

OCALA/MARION TPO 2018 ITS STRATEGIC PLAN UPDATE



Table of Contents

<i>List of Tables</i>	5
<i>Chapter 1 Introduction</i>	1
Background	1
Study Area	2
Stakeholders	2
<i>Chapter 2 ITS Vision, Objectives, and Goals</i>	4
ITS Vision	4
Goals	6
Objectives	7
<i>Chapter 3 Existing Intelligent Transportation Systems and Operations</i>	11
Transportation Network	11
Roads	11
Bicycle Facilities	13
Pedestrian Facilities	13
Transit Facilities	14
Freight Facilities	14
Evacuation Routes	14
Fire Stations	18
Emergency Operations Center	18
Parking Management	18
Traffic Control and Management	20
Traffic Management Centers	20
Traffic Signal Operations	20
Adaptive Signal Control	23
ITS Communication	23
Portable Variable Message Signs	25
ITS Devices	25
City and County Staffing	28

City of Ocala Staffing.....	28
Marion County Staffing.....	29
FDOT Initiatives.....	29
I-75 FRAME.....	30
Automated Traffic Signal Performance Measures.....	30
RITIS.....	31
Freight Advanced Traveler Information System (FRATIS).....	31
Connected and Autonomous Vehicles.....	32
Capacity Improvement Projects.....	32
<i>Chapter 4 Traffic Operations Analysis.....</i>	<i>35</i>
Segment Scoring Methodology.....	35
Roadway Classification.....	35
Maximum Acceptable Volume (MAV) Ratio	36
Existing Volume.....	36
Safety Significance	41
Freight Significance	44
Evacuation Significance.....	44
Existing ITS	47
Scoring Methodology Matrix	47
Top 25 Ranked Analysis Segments.....	50
<i>Chapter 5 Regional Opportunities and Potential ITS Strategies and Technologies</i>	<i>56</i>
Regional Opportunities	56
Traffic Operations and Management.....	56
Performance Measures.....	57
Traffic Management Center Integration.....	57
Emergency Management.....	57
Potential Solutions.....	57
Strategic Solutions	57
Interagency Coordination	58
Performance Measures.....	61

Technological Solutions	61
Advanced Traffic Controller	62
Vehicle Speed and Volumes.....	62
Closed Circuit Television (CCTVs).....	62
Bluetooth® Travel Time Devices	62
Traveler Information Dissemination	63
Adaptive Traffic Control Systems.....	63
Emergency Vehicle Preemption.....	63
Transit Signal Priority	63
Roadside Units/DSRC	64
Traffic Signal Detection.....	65
Active Arterial Management.....	65
Traffic Incident Management Program)	65
Active Incident Management.....	66
Emergency Preparation, Security, Response, and Recovery	66
Traffic and Weather Information Systems.....	67
Work Zone Management	67
Variable Speed Limits.....	68
<i>Chapter 6 Proposed ITS Projects</i>	<i>69</i>
Methodology to Identify Projects.....	69
Recommended Projects.....	70
Staffing Needs and Estimates	75
<i>Chapter 7 Regional ITS Architecture Compliance.....</i>	<i>79</i>

List of Figures

Figure 1 Study Area	3
Figure 2 Major Corridors and Key Facilities	12
Figure 3 Existing Transit Service.....	15
Figure 4 Freight Routes and Volumes	16
Figure 5 Evacuation Routes.....	17
Figure 6 Emergency Management.....	19
Figure 7 Existing Traffic Signal Locations	22
Figure 8 Available ITS Communication Infrastructure	24
Figure 9 ITS Device Locations.....	26
Figure 10 Available Traffic Count Stations	27
Figure 11 Capacity Improvements in the TIP	34
Figure 12 Roadway Classification.....	37
Figure 13 V/C Ratios for Roadway Segments Analyzed	38
Figure 14 Existing Volumes for Two-Lane Rural Roadways Analyzed.....	39
Figure 15 Existing Volumes for Urban and 4+ Lane Rural Roadways Analyzed.....	40
Figure 16 Total Crash Rate per Segment (Fatal, Incapacitating Injury, and PDO)	42
Figure 17 Fatal and Incapacitating Injury Crash Rate per Segment.....	43
Figure 18 Freight Routes and Volume.....	45
Figure 19 Existing Evacuation Routes	46
Figure 20 Existing ITS	48
Figure 21 Top 25 Ranked Segments by Facility Type	55
Figure 22 Example Detour for Northbound I-75 Closure	59
Figure 23 Example Coordination Process During I-75 Incident	60
Figure 24 ITS Project Selection Elements.....	69
Figure 25 Proposed ITS Projects	72
Figure 26 Proposed Emergency Preemption	74
Figure 27 Example of City of Ocala Interface (data flows) to Field Equipment	80
Figure 28 Example of Service Package for Traffic Signal Control, City of Ocala (ATMS03).....	81

List of Tables

Table 1 Status of Recommended Short-term 2008 ITS Projects.....	5
Table 2 City of Ocala Staffing	28
Table 3 Marion County Staffing	29
Table 4 Scoring Methodology Matrix.....	49
Table 5 Top 25 Ranked SIS Segments	51
Table 6 Top 25 Ranked Regional Segments	52
Table 7 Top 25 Ranked Non-Regional Segments	53
Table 8 Top 25 Ranked Collector Segments.....	54
Table 9 Summary of ITS Needs	56
Table 10 Proposed Project Corridors.....	71
Table 11 Cost Estimate for Emergency Vehicle Preemption System.....	73
Table 12 Summary of ITS Needs	76
Table 13 City of Ocala Staffing	77
Table 14 Marion County Staffing	78

Chapter 1 | Introduction

Background

The Marion/Ocala Transportation Planning Organization (TPO), with regional stakeholders including the Cities of Ocala, Belleview, Dunnellon, and Marion County, are seeking to continue to improve traffic flow and the reliability of their transportation systems through the application of Intelligent Transportation Systems (ITS). ITS technologies advance transportation safety and mobility and enhance productivity by integrating advanced communication technologies into transportation infrastructure and into vehicles. ITS technologies allow communities to use their roadway capacity to its fullest potential by actively monitoring and managing traffic signals on the regions roadways and responding to crashes and incidents more effectively. Additionally, ITS has the potential of extending the life of a roadway by delaying the need to widen roads and add lanes at intersections a few years more.

The purpose of this report is to document the development of a strategic plan to guide continuing updates of ITS in the study area, which encompasses the City of Ocala, City of Belleview, and Marion County region. This plan ultimately identifies specific projects to deploy ITS consistent with local, state and federal policies, regulations, standards, and guidelines.

This plan was preceded by the region's first ITS plan in 2008. That document laid the foundation for the region's ITS strategy. It inventoried the existing conditions of the region's traffic management equipment and made extensive recommendations about the ITS equipment necessary to improve the operations of the region's transportation network. Ten years later, many of these recommendations have been followed and there is far more ITS equipment in the field.

However, there is still needs to expand and enhance the ITS system in Marion County. Demands on the roadway system continues to increase with increasing freight and commuter traffic. In the next 10 years, disruptive technology such as rideshare, connected vehicles and autonomous vehicles have the potential to be more mainstream and will require a more robust sources of data and infrastructure, which will come from the ITS network.

There are as expected, there are costs associated with the ITS network expansion. Capital costs for new ITS technology, communication technology, and traffic signal equipment are expected. There will also be a need for additional staff to manage expanding network of ITS systems and devices. However, the cost of doing nothing will be greater in the long run. As congestion increases, loss of productivity due to delays moving good, services, and workers in the region are expected. Increases in crash rates and severity may results in a direct increase in insurance costs to vehicle owners.

This plan will document those new additions, identify new needs and improvements that can be made, and will identify additional strategies to improve the function of the existing ITS network.

Study Area

The study area, commonly referred to as north-central Florida, includes Marion County and the Cities of Ocala, Belleview, and Dunnellon. Major roadways through the area include I-75, US- 441, US-41, US-301 and US-27 in the north-south direction and SR-40, SR-464, and SR-200 in the east-west direction. These roadways form the major transportation network within the study area. The study area is shown in **Figure 1**.

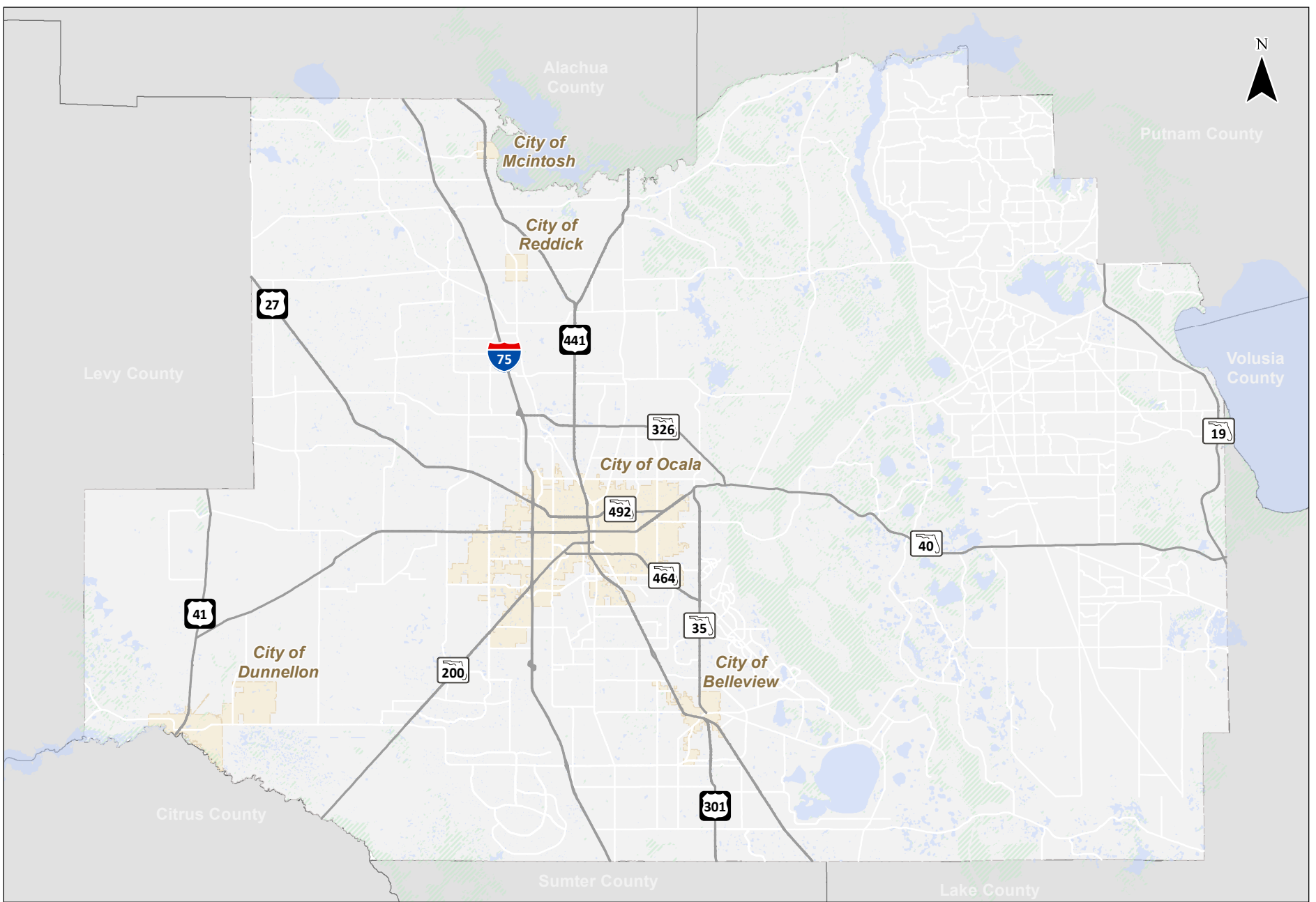
The Ocala-Marion County major road network includes 38 miles of freeway (I-75) with 228 lane-miles. The freeway system carries 2.54 million daily vehicle-miles of travel (VMT), with an average daily volume per lane of 11,384 vehicles. There are 210 additional miles of State roadways, with 880 lane-miles. The other State roadways carry 3.06 million daily VMT, with an average annual daily volume per lane of 5,337 vehicles. The non-State system of major County and City roadways include 742 miles with 1,784 lane-miles. The non-State system carries 3.18 million daily VMT, with an average annual daily volume per lane of 2,509 vehicles. The State system is more heavily traveled than the county and local network, accounting for 64 percent of the travel demand while representing only 38 percent of the available lane miles.

Stakeholders

A coalition of stakeholders and system users was created to ensure the successful development of the ITS Strategic Plan for Marion County. This coalition was used to gather input and build consensus in the development of the ITS Strategic Plan. The key stakeholders include the transportation and public safety agencies that own and operate transportation systems throughout Marion County. The following is a list of the key stakeholders involved with the development of the ITS Strategic Plan:

- Ocala/Marion County TPO
- City of Ocala
- City of Belleview
- City of Dunnellon
- Florida Department of Transportation - District V
- Marion County
- Ocala Fire Department
- Ocala Police Department
- Marion County Sheriff's Office
- Florida Highway Patrol

Personal interviews and workshops were held with key stakeholder representatives, focusing on understanding the existing system and identifying individual agency needs as they relate to overall regional ITS needs. The primary outcome of these discussions was the set of regional transportation needs and goals presented in Chapter 2.



Study Area
Ocala / Marion County

Figure
1

Chapter 2 | ITS Vision, Objectives, and Goals

ITS Vision

This ITS strategic plan is a successor and update to the original ITS plan Ocala/Marion TPO prepared in 2008. At that time, ITS was in its initial stages and local agencies were preparing for the installation of new ITS technology to improve the operation of the region's transportation network. Therefore, the 2008 plan focused on a comprehensive assessment of the existing transportation network and its shortcomings, then provided a variety of recommendations for improving the performance of the transportation network using ITS technology. The 2008 plan concentrated heavily on new ITS equipment that could be installed to improve the performance of the transportation network. Recommendations included establishing both the City of Ocala and Marion County Traffic Management Centers (TMC), upgrading traffic signal technology, adding ITS devices, expanding the fiber optic interconnect cable network, improving the communication hubs, and many other forms of equipment. **Table 1** summarizes the status of the short-term (0-5 year) and mid-term (6-10 years) ITS projects recommended in the 2008 ITS Strategic Plan.

Ten years later, many of those earlier recommendations were implemented. ITS technologies have advanced significantly over the past decade and the local agencies also operate at a much higher technical level. During stakeholder meetings over the past year, the needs identified included continuing to expand and enhance the current system, as well as needs that were more strategic in nature, such as improving upon the existing processes and improving interagency coordination. Those needs include:

- Improve interagency coordination, detour and traffic incident management
- Center-to-Center integration between City of Ocala, Marion County, and Florida Department of Transportation District 5 Traffic Management Centers
- Increase staff levels to appropriately operate and maintain the ITS system
- Education and training for staff
- Better information and data to identify when to updated signal timing plans
- Improve fire department response times
- System expansion
 - Communication
 - Advanced traffic signal controllers
 - Cameras and data collection

Table 1 Status of Recommended Short-term 2008 ITS Projects

Project Title	Description	Status
Short-term (0-5 years)		
Upgrade Ocala TMC	Remodel TMC to provide more space and capabilities to monitor and manage City Traffic Signal System	Complete
Marion County TMC	Construct new TMC to monitor and manage County Traffic Signal System	Complete
Incident Management and Operations	Improve multi-agency traffic-responsive corridor management.	Emergency Operations Center implemented. Daily coordination not formalized.
Traffic Signal System Improvements	Improve traffic signals on key corridors	Complete
Data Collection System	Streamline the process of managing traffic data and implement automation for collecting data	On-going
Railroad Crossing Information System	Improve traffic management and reduce delays associated with at-grade railroad crossings.	No Progress Achieved
Mid-term (6-10 years)		
City of Ocala: Expand Traffic Signal System	Expand the implementation of new signal and detection technology to better respond to congestion and incidents	On-going
Marion County: Expand Traffic Signal System	Expand the implementation of new signal and detection technology to better respond to congestion and incidents	On-going
City of Ocala and Marion County TMC Center-to-Center Integration	Prepare software and hardware interface needed to share traffic data and video and provide redundant back-up operational capabilities	Not Complete
TMC Center-to-Center Integration with FDOT	Interconnection between TMCs to share information locally and with FDOT Regional TMC in Orlando.	Not Complete

Therefore, while this ITS plan will still recommend expansion of the ITS system with new technologies, the focus will be include addressing the strategic shortcomings of the region’s ITS system highlighted during the stakeholder meetings.

It is crucial to the efficient function of a modern transportation network that ITS technologies be integrated into an overall transportation system and operations management (TSMO) strategic plan. While this plan will document the current state of the ITS network in the region and make recommendations for its continual improvement, it will also serve as a framework for how ITS decisions should be made in the region and what local jurisdictions value when it comes to the benefits that ITS technologies offer. There will be many new ITS technologies in the coming years. This document describes the range of available technologies as well as a methodology for determining what technologies are appropriate for deployment in the region.

Goals

The Ocala-Marion County ITS stakeholder group established the following set of goals to guide the ITS Strategic Plan:

1. **Facilitate the efficient multimodal movement of goods and people.** The transportation system represents a significant ITS investment. To realize the best return on this investment, it is necessary to have the right technology and actively manage the system to improve quantifiable and pre-established performance metrics such as travel time and travel time reliability. This is not just for vehicular transportation, but also other modes of transportation, such as transit, biking or walking. The transportation system will use ITS technology to improve the traveling experience for all modes of transportation.
2. **Improve the safety and security of all network users.** The safe movement of people and goods is of primary importance across all travel modes. The central goal of this ITS strategic plan is to improve safety. Among other things, appropriately deployed ITS technologies can help reduce the number and impact of nonrecurring incidents and enhance the real-time user awareness of the current state of the system, which in turn allows the public to make more informed decisions regarding both their time and path of travel.
3. **Provide predictable transportation experience.** Travel time unreliability results in a significant cost to all system users and particularly so for those involved in freight movement. Appropriately-deployed ITS technologies can help improve system reliability and thus the efficient and effective use of the available transportation network.

The overarching thread that ties all the goals together is to deploy and maintain an ITS system that enables a safer and more effective use of the multimodal transportation network for all users. The existing ITS system has changed significantly in the past 10 years, with a variety of new equipment having been installed in that period. New detection and roadway cameras, adaptive signal technology, fiber optic cable, dynamic messaging signs, and signal performance technology have all been installed in the past 10 years, greatly increasing the resources available to local authorities. The existing equipment in the field has improved as well, as new generations of technology have been installed, increasing the capabilities

and flexibility of the ITS system. Significant performance benefits will continue over the next decade as well. Therefore, the primary focus of this ITS plan is (1) expand the appropriate deployment of currently-available technologies; (2) introduce the appropriate deployment of newly-available and emerging technologies; and (3) recommend operational strategies to encourage a more efficient and effective use of the entire multimodal transportation system. To that end, four objectives emerged during stakeholder meetings held this year that are meant to achieve these outcomes. These objectives are discussed below.

Objectives

Multiple meetings and discussions were held over the course of this project with all known stakeholders to assess the region's current ITS network and to identify desired improvements to the network. These conversations ranged from an assessment of the successes and shortcomings of the current network to future capabilities that are desired for the ITS network to make the region's transportation network more safe, efficient, and effective. As these diverse thoughts coalesced, several objectives for this new ITS plan emerged. These objectives will be the foundation of this ITS plan and are discussed below.

- Reduce system-wide delay for cars, trucks, and transit
- Reduce corridor delay for cars, trucks, and transit
- Improve reliability and predictability of travel

Reduce system-wide delay for cars, trucks and transit

The performance measure for this objective is Vehicle Hours of Delay (VHD). VHD per person per day is used by the Florida Department of Transportation to report on statewide facility performance and is collected yearly and produced in the FDOT Source Book. This statistic should be used in Marion County because it can be used to measure the impact of current and future ITS deployments within the County. Also, looking at trends over multiple years can help identify with VHD increases, which can be used as an indicator that corridors may need future capacity or ITS improvements.

Reduce corridor delay for cars, trucks and transit

There are several performance measures that can be used to measure this objective. At an intersection level these could include, volume, approach delay, movement delay, and phase or cycle failures. At the corridor level, it could include volumes, flow, travel time and delay. Establishing production of regular reports summarizing intersection and corridor performance will allow for identification of changes in trends and the need to revisit the operations.

Improve reliability and predictability of travel

The reliability of a roadway is just as important as the amount of congestion or delay, as the public tend to be less tolerant of unexpected delays that have a more disruptive effect on timely destination arrivals than everyday congestion. Specific measures have been developed by FHWA and adopted by many traffic management agencies to measure travel time reliability. They include the following:

- 90th or 95th percentile travel time - indicates how much delay can be expected on the heaviest

travel days. The 90th or 95th percentile travel times are reported in minutes and seconds and should be easily understood by commuters familiar with their trips.

- Buffer index - represents the extra time (or time cushion) that travelers should consider adding to their average travel time when planning trips to ensure on-time arrival. This extra time is added to account for any unexpected delay.
- Planning time index - represents the total travel time that should be planned when an adequate buffer time is included. The planning time index differs from the buffer index in that it includes typical delay as well as unexpected delay.
- Frequency that congestion exceeds some expected threshold - typically expressed as the percent of days or time that travel times exceed, or travel speeds fall below established thresholds.

Stakeholders also identified additional outcomes that support the objectives. These include consistent coordination and communication between local authorities managing the transportation network. In the past, these were often inadequate.

1. **Apply Quantifiable and Relevant Performance Measures.** The County and City traffic departments and TPO all expressed a desire for better performance measures of the transportation network.
2. **Improve TMC Resource Sharing.** Multiple stakeholders communicated a desire to establish a physical connection and provide interoperability between the County and City Traffic Management Center (TMC).
3. **Improve First Responder Response Times.** City of Ocala Fire Department discussed their desire to reduce their current response times for traffic incidents and other emergencies.

The four themes support the primary objectives, which are described in detail below.

Improve Coordination

The first objective of this ITS plan emerged from conversations during the stakeholder meetings about an inconsistent level of coordination that exists between the different agencies and authorities in the region. Currently, portions of the regional ITS network are separately managed by (a) different law enforcement agencies; (b) Marion County's Traffic Operations Department; and (c) Ocala's Traffic Operations Department. No single agency has access to the entire ITS network and associated data stores. Additionally, the various jurisdictions have not developed a pre-established set of communication protocols for use in the event of minor or major roadway incidents. Such communication protocols have been established for use during major events when the Emergency Operations Center is activated, but not during normal operations. This has led to numerous situations where responsible traffic agencies have not been made aware of traffic incidents, road closures, and detours implemented by law enforcement in a timely manner. This, in turn, has led to delays in implementing traffic control plans, signed detours and active management of the various incidents, leaving the public agencies and roadway users feeling frustrated.

Therefore, the first objective of this ITS plan is to improve coordination between these agencies. This can be partially accomplished through the installation of better equipment, but the emphasis of this change

must be in creating better data sharing agreements and procedures between the different agencies with a stake in these ITS technologies.

The performance measures necessary to confirm whether this objective has been achieved are two-fold. First, an agreement will be developed and approved by all affected agencies defining the specific protocols and procedures necessary to produce better ITS coordination. Once this is achieved, the measure will be completed. Second, quarterly evaluation of the implementation and effectiveness of the coordination agreement will be needed to identify improvements to the procedures and to determine whether the objective is being met to expectations of all parties. Scheduled implementation goals can be created as part of this plan and these quarterly evaluations will measure whether these implementation goals have been achieved.

Apply Quantifiable and Relevant Performance Measures

The second objective of this ITS plan focuses on the need expressed by stakeholders to better understand how their transportation network functions. Throughout much of the region, there is little data describing the everyday adequacy of roadways, signals, and other transportation infrastructure. This makes it challenging to understand the health of the overall transportation network, as well as what locations are most in need of improvement. Also, federal requirements from MAP-21 and FAST Act mandate establishment of performance measures which include infrastructure condition, congestion reduction and system reliability.

The solution to this is performance measures that can be used to quickly evaluate how the transportation network is functioning and identify locations where resources should be focused. Therefore, the objective is to modify or add equipment to the region that can create performance measures that will provide quantifiable benchmarks for the function of the region's different infrastructure. The City of Ocala is already pursuing this objective, having installed many signals with new technology that can provide real time data on the multiple functions of an individual intersection. With this new technology, the City can accurately monitor its signals and determine which signals are not performing well. However, the City does not yet have the staff necessary to fully realize the benefits of this technology. Part of this goal will include providing the staff required to properly utilize this technology.

Improve TMC Resource Sharing

The third objective is centered on the function of the City and County TMCs. These TMCs operate as the nerve center of their respective traffic management systems, monitoring the function of the overall transportation network maintained by the County and the City. These facilities monitor system performance and collect data such as volumes, speeds, signal function and status, location/duration/severity/time of traffic incidents, and other important features of the transportation network to manage the transportation network from one central location. Both the County and the City have enjoyed the powerful management capabilities these facilities provide but have been frustrated by the limited access they have to one another's resources.

The original ITS plan recommended that a sharing interface be developed and maintained between the two TMC's; among other things, this would also provide redundant back-up operational capabilities for each TMC, especially in the event that one of the TMCs was rendered inoperable, like during a major storm. Since each TMC currently only has access to its own traffic data, each TMC is operating less effectively than originally planned. Determining how to best create this resource sharing agreement will be difficult, as the TMCs use different and highly complex traffic signal software platforms, which will not allow simple integration. This will be discussed further in this plan.

The measure of this objective is the successful coordination of the City of Ocala and Marion County TMCs. While these two TMCs would still function separately, the goal is that both TMCs receive information about relevant traffic conditions occurring in the other TMC's jurisdiction. Another measure of success can be seen in the time that City and County staff are overseeing each TMC for monitoring and roadway system management purposes.

Improve First Responder Response Times

The final objective is an important need highlighted by the City of Ocala Fire Department personnel in the stakeholder meetings. More specifically, Fire Department officials would like to evaluate the ITS system in accordance with its ability to reduce first responder response time to accidents and emergencies around the region. Achieving this objective will have real and consequential safety effects for all system users. This also has an economic impact, as reducing response time will allow fire and rescue personnel in each fire station to cover more distance, reducing the number of fire stations needed to serve the region.; quicker response times will also reduce the duration of any congestion that results from the incident, resulting in time savings for all system users. However, this will be a challenging goal to pursue as City and County traffic departments currently do not have enough funding or staff to support the installation of large numbers of emergency related equipment. This equipment, such as signal preemption technology, may also negatively affect traffic flow in the area.

This objective can be achieved using a variety of ITS technology, such as signal preemption technology, which will be discussed in Chapter 5. The measure for this objective is a reduction of emergency response time by at least 5% within the City of Ocala.

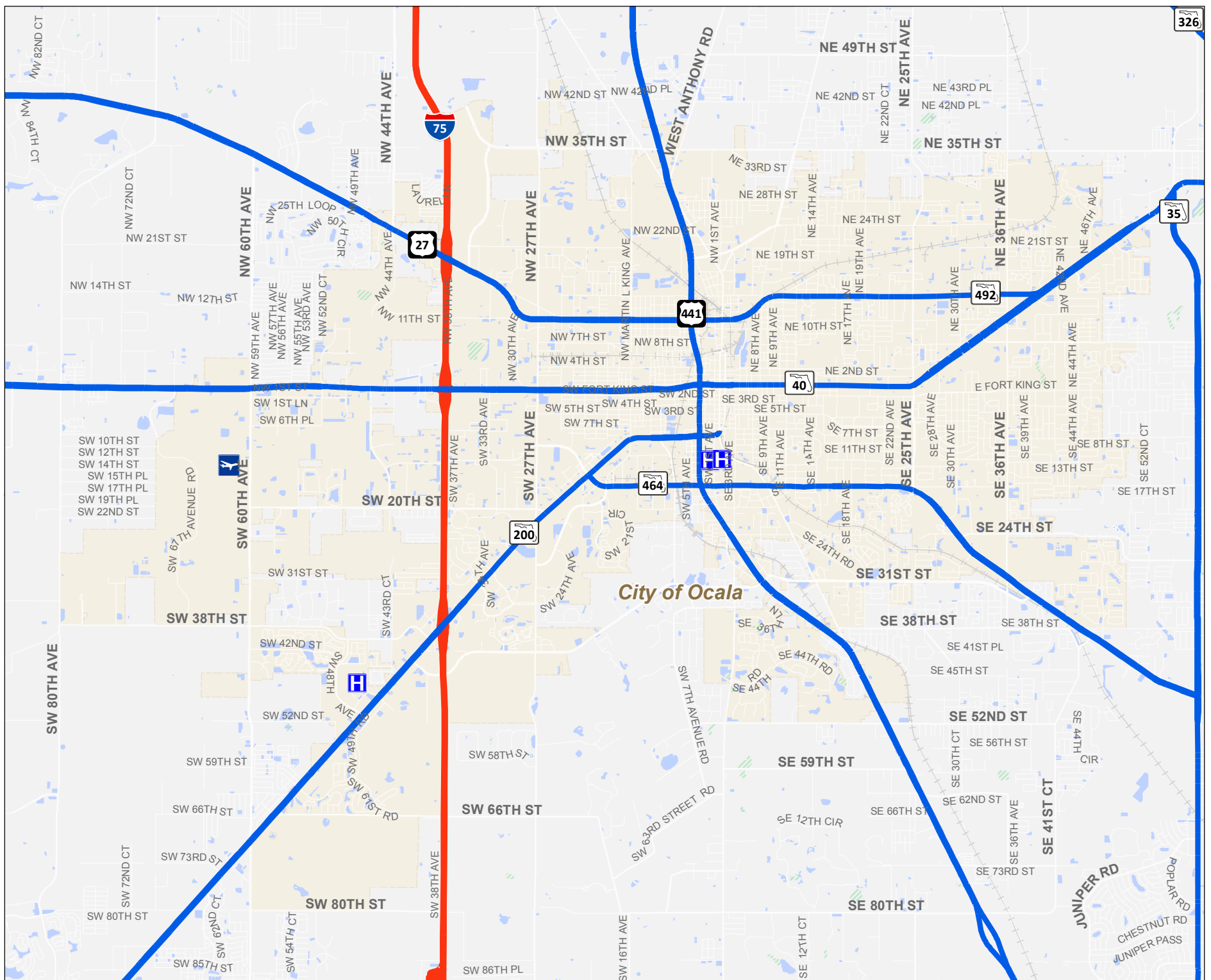
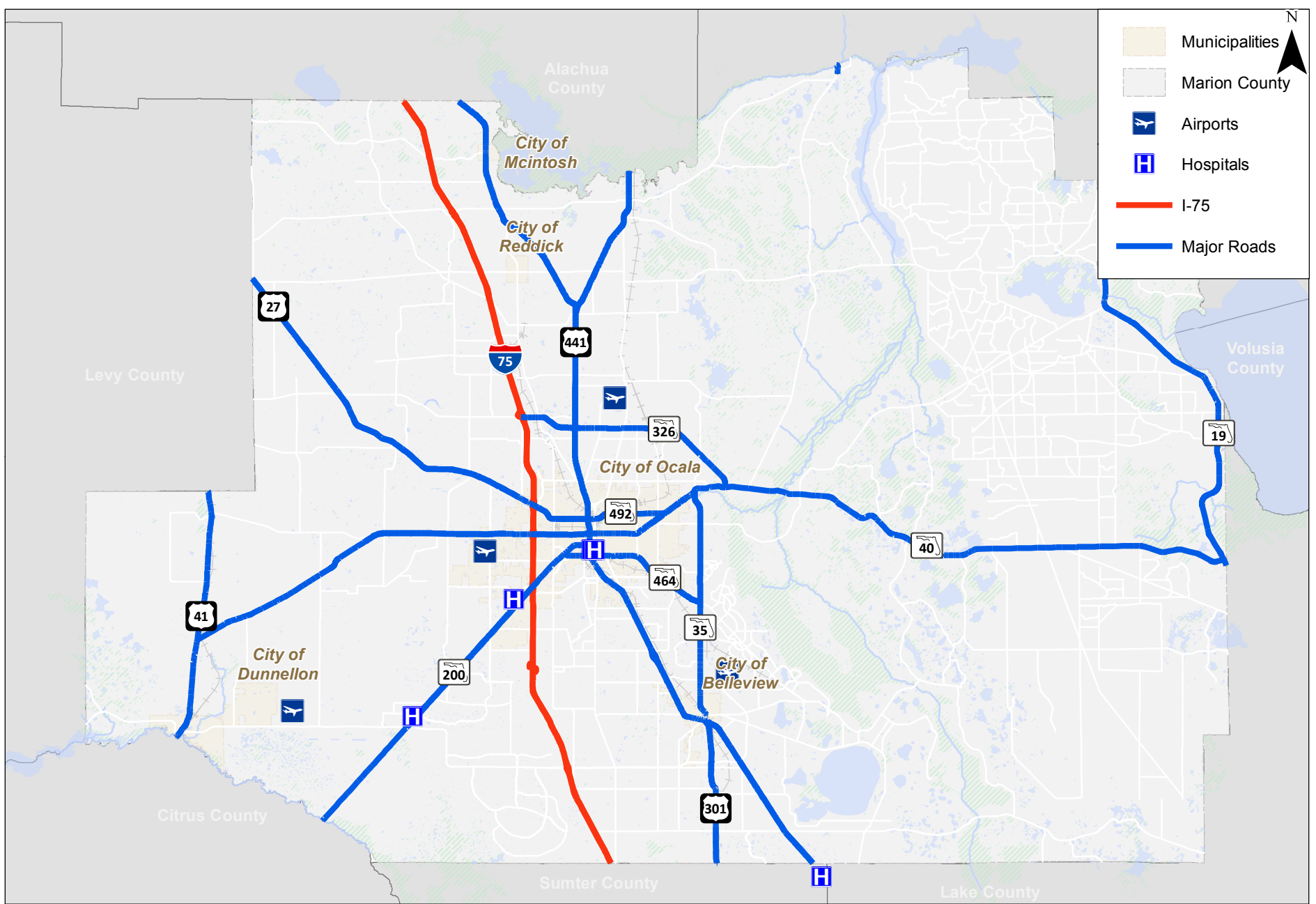
Chapter 3 | Existing Intelligent Transportation Systems and Operations

Transportation Network

The transportation network incorporates every form of transportation that residents and visitors use to travel throughout Marion County and the support structures used to ensure the safety, effectiveness, and efficiency of these modes of transportation. Therefore, the transportation network is a prerequisite of all ITS components and implementation strategies. This section summarizes the existing condition of the transportation network infrastructure supporting all travel modes.

Roads

The road network within Marion County centers around Interstate 75 (I-75), which is a north-south facility traversing through the center of the County. I-75 travels through the western part of the City of Ocala and is the major route for commercial, local and tourist traffic through both the County and the City. Additionally, State roads provide significant connections across the County. SR 40 is an east-west facility that traverses directly through the City of Ocala. US 301 is a north-south facility situated between the City of Ocala and the City of Belleview. US 441 provides an additional north-south facility connecting Ocala with Belleview. US 41 is a north-south facility located on the far western side of Marion County and passing through the City of Dunnellon. SR 200 provides a northeast-southwest facility, which mainly serves as a route into Ocala from outlying areas. SR 464 provides a similar northwest-southeast route into Ocala and also provides access to the Silver Springs Shores community. Finally, US 27 provides another northwest-southeast route, this time to the northwest of Ocala. Other state roads provide similarly important connections. The non-State system of major County and City roads connect the downtown areas of the three main cities of Marion County, Ocala, Belleview, and Dunnellon. Examples of these major City roads in Ocala include 60th Avenue, Fort King Street, 10th Street (US 27), 14th Street (SR 492), 25th Avenue, 36th Avenue, Martin Luther King Jr. Avenue, 27th Avenue, and 31st Street/32nd Street/42nd Street/43rd Street. The region's major roadways are illustrated in **Figure 2** below.



**Major Corridors and Key Facilities
Ocala / Marion County**

**Figure
2**

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Bicycle Facilities

Throughout the country, the bicycle is more and more common as a form of transportation, both for pleasure and commute. There has been an increase in bicycle facilities within the region during the past decade, including bike paths, cycle tracks, dedicated bike lanes, and bike racks. Both Marion County and the City of Ocala have installed and maintain these bicycle facilities, with the most common type being traditional bike lanes on public roadways. Throughout Marion County, there are approximately 85 bicycle lane-miles. Most of these bike lanes are within the City of Ocala or the suburbs surrounding it, meaning that bicycle facilities are far less common in rural Marion County.

However, there are two major exceptions to this rule. The Cross Florida Greenway is a current multiuse trail that runs throughout rural Marion County and the Silver Springs Bikeway is a planned multiuse trail that will do the same. While they are not intended as viable forms of commuter transportation, they provide excellent recreational bicycling activity and may help Marion County enhance tourism. The Cross Florida Greenway connects the City of Dunnellon the City of Ocala and ends near Silver Springs Park. The Silver Springs Bikeway will connect eastern Ocala with the Silver Springs Park, the Ocklawaha Prairie Restoration Area, and the Sunnyhills Restoration Area. Since Silver Springs is a large tourism attraction in Marion County, the access these trails provide to the springs means that they represent an important component of outdoor recreation and tourism opportunities within the area.

One final factor that should be considered when considering current bicycle facilities and future growth is the rise of electric assist bicycles and electric scooters, which have become increasingly common in downtown areas. These vehicles allow for both regular human propelled use and electric propelled use. They are increasingly becoming an attractive and flexible option for cities interested in providing a low cost and effective transit option, such as a bike share program. While research would be required to determine how they could be applied in Ocala, they are worth consideration moving forward.

Pedestrian Facilities

For many, walking may be the more convenient, healthier, and/or more affordable form of transportation. Therefore, pedestrian facilities are a critical part of the transportation system and especially so in urban areas. There are approximately 132 miles of sidewalks in Marion County, with most of these facilities being in the City of Ocala, although some are also located in the City of Dunnellon and the City of Belleview. In downtown Ocala, most of the road network is supported by sidewalks, providing continuous walkways to attractions and employment areas around the City. These sidewalks are often aid bicyclists as well and are used by those relying on transit services for transportation. Outside of the downtown Ocala, most of the remaining sidewalks are in suburban neighborhoods. Unlike downtown Ocala, these sidewalks often do not connect to a larger network of sidewalks, which makes walking as transportation less likely and the use of a vehicle more common.

There are also a variety of walking trails throughout Marion County. This includes the Cross Florida Greenway (and the Silver Springs Bikeway when it is completed), which were discussed in the previous section and provide access to pedestrians. However, there are many other pedestrian trails, such as the Marshall Swamp Trailhead, Pruitt Trailhead, and Baseline Road Trailhead. These are mostly used for recreational purposes.

Transit Facilities

Public transit systems are an important part of a healthy and prosperous metropolitan area. They provide convenient service to all citizens. The Ocala-Marion County TPO has been successfully operating a public transit system since 1983, when it inaugurated Marion Transit, providing all non-emergency medical transportation in the Ocala-Marion County area. In 1990, the program expanded to service all transportation-disadvantaged citizens in the County with door-to-door para transit services.

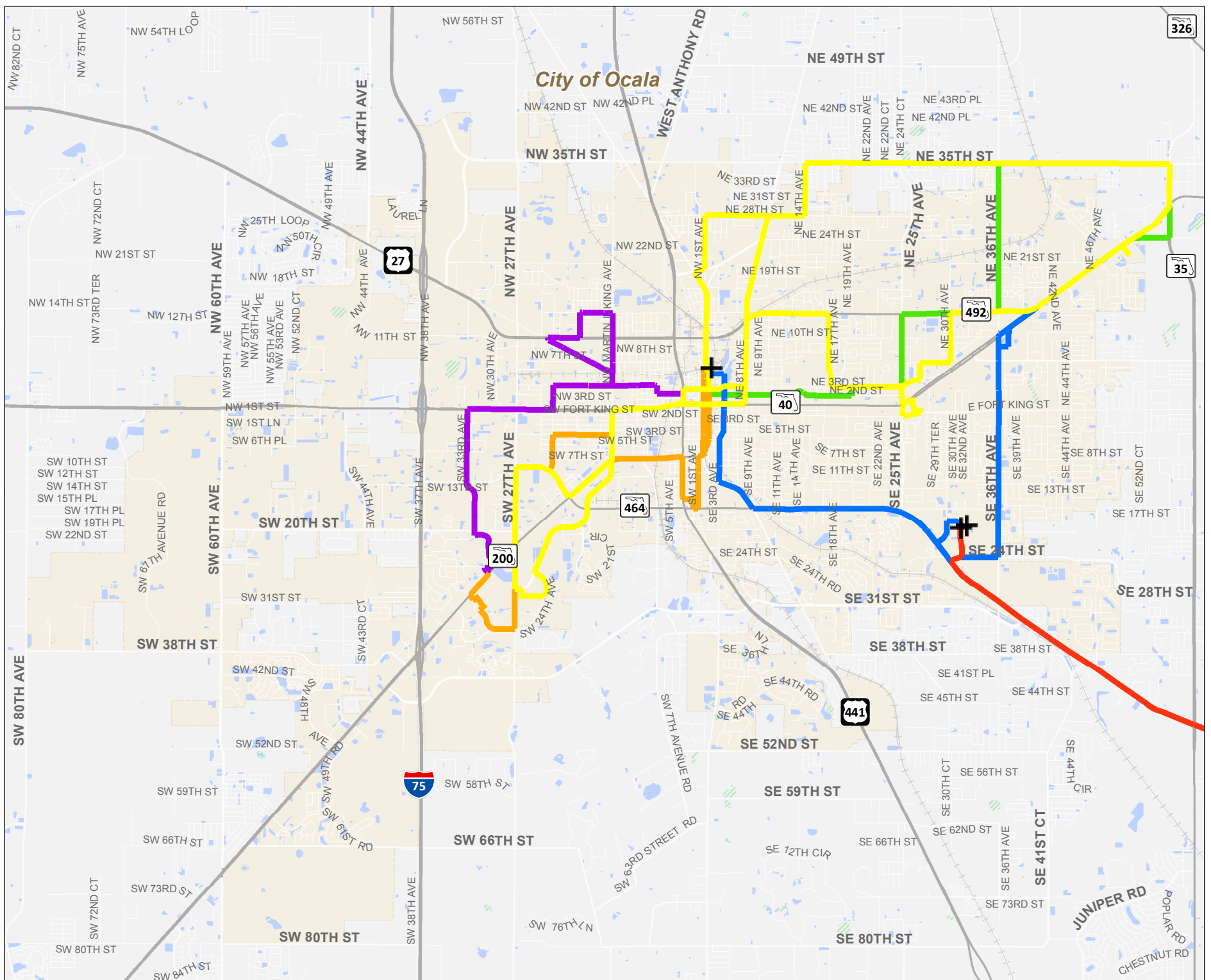
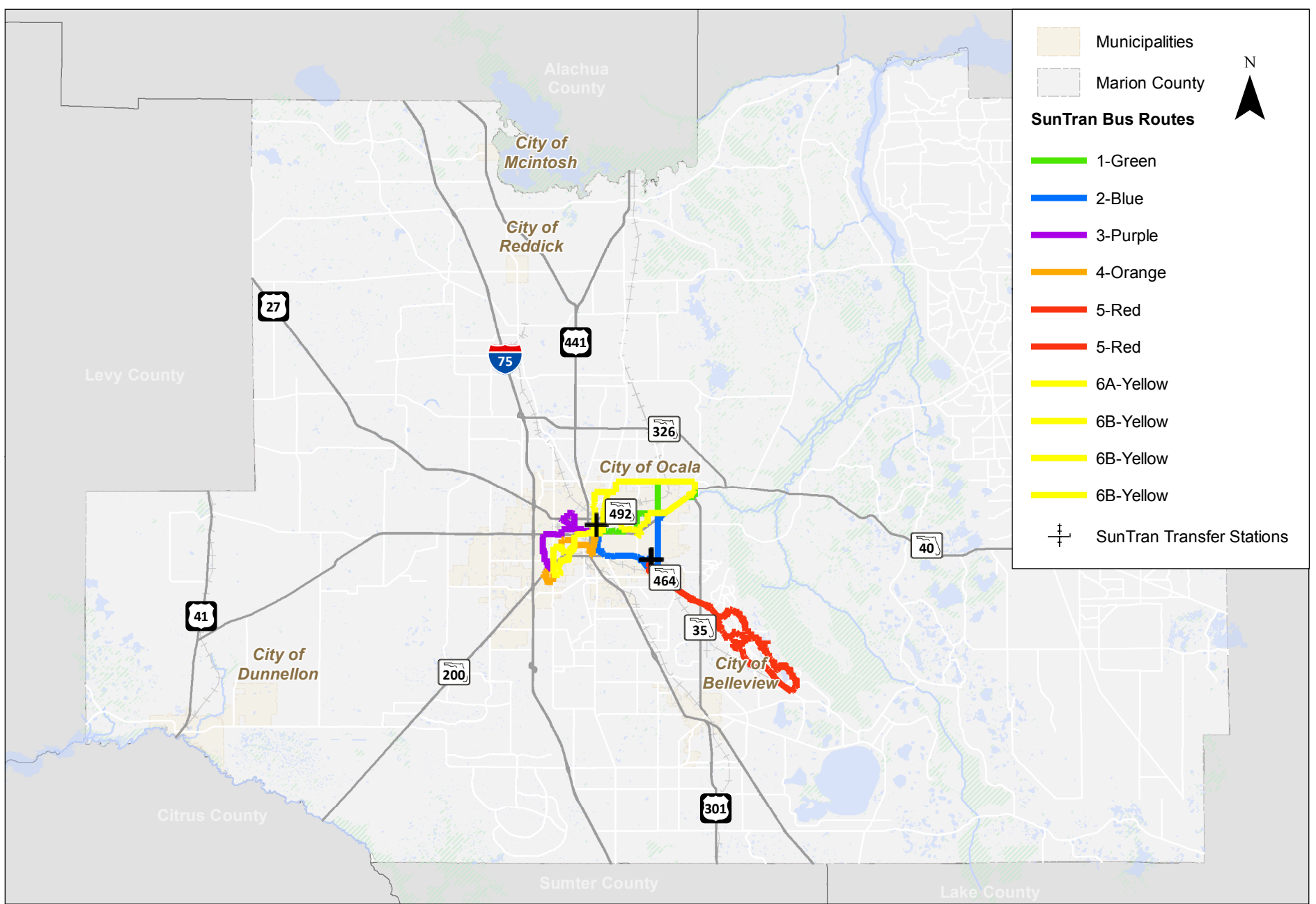
In 1998, the Ocala-Marion County TPO created SunTran, which operates a fixed-route transit system, six days per week. SunTran operates six routes, with service mostly focused in the City of Ocala. The Green Route serves northeast Ocala and Silver Springs, the Blue Route serves southeast Ocala, the Purple Route serves northeast Ocala, the Orange Route serves southwest Ocala, the Red Route serves Silver Springs Shores, and the Yellow Route serves southwest Ocala and north Ocala. An overview of the transit routes in Ocala and Marion County can be seen in **Figure 3**. Most of the routes run once every hour, while the Red and Yellow routes run once every two hours. These headways are constant throughout the day.

Freight Facilities

Due to Marion County's location along I-75, freight movement is an important role of the County's transportation network. I-75 alone carries an average of 13,500 trucks per day, with one segment near Ocala carrying over 18,000 trucks per day based on an average annual daily traffic (AADT) volume. US 441 and US 301 also serves as key secondary truck routes. In response to the major freight moving through the County, multiple companies have opened freight processing centers to support their distribution systems. Most of these freight distribution centers are in western Ocala along I-75 near US 27, SR 40, and SR 200. These locations provide thousands of jobs and ensure that the area continues to receive a steady stream of business. **Figure 4** shows the truck AADT throughout the County, as well as major truck routes.

Evacuation Routes

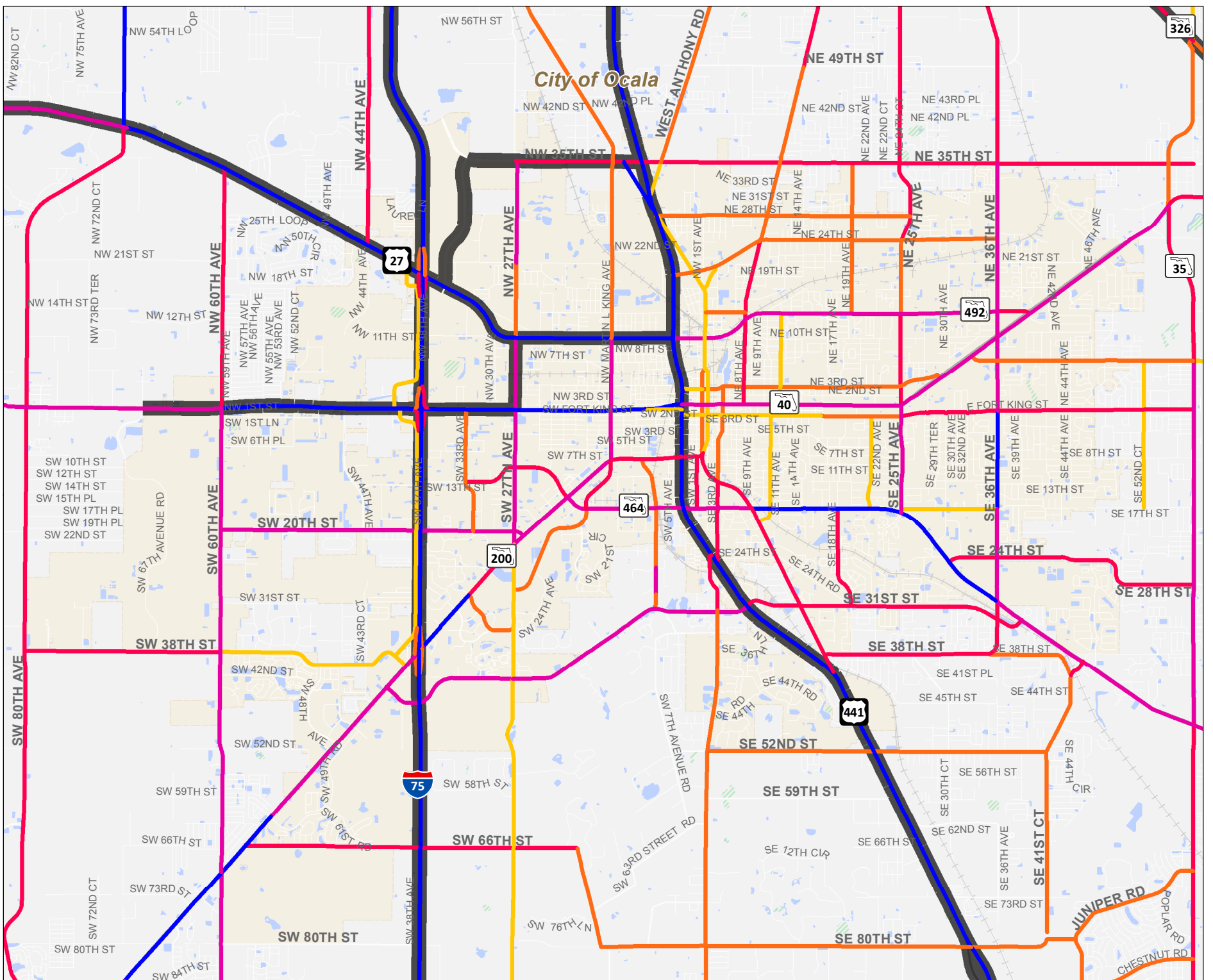
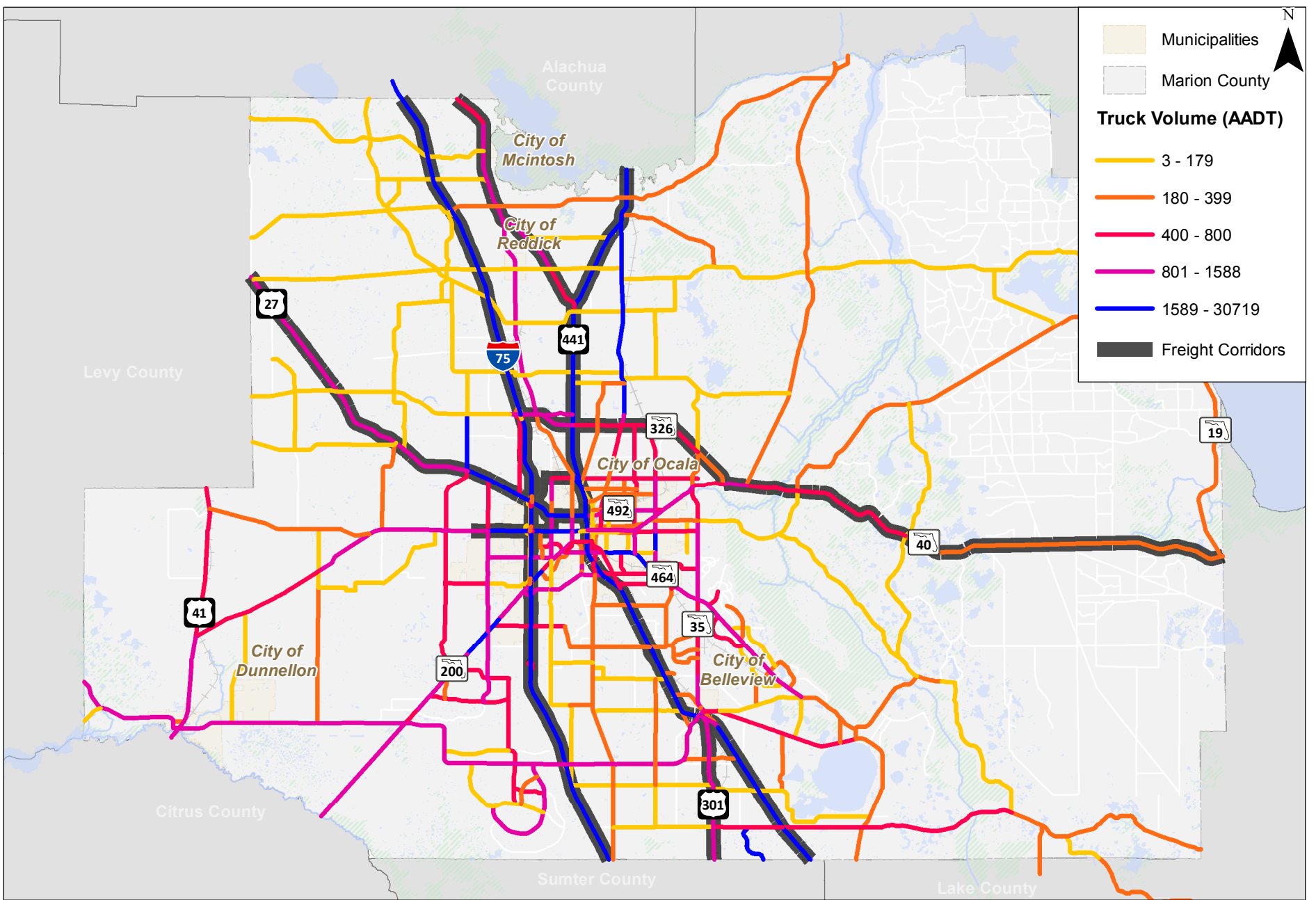
Given Florida's location between the Gulf of Mexico and the Atlantic Ocean, the risk of hurricanes makes evacuation routes a necessity. While it is important for Marion County to have the facilities to safely evacuate its own citizens in the event of an imminent threat such as a hurricane, its central location in the State of Florida reduces the storm surge risk posed by hurricanes, at least compared to coastal counties in the State. Instead, its major role in evacuation situations is as a through point on a major evacuation route. I-75, which extends the length of Marion County, is a critical interstate highway that, along with I-95, provides a significant and direct north-south route in and out of the State. While I-75 is overwhelmingly the most important evacuation route in Marion County, there are several other major roads designated as evacuation routes. US 27, US 441, US 41, US 301, SR 200, SR 19, SR 35, and SR 40 all function as primary evacuation routes, while SR 464, SR 492, and SR 326 all function as secondary evacuation routes. These evacuation routes are identified in **Figure 5**.



**Existing Transit Service
Ocala / Marion County**

**Figure
3**

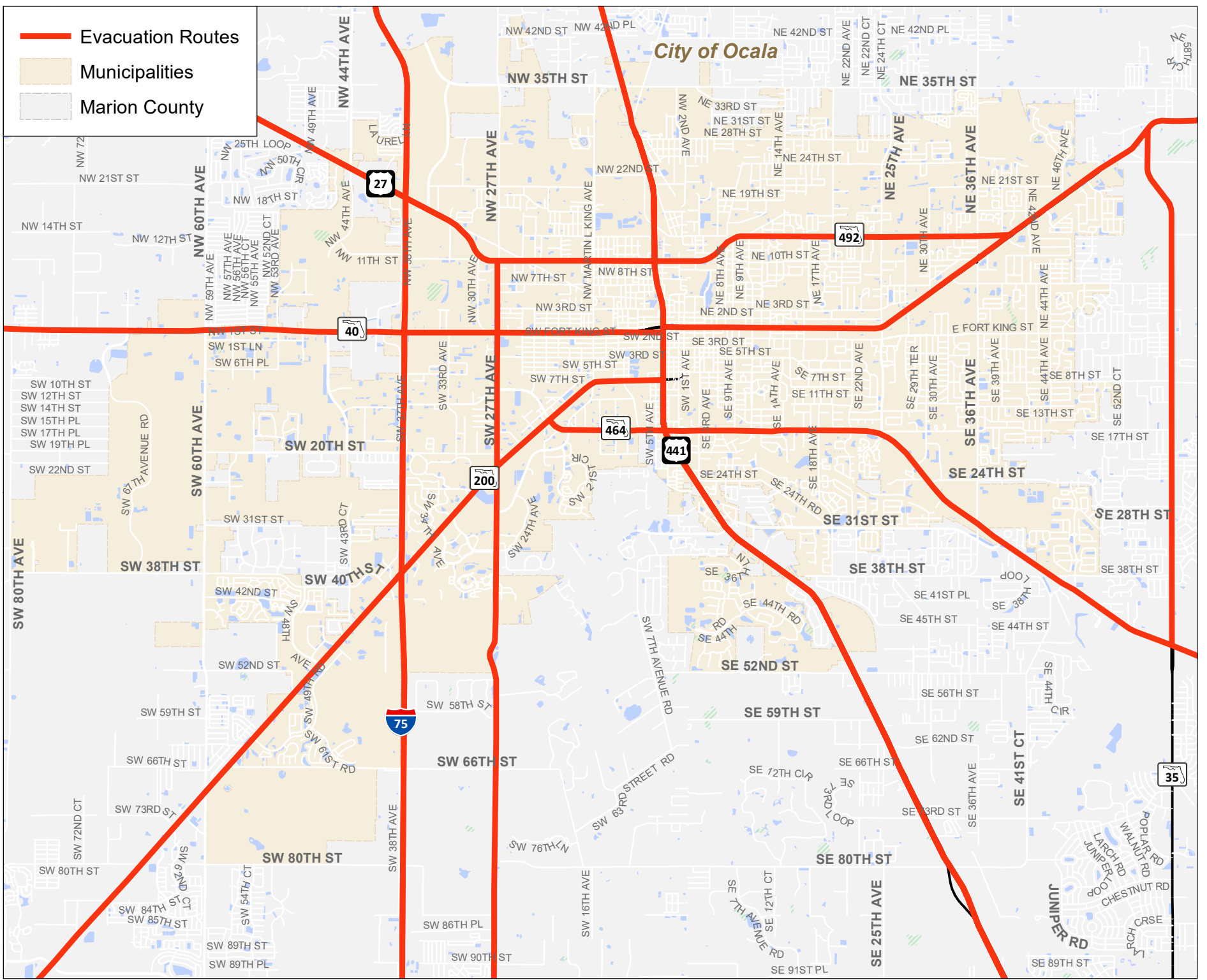
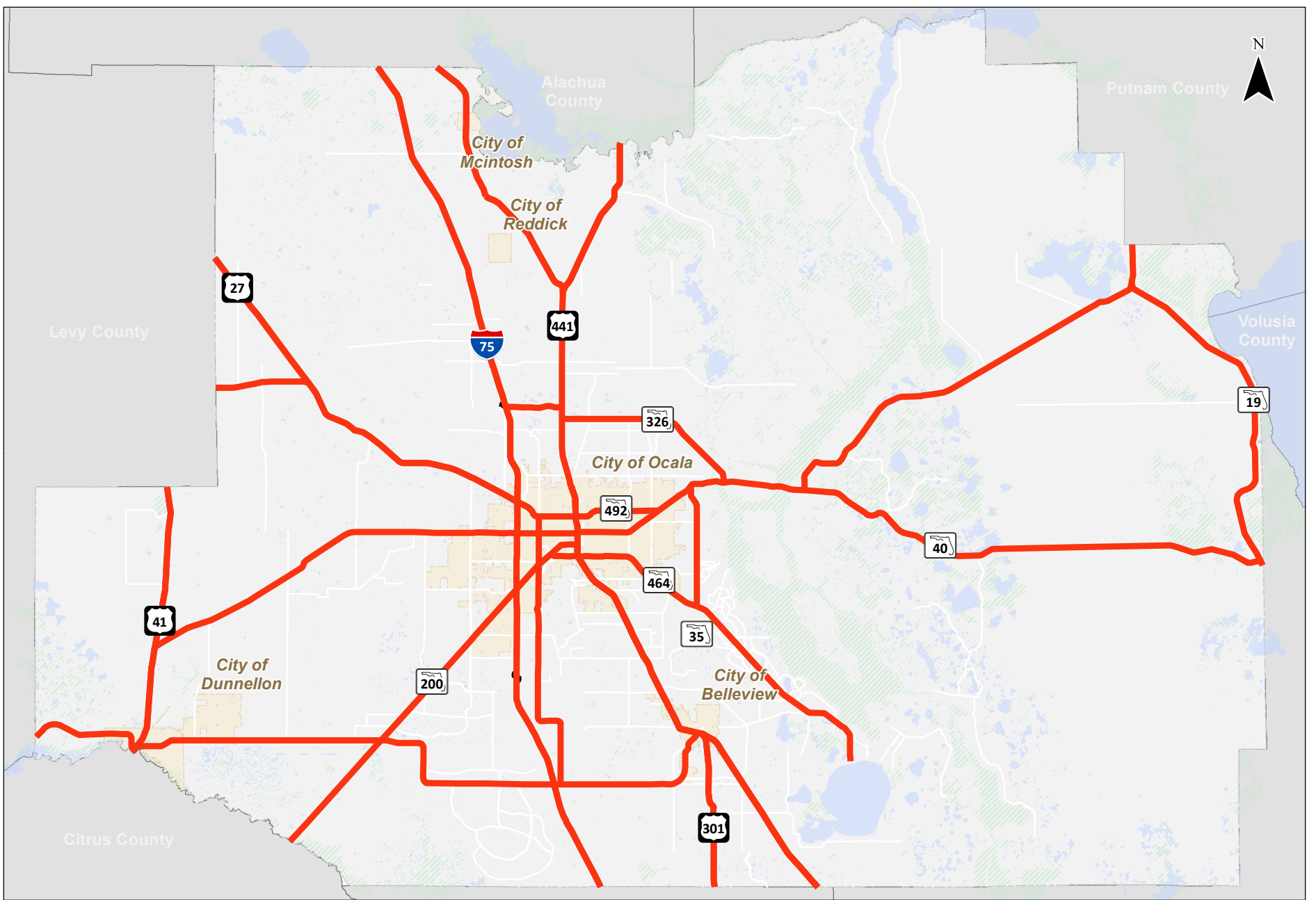
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**Truck Volume (AADT) and Designated Freight Corridors
Ocala / Marion County**

**Figure
4**





**Evacuation Routes
Ocala / Marion County**

**Figure
5**

Fire Stations

Fire stations are a critical part of the health and safety network serving the region, and their locations help define the effectiveness of the City and County emergency response systems. The City of Ocala currently operates seven stations, while Marion County operates 39 stations. **Figure 6** shows the locations of the current fire stations in the City of Ocala and Marion County.

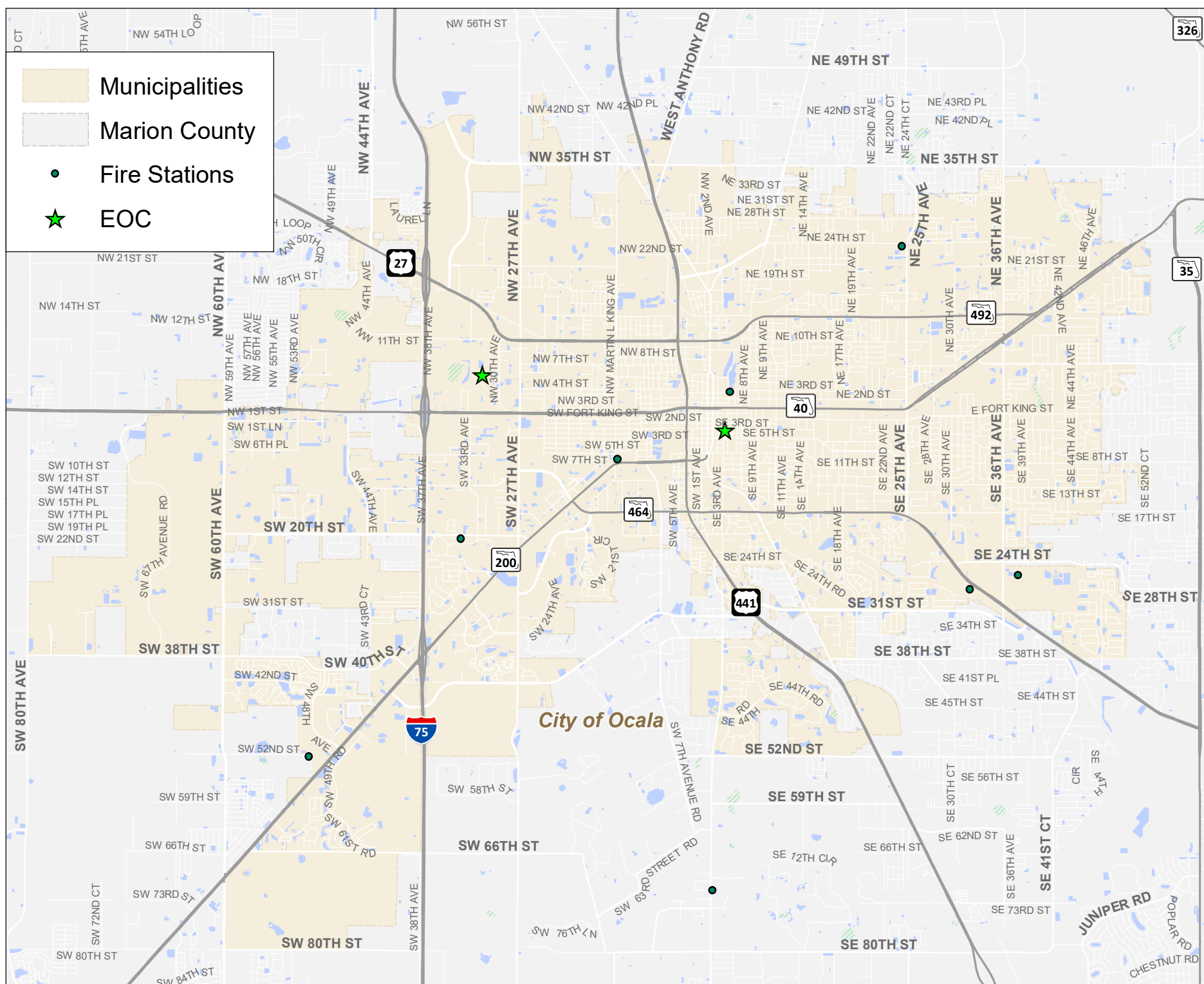
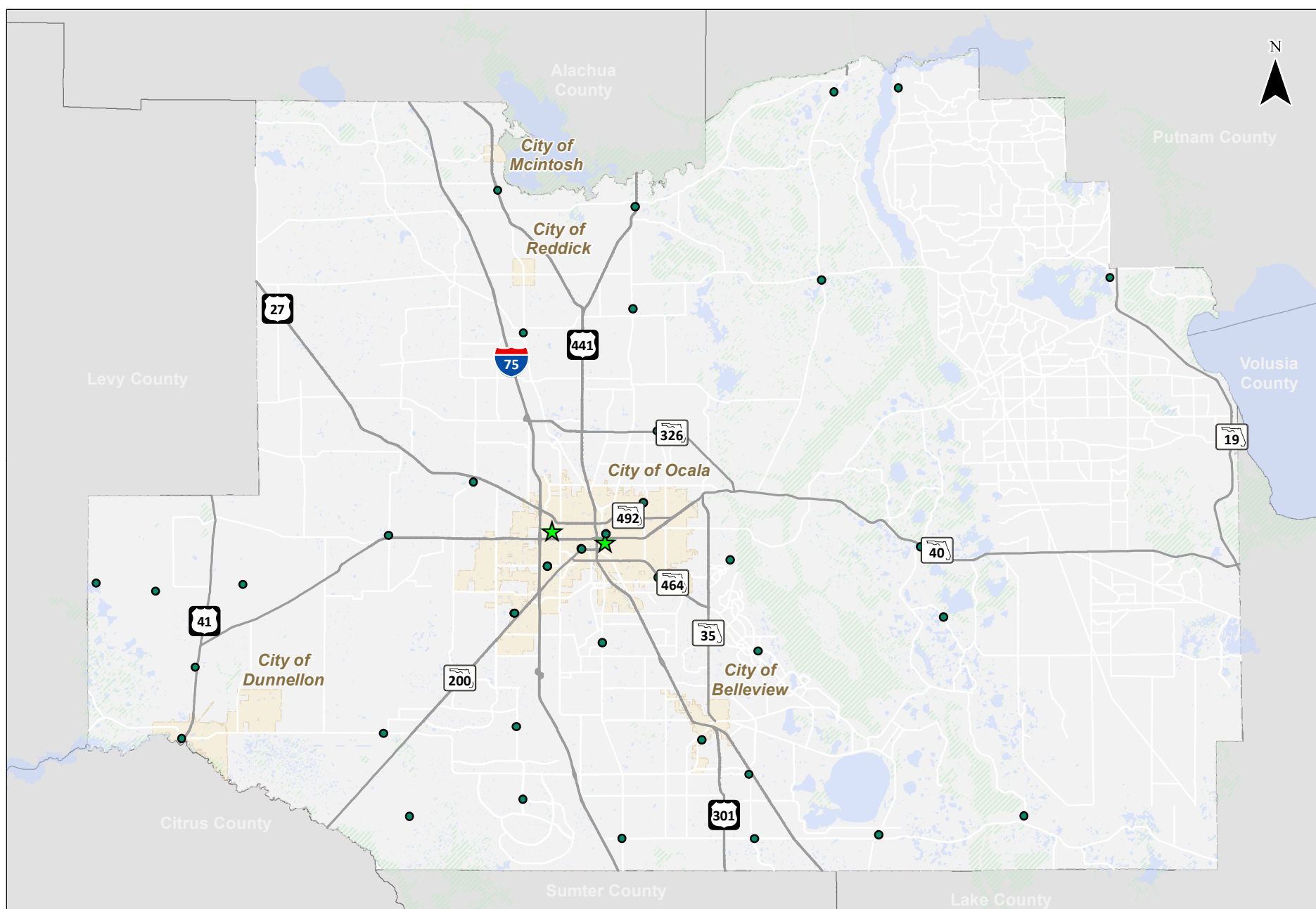
Emergency Operations Center

The Marion County Emergency Operations Center (EOC) was built in 2009 to serve as a central location for the region's emergency response resources. This facility, located in northwest Ocala, serves two major roles. First, it provides a staff location for everyday emergency response, like fire and rescue. However, it also serves a larger role when major statewide emergencies occur.

As mentioned earlier, hurricanes often pose a serious risk to the people of Marion County. When these storms threaten the State of Florida, Marion County and City of Ocala officials need a space to organize and prepare for the storm, then manage resources during the storm to ensure the safety of all their citizens. The Marion County EOC provides space for government agencies to coordinate resources during an emergency, efficiently funnel evacuees through the County, and respond to any life-threatening circumstances during a storm. The facility was used successfully in this manner during the preparations for Hurricane Matthew in 2016 and Hurricane Irma in 2017.

Parking Management

In early 2017, The City of Ocala installed approximately 140 smart parking meters in the downtown. The meters accept cash, credit card, and the PassportParking mobile app. The meters also provide the City real-time parking management analytics on parking utilization and financial performance.



**Emergency Operations
Ocala / Marion County**

**Figure
6**

Traffic Control and Management

Marion County and the City of Ocala employ several facilities, tools, and strategies to promote safe and reliable transportation along their roadways. The facilities, tools, and strategies discussed in the following sections include:

- Traffic Management Centers (TMC's)
- Traffic Signal Operations
- Adaptive Signal Control
- Remote Communication
- Portable Dynamic Message Signs
- ITS Devices

Traffic Management Centers

A traffic management center (TMC) acts as a command center for an ITS network, coordinating the traffic management system across its jurisdiction and responding to traffic incidents to quickly return the areas in question to normal traffic flow. TMCs form the heart of an efficient and effective traffic management system and are essential for the ITS strategies discussed in this plan. Both Marion County and the City of Ocala currently operate TMCs to manage and monitor the overall performance of their respective transportation networks. The City of Ocala operates *Trafficware's ATMS.now* central system and Marion County operates the *Siemens Tactics* system. Each of these signal controller systems allows for centralized monitoring of the traffic signal equipment and for adjusting signal timing plans and receiving performance reports from the field equipment.

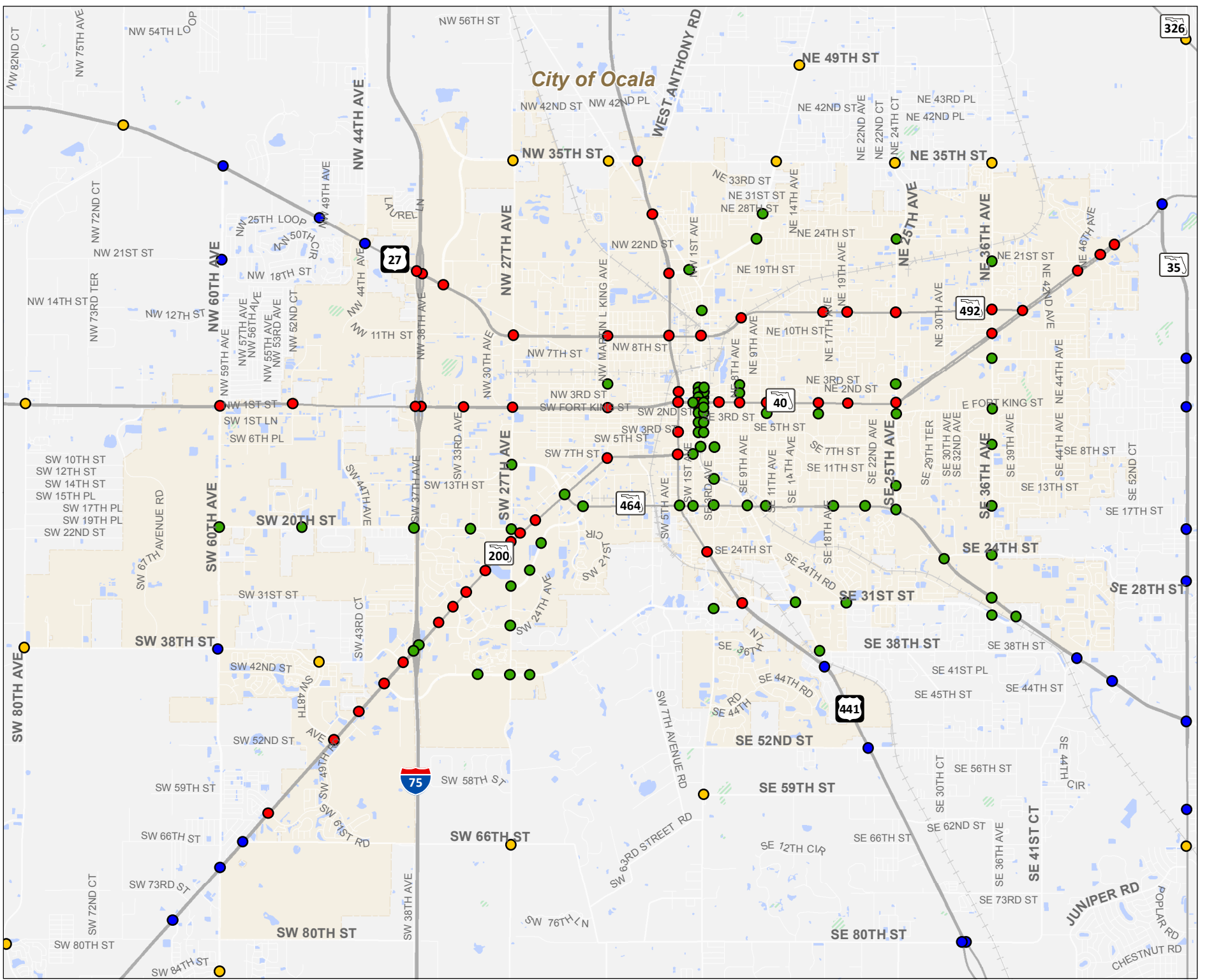
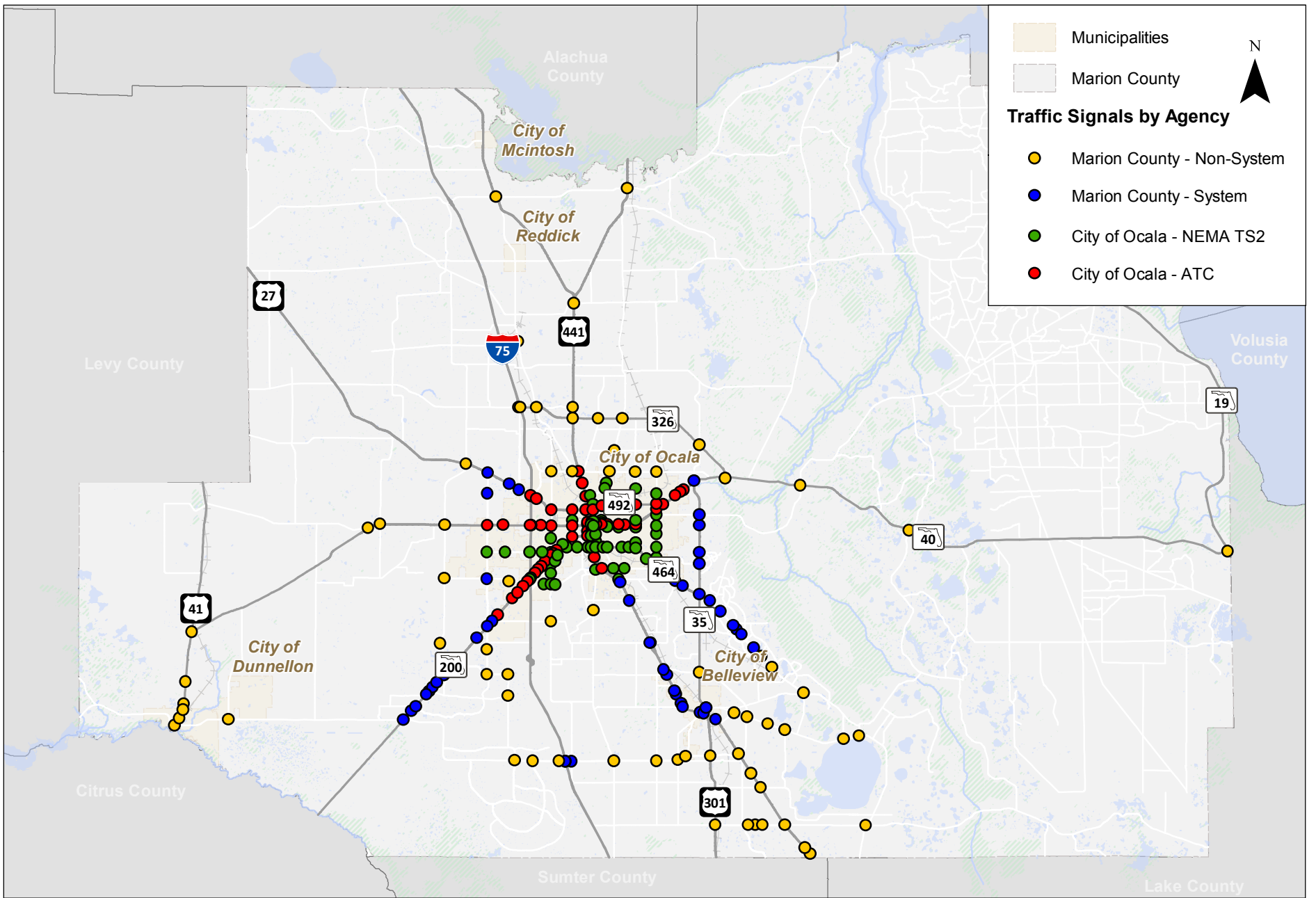
Currently, the City and County TMCs are connected to each other through the City's fiber network that also connects the County's Emergency Operations Center. However, to date, the operators in each TMC have access only to the cameras and signal systems within their jurisdiction due to unresolved cyber security concerns. The inability of these facilities to share information with one another prevents City and County staff from supporting each other when operations need to be monitored and actively controlled on a corridor and/or regional basis.

Traffic Signal Operations

Traffic signals within the study area are currently operated and maintained by the City of Ocala and Marion County. Each jurisdiction manages, operates, and maintains the traffic signal equipment only within its own jurisdiction. The City of Ocala is responsible for the operations and maintenance of most of the traffic signals within the Ocala Metropolitan Area. Marion County is primarily responsible for the operation and maintenance of traffic signals outside of the metropolitan area to the county lines.

The City of Ocala operates an advanced transportation management system, Trafficware ATMS.now, at the TMC. Local NEMA TS2 traffic signal controllers are located at each of the intersections and operate under time-of-day, actuated and coordinated timing plans. Recently, the City has begun an upgrade of their intersection equipment and have replaced 54 of their signal cabinets and signal controllers that meet the Institute of Transportation Engineer's Advanced Traffic Controller (ATC) standard.

Marion County signal system included NEMA TS2 traffic signal controllers and Siemens Tactics advanced transportation management system. A portion of the County's signals are located along arterials and corridors and operate under time-of-day, actuated and coordinated timing plans. Other remote intersections run fully-actuated and independent of other intersections. **Figure 7** shows the existing traffic signal locations within the Marion County region.



Existing Traffic Signal Locations
Ocala / Marion County

Figure
7

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Adaptive Signal Control

As part of an initiative by the City of Ocala to modernize its transportation network, adaptive signals were installed on the SR 464 corridor in the City and County jurisdictions to facilitate better traffic flow, especially during peak hours. Adaptive signals work together along an urban arterial by adjusting the signal timing and the traffic progression characteristics on the arterial based on actual traffic demand. This typically results in a significant increase in the efficiency and capacity of the intersections and arterial sections that use such signal systems.

The City of Ocala has installed 14 adaptive signals on SR 464 and Marion County installed three adaptive signals on SR 464. These signals are using the Rhythm Engineering's InSync system. Unfortunately, the signals have not performed to expectations. The City and County are frustrated by poor operational performance and an inability to determine how the signals are adjusting signal timings (as these adjustments are not made known to traffic staff). Therefore, the system will be removed when the traffic signal cabinet assemblies are upgraded to the Type VI ATC format. It is likely that the County and the City will not be interested in further installation of adaptive signal technology.

ITS Communication

Communication is a critical component of a traffic control system. The specific communication media such as copper wire, wireless or fiber optic cable is often the limiting factor is an agency's ability to monitor, manage, and control traffic management in real time. The existing transportation related communication network within the study area is composed primarily of radio interconnect and fiber optic cable. Fiber optic cable interconnection locations are found mainly within the City of Ocala. Many Marion County intersections are connected to their TMC through radio interconnect technology. There are several intersections in region that currently have no communication capability.

Fiber optic cable is becoming more common across the country because of its reliability and its capacity to transmit high volumes of digital data at high speeds. It is being used in a variety of applications, but a major application is for traffic signal communication. Fiber optic cable also facilitates communication between traffic management systems.

A significant investment in fiber optic cables has occurred within the study area in the last 10 years. This is mostly occurring in the City of Ocala because there is a significant startup cost associated with this technology. The fiber optic cable in Ocala is owned by Ocala Fiber Network (OFN) and the Traffic Operations Department in the City of Ocala has an agreement to lease a portion for traffic operations use throughout the City of Ocala. **Figure 8** summarizes the location of the existing and planned ITS communication infrastructure in Marion County and the City of Ocala.

Portable Variable Message Signs

Both the City of Ocala and Marion County own a few portable variable message signs (PVMS). These signs display a simple message of at most about five words to alert drivers to temporary or changing conditions. Examples of such use include advising motorists of temporary traffic pattern changes due to events or roadway construction and permanent changes in downstream traffic control (e.g., changing from stop sign control to signalized control).

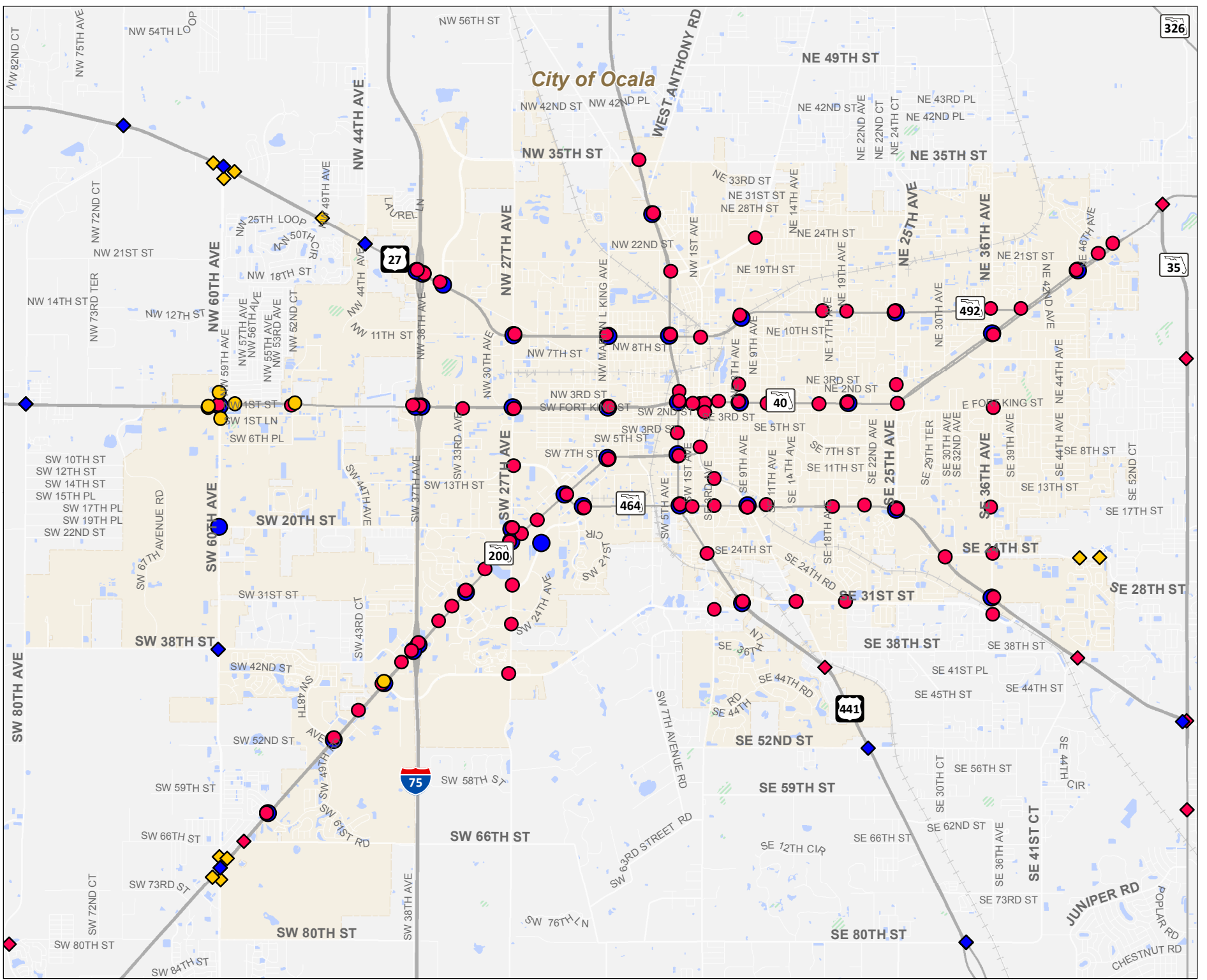
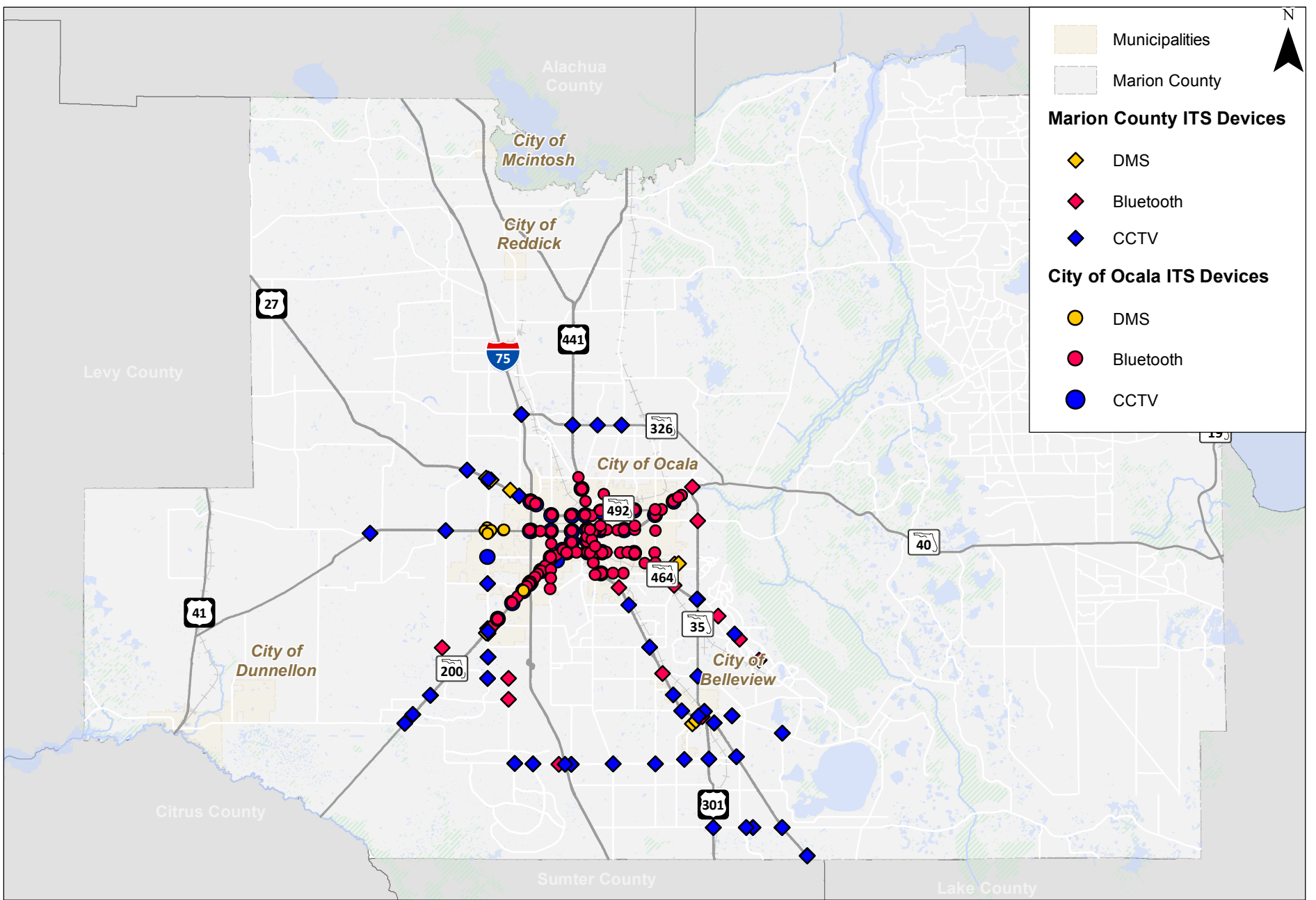
ITS Devices

Both the City of Ocala and Marion County have implemented ITS devices throughout the region, which include closed-circuit television (CCTV) cameras, Dynamic Message Signs (DMS), and Bluetooth® travel time devices.

Marion County currently operates a number of CCTV cameras on the regionally significant corridors including SR 464, SR 200, SR 484, US 27, SR 40 and US 441. The county also has a few DMS signs located on US 27, SR 200 and US 441. Bluetooth® devices are also located along key corridors in the County.

The City of Ocala is also operating CCTV cameras, DMS, and Bluetooth® devices within the City Limits. The locations of regions ITS devices including CCTV, DMS, and Bluetooth® can be seen in **Figure 9**.

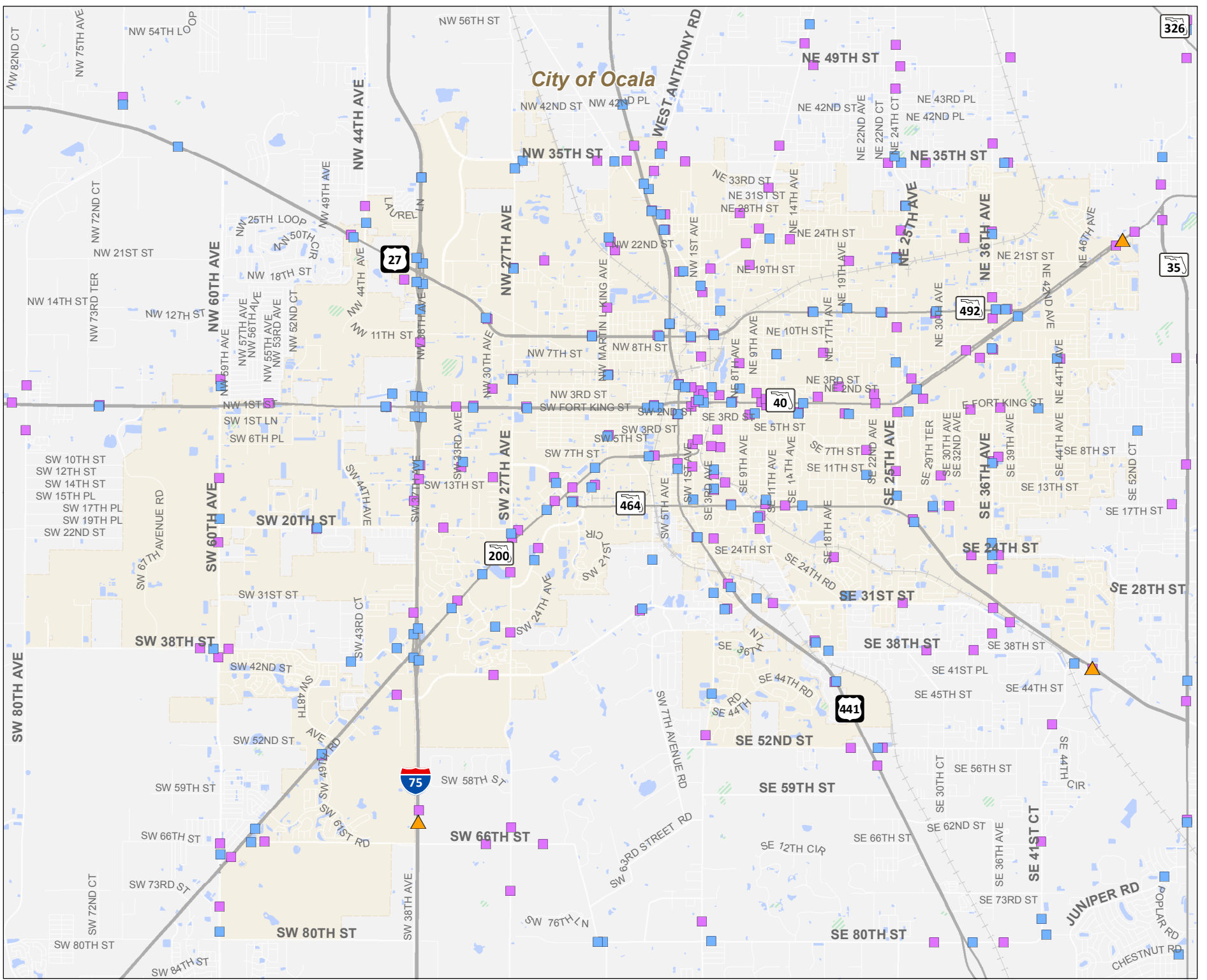
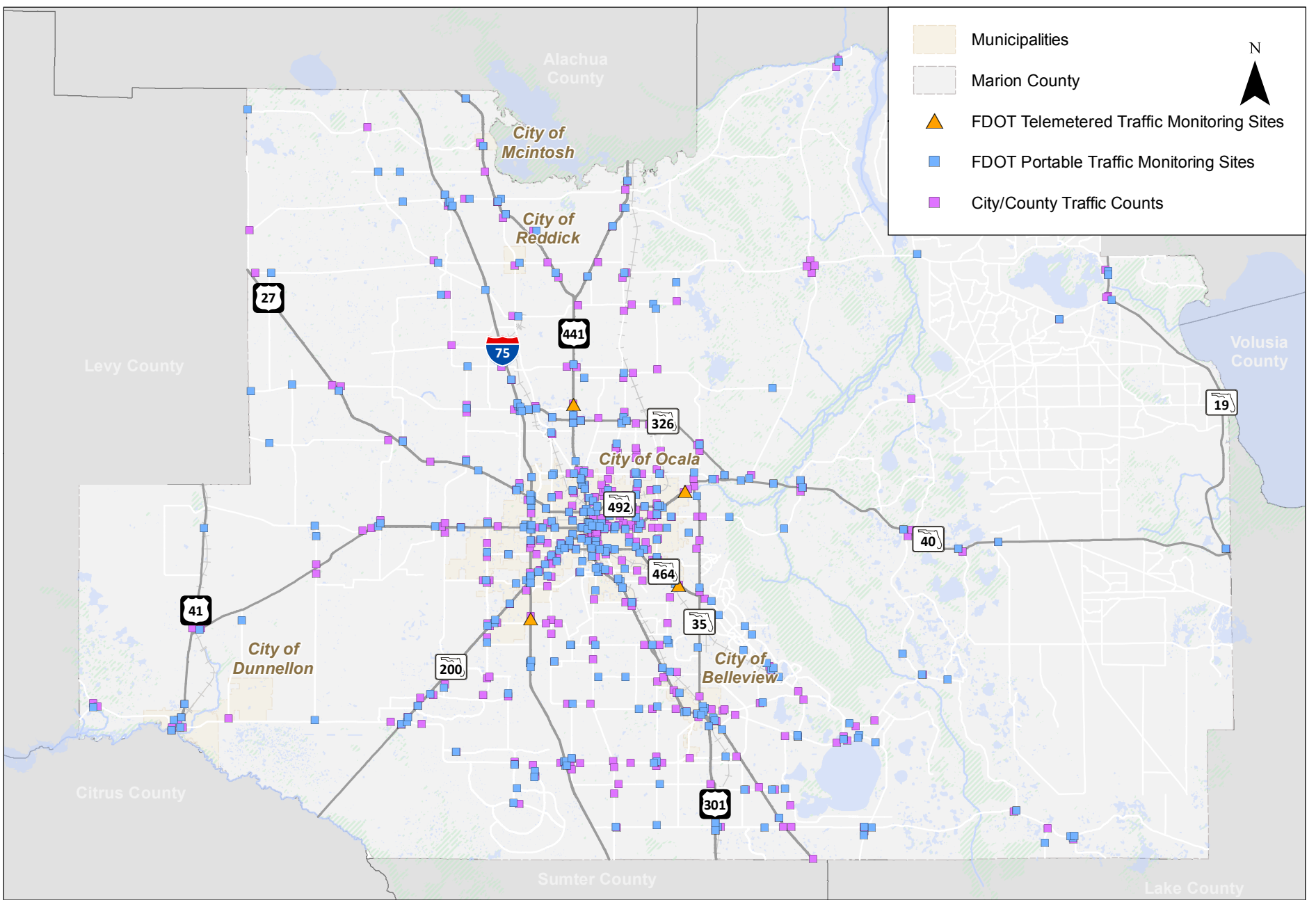
Additionally, there are several permanent and portable traffic monitoring stations that are used by the City of Ocala, Marion County, and the FDOT District 5. Traffic reports prepared from the data include AADT, Vehicle Class, and K, D, and T Factors. The traffic reports are archived. **Figure 10** identifies the locations of the permanent and portable count stations.



**Existing ITS Device Locations
Ocala / Marion County**

**Figure
9**

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Available Traffic Monitoring Count Stations
Ocala / Marion County

Figure
10

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City and County Staffing

Stakeholder meetings conducted during the project consistently identified a lack of proper staffing as one of the major factors contributing to the ineffectiveness of the region’s traffic management system. This is true for the traffic management centers (TMCs), but also for the City and County transportation departments themselves. Therefore, this section will provide a brief overview of the current staff levels in both transportation departments. Additionally, Chapter 6 will discuss this staffing issue again, proposing appropriate staff increases for each department, as well as cost estimates for such increases.

City of Ocala Staffing

The City of Ocala operates its transportation department with the staffing shown in **Table 2**. This table was created from data provided in FDOT’s *District 5 Districtwide ITS Master Plan*, which provided tallies for existing staff, as well as recommending appropriate additions to the staff. These recommended staff increases will be discussed more in Chapter 6. Currently, the department operates with eight employees, which is a common size for a city of Ocala’s size. Notably, the Ocala Traffic Management Center currently operates without any dedicated staff. Instead, the TMC is operated as needed by other Ocala staff shown below. This is not ideal, as it limits the effectiveness of the TMC and the equipment placed in the field to support the TMC. As several of the objectives and goals of this ITS plan focus on improving the potency of the local TMCs, this is a critical topic and it will be discussed further in Chapter 6.

Table 2 City of Ocala Staffing

City of Ocala			
Position	Existing Staff	Current Needed - Recommended Staff	Current Needed - Additional Staff
Traffic Engineering Operations Manager	1.0	1.0	0.0
Traffic Signal Engineer	0.0	0.0	0.0
Traffic Signal Analyst/Technician	0.5	1.0	0.5
Traffic Signal Maintenance / ITS Fiber Technician	4.0	4.0	0.0
Network Specialist	0.5	0.5	0.0
Electronic Specialist (L2 Network Tech)	1.0	1.0	0.0
TMC Manager	1.0	1.0	0.0
Supervisor	0.0	0.0	0.0
TMC Operators	0.0	1.0	1.0

Marion County Staffing

Marion County operates its transportation department with the staffing shown in **Table 3**. This table was created from data provided in FDOT’s *District 5 Districtwide ITS Master Plan*, which provided tallies for existing staff, as well as recommending appropriate additions to the staff. These recommended staff increase will be discussed more in Chapter 6. Currently, the department operates with six employees, which is a common size for a county with Marion County’s population. Notably, the Marion County Traffic Management Center currently operates without any dedicated staff. Instead, the TMC is operated as needed by other Marion County staff shown below. This is not ideal, as it limits the effectiveness of the TMC and the equipment placed in the field to support the TMC. As several of the objectives and goals of this ITS plan focus on improving the potency of the local TMCs, this is a critical topic and it will be discussed further in Chapter 6.

Table 3 Marion County Staffing

Marion County			
Position	Existing Staff	Current Needed - Recommended Staff	Current Needed - Additional Staff
Traffic Engineering Operations Manager	0.0	0.0	0.0
Traffic Signal Engineer	1.0	1.0	0.0
Traffic Signal Analyst/Technician	1.0	1.0	0.0
Traffic Signal Maintenance / ITS Fiber Technician	4.0	4.0	0.0
Network Specialist	0.0	0.5	0.5
Electronic Specialist (L2 Network Tech)	0.0	0.5	0.5
TMC Manager	0.0	0.0	0.0
Supervisor	0.0	0.0	0.0
TMC Operators	0.0	0.0	0.0

FDOT Initiatives

The Florida Department of Transportation is leading several major initiatives that Marion County and the City of Ocala can build upon. These initiatives are focused on embracing and integrating new technologies in the State of Florida’s transportation network. Among these initiatives are the following:

- I-75 FRAME, a multimodal integrated corridor management (ICM) project that will help to manage traffic during incidents and improve safety and connectivity for all road users;
- Automated traffic signal performance measures (ATSPM), which provide continuous monitoring capability and high-resolution data to support objectives and performance-based maintenance and

- operations-based strategies;
- Regional Integrated Transportation Information System (RITIS), a big-data aggregation and dissemination platform;
- Freight Advanced Traveler Information System (FRATIS); and
- Pilot implementation of technology to prepare for future connected and autonomous vehicles, which is also part of the I-75 Frame project.

All these initiatives promise to add major benefits for Marion County and the City of Ocala and are discussed separately in the following sections.

I-75 FRAME

The I-75 Florida’s Regional Advanced Mobility Elements (FRAME) project will implement multiple kinds of emerging technologies to “efficiently manage traffic during incidents and special/emergency events and improve safety and connectivity for all types of road users.”¹ The project will create a Multimodal Integrated Corridor Management (MMICM) plan for I-75, US 441 and US 301 and use connected vehicle (CV) technologies, advanced signal control, and multijurisdictional coordination to accomplish its goals of increasing the safety and reliability of the roadway for its users, while also decreasing delay, accommodating continued population growth, and enhancing emergency evacuation preparedness in the region. The project will take place in north central Florida, with the City of Gainesville and the City of Ocala being the two major focuses of the project.

Much of this project will hinge on emerging technologies that coincide with the ITS applications this plan discusses. These technologies include Emergency Vehicle Preemption (EVP), Automated Signal Traffic Performance Measures (ASTPMs), connected vehicle technologies like RoadSide Units (RSUs) and On-Board Units (OBU), which will support a Connected Vehicle Signal Phasing and Timing (CV SPaT) system, and Transit Signal Priority. In Marion County, the project will be installing devices on I-75 and US 441/US 301, and the roadways that connect them including SR 326, SR 500, SR 40, SR 200, and CR 484. Marion County and the City of Ocala will be heavily impacted by this project and it is recommended that the efforts pursued in this ITS plan coincide with the I-75 FRAME project. To use the Department server and

Automated Traffic Signal Performance Measures

Marion County and the City of Ocala operate hundreds of traffic signals in the region and sometimes these signals do not operate properly or efficiently. Typically, when this occurs, citizens complain to local agencies and a study must be done to determine the current operation of the signal and how it should be repaired or improved. This comes at great cost to the taxpayer and is inefficient.

Automated Traffic Signal Performance Measures (ATSPMs) provide detailed historical data about the operation of signalized intersections so that problems can be identified even before citizen complaints are received. Additionally, ATSPMs also allow traffic operations staff to quickly understand whether a citizen complaint is valid and how to repair the signal or improve the signal timing. This offers tremendous value as this drastically

¹ http://www.cflsmartroads.com/projects/design/future/i-75_Frame_Application.pdf

reduces the manpower and resources needed to review the performance of local signals. FDOT is continuing to encourage local jurisdictions to implement this technology and Marion County and the City of Ocala could benefit greatly from this technology.

The City of Ocala has recently updated 58 of their traffic signals to incorporate ATSPM capabilities. The Trafficware signal controller that were installed can collect the high-definition data required to produce the ATSPMs. A network server is needed (and not yet available) to store the data and the software program needed to process the data and produce the individual performance measures. FDOT District 5 has developed a District version of the software program that is based on the Federal Highway Administration's software. This software was originally developed in cooperation with Utah Department of Transportation and available for free to all state DOT's. FDOT has indicated the City and County could use the District's server and software to process the high-definition data collected in their new controllers. For the City and the County to use the Department's servers and software, a network connection agreement with FDOT would need to be in place to bring the ATSPMs online.

RITIS

The Regional Integrated Transportation Information System (RITIS) is an automated data system which combines different datasets throughout any region and then disseminates that data in a coherent package to provide an overall view of the transportation network. Participating agencies can view multiple kinds of location-centric data to improve their traffic operations. For example, they can see emergency management information and use such data to improve their emergency preparedness or see accident data to improve response time to accidents. Third party clients can also access this data for use in a variety of different fields.

RITIS information is used statewide by the Florida Department of Transportation and their partners to evaluate performance on interstate and most highways. RITIS can be used to create roadway performance reports, showing travel times, reliability and congestion. Other tools allow for active monitoring of work zones and incidents. The most relevant application of RITIS in Marion County is in preparing travel time reliability performance measures at regular intervals and monitoring incidents, evacuations and work zones in real-time.

Freight Advanced Traveler Information System (FRATIS)

Freight is an important aspect of the American transportation network. Billions of tons of goods are moved by truck around the United States each year. Therefore, it is critical that the transportation network is utilized efficiently to enable the effective flow of freight goods around the country. To that end, the Federal Highway Administration (FHWA) is promoting a new initiative, the Freight Advanced Traveler Information System (FRATIS) to improve the performance of the freight system across the country. The goal of FRATIS is to provide data including real time incident information, congestion, and travel time to enable freight companies to better plan their freight shipments.

In the State of Florida, FDOT has pursued FRATIS rigorously, putting an emphasis on enhancing traveler information systems to address specific freight needs. This has included a specialized effort to include wait times at intermodal facilities like ports in more usual transportation network data to better equip freight users.

In Marion County, I-75 is a major statewide freight route, making freight an important part of the local economy, as shown by the new distribution centers built along I-75 near Ocala. Therefore, it is recommended that Marion County and the City of Ocala coordinate with FDOT as to the applicability of FRATIS in their jurisdiction. For example, Los Angeles region participated in a FRATIS project with the US Department of Transportation in 2014 and 2015 to improve intermodal truck utilization and enhance the performance of freight transfers between sea and freight travel. While Marion County won't need better sea transfer, they can still work with FDOT to determine the best application of FRATIS for their freight network.

Connected and Autonomous Vehicles

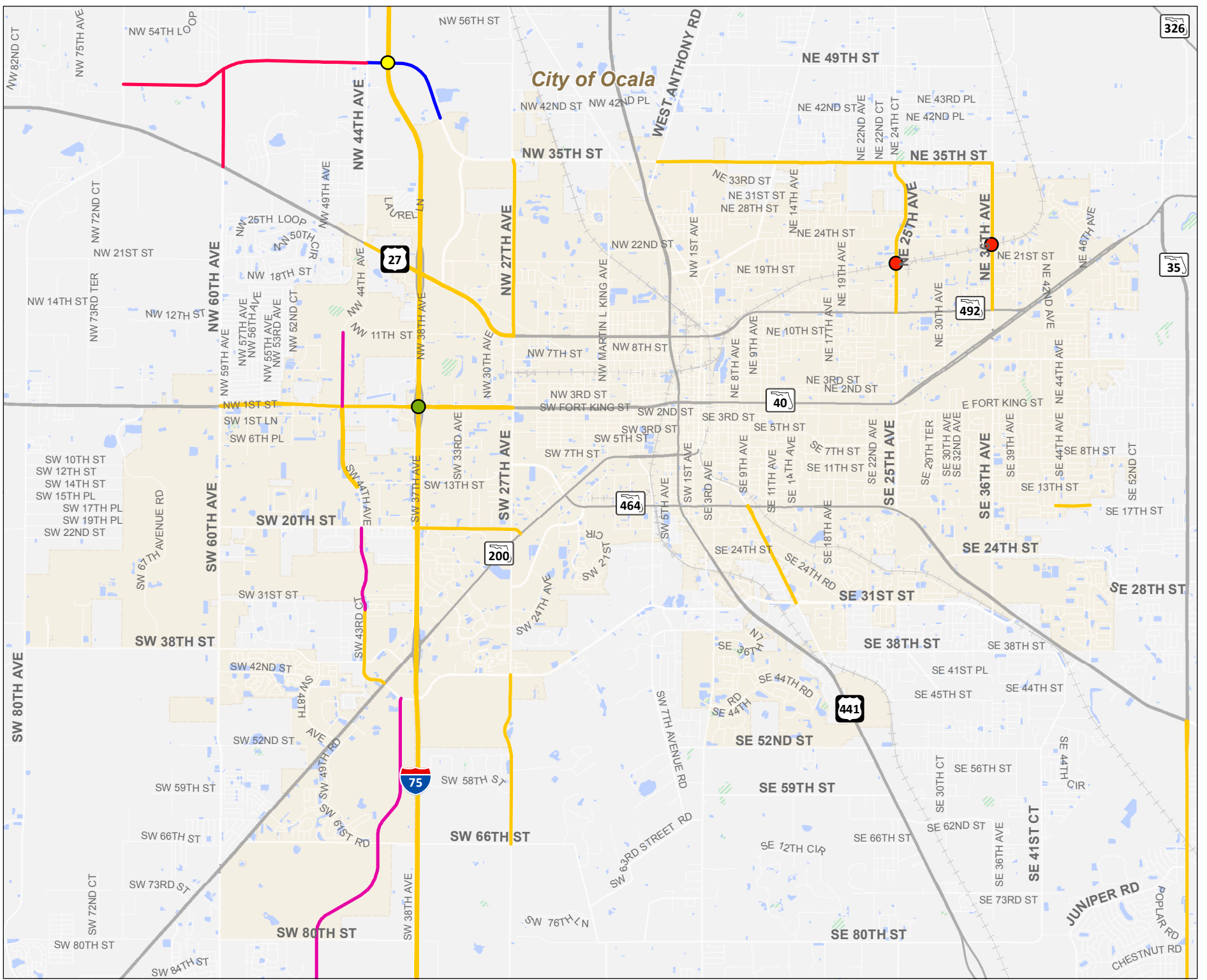
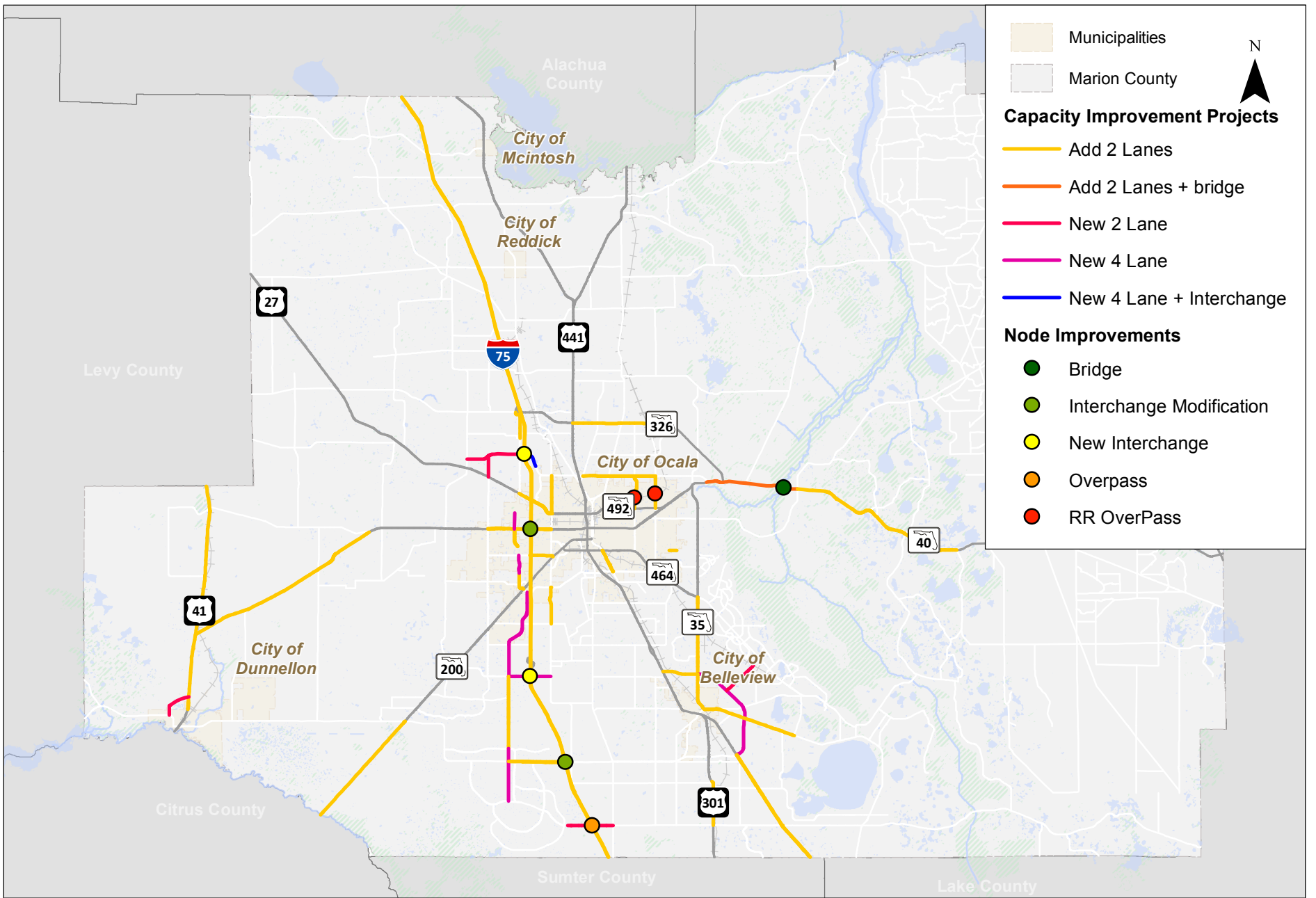
New technologies are constantly entering the field of transportation, many of which warrant inclusion in this ITS plan due to the influence they can and will have on transportation both now and in the future. Few technologies promise larger and more seismic changes than the effects that can be expected from connected and autonomous vehicles (CAVs). Both are revolutionary technologies that will soon be shaping our roadways in enormous ways. Connected vehicles are a first step toward automation, in which a communication infrastructure between other vehicles and sensors on the roadways or other transportation systems enables drivers to receive real time alerts for everything from the positions of other vehicles to when a signal will switch to yellow. Based on the I-75 FRAME project, connected vehicles are the main technology that Marion County and the City of Ocala may consider preparing for the near future. While connected vehicles are revolutionary themselves, autonomous vehicles go even further, potentially taking humans out of the driver seat altogether. It is currently projected that fully autonomous vehicles are still some years away from full-scale production and will probably be initially designed and used in the context of vehicle fleets. In the meantime, semi-autonomous vehicles can already be purchased and are already operating at various levels on the road system.

In Marion County and the City of Ocala, the question should be this: what, if anything, can and should these jurisdictions do to intentionally prepare for the advent of CAVs? The clearest answer right now lies with the I-75 FRAME project discussed earlier. This project has many major goals, but one of its goals is to implement connected vehicle technology on I-75 and roadways surrounding it. This entails the installation of roadside units (RSUs) and other devices that can communicate with connected vehicles. This will be a first step for Marion County and the City of Ocala with connected vehicle technology and will allow the jurisdictions to understand the benefits and pitfalls associated with the technology and determine how they want to utilize connected vehicle technology moving forward.

Capacity Improvement Projects

The Transportation Improvement Program (TIP) is a federally mandated list of all upcoming transportation projects that each metropolitan planning organization (MPO) must prepare as part of their charter. The Ocala-Marion County TPO has accordingly prepared a list of all transportation projects planned in the region. This is an important information source in discussing ITS allocations, as ITS resources should be utilized in conjunction with capacity projects so that ITS equipment is not placed where it isn't needed and so that congested corridors receive the most effective management. The Ocala-Marion County TIP shows capacity improvements, which consist mostly of lane additions, and node improvements, which consist mostly of interchange and bridge

improvements. There are capacity improvement projects planned on major roadways, such as I-75, Us 41, SR 40, and 35th Street, while node improvements are planned at intersections like I-75 and SR 40, I-75 and 35th Street, and I-75 and I-75 and CR 484. All of these projects are shown in **Figure 11** below.



Transportation Improvement Program (TIP) Projects
Ocala / Marion County

Figure
11



Coordinate System: NAD 1983 StatePlane Florida West FIPS 0902 Feet
Data Source: Marion County Open Data Portal

Chapter 4 | Traffic Operations Analysis

Segment Scoring Methodology

As part of the analysis for this ITS plan, a methodology was developed to score every roadway segment in Marion County. This was done to determine which roadway segments could benefit most from ITS improvements. This process involved compiling the final results, reviewing the high-ranking segments, and combining the adjacent segments to identify corridors that are strong candidates for future ITS projects. The scoring process accounts for several important characteristics of each roadway segments and assigns a score for each category. The following factors were considered and are integral to the scoring methodology:

- Roadway classification
- Maximum acceptable volume (MAV) ratio
- Existing volume
- Safety significance
- Freight, significance
- Evacuation significance
- Existing ITS infrastructure

Each of these factors is described in greater detail in the following paragraphs.

Roadway Classification

Each roadway analyzed for the segment rankings was classified as either a Strategic Intermodal System (SIS), regional, non-regional, or local roadway. A list of the classifications and the characteristics that categorize them follows and is displayed in **Figure 12**:

- **SIS or SIS Connector** – These roadways are given the highest priority for their role in connecting Marion County with intermodal hubs while aiding in the statewide movement of goods and people. These roadways include US 301, SR 40, and SR 326, and US 27.²
- **Regional Roadway** – These roadways serve inter-county travel or travel between major population centers within Marion County. For this analysis they include all National Highway System facilities that are not already included in the SIS classification.
- **Non-Regional Roadway** – These roadways serve intra-county travel but generally do not connect major population centers. They roadways classified as local urban and local rural and any remaining roadways that are not included in the other three categories.
- **Collectors** – These roadways include those Major Collector Rural, Minor Collector Rural, Major Collector Urban, Minor Collector Urban as defined by the FDOT Functional Classification.

² Note: I-75 was removed from the analysis because it has already received significant ITS attention and its major importance in the region would skew results, thus making the needs of other roadways difficult to see.

Maximum Acceptable Volume (MAV) Ratio

The existing volume to maximum acceptable volume (MAV) ratio (also known as the v/c ratio) is an indicator that helps identify locations of recurring congestion. MAV is given the highest weight in the scoring system. This performance measure score is calculated by multiplying the corridor's v/c ratio by 30 points. For corridors where the v/c ratio is greater than 1.0, the score will still be calculated out of 30 points but the maximum score for the measure is 40 (equates to a v/c ratio of 1.33). The scoring criteria are shown below:

- MAV * 30 points
- Limit to maximum of 40 points (v/c = 1.33)

Existing year AADT volumes and capacities were obtained from the following sources:

- 2016 AADT volumes and capacities for Marion County roads obtained from Transportation Inventory Management and Analysis System provided by the Ocala Marion County TPO;
- Capacities for Marion County roads obtained from the LOS tables from the *FDOT Quality LOS Handbook*.

Note that in some cases a roadway did not have a current 2016 or 2017 AADT, thus the most recent historical data was utilized for the analysis. **Figure 13** displays the v/c ratios for the segments analyzed.

Existing Volume

Improvements on high volume segments will benefit a larger number of motorists; therefore, an existing volume category was developed to favor such segments. Two sets of volume ranges, one for two lane rural facilities and one for all other facilities, were used in the calculation of the score for this category. The criteria are shown below:

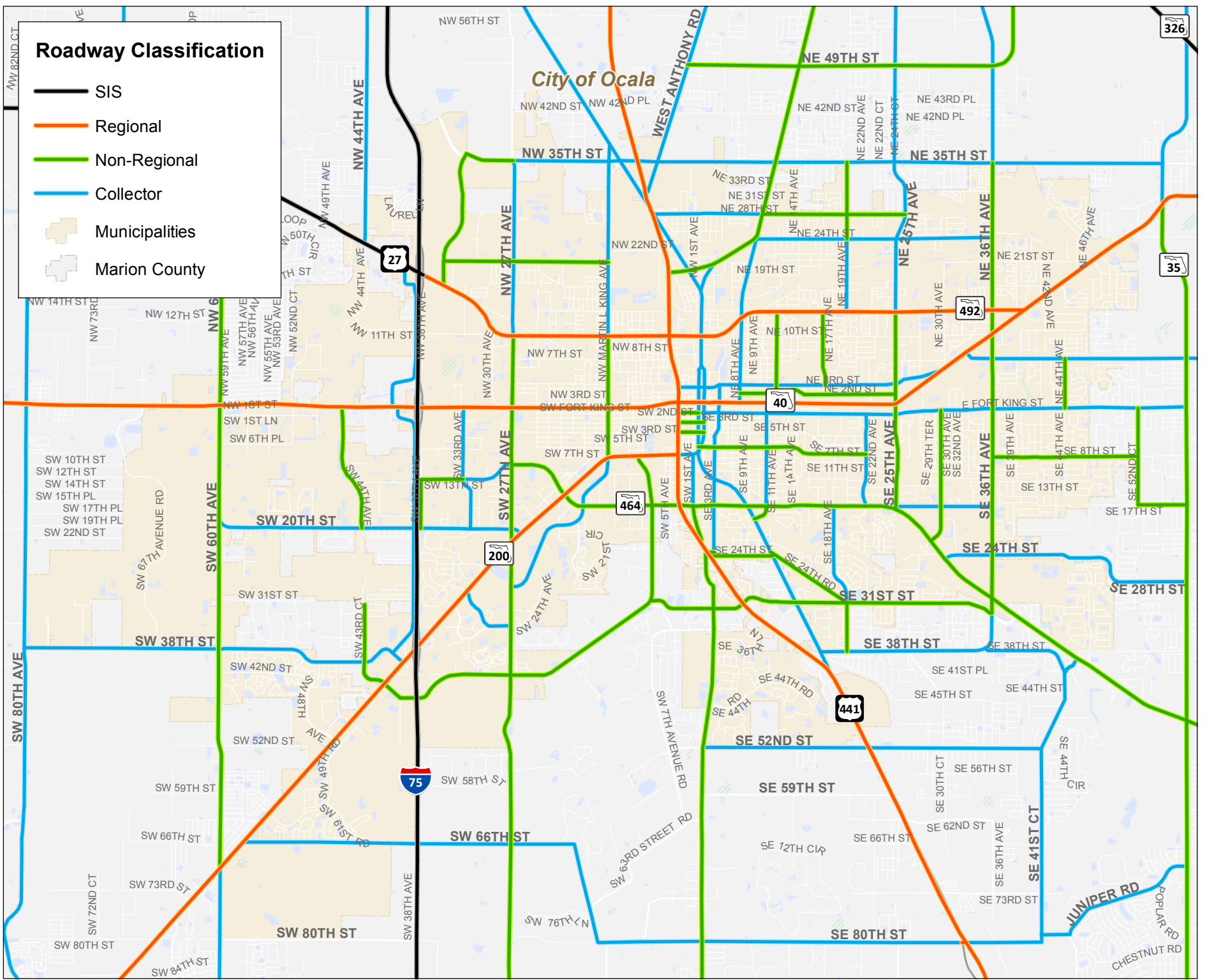
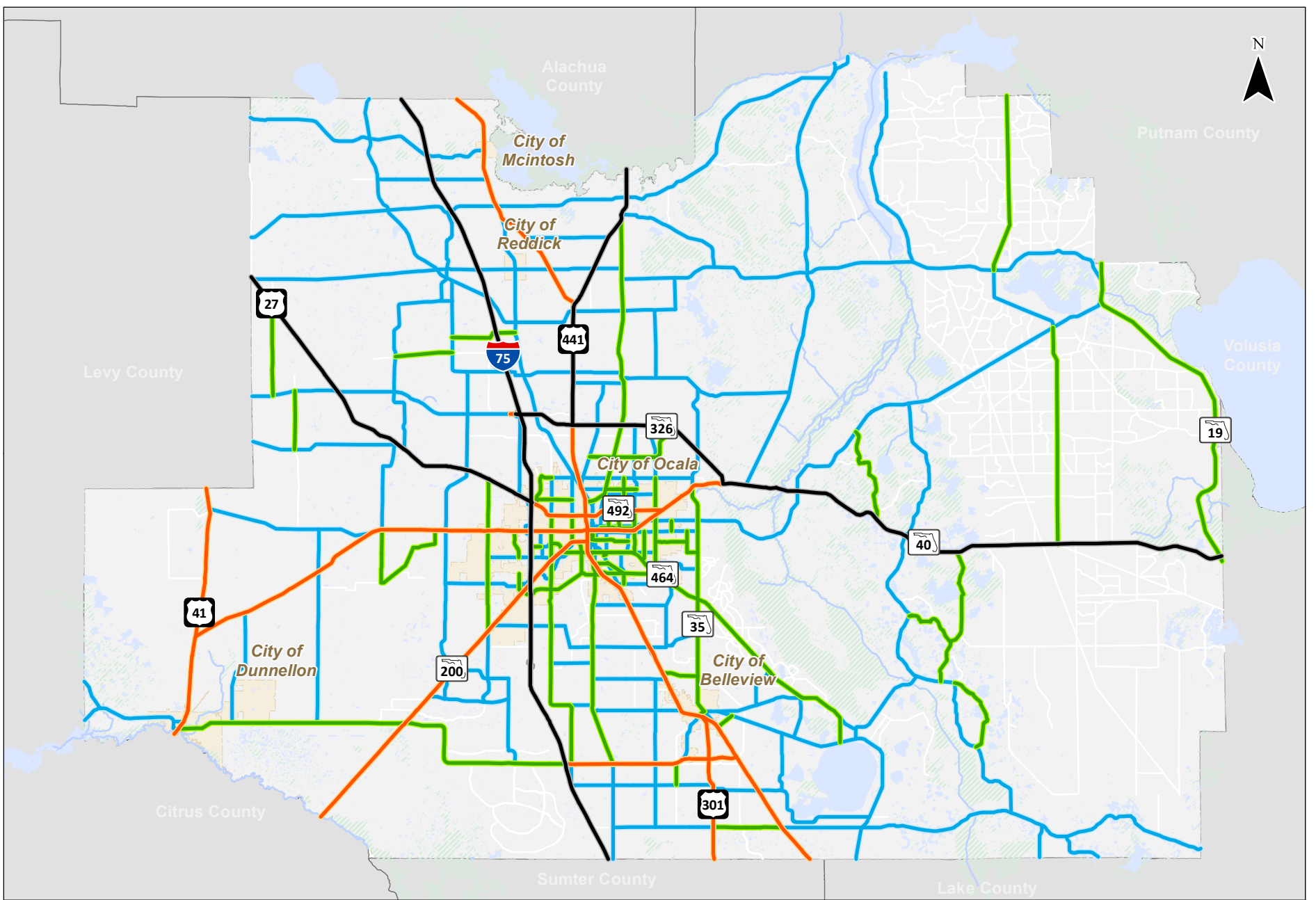
Two Lane Rural Facilities

- 4,999 or less = 0.0
- 5,000 to 5,999 = 2.5
- 6,000 to 6,999 = 5.0
- 7,000 to 7,999 = 7.5
- 8,000 or greater = 10.0

All Other Facilities

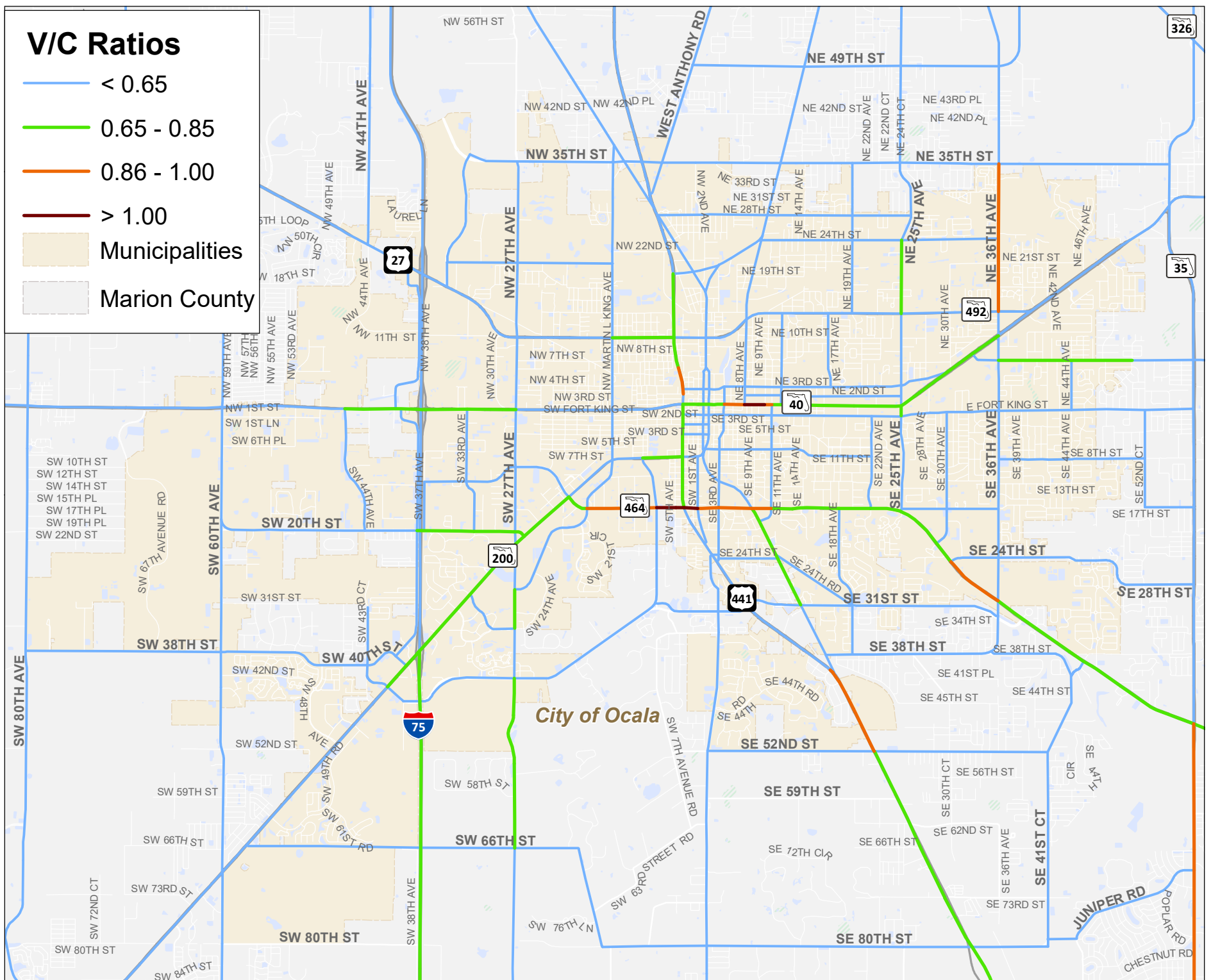
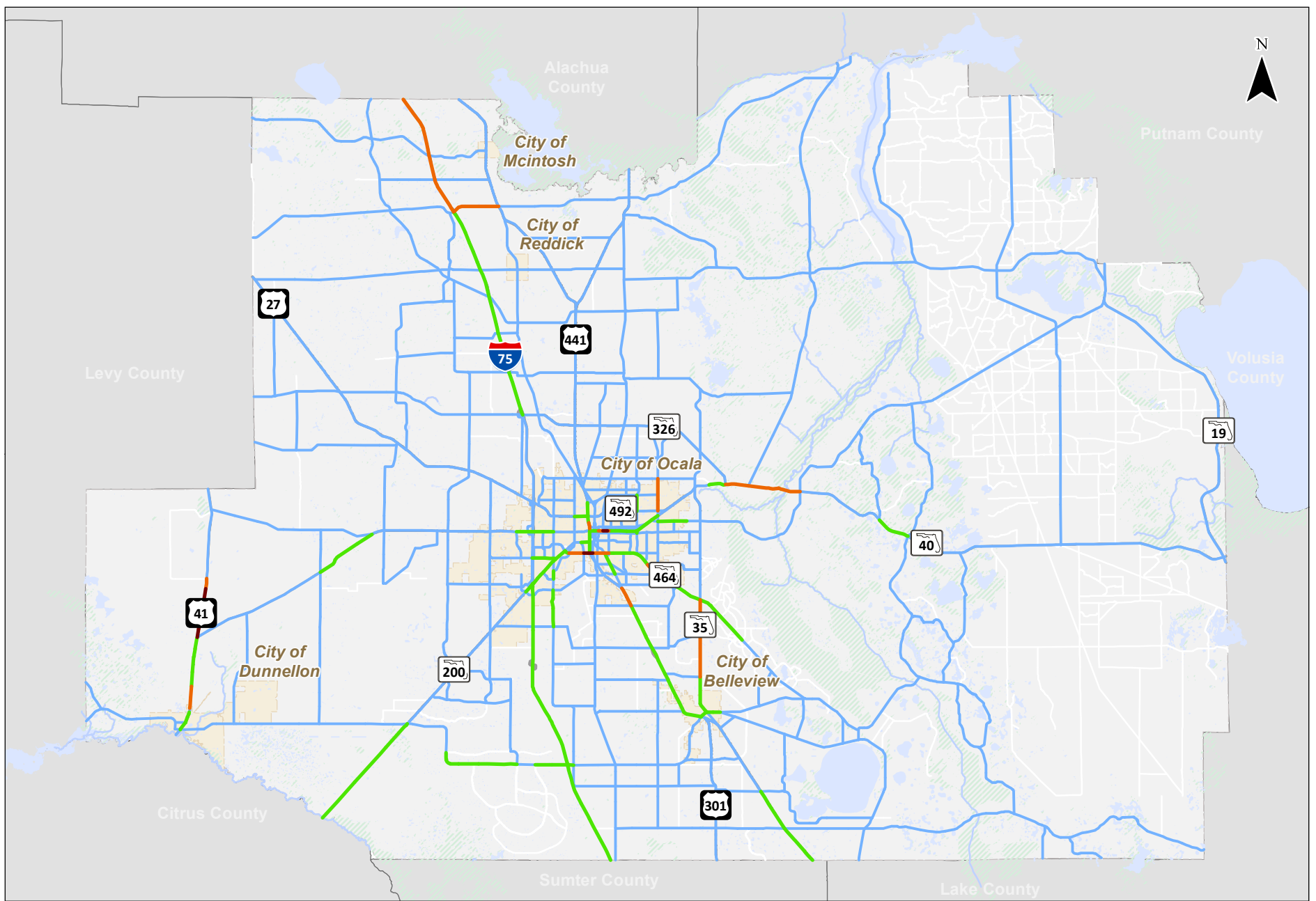
- 9,999 or less = 0.0
- 10,000 to 19,999 = 2.5
- 20,000 to 29,999 = 5.0
- 30,000 to 39,999 = 7.5
- 40,000 or greater = 10.0

See **Table 4** for a summary of the existing volume breakdown and scoring. AADT values were obtained from the sources noted in the MAV section. **Figure 14** and **Figure 15** display the existing volumes for the rural two-lane and urban/four+-lane rural segments analyzed.



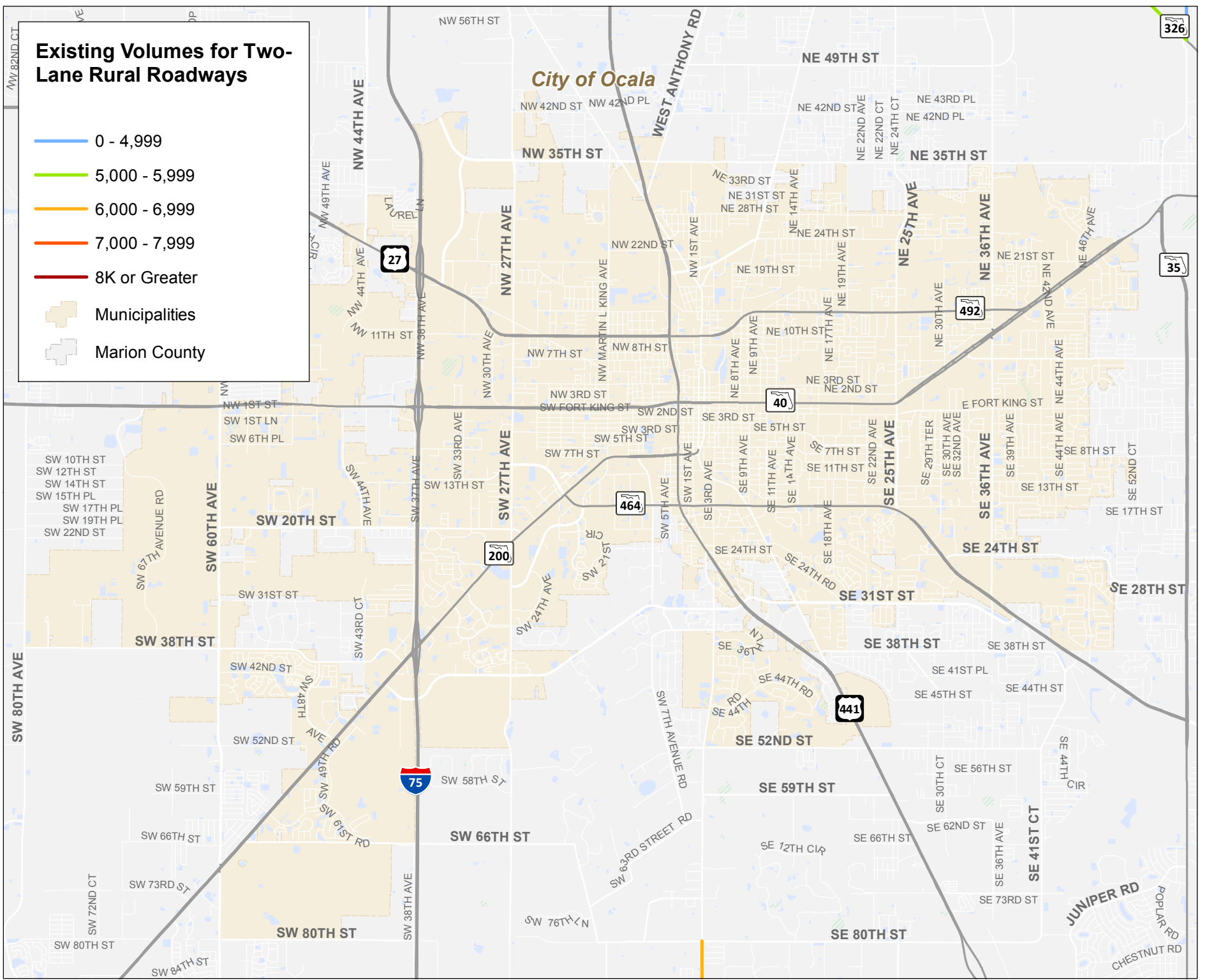
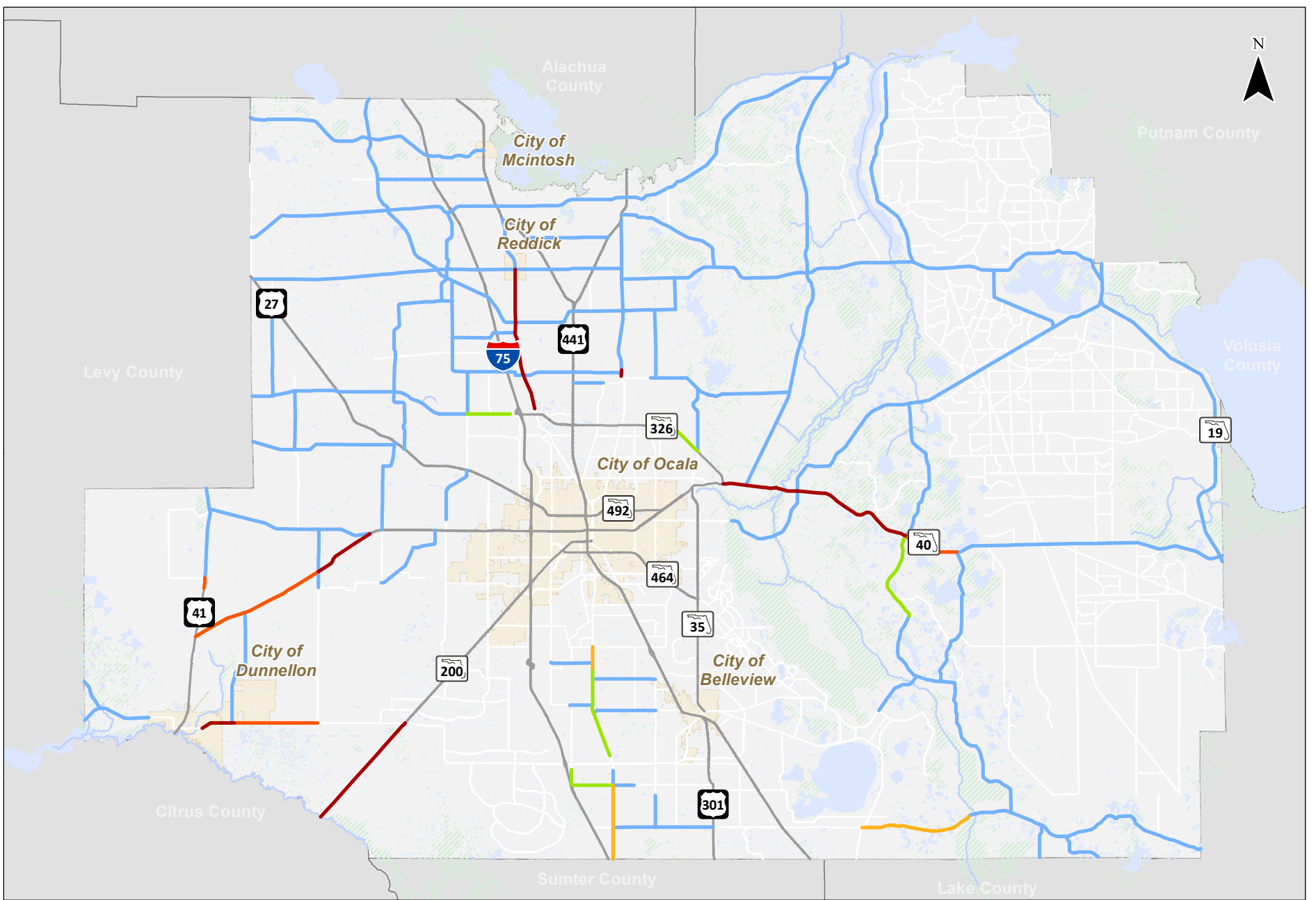
**Roadway Segments Analyzed by Roadway Classification
Ocala / Marion County**

**Figure
12**



V/C Ratios for Roadway Segments Analyzed
Ocala / Marion County

Figure
13



Existing Volumes for Two-Lane Rural Roadways Analyzed
Ocala / Marion County

Figure
14



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Safety Significance

The MAV ratio and existing volume sections directly relate to recurring congestion while the safety portion of the segment scoring correlates with non-recurring congestion. ITS technology has historically demonstrated its ability to help alleviate congestion caused by the incident. Better incident detection systems can facilitate local emergency response to the incident site and more efficiently clear the incident. Dynamic Message Signs (DMS) and other points of information dissemination provide advanced notice to travelers to influence their choice on potential alternate routes, minimizing congestion at the crash site.

Crash data was obtained from the University of Florida's Signal Four Analytics Database for the most recent five calendar years (2013 through 2017) and mapped using GIS. Segment length was obtained from GIS, and traffic volumes were obtained from the sources noted above.

The safety scoring procedure takes into consideration two different elements:

Crashes per year per mile (Total Crash Rate)

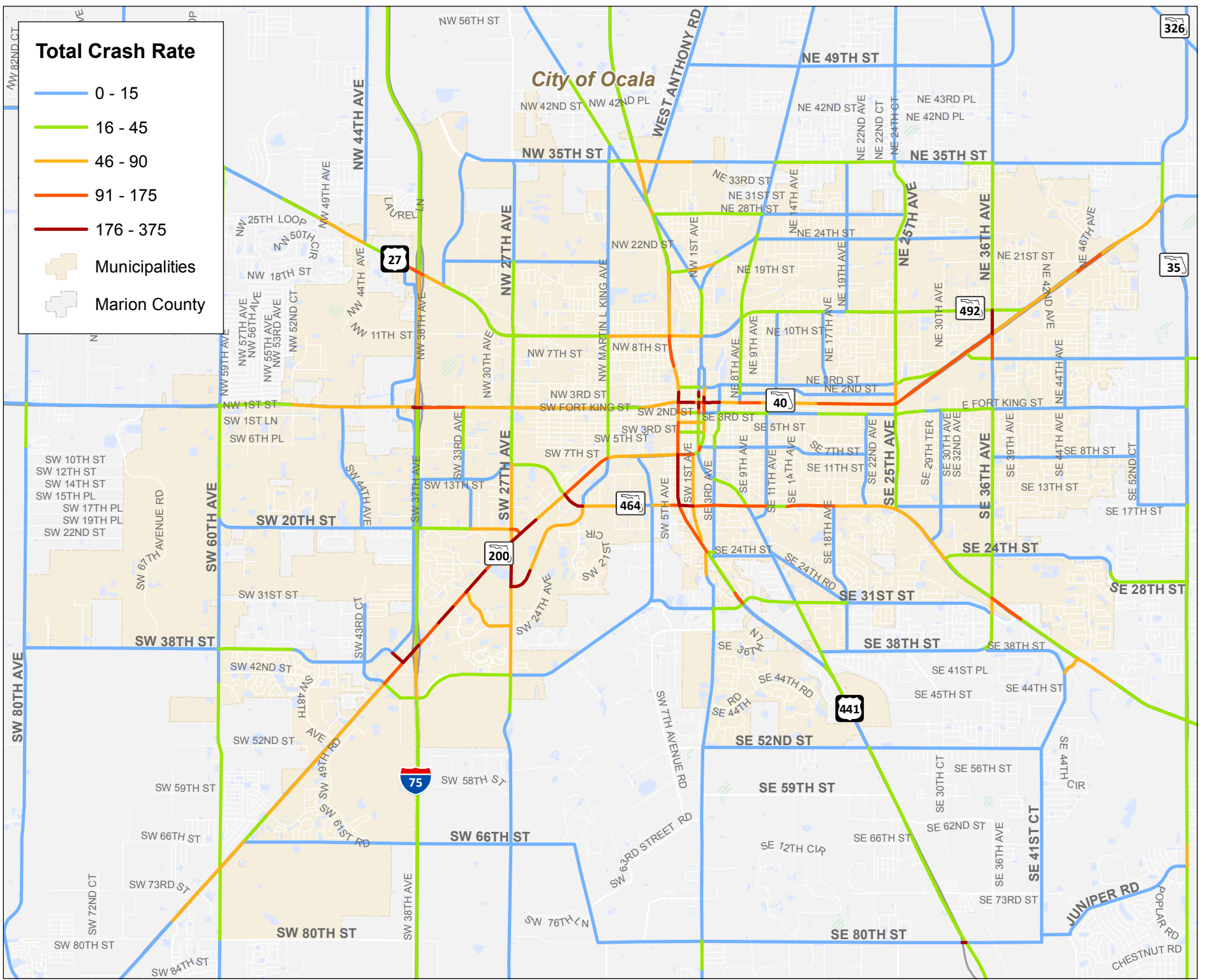
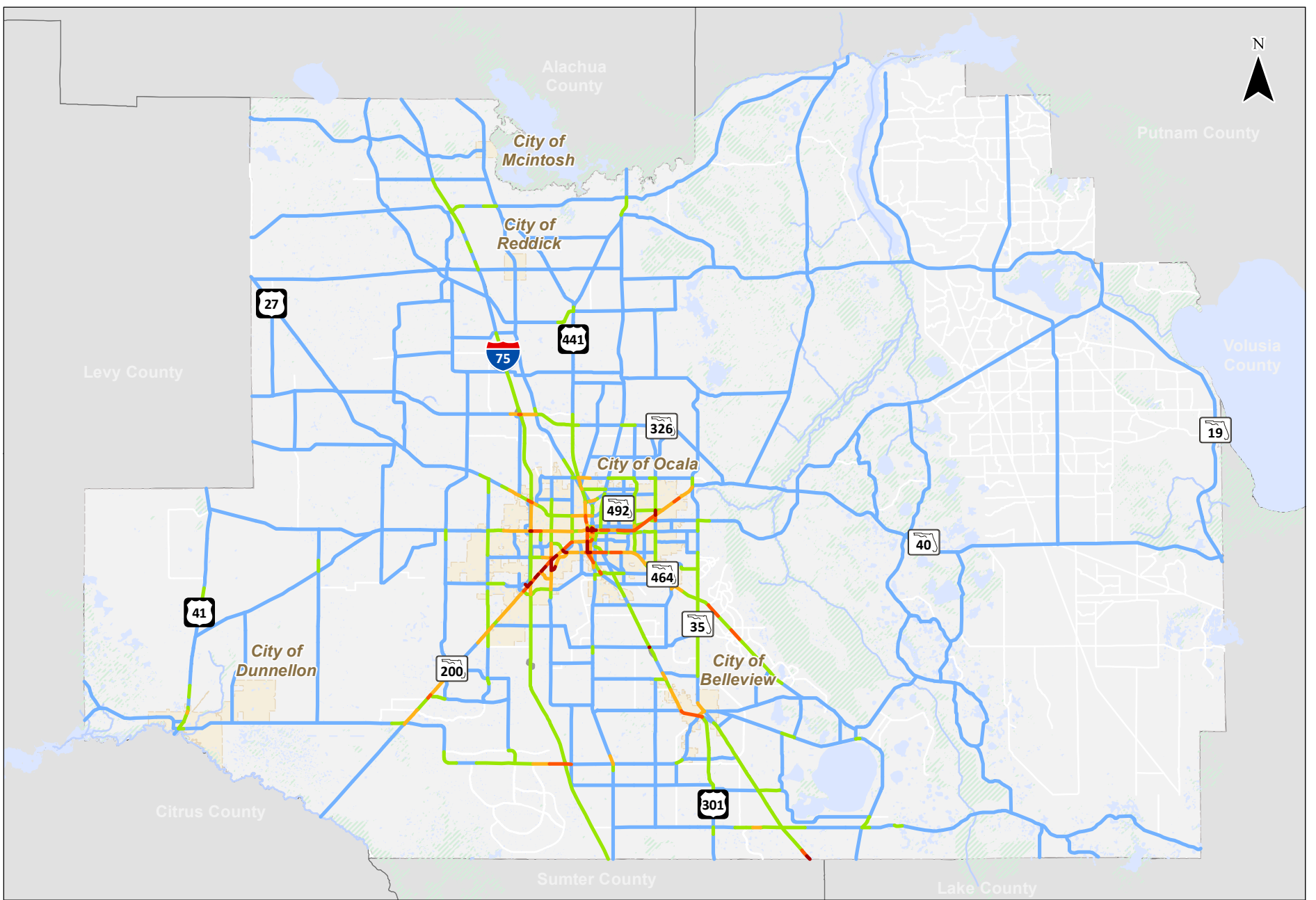
- 0 to 15 = 0.0
- 15 to 45 = 2.5
- 45 to 90 = 5.0
- 90 to 175 = 7.5
- 175 to 375 = 10.0

Fatal and incapacitating injury crashes per year per mile (Crash Rate)

- 0 to 0.3 = 0.0
- 0.3 to 1.1 = 5.0
- 1.1 to 2.5 = 10.0
- 2.5 to 4.5 = 15.0
- 4.5 to 8.0 = 20.0

As can be seen, the first crash rate category is assigned a maximum of 10 points and the second crash rate category is assigned a maximum of 20 points. The scores of these three elements are added together to obtain a final score for the Safety Significance factor. Thus, for example, if both elements are assigned the maximum possible score then the segment would receive a total of 30 points for the Safety Significance factor.

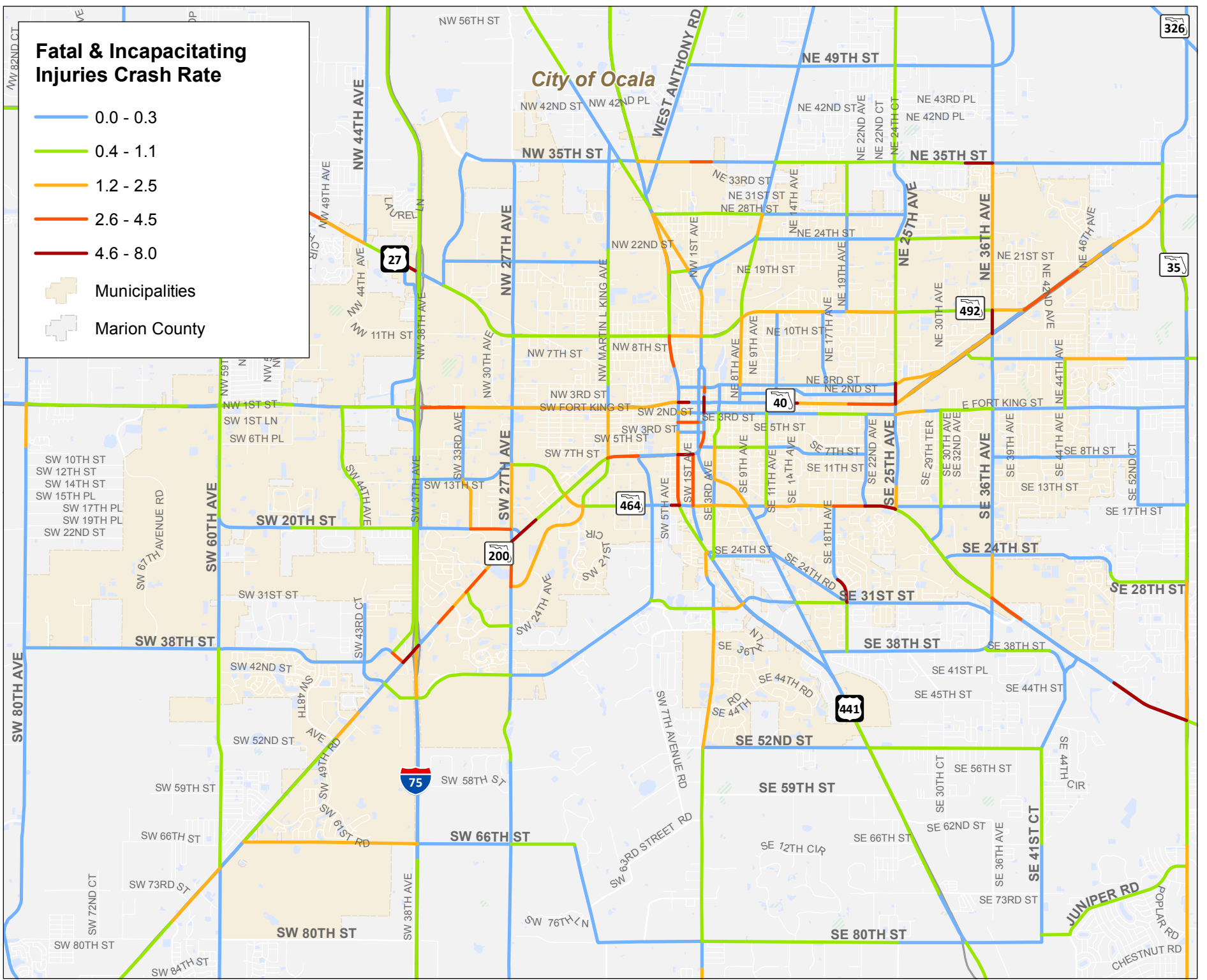
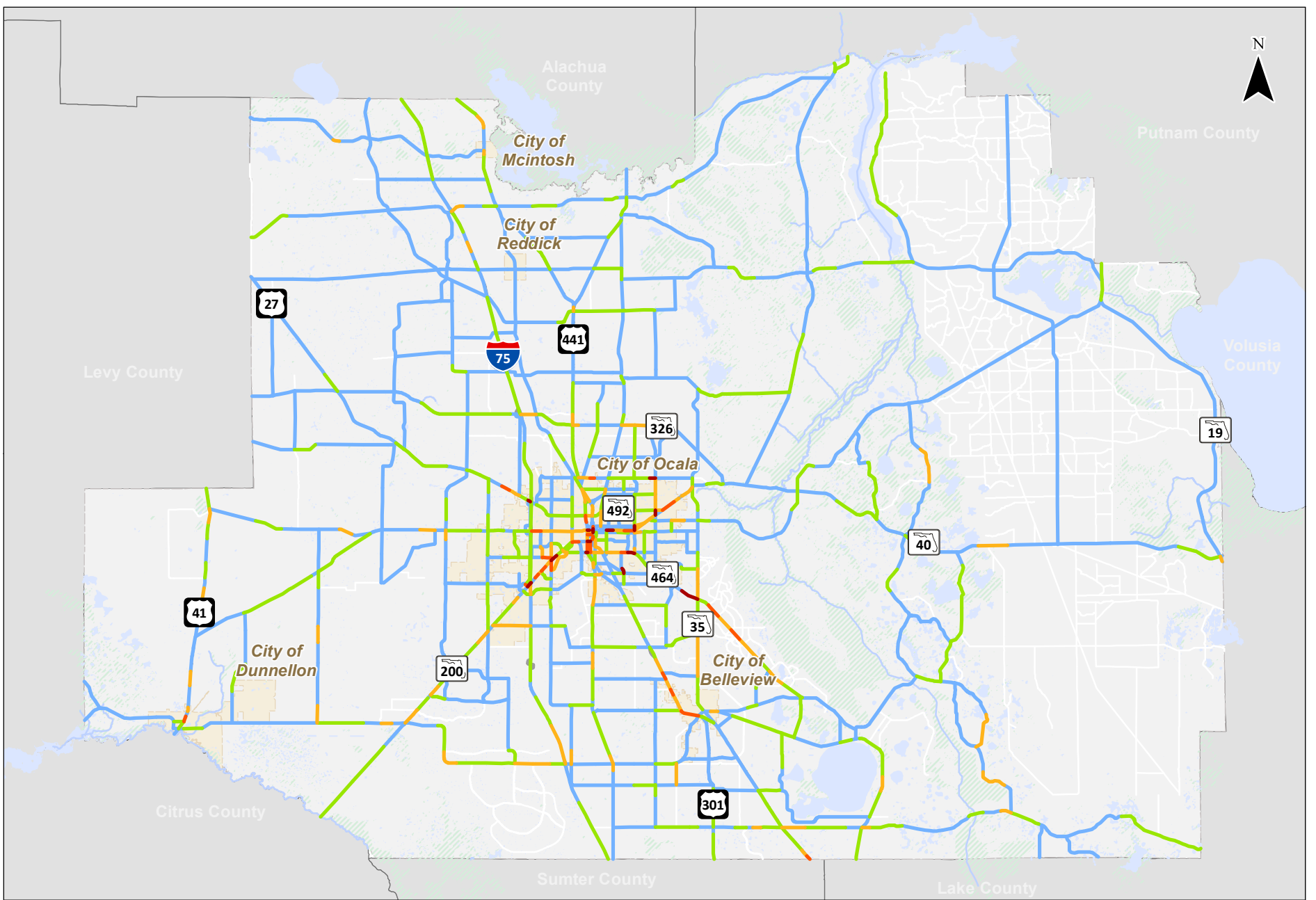
Figure 16 and **Figure 17** display the total and fatal and incapacitating injury crash rate in crashes/year/mile that received scoring.



**Total Crash Rate per Segments (Fatal, Incapacitating Inj. and PDO)
Ocala / Marion County**

Figure 16

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**Fatal and Incapacitating Injury Crash Rate per Segments
Ocala / Marion County**

**Figure
17**

Freight Significance

As discussed earlier, Marion County experiences a large amount of truck volume due to its location along I-75. Congestion experience on roadway segments could be exacerbated by higher volumes of trucks, and therefore truck volumes and the presence of truck routes were included as a criteria category for the analysis. The following criteria was used and represents annual average daily traffic (AADT) traffic volumes for freight vehicles:

- High Volumes (4,275 to 18,320) = 10.0
- Medium Volumes (1,079 to 4,274) = 5.0
- Low Volumes (0 to 1,079) = 0.0

- Designated Truck Route = 10.0

See **Table 4** for a summary of the existing truck volume breakdown and scoring. Truck AADT values were obtained from the sources noted in the MAV section. **Figure 18** displays the truck volumes and truck routes throughout the region.

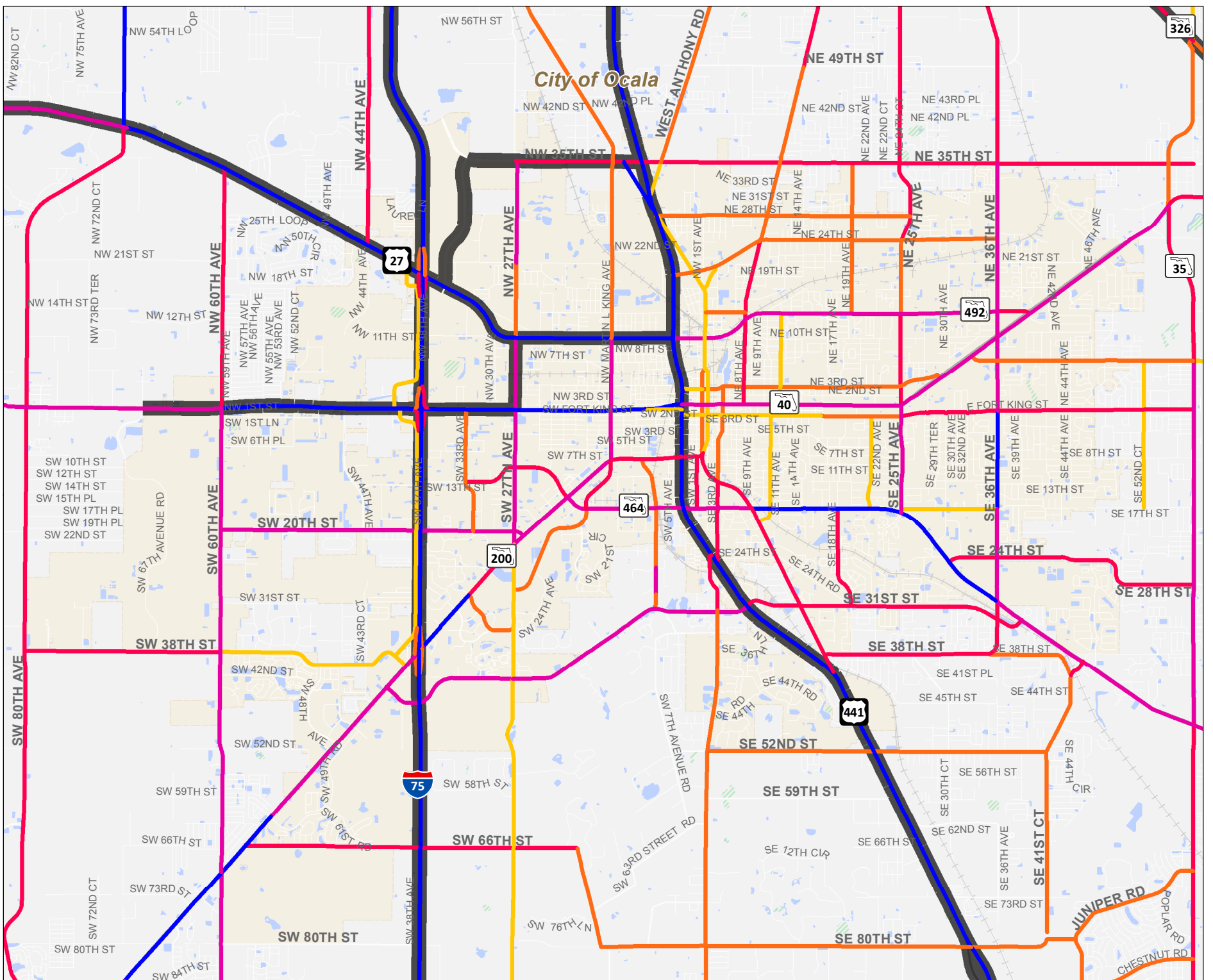
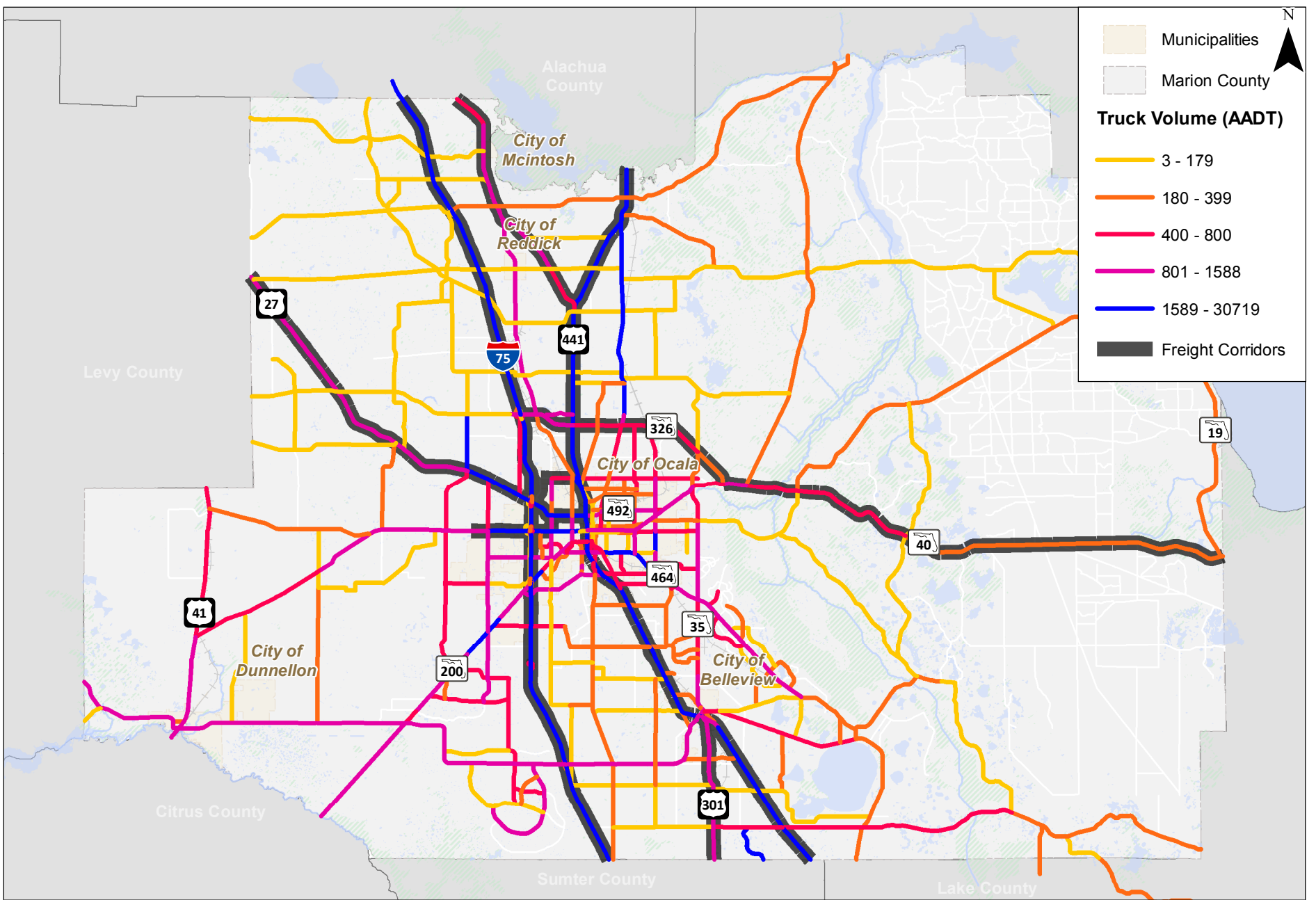
Evacuation Significance

ITS strategies can help better manage congestion and traffic during times of emergency and help direct travelers to identify hurricane evacuation routes and inform travelers of changes to travel routes. Segments having been identified by FDOT and Marion County were mapped and given points based on the following:

- A primary hurricane evacuation route was given 10 points;
- A secondary hurricane evacuation route was given 5 points; and
- A segment not designated as a hurricane evacuation route was given 0 points.

Figure 19 displays the hurricane evacuation routes within the planning area and was used for this evaluation.

I-75 was classified as primary hurricane evacuation routes due to its Statewide importance to overall hurricane evacuation route procedures. If a major arterial connected to this facility, served a major population center, or was the primary parallel route, it was also classified as a primary hurricane evacuation route. Examples of primary hurricane evacuation routes include US 441, US 301, SR 40, SR 200, US 41, SR 19, and SR 27. Secondary hurricane evacuation routes are any designated hurricane evacuation routes that are not otherwise classified as a primary route.



**Truck Volume (AADT) and Designated Freight Corridors
Ocala / Marion County**

**Figure
18**

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Existing ITS

A significant capital investment has already been made in Marion County to provide existing CCTVs and trunk fiber lines. To further identify roadways where ITS strategies could be implemented while also seeing where there are gaps in the existing network, the following scoring procedure was used:

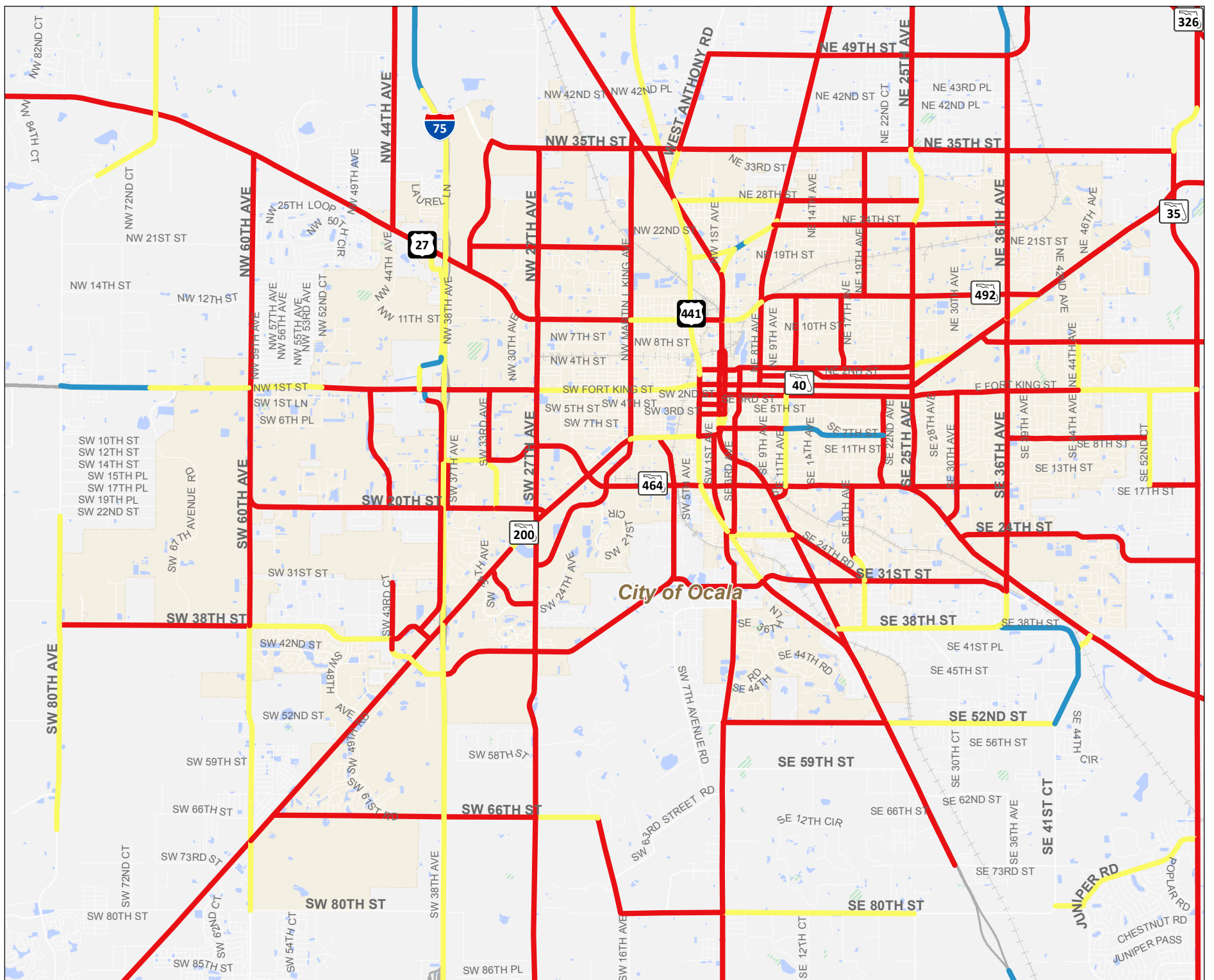
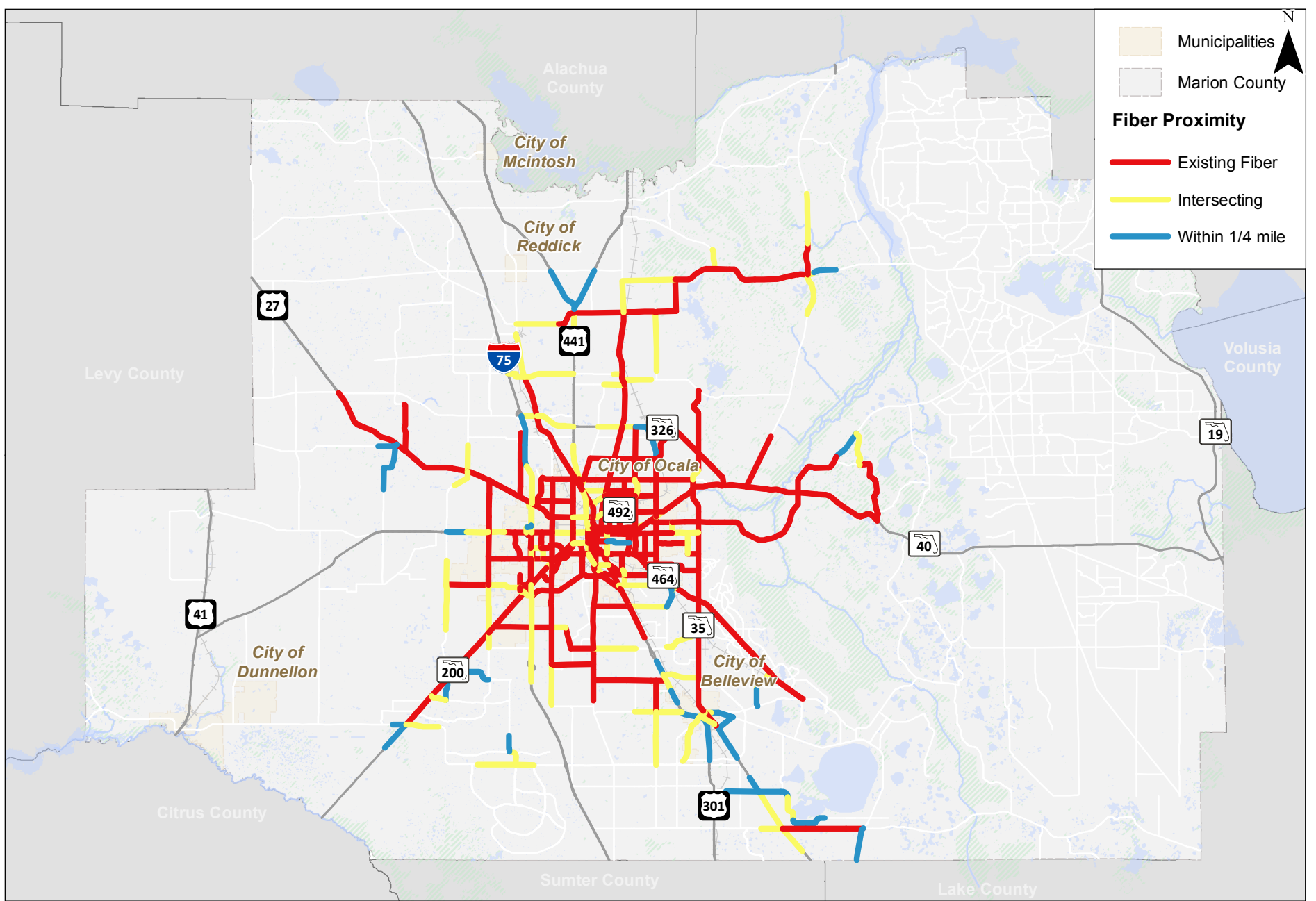
- Existing Fiber – Roadway segments with an existing fiber network in place are given 7.5 points;
- Intersecting Fiber – Roadway segments that intersect another roadway with existing fiber are given 5 points;
- Within ¼ Mile of Fiber – Roadway segments that do not intersect a roadway with existing fiber but are within ¼ of a roadway with fiber are given 2.5 points; and
- Existing CCTVs – Roadway segments that have a CCTV located within a ¼ mile are given 2.5 points.
- Bluetooth® – Roadway segments that have Bluetooth® devices are given 2.5 points.

The rationale underlying this scoring procedure is that roadways with existing fiber, intersecting existing fiber, or are within ¼ mile of fiber may have a much lower cost to implement TSM&O strategies than roadways with no fiber and also further than ¼ mile away from existing fiber. A roadway with existing fiber and CCTV, can receive a maximum of 10 points. Roadways with intersecting segments can receive a maximum of 7.5 points and segments within ¼ miles can receive a maximum of 5 points. This scoring methodology will identify roadway segments that are most suited to further ITS projects given their existing capabilities.

Figure 20 displays the existing ITS network within the study area.

Scoring Methodology Matrix

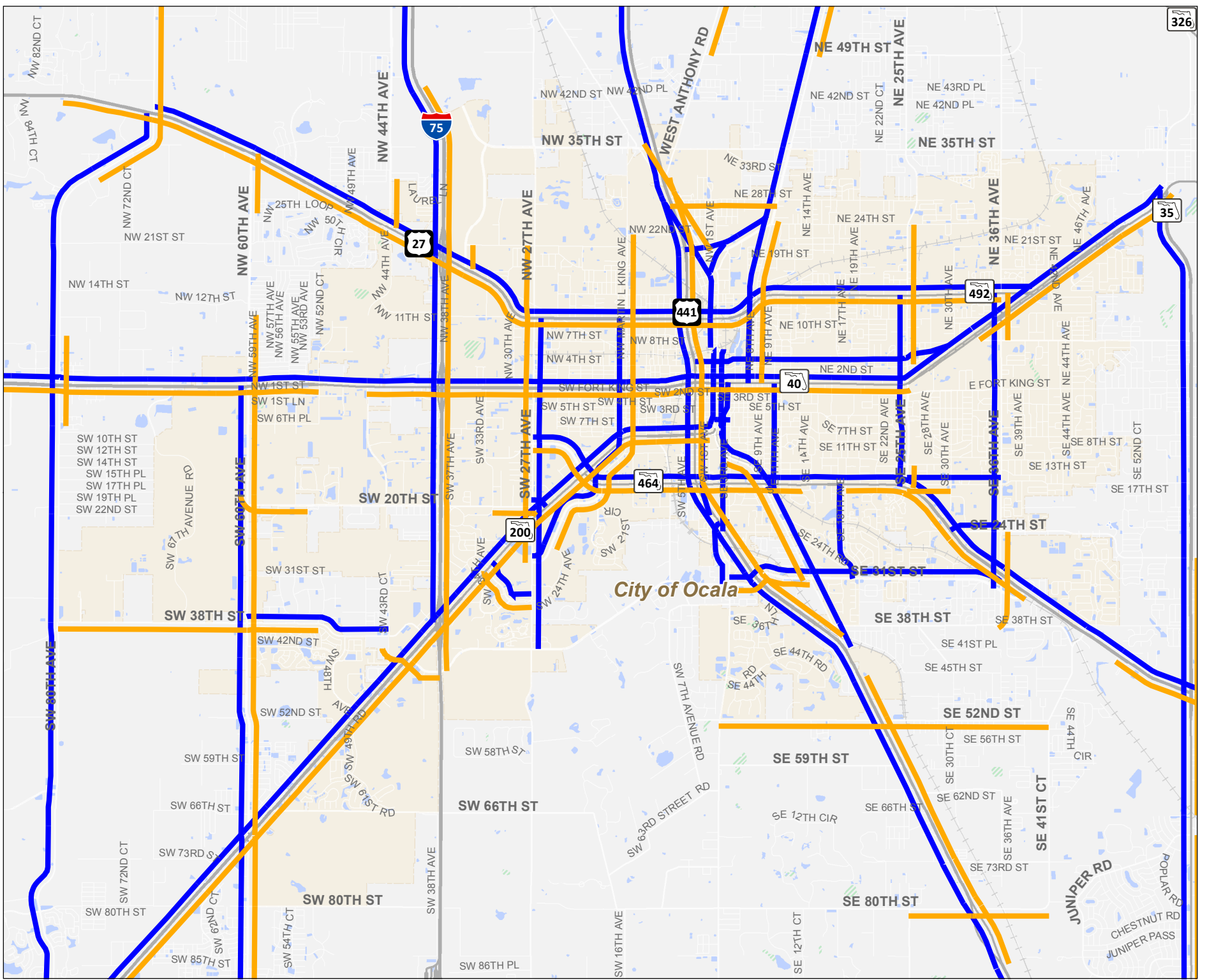
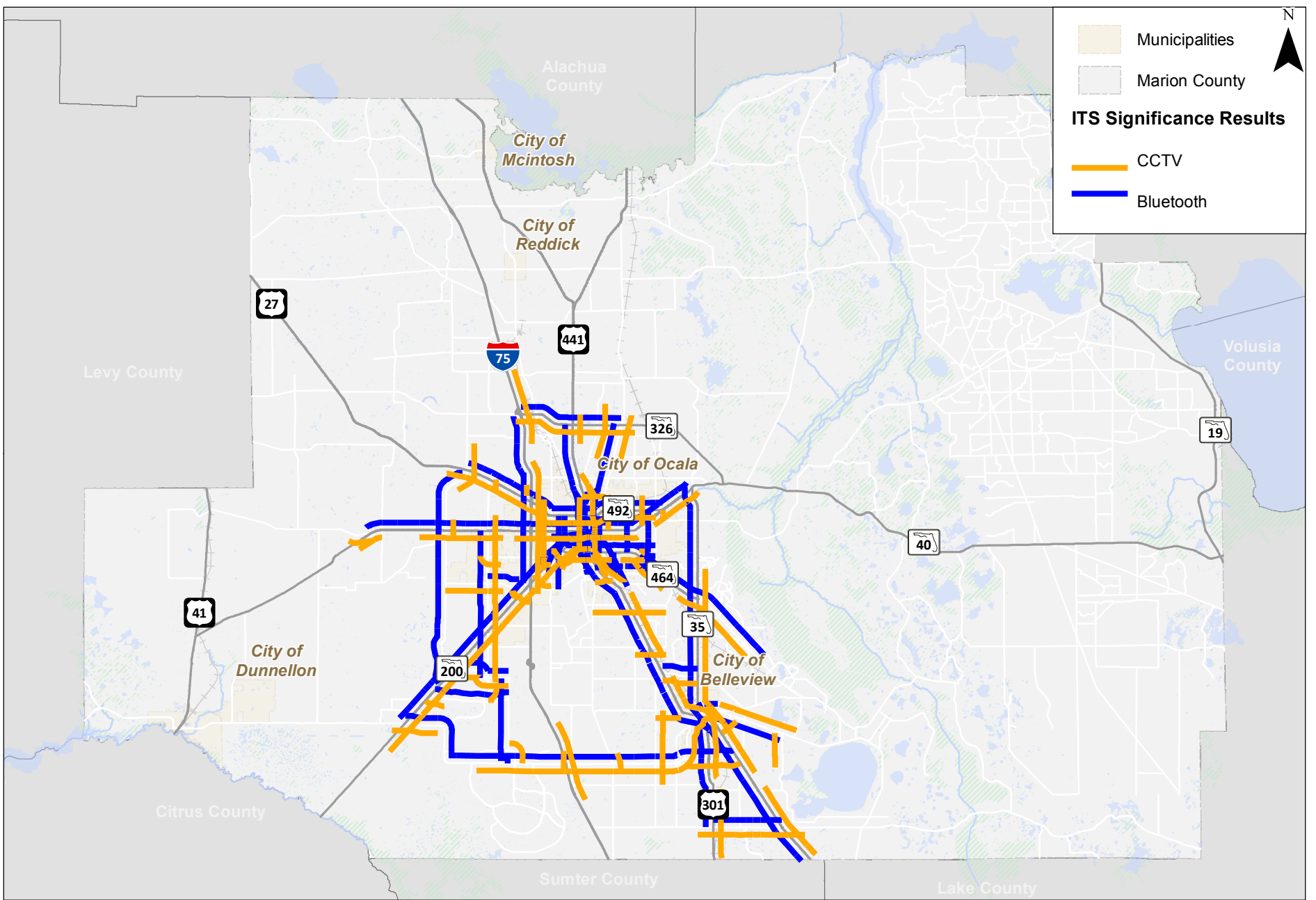
This scoring methodology was developed to quantitatively measure the need for ITS infrastructure throughout the region. All the factors discussed above are criteria that local authorities deem important for determining the need for ITS support. Some of these factors are more important than others so they are weighted more heavily. In this scoring, the volume and capacity measures had the highest weighting, safety had the next highest weighting, and roadway classification, truck volumes, evacuation significance and existing ITS infrastructure all had equal weighting. The detailed scoring criteria is shown below. **Table 4** outlines the method and values used for segment scoring for each of the previously described categories.



ITS Significance Results for Fiber Optic Scoring
Ocala / Marion County

Figure
20.a

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ITS Significance Results for CCTV and Bluetooth Scoring
Ocala / Marion County

Figure
20.b

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Table 4 Scoring Methodology Matrix

Prioritization Category	Description	Data Inputs	Scoring Methodology	
Maximum Acceptable Volume (MAV) Ratio	A measure of existing congestion severity	2016 and 2017 Volumes and Capacities from Various Sources	MAV * 30 points Limit to maximum of 40 points (v/c = 1.33)	
Existing Volume	A measure of the number of vehicles along roadway segments	2016 and 2017 Volumes from Various Sources	<p>Two Lane Rural Facilities</p> <p>4,999 or less = 0.0 5,000 to 5,999 = 2.5 6,000 to 6,999 = 5.0 7,000 to 7,999 = 7.5 8,000 or greater = 10.0</p>	<p>All Other Facilities</p> <p>9,999 or less = 0.0 10,000 to 19,999 = 2.5 20,000 to 29,999 = 5.0 30,000 to 39,999 = 7.5 40,000 or greater = 10.0</p>
Safety	A measure incorporating corridor crash density and crash severity	Signal 4 Analytics (annual average of 2013-2017 data)	<p>Total Crash Rate</p> <p>0 to 15 = 0.0 15 to 45 = 2.5 45 to 90 = 5.0 90 to 175 = 7.5 175 to 375 = 10.0</p>	<p>Fatal and Incapacitating Injury Crash Rate</p> <p>0.0 to 0.3 = 0.0 0.3 to 1.1 = 5.0 1.1 to 2.5 = 10.0 2.5 to 4.5 = 15.0 4.5 to 8.0 = 20.0</p>
Freight Significance	A measure of the number of trucks along roadway segments	2016 and 2017 Volumes from Various Sources	<p>High Volumes (4,275 to 18,320) = 10.0 Medium Volumes (1,079 to 4,274) = 5.0 Low Volumes (0 to 1,079) = 0.0</p> <p>Designated Truck Route = 10.0</p>	
Evacuation Significance	Designation as an evacuation route	FDOT Evacuation Routes Map	<p>Primary evacuation route = 10 points Secondary Evacuation Route = 5 points Not a designated Evacuation Route = 0 points</p>	
Existing ITS Infrastructure	A measure of existing facilities in place and opportunities for expansion	Ocala-Marion County TPO	<p>Existing fiber – 7.5 points Intersecting fiber – 5 points Within ¼ mile of fiber – 2.5 points Existing CCTV – 2.5 points Existing Bluetooth® – 2.5 points</p>	

Scores are assigned to each segment based on the scoring matrix shown above, the scores are added, and final scores are calculated. A potential scoring example is shown below.

Potential Total Scoring: 30 (Safety) + 10 (Existing Volume) + 40 (MAV) + 20 (Truck Significance) + 10 (Evacuation) + 12.5 (ITS Significance) = **122.5 PTS.**

The segments were ranked after being scored. The top 25 ranked segments are discussed below.

Top 25 Ranked Analysis Segments

Table 5 through **Table 8** summarize the Top 25 scoring roadway segments for SIS, Regional, Non-Regional, and Collector roadways when using the scoring methodology described in the Segment Scoring Methodology section above. A full listing of all Marion County roadway segment rankings, in alphabetical order, is provided in **Appendix A**.

Figure 21 provides a graphical representation of the Top 25 scoring roadway segments for the various roadway classifications and the overall top 25 roadway segments. These segments were reviewed and combined to establish the locations where the deployment of ITS strategies is expected to provide the optimum return on investment in improving the Marion County's roadway network. Specific ITS projects recommended for the region's roadways are summarized in Chapter 6.

Table 5 Top 25 Ranked SIS Segments

Priority Rank	Road Name	From	To	MAV Ratio	Existing Volume	Safety	Truck	Evacuation Route	ITS	Total Score
1	US 27	NW 38 th Ave.	I-75 West Ramp	12.9	2.5	27.5	10.0	10.0	12.5	75.4
2	SR 40	CR 315	CR 314	29.4	10.0	0.0	15.0	10.0	7.5	71.9
3	US 27	I-75 West Ramp	I-75 East Ramp	14.1	2.5	7.5	20.0	10.0	12.5	66.6
4	SR 40	NE 10 th St. Rd.	NE 145 th Ave.	18.1	10.0	5.0	15.0	10.0	7.5	65.6
5	SR 40	NE 125 th Ter. Rd.	NE 10 th St. Rd.	18.1	10.0	5.0	15.0	10.0	7.5	65.6
6	SR 40	SR 326	CR 315	27.7	10.0	0.0	10.0	10.0	7.5	65.2
7	US 27	NW 60 th Ave.	NW 49 th Ave.	12.5	2.5	17.5	10.0	10.0	12.5	64.9
8	US 27	NW 49 th Ave.	NW 44 th Ave.	12.9	2.5	15.0	10.0	10.0	12.5	62.9
9	US 27	I-75 West Ramp	I-75 East Ramp	14.1	2.5	7.5	20.0	10.0	7.5	61.6
10	SR 40	CR 314	NE 117 th Ct.	18.1	10.0	0.0	15.0	10.0	7.5	60.6
11	SR 40	NE 117 th Ct.	NE 125 th Ter. Rd.	18.1	10.0	0.0	15.0	10.0	7.5	60.6
12	US 441	CR 329	US 301	16.9	5.0	12.5	10.0	10.0	5.0	59.4
13	SR 326	CR 200A	NE 25 th Ave.	17.4	0.0	12.5	15.0	5.0	7.5	57.4
14	SR 40	NE 145 th Ave.	CR 314A	20.9	10.0	0.0	15.0	10.0	0.0	55.9
15	US 27	NW 44 th Ave.	NW 38 th Ave.	12.9	2.5	7.5	10.0	10.0	12.5	55.4
16	US 27	CR 225A	NW 60 th Ave	12.1	2.5	7.5	10.0	10.0	12.5	54.6
17	SR 326	US 441	NW 12 th Ave.	17.0	0.0	12.5	15.0	5.0	5.0	54.5
18	SR 40	CR 314A	SE 183rd Ave.	16.8	7.5	5.0	15.0	10.0	0.0	54.3
19	US 27	CR 225A	NW 60 th Ave.	12.1	2.5	5.0	10.0	10.0	12.5	52.1
20	US 441	SR 326	NW 77 th St.	13.2	2.5	12.5	10.0	10.0	2.5	50.7
21	SR 326	NE 25 th Ave.	NE 36 th Ave.	17.0	0.0	10.0	15.0	5.0	2.5	49.5
22	SR 40	CR 314A	SE 183 rd Ave.	16.8	7.5	0.0	15.0	10.0	0.0	49.3
23	US 441	NW 77 th St.	NW 117 th St.	17.6	5.0	5.0	10.0	10.0	0.0	47.6
24	US 27	NW 60 th Ave.	NW 55 th Ave.	12.5	2.5	0.0	10.0	10.0	12.5	47.5
25	US 27	NW 55 th Ave.	NW 49 th Ave.	12.5	2.5	0.0	10.0	10.0	12.5	47.5

Table 6 Top 25 Ranked Regional Segments

Priority	Road Name	From	To	MAV Ratio	Existing Volume	Safety	Truck	Evacuation Route	ITS	Total Score
1	SR 200	I-75 West Ramp	I-75 East Ramp	19.8	7.5	30.0	10.0	10.0	12.5	89.8
2	US 441	SR 464	SW 10 th St.	21.7	7.5	25.0	10.0	10.0	10.0	84.2
3	US 441	NW 6 th St.	US 27	22.9	7.5	22.5	10.0	10.0	10.0	82.9
4	SR 40	I-75 East Ramp	SW 33 th Ave.	21.2	5.0	22.5	10.0	10.0	12.5	81.3
5	US 441	SW 10 th St.	SW 5 th St.	23.3	7.5	17.5	10.0	10.0	12.5	80.8
6	SR 200	SW 38 th Ct.	I-75 West Ramp	19.8	7.5	30.0	0.0	10.0	12.5	79.8
7	SR 200	SW 27 th Ave.	SW 20 th St.	19.8	7.5	30.0	0.0	10.0	12.5	79.8
8	SR 200	SW 20 th St.	SW 17 th Rd.	19.7	7.5	30.0	0.0	10.0	12.5	79.7
9	SR 200	SW 36 th Ave.	SW 34 th Ave.	22.0	10.0	25.0	0.0	10.0	12.5	79.5
10	SR 40	US 441	NW 2 nd Ave.	21.2	5.0	30.0	0.0	10.0	12.5	78.7
11	SR 40	I-75 West Ramp	I-75 East Ramp	20.9	5.0	10.0	20.0	10.0	12.5	78.4
12	SR 40	SW 33 rd Ave.	SW 27 th Ave.	22.9	7.5	15.0	10.0	10.0	12.5	77.9
13	SR 40	NE 11 th Ave.	SE 14 th Ave.	21.3	5.0	27.5	0.0	10.0	12.5	76.3
14	US 441	CR 484	SE 110 th St.	21.2	5.0	22.5	10.0	10.0	7.5	76.1
15	SR 40	NE 19 th Ct.	NE 25 th Ave.	23.6	7.5	22.5	0.0	10.0	12.5	76.1
16	US 441	SW 5 th St.	SR 40	23.3	7.5	7.5	15.0	10.0	12.5	75.8
17	SR 200	SW 32 nd Ave.	SW 26 th St.	20.0	7.5	25.0	0.0	10.0	12.5	74.9
18	US 441	Sumter County Line	SE 178 th Pl.	22.4	5.0	25.0	10.0	10.0	2.5	74.9
19	SR 40	NE 11 th Ave.	SE 14 th Ave.	21.3	5.0	25.0	0.0	10.0	12.5	73.8
20	US 441	SE 102 nd Pl.	SE 100 th St.	20.2	5.0	20.0	10.0	10.0	7.5	72.7
21	US 441	SE 95 th St.	SE 92 nd Pl. Rd.	20.2	5.0	20.0	10.0	10.0	7.5	72.7
22	US 441	SE 52 nd St.	SE 40 th Cir.	27.2	7.5	5.0	10.0	10.0	12.5	72.2
23	SR 200	SW 34 th Ave.	SW 32 nd Ave.	22.0	10.0	17.5	0.0	10.0	12.5	72.0
24	US 441	SW 5 th St.	SR 40	23.3	7.5	7.5	10.0	10.0	12.5	70.8
25	US 27	NW MLK Ave.	US 441	23.2	7.5	10.0	10.0	10.0	10.0	70.7

Table 7 Top 25 Ranked Non-Regional Segments

Priority Rank	Road Name	From	To	MAV Ratio	Existing Volume	Safety	Truck	Evacuation Route	ITS	Total Score
1	SR 464	SW 5 th Ave.	US 441	38.0	7.5	27.5	0.0	5.0	12.5	90.5
2	SR 464	SE 3 rd Ave.	CR 464A	29.0	7.5	17.5	5.0	5.0	12.5	76.5
3	SR 464	SW 1 st Ave.	SE 3 rd Ave.	29.0	7.5	17.5	5.0	5.0	12.5	76.5
4	SR 464	SE 22 nd Ave.	SE 25 th Ave.	24.4	7.5	25.0	0.0	5.0	12.5	74.4
5	SR 464	US 441	SW 1 st Ave.	34.1	7.5	10.0	5.0	5.0	12.5	74.1
6	CR 464	Midway Rd.	Bahia Rd.	23.0	5.0	22.5	5.0	5.0	12.5	73.0
7	CR 464	SE 64 th Ave.	SE Pine Rd.	23.0	5.0	22.5	5.0	5.0	12.5	73.0
8	SR 464	SE 36 th Ave.	SE 44 th Ave.	24.4	7.5	22.5	0.0	5.0	12.5	71.9
9	SR 35	SE Juniper Cir.	Laurel Rd.	27.3	2.5	15.0	5.0	10.0	10.0	69.8
10	SR 35	SE 92 nd Pl.	SE Juniper Cir.	27.3	2.5	12.5	5.0	10.0	12.5	69.8
11	SW 27 th Ave.	SW 19 th Ave.	SR 200	17.3	5.0	25.0	5.0	5.0	12.5	69.8
12	SR 464	SE 18 th Ave.	SE 22 nd Ave.	24.4	7.5	20.0	0.0	5.0	12.5	69.4
13	SR 464	SW 7 th Ave.	SW 5 th Ave.	38.0	7.5	5.0	0.0	5.0	12.5	68.0
14	SR 35	Laurel Rd.	SR 464	30.0	2.5	7.5	5.0	10.0	12.5	67.5
15	SR 464	SE 49 th Ter.	SR 35	21.7	5.0	22.5	0.0	5.0	12.5	66.7
16	SR 464	SE 13 th Ave.	SE 18 th Ave.	24.0	7.5	17.5	0.0	5.0	10.0	64.0
17	SR 464	SW 19 th Ave.	SW 12 th Ave.	28.0	7.5	10.0	0.0	5.0	12.5	63.1
18	SR 464	SR 200	SW 19 th Ave.	20.5	5.0	20.0	0.0	5.0	12.5	63.0
19	CR 464	SE Pine Rd.	Midway Rd.	23.0	5.0	12.5	5.0	5.0	12.5	63.0
20	SR 464	CR 464A	SE 11 th Ave.	29.3	7.5	7.5	0.0	5.0	12.5	61.8
21	SR 464	SE 11 th Ave.	SE 13 th Ave.	24.0	7.5	12.5	0.0	5.0	12.5	61.5
22	CR 484	Marion Oaks Blvd.	SW 135 th Pl.	20.9	5.0	15.0	5.0	10.0	5.0	60.9
23	CR 484	SW 45 th Ave.	Marion Oaks Blvd.	18.0	5.0	12.5	5.0	10.0	10.0	60.5
24	SR 35	SE Robinson Rd.	SE 92 nd Pl.	25.3	2.5	10.0	0.0	10.0	12.5	60.3
25	SR 464	SE 25 th Ave.	SE 24 th St.	25.1	7.5	10.0	0.0	5.0	12.5	60.1

Table 8 Top 25 Ranked Collector Segments

Priority Rank	Road Name	From	To	MAV Ratio	Existing Volume	Safety	Truck	Evacuation Route	ITS	Total Score
1	CR 318	I-75	NW 60 th Ave.	28.7	0.0	12.5	5.0	10.0	0.0	56.1
2	SW 19 th Ave.	SW 27 th Ave.	SW 24 th Ave.	16.7	2.5	20.0	5.0	0.0	10.0	54.2
3	SW 40 th St.	SW 38 th Ave.	SR 200	16.4	0.0	25.0	5.0	0.0	7.5	53.9
4	SE 1 st Ave.	SE Broadway St.	SR 40	0.0	0.0	27.5	5.0	10.0	10.0	52.5
5	SW 20 th St.	SW 31 st Ave.	SW 27 th Ave.	19.9	2.5	20.0	0.0	0.0	10.0	52.4
6	SW 19 th Ave.	SW 24 th Ave.	SR 464	16.7	2.5	15.0	5.0	0.0	12.5	51.7
7	CR 318	NW 60 th Ave.	US 441	28.7	0.0	7.5	5.0	10.0	0.0	51.2
8	CR 25	SE 110 th St.	SE 65 th Ct.	25.4	2.5	10.0	5.0	0.0	7.5	50.4
9	NE 35 th St.	NE 33 rd Ave.	NE 36 th Ave.	15.3	0.0	22.5	5.0	0.0	7.5	50.3
10	NE 25 th Ave	SR 492	NE 24 th St.	24.8	2.5	7.5	5.0	0.0	10.0	49.8
11	NE 1 st Ave.	SR 40	NE 1 st St.	3.9	0.0	30.0	5.0	0.0	10.0	48.9
12	SE 19 th Ave.	SE 31 st St.	SE 28 th Pl.	15.0	0.0	20.0	5.0	0.0	7.5	47.5
13	CR 464A	SE 17 th St.	SE 3 rd Ave.	16.9	0.0	12.5	5.0	0.0	12.5	46.9
14	SW 10 th St.	US 441	SE 1 st Ave.	0.0	0.0	27.5	5.0	0.0	12.5	45.0
15	CR 314	NE 36 th Ave.	NE 51 st Ave.	21.4	0.0	10.0	5.0	0.0	7.5	43.9
16	CR 318	I-75	NQ 60 th Ave.	28.7	0.0	0.0	5.0	10.0	0.0	43.7
17	CR 25	SE 65 th Ct.	SR 35	25.4	2.5	0.0	5.0	0.0	10.0	42.9
18	SW 20 th St.	SW 27 th Ave.	SR 200	20.2	2.5	7.5	0.0	0.0	12.5	43.7
19	SE 1 st Ave.	E Fort King St.	SE Broadway St.	0.0	0.0	27.5	5.0	0.0	10.0	42.5
20	NW 35 th St.	NE 2 nd Ave.	NE 33 rd St.	14.3	0.0	15.0	5.0	0.0	7.5	41.8
21	E Fort King St.	NE 25 th Ave.	SE 28 th Ave.	16.5	0.0	12.5	5.0	0.0	7.5	41.5
22	CR 42	US 441	SE 130 th Ave.	13.9	0.0	12.5	5.0	0.0	10.0	41.2
23	S Magnolia Ave.	SR 40	W Broadway St.	5.3	0.0	10.0	5.0	10.0	10.0	40.3
24	CR 464A	SE 31 st St.	SE 17 th St.	19.4	2.5	0.0	5.0	0.0	12.5	39.4
25	CR 25A	City of Ocala Boundary	CR 329	16.7	10.0	0.0	5.0	0.0	7.5	39.2

Chapter 5 | Regional Opportunities and Potential ITS Strategies and Technologies

Regional Opportunities

The analysis summarized in the previous chapter reveals that there are opportunities for ITS applications to improve the function of the local transportation network. The subsets of this analysis reveal several areas of need for the region, which will be discussed in this section. Additionally, the stakeholder meetings also exposed areas where the region can improve its transportation network through organizational changes and additional ITS investment the analysis didn't reveal. A summary of the regional needs is listed in **Table 9** below.

Table 9 Summary of ITS Needs

Traffic Operations and Management	Communication
TMC Center-to-Center integration	Utilize existing communication infrastructure
Regional signal coordination	Expand existing communication for traffic operations
Emergency Vehicle Preemption	Traveler Information
Expansion of roadway video surveillance	DMS installation
Regular traffic signal retiming	Dynamic detour route development and management
Enhanced traffic signal functionality	Information Management
Performance measures	Expanded interagency data sharing
Active arterial management	Incident Management
Emergency Management	Interagency incident response
Remote monitoring and information sharing	Performance measures
Improved coordination with EOC and police	Maintenance and Construction
Improved incident detection	Work zone management
Improved coordinated incident response	Performance measures

The summary above shows a list of needs for the region and are not prioritized in any order. In the next sections, some of the needs will be discussed in further detail.

Traffic Operations and Management

A robust ITS network is vital for creating a strong transportation network. While ITS equipment has been installed throughout the region over the past 10 years, there are still areas throughout the region that can benefit greatly from installing new equipment.

The analysis completed in Chapter 4 revealed a need to continue to expand, enhance, and fill gaps associated with the communication network, the appropriate use of state-of-the-art ITS devices, and the information communicated to traffic management staff.

Performance Measures

Targeted and quantifiable performance measures are recommended to better monitor the transportation system. Traffic operations staff in both the County and the City will benefit from the ability to accurately monitor the performance of the roadway and signal infrastructure. More specifically, Automated Traffic Signal Performance Measures (ATSPMs) are recommended for use at signalized intersections. The City of Ocala has already begun installing Advanced Traffic Controllers (ATC) at intersections at key locations, which will also facilitate the use of ATSPMs. As of the date of this report, Marion County has not started any program to replace their traffic controllers with ATCs but have indicated ATSPMs are a desirable feature in the near future.

Traffic Management Center Integration

Stakeholder meetings revealed a major need for better information, more staff communication between the State, County and City TMCs, and more staff in general. These TMCs are unable to share traffic information with one another, limiting the effectiveness of their overall operational capabilities, particularly with respect to traffic incidents and special events that affect traffic conditions in overlapping geographic/jurisdictional areas. However, the greatest need is more staff to operate these TMCs properly.

Emergency Management

Better emergency management practices will benefit safety and mobility within the study area. The safety analysis revealed several corridors with high rates of fatal and incapacitating crashes. Stretches of SR 200 and SR 464 are particularly prone to these kinds of incidents. While the analysis revealed that there is some CCTV coverage within these areas, expansion of this coverage will enable authorities to respond more quickly and effectively to incidents when they occur.

Potential Solutions

Significant hardware improvements have already been made in Marion County and the City of Ocala with respect to ITS technology. Since the last ITS plan was produced in 2008, technology such as Bluetooth® data collection devices, CCTV cameras fiber optic interconnect and more advanced signal controllers have been installed across the region. More effective use of the technology already in place will help to achieve the goals of improved operations and safety of the system. Additionally, expansion of the ITS system capabilities will provide additional benefits. Finally, local authorities have communicated that the most pressing need is more staff to effectively utilize deployed and proposed technologies. In the rest of this chapter, both topics will be discussed. First, recommendations will be made about strategic solutions that can be implemented to increase the effectiveness and efficiency of the existing ITS system in Marion County and the City of Ocala. Second, a variety of potential technical solutions will be discussed, all of which may be implemented to provide a stronger ITS network to be utilized by all relevant jurisdictions in the area.

Strategic Solutions

While the first ITS plan for the region in 2008 focused on installing new equipment to build a functioning ITS network, this plan relies more on strategic solutions that aim to optimize the use of the existing equipment

through improved processes and through partnering and staff resource sharing. Strategic solutions are key to minimizing the operational challenges of the current ITS system. The most simple and effective solution is to increase staff size, but other solutions will be discussed when this is not possible. New technology can be used to increase the capabilities of the ITS system but effectively applying the information produced through these enhanced capabilities will require strategic solutions.

The following paragraphs address two relevant objectives presented in Chapter 2:

- Improved agency coordination; and
- Improved TMC resource sharing

Achieving these objectives will require institutional and business process modifications in addition to technology upgrades. Recommended solutions to these challenges are discussed below.

Interagency Coordination

It is recommended that interagency coordination activities be increased across agencies and across departments within each agency. New ITS technologies produce large amounts of data that must be properly organized, archived, and made accessible to the staff and departments that can benefit from it. Stakeholders who can potentially make effective use of such information include the traffic departments of Marion County and the City of Ocala, the Ocala-Marion County TPO, FDOT, law enforcement agencies, and fire and rescue agencies.

Under current institutional relationships and procedures, it is typical that each agency and/or department has access to some but not all regionally-available and potentially useful information. For example, a law enforcement agency like the Florida Highway Patrol may have immediate knowledge of an incident on I-75 but no insight into the scale of the upstream traffic queues and delays to other essential services that are building as a result. At the same time, the TMC staff may know the length and growth rate of the traffic queue but might not have a good estimate of when the downstream crash will be cleared from the roadway.

In the case of a closure on northbound I-75 located between SR-200 and SR-40, interagency coordination will aid in managing the traffic incident. **Figure 22** illustrates the location of an incident that closes northbound I-75. Two potential detours are identified, the shortest detour is east on SR-200 to SW 27th Avenue and the second is west to SW 60th Avenue. **Figure 23** summarizes the coordination and communication protocol that could be implemented, summarizing the activities for Fire Department (FD), Law Enforcement Officers (LEO), Emergency Medical Services (EMS), and TMC staff.

In this scenario, 911 is notified of a crash and they dispatch the crash to FD, LEO, and EMS personnel. Immediately afterward, they notify the City of Ocala and Marion County TMC staff of the crash and the extent of expected lane closures or full facility closure. TMC staff will identify a preplanned alternative Traffic Management Plan (TMP) and begin the implementation of the plan. This plan may include selecting appropriate detour routes, locations of portable DMS signs guiding the detour, signal timing plans, and traffic control personnel. As the incident continues to be worked by FD, LEO, and EMS personnel, they provide

updates to TMC staff where changes are made as needed, additional detour routes activated and adjusted as needed until the crash is cleared.

Figure 22 Example Detour for Northbound I-75 Closure

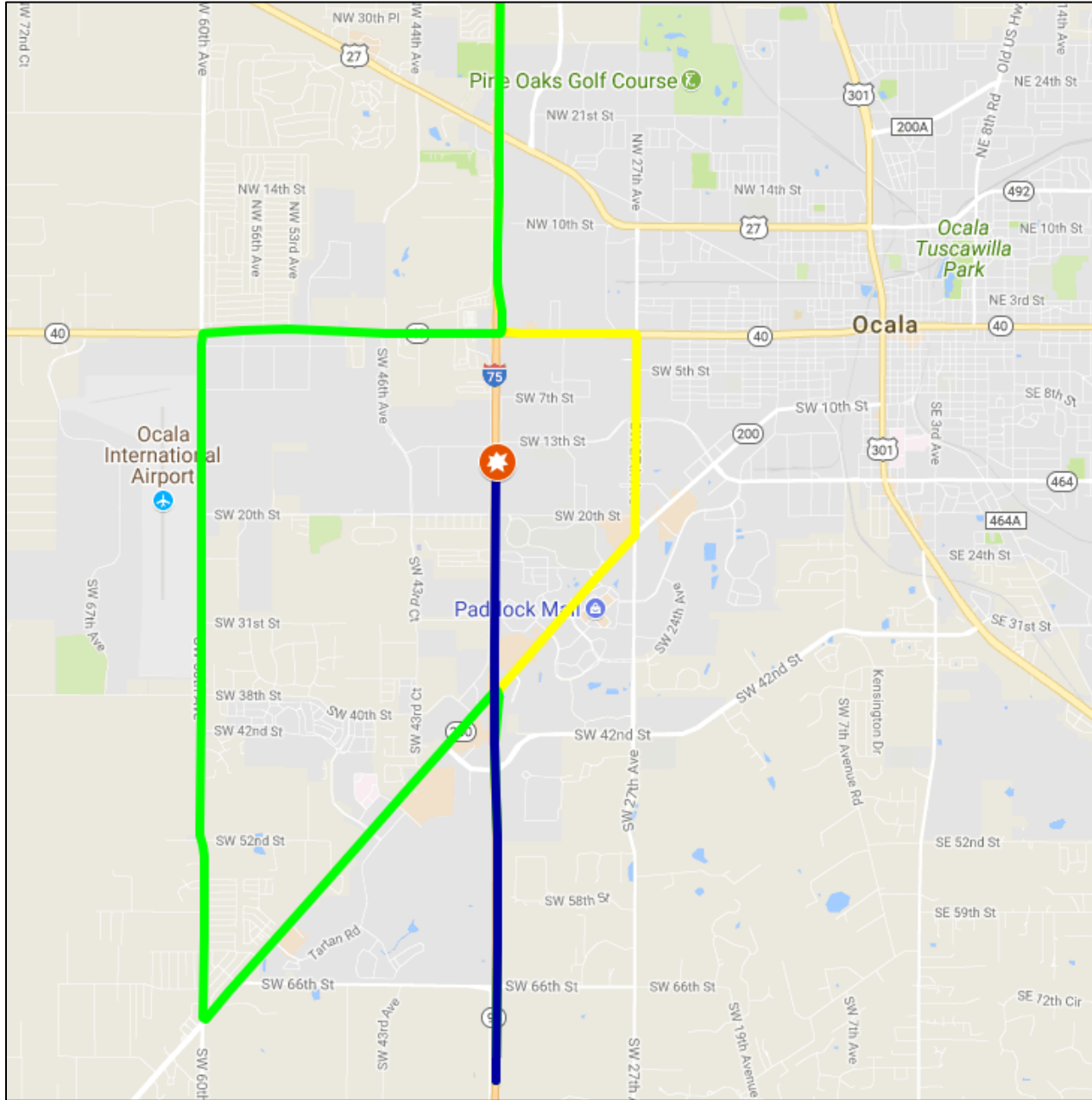
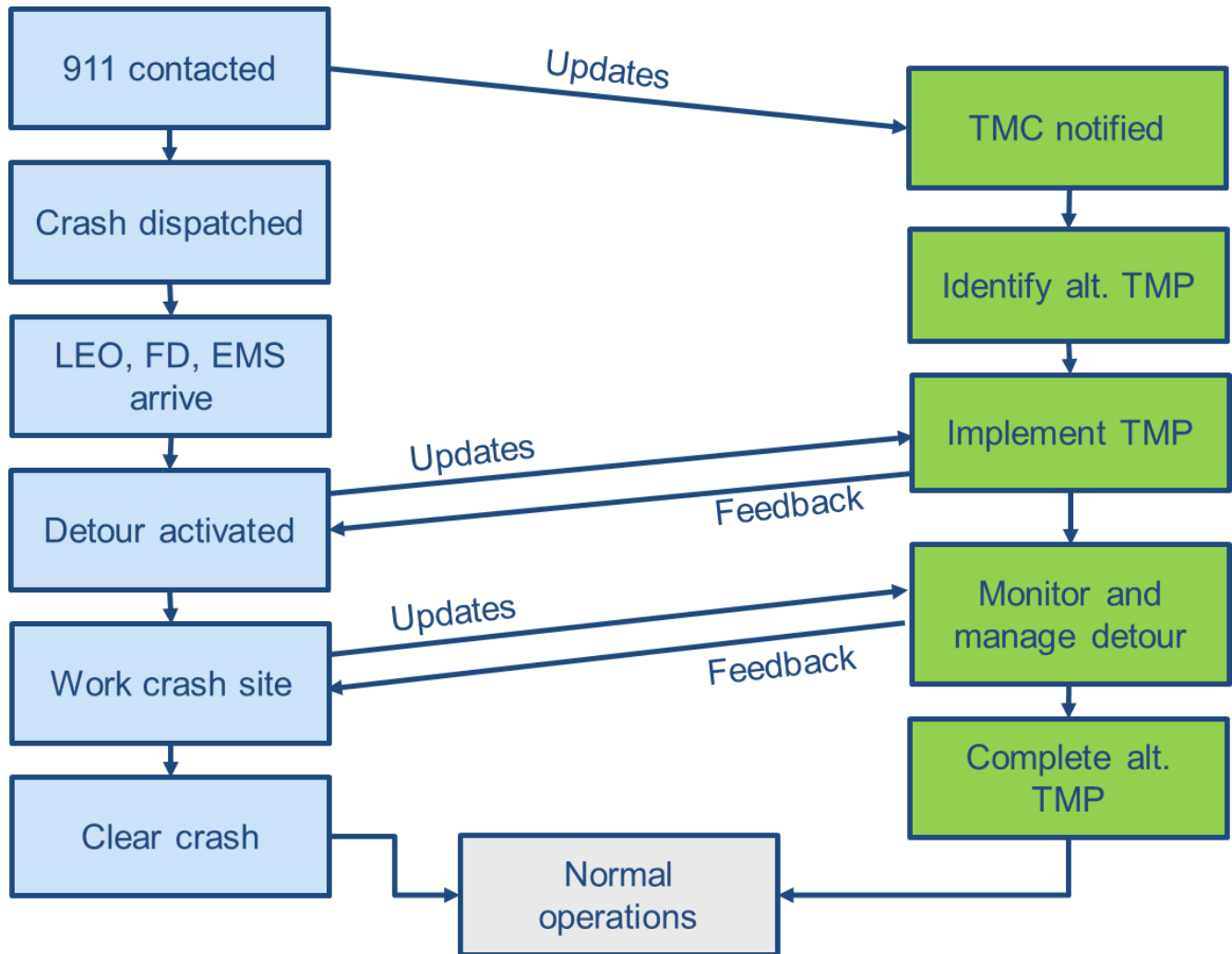


Figure 23 Example Coordination Process During I-75 Incident



Better access by all agency staff to relevant information before, during, and after such events will reduce the duration and severity of the impact of such events on the safety and operating characteristics of the transportation system. The following recommendations are made to improve the amount of information sharing among agencies within the region:

- Staff the TMC's so that the traffic data being collected by the signal system and ITS equipment can be processed, analyzed and system changes made as incidents and transportation network demands require. This is absolutely essential to the establishment of a robust and responsive TMC. Additional discussion on staffing needs are in Chapter 6.
- Establish robust lines of communication between agencies, including but not limited to the following:
 - Provide for real-time representation and/or communication links among all agencies at each TMC;
 - Establish standard protocols that each TMC will follow for information sharing among agencies

- for each event type;
- Conduct regular after-the-fact de-brief sessions with representatives from all agencies to memorialize lessons learned and identify future procedural updates to be implemented.
- Fuse individual databases to the degree possible and, where separate databases must continue to be maintained, provide easy and reliable access portals/protocols to other agencies.
- Establish specific agency/staff responsibilities for ingesting, organizing, and archiving/maintaining each data set.

The TMC interoperability also enhances staff coverage between the City and County’s TMCs, as highlighted above. A power outage at one TMC would prevent their staff from managing the roadway effectively. In this case, having a fused or shared database will allow the other agency to manage those roads from their TMC.

Taken together, these recommendations will enhance the level of cooperation and awareness that agency staff have with respect to both the existing state of the transportation system and the activities either underway or planned by peer agencies. The result will be a transportation system that performs more efficiently and safely.

Performance Measures

Some specific performance measure recommendations are provided in Chapter 2, which also includes discussion on Automated Traffic Signal Performance Measures (ATSPMs), Freight Advanced Traveler Information System (FRATIS) and Regional Integrated Transportation Information System (RITIS) for travel time reliability. These technologies and systems will provide local authorities with valuable performance measures that enable sound decision making. Certain performance measures should be adopted to ensure the transportation network operates in way that aligns with the objectives for the ITS system discussed in Chapter 2. These performance metrics could include:

- Approach volume
- Approach speed
- Approach delay
- Arrivals on red
- Travel time
- Travel time reliability

ATSPM equipment can provide local authorities with metrics like those above. This valuable information can be used to improve the performance of individual intersections but can also be collected to understand the function of the overall transportation network and determine areas where targeted ITS projects could be effective.

Technological Solutions

While the focus of this section is on strategic solutions to ITS shortcomings due to the ITS equipment already in the field and the stakeholders’ acknowledgement of strategic shortcomings, there is still a significant role for technical solutions in improving the ITS system in this region. While many potential technologies are presented, it is important to remember that these are secondary solutions that defer to the strategic solutions offered above. Nevertheless, the technical solutions all offer the potential to improve the ITS system in the region. Not

all these solutions need to or ought to be implemented, but by choosing the right equipment to implement, the region can significantly enhance its ITS infrastructure.

Advanced Traffic Controller

The Institute of Transportation Engineers (ITE) Advanced Transportation Controller (ATC) Family of Standards are intended to provide open-architecture hardware and software platforms to support a wide range of Intelligent Transportation Systems (ITS) applications requiring a field-implementable controller. The initial standards in this family focus on traffic control applications of traffic signal control, ramp control, traffic monitoring (including ATSPMs), lane use signals, field masters, general ITS beacons, lane control, and access control. The modularity provided in the current standards will support the expansion to cover additional ITS functions in the future.

The City of Ocala has started the migration from the NEMA standard to the ATC standard with the recent replacement of 54 intersections with ATC controllers and cabinets. Marion County has not started any controller replacement to the ATC.

Vehicle Speed and Volumes

To maintain a transportation network properly, it is important understand how local roadways are being utilized. Some of the simplest but most important data available is speed and volume data. With basic speed and volume data, engineers can extrapolate a variety of other information about the roadway. With real time sensors, they can also use this data to understand how the roadway is operating in real time, allowing engineers to advise drivers of potential slow or busy spots. These measurements can be determined by a variety of sensors. Loop detectors in the pavement are a traditional and reliable way to measure these data but are expensive to install and maintain. Alternatively, a Microwave Vehicle Detection System (MVDS) can be used, which are roadside mounted units that use microwave radiation to determine volume, speed, vehicle classification, and occupancy data. Another method of collecting this data is the use video image processors, which are cameras with the programming to calculate a variety of traffic parameters.

Closed Circuit Television (CCTVs)

Closed Circuit Television (CCTV) cameras are not a new technology, but they continue to offer significant benefits in traffic management. They are most useful on major roadways, where quick and deliberate traffic management is crucial to ensuring the steady flow of traffic on critical thoroughfares. These cameras offer local Traffic Management Centers the ability to make real time decisions about how traffic should flow on these roadways, responding to accidents and congestion appropriately. It is recommended that local authorities continue to employ this technology.

Bluetooth® Travel Time Devices

Travel time is an important performance measure in road operation and can help road users make informed trip decisions based on the current state of the system and thus optimize the road network utilization. Traffic operators can also take advantage of the real-time data to identify and respond to bottlenecks as they develop.

Bluetooth® based travel time estimation systems are non-invasive, cost-effective and relatively easy to install. Travel times are determined from the Bluetooth®-enabled devices passengers carry with them in vehicles. In addition to travel times, some systems can also provide origin-destination information.

Traveler Information Dissemination

When travelers know the current state of the transportation system they can make better decisions about when, where, and how they travel. Advance traveler information systems (ATIS) are therefore of great value both to system users and to ensure the efficient performance of the system itself. In Florida, three methods are most commonly used to provide advance traveler information:

- Dynamic Message Signs (DMS) are a common and effective tool. They are large, permanent signs usually hung above major roadways. These signs operate on a continuous basis and are typically used to inform drivers of downstream travel times, incidents, lane closures, etc.
- Portable Variable Message Signs (PVMS) are programmable roadside message signs that can be moved to any location according to need. Typically, these signs are used to display information about temporary traffic pattern changes associated with work zones, construction activity, special events, etc.
- Florida 511 is a service provided by FDOT which provides traffic incident information by phone and text message. The service notifies drivers of incidents ahead like crashes that are slowing traffic. The service can also be tied to the dynamic messaging signs, as the signs can be programmed to instruct drivers to call 511 for important traffic information.

Adaptive Traffic Control Systems

Adaptive Traffic Control Systems (ATCS) are traffic signals that communicate with one another and can adapt to changing traffic patterns by adjusting signal timing parameters such as green splits and offsets. An ATCS system is therefore able to reallocate green time among intersection approaches in response to short-term demand fluctuations; it is also able to anticipate the arrival time of vehicle platoons at downstream intersections and adjust the start of the green time accordingly. Some challenges must be overcome in the implementation of ATCS systems but the benefits of such systems to overall network performance can be significant.

Emergency Vehicle Preemption

Emergency signal preemption is an important capability that is employed to facilitate the movement of first responders (ambulances, fire trucks, and police) to their destinations. Emergency signal preemption can be achieved by either equipping the signals to recognize an emergency vehicle in transit or equipping emergency vehicles with a communication device that overrides the signal's normal operation. This is an important component of most emergency preparedness plans. It is recommended that preemption technology be implemented on important emergency corridors, such as SR 200, which serves multiple hospitals.

Transit Signal Priority

Transit Signal Priority (TSP) is a technology that reduces travel time and increases travel time reliability for transit riders. This technology works primarily by changing the signal timing at an intersection where an

approaching public transit vehicle is detected. It is similar to the preemption technology described above but works within a defined signal timing plan and either elongates a green interval or shortens a red interval to minimize the amount of delay the transit vehicle will experience at the intersection. The system does not cause the corridor to go out of coordination and it does not guarantee that an approaching transit vehicle will receive an extended green interval or a shortened red interval all the time.

Many TSP systems use the same technology as emergency vehicle preemption and so the implementation of TSP may be particularly opportunistic on corridors where emergency vehicle preemption has already been installed. As Ocala's transit network continues to grow, this technology is worth studying, especially if emergency preemption technology is installed in the region.

Roadside Units/DSRC

Roadside Units (RSUs) are essentially communication equipment that is placed alongside the roadside and housed in cabinets, which facilitates communication between nearby connected vehicles and the roadway infrastructure. RSUs are an important part of a national initiative to develop connected vehicle technology. Accordingly, they are part of the I-75 FRAME initiative to place emerging technologies on and around I-75 in Marion and Alachua Counties. As discussed earlier, connected vehicles are a growing phenomenon and will potentially serve as a stepping stone to fully automated vehicles. RSUs allow connected vehicles to communicate with roadway infrastructure such as traffic signals. Thus, for example, RSU's can allow a connected vehicle to know how many seconds remain until a downstream signal indication will turn from red to green.

Roadside Units (RSUs) form an important part of the vehicle to infrastructure (V2I) communication discussed above. The RSUs will communicate with On Board Units (OBUs), which are the receivers that all connected vehicles will be equipped with. These RSUs will communicate using either Dedicated Short-Range Communications (DSRC) technology (which operates at a 5.9 GHz frequency band) or via 5G cellular technology. In either case, the RSUs will receive data such as the speed, location, heading, and acceleration of the connected vehicle. It is important to note that the RSU only facilitates communication between vehicle and traffic infrastructure like traffic signals. Once it receives data from the traffic infrastructure, the RSU will then broadcast this information to all connected vehicles in its range.

RSUs are likely to play a major role in the continual development of connected vehicle technology. However, all future technology has risk. Local jurisdictions should be careful about committing to a technology before it is an established standard wherever possible. Thus, for example, the question of whether DSRC or 5G technology will become the de facto communication standard is still an open one. It is therefore recommended that local authorities closely follow the progress of the I-75 FRAME project and the establishment of technology standards.

Traffic Signal Detection

Traffic detection capabilities are critical to ensuring the efficient operation of a transportation network. When they are installed on the approaches to signalized intersections, for example, these detectors can help ensure that the traffic signal indications will be more responsive to vehicle arrivals.

The most common kind of traffic signal detection is an inductive loop. This technology can detect the arrival and presence of vehicles on an intersection approach and then communicate this information to the signal controller. Newer signal detection technology uses video cameras mounted above an intersection to perform the same function.

These detectors are also critical for implementing the ATSPM technology across the region, which will provide crucial performance measures for local authorities. The type of specific measures available for use is highly dependent on the quality and configuration of the detection technology. For example, some performance measures such as Purdue Coordination and Arrivals on Red require the use of advanced detection and stop bar detection is needed to collect turning movement counts. However, other ATSPMs such as Split Monitor and Purdue Phase Termination does not need any detection.

Individual traffic signal detectors can also be quite useful in managing a large network of signalized intersections because the vehicle demand information they provide at the individual intersection level helps inform the overall management of the network. Therefore, it is recommended that the region continue to invest in the installation and maintenance of efficient and effective vehicle detection technologies throughout the region.

Active Arterial Management

Active Arterial Management (AAM) is the ability to actively manage congestion on an urban street or arterial based on current and predicted traffic conditions. Focusing on travel time reliability, it maximizes the effectiveness and efficiency of the facility. It increases throughput and safety through the use of integrated systems with new technology, including the dynamic deployment of operational strategies to optimize system performance quickly and without the delay that occurs when operators must deploy operational strategies manually.

Many transportation agencies in Florida are beginning to implement AAM programs, including the metropolitan areas of Orlando, Miami-Dade County, Palm Beach County and Broward County. Marion County region's ITS infrastructure is well enough in place for it to start taking advantages of arterial management based on AAM approach of a continuously monitored system.

Traffic Incident Management Program)

Traffic incidents are disruptive events that result in unexpected delay and degrade travel time reliability. Because of their unexpected nature, they can also have an adverse effect on safety by causing secondary crashes. Therefore, it is important that local authorities have a clear plan for responding to such incidents. This is the purpose of the Traffic Incident Management (TIM) Program. The TIM Program is a product of the Federal

Highway Administration (FHWA) and is applicable in most every local context. TIM is a “planned multi-disciplinary process to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible.”³

The basic strategy the TIM employs is identifying all relevant partners in this incident response process and codifying the responsibilities of each partner. Partners include law enforcement, fire and rescue, emergency medical services, transportation agencies, public safety communications, emergency management, towing and recovery services, hazardous materials contractors, and traffic information media. The FHWA describes a myriad of responsibilities that each stakeholder has in responding to a traffic incident, which offer a strong framework that local authorities can use to apply to their unique context. While Marion County and the City of Ocala already use some of these strategies, it is recommended that local authorities specifically refer to the TIM Program and review their current response plans for traffic incidents to determine if there are ways to improve.

Active Incident Management

The previous section discussed the Traffic Incident Management (TIM) Program, which mainly describes the responsibilities and procedures recommended for responding to a traffic incident. However, there is also another important way to prepare for traffic incidents. Active incident management focuses on using ITS systems to respond to traffic incidents in real time. With ITS technology like CCTV cameras and DMS, traffic incidents can be quickly identified, activating the TIM program discussed earlier, and relayed to the travelling public. Using an active incident management program, local authorities can increase safety and decrease the disruption caused by a traffic incident. While Marion County and the City of Ocala have much of the technology necessary for an active incident management system, it is recommended that these jurisdictions formalize such a system and integrate it into the improved interagency coordination process. Also, this process will also require greater staff size to manage properly.

Emergency Preparation, Security, Response, and Recovery

Marion County’s Emergency Operations Center (EOC) serves as the nerve center for the region’s emergency response apparatus. It was primarily designed to coordinate the region’s response to hurricanes passing through the State of Florida. These storms create chaos, flooding roads with evacuations and requiring County and City staff to complete extensive procedures to prepare the area for the storm. This response is coordinated by the emergency management branch of the Marion County Sheriff’s Office. However, the emergency management department does more than just prepare for hurricanes: it also responds to all other weather emergencies, as well as other hazards like a hazardous material incident or terrorist attack.

The effectiveness and timeliness of these responses depends at least in part upon the ITS equipment deployed throughout the region. DMS signs and the Highway Advisory Radio are used to communicate important messages to drivers. CCTV cameras give EOC staff a clear picture of what is happening across the region. Detour

³ https://ops.fhwa.dot.gov/eto_tim_pse/about/tim.htm

routes are created with ITS information and evacuation routes are supported by ITS equipment. Overall, Marion County and the City of Ocala have prepared well for emergencies with the creation of the Emergency Operations Center. Therefore, it is recommended that local authorities continue supporting the EOC and continuously monitor how new ITS technology can be used to enhance the EOC's abilities.

Traffic and Weather Information Systems

Severe weather is a constant threat to the safe and effective function of a transportation network. Therefore, developing a weather information system for a region's transportation network can be a valuable investment. To respond to this need, authorities around the country have developed a Road Weather Information System (RWIS). RWIS uses a variety of sensors to detect dangerous driving conditions and immediately relay that information to drivers. These sensors include thermometers for measuring temperature, anemometers for measuring wind speed, wind vanes for measuring wind direction, visibility sensors for detecting fog and smoke, and rain gauges for measuring precipitation. These sensors can be used to detect adverse weather conditions like freezing roads, high winds, low visibility conditions, flash flooding and severe thunderstorms. With this system, these conditions can be directly communicated to drivers in real time.

In Marion County, the main weather threats are the occasional fog, smoke from forest fires and rain and wind from severe thunderstorms or hurricanes. During the dry season, forest fires sometimes grow large enough to threaten major roadways, requiring a way to communicate the danger to drivers. However, severe thunderstorms are by far the most common threat Floridian drivers face. Storms can arrive in an instant, bringing dangerous winds, lightning and blinding rain. As these cells can move quickly, it is important to alert drivers to their presence. Therefore, it is recommended that local authorities assess the viability of beginning an RWIS in the region, given its relatively low operational costs and its significant ability to inform drivers of potentially dangerous conditions.

Work Zone Management

Work zone management is an important component of a successful traffic management system. As areas grow roadwork is nearly constant, creating work zones that must be managed properly to ensure the workers' safety and the continued effectiveness of local roadways. This process can be assisted using ITS technology. ITS technology can provide traffic monitoring and management, information to travelers, incident management, and increased safety in work zone areas. Technology like messaging signs can be used to alert drivers to work zones ahead, portable speed sensors can warn drivers to slow down in work zones, and roadway sensors can be used to warn workers when a vehicle is entering the work zone. All these tools can provide major improvements in the process of work zone management.

For Marion County and the City of Ocala, work zone management using ITS technology will not require new technology, but an organized strategy for the proper utilization of the ITS and tools already in the field and performance measures produced by those devices or systems. Therefore, it is recommended that local authorities develop a set of standards that define when and how ITS should be used to support work zone management. Doing so will increase worker safety and reduce the traffic impacts of such construction.

Variable Speed Limits

Speed limits are a simple but important tool for managing the speed on local roadways. While most locations only need a static sign to set the speed limit, some major roadways experience large fluctuations in their average speed throughout the day and can cause stop-and-go conditions that reduce a roadway's efficiency. As well, the region can also experience weather conditions that dictate slower-than-normal speed limits. In these cases, variable speed limits can be used to ensure that a reasonable speed limit is imposed on the roadway at all times of the day. These signs change the speed limit based on traffic volumes, congestion levels, and/or weather conditions. They can restore the credibility of speed limits for the driver and improve safety by reducing speed differential and providing a smoother rate of traffic flow. They usually resemble a regular speed limit sign, but with a digital display in the center that updates the speed limit as needed.

Variable speed limits are not currently used in Marion County and the City of Ocala. While these signs will not revolutionize a transportation network, they have the possibility of increasing safety and improving the function of local roadways. A before-and-after study in the Portland, OR metropolitan area, for example, reported an 11 percent reduction in crashes after installing variable speed limit signs on a busy corridor. As this region's population continues to grow and congestion increases, these signs may prove to be an affordable and effective option in improving the function of the local transportation network.

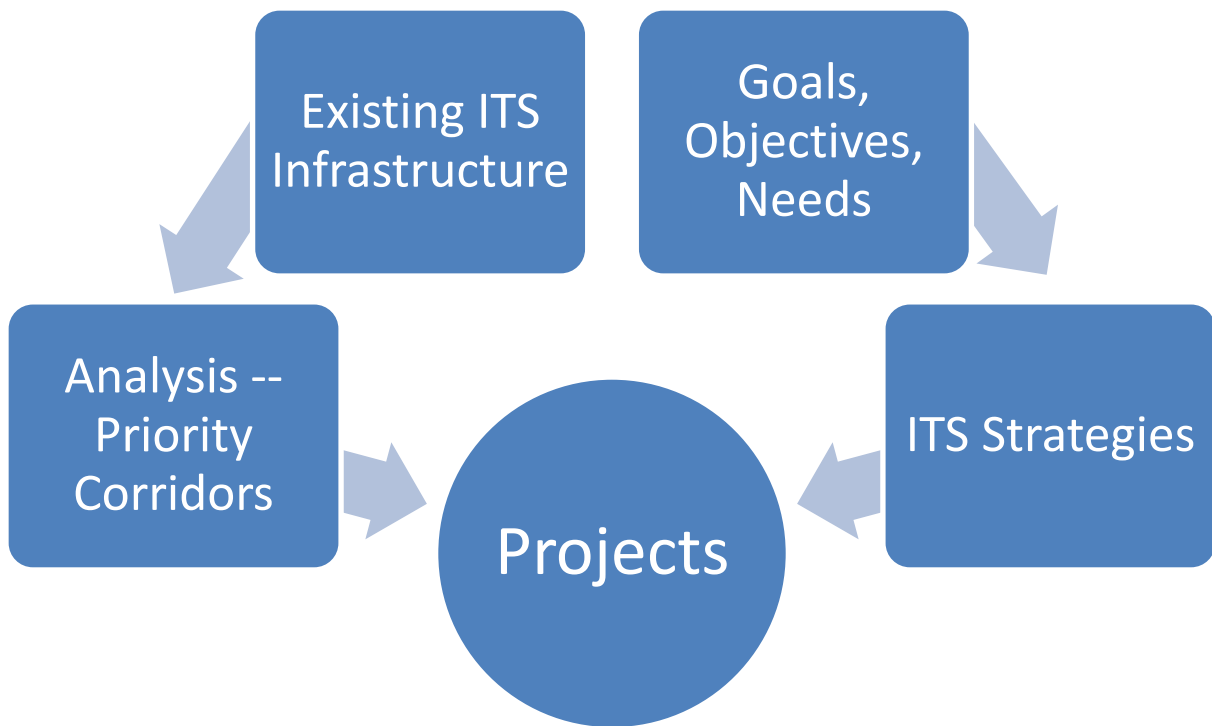
Chapter 6 | Proposed ITS Projects

This chapter will summarize a variety of ITS projects identified for implementation throughout the region. In support of the recommendations presented in Chapter 5, this chapter will present a specific list of corridors that will benefit from ITS device installation, identify the specific ITS elements recommended for each project, and summarize cost estimates for construction, maintenance and operations for the life cycle of the devices. This chapter will also discuss staffing needs for both the City of Ocala and Marion County to meet current and future needs.

Methodology to Identify Projects

The methodology used in the identification of the proposed ITS project corridors that support the Goals and Objectives are presented in this section. **Figure 24** illustrates the elements used to identify the projects.

Figure 24 ITS Project Selection Elements



The first set of key components of the process are the goals and objectives presented in Chapter 2 and the relationship of the needs and potential ITS strategies and technologies presented in Chapter 5. The goals and objectives are important to the region (and therefore the recommendations presented) and the projects and the technology recommended for each project below were selected to meet those regional goals and objectives. The results of the Traffic Operations Analysis in Chapter 4, and the identification of the Top 25 Priority Corridors were used to identify the specific roadways where continued investment in ITS has the potential to provide operational benefit.

The Top 25 segments overall, and Top 25 segments categorized by roadway classification, were reviewed and roadway facilities which presented multiple segments which scored in the top 25 of the lists were grouped into initial potential projects. The existing ITS infrastructure was then used to screen the initial projects to determine opportunities to expand remote communication (fiber or radio), CCTV cameras and Bluetooth® travel time devices. Identification of intersecting facilities that are also in the Top 25 lists were also identified and used to determine starting and ending points of a projects.

With the project limits defined, the existing ITS infrastructure was once again referenced and used to identify appropriate locations to expand the communication infrastructure, locations of CCTV cameras and Bluetooth® travel time devices.

Additionally, locations for Advanced Traffic Controller (ATC) upgrades were identified along these corridors. As mentioned previously, the City of Ocala has already upgraded about half of the signalized intersections with the new standard of traffic signal controllers. However, Marion County has not begun this process to date. The recommended location for ATC upgrades are on both City and County roadways. Even though the County currently does not use the technology, there is a likelihood in the next 10 years for the County to begin upgrading for strategic operational needs. Some of those needs include Automated Traffic Signal Performance Measures and future Connected Vehicle deployments discussed in Chapter 5.

In addition to the ITS Project Corridors, this report presents a separate standalone project recommendation. Based on the need to improve First Responder response times, implementation of an Emergency Vehicle Preemption (EVP) system is recommended. The decision to establish this as a separate project is based on how similar projects are implemented. The routes identified to provide the EVP are traffic signals on roadways that lead from fire stations, connect to roadways that typically experience congested operations throughout the day and are likely the sources of delay for emergency vehicles, and lead to hospitals with emergency room services. Other agencies who have implemented this regionally, typically do not select one or two corridors for initial implementation. Rather, they create a network of roadways to cover the various routes their personnel and equipment would be dispatched to. The process to determine recommended EVP corridors presented below followed this methodology. The routes from the fire stations along the major corridors which experience congestion to hospitals were identified and presented in the recommendations.

Recommended Projects

This section presents the recommend ITS Project Corridors and the recommended Emergency Vehicle Preemption.

Table 10 summarizes the Proposed Project Corridors the limits, and the recommended devices. The table also includes a cost estimate which includes capital costs, maintenance and operations cost and life-cycle replacement costs. **Appendix B** contains the detailed summary of the cost breakdown and **Figure 25** illustrates the location of the project corridors and the recommend ITS devices.

Table 10 Proposed Project Corridors

Project Number	Road Name	From	To	ATC Controllers	CCTV Devices	Radio Devices	Bluetooth® Devices	Capital Cost Estimate
1	US 27	NW 70 th Ave.	I-75	4	0	2	3	\$161,370
2	SR 40	SR 35	CR 314A	4	1	0	2	\$171,600
3	SR 326	I-75	SR 200A	6	1	5	2	\$279,870
4	SR 200	SR 484	SR 464	15	6	0	1	\$671,360
5	US 301/US 441	SE 165 th St.	SR 464	19	0	0	3	\$549,570
6	US 301	NW 35 th St.	SR 326	0	1	1	0	\$52,640
7	SR 40	Hwy 328	SW 27 th Ave.	3	1	3	1	\$166,260
8	SR 40	NE 1 st Ave.	SE 25 th Ave.	0	4	0	0	\$167,650
9	E Magnolia Ave/E 1 st Ave.	NE 20 th St.	SR 200A	18	6	0	0	\$743,070
10	SR 464	SR 200	Oak Rd.	24	2	0	0	\$739,280
11	SE 36 th St.	SR 464	SR 40	5	3	0	0	\$262,290
12	NW 35 th St.	NW 35 th Ave. Rd.	NE 36 th Ave.	5	0	4	0	\$179,470
13	SR 200A	US 301	NE 49 th St.	4	3	0	1	\$245,210
14	SW 42 nd St.	SR 200	SR 464	6	2	0	1	\$257,910
15	SR 484	Marion Oaks Course	US 441	11	0	0	2	\$320,860
16	Hwy 42	US 301	US 441	4	0	5	1	\$173,120
17	SW 27 th Ave/SW 19 th Ave Road	SW 42 nd St.	SR 464	4	0	0	0	\$109,240
18	SW 20 th St.	NW 60 th Ave.	SR 200	5	0	0	1	\$146,780

Figure 26 illustrates the location of the proposed Emergency Preemption Corridors, associated with the installation of Emergency Vehicle Preemption for City and County Fire and Rescue vehicles. The system that is most well-known for the past 15 years in North America is the Opticom GPS system manufactured by Global Traffic Technologies (GTT). While there are other systems that could be selected and installed, for the purpose of this discussion, Opticom will be used to develop the cost estimate.

The Opticom GPS technology consists to two components; a vehicle unit that is permanently installed on each vehicle that will require preemption service, and an intersection unit installed at a traffic signal. The role of the vehicle unit is to communicate a request for preemption as a fire truck or ambulance on route to a call approaches a traffic signal. The intersection unit receives the message from the vehicle as triggers an input in the traffic signal controller to start the preemption routine. The preemption routine is normally part of a standard signal controller function, so no upgrades are necessary. Additionally, if the signalized intersections are connected through ethernet to the TMC, GTT offers a management system called the Opticom Centralized Management System (CMS). The CMS allows for remote monitoring of the preemption in real time, and it also provides upload of settings downloading of activity logs. The CMS platform is usually installed on a separate server and the size of the server is dependent on the number of intersections operating the Opticom and are on the system.

Costs of the Opticom vehicle unit is approximately \$7,000 per vehicle, the cost of the intersection unit is approximately \$9,000 per location. The CMS platform for up to 75 intersections is approximately \$30,000 and a dedicated server to install the CMS on is approximately \$16,000. See **Table 11** below for a detailed cost estimation to install the system on both City of Ocala and Marion County vehicles and intersections.

Table 11 Cost Estimate for Emergency Vehicle Preemption System

	Unit Cost	City of Ocala		Marion County	
		Number	Total	Number	Total
Intersection Units	\$9,000.00	69	\$621,000.00	79	\$711,000.00
Vehicle Units	\$7,000.00	15	\$105,000.00	109	\$763,000.00
Central Management System	\$30,000.00	1	\$30,000.00	1	\$30,000.00
Dedicated Server	\$16,000.00	1	\$16,000.00	1	\$16,000.00
Total			\$772,000.00		\$1,520,000.00

Staffing Needs and Estimates

As discussed throughout this ITS plan, stakeholders repeatedly listed staffing as one of the major needs for a more effective ITS network. This section will discuss the existing traffic staff in the region, as well as discussing criteria for increasing staff and estimates for those increases. Chapter 3 described the existing staff levels for traffic divisions of the City of Ocala and Marion County, with **Table 2** and **Table 3** showing each jurisdiction’s respective staff level.

Current Staff Levels

The City of Ocala operates its traffic division with eight employees, with most serving as signal technicians. The budget has not allowed for a dedicated staff member for the operation of the Ocala Traffic Management Center, so the signal technicians typically manage it in addition to their other duties. However, this is only done in times of emergency or when the technicians’ other responsibilities do not interfere. This fact was repeatedly discussed in the stakeholder meetings as a major hindrance to the effective function of the TMC, as it means that the TMC is not regularly utilized effectively.

Marion County faces many of the same challenges in their traffic management strategies. They operate their traffic division with six employees and most serve as signal technicians, like the City of Ocala. Just as with the City of Ocala, the budget has not allowed for a dedicated staff member for the operation of the Marion County Traffic Management Center, so the signal technicians typically manage it in addition to their other duties. This poses the same problems as the City of Ocala has experienced, as it prevents the TMC from being used effectively.

Criteria for Staff Increases

The stakeholder meetings discussed earlier clearly identified a need for staff increases in the traffic divisions for the City of Ocala and Marion County, especially in TMC positions. To provide guidelines for this expansion of traffic management staffs, this plan will reference the recommendations of FDOT’s *District 5 Districtwide ITS Master Plan*. This FDOT plan provided criteria for agencies operating both traffic signals and ITS devices with a TMC. The criteria recommended staff levels for each position based on the combined number of the signals and ITS devices. These criteria are shown in **Table 12** below.

Table 12 Summary of ITS Needs

Position	Number of Signals + ITS End Devices				
	<100	<200	<350	<700	<1400
Traffic Engineering Operations Manager	0	0-1	1	1	1
Traffic Signal Engineer	0-1	0-1	1-2	2-3	2-5
Traffic Signal Analysts/Technician	1-3	3-5	4-10	8-16	15-30
Traffic Signal Maintenance/ITS Fiber Technician	*	0-1	1	1-2	2-3
Network Specialist	*	0-1	1	1-2	2-3
Electronics Specialist (L2 Network Tech)	0-1	0-1	1	1-3	2-7
TMC Manager	*	0-1	1	1	1-2
Supervisor**	*	0-1	1	1-2	2-3
TMC Operators**	0-1	1	1	2-4	4-6

** This position is desirable, but not required*

*** This position is required 14 hours a day (Weekdays Only). Note that FDOT and the City of Orlando are 24 hours a day/7 days a week/365 days a year.*

Both the City of Ocala and Marion County operate enough signals and devices to be in the <200 level, so these staffing recommendations will be used for the cost estimates provided below, although local staffing realities will also be considered in these recommendations.

Cost Estimates for Staff Increases

The recommendations above form the basis of cost estimates for increasing the staff of the traffic divisions for the City of Ocala and Marion County. These cost estimates will begin by comparing the current staff level of each department with the recommended staff levels shown above. It is worth noting that the staff levels shown below represent information provided by the City and County and may not completely align with the older FDOT report referenced in Chapter 3. Then, the average salary (with a 2.15 multiplier to accurately reflect the true cost of each employee) of each employee will be computed for each recommended addition to the staff.

With these criteria, this report recommends several TMC staff to be added. Also, these existing staff and, as a result, the recommendations are slightly different from the recommendation presented in **Table 2** and **Table 3**. The City of Ocala should add a TMC manager and TMC operator. The total costs of these staff increases will be about \$226,000 per year. Likewise, recommendations for Marion County staff are also presented. Marion County should add a TMC manager and TMC operator. These staff increases will also cost about \$226,000 per year. The recommended staff increases are detailed in **Table 13** and **Table 14**.

Table 13 City of Ocala Staffing

City of Ocala Staffing					
Position	Existing Staff	Current Needed - Recommended Staff	Current Needed - Additional Staff	Average Pay (Includes 2.15 multiplier) **	Total Proposed Cost
Traffic Engineering Operations Manager	1.0	1.0	0.0	\$ 268,750	\$ -
Traffic Signal Engineer	0.0	0.0	0.0	\$ 201,240	\$ -
Traffic Signal Analyst/Technician	0.0	0.0	0.0	\$ 134,160	\$ -
Traffic Signal Maintenance / ITS Fiber Technician	5.0	5.0	0.0	\$ 112,226	\$ -
Network Specialist	0.0	0.0	0.0	\$ 182,750	\$ -
Electronic Specialist (L2 Network Tech)	1.0*	1.0	0.0	\$ 115,581	\$ -
TMC Manager	0.0	1.0	1.0	\$ 172,000	\$ 172,000
TMC Supervisor	0.0	0.0	0.0	\$ 80,625	\$ -
TMC Operator	0.0	1.0	1.0	\$ 53,750	\$ 53,750
TOTAL					\$ 225,750

* This staff person is maintained by the Ocala Fiber Network

** This pay multiplier is the same as used the Space Coast TPO ITS Master Plan. Original source is Palm Beach County MPO.

Table 14 Marion County Staffing

Marion County Staffing					
Position	Existing Staff	Current Needed - Recommended Staff	Current Needed - Additional Staff	Average Pay (Includes 2.15 multiplier)	Total Proposed Cost
Traffic Engineering Operations Manager	0.0	0.0	0.0	\$ 268,750	\$ -
Traffic Signal Engineer	0.0	0.0	0.0	\$ 201,240	\$ -
Traffic Signal Analyst/Technician	1.0	1.0	0.0	\$ 134,160	\$ -
Traffic Signal Maintenance / ITS Fiber Technician	3.0	3.0	0.0	\$ 112,226	\$ -
Network Specialist	0.0	0.0	0.0	\$ 182,750	\$ -
Electronic Specialist (L2 Network Tech)	0.0	0.0	0.0	\$ 115,581	\$ -
TMC Manager	0.0	1.0	1.0	\$ 172,000	\$ 172,000
TMC Supervisor	0.0	0.0	0.0	\$ 80,625	\$ -
TMC Operator	0.0	1.0	1.0	\$ 53,750	\$ 53,750
				TOTAL	\$ 225,750

Chapter 7 | Regional ITS Architecture Compliance

Code of Federal Regulations Part 940 (23 CFR 940) defines Intelligent Transportation System (ITS) Architecture and Standards and requires that ITS projects must conform to a regional Intelligent Transportation System Architecture and should be consistent with the transportation planning process for Statewide and Metropolitan Transportation Planning. 23 CFR 940 applies to all ITS Projects receiving any federal funding on all roadways. The policy states that all ITS Projects shall conform to the National ITS Architecture and standards and it requires that all states and region within those states have an ITS Architecture. The policy continues that all ITS Projects must follow those statewide and Regional ITS Architectures and should be on the scale commensurate with the scope of the local ITS investment. The Regional ITS Architecture should include some of the following elements:

1. A description of the region;
2. Identification of participating agencies and other stakeholders;
3. An operational concept that identifies the roles and responsibilities of participating agencies and stakeholders in the operation and implementation of the systems included in the regional ITS architecture;
4. Any agreements (existing or new) required for operations, including at a minimum those affecting ITS project interoperability, utilization of ITS related standards, and the operation of the projects identified in the regional ITS architecture;
5. System functional requirements;
6. Interface requirements and information exchanges with planned and existing systems and subsystems (for example, subsystems and architecture flows as defined in the National ITS Architecture);
7. Identification of ITS standards supporting regional and national interoperability; and
8. The sequence of projects required for implementation.

Each stakeholder has their own portion of the Regional ITS Architecture with their own Service Packages and data flows showing how they receive and provide information and/or data to the other agencies. FDOT - District 5 manages the Regional ITS Architecture update on January 18, 2016:

<http://www.consystec.com/florida/d5/web/index.htm>

Regional ITS Architecture was reviewed and compared against the recommended project summarized in Chapter 6. All the proposed projects are reflected in the Regional ITS Architecture in terms of market packages, data flows and stakeholders. However, as the ITS projects are implemented, the TPO would need to work with FDOT D5 to ensure connects are updated from *planned* to *existing*.

Figure 27 and Figure 28 illustrate example diagrams from the Regional ITS Architecture.

Figure 27 Example of City of Ocala Interface (data flows) to Field Equipment

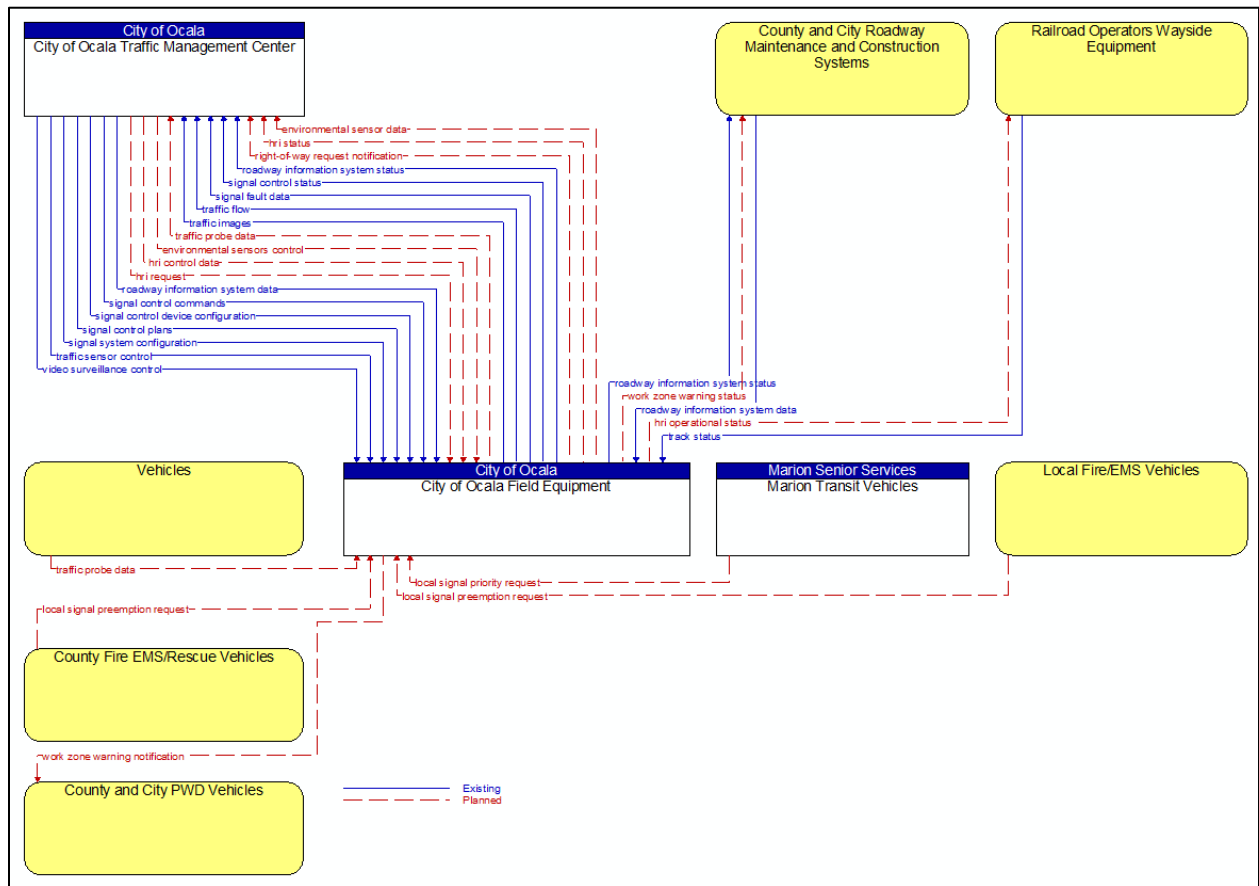
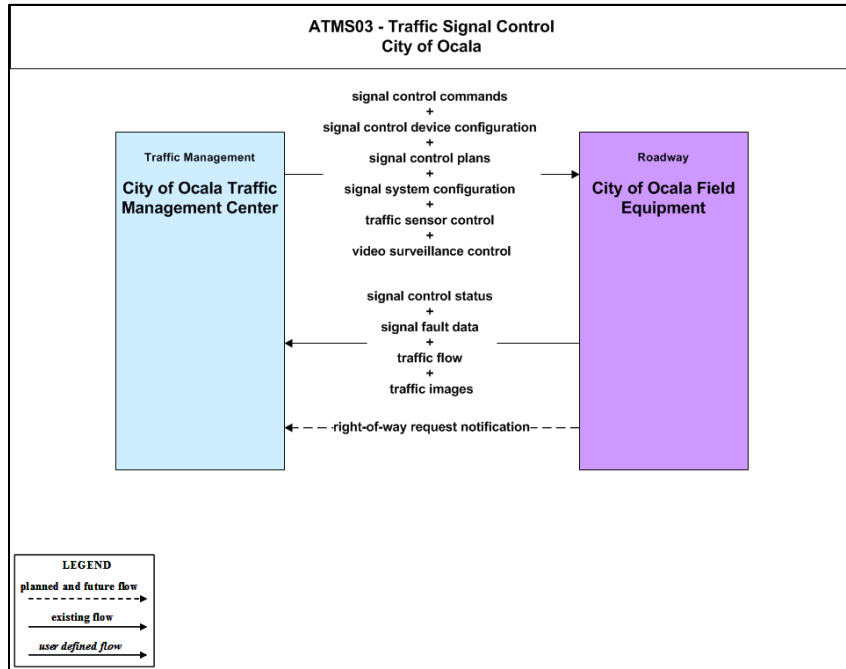


Figure 28 Example of Service Package for Traffic Signal Control, City of Ocala (ATMS03)



Appendix A – Rankings

Roadway	From	To	Roadway Classification	Rural 2-Lane Facility	Fatal Crash Rate	Fatal & Incapacitating Injury Crash Rate	Total Crash Rate	Total Crash Ranking	Total Fatal Ranking	Fatal and Incapacitating Injury Ranking	Safety Significance	V/C Ratio	MAV Ranking (V/C<10)	Existing Volume Ranking	Truck Volume Ranking	Truck Route Ranking	Evac Route Ranking	Fiber Connection Ranking	CCTV Ranking	Bluetooth Ranking	ITS Significance	Total Scoring	Ranked Top 25 Segments (-75 removed)	Top 25 Collector Segments	Top 25 Non-Regional Segments	Top 25 Regional Segments	Top 25 SIS Segments	Proposed Emergency Vehicle Present	Proposed Comment/Exception	Proposed AIC Signal Control	
SR 464	SW 5TH AVE	US 441	Non-Regional		0.00	4.69	121.96	7.5	0	20	27.5	0.75	19.83	7.5	0	0	5	7.5	2.5	2.5	12.5	90.45	YES		YES						
SR 200	I-75 RAMP (WEST)	I-75 RAMP (EAST)	Regional		0.00	5.78	182.13	10	0	20	30.0	0.66	19.83	7.5	10	0	10	7.5	2.5	2.5	12.5	89.81	YES		YES						
US 441	SR 464	SW 10 ST	Regional		0.00	3.03	209.88	10	0	15	20.0	0.72	21.72	7.5	0	10	10	7.5	2.5	2.5	12.5	84.22	YES		YES						
SR 464	CR 484	SR 200	SIS		0.00	1.36	55.70	5	0	10	15.0	0.71	21.21	10	10	10	10	7.5	2.5	0	7.5	83.71	YES		YES						
US 441	NW 47H ST	US 27	Regional		0.00	2.52	95.84	7.5	0	15	20.0	0.76	22.92	7.5	0	10	10	7.5	2.5	2.5	12.5	82.92	YES		YES						
SR 40	I-75 RAMP (EAST)	SW 33 AV	Regional		0.00	3.69	144.65	7.5	0	15	25.0	0.71	21.27	5	0	10	10	7.5	2.5	2.5	12.5	81.27	YES		YES						
US 441	SW 10 ST	SW 5 ST	Regional		0.00	1.72	117.60	7.5	0	10	17.5	0.78	23.31	7.5	0	10	10	7.5	2.5	2.5	12.5	80.81	YES		YES						
SR 200	SW 38TH CT	I-75 RAMP (WEST)	Regional		0.00	4.69	295.68	10	0	20	30.0	0.66	19.83	7.5	0	10	10	7.5	2.5	2.5	12.5	79.83	YES		YES						
SR 200	SW 27 AV	SW 20 ST	Regional		0.00	6.49	132.11	10	0	20	30.0	0.66	19.83	7.5	0	10	10	7.5	2.5	2.5	12.5	79.83	YES		YES						
SR 200	SW 20 ST	SW 17 RD	Regional		0.00	4.74	182.17	10	10	20	30.0	0.66	19.83	7.5	0	0	0	7.5	2.5	2.5	12.5	79.68	YES		YES						
SR 200	SW 36 AV	SW 34 AV	Regional		0.00	3.65	175.08	10	0	15	25.0	0.73	21.96	10	0	0	10	7.5	2.5	2.5	12.5	79.46	YES		YES						
SR 40	US 441	NW 25 AV	Regional		0.00	5.59	130.67	10	0	20	30.0	0.71	21.27	5	0	0	10	7.5	2.5	2.5	12.5	78.68	YES		YES						
SR 40	I-75 RAMP (WEST)	I-75 RAMP (EAST)	Regional		0.00	0.00	212.47	0	0	0	10.0	0.69	20.85	5	10	10	10	7.5	2.5	2.5	12.5	78.35	YES		YES						
SR 40	SW 33 AV	SW 27 AV	Regional		0.00	2.40	82.13	5	0	10	15.0	0.76	22.86	7.5	0	10	10	7.5	2.5	2.5	12.5	77.86	YES		YES						
SR 40	URBAN AREA BOUNDARY	CR 318	SIS		0.83	1.67	22.49	2.5	7.5	10	12.5	0.84	25.11	10	10	10	10	7.5	0	0	0	77.81	YES		YES						
SR 40	SE 40	SE 38	SIS		0.00	0.72	10.0	5	0	5	0.84	0.58	17.37	10	10	10	10	7.5	2.5	2.5	12.5	77.37	YES		YES						
SR 464	SE 3 AV	CR 464A	Non-Regional		0.00	1.75	94.58	7.5	0	10	17.5	0.97	28.08	7.5	5	0	5	7.5	2.5	2.5	12.5	76.48	YES		YES						
SR 464	SW 1 AV	SE 3 AV	Non-Regional		0.00	1.87	102.95	7.5	0	10	17.5	0.97	28.08	7.5	5	0	5	7.5	2.5	2.5	12.5	76.48	YES		YES						
SR 200	SR 200	SR 40	SIS		0.16	0.65	43.73	2.5	2.5	5	0.63	18.9	10	10	10	10	10	7.5	2.5	2.5	12.5	76.4	YES		YES						
SR 40	NE 11 AV	SE 14 AV	Regional		0.00	6.48	92.86	7.5	0	20	27.5	0.71	21.33	5	0	0	5	7.5	2.5	2.5	12.5	76.33	YES		YES						
SR 40	CR 484	SR 200	SIS		0.31	1.33	36.41	2.5	5	10	12.5	0.71	21.21	10	10	10	10	7.5	2.5	2.5	12.5	76.21	YES		YES						
US 441	CR 484	SE 110 ST	Regional		0.00	2.97	99.74	7.5	0	15	22.5	0.70	21.12	5	0	10	10	7.5	2.5	2.5	12.5	76.12	YES		YES						
SR 40	NE 19 AV	NE 25 AV	Regional		0.00	2.88	102.95	7.5	0	15	22.5	0.79	23.61	7.5	0	10	10	7.5	2.5	2.5	12.5	76.11	YES		YES						
US 441	SW 5 ST	SR 40	Regional		0.00	0.00	145.30	7.5	0	0	7.5	0.78	23.31	7.5	5	10	10	7.5	2.5	2.5	12.5	75.81	YES		YES						
US 27	NW 38 AV	I-75 RAMP (WEST)	SIS		0.00	6.75	138.34	7.5	0	20	27.5	0.43	12.93	2.5	0	10	10	7.5	2.5	2.5	12.5	75.43	YES		YES						
SR 200	SR 200	SR 200	SIS		0.00	0.67	31.30	2.5	0	5	7.5	0.84	25.11	10	10	10	10	7.5	2.5	0	2.5	75.11	YES		YES						
SR 200	URBAN AREA BOUNDARY	CR 318	SIS		0.22	0.88	92.25	2.5	2.5	5	7.5	0.84	25.11	10	10	10	10	7.5	2.5	2.5	12.5	75.11	YES		YES						
SR 200	SW 32 AV	SW 26 ST	Regional		0.00	2.69	280.72	10	0	15	20.0	0.66	19.92	7.5	0	10	10	7.5	2.5	2.5	12.5	74.92	YES		YES						
US 441	COUNTY LINE (S)	SE 178 PL	Regional		0.00	3.75	178.85	10	0	15	25.0	0.75	22.38	5	0	10	10	7.5	2.5	2.5	12.5	74.88	YES		YES						
SR 464	SE 23 AV	SE 25 AV	Non-Regional		0.00	1.26	6.30	2.5	0	5	7.5	0.84	25.11	10	10	10	10	7.5	2.5	2.5	12.5	74.88	YES		YES						
SR 326	SR 326	SR 326	Non-Regional		0.00	0.44	32.10	2.5	0	5	7.5	0.56	16.83	10	10	10	10	7.5	2.5	2.5	12.5	74.33	YES		YES						
SR 464	US 441	SW 1 AV	Non-Regional		0.00	0.00	221.66	10	0	10	10.0	1.14	34.14	7.5	5	0	5	7.5	2.5	2.5	12.5	74.14	YES		YES						
SR 464	CR 318	COUNTY LINE (N)	SIS		0.00	0.67	14.95	0	0	5	5.0	0.96	28.92	10	10	10	10	7.5	2.5	2.5	12.5	73.92	YES		YES						
SR 464	CR 318	COUNTY LINE (N)	SIS		0.17	0.51	11.29	2.5	0	5	5.0	0.96	28.92	10	10	10	10	7.5	2.5	2.5	12.5	73.92	YES		YES						
SR 40	NE 11 AV	SE 14 AV	Regional		0.00	7.06	80.28	5	0	20	25.0	0.71	21.33	5	0	0	10	7.5	2.5	2.5	12.5	73.83	YES		YES						
SR 464	CR 484	SR 200	SIS		0.00	0.99	29.67	2.5	0	5	7.5	0.71	21.21	10	10	10	10	7.5	2.5	2.5	12.5	73.71	YES		YES						
CR 464	MIDWAY RD	MIDWAY RD	Non-Regional		0.00	4.41	221.5	10	0	20	27.5	0.43	12.93	2.5	0	10	10	7.5	2.5	2.5	12.5	73.28	YES		YES						
CR 464	SE 64 AV	SE PINE RD	Non-Regional		0.28	3.70	92.56	7.5	2.5	15	22.5	0.77	22.98	5	5	0	5	7.5	2.5	2.5	12.5	72.98	YES		YES						
US 441	SE 102 PL	SE 100 ST	Regional		0.00	2.70	75.61	5	0	15	20.0	0.67	20.16	5	0	10	10	7.5	2.5	2.5	12.5	72.66	YES		YES						
US 441	SE 95 ST	SE 92 PL RD	Regional		0.00	2.59	61.48	5	0	15	20.0	0.67	20.16	5	0	10	10	7.5	2.5	2.5	12.5	72.66	YES		YES						
SR 464	URBAN AREA BOUNDARY	CR 318	SIS		0.00	1.04	21.1	2.5	0	5	7.5	0.84	25.11	10	10	10	10	7.5	2.5	2.5	12.5	72.61	YES		YES						
SR 464	URBAN AREA BOUNDARY	CR 318	SIS		0.35	0.71	18.41	2.5	5	5	7.5	0.84	25.11	10	10	10	10	7.5	2.5	2.5	12.5	72.61	YES		YES						
SR 464	URBAN AREA BOUNDARY	CR 318	SIS		0.49	0.98	26.33	2.5	5	5	7.5	0.84	25.11	10	10	10	10	7.5	2.5	2.5	12.5	72.61	YES		YES						
US 441	SE 52 ST	SE 40 CIR	Regional		0.83	0.88	8.72	0	7.5	5	5.0	0.91	27.15	7.5	0	10	10	7.5	2.5	2.5	12.5	72.15	YES		YES						
SR 200	SW 34 AV	SW 32 AV	Regional		0.00	1.86	155.76	7.5	0	15	20.0	0.75	22.92	10	10	10	10	7.5	2.5	2.5	12.5	72.06	YES		YES						
SR 464	SE 36 AV	SE 44 AV	Non-Regional		0.00	3.77	101.77	7.5																							

Roadway	From	To	Roadway Classification	Rural 2-Lane Facility	Fatal Crash Rate	Fatal & Incapacitating Injury Crash Rate	Total Crash Rate	Total Crash Ranking	Total Fatal Ranking	Fatal and Incapacitating Injury Ranking	Safety Significance	V/C Ratio	MAV Ranking (V/C<10)	Existing Volume Ranking	Truck Volume Ranking	Truck Route Ranking	Evac Route Ranking	Fiber Connection Ranking	CCTV Ranking	Bluetooth Ranking	ITS Significance	Total Scoring	Ranked Top 25 Segments (-75 removed)	Top 25 Collector Segments	Top 25 Non-Regional Segments	Top 25 Regional Segments	Top 25 SIS Segments	Proposed Emergency Vehicle	Proposed Comment	Proposed ATC Signal Control		
5 MAGNOLIA AV	SR 40	W BROADWAY ST	Collector		0.00	0.00	211.35	10	0	0	10.0	0.38	5.25	5	5	0	10	7.5	0	2.5	10	40.25										
US 301	I43 PL	US 441	Regional		0.00	0.21	21.98	2.5	0	0	2.5	0.33	9.93	2.5	0	10	10	0	2.5	2.5	5	39.93	YES							YES		
CR 200A	US 441	N MAGNOLIA AV	Non-Regional		0.00	0.97	22.31	2.5	0	5	7.5	0.33	9.87	0	5	0	10	5	0	2.5	7.5	39.87										
SR 40	SE 183 AV	SR 19	SIS	Yes	0.00	0.57	1.49	0	0	5	5.0	0.32	9.72	0	5	10	10	0	0	0	0	39.72										
SR 326	NE 36 AV	NE 40 AV	SIS	Yes	0.00	0.00	2.25	0	0	0	0.00	0.32	9.66	2.5	5	10	5	7.5	0	0	7.5	39.66										
CR 326	NE 40 AV		SIS	Yes	0.00	0.00	1.28	0	0	0	0.00	0.32	9.66	2.5	5	10	5	7.5	0	0	7.5	39.66										
SE 31 ST	CR 475	US 441	Non-Regional		0.00	1.24	34.15	2.5	0	10	12.5	0.41	12.15	2.5	0	0	0	7.5	2.5	2.5	12.5	39.65										
SE 25 AV	E FORT KING	SR 40	Non-Regional		0.00	0.00	23.86	2.5	0	0	2.5	0.37	24.14	0	0	0	0	7.5	0	0	0	39.64					YES			YES		
CR 464A	SE 17TH ST	CR 318	Collector		0.00	0.18	13.31	0	0	0	0.00	0.65	19.38	2.5	5	0	0	7.5	2.5	2.5	12.5	39.38	YES									
US 41	SW 111 PL LN	Regional			0.00	0.00	55.92	5	0	0	0.00	0.64	19.32	5	0	0	0	10	0	0	0	39.32										
NE 25 AV	NE 3 ST	SR 492	Non-Regional		0.00	1.09	36.84	2.5	0	5	7.5	0.39	11.79	2.5	5	0	0	7.5	2.5	2.5	12.5	39.29					YES					
URBAN AREA BOUNDARY	CR 329	Collector	Yes		0.00	0.00	4.26	0	0	0	0.00	0.56	12.04	0	10	5	0	7.5	0	0	7.5	39.24	YES									
CR 328	SW 140 AV	E OF NW 125 AV	Collector	Yes	0.00	1.28	8.65	0	0	10	10.0	0.47	14.13	0	5	0	0	10	0	0	0	39.13										
SR 40	SW 80 AV	Regional			0.00	0.43	8.95	0	0	5	5.0	0.47	14.07	2.5	0	0	0	10	2.5	2.5	2.5	39.07					YES	YES	YES			
SW 1 AV	SR 464	Collector	Yes		0.00	2.63	59.43	5	0	15	20.0	0.30	8.97	0	0	0	0	7.5	0	2.5	10	38.97										
CR 484	SW 180 AVE RD	Non-Regional	Yes		0.00	0.23	0.00	0	0	0	0.00	0.55	16.38	7.5	5	0	0	10	0	0	0	38.88										
CR 484	SW 180 AVE RD	Non-Regional	Yes		0.00	0.00	1.63	0	0	0	0.00	0.55	16.38	7.5	5	0	0	10	0	0	0	38.88										
SW 60 AV	SW 20 ST	SR 40	Non-Regional		0.00	0.70	22.94	2.5	0	5	7.5	0.38	11.37	2.5	5	0	0	7.5	2.5	2.5	12.5	38.87										
NE 2 AV	NE 3 ST	Collector	Yes		0.00	3.98	55.67	5	0	15	20.0	0.13	13.84	0	5	0	0	7.5	0	2.5	10	38.84										
NE 8 AV	NE 3 ST	SR 492	Collector	Yes	0.00	1.44	35.51	2.5	0	10	12.5	0.29	8.79	0	5	0	0	7.5	2.5	2.5	12.5	38.79	YES									
CR 318	COUNTY LINE	I-75	Collector	Yes	0.20	0.59	1.74	0	2.5	5	5.0	0.62	18.72	0	5	0	0	7.5	0	0	0	38.72										
SW 27 AV	SR 464	Collector	Yes		0.00	0.00	14.75	2.5	0	0	2.5	0.53	15.84	2.5	0	0	0	7.5	2.5	2.5	12.5	38.34					YES			YES		
CR 475	SE 95 ST	URBAN AREA BOUNDARY	Non-Regional	Yes	0.00	1.29	13.91	0	0	10	10.0	0.36	13.01	0	5	0	0	7.5	0	0	7.5	38.3	YES									
CR 200A	N MAGNOLIA AV	NE JACKSONVILLE RD	Non-Regional		0.00	0.00	50.17	5	0	0	5.0	0.35	10.62	0	5	0	0	7.5	0	2.5	7.5	38.12										
N MAGNOLIA AV	NW 14 ST	NE JACKSONVILLE RD	Collector		0.00	1.79	18.77	2.5	0	10	12.5	0.35	10.62	0	5	0	0	7.5	0	2.5	10	38.12										
N MAGNOLIA AV	SR 492	NW 14 ST	Collector		0.00	1.55	20.10	2.5	0	10	12.5	0.35	10.62	0	5	0	0	7.5	0	2.5	10	38.12										
NE 36 AV	CR 314	SR 40	Non-Regional		0.00	0.00	107.76	7.5	0	5	7.5	0.52	15.22	2.5	5	0	0	7.5	2.5	2.5	12.5	38.07	YES									
CR 200A / JACKSONVILLE RD	URBAN AREA BOUNDARY	Non-Regional	Yes		0.00	0.00	8.63	0	0	0	0.00	0.35	10.5	10	0	0	0	10	0	0	0	38										
CR 200A / JACKSONVILLE RD	NE 100 ST	Non-Regional	Yes		0.00	0.00	0.00	0	0	0	0.00	0.35	10.5	10	0	0	0	10	0	0	0	38										
CR 484	NE 36 AV	Regional			0.00	1.23	12.49	2.5	0	0	2.5	0.49	12.18	0	5	0	0	7.5	0	0	0	37.99	YES									
CR 484	LAKESHORE DR	E OF HENDRIX DR	Non-Regional		0.45	0.45	1.87	0	5	5	5.0	0.60	17.97	0	5	0	0	7.5	0	0	0	37.97										
SR 492	NE 17 AV	Regional			0.00	0.00	12.43	0	0	0	0.00	0.51	15.27	5	0	0	5	7.5	2.5	2.5	12.5	37.77										
SR 35	CR 314	NE 13 ST	Non-Regional		0.00	0.00	2.39	0	0	0	0.00	0.33	9.84	2.5	5	0	0	7.5	2.5	2.5	10	37.34										
SW 17 ST	SR 200	SW 22 AV	Non-Regional		0.00	0.87	2.25	0	0	0	0.00	0.27	9.78	2.5	5	0	0	7.5	0	0	0	37.28										
CR 42	SE 86 CT	SE 89 TER	Non-Regional		0.00	1.75	46.03	5	0	10	15.0	0.32	9.75	2.5	5	0	0	7.5	2.5	2.5	12.5	37.25					YES	YES	YES			
US 301	NE JACKSONVILLE RD	CR 318	SIS		0.22	0.65	16.73	2.5	2.5	5	5.0	0.32	9.72	0	0	0	10	0	0	0	0	37.22										
NE 35 ST	CR 200A	NE 25 AV	Collector		0.00	0.83	18.38	2.5	0	5	7.5	0.35	11.23	0	0	0	0	7.5	0	0	0	37.22										
NE 8 AV	SR 492	CR 200A	Collector		0.00	0.46	20.57	2.5	0	0	7.5	0.41	12.21	0	5	0	0	7.5	2.5	2.5	12.5	37.21										
SR 492	NE 25 AV	Regional			0.00	1.00	42.46	2.5	0	5	7.5	0.32	9.6	2.5	0	0	5	7.5	2.5	2.5	12.5	37.1										
CR 200A / JACKSONVILLE RD	NE 28 ST	NE 35 ST	Non-Regional		0.00	0.00	14.47	0	0	0	0.00	0.32	9.48	2.5	5	0	0	7.5	0	2.5	10	36.98										
US 41	SW ROBINSON RD	BROOKS ST	Regional		0.00	0.00	25.43	2.5	0	0	0.00	0.64	19.33	5	0	0	0	7.5	0	0	0	36.83										
US 301	US 441	NE JACKSONVILLE RD	SIS		0.00	0.40	5.14	0	0	5	5.0	0.31	9.3	2.5	0	0	10	10	0	0	0	36.8										
SE 3 AV	5 MAGNOLIA AV	Collector	Yes		0.00	1.20	4.82	0	0	10	10.0	0.39	11.76	0	5	0	0	7.5	0	2.5	10	36.76										
CR 25A	URBAN AREA BOUNDARY	CR 329	Collector	Yes	0.00	0.00	2.63	0	0	0	0.00	0.56	16.74	10	5	0	0	7.5	0	0	0	36.74										
SR 40	US 41	URBAN AREA BOUNDARY	Regional	Yes	0.00	0.00	12.48	0	0	0	0.00	0.47	14.19	7.5	5	0	0	7.5	0	0	0	36.69										
SR 40	URBAN AREA BOUNDARY	SW 140 AV	Regional	Yes	0.00	0.23	12.10	0	0	0	0.00	0.47	14.19	7.5	5	0	0	10	0	0	0	36.69										
SR 40	URBAN AREA BOUNDARY	SW 140 AV	Regional	Yes	0.00	0.00	3.27	0	0	0	0.00	0.47	14.19	7.5	5	0	0	10	0	0	0	36.69										
SR 40	URBAN AREA BOUNDARY	SW 140 AV	Regional	Yes	0.00	0.00	0.00	0	0	0	0.00	0.47	14.19	7.5	5	0	0	10														

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US 301	CR 318	COUNTY LINE (N)	S5		0.00	0.00	5.95	0	0	0	0.28	8.34	2.5	0	30	10	0	0	0	0	0	30.84									
US 301	CR 318	COUNTY LINE (N)	S5		0.00	0.00	4.28	0	0	0	0.28	8.34	2.5	0	30	10	0	0	0	0	0	30.84									
CR 475	URBAN AREA BOUNDARY	SE 80 ST	Non-Regional	Yes	0.00	0.00	15.80	2.5	0	0	2.5	10.8	5	5	0	0	0	7.5	0	0	7.5	30.8									
US 441	CR 318	AVENUE I	Regional		0.00	0.33	2.83	0	0	5	5.0	0.19	5.73	0	10	10	0	0	0	0	0	30.73									
US 441	CR 318	AVENUE I	Regional		0.33	0.33	30.29	0	5	5	0.19	5.73	0	10	10	0	0	0	0	0	0	30.73									
SW 13 ST	SW 33 AV	SW 27 AV	Collector		0.00	0.00	1.22	0	0	0	0.52	15.66	2.5	5	0	0	0	7.5	0	0	0	30.66									
NE 25 AV	NE 35 ST	NE 49 ST	Collector		0.00	0.40	6.24	0	0	5	5.0	0.44	13.11	0	5	0	0	0	0	0	7.5	30.61									
CR 484	CR 475	SE 25 AV	Regional		0.00	0.00	4.17	0	0	0	0.00	11.08	2.5	0	10	10	0	7.5	0	2.5	0	30.58					YES		YES		
SW 1 AV	US 441	SR 464	Non-Regional (Unclassified)		0.00	0.00	47.50	5	0	0	0.52	15.54	0	0	0	0	0	7.5	0	2.5	10	30.54									
US 41	SW 36 ST	COUNTY LINE (S)	Regional	Yes	0.00	0.00	1.25	0	0	0	0.0	15.3	0	0	5	0	0	0	0	0	0	30.3									
US 41	COUNTY LINE (S)	CR 484	Regional		0.00	0.00	2.48	0	0	0	0.0	0.59	17.76	2.5	0	0	0	0	0	0	0	30.26									
US 441	AVENUE B	COUNTY LINE (N)	Regional		0.00	0.32	4.44	0	0	0	5.0	0.17	5.22	0	0	0	0	0	0	0	0	30.22									
CR 316	JACKSONVILLE RD	NE 110TH AVE RD	Collector	Yes	0.14	0.70	0.98	0	2.5	5	5.0	0.09	2.7	0	5	0	10	7.5	0	0	0	30.2									
US 441	US 301	CR 25A (N)	Regional		0.21	0.63	2.96	0	2.5	5	5.0	0.17	5.19	0	0	10	10	0	0	0	0	30.19									
CR 475	CR 484	URBAN AREA BOUNDARY	Non-Regional		0.00	1.45	47.38	5	0	10	15.0	0.26	7.65	0	5	0	0	0	2.5	0	2.5	30.15									
CR 200A / JACKSONVILLE RD	SR 281	NE 49 ST	Non-Regional		0.00	0.26	2.65	0	0	0	0.0	2.95	7.99	0	5	0	0	0	0	0	0	30.09									
SE 1 AV	SE 8 ST	SW 5 ST	Collector		0.00	2.52	27.75	2.5	0	15	17.5	0.00	0	0	5	0	0	5	0	2.5	0	30									
SW 49 AV	CR 484	SW 48 TER	Collector		0.00	0.48	17.49	2.5	0	5	7.5	0.25	7.38	0	5	0	0	5	2.5	0	2.5	10	29.88			YES					
CR 484	SW 140 AVE	SW 13 ST	Non-Regional		0.00	0.46	7.43	0	0	5	5.0	0.33	9.87	0	5	0	0	0	0	0	0	29.87									
SW 31 AV	SW 20 ST	SW 13 ST	Collector		0.00	2.20	13.58	0	0	10	10.0	0.33	9.81	0	5	0	0	5	0	0	0	29.81									
US 27	COUNTY LINE (W)	CR 464B	SIS		0.00	0.79	5.0	0	0	5	7.5	0.16	4.8	0	10	10	0	0	0	0	0	29.8									
CR 42	SE 77 AV	SE 83 AV	Non-Regional		0.00	0.38	28.46	2.5	0	5	7.5	0.32	9.75	2.5	5	0	0	0	2.5	0	2.5	5	29.75				YES	YES	YES		
SE 1 AV	US 441	SR 464	Collector		0.35	0.56	5.66	0	5	0	5.0	0.33	9.75	0	5	0	0	7.5	0	2.5	0	29.75					YES	YES	YES		
US 301	NE JACKSONVILLE RD	CR 318	SIS		0.00	0.00	14.99	0	0	0	0.0	0.32	9.72	0	0	10	10	0	0	0	0	29.72									
SE 25 AV	SE 14 ST	E FORT KING	Non-Regional		0.00	0.00	17.49	2.5	0	0	2.5	0.49	14.7	2.5	0	0	0	7.5	0	2.5	10	29.7						YES	YES	YES	
SW MARTIN L KING AVE	SR 464	SE 200	Collector		0.00	0.34	11.61	0	0	5	5.0	0.24	7.2	0	5	0	0	7.5	0	2.5	12.5	29.7									
CR 484	SW 110 AV	SW 85 AV	Regional		0.00	0.00	4.91	0.0	0	0	0.49	0.49	2.25	0	0	0	0	7.5	0	2.5	0	29.67					YES	YES	YES		
CR 484	CR 25 AV	CR 464	Regional		0.00	0.00	5.37	0	0	0	0.0	0.40	12.15	2.5	0	0	0	0	0	0	0	29.65					YES	YES	YES		
E FORT KING ST	SE 30TH AVE	SE 36 AV	Collector		0.00	0.76	15.17	2.5	0	5	7.5	0.63	9.63	0	5	0	0	0	0	0	0	29.63									
SE 31 ST	W OF SE 22ND AVE	SE 36 AV	Non-Regional		0.00	0.00	0.00	0	0	0	5.78	0.00	12.11	2.5	0	0	0	7.5	0	0	0	29.62									
SE 31 ST	SE 19 AV	W OF SE 22ND AVE	Non-Regional		0.00	0.00	1.47	0	0	0	0.0	12.12	2.5	5	0	0	0	7.5	0	2.5	10	29.62									
CR 25	SE 100 AV	SE 110 ST	Collector		0.00	0.56	9.74	0	0	5	5.0	0.49	14.61	0	5	0	0	0	2.5	0	2.5	5	29.61								
CR 484	US 41	LAKESHORE DR	Non-Regional		0.00	0.00	29.26	2.5	0	0	2.5	0.39	11.76	0	5	0	0	0	0	0	0	29.26									
CR 200A	URBAN AREA BOUNDARY	SE 90 ST	Non-Regional	Yes	0.40	0.26	2.65	0	0	0	2.6	0.18	2.25	0	5	0	0	7.5	0	0	0	29.18									
CR 328	SW 140 AV	E OF NW 125 AV	Collector	Yes	0.00	0.00	6.33	0	0	0	0.0	0.47	14.13	0	5	0	0	0	0	0	0	29.13									
CR 484	CR 467	SE 47 AV	Regional		0.00	0.60	7.97	0	0	5	5.0	0.22	6.6	2.5	0	0	0	10	0	2.5	0	29.1									
S MAGNOLIA AV	SW 8 ST	SW 1 AV	Collector		0.00	0.00	8.00	0	0	0	0.00	0.20	8.00	0	5	0	0	7.5	0	2.5	0	29.03									
NW 60 AV	NW 17 ST	US 27	Non-Regional		0.00	0.32	15.50	2.5	0	5	7.5	0.21	6.45	0	5	0	0	0	7.5	2.5	0	10	28.95								
SW 40 ST	SW 43 CT	SW 38 AV	Collector		0.00	0.00	8.36	0	0	0	0.0	0.55	16.41	0	5	0	0	0	7.5	0	0	7.5	28.91								
SW 40 ST	SW 51 TER	SW 43 CT	Collector		0.00	0.00	12.78	0	0	0	0.0	0.55	16.41	0	5	0	0	0	0	2.5	0	7.5	28.91								
CR 314	NW 48TH AVE	NW 48TH AVE	Regional		0.00	0.00	0.63	0.0	0	0	0.63	16.75	0	0	0	0	0	0	0	0	0	28.75									
CR 464A	SE 38 ST	SE 31 ST	Collector		0.00	0.00	21.42	2.5	0	0	2.5	0.0	11.22	0	5	0	0	0	7.5	0	2.5	10	28.72								
CR 464A	US 441	SE 38 ST	Collector		0.00	0.00	15.57	2.5	0	0	2.5	0.0	11.22	0	5	0	0	0	7.5	0	2.5	10	28.72								
SE 3 ST	S MAGNOLIA AV	SE 1 AV	Non-Regional (Local)		0.00	0.00	23.07	2.5	0	0	2.5	0.37	11.16	0	5	0	0	0	7.5	0	2.5	10	28.66								
CR 314	SR 40 (E)	NE 138 AV	Collector	Yes	0.67	0.67	0.00	0	0	0	0.0	0.0	6	0	5	0	0	7.5	0	0	0	28.65									
CR 314	SR 40 (E)	NE 138 AV	Collector	Yes	0.00	0.00	7.14	0	0	5	5.0	0.20	8.49	0	5	0	5	7.5	0	0	0	28.5									
NE 28 ST	US 441	CR 200A	Collector		0.00	1.06	26.29	2.5	0	5	7.5	0.28	8.49	0	5	0	0	5	2.5	0	0	7.5	28.49								
NE 8 AV	NE 25 AV	NE 25 AV	Collector		0.00	0.00	8.43	0	0	0	0.0	0.28	8.43	0	5	0	0	0	7.5	0	2.5	10	28.43								
NW 42 ST	SW 27 AV	SW 7 AV	Non-Regional		0.00	0.12	12.51	0	0	0	0.0	0.45	13.38	2.5	5	0</															

Roadway	From	To	Roadway Classification	Rural 2-Lane Facility	Fatal Crash Rate	Fatal & Incapacitating Injury Crash Rate	Total Crash Rate	Total Crash Ranking	Total Fatal Ranking	Fatal and Incapacitating Injury Ranking	Safety Significance	V/C Ratio	MAV Ranking (V/C*10)	Existing Volume Ranking	Truck Volume Ranking	Truck Route Ranking	Evac Route Ranking	Fiber Connection Ranking	CCTV Ranking	Bluetooth Ranking	ITS Significance	Total Scoring	Ranked Top 25 Segments (-75 removed)	Top 25 Collector Segments	Top 25 Non-Regional Segments	Top 25 Regional Segments	Top 25 SIS Segments	Proposed Emergency Vehicle Preempt	Proposed Commentation Expansion	Proposed ATC Signal Control
5 MAGNOLIA AV	SW 5 ST	SW 8 ST	Collector		0.00	0.00	33.12	2.5	0	0	2.5	0.30	9.03	0	5	0	0	5	0	2.5	7.5	24.03								
CR 25A	US 441 (S)	NW 46 ST	Collector		0.25	0.25	15.15	2.5	2.5	0	2.5	0.30	8.94	0	5	0	0	5	0	7.5	0	7.5	23.94							
CR 25A	US 441 (S)	NW 46 ST	Collector		0.00	0.35	6.24	0	0	5	5.0	0.30	8.94	0	0	0	0	0	7.5	2.5	0	7.5	23.94							
NE 1 AV	NE 1 ST	NE 2 ST	Collector		0.00	0.00	49.62	5	0	0	5.0	0.13	3.84	0	5	0	0	0	7.5	0	0	7.5	23.84							
SW 46 AV	SW 13 ST	SW 40	Non-Regional (Unclassified)		0.48	0.48	11.34	0	0	0	0.38	11.34	0	0	0	0	0	0	7.5	0	0	7.5	23.84							
SE 11 AV	SR 464	E FT KING ST	Collector		0.00	0.42	8.57	0	0	5	5.0	0.21	6.27	0	5	0	0	0	7.5	0	2.5	10	23.77							
NE 25 AV	NE 49 ST	SR 326	Collector		0.00	0.40	2.38	0	0	5	5.0	0.21	6.24	0	0	0	0	0	7.5	0	0	7.5	23.74							
SW 37 AV	SW 20 ST	SW 13 ST	Non-Regional (Unclassified)		0.00	0.00	0.00	0	0	0	0.00	0.21	6.18	0	5	0	0	0	7.5	0	0	7.5	23.68							
CR 314	SR 40 (E)	NE 138 AV	Collector	Yes	0.00	0.00	2.07	0	0	0	0.20	0.20	6.14	0	5	0	0	0	7.5	0	0	7.5	23.65							
CR 314	SR 40 (E)	NE 138 AV	Collector	Yes	0.00	0.00	2.09	0	0	0	0.20	0.20	6.0	0	5	0	0	0	7.5	0	0	7.5	23.5							
CR 315	CR 21	COUNTY LINE	Collector	Yes	0.00	0.57	8.85	0	0	5	5.0	0.11	3.45	0	5	0	10	0	0	0	0	7.5	23.45							
NE 11 AV	N MAGNOLIA AV	NE 1 AV	Collector		0.00	0.00	0.00	0	0	0	0.11	31.39	0	5	0	5	0	0	7.5	0	2.5	10	23.39							
CR 200A / JACKSONVILLE RD	NE 101 ST	US 301	Non-Regional	Yes	0.00	0.00	2.52	0	0	0	0.0	0.19	5.85	0	0	0	10	0	7.5	0	0	7.5	23.35							
SE 80 ST	CR 475	SE 25 AV	Collector		0.20	0.40	10.21	0	2.5	5	5.0	0.27	8.22	0	5	0	0	0	7.5	0	0	5	23.22							
CR 329	US 441	JACKSONVILLE RD	Collector	Yes	0.17	0.34	6.80	0	2.5	5	5.0	0.19	5.64	0	5	0	0	0	7.5	0	0	7.5	23.14							
CR 42	URBAN AREA BOUNDARY	SE 190TH AVE RD	Collector	Yes	0.00	0.50	14.63	0	0	0	5.0	0.27	8.01	5	0	0	0	0	0	0	0	0	23.04							
N MAGNOLIA AV	NW 1 ST	SR 40	Collector		0.00	0.00	35.59	2.5	0	0	2.5	0.18	5.4	0	5	0	0	0	7.5	0	2.5	10	22.9							
CR 328	US 41	SW 140 AV	Collector	Yes	0.00	0.00	2.74	0	0	0	0.0	0.26	7.89	0	5	0	0	0	7.5	0	0	0	22.89							
CR 328	US 41	SW 140 AV	Collector	Yes	0.00	0.00	1.24	0	0	0	0.0	0.26	7.89	0	5	0	0	0	7.5	0	0	0	22.89							
NW MARTIN L KING AV	US 27	NW 22 ST	Collector		0.00	0.90	14.88	0	0	5	5.0	0.29	2.79	0	0	0	0	0	7.5	2.5	0	22.79								
NE 1 ST	NE 1 AV	NE 8 AV	Collector		0.00	0.00	10.67	0	0	0	5.0	0.09	2.7	0	5	0	5	0	7.5	0	2.5	10	22.7							
CR 316	JACKSONVILLE RD	NE 110TH AVE RD	Collector	Yes	0.00	0.00	0.00	0	0	0	0.0	0.27	8.01	0	5	0	0	0	7.5	0	0	5	22.7							
SE 11 AV	CR 464A	SR 464	Non-Regional (Local)		0.00	0.00	9.81	0	0	0	0.0	0.25	7.62	0	5	0	0	0	7.5	0	2.5	10	22.62							
CR 318	US 301	1 MI E OF US 301	Collector	Yes	0.00	0.24	2.44	0	0	0	0.0	0.25	7.56	0	5	0	0	0	7.5	0	0	0	22.56							
CR 318	NE 10 AVE	US 301	Collector	Yes	0.00	0.00	2.30	0	0	0	0.0	0.25	7.56	0	5	0	0	0	7.5	0	0	0	22.56							
CR 25	COUNTY LINE	CR 42	Collector	Yes	0.40	0.51	33.68	0	0	0	5.0	0.50	8.01	0	0	0	0	0	2.5	0	0	2.5	22.53							
CR 316	CR 25A	NW 38TH AVE	Collector	Yes	0.00	0.00	2.74	0	0	0	0.0	0.25	7.5	0	5	0	0	0	7.5	0	0	0	22.5							
SE 14 AV	SW 30 ST	SE 8 ST	Collector		0.00	0.00	106.41	7.5	0	0	7.5	0.00	0.0	0	5	0	0	0	7.5	0	2.5	10	22.5							
NE 14 ST	NE 25 AV	NE 36 AV	Collector		0.40	0.40	0.00	0	0	0	0.0	0.40	4.88	0	5	0	0	0	7.5	0	0	0	22.48							
CR 42	US 301	SE 77 AV	Non-Regional		0.00	0.00	12.30	0	0	0	0.0	0.33	9.84	2.5	5	0	0	0	7.5	0	2.5	5	22.34					YES	YES	YES
CR 316	I-75	NW 48TH AVE	Collector	Yes	0.00	0.29	0.58	0	0	0	0.0	0.24	7.32	0	5	0	0	0	7.5	0	0	0	22.32							
CR 316	NW 48TH AVE	CR 25A	Collector	Yes	0.00	0.00	0.56	0	0	0	0.0	0.24	7.32	0	5	0	0	0	7.5	0	0	0	22.32							
CR 316	E OF CR 225	I-75	Collector	Yes	0.15	0.25	0.92	0	0	0	0.0	0.24	7.32	0	5	0	0	0	7.5	0	0	0	22.32							
SW 33 AV	SW 13 ST	SW 77th ST	Collector		0.00	0.00	8.24	0	0	0	0.0	0.33	9.81	0	5	0	0	0	7.5	0	0	0	22.31							
CR 25	SE 128 PL RD	SE 138TH TER	Collector		0.00	0.36	7.65	0	0	5	5.0	0.41	12.3	0	5	0	0	0	7.5	0	0	0	22.3							
CR 42	SE 138TH RD	SE 148TH RD	Collector		0.00	0.00	2.63	0	0	5	5.0	0.41	12.3	0	5	0	0	0	7.5	0	0	0	22.3							
CR 25	CR 42	SE 128 PL RD	Collector		0.00	0.89	6.86	0	0	0	5.0	0.41	12.3	0	5	0	0	0	7.5	0	0	0	22.3							
CR 25A	CR 329	CR 316	Collector	Yes	0.00	0.00	0.72	0	0	0	0.0	0.40	12.12	10	0	0	0	0	7.5	0	0	0	22.12							
E FORT KING ST	SE 36 AV	SR 35	Collector		0.00	0.00	0.00	0	0	0	0.0	0.40	12.09	0	5	0	0	0	7.5	0	0	5	22.09							
E FORT KING ST	SE 36 AV	SR 35	Collector		0.00	0.00	4.43	0	0	0	0.0	0.40	12.09	0	5	0	0	0	7.5	0	0	0	22.09							
CR 40	CR 40	CR 40	Collector		0.00	0.00	4.11	0	0	0	0.0	0.24	7.05	0	5	0	0	0	7.5	0	0	0	22.05							
SW 20 ST	SW 60 AV	SW 53RD AVE	Collector		0.00	0.00	2.86	0	0	0	0.0	0.32	9.48	2.5	0	0	0	0	7.5	2.5	0	10	21.98							
CR 25A	SR 40	NW 5 ST	Collector		0.00	0.00	3.32	0	0	0	0.0	0.39	11.79	0	5	0	0	0	7.5	0	2.5	5	21.79							
NW 27 AV	NW 27 AV	NW 21 ST	Collector		0.00	0.00	2.5	0	0	0	2.5	0.25	9.17	0	5	0	0	0	7.5	0	0	0	21.77							
SE WATULA AVE	E FT KING ST	SR 40	Collector		0.00	0.00	9.23	0	0	0	0.0	0.22	6.69	0	5	0	0	0	7.5	0	2.5	10	21.69							
CR 475	URBAN AREA BOUNDARY	SE 90 ST	Non-Regional	Yes	0.00	0.36	1.63	0	0	5	5.0	0.31	9.18	2.5	5	0	0	0	7.5	0	0	0	21.68							
N MAGNOLIA AV	NE JACKSONVILLE RD	CR 200A	Collector		0.00	0.00	0.00	0	0	0	0.0	0.22	6.65	0	5	0	0	0	7.5	0	2.5	10	21.6							
CR 316	NW 38TH AVE	US 441	Collector	Yes	0.00	0.00	1.05	0	0	0	0.0	0.21	6.36	0	5	0	0	0	7.5	0	0	0	21.36							
CR 316	US 441	JACKSONVILLE RD	Collector	Yes	0.00	0.00	1.44	0	0	0	0.0	0.21	6.36	0	5	0	0	0	7.5	0	0									

Roadway	From	To	Roadway Classification	Rural 2-Lane Facility	Fatal Crash Rate	Fatal & Incapacitating Injury Crash Rate	Total Crash Rate	Total Crash Ranking	Total Fatal Ranking	Fatal and Incapacitating Injury Ranking	Safety Significance	V/C Ratio	MAV Ranking (V/C<10)	Existing Volume Ranking	Truck Volume Ranking	Truck Route Ranking	Evac Route Ranking	Fiber Connection Ranking	CCTV Ranking	Bluetooth Ranking	ITS Significance	Total Scoring	Ranked Top 25 Segments (-75 removed)	Top 25 Collector Segments	Top 25 Non-Regional Segments	Top 25 Regional Segments	Top 25 SIS Segments	Proposed Emergency Vehicle Preempt	Proposed Communication Expansion	Proposed ATIS Signal Control	
SR 19	NE 77 ST	CR 314	Non-Regional	Yes	0.00	0.00	0.00	0	0	0	0.0	0.10	2.88	0	5	0	10	0	0	0	0	17.88									
SR 19	NE 77 ST	CR 314	Non-Regional	Yes	0.15	0.15	0.60	0	2.5	0	0.0	0.10	2.88	0	5	0	10	0	0	0	0	17.88									
SR 19	NE 77 ST	CR 314	Non-Regional	Yes	0.00	0.00	1.17	0	0	0	0.0	0.10	2.88	0	5	0	10	0	0	0	0	17.88									
CR 40	URBAN AREA BOUNDARY	KINNESAW RD	Collector	Yes	0.00	0.00	1.09	0	0	0	0.0	0.09	2.85	0	5	0	10	0	0	0	0	17.85									
CR 40	CR 336	URBAN AREA BOUNDARY	Collector	Yes	0.00	0.00	0.95	0	0	0	0.0	0.09	2.85	0	5	0	10	0	0	0	0	17.85									
CR 40	CR 336	URBAN AREA BOUNDARY	Collector	Yes	0.00	0.00	1.33	0	0	0	0.0	0.09	2.85	0	5	0	10	0	0	0	0	17.85									
CR 40	CR 336	URBAN AREA BOUNDARY	Collector	Yes	0.00	0.00	4.03	0	0	0	0.0	0.09	2.85	0	5	0	10	0	0	0	0	17.85									
CR 40	CR 336	URBAN AREA BOUNDARY	Collector	Yes	0.00	0.00	1.83	0	0	0	0.0	0.09	2.85	0	5	0	10	0	0	0	0	17.85									
SW 13 ST	SW 33 AV	Non-Regional (Unclassified)	Collector	Yes	0.00	0.00	1.71	0	0	0	0.0	0.34	10.32	2.5	0	5	0	5	0	0	0	17.82									
NW 44 AV	NW 30 PL	Collector	Yes	0.00	0.00	7.34	0	0	0	0.0	0.09	2.79	0	5	0	5	0	2.5	2.5	0	0	17.79									
CR 40	KINNESAW RD	Collector	Yes	0.00	0.00	0.65	0	0	0	0.0	0.09	2.73	0	5	0	10	0	0	0	0	0	17.73									
NW 40 AV	SW 38 AV	Collector	Yes	0.00	0.00	2.04	0	0	0	0.0	0.34	10.17	0	5	0	5	0	2.5	0	0	0	17.67									
SE 38 ST	SE 36 AV	Collector	Yes	0.00	0.59	1.26	0	5	0	5.0	0.17	5.13	0	5	0	0	2.5	0	0	0	2.5	17.63									
CR 320	COUNTY LINE	CR 329	Collector	Yes	1.30	1.30	1.30	0	10	10.0	1.09	2.61	0	5	0	0	0	0	0	0	0	17.61									
CR 320A	CR 326	Collector	Yes	0.47	0.94	1.64	0	5	5	5.0	0.25	7.56	0	5	0	0	0	0	0	0	0	17.56									
SE 132 ST RD	CR 484	Regional	Yes	0.00	0.16	0.85	0	0	0	0.0	0.25	7.53	0	5	0	0	2.5	0	0	2.5	0	17.53									
SE 1 AV	SW 3 ST	E FORT KING ST	Collector	Yes	0.00	0.00	11.53	2.5	0	0	5.0	0.13	0	0	5	0	0	7.5	0	2.5	10	17.5					YES		YES		
SW 10 ST	SE 1 AV	S MAGNOLIA AV	Collector	Yes	0.00	0.00	35.39	2.5	0	0	2.5	0.00	0	0	5	0	0	7.5	0	0	2.5	10	17.5								
NW 35 ST	NW 27 AVE	Non-Regional (Unclassified)	Collector	Yes	0.00	0.00	0.84	0	0	0	0.0	0.00	0	0	0	0	7.5	0	0	0	0	17.5									
NW 35 AV	NW 21 ST	Non-Regional (Unclassified)	Collector	Yes	0.00	0.00	1.19	0	0	0	0.0	0.00	0	0	0	10	0	0	7.5	0	0	17.5								YES	
SE 24 ST	SR 464	Collector	Yes	0.00	0.00	34.94	2.5	0	0	2.5	0.0	0.51	0	0	5	0	0	7.5	0	0	2.5	10	17.5								
SW 103 ST RD	SR 200	SW 49 AV	Collector	Yes	0.00	0.00	6.77	0	0	0	0.33	9.9	0	0	5	0	0	0	0	0	2.5	2.5	17.4								
SW 103 ST RD	SR 200	SW 49 AV	Collector	Yes	0.17	0.17	0.60	0	2.5	0	0.0	0.33	9.9	0	5	0	0	0	0	0	2.5	2.5	17.4								
SR 19	SR 40	NE 77 ST	Non-Regional	Yes	0.00	0.00	0.51	0	0	0	0.0	0.08	2.4	0	5	0	0	10	0	0	0	17.4									
SR 19	SR 40	NE 77 ST	Non-Regional	Yes	0.00	0.00	0.48	0	0	0	0.0	0.08	2.4	0	5	0	0	10	0	0	0	17.4									
SR 19	SR 40	NE 77 ST	Non-Regional	Yes	0.00	0.00	0.19	0	0	0	0.0	0.08	2.4	0	5	0	0	10	0	0	0	17.4									
SR 19	SR 40	NE 77 ST	Non-Regional	Yes	0.00	0.00	0.64	0	0	0	0.0	0.08	2.4	0	5	0	0	10	0	0	0	17.4									
CR 35	NE 58 AV AT NE 53 AV	Collector	Yes	0.00	0.00	9.03	0	0	0	0	0.24	7.29	0	0	5	0	0	5	0	0	0	17.29									
SW 7 AV	SW 23 ST	SR 464	Non-Regional (Local)	Yes	0.00	0.00	1.17	0	0	0	0.0	0.16	4.77	0	5	0	0	0	7.5	0	0	7.5	17.27								
CR 314	NE 73 AV	Collector	Yes	0.29	0.29	6.29	0	2.5	0	0	0.0	0.29	4.77	0	5	0	0	0	7.5	0	0	7.5	17.27								
CR 475A	CR 484	URBAN AREA BOUNDARY	Collector	Yes	0.00	0.00	6.18	0	0	0	0.0	0.32	9.72	0	5	0	0	0	2.5	0	0	2.5	17.22								
CR 475A	URBAN AREA BOUNDARY	CR 475	Collector	Yes	0.00	0.15	1.49	0	0	0	0.0	0.32	9.72	2.5	0	0	0	0	0	0	0	0	17.22								
CR 336	COUNTY LINE	CR 475	Collector	Yes	0.00	0.00	0.46	0	0	0	0.0	0.07	2.22	0	5	0	0	10	0	0	0	17.22									
CR 336	COUNTY LINE	CR 480	Collector	Yes	0.00	0.00	0.64	0	0	0	0.0	0.07	2.22	0	5	0	0	10	0	0	0	17.22									
CR 336	COUNTY LINE	CR 40	Collector	Yes	0.00	0.00	0.00	0	0	0	0.0	0.07	2.22	0	5	0	0	10	0	0	0	17.22									
SW 95 ST	SW 60 AV	SW 49 AV	Collector	Yes	0.00	0.00	4.40	0	0	0	0.0	0.24	7.17	0	5	0	0	0	2.5	2.5	5	17.17									
NE 49 ST	CR 200A	NE 29 AV	Non-Regional (Unclassified)	Collector	Yes	0.00	0.00	0.00	0	0	0.0	0.32	9.65	0	0	0	0	7.5	0	0	0	17.16									
NE 49 ST	W ANTHONY RD	CR 200A	Non-Regional (Unclassified)	Collector	Yes	0.00	0.00	1.57	0	0	0.0	0.32	9.66	0	0	0	0	7.5	0	0	0	17.16									
SW 44 AV	SW 20 ST	SW 13 ST	Non-Regional (Unclassified)	Collector	Yes	0.00	0.85	6.81	0	5	5.0	0.15	4.44	0	0	0	0	7.5	0	0	0	16.94									
CR 35	SR 326	NE 97TH ST RD	Collector	Yes	0.00	0.13	0.02	0	0	0	0.0	0.14	4.32	0	5	0	0	0	7.5	0	0	7.5	16.82								
CR 316	NE 152 LN	SR 19	Collector	Yes	0.00	0.00	0.95	0	0	0	0.0	0.06	1.71	0	5	0	0	0	7.5	0	0	7.5	16.71								
CR 316	NE 203 AV	NE 152 LN	Collector	Yes	0.00	0.00	1.09	0	0	0	0.0	0.06	1.71	0	5	0	0	10	0	0	0	16.71									
CR 316	NE 203 AV	NE 152 LN	Collector	Yes	0.00	0.00	0.53	0	0	0	0.0	0.06	1.71	0	5	0	0	10	0	0	0	16.71									
CR 475	URBAN AREA BOUNDARY	SE 90 ST	Non-Regional	Yes	0.00	0.00	1.47	0	0	0	0.0	0.31	9.18	2.5	5	0	0	0	0	0	0	16.68									
CR 316	NE 152 LN	Collector	Yes	0.00	0.00	2.99	0	0	0	0	0.0	0.14	4.17	0	5	0	0	7.5	0	0	0	16.67									
NW MARTIN L KING AV	NW 35 ST	CR 25A	Collector	Yes	0.00	0.00	1.22	0	0	0	0.0	0.14	4.17	0	5	0	0	0	7.5	0	0	7.5	16.67								
NW MARTIN L KING AV	NW 22 ST	NW 31 ST	Collector	Yes	0.00	0.00	3.13	0	0	0	0.0	0.14	4.17	0	5	0	0	0	7.5	0	0	7.5	16.67								
SE 132 ST RD	US 303	US 441	Regional	Yes	0.30	0.30	3.80	2.5	0	0	5.0	0.22	6.63	0	0	0	0	2.5	2.5	5	0	16.63						YES		YES	
CR 464	COUNTY LINE	US 27	Collector	Yes	0.00	0.37	1.21	0	0	0	5.0	0.22	6.63	0	0	0	0	0	0	0	0	16.63									
CR 314A	CR 464C	Collector	Yes	0.34	0.34	1.91	0	5	5	5.0	0.22	6.57	0	0	0	0	0	0	0	0	0	16.57									
SE 41 CT	SE 29 ST	SE 52 ST	Collector	Yes	0.00	0.41	0.00	0	0	0	5.0	0.22	6.48	0	5	0	0	0	0	0	0	0	16.48								
CR 45A	US 441 (E)	NW 45 ST	Collector	Yes	0.00	0.00	5.70	0	0	0	0.0	0.30	8.94	0	0	0	0	0	0	0	0	16.44									
CR 225A	US 27	CR 326	Collector	Yes	0.00	0.00	4.59	0	0	0	0.0	0.30	8.94	0	0	0	0	2.5	0	0	0	16.44									
CR 42	SE 58 AV	US 301	Collector	Yes	0.00	0.00	5.63	0	0	0	0.0	0.30	8.88	0	5	0	0	0	2.5	0	0	2.5	16.38								
NE 28 ST	CR 200A	NE 25 AV	Non-Regional (Local)	Yes	0.00	0.00	1.748	0	0	0	0.0	0.13	3.87	0	5	0	0	0	7.5	0	0	7.5	16.37								
NE 17 AV	NE 13 ST	NE 14 ST	Non-Regional (Unclassified)	Collector	Yes	0.00	0.00	8.29	0	0	0.0	0.29	8.73	0	5	0	0	0	7.5	0	0	7.5	16.23								
CR 329	CR 25A	NW 21 CT	Collector	Yes	0.00	0.00	2.28	0	0	0	0.0	0.20	6.09	0	5	0	0	0	0	0	0	16.09									
SE 95 ST	W OF 7TH AVE RD	URBAN AREA BOUNDARY	Collector	Yes	0.00</																										

Roadway	From	To	Roadway Classification	Rural 2-Lane Facility	Fatal Crash Rate	Fatal & Incapacitating Injury Crash Rate	Total Crash Rate	Total Crash Ranking	Total Fatal Ranking	Fatal and Incapacitating Injury Ranking	Safety Significance	V/C Ratio	MAV Ranking (V/C*30)	Existing Volume Ranking	Truck Volume Ranking	Truck Route Ranking	Evac Route Ranking	Fiber Connection Ranking	CCTV Ranking	Bluetooth Ranking	ITS Significance	Total Scoring	Ranked Top 25 Segments (-75 removed)	Top 25 Collector Segments	Top 25 Non-Regional Segments	Top 25 Regional Segments	Top 25 SIS Segments	Proposed Emergency Vehicle	Proposed Comment	Proposed ATC Signal
SE 24 ST	SE 36 AV	SE 28 ST	Collector		0.00	0.00	4.74	0	0	0	0.00	0.55	0	0	5	0	0	7.5	0	0	7.5	12.5								
NW 40 AV	SR 40	NW 3 ST	Collector		0.00	0.00	3.74	0	0	0	0.00	0.08	2.49	0	5	0	0	5	0	0	5	12.49								
CR 329	COUNTY LINE	HWY 318	Collector	Yes	0.00	0.00	1.36	0	0	0	0.00	0.25	7.44	0	5	0	0	0	0	0	0	12.44								
CR 329	COUNTY LINE	HWY 318	Collector	Yes	0.00	0.00	0.74	0	0	0	0.00	0.25	7.44	0	5	0	0	0	0	0	0	12.44								
CR 329	COUNTY LINE	HWY 318	Collector	Yes	0.00	0.00	0.25	0	0	0	0.00	0.25	7.44	0	5	0	0	0	0	0	0	12.44								
CR 329	COUNTY LINE	HWY 318	Collector	Yes	0.00	0.00	0.74	0	0	0	0.00	0.25	7.44	0	5	0	0	0	0	0	0	12.44								
CR 329	COUNTY LINE	HWY 318	Collector	Yes	0.00	0.00	0.45	0	0	0	0.00	0.25	7.44	0	5	0	0	0	0	0	0	12.44								
CR 329	COUNTY LINE	HWY 318	Collector	Yes	0.00	0.00	1.34	0	0	0	0.00	0.25	7.44	0	5	0	0	0	0	0	0	12.44								
NE 95 ST	W ANTHONY RD	CR 200A	Collector	Yes	0.00	0.00	1.41	0	0	0	0.00	0.08	2.43	0	5	0	0	0	0	0	5	12.43								
SW 49 AV	SW 48 TER	SW 95 ST	Collector	Yes	0.00	0.00	5.13	0	0	0	0.00	0.24	7.32	0	0	0	0	0	0	2.5	5	12.32								
SW 80 AV	SW 103 ST	SR 200	Collector	Yes	0.00	0.00	4.48	0	0	0	0.00	0.16	4.8	0	5	0	0	0	0	2.5	5	12.3								
SW 740	SW 22 ST	SW 22 ST	Non-Regional (Local)		0.00	0.00	0.66	0	0	0	0.00	0.16	4.77	0	5	0	0	0	0	0	2.5	12.27								
SE 110 ST	SE 25 AV	CR 467	Collector	Yes	0.00	0.19	5.03	0	0	0	0.00	0.08	2.25	0	5	0	0	0	0	0	5	12.25								
SE 24 ST	SE 3 AV	CR 464A	Non-Regional (Unclassified)		0.00	0.00	1.64	0	0	0	0.00	0.24	7.17	0	0	0	0	0	0	0	5	12.17								
SE 108 TER RD	CR 25	SE 130 ST RD	Collector	Yes	0.21	0.41	1.34	0	2.5	5	5.0	0.07	2.07	0	5	0	0	0	0	0	0	12.07								
SE 147 PL	US 302	E OF SE 79 AVE	Collector	Yes	0.00	0.00	0.23	0	0	0	0.00	0.23	7.05	0	5	0	0	0	0	0	0	12.05								
SW 110 AV	SW 38 ST	SR 40	Non-Regional (Unclassified)		0.00	0.00	0.18	0	0	0	0.00	0.40	11.94	0	0	0	0	0	0	0	0	11.94								
SW 110 AV	SW 38 ST	SR 40	Non-Regional (Unclassified)		0.00	0.14	0.86	0	0	0	0.00	0.40	11.94	0	0	0	0	0	0	0	0	11.94								
CR 467	SE 150 ST	CR 475A	Collector	Yes	0.00	0.28	5.04	0	0	0	0.00	0.16	1.83	0	5	0	0	0	0	0	0	11.83								
SE 110 ST RD	W OF 83RD TER	OAK RD	Collector	Yes	0.43	0.43	3.02	0	5	5	5.0	0.06	1.83	0	5	0	0	0	0	0	0	11.83								
NW 100 ST	NE 14 AV	JACKSONVILLE RD	Collector	Yes	0.00	0.00	0.06	0	0	0	0.00	0.06	1.8	0	5	0	0	0	0	0	5	11.8								
SE 41 CT	SE 80 ST	SE 79 ST	Collector	Yes	0.00	0.00	6.52	0	0	0	0.00	0.23	6.75	0	5	0	0	0	0	0	0	11.75								
SE 464B	COUNTY LINE	US 27	Collector	Yes	0.00	0.00	2.63	0	0	0	0.00	0.22	6.63	0	5	0	0	0	0	0	0	11.63								
CR 464B	COUNTY LINE	US 27	Collector	Yes	0.14	0.27	1.49	0	2.5	0	0.00	0.22	6.63	0	5	0	0	0	0	0	0	11.63								
NE 36 AV	NE 101 ST	CR 329	Collector	Yes	0.00	0.00	0.64	0	0	0	0.00	0.05	1.5	0	5	0	0	0	0	0	5	11.5								
SE 100 AV	SE 136TH LN	SUNNY HARBOR RD	Collector	Yes	0.00	0.00	6.53	0	0	0	0.00	0.22	6.48	0	5	0	0	0	0	0	0	11.48								
CR 321	CR 335	COUNTY LINE	Collector	Yes	0.00	0.46	6.96	0	0	0	0.00	0.05	1.35	0	5	0	0	0	0	0	0	11.35								
CR 325	NW 83RD PL	NW 83RD PL	Collector	Yes	0.00	0.00	1.30	0	0	0	0.00	0.21	6.18	0	5	0	0	0	0	0	0	11.18								
NW 100 ST	HWY 252A	US 441	Collector	Yes	0.00	0.00	1.01	0	0	0	0.00	0.04	1.17	0	5	0	0	0	0	0	5	11.17								
NW 100 ST	HWY 252A	US 441	Collector	Yes	0.00	0.00	0.66	0	0	0	0.00	0.04	1.17	0	5	0	0	0	0	0	0	11.17								
NW 44 AV	NW 63RD ST	SR 326	Collector	Yes	0.00	0.00	5.56	0	0	0	0.00	0.20	6.09	0	5	0	0	0	0	0	0	11.09								
CR 464C	CR 25	SE 114TH ST RD	Collector	Yes	0.00	0.00	6.57	0	0	0	0.00	0.20	6.06	0	5	0	0	0	0	0	0	11.06								
CR 475	CR 475A	URBAN AREA BOUNDARY	Collector	Yes	0.00	0.00	1.15	0	0	0	0.00	0.20	5.97	0	5	0	0	0	0	0	0	10.97								
CR 475	CR 475A	URBAN AREA BOUNDARY	Collector	Yes	0.00	0.00	2.63	0	0	0	0.00	0.11	3.36	0	5	0	0	0	0	0	0	10.97								
SE 52 CT	SE 17 ST	E FORT KING ST	Non-Regional (Local)		0.00	0.00	1.40	0	0	0	0.00	0.03	0.84	0	5	0	0	0	0	5	0	10.84								
CR 42	SE 190TH AVE RD	CR 450	Collector	Yes	0.00	0.23	3.25	0	0	0	0.00	0.19	5.82	0	5	0	0	0	0	0	0	10.82								
CR 42	SE 190TH AVE RD	CR 450	Collector	Yes	0.00	0.00	0.00	0	0	0	0.00	0.19	5.82	0	5	0	0	0	0	0	0	10.82								
CR 42	SE 190TH AVE RD	CR 450	Collector	Yes	0.00	0.00	3.95	0	0	0	0.00	0.19	5.82	0	5	0	0	0	0	0	0	10.82								
CR 42	SE 190TH AVE RD	CR 450	Collector	Yes	0.00	0.00	0.99	0	0	0	0.00	0.19	5.82	0	5	0	0	0	0	0	0	10.82								
CR 42	SE 190TH AVE RD	CR 450	Collector	Yes	0.00	0.00	0.66	0	0	0	0.00	0.19	5.82	0	5	0	0	0	0	0	0	10.82								
NE 301 ST	1.1 MI E OF NE 38TH AVE	CR 314	Collector	Yes	0.14	0.42	2.48	0	2.5	0	0.00	0.14	4.78	0	5	0	0	0	0	0	0	10.78								
NW 3 ST	NW 40 AV	NW 38 AV	Collector	Yes	0.00	0.00	1.87	0	0	0	0.00	0.10	2.85	0	5	0	0	0	0	0	2.5	10.35								
SW 180 AV RD	CR 484	SW 177 AVE	Collector	Yes	0.00	0.00	1.50	0	0	0	0.00	0.17	5.1	0	5	0	0	0	0	0	0	10.1								
SW 180 AV RD	CR 484	SW 177 AVE	Collector	Yes	0.00	0.00	0.82	0	0	0	0.00	0.17	5.1	0	5	0	0	0	0	0	0	10.1								
SW 1	S MAGNOLIA AV	SE 1 AV	Non-Regional (Unclassified)		0.00	0.00	2.5	0	0	0	0.00	0.25	7.5	0	5	0	0	0	0	0	0	10								
SE 47 AV	CR 475A	CR 484	Non-Regional (Unclassified)		0.40	1.19	7.75	0	5	10	0.00	0.00	0	0	0	0	0	0	0	0	0	10								
SW 5 ST	S MAGNOLIA AV	SE 1 AV	Non-Regional (Unclassified)		0.00	0.00	23.82	2.5	0	0	2.5	0.00	0	0	0	0	0	0	0	0	7.5	10								
NE 44 AV	E FORT KING ST	CR 314	Non-Regional (Unclassified)		0.79	0.79	5.80	0	0	0	0.00	0.29	4.34	0	5	0	0	0	0	0	5	10								
SW 5 ST	US 441	S MAGNOLIA AV	Non-Regional (Unclassified)		0.00	0.00	43.98	2.5	0	0	2.5	0.00	0	0	0	0	0	0	0	7.5	0	10								
CR 464C	URBAN AREA BOUNDARY	CR 314A	Collector	Yes	0.23	0.23	4.53	0																						

Appendix B – Cost Estimates

Cost Estimate - US 27 from NW 70th Ave to I-75						
Project 1						
Project Length (mile) - 3.43						
Number of CCTV Cameras - 0						
Number of ATC Devices - 4						
Number of Radio Devices - 2						
Number of Bluetooth Devices - 3						

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT , F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	0.00	\$5.01	\$0.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	0.00	\$501.84	\$0.00
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	0.00	\$20,608.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.00	\$4,000.00	\$0.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	4	\$18,835.00	\$75,340.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	2.00	\$3,500.00	\$7,000.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	2.00	\$3,900.00	\$7,800.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	300.00	\$3.95	\$1,185.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	3.00	\$880.00	\$2,640.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	3.00	\$5,775.00	\$17,325.00
Total						\$111,290.00
10% Cost of MOT/Mobilization						\$11,129.00
10% Cost of Design						\$11,129.00
15% Cost of CEI						\$16,693.50
10% Cost of Contingency						\$11,129.00
Grand Total						\$161,370.50

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	0.00	\$1,500.00	\$0.00	
ATC MAINTENANCE	EA	per year	4.00	\$3,000.00	\$12,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	2.00	\$1,000.00	\$2,000.00	
BLUETOOTH MAINTENANCE	EA	per year	3.00	\$3,000.00	\$9,000.00	
Total						\$23,000.00

Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	3.40	\$187.50	\$637.50	
CCTV	EA	per year	0.00	\$192.00	\$0.00	
ATC	EA	per year	4.00	\$840.00	\$3,360.00	
WIRELESS ANTENNA	EA	per year	2.00	\$192.00	\$384.00	
BLUETOOTH	EA	per year	3.00	\$96.00	\$288.00	
Total						\$4,669.50
O&M (Per Year)					Total	\$27,669.50

Life Cycle Replacement Investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		3.00	\$880.00	\$2,640.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		3.00	\$5,775.00	\$17,325.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.00	\$4,000.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		2.00	\$3,900.00	\$7,800.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		2.00	\$3,500.00	\$7,000.00
Total						\$34,765.00
10% Cost of MOT/Mobilization						\$3,476.50
10% Cost of Design						\$3,476.50
15% Cost of CEI						\$5,214.75
10% Cost of Contingency						\$3,476.50
Grand Total						\$50,409.25

Cost Estimate - SR 40 from SR 35 to CR 314A

Project 2

Project Length (mile) - 10.93
 Number of CCTV Cameras - 1
 Number of ATC Devices - 4
 Number of Radio Devices - 0
 Number of Bluetooth Devices - 2

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT , F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	100.00	\$5.01	\$501.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	100.00	\$3.95	\$395.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	1.00	\$501.84	\$501.84
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	1.00	\$20,608.00	\$20,608.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	1.00	\$6,400.00	\$6,400.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.13	\$4,000.00	\$500.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	4	\$18,835.00	\$75,340.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	200.00	\$3.95	\$790.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	2.00	\$880.00	\$1,760.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	2.00	\$5,775.00	\$11,550.00
Total						\$118,345.84
10% Cost of MOT/Mobilization						\$11,834.58
10% Cost of Design						\$11,834.58
15% Cost of CEI						\$17,751.88
10% Cost of Contingency						\$11,834.58
Grand Total						\$171,601.47

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	1.00	\$1,500.00	\$1,500.00	
ATC MAINTENANCE	EA	per year	4.00	\$3,000.00	\$12,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00	
BLUETOOTH MAINTENANCE	EA	per year	2.00	\$3,000.00	\$6,000.00	
Total						\$19,500.00

Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	10.90	\$187.50	\$2,043.75	
CCTV	EA	per year	1.00	\$192.00	\$192.00	
ATC	EA	per year	4.00	\$840.00	\$3,360.00	
WIRELESS ANTENNA	EA	per year	0.00	\$192.00	\$0.00	
BLUETOOTH	EA	per year	2.00	\$96.00	\$192.00	
Total						\$5,787.75
O&M (Per Year)				Total	\$25,287.75	

Life Cycle Replacement Investment (TO BE DONE AT YEAR 10)						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
660-6-121	EA	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	2.00	\$880.00	\$1,760.00	
660-6-122	EA	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	2.00	\$5,775.00	\$11,550.00	
682-1-11	EA	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	1.00	\$6,400.00	\$6,400.00	
684-4-11	EA	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	0.13	\$4,000.00	\$500.00	
684-6-11	EA	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	0.00	\$3,900.00	\$0.00	
684-1-1	EA	ITS MANAGED FIELD ETHERNET SWITCH,F&I	0.00	\$3,500.00	\$0.00	
Total						\$20,210.00
10% Cost of MOT/Mobilization						\$2,021.00
10% Cost of Design						\$2,021.00
15% Cost of CEI						\$3,031.50
10% Cost of Contingency						\$2,021.00
Grand Total						\$29,304.50

**Cost Estimate - SR 326 from I-75 SR 200A
Project 3**

Project Length (mile) - 4.91
Number of CCTV Cameras - 1
Number of ATC Devices - 6
Number of Radio Devices - 5
Number of Bluetooth Devices - 2

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT, F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	100.00	\$5.01	\$501.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	100.00	\$3.95	\$395.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	1.00	\$501.84	\$501.84
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	1.00	\$20,608.00	\$20,608.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	1.00	\$6,400.00	\$6,400.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.13	\$4,000.00	\$500.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	6	\$18,835.00	\$113,010.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	5.00	\$3,500.00	\$17,500.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	5.00	\$3,900.00	\$19,500.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	200.00	\$3.95	\$790.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	2.00	\$880.00	\$1,760.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	2.00	\$5,775.00	\$11,550.00
Total						\$193,015.84
10% Cost of MOT/Mobilization						\$19,301.58
10% Cost of Design						\$19,301.58
15% Cost of CEI						\$28,952.38
10% Cost of Contingency						\$19,301.58
Grand Total						\$279,872.97

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	1.00	\$1,500.00	\$1,500.00	
ATC MAINTENANCE	EA	per year	6.00	\$3,000.00	\$18,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	5.00	\$1,000.00	\$5,000.00	
BLUETOOTH MAINTENANCE	EA	per year	2.00	\$3,000.00	\$6,000.00	
Total						\$30,500.00
Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	4.91	\$187.50	\$920.63	
CCTV	EA	per year	1.00	\$192.00	\$192.00	
ATC	EA	per year	6.00	\$840.00	\$5,040.00	
WIRELESS ANTENNA	EA	per year	5.00	\$192.00	\$960.00	
BLUETOOTH	EA	per year	2.00	\$96.00	\$192.00	
Total						\$7,304.63
O&M (Per Year)					Total	\$37,804.63

Life Cycle Replacement investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		2.00	\$880.00	\$1,760.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		2.00	\$5,775.00	\$11,550.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		1.00	\$6,400.00	\$6,400.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.13	\$4,000.00	\$500.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		5.00	\$3,900.00	\$19,500.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		5.00	\$3,500.00	\$17,500.00
Total						\$57,210.00
10% Cost of MOT/Mobilization						\$5,721.00
10% Cost of Design						\$5,721.00
15% Cost of CEI						\$8,581.50
10% Cost of Contingency						\$5,721.00
Grand Total						\$82,954.50

Cost Estimate - SR 200 from SR 484 to SR 464

Project 4

Project Length (mile) - 11.13
 Number of CCTV Cameras - 6
 Number of ATC Devices - 15
 Number of Radio Devices - 0
 Number of Bluetooth Devices - 1

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT , F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	600.00	\$5.01	\$3,006.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	600.00	\$3.95	\$2,370.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	6.00	\$501.84	\$3,011.04
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	6.00	\$20,608.00	\$123,648.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	6.00	\$6,400.00	\$38,400.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.75	\$4,000.00	\$3,000.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	15	\$18,835.00	\$282,525.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	100.00	\$3.95	\$395.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	1.00	\$5,775.00	\$5,775.00
Total						\$463,010.04
10% Cost of MOT/Mobilization						\$46,301.00
10% Cost of Design						\$46,301.00
15% Cost of CEI						\$69,451.51
10% Cost of Contingency						\$46,301.00
Grand Total						\$671,364.56

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	6.00	\$1,500.00	\$9,000.00	
ATC MAINTENANCE	EA	per year	15.00	\$3,000.00	\$45,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00	
BLUETOOTH MAINTENANCE	EA	per year	1.00	\$3,000.00	\$3,000.00	
Total						\$57,000.00

Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	11.10	\$187.50	\$2,081.25	
CCTV	EA	per year	6.00	\$192.00	\$1,152.00	
ATC	EA	per year	15.00	\$840.00	\$12,600.00	
WIRELESS ANTENNA	EA	per year	0.00	\$192.00	\$0.00	
BLUETOOTH	EA	per year	1.00	\$96.00	\$96.00	
Total						\$15,929.25
O&M (Per Year)				Total	\$72,929.25	

Life Cycle Replacement investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		1.00	\$5,775.00	\$5,775.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		6.00	\$6,400.00	\$38,400.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.75	\$4,000.00	\$3,000.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$48,055.00
10% Cost of MOT/Mobilization						\$4,805.50
10% Cost of Design						\$4,805.50
15% Cost of CEI						\$7,208.25
10% Cost of Contingency						\$4,805.50
Grand Total						\$69,679.75

**Cost Estimate - US 301/US 441 from SE 165th St to SR 464
Project 5**

Project Length (mile) - 16.04
Number of CCTV Cameras - 0
Number of ATC Devices - 19
Number of Radio Devices - 0
Number of Bluetooth Devices - 3

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT , F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	0.00	\$5.01	\$0.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	0.00	\$501.84	\$0.00
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	0.00	\$20,608.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.00	\$4,000.00	\$0.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	19	\$18,835.00	\$357,865.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	300.00	\$3.95	\$1,185.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	3.00	\$880.00	\$2,640.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	3.00	\$5,775.00	\$17,325.00
Total						\$379,015.00
10% Cost of MOT/Mobilization						\$37,901.50
10% Cost of Design						\$37,901.50
15% Cost of CEI						\$56,852.25
10% Cost of Contingency						\$37,901.50
Grand Total						\$549,571.75

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	0.00	\$1,500.00	\$0.00	
ATC MAINTENANCE	EA	per year	19.00	\$3,000.00	\$57,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00	
BLUETOOTH MAINTENANCE	EA	per year	3.00	\$3,000.00	\$9,000.00	
Total						\$66,000.00
Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	16.00	\$187.50	\$3,000.00	
CCTV	EA	per year	0.00	\$192.00	\$0.00	
ATC	EA	per year	19.00	\$840.00	\$15,960.00	
WIRELESS ANTENNA	EA	per year	0.00	\$192.00	\$0.00	
BLUETOOTH	EA	per year	3.00	\$96.00	\$288.00	
Total						\$19,248.00
O&M (Per Year)				Total	\$85,248.00	

Life Cycle Replacement Investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		3.00	\$880.00	\$2,640.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		3.00	\$5,775.00	\$17,325.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.00	\$4,000.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$19,965.00
10% Cost of MOT/Mobilization						\$1,996.50
10% Cost of Design						\$1,996.50
15% Cost of CEI						\$2,994.75
10% Cost of Contingency						\$1,996.50
Grand Total						\$28,949.25

**Cost Estimate - US 301 from NW 35th St to SR 326
Project 6**

Project Length (mile) - 2.55
Number of CCTV Cameras - 1
Number of ATC Devices - 0
Number of Radio Devices - 1
Number of Bluetooth Devices - 0

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT , F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	100.00	\$5.01	\$501.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	100.00	\$3.95	\$395.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	1.00	\$501.84	\$501.84
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	1.00	\$20,608.00	\$20,608.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	1.00	\$6,400.00	\$6,400.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.13	\$4,000.00	\$500.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	0	\$18,835.00	\$0.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	1.00	\$3,500.00	\$3,500.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	1.00	\$3,900.00	\$3,900.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	0.00	\$5,775.00	\$0.00
Total						\$36,305.84
10% Cost of MOT/Mobilization						\$3,630.58
10% Cost of Design						\$3,630.58
15% Cost of CEI						\$5,445.88
10% Cost of Contingency						\$3,630.58
Grand Total						\$52,643.47

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	1.00	\$1,500.00	\$1,500.00	
ATC MAINTENANCE	EA	per year	0.00	\$3,000.00	\$0.00	
WIRELESS RADIO MAINTENANCE	EA	per year	1.00	\$1,000.00	\$1,000.00	
BLUETOOTH MAINTENANCE	EA	per year	0.00	\$3,000.00	\$0.00	
Total						\$2,500.00
Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	2.60	\$187.50	\$487.50	
CCTV	EA	per year	1.00	\$192.00	\$192.00	
ATC	EA	per year	0.00	\$840.00	\$0.00	
WIRELESS ANTENNA	EA	per year	1.00	\$192.00	\$192.00	
BLUETOOTH	EA	per year	0.00	\$96.00	\$0.00	
Total						\$871.50
O&M (Per Year)				Total	\$3,371.50	

Life Cycle Replacement Investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		0.00	\$5,775.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		1.00	\$6,400.00	\$6,400.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.13	\$4,000.00	\$500.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		1.00	\$3,900.00	\$3,900.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		1.00	\$3,500.00	\$3,500.00
Total						\$14,300.00
10% Cost of MOT/Mobilization						\$1,430.00
10% Cost of Design						\$1,430.00
15% Cost of CEI						\$2,145.00
10% Cost of Contingency						\$1,430.00
Grand Total						\$20,735.00

**Cost Estimate - SR 40 from Hwy 328 to SW 27th Ave
Project 7**

Project Length (mile) - 8.71
Number of CCTV Cameras - 1
Number of ATC Devices - 3
Number of Radio Devices - 3
Number of Bluetooth Devices - 1

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT, F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	100.00	\$5.01	\$501.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	100.00	\$3.95	\$395.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	1.00	\$501.84	\$501.84
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	1.00	\$20,608.00	\$20,608.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	1.00	\$6,400.00	\$6,400.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.13	\$4,000.00	\$500.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	3	\$18,835.00	\$56,505.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	3.00	\$3,500.00	\$10,500.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	3.00	\$3,900.00	\$11,700.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	100.00	\$3.95	\$395.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	1.00	\$5,775.00	\$5,775.00
Total						\$114,660.84
10% Cost of MOT/Mobilization						\$11,466.08
10% Cost of Design						\$11,466.08
15% Cost of CEI						\$17,199.13
10% Cost of Contingency						\$11,466.08
Grand Total						\$166,258.22

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	1.00	\$1,500.00	\$1,500.00	
ATC MAINTENANCE	EA	per year	3.00	\$3,000.00	\$9,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	3.00	\$1,000.00	\$3,000.00	
BLUETOOTH MAINTENANCE	EA	per year	1.00	\$3,000.00	\$3,000.00	
Total						\$16,500.00
Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	8.70	\$187.50	\$1,631.25	
CCTV	EA	per year	1.00	\$192.00	\$192.00	
ATC	EA	per year	3.00	\$840.00	\$2,520.00	
WIRELESS ANTENNA	EA	per year	3.00	\$192.00	\$576.00	
BLUETOOTH	EA	per year	1.00	\$96.00	\$96.00	
Total						\$5,015.25
O&M (Per Year)					Total	\$21,515.25

Life Cycle Replacement Investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		1.00	\$5,775.00	\$5,775.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		1.00	\$6,400.00	\$6,400.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.13	\$4,000.00	\$500.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$13,555.00
10% Cost of MOT/Mobilization						\$1,355.50
10% Cost of Design						\$1,355.50
15% Cost of CEI						\$2,033.25
10% Cost of Contingency						\$1,355.50
Grand Total						\$19,654.75

**Cost Estimate - SR 40 from NE 1st Ave to SE 25th Ave
Project 8**

Project Length (mile) - 1.98
Number of CCTV Cameras - 4
Number of ATC Devices - 0
Number of Radio Devices - 0
Number of Bluetooth Devices - 0

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT , F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	400.00	\$5.01	\$2,004.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	400.00	\$3.95	\$1,580.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	4.00	\$501.84	\$2,007.36
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	4.00	\$20,608.00	\$82,432.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	4.00	\$6,400.00	\$25,600.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.50	\$4,000.00	\$2,000.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	0	\$18,835.00	\$0.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	0.00	\$5,775.00	\$0.00
Total						\$115,623.36
10% Cost of MOT/Mobilization						\$11,562.34
10% Cost of Design						\$11,562.34
15% Cost of CEI						\$17,343.50
10% Cost of Contingency						\$11,562.34
Grand Total						\$167,653.87

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	4.00	\$1,500.00	\$6,000.00	
ATC MAINTENANCE	EA	per year	0.00	\$3,000.00	\$0.00	
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00	
BLUETOOTH MAINTENANCE	EA	per year	0.00	\$3,000.00	\$0.00	
Total						\$6,000.00

Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	2.00	\$187.50	\$375.00	
CCTV	EA	per year	4.00	\$192.00	\$768.00	
ATC	EA	per year	0.00	\$840.00	\$0.00	
WIRELESS ANTENNA	EA	per year	0.00	\$192.00	\$0.00	
BLUETOOTH	EA	per year	0.00	\$96.00	\$0.00	
Total						\$1,143.00
O&M (Per Year)					Total	\$7,143.00

Life Cycle Replacement investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		0.00	\$5,775.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		4.00	\$6,400.00	\$25,600.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.50	\$4,000.00	\$2,000.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$27,600.00
10% Cost of MOT/Mobilization						\$2,760.00
10% Cost of Design						\$2,760.00
15% Cost of CEI						\$4,140.00
10% Cost of Contingency						\$2,760.00
Grand Total						\$40,020.00

Cost Estimate - Magnolia Ave from NE 20th St to SR 200A

Project 9

Project Length (mile) - 1.42
 Number of CCTV Cameras - 6
 Number of ATC Devices - 18
 Number of Radio Devices - 0
 Number of Bluetooth Devices - 0

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT, F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	600.00	\$5.01	\$3,006.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	600.00	\$3.95	\$2,370.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	6.00	\$501.84	\$3,011.04
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	6.00	\$20,608.00	\$123,648.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	6.00	\$6,400.00	\$38,400.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.75	\$4,000.00	\$3,000.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	18	\$18,835.00	\$339,030.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	0.00	\$5,775.00	\$0.00
Total						\$512,465.04
10% Cost of MOT/Mobilization						\$51,246.50
10% Cost of Design						\$51,246.50
15% Cost of CEI						\$76,869.76
10% Cost of Contingency						\$51,246.50
Grand Total						\$743,074.31

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	6.00	\$1,500.00	\$9,000.00	
ATC MAINTENANCE	EA	per year	18.00	\$3,000.00	\$54,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00	
BLUETOOTH MAINTENANCE	EA	per year	0.00	\$3,000.00	\$0.00	
Total						\$63,000.00
Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	1.40	\$187.50	\$262.50	
CCTV	EA	per year	6.00	\$192.00	\$1,152.00	
ATC	EA	per year	18.00	\$840.00	\$15,120.00	
WIRELESS ANTENNA	EA	per year	0.00	\$192.00	\$0.00	
BLUETOOTH	EA	per year	0.00	\$96.00	\$0.00	
Total						\$16,534.50
O&M (Per Year)					Total	\$79,534.50

Life Cycle Replacement Investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		0.00	\$5,775.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		6.00	\$6,400.00	\$38,400.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.75	\$4,000.00	\$3,000.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$41,400.00
10% Cost of MOT/Mobilization						\$4,140.00
10% Cost of Design						\$4,140.00
15% Cost of CEI						\$6,210.00
10% Cost of Contingency						\$4,140.00
Grand Total						\$60,030.00

Cost Estimate - SR 464 from SR 200 to Oak Rd	
Project 10	
Project Length (mile) - 12.07	
Number of CCTV Cameras - 2	
Number of ATC Devices - 24	
Number of Radio Devices - 0	
Number of Bluetooth Devices - 0	

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT , F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	200.00	\$5.01	\$1,002.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	200.00	\$3.95	\$790.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	2.00	\$501.84	\$1,003.68
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	2.00	\$20,608.00	\$41,216.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	2.00	\$6,400.00	\$12,800.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.25	\$4,000.00	\$1,000.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	24	\$18,835.00	\$452,040.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	0.00	\$5,775.00	\$0.00
Total						\$509,851.68
10% Cost of MOT/Mobilization						\$50,985.17
10% Cost of Design						\$50,985.17
15% Cost of CEI						\$76,477.75
10% Cost of Contingency						\$50,985.17
Grand Total						\$739,284.94

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	2.00	\$1,500.00	\$3,000.00	
ATC MAINTENANCE	EA	per year	24.00	\$3,000.00	\$72,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00	
BLUETOOTH MAINTENANCE	EA	per year	0.00	\$3,000.00	\$0.00	
Total						\$75,000.00

Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	12.10	\$187.50	\$2,268.75	
CCTV	EA	per year	2.00	\$192.00	\$384.00	
ATC	EA	per year	24.00	\$840.00	\$20,160.00	
BLUETOOTH	EA	per year	0.00	\$96.00	\$0.00	
WIRELESS ANTENNA	EA	per year	0.00	\$192.00	\$0.00	
Total						\$22,812.75

O&M (Per Year)	Total	\$97,812.75
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Life Cycle Replacement investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		0.00	\$5,775.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		2.00	\$6,400.00	\$12,800.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.25	\$4,000.00	\$1,000.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$13,800.00
10% Cost of MOT/Mobilization						\$1,380.00
10% Cost of Design						\$1,380.00
15% Cost of CEI						\$2,070.00
10% Cost of Contingency						\$1,380.00
Grand Total						\$20,010.00

Cost Estimate - SE 36th St from SR 464 to SR 40	
Project 11	
Project Length (mile) - 2.73	
Number of CCTV Cameras - 3	
Number of ATC Devices - 5	
Number of Radio Devices - 0	
Number of Bluetooth Devices - 0	

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT , F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	300.00	\$5.01	\$1,503.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	300.00	\$3.95	\$1,185.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	3.00	\$501.84	\$1,505.52
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	3.00	\$20,608.00	\$61,824.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	3.00	\$6,400.00	\$19,200.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.38	\$4,000.00	\$1,500.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	5	\$18,835.00	\$94,175.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	0.00	\$5,775.00	\$0.00
Total						\$180,892.52
10% Cost of MOT/Mobilization						\$18,089.25
10% Cost of Design						\$18,089.25
15% Cost of CEI						\$27,133.88
10% Cost of Contingency						\$18,089.25
Grand Total						\$262,294.15

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	3.00	\$1,500.00	\$4,500.00	
ATC MAINTENANCE	EA	per year	5.00	\$3,000.00	\$15,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00	
BLUETOOTH MAINTENANCE	EA	per year	0.00	\$3,000.00	\$0.00	
Total						\$19,500.00

Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	2.70	\$187.50	\$506.25	
CCTV	EA	per year	3.00	\$192.00	\$576.00	
ATC	EA	per year	5.00	\$840.00	\$4,200.00	
BLUETOOTH	EA	per year	0.00	\$192.00	\$0.00	
WIRELESS ANTENNA	EA	per year	0.00	\$96.00	\$0.00	
Total						\$5,282.25
O&M (Per Year)					Total	\$24,782.25

Life Cycle Replacement Investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		0.00	\$5,775.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		3.00	\$6,400.00	\$19,200.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.38	\$4,000.00	\$1,500.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$20,700.00
10% Cost of MOT/Mobilization						\$2,070.00
10% Cost of Design						\$2,070.00
15% Cost of CEI						\$3,105.00
10% Cost of Contingency						\$2,070.00
Grand Total						\$30,015.00

**Cost Estimate - NW 35th St from NW 35th Ave Rd to NE 36th Ave
Project 12**

Project Length (mile) - 5.45
Number of CCTV Cameras - 0
Number of ATC Devices - 5
Number of Radio Devices - 4
Number of Bluetooth Devices - 0

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT , F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	0.00	\$5.01	\$0.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	0.00	\$501.84	\$0.00
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	0.00	\$20,608.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.00	\$4,000.00	\$0.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	5	\$18,835.00	\$94,175.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	4.00	\$3,500.00	\$14,000.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	4.00	\$3,900.00	\$15,600.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	0.00	\$5,775.00	\$0.00
Total						\$123,775.00
10% Cost of MOT/Mobilization						\$12,377.50
10% Cost of Design						\$12,377.50
15% Cost of CEI						\$18,566.25
10% Cost of Contingency						\$12,377.50
Grand Total						\$179,473.75

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	0.00	\$1,500.00	\$0.00	
ATC MAINTENANCE	EA	per year	5.00	\$3,000.00	\$15,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	4.00	\$1,000.00	\$4,000.00	
BLUETOOTH MAINTENANCE	EA	per year	0.00	\$3,000.00	\$0.00	
Total						\$19,000.00
Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	5.50	\$187.50	\$1,031.25	
CCTV	EA	per year	0.00	\$192.00	\$0.00	
ATC	EA	per year	5.00	\$840.00	\$4,200.00	
WIRELESS ANTENNA	EA	per year	4.00	\$192.00	\$768.00	
BLUETOOTH	EA	per year	0.00	\$96.00	\$0.00	
Total						\$5,999.25
O&M (Per Year)				Total	\$24,999.25	

Life Cycle Replacement investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		0.00	\$5,775.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.00	\$4,000.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		4.00	\$3,900.00	\$15,600.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		4.00	\$3,500.00	\$14,000.00
Total						\$29,600.00
10% Cost of MOT/Mobilization						\$2,960.00
10% Cost of Design						\$2,960.00
15% Cost of CEI						\$4,440.00
10% Cost of Contingency						\$2,960.00
Grand Total						\$42,920.00

Cost Estimate - SR 200A from US 301 to NE 49th St

Project 13

Project Length (mile) - 2.83

Number of CCTV Cameras - 3

Number of ATC Devices - 4

Number of Radio Devices - 0

Number of Bluetooth Devices - 1

Capital Investment

Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT, F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	300.00	\$5.01	\$1,503.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	300.00	\$3.95	\$1,185.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	3.00	\$501.84	\$1,505.52
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	3.00	\$20,608.00	\$61,824.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	3.00	\$6,400.00	\$19,200.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.38	\$4,000.00	\$1,500.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	4	\$18,835.00	\$75,340.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	100.00	\$3.95	\$395.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	1.00	\$5,775.00	\$5,775.00
Total						\$169,107.52
10% Cost of MOT/Mobilization						\$16,910.75
10% Cost of Design						\$16,910.75
15% Cost of CEI						\$25,366.13
10% Cost of Contingency						\$16,910.75
Grand Total						\$245,205.90

Maintenance

Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV MAINTENANCE	EA	per year	3.00	\$1,500.00	\$4,500.00
ATC MAINTENANCE	EA	per year	4.00	\$3,000.00	\$12,000.00
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00
BLUETOOTH MAINTENANCE	EA	per year	1.00	\$3,000.00	\$3,000.00
Total					\$19,500.00

Operations

Description	Unit	Notes	Quantities	Unit Price	Total Price
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	2.80	\$187.50	\$525.00
CCTV	EA	per year	3.00	\$192.00	\$576.00
ADMS	EA	per year	4.00	\$840.00	\$3,360.00
WIRELESS ANTENNA	EA	per year	0.00	\$192.00	\$0.00
BLEUTOOTH	EA	per year	1.00	\$96.00	\$96.00
Total					\$4,557.00
O&M (Per Year)				Total	\$24,057.00

Life Cycle Replacement investment (TO BE DONE AT YEAR 10)

Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		1.00	\$5,775.00	\$5,775.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		3.00	\$6,400.00	\$19,200.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.38	\$4,000.00	\$1,500.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$27,355.00
10% Cost of MOT/Mobilization						\$2,735.50
10% Cost of Design						\$2,735.50
15% Cost of CEI						\$4,103.25
10% Cost of Contingency						\$2,735.50
Grand Total						\$39,664.75

Cost Estimate - SW 42nd St from SR 200 to SR 464

Project 14

Project Length (mile) - 7.00

Number of CCTV Cameras - 2

Number of ATC Devices - 6

Number of Radio Devices - 0

Number of Bluetooth Devices - 1

Capital Investment

Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT , F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	200.00	\$5.01	\$1,002.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	200.00	\$3.95	\$790.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	2.00	\$501.84	\$1,003.68
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	2.00	\$20,608.00	\$41,216.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	2.00	\$6,400.00	\$12,800.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.25	\$4,000.00	\$1,000.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	6	\$18,835.00	\$113,010.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	100.00	\$3.95	\$395.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	1.00	\$5,775.00	\$5,775.00
Total						\$177,871.68
10% Cost of MOT/Mobilization						\$17,787.17
10% Cost of Design						\$17,787.17
15% Cost of CEI						\$26,680.75
10% Cost of Contingency						\$17,787.17
Grand Total						\$257,913.94

Maintenance

Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV MAINTENANCE	EA	per year	3.00	\$1,500.00	\$4,500.00
ATC MAINTENANCE	EA	per year	4.00	\$3,000.00	\$12,000.00
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00
BLUETOOTH MAINTENANCE	EA	per year	1.00	\$3,000.00	\$3,000.00
Total					\$19,500.00

Operations

Description	Unit	Notes	Quantities	Unit Price	Total Price
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	7.00	\$187.50	\$1,312.50
CCTV	EA	per year	2.00	\$192.00	\$384.00
ADMS	EA	per year	6.00	\$840.00	\$5,040.00
WIRELESS ANTENNA	EA	per year	0.00	\$192.00	\$0.00
BLUETOOTH	EA	per year	1.00	\$96.00	\$96.00
Total					\$6,832.50
O&M (Per Year)				Total	\$26,332.50

Life Cycle Replacement Investment (TO BE DONE AT YEAR 10)

Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		1.00	\$5,775.00	\$5,775.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		2.00	\$6,400.00	\$12,800.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.25	\$4,000.00	\$1,000.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$20,455.00
10% Cost of MOT/Mobilization						\$2,045.50
10% Cost of Design						\$2,045.50
15% Cost of CEI						\$3,068.25
10% Cost of Contingency						\$2,045.50
Grand Total						\$29,659.75

Cost Estimate - SR 484 from Marion Oaks Course to US 441

Project 15

Project Length (mile) - 10.61
 Number of CCTV Cameras - 0
 Number of ATC Devices - 11
 Number of Radio Devices - 0
 Number of Bluetooth Devices - 2

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT, F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	0.00	\$5.01	\$0.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	0.00	\$501.84	\$0.00
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	0.00	\$20,608.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.00	\$4,000.00	\$0.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	11	\$18,835.00	\$207,185.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	200.00	\$3.95	\$790.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	2.00	\$880.00	\$1,760.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	2.00	\$5,775.00	\$11,550.00
Total						\$221,285.00
10% Cost of MOT/Mobilization						\$22,128.50
10% Cost of Design						\$22,128.50
15% Cost of CEI						\$33,192.75
10% Cost of Contingency						\$22,128.50
Grand Total						\$320,863.25

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	0.00	\$1,500.00	\$0.00	
ATC MAINTENANCE	EA	per year	11.00	\$3,000.00	\$33,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00	
BLUETOOTH MAINTENANCE	EA	per year	2.00	\$3,000.00	\$6,000.00	
Total						\$39,000.00

Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	10.60	\$187.50	\$1,987.50	
CCTV	EA	per year	0.00	\$192.00	\$0.00	
ATC	EA	per year	11.00	\$840.00	\$9,240.00	
WIRELESS ANTENNA	EA	per year	0.00	\$192.00	\$0.00	
BLUETOOTH	EA	per year	2.00	\$96.00	\$192.00	
Total						\$11,419.50
O&M (Per Year)				Total	\$50,419.50	

Life Cycle Replacement Investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		2.00	\$880.00	\$1,760.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		2.00	\$5,775.00	\$11,550.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.00	\$4,000.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$13,310.00
10% Cost of MOT/Mobilization						\$1,331.00
10% Cost of Design						\$1,331.00
15% Cost of CEI						\$1,996.50
10% Cost of Contingency						\$1,331.00
Grand Total						\$19,299.50

Cost Estimate - Hwy 42 from US 301 to US 441	
Project 16	
Project Length (mile) - 3.26	
Number of CCTV Cameras - 0	
Number of ATC Devices - 4	
Number of Radio Devices - 5	
Number of Bluetooth Devices - 1	

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT, F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	0.00	\$5.01	\$0.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	0.00	\$501.84	\$0.00
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	0.00	\$20,608.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.00	\$4,000.00	\$0.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	4	\$18,835.00	\$75,340.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	5.00	\$3,500.00	\$17,500.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	5.00	\$3,900.00	\$19,500.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	100.00	\$3.95	\$395.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	1.00	\$5,775.00	\$5,775.00
Total						\$119,390.00
10% Cost of MOT/Mobilization						\$11,939.00
10% Cost of Design						\$11,939.00
15% Cost of CEI						\$17,908.50
10% Cost of Contingency						\$11,939.00
Grand Total						\$173,115.50

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	0.00	\$1,500.00	\$0.00	
ATC MAINTENANCE	EA	per year	4.00	\$3,000.00	\$12,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	5.00	\$1,000.00	\$5,000.00	
BLUETOOTH MAINTENANCE	EA	per year	1.00	\$3,000.00	\$3,000.00	
Total						\$20,000.00

Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	3.30	\$187.50	\$618.75	
CCTV	EA	per year	0.00	\$192.00	\$0.00	
ATC	EA	per year	4.00	\$840.00	\$3,360.00	
WIRELESS ANTENNA	EA	per year	5.00	\$192.00	\$960.00	
BLUETOOTH	EA	per year	1.00	\$96.00	\$96.00	
Total						\$5,034.75

O&M (Per Year)	Total	\$25,034.75
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Life Cycle Replacement Investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		1.00	\$5,775.00	\$5,775.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.00	\$4,000.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$6,655.00
10% Cost of MOT/Mobilization						\$665.50
10% Cost of Design						\$665.50
15% Cost of CEI						\$998.25
10% Cost of Contingency						\$665.50
Grand Total						\$9,649.75

Cost Estimate - SW 27th Ave from SW 42nd St to SR 464

Project 17

Project Length (mile) - 2.15

Number of CCTV Cameras - 0

Number of ATC Devices - 4

Number of Radio Devices - 0

Number of Bluetooth Devices - 0

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT, F&I, OPEN TRENCH	LF	2-1.25" and 1-2", 100 LF per device	0.00	\$5.01	\$0.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	0.00	\$501.84	\$0.00
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	0.00	\$20,608.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.00	\$4,000.00	\$0.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	4	\$18,835.00	\$75,340.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	0.00	\$5,775.00	\$0.00
Total						\$75,340.00
10% Cost of MOT/Mobilization						\$7,534.00
10% Cost of Design						\$7,534.00
15% Cost of CEI						\$11,301.00
10% Cost of Contingency						\$7,534.00
Grand Total						\$109,243.00

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	0.00	\$1,500.00	\$0.00	
ATC MAINTENANCE	EA	per year	4.00	\$3,000.00	\$12,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00	
BLUETOOTH MAINTENANCE	EA	per year	0.00	\$3,000.00	\$0.00	
Total						\$12,000.00

Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	2.20	\$187.50	\$412.50	
CCTV	EA	per year	0.00	\$192.00	\$0.00	
ATC	EA	per year	4.00	\$840.00	\$3,360.00	
WIRELESS ANTENNA	EA	per year	0.00	\$192.00	\$0.00	
BLUETOOTH	EA	per year	0.00	\$96.00	\$0.00	
Total						\$3,772.50
O&M (Per Year)				Total	\$15,772.50	

Life Cycle Replacement Investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		0.00	\$880.00	\$0.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		0.00	\$5,775.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.00	\$4,000.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$0.00
10% Cost of MOT/Mobilization						\$0.00
10% Cost of Design						\$0.00
15% Cost of CEI						\$0.00
10% Cost of Contingency						\$0.00
Grand Total						\$0.00

Cost Estimate - SW 20th St to NW 60th Ave to SR 200

Project 18

Project Length (mile) - 3.12

Number of CCTV Cameras - 0

Number of ATC Devices - 5

Number of Radio Devices - 0

Number of Bluetooth Devices - 1

Capital Investment						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
CCTV Equipment						
630-2-11	CONDUIT , F&I, OPEN TRENCH	LF	2-1.25" and 1-2"	0.00	\$5.01	\$0.00
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	0.00	\$3.95	\$0.00
635-2-11	ITS PULL AND JUNCTION BOX,F&I	LF	1 per each Pole	0.00	\$501.84	\$0.00
641-3-163	CONCRETE CCTV POLE, FURNISH & INSTALL WITH LOWERING DEVICE, 63'	EA	1 per each device as needed	0.00	\$20,608.00	\$0.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA	1 per location	0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA	1 per 8 CCTV	0.00	\$4,000.00	\$0.00
ATC Equipment						
670-5-150	TRAFFIC CONTROLLER ASSEMBLY (CONTROLLER WITH CABINET)	EA	1 per location	5	\$18,835.00	\$94,175.00
Wireless Radio Equipment						
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA	1 per location	0.00	\$3,500.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA	1 per location	0.00	\$3,900.00	\$0.00
Bluetooth Equipment						
633-8-1	ITS MULT-CONDUCTOR COMMUNICATION CABLE,F&I	LF	100 LF per device	100.00	\$3.95	\$395.00
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA	1 per location	1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA	1 per location	1.00	\$5,775.00	\$5,775.00
Total						\$101,225.00
10% Cost of MOT/Mobilization						\$10,122.50
10% Cost of Design						\$10,122.50
15% Cost of CEI						\$15,183.75
10% Cost of Contingency						\$10,122.50
Grand Total						\$146,776.25

Maintenance						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
CCTV MAINTENANCE	EA	per year	0.00	\$1,500.00	\$0.00	
ATC MAINTENANCE	EA	per year	5.00	\$3,000.00	\$15,000.00	
WIRELESS RADIO MAINTENANCE	EA	per year	0.00	\$1,000.00	\$0.00	
BLUETOOTH MAINTENANCE	EA	per year	1.00	\$3,000.00	\$3,000.00	
Total						\$18,000.00
Operations						
Description	Unit	Notes	Quantities	Unit Price	Total Price	
DATA MANAGEMENT	EA	Per Center Mile * 1 Years	3.10	\$187.50	\$581.25	
CCTV	EA	per year	0.00	\$192.00	\$0.00	
ATC	EA	per year	5.00	\$840.00	\$4,200.00	
WIRELESS ANTENNA	EA	per year	0.00	\$192.00	\$0.00	
BLUETOOTH	EA	per year	1.00	\$96.00	\$96.00	
Total						\$4,877.25
O&M (Per Year)					Total	\$22,877.25

Life Cycle Replacement investment (TO BE DONE AT YEAR 10)						
Pay Item No.	Description	Unit	Notes	Quantities	Unit Price	Total Price
660-6-121	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH, CAB. EQUIP.	EA		1.00	\$880.00	\$880.00
660-6-122	ITS VEHICLE DETECT. SYSTEM,F&I, BLUETOOTH ABOVE GND EQUIP	EA		1.00	\$5,775.00	\$5,775.00
682-1-11	ITS CCTV CAMERA,F&I DOME ENCLOSURE,PRESSURIZED	EA		0.00	\$6,400.00	\$0.00
684-4-11	ITS DIGITAL VIDEO ENCODER,F&I,W/HARDENED DECODER	EA		0.00	\$4,000.00	\$0.00
684-6-11	WIRELESS COMM DEVICE, F&I, ETHERNET ACCESS POINT	EA		0.00	\$3,900.00	\$0.00
684-1-1	ITS MANAGED FIELD ETHERNET SWITCH,F&I	EA		0.00	\$3,500.00	\$0.00
Total						\$6,655.00
10% Cost of MOT/Mobilization						\$665.50
10% Cost of Design						\$665.50
15% Cost of CEI						\$998.25
10% Cost of Contingency						\$665.50
Grand Total						\$9,649.75