TAMPA BAY EXPRESS
REGIONAL CONCEPT FOR TRANSPORTATION OPERATIONS


March 2017

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LIST OF ACRONYMS

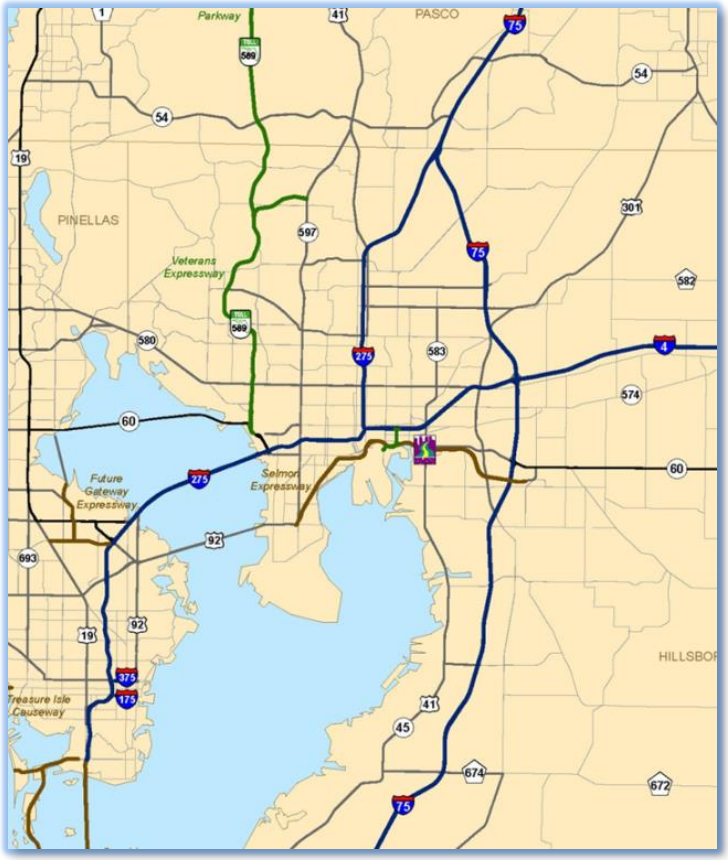
CCTV	Closed-Circuit Television
DMS	Dynamic Message Signs
EL	Express Lane
FAC	Florida Administrative Code
FAST	Fixing America's Surface Transportation Act
FCC	Federal Communications Commission
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
FLP	Freight, Logistics, and Passengers Operations
FTE	Florida's Turnpike Enterprise
GTR	General Tolling Requirements
GTL	General Toll Lane
GUL	General Use Lane
HART	Hillsborough Area Regional Transit
HOV	High Occupancy Vehicle
ITS	Intelligent Transportation System
ITS-FM	ITS Facilities Management
LOS	Level of Service
MAP-21	Moving Ahead for Progress in the 21st Century
MPO	Metropolitan Planning Organization
MUTCD	Manual on Uniform Traffic Control Devices
MVDS	Microwave Vehicle Detection System
NEPA	National Environmental Policy Act
PD&E	Project Development and Environmental
PIO	Public Information Officer
PM	Project Manager

LIST OF ACRONYMS (CONT.)

PPM	Plans Preparation Manual
PSTA	Pinellas Suncoast Transit Authority
RCTO	Regional Concept for Transportation Operations
REL	Reversible Express Lane
RITSA	Regional ITS Architecture
ROD	Record of Decision
ROW	Right-of-Way
RTMC	Regional Transportation Management Center
RTVM	Requirements Traceability Verification Matrix
SHS	State Highway System
SIS	Strategic Intermodal System
SOP	Standard Operating Procedures
TBARTA	Tampa Bay Area Regional Transportation Authority
TBPM	Tampa Bay Regional Planning Model
TBPM-ML	Tampa Bay Regional Planning Model for Managed Lanes
TBX	Tampa Bay Express
TEA	Tampa-Hillsborough Expressway Authority
TIP	Transportation Improvement Plan
TPPPH	Turnpike Plans Preparation and Practices Handbook
TSM&O	Transportation Systems Management and Operations
TTI	Travel Time Index

1 INTRODUCTION

Addressing the need to provide mobility choices along the transportation system is a key component of federal and Florida transportation policies and legislation. Previously, the Moving Ahead for Progress in the 21st Century (MAP-21) Act provided authority for states and regions to toll along the interstate system. While there are some limitations to applying tolls, there are now over 30 Express Lane (EL) projects open to traffic along US interstates and highways. With the recently signed Fixing America's Surface Transportation (FAST) Act, this authority has been continued largely due to the success of these projects as solutions to help effectively manage congestion.



Source: Tampa Bay Region Interstate Network

Managed lanes are defined as "highway facilities or sets of lanes within an existing highway facility where operational strategies (such as access control and pricing) are proactively implemented and managed in response to changing conditions with a combination of tools." ELs are "a type of managed travel lane physically separated from a general use lane (GUL) or general toll lane (GTL) within a roadway corridor. ELs use dynamic pricing through electronic tolling in which toll amounts are set based on traffic conditions." ELs are actively managed to respond to changing traffic demands with the goal of:

- Offering driver mobility choices;
- Using a-long term congestion management tool on interstate systems;
- Improving regional mobility;
- Maximizing future construction dollars by reducing the need for additional roadway widening; and Offering a more reliable and predictable travel time.

In Florida, the statewide directive 525-030-020a: Tolling for New and Existing Facilities on the State Highway System describes the Florida Department of Transportation's (FDOT's) policies for tolling additional capacity along interstates and similar limited-access facilities on the state highway system. It states that "when adding capacity to a non-Interstate existing limited access facility… ELs shall be implemented across the state, where deemed appropriate through the transportation planning process. When adding capacity to an Interstate, the additional capacity shall be ELs."

The Tampa Bay Region has a well-established transportation system; however, according to the Texas Transportation Institute's 2015 Annual Urban Mobility Scorecard, this system ranks 45th in the nation in congestion with an on average 41 annual hours of delay for each auto commuter. This results in a cost of congestion of approximately $1.58 billion annually. It is important for the Tampa Bay Region to address the growing congestion in to continue the area-wide economic success and ensure a high quality of life. ELs provide drivers with reliable travel times which has proven to be an effective route option for transit systems. Similar success could be expected for the express bus services provided by Pinellas Suncoast Transit Authority (PSTA) and Hillsborough Area Regional Transit Authority (HART).

There are two entities directly responsible for the operation and maintenance of ELs in the Tampa Bay Region – FDOT and Florida's Turnpike Enterprise (FTE). Tampa-Hillsborough Expressway Authority (THEA) is the owner and operator of the Selmon Expressway which includes the Selmon Expressway Reversible Express Lanes (RELs) project which will interface with the Tampa Bay Express (TBX) network. Additional stakeholders, described in later sections, include Hillsborough and Pinellas Counties, the City of Tampa, HART, PSTA, and Federal Highway Administration (FHWA). It is the primary purpose of the TBX Regional Concept for Transportation Operations (RCTO) to document the roles and responsibilities and process of collaboration, so the TBX network can operate consistently within the region regardless of ownership. Additionally, the TBX RCTO will provide the necessary guidance for the development of the region's EL network.

There are two primary documents that will serve as inputs for the development of this TBX RCTO. These documents are described briefly below and in more detail in following sections:

- Florida Department of Transportation Express Lanes Handbook - Statewide guidance which establishes a framework to ensure consistency for operational and design decisions on ELs throughout Florida.
- Draft Tampa Bay Express Master Plan – A regional planning effort recently undertaken by FDOT District 7 to establish the ELs network for the region and document design decisions.

1.1 GOVERNING LEGISLATION

Existing Florida statutes, Florida administrative codes, and Department directives must be followed when planning, designing, and operating EL projects. Together, these guiding documents and laws dictate how funds can be used, which vehicles are eligible to use ELs, where tolls can be implemented, and how tolls are to be collected and spent. The purpose of these guiding documents, described in the following sections, is to better manage congestion and to provide a congestion-free choice to drivers in the EL and will also provide a fixed guideway for public transit buses. ELs are a required Transportation Systems Management and Operations (TSM&O) solution for all additional capacity on limited access facilities on the SHS.

1.1.1 Existing Florida Statutes

The primary Florida Statutes authorizing ELs are:

FS 338.151. This statute gives authority to implement tolls on the state highway system (SHS) such as on new limited-access facilities, lanes added to existing limited-access facilities, new major bridges over waterways, and replacements of existing major bridges over waterways. However, FDOT may not establish tolls on lanes of limited-access state highways that existed on July 1, 2012, with the exception of high occupancy vehicle (HOV) lanes, ELs, and the Turnpike system, unless tolls were already established by that date.

FS 338.166. This statute gives FDOT the authority to request the Division of Bond Finance to issue bonds secured by toll collections from the EL facilities owned by FDOT. It allows FDOT to continue to collect the toll on the EL after the discharge of any bond obligation related to the project. It assigns the order in which toll collections may be used and gives direction on how funds can be used once financial obligations have been met. Per this statute, FDOT can implement variable toll rates.

1.1.2 Florida Administrative Code

Florida Administrative Code (FAC) Rule 14-100.003 establishes criteria for EL tolling, including toll amounts, pricing criteria, tolling methods, vehicle eligibility, toll displays, and toll violation procedures. According to this rule, toll amounts for authorized users in ELs will be "established and adjusted through the collection and analysis of traffic data such as traffic volumes, operating speeds, level of services, and trend data in the ELs, general use lanes (GULs), general toll lanes, or a combination thereof, to promote free-flow traffic conditions."

1.1.3 Directives

FDOT Central Office released the statewide Directive 525-030-020-a: Tolling for New and Existing Facilities on the State Highway System, referred to as the ELs Directive, on August 30, 2013. This directive was valid for one year, during which time, additional feedback and input from FDOT District Offices was requested. This directive was extended to August 2017 to progress to a procedure on ELs which will include required processes and procedures for the planning, design, construction, and operation of FTE and District EL facilities. The directive currently outlines the statewide policies for tolling on the SHS and ELs.

The directive states that tolling strategies shall be considered for all new limited access facilities on the SHS and lanes added to existing limited access facilities on the SHS. The directive also states that "all additional capacity on interstates shall be ELs."

For EL projects, each region of the state must develop a RCTO which outlines the agreements and roles and responsibilities of the different stakeholders for operating the defined EL network. The RCTO is a planning tool outlining the region's EL network long term vision as well as the policies, operational guidelines, and goals for how the EL network will operate. Building off of the RCTO, each EL project shall develop a corridor-level or project-level Concept of Operations (ConOps). The ConOps document shall define how each project will operate from a user perspective and set the framework for design. The ConOps document is owned by the District Office of Traffic Operations and shall be frequently updated throughout the life of the project development at a minimum of once every 6 months.

1.2 STAKEHOLDERS

The planning and implementation of ELs in the Tampa Bay Region involves coordination with a number of stakeholders, including FDOT Central Office, FDOT District 7, FHWA, FTE, THEA, Hillsborough Area Regional Transit (HART), Pinellas Suncoast Transit Authority (PSTA) and local municipalities including county and city agencies. These partners must work together, in various roles, to successfully navigate the planning, design, operation and maintenance of an EL network, as described in the following sections.

To ensure coordination and consensus building among these key decision makers, the TBX RCTO development process involved extensive stakeholder engagement. A Technical Team and an Executive Team, comprised of members from the stakeholders were developed. These groups collaboratively determined key decisions related to the future design and operations of the TBX network.

Technical Team

- Comprised of technical staff from FDOT Central Office, FDOT District 7, FHWA, FTE, THEA, City of Tampa
- Met 6 times over the course of the study

Executive Team

- Comprised of Executive staff from FDOT District 7, FHWA, FTE, THEA
- Met at 3 key milestones over the study period

1.2.1 FDOT Central Office

FDOT Central Office provides general oversight for ELs projects throughout the state through planning efforts, as well as the publication of the *FDOT Express Lanes Handbook*. To ensure consistent evaluation and operation of ELs throughout the state, Central Office provides best practices in feasibility assessments, travel demand modeling and financial analysis of all EL projects. Furthermore, the *FDOT Express Lanes Handbook* defines guidelines related to design, toll collection methodology, operations, maintenance, public communications, and reporting for ELs.

1.2.2 FDOT District 7

FDOT districts have intimate knowledge of the opportunities and challenges of the transportation system within their regions of the state. In the Tampa Bay Region, District 7, in coordination with FTE and FDOT Central Office, plays a lead role in providing general oversight of all aspects of planning, design, construction and operations of the TBX network.

Benefits of Technical Team Coordination:

Specific examples include coordination between district EL designers and the City of Tampa on ongoing City projects which had an impact access point decisions. Early coordination on this issue mitigated potential future delays in the design process.

District 7 will be responsible for identifying needed EL projects and leading the conceptual studies and Traffic and Revenue studies. The district is responsible for funding all phases of the EL projects, including the Traffic and Revenue studies. The District leads all public communications efforts related to ELs, but will coordinate with the Central Office Public Information Office and the FTE Public Information Officer to ensure consistency in the message and preservation of the SunPass brand. The District is responsible for operating the ELs and coordination with additional stakeholders such as emergency first responders.

The District 7 SunGuide® Regional Transportation Management Center (RTMC) will manage operations of the Express Lanes. This includes oversight and maintenance of the existing Intelligent Transportation Systems (ITS), which consists of dynamic message signs, microwave detection system devices and closed-circuit television cameras, and any additional components required with implementation of new Express Lanes. The RTMC also oversees coordination with transit agencies, emergency responders and Florida Highway Patrol to ensure efficient traffic operations on the regional transportation network.

District operations and roadway design staff will continue to coordinate with FTE's tolling systems team throughout project development with respect to design decisions such as separation types, access point locations, signage, and toll sites. Coordination will also occur throughout all phases of project development, implementation, operation and maintenance, with additional stakeholders, such as emergency response providers and transit agencies that might operate within the ELs.

1.2.3 Federal Highway Administration

FHWA governs all modifications and improvements to the interstate system. Representatives from FHWA played an integral part in the TBX RCTO Technical Team meetings, engaging in conversations about access point decisions for the TBX network. Though the RCTO process does not generate recommendations for specific access points for the EL facilities, the participation of FHWA throughout this process helped ensure its involvement in the identification and review of such decisions. The role of FHWA is the same for ELs as for conventional projects. EL projects that use federal funds must receive FHWA approval of required environmental documents under the rules and requirements of the National Environmental Policy Act (NEPA). As part of the NEPA process, FHWA plays a role in reviewing traffic analyses performed for EL projects.

1.2.4 Florida's Turnpike Enterprise

As the overarching toll authority for the state, FTE works with each district throughout the EL planning and implementation process and continues to play key operations and maintenance roles throughout the life of these projects. FTE engages early in the process to provide guidance in planning, design, construction, and operations and to ensure consistency in the deployments statewide.

The district begins coordination with the FTE at the initial step of assessing the viability of an EL project through feasibility assessment. FTE provides support staff for developing the Traffic and Revenue studies and feasibility assessments. FTE determines the toll technology, toll equipment, toll operations, and toll maintenance for EL facilities. FTE also assists with the selection of the toll site and review of all aspects of the toll site infrastructure design.

To facilitate proper coordination throughout the planning, design, operation and maintenance of EL networks, FTE has developed a Roles and Responsibilities Matrix. The Roles and Responsibilities Matrix details the coordination required and the specific responsibilities of FTE and the district in regard to toll equipment, operations, maintenance, staffing and other EL functions through all phases of EL implementation. A FTE project manager (PM) is assigned to each EL project to be a single point of contact in coordination of design reviews, shop drawing reviews, and general coordination between the District PM and FTE PM.

1.2.5 Tampa Hillsborough Expressway Authority (THEA)

THEA owns and operates the Selmon Expressway, an east-west toll road that provides an alternative to I-275 through Downtown Tampa. The 14-mile facility, which is priced using static tolls, was the first in the state to use all electronic tolling. Tolls are collected via SunPass or Toll-by-Plate technology. The Selmon Expressway also includes 11 miles of elevated RELs. The elevated RELs connect the western suburb of Brandon to Downtown Tampa, providing limited-access travel into downtown in the morning and out of downtown in the afternoon. These toll lanes operate using a pricing schedule that is fixed throughout the day, they are not dynamically priced as will be the case for all non-THEA ELs in the region. For the purpose of RCTO development, THEA participated on the Technical and Executive Teams to ensure coordination between planning efforts for FDOT owned EL facilities and THEA facilities (both in operation and planned for the future).

1.2.6 Transit Agencies

HART and PSTA provide express bus service in the Tampa Bay area. Coordination with these agencies was initiated due to the opportunity for some of the express routes to utilize future ELs to reduce travel time. This coordination included discussions related to EL access, to ensure transit operations are considered when determining the ingress/egress points for TBX. More detail about transit coordination and consideration in the RCTO is provided in **Subsection 2.5.**

1.2.7 Stakeholder Coordination

Over the course of the TBX RCTO development, six Technical Team Meetings (5 in person and one held via webex) with 55 participants from various local, regional and statewide agencies were held to discuss a range of technical topics as described in **Table 1-1.** These meetings facilitated early coordination on key decisions and formed partnerships which will extend beyond the RCTO effort. Additionally, three Executive Meetings (one which was held via webex) were held at key decision points in the process. **Table 1-1** shows the meeting dates and topics discussed by the stakeholder groups.

Table 1-1: Overview of Stakeholder Coordination

Date	Technical/Executive Teams	Topics Discussed
March 31 and April 1, 2015	Technical and Executive Teams	RCTO Decision Matrix
		Roles and Responsibilities
		Public Outreach Plan
August 5, 2015	Technical Team	Network Map and Programming Scenarios
		Access Points and Gantry Locations
		Gateway Expressway/Section 2 Connection
		City of Tampa Signal Timing Project
		Current and Future Operations
		Operational Lessons Learned from District 6
		Public Outreach Plan Update
October 7, 2015	Technical Team	Access Points Update
		Enforcement and Incident Management Considerations
		Business Rules
		Public Outreach Plan Update
December 4, 2015	Technical Team	Travel Demand Modeling and Traffic Analysis
		Access Points Update
		TBX RCTO document Outline
February 10, 2016	Technical and Executive Teams	Performance Metrics
		Pricing Software
		Access Points Update
		Anticipated Project Costs (Executive Team Only)
		Regional Business Rules (Executive Team Only)
April 14, 2016	Technical and Executive Teams	TBX RCTO document review webinar

One of the critical tasks, performed early in the coordination process, was to identify and assign roles and responsibilities for the EL network. **Table 1-2** details the roles and responsibilities of each of the participating agencies as defined through the TBX RCTO process.

Table 1-2: Stakeholder Roles and Responsibilities

Responsibility	Stakeholder	Position/Role
EL Project Spokesperson	Owner (District 7)	TBX Public Outreach Officer District 7 Public Information Officer FTE Public Information Officer (for SunPass and Tolling questions)
General Statewide Oversight	FDOT Central Office	FDOT Central Office Florida Highway Systems Management
General Project Oversight	Owner (District 7 and FTE)	District 7 TBX Project Manager and FTE Project Manager
Traffic and Revenue Studies	FTE	FTE Express Lanes Development Administrator District 7 Intermodal System Development Manager District 7 EL Project Manager
Project Funding	Owner (District 7) in cooperation with FDOT Central Office	District 7 Work Program Manager FDOT Project Finance Manager
Toll Setting	Owner (District 7)	ITS Operations Manager
Toll Collection/Back Office	FTE	FTE Tolls Data Center Senior Operations Manager
Enforcement	Florida Highway Patrol (FHP), Local Law Enforcement	FHP Regional Transportation Management Center (RTMC) Representative
Corridor Maintenance	Owner (District 7 or FTE)	District 7 Maintenance Engineer FTE Maintenance Engineer
Toll Site Maintenance	Owner (FTE)	FTE Deputy Director of Facilities and Equipment
Incident Management	Owner (District 7 or FTE) in cooperation with FHP	District 7 ITS Operations Manager FTE Roadway Operations Manager FHP RTMC Representative
Transit Operations	Transit Agencies	TBD
ITS/Communications/Traffic Management Center (RTMC)	Owner (District 7 or FTE)	District 7 ITS Program Manager FTE Traffic Operations Engineer
Project Delivery	Owner (District 7 or FTE)	District 7 TBX Project Manager
Design Standards	FDOT Central Office	FDOT Central Office Roadway Design Criteria Administrator
Access Points	Owner (District 7 or FTE) in cooperation with FTE and FHWA	District 7 TBX Project Manager

1.3 GOALS AND OBJECTIVES

The purpose of the RCTO process is to facilitate coordination between decision makers and technical practitioners from agencies which will be involved in the planning, design, implementation, operation and maintenance of ELs within the region. The goal of early and on-going coordination is to improve the efficiency of project implementation. Early coordination of decisions with all necessary entities can mitigate the need for re-work and schedule delays. For example, some operational decisions can impact the design of the network and should therefore be made early in the process and communicated to the design teams. The RCTO document is a compilation of the decisions made through this process, and will serve as guidance for future EL implementation within the region.

Vision Statement

As part of the stakeholder coordination process, participants were asked to develop a vision for the EL network. The following statement resulted from this process and shall guide the development of the network:

> "The TBX Network Will Deliver Reliable Operations and a Consistent Customer Experience by Providing Travel Choices and Encouraging the Use of a Variety of Travel Modes."

1.4 USING THE RCTO DOCUMENT

The key audience for this document is those involved in planning and implementing the EL projects. For these technical practitioners, the RCTO document serves as a repository for guidance on design and operational decisions, detailing decisions that have been made at a Federal, statewide and regional level. The TBX RCTO was structured to serve as the starting point of each project- or corridor-level ConOps. Moving forward, practitioners can build upon the information presented in this document, supplementing where necessary to provide more detailed project-level information. The RCTO is a living document and shall be updated as decisions are made and projects are implemented.

For ease of use, the key decisions are called out throughout the document as either "Recommendations" (shown in the red boxes) or "Responsibilities" (shown in the blue boxes), see samples below:

RCTO Recommendation: SAMPLE

Red call-out boxes define recommendations made through the TBX RCTO process based on industry best practices, lessons learned in other Florida regions and input from the Technical and Executive Teams. These decisions serve as guidelines for regional EL projects moving forward.

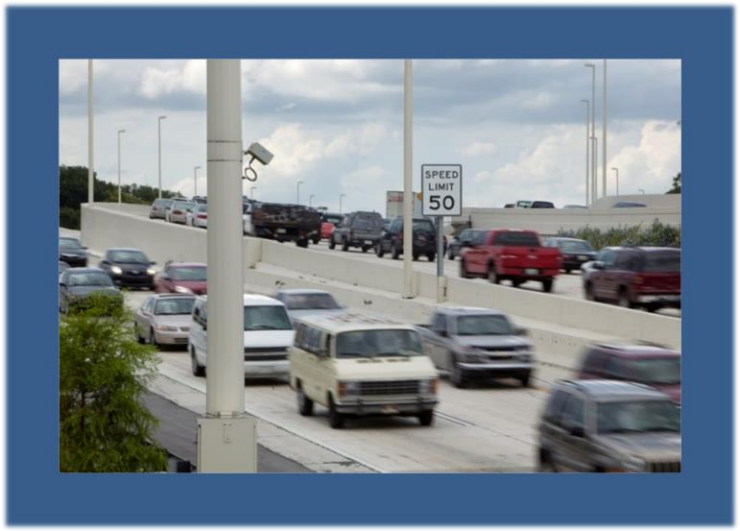
Responsibilities: SAMPLE

Blue call-out boxes detail stakeholders responsible for various EL activities including coordination, financial, ownership, operation, and maintenance responsibilities. The boxes also define responsibilities for the toll system components.

2 OVERVIEW OF TRANSPORTATION SYSTEM

The following subsections document the recommendations of previous studies and the next steps performed to assess the feasibility of ELs in the Tampa Bay Region.

2.1 SYSTEM DESCRIPTION



Within the Tampa Bay Region, the major limited-access, highway, high-speed facilities, considered for potential EL implementation include the following:

- I-75 – This north-south facility spans the entire state of Florida and continues north through other states. Within the Tampa Bay Region, I-75 bypasses downtown to the east, serving longer distance trips through the region as well as connecting to I-275 and I-4 within the region. I-75 is owned and maintained by FDOT District 7.
- I-275 – A generally north-south facility, which runs east-west through Downtown Tampa, I-275 serves as an alternate to I-75, providing access to downtown from northern Hillsborough County and Pasco County. I-275 serves motorists travelling to and from the Clearwater/St. Petersburg area and downtown, connecting to I-75 near Wesley Chapel (on the north end) and north of Bradenton (on the south end). I-275 is owned and maintained by FDOT District 7. I-275 serves as the western terminus for I-4 near Downtown Tampa.
- I-4 – Downtown Tampa (at I-275) serves as the western terminus for this east-west interstate corridor, which traverses east to Orlando. This corridor serves commute traffic travelling to and from the region's eastern suburbs. I-4 is owned and maintained by FDOT District 7.
- Selmon Expressway – This toll facility serves as an alternate route to I-275/I-4 through downtown. The Selmon Expressway includes an REL, which is statically priced, serving westbound (to Downtown) traffic in the mornings and eastbound (to Brandon) traffic in the evenings. THEA is currently in the process of planning a 1.6-mile extension of the Selmon Expressway southward in the median of Gandy Boulevard. The Selmon Expressway is owned and maintained by THEA.
- Veterans Expressway – This north-south facility extends from SR 60 north for 15 miles. It connects the airport and northern suburbs to Downtown and is mostly (13 of 15 miles) tolled. Veterans Expressway is owned and maintained by FTE.
- I-4 Connector – This all-electronic toll facility is a series of ramps that connect I-4 to the Selmon Expressway west of 31st Street in Tampa. The elevated roadway links these two major east-west corridors and provides an alternative for commercial trucks using the arterial roadways in Ybor City to access Port Tampa. The I-4 Connector is owned and maintained by FTE.
- Gateway Expressway – The Gateway Expressway is proposed four-lane elevated tolled facility connecting the Bayside Bridge and U.S. Highway 19 to Interstate 275. It also provides access to St. Pete-Clearwater International Airport. Customers will have the option to utilize toll-by-plate or SunPass to pay the static toll for this facility. Gateway Expressway will be owned and maintained by FDOT District 7.

Figure 2-1 illustrates the Tampa Bay Region's roadway system, as described above.

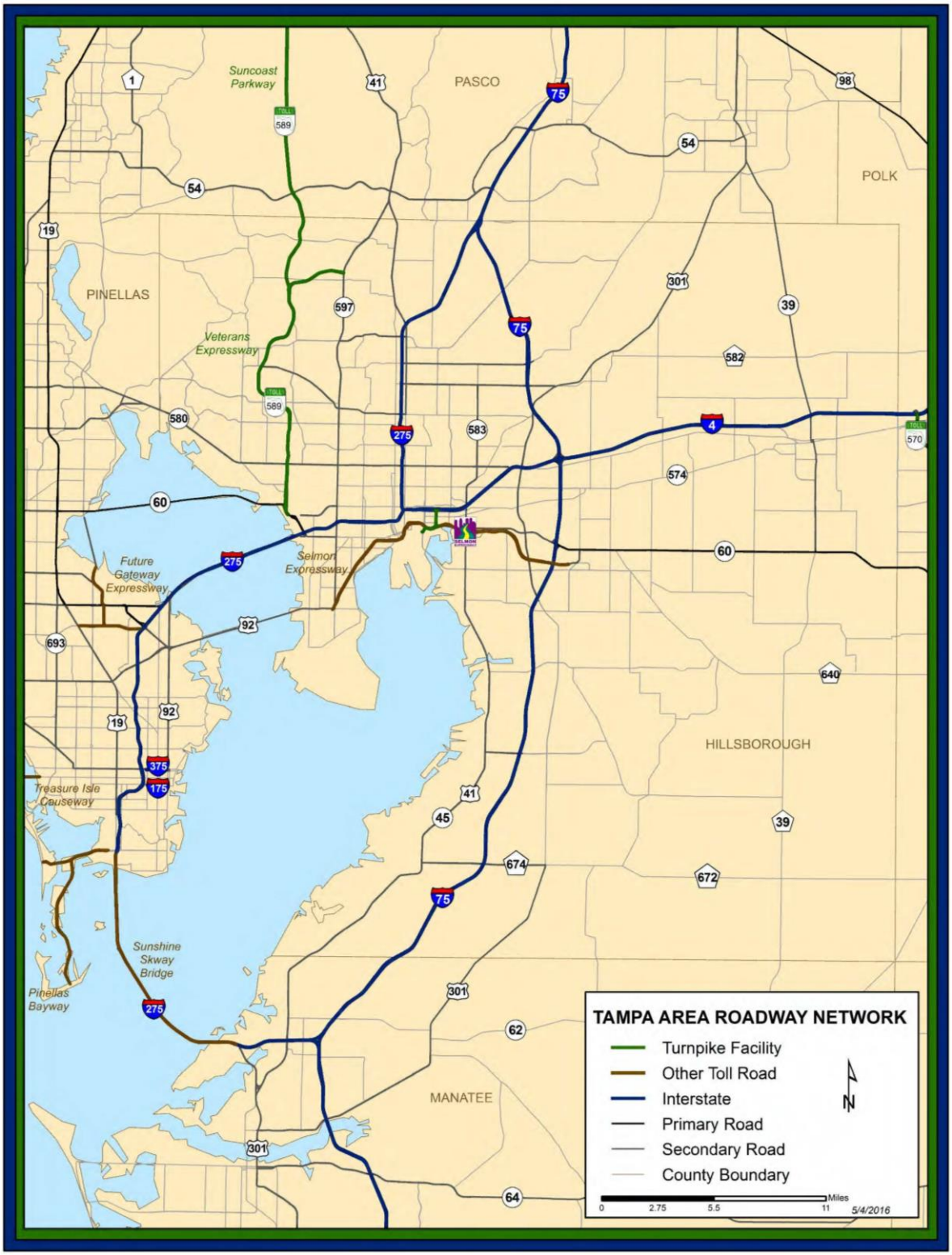


Figure 2-1: Tampa Bay Region Roadway System

2.2 PREVIOUS STUDIES

Transportation planning efforts have identified improvement needs along interstates in the Tampa Bay Region. Within these studies, ELs have been consistently listed as a recommendation. **Table 2-1** summarizes the resulting EL recommendations.

Table 2-1: EL Recommendations from Previous Studies

Plan Title	Plan Purpose	Relevant EL Recommendation
Florida Transportation Plan	Statewide Long Range Plan	Proactively manage transportation assets by using enhanced transportation corridors with managed or special use lanes
Strategic Intermodal System (SIS) Strategic Plan and SIS Investment Needs (a family of documents)	Enhance economic competitiveness and quality of life by ensuring mobility for people and freight	Special Use Lanes/Managed Lanes/Express Lanes are included in prioritized project recommendations
Regional Long Range Transportation Plans (Hillsborough County MPO for Transportation, Pasco County MPO, Pinellas County MPO, and Polk County MPO)	Local Long Range Transportation Plans	The region's metropolitan planning organizations have all identified ELs as needed improvements on their respective sections of interstate
Tampa Interstate Study	FDOT master plan identifying improvements along 40 miles of I-275, I-75, and I-4.	Record of Decision (ROD) awarded by FHWA in 1997 which includes separated special use lanes in each direction along I-4 and I-275 in the vicinity of downtown Tampa
Tampa Bay Area Regional Transportation Authority (TBARTA) Master Plan	Regional Long Range Transportation Plan, updated every two years that includes the region's six MPOs: Hernando/Citrus, Hillsborough County MPO, Pasco County MPO, Polk County TPO, and Sarasota/Manatee MPO	Plan supports ELs for all of the region's interstates, as well as some additional corridors
Bus Toll Lanes Proof of Concept Study	Assess the feasibility of Bus Toll Lanes on the Tampa interstate system	Results showed the potential for increased transit ridership on premium service facilities
Express Bus in Tampa Bay Express Study	Evaluated potential premium express bus service operating within proposed ELs	Proposed six stations (St. Pete, Greater Gateway, Westshore, Tampa, USF, and Wesley Chapel) with overlapping services with different service options that vary in headway frequency.
Draft Tampa Bay Express Master Plan	Assess the need for and feasibility of ELs within the region	The plan defines a network of ELs (presented in the following section) and presents initial design recommendations for the network. The plan remains in Draft form at the time of the RCTO

2.3 NEEDS ASSESSMENT

The *Draft Tampa Bay Express Master Plan,* initiated in 2014, included a needs assessment to determine the viability of ELs and the definition of the future network. The plan also provided initial traffic projections for the network and identified projects which could be developed within a reasonable timeframe (3 to 5 years) to relieve congestion on the Tampa Bay interstate system. These "starter" projects were selected based on current and future projected traffic operations, environmental and administrative requirements, and construction, maintenance, and operations costs.

The major decision factor in determining the need for ELs is the level of congestion. The needs assessment performed for the *Draft Tampa Bay Express Master Plan* included a traffic analysis to determine the existing (using 2012 traffic data from FDOT's database) and future Levels of Service (LOS) on the region's interstate facilities: I-4, I-75, and I-275. The assessment was performed using the most recent version of the regional travel demand model, which was developed by FDOT for use in evaluating the greater Tampa Bay Region (including the counties of Hillsborough, Pinellas, Pasco, Hernando, and Citrus and adjacent areas of Manatee, Sarasota, and Polk). This model, called the *Tampa Bay Regional Planning Model (TBRPM),* was used to develop the *TBARTA Master Plan*. For the purpose of simulating the potential attraction of vehicle trips to future ELs, a network of ELs were added to the model. This resulted in the *Tampa Bay Regional Planning Model for Managed Lanes (TBRPM-ML).*

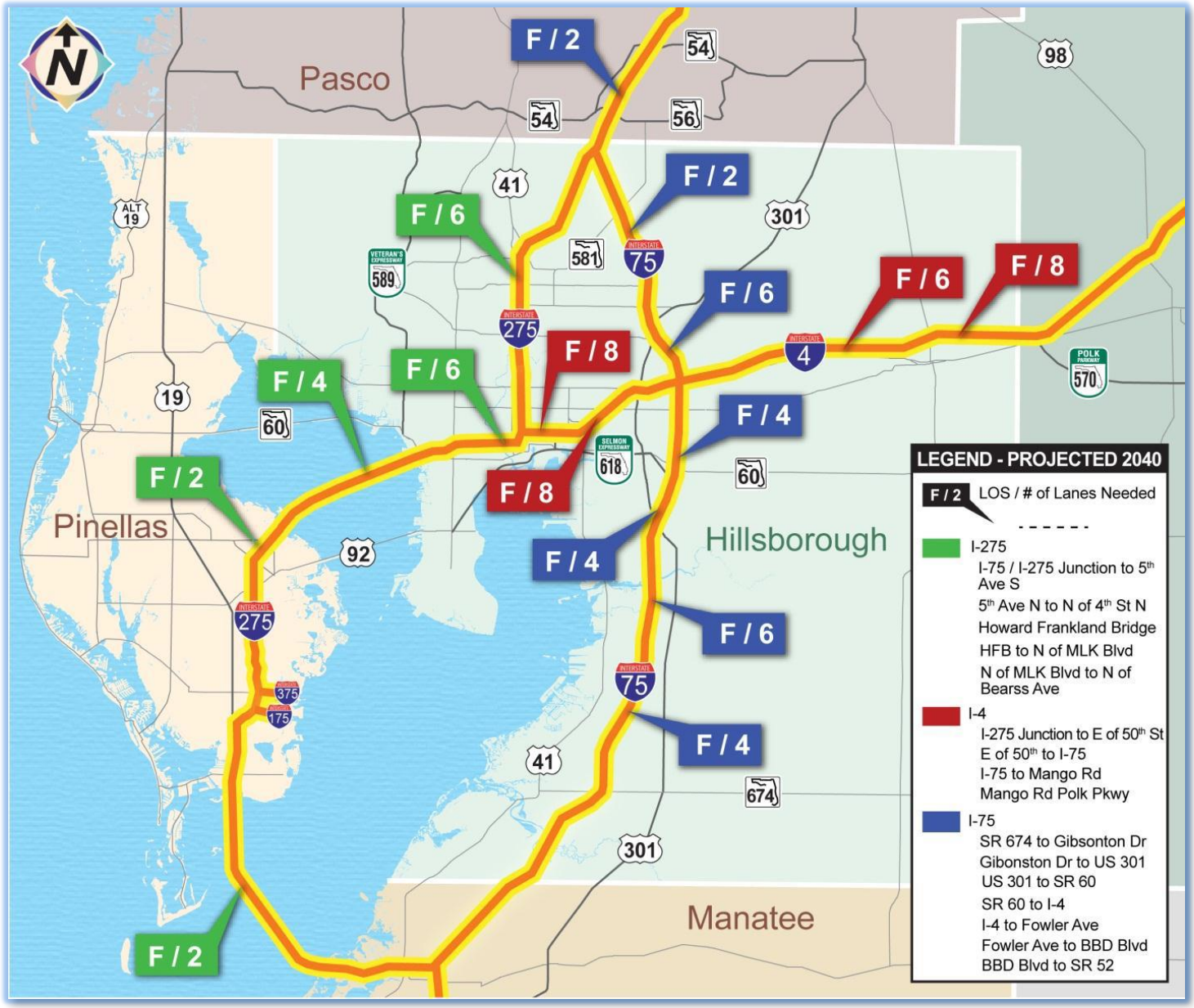
The LOS, which is based on the volume to capacity (v/c) ratio, for each roadway segment analyzed is shown in **Table 2-2**. According to FDOT LOS Standards for the State Highway System (Policy #000-525-006-b), an LOS of D or better is acceptable in urbanized areas (LOS E and F are considered unacceptable). The table also indicates the number of lanes required to achieve an acceptable LOS during the existing (2012) and future (2040) years. **Figure 2-2** provides an illustration of the LOS and required lanes in future year 2040.

Table 2-2: Existing and Future Traffic Conditions

Interstate	Segment	v/c Ratio*		LOS		Additional Lanes Needed	
		2012	2040	2012	2040	2012	2040
I-275	I-75S/I-275 junction to 5th Ave. N.	0.59	1.20	B	F	0	2
	5th Ave. N. to north of 4th St. N.	0.86	1.21	D	F	0	2
I-275	Howard Frankland Bridge	0.81	1.32	D	F	0	4
I-275 (TIS)	Howard Frankland Bridge to north of MLK Blvd.	1.03	1.70	F	F	2	6
I-275	North of MLK Blvd. to north of Bearss Ave.	1.10	2.05	F	F	2	6
I-4 (TIS)	I-4/I-275 Junction to east of 50th St.	0.97	1.82	E	F	2	8
I-4	East of 50th St. to I-75	1.05	2.28	F	F	2	8
	I-75 to Mango Rd.	0.92	1.98	E	F	2	6
	Mango Rd. to Polk Pkwy.	0.74	2.28	D	F	0	8
I-75	SR 674 to Gibsonton Dr.	0.67	1.63	C	F	0	4
	Gibsonton Dr. to US 301	0.79	2.03	D	F	0	6
I-75	US 301 to SR 60	0.52	1.41	B	F	0	4
	SR 60 to I-4	1.08	1.69	F	F	2	4
	I-4 to Fowler Ave.	0.94	1.87	E	F	2	6
	Fowler Ave. to BBD Blvd.	0.57	1.35	B	F	0	2
	BBD to SR 52	0.60	1.11	B	F	0	2

Source: ***Draft Tampa Bay Express Master Plan****, pages 2-2 and 2-5*

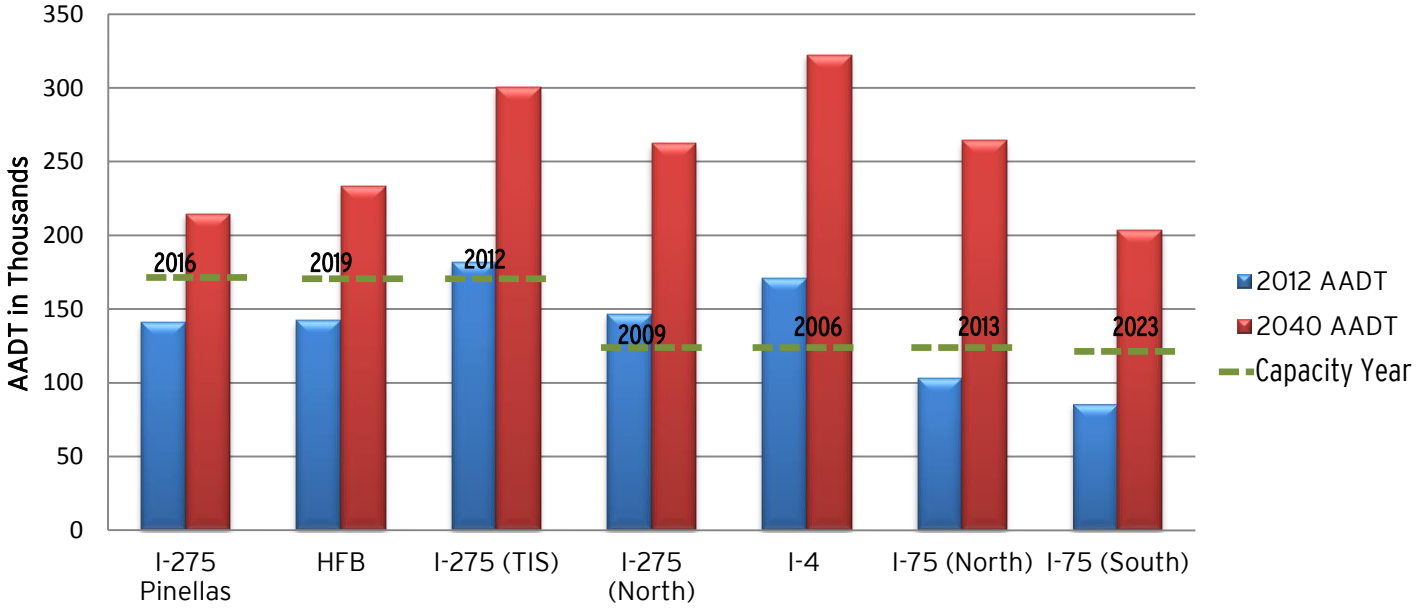
**Capacity calculation is derived from the FDOT Generalized AADT Tables, as adopted December 18, 2012.*



Source: ***Draft Tampa Bay Express Master Plan**, page 2-5*

Figure 2-2: Projected 2040 Interstate Traffic Conditions

As indicated in the **Table 2-2** and illustrated in **Figure 2-2,** all of the studied segments are anticipated to reach an LOS F by 2040. To better understand the timing of capacity needs on Tampa Bay's interstate network, the plan included an illustration of the AADT volume at which the facility reaches capacity (resulting in an LOS F) versus the volume of each facility in years 2012 and 2040. **Figure 2-3** shows the results of this analysis. The red and blue bars illustrate the 2012 and 2040 AADT. The green lines show the capacity for each segment (175,600 vehicles per day for the three segments on the left and 130,600 vehicles per day for the remaining four).



Source: ***Draft Tampa Bay Express Master Plan,*** *page 2-6*

Figure 2-3: Capacity versus Volume

Bottlenecks are distinguished from congestion in that they occur at specific points along a facility and may not extend to the whole facility. Bottlenecks, as defined by the statewide study *Bottlenecks on Florida SIS Year 2011*, are caused by one of six sources: limited physical capacity, traffic incidents, bad weather, work zones, poor traffic signal timing, and special events. According to this study, which ranks SIS segments based on 90th Percentile Travel Time, Free-flow Travel Time, Planning Time Index and Frequency of Congestion. Four of the Top 20 Statewide SIS Bottlenecks in 2011 are within the Tampa Bay Region, as shown in **Table 2-3**.

Table 2-3: Tampa Bay Region Top Bottlenecks in 2011

Bottleneck Rank (2011)	Road	Segment	Length
2	I-275 NB	Floribraska Ave to 26th Ave	0.23 miles
5	I-4 WB	15th St to I-275	0.86 miles
8	I-275 NB	Howard Frankland Bridge to West Shore Blvd	2.63 miles
9	I-275 SB	I-4 to N Tampa St	0.55 miles

Source: ***Bottlenecks on Florida SIS Year 2011****, page 6*

2.4 EXISTING TRAFFIC MANAGEMENT/ITS

FDOT District 7 manages freeway operations via a SunGuide® Regional Transportation Management Center (RTMC). This approximately 20,000 square-foot facility is located at the District Headquarters. The approximately 30 staff members at the RTMC provide traffic monitoring/management and incident response on a 24-hour-per-day/ 7-day-per-week basis. Effective

traffic management involves coordination among various agencies, including FTE, FHP, FDOT District ITS staff, emergency responders, transit agencies, and local jurisdictions.

The District 7 SunGuide® RTMC manages the following intelligent transportation system (ITS) equipment which is currently deployed on 155 miles of the region's interstate system:

- 121 Dynamic Message Signs (DMS)
- 578 Microwave Detection System Devices (MVDS)
- 304 Closed-Circuit Television (CCTV) Cameras

The TBX RCTO discusses the required coordination between RTMC staff and other entities (including FTE, emergency responders and FHP), the opportunity to utilize existing ITS equipment for EL monitoring and the potential need for additional staff to manage EL activities.

2.5 EXISTING EXPRESS BUS SERVICE

Transit service does not seamlessly connect Hillsborough, Pasco, and Pinellas Counties. Commuters must transfer between different express and local bus routes to reach their destination in adjacent counties. Express bus service is currently provided by HART and PSTA. There is an opportunity for some of the express bus routes to utilize future ELs to reduce travel time. Statewide policy recommends that transit vehicles use ELs at no charge (it should be noted that transit vehicles using the Veterans Parkway ELs will still pay the general toll). Individual transit agencies will register with FTE's SunPass Program so a valid license plate is associated with each SunPass Mini sticker tag in each bus.

It is recommended that transit agencies consider the use of ELs in their route planning activities to better serve their customers. Future or planned express bus routes may benefit by using the ELs depending on the access points defined for the TBX network. Coordination between transit agencies and the District should occur early in the EL planning process, before concept plans are finalized, to ensure transit operations are considered when determining the ingress/egress points for TBX. The following describes the existing express bus routes that may benefit from EL use on TBX.

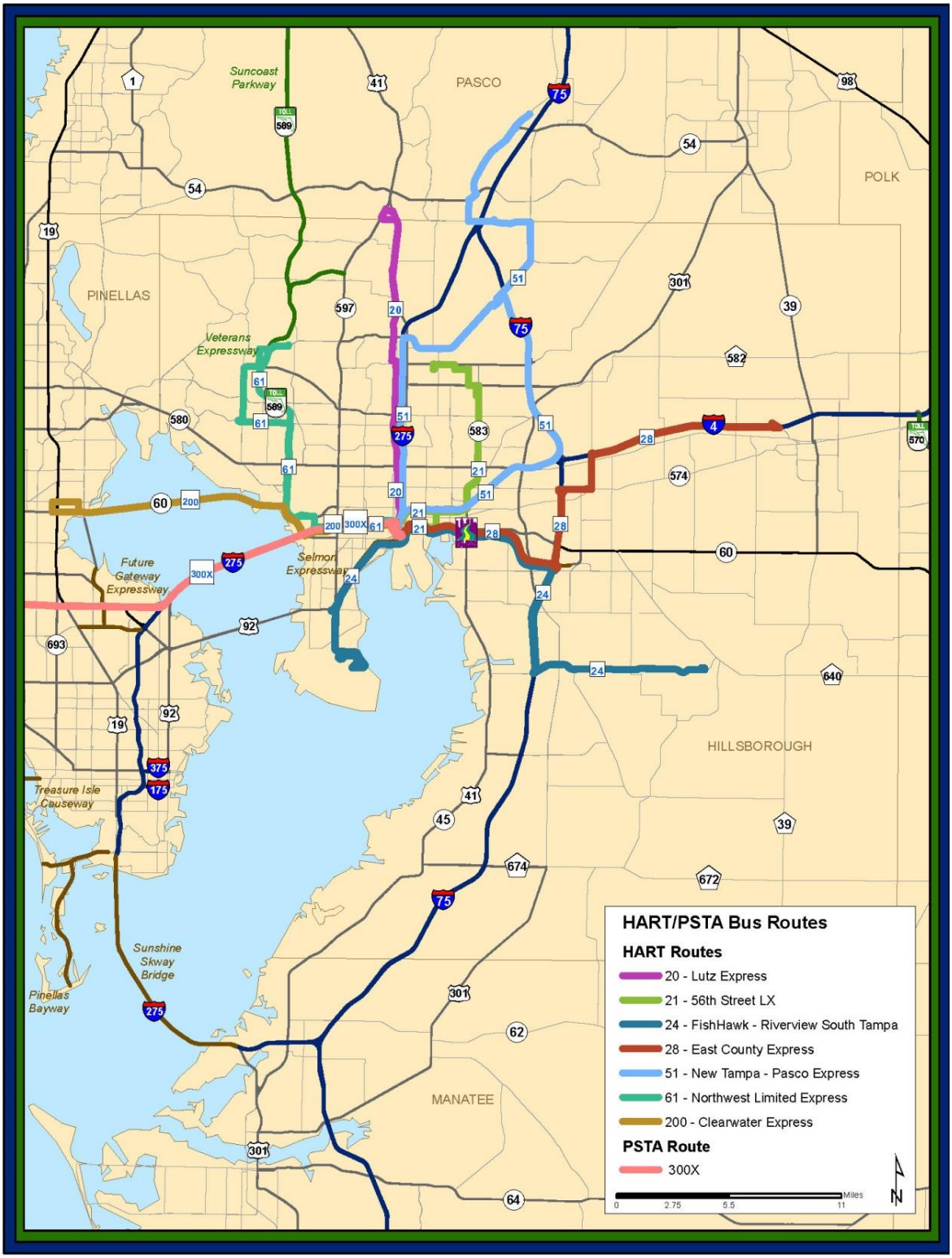
2.5.1 Pinellas Suncoast Transit Authority (PSTA)

PSTA serves the residents and visitors of Pinellas County, providing local and express bus service via 42 routes. It currently provides express bus service on one of these routes, as illustrated in **Figure 2-4**. This route, called 300X, provides weekday express service (with limited stops) from Ulmerton park-and-ride lot to Downtown Tampa (Marion Transit Center).

2.5.2 Hillsborough Area Regional Transit (HART)

HART provides local and express bus service to an approximate 1000 square-mile area within the Tampa Bay Region. There is an opportunity for some of the seven express routes, described in **Table 2-4** and illustrated in **Figure 2-4**, to utilize future ELs to reduce travel time. PSTA, HART, and FDOT are developing a process for evaluating appropriate locations for use of bus on shoulder operations that complement the TBX ELs. The process involves evaluating I-275 in Pinellas County from I-375 to Gandy Boulevard. The final report on this effort will include conceptual alternatives for bus on shoulder operations.

RCTO Recommendation: Transit
HART and PSTA continue to work with FDOT District 7 and consider the use of ELs in their express bus route planning activities. Possibly explore the use of the bus on shoulder operations to fill in gaps where the ELs are not available for express bus use.



Source: PSTA and HART websites

Figure 2-4: Existing Express Bus Routes

Table 2-4 describes the seven existing HART express bus service routes which could benefit from the implementation of ELs. It should be noted that, due to limited-access points on ELs, some routes may require route adjustments or buses will simply need to transition to GULs in advance of the intended interstate exit.

Table 2-4: Existing HART Express Bus Service

Route Name	To/From	EL Corridor	Number of Stops	# of trips (AM/PM)
20X Pasco/Lutz Express	Between Downtown/ Marion Transit Center and Pasco/Lutz	I-275	6 stops (approx. 45 min headways)	2 inbound/ 2 outbound
21LX 56th Street Limited Express	Between Downtown/ Marion Transit Center and Pasco/Lutz	I-4 (uses I-4 Connector, and Selmon)	5 stops (approx. 45 min headways)	2 inbound/ 2 outbound
24X FishHawk / Riverview / South Tampa Express	Between Florida Keys Ave. and FishHawk / Riverview	(I-75, Selmon)	5 stops (approx. 30 min headways in PM and 10 to 25 min in AM)	6 inbound/ 6 outbound
28X East County Express	Between Downtown Tampa and East County	I-4, I-75 and Selmon	4 stops (headway N/A)	1 inbound/ 1 outbound
51X New Tampa/ Pasco Express	Between Downtown Tampa and New Tampa/Pasco County	I-275, I-4, and I-75	5 stops (approx. 45 min headways in PM and 30 min in AM)	2 inbound/ 2 outbound
61LX Northwest Limited Express	Between Town N' Country and Downtown Tampa	I-275	5 stops (approx. 30 min headways)	2 inbound/ 2 outbound
200X Clearwater Express	Between Downtown Tampa and Clearwater	I-275	4 stops (approx. 30 min to 1 hour headways)	3 inbound and 2 outbound / 2 inbound and 3 outbound

Source: HART website

3 FUTURE TRANSPORTATION SYSTEM OVERVIEW

3.1 TBX EL NETWORK

The *Draft Tampa Bay Express Master Plan* identified a network of EL projects based on needs assessment and travel demand modeling efforts. The needs assessment was performed using the *Tampa Bay Regional Planning Model for Managed Lanes (TBRPM-ML),* discussed in **Subsection 2.3**. The Base Model included the existing plus committed roadway network, which was defined as the current roadway network (2014) plus all capacity projects under construction and funded for construction in the five-year work program (adopted in FY 2014). The Base Model network was then adjusted to include two ELs in each direction to evaluate the potential attraction of vehicle trips from GULs to the ELs. The results helped to define the *Draft Tampa Bay Express Master Plan* limits illustrated in **Figure 3-1:**

- I-4 from I-4/I-275 Junction to Polk Parkway
- I-75 from south of SR 674 to Bruce B. Downs Boulevard
- I-275 from south of Gandy Boulevard to Bearss Avenue

TBX RCTO Technical and Executive Team members confirmed that the EL network defined in the *Draft Tampa Bay Express Master Plan*, and illustrated in **Figure 3-1**, would serve as the official proposed EL network map for the region. This map is a living document and is subject to change with future planning efforts as projects are implemented.

For phasing purposes, the proposed network was broken into seven sections representing implementable projects. The *Draft Tampa Bay Express Master Plan* identified short-term projects (those which could be implemented within 3 to 5 years), referred to as "Starter Projects." The "Starter Projects" include six sections along I-275 and one section along I-4 that were the focus of the *Tampa Interstate Study*. The *Draft Tampa Bay Express Master Plan* documented recommended typical sections, interchanges, EL access points, and projected traffic volumes for the seven starter projects. It should be noted that Gateway Expressway was originally labeled as Section 1 of the TBX network, but the decision was made to designate this as a toll facility, not an Express Lane.

Several of the TBX sections are in the project development and environment (PD&E) phase and a traffic and revenue study was completed for the entire TBX network. These efforts have focused on the I-275 and I-4 sections, as illustrated in **Figure 3-2**. Since the TBX will undergo incremental deployment over many years, special attention needs to be placed on how the network will operate incrementally and how changes in the order of implementation may affect operations. This needs to be addressed in the corridor and project efforts. Also, project limits for design and construction need to be evaluated to ensure that, as projects are complete, they include all the elements needed to operate.

RCTO Recommendation: TBX Network
Technical and Executive Team members confirmed that the EL network defined for the *Draft Tampa Bay Express Master Plan*, and illustrated in Figure 3-1, is the official TBX EL network map for the region.

3.2 PLANNED IMPROVEMENTS

In addition to TBX EL projects, the region has many other roadway projects identified in the *FDOT Work Program* and *State Transportation Improvement Plan (TIP) adopted FY 2016.* A total of $3.3 billion of programmed transportation improvements include $436 million for EL projects. The remaining projects consist of non-EL capacity adding roadway projects ($1.19 billion), interchange projects ($890 million), bridge improvements and repair projects ($510 million), toll collection projects ($213 million), ITS/operations projects ($26 million) and miscellaneous maintenance and safety projects ($82 million).

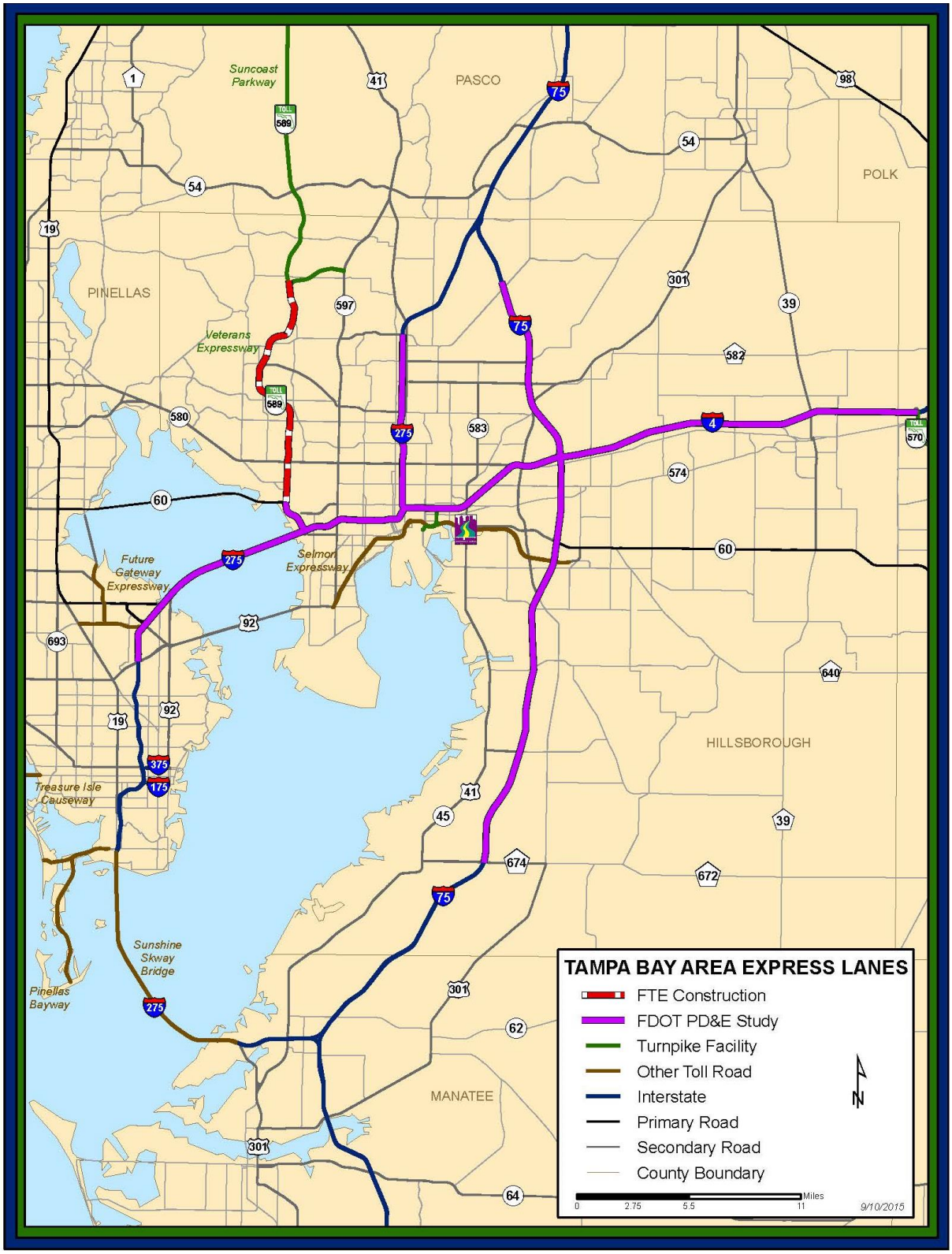
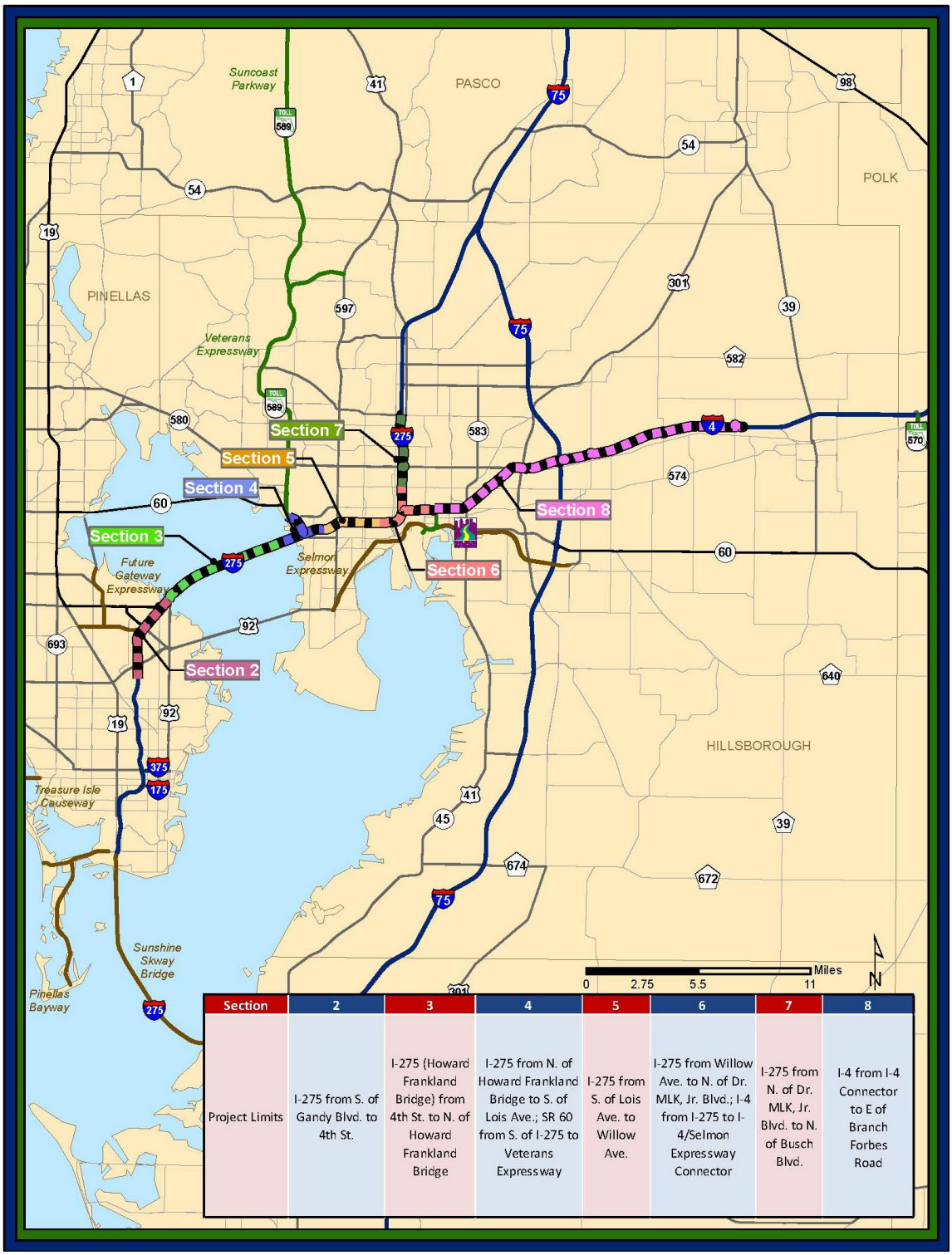


Figure 3-1: Tampa Bay Area Express Lanes



Section	2	3	4	5	6	7	8
Project Limits	I-275 from S. of Gandy Blvd. to 4th St.	I-275 (Howard Frankland Bridge) from 4th St. to N. of Howard Frankland Bridge	I-275 from N. of Howard Frankland Bridge to S. of Lois Ave.; SR 60 from S. of I-275 to Veterans Expressway	I-275 from S. of Lois Ave. to Willow Ave.	I-275 from Willow Ave. to N. of Dr. MLK, Jr. Blvd.; I-4 from I-275 to I-4/Selmon Expressway Connector	I-275 from N. of Dr. MLK, Jr. Blvd. to N. of Busch Blvd.	I-4 from I-4 Connector to E of Branch Forbes Road

Source: TBX PD&E Studies
Note: Section 1 became toll facility called Gateway Expressway early in the process.

Figure 3-2: TBX Ongoing Projects

4 EXPRESS LANES CONCEPT

All ELs in the state of Florida shall be consistent from the user's perspective in how the TBX network looks, feels, and operates. The following subsections of the RCTO define applicable directives, regional decisions, and guidance pertaining to ELs. Chapter 4 of this document is divided into the following:

- Design – defines decisions regarding EL separation type, access point locations, access types, signage, toll site infrastructure, and gantries;
- Toll system – describes the physical toll system (including equipment and gantries);
- Toll strategy –describes the conceptual plan for toll collection, and the pricing strategy; and
- Operations – documents policy decisions for EL operations and defines required coordination and additional resources for RTMC operations, enforcement, incident management and maintenance.

4.1 DESIGN

Currently, the sections of the TBX EL network are at various stages of implementation. The goal of the RCTO was to encourage coordination on design decisions for the network and to document guidelines for these decisions moving forward. The Technical Team meetings discussed topics such as access type/location, separation type, toll equipment and signing in varying levels of detail. Detailed design decisions depend on project specifics such as geometry, existing roadway alignment, available right of way, existing and future traffic conditions and other design constraints. The following subsections detail the results from these discussions and recommended guidelines for design decisions on future TBX sections.

TBX will be built project by project and due to this incremental deployment over many years, special attention needs to be placed on how the network will operate incrementally and how it will operate if projects get implemented out of order. this needs to be addressed in the corridor and project efforts. Also, project limits for design and construction need to be evaluated to ensure that as projects are complete they include all the elements needed to operate.

4.1.1 Design Criteria

The projects on initial sections of I-275 and I-4, documented in **Section 3**, have progressed to the PD&E phase of implementation. Designers working on the different sections of the TBX network must ensure design consistency on a regional level, to the greatest extent possible. The ongoing coordination for consistency shall continue to occur as different project sections progress towards operation.

Design criteria and standards are established by the following documents:

- FDOT, Plans Preparation Manual (PPM), 2016;
- FDOT, Standard Specifications for Roadway and Bridge Construction, 2016;
- FDOT, Traffic Engineering Manual, 2016;
- FDOT, Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System Topic No. 625-010-003, 2013;
- FHWA, Manual on Uniform Traffic Control Devices (MUTCD), 2009;
- FTE, Turnpike Plans Preparation and Practices Handbook (TPPPH) (2016);

- AASHTO, A Policy on Geometric Design of Highways and Streets (also known as the Green Book), 2011, Sixth Edition;
- AASHTO, Guide for Design of High Occupancy Vehicle (HOV) Facilities, 2004; and
- AASHTO, Interstate System Design Standards, 2005.
- FTE, General Tolling Requirements (GTR), 2016

All EL projects shall adhere to the criteria and standards set forth in the documents listed above. The AASHTO *Interstate System Design Standards and Green Book* serve as the baseline for all roadway controlling criteria and standards. The FDOT *PPM* provides Florida-specific design criteria and procedures. Many EL-specific design issues are not yet covered in the FDOT *PPM*. In these instances, guidance provided in the FTE TPPPH, FTE GTR, and FDOT *Statewide Express Lanes Handbook* shall be followed.

4.1.2 Typical Sections

The proposed typical sections for the seven sections of TBX generally includes three GULs and one or two ELs in each direction. The proposed typical sections also accommodate EL access points along the project corridor through the use of slip ramps to the GULs or direct access ramps.

Additional consideration will be given for dedicated incident investigation areas to serve crashes that occur in the ELs. Through the RCTO Technical and Executive Team coordination, it was confirmed that regional EL project design teams should identify areas to stage vehicles involved in incidents and minimize impact on operations and safety to the ELs. Dedicated incident investigation areas can be located along interchange ramps, on shoulders, or at locations such as park-and-ride lots. Coordination between project designers and emergency responders should continue throughout the design process to make sure safe and effective incident investigation areas are identified.

The typical section for each TBX EL project should be evaluated on an individual basis, but should consider network characteristics in the design process, which include the following:

- Three 12-feet GULs in each direction;
- One or two 12-feet ELs in each direction;
- 12-feet outside shoulders, of which 10 foot will be paved (GUL);
- 12-feet inside shoulders, of which 10 foot will be paved (EL);
- 12-feet paved inside/outside shoulders when adjacent to barrier wall (GULs and ELs);
- A 4-feet wide buffer between the GUL and EL which includes EL markers.

4.1.3 Separation

There are two separation treatments for ELs that were considered for the TBX network: concrete barrier separated and buffer separated with EL markers. Project implementation costs, operation and maintenance costs, safety and operational characteristics, enforcement, and traffic incident management are all influenced by the type of separation treatment. **Table 4-1** provides a summary of the advantages and disadvantages for each separation treatment.

Table 4-1 Design Issue: Separation

Separation Treatment	Advantages	Disadvantages
Concrete Barrier Separated	Lower maintenance costs	Higher project construction cost
	No cross-over violation or lane diving from traffic using GULs	Need special design to support drainage
	Motorists perception of a safer corridor	Requires special barriers or gates at regular intervals to allow emergency access. Increased emergency/incident management – for example, to remove motorists trapped within the concrete barrier system
	Potential future use of automated/connected vehicle technology	Requires more right-of-way (ROW)
Buffer Separated: - With longitudinal pavement markings and EL markers	Lower cost to construct	Higher maintenance costs
	Easier emergency access	Potential for illegal movements, such as lane diving between the GULs and ELs
	Alternative detour when the GULs are closed due to an incident	Potential sight distance issues on horizontal curves
	Reconfigurable as additional EL sections come on line	

RCTO Recommendation: TBX Separation Between GULs and EL
Due to design considerations such as available right-of-way, most TBX EL projects will use buffer separation with EL markers between the GULs and the ELs.

4.1.4 Access

Access locations for ingress and egress to the EL are identified using major origin-destination (O/D) patterns. ELs should have a minimum number of ingress and egress points to promote the longer distance trips.

Various types of access treatments are used for ingress and egress into and out of ELs. Due to design considerations including the type of separation being implemented (buffer with markers), the available right-of-way, the location of key access points,

as well as, safety and operational considerations, initial designs include two types of access: slip ramps and direct connect ramps.

- Slip Ramps - Slip ramps provide connections between ELs and GULs using breaks in the separation techniques (i.e. the buffer). Slip ramp access allows for either ingress or egress typically facilitated by an exclusive lane.
- Direct Connect Ramps - Direct connect ramps provide access to and from the ELs using dedicated grade separated ramps. These types of ramps require additional right-of-way and often significant roadway structure, and are, therefore, more expensive. Therefore, this option is typically used when high traffic volumes or operations dictate the need for the exclusive connections, or, as is the case in the Tampa Bay Region, for system-to-system connections between EL facilities, toll facilities, major arterials, park-and-ride facilities, and for transit facilities.

Several factors influence the selection of type of access which include safety/crash data, traffic volumes, cost, available ROW, interchange spacing, areas of congestion or bottlenecks, the impact of the surrounding network, consistency among other facilities in the region, and the ability to properly sign the access point.

The location and consideration of the type of access is an iterative process involving coordination with FTE tolling operations, FTE signing, District traffic operations, District travel demand modeling, and the District project manager. All access points, signage, and toll gantry locations are identified in a conceptual tolling plan. The conceptual tolling plan is used as the baseline for the design phase. In the event of any changes to the access locations during the design phase, coordination with FTE will be needed to assess how changes may impact the conceptual tolling plan.

The RCTO Technical Team discussed EL access to Downtown Tampa and explored the potential impacts of shifting traffic from I-4 westbound to the Selmon Expressway as an alternative way to access Downtown. The Technical Team also coordinated with the City of Tampa Traffic Engineering staff to understand where their Complete Streets improvements, which seek to provide multimodal corridors within Downtown, would be located (multiple downtown streets, including Borein Street and Morgan Street). The Technical Team also worked with the City of Tampa Traffic Engineering staff to understand where they were installing coordinated signal timing which has the potential to complement the operations of any EL direct connections to city streets.

Direct connections with existing and planned ELs, such as the Veterans Expressway, should be considered a priority. Slip ramps to and from GULs and ELs are not considered interchange access points for purposes of an interchange access request. Direct connections to and from one EL to another EL or to the cross street are considered interchange access and an interchange access request is required per the Interchange Access Request User's Guide.

Through the RCTO's Technical Team meetings, access locations were identified, resulting in an integrated design to maximize the effectiveness of the EL usage within the Tampa Bay region.

RCTO Recommendation: TBX Access Location and Type

Currently, there is one direct connection (to SR 589) in design for the initial TBX sections. Section 6, which contains the Downtown interchange (I-275/I-4) and the connection of I-75 to I-4, will likely also contain direct connections to link ELs on these facilities. Current designs show 30 slip ramp locations proposed for the TBX network: 14 ingress and 16 egress.

4.1.5 Express Lanes Signage

EL signage needs to communicate access (ingress/egress) to the EL and the toll amount from the point of entry to the point of exit in a clear, concise, and timely manner. Consistency in signage and messaging is important for EL usage and public expectations. EL signs must comply with the MUTCD, 2009 Edition, FDOT PPM, FDOT Design Standards, FDOT Express Lanes Handbook and the Florida Turnpike Plans Preparation and Practice Handbook (TPPPH).

The following provides general guidance on the type and placement of the signing sequence based on the statewide recommendations, regional decisions, and coordination with FTE. **Figure 4-1** provides the example of EL sign panels that will be utilized throughout the region and **Figure 4-2** provides an illustration of the Conceptual Master Signing Plan for TBX Section 2. There are two types of DMS signs which are defined below:

- Toll Amount Sign– Signs should be located three quarter mile and one quarter mile in advance of the access/decision point. DMS will be connected to the SunGuide® RTMC. The RTMC will provide real-time toll amount information on these signs. See bottom left sign panel on **Figure 4-1** for example of the Toll Amount Sign.

- Lane Status Sign - Lane status sign, located at the bottom of the entrance guide signs, includes the real-time lane status information to inform the driver if the express lanes are open or closed. The bottom right sign panel on **Figure 4-1** is an example of the lane status sign.

Coordination between District EL designers and FTE shall occur early in the design process, as decisions on access points, gantry locations and signage are all inter-related. For example, if the design cannot accommodate the one-quarter-mile and three-quarters of a mile advanced signage, the facility may require adjustment of the ingress point and associated toll gantry or it may require an exception in the recommended distance. Coordination among these entities early and often will ensure any changes in access points or signage are appropriately accommodated.

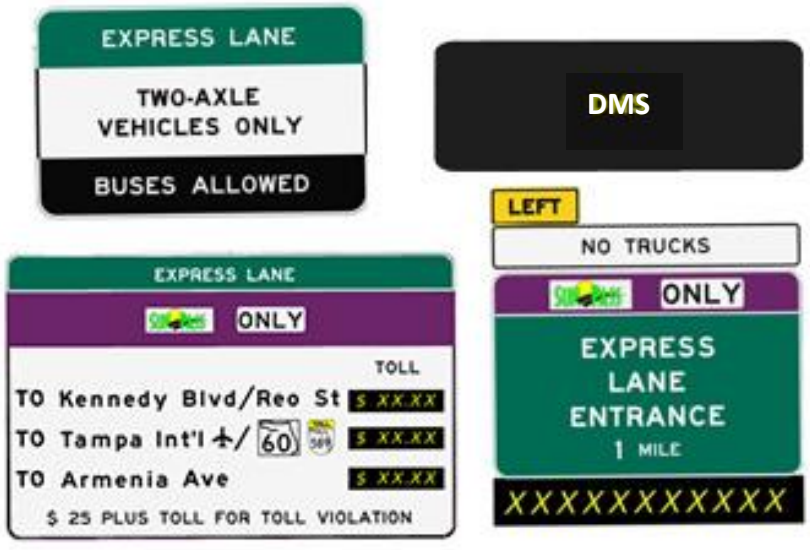
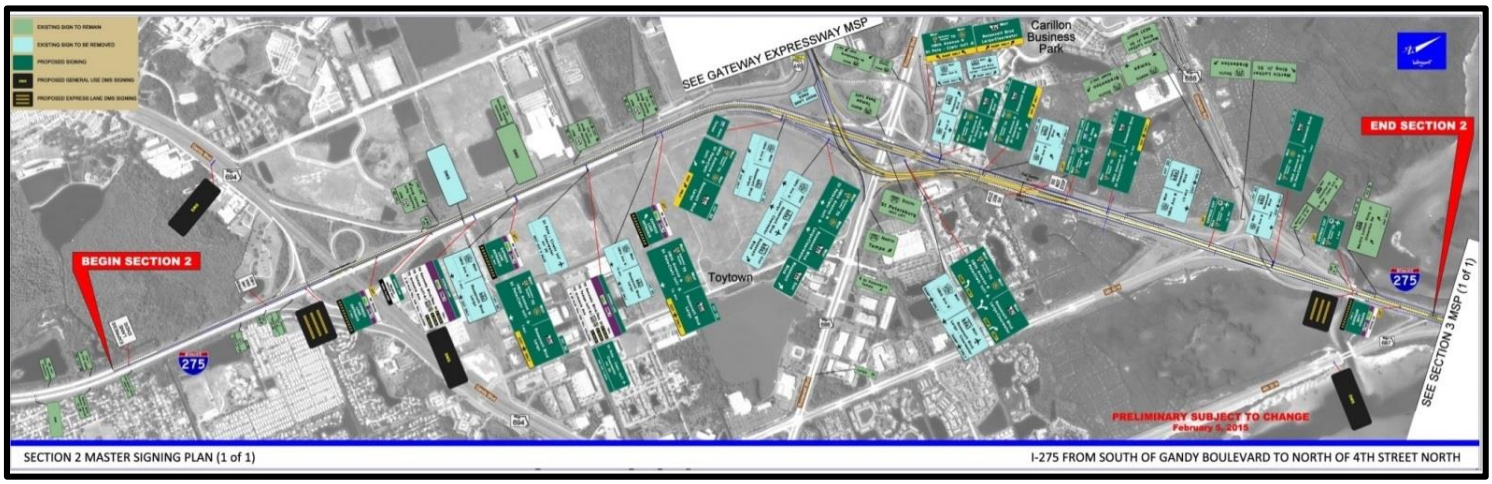


Figure 4-1: Various Express Lane Sign Panels

RCTO Recommendation: Signage
The RCTO recommends that the Conceptual Tolling Plan and Conceptual Master Signing Plan are developed in an iterative manner and shall be revisited after any change to access type/location or a change to gantry placement/type.



Source: Section 2 P D & E Conceptual Master Signing Plan

Figure 4-2: Section 2 Example Conceptual Master Signing Plan

4.1.6 ITS Equipment

ITS equipment is a critical component, necessary to effectively manage the EL network and support the toll equipment. It is essential that ITS decisions are brought into the early planning and design process to ensure that all required elements are adequately accounted for in the design of each EL section. Though the RTMC currently maintains an extensive ITS network for monitoring traffic conditions, collecting data and providing customer information, the implementation of ELs requires additional equipment and communications infrastructure. Other complementary TSM&O considerations should be analyzed such as ramp signaling. FTE, through the use of the SunPass system, will be responsible for the toll collection components. Additionally, the designer must be aware of the Federal Communications Commission (FCC) regulations and will coordinate with the FDOT TSM&O Section for information on licensing, frequency allocation, and other specifics.

The EL ITS equipment will need to be maintained and adhere to higher performance requirements compared to more general ITS equipment. Another important consideration is that ITS equipment is strategically located along the EL corridors to ensure ELs are accessible and maintainable, minimizing the need to require any facility or lane closures.

4.1.6.1 Software Components

In spring 2016, a statewide pricing software was selected for use by each district to determine dynamic toll rates. In Tampa, the RTMC will be responsible for coordinating with FDOT Central Office and FTE for the statewide pricing software. The district shall identify any needed modifications or enhancements to this software early in the TBX network design efforts to provide adequate time to follow the statewide pricing software change management process. The project- or corridor-level ConOps will detail all software needs, agency responsibilities and required interfaces. It will also provide diagrams defining system interactions between all components of the toll system, both software components and roadside toll equipment.

In addition to the pricing software, there are several software programs which the RTMC will need to allow FTE to access. FTE can access the programs via a web portal hosted by the RTMC. FTE required information includes:

- Data on the toll amount posted
- Camera image of the toll amount sign
- Camera image of current lane status
- Traffic event data

The RTMC software also provides an interface to send final toll rates to FTE for fare assignment of transactions as well as reporting capabilities to assist in performance monitoring. **Subsection 4.4.1.3** provides more detailed discussion on the coordination required to ensure the district is collecting and reporting data accurately.

4.1.6.2 ITS Planning and Coordination

ITS components must be coordinated on a regional level to ensure a fully integrated system. The Regional ITS Architecture (RITSA) provides the framework for integrating new ITS projects into the existing system. The District 7 RITSA includes consideration of future ELs in the Tampa Bay Region and has incorporated initial components of the system into the plan, including ELs on the "Gateway Project" (as described in the RITSA), as well as the integration of the dynamic pricing functionality into the ITS system. The "Gateway Project" component of the RITSA discusses the functional requirements and system interfaces needed for operating an EL, including traffic and roadway monitoring and toll collection and administration. Moving forward, it is recommended that the RITSA be updated to discuss these details for each project within the TBX EL network, making sure to address all ITS elements addressed in this RCTO.

On a more detailed level, planning, design, installation, integration and testing of the ITS equipment for the TBX network shall follow a systems engineering process as required by FDOT Procedure 750-040-003. The process includes the development of project- or corridor level ConOps, Systems Engineering Management Plan (SEMP), the System Validation Plan, Requirements Traceability Verification Matrix (RTVM), integration plans and testing plans. The project- or corridor-level ConOps will detail ITS devices included as part of the regional system. The project- or corridor-level ConOps will also provide details on the required interfaces with the FTE customer service center. The ConOps, SEMP, System Validation Plan and RTVM should be initially developed early in the design phase, building upon the recommendations and guidance from this RCTO. The RTVM should be updated throughout design, construction, integration and testing to document and verify that all ITS requirements have been provided and proven to be functioning as intended prior to final acceptance.

RCTO Recommendation: ITS

The following ITS items shall be incorporated with the TBX EL network:

- CCTV cameras, including CCTV for traffic monitoring and incident management, spaced at half-mile intervals. Confirmation cameras shall be located in a position to view, record, and verify the toll amounts displayed on each toll rate sign as well as confirmation cameras to view the lane status signs.
- MVDS, spaced at quarter-mile intervals, provided for EL to enhance traffic monitoring, dynamic pricing, and tolling.
- Power systems, including backup systems, such as generators, redundancy, and uninterruptible power supply (UPS)
- Fiber optic communication lines. District 7 shall coordinate regular evaluations of the communication infrastructure's ability to transmit toll information and recommend additional capacity if necessary. Must include robust lightning protection system, including air terminal, surge suppression and grounding.
- Incorporation of each TBX project into the RITSA.
- Adherence to the systems engineering process (Federal requirement).

4.2 TOLL SYSTEM

4.2.1 Toll Collection

Vehicles are detected and data from the transponder is collected using roadside toll equipment. The data is sent to the transaction host for storage. The data is sent from the transaction host to the toll system back office, to assign transactions to customer accounts or to prepare notices for violators.

4.2.1.1 Roadside Toll Equipment

Each toll site should conform to the requirements set forth in FTE's *General Tolling Requirements*. A transaction begins when the roadside toll equipment detects, captures and temporarily stores information for each vehicle. Inductive loops in the pavement detect the vehicle. Readers located above the lane receive tag information from the SunPass (or other interoperable) transponder via radio frequency. The violation enforcement camera is triggered to capture an image of both the front and rear of each vehicle.

4.2.1.1.1 Express Lane ITS and Toll System Overview

The EL ITS system architecture provides detailed information about the type of roadside equipment to be implemented and the necessary interfaces. The following list provides common roadway ITS devices used in an EL application. The following list of ITS devices were identified during the RCTO meetings. However, it is recommended that this list be revisited during the development of the project- or corridor-level ConOps to identify a more comprehensive list based on the project needs:

Toll System Equipment

- Lane Controllers
- Violation Enforcement System (VES) Cameras
- Automatic Vehicle Identification (AVI) Sensors

RTMC ITS Equipment

- Vehicle Detection Systems
- DMS
- CCTV
- Power Systems
- Communications System

Responsibilities: Roadside Toll Equipment

Non-Turnpike ELs are owned by the district in which they are located. The district is responsible for the capital, operations and maintenance costs of all EL and toll system components. FTE will coordinate with District 7 throughout the planning and design process to provide technical support and ensure statewide consistency and adherence to the GTR. FTE will perform maintenance on toll equipment and the toll equipment building. More detailed information on the cost obligations is provided in **Section 5**.

- Loops – FTE defines the loop layout which are installed by the Toll Equipment Contractor. District 7 is responsible for coordinating with FTE on the site infrastructure (roadway, drainage, pavement, gantry, etc.). FTE is responsible for maintenance (to be funded by the District 7)
- Toll Equipment - FTE is responsible for implementation and maintenance of violation enforcement cameras, readers, antennae, servers, and all other equipment installed by the toll equipment contractor (to be funded by District 7).
- Toll Gantry – District 7 to coordinate with FTE on design and location. District 7 is responsible for construction and maintenance.
- Toll Equipment Building - FTE to review toll equipment building design for conformance. FTE will perform maintenance on the toll equipment building. Electrical components within the building are maintained by FTE, but the power distribution to the building is maintained by District 7.

4.2.1.2 Transaction Host

Toll transaction data is transmitted via fiber optic cable (owned by District 7 and FTE) to FTE's transaction host. This data is stored at the transaction host and sent to the toll system back office for processing. Once processed and verified at the toll system back office, any necessary amendments are sent back to the transaction host where final transaction data is stored.

Responsibilities: Transaction Host

FTE is responsible for processing toll transaction data and operating and maintaining the transaction host. The cost of this is covered by toll revenues from the EL.

4.2.1.3 Toll System Back Office

The toll system back office processing of toll transactions is handled by FTE. For ELs, the toll system back office receives toll amount data (generated by the statewide pricing software, as discussed in **Subsection 4.3.2**) from District 7, assigns this data to transactions received from the transaction host and processes the transaction. This process can be completed automatically, through computer programs or, if necessary, can involve manual processes (such as image review) performed by back office staff. Customer service staff are also available to answer questions about invoices or customer accounts.

Responsibilities: Toll System Back Office

The District 7 RTMC is responsible for sending toll amounts to FTE based on the statewide toll pricing algorithm. FTE is then responsible for assignment of final toll amounts to customers, processing of toll violations and customer service and account management. The cost for these efforts will be funded by toll revenue.

4.3 TOLLING STRATEGY

Criteria for EL tolling is defined in FAC Rule 14-100.003. This includes discussion of toll rate criteria, collection type, eligibility, display of toll rates and fees for violators. Operational guidance relating to those topics and more is also provided in the *FDOT Statewide Express Lanes Handbook*. Regional level activities and responsibilities associated with EL tolling identified during the RCTO process are documented in the following subsections.

4.3.1 Payment Options

FAC Rule 14-100.003 (4) establishes that payment on ELs within the state will be collected electronically via the SunPass (or other interoperable) transponder. Based on this Administrative Code and the operational guidelines established for FDOT ELs throughout the state, all ELs planned for the TBX network (as defined in **Figure 3-1**) will collect tolls using SunPass only.

THEA currently allow both SunPass and toll-by-plate payment options. It is important for the customer to understand toll-by-plate is not an option for TBX ELs. Signage on both THEA and FDOT EL facilities must clearly communicate acceptable payment options. Additionally, public outreach and education distinguishing the difference between payment options for each type of facility is suggested. One aspect that will need focused attention is that motorists without transponders will be treated as customers on THEA ELs, but will be violators on TBX ELs and will incur a $25 per day fine.

Responsibilities: Payment Options

FTE is responsible for all toll system back office processing for FDOT facilities. In this role, FTE will issue notices for violators travelling on these facilities without a transponder. Through their SunPass Customer Service Center, FTE will also assist violators with any questions related to violation notices on FDOT facilities.

District 7, in coordination with FTE, is responsible for all TBX public outreach and facility signage for communicating that EL sare SunPass only. Focused public outreach shall be performed to educate potential customers of the TBX ELs that SunPass is the only payment option. FTE and District 7 will continue to coordinate on the signing sequence for the ELs to ensure the "SunPass Only" message is shown in advance of the entry points to the TBX EL network.

4.3.2 Pricing Strategy

All ELs will be dynamically priced. In an effort to provide consistency in pricing on a statewide level, FDOT requires the use of the statewide pricing algorithm on all district and FTE ELs across the state. The pricing algorithm assigns toll amount based on data from the vehicle detection system (e.g. volumes, speed, level of service) with the purpose of maintaining speeds of 45

mph or more in the ELs. FAC Rule 14-100.003 3(b) also states that the minimum toll amount for an EL trip on the interstate will be $0.50.

Responsibilities: Pricing Strategy

A statewide pricing software is used by District 7 to determine toll amounts. The district shall identify any needed modifications or enhancements to the pricing software early in the TBX network design efforts in order to provide adequate time to follow the statewide pricing software change management process.

District 7 is responsible for communicating the final toll rate at each gantry location to the FTE toll system back office.

District 7 will implement, operate, and maintain required toll rate signs and cameras to assist in confirming and monitoring the posted toll amount.

4.4 OPERATIONS

The RCTO has brought together key agencies who will be involved in the operations of the TBX network on a regular basis and affirmed roles and responsibilities for each of these agencies moving forward as they relate to EL operations. The following subwsections document the status of operational decisions and the recommended actions to be taken upon implementation of ELs.

4.4.1 Regional Transportation Management Center (RTMC)

Implementation of ELs will result in increased activity at the RTMC including additional equipment monitoring, coordination with the FTE back office and customer service center, performance monitoring and enhanced incident response.

4.4.1.1 Equipment Monitoring and Maintenance

District RTMC staff are currently responsible for monitoring and maintaining all ITS equipment deployed on the district's roadways. The implementation of ELs will include additional signage, communications infrastructure, and CCTV cameras specific to EL operation. The district is directly responsible for the monitoring and maintenance of all toll amount and lane status sign equipment. CCTV cameras must be placed to view the toll amount posted on the toll rate signs for monitoring purposes. Additionally, cameras are needed to monitor each lane status DMS. District 7 is also responsible for all power and communications infrastructure required to operate and monitor the ITS equipment.

FTE will perform monitoring and maintenance on all ground/gantry/building mounted toll equipment required for toll collection (e.g. violation enforcement cameras, AVI readers, etc.), in coordination with district RTMC staff.

Lessons Learned from District 6

District 6 representatives attended Technical team meetings and provided the following lessons learned in terms of operations:

- District 6 recommends mitigating bad driving behavior immediately. To eliminate "lane diving," District 6 hired additional FHP troopers to ticket anyone driving in the lane when it was closed.
- Additional management staff was a key to District 6's success - quick decisions required 24/7.
- More training is required for operators, engineers, FHP, etc.
- Have a "go live" plan. Ramp metering had a "days" countdown clock to prepare and inform motorists.
- Have people in the field during opening week.
- Don't take months to make operational changes, do them quickly.
- Consider how existing operations will be maintained during and after construction.
- Business rules need to be tied to project- or corridor-level ConOps.

4.4.1.2 Coordination with FTE Toll System Back Office

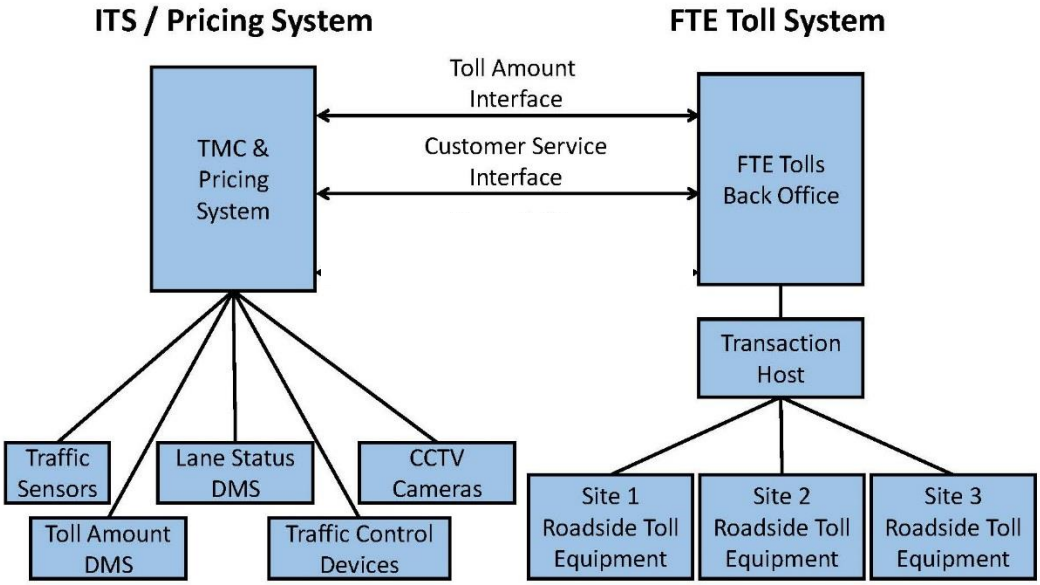
Two main systems interact to perform all of the actions required for toll collection on ELs within the state of Florida. The district is responsible for the RTMC and pricing system, while FTE manages the toll collection and toll system back office. The *FDOT Express Lanes Handbook* illustrates the interaction between these two systems, as shown in **Figure 4-3**.

As shown in the figure, all ITS equipment is connected to District 7's RTMC. Roadside toll equipment communicates with FTE's toll system back office via the transaction host, as described in **Subsection 4.2.1.2**. Two key interfaces exist between the systems as described below:

Toll System Responsibilities

- FTE operates the toll collection system and is responsible for processing toll transactions through roadside toll equipment and toll system back office.
- The district is responsible for the management of the EL traffic operations through the RTMC.

- Toll Amount Interface – The district is responsible for sending the final toll amount to the toll system back office.
- Customer Service Interface – FTE customer service staff will have the ability to view toll amounts displayed at a certain point in time to inform calls regarding customer inquiries and disputes. They can also view any traffic events associated with the ELs and the status of DMS.



Source: FDOT Express Lanes Handbook, 2015

Figure 4-3: Typical Toll System Interfaces

4.4.1.3 Performance Monitoring

With the implementation of ELs, there will be a need to collect and report on network performance. Some key focuses will be maintaining the federal and statewide performance metric of 45 miles per hour in the ELs for 90 percent or more of the time, as well as showing a comparison of average travel speeds between ELs and GULs. Another key performance metric that requires measurement and documentation in advance of any EL being deployed is the comparison of average travel speeds in the GULs before and after implementation of ELs. For this metric, RTMC staff should ensure accurate speed data is collected prior to construction of ELs.

Existing RTMC software allows for the collection of and reporting on the necessary performance measures, as discussed in **Subsection 4.1.6.1,** but consideration should be made to any additional equipment required or staff time allocated to perform this reporting.

4.4.1.4 Enhanced Incident Response

In an effort to minimize impact to travel times and operations of the ELs the district should have performance standards and incentives defined for the incident response providers. Close coordination with law enforcement and other emergency first responders is necessary to ensure efficient operations. Additional discussion regarding this coordination is documented in **Subsection 4.4.2.**

4.4.1.5 Staffing Needs

The district RTMC will require additional staff resources dedicated to the ELs, which can be accomplished via new full-time District 7 positions or through the existing district RTMC staff, Road Rangers, ITS maintenance or ITS general engineering contracts. Initial estimates from the District 7 RTMC assume the need for three or more EL operators for the TBX and Gateway Expressway projects, as well as additional staffing in the IT and Engineering Departments. Maintenance staff and additional Road Rangers will be required for ELs physical closures, quick incident clearance, and maintenance of traffic (MOT).

4.4.1.6 Standard Operating Procedures

Well-documented Standard Operating Procedures (SOPs) and supporting business rules for EL facility operations for event management will also need to be developed, to guide operations during atypical circumstances (e.g. special events, incidents, evacuations, and construction). These procedures should include advanced event notifications to all transportation partners, including: transit agencies, SunPass operations, FHP, adjoining EL operating agencies and RTMC operations, as well as other users.

RCTO Recommendation: RTMC

The RCTO recommends that a full staffing needs assessment be performed for future district RTMC operations, as part of the project- or corridor-level ConOps, to determine exact staffing requirements so District 7 can plan appropriately for their staffing needs. As part of the staffing needs assessment effort, SOPs shall be developed, which define detailed responsibilities, required interfaces and coordination needs.

4.4.2 Incident Management

To meet performance measures and maintain customer expectations, incidents that occur within the ELs will need to be cleared expeditiously. The following activities are options for enhanced incident clearance:

- ***Road Rangers and Other Towing Equipment*** - The District 7 RTMC will be responsible for dispatching Road Rangers and any specialty equipment required to clear incidents. This includes vehicles that are appropriately sized and equipped to remove any buses from the lanes. Currently, District 6 has a flat-bed truck and an on-call heavy duty wrecker as part of the Road Ranger contract. This was indicated as a best practice by District 6. They also have a separate Rapid Incident Scene Clearance (RISC) contract that provides access to additional equipment to clear major incidents including spills.

Lessons Learned from District 6

District 6 has an on-call contract with a flat-bed truck service for use in clearing incidents.

- ***Incident Investigation Areas*** – Due to the physical constraints in the EL facility, locations need to be identified to safely stage vehicles that break down or are involved in incidents. To begin coordination regarding the identification of incident investigation areas, RCTO team members attended meetings with the Pinellas and Hillsborough County Traffic Incident Management (TIM) teams, a group consisting of first responders and enforcement officials operating in the region. Meetings were held in February 2016 to present an overview of the TBX network and to obtain input from this group. Opportunities discussed include HART park-and-ride lots, interstate off ramps and where GUL shoulders allow the appropriate width. The input provided was taken into consideration by TBX designers to incorporate into the PD&E phase.
- ***Standard Operating Procedures*** - District 7 will need to develop SOPs to guide the process of incident management in ELs. Special attention should be paid to the potential for EL facility closures due to incidents. Additionally, EL procedures will need to be defined for contraflow events on routes designated as evacuation routes (e.g. I-4). These detailed operating procedures shall clearly define coordination and responsibilities.

RCTO Recommendation: Incident Management

Incident investigation areas shall be included in the design of ELs within the TBX network. The district shall assess the need for additional Road Rangers and potential use of flat-bed truck and an on-call heavy duty wrecker services. District 7 shall develop SOPs for incident management within ELs.

4.4.3 Enforcement

Traffic violations in the ELs, as in the GULs, are the responsibility of law enforcement. State law prohibits the use of cameras for monitoring of traffic violations; therefore, FHP and other law enforcement is the only way to enforce these violations. The district will need to work with FHP and local law enforcement to assess the use of the hire back program and coordinate speed enforcement, illegal access/egress and unauthorized vehicles. Toll violations will be handled by FTE.

Lessons Learned from District 6

District 6 uses a hire-back program for additional FHP troopers

4.4.4 Maintenance

ELs shall be maintained to ensure operations are not compromised by the physical state of the roadway. To facilitate proper maintenance, FS 338.166 states that operations and maintenance costs shall be funded by the tolls collected on state owned and operated EL facilities. Maintenance responsibilities can be defined by three categories, as defined in the following subsections: toll systems, EL ITS and roadway maintenance.

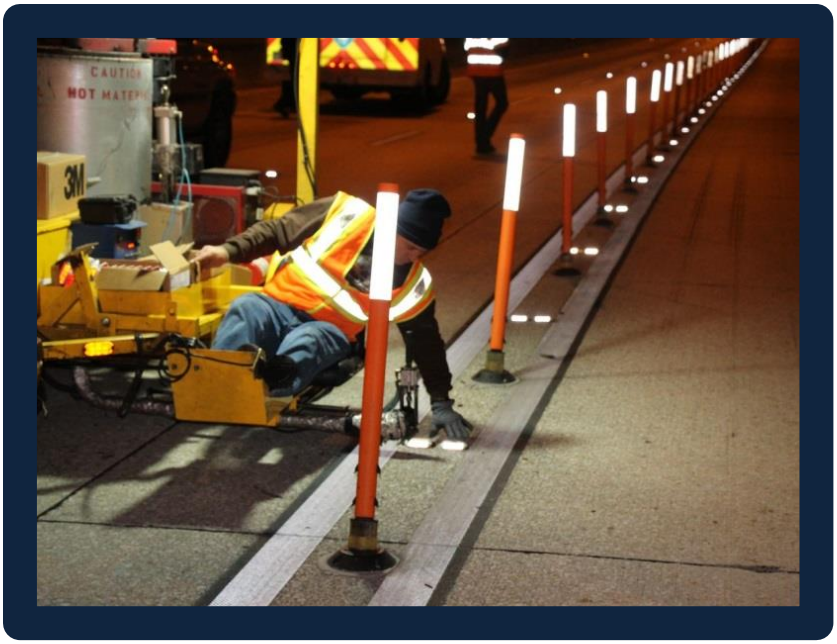
4.4.4.1 Toll Systems Maintenance

FTE will perform all toll equipment maintenance, including maintenance of CCTV cameras, readers, antennae, servers and all other devices installed by the toll contractor, as well as maintenance of the toll equipment building. Coordination will occur with District 7 on any facility access or traffic control needs for these maintenance duties. District 7 will be responsible for the maintenance of all gantry structures. The district must notify FTE when performing toll gantry structure inspections and the FTE will perform an annual inspection of the toll gantry.

4.4.4.2 EL ITS Maintenance

Maintenance of all ITS roadside equipment and communication required for EL operations is the responsibility of District 7. This equipment will be integrated into the district's current ITS facilities management (ITS-FM) system to enable asset management and protection.

As TBX projects roll out with new EL-specific ITS equipment, such as toll rate signs, MVDS, and cameras specific to ELs it is critical that RTMC staff provide an accurate cost estimate to incorporate in existing and new ITS maintenance contracts. ITS maintenance requirements need to address routine preventative maintenance and define response times for repair of malfunctioning ITS equipment to reduce the risk of operational impacts due to prolonged equipment outage.



4.4.4.3 Roadway Maintenance

Roadway maintenance activities need to be adjusted and new procedures established for maintenance of additional items such EL markers. The EL markers can have the most impact on existing asset maintenance contracts so it is critical to include a replacement cost for these EL markers. Lessons learned from District 6 indicate this cost can be over $1 million per year.

District 7 is responsible for budgeting the maintenance costs and must ensure their Work Program Manager has coordinated with Central Office Toll Finance Manager for the programing of funds to cover maintenance activities of an EL facility.

4.4.4.4 Standard Operating Procedures

District 7 shall develop SOPs to define procedures for all maintenance activities and establish performance measures. SOPs shall focus on required processes and coordination to minimize impact to operations while safely performing roadway, toll system and ITS maintenance. SOPs shall document coordination with ongoing maintenance activities and coordination between District 7 maintenance staff, RTMC staff, FTE and FHP regarding activities such as traffic management for necessary lane closures, the dissemination of toll amount information, and invoicing considerations for EL closures.

RCTO Recommendation: Maintenance
District 7 will be responsible for maintenance activities as defined in this section. District 7 and FTE shall coordinate regularly regarding maintenance activities. SOPs shall be developed detailing procedures and required coordination for all EL maintenance activities. The district must budget for EL maintenance costs and have their Work Program Manager coordinate with Central Office Toll Finance Manager to program the funds.

4.4.5 Operational Scenarios

As the EL network progresses, a project- or corridor-level ConOps shall be developed, which details network interactions, communications protocols and required coordination. The project- or corridor-level ConOps:

- Communicates user needs and the proposed network expectations
- Communicates the network developer's understanding of the user needs and how the network will meet those needs

Operational Scenarios shall be developed as part of the project- or corridor-level ConOps, which provide a detailed description of how an EL should operate and interact with customers, as well as with those who operate, maintain, and enforce the facility. The scenarios should be written in nontechnical language, which allows the reader to understand how all components of the system function and interact.

RCTO Recommendation: Operational Scenarios

Scenarios shall be developed for all exceptions to the normal mode of operation (e.g. emergency evacuation, facility maintenance and repair work, incident blocking entry/exit, incident blocking GULs, etc.) and for all conditions. Each Operational Scenario shall provide readers with a comprehensive understanding of the network operations from the viewpoint of various users.

4.4.6 Performance Monitoring

The day-to-day operations and management of the EL network requires real-time knowledge and data of both the ELs and the adjacent GULs. Monitoring and evaluating the performance of both ELs and GULs provides information on lane performance and helps to identify the existence of any issues or concerns.

The primary use of District 7's traffic volume data is input to the statewide pricing software for calculation of the toll amounts and performance reporting.

4.4.6.1 Data Collection

Data requirements need to be determined early in the design process so that proper data collection devices and reporting software are in place. For ELs, four general categories of data are collected to support performance monitoring and reporting procedures, including:

1. Traffic performance data - To measure the amount of traffic, raw volume counts and speed data will be collected from MVDS. The MVDS should be installed in both the EL and GUL to facilitate comparative analysis, as well as to allow for pricing and performance monitoring. Toll amount data – The amount posted on the toll rate sign is maintained by the District 7 RTMC and provided to the FTE toll system back office. The toll amount is compared with traffic volume and speed data (collected by District 7 RTMC) to evaluate the impact of toll amounts on traffic operations (e.g. how much do speeds improve with increases in tolls? Etc.).

Typical raw data outputs for traffic quantity statistics are:

- Volumes (AADT, peak period)
- Lane occupancy
- Trip origin and destination pairings (within EL)
- Vehicle type

Typical raw data outputs for traffic quality statistics are:

- Speed
- Speed > 45 mph
- Speed vs. volume
- Travel time

2. Safety and crash data - Crash data, regarding the number and severity of crashes, is documented by the RTMC in coordination with FHP. This information is used to illustrate safety performance in the ELs and GULs.

3. EL and/or GUL facility closure data – Closure event data collected by District 7 to monitor EL closure duration as a result of planned or unplanned incidents.

The data collected by the roadside toll equipment is provided by FTE to District 7 and serves as the official traffic volume data for the facility. District 7 shall coordinate any planned reporting efforts with FTE prior to EL implementation.

4.4.6.2 Database Management Requirements

The implementation of ELs will introduce additional data storage needs for the District 7 traffic database. Original data, including raw traffic counts and speed information, collected from the field should be saved for a specified period of time and available in some query format. Many data archiving systems aggregate data to a consistent time interval (five minutes is most common) for loading into a data archive. The technological processes used for database management is at the discretion of the District 7 operations staff.

4.4.6.3 Reporting

A successful reporting program efficiently communicate EL network performance for various purposes. Many reports are used by the operations team for internal performance monitoring while other reports are used by customers and the general public to see the performance of the EL network.

The project- or corridor-level ConOps should outline the workgroup with the primary responsibility for organizing and collecting the reporting data. This will improve efficiency in reporting processes and improve communication with stakeholders who request information from District 7. Due to the frequency and complexity of data reporting, it is recommended that all processes be automated.

During the development timeframe of this RCTO, FDOT was concurrently working to define guidelines for statewide performance reporting. These efforts were aimed at providing consistent performance measures and to develop a common report that could be used for all EL networks across the state. The performance measures focused on those related to mobility, customer satisfaction, and other operational characteristics. The efforts included the following:

- Set performance goals at a statewide level
- Measure and report performance of GULs before and after the ELs are implemented
- Defined a peak period on which all regions will report (note: statewide guidance allows regions to choose their own peak period when reporting at a regional level)
    - 2-hour peak period
    - 7 to 9 a.m. for morning period
    - 4:30 to 6:30 p.m.
    - Typical Monday through Friday (excluding holidays and special events)
    - Measure both peak and off peak directions
- Identified other measures considered for reporting include:
    - 95th percentile travel time index
    - Average travel speed
    - Vehicle miles traveled
    - Vehicle hours of delay
    - Percent of time speed is at posted speed limit or above (for peak period)
    - Travel Time Index (TTI)
    - Buffer time index

    - Travel times
- Determined that segmentation will be provided by FDOT Central Office, to be based on:
    - Freeway to freeway interchanges
    - Major core areas (e.g. airports, downtown areas)

Appendix A provides an example of a reporting tool that summarizes the key EL performance metrics for a specific time period. This will need to be modified to adjust to the final decisions of FDOT Central Office in regards to statewide EL reporting.

RCTO Recommendation: Performance Monitoring

A Performance Monitoring and Reporting Team shall be established in coordination with the development of the project- or corridor-level ConOps. Responsibilities for this team will include data collection, report development, the development of quality control measures, and the planning and budgeting for data collection and reporting efforts. This team should coordinate with ongoing statewide efforts to develop performance measures that are consistent with other regions across the state as discussed in this section. The Team will also need to decide what, if any, additional performance measures that might be beneficial to report on at a regional level.

5 CAPITAL, OPERATING AND MAINTENANCE COSTS

The initial capital cost and ongoing operations and maintenance expense for the ELs must be budgeted and funded by District 7. Details are provided below that briefly summarize funding responsibilities for FTE and District 7 with regard to EL planning, design, implementation, operation and maintenance.

5.1 CAPITAL COSTS:

Capital cost requirements for ELs include costs associated with the design and construction of the roadway, as well as the toll system and associated communications infrastructure. Specific components include:

- Right-of-way acquisition
- Roadway design and construction
- Toll site design and construction
- ELs toll equipment
- ITS infrastructure
- Signage (both static and DMS)
- District fiber optic communications
- Redundant communications (either separate district fiber path or leased telecommunications lines)
- MOT
- Permits

5.2 OPERATING AND MAINTENANCE COSTS:

District 7 must plan for funding the maintenance of the physical roadway which includes replacement of EL markers and other associated costs to operate and maintain the ELs. The district must also consider and plan for the cost of additional staff requirements. Staffing needs identified in the RCTO include increased Road Rangers, RTMC staff, FHP, and communications staff. Specific operating and maintenance costs include:

- Maintenance of the roadway and toll site infrastructure
- Toll site electric utilities
- Toll site and toll equipment maintenance
- RTMC staffing and Road Rangers for ELs
- Additional highway patrol (if necessary)
- Toll transaction processing
- ITS infrastructure maintenance
- Communications system maintenance
- ELs traffic reporting (volumes, speed, incidents)
- Annual update of EL Traffic and Revenue report
- Replacement of EL markers

6 PUBLIC OUTREACH

Public Outreach during the planning, design, construction, implementation, and operational phases of the TBX EL network is critical in educating the customer and gaining support for the network. To facilitate an efficient communications and outreach effort, a plan must be established to define how, when and who will develop and deliver the messages and what the message will be.

The District 7 staff has been actively engaging with the public regarding the development of the EL network in the Tampa Bay Region. This outreach is focused on the PD&E phases of the TBX EL network and are documented in Chapter 9 of the *Draft Tampa Bay Express Master Plan*. The public outreach objectives include:

Outreach and Marketing Plan

- **What** is the message?
- **How** will the message be delivered?
- **When** should the message be delivered?
- **Who** should deliver the message and who is the audience?

- Creating project detail awareness and receiving input, thoughts and opinions about the proposed TBX network
- Educating the public on the benefits of the TBX network for the region

As the region moves beyond the *Draft Tampa Bay Express Master Plan* and PD&E phases into design, outreach efforts will need to continue, building upon the principles established through this effort.

6.1 PHASED APPROACH

Through the *Draft Tampa Bay Express Master Plan* development efforts, key messages, audiences and outreach methods were defined by phases, which included planning, design and implementation. The following subsections summarize the efforts established for initial phases and provides recommendations for future stages

6.1.1 Audiences

The *Draft Tampa Bay Express Master Plan* defines key audiences for the initial planning phases. The initial outreach focused on elected officials, regional leaders, transportation agencies and professionals, transportation supporters, and the media. Following this initial outreach, outreach should include neighborhood groups, business associations, political, social and religious organizations and underrepresented communities.

As the projects move towards implementation, continued outreach to these individuals and groups is needed. Additionally, outreach shall occur to identify and publicize success stories to the general public, as well as to understand and mitigate any consumer concerns with the TBX EL network.

6.1.2 Key Messages

The *Draft Tampa Bay Express Master Plan* provides both targeted messages for each phase of implementation, as well as overarching messages that are intended to resonate through all phases of communication. The guiding messages for TBX are:

- ELs are a travel choice;
- ELs provide long-term congestion management tool to enhance mobility and improve predictability in travel time; and
- Vehicles utilizing the ELs must use a SunPass.

The following describes targeted messages developed for specific audiences:

- Regional Leaders and Decision Makers – The TBX EL network manages congestion, improves mobility (for both quality of life and movement of goods), provides commuters a choice, promotes connectivity, supports transit and is cost effective
- Residents/Network Users – The TBX EL network provides a convenient, reliable, affordable, faster commute option, which is transit supportive and relieves congestion

Key messages will evolve over the course of the implementation process. Through the design phases, targeted outreach will need to occur to educate potential customers on how to use the network and the benefits to using the ELs. The TBX communications team will also need to continue spending time working with any groups that feel disproportionately impacted during this timeframe. As EL projects progress into implementation, messaging will focus on answering questions about construction impacts and project timeline, while continuing the public outreach and education efforts. Once EL projects are open to traffic, the TBX communications team will need to respond to operational questions (in coordination with the FTE customer service center) and report on network performance.

6.1.3 Public Outreach Methods

Various public outreach tools are employed to help deliver key messages to the intended audiences. Tools such as focus groups and surveys were used during the *Draft Tampa Bay Express Master Plan* effort to better understand public perceptions and to help inform project champions and develop appropriate messages. Once the message was established, informational tools such as a public website and collateral materials were used to disseminate the message.

The **TBX website** promotes the TBX EL network, as well as provides project information including project status and updates, frequently-asked-questions, and public outreach. The website also serves as a central location to have questions answered and share resources with the public and media.

Moving forward, these tools will be built upon, incorporating new information as projects progress to operation.

6.1.4 Branding

Branding is an important tool for establishing a sense of consistency and reliability for customers who will use the various EL facilities statewide. The Flying "e" logo, illustrated to the right, is used along each EL facility in the region and across the state and on any accompanying information messaging or educational outreach material. The Flying "e" provides to customers a sense of connectivity, and helps reduce customer confusion.

6.2 PUBLIC OUTREACH ROLES AND RESPONSIBILITIES

Various agencies and departments within these agencies will be responsible for different aspects of public outreach for the TBX network, as detailed in **Table 6-1**. District 7 will manage the overall outreach process. Coordination should occur between the district and the Express Lanes Planning Department at FTE, who are responsible for the statewide coordination of public outreach activities for EL projects. Currently, a district Public Information Officer (PIO) representative is focused full-time on TBX EL network outreach efforts. District 7 should continue to fund this position and also monitor outreach efforts to ensure one dedicated staff member is sufficient to handle communication needs

6.3 IDENTIFICATION OF PROJECT CHAMPIONS

Project champions are individuals or groups of individuals from organizations outside of the implementing agencies who can advocate for the project and help gain support. Project champions can be influential in political processes by communicating with affected politicians and interest groups, educating these groups on the concept of the project, answering questions, and addressing concerns. Early identification of champions and their continual support throughout implementation and operations is critical.

Table 6-1: Public Outreach Responsibilities

Organization	Public Outreach Responsibilities
FDOT (Includes Districts 1 and 7, State Traffic Engineering and Operations Office, Systems Planning Office, Office of Planning Policy, Emergency Management Office, Office of Environmental Management, Office of Freight, Logistics, and Passengers Operations (FLP))	• Manage public outreach efforts for TBX network *(District 7)* • Educate and outreach to customers *(District 7 and FTE)* • Run the network website and project websites *(District 7)* • Create approved fact sheets and social media material *(District 7 and FTE)* • Employ communications via email blasts, newsletters, and facility tours *(District 7)* • Provide necessary alerts to TBX PIO regarding daily traffic *(District 7 RTMC)*
FTE	• Provide general public outreach material that gives the traveling public a consistent message about ELs • Provide general customer support associated to toll invoicing and payments • Coordinate with District 7 to make sure all customer service calls are routed to the correct entity (FTE for toll-related calls and District 7 for travel-related calls) • Educate and outreach to customers about SunPass via websites, email distribution and other media • Provide real-time facility condition information on FTE facilities • Communicate toll violation policy
FHWA	• Educate and outreach pertaining to federal guidance
Hillsborough County MPO, Pasco County MPO, Pinellas County MPO, and Polk TPO	• Communicate how ELs are included in Long Range Planning efforts via websites • Work with District 7 PIO to share project information and participate in public education
Transit Agencies - HART, PSTA	• Communicate updated service information via websites, on-board information and email distributions • Promote benefits of ELs for transit service

RCTO Recommendation: Public Outreach
The RCTO recommends that District 7 continue to fund full-time staff support for public outreach efforts for the TBX network. Outreach methods, messages and branding shall be consistent with other Florida EL networks; therefore, the TBX outreach team should continue coordination with these districts and FTE.

Appendices

Appendix A: Sample Reporting Sheet

Florida Department of Transportation
SunGuide Transportation Management Center – District VI
1001 NW 111 Avenue • Miami, Florida 33172
Phone: 305.470.5757 • Fax: 305.470.5832

95 Express Monthly Operations Report – February 2016

General

In total, the 95 Express Lanes:

- ✓ Serviced 1,849,374 vehicle trips in February 2016 (3.65 million trips in 2016 to date), bringing the total since opening (December 5, 2008) to approximately 134.5 million trips.
- ✓ Had estimated monthly toll revenue of $2.67 million in February 2016 ($5.51 million in 2016 to date), bringing the total revenue since opening to date to approximately $130.0 million.
- ✓ Increased to a total of 9,395 registered vehicles, resulting in 63,750 toll exempt trips.

February 2016 Statistics	Southbound			Northbound		
Total Trips	959,401			889,973		
Exempt Trips	31,745			32,005		
Revenue	$775,719			$1,890,060		
Tolls						
- Range	$0.00 - $8.50			$0.00 - $10.50		
- Avg. Weekday	$1.06			$2.96		
- Avg. Peak Period**	$1.50			$7.63		
- Avg. Weekend	$0.57			$0.77		
- Avg. Off Peak	$1.01			$1.81		
- 85th Percentile	$1.00			$8.25		
Volume (veh)	**EL**	**LL**		**EL**	**LL**	
- Avg. Weekday	35,566	103,479		32,616	100,984	
- Avg. Peak Period**	9,305	16,189		7,316	15,862	
Speed (mph)	**EL**	**LL**	**Δ**	**EL**	**LL**	**Δ**
- Avg. Overall	64	55	9	63	56	7
- Avg. Peak Period**	56	36	20	42	26	16
Operated Above 45 MPH	98.7%			93.6%		
Remained Open to Motorists	90.5%			88.4%		
Closed due to Planned Construction	6.8%			7.7%		
Closed due to Non-recurring Events	2.7%			3.9%		

*EL (Express Lanes); LL (Local Lanes); **Peak Period is defined as 6-9 AM (southbound) and 4-7 PM (northbound).*

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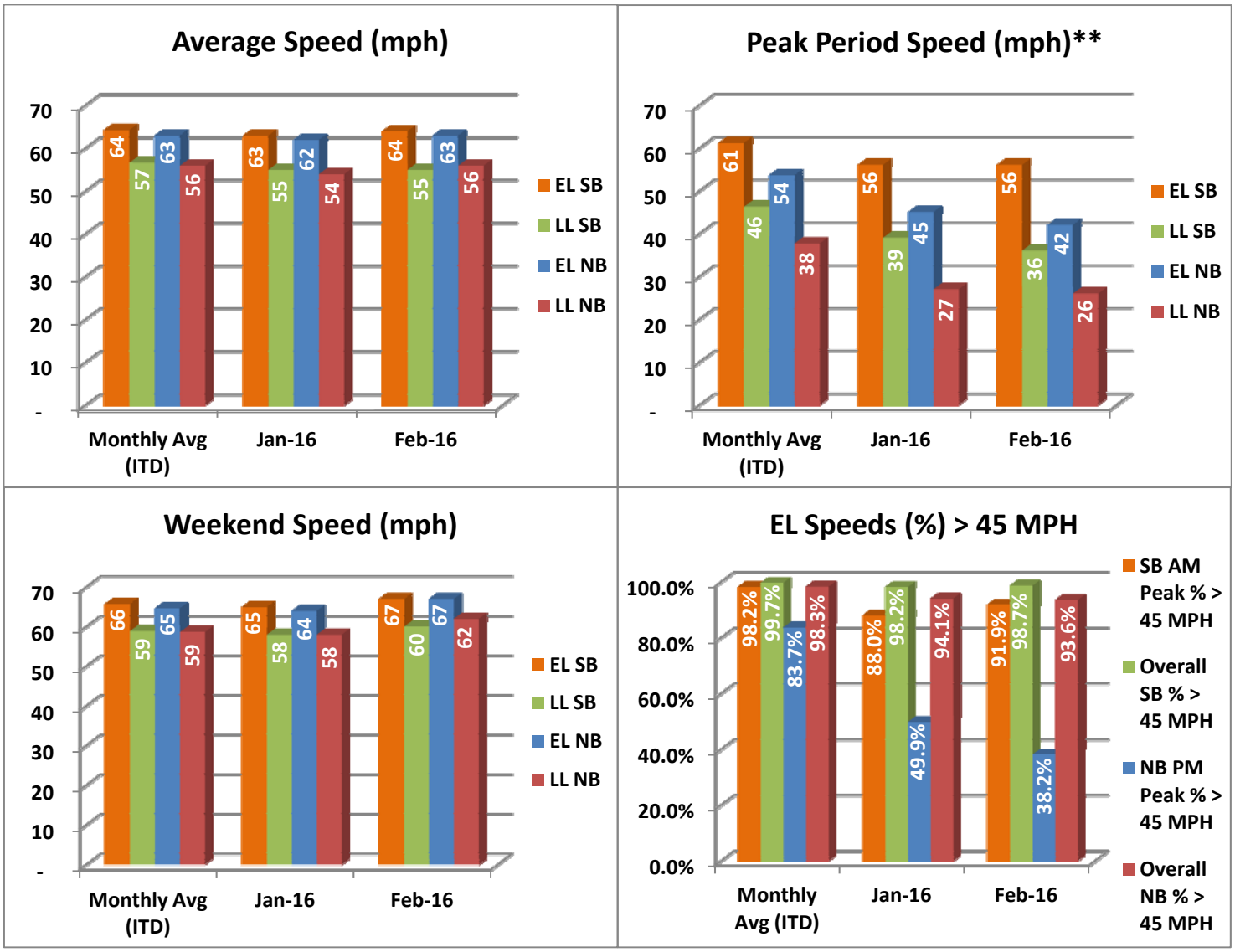
95 EXPRESS

Operations/Traffic Statistics - Speed Data

** Peak Period is defined as 6-9 AM (southbound) and 4-7 PM (northbound).



NOTE: ITD = Inception to Date; EL = Express Lanes; LL = Local Lanes

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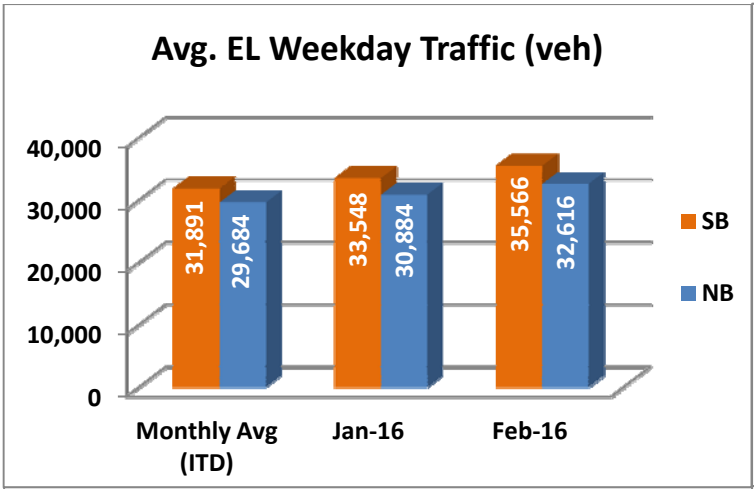
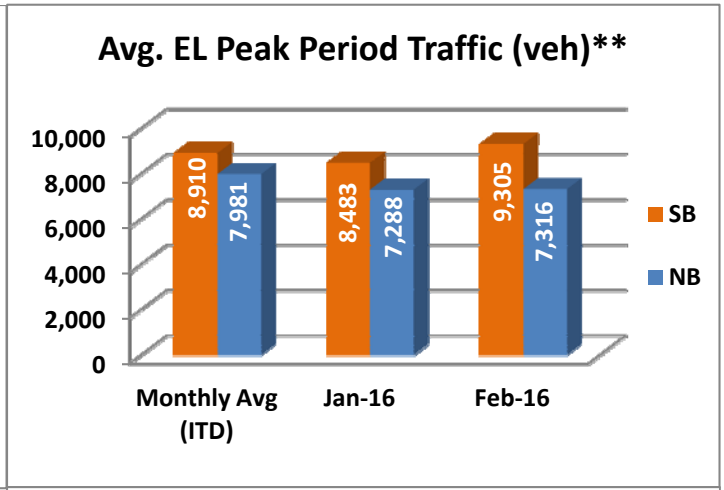
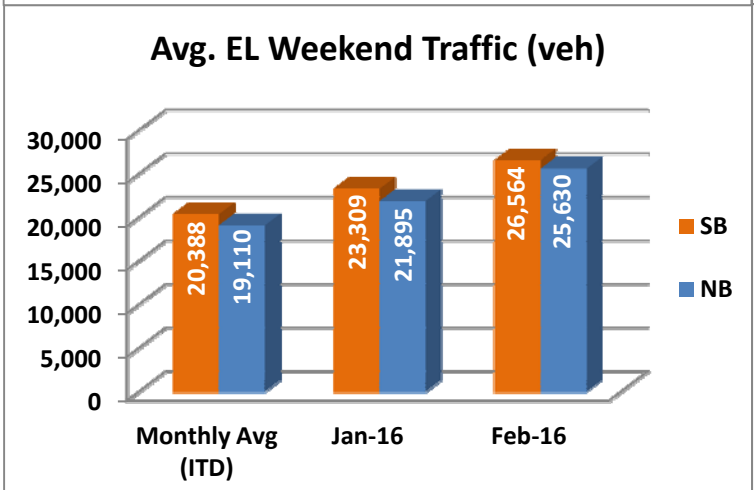
95 EXPRESS

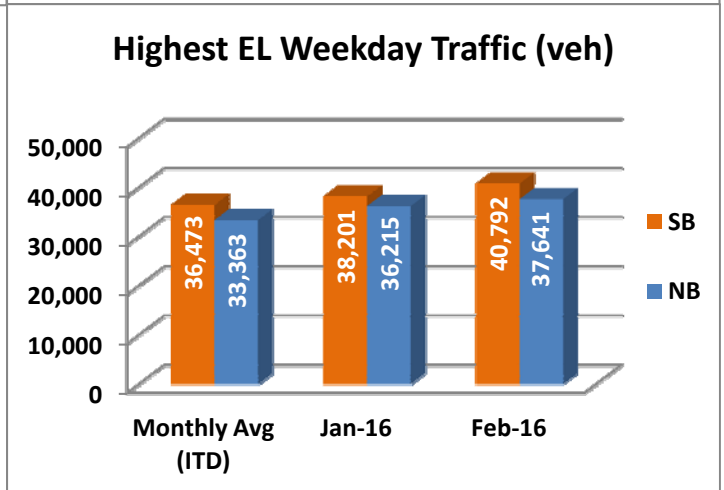
Operations/Traffic Statistics - Volume Data

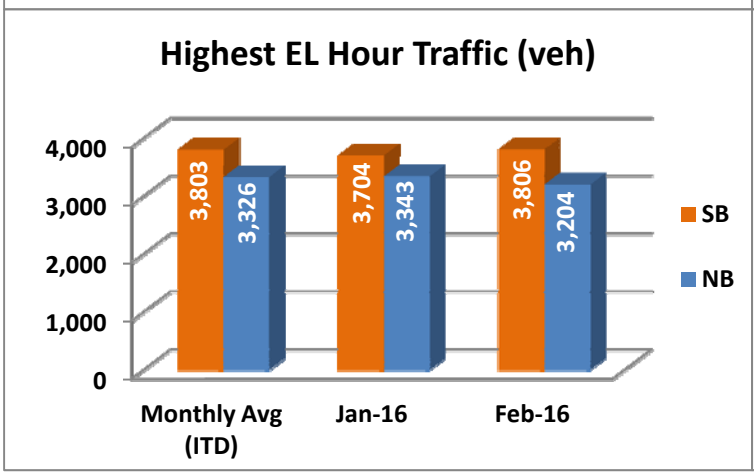
** Peak Period is defined as 6-9 AM (southbound) and 4-7 PM (northbound).

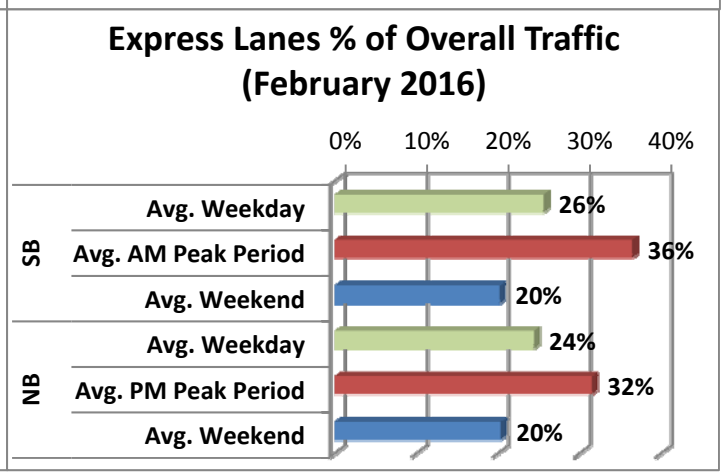












NOTE: ITD = Inception to Date

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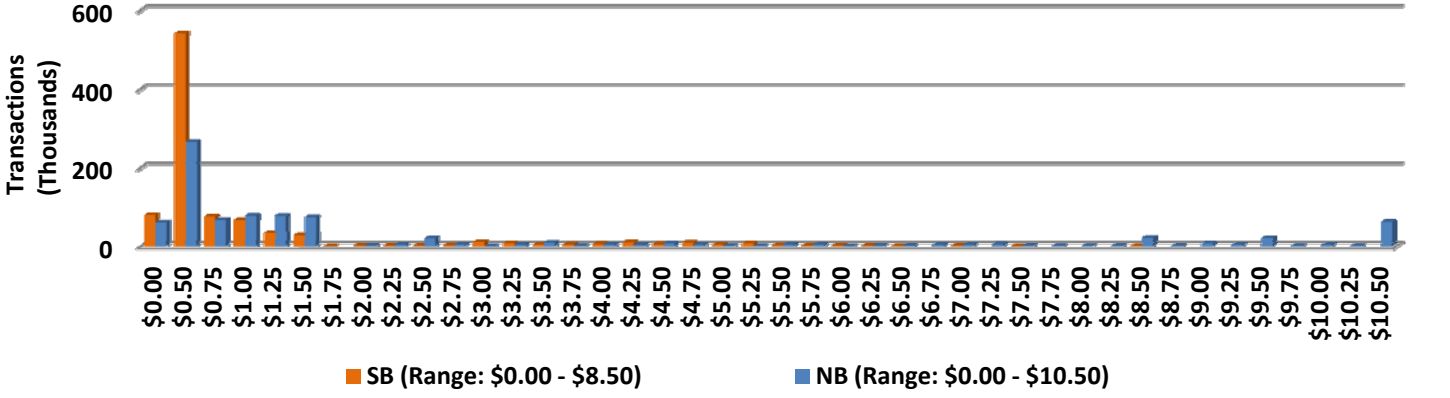
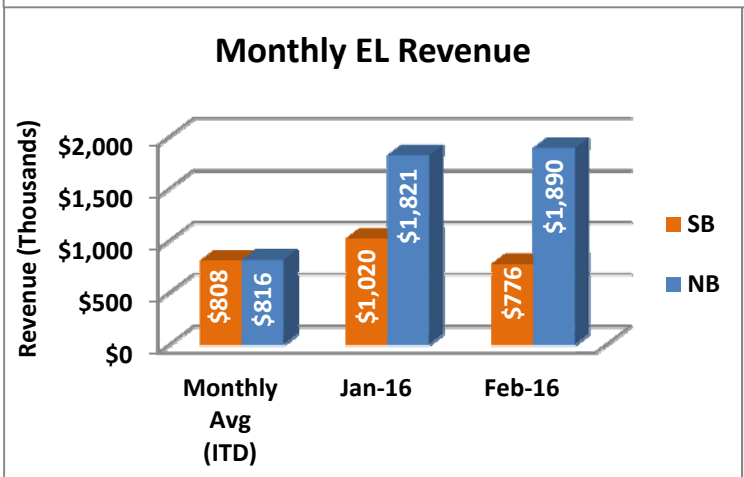
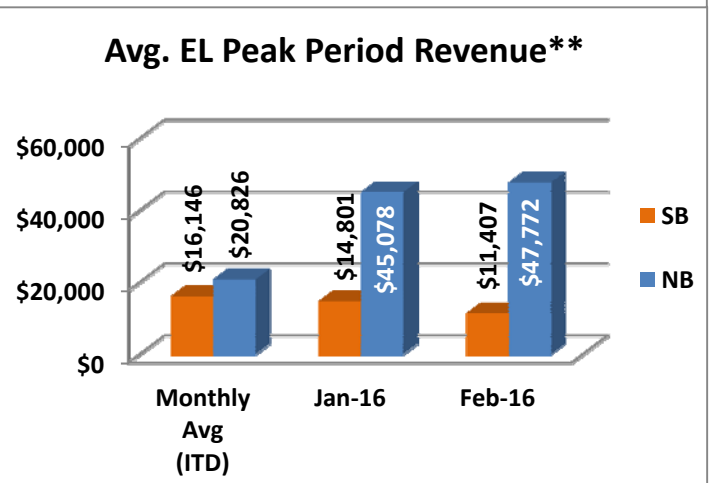
95 EXPRESS

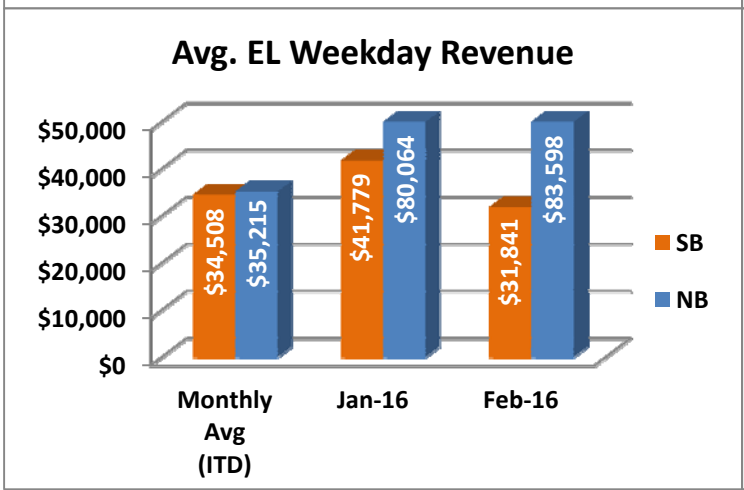
Revenue/Tolls Statistics

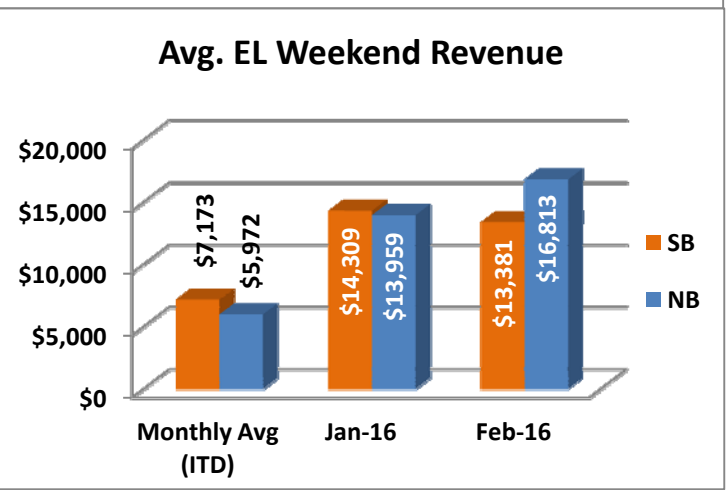
** Peak Period is defined as 6-9 AM (southbound) and 4-7 PM (northbound).











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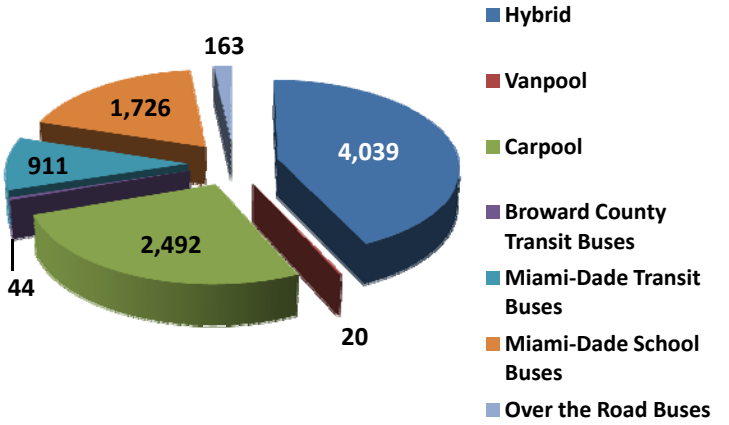
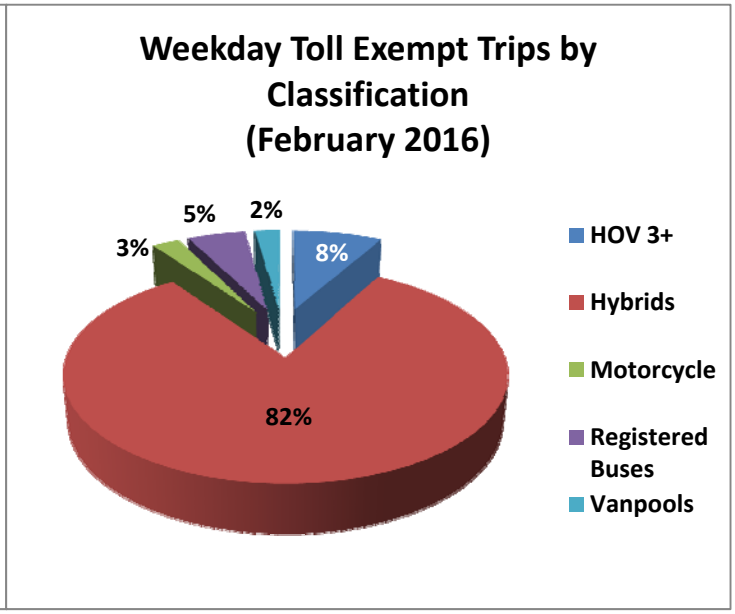
95 EXPRESS

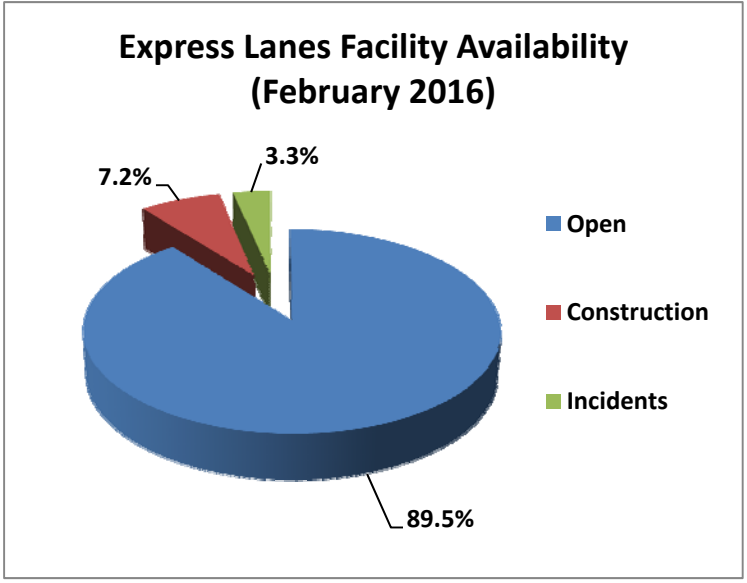
Registrations—Toll Exempt Trips

The total registrations through February 2016 increased to 9,395. The Weekday Toll Exempt Trips for this month are shown by classification below.





Facility Availability



The entire 95 Express lanes (both directions) were open to motorists 89.5% of the time, while closed 7.2% due to 21 planned construction/ maintenance events (each lasting approximately 4 hours, 48 minutes in duration, on average) and 3.3% due to 96 non-recurring events (each lasting approximately 29 minutes in duration, on average).