Comprehensive Operational Analysis

Final Report

Votran
We drive a great bargain

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1. Introduction

The Comprehensive Operational Analysis or COA is a thorough investigation of Votran's existing transit system and services in order to identify improvement opportunities in delivering a quality service while minimizing new costs. The COA provides a detailed examination of all existing Votran routes and operational practices that impact service delivery and the costs of providing service. The most significant result for the COA is a revised transit route network that can be scaled to the budget demands of Volusia County.

The study is being done simultaneously with the 2022-31 Major Update of the Transit Development Plan. The TDP represents the County's vision for public transportation during this time period and functions as the strategic guide for public transportation in the community. A major TDP update allows transit agencies to outline actions to be taken in the following year and set goals for subsequent years. As a strategic plan, the TDP identifies needs in an unconstrained fashion and for which currently there is no funding.

While the TDP designs a ten-year improvement plan which focuses on opportunities for transit expansion in the future, a COA is more focused on immediate term needs and providing recommendations for mobility enhancements that can be implemented with existing budgetary and capital resources. TDP plan updates are requirements of the Florida Department of Transportation (FDOT) and follow a prescribed set of analyses that must be included. While the same requirement does not exist for a COA, a COA does offer an opportunity for an outside perspective in improving existing transit services.

An advantage to the joint effort of the COA and TDP as Volusia County has pursued with this project is that the results of the COA network and recommendations can serve as a baseline network in which to make future improvements to transit service.

As part of the COA, a Service and Market Assessment Dashboard was created to facilitate analysis of the current Votran bus system as well as community conditions that impact transit use. Many of the data elements that were utilized in the analysis of this COA were delivered to Volusia County staff electronically by virtue of the dashboards. The advantage to the electronic delivery method is the ability to create more customizable visualizations for data that has traditionally been delivered in a static form.

The following are a list of dashboards provided to Volusia County in January 2021.

- Ridership Analysis – This workbook includes maps of systemwide ridership for July to December 2019 along with stop-level and segment ridership for each route. Maps and charts also display ridership and service productivity by trip and passenger load data.
- On-Time Performance – The data displayed within this dashboard includes a full systemwide on-time performance report, along with breakdown for route, timepoint, time period, and specific trip.
- Key Performance Indicators – This workbook shows key benchmarks for each route as well as system totals for such metrics as Passenger per Revenue Hour, Passenger per Revenue Mile, Farebox Recovery, and other measures.
- Historical Ridership – This workbook contains tables and charts for the historical ridership totals for each Votran route.
- Transit Propensity – The demographic data within this workbook maps each block group within Volusia County while assigning a score to each based on the household characteristics who reside there. The transit propensity composite index includes variables found to correlate strongly with transit use: low-income households, renter-occupied households, and zero-vehicle households.

- Employment Travel Patters – Using 2018 LEHD Origin-Destination Employment Statistics (LODES) data, this workbook allows users to see on a map employment travel patterns between different geographies. The map includes all surrounding counties and others within Central Florida.
- LBS Travel Patterns – This workbook is designed similarly to the previous, but the data set uses cell phone produced location-based data. The data was provided by AirSage and is for the month of October 2019, prior to the COVID-19 pandemic.

2. Existing Conditions

County Population and Employment

Like much of the state of Florida, Volusia County has grown at a fairly rapid pace from 2010 to the most recent Census estimates from 2019. In each Census since the county's founding, population growth has been at least 11% and the same should be expected for 2020, given population estimates. Table 1 provides the recent population trends of the county, showing its continued growth pattern.

Table 1: Historical Population of Volusia County

Census Year	Population	Change from Prior Decade
1980	258,762	52.7%
1990	370,712	43.3%
2000	443,343	19.6%
2010	494,343	11.6%
2019 (estimate)	553,284	11.9%

Source: U.S. Census Bureau

Growth within the county has varied by jurisdiction. Table 2 shows the growth rate from 2010 to 2019 for the largest communities within Volusia County.

Table 2: Population Growth of Volusia Communities

City	2010 Census Population	2019 Population Estimate	Growth, 2010-2019
Deltona	85,182	92,757	8.9%
Daytona Beach	61,005	69,186	13.4%
Port Orange	56,048	64,842	15.7%
Ormond Beach	38,137	43,759	14.7%
DeLand	27,031	34,851	28.9%
New Smyrna Beach	22,464	27,843	23.9%
Edgewater	20,750	23,918	15.3%
DeBary	19,320	21,305	10.3%
South Daytona	12,252	13,080	6.8%
Holly Hill	11,659	12,357	6.0%
Orange City	10,599	12,335	16.4%

Source: U.S. Census Bureau

Among the largest cities in Volusia County, DeLand and New Smyrna Beach grew by the highest percentages from 2010 to 2019. Each of the six largest cities added between 5,000 and 9,000 residents during the decade.

In 2019, Volusia County had 240,527 residents who were employed. A total of 217,088 people were employed within Volusia County, meaning more commute trips travel out of the county than those that travel into it. Table 3 shows the total employment within each of the largest cities within Volusia County.

Table 3: Employment by City

City	Total Employment	Residents Currently Employed
Daytona Beach	55,449	28,354
DeLand	24,457	12,327
Ormond Beach	20,170	18,053
Port Orange	18,355	27,599
New Smyrna Beach	13,164	9,614
Deltona	10,190	39,421
Orange City	9,498	4,645
Holly Hill	5,845	4,465
Edgewater	5,695	9,644
South Daytona	4,708	5,524
DeBary	4,145	9,137

Source: 2019 5-Year American Community Survey, Census Bureau

Daytona Beach and DeLand serve as employment hubs on either side of the county with the largest total employment, and both cities have nearly twice as many jobs as they have workers who live in the city. New Smyrna Beach and Orange City are smaller hubs which have more employment than residents who are employed. Many of the largest Volusia communities are more residential, especially Port Orange, Deltona, Edgewater, and DeBary. These communities have many more working residents than people employed within the cities.

Population and employment densities for Volusia County are found on Figures 1 and 2. Votran services are included to demonstrate the existing transit coverage of the community.

The general extent of the current transit network does serve nearly all the block groups within the county with populations of 2,000 or more per square mile, with a few notable exceptions. There is an area along Williamson Boulevard south of Taylor Road within Port Orange and another within Daytona Beach where service is only provided at the northern edge of the community. Another area along Beville Road west of Clyde Morris is not served by transit. Neither area has a density beyond 3,000 people per square mile and both areas contain more affluent households relative to the county generally. Neither of these areas are likely to produce strong transit demand.

Figure 1: Population Density of Volusia County

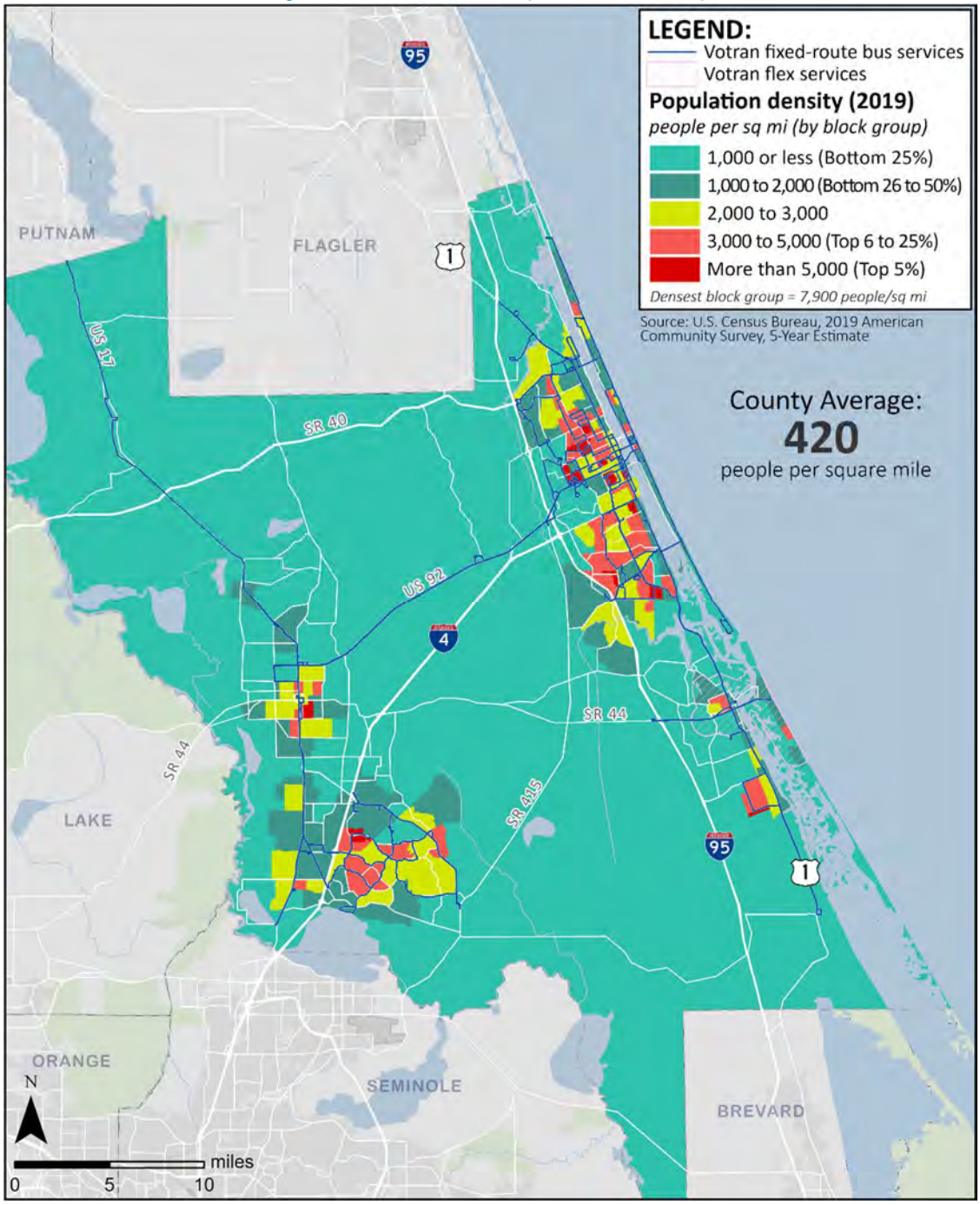
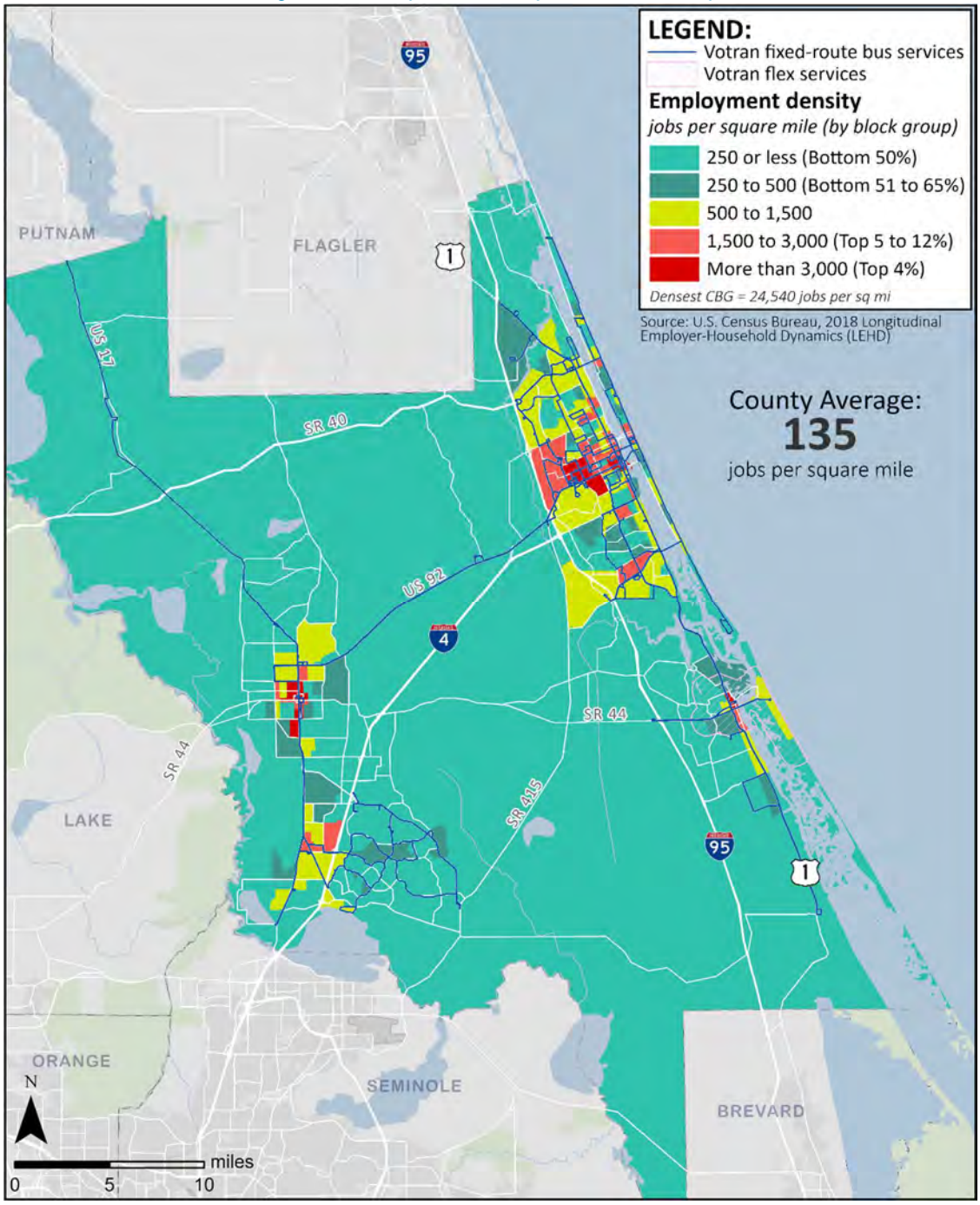


Figure 2: Employment Density of Volusia County



There are areas with at least 500 jobs per square mile in the county where fixed route transit does not operate. The highest levels of employment densities are found in between the International Speedway Boulevard and LPGA Boulevard corridors in Daytona Beach. Other employment concentrations are found along Woodland Boulevard in DeLand, and other smaller areas in Orange City, Port Orange, New Smyrna Beach and in several beach areas.

Demographic Profile

Volusia County, like the rest of Florida, is home to a varied population. Table 4 shows basic sex and age make-up for the county population in 2019, along with statewide numbers for comparison.

Table 4: Demographic Composition of Volusia County

Demographic Group	Percentage of Volusia County	Percentage of Florida
Male	48.7%	48.9%
Female	51.3%	51.1%
Youth (under 18 years)	17.5%	19.7%
Ages 19-24	7.9%	8.3%
Ages 25-64	49.8%	51.1%
Seniors (65+ years)	24.8%	20.9%

Source: American Community Survey, 2019 1-Year Data

Florida has a high rate of seniors compared to the rest of the United States. In 2019, 16.5% of Americans were over 65 years of age. Florida's rate was over 20%. Volusia County has an even higher proportion of senior population that the state overall at 24.8%. As a result, the proportion of the county in other age groups is lower in Volusia County. The youth population is only 17.5%, compared to Florida's rate of 19.7% and 22.2% for the full United States.

Racially and ethnically, Florida is one of the more diverse states in the country. People who identify themselves within some minority group, either being a racial minority or being Hispanic, constitute nearly half of the total population.

Table 5: Race/Ethnicity Composition of Volusia County

Demographic Group	Percentage of Volusia County	Percentage of Florida
White	78.7%	74.5%
Black	10.6%	16.0%
Asian	1.9%	2.8%
Native American	0.2%	0.3%
Other or multiple races	8.6%	6.4%
Hispanic	15.0%	26.4%
Non-Hispanic	85.0%	73.6%
Non-Hispanic White	70.6%	53.0%
All Minorities	29.4%	47.0%

Source: American Community Survey, 2019 1-Year Data

Compared to Florida, Volusia County has a much larger share of its population who are non-Hispanic white. The County has a much smaller share of Hispanics than found in other parts of Florida. The black or African American community is also smaller than the state. Indeed, while the black and Hispanic populations of Florida are a larger

percentage of the total than national averages, Volusia County has lower proportions of both groups than the country.

Figure 3 shows the distribution of the youth population in Volusia County. Most of Deltona has a higher share of young population. Other smaller areas with higher youth population are the northwestern part of the County, urban portions of DeLand and Daytona Beach, and Interstate 95 corridor in Ormond Beach, Port Orange, and Edgewater.

Figure 3: Youth Population

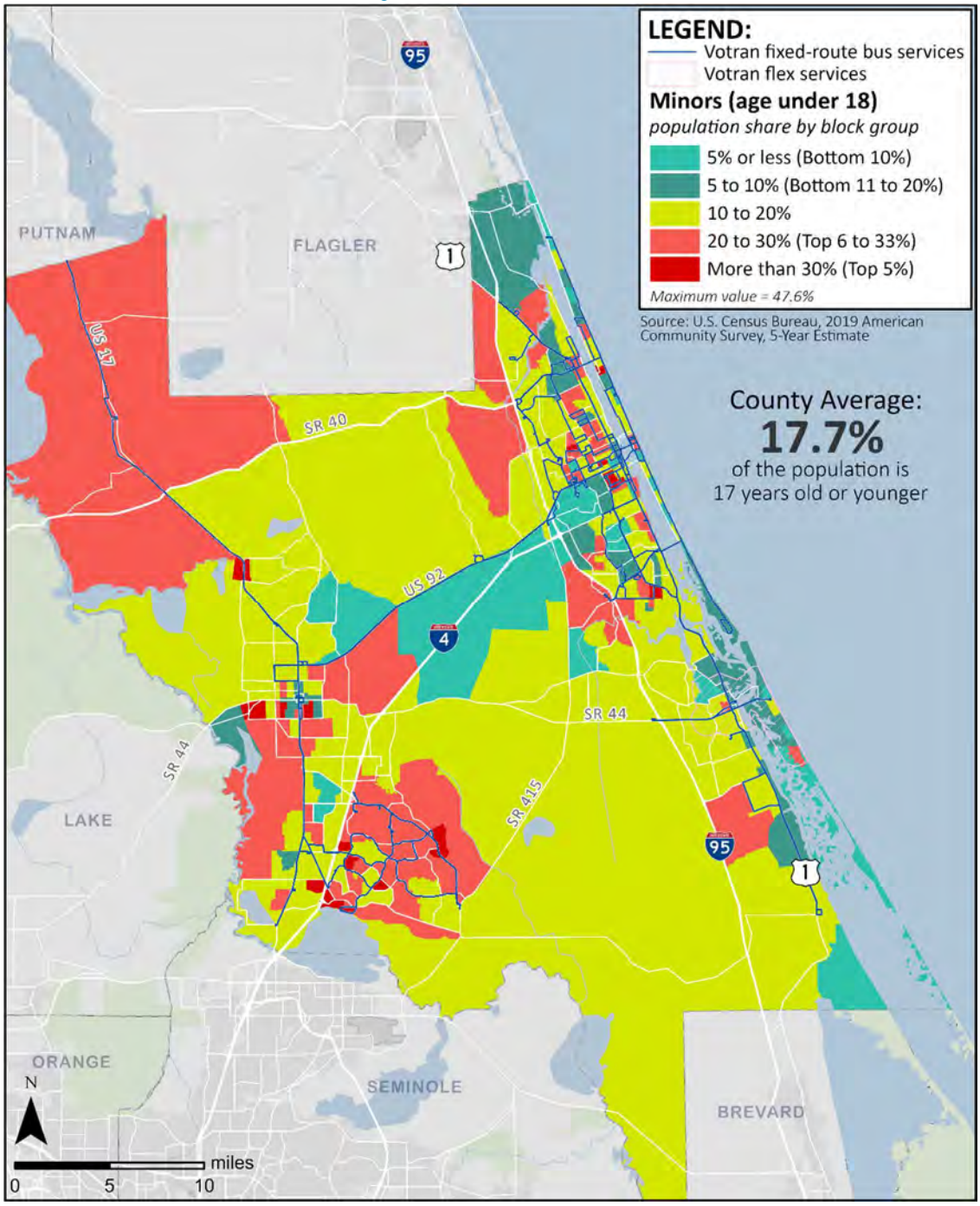
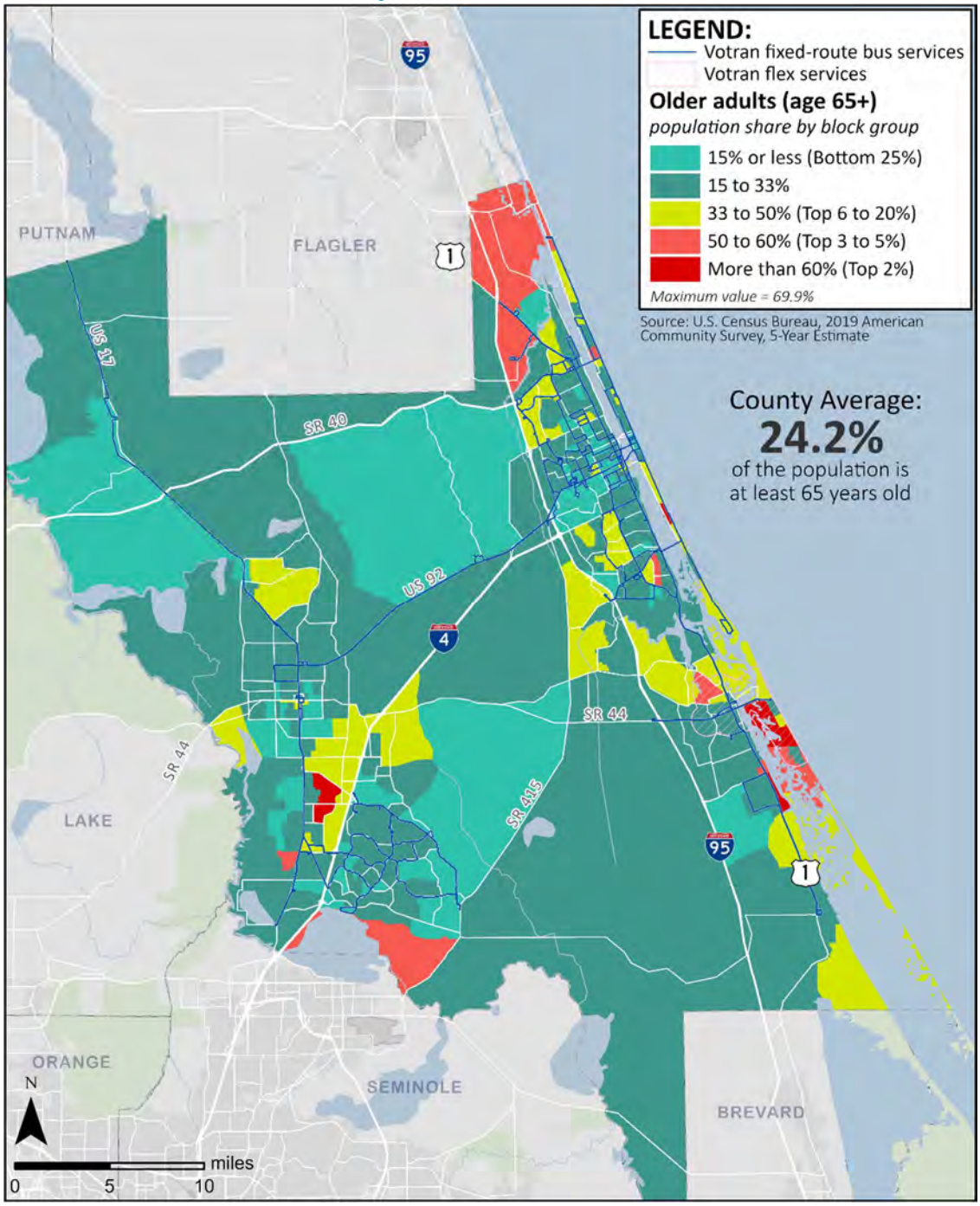


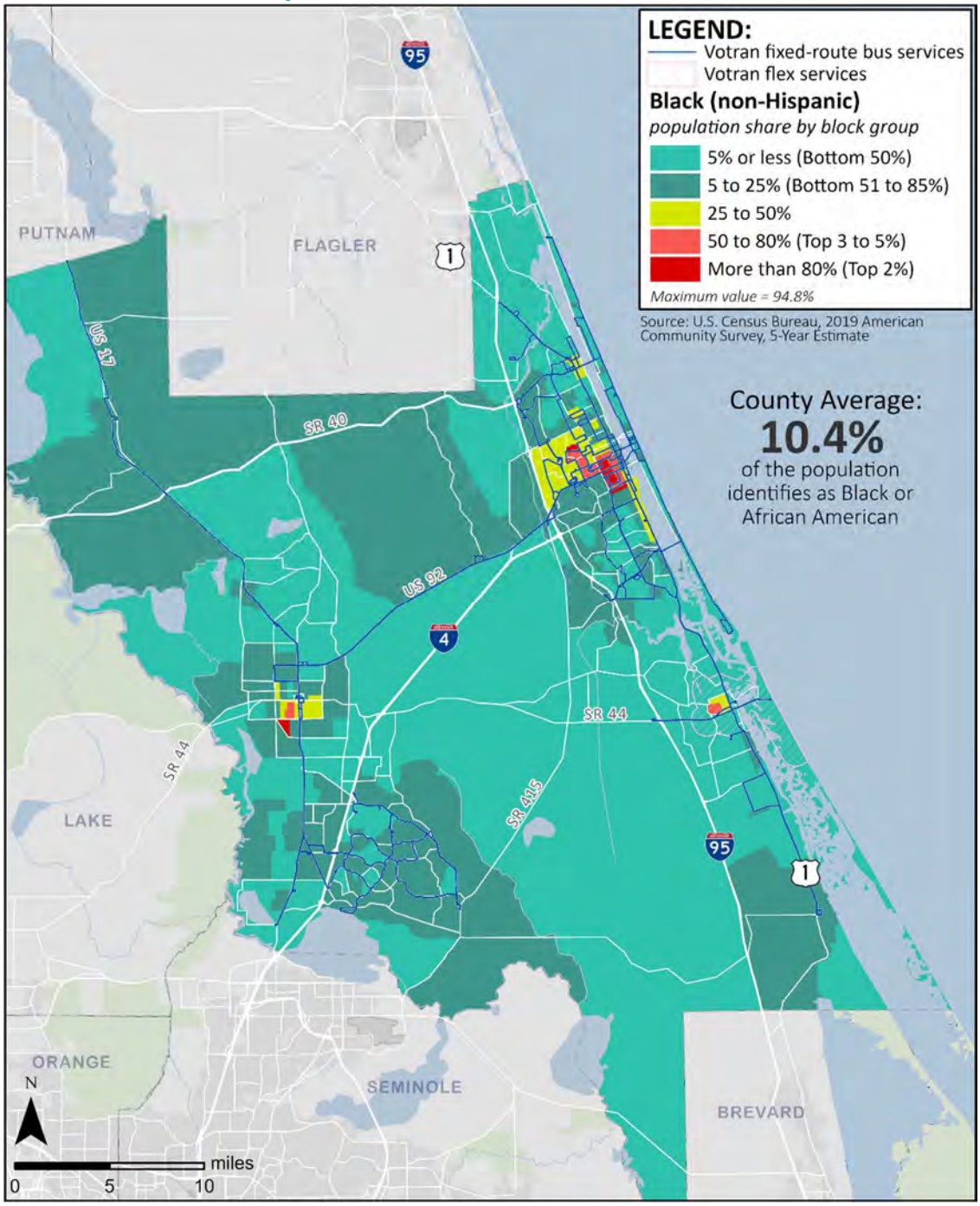
Figure 4: Senior Population



Several areas of the county have large senior populations. Much of New Smyrna Beach, has higher than average senior populations, especially in areas nearest the beach. Other locations with larger senior populations are the east side of DeLand and Orange City, Daytona Beach shores, and the northern parts of Ormond Beach.

Figures 5 through 8 show the proportion of the population within different racial and ethnic groups.

Figure 5: Black or African American Population



The black and African American in Volusia County are primarily concentrated in several communities in Volusia County. The largest concentration is in Daytona Beach, especially between Ridgewood Avenue and Clyde Morris Boulevard. Other smaller areas with higher black populations are in DeLand and New Smyrna Beach.

The Hispanic population of Volusia County are more widespread in the county's west side. The northwestern part of the county, northern DeLand, and Deltona are all areas where at least 30% of the population is Hispanic.

Figure 6: Hispanic Population

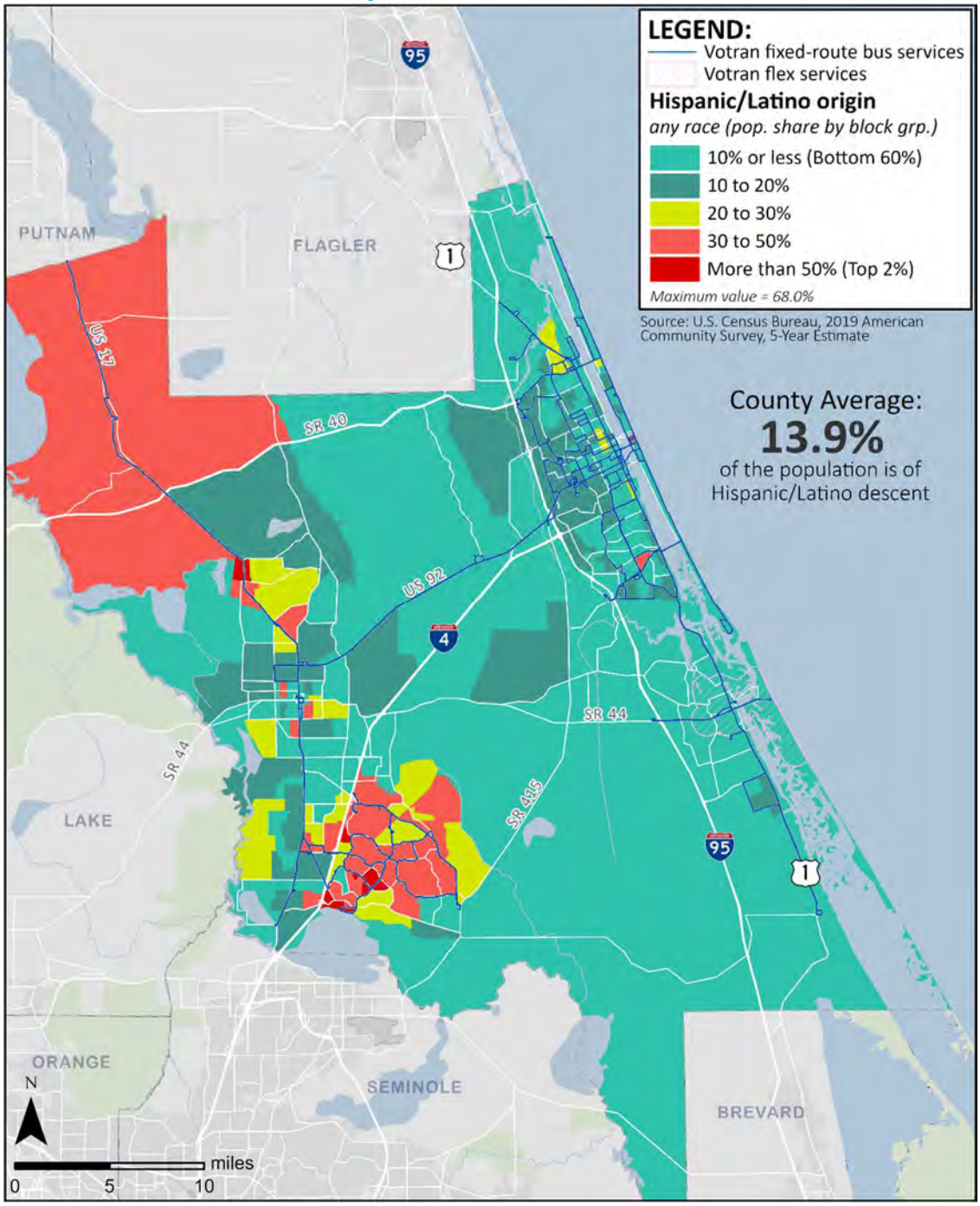
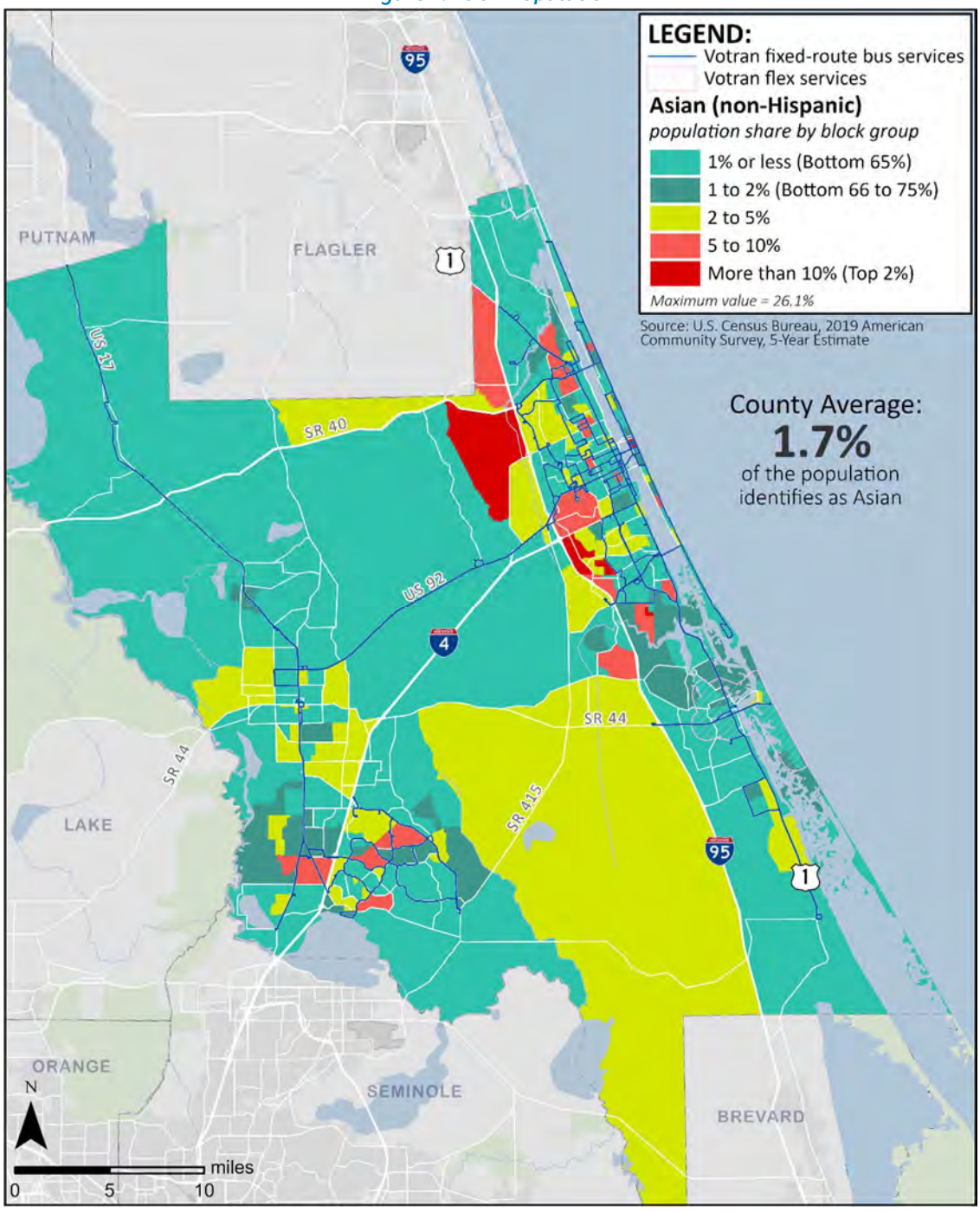


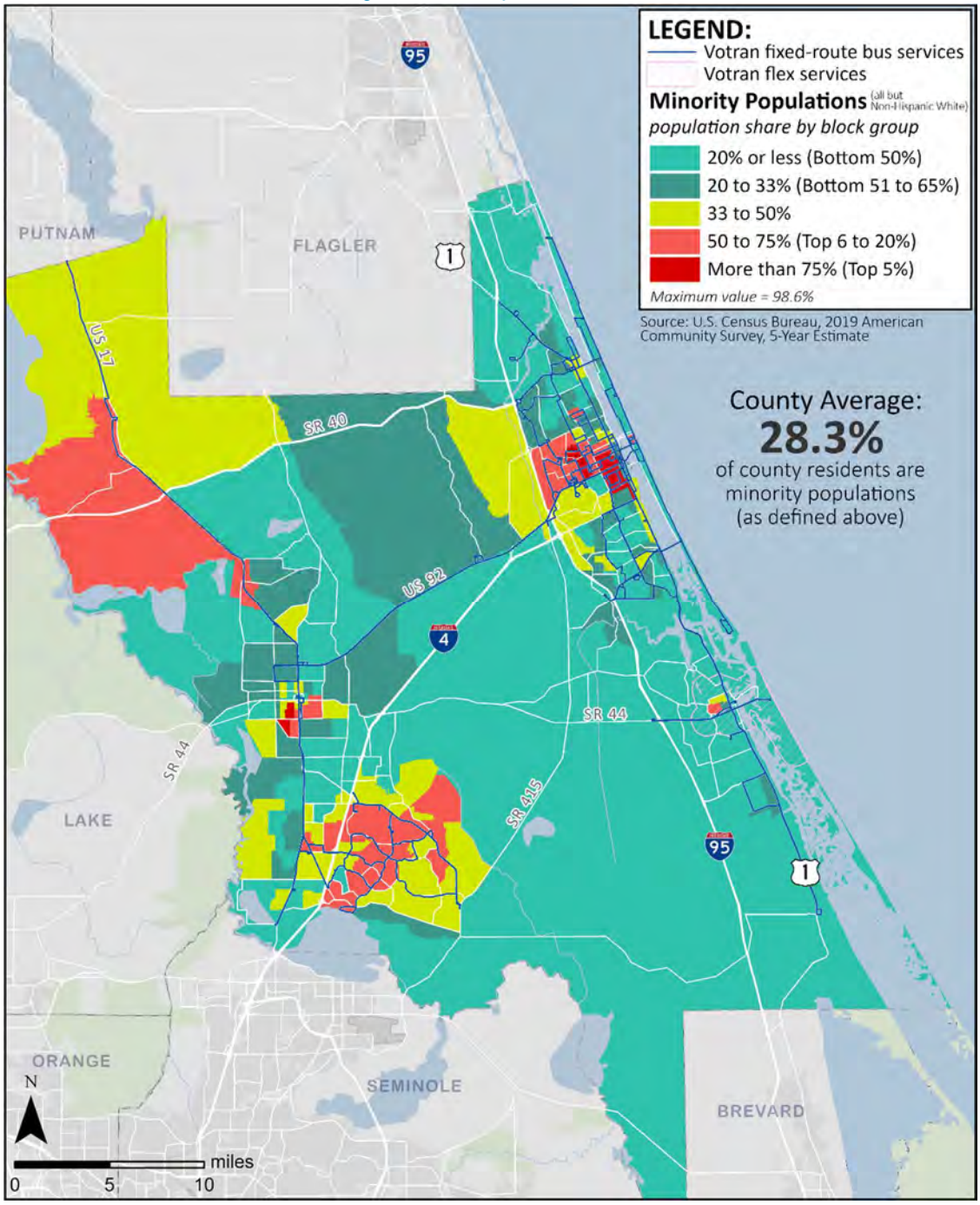
Figure 7: Asian Population



The Asian population within Volusia is not extensive. Much of the county has fewer than 2% of the population who are Asian. Areas with larger concentrations are along the Interstate 95 corridor from Ormond Beach to Port Orange, other areas further east in Ormond Beach, and a handful of block groups in Deltona, Orange City, and DeBary in southwestern Volusia County.

Figure 8 shows the cumulative percentages of all minority populations.

Figure 8: Minority Populations



When totaled, the proportion of minority populations is centered in three populous areas: Daytona Beach, central areas of DeLand, and Deltona along with adjacent areas of Orange City. The rural areas of northwest Volusia County also have higher populations of minorities.

3. Transit Propensity

Existing Transit Ridership

The share of existing trips that are currently made using public transportation within Volusia County is quite limited. This is to be expected given that Volusia County is located in the South and outside a large metropolitan area. According to the 2019 American Community Survey, just 1% of commute trips within Volusia County are made using public transportation. Table 6 shows a comparison of transit share within Volusia County and compares to other similar counties within a 300-mile radius.

While the number of commuters using transit is not as great as the state, the state average tends to be much higher due to higher usage in the largest areas. Outside of Southeast Florida, the average transit usage for the state is 1.1%, which is similar to the number for Volusia County.

Table 6: Transit Share for Commute Trips

Geography	Percentage of Commuters Using Public Transportation
Volusia County, FL	1.0%
Florida	1.8%
Brevard County, FL	0.5%
Lee County, FL	0.7%
Pasco County, FL	0.4%
Polk County, FL	0.5%
Chatham County, GA	2.5%
Charleston County, SC	1.2%

Source: American Community Survey, 2019 5-Year Data

Table 7 shows transit usage among commuters for different ages and between males and females. The trend of Volusia County is the same as the state with younger workers and women more likely to use transit.

Table 7: Transit Share for Different Age/Sex Groups

Demographic Group	Transit Share in Volusia County	Transit Share in Florida
Total Population	1.0%	1.8%
Ages 16-19	3.2%	3.0%
Ages 20-24	1.3%	2.9%
Ages 25-44	1.2%	1.8%
Ages 45-54	0.7%	1.6%
Ages 55-59	0.6%	1.6%
Ages 60+	0.8%	1.5%
Male	0.9%	1.7%
Female	1.1%	2.0%

Source: American Community Survey, 2019 5-Year Data

Table 8: Transit Share for Different Race/Ethnicity/Culture Groups

Demographic Group	Transit Share in Volusia County	Transit Share in Florida
Total Population	1.0%	1.8%
White	0.7%	1.2%
Black	3.7%	4.7%
Asian	0.6%	1.7%
Hispanic	0.9%	2.4%
White, non-Hispanic	0.7%	0.7%
Native-born	1.0%	1.3%
Foreign-born	1.3%	3.2%
Limited-English Proficiency	0.7%	3.9%

Source: American Community Survey, 2019 5-Year Data

Table 8 provides transit share data for different categories associated with race, ethnicity, place of birth, and language spoken. For both non-Hispanic whites and blacks or African Americans, transit usage in Volusia County follows much of the same trends. However, for several groups, the county significantly underperforms the state in transit share: Hispanics, foreign-born residents, and those with limited-English proficiency. In all cases, these groups tend to be more likely to use transit compared to the total population; however, for all three groups in Volusia County, they actually have lower percentages than the county overall.

Table 9: Transit Share for Different Economic Groups

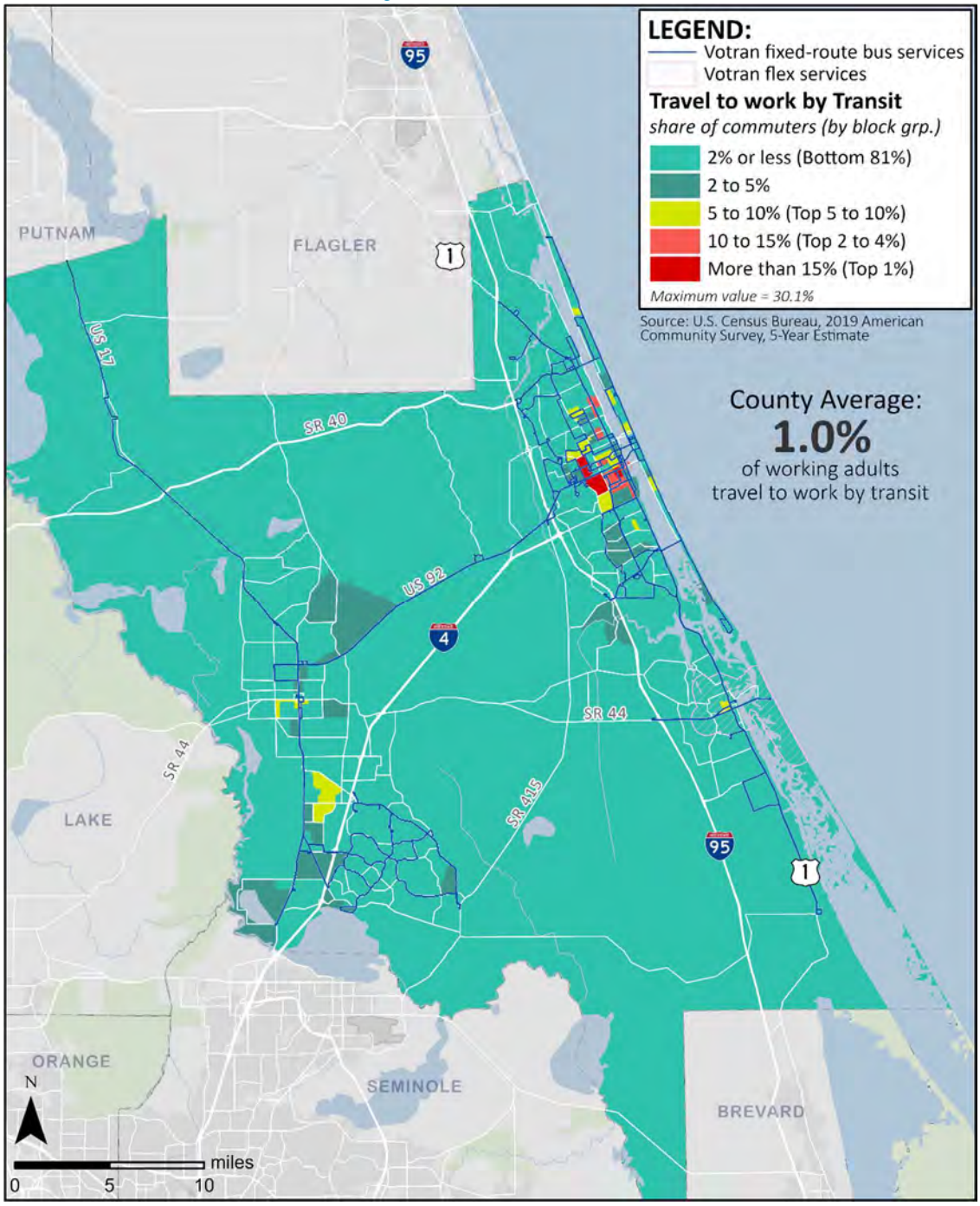
Demographic Group	Transit Share in Volusia County	Transit Share in Florida
Total Population	1.0%	1.8%
Earnings $0-$9,999	2.4%	3.9%
Earnings $10,000-$14,999	0.7%	3.5%
Earnings $15,000-$24,999	1.6%	2.8%
Earnings $25,000-$34,999	1.2%	1.6%
Earnings $35,000-$49,999	0.5%	1.0%
Earnings $50,000-$64,999	0.3%	0.8%
Earnings $65,000-$74,999	0.7%	0.6%
Earnings $75,000+	0.6%	0.6%
Below Poverty Level	3.1%	5.8%
100%-149% of Poverty Level	1.9%	3.8%
Above 150% of Poverty Level	0.8%	1.4%
Service Workers	1.6%	3.4%

Source: American Community Survey, 2019 5-Year Data

Not surprisingly, transit shares are significantly higher among those with lower earnings and those whose income is below or near the poverty level. The trend for the county and state are similar. Service workers are the occupation group most likely to use transit nationally, and both state and county shares are higher among these workers than for other commuters.

Figure 9 shows transit shares for work trips using the worker's place of residence.

Figure 9: Transit Share for Work Trips



Existing transit usage is significantly concentrated within a few small areas of the county. In particular, all block groups with at least 10% of workers using transit are located in the Daytona Beach and Holly Hill areas, areas which are all within three miles of the Daytona Beach Central Business District. There are a few block groups with at least 5% transit share scattered in DeLand, Orange City, New Smyrna Beach, and along the barrier island.

Potential Transit Markets and Transit Need

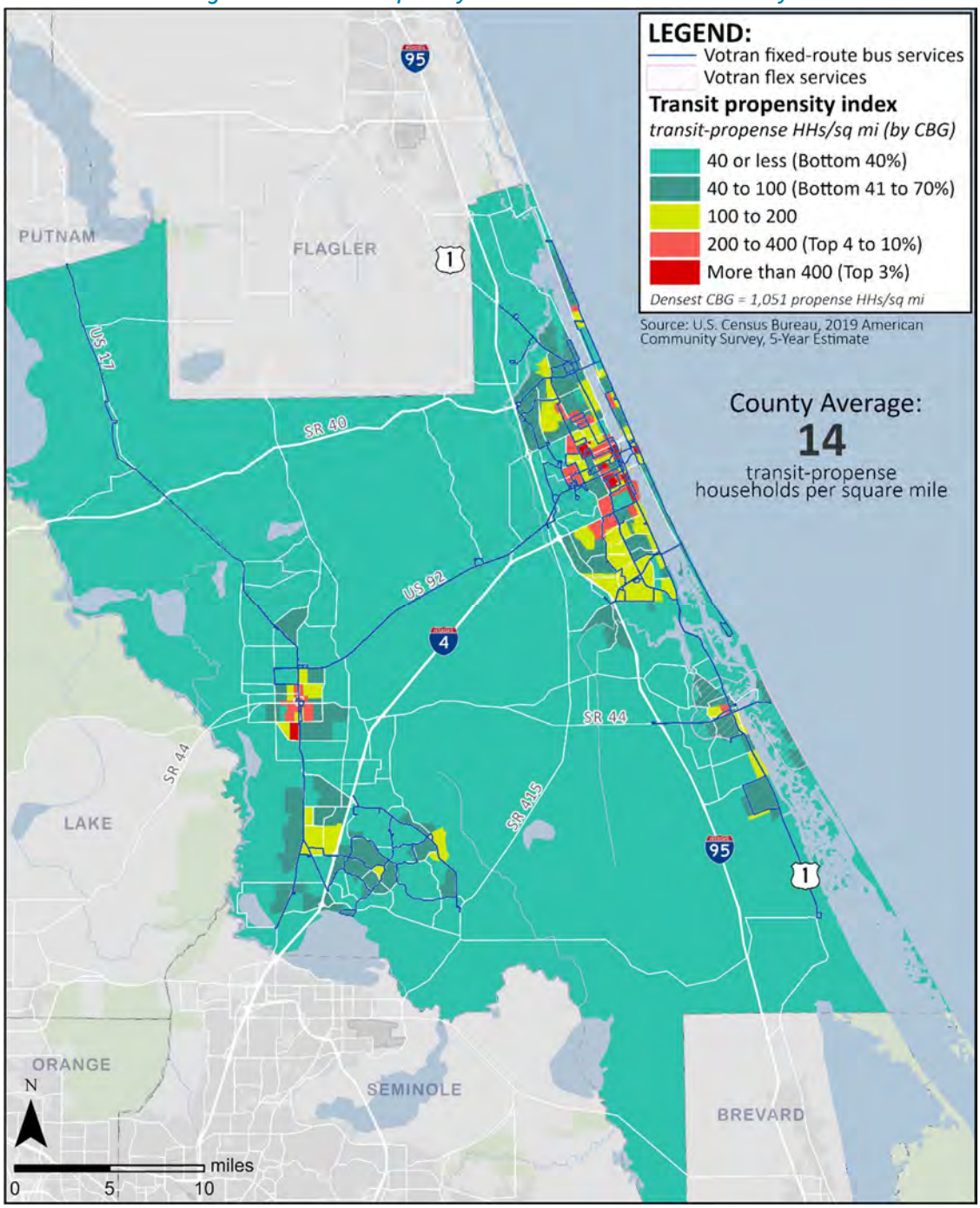
Several demographic groups have been shown to use transit with more frequency than others. There are differences between racial and age groups, and much of these differences can be explained by differences in income among the groups. Other categories that correlate even more significantly with transit usage are categories related to housing: the density of housing or number of units in structures, housing tenure (owners or renters), and the size and age of the units. No demographic category among those that are part of the American Community Survey correlates as well as vehicle ownership.

Transit users are more frequently found in neighborhoods with smaller, housing units grouped together in multi-family structures. Those neighborhoods which were developed more recently rarely use traditional grid layouts for the neighborhood which means walk distances to arterials are longer and transit use is not as frequent. Finally, there is a strong correlation with the share of housing that is renter-occupied with transit usage.

As part of the project, the CTG team developed a Transit Propensity Index to show areas of the county where transit markets are more prevalent and transit service is more likely to be utilized. The three factors used within the metric are households without vehicles, renter-occupied units, and households with incomes less than $30,000. Weights were assigned to each based on correlation with transit usage, and each household was given a propensity value of 0-1, based on likelihood of using transit.

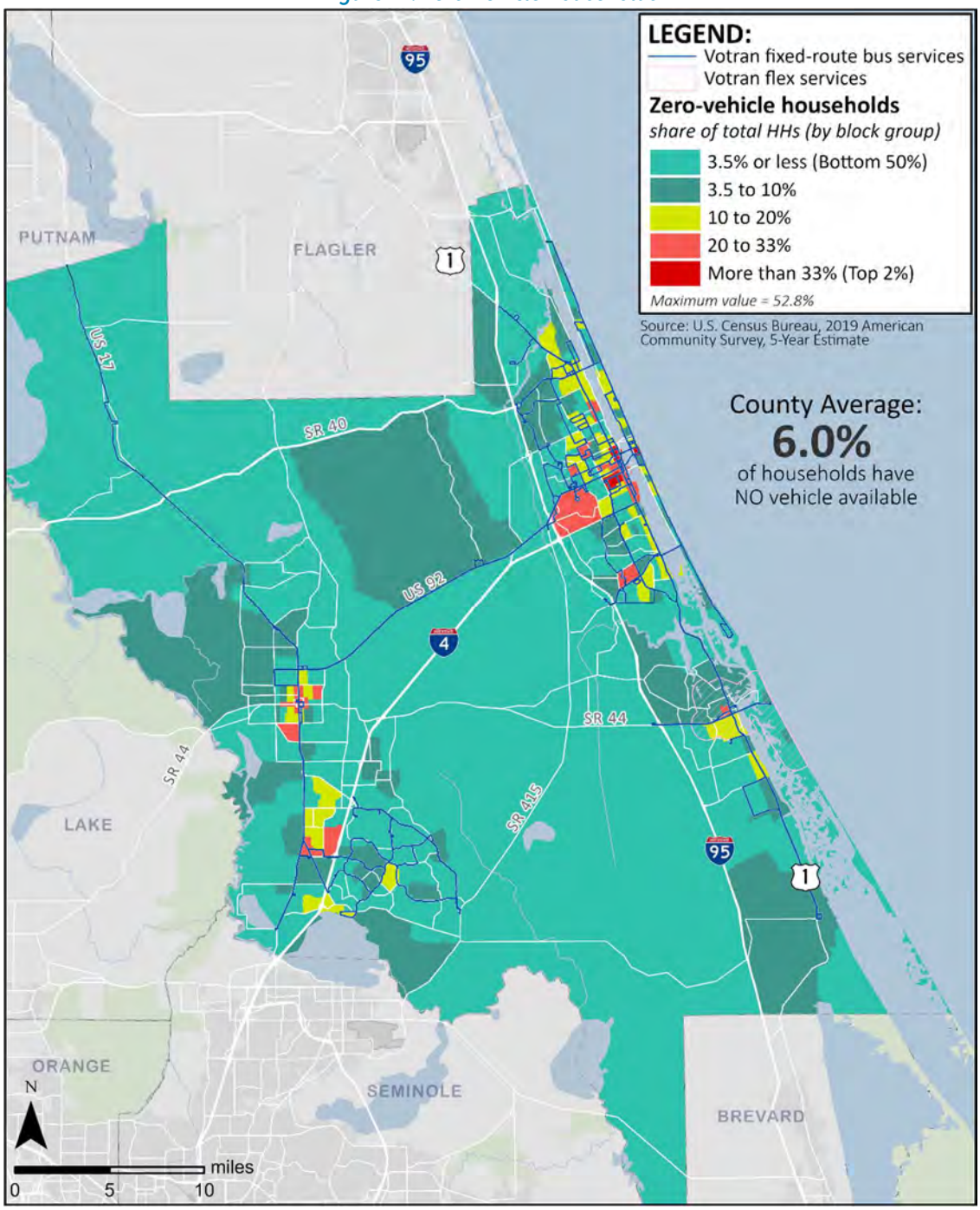
Figure 10 is a map showing the total transit propensity for the county. The map shows the density for those households most likely to produce transit trips. Component maps to the Transit Propensity Index follow.

Figure 10: Transit Propensity for Households in Volusia County



The highest levels of concentration of households likely to need public transportation are centered on Daytona Beach and DeLand. The areas with higher values within the county all have transit service and tend to be places that produce much of the existing transit ridership.

Figure 11: Zero-Vehicle Households



Zero-vehicle households follow a similar pattern to overall transit propensity and contributes to the high propensity values for core areas of Daytona Beach and DeLand. Other areas with at least 20% of households without a vehicle are in Orange City, Port Orange, and New Smyrna Beach.

Figure 12 shows the percentage of housing units occupied by renters. Concentrations are similar to zero-vehicle households. Much of the housing on the mainland side of the Halifax River south of the Daytona Beach CBD is occupied primarily by renters. Like with zero-vehicle households, concentrations within the eastern half of the county exceed those on the western side.

Figure 12: Renter-Occupied Housing Units

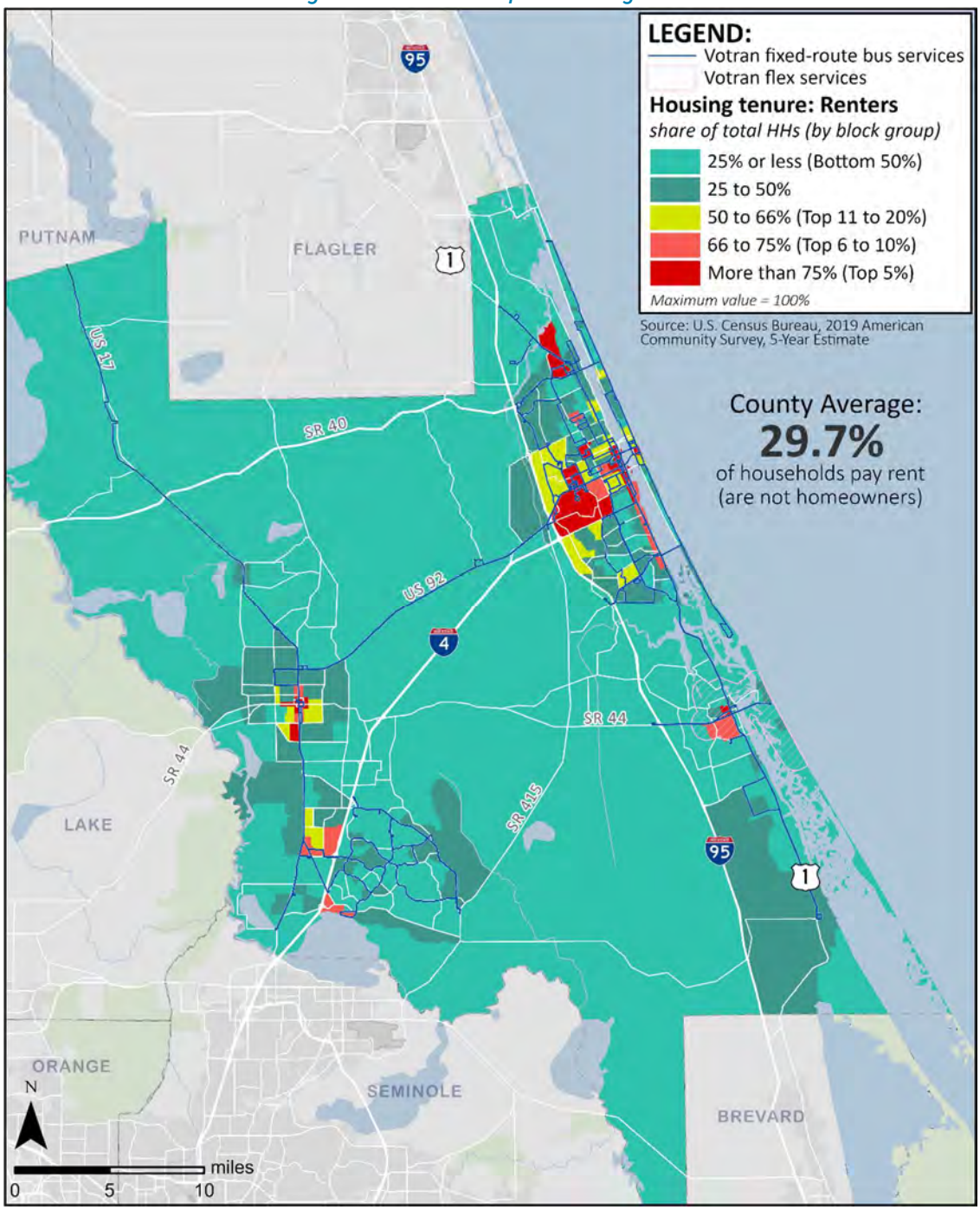
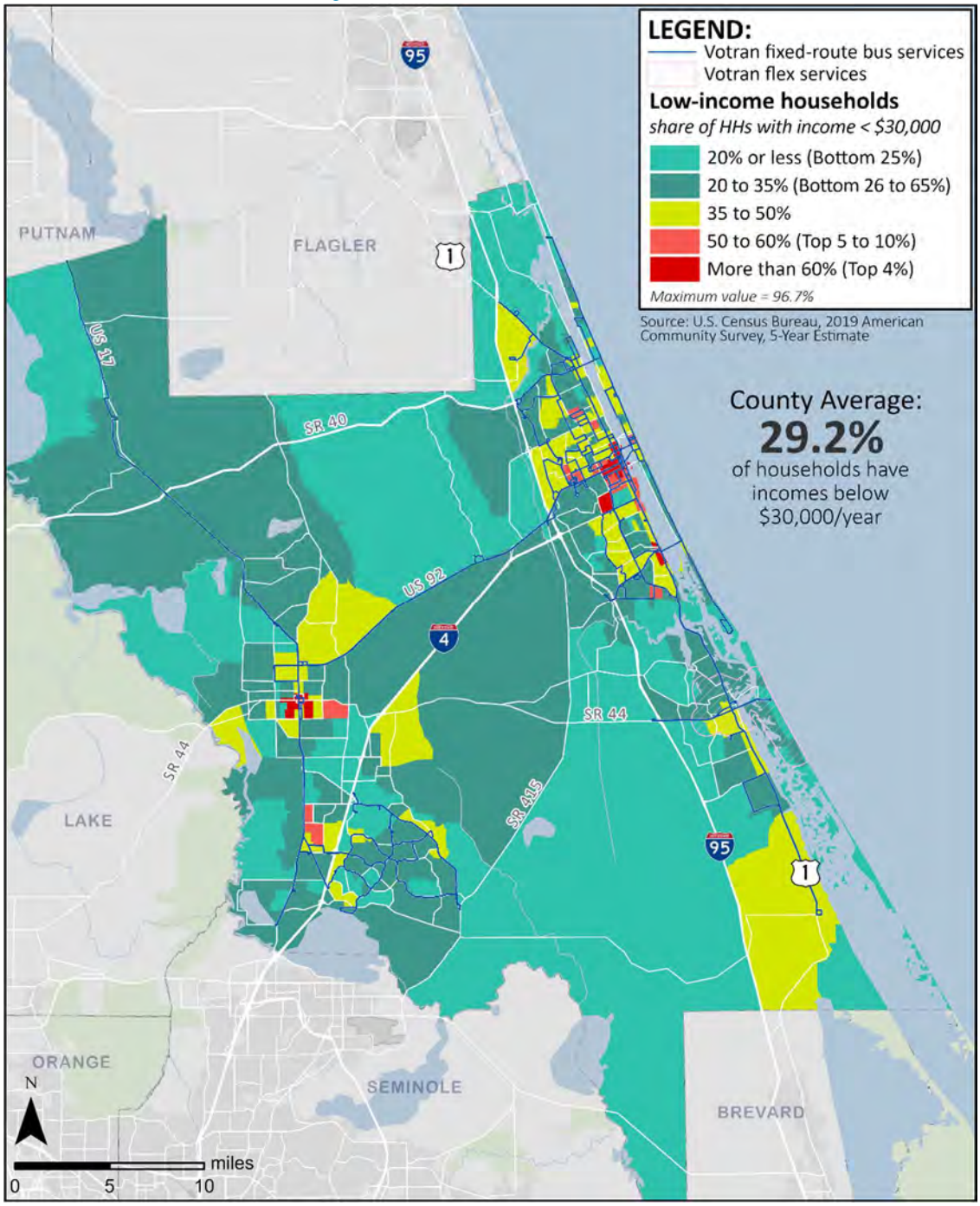


Figure 13: Lower Income Households



The map of lower income households does vary a bit from the prior two figures. While some of the same urban core areas which showed high numbers of renters and zero-vehicle households also have larger numbers of low-income households, several rural block groups also show elevated levels of low-income households such as Oak Hill, Lake Helen, and areas to the west and northeast of DeLand. Nationally, lower-income rural areas like these are often identified as having a need for transit, but do not tend to produce significant ridership.

Figures 14 through 16 provide a look at several other demographic datasets that are associated with need for transit services. Figure 14 displays poverty rates throughout the county while Figure 15 shows recipients of Supplemental Nutritional Assistance Program (SNAP; sometimes called “food stamps”). Figure 16 shows the rate of disability throughout the county.

Figure 14: Poverty Rates

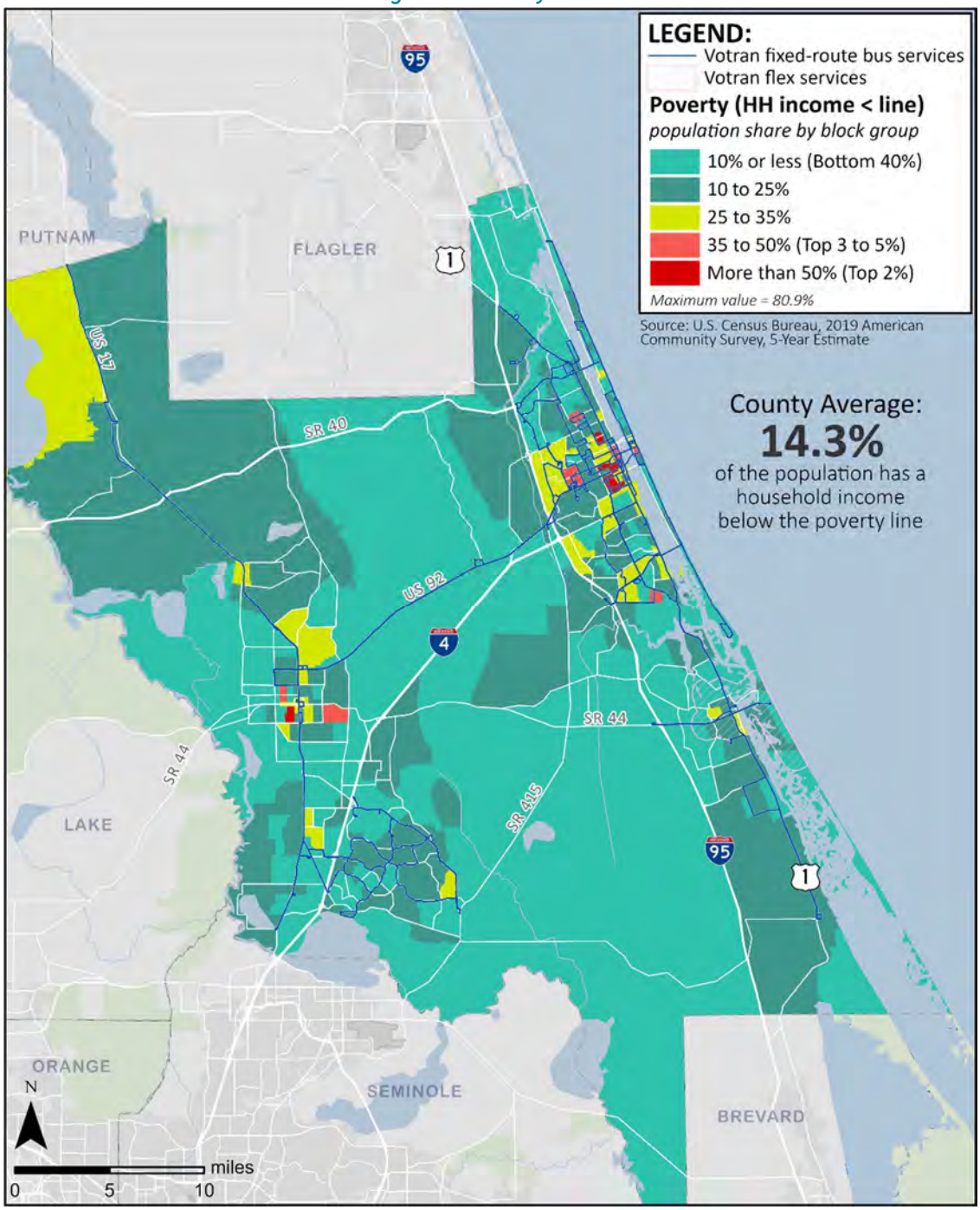
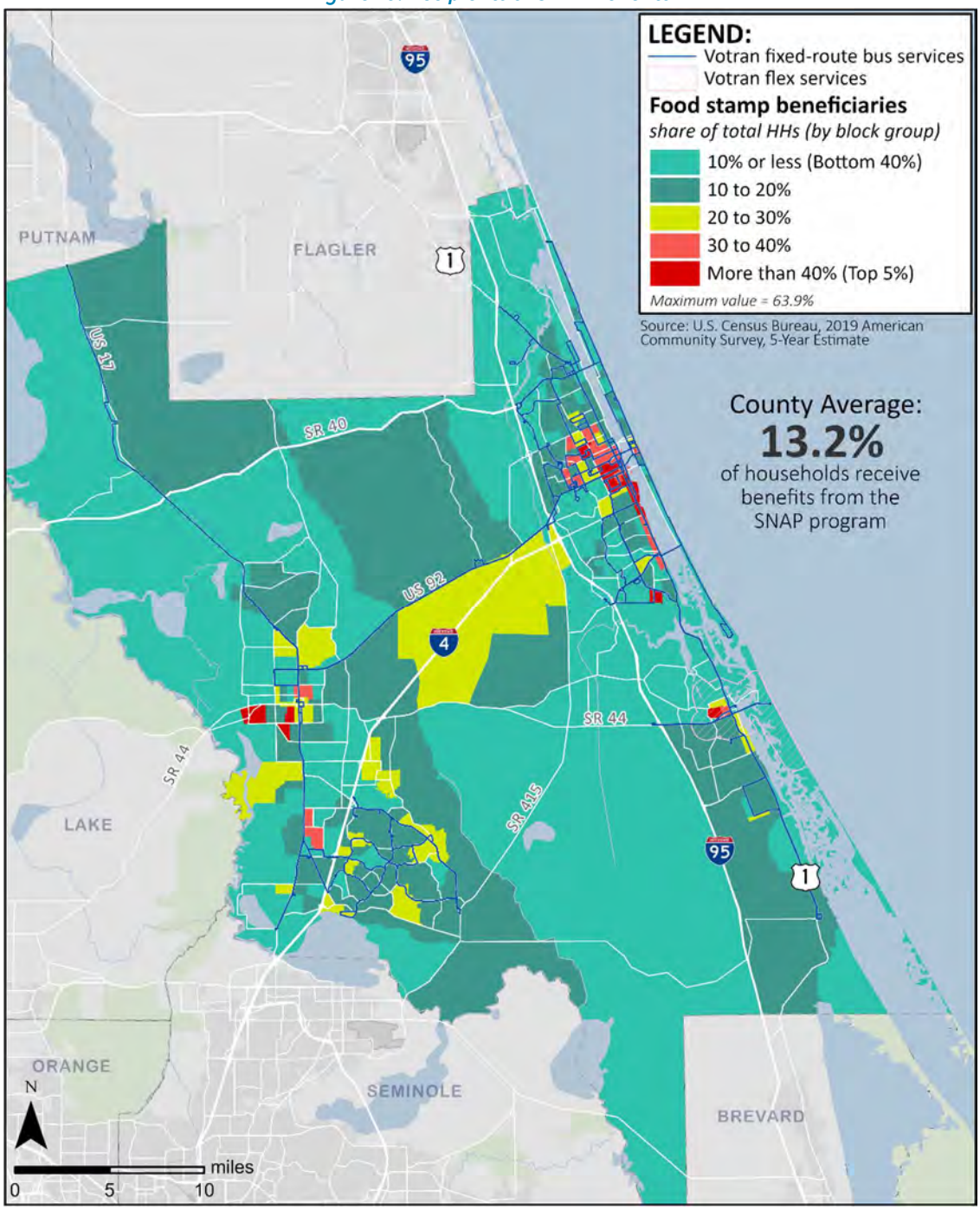


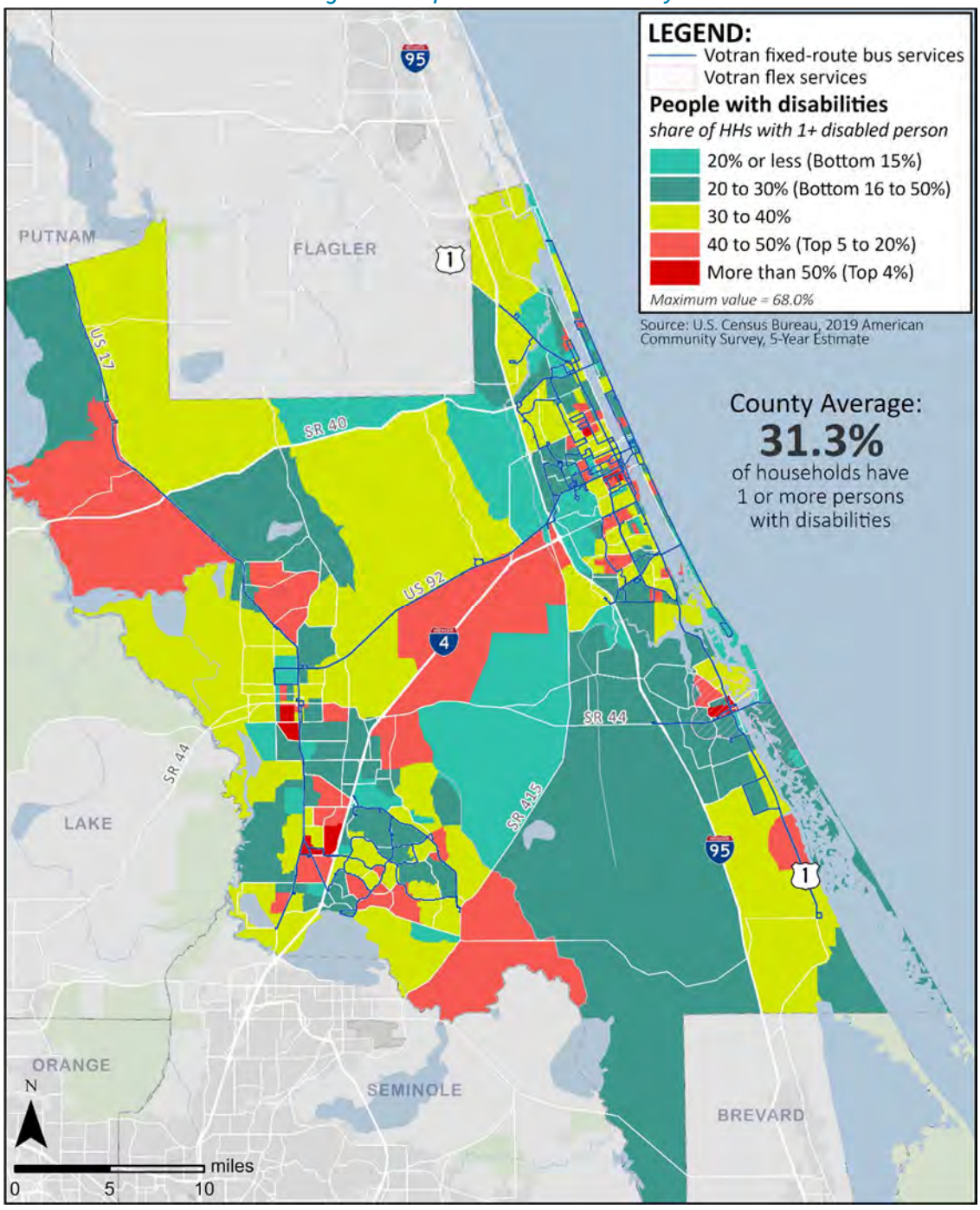
Figure 15: Recipients of SNAP Benefits



Both of the previous two figures show much the same trend as the several of the components of transit propensity from early in this section. Poverty in DeLeon Springs, one area near Osteen, and the most northwestern block group are all above 25% though they had not shown elevated levels of lower income households. Poverty considers household size, so families with children have a different threshold than single individuals. SNAP recipients are much higher in the eastern county, and clustered in many of the same locations with high renter-occupied units in central Daytona Beach and along the Halifax River to the south.

The proportion of the population who have a disability is shown in Figure 16. Unlike other factors shown in the figures within this section, there is not much of a pattern when looking at this statistic. Unlike many of the factors which are related more strongly to income, persons with disabilities are widespread throughout the county.

Figure 16: Population with a Disability



4. Travel Patterns

The following section focuses on prevalent travel patterns found throughout Volusia County. It is essential that transit service not only serve those locations where transit is most likely to be efficient and effective, but also to make connections for customers as simple as possible. The data sets that are used within this analysis are the following:

- 2015 American Community Survey (ACS), 5-year survey data on commute patterns between Volusia County and all other counties
- Longitudinal Employment-Household Data (LEHD) from 2018, specifically the LEHD Origin-Destination Employment Statistics (LODES) data, which is a disaggregated data set that links employee addresses with that of their employer
- Location-Based Service (LBS) data from October 2019 provided by AirSage for seven Central Florida counties, which determines trip origins and destinations using a sampling of anonymous cell phone data
- An on-board survey conducted in January and February 2021, as part of the TDP/COA project which asked customers for specific trip origins and destinations which are then aggregated

The multiple data sources are important to allow the study to analyze travel patterns from multiple perspectives which allows a more holistic understanding of travel within the county.

Existing Commute Patterns

Two data sources were examined to look at existing commute patterns: ACS data for commute patterns between different counties and LODES data from 2018 which is disaggregated for geographies smaller than counties to allow more precise analysis. One drawback of the latter dataset is that in some instances, an actual work location does differ from the employer's address, which causes some anomalies within the results.

For county-to-county commute flows, Volusia County is generally self-contained with nearly 80% of residents working within the county. The most common work counties for Volusia County residents are shown below in Table 10.

Table 10: Work Counties for Residents of Volusia County

County of Work	Workers	Percentage
Volusia County	156,522	79.7%
Seminole County	18,158	9.2%
Orange County	12,067	6.1%
Flagler County	1,963	1.0%
Brevard County	1,180	0.6%

Source: American Community Survey, 5-year data, 2015

The only significant flows from Volusia County are south into the Orlando Metropolitan Area to Orange County and Seminole County. This travel market is served by the existing SunRail service which connects the DeBary SunRail Station to multiple locations in Orange, Seminole and Osceola counties. In addition, existing Florida Department of Transportation (FDOT) Park-and-Ride lots serve the Interstate 4 corridor serving carpools and vanpools to the counties to the south. No other outflow exceeds 1% of all Volusia County workers. Commute movements north and south from Volusia County along Interstate 95 are considerably smaller than those within the Interstate 4 corridor.

Among residents of other counties who work in Volusia County, the following table provides a breakdown of the location these trips originate.

Table 11: Residence Counties for Workers of Volusia County

Residence County	Workers	Percentage of Volusia Workers
Volusia County	156,522	89.4%
Flagler County	7,999	4.6%
Seminole County	3,166	1.8%
Orange County	2,162	1.2%
Lake County	1,497	0.9%

Source: American Community Survey, 5-year data, 2015

While an estimated 39,824 Volusia County residents work outside of the county, there are only 18,643 residents from other counties who work in Volusia County. Less than 11% of workers within Volusia County are residents of other counties.

Using LODES data, the analysis further identified trip patterns on a sub-county area. This analysis examined city-to-city commute patterns to quantify actual travel patterns. The table below shows the most prevalent patterns.

Table 12: Most Common City Origin-Destination Commute Combinations

Residence City	Employment City	Number of Workers
Daytona Beach	(Internal)	8,063
Port Orange	Daytona Beach	5,287
Ormond Beach	Daytona Beach	4,519
Deltona	Orlando	3,688
Port Orange	(Internal)	3,434
Deltona	DeLand	3,307
Deltona	Sanford	3,236
DeLand	(Internal)	2,975
Ormond Beach	(Internal)	2,935
Palm Coast	Daytona Beach	2,105
Deltona	(Internal)	1,921
New Smyrna Beach	(Internal)	1,897
Deltona	Daytona Beach	1,746
Deltona	Orange City	1,741
Daytona Beach	Ormond Beach	1,738
Port Orange	DeLand	1,675
Holly Hill	Daytona Beach	1,502
Deltona	Lake Mary	1,457
South Daytona	Daytona Beach	1,454
Edgewater	New Smyrna Beach	1,429
Daytona Beach	Port Orange	1,346
Palm Coast	Ormond Beach	1,292

Source: LEHD Origin-Destination Employment Statistics, 2018

From the table on LODES data, several notable trends emerge. First, the commute travel into Seminole County and Orange County shown in the county-level data is concentrated from the southwest corner of Volusia County. Orlando and Sanford are common destinations for residents of Deltona and while the population is much smaller, a similar trend also exists from DeBary. Cities farther north or east do not exhibit the same pattern. Second, the

common destinations of travel from Flagler County are Ormond Beach and Daytona Beach, especially the latter. Locations farther south do not have significant travel flows. Third, there is relatively little interchange of commute trips between the east and west side of the county. Only two of the origin and destination combinations in Table 12 involve cross-county movement.

Another important finding is that Daytona Beach is the county's largest job attraction center. Not only does it have the largest number of employees, but it clearly draws trips from a number of other cities from Palm Coast to New Smyrna Beach along the Interstate 95 corridor.

Tables 13 and 14 are similar tables using county subdivisions of the U.S. Census Bureau. These areas tend to be more uniform in size and include both incorporated and unincorporated parts of the county. Table 13 shows all patterns involving the westside of the county while Table 14 shows the same patterns for the east. County subdivisions in Orange and Seminole Counites are rather large compared to cities, explaining the different numbers in Tables 13 and 14.

Table 13: Most Common County Subdivision Origin-Destination Commute Combinations (West)

Residence CCD	Employment CCD	Number of Workers
Volusia – DeLand	(internal)	8,272
Volusia – Deltona	Seminole – Sanford	7,869
Volusia – Deltona	Orange – Orlando	7,262
Volusia – Deltona	Volusia – DeLand	4,360
Volusia – DeBary/Orange City	Seminole – Sanford	3,204
Volusia – Deltona	Volusia – DeBary/Orange City	3,007
Volusia – Deltona	Seminole – Casselbery/Altamonte	2,911
Volusia – DeLand	Orange – Orlando	2,730
Volusia – DeBary/Orange City	Orange – Orlando	2,695
Volusia – Deltona	(internal)	2,627
Volusia – DeBary/Orange City	Volusia – DeLand	2,280
Volusia – DeLand	Seminole – Sanford	2,232
Volusia – DeBary/Orange City	(internal)	2,204
Volusia – Port Orange	Volusia – DeLand	1,980
Volusia – Deltona	Orange – Southwest Orange	1,973
Volusia – DeLand	Volusia – Daytona Beach	1,703
Volusia – Deltona	Volusia – Daytona Beach	1,639
Volusia – New Smyrna Beach	Volusia – DeLand	1,633
Volusia – Central Volusia	Volusia – DeLand	1,349
Volusia – DeLand	Volusia – DeBary/Orange City	1,305
Volusia – DeBary/Orange City	Seminole – Casselbery/Altamonte	1,099
Volusia – Ormond Beach	Volusia – DeLand	1,050
Volusia – Deltona	Orange – Union Park	1,021

Source: LEHD Origin-Destination Employment Statistics, 2018

Many of the most prevalent flows from the western part of Volusia County, especially from Deltona, DeBary, and Orange City are to locations in Orange and Seminole Counties. With this level of analysis, more cross-county trips do emerge with the areas of southeast Volusia County (New Smyrna Beach and Port Orange) having moderate flows west to DeLand and trip flows from Deltona and DeLand to Daytona Beach.

Table 14: Most Common County Subdivision Origin-Destination Commute Combinations (East)

Residence CCD	Employment CCD	Number of Workers
Volusia – New Smyrna Beach	(internal)	7,000
Volusia – Port Orange	Volusia – Daytona Beach	5,477
Volusia – Ormond Beach	(internal)	5,240
Volusia – Ormond Beach	Volusia – Daytona Beach	4,563
Volusia – Daytona Beach	(internal)	4,379
Volusia – Port Orange	(internal)	4,282
Volusia – Central Volusia	Volusia – Daytona Beach	3,198
Volusia – Port Orange	Volusia – Ormond Beach	2,216
Volusia – New Smyrna Beach	Volusia – Daytona Beach	2,062
Volusia – Port Orange	Volusia – DeLand	1,980
Flagler – Bunnell	Volusia – Ormond Beach	1,901
Volusia – Daytona Beach	Volusia – Ormond Beach	1,758
Volusia – DeLand	Volusia – Daytona Beach	1,703
Volusia – Central Volusia	Volusia – Ormond Beach	1,663
Volusia – Deltona	Volusia – Daytona Beach	1,639
Volusia – New Smyrna Beach	Volusia – DeLand	1,633
Flagler – Bunnell	Volusia – Daytona Beach	1,550
Volusia – North Peninsula	Volusia – Daytona Beach	1,545
Volusia – Central Volusia	Volusia – DeLand	1,349
Volusia – North Peninsula	(internal)	1,345
Volusia – Port Orange	Orange – Orlando	1,298
Volusia – New Smyrna Beach	Volusia – Port Orange	1,292
Volusia – Port Orange	Volusia – New Smyrna Beach	1,275
Volusia – North Peninsula	Volusia – Ormond Beach	1,266
Volusia – Central Volusia	Orange – Orlando	1,255
Volusia – Ormond Beach	Volusia – North Peninsula	1,181
Volusia – Ormond Beach	Volusia – Port Orange	1,167
Volusia – Central Volusia	Volusia – Port Orange	1,164
Volusia – New Smyrna Beach	Orange – Orlando	1,145
Volusia – Daytona Beach	Volusia – Port Orange	1,130
Volusia – Central Volusia	(internal)	1,100
Volusia – Ormond Beach	Volusia – DeLand	1,050
Volusia – Port Orange	Volusia – Central Volusia	1,047

The table shows that most of the travel flow in the eastern half of the county is internal to the same area. There are five total flows between the east and west halves of the county, two flows from Flagler County into the area, and three long-distance commutes to Orlando. However, more than two-thirds of trip patterns stay within eastern Volusia County.

Location-Based Travel Patterns

Data was also analyzed using location-based services. This data is anonymous cell phone data compiled and processed by AirSage and purchased as part of the COA project. The detailed data was provided as an electronic dashboard to Volusia County and Votran staff as an earlier project deliverable. This data augments employment data in that it is able to capture a wider range of trip patterns than only commute trips. In general, most non-employment trips tend to be more local. This section will provide a brief overview of findings based on AirSage LBS data.

Table 15 summarizes county-to-county movement for all trips that had an origin or a destination within Volusia County. The large majority of trips remain within Volusia County, while a sizable minority of trips travel to and from Seminole, Orange, and Flagler Counties. There is very little trip exchange with other counties in Central Florida.

Table 15: Trip Patterns to/from Volusia County

County	All Trips	Percentage
Volusia County (internal)	5,112,211	89.2%
Seminole County	219,471	3.8%
Orange County	162,378	2.8%
Flagler County	116,394	2.0%
Lake County	50,288	0.9%

Source: October 2019 AirSage Data for Central Florida

Most of the travel to and from Seminole County involves the areas of DeBary, Orange City, and Deltona. These three communities comprise over 60% of the travel between Seminole and Volusia Counties. Interestingly, the more distant Orange County draws only about 40% of trips from the southwestern corner of Volusia County as the trip patterns are more dispersed. In fact, among trips from eastern Volusia County, there are a larger number to Orange County than Volusia County despite the longer distance. Travel between Volusia County and Flagler County is highly concentrated. Ormond Beach and Daytona Beach account for nearly 80% of the travel between the two counties.

In looking at major trip attraction nodes, much of the travel to these locations is local to the area. Table 16 shows opposite trip ends for trips between the commercial area along Saxon Boulevard west of Interstate 4. DeBary, Orange City, and Deltona account for over 80% of the travel here and there is little travel between the location and any of the beach communities in Volusia County.

Table 16: Trip Patterns to/from Saxon Boulevard Area

Area	All Trips	Percentage
DeBary/Orange City	83,021	48.6%
Deltona	57,667	33.7%
DeLand	19,146	11.2%
All Eastern Volusia County	6,117	3.6%

Source: October 2019 AirSage Data for Central Florida

Table 17 shows the same information for the central core area of DeLand. A very large proportion of the trips to this location come from within the city of DeLand itself.

Table 17: Trip Patterns to/from Central DeLand

Area	All Trips	Percentage
DeLand	193,918	75.7%
Deltona	15,575	6.1%
DeBary/Orange City	13,832	5.4%
Daytona Beach	11,494	4.5%

Source: October 2019 AirSage Data for Central Florida

Even with large regional attractors such as the Volusia Mall and other retail areas near the area along International Speedway Boulevard does not draw cross county-traffic. All of the west county accounts for less than 7% of trips into this area.

Table 18: Trip Patterns to/from Area near Volusia Mall

Area	All Trips	Percentage
Daytona Beach	307,586	59.1%
Port Orange	57,686	11.1%
Ormond Beach	35,891	6.9%
DeLand	22,725	4.4%

Source: October 2019 AirSage Data for Central Florida

Table 19: Trip Patterns to/from Central Daytona Beach

Area	All Trips	Percentage
Daytona Beach	142,697	65.8%
Ormond Beach	22,946	10.6%
Port Orange	18,191	8.4%
All of West Volusia	11,694	5.4%

Source: October 2019 AirSage Data for Central Florida

Central Daytona Beach draws from similar locations as the attractions immediately to the west. There are a higher percentage of trips from the north and Ormond Beach in this case and fewer from Port Orange.

Table 20: Trip Patterns to/from Port Orange/Dunlawton Boulevard

Area	All Trips	Percentage
Port Orange	167,823	54.4%
Daytona Beach	35,620	11.5%
New Smyrna Beach/Edgewater	30,043	9.7%
South Daytona	17,471	5.7%

Source: October 2019 AirSage Data for Central Florida

For the attraction area along Dunlawton Boulevard from Williamson Boulevard to Nova Road, the trip exchanges with different communities are shown in Table 20. The location draws a larger number of trips from the south, particularly from areas along Interstate 95. In the case of this area, western Volusia County combines for less than 3% of trips.

These are some of the significant trip attraction areas based on the location-based data. Other more localized analysis is possible with this data, but the general trend of highly localized travel is consistent within this dataset.

On-Board Origin-Destination Survey

The on-board survey conducted for the TDP/COA project corroborates many of the conclusions drawn from other data sources. To more easily process these data, origins and destinations were grouped by census block group and then these were aggregated into more intuitive subareas. Figure 17 below illustrates what parts of the county comprise each subarea.

Figure 17: On-Board Survey Subareas

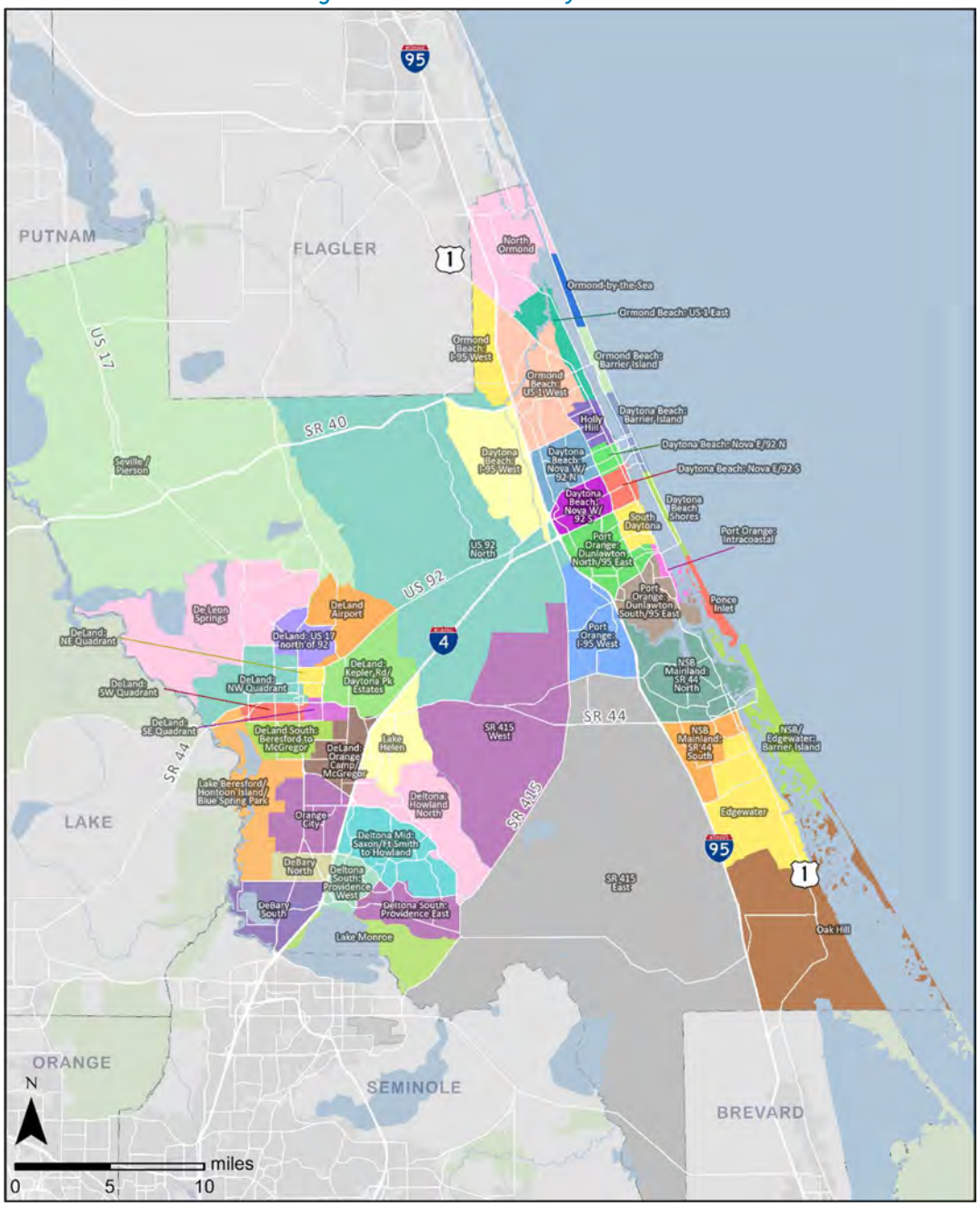


Table 21 below provides a high-level view of the origin-destination interactions identified.

Table 21: Intra-County Trip Patterns of Votran On-Board Survey

Origin	Destination	Number of Expanded Trips	As Percent of Total
East County	(internal)	21,357	75.5%
West County	(internal)	3,676	13.0%
Central County	East County	948	3.4%
East County	Central County	497	1.8%
West County	East County	489	1.7%
East County	West County	470	1.7%
Central County	West County	310	1.1%
West County	Other Counties	278	1.0%
Other Counties	West County	131	0.5%
East County	Other Counties	99	0.3%
Other Counties	East County	31	0.1%

There is not much interaction with other counties, but the bulk of it is from West County, which coincides with the earlier finding of many out-of-county trips going from Deltona to Orange and Seminole Counties. Trips that start in Central County and head east are the third biggest flow, even greater than the trip exchange between East and West County. Interestingly, Central County is a destination for trips that start in the eastside, as well as an origin for some trips that head west.

Focusing at a more granular scale, Table 22 shows the interactions between different areas of the East County.

Table 22: Matrix of Trip Patterns by Area – East Volusia

Subregion: From ↓ / To →		DAYT	PTOR	BARR	ORM	CTR	Total Trips Generated
Daytona Beach/Holly Hill	DAYT	4,809	2,792	2,185	1,789	105	11,680
Port Orange/South Daytona	PTOR	1,172	1,214	628	234	43	3,291
Barrier Island	BARR	1,210	718	1,586	441	67	4,022
Ormond Beach	ORM	591	243	157	380	42	1,413
Central County	CTR	567	100	131	121	0	919
Total Trips Attracted:		8,349	5,067	4,687	2,965	257	21,325

The Daytona Beach/Holly Hill subregion proves to be the biggest generator and attractor in the county, with the largest flow being internal, mostly due to the exchange between areas east of Nova Road and areas west of it, north of International Speedway Boulevard. This subregion also sends a significant number of trips to both Port Orange/South Daytona and the Barrier Island, being the largest contributor of trips to either of these subregions (even greater than internal volumes). Indeed, Daytona Beach/Holly Hill generates more trips to these two subregions than it attracts from them. Most trips with destination in the Barrier Island (Ormond-by-the-Sea to Ponce Inlet) are internal or coming from Daytona Beach/Holly Hill, concentrating mostly in the Ormond Beach, Daytona Beach, and Daytona Beach Shores subareas of the island. Ormond Beach is neither a big attractor nor a big generator, trips are mostly internal, except for a moderate inflow from Daytona Beach/Holly Hill, reciprocated with only a few hundred trips generated in Ormond Beach. Central County's biggest interaction is with Daytona Beach/Holly Hill, being not only a generator for the county's main attractor, but also attracting a few trips from it.

Note that areas of Daytona Beach, Ormond Beach and Port Orange *west of* Interstate 95 were treated as a separate subregion which is not portrayed above because it did not produce many trips. Also, relative to the subregions that are portrayed, the New Smyrna Beach/Edgewater/Oak Hill subregion had a very low activity level, so it is not portrayed either. A similar situation occurs in the table below with subareas in northwestern parts of the county (Seville/Pierson & De Leon Springs) as well as those northeast of DeLand (Kepler Road/Daytona Park Estates & DeLand Airport): they are not portrayed due to small trip volumes.

In West County, a similar analysis can be made by using Table 23 below.

Table 23: Matrix of Trip Patterns by Area – West Volusia

Subregion: From ↓ / To →		DLN	DLS	DELT	OCB	CTR	Total Trips Generated
DeLand north of SR 44	DLN	357	268	0	233	0	858
DeLand south of SR 44	DLS	568	21	0	257	0	846
Deltona	DELT	48	50	429	315	0	842
Orange City/DeBary	OCB	238	181	226	290	0	935
Central County	CTR	65	137	9	99	0	310
Total Trips Attracted:		1,276	657	664	1,194	0	3,791

In this case, the biggest flow is from southern parts of DeLand to the north, mainly driven by the area around the Walmart on Woodland Boulevard. This flow is followed in size by internal trips in the Deltona subregion, which is not much of an attractor, other than some trips from Orange City/DeBary. The latter is not only the biggest generator in West County, but also a significant attractor. The interaction of the westside with Central County is not as strong as that of East County, with only a few trips coming from Central County to DeLand and Orange City/DeBary.

In addition to these large-scale trip flows highlighted here, the project team reviewed specific origin-destination pairs in order to assist in evaluating new route alternatives. While many trip pairs occurred in only one or two surveys, the team identified approximately 90 patterns with multiple survey responses and a daily weighted value representing at least 15 linked passenger trips.

5. Existing Transit Service Performance

The section of the COA provides analysis for the transit network overall, including specific metrics for each of the current Votran routes. The first portion of this section will evaluate common measures of customer satisfaction such as on-time performance and vehicle capacity. The second part of this chapter is provided to evaluate route effectiveness and efficiency, elements that impact the cost-benefit of the service. The final section of the chapter treats some additional items of analysis related to fares and ADA service.

Service Reliability

A key to successfully implementing public transportation service is ensuring service operates generally at the time a customer assumes it to operate based on the schedule of the service. If buses leave designated timepoint locations too soon, a customer reliant on the schedule could miss the bus and be forced to wait an entire cycle for the next bus to arrive. Conversely, when buses run well behind the schedule that has been advertised, customers who use the service to make it to their destination at a specific time such as the start of a work or school day or to visit the doctor could find themselves harmed by missing these time-sensitive appointments. Because conditions are always changing, impacting the speed of service, a typical industry on-time window of five minutes is used. This means that a bus is considered “on-time” only if it leaves a stop 0 to 5 minutes following the scheduled time.

It has been apparent in the evaluation of Votran service and interviews with operators and other operational personnel that maintaining on-time service is a priority for the agency. A culture within an operation that understands the importance of adhering to schedule is necessary for service to be on-time and it is clear that exists at Votran. Secondly, the scheduling of service with realistic runtimes is also necessary. Scheduled runtimes at Votran consistently matched or in some cases exceeded the actual times reviewed in the data. The results of these two factors are on-time performance metrics which are strong across the service.

Perhaps the strongest attribute of the current Votran operation is strong on-time performance. Votran staff stated an aggressive goal of 90% for on-time departures, and almost all routes have on-time performance above 85%. Failures in on-time performance can create negative customer experience and erode the perceived quality of the service within the community. It was apparent in interviews with Votran operational staff and even drivers there is a high priority given to on-time performance and the results show these efforts are effective.

Figure 18 provides a summary of the on-time performance for each service day across the Votran network.

Figure 18: On-Time Performance by Service Day

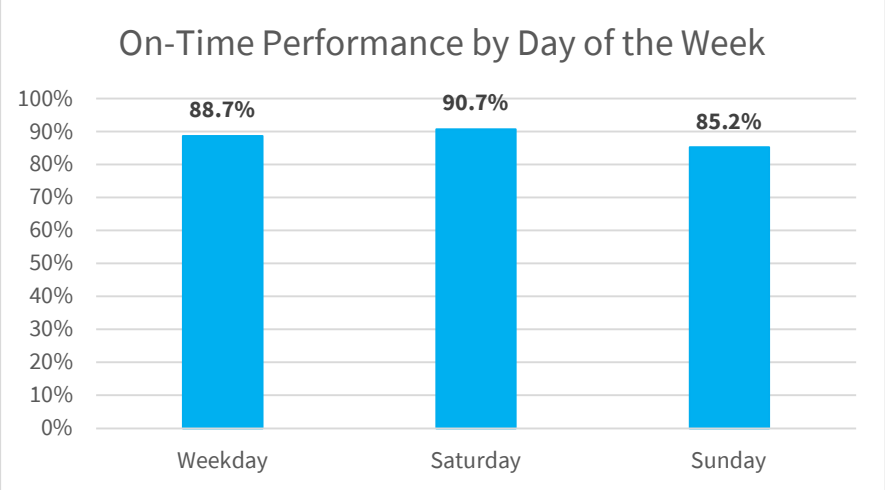


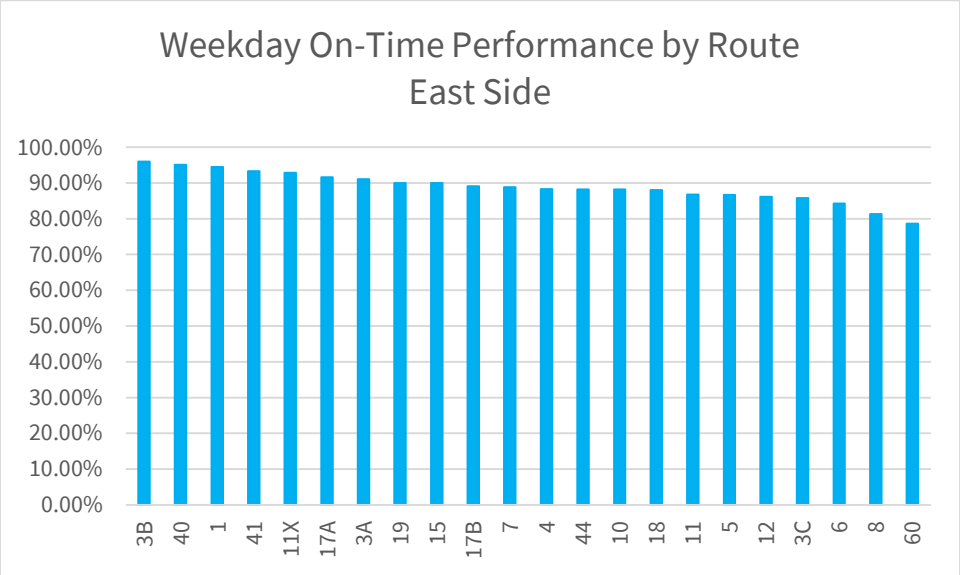
Table 24 gives more detailed data for each daytime route in the eastern half of the Votran service area. Figure 18 displays a ranking of the routes based on on-time performance percentage.

Table 24: Weekday On-Time Performance Data for East County Routes

Route	Early	On-Time	Late
Route 1	0.6%	94.4%	4.9%
Route 3A	0.3%	91.1%	8.6%
Route 3B	0.2%	96.0%	3.8%
Route 3C	0.6%	85.7%	13.6%
Route 4	0.4%	88.3%	11.3%
Route 5	0.2%	86.6%	13.2%
Route 6	0.4%	84.3%	15.3%
Route 7	0.4%	88.8%	10.8%
Route 8	0.1%	81.3%	18.6%
Route 10	0.3%	88.2%	11.5%
Route 11	0.2%	86.8%	13.0%
Route 12	0.3%	86.2%	13.5%
Route 15	0.2%	89.9%	9.9%
Route 17A	1.0%	91.6%	7.4%
Route 17B	0.8%	89.1%	10.1%
Route 18	0.4%	88.0%	11.6%
Route 19	0.3%	89.9%	9.8%
Route 40	0.1%	95.1%	4.8%
Route 41	0.1%	93.3%	6.6%
Route 44	0.2%	88.2%	11.6%
Route 60	0.6%	78.6%	20.8%

Source: Votran AVL Data, July-December 2019

Figure 19: East Volusia Routes – Weekday On-Time Performance



For eastside routes and route patterns, seven have average weekday on-time performances above 90%, an outstanding mark for service reliability. Twelve more routes/route patterns have strong on-time performances of between 85-90%. Only three routes have on-time performances less than 85% with only Route 60 performing below 80%. This route underperforms due to afternoon westbound schedules that appear to need additional scheduled running time.

Table 25 shows on-time performance data for weekdays for routes in western Volusia County.

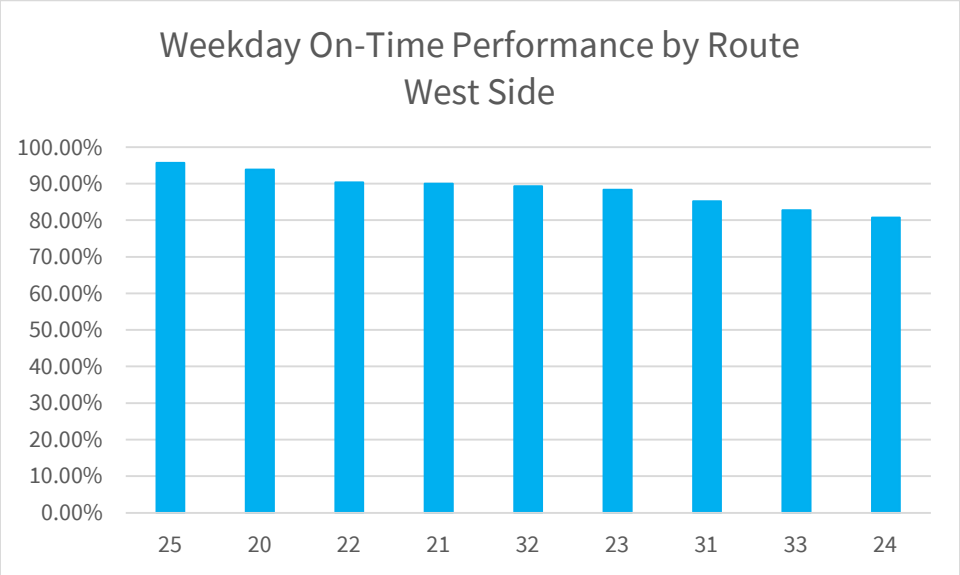
Table 25: Weekday On-Time Performance Data for West County Routes

Route	Early	On-Time	Late
Route 20	0.3%	93.9%	5.8%
Route 21	0.3%	90.0%	9.7%
Route 22	0.4%	90.3%	9.2%
Route 23	0.2%	88.4%	11.5%
Route 24	0.2%	80.7%	19.1%
Route 25	0.3%	95.7%	4.0%
Route 31	0.2%	85.2%	14.6%
Route 32	0.3%	89.3%	10.4%
Route 33	0.6%	82.8%	16.7%

Source: Votran AVL Data, July-December 2019

Figure 20 shows these routes ranked by percentage of trips that were on-time. Four routes were at 90% on-time or better, while another three routes were between 85% and 90%. Two routes, Routes 24 and 33 were less than 85%. The Route 24 is negatively affected by delays in the Route 60 during the P.M. peak as the final northbound trip starts on-time only 76% of the time.

Figure 20: East Volusia Routes - Weekday On-Time Performance



Night service begins at 7:00 P.M. for a small number of routes and operates to midnight on weekdays. Because these routes follow unique patterns, their on-time performance is analyzed separately in Table 26.

Table 26: Weekday On-Time Performance Data for Night Routes

Route	Early	On-Time	Late
1N	0.8%	95.2%	4.0%
3N	0.3%	91.5%	8.1%
4N	0.2%	85.7%	14.1%
10N	0.6%	88.8%	10.6%
15N	0.9%	96.2%	2.9%
17N	0.9%	95.2%	4.0%

Source: Votran AVL Data, July-December 2019

There are no issues with on-time performance for the six night routes that are operated by Votran. Four of the six routes have on-time performance metrics above 90% while all six exceed 85%. Figure 20 shows the on-time performance graphically.

Figure 21: Night Routes - Weekday On-Time Performance

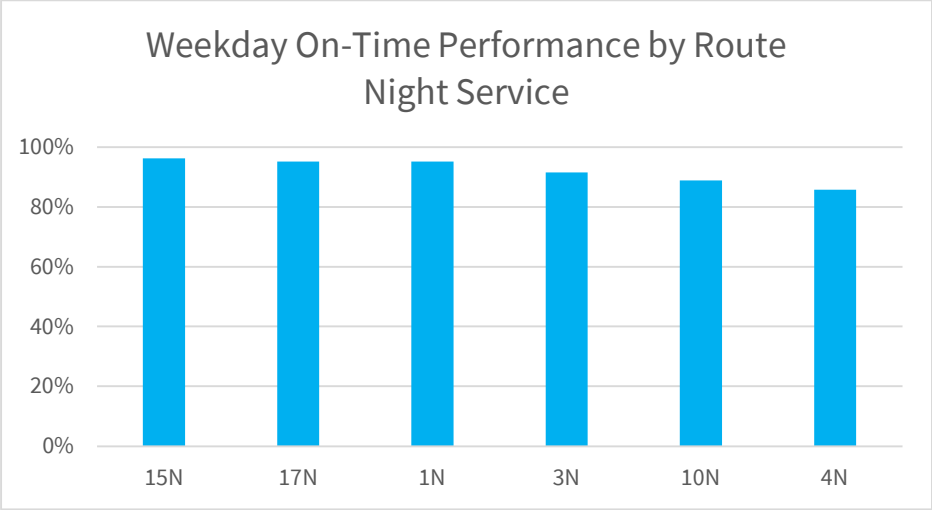
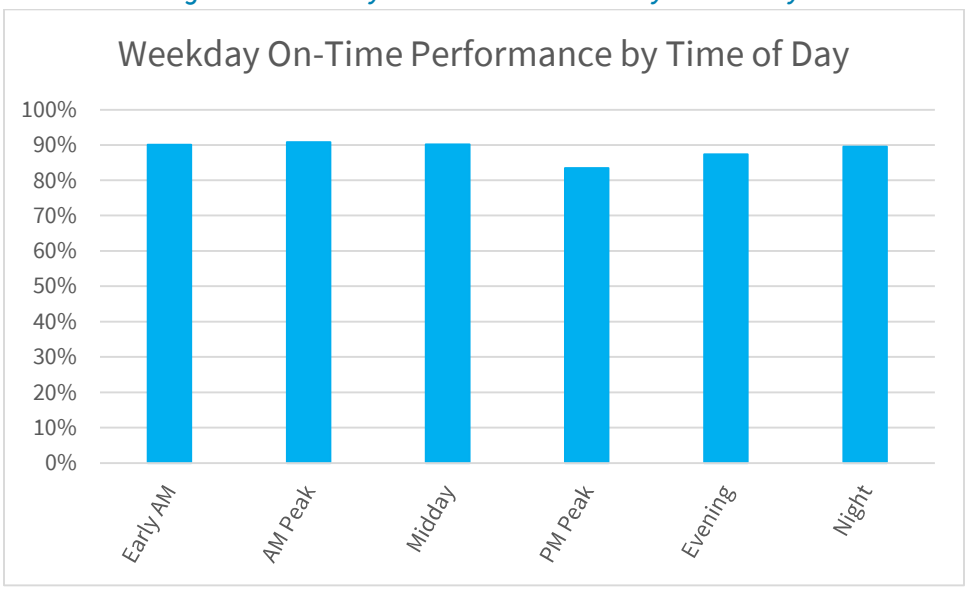


Figure 22 shows on-time performance for weekdays for all routes based on time of day. Daytime routes generally have stronger on-time performance earlier in the day. An important note is that while traffic conditions will fluctuate during the day, Votran route schedules usually follow universal runtimes that do not adjust for time of day. This type of scheduling creates more simplicity for the customer but can result in delays during certain times of the day.

Figure 22: Weekday On-Time Performance by Time of Day



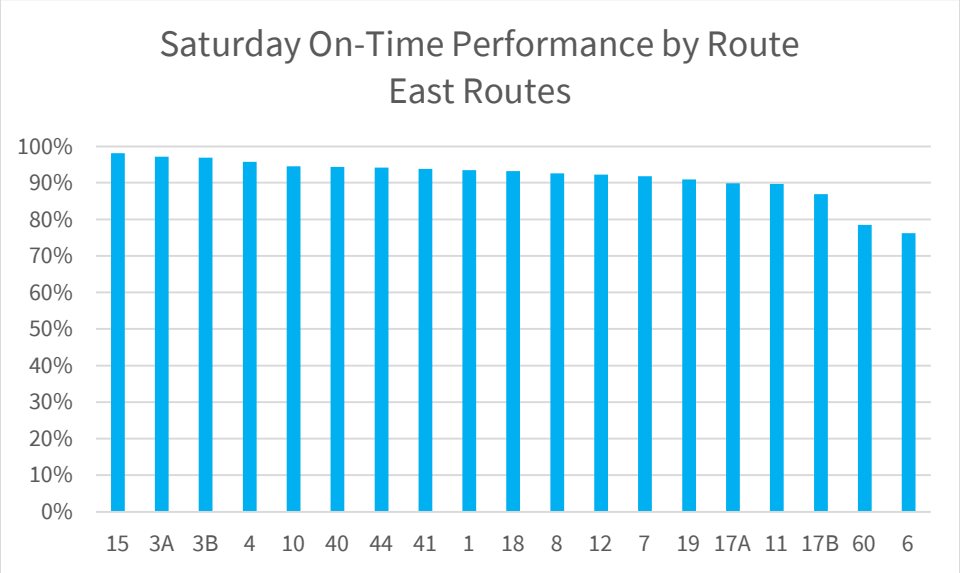
Votran service runs a similar schedule on Saturdays as compared to weekdays. Most runtimes of routes are identical and there is only a small reduction in the number of trips on many routes. Service reliability is also strong on Saturdays, but route results show a different pattern for Saturdays. Table 27 shows the on-time performance of the service for east side routes on Saturdays.

Table 27: Saturday On-Time Performance Data for East Volusia Routes

Route	Early	On-Time	Late
Route 1	0.7%	93.4%	5.9%
Route 3A	0.6%	97.1%	2.4%
Route 3B	0.5%	96.9%	2.6%
Route 4	0.8%	95.7%	3.5%
Route 6	0.6%	76.2%	23.2%
Route 7	0.5%	91.8%	7.7%
Route 8	0.1%	92.6%	7.3%
Route 10	0.1%	94.5%	5.4%
Route 11	0.2%	89.7%	10.1%
Route 12	0.3%	92.2%	7.5%
Route 15	0.1%	98.1%	1.8%
Route 17A	0.7%	89.9%	9.4%
Route 17B	1.0%	86.9%	12.1%
Route 18	0.4%	93.2%	6.4%
Route 19	0.5%	90.9%	8.6%
Route 40	1.0%	94.4%	4.6%
Route 41	0.8%	93.8%	5.4%
Route 44	0.5%	94.2%	5.3%
Route 60	0.8%	78.5%	20.7%

Source: Votran AVL Data, July-December 2019

Figure 23: East Volusia Routes - Saturday On-Time Performance



Among routes and route patterns for Saturday, there are fourteen with on-time performance in excess of 90%, which is even better than performance on weekdays. Three other routes have on-time performance between 85% and 90%. However, on Saturdays there is an additional route, Route 6, which falls below 80% for on-time

performance. This route has its reliability reduced due to longer actual runtimes along Granada Boulevard on the northernmost portion of the route. Route 60 has similar issues on weekdays as it has on Saturdays as the route needs more time in the afternoon when travelling west from Midway Avenue to the Volusia County Jail.

Table 28 and Figure 24 show on-time performance for Saturday routes that operate in western Volusia County.

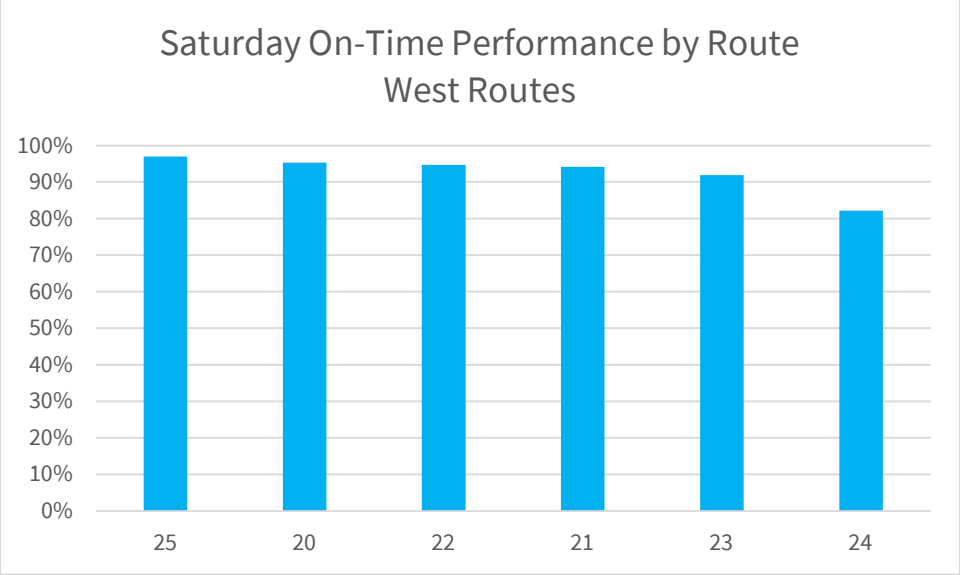
Table 28: Saturday On-Time Performance Data for West Volusia Routes

Route	Early	On-Time	Late
Route 20	0.6%	95.3%	4.1%
Route 21	0.2%	94.2%	5.6%
Route 22	0.8%	94.7%	4.5%
Route 23	0.4%	91.8%	7.8%
Route 24	0.2%	82.1%	17.7%
Route 25	0.3%	97.0%	2.7%

Source: Votran AVL Data, July-December 2019

Five of the six routes that operate in western Volusia County have on-time performances exceeding 90%. Route 24 is the one route below that mark at 82.1%. The route needs more time northbound between Amelia Superstop and the Wal-Mart just to the north. Like weekdays, the connection with Route 60 also causes some delays with this route.

Figure 24: West Volusia Routes - Saturday On-Time Performance



One clear difference in service reliability performance in comparing weekdays to Saturdays is service at night. While weekday night service operates with a very strong on-time performance, several Saturday night routes struggle to adhere to schedules. Table 29 provides data on Saturday night service.

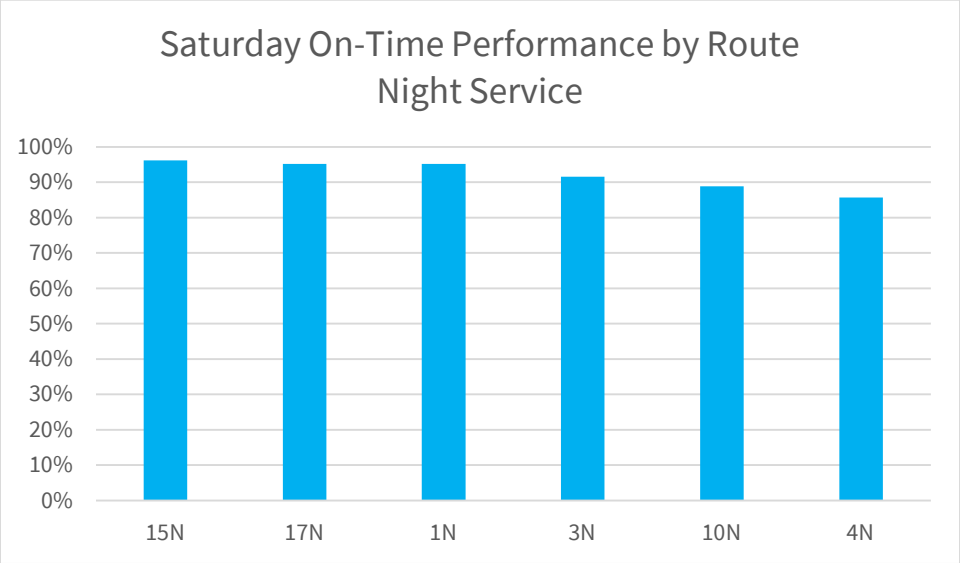
Table 29: Saturday On-Time Performance Data for Night Routes

Route	Early	On-Time	Late
1N	0.8%	84.8%	14.4%
3N	1.0%	82.9%	16.1%
4N	0.8%	72.4%	26.8%
10N	1.0%	76.3%	22.7%
15N	0.9%	90.6%	8.5%
17N	0.5%	78.0%	21.5%

Source: Votran AVL Data, July-December 2019

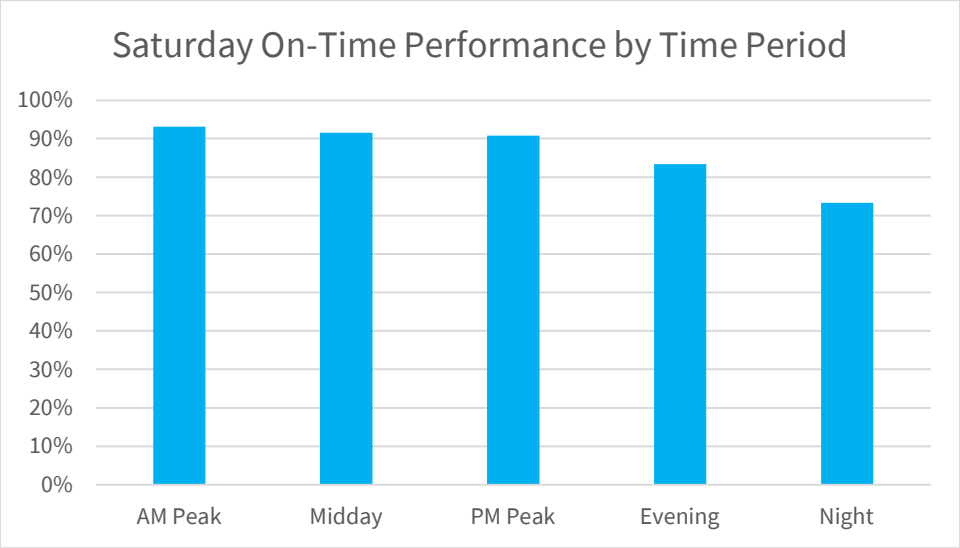
While weekday night service has no routes with on-time performance numbers below 85%, five of the six routes operate at less than 85% on Saturday nights. This includes three routes that have on-time performances below 80%. Among these routes, it appears that runtime is insufficient in the earlier hours of the night service – between 7:00 A.M. and 10:00 P.M. Higher levels of traffic on Saturdays suggest these schedules need to be reconsidered for this period.

Figure 25: Night Routes - Saturday On-Time Performance



The lower on-time performance at night is apparent when looking at Saturday on-time performance by time of day, as shown in Figure 26.

Figure 26: Saturday On-Time Performance by Time of Day



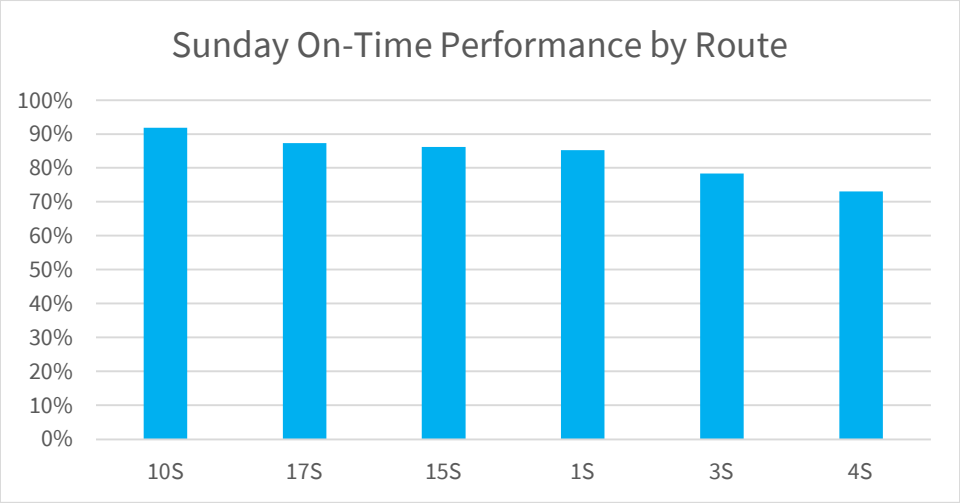
Among service days, Sunday has the poorest on-time performance. Table 30 shows the number of early, late, and on-time results for each route.

Table 30: Sunday On-Time Performance by Route

Route	Early	On-Time	Late
Route 1S	1.0%	85.2%	13.8%
Route 3S	0.2%	78.3%	21.4%
Route 4S	0.1%	73.1%	26.8%
Route 10S	1.0%	91.8%	7.2%
Route 15S	0.4%	86.2%	13.4%
Route 17S	2.1%	87.3%	10.6%

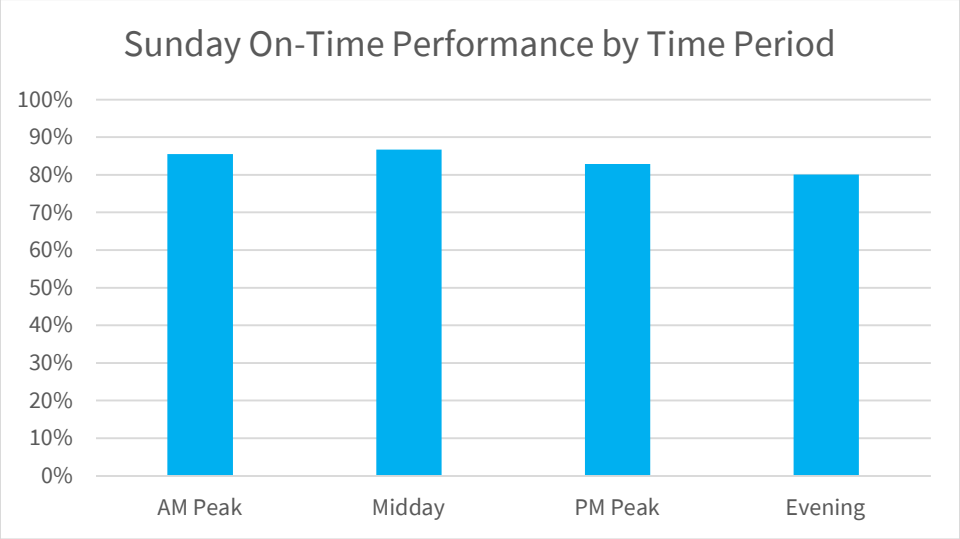
Source: Votran AVL Data, July-December 2019

Figure 27: Sunday Routes – On-Time Performance



For Sunday routes, only one route operates with an on-time performance that exceeds 90%. Three more routes run with on-time performance between 85% and 90%. Two routes, Route 3s and Route 4s, have poorer on-time performance metrics. Both routes lack sufficient runtime during afternoon hours that negatively impacts southbound trips. The route interlines (3s with Route 15s and 4s with Route 10s) allow the routes to return to schedule, especially the Route 4s, but more runtime is necessary for both routes.

Figure 28: Sunday On-Time Performance by Time Period



Sunday and night services operate similarly and appear to be scheduled more aggressively than service during weekdays and Saturdays. While traffic may be less during these periods, there are adjustments needed for some routes during these periods; non-peak hours are periods when achieving a better on-time performance is typically more straightforward.

Service Capacity

As part of the analysis on each route, the project team reviewed passenger loads on all routes and trips for each route. The results of that analysis follow within this portion of the report. Generally, there are few concerns with service that exceeds capacity. The 35-foot vehicles operated by Votran typically carry 31 seated customers, and a common transit industry allowance is for an additional 25% customers standing. Given these thresholds, the number of instances of service exceeding capacity is quite limited based on the Automated Passenger Counter (APC) system.

For evaluating capacity, the process is to break each route into its many trips during the day and its segments. It is not uncommon in transit for a bus route to have excess capacity during most hours of the day, and yet still have capacity issues in specific places and times. This is similar to the same pattern that is found in the road and highway network where capacity must consider the periods of the day with the largest traffic volumes. To find the maximum passenger loads, each trip during a six-month period was evaluated by finding its maximum load. Because anomalies occur, both with the data collection equipment or due to unusual event, the highest 5% of actual loads were disregarded. The tables in this section show the highest maximum load of all trips operated on each route.

Table 31: Weekday Maximum Loads by Route for East Volusia

Route	Maximum Load	Percent of Seated Capacity	Percent of Maximum Capacity
Route 1	22.2	71.5%	58.3%
Route 3A	31.2	100.6%	82.0%
Route 3B	22.8	73.6%	60.0%
Route 3C	23.4	75.3%	61.5%
Route 4	33.0	106.4%	86.8%
Route 5	9.0	28.9%	23.6%
Route 6	25.5	82.2%	67.0%
Route 7	16.8	54.0%	44.1%
Route 8	18.1	58.3%	47.5%
Route 10	22.6	72.9%	59.5%
Route 11	27.0	87.1%	71.1%
Route 12	19.6	63.3%	51.7%
Route 15	16.4	53.0%	43.2%
Route 17A	27.4	88.5%	72.2%
Route 17B	33.0	106.6%	87.0%
Route 18	28.6	92.3%	75.3%
Route 19	21.0	67.7%	55.2%
Route 40	13.4	43.2%	35.3%
Route 41	10.2	32.9%	26.9%
Route 44	4.0	12.9%	10.5%
Route 60	31.8	102.4%	83.6%

Source: Votran APC Data, July-December 2019

Four routes have maximum loads that exceed seated capacity for this analysis, and no routes approach maximum bus capacity or what is termed “crush load”. Further, each of the four routes that exceed the 31-person seated capacity only exceed that capacity on one individual trip each. Routes 17 and 60 experience their highest loads during the morning peak period while Routes 3 and 4 reach their largest loads during the evening peak period.

No route in the western half of Volusia County approaches the maximum load thresholds. Table 32 provides details on these routes.

Table 32: Weekday Maximum Loads by Route for West Volusia

Route	Maximum Load	Percent of Seated Capacity	Percent of Maximum Capacity
Route 20	10.3	33.1%	27.0%
Route 21	10.6	34.2%	27.9%
Route 22	11.3	36.6%	29.8%
Route 23	7.7	25.0%	20.4%
Route 24	9.3	30.0%	24.5%
Route 25	2.8	9.2%	7.5%
Route 31	6.8	22.0%	18.0%
Route 32	3.2	10.3%	8.4%
Route 33	9.7	31.4%	25.6%

Source: Votran APC Data, July-December 2019

Maximum loads for weekday night routes are found in Table 33. Interestingly, maximum loads are similar at night on many routes as what is found during daytime service, which is not a common occurrence. While several routes have notable loads for this time of day, none exceeds the seated threshold.

Table 33: Weekday Maximum Loads by Route for Night Service

Route	Maximum Load	Percent of Seated Capacity	Percent of Maximum Capacity
Route 1N	25.3	81.6%	66.6%
Route 3N	17.5	56.4%	46.0%
Route 4N	29.1	93.8%	76.5%
Route 10N	30.6	98.9%	80.6%
Route 15N	15.8	51.1%	41.7%
Route 17N	25.7	82.8%	67.5%

Source: Votran APC Data, July-December 2019

Maximum loads for Saturday in eastern Volusia County are shown in Table 34. There are two routes, each with a single trip that exceeds the seated lead threshold. The Route 17B exceeds the seated threshold in the morning peak period while the Route 18 does so in the afternoon peak.

Table 34: Saturday Maximum Loads by Route for East Volusia Service

Route	Maximum Load	Percent of Seated Capacity	Percent of Maximum Capacity
Route 1	28.5	92.0%	75.1%
Route 3A	20.3	65.3%	53.3%
Route 3B	23.6	76.3%	62.2%
Route 4	22.7	73.2%	59.7%
Route 6	18.8	60.5%	49.4%
Route 7	15.3	49.5%	40.4%
Route 8	22.8	73.5%	59.9%
Route 10	27.3	88.0%	71.8%
Route 11	22.5	72.5%	59.2%
Route 12	14.8	47.7%	38.9%
Route 15	11.5	37.2%	30.4%
Route 17A	29.4	95.0%	77.5%
Route 17B	36.2	116.6%	95.1%
Route 18	32.0	103.4%	84.3%
Route 19	26.0	83.9%	68.5%
Route 40	8.4	27.0%	22.0%
Route 41	7.1	22.9%	18.6%
Route 44	4.2	13.6%	11.1%
Route 60	31.0	99.9%	81.5%

Source: Votran APC Data, July-December 2019

Like weekdays, Saturday service on the western side of the county does not have any routes which are near the maximum capacity at any point. Data for western Volusia routes are found in Table 35.

Table 35: Saturday Maximum Loads by Route for West Volusia Service

Route	Maximum Load	Percent of Seated Capacity	Percent of Maximum Capacity
Route 20	11.8	38.1%	31.1%
Route 21	12.0	38.8%	31.7%
Route 22	7.1	23.0%	18.7%
Route 23	7.2	23.4%	19.1%
Route 24	7.8	25.1%	20.4%
Route 25	2.1	6.7%	5.5%

Source: Votran APC Data, July-December 2019

None of the routes operating on Saturday night approach capacity either. Table 36 provides information regarding maximum loads for Saturday night routes.

Table 36: Saturday Maximum Loads by Route for West Volusia Service

Route	Maximum Load	Percent of Seated Capacity	Percent of Maximum Capacity
Route 1N	13.5	43.5%	35.5%
Route 3N	17.6	56.7%	46.2%
Route 4N	12.2	39.2%	32.0%
Route 10N	13.4	43.2%	35.2%
Route 15N	18.0	58.0%	47.3%
Route 17N	12.7	41.1%	33.5%

Source: Votran APC Data, July-December 2019

There are no cases of Sunday route trips which regularly exceed the seated capacity. The loads on Sunday, however, are generally robust with each route achieving at least 70% of capacity on one trip during the day. Compared to Saturday and weekdays, there is less variation among routes in terms of maximum loads.

Table 37: Saturday Maximum Loads by Route for West Volusia Service

Route	Maximum Load	Percent of Seated Capacity	Percent of Maximum Capacity
Route 1S	24.4	78.8%	64.3%
Route 3S	28.3	91.3%	74.5%
Route 4S	30.6	98.8%	80.6%
Route 10S	24.1	77.7%	63.4%
Route 15S	22.9	73.8%	60.2%
Route 17S	29.7	95.8%	78.2%

Source: Votran APC Data, July-December 2019

Service Effectiveness

The following section will provide data on the quantity of service offered on each route along with its usage. This includes many metrics that measure both service and cost effectiveness. Data is broken out by service day (weekday, Saturday, Sunday) for a complete view of how well the service is utilized.

Table 38 provides data on the average weekday levels of service for routes on the eastern side of Volusia County. The total number of required vehicles for weekday service in East Volusia County is 40 and the total revenue hours provided for this service is 482.

Table 38: Weekday Service Summary – East Volusia

Route	Peak Vehicles	Revenue Hours	Revenue Miles
Route 1	2	26	430
Route 3	4	38	518
Route 4	3	37	540
Route 5	1	12	135
Route 6	2	27	398
Route 7	4	50	683
Route 8	1	13	170
Route 10	2	24	228
Route 11	4	47	629
Route 12	2	26	346
Route 15	1	13	133
Route 17	3	38	620
Route 18	2	24	321
Route 19	2	24	322
Route 40	1	12	265
Route 41	1	12	242
Route 44	1	12	178
Route 60	4	48	1,124
Total	**40**	**482**	**7,281**

Source: Votran Schedule Data, July-December 2019

Table 39 includes key weekday service metrics for the same routes.

Table 39: Weekday Service Effectiveness – East Volusia

Route	Average Daily Passengers	Passengers per Hour	Passengers per Mile
Route 1	457	17.7	1.06
Route 3	709	18.6	1.37
Route 4	836	22.9	1.55
Route 5	151	12.8	1.12
Route 6	357	13.2	0.90
Route 7	879	17.7	1.29
Route 8	252	19.7	1.48
Route 10	509	21.1	2.23
Route 11	689	14.6	1.10
Route 12	486	18.8	1.40
Route 15	334	25.1	2.51
Route 17	848	22.5	1.37
Route 18	360	15.1	1.12
Route 19	389	16.0	1.21
Route 40	154	12.9	0.58
Route 41	94	7.9	0.39
Route 44	84	7.0	0.47
Route 60	932	19.5	0.83
Total	**8,520**	**17.7**	**1.17**

Source: Votran APC and Schedule Data, July-December 2019

Four routes carry at least 20 passengers per hour – Routes 4, 10, 15, and 17. Most routes that operate on the east side carry between 10 to 20 passengers per hour, and the average for all these routes is 17.7. Two of the three routes which serve the southeast part of Volusia County are the lowest performers among these routes, carrying between 7 and 8 passengers per hour.

Table 40 gives an overview of service provided in the western half of the county.

Table 40: Weekday Service Summary – West Volusia

Route	Peak Vehicles	Revenue Hours	Revenue Miles
Route 20	5	58	752
Route 21	1	14	286
Route 22	1	13	254
Route 23	1	14	231
Route 24	1	6	163
Route 25	1	12	178
Route 31	3	20	369
Route 32	1	7	135
Route 33	1	9	154
Total	**15**	**152**	**2,522**

Source: Votran Schedule Data, July-December 2019

Table 41: Weekday Service Effectiveness – West Volusia

Route	Average Daily Passengers	Passengers per Hour	Passengers per Mile
Route 20	606	10.4	0.81
Route 21	122	8.8	0.43
Route 22	115	9.1	0.45
Route 23	105	7.4	0.45
Route 24	30	5.0	0.18
Route 25	32	2.7	0.18
Route 31	134	6.8	0.36
Route 32	31	4.2	0.23
Route 33	32	3.6	0.21
Total	**1,206**	**7.9**	**0.48**

Source: Votran APC and Schedule Data, July-December 2019

Only one route on the west side of the county has passenger boardings of at least 10 per hour. Generally, the service in DeLand, Orange City, and Deltona is not as strong as those that operate in the Daytona Beach area. While the route 20 does rank 7th in terms of average weekday passengers using the route, it also has more service than any route in the county. While routes 21, 22, and 23 each carry between 7-10 customers per hour, all other routes fall below that mark including all SunRail routes.

Service data for weekday night routes is found in Tables 33 and 34. All of the weekday night routes have passenger per hour totals between 13 and 18, a very tight clustering of performance. The night service also operates only slightly less effectively than daytime service in the east.

Table 42: Weekday Service Summary – Night Routes

Route	Peak Vehicles	Revenue Hours	Revenue Miles
Route 1n	1	5	81
Route 3n	1	5	81
Route 4n	1	5	80
Route 10n	1	5	78
Route 15n	1	5	75
Route 17n	1	5	76
Total	**6**	**31**	**471**

Source: Votran Schedule Data, July-December 2019

Table 43: Weekday Service Effectiveness – Night Routes

Route	Average Daily Passengers	Passengers per Hour	Passengers per Mile
Route 1n	88	16.5	1.08
Route 3n	71	14.3	0.87
Route 4n	89	17.2	1.10
Route 10n	81	15.6	1.03
Route 15n	76	14.6	1.02
Route 17n	74	13.9	0.98
Total	**477**	**15.3**	**1.01**

Source: Votran APC and Schedule Data, July-December 2019

Eastside Saturday data is shown in Tables 44 and 45.

Table 44: Saturday Service Summary – East Volusia

Route	Peak Vehicles	Revenue Hours	Revenue Miles
Route 1	2	25	408
Route 3	3	37	485
Route 4	3	34	508
Route 6	2	26	378
Route 7	2	50	681
Route 8	1	11	144
Route 10	2	22	208
Route 11	2	47	579
Route 12	4	25	332
Route 15	1	12	125
Route 17	3	36	588
Route 18	2	23	305
Route 19	2	24	322
Route 40	1	12	265
Route 41	1	12	235
Route 44	1	12	179
Route 60	4	41	955
Total	**36**	**449**	**6,696**

Source: Votran Schedule Data, July-December 2019

Service on Saturday for most routes is only slightly less than the amount of service provided during the week. Route 5 is the only current route that did not operate on Saturday.

Table 45: Saturday Service Effectiveness – East Volusia

Route	Average Daily Passengers	Passengers per Hour	Passengers per Mile
Route 1	454	18.3	1.11
Route 3	557	15.2	1.15
Route 4	609	17.8	1.20
Route 6	307	11.9	0.81
Route 7	685	13.7	1.01
Route 8	213	18.8	1.48
Route 10	334	15.0	1.60
Route 11	539	11.5	0.93
Route 12	361	14.4	1.09
Route 15	230	19.0	1.85
Route 17	759	21.1	1.29
Route 18	309	13.5	1.01
Route 19	388	15.9	1.20
Route 40	116	9.7	0.44
Route 41	74	6.2	0.32
Route 44	67	5.6	0.38
Route 60	644	15.8	0.67
Total	**6,645**	**14.8**	**0.99**

Source: Votran APC and Schedule Data, July-December 2019

While the number of revenue hours provided on Saturday is similar to weekday, the number of customers using service on the eastern side of the county is fewer. Such drops for Saturday service are typical and for many agencies more significant. However, because service levels are very comparable, service effectiveness does decline from 17.7 to 14.8 from weekday to Saturday. Only Route 17 carries more than 20 customers per hour.

Table 46: Saturday Service Summary – West Volusia

Route	Peak Vehicles	Revenue Hours	Revenue Miles
Route 20	5	48	621
Route 21	1	12	247
Route 22	1	12	234
Route 23	1	13	210
Route 24	1	6	166
Route 25	1	12	179
Total	**10**	**102**	**1,657**

Source: Votran Schedule Data, July-December 2019

The most significant difference for Saturday service on the west side of Volusia County when comparing to weekday service is that the three SunRail routes, 31, 32, and 33, do not operate. The result is a service that is about 2/3 as large as service on weekdays.

Table 47: Saturday Service Effectiveness – West Volusia

Route	Average Daily Passengers	Passengers per Hour	Passengers per Mile
Route 20	490	10.1	0.79
Route 21	93	7.9	0.37
Route 22	82	6.9	0.35
Route 23	87	6.9	0.42
Route 24	34	6.1	0.20
Route 25	24	2.0	0.13
Total	**810**	**7.9**	**0.49**

Source: Votran APC and Schedule Data, July-December 2019

Service effectiveness as measured by Passengers per Hour is the same on Saturday as it is for weekdays among West Volusia routes. The six Saturday routes do not carry as many customers on Saturday, but this is offset by the fewer total hours due to the three SunRail routes not operating.

Night service on Saturday is similar to weekday service. Interestingly, Saturday nights do produce more passenger traffic than weekdays, creating a rather strong passengers per hour total for this time period. Like on weekdays, the six routes on Saturday operate within a tight range of effectiveness.

Table 48: Saturday Service Summary – Night Routes

Route	Peak Vehicles	Revenue Hours	Revenue Miles
Route 1n	1	4	69
Route 3n	1	4	69
Route 4n	1	4	68
Route 10n	1	4	67
Route 15n	1	4	62
Route 17n	1	4	76
Total	**6**	**25**	**411**

Source: Votran Schedule Data, July-December 2019

Table 49: Saturday Service Effectiveness – Night Routes

Route	Average Daily Passengers	Passengers per Hour	Passengers per Mile
Route 1n	90	20.7	1.29
Route 3n	77	19.4	1.12
Route 4n	93	22.3	1.36
Route 10n	83	20.0	1.24
Route 15n	96	22.7	1.55
Route 17n	87	20.0	1.15
Total	**526**	**20.8**	**1.28**

Source: Votran APC and Schedule Data, July-December 2019

Statistics for Sunday service are shown in Tables 50 and 51. Sunday service easily has the strongest performance in terms of both measures of service effectiveness used – passengers per hour and passenger per mile. The number of passengers per hour on many routes is more common in larger, more robust systems. Given the limited amount of service, the numbers here strongly suggest latent transit demand during Sundays.

Table 50: Sunday Service Summary

Route	Peak Vehicles	Revenue Hours	Revenue Miles
Route 1	2	20	298
Route 3	1	12	194
Route 4	1	12	179
Route 10	2	23	349
Route 15	1	12	160
Route 17	2	20	313
Total	**9**	**99**	**1,495**

Source: Votran Schedule Data, July-December 2019

Table 51: Sunday Service Effectiveness

Route	Average Daily Passengers	Passengers per Hour	Passengers per Mile
Route 1	462	22.9	1.55
Route 3	339	28.9	1.75
Route 4	391	33.3	2.18
Route 10	414	18.0	1.18
Route 15	341	28.9	2.13
Route 17	473	23.5	1.51
Total	**2,419**	**24.5**	**1.62**

Source: Votran APC and Schedule Data, July-December 2019

Cost Effectiveness

The following section will provide data on the quantity of service offered on each route along with its usage. This includes many metrics that measure both service and cost effectiveness. Data is broken out by service day (weekday, Saturday, Sunday) for a complete view of how well the service is utilized. For routes costs were determined by allocating all reported operating costs by revenue hours of service. Unallocated passenger fares were attributed to routes using an allocation by passenger boardings.

Table 52: Weekday Route Cost Effectiveness – East Routes

Route	Farebox Recovery	Cost per Passenger	Subsidy per Passenger
Route 1	12.8%	$4.85	$4.23
Route 3	13.7%	$4.62	$3.98
Route 4	15.7%	$3.76	$3.17
Route 5	11.8%	$6.70	$5.91
Route 6	12.6%	$6.50	$5.68
Route 7	12.1%	$4.85	$4.27
Route 8	14.6%	$4.37	$3.73
Route 10	10.7%	$4.07	$3.63
Route 11	10.9%	$5.90	$5.26
Route 12	13.7%	$4.57	$3.94
Route 15	11.0%	$3.43	$3.05
Route 17	14.8%	$3.82	$3.25
Route 18	16.7%	$5.70	$4.75
Route 19	13.7%	$5.38	$4.65
Route 40	8.6%	$6.65	$6.07
Route 41	6.5%	$10.93	$10.22
Route 44	4.3%	$12.26	$11.73
Route 60	16.0%	$4.41	$3.70

Source: Votran APC and Schedule Data, July-December 2019

The results are similar to the same analysis based on service effectiveness. Most routes here have farebox recovery ratios between 10% and 17% and subsidies per passenger of less than $6.00. However, the three routes which serve New Smyrna Beach, Routes 40, 41, and 44, lag behind the other routes in these metrics.

Table 53: Weekday Route Cost Effectiveness – West Routes

Route	Farebox Recovery	Cost per Passenger	Subsidy per Passenger
Route 20	8.1%	$8.27	$7.60
Route 21	5.4%	$9.74	$9.22
Route 22	7.5%	$9.48	$8.77
Route 23	4.3%	$11.57	$11.07
Route 24	5.5%	$17.23	$16.28
Route 25	0.5%	$31.72	$31.58
Route 31	8.2%	$12.61	$11.58
Route 32	4.2%	$20.30	$19.45
Route 33	5.5%	$20.61	$19.47

Source: Votran APC and Schedule Data, July-December 2019

For routes serving west Volusia County, none have farebox recovery ratios that exceed 9%. Several of the routes, including Routes 24, 25, 32, and 33 had subsidy per passenger figures above $15.

Cost effectiveness metrics for routes operating at night are provided in Table 54. As with service metrics, these routes all have similar metrics when compared to one another. These figures are not as strong as the daytime version of these routes, but the routes outperform many other daytime routes.

Table 54: Weekday Route Cost Effectiveness – Night Routes

Route	Farebox Recovery	Cost per Passenger	Subsidy per Passenger
Route 1n	14.4%	$5.21	$4.46
Route 3n	14.3%	$6.00	$5.14
Route 4n	15.3%	$5.01	$4.24
Route 10n	13.0%	$5.50	$4.78
Route 15n	11.0%	$5.90	$5.25
Route 17n	11.9%	$6.20	$5.47

Source: Votran APC and Schedule Data, July-December 2019

Table 55 shows cost effectiveness data for Saturday service. Eastside routes tend to perform a little weaker for Saturday. There are five routes with farebox recovery ratios less than 10% and five routes with subsidy per capita greater than $6.00.

Table 55: Saturday Route Cost Effectiveness – East Routes

Route	Farebox Recovery	Cost per Passenger	Subsidy per Passenger
Route 1	16.7%	$4.70	$3.92
Route 3	15.3%	$5.67	$4.80
Route 4	19.1%	$4.83	$3.91
Route 6	10.4%	$7.23	$6.48
Route 7	9.5%	$6.26	$5.66
Route 8	13.0%	$4.57	$3.97
Route 10	14.8%	$5.74	$4.89
Route 11	8.7%	$7.47	$6.82
Route 12	11.2%	$5.97	$5.30
Route 15	17.1%	$4.53	$3.76
Route 17	16.4%	$4.08	$3.41
Route 18	13.7%	$6.38	$5.50
Route 19	10.8%	$5.40	$4.82
Route 40	7.9%	$8.86	$8.16
Route 41	6.0%	$13.95	$13.11
Route 44	3.4%	$15.23	$14.71
Route 60	14.8%	$5.44	$4.63

Source: Votran APC and Schedule Data, July-December 2019

Routes within western Volusia County have similar cost effectiveness metrics on Saturday as they do during the week. All routes but Route 20 have subsidy per passenger numbers greater than $10.00. The Route 25 had a subsidy per passenger at a very high metric of over $40.00.

Table 56: Saturday Route Cost Effectiveness – West Routes

Route	Farebox Recovery	Cost per Passenger	Subsidy per Passenger
Route 20	8.8%	$8.48	$7.73
Route 21	7.0%	$10.86	$10.10
Route 22	6.4%	$12.48	$11.68
Route 23	5.3%	$12.48	$11.82
Route 24	4.6%	$14.21	$13.55
Route 25	0.4%	$42.40	$42.25

Source: Votran APC and Schedule Data, July-December 2019

Table 57: Saturday Route Cost Effectiveness – Night Routes

Route	Farebox Recovery	Cost per Passenger	Subsidy per Passenger
Route 1n	13.9%	$4.16	$3.58
Route 3n	13.9%	$4.44	$3.82
Route 4n	14.9%	$3.86	$3.29
Route 10n	12.7%	$4.30	$3.75
Route 15n	10.6%	$3.80	$3.39
Route 17n	11.4%	$4.29	$3.80

Source: Votran APC and Schedule Data, July-December 2019

All routes operating on Saturday night have farebox recovery percentages higher than 10%. Also, the subsidy per passenger trip for all Saturday night services is less than $4.00; in comparison only five of the 23 Saturday daytime routes have per passenger subsidies of less than $4.00 per hour.

Costs and subsidies per passenger for routes operating on Sunday are lower than the same measure for most weekdays and Saturday services. The three Sunday routes which operate with a single vehicle, Routes 3, 4, and 15, all have total costs per passenger less than $3.00.

Table 58: Sunday Route Cost Effectiveness

Route	Farebox Recovery	Cost per Passenger	Subsidy per Passenger
Route 1	6.2%	$3.75	$3.52
Route 3	14.5%	$2.97	$2.54
Route 4	16.8%	$2.58	$2.15
Route 10	4.4%	$4.79	$4.58
Route 15	5.3%	$2.98	$2.82
Route 17	8.9%	$3.66	$3.33

Source: Votran APC and Schedule Data, July-December 2019

Fares

Votran charges customers $1.75 as single fare for bus service. A variety of discounts are available for users who purchase longer-term passes or who qualify for a discounted fare. A list of fares at the time of this report is shown in Table 59. Table 60 includes costs for longer term passes.

Table 59: Single Ride Fares

Category	Amount
Full Fare	$1.75
Senior Citizens (65+)	$0.85
Youth (Ages 7-18)	$0.85
Persons with Disabilities	$0.85
Children 6 Years and Under	Free

Votran Public Information

Table 60: Value Pass Fares

Category	Full Fare Customer	Discounted Customer
1-Day Pass	$3.75	$1.85
3-Day Pass	$7.50	$3.75
7-Day Pass	$13.00	$6.50
31-Day Pass	$46.00	$23.00

Votran Public Information

Votran offers passes of four increments. This is not unusual, although 3-day passes are not as common as the other three in the industry. Votran also offers every pass fare at a 50% discount for certain customers. It is important to note that the only Half Fare requirement of the Federal Transit Administration applies to the single-ride fare. However, many transit properties offer passes at discounted fares as well, as pass purchases can encourage off-vehicle fare purchases which improves operating efficiency.

For the analysis, a review was conducted of the average fare collected by Votran in comparison with some nearby agencies in similar-sized communities. Data is from the 2019 National Transit Database.

Table 61: Bus Fares Collected per Customer – Peer Analysis

Transit Agency	Total Bus Fares	Total Bus Passengers	Fare per Passenger
Votran	$2,567,333	3,150,416	$0.81
Brevard County, FL	$760,249	2,054,268	$0.37
Lakeland, FL	$1,134,623	1,187,030	$0.96
Lee County, FL	$2,386,336	2,971,742	$0.80
Pasco County, FL	$819,318	859,657	$0.95
Chatham County, GA	$4,600,010	3,168,774	$1.45
Charleston County, SC	$4,147,422	2,991,215	$1.39
Peer Median			**$0.95**
Peer Average			**$0.99**
Peer Maximum			$1.45
Peer Minimum			$0.37

Average fare on the Votran system is lower than the peer average or peer median for bus service. In this case, both numbers are higher because of the higher average fare for the two non-Florida properties. A fare change that would bring the number up to the median of this group would result in new revenues but would almost certainly cut ridership as well. The average fare for Votran is certainly not an outlier among the group.

Table 62 provides average fare information for demand response service. Most demand response service is provided in compliance with the Americans with Disabilities Act (ADA), which requires complementary paratransit where fixed-route service operates. Single-trip fares must be no more than twice the cost for the same trip in the fixed-route service. There is no similar requirement for unlimited passes.

Table 62: Paratransit Fares Collected per Customer – Peer Analysis

Transit Agency	Total Paratransit Fares	Total Paratransit Customers	Fare per Passenger
Votran	$1,100,659	305,885	$3.60
Brevard County, FL	$827,266	195,831	$4.22
Lakeland, FL	$135,963	107,741	$1.26
Lee County, FL	$686,883	140,593	$4.89
Pasco County, FL	$69,387	66,013	$1.05
Chatham County, GA	$180,311	112,915	$1.60
Charleston County, SC	$209,860	75,790	$2.77
Peer Median			**$2.18**
Peer Average			**$2.63**
Peer Maximum			$4.89
Peer Minimum			$1.05

Paratransit fares among the peers in Table 62 vary much more significantly than bus fares. Votran collects more per customer than the base ADA fare of $3.50, due to other trip types. Votran stands out for collecting more in total in paratransit fares than any of these peers. As populations age, growing paratransit costs are a challenge for the transit industry. As much of how the service must operate is regulated by standards of the FTA, fares (within the maximum threshold) are one way to control costs.

Paratransit Costs

Votran operates paratransit service, termed "Gold Service", for customers who are eligible by virtue of disability and whose trips meet requirements of the ADA. A smaller share of the paratransit service is provided for Transportation Disadvantaged (TD) populations, a program of the state of Florida. By its nature, paratransit service operates at far lesser efficiency than fixed transit services. As such, controlling the proportion of service that is demand response is critical in maintaining systemwide efficiency, and ensuring public transportation subsidies can serve as many trips as possible.

Table 63 compares paratransit service for Votran and the same peer set used earlier on the analysis on peers. In regard to proportion of service that is paratransit, Votran is an outlier. In making transit as efficient as possible, this creates a challenge. Among the seven agencies evaluated in Table 60, Votran's bus service ranks 2nd of seven in terms of customers per hour. However, when looking at the same metric for all services, it falls to 5th of seven. This is fully attributable to having such a large proportion of service and budget dedicated to paratransit service.

As a means of possibly reducing the demand on the paratransit service, Chapter 10 recommends converting some existing lower performing fixed route areas to Mobility on Demand zones. This type of service is similar to the Flex services currently operated by Votran but uses technology in the trip booking and scheduling functions. The benefit is that customer preferences have moved towards more smartphone app usage, but it also can be less costly than phone reservations because of labor costs. The systems available also promote their ability to be more efficient in vehicle scheduling than traditional means, but those claims have not been independently verified.

Table 63: Paratransit as Percentage of All Service– Peer Analysis

Transit Agency	Fixed Route Hours	Paratransit Hours	Paratransit % of Service
Votran	202,313	166,284	45.1%
Brevard County, FL	100,865	55,070	35.3%
Lakeland, FL	89,311	56,094	38.6%
Lee County, FL	193,428	88,488	31.4%
Pasco County, FL	94,434	21,128	18.3%
Chatham County, GA	181,498	71,442	28.2%
Charleston County, SC	200,472	41,544	17.2%
Peer Median			**29.8%**
Peer Average			**28.2%**
Peer Maximum			38.6%
Peer Minimum			17.2%

6. Findings on Current Bus Network

The following section revisits some of the important points of the various reports on existing conditions and summarizes findings important to general transit availability. Following these brief overviews, both general concerns and specific route concerns are discussed.

Network Coverage

The current Votran route network was evaluated in relationship to the development patterns and demographics of the community to ensure network coverage to all likely potential transit markets. Areas with the higher transit propensity are clustered in the core areas of Daytona Beach and DeLand on the two sides of the county and are served by the transit network. The Daytona Beach is served by multiple routes while local DeLand service is provided by two routes generally along the Woodland Boulevard corridor with Route 31 operating only during peak periods. Given the density and demographics of DeLand, additional local service options should be needed to serve existing transit needs.

Just as it is necessary to compare service spread to demographic data, it is also important to ensure transit serves important employment or activity centers. The current network appears to offer coverage to most existing locations. Several more recent warehouse developments are beyond the existing transit coverage. These facilities can employ large numbers of people with basic skills, many of whom may need transit service for job access. New Amazon warehouses have been developed along Mason Avenue west of Williamson Boulevard near the Tomoka Town Center and another along Normandy Boulevard in Deltona. The latter of these is more isolated from other employers and would be more difficult to serve effectively.

Service Reliability and Capacity

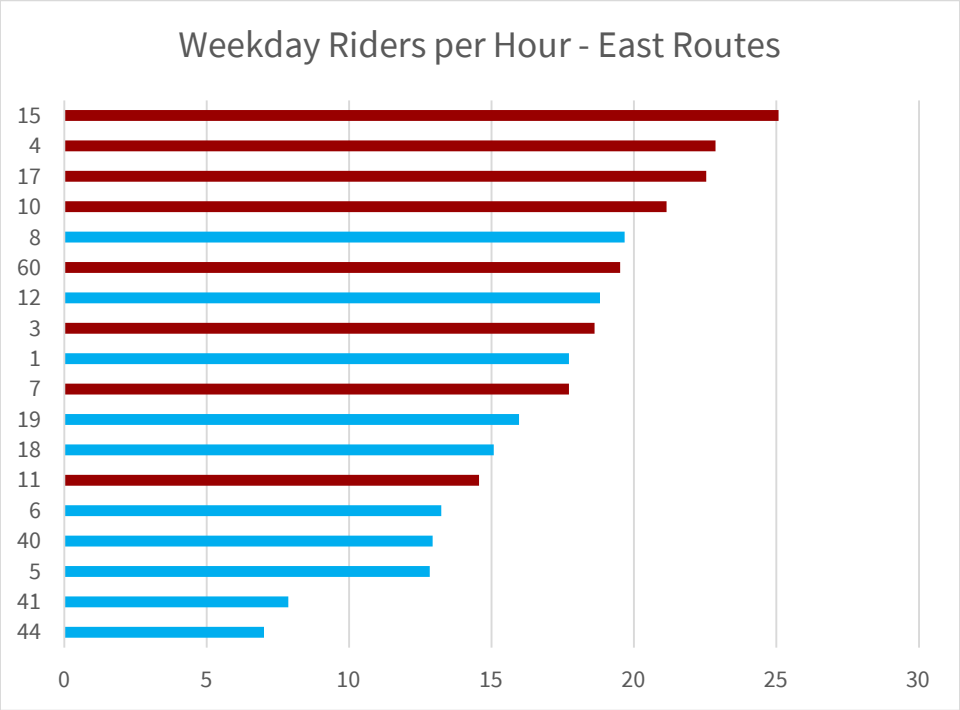
Perhaps the strongest attribute of the current Votran operation is strong on-time performance. Votran staff stated an aggressive goal of 90% for on-time departures, and almost all routes have on-time performance above 85%. Failures in on-time performance can create negative customer experience and erode the perceived quality of the service within the community. It was apparent in interviews with Votran operational staff and even drivers there is a high priority given to on-time performance and the results show these efforts are effective.

Generally, on-time performance is consistent throughout the day except for late service during the afternoon peak period. While Saturday service performs better than weekday service, Sunday service has lower on-time performance.

Service Performance

Votran services generally operates regular service intervals of 30 minutes or 60 minutes. In general, routes with better frequency correlate with those which are most effective, which indicates a good match between service quantity and existing service demand. Figure 29 shows the number of passengers per hour for routes operating on the eastern half of Volusia County. Routes in red operate every 30 minutes during weekdays.

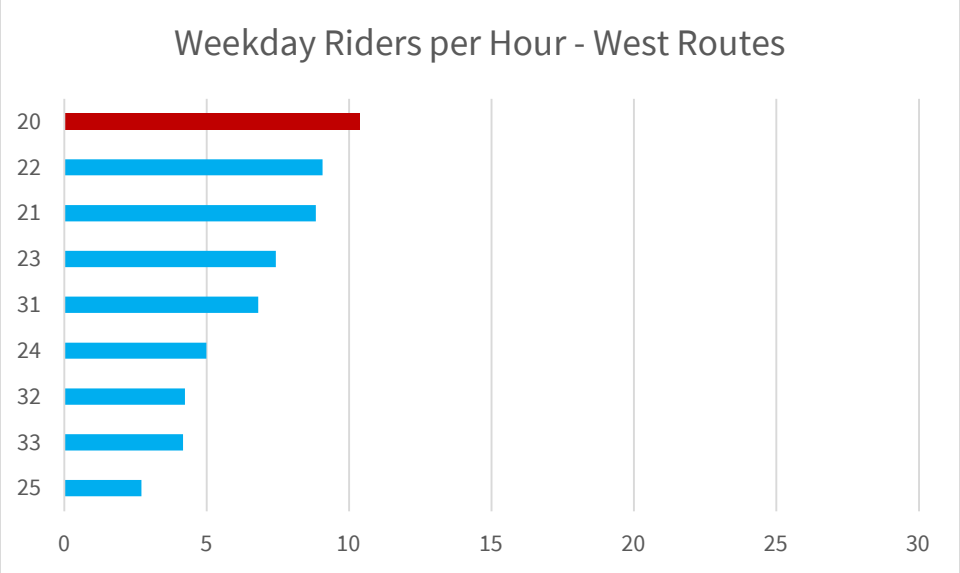
Figure 29: Passengers per Hour for East Volusia Routes



Red bars indicate routes that operate at 30-minute headways.

Route performance for routes on the west side of the county are shown in Figure 30. Among these routes, only Route 20 operates consistently every 30 minutes throughout the day. This route is the most effective route on the west side of the county; however, its performance still ranks well below all similar routes on the east side of the county.

Figure 30: Passengers per Hour for West Volusia Routes



Red bars indicate routes that operate at 30-minute headways.

In addition to evaluating the quantity of service and performance at a route level, each route was analyzed on a segment-level and stop-level basis to identify opportunities for efficiencies within the proposed network.

General Service Deficiencies and Opportunities

Several areas of the existing Votran system were identified in the COA as opportunities for enhanced mobility through streamlining route alignments, eliminating route redundancy, improving connections between origins and destinations through more direct service alignments, improved connections between routes, and expanding service periods (days and hours) on select routes.

Indirect Routes. Routes that are not designed to operate in direct paths can add significant time to customers' trips. There are two specific issues found in several existing Votran routes: loop or one-direction routes and excessive deviations. There are two sets of bi-directional routes within the Votran service network. The routes 18 and 19 in the east county and the routes 21 and 22 in the Deltona area. The coupling of routes in either direction allows a customer to take one in one direction while taking the other for return trips. This increases complexity and not best practice. There are also several routes (such as Routes 3, 6, 11, 15, 23, and 40) where one end of line operates in a single-direction loop. The disadvantage to this configuration is that in many cases, customers must ride out of direction substantially even when both origin and destination is served by the same route.

A similar lack of directness occurs when routes have an excessive number of deviations. While each route deviation may only add several minutes to a trip, a route with several of these could add large amounts of time to a person's travel. The Routes 6, 11, 21, and 22 are all examples of routes with either large numbers of deviations or rather long deviations that make the in-vehicle travel time very long. For example, a trip from the Transfer Plaza to the Volusia Health Department on Route 11 takes over an hour, a four-mile trip that would take 12-15 minutes in a car. This is an extreme case of a common issue for several Votran routes.

Limited night and Sunday hours. It is a common practice in transit for services to be reduced during hours where demand is much less. There is generally less ridership during later hours following the evening peak period and on weekends. With that said, the changes from weekday to both night service and Sunday service for Votran is extreme. Night service begins at 7:00 P.M. and utilizes only 6 vehicles compared to 55 peak vehicles. Sunday service uses nine vehicles and two of those are added service for Routes 1 and 17 to maintain necessary capacity. Sunday service carries about a quarter of the ridership of weekday service, but the revenue hours are fewer than 15% of the same for weekday service. Much of the transit ridership within Volusia County is associated with retail areas, hotels, and other uses that do not necessarily follow traditional weekday service hours.

Connected with the limited night and Sunday hours are poorer performances for customer service metrics such as on-time performance and excessive passenger loads. Service that is not terribly robust is much less able to offer customers satisfactory alternatives when there are operational issues with their regular bus. Additionally, where market demand exceeds service supplied, that itself can be the cause of these same operational challenges.

Service overlaps with SunRail service. Three SunRail feeder routes are funded through the Florida Department of Transportation (FDOT). These routes run only in the morning and evening peak periods and connect locations in western Volusia County to the DeBary SunRail station. The routes themselves are among the lowest performers in the Votran system, but in many cases run substantially along the same alignments of other Votran routes. While removing these overlaps is not simple given the purpose of the funding, the proposed network design does attempt to reduce this overlap.

Specific Route Observations

For this project, the project team provided Volusia County with electronic versions of traditional route profiles. Unlike traditional printed route profiles, the electronic versions are fully customizable by the user. Some of the enhancements are the ability to see multiple routes mapped and summed if desired as opposed to only appearing individually. Users can choose certain times of day to see the data. All route data that has traditionally been provided for weekday service is available for all service days. Given this earlier deliverable, the route-by-route analysis within this section is limited to analysis and observations made by the team.

Route 1 is a good performer, with 17.7 passengers per revenue hour on weekdays, which is above the system average. Saturday ridership is nearly as strong as that on weekdays. On the segment of the route north of Granada Boulevard, only 11 percent of the average daily boardings take place. Also, along State Road A1A (south of Granada Boulevard), Route 1 augments Route 18/19, which is good since this is an important corridor and both Route 1 and the 18/19 couplet are hourly services.

Route 3 performs above the system average. It is comprised by three patterns: 3A, 3B, and 3C. The end-of-line loops for Routes 3A and 3B are circuitous and long, which may cause confusion among riders. Only four percent of daily boardings take place north of the transfer stop on Thompson Creek Road, which is where the patterns go their separate ways. This could speak to little demand on these areas north of Granada Boulevard and/or to the lack of utility of circuitous, one-way loops.

Route 4 is a very strong route, so much so that it experiences heavy passenger loads. This is something that the operators mentioned, but it is also backed up by the data. Over three quarters of the ridership is concentrated in the portion north of Sunshine Park Mall. The southern piece has less usage, but it is not negligible. This route is duplicated in the southern end by parts of Routes 7 and 40.

Route 5 is a short, circulator route that provides weekday-only service; it does not operate on Saturday or Sunday. It is a below-average performer and most of its ridership (over 70%) concentrates on both ends of the route (Transfer Plaza and Holly Hill).

Route 6 also performs below average. It drew the most complaints from operators, due to the high number of turns. Beyond its circuitous alignment, this route also has two large loops on the northern end-of-line. These loops only produce 19 percent of the route's daily ridership, and half of that is concentrated on two stops: Walmart Ormond Beach and Ormond Towne Square.

Route 7 performs above average. It has consistent ridership on the northern half. The segment south of Big Tree Road produces only 22 percent of the route's daily ridership, with over half of those boardings taking place near the intersection of Nova Road and Dunlawton Avenue. This route's southern end (Spruce Creek Road/Taylor Road portions) may be better off as part of a different route.

Route 8 is a short, circulator route that connects the mainland with the busiest parts of the barrier island: Bellair Plaza and the Seabreeze Historic District (where the Intermodal Transit Facility is located). It is a strong performer even though more than three quarters of the boardings are on stops shared with Route 1. Given that these routes are parallel to each other, this could be detrimental for both services, as riders could take either route to get to their destination, which is a redundancy that may claim an excessive amount of resources.

Route 10 is the best performer among the routes that operate north of International Speedway Boulevard. It is a short route, much more direct than Route 11. The end-of-line loop negatively impacts service to the Halifax Health Medical Center. This route does not do justice either to Daytona State College, but this may be due to the intricacy of the road network surrounding their main campus, which makes it hard to serve with transit.

Route 11 is a long route that, compared to its East County peers, performs below average. This route is very circuitous and involves some out-of-direction travel, to the point that it takes about one hour to go from the Transfer Plaza to the intersection of Mason Avenue and Williamson Boulevard (near the Tanger Outlets), which is a relatively short distance. All stops west of Volusia Mall, which comprise the end-of-line loop, produce only 12 percent of the route's average daily boardings.

Route 12 is the best performer among the 60-minute routes in the system. The northern end-of-line is made up by a long one-way loop, which is not considered best practice. The southern end of the route deviates considerably to connect with the Swallowtail transit hub. This piece of Route 12 could be taken over by other Port Orange routes.

Route 15 is the strongest performer in terms of passengers per revenue hour. It is a circulator route that serves a highly transit-dependent neighborhood. However, it connects to very few destinations, forcing users to transfer at least once. About half of the route's daily boardings occur at the Transfer Plaza.

Route 17 is a branching route, with two patterns: 17A and 17B. Overall, Route 17 is a very strong performer, with 89% of the boardings happening within the shared segment or trunkline. The Ponce Inlet branch experiences only 34 daily boardings, on average. The Dunlawton Avenue/Herbert Street branch is not that much stronger, with 63 average daily boardings.

Routes 18 and 19 are one-way, countercyclical loops that join forces to create a vast bi-directional loop. This could lead to confusion among new riders as well as some other inefficiencies due to the great length. Over 75 percent of the boardings take place on the north and east pieces of the loop, i.e., Granada Boulevard and Atlantic Avenue (State Road A1A). This route couplet duplicates Route 60 along International Speedway Boulevard, which may be redundant given that this corridor is already well served by the East-West Connector.

Route 20 is the best performing route on the West County. It accounts for half of the daily boardings that happen on the westside. Route 20 connects two major transfer nodes in the west: Amelia SuperStop and the Orange City Market Place. Further, it is the only local route that serves DeLand.

Routes 21 and 22, like the 18/19 couplet, are two countercyclical, one-way loops. However, Route 21/22 may become very confusing since there are segments where both services are bidirectional, and the order in which different deviations are served varies by direction. This couplet is also very infrequent, since both routes operate on a 2-hour headway, which combine to be hourly but, given the countercyclical nature of the huge loops on the eastern end, riders could wait up to two hours depending on where they are and what is their destination. Each route performs at 9 passengers per revenue hour. Also, there are large segments that produce very little ridership: Fort Smith Boulevard, Newmark Drive, and South Providence Boulevard.

Route 23 performs poorly. One of its ends-of-line (Market Place) is in the middle of the alignment, which is confusing and somewhat counterintuitive. The segment along Charles R. Beall Boulevard (U.S. Highway 17-92) accounts for 13 daily boardings (12% of route's total), while the one-way loop along Fort Smith, Elkcam, and Normandy Boulevards only produces 11 daily riders (10%).

Route 24 serves the U.S. Highway 17 corridor, connecting rural areas, such as Pierson and Seville, to DeLand and the rest of the system. However, given the very rural character of its service area, this route is the lowest performer of the system, barring the three SunRail routes. North of State Road 40 (Barberville), this route picks up only 10 riders per day, on average. The first outbound trip and the last inbound trip are basically deadhead trips, which – given how long the route is – could be very detrimental for performance.

Route 25 was suspended during the COVID-19 pandemic and has had extremely little ridership during its service tenure. The recommendation is to make the suspension permanent.

The SunRail routes (Routes 31, 32, and 33) serve the most popular locations served by other routes. Performance is 30% below that of comparable West County routes. Service operates only on weekday peak periods, mostly circumscribed to early morning and late evening.

Route 40 connects Port Orange with New Smyrna Beach. It performs below average, compared to other East County routes. However, of all the routes serving the New Smyrna Beach area, this is the most optimal. The northern end-of-line loop is long, and it duplicates parts of Route 4.

Route 41 is a poor performing service. On average, only 5 daily boardings take place south of Roberts Road (i.e., the Oak Hill leg, which is very lengthy) and just 4 passengers per day are picked up along the deviation to Daytona State College. Together, these two legs comprise a meager 9.6% of the route's total ridership.

Route 44 is the poorest performing route in all East County. The portion west of the Regional Shopping Center produces 20 daily riders (24% of route's total), most of which occur at the Walmart. Meanwhile, stops on the beachside account for 11 daily boardings (13%). These two are very long legs, which may not be warranted to serve only 30 trips per day.

Route 60, also known as the East-West Connector, is a strong performer. This route not only links the east and west parts of the county; it also serves multiple other markets. Among these, riders from the central portion of the route (County Jail area) travel mostly to/from East County.

7. New Route Recommendations

Following an analysis of various data sources for the existing Votran fixed-route bus system and the input from Votran staff on initial findings and recommendations, a final set of route recommendations has been developed. The proposed route network is designed to be generally consistent between different service days and times, and thus eliminates the need for special night or Sunday services. Like existing service, there is consistency among routes with service spans, but the recommended route structure does contain more route-specific adjustments to meet budget targets for each scenario.

For the COA study, three scenarios have been developed with significant differences in the quantity of service offered. The proposed route network remains the same throughout, but many routes vary on the service span or frequency of service based on each scenario. Routes are numbered starting with 100 to distinguish the proposed routes with current Votran routes which uses one- or two-digit numbers.

Three service scenarios were developed as part of the COA due to a request from Volusia County staff to enable better planning of service and budgets for transit in the county. The three scenarios are as follows:

- **Baseline Scenario** is the original service developed that creates some net savings from the current Votran system but is just as focused on re-investing efficiency improvements from some parts of the transit network to improved services where those were warranted.
- **Reduced Scenario** was a scenario developed to equal at least a 5% reduction of service hours from what was operated in 2019 prior to COVID-19 and the network that was evaluated as part of this study.
- **Significantly Reduced** was a third scenario with more substantial cuts in order to meet a budget target of 10% reduction from the 2019 network.

Of note is that while service levels do change in many cases between scenarios, the overall network structure does not change dramatically between scenarios. The result of this is that hybrids of these scenarios can be achieved fairly readily without substantial rework.

Figures 31, 32, and 33 provide system maps of the proposed network for different portions of the county. Following these maps is detailed route by route information including a route map, and service levels for each of three scenarios developed as part of the COA.

Figure 31: Proposed Network for West Volusia County

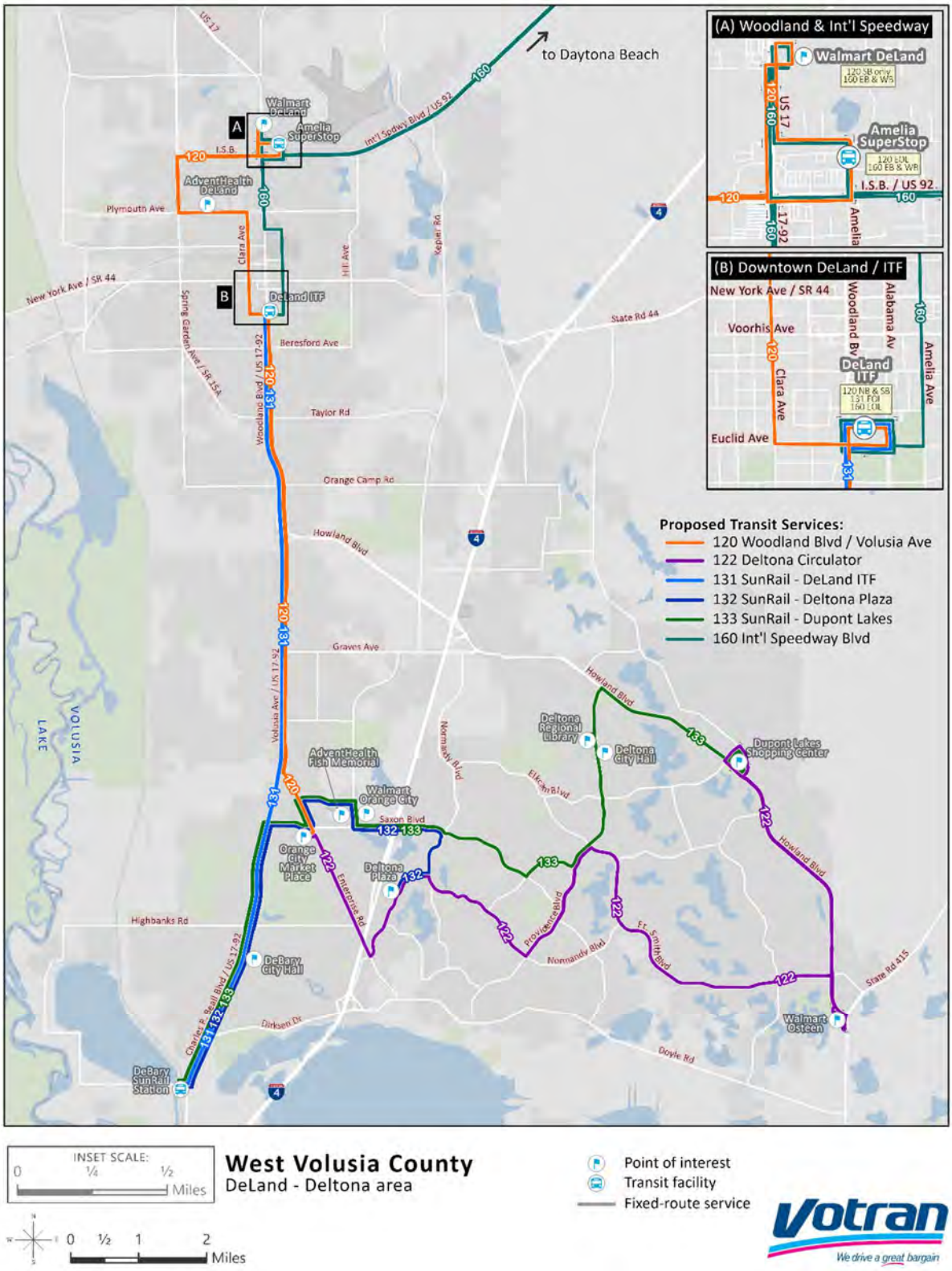


Figure 32: Proposed Network for Northeast Volusia County

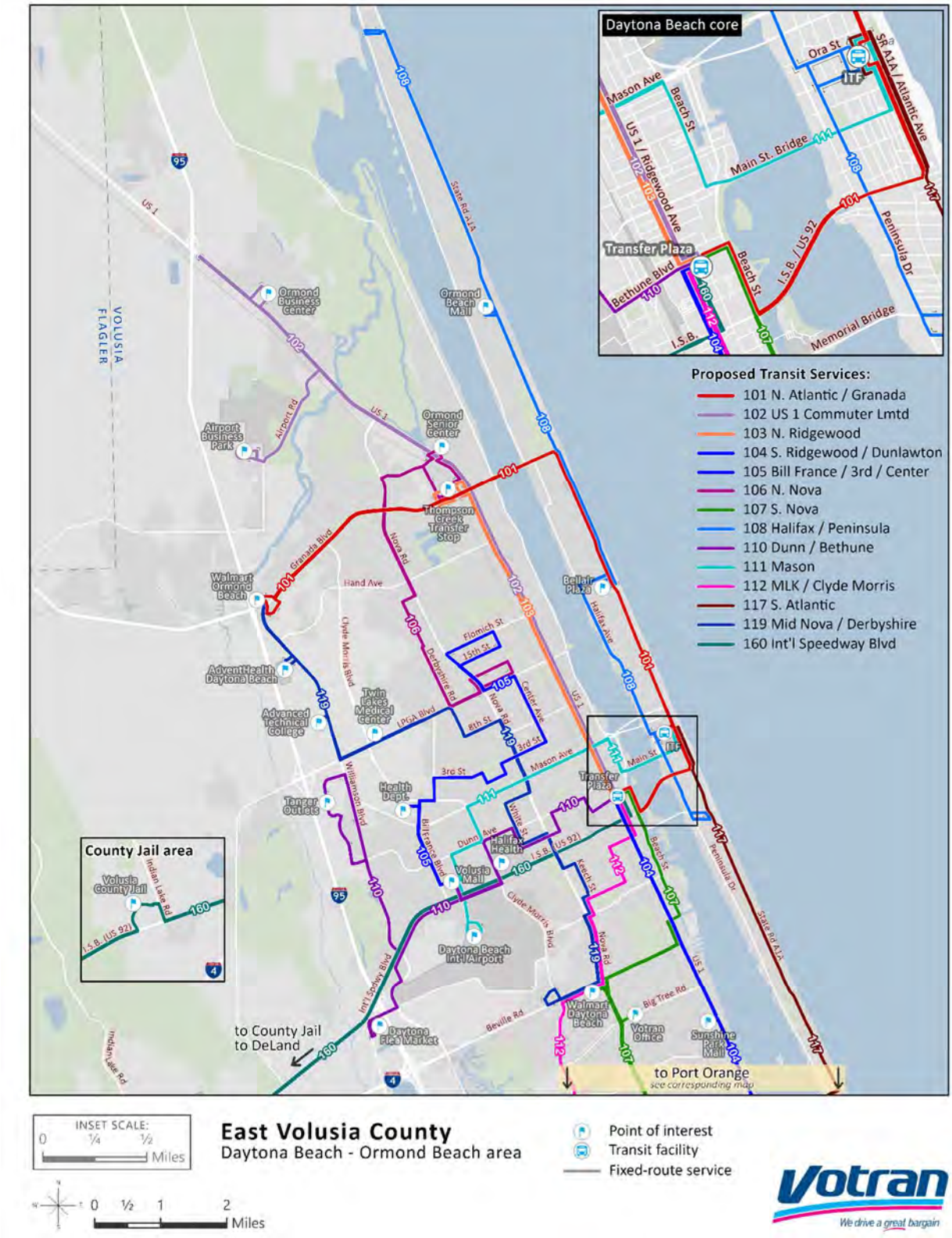
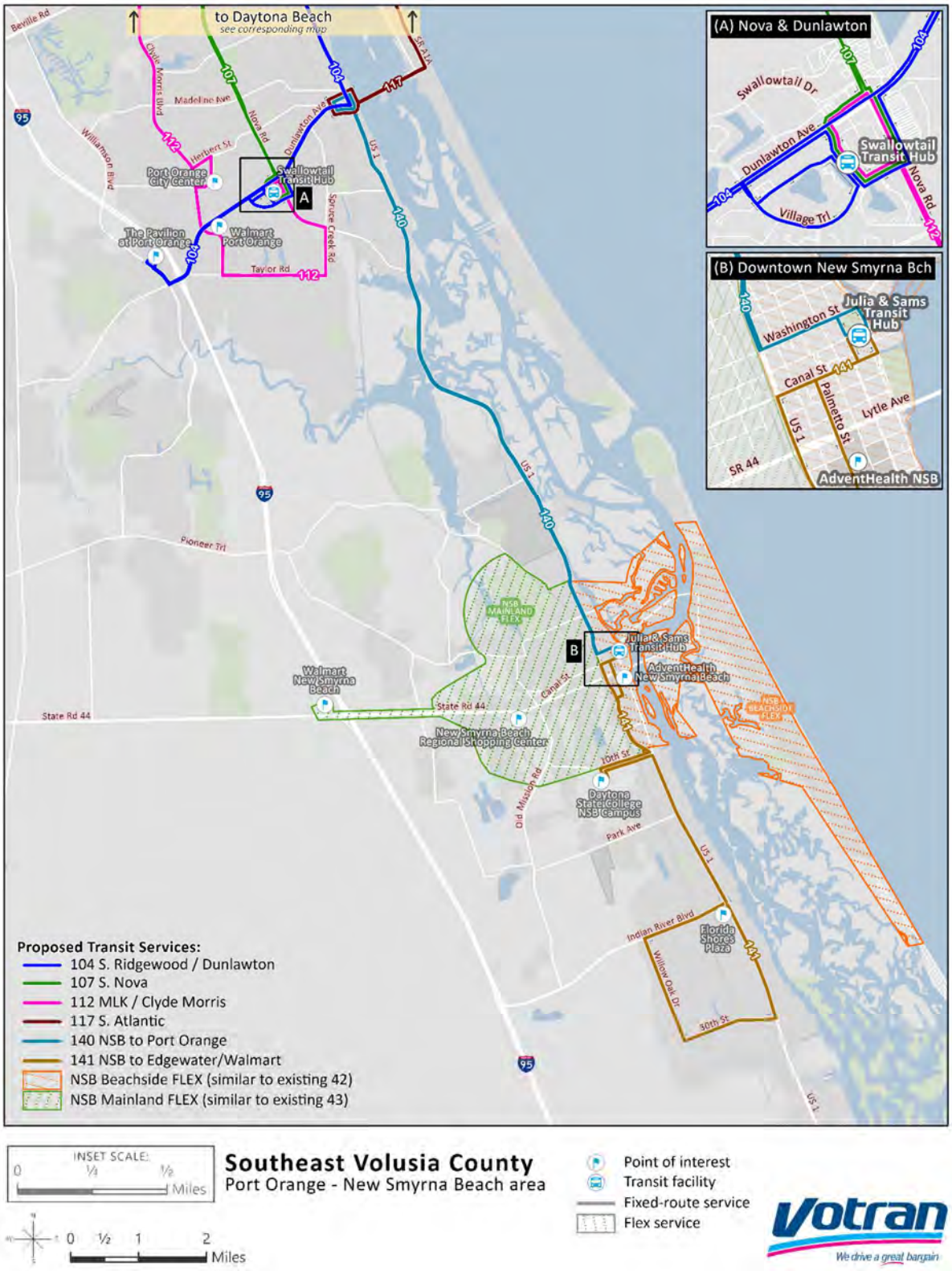


Figure 33: Proposed Network for Southeast Volusia County



Route 101

The Route 101 replaces portions of current Routes 1, 18 and 19. The proposed route would connect the Transfer Plaza with the Intermodal Transit Facility in Daytona Beach. It would serve the North Atlantic Avenue corridor between Granada Boulevard and International Speedway Boulevard and would continue along Granada Boulevard from Atlantic Avenue to Williamson Boulevard.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. - 10:00 P.M.	30	60	60
Holiday	7:00 A.M. - 10:00 P.M.	60	60	60

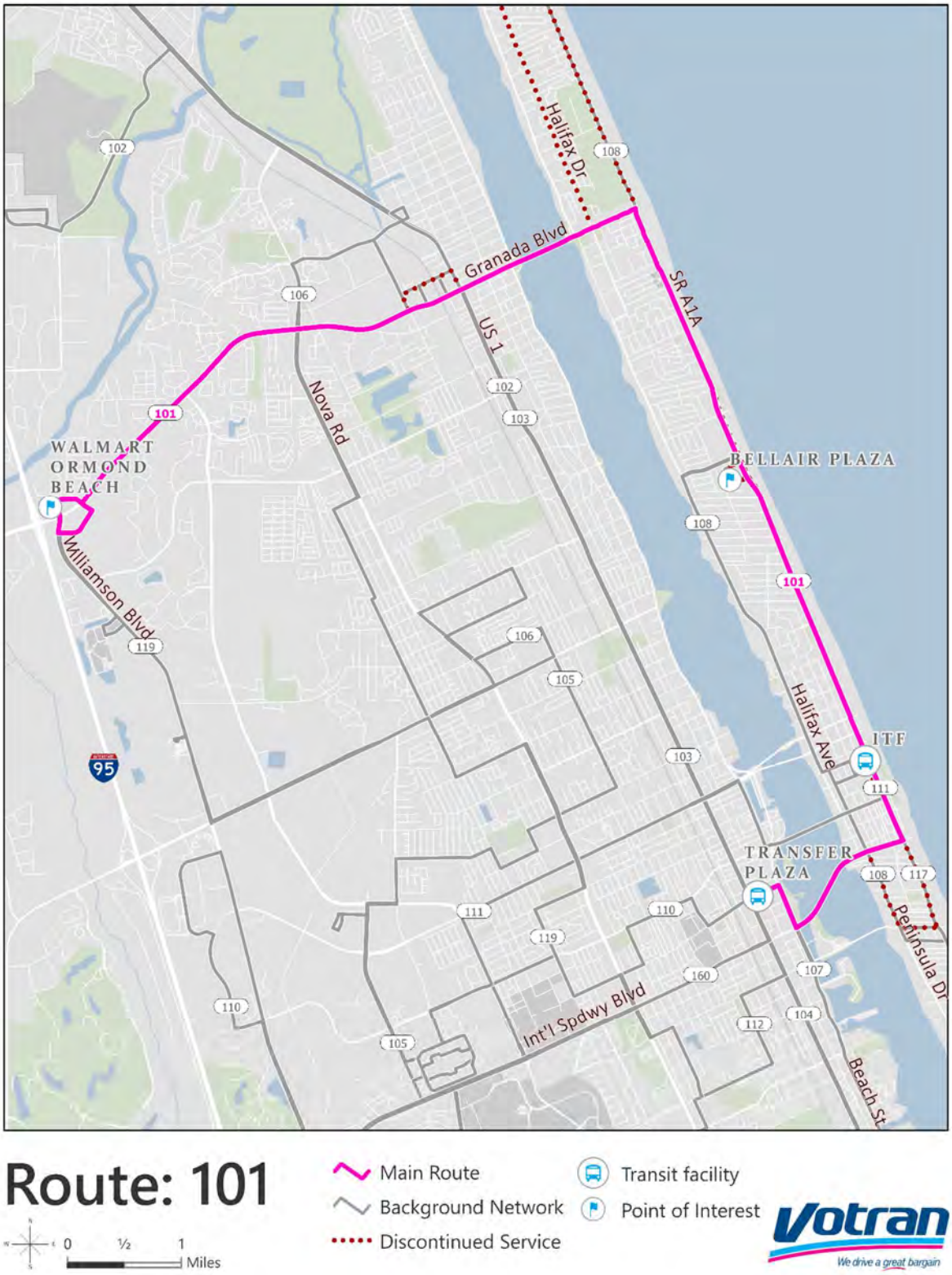
Reduced Service

Same as Baseline Service.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. - 7:00 P.M.	30	60	60
Holiday	7:00 A.M. - 7:00 P.M.	60	60	60

Figure 34: Route 101



Route 102

The Route 102 is a proposed new route replacing the “C” pattern of current Route 3. The route operates only two trips in both the morning and evening peak hours connecting to job centers north of Granada Boulevard near the U.S. Highway 1 corridor. A non-stop, or express, trip would be included for the first morning and last evening trip connecting to the Transfer Plaza to reduce deadhead miles.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:00 A.M. - 7:45 A.M.; 3:15 P.M. - 5:00 P.M.	45	No Service	
Saturday	No Service			
Sunday	No Service			
Holiday	No Service			

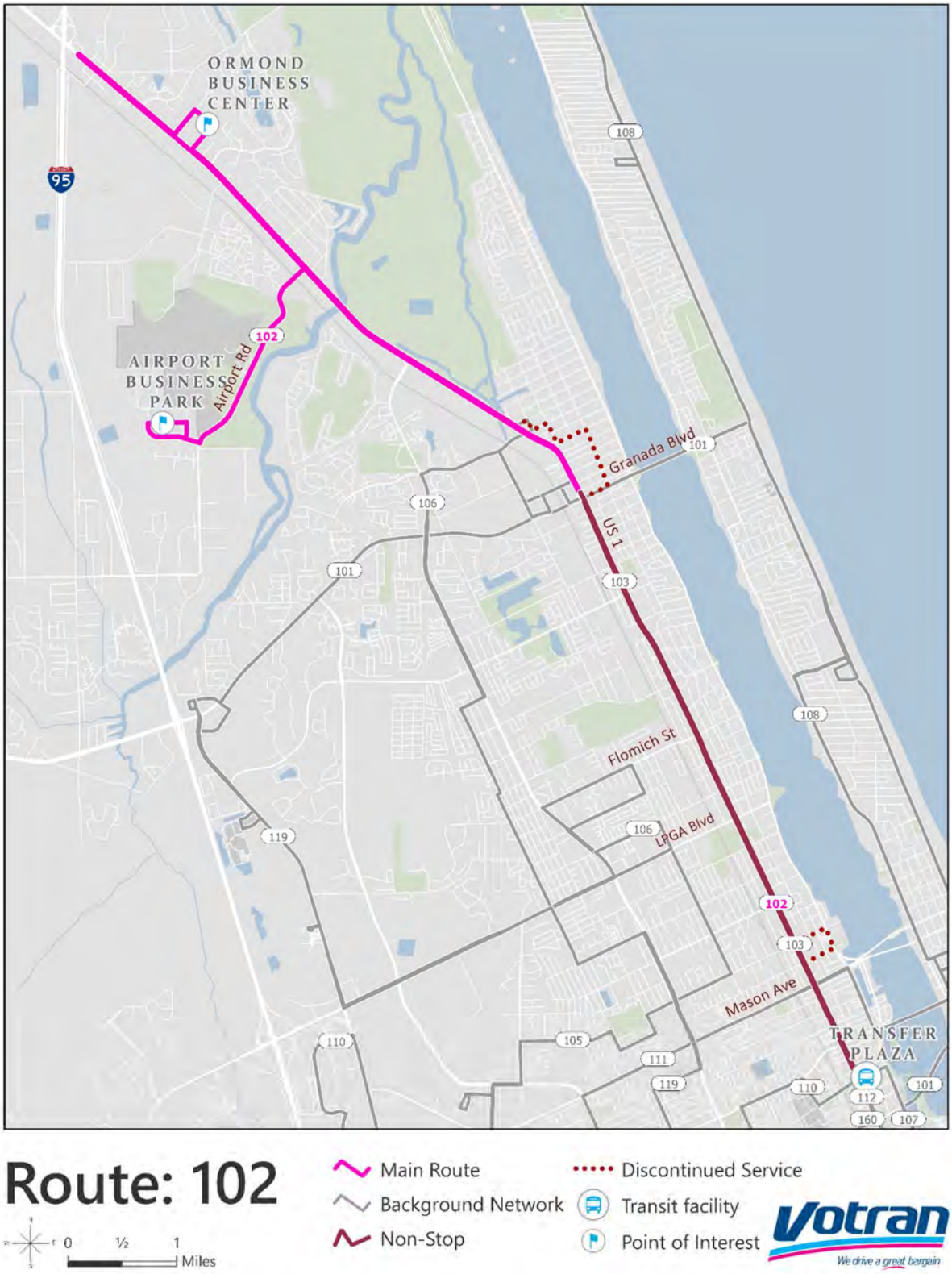
Reduced Service

Same as Baseline Service.

Significantly Reduced Service

The Route 102 would not operate in the “Significantly Reduced Service” scenario.

Figure 35: Route 102



Route 103

The Route 103 replaces and streamlines the current Route 3. The proposed route would operate along U.S. 1/Ridgewood Avenue/Yonge Street north from the Transfer Plaza to the Thompson Creek bus stop near Lincoln Avenue. The current Route 3 service north of Granada Boulevard along the "A" and "B" route segments are not served by the proposed Route 103.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. - 10:00 P.M.	60	60	60
Holiday	7:00 A.M. - 10:00 P.M.	60	60	60

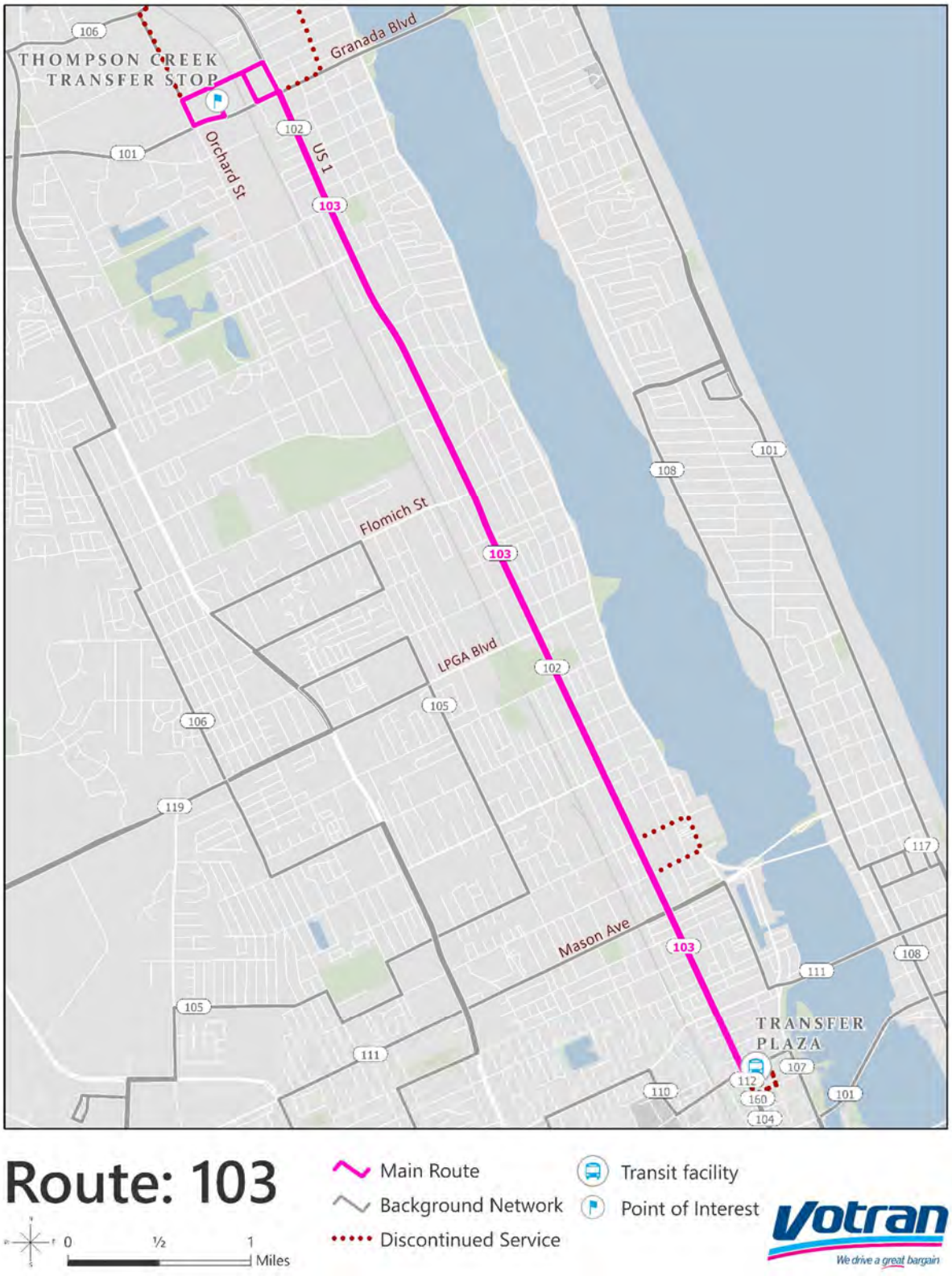
Reduced Service

Same as Baseline Service.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. - 7:00 P.M.	60	60	60
Holiday	7:00 A.M. - 7:00 P.M.	60	60	60

Figure 36: Route 103



Route 104

Route 104 is a proposed route that would replace portions of current Routes 4, 12, and 17. The proposed route would serve the South Ridgewood Avenue corridor from the Transfer Plaza to Dunlawton Avenue and continue along Dunlawton Avenue from Ridgewood Avenue to Williamson Boulevard.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. - 10:00 P.M.	30	60	60
Holiday	7:00 A.M. - 10:00 P.M.	60	60	60

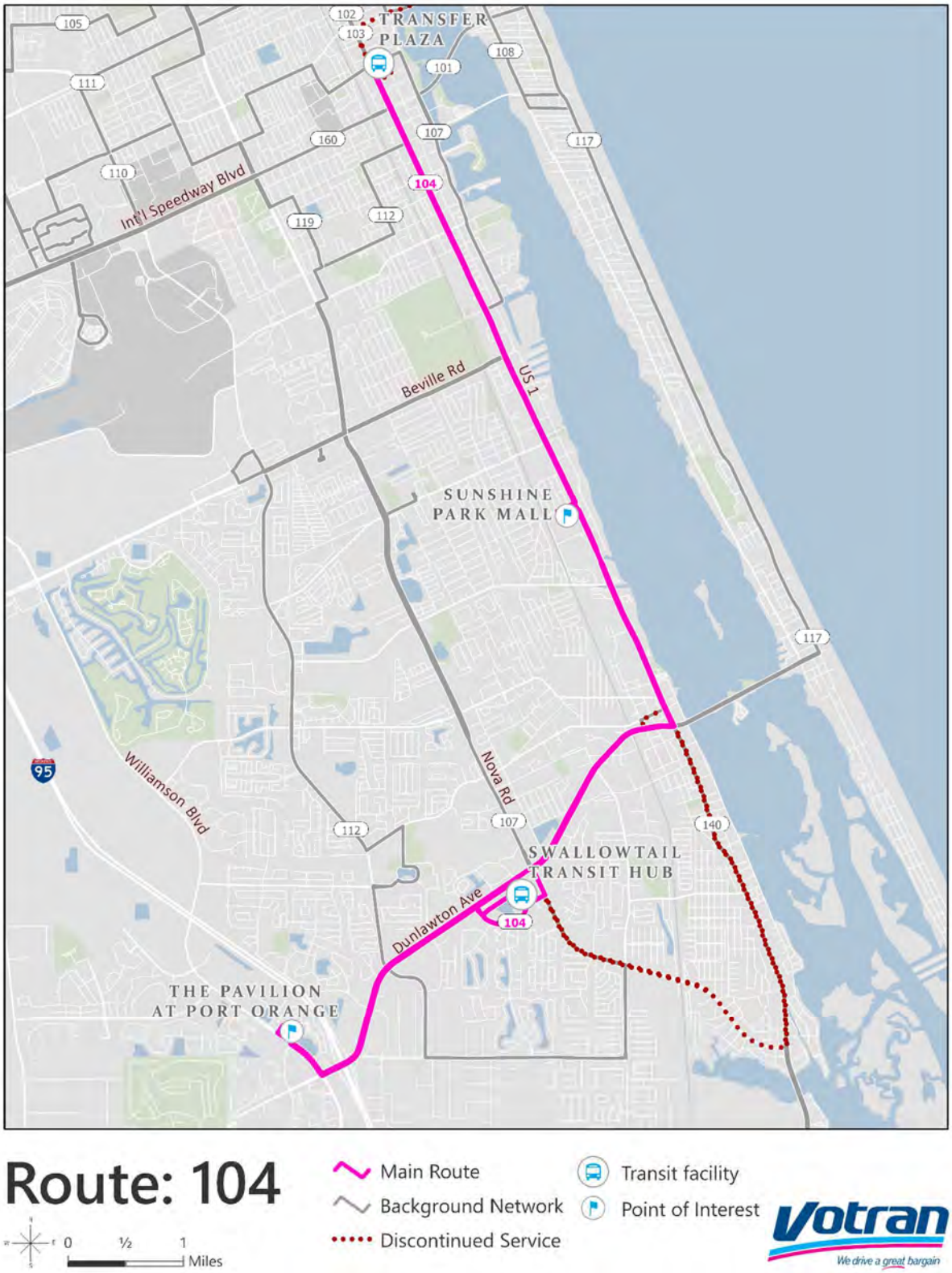
Reduced Service

Same as Baseline Service.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. - 7:00 P.M.	30	60	60
Holiday	7:00 A.M. - 7:00 P.M.	60	60	60

Figure 37: Route 104



Route 105

The Route 105 of the proposed route network would replace locations that are currently served by Route 5 in the Holly Hill area and Route 11 in areas north of Volusia Mall. The routes end points are at Flomich Street and Nova Road on the north end, running to Volusia Mall. The route would serve portion of Center Street, 3rd Street, and Bill France Boulevard. Key destinations along the route are the Volusia County Health Department and Daytona Beach Health and Rehab. The costs of this route in some scenarios presumes an interline at Volusia Mall with Route 111.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. – 6:30 P.M.	60	60	N/A
Saturday	6:30 A.M. – 6:30 P.M.	60	60	N/A
Sunday	No Service			
Holiday	No Service			

On weekdays and Saturdays, Route 105 interlines with Route 111 at Volusia Mall.

Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. – 6:30 P.M.	60	60	60
Saturday	7:30 A.M. – 6:30 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

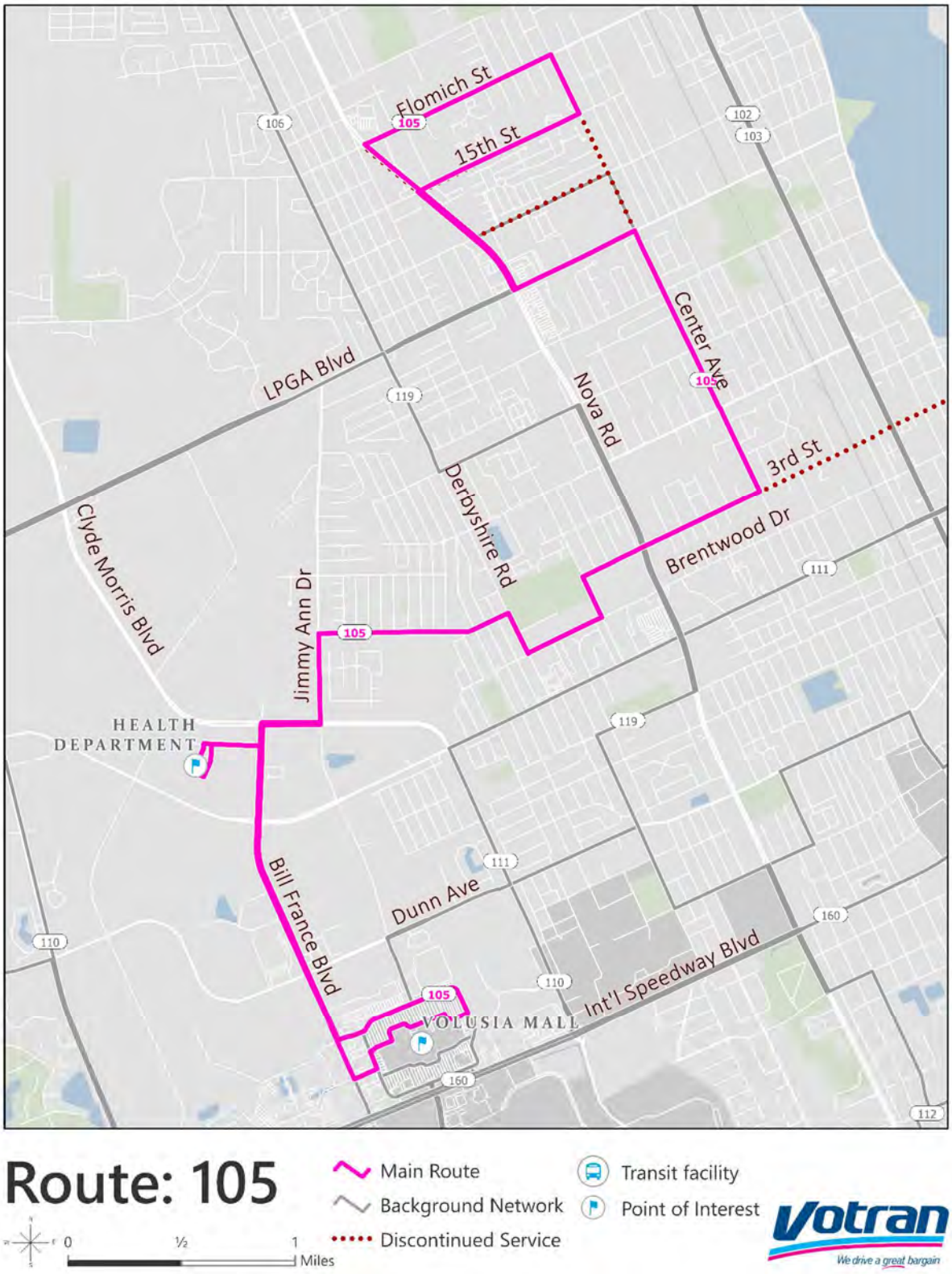
On weekdays, Route 105 interlines with Route 111 at Volusia Mall.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. - 6:00 P.M.	60	60	N/A
Saturday	No Service			
Sunday	No Service			
Holiday	No Service			

Route 105 interlines with Route 111 at Volusia Mall.

Figure 38: Route 105



Route 106

The proposed Route 106 would provide service generally along North Nova Road from Mason Avenue to Willmette Avenue. Many of these areas are generally served by the current Route 6, but Route 106 would operate mostly on Nova Road. The route also serves the Ormond Beach Performing Arts Center and the Ormond Beach Senior Center which are currently served by Route 3.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. – 7:00 P.M.	60	60	60
Saturday	7:30 A.M. – 7:00 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

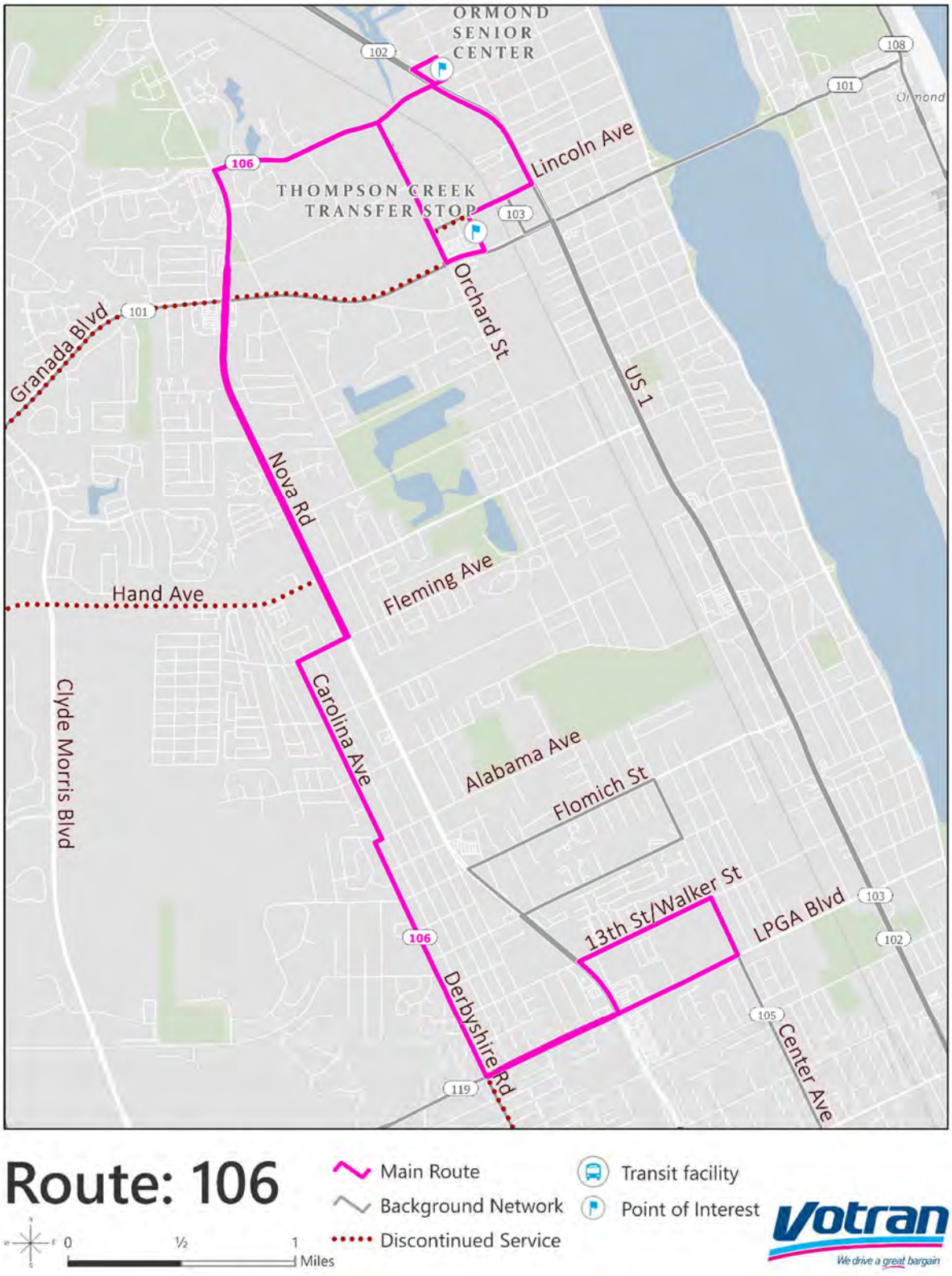
Reduced Service

Same as Baseline Service.

Significantly Reduced Service

Same as Baseline Service.

Figure 39: Route 106



Route 107

The Route 107 of the proposed route network connect the Transit Plaza with the Swallowtail Drive transfer location in Port Orange. The route would also serve the Votran Operations Center along Big Tree Road in South Daytona. The route would replace the current northern portion of Route 12 and the service along Nova Road currently served by Route 107. With some scenarios where the route operates every 60 minutes, the cost calculation includes an interline with Route 160 at the Transfer Plaza.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. - 10:00 P.M.	60	60	60
Holiday	7:00 A.M. - 10:00 P.M.	60	60	60

Interlines with Route 160 on Sundays and holidays.

Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. - 10:00 P.M.	60	60	60
Holiday	7:00 A.M. - 10:00 P.M.	60	60	60

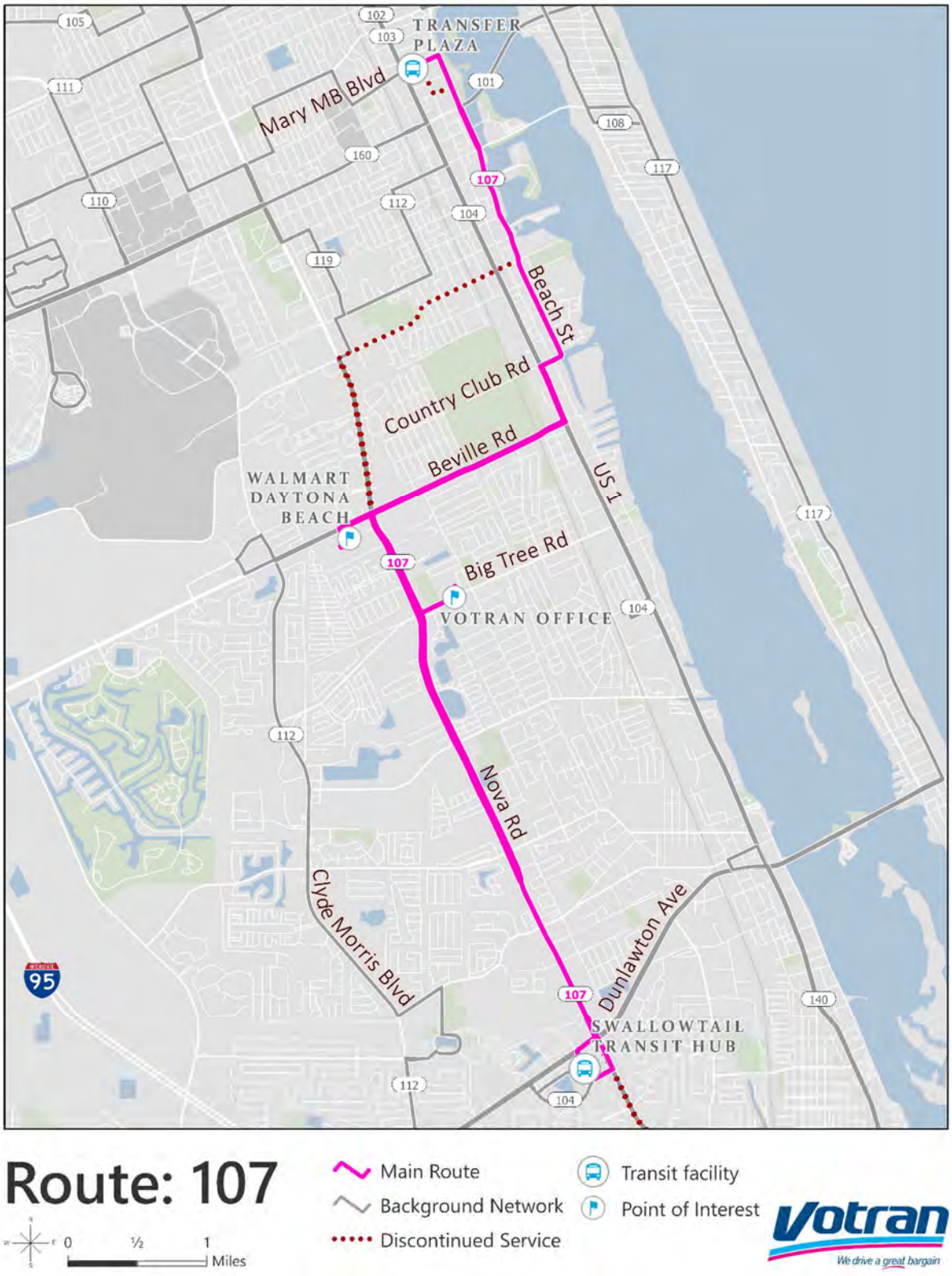
Evening service does not operate south of Beville Wal-Mart. Routes 4 or 12 provide service to Swallowtail Transfer Center. Interlines with Route 160 on Sundays and holidays.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	60	60	60
Sunday	No Service			
Holiday	No Service			

Evening service does not operate south of Beville Wal-Mart. Routes 4 or 12 provide service to Swallowtail Transfer Center. Saturday service interlines with Route 160.

Figure 40: Route 107



Route 108

The proposed Route 108 would replace the current Route 8 and the northernmost segments of Route 1. The route is designed to function as a circulator on the barrier island with a mid-line stop at the Intermodal Transit Facility in Daytona Beach. The route would operate along Peninsula Drive and Halifax Drive south of Bellair Plaza and along Atlantic Avenue north of this location.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. – 7:00 P.M.	60	60	60
Saturday	7:30 A.M. – 7:00 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

Reduced Service

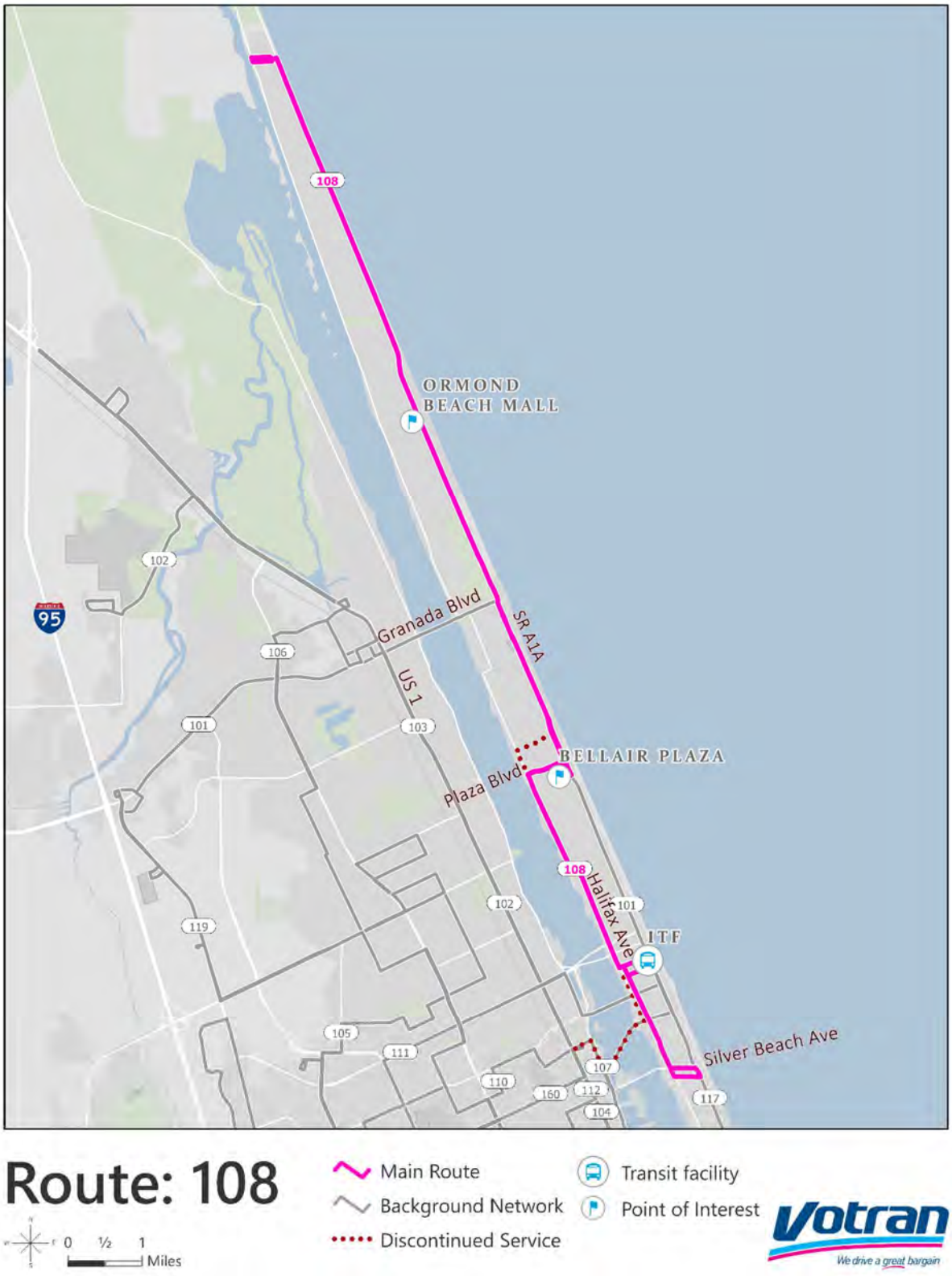
Same as Baseline Service.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. – 7:00 P.M.	60	60	60
Saturday	7:30 A.M. – 7:00 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

Route north of Belair Plaza does not operate on Saturdays.

Figure 41: Route 108



Route 110

The current Route 10 would be replaced with the proposed Route 110. From the Transfer Plaza to Volusia Mall the proposed route is nearly identical to the former route. Unlike the current route, the Route 110 would continue west to serve location currently served by Route 11 along International Speedway Boulevard and Williamson Boulevard. Along with the mall, major destinations include the Tanger Outlet Mall, Halifax Medical Center, and the Daytona Flea and Farmers Market when this location is open Friday through Sunday.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. - 10:00 P.M.	60	60	60
Holiday	7:00 A.M. - 10:00 P.M.	60	60	60

Service to Williamson operates every hour during peak and midday periods weekday and Saturday. Service to Williamson ends at 10:00 P.M. weekdays and Saturdays and 8:00 P.M. Sundays. Friday and weekend service includes a deviation to the Flea Market once per hour.

Reduced Service

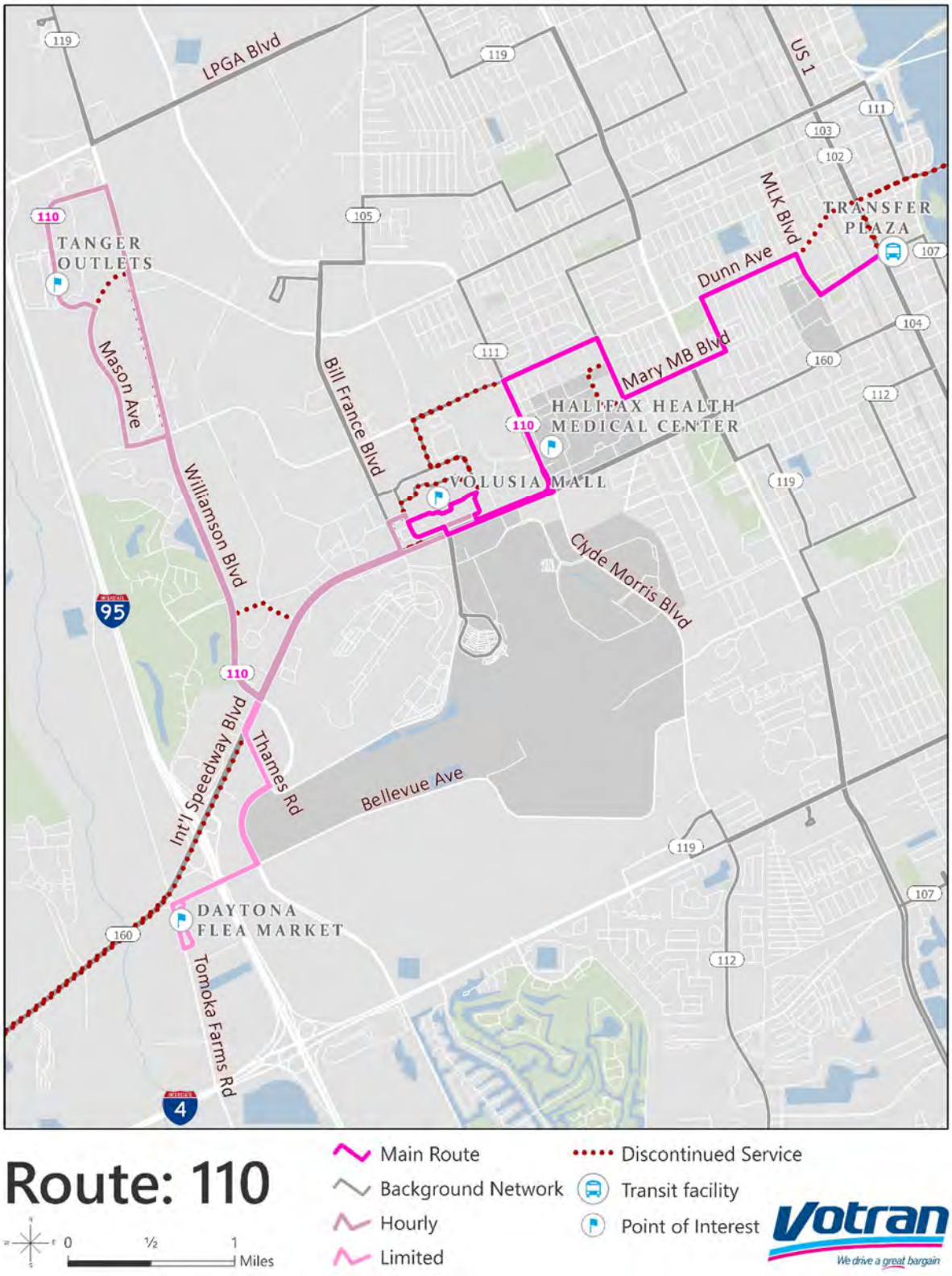
Same as Baseline Service.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. - 7:00 P.M.	60	60	60
Holiday	7:00 A.M. - 7:00 P.M.	60	60	60

Service to Williamson operates every hour during peak and midday periods weekday and Saturday. Service to Williamson ends at 10:00 P.M. weekdays and Saturdays. Friday and weekend service includes a deviation to the Flea Market once per hour.

Figure 42: Route 110



Route 111

Portions of current Routes 11, 18, and 19 is recommended to be replaced by the proposed Route 111. This route serves the Mason Avenue corridor from the Halifax River to Clyde Morris Boulevard. Unlike the current Route 11, this route would serve the Intermodal Transit Facility in Daytona Beach as opposed to the Transfer Plaza. Similar to current Routes 18 and 19 this route would link hotels and attractions near the Ocean Walk Shoppes directly with Daytona Beach International Airport.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – 10:00 P.M.	30	30	60
Saturday	6:30 A.M. – 10:00 P.M.	30	30	60
Sunday	7:00 A.M. – 8:00 P.M.	60	60	60
Holiday	7:00 A.M. – 8:00 P.M.	60	60	60

Service to the airport operates every hour during weekday peak and midday periods. On weekdays and Saturdays, route terminating at Volusia Mall interlines with Route 105.

Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – 10:00 P.M.	30	30	60
Saturday	6:30 A.M. – 10:00 P.M.	60	60	60
Sunday	7:00 A.M. – 8:00 P.M.	60	60	60
Holiday	7:00 A.M. – 8:00 P.M.	60	60	60

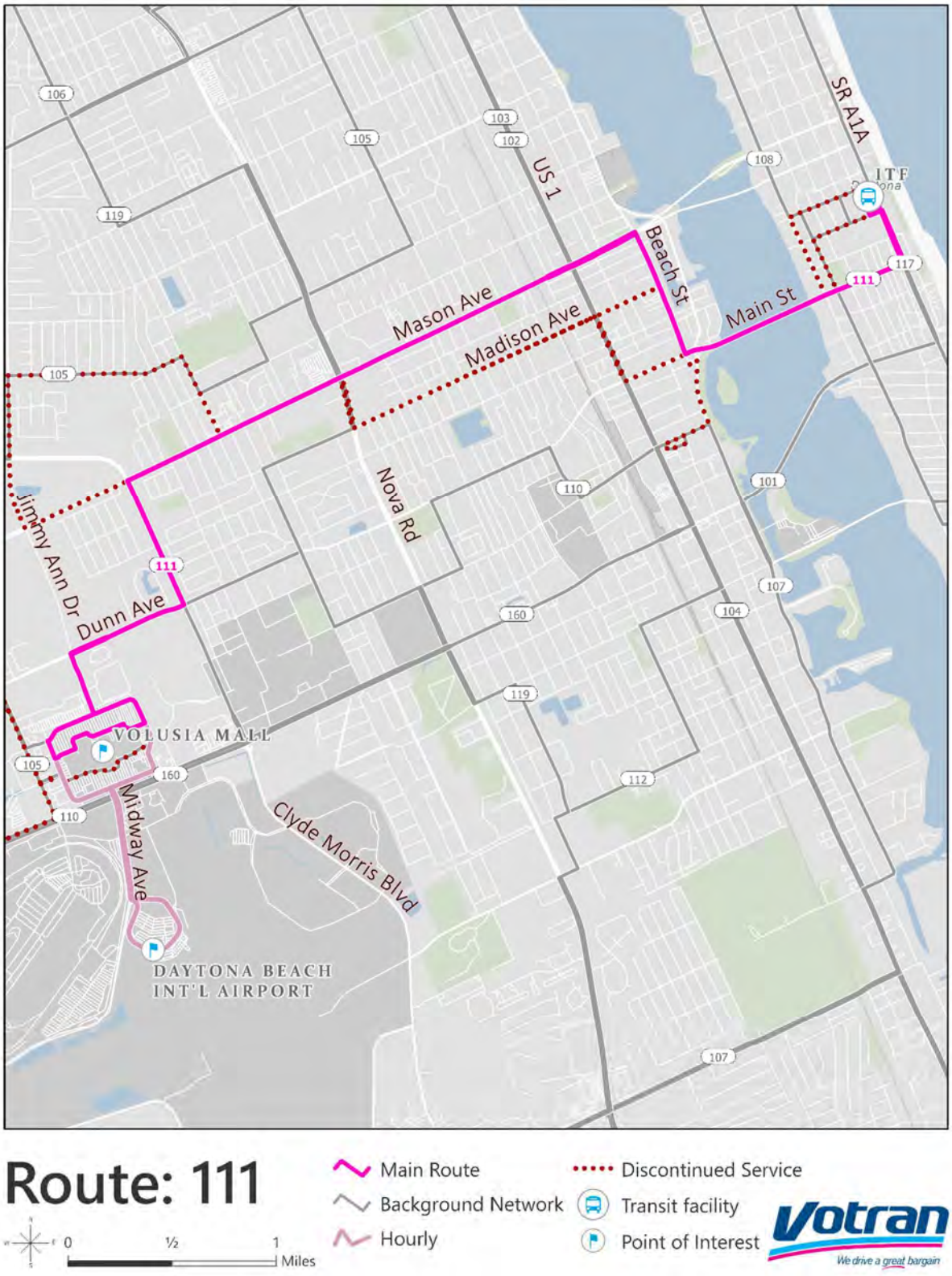
Service to the airport operates every hour during weekday peak and midday periods. On weekdays, route terminating at Volusia Mall interlines with Route 105.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – 10:00 P.M.	30	30	60
Saturday	6:30 A.M. – 10:00 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

Service to the airport operates every hour during weekday peak and midday periods. On weekdays, route terminating at Volusia Mall interlines with Route 105.

Figure 43: Route 111



Route 112

Portions of the current Routes 7, 12, and 15 are recommended to be replaced with Route 112. This route would serve the residential areas near Martin Luther King Boulevard and South Street currently along Route 15 and link them to commercial areas along Beville Road and Clyde Morris Boulevard. The route would also serve locations along Taylor Road and Spruce Creek Drive currently served by Route 7.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	60	60	60
Sunday	7:00 A.M. – 8:00 P.M.	60	60	60
Holiday	7:00 A.M. – 8:00 P.M.	60	60	60

Service south of Beville Wal-Mart to Swallowtail Transit Center operates every hour during weekday peak and midday periods. This portion of service ends at 9:30 P.M. weekdays and Saturdays.

Reduced Service

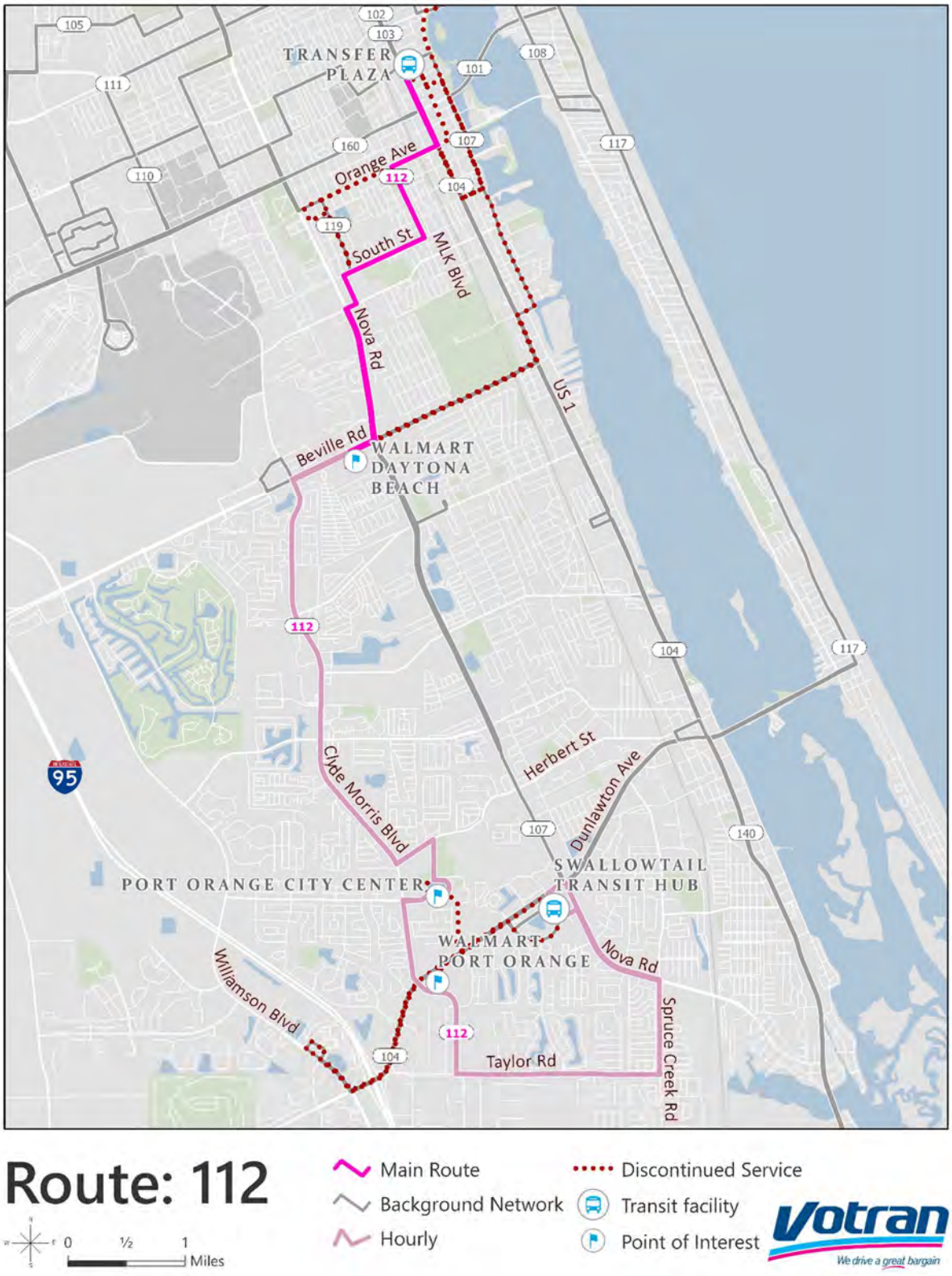
Same as Baseline Service.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	60	60	60
Sunday	7:00 A.M. – 7:00 P.M.	60	60	60
Holiday	7:00 A.M. – 7:00 P.M.	60	60	60

Service south of Beville Wal-Mart to Swallowtail Transit Center operates every hour during weekday and Saturday peak and midday periods. This portion of service ends at 8:30 P.M. weekdays and Saturdays and does not operate on Sunday or holiday.

Figure 44: Route 112



Route 117

The proposed Route 117 would take the place of current Route 17. The proposed route follows the routing of the current Route 17N or 17S, which are more streamlined services that the Route 17 which operates weekdays and Saturdays. A notable change to the route is the termination of service south of Dunlawton along Atlantic Avenue to the Marine Science Center at Ponce Inlet.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. - 10:00 P.M.	30	60	60
Holiday	7:00 A.M. - 10:00 P.M.	60	60	60

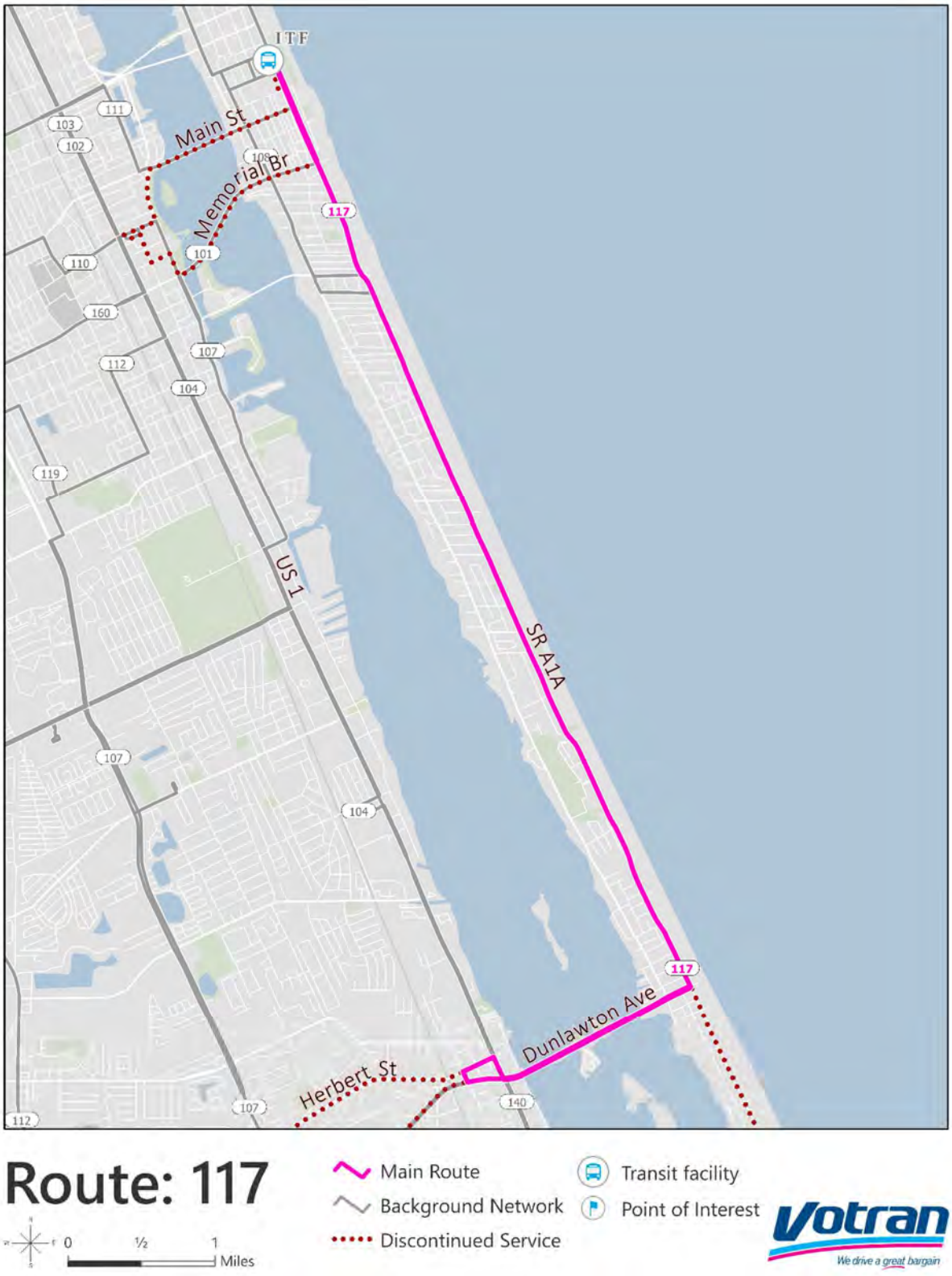
Reduced Service

Same as Baseline Service.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – Midnight	30	30	60
Saturday	6:30 A.M. - Midnight	30	30	60
Sunday	7:00 A.M. -7:00 P.M.	30	60	60
Holiday	7:00 A.M. - 7:00 P.M.	60	60	60

Figure 45: Route 117



Route 119

The proposed Route 119 would serve portions of North Williamson Boulevard, Derbyshire Road, and Nova Road. The route replaces portions of current Routes 6, 18, and 19, and serves as a crosstown route linking South Daytona to Ormond Beach without running through the Transfer Plaza. The route was extended to the west along Beville Road on its southern end in order that any layover on this end of the route is in a safer location than current stops along Beville Road.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. – 9:30 P.M.	60	60	60
Saturday	7:30 A.M. – 9:30 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

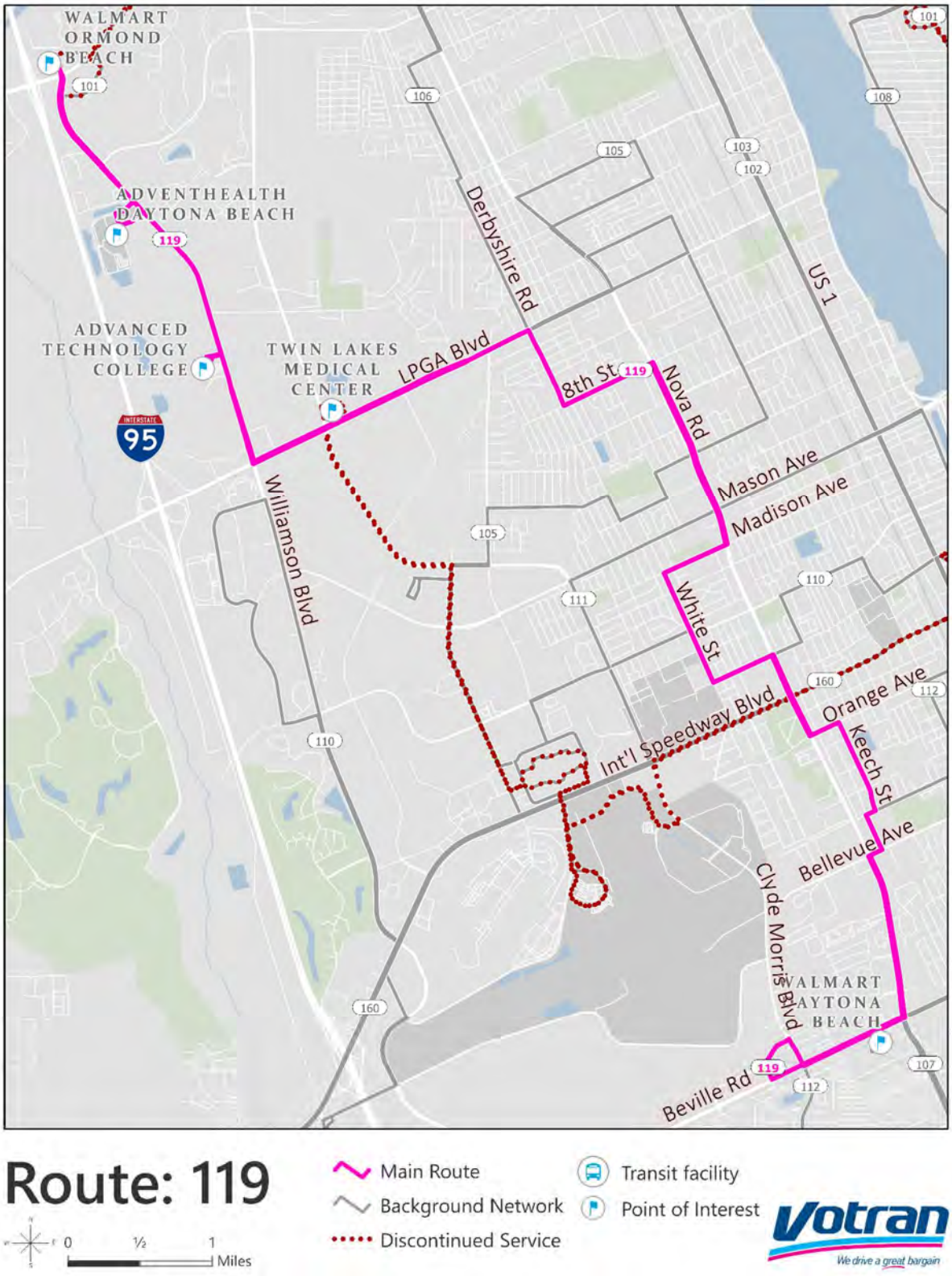
Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. – 7:30 P.M.	60	60	60
Saturday	7:30 A.M. – 7:30 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

Significantly Reduced Service

Same as Reduced Service.

Figure 46: Route 119



Route 120

The recommended Route 120 is a replacement to current Route 20, generally serving the north-south corridor of U.S. Highway 17/92 in Western Volusia County. Like the current Route 20, the route operates from the transfer location along Amelia Avenue in DeLand to the Market Place Shopping Center in Orange City. The proposed route is somewhat streamlined within DeLand when compared with the current Route 20.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. – 7:00 P.M.	60	60	60
Saturday	7:30 A.M. – 7:00 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

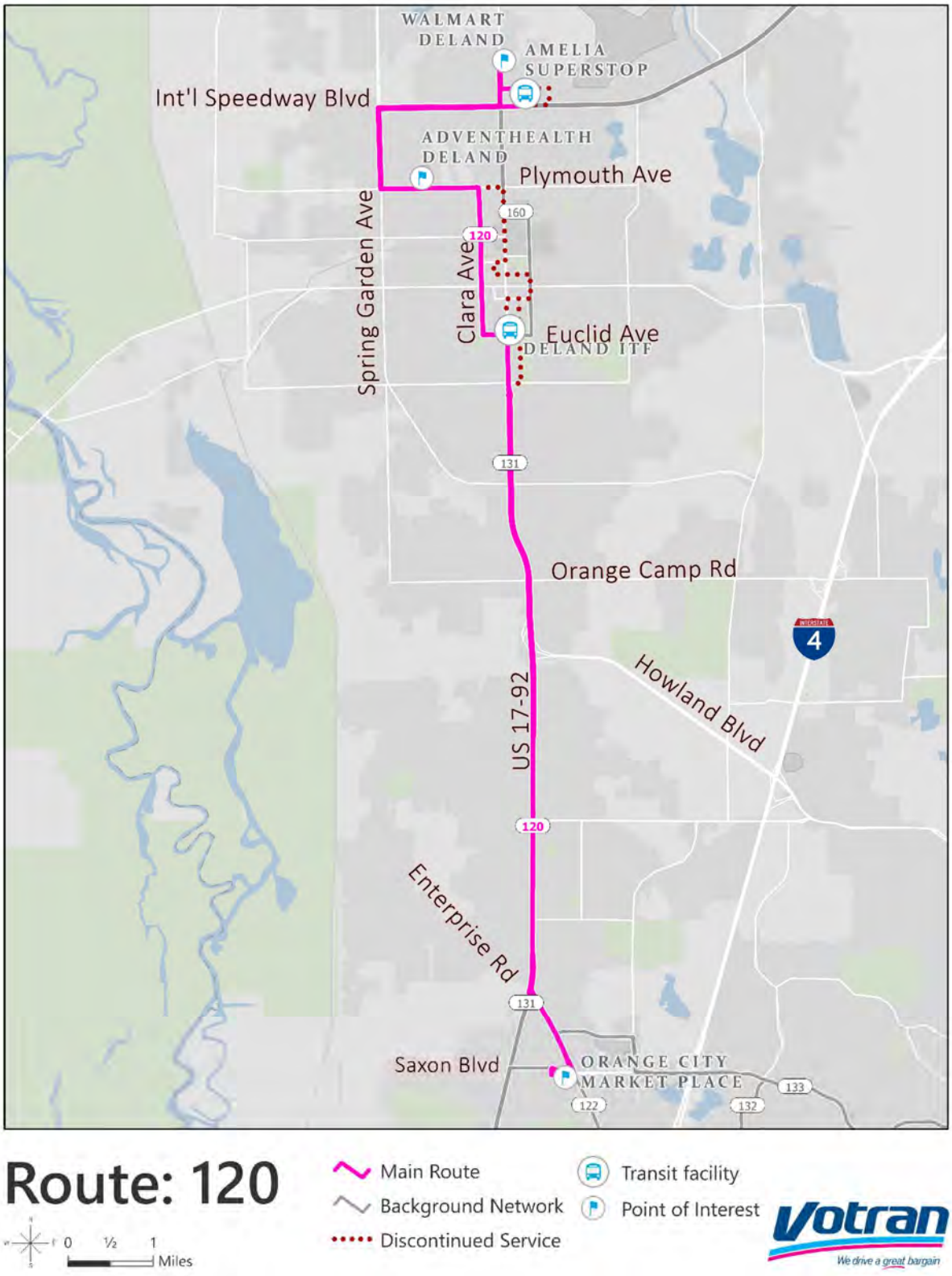
Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	7:30 A.M. – 7:00 P.M.	60	60	60
Saturday	7:30 A.M. – 7:00 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	7:30 A.M. – 7:00 P.M.	60	60	60
Saturday	7:30 A.M. – 6:00 P.M.	60	60	N/A
Sunday	No Service			
Holiday	No Service			

Figure 47: Route 120



Route 122

The proposed Route 122 is one of two fixed routes proposed for Deltona. A significant change to the service within Deltona as compared to the current operation is the conversion of existing loop Routes 21 and 22 to two-direction service. Due to budget limits, this route maintains the current 120-minute headway or those routes. A goal would be the eventual reduction of headways to 60 minutes. This does result in some Deltona Street segments losing service. Route 122 operates from Market Place Shopping Center in Orange City to the Osteen Wal-Mart.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. – 7:00 P.M.	120	120	120
Saturday	7:30 A.M. – 7:00 P.M.	120	120	120
Sunday	No Service			
Holiday	No Service			

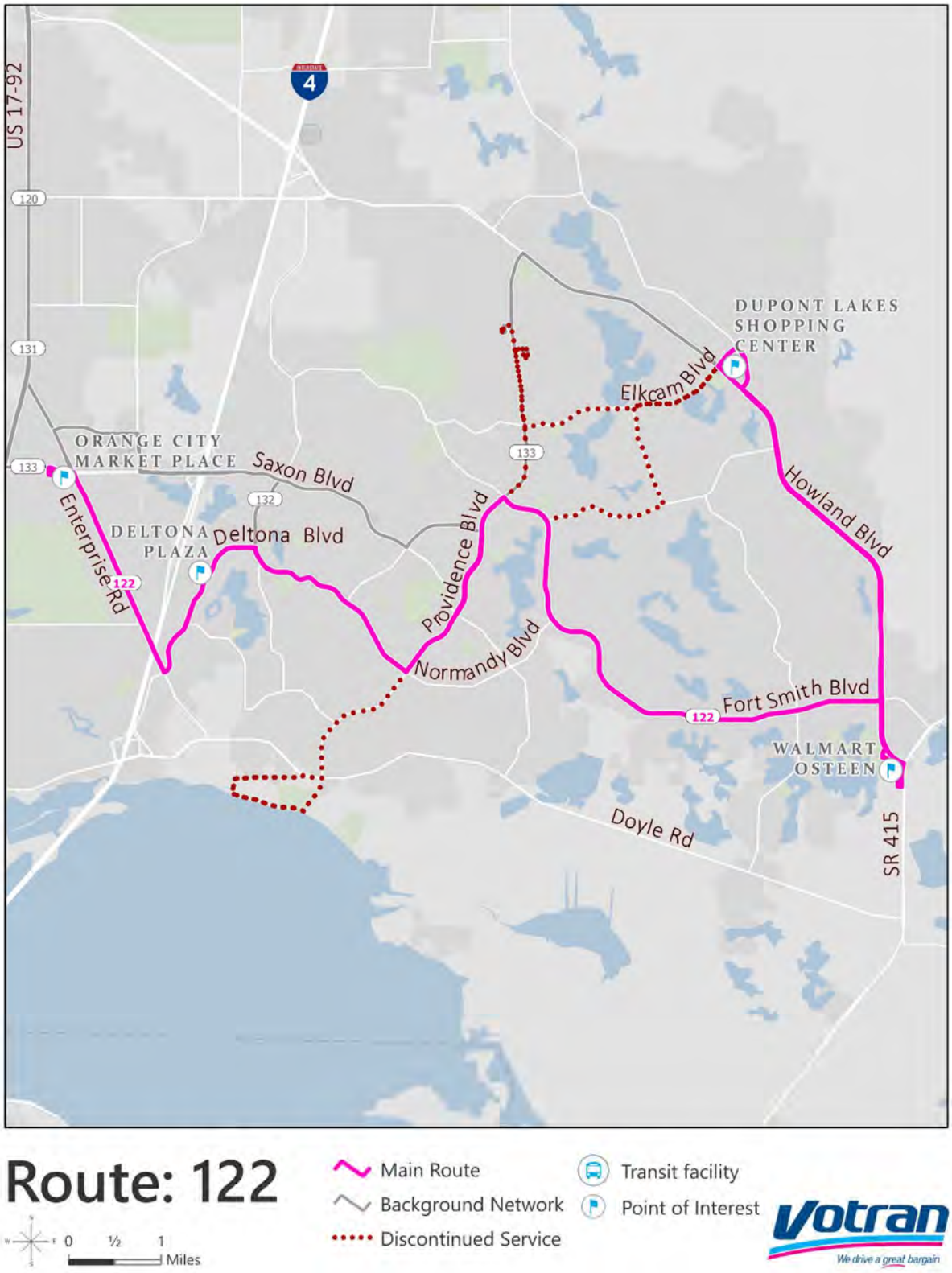
Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	7:30 A.M. – 7:00 P.M.	120	120	120
Saturday	7:30 A.M. – 7:00 P.M.	120	120	120
Sunday	No Service			
Holiday	No Service			

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	7:30 A.M. – 7:00 P.M.	120	120	120
Saturday	7:30 A.M. – 6:00 P.M.	120	120	N/A
Sunday	No Service			
Holiday	No Service			

Figure 48: Route 122



Route 131

The proposed Route 131 is a replacement route to the current Route 31, funded by the Florida Department of Transportation as a feeder bus service from DeLand and Orange City to the DeBary SunRail Station. The only change recommended from the former route is to adjust the northern end of line location to the DeLand Intermodal Transit Facility. This change also allows the non-stop or deadhead portions of the current Route 131 schedule to be discontinued.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	4:30 A.M. – 8:30 A.M.; 3:30 P.M. – 8:30 P.M.	30	No Service	
Saturday	No Service			
Sunday	No Service			
Holiday	No Service			

Service span is directional. Start and end times for each direction varies.

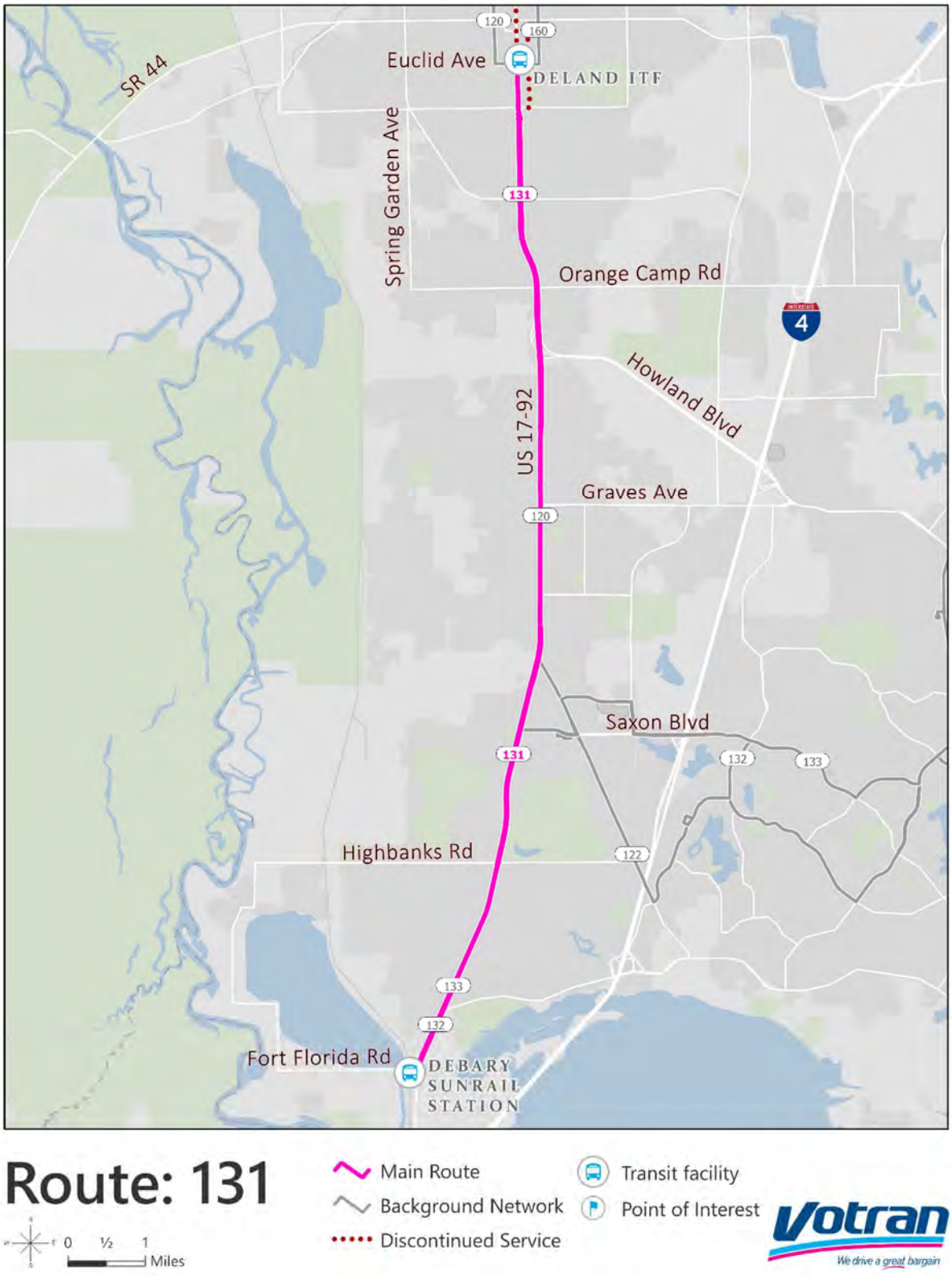
Reduced Service

Same as Baseline Service.

Significantly Reduced Service

Same as Baseline Service.

Figure 49: Route 131



Route 132

The proposed Route 132 is an exact replacement of the current Route 32. There would be no change to route, service span, or frequency, although some trip times may need to be adjusted to ensure optimum operation with other SunRail feeder routes, especially Route 133.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:30 A.M. – 9:30 A.M.; 3:30 P.M. – 7:30 P.M.	60	No Service	
Saturday	No Service			
Sunday	No Service			
Holiday	No Service			

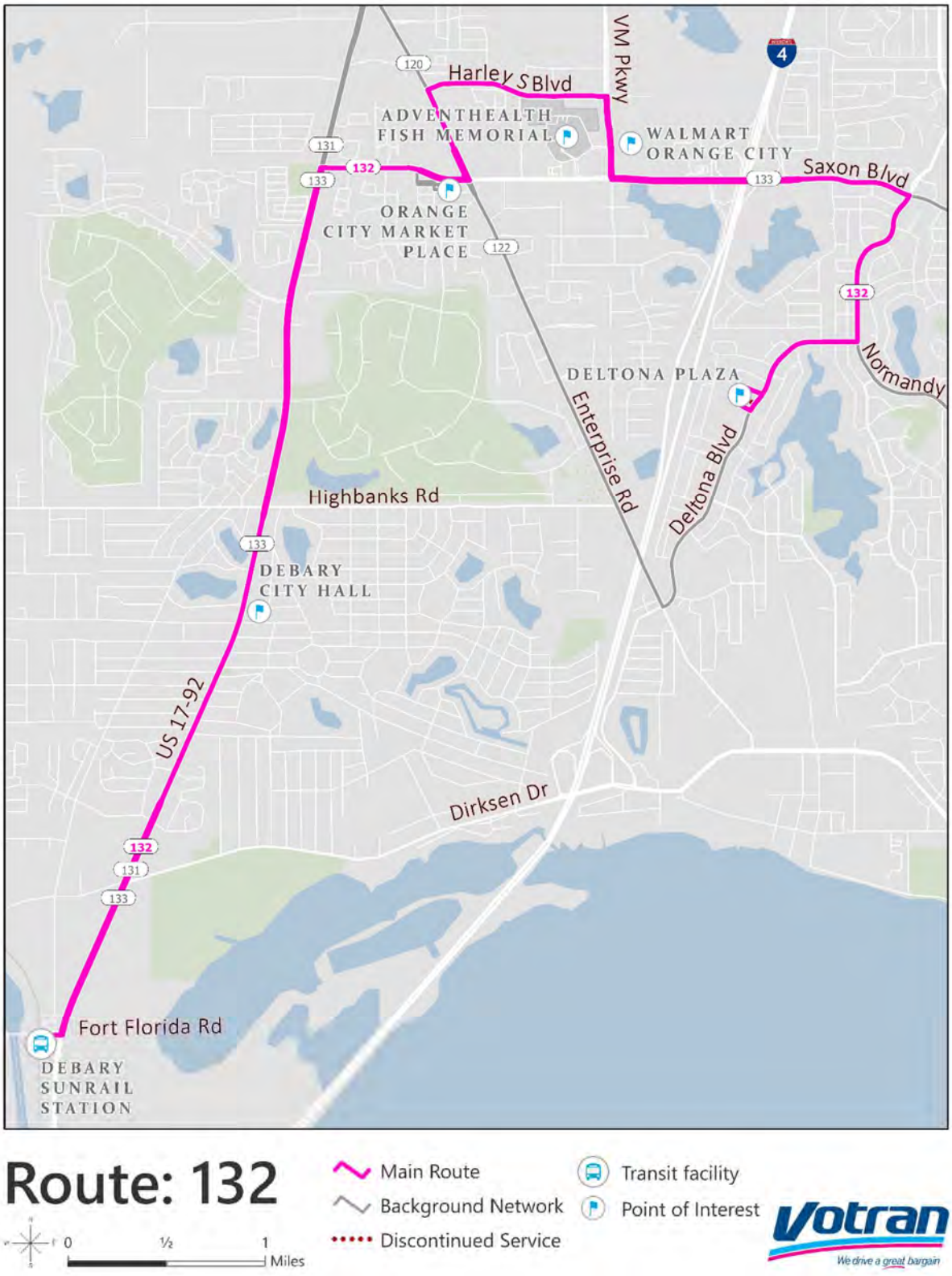
Reduced Service

Same as Baseline Service.

Significantly Reduced Service

Same as Baseline Service.

Figure 50: Route 132



Route 133

The proposed Route 133 would generally follow the same path as the existing Route 33. A major distinction between the recommended route with what operates today is the inclusion of midday service, allowing customers to access the SunRail during off-peak periods. During off-peak times, the route would also deviate to more directly serve the Market Place Shopping Center, Deltona City Hall, and the Deltona Public Library. This route would operate on Saturday, although the service would not operate south of Angeles Road on these days.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:00 A.M. – 7:00 P.M.	60	60	60
Saturday	7:30 A.M. – 7:00 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

Weekday service span is directional. Start and end times for each direction varies. Saturday service does not operate south of DeBary City Hall.

Reduced Service

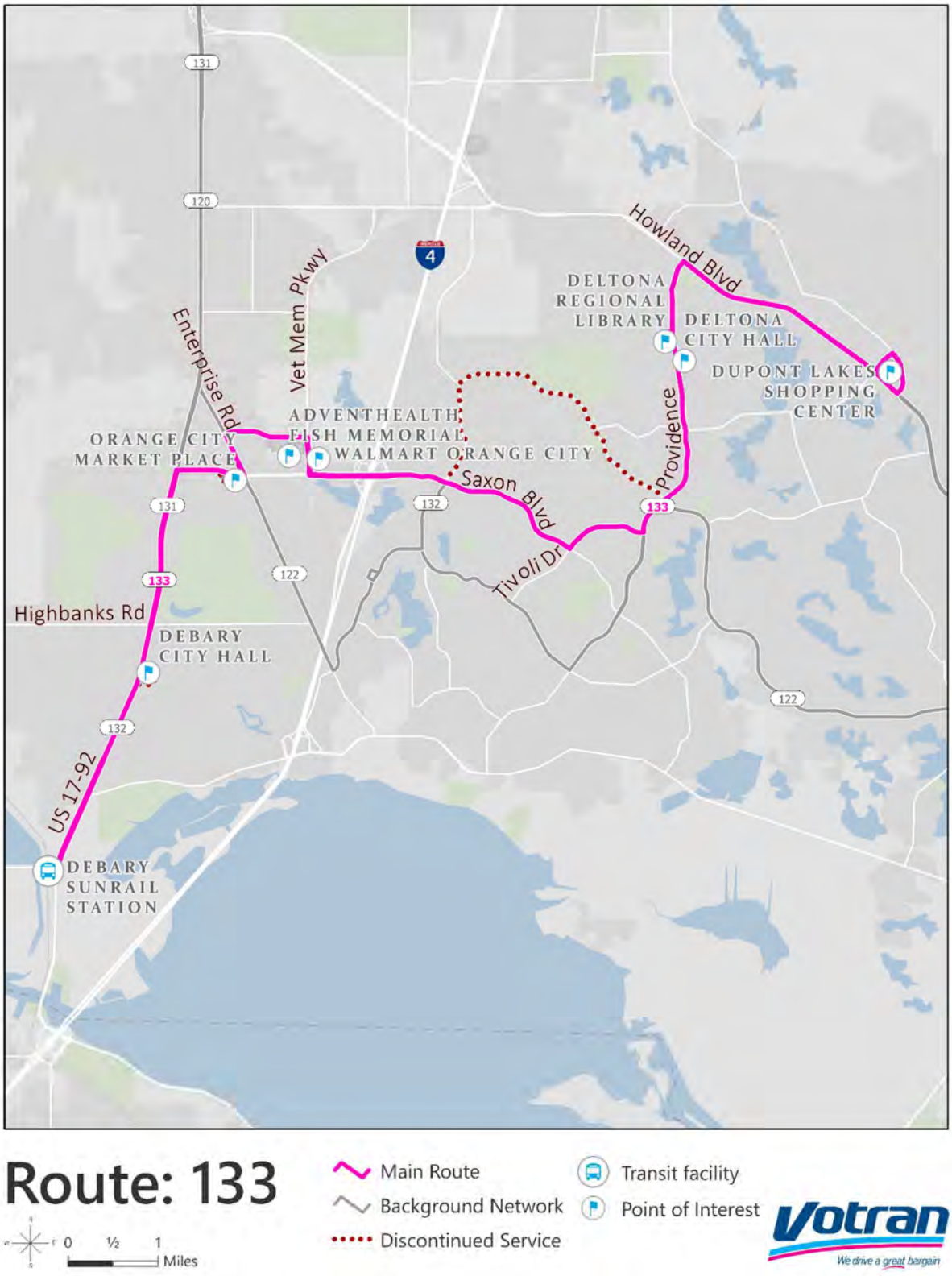
Same as Baseline Service.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	5:00 A.M. – 7:00 P.M.	60	60	60
Saturday	7:30 A.M. – 6:00 P.M.	120	120	N/A
Sunday	No Service			
Holiday	No Service			

Weekday service span is directional. Start and end times for each direction varies. Saturday service does not operate south of DeBary City Hall.

Figure 51: Route 133



Route 140

The proposed Route 140 would serve New Smyrna Beach and connect this community with Port Orange, from where customers could transfer to Routes 4 or 17 to travel to other locations in the service area including the Transfer Plaza or Daytona Beach Intermodal Transit Center. This route would replace Route 40, although the proposed route modifies the northern loop into two-way service ending at Ridgewood Avenue and Dunlawton Avenue.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. – 7:00 P.M.	60	60	60
Saturday	7:30 A.M. – 7:00 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

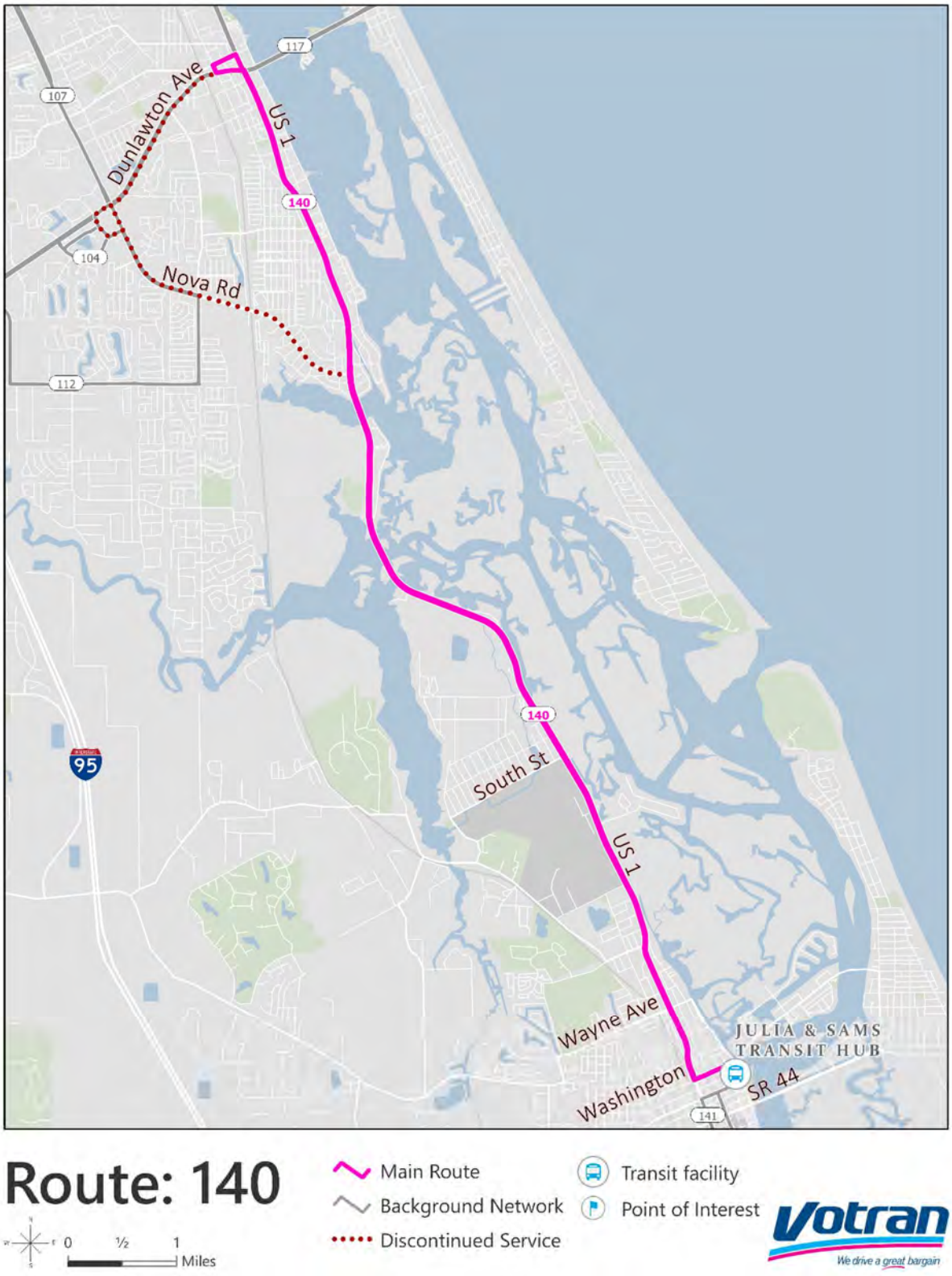
Reduced Service

Same as Baseline Service.

Significantly Reduced Service

Same as Baseline Service.

Figure 52: Route 140



Route 141

The proposed Route 141 would replace current Routes 41. Changes to the route are limited to the elimination of lower performing service to Oak Hill. The schedules on the three trips that serve Oak Hill have very little layover time. Baseline service is similar to current service levels while Saturday service is discontinued if more reduced scenarios are implemented.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. – 7:00 P.M.	60	60	60
Saturday	7:30 A.M. – 7:00 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

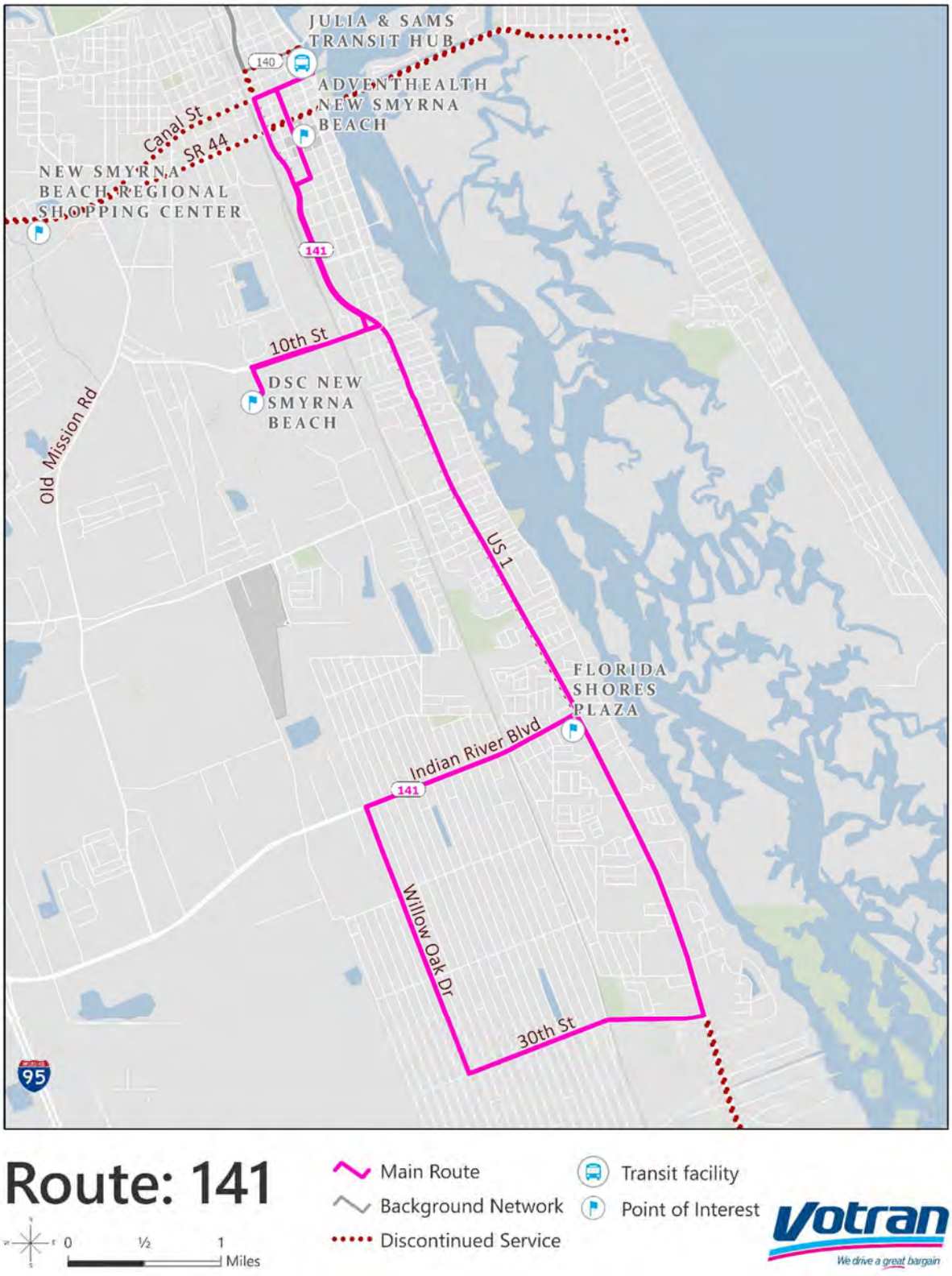
Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:30 A.M. - 6:00 P.M.	60	60	N/A
Saturday	No Service			
Sunday	No Service			
Holiday	No Service			

Significantly Reduced Service

Same as Reduced Service.

Figure 53: Route 141



Route 160

The current Route 60 links East and West Volusia County together. In a similar way, the Route 160 would perform the same function and is mostly the same route. The only modification is within DeLand, the proposed Route 160 operates to the DeLand Intermodal Facility using Woodland Boulevard and Amelia Avenue from the current route terminus just north of International Speedway Boulevard. For some periods, the route costs presume a route interline with Route 107 at the Transfer Plaza in Daytona Beach.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:00 A.M. – 7:00 P.M.	30	30	60
Saturday	7:00 A.M. – 7:00 P.M.	30	30	60
Sunday	7:00 A.M. – 7:00 P.M.	60	60	60
Holiday	7:00 A.M. – 7:00 P.M.	60	60	60

Sunday and holiday service does not operate west of Volusia Jail. Interlines with Route 107 on Sundays and holidays.

Reduced Service

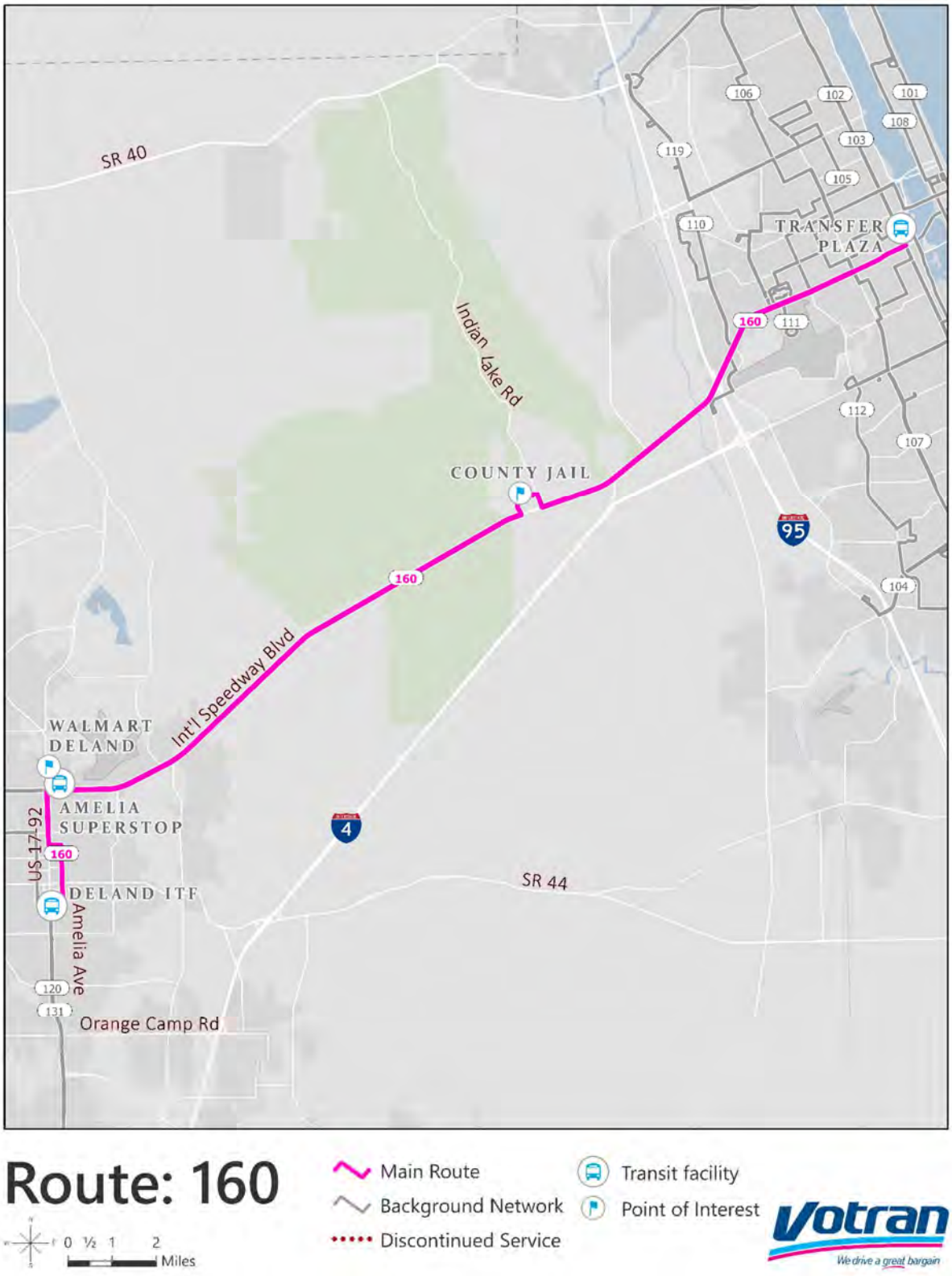
Same as Baseline Service.

Significantly Reduced Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:00 A.M. – 7:00 P.M.	30	30	60
Saturday	7:00 A.M. – 7:00 P.M.	60	60	60
Sunday	7:00 A.M. – 7:00 P.M.	60	60	60
Holiday	7:00 A.M. – 7:00 P.M.	60	60	60

Saturday service interlines with Route 107. Sunday and holiday service does not operate west of Volusia jail.

Figure 54: Route 160



FLEX Route 142

The flex route 142 is the proposed replacement of Route 42. It would have similar operating attributes to the current service, with service span and headway which is the same. The service would provide service in a similar footprint to the existing Flex service, with some adjustments shown in Figure 55. Eventually, the COA foresees existing flex service migrating to Mobility-on-Demand service, which could take several approaches. Our recommendation would be to maintain regular service to the Julia/Sams transfer center in New Smyrna Beach.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:45 A.M. – 6:45 P.M.	60	60	60
Saturday	6:45 A.M. – 6:45 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

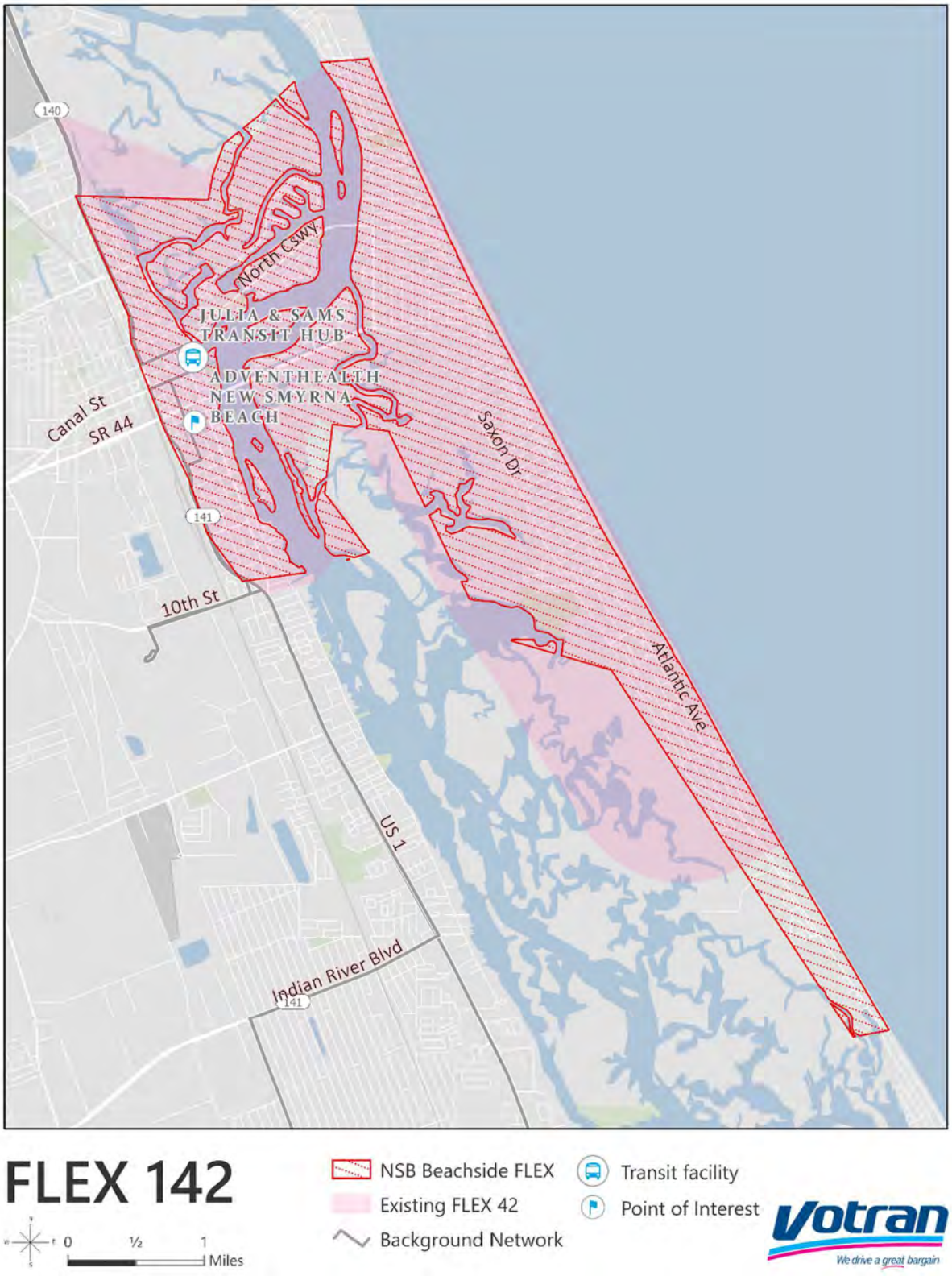
Reduced Service

Same as Baseline Service.

Significantly Reduced Service

Same as Baseline Service.

Figure 55: Flex Route 142



FLEX Route 143

The proposal is for the current flex route 43 to be replaced with a similar service. The proposed Flex Route 143 would also include service west along State Road 44 to the Wal-Mart near Interstate 95. This segment of the route replaces the fixed route service along current Route 44. Like Flex Route 142, the COA recommends the service transitioning eventually to an MOD service with regularly scheduled stops to allow transfers to Routes 140 and 141.

Baseline Service

Service Day	Service Span	Peak Headway	Midday Headway	Evening Headway
Weekday	6:45 A.M. – 6:45 P.M.	60	60	60
Saturday	6:45 A.M. – 6:45 P.M.	60	60	60
Sunday	No Service			
Holiday	No Service			

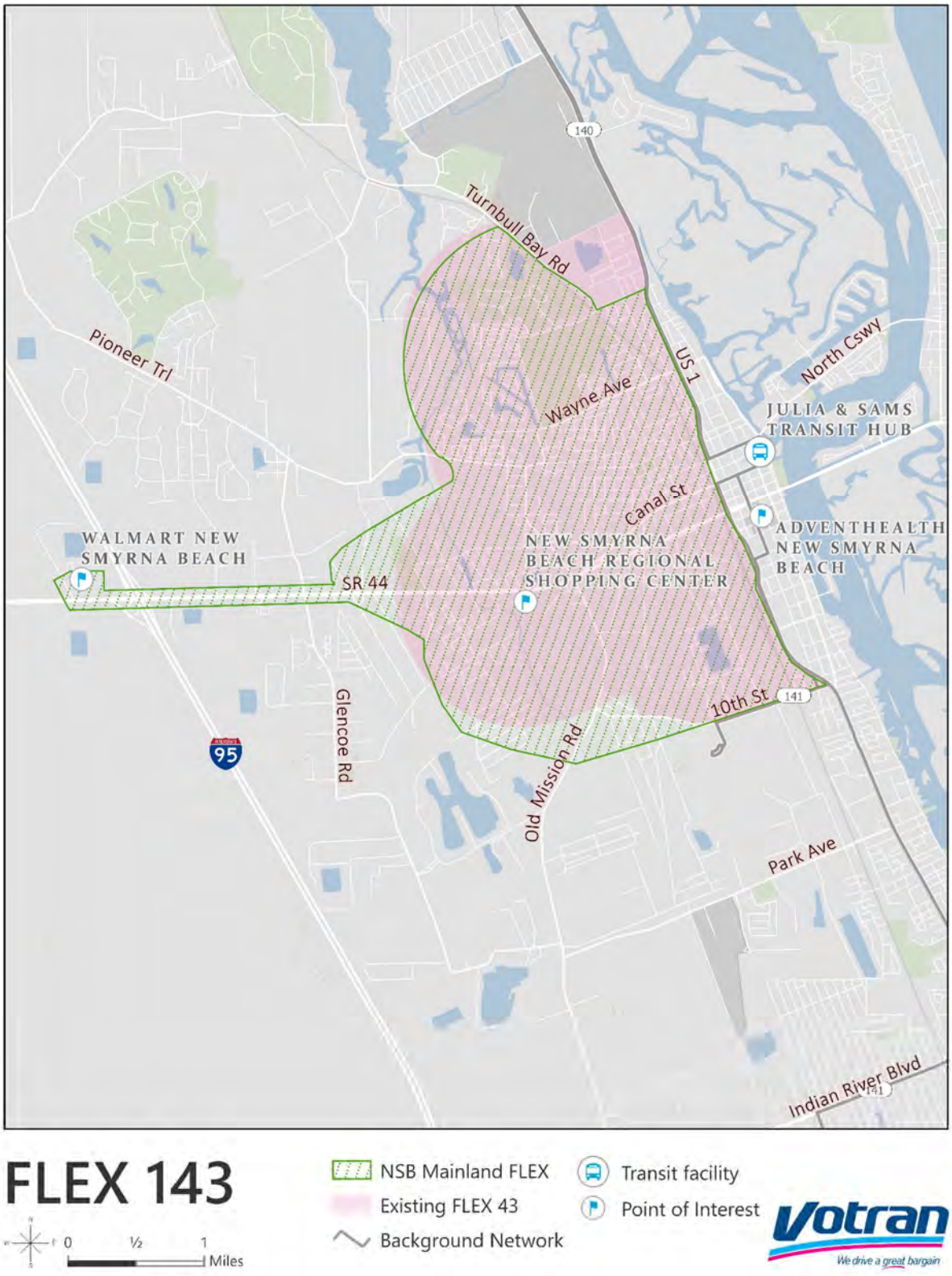
Reduced Service

Same as Baseline Service.

Significantly Reduced Service

Same as Baseline Service.

Figure 56: Flex Route 143



8. Fixed-Route Scenario Costs

Depending on which scenario is selected will determine the annual bus operating costs for the system moving forward. The scenario selected could also influence the capital cost of fixed-route buses, as there are different requirements for each. However, in this case, the peak vehicles are expected to be less than current requirements, so there would be no immediate vehicle capital need associated with implementation of any of the recommended scenarios.

Given the route alignments themselves do not change among the three scenarios, the following two costs should be similar regardless of which scenario is selected. The first is paratransit annual operating costs, which could decrease if the county were to enforce an updated ¾ mile buffer of the fixed route network. The second cost is a capital cost associated with new bus stops along new route segments.

Operating Costs

Fixed Route

The larger component of the costs associated with the proposed transit network are annual operating costs. Each of the three scenarios have differing levels of service, resulting in differences from the 2019 base network. A synopsis of the revenue hours for the scenarios are listed below.

Table 64: Fixed Route Operating Cost Summary

Scenario	Revenue Hours	Cost per Rev. Hour (2021)	Total Bus Operating Cost	Change from 2019	Percentage Change
2019 Network	205,443	$78.74	$16,176,882	--	--
Baseline Scenario	199,521	$78.74	$15,710,284	$-466,298	-2.9%
Reduced Scenario	194,372	$78.74	$15,304,851	$-871,731	-5.4%
Significantly Reduced	184,246	$78.74	$14,507,530	$-1,669,052	-10.3%

2019 hours are calculated based on scheduled service. Cost data is from TDP Financial Plan.

Paratransit

In addition to changes for the fixed route service, there are also expected changes for paratransit costs based on the population within the ADA service area and the hours of service operated. Paratransit cost changes presume the ADA boundary is reassessed when implementing the proposed network, and that the ADA boundary adjusts during service periods based on the service spread of the fixed route system. This would result in fewer weekday and Saturday daytime paratransit trips as less of the population would be within ¾ mile of a fixed route, and an increase in night and Sunday service paratransit trips as the boundary expands during these periods.

Table 65: Paratransit Operating Cost Summary

Scenario	Revenue Hours	Cost per Rev. Hour (2021)	Total Bus Operating Cost	Change from 2019	Percentage Change
2019 Network	167,809	$59.12	$9,920,868	--	--
Baseline Scenario	159,739	$59.12	$9,443,770	$-477,098	-4.8%
Reduced Scenario	159,739	$59.12	$9,443,770	$-477,098	-4.8%
Significantly Reduced	158,968	$59.12	$9,398,188	$-522,680	-5.3%

2019 hours are calculated based on NTD "Typical Weekday" values. Cost data is from TDP Financial Plan.

Capital Costs

Major capital costs associated with implementation of the proposed network are vehicle costs and facility costs. Vehicle costs vary based on the peak requirement of the transit network. As the weekday service does not vary much from scenario to scenario, the vehicle requirements stay the same as well.

Table 66: Revenue Vehicle Requirements by Scenario

Scenario	Maximum Vehicle Requirements
2019 Network	55
Baseline Scenario	47
Reduced Scenario	47
Significantly Reduced	46

For facility capital costs, no new transit centers are required to implement the proposed network, and with no recommended expansion of vehicle needs, current operational facilities should be adequate. There will be required installation of new bus stops with required ADA access added for each. While actual locations of bus stops will require a detailed analysis of locations, it is possible to make estimates based on the new lane miles within the network. New two-way route mileage of 14.7 miles is estimated at various locations throughout the county. In addition, 8.6 miles of current routes which operate in only one direction will need stops on the opposite side to serve new service in the opposite direction. This means 38 total directional miles are added in total.

Table 67: Bus Stop Additions and Costs

New Directional Route Miles	Stops per Mile	Total Stops	Cost per Stop	Total Cost
38	4	142	$10,000	$1,420,000

Costs here are assumed to require a new landing pad at each location. Improvements such as added sidewalks, where they are insufficient, or more complicated improvements due to lack of right of way or drainage features would demand additional costs, provided selected sites require these improvements.

9. Route Operating Statistics

For each of the three scenarios, a full set of operating statistics was compiled by route. The following several tables illustrate the number of hours and miles within each scenario and how they are allocated by route and service day.

Table 68: Baseline Scenario Revenue Hours

Route	Weekday Rev. Hour	Saturday Rev. Hour	Sunday Rev. Hour	Annual Revenue Hours	Annual Operating Cost
Route 101	59	57	40	20,269	$1,595,981
Route 102	4	0	0	893	$70,315
Route 103	30	29	15	9,875	$777,558
Route 104	59	57	40	20,269	$1,595,981
Route 105	19	18	0	5,628	$443,149
Route 106	13	12	0	3,786	$298,110
Route 107	48	46	15	15,502	$1,220,627
Route 108	25	23	0	7,571	$596,141
Route 110	44	39	27	14,661	$1,154,407
Route 111	39	37	26	13,224	$1,041,258
Route 112	45	32	26	14,494	$1,141,258
Route 117	30	29	20	10,135	$798,030
Route 119	30	28	0	9,106	$717,006
Route 120	25	23	0	7,571	$596,141
Route 122	13	12	0	3,786	$298,110
Route 131	21	0	0	5,355	$421,653
Route 132	8	0	0	2,040	$160,630
Route 133	26	23	0	7,826	$616,219
Route 140	13	12	0	3,786	$298,110
Route 141	13	12	0	3,786	$298,110
Route 160	61	58	24	19,963	$1,571,887
Total	620	542	233	199,521	$15,710,284

Table 69: Baseline Scenario Revenue Miles

Route	Peak Vehicles	Weekday Rev. Mile	Saturday Rev. Mile	Sunday Rev. Mile	Annual Revenue Miles
Route 101	4	738	713	500	253,363
Route 102	1	72	0	0	18,248
Route 103	2	351	339	179	117,507
Route 104	4	652	630	442	223,972
Route 105	1.5	222	210	0	67,530
Route 106	1	178	163	0	53,754
Route 107	3	598	573	134	190,155
Route 108	2	384	353	0	116,215
Route 110	3	413	406	300	143,766
Route 111	2.5	400	380	257	136,663
Route 112	3	502	388	334	167,426
Route 117	2	445	430	302	153,031
Route 119	2	390	364	0	118,378
Route 120	2	346	319	0	104,858
Route 122	1	226	208	0	68,328
Route 131	3	335	0	0	85,323
Route 132	1	150	0	0	38,148
Route 133	2	408	361	0	122,868
Route 140	1	245	225	0	74,196
Route 141	1	239	220	0	72,303
Route 160	5	1,283	1,220	334	410,129
Total	47	8,575	7,502	2,781	2,736,161

Table 70: Reduced Scenario Revenue Hours

Route	Weekday Rev. Hour	Saturday Rev. Hour	Sunday Rev. Hour	Annual Revenue Hours	Annual Operating Cost
Route 101	59	57	40	20,269	$1,595,981
Route 102	4	0	0	893	$70,315
Route 103	30	29	15	9,875	$777,558
Route 104	59	57	40	20,269	$1,595,981
Route 105	19	22	0	5,862	$461,574
Route 106	13	12	0	3,786	$298,110
Route 107	41	40	15	13,252	$1,043,462
Route 108	25	23	0	7,571	$596,141
Route 110	44	39	27	14,661	$1,154,407
Route 111	39	31	26	12,938	$1,018,738
Route 112	45	32	26	14,494	$1,141,258
Route 117	30	29	20	10,135	$798,030
Route 119	26	24	0	7,878	$620,314
Route 120	23	23	0	7,061	$555,983
Route 122	12	12	0	3,531	$278,031
Route 131	21	0	0	5,355	$421,653
Route 132	8	0	0	2,040	$160,630
Route 133	26	23	0	7,826	$616,219
Route 140	13	12	0	3,786	$298,110
Route 141	12	0	0	2,933	$230,944
Route 160	61	58	24	19,963	$1,571,887
Total	604	519	233	194,372	$15,304,851

Table 71: Reduced Scenario Revenue Miles

Route	Peak Vehicles	Weekday Rev. Mile	Saturday Rev. Mile	Sunday Rev. Mile	Annual Revenue Miles
Route 101	4	738	713	500	253,363
Route 102	1	72	0	0	18,248
Route 103	2	351	339	179	117,507
Route 104	4	652	630	442	223,972
Route 105	1.5	222	264	0	70,338
Route 106	1	178	163	0	53,754
Route 107	3	478	469	134	154,072
Route 108	2	384	353	0	116,215
Route 110	3	413	406	300	143,766
Route 111	2.5	400	306	257	132,793
Route 112	3	502	388	334	167,426
Route 117	2	445	430	302	153,031
Route 119	2	338	312	0	102,414
Route 120	2	319	319	0	97,795
Route 122	1	208	208	0	63,726
Route 131	3	335	0	0	85,323
Route 132	1	150	0	0	38,148
Route 133	2	408	361	0	122,868
Route 140	1	245	225	0	74,196
Route 141	1	220	0	0	56,011
Route 160	5	1,283	1,220	334	410,129
Total	47	8,338	7,106	2,781	2,655,093

Table 72: Significantly Reduced Scenario Revenue Hours

Route	Weekday Rev. Hour	Saturday Rev. Hour	Sunday Rev. Hour	Annual Revenue Hours	Annual Operating Cost
Route 101	59	57	34	19,921	$1,568,580
Route 102	0	0	0	0	$0
Route 103	30	29	12	9,701	$763,857
Route 104	59	57	34	19,921	$1,568,580
Route 105	18	0	0	4,463	$351,417
Route 106	13	12	0	3,786	$298,110
Route 107	41	29	0	11,810	$929,919
Route 108	25	12	0	6,973	$549,054
Route 110	44	39	24	14,487	$1,140,706
Route 111	39	31	0	11,430	$899,998
Route 112	44	31	12	13,375	$1,053,148
Route 117	30	29	17	9,961	$784,329
Route 119	26	24	0	7,878	$620,314
Route 120	23	21	0	6,957	$547,794
Route 122	12	11	0	3,479	$273,936
Route 131	21	0	0	5,355	$421,653
Route 132	8	0	0	2,040	$160,630
Route 133	26	11	0	7,176	$565,038
Route 140	13	12	0	3,786	$298,110
Route 141	12	0	0	2,933	$230,944
Route 160	61	36	24	18,819	$1,481,808
Total	599	436	157	184,246	$14,507,530

Table 73: Significantly Reduced Scenario Revenue Miles

Route	Peak Vehicles	Weekday Rev. Mile	Saturday Rev. Mile	Sunday Rev. Mile	Annual Revenue Miles
Route 101	4	738	713	425	249,013
Route 102	0	0	0	0	0
Route 103	2	351	339	143	115,436
Route 104	4	652	630	376	220,127
Route 105	1.5	210	0	0	53,550
Route 106	1	178	163	0	53,754
Route 107	3	478	332	0	139,198
Route 108	2	384	0	0	97,856
Route 110	3	413	406	272	142,165
Route 111	2.5	400	306	0	117,914
Route 112	3	484	370	96	148,182
Route 117	2	445	430	257	150,404
Route 119	2	338	312	0	102,414
Route 120	2	319	291	0	96,354
Route 122	1	208	190	0	62,787
Route 131	3	335	0	0	85,323
Route 132	1	150	0	0	38,148
Route 133	2	408	165	0	112,663
Route 140	1	245	225	0	74,196
Route 141	1	220	0	0	56,011
Route 160	5	1,283	757	334	386,059
Total	46	8,237	5,629	1,903	2,501,554

10. Service Implementation

The new COA network is designed as a short-term solution for transit service, and as such the plan could be implemented in one phase. Some transit properties have taken the step of implementing complete system redesigns as a single, large project. The advantage of doing so is that because the changes are highly disruptive for customers, avoiding multiple changes prevents repetitive inconveniences for customers. Making all changes simultaneously would require a longer implementation period to ensure the transition is successful

Based on the recommended changes, two elements that require substantial leads times are avoided. The number of peak vehicles with the recommendation has declined, so the plan does not require additional fleet. The number of revenue hours has also declined, meaning the required operator headcount will also not be higher than current. There are new street segments recommended to gain service, and a next step for implementation would be an evaluation of these segments to identify stop locations. In most cases, accessible boarding areas will need to be constructed, which would take several months to accomplish. Because operational savings are part of the proposed network, the anticipated savings would be delayed until the implementation process is completed.

The recommended implementation approach is to adjust the existing services in two phases. Because the short-term nature of the changes, more phases would be inappropriate, as it would mean multiple changes in quick succession. Using two phases will allow cost savings in the immediate term by pushing changes requiring more bus stop planning and construction to the second phase. The changes listed in the phases presume the final short-term plan is the recommended baseline scenario, but the changes of Phase 1 do not preclude other final scenarios from being selected.

Phase 1 Service Changes

The first phase of service changes recommended here are those changes that will produce operational savings and those changes that serve a limited number of new segments, so as not to demand a large number of new stops. Those changes that result in service improvements or require many new bus stops would be deferred to Phase 2 of the implementation plan.

Within western Volusia, many of the changes can happen more immediately, as the number of route operating on new street sections is limited. The recommended Phase 1 changes would include:

- Adjusting the northern end of Route 20 southbound trips as recommended in Route 120, serving Amelia SuperStop once. Reduce the headway of service to once per hour south of DeLand Intermodal Transit Center.
- Replacing Routes 21, 22, and 23 with new Route 122.
- Expanding the service day for Route 33 to include midday service as per the recommendation of Route 133.
- Eliminating Route 24.
- Making permanent the suspension of Route 25, eliminating this route.

These changes in western Volusia County would make permanent the reduction of 3,684 revenue hours from the suspension of Route 25. The other changes would save 10,017 revenue hours per year. Using the average cost of service values used within the TDP, the additional savings would equal $788,738.

For eastern Volusia County, the changes would be several. These changes would not result in significant savings but would shift hours from some routes to others. These changes would include the following:

- Replacing Route 1 with Route 101

- Replacing Route 8 with Route 108
- Elimination of Routes 18 and 19. A modified Route 19 is recommended to operate the existing Route 18/19 segment between Ormond Beach Wal-Mart and Volusia Mall.
- Replacing Route 5 with Route 105. The Route 105 would not operate on Saturday consistent with current operation and the service levels in the significantly reduced scenario.
- Replacing Route 10 with Route 110
- Replacing Route 11 with proposed Route 111 west of Nova Road. The Route 11 east of Nova Road would remain the same during Phase 1.
- Extending Route 4 from Swallowtail Transit Center to the Pavilion at Port Orange.
- South of Herbert Street, adjusting Route 12 to conform with the recommended routing of Route 112. No service span of headway changes for Route 12 would occur for Phase 1.
- Terminating Route 7 at Swallowtail Transit Center.

These changes would shift current revenue hours of Route 11 to Routes 5 and 10 and would also shift revenue hours from Route 7 to Route 4. The focus of these changes is to correct some longer existing trip lengths to major destinations in the service area.

For southeast Volusia County, there would be two recommended changes for Phase 1. These include:

- Adjusting Flex Routes 42 and 43 to the recommended service areas of Routes 142 and 143. This would extend flex service to New Smyrna Beach Wal-Mart.
- Eliminating Route 44

The elimination of Route 44 would reduce revenue hours by 3,684 revenue hours. This would reduce operational costs by approximately $290,078.

The net budgetary effect of all Phase 1 changes would make permanent the savings of the route 25 suspension which equals $290,078. It would also add additional savings of $1,078,816, based on the additional service reductions recommended for Phase 1.

Phase 2 Service Changes

Recommended Phase 2 changes would then complete the service adjustment from current service to the recommended network. Many of the changes in this phase require more preparation time due to planning and constructing new bus stops where service has been added. Depending on the scenario selected, Phase 2 could result in either an increase (Baseline, Reduced) operating costs compared to Phase 1 or a decrease (Significantly Reduced). The benefit of the phased implementation and the multiple scenarios is the ability to respond to future budget conditions.

For Western Volusia County the following changes are recommended for Phase 2:

- Route adjustment of Route 20 to Route 120, and reduction of headways for all route segments to once per hour.
- Extension of Route 60 (Route 160 in the plan) to the DeLand Intermodal Transit Facility
- Replacement of Route 31 with Route 131

The changes within eastern Volusia County would be more numerous. The adjustments for this part of the county are anticipated to be more complex and thus more frequently recommended for change during Phase 2.

These changes include:

- Replacing Route 3 with Routes 102 and 103
- Replacing the modified Route 19 of Phase 1 with Route 119
- Replacing Route 6 with Route 106
- Replacing Route 17 with Route 117
- Elimination of Route 115
- Re-routing of Route 111 east of Nova Road
- Changes to Routes 7 and 12 in South Daytona in accordance with recommended plans for Routes 107 and 112
- Additional re-routing of Route 4 to align with Route 104
- Elimination of special night and Sunday service route designations

Finally, for southeast Volusia County, route changes within Phase 2 would include:

- Replacement of Route 40 with Route 140
- Replacement of Route 41 with Route 141

Total costs for Phase 2 will depend on the operational scenario selected. As savings have been moved mostly to Phase 1 in the recommended phasing plan, while enhancements are in most cases deferred to Phase 2, Phase 2 would add back costs in two of the three operating scenarios.

In the Baseline Scenario, 11,463 hours would be added back into the operating costs of Votran. That would increase costs by $902,597. For the reduced scenario, revenue hours would increase by 6,314 annually as compared to service from Phase 1, an increase of $497,164. If the significantly reduced scenario were selected, Phase 2 would result in additional savings of 3,812 revenue hours or $300,157 in costs.

11. On-Demand Mobility Options

While the fixed-route bus system is likely to remain the backbone and most utilized service, much of Volusia County has not been developed in a manner conducive to efficient bus service operations. More than 4 of 5 bus passengers board the bus in communities between Ormond Beach and Port Orange on the east side of the county. Most of the remainder board in locations on or near U.S. Highway 92 as it runs west to DeLand and then south to the DeBary SunRail station. This means large geographical segments of the service area do not show as many residents taking advantage of transit service. Many of these areas are rural, but three of the seven largest cities in the county - Deltona, New Smyrna Beach, and Edgewater – also generate fewer than 300 trips per weekday.

As the county continues to grow, new methods of service delivery will become increasingly appropriate to both meet resident mobility needs while managing financial resources. The flex services that are operational in the New Smyrna Beach area are examples of services gaining popularity nationally which are designed to offer additional customer convenience than fixed route service is able. More recent iterations of flexible service utilize mobile apps to provide more options for booking and checking on customer trip requests. The service is known typically as Mobility-on-Demand (MOD).

During the coming decade, Mobility-on-Demand zones may become increasingly attractive as a service alternative. The analysis of current Flex Zones (142 and 143) noted these routes as candidates for introducing MOD services. In addition, the project team reviewed eighteen identified possible areas for MOD expansion. This analysis identifies those areas with the most short-term likelihood for success as an MOD area.

Southwest DeLand

In both the current and proposed route structure, DeLand is served by three bus routes. South of the DeLand Intermodal Transit Facility, the routes essentially serve only the Woodland Avenue corridor. There are neighborhoods to the west and east of Woodland Avenue that are therefore limited in their transit access. Much of the street grid are narrow residential streets. A neighborhood fixed route was considered for this area and may still be possible with future resources. A potential lower cost alternative is an MOD zone as shown in Figure 57. The area has a high number of low-income households, renters, and a very high proportion of households without a vehicle.

Figure 57: Southwest DeLand MOD Zone

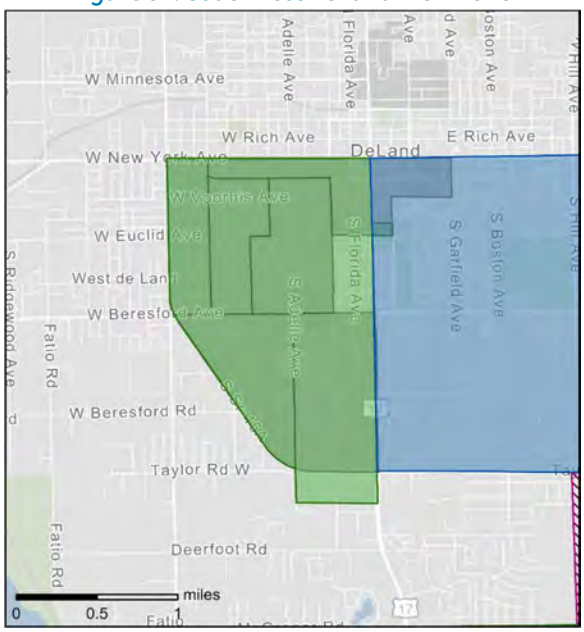


Table 74: Southwest DeLand MOD Demographics

Zone	Southwest DeLand
Population	5,854
Density (Population per Square Mile)	2,651
% of Low-Income Households	47.4%
% Minority Population	56.4%
% Rented Households	61.7%
% Zero-Vehicle Households	21.2%

Source: American Community Survey, 2019 5-Year

East DeLand

Like Southwest DeLand, the East DeLand area is a largely residential area with many portions removed from bus service along Woodland Avenue. The zone does not have quite the same high proportions of low-income households or those without vehicles as reflected for the Southwest DeLand zone. The zone could be combined with Southwest DeLand initially until service usage increases to the point of requiring multiple vehicles. While geographically compact, the area is well-populated. The East DeLand Zone is shown in Figure 58.

Figure 58: East DeLand MOD Zone

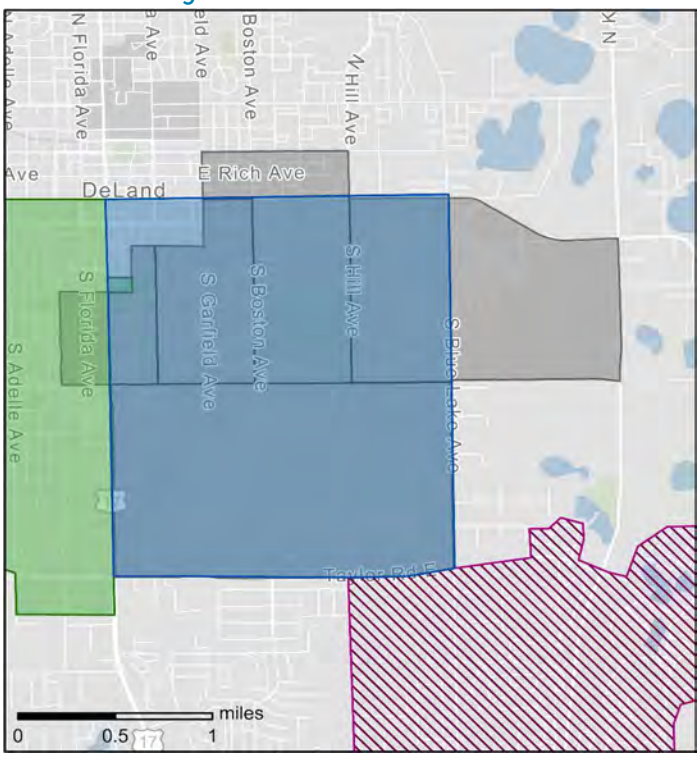


Table 75: East DeLand MOD Demographics

Zone	Southwest DeLand
Population	10,600
Density (Population per Square Mile)	2,413
% of Low-Income Households	40.3%
% Minority Population	42.7%
% Rented Households	47.2%
% Zero-Vehicle Households	4.0%

Source: American Community Survey, 2019 5-Year

Northwest Deltona

The Route 25, a route suspended in 2020 due to poor ridership, served the northwest part of Deltona near Howland Boulevard. The proposed Northwest MOD would serve Halifax Hospital and other locations near Howland Boulevard once served by Route 25. In addition, the zone would serve areas the fixed-route analysis recommends abandoning along Elkcam Boulevard and Normandy Boulevard. Deltona is particularly challenging for fixed route service due to the winding nature of its road network and its demographic composition of mostly households with vehicles.

Figure 59: Northwest Deltona MOD Zone

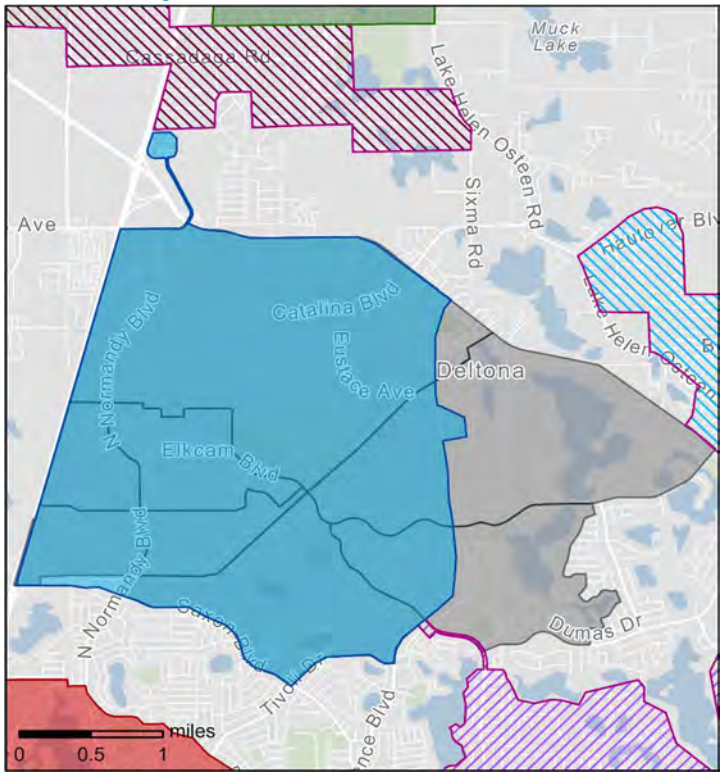


Table 76: Northwest Deltona MOD Demographics

Zone	Southwest DeLand
Population	21,280
Density (Population per Square Mile)	2,099
% of Low-Income Households	22.5%
% Minority Population	51.6%
% Rented Households	18.0%
% Zero-Vehicle Households	3.5%

Source: American Community Survey, 2019 5-Year

South Deltona/Enterprise

Figure 60 shows the extent of the proposed South Deltona/Enterprise MOD Zone. Customers within the zone could access fixed route service along Deltona Boulevard or Normandy Boulevard to the north and west of the zone. A portion of Routes 21 and 22 which have been proposed for elimination along South Providence Boulevard is within this service zone.

Figure 60: South Deltona/Enterprise MOD Zone

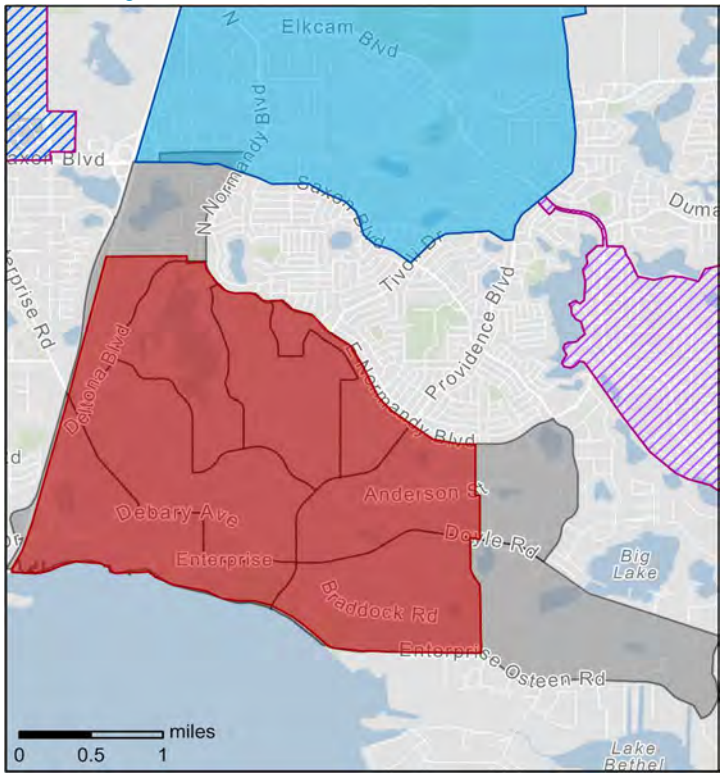


Table 77: South Deltona/Enterprise MOD Demographics

Zone	Southwest DeLand
Population	17,183
Density (Population per Square Mile)	2,056
% of Low-Income Households	26.1%
% Minority Population	46.3%
% Rented Households	26.7%
% Zero-Vehicle Households	2.8%

Source: American Community Survey, 2019 5-Year

Holly Hill/Ormond Beach

Because the fixed-route service and usage is more robust in East Volusia County as compared to the west of the county, there is less need for alternative MOD services. Several areas were analyzed, and many may become strong longer-term locations for such service, especially as development continues to occur just west of Interstate 95 throughout the county. Short-term, one zone does appear to have potential as an MOD zone. Bus service north of Flomich Street provides direct access only to the principal corridors of Granada Boulevard, U.S. Highway 1, and Nova Road. The area in between has many households without vehicles and more significant walks to bus routes along the edges of the zone.

Figure 61: Holly Hill/Ormond Beach MOD Zone

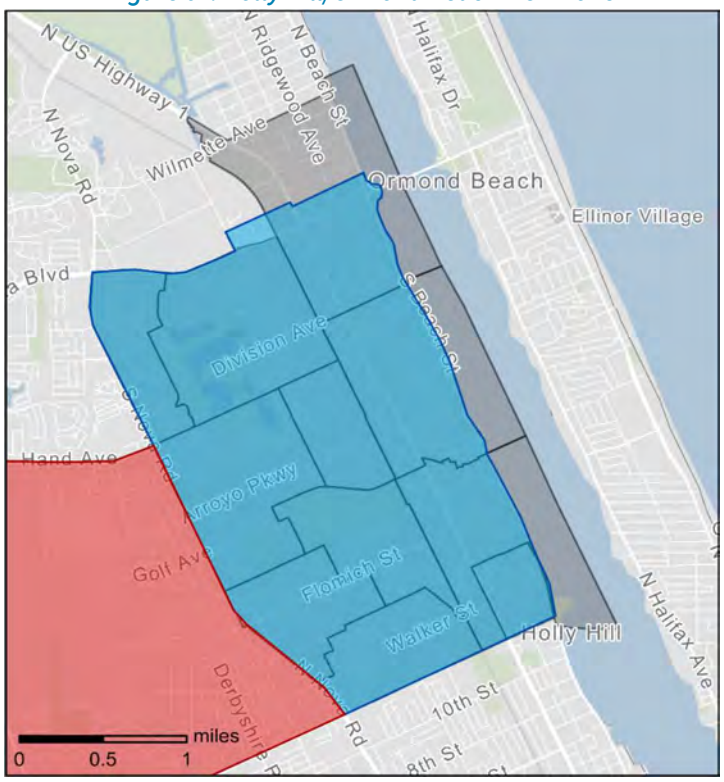


Table 78: Holly Hill/Ormond Beach MOD Demographics

Zone	Southwest DeLand
Population	14,220
Density (Population per Square Mile)	2,205
% of Low-Income Households	37.1%
% Minority Population	26.3%
% Rented Households	36.8%
% Zero-Vehicle Households	10.7%

Source: American Community Survey, 2019 5-Year

Ponce Inlet

An area of existing transit service which has been recommended for service cuts is Atlantic Avenue south of Dunlawton Boulevard. Maintaining bus service to this area within the proposed route framework is beyond the budget possibilities of all scenarios offered. The area does however generate 30-35 daily boardings on the bus, which is easily the highest among all area where service is not recommended to continue. The Ponce Inlet MOD could be an option to provide service to this area.

Figure 62: Ponce Inlet MOD Zone

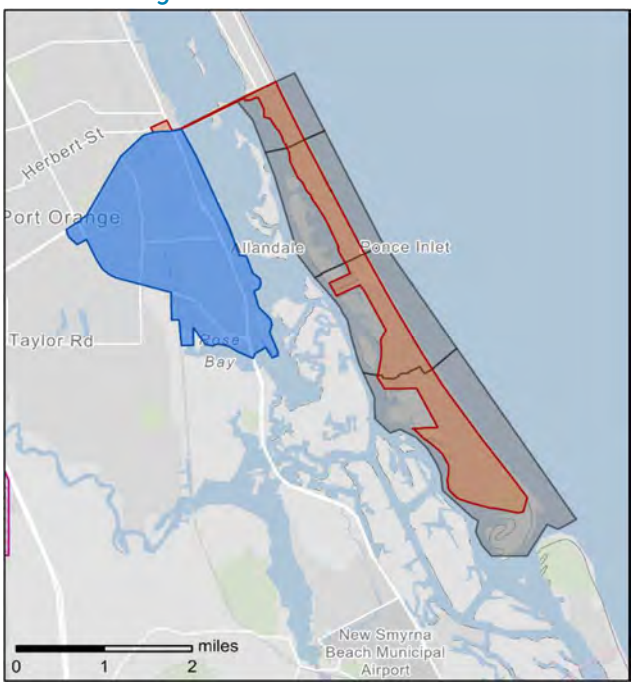


Table 79: Ponce Inlet MOD Demographics

Zone	Southwest DeLand
Population	5,170
Density (Population per Square Mile)	907
% of Low-Income Households	24.3%
% Minority Population	7.2%
% Rented Households	20.3%
% Zero-Vehicle Households	3.2%

Source: American Community Survey, 2019 5-Year

12. Park & Ride Analysis

As an element of the Comprehensive Operational Analysis, the project team reviewed the existing Park & Ride locations as well as existing area travel patterns to discern if other locations should be considered as strong candidates for future park & ride locations for inclusion in the ongoing Major Update of the Transit Development Plan. Transit or ridesharing trips utilizing park & ride areas tend to be most successful in serving longer-distance trips, usually for work. While a park & ride does allow commuters to come from dispersed locations as users drive to the location, destinations do need to be clustered more compactly.

Existing Park & Ride Locations

There are four regular park & ride locations within Volusia County. One of these is at the DeBary SunRail Station which is the northern terminus of the current SunRail service. Commuter rail service from this location links DeBary to locations in Seminole, Orange, and Osceola Counties. A second park & ride location is located along Saxon Boulevard immediately west of Interstate 4. While existing and planned transit service operates adjacent to the lot, these routes do not serve the most likely users of the lot which are commuters travelling south into Seminole and Orange Counites. Express bus service operated (by LYNX, under a FDOT Service Development Grant) from this lot to downtown Orlando prior to the start of SunRail operations. SunRail is now the exclusive transit option linking Volusia County with counties immediately south. A third park & ride is located along DeBary Avenue immediately east of Interstate 4. A final park & ride is within DeLand.

Table 80: Existing Park & Ride Locations

Location	Parking Available
DeBary SunRail Station	275
Orange City – Saxon Lot	119
DeBary – Dirksen/DeBary Lot	50
DeLand Intermodal	28

Chapter 4 detailed commute travel patterns in Volusia County. Many of the most prevalent commute trips are short in distance, being less than ten miles in length. They are internal to a community or to an adjacent community. The exceptions would be trips to Sanford and Orlando from the southwest areas of the county, and trips from Palm Coast and Flagler County into northeastern Volusia County. These are the significant commute flows which would be most likely to be aided by express bus routes or carpooling opportunities that benefit from park & ride lots.

While all three existing park & ride lots serve the market of commutes travelling south to Seminole and Orange Counties, a logical additional location for these trips would be the area near the intersection of State Road 472 (Howland Boulevard) and Interstate 4. In addition to being close to northern areas of Deltona, the area is also convenient for quickly developing residential areas in southeast DeLand. This would serve a similar market to the existing Saxon Road Park & Ride, and its development would logically depend on use and capacity within this existing location. For the eastern portion of Volusia County, a logical intercept within the county for workers from the north would be the area near Interstate 95 and U.S. Highway 1. Such a park & ride would be most useful if paired with a future express service from this area to Ormond Beach and the Daytona Beach CBD.

Figure 63 provides a map of existing and proposed Park & Ride locations.

Figure 63: Volusia County Park & Ride Recommendations