieve the following goals:

- Provide an acceptable level of service.
- Maximize retention of the existing structure.
- Meet acceptable safety requirements.
- Accommodate ADA accessibility and emergency evacuation of system.
- Provide best value to the community.

The preferred alternative could be a combination of the above alternatives as a result of further analysis and confirmation of available vehicle and systems technologies.

JTA Mobility Optimized through Vision and Excellence (MOVE) Plan

The JTA's Mobility Optimized through Vision and Excellence (MOVE) Plan describes a robust, well-connected regional transportation system that integrates traditional transit solutions with rideshare, emerging technologies, and innovative partnerships to efficiently take people where they want to go. The framework and concepts explored in the MOVE Plan helped guide the development of JTA's 2019 major update of the Transit Development Plan.

The MOVE Plan outlined JTA's regional initiatives including the Jacksonville Regional Transportation Center Project, Amtrak Relocation/Commuter Rail Initiatives, Express Bus Initiatives, First Coast Flyer BRT Projects, the Integrated Mobility App, and the U²C Program. It described the U²C service as connecting the regional network through the JRTC at LaVilla and offering downtown visitors and residents an increased level of mobility. It explained that upgrading the Skyway to accommodate autonomous vehicles will be a multi-year process and that JTA will pursue a timeline that properly addresses safety while keeping up with emerging technologies.

JTA Transit Development Plan Major Update

On August 13, 2019, the JTA Board of Directors approved the Transit Development Plan (TDP) major update as mandated by federal and state statutes. The TDP serves as a comprehensive self-evaluation of the agency's existing services relative to its mission, values, goals, and objectives and the practices and performance of peer agencies. It outlines JTA's array of strategies to improve its services and align with other plans for the Northeast Florida region over the period from 2019 to 2029.

During the TDP development process, JTA analyzed current and projected travel patterns to identify common origins, destinations, and transportation needs in the Jacksonville metropolitan area. Major travel patterns in and around Duval County were discovered to connect to downtown

Jacksonville in both peak and off-peak periods. This data was supported by input from the public and JTA staff who made the following recommendations related to the U²C Program.

- **Integrate transportation modes:** After expansion of the U²C system, it will be appropriate to take advantage of frequent U²C service and truncate certain crosstown routes at the U²C stations rather than continuing service through downtown and to Jacksonville Regional Transportation Center (JRTC).
- **Use innovative methods to serve customers:** Customers should be provided opportunities to use new mobility modes such as demand-response service or automated vehicles to meet their first- and last-mile needs.

Outlined in the TDP, over the next 10 years, JTA seeks to evolve from a transit, ferry, and road agency to a transportation mobility integrator. In this role, JTA will provide customers with seamless trips across a variety of modes, be it an automated vehicle, BRT, local bus, ferry, rail, demand-response service, or another mode. If implemented, these concepts and related recommendations will enable JTA to become a more effective provider of transit and further integrate the growing range of services it provides.

Relevant long-term system recommendations outlined in the TDP include:

- ***Continue the transformation of the Skyway into the Ultimate Urban Circulator****. An early phase of these improvements will create a corridor for autonomous vehicles to travel between the Sports Complex along Bay Street to the JRTC along a mix of ground-level and elevated transitways. As study of U²C opportunities continues, JTA should continue to refine its estimates of phasing, operating and capital costs and ensure these estimates are reflected in future TDP Annual Updates. Following the extension of U²C service to new stations such as the Entertainment and Sports Complex, JTA should truncate services such as Route 11 and Route 31 at the U²C alignment to avoid duplicating service on Bay Street.*
- ***Continue testing the autonomous vehicle concepts****. Beyond the U²C program, JTA is continuing to seek out opportunities to make use of autonomous vehicles in other areas of the region. The in-development JTA Agile Plan is identifying candidate sites where short alignments for autonomous vehicle routes could address mobility needs, such as on the campuses of University of North Florida or between major destinations at St. Johns Town Center. The routes are intended to be implemented with minimal infrastructure investment and only two vehicles. As it analyzes opportunities for autonomous vehicle deployment, JTA should continue to prioritize service concepts that provide a first and last mile connection between transit services and major destinations.*
- ***Develop Additional First- and Last-Mile Services****. JTA provides several different existing transit options as first- and last-mile solutions, including the Skyway system in the Downtown area, several specialty shuttle options, and the recently implemented ReadiRide on-demand service. Shortly, the U²C service will also be implemented, providing a driverless first-/last-mile transit option also in the Downtown area.*

Duval County Transportation Disadvantaged Service Plan

Transportation Disadvantaged Service Plans (TDSP) are developed by the designated community transportation coordinator and the designated planning organization under the guidance and approval of the Local Coordinating Board. The designated planning organization for Duval County is the North Florida TPO. The TDSP is updated annually with locally developed service standards that are consistent with the needs and resources of the community.

Most of the Duval County TDSP goals and objectives are relevant to the U^{2}C Program. The full list of goals and objectives are contained in Appendix A: Related Studies.

1.5 Agency Roles and Responsibilities

The JTA is conducting this System Expansion Study in accordance with the guidance of the FDOT's TCAR Process. The JTA is coordinating with the FDOT, the North Florida TPO and the City of Jacksonville on a regular basis to keep the partner agencies apprised on project analyses and community input. In addition to JTA planning and development personnel, JTA Automation Division personnel, the FDOT District 2 Jacksonville Urban Office representatives will be responsible for project oversight and review of project deliverables.

All agency partners are notified of project updates and are afforded the opportunity to participate in public outreach activities. Additionally, outlined in Section 6 of this report, an extensive outreach process has been undertaken to provide multiple opportunities for review of the unique project activities and the exposure to the introduction of autonomous shuttles in the downtown transportation ecosystem.

1.6 Format of this Report

This TCAR Report has been developed in reference to the FDOT's TCAR Guidance.

Section 1 contains project background information and a description of the project, along with a summary of related studies and projects.

Section 2 describes the existing conditions pertaining to demographics, land use and transportation modal features.

Section 3 outlines future system needs related to planned and future development, including future travel demand projections.

Section 4 presents the identification of evaluation criteria and describes the development of alternatives that have been identified through the study process.

Section 5 summarizes the evaluation of the preferred route alternative for each corridor.

Section 6 describes the public involvement and stakeholder outreach activities.

Section 7 provides an overview of potential funding options for current and future system requirements.

Section 8 is a summary of related activities and defines next steps for project development.

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2 Existing Conditions

Downtown Jacksonville is the employment and cultural center of Northeast Florida. With a land area of approximately 840 square miles, the City of Jacksonville is the largest city in land area in the continental United States. Jacksonville's estimated population in 2018 was 903,889. The Greater Jacksonville Metropolitan Area, which includes Duval, Clay, St. Johns, Nassau, and Baker Counties, is estimated to have approximately 1.4 million residents[1].

This section of the report focuses on the existing conditions within the study area, approximately one-half mile wide for each proposed system expansion corridor. For additional information regarding the condition of the existing Skyway infrastructure and stations, please refer to the JTA Skyway Conversion and Brooklyn Extension Study (TCAR 1, 2018).

This section provides an overview of existing demographic, land use, and transportation characteristics for each corridor and surrounding neighborhoods.

The section is divided as follows for each of the system expansion corridors:

- **Demographic Profile:** Describes the community's composition by using data primarily collected by local, state, or federal agencies, such as the U.S. Census Bureau
- **Existing Land Use**: Presents existing land use designations based on 2018 Duval County Property Appraiser's parcel data
- **Transportation System Features**: Identifies roadway network features, including traffic volumes, sidewalk and bicycle facilities, as well as transit services
- **Crash Analysis**: Summarizes a three-year review of crashes using FDOT's Signal Four Analytics tool
- **Environmental/ETDM Summary**: Highlights considerations from the Efficient Transportation Decision Making (ETDM) process which reviews potential environmental effects of the project.

Overview of Demographic Profile

The demographic profile covers a range of topics about communities, including population size, gender, age, ethnic backgrounds, household characteristics, and geographic distribution. The analysis conducted in this report references the American Community Survey (ACS). It also utilizes the 2010 U.S. Census Block Group Data which contains the most recent comprehensive demographic profile available today. This data is typically presented in block groups which may contain several census blocks.

[1] Annual estimates of resident population: April 1, 2010 to July 1, 2018 U.S. Census Bureau

Overview of Transit Services Definitions

The existing transit services described for each corridor will include the following diverse transit services that JTA operates:

- Local and Express Bus
- Regional Express – “Express Select”
- Bus Rapid Transit (BRT) – “First Coast Flyer”
- On Demand – “ReadiRide”
- Stadium Shuttles – “Gameday Xpress”
- Paratransit – “Connexion”
- Automated fixed guideway – “Skyway”

Overview of ETDM Planning Screen

In accordance with the ETDM guidance, the ETDM process defines the FDOT's procedure consistent with the streamlining objectives of subsequent amendments to 23 U.S.C. sections 139 and 168 through the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation (FAST) Act and supports FDOT's Project Development and Environment (PD&E) Process. In more general terms, through this process the FDOT assumes the review of all highway projects in Florida whose source of federal funding comes from FHWA or which constitute a federal action through FHWA. This includes responsibilities for environmental review, interagency consultation and other activities pertaining to the review or approval of National Environmental Policy Act (NEPA) actions.

The ETDM process includes multiple screening levels to incorporate environmental considerations in the transportation planning process and inform subsequent phases of project development. For this Skyway System Expansion Study, the Planning Screen was completed which includes review comments by the Environmental Technical Advisory Team (ETAT). The Planning Screen for the Skyway System Expansion is defined as Project #14424, completed on February 10, 2020 by FDOT District 2. Detailed information for each of the environmental topic areas is contained in the Planning Screen Summary Report, included as Appendix C.

The following sections include details for each the system expansion corridors defined as follows.

Corridor	From	To
North	Rosa Parks Station	UF Health
West	Brooklyn Station	Five Points
South	San Marco Station	Medical Complex
Southeast	Kings Ave Station	San Marco East
East	Central Station	Sports/ Entertainment Complex

2.1 North Extension (UF Health) Corridor



The North Extension (UF Health) Corridor begins at the existing Rosa Parks Transit Station, located in the north downtown area at State and Union Streets. This corridor extends further north through the burgeoning historic Springfield District along Main Street and west along 8th Street to connect to the University of Florida (UF) Health Campus, the largest UF Academic Health Center outside of Gainesville and the region's safety net hospital.

2.1.1 Demographic Profile

The ½ -mile study area for the proposed North Extension (UF Health) Corridor intersects eight census block groups in Duval County. After grouping the eight census blocks intersecting the corridor, the averages of specific demographic information were compared to the demographic information for all of Duval County, based on Census Block Group Analysis (2010), shown in Tables 2.1.1 to 2.1.6. Detailed maps illustrating the area's demographic profile are included in *Appendix B: Demographic Figures.*

Table 2.1.1: North Extension Corridor Population

Evaluation Criteria	Duval County	North Extension Corridor
Total Population	864,263	7,332
Percent of the population that is White	52.3%	35.1%
Percent of the population that is Black	32.7%	59.0%
Percent of the population that is Hispanic	6.7%	4.4%
Percent of the population that is Asian	3.1%	1.4%
Percent of the population that is Other[1]	5.2%	4.6%
Percent of the population that is considered 'Minority'	44.6%	68.8%
Median population age	37.8	41.5
Percent of the population that is above 65 years old	12.5%	10.8%

[1] *Other population groups include: American Indian or Alaska native, Native Hawaiian or other Pacific islander, or 2 or more races.*

The percent of the population considered white is significantly lower in the North Extension (UF Health) Corridor (35.1%) than in all of Duval County (52.3%). Similarly, the corridor has a slightly lower percentage of Hispanics compared to Duval County. The corridor has a significantly higher percentage of blacks (59.0%) compared to Duval County (32.7%). Therefore, the overall minority percentage is significantly higher in the corridor (68.8%) than in Duval County (44.6%). The percent of the population older than 65 years old is slightly lower in the corridor (10.8%) than in Duval County (12.5%).

As depicted in *Table 2.1.2 North Extension Corridor Population Density*, the corridor has a higher population density than Duval County, a characteristic which is consistent with an urban corridor.

The most prevalent demographic difference between the corridor and Duval County is the median household income, which is approximately $18,000 lower compared to the county as a whole. Similarly, the median family income in this corridor is lower than Duval County, $42,835 compared to $58,496 respectively.

In addition, the percentage of households and population below the poverty line are significantly higher than Duval County. A total of 38.0% of the households in the corridor are below the poverty line compared to 13.0% for Duval County. Moreover, the percent of the population that is below the 150% poverty line is slightly higher in the corridor (11.0%) than in Duval County (9.5%).

Table 2.1.2: North Extension Corridor Population Density

Evaluation Criteria	Duval County	North Extension (UF Health) Corridor
Total acres	587,813	1,857
Population density (persons per acre)	1.5	3.95
Household density (housing units per acre)	2.4	2.38
Percent of housing units occupied	87.4%	73.0%
Percent of housing units vacant	12.6%	27.0%
Average family size	3.0	3.1
Average household size	2.5	2.0

Table 2.1.3: North Extension Corridor Income

Evaluation Criteria	Duval County	North Extension (UF Health) Corridor
Median Household Income ($)	$ 49,188	$ 30,846
Median Family Income ($)	$ 58,496	$ 42,835
Percent of households below the poverty line[2]	13.0%	38.0%
Percent of the population below the poverty line[2]	13.8%	35.1%
Percent of the population below the 150% poverty line[2]	9.5%	11.0%

[2] *The Census Bureau uses a set of income thresholds that vary by family size to determine poverty level. The 150% poverty level guideline excludes those below poverty line.*

The percentage of the population that commutes via a car, truck, or van in the corridor (76.4%) is lower than Duval County (91.7%). Similarly, the percent of the population that walks to/from work is significantly higher in the corridor (6.0%) compared to Duval County (1.7%). The percent of the population that takes public transportation (8.6%) is also higher in the corridor than in Duval County. The percent of households that do not have a vehicle is significantly higher in the corridor (27.0%) compared to Duval County (7.4%).

The percent of the population that is considered Limited English Proficient (LEP) is lower in the corridor than in Duval County – 1.7% compared to 4.9%. This gap is consistent with the corridor containing a lower percentage of Hispanics than all of Duval County.

Table 2.1.4: North Extension Corridor Work Transportation

Evaluation Criteria	Duval County	North Extension (UF Health) Corridor
Percent of the population that commutes via a car, truck or van	91.7%	76.4%
Percent of the population that does not commute	3.5%	6.5%
Percent of the population that commutes via bicycle	0.6%	0.4%
Percent of the population that commutes via walking	1.7%	6.0%
Percent of the population that commutes via public transportation	1.6%	8.6%
Percent of the population that commutes via motorcycle	0.3%	0.3%
Percent of the population that commutes via other means	0.6%	0.8%
Percent of households that do not have a vehicle	7.4%	27.0%

Table 2.1.5: North Extension Corridor Language

Evaluation Criteria	Duval County	North Extension (UF Health) Corridor
Percent of the population that speaks only English	87.4%	92.6%
Percent of the population that speaks a language other than English and also speaks English "very well"	7.7%	3.7%
Percent of the population that is considered to be Limited English Proficient [3]	4.9%	1.7%

[3] *People with Limited English Proficiency (LEP) speak English "less than very well" or "not at all." These people have a limited ability to read, write, speak or understand English.*

The corridor has a lower education attainment than Duval County as a whole, with a lower high school graduation rate and lower percentage with a bachelor's or higher college degree. However, the percent of the population with some college or an associate's degree is slightly higher than in Duval County – 35.7% compared to 32.0%.It is notable that the FSCJ Downtown Campus is located within this corridor; the student population may explain the higher number of individuals with some college while having a lower number of individuals with a bachelor's degree or higher.

Table 2.1.6: North Extension Corridor Education

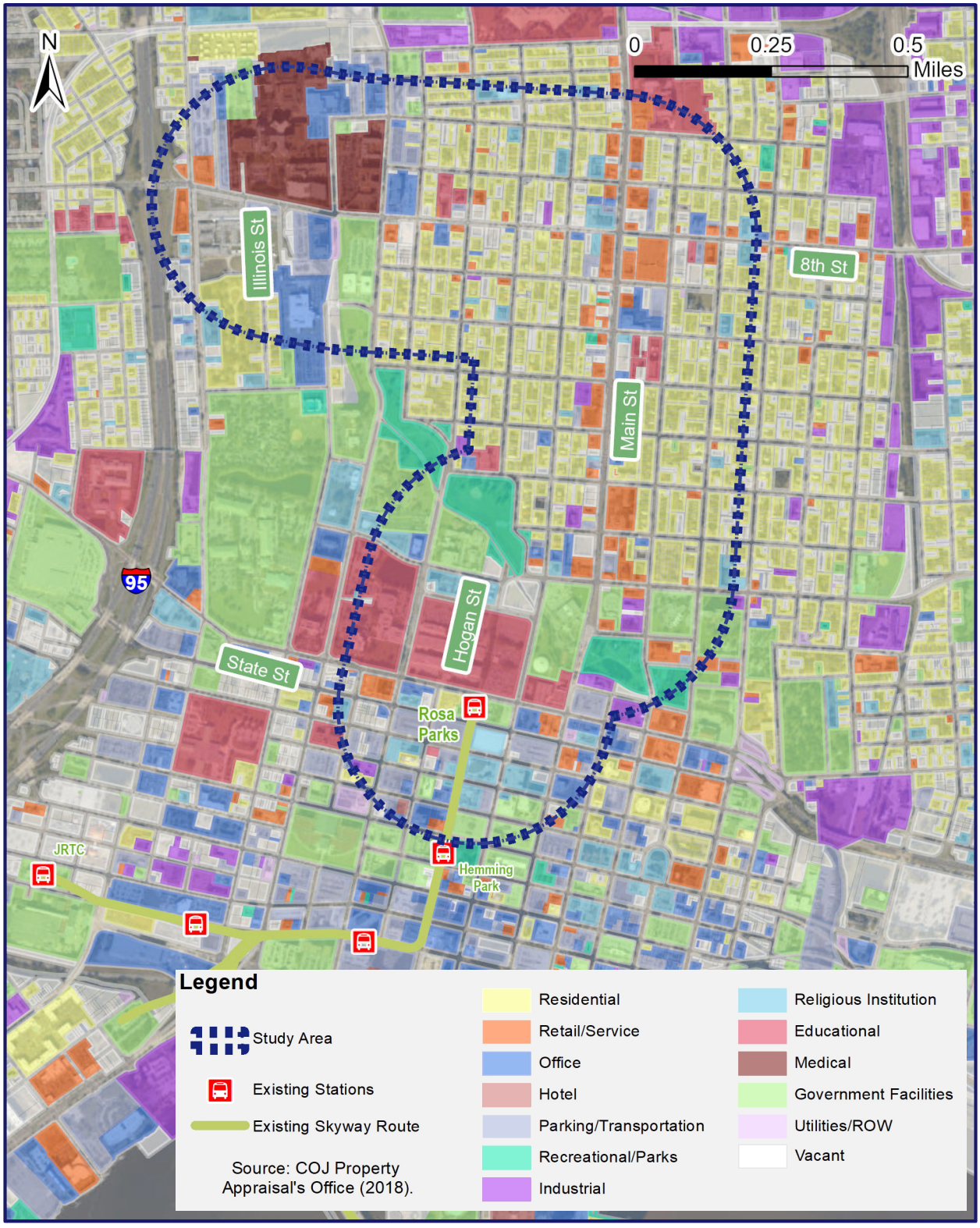
Evaluation Criteria	Duval County	North Extension (UF Health) Corridor
Percent of the population that is over 25 years old and has less than a 9th grade education	3.8%	4.6%
Percent of the population that is over 25 years old and has completed more than 9th grade but does not have a high school diploma	9.0%	15.3%
Percent of the population that is over 25 years old and has a high school diploma	87.2%	80.1%
Percent of the population that has some college or an associate degree	32.0%	35.7%
Percent of the population that has a bachelor's, master's, doctorate or professional degree	16.9%	9.8%

2.1.2 Existing Land Use

The North Extension (UF Health) Corridor includes institutional (71 acres), commercial (61 acres) and high-density residential areas (55 acres) as the three major existing land uses. It also includes, five Planned Unit Developments (PUDs), one Development of Regional Impact (DRI) (Jacksonville Downtown) and two brownfield locations. The proposed corridor project is expected to maintain current land uses.

As illustrated in *Figure 2.1.1: North Extension Corridor Existing Land Use,* the corridor appears to be predominantly residential with retail activity along Main Street and medical, government and office land uses along 8th Street. Educational and government facilities and park lands are found in the southern portions of the corridor.

Figure 2.1.1: North Extension Corridor Existing Land Use



2.1.3 Transportation System Features

The following is an overview of the existing transportation system within the North Extension (UF Health) Corridor. The North Extension (UF Health) Corridor extends from the existing Skyway system from the Rosa Parks Transit Station northward via Hogan Street and Main Street. It will extend northward along Main Street between 1st and 8th Streets and then proceed west along 8th Street to terminate at or near the UF Health Medical Center and the Jacksonville Veterans Administration Outpatient Clinic (VA Clinic).

Roadway Characteristics

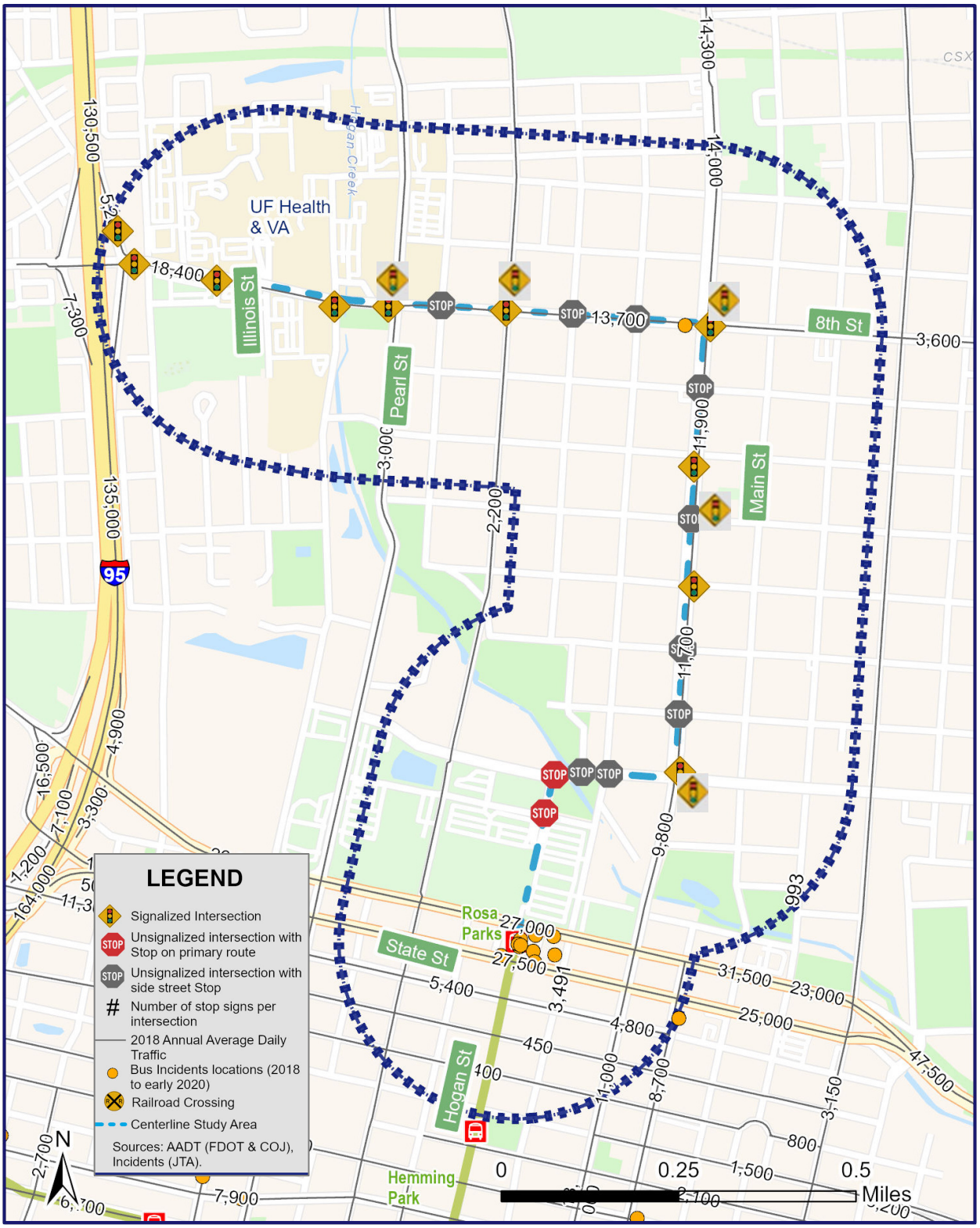
Within the North Extension (UF Health) Corridor, lane configuration varies as land uses transition from residential to medical and educational. The number of lanes on 8th Street ranges from 2 to 6 lanes as it proceeds eastbound within the corridor. From Boulevard Street to Main Street, 8th Street has a 2-lane configuration, one lane in each direction, divided by a shared turn lane median and a landscaped median at the Silver Street and Perry Street intersections.

Main Street (US Route 17 / US Route 1) has a 4-lane configuration with two lanes in each direction divided by a median from 1st Street to 8th Street. On-street parking is found on both sides along the major corridor of Main Street.

The posted speed limit for both the Main Street and 8th Street segments is 30 miles per hour (mph). Minor streets such as Illinois Street and Calhoun Street have a posted speed limit of 25 mph.

Annual average daily traffic (AADT) is typically used to describe the daily volume of vehicle traffic on a road; U.S. highways and state routes values were taken from the FDOT Florida Traffic Online 2018 AADT dataset and local street values (if available) were taken from the City of Jacksonville 2018 Local Traffic Counts Spreadsheet. 8th Street has a higher annual AADT of 13,700 while Main Street has an AADT of 9,800. *Figure 2.1.2: North Extension Corridor Traffic & Intersections Map* illustrates traffic signalization and AADT along the North Extension (UF Health) Corridor.

Figure 2.1.2: North Extension Corridor Traffic & Intersections



Transit Service & Connectivity

The North Extension (UF Health) Corridor begins at JTA's transit station named the Rosa Parks Transit Station. This station currently serves as a transit hub for 26 bus routes including each of the First Coast Flyer and Express Routes and by the Skyway system. The corridor is primarily served by the First Coast Flyer Green Line; local Routes 1 North Main, 3 Moncrief and 86 Northside; and the Northside ReadiRide service. With the opening of the new JRTC in spring 2020, a majority of the transit services will shift to the JRTC as the new multi-modal hub.

The transit service statistics are summarized in *Table 2.1.7: North Extension Corridor Transit Statistics*. Current transit services in this area are shown in *Figure 2.1.3: North Extension Corridor Transit Services* and further described below.

Table 2.1.7: North Extension Corridor Transit Statistics

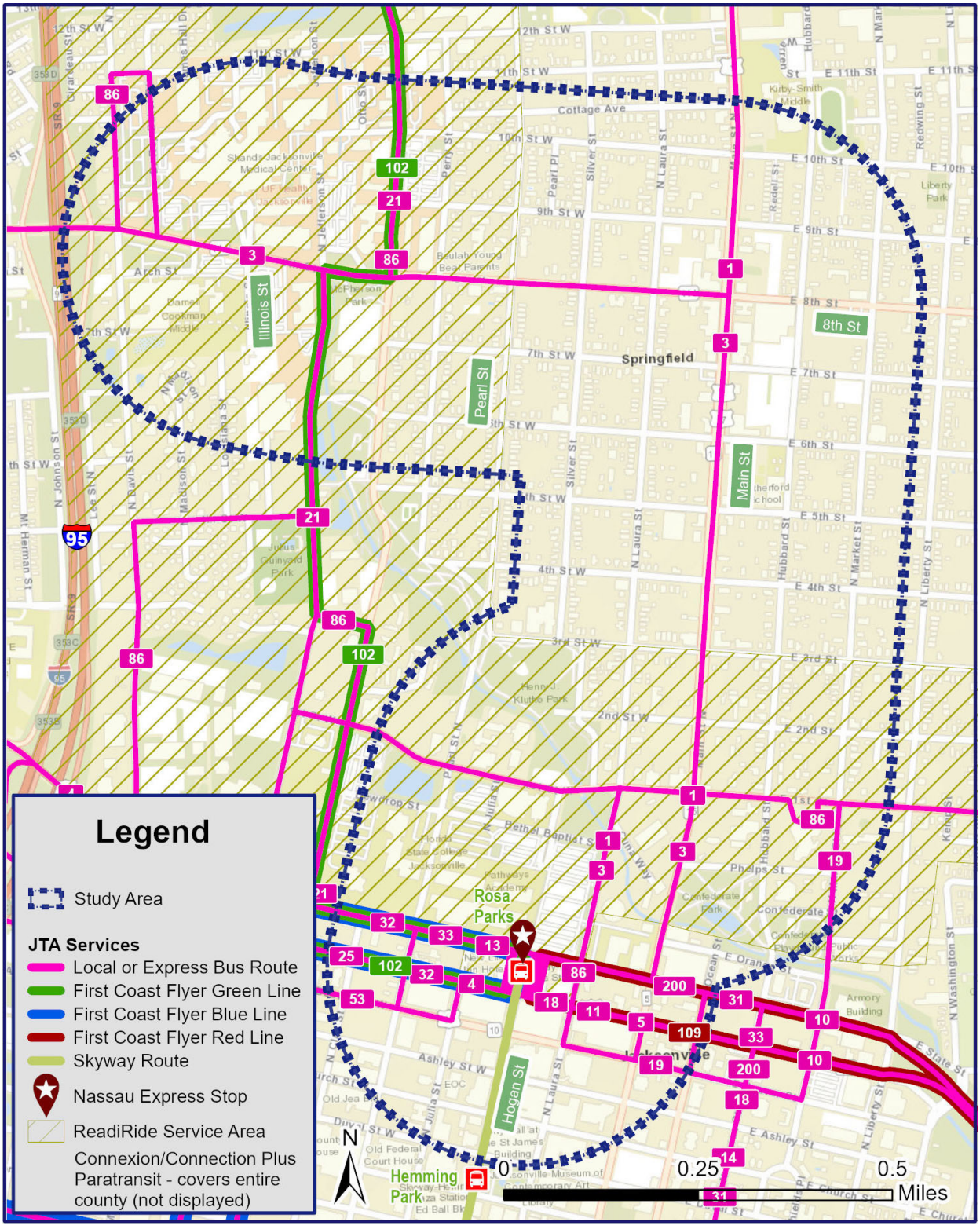
Route	Annual Boardings	Avg Passengers per Hour	Avg Load
Green First Coast Flyer	608,289	19.9	7.1
Route 1 North Main	786,765	21.5	9.4
Route 3 Moncrief	796,564	24.2	9.4
Route 86 Northside	15,310	4.2	0.7

The **First Coast Flyer Green Line** travels from the Rosa Parks Transit Station to the Armsdale Park-n-Ride. Within the North Extension (UF Health) Corridor, it travels from the Rosa Parks Transit Station to north on Broad Street along the west side of the FSCJ Downtown campus to Jefferson Street with a brief turn on 8th Street to Boulevard Street. It provides service every 10 minutes during weekday peak hours and every 15 to 30 minutes during off peak hours and weekends. According to JTA's 2019 Transit Development Plan, this high frequency route transported 608,289 passengers in 2018, averaging 19.9 passengers per revenue hour with an average load of 7.1 passengers.

Route 1 North Main connects the FSCJ North Campus with the FSCJ Downtown Campus. Within the North Extension (UF Health) Corridor, it travels from the Rosa Parks Transit Station, north along Laura Street to 1st Street before turning north on Main Street. It is a high frequency route providing service every 15 minutes during weekday peak hours and every 30 minutes during off peak hours and weekends. According to JTA's 2019 Transit Development Plan, Route 1 North Main transported 786,765 passengers in 2018, averaging 21.5 passengers per hour with an average load of 9.4 passengers.

Route 3 Moncrief serves the Amtrak Station, Soutel Transit Hub and Dunn Ave. Within the North Extension (UF Health) Corridor, it travels from the Rosa Parks Transit Station, north along Laura Street to 1st Street before turning north on Main Street to 8th Street. It is a high frequency route providing service every 15 minutes during weekday peak hours and every 30 minutes during off peak hours and weekends. According to JTA's 2019 Transit Development Plan, Route 3 Moncrief is one of JTA's highest performing routes transporting 796,564 passengers in 2018, averaging 24.2 passengers per hour with an average load of 9.4 passengers.

Figure 2.1.3: North Extension Corridor Transit Services



Route 86 Northside circulates through the southernmost area of Springfield to the Gateway Town Center and Edgewood Avenue. Within the North Extension (UF Health) Corridor, it travels from the Rosa Parks Transit Station to Laura and Beaver Streets to Harvey's Supermarket, then north on Market and 1st Streets to the Mary L. Singleton Senior Center, west to Broad Street and the Hogan Creek Towers and the Jacksonville Housing Authority, over to Jefferson Street and the VA Clinic and north to UF Health where it circulates to both sides of the UF Health campus. It is a low frequency, limited connector route operating between 10:30 a.m. and 3:00 p.m., every 90 minutes Monday through Saturday. According to JTA's 2019 Transit Development Plan, Route 86 Northside transported 15,310 passengers in 2018, averaging 4.2 passengers per hour with an average load of 0.7 passengers.

Northside ReadiRide service operates on-demand between 6 a.m. to 7 p.m. Monday through Saturday. Passengers may request pickups and drop offs within the service area. The service area extends from the Rosa Parks Transit Station the Gateway Transit Hub and northwest to Edgewood Avenue, covering the same area as Route 86. This service began in December 2018. August and September 2019 reports from JTA demonstrate that the service averages 6 trips per day with most trips traveling to or from the Rosa Parks Transit Station or Gateway Transit Hub.

Other transportation services in the North Extension (UF Health) Corridor include JTA's paratransit services **Connexion** and **Connexion Plus** and a UF Health campus shuttle.

The North Extension (UF Health) Corridor includes three of the top 20 regional paratransit destinations. An analysis of common paratransit trip locations was conducted by JTA staff for the period between January and December 2018. This analysis revealed that the UF Health complex has the highest paratransit demand in the region with 24,381 annual trips from across Jacksonville and surrounding counties. Most of these trips were to the ACC Building off of Dr. Roy Baker Drive on the far west side of the complex. The largest trip demand at this location are on Tuesdays and Thursdays with more than 60 daily trips.

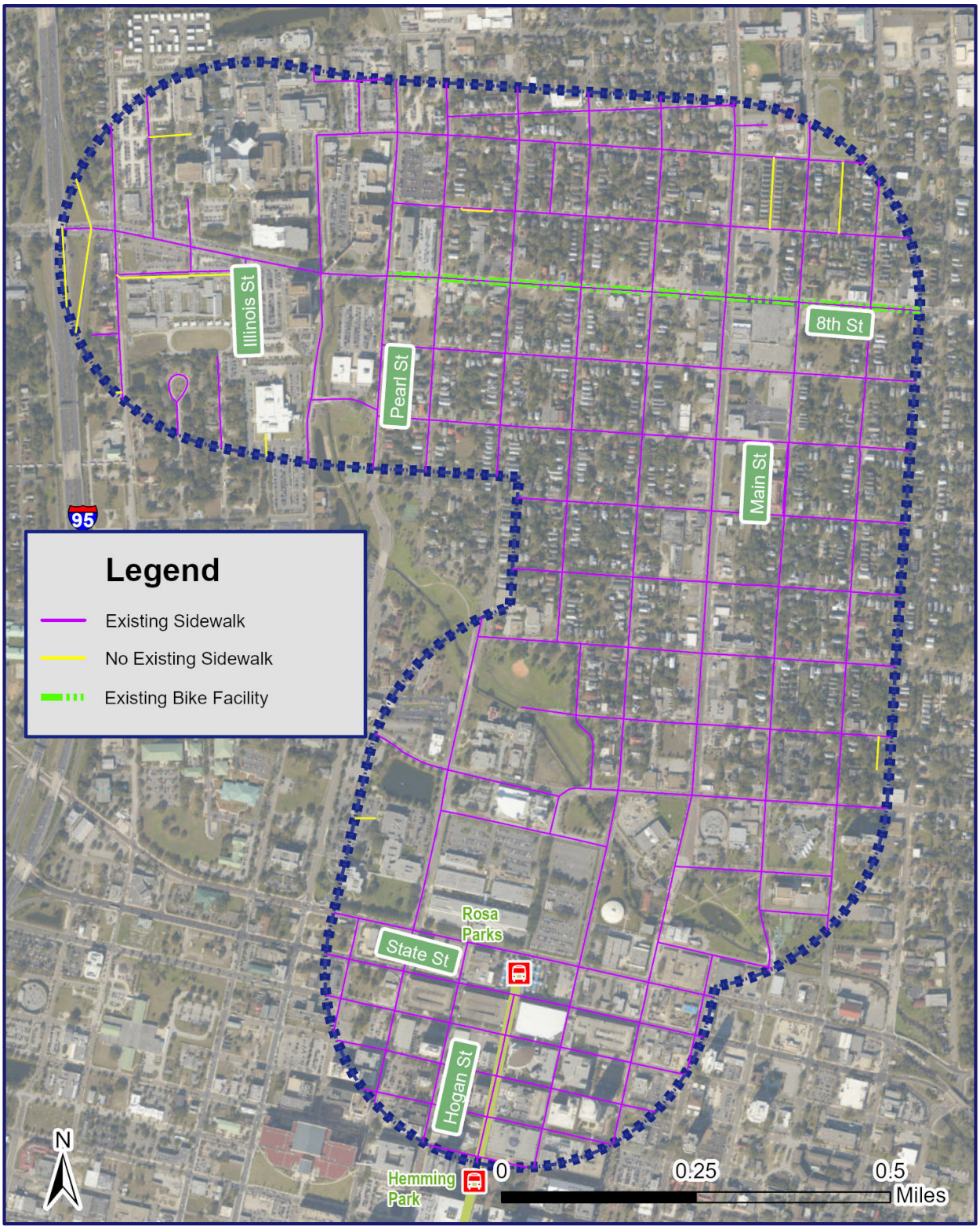
The Downtown campus of FSCJ ranked tenth on the list of paratransit destinations with 3,165 trips and the VA Clinic on Jefferson Street ranked thirteenth with 2,803 trips. It is interesting to note that there were 176 paratransit trips to or from the Rosa Parks Transit Station in 2018.

UF Health Jacksonville provides two campus shuttles primarily for their employees. Their Blue Shuttle operates from 6 a.m. to 9 a.m. and 4 p.m. and 8 p.m., circling the parking areas to the east of the complex. The Orange Shuttle operates continuously between 6 a.m. and 8 p.m. between the main Clinical Center, the Pavilion and the two Towers on the south side of 8th Street.

Bicycle and Pedestrian Accommodations

The North Extension (UF Health) Corridor is pedestrian and bicycle friendly. Sidewalks with recently upgraded crosswalks and curb ramps are located on both sides of most roads in the corridor and a bike lane runs down 8th Street from Main Street to Boulevard Street. These features are displayed in *Figure 2.1.4: North Extension Corridor Sidewalks and Bicycle Facilities*.

Figure 2.1.4: North Extension Corridor Sidewalks and Bicycle Facilities



2.1.4 Crash Analysis

Crash data was obtained from Signal Four Analytics covering a three-year analysis period from January 1, 2015 to December 31, 2017. The total number of crashes in each corridor was obtained and reviewed for locations with a high number of crashes (hotspots).

Within the North Extension (UF Health) Corridor, crash data was analyzed for the following four street segments:

- West 8th Street – from Illinois Street to Main Street
- Main Street – from West 8th Street to East 1st Street
- West 1st Street – from Main Street to Rudolph McKissick Sr Boulevard (Hogan Street)
- Rudolph McKissick Sr Boulevard – from West 1st Street to Bethel Baptist Street (Caroline Street)

From this analysis, six hotspots were identified as shown in *Table 2.1.8: North Extension Corridor Crash Hotspots*.

Table 2.1.8: North Extension Corridor Crash Hotspots

Corridor	Hotspot Areas	Number of Crashes
West 8th Street	Illinois Street, Boulevard Street, North Pearl Street	61
Main Street	West 8th Street, 3rd Street	44
West 1st Street	Main Street	15
Hogan Street	None along corridor	0

Collision diagrams were developed for each hotspot area using the crash data and police reports. Collision summaries were also produced from the crash data and police reports. The collision summaries tabulate the details of each crash including location, time of day, roadway conditions, injuries, crash type, and contributing factors. Additional collision diagrams and collision summaries are contained within *Appendix D*.

For the crashes within the hotspots along the West 8th Street, 36% of the crashes involved some level of injury while 64% resulted in property damage only. There were eight incidents of bicycle/pedestrian crashes along this corridor. The majority of the crash types represented include rear-end and sideswipe crashes.

For the crashes within the hotspots along Main Street, 36% of the crashes involved some level of injury while 64% resulted in property damage only. There were two incidents of bicycle/pedestrian crashes along this corridor. The majority of the crash types represented include angle, rear-end, and sideswipe crashes.

For the crashes within the hotspot areas along the West 1st Street, 40% of the crashes involved some level of injury while 60% resulted in property damage only. There was one incident of bicycle/pedestrian crashes along this corridor. The majority of the crash types represented include angle, left-turn, and run-off-road crashes.

Data was also obtained through the JTA to assess recent information regarding transit crashes in this corridor. A review of bus-vehicle incidents between the available dates of 7/31/2018 and 2/23/2020 found 13 incidents within the corridor study area. The highest recorded severity was attributed to striking a bicyclist (minor injury) inside the Rosa Parks Transit station. A second incident involving a bicyclist was of severity unknown. Other recorded incidents include striking fixed objects, mirrors, and moving vehicles. Multiple incidents involved the Rosa Parks Transit station or its surrounding areas.

2.1.5 Environmental/ETDM Summary

The ETDM Planning Screen was completed for the North Extension (UF Health) Corridor to incorporate an environmental review, including agency assessments concerning potential effects to natural, cultural and community resources. This section summarizes results from the Environmental Screening Tool (EST) analysis performed within a 500-ft buffer area of the North Extension (UF Health) corridor centerline. The review also provides a summary of Secondary and Cumulative Effects analysis. A copy of the full ETDM Summary Report can be found in Appendix C. The full report contains the corresponding analysis maps, found on pages 174 through 195, and as referenced in the following summary of comments.

***Social**: The Sociocultural Data Report (SDR) indicates that 21.5% of the population are below poverty level and 44.05% are identified as minority population. Multiple social resources can be found within the analysis area, highlighted by Karpeles Manuscript Library, the Veteran's Affairs Outpatient Clinic, YMCA (Shands), religious centers, parks (Gateway and Henry J Klutho), and schools (FSCJ Downtown Campus, Mattie V. Rutherford Alternative Education Center and Ambleside Green). The evaluated corridor is expected to result in substantial involvement with social resources depending on the alternative selected. A proactive public involvement program may be required (if needed) to avoid disproportionally high or adverse effects to any distinct population.*

***Relocation Potential**: The evaluated corridor is expected to result in minimal involvement with relocations is within ROW. Should any resident, business or community structures require relocation, a Right-Of-Way (ROW) and relocation program will need to be implemented.*

***Farmlands**: There are no prime farmlands within the 500-foot project buffer area.*

***Aesthetic Effects**: Elevated alternatives may result in minimal involvement with aesthetic resources and will be analyzed during Project Development.*

***Economic**: Corridor will enhance economic resources and regional connectivity.*

***Mobility**: Corridor will enhance mobility in the region.*

***Cultural**: The EST found one Florida Site File cemetery, three bridges, 288 standing structures, five resource groups and four National Register of Historic Places listed sites (Henry Klutho House, Bethel Baptist Institutional Church, Springfield Historic District and Downtown*

Jacksonville Historic District). The proposed corridor is expected to result in moderate involvement with historic and archaeological resources. A Cultural Resource Assessment Survey may be conducted. Coordination with the State Historic Preservation Office (SHPO) and the Seminole Tribe of Florida may be required in subsequent project development.

Additional information can be seen on the Cultural Resources Data Map on page 178 of the ETDM Summary Report, and the Historic Resources Map on page 181.

The proposed corridor is expected to result in minimal involvement with recreational facilities.

***Natural**: The Natural Wetland Inventory (NWI) identified 1.59 acres of wetlands, two waterbodies (St. Johns River and Hogans Creek), floodplain zone AE, and one rare and imperiled fish (Atlantic sturgeon) within analysis area. The project is completely within Woodstork Core Foraging Areas. A Natural Resource Evaluation may be conducted during project development (if needed) to document any involvement with wetlands, protected species and habitats. See Wetland and Surface Waters Map, page 195 and Floodplains Map, page 180, of the ETDM Summary Report.*

The proposed corridor is expected to result in minimal involvement with wetland resources, water quality and quantity resources, floodplain resources, wildlife and habitat resources, and no impact to coastal resources. The only wetland involvement is with Hogan's Creek. It is anticipated that the project may require an Individual Environmental Resource Permit.

***Physical**: The proposed corridor is expected to result in minimal involvement with noise, air quality and navigation resources.*

The project is anticipated to have moderate involvement with infrastructure. Coordination with downtown stakeholders may be required to minimize potential concerns during Project Development.

The EST identified several potential contamination sites across the corridor (see the Contamination Site Map on page 177 of the ETDM Summary Report) and is expected to result in moderate involvement with potential sources of contamination. A Phase I or possibly a Phase II contamination site assessment may be conducted during the next phase of project development.

***Special Designations**: The EST analysis did not identify any involvement with Outstanding Florida Water, Aquatic Preserves, Scenic Highway resources or Wild and Scenic Rivers.*

2.2 West Extension (Riverside) Corridor



The West Extension (Riverside) Corridor will extend from the Skyway to Brooklyn, Five Points and the Riverside Arts Market. The newly revitalized Brooklyn area is home to major office facilities, residential buildings and commercial centers including the growing retail area at the Fresh Market. The system will extend to the Riverside Arts Market and Cummer Museum of Art and Gardens along the St Johns River and to the popular Five Points area, which encompasses an eclectic selection of restaurants and stores. This system extension will also serve an area with significant medical facilities including St Vincent's Medical Center Riverside.

2.2.1 Demographic Profile

The ½ -mile study area for the proposed West Extension (Riverside) Corridor intersects four census block groups in Duval County. Data was obtained through the Census Block Group Analysis 2010. After grouping the four census blocks intersecting the corridor, the averages of specific demographic information were compared to the demographic information for all of Duval County and is shown in Tables 2.2.1 to 2.2.6. Detailed maps illustrating the area's demographic profile are included in *Appendix B: Demographic Figures.*

Table 2.2.1: West Extension Corridor Population

Evaluation Criteria	Duval County	West Extension Corridor
Total Population	864,263	7,406
Percent of the population that is White	52.3%	63.2%
Percent of the population that is Black	32.7%	29.5%
Percent of the population that is Hispanic	6.7%	5.4%
Percent of the population that is Asian	3.1%	2.9%
Percent of the population that is Other[1]	5.2%	4.4%
Percent of the population that is considered 'Minority'	44.6%	34.5%
Median population age	37.8	38.0
Percent of the population that is above 65 years old	12.5%	20.3%

[1] *Other population groups include: American Indian or Alaska native, Native Hawaiian or other Pacific islander, or 2 or more races.*

As shown in Table 2.2.1, the West Extension (Riverside) Corridor has a similar demographic profile as the whole of Duval County with a few notable exceptions. The percent of the population considered white is slightly higher in the corridor (63.2%) than in all of Duval County (52.3%). The corridor has a slightly lower percentage of blacks and Hispanics compared to Duval County. Therefore, the overall minority percentage is slightly lower in the corridor (34.5%) than in Duval County (44.6%). The percent of the population older than 65 years old is significantly higher in the corridor (20.3%) than in Duval County (12.5%).

The project corridor has a higher population density than Duval County, a characteristic which is consistent with an urban corridor.

The most prevalent demographic difference between the corridor and Duval County is the median family income, which is approximately $13,000 higher compared to the county as a whole. However, the corridor median household income is lower than Duval County, $38,468 compared to $49,188 respectively. In addition, the percentage of households and population below the poverty line are slightly higher than Duval County. A total of 19.6% of the households in the corridor are below the poverty line compared to 13.0% for Duval County. Moreover, the percent of the population that is below the 150% poverty line is slightly lower in the corridor (8.5%) than in Duval County (9.5%).

Table 2.2.2: West Extension Corridor Population Density

Evaluation Criteria	Duval County	West Extension Corridor
Total acres	587,813	2,228
Population density (persons per acre)	1.5	2.52
Household density (housing units per acre)	2.4	1.67
Percent of housing units occupied	87.4%	83.9%
Percent of housing units vacant	12.6%	16.1%
Average family size	3.0	2.8
Average household size	2.5	1.8

Table 2.2.3: West Extension Corridor Income

Evaluation Criteria	Duval County	West Extension Corridor
Median Household Income ($)	$ 49,188	$ 38,468
Median Family Income ($)	$ 58,496	$ 71,725
Percent of households below the poverty line[2]	13.0%	19.6%
Percent of the population below the poverty line[2]	13.8%	19.4%
Percent of the population below the 150% poverty line[2]	9.5%	8.5%

[2] *The Census Bureau uses a set of income thresholds that vary by family size to determine poverty level. The 150% poverty level guideline excludes those below poverty line.*

The percentage of the population that commutes to/from work via a car, truck, or van in the corridor (83.1%) is lower than Duval County (91.7%). Similarly, the percent of the population that walks to/from work is significantly higher in the corridor (6.9%) compared to Duval County (1.7%). The percent of the population that bikes or takes public transportation (5%) is also higher in the corridor than in Duval County. The percent of households that do not have a vehicle is significantly higher in the corridor (24.9%) compared to Duval County (7.4%).

The percent of the population that is considered Limited English Proficient (LEP) is lower in the corridor than in Duval County, 3.0% compared to 4.9%. This gap is consistent with the corridor containing a lower percentage of Hispanics than all of Duval County.

Table 2.2.4: West Extension Corridor Transportation

Evaluation Criteria	Duval County	West Extension Corridor
Percent of the population that commutes via a car, truck or van	91.7%	83.1%
Percent of the population that does not commute	3.5%	4.9%
Percent of the population that commutes via bicycle	0.6%	0.8%
Percent of the population that commutes via walking	1.7%	6.9%
Percent of the population that commutes via public transportation	1.6%	3.0%
Percent of the population that commutes via motorcycle	0.3%	0.0%
Percent of the population that commutes via other means	0.6%	1.3%
Percent of households that do not have a vehicle	7.4%	24.9%

Table 2.2.5: West Extension Corridor Language

Evaluation Criteria	Duval County	West Extension Corridor
Percent of the population that speaks only English	87.4%	87.9%
Percent of the population that speaks a language other than English and also speaks English "very well"	7.7%	5.9%
Percent of the population that is considered to be Limited English Proficient [3]	4.9%	3.0%

[3] *People with Limited English Proficiency (LEP) speak English "less than very well" or "not at all." These people have a limited ability to read, write, speak or understand English.*

As illustrated in *Table 2.2.6 West Extension Corridor Evaluation*, the corridor has a comparable education attainment as Duval County as a whole, with a significantly higher percentage with some college or an associate degree but a slightly lower percentage with a bachelor's or higher college degree.

Table 2.2.6: West Extension Corridor Education

Evaluation Criteria	Duval County	West Extension Corridor
Percent of the population that is over 25 years old and has less than a 9th grade education	3.8%	2.6%
Percent of the population that is over 25 years old and has completed more than 9th grade but does not have a high school diploma	9.0%	9.3%
Percent of the population that is over 25 years old and has a high school diploma	87.2%	88.0%
Percent of the population that has some college or an associate degree	32.0%	48.5%
Percent of the population that has a bachelor's, master's, doctorate or professional degree	16.9%	16.5%

2.2.2 Existing Land Use

As illustrated in *Figure 2.2.1: West Extension Corridor Existing Land Use*, the corridor is predominantly offices and retail land uses. Existing industrial uses are located on the perimeter of the corridor. Residential, educational, and park land uses appear adjacent to the Five Points area.

2.2.3 Transportation System Features

The following is an overview of the existing transportation system within the West Extension (Riverside) Corridor. The West Extension (Riverside) Corridor is bounded by the existing Skyway to the north and extends along Riverside Avenue until splitting into two spurs at Forest Street. One spur extends beyond Interstate 95 to the south to the Riverside Arts Market and the Cummer Museum of Art and Gardens. The second spur travels south on Park Street to the Five Points area.

Roadway Characteristics

Within the West Extension (Riverside) Corridor, lane configuration varies as land uses transition from residential to offices and retail. Riverside Avenue ranges from 3 to 6 lanes as it proceeds south. From Leila Street to Forest Street, there's a 6-lane configuration with three lanes on each side divided by a median, from Forest Street to I-95 there's a 4-lane configuration with two lanes on each side divided by a median and a 3-lane configuration from I-95 to Lomax Street. Parking on both sides of the roadway is found under the I-95 bridge.

Figure 2.2.1: West Extension Corridor Existing Land Use

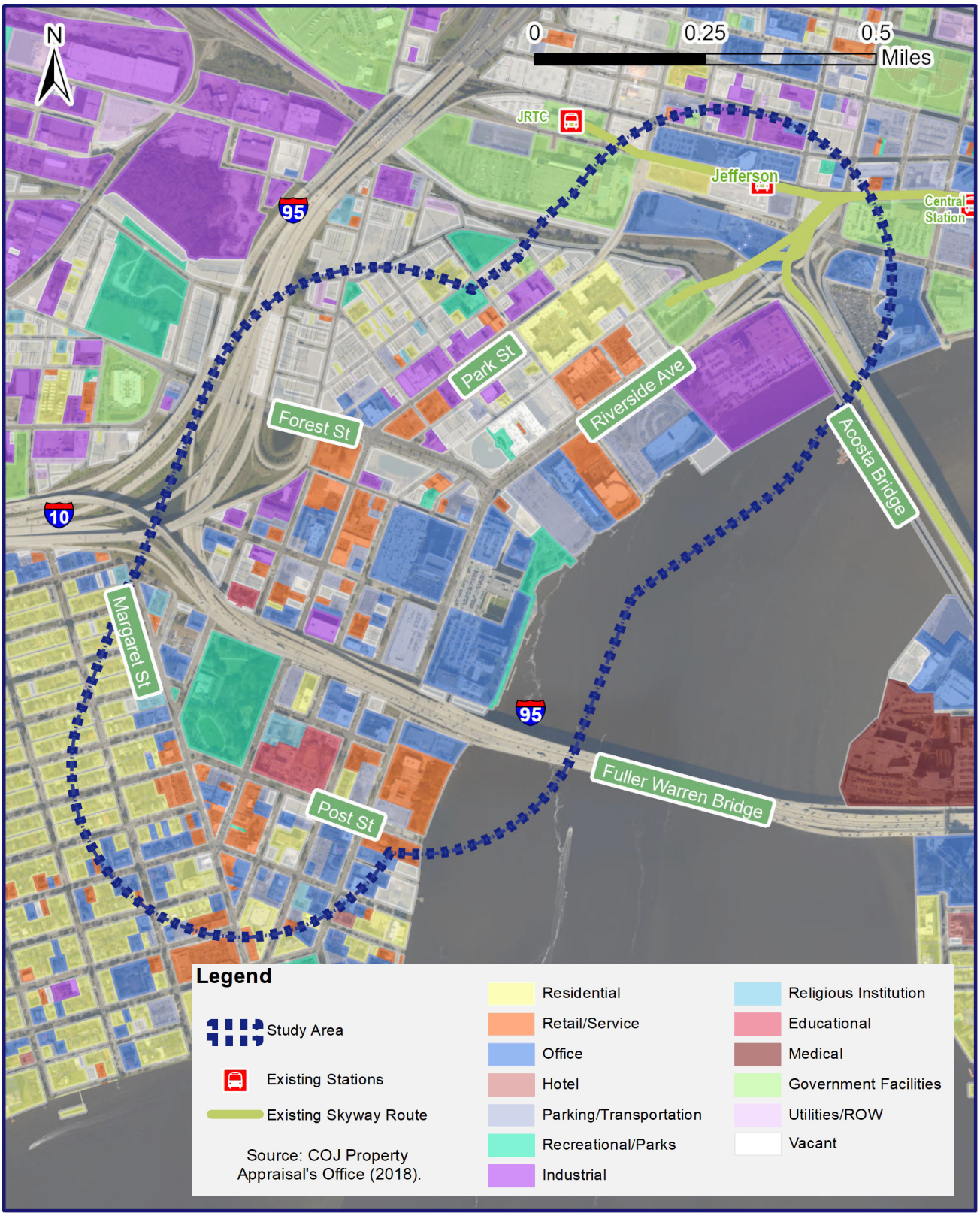


Figure 2.2.2: West Extension Corridor Traffic & Intersections



Park Street has a 4-lane configuration with two lanes on each side from Forest Street to I-95 and transitions to a 2-lane configuration with one lane on each side as it approaches Post Street. On-street parking on both sides of the roadway is found between I-95 and Post Street and along Riverside Park Place. Parking on one side of the road is found on minor residential streets, including Post Street. Roadway characteristics are depicted in *Figure 2.2.2: West Extension Corridor Traffic & Intersections.* AADT values for U.S. highways and state routes were taken from the FDOT Florida Traffic Online 2018 AADT dataset and local street values (if available) were taken from the City of Jacksonville 2018 Local Traffic Counts Spreadsheet.

The corridor includes a traffic circle where five streets, Park Street, Lomax Street, and Margaret Street intersect. Lomax Street terminates at the traffic circle and Park Street continues southbound with a 2-lane configuration.

Forest Street has a 6-lane configuration, three lanes on each side, divided by a median between Park Street and Riverside Avenue. The posted speed throughout the West Extension (Riverside) Corridor varies from 25 mph to 35 mph. Riverside Avenue has a higher AADT of 29,000 while Forest Street has an AADT of 2,600.

Transit Service & Connectivity

The northern most point of this West Extension (Riverside) Corridor is the Jefferson Street Skyway Station. The transit services currently serving the corridor include the First Coast Flyer Blue Line and local routes 5 Park/Blanding, 14 Edison, 15 Post/Normandy, 16 Riverside/Wilson and 32 McDuff. The transit service statistics are summarized in *Table 2.2.7: West Extension Corridor Transit Statistics*. These services are also illustrated in *Figure 2.2.3: West Extension Corridor Transit Services* with additional details summarized as follows.

Table 2.2.7: West Extension Corridor Transit Statistics

Route	Annual Boardings	Avg Passengers per Hour	Avg Load
Route 5 Park/Blanding	727,394	18.2	9.9
Route 14 Edison	236,879	17.5	6.8
Route 15 Post/Normandy	307,532	16.6	7
Route 16 Riverside/Wilson	272,378	15.2	7.1
Route 32 McDuff	14,700	5.2	1.9

Route 5 Park/Blanding travels from the Rosa Parks Transit Station to 103rd Street and the Orange Park Mall. Within the corridor, it travels from Water Street to Park Street, remaining on Park Street through the Riverside area. This is a high frequency route providing service every 15 minutes during weekday peak hours and every 30 minutes during off peak hours and weekends.

According to JTA's 2019 Transit Development Plan, Route 5 Park/Blanding transported 727,394 passengers in 2018, averaging 18.2 passengers per revenue hour with an average load of 9.9 passengers.

Figure 2.2.3: West Extension Corridor Transit Services



Route 14 Edison travels from the Rosa Parks Transit Station to the Normandy Walmart. Within the corridor, it travels from Water Street to Park Street, turning west and continuing along Forest Street. It operates between 5:00 a.m. and 11:30 p.m. with a 30-minute peak hour frequency. Route 14 Edison transported 236,879 passengers in 2018, averaging 17.5 passengers per revenue hour with an average load of 6.8 passengers.

Route 15 Post/Normandy travels from the Rosa Parks Transit Station to the Normandy Walmart and the Herlong Recreational Airport. Within the corridor, it travels from Water Street to Park Street, turning west at Post Street. It operates between 4:00 a.m. and 1:30 a.m. with a 30-minute peak hour frequency. Route 15 Post/Normandy transported 307,532 passengers in 2018, averaging 16.6 passengers per revenue hour with an average load of 7 passengers.

Route 16 Riverside/Wilson travels from the Rosa Parks Transit Station, through Riverside to St. Vincent's Medical Center and Middleburg Road at 103rd Street. Within the corridor, it travels from south along Broad and Jefferson Streets to Riverside Avenue. It operates between 5:00 a.m. and 11:00 p.m. with a 30-minute peak hour frequency. Route 16 Riverside/Wilson transported 272,378 passengers in 2018, averaging 15.2 passengers per revenue hour with an average load of 7.1 passengers.

Route 32 McDuff travels from the Rosa Parks Transit Station, through Riverside to the Paxon area. Within the corridor, it travels Riverside Avenue to Post and Park Streets. It operates between 5:45 a.m. and 8:00 p.m. Monday through Saturday with a 60-minute frequency. It transported 14,700 passengers in 2018, averaging 5.2 passengers per revenue hour with an average load of 1.9 passengers.

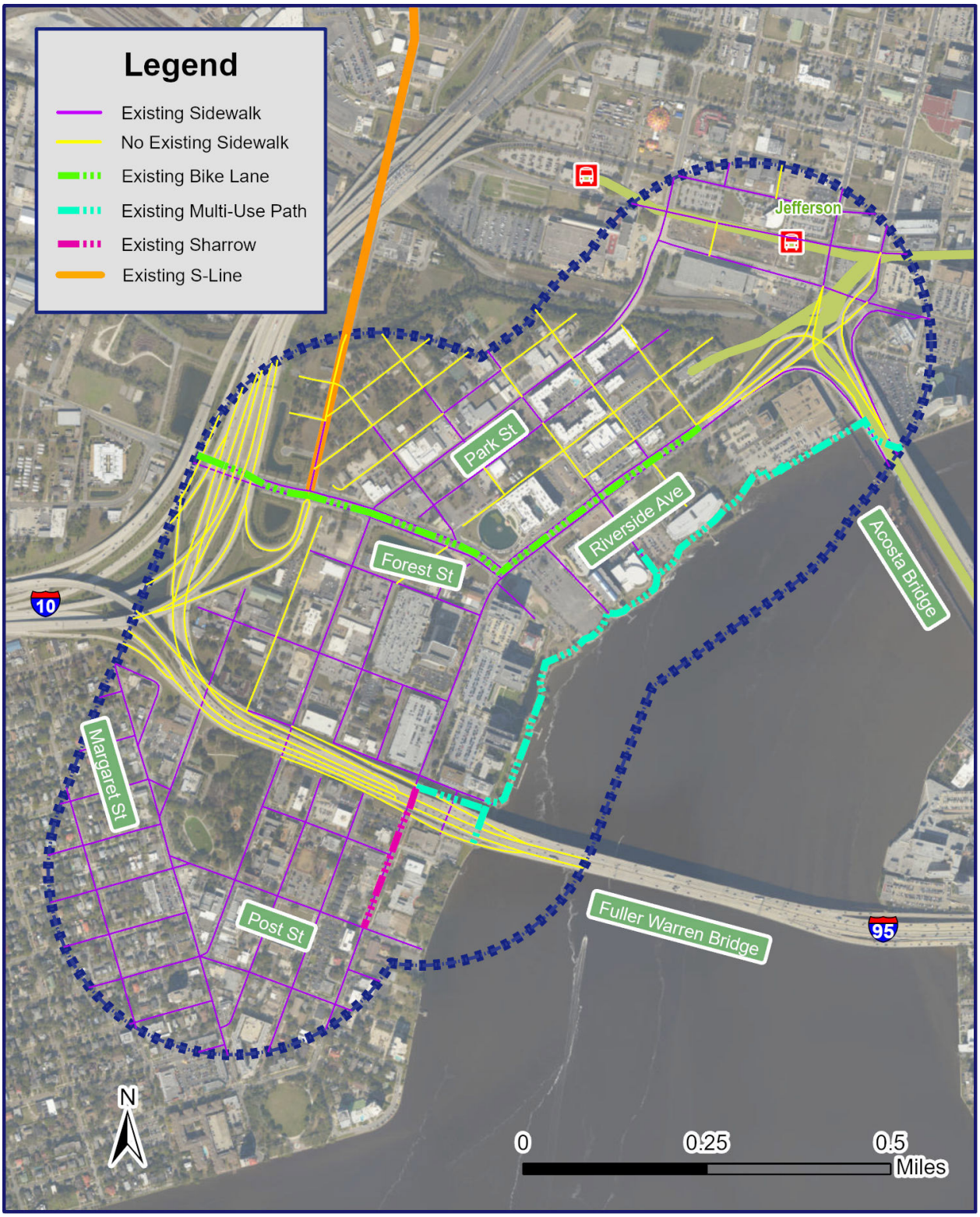
According to the common paratransit trip locations analysis, the YMCA on Riverside Avenue had 1,561 paratransit trips in 2018. No other single location within the West Extension (Riverside) Corridor had more than 150 paratransit trips in 2018.

Bicycle and Pedestrian Accommodations

Dedicated bicycle lanes are located on Riverside Avenue from Leila Street to Rosselle Street and along Forest Street. Along Riverside Avenue, from Rosselle Street to Lomax Street, sharrows pavement markings are included to encourage shared lane use. The streets within the Western Extension (Riverside) Corridor have sidewalks on both sides of the roadway. The corridor includes a segment of the Northbank Riverwalk, which extends from Hyatt Regency to the Fuller Warren bridge in Riverside.

The Northbank Riverwalk can be accessed at multiple locations, including Jackson Street and Peninsular Place. *Figure 2.2.4: West Extension Corridor Sidewalks and Bicycle Facilities* illustrates these bicycle and pedestrian features.

Figure 2.2.4: West Extension Corridor Sidewalks and Bicycle Facilities



2.2.4 Crash Analysis

Crash data was obtained from Signal Four Analytics covering a three-year analysis period from January 1, 2015 to December 31, 2017. The total number of crashes for each corridor was obtained and reviewed for locations with a high number of crashes (hotspots).

Within the West Extension (Riverside) Corridor, crash data was obtained and analyzed along three street segments, including:

- Park Street – from Post Street to Stonewall Street
- Forest Street – from Park Street to Riverside Avenue
- Riverside Avenue – from Peninsular Place to Leila Street

From this analysis, *Table 2.2.8: West Extension Corridor Crash Hotspots* was created to identify crash hotspots along the corridor.

Table 2.2.8: West Extension Corridor Crash Hotspots

Segment	Hotspot Descriptions	Number of Crashes
Park Street	Post Street, Riverside Park Place, Roselle Street, Forest Street	90
Forest Street	None along corridor	0
Riverside Avenue	Roselle Street, Forest Street, Dora Street, Jackson Street, Stonewall Street	94

Collision diagrams were developed for each hotspot area using the crash data and police reports. Collision summaries were also produced to tabulate the details of each crash including location, time of day, roadway conditions, injuries, crash type, and contributing factors. These collision summaries and diagrams can be found in *Appendix D*.

For the crashes within the hotspots along Park Street, 39% of the crashes involved some level of injury while 61% resulted in property damage only. There were seven incidents of bicycle/pedestrian crashes along this corridor. The majority of the crash types represented included rear-end, sideswipe, and angle crashes.

For the crashes within the hotspots along Riverside Avenue, 31% of the crashes involved some level of injury while 69% resulted in property damage only. There were incidents of bicycle/pedestrian crashes along this corridor. The majority of the crash types represented were rear-end crashes.

Data was also obtained through the JTA to assess recent information regarding transit crashes in this corridor. A review of bus-vehicle incidents between the available dates of 7/31/2018 and 2/23/2020 found 16 incidents within the corridor study area. The highest recorded severity was attributed to a collision at an intersection with minor injuries reported near Park Street and Edison Avenue. A second incident involving striking a pedestrian near the Convention Center Station was of no-injury severity. Other recorded incidents include striking fixed objects and moving vehicles. Multiple incidents involved the Park Street corridor and Route 5 at night.

2.2.5 Environmental/ETDM Summary

The ETDM Planning Screen was completed for the West Extension (Riverside) Corridor to incorporate an environmental review, including agency assessments concerning potential effects to natural, cultural and community resources into the study process. This section specifically summarizes results from the Environmental Screening Tool (EST) analysis performed within a 500-ft buffer area of the West Extension (Riverside) corridor centerline. The review also provides a summary of Secondary and Cumulative Effects analysis. A full report of the can be found in Appendix C. The full report contains the corresponding detailed analysis maps (see pages 243 through 264 of the ETDM Summary Report) and as referenced in the following summary of comments.

***Social**: Sociocultural Data Report indicates 22.6% of population below poverty level and 17.61% minority population. Approximately 91% of the housing units along this corridor are multi-family.*

Multiple social resources within analysis area include Cummer Museum of Art, Northbank Riverwalk, Riverside Park, and Riverside Presbyterian Church and School, and YMCA (Yates Family Center). The evaluated corridor is expected to result in moderate involvement with social resources. A proactive public involvement program may be required (if needed) to avoid disproportionally high or adverse effects to any distinct population.

***Relocation Potential**: The evaluated corridor is expected to result in minimal involvement with relocations is within ROW. Should any resident, business or community structures require relocation, a ROW and relocation program will need to be implemented.*

***Farmlands**: There are no prime farmlands within the 500-foot project buffer area.*

***Aesthetic Effects**: Elevated alternatives may result in moderate involvement with aesthetic resources and will be analyzed during Project Development.*

***Economic**: Corridor will enhance economic resources and regional connectivity.*

***Mobility**: Corridor will enhance mobility in the region.*

***Cultural**: The EST found three Florida Site File archeological or historical sites, 137 standing structures, one resource group, and one National Register of Historic Places listed site (Riverside Historic District). A Cultural Resource Assessment Survey may be conducted. Since the purpose is to provide transit service to key destinations, the proposed corridor is expected to result in moderate involvement with historic and archaeological resources. Coordination with SHPO and Seminole Tribe of Florida may be required during subsequent project development. Additional information is depicted in the Cultural Resources Data Map on page 247 and the Historic Resources Map on page 250 of the ETDM Summary Report in Appendix C.*

The proposed corridor is expected to result in minimal involvement with recreational facilities.

***Natural**: The proposed corridor is expected to result in minimal involvement with wetland resources, water quality and quantity resources, floodplain resources, wildlife and habitat resources, and no impact to coastal resources. However, the Natural Wetland Inventory (NWI) identified .78 acres of wetlands, three waterbodies (St. Johns River, McCoy Creek, and Willow Branch), floodplain zone AE, and one rare and imperiled fish (Atlantic sturgeon) within analysis area. Details of this environmental area can be found on the Water Resources Map and the*

Wetland and Surface Waters Map on pages 263 and 264, respectively in the ETDM Summary Report included in Appendix C. The St. Johns River Water Management District (SJRWMD) may require an Individual Environmental Resource Permit during subsequent project development.

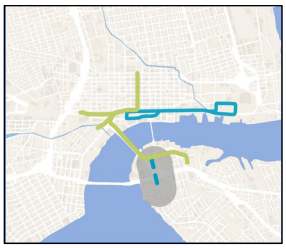
The project is completely within Woodstork Core Foraging Areas. A Natural Resource Evaluation may be conducted during project development (if needed) to document any involvement with wetlands, protected species and habitats.

***Physical**: The proposed corridor is expected to result in minimal involvement with noise, air quality, infrastructures, and navigation resources.*

The EST identified several potential contamination sites across the corridor and is expected to result in moderate involvement with potential sources of contamination. Future project development phases may require a Phase I and possibly a Phase II Contamination Site Assessment. The Contamination Map is shown on page 246 of the ETDM Summary Report contained in Appendix C.

***Special Designations**: The EST analysis did not identify any involvement with Outstanding Florida Water, Aquatic Preserves, Scenic Highway resources or Wild and Scenic Rivers.*

2.3 South Extension (Medical Complex) Corridor



The South Extension (Medical Complex) Corridor connects the existing San Marco Skyway Station to a growing medical center complex. The medical center is one of the largest in Florida and includes the Baptist Health Medical Center, Nemours's Children's Hospital and the newly constructed MD Anderson Cancer facilities. In addition, there are numerous residential and commercial buildings in this area.

2.3.1 Demographic Profile

The ½ -mile study area for the proposed South Extension (Medical Complex) Corridor intersects two census block groups in Duval County based on the Census Block Group Analysis (2010). After grouping the two census blocks intersecting the corridor, the averages of specific demographic information were compared to the demographic information for all of Duval County and is shown in Tables 2.3.1 to 2.3.6. Detailed maps illustrating the area's demographic profile are included in *Appendix B: Demographic Figures*.

Table 2.3.1: South Extension Corridor Population

Evaluation Criteria	Duval County	South Extension Corridor
Total Population	864,263	2,611
Percent of the population that is White	52.3%	83.0%
Percent of the population that is Black	32.7%	9.7%
Percent of the population that is Hispanic	6.7%	5.4%
Percent of the population that is Asian	3.1%	4.4%
Percent of the population that is Other[1]	5.2%	2.9%
Percent of the population that is considered 'Minority'	44.6%	19.5%
Median population age	37.8	42.0
Percent of the population that is above 65 years old	12.5%	14.6%

[1] *Other population groups include: American Indian or Alaska native, Native Hawaiian or other Pacific islander, or 2 or more races.*

As shown in *Table 2.3.1 South Extension Corridor Population,* the percent of the population considered white is significantly higher in the South Extension (Medical Complex) Corridor (83.0%) than in all of Duval County (52.3%). The corridor has a significantly lower percentage of blacks and Hispanics compared to Duval County.

Therefore, the overall minority percentage is significantly lower in the corridor (19.5%) than in Duval County (44.6%). The percent of the population older than 65 years old is slightly higher in the corridor (14.6%) than in Duval County (12.5%).

The corridor has a higher population density than Duval County, a characteristic which is consistent with an urban corridor as noted in *Table 2.3.2 South Extension Corridor Population Density*.

The most prevalent demographic difference between the corridor and Duval County is the median household income, which is approximately $11,000 lower compared to the county as a whole. However, the median family income is slightly lower than Duval County, $57,099 compared to $58,496 respectively. In addition, the percentage of households and population below the poverty line are slightly lower than Duval County. A total of 11.1% of the households in the corridor are below the poverty line compared to 13.0% for Duval County. Moreover, the percent of the population that is below the 150% poverty line is slightly lower in the corridor (7.0%) than in Duval County (9.5%).

Table 2.3.2: South Extension Corridor Population Density

Evaluation Criteria	Duval County	South Extension Corridor
Total acres	587,813	823
Population density (persons per acre)	1.5	3.2
Household density (housing units per acre)	2.4	2.5
Percent of housing units occupied	87.4%	80.7%
Percent of housing units vacant	12.6%	19.3%
Average family size	3.0	2.5
Average household size	2.5	1.5

Table 2.3.3: South Extension Corridor Income

Evaluation Criteria	Duval County	South Extension Corridor
Median Household Income ($)	$ 49,188	$ 37,930
Median Family Income ($)	$ 58,496	$ 57,099
Percent of households below the poverty line[2]	13.0%	11.1%
Percent of the population below the poverty line[2]	13.8%	8.8%
Percent of the population below the 150% poverty line[2]	9.5%	7.0%

[2] *The Census Bureau uses a set of income thresholds that vary by family size to determine poverty level. The 150% poverty level guideline excludes those below poverty line.*

The percentage of the population that commutes to/from work via a car, truck, or van in the corridor (90.4%) is lower than Duval County (91.7%). Similarly, the percent of the population that walks to/from work is higher in the corridor (4.5%) compared to Duval County (1.7%). The percent of the population that takes public transportation is also higher in the corridor than in Duval County. The percent of households that do not have a vehicle is significantly higher in the corridor (13.4%) compared to Duval County (7.4%).

Table 2.3.4: South Extension Corridor Transportation

Evaluation Criteria	Duval County	South Extension Corridor
Percent of the population that commutes via a car, truck or van	91.7%	90.4%
Percent of the population that does not commute	3.5%	0.3%
Percent of the population that commutes via bicycle	0.6%	0.4%
Percent of the population that commutes via walking	1.7%	4.5%
Percent of the population that commutes via public transportation	1.6%	4.4%
Percent of the population that commutes via motorcycle	0.3%	0.0%
Percent of the population that commutes via other means	0.6%	0.0%
Percent of households that do not have a vehicle	7.4%	13.4%

The percent of the population that is considered Limited English Proficient (LEP) is lower in the corridor than in Duval County – 1.1% compared to 4.9%. This gap is consistent with the corridor containing a lower percentage of Hispanics than all of Duval County.

Table 2.3.5: South Extension Corridor Language

Evaluation Criteria	Duval County	South Extension Corridor
Percent of the population that speaks only English	87.4%	87.5%
Percent of the population that speaks a language other than English and also speaks English "very well"	7.7%	9.2%
Percent of the population that is considered to be Limited English Proficient [3]	4.9%	1.1%

[3] People with Limited English Proficiency (LEP) speak English "less than very well" or "not at all." These people have a limited ability to read, write, speak or understand English.

As depicted in *Table 2.3.6 South Extension Corridor Education*, the corridor has a comparable education attainment as Duval County as a whole, with a higher high school graduation rate, but a slightly lower percentage with a bachelor's or higher college degree.

Table 2.3.6: South Extension Corridor Education

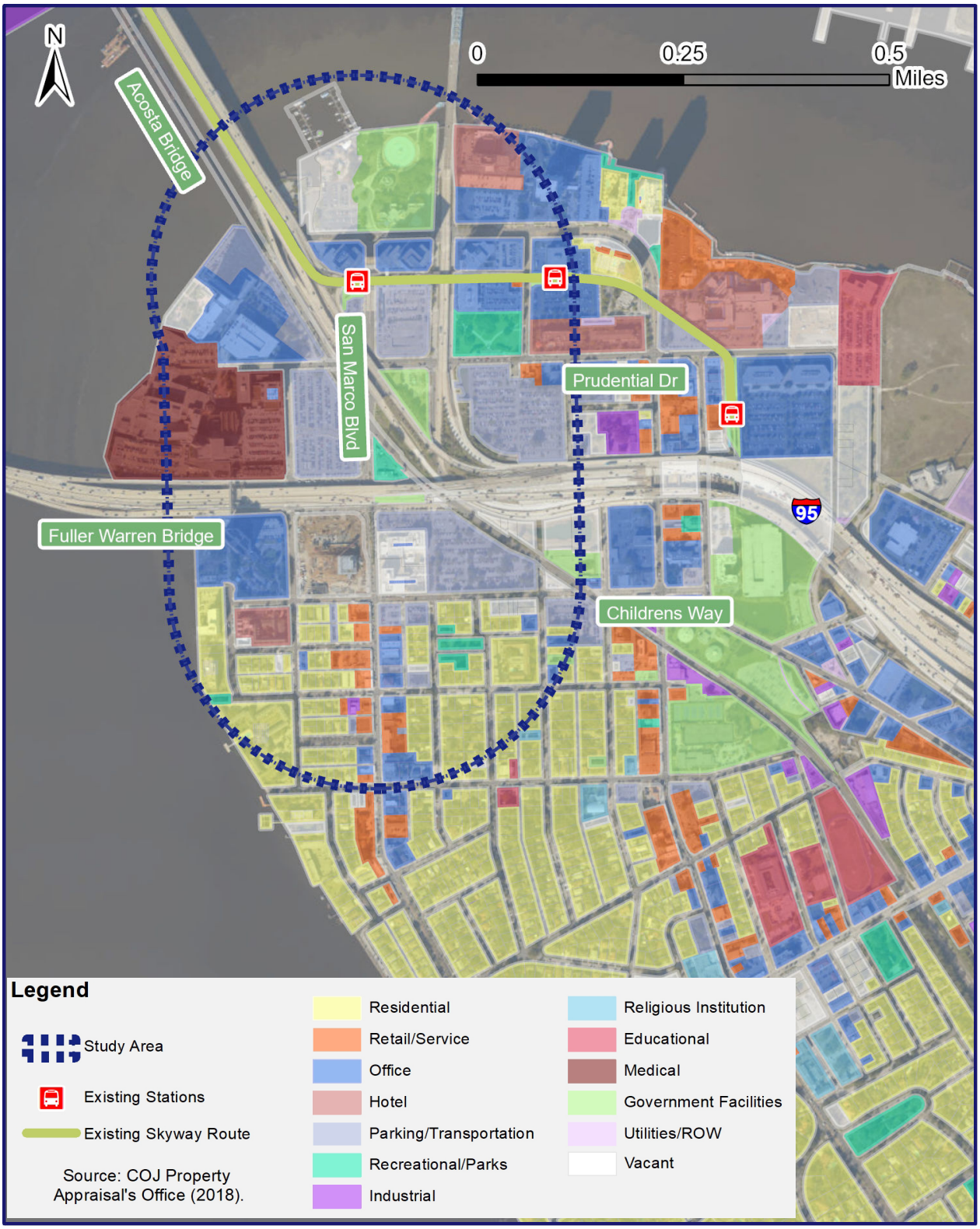
Evaluation Criteria	Duval County	South Extension Corridor
Percent of the population that is over 25 years old and has less than a 9th grade education	3.8%	0.4%
Percent of the population that is over 25 years old and has completed more than 9th grade but does not have a high school diploma	9.0%	4.6%
Percent of the population that is over 25 years old and has a high school diploma	87.2%	95.0%
Percent of the population that has some college or an associate degree	32.0%	54.9%
Percent of the population that has a bachelor's, master's, doctorate or professional degree	16.9%	14.0%

2.3.2 Existing Land Use

The South Extension (Medical Complex) Corridor includes commercial and services (31 acres), roads (15 acres), and institutional (12 acres) as the three major existing land uses. It also includes one PUD, one DRI (Jacksonville Downtown) and one brownfield location.

As illustrated in *Figure 2.3.1: South Extension Corridor Existing Land Use*, the corridor appears to be predominantly medical, offices, and parking. Other land uses located on the perimeter of the corridor are government facilities. Existing residential and retail land uses are located south of corridor.

Figure 2.3.1: South Extension Corridor Existing Land Use



2.3.3 Transportation System Features

The following is an overview of the existing transportation system within the South Extension (Medical Complex) Corridor. The corridor is bounded by the existing San Marco Skyway Station to the north as it branches off the Acosta Bridge. The corridor extends south along San Marco Boulevard from Mary Street towards Nira Street and Childrens Way.

Roadway Characteristics

Within the South Extension (Medical Complex) Corridor, lane configuration varies as land uses transition from medical to residential. San Marco Boulevard has two thru lanes and a dedicated turn lane in each direction, north of I-95, with a posted speed limit of 30 mph. South of I-95, this changes to one thru lane in each direction with intermittent turn lanes.

Parking lots are found under the I-95 bridge from San Marco Boulevard to Palm Avenue. There is a 5-lane configuration separated by a painted median consisting of 2-lanes on one side and 3-lanes on the other. A railroad bridge is found running parallel to the Acosta Bridge. Parking lots on both sides of San Marco Boulevard are found under the Acosta Bridge. The roadway under the bridge has a 7-lane configuration transitioning to a 5-lane configuration.

Throughout Cedar Street, Palm Avenue, and Nira Street/Childrens Way there are two lanes (undivided) in each direction with a posted speed limit of 25 mph. Along the major corridor of San Marco Boulevard, the AADT is 11,900. *Figure 2.3.2: South Extension Corridor Traffic & Intersections* illustrates these roadway characteristics. AADT values were taken from the FDOT Florida Traffic Online 2018 AADT dataset and local street values (if available) were taken from the City of Jacksonville 2018 Local Traffic Counts Spreadsheet.

Transit Service & Connectivity

People in the South Extension (Medical Complex) Corridor can connect with the Skyway system at the San Marco Station. They can also board JTA's local Route 8 Beach/Town Center or Route 25 San Jose/Southpoint.

Route 8 Beach/Town Center operates from the Rosa Parks Transit Station, passed the San Marco Skyway Station along San Marco Blvd. to LaSalle Street as it heads towards the St. Johns Town Center. It operates between 5 a.m. and mid-night with a 15-minute peak hour frequency. According to JTA's 2019 Transit Development Plan, this route transported 586,448 passengers in 2018, averaging 14 passengers per revenue hour with an average load of 6.9 passengers.

Route 25 San Jose/Southpoint operates from the Rosa Parks Transit Station to St. Vincent's Medical Center Southside. Within the South Extension (Medical Complex) Corridor, it travels passed the San Marco Skyway Station, turning right on Prudential Drive into the Baptist Medical Center, south on Palm Avenue to Nemours Children's Hospital and The Towers of Jacksonville (a living facility for seniors on low of fixed income), before using Cedar Street to travel further south on San Marco Boulevard. It is a connector route operating between 5 a.m. and 11 p.m. at a 60-minute headway. According to JTA's 2019 Transit Development Plan, Route 25 San Jose/Southpoint transported 132,236 passengers in 2018, averaging 12 passengers per revenue hour with an average load of 6.3 passengers.

Figure 2.3.2: South Extension Corridor Traffic & Intersections



The transit service statistics are summarized in *Table 2.3.7: South Extension Corridor Transit Statistics*. Current transit services in this area are shown in *Figure 2.3.3: South Extension Corridor Transit Services* and further described below.

Table 2.3.7: South Extension Corridor Transit Statistics

Route	Annual Boardings	Avg Passengers per Hour	Avg Load
Route 8 Beach/Town Center	586,448	14	6.9
Route 25 San Jose/Southpoint	132,236	12	6.3

Other transportation services in the South Extension Corridor include JTA's **Connexion service**, Baptist Medical Center campus shuttle and a Beach Buggy service, sponsored by area merchants.

Baptist Medical Center on Prudential Drive ranked twelfth in the 2018 common paratransit trip locations analysis with 2,889 annual paratransit trips. The Aetna Building had 157 trips and Wolfson Children's Hospital had 68 paratransit trips in the year.

The Baptist Medical Center provides a campus shuttle primarily for their employees through a contract with Jacksonville Elite Parking Services.

The private Beach Buggy service began operating July 2019, funded by the local restaurants and bars. The service area extends from the St. Johns River to Kings Avenue and south of the San Marco Square at River Oaks Road. The service operates between 11 a.m. and 10 p.m. Sunday

through Thursday and to mid-night on Friday and Saturdays. Passengers are not required to pay a fare. However, tipping is clearly suggested.

Bicycle and Pedestrian Accommodations

San Marco Boulevard have sharrows pavement markings between Mary Street and Nira Street/Childrens Way. Sidewalks on both sides of the road are also present throughout the major corridor. Along Palm Avenue, from Cedar Street to Nira Street/Childrens Way, sidewalks are present on one side of the road. A segment of the Southbank Riverwalk is included within the corridor at Friendship Fountain Landing and can be accessed through other multiple locations. These bicycle and pedestrian facilities are further illustrated in *Figure 2.3.4: South Extension Corridor Sidewalks and Bicycle Facilities.*

Figure 2.3.3: South Extension Corridor Transit Services

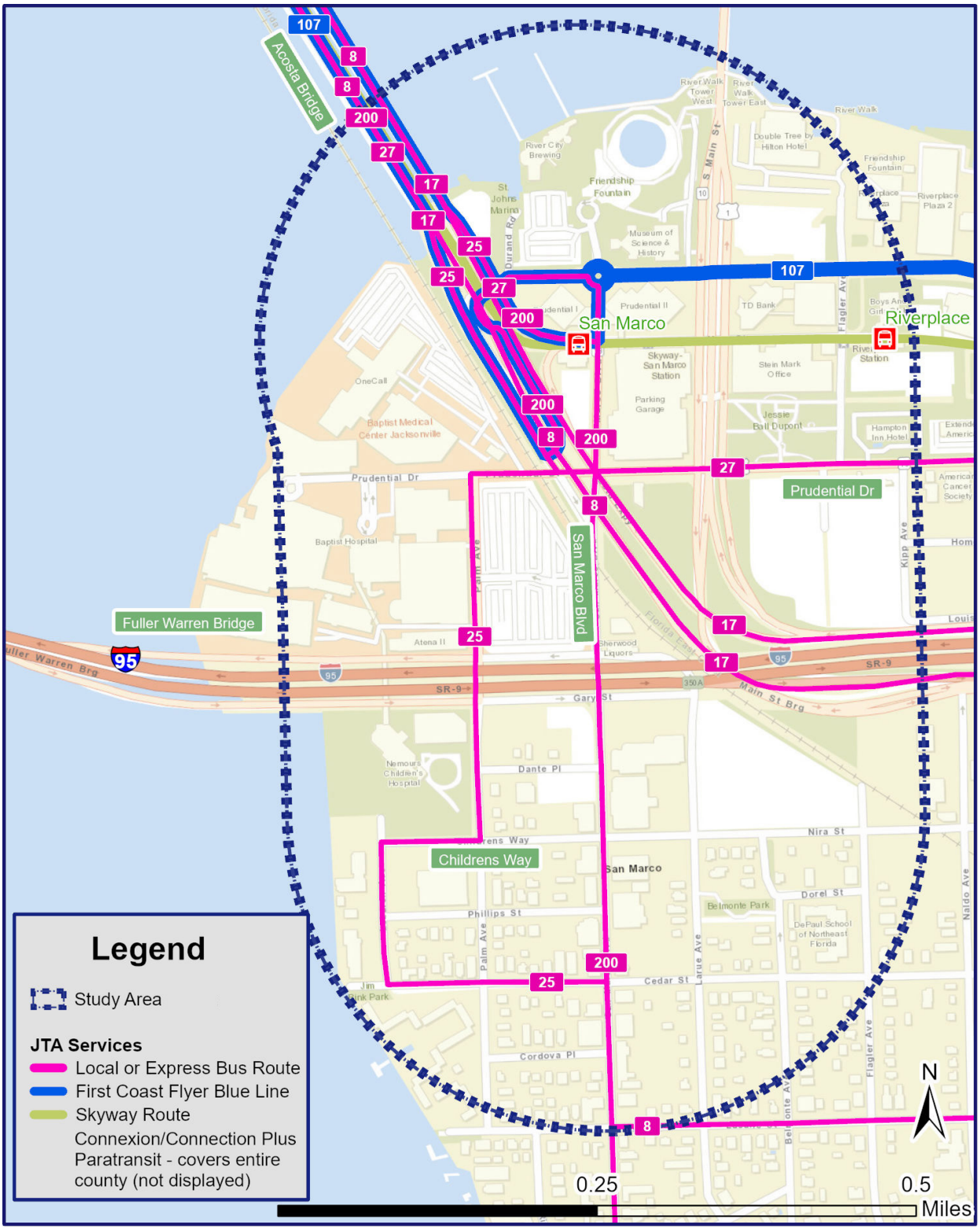


Figure 2.3.4: South Extension Corridor Sidewalks and Bicycle Facilities



2.3.4 Crash Analysis

Crash data was obtained from Signal Four Analytics covering a three-year analysis period from January 1, 2015 to December 31, 2017. The total number of crashes for each corridor was obtained and reviewed for locations with a high number of crashes (hotspots).

Crash data was obtained and analyzed along San Marco Boulevard from Mary Street to Nira Street. Two major crash hotspots were identified at Gary Street and at Nira Street. From this analysis, *Table 2.3.8: South Extension Corridor Crash Hotspots* was created to identify crash hotspots along the corridor.

Table 2.3.8: South Extension Corridor Crash Hotspots

Segment	Hotspot Descriptions	Number of Crashes
San Marco Blvd	Gary Street and Nira Street	71

Collision diagrams were developed for each hotspot area using the crash data and police reports. Collision summaries were also produced to tabulate the details of each crash including location, time of day, roadway conditions, injuries, crash type, and contributing factors. These collision summaries and diagrams can be found in *Appendix D*.

For the crashes within the hotspots along the San Marco Boulevard, 34% of the crashes involved some level of injury while 66% resulted in property damage only. There were no reported bicycle/pedestrian crashes along this corridor. The majority of the crash types represented included angle and left-turn collisions.

Data was also obtained through the JTA to assess the historical information regarding transit crashes in this corridor. A review of bus-vehicle incidents between the available dates of 7/31/2018 and 2/23/2020 found 3 incidents within the corridor study area. The highest recorded severity was attributed to a collision at an intersection with minor injuries and significant bus damage reported near San Marco Blvd and Nira Street during early morning. The other incidents include a right-turn collision along Palm Avenue near I-95 ramps and a vehicle sideswiping a bus on Prudential Drive.

2.3.5 Environmental/ETDM Summary

The ETDM Planning Screen was completed for the South Extension (Medical Complex) Corridor to incorporate an environmental review, including agency assessments concerning potential effects to natural, cultural and community resources into the study process. This section specifically summarizes results from the Environmental Screening Tool (EST) analysis performed within a 500-ft buffer area of the South Extension (Medical Complex) Corridor centerline. The review also provides a summary of Secondary and Cumulative Effects analysis. The full ETDM Summary Report can be found in Appendix C. The full report contains the corresponding detailed analysis maps (see pages 220 through 241 of the ETDM Summary Report) and as referenced in the following summary of comments.

***Social**: Sociocultural Data Report indicates 13.3% of population below poverty level and 19.42% minority population. Housing units are estimated to be 83% multi-family units. Multiple social resources within analysis area include Museum of Science and History, Friendship Fountain, St.*

Johns Marina Boat Ramp, and Belmonte Park. The evaluated corridor is expected to result in moderate involvement with social resources. A proactive public involvement program may be required (if needed) to avoid disproportionally high or adverse effects to any distinct population.

***Relocation Potential**: The evaluated corridor is expected to result in minimal involvement with relocations is within ROW. Should any resident, business or community structures require relocation, a ROW and relocation program will need to be implemented.*

***Farmlands**: There are no prime farmlands within the 500-foot project buffer area.*

***Aesthetic Effects**: Elevated alternatives may result in moderate involvement with aesthetic resources and will be analyzed during Project Development.*

***Economic**: Corridor will enhance economic resources and regional connectivity.*

***Mobility**: Corridor will enhance mobility in the region.*

***Cultural**: The EST found two Florida Site File archeological or historical sites, one bridge, 43 standing structures, and one resource group. A Cultural Resource Assessment Survey may be conducted if needed. The proposed corridor is expected to result in moderate involvement with historic and archaeological resources. Previously recorded archaeological sites are in the project area. Coordination with SHPO and the Seminole Tribe of Florida may be required during subsequent Project Development. Cultural Resources Data Map is page 224, ETDM Summary Report.*

The proposed corridor is expected to result in minimal involvement with recreational facilities.

***Natural**: The proposed corridor is expected to result in minimal involvement with wetland resources, water quality and quantity resources, floodplain resources, wildlife and habitat resources, and no impact to coastal resources. The Natural Wetland Inventory (NWI) did not identify any wetlands, one waterbody (St. Johns River), floodplain zone AE, and one rare and imperiled fish (Atlantic sturgeon) within analysis area. The project is completely within Woodstork Core Foraging Areas. A Natural Resource Evaluation may be conducted during project development (if needed) to document any involvement with wetlands, protected species and habitats. See Floodplain Map, pg. 226, Vegetation Map, pg.239, ETDM Summary Report.*

***Physical**: The proposed corridor is expected to result in minimal involvement with noise, air quality, and no impact on navigation resources. The proposed project will have moderate involvement with infrastructure. Coordination with the community and key stakeholders may be required as the project advances in development.*

The EST identified several potential contamination sites across the corridor and is expected to result in moderate involvement with potential sources of contamination. For additional details, refer to the Contamination Site Map on page 223 of the ETDM Summary Report. Subsequent project phases may require a Phase I or possibly a Phase II Contamination Site Assessment.

***Special Designations**: The EST analysis did not identify any involvement with Outstanding Florida Water, Aquatic Preserves, Scenic Highway resources or Wild and Scenic Rivers.*

2.4 Southeast Extension (San Marco) Corridor



The Southeast Extension (San Marco) Corridor connects the existing Skyway Stations at Riverplace and Kings Avenue to a planned redevelopment, The District at the former JEA Generating Station site, and a planned shopping center with a Publix grocery store in East San Marco. The extension will serve the growing needs of the area including the historic San Marco District, major office buildings, multiple hotels and restaurants and high-rise residential buildings, the Strand and Peninsula.

2.4.1 Demographic Profile

The ½-mile study area around the proposed Southeast Extension Corridor (San Marco) intersects five census block groups in Duval County based on Census Block Group Analysis (2010). After grouping the five census blocks intersecting the corridor, the averages of specific demographic information were compared to the demographic information for all of Duval County and is shown in Tables 2.4.1 to 2.4.6. Detailed maps illustrating the area's demographic profile are included in *Appendix B: Demographic Figures*.

Table 2.4.1: Southeast Extension Corridor Population

Evaluation Criteria	Duval County	Southeast Extension Corridor
Total Population	864,263	6,073
Percent of the population that is White	52.3%	74.0%
Percent of the population that is Black	32.7%	15.6%
Percent of the population that is Hispanic	6.7%	5.9%
Percent of the population that is Asian	3.1%	6.9%
Percent of the population that is Other[1]	5.2%	3.5%
Percent of the population that is considered 'Minority'	44.6%	31.8%
Median population age	37.8	38.0
Percent of the population that is above 65 years old	12.5%	11.2%

[1] *Other population groups include: American Indian or Alaska native, Native Hawaiian or other Pacific islander, or 2 or more races.*

As shown in the table, the percent of the population considered white is significantly higher in the Southeast Extension Corridor (74.0%) than in all of Duval County (52.3%). The corridor has a significantly lower percentage of blacks and Hispanics compared to Duval County. Therefore, the overall minority percentage is significantly lower in the corridor (31.8%) than in Duval County (44.6%). The percent of the population older than 65 years old is slightly lower in the corridor (11.2%) than in Duval County (12.5%).

The corridor has a higher population density than Duval County, a characteristic which is consistent with an urban corridor.

The most prevalent demographic difference between the corridor and Duval County is the median family income, which is approximately $15,000 higher compared to the county as a whole. However, the corridor median household income is slightly lower than Duval County, $44,008 compared to $49,188 respectively. In addition, the percentage of households below the poverty line is slightly lower in the corridor (12.5%) than in Duval County (13.0%). A total of 14.2% of the population in the corridor is below the poverty line compared to 13.8% for Duval County. Moreover, the percent of the population that is below the 150% poverty line is lower in the corridor (4.2%) than in Duval County (9.5%).

Table 2.4.2: Southeast Extension Corridor Population Density

Evaluation Criteria	Duval County	Southeast Extension Corridor
Total acres	587,813	1,973
Population density (persons per acre)	1.5	3.08
Household density (housing units per acre)	2.4	1.79
Percent of housing units occupied	87.4%	85.9%
Percent of housing units vacant	12.6%	14.1%
Average family size	3.0	3.0
Average household size	2.5	2.0

Table 2.4.3: Southeast Extension Corridor Income

Evaluation Criteria	Duval County	Southeast Extension Corridor
Median Household Income ($)	$ 49,188	$ 44,008
Median Family Income ($)	$ 58,496	$ 73,365
Percent of households below the poverty line[2]	13.0%	12.5%
Percent of the population below the poverty line[2]	13.8%	14.2%
Percent of the population below the 150% poverty line[2]	9.5%	4.2%

[2] *The Census Bureau uses a set of income thresholds that vary by family size to determine poverty level.*

The percentage of the population that commutes via a car, truck, or van in the corridor (88.1%) is lower than Duval County (91.7%). Similarly, the percent of the population that walks to/from work is slightly higher in the corridor (2.7%) compared to Duval County (1.7%). The percent of the population that bikes is lower in the corridor (0.0%) than in Duval County (0.6%). However, the percent of the population that takes public transportation is slightly higher in the corridor than in Duval County. The percent of households that do not have a vehicle is higher in the corridor (10.0%) compared to Duval County (7.4%).

The percent of the population that is considered Limited English Proficient (LEP) is higher in the corridor than in Duval County – 7.1% compared to 4.9%.

Table 2.4.4: Southeast Extension Corridor Transportation

Evaluation Criteria	Duval County	Southeast Extension Corridor
Percent of the population that commutes via a car, truck or van	91.7%	88.8%
Percent of the population that does not commute	3.5%	5.0%
Percent of the population that commutes via bicycle	0.6%	0.0%
Percent of the population that commutes via walking	1.7%	2.7%
Percent of the population that commutes via public transportation	1.6%	3.3%
Percent of the population that commutes via motorcycle	0.3%	0.0%
Percent of the population that commutes via other means	0.6%	0.3%
Percent of households that do not have a vehicle	7.4%	10.0%

Table 2.4.5: Southeast Extension Corridor Language

Evaluation Criteria	Duval County	Southeast Extension Corridor
Percent of the population that speaks only English	87.4%	82.5%
Percent of the population that speaks a language other than English and also speaks English "very well"	7.7%	7.7%
Percent of the population that is considered to be Limited English Proficient [3]	4.9%	7.1%

[3] People with Limited English Proficiency (LEP) speak English "less than very well" or "not at all." These people have a limited ability to read, write, speak or understand English.

The corridor has a comparable education attainment as Duval County as a whole, with a slightly lower percentage of the population that has a bachelor's or higher college degree but a higher percentage with some college or an associate degree.

Table 2.4.6: Southeast Extension Corridor Education

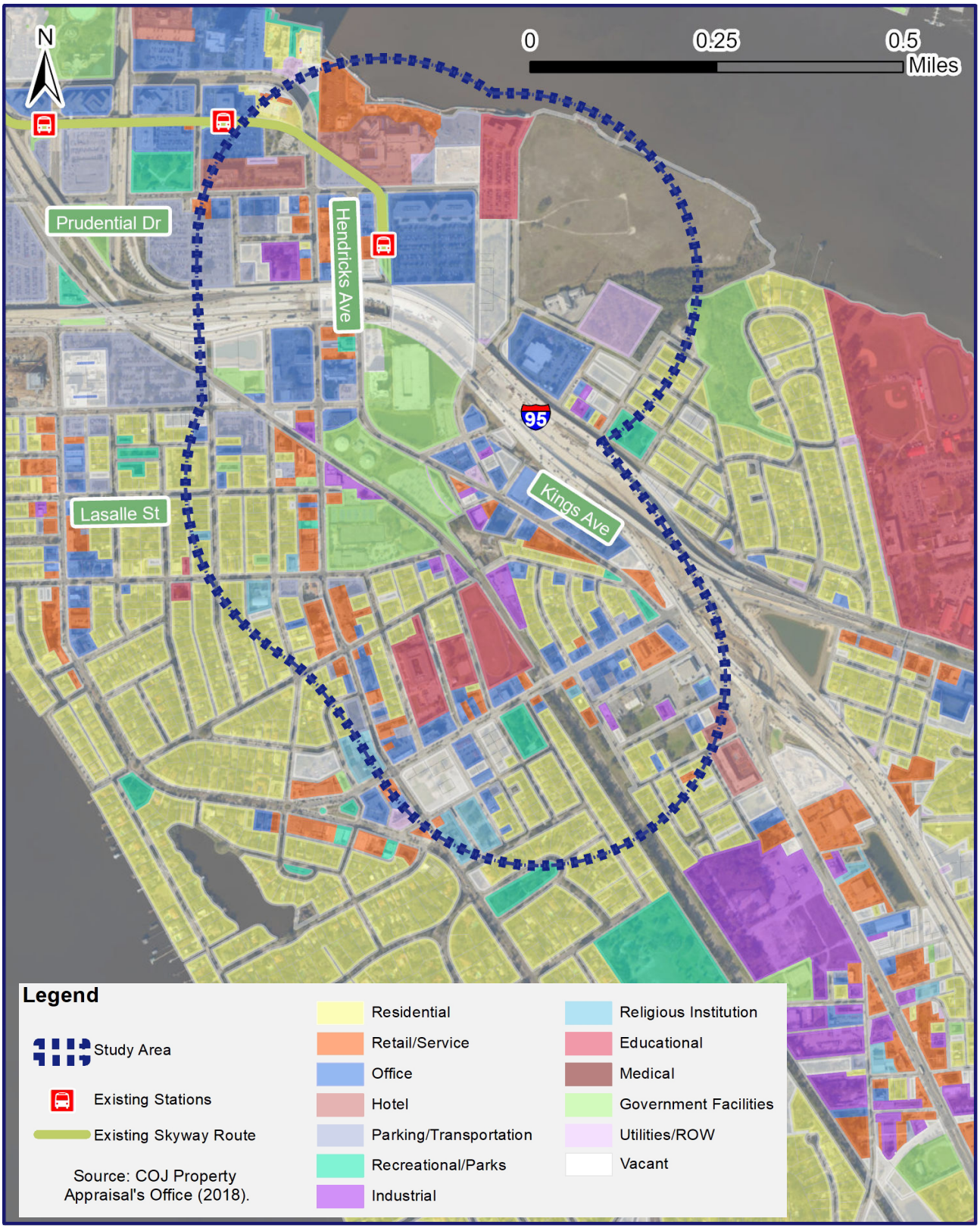
Evaluation Criteria	Duval County	Southeast Extension Corridor
Percent of the population that is over 25 years old and has less than a 9th grade education	3.8%	1.2%
Percent of the population that is over 25 years old and has completed more than 9th grade but does not have a high school diploma	9.0%	12.4%
Percent of the population that is over 25 years old and has a high school diploma	87.2%	86.4%
Percent of the population that has some college or an associate degree	32.0%	40.7%
Percent of the population that has a bachelor's, master's, doctorate or professional degree	16.9%	14.7%

2.4.2 Existing Land Use

The Southeast Extension (San Marco) Corridor includes commercial and services (45 acres), institutional (16 acres), and high density residential (15 acres) as the three major existing land uses. It also includes three PUDs, one DRI (Jacksonville Downtown) and four brownfield locations.

As illustrated in *Figure 2.4.1: Southeast Extension Corridor Existing Land Use*, the corridor appears to be predominantly government facilities, educational, and offices. Existing industrial land uses are located throughout the corridor. Residential and park uses appear south of the proposed corridor.

Figure 2.4.1: Southeast Extension Corridor Existing Land Use



2.4.3 Transportation System Features

The following is an overview of the existing transportation system within the Southeast Extension (San Marco) Corridor. The Southeast Extension Corridor is bounded by the existing Skyway to the north along Riverplace Boulevard and diverges into two different segments at the existing Kings Avenue Station. One segment extends east of Kings Avenue to the proposed development at The District and the other extends south of Kings Avenue to the proposed East San Marco shopping center at Atlantic Boulevard.

Roadway Characteristics

Riverplace Boulevard has narrower lanes to provide more room for pedestrians and bicyclists. It has a 2-lane configuration with one lane in each direction divided by a shared turn lane median. On-street parking on both sides of the roadway is found throughout the segment with a buffer separating parking and bike lane.

Hendricks Avenue has one lane in each direction with intermittent striped median or turn lanes. This street was recently modified as a part of a larger resurfacing and “road diet” project to accommodate bicycle and pedestrian uses. Features of this project include narrowing of the median to accommodate both new bicycle lanes and on-street parking between Peachtree Circle North and Dunsford Road. On-street parking from Dunsford Road to San Marco Boulevard was removed. There is one bicycle lane in each direction from Baymeadows Road to Prudential Drive.

Within the Southeast Extension Corridor, lane configuration varies as land uses transition south of Kings Avenue. Kings Avenue has a 4-lane configuration with two lanes on each direction and two thru lanes and two curbside lanes for buses only between I-95 to Manning Street. Parking lots are found under the I-95 bridge from Hendricks Avenue to Kings Avenue. Off-street parking on one side of the road is found from I-95 to Prudential Drive. Kings Avenue has an AADT of 11,900. AADT for most intersecting local roads were not assessed in the COJ 2018 Counts.

Atlantic Boulevard, within the corridor, has a 4-lane configuration with two lanes on each side separated by either a physical or striped median. Proceeding eastbound, Atlantic Boulevard continues under I-95 and merges into US-90, widening the typical configuration to four lanes in each direction. West of I-95, Atlantic Boulevard has sidewalks on both sides of the roadway, many of which have been recently upgraded from Farragut Place to beyond I-95. Between the railroad and Kings Avenue, unmetered on-street parking is available on both sides of the roadway except in close proximity to the railroad or intersections. This roadway segment of Atlantic Boulevard has an AADT of 20,000.

Montana Avenue/Broadcast Place has a 2-lane undivided configuration, with one lane in each direction, with a posted speed limit of 25 mph. Under I-95, Montana Avenue has curb and gutter and a five-foot sidewalk on the northbound side; the southbound side does not have curb and gutter but does feature a shoulder approximately eight feet wide. Beyond I-95, the Broadcast place cross section narrows, curb and gutter are no longer present and nor is the shoulder, however a four-foot sidewalk continues in the northbound direction. *Figure 2.4.2: Southeast Extension Corridor Traffic & Intersections Map* illustrates these roadway characteristics and annual average daily traffic.

Figure 2.4.2: Southeast Extension Corridor Traffic & Intersections



Transit Service & Connectivity

The Southeast Extension Corridor (San Marco) is anchored by the southern terminus of the Skyway and the Kings Avenue parking garage. The Blue First Coast Flyer and Route 27 (Philips/Avenues) connect with the Skyway at the Kings Avenue Station. The Kings Avenue parking garage is also used as a staging point for JTA's Gameday Xpress service during Jacksonville Jaguar games. Transit service statistics are summarized in *Table 2.4.7: Southeast Extension Corridor Transit Statistics*. The transit services in this area are shown in *Figure 2.4.3*: *Southeast Extension Corridor Transit Services* and further described below.

The Blue First Coast Flyer is part of the BRT System providing service every 10 minutes during weekday peak hours and every 15 to 30 minutes during off peak hours and weekends. It travels from the Rosa Parks Transit Station to the Avenues Walk Park-n-Ride. Within the Southeast Extension (San Marco) Corridor, it travels along Riverplace Boulevard and Prudential Drive to the Kings Avenue Station and south along Kings Avenue. According to JTA's 2019 Transit Development Plan, this route transported 431,238 passengers in 2018, averaging 10.9 passengers per revenue hour with an average load of 5 passengers.

Route 27 Philip/Avenues operates with a 60-minute headway between 6:30 a.m. and 10:30 p.m. It travels from Rosa Parks Transit Station to the Avenues Walk Park-n-Ride. Within the corridor, it travels on Prudential Drive to the Kings Avenue Station and south along Kings Avenue. Route 27 Philip/Avenues transported 122,523 passengers in 2018, averaging 11.7 passengers per revenue hour with an average load of 5.4 passengers.

Table 2.4.7: Southeast Extension Corridor Transit Statistics

Route	Annual Boardings	Avg Passengers per Hour	Avg Load
Blue First Coast Flyer	431,238	10.9	5
Route 27 – Philip/Avenues	122,523	11.7	5.4

In addition, a water taxi service, the St. Johns River Taxi, links the Southeast Extension Corridor with East, South and West Extension Corridors with a landing at the Lexington Hotel.

Bicycle and Pedestrian Accommodations

The Southeast Extension (San Marco) Corridor is bicycle and pedestrian friendly. *Figure 2.4.4: Southeast Extension Corridor Sidewalks and Bicycle Facilities* details these facilities including 5-foot wide bike paths and 8-foot sidewalks on each side of Riverplace Boulevard from the Main Street Bridge to Prudential Drive. Kings Avenue, portions of Montana Avenue, and Atlantic Boulevard include sidewalks on both sides of the roadway. Hendricks Avenue from Baymeadows Road to Prudential Drive, features a recently completed project to construct bicycle lanes, widen sidewalks and modify signals and ramps for ADA accessibility.

A segment of the Southbank Riverwalk is within the corridor. The Southbank Riverwalk extends east from the Friendship Fountain Landing to the Duval County Public Schools building. The Riverwalk can be accessed at multiple locations, including Friendship Fountain, Riverplace Boulevard, and Broadcast Place.

Figure 2.4.3: Southeast Extension Corridor Transit Services



Figure 2.4.4: Southeast Extension Corridor Sidewalks and Bicycle Facilities



2.4.4 Crash Analysis

Crash data was obtained from Signal Four Analytics covering a three-year analysis period from January 1, 2015 to December 31, 2017. The total number of crashes for each corridor was obtained and reviewed for locations with a high number of crashes (hotspots).

Within the Southeast Extension (San Marco) Corridor, crash data was obtained and analyzed in two segments, including:

- Prudential Drive – from Kings Avenue to The District
- Kings Avenue – from Vine Street to Atlantic Boulevard

From this analysis, *Table 2.4.8: Southeast Extension Corridor Crash Hotspots* was created to identify crash hotspots along the corridor.

Table 2.4.8: Southeast Extension Corridor Crash Hotspots

Segment	Hotspot Descriptions	Number of Crashes
Prudential Drive	Kings Avenue	5
Kings Avenue	Atlantic Boulevard	29

Collision diagrams were developed for each hotspot area using the crash data and police reports. Collision summaries were also produced to tabulate the details of each crash including location, time of day, roadway conditions, injuries, crash type, and contributing factors. These collision summaries and diagrams can be found in *Appendix D*.

For the crashes within the hotspots along Prudential Drive, 40% of the crashes involved some level of injury while 60% resulted in property damage only. There was one incident of bicycle/pedestrian crashes along this corridor. The majority of the crash types represented included rear-end and run off the road crashes.

For the crashes within the hotspots along Kings Avenue, 31% of the crashes involved some level of injury while 69% resulted in property damage only. There were no incidents of bicycle/pedestrian crashes along this corridor. The majority of the crash types represented were rear-end and left-turn crashes.

Data was also obtained through the JTA to assess the historical information regarding transit crashes in this corridor. A review of bus-vehicle incidents between the available dates of 7/31/2018 and 2/23/2020 found 2 incidents within the corridor study area. Both reported no injuries and minor bus damages. The first, involved a bus sideswiping a vehicle near 1840 Thacker Avenue. The second, a BRT vehicle struck a fixed object near the Kings Avenue stop at night.

2.4.5 Environmental/ETDM Summary

The ETDM Planning Screen was completed for the Southeast Extension (San Marco) Corridor to incorporate an environmental review, including agency assessments concerning potential effects to natural, cultural and community resources into the study process. This section specifically

summarizes results from the Environmental Screening Tool (EST) analysis performed within a 500-ft buffer area of the Southeast Extension (San Marco) Corridor centerline. The review also provides a summary of Secondary and Cumulative Effects analysis. The full ETDM Summary Report can be found in Appendix C. The full report contains the corresponding detailed analysis maps (see pages 197 through 218 of the ETDM Summary Report) and as referenced in the following summary of comments.

***Social**: Sociocultural Data Report indicates 12.2% of population below poverty level and 25.55% minority population. Multiple social resources within analysis area, highlighted by San Marco Branch Library, Southside Park, Fletcher Park, and San Marco Preservation Hall. The evaluated corridor is expected to result in moderate involvement with social resources. A proactive public involvement program may be required (if needed) to avoid disproportionally high or adverse effects to any distinct population.*

***Relocation Potential**: The evaluated corridor is expected to result in minimal involvement with relocations is within ROW. Should any resident, business or community structures require relocation, a ROW and relocation program will need to be implemented.*

***Farmlands**: There are no prime farmlands within the 500-foot project buffer area.*

***Aesthetic Effects**: Elevated alternatives may result in moderate involvement with aesthetic resources and will be analyzed during Project Development.*

***Economic**: Corridor will enhance economic resources and regional connectivity.*

***Mobility**: Corridor will enhance mobility in the region.*

***Cultural**: The EST found two Florida Site File archeological or historical sites, one bridge, 98 standing structures, and four resource groups. A Cultural Resource Assessment Survey may be conducted during the next phase of the project. The proposed corridor is expected to result in moderate involvement with historic and archaeological resources. Coordination with SHPO and the Seminole Tribe of Florida may be required during subsequent project development. The Cultural Resources Data Map and Historic Resources Map, are shown on pages 201 and 204, respectively, in the ETDM Summary Report included in Appendix C.*

The proposed corridor is expected to result in minimal involvement with recreational facilities.

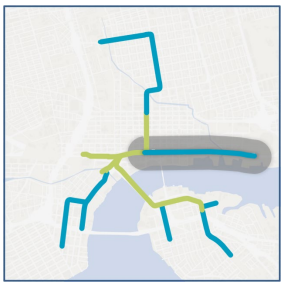
***Natural**: The proposed corridor is expected to result in minimal involvement with wetland resources, water quality and quantity resources, floodplain resources, wildlife and habitat resources, and no impact to coastal resources. The Natural Wetland Inventory (NWI) identified 1.2 acres of wetlands, one waterbody (St. Johns River), floodplain zone AE, and one rare and imperiled fish (Atlantic sturgeon) within analysis area. Reference Floodplain Map, page 203, Wetlands and Surface Waters Map, page 218, and related maps in Appendix C - ETDM Summary Report.*

The project is completely within Woodstork Core Foraging Areas and partially (.5%) in critical habitat for West Indian Manatee although the project will not involve any waterways. A Natural Resource Evaluation may be conducted during project development (if needed) to document any involvement with wetlands, protected species and habitats. The project may require an Individual Environmental Resource Permit during subsequent Project Development.

***Physical**: The proposed corridor is expected to result in minimal involvement with noise, air quality, moderate involvement with infrastructure, and no impact on navigation resources. The EST identified several potential contamination sites across the corridor (see page 200 for the Contamination Site Map) and is expected to result in moderate involvement with potential sources of contamination. A contamination screening assessment may be conducted in Project Development.*

***Special Designations**: The EST analysis did not identify any involvement with Outstanding Florida Water, Aquatic Preserves, Scenic Highway resources or Wild and Scenic Rivers.*

2.5 Bay Street Innovation Corridor



Existing conditions and services for the Bay Street Innovation Corridor (previously referenced as the East Extension (Sports Complex) Corridor, have been addressed through a separate project and comply with the requirements for the Bay Street Innovation Corridor project BUILD grant implementation.

The limits of the Bay Street Innovation Corridor, extending from Central Skyway Station at Pearl Street, east to the Sports Complex and TIAA Bank Field. Additional information pertaining to the background information for the Bay Street Innovation Corridor Categorical Exclusion can be found in Appendix C.

Additional information and reference to the Bay Street Innovation Corridor is contained in subsequent sections of this report as part of the overall U²C Program and system expansion analysis.

2.6 Existing Conditions Summary

Each of the proposed extension corridors exhibit conditions traditionally found in urban settings. *Table 2.6.1: Summary of Significant Existing Conditions* highlights a few of the statistics, that are remarkably different from the county-wide average, based on the American Community Survey and the Census 2010 data reviewed,

Table 2.6.1: Summary of Significant Existing Conditions Statistics

Evaluation Criteria	Duval County	Extension Corridor			
		North (UF Health)	West (Riverside)	South (Bap Med Ctr)	Southeast (San Marco)
Total Population	864,263	7,332	5,605	2,611	6,073
Minority Population	44.6%	68.8%	34.5%	19.5%	31.8%
Population Density	1.50	3.95	2.52	3.20	3.08
Commutes via car, truck or van	91.7%	76.4%	83.1%	90.4%	88.8%
Commutes via walking	1.7%	6.0%	6.9%	4.5%	2.7%
Commutes via public transit	1.6%	8.6%	3.0%	4.4%	3.3%
People commuting via public transit	14,462	297	63	34	27
Households without a vehicle	7.4%	27.0%	24.9%	13.4%	10.0%
Fixed Routes serving corridor	N/A	4	5	2	2
Crashes over 3-year period	N/A	120	184	71	34

The most striking difference in demographics between each corridor is the percentage of the population considered minority. The county-wide minority population average is 44.6%. This average is much higher in the North (UF Health) at 68.8% and the average is lower in the West (Riverside) at 34.5%, Southeast (San Marco) at 31.8% and in the South Extension (Medical Complex) Corridor at 19.5% of the total population.

The population density in each corridor is significantly higher than the county-wide average. The density is highest in the North Extension (UF Health) Corridor at 3.95. The high-rise residential buildings in the South Extension (Medical Complex) Corridor and Southeast Extension (San Marco) Corridor contribute to higher population density in these areas.

The commuting patterns within each extension corridor are consistent with urban settings. While the average percentage of people commuting in a personal vehicle such as a truck, car or van is 91.7% across Duval County, it is much lower in all of the other corridors except the South Extension (Medical Complex) Corridor. More people walk and take public transportation in these

urban corridors than the Duval County average. The highest percentage of people taking public transportation is in the North Extension (UF Health) Corridor.

The most dangerous corridors are the West Extension (Riverside) Corridor with 184 crashes and North Extension (UF Health) Corridor with 120 crashes in a 3-year period. Most of these crashes were rear-end collisions. The Southeast Extension (San Marco) Corridor had the lowest number of crashes in the 3-year period.

While each of the extension corridors have many similarities consistent with urban settings, they also have unique attributes. These attributes include:

- **North Extension (UF Health) Corridor** includes a historic community with an emerging retail and entertainment district. It is also home to the top three highest paratransit destination demands in the county. More than 60 paratransit trips a day are made to the UF Health Medical Center.
- **West Extension (Riverside) Corridor** is a rapidly growing area with high-rise apartment communities and major employers. It is also home to a historic community with an established retail and entertainment district.
- **South Extension (Medical Complex) Corridor** is predominantly filled with medical centers. Freight trains frequently run through the corridor, blocking traffic including emergency vehicles and causing employees and patients to be late.
- **Southeast Extension (San Marco) Corridor** includes the Skyway terminus, the Kings Avenue Station, a transit hub and a public parking garage. While few people live in the corridor today, new major developments are planned for immediate construction.

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3 Future Needs Assessment

Downtown Jacksonville was the heart of the city from its early days through the 1950's. As the popularity of suburban living exploded, people and businesses abandoned the urban core. That trend is rapidly reversing today. According to the Urban Land Institute (ULI), population growth rates in urban places are approaching suburban growth rates for the first time in decades[1].



Housing growth: This multi-family housing development was built in 13 months and is the second of five downtown projects proposed by the same developer. (Pictured: Lofts at Monroe)

ULI reported that Jacksonville has the highest percentage of population (12%) in emerging economic centers. As Jacksonville's urban core neighborhoods continue to grow and cultivate housing and job opportunities, each Skyway System Expansion Corridor will experience an increase in transportation demand.

Overall, each corridor under consideration in this study is experiencing a combination of growth and revitalization:

- **North Extension (UF Health) Corridor** – Main Street continues to strengthen with small businesses and infill. In the southern end, the JTA Rosa Parks Transit Oriented Development (TOD) is a prime opportunity for growth.
- **West Extension (Riverside) Corridor** – Multi-family developments and riverfront office space continues to expand along Riverside Avenue. Ample opportunities along Park Street will expand retail beyond the traditional Five Points shopping district.
- **South (Medical Complex) Corridor** – Baptist Health and affiliate medical facilities continue to expand their footprint and density. A new shared-use path along the I-95 Fuller Warren Bridge will create synergy between Riverside and San Marco neighborhoods.
- **Southeast (San Marco) Corridor** – The District master plan continues to be executed. Medium and high-density residential projects, along with JTA TOD opportunities near Kings Avenue Parking Garage, are expected to gradually increase daytime and total population.

Along the **Bay Street Innovation Corridor**, representing the Skyway system east expansion corridor, there is new housing and commercial/retail space from the Doro District, Lot J and the Shipyards on the east end of the corridor near TIAA Bank Field; to The Elbow, and The Ford on

[1] *The New Geography of Urban Neighborhoods*: Urban Land Institute 2018 https://americas.uli.org/wp-content/uploads/sites/2/2018/06/GUN_update-JUNE4th_web_F.pdf

Bay closer to the urban core. This corridor is expected to experience substantial increase in the number of residential units according to data provided by Downtown Vision.

The JTA is planning major service changes and enhancements within the urban core and throughout the region. The *2019 Transit Development Plan Major Update* portrays JTA's 10-year outlook as an evolution from a transit, ferry, and road building agency to a mobility integrator. In this role, JTA will provide customers with seamless trips across a variety of modes.

In addition to moving their administrative headquarters and consolidating bus transfers to the new Jacksonville Regional Transportation Center (JRTC), JTA is planning to implement:

- First Coast Flyer Orange line premium bus rapid transit service from Downtown Jacksonville to the Orange Park Mall.
- Interconnected express bus routes that expand regional transit service and nurture interagency cooperation to St. Johns, Baker, and Clay Counties.
- ReadiRide service areas around Jacksonville and in Clay County.
- Vanpool program particularly for veterans traveling to the VA Medical Centers.
- Autonomous vehicle services at the St Johns Town Center, University of North Florida, Jacksonville Beach, Mayo Clinic and other locations.
- Relocation of Amtrak services at the Convention Center directly across from the JRTC.
- Commuter rail lines between Downtown Jacksonville and Yulee, Green Cove Springs and St Augustine.
- Bike-share program with docking stations at key locations including Skyway Stations and JRTC.

This section of the report provides an overview of expected future or planned developments, forecasted population growth, and programmed roadway projects within each corridor to be considered in the corridor evaluation and prioritization of future project improvements.

The Future Needs Assessment sections are organized by corridor as follows:

- **Planned and Future Development:** Identifies large and medium-sized projects within the area of study.
- **Population and Employment Growth:** Analyzes current population and employment growth patterns to serve as the basis for estimates of future travel demand in each corridor.
- **Future Transportation Improvements:** Identifies known transportation projects within the corridor that may require coordination or future considerations.

3.1 North Extension (UF Health) Corridor



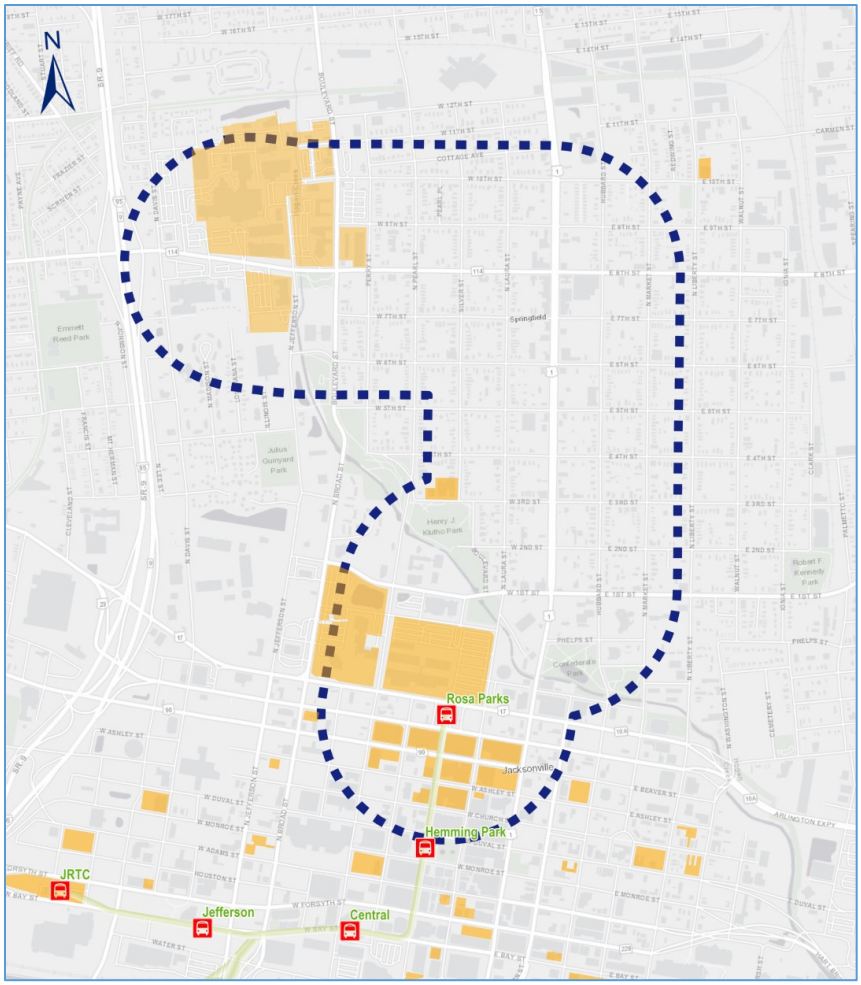
The North Extension (UF Health) Corridor includes an up-and-coming residential area known as the Springfield Historic District. Located north of Downtown Jacksonville, this mostly residential corridor benefits from gridded streets, walkability, a variety of parks and a passionate group of residents and organizations committed to preserving the historic character of the neighborhood and a vibrant Main Street.

This corridor extends from the existing Rosa Parks Skyway station to connect downtown with Springfield and the UF Health and VA Medical Centers. The corridor also connects Main Street and the Florida State College at Jacksonville (FSCJ) campus.

3.1.1 Planned and Future Development

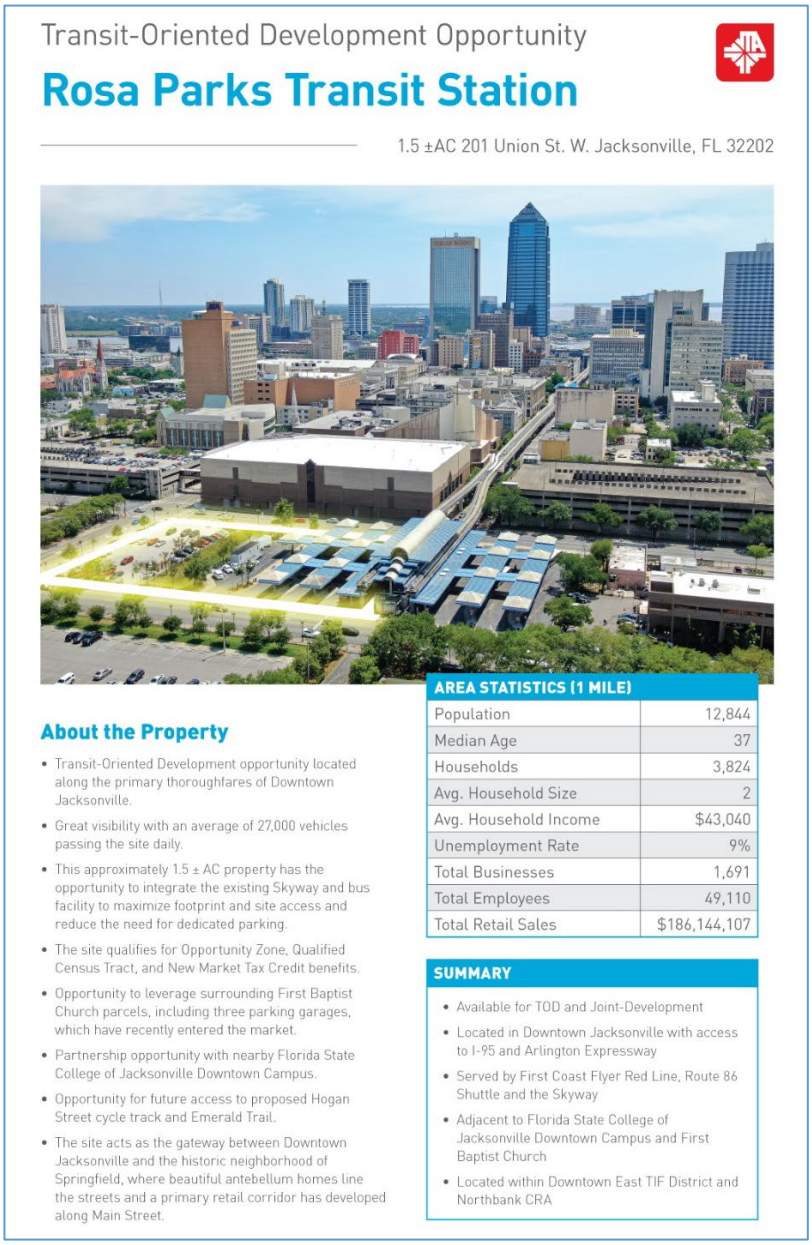
The southern tip of the North Extension (UF Health) Corridor is anticipated to undergo major changes in the next few years (see *Figure 3.1.1: North Extension Corridor Planned/Future Developments* for highlighted parcels).

Figure 3.1.1: North Extension Corridor Planned/Future Development



The JTA will be moving their regional bus transfer hub from the Rosa Parks Transit Station to the new Jacksonville Regional Transit Center (JRTC) in LaVilla in March 2020. The activity at the Rosa Parks Transit Station will be scaled back to serving the Skyway and several bus routes. The JTA is promoting the property as a potential Transit Oriented Development (TOD) opportunity and JTA is seeking proposals to develop the 1.5-acre property. A copy of the advertisement can be seen as *Figure 3.1.2: Rosa Parks TOD Advertisement*. The Rosa Parks Transit Station is a TOD opportunity served by the Skyway, premium transit and is adjacent to the FSCJ Downtown Campus and First Baptist Church properties.

Figure 3.1.2: Rosa Parks TOD Advertisement



Source: JTA

The First Baptist Church has announced plans to sell a bulk of their downtown properties, including parking garages located near the Rosa Parks Transit Station. *Figure 3.1.3: Existing First Baptist Church Blocks* illustrates the church structures which total 1.5 million square feet of space. The area is in the Central Business District Zone. FSCJ's Downtown Campus and the UF Health Jacksonville campus are two corridor magnets, located at the southern and northern terminus, respectively. However, as of June 2019, neither entity has announced any new campus building plans. Early 2020, the former Jacksonville Jewish Center location received a $14.8 million proposal for mixed-use redevelopment. The parcels located near Klutho Park and along West 3rd Street will include 8,000 square feet of commercial office space and 78 residential units.

Figure 3.1.3: Existing First Baptist Church Blocks & Former Jacksonville Jewish Center



Source: First Baptist Church of Jacksonville (left); Google Street View of main building former Jacksonville Jewish Center (right)

A majority of the North Extension (UF Health) Corridor traverses the Springfield community. Due to the historic character of the Springfield neighborhood, no new large-scale developments have been proposed. It is expected that the renovation and revitalization of historic homes will continue its trend throughout the historic district. Main Street, specifically between 2nd Street and 8th Street, has planned breweries, bakeries, apparel shops, restaurants, and meeting venues.



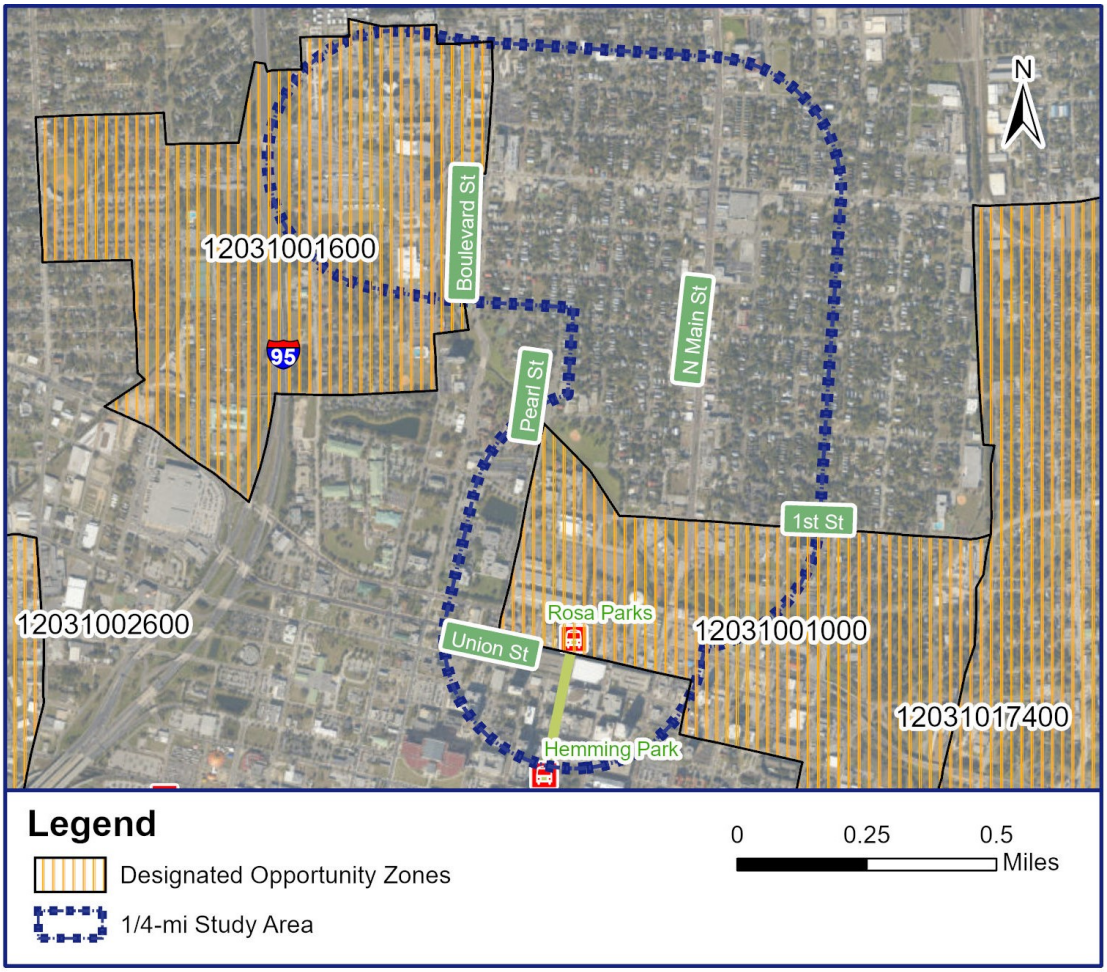
Main Street retail revitalization has brought a mix of breweries, shops and restaurants to the Springfield neighborhood.

Opportunity Zone

An Opportunity Zone is a low-income census track, as determined within the New Markets Tax Credits legislation and designated by the governor of the state. The Opportunity Zone tax incentive is a federal initiative to spur long-term private investment (real estate, business investments, or new equipment and other assets) in low-income urban and rural communities, established by Congress in the 2017 Investing in Opportunities Act.

In the North Extension (UF Health) Corridor, census tract 12031001600 and 12031001000 (see *Figure 3.1.4: North Extension Corridor Opportunity Zones)* are certified as Qualified Opportunity Zones. These areas include the Rosa Parks Transit Station and UF Health Medical Center and the VA Outpatient Clinic.

Figure 3.1.4: North Extension Corridor Opportunity Zones



3.1.2 Projected Population and Employment Growth

Due to its proximity to downtown Jacksonville, the presence of FSCJ educational campus, as well as the UF Health Jacksonville and Jacksonville VA Outpatient Clinic, this corridor is expected to sustain and increase both its daytime population, resulting in an increased number of households.

Using 2015 as the baseline information, this corridor alone is expected to add 2,432 jobs and 1,013 dwelling units. See *Table 3.1.1: North Extension Corridor Population and Employment Growth* for details. Year 2015 and 2045 data was obtained from the North Florida Transportation Planning Organization (TPO). The Ridership Forecast Technical Memo describes assumptions, trip rates, and employment ratios in Appendix F.

Table 3.1.1: North Extension Corridor Population and Employment Growth

Year	Dwelling Units	Population	Employment
2015	2,351	4,566	14,510
2022	2,610	4,990	15,108
2045	3,364	6,196	16,942
Increase	1,013	1,630	2,432
Growth Percentage*	1.4%	1.2%	0.6%

*Calculated as annual percentage growth rate over 30 years, $(\frac{Y_{2045}-Y_{2015}}{Y_{2015}})/N_{years}$.

3.1.3 Future Transportation Improvements

The following is a description of the planned transportation improvements within the North Extension (UF Health) Corridor.

Roadway

The North Extension (UF Health) Corridor projects identified in the City of Jacksonville's Capital Improvement Program (2019-2023), the North Florida TPO's Unified Planning Work Program (FY2018/2019 to FY2019/2020), and FDOT's Five-Year Work Program (2019-2024) are listed in *Table 3.1.2: North Extension Corridor Roadway Projects*. Additional projects will be included as they are identified or progress through their respective planning processes. While the study area intersects the northwest boundary of I-95, the interstate projects are not expected to have an impact on current or future conditions of the North Extension (UF Health) corridor.

Bicycle and Pedestrian Facilities

The most significant bicycle and pedestrian project in North Extension (UF Health) Corridor is the *Emerald Trail Master Plan.* Led by Groundwork Jacksonville, it is a master plan of nearly 20 miles of new trails connecting multiple historic neighborhoods, including Springfield, Riverside, San Marco and LaVilla to Hogans Creek, the S-Line Rail Trail and the Northbank and Southbank Riverwalks. This will create a total of 30 miles of contiguous trails and linear parks within the area.

Table 3.1.2: North Extension Corridor Roadway Projects

Project	Agency Project ID
City of Jacksonville	
Sidewalk/Curb Construction and Repair (county-wide)	24
Hogans Creek Greenway	252
Hogans Creek Stormwater Improvements	290
UF Health Capital Improvements	326
Duval County Health Dept. - Various Projects	72, 346
Phoenix Area Pedestrian Safety Improvements	228
Duval County Health Dept (resurface parking)	72
8th Street - I-95 to Boulevard Street Landscaping/Tree Planting	89
Boulevard Street Water Main Replacement – 7th Street to 11th Street	JEA – Proposed
8th Street Water Main Replacement – Mt. Herman Street to Boulevard Street	JEA – Proposed
Bike Lanes – Boulevard Street to Liberty Street	Mobility Plan Standalone Bicycle Projects 78
Bike Lanes – Boulevard Street to the S Line	Mobility Plan Standalone Bicycle Projects 183
FDOT	
Sidewalk – Various Streets Near Andrew Robinson Elementary	Preliminary Engineering 2020, Construction 2040
JTA	
Complete Streets – Main Street	N/A
Complete Streets – 8th Street	N/A
TPO	
Rehabilitate various pedestrian facilities	4355621, 4355621
Railroad crossing rebuilds	4188643
I-95 (SR 9)	4322591, 4240264, 4240265, 4240264, 4240265, 4346191, 4392011

The master plan identifies two tiers of projects, based on their apparent need and ease of development. These trails are illustrated in *Figure 3.1.5: Study Area over Emerald Necklace Trail Master Plan.*

The following trails are contained within or approaching the corridor:

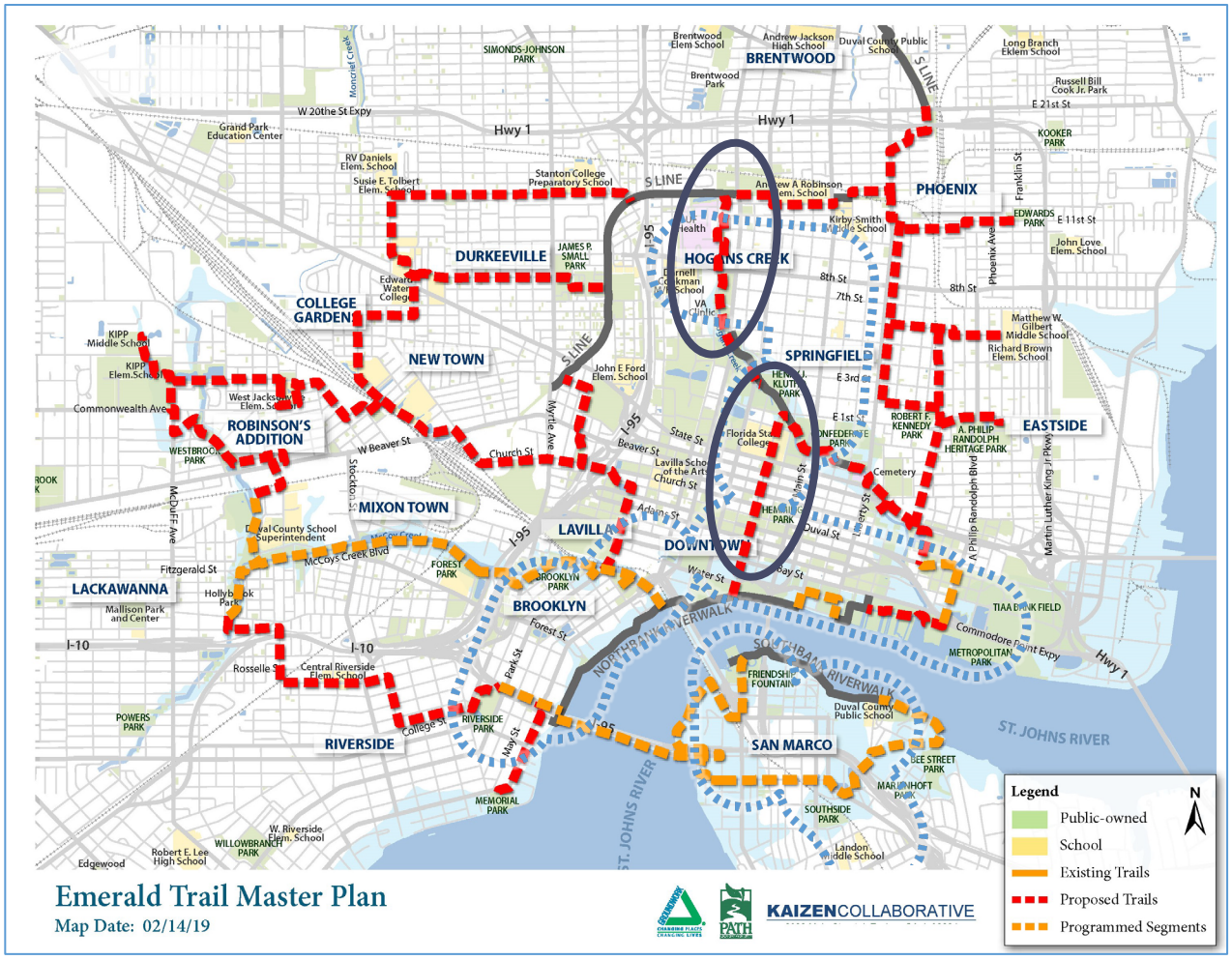
- Segment #2: Hogan Street Connector
- Segment #4 S-Line Connector
- Segment #8 Eastside Connector
- Segment #9 Hogans Creek to Riverwalk

The Hogan/Laura Street connector project is currently being advanced by the City and it plans to convert Hogan Street to a one-way street and add a two-way protected bike lane. Near Union Street, this bike facility would convert to a buffered bike lane along Laura Street. Existing plans

do not show how the connection at State and Union Street (near the Rosa Parks Transit Station) would occur.

Near 8th Street, additional bike lanes and sharrows are planned at intersecting Boulevard Street. It should be noted that parallel to the Main Street corridor, the Eastside and Phoenix neighborhoods show planned urban trails that connect to the S-Line. This trail segment would be a few blocks removed from the 8th and Main Street intersection. The project includes site furnishings and landscape that reflect the historic neighborhood. Street crossings and connections will be enhanced with this project.

Figure 3.1.5: Study Area over Emerald Necklace Trail Master Plan



Trail Master Plan Map Source: Emerald Trail Master Plan and Implementation Strategy (2019)

Transit

The completion of the JRTC super hub, and the shift of bus routes as the new main bus transfer facility at the JRTC, will necessitate changes in and around the Rosa Parks Transit Station. Three routes: The First Coast Flyer Red Line, Routes 10 Atlantic and 19 Arlington currently traveling across the Matthews Bridge will continue to serve the Rosa Parks Transit Station after the opening of the JRTC. All other routes will travel directly to the JRTC and no longer stop at the Rosa Parks Transit Station. However, the Skyway will continue to have its northern terminus at Rosa Parks Transit Station.

The JTA is working with the Veterans Administration to design and seek funding for a vanpool service to help veterans access medical services at the VA Outpatient Clinic on Jefferson Street, across the region and to the VA Medical Centers in Gainesville and Lake City.

The implementation of the North Extension (UF Health) Corridor may allow JTA to realign Route 3 Moncrief to Jefferson Street and the JRTC. This will provide Route 3 Moncrief passengers with a shorter trip time between Downtown and destinations north of UF Health and more convenient access to the VA Clinic, Housing Authority and Department of Health.

In 2019, as part of the JTAMobilityWorks Program, a feasibility study for Main Street was completed. The Complete Streets Study included charrettes, walkability audits, and traffic concepts, including a lane elimination study. Among recommendations, the report finds that a reduction of travel lanes and a transit lane replacement may be feasible, but that additional public and stakeholder input is required (*JTA Complete Streets: Main Street Feasibility Study, Spring 2019*).

3.2 West Extension (Riverside) Corridor



The West Extension (Riverside) Corridor extends from the current Skyway Operations and Management Center to Brooklyn, Five Points and Riverside neighborhoods. This section provides an overview of known planned developments, forecasted population growth, and programmed transportation infrastructure projects within the area. A proposed Brooklyn Station, built on existing JTA property, was included in the previous TCAR 1 Study and a preliminary design is currently in development.

3.2.1 Planned and Future Development

A mix of retail and multi-family residential projects are planned in the rapidly growing West Extension (Riverside) Corridor. Most of the activity in this corridor is located in the Brooklyn area as highlighted in Figure *3.2.1: West Extension Corridor Planned/Future Development*.

Large new developments are planned in the Brooklyn area including Vista Brooklyn, a mixed-use retail and multi-family residential building nested between another recently completed mixed-use residential project and an expanding shopping center with grocery store

Figure 3.2.1: West Extension Corridor Planned/Future Development



Recently, the DIA has announced an undisclosed company's interest to relocate to a riverfront parcel in the Brooklyn neighborhood (see *Figure 3.2.2: Project Sharp*).

In the proposed agreement the project would create 500 jobs and build a 300,000-square-foot office building and parking structure for a $145 million corporate headquarters at 323 Riverside Avenue.



The Brooklyn neighborhood, home to a cluster of financial service companies, has ignited the development of retail and high-density residential projects.

Figure 3.2.2: Project Sharp



A new hotel is also planned for the area. The Cummer Museum of Arts & Gardens, which receives nearly 140,000 annual visitors, is leading a fund-raising effort to expand and present additional opportunities in this corridor. The JTA also announced a TOD oportunity adjacent to the JRTC at LaVilla available for redevelopment at Johnson Street. A copy of the advertisement can be seen as *Figure 3.2.3: Jacksonville Regional Transportation Center at LaVilla TOD Opportunity*.

The Historic Five Points Shopping district continues to attract tenants to an already active corridor.

Opportunity Zones

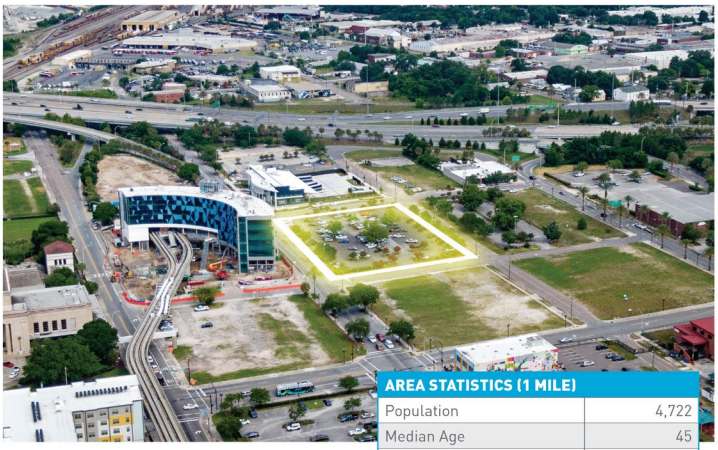
As of 2019, there are no designated Qualified Opportunity Zones within the West Extension Corridor. An Opportunity Zone is a low-income census track, as determined within the New Markets Tax Credits legislation and designated by the governor of the state.

Figure 3.2.3: JRTC at LaVilla TOD Advertisement

Transit-Oriented Development Opportunity

Jacksonville Regional Transportation Center at LaVilla

1.54 ±AC 0 Johnson St. Jacksonville, FL 32204



About the Property

- Located adjacent to the premier transportation facility in the region, the Jacksonville Regional Transportation Center at LaVilla (JRTC), which provides access to local, regional, and express bus services, Bus Rapid Transit (BRT), the Skyway downtown circulator and paratransit services.
- Located directly off of I-95 near the I-10 convergence, this 1.54 ± AC site has an unmatched visibility with an average of 164,000 vehicles passing the site daily.
- The surrounding area is primed for development, with a number of publicly owned parcels surrounding site and planned developments in the area.
- 88-unit market-rate townhome development recently approved for three adjacent parcels.
- The site offers a direct connection to the urban core, as well as emerging neighborhoods like Brooklyn, Riverside, and the Rail Yard District.
- The proposed Emerald Trail will pass through the LaVilla neighborhood in close proximity to the site, providing a multi-use path for safe pedestrian and bicycle access to and from the site.
- The LaVilla neighborhood has seen an increased growth in multi-family units, reaching more than 500 units in 2019, with more on the horizon.

AREA STATISTICS (1 MILE)	
Population	4,722
Median Age	45
Households	2,053
Avg. Household Size	2
Avg. Household Income	$52,936
Unemployment Rate	7%
Total Businesses	1,526
Total Employees	40,088
Total Retail Sales	$185,790,204

SUMMARY

- Available for redevelopment
- Adjacent to Intercity Bus Terminal and Jacksonville Regional Transportation Center at LaVilla
- LaVilla Redevelopment Strategy proposed mixed-use development
- Other surrounding parcels primarily owned by the City of Jacksonville and FDOT, totaling 40 acres of redevelopable land
- Located within Northside West TIF District and Northbank CRA, and is listed as a catalytic redevelopment project in the DIA's BID and CRA Plan

3.2.2 Projected Population and Employment Growth

Due to its proximity to downtown Jacksonville and the presence of large financial and information technology-services offices and headquarters, this corridor is expected to sustain and increase both its daytime population as well as an increase in number of households, in particular in the Brooklyn neighborhood. Similarly, the established Riverside/Five Points neighborhood nationally ranks 6th behind zip codes in major cities long identified as millennial favorites, according to statistics published by RENTCafe.com.

Using 2015 as the baseline information, this corridor alone is expected to grow by 5,269 jobs and 2,043 dwelling units. See *Table 3.3.1: West Extension Corridor Population and Employment Growth* for details. Year 2015 and 2045 data was obtained from the North Florida TPO. The Ridership Forecast Technical Memo, included in Appendix F, describes assumptions, trip rates, and employment ratios.

Table 3.2.1: West Extension Corridor Population and Employment Growth

Year	Dwelling Units	Population	Employment
2015	1,864	3,463	17,588
2022	3,177	6,138	19,207
2045	3,907	7,411	22,857
Increase	2,043	3,948	5,269
Growth Percentage*	3.7%	3.8%	1.0%

*Calculated as annual percentage growth rate over 30 years.

3.2.3 Future Transportation Improvements

Roadway

The West Extension (Riverside) Corridor projects identified in the City of Jacksonville's Capital Improvement Program (2019-2023), the North Florida TPO's Unified Planning Work Program (FY2018/2019 to FY2019/2020), and FDOT's Five-Year Work Program (2019-2024) are listed in *Table 3.2.2: West Extension (Riverside) Corridor Roadway Projects*. Additional projects will be included as they are identified or progress through their respective planning processes.

Some of the projects that may require coordination include:

- *Downtown Pocket Parks:* Landscape renovation of ten downtown pocket parks and medians including: Riverside Avenue median (between Peninsular Place and Edison Avenue), Water Street median (between Broad Street and Pearl Street), Water Street Pocket Park, Bay and Broad Street Pocket Park, Independent Drive/Main Street Bridge Ramp, Jessie Smith Pocket Park, Main Library Pocket Park, Howard's Island, Sister City Park, State/Union/Liberty median.
- *Park Street Road Diet:* This project provides modifications to existing roadway infrastructure from Forest Street to Stonewall Street within the Brooklyn neighborhood to enhance pedestrian and bicycle connectivity and improve vehicular safety. Improvements include adding a two-way protected bike lane, on street parking, expanded sidewalk areas, reduced roadway widths for safer pedestrian crossings and the addition of street trees.
- *Five Points Project Improvements:* This project provides modifications to existing roadway infrastructure within the Five Points area to enhance pedestrian utilization and improve vehicular safety. Within this area, the improvements will impact: Park, Post, Margaret, Lomax, Oak and Herschel Streets. Improvements include turning Lomax Street into a one-way eastbound street, expanded sidewalk areas, reduced roadway widths for safer pedestrian crossings and the retention of the historic beacon that sits at the heart of the Five Points Intersection.

- *McCoy's Creek New Pedestrian Bridge:* New pedestrian bridge over McCoy's Creek will provide connectivity from the north side of the creek to the Brooklyn redevelopment area.
- *Median Beautification:* Renovation of landscape and irrigation Riverside Avenue between Gilmore and Roselle Streets.

Table 3.2.2: West Extension Corridor Roadway Projects

Project	Agency Project ID
City of Jacksonville	
Sidewalk/Curb construction and repair	24,25, 27
Pedestrian crossings (county-wide)	76
Park Street road diet	340
Five Points project improvements	39
McCoy's Creek new pedestrian bridge	377
Median beautification	213
JAX ASH – McCoy's Creek buffer to creek bank	386, 387
Bike lanes/buffered lanes Riverside Avenue	Mobility Plan Bicycle Projects 49
Protected bike lane – Forest Street	Mobility Plan Bicycle Projects 68
FDOT	
I-95 (various)	2019-2020
I-10 (various)	2019-2021
TPO	
Main St	4393071, 4284891
Acosta Bridge and connectors	4260781
Rehabilitate various pedestrian	4355621, 4355621
I-95 (SR 9)	4322591, 4240264, 4240265, 4240264, 4240265, 4346191, 4392011
Overland Bridge	4376971
Urban Core riverfront revitalization	4433972

Bicycle and Pedestrian Facilities

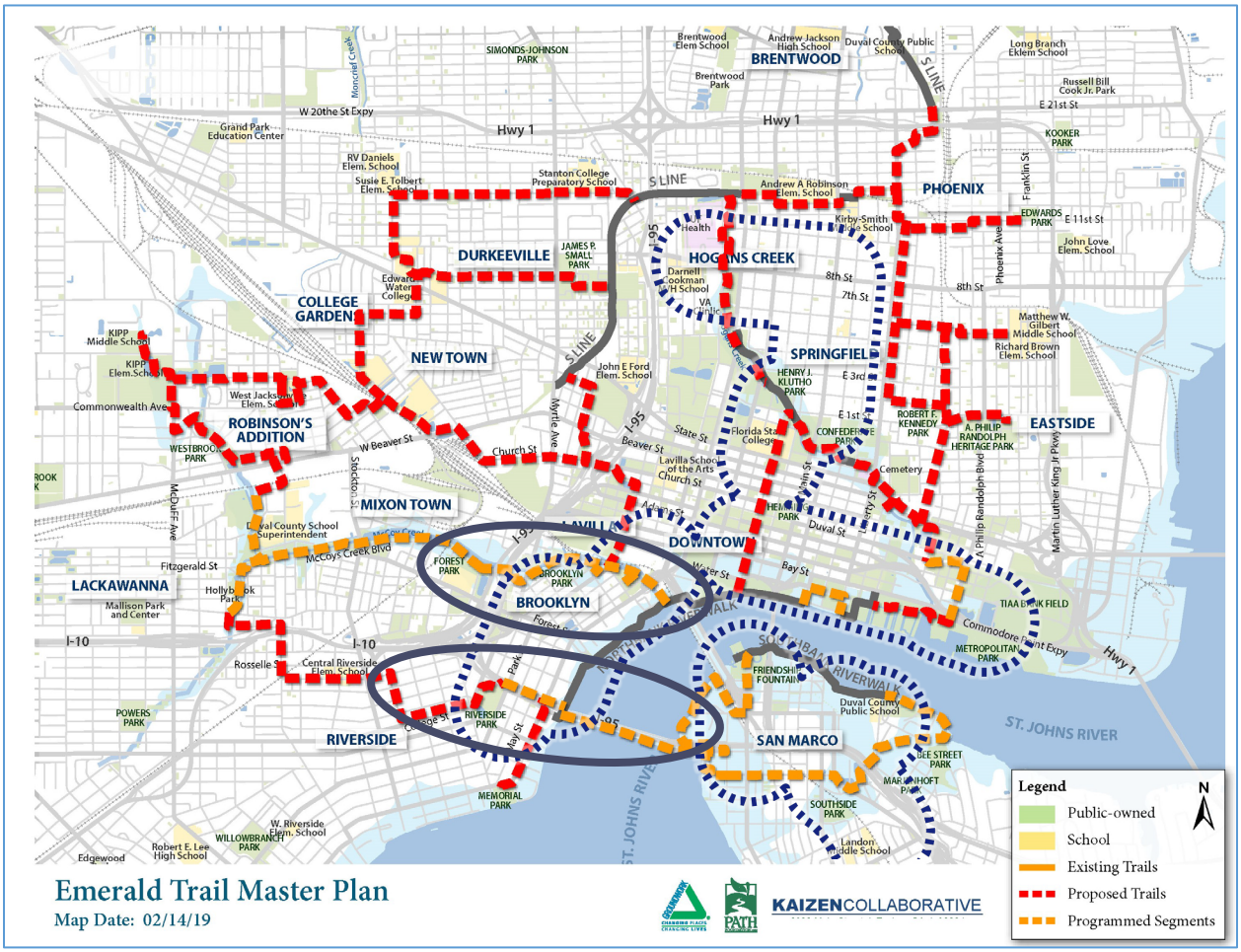
The City of Jacksonville plans to begin a complete streets project in early 2020 on Park Street to reduce it from four to two lanes of auto traffic and install a bike path, street parking, bigger sidewalks and trees.

However, the most significant bicycle and pedestrian facility project in the corridor is the Emerald Trail Master Plan project. Led by Groundwork Jacksonville, the Emerald Trail is a master plan of nearly 20 miles of new trails connecting multiple historic neighborhoods, including Riverside and Brooklyn to existing and planned trails for a total of 30 miles of contiguous trails and linear parks.

The following trails are contained within or approaching the area of study:

- Artist Walk to Fuller Warren Bridge
- McCoy's Creek Greenway
- #1 S Line to Stonewall
- #3 Southwest Connector

Figure 3.2.4: Study Area over Emerald Necklace Trail Master Plan



Trail Master Plan Map Source: Emerald Trail Master Plan and Implementation Strategy (2019)

Transit

The JTA plans to launch their fourth First Coast Flyer BRT route, the Orange Line, in December 2020. This route will provide service from the Convention Center, south along Park Street to Blanding Boulevard and the Orange Park Mall. Their Transit Development Plan, updated in 2019, describes additional frequent service along Riverside Avenue by implementing service frequency improvements to Route 16 Riverside/Wilson by the year 2026.

There is currently some duplication of transit routes including the proposed First Coast Flyer Orange Line along the West Extension (Riverside) Corridor. However, realigning the routes would cause segments beyond the corridor to be without transit service. A thorough examination of the ridership by stop and time of day of Routes 14, 15, 16 and First Coast Flyer Orange Line should be conducted for potential realignment to coincide with the implementation of the West Extension (Riverside) Corridor project.

The St. Johns River Taxi currently provides water taxi service to the Riverside Arts Market only on Saturdays on demand. The increase in multi-modal opportunities and pedestrian traffic may encourage regular water taxi service to this or other locations in Brooklyn.

3.3 South Extension (Medical Complex) Corridor



The South Extension (Medical Complex) Corridor extends off the existing San Marco Station to connect to the nearby Baptist Medical Center Complex. This section provides an overview of known planned developments within this small corridor, forecasted population growth, and programmed transportation infrastructure projects within the area.

3.3.1 Planned and Future Development

Although the South Extension (Medical Complex) Corridor is constrained, there are a lot of plans for redevelopment of the facilities in this area as highlighted (purple areas are under construction) in *Figure 3.3.1: South Extension Corridor Planned/Future Development.* Baptist Health, a major occupant of facilities and parking in the South Extension (Medical Complex) Corridor, continues to execute and plan for growth.

In 2018, Baptist MD Anderson Cancer Center opened a nine-story building where a surface parking lot used to be. Early 2019, Baptist Health announced plans to demolish a parking garage and build a seven-story building for Wolfson Children's Hospital and Baptist Medical Center. Their plans also include widening Palm Avenue with a median, wider sidewalks and landscaping, realigning Baptist Way to provide a direct connection between the medical center's new central entrance and San Marco Boulevard.

Residential developments planned in this corridor includes one major market-rate residential project at 0 Prudential Drive. This development will include 185 residential rental units and Southbank Riverwalk improvements. The site location is illustrated in *Figure 3.3.2: Planned*

Residential Development on Prudential Drive. Another 147-unit apartment project is near completion about half-mile east of the first, near Hendricks Avenue and Home Street.

Figure 3.3.1: South Extension Corridor Planned/Future Development



Figure 3.3.2: Planned Residential Development on Prudential Drive



The Museum of Science and History (MOSH) and Friendship Fountain Park are also anticipated to be redeveloped soon. The MOSH 2.0 project will reorient the museum's public entrance and inner focus toward the St. Johns River and increase exhibition areas by 200 percent. The expansion plans include a cafe, rooftop conference center, event space, and innovation labs. The renovation of the existing Friendship Fountain has been identified as priority and will receive city funding.

Opportunity Zones

As of 2019, there are no designated Qualified Opportunity Zones within the South Extension (Medical Complex) Corridor. The Opportunity Zone tax incentive is a federal initiative to spur long-term private investment (real estate, business investments, or new equipment and other assets) in low-income urban and rural communities.

3.3.2 Project Population and Employment Growth

Due to the location of Baptist Health hospitals and ancillary medical services, this corridor is expected to increase its daytime population as well as an increase in number of households adjacent to the riverbank. Recent completed projects like Baptist MD Cancer Center supports the addition of retail and residential projects.

Using 2015 as the baseline information, this corridor alone is expected to grow by 1,921 jobs and 978 dwelling units. See *Table 3.4.1: South Extension (Medical Complex) Corridor Population and Employment Growth* for details. Year 2015 and 2045 data was obtained from the North Florida TPO. The Ridership Forecast Technical Memo describes assumptions, trip rates, and employment ratios in Appendix F.

Table 3.3.1: South Extension Corridor Population and Employment Growth

Year	Dwelling Units	Population	Employment
2015	1,432	2,269	13,677
2022	1,890	3,117	14,833
2045	2,410	3,836	15,598
Increase	978	1,567	1,921
Growth Percentage*	2.3%	2.3%	0.5%

*Calculated as annual percentage growth rate over 30 years.

3.3.3 Future Transportation Improvements

Roadway

The South Extension (Medical Complex) Corridor projects identified in the City of Jacksonville's Capital Improvement Program (2019-2023), the North Florida TPO's Unified Planning Work Program (FY 2018/2019 to FY 2019/2020), and FDOT's Five-Year Work Program (2019-2024) are listed in *Table 3.3.2: South Extension (Medical Complex) Corridor Roadway Projects*.

The projects that may require coordination include:

- Palm Avenue Improvements from Gary Street to Prudential Drive: This project will include signalization improvements, reconstruction of intersections of Palm Avenue, Gary Street, Baptist Way and Prudential Drive. Project improvements include turn lanes, sidewalks, drainage, bike lanes, landscaping, hardscaping and lighting enhancements.
- Southbank Riverwalk enhancements and loop.

Table 3.3.2: South Extension Corridor Roadway Projects

Project	Agency Project ID
City of Jacksonville	
Sidewalk/Curb construction and repair	24
Palm Avenue improvements	120
LaSalle Street outfall	193
Southbank Riverwalk extension & enhancements	250
Southbank floating dock	251
Railroad quiet zone match	397
Bike lanes San Marco and Riverplace	Mobility Plan Bicycle Projects 106, 105
Southbank Riverwalk extension	Mobility Plan Bicycle Projects 194, 108, 90
Prudential Drive pedestrian improvements	Mobility Plan Pedestrian Projects 76
Shared Use Path – Nira Street	Mobility Plan Bicycle Projects 251
Sharrows – Palm Avenue	Mobility Plan Bicycle Projects 104
FDOT	
I-95 (various)	Construction 2020
TPO	
Main Street	4393071, 4284891
Acosta Bridge and connectors	4260781
Rehabilitate various pedestrian	4355621, 4355621
Railroad crossing rebuilds	4188643
I-95 (SR 9)	4322591, 4240264, 4240265, 4240264, 4240265, 4346191, 4392011
Overland Bridge	4376971
Urban Core riverfront revitalization	4433972

Bicycle and Pedestrian Facilities

The most significant bicycle and pedestrian facility project in the corridor is the Emerald Trail Master Plan project. Led by Groundwork Jacksonville, the Emerald Trail is a master plan of nearly 20 miles of new trails connecting multiple historic neighborhoods, including San Marco, to existing and planned trails for a total of 30 miles of contiguous trails and linear parks. The master plan identifies two tiers of projects, based on their apparent need and ease of development. *Figure 3.3.3: Study Area over Emerald Necklace Trail Master Plan* illustrates this plan.

The following trails are contained within or approaching the area of study:

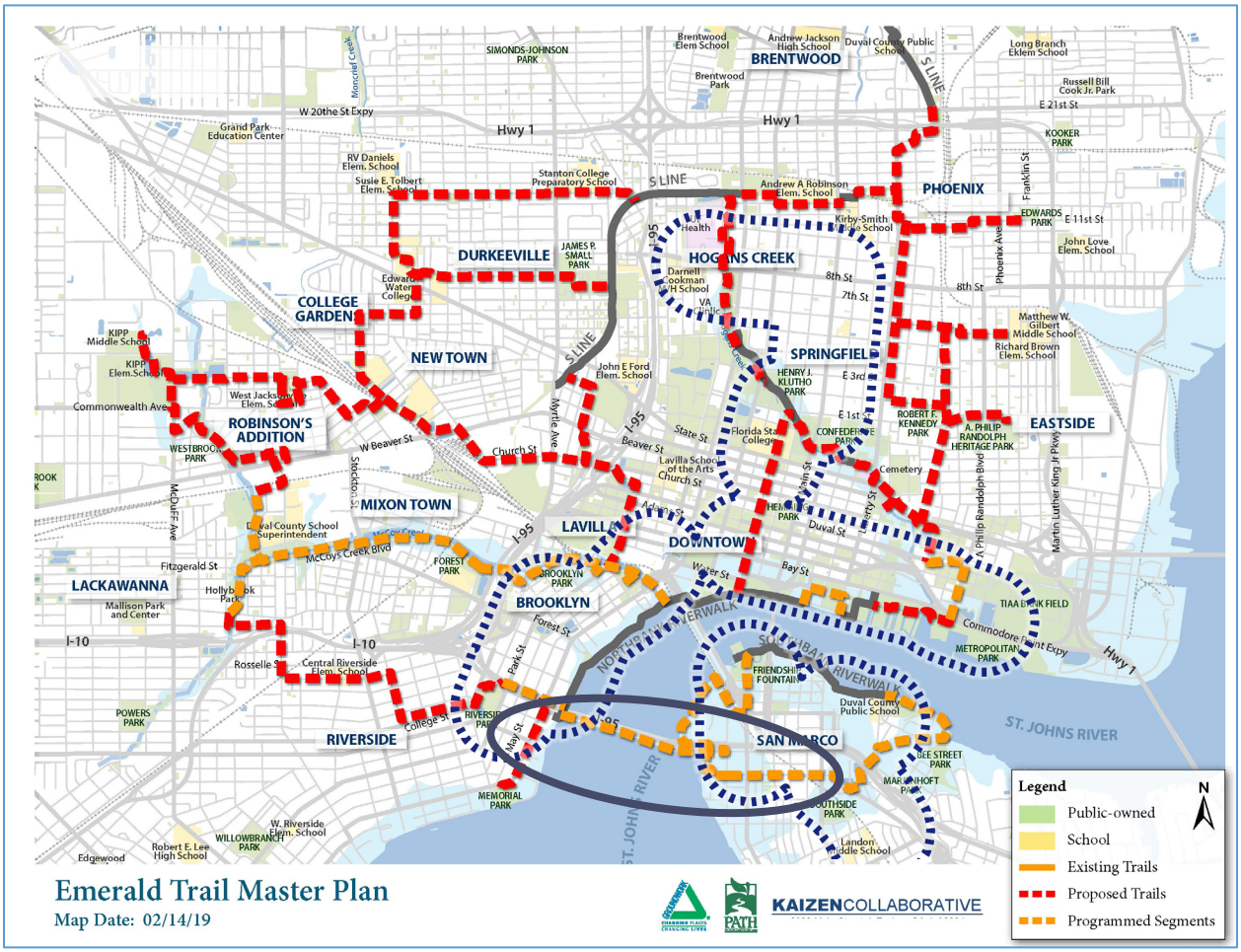
- Artist Walk to Fuller Warren Bridge
- San Marco Connector

The San Marco Connector is currently programmed by City of Jacksonville.

Transit

The JTA continues to conduct planning studies for future commuter rail which would provide enhanced connectivity in this corridor. In earlier commuter rail studies, the highest priority corridor for additional study is the southeast commuter rail line between St. Augustine and Jacksonville.

Figure 3.3.3: Study Area over Emerald Necklace Trail Master Plan



Trail Master Plan Map Source: Emerald Trail Master Plan and Implementation Strategy (2019)

3.4 Southeast Extension (San Marco) Corridor

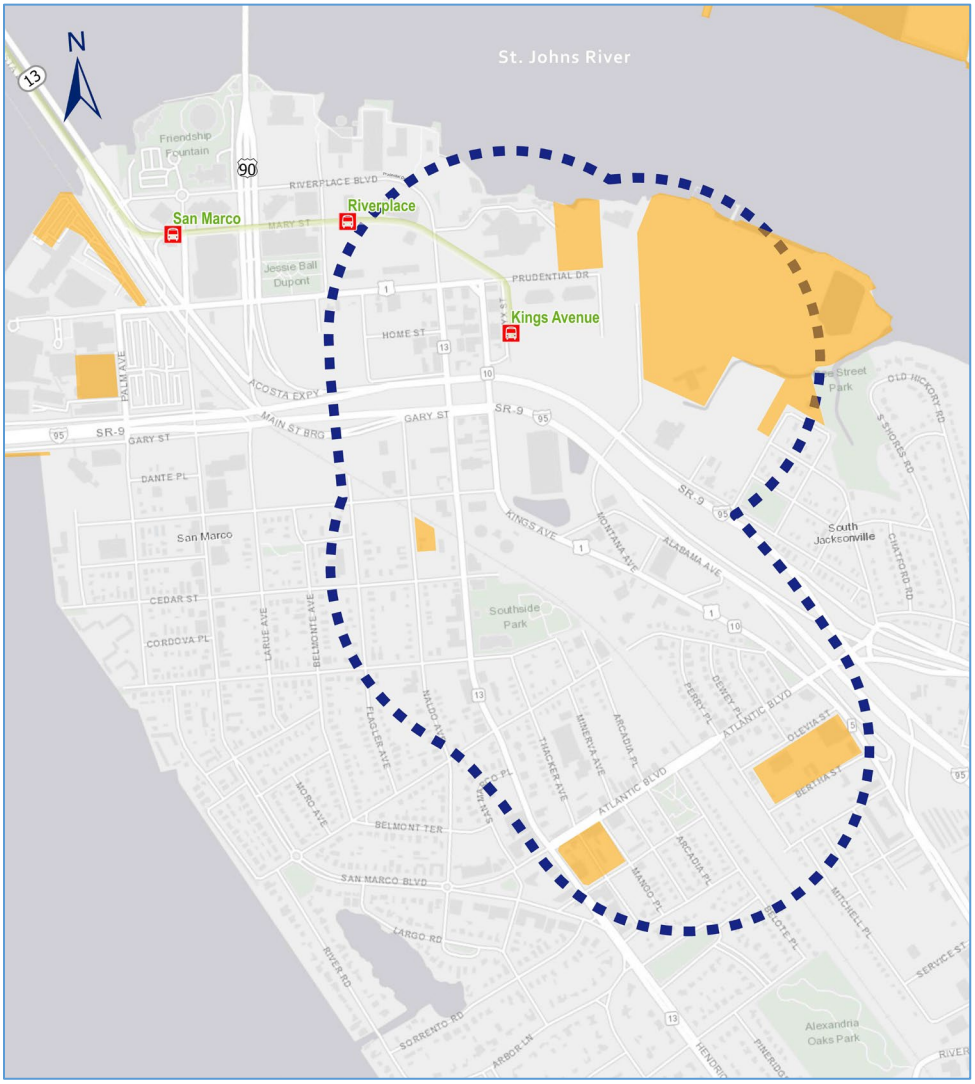


The Southeast Extension (San Marco) Corridor connects the existing Skyway Stations at Riverplace and Kings Avenue to a planned redevelopment, The District, at the former JEA Generating Station site, and a planned retail center with a Publix grocery store in East San Marco.

3.4.1 Planned and Future Development

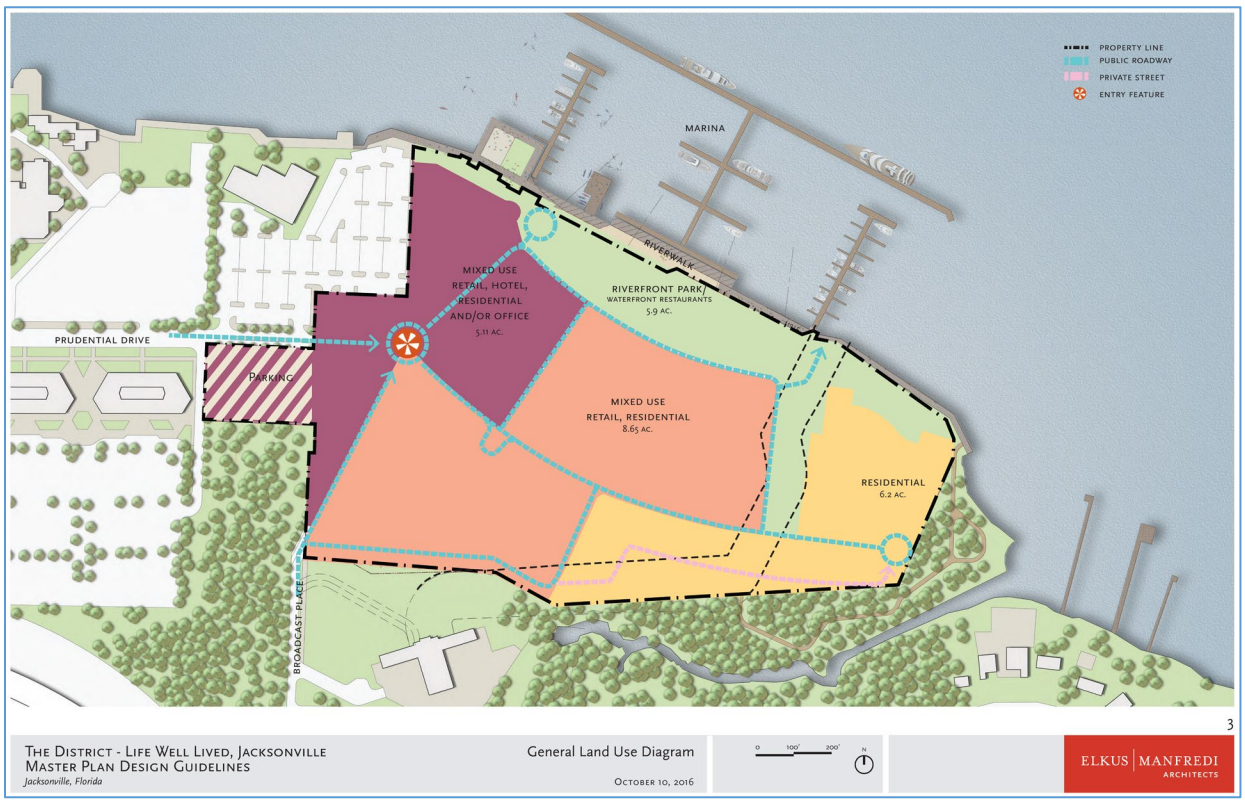
New developments planned in the Southeast Extension (San Marco) Corridor will soon ignite more medium and high-density projects. *Figure 3.4.1: Southeast Extension Corridor Planned/Future Development* highlight the planned developments.

Figure 3.4.1: Southeast Extension Corridor Planned/Future Development



The District is a planned 32-acre mixed-use development (*Figure 3.4.2: The District Master Plan Design Guidelines (2017)*). When complete in 2022, it will become home to 1,170 residents; 200,000 square feet of office space; more than 200,000 square feet of retail space; a 147-room hotel; riverfront bars and restaurants; a 125-slip marina and a 3.5-acre riverfront park with an extension of the Southbank Riverwalk. The District Master Plan continues to be executed. The District, the site of a former JEA generating station, is currently adding utilities to the site and has announced the location of a new hotel.

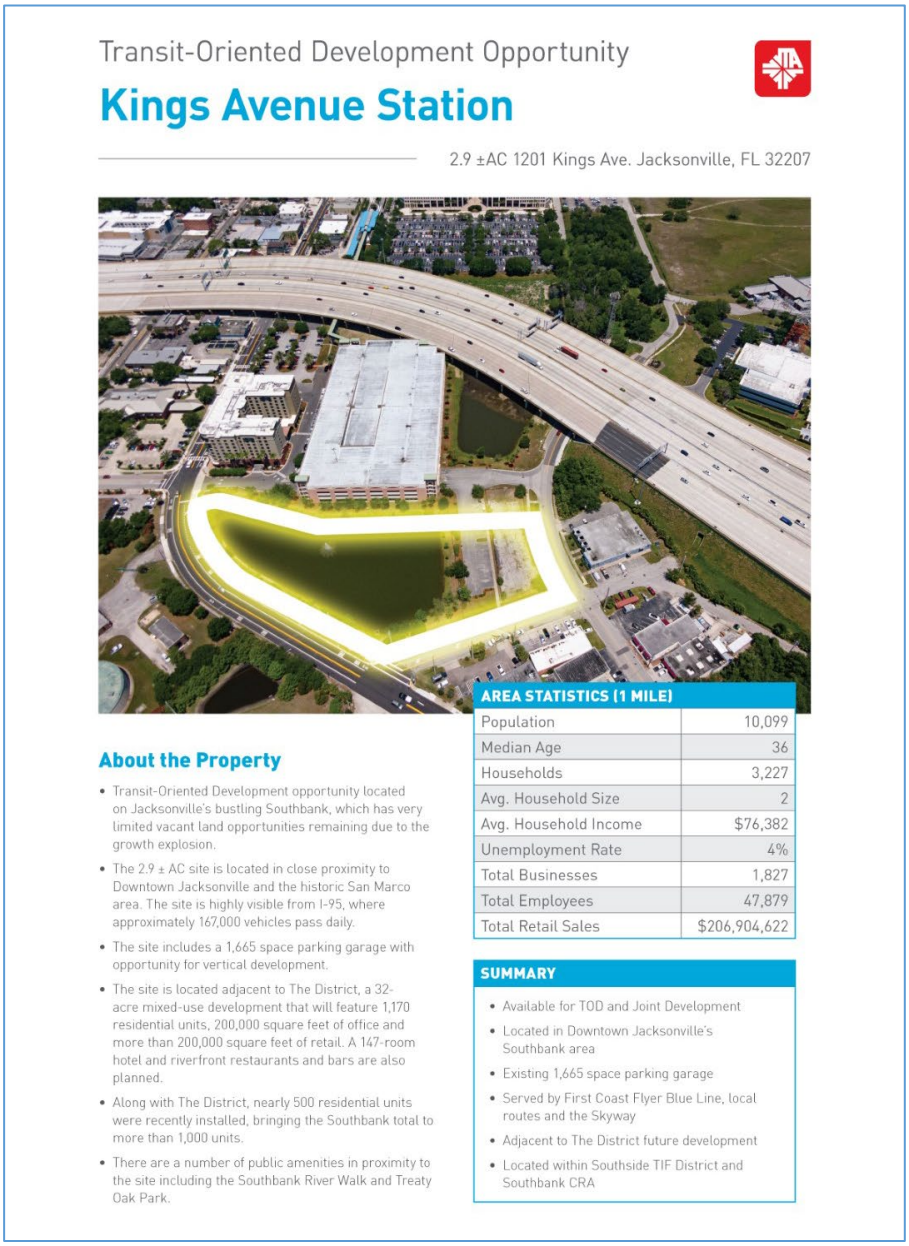
Figure 3.4.2: The District Master Plan Design Guidelines (2017)



Construction is expected to begin in 2020 on a shopping center with retail shops, restaurants and a 30,000 square foot Publix at Hendricks Avenue near Atlantic Boulevard.

The JTA is advertising TOD opportunities on Kings Avenue near the Kings Avenue Parking Garage and Montana Avenue near The District (*Figure 3.4.3: Kings Avenue TOD Advertisement*). These properties are at different stages of planning and are expected to gradually increase daytime and total population within the corridor.

Figure 3.4.3: Kings Avenue Station TOD Advertisement



Transit-Oriented Development Opportunity

Kings Avenue Station

2.9 ±AC 1201 Kings Ave. Jacksonville, FL 32207

About the Property

- Transit-Oriented Development opportunity located on Jacksonville's bustling Southbank, which has very limited vacant land opportunities remaining due to the growth explosion.
- The 2.9 ± AC site is located in close proximity to Downtown Jacksonville and the historic San Marco area. The site is highly visible from I-95, where approximately 167,000 vehicles pass daily.
- The site includes a 1,665 space parking garage with opportunity for vertical development.
- The site is located adjacent to The District, a 32-acre mixed-use development that will feature 1,170 residential units, 200,000 square feet of office and more than 200,000 square feet of retail. A 147-room hotel and riverfront restaurants and bars are also planned.
- Along with The District, nearly 500 residential units were recently installed, bringing the Southbank total to more than 1,000 units.
- There are a number of public amenities in proximity to the site including the Southbank River Walk and Treaty Oak Park.

AREA STATISTICS (1 MILE)	
Population	10,099
Median Age	36
Households	3,227
Avg. Household Size	2
Avg. Household Income	$76,382
Unemployment Rate	4%
Total Businesses	1,827
Total Employees	47,879
Total Retail Sales	$206,904,622

SUMMARY

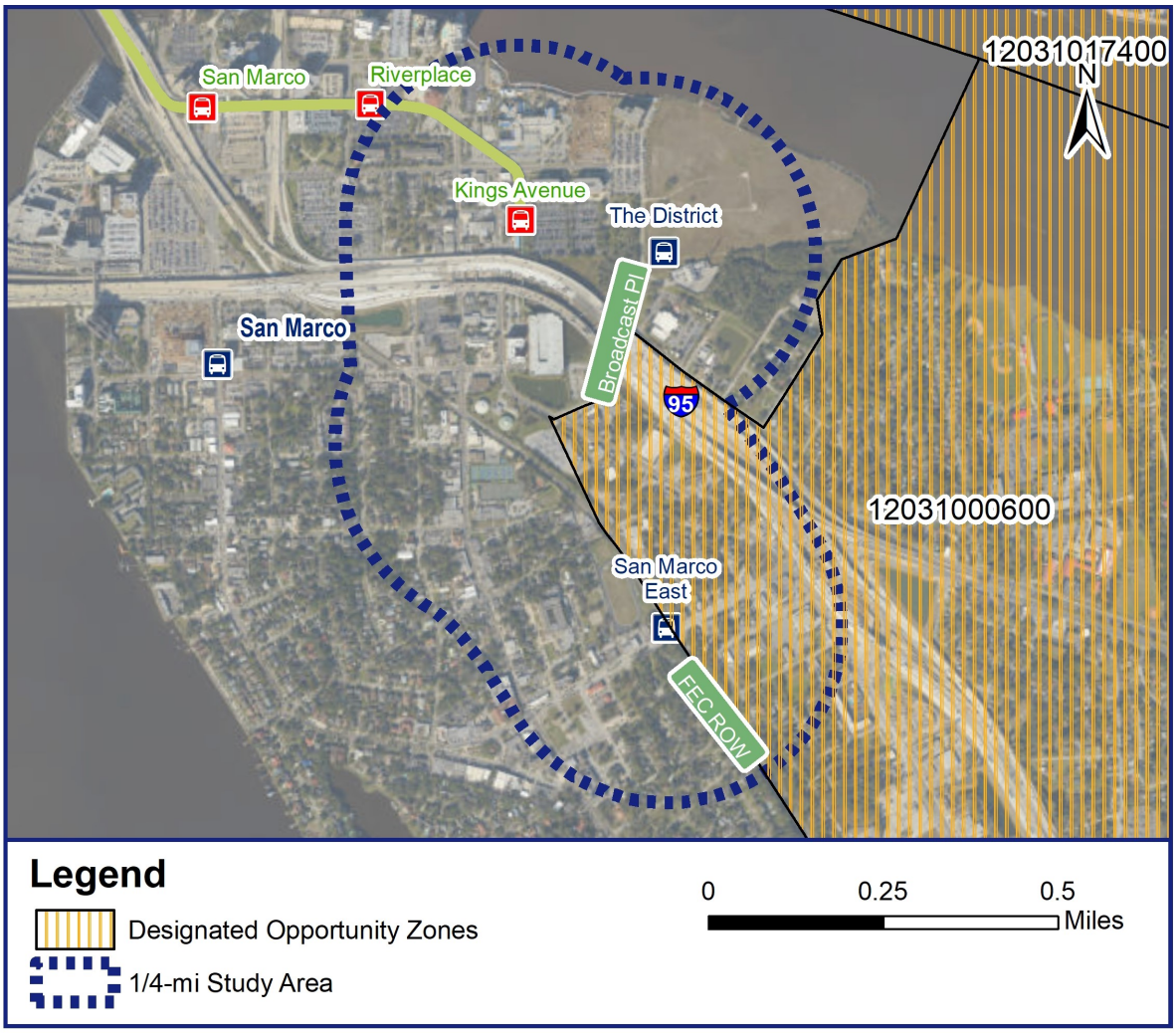
- Available for TOD and Joint Development
- Located in Downtown Jacksonville's Southbank area
- Existing 1,665 space parking garage
- Served by First Coast Flyer Blue Line, local routes and the Skyway
- Adjacent to The District future development
- Located within Southside TIF District and Southbank CRA

The Kings Avenue Station is a 2.9-acre TOD opportunity served by Skyway and a 1,665-space parking garage adjacent to the future District development. Source: JTA

Opportunity Zones

In the Southeast Corridor, census tract 12031000600 is a designated Qualified Opportunity Zone. This area can be generally described as the parcel north of the Florida East Coast (FEC) railroad tracks and east of Broadcast Place and is illustrated in *Figure 3.4.4: Southeast Extension (San Marco) Corridor Opportunity Zone*.

Figure 3.4.4: Southeast Extension Corridor Opportunity Zone



3.4.2 Projected Population and Employment Growth

Due to its location along the Southbank and proximity to San Marco, this corridor is expected to sustain and increase both its daytime population as well as the number of households and retail, especially in the site known as The District.

Using 2015 as the baseline information, this corridor alone is expected to grow by 3,243 jobs and 1,768 dwelling units. See *Table 3.4.1: Southeast Extension (San Marco) Corridor Population and Employment Growth* for details. Year 2015 and 2045 data was obtained from the North Florida

TPO. The Ridership Forecast Technical Memo describes assumptions, trip rates, and employment ratios in Appendix F.

Table 3.4.1: Southeast Extension Corridor Population and Employment Growth

Year	Dwelling Units	Population	Employment
2015	1,593	3,358	6,349
2022	3,003	6,244	8,609
2045	3,361	6,753	9,592
Increase	1,768	3,395	3,243
Growth Percentage*	3.7%	3.4%	1.7%

*Calculated as annual percentage growth rate over 30 years.

3.4.3 Future Transportation Improvements

Roadway

The Southeast Extension (San Marco) Corridor projects identified in the City of Jacksonville's Capital Improvement Program (2019-2023), the North Florida TPO's Unified Planning Work Program (FY 2018/2019 to FY2019/2020), and FDOT's Five-Year Work Program (2019-2024) are listed in *Table 3.4.2: Southeast Corridor Roadway Projects*.

Table 3.4.2: Southeast Extension Corridor Roadway Projects

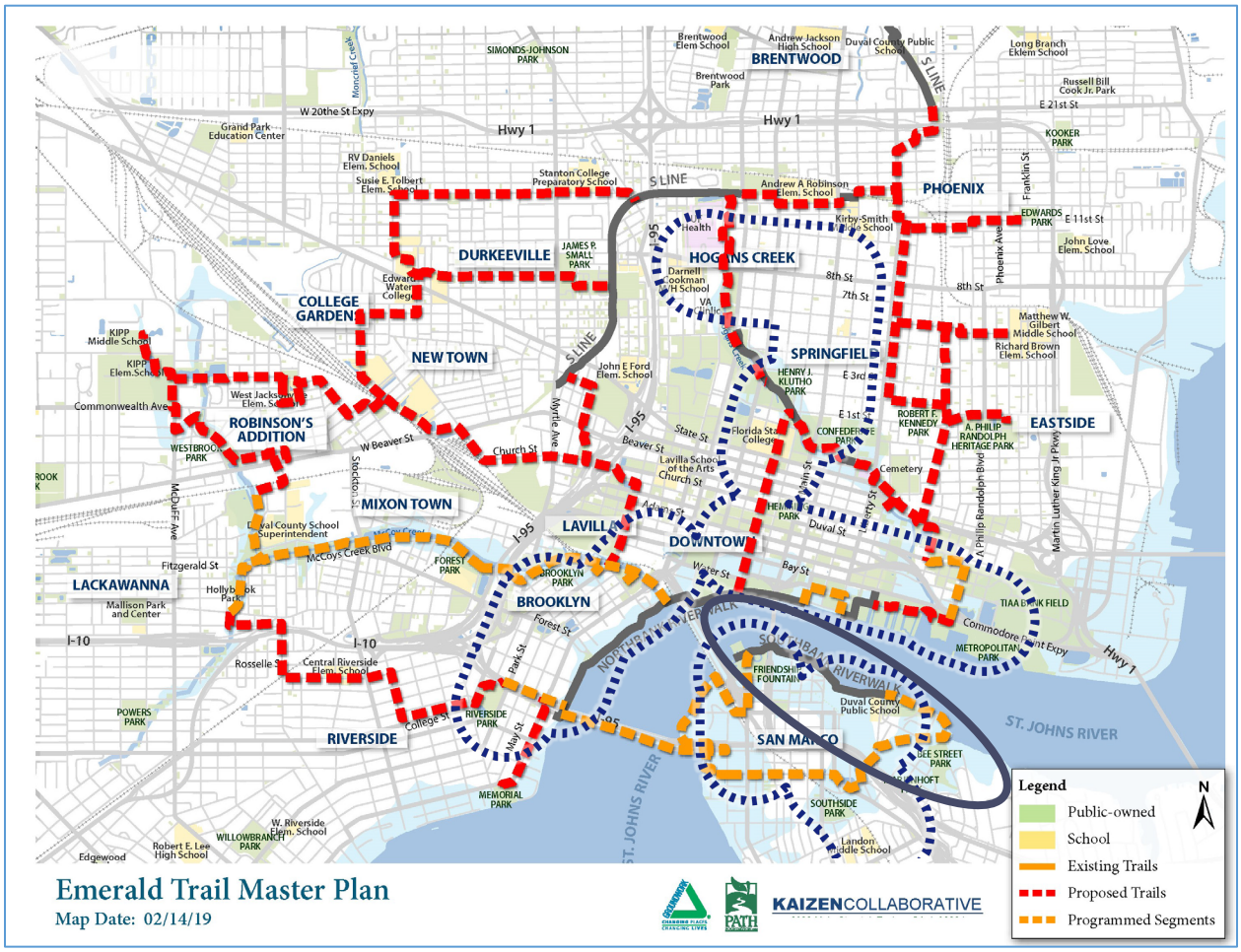
Project	Agency Project ID
City of Jacksonville	
Sidewalk/Curb construction and repair	24
Southbank Riverwalk extension & enhancements	250
Southbank floating dock	251
Railroad Quiet Zone match	397
Bike lanes San Marco and Riverplace	Mobility Plan Bicycle Projects 106, 105
Southbank Riverwalk extension	Mobility Plan Bicycle Projects 194, 108, 90
Prudential Drive pedestrian improvements	Mobility Plan Pedestrian Projects 76
FDOT	
I-95 Overland Bridge (various)	Construction 2020
TPO	
Acosta Bridge and connectors	4260781
Rehabilitate various pedestrian	4355621, 4355621
Railroad crossing rebuilds	4188643
I-95 (SR 9)	4322591, 4240264, 4240265, 4240264, 4240265, 4346191, 4392011
Overland Bridge	4376971
Urban Core riverfront revitalization	4433972

The most significant projects that may require coordination include I-95 ramps and enhancements related to multi-use path bridge, any rail crossing modifications, and Southbank Riverwalk loop and enhancements.

Bicycle and Pedestrian Facilities

The most significant bicycle and pedestrian facility project in the corridor is the Emerald Trail Master Plan project. Led by Groundwork Jacksonville, the Emerald Trail, depicted in Figure 3.4.5, is a master plan of nearly 20 miles of new trails connecting multiple historic neighborhoods, including San Marco, to existing and planned trails for a total of 30 miles of contiguous trails and linear parks. The master plan identifies two tiers of projects, based on their apparent need and ease of development. The San Marco Connector project is currently programmed by City of Jacksonville. It is along the Riverwalk and will intersect the study area.

Figure 3.4.5: Study Area over Emerald Necklace Trail Master Plan



Trail Master Plan Map Source: Emerald Trail Master Plan and Implementation Strategy (2019)

Transit

The Southeast Extension (San Marco) Corridor has two potential extensions: to Atlantic Boulevard and the new San Marco East shopping center and to The District, a planned mixed-

use development. The opening of The District and the new Publix shopping center may coincide with additional St. Johns River Taxi service, bike share, and other alternative transportation options.



Planning for future commuter rail service and a potential station, Jackson Square Station at Hendricks Avenue and Atlantic Boulevard are within this corridor. JTA is evaluating feasibility and funding options to update aging rail and signal infrastructures, move Jacksonville's Amtrak Station downtown and launch three commuter rail services connecting Jacksonville and St. Augustine, Yulee and Green Cove Springs.

The proposed Southeast Extension (San Marco) corridor does not duplicate any existing JTA route segments and no changes to the current routes are anticipated with the Southeast Extension (San Marco) Corridor.

3.5 Bay Street Innovation Corridor

The Bay Street Innovation Corridor (also previously referred to as the East Corridor of the U²C System) extends from the existing Central Station to connect the downtown core along Bay Street through the Elbow District and east to the Sports/Entertainment District. This section provides an overview of planned developments, forecasted population growth, and programmed transportation infrastructure projects within the corridor that used as a basis for future ridership projections for the U²C System.

3.5.1 Planned and Future Development

Several large-scale projects are planned along the Bay Street Innovation Corridor including the Shipyards (also known as Shipyards + Lot J), Ford on Bay, BayJax Innovation Corridor, VyStar headquarters, rehabilitation of historical buildings along Forsyth and Hogan for residential and commercial use, a new hotel, additional parking garages along Bay Street, a master plan for the former Landing property; and plans for an outdoor soccer facility for the Armada Football Club. These developments are illustrated with orange shading in *Figure 3.5.1: Bay Street Innovation Corridor Planned/Future Development.*

The Shipyards Master Plan encompasses the area around TIAA Bank Field and Daily's Place. The developers, Iguana Investments and The Cordish Companies, have the rights to build up to 400 marina slips, 662 residential units, 100,000 square feet of commercial space, 1 million square feet of office space and 350 hotel rooms[2]. Figures 3.5.2 and 3.5.3 illustrate the Shipyards Master Plan Concept and a closeup of the proposed Lot J venues.

[2] www.bizjournals.com/jacksonville/news/2018/12/13/dia-expands-shipyards-development-rights.html

Figure 3.5.1: Bay Street Innovation Corridor Planned/Future Development

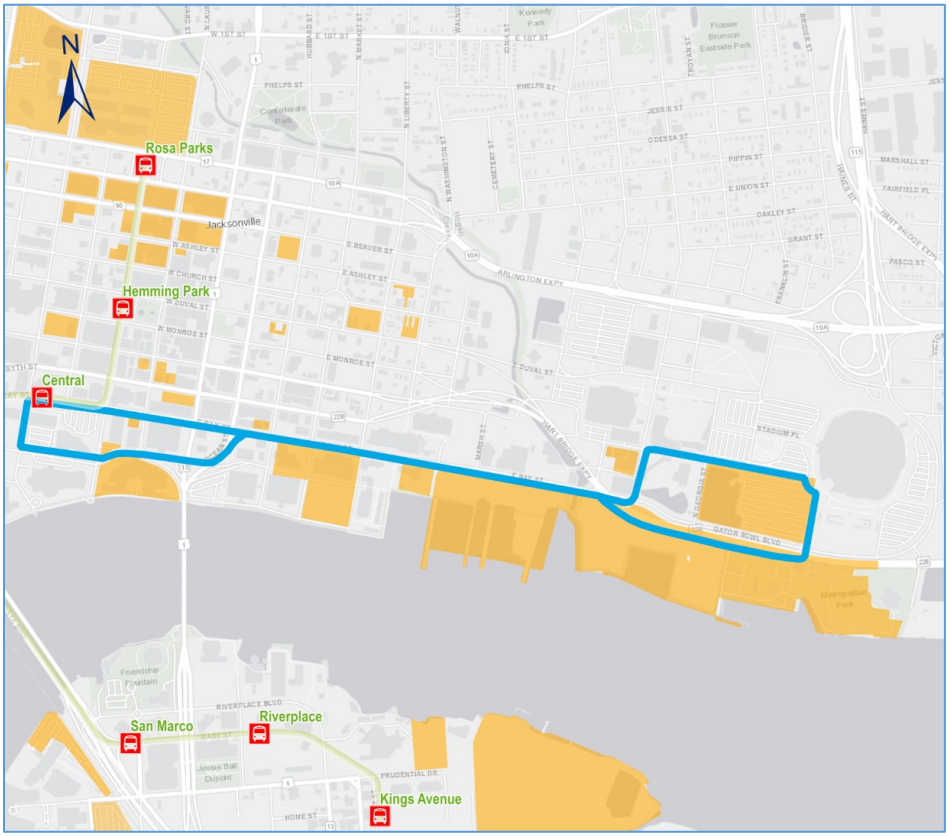


Figure 3.5.2: Shipyards+Lot J Concept

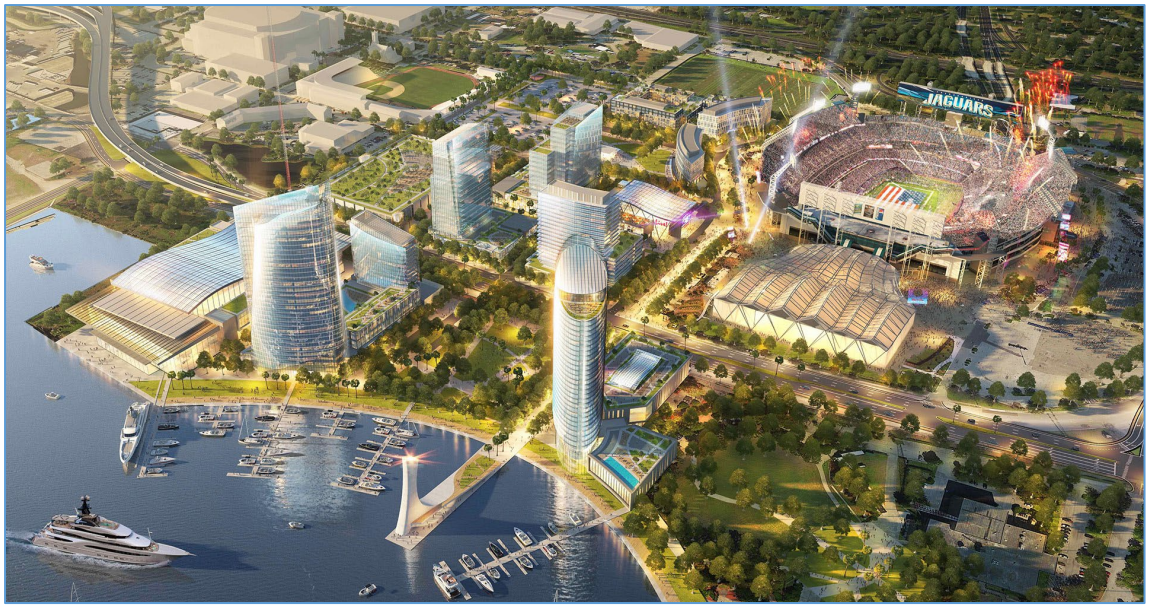
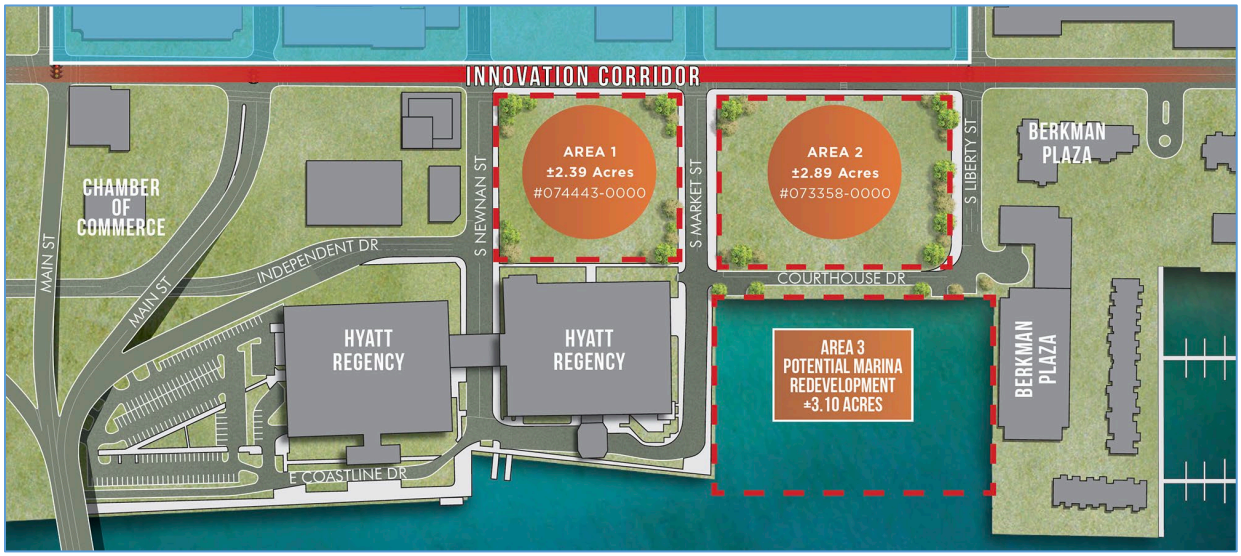


Figure 3.5.3: Lot J Redevelopment



Recently, the Downtown Investment Authority (DIA) announced its intention to market the sites of the former County Courthouse and City Hall as "The Ford on Bay." If approved, the sites, along with the adjacent demolished parking deck over the St. Johns River, would be subject to a unified RFP to develop a retail and multifamily residential project with an optional marina (see *Figure 3.5.4: The Ford on Bay Proposed Plan*).

Figure 3.5.4: The Ford on Bay Proposed Plan



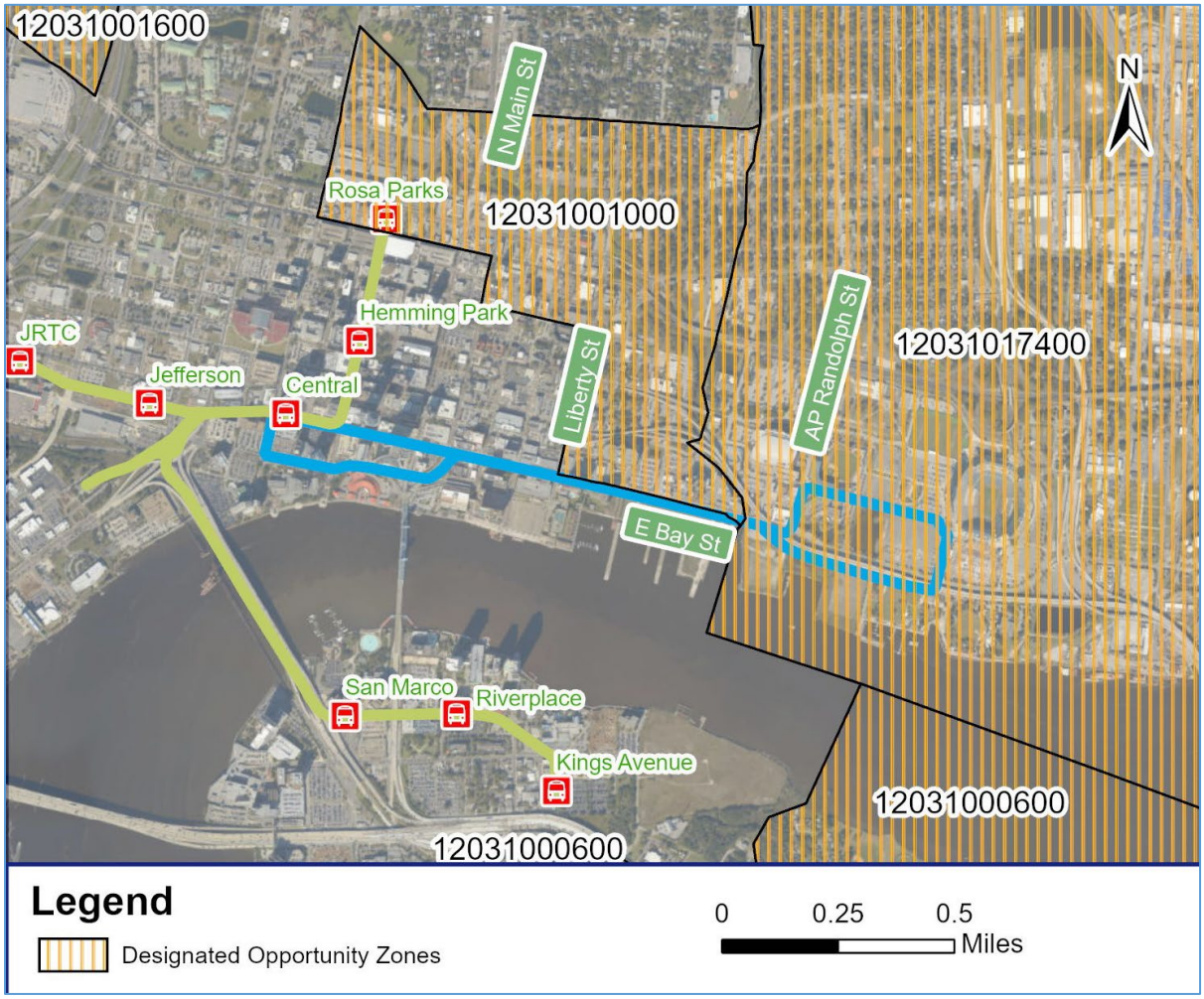
Source: Jacksonville Daily Record

The BayJax Innovation Corridor is a three-mile business, residential and entertainment segment of Bay Street that will serve as a test bed for select North Florida Smart Region strategies and technologies. Projects under consideration include an integrated data exchange, autonomous shuttles (this project), smart and connected signals, pedestrian sensors, street flood notification systems, smart lighting, wayfinding and event management, solar path, conversion to a two-way road, public broadband network, public safety surveillance and smart waste management. The BayJax Innovation Corridor runs east-west from the JRTC to TIAA Bank Field.

Opportunity Zones

In the Bay Street Innovation Corridor, census tracts 12031017400 and 12031001000 are certified Qualified Opportunity Zones. These areas encompass the general location of the Sports/Entertainment District and part of the Bay Street Innovation Corridor and are illustrated in *Figure 3.5.5: East Extension (Sports Complex) Corridor Opportunity Zones*.

Figure 3.5.5: Bay Street Innovation Corridor Opportunity Zones



3.5.2 Projected Population and Employment Growth

Due to the planned developments along Bay Street and around the Sports and Entertainment District, this corridor is expected to substantially increase both its daytime population and number of households.

Using 2015 as the baseline information, this corridor alone is expected to grow by 14,655 jobs and 5,520 dwelling units. See *Table 3.5.1: Bay Street Innovation Corridor Population and Employment Growth* for details. Year 2015 and 2045 data was obtained from the North Florida TPO. The Ridership Forecast Technical Memorandum, included in Appendix F, describes assumptions, trip rates, and employment ratios.

Table 3.5.1: Bay Street Innovation Corridor Population and Employment Growth

Year	Dwelling Units	Population	Employment
2015	591	770	25,309
2022	2,501	4,781	35,254
2045	6,111	12,365	39,964
Increase	5,520	11,595	14,655
Growth Percentage*	31%	50%	1.9%

*Calculated as annual percentage growth rate over 30 years.

3.5.3 Future Transportation Improvements

Roadway

The following projects identified in the City of Jacksonville's Capital Improvement Program (2019-2023), the North Florida TPO's Unified Planning Work Program (FY2018/2019 to FY2019/2020), and FDOT's Five-Year Work Program (2019-2024) are listed in *Table 3.5.2: Bay Street Innovation Corridor Roadway Projects*.

The Hart Bridge Ramp Modifications project by the City of Jacksonville will significantly modify the existing conditions of Bay Street. The project consists of the removal of a section from Liberty Street to Festival Park Avenue and roadway and intersection improvements along Bay Street for users of all modes.

Other projects that may require coordination include:

- Downtown Pocket Parks: Landscape renovation of ten downtown pocket parks and medians: Riverside Ave median (between Peninsular Place and Edison Avenue), Water Street median (between Broad Street and Pearl Street), Water Street Pocket Park, Bay and Broad Street Pocket Park, Independent Drive/Main Street Bridge Ramp, Jessie Smith Pocket Park, Main Library Pocket Park, Howard's Island, Sister City Park, State/Union/Liberty median.
- Civil/Cultural Riverwalk Northbank: Improvements to Northbank Riverwalk and all publicly owned land between Hogan Street and Pearl Street in Downtown Jacksonville.

Table 3.5.2: Bay Street Innovation Corridor Roadway Projects

Project	Agency Project ID
City of Jacksonville	
Hart Bridge Ramp Modifications	336
Sidewalk/Curb Construction and Repair	24
Downtown Pocket Parks	90
Northbank Bulkhead	37
UF Health Capital Improvements	326
Liberty Street Basin (new marina)	408
Hogan's Creek Greenway	72, 346
Hogan's Creek Stormwater Improvements	228
Water Street Parking Garage Renovation	52
Civil/Cultural Riverwalk Node – Northbank	294
Two-way lane conversion (Forsyth & Adams)	Mobility Plan DIA Projects 4, 5
Bicycle Boulevard Street and Newnan Street	Mobility Plan Bicycle Projects 247
Protected Bike Lanes Pearl and Park Streets	Mobility Plan Bicycle Projects 73, 75, 76
Priority Sharrows Laura Street	Mobility Plan Bicycle Projects 74
Buffered Bike Lanes Liberty Street	Mobility Plan Bicycle Projects 77, 7
Pedestrian Improvements – Adams, Bay, Forsyth and Water Streets	Mobility Plan Pedestrian Projects 73-75
Bay Street two-way protected bike lane	DIA BID Plan VI-42
Reintroduce Two-Way Street	DIA BID Plan VI-45
FDOT	
SR10A (Mathews Bridge) Steel Repair	Construction 2022
ITS, SR115 (US1) Martin Luther King Expressway from I-95 to Hart Expressway	Preliminary Engineering 2021, Construction 2023
TPO	
Main St	4393071, 4284891
Rehabilitate various pedestrian infrastructure	4355621, 4355621
Urban Core Riverfront Revitalization	4433972

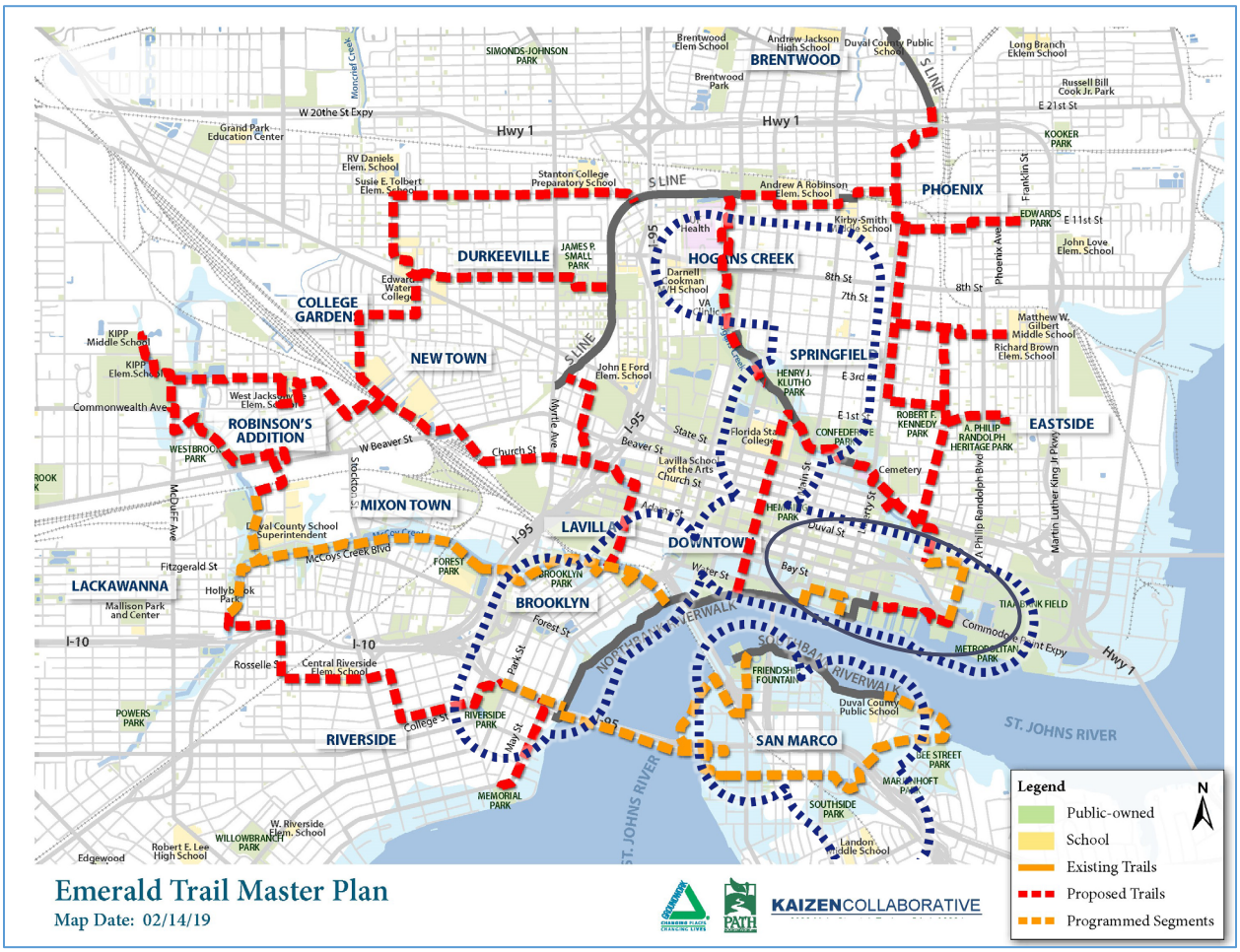
Bicycle and Pedestrian Facilities

The most significant bicycle and pedestrian project along the Bay Street Innovation Corridor is the Emerald Trail Master Plan. Led by Groundwork Jacksonville, it is a master plan of nearly 20 miles of new trails connecting multiple historic neighborhoods, including Springfield, Riverside, San Marco and LaVilla to Hogan's Creek, the S-Line Rail Trail and the Northbank and Southbank Riverwalks. This will create a total of 30 miles of contiguous trails and linear parks within the area. The master plan identifies two tiers of projects, based on their apparent need and ease of development. These trails are illustrated in *Figure 3.5.6: Study Area over Emerald Necklace Trail Master Plan.*

The following trails are contained within or approaching the corridor:

- Segment #2 Hogan Street Connector
- Segment #9 Hogan's Creek to Riverwalk

Figure 3.5.6: Study Area over Emerald Necklace Trail Master Plan



Trail Master Plan Map Source: Emerald Trail Master Plan and Implementation Strategy (2019)

Transit

The Bay Street Innovation Corridor is being advanced by a BUILD grant from the U.S. DOT. JTA has been working with the City of Jacksonville, North Florida TPO, JaxChamber, DIA, JEA, Jacksonville Sheriff's Office and the Jacksonville Jaguars to create a test bed for smart region strategies and technologies.

The implementation of the Bay Street Innovation Corridor will allow JTA to realign and combine routes **11 A Philip Randolph** and **31 Talleyrand** to better serve the people using the service north and east of the sports complex.

The redevelopment of the sports and entertainment area will include an expansion of the Northbank Riverwalk and other bike and pedestrian pathways.

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4 Development of Alternatives

This section of the report summarizes the methodology for the development of alternatives for the proposed expansion of the U²C System. All potential alternatives assume the deployment of autonomous rubber-tired transit vehicles that will be able to operate on both an elevated structure and at street level. The alternatives development was conducted as a two-step screening process.

Step One is the initial screening of potential routes in each proposed corridor study area resulting in a preferred route alternative selected for advancement for each corridor. **Step Two** involves the evaluation of a preferred route alternative for which typical sections were developed including an elevated option as well as two at-grade options in dedicated lanes. The dedicated lane options include one with the transit lanes in the median and one with transit lanes at the curbs. Section 5 presents the evaluation of the preferred route alternatives for each type of roadway typical section for each corridor.

4.1 Project Evaluation Criteria

In Step One of the development of alternatives, multiple initial route alternatives were identified within the study area of each corridor, taking into consideration the project objectives and the primary locations to be served. The initial route alternatives were holistically evaluated using qualitative and quantitative data. The initial route alternatives were compared against each other to select an alternative to be advanced for further consideration. The following categories formed the basis of the initial evaluation:

- Operational Characteristics
- Physical/Environmental Characteristics
- Customer Service
- Safety

Operational characteristics include those features impacting the operational performance of the corridor, such as the number of intersections, the number of left turns required, and the number of driveways along the corridor.

Physical/Environmental characteristics include whether or not the route alternative can be achieved within the existing right-of-way, whether or not the route provides the most direct connection from the station termini, and how the existing corridor capacity would be impacted.

Customer Service characteristics evaluated include the visibility and accessibility along the route, connectivity to activity hubs along the corridor, and a sense of place from a customer experience perspective.

Safety considerations include illumination along the route, access to sidewalks, and posted speeds along the route as well as those of adjacent cross streets.

In the evaluation of alternatives, each characteristic was assigned a score ranging from "1" to "3" with a "1" representing ideal conditions. Illustrations of the corridor location are shown with each corridor. Table 4.1.1 summarizes the evaluation criteria established for the initial screening.

Table 4.1.1: Evaluation Criteria for Route Alternatives Considered for Initial Screening

Group	Criteria	Considerations
Operational	Complexity	How complex is the existing roadway configuration along the entire route? Are there many bends or turns along the route?
	Number of left turns	How many left turns will be required of the AV along the route?
	Number of intersections	How many intersections will the AV cross along the route? Will intersection modifications be required to accommodate the AV?
Physical	Require ROW acquisition	Can the AV lanes be added within the existing right of way or will additional rights of way need to be acquired?
	Route length	How direct is the route from the existing Skyway station to the proposed terminal location?
	Existing roadway capacity	Can the existing roadway capacity (number of lanes) be maintained with the addition of AV lanes?
	Require new construction	Will new construction be required to meet existing roadway capacity and accommodate new AV lanes (i.e., will widening be required)? Will elevated construction be required as a part of this route?
Customer Service	Visibility/access	How visible is the route to potential customers? Are paths leading to the potential route ADA accessible?
	Activity hubs	Is the route close to activity hubs in the study area? Is it near destinations where customers wish to be?
	Overall customer service experience	Does the route provide potential for intermediate stations or ticketing locations? Does it provide easy access to other modes?
Safety	Route safety for all users	Can pedestrians and cyclists safely access the stations along the route? What are the prevailing speeds of vehicular traffic along the route? What are the minimum and maximum lane widths along the corridor? Will the AV lane have to operate in mixed traffic along the route? Are there any at-grade crossings with commercial railroads on the route?

4.2 Initial Route Alternatives

The following sub-sections describe the initial route alternatives evaluation process for each corridor, and the selection of a preferred route alignment for each corridor. Illustrations of the corridor location are shown with each corridor.

4.2.1 North Extension (UF Health) Corridor



Initial Alternatives

Within the North Extension (UF Health) Corridor study area, eight potential route alternatives were considered to provide a connection from the existing Rosa Parks Transit Station to UF Health, including six Primary Routes and two Connector Routes. Operational and physical characteristics were analyzed for each route prior to advancement of any of the alternatives. An overview map of the initial alternative routes within the North Extension (UF Health) Corridor is shown in *Figure 4.2.1: North Extension Corridor Initial Alternatives*.

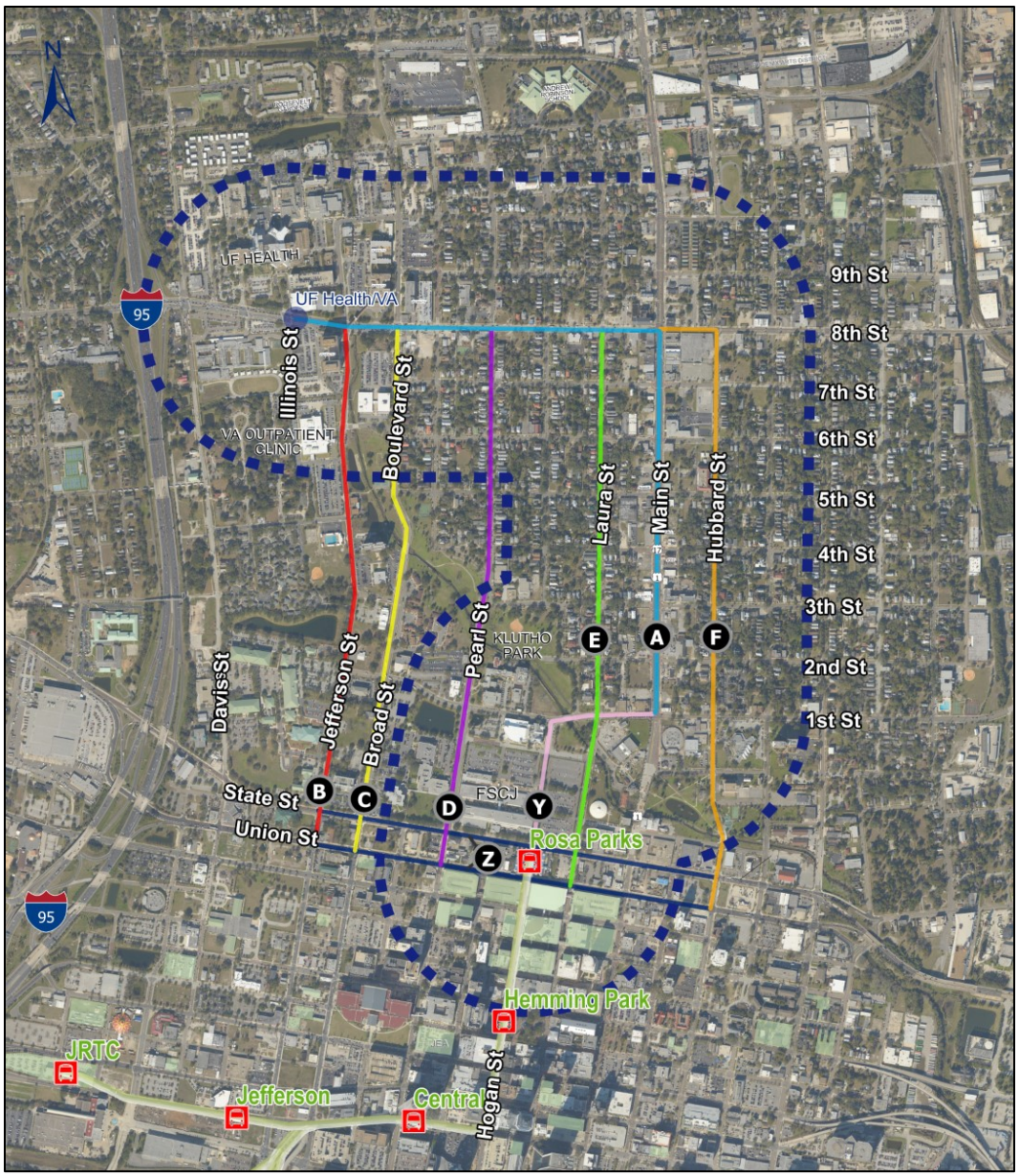


Figure 4.2.1: North Extension Corridor Initial Alternatives

Table 4.2.1: North Extension Corridor Route Options Evaluation Matrix outlines the performance of each of the initial primary route alternative and the connector routes against the evaluation criteria. While the Main Street route alternative had more operational challenges than the other route alternatives, primarily due to the number of left turns and intersections along the corridor, its physical characteristics, customer service opportunities, and safety rankings generally outperformed the other alternatives. Furthermore, Main Street offers the most direct route that is also easily accessible and close to the activity centers customers are seeking, leading to its ranking for customer service. The Main Street route received a better safety ranking due to the high visibility, safe travel speeds, and multimodal amenities along the route.

The Jefferson and Broad Street routes offered less operational complexity and enhanced safety. However, they were less direct and further from activity hubs. The Jefferson and Broad Street routes also had safety rankings of one due the travel speeds on the corridor and the ability of the AV to operate without safety challenges.

Table 4.2.1: North Extension Corridor Route Options Evaluation Matrix

Option	Description	Operational	Physical/ Environmental	Customer Service	Safety	Overall Rating
Primary Routes						
A	Main Street	2.0	1.5	1.0	1.0	**1.38**
B	Jefferson Street	1.7	2.0	2.0	1.0	**1.67**
C	Broad Street	1.7	2.0	2.0	1.0	**1.67**
D	Pearl Street	1.3	1.5	2.7	2.0	**1.88**
E	Laura Street	1.3	1.5	2.7	2.0	**1.88**
F	Hubbard Street	1.3	1.5	2.7	2.0	**1.88**
Connector Routes						
1	FSCJ Connector	2.0	2.0	1.7	1.0	**1.67**
2	State/Union St Connector	3.0	2.5	2.3	3.0	**2.71**

Of the two connector routes examined, the FSCJ Connector outperformed the State/Union Street Connector in all categories. The State/Union Street connector received a ranking of three due to operational challenges with this corridor: proximity to the I-95 interchange and congestion levels. Furthermore, the route has a history of frequent speeding incidents and vehicle-pedestrian crashes, which earned it a safety score of three.

Preferred Route

For the North Extension (UF Health) Corridor, the Main Street route was selected as the preferred route alternative to be advanced and the accompanying connector route selected was the FSCJ Connector. The preferred route alternative for the North Extension (UF Health) Corridor is illustrated in *Figure 4.2.2: North Extension Corridor Preferred Route Alternative.*

Figure 4.2.2: North Extension Corridor Preferred Route Alternative



4.2.2 West Extension (Riverside) Corridor



Initial Alternatives

Within the West Extension (Riverside) Corridor study area, four initial route alternatives were considered. Operational and physical characteristics were analyzed for each route. Other factors such as requiring right of way acquisition, new construction, or widening were also taken into consideration in addition to safety and customer service. The overall rating for each route was determined in order to select the best option. An overview map of the initial alternative routes is shown in *Figure 4.2.3: West Extension Corridor Initial Alternatives*.

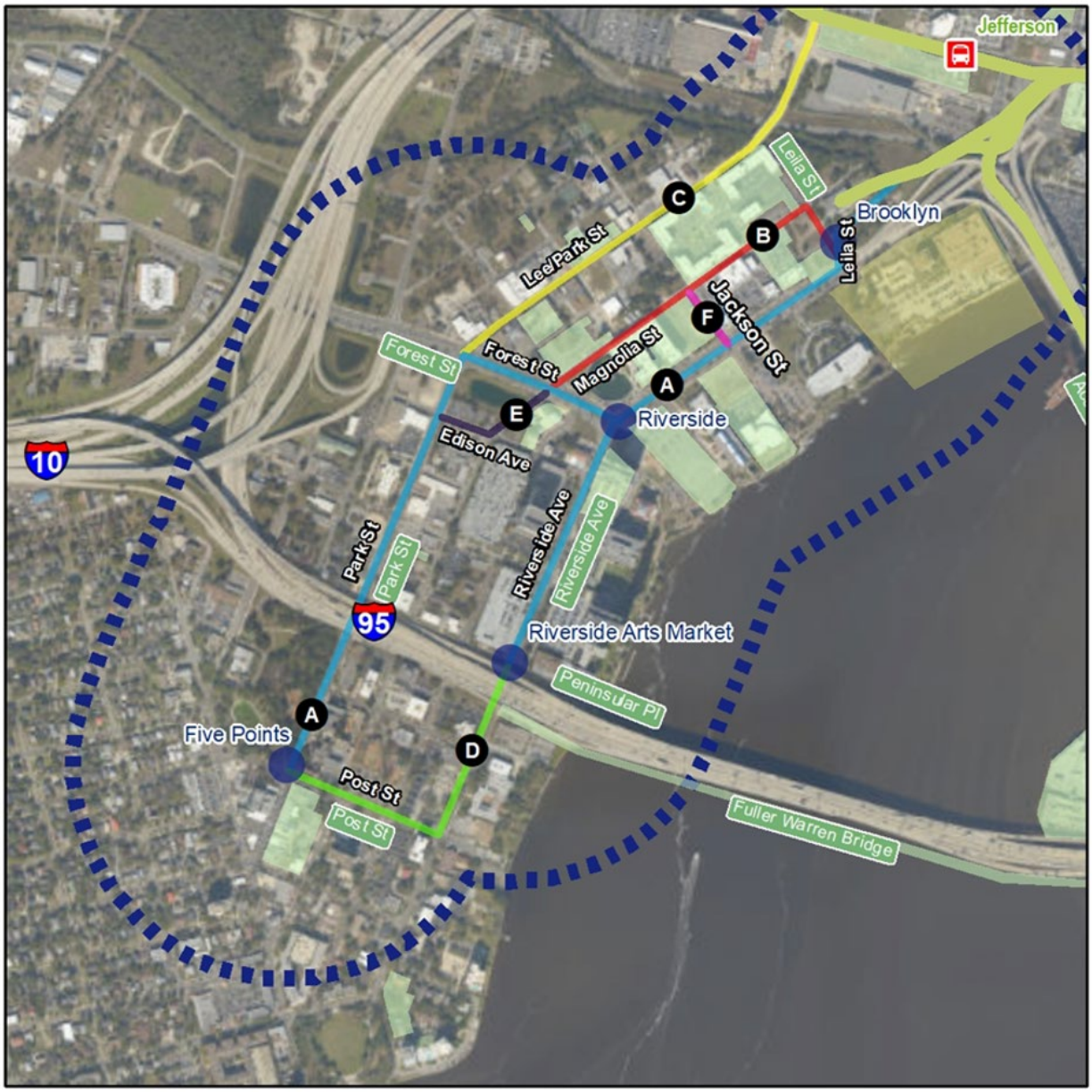


Figure 4.2.3: West Extension Corridor Initial Alternatives

Table 4.2.2: West Extension Corridor outlines the performance of each route alternative against the evaluation criteria. Option A, departing from a proposed Brooklyn Station and connecting to the proposed Five Points and Riverside Arts Market locations, utilizing Riverside Avenue, Forest Street, and Park Street, was selected against the remaining alternatives. While the route does encounter more intersections along its path, it ranked favorably in most categories such as route length, visibility/access, and customer service. Option A's customer service score was ranked with a score of one due to its proximity to activity hubs, such as commercial business and restaurants, along the route. Options C, D, E, F all ranked highly for safety due to the lower existing traffic volumes and posted speeds benefiting the ability to operate AV lanes along the routes.

Table 4.2.2: West Extension Corridor Route Options Evaluation Matrix

Option	Description	Operational	Physical/ Environmental	Customer Service	Safety	Overall Rating
A	Leila St -> Riverside Ave and -> Forest St -> Park St	2.3	2.0	1.0	2.0	**1.83**
B	Leila St -> Magnolia St -> Forest St -> Park St	2.7	2.0	2.0	2.0	**2.17**
C	JRTC -> Lee/Park St	1.7	1.8	2.3	1.0	**1.69**
D	Leila St -> Riverside Ave -> Post St -> Park St	2.3	2.3	1.3	1.0	**1.73**
E	Leila St -> Magnolia St -> Jackson St -> Park St	2.3	2.3	1.7	1.0	**1.81**
F	Leila St -> Magnolia St -> Edison Ave-> Park St	2.3	2.3	2.0	1.0	**1.90**

Preferred Route

All initial West Extension (Riverside) Corridor routes scored relatively close for nearly all criteria with the exception of Option B. Option A, utilizing Riverside Avenue, Forest Street and Park Street was selected as the preferred route alternative due it its limited physical constraints and enhanced customer service options when compared against the other route alternatives. The preferred route alternative is illustrated in *Figure 4.2.4: West Extension Corridor Preferred Route Alternative*. Two sections along the main corridors, Riverside Avenue and Park Street, were analyzed at W1 and W2 respectively.

Figure 4.2.4: West Extension Corridor Preferred Route Alternative



4.2.3 South Extension (Medical Complex) Corridor



Initial Alternatives

Within the South Extension (Medical Complex) Corridor study area, four route alternatives were considered, including one elevated and two at-grade routes extending from the existing San Marco Station to a proposed station at the Medical Center Complex. A pedestrian-only route alternative over the Acosta Bridge was also considered to provide enhanced safety along the route. Operational and physical characteristics were analyzed for each route. Other factors such as requiring right of way acquisition, new construction, or widening were also taken into consideration. The overall rating for both alternatives was analyzed to determine the best route option for the South Corridor. An overview map of the initial alternative routes within the South Corridor is illustrated in *Figure 4.2.5: South Extension Corridor Initial Alternatives*.

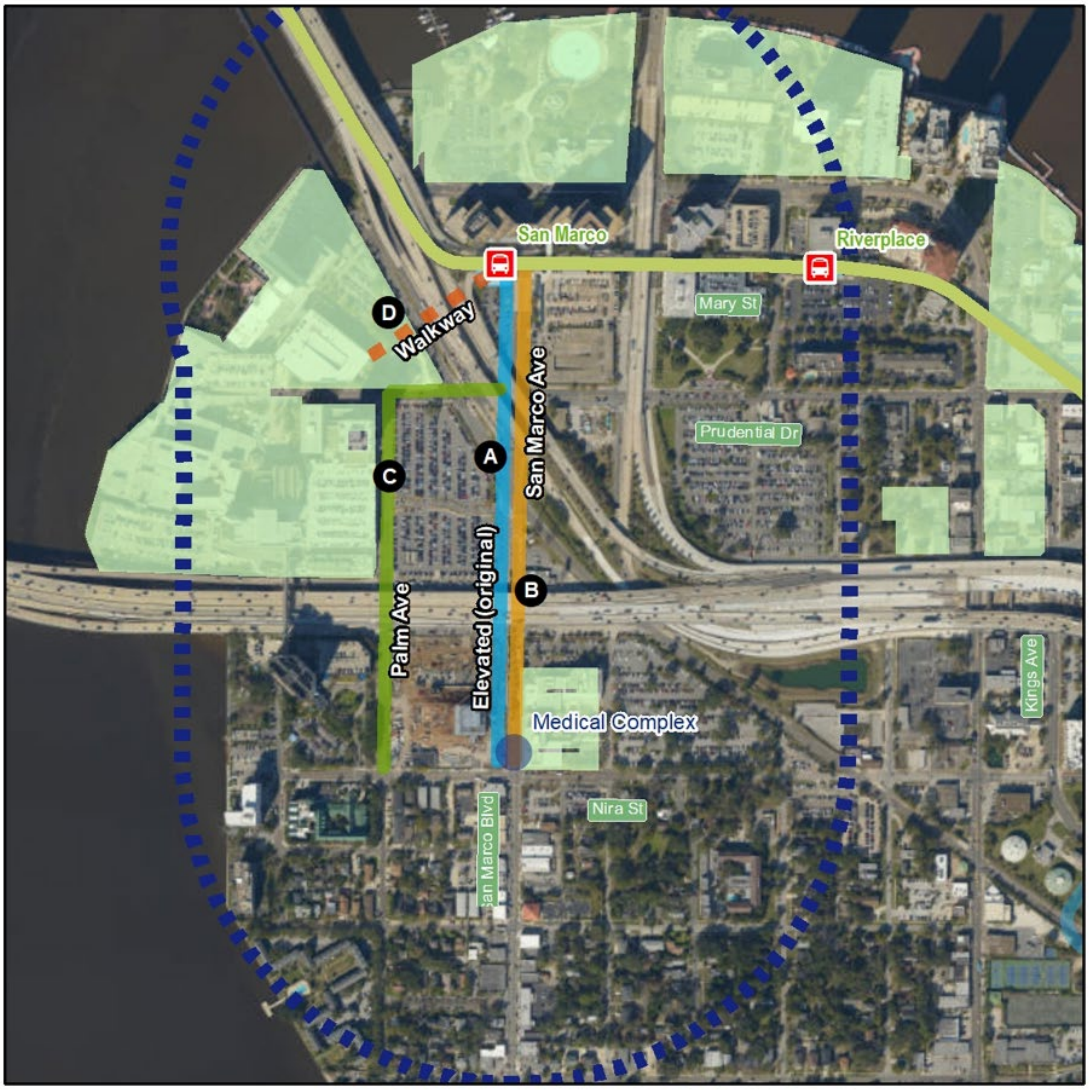


Figure 4.2.5: South Extension Corridor Initial Alternatives

Table 4.2.3: South Extension Corridor Route Evaluation Matrix outlines the performance of each of the initial route alternatives against the evaluation criteria. The elevated route alternative, Option A, outperformed the at-grade alternative. While the elevated route is more complex and requires ROW acquisition, it ranked favorable in most categories such as route length, visibility/access, activity hubs, and safety.

The at-grade route presented operational challenges, still required additional ROW and reduced the existing roadway capacity. The safety ranking of one for the elevated option is due to the inherent safety associated with having a grade-separated AV lane eliminating the need to operate adjacent to mixed traffic.

A pedestrian walkway only route also presented similar customer service and safety benefits by providing a physical barrier from mixed traffic earning a score of one.

Table 4.2.3: South Extension Corridor Route Evaluation Matrix

Option	Description	Operational	Physical/ Environmental	Customer Service	Safety	Overall Rating
A	Elevated - Medical	1.7	1.8	1.0	1.0	**1.35**
B	San Marco Ave - Medical	2.3	2.5	1.0	2.0	**1.96**
C	San Marco Ave -> Prudential Dr -> Palm Ave	2.0	2.3	1.3	1.0	**1.65**
D	Pedestrian Walkway Alternative	1.7	2.0	1.0	1.0	**1.42**

Preferred Route

The elevated route, illustrated in *Figure 4.2.6: South Extension Corridor Preferred Route Alternative*, was selected as the preferred route alternative to be advanced for further evaluation. The elevated route included fewer operational and physical constraints and provided increased safety when compared against an at-grade alternative. Two sections along the main corridor, San Marco, were analyzed at S2 and S3, respectively. The preferred route for mixed traffic follows route B.

Figure 4.2.6: South Extension Corridor Preferred Route Alternative



4.2.4 Southeast Extension (San Marco) Corridor



Initial Alternatives

Within the Southeast Extension (San Marco) Corridor study area, six route alternatives were considered, including four primary routes to San Marco East and two routes directly serving The District. The objective of the routes studied is to provide the best connection from the existing Riverplace and Kings Avenue stations to San Marco East and The District. Operational and physical characteristics were analyzed for each route. Other factors such as the need for right of way acquisition, new construction, or widening were also taken into consideration. An overview map of the route alternatives within the Southeast Extension (San Marco) Corridor is shown in *Figure 4.2.7: Southeast Extension Corridor Initial Alternatives.*

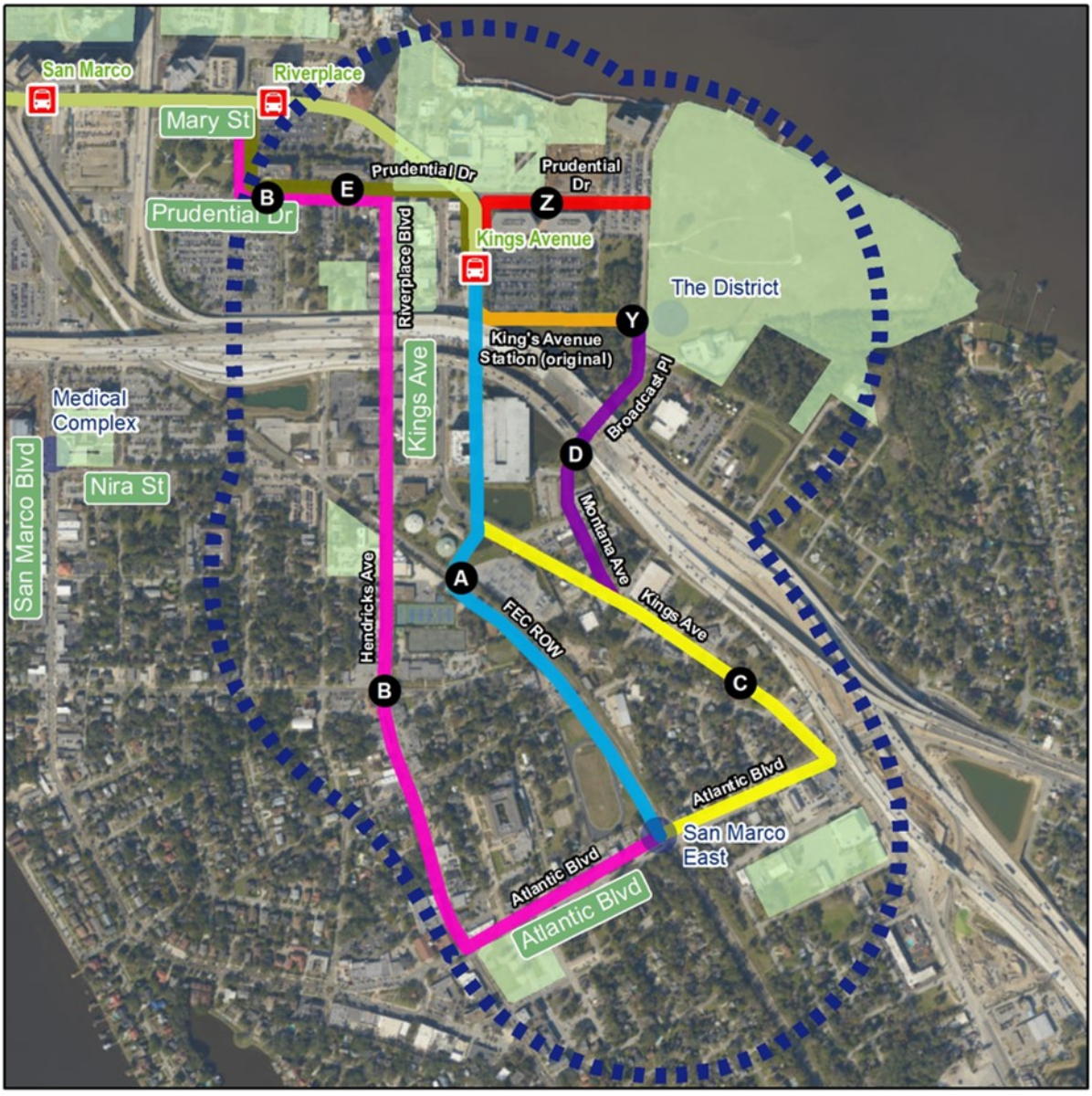


Figure 4.2.7: Southeast Extension Corridor Initial Alternatives

Table 4.2.4: Southeast Extension Corridor Route Options Evaluation Matrix outlines the performance of each of the initial route alternatives against the evaluation criteria. While Route A, using the FEC Right of Way (ROW), had more customer service challenges than other route alternatives, its operational and safety rankings generally outperformed the other alternatives. Route A received a ranking of three for safety considerations due to proximity to the railroad. Furthermore, the FEC ROW route offered the most direct route that also had the least number of left turns and intersections.

Hendricks Avenue and Kings Avenue were routes that offered better customer service; however, they were less direct and required more new construction. The Hendricks Avenue route (Route B) received a safety rating of three due to the presence of an at-grade crossing with the railroad. The Kings Avenue route (Route C) received an operational rating of three due to the turns that the AV would be required to make at the intersection with Atlantic Avenue, which directly connects to the on and off ramps at I-95. Route D received a safety rating of three due to the constrained geometry in the vicinity of I-95 limited safe access for multimodal users north of the I-95 interchange.

Table 4.2.4: Southeast Extension Corridor Route Options Evaluation Matrix

Option	Description	Operational	Physical/ Environmental	Customer Service	Safety	Overall Rating
Primary Routes to San Marco East						
A	Kings Ave Station -> FEC ROW -> Atlantic Blvd	1.7	1.7	2.0	3.0	**2.08**
B	Riverplace Station -> Hendricks Ave -> Atlantic Blvd	2.3	2.8	1.3	3.0	**2.35**
C	Kings Ave Station -> Kings Ave -> Atlantic Blvd	2.3	2.5	1.7	2.0	**2.13**
D	Kings Ave Station -> The District -> District Pl -> Montana Ave -> Atlantic Blvd	2.3	2.8	2.0	3.0	**2.52**
E	Riverplace Station -> Prudential Dr -> Kings Ave -> FEC ROW -> Atlantic Blvd	2.0	2.8	1.3	3.0	**2.27**
Primary Routes to The District						
Y	Kings Avenue Station -> Kings Ave -> Prudential Dr	2.0	1.8	1.0	1.0	**1.44**
Z	Riverplace Station ->Prudential Dr	2.7	2.0	1.0	1.0	**1.67**

Of the two routes examined to serve The District, Route Y Kings Avenue Station out-performed Route Z Riverplace Station/Prudential Drive. Specifically, Route Y ranked better in the operational and physical characteristics categories, while both routes received equal rankings in the customer service and safety categories. Both routes are along corridors that are near customer amenities, relatively low ADTs and slower corridor operating speeds, and have recent pedestrian improvements, earning customer service and safety scores of one.

Preferred Route

For the Southeast Corridor, the Option A FEC ROW route was selected as the primary route alternative to be advanced for San Marco East, and Option Y Kings Avenue Station for The District. The preferred route alternative is illustrated in *Figure 4.2.8: Southeast Extension Corridor Preferred Route Alternative*. One section along the main corridor, FEC ROW, was analyzed at S1. Since this route will occupy railroad right of way, extensive coordination with FEC railroad will be required. The preferred route for the mixed traffic option is route C.



Figure 4.2.8: Southeast Extension Corridor Preferred Route Alternative

4.2.5 Bay Street Innovation Corridor



The Bay Street Innovation Corridor will connect the existing Skyway Central Station to the Sports/Entertainment District using Bay Street. The proposed alignments along the corridor have been evaluated under a separate project, referenced earlier in this report, called the *Bay Street Innovation Corridor BUILD Grant project.* The options developed for the process were the result of consultation with JTA, DIA and the City of Jacksonville. For reference, a brief summary of the route options are as follows.

Initial options focused on the loop east of Hogan's Creek due to its proximity to another project in development by the City of Jacksonville, known as the Hart Bridge Ramp Removal and Talleyrand Connector Project. The Bay Street Innovation Corridor overlaps the project area with the City's project; therefore, significant review was conducted to address this area – known as the East Loop of the East Corridor/Bay Street Innovation Corridor. Options were evaluated as the Georgia Street Loop Options and the Bay Street/Shipyard Options. These options are described briefly below and in more detail on in the Concept Plans and technical memorandum prepared for the Bay Street Innovation Corridor project contained in the appendices and as reference documents, respectively.

The Georgia Street Loop Options include three options: a dedicated lane concept (considering widening and no widening), an option for operations within mixed traffic on Bay Street, and an option that would include a new bridge over Hogan's Creek.

The Initial Bay Street/Shipyard Options included two concepts: a bi-directional combined AV/bicycle lane with an adjacent sidewalk, and a bi-directional dedicated AV lane with a shared use path.

The Bay Street Innovation Corridor Concept Plans are contained in the Appendices for reference. Additionally, the evaluation matrix applicable to the Bay Street Innovation Corridor options is also contained in Appendix G.

After evaluation further refinement of the alternatives occurred which resulted in the development of Concepts I, J, and K as noted in the reference documents. All concepts evaluated considered the Hart Bridge Ramp Removal and Talleyrand Connector Project in the development of the AV paths.

Preferred Route

The plans for the Bay Street Innovation Corridor have been advanced through extensive continuing coordination between JTA, City of Jacksonville and FDOT. The Bay Street Innovation Corridor is depicted in *Figure 4.2.9: Bay Street Innovation Corridor Proposed AV Route*. At the time of this report, the preferred concept will be operation of the AV in mixed traffic adjacent to curb on south side of Bay Street and adjacent to parking lane on north side of Bay Street.

Figure 4.2.9: Bay Street Innovation Corridor Proposed AV Route



4.3 Summary of Preferred Routes

Following the initial evaluation screening process, a preferred route alternative was selected within each four expansion study corridors as summarized below to be advanced for further study.

For the **North Extension (UF Health) Corridor**, extending from the existing Skyway Rosa Parks station, the Main Street route was selected as the primary route alternative to be advanced and the accompanying connector route selected was the FSCJ Connector. This route provides the most direct link to the proposed UF Health and VA terminal station and it ranked highly in safety and customer service. It is close to activity hubs in the area and allows for two intermediate stations at 2nd Street and Main and at 8th Street and Main to be included along the route.

For **West Extension (Riverside) Corridor**, Route A utilizing Riverside Avenue, Forest Street and Park Street was selected as the primary route alternative to be advanced for further evaluation due to its limited operational complexity and enhanced customer service options when compared against the other route alternatives.

The **South Extension (Medical Complex) Corridor** evaluated an at-grade and an elevated route to connect the existing San Marco Skyway Station to a proposed station at the medical complex. The elevated route was selected as the primary route alternative to be advanced. The elevated route included fewer operational and physical constraints and provided increased safety when compared against an at-grade alternative. If the mixed traffic option is advanced, the preferred route is along San Marco Avenue from San Marco Station to the medical complex.

The **Southeast Extension (San Marco) Corridor** would connect the existing Riverplace and Kings Avenue stations to proposed stations at San Marco East and The District. For this corridor, Route A connecting Kings Avenue Station to Atlantic Boulevard via FEC ROW route was selected as the primary route alternative to be advanced for San Marco East. Route Y – Kings Avenue Station was chosen to provide service to The District. The FEC ROW route's operational, physical characteristics, and safety rankings outperformed the other alternatives and the Kings Avenue Station route to The District outperformed the other alternative in all categories. If a mixed traffic option is advanced, the preferred route is from Kings Avenue Station to Kings Avenue and to Atlantic Boulevard.

Table 4.3.1: Summary of Preferred Route Alternatives summarizes the preferred route alternative for each corridor evaluated within the initial screening process. *Figure 4.3.1: System Map* illustrates an overall system map with the preferred route alternatives.

Table 4.3.1: Summary of Preferred Route Alternatives

Corridor	Description
North (UF Health)	Main Street with FSCJ Connector
West (Riverside)	Leila St -> Riverside Ave and -> Forest St -> Park St
South (Medical Complex)	San Marco Station -> San Marco Blvd
Southeast (San Marco) to San Marco East	Kings Ave Station -> FEC ROW -> Atlantic Blvd
Southeast (San Marco) to The District	Kings Avenue Station -> Kings Ave -> Prudential Dr

Step Two of the route alternative evaluation process, outlined in the next section, examines the preferred route alternatives under various proposed conceptual typical sections. The conceptual typical sections include an elevated option as well as two at-grade options in dedicated lanes, one with the transit lanes in the median and one with transit lanes at the curbs. The preferred route alternatives are also evaluated for the mixed traffic option.

A detailed discussion of the application of the conceptual typical sectional options and considerations for transitions (from elevated to street level) for the preferred route alternative for each corridor is presented in Section 5. It is important to note that the preferred route alternatives presented are subject to modification during subsequent stages of project development.

Figure 4.3.1: System Map



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5 Evaluation of Alternatives

This section of the report summarizes the process of evaluating the preferred route alternatives within each system expansion study corridor. The evaluation of alternatives is based on the preferred route alternatives identified in Section 4 and further examines these alternatives according to varying roadway typical sections, infrastructure options, operational analysis, land use impacts, economic development opportunities, and community input.

This section first describes the evaluation components (typical sections, stops/stations and transitions) and the corresponding criteria for each component; followed by the evaluation of preferred route alternatives by corridor with considerations for future project development. This section concludes with a summary of the evaluation into a matrix of key data and analysis results.

5.1 Conceptual Typical Sections

The evaluation of each preferred route alternative begins with defining general roadway typical sections for the proposed autonomous vehicle (AV) operations. These conceptual typical section options range from considering the current elevated system, modifying the existing roadway lanes, or operating at street level under existing conditions. The conceptual typical sections also consider the location for accessibility to the AV, either curb side or in the median. The typical section options are generally described as:

- Elevated Concept
- Dedicated, At-Grade AV lane with Curbside Access (constrained and unconstrained)
- Dedicated, At-Grade AV lane with Median Access (constrained and unconstrained)
- Mixed Traffic with Curbside Access

Following is a brief description of each of the Typical Section Concepts considered for each preferred route alternative; followed by more detailed descriptions in Sections 5.1.1 through 5.1.4.

Elevated

1. Elevated Concept - generally consistent with the existing Skyway.

At-Grade Dedicated Lanes

2. Constrained with Curbside Stops – AV lanes are added (one in each direction) along each curbside within the limits of existing pavement width; existing travel lanes and or parking lanes may have reduced widths or be repurposed to accommodate the AV lanes.
3. Constrained with Median Stops – AV lanes are added (one lane in each direction) adjacent to the median within the existing pavement width; where needed a median would be constructed and existing travel and or parking lanes may have reduced widths or be repurposed to accommodate the AV lanes.
4. Dedicated AV Lane (Unconstrained with Curbside Stops) – Existing number of travel lanes will be maintained and pavement widening and right of way acquisition will occur as needed to accommodate one new AV lane in each direction along the curbside. Existing parking lanes may be used for the AV Lane.
5. Dedicated AV Lane (Unconstrained with Median Stops) - Existing number of travel lanes will be maintained and construction of median along with pavement widening and right of

way acquisition will occur as needed to accommodate one new AV lane in each direction along the median. For roadway segments with parking lanes it is assumed that the parking lanes could be used for the AV Lane.

At-Grade Mixed Traffic

6. Mixed Traffic with Curbside Stops – Transit vehicles operate in mixed traffic, with accessibility to the vehicle from curbside stations.

5.1.1 Elevated Concept

The Elevated Concept, shown in Figure 5.1.1, is generally consistent with the configuration of the existing Skyway and allows for grade-separated travel for the autonomous vehicle, minimizing potential impacts to existing roadway capacity. This concept is intended to be constructed within the existing right of way. The Elevated Concept will likely incur higher capital costs typically associated with an elevated structure, however, due to the vehicular traffic being limited to the AV operations, and not including mixed traffic, the operations and maintenance costs are expected to be lower. Due to the absence of other vehicular traffic, this concept is anticipated to provide higher reliability and operational efficiencies.

The Elevated Concept includes sufficient width for one autonomous vehicle to travel in each direction with a buffer separating the two directions of travel. Bridge railings on each side of the support structure will be designed to be crash-rated for the selected autonomous vehicle. The support structure will include the bridge deck seated on top of bridge columns. The Elevated Concept includes maintaining a minimum four-foot sidewalk in locations where the support columns impact pedestrian facilities.

5.1.2 Dedicated At-Grade AV Lane with Curbside Access

The Dedicated At-Grade AV Lane with Curbside Access Concept leverages existing roadway width to accommodate the AV lanes. This concept is similar to that of bus rapid transit (BRT) where the vehicle has exclusive use of the lane and will not mix with other traffic and the stops/stations are also located at-grade. As such, the AV ridership can expect travel time reliability better than in mixed traffic. The stop locations at the curbside along sidewalks and shared use paths allow for ease of access for pedestrians and cyclists to the autonomous vehicle. Because one lane in each direction is being removed from the existing capacity to accommodate the AV lane, impacts to travel time and congestion may be experienced by other vehicular traffic. The expectation would be that mode shift to the AV lane could somewhat offset the impact to existing vehicular capacity.

While there are expected to be fewer capital costs associated with the at-grade, street level concepts, it is worth noting that with proximity to mixed traffic there will be associated operations and maintenance costs, such as repair to any of the buffer infrastructure separating the travel lanes from the AV lanes and removal of any debris from the roadway or sidewalk that may encroach into the AV lanes. There may be sections where the right of way is not adequate to support the addition of AV lanes and which would result in additional costs.

For the at-grade concepts the general approach was to maintain a minimum lane width of 11 feet where possible, although some segments may be reduced to ten feet. The typical buffer

separation between the AV lanes and the travel lanes is one foot. The typical width to support sidewalks or multi-use paths as well as curbside stations ranges from eight to 14 feet.

As described previously, the constrained typical sections add one AV lane in each direction within the existing pavement width; as a result, existing travel lanes may have reduced width or be repurposed. Parking lanes or bicycle lanes may be eliminated or repurposed also in the constrained configuration. The existing sidewalks and multiuse paths remain unchanged. This concept is shown in Figure 5.1.2.

5.1.3 Dedicated At-Grade AV Lane with Median Side Access

The Dedicated At-Grade AV Lane with Median Side Access Concept uses the existing roadway width to accommodate the AV lanes. As with the at-grade at curb concept, the vehicle has exclusive use of the lane and will not mix with other traffic and the stations are also located at-grade. As such, travel time reliability is better than with curbside access concept.

The stop locations at the median require users of the autonomous vehicle to cross traffic from the curb to the median station. Because one lane in each direction may be removed from the existing capacity to accommodate the AV lane, impacts to travel time and congestion may be experienced by personal and commercial vehicular traffic. The expectation would be that mode shift to the AV lane may offset the impact to existing capacity.

While there are expected to be fewer capital costs associated with the at-grade concepts, the proximity to mixed traffic may result in additional operations and maintenance costs associated with a potential buffer infrastructure separating the travel lanes from the AV lanes and removal of any debris from the roadway or station that may encroach into the AV lanes. There may be sections where the right of way is not adequate to support the addition of AV lanes and which would result in additional costs. For this concept, the approach was to maintain a minimum lane width of 11 feet where possible, although some segments may be reduced to ten feet. The typical buffer separation between the AV lanes and the travel lanes is one foot. The typical median width to support stops or stations ranges from 15 ½ feet to 22 feet. This concept, depicted in Figure 5.1.3, also typically includes a sidewalk or an eight-foot multi-use path for both directions of travel which is separated from the curb by a landscaped buffer where available, up to six feet wide.

5.1.4 At-Grade Mixed Traffic

For the At-Grade Mixed Traffic Concept, it is assumed that the autonomous vehicle will operate primarily in the right most travel lane either next to curb or parking lane. The autonomous vehicle will enter other traffic lanes as needed to navigate left turns at intersections. AV stops will be developed along curb lanes, using existing bus stops where feasible, at appropriate locations for each corridor. This concept is depicted in Figure 5.1.4.

In all cases, the conceptual typical sections are intended to be representative and general in nature and are presented to assist with the evaluation of overall feasibility for each type. There may be adjustments to design details that can be further explored at the schematic or detailed design level, such as lane or median widths. It is also possible that a combination of sections could be deployed for individual corridors depending on the specific goals for each.

Figure 5.1.1 Elevated Concept

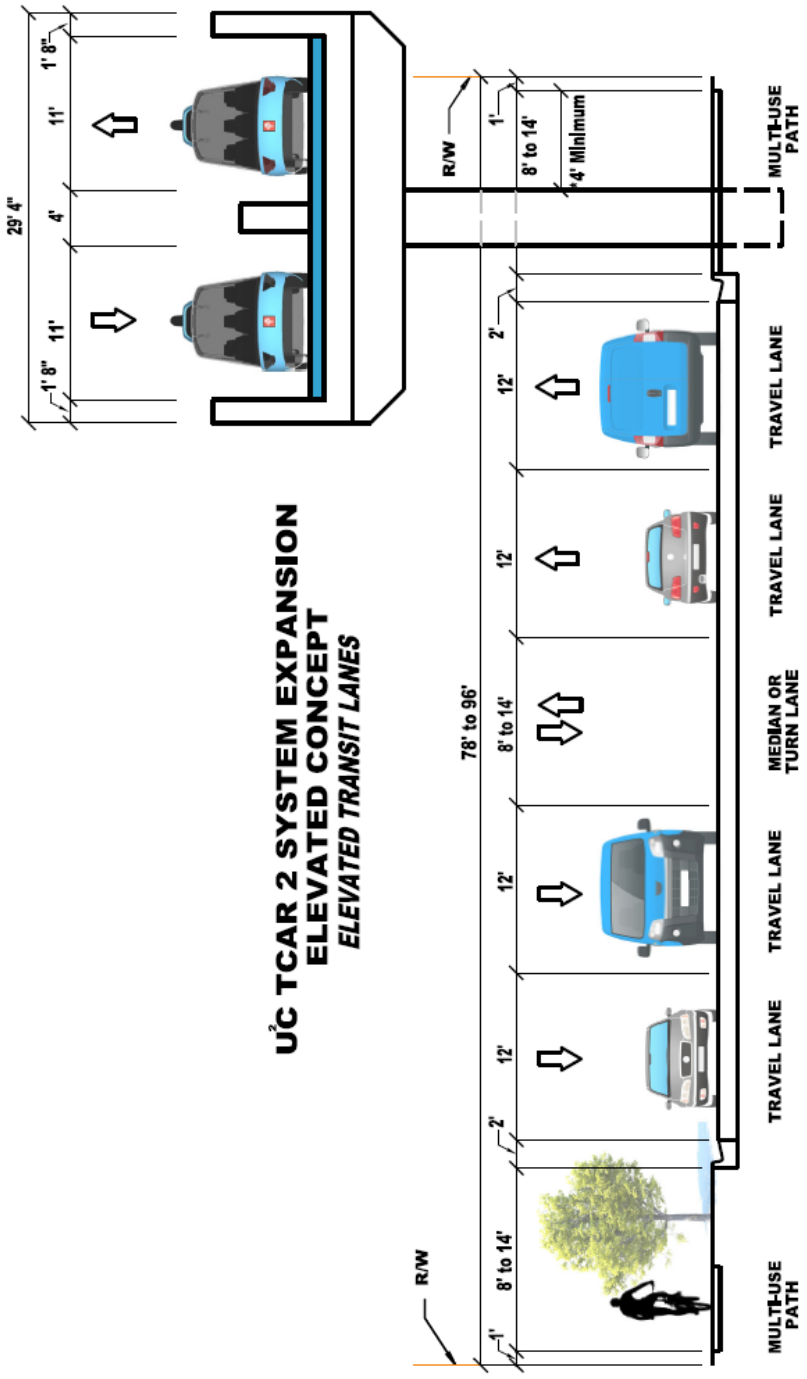


Figure 5.1.2: Dedicated AV Lane At-Grade Concept with Curb Side Access Concept

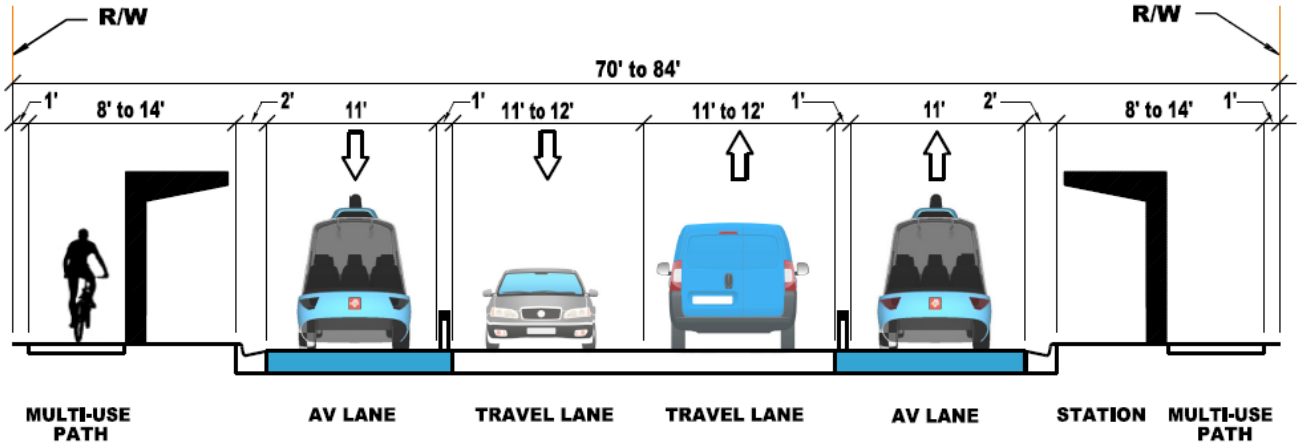


Figure 5.1.3: At-Grade Median Side Access Concept

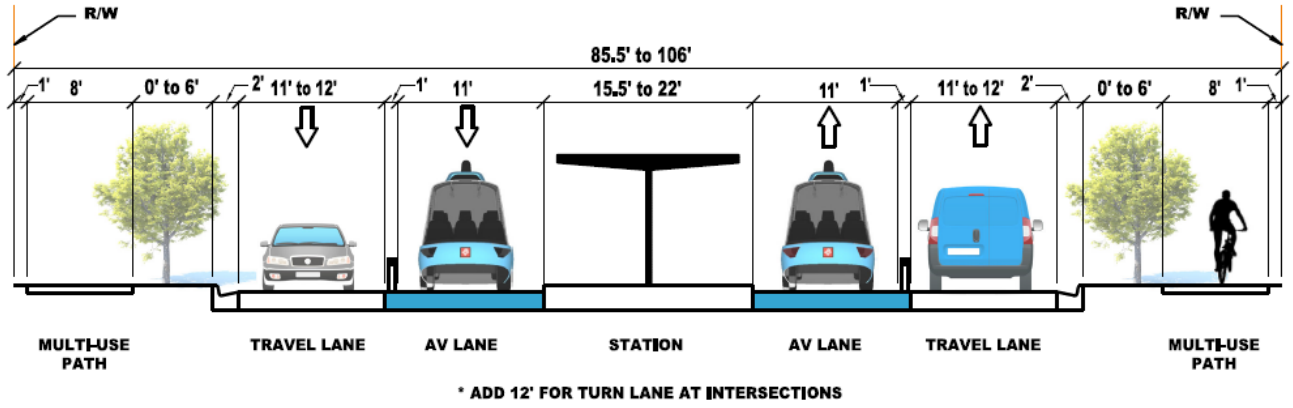
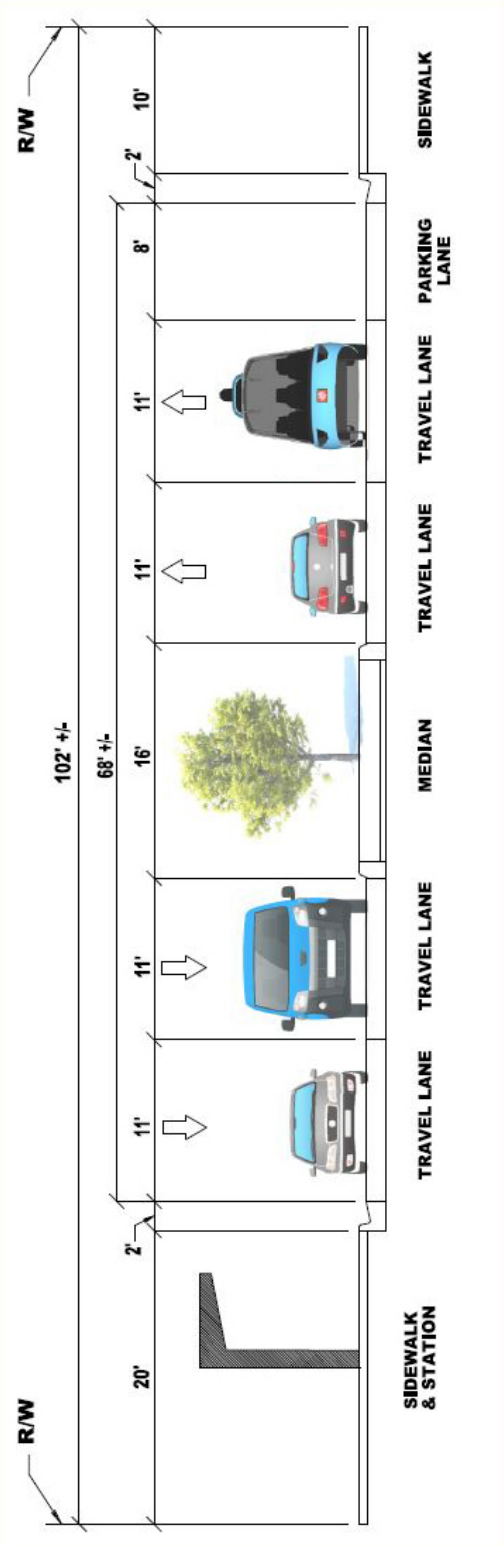


Figure 5.1.4: At-Grade Mixed Traffic Concept



5.2 Evaluation Criteria for Comparison of Typical Sections

The conceptual typical sections were applied to each corridor and evaluated based on the criteria in *Table 5.2.1: Evaluation Criteria for Infrastructure Options.*

Table 5.2.1: Evaluation Criteria for Infrastructure Options

Group	Criteria	Considerations
Physical	Requires ROW Acquisition	Will the typical section fit within the existing ROW? How much ROW acquisition be required? What is the proposed station footprint?
	New Construction/ Pavement Widening	Will the typical section fit within the existing pavement width? What is the expected construction cost?
	Aerial Obstructions	Will there be aerial easements needed? What is the proposed station footprint?
Operational	Level of Service	Can the existing number of travel lanes be maintained? Are there areas where the AV lane may encounter mixed traffic? Will the AV lane experience many turns/crossovers?
	Curb Cuts/ Intersections	What is the spacing between intersections/signals? What is the spacing of driveways?
	Lane Widths	Is the 11-foot minimum travel lane/AV lane achievable?
Other Factors (Customer Service/ Safety/ Access)	Ease of Pedestrian Access	Is the station only accessible by elevator, escalator, or stairs?
	Potential for Station/ Pedestrian Conflicts	What is the sidewalk/shared use path width surrounding the station?
	Additional Infrastructure Needs	Will a station be convenient to existing crosswalks or will other infrastructure be needed?

Physical characteristics were scored on the following criteria:

1. Minimal widening or median adjustments.
    - Fits within the existing right of way.
2. Substantial widening or median adjustments.
    - Minimal right of way acquisition needed (five feet or less).
    - Infrastructure footprints are obtrusive or obstruct views.
    - Aerial easements may be required.
3. Substantial widening accompanied by right of way acquisition greater than five feet.

Operational characteristics examined include an evaluation of proposed lane widths and configuration compared against the existing conditions and an analysis of the existing and proposed level of service for both the travel lanes and the AV lanes. Scoring for operational characteristics was subject to the following criteria:

1. Maintain the existing number of travel lanes and the ideal 11-foot lane width.
    - AV lanes experience optimal operational conditions, such as few intersections and limited turns.
    - Travel lanes would also experience ideal operational conditions, such as 11-foot lane widths.
    - Limited number of curb cuts/median openings.
2. May have some reduction in lane width or sidewalk widths but is generally able to meet ideal conditions.
    - AV lanes may feature some undesirable operational characteristics such as crossovers or multiple entrances.
    - Travel lanes may have intermittent turn lanes or parking lanes eliminated.
    - Moderate number of curb cuts/median openings.
3. Absolute minimum lane, sidewalk, or stop/station widths.
    - High number of intersections, curb cuts, or median openings.
    - Short distance between intersections.
    - Single lane AV or travel lane option.

Other factors examined include customer service, cost, safety, and access. Scores were assessed as follows:

1. Stops/Stations are located in ideal locations and easily accessible.
    - Stops/Stations are located at grade and there is limited opportunity for conflict between pedestrians and customers queuing at the station.
    - Stops/Stations can be easily accessed via existing sidewalks and crosswalks.
    - Stop installation would be low cost/adapted to existing infrastructure.
2. Stop/Station widths are minimized and may require infrastructure modifications.
    - Station access requires stairs, elevators, escalators for customer access.
    - Costs for adding stations are moderate.
3. Stop/Station widths are the absolute minimum.
    - Cost for adding stops are high.
    - Midblock crossings would need to be installed to access stops.

5.3 Stop/Station Considerations

For the proposed extensions, the stops and/or stations will either be elevated if the U²C system expansion is elevated or at street level if at-grade operations is selected. If elevated, it is anticipated that the design would be similar to existing Skyway stations upgraded to accommodate the AV system and technology.

Enhanced stops and stations facilitate passenger service and system performance. Preliminary locations have been identified through planning studies, community outreach and adjacent land use considerations. The final locations for stops and stations will be coordinated with City of Jacksonville, FDOT, business owners and developers as the design develops. In addition, downtown locations must comply with local regulations, including Jacksonville Ordinance Code Section 656.361.6.3 on public realm and transit shelters and standards developed by FDOT and noted in the FDM Section 225. The existing Skyway stations and existing JTA bus stops or stations will be utilized to the extent possible for the autonomous vehicle access.

An adequate stop and station site and size can do the following:

- Attract new riders.
- Provide shelter from the weather and a safe and secure environment.
- Provide amenities and passenger information, including real-time arrival information.
- Facilitate boarding and fare collection.
- Ensure safe access for all, including bicyclists, pedestrians and people with disabilities.
- Ensure the branding of the system.
- Create a sense of place, encouraging activities to occur near the station.

This section outlines desirable stop and station components for elevated and at-grade stations. As for any transit infrastructure, the JTA will consider sustainability and resiliency factors, landscape and public art, lifecycle maintenance requirements and costs along with construction costs and regular operating costs.

Elevated Stops/Stations

An elevated station consists of a structure with two or more levels, that connects street activity with passenger boarding at an elevated platform. Elevated passenger stations tend to have a much larger footprint than an at-grade equivalent due to the need for passenger escalators, elevators, and stairs. Often, these stations will include additional amenities such as vending machines, customer seating, and customer service kiosks. The existing JTA Skyway stations, with island platform boarding are an example of an elevated station.

Each proposed elevated station will have a roof, seating area, trash cans, and real time passenger information. It will also allow the public to interface with the vehicle operating system by requesting AV stops and provide for emergency communication. Station platforms will allow for level boarding and comply with all ADA requirements. Platforms widths will be sized according to ridership, circulation and egress requirements, and based on experience. Platform length will accommodate the longest autonomous vehicle or combination of vehicles that is needed to meet operational requirements and enhance connectivity to other transit or mobility services.





Existing Skyway ground level and platform level configuration at Rosa Parks Transit Center Station.

At-Grade Stops/Stations

At-grade stops or stations allow passengers to board the autonomous vehicle system from the street level. Street level stops/station configurations may include:



Curbside Station at First Coast Flyer

Curbside Stop/Station – Located adjacent to the curb and integrated into the surrounding sidewalk, generally requires two platforms (one in each direction). The advantages of curbside stations are, if space is available, it eliminates the need for some pedestrian street crossings, and may complement other uses of the sidewalk. The disadvantages include that the AVs must share curb space with other transit, parking, right-turning vehicles, etc. The JTA First Coast Flyer BRT is an example of an at-grade curbside station.



Median Station at EmX (Eugene, OR)

Median Stop/Station – The advantages of median stops or stations are that they can serve both directions simultaneously, take advantage of unused medians, and do not impact sidewalk or curbside parking. The disadvantage is that all passengers are required to cross street traffic at every stop. The Lane Transit District (LTD) Emerald Express (EmX) Green Line in Eugene, Oregon is an example of median station placement for a BRT system.

It is anticipated that each stop/station will have passenger amenities (shelter, bench, trash can, communications with real time passenger information). This will enable communication with the AV and the overall fiber-based autonomous network control system. As technology allows, the public could interface with the AV system by requesting the AV to stop at that station and provide emergency communication. Stations will be designed to meet ADA and JTA security requirements and allow for safe boarding and de-boarding of the autonomous vehicles. Desirable length should accommodate multiple vehicles to allow for queuing and special events but may be constrained by right-of-way as well as other roadway elements. Platforms

widths will be sized according to ridership, circulation and egress requirements. Stops and station design will also consider multimodal connectivity and integration with the larger transit system, which will be enabled by signage and real time passenger information.

5.4 Transition Considerations

This section presents four options for transitioning from the existing elevated system to at-grade, street level service where conditions require. The four potential transition options are as follows:

- Linear ramp – Similar to a bridge ramp, infrastructure to connect guideway with roadway.
- Curve/spiral ramp – Use of a constrained, curved ramp to connect to roadway.
- Vehicle Lift – Use of an industrial elevator to lower vehicle to roadway.
- Elevator/Passenger Lift – Allow for passenger transfer via elevator to a street station.

Table 5.4.1 identifies evaluation criterion for each transition option based on infrastructure, operational and ridership needs:

- Guideway modifications
- Station modifications
- Infrastructure impacts
- Passenger safety
- Supervisory system
- Ridership forecast
- Scheduling and operations.

As shown in *Table 5.4.2: Summary of Transition Considerations*, general considerations for each transition type weigh heavily on the additional infrastructure and the impact on transit service. In comparison, the preferred transition is one that allows for limited infrastructure impacts, no or brief service disruptions, is compatible with supervisory system and does not impact ridership. A general discussion of each transition type is presented in the following section.

Table 5.4.1: Evaluation Criteria for Transitions

Criteria	Description	Preferred Conditions	Potential Measure (s)
Infrastructure			
Guideway Modifications	Required modifications that would impact guideway usage.	No guideway impacts or limited to one track. Minimal additional maintenance needs.	Cost. Complexity of design. Impacted elements.
Station Modifications	Required modifications that would impact station layout, aesthetics or footprint.	Minimal station modifications within existing footprint. Minimal additional maintenance needs.	Cost. Complexity of design. Impacted elements.
Infrastructure impacts	Required additional infrastructure beyond station footprint.	Minimal footprint and with no right of way impacts. Minimal additional maintenance needs.	Cost. Complexity of design. ROW impacts.
Safety			
Passenger safety	Infrastructure and or devices required to keep unauthorized access to guideway, vehicles or facilities.	Compatible with existing security protocols. Minor modifications.	Required safety devices/infrastructure. Requirement for operator assistance.
Supervisory System	Compatible with supervisory system. Transition can be safely controlled or monitored by personnel.	Automated or remote supervision of activities related with transition.	Level of customization or modifications to supervisory system. Requirement for operator assistance.
Operations & Ridership			
Ridership forecast	Expected impact to station ridership and system ridership.	Minimal or negligible impacts.	Relative change on ridership model (increase, decrease, negligible or unknown).
Scheduling and Operations	Impacts to routes and or operational needs to maintain required level of service.	Minimal or no impacts to dwell time and operating speed. Does not impact fleet size.	Number of vehicles. Dwell time or operating speed.

Table 5.4.2 Summary of Transition Considerations

Impacts	Linear Ramp	Curve/Spiral Ramp	Vehicle Lift	Elevator/ Passenger Lift
Infrastructure	Complexity of design and ROW impacts.	Complexity of design and ROW impacts.	Extensive station and guideway modification.	Station modifications for at-grade station access.
Safety	Level of customization or modifications to supervisory system. Emergency walkway constraints.	Level of customization or modifications to supervisory system. Emergency walkway constraints.	Level of customization or modifications to supervisory system. May require operator assistance.	Additional signage and/or cameras.
Operations & Ridership	May require multiple lanes to avoid bottlenecks.	Some negative ridership due to low speed at transitions. May require multiple lanes to avoid bottlenecks.	Some transfer penalty. Unknown impact of vehicle elevator. Potential bottleneck. Requires coordination between elevated and at-grade to avoid trip disruption.	Transfer penalty. Additional vehicles for at-grade routes. Requires coordination between elevated and at-grade to avoid trip disruption.

Linear Ramp



Considerations for a linear ramp in an urban environment will be driven by space constraints. The purpose of the ramp is to provide a smooth transition for transit shuttles to gain access to and from the elevated segments of the Skyway.

This type of transition will require guideway modifications to extend service. Station modifications would be minimal, as passengers would board

through platform. However, structural additions, such as bridge structures would impact right of way beyond existing facilities and would require extensive coordination. For passenger safety, main considerations are emergency evacuation requirements and the appropriate signage and potentially the use of gates or mechanical devices to restrict access to unauthorized pedestrians or vehicles. The updated supervisory system would need to be able to monitor vehicle and passengers within the transition. Ridership impacts are expected to be negligible, but ramps may be challenging to introduce into roadways in urban settings.

Curve and Spiral Ramp



A spiral ramp is a series of consecutive curves typically located outside of the main structure to bring the traffic in and out of a facility. Spiral ramps, often used in large parking structures, are constrained by the circumference of the outer frame, story height and width of traffic lane.

This type of transition will also require guideway modifications to extend service. Station modifications would be minimal, as passengers would board through platform. However, the ramp would be a separate structure by itself and would impact right of way beyond existing facilities. For passenger safety, main considerations are the emergency evacuation requirements and the appropriate signage and potentially the use of gates or mechanical devices to restrict access to unauthorized pedestrians or vehicles. The updated supervisory system should be able to monitor vehicle and passengers within the transition. Ridership impacts may be considerable if station height and slower vehicle speed extends the trip length beyond reasonable time. In addition, bottleneck analysis might warrant multiple lanes and additional vehicles to maintain frequency.

Vehicle Lift

The vertical transport of the vehicle can be performed by a class B freight elevator. The national code for vehicle lifts is described in ASME A17.1. Vehicle elevators typically travel at a slower speed as compared to full Passenger Elevators. The speed can range from between 15 fpm to 120 fpm. There is no restriction by code as to how fast or how slow a vehicle elevator should go.

A mechanical transition will require guideway modifications to extend service. Station modifications would be expected to accommodate industrial elevator. However, structural additions may be possible to accommodate within existing JTA property. For passenger safety, main considerations are the emergency evacuation requirements and the lift operation of the moving vehicle. A traditional supervisory system may not be able to monitor vehicle and passengers within the transition without staff intervention. Some ridership impacts are expected as passengers may consider the lift a transfer.



Source: Syntel industrial elevators

Elevator/Passenger Lift

A passenger elevator could be employed to facilitate transition between the elevated Skyway and the at-grade extensions. Currently, all stations provide elevator service for ADA compliance. Most stations employ holed hydraulic elevators, with a capacity of 3,000 lbs. Transfer by elevator would require passengers to physically exit the vehicle and be directed to an elevator entrance, where they would be transported to a lower floor to re-board a second vehicle. This type of transfer allows for a smaller infrastructure footprint impact relative to vehicle ramps.

A mechanical transition will not require guideway modifications to extend service. Station modifications would be minimal to accommodate existing capacity elevators. However, structural additions may be needed to accommodate additional elevators within existing JTA property. For passenger safety, no immediate considerations are highlighted. A traditional supervisory system would be able to monitor passengers remotely. Some ridership impacts are expected as passengers tend to assign a time penalty for vehicle transfer. This mode would also require coordination between routes to minimize this transfer penalty.



Existing Skyway Station

Transition alternatives for each extension will be further evaluated during project development to determine the transition type best suited for each location considering overall operation, impacts and costs.

5.5 Evaluation of Typical Sections by Expansion Corridor

The general typical sections were applied to each corridor and specific typical sections were developed using available GIS mapping and approximate right of way widths based on parcel lines from City of Jacksonville Property Appraiser site. The typical sections for each corridor, along with approximate 100 scale (1 inch = 100 feet) drawings, are included in Appendix G. The following narrative includes a detailed discussion for each potential expansion corridor under consideration.

5.5.1 North Extension (UF Health) Corridor



Typical Section Evaluation

The preferred route alternative for this corridor is along Main Street and W. 8th Street. Main Street is a major north-south arterial, also known as US 17. The following typical sections were evaluated for this corridor.

Elevated

An elevated typical section concept was developed for both Main Street and W. 8th Street, which are the locations for the preferred route alternative in the North Extension (UF Health) Corridor. For Main Street, the columns to support the elevated structure may be located within the eight-foot parking lane area, which can remain open for parking in between the columns. For the W. 8th Street, the representative elevated section places the columns within the existing median.

Constrained with Curbside Stops/Stations

Constrained typical sections were developed under the criteria of holding the existing pavement width while adding one AV lane in each direction and stations along the outside lanes. The Main Street typical section required the reduction of one travel lane in each direction while the W. 8th Street typical section required the removal of both the median and bike lanes to accommodate the two additional AV lanes.

Constrained with Median Stops/Stations

Constrained typical sections were developed under the criteria of holding the existing pavement width within the limits of the existing curb and gutter, while adding one AV lane in each direction along the inside lanes with stations located in the median. The Main Street typical section required the reduction of one travel lane in each direction however, the parking lane was able to be maintained. The W. 8th Street typical section has significant challenges due to the need to remove one travel lane and bicycle lanes to accommodate the AV lanes and median station.

Unconstrained with Curbside Stops/Stations

The unconstrained typical sections were developed with criteria of maintaining the existing number of travel lanes and adding one AV lane in each direction to the facility. Stops/Stations are added to the curbside lane. For Main Street, the Unconstrained Typical Sections with Curbside Stations has the following features: removes existing parking lane; includes eight foot sidewalks

with stations on both sides of the road, requires approximately 16 feet of additional pavement width; and, requires approximately four feet of additional right of way. The W. 8th Street typical section features reduced travel lane widths, maintains the existing bike lanes, and requires approximately eight feet of right of way acquisition.

Unconstrained with Median Stops/Stations

The unconstrained typical sections were developed with criteria of maintaining the existing number of travel lanes and adding one AV lane in each direction to the facility. Stations are added to the median. The Main Street typical section accomplishes this by removing the existing parking lane, reducing the existing sidewalk widths to the six-foot minimum, and adding 16 feet of additional pavement width while remaining within the existing right of way. The W. 8th Street typical section adds approximately 20 feet of additional pavement width and requires an additional approximately ten feet of right of way to accommodate the existing and proposed infrastructure; sidewalks are reduced to six feet in this typical section.

Mixed Traffic with Curbside Stops/Stations

In this concept, no dedicated AV lanes are created, and transit vehicles operate in mixed traffic with passenger loading activities occurring at curbside. Within the North Extension Corridor, lane configuration varies, for instance, 8th Street ranges from 2 to 6 lanes. From Boulevard Street to Main Street, 8th Street has a 2-lane configuration, one lane in each direction, bike lanes, and divided by a shared turn lane median and a landscaped median at Silver Street and Perry Street intersections. Main Street has a 4-lane configuration with two lanes in each direction divided by a median from 1st Street to 8th Street. On-street parking on both sides is found along the major corridor of Main Street. The Main Street segment will require converting select parking lanes in order to accommodate vehicle stops while the W. 8th Street typical section will require interruptions in the bike lanes adjacent to the vehicle stops.

Transition Evaluation

The North Extension (UF Health) Corridor expansion would require a transition at Rosa Parks Skyway Station for any at-grade option. Using the methodology outlined in Section 5.4, the following options were considered:

- linear ramp,
- alternate ramp,
- vehicle elevator or
- passenger elevator.

Infrastructure modifications would require work over or near State Street and Union Streets, two major arterials connecting the interstate with downtown. As such, a ramp or lift along these streets would be unfavorable and likely more complicated to construct. Roadway and right-of-way considerations include the repurposing of the Rosa Park Transit Center bus stops as primary transit operations move to the JRTC, allowing space for an at-grade vehicle stop and storage location.

The effect on services and operations varies by whether the passenger stays in the vehicle (ramps and vehicle lift) or the passenger transfer to another shuttle. Local conditions may require a solution that avoids traffic and conflicts along State Street and Union Street. The type of transition for this location should be fully evaluated during project development and consider capital and operating cost, maintenance and effect on operations of the system.

Evaluation Matrix

Each of the typical section concepts created for the North Extension (UF Health) Corridor was evaluated based on the established evaluation criteria. See *Table 5.5.1: North Extension Corridor Typical Section Evaluation Matrix* for corridor details.

North Extension (UF Health) Corridor Summary

The North Extension (UF Health) Corridor route alternative selected led to the development of six typical section concepts for two locations, Main Street and W. 8th Street.

The Elevated Typical Sections can be made to fit into both existing configurations with minimal disruption to the existing travel lanes, although further review concerning alignment, structural design, station location, construction cost and aerial impacts should be evaluated.

The constrained concepts for each portion of the route include one with curbside stations and one with median stations, both of which were developed holding the existing pavement width and right of way.

Both constrained concepts for Main Street resulted in a reduction of existing travel lane capacity. However, the impact to the W. 8th Street segment of the route for the median station concept is greater due to the number of existing lanes to one in each direction to one in only one direction.

The Constrained Typical Section with Curbside Station along W. 8th Street is able to add the two AV lanes and maintain existing capacity, however this is achieved at the expense of the existing bicycle lanes.

The unconstrained typical sections, developed holding the existing number of travel lanes, generally resulted in the need to acquire additional right of way, except for the Unconstrained Typical Section with Median Station along Main Street. For the W. 8th Street Unconstrained Typical Sections, the Curbside Station concept requires less right of way (eight feet) than the Median Station concept (ten feet).

Deploying the AV system in mixed traffic will greatly simplify the necessary infrastructure modifications and will have minimal effect on existing traffic. However, for the system to operate in mixed traffic approval of FDOT, NHTSA, and FTA will be required to ensure safe operation. It is likely that during early deployment an operator will have to be on board each AV shuttle. This option is also associated with more uncertainty towards on-time performance particularly during peak hours.

Table 5.5.1: North Extension Corridor Typical Section Evaluation Matrix

Alternative	Description	Physical	Operational	Other Factors (Customer Service/ Safety/Access)	Overall Rating
North - Main Street	1 - Elevated	3	1	2	2.00
	2 - Constrained with Curbside Stations	1	3	1	1.67
	3 - Constrained with Median Stations	1	3	1	1.67
	4 - Unconstrained with Curbside Stations	2	1	2	1.67
	5 - Unconstrained with Median Stations	1	1	2	1.33
	6 - Mixed Traffic with Curbside Stations	1	2	3	2.33
North - W. 8th Street	1 - Elevated	3	1	2	2.00
	2 - Constrained with Curbside Stations	1	2	2	1.67
	3 - Constrained with Median Stations	3	3	2	2.67
	4 - Unconstrained with Curbside Stations	3	2	2	2.33
	5 - Unconstrained with Median Stations	3	2	2	2.33
	6 - Mixed Traffic with Curbside Stations	1	3	3	2.33

5.5.2 West Extension (Riverside) Corridor



The West Extension (Riverside) Corridor preferred route alternative begins at the anticipated at-grade Brooklyn Skyway Station and extends west, ultimately branching in two directions to reach stops at the Riverside Arts Market and Five Points. The route includes Leila Street, Riverside Avenue, Forest Street, and Park Street. The Brooklyn Skyway Station is located on JTA property adjacent to the existing Skyway Operations and Maintenance Center.

Typical Section Evaluation

For the West Extension (Riverside) Corridor preferred route alternative, the following typical sections were developed and evaluated for Park Street and W. Riverside Avenue.

Elevated

The Elevated Typical Section developed for the Park Street segment in the West Extension (Riverside) Corridor may be placed in the parking lane to allow for intermittent parking in the spaces in between the columns. This will allow for the existing sidewalk width to remain in place unimpacted. The W. Riverside Avenue Elevated Typical Section presents an option of placing the columns within the median of the existing roadway.

Constrained with Curbside Stops/Stations

The Constrained Typical Section with Curbside Station for both Park Street and W. Riverside Avenue results in the reduction of one travel lane in each direction to accommodate one proposed AV lane in each direction. Due to one of the sidewalks along Park Street being five feet wide in the exiting condition, it is proposed to make the parking lane accommodate any proposed station locations along Park Street.

Constrained with Median Stops/Stations

The Constrained Typical Sections with Median Stations result in the reduction of one travel lane in each direction to accommodate one AV lane in each direction. Existing sidewalk widths and bicycle lanes, where present, remain unimpacted.

Unconstrained with Curbside Stops/Stations

The West Extension (Riverside) Corridor Unconstrained Typical Sections with Curbside Stations maintain the existing number of travel lanes while adding one AV lane in each direction. The representative typical section at Park Street achieves this by eliminating the existing parking lane to help accommodate the additional 11 feet of pavement widening needed; an additional nine feet of right of way would need to be acquired for this configuration. Along West Riverside Avenue the existing travel lanes, bike lanes, and median remain requiring an additional 24 feet of pavement widening and 18 feet of additional right of way. There is a possibility of reducing the widening and right of way needs by eliminating the existing 15-foot median.

Unconstrained with Median Stops/Stations

The West Extension (Riverside) Corridor Unconstrained with Median Stations Typical Section provides one AV lane in each direction in addition to the existing number of travel lanes. The representative typical section for Park Street provides a 12-foot median station, two six-foot sidewalks, and widens the overall pavement section by 23 feet requiring 17 feet of additional right of way. The representative typical section for W. Riverside Avenue utilizes the existing 15-foot median as a station location, matches the existing four-foot bike lanes, and provides six-foot sidewalks on both sides. The W. Riverside Avenue typical section requires 24 feet of pavement widening and 14 feet of additional right of way to accommodate all the design elements.

Mixed Traffic with Curbside Stops/Stations

In this scenario, no dedicated AV lanes are created, and transit vehicles operate in mixed traffic with passenger loading activities occurring at curbside. The Park Street segment will require converting select parking lanes in order to accommodate vehicle stops. The Riverside Avenue segments will also see interruption of bike lanes where a stop is located.

Evaluation Matrix

Each of the typical section concepts created for the West Extension (Riverside) Corridor was evaluated based on the established evaluation criteria. See *Table 5.5.2: West Extension Corridor Typical Section Evaluation Matrix* for details.

West Extension (Riverside) Corridor Summary

The West Extension (Riverside) Corridor route alternative selected led to the development of five typical section concepts for two locations, Park Street and W. Riverside Avenue.

The elevated typical sections can be made to fit into both existing configurations with minimal disruption to the existing travel lanes, although further review concerning construction cost and aerial impacts should be evaluated. Also, crossing I-95 will present challenges.

The constrained concepts for each portion of the route include one with curbside stations and one with median stations, both of which were developed holding the existing pavement width and right of way. All constrained typical section concepts for both Park Street and W. Riverside Avenue results in the reduction of one travel lane in each direction to accommodate one proposed AV lane in each direction. Due to one of the sidewalks along Park Street being five feet wide in the exiting condition, it is proposed to make the parking lane accommodate any proposed station locations along Park Street.

The unconstrained typical sections, developed holding the existing number of travel lanes, resulted in the need to acquire additional right of way as well as pavement widening. The curbside stations require less right of way for the Park Street typical section while the median stations require less right of way for the W. Riverside Avenue typical section. Widening at I-95 will present challenges.

Deploying the AV system in mixed traffic will greatly simplify the necessary infrastructure modifications and will have minimal effect on existing traffic. However, for the system to operate

in mixed traffic approval of FDOT, NHTSA, and FTA will be required to ensure safe operation. It is likely that during early deployment an operator will have to be on board each AV shuttle. This option is also associated with more uncertainty towards on-time performance particularly during peak hours.

Table 5.5.2: West Extension Corridor Typical Section Evaluation Matrix

Alternative	Description	Physical	Operational	Other Factors (Customer Service/ Safety/Access)	Overall Rating
West - Park Street	1 - Elevated	3	1	2	2.00
	2 - Constrained with Curbside Stations	3	3	2	2.67
	3 - Constrained with Median Stations	1	3	2	2.00
	4 - Unconstrained with Curbside Stations	3	1	2	2.00
	5 - Unconstrained with Median Stations	3	1	2	2.00
	6 - Mixed Traffic with Curbside Stations	1	3	3	2.33
West - W. Riverside Avenue	1 - Elevated	3	1	2	2.00
	2 - Constrained with Curbside Stations	2	3	2	2.33
	3 - Constrained with Median Stations	1	3	2	2.00
	4 - Unconstrained with Curbside Stations	3	1	2	2.00
	5 - Unconstrained with Median Stations	3	1	2	2.00
	6 - Mixed Traffic with Curbside Stations	1	3	3	2.33

5.5.3 South Extension (Medical Complex) Corridor



The South Extension (Medical Complex) Corridor extends from the existing San Marco Skyway station to a proposed station at the Medical Complex. The route alternative selected extends along San Marco Boulevard.

Typical Section Evaluation

Due to the nature of the route alternative analysis for the South Extension (Medical Complex) Corridor, the route alternative process occurs simultaneously with the typical section evaluation process. Within the South Extension (Medical Complex) Corridor study area, four route alternatives were considered, including one elevated and two at-grade routes extending from the existing San Marco Station to a proposed station within the Medical Center Complex. A pedestrian-only route alternative over the Acosta Bridge was also considered to provide enhanced safety along the route.

Elevated

The greatest constraint faced by the elevated typical section along San Marco Boulevard is the limited space outside of existing travel lanes that can be used to place the columns to support the superstructure. As defined, this typical section concept requires columns encroaching along the eight-foot sidewalk, however other alternatives may be developed in the future that may result in reconfiguration of the existing travel lanes. The elevated concept along San Marco Boulevard would include complex grade-separated crossings at I-95 and Acosta Expressway, respectively.

Constrained with Curbside Stops/Stations

The greatest challenge in applying this concept at the at-grade alternatives along the San Marco Boulevard route is the variability in existing pavement width and right of way along the entirety of the corridor. The closer the route is to the existing Skyway Station, more right of way is available to incorporate the AV lane. Further south, along Nira Street, the available right of way is reduced by 30 feet. This concept results in the reduction of a travel lane from the existing configuration and the station width is the minimum allowable.

Constrained with Median Stops/Stations

The Constrained with Median Stations typical section functions adequately at San Marco north of Prudential Drive; however, the right of way and pavement width constraints make it not less feasible north of Nira Street. North of Nira Street, the existing travel lane would need to be converted to one-way operations or the AV lane would need to be a single lane for this to be a feasible alternative.

Unconstrained with Curbside Stops/Stations

The Unconstrained Typical Section has similar challenges to that of the Constrained Typical Section, that is, the inconsistent right of way width along the route. Although with the Unconstrained Typical Section, widening is contemplated and there are locations along the route where the degree of widening is substantial. North of Nira Street, an estimated 22 feet of additional right of way would need to be acquired to accommodate the 20 feet of pavement widening. North of Prudential Drive, 28 feet of additional right of way would be needed and 26 feet of pavement widening would be required.

Unconstrained with Median Stops/Stations

The Unconstrained with Median Stations typical section in the South Extension (Medical Complex) Corridor add one AV lane in each direction to the existing travel lanes. The median station for both of the representative sections is the minimum size at ten-feet wide and are accompanied by six-foot sidewalks on both sides of the roadway. North of Nira Street, based on preliminary calculations, this configuration would require approximately 28 feet of right of way. North of Prudential Drive, this configuration would require approximately 21 feet of additional right of way.

Mixed Traffic with Curbside Stops/Stations

In this scenario, no dedicated AV lanes are created, and transit vehicles operate in mixed traffic with passenger loading activities occurring at curbside. The San Marco Boulevard segment will require converting select parking lanes in order to accommodate vehicle stops.

Transition Evaluation

The South Extension (Medical Complex) Corridor would require a transition at San Marco station for any at-grade option. Using the methodology developed in Section 4, the following options were considered: linear ramp, alternate ramp, vehicle elevator or passenger elevator.

Infrastructure modifications would require construction work within a very narrow space, due to the San Marco Station's location between the Acosta Bridge ramps and nearby office buildings. Roadway and right-of-way considerations include the nearby Acosta Bridge as well as the connection over/under I-95 Overland Bridge. The effect on services and operations varies by whether the passenger stays in the vehicle (ramps and vehicle lift) or the passenger transfer to another shuttle. Local conditions favor a direct connection over such relative short route, in particular to the Baptist Health main hospital and parking garages.

Evaluation Matrix

Each of the typical section concepts created for the South Extension (Medical Complex) Corridor was evaluated based on the established evaluation criteria, as shown in *Table 5.5.3: South Extension Corridor Typical Section Evaluation Matrix.*

South Extension (Medical Complex) Corridor Summary

- The greatest constraint for the elevated typical section along San Marco Boulevard is the limited space outside of existing travel lanes that can used to place the columns to support the superstructure, as well as challenges crossing the Acosta Bridge and I-95. The typical section concept produced illustrates the columns encroaching along the eight-foot sidewalk, however other alternatives may be developed in the future that may result in reconfiguration of the existing travel lanes.
- The greatest challenge in applying the at-grade alternatives along the San Marco Boulevard route is the variability in existing pavement width and right of way along the entirety of the corridor as well as crossing Gary Street. The closer the route is to the existing San Marco Skyway Station, the closer the greater the available right of way to

incorporate the AV lane. Further south, along Nira Street, the available right of way is reduced by 30 feet.

Table 5.5.3: South Extension Corridor Typical Section Evaluation Matrix

Alternative	Description	Physical	Operational	Other Factors (Customer Service/ Safety/Access)	Overall Rating
South - Medical	1 - Elevated	1	1	3	1.67
	2 - Constrained with Curbside Stations	3	3	2	2.67
	3 - Constrained with Median Stations	3	3	2	2.67
	4 - Unconstrained with Curbside Stations	3	2	2	2.33
	5 - Unconstrained with Median Stations	3	2	2	2.33
	6 - Mixed Traffic with Curbside Stations	1	3	3	2.33

- Constrained Typical Sections with Curbside Stations concept have seven feet wide sidewalks with a one-foot offset from the right of way for both sections, which may result in conflicts between pedestrians and those queuing at the station. For the Constrained with Median Stations option, north of Nira Street, the amount of existing pavement width and right of way is not available to accommodate one travel lane and one AV lane in each direction; one of the modes would be required to operate one-way for this constrained configuration to be feasible.
- Unconstrained Typical Sections, widening required, there are locations along the route where the degree of widening is substantial. For the Unconstrained with Curbside Stations, North of Nira Street, estimated 22 feet of additional right of way would need to be acquired to accommodate the 20 feet of pavement widening. North of Prudential Drive, 28 feet of additional right of way would be needed and 26 feet of pavement widening would be required. The Unconstrained with Median Stations typical sections in the South Extension (Medical Complex) Corridor also add one AV lane in each direction to the existing travel lanes. The median station for both of the representative sections is the minimum size at ten-feet wide and are accompanied by six-foot sidewalks on both sides of the roadway. North of Nira

Street, this configuration would require 28 feet of right of way. North of Prudential Drive this configuration would require approximately 21 feet of additional right of way.

- Deploying the AV system in mixed traffic will greatly simplify the necessary infrastructure modifications and will have minimal effect on existing traffic. However, for the system to operate in mixed traffic, approval by FDOT, NHTSA, and FTA will be required to ensure safe operation. It is likely that during early deployment an operator will have to be on board each AV shuttle. This option is also associated with more uncertainty towards on-time performance particularly during peak hours.

5.5.4 Southeast Extension (San Marco) Corridor



The Southeast Extension (San Marco) Corridor has two routes selected for advancement, connecting to: San Marco East and The District. The first serves San Marco from the Kings Avenue Station via FEC right of way to Atlantic Boulevard. The other serves the District from Kings Avenue Station via Kings Avenue to Prudential Drive. Given that the preferred route alternatives are not along existing roadways, not all concepts will apply, and adjacent routes are considered for the Mixed Traffic concept.

Typical Section Evaluation

The Southeast Extension (San Marco) Corridor preferred route alternative assumes an elevated cross section from the existing Kings Avenue Skyway Station that will transition to an at-grade alternative parallel to the FEC right of way to the proposed San Marco East Station.

Elevated

The District: An elevated alternative was considered to The District. The short extension would connect the Kings Avenue Skyway Station with a new elevated station near The District. This concept is challenged by the relative short distance between stations and the physical constraints to connect to the station and creating an extension while avoiding nearby buildings and bridges.

San Marco East: Similarly, an elevated alternative would extend from Kings Avenue Skyway Station, go under I-95, parallel to the Kings Avenue Garage, cross part of Kings Avenue and continue within FEC right-of-way to reach San Marco East near Atlantic Boulevard.

Constrained with Curbside Stops/Stations

The District: A constrained concept does not apply given that the alternative considered is not along existing roadway.

San Marco East: A constrained concept does not apply given that the alternative considered intersects Kings Avenue but is not along existing roadway.

Constrained with Median Stops/Stations

The District: A constrained concept does not apply given that the alternative considered is not along existing roadway.

San Marco East: A constrained concept does not apply given that the alternative considered intersects Kings Avenue but is not along existing roadway.

Unconstrained with Curbside Stops/Stations

The District: An unconstrained concept with AV lanes would require a new 4-lane road from adjacent parcels. The concept would assign an AV lane at each curbside. This concept remains challenged by the need to purchase all necessary right-of-way from existing parcels serving as parking space for nearby buildings.

San Marco East: The unconstrained typical sections for the Southeast Extension (San Marco) Corridor were developed using the alternative along the railway after passing under I-95 and over the JEA property as an elevated structure. The only station would be at the node at the end of the route, so there would be no stations along the railway. The typical section demonstrates 2 AV lanes, curb and gutter, and a 6-foot sidewalk on the opposite side of the railroad from the lanes.

Unconstrained with Median Stops/Stations

The District: An unconstrained concept with AV lanes would require a new 4-lane road constructed on new right of way from adjacent parcels. The concept would assign two AV lanes near the median. This concept remains challenged by the need to purchase all necessary right-of-way from existing parcels serving as parking space for nearby buildings.

San Marco East: The unconstrained typical sections for the Southeast Extension (San Marco) Corridor were developed using the alternative along the railway after passing under I-95 and over the JEA property as an elevated structure. The only station would be at the node at the end of the route, so there would be no stations along the railway. The typical section requires two AV lanes, curb and gutter, and a 6-foot sidewalk on the opposite side of the railroad from the lanes.

Mixed Traffic with Curbside Stops/Stations

The District: In order to satisfy a mixed traffic concept, a modified alignment along Prudential Drive was evaluated. Existing considerations include the evaluation of a signalized intersection that would allow vehicles to enter the Kings Avenue Station through the existing Kings Avenue Parking Garage bus entrance.

San Marco East: In order to satisfy a mixed traffic concept, the preferred alignment cannot be evaluated, as it does not currently serve as a roadway. For this purpose, preliminary screening Option B was identified as an alternative. This option would leave the Kings Avenue Station, take Kings Avenue and Atlantic Boulevard to reach the San Marco East station. This option would require further assessment of a signalized intersection during further stages of project development.

Transition Evaluation

The Southeast Extension (San Marco) Corridor would require a transition at Kings Avenue Station for any at-grade option. Using the methodology developed in Section 4, the following options were considered: linear ramp, alternate ramp, vehicle elevator or passenger elevator.

Infrastructure modifications would require work along the Kings Avenue Station with considerations to nearby structures and the Kings Avenue Parking Garage connection. Roadway and right-of-way considerations include nearby buildings and parcels, including access under I-95 and the proximity to FEC rail. The effect on services and operations varies by whether the passenger stays in the vehicle (ramps and vehicle lift) or the passenger transfer to another shuttle. Local conditions for such a short route may not favor an elevator transition due to the short distance to The District.

Evaluation Matrix

Each of the typical section concepts created for the Southeast Extension (San Marco) Corridor was evaluated based on the established evaluation criteria as depicted in *Table 5.5.4: Southeast Extension Corridor Typical Section Evaluation Matrix.*

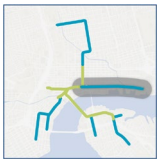
Southeast Extension (San Marco) Corridor Summary

- The Southeast Extension (San Marco) Corridor is comprised of two segments that connect the existing highway to the following destinations.
    - The District and
    - A future San Marco East commuter rail station.
- Considerations for The District Extension include
    - The extension to The District would connect to the proposed District development with mixed use commercial and residential with high potential ridership and will required coordination with the proposed development.
    - The elevated or dedicated lane option would likely require additional right of way.
    - For the mixed traffic option and to minimize cost for additional infrastructure a route from Kings Avenue Garage to Prudential Avenue could be considered but will required a connection to the new development.
- Considerations for the connection to a future San Marco East Commuter Rail include
    - The location of the future station must be coordinated with the commuter rail plan
    - The combination elevated/dedicated lane extension from the existing Kings Avenue Skyway Station under I-95 the over and along the FEC railroad will be advantageous from an operational standpoint but will require coordination and approval by the railroad and will have a relatively high cost for infrastructure.
- In order to connect to the existing Skyway in mixed traffic, the route from the Kings Avenue Station along Kings Avenue to Atlantic Boulevard may be the most direct route and will likely require a signalized intersection at access to a future commuter rail option.
- Development of plan for Southeast Extension (San Marco) Corridor should be closely coordinated with plans for The District mixed-use development and future plans for commuter rail.

Table 5.5.4: Southeast Extension Corridor Typical Section Evaluation Matrix

Alternative	Description	Physical	Operational	Other Factors (Customer Service/ Safety/Access)	Overall Rating
Southeast	1 - Elevated	1	1	3	1.67
	2 - Constrained with Curbside Stations	3	3	2	2.67
	3 - Constrained with Median Stations	3	3	2	2.67
	4 - Unconstrained with Curbside Stations	2	2	2	2.00
	5 - Unconstrained with Median Stations	2	2	2	2.00
	6 - Mixed Traffic with Curbside Stations	1	3	3	2.33

5.5.5 Bay Street Innovation Corridor



As previously referenced, the East Extension Corridor is known as the Bay Street Innovation Corridor which is advancing through a separate project process. The Bay Street Innovation Corridor connects the Urban Core from the existing Central Skyway Station, with The Elbow and the Sports/Entertainment District. Nearby landmarks include the Northbank Riverwalk, the Main Street Bridge, Florida Theater, the VyStar Arena, and the TIAA Bank Field. This section highlights the assessment of various typical sections conducted as part of the Bay Street Innovation Corridor project. The Bay Street Innovation Corridor is included in the overall evaluation of future ridership analysis and preliminary cost estimates for the overall U²C System presented in this study. Therefore, the overview of the Bay Street Innovation Corridor concept development is provided for reference.

Typical Section Evaluation

The preferred route alternative for the Bay Street Innovation Corridor extends from the intersection of Pearl Street and Hogan Street to the Sports/Entertainment Complex. The options evaluated for the Bay Street Innovation Corridor focused initially on the loop east of Hogan's Creek and fell under three general categories: Georgia Street Loop Options, Initial Bay Street/Shipyard Options, and Additional Options.

The initial deployment proposes that the autonomous vehicle will operate in mixed traffic with an operator on board the vehicle. The proposed AV route consists of two single lane loops connected by a double-lane route allowing multiple autonomous vehicles to move in both the east and west directions simultaneously. In this proposed configuration, the AV will require signal modifications at all intersections to incorporate Transit Signal Priority (TSP). Concept plans including typical sections have been developed for the Bay Street Innovation Corridor and are included in Appendix G.

Elevated

The original Skyway plan contemplated a future elevated extension along Bay Street to the Sports/Entertainment Complex and the system was designed with a stub out that would facilitate the extension at the intersection of Bay Street. An elevated section along Bay Street would require placement of the columns within existing sidewalk and or parking areas. Construction of the elevated system could adversely affect the aesthetics of the corridor and will have a high cost.

Constrained with Curbside Stops/Stations

Initial concepts developed for the Bay Street corridor included dedicated lanes with curbside stops running from Hogan Street east to the Stadium (TIAA Bank Field) with loops on each end. The west loop included Hogan Street, with a stop at the Landing then proceeding along Water Street, returning to Bay Street along a pocket part on the east side of the Main Street Bridge. The East loop runs along the southside of Gator Bowl Boulevard then through Lot J near TIAA Bank Field then along Adams Street by the Baseball Ground returning to Bay Street along A Philip Randolph. The plans for this concept, dated September 9th are included in Appendix A. This concept was presented to the City of Jacksonville, DIA and FDOT for review.

Constrained with Median Stops/Stations

This concept was not advanced as development of median stations would require widening of Bay Street which would be cost prohibitive in the dense downtown environment. It would also require the development of additional pedestrian crossings

Unconstrained with Curbside Stops/Stations

Due to the constraints in the dense downtown setting this option was not evaluated as any widening would greatly impact sidewalk widths and conflict with other plans along the corridor.

Unconstrained with Median Stops/Stations

Due to the constraints in the dense downtown setting this option was not evaluated as any widening would greatly impact sidewalk widths and conflict with other plans along the corridor.

Mixed Traffic

Feedback from the City of Jacksonville, DIA and the FDOT on the plans dated September 9th that showed dedicated lanes along the route resulted in development of refined concept plans dated January 10th included in Appendix G-5. The refined concept plans identify a mixed traffic route follows the same general route and extending the west loop to Pearl Street. At the time of this

report, the JTA is advancing the plans for the mixed traffic option and defining requirements for approvals for the AV to operate in mixed traffic.

Transition Evaluation

The future expansion of the Bay Street Innovation Corridor would require a transition at Central Station for any at-grade option. Using the methodology developed in Section 4, the following options are considered: linear ramp, alternate ramp, vehicle elevator or passenger elevator.

Infrastructure modifications necessary for a transition at Central Station would require construction on or near Bay Street, Hogan Street, or the adjacent parking lot. Due to a spiral ramp's footprint and the downtown dense environment, the Central Station appears to be constrained by the lack of space. Roadway and right-of-way considerations include the footprint of a ramp along intersections, both constrained by grade and clearance restrictions at intersecting streets. The effect on services and operations varies by whether the passenger stays in the vehicle (ramps and vehicle lift) or the passenger transfers to another shuttle. Local conditions and movement patterns do not seem to favor one transition over the other: a ramp-type service could offer a direct, but slower route from the West Extension (Riverside) Corridor and the JRTC, while a passenger transfer would speed up operations for users already located downtown. A detailed evaluation of this transition should be performed during project development to determine the preferred option.

Evaluation Matrix

An evaluation matrix of initial alternatives was referenced in Section 4 and is included in the appendices. An additional matrix was not developed for east corridor due to advancement of this corridor under a separate project.

Bay Street Innovation Corridor Summary

- Development of the Bay Street Innovation Corridor has been advanced through a separate project due to the receipt of a federal BUILD Grant for the Bay Street Innovation Corridor.
- Several concepts have been evaluated during the Bay Street Innovation Corridor project, leading to development of a constrained dedicated lane scenario and a mixed traffic scenario.
- JTA is coordinating with the City of Jacksonville and FDOT to advance the mixed traffic autonomous vehicle route along Bay Street from Pearl Street to TIAA Bank Field in the Sports/Entertainment District.

5.6 Operational Analysis

An operational analysis was conducted for each corridor extensions and for the overall system to define and quantify operational requirements for the set of runningway configurations examined and for the service frequencies considered.

The results of the operational analysis identified key operating requirements: the number of vehicle or shuttles needed; the station-to station travel times; the one-way and round-trip travel times. This information was developed for operating scenarios that included a service line frequency of a vehicle every three minutes and every five minutes.

The operating analysis estimated operating requirements and travel times for the following typical sections, or runningway concept alternatives:

- elevated;
- at-grade dedicated median lanes;
- at-grade dedicated curb lanes; and
- at-grade mixed traffic alternative.

In addition, two alternatives involved a combination of runningway configurations to connect key destinations. These destinations were identified in previous studies and serve as the endpoints of the proposed system expansion corridors. The combination alternatives are the Medical Center (South Extension Corridor) to UF Health (North Extension Corridor); and Five Points (West Extension Corridor) to Sports/Entertainment Complex (Bay Street Innovation Corridor).

The operations analysis also included an evaluation of the alternatives based on vehicle requirements, travel time, and service reliability. Service reliability was determined based on potential for delays due to interference with ambient traffic. As a result, elevated alternatives are expected to have the best reliability followed by alternatives in dedicated median runningway, and then alternatives in dedicated curb runningway. Alternatives operating in mixed traffic are expected to have the lowest reliability.

The study findings indicated that the differences between dedicated at-grade curb alternative and mixed traffic alternative scenarios were largely subject to similar travel delays and therefore these are represented as curb running scenarios. Transit Signal Priority (TSP) was considered at all signalized intersections. To achieve more exact differentiation between mixed traffic operations and curb running operations with accommodation for impacts due to driveways and right turn lanes, the operations analysis would benefit from a traffic modelling analysis. This recommendation is consistent with the scoring basis used when considering operations reliability.

The results of the operational analysis were prepared to identify operating requirements that help to define vehicle and operating costs and to provide service level information to be used for operations and for demand estimation described in Section 5.4. This information reflects travel times, service frequency, service span, operating days, and transfer requirements.

The general operating assumptions for span of service and service frequencies that apply to all alternatives are described in Table 5.6.1 and in Table 5.6.2.

Table 5.6.1 reflects operating parameters associated with a service span consistent with the existing Skyway operations. This service information was used to determine operating requirements and for demand estimation which assumed the existing service span.

Table 5.6.1: General Operating Assumptions – Service Span and Frequencies

Operating Characteristics	Span	Service Hours	Peak Hours	Non-peak	Frequency
Monday-Thursday	6:30 AM - 9:30PM	15	6	9	3min./5min.
Friday	6:30 AM - 9:30PM	15	6	9	3min./5min.
Saturday	7AM - 9:30PM	14.5	0	14.5	3min./5min.
Sunday	8AM - 9:30PM	13.5	0	13.5	3min./5min.

Table 5.6.2 reflects operating parameters associated with a more robust service plan, it provides more hours of service per operating day and would presumably generate higher demand estimates and higher operating costs. A more robust service plan, as described in Table 5.6.2 is recommended for future operations planning and analysis.

Table 5.6.2: General Operating Assumptions – Service Span and Frequencies (Robust)

Operating Characteristics	Span	Service Hours	Peak Hours	Non-peak	Frequency
Monday-Thursday	6AM to 11:00PM	17	6	11	3min./5min.
Friday	6AM to 1:00AM	19	6	13	3min./5min.
Saturday	7AM to 1:00AM	18	0	18	3min./5min.
Sunday	8AM to 9:30PM	13.5	0	13.5	3min./5min.

Table 5.6.3 presents travel time assumptions and factors that apply to each operating alternative concept. The travel time assumptions include station dwell time, end of line layover time, a delay factor for mixed traffic operations, vertical transfer times for riders and vehicles, and maximum speed. These factors impact operating requirements and thus demand estimates.

Table 5.6.3: General Operating Assumptions – Time Factors

Time Factors	Value
Maximum operating speed – Elevated	25 mph
Maximum operating speed – Median	22 mph
Maximum operating speed – Curb and Mixed	20 mph
Curb running traffic factor – applied to travel time	1.1 * segment travel time
Mixed traffic factor – applied to travel time	1.2 * segment travel time
Severe curve factor – applied to relevant sections	36 seconds per 0.1 mile
End of line layover – applied to round trip travel time	1.05 * round trip time
Station dwell time	30 seconds

Time Factors	Value
Vertical transfer – vehicle	90 seconds
Vertical transfer – rider	60 seconds

5.6.1 Operating Requirements and Travel Times by Corridor

The resulting travel times and vehicle requirements by corridor are summarized in Table 5.6.4. The system corridors include elevated and mixed traffic running way configurations for vehicles operating every 3-minutes and every 5-minutes.

Table 5.6.4: System Corridor Operating Requirements and Travel Times

Operating Characteristics	Round Trip Dist. (mi)	1-way Time* (min)	Round Trip Time* (min)	Avg. MPH	Veh. at 3 mins	Veh. at 5 mins
Existing Routes and Brooklyn						
JRTC to Rosa Parks - Elevated	2.30	6.42	12.84	10.75	4	3
JRTC to Kings Ave - Elevated	4.34	11.41	22.81	11.41	8	5
JRTC to Brooklyn - Elevated	2.36	6.46	12.92	10.96	4	3
West-East						
Five Points to Sports Complex - Elevated	6.35	17.54	35.08	10.86	12	7
Five Points to Sports Complex - Elevated & Median	6.35	19.47	38.94	9.78	13	8
Five Points to Sports Complex - Elevated & Curb	6.35	20.78	41.56	9.17	14	8
Five Points to Sports Complex - Elevated & Mixed	6.35	23.66	47.32	8.05	16	9
Five Points to Sports Complex - Curb Loop	6.85	23.07	46.14	8.91	15	9
Five Points to Sports Complex - Mixed Loop	6.85	25.99	51.99	7.91	17	10
East						
Central to Sports Complex - Elevated	2.80	7.49	14.98	11.21	5	3
Central to Sports Complex - Median	3.00	9.13	18.26	9.86	6	4
Central to Sports Complex - Curb Loop	3.50	12.75	25.51	8.23	9	4
Central to Sports Complex - Mixed Loop	3.50	14.63	29.25	7.18	10	5
North-South						
Medical Complex to UF Health - Elevated	7.28	19.11	38.21	11.43	13	8
Medical Complex to UF Health - Elevated & Median	8.94	23.78	47.56	11.28	16	10
Medical Complex to UF Health - Elevated & Curb	7.94	24.05	48.11	9.90	16	10
Medical Complex to UF Health - Elevated & Mixed	7.94	25.43	50.86	9.37	17	10

*Note: Vehicle trip time, does not include passenger transfer times, if needed.

5.6.2 Operating Requirements and Travel Times by Expansion Corridor

The resulting travel times and vehicle requirements for each expansion corridor are summarized in Table 5.6.5. The system expansion corridors include elevated and mixed traffic configurations for vehicles operating every three-minutes and every five-minutes.

Key findings from the operational analysis are:

- *Elevated* extensions provide the shortest trips and require the fewest vehicles and are expected to have best reliability.
- Operation in dedicated lanes is expected to provide better service reliability than in mixed traffic, and also safer operations, faster travel times, and generally require fewer vehicles (depending on cycle times and headway).
    - *AV Lane along Median* extensions are expected to provide better service reliability than dedicated lanes at curb or mixed traffic extensions.
    - *AV Lane along Curb* extensions require more vehicles and take longer than an AV Lane along Median or Elevated.
- *Mixed Traffic* extensions will behave similarly to an AV Lane with Curbside Access but will operate at slower speeds and are expected to have poorer reliability and safety due to interface with ambient traffic.
- A traffic modeling analysis will be required to better understand local traffic impacts and vehicle operations along curb and median configurations for both dedicated and mixed traffic options.



From an operational analysis, elevated extensions provide high reliability, short trips, and lower number of vehicles. Pictured above, elevated guideway over Union Street leading to Rosa Parks Transit Station.

Table 5.6.5: Expansion Corridor Operating Requirements and Travel Times

Operating Characteristics	Round Trip Dist. (mi)	1-way Time* (min)	Round Trip Time* (min)	Avg. MPH	Veh. at 3 min	Veh. at 5 min.
North						
Rosa Parks to UF Health - Elevated	3.40	8.89	17.79	11.47	6	4
Rosa Parks to UF Health - Median	3.86	11.26	22.52	10.28	8	5
Rosa Parks to UF Health - Curb	3.85	12.25	24.50	9.43	8	5
Rosa Parks to UF Health - Mixed	3.85	13.77	27.53	8.39	9	6
East						
Central to Sports Complex - Elevated	2.80	7.49	14.98	11.21	5	3
Central to Sports Complex - Median	3.00	9.13	18.26	9.86	6	4
Central to Sports Complex - Curb Loop	3.50	12.75	25.51	8.23	9	5
Central to Sports Complex - Mixed Loop	3.50	14.63	29.25	7.18	10	6
Southeast						
Kings Ave to District - Elevated	0.50	1.37	2.74	10.96	1	1
Kings Ave to District - Median	0.50	1.71	3.42	8.78	1	1
Kings Ave to District - Curb	0.76	1.95	3.91	11.67	1	1
Kings Ave to District - Mixed	0.75	2.82	5.64	7.98	2	1
Kings Ave to San Marco East - Elevated	1.40	3.64	7.27	11.55	3	1
Kings Ave to San Marco East - Median	1.60	4.86	9.72	9.88	4	2
Kings Ave to San Marco East - Curb Loop	1.75	5.68	11.35	9.25	4	2
Kings Ave to San Marco East - Mixed Loop	1.75	6.69	13.37	7.85	4	3
Kings Ave to District and SME - Elevated	2.10	5.75	11.49	10.96	4	2
Kings Ave to District and SME - Median	2.30	7.66	15.32	9.01	5	3
Kings Ave to District and SME - Curb Loop	1.95	6.68	13.37	8.75	4	3
Kings Ave to District and SME - Mixed Loop	1.95	7.80	15.59	7.50	5	3
West						
Five Points/RAM to Brooklyn - Elevated Loop	2.15	5.69	11.38	11.34	4	2
Five Points/RAM to Brooklyn - Median Loop	2.15	6.36	12.73	10.14	4	3
Five Points/RAM to Brooklyn - Curb Loop	2.15	6.92	13.85	9.32	5	3
Five Points/RAM to Brooklyn - Mixed Loop	2.15	8.16	16.31	7.91	5	3
Five Points to Brooklyn - Elevated	2.00	5.15	10.31	11.64	3	2
Five Points to Brooklyn - Median	2.00	5.79	11.57	10.37	4	2
Five Points to RAM to Brooklyn - Curb	2.30	7.53	15.06	9.16	5	3
Five Points to RAM to Brooklyn - Mixed	2.30	8.03	16.07	8.59	5	3
South						
Medical Complex to San Marco - Elevated	0.80	2.12	4.25	11.30	1	1
Medical Complex to San Marco - Median	1.30	5.01	10.02	7.78	3	2
Medical Complex to San Marco - Curb	1.30	5.22	10.44	7.47	3	2
Medical Complex to San Marco - Mixed	1.30	5.69	11.37	6.86	4	2

*Note: Vehicle trip time, does not include passenger transfer times, if needed.

5.7 Ridership Projections

The purpose of this section is to section is to summarize ridership projections for several corridors and scenarios. These projections and its methodology are consistent with the JTA Skyway Conversion and Brooklyn Station Extension study (TCAR 1).

Ridership forecasts were prepared using an advanced copy of v2.01 of Federal Transit Administration's (FTA) Simplified Trips-On-Project Software (STOPS). The modeling scope for this study was set to match the six-county area of the NERPMAB1, the local travel-demand model maintained by the North Florida Transportation Planning Organization. As part of the review, the Jacksonville Area STOPS model was used to compare various scenarios and corridors. The Jacksonville Area STOPS model is a combination of JTA's existing bus, Express bus, BRT, Community Shuttle and Skyway services in Duval and Clay County, along with socioeconomic data to estimate (a) person travel volumes, (b) travel times, (c) mode share, and (d) ridership. Scenario ridership were estimated for 2015, 2022, 2035 and 2045 for the following scenarios:

- Scenario 1: By corridor
- Scenario 2: East-West and North-South Extension Corridors
- Scenario 3: Full System

For each scenario, two alternates were evaluated:

- Alternate A - Elevated corridor (Concept 1)
- Alternate B - Mixed traffic corridor (Concept 6)

In total, 12 scenarios were analyzed for the System Expansion Study. The ridership estimates associated with these modeling runs is the discussed in the following sections. A full report including modeling process and assumptions can be found in Appendix F. Maps depicting each scenario are included at the end of this section.

5.7.1 Ridership by Corridor

By Corridor – Elevated

In Scenario 1A, the existing two service lines are run from the previous Convention Center Station, or the new Jacksonville Regional Transportation Center (JRTC) to Kings Ave Station and from the JRTC to Rosa Parks Station. These service lines are elevated and remain elevated in all scenarios. In addition to the two existing lines, the Brooklyn Station to JRTC line is elevated in all of the scenarios. The following extensions, defined by destination points, were specified in the elevated mode.

- Rosa Parks Station – UF Health
- Central Station – Sports Complex
- Kings Ave Station – San Marco
- Brooklyn Station – Five Points
- San Marco Station – Medical Complex (Medical Complex)

Scenario 1A was analyzed with a three-minute headway and a five-minute headway. Table 5.7.1 shows the average daily boardings of Scenario 1A with a three-minute headway, while Table 5.7.2 lists the average daily boardings with a five-minute frequency.

Table 5.7.1: Boardings by Corridor for Elevated Concept – Three Minute Frequency

Route	Corridor	Description	2015	2022	2035	2045
400	Existing	JRTC to Rosa Parks	2,220	3,360	4,550	5,960
401	Existing	JRTC to Kings Ave	1,210	1,910	2,660	3,240
402	Existing	JRTC to Brooklyn	190	240	310	350
407	North	Rosa Parks to UF Health	5,190	6,050	7,020	7,800
409	East	Central to Sports	670	1,550	2,230	2,740
411	Southeast	Kings Ave to San Marco	130	130	140	140
413	West	Five Points to Brooklyn	180	240	270	290
415	South	San Marco to Medical	80	120	180	240
		Total	**9,860**	**13,590**	**17,360**	**20,760**

Table 5.7.2: Boardings by Corridor for Elevated Concept – Five Minute Frequency

Route	Corridor	Description	2015	2022	2035	2045
400	Existing	JRTC to Rosa Parks	1,810	2,830	4,080	5,630
401	Existing	JRTC to Kings Ave	1,070	1,490	1,710	1,860
402	Existing	JRTC to Brooklyn	160	200	230	250
407	North	Rosa Parks to UF Health	4,870	5,620	6,480	7,090
409	East	Central to Sports Complex	690	1,550	2,190	2,680
411	Southeast	Kings Ave to San Marco	120	120	120	120
413	West	Five Points to Brooklyn	120	140	160	170
415	South	San Marco to Medical	70	80	100	100
		Total	**8,900**	**12,030**	**15,060**	**17,900**

By Corridor – Mixed Traffic

In Scenario 1B, the existing two service lines are run from the new JRTC to Kings Ave Station and from the JRTC to Rosa Parks Station. These service lines are elevated and remain elevated in all scenarios. In addition to the two existing lines, the Brooklyn Station to JRTC service line is elevated in all of the scenarios. Similar to Scenario 1A, the following extensions, defined by destination points, were specified in mixed traffic mode:

- Rosa Parks Station – UF Health
- Central Station – Sports Complex
- Kings Ave Station – San Marco
- Brooklyn Station – Five Points
- San Marco Station – Medical Complex

Scenario 1B was analyzed with a three-minute headway and a five-minute headway. Table 5.7.3 shows the average daily boardings of the Scenario 1B with a three-minute headway, while Table 5.7.4 lists the average daily boardings with a five-minute frequency.

Since the travel times on the elevated systems are faster than in mixed traffic, as discussed in the operational section, the ridership is higher in the three-minute scenario versus the five-minute scenario. The only exception is the Five Points to Sports/Entertainment Complex line. However, this service line has a different alignment from the elevated system and stops at additional stations compared to the elevated system. Therefore, a direct comparison between the service in mixed traffic and the elevated is not accurate. Another interesting point is that the difference in average daily boardings reduces over the time period. This reduction is caused by a change in boardings at Central Station and Hemming Park Station. It is likely that a change in the socioeconomic data caused this change in pattern.

Table 5.7.3: Boardings by Corridor for Mixed Traffic Concept – Three Min. Frequency

Route	Corridor	Description	2015	2022	2035	2045
400	Existing	JRTC to Rosa Parks	4,570	6,070	7,760	9,560
401	Existing	JRTC to Kings Ave	1,340	2,190	3,150	3,870
402	Existing	JRTC to Brooklyn	210	280	320	350
408	North	Rosa Parks to UF Health	1,900	2,370	2,830	3,170
410	East	Central to Sports	300	1,050	1,650	2,110
412	Southeast	Kings Ave to San Marco	30	30	30	30
414	West	Five Points to Brooklyn	40	70	80	80
416	South	San Marco to Medical	60	90	130	170
		Total	**8,460**	**12,150**	**15,950**	**19,340**

Table 5.7.4: Boardings by Corridor for Mixed Traffic Concept – Five Min. Frequency

Route	Corridor	Description	2015	2022	2035	2045
400	Existing	JRTC to Rosa Parks	4,060	5,660	7,740	9,890
401	Existing	JRTC to Kings Ave	1,200	1,690	1,930	2,100
402	Existing	JRTC to Brooklyn	170	220	250	280
408	North	Rosa Parks to UF Health	1,360	1,800	2,160	2,420
410	East	Central to Sports	240	760	1,030	1,230
412	Southeast	Kings Ave to San Marco	20	20	20	20
414	West	Five Points to Brooklyn	30	60	60	70
416	South	San Marco to Medical	50	70	100	120
		Total	**7,140**	**10,280**	**13,300**	**16,130**

In the mixed traffic scenario, the change in average daily ridership in comparing the five-minute frequency with the three-minute frequency is even more significant. The increase in travel time has resulted in different travel patterns affecting the JRTC to Rosa Parks Station and the Rosa Parks Station to UF Health lines.

5.7.2 East-West and North-South Corridors

East-West and North-South Corridors – Elevated

In Scenario 2A, the existing two service lines are run from the new JRTC to Kings Ave Station, and from the JRTC to the Rosa Parks Station. These lines are elevated and remain elevated in all scenarios. In addition to the two existing lines, the Brooklyn Station to JRTC line is elevated in all of the scenarios. The following extensions were specified, defined by destination points, in the elevated mode:

- Kings Ave Station – San Marco
- Five Points – Sports Complex
- Medical Complex – UF Health

Scenario 2A was analyzed with a three-minute headway and a five-minute headway. Table 5.7.5 shows the average daily boardings of Scenario 2A with a three-minute headway, while Table 5.7.6 lists the average daily boardings with a five-minute frequency.

Table 5.7.5: East/West & North/South Elevated Concept – Three Minute Frequency

Route ID	Description	2015	2022	2035	2045
400	JRTC to Rosa Parks	1,150	1,660	1,790	1,880
401	JRTC to Kings Ave	810	1,180	1,290	1,360
402	JRTC to Brooklyn	90	120	150	170
403	Five Points to Sports	1,060	2,320	3,500	4,390
405	Medical to UF Health	8,870	10,620	13,000	15,380
411	Kings Ave to San Marco	100	110	110	110
	Total	**12,080**	**16,000**	**19,830**	**23,280**

Table 5.7.6: East/West & North/South Elevated Concept – Five Minute Frequency

Route ID	Description	2015	2022	2035	2045
400	JRTC to Rosa Parks	3,840	5,320	7,630	10,260
401	JRTC to Kings Ave	1,270	1,770	2,020	2,190
402	JRTC to Brooklyn	200	270	310	350
403	Five Points to Sports	470	1,460	2,840	4,380
405	Medical to UF Health	4,910	5,980	7,050	7,890
411	Kings Ave to San Marco	120	130	130	130
	Total	**10,800**	**14,920**	**19,980**	**25,200**

East-West and North-South Corridors – Mixed Traffic

In Scenario 2B, the existing two service lines are run from the new JRTC to Kings Ave Station and from the JRTC to the Rosa Parks Station. These lines are elevated and remain elevated in all scenarios. In addition to the two existing lines, the Brooklyn Station to JRTC line is elevated in

all of the scenarios as well. Like Scenario 2A, the following extensions were added, defined by destination points, in mixed traffic mode:

- Kings Ave Station – San Marco
- Five Points – Sports Complex
- Medical Complex– UF Health

Scenario 2B was analyzed with a three-minute headway and a five-minute headway. Table 5.7.7 shows the average daily boardings of Scenario 2B with a three-minute headway, while Table 5.7.8 lists the average daily boardings with a five-minute frequency.

Table 5.7.7: East/West & North/South Mixed Traffic Concept – Three Minute Frequency

Route ID	Description	2015	2022	2035	2045
400	JRTC to Rosa Parks	3,740	4,980	6,520	8,240
401	JRTC to Kings Ave	1,360	2,210	3,070	3,700
402	JRTC to Brooklyn	210	300	340	370
404	Five Points to Sports	450	1,530	2,490	3,210
406	Medical to UF Health	4,490	5,560	6,650	7,540
412	Kings Ave to San Marco	30	30	30	30
	Total	**10,270**	**14,600**	**19,090**	**23,090**

Table 5.7.8: East/West & North/South Mixed Traffic Concept – Five Minute Frequency

Route ID	Description	2015	2022	2035	2045
400	JRTC to Rosa Parks	3,620	4,870	6,800	8,850
401	JRTC to Kings Ave	1,250	1,760	2,000	2,170
402	JRTC to Brooklyn	160	220	250	270
404	Five Points to Sports	380	1,190	1,910	2,450
406	Medical to UF Health	4,310	5,340	6,380	7,230
412	Kings Ave to San Marco	20	20	20	20
	Total	**9,740**	**13,400**	**17,360**	**20,990**

Full System Expansion – Elevated

In Scenario 3A, only one existing service line is run. This is the line from the JRTC to Kings Ave Station. The following extensions were added in the elevated mode:

- Kings Ave Station s– San Marco East
- Five Points – Sports Complex
- Medical Complex – UF Health

Scenario 3A was analyzed with a three-minute headway and a five-minute headway. Table 5.7.9 shows the average daily boardings of Scenario 3A with a three-minute headway, while Table 5.7.10 lists the average daily boardings with a five-minute frequency.

Table 5.7.9: East/West & North/South Elevated Concept – Three Minute Frequency

Route ID	Description	2015	2022	2035	2045
401	JRTC to Kings Ave	1,090	1,580	1,740	1,840
403	Five Points to Sports	1,130	2,500	3,730	4,640
405	Medical to UF Health	9,390	11,340	13,810	16,240
411	Kings Ave to San Marco	100	110	110	110
	Total	**11,700**	**15,530**	**19,380**	**22,840**

Table 5.7.10: East/West & North/South Elevated Concept – Five Minute Frequency

Route ID	Description	2015	2022	2035	2045
401	JRTC to Kings Ave	920	1,200	1,320	1,400
403	Five Points to Sports	930	2,150	3,240	4,060
405	Medical to UF Health	9,200	11,100	13,570	15,990
411	Kings Ave to San Marco	90	100	100	100
	Total	**11,150**	**14,550**	**18,240**	**21,550**

Full System Expansion – Mixed Traffic

In Scenario 3B, only one existing line is run. This is the line from the JRTC to Kings Ave Station. The following extensions were added in the mixed traffic mode:

- JRTC to Kings Ave Station – San Marco East
- Five Points – Sports Complex
- Medical Complex – UF Health

Scenario 3B was analyzed with a three-minute headway and a five-minute headway. Table 5.7.11 shows the average daily boardings of Scenario 3B with a three-minute headway, while Table 5.7.12 lists the average daily boardings with a five-minute frequency.

Table 5.7.11: East/West & North/South Mixed Traffic Concept – Three Minute Frequency

Route ID	Description	2015	2022	2035	2045
401	JRTC to Kings Ave	1,880	3,050	4,380	5,490
404	Five Points to Sports	400	1,400	2,370	3,100
406	Medical to UF Health	5,450	6,730	8,150	9,410
412	Kings Ave to San Marco	30	30	30	30
	Total	**7,750**	**11,220**	**14,930**	**18,030**

Table 5.7.12: East/West & North/South Mixed Traffic Concept – Five Minute Frequency

Route ID	Description	2015	2022	2035	2045
401	JRTC to Kings Ave	1,720	2,740	3,880	4,820
404	Five Points to Sports	350	1,180	1,890	2,420
406	Medical to UF Health	5,030	6,270	7,750	9,070
412	Kings Ave to San Marco	20	20	20	20
	Total	**7,120**	**10,210**	**13,540**	**16,330**

In the Scenario 3A there is a logical increase resulting in a greater number of boardings in the scenario with the three-minute frequency, as well as an increase in boardings over the different time periods. In Scenario 3B there is a logical increase resulting in a greater number of boardings in the scenario with the three-minute frequency, as well as an increase in boardings over time.

5.7.3 System Summary

The following figures, 5.7.1 through 5.7.5 show the comparisons between the elevated and the mixed traffic scenarios by headways and for the different time periods. As indicated in the graphs, the elevated scenarios outperform the mixed traffic scenarios in both the three-minute and the five-minute scenarios.

Elevated versus Mixed Traffic – Three-Minute Frequency

Figure 5.7.1 compares the results of the elevated and mixed traffic scenarios with a three-minute frequency. Scenario 2A draws the largest number of daily boardings. The average daily boardings on 2A is between 12% and 23% higher than scenario 1A, and 2% to 3% higher than scenario 3A, depending on the year. For all scenarios the average daily boardings are higher on the elevated system compared with the mixed traffic system.

Elevated versus Mixed Traffic – Five-Minute Frequency

Figure 5.7.2 compares the results of the elevated and mixed traffic scenarios with a five-minute frequency. Scenario 2A draws the largest number of daily boardings, except in the year 2015 where Scenario 3A outperforms Scenario 2A by 3%. The average daily boardings on Scenario 2A is between 21% and 41% higher than Scenario 1A, depending on the year, and -3% to 14% higher than scenario 3A. For all scenarios the average daily boardings are higher on the elevated system compared with the mixed traffic system.

Figure 5.7.1: Average Daily Boardings Elevated vs Mixed Traffic Scenarios Three-Minute Frequency

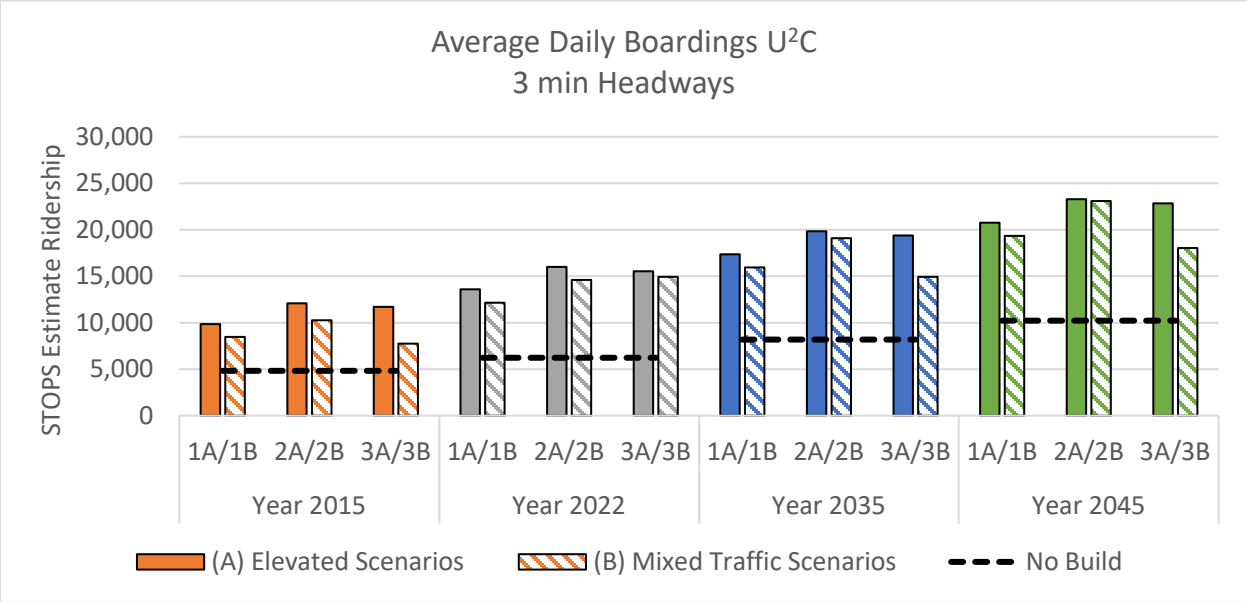


Figure 5.7.2: Average Daily Boardings Elevated vs Mixed Traffic Scenarios Five-Minute Frequency

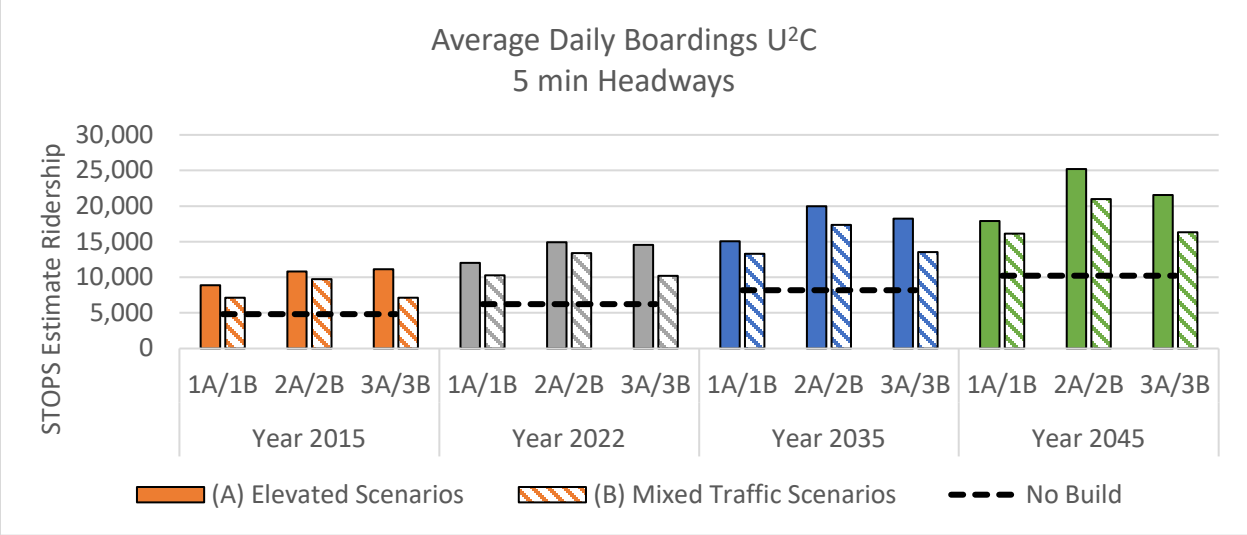
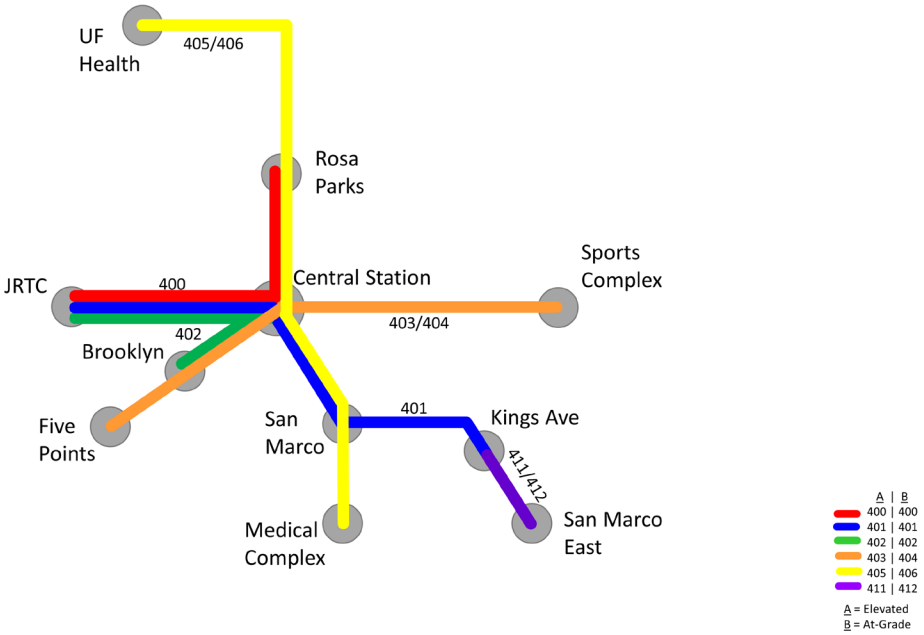


Figure 5.7.3: Operational Scenario 1: Individual Corridor Routes (Elevated/Mixed Traffic)



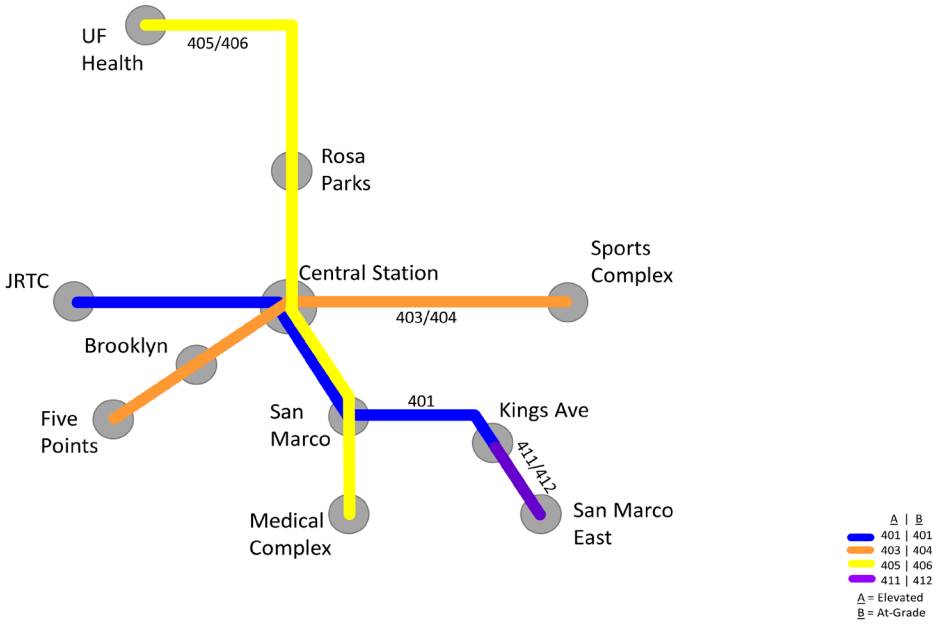
Scenario 1A/1B

Figure 5.7.4: Operational Scenario 2: East-West and North-South Routes (Elevated/ Mixed Traffic)



Scenario 2A/2B

Figure 5.7.5: Operational Scenario 3: Full System (Elevated/Mixed Traffic)



Scenario 3A/3B

5.8 Corridor-Level Evaluation Matrix

For each corridor preferred route alternative examined, the following characteristics were examined and are summarized in *Table 5.8.1: Evaluation Criteria for Corridor Evaluation*

- **Infrastructure & Safety** – Overall physical, engineering design and safety considerations for expanding service to the corridor.
- **Operations** – Overall assessment of potential schedule and performance reliability considering number of intersections and other factors.
- **Ridership** – Considerations based on estimated ridership values for each corridor along with number and size of key destinations or potential passenger generators. Ridership range taken from Table 5.7.1 and Table 5.7.3 and represents estimated ridership for elevated and mixed traffic, respectively.
- **Economic Development** – Considerations for transit-supportive characteristics and projected number of 2045 workers within study area.
- **Modal Connectivity** – Ability to improve local connectivity for transit users and/or regional connectivity in North Florida.
- **Community Feedback** - Review of community survey results and public feedback.
- **Cost Estimate**– Order of magnitude capital cost estimates associated with corridor expansion.

All the factors outlined are considered in the summary of key considerations for each corridor and in the development of the evaluation matrix, shown in *Table 5.8.2: Corridor Evaluation Summary.*

Table 5.8.1: Evaluation Criteria for Corridor Evaluation

Group	Criteria	Considerations
Infrastructure & Safety	Engineering Design	Complexity, obstacles, number of intersections, entrances
	Safety	Number of intersections, entrances, pedestrian access to stop
Operations	Schedule/Speed/Reliability	Traffic, number of intersections, driveways
Ridership	Generators	Key destinations along the corridor
	Potential Ridership	Number of potential riders by corridor. (Mixed Traffic / Elevated)
Economic Development	Transit-Oriented Development (TOD)	Transit dependent population, development opportunities and planned development
	Number of Employees	Number of employees in corridor
Modal Connectivity	Local Connectivity	Connectivity with local bus routes
	Regional Connectivity	Connectivity to BRT, inter-county or commuter rail routes.
	Annual Boardings	Total annual boardings for routes that serve the corridor (Fixed bus and BRT) from 2019 TDP.
Community Feedback	Survey Results	Number of responses, number of people that work/play/live in the corridor, subjective
Cost Estimate	Cost Model	Order of magnitude estimated capital cost.

North (UF Health) Corridor

- Infrastructure & Safety
  - Corridor faces engineering constraints transitioning from Rosa Parks station to at-grade along FSCJ or maintaining travel lanes along 8th street.
  - Overall safety will improve for transit users.
- Operations
  - Direct route and limited stops allow for competitive travel times.
- Potential Ridership
  - UF/Health and VA attract most of the trips.
  - Lower density residential/vacant lots along Springfield.
    - OR Connects lower density residential Springfield neighborhood with Downtown
- Economic Development
  - Opportunity to further develop along Main Street.
  - Potential alternative to some people who are transportation disadvantaged.
- Modal Connectivity
  - Connects to VA Clinic, a major regional destination for North Florida veterans and dependents.
  - Connects UF Health, a level-I trauma facility.
- Cost
  - Requires ITS and roadway improvements.
  - Capital cost estimated at $18.6 - $86 million.

West (Riverside) Corridor

- Infrastructure & Safety
  - Corridor faces engineering constraints crossing I-95 and along Riverside Avenue and Park Street.
  - Overall safety will improve for transit users.
- Operations
  - Five Points (Riverside Park) segment challenged by limited number of lanes and multiple stops.
  - Traffic along Riverside Avenue and Park Street may impact trip reliability.
  - Loop option reduces route segment and travel time as well as number of vehicles.
- Potential Ridership
  - Riverside Park and Brooklyn stations attract most of the trips.
  - Connects *lower density* Riverside neighborhood with Downtown.
- Economic Development
  - Transit-supportive environment along Riverside Avenue.
  - Major financial tech employment center in Brooklyn.
- Modal Connectivity
  - Connects the Historic Five Points and the Jacksonville Riverwalk.

- Cost
  - Requires ITS and roadway improvements.
  - Capital cost estimated at $20.1 - $75.1 million.

South (Medical Complex) Corridor

- Infrastructure & Safety
  - Corridor faces engineering constraints crossing I-95 and Acosta Expressway.
  - Overall safety will improve for transit users.
- Operations
  - At-grade connection may decrease reliability.
- Potential Ridership
  - Model identified limited ridership, in particular at-grade.
- Economic Development
  - Supports downtown medical employment.
  - Potential alternative to some people who are transportation disadvantaged.
- Modal Connectivity
  - Expands service to nearby medical complex.
- Cost
  - May require elevated bridge over interstate.
  - Capital cost estimated at $9.6 - $31.4 million.

Southeast (San Marco East/The District) Corridor

- Infrastructure & Safety
  - Corridor faces engineering constraints crossing I-95 and CD roads.
  - May require new roadway.
  - Overall safety will improve for transit users.
- Operations
  - Direct connection to future commuter rail station.
  - Direct connection to The District master plan.
- Potential Ridership
  - Model identified limited ridership.
- Economic Development
  - Supports Southbank redevelopment.
- Modal Connectivity
  - Direct connection to commuter rail east of the St. Johns River.
- Cost
  - Capital cost estimated at $44.1 - $85.8 million.

East Corridor (Bay Street Innovation Corridor)

- Infrastructure & Safety
  - Transit component of the Bay Street Innovation Corridor.
  - Limited right of way for corridor improvements/modifications.
  - Overall safety will improve for transit users.

- Operations
  - Traffic along Main Street ramps and Bay Street may impact trip reliability.
- Potential Ridership
  - Sports Complex/Shipyards redevelopment and Downtown Jacksonville/The Elbow are major trip generators.
  - Special events may require unique travel schedule.
- Economic Development
  - Supports downtown employment and residential goals.
- Modal Connectivity
  - Connects to special event generators within the Sports/Entertainment District.
  - Can serve as downtown circulator, connecting parking facilities along Bay Street.
  - Connects Downtown Urban Core with Sports/Entertainment/District.
- Cost
  - Requires ITS and roadway improvements.
  - Capital cost estimated at $17.4 - $91.1 million.

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Table 5.8.2: Corridor Evaluation Summary

Categories		North (UF Health)	West (Riverside)	South (Medical Complex)	Southeast (San Marco East)	East (Sports Complex)
Infrastructure & Safety	**Infrastructure**	Transition and travel lanes along 8th St	Crossing I-95 and limited lanes on Park St	Crossing I-95 and Acosta Expressway	Crossing I-95 and CD roads and may require a new roadway	Limited right of way
	Safety	Avoid traffic conflicts at State and Union Streets	Reduce passenger and traffic conflicts	Avoid conflict with trains; improves access to medical centers	Avoid conflict with trains	Reduce walking distance and passenger/traffic conflicts
Operations		Competitive travel times due to direct route & limited stops	Traffic along Riverside Ave and Park St may impact reliability	At-grade connection may decrease reliability	Direct connection to future commuter rail station	Traffic may impact reliability and special events may require a unique schedule
Ridership	**Attractions**	UF Health and VA Clinic	5 Points and Brooklyn Station	Medical Offices	Limited	Sports Complex, Shipyards, The Elbow & downtown
	Potential Ridership	3,171 / 7,798	82 / 290	165 / 237	32 / 139	2,106 / 2,679
Economic Development	**TOD**	Rosa Parks Station	JRTC at LaVilla	Medical Complex	San Marco East Kings Ave Garage	Various Proposed Developments
	Number of Workers	Supports Springfield businesses and medical centers 16,942 workers	Supports Brooklyn redevelopment and businesses in corridor 22,857 workers	Supports medical employment and patients 15,598 workers	Supports Southbank redevelopment and The District master plan 9,592 workers	Supports downtown employment & residential goals 39,246 workers
Modal Connectivity	**Local**	Connects medical center employees and patients to services and residents to employment	Connects Riverside, Brooklyn and Downtown to employment and entertainment options	Connects employees with restaurant options	Connects residents to multi-modal options, employment and entertainment	Connects urban core with Sports/Entertainment District
	Regional	Provides regional access to VA Clinic and UF Health	Provides regional access to 5 Points and Cummer Museum	Improves access to medical complex and MOSH	Provides a direct connection to commuter rail	Provides access to special events
	Annual Boardings	>2.2 M	> 1.5 M	>0.7 M	>0.5 M	>0.2 M
Community Feedback	**Stop Pin Clusters**	UF Health, FSCJ Downtown and along Main Street	Along Riverside Ave and 5 Points area	Near MOSH, Baptist Medical Center, and along San Marco Blvd	Along river (including The District) and Hendricks Ave	Major sports venues, along Bay St. and Hemming Plaza
	Comment Summary	▪ Many students do not own a car ▪ Employee parking issues at UF Health ▪ Some patients travel between UF Health and Baptist ▪ End in Durkeeville or Moncrief ▪ Norwood	▪ Less parking concerns, less drinking and driving ▪ Connect Skyway to retail so workers have dining options ▪ Make Riverside a more livable community ▪ King & College Street, St Vincent's & Avondale	▪ FREE or VERY low-cost parking as well as easy and well-identified access to MOSH and Riverwalk ▪ Easy access to hospital and Restaurants ▪ Ease of use for patients ▪ Go to San Marco Square	▪ An alternative is the private Beach Buggy service ▪ Connect to St Nicholas ▪ Continue down San Jose ▪ Expand further east and south to Philips and Emerson	▪Should be transit directly to and from the [TIAA] field from Riverside, Springfield, San Marco and Downtown ▪ Enjoy museum but hate finding parking ▪ Hyatt connection is critical
Order of Magnitude Capital Cost (in millions)		$18.6 to $86	$20.1 to $75.1	$9.6 to $31.4	$44.1 to $85.8	$17.4 to $91.1

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6 Public Involvement

The public engagement activities for the Skyway System Expansion Study were guided by the *Public Involvement Plan (PIP)* developed at the commencement of the study as a continuation of the community outreach efforts that have taken place since the launch of the Skyway Technology Studies in 2014. The PIP is a living document outlining outreach and communication objectives and corresponding public and stakeholder engagement activities to meet the needs of this specific project.

The initial PIP, prepared in accordance with FDOT guidelines, defines the overall public involvement and outreach strategies to ensure consistent, frequent communications with the public and agency stakeholders. The PIP identifies team member roles and responsibilities; communication and outreach techniques; as well as overall plan for documenting public comments, questions and concerns. The PIP, included in the appendices of this report, reflects the outreach and communication tools determined to be beneficial for this specific project. Additionally, a subset of the overall PIP – the *Skyway System Expansion (TCAR 2) Outreach Plan* – was updated more frequently to identify and share ongoing public engagement activities with the JTA leadership and Project Team.

6.1 Public Involvement Overview and Objectives

The Skyway System Expansion Study is a unique transportation project. In addition to sharing information about the physical requirements and mobility benefits of the Skyway system expansion, this project presents an opportunity to educate the community about the emergence of autonomous vehicles in the public transportation network. For this reason, a variety of communication tools and techniques have been considered for the project outreach. Hands on opportunities and visual aides are critical to sharing this importance and value of the new technologies in the transportation industry.

Understanding the multiple audiences was an initial step to identifying the communication tools and techniques that best serve the specific project. For the Skyway System Expansion Study, the outreach activities targeted customers, downtown businesses and residents, government agencies and elected officials as depicted in *Figure 6.1.1: Targeted Audiences*.



Photo at Riverside Arts Market, October 2019

Figure 6.1.1: Targeted Audience



6.1.1 Team Roles and Responsibilities

In order to manage and facilitate the multiple outreach activities, the Project Team divided the activities between various team members to allow each team to focus on one area and support others. These teams are illustrated in *Figure 6.1.2: Team Roles.* Periodic outreach team calls were held to communicate results of outreach activities as well as to discuss additional strategies to enhance or modify project messages, collateral or graphics.

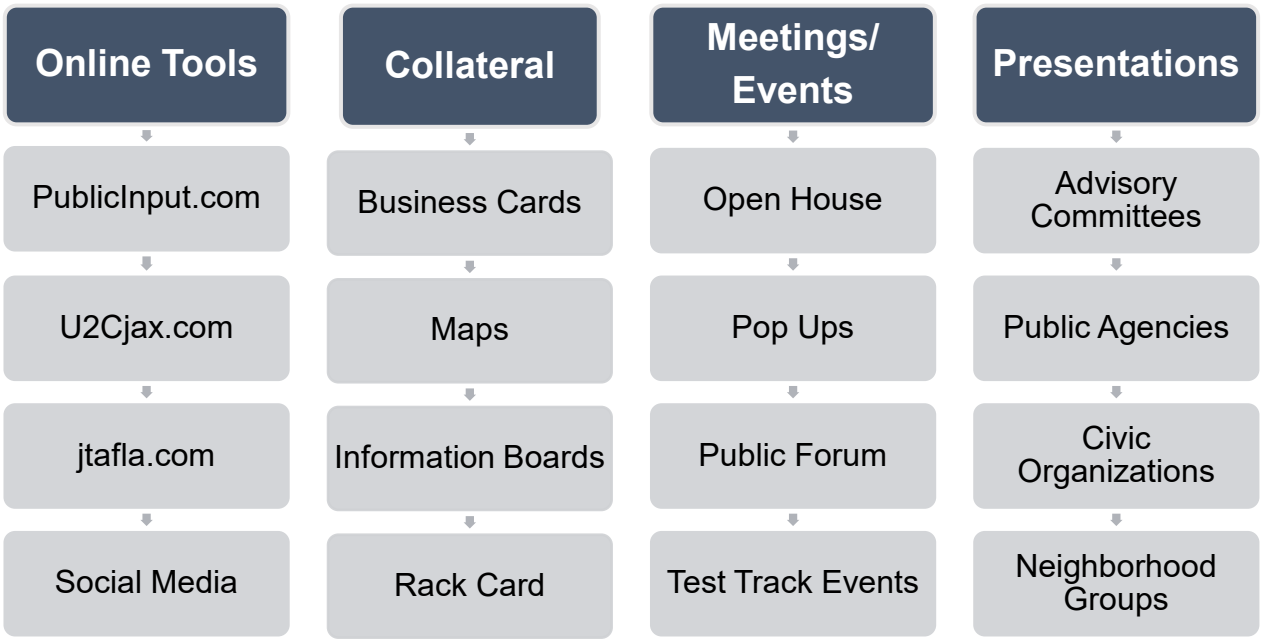
Figure 6.1.2: Team Roles



6.2 Outreach Plan and Activities

Ongoing public outreach to gather feedback and communication about project benefits and potential impacts are essential to a successful project outcome. As illustrated in *Figure 6.2.1: Tools and Techniques*, a wide range of tools and techniques were utilized to communicate with the variety of audiences.

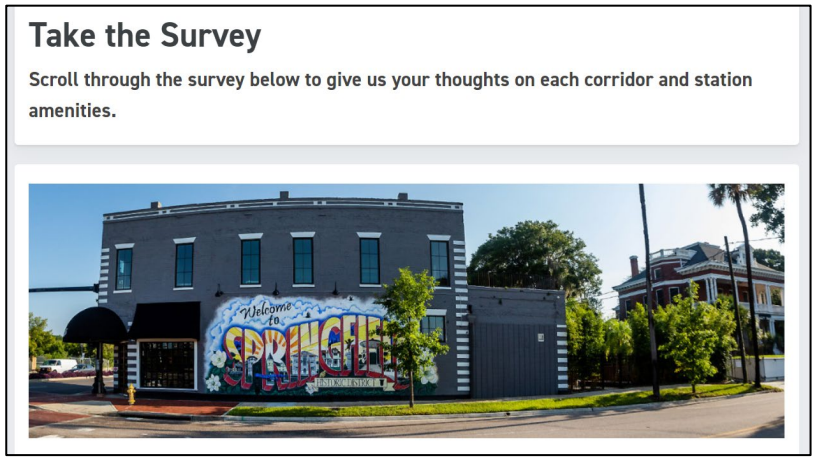
Figure 6.2.1: Tools and Techniques



6.2.1 Online Survey

New to the communication tools for Skyway project outreach, is the use of an online public engagement tool offered through a third-party company, PublicInput.com. The survey tool was developed on the publicinput.com platform to achieve the following objectives:

1) Gain public input on desired station locations within each corridor.
2) Learn the significance of each corridor to respondents.
3) Understand the importance of various station amenities.
4) Obtain input on other amenities desired.



Interactive tools bring together virtual and traditional channels to enhance public participation.

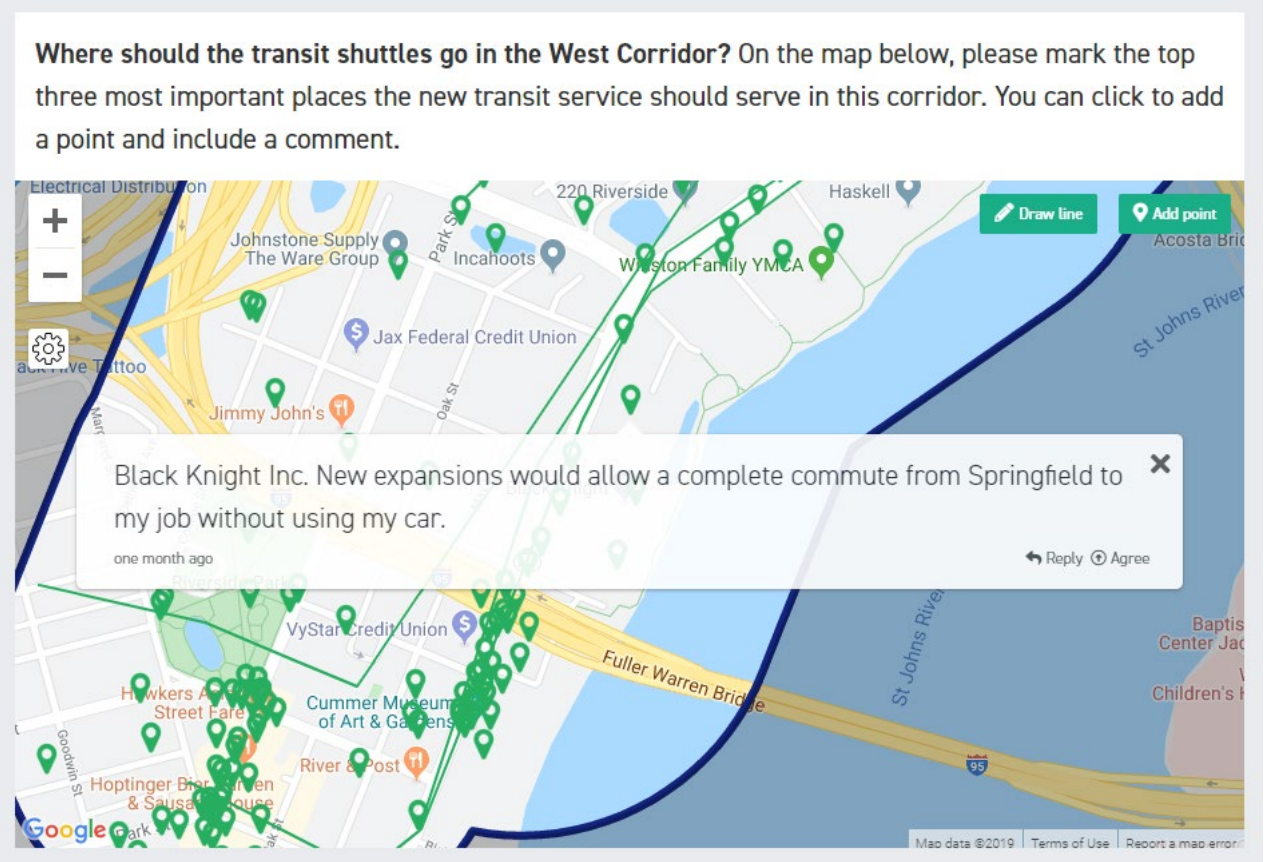
The Project Team utilized prior surveys and other online surveys as an example; then developed draft survey questions. The Project Team collaborated with JTA's Public Affairs team to gather feedback and adjustments to the survey questions.

The survey format included an overview video describing the Skyway System Expansion project and overall map of the five corridors. Each corridor was addressed via a map pinning process where respondents were asked to mark the three most important locations within that corridor. Respondents could add comments to their pins, as well as, respond to comments posted by others. An example is shown in *Figure 6.2.2: Example of a comment attached to a map pin*.

Optional demographic information was requested to aid in planning outreach and respondents could also provide their email addresses for future project updates. The online survey was designed to be responsive on all devices - desktop, tablet and mobile, and is translated in over 100 languages via Google Translate.

The survey went live on August 15, 2019 using the link www/.jtafla.com/skywaysurvey. A copy of the survey is included in the appendices.

Figure 6.2.2: Example of a comment attached to a map pin



The survey encourages respondents to identify important places on a map, attach comments to those locations and upvote and respond to comments posted by other people.

6.2.2 Surveying Procedures

The survey could be taken on any device including cellphone, iPad or computer. However, it can be taken only once per IP address. Project Team iPads were installed with a special kiosk link that allowed unlimited surveys to be completed on the device. These iPads were used at community events where members of the public were able to complete the survey (with the assistance of Project Team members as necessary) using the iPad. English and Spanish paper versions of the survey were also distributed at outreach events to meet the needs of those without phones or comfort with technology. Paper survey responses were later transcribed into the web-based survey platform and are included in the results.

Members of the public who were not able to complete the survey during the events, were encouraged to complete the survey on their own phone or on the computer later. The Project Team also developed social media tools and various collateral to drive people to the take the survey. JTA Facebook and website postings were sent by the JTA Project Manager and coordinated with the JTA leadership and Public Affairs team.

The tabulation of survey data and results is contained in the appendices of this report and is summarized later in this section.

6.2.3 Collateral Materials

As part of the communications tools, a variety of project collateral have been developed. These materials provide additional information on project development, project benefits and provide instruction for contacting project personnel for additional questions. These items are outlined in *Table 6.2.1: Collateral Materials*.

One of the most useful collateral materials developed for this project was the survey business card reminder (see Figure 6.2.3: Survey Business Card Reminder) which was distributed during all presentations and events to help remind people to take the survey and where they can find more information about the project.

Figure 6.2.3: Survey Business Card Reminder



Table 6.2.1: Collateral Materials

Items	Purpose/Project Use
Business Card	All events – has link to survey and project websites
Informational Boards	List survey methods and illustrate proposed corridors
Presentation	Demonstrate project to large audiences in a single setting
Email Blast	Notification and awareness of events and survey
Tri-Fold Brochure	Handout, sized for placement on transit vehicles
Social Media	Inform public about events, encourage survey participation and document event success
Project Website	Maintain project information for public access
Frequently Asked Questions	Internal document to capture frequent questions by the public and team members
Partner Websites	Coordination with partner agencies and neighborhoods

6.2.4 Event Participation and Presentations

As with all transportation improvement projects, it is beneficial to conduct a variety of outreach events to reach as many people as possible. Unique and important to this project is the socialization of the autonomous transportation concept. An autonomous transportation network is an innovative and even considered a groundbreaking strategy to enhance mobility. Therefore, introducing autonomous vehicles and new technologies is a key component in presentation materials and communication during outreach events.



Skyway Saturday's community outreach at the Hispanic Heritage Celebration in Hemming Park.

JTA staff and the Project Team participated in a variety of community events, conducted pop-up informational tables, presented to various organizations and arranged Test Track Tours.

The Project Team worked with JTA's Automation team to include the Autonomous Vehicle (AV) static display, which consisted of the current test vehicle and corresponding JTA Automation Team staff, when feasible for events or presentations.

Community Events

A list of community events was developed from agency websites and community calendars in order to determine opportunities to participate in an event or have a display of project materials. The Project Team used these opportunities to share information about the plans for the Skyway conversion and expansion and ultimately seeking feedback on how this transportation improvement is viewed by the public.

Table 6.2.2: Community Events lists the community events the team participated in through December 2019. These events included Skyway Saturdays, Friday in the Park, Springfield Porchfest, Riverside Arts Market and First Wednesday Art Walk.



Riverside Arts Market, October 2019

Table 6.2.2: Community Events

Date	Name of Event	Timeframe or Status	Outreach Materials
8/24/19	Skyway Saturday	Event 11 am – 5 pm Survey 11 am - 2 pm	iPads with survey Static display of AV Boards and business cards
9/21/19	Skyway Saturday	Event 12 pm – 10 pm Survey 11 am - 2 pm	iPads with survey Static Display of AV Boards and business cards
10/26/19	Riverside Arts Market	Event and Survey 10 am – 5 pm	iPads with survey Static Display of AV Boards, maps and business cards
11/9/19	Springfield Porchfest	Event and Survey 12 pm – 7pm	iPads with survey Static Display of AV Boards, maps and business cards
11/22/19	Fridays in the Park	Event and Survey 11 am – 2 pm	iPads with survey Static Display of AV Boards, maps and business cards
12/4/19	Art Walk	Event and Survey 5 pm – 9 pm	iPads with survey Static Display of AV Boards, maps and business cards

Presentations

Typically led by the JTA Project Manager, and supported by Project Team members, the presentations (listed in *Table 6.2.3)*, were provided for various agencies and organizations. These presentations included downtown stakeholder groups, neighborhood organizations, and transportation advisory committees including the North Florida TPO committees.



Downtown Vision Quarterly Stakeholders meeting, August 2019

Table 6.2.3: Presentations

Date	Group and Location	Estimated Attendees	Outreach Materials
8/12/19	Jacksonville Transportation Advisory Committee at JTA Myrtle Campus	20	Presentation and business cards
8/13/19	Downtown Vision Quarterly Stakeholders Meeting at the Ed Ball Building	25	Presentation and business cards
9/25/19	San Marco Preservation Society - One on One meeting with the Board President	1	Reviewed maps
10/7/19	Urban Core Citizen Planning Advisory Committee	20	Presentation and business cards
10/17/19	Riverside Avondale Preservation Transportation Committee	6	Reviewed maps
11/6/19	North Florida TPO Technical Advisory Committee	20	Presentation and business cards
11/6/19	North Florida TPO Citizen Advisory Committee	20	Presentation and business cards
11/19/19	Springfield Preservation and Revitalization Council Quarterly Meeting	30	Presentation and business cards

Pop-Up Open House Informational Displays

The Project Team developed a list of potential locations for Community Pop-Up Open Houses to be held along each expansion corridor. The Pop-Up Open Houses are scheduled in advance, but are more casual in nature, typically held in community or multi-purpose rooms and involve setting up project maps and engaging passersby to participate in the survey. These events, which included setting up display/information tables at UF Health Shands Hospital, Riverside YMCA, and Taco Tuesday at LaNapolera, are listed in *Table 6.2.4: Pop-Ups/Open Houses*.

Table 6.2.4: Pop-Ups/Open Houses

Date	Study Area	Location	Format/Materials
10/14/19	West Corridor	Riverside YMCA 9 am – 1pm; 4 – 7 pm	Display table in community gathering area; maps, survey; presentation on monitor
10/23/19	Southeast Corridor	LaNapolera Taco Tuesday 4:30 pm – 7 pm	Display table in community gathering area; maps, survey
11/12/19	North Corridor	UF Health Shands Hospital 10 am – 2 pm	Display table in café area; maps, survey
02/12/20	Entire Study Area	MOCA 12 pm – 6 pm	Open House (Corridor stations, etc.)



UF Health Shands Hospital Pop Up, November 2019

Test Track Tours

The JTA's Test & Learn Facility located within the limits of downtown is a unique opportunity to provide firsthand information pertaining to the operation and function of the proposed autonomous shuttles JTA is considering for this project.

The Test Track Tours are also an opportunity for multiple audience engagement – professional groups, senior citizen groups, persons with disabilities and school age children who may not be interested in a presentation. On October 2, students from Andrew Jackson High School held a school field trip at the JTA Test Track.



Test Track Tour – Andrew Jackson High School, October 2019



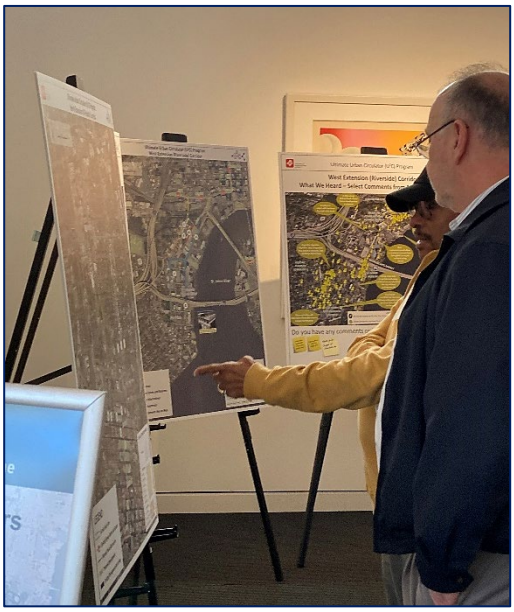
Public Open House

An Open House was held at the Museum of Contemporary Arts (MOCA) on Thursday, February 27, 2020 to afford the general public the opportunity to review project materials and speak with Project Team members. MOCA is located adjacent to Hemming Park conveniently located near City of Jacksonville government offices and easily accessible by the Skyway and local bus services. The weather was a little cool (high of 61 degrees) and windy with gusts of up to 12 miles per hour.

Sixteen people signed the Sign In sheets. Five attendees stated that they learned about the meeting through email, Facebook or other electronic methods. Another five people learned about the event as they walked by the building or came to the museum. There were several more people who viewed the posters and asked questions, however, did not sign the Sign In sheets. These individuals either worked, volunteered or visited the museum during the event.

The Open House included:

- ***Welcome/Sign in Area*** – attendees gave their names and were provided a project brochure.
- ***Presentation Area*** – a narrated, continuous looping video with highlights of the project purpose, need and components were presented.
- ***Corridor Map Displays*** – a map of each potential expansion corridor and an informational board for each corridor highlighting a summary of the online comments were displayed.
- ***Comment/Survey Area*** – an opportunity to provide written comments or take the online survey was made available.



Open House at MOCA, Map Displays, February 27, 2020

Some participants took the opportunity to leave additional comments during the event. Comment cards, an online survey, and a comment board (providing comments or ideas on post it notes), were available. Two comments were received on comment cards and two comments were left on the posters stating:

1. *Thank you for displaying this & hearing from community. Important to be on display – more to come via email on feedback*



Open House at MOCA, February 27, 2020

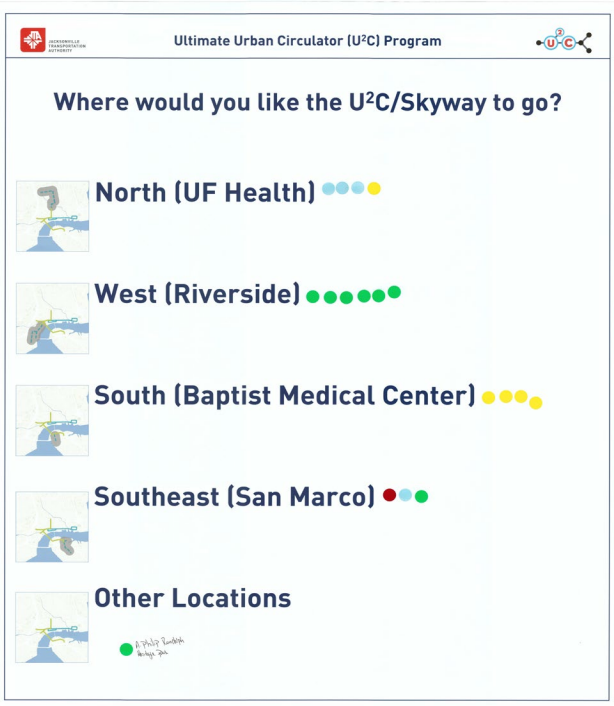
2. *Grateful for the improvements. Would like to see transportation go into Eastside; A. Philip Randolph H Park, 2 more into Historic San Marco Square.*
3. *Extend into Eastside A. Philip Randolph Heritage Park (comment on overall map poster)*
4. *Please go to Shoppes of Avondale too (comment on Riverside Comments poster)*

These comments have been added to the public comment tracking documentation developed throughout the project for all outreach events.

The Open House participants were also asked to place a dot on a board, by the locations that they would like the U²C/Skyway to go. The results were as follows:

- North (UF Health) – 4 dots
- West (Riverside) – 6 dots
- South (Medical Complex) – 4 dots
- Southeast (San Marco) – 3 dots
- Other locations – 1 dot with a notation of A. Philip Randolph Heritage Park

This feedback from the community at the Open House and through the various outreach activities, is important to the continued evaluation and prioritization of projects, and the overall decision-making process for the system expansion. An additional summary of the detailed online survey comments is included in the next section.



Open House Comment/Location Board
February 27, 2020



Open House Map Display area at MOCA,
February 27, 2020

6.3 Comments and Outreach Results

This section of the report highlights the results of the outreach efforts and summarizes the public input and comments, primarily received through the online survey. Public input is an important factor included the evaluation of route alternatives. Tabulating the results of the outreach efforts is important to understand public opinions, identify additional information that may be helpful to the stakeholders and assist in the evaluation of the project alternatives. Interim results of the outreach efforts are summarized and organized by general comments and by corridor to utilize in the initial evaluation of alternatives. Outreach activities continued throughout the life of the project in order to provide continuous learning and coordination. A copy of Survey Summary Report is included in the appendices.

The Skyway System Expansion Survey was available for responses between August 13, 2019 and March 8, 2020. Over 700 people completed the survey, providing 7,281 responses and posting 1,113 comments. These participants identified:

- Points in each corridor that they felt the Skyway extension should reach and attached comments to those points which other participants may “agree” to.
- Reason each corridor is important to them:
    - I’m interested in downtown transit and redevelopment.
    - I come here for shopping, dining or entertainment.
    - I live here.
    - I come here for services such as healthcare.
    - I work here.
    - I own a business here.
    - Other
- Station amenities and their level of importance.

Some participants took the opportunity to respond to the open-ended question of “What other station amenities are important to you?” with comments concerning the overall expansion. A detailed report of the survey results can be found in the appendices. Summarized results of the survey and outreach data collection follows by corridor.

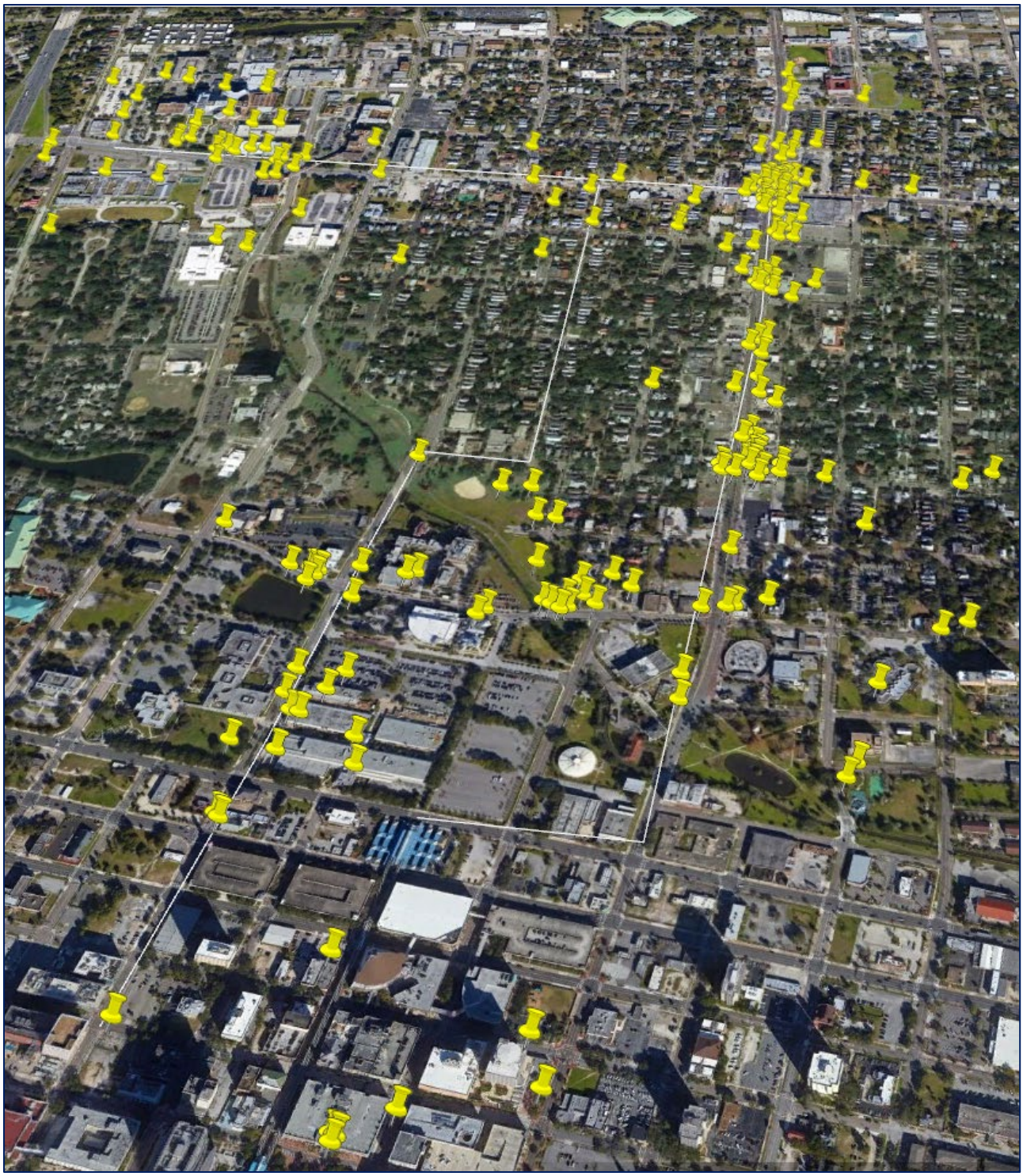
6.3.1 North Extension (UF Health) Corridor

Survey participants identified a good mix of potential stop locations throughout the North Extension (UF Health) Corridor. The points included FSCJ Downtown Campus, businesses along Main and 8th Streets, UF Health Shands Hospital and the VA Clinic. Local churches and parks were also identified.

Two participants drew proposed routes through the North Extension (UF Health) Corridor. One route traveled north along Pearl Street, east on 3rd Street, north on Silver Street to 8th Street. The second route extended east from the Rosa Parks Transit Station, north at Main Street to west on 8th Street.

Figure 6.3.1: North Extension Corridor Survey Map Results illustrates these routes and points identified by the survey participants.

Figure 6.3.1: North Extension Corridor Survey Map Results



Some of the select comments collected from the survey and outreach efforts within the North Extension (UF Health) Corridor include:

- An extension to the FSCJ campus would have a huge impact on the students, many of whom do not own a car
- Jacksonville is home to multiple college institutions and over 400 parks and recreational areas. These hot spots should be priority. Student access to transportation and city parks should be included as top priority of the shuttle system.
- The closer to Springfield's entertainment district the better!
- I would like to get to Klutho park and the trails. Crossing FSCJ parking lot is not too appealing.
- If the lines expand to the stadium, Riverside, and deeper into San Marco that would be amazing for downtown nightlife.
- Transit shuttles should connect main thoroughfares throughout Springfield to other transit hubs to navigate the urban core and connect the Northbank to the Southbank.
- Visit the elderly as well as an opportunity for the elderly to move around downtown (point at Mary Singleton Senior Center).
- This would be great to get access to the church which hosts several events in the neighborhood (point at Bethel Baptist Church).
- Many employees do not leave campus for lunch as they may not have a good parking spot when the return (comment received during UF Health Shands Hospital event).
- Patients are sometimes referred to and must travel between UF Health and Baptist Medical Center and occasionally do not have the means to do so (comment received during UF Health Shands Hospital event).

6.3.2 West Extension (Riverside) Corridor

While the West Extension (Riverside) Corridor section was located near the end of the online survey, the participants provided some colorful comments and identified a variety of potential stop locations. These locations, illustrated in *Figure 6.3.2: West Extension Corridor Survey Map Results*, are concentrated along Riverside Avenue and within the 5-Points area.

Figure 6.3.2: West Extension Corridor Survey Map Results



Some of the select comments collected from the survey and outreach efforts within the West Extension (Riverside) Corridor include:

- I'd love to be able to go from antiquing in 5 points to a museum in the city without moving my car.
- Nightlife, Nightlife, Nightlife…less congestion, less parking concerns, less drinking and driving.
- Connect skyway to retail so downtown workers have dining options.
- New expansions would allow a complete commute from Springfield to my job without using my car.
- Close to Publix will help make Riverside a more livable community.
- Lots of people living in this area now, also benefits the convention center for people coming from riverside.

- Five points is the social hub of Tax.
- Brooklyn is salted with business & people who work.
- Loop should include a stop close to Publix the only grocery store in this area.
- New Station should be built here to accommodate future development at TU site.
- Five Points is a MUST for this area. Will help with parking/traffic, increase more clientele to the area.
- Good area for five points, it's tricky to add transportation in such a historic area though.

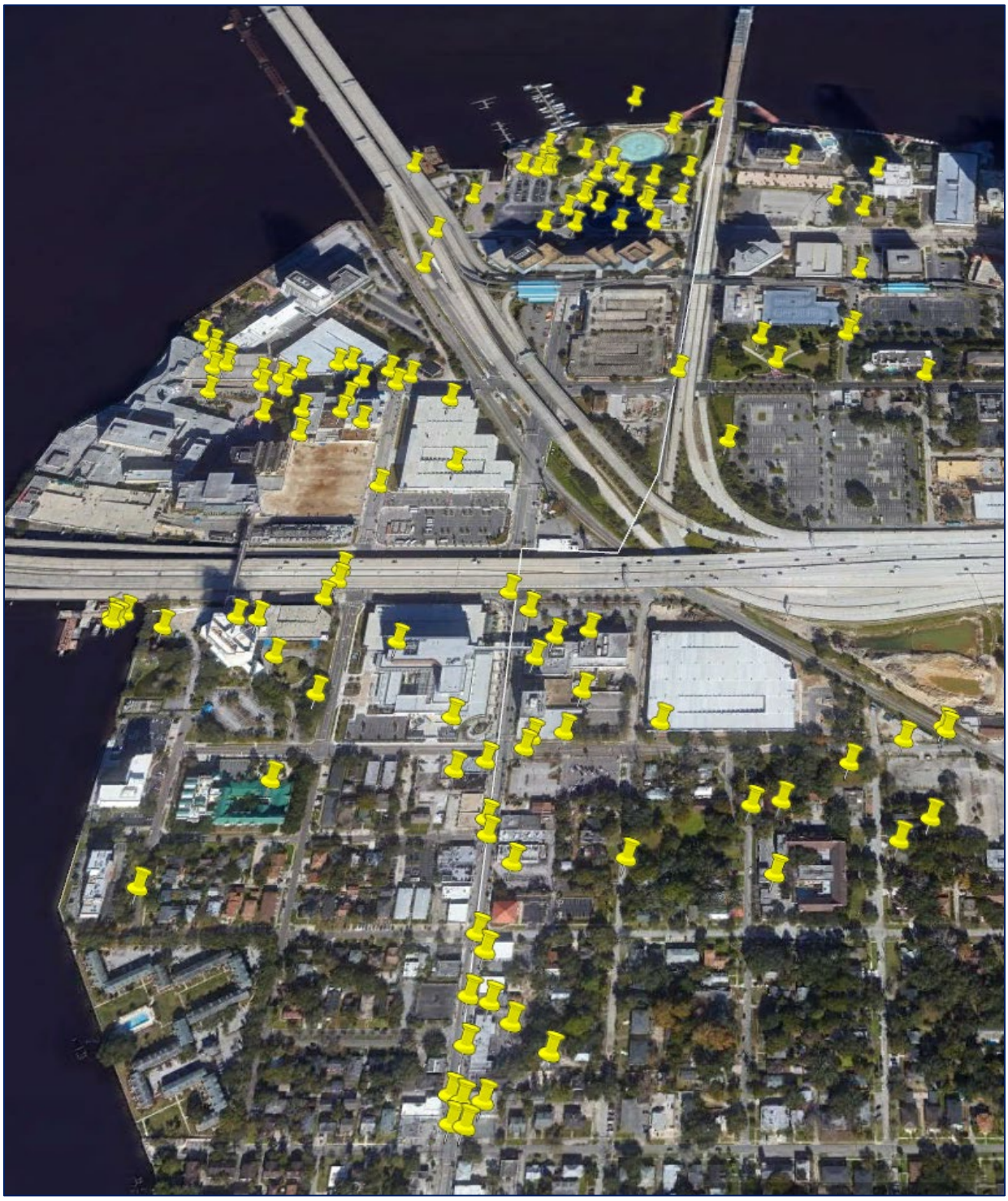
6.3.3 South Extension (Medical Complex) Corridor

The locations identified by the survey participants clustered primarily at the riverfront near the Museum of Science and History and the medical facilities. These facilities include the Baptist Medical Center, Wolfson Children's Hospital, MD Anderson Cancer Center and Nemours Children's Hospital. These points are illustrated in *Figure 6.3.3: South Extension Corridor Survey Map Results*.

Some of the select comments collected from the survey and outreach efforts within the South Extension (Medical Complex) Corridor include:

- Ease of use for patients.
- Parking for the hospital is always a pain.
- I want to visit the museums but don't want to deal with the traffic and confusing routes.
- Good secure parking is vital to people visiting downtown.
- FREE or VERY low-cost parking as well as easy and well-identified access to MOSH and the Riverwalk.
- Close to the high-rise buildings.
- Easy access to hospital; Restaurants.
- Southbank Riverwalk.
- Extend even farther, if possible, to the center of the shoppes where the parking problem is and where the playgrounds and the library are.

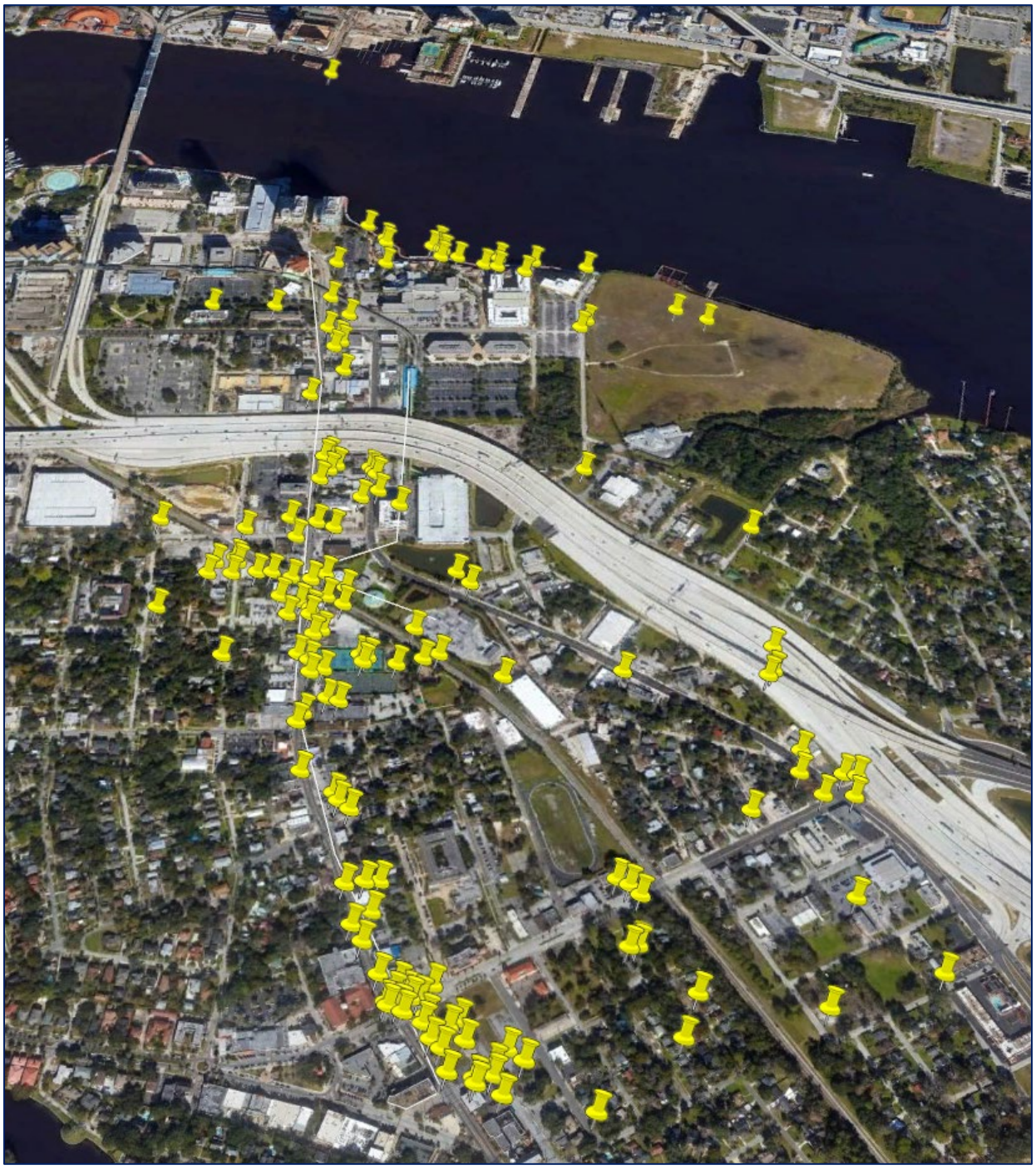
Figure 6.3.3: South Extension Corridor Survey Map Results



6.3.4 Southeast Extension (San Marco) Corridor

Survey participants identified current, emerging and planned activity centers in the Southeast Extension (San Marco) Corridor. The planned activity centers included The District, a “housing complex” off Philips Highway and the San Marco East shopping center. The points were clustered along the river and Hendricks Avenue as illustrated in *Figure 6.3.4: Southeast Extension Corridor Survey Map Results*.

Figure 6.3.4: Southeast Extension Corridor Survey Map Results



Some of the select comments collected from the survey and outreach efforts within the Southeast Extension (San Marco) Corridor include:

- I like the idea of the shuttles going down Hendricks Avenue, but wouldn't they be on a track that would graduate to street grade from existing stations?
- Must reach San Marco Library, Hampton Inn, and Landon Middle School.
- Nira/Hendricks is good intersection for hotels, businesses and dining.
- We must have a growing interest in Park recreation activities.
- That is the idea. An alternative to U2C operations on street level is the Beach Buggy rideshare app, already currently in use! It is free for users and will take you most anywhere you need to go within San Marco. (It's like Uber but with small, local, really nice golf carts!) A quick ride across the river on the U2C could deposit you in north San Marco, and a free Beach Buggy ride could take you to all other locations you wish to visit!
- San Marco is fortunate enough to now host the Beach Buggy rideshare app! It is free for users and will take you most anywhere you need to go within San Marco. (It's like Uber but with small, local, really nice golf carts!) A quick ride across the river on the U2C could deposit you in north San Marco, and a free Beach Buggy ride could take you to all other locations you wish to visit!
- Close to the San Marco shopping/entertainment area will allow access for many residents in this area to go to the other areas served by the Skyway/U2C.

6.3.5 Bay Street Innovation Corridor

Survey participants identified potential stop locations from the Downtown core and throughout the Bay Street Innovation Corridor area. These locations included TIAA Bank Field, Baseball Grounds of Jacksonville, VyStar Veterans Memorial Arena, Metropolitan Park, Hyatt Regency, the Landing, Duval County Courthouse, Times Union Center for the Performing Arts, Florida Theatre and many restaurants and office buildings. These locations are illustrated in *Figure 6.3.5: Bay Street Innovation Corridor Survey Map Results*.

A few route segments were drawn within the survey application. The comments attached to the route segments include:

- Circular route that services all of the east DT [Downtown] area.
- We need something that will take us through the places with most activity. Places like bars and pubs are places people can use public transportation instead of driving to reduce drunk drivers.

Figure 6.3.5: Bay Street Innovation Corridor Survey Map Results



Some of the select comments collected from the survey and outreach efforts within the East Extension (Sports Complex) Corridor include:

- I enjoy the museum but hate finding parking (point at the Museum of Contemporary Art).
- Games wo [without] having to park and relieve traffic.
- Many people need access to the Duval County Courthouse for a variety of basic public needs.
- The former landing site should definitely be a stop, regardless of which type of future development is selected.
- Hyatt connection is critical for tourist and locals attending conferences, etc.
- Should be transit directly to and from the field from Riverside, Springfield, San Marco, and Downtown.
- The arena is a must, and it would be important to include separate stops for the arena and TIAA Field/Daily's Place. This is too far of a walk for many older people, so they would end up driving.
- Need to get close to WJCT building – lots of public events there.
- I live in the Plaza and do many activities in this area.

6.3.6 Comments Outside of the Corridors

Survey participants took the opportunity within the map comments and in the final open-ended question to suggest expansion of the Skyway (or U²C System) to areas outside of the corridors. Many of the suggestions outside of the corridor were located in the Southeast Extension (San Marco) Corridor and the South Extension (Medical Complex) Corridor maps with recommendations to extend the corridors to San Marco Square.

Some of the suggestions outside of the corridors include:

- Airport.
- Durkeeville or Moncrief.
- Connect to St Nicholas neighborhood.
- Expand service to Eastside in future.
- Should continue down San Jose!
- Close to shops in Avondale, banking, and other businesses.
- Further south & west. We need to connect greater Jacksonville!!
- All the way to Orange Park / I-295 intersection.
- I think you're missing out on potential riders. The oval needs to go further east to move people from the new developments on Philips to the hospital, nightlife, etc. Why can't it continue from the Kings Ave. Station, South to say, Emerson? If people are considering buying/renting in these areas, wouldn't having a station close to them be an added reason to move there? They would be so close to the core, yet still have to get in the car and drive.
- Needs to go more into the heart of San Marco – no one is going to walk under the highway and those busy intersections to get to the restaurants and recreation.
- I would pay good money for a commuter train from the suburbs, i.e. Orange Park, Mandarin, St johns, etc. to downtown. Something with a few main stops but can bypass the traffic.
- You really need service the Durkeeville area not all the residents here are aware of this survey and don't have access to the internet like the people in Springfield, San Marco and Riverside they are all well connected. Majority of the people on a daily basis in my neighborhood take public transit and this would help us a great deal to have the pods come into our area. Springfield Riverside and San Marco, it's a novelty to them it's a necessity to us.
- Why not extend it to at least St Vincent's and on to Avondale?
- The skyway/cars must go to places where people live. It must get into Five Points and further into Riverside and Avondale, Springfield, into San Marco. Otherwise, the system is useless. If you really want a robust system, it should also extend to the beach and Mandarin. Keep it simple.

- Add the Beaches to your area of service.
- More stations including King Street and College Street.
- Norwood.
- It'd be nice to actually have it come down where most of your customers live. I understand San Marco, Springfield & Riverside have more money and influence, but your core riders are coming from places like Durkeeville.
- The Skyway system should be expanded into a complete light rail system reaching north to the airport and south to UNF, Mandarin, and Orange Park. The elevated line downtown is a great start and could become something even better with the right support.
- If can extend to Park and King and Avondale Shoppes then at least add dedicated bike lanes from those areas to U²C - I'd think there is plenty of room on several streets if restricted parking to just one side of street then could have one bike lane on 2 parallel streets like maybe Oak and Herschel or St. John's and Riverside.
- Continue with a stop to the retail strip on Stockton, Park and King and Avondale! I live in Avondale and want to be able to hop all around the neighborhoods and connect with downtown and the other neighborhoods.
- The Jacksonville Traction Company ran the streetcars. One major line went right up Myrtle Avenue. Businesses owned by African Americans sprang up, servicing those whose business was strictly limited in the big stores downtown. This is a little history of Jacksonville's past streetcars that serviced Durkeeville from the Durkeeville historical society. Let's run a line down Myrtle Street than East on West 8th Street back to Springfield. these are underserved communities that need attention not just the people with money and influence in Historic Springfield.

6.3.7 Station Amenities Comments

The survey participants were also asked to rate the level of importance of station amenities as listed in *Table 6.3.1: Station Amenity Survey Results*.

Table 6.3.1: Station Amenity Survey Results

Amenity	Not important	Somewhat important	Moderately important	Important	Very important
Interactive information kiosks	7%	20%	16%	28%	29%
Shelters	3%	4%	13%	27%	52%
Wi-Fi	16%	16%	15%	22%	32%
Bicycle storage	11%	11%	16%	30%	33%

Survey participants were given the opportunity to provide comments in response to the open-ended question, “What other station amenities are important to you?”. More than 250 comments were received in response to this question.

The responses were categorized and calculated as shown below with select comments:

- Safe, Secure and Clean 29% (72 mentions)
    - Emergency stations in case someone is in need of medical or police assistance.
    - Police presence to prevent crime and loitering at the stations. No one will use the station if it is occupied by homeless or puts them at risk for theft or assault.
    - Cameras, security guard, trash cans, change machine if expecting cash, well lit.
    - The stations must be safe, clean, well-lit and family friendly.
    - The Skyway/U2C should be elevated. There have been many accidents involving pedestrians and bicyclists with buses, but none with Skyway. We need safe streets!
- Displays and Technology 20% (51 mentions with 18 related to charging stations)
    - Phone Charging Stations.
    - I’d also love it if it were interactive with apple maps so that it will tell me which route to transfer to and when.
    - Automated alerts of busy station so Alt transportation (bus) can be routed for unexpected heavy use.
    - Easy to interpret directional signage for inbound/outbound trains. I think these are confusing at current stations.
    - Screens with transit, weather and general information.
    - Board that displays bus times; be able to charge electronics; better seating; change machine.
    - Easy on, easy off - easy access to ticket sale, annual passes, a variety of routes and many stops.
- Restrooms 19% (47 mentions)
    - Bathrooms that are fully handicapped accessible and include changing tables, not only for children, but also for the adult handicapped are imperative.
    - Clean restrooms, regularly emptied trash cans, and additional seating would be beneficial as well.
- Concession/Food/Retail 8% (19 mentions)
    - Mini markets at significant stations, could be licensed to entrepreneurs and offer water, snacks, etc.
    - Fresh water to refill water bottles, recycling /trash receptacles and water for dogs.

- On site retail / refreshment space.
- Free beer taps.
- Keep the vending machines away from stations unless there are no restaurants or other food / beverage service are close by.

- Accessibility 3% (7 mentions)
  - Leaning rails rather than benches to accommodate those in wheelchairs as well as preventing people from camping at the stops.
  - Good protection from the weather. Adequate lighting. Good ADA access.
  - Some benches or seating for elderly or challenged persons.
  - Everything is important, especially for those who are blind and handicapped. We are not but would love to see services provided for these people and for those who are known as shut in people.
- Other Amenity Comment 9% (23 mentions with 9 related to bicycles and 4 to parking)
  - I think it would be nice to have bike storage even if Rent was needed. Right now, I take the Nassau Express and am walking 1 mile to catch the express from my office in Riverside.
  - A place to SECURELY lock up my bike.
  - Covered bicycle storage for people connecting from areas outside of the network but nearby.
  - It'd be nice to put your bikes on the pod vehicles.
  - Creative use of artwork to enhance overall experience.
  - Up-to-date Neighborhood/Corridor centric advertising.
  - Some music would be nice. Rotating artists.
  - Shelters are most important due to our unpredictable weather.
  - Easy access for vehicular traffic, such as buses, ride shares and personal vehicles.
  - Park and ride lots. Multi-modal station to transfer between train and bus / car.
- Other General Comment 12% (31 mentions with many previously shown in section 6.3.6: Comments Outside of the Corridors)
  - These corridors should connect to each other to be truly beneficial. As an older person, I want to use my car less, and have an option to use a system like this more. Also, the timings should be more frequent, so as not to have to wait too long, especially in inclement weather.
  - Evening hours
  - Keep it safe and simple, so people will be inclined to use the transit system on a regular basis.

- The main reason I do not use the Skyway is that it does not operate regularly on the weekends. I would love to ride it to go downtown to shop, visit the main library and museums, and eat, but I can't do that when it is convenient for me (i.e., the weekend) unless there is a special event going on, such as a Jags game.
- The Skyway is already a good autonomous vehicle. It could use updating; but not U²C. I love that the Skyway is elevated over the streets and avoids all the traffic. Build on to what you already have. Adding U²C to the street level is not going to work. Would love to see the Skyway converted to light rail and moved further out away from the city center. Even maybe a connection to the airport.
- Maybe a connector service for other parts of Jacksonville with the bus? The entertainment districts of Brooklyn, Springfield, 5 points, Riverside, Avondale, and San Marco have so much to offer and its great that we are working to connect them, but what are we doing to bring people from Mandarin, Southside, Baymeadows, the Beaches to these entertainment districts.
- I think the two methodologies should be integrated. The keys to any such systems are timeliness of vehicles; cleanliness; parking near the outermost stations of each corridor; and running on a timed 24-hour cycle, with additional vehicles added at high demand times and events.
- I used the skyway on a daily basis that is always crowded at some time to the point a disabled person can't even roll. Instead of replacing the skyway with small cars that only have hold 15 passengers, they should instead just upgrade the skyway with modern newer people moves that can hold more people. I believe the skyway system should be replaced with a much newer autonomous people mover system one that would provide greater capacity. I also think the system should also remain elevated that would combat the terrible traffic and roads that are already congested as it is.
- Would like to have it so that the libraries are connected, and one could stay open at all times and all the libraries work together to make it happen. It would be nice to see trolleys or buses working in conjunction with it. Like buying a metro card and making it able to use subway and bus transportation.

6.4 Agency Coordination

This U²C/Skyway System Expansion Study has been developed in cooperation with the FDOT and the City of Jacksonville Planning staff. In order to ensure all agencies having approval or reviewing jurisdiction are informed of the project activities, the JTA project managers and the Project Team coordinate with the various agencies throughout the study process.

A kickoff meeting was held with the partner agencies, including the FDOT, City of Jacksonville and North Florida TPO representatives, at the commencement of the project on April 18, 2019. This meeting was held at the JTA Administrative Offices. An overview of the project study and key milestones were presented.

Throughout project development, the Project Team provided periodic updates including a review of the preliminary alternatives with FDOT representatives on September 18, 2019. The project was also presented to the North Florida TPO Technical Advisory and Citizens Advisory Committees on November 6, 2019.

The following items related to the public involvement activities can be found in the appendices of this report.

- Public Involvement Plan
- Online Survey
- Summary of Survey Results and Comments Received
- Project Collateral Examples (Survey Business Card, Trifold/Handout and Frequently Asked Questions)
- Project Communications Examples (Meeting announcements, or other notifications)

Public feedback is critical to the project decision-making and prioritization of community needs. Public input received as a result of the community outreach efforts has been incorporated into the evaluation of preferred route alternatives.



Pop Up at La Nopalera, October 2019



Photo taken at Art Walk, December 2019

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7 Funding

Funding options for a project as large as the Skyway Expansion will often consist of a combination of federal, state and local sources. Specific sources can include existing federal formula and discretionary funds (Federal New Starts, Small Starts and Surface Transportation Block Grant Program) from the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA) and from state FDOT funding programs and local funding eligible for transportation uses. In addition, there are potential local funding programs that may require City/County approval (i.e. Special Assessment Districts, new transportation taxes or fees or Tax Increment Districts). The funding sources may require specific types of activities or project scopes as part of an eligibility test to secure the funding.

As part of the System Expansion Study process, the JTA will prioritize the project options and develop an initial project funding plan which will be refined and detailed as the project is moved through the Project Development phase. This initial funding plan will identify prospective funding sources such as Federal, State and local funds for review by FTA and FDOT as part of the process to request entry into the FTA's Project Development Phase.

At this point in the process, the following information is provided to outline and identify various funding sources which can be considered. With a project scope as large as the System Expansion Study which includes five additional expansion corridors, it is likely the funding will come from multiple sources and will require substantial coordination and modeling efforts to maximize the efficiency and usage of various funding alternatives. Potential funding sources are summarized below and are described in the following sections.

Major Funding sources:

- Federal Highway Administration funds
- Federal Discretionary (INFRA/BUILD) Grants
- Federal Transit funds
- Formula Funds
- Discretionary Funds
- Capital Investment Grant Program
- State/Local Transportation Funds

Additional Sources:

- Transit Oriented Development
- Special Property Assessment Fees
- Loan Programs
    - SIB
    - TIFIA
- Public Private Partnerships

7.1 Cost Estimates

Order of magnitude project cost estimates were prepared for each potential system extension to assist with the comparison of the different alternatives. The alternatives considered included: elevated extension, at-grade constrained roadway extensions, and at-grade unconstrained roadway extensions, as well as options to place the stations at the curb or in the median. Estimates were developed using approximate quantities and unit costs from FDOT historical data including long-range estimates, JTA Operations and Maintenance budget, and other sources including engineering judgment. A detailed estimate is included in Appendix I.

Estimates are organized into the following categories:

- Initial Capital Cost
  - Infrastructure
  - Vehicles
  - Systems
- Operations and Maintenance
  - Initial & Routine Maintenance
  - Recurring Maintenance
  - Operations
  - JTA Enterprise
  - Consultant Planning and Design

Costs for vehicles and systems are based on information from vehicle vendors and JTA planning estimates. Initial and routine maintenance costs are based on information from the 2017 Biannual Inspection Report as well as AV considerations. Estimates for transitions are based on general costs and modifications to a standard Skyway station and FDOT historical bridge data.

Recurring and operating costs are based on historical information and engineering assumptions for intervals and extent of rehabilitation or replacement that may be required for major components including vehicles, infrastructure repair, etc.

JTA Enterprise costs include estimates for staffing, IT, communications, executive services, and other miscellaneous administrative costs. Consultant planning and design costs are based on a percentage of estimated capital costs for each alternative.

Property costs are estimated based on property appraiser data, typical section widths, and engineering assumptions made during the analysis. Property costs could fluctuate immensely depending on a number of factors beyond the scope of this study.

Estimates are presented for planning purposes only and that more detailed estimates should be prepared during further stages of project development. Actual costs could vary significantly from the estimates in this report and will be dependent on a variety of factors including right of way impacts and market conditions at the time of procurement.

The estimates were incorporated into the financial model and the results are presented in Appendix I.

7.2 Summary of Funding Options

As part of the System Expansion Study alternatives analysis, financial analysis for the alternatives was conducted. This included the development of a pre-planning-level financial model that would be used to compile the estimated capital and operations and maintenance costs as well as identified potential funding sources to evaluate the feasibility of each option.

7.2.1 Model Scenarios

In total, four separate funding and financing scenarios were conducted for the "All Elevated" (highest initial capital cost option), "Constrained with curb stations" (lowest initial capital cost option), "Unconstrained with median stations" (highest initial capital cost at-grade option)and "Mixed Traffic" (option that requires the least amount of upfront infrastructure upgrades):

- Local Funding Only - Model runs 3,6,9 evaluated each of the three alternatives with the assumption that JTA would shoulder the entire financial responsibility for the project, including capital and operations and maintenance. Each of these model runs requires a significant contribution from JTA for which no funding has yet been identified.
- Local – State Funding - Model runs 2,5,8 evaluated each of the three alternatives with the assumption that JTA and FDOT would share the financial burden for the upfront capital portion of the project. As with model runs 3,6,9, it was assumed that JTA would bear the responsibility of funding operations and maintenance of the system. While an upfront contribution from FDOT helps reduce the capital costs for JTA, each model run still requires a sizeable contribution from JTA, again, for which no funding has yet been identified.
- Local – State – Federal Funding - Model runs 1,4,7 evaluated each of the three options with the assumption that FTA would provide 50% of the upfront capital costs and JTA and FDOT would split the remaining 50% for the upfront capital portion of the project. Again, as with the prior model runs, it was assumed that JTA would bear the responsibility of funding operations and maintenance of the system. Model runs 1,4,7 were further refined to include some basic financing scenarios for the JTA capital cost contributions to demonstrate the annual cost to JTA should a loan such as and FDOT State Infrastructure Bank Loan be utilized to cover the local match.

For the purposes of this analysis, the additional cost associated with transitions (ramps, passenger/vehicle elevators) from the existing system to the new extensions have been kept separate from the model scenarios. This was done in an effort to reduce the total number of model scenarios presented in this report to a manageable number. Instead, an additional table (*7.2.3: Cost of Transition from Existing System to New System*) has been added to the bottom of this section to illustrate the impact that each transition would have on the various options.

7.2.2 Key Model Assumptions

The cost estimates for capital and operations and maintenance were developed and based on standard cost estimating procedures and are included in Appendix I for reference purposes.

The model assumes a total lifecycle of 50 years. This time period includes assumed design-build for 3 years and operations and maintenance for 47 years. This was used to capture the impact of each option across time while also providing a long enough time horizon to evaluate the impact of potential financing options.

For financing, the scenarios assume a FHWA Build America Bureau Transportation Infrastructure Finance and Innovation Act (TIFIA) Loan to advance local funds for JTA's local match portion of the capital costs. This was assumed with the understanding that the TIFIA Loan would only qualify as local match as long as the loan was repaid using local funds.

7.2.3 Financial Summary Results

Table 7.2.1: Initial Capital Cost Funding Share shows the funding breakdown for the most economically viable option for each of the three alternatives: 50% FTA capital funding contribution, 25% FDOT capital funding contribution and 25% JTA (Local) funding contribution.

Table 7.2.2: Cumulative System Cost over 47-Year Operating Period shows the cumulative impact of the project over the full 47-year forecast and includes debt service, operations and maintenance and renewal and replacement costs.

Based on the funding share and assuming a low cost TIFIA loan to cover the JTA funding portion, JTA would be responsible for $1.8-$8.5 million (depending on the chosen option) per year for 30 years to cover the local matching portion of the upfront capital contribution.

For operations and maintenance, the model assumes a 47-year forecast with costs for the new system beginning in 2023 after a three-year design/construction phase. Costs to operate and maintain the system begin initially around $15-$19 million and increase each year based on assumed inflation rates and increased ridership. In terms of an average annual operations and maintenance cost over the full 47-year term, it ranges from $29-$37 million for the lowest and highest cost options for the project.

Table 7.2.1: Initial Capital Cost Funding Share

Initial Capital Cost Funding Share	All Elevated	Constrained with curb stations	Unconstrained with median stations	Mixed Traffic
	JTA 25% FDOT 25% FTA 50%	JTA 25% FDOT 25% FTA 50%	JTA 25% FDOT 25% FTA 50%	JTA 25% FDOT 25% FTA 50%
Capital Costs	428,225,958.47	128,248,244.07	364,383,757.80	123,706,101.00
Funding Share				
JTA Capital Cost Contribution	107,056,489.62	32,062,061.02	91,095,939.45	30,926,525.25
FDOT Capital Cost Contribution	107,056,489.62	32,062,061.02	91,095,939.45	30,926,525.25
FTA Capital Cost Contribution	214,112,979.23	64,124,122.04	182,191,878.90	61,853,050.50
Total Capital Funding	428,225,958.47	128,248,244.07	364,383,757.80	123,706,101.00

Table 7.2.2: Cumulative System Cost over 47-Year Operating Period

Operating Period (47-Years) Cumulative Cost by Funding Alternative	All Elevated	Constrained with curb stations	Unconstrained with median stations	Mixed Traffic
	JTA 25% FDOT 25% FTA 50%	JTA 25% FDOT 25% FTA 50%	JTA 25% FDOT 25% FTA 50%	JTA 25% FDOT 25% FTA 50%
Cumulative Operating Costs				
Total Debt Service Payments (30-year term)	249,161,788.75	56,050,624.15	159,253,151.58	54,065,490.11
Total Operations & Maintenance (O&M) Costs (47-Years)	750,592,057.15	985,238,243.59	982,439,013.81	982,439,013.81
Total Renewal & Replacement (R&R) Costs (47-Years)	279,450,909.27	251,877,016.82	251,877,016.82	251,877,016.82
Total Debt Service, O&M and R&R	1,279,204,755.17	1,293,165,884.56	1,393,569,182.21	1,288,381,520.74

Table 7.2.3: Estimated Cost of Transition from Existing System to At- Grade System

Transitions Cost by Type		
Straight Ramp	$	3,000,000
Spiral Ramp	$	6,000,000
Vehicle Elevator	$	1,500,000
Passenger Elevator/Escalator	$	1,000,000

7.3 Major Transportation Funding Sources

Most transportation funding sources are very specific as to the purposes for which the funds can be used. A few others are more flexible, so long as the funds are used for a specified overall purpose such as transportation improvements or operations. The key transportation funding options are outlined below:

Federal Highway Administration (FHWA) funds – these funds are allocated to the State Department of Transportation (FDOT) in "programs" set in Federal law. Each program has requirements that outline the type of transportation improvements for which the funds can be used during the term of that program. FDOT coordinates with the TPO on prioritizing the use of these funds and the TPO must include the transportation improvement project in their Transportation Improvement Plan (TIP) for the use of Federal Highway funds within their jurisdictional boundaries. While these are identified as "highway" funds there are certain FHWA programs that can be used for items like "intermodal facilities" where roads and transit connect and also the Surface Transportation Block Grant Program which can be "flexed" to the Federal Transit Administration for transit projects. More details on the Federal Highway funds can be found at the FHWA internet site at: www.fhwa.dot.gov/fastact/

Federal Discretionary (BUILD) Grants – The BUILD Discretionary Grant program (formerly called TIGER), is a U.S. DOT-wide program investing in critical road, rail, transit and port projects across the nation, managed by U.S. DOT's Office of the Secretary. The highly competitive BUILD grant program supports innovative projects, including multi-modal and multi-jurisdictional projects, which are difficult to fund through traditional federal programs. The BUILD program is designed to award funding based on merit and need. More detail on the U.S. DOT BUILD Grant program can be found at https://ops.fhwa.dot.gov/Freight/infrastructure/tiger/

The JTA was awarded a $12.5 million BUILD Grant in 2018 for the Bay Street Innovation Corridor. JTA is currently developing plans for this corridor which will connect downtown to the Sports District and TIAA Bank Field.

Federal Discretionary Infrastructure for Rebuilding America (INFRA) Grants - The INFRA program provides dedicated, discretionary funding for projects that address critical issues facing our nation's highways and bridges. INFRA grants will support the Administration's commitment to fixing our nation's crumbling infrastructure by creating opportunities for all levels of government and the private sector to fund infrastructure, using innovative approaches to improve the necessary processes for building significant projects, and increasing accountability for the projects that are built. More detail on the U.S. DOT INFRA Grant Program can be found at www.transportation.gov/buildamerica/infragrants

Federal Transit Administration (FTA) funds – these funds are in two major groupings: "formula funds" and "discretionary funds" as shown below. More information is available at the FTA internet site: www.transit.dot.gov/grants

- Formula Funds (Section 5307) – are allocated to applicable TPO areas and then to transit agencies such as the JTA and other transit agencies in the regional area of the TPO based on items like number of transit riders served, population, transit system miles, etc. In addition, there are formula funds for "rural areas" with population less than 50,000 that are also

allocated to rural areas for transit systems. These formula funds are allocated annually to the transit agencies to fund federally eligible transit improvements and rehabilitation and to a limited extent operating assistance for rural areas.

- Discretionary Funds (Section 5309) - are competitive grants managed by the FTA where eligible transit agencies must apply for the grant funds to the FTA for projects like new bus or replacement bus purchases; new transit corridor improvements like Bus Rapid Transit and fixed rail public transit systems. These funds typically require some level of match from state and local funds.

Capital Investment Grant Program – These are commonly termed "New Starts", "Small Starts" and "Core Capacity" programs that provides Federal transit funding for projects that add new capacity for local public transit programs. This is normally a transit project that adds new service such as a new Bus Rapid Transit or rail transit corridor or expands an existing service with an extension of the current service. The only difference between New Starts and Small Starts is the size of the transit project. Recently, JTA has been successful in competing for FTA Capital Investment Grants for the First Coast Flyer Bus Rapid Transit Program. More information is available at the FTA Capital Investment Grant Program site www.transit.dot.gov/funding/grant-programs/capital-investments/capital-investment-grants-program

State Transportation Funds – These funds are directed to FDOT by state laws such as the state motor fuel tax (commonly called "gas tax") and state motor vehicle fees, and other fees and taxes as outlined in law. (more detailed information is located on the FDOT web at https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/content/comptroller/pdf/gao/revmanagement/tax-primer.pdf?sfvrsn=f1eadaf7_0

There are transportation "programs" in state law that direct certain defined portions of state transportation funds to specific uses such as the examples outlined in the bullets below. There are very detailed instructions provided by FDOT on the use of state funds in what is termed the "FDOT Work Program Instructions," available on the FDOT web site: www.fdot.gov/workprogram/development/wp-instructions.shtm There is also a less technical document, termed the "FDOT Program and Resource Plan" available at www.fdot.gov/workprogram/programresourceplan.shtm.

- A minimum of 15% of state transportation revenues must be spent on "public transportation" systems such as public transit systems, public and private rail facilities, public aviation facilities, commercial seaports and intermodal transportation facilities. The funds are primarily for capital improvements for the various programs outlined with limited funds such as the public transit block grant program with more flexible uses for public transit systems.
- A minimum allocation amount to the Strategic Intermodal System (SIS), FDOT, by policy, currently allocates 75% of available Federal Highway Administration and State funds for transportation improvements to the SIS and 25% to the Non-SIS. The rationale is that the SIS facilities such as the interstate system, major expressways, major US routes, commercial airports, commercial seaports, intercity rail, and major intermodal centers move most people and goods in the State and thus should receive most of the available funding. This policy was developed over a period of years and has been in place for some time with the support of the Governors, Legislature, TPOs, the business community, and other interested parties. While

this policy seems logical and has solid support, it leaves limited FDOT funds, typically used for resurfacing, maintenance and ongoing operations, for Non-SIS facilities.

- A minimum allocation of funds to the transit New Starts program that is patterned after the FTA New Starts Program for new public transit capital projects like fixed rail, bus rapid transit and automated transit. These funds are managed out of FDOT Central Office on a competitive basis following a similar process to FTA New Starts. State law and FDOT policy encourages the pursuit of Federal funds for major transit capital improvements to match the FDOT New Starts funding. These funds are limited to 50% of the non-Federal share.
- Certain funds must be allocated by "Statutory Formula" composed of 50% population and 50% motor fuel tax collected within each FDOT District.
- Funds are allocated for competitive grant and loan programs such as the examples below:
    - Transportation Regional Incentive Grant Program (TRIP) – provides up to 50% of project funding for eligible projects. These projects may be flexible and could include transit capital improvements. The funds are limited statewide.
    - State Infrastructure Bank (SIB) – provides loans and loan guarantees with flexible terms at attractive rates for eligible projects.
    - There are other FDOT discretionary grants programs focused on small counties below the size of Jacksonville/Duval County.

Local Transportation Funds –are generated by the applicable local government (County, City, special districts) under tax and fee sources as briefly outlined below. The table below also outlines taxing authority that has not been enacted and the amount that could be generated for each source.

- Local Option Motor Fuels Tax - County governments are authorized to levy up to 12 cents of local option motor fuel taxes in the form of three separate levies. Duval County/City of Jacksonville as of March 2018 has imposed 6 cents of the allowable 12 cents of local option motor fuel taxes.
    - The first is a tax of 1 cent on every net gallon of motor and diesel fuel sold within a county. ("Ninth-Cent Fuel Tax"). The imposition of this tax is estimated to generate approximately $4.9 million per year for transportation.
    - The second is a tax of 1 to 6 cents on every net gallon of motor and diesel fuel sold within a county.
    - The third tax is a 1 to 5 cent levy upon every net gallon of motor fuel sold within a county, and diesel fuel is not subject to this tax. The imposition of the full range of 5 cents is estimated to generated approximately $22.1 million per year for transportation.
    - The first two taxes above can be authorized by an ordinance adopted by a majority vote of the governing body or voter approval in a countywide referendum, and the proceeds are used to fund specified transportation expenditures.
    - The third tax may be levied by an ordinance adopted by a majority plus one vote of the membership of the governing body or voter approval in a countywide referendum,

and the proceeds are used for transportation expenditures needed to meet the requirements of the capital improvements element of an adopted local government comprehensive plan.

  - As of January 1, 2019 –Duval County joins with 11 other counties at 6 cents, 19 counties at 7 cents, 1 county at 9 cents, 3 counties at 10 cents, 2 counties at 11 cents and 30 counties at 12 cents.
  - In the Northeast Florida region, Duval and St Johns Counties are at 6 cents; Baker and Union are at 7 cents; and Bradford, Clay, Nassau and Putnam are at 12 cents.

- **Charter County and Regional Transportation System Surtax** - Each charter county that has adopted a charter, each county the government of which is consolidated with that of one or more municipalities, and each county that is within or under an interlocal agreement with a regional transportation or transit authority, may levy the Charter County and Regional Transportation System Surtax (sales tax) at a rate of up to 1 percent. Duval County has implemented 0.5% of the up to 1 percent available for the Charter County and Regional Transportation System Surtax.
  - The levy is subject to approval by a majority vote of the county's electorate or by a charter amendment approved by a majority vote of the county's electorate.
  - Generally, the tax proceeds are for the development, construction, operation, and maintenance of fixed guideway rapid transit systems, bus systems, on-demand transportation services, and roads and bridges.
  - The imposition of the additional .5% is estimated to generate approximately $106.4 million per year for transportation.

- **Local Government Infrastructure Surtax** - This Surtax may be levied at the rate of 0.5 or 1 percent pursuant to an ordinance enacted by a majority vote of the county's governing body and approved by voters in a countywide referendum. Duval County has implemented 0.5 percent of the available 1 percent.
  - Generally, the proceeds must be expended to finance, plan, and construct infrastructure; acquire land for public recreation, conservation, or protection of natural resources; finance the closure of local government-owned solid waste landfills that have been closed or are required to be closed by order of the Department of Environmental Protection (DEP).

Table 7.3.1 Local Option Gas Tax Values provides a summary of the current local taxes levied for transportation and infrastructure purposes in Duval County. The amounts shown in the table reflect the amount that could be levied by Duval County by tax source should a decision be made to pursue these available funding sources.

Table 7.3.1: Local Option Gas Tax Values

County	Local Option Gas Tax (Per Gallon)			Local Discretionary Sales Surtax		
	Ninth-Cent Tax	1-6 Cents	1-5 Cents	Local Option Infrastructure Sales Tax	Charter County Transit Surtax	Small County Surtax
Duval	0/1 - $4.9M unrealized	6/6 - $33.7M	0/5 - $22.1M unrealized	Yes - 0.5% - $106.4M - 0.5% $106.4M unrealized	Yes - 0.5% - $106.4M, 0.5% $106.4M unrealized	N/A
**Amounts above based on FY 2019 estimates published by the Florida Office of Economic and Demographic Research and reflect the estimated annual amount generated for this source.						

- **Local County or City General Funds** – Counties and cities may allocate General Funds for transportation purposes. Transportation uses must compete against many other top priorities and it is up to the governing body in the annual budget to allocate any General Funds for transportation purposes. This is generally based on a specific need and is not a routine amount of funds that can be outlined or projected for the future. This varies significantly by local government and the priorities for their respective jurisdiction.
- **Regional Transportation Authority** – Chapter 163, Part V, Florida Statutes provides that any two or more contiguous counties, municipalities, other political subdivisions, or combinations thereof are authorized and empowered to convene a charter committee for the purpose of developing a charter under which a regional transportation authority, hereinafter referred to as "authority," may be constituted, composed, and operated as a regional transportation authority. If created, the regional transportation authority may enact through a majority vote of the citizens in the region of the authority for up to three mills. This section of law has been in place for many years and to date has not been used to create a regional transportation authority. The existing regional transportation authorities in law were created for a specific purpose and region and none of the existing authorities have been provided the ability to implement taxes. The authorities created to date have been more focused on raising revenues through user fees such as tolls, transit fares and advertising sales. The tax funds provided to existing authorities such as the Jacksonville Transportation Authority have been provided through existing taxing authority available to the county.

7.3.1 Transportation User Fees

Transportation User Fees Authorized Under Current Law – The state and local governments are authorized to collect user fees for the use of the transportation system. The different types of

user fees vary by the mode of transportation and the benefit being generated by the user. Some key examples are outlined below:

- **Public Transit User Fees** – Some form of fees (often term "Fares") are in use in all counties in the region for use on the public transit system to help cover part of the cost of the annual operations. In addition, the public transit entities also normally charge for advertising and related fees such as for logos on a bus or bus shelter. These fees normally cover a percentage of the annual operating costs (a coverage rate of 25% of annual operating cost is considered as good in the transit industry) with the remainder of annual cost of operations and capital cost being funded through traditional transportation funding tax sources.
- **Special Property Assessment Fees/Tax Increment** – A common practice in major urban areas and high growth areas is the use of special project assessments and/or tax increments that are directed to a specific transportation improvement project (could be a transportation corridor of projects) that provides demonstrated benefit to the properties that are being assess or from which the tax increment (from growth in the property values) are collected and used to help fund the transportation improvement. Common examples are for major transportation and related improvements (landscaping, lighting, etc.) in public transit corridors (fixed rail systems or bus rapid transit corridors), for renovation of an existing transportation corridor in a redevelopment area of a city, or for a new major development such as a community development district that adds roads or transit services associated with the new development. There are examples in the region such as:
    - Redevelopment Agencies (property tax increment) such as the Keystone Heights Community Redevelopment Agency, Downtown Investment Authority in Jacksonville, Jacksonville Beach Community Redevelopment Agency, Fernandina Beach Redevelopment Agency, Crescent City Community Redevelopment Agency, Palatka Downtown Community Redevelopment Agency, St. Johns County Community Redevelopment Agency. Funds generated by the increase in property values (and the property tax increment associated with this increase) can be used for a range of improvements including transportation associated with the redevelopment activities.
    - Community Development Districts (CDD's) are quasi-governmental entities created to collect property assessment fees from property owners within the district. There are a few CDD's in and around Duval County. CDDs are commonly used to help fund the infrastructure for major new developments, including roads and other transportation infrastructure. Roads funded by CDD's are considered public roads whether the roadways are owned and operated by local governments or by the CDD itself. A number of CDDs have experienced cash flow challenges related to the "Great Recession" when development slowed dramatically and in some cases was at a standstill. In situations where advances had been provided by debt (such as bonds) to fund infrastructure improvements (such as roads), the lack of growth led to the inability to make debt payments in full and on time. This led to "workout scenarios" that continue for some CDDs even today, over seven years after the beginning of the Great Recession. This makes the use of CDD's more challenging.

- **Concurrency Management (Mobility Fee)** -To adequately and efficiently address the City's mobility needs the City has replaced transportation concurrency with the 2030 Mobility Plan. The intent of the 2030 Mobility Plan is to replace the transportation concurrency management system with a holistic mobility approach that applies a fee system to new development based upon the link between land development and transportation. Mobility fees received by the City shall be deposited into the Mobility Fee Special Revenue Fund. For a project to be eligible for proceeds from the City's Mobility Fee, it must meet certain applicability criteria.

Transportation User Fees That Require A Change in Law - In the past, various entities around Florida has proposed the creation of local option user fees based on these statewide user fees that would be enacted by a county level vote of the citizens. It would require legislative action to create a local option for each of these user fees. The following transportation user fees are collected today on a statewide basis.

- **Rental Car Surcharge** – A surcharge of $2.00 per day or any part of a day is imposed upon the lease or rental of a motor vehicle licensed for hire and designed to carry less than nine passengers regardless of whether such motor vehicle is licensed in Florida. The surcharge applies to only the first 30 days of the term of any lease or rental. 80 percent of the proceeds of this surcharge shall be deposited in the State Transportation Trust Fund. The proceeds deposited in the State Transportation Trust Fund shall be allocated on an annual basis in the Department of Transportation's work program to each department district, except the Turnpike District. The amount allocated for each district shall be based upon the amount of proceeds attributed to the counties within each respective district. While this option is available to Jacksonville, the existing rental car market will not generate significant additional funding through this approach.
- **Motor Vehicle Registration Fee** – Florida charges different fees based upon the type of vehicle you're registering, its weight, the license plates you choose, and if you will be registering the vehicle for 1 year or 2 years. A local option registration fee can be established only through legislative action.

7.3.2 Loan Programs

Federal and State Loan Programs – Both the State of Florida and the USDOT offer low interest loans on a competitive basis to help fund infrastructure projects.

- **FDOT SIB Loan** - The State Infrastructure Bank (SIB) is a revolving loan and credit enhancement program consisting of two separate accounts. The federally funded account is capitalized by federal money matched with state money as required by law and the state-funded account is capitalized by state money and bond proceeds. The SIB can provide loans and other assistance to public and private entities carrying out or proposing to carry out projects eligible for assistance under state and federal law. SIB participation from the federally-funded account is limited to projects which meet all federal requirements pursuant to the Transportation Equity Act for the 21st Century (TEA-21) and are eligible for assistance under Title 23, United States Code (USC) or capital projects as defined in Section 5302 or Title 49 USC and other applicable federal guidelines. SIB participation from the state-funded

account is limited to a transportation facility project that is on the State Highway System or that provides for increased mobility on the state's transportation system in accordance with Section 339.55, Florida Statutes or provides for intermodal connectivity with airports, seaports, rail facilities, transportation terminals, and other intermodal options for increased accessibility and movement of people, cargo, and freight.

- **USDOT TIFIA Program** - The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides credit assistance for qualified projects of regional and national significance. Many large-scale, surface transportation projects - highway, transit, railroad, intermodal freight, and port access - are eligible for assistance. Eligible applicants include state and local governments, transit agencies, railroad companies, special authorities, special districts, and private entities. The TIFIA credit program is designed to fill market gaps and leverage substantial private co-investment by providing supplemental and subordinate capital. Each dollar of Federal funds can provide up to $10 in TIFIA credit assistance and support up to $30 in transportation infrastructure investment.

7.3.3 Additional Revenue Options / Considerations

Additional Revenue Options – In addition to revenue sources that are already available, new funding sources could include:

- **Ridership Fares –** also referred to as ridership fees or user charges, the revenue generated could be used for annual maintenance costs or to repay the upfront capital investment costs.
- **Advertising –** like farebox revenue, this new funding source could be used to offset a myriad of project related costs. Advertising revenue could come from traditional means (station advertising placement, vehicle wraps, etc.) or non-traditional means (use of a mobile payment platform for farebox collection could provide an additional opportunity to attract mobile based advertisers).
- **Transit Oriented Development (TOD)** – based on the current footprint of the Skyway and the planned expansion, TOD represents a very realistic way for the JTA to offset the capita costs of current station upgrades as well as new stations. New multi-use development at or near the existing and new stations could also increase ridership and increase the value of advertising space. JTA is exploring TOD opportunities through a request for proposal.
- **Public Private Partnerships (P3)** As the project advances JTA could develop a funding strategy that may include a private contribution component and public-private partnership delivery (P3) approach. If so, the process and agreements will be modified to incorporate P3 requirements per FTA and FDOT requirements as well as to ensure compliance with Florida Statutes.

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8 Summary and Next Steps

This System Expansion Study report has been prepared to present information required to demonstrate the evaluation of the proposed U²C/Skyway system expansion. The report also presents a request that the FDOT consider the phased expansion of the North, West, East, South, and Southeast Corridors for acceptance into the State and/or Federal Project Development process and that additional funding be provided to continue project development.

8.1 Summary of Conditions and System Expansion Options

Florida continues to be one of the fastest growing states in the country. Jacksonville, as a gateway city to Florida, continues to experience rapid growth and along with this growth increasing need to provide better more efficient transportation options to ensure the continued economic vitality and quality of life for our community. The U²C Program presents an opportunity for Jacksonville and the State of Florida to be a leader in developing transportation systems of the future that will use emerging autonomous and connected vehicle technology.

This report is a companion to the initial Skyway Conversion Study (TCAR 1) that summarized alternatives for conversion of the existing 2.5-mile Skyway system. This report documents existing and future conditions along four corridors, with an evaluation of alternatives to expand the existing Skyway system to a total length of approximately 10 miles as envisioned for the U²C Program. The following narrative summarizes conditions and considerations evaluated through the study process.

Existing Conditions

Existing conditions along the corridors were documented including demographics, land use, existing transportation system, crash analysis along with environmental considerations. While each of the corridors have unique considerations, all are predominantly within the limits of the urban downtown area with primarily commercial and residential use. Significant population density as well as businesses including medical facilities are common to most corridors. Opportunities for development or redevelopment are found in all corridors.

Future Needs

Jacksonville's urban core continues to grow with expected growth in population and employment for all corridors. The most rapid growth is anticipated in the Northbank, which has several large developments/re-developments in the planning or construction stages. Most notably are The Ford on Bay, near the old City Hall Annex/Courthouse area and The Shipyards and Lot J in the Sports/Entertainment district. Other major developments and redevelopment opportunities include The District, Baptist Health Expansion, and LaVilla Redevelopment. Additional mobility projects include the Emerald Necklace, the I-95 Shared-Use Path/Riverwalk Expansion, and Springfield's Main Street Complete Street. *Table 8.1.1 Expected Growth Percentage* depicts the expected growth in each study corridor. An efficient state of the art transportation system such as envisioned for the U²C System, will support the projected economic growth and enhance quality of life well into the future.

Table 8.1.1: Expected Growth Percentage
30 Year Period from 2015 to 2045

Corridor	Dwellings	Population	Employment
North (UF Health)	1.40%	1.20%	0.60%
West (Riverside)	3.70%	3.80%	1.00%
South (Medical Complex)	2.30%	2.30%	0.50%
Southeast (San Marco)	3.70%	3.40%	1.70%
East (Bay Street Innovation)	31.00%	50.00%	1.90%

Alternatives Development

The development of potential route alternatives followed a two-step process. First was the development of initial route alternatives within the corridor study area; and second, the selection of a preferred route alternative within each corridor for further evaluation.

The initial route alternatives were developed within the study area for each corridor which originate at an existing Skyway station, or as in the case for the West Corridor at the proposed Brooklyn Station, extending to the desired destination at the end of each corridor. The key destinations for the expansion of the Skyway system were developed in earlier studies and considered community input regarding where the new system should go. The corridors limits are defined in *Table 8.1.2: U2C/Skyway System Corridor Extensions*.

Table 8.1.2: U²C/Skyway System Corridor Extensions

Corridor	From	To
North (UF Health)	Rosa Parks Station	UF Health
West (Riverside)	Brooklyn Station	Five Points
South (Medical Complex)	San Marco Station	Medical Complex
Southeast (San Marco)	Kings Avenue Station	San Marco East
East* (Bay Street Innovation)	Central Station	Sports/Entertainment Complex

*Previously evaluated; extension advanced through the Bay Street Innovation Corridor.

As described in Section 4, the initial routes within the study area for each corridor were evaluated based on operational, physical and other factors such as complexity, accessibility, customer service and relative cost. A preferred route was selected for further evaluation.

Evaluation of Alternatives

Each of the preferred route alternatives were further evaluated for each system expansion corridor using conceptual typical sections or infrastructure design options presented in *Table 8.1.3: Infrastructure Options*. Infrastructure options were considered for elevated, or at-grade scenarios. At-grade (or street level) options included a dedicated lane for the autonomous vehicles or operating in mixed traffic.

Each of the options were evaluated to assess physical impacts including effect on existing lane use and traffic as well as an evaluation of available right of way and impacts of widening to accommodate additional dedicated lanes. The constrained at-grade option would have the biggest impact on existing lane use and traffic.

The elevated and unconstrained options would have the largest impact on right of way and would be the highest cost. The evaluation of the preferred alternatives also considered customer safety, potential ridership, connectivity to other transit services or travel modes, support to economic development and community input. Recognizing that transition from the elevated station to street level would be necessary with the expansion, alternatives for various potential transitions to the street level including linear ramp, spiral ramp, vehicle and passenger elevators were identified.

Table 8.1.3: Infrastructure Options

Option	Extension Description
Elevated	Elevated generally consistent with existing Skyway
At-Grade	
Dedicated Lane	Autonomous transit vehicles operate in a designated lane.
Constrained with Curb Stations	AV lanes along curb within the limits of existing curbs; travel lanes and or parking lanes reduced or eliminated.
Constrained with Median Stations	AV lanes adjacent to median within the existing curbs; median constructed and existing travel and or parking lanes reduced eliminated.
Unconstrained with Curb Stations	AV Lanes added along curb, existing travel lanes maintained and widening and right of way acquisition as needed. Existing parking lanes could be used for the AV Lane.
Unconstrained with Median Stations	AV Lanes adjacent to median, travel lanes maintained and widening and right of way acquisition as needed. Existing parking lanes could be used for the AV Lane.
Mixed Traffic	Autonomous transit vehicles operate in mixed traffic with curbside stations.

From an operational perspective, the elevated system would offer better service and reliability. However, this would be the most expensive option and result in a significant visual and aesthetic impacts along the corridor.

The dedicated AV lane options would offer less reliability than elevated option, with better operation expected from the median option because the friction due to entrance and right turns along the curve would be minimized. All at-grade dedicated lane options would also interface with other vehicular traffic at each intersection, which would also affect reliability.

The mixed traffic option would have the least infrastructure impacts as the majority of infrastructure needed would be related to traffic signal, supervisory systems and stations only. However, this option offers the least reliability, particularly during peak traffic hours.

To maximize the reliability and level of service for all at grade options, consideration should be given to signal optimization along each corridor along with the inclusion of Transit Signal Priority (TSP) for each corridor for both dedicated lane and mixed traffic options.

For all options, particularly the at-grade dedicated and mixed traffic options, the AV selected for deployment must meet all necessary approvals including FTA, FDOT, COJ and NHTSA. It is expected that the vehicles for initial deployment will be based on the federally approved vehicle at the time. It is desirable to deploy at SAE Level 3 with an attendant on board the vehicle with the ability to control all aspects of vehicle operation until the technology is advanced and approved for use at SAE Level 4 or 5.

Preferred options for the mode and alignment have been identified for each corridor. The preferred route alignment, and more specifically, the infrastructure option for each corridor will be further examined during the next phase of project development. It is possible that a combination of alternatives may be incorporated into each corridor to best fit specific needs. For example, the North Extension (UF Health) Corridor may include an elevated section departing Rosa Parks Transit Station then transitioning to street level. Also, the available space for dedicated lanes may be affected for further plans including adjacent development and changes to the roadways including possible roadway widening or road diets. Therefore, the design of each corridor will be developed in the next phase in collaboration with DIA, City of Jacksonville and FDOT.

Public Involvement

Community engagement has been an integral part of the project development since the initial Skyway technology assessments were initiated. At each phase of study, the community was afforded the opportunity to review project maps and materials to be a part of the decision-making process. Specifically, the definitions of the initial expansion corridors were determined during the Skyway Modernization Program outreach efforts. As part of the initial public surveys – the community was asked – “where do you want the Skyway to take you – where should it go?’. The community input helped to form the scope and study areas for the System Expansion Study.

The community outreach and stakeholder engagement continued through the project development as options were revealed for the consideration of expanding on new elevated infrastructure or making space at the street level for autonomous vehicle operations. From August 2019 through February 2020, the project team participated in six community events, conducted eight presentations to various organizations and held three pop up displays which included the UF Health/Shands Hospital, a YMCA and a local restaurant. The public involvement also included an Open House in February 2020, held at the Museum of Contemporary Art (MOCA). This location was conveniently located in Downtown Jacksonville and easily accessible by the Skyway or other transit services. The Open House offered extended hours of displays and opportunities to discuss the project with the JTA representatives and the project team.

An online survey, via the link https://www.jtafla.com/skywaysurvey, through publicinput.com was the centerpiece of the outreach efforts. The survey was open between August 13, 2019 and March 8, 2020. More than 1,000 comments have been shared on the project survey site. The survey comments were summarized by corridor – and included responses to convey desirable use of the services and amenities, as well as, key destinations to be served or potential bus stop locations.

More than 200 participants provided multiple comments with their map pin drops. Their comments were categorized by statement type (location identifier or general comment). *Table 8.1.4: Summary of Survey Comments* lists the number of comments received for each corridor.

Table 8.1.4: Summary of Survey Comments

Expansion Corridor	Number of Comments		Total Number of Comments
	General	Location	
North	20	34	54
South	28	37	65
Southeast	15	13	28
West	15	12	27
East*	18	19	37
Total	**96**	**115**	**211**

The East Extension (Bay Street Innovation Corridor) received the most overall comments with 28 participants providing general comments and 37 location identifiers. However, the North Extension (UF Health) Corridor had more (34) location identifiers. The South Extension (Medical Complex) and Southeast Extension (San Marco) Corridors received the least number of comments. While the West Extension (Riverside) Corridor section was located near the end of the survey, the participants provided some colorful comments in support of the extension and identified a variety of potential stop locations.

The coordination with key stakeholders, including the agency partners, has been ongoing. The JTA leadership and the project team has engaged multiple representatives from the FDOT and COJ to continue to share information regarding related activities and the project status, including the development of concept plans and prototype typical sections.

Estimated Cost and Funding

Order of magnitude cost estimates for capital and operations were developed for each corridor along with and evaluation of funding options.

Cost estimates were developed using historical cost data for each option and include estimates for roadway, signals, vehicles, and supervisory system. Where applicable, right of way costs were developed using information from the City of Jacksonville GIS system. It is important to note that the costs were developed as order of magnitude and are intended to enable comparison of the different alternatives. It is possible that actual costs could vary significantly, higher or lower and will depend on a variety of factors including market conditions at time of implementation.

The estimated capital cost for all of the proposed system extensions ranges from approximately $100 million for the mixed traffic option to $400 million for the elevated system option. For the at-grade dedicated lane options, the estimated total system cost ranges from $125 million for the constrained to $360 million for the unconstrained.

For a large project like the U²C Program, funding will consist of a combination of federal state and local sources and possibly private partnerships. Options for funding are described in Section 7 of the report. The East Corridor has been partially funded through the Better Utilizing Investment Leveraging Development (BUILD) grant program and consequently, will be the first corridor to be advanced in project development. A detailed funding plan for both capital and operating costs will be developed during the next phase of project development.

8.2 Next Steps

This System Expansion Study recommends the prioritization and continued development of each potential system expansion corridor, working with local partners and agencies to better understand the needs of the population and the development patterns of each neighborhood. Confirmation of the preliminary preferred route alternative is required for the North (UF Health), West (Riverside), South (Medical Complex), and Southeast (San Marco) Corridors. Due to BUILD grant funding for the Bay Street Innovation Corridor, the East (Bay Street Innovation) Corridor will be advanced as one of the initial phases of the U²C System expansion.

Initial prioritization of the corridors is presented in *Table 8.2.1: Corridor Ranking*. The methodology to initially prioritize the corridors considers potential ridership, cost, and public input. Utilizing these factors and the body of knowledge compiled in Sections 2 to 7, a preliminary ranking matrix was developed. In this table, a relative rank based on technical evaluation and community feedback assigns a value between 1 and 4 for each of the corridors, 1 being the highest/most desirable rank. Given the multitude of cost and ridership scenarios, the ranking assumes that potential expansions will follow the Bay Street Innovation Corridor preferred mixed-traffic option.

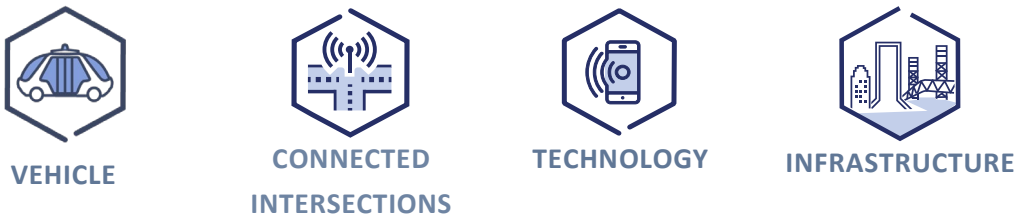
Table 8.2.1: Corridor Ranking (Mixed-Traffic Option)

Evaluation Criteria	Corridor			
	North	West	South	Southeast
Potential Ridership	1	3	2	4
Cost	2	3	1	4
Public Input	1	2	4	3
Average Rank	**1.3**	**2.7**	**2.3**	**3.6**

The ranking indicates the North Extension (UF Health) as the initial preferred corridor to advance into Project Development. The South Extension (Medical Complex) and the West (Riverside) Extension are a close second choice, followed by the Southeast Extension (San Marco) Corridor.

It is recommended that the North (UF Health) Corridor be advanced initially into project development. However, it is also recommended that additional evaluation be performed to confirm the prioritization of the corridor development in accordance with the FDOT TCAR Process as depicted in *Figure 8.2.1: FDOT TCAR Process*.

The JTA will continue to work with the North Florida TPO to advance the Smart North Florida initiatives, specifically coordination of development of the integrated data exchange (IDE) and the installation of connected intersections and other mobility sensors to support the autonomous transportation network.



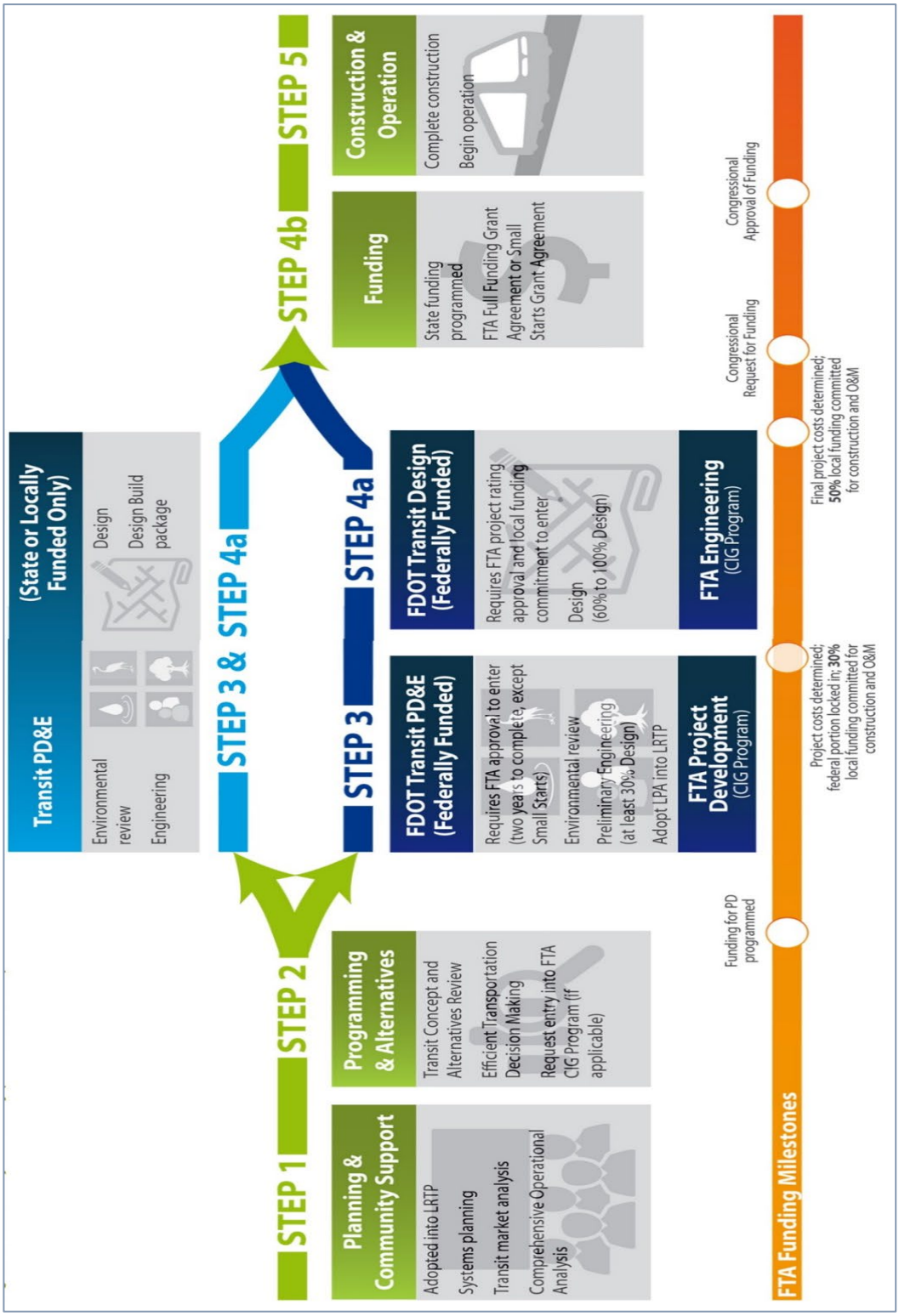
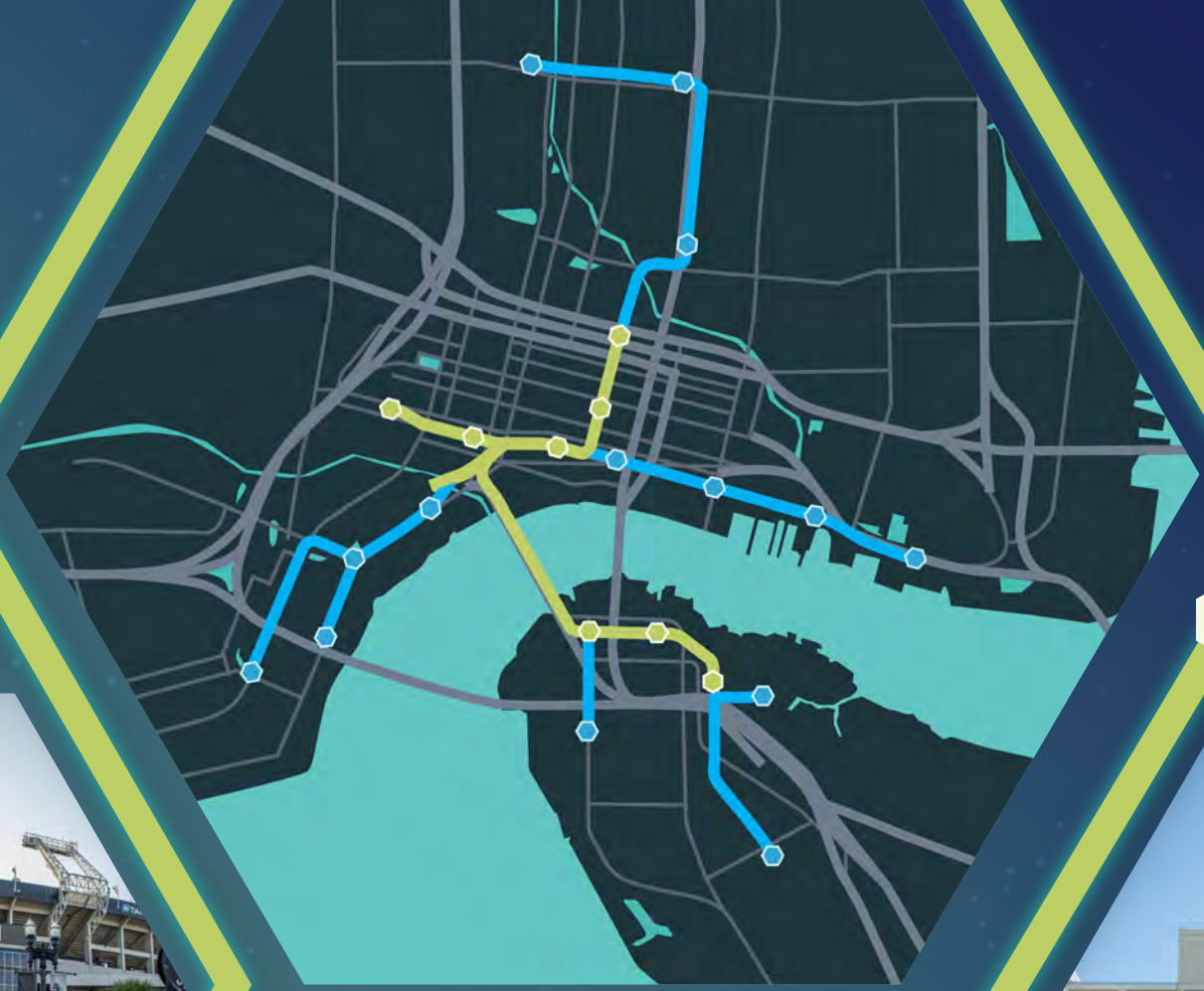


Figure 8.2.1: FDOT TCAR Process







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