

TCAR Report



JACKSONVILLE
TRANSPORTATION
AUTHORITY

APPENDIX D

Ridership Forecast Technical Memorandum



Ridership Forecast
Transit Concept and Alternatives Review (TCAR)
Skyway -Brooklyn Extension Scenarios



September, 2018

Contents

List of Tables	3
Introduction	4
Background	4
JTA Studies, Plans and Projects.....	7
Technology Assessment.....	7
2015 JTA Route Optimization/Blueprint.....	7
First Coast Flyer BRT	8
Downtown Investment Authority (DIA) Redevelopment Master Plan.....	10
STOPS Implementation for the Jacksonville Area.....	12
STOPS Introduction	12
STOPS Model Application	13
Geographic Scope of Analysis	13
Population and Employment Assumptions.....	17
Year 2015 Transit System Represented in STOPS.....	21
Operating Speed Assumptions.....	22
Validation to Year 2015 Ridership Data.....	22
First Coast Flyer Adjustments	24
Scenario Development.....	25
Year 2017 No Build.....	25
Year 2022 No Build.....	28
Year 2022 Scenarios without Brooklyn Station.....	28
Year 2022 Scenarios with Brooklyn Station	31
Conclusion.....	34

LIST OF FIGURES

Figure 1 Study Area Location	5
Figure 2 Existing Skyway System.....	6
Figure 3 First Coast Flyer (BRT) System.....	9
Figure 4 Downtown Investment Authority Area.....	11
Figure 5 NERPMAB Area	14
Figure 6 STOPS Districts Region	16
Figure 7 STOPS Districts Downtown	17
Figure 8 Year 2022 1A Build Scenario – without Brooklyn Station 45 second frequency.....	29

Figure 9 Year 2022 1B Build Scenario – without Brooklyn Station 30 second frequency.....	30
Figure 10 Year 2022 2A Build Scenario – with Brooklyn Station 45 second frequency.....	31
Figure 11 Year 2022 2B Build Scenario – with Brooklyn Station 30 second frequency.....	32

List of Tables

Table 1 District Numbers and Names	15
Table 2 NFTPO Year 2010 and 2030 Population Estimates by County	18
Table 3 Population and Employment Data Estimates for the Years 2010, 2015, 2020, 2030, and 2040 ...	19
Table 4 Population Growth Patterns between the Years 2010 and 2040	20
Table 5 Employment Growth Patterns between 2010 and 2040	21
Table 6 Year 2015 APC Data and Average Weekday Boardings Comparison	23
Table 7 Year 2015 Skyway Station Boarding Estimates	24
Table 8 Year 2015/2016 Average Daily Boardings – with First Coast Flyer BRT Routes.....	25
Table 9 Year 2017 No Build Scenario – Average Daily Boardings	27
Table 10 Year 2022 No Build Scenario – Average Daily Boardings	28
Table 11 Year 2022 1A Scenario Average Weekday Boardings	29
Table 12 Year 2022 1B Scenario Average Weekday Boardings	30
Table 13 Year 2022 1A and 1B Average Weekday Boardings Comparison.....	31
Table 14 Year 2022 2A Scenario Average Weekday Boardings	32
Table 15 Year 2022 2B Scenario Average Weekday Boardings	33
Table 16 Year 2022 2A and 2B Average Weekday Boardings Comparison.....	34

Introduction

The purpose of this report is to document the modeling process used to estimate the ridership for the Skyway Brooklyn extension as part of the Transit Concept and Alternatives Review (TCAR) process¹.

Prior to discussing the Simplified Trips on Project Software (STOPS) model which was used for the ridership estimations, this report will first introduce the reader to the history of the Skyway system and provide an overview of the transit system in Jacksonville based on the findings and recommendations from recent Jacksonville Transportation Authority (JTA) studies, plans, and projects.

Background

The location of study area is downtown Jacksonville which is located in northeast Florida (See Figure 1). The Skyway is operated by the JTA and opened in 1989 with three stations. It was extended to a 2.5 mile system with eight stations in 2000. (See Figure 2).

Beginning in August 2014, the JTA initiated a study to assess the condition of the Skyway vehicles, operation system, and infrastructure. Based on this study, options were developed to address the needs of the Skyway including an overhaul of the vehicles.

Following the technology assessment, a future needs assessments was conducted which focused on the optimal downtown circulator system, connecting existing and emerging downtown developments. As part of this assessment, the transit ridership within the study area was analyzed in conjunction with future expansion and the Downtown Investment Authority (DIA) plans for future development.

¹ <http://www.fdot.gov/transit/Pages/TCARGuidanceFinalNov2016.pdf>

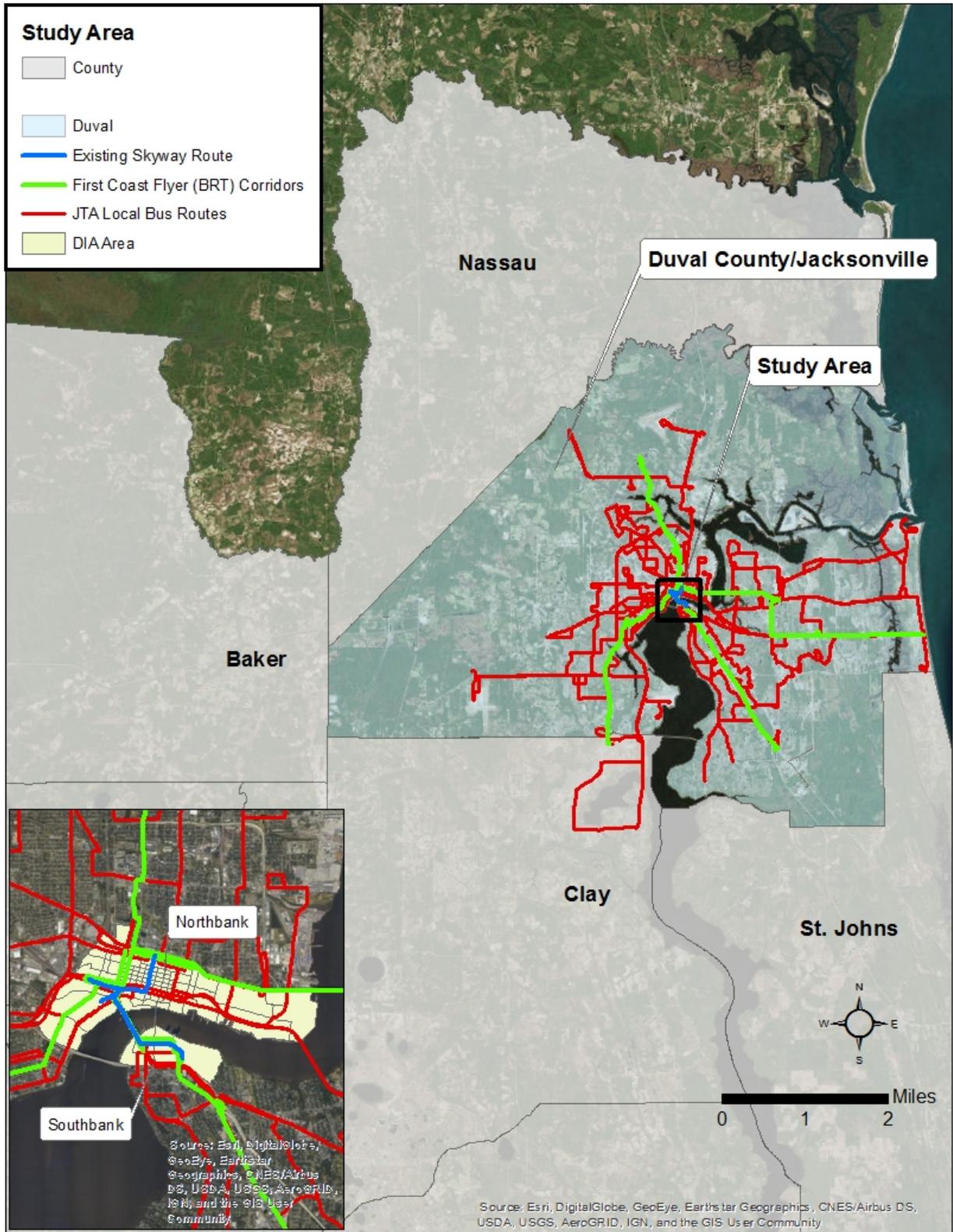


Figure 1 Study Area Location

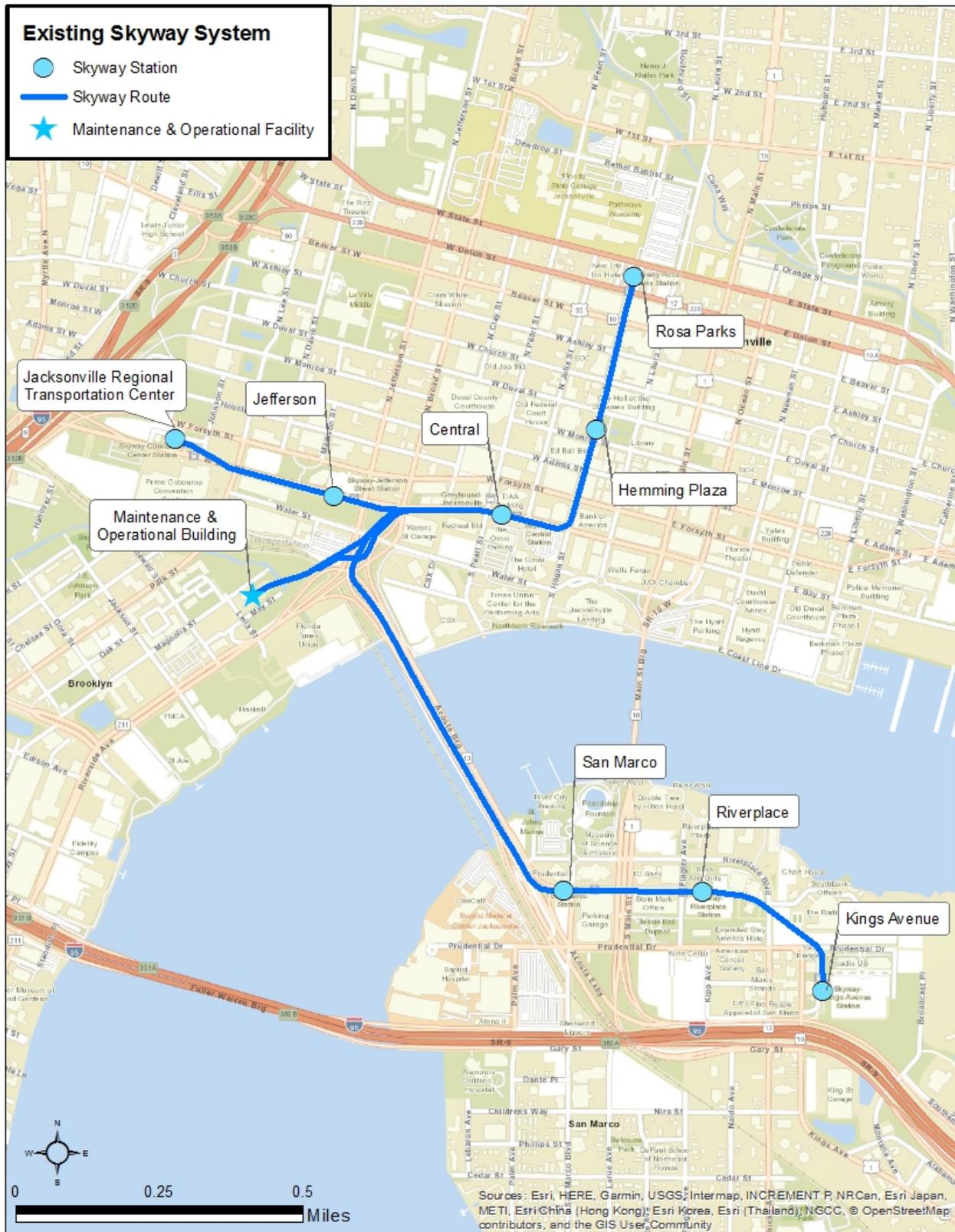


Figure 2 Existing Skyway System

JTA Studies, Plans and Projects

Technology Assessment

In 2014, JTA performed an independent assessment of the industry by putting out a Request for Industry Feedback (RFIF) on the Skyway system. Industry feedback was desired in order to gauge the feasibility of various options for updating the systems:

- simple overhaul of the operating system
- replacement of the vehicles and overhaul of operating system elements
- replacement of existing vehicles with new vehicles and allowing for some modification of the existing infrastructure.

Additionally, JTA also considered the option of replacing the system with streetcar vehicles.

The option to replace the existing vehicles with the same type of vehicle was deemed not viable due to lack of interest. Based on the industry's response, the third more complex solution, which would replace the existing vehicles with no net weight increase on the existing infrastructure, warranted further study. Final recommendations of the report called for additional citizen and stakeholder input. The JTA U²C Modernization Program is a continuation of that effort.

2015 JTA Route Optimization/Blueprint

In 2014 JTA also embarked on an overhaul of its service. This effort was called the Route Optimization Initiative and was part of the Blueprint 2020 Transit Master Plan. The purpose of the Initiative was to completely redesign the bus and community shuttle service to make them more appealing to current and potential riders. Key efforts included aligning bus routes with the First Coast Flyer BRT, optimizing transit routes to make them more frequent and direct, restructuring the entire system (new routes, new numbering, and new service), improving bus hours of operations and making the overall system simpler and easier to use.

The Route Optimization Initiative objectives were intended to increase ridership, increase annual recurring revenues, result in no increase in annual operating budget, and to reinvest increased revenue from ridership into service enhancements. In March of 2015 the ridership was up 10.1% compared to March of 2014. The average weekday ridership was up 7%. The average ridership on Saturdays increased by 10% and on Sundays by 15%. The ridership average over the first four months of the implementation was up 6% by more than 200,000 trips over the same period previous year².

Enhancements included adding a frequent transit network consisting of 22 routes with 30-minute frequencies or better. The network is over 100-miles and serves 90% of current JTA customers. Three new express routes were also added connecting to Park-n-Ride lots as a way

² <http://www.metro-magazine.com/management-operations/news/293926/jacksonville-transit-route-optimization-a-success>

of accessing new markets. The changes were completed and rolled out in late 2014 and by all accounts, has been a resounding success.

First Coast Flyer BRT

The First Coast Flyer's system was developed in five project phases³. Upon completion in 2019, the First Coast Flyer will connect customers to 57 miles of destination travel downtown and in the north, southeast, east and southwest areas of Jacksonville. Flyer service requires minimal use of schedules and features fewer stops, shorter waits, easier transfers, and frequent trips. As the Northeast Florida region expands, the Flyer is expected to be an essential part of a streamlined transit system (See Figure 3).

The downtown portion of the project is complete and in operation. It includes enhancements branded stations, dedicated lanes at Broad, Jefferson, Bay and Forsyth, a queue jump on Forsyth, streetscapes, Transit Signal Priority (TSP), and ticket vending machines. The second phase of the project, the North Flyer (Green Line), began service in 2015. It includes 18 branded stations, eight CNG buses, a Park-n-Ride lot at Lem Turner/I-295, and transit signal priority. The Southeast Flyer (Blue Line), opened in 2016 operates from Rosa Parks to Avenues Walk Park-n-Ride. This line includes seven branded stations and will serve Rosa Parks Station, the LaVilla Neighborhood, Courthouse, the Jacksonville Regional Transit Center (JRTC), Southbank, and Kings Avenue. The East Flyer (Red Line) is under construction and will provide service from downtown via Arlington Expressway to the beaches. While the Southwest Flyer (Purple Line) is under final design. This line will provide service from downtown to the Orange Park Mall.

³ <https://fcf.jtafla.com/phases/>

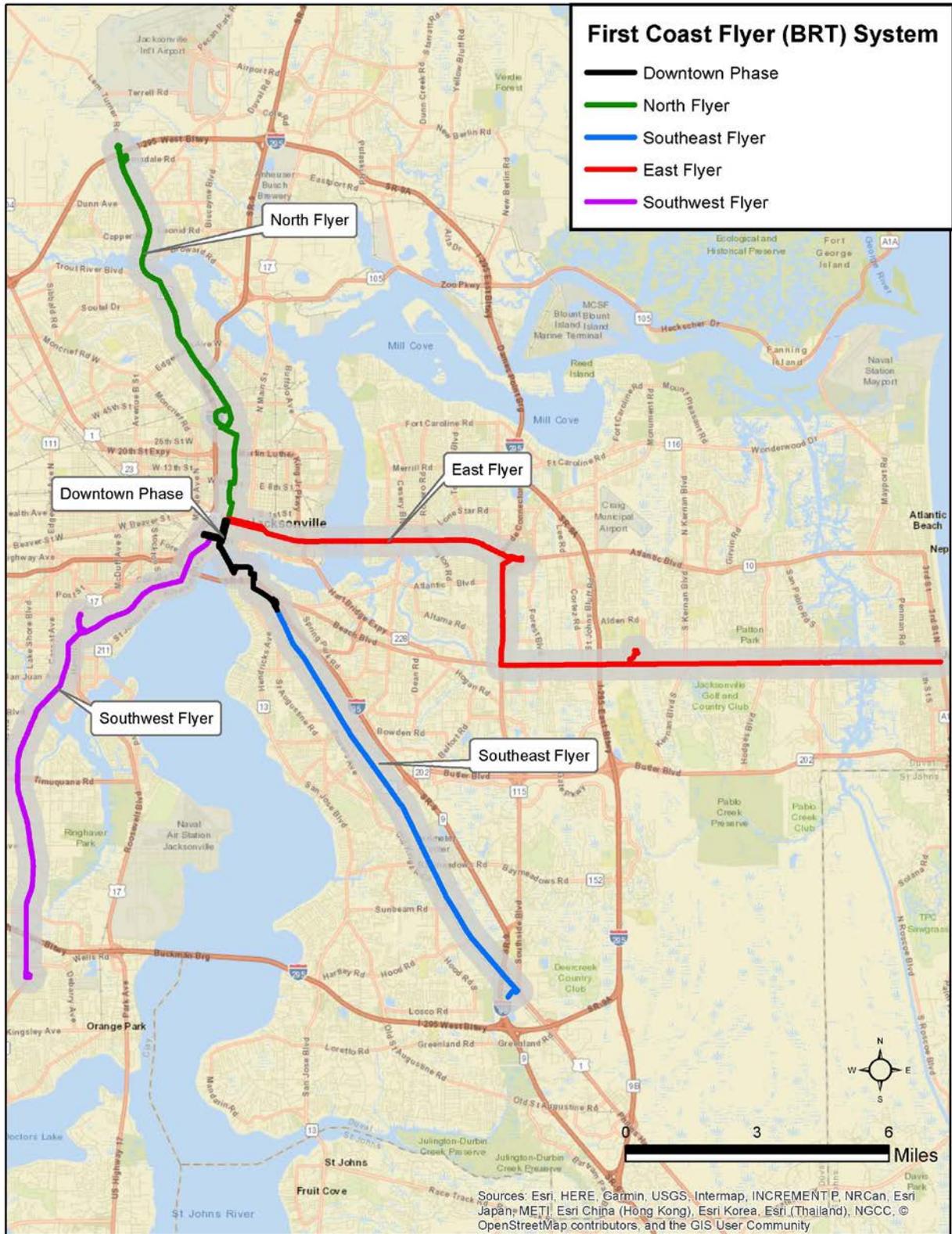


Figure 3 First Coast Flyer (BRT) System

Downtown Investment Authority (DIA) Redevelopment Master Plan

The DIA was created to revitalize Jacksonville's urban core by leveraging Community Redevelopment Area (CRA) resources to spur economic development⁴. The DIA's projects are guided by a nine-member board of directors on a volunteer basis. Five members are appointed by the mayor of Jacksonville and four are appointed by the council president.

In 2014, the DIA adopted their current redevelopment plan for the Downtown Northbank and Southside Redevelopment Areas (see Figure 4). The plan is specifically designed to:

- Establish a Community Redevelopment Plan that uses mechanisms that provide a mix of housing, parks, walkable streets, attractive retail, enhanced cultural facilities, and accessible parking.
- Offer consistency over time, regardless of leadership changes within the community
- Define the strategic framework, conceptual themes, goals, and objectives for the future downtown CRAs
- Include a neighborhood impact assessment of traffic and transportation affecting the physical and social quality of the neighborhood.
- Identify specific priority redevelopment capital improvement projects and other redevelopment project elements to be completed as part of plan implementation.
- Provide projected costs of the recommended improvements.

The socioeconomic data within the DIA area was updated for the Skyway analysis to include the latest development patterns. The specific growth patterns are discussed as part of the STOPS model setup.

⁴ <http://www.coj.net/departments/downtown-investment-authority.aspx>

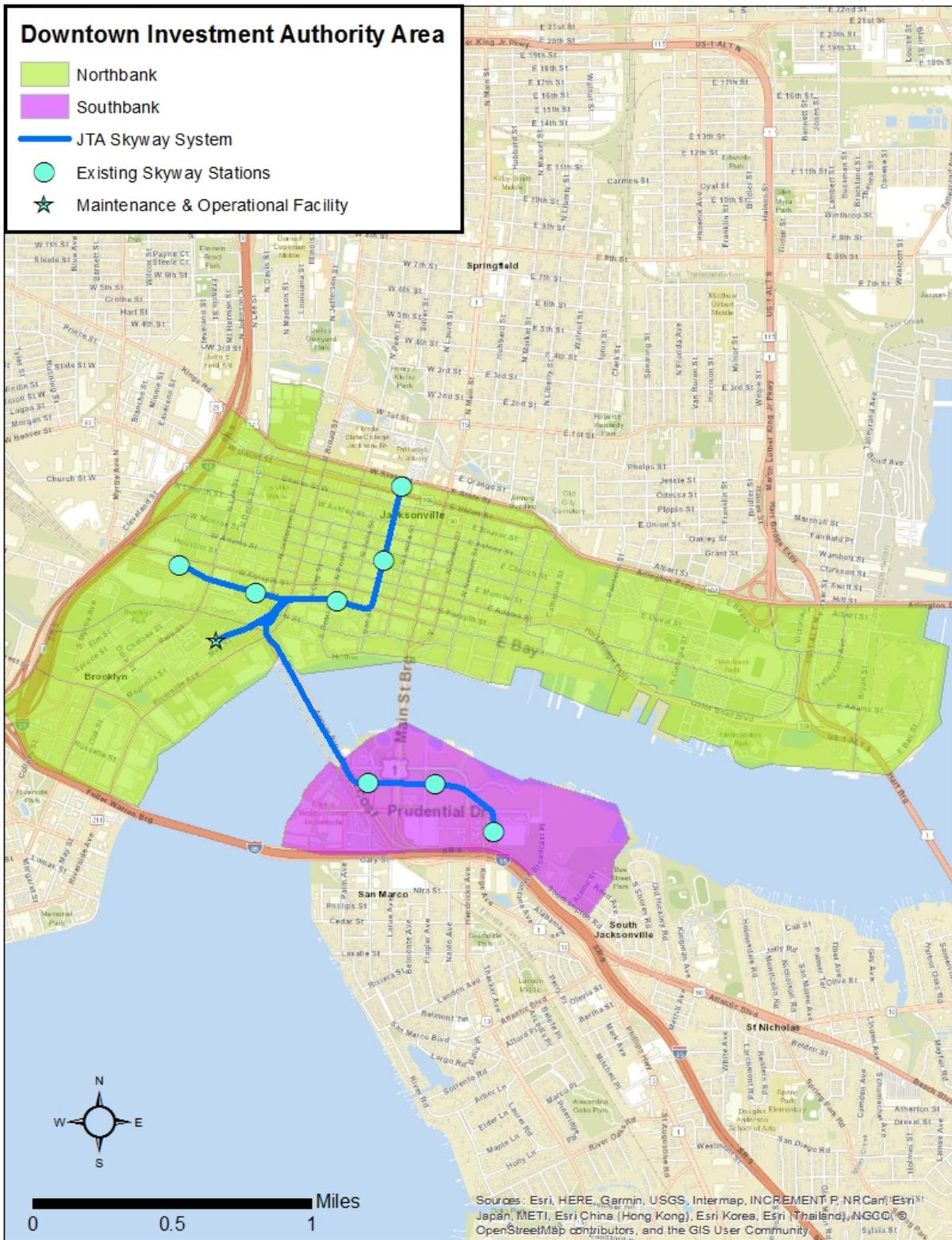


Figure 4 Downtown Investment Authority Area

STOPS Implementation for the Jacksonville Area

STOPS Introduction

Ridership forecasts for the Skyway project are prepared using an advanced copy of v2.01 of the Federal Transit Administration's (FTA) Simplified Trips-On-Project Software (STOPS). Key elements of STOPS include:

- 1- Estimates of total origin-to-destination travel derived from Census Journey-to-Work data.
- 2- Representations of transit levels-of-service derived directly from published timetable information.
- 3- Self-calibration to match current ridership count data for individual geographic subareas within the region.

For the Skyway project, the model was calibrated against 2015 schedules and ridership count data. Forecasts of Skyway project ridership are prepared for the base year (2015), 2020, 2030 and a long-range horizon year of 2040.

Key input information for the Skyway project implementation of STOPS includes:

- Northeast Florida Regional Planning Model (NERPMAB) forecasts of population and employment by Traffic Analysis Zone (TAZ) for 2010 and 2040 (and interpolated to 2015).
- 2006-2010 American Community Survey (ACS) data providing home and work locations for all persons using all modes of transportation.
- Highway travel times and costs obtained from the Year 2010 NERPMAB regional forecasting model.
- Transit schedule data provided by the Jacksonville Transportation Authority (JTA) in General Transit Feed Specification (GTFS) format.
- Year 2006-2010 transit mode shares from the Census Journey-to-Work.
- Automated Passenger Count (APC) ridership data for 2015 providing transit boardings by station, stop, and route for the Jacksonville area.

STOPS uses this information to:

- 1- Estimate the calibration year, opening year, and horizon year all-mode person travel by factoring the 2006-2010 Census Transportation Planning Products (CTPP) using zone-level estimates of population and employment.
- 2- Estimate zone-to-zone travel times by reading each transit schedule and finding the best origin-to-destination path for each of the following conditions:
 - a. Access mode: walk access, kiss-ride access, and Park-n-Ride access

- b. Path type: fixed guideway (e.g., Light Rail Transit [LRT] or Bus Rapid Transit [BRT]) only, bus-only, and fixed guideway and bus together on the same trip
 - c. Time of day: AM, peak, and midday
 - d. Scenario: calibration year, no-build, and build
 - e. Year: 2015, 2020, 2030, and 2040
- 3- Estimate Year 2015 mode shares and transit ridership by station and route and then adjust the model parameters to match both CTPP mode shares and current year counts.
 - 4- Estimate scenario ridership for 2015, 2020, 2030, and 2040 using the model calibrated in the previous steps and transit travel times for each scenario and each year.

The next section describes how the model was implemented for Jacksonville.

STOPS Model Application

This section describes the key assumptions that were used to configure STOPS to forecast ridership for the Skyway project.

Geographic Scope of Analysis

STOPS is designed to make use of pre-existing data sources on transportation supply and demand for nearly all aspects of the ridership forecasting process. The FTA STOPS website includes copies of the Year 2000 CTPP data which is used by STOPS. For this study, an advanced copy of STOPS v2.01 and the 2006-2010 ACS data was obtained from FTA for use in this project.

The modeling scope for this project was set to match the six county area of the NERPMAB. The six counties include Baker, Clay, Duval, Nassau, Putnam, and St. Johns counties and are shown in Figure 5. The NERPMAB model covers a larger area than the service area of the JTA, which is primarily Duval County and the Orange Park area in northern Clay County.

The modeling area was subdivided into 30 districts to support the calibration and reporting of transit service. These districts are designed to represent different transit markets in the region and the downtown area in particular and account for differences among areas such as:

- Density
- Socioeconomic characteristics
- Walk-ability and other non-service impacts on transit demand
- Geographic barriers (highways, waterways, or other features) that separate neighborhoods from one another

The 30 districts used in this analysis are listed in Table 1, and depicted in Figure 6. The table is subdivided in Study Area Districts and Region Districts. The study area was subdivided in many smaller districts, as shown on Figure 7, to accommodate the calibration of the Skyway.

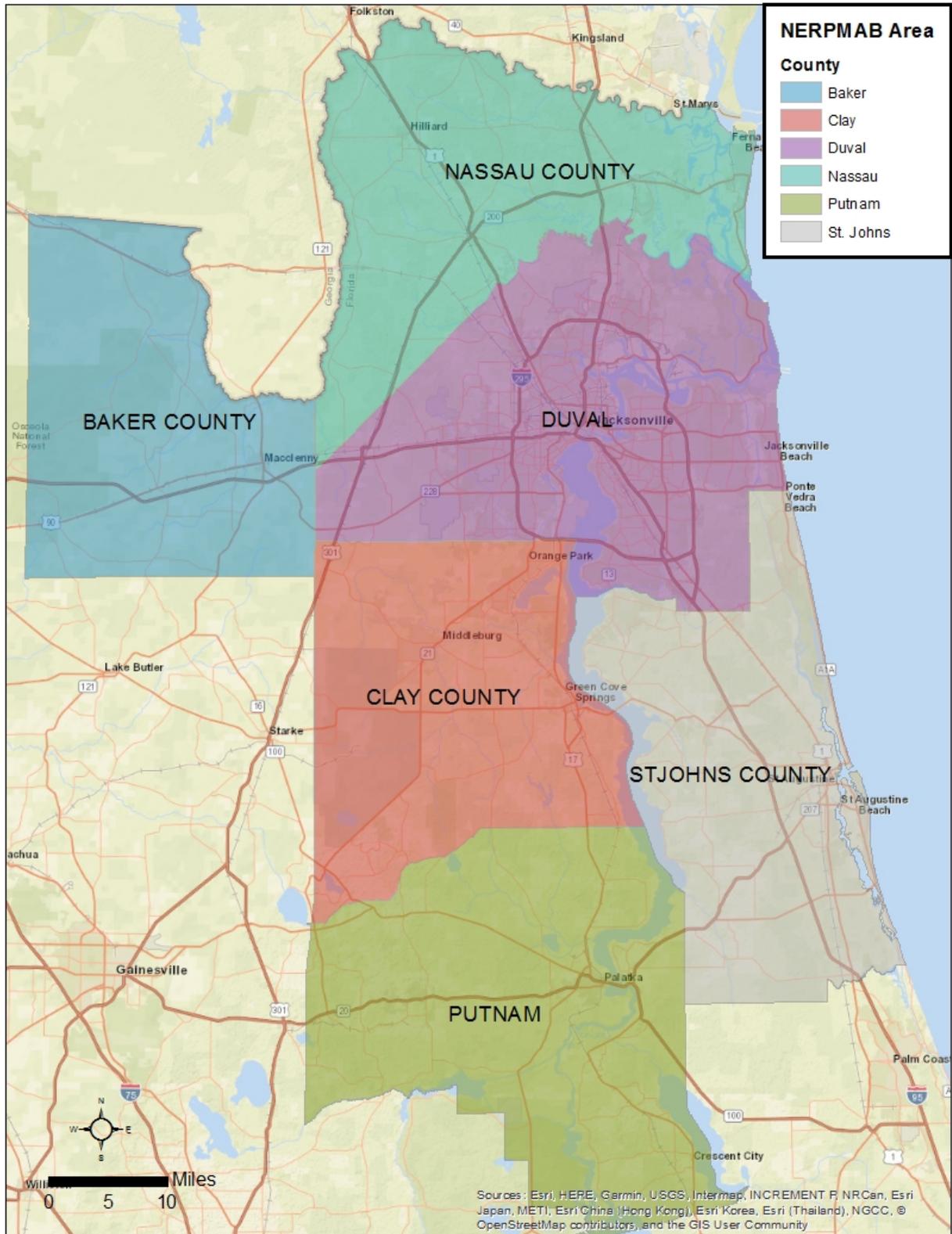


Figure 5 NERP MAB Area

Table 1 District Numbers and Names

STOPS District	
Number	Name
Study Area	
1	CBD West
2	CBD Central South
3	CBD Central North
4	CBD East
5	Sports Complex
6	San Marco
7	Southbank
8	Brooklyn
9	Riverside
10	Five Points
11	Shands
12	Southbank Central
13	Jackson Square
Region	
14	US 1
15	Belfort
16	Beaches
17	Mandarin
18	Far South
19	Southwest
20	NAS
21	Orange Park
22	Edgewood
23	Lem Turner Moncrief
24	Northside
25	Springfield
26	Westconnett
27	Arlington
28	Empire Point
29	Wonderwood
30	San Jose

There are 30 districts in the STOPS model. Thirteen districts in the study area and 17 in the region area.

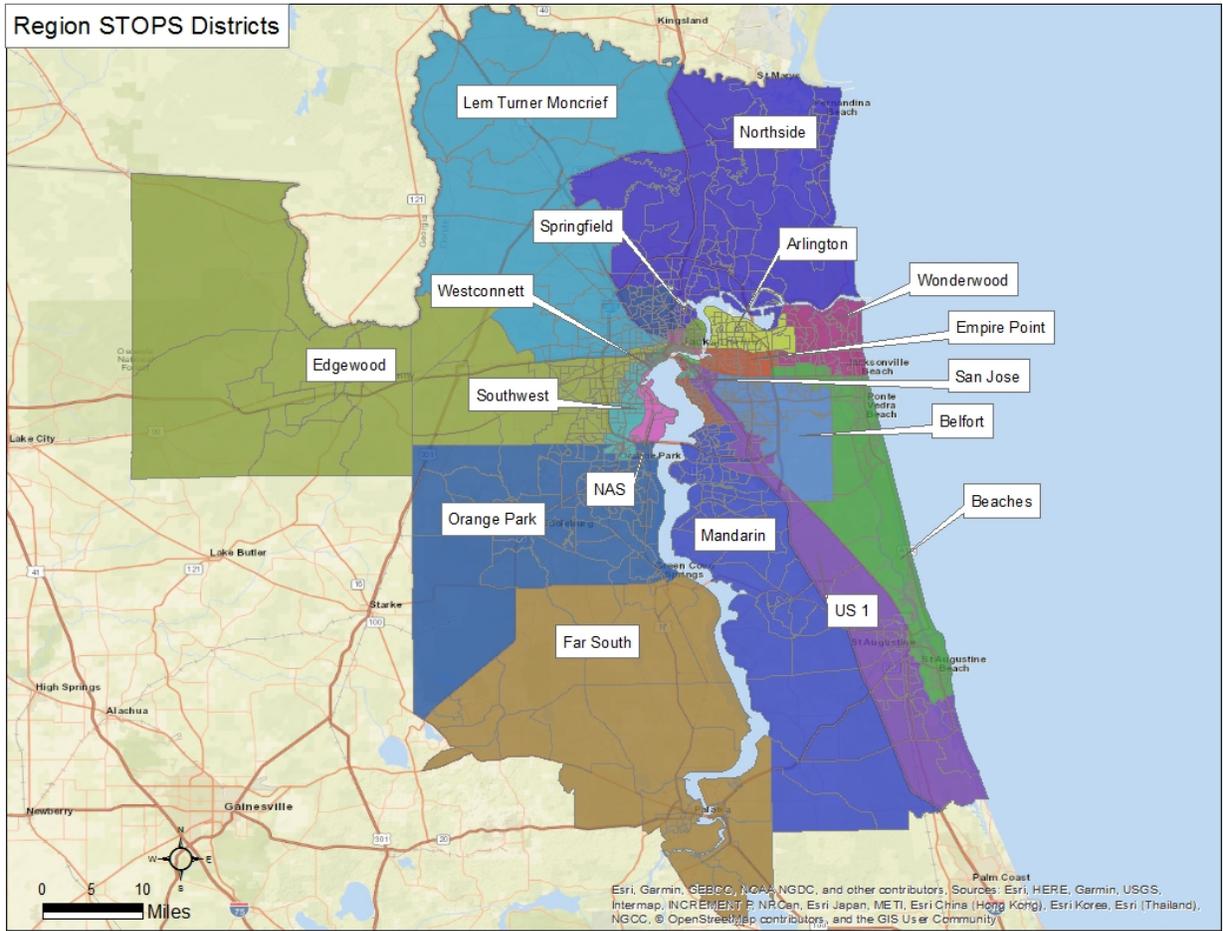


Figure 6 STOPS Districts Region

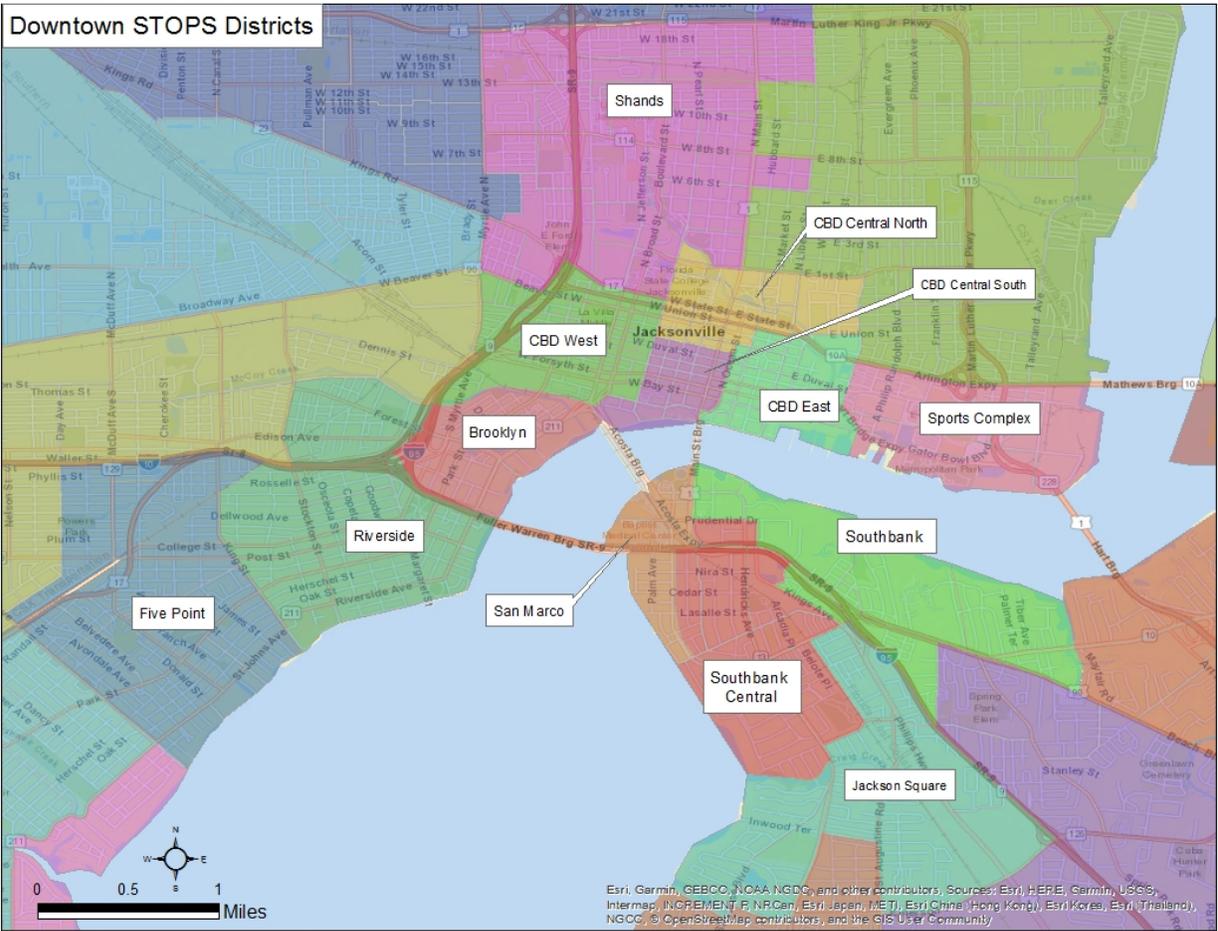


Figure 7 STOPS Districts Downtown

Population and Employment Assumptions

Estimates of population and employment for the modeling region were obtained from the North Florida Transportation Planning Organization (NFTPO) for the year 2010 and 2040 for each TAZ in the modeling area. This area includes the six counties as shown in Figure 5, which contains 2494 TAZs. Table 2 shows the population and employment projections as developed by the NFTPO for the different counties within the NERPMAB model area.

The focus of this study is Duval County and in particular the downtown area. In Table 2, Duval County’s population has a projected growth rate of 24% and the employment a growth rate of 23% between the time period of 2010 and 2040. This constitutes a very low annual growth rate of 0.8%. It should be noted that these projections were developed after the Great Recession (2007-2009). Also, it was assumed that employment center would shift primarily towards Nassau, St. Johns, Clay, and Baker counties.

Table 2 NFTPO Year 2010 and 2030 Population Estimates by County

County	Total Population living in households				Total Employees			
	2010	2040	Growth Rate 2010 - 2040	Annual Growth Rate 2010 - 2040	2010	2040	Growth Rate 2010 - 2040	Annual Growth Rate 2010 - 2040
Nassau	72,771	116,159	60%	2.0%	24,126	39,586	64%	2.1%
Duval	844,293	1,050,684	24%	0.8%	519,142	636,596	23%	0.8%
St. Johns	186,598	374,207	101%	3.4%	61,714	155,227	152%	5.1%
Clay	189,614	314,010	66%	2.2%	54,454	88,958	63%	2.1%
Baker	24,771	36,657	48%	1.6%	7,396	13,860	87%	2.9%
Putnam	72,957	77,991	7%	0.2%	25,148	28,051	12%	0.4%
Total	1,391,004	1,969,708	42%	1.4%	691,980	962,278	39%	1.3%

The data was first updated from the year 2010 to the year 2015 based on the growth which had occurred between these two points in time. This was accomplished by adding the building permits data received from the City of Jacksonville to the base year 2010 data. In the downtown area information was obtained from the DIA.

In addition to past activities, the DIA provided data related to anticipated future development in the downtown area. These developments are anticipated to take place within the next five years and were added to the year 2020. Straight line projections were used to develop the year 2020 and 2030 data sets. These straight line projections were based on the updated year 2015 data set and the year 2040 data set.

Several assumptions had to be made to convert the development data into the population and employment numbers needed as input into the STOPS model. The development data is typically presented as the number of dwelling units on the residential side and in square feet on the commercial side.

In order to estimate the population, the average household size of 2.33 per persons per dwelling unit was used in Duval County. The average household size for Duval County for the four-year period between 2011 and 2015 was 2.57⁵ However, according to the 2010 census, which was used to develop the NFTPO data, the person per household varied in Duval County from 2.08 to 2.57 depending on the geographical location within the County. Since the household size is not known at this time, the average of 2.33 was assumed for all the new units.

The employment types added were service, commercial and industrial. For “mixed used” development it was assumed that 40% would be retail/commercial and 60% office/service. The employee calculations were primarily based on the square feet information associated with the development. For retail/commercial two employees per 1,000 square feet was used, while for office/service five employees per 1,000 square feet was used. For the employment associated with projected hotel development, the employment was based on the number of rooms (0.9 employees per room). The assumed relationships were based on information listed in the Institute of Transportation Engineers (ITE) Trip Generation manual as well as the ratios used in

⁵ <http://www.census.gov/quickfacts/table/PST045215/12031>

the development of the original NFTPO data forecasts. It should be noted that the numbers of employee per square feet can vary wildly, depending on the type and size of the development. It is therefore recommended to refine these calculations as more detailed information becomes available.

The additional population in the year 2040 is 50,103 persons or 3.6% and 29,686 employees were added to the employment total (4.3%). The increase reflects the development that has been permitted between 2010 and 2015 in Duval County as well as the development that is expected to take place in the downtown area. Table 3, lists the final population and employment estimates by district, while Tables 4 and 5 show the growth patterns between the different years.

Table 3 Population and Employment Data Estimates for the Years 2010, 2015, 2020, 2030, and 2040

District		Population					Employment				
Number	Name	2010*	2015	2020	2030	2040	2010*	2015	2020	2030	2040
Study Area											
1	CBD West	172	172	1,349	1,566	1,781	3,869	3,870	3,985	4,127	4,261
2	CBD Central South	261	284	620	622	624	15,227	16,760	17,524	17,875	18,227
3	CBD Central North	1,069	1,069	1,201	1,336	1,470	6,512	6,559	6,698	6,930	7,161
4	CBD East	829	842	1,791	3,686	5,583	10,188	10,573	10,759	11,111	11,465
5	Sport Complex	32	1,575	1,575	1,575	1,576	3,457	8,376	8,605	8,721	8,839
6	San Marco	822	822	1,523	1,527	1,531	4,902	4,924	4,957	5,023	5,088
7	Southbank District	2,145	2,163	5,209	5,241	5,275	7,699	7,962	9,185	9,332	9,478
8	Brooklyn	64	2,156	2,676	2,678	2,678	9,282	9,440	9,942	10,249	10,557
9	Riverside	5,186	5,193	5,360	5,700	6,037	10,488	10,647	10,685	10,762	10,837
10	Five Points	7,069	7,106	7,166	7,288	7,410	1,738	1,740	1,755	1,794	1,828
11	Shands	6,799	6,845	7,164	7,806	8,449	12,612	13,050	13,089	13,164	13,238
12	Southbank Central	2,405	2,423	2,432	2,448	2,464	2,259	2,273	2,894	2,937	2,977
13	Jackson Square	3,843	3,868	3,951	4,120	4,289	2,067	2,067	2,091	2,137	2,183
Subarea Subtotal		30,696	34,518	42,017	45,593	49,167	90,300	98,241	102,169	104,162	106,139
Region											
14	US 1	91,537	93,955	107,825	135,561	163,291	78,750	80,591	89,563	107,507	125,451
15	Belfort	80,099	88,736	94,370	105,647	116,921	89,650	91,769	99,942	116,283	132,625
16	Beaches	111,354	113,161	123,242	143,415	163,579	43,138	43,370	49,855	62,847	75,819
17	Mandarin	144,416	148,282	167,809	206,858	245,908	33,690	34,985	43,855	61,591	79,321
18	Far South	54,393	54,393	59,075	68,448	77,819	23,635	23,635	24,409	25,954	27,500
19	Southwest	59,055	59,843	61,504	64,837	68,158	25,801	26,430	26,794	27,531	28,263
20	NAS	17,437	17,486	18,017	19,085	20,147	27,031	27,070	27,565	28,554	29,542
21	Orange Park	160,560	160,560	182,030	224,985	267,927	39,883	39,883	46,258	59,006	71,748
22	Edgewood	58,630	59,766	67,035	81,578	96,113	37,720	38,248	41,633	48,406	55,183
23	Lem Turner Moncrief	56,460	56,696	60,005	66,623	73,240	12,689	12,863	12,945	13,116	13,284
24	Northside	139,385	144,602	156,764	181,079	205,393	53,356	54,811	60,911	73,129	85,337
25	Springfield	9,282	9,326	10,034	11,442	12,849	7,743	7,768	7,862	8,060	8,254
26	Westconnett	145,280	149,472	159,330	179,066	198,799	41,549	42,787	47,548	57,094	66,627
27	Arlington	67,344	68,625	70,096	73,038	75,982	20,312	20,765	20,964	21,367	21,763
28	Empire Point	41,619	42,340	43,709	46,438	49,171	20,224	20,651	20,864	21,292	21,721
29	Wonderwood	94,142	97,065	99,584	104,608	109,633	30,844	31,335	31,808	32,755	33,702
30	San Jose	23,805	24,085	24,411	25,063	25,714	9,274	9,395	9,454	9,570	9,685
Regional Subtotal		1,354,798	1,388,393	1,504,840	1,737,771	1,970,644	595,289	606,356	662,230	774,062	885,825
Grand Total		1,385,494	1,422,911	1,546,857	1,783,364	2,019,811	685,589	704,597	764,399	878,224	991,964

* The 2010 numbers do not match the NFTPO year 2010 estimates because of adjustments made by STOPS based on Census data and geography.

Table 4 Population Growth Patterns between the Years 2010 and 2040

District		Population Growth							
Number	Name	2010-2015		2015 - 2020		2020 - 2030		2030 - 2040	
Study Area		Number	Percent	Number	Percent	Number	Percent	Number	Percent
1	CBD West	0	0.0%	1,177	684.3%	217	16.1%	215	13.7%
2	CBD Central South	23	8.8%	336	118.3%	2	0.3%	2	0.3%
3	CBD Central North	0	0.0%	132	12.3%	135	11.2%	134	10.0%
4	CBD East	13	1.6%	949	112.7%	1,895	105.8%	1,897	51.5%
5	Sport Complex	1,543	4821.9%	0	0.0%	0	0.0%	1	0.1%
6	San Marco	0	0.0%	701	85.3%	4	0.3%	4	0.3%
7	Southbank District	18	0.8%	3,046	140.8%	32	0.6%	34	0.6%
8	Brooklyn	2,092	3268.8%	520	24.1%	2	0.1%	0	0.0%
9	Riverside	7	0.1%	167	3.2%	340	6.3%	337	5.9%
10	Five Points	37	0.5%	60	0.8%	122	1.7%	122	1.7%
11	Shands	46	0.7%	319	4.7%	642	9.0%	643	8.2%
12	Southbank Central	18	0.7%	9	0.4%	16	0.7%	16	0.7%
13	Jackson Square	25	0.7%	83	2.1%	169	4.3%	169	4.1%
Subarea Subtotal		3,822	12.5%	7,499	21.7%	3,576	8.5%	3,574	7.8%
Region									
14	US 1	2,418	2.6%	13,870	14.8%	27,736	25.7%	27,730	20.5%
15	Belfort	8,637	10.8%	5,634	6.3%	11,277	11.9%	11,274	10.7%
16	Beaches	1,807	1.6%	10,081	8.9%	20,173	16.4%	20,164	14.1%
17	Mandarin	3,866	2.7%	19,527	13.2%	39,049	23.3%	39,050	18.9%
18	Far South	0	0.0%	4,682	8.6%	9,373	15.9%	9,371	13.7%
19	Southwest	788	1.3%	1,661	2.8%	3,333	5.4%	3,321	5.1%
20	NAS	49	0.3%	531	3.0%	1,068	5.9%	1,062	5.6%
21	Orange Park	0	0.0%	21,470	13.4%	42,955	23.6%	42,942	19.1%
22	EdgeWood	1,136	1.9%	7,269	12.2%	14,543	21.7%	14,535	17.8%
23	Lem Turner Moncrief	236	0.4%	3,309	5.8%	6,618	11.0%	6,617	9.9%
24	Northside	5,217	3.7%	12,162	8.4%	24,315	15.5%	24,314	13.4%
25	Springfield	44	0.5%	708	7.6%	1,408	14.0%	1,407	12.3%
26	Westconnett	4,192	2.9%	9,858	6.6%	19,736	12.4%	19,733	11.0%
27	Arlington	1,281	1.9%	1,471	2.1%	2,942	4.2%	2,944	4.0%
28	Empire Point	721	1.7%	1,369	3.2%	2,729	6.2%	2,733	5.9%
29	Wonderwood	2,923	3.1%	2,519	2.6%	5,024	5.0%	5,025	4.8%
30	San Jose	280	1.2%	326	1.4%	652	2.7%	651	2.6%
Regional Subtotal		33,595	2.5%	116,447	8.4%	232,931	15.5%	232,873	13.4%
Grand Total		37,417	2.7%	123,946	8.7%	236,507	15.3%	236,447	13.3%

Table 5 Employment Growth Patterns between 2010 and 2040

District		Employment							
Number	Name	2010-2015		2015 - 2020		2020 - 2030		2030 - 2040	
Study Area		Number	Percent	Number	Percent	Number	Percent	Number	Percent
1	CBD West	1	0.0%	115	3.0%	142	3.6%	134	3.2%
2	CBD Central South	1,533	10.1%	764	4.6%	351	2.0%	352	2.0%
3	CBD Central North	47	0.7%	139	2.1%	232	3.5%	231	3.3%
4	CBD East	385	3.8%	186	1.8%	352	3.3%	354	3.2%
5	Sport Complex	4,919	142.3%	229	2.7%	116	1.3%	118	1.4%
6	San Marco	22	0.4%	33	0.7%	66	1.3%	65	1.3%
7	Southbank District	263	3.4%	1,223	15.4%	147	1.6%	146	1.6%
8	Brooklyn	158	1.7%	502	5.3%	307	3.1%	308	3.0%
9	Riverside	159	1.5%	38	0.4%	77	0.7%	75	0.7%
10	Five Points	2	0.1%	15	0.9%	39	2.2%	34	1.9%
11	Shands	438	3.5%	39	0.3%	75	0.6%	74	0.6%
12	Southbank Central	14	0.6%	621	27.3%	43	1.5%	40	1.4%
13	Jackson Square	0	0.0%	24	1.2%	46	2.2%	46	2.2%
Subarea Subtotal		7,941	8.8%	3,928	4.0%	1,993	2.0%	1,977	1.9%
Region									
14	US 1	1,841	2.3%	8,972	11.1%	17,944	20.0%	17,944	16.7%
15	Belfort	2,119	2.4%	8,173	8.9%	16,341	16.4%	16,342	14.1%
16	Beaches	232	0.5%	6,485	15.0%	12,992	26.1%	12,972	20.6%
17	Mandarin	1,295	3.8%	8,870	25.4%	17,736	40.4%	17,730	28.8%
18	Far South	0	0.0%	774	3.3%	1,545	6.3%	1,546	6.0%
19	Southwest	629	2.4%	364	1.4%	737	2.8%	732	2.7%
20	NAS	39	0.1%	495	1.8%	989	3.6%	988	3.5%
21	Orange Park	0	0.0%	6,375	16.0%	12,748	27.6%	12,742	21.6%
22	EdgeWood	528	1.4%	3,385	8.9%	6,773	16.3%	6,777	14.0%
23	Lem Turner Moncrief	174	1.4%	82	0.6%	171	1.3%	168	1.3%
24	Northside	1,455	2.7%	6,100	11.1%	12,218	20.1%	12,208	16.7%
25	Springfield	25	0.3%	94	1.2%	198	2.5%	194	2.4%
26	Westconnett	1,238	3.0%	4,761	11.1%	9,546	20.1%	9,533	16.7%
27	Arlington	453	2.2%	199	1.0%	403	1.9%	396	1.9%
28	Empire Point	427	2.1%	213	1.0%	428	2.1%	429	2.0%
29	Wonderwood	491	1.6%	473	1.5%	947	3.0%	947	2.9%
30	San Jose	121	1.3%	59	0.6%	116	1.2%	115	1.2%
Regional Subtotal		11,067	1.9%	55,874	9.2%	111,832	16.9%	111,763	14.4%
Grand Total		19,008	2.8%	59,802	8.5%	113,825	14.9%	113,740	13.0%

As reflected in these two tables, the Brooklyn and Sports Complex areas have added a significant amount of residential units within the last several years. In total, the residential population growth between 2010 and 2040 within the study area is projected to be 18,471. This represents a 60% increase in population within the study area. The employment within the study area is expected to increase by 15,839 which is a 17.5% increase during that same time period.

Year 2015 Transit System Represented in STOPS

In 2015, the JTA operated 35 fixed routes. Six of these routes were express routes. Also in operation were nine community shuttles, two trolley routes and the Skyway. The frequent routes ran every 15 to 20 minutes, while the local routes ran every 30 to 60 minutes.

The average weekday bus ridership for 2015 was based on APC data collected during the time period from December, 2014 through April, 2015. During this time period the average weekday bus ridership was 48,789. Following discussions with JTA staff, this number was adjusted to the number that was reported to the FTA and listed in the National Transit Database (NTD) to 42,638. Due to different underlying assumptions in the calculations, it is not uncommon for these average weekday ridership numbers to be different. However, for the purpose of this analysis it was decided that the NTD numbers were a more appropriate data source to use. Therefore, the total average daily boardings was adjusted to the NTD ridership number, while the same proportional relationship for each route to the total average daily boardings was maintained.

In 2015, the Skyway operated three lines, JRTC to Rosa Parks, Kings Ave to Rosa Parks, and JRTC to Kings Ave. The routes ran at a headway of four minutes in the peak and six minutes in the off-peak. No APC data is available for the Skyway, the only data available are the counts taking at the turnstile at the stations. During the year 2015 the average weekday Skyway estimated ridership was 4,945. There is no ridership fee associated with the Skyway. The fare elimination went into effect on January 30, 2012.

Operating Speed Assumptions

TAZ-to-TAZ estimates of travel time and distance were obtained from the year 2010 NERPMAB model and were used as zone-to-zone highway travel times. The STOPS implementation for Jacksonville uses 2010 distances and travel times to represent the 2015 calibration year as well as the forecast years.

Validation to Year 2015 Ridership Data

As shown in Table 6, the year 2015 average weekday total transit boardings based on APC and NTD data shows a total ridership number of 42,638, while the STOPS estimates 43,099 average weekday ridership. This is a difference of one percent or -461 riders.

Also listed in Table 6, are the Skyway riders. Based on the data collected at the turnstiles, the ridership was 4,945 and the STOPS estimate was 4,366. The difference being - 579 riders or 12 percent. These results look very reasonable based on the amount of data available and the size of the system.

Table 7 takes a closer look at the Skyway boardings. The only data available for the Skyway was collected at the turnstiles. As such, no information is available on the access mode (walk, kiss and ride, Park-n-Ride, and/or transfer) nor on the destination of the trip. Additional pertinent information associated with the Skyway ridership are the locations of the Park-n-Ride lots and the interactions between the Skyway and the other transit services. The stations with a Park-n-Ride lot are the JRTC, Kings Ave, River Place and San Marco. The station where most transfers to the other transit services takes place, is the Rosa Parks Station.

It is important to note, that the current ridership markets of the Skyway system can be divided into three groups. These are the transit riders that transfer to the Skyway, the Park-n-Ride users

Table 6 Year 2015 APC Data and Average Weekday Boardings Comparison

Route Name	Year 2015 APC	Year 2015 STOPS Average Weekday Estimate Existing	Existing minus APC	Percent Difference APC vs. Existing
64-JRTC to Central				
65-JRTC to Rosa Parks (A)		3,173		
66-Kings Ave to Rosa Parks(D)		890		
67-JRTC to Kings Ave (H)		303		
68-Brooklyn to Kings Ave				
69-Brooklyn to Rosa Parks				
70-Brooklyn to JRTC				
Total Skyway	4,945	4,366	-579	-12%
9-Arlington/Beach	3,186	4,786	1,600	50%
8-Beach/Town Center	2,277	1,915	-362	-16%
7-Philips	2,318	2,074	-244	-11%
5-Park/Blanding	2,729	2,481	-248	-9%
51-Edgewood	1,549	1,599	50	3%
50-University	1,526	1,144	-382	-25%
4-Kings	1,494	2,714	1,220	82%
3-Moncrief	2,676	1,841	-835	-31%
34-Blanding/Edgewood	113	123	10	9%
33-Spring Park/Philips	146	67	-79	-54%
32-McDuff	142	72	-70	-49%
31-Talleyrand	91	78	-13	-15%
30-Cecil/Cassat	146	252	106	72%
308-Arlington Community Shuttle	44	24	-20	-45%
307-Northside Community Shuttle	55	28	-27	-49%
306-Heckscher Community Shuttle	18	0	-18	-100%
305-Highlands Community Shuttle	51	2	-49	-96%
304-Mandarin Community Shuttle	38	12	-26	-69%
303-Beaches Community Shuttle	53	42	-11	-20%
302-Southeast Community Shuttle	64	35	-29	-45%
301-Oakleaf Community Shuttle	92	60	-32	-35%
300-Dunn/Pritchard Community	73	0	-73	-100%
2-Lem Turner	2,082	2,962	880	42%
25-San Jose	499	281	-218	-44%
24-Mayport	265	152	-113	-43%
23-Townsend/Southside/Avenue	734	519	-215	-29%
22-Avenue B	619	559	-60	-10%
205-Beaches Express	31	70	39	124%
204-Dinsmore Shuttle	83	1	-82	-99%
203-NAS	23	14	-9	-39%
202-Mayport Express	85	75	-10	-12%
201-Clay Regional Express	79	62	-17	-21%
200-Mandarin Express	73	209	136	185%
1-North Main	2,816	3,123	307	11%
19-Arlington	2,026	1,356	-670	-33%
18-Atlantic/Monument	1,148	1,159	11	1%
17-St. Augustine/ San Jose	993	1,385	392	40%
16-Riverside/Wilson	762	587	-175	-23%
15-Post/Normandy	1,396	830	-566	-41%
14-Edison	828	749	-79	-10%
13-Commonwealth/Lane	1,506	2,005	499	33%
12-Myrtle/Lem Turner	898	229	-669	-74%
11-A Philip Randolph	654	686	32	5%
10-Atlantic	1,213	2,371	1,158	95%
Total Local Bus (No BRT/Skyway)	37,693	38,733	1,040	3%
Grand Total	42,638	43,099	461	1%

Table 7 Year 2015 Skyway Station Boarding Estimates

Station Name	Year 2015 Average Weekday STOPS Estimate - Existing					Turnstile Data Year 2015	STOPS Estimate minus Turnstile	Percent Difference Turnstile vs. Existing
	WLK	KNR	PNR	XFR	ALL			
Central	1,218	8	0	71	1,297	888	409	46%
Convention Center	65	59	103	5	232	466	-234	-50%
Hemming Plaza	471	2	0	4	476	1,098	-622	-57%
Jefferson	23	0	0	62	85	87	-2	-2%
Kings Ave	142	22	25	97	286	337	-51	-15%
RiverPlace	80	1	2	28	111	161	-50	-31%
Rosa Parks	1,428	15	0	323	1,766	1,672	94	6%
San Marco	42	23	47	1	113	239	-126	-53%
Total	3,469	130	177	591	4,366	4,948	-582	-12%

that transfer to the Skyway and the riders that use it as a downtown circulation system. As such, refinements were made to the STOPS model to capture these three markets.

These refinements were made through the use of time penalties. In the STOPS model, costs associated with the Park-n-Ride lots were added in time (minutes). The cost to park in the lot is between \$21.00 and \$24.00 a month which was set to a “cost” of 2 minutes. In order to “inform” STOPS that the Skyway is free, and to differentiate that cost between this particular mode and all other modes (Local Bus and BRT) a cost of 2.8 minutes was added to all other modes. No other adjustments were made to the model.

As can be seen in Table 7, the station boardings with the closer validation are Jefferson (2%), and Rosa Parks (6%) stations. As stated before, based on the available data, the overall patterns and the estimates of the total number of average daily ridership are within an acceptable range.

First Coast Flyer Adjustments

The STOPS model was originally developed to analyze the SW First Coast Flyer BRT line. The first BRT line in operation in Jacksonville was the North First Coast Flyer BRT route. This route was added to the STOPS model and validated against the automated passenger count (APC) data from August through December in the year 2016. As shown in Table 8, the average weekday ridership on the North First Coast Flyer was 2,082 during the period from August to December in 2016.

The average ridership number for the Skyway was 4,203 in the year 2016, which represents a reduction of 742 riders compared to the average ridership number of the year 2015. This reduction can be partially contributed to the introduction of the BRT routes.

Table 8, list the results of the addition of the First Coast Flyer BRT routes. In the year 2015 No Build scenario, both the North and Southeast First Coast Flyers were added to the GTFS file. In the year 2015 Build scenario the Southwest and the East First Coast Flyers were added. The

Table 8 Year 2015/2016 Average Daily Boardings – with First Coast Flyer BRT Routes

Route Name	Automated Passenger Count(APC) & Trunstile Data*	Year 2015 STOPS Average Weekday Estimate Existing	Existing minus APC	Percent Difference APC vs. Existing
64-JRTC to Central				
65-JRTC to Rosa Parks		1,872		
66-Kings Ave to Rosa Parks		1,397		
67-JRTC to Kings Ave		664		
Total Skyway	4,203	3,933	-270	-6%
102-North First Coast Flyer	2,082	2,186	104	5%
107-Southeast First Coast Flyer		1,451		
5-Southwest First Coast Flyer		1,817		
9-East First Coast Flyer		1,640		
Total Flyers (BRT)		7,094		
Total Local Bus	37,693	36,594	-1,099	-3%
Grand Total	41,896	47,621	5,725	14%

* APC data for the local buses reflects Jan-March, 2015, BRT Aug-Dec, 2016 and Skyway average of year 2016.

North and Southeast Flyers both stop at Rosa Parks, while the Southwest and East Flyer stop at the JRTC

The Skyway ridership matches the year 2016 turnstile count very closely with a difference of 270 or 6%. The North First Coast Flyer ridership difference is 5% or 104 average weekday riders.

Based on the results shown in Table 8, the “visibility factor” for the BRT routes was not changed. Setting the route type to 0 with a visibility factor of 0, has a similar effect as coding BRT services with route type to 3, which is the type for a local bus⁶.

The BRT routes in Jacksonville will be operating in mixed traffic, will be branded, and will operate with signal optimization. However, as can be seen, with a route type 0 and a visibility factor of 0, the STOPS model simulates the ridership numbers in an acceptable range.

Scenario Development

Year 2017 No Build

The 2017 No Build operating system for the Skyway is assumed to run on the elevated system as it exists today. In this scenario, the Skyway headway was set to three and a half minutes and three lines were coded. The lines are JRTC to Rosa Parks, Kings Ave to Rosa Parks, and JRTC to Central. For this analysis the GTFS files for the Skyway were created by the JTA and included in the STOPS model.

⁶ https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/STOPS_1.50_user_documentation_v5.pdf

The BRT system is based on 2016 GTFS files, developed by the JTA, which contained all the changes associated with the North and SE BRT and the local routes in those corridors. These GTFS files identify the stops and time schedule associated with these two BRT routes as well as the local bus system. BRT stations with Park-and-Ride lots were also identified in the Station file and added to the GTFS PNR.txt file. No updated GTFS files for the SW and the East BRT were available and these BRT lines were coded manually based on service level information that were received by the JTA. The local bus system and the BRT lines are the same as in the year 2015 STOPS model and remain the same in all the scenarios.

As shown in Table 9, the STOPS model estimate for the average weekday ridership for the Skyway in for the year 2017 No Build scenario for the year 2015 is 4,258. This is slightly higher (55) than the average annual ridership count for the year 2016. In this scenario, several of the local buses services have been replace by the Flyer routes, which results in an increase of the BRT ridership by 3,299 or 46%.

Table 9 Year 2017 No Build Scenario – Average Daily Boardings

Route Name	Automated Passenger Count(APC) & Trunstile Data*	Year 2017 No Build STOPS Estimate Year 2015	Year 2017 No Build STOPS Estimate Year 2020	Year 2017 No Build STOPS Estimate Year 2030	Year 2017 No Build STOPS Estimate Year 2040
64-JRTC to Central		541	557	571	584
65-JRTC to Rosa Parks		213	227	236	246
66-Kings Ave to Rosa Parks		3,504	3,931	4,080	4,212
67-JRTC to Kings Ave					
68-Brooklyn to Kings Ave					
69-Brooklyn to Rosa Parks					
70-Brooklyn to JRTC					
Total Skyway	4,203	4,258	4,715	4,887	5,042
102-North First Coast Flyer	2,082	3,781	3,913	4,070	4,253
107-Southeast First Coast Flyer		1,902	1,941	1,963	1,994
5-Southwest First Coast Flyer		1,225	1,245	1,270	1,290
9-East First Coast Flyer		3,485	3,616	3,672	3,726
Total Flyers (BRT)		10,393	10,715	10,975	11,263
1-North Main	2,816	2,846	2,945	3,096	3,262
2-Lem Turner	2,082	<i>Service replaced by North First Coast Flyer</i>			
3-Moncrief	2,676	1,945	2,047	2,230	2,396
4-Kings	1,494	1,274	1,291	1,315	1,343
5-Park/Blanding	2,729	670	679	688	695
7-Phillips	2,318	<i>Service replaced by Southeast First Coast Flyer</i>			
8-Beach/Town Center	2,277	1,855	1,941	2,002	2,065
9-Arlington/Beach	3,186	<i>Service replaced by East First Coast Flyer</i>			
10-Atlantic	1,213	4,655	4,640	4,596	4,561
11-A Philip Randolph	654	523	535	550	566
12-Myrtle/Lem Turner	898	749	777	789	801
13-Commonwealth/Lane	1,506	1,342	1,339	1,342	1,350
14-Edison	828	861	885	906	925
15-Post/Normandy	1,396	1,290	1,314	1,350	1,385
16-Riverside/Wilson	762	923	929	936	942
17-St. Augustine/ San Jose	993	1,566	1,568	1,555	1,553
18-Atlantic/Monument	1,148	1,147	1,178	1,219	1,259
19-Arlington	2,026	1,342	1,342	1,341	1,344
21-Boulevard		419	416	417	420
22-Avenue B	619	709	719	745	771
23-Townsend/Southside/Avenue	734	447	456	477	499
24-Mayport	265	198	203	210	217
25-San Jose	499	358	363	365	369
27-Phillips Hwy/Baymeadows/Ave		541	565	594	623
30-Cecil/Cassat	146	320	347	402	456
31-Talleyrand	91	59	61	63	65
32-McDuff	142	114	113	110	108
33-Spring Park/Phillips	146	115	116	118	121
34-Blanding/Edgewood	113	<i>Service replaced by other routes</i>			
35-Old St Augustine Rd/Baymeadows		134	144	157	170
50-University	1,526	1,425	1,411	1,395	1,390
51-Edgewood	1,549	1,185	1,222	1,249	1,274
53-Commonwealth Cassat		1,484	1,497	1,521	1,544
80-NAS		7	8	8	8
81-Dinsmore Shuttle		2	2	2	2
200-Mandarin Express	73	133	134	131	128
201-Clay Regional Express	79	108	106	101	96
202-Mayport Express	85	81	81	81	80
203-NAS	23	<i>Service replaced by other routes</i>			
204-Dinsmore Shuttle	83	<i>Service replaced by other routes</i>			
205-Beaches Express	31	219	216	207	201
300-Dunn/Pritchard Community	73	0	0	0	0
301-Oakleaf Community Shuttle	92	56	55	55	54
302-Southeast Community Shuttle	64	21	25	32	36
303-Beaches Community Shuttle	53	90	92	96	102
304-Mandarin Community Shuttle	38	<i>Service replaced by other routes</i>			
305-Highlands Community Shuttle	51	157	156	155	155
306-Heckscher Community Shuttle	18	<i>Service replaced by other routes</i>			
307-Northside Community Shuttle	55	120	120	124	129
308-Arlington Community Shuttle	44	15	15	16	16
Total Local Bus (No BRT/Skyway)	37,693	31,505	32,053	32,746	33,481
Grand Total	41,896	46,156	47,483	48,608	49,786

* APC data for the local buses reflects Jan-March, 2015. BRT and Skyway data reflects average of year 2016.

Year 2022 No Build

The 2022 No Build operating system for the Skyway is assumed to run on the elevated system as it exists today. The Skyway was updated to run with a headway of three minutes and was reduced to two lines, JRTC to Rosa Parks, and Kings Ave to Rosa Parks. The line from JRTC to Central had to be dropped in order to accommodate the increase in headway on the other two lines.

As shown in Table 10, the STOPS model estimate for the average weekday ridership for the Skyway for the year 2022 No Build scenario for the year 2015 is 3,638. Even with the increase in headway, the elimination of the JRTC to Central line results in a reduction in ridership compared to the year 2017 No Build scenario for the year 2015.

Table 10 Year 2022 No Build Scenario – Average Daily Boardings

Route Name	Year 2017 No Build STOPS Estimate Year 2015	Year 2022 No Build STOPS Estimate Year 2015	Year 2022 No Build STOPS Estimate Year 2020	Year 2022 No Build STOPS Estimate Year 2030	Year 2022 No Build STOPS Estimate Year 2040
64-JRTC to Central	541				
65-JRTC to Rosa Parks	213				
66-Kings Ave to Rosa Parks	3,504	910	962	971	981
67-JRTC to Kings Ave		2,773	3,130	3,278	3,410
68-Brooklyn to Kings Ave					
69-Brooklyn to Rosa Parks					
70-Brooklyn to JRTC					
Total Skyway	4,258	3,683	4,092	4,249	4,391
102-North First Coast Flyer	3,781	3,753	3,860	4,016	4,197
107-Southeast First Coast Flyer	1,902	1,935	1,991	2,011	2,039
5-Southwest First Coast Flyer	1,225	1,121	1,133	1,144	1,153
9-East First Coast Flyer	3,485	3,268	3,394	3,443	3,492
Total Flyers (BRT)	10,393	10,077	10,378	10,614	10,881
Total Local Bus	31,505	31,621	32,161	32,866	33,610
Grand Total	46,156	45,381	46,631	47,729	48,882

Year 2022 Scenarios without Brooklyn Station

In the year 2022 scenarios, new autonomous vehicles (AV) and a new infrastructure are assumed to be in place. As such, the system can run at higher frequencies and with additional lines.

The year 2022 systems were run with two separate sets of frequencies. Scenario 1A runs with a 45 second frequency at Central Station as shown in Figure 8.

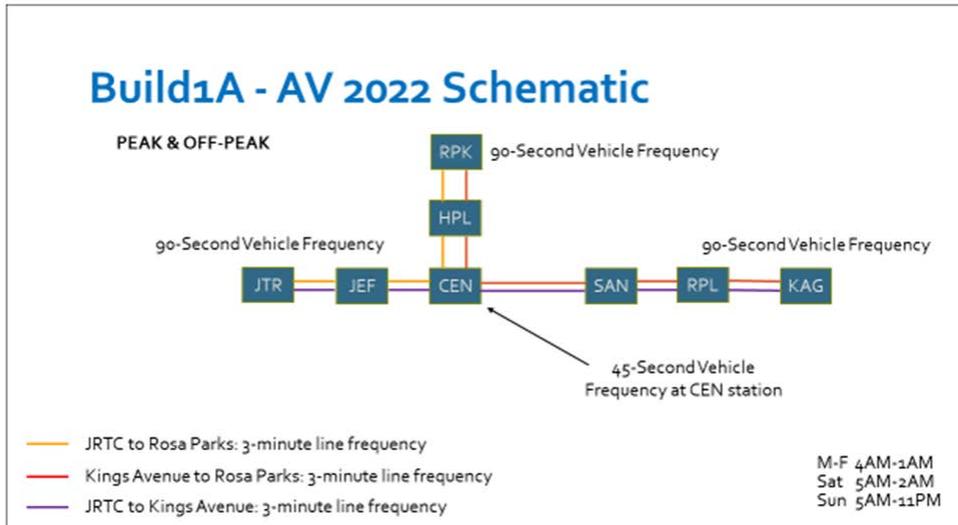


Figure 8 Year 2022 1A Build Scenario – without Brooklyn Station 45 second frequency

Table 11 lists the average daily boardings for Scenario 1A for the years 2015, 2020, 2030, and 2040.

Table 11 Year 2022 1A Scenario Average Weekday Boardings

Route Name	Year 2017 No Build STOPS Estimate Year 2015	Year 2022 1A STOPS Estimate Year 2015	Year 2022 1A STOPS Estimate Year 2020	Year 2022 1A STOPS Estimate Year 2030	Year 2022 1A STOPS Estimate Year 2040
64-JRTC to Central	541				
65-JRTC to Rosa Parks	213	804	813	827	845
66-Kings Ave to Rosa Parks	3,504	4,384	4,829	5,028	5,208
67-JRTC to Kings Ave		1,167	1,195	1,210	1,223
68-Brooklyn to Kings Ave					
69-Brooklyn to Rosa Parks					
70-Brooklyn to JRTC					
Total AV	4,258	6,355	6,837	7,065	7,276
102-North First Coast Flyer	3,781	3,720	3,806	3,946	4,114
107-Southeast First Coast Flyer	1,902	2,248	2,268	2,283	2,308
5-Southwest First Coast Flyer	1,225	1,789	1,801	1,815	1,826
9-East First Coast Flyer	3,485	4,114	4,190	4,229	4,268
Total Flyers (BRT)	10,393	11,871	12,065	12,273	12,516
Total Local Bus	31,505	31,153	31,795	32,480	33,203
Grand Total	46,156	49,379	50,697	51,818	52,995

Scenario 1B is identical to scenario 1A except for an increase in headway of 15 seconds, resulting in a 30 seconds frequency at Central Station (See Figure 9). Table 12 list the average daily boardings for scenario 1B.

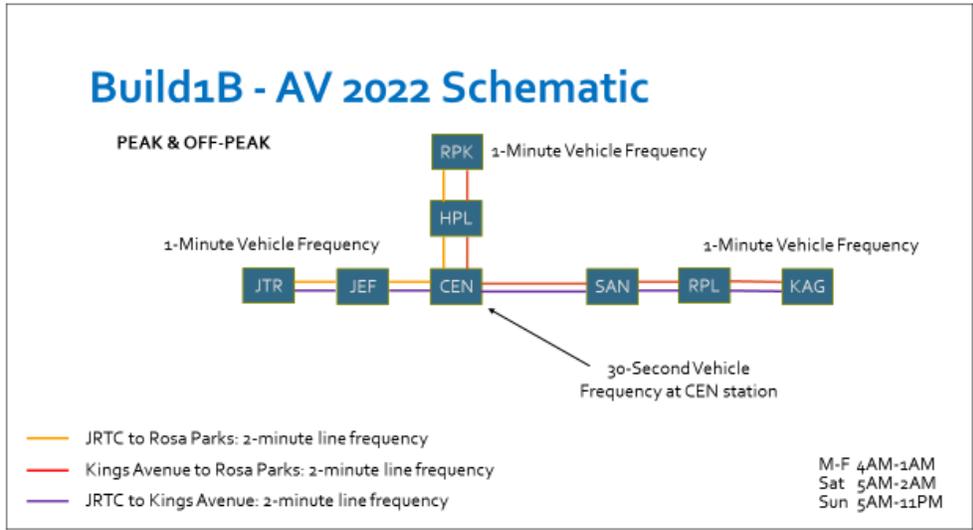


Figure 9 Year 2022 1B Build Scenario – without Brooklyn Station 30 second frequency

Table 12 Year 2022 1B Scenario Average Weekday Boardings

Route Name	Year 2017 No Build STOPS Estimate Year 2015	Year 2022 1B STOPS Estimate Year 2015	Year 2022 1B STOPS Estimate Year 2020	Year 2022 1B STOPS Estimate Year 2030	Year 2022 1B STOPS Estimate Year 2040
64-JRTC to Central	541				
65-JRTC to Rosa Parks	213	1,051	1,104	1,121	1,138
66-Kings Ave to Rosa Parks	3,504	4,384	4,829	5,028	5,208
67-JRTC to Kings Ave		1,256	1,390	1,418	1,443
68-Brooklyn to Kings Ave					
69-Brooklyn to Rosa Parks					
70-Brooklyn to JRTC					
Total AV	4,258	6,691	7,323	7,567	7,789
102-North First Coast Flyer	3,781	3,777	3,913	4,067	4,247
107-Southeast First Coast Flyer	1,902	1,820	1,831	1,842	1,865
5-Southwest First Coast Flyer	1,225	1,763	1,792	1,819	1,841
9-East First Coast Flyer	3,485	4,069	4,223	4,284	4,344
Total Flyers (BRT)	10,393	11,429	11,759	12,012	12,297
Total Local Bus	31,505	31,472	32,043	32,739	33,471
Grand Total	46,156	49,592	51,125	52,318	53,557

In Table 13, the Skyway ridership is compared between the two year 2022 Build scenarios without Brooklyn Station. As would be expected, the increase in service results in an increase in ridership. The increase is approximately 340 riders in 2015, 480 in 2020, 510 in 2030, and 510 in the year 2040. This represents a 5% in 2015 and a 7% increase in 2040.

Table 13 Year 2022 1A and 1B Average Weekday Boardings Comparison

Year 2022 AV Alternative Without Brooklyn Station 1A (45 seconds frequency at Central Station) and Alternative 1B (30 seconds frequency at Central Station) Average Daily Ridership Comparison*								
Route Name	STOPS Estimate Year 2015		STOPS Estimate Year 2020		STOPS Estimate Year 2030		STOPS Estimate Year 2040	
	45 Seconds Frequency	30 Seconds Frequency						
65-JRTC to Rosa Parks	810	1,060	820	1,110	830	1,130	850	1,140
66-Kings Ave to Rosa Parks	4,390	4,390	4,830	4,830	5,030	5,030	5,210	5,210
67-JRTC to Kings Ave	1,170	1,260	1,200	1,390	1,210	1,420	1,230	1,450
Total AV	6,370	6,710	6,850	7,330	7,070	7,580	7,290	7,800

* Numbers rounded up to the nearest 10.

Year 2022 Scenarios with Brooklyn Station

Like the year 2022 scenario without the Brooklyn Station, the year 2022 scenario with Brooklyn Station assumes the new autonomous vehicles and the new infrastructure to be in place. As such, the system with the Brooklyn Station can run at higher frequencies and with more lines than the year 2022 No Build scenario.

The year 2022 systems with Brooklyn Station were run with two separate sets of frequencies. Scenario 2A is reflected in Figure 10 and provides service with a 40 second frequency at Central Station. Table 14 lists the average daily boardings for scenario 2A for the years 2015, 2020, 2030, and 2040.

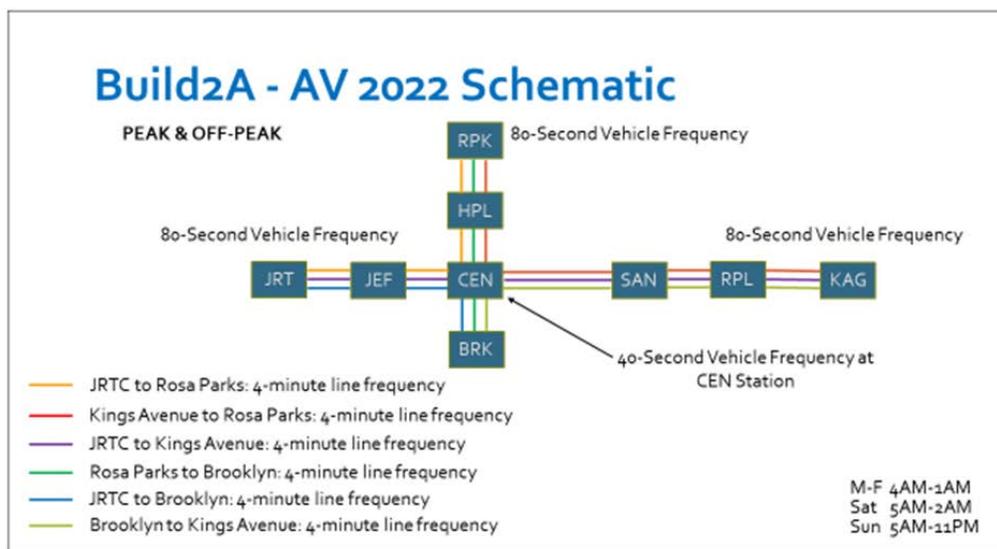


Figure 10 Year 2022 2A Build Scenario – with Brooklyn Station 45 second frequency

Table 14 Year 2022 2A Scenario Average Weekday Boardings

Route Name	Year 2017 No Build STOPS Estimate Year 2015	Year 2022 2A STOPS Estimate Year 2015	Year 2022 2A STOPS Estimate Year 2020	Year 2022 2A STOPS Estimate Year 2030	Year 2022 2A STOPS Estimate Year 2040
64-JRTC to Central	541				
65-JRTC to Rosa Parks	213	728	747	762	780
66-Kings Ave to Rosa Parks	3,504	3,715	4,074	4,233	4,373
67-JRTC to Kings Ave		602	637	655	671
68-Brooklyn to Kings Ave		802	937	954	970
69-Brooklyn to Rosa Parks		376	416	415	412
70-Brooklyn to JRTC		293	306	316	325
Total AV	4,258	6,516	7,117	7,335	7,531
102-North First Coast Flyer	3,781	3,777	3,915	4,071	4,251
107-Southeast First Coast Flyer	1,902	1,755	1,766	1,777	1,800
5-Southwest First Coast Flyer	1,225	1,614	1,641	1,667	1,688
9-East First Coast Flyer	3,485	3,965	4,123	4,178	4,232
Total Flyers (BRT)	10,393	11,111	11,445	11,693	11,971
Total Local Bus	31,505	31,596	32,168	32,863	33,596
Grand Total	46,156	49,223	50,730	51,891	53,098

The scenario 2B is the same as scenario 2A except for the frequency of service. Scenario 2B runs with a 30 seconds frequency at Central Station, as reflected in Figure 11.

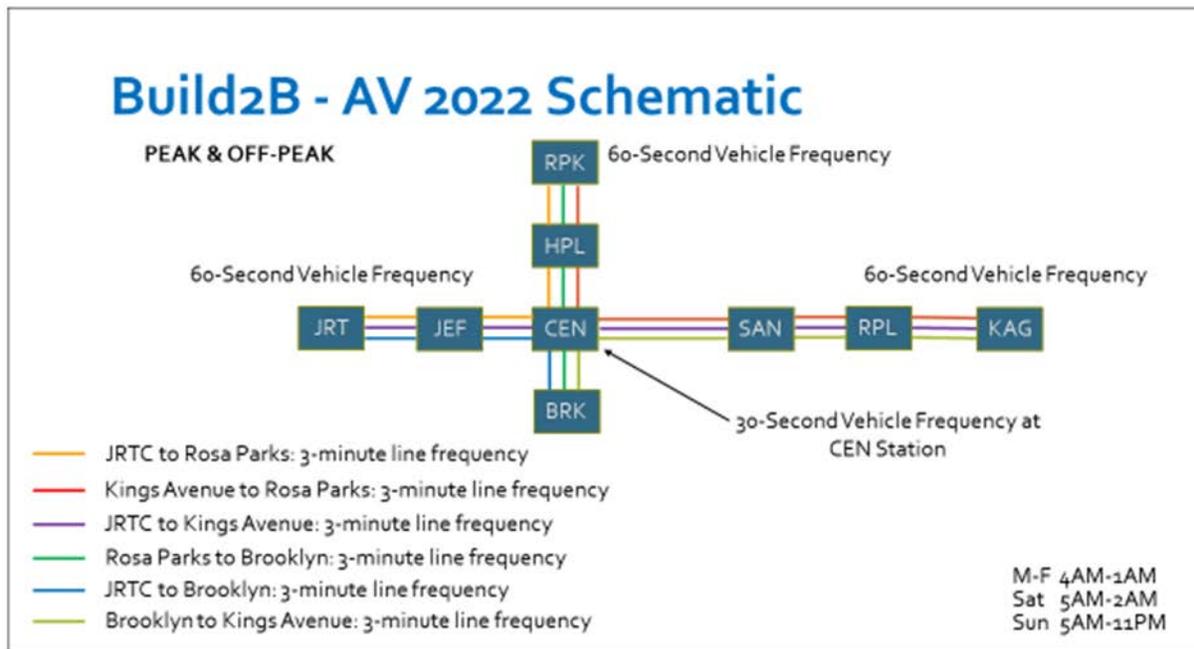


Figure 11 Year 2022 2B Build Scenario – with Brooklyn Station 30 second frequency

Table 15 lists the average daily boardings for scenario 2B for the years 2015, 2020, 2030, and 2040.

Table 15 Year 2022 2B Scenario Average Weekday Boardings

Route Name	Year 2017 No Build STOPS Estimate Year 2015	Year 2022 2B STOPS Estimate Year 2015	Year 2022 2B STOPS Estimate Year 2020	Year 2022 2B STOPS Estimate Year 2030	Year 2022 2B STOPS Estimate Year 2040
64-JRTC to Central	541				
65-JRTC to Rosa Parks	213	736	755	769	786
66-Kings Ave to Rosa Parks	3,504	3,950	4,353	4,547	4,720
67-JRTC to Kings Ave		602	637	655	671
68-Brooklyn to Kings Ave		802	937	954	970
69-Brooklyn to Rosa Parks		377	416	418	419
70-Brooklyn to JRTC		343	358	372	385
Total AV	4,258	6,810	7,456	7,715	7,951
102-North First Coast Flyer	3,781	3,789	3,924	4,082	4,264
107-Southeast First Coast Flyer	1,902	1,753	1,765	1,778	1,802
5-Southwest First Coast Flyer	1,225	1,623	1,650	1,677	1,700
9-East First Coast Flyer	3,485	4,036	4,194	4,254	4,313
Total Flyers (BRT)	10,393	11,201	11,533	11,791	12,079
Total Local Bus	31,505	31,592	32,167	32,862	33,589
Grand Total	46,156	49,603	51,156	52,368	53,619

Table 16 compares the Skyway ridership for the two scenarios. As would be expected, the increase in service results in an increase in ridership between the two different scenarios. In 2015, the difference is 290, in 2020 the difference is 340, in 2030 the difference is 370, and in 2040 the difference is between the two scenarios is 410. The increases are around 5%.

Table 16 also provides insight related to the addition of the Brooklyn Station. Three lines provide service to the Brooklyn Station, these are Brooklyn Station to Rosa Parks, Brooklyn Station to Kings Ave., and Brooklyn Station to the JRTC. In comparing these three lines, the Kings Ave line draws around 55% of the riders, while the Rosa Parks Station draws around 25% and the line to the JRTC around 20%. These percentages are pretty consistent between the years and scenarios. Overall the three lines to the Brooklyn Station make up around 23% of the total ridership.

Table 16 Year 2022 2A and 2B Average Weekday Boardings Comparison

Year 2022 AV Alternative With Brooklyn Station 2A (40 seconds frequency at Central Station) and Alternative 2B (30 seconds frequency at Central Station) Average Daily Ridership Comparison*								
Route Name	STOPS Estimate Year 2015		STOPS Estimate Year 2020		STOPS Estimate Year 2030		STOPS Estimate Year 2040	
	40 Seconds Frequency	30 Seconds Frequency						
65-JRTC to Rosa Parks	730	740	750	760	770	770	780	790
66-Kings Ave to Rosa Parks	3,720	3,950	4,080	4,360	4,240	4,550	4,380	4,720
67-JRTC to Kings Ave	610	610	640	640	660	660	680	680
Subtotal	5,060	5,300	5,470	5,760	5,670	5,980	5,840	6,190
68-Brooklyn to Kings Ave	810	810	940	940	960	960	970	970
69-Brooklyn to Rosa Parks	380	380	420	420	420	420	420	420
70-Brooklyn to JRTC	300	350	310	360	320	380	330	390
Subtotal	1,490	1,540	1,670	1,720	1,700	1,760	1,720	1,780
Total AV	6,550	6,840	7,140	7,480	7,370	7,740	7,560	7,970

* Numbers rounded up to the nearest 10.

Conclusion

The forecasts presented in this report are the results of the service plan being coded in GTFS format and analyzed with FTA’s Simplified Trips-on-Project Software (STOPS). As part of its original development, STOPS was calibrated to match the actual ridership response associated with past BRT, LRT, and other fixed guideway transit projects constructed throughout the United States over the past 10 to 15 years.

The goal for the forecasts presented in this report is to analyze set of predictions of how the Skyway transit ridership in Jacksonville would respond to new Skyway transit investments. Even though these forecasts may be plausible, as always, there are uncertainty associated with ridership forecasts. The main factors influencing the ridership predictions as documented are:

- Uncertainty of population and employment forecasts. STOPS forecasts of future year ridership are based on the Northeast Florida TPO estimates of population and employment in the Jacksonville area. Additionally, development data was obtained from the City of Jacksonville and the DIA. These forecasts depend on the region achieving the forecasted levels of development.
- Uncertainty of service plan. The project definition described in this report present the expected transit level-of-service. As projects move through the development process from plans to design to implementation, events can occur which may cause significant changes to the project definition.
- Other Sources of Uncertainty. The forecasts presented in this report were prepared following FTA requirements that transportation policies are consistent among the runs. This means that key assumptions such as land uses, fare policies, and costs for competing modes be consistent for all scenarios to allow for a meaningful comparison of transit alternatives. FTA also requires project sponsors to use forecasting methods that have been validated to match existing transit market characteristics. Key parameters such as trip rates, auto operating costs, and mode-specific parameters must

be the same for model calibration and analysis of each alternative. Experience has shown that adherence to these requirements results in a fair analysis of alternatives and a good chance that the forecasted results will be achieved when projects are implemented.

Nevertheless, it is possible that changes in the nature of commuting (e.g., tele-working), costs of transit or competing modes, nature of land development, or overall levels of transit service can occur over time. These changes can affect the magnitude of the projected demand for transit which are not reflected in the results presented in this report.