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Transportation
Congestion Management/Performance Measures
Report

RIVER TO SEA
Transportation Planning Organization
VISION - PLAN - IMPLEMENT
TPO

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2017

TRANSPORTATION
CONGESTION MANAGEMENT/PERFORMANCE MEASURES REPORT

RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

INTRODUCTION

Congestion management has been a required activity for MPOs since the early 1990s. However, the 2012 federal transportation funding and authorization bill, Moving Ahead for Progress in the 21st Century Act (MAP-21), made it clear that congestion is just one aspect of transportation system performance that requires monitoring. MAP-21 required states and MPOs to develop transportation plans and transportation improvement programs through a performance-driven, outcome-based approach to planning. Hence, transportation system performance monitoring must now include consideration of safety, physical conditions, environmental quality, economic development, quality of life and customer satisfaction as part of a comprehensive, performance-based planning and programming process.

The River to Sea Transportation Planning Organization (R2CTPO) updated and refined its Congestion Management Process (CMP) in concert with its 2040 Long Range Transportation Plan (LRTP). It was adopted by the TPO Board on August 26, 2015 by Resolution 2015-16. The CMP and the LRTP share the same goals and objectives; but the CMP provides performance measures to evaluate changes in congestion and other important aspects of transportation system performance over time. These changes will serve as an indication of whether or not the TPO's transportation improvement strategies are succeeding.

Following adoption of the CMP, the TPO staff, with guidance from the Technical Working Group (TWG), developed an initial performance evaluation of the transportation system as prescribed in the adopted CMP. This exercise will be repeated annually to provide regular progress reports. In subsequent years, as additional guidance is provided, the data and measures will be refined and enhanced as necessary to improve the decision-making process.

Having a congestion management process and an on-going evaluation of transportation system performance is important to:

- inform decision-making;
- improve return on investments and resource allocation;
- measure transportation system performance;
- increase transparency and accountability; and
- provide support for potential mitigation measures.

The Performance Based Planning Process established in MAP-21 continues in the FAST Act:

- Requires MPOs and states to develop transportation plans and transportation improvement programs through a performance-driven, outcome-based approach to planning.
- Requires MPOs to establish performance targets that address both the surface transportation measures set forth in 23 U.S.C 150(c), in coordination with the state and public transportation performance measures in coordination with providers of public transportation, to ensure consistency with performance targets related to transit asset management and transit safety, as set forth in 49 U.S.C. 5326(c) and 5329(d).
- MPO plans must include performance targets that address performance measures and standards and a system performance report
- Transportation Improvement Programs (TIPs) must include a description of the anticipated progress brought about by implementing the TIP toward achieving the performance targets.
- By October 1, 2017, DOT must submit a report to Congress evaluating the effectiveness of performance-based planning and assessing the technical capacity of MPOs in smaller areas to undertake performance based planning.

The measures reported in this document pertain to motor vehicle travel, non-motorized travel (bicycling and walking), public transit service, and freight movements. They aim to evaluate the multiple dimensions of mobility including quantity and quality of travel, accessibility, and utilization. Most importantly, they address safety. They are primarily based on data collected and managed by other agencies. When possible, data from different agencies have been normalized to allow for comparison from one area to another or from one transportation network to another. In some cases, differences remain which prevent direct comparisons. Where these differences occur, they are noted.

CMP NETWORK IDENTIFICATION

The River to Sea TPO's Metropolitan Planning Area (MPA) is comprised of Volusia County and the urbanized eastern portion of Flagler County (including Flagler Beach, Beverly Beach and portions of the cities of Palm Coast and Bunnell, as well as some portions of unincorporated Flagler County).

The CMP addresses the multimodal transportation network within the TPO's MPA that includes the National Highway System (NHS), Interstate System, Strategic Intermodal System (SIS), State Highway System (SHS), and Off-System Arterial and Collector roadways. For the evaluation of fatalities and injuries, the network is comprised of all public roads as prescribed by federal regulations. In addition to evaluating congestion and safety on roadways, the CMP evaluates auto and bicycle/pedestrian facilities, Votran transit services on the current fixed routes and SunRail services. These various systems are described below and displayed on maps in the appendix.

National Highway System (NHS) - A system designated by Congress that includes all Interstate routes, urban and rural principal arterials, the Strategic Highway Network (STRAHNET) and Strategic Highway Network Connectors, and connectors to approved Intermodal Facilities.

Strategic Intermodal System (SIS) - Highways and other modes important for transportation in Florida.

State Highway System (SHS) - Roads under the jurisdiction of the Florida Department of Transportation, state-chartered expressway authorities, and other state agencies

Off-System Arterial & Collectors - Off-System network includes all functionally classified roadways and these roads are not located on the NHS, SIS, and SHS systems.

PERFORMANCE SCORECARD

The following is an overall “Performance Scorecard” that shows key performance measures for the Flagler and Volusia County transportation system. The Performance Scorecard provides users a quick look at how well the transportation system is functioning with regard to the performance measures that have been or will be established by FHWA pursuant to MAP-21. With these key performance measures, the TPO will track year-to-year performance of the transportation system, and improvements will be planned and prioritized accordingly.

MAP-21 prescribes that FHWA will establish certain performance measures for state departments of transportation and MPOs to use to assess the performance of the transportation system for the purpose of advancing the objectives of the federal transportation program. Required performance measures have received final approval and target setting and reporting for safety congestion reduction, system reliability, on-road mobile source emissions, condition of pavement and bridges, and freight mobility will be approved in the coming months. These will be added to the Performance Scorecard. A detailed description of the performance measures is provided in a particular section.

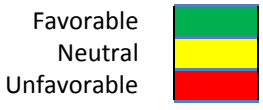
Following approval of the performance measures by FHWA, the states and, in turn, the MPOs/TPOs will establish performance targets as required by federal law. Relating performance measures to specific targets will provide a clear indication of whether the TPO's strategies and investments in the transportation system are achieving the desired outcomes.

As these key performance measures are intended only to provide a "high level" view of general transportation system performance, additional performance measures included in the following report sections, will be used to evaluate and monitor the performance of specific aspects of the transportation system.

In the performance scorecard, the green color shows performance is trending in a favorable direction. The yellow color shows the trend is holding and the red color shows performance is trending in an unfavorable direction.

Table 1 Transportation System Performance Scorecard

PERFORMANCE (All Public Roads)						
Measure	**2011**	**2012**	**2013**	**2014**	**2015**	**Trend**
Flagler County						
Auto Demand						
Daily vehicle miles traveled[1] [2]	3,008,159	2,887,406	2,882,235	3,554,788	3,679,679	
Total centerline miles[1]	980	984	986	986	986	
Auto Safety						
Total Fatalities	22	15	16	24	12	
Total Injuries	669	765	849	817	1,023	
Total Property damage only	174	335	466	619	709	
Bicycle Safety						
Fatalities	0	0	2	1	0	
Injuries	16	23	31	29	34	
Pedestrian Safety						
Fatalities	6	2	0	0	2	
Injuries	14	26	26	18	25	
Intersection Related Crashes						
Total Crashes	242	342	415	507	601	
Volusia County						
Auto Demand						
Daily Vehicle Miles Traveled[1]	14,776,444	14,723,818	14,872,278	15,194,907	15,688,513	
Total centerline miles[1]	3,366	3,361	3,357	3,362	3,400	
Auto Safety						
Total Fatalities	86	97	90	86	87	
Total Injuries	4,460	4,702	5,210	5,251	5,705	
Total Property Damage Only	2,128	3,178	4,339	4,607	4,840	
Transit Demand						
Votran Ridership (fixed routes)	3,526,276	3,570,329	3,734,117	3,729,307	3,357,74	
Passenger Trips per Revenue Mile	1.29	1.37	1.46	1.41	1.29	
Passenger Trips per Revenue Hour	22.19	22.86	23.62	22.46	20.28	
SunRail Ridership	NA	NA	NA	29,147	44,715	
Transit Safety						
Votran Collision	6	2	3	5	10	
Votran Total Fatalities	0	0	0	0	0	
Votran Total Injuries	18	8	16	19	23	
SunRail Crashes	NA	NA	NA	14	11	
Bicycle Safety						
Fatalities	6	1	5	4	4	
Injuries	144	180	201	175	192	
Pedestrian Safety						
Fatalities	18	16	19	25	17	
Injuries	188	179	224	213	199	
Intersection Related Crashes						
Total Crashes	1,728	2,104	2,944	3,060	3,274	



[1] Florida Highway Mileage Reports - Public Roads, Transportation Statistics Office, Florida Department of Transportation

[2]The increase in VMT between 2013 and 2014 resulted primarily from expansion of the Census designated urban boundary, the concomitant reclassification of many local roads from “rural” to “urban”, and use of a higher estimated traffic count on all reclassified urban local roads.

The following section looks more closely at transportation system performance by mode, including motor vehicle travel, bicycling and walking, and public transit. For each mode, data is included (if available) to gauge quantity of travel, the quality of the travel experience, accessibility to travel opportunities, the degree to which the transportation system is utilized, and safety.

MOTOR VEHICLE TRAVEL

Daily Vehicle Miles Traveled (DVMT): This is simply a measure of how much traffic is traveling over the roadways during an average 24 hour period. It is calculated as the product of vehicle average annual daily (AADT) traffic volume and road (segment) length. Because traffic counts are rarely available for local roads, FDOT currently uses an estimated count applied to all local roads. The estimated count varies depending on classification of the area as rural, small urban (5,000 – 49,000 pop.), small urbanized (50,000 – 199,000 pop.), or large urbanized (200,000 or more pop.).

∑ (segment length * Volume), Volume = AADT data

DVMT is directly affected by changes in population and economic activity. It is also affected by changes in per capita trip length and/or frequency. Increasing DVMT contributes to air pollution and, without improvements to the roadways, may also contribute to congestion and crashes.

Level of Service: This is a quantitative measure of the quality of service provided by a transportation facility based on a traveler's perception of how well a facility is operating. Here, it is described as one of six letter grade levels, A through F, with A being the best and F being the worst.

Percent travel meeting LOS criteria in the peak hour: The percent of average annual daily travel (AADT) meeting generally acceptable operating conditions is determined by summing the Daily Vehicle Miles Traveled (DVMT) on roadways operating acceptably and then dividing by the total system Daily Vehicle Miles Traveled. "Acceptably" is defined as LOS D (two-hour peak) for the 7 largest counties, LOS D (one-hour peak) for other urbanized areas, and LOS C (one-hour peak) everywhere else.

∑ (VMT|Peak Hour Volumes < Acceptable LOS Volume Threshold)/ ∑ (VMT)*100

Percent centerline miles severely congested: The percentage of miles severely congested is determined by summing the miles of roadway operating at LOS F in the peak hour and then dividing by the total highway miles.

∑ (Segment Length|Peak Hour Volumes < Acceptable LOS Volume Threshold / ∑ (Segment Length) * 100

Table 2 General Roadway System Measures for 2015 (except as noted)

Measure	R2CTPO Boundary	Volusia County	Flagler County
National Highway System			
Daily vehicle miles traveled (millions)[3]	10.1	8.6	1.6
Percent travel meeting LOS criteria[4]	>99%	>99%	>99%
Percent miles severely congested	<1%	<1%	<1%
Total centerline miles[5]	397.99	334.62	80.19
Interstate			
Daily vehicle miles traveled (millions)[3]	5.1	4.2	1.0
Percent travel meeting LOS criteria[4]	>99%	>99%	>99%
Percent miles severely congested	<1%	<1%	<1%
Total centerline miles[5]	92.29	73.76	18.73
Strategic Intermodal System			
Daily vehicle miles traveled (millions)[3]	6.2	5.1	1.1
Percent travel meeting LOS criteria[4]	>99%	>99%	>99%
Percent miles severely congested	<1%	<1%	<1%
Total centerline miles[5]	292.51	244.60	65.13
State Highway System			
Daily vehicle miles traveled (millions)[3]	10.2	8.7	1.6
Percent travel meeting LOS criteria[4]	>99%	>99%	>99%
Percent miles severely congested	<1%	<1%	<1%
Total centerline miles[5]	428.91	359.43	102.37

Table 3 Flagler County Off-System Arterials & Collectors Measures

Flagler Off-System Arterials & Collectors[6]			
Year	2013	2015	2017
Daily vehicle miles traveled (millions)[7]	0.68	0.69	0.74
Percent daily travel meeting LOS criteria	100%	99.71%	99.68%
Percent roadway centerline miles severely congested	0%	0%	0%
Total centerline miles	117.88	117.88	117.88

[3] Unpublished data, Transportation Statistics Office, Florida Department of Transportation, 11/20/2015

[4] Percent travel meeting LOS criteria in the peak hour

[5] FDOT GIS data files

[6]The Data for Off-System Arterials & Collectors is only available for Volusia County 2014, 2015 and 2016, Flagler 2013, 2015 and 2017 (PMPH). PMPH = P.M. Peak Hour

[7]Florida Department of Transportation & Flagler & Volusia Counties AADT data, Flagler County street network GIS shape file & Volusia County Public Works GIS shape file

Table 4 Volusia County Off-System Arterials & Collectors Measures

Volusia Off-System Arterials & Collectors			
Year	2014	2015[8]	2016[8]
Daily vehicle miles traveled (millions)[7]	2.74	2.79	3.12
Percent daily travel meeting LOS criteria	96.65%	93.73%	90.30%
Percent roadway centerline miles severely congested	1.12%	1.63%	2.81%
Total centerline miles	530.67	530.67	530.67

[8] Some roadways do not have the 2015 and 2016 AADT data, it has been calculated based on the 2014 AADT data to get a more accurate result

A Congestion Management Process (CMP) employs strategies that work to reduce travel demand, encourage multimodal transportation, and help identify operational improvements. Therefore, it is imperative that the CMP be considered part of an overall transportation management program.

FEDERAL REQUIREMENTS

Federal law requires Metropolitan Planning Organizations with urbanized area populations exceeding 200,000 to "...address congestion management through a process that provides for safe and effective integrated management and operation of the multimodal transportation system, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities...through the use of travel demand reduction and operational management strategies."[9]

The Congestion Management Process (CMP) is defined as a systematic process that provides for safe and effective integrated management and operation of the multimodal transportation system. The process includes:

- Development of congestion management objectives
- Establishment of measures of multimodal transportation system performance
- Collection of data and system performance monitoring to define the extent and duration of congestion and determine the causes of congestion
- Identification of congestion management strategies
- Implementation activities, including identification of an implementation schedule and possible funding sources for each strategy

With the enactment of the federal Moving Ahead for Progress in the 21st Century Act (MAP-21), state departments of transportation and MPOs were required to give greater emphasis to performance- and outcome-based planning and programming. In order to accomplish this, the law directed the USDOT to establish performance measures in these areas:

- Pavement condition on the Interstate System and on remainder of the National Highway System (NHS)
- Performance of the Interstate System and the remainder of the NHS
- Bridge condition on the NHS
- Fatalities and serious injuries—both number and rate per vehicle mile traveled--on all public roads
- Traffic congestion
- On-road mobile source emissions
- Freight movement on the Interstate System

The law further required states to set performance targets in support of those measures not more than one year from when the USDOT adopts the final rule(s) on the performance measures. MPOs then have not more than 6 months to set performance targets in relation to the performance measures (where applicable).

To date, only the safety-related performance measures have been finalized. Proposed performance measures relating to the following national goals are currently under review:

[9] 23 CFR 450.320(a) and (b). Metropolitan Transportation Planning, Final Rule, February 14, 2007.

- Congestion reduction - To achieve a significant reduction in congestion on the National Highway System (NHS);
- System reliability - To improve the efficiency of the surface transportation system;
- Freight movement and economic vitality - To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development; and
- Environmental sustainability - To enhance the performance of the transportation system while protecting and enhancing the natural environment.

The safety performance measures final rule establishes five performance measures to carry out the HSIP: the five-year rolling averages for: 1) Number of Fatalities, 2) Rate of Fatalities per 100 million vehicle miles traveled (VMT), 3) Number of Serious Injuries, 4) Rate of Serious Injuries per 100 million VMT, and 5) Number of Non-motorized Fatalities and Non-motorized Serious Injuries. These safety performance measures are applicable to all public roads regardless of ownership or functional classification.

STATE REQUIREMENTS

Relevant portions of the applicable Florida Statutes are provided below. These requirements guide the development and application of the R2CTPO Congestion Management Process.

- "Florida Statutes Title XXVI, Chapter 339.175", Metropolitan Planning Organization "In order to provide recommendations to the department and local government entities regarding transportation plans and programs, each MPO shall prepare a congestion management system for the metropolitan area and cooperate with the department in the development of all other transportation management systems required by state or federal law."
- "Florida Statutes Chapter Title XXVI, Chapter 339.175", Transportation Management Programs "Each MPO within the state must develop and implement a congestion management system." It continues that the CMS "should be developed and implemented so as to provide the information needed to make informed decisions regarding the proper allocation of transportation resources." The CMS "must use appropriate data gathered at the state or local level to define problems, identify needs, analyze alternatives, and measure effectiveness."

The purpose of the CMP is to provide data to assist in identifying actual projects. The CMP involves selecting congested corridors to be evaluated for potential projects/programs that could be implemented to reduce the congestion identified.

Annual monitoring will review the level of service on the roads to identify recurring congestion. Roadways that are severely congested today or forecasted to be congested in five years are considered for review through the CMP. Corridors are identified in the following two categories:

- Severely congested: Roadways with a volume to capacity ratio of 1.00 and greater are deemed to be severely congested.
- Congested: Roadways with a volume to capacity ratio of greater than 0.90 and less than 1.00 are deemed to be congested.

Since congestion mitigation strategies cannot be implemented for all of the congested facilities simultaneously, and congestion management strategies are not one size fits all, the projects and strategies must be evaluated logically. The congested roadways or intersections must be examined carefully to determine which management strategy will best address the particular problems. Strategies can be selected and evaluated by a CMP Review Team. The strategies will include (but will not be limited to):

- Improvements to the management and operation of the transportation system, including the implementation of Intelligent Transportation Systems (ITS)
- Smart transportation policies that promote alternate modes of transportation to automobile travel and assist in the development of more livable communities
- Transportation demand management (TDM), including growth management
- Where necessary, additional road and transit capacity
- Improvements to transit, pedestrian, and bicyclist facilities

The tables below show, for Volusia County, 1.7% of the roadway centerline miles (including all public roads except local roads) were severely congested and 3.17% are congested in 2015, and 2.83% were severely congested and 1.03% were congested in 2016. The trend shows that severely congested roads have been increasing in Volusia County. For Flagler County, 0.06% of the roadway centerline miles are congested and no roads are severely congested.

The severely congested and congested roadways identified here are based on the latest available average annual daily traffic counts. It is important to note that traffic volumes can vary significantly on a seasonal, daily, and even hourly basis. An evaluation of roadway performance on the basis of average annual daily traffic alone does not always identify congestion that occurs only during peak travel demand periods or as a result of traffic incidents. For this reason, the TPO often relies on other, more sensitive techniques to identify congestion including measuring level of service at peak periods. One of the more promising techniques is the use of vehicle probe data that can very effectively and efficiently measure congestion and travel time reliability (as indicated by variations in average vehicle speed). The R2CTPO is investigating the use of vehicle probe data and other techniques that might be used in the future to better identify the occurrence and cause of congestion and delay.

Table 5 Congested Road in Flagler County 2013

Road Name	Limits	Centerline miles congested	V/C
Cypress Point Parkway	Cypress Edge (N) to Palm Coast Parkway	0.12	0.93

Source: River to Sea Transportation Planning Organization 2040 Long Range Transportation Plan

Table 6 Severely Congested Roads in Volusia County 2015

Road Name	Limits	Centerline miles severely congested	V/C
*Catalina Blvd	Howland Blvd to Sixma Rd	0.5	1.18
*Catalina Blvd	Sixma Rd to Lake Helen-Osteen Rd	0.4	1
Dirksen/DeBary/Doyle	I-4 to Deltona Blvd	0.1	1.03
Graves Av/CR 4145	Veteran's Memorial Pkwy to Kentucky Av	0.3	1.05
Hand Av	Clyde Morris Blvd to Shangri La Dr	0.75	1.09

Road Name	Limits	Centerline miles severely congested	V/C
Howland Blvd	Providence Blvd to Elkcam Blvd	2.1	1.23
I-4	Dirksen Dr to Saxon Blvd	2.79	1.15
LPGA Blvd (DB)	Jimmy Ann Dr to Derbyshire Rd	0.25	1.39
*Normandy Blvd	Saxon Blvd to Deltona Blvd	0.7	1
Saxon Blvd	FDOT Park & Ride to I-4	0.3	1.06
Saxon Blvd	I-4 to Finland Dr	0.35	1.07
Saxon Blvd	Finland Dr to Normandy Blvd	0.35	1.04
*Tivoli Dr	Saxon Blvd to Providence Blvd	0.85	1.16
US 17/92	Euclid Av to Beresford Av	0.49	1.04
W Volusia Bltwy (Veteran's Memorial Pkwy)	Graves Av to Rhode Island Av	1.5	1.03
W Volusia Bltwy (Veteran's Memorial Pkwy)	Rhode Island Av to Harley Strickland Blvd	1.22	1.1

Source: 2015 Volusia County AADT Spreadsheet

**Deltona's traffic counts on Catalina Blvd, Normandy Blvd and Tivoli are based on Deltona's traffic counts*

Table 7 Severely Congested Roads in Volusia County 2016

Road Name	Limits	Centerline miles congested	V/C
*Catalina Blvd	Howland Blvd to Sixma Rd	0.5	1.18
*Catalina Blvd	Sixma Rd to Lake Helen-Osteen Rd	0.4	1
Dirksen/DeBary/Doyle	Sunrise Blvd to WB I-4 Ramps	0.20	1.06
Dirksen/DeBary/Doyle	Providence Blvd. to Garfield Rd.	1.20	1.00
Graves Av/CR 4145	Veteran's Memorial Pkwy. to Kentucky Ave.	0.30	1.07
Hand Ave.	Clyde Morris Blvd. to Shangri La Dr.	0.75	1.13
Highbanks Rd. (DB)	Westside Connector to US 17/92	1.00	1.06
Howland Blvd.	Providence Blvd. to Elkcam Blvd.	2.10	1.26
I-4	Dirksen Dr. to Saxon Blvd.	2.79	1.16
LPGA Blvd. (DB)	Jimmy Ann Dr. to Derbyshire Rd.	0.25	1.45
Providence Blvd	Elkcam Blvd to Ft Smith Blvd	0.8	1.08
Providence Blvd.	Anderson Dr. to Doyle Rd.	0.55	1.01
Saxon Blvd.	FDOT Park & Ride to I-4	0.30	1.04
Saxon Blvd.	I-4 to Finland Dr.	0.35	1.05
SR 40	US 1 to Halifax Av	1.11	1.06
SR 44	Kepler Rd. to Summit Ave.	1.18	1.02
*Tivoli Dr	Saxon Blvd to Providence Blvd	0.85	1.16
US 17	SR 40 to Lake Winona Rd	4.93	1.10
US 17/92	SR 44 (New York Av) to Euclid Av	0.49	1.10
US 17/92	Euclid Ave. to Beresford Ave.	0.49	1.00
W Volusia Bltwy (Kepler Rd)	Minnesota Av to SR 44	0.75	1.01
W. Volusia Bltwy (Veteran's Memorial Pkwy)	Rhode Island Ave. to Harley Strickland Blvd.	1.22	1.18
Williamson Blvd	SR400/Beville Rd to Madeline Av	1.5	1.02
Williamson Blvd	Madeline Av to Willow Run Blvd	1.1	1.03
Williamson Blvd	Willow Run Blvd Townwest Blvd	0.25	1.07

Source: 2016 Volusia County AADT Spreadsheet

**Deltona's traffic counts on Catalina Blvd, Normandy Blvd and Tivoli are based on Deltona's traffic count from 2015.*

Table 8 Congested Roads in Volusia County 2015

Road Name	Limits	Centerline miles congested	V/C
Dirksen/DeBary/Doyle	Providence Blvd to Garfield Rd	1.2	0.96
Elkcam Blvd	Montecito Av to Howland Blvd	1	0.96
Elkcam Blvd	Providence Blvd to Montecito Av	1.05	0.95
Howland Blvd	I-4/SR 472 to Wolf Pack Run	0.4	0.96
I-4	Saxon Blvd to SR 472	3.15	0.99
I-4	SR 44 to US 92 Connector	10.31	0.93
*Normandy Blvd	Deltona Blvd to Tivoli Dr	1.1	0.95
Providence Blvd	Elkcam Blvd to Ft Smith Blvd	0.8	0.98
SR 40	US 1 to Halifax Av	1.11	0.96
US 1	Fairview/Main St to US 92/ISB	0.66	0.97
US 17	SR 40 to Lake Winona Rd	4.93	0.96
US 17/92	SR 44 (New York Av) to Euclid Av	0.49	0.99
W Volusia Bltwy (Kepler Rd)	Minnesota Av to SR 44	0.75	0.95
Williamson Blvd	SR 400/Beville Rd to Madeline Av	1.5	0.93
Williamson Blvd	Madeline Av to Willow Run Blvd	1.1	0.92
Williamson Blvd	Willow Run Blvd Townwest Blvd	0.25	0.98

Source: 2015 Volusia County AADT Spreadsheet

**Deltona's traffic counts on Catalina Blvd, Normandy Blvd and Tivoli are based on Deltona's traffic counts*

Table 9 Congested Roads in Volusia County 2016

Road Name	Limits	Centerline miles congested	V/C
Big Tree Rd.	Nova Rd. to Magnolia Ave.	0.4	0.93
Dirksen/DeBary/Doyle	I-4 to Deltona Blvd.	0.1	0.91
Dunn/George Engram/Fairview/Main	Bill France Blvd. to Clyde Morris Blvd.	0.85	0.92
Plymouth Ave.	Clara Ave. to US 17/92	0.2	0.99
Providence Blvd.	Normandy Blvd. to Anderson Dr.	0.8	0.94
Taylor Rd. (VC)	Crane Lake Blvd. to Summertree Rd.	0.75	0.93
Taylor Rd. (PO)	Dunlawton Ave. to Clyde Morris Blvd.	0.55	0.96
Normandy Blvd	Deltona Blvd to Tivoli Dr	1.1	0.95
US 1	US 92/ISB to Orange Ave.	0.3	0.96
US 17/92	Plymouth Ave. to SR 44 (New York Ave.)	1.01	0.95
W. Volusia Bltwy (Veteran's Memorial Pkwy)	Graves Ave. to Rhode Island Ave.	1.5	0.92

Source: 2016 Volusia County AADT Spreadsheet

**Deltona's traffic counts on Catalina Blvd, Normandy Blvd and Tivoli are based on Deltona's traffic count from 2015.*

The table below shows roadway segments identified in the 2040 Long Range Transportation Plan (LRTP) that are currently congested or are expected to become congested in the future. The V/C ratios presented here reflect the Central Florida Regional Planning Model's adjusted 2040 traffic volumes on the Existing+PlusCommitted Highway Network. These roadways should be monitored closely to determine when improvements may be needed, and to confirm that any improvements, once completed, actually produce the desired results.

Table 10 Roadway Deficiencies for 2040

Road Name	Limits	2040 V/C[10]
Beach/Riverside/Beach (HH)	LPGA Blvd to 5th St	1.47
Beach/Riverside/Beach (OB)	Wilmette Av. to SR 40	1.06
Beach/Riverside/Beach (OB)	SR 40 to Division Av.	1.33
Belle Terre Parkway	Bird of Paradise Drive to Pine Lakes Pkwy (North)	1.73
Belle Terre Parkway	Palm Coast Pkwy (EB) to Cypress Point Pkwy	1.32
Cypress Point Pkwy	Belle Terre Pkwy to Pine Cone Dr	1.12
Cypress Point Pkwy	Pine Cone Dr to Cypress Edge (S)	1.11
Cypress Point Pkwy	Cypress Edge (S) to Cypress Edge (N)	1.11
Cypress Point Pkwy	Cypress Edge (N) to Palm Coast Pkwy	1.17
Dirksen/DeBary/Doyle	US 17/92 to Sunrise Blvd	2.18
Dirksen/DeBary/Doyle	Sunrise Blvd to WB I-4 Ramps	1.34
Dirksen/DeBary/Doyle	I-4 to Deltona Blvd	1.05
Dirksen/DeBary/Doyle	Enterprise St to Main St	1.04
Dirksen/DeBary/Doyle	Providence Blvd to Garfield Rd	1.18
Dunn/George Engram/Fairview/Main	Bill France Blvd to Clyde Morris Blvd	1.13
Graves Av/CR 4145	Veteran's Memorial Pkwy to Kentucky Av	1.16
Hand Av	Clyde Morris Blvd. to Shangri La Dr	1.23
Howland Blvd	Providence Blvd to Elkcam Blvd	1.36
I-4	Dirksen Dr to Saxon Blvd	1.21
I-4	Saxon Blvd to Rhode Island Slip Ramp	1.08
I-4	Rhode Island Slip Ramp to SR 472	1.08
I-4	SR 472 to Orange Camp Rd	1.02
I-95	SR 40 to US 1	1.01
I-95	Old Dixie Hwy to SR 100	1.04
LPGA Blvd (HH)	SR5A/Nova Rd to US 1	1.06
LPGA Blvd (DB)	Tomoka Farms Rd to Williamson Blvd	1.04
Mason Av	Fentress Blvd to Bill France Blvd	1.01
Matanzas Woods Pkwy	US 1 to Belle Terre Pkwy	1.1
Matanzas Woods Pkwy	Bird of Paradise Dr to I-95 SB Ramps	1.27
Normandy Blvd	Graves (old Howland) to Rhode Island Av	1.14
Normandy Blvd	Rhode Island Av to Firwood Dr	1.04
Old Dixie Hwy	I-95 to Old Kings Rd	1.25
Orange Camp Rd	US 17/92 to Princeton	1.11
Orange Camp Rd	Blue Lake Av to W Volusia Bltwy (Dr MLK Jr)	1.12
Orange/Silver Beach Av	City Island Pkwy to Peninsula Dr	1.44
Orange/Silver Beach Av	Peninsula Dr to SR A1A	1.11
Palm Coast Pkwy	US 1 to Pine Lakes Pkwy	1.12
Palm Coast Pkwy	Cypress Point Pkwy to I-95 SB Ramps	1.16
Palm Coast Pkwy	I-95 SB Ramps to I-95 NB Ramps	1.07
Palm Coast Pkwy (WB)	Old Kings Rd to Florida Park Dr	1.7
Palm Coast Pkwy (WB)	Florida Park Dr to Club House Dr	1.4
Palm Coast Pkwy (WB)	Club House Dr to Colbert	1.4

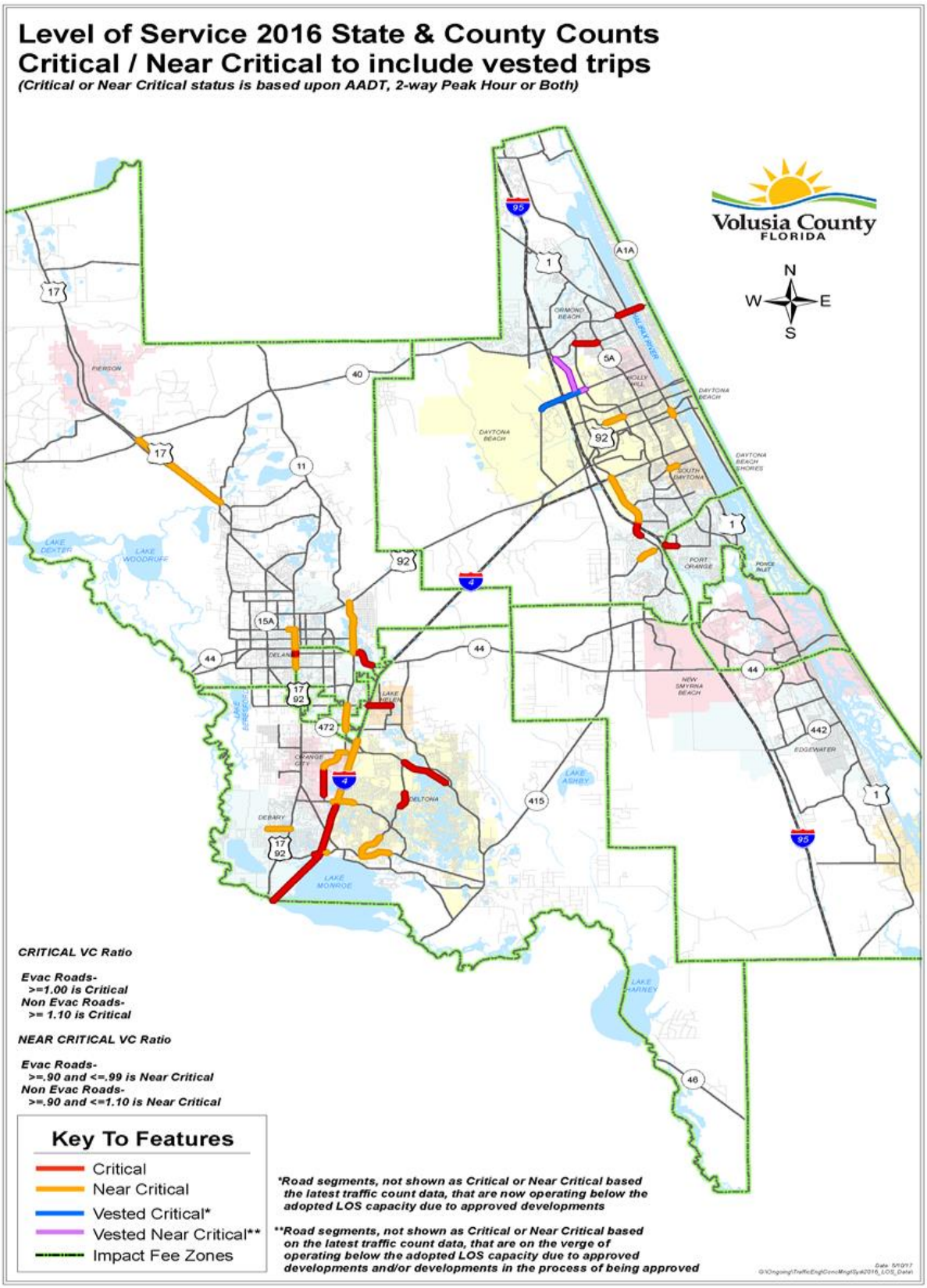
[10] 2040 Central Florida Regional Planning Model, Version 6, volume to capacity ratio (V/C) using adjusted 2040 volumes on the Existing plus Committed Highway Alternative Network

Road Name	Limits	2040 V/C[10]
Providence Blvd	Howland Blvd to Elkcam Blvd	1.05
Providence Blvd	Elkcam Blvd to Ft Smith Blvd	1.25
Providence Blvd	Normandy Blvd to Anderson Dr	1.28
Providence Blvd	Anderson Dr to Doyle Rd	1.12
Royal Palms Pkwy	US 1 to Rymfire Dr	1.01
Saxon Blvd	I-4 to Finland Dr	1.05
SR 100	US 1/SR 5/SR 100 to Inside City (Urban)	1.07
SR 100	Seminole Woods Pkwy to SR 9/I-95	1.26
SR 11	CR 15A to SR 40	2.38
SR 11	SR 40 to Flagler County Line	2.68
SR 11	Volusia County Line to CR 304	1.37
SR 15/US 17	Lake Winona Rd to SR 40	1.43
SR 15/US 17	SR 40 to Washington Av	1.46
SR 15/US 17	Washington Av to CR 305/Lk George Rd	1.3
SR 20/SR 100	Putnam County Line to SR 5/US 1	1.48
SR 40	Lake County Line to Emporia Rd	1.1
SR 40	SR 11 to Cone Rd	2.95
SR 40	SR 9/I-95 to Williamson Blvd	1.21
SR 40	SR 5/US 1 to Halifax Dr	1.73
SR 40	Halifax Dr to SR A1A	1.01
SR 44	Clara Av to Amelia Av	1.47
SR 44	Lake County Line to Shell Rd	3.74
SR 44	CR 4053/Grand Av to Old New York Av	1.18
SR 44	Old New York Av to Woodward Av	1.32
SR 44	Woodward Av to Amelia Av	1.32
SR 44	Old New York Av to SR 15A/Spring Garden Av	1.32
SR 44	Clara Av to Amelia Av	1
SR 5/US 1	SR 9/I-95 - SB exit ramp to Flagler County Line	1.39
SR 5/US 1	White View Pkwy to Royal Palms Pkwy (Urban Boundary)	1.06
SR 5/US 1	Royal Palms Pkwy (Urban Boundary) to Palm Coast Pkwy	1.06
SR 5/US 1	Palm Coast Pkwy to Matanzas Wood Pkwy	1.06
SR 5/US 1[11]	Railroad St to Moody Blvd	2.93
SR 5/US 1[14]	Moody Blvd to SR 20/SR 100	3.89
SR A1A	SR 5/US 1 to Atlantic Av / Dunlawton Av	1.02
SR A1A	SR 40/Granada Blvd to Amsden Rd	1.04
US 17-92/SR 600/SR15	N. End of St. John's River Bridge to Barwick Rd	2.11
US 17-92/SR 600/SR15	Barwick Rd to Fort Florida Rd	1.09
US 17-92/SR 600/SR15	Beresford Av to Euclid Av	1.17
US 17-92/SR 600/SR15	Euclid Av to SR 44/New York Av	1.04
US 17-92/SR 600/SR15	SR 44/New York Av to Plymouth Av	1.11
Williamson Blvd	Willow Run Blvd to McGinnis Av	1.37

Source: River to Sea Transportation Planning Organization 2040 Long Range Transportation Plan

[11] FDOT has changed the area classification for these congested roadways from “rural” or “transitioning” to “urban.” That, in turn, changed the LOS standards from C to D.

Figure 1 Volusia County Critical & Near Critical to include vested trips 2016



Source: Volusia County Traffic Engineering

PUBLIC TRANSIT

This report addresses three public transit service providers: Votran, Flagler County Public Transportation, and SunRail.

Votran serves as Volusia County's transit service provider, offering both fixed route and paratransit service with the mission of safely and dependably meeting the community's mobility needs at an affordable price. Fixed route buses are the predominant transit service that provides mobility to citizens across the county. In addition, paratransit service is available to people who are elderly or live with disabilities within the planning area. Votran Gold, a local paratransit service, provides door-to-door service to individuals with a disability who cannot use Votran's regular bus service or are unable to obtain or arrange for transportation through their own efforts or those of their friends, family, or volunteers.

Flagler County Public Transportation currently provides only demand-responsive, door-to-door service.

SunRail provides commuter rail service in Orange, Seminole, and Volusia in Central Florida. The first phase of service began in May 2014, included 12 stations, and spanned 32 miles from DeBary in southwest Volusia County to Sand Lake Road south of Orlando. The second phase of construction is currently underway. During last fiscal year, Phase II South received grant funding to extend service an additional 29 miles from Sand Lake Road in Orange County to Kissimmee and Poinciana in Osceola County. The service is expected to be up and running by mid-2018.

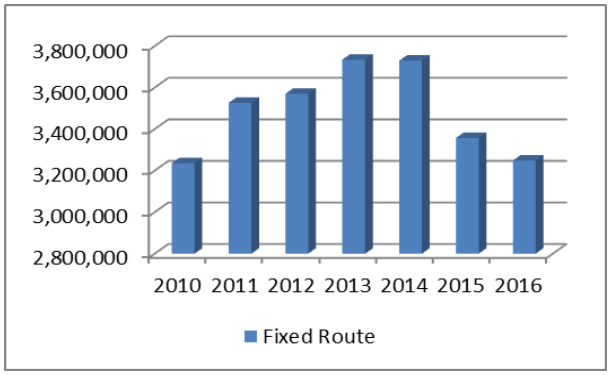
Votran Ridership

Ridership shows the annual number of passengers utilizing Votran's fixed route service. Votran ridership decreased in 2015 and 2016.The slight decrease may be attributed to an increase in fare from 2013 to 2014, which has affected the total ridership. However, this trend is being experienced by many other transit agencies throughout the United States, which has been attributed to the improved economy, lower fuel prices, and an introduction of additional alternative travel modes.

Table 11 Votran Ridership

Year	Fixed Route
2010	3,235,767
2011	3,526,276
2012	3,570,329
2013	3,734,117
2014	3,729,307
2015	3,357,743
2016	3,248,466

Figure 2 Votran Ridership



Source: National Transit Database

Transit/Utilization

Transit utilization is expressed as the ratio of total passengers transported to total revenue or service miles and the ratio of total passengers transported to total revenue or service hours.

Table 12 Votran Passenger Trips per Revenue Mile

Year	Passenger Trips per Revenue Mile (million)
2010	1.1
2011	1.29
2012	1.37
2013	1.46
2014	1.41
2015	1.29

Table 13 Votran Passenger Trips per Revenue Hour

Year	Passenger Trips per Revenue Hour (million)
2010	19.64
2011	22.19
2012	22.86
2013	23.62
2014	22.46
2015	20.28

Figure 3 Votran Passenger Trips per Revenue Mile

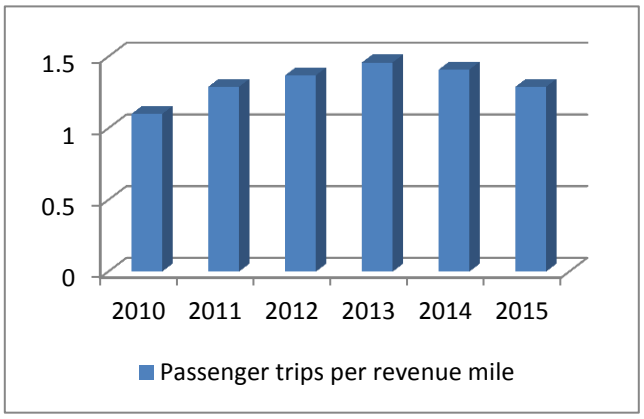
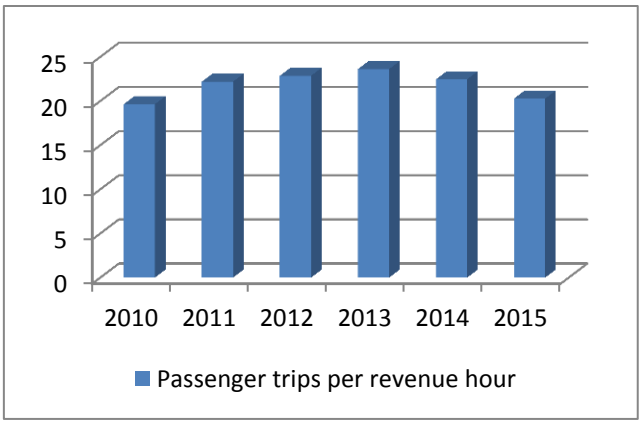


Figure 4 Votran Passenger Trips per Revenue Hour



Source: Florida Transit Information System, Integrated National Transit Database Analysis System (INTDAS), Florida Department of Transportation

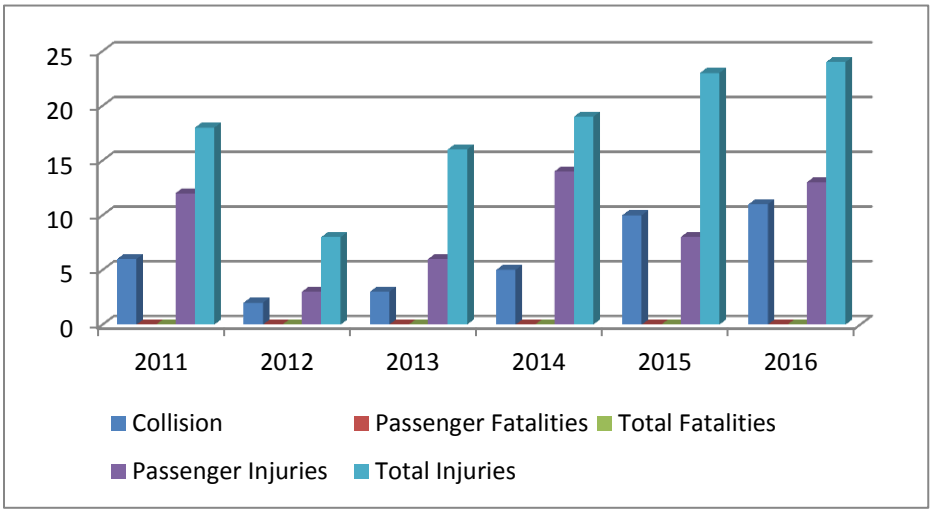
The table above shows the passenger trips per revenue miles increased in the six-year period, but slightly decreased in 2015. The indication of the data is that more passengers' trips were made for every mile the bus traveled. It shows that the transit system is running more efficiently to carry more people through the distance it serves.

The 5-year trend of passenger trips per revenue hour has shown a steady increase from 2011-2013, and a slight decrease in 2014 and 2015. The indication of the data is that more passenger trips were made for every hour that the bus operated. This also means that the transit service is running more efficiently to pick up more people for every hour of operation.

Table 14 Votran Safety Data

Year	Events[12]	Events per 100M Vehicle Revenue Mile	Passenger Fatalities	Passenger Fatalities per 100M Vehicle Revenue Mile	Total Fatalities	Total Fatalities per 100M Vehicle Revenue Mile	Passenger Injuries	Passenger Injuries 100M Vehicle Revenue Mile	Total Injuries	Total Injuries per 100M Vehicle Revenue Mile
2011	6	2.15	0	0	0	0	12	4.30	18	6.45
2012	2	0.76	0	0	0	0	3	1.15	8	3.06
2013	3	1.16	0	0	0	0	6	2.33	16	6.20
2014	5	1.88	0	0	0	0	14	5.26	19	7.14
2015	10	4.13	0	0	0	0	8	3.30	23	9.49
2016	11	4.54	0	0	0	0	13	4.60	24	8.50

Figure 5 Votran Safety Data



Source: National Transit Database

Table 14 shows Votran collisions, passenger fatalities, total fatalities, passenger injuries, and total injuries. The total number of collisions peaked in 2016; but no fatalities were reported. Passenger injuries varied over the

[12] Changed from Collision to Events that being used in National Transit Database definition

five-year period; but total injuries, including non-passengers, generally increased over the period to a 2016 peak.

Percent of Congested Roadway Centerline Miles with Transit Service

Where roadway congestion exists, providing public transit service will give travelers an effective alternative to personal motor vehicle travel, and it will help to ease congestion. The measure of performance in providing public transit service on these congested roadways is expressed as the ratio of centerline miles of severely congested roadways with scheduled transit service to centerline miles of all severely congested roadways.

The table shows for Volusia County, the total 12.57-centerline miles of severely congested roadways in 2014, 17.62 miles in 2015, and 23.96 centerlines miles of severely congested roadways in 2016, of which 4.45-centerline miles are served by scheduled (fixed-route) transit service.

Table 15 Severely Congested Roadways Served by Votran Transit - 2014

	2014	2015	2016
Total centerline miles of severely congested roadways	12.57	17.62	23.96
Centerline miles of severely congested roadways with Votran scheduled transit service	4.45	4.45	4.45
Percentage of total centerline miles of severely congested roadways with Votran scheduled transit service	35.4%	25.25%	18.57%

Source: Votran routes shape file and Volusia County AADT data

SUNRAIL

SunRail boarding data shows the monthly boardings have decreased in 2016, but it showed positive signs in December.

Table 16 SunRail Ridership Trends

Month	Passenger Boardings		
	2014	2015	2016
January		3,789	3,318
February		3,561	3,498
March		4,931	3,839
April		3,774	3,427
May	4,075	3,636	3,393
June	4,212	3,660	3,587
July	4,127	3,904	3,501
August	3,647	3,635	3,272
September	3,045	3,237	3,148
October	3,214	3,397	3,060
November	3,198	3,527	3,303
December	3,629	3,664	3,623
Total Ridership	29,147	44,715	40,969

Figure 6 SunRail Ridership Trends

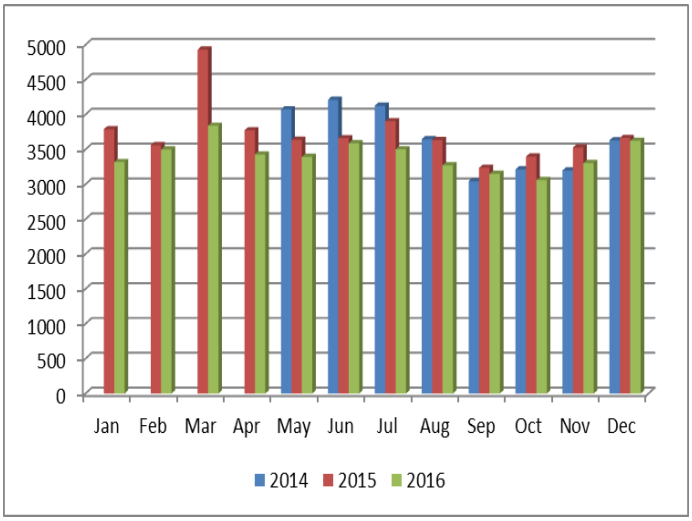


Table 17 SunRail On Time Performance

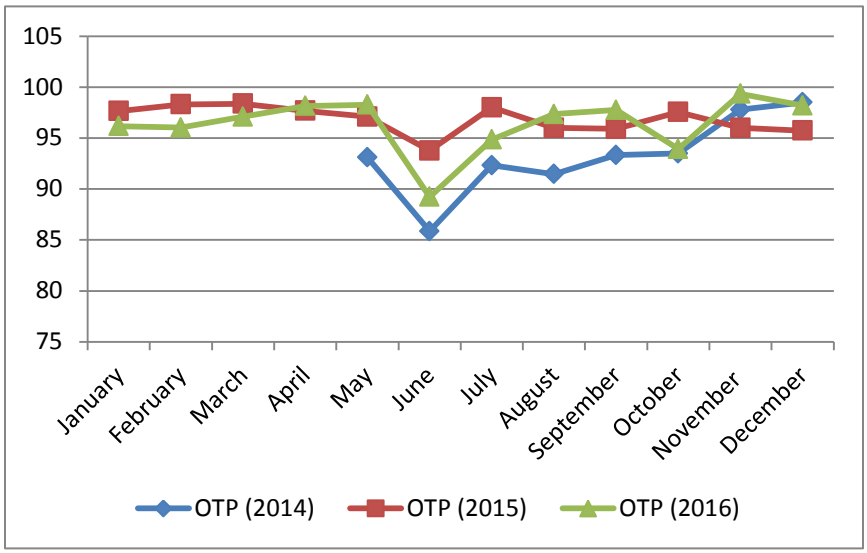
Month	% On Time Performance		
	2014	2015	2016
January		97.7	96.1
February		98.3	96.0
March		98.3	97.1
April		97.7	98.1
May	93.1	97.1	98.2
June	85.7	93.8	89.2
July	92.3	98.0	94.9
August	91.4	96.0	97.3
September	93.3	96.0	97.8
October	93.4	97.6	93.9
November	97.8	96.0	99.3
December	98.5	95.7	98.1

Table 18 SunRail Crashes

Year	2014	2015	2016
Total Crashes	14	11	12

Table 18, above, shows SunRail's crashes from 2014-2016. The data appears to show the total number of crashes decreased in 2015, but increased slightly in 2016.

Figure 7 SunRail On-Time Performance



Source: *Florida Department of Transportation*

"An on-time train is a scheduled revenue train that arrives at its final destination no more than one minute early or five minutes later than its scheduled arrival time or the lateness is a result of circumstances no under the O&M firm's control and/or influence, as determined by the Department." The data shows the SunRail's monthly overall on-time performance increased in 2015, but is slightly lower in 2016.

SAFETY

The main objective of the River to Sea TPO is to improve safety and security on roadways and to identify and prioritize improvements to reduce the frequency and severity of crashes, and minimize injuries and fatalities. Crash rate is the number of crashes per 100 million vehicle miles traveled. The safety data figures in the table are for all "public roads" as will be required for the upcoming performance measures.

Table 18 Flagler and Volusia County Auto Crashes

Year	2011	2012	2013	2014	2015	5-Yr Rolling Average
Flagler County						
Fatalities	22	15	16	24	12	17.8
Fatality Rate[13]	2.00	1.45	1.52	1.85	0.89	1.542
Injuries	669	765	849	817	1,023	824.6
Injury Rate[14]	60.93	73.87	80.70	62.97	76.16	70.926
Property Damage Only	174	335	466	619	709	460.6
Property Damage Only Rate[15]	15.85	32.35	44.30	47.71	52.78	38.598
Volusia County						
Fatalities	86	97	90	86	87	89.2
Fatality Rate[16]	1.59	1.80	1.66	1.55	1.51	1.622
Injuries	4,460	4,702	5,210	5,251	5,750	5,074.6
Injury Rate[17]	82.69	87.49	95.98	94.68	100.41	92.250
Property Damage Only	2,128	3,178	4,339	4,607	4,840	3,818.4
Property Damage Only Rate[15]	39.46	59.13	79.93	83.07	84.52	69.222

Figure 8 Flagler County Auto Crash Rate per 100 Million VMT

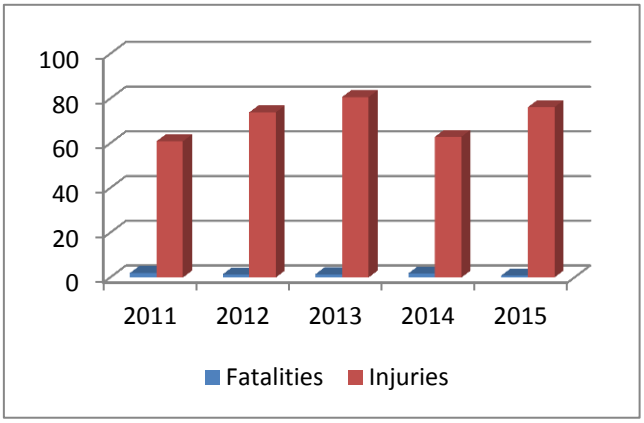
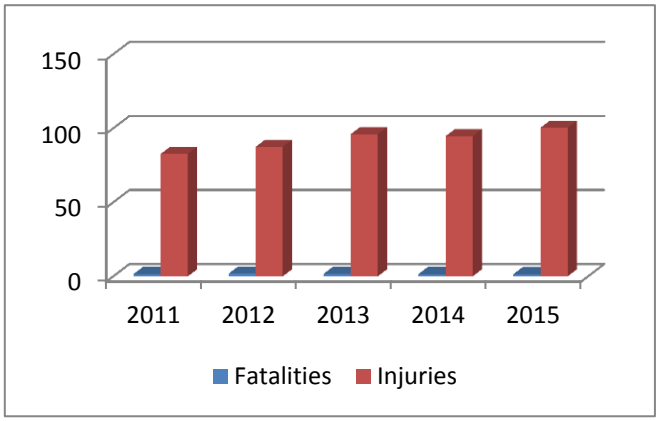


Figure 9 Volusia County Auto Crash Rate per 100 Million VMT



Source: Florida's Integrated Report Exchange System

[13] Fatality Rate (Per 100 Million VMT)

[14] Injury Rate (Per 100 Million VMT)

[15] Property Damage Only Rate (Per 100 Million VMT)

Auto fatalities reported in Flagler County indicate a slightly decreasing trend over the five-year period with an increase in fatalities reported in 2014, a decrease again in 2015; however, injuries spiked in 2015 and property damage only indicates a steady increase over the five year period. Auto fatalities reported in the table above indicate some variation in recent years, but auto injuries and property damage only indicate a steady increase in recent years in Volusia County.

The Metropolitan Planning Organizations (MPOs) shall establish performance targets for number of fatalities, rate of fatalities, number of serious injuries, rate of serious injuries and number of non-motorized fatalities and non-motorized serious injuries. Target means a quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period required by the FHWA. Each performance measure is based on a 5 year rolling average as described in the table 15 above.

Table 19 Flagler and Volusia County Bicycle Crashes

Year	2011	2012	2013	2014	2015	5-Yr Rolling Average
Flagler County						
Fatalities	0	0	2	1	0	0.6
Injuries	16	23	31	29	34	26.6
Volusia County						
Fatalities	6	1	5	4	4	4
Injuries	144	180	201	175	192	178.4

Figure 10 Flagler County Bicycle Crashes

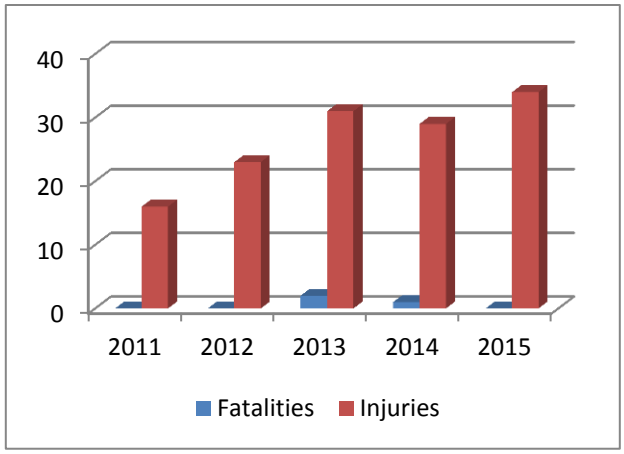
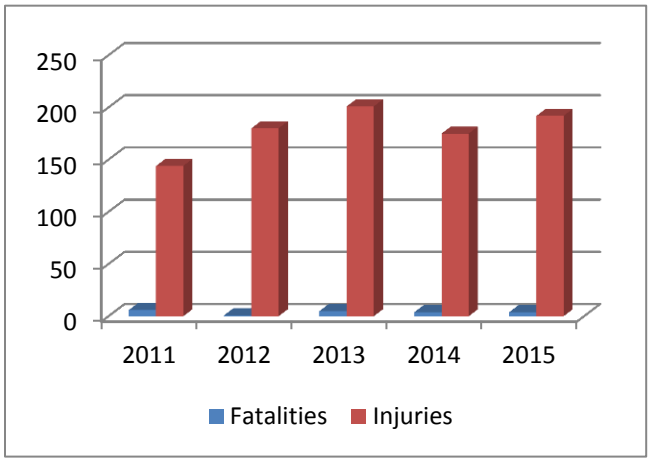


Figure 11 Volusia County Bicycle Crashes



Source: Florida's Integrated Report Exchange System

Bicycle fatalities and injuries reported in Flagler and Volusia Counties are shown in the table above. Bicycle fatalities decreased in Flagler County with an increase in 2013, but bicycle injuries increased in recent years. The data appears to show a slight trend of increased bicycle fatalities, except for a decrease in 2012. Injuries also increased in Volusia County.

Table 20 Flagler and Volusia County Pedestrian Crashes

Year	2011	2012	2013	2014	2015	5-Yr Rolling Average
Flagler County						
Fatalities	6	2	0	0	2	2
Injuries	14	26	26	18	25	21.8
Volusia County						
Fatalities	18	16	19	25	17	19
Injuries	188	179	224	213	199	200.6

Figure 12 Flagler County Pedestrian Crashes

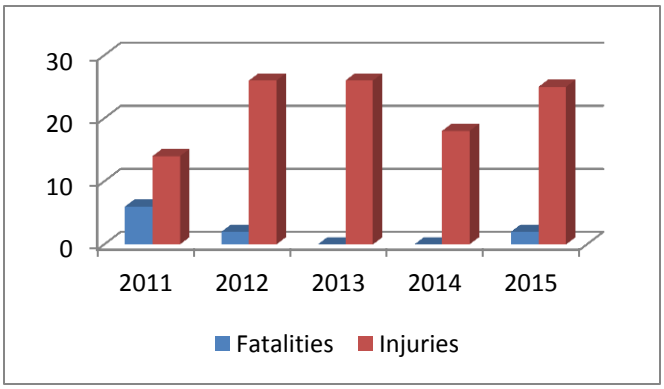
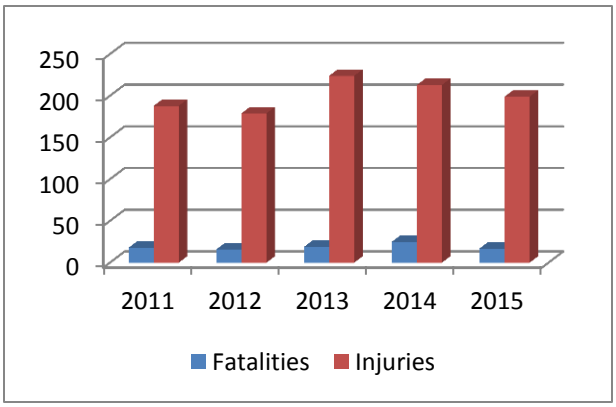


Figure 13 Volusia County Pedestrian Crashes



Source: Florida's Integrated Report Exchange System

Pedestrian fatalities and injuries reported in Volusia and Flagler Counties are shown in the table above. In Flagler County, pedestrian fatalities spiked in 2011, but remained stable in other years, but injuries increased and slightly drop in 2015. The data indicates pedestrian fatalities and injuries varied peaking in 2013 and 2014 respectively in Volusia County.

However, overall vehicular crashes continue to rise and crashes with injuries show quite an increase. Crashes resulting in fatalities do appear to have increased in Volusia, but they are generally stable over time. Fatalities in Flagler are lower in 2015, but increased in 2014.

Intersection related crashes reported in Volusia and Flagler Counties indicate an increasing trend over the five-year period. These high crash intersection related locations are further considered for an in-depth analysis to evaluate the nature and severity of these crashes.

Table 21 Intersection Related Crashes

Year	Flagler County	Volusia County
2012	342	2,104
2013	415	2,944
2014	507	3,059
2015	601	3,273
2016	624	3,332

Figure 14 Flagler County Intersection Related Crashes

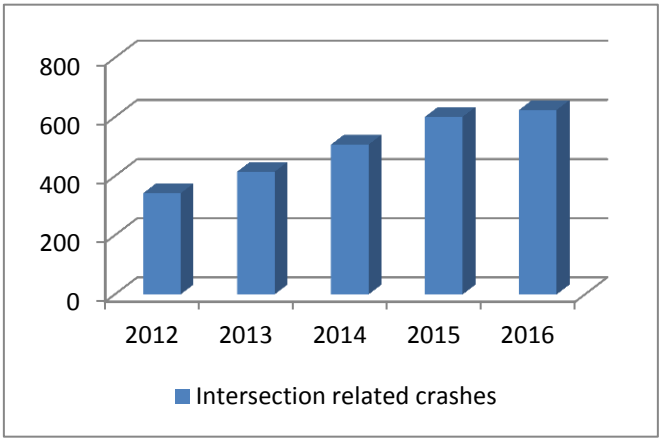
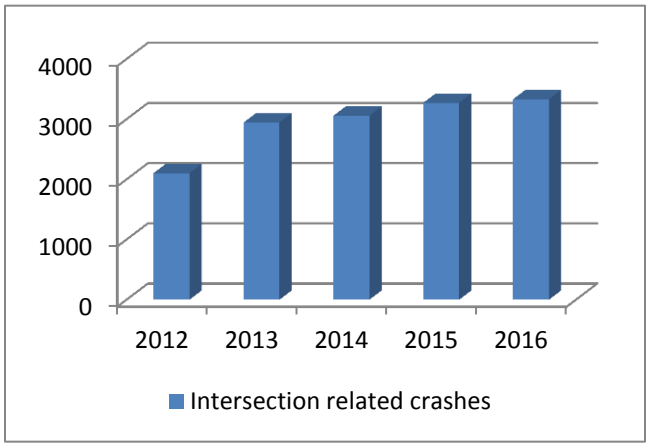


Figure 15 Volusia County Intersection Related Crashes



Source: Signal Four Analytics

The tables below show the total number of high crash intersection locations in Flagler and Volusia Counties. A minimum crash count is five.

Table 22 Intersection Related High Crash Locations – 2015

Rank	Intersection Name	Crash Count	City
1	Cypress Point Pkwy & Palm Coast Pkwy SW & Palm Coast Pkwy & Boulder Rock Dr & Palm Coast Pkwy NW	59	Palm Coast
2	S Clyde Morris Blvd & Beville Rd	49	Daytona Beach
3	S Ridgewood Ave & W International Speedway Blvd & N Ridgewood Ave	47	Daytona Beach
4	W International Speedway Blvd & CR-4009 & Williamson Blvd & S Williamson Blvd & N Williamson Blvd	45	Daytona Beach
5	W International Speedway Blvd & SR-483 & N Clyde Morris Blvd & S Clyde Morris Blvd	44	Daytona Beach

6	Midway Ave & W International Speedway Blvd	42	Daytona Beach
7	Dunlawton Ave & S Nova Rd	41	Port Orange
8	SR-40 & Williamson Blvd & W Granada Blvd	40	Ormond Beach
9	Veterans Memorial Pkwy & Broward Ave & Saxon Blvd	37	Orange City
9	Mason Ave & Ridgewood Ave & N Ridgewood Ave	37	Holly Hill
9	N Yonge St & W Granada Blvd & US-1 & S Yonge St	37	Ormond Beach
9	Tomoka Farms Rd & W International Speedway Blvd & N Tomoka Farms Rd	37	Unincorporated
9	Old Kings Rd N & Palm Coast Pkwy & Palm Coast Pkwy Se & Old Kings Rd & Palm Coast Pkwy NE	37	Palm Coast
10	Dunlawton Ave & Yorktowne Blvd	34	Port Orange

Table 23 Intersection Related High Crash Locations – 2016

Rank	Intersection Name	Crash Count	City
1	S Clyde Morris Blvd & Beville Rd	63	Daytona Beach
2	W International Speedway Blvd & SR-483 & N Clyde Morris Blvd & S Clyde Morris Blvd	61	Daytona Beach
3	S Ridgewood Ave & W International Speedway Blvd & N Ridgewood Ave	45	Daytona Beach
4	Tomoka Farms Rd & W International Speedway Blvd & N Tomoka Farms Rd	43	Unincorporated
5	N Yonge St & W Granada Blvd & US-1 & S Yonge St	41	Ormond Beach
5	Old Kings Rd N & Palm Coast Pkwy & Palm Coast Pkwy Se & Old Kings Rd & Palm Coast Pkwy NE	41	Palm Coast
6	W International Speedway Blvd & CR-4009 & Williamson Blvd & S Williamson Blvd & N Williamson Blvd	40	Daytona Beach
7	Beville Rd & S Ridgewood Ave	36	Daytona Beach
8	Mason Ave & Ridgewood Ave & N Ridgewood Ave	35	Holly Hill
8	W Granada Blvd & N Nova Rd & SR-5a & S Nova Rd	35	Ormond Beach
9	Veterans Memorial Pkwy & Broward Ave & Saxon Blvd	32	Orange City
10	S Nova Rd & Spruce Creek Rd	31	Port Orange

Figure 16 Intersection Related High Crash Locations - 2015

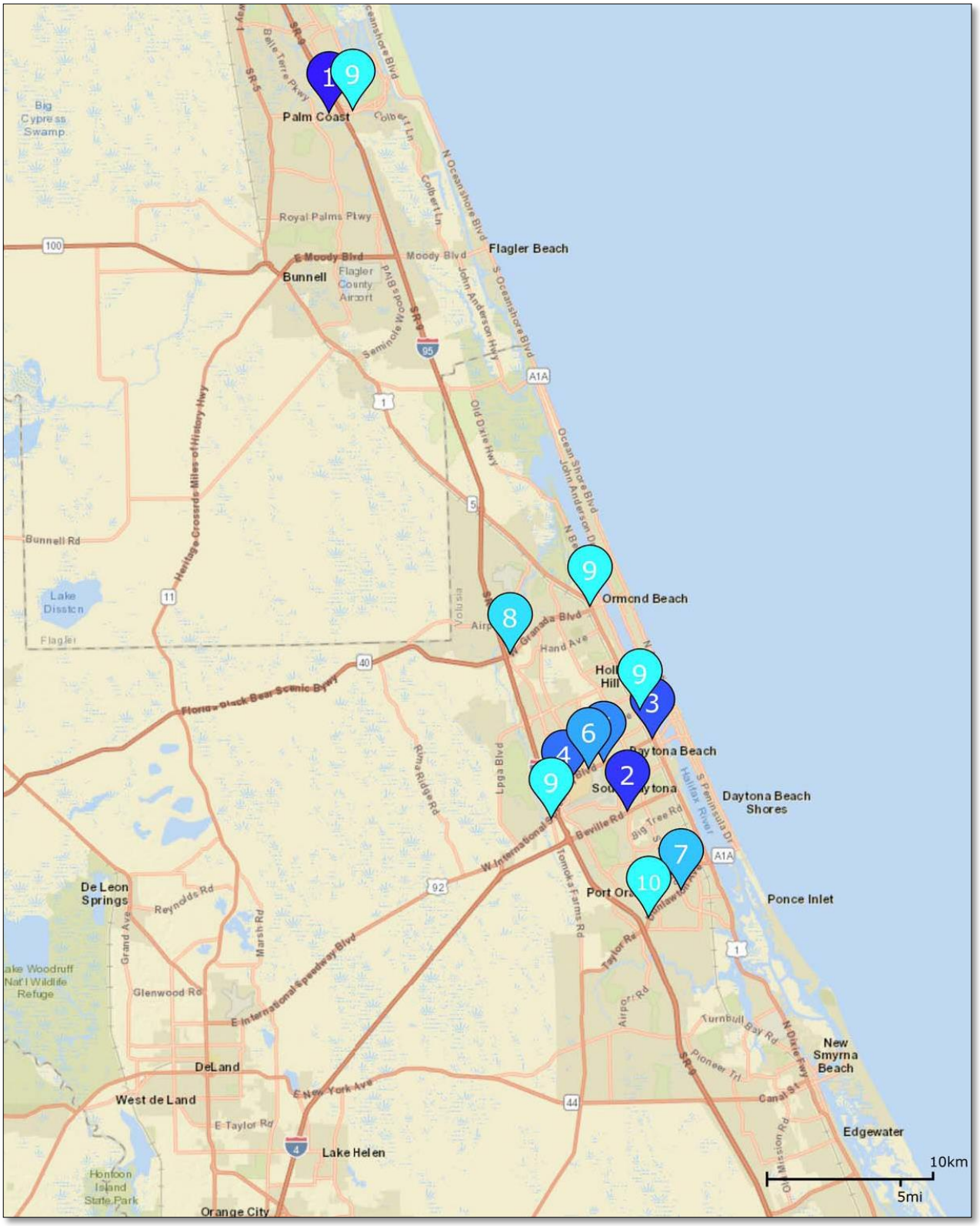
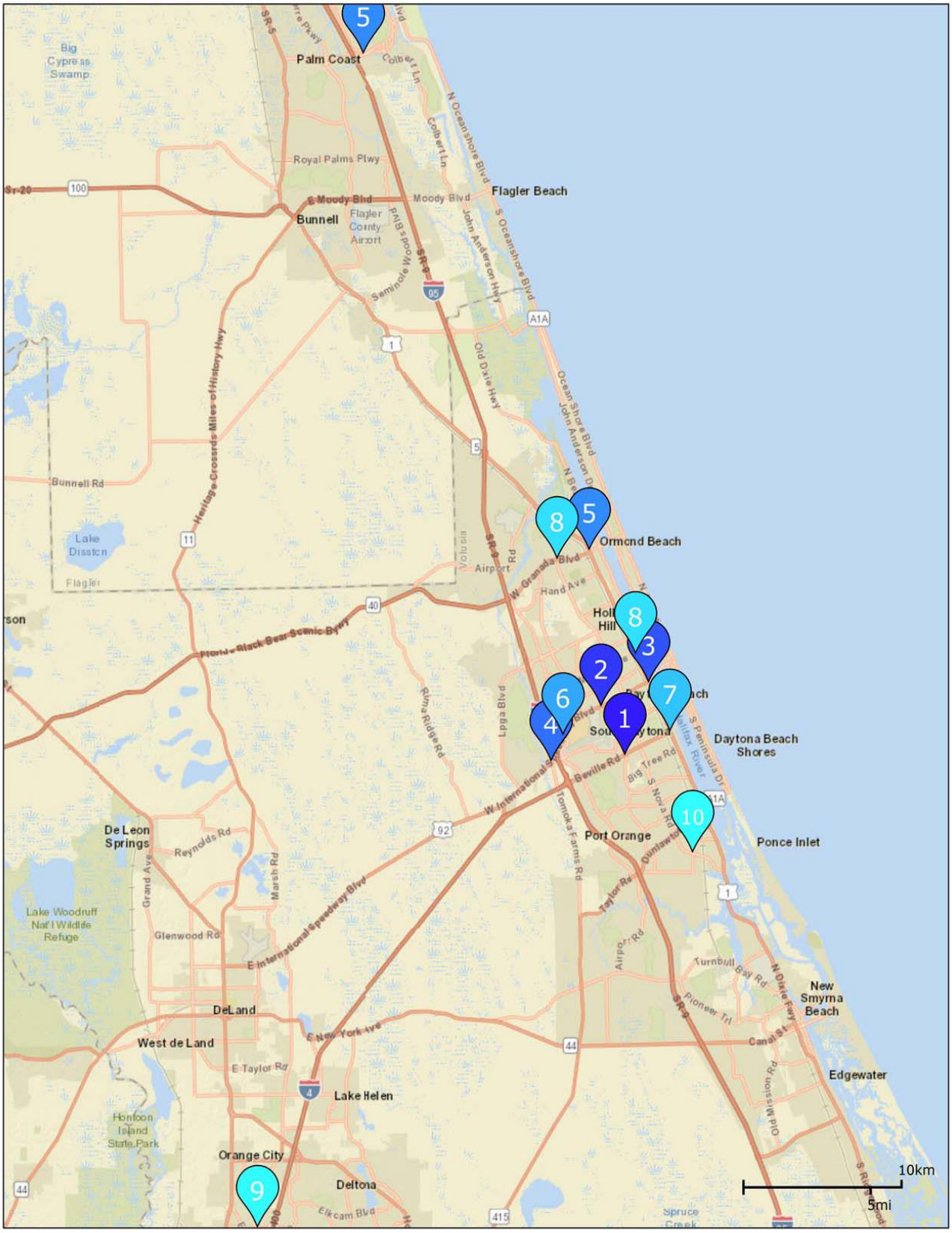


Figure 17 Intersection Related High Crash Locations - 2016



Source: Signal Four Analytics

The tables below show the Bike/Ped high crash intersection locations. A minimum crash count is three.

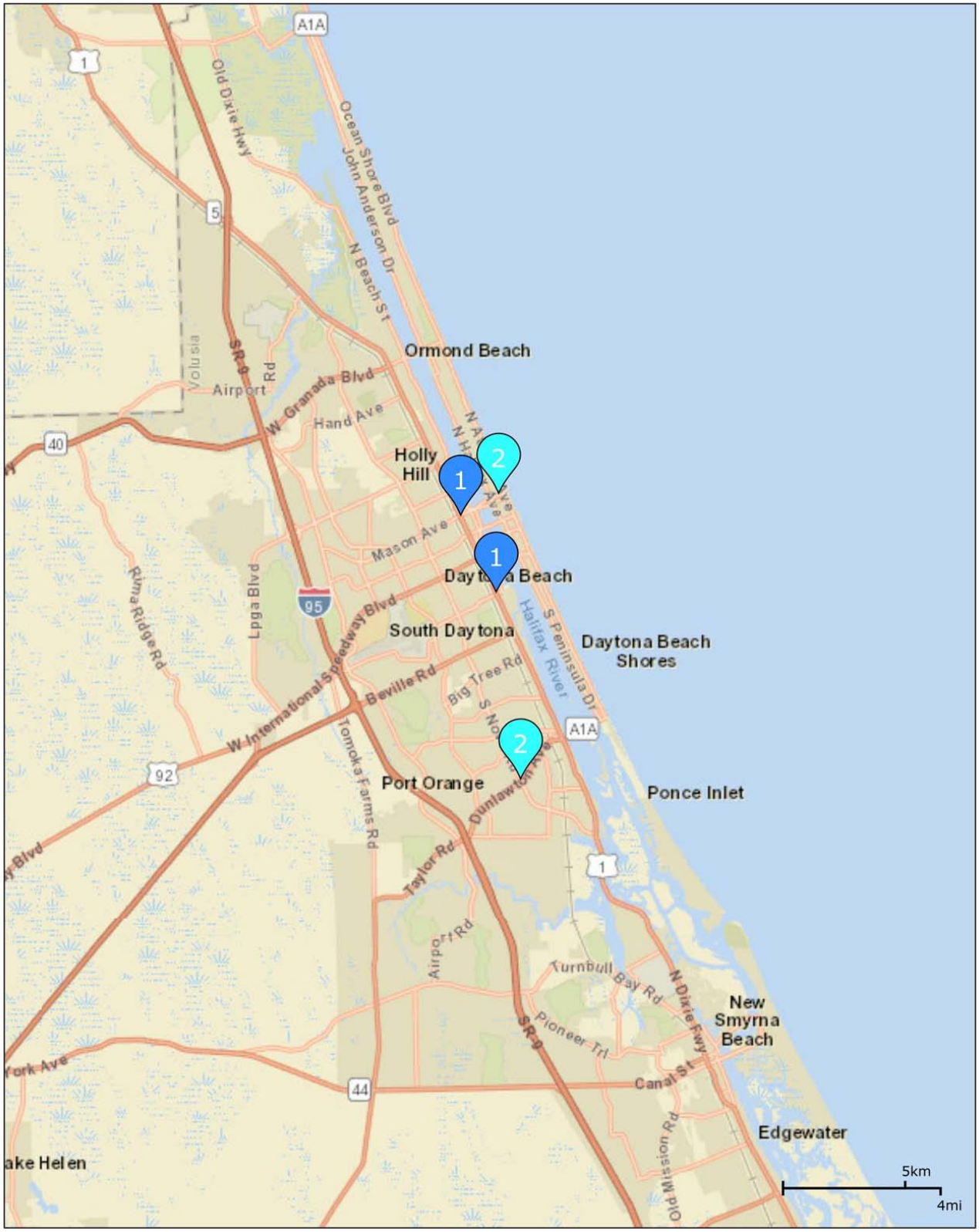
Table 24 Intersection Related Bike/Ped High Crash Locations – 2015

Rank	Intersection Name	Crash Count	City
1	Mason Ave & Ridgewood Ave & N Ridgewood Ave	37	Holly Hill
1	S Ridgewood Ave & Bellevue Ave	19	Daytona Beach
2	Dunlawton Ave & S Nova Rd	41	Port Orange
2	Seabreeze Blvd & N Wild Olive Ave	22	Daytona Beach

Table 25 Intersection Related Bike/Ped High Crash Locations – 2016

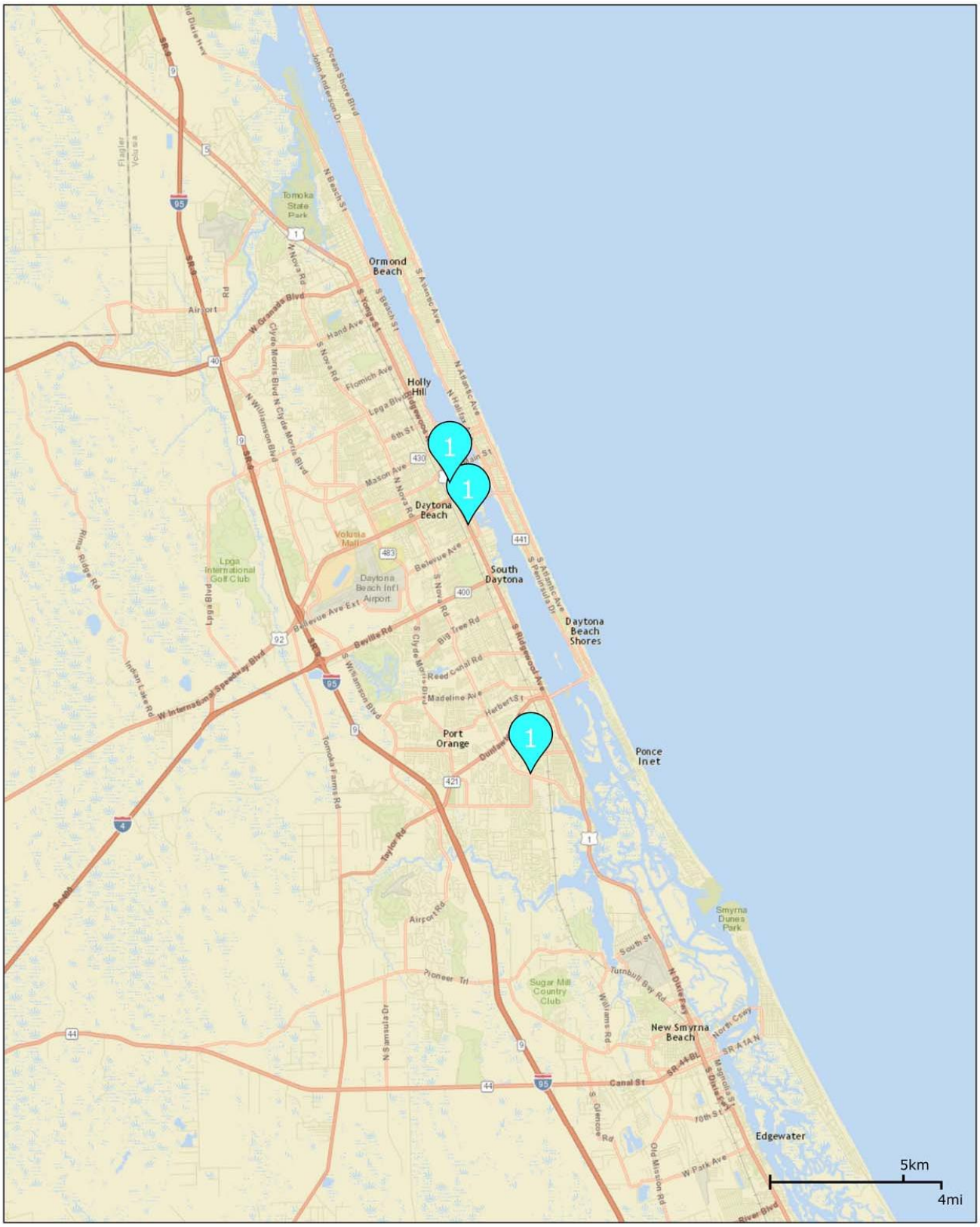
Rank	Intersection Name	Crash Count	City
1	S Nova Rd & Spruce Creek Rd	31	Port Orange
1	Cedar St & S Ridgewood Ave	8	Daytona Beach
1	Dr Mary Mcleod Bethune Blvd & N Ridgewood Ave	7	Daytona Beach

Figure 18 Intersection Related Bike/Ped High Crash Locations – 2015



Source: Signal Four Analytics

Figure 19 Intersection Related High Crash Location - 2016



Source: Signal Four Analytics

APPENDIX

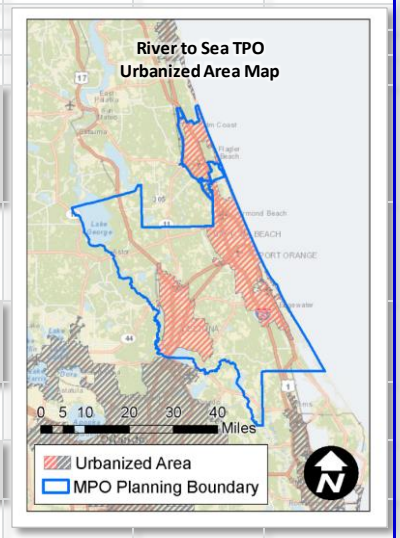
Table 26 FDOT MPO Mobility Performance Measures

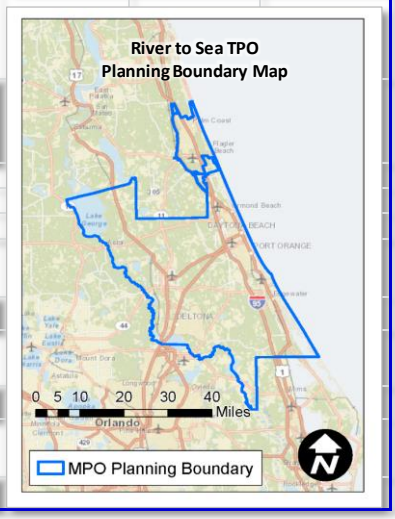
Flagler (County Boundary)								
Networks/Measures	A: Daily vehicle miles traveled (Millions)	B:Percent travel meeting LOS criteria in the peak hour	C: Travel time reliability in the peak hour	D:Daily vehicle hours of delay (Thousands)	E: Percent miles severely congested	F:Daily combination truck miles traveled (Thousands)	G:Freight travel time reliability in the peak hour	H:Daily combination truck hours of delay (Thousands)
A: National Highway System	1.6	>99%		1.0	<1%	120		0.1
B: Interstate	1.0	>99%	98%	0.2	<1%	94	91%	0.1
C: Strategic Intermodal System	1.1	>99%		0.4	<1%	100		0.1
D: State Highway System	1.6	>99%		1.3	<1%	120		0.2
E: Freeways	1.0	>99%	98%	0.2	<1%	94	91%	0.1
F: Non-freeways (SHS)	0.7	>99%		1.1	<1%	29		0.1
Volusia (County Boundary)								
Networks/Measures	A: Daily vehicle miles traveled (Millions)	B:Percent travel meeting LOS criteria in the peak hour	C: Travel time reliability in the peak hour	D:Daily vehicle hours of delay (Thousands)	E: Percent miles severely congested	F:Daily combination truck miles traveled (Thousands)	G:Freight travel time reliability in the peak hour	H:Daily combination truck hours of delay (Thousands)
A: National Highway System	8.6	>99%		7.9	<1%	460		0.7
B: Interstate	4.2	99%	85%	2.5	<1%	370	79%	0.5
C: Strategic Intermodal System	5.1	>99%		3.7	<1%	390		0.6
D: State Highway System	8.7	>99%		8.7	<1%	470		0.8
E: Freeways	4.2	99%	85%	2.5	<1%	370	79%	0.5
F: Non-freeways (SHS)	4.5	>99%		6.2	<1%	110		0.2
FDOT Supplied MPO Mobility Performance Measure Analyses for 2014 (River To Sea TPO)								
						Date:	11/20/2015	
River To Sea (Urbanized Area)						Source:	FDOT Transportation Statistics Office	
Networks/Measures	A: Daily vehicle miles traveled (Millions)	B:Percent travel meeting LOS criteria in the peak hour	C: Travel time reliability in the peak hour	D:Daily vehicle hours of delay (Thousands)	E: Percent miles severely congested	F:Daily combination truck miles traveled (Thousands)	G:Freight travel time reliability in the peak hour	H:Daily combination truck hours of delay (Thousands)
A: National Highway System	8.6	>99%		6.0	<1%	450		0.6
B: Interstate	4.3	99%	91%	1.7	<1%	370	84%	0.4
C: Strategic Intermodal System	5.1	>99%		2.5	<1%	380		0.5
D: State Highway System	8.5	>99%		6.6	<1%	460		0.6
E: Freeways	4.3	99%	91%	1.7	<1%	370	84%	0.4
F: Non-freeways (SHS)	4.2	>99%		4.9	<1%	89		0.2
River To Sea (MPO/TPO Boundary)								
Networks/Measures	A: Daily vehicle miles traveled (Millions)	B:Percent travel meeting LOS criteria in the peak hour	C: Travel time reliability in the peak hour	D:Daily vehicle hours of delay (Thousands)	E: Percent miles severely congested	F:Daily combination truck miles traveled (Thousands)	G:Freight travel time reliability in the peak hour	H:Daily combination truck hours of delay (Thousands)
A: National Highway System	10.1	>99%		8.8	<1%	580		0.9
B: Interstate	5.1	99%	88%	2.7	<1%	460	81%	0.6
C: Strategic Intermodal System	6.2	>99%		3.9	<1%	490		0.7
D: State Highway System	10.2	>99%		9.9	<1%	590		0.9
E: Freeways	5.1	99%	88%	2.7	<1%	460	81%	0.6
F: Non-freeways (SHS)	5.0	>99%		7.1	<1%	130		0.3
Flagler, Volusia (County Boundary)								
Networks/Measures	A: Daily vehicle miles traveled (Millions)	B:Percent travel meeting LOS criteria in the peak hour	C: Travel time reliability in the peak hour	D:Daily vehicle hours of delay (Thousands)	E: Percent miles severely congested	F:Daily combination truck miles traveled (Thousands)	G:Freight travel time reliability in the peak hour	H:Daily combination truck hours of delay (Thousands)
A: National Highway System	10.2	>99%		8.9	<1%	580		0.9
B: Interstate	5.1	99%	88%	2.7	<1%	460	81%	0.6
C: Strategic Intermodal System	6.3	>99%		4.0	<1%	500		0.7
D: State Highway System	10.3	>99%		10.0	<1%	590		0.9
E: Freeways	5.1	99%	88%	2.7	<1%	460	81%	0.6
F: Non-freeways (SHS)	5.2	>99%		7.3	<1%	130		0.3

Source: Unpublished data, Transportation Statistics Office, Florida Department of Transportation, 11/20/2015

Measures	Definitions
A: Daily vehicle miles traveled	The product of vehicle traffic volume and road (segment) length.
B: Percent travel meeting LOS criteria in the peak hour	The percentage of travel meeting FDOT's LOS standards is determined by summing the vehicle miles traveled on roadways operating acceptably and then dividing by the total system vehicle miles traveled. Acceptably is defined as LOS D (two-hour peak) for the 7 largest counties, LOS D (one-hour peak) for other urbanized areas, and LOS C (one-hour peak) everywhere else.
C: Travel time reliability in the peak hour	For seven largest counties travel time reliability is defined as the percentage of freeway trips traveling at least 45 mph. For all others travel time reliability is defined as the percentage of freeway trips travelling at greater than or equal to 5 mph below the posted speed limit.
D: Daily vehicle hours of delay	Delay is the product of directional hourly volume and the difference between travel time at "threshold" speeds and travel time at the average speed. The thresholds are based on LOS B as defined by FDOT.
E: Percent miles severely congested	The percentage of miles severely congested is determined by summing the miles of roadway operating at LOS F in the peak hour and then dividing by the total highway miles.
F: Daily combination truck miles traveled	Determined using combination truck traffic volume and segment length. Combination trucks are defined by FHWA as Classification 8-13.
G: Freight travel time reliability in the peak hour	For seven largest counties freight travel time reliability is defined as the percentage of freeway trips by combination trucks traveling at least 45 mph. For all others travel time reliability is defined as the percentage of freeway trips by combination trucks travelling at greater than or equal to 5 mph below the posted speed limit.
H: Daily combination truck hours of delay	Combination truck hours of delay is based on combination truck speed. Delay is calculated as the product of directional hourly volume and the difference between travel time at "threshold" speeds (at LOS B) and travel time at the average speed.

Roadway Networks	Definitions
A: National Highway System	Includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility
B: Interstate	Includes all interstate highway system roadways
C: Strategic Intermodal System	Florida's transportation system composed of facilities and services of statewide and interregional significance, including appropriate components of all modes.
D: State Highway System	All roadways that the Florida Department of Transportation operates and maintains.
E: Freeways	Multilane, divided highways with at least two lanes for exclusive use of traffic in each direction and full control of ingress and egress.
F: Non-freeways (SHS)	Arterials and highways of the State Highway System which are not freeways





Source: Florida Department of Transportation

ABBREVIATIONS AND ACRONYMS

AADT	Average Annual Daily Traffic
CAC	Citizens Advisory Committee
CMP	Congestion Management Process
LOS	Level of Service
MPA	Metropolitan Planning Area
MPO	Metropolitan Planning Organization
NHS	National Highway System
SHS	State Highway System
SIS	Strategic Intermodal System
TCC	Technical Coordinating Committee
TMA	Transportation Management Area
TPO	Transportation Planning Organization
TWG	Technical Working Group
VMT	Vehicle Miles Traveled

DEFINITIONS

1. **ARTERIAL ROADS -** The group of roads constituting the highest degree of through traffic movement and largest proportion of total travel. The interstate highway system is part of the federal arterial highway system. The arterial road system is further broken down to principal and minor arterial roads.
2. **CENTERLINE MILES** - Length of a road, without regard to number of lanes.
3. **COLLECTOR ROADS** - The group of roads providing a link between through traffic movement and direct private property access functions, typically within a given county or urban area, linking major property uses to each other or to the arterial highway system. The collector road system is composed of rural major collector roads, rural minor collector roads, urban major collectors and urban minor collectors. The collector road system is further broken down to major and minor collector roads.
4. **FEDERAL-AID ELIGIBLE ROADS** - Roads on the National Highway System (NHS) or functionally classified as Urban Collector / Rural Major Collector, or higher. They are eligible for federal aid from the Federal Highway Administration for disaster recovery and other purposes.
5. **FUNCTIONAL CLASSIFICATION -** Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the character of service they are intended to provide. Five functional classification categories are common to rural and urban roads. The rural or urban designation is part of the complete functional classification designation; e.g., Urban Minor Arterial.

Urban	Rural
Principal Arterial	Principal Arterial
Minor Arterial	Minor Arterial
Major Collector	Major Collector
Minor Collector	Minor Collector
Local	Local

6. **INTERMODAL FACILITIES** - Intermodal facility' means "a transportation element that accommodates and interconnects different modes of transportation and serves intrastate, interstate, and international movement of people and goods.

7. **INTERSTATE HIGHWAY SYSTEM** - The Dwight D. Eisenhower National System of Interstate and Defense Highways (commonly known as the Interstate Highway System, Interstate Freeway System, Interstate System, or simply the Interstate) is a network of controlled-access highways that forms a part of the National Highway System of the United States.
8. **LANE MILES** - The length of a roadway (in miles) multiplied by the number of traffic lanes. Only pavement normally used should be included; shoulders should not be included, except if shoulders are legally used in peak hours.
9. **LOCAL STREETS** - The class of roads having direct property access as their primary purpose. Although providing the largest proportion of road miles, this system contributes little to total highway travel due to short trip lengths and low volumes.
10. **MOBILITY** - The ease with which people and goods move across the transportation network. This definition emphasizes mobility from the user perspective. It is often viewed as having the following dimensions:
    a. quantity of travel - the magnitude of the use of a facility or service;
    b. quality of travel - travel conditions and the effects of congestion;
    c. accessibility - the ease with which people can connect to the multimodal transportation
    d. system; and
    e. utilization - whether or not a transportation system is properly sized and has the ability to accommodate growth.
11. **NATIONAL HIGHWAY SYSTEM (NHS) -** A system designated by Congress that includes all Interstate routes, urban and rural principal arterials, the Strategic Highway Network (STRAHNET) and Strategic Highway Network Connectors and connectors to approved Intermodal Facilities.
12. **SEVERELY CONGESTED –** a roadway segment operating with a volume to capacity ratio equal to or greater than 1.0.
13. **CONGESTED –** a roadway segment operating with a volume to capacity ratio greater than 9.0 and less than 1.0.
14. **STATE HIGHWAY SYSTEM (SHS)** - Roads under the jurisdiction of the Florida Department of Transportation, state-chartered expressway authorities, and other state agencies.
15. **STRATEGIC INTERMODAL SYSTEM (SIS)** - Highways and other modes important for transportation in Florida.
16. **STRATEGIC HIGHWAY NETWORK (STRAHNET)** - Interstate and non-Interstate highways essential to strategic mobility. These highways can support mobilization and sustainment of forces during a defense contingency. These routes constitute part of the NHS.
17. **VEHICLE MILES TRAVELED (VMT)** - The number of vehicle miles of travel (VMT) is an indicator of the travel levels on the roadway system by motor vehicles. VMT is estimated for the given time period. This estimate is based upon traffic volume counts and roadway length. A comparison of VMT for successive time periods is important for determining travel trends. An increase or decrease in population is one factor that can contribute to an increase or decrease in VMT. Other factors that can affect a change in VMT include economic growth, relatively affordable auto travel costs, tourism, low levels of public transit, sprawl, and related factors.

Figure 20 National Highway System (NHS)

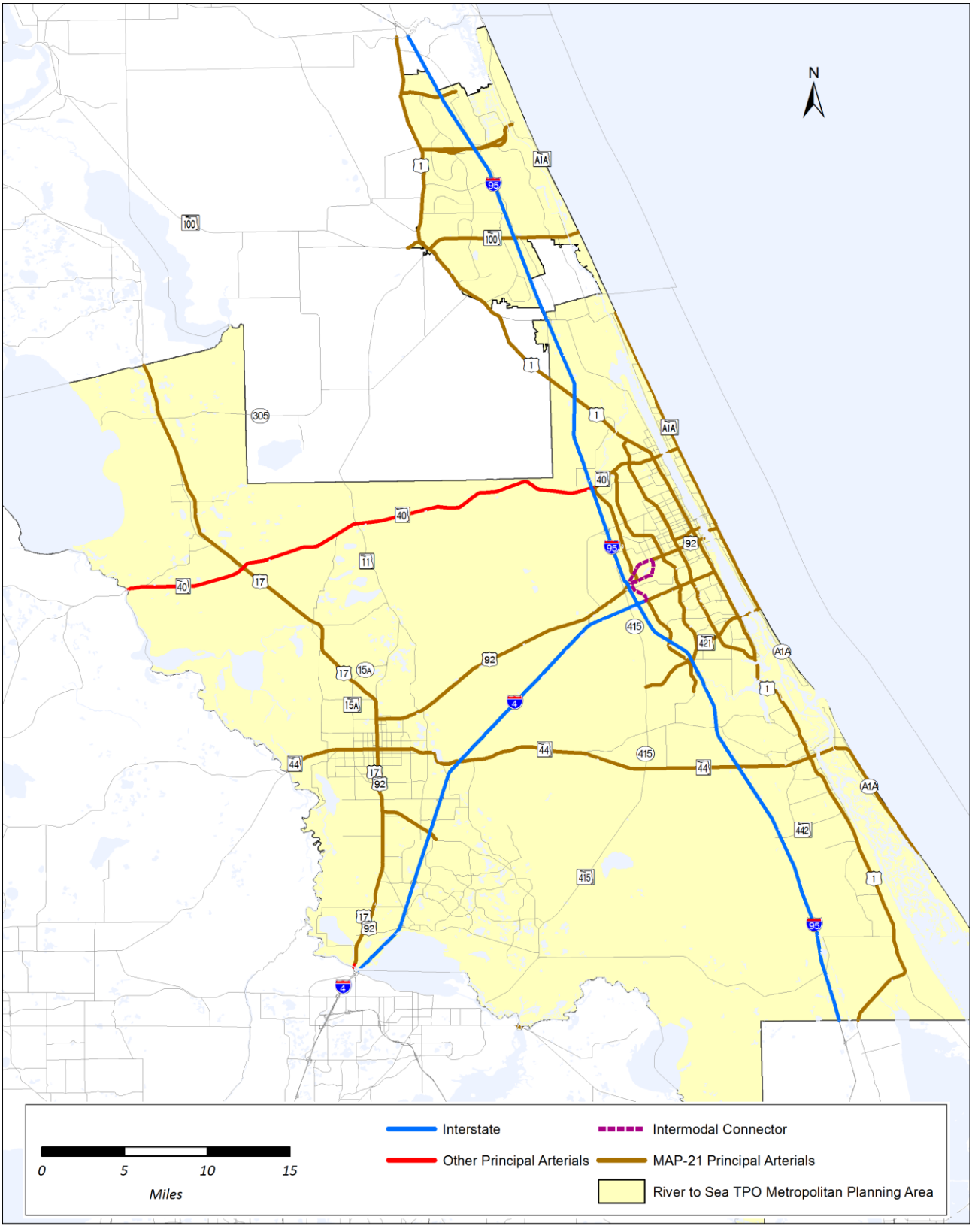


Figure 21 Strategic Intermodal System (SIS)

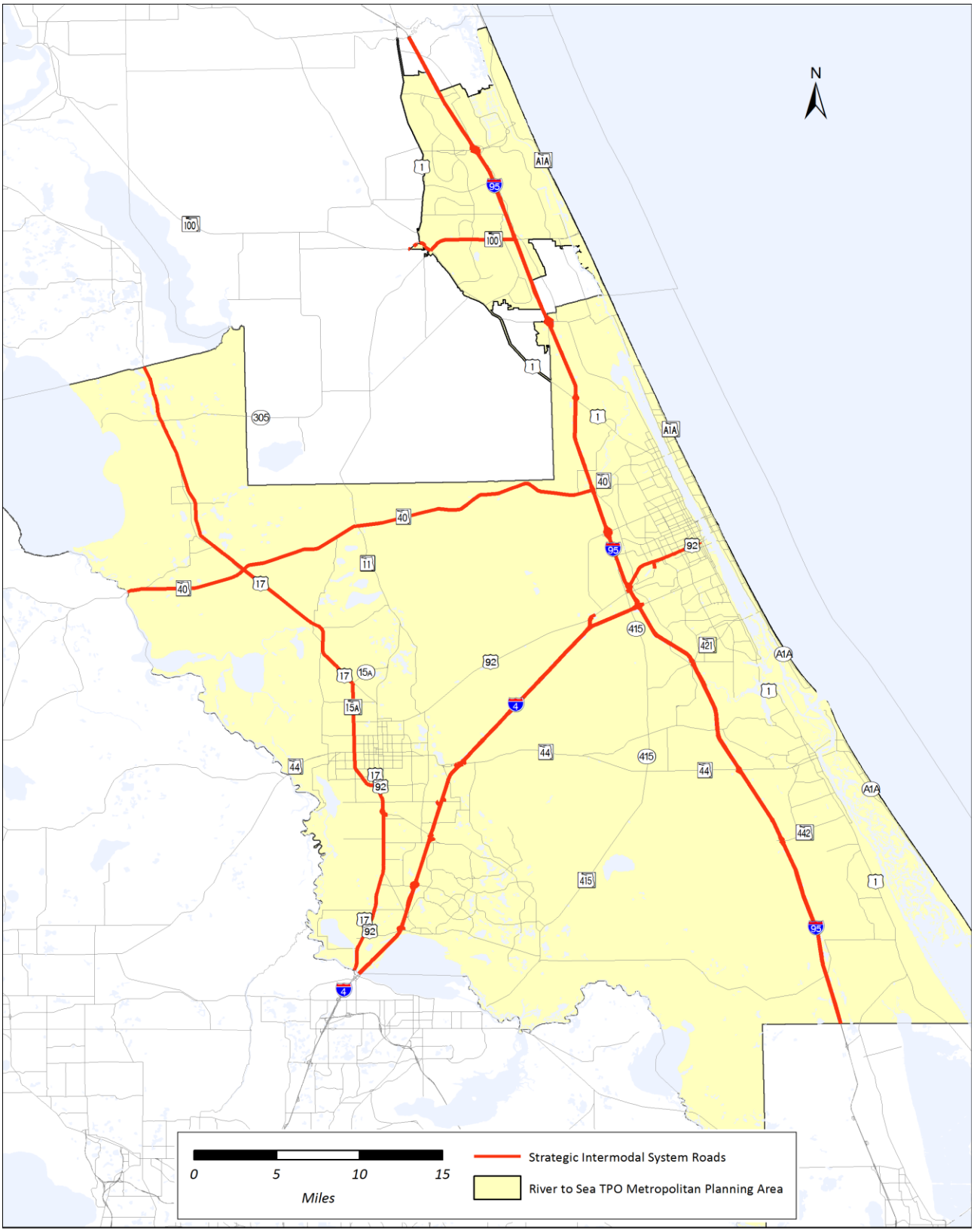


Figure 22 State Highway System (SHS)

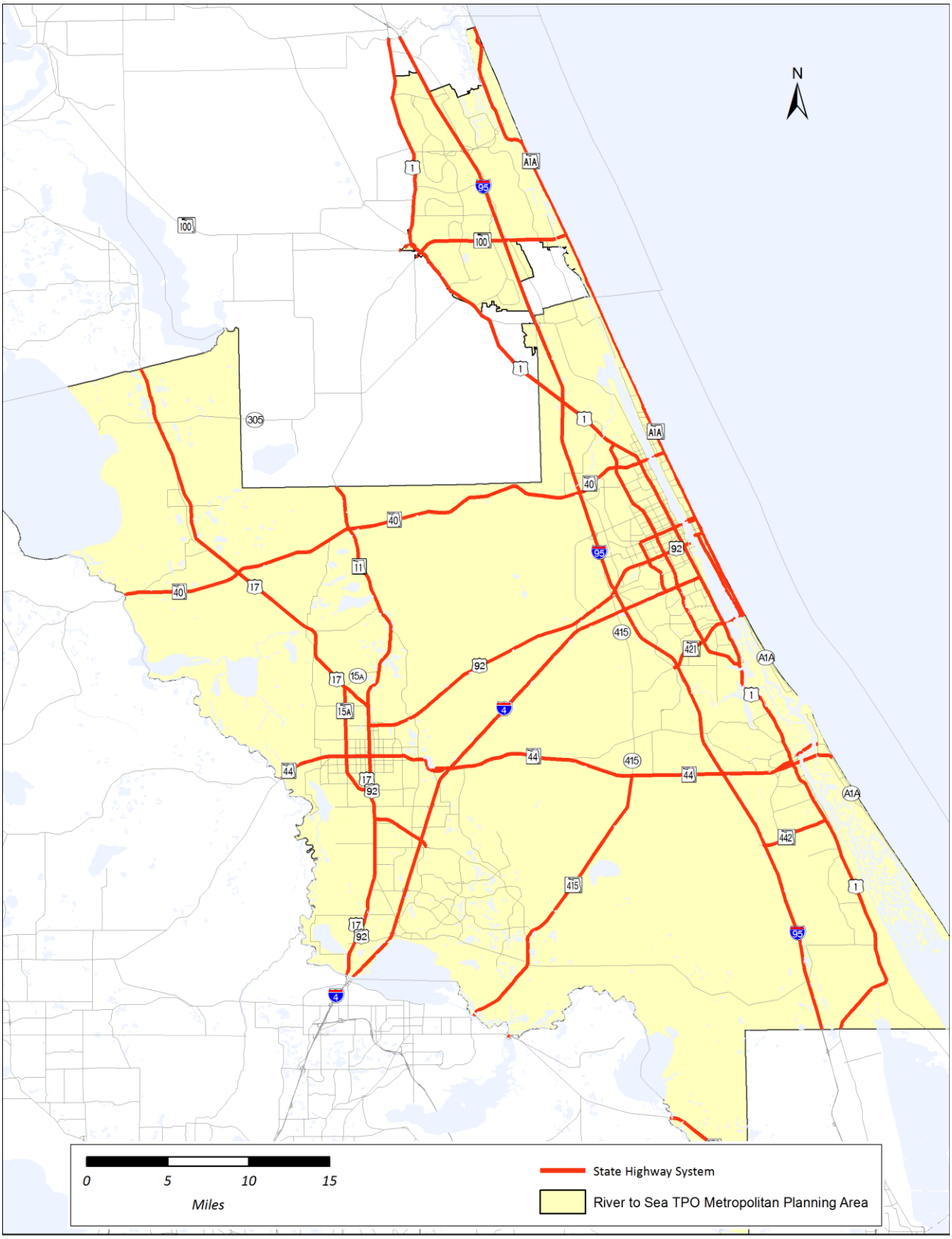
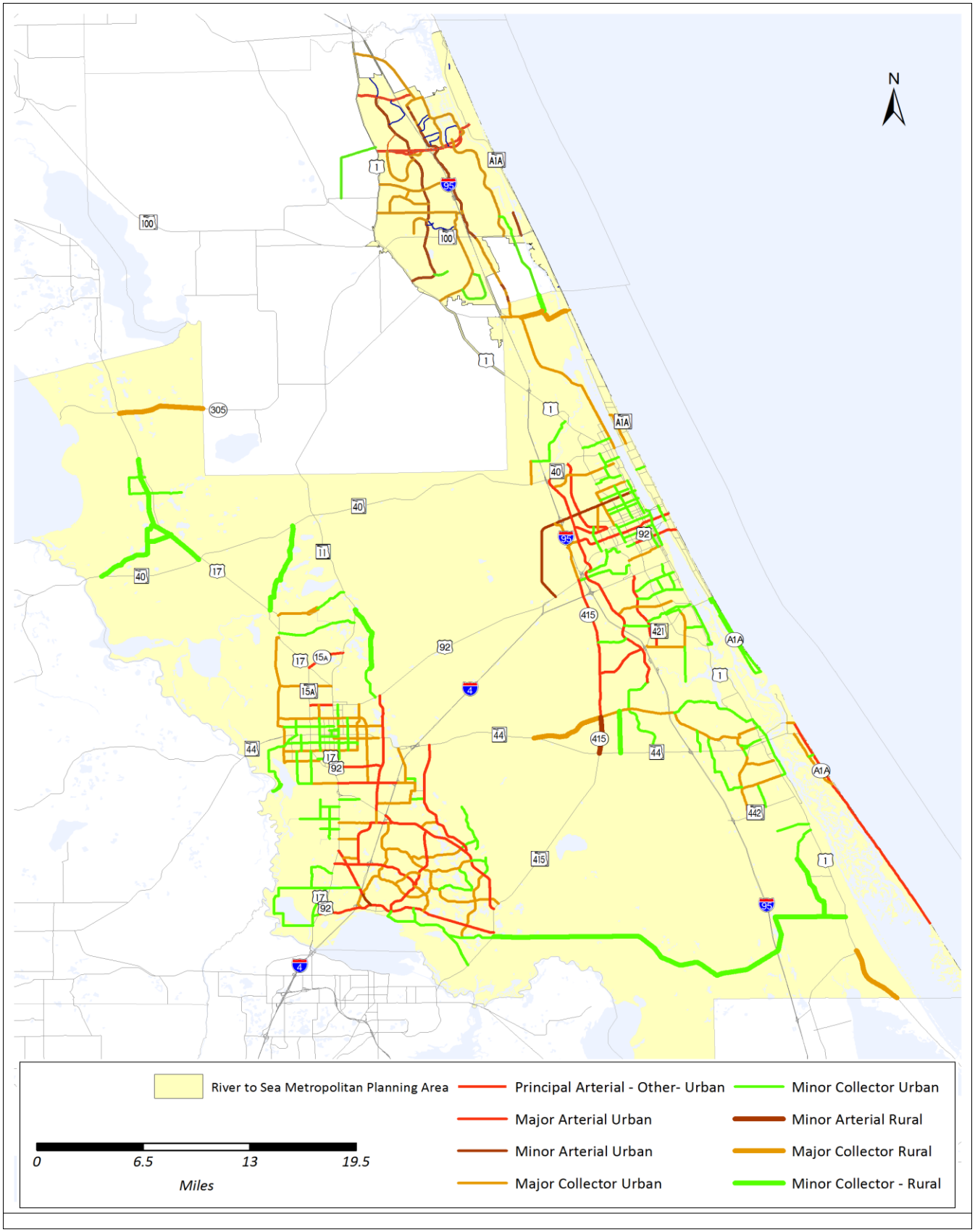



Figure 23 Off System Arterials and Collectors