

BAY STREET INNOVATION CORRIDOR

BUILD GRANT



JULY 19, 2018
DTOS59-18-RA-BUILD1



Project Application

Item	Response
Project Name	Bay Street Innovation Corridor
Project Description (100 words)	Through private industry, local, state and federal collaboration the <i>Bay Street Innovation Corridor</i> will uniquely transform downtown mobility, enhancing safety, efficiency and accessibility along a critical east-west corridor in Downtown Jacksonville. Advancing the deployment of autonomous shuttles and new technologies, this project will energize Bay Street as a corridor for smart city innovations and emerging technologies incubator, supporting the upsurge in economic development activity and redevelopment opportunities. Moving from demonstration to deployment, this transformative project implements initial elements of the JTA's Ultimate Urban Circulator (U ² C) Program and the North Florida TPO's Smart Region Initiative.
Urban/Rural	Urban
Urbanized Area	Jacksonville, FL
Project Type	Transit-ITS
Primary Project Location Zip Code	32202
Project Previously Submitted?	No
Prior BUILD/TIGER Funds Awarded to Project?	None
Is this part of a Program of Projects?	No
How many applications are a part of this Program of Projects?	N/A
Program of Projects Name	N/A
BUILD Request	\$ 25M
Total Project Cost	\$ 62.9M
Total Federal Funding	\$ 25M
Total Non-Federal Funding	\$ 37.9M
Tribal Government?	No
Tribal Benefits?	No

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Downtown Jacksonville is experiencing an economic upsurge along **Bay Street**, from Interstate 95, adjacent to the new Jacksonville Regional Transportation Center (JRTC), east through the business district to the revitalized multi-use, sports and entertainment district located on the banks of the St. Johns River. The Bay Street corridor is a **primary east-west artery** through Downtown, providing access to multiple major employers as well as landmark cultural and entertainment venues including TIAA Bank Field, home of the Jacksonville Jaguars.

\$3.5 Billion in proposed development

Work! With more than 56,000 employees and 1,800 businesses representing predominantly financial, technology, healthcare and legal services, including three Fortune 500 Companies, Downtown Jacksonville is experiencing expansion at record pace. According to Downtown Vision's recent *2017 State of Downtown Report*, "Downtown is on track to quickly beat the progress of the past 17 years with **more than \$3.5B in projects under construction or proposed in 2017**". (<https://www.jtafla.com/buildgrant>)

Invest! We're open for business! With the support of the City of Jacksonville, the Downtown Investment Authority (DIA) has invested approximately \$35M into Downtown Jacksonville over the past four years, **leveraging more than \$300M in private investment**. With approximately 27 projects under construction and 30 projects on the horizon, economic opportunities and an expanding job market has earned Jacksonville the recognition as the *3rd for Job Growth among Large U.S. Metro Areas (2016-17)*, according to the Bureau of Labor Statistics.

Live! Currently, more than 8,500 people call Downtown home, and the number of Downtown residents is rapidly increasing with more than 4,450 units added in 2017 alone, more than twice the 2,100 units in 2007. Approximately 900 units are under construction with an **additional 2,800 units planned**, offering a diversity of urban living opportunities, from historical to modern eclectic, to waterfront options.

96% occupancy in 2017

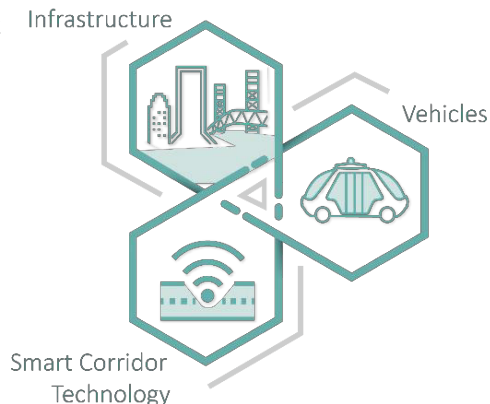


View of TIAA Bank Field along Bay Street

I. Project Description

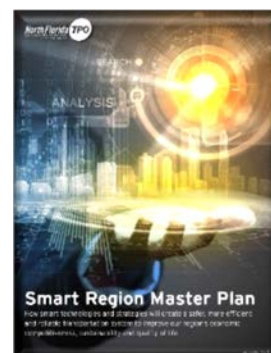
The *Bay Street Innovation Corridor* is a three-mile project serving as the gateway to Downtown Jacksonville that will connect to major destinations, support economic development and enhance mobility with the following elements:

- ◆ Fifteen vehicle autonomous transit network;
- ◆ Supervisory control system;
- ◆ Smart city technologies;
 - Dynamic connected signals;
 - Smart lighting systems;
 - Pedestrian sensors;
 - Smart parking;
 - Flood warning sensors; plus an
 - Integrated data exchange to collect, manage and analyze information from the sensors and ultimately from autonomous vehicles.



The *Bay Street Innovation Corridor* will:

- ◆ Address mobility and infrastructure management needs along the corridor;
- ◆ Implement initial elements of JTA's Ultimate Urban Circulator (U²C) Program and the North Florida Transportation Planning Organization's (TPO's) Smart Region Master Plan;
- ◆ Connect with the Jacksonville Electric Authority's (JEA's) available "dark fiber" network within the corridor;
- ◆ Maximize the value of the existing Skyway infrastructure; and
- ◆ Leverage multiple public investments in the corridor including:
 - JRTC multimodal transportation center;
 - First Coast Flyer Bus Rapid Transit (BRT) System; and
 - Integrated Data Exchange (IDE) Proof of Concept.



"These solutions move innovation from demonstration to deployment in a setting that will provide meaningful mobility benefits and a solution that is scalable to provide industry-wide transformation."

Nathaniel P. Ford Sr., CEO, Jacksonville Transportation Authority

Project Partners



A partnership between the Jacksonville Transportation Authority (JTA), the North Florida TPO, Jacksonville Chamber of Commerce (JAX Chamber), Jacksonville Electric Authority (JEA) and the City of Jacksonville, establishes the *Bay Street Innovation Corridor* as a showcase for proven smart city technologies and new transportation options.

Together with private sector partners, this application is submitted to secure project funding from the *Better Utilizing Investments to Leverage Development (BUILD) Discretionary Grant Program* to advance an innovative and transformative **\$62.9M** project to immediately develop an “innovation corridor” along Bay Street to enhance mobility, safety and accessibility to meet the needs of our residents, businesses and visitors.

The *Bay Street Innovation Corridor* will implement key elements of the vision for a **unique transportation innovation corridor** in Downtown Jacksonville. The project includes evolving technology elements that will energize Bay Street as a corridor for “smart city” innovations, an emerging technologies incubator and the introduction of an elevated and at-grade autonomous transportation network. This corridor is not a proving ground to test new technologies, it captures the potential proven new innovations of an integrated corridor solution.

Context

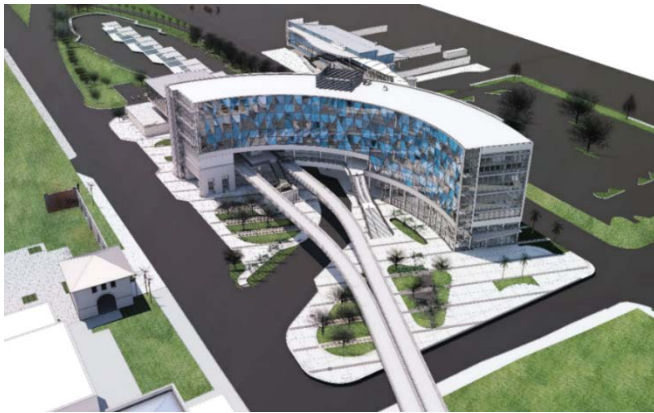
The Bay Street corridor is a major thoroughfare cutting east-west through Downtown Jacksonville, connecting the historic LaVilla District with the Sports Complex. Similar to the Navy Shipyards District in Washington, D.C., Bay Street is becoming a major destination in Jacksonville due to the diversity of developments existing and planned in the corridor. There is also a vast amount of development potential within the corridor due to the amount of underdeveloped vacant parcels and surface parking lots. The innovation corridor will support and catalyze the optimal use of land on the corridor.

LaVilla

Redevelopment activity is already occurring in the LaVilla district. From 2016-17 the total completed, active, and proposed investments was over \$121M. One of the major projects currently under construction in the LaVilla area is the JRTC. The new central transportation hub will provide with multi-modal connections to Fixed Route Bus, BRT, Skyway/U²C, Intercity Bus, Bike and Car-share, and future Amtrak will be a major destination and trip generator in the district. To complement the transportation hub a number of residential developers have begun developing the area with multi-family complexes including workforce, affordable and senior living units. In addition, there are six vacant blocks of land, surrounding the JRTC in LaVilla, where a development strategy proposal is currently underway.



Intercity Bus Terminal, Opened January 2018



Rendering of JRTC

Brooklyn

Brooklyn, a mixed-use district including residential, major employers, and retail and commercial developments, is located on the southwest end of the corridor. Brooklyn's total completed, active, and proposed investments topped \$195M in 2016-17 and included infrastructure improvements, green space and river access improvements, and the addition of more than 300 additional residential apartments.

Central Business District

The Central Business District (CBD) is the primary employment district for downtown with more than 56,000 employees and projected to reach 90,000 in 2020. The CBD is also the civic and cultural center for all of Northeast Florida. In 2016-17 total developments in the area exceeded \$275 M. The CBD has seen an influx of start-ups and small businesses beginning to fill in the vacancies between major employers. With commitments from the major universities in the area to expand their presence Downtown, as well as potential development of student housing, there will be an influx of students in the area to support local businesses. Other major mixed-use development, such as the Barnett Building (Laura Street Trio) redevelopment, will help diversify the mix of uses in the CBD.

Sports Complex



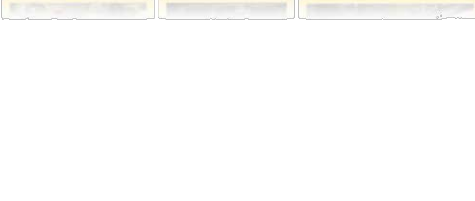
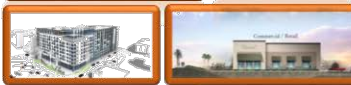
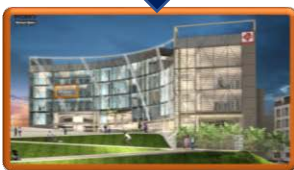
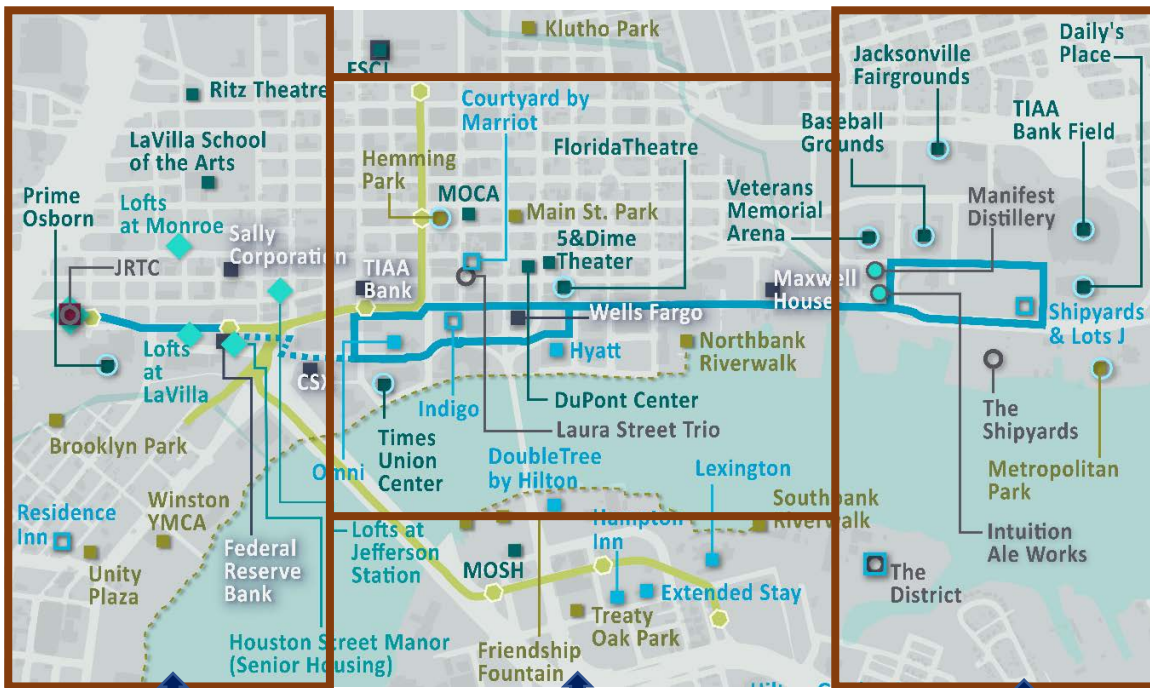
Shipyards & Daily's Place

On the east end of the *Bay Street Innovation Corridor*, the bustling Sports Complex is Jacksonville's premiere entertainment district, drawing event attendees from across Northeast Florida. It is the location of TIAA Bank Field, home of the NFL Jacksonville Jaguars, as well as the Baseball Grounds of Jacksonville, Veterans Memorial Arena, the Jacksonville Fair and Expo Center, Metropolitan Park and the recently built Daily's Place Amphitheater. There are more than 800 events held in the district each year,

which draw in over 2.2M attendees. There has been substantial investment in the district over the past year, totaling over \$550M, with an additional \$2.5B planned at the Shipyards including, an upgraded marina, exposition space, hotels, a new convention center, mixed-use entertainment buildings and much more. The new development will make more effective use of the space by reducing surface parking and vacant land and will require alternate modes of transportation in and out to support the growing crowds.

The project corridor traverses a diverse mix of land uses and redevelopment opportunities, which will help drive economic development along Bay Street. The major developments under construction and planned in the Brooklyn, LaVilla, CBD and Sports Complex districts will provide a major increase in live, work and play opportunities for residents of Northeast Florida.

The *Bay Street Innovation Corridor* is a **transformative project** integrating emerging technologies into public transportation service delivery, demonstrating a national model for deployment of autonomous vehicles and providing important insights for these cutting-edge applications throughout the transportation industry.



Project History

Modernizing the Skyway



The City of Jacksonville currently has the Skyway, a 2.5-mile elevated, automated people mover throughout Downtown Jacksonville. In 2014, as the Skyway system reached its 25th anniversary, the JTA commissioned technical studies to assess the condition of the Skyway vehicles, operating system and infrastructure; and subsequently, developed options to address the needs of the Skyway in preparation for the mid-life overhaul of the vehicles. The current Skyway vehicles are not used elsewhere and are no longer supported or produced by the manufacturer, making it difficult to service and secure parts. Therefore, the *Skyway Technology Assessment* explored new options, in addition to an overhaul of the existing vehicles and new technologies.

With six, two-car trains in operation, each with a capacity of 56 passengers, the Skyway moves approximately 5,000 riders a day throughout Downtown, offering first mile/last mile connections for commuters, along with peripheral parking. However, the Skyway system was never fully built out as originally envisioned to reach key destinations and vibrant neighborhoods surrounding the urban core. Public feedback, collected during the technical analyses, indicated a desire to keep the existing infrastructure, but expressed the need to reach more destinations; and thus, a new Skyway system plan was developed, providing extensions to the street level, and expanding the overall system to 10 miles.



Skyway Infrastructure at Bay and Hogan

Subsequent to the technical analyses, a distinguished group of business leaders and community stakeholders were convened by the JTA to evaluate the technical results, examine industry feedback and a life-cycle cost analysis, and review public input to assist JTA leadership on this important community decision of a path forward for the modernization of the Skyway. Ultimately, in February 2017, following the JTA Board of Directors authorization to initiate the *Skyway Modernization Program* to further explore the replacement of the existing Skyway vehicles with emerging technologies, a new vision was adopted to utilize next generation autonomous vehicle technology to modernize and expand the existing system.

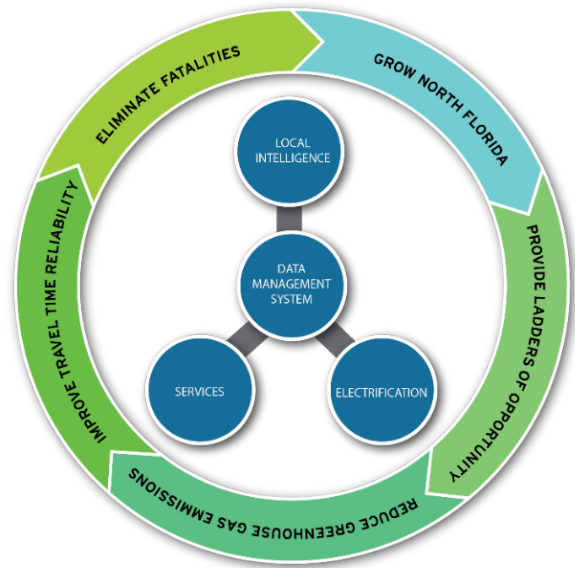
Under the new service delivery vision, the U²C, an expanded fleet of smaller vehicles would operate on the current elevated structure then ramp down to ground level for extensions in dedicated lanes or mixed traffic as technology and conditions permit. This operational flexibility would allow the system to better respond to service demands now and in the future, especially as the current growth, continuing along the anchors near the JRTC and the Sports Complex. The U²C system plan is included in supporting documents on <https://www.jtafla.com/buildgrant>.



Watch the visualization at [U2CJAX.com](https://www.jtafla.com/buildgrant)

An Evolving Smart Region

While the JTA was assessing transportation and mobility options through the modernization of the Skyway, the North Florida TPO was actively developing the Smart Region Master Plan. The *Bay Street Innovation Corridor* will be the initial “signature” project for mobility as part of the Smart Region Master Plan adopted in 2017. Three key efforts laid the groundwork for the Smart Region Master Plan, the Intelligent Transportation System (ITS) Master Plan (2010), Path Forward 2040 Long Range Transportation Plan (LRTP 2014), and the C2JAX (2016) proposal that was developed in response to the USDOT Smart City Challenge.



Smart Region Vision

The Smart Region Vision illustrates the four key project types and the following core objectives:

- ◆ Eliminate fatalities;
- ◆ Improve travel time reliability;
- ◆ Reduce greenhouse gas emissions; and
- ◆ Provide economic growth and opportunity to grow Northeast Florida.

North Florida Smart Region Vision

- Air quality monitoring
- Rapid response information
- Underground septic tank monitoring

- Smart recycling
- Sophisticated waste management

- Demand responsive distribution
- Intelligent meters

- Building environmental conditions
- Incident response management
- Remote monitoring and management

- Infrastructure monitoring
- Predictive maintenance
- Security and safety detection and notification

- Applications for management
- Car sharing
- Connections to transit
- Ride sharing incentives
- Remote health care
- Smart cards
- Transportation for the disadvantaged
- Technology jobs

- Integrated data exchange
- Public WiFi
- Regional shared fiber
- Security

- Connected vehicles and corridors
- Integrated corridor management
- Smart parking management
- Pedestrian warning and detection

- Automated vehicles
- Neighborhood connectors
- Special event management
- Skyway modernization (U2C)
- Transit signal priority

- Bike sharing
- Pedestrian and bicycle warning
- Wayfinding and event management kiosks
- Smart lighting

- Loading zone parking management
- Rail crossing safety system
- Truck parking on Interstates
- Truck parking at JAXPORT
- Truck priority at key locations

- Automated parking enforcement
- Crime detection and notification
- Incident management
- Gunshot detection
- Rail crossing notifications
- Traffic information for first responders

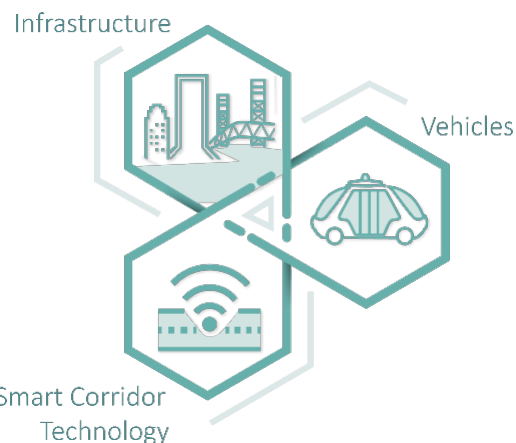
- High wind warnings
- Street flooding warnings
- Visibility warnings (fog and rain)

- CNG and LNG logistics
- Electric vehicle charging station
- Solar roads and paths
- Smart grid
- Advanced detection lighting sensors
- Smart recycling
- Intelligent water distribution

<https://www.jtafla.com/buildgrant>

Project Components

The project components include smart corridor technologies, vehicles and a supervisory system, along with infrastructure modifications and expansion, of an elevated and at-grade transportation network. These components are discussed briefly below and in more detail in **Section IV. A. Technical Feasibility**.



Smart Corridor/Integrated Data Exchange



Vehicle to infrastructure (V2I) communications systems will support dynamic and connected signals, and several safety features such as pedestrian sensors, flood warning systems, smart parking, smart lighting, and crime detection system. Greenwave signal communications and other technologies will enhance corridor operations, maintenance and safety. An **Integrated Data Exchange (IDE)** will manage data generated from the autonomous transit network and other corridor communications elements; establish systems and protocols; ensure privacy; address cybersecurity and provide public benefits from access to the data.

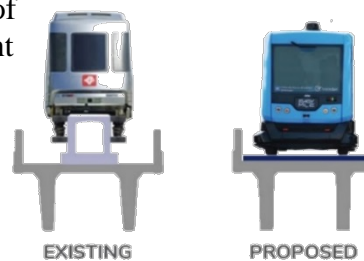


Connected/Smart Intersection Concept

Infrastructure



The proposed 1.6-mile at-grade autonomous transit network, along existing roads, will connect with the existing Skyway at Central Station and extend to the growing Sports/Entertainment and Residential District located at the east end of the Bay Street. A segment of the existing elevated Skyway guideway, from the Convention Center Station east to Jefferson Station, approximately one-third mile, will be converted to a smooth running surface, replacing the guide-beam of the existing monorail system. The conversion of this initial segment of the elevated guideway will be used to guide the full conversion of the existing 2.5-mile Skyway system as envisioned in the U²C Program. Additional information pertaining to the development of the U²C program can be found on the project website www.u2cjax.com and <https://www.jtafla.com/buildgrant>.



Vehicle/Supervisory System

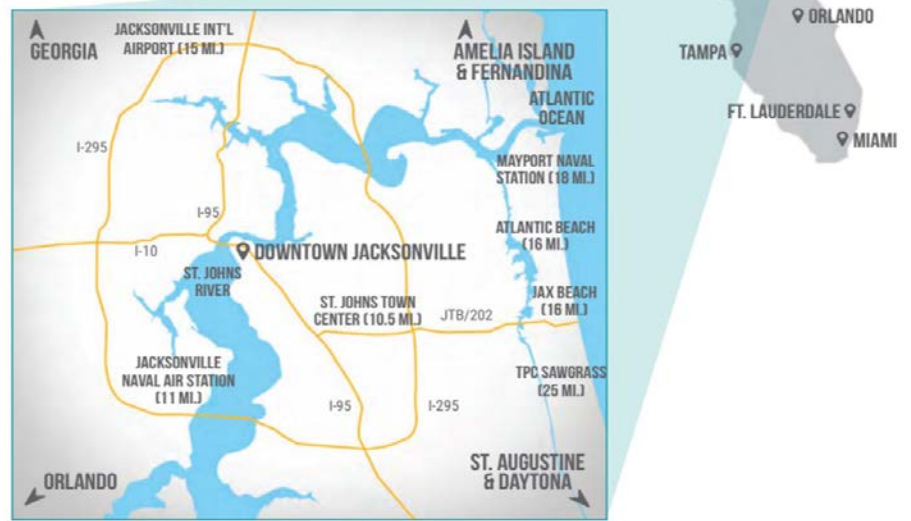


Fifteen autonomous shuttles will enable two-minute headways with vehicles operating along the elevated segment and in dedicated lanes and mixed traffic along the at-grade autonomous corridor along Bay Street. This is a key initial segment of the vision for the expansion of the Skyway to the street level for the future 10-mile U²C system. This project will move beyond testing autonomous vehicles and smart city technologies to implementing them as an integrated and connected network improving mobility, optimization of existing infrastructure, stimulating economic development, and developing a scalable model that can be expanded throughout Jacksonville and other communities.

II. Project Location

Jacksonville, located in Northeast Florida, encompasses 874 square miles and is the largest city by land area in the continental United States. Recognized as “America’s Logistics Center”, Jacksonville is uniquely located at the nexus of Interstates 10 and 95, supported by an intermodal system that includes three railroads and the Jacksonville Port Authority, Florida’s largest container port complex and host to a cruise terminal. The Jacksonville Metropolitan Statistical Area (MSA) is home to approximately 1.5M people.

Source: 2016-17 DVI State of Downtown



The specific project limits are along Bay Street from Interstate 95 on the west, adjacent to the new JRTC (under construction), east to A. Philip Randolph Boulevard and Gator Bowl Boulevard, near TIAA Bank Field; and from A. Philip Randolph Street to East Duval Street. Neither Bay Street nor Gator Bowl Boulevard are on the state-highway system. The project corridor generally follows the St. Johns River and intersects SR 23 (Acosta Bridge ramps), US 1/US 17 (Main Street) and SR 228 (Hart Bridge ramps).

III. Grant Funds, Sources and Uses of Project Funds

Total Estimated Project Cost: \$62.9M

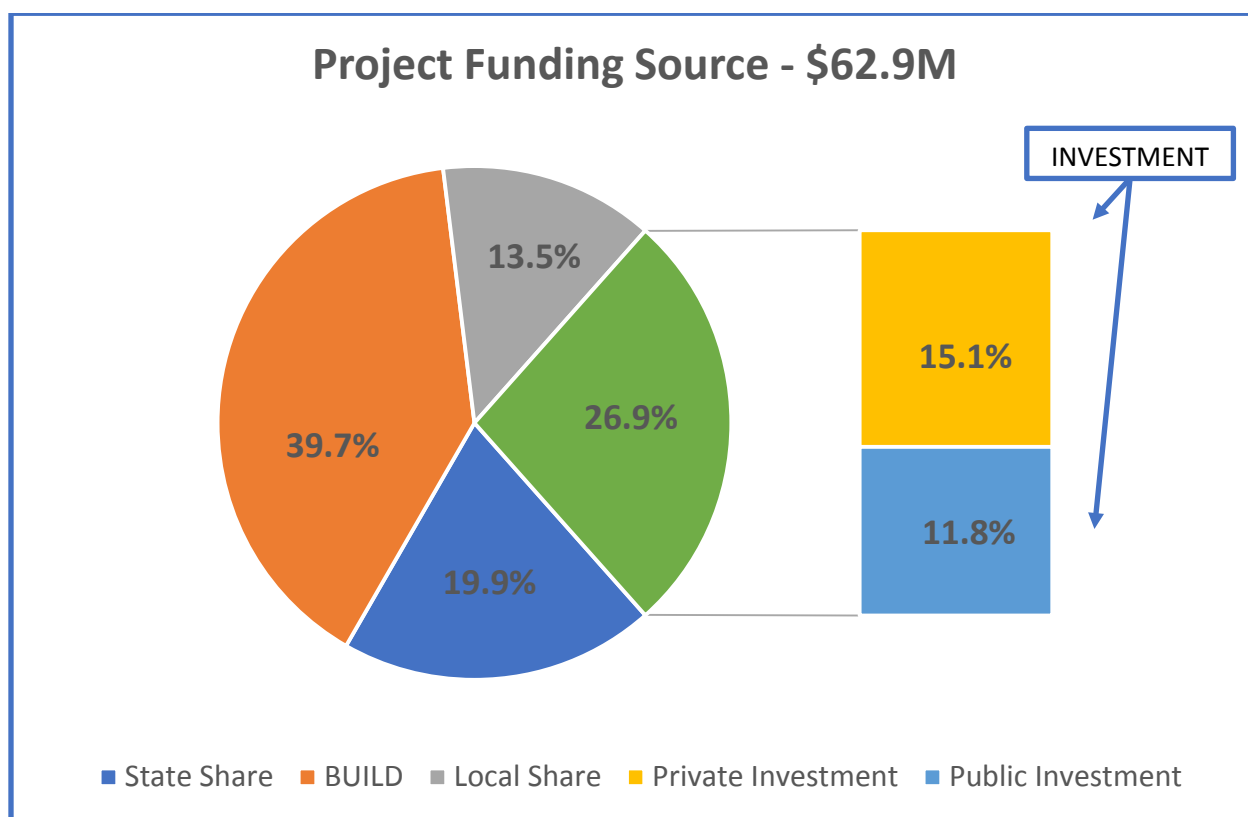
The JTA and the North Florida TPO have jointly contributed to the planning and initial preliminary engineering phases of the project. This project includes new and emerging technologies and requires nontraditional project components as part of the public transportation delivery service.

Total Costs and Sources of Funding

Funding Source	Est. Amount
BUILD Grant	\$25M
Local Matching Funds (JEA, JTA)	\$13.9M
State Matching (State New Starts)	\$12.5M
Other Federal (NFTPO SU Funds allocated for Smart Region Program)	\$2M
Private Sector	\$9.5M
Total Project Cost	\$62.9M

Project Budget

Project Component	Amount	Percentage of Project
At Grade Roadway & V2X	\$19,000,000	30.2%
Vehicle Systems	\$15,000,000	23.8%
Elevated Roadway	\$8,000,000	12.7%
Engineering	\$6,000,000	9.5%
Contingency	\$4,500,000	7.2%
Smart Corridor Technology	\$4,000,000	6.4%
Software Systems	\$4,000,000	6.4%
Electric Charging/Storage	\$2,400,000	3.8%
Total	\$62,900,000	100%



“Policy makers need to preserve the creativity and innovation that is part of the American tradition and allow innovation to flourish.”

Secretary Elaine Chao, U.S. Department of Transportation

IV. Merit Criteria

A. Safety



The *Bay Street Innovation Corridor* project utilizes the newest technology to ensure vehicular and pedestrian safety. Specifically, the project will incorporate pedestrian and flood warning sensors, as well as security surveillance to allow law enforcement to detect the source, location and type of gun shots. Downtown safety has received attention as the City of Jacksonville is ranked 4th in the nation in pedestrian fatalities according to *Dangerous by Design*. According to National Highway Traffic Safety Association (NHTSA) the safety benefits of automated vehicles are paramount. Automated vehicles' potential to save lives and reduce injuries is rooted in one critical fact: 94 percent of serious crashes are due to human error. Automated vehicles have the potential to remove human error from the crash equation, which will help protect drivers and passengers, as well as bicyclists and pedestrians.

Pedestrian Safety Sensors

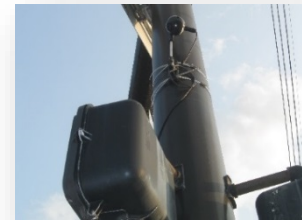
The corridor will incorporate technology that identifies the location of buses and pedestrians along the corridor and notify drivers using time-activated warning signs and signal preemption. Connected signal devices will be installed to identify bicyclists approaching intersections. Also, infrared pedestrian detectors will be installed along the corridor and will be connected to smart lighting devices to intensify street lights when a pedestrian is making a mid-block crossing at night.

Flood Warning Sensors

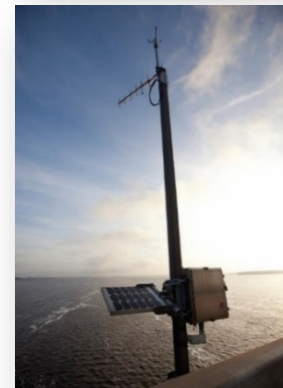
The proposed deployment of flood warning sensors will occur at four main outfall locations for the roadway storm drainage in Downtown Jacksonville. When flood stages are approaching, the City of Jacksonville Traffic Management Center, Regional Traffic Management Center (Florida Department of Transportation, Florida Highway Patrol and others) and JTA's Operations Center will be notified. The installation of sensors avoids the need for first responders to physically measure storm water during extreme storm events. The devices can be installed as standalone weather information sensors or under a manhole cover. After installation, important resources can be deployed where needed.

Public Safety and Surveillance

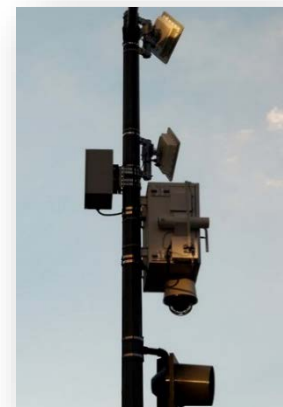
Technologies are available that can be installed as part of lighting or signal systems that notify law enforcement when gunshots are fired. These notifications will alert law enforcement officers before a phone call or other alerts are received. By being able to respond sooner to assess an incident and determine if rescue services are needed, there is potential to improve the survivability of the victims of violent crimes and catch the perpetrator. The Jacksonville Sheriff's Office recently deployed ShotSpotter sensors in a 5-square mile area in Northwest Jacksonville.



Pedestrian Sensor



Flood Warning Sensor



Shot Surveillance

Smart Lighting

Each year, the city spends \$11M on electricity for street lights. The City of Jacksonville is in the process of replacing street lights from High Pressure Sodium bulbs and fixtures to LED bulbs and fixtures on its 113,000 street lights. The current rate of replacement is approximately 21,500 lights per year and the anticipated energy use reduction is approximately 50% over the life-span of the LED lights.



illuminatingconcepts.com/intellistreets

As part of this project, street lights will be converted to LED with connected vehicle systems and detectors to change light intensity based on the presence of pedestrians and vehicles. Attached sensors will provide data to enhance the predictive maintenance functions, reduce outages and save resources when maintaining the system. The distribution of smart lighting on this project will support the sustainability goals of the City of Jacksonville to reduce energy consumption.

Smart Trash Receptacles

The perception of the safety and security of urban streets is highly influenced by its cleanliness. The proposed approach includes using smart trash cans to optimize resources for the handling and removing waste in the street environment. The deployment will place smart trash cans at intersections and bus stops or stations.



Smart Trash Receptacles

B. State of Good Repair



The *Bay Street Innovation Corridor* project modernizes the existing Skyway vehicles that are facing obsolescence. The technology and supervisory control system will provide a higher level of asset monitoring and maintenance requirements to contribute to a more sustainable public transportation system.



The *Bay Street Innovation Corridor* project is comprised of infrastructure modifications for both elevated and at-grade segments of the future U²C system. Technical studies were conducted leading up to and following the decision to modernize the Skyway with new autonomous technology. Specifically, the *Infrastructure Assessment Report* provides detailed discussion regarding the condition and feasibility of the elevated infrastructure to accommodate the new technology and extension of the system to the ground level. These documents can be accessed at <https://www.jtafla.com/buildgrant>.

The proposed project involves modernization of a portion of the existing elevated Skyway infrastructure to accommodate autonomous vehicles systems. This transformation will include upgrading the aging existing infrastructure. If the Skyway infrastructure is not improved it will continue to deteriorate and reduce the efficiency of the local transportation network and further limit economic growth opportunities along the corridor. The new infrastructure will be included in JTA's Transit Asset Management Plan in accordance with Federal Transit Administration (FTA) policies and procedures. Operations and Maintenance will be funded through the existing revenue dedicated to the Skyway. The upgrades will prolong the useful life of the structure therefore reducing overall life-cycle costs.

The at-grade segment will use the existing public roadway network in Jacksonville. Improvements will include resurfacing, re-installation of pavement markings, construction of new sidewalk and transit shelters as well as modernize the traffic control system to allow safe and efficient operation of the autonomous vehicles. Project improvements will enhance mobility in Downtown Jacksonville and provide more opportunity for economic growth. These upgrades will improve the condition of the existing roadway network thereby reducing life cycle costs. JTA has a long history of participating in maintenance agreements with the City of Jacksonville and will follow procedures to ensure that the new facilities will be properly maintained consistent with the JTA's and the City of Jacksonville's maintenance program.



Looking west toward Jefferson Station at Lofts of LaVilla construction. Completed Fall 2017.

C. Economic Competitiveness

The *Bay Street Innovation Corridor* is part of a long-term strategy to integrate new technologies to enhance mobility and overall well-being in Northeast Florida. Because the project involves the deployment of innovative solutions, the economic competitiveness impact translates beyond Jacksonville and Northeast Florida, as these solutions are scalable and provide a template to deploy in other cities.

Expansion of Private Development

The expansive nature of Jacksonville has challenged mobility and resulted in auto-dependent development solutions with extensive use of land for surface parking. This is inconsistent with the typical character of urban areas. Oftentimes, parking and the lack of mobility solutions has affected the decision of businesses to locate in Downtown. Further, the development of residential properties has too often been driven by the availability of parking.

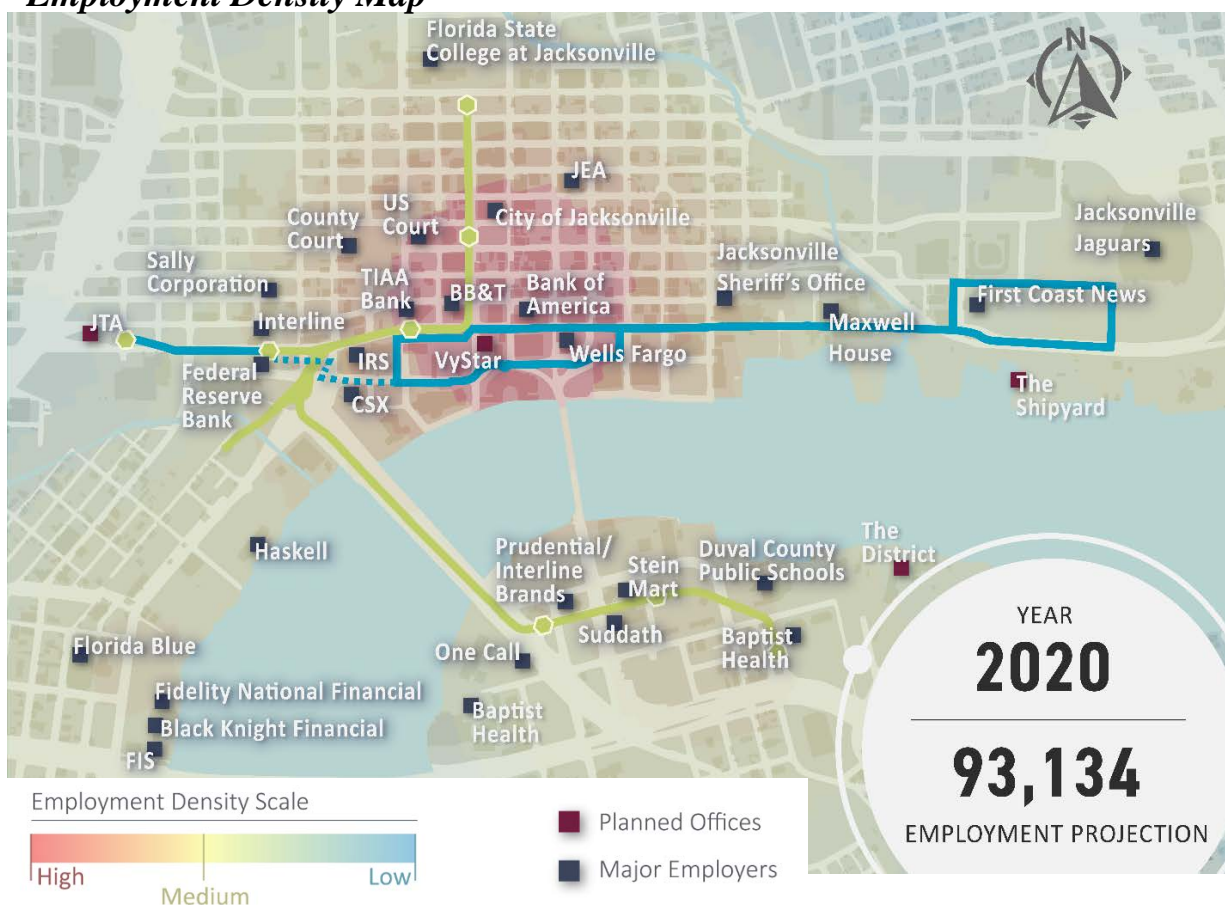
As outlined in the *Context* portion of this application, this project supports major economic development occurring today and planned for the future, especially in the LaVilla District located on the west end of the corridor; and Sports/Entertainment Complex on the east end of the corridor. Approximately **\$2.5B** in development is planned for the Sports/Entertainment Complex, redevelopment of the old county courthouse and former city hall on Bay Street. New residential development is quickly emerging in the LaVilla District. JTA and the DIA are jointly planning a development strategy for LaVilla where both entities own significant undeveloped land around the JRTC, which is under construction. The development opportunities along the corridor are particularly exciting given the amount of publicly owned property that can be put into active use. Converting these assets into private development adds to the tax base and creates opportunity for Transit Oriented Development (TOD), joint use development and value capture, all of which are under evaluation as part of the long-term funding and project delivery strategy of the Bay Street Innovation Corridor project.

Enhancing Mobility

The *Bay Street Innovation Corridor* will enhance access to transportation options and improve mobility by introducing autonomous transit service and optimize the flow of traffic through connected smart signals, reducing congestion and increasing fuel economy.

The 3.2 mile *Bay Street Innovation Corridor* is an initial segment of the U²C Program and is projected to carry approximately 2,500 passengers per day. Because the current circulator system was not fully built out, it does not effectively connect residential, employment, and retail nodes. Once fully built, the 10-mile U²C system will connect more origins and destinations to deliver complete trips in Downtown serving as a true circulator system and to vibrant neighborhoods adjacent to the urban core. Additional data maps are included with supporting documents at <https://www.jtafla.com/buildgrant>.

Employment Density Map



Developing Technologies for Competitiveness

The *Bay Street Innovation Corridor* seeks to capture broader benefits than mobility and Downtown development. The additional strategies include:

- ◆ Generating greater service productivity creating a more sustainable and competitive funding model for public transit;
- ◆ Branding Northeast Florida as an innovation hub;
- ◆ Facilitating new solutions to improve well-being through the collection of analytics and access to data through the IDE;
- ◆ Building domestic production capacity for next generation transportation solutions; and
- ◆ Utilizing new technologies to improve productivity and implementing JTA University, a comprehensive workforce development strategy to prepare employees to prosper in the emerging mobility marketplace.

Jacksonville was rated the #2 Best City for young professionals by Forbes Magazine (2017)



Rendering of proposed Shipyards, Lot J and Sports Complex Plan

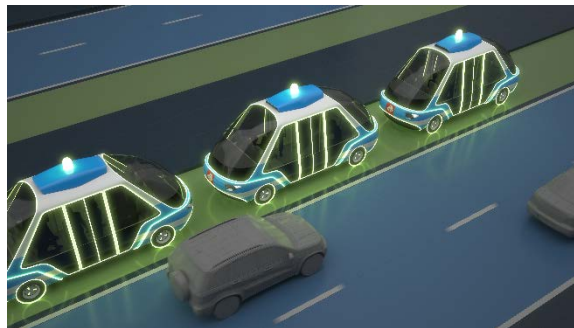
Smart Region Master Plan: How smart technologies and strategies will create a safer, more efficient and reliable transportation system to improve our region's economic competitiveness, sustainability and quality of life.

"We feel that the heart of being a smart city is having an integrated data exchange. We're deciding to do the heaviest lift first."

Jeff Sheffield, Executive Director, North Florida TPO

D. Environmental Protection

A key component of the *Bay Street Innovation Corridor* is the implementation of an autonomous transportation network using autonomous shuttles. Based on current research and industry engagement, the proposed autonomous transportation network will utilize a fleet of electric vehicles. These vehicles will reduce the dependence on oil and will reduce emissions. Dynamic signals and Greenwave technology will optimize traffic flow reducing congestion related emissions and increasing fuel efficiency.



Concept Vehicle

It is anticipated that the project will be implemented entirely within existing right of way thereby minimizing adverse environmental impacts. It is expected that the project will be eligible for permitting through a documented Categorical Exclusion (CE) or a limited Environmental Assessment (EA). A portion of the project, the elevated segment between the JRTC and Jefferson Station was determined to be a class of action as a CE. Please refer to **Section IV. C Required Approvals** for additional discussion of the environmental classification.

The project will be developed to minimize impacts and opportunities to streamline permitting and will be coordinated directly with authorities having jurisdiction including the FDOT, City of Jacksonville, St Johns River Water Management District, and local utility companies.

The new autonomous vehicles will operate on existing paved surfaces minimizing the need for additional construction and increased storm water runoff. Where feasible landscaping will be incorporated along the corridor to provide better aesthetics and create additional permeable area to better absorb rainfall and contribute to groundwater recharge.

The introduction of a state of the art transit system will provide incentive for redevelopment of brownfield areas within Downtown Jacksonville. Dedicated transit lanes or shared use “smart lanes” will reduce overall vehicle miles traveled and reduce need for surface parking at events.

Autonomous vehicles will reduce global oil independence by improving vehicle efficiency.

Source: SAFE, Commission on Autonomous Vehicle Testing & Safety, January 2017

E. Quality of Life

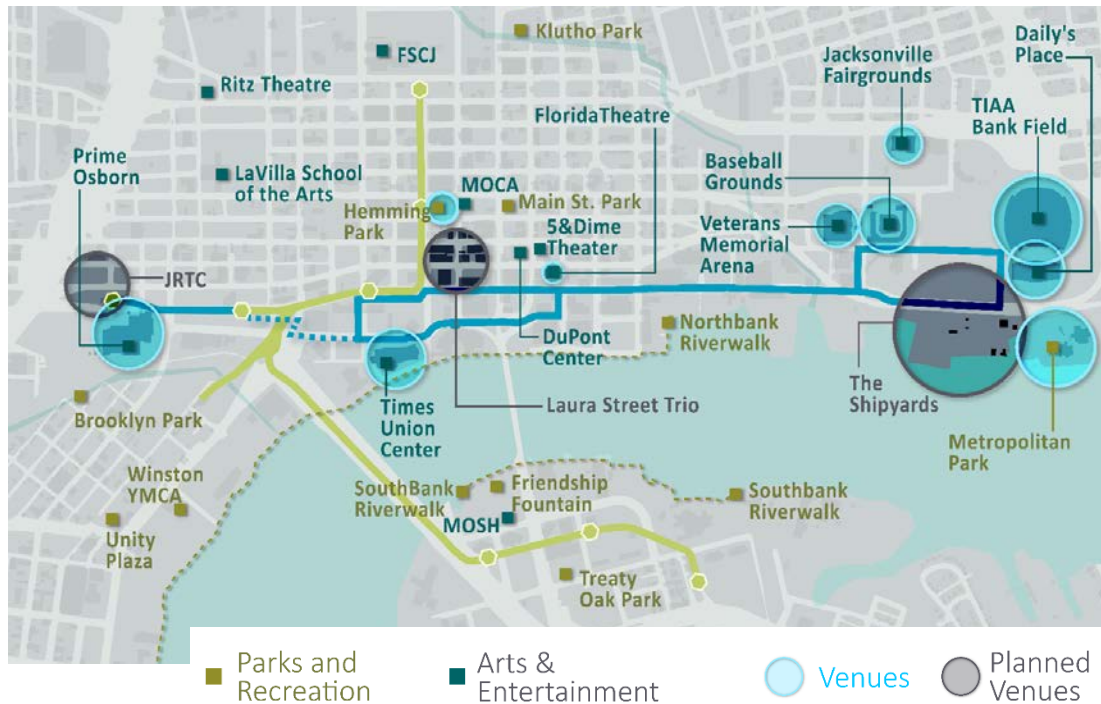
Downtown Jacksonville is the center of employment, culture and healthcare for the region. The Bay Street Innovation Corridor provides new safe, efficient and accessible transportation choices in the urban core enhancing the overall live, work, play and shop experience for Jacksonville’s residents, businesses and visitors. Through this collaborative project, the *Bay Street Innovation Corridor* builds upon the diverse and multi-modal transportation options, connecting popular residential neighborhoods, the business district and the numerous sports and entertainment venues along the corridor. There have been 883 events held with over 2.2 million participants since July of 2017.

The *Bay Street Innovation Corridor* connects the burgeoning Brooklyn and LaVilla Historic Districts on the west, and the revitalized sports and entertainment district on the east, enhancing accessibility to restaurants, theatre, sports and entertainment.



“The Elbow” Downtown Jacksonville

Art/Entertainment/Venue Map



“There absolutely are people waiting to invest (Downtown). Once you get the pioneers in, the others will jump in.”

-Daniel Davis, JAX Chamber CEO, J Magazine, June 2018

F. Innovation

The *Bay Street Innovation Corridor* incorporates innovative technologies, project delivery and financing.

Innovative Technologies

The project is centered on utilizing innovative technology. What distinguishes the *Bay Street Innovation Corridor* from other technology innovations is the context for deployment. Autonomous transit demonstrations have become fairly commonplace. The important next step is distribution of the technology in a setting that allows significant public benefit and involves the organization of a network of connected autonomous transit vehicles. By deploying in an urban setting to support economic development, the autonomous transit network created in this project is not just innovation, it represents industry transformation.

New Transit Paradigm

Traditionally, transit operations thrive when providing high frequency service in densely populated areas. Transit has been less productive providing low-density service, first and last mile connections, late night and entertainment based services without regular schedules. This results in a model plagued by lower cost recovery than desired from public investments.

New technologies like autonomous vehicles hold the promise of making transit services more efficient, flexible and productive. Ideally, this results in cost efficiencies allowing deployment of more frequent service on heavily traveled corridors. At the same time, JTA envisions incorporating demand responsive or dynamically scheduled services to allow more effective feeder services and first and last mile connections. In the end, how the transit industry captures new technologies will help define transit's place in the emerging mobility ecosystem. With that in mind, this project will assist in establishing the template for the future of public transportation.

Changing the Transit Paradigm with New Technology

- Reduce the cost per revenue hour of service
- Enhance service and accessibility without increased operating costs
- Provide service frequency and flexibility
- Address first and last mile connectivity, generate new operating revenue sources
- Provide operational funding sustainability by improving fare recovery

Digital Architecture and Technology Roadmap

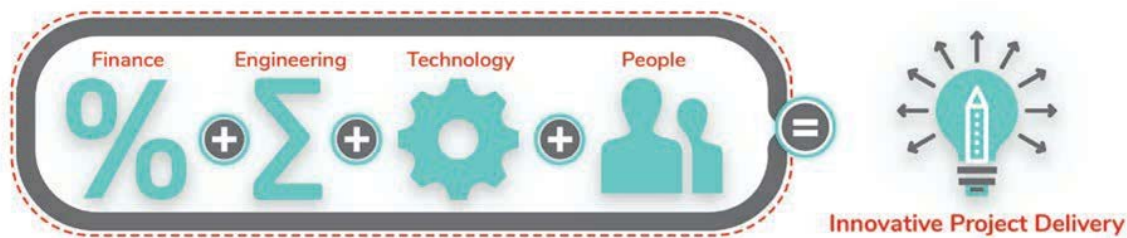
Success demands building the framework of software and digital systems architecture that will support our autonomous vehicle infrastructure. Key features of our digital strategy include seamless data transfer between all layers and cybersecurity as a standard build-in to every element.

The view of the digital environment is holistic, including functionality for operators, maintenance, revenue, fleet management, safety and security and artificial intelligence. As a custom digital framework is assembled, we are conscious that our primary user, the customer, must have access to our data and transparency into our system. As with big tech, the user experience and peer-to-peer advocacy of our system is paramount to our success.

The proposed system architecture and technology roadmap, illustrated in **Section V: A. Technical Feasibility**, will ensure secure and efficient transfer of information between the infrastructure, autonomous vehicles and the operational systems that will monitor and manage them. Data obtained from the environment will be warehoused and analyzed for opportunities in several areas including, operational efficiencies, safety and security and maintenance planning.

Data Management

Integrating new smart city technology into the *Bay Street Innovation Corridor* will make this project the “**Complete Street of the Future**” with connected smart signals, pedestrian sensors, smart parking systems, and flood sensor detection among other enhancements. The *Bay Street Innovation Corridor* will produce vast amounts of data. The influx of new data will provide data analytics opportunities to help understand ridership patterns and improve service. The IDE will be the foundation for leveraging transportation based “Big Data” in the region. Although not a highly-visible infrastructure component, the deployment of an IDE is a fundamental building block in the Innovation Corridor. Without the development of a way for information to be shared and data analytics to be performed the implementation of the field equipment and operation of an autonomous vehicle system will not function to its full potential. With it, stakeholders and users can “self-service” their data and analytics needs. Users browse the data catalog to find and select available data to work with. Once data is provisioned, users can use the analytical tools of their choice to develop models and reports.



Innovative Project Delivery

Traditional project delivery is time consuming, relies heavily on public grant funding, does not foster innovation and places too much risk on risk averse public agencies. The clock speed of technology development will challenge the transportation planning and project development model. It will also present incredible opportunities to change the relationship between local, state and federal partners to develop a sustainable model for planning, developing, constructing and operating transportation services.

The *Bay Street Innovation Corridor* envisions Public-Private Partnerships (P3s) to assume certain technology risks, enhance accountability, bring incentives for innovations with new technology and expedite project delivery. Project partners understand the complexities of procuring, contracting and delivering a P3 and based on prior experience, JTA is well-suited to create a model innovative project delivery framework. Additionally, the State of Florida is a leader in supporting statutory authorization for P3s. Managing risk will be an integral part of delivering innovative projects. As part of this project, JTA has taken initial steps to conduct a risk assessment analysis of the U²C Program and held an industry wide forum with national and international experts in attendance. The preliminary risk assessment will serve to advise project partners of potential risks,

as well as opportunities, as new guidance and legislation pertaining to autonomous vehicles is in development.

Innovative Funding and Financing

The BUILD Grant presents an important opportunity to accelerate innovation outside the traditional funding programs. Because JTA has developed an extensive public and private sector funding partnership (\$37.9M in nonfederal funding, including \$9.5M from private sector partners), the BUILD Grant can serve as the critical funding element to leverage additional resources.

In addition to the funding commitments secured, the project team is developing additional long-term funding strategies for the U²C Program and the Smart Technology components. JTA also has evaluated existing real estate assets and has been aggressively marketing assets deemed surplus or underutilized. JTA expects to generate up to \$25M-\$30M in the sale of property over the next two years that will be dedicated to JTA's capital program. In addition, the JTA owns several parcels along the planned U²C system that will be part of TOD or joint use development projects. As noted in the ***Project Description***, there are several publicly owned parcels that are vacant or underutilized that will be put into private development. This presents a unique opportunity for joint use, TOD and value capture to support capital and operating costs of the system.

Because the *Bay Street Innovation Corridor* will generate significant data, management of that data can generate revenue opportunities to support long term operations. A financial plan will be a critical element to successful project delivery.

G. Partnerships

Delivering complex innovative projects in the evolving mobility ecosystem demands strong partnerships to leverage resources, manage risk and capitalize on specialized expertise. The *Bay Street Innovation Corridor* is built upon a partnership web of multiple public and private entities.

On the public side, the JTA, North Florida TPO, City of Jacksonville and JEA are key project planners and implementers. Joint planning and ongoing coordination between the JTA and North Florida TPO has established the vision for leveraging new technologies and autonomous transit on the Bay Street corridor. The JTA, City of Jacksonville and JEA own assets critical to the effective delivery of the project.

Private sector partnerships include the Jacksonville Regional Chamber of Commerce (JAX Chamber), and other private sector partners specializing in the advancement and deployment of autonomous vehicle technologies to deliver this **transformative** and innovative project. JTA has conducted market research of potential private sector partners and based on that analysis identifies that there is a minimum of \$9.5M of available private sector investment for the *Bay Street Innovation Corridor*.

Public Sector Roles

The JTA owns, manages and operates the existing Skyway. JTA will be managing project development, design, construction and operations of the autonomous vehicle or U²C component of the project.

The **North Florida TPO** has been leading the development of the North Florida Smart Region Plan which includes the *Bay Street Innovation Corridor*. The North Florida TPO is developing and will support operation and maintenance of the IDE and is funding design of initial smart corridor elements, including connected signals. The North Florida TPO (with concurrence of the FDOT) is allocating \$2M in federal Sub-allocated Urban (SU) Funds.

The **City of Jacksonville**, owner of the at-grade sections of the Bay Street corridor, is overseeing design of initial smart corridor elements and will assume the operations and maintenance of the non-autonomous vehicle transit elements of the smart corridor.

JEA, a publicly-owned utility, will be providing electrification and access to “dark fiber” on the Bay Street Corridor valued at \$5.4M. JEA will also provide any substation upgrades as needed.

Private Sector Roles

The **JAX Chamber** is a key partner to leverage the *Bay Street Innovation Corridor* to generate economic development in Northeast Florida. JAX Chamber has identified the *Bay Street Innovation Corridor* as an opportunity to market Jacksonville as a leader in transportation innovation and is working with project partners to facilitate location of companies in Northeast Florida.

Based on market sounding JTA anticipates the private sector partners will participate in the implementation as follows:

- ◆ Vehicles, vehicle hardware and charging stations;
- ◆ Supervisory system software and Computer-Aided Dispatch/Automatic Vehicle Location (CAD/AVL); and
- ◆ Support for the development of the proof of concept for the Integrated Data Exchange.

Regional Collaboration

This project provides scalable solutions that can be implemented regionally. The North Florida TPO envisions expanding the IDE and working with regional partners to implement autonomous transit solutions in locations throughout Northeast Florida. The North Florida TPO facility is also home to the Regional Transportation Management Center (RTMC) which houses multi-agency emergency management personnel.

Partnership



Diverse Partnerships

The utilization of smart city technology means the *Bay Street Innovation Corridor* will impact more than transportation. Various sensors will also monitor the pulse of activities within the City of Jacksonville and provide public safety benefits through elements like ShotSpotter, as well as pedestrian sensors and flood monitoring. Additionally, smart parking, smart waste collection and smart lighting equipment will enhance the public realm and result in operational efficiencies.



Bay Street Rendering

Letters of Support from these partners and other stakeholders are contained in the supporting documents for this application and can be accessed at <https://www.jtafla.com/buildgrant>.

H. Non-Federal Revenue for Transportation Infrastructure Investment

Non-federal revenue for the project has been identified through the local funding provided by JTA and JEA in the amount of \$13.9M; state funding through the Florida Department of Transportation's New Starts program in the amount of \$12.5M per F.S.341.051(5)(a); and private investment proposed in the amount of \$9.5M based on JTA's market research of industry stakeholders. The private funding partners are vested in this transformative project to advance the industry and be leaders in the autonomous transit world. In the event that any one of the private partners are unable to fulfill the anticipated investment in the project, JTA is prepared to find other funding alternatives to fulfill this proposed project's financial commitments.

As the applicant, JTA will comply with all federal procurement rules related to the engagement of private partners. There are no other financial or legal impediments to this partnership for the project.

V. Project Readiness

A. Technical Feasibility

A series of planning studies and technical analyses have been conducted or are currently underway as part of the project development and implementation phases of the U²C Program and Smart Region Master Plan. Concurrent with the analyses, these two programs also incorporated community engagement and stakeholder collaboration as part of the planning and decision-making processes. These activities provide the foundation to move forward with the successful implementation of the *Bay Street Innovation Corridor*.

Specifically, the following key activities have been completed or underway:

- ◆ Advancement of design of the elevated segment of the infrastructure which connects to the JRTC currently under construction;

- ◆ Proof of Concept Phase for the Integrated Data Exchange (Resources are in place to advance to construction commencing July 1, 2019);
- ◆ A connected intersection project for three of the intersections located at the eastern end of the Bay Street corridor, to be interoperable with the JTA Test & Learn facility adjacent to Bay Street’
- ◆ Partner coordination with JEA for the use of the available dark fiber infrastructure.

In addition, the following activities have been recently completed or are in progress. A brief description follows. More detailed information can be accessed through the BUILD Grant Application website at: <https://www.jtafla.com/buildgrant>

- ◆ Skyway Infrastructure Assessment;
- ◆ Technology Roadmap;
- ◆ AV Test & Learn Facility; and
- ◆ Transit Concept and Alternatives Review Study.

Skyway Infrastructure Assessment

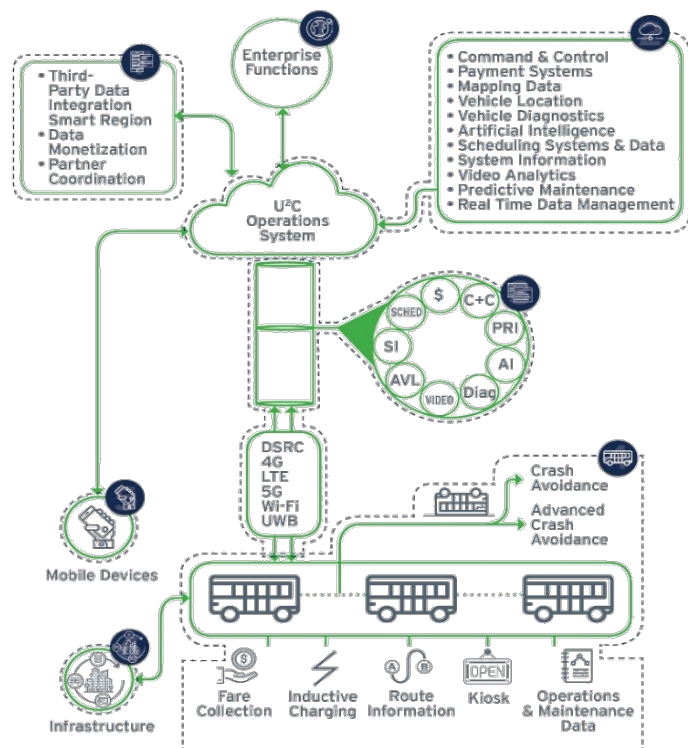
The assessment documents provide a more in-depth look at the current condition of the existing Skyway infrastructure and the feasibility for the transformation to maximize this important community investment. The technology and modernization program documents provide additional details on the industry input, autonomous vehicle options, as well as physical constraints and operating conditions. Preliminary concept plans and conceptual typical sections are located in the application support documents on the website at: <https://www.jtafla.com/buildgrant>

Technology Roadmap

JTA developed a vision for an autonomous transportation network and devised a plan to address the technology components, software integration platform and operating environment, keeping in mind the pace at which technology is advancing.

AV Test & Learn Facility

In December 2017, JTA launched an experimental test track to evaluate various autonomous vehicles in development. This allows for on-site testing, and for decision makers and the community to ride and tour the test track.



Technology Roadmap



The AV Test & Learn Facility is currently testing and evaluating multiple vehicles from the autonomous vehicle industry. This process will enable JTA to learn how to operate and plan for autonomous shuttles as part of its overall public transportation system. Additionally, it is an important component of proving exposure to AVs for the public. To date, there have been more than 22 events and 860 people have participated at the Test & Learn Facility.

Transit Concept and Alternatives Review (TCAR)

JTA has coordinated with the FDOT and initiated the TCAR process to position the project for future funding eligibility from state and federal resources. The TCAR process, a process similar to the FTA's former Alternatives Analysis, defines mode and alignment and provides a comprehensive review of potential impacts, benefits and costs of the proposed project.

The TCAR process further examines the future system plan, operating scenarios, ridership forecasting, land use, economic development, and potential project costs. The TCAR process also included community and stakeholder engagement. The JTA has convened agency partners, held a public forum and provided numerous project presentations to share information and gather public input on the future vision for the Skyway. The proposed U²C System Map and other materials prepared as part of the TCAR process can be accessed at <https://www.jtafla.com/buildgrant>.

JEA Dark Fiber Connectivity

A key component, included as part of the infrastructure, but essential to enable the connectivity is the JEA's extensive network of "dark fiber", unused fiber-optic infrastructure. The "dark fiber" is a major advantage for the *Bay Street Innovation Corridor* project readiness. Fiber-optic cable can be used for telecommunication transport services including voice, video, data, and internet by either communication carriers or business enterprises. JEA's network is made up of 500 miles of fiber-optic cable running various routes throughout the Jacksonville metropolitan area. The network runs below ground and overhead, and is in close proximity to critical commercial and industrial locations.

The fiber increases Jacksonville's status as a "wired-city" and reduces the need and costs of construction, and increases speed to market for many projects as opposed to building a network. The "dark fiber" network also includes a data center and network access point (NAP) located in Downtown Jacksonville. The NAP provides direct connection for fiber-optic paths to Atlanta, Miami and Dallas as well as Central/South America and the Caribbean providing Downtown Jacksonville and its technologies global accessibility. Along with the extensive network of "dark fiber" there is an additional 3.1 miles of "Lit" fiber along the corridor.

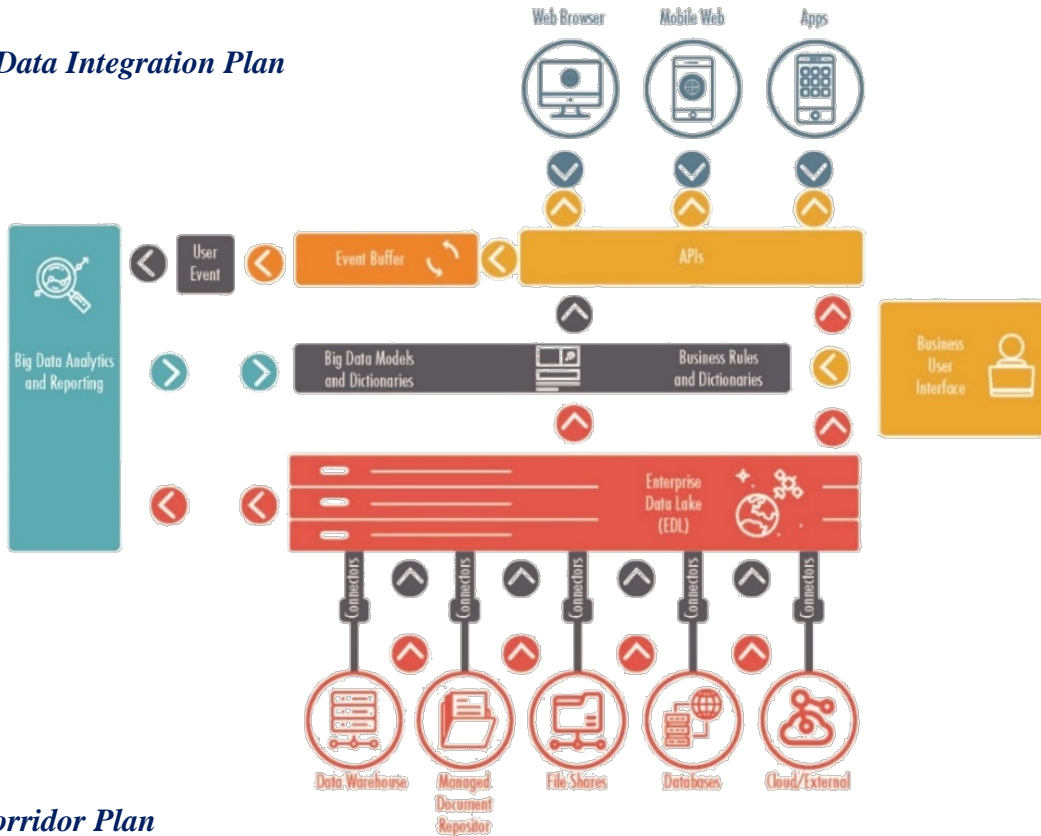
JEA Fiber - Charging Stations



Integrated Data Exchange

The North Florida TPO recently initiated the Proof of Concept phase for the IDE. The IDE will capture the proliferation of data generated by sensors along the Bay Street Transportation Corridor and make it accessible to improve the efficient movement of traffic, optimize existing and new infrastructure investments, and facilitate the development of new applications to improve general well-being for all residents, businesses and visitors. Additional information is available at: <http://northfloridatpo.com/>.

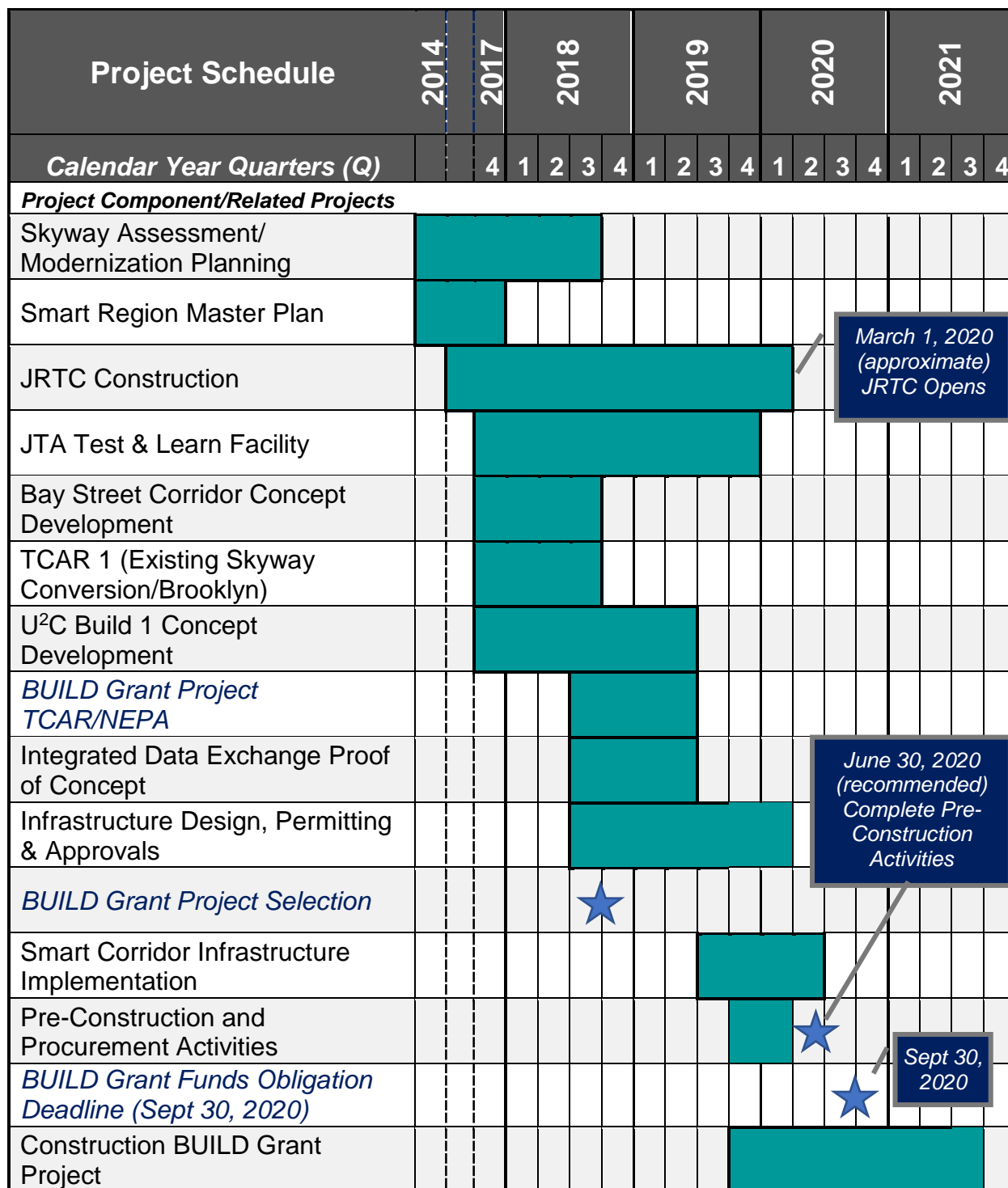
Data Integration Plan



Smart Corridor Plan



B. Project Schedule



C. Required Approvals

1. Environmental Permits and Reviews

a. National Environmental Policy Act (NEPA)

The first phase of the *Bay Street Innovation Corridor* has completed some of the NEPA process. On April 7, 2017, FTA determined that the Skyway Conversion and Brooklyn Extension project qualifies for Categorical Exclusion C9 (23 CFR 771.118(c)(9)), “Assembly or construction of facilities that is consistent with existing land use and zoning requirements (including floodplain regulations) and uses primarily land disturbed for transportation use.”

FTA also determined that the existing Skyway Conversion project qualifies for Categorical Exclusion C8 (23 CFR 771.118(c)(8)), “Maintenance, rehabilitation, and reconstruction of facilities that occupy substantially the same geographic footprint and do not result in a change in functional use.”

b. Other Approvals

The at-grade portion of the project is preparing for the entry into the FDOT Efficient Transportation Decision Making process to gain comments from reviewing agencies and the FTA Checklist for Class of Action determination is being prepared to submit to FTA Region 4.

c. Other Studies

The JTA has been evaluating the Skyway infrastructure and modernization through a series of studies and technical analyses. These documents are available on the application website and can be accessed here. <https://www.jtafla.com/buildgrant>. Currently the JTA is completing the initial Transit Concept and Alternatives Review (TCAR) Study for the entire elevated Skyway system and the extension to the Brooklyn area in cooperation with the FDOT.

d. Agency Coordination

The JTA is coordinating with the FDOT, North Florida TPO and the City of Jacksonville on the modernization studies and advancement of the U²C Program. The JTA project team has been involved in numerous project presentations to other government representatives and decision makers in the community. Most recently, the proposed *Bay Street Innovation Corridor* project was presented to the North Florida TPO Board of Directors, Technical Coordinating Committee (TCC) and Citizen Advisory Committee (CAC).

The North Florida TPO has conducted workshops and coordinates regularly with JAX Chamber, FDOT, City of Jacksonville, JTA and other agencies on the implementation strategies and technology projects outlined in the Smart Region Master Plan. For more information please visit the North Florida TPO website <http://northfloridatpo.com/>

e. Public Engagement Activities

Both the JTA and the North Florida TPO routinely engage in comprehensive public engagement activities as part of the project development process.

During the Skyway modernization and U²C planning studies, JTA conducted online surveys and provided numerous presentations to groups representing a variety of stakeholders including elected officials, policy makers, community leaders and citizens. Multiple public forums were held to

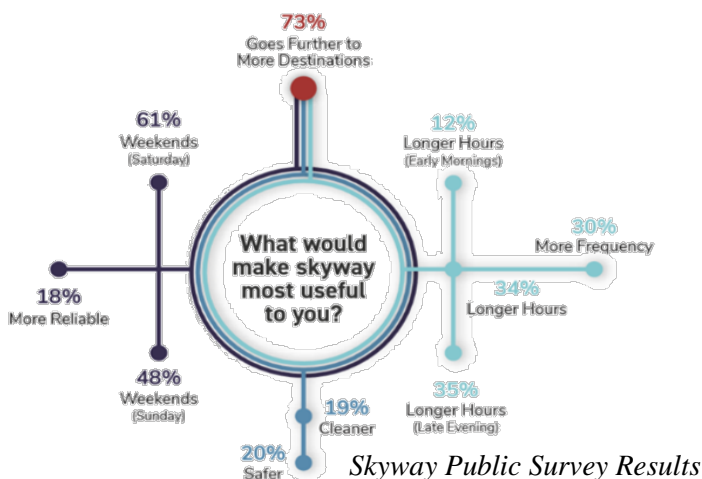
provide additional opportunities for public input. Community and stakeholder input was critical in confirming the location and prioritization of the proposed Skyway extensions adopted as part of the U²C System Plan.

Additionally, the North Florida TPO convened a coalition to engage the community as part of the development and implementation of the Smart Region Master Plan and Smart Region Vision. Additional information may be accessed through the North Florida TPO website <http://northfloridatpo.com/>.

2. State and Local Approvals

Locally Preferred Alternative

The *Bay Street Innovation Corridor* was approved as the Locally Preferred Alternative on June 6 and June 14, 2018 respectively by the North Florida TPO a TCC, CAC, and the North Florida TPO Board of Directors, following a presentation and detailed discussion on the proposed project improvements. The JTA Board of Directors approved the LPA at its June 2018 meeting.



3. Federal Transportation Requirements Affecting State and Local Planning

An earlier concept of the Skyway expansion was previously adopted into the 2040 Long Range Transportation Plan. If funded, the North Florida TPO will amend the Transportation Improvement Program (TIP) and FDOT will amend the State TIP to include the *Bay Street Innovation Corridor* project.

D. Assessment of Project Risks and Mitigation Strategies

In November 2017, KPMG conducted an extensive Risk Assessment of the U²C program. The study focused on three major areas that JTA has been actively working towards. These include Organizational Alignment, Funding Requirements, and Time Requirements. A technology plan has been developed and JTA has begun its implementation. Funding requirements for the phases of the program have been determined and funding sources are being sought. Time requirements in the risk assessment include the timing of the changing technology which is being addressed through use of an open architecture and plug and play software modules for integration.

Key risk factors identified that could affect project cost, schedule or both include:

- ◆ Right of Way – Securing City approval for dedication of lanes for the Autonomous vehicles could affect cost and schedule;
- ◆ Technology – Readiness of technology for deployment in urban environment could affect schedule;
- ◆ Permitting – Permit approvals from various authorities will be required and could contribute to schedule uncertainty;

- ◆ Feasibility of Elevated Conversion – Project development will confirm scope of modifications required to safely transform the elevated monorail structure and could contribute to schedule and cost risk; and
- ◆ Equipment - Availability of and delays associated with delivery of vehicles, supervisory system and other project components and unknown costs associated with operating an AV system.

JTA will mitigate these risk factors by developing detailed project risk registers at key stages of project development including:

- ◆ Concept Plans;
- ◆ Permit Plans;
- ◆ Pre-Procurement;
- ◆ Procurement;
- ◆ Construction; and
- ◆ Operations and Maintenance.

The registers will include a probability for each risk factor, potential cost or schedule delay and the risks will be mitigated by adjusting project scope, schedule, delivery method, contract requirements during project development to ensure effective reduction and appropriate assignment of risk.

E. Benefit-Cost Analysis

Investment in the *Bay Street Innovation Corridor* offers the opportunity to generate a variety of benefits that align with the BUILD merit criteria, based on the United States Department of Transportation guidance on the preparation of BUILD applications. Where USDOT has not provided valuation guidance or a reference to guidance, standard industry practice has been applied. (See Benefit-Cost Analysis Technical Appendix for complete summary and backup information).

In the benefit-cost analysis conducted for this application, benefits are estimated for current and future users on an incremental basis; that is, the change in welfare that consumers and, more generally, society derive from the investment, as compared to the current situation. As with most transportation projects, the benefits derived from the implementation of an infrastructure project are actually a reduction in the costs associated with transportation activities. The benefits of a project are the cost reductions that may result from the project's implementation. These cost reductions may come in the form of average time saved by users, reductions in operating expenses, decreased levels of pollution, or more generally, a combination of multiple effects.

Two alternatives were compared in the benefit-cost analysis, a build and no-build scenario. The build scenario represents the corridor improvements, including the Innovation infrastructure, as described in this application. The no-build scenario reflects the status quo. For the build scenario, it is estimated that the project will require \$62.9M in capital expenditures. Annual operations and maintenance costs after the improvements are made are expected to be \$123,559.

Benefits are generated by the improved corridor, as well as the travel time savings generated by the addition of an Innovation system. It should be noted that we anticipate that riders of the AV's will experience a reduction in personal transportation costs as well. For example, rideshare users

who use the AV system will save in rideshare fares. Similarly, existing automobile drivers who park in the project area will not incur that parking expense. A complete discussion of the sensitivity analyses conducted as a part of this benefit-cost analysis is provided in the technical appendix that accompanies the application. In addition, the benefit-cost model is included to allow USDOT to conduct additional sensitivity analyses as desired.

The table below presents results of the benefit-cost analysis conducted for this application. Using the discount rate recommended in the BUILD Benefit-Cost Analysis Guidance (7%), the *Bay Street Innovation Corridor* improvements are expected to generate a benefit cost ratio (BCR) of 2.32 when discounted at 7 percent. At a 3 percent discount rate, the BCR is 4.12.

Benefit and Cost Categories	Value @ 7% Discount	Value @ 3% Discount
<i>BENEFITS</i>		
Travel Time Savings	\$25,394,457	\$49,106,937
VOC Impacts	\$94,745,691	\$183,215,993
Downtown Congestion Reduction	\$768,485	\$1,486,070
Emissions Impacts	\$24,948	\$45,392
Safety Benefits	\$3,087,480	\$5,970,464
Total Benefits	\$123,252,577	\$239,824,856
<i>COSTS</i>		
Capital Costs	\$50,534,771	\$57,149,554
Operations & Maintenance Costs	\$1,169,708	\$2,151,748
Total Costs	\$51,704,479	\$59,301,301
<i>PERFORMANCE OUTCOMES</i>		
Net Present Value	\$72,316,583	\$180,523,554
Benefit-Cost Ratio, Ratio	2.43	4.16

VI. Supplemental Information to Support Application

The following materials are located on the application website which can be accessed at the following link: <https://www.jtafla.com/buildgrant>

- ◆ Letters of Support
- ◆ Bay Street Innovation Corridor Maps and Concept Development
- ◆ Benefit-Cost Analysis Technical Memorandum
- ◆ Downtown Development Documents
- ◆ Skyway Technology Assessment Documentation
- ◆ U²C Program Development and Outreach
- ◆ Smart Region Master Plan
- ◆ Skyway History
- ◆ Project Corridor Photos