#### CONCEPT OF OPERATIONS

#### Florida Department of Transportation (FDOT)

#### District Six

I-95/State Road (SR) 9 Project Development and Environment (PD&E) Study
From South of SR 860/Miami Gardens Drive to North of Broward County Line
Miami-Dade County, Florida

Financial Management Number: 414964-1

ETDM Number: 14419 April 2025

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated December 26, 2022 and executed by Federal Highway Administration and FDOT.



# CONCEPT OF OPERATIONS

I-95/State Road (SR) 9 Project Development and Environment (PD&E) Study From South of SR 860/Miami Gardens Drive to North of Broward County Line Miami-Dade County, Florida

> Financial Management Number: 414964-1-22-01 Federal Aid Project Number: N/A Efficient Transportation Decision Making (ETDM): 14419

### **DISTRICT VI**





The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.

# **Concept of Operations (ConOps)**

# Interstate 95 (I-95) / State Road (SR) 9 Project Development and Environment (PD&E) Study

FDOT Financial Project Identification Number: 414964-1-22-01 Efficient Transportation and Decision Making (ETDM) Number: 14419

#### **Project Study Limits:**

From South of SR 860/Miami Gardens Drive to North of the Miami-Dade/Broward County Line Miami-Dade County, Florida



# FLORIDA DEPARTMENT OF TRANSPORTATION District Six 1000 NW 111th Avenue Miami, Florida 33172

Version: 2.5

**Approval Date: TBD** 

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by FDOT pursuant to 23 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022, and executed by FHWA and FDOT.

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# **List of Acronyms and Abbreviations**

23 CFR 940	Federal Rule for ITS Planning and Architecture Development
AADT	
ADMS	
AET	Automated Electronic Tolling
APL	Approved Product List
C2C	
CAV	
CCTV	
CE&I	
ConOps	
CR	
DDI	Diverging Diamond Interchange
DMS	Dynamic Message Sign
	Express Lane
EL	
ELM	Express Lane
ELELMEL-MVDS	Express Lane  Express Lane Marker
ELEL-MVDSEOR	Express Lane  Express Lane Marker  Express Lane Microwave Vehicle Detection System
ELELMEL-MVDSEORESS	Express Lane  Express Lane Marker  Express Lane Microwave Vehicle Detection System  Engineer of Record
ELELMEL-MVDSEORESSETC	Express Lane Express Lane Marker Express Lane-Microwave Vehicle Detection System Engineer of Record Emergency Stopping Site
EL ELM EL-MVDS EOR ESS ETC ETDM	Express Lane Express Lane Marker Express Lane-Microwave Vehicle Detection System Engineer of Record Emergency Stopping Site Electronic Toll Collection
ELELMEL-MVDSEORESSETCETDMFDOT	Express Lane Express Lane Marker Express Lane-Microwave Vehicle Detection System Engineer of Record Emergency Stopping Site Electronic Toll Collection Efficient Transportation and Decision Making Florida Department of Transportation
EL	Express Lane Express Lane Marker Express Lane-Microwave Vehicle Detection System Engineer of Record Emergency Stopping Site Electronic Toll Collection Efficient Transportation and Decision Making
EL	Express Lane Express Lane Marker Express Lane-Microwave Vehicle Detection System Engineer of Record Emergency Stopping Site Electronic Toll Collection Efficient Transportation and Decision Making Florida Department of Transportation Florida Highway Patrol
EL	Express Lane Marker Express Lane Marker Express Lane-Microwave Vehicle Detection System Engineer of Record Emergency Stopping Site Electronic Toll Collection Efficient Transportation and Decision Making Florida Department of Transportation Florida Highway Patrol Federal Highway Administration
EL	Express Lane Marker Express Lane Marker Express Lane-Microwave Vehicle Detection System Engineer of Record Emergency Stopping Site Electronic Toll Collection Efficient Transportation and Decision Making Florida Department of Transportation Florida Highway Patrol Federal Highway Administration Florida Advanced Traveler Information System
EL	Express Lane  Express Lane Marker  Express Lane-Microwave Vehicle Detection System  Engineer of Record  Emergency Stopping Site  Electronic Toll Collection  Efficient Transportation and Decision Making  Florida Department of Transportation  Florida Highway Patrol  Federal Highway Administration  Florida Advanced Traveler Information System  Florida Turnpike Enterprise

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GPS	Geographic Positioning System
GTR	General Tolling Requirements
GUL	
HAZMAT	
HOV	High Occupancy Vehicle
HVAC	Heating Ventilation Air Conditioning
IDS	Incident Detection Subsystem
IT	
ITS	Intelligent Transportation System
LOS	Level of Service
LSDMS	Lane Status Dynamic Message Sign
	Maintenance of Communication
MOT	
MVDS	Microwave Vehicle Detection System
	Not Applicable
O&M	Operations and Maintenance
OTM	Operations Task Manager
PD&E	Project Development and Environmental
PIO	Public Information Office
PSEMP	Project Systems Engineering Management Plan
RCTO	Regional Concept for Transportation Operations
RISC	
RITSA	
RSS	
RTVM	Requirements Traceability Verification Matrix
	heast Florida Regional TMC Operations Committee
SELS	State Express Lanes Software
SEMP	Systems Engineering Management Plan
SERPM	Southeast Regional Planning Model
SIS	Strategic Intermodal System
SR	State Road
TADMS	Toll Amount Dynamic Message Sign

TAS	
TBD	To Be Determined
TIM	Traffic Incident Management
TMC	
TOD	Time of Day
TS&S	Traffic Signals & Signs
TSS	Transportation Sensor Subsystem
TSM&O	
USDOT	
V2X	Vehicle-to-Everything
V-CCTV	CCTV Cameras used to Verify DMS Messages
VDS	Vehicle Detection System
WAN	
WWD	Wrong Way Detection

#### 1. Overview

The Florida Department of Transportation (FDOT), District Six (D6) began operations of the Interstate 95 (I-95)/State Road 9 (SR 9) Express Lanes (EL) during 2008. This was the first EL project implemented within the State of Florida funded through a United States Department of Transportation (USDOT) "Urban Partnership Agreement" focusing on the 4 Ts (i.e., tolling, transit, technology, travel demand management). The EL program has expanded into a regional network within Districts Six and Four.

A Project Development & Environment (PD&E) Study is being conducted to address needed improvements to upgrade safety, capacity, weaving, and accessibility of the District Six I-95/SR 9 segment from south of SR 860/Miami Gardens Drive to north of the Miami-Dade/Broward County Line (four miles). As part of the PD&E Study, a Concept of Operations (ConOps) document is prepared herein as an early step of the Federal Highway Administration's (FHWA) Systems Engineering Management process. This is a formal process to help develop a system of high integrity, reduce the risk of schedule delays and cost overruns, ensure better system documentation, and promote a higher level of stakeholder participation. The systems engineering process is shown as a "V" diagram in Figure 1 as a way of relating the various stages in the system life cycle to one another.

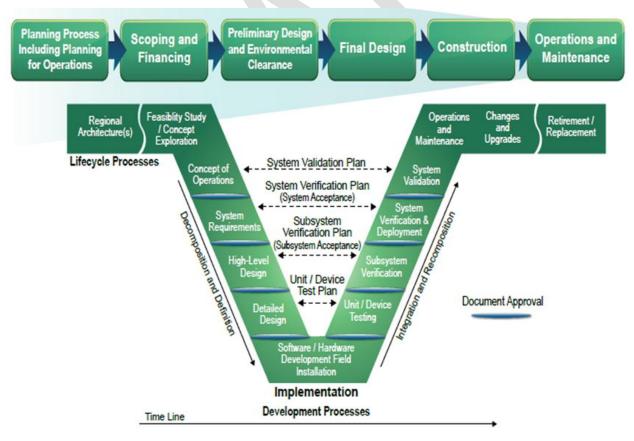


Figure 1 – Systems Engineering "V" Diagram

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The ConOps describes how the system is expected to operate in its intended environment. It does not specify technology or detailed requirements of the system design; however, it does address the operational scenarios and objectives, information needs, and overall functionality. The ConOps also addresses the "institutional" environment in which the system will be deployed, operated, and maintained. The contents of the ConOps follows the guidance identified in the FDOT Managed Lanes Guidebook (2023).

ConOps documents for ELs are prepared at a regional and project level. At the regional level, EL diagrams are provided for adjacent segments, as well as within, the proposed project limits to ensure that tolling infrastructure (i.e., toll gantries, data gantries, toll buildings, EL signage) is consistent as well as serving both interim and ultimate construction needs as project schedules will likely differ. The project level ConOps is developed late in the PD&E process, or during preliminary design, and is specific to the project that will be designed and constructed. The ConOps serves to document the consensus built among the partnering agencies and is written for the project development team. As a critical component to the systems engineering process, the ConOps provides a framework for the future development of functional/design requirements.

The EL project ConOps is a planning-level document describing the operations, incident management, maintenance, stakeholder roles and responsibilities, connectivity, and integration of pricing and toll collection activities for the EL facility and associated systems. It is based on Florida's Statewide Systems Engineering Management Plan (SEMP), which outlines the roles and responsibilities for implementation and management of Intelligent Transportation System (ITS) projects. Stakeholders include operators (i.e., Transportation Management Centers), emergency responders, law enforcement, maintenance providers, local governments, transit agencies, customers, and others as deemed necessary by the Department for successful operations and maintenance (O&M) of the subject EL project. The ConOps determines the geographical and physical extent, user needs, sequence of activities performed, and the development, operations, and maintenance of the EL system.

The EL project ConOps is a living document delivered before progressing to the system requirements and design phases and as such is updated as the various components of the project are implemented, tested, and deployed. It is typical for additional changes to the user needs and project concept to occur in subsequent project phases; however, changes made later in the project need to be managed carefully as they typically result in greater cost. The ConOps reflects the latest scope of the EL system and is aligned with the system requirements, design, and implementation to confirm successful system testing, system validation, operations, and maintenance.

The first section of the ConOps provides six elements: system identification, purpose and audience, an overview of the document, a high-level overview of the proposed system, stakeholders, and reference documentation. These elements are described in the following sections.

#### 1.1. Identification

This ConOps project-level document (i.e., PD&E phase) describes the operational requirements for I-95/SR 9 from south of SR 860/Miami Gardens Drive to north of the Miami-Dade/Broward County Line. The eastern and western project limits for the corridor typically consist of one adjacent signalized intersection east and west of the I-95/SR 9 interchanges, referred to as the interchange influence area. Project limits are extended at the SR 860/Miami Gardens Drive interchange and at the County Road (CR) 854/Ives Dairy Road interchange due to the complexity of traffic operations. The project includes various aspects that extend beyond those limits, such as signing and transition striping. The project length is approximately four miles. Table 1 presents the Project Identification and Figure 2 presents the Project Location Map.

Table 1 – Project Identification

Project Name	I-95/SR 9 PD&E Study from South of SR 860/Miami Gardens Drive to Broward County Line
Financial Project Identification	414964-1-22-01
Efficient Transportation and Decision Making (ETDM) Number	14419
Federal Aid Project Number	N/A

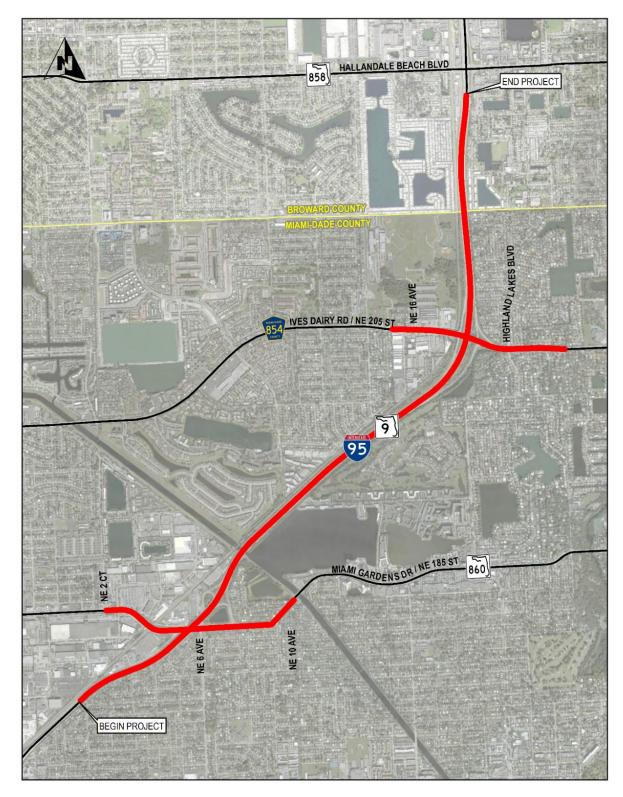


Figure 2 – Project Location Map

Each EL project contains multiple components with existing subsidiary documents or in some cases existing ConOps for statewide platforms such as tolling systems, toll collection, and pricing software. All related ConOps documents are described in a hierarchical manner, identifying the position of this document relative to other ConOps or related subsidiary documents as shown in Table 2 below.

Table 2 – ConOps or Related Subsidiary Documents for the I-95/SR 9 EL Project

Title of ConOps or Related Document	Summary of Contents
Southeast Florida Express Lanes Regional Concept for Transportation Operations, May 2014	Overview and guidance for the implementation of ELs in the Southeast Florida region using the functional categories of Planning and Policy; Physical, Design Features; Operations; Communications; Financial; and Legal
Concept of Operations for the I-95 Corridor Planning Study Ver 1.0, August 2019	The EL Corridor ConOps describes the operational requirements for the I-95/SR 9 corridor within Miami-Dade County from US 1/SR 5 (Mile Post 0.000) to the Broward County Line.
Concept of Operations for I-95 from South of Miami Gardens Road Interchange to North of the Broward County Line, December 2024	This document contains the project level ConOps information including system inclusions for ELs.
Project Systems Engineering Management Plan (PSEMP) for I-95 from South of Miami Gardens Road Interchange to north of the Broward County Line, December 2024	Guidance plan for ITS systems engineering and implementation for this project.

### 1.2. Purpose and Intended Audience

The purpose of the PD&E Study is to develop and evaluate improvement concepts and perform a planning level operational analysis for the I-95/SR 9 corridor within the project limits. The analysis includes the evaluation of the study interchanges, interchange influence areas, and ramp junctions. The purpose of the evaluation is to identify deficiencies focusing on recurring bottlenecks along the I-95/SR 9 mainline and to develop a series of proposed improvements to address the existing and future demands in the corridor. Specifically, the purpose of this ConOps document is to:

- Communicate user needs and the proposed system expectations, the system developer's understanding of the user needs, and how the system will meet those needs;
- Build consensus among user groups or developers;
- Create the basis for requirements development and verification and framework for system validation; and
- Provide project information for use by the FDOT District Six Public Information Office (PIO).

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The audience for the document includes all the stakeholders involved with the various components of the project, including implementers, operators, and maintainers, as well as law enforcement and first responders. The audience consists of people from multiple parties with varying levels of technical knowledge. Therefore, the document is written to clearly define technical terms and utilize layman's English for most of the text.

#### 1.3. Document Overview

This ConOps document describes the existing system or operation, identifies the stakeholders relevant to the project execution, the shortcomings or unmet needs, changes that would address the needs, operational scenarios, and the final system after the changes are made to the system or operation.

#### 1.4. High-Level System Overview

This roadway project provides additional express and/or general purpose lanes on I-95/SR 9 and implements interchange improvements at SR 860/Miami Gardens Drive and CR 854/Ives Dairy Road within Miami-Dade County. The improvements proposed as part of the project stem from the refined build concept that was developed as part of the I-95/SR 9 Corridor Planning Study, conducted by FDOT in May 2019. It assessed enhancements along the length of the I-95/SR 9 corridor within Miami-Dade County from US 1/SR 5 (Mile Post 0.000) to the Miami-Dade/Broward County Line. As such, this project is part of a larger effort to improve the I-95/SR 9 corridor within Miami-Dade County and regionally within Broward and Palm Beach Counties.

Within the project limits, I-95/SR 9 is classified as 'Urban Principal Arterial Interstate'. The segment consists of six to eight general use lanes (GULs) and two to four express lanes; the typical section varies throughout the project segment. This section of the corridor traverses five U.S. Census Designated Places: North Miami Beach, Ojus, Ives Estates, Pembroke Park, and Hallandale Beach.

It should be noted that the greater I-95/SR 9 corridor is part of Florida's Strategic Intermodal System (SIS) highway network and is a designated state hurricane evacuation route. In addition, I-95/SR 9 serves a critical role in facilitating the north-south movement of traffic in southeast Florida as one of two major expressways (Florida's Turnpike being the other) that connect the major employment centers and residential areas between Miami-Dade, Broward, and Palm Beach Counties. The corridor traverses dense urban areas with predominantly commercial and residential uses.

Overall, the project will offer enhanced mobility options for South Florida's transportation system users as it will provide additional capacity along the I-95/SR 9 corridor throughout northern Miami-Dade County. Consistent with the existing managed lanes system on I-95/SR 9, the additional ELs are anticipated to operate using variable toll pricing based on congestion to optimize traffic flow.

The final concept being recommended for the PD&E phase will provide two ELs throughout the entire corridor in addition to other roadway improvements described in Section 2.2.2. In addition to the physical geometric improvements, the project will expand the following existing ITS components:

- Dynamic Message Signs (DMS) System
- Vehicle Detection System (VDS)
- Closed-Circuit Television (CCTV) Camera System
- Ramp Signal System (RSS)
- FDOT Statewide Express Lanes Software (SELS)
- Electronic Toll Collection (ETC) System
- Warning Gate System (WGS)

Figure 3 shows a diagram of the I-95/SR 9 Express Systems interactions between regional TMC operations, FTE, and other agencies and programs.

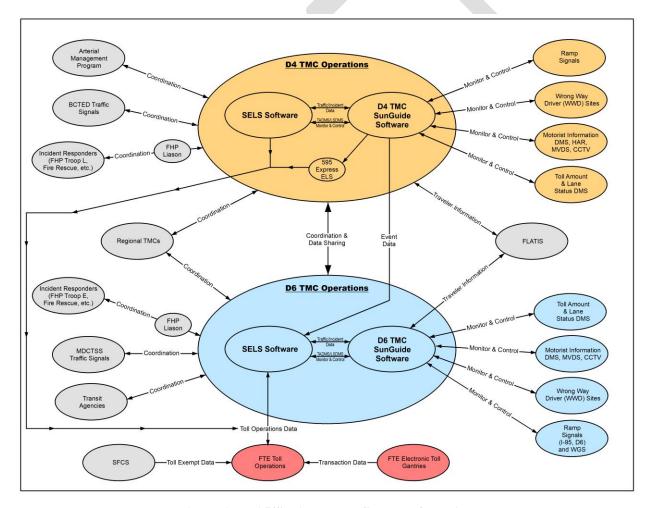


Figure 3 – I-95/SR 9 Express Systems Overview

Operation of the I-95/SR 9 Express Lanes will continue to be performed by the FDOT District Six SunGuide® Transportation Management Center (TMC). The FDOT District Six SunGuide® TMC will use the statewide SunGuide® Software to monitor and control the ITS field devices. The toll operations functionality will be controlled through the Statewide Express Lanes Software (SELS) that will interface with the SunGuide® Software and the Florida's Turnpike Enterprise (FTE) back-office software. The SELS will be used to operate the ELs. FDOT District Six will utilize their contracts/resources for:

- TMC Operations
- EL Operations
- Ramp Signaling Operations
- Incident Management
- ITS Maintenance
- Roadway Maintenance
- Public Information

#### 1.5. Stakeholders

The stakeholders and users include the project sponsor, system owner, user agencies, maintenance and support entities, evaluation and certification entities, law enforcement and first responders, and the operating centers or sites that will run the system. A summary of existing stakeholder roles and responsibilities is presented below in Table 3. More detailed information can be found in Table 4 and Table 5, later in this document.

Table 3 – Summary of Existing Stakeholder Roles and Responsibilities

Stakeholder	Project Role
FDOT District Six Operations	<ul> <li>Monitor corridor for congestion and incidents</li> <li>Operation of EL facilities</li> <li>Operate and maintain traffic management system components</li> <li>Receive regular system status reports</li> <li>Provide Road Ranger, Incident Response Vehicle (IRV), and Rapid Incident Scene Clearance (RISC) services</li> <li>Develop and refine ramp signaling operational strategies</li> <li>Operate the Ramp Signaling System (RSS)</li> <li>Operate the Warning Gate System (WGS)</li> </ul>
FDOT Central Office	<ul> <li>Statewide guidelines on managed lanes, traffic, and incident management</li> <li>Statewide Florida 511 program</li> <li>Statewide data sharing including Vehicle to Everything (V2X) Data Exchange Platform</li> <li>Statewide regulations on traffic operations</li> <li>SELS and SunGuide® change management</li> </ul>
Florida Turnpike Enterprise (FTE)	<ul> <li>Toll Collection of EL facilities</li> <li>Operate and maintain FTE's traffic management system components</li> <li>Receive regular system status reports</li> <li>Operation, maintenance, marketing of Florida SunPass services</li> <li>Specification, development, and maintenance of open road tolling hardware including antennas, gantries, readers, communications, and other infrastructure</li> <li>Customer support including call center and account management</li> </ul>

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Stakeholder	Project Role
Florida Highway Patrol Troop E	<ul> <li>Partner in developing operational procedures</li> <li>Enforcement of traffic laws including High Occupancy Vehicle (HOV) usage</li> <li>Incident scene management if Fire/Rescue services are not present</li> <li>Enforcement of regulatory displays at ramp signals</li> </ul>
Local and County Public Safety Agencies (Miami- Dade County Fire and Miami-Dade Police Dept.)	<ul> <li>Management of incident scenes in partnership with FHP</li> <li>Provide emergency care and rescue services at incident sites</li> <li>Provide fire containment and initial Hazardous Materials (HAZMAT) response and containment</li> <li>Provide emergency medical care</li> <li>Transport injured from incident scene to hospital</li> </ul>
Local and County Transportation Agencies (Miami-Dade County Traffic Signals and Signs Division)	<ul> <li>Manage regional traffic control efforts and assist in coordinating traffic across boundaries along alternate routes</li> <li>Coordinate with other regional agencies during emergencies and evacuation for emergency traffic control in the event of freeway / expressway closure</li> <li>Coordinate transit signal priority services utilizing bus location data on parallel corridor routes</li> </ul>
Public Transit Agency (Miami-Dade Transit and Broward County Transit)	<ul> <li>Provide bus and rail services in corridor including Express Bus</li> <li>Provide and maintain park-and- ride facilities adjoining corridor supporting Express Bus</li> <li>Provide service alerts and advisories</li> <li>Provide next train arrival times</li> <li>Provides next bus arrival times</li> </ul>
Miami-Dade Department of Transportation and Public Works (DTPW) – Traffic Signals & Signs (TS&S)	<ul> <li>Test transit related system functionality.</li> <li>Support transit operations and maintenance plans</li> <li>Maintain vehicles and transit stop facilities owned by the agency</li> </ul>
Federal Highway Administration (FHWA)	<ul> <li>Provide funding support for key projects</li> <li>Provide technical and procedural oversight for ITS and other program compliance on projects with Federal funding and/or on Interstate system</li> </ul>
Miami-Dade Transportation Planning Organization (TPO)	<ul> <li>Develop Constrained Long-Range Transportation Plan, Transportation Improvement Plan, and/or Regional Transportation Priorities Plan (typical)</li> <li>Champion the enhancement of transportation systems management and operations for all agencies in region</li> </ul>

# 1.6. Referenced Documentation

- 1. FDOT, "Concept of Operations (ConOps) Template" Version 2.1, Form FM-SE-01, July 23, 2024.
- 2. FDOT, "Managed Lanes Guidebook," 2023.
- 3. FDOT, "I-95 Express Lanes Phase 2 Concept of Operations for I-95 from Golden Glades Interchange to Broward Boulevard," April 18, 2015.
- 4. FDOT, "Operations Task Manager (OTM) User Manual (SELS)," August 17, 2017.
- 5. FDOT, "SR826/Palmetto Expressway Express Lanes from US 1 to SR 836," Version 3.0 (Draft), October 2019.
- 6. FDOT, "Project Systems Engineering Management Plan (PSEMP) I-95/SR 9 from South of SR 860/Miami Gardens Drive to North of the Broward County Line" Ver 2.0, 2025.
- 7. FDOT, "Florida Statewide ITS Architecture (SITSA)," available online at <a href="https://teo.fdot.gov/architecture/">https://teo.fdot.gov/architecture/</a>

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# 2. Current System Situation

#### 2.1. Background, Objectives, and Scope

FDOT District Six began operating the I-95/SR 9 ELs 24 hours per day, seven days per week, within Miami-Dade County in 2008. The ELs are dynamically tolled using congestion-based pricing and offer a choice to commuters for travel through the corridor. The existing EL facility within the study area is shown below in Figure 4.



Figure 4 – Preliminary Traffic Study Area and EL facility

This PD&E Study identified a refined concept that would expand the existing EL network. The objectives are to increase capacity by expanding to two ELs throughout the entire corridor and providing additional capacity to General-Purpose Lanes (GPL) to accommodate future traffic demands.

The Managed Lanes Guidebook (2023) in conjunction with other FDOT manuals, procedures, handbooks, guidebooks, and design criteria is used in the development, implementation, and operation of FDOT managed lanes projects. It includes information and guidance on project identification and development, operational strategies, facility types, screening of managed lanes, tolling, EL software, design considerations, operations & maintenance (O&M), mobility performance reporting, and funding and financing.

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#### 2.2. Operational Constraints

#### 2.2.1. Capacity Limitations

I-95/SR 9 in Miami-Dade County is one of the most heavily traveled sections of urban interstate in the nation. According to data extracted from the FDOT Florida Traffic Online database and the Southeast Regional Planning Model (SERPM), the Year 2021 and future (Year 2050) Average Annual Daily Traffic (AADT) for the I-95/SR 9 project segment are shown in Figure 5.

Based on the traffic operations analysis for the I-95/SR 9 Corridor Planning Study conducted by the FDOT in 2019, sections of this I-95/SR 9 project segment operate at Level of Service (LOS) F in the peak periods of travel. It is important to note that the existing managed lanes along most of the corridor are also operating near capacity, negatively impacting their ability to provide time savings to vehicles on I-95/SR 9. As a result of the corridor being over capacity, travel demand is shifting vehicles onto less appropriate facilities. This, in turn, is reducing safety and increasing trip travel times.

The regional roadway system is also close to build-out and the ability to add more traffic lanes is limited. Without improvements, the project corridor will continue to experience high delays and operate at LOS F in 2050; driving conditions for residents and commuters will also deteriorate well below acceptable LOS standards. The project is anticipated to meet the mobility needs of the area by alleviating current and future congestion on the corridor and surrounding roadway network. The additional capacity will allow I-95/SR 9 to continue to serve as an important roadway in facilitating the north-south movement of traffic in northern Miami-Dade County, thus improving access between communities of Miami-Dade, Broward, and Palm Beach Counties.

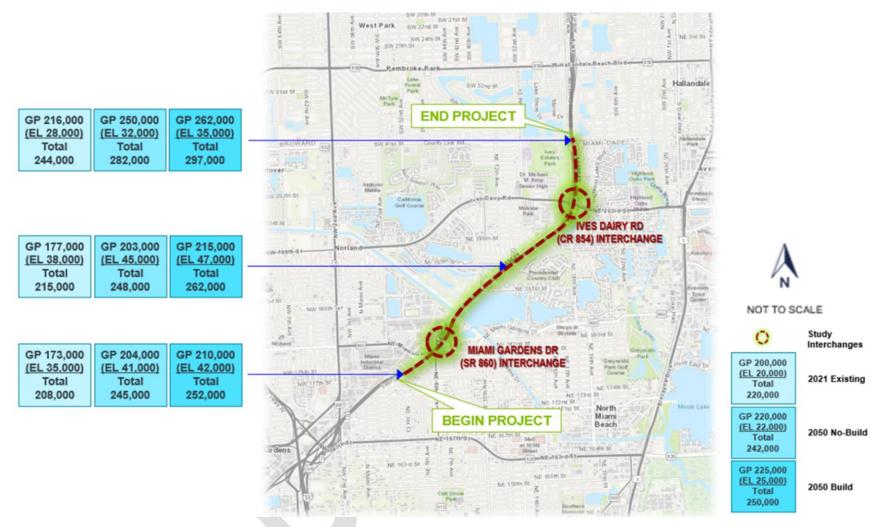


Figure 5 – Average Annual Daily Traffic (AADT): Year 2021 and Future (Year 2050)

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#### 2.2.2. Regional Considerations

I-95/SR 9 is the primary interstate route along the east coast of the United States extending from Florida to Maine and serving some of the most populated urban areas in the country. As part of Florida's Strategic Intermodal System (SIS) highway network, I-95/SR 9 plays a significant role in facilitating commuter and freight traffic within the state. Within the project limits, I-95/SR 9 connects to SR 860/Miami Gardens Drive, which links I-95/SR 9 to both I-75 (an additional SIS facility) to the west and US 1/SR 5 to the east. Further, I-75 and Florida's Turnpike (SIS facilities) run parallel to the I-95/SR 9 project corridor.

The proposed improvements are part of a larger, regional effort to provide additional EL capacity/continuous ELs along the I-95/SR 9 corridor, both within Miami-Dade County and to the north in Broward and Palm Beach Counties. The interfaces between the proposed project and adjacent projects are shown in Figure 6.

The intent is for these projects to collectively improve the overall reliability and performance of the interstate system in moving high volumes of goods and people at efficient speeds. Reduced congestion will serve to maintain and improve viable access to the major transportation facilities and businesses of the area (including connectors to freight activity centers/local distribution facilities or between the regional freight corridors) and create an opportunity to provide efficient and reliable transit service within the corridor. As such, these improvements are critical to enhancing regional mobility. They are also key in preserving the operational integrity and regional functionality of the entire I-95/SR 9 corridor.



Figure 6 – Regional EL Project Interfaces

#### 2.2.3. Transportation Systems Management & Operations (TSM&O)

Transportation Systems Management and Operations (TSM&O) focuses on maximizing the efficiency of the existing facility through operational improvements and/or travel demand management. The additional roadway capacity required to accommodate the design year traffic volumes on I-95/SR 9 at an acceptable level of service cannot be provided through the implementation of these types of improvements alone; however, the TSM&O strategy is included as a component of the Build Alternative.

While the proposed project introduces new access points (ingress/egress) to the existing EL facility, the existing ITS devices (e.g., DMS, CCTV cameras, vehicle detectors) and fiber optic communications are assumed to be replaced with new equipment complying with the current FDOT standards, specifications, and Approved Product List (APL).

#### 2.2.4. Emergency Evacuation

I-95/SR 9 is part of the emergency evacuation route network designated by the Florida Division of Emergency Management. Also designated as a Miami-Dade County evacuation facility, I-95/SR 9 is critical in facilitating traffic during emergency evacuation periods as it connects other major arterials and highways of the state evacuation route network (i.e., I-195, I-395 and Florida's Turnpike).

While this project section of I-95/SR 9 does not directly connect to other designated evacuation routes, it runs parallel to important corridors of the state evacuation route network, including I-75, Florida's Turnpike, and US 1/SR 5. The project is anticipated to:

- Improve emergency evacuation capabilities by enhancing accessibility to other major arterials designated on the state evacuation route network
- Increase the capacity of traffic that can be evacuated during an emergency event
- Allow for enhanced emergency access and incident response times

#### 2.3. Description of the Current System or Situation

The FDOT has implemented a robust ITS infrastructure along the project corridor that is operated from the FDOT District Six SunGuide® TMC located at 1001 NW 111 Avenue, in Miami-Dade County. The TMC operates 24 hours per day/7 days a week and uses the statewide SunGuide® Software to monitor and control the field devices. The regional fiber optic communications network connects the TMC and the District's ITS field devices, as well as having a connection to Florida Turnpike's back-office systems and neighboring TMCs. Florida Turnpike's toll collection system has dedicated buffer tubes along the fiber optic network. For diagrams illustrating data flows please reference the Florida Statewide ITS Architecture.

The District Six SunGuide® TMC participates in the Southeast Florida Regional TMC Operations Committee (SEFRTOC) to coordinate operations at interchanges with roadways operated by other TMCs (FDOT District Four, Greater Miami Expressway Authority, Florida's Turnpike). Through the SEFRTOC, procedures exist for incident coordination, information dissemination, and sharing data/video. Each TMC acts as the command and control center for their respective ITS programs. FDOT District Six's ITS includes field devices, software, incident management, traveler information, EL, and ramp signaling.

#### 2.3.1. Express Lanes

Within the study area, the District Six SunGuide® TMC manages the Express Lanes (ELs) in each direction from south of SR 860/Miami Gardens Drive to North of the Miami-Dade/Broward County Line. Within each directional EL segment, a toll gantry registers the vehicles utilizing the managed lanes facility. The District Six SunGuide® TMC is responsible for toll setting, ITS maintenance, and incident management along the I-95/SR 9 corridor, including ELs. The managed lanes facility has the objective of maintaining speeds above 45 miles per hour to ensure reliable travel times.

FTE provides the Electronic Toll Collection (ETC) System for all ELs throughout the State of Florida. This includes the toll and data gantry equipment, toll tag readers, toll building equipment, and all back-office software for account management and customer service. The District Six SunGuide® TMC coordinates with the FDOT District Four TMC, located at 2300 Commercial Boulevard in Broward County, on all events along the I-95/SR 9 corridor. FDOT District Four is currently expanding I-95/SR 9 ELs to the north into Palm Beach County.

The existing I-95/SR 9 ELs currently traverses Miami-Dade County, Broward County, and southern Palm Beach County. The District Six SunGuide® TMC is responsible for setting tolls along tolling segments in Miami-Dade County in each direction, communicating toll amounts to FTE's back-office services, and posting messages and toll amounts on all I-95/SR 9 EL assigned Toll Amount Dynamic Message Signs (TADMS). A diagram of the current access points of the express lanes in the study area was presented in Figure 4.

#### 2.3.2. ITS Devices

Throughout the area, District Six owns, operates, and maintains ITS field devices and a fiber optic communications network. The devices include:

- CCTV Cameras CCTV cameras are used for monitoring the roadways to support incident detection, verification, and incident clearance verification. Within the study area, there currently are 36 CCTVs, including some specifically used to verify messages on the DMS, called V-CCTV. V-CCTV are typically at a ratio of one-to one with the DMS it is positioned to view. The CCTV cameras provide full coverage and support full pan, tilt, and zoom capability. CCTV video is shared among the TMCs through a regional fiber communication network. The video is shared with the public through the Florida Advanced Traveler Information System (FLATIS) or FL511.com website. Video is made available to local agencies through the Miami-Dade County Communications network or a direct link to the District Six SunGuide® TMC. Video is shared with the public and local agencies through real time video streams on the Districts' TMC websites and Traffic Land.
- Dynamic Message Signs (DMS) District Six utilizes a total of 26 DMSs. From those, four are Arterial DMSs (ADMS) providing road users with event information that may impact motorists' decision to divert into or out of the ELs. These full color, three-line, full-matrix DMSs are used to disseminate event information (e.g., incidents, lane closures, weather), safety messages, travel time messages, and special alerts to motorists along the I-95/SR 9 corridor. All DMSs are monitored and controlled using the SunGuide® Software DMS Subsystem. Of the total 26 DMSs, eight are TADMS and six are Lane Status DMS (LSDMS) to support the Toll Operations for I-95/SR 9 ELs. The TADMS are attached to static signs containing the EL destinations. The static signs containing the TADMSs are referred to as Toll Amount Signs (TAS). The TADMS are full color, 7-character DMS inserts which display the toll amounts for each destination. In addition to the toll amounts, they should be able to display "\$0.00" and "CLOSED".

Each I-95/SR 9 EL entrance (ingress) has at least one TAS upstream of its ramp entrance. The LSDMS are attached to static guide signs for each EL entrance. They are full color, one-line, 18-25 characters DMS that typically display the operational status of the 95X, such as "TOLLS ENFORCED", "OPEN", "EXPRESS LNS CLOSED", or "CONGESTED". The "CONGESTED" messages are displayed when the EL performance drops below the target of an average speed of 45 miles per hour. Each I-95/SR 9 EL entrance from the I-95/SR 9 GPLs has at least three LSDMS attached to the I-95/SR 9 EL entrance ramp guide signs.

- Microwave Vehicle Detection Stations (MVDS) are used to monitor traffic operations and collect real-time traffic flow data including volume, speed, and occupancy. The maximum distance between MVDSs to support adequate EL operations is 1/3 mile. The collected data is also used to support the traffic management functions such as detecting incidents and archiving traffic data for transportation planning and reporting purposes. The District Six SunGuide® TMC operates and maintains 36 MVDS within the study area. The MVDS are also used to support toll setting. Traffic data is collected every 20 seconds and disseminated to the SunGuide® Software. The District Six SunGuide® TMC utilizes Operations Task Manager (OTM) software and the SELS that uses the collected speed and volume data (within the ELs only) to feed a variable tolling algorithm which calculates I-95/SR 9 EL tolls based on its 15-minute change in demand.
- Ramp Signal System (RSS) Ramp signals regulate the flow of traffic of on-ramps along the freeway mainline. It reduces the conflicts and delay caused by a platoon of vehicles trying to merge onto the highway. There are seven ramp signal locations within the study corridor, three ramp signals in the northbound direction, and four ramp signals in the southbound direction. Ramp signals are controlled through the SunGuide® Software from the District Six SunGuide® TMC
- Warning Gate System (WGS) is a series of automated gates/signs that are used to close access to the I-95/SR 9 ELs during incidents on the ELs. The gates and signs are configured in a master-slave configuration in the field for each location. The WGS can be operated either remotely from the District Six SunGuide® TMC using SunGuide® Software or directly in the field. The WGS is integrated into FDOT District Six's existing fiber optic communications network and is powered by service locations. The WGS is maintained by FDOT District Six via an existing ITS maintenance contract. Currently, there are no WGS within the study area; however, three WGSs exist along I-95/SR 9 south of the GGI. During the subsequent design phase, WGSs should be considered at all braided ramp access points.
- Wrong Way Detection (WWD) is a system for detecting wrong way vehicles on the road. Construction of WWD treatments will be completed for the Miami Gardens Drive northbound and southbound ramps by December 2025. Construction of WWD treatments will be completed for the Ives Dairy Road southbound ramp by December 2025 and the northbound ramp during 2026.

#### 2.3.3. TMC Software

The District Six SunGuide® TMC utilizes the SunGuide® software. SunGuide® is FDOT's Statewide TMC software application for the control of ITS roadway devices, traffic and incident management, data collection, traveler information dissemination, as well as information exchange across a variety of transportation agencies.

The District Six SunGuide® TMC has Geographic Positioning System (GPS) devices on Road Ranger vehicles that send GPS data to SunGuide® to display and report on Road Ranger positioning. The District Six SunGuide® also has the Operations Task Manager (OTM) software that supports all aspects of the TMC operations: data collection, performance reporting, information dissemination, EL operations (including SELS), ramp signaling operations, Rapid Incident Scene Clearance (RISC) operations, Road Ranger break log, shifts change, communication logs, and ITS maintenance.

The District Six SunGuide® TMC has specific contractual operational performance measures that are tracked using the Operator Quality Control Database, which is also a component of OTM. OTM interfaces with SunGuide® through databus communications that allows OTM to collect data from as well as send commands to SunGuide®.

As part of OTM, the District Six SunGuide® TMC utilizes SELS to manage I-95/SR EL toll setting. The variable, congestion pricing tolling algorithm is based in SELS and utilizes the detector data (volume and speed) populated by SunGuide® to compute changes in demand along the ELs, which is used in combination with pre-configured level of service tables to assign a toll to the facility for each tolling segment in each direction. The tolling algorithm is set to 15-minute intervals. SELS is currently being upgraded.

#### 2.3.4. Toll Systems

The tolling equipment within the study area includes two components: signing and tolling. The signing system is owned, maintained, and managed by the District Six SunGuide® TMC. Toll messages including the status of ELs and the toll amounts are disseminated to the DMSs via SunGuide®.

The tolling equipment is owned and maintained by FTE. Customers of the I-95/SR 9 ELs are required to own and place in their vehicle a transponder that is associated with the SunPass tolling system. FTE uses the tolling equipment on the gantry within each segment to identify the customer using the I-95 ELs and associates the effective toll at the time they pass under the gantry to their individual account. FTE owns and operates their own 'back-office' software that manages the toll collection process.

The I-95/SR 9 ELs also use a method of locking in a customer's toll in downstream tolling segments called Trip Building. The I-95/SR 9 EL shows the toll amount for up to three destinations at any point of entry (ingress). The destinations are listed from top to bottom in order of closest to furthest distance. The toll amount shown on the TADMSs associated with each destination is the sum of the effective tolls at the time a customer enters the system. When a customer is read when passing their first toll gantry, their time stamp is recorded by the FTE's tolling equipment and all downstream tolling segments associated with their entry location are locked in. If, however, the toll amount decreases on any given tolling segment they traverse during their locked in trip, the customer receives the benefit of the lower toll amount.

#### 2.3.5. Incident Management

Existing Incident Management efforts along the project corridor include five key program elements: Traffic Incident Management (TIM) Team, Road Rangers, Rapid Incident Scene Clearance (RISC), Incident Response Vehicle (IRV) Operations, and the FHP Hireback Program. These resources work closely with FDOT Maintenance/Asset management Contractors for extended incidents.

- TIM Team The FDOT District Six SunGuide® TMC has an established TIM Team. The TIM Team consists of FDOT, FTE, FHP, tow companies, local police, local fire rescue, consultants, and asset management companies. Through the TIM Team, the FDOT District Six SunGuide® TMC has established an excellent working relationship with the incident responders. The TIM Team has helped to establish quick clearance policies and provide a forum to discuss issues, which results in continuous improvement to incident response within the region.
- Road Rangers Road Rangers are the FDOT's Service Patrol Program, which is managed by the District Six SunGuide® TMC. They provide the following services:
  - Short-term maintenance-of-traffic (MOT) services during incidents
  - Assist in Incident Management and response
  - Clear disabled vehicles from travel lanes
  - Clear debris from travel lanes
  - Change flat tires
  - Jump-start vehicles and make minor repairs
  - o Supply emergency gasoline, diesel, water
  - o Provide stranded motorists with two free local calls
  - Monitor abandoned vehicles and notify FHP

The Road Rangers vehicles include tow trucks, pick-up trucks, flatbed tow trucks (Miami-Dade County only) and Class "C" Heavy-Duty wreckers. The Road Ranger vehicles (pick-up trucks and tow trucks) constantly patrol the project corridor and other vehicles (flatbed tow trucks and heavy-duty wreckers) are strategically located for quick response/clearance.

■ Rapid Incident Scene Clearance Program (RISC) – The RISC program offers financial incentives to pre-qualified towing companies to respond to and clear large-scale incidents such as large truck crashes, rollovers and cargo spills within a specified timeframe. The RISC contractor has 60 minutes to arrive on scene with the required equipment. Once given a "notice to proceed" by the FHP Trooper on scene, the RISC contractor has 90 minutes to "open all travel lanes" to traffic. The District Six SunGuide® TMC coordinates with FHP to activate RISC. In Miami-Dade County, FHP, the TMC, or the IRV operator may activate RISC.

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- Incident Response Vehicle (IRV) IRVs assist in the mitigation of delays caused by severe traffic incidents as well as increasing the safety of emergency responders. IRV operators are specially trained staff that serve as an Incident Commander responsible for coordination and communication between incident responders, the District Six SunGuide® TMC and FDOT District Six Maintenance. In addition, IRV vehicles are outfitted with traffic management equipment such as cones, signs, spill absorbent, roadway repair supplies and flares used for the MOT to ensure the safety of everyone on scene. IRV services are currently provided along I-95/SR 9 ELs operating 16 hours per day / 5 days a week, from 5:30 AM to 9:30 PM.
- FHP Hireback Program This program provides dedicated FHP officers to the EL corridors to help incidents be cleared quickly and safely, and that all aspects of the facility are being correctly operated regarding moving operations. FHP will be responsible for all enforcement. In addition to FHP troopers, local police/fire rescue agencies provide emergency response.

As the project continues to be refined beyond the PD&E phase, the Engineer of Record (EOR) will identify if additional resources are needed in alignment with the proposed improvements.

#### 2.3.6. Enforcement Activities

I-95/SR 9 within the study area is enforced by FHP, Troop E, which includes ELs, GPLs, and the Ramp Signal System (RSS). The District Six SunGuide® TMC utilizes the FHP Hireback Program in which FHP patrols I-95/SR 9 exclusively. They provide enforcement activities including speed, lane-diving (crossing illegally over the Express Lane Markers [ELMs]), illegal entry into the EL when the facility is closed, and High Occupancy Vehicle (HOV) and transponder misusage.

#### 2.3.7. Customer Service Activities

In addition to the DMSs, FDOT provides additional traveler information through a Statewide 511 System known as the Florida Advanced Traveler Information System (FLATIS). FLATIS provides traveler information via a website (www.FL511.com), a mobile application and an Interactive Voice Recognition system by dialing 511. FLATIS is populated from information provided by both District Four and Six TMCs via the SunGuide® software. FLATIS provides users up-to-theminute reports on traffic events, regional travel times, construction events, links to other agencies and more. Snapshot images of CCTVs are also provided via the FLATIS website.

#### 2.3.8. Traveler Information and Data Sharing

Following advances in technology that increased the number of motorists owning smartphones, FDOT entered into an agreement to exchange data with Google, the provider of a cellular phone application (Waze) that aids motorists with navigation through the roadways. Waze is a community-based traffic and navigation system that allows users to input information through a smartphone app and collaborate in updating maps online. In the first phase of this collaboration, FDOT allowed Waze to access FDOT'S third party data feed so that information on roadway incidents that the TMCs are managing may be disseminated to Waze users through the app. Also, as part of this phase, Waze shares information on incidents that have been reported by the app users with FDOT by providing FDOT with Waze's incident data feed.

The Waze incident data feed is processed by the Center-to-Center (C2C) interface of the SunGuide® software through a C2C plug-in that downloads incident alert data from Waze and feeds it to the TMCs through a C2C Event Status data feed. The TMC operators are alerted of the Waze events through a read only icon that is displayed in the SunGuide® Software's Operator Map. Phase 2 of this Waze and FDOT Data Sharing Agreement facilitates the processing of Waze information using an Incident Detection Subsystem (IDS) and reduces the burden on the operators by automating many of the processes that were handled manually. Waze incidents will be processed similarly to other incident data feeds that are currently used by FDOT TMCs.

#### 2.3.9. Ramp Signaling

Ramp signaling is a traffic management strategy that installs ramp signals at highway on-ramps to regulate the flow of traffic onto the highway mainline. When activated, a ramp signal head alternates between green and red to establish a steady flow of vehicles onto the highway, which allows them to smoothly merge onto the mainline traffic. This reduces the delay caused by a platoon of vehicles competing for available gaps as they merge onto the highway.

FDOT launched Florida's first RSS as part of the I-95/SR 9 ELs Phase 1 Project. The Ramp Signal System (RSS) along I-95/SR 9 within Miami-Dade County is currently controlled through the SunGuide® Software from the District Six SunGuide® TMC. It has proven to reduce recurring and non-recurring congestion in the GPLs. The TMC has established operating procedures for the I-95/SR 9 GPL's RSS that can be applied to other projects, including this one.

RSS field components are shown in Figure 7 and a similar design exists at each I-95/SR 9 on-ramp in both directions along the corridor. The upstream, local, and downstream detectors are MVDS. The passage, demand, and ramp queue detectors are inductive loop detectors. All detectors pass through the ramp signal controller to the SunGuide® software.

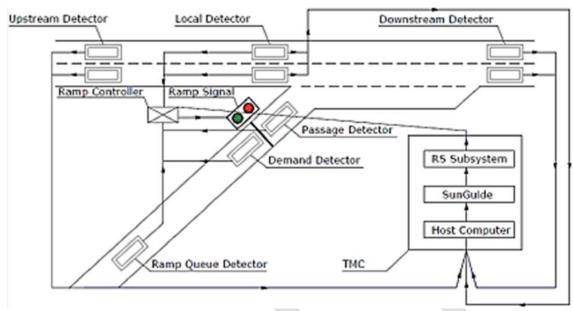


Figure 7 – Ramp Signal System Components

There are seven ramp signal locations within the study corridor, three ramp signals in the northbound direction, and four ramp signals in the southbound direction. The three ramp signals in the northbound direction are rarely active; they are activated in cases of non-recurring congestion occurring north of the Golden Glades Interchange (GGI). All other ramp signals have scheduled operational windows; however, the operational timings are based on daily traffic conditions. Currently, the range in metering rates are a minimum of four vehicles per minute to a maximum of 24 vehicles per minute.

The existing I-95/SR 9 RSS in District Six is operated during AM and PM peak hours and as needed during other time periods. During the peak periods, the ramp signals are turned on in groups and the process is initiated when one-minute average detector speeds lower than 45 mph are observed in the ELs for five consecutive minutes. The I-95/SR 9 District Six ramp signals operate generally during times of heavy congestion in the mainline.

# 2.4. User Class Profiles

The I-95/SR 9 EL operations and maintenance is a multi-agency effort among the FDOT District Six, FTE, FHP, Local Fire Rescue, and Miami-Dade County Traffic Signals and Signs Division. This section highlights the responsibilities of the partnering agencies.

#### 2.4.1. FDOT District Six SunGuide® TMC

The FDOT District Six SunGuide® TMC is responsible for operating all EL segments within Miami-Dade County. TADMS/LSDMS for these segments is on the TMC network. The District Six SunGuide® TMC Operators monitor traffic conditions in the ELs and post toll amounts via the SELS. The vehicle detectors within these toll segments are used to monitor traffic conditions, toll setting and reporting by the TMC. The dedicated CCTV for the TMC controlled TADMS and LSDMS are on the TMC network and used by the TMC to confirm the messages posted. The CCTV cameras and DMSs in Miami-Dade County along the ELs and GPLs are used for incident management.

Along the portion of I-95/SR 9 in Miami Dade County, the District Six SunGuide® TMC is responsible for:

- Maintaining ITS devices
- Maintaining power service and communication conduits for all devices.
- Incident management within the ELs and GPLs. This includes incident detection, dispatching resources (Road Rangers, IRV, and RISC), agency notifications and posting messages on DMSs.
- Performance reporting of ELs and GPLs.

#### 2.4.2. FDOT District Six Maintenance

FDOT District Six Maintenance is responsible for all roadway maintenance activities, including sign, toll gantry structures/toll buildings, ELMs, and bridge structures along I-95/SR 9. There will be no change from their current responsibilities.

#### 2.4.3. Florida Turnpike Enterprise (FTE)

FTE handles account management of the SunPass® accounts, which includes all back-office functions. Back-office functions include developing and maintaining the trip reconstruction software and any interface software developed to receive the tolls set by the District. The FTE shares data required to support the EL reporting requirements. The FTE Customer Service Representatives handles all initial account inquiries and is supported by FDOT District Six SunGuide® TMC to address any toll disputes, respectively. FTE is also responsible for the ETC equipment on the toll gantries, the toll buildings, and the equipment inside the toll buildings.

#### 2.4.4. Florida Highway Patrol (FHP)

FHP is responsible for providing field enforcement of the EL and RSS, as well as incident management support. These additional Troopers are provided through existing FHP Hire-Back contracts managed by FDOT District Six.

#### 2.4.5. Local Fire Rescue

The fire rescue agencies provide emergency services for incidents along the project corridor. These agencies will have to revisit their existing mutual aid agreements for responding to incidents near their respective jurisdictional boundaries.

#### 2.4.6. Miami-Dade County Traffic Signals and Signs Division

The Miami-Dade County Traffic Signals and Signs (TS&S) is responsible for the operation and maintenance of arterial traffic signals along the project corridor. In addition, FDOT District Six TSM&O Office manages the signal retiming along state roads. The arterial operations will be impacted by the ramp signal operations and close coordination among the FDOT District Six SunGuide® TMC and Miami-Dade County TS&S will play a critical role in the success of the ramp signaling operations. The FDOT District Six SunGuide® TMC produces and distributes weekly Ramp Signaling reports. These weekly reports identify the operational periods for each ramp signal, release rates, and the observed ramp queuing from ramp signal operations. This provides valuable information to the Miami-Dade County TS&S for any signal timing adjustments needed to improve traffic flow along the arterials.

Table 4 provides a high-level description of roles and responsibilities for operations of the I-95/SR 9 ELs in Miami-Dade County. Later in this document, Table 5 supplements the information presented in Table 4 providing more detailed information for future operations of the I-95/SR 9 ELs.

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Table 4 – I-95/SR 9 EL High-Level Roles and Responsibilities

A 6D 11114	I-95/SR 9 Miami-Dade County					
Area of Responsibility	GPL	EL				
Roadway Monitoring/Notification	District Six	District Six				
Incident Dispatch	District Six	District Six				
Incident Response	District Six	District Six				
Roadway (TMC) Performance Reporting	District Six	District Six				
EL Performance Reporting	N/A	District Six				
Toll and Revenue Reporting	N/A	Turnpike				
Toll Setting	N/A	District Six				
ITS Maintenance Monitoring/Notification	District Six	District Six				
ITS Maintenance Dispatch	District Six	District Six				
ITS Maintenance Response	District Six	District Six				
ITS Maintenance Reporting	District Six	District Six				
ITS Equipme	ent Ownership					
CCTV Cameras	District Six	District Six				
Toll Amount DMS	N/A	District Six				
Lane Status DMS <sup>1</sup>	N/A	District Six				
Full DMS	District Six	District Six				
Detectors	District Six	District Six				
Cabinets/Laterals/Electrical	District Six	District Six				
Ramp Signaling	District Six	N/A				
ITS Equipm	nent Network					
CCTV Cameras	District Six	District Six				
Toll Amount DMS <sup>1</sup>	District Six	District Six				
Lane Status DMS <sup>1</sup>	District Six	District Six				
Full DMS	District Six	District Six				
Detectors <sup>2</sup>	District Six	District Six				
Ramp Signaling	District Six	N/A				
Tolling Equipment Ownership <sup>3</sup>	N/A	Turnpike/District Six				
Toll Gantry Building	N/A	District Six				
Transaction Processing	N/A	Turnpike				
Tolling Equipment Maintenance <sup>4</sup>	N/A	Turnpike				
Fiber Ownership	District Six	District Six				
Power Ownership (Pay Bills)	District Six	District Six				
Public Inquiries <sup>5</sup>	District Six	Turnpike/District Six				

#### **Notes:**

- 1. Includes Dedicated CCTV Camera.
- 2. I-95/SR 9 will have two sets of detectors (one on District Four Network).
- 3. Each District will own the tolling equipment, structure and building within their respective District boundaries.
- 4. Does not include gantry structure and building. Gantry structure and building will be responsibility of District Maintenance.
- 5. FTE's SunPass Customer Service will handle customer account inquiries and FDOT District Six will provide support. Incident Management inquiries will be handled by the responsible agency. Registration inquiries will be handled by South Florida Commuter Services and Transit related inquiries will be handled by the responsible agency.

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# 2.5. Support Environment

The existing ITS infrastructure is maintained by contractors managed from the District Six SunGuide® TMC. The ITS Maintenance contract includes preventive and emergency repair services, separately for EL and non-EL ITS devices. The ITS Maintenance Contractor has performance measures for responding to and resolving failures depending on the nature of the failure (critical or non-critical). These services are tracked via the OTM software, also operated by the District Six SunGuide® TMC.

FDOT District Six provides roadway maintenance/asset maintenance for I-95/SR 9 within Miami-Dade County. Road Rangers in Miami-Dade County are managed through the District Six SunGuide® TMC. FDOT District Six roadway maintenance contractors are contracted to maintain the system according to a level of service established within their respective scope of services.

FTE has maintenance contracts with vendors to provide maintenance on the Electronic Toll Collection (ETC) system.

# 3. Change Justification

# 3.1. Justification for Changes

The improvements proposed as part of the project stem from the Refined Build Concept that was developed as part of the Interstate 95 Corridor Planning Study, conducted by the FDOT in May 2019. The study assessed enhancements along the length of the I-95/SR 9 corridor within Miami-Dade County from US 1/SR 5 (Mile Post 0.000) to North of the Miami-Dade/Broward County Line. As such, this project is part of a larger effort to improve the I-95/SR 9 corridor within Miami-Dade County and regionally within Broward and Palm Beach Counties.

The greater I-95/SR 9 corridor is part of Florida's Strategic Intermodal System (SIS) highway network and is a designated state hurricane evacuation route. In addition, I-95/SR 9 serves a critical role in facilitating the north-south movement of traffic in southeast Florida as one of two major expressways (Florida's Turnpike being the other) that connect the major employment centers and residential areas between Miami-Dade, Broward, and Palm Beach Counties. The corridor traverses dense urban areas with predominantly commercial and residential uses, including downtown Miami.

This roadway project will offer enhanced mobility options for motorists and transit users as it will provide additional capacity along the I-95/SR 9 corridor throughout northern Miami-Dade County. It will also provide traffic and safety enhancements through the interchange improvements at SR 860/Miami Gardens Drive and CR 854/Ives Dairy Road within Miami-Dade County.

### 3.2. User Needs

The project identified improvements that will create additional capacity throughout the corridor, enhance regional connectivity, and increase safety of motorists. These capacity improvements include braided access ramps to the ELs as well as a Diverging Diamond Interchange (DDI) configuration at CR 854/Ives Dairy Road. The development of these improvements during the PD&E and design phase will need to include ITS infrastructure and the proper resources to manage, operate, and maintain the corridor. These additional systems and assets include, but are not limited to:

■ ITS Infrastructure – TADMSs, ADMSs, and LSDMSs will be needed along CR 854/Ives Dairy Road to display toll amounts for motorists approaching the ELs. ADMSs will also be needed at the SR 860/Miami Gardens Drive interchange. Furthermore, replacement and enhancement of ITS devices (CCTV cameras, DMS, vehicle detectors, tolling equipment, etc.) will be necessary for infrastructure impacted during construction.

- Operations Staff Proper staffing levels will need to be provided based on network coverage, operational strategies, and necessary coordination with external partners. Activities anticipated to be considered for expansion and further evaluation at this stage of project development include:
  - o 24/7/365 network monitoring and management of ELs, GPLs, and messaging
  - o Incident management response, resources, and personnel
  - o Enhanced performance measurement, analysis, and reporting
  - Engineering and operational analysis
  - o Information Technology (IT) support
  - Public information and outreach
- ITS Maintenance Staff Due to new infrastructure and additional devices being utilized for future conditions, an evaluation of current maintenance staffing levels is needed.

The proposed improvements will require extensive coordination, particularly among the various adjacent sections of EL projects, and an all-encompassing approach to consider the infrastructure and operational changes that are a result of the future work. The changes identified in the project will be further evaluated during subsequent phases of design. For the purposes of this ConOps, high-level assumptions were identified including the following:

- A data gantry will be needed to capture traffic entering from two successive ingress points for the northbound collector/distributor road providing access to the ELs.
- Proper resources for TMC Operations, Incident Response, Engineering/Technical Support,
   Public Information, and ITS Maintenance will be budgeted to maintain the project's goals.
- A comprehensive public information campaign will be developed to assist commuters with new I-95/SR 9 GPL and I-95/SR 9 EL access locations as well as the new DDI at CR 854/Ives Dairy Road.
- No changes in tolling procedures, nor additional software development will be needed to facilitate the new I-95/SR 9 EL access locations.
- Any existing mutual aid agreements will be evaluated, and new agreements will be developed to support any improvements, if necessary.
- The systems and components required to operate and manage the system are defined in the Regional ITS Architecture (RITSA) or will be updated to be included as needed.
- Performance measures currently in place will be carried over to any new components, connections, or systems to serve as the basis for future evaluations and assessments.

A system validation plan will be developed during the design phase, by the Engineer-of-Record. It will be developed using the guidance from the ConOps. Specifically, it will define system goals, objectives, and recommended strategies with performance measures for validation of the system. The goals, objectives and strategies will serve as inputs to the development of the System Validation Plan to be completed following ConOps and system requirements development.

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# 4. Concepts for the Proposed System

# 4.1. Background, Objectives, and Scope

This roadway project provides additional roadway capacity to express lanes (ELs) and/or general use lanes (GULs) on I-95/SR 9 and implements interchange improvements at SR 860/Miami Gardens Drive and CR 854/Ives Dairy Road within Miami-Dade County. Consistent with the existing managed lanes system on I-95/SR 9, the tolled segments are anticipated to continue operating using variable toll pricing based on congestion to optimize traffic flow.

The final concept being recommended for the PD&E phase proposes changes to the I-95/SR 9 corridor roadway section by providing two express lanes throughout the entire segment length and introducing new access to the express lanes via braided ramp movements using new bridges. The braided ramps system removes weaving along I-95/SR 9 by providing direct access from the arterial to the express lanes. It improves the overall operations and safety of the mainline, ramps, and interchanges.

The preferred alternative also includes reconfiguration of the SR 860/Miami Gardens Drive interchange to redistribute the on- and off-ramps, a reconfiguration of the CR 854/Ives Diary Road interchange to a Diverging Diamond Interchange (DDI), and multimodal improvements for pedestrians, bicycles, and bus services in the area.

The proposed direct access to express lanes from CR 854/Ives Dairy Road will eliminate the need for drivers to use the general purpose lanes to access NB and SB express lanes. This will reduce the amount of traffic using these segments of I-95/SR 9, resulting in a corresponding reduction in traffic exposure and reduction in crash risk at these segments.

# 4.2. Operational Policies and Constraints

FDOT District Six has established business rules and operational policies for the 95 Express Phases 1 and 2, which include ramp signaling operations. These business rules and operational policies are expected to continue with this improvement project.

As more opportunities arise for incorporation of Connected and Autonomous Vehicles, FDOT District Six will accommodate additional roadside ITS infrastructure to include cellular devices, additional CCTV cameras, additional DMS, cellular communication devices, and other technology as needed. These devices should be considered at strategic locations such as high-crash locations and approaches to the proposed braided ramp connections. Design of the ITS system should account for these potential future technology enhancements regarding power and communication.

# 4.3. Description of the Proposed System

The proposed system will include changes in roadway geometry features as well as ITS/Toll systems.

### **4.3.1.** Roadway Geometry Features

Within the project limits, ELs will continue to operate on the left side of the freeway with buffer and express lane marker (ELM) separation from the local lanes. Figure 8 presents the existing and proposed typical sections for the I-95/SR 9 Mainline. APPENDIX A presents the roll plot of the proposed build alternative within the project limits.

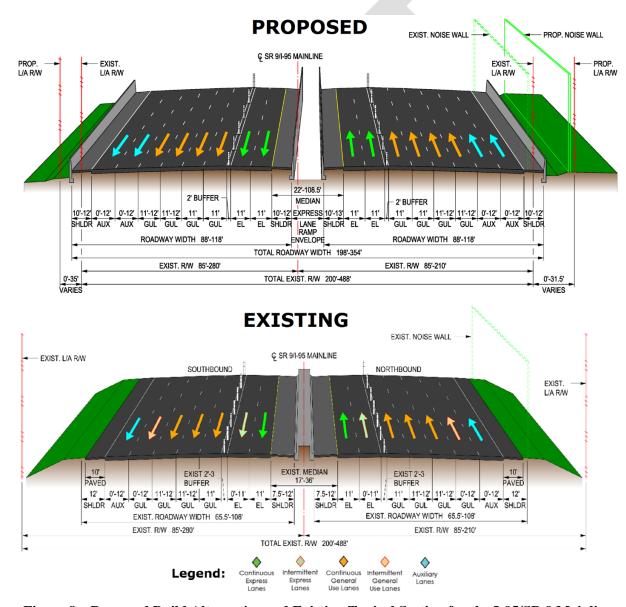


Figure 8 – Proposed Build Alternative and Existing Typical Section for the I-95/SR 9 Mainline

### Changes for users on the Express Lanes

Motorists using the express lanes (ELs) at I-95/SR 9 in both directions currently drive through a single lane for most of the segment within the project limits. In each direction, the only segment with two express lanes is between the access point at SR 860/Miami Gardens Drive (ingress in the northbound direction and egress in the southbound direction) and the access point south of CR 854/Ives Dairy Road (egress in the northbound direction and ingress in the southbound direction). The dual lane segment allows weaving to and from the general use lanes (GULs). The dual lane segment is less than one mile long in the northbound direction and approximately one mile long in the southbound direction. North of the project limits, two ELs in both directions start at Hallandale Beach Blvd.

The proposed build alternative provides two ELs in each direction throughout the entire segment within the project limits. The additional lane allows more capacity throughout the facility. For accessing the ELs, the proposed build alternative introduces a series of braided movements in both directions. Instead of keeping left at the GULs to enter the ELs, drivers would keep right to braid over the GP and ingress the EL in the center of the facility. To exit the ELs, drivers would keep left to braid over the EL and GUL. Traffic to and from CR 854/Ives Dairy Road would have direct access to the ELs through a Collector-Distributor (CD) road system.

### Changes for users on the General Use Lanes

Motorists in the general purpose lanes at I-95/SR 9 in the northbound direction currently have three travel lanes south of the on-ramp from SR 860/Miami Gardens Drive. From this merging point, four travel lanes continue for approximately 0.5-mile until an additional lane is added at the express lane egress north of SR 860/Miami Gardens Drive. In the approximately 0.8-mile segment with 5 travel lanes, traffic from the express lane going to the CR 854/Ives Dairy Road off-ramp weaves across the general purpose lanes. Four lanes continue north of CR 854/Ives Dairy Road to the north end of the project limits.

Motorists in the general purpose lanes at I-95/SR 9 in the southbound direction currently have three travel lanes for most of the segment within the project lanes. Segments with four travel lanes are relatively short, such as north of the CR 854/Ives Dairy Road overpass, after the on-ramp from CR 854/Ives Dairy Road, before the ingress to the ELs south of CR 854/Ives Dairy Road, and after the on-ramp from SR 860/Miami Gardens Drive. The lane drops causes backups on top of the conflicts caused by weaving movements of vehicles from CR 854/Ives Dairy Road looking to access the express lanes.

The proposed build alternative expands the general use lanes in both directions of I-95/SR 9 by providing four continuous travel lanes in each direction throughout the entire segment within the project limits. This alternative increases both the GUL and the EL capacity. Auxiliary lanes provide access to braided ramps and interchange ramps. Freeway analysis results indicate that all the freeway segments in the study area will be able to serve 90% or more of the projected demand. The current corridor segment experiences heavy recurring congestion, and the proposed build alternative will reduce congestion significantly.

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The proposed layouts of the I-95/SR 9 interchanges at SR860/Miami Gardens Drive and CR854/Ives Dairy Road are shown in Figure 9 below.

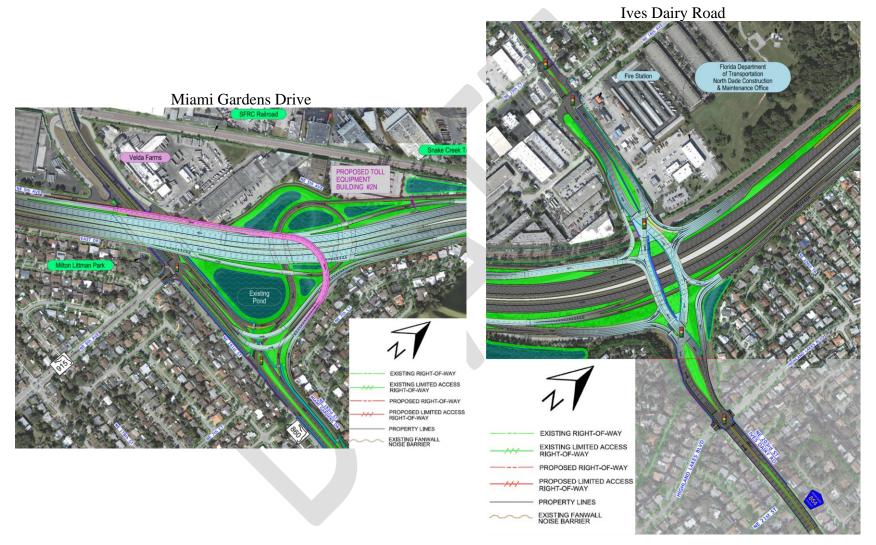


Figure 9 – Proposed I-95/SR 9 Interchange Layouts

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## 4.3.2. ITS/Toll Systems

In addition to the physical geometric improvements, the Project will also include improvements to the following ITS/Toll system components:

- Dynamic Message Signs (DMS) System
- Vehicle Detection System (VDS)
- Closed-Circuit Television (CCTV) Cameras System
- Transportation Sensor Subsystem (TSS)
- Ramp Signal System (RSS)
- Statewide Express Lanes Software (SELS)
- Electronic Toll Collection System (Gantries and Back Office)
- Cellular devices future needs based upon accommodating Connected and Automated Vehicles (CAV)

The ETC System includes both the toll and data gantries as well as back-office operations. This FTE ETC system is deployed statewide and consists of All-Electronic Tolling (AET) lanes and Automatic Vehicle Identification (AVI) transponders. The AET will continue to be deployed for all ELs.

- Toll Sites The AET toll sites will be equipped with detectors, CCTVs, and transponder readers. The data collected from the gantries will be used to assess tolls through the FTE back-office operations. Toll collection on the EL facility is done through SunPass only.
- Back-Office Operations FTE will use the existing back-office operations to process toll collections, account management, and customer service support. The customer service representatives will have access to EL operations data to assist with fielding questions from customers regarding the tolls charged. FTE will also use a trip building software application to determine the total toll to charge motorists.

The FDOT District Six SunGuide® TMC utilizes the SELS, which will also be used for these ELs. The TMC has TADMS and LSDMS control through SunGuide® Software. The SELS application interfaces with SunGuide® Software to obtain detector data and event information related to ELs operations. The SELS will send the final toll amounts by segment and trip to the FTE. The SELS will provide a web service to allow FTE customer service representatives access to toll operation data, incident information, and TADMS/LSDMS messages regarding the EL operations.

Variable, congestion-based pricing will be used to manage demand in the ELs. Upon completion, the portion of I-95/SR 9 that the District Six SunGuide® TMC manages will have ELs with standard 12-foot-wide lanes and 10-foot wide inside shoulders. Tubular ELMs will separate the ELs from the GPLs.

The project is consistent with the South Florida RITSA defined for FDOT District Six. The South Florida RITSA includes Market Packages related to the deployment of ELs and RSS. The following Market Packages are used to define the Project ITS Architecture:

- ATMS02 Network Surveillance
- ATMS04 Freeway Control
- ATMS06 Traffic Information Dissemination
- ATMS07 Regional Traffic Control
- ATMS08 Traffic Incident Management System
- ATMS09 Traffic Forecast and Demand Management
- ATMS10 Electronic Toll Collection
- ATMS21 Roadway Closure Management

These system and devices, including the enhancement of existing systems and devices, are considered during the PD&E Study for this project.

A Maintenance of Communications (MOC) plan is required during the multiple construction phases for both the Tolling and ITS systems. The MOC plan will need to be developed during the design phase and coordinated with the overall Maintenance of Traffic Plan.

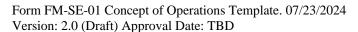
A MOC Plan for Tolling will need to be developed during the design phase to provide continuity of toll collection throughout all phases of construction. The communications infrastructure for tolling systems needs to maintain fiber optic cable connectivity. If toll gantries are not feasible during certain phases of construction, other less-infrastructure intensive toll collection alternatives could be proposed for consideration. Tolling solutions will need to be compliant with the FDOT Approved Product List. If toll collection is interrupted, it will need to be coordinated with the District Six Secretary and the Florida's Turnpike Enterprise.

The MOC plan for ITS during construction may be achieved by maintaining fiber optic cable connectivity, installing a temporary wireless system, or a combination of both. Microwave links may be used, with temporary poles, to connect wireless sites to the existing network infrastructure. This ensures continuity of service. The TMC network management system could be used to monitor and optimize the performance of the temporary wireless network. Backup power would be provided to ensure all temporary sites have reliable power to maintain service during outages. Regular monitoring of the performance and coverage of the temporary wireless network would be performed by the contractor with adjustments made as needed.

## 4.3.3. Express Lane Diagrams

The EL diagrams for the regional I-95/SR 9 Corridor - identifying the layout of access points, toll gantries, building locations, and signage - are presented in Figure 10. These EL diagrams cover the I-95/SR 9 PD&E Study project limits from South of SR 860 to North of the Miami-Dade/Broward County Line. Additional EL diagram details are presented in the Appendix for the broader corridor, south and north of the PD&E Study project limits. Specifically, the Appendix includes EL Diagrams for the following four scenarios:

- APPENDIX B: 95 Express Phase 3C (Estimated Operating Year 2025) Estimated EL configuration from south of the I-395/SR 836 interchange in Miami-Dade County to north of the I-595 interchange in Broward County during Year 2025.
- APPENDIX C: D6 PD&E (From South of SR 860/Miami Gardens Drive to North of Broward County Line 414964-1) Proposed EL configuration from south of the I-395/SR 836 interchange in Miami-Dade County to north of the I-595 interchange in Broward County.
- **APPENDIX D: GGI Improvements Light (Estimated Operating Year 2031)** from south of the I-395/SR 836 interchange in Miami-Dade County to north of the I-595 interchange in Broward County.
- APPENDIX E: 95 Express Ultimate (US-1 to I-595) from south of the I-395/SR 836 interchange in Miami-Dade County to north of the I-595 interchange in Broward County.



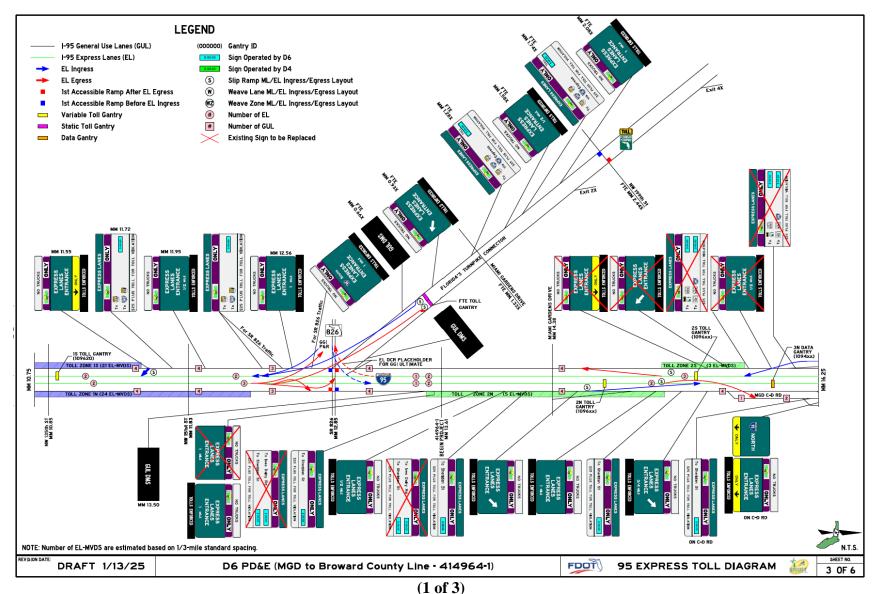


Figure 10 – Managed Lanes Diagram

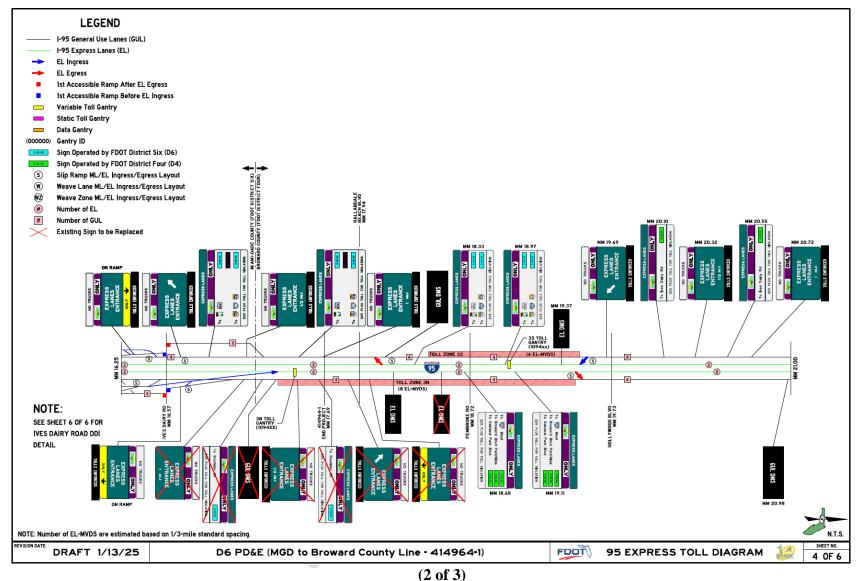


Figure 10 – Managed Lanes Diagram

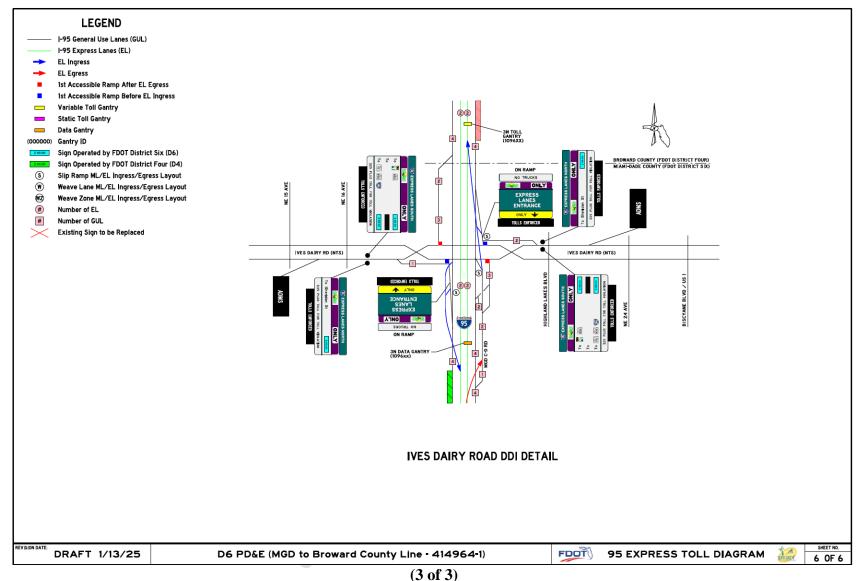


Figure 10 – Managed Lanes Diagram

# 4.3.4. Dynamic Message Signs (DMS) System

The project will include additional DMSs in the functional areas as described below:

- DMS The District Six SunGuide® TMC EL Operators will use DMSs to provide motorists with event information that may impact the motorists' decision to enter of exit the ELs. They will also be used for travel times, vehicle alerts, safety messages, construction, and other messages approved by FDOT in accordance with District Six SunGuide® TMC standard operating procedures. DMSs will be placed in GPLs prior to each ingress ramp approaching the EL and in the EL prior to each egress ramp out of the EL. The DMSs will be controlled by the District Six SunGuide® TMC. DMS messages will be generated by the SunGuide® Software and will be associated with specific events created in SunGuide®. The DMSs located in Miami-Dade County will be integrated into District Six SunGuide® TMC network.
- Arterial DMS (ADMS) ADMSs will be placed on arterial approaches to I-95/SR 9 interchange entrance ramps that enter prior to an EL ingress locations, but after the DMS identified for the EL entrance locations. This will ensure all motorists can receive event information regarding the ELs prior to entering. The need for ADMS will be based upon where DMS exist, where EL entrance locations exist, and where on-ramps to I-95/SR 9 exist. The ADMS needs for the project should be identified during the development of the procurement documentation. As a minimum, ADMSs for the I-95/SR 9 ELs are needed at the CR 854/Ives Dairy Road interchange.
- Toll Amount DMS (TADMS) are attached to static signs containing the EL destinations. The static signs containing the TADMS are referred to as Toll Amount Signs. These signs display the toll amounts for each destination. Monitoring and control functionality will be provided by the SELS, SunGuide® DMS Subsystem. In addition to the toll amounts, they should be able to display "\$0.00", "CLOSED", and "TEST" and designed to provide a high degree of reliability and availability.
- Lane Status DMS (LSDMS) are attached to static guide signs for EL entrances. They typically display the operational status of the ELs, such as "TOLLS ENFORCED," "OPEN", "EXPRESS LNS CLOSED", or "CONGESTED". LSDMSs are controlled by the SELS, SunGuide® DMS Subsystem. The "CONGESTED" messages are displayed when the I-95/SR 9 ELs performance drops below the target of an average speed of 45 miles per hour.

TADMSs and LSDMSs will be included as part of the Project to provide sufficient advanced and redundant notice of current toll amounts in using the ELs for up to three upstream destinations. They will be supplemented by ADMSs at the SR 860/Miami Gardens Drive interchange and the CR 854/Ives Dairy Road DDI.

### **4.3.5.** Vehicle Detection System (VDS)

The VDS will collect real-time traffic volumes, speeds, and occupancy data. The raw detector data will be processed to reduce erroneous data from the data set before it is fed into the variable pricing algorithm for calculating tolls. The VDS will be integrated into the TMC's SunGuide® Software for collecting and storing the raw data. This data will also be used by the District Six SunGuide® TMC Operators to detect incidents and can be used to post travel times.

The VDS in the ELs require a higher level of accuracy and reliability as they play a critical part in determining tolls to be charged. The accuracy of the detectors should be at least 95% for speed, volume, and occupancy regardless of direction. When detectors are not providing the required level of accuracy, they will be removed from the variable pricing algorithm. The vehicle detectors within operational segments will be on the District Six network and will be used to monitor traffic conditions, toll setting and reporting by the District Six SunGuide® TMC. VDS should have a minimum detector spacing of at least 1/3 mile or closer. In certain cases, 1/4 mile spacing may be required to allow for optimal algorithm conditions depending on the length of the tolling segment.

## 4.3.6. Closed-Circuit Television (CCTV) Camera System

CCTV cameras will be integrated into the existing CCTV control software used by the District Six SunGuide® TMC. TMC Operators will use the CCTV cameras to quickly detect, verify, and monitor incidents in both the ELs and GPLs. The CCTV cameras will also be used by TMC EL Operators to confirm the messages and toll amounts posted on all DMSs. The CCTV cameras should be designed to provide 100% coverage of the ELs and GPLs.

It is the Department's goal to have one dedicated verification CCTV for each DMS within the project limits. The TADMS and LSDMS will be configured to the SunGuide® Software and will be used by TMC EL Operators to confirm the messages posted. CCTV cameras will be used for incident management in Miami-Dade County along ELs and GPLs and will be on the District Six SunGuide® TMC network.

### 4.3.7. Ramp Signal System (RSS)

The existing RSS will continue to be operated by the District Six SunGuide® TMC. The existing RSSs will be relocated to locations that fit within the proposed geometric design improvements for the I-95/SR 9 interchanges at SR 860/Miami Gardens Drive and at the CR 854/Ives Dairy Road interchanges.

# 4.3.8. Incident Management Concepts

The following sections provide guidelines for the incident management concepts that will need to be considered during the design phase. The final build conditions that are considered during the design phase must maintain, or improve, the existing incident management concepts in place along the corridor.

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### 4.3.8.1. Emergency Access

Emergency access along the project corridor will be continuous with tubular ELMs used to separate the ELs from the GPLs. Any changes to access for the ELs, regarding emergency management, must be evaluated by incident management stakeholders and all first responding agencies (FHP, Fire Rescue, Emergency Medical Services) prior to being incorporated in the final design conditions.

ELs and GPLs are primarily buffer separated with tubular ELMs, except for access and egress locations. Access points could be grade-separated or barrier-separated. Emergency access will be continuous along the buffer with tubular ELM areas. However, incident management solutions are needed for the elevated ramps providing access to and from the ELs. This may require Road Ranger staging as well as special incident clearance procedures to address road blockage due to crashes or disabled vehicles.

### 4.3.8.2. Staging, Investigation Areas, and Emergency Stopping Sites

Staging areas exist within the I-95/SR 9 corridor within Miami-Dade County at key locations for Road Rangers, IRV, and FHP. District Six utilizes a specific area within the GGI Park and Ride Lot for its investigation area. Additionally, I-95/SR 9 has five Emergency Stopping Sites (ESS) along the median shoulder: three northbound, and two southbound. The proposed improvements provide continued presence of each of these strategies. The following are definitions and descriptions for each strategy:

- Staging areas strategically placed locations for incident responders to have safe access to the EL. They will be located along each direction of the corridor where heavy demand is anticipated. It is recommended that they be placed immediately upstream of investigation areas and EL entrance ramps.
- Investigation areas provided for FHP and other responders to manage incidents and events, relocate vehicles blocking EL or access ramps, and perform other tasks related to traffic investigation. First responders use them to assess incidents after lane blockages have been cleared. It is recommended that these areas are large enough to hold multiple tow trucks and response vehicles. They should be placed at interchange off-ramps where possible.
- Emergency Stopping Sites (ESS) The addition of ESS along I-95/SR 9 as part of the 95 Express Phase 1 Project has been shown to be an effective strategy for increasing safety throughout the facility. As such, the I-95/SR 9 EL project, from south of the Miami Gardens Road interchange to north of the Broward County Line, should consider ESSs. During the design phase, at least one ESS per direction along I-95/SR 9 in each direction within the project limits should be considered if they can be accommodated within existing right-of-way.

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### 4.3.8.3. Incident Response Resources

Incident management will play a critical role in providing a reliable trip within the I-95/SR 9 ELs. A comprehensive Incident Management Plan will be developed prior to opening the Els. It will focus on identifying and documenting quick clearance policies, staging/accident investigation areas, and additional resources. The Incident Management Plan will utilize the existing procedures established for the I-95/SR 9 ELs, where applicable. Additional project specific incident management procedures will be needed to address maintenance of traffic, and mutual aid agreements for emergency personnel and incident responders.

The District Six SunGuide® TMC may need to supplement their current District contracts for Road Rangers and IRV to provide additional incident response resources along I-95/SR 9 ELs. The staffing, personnel, and resources necessary to accommodate the future conditions will be further evaluated during the subsequent design phase of this project.

#### 4.3.9. Enforcement

Enforcement will play a critical role in maintaining the integrity of the ELs. Enforcement will be provided at the toll gantries utilizing the existing FTE methods for identifying toll violators as they pass through the toll gantries. Vehicles must display a SunPass transponder, and FTE's Violation Enforcement System will electronically monitor traffic. Drivers without transponders will have their license plates photographed and receive an Unpaid Toll Notice for failing to pay a toll. Failure to resolve the Unpaid Toll Notice will result in a Uniform Traffic Citation. FDOT District Six utilizes the existing FHP Hireback Program for enforcement activities (other than toll violations) within the project corridor. Additional considerations for enforcement policies and procedures will need to be further evaluated during the design phase.

### 4.3.10. Tolling Operations

The proposed destination signing was previously shown in Figure 10. It is recommended that the following categories be refined for the proposed alternative: EL points of ingress/egress; EL segments; destination signing; and toll and data gantry locations. Additional details related to these categories will be further evaluated during the design phase.

### 4.3.10.1. Trip Building

The Project will be operated using a Trip-Based tolling strategy. FTE will be responsible for the account management functions that will assess tolls, which includes the toll assessment calculations. To assess trip tolls, FTE will follow a Trip Building process that consists of determining if a vehicle completed a defined Trip by combining vehicle transactions at a sequential set of segments beginning with the Trip's First Segment and verifying that the vehicle traveled consecutive segments of a trip within a configurable interval (Segment Travel Time Limit). The segments are combined to define trips, which are displayed at the entrance of the ELs. A toll amount will be calculated for each segment based on the traffic density in that segment. The trip tolls will be a summation of the segment tolls traveled for a specific trip.

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The toll assessment will provide a Trip Toll benefit by locking in the Trip Toll when the motorists first enter the ELs along the project corridor. The current policies/procedures for I-95/SR 9 ELs regarding tolling will be used as a framework for developing the specific procedures regarding:

- TADMS/LSDMS failures
- Vehicle Detector System failures
- Retroactive Adjustments and Overrides
- Data exchange with FTE
- Use of operating modes
- Maximum Trip Toll
- Trip Configuration
- Time-based relationships among tolls posted and when tolls are effective (charged).

A key component of implementing this trip building system will be maintaining operations of the ELs. Incorporation of trip building in FTE's back-office (toll rate signing, EL access, etc.) are all critical components to be included in the development of a continuity plan, which should be developed in close coordination with FTE.

#### 4.3.10.2. Toll Assessment Calculations

Once it has been established that a valid Trip was completed by a vehicle, Toll Assessment will compare, on a segment-by-segment basis, the segment tolls in effect at the time the vehicle arrived at the gantry in each segment and the corresponding segment toll included in each trip toll for which the vehicle qualifies at the time the vehicle arrived at the first gantry in that trip, and will use the lowest toll as the toll to be charged. It is important that FTE is aware of each valid trip toll to build them into the Trip Building process. As this project is further developed, a key component will be the coordination with FTE to ensure their back-office system is reconfigured to accommodate the new trips, and that the OTM and SELS are reconfigured with the new access locations.

# 4.3.10.3. Tolling Gantries

Toll gantries will be utilized for either toll or data collection and enforcement purposes within each EL segment. Toll gantries will be designed according to FDOT's General Tolling Requirements (GTR). Toll gantries will be located as close to the associated express lane segment ingress as possible to minimize travel time and potential latency between the actual toll amount at the time of entrance and any toll amount changes. Dedicated CCTV cameras will be used to validate the actual toll amount displayed at the TADMS at the time of entrance and correctly applied to each toll transaction.

### 4.3.11. Operational Policies and Constraints

FDOT District Six has established business rules and operational policies for the 95 Express Phases 1 and 2, which include ramp signaling operations. These business rules and operational policies are expected to continue with this improvement project.

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As more opportunities arise for incorporation of Connected and Autonomous Vehicles, FDOT District Six will accommodate additional roadside ITS infrastructure to include cellular devices, additional CCTV cameras, additional DMS, cellular communication devices, and other technology as needed. These devices should be considered at strategic locations such as high-crash locations and approaches to the proposed braided ramp connections. Design of the ITS system should account for these potential future technology enhancements regarding power and communication.

The possible constraints for the proposed system include:

- The long flyovers proposed by the braided ramp interchanges providing direct access to ELs could provide operational constraints if an incident occurs, or if a vehicle becomes disabled. Incident response requirements will need to be evaluated to ensure proper performance requirements are established and met.
- Funding for operations and maintenance will be provided from toll revenues. It is critical to the success of the project that adequate funding levels for the additional resources are allocated to ensure the performance targets are met.
- Consideration of emerging technologies to accommodate future Connected and Autonomous Vehicle (CAV) operations, including dedicated CAV lanes.
- Limitations on redundant TADMSs along arterials approaching the braided ramp flyover providing direct access to the ELs. Furthermore, design speeds less than 45 miles per hour along the long flyovers at the braided ramps would require FTE to charge a minimum toll to the users based upon FTE's back-office software in conjunction with vehicle speeds.

# 4.3.12. Operational Policies / Business Rules

As ELs are deployed and expanded across the State of Florida, the FDOT has established guidance and policy decisions that will affect the Project operations. The guidance and policy decisions establish the basis from which business rules and procedures are developed. The existing guidance and policy decisions are contained in the following documents:

- Florida Administrative Code 14-100.003 (Toll Rule) was established in 2008 and was amended February 19, 2014. They were implemented on March 1, 2014, for 95 ELs Phase 1. It establishes the minimum toll of \$0.50 and a maximum toll rate of \$1.50 per mile for 95 Express from I-395 to GGI. There is no maximum toll rate for all other ELs.
- FDOT Managed Lanes Guidebook (2023) provides guidance for implementation of the Department's Managed Lanes Policy, Topic No. 000-525-045. This Guidebook is designed to work in conjunction with other FDOT manuals, procedures, handbooks, guidebooks, and design criteria used in the development, implementation, and operation of FDOT projects. It includes information and guidance on project identification and development, operational strategies, facility types, screening of managed lanes, tolling, EL software, design considerations, operations & maintenance (O&M), mobility performance reporting, and funding and financing.

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- I-95/SR 9 ELs Phase 2 Business Rules Technical Memorandum This document contains the business rules for the I-95/SR 9 ELs Phase 2 Project, which is the first operational trip-based express lanes project in Florida. The business rules primarily focus on elements that affect how tolls are charged for various scenarios. For example, what toll amounts are charged when a TADMS has a stuck message or failed. The I-95/SR 9 EL Phase 2 business rules memorandum define the following concepts and their impacts to tolling:
  - Operating Modes
  - Trip Tolls
  - Toll Adjustments
  - Special Cases
    - Closed Operations
    - Detector Malfunction
    - TADMS Malfunction
    - Stuck Segment Toll
    - Stuck Maximum Trip Toll
    - Lane Status DMS Malfunction
    - Verification CCTV Camera Failures
    - FTE Communication Problems
    - SELS Start-Up
    - Operating Mode Changes

The I-95/SR 9 ELs will continue to not have any toll exemptions for High Occupancy Vehicles (HOV), vanpooling, carpooling, motorcycles, or hybrid vehicles.

# 4.4. Modes of Operation

The EL pricing strategy is considered dynamic and requires EL Operator monitoring. The EL Module contained in the SELS is the primary operator interface for EL Operators and controls the distribution of calculated toll amounts to the Turnpike and DMSs in the field. The software will recommend toll amounts to the EL Operator, who will then acknowledge the recommendations and subsequently confirm that the approved toll amounts have been used and posted correctly on the TADMSs. The EL Operator will also confirm that the LSDMS are displaying the correct messages. The SELS has six operational modes available to EL Operators for Segment Tolls, plus toll adjustment functionality for Segment and Trip tolls, and a start sequence. These include:

■ Time-of-Day — Time-of-Day operating mode is an override mode and will be used when the EL facility is open, dynamic mode is unavailable (possibly due to lack of detector data), and traffic warrants the utilization of the toll stored in the Time-of-Day (TOD) table. TOD operating mode only requires EL Operator interaction when switching from another operating mode to TOD mode. While in this mode, the tolls update automatically based on the operating tolls stored in the SELS Software TOD table. There is a schedule in SELS software that causes SELS to use different TOD tables for weekdays and weekends/holidays. TOD can be configured to utilize automatic approval.

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- Manual Manual operating mode is an override mode that allows the EL Operator to set tolls manually by selecting from a predefined set of tolls. Tolls remain the same amount until the EL Operator chooses a new toll or mode. The EL Operator will use this mode typically when toll amounts are stuck due to Toll Amount Sign failure(s).
- **Dynamic** Dynamic operating mode is the default mode that allows the operating toll amounts to be "adjusted" based on the real time responsive toll amount adjustment algorithm. Dynamic operating mode is the most commonly used operating mode and will be used until a situation arises that warrants a change in mode. In dynamic mode, SELS will recommend a toll amount based on current traffic conditions. Dynamic mode can be configured to utilize automatic approval for changing toll amounts.
- Closed Closed operating mode is an override mode that requires EL Operator interaction. Closed operating mode will be used when the EL facility is closed, and a zero-toll amount is charged. As the EL Operator changes the operating mode to closed, SELS will adjust the effective time to 10 minutes before the incident was confirmed by the EL Operator. The EL facility will be closed for an incident that results in a blocked travel lane within the EL and when traffic is diverted from the GPLs to the ELs because of an incident in the GPLs. Either FHP or FDOT initiate the diversion.
- **Zero-Toll** Zero Toll operating mode is an override mode that requires EL Operator interaction. It will be used when the EL are open, but a \$0.00 toll must be charged. The EL operator will implement this mode during evacuations, when the Governor has suspended tolls, and/or under the direction of FDOT.
- **Toll Adjustment** Toll adjustments are retroactive toll reductions that require EL Operator interaction. An ongoing adjustment shall continually replace the toll amount until terminated by an operator. A finite adjustment allows the EL Operator to replace toll amounts for a specified interval in time utilizing beginning and ending times no later than the present time. EL Operators can implement either an on-going or finite adjustment for a segment or a trip. Segment toll adjustments allow the EL Operators to go back in time (up to eight hours) and change the toll amount charged to customers to an amount less than or equal to that posted on the TADMS. A toll adjustment will be applied when any TADMS is unable to post the current toll amount. When any toll amount sign is blank, the minimum toll amount of \$0.50 will be charged. The toll adjustment does not change the tolls displayed on the TADMS and only affects the toll charged to customers. Therefore, the current applicable toll amounts can be displayed on all operating TADMS to manage demand, while the customers are only charged \$0.50. Trip toll adjustments are similar, except that the toll and effective time are chosen from a list of previous tolls to ensure that the tolls associated with each segment included in that trip are known. The list contains tolls effective up to eight hours in the past, except that any toll higher than a subsequent toll is not included and stops the search back in time for tolls to include in the list.

# 4.5. User Involvement and Interaction

Operations and maintenance functions for the Project will be a multi-agency effort, primarily among internal stakeholders FDOT District Six, FDOT District Four, and FTE. The User Profiles and Support Environments do not change; however, the project specific roles and responsibilities previously identified in Table 3 and Table 4 are further described in the Roles and Responsibility Matrix below (Table 5). The matrix is a placeholder, and it is subject to change while Districts Six, District Four, and FTE move forward with agreements. The matrix will be updated and replaced, if needed, during the Design phase.



**Table 5 – Responsibility Matrix - Express Lanes FDOT District Six (non-Turnpike)** 

		Owner-	Design	Submitta	al Reviews	Construction/	Mainte	enance	RCI/Asset	Notes
Element	Description	ship	Delivery	Design Plans	Shop Drawings	Implementation/ Testing	Program	Perform	Mgmt	
Right-of-Way	Includes all ROW associated with the project	District	District	District	NA	NA	District	District	District	
Utility Permitting	Includes any necessary permits for utilities associated with the toll site (e.g., leased line or power service permits)	NA	District	NA	NA	NA	NA	NA	NA	
Toll Building Permitting	Includes the permitting of the Toll Equipment Building	NA	Turnpike	NA	NA	NA	NA	NA	NA	Turnpike is self-permitting. Permitting completed through Building Code Administrative Services Inc. Coordination through FTE Building Permit Coordinator.
Roadway/ Pavement	Includes resurfacing, patching, pavement marking and other elements within the corridor.	District	District and Turnpike (R)	District and Turnpike (R)	NA	District and Turnpike (R)	District	District	District	Turnpike (R) includes a limited review of the roadway features surrounding the toll point (100' section) including pavement design.
Bridges	Includes all bridges and bridge components, inclusion in inspection and routine and periodic maintenance.	District	District	District	District	District	District	District	District	
Static Signs	Includes static signs related to the managed lane operations.	District	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike (R)	District	District	District	District	Turnpike (R) includes a limited review of the toll rate signs, toll schedule, SunPass, Toll By Plate and other related toll collection messaging.
DMS	Includes DMS related to the managed lane operations.	District	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike (R)	District	District	District	District	Turnpike (R) includes a limited review of the toll rate signs, toll schedule, SunPass, Toll By Plate and other related toll collection messaging.
Sign Structures	Includes the structure required to hold any signs related to the managed lane operations.	District	District	District	District	District	District	District	District	
Incident Management	Includes funding for Road Ranger Services and other incident management services.	District	NA	NA	NA	District	District	District	NA	
District Fiber Optic Cable	Includes the communication back-bone for both the ITS system for traffic operations as well as the communication back-bone for tolls data	District	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike	District	District	District	Turnpike (R) includes a limited review to confirm tolls data connectivity approach and architecture from toll sites to the FTE Tolls Data Center. Optical Time Domain Reflectometer is required as a contract deliverable per FDOT Standard Specifications. Review test documents to ensure acceptable dB losses.

		Owner-	Design	Submitta	al Reviews	Construction/	Mainte	nance	RCI/Asset	Notes
Element	Description	ship	Delivery	Design Plans	Shop Drawings	Implementation/ Testing	Program	Perform	Mgmt	
Turnpike Fiber Optic Cable	Includes the communication back-bone on the Turnpike for Tolls Data. In most District Express Lane Projects, the District will have project network communication connect to the existing Turnpike fiber optic backbone.	Turnpike	Turnpike	NA	NA	Turnpike	NA	Turnpike	Turnpike	Includes review to confirm tolls data connectivity approach and architecture from toll sites to the FTE Tolls Data Center. Optical Time Domain Reflectometer is required when new fiber is installed as a contract deliverable per FDOT Standard Specifications. Review test documents to ensure acceptable dB losses.
Miami-Dade Department of Transportation and Public Works (DTPW)	Responsible for public transportation services in a given region, may include operation of transit vehicles within Express Lanes facility.	DTPW	NA	NA	NA	Test transit related system functionality.	Support transit operations and maintenan ce plans	Maintain vehicles and transit stop facilities owned by the agency	NA	Identify role relative to other agencies and how functions are to be carried out.
Tolls Lateral and Interconnects	Includes the lateral drop between the nearest splice vault and the tolls communications cabinet fiber distribution panel (FDP) inside or between toll equipment buildings.	District	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike (R)	District	District	District	Review test documents to ensure acceptable dB losses.
Leased Line Telephone Company (Telco)	Includes the site infrastructure (pull boxes and conduit) from the toll equipment building to the nearest splice vault or point of presence. If no geodiverse fiber is provided, leased lines are required for physical redundancy on Express Lanes, per GTR 12.5 (see table notes).	District and Telco (*)	District, Telco (*) and Turnpike (R)	District, Telco (*) and Turnpike (R)	District, Telco (*) and Turnpike (R)	District, Telco (*) and Turnpike (R)	District, Telco (*) and Turnpike (R)	District, Telco (*) and Turnpike (R)	District and Telco (*)	Turnpike coordinates with the Telco and communicates need based on forecasted traffic volumes and toll system bandwidth requirements. Telco (*) requires 200 days advanced coordination prior to turning the site over to the toll equipment contractor. This effort includes circuit ordering and equipment installation by the Telco. To be included only if leased lines are used.
District Six SunGuide® TMC to FTE Tolls Data Center Communications Media (for sending toll amount data)	This item is associated with the protocol for communicating tolls amount data from the District to the Turnpike. It is not associated with the physical communications media, but rather the protocol. The Turnpike owns the Interface Control Document.  Communications media will be either fiber communications or leased line.	District and Turnpike	District and Turnpike	District and Turnpike	District and Turnpike	NA	District and Turnpike	District and Turnpike	NA	

		Overson	Design	Submitta	al Reviews	Construction/	Mainte	enance	RCI/Asset	Notes
Element	Description	Owner- ship	Delivery	Design Plans	Shop Drawings	Implementation/ Testing	Program	Perform	Mgmt	
Tolls Wide Area Network (WAN) Monitoring	Includes monitoring of all of the Toll's WAN electronics (within FTE and District network) and leased line Connectivity.	Turnpike	Turnpike	NA	NA	NA	Turnpike	Turnpike	Turnpike	Turnpike will monitor the WAN switch for connectivity. Wide Area Communication requires a response as soon as practicable. Performance metrics should be established for response and repair time.
ITS Roadside Equipment	Includes all of the ITS roadside equipment (not including the signs - covered elsewhere in matrix) and system required to identify traffic conditions and monitor vehicle speeds and volumes through the corridor.	District	District	District	District	District	District	District	District	
ITS Roadside Communication	Includes the equipment required to connect the roadside equipment with the ITS building/cabinet equipment.	District	District	District	District	District	District	District	District	
ITS Traffic Management Software	Includes the software required for traffic management as well as calculate the toll amounts.	District	District	District	District	District	District	District	NA	District will test pricing system. The Turnpike and District will jointly perform End to End testing.
ITS Power Service	Includes power services required for equipment use.	District	District	District	District	District	District	District	NA	ITS power shall not be combined or shared with the toll equipment building power service.
ITS Cabinet/ Building	Includes the site infrastructure and building or cabinet required to house the ITS equipment and/or ancillary equipment.	District	District	District and Turnpike (R)	District	District	District	District	NA	For Turnpike involvement in submittal review - Should Toll's WAN regeneration be required, then the District ITS cabinet/building shall accommodate the Tolls WAN equipment and electronics.
Toll Amount Pricing	The District will provide toll amount/rates through coordination with the TMC and provide them to Turnpike Toll's back office.	District	NA	NA	NA	NA	NA	NA	NA	The District is responsible for the dynamic pricing of Express Lanes based on traffic conditions. (The Turnpike establishes toll rates through the Rule Making Process.)
Express Lane (EL) Performance Reporting	Performance and accuracy statistics for speeds, incidents, ITS equipment performance, etc.	District	NA	NA	NA	NA	District	District	NA	
Express Lane (EL) Traffic and Revenue Reporting	Traffic and revenue reporting of Express Lane traffic and toll transactions.	Turnpike	Turnpike	NA	NA	NA	Turnpike	Turnpike	NA	Turnpike will report Traffic and Revenue to the District.
Toll Site	Locating of tolling site and all the civil/site infrastructure in, around, and below the gantry, building, maintenance access area, utility constraints, drainage, etc.	District	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike	District	District	District	Turnpike (R) includes the review of site components for GTR conformance.

		Owner-	Design	Submitta	al Reviews	Construction/	Mainte	nance	RCI/Asset	
Element	Description	ship	Delivery	Design Plans	Shop Drawings	Implementation/ Testing	Program	Perform	Mgmt	Notes
Toll Gantry	Includes the structure and all associated elements included with the structure required for installing, operating, and testing toll equipment. Includes all ancillary items such as grating, fall protection systems, gear operators, electrical equipment, man lifts, access gates, etc. Excludes toll equipment and associated cables provided by the toll equipment contractor.	District	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike	District	District	District	Turnpike (R) includes the review of gantry components for GTR conformance.  Turnpike to provide guidance on the appropriate use of accessible gantries.  District to notify Turnpike when performing Toll Gantry Structure Inspections.
Toll Equipment Building	Includes the toll equipment building, and foundation.	District	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike	District	Turnpike	District	Turnpike (R) includes the review of toll equipment building components for GTR conformance. The Turnpike will perform maintenance on the Toll Equipment Building. Electrical components within the building will be maintained by Turnpike, but the Power Distribution to the Building will be maintained by the District. Replacement of building from damage beyond repair or end of service life is the District's responsibility. District will program and pay for maintenance performed by the Turnpike. Turnpike will provide estimates for District programming.
Toll Equipment Building (Facility Systems)	Includes the systems required for operation of the toll equipment building. These systems include stand-by generator, automatic transfer switch, diesel fuel tank, HVAC, lighting, electrical power up to the UPS, equipment connections to the SCADA system, and other required systems.	District	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike	District	Turnpike	District	Turnpike (R) includes the review of the facility systems for GTR conformance. This does not include gantry or rack mounted toll equipment provided and installed by the toll equipment contractor. District is responsible for purchasing all fuel. Replacement of all toll equipment building facility systems due to damage beyond repair and end of service life is the District's responsibility. District will program and pay for maintenance performed by the Turnpike. Turnpike will provide estimates for District programming.

		Owner-	Design	Submitta	al Reviews	Construction/	Mainte	nance	RCI/Asset	
Element	Description	ship	Delivery	Design Plans	Shop Drawings	Implementation/ Testing	Program	Perform	Mgmt	Notes
Toll Equipment Building (Tolling Systems)	Includes the systems required by the GTR for card access control, communications switch, and CCTV.	District	Turnpike	Turnpike	Turnpike	Turnpike	District	Turnpike	District	This does not include gantry or rack mounted toll equipment provided and installed by the toll equipment contractor. Turnpike will coordinate with the District on Toll Systems installation. District will program and pay for maintenance performed by the Turnpike. Turnpike will provide estimates for District programming.
Toll Equipment Building (Power Service)	Includes power services required by the toll facility.	District	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike (R)	District and Turnpike	District	District	District	Turnpike (R) includes the review of the facility power systems for GTR conformance. The toll equipment building power service shall be dedicated and not shared. Roadway lighting and ITS power shall not be combined or shared with the toll equipment building power service.
Toll Loops	Includes the loop system installed in the tolling area pavement, 50 feet on both sides of the gantry centerline in the Express Lanes, inside shoulder and adjacent general use lane as required by the toll equipment contractor.	District	District and Turnpike (R)	District and Turnpike (R)	NA	District Turnpike and TEC	District	Turnpike	District	The toll equipment contractor shall install these loops in the tolling pavement area in conjunction with the gantry and building mounted toll equipment for the means of revenue collection. The Turnpike will perform an annual inspection of the toll pavement. District will program and pay for maintenance performed by the Turnpike. Turnpike will provide estimates for District programming.
Toll Equipment	Includes the gantry/ground/building mounted equipment provided and installed by the toll equipment contractor. Includes the gear boxes on accessible gantries.	District	NA	NA	NA	Turnpike	District	Turnpike	District	Turnpike will test the tolling system. The Turnpike and District will jointly perform End to End testing. Toll equipment installation as-builts are provided by the toll equipment contractor. District will program and pay for maintenance performed by the Turnpike. Turnpike will provide estimates for District programming.
FCC License	This includes the coordination and acquisition of the license for the AVI subsystem RF License from the Federal Communications Commission.	Turnpike	NA	NA	NA	Turnpike	NA	NA	NA	Timeline as required by FCC, requires Northing and Easting, Lat/Long and physical building address for application.

		Owner-	Design	Submitta	al Reviews	Construction/	Mainte	enance	RCI/Asset	Notes
Element	Description	ship	Delivery	Design Plans	Shop Drawings	Implementation/ Testing	Program	Perform	Mgmt	
Toll Transaction Processing Software	Includes the software required to manage and operate the toll facility including, transaction creation, trip building, account management, and violations processing.	Turnpike	Turnpike	NA	NA	Turnpike	Turnpike	Turnpike	NA	
Toll Enforcement (Back Office)	Includes programs used to enforce tolls within the system	Turnpike	NA	NA	NA	Turnpike	Turnpike	Turnpike	NA	Includes back-office processing for toll violations in accordance with violation business rules for Express Lanes.
Traffic Enforcement (Roadside)	Coordination of speed enforcement, illegal access/egress, and unauthorized vehicles with FHP or other enforcement agencies.	District	NA	NA	NA	NA	NA	NA	NA	
Toll Transaction Processing	Back-office processing of Express Lane toll transactions in accordance with Express Lane Toll Processing Business Rules. This element is associated with the transaction processing activity.	Turnpike	Turnpike	NA	NA	Turnpíke	Turnpike	Turnpike	NA	
Project Systems Engineering Management Plan (PSEMP)	A plan for the implementation of the Express Lanes Project using Systems Engineering Process principles	District	District and Turnpike	District and Turnpike	NA	NA	District and Turnpike	District and Turnpike	NA	
Project/Corridor Concept of Operations	A plan for how the Express Lane will be operated.	District	District and Turnpike	District and Turnpike	NA	NA	District and Turnpike	District and Turnpike	NA	The Concept of Operations should be consistent with the overall regional plan defined in the Regional Concept of Transportation Operations (RCTO) documentation and is a key component within the Systems Engineering Process.
System Validation Plan	Identifies the process for measuring the performance of the project based on system goals and objectives.	District	District	District and Turnpike	NA	District and Turnpike	District	District	NA	Developed before implementation, completed after Implementation.
Public Information Office (PIO)	Coordination of all project-related information on the Express Lanes Project.	District and Turnpike	District and Turnpike	NA	NA	NA	NA	NA	NA	District PIO provides operational information and statistics (average toll, traffic information, incident management). Turnpike addresses Express Lanes tolling methodology and processes.

Turnpike (R) = Limited Design and Shop Drawing Review by Turnpike

NA = Not Applicable
GTR: The State's General Tolling Requirements

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# 4.6. Assumptions

The changes identified in the project will be further evaluated during subsequent phases of design. For the purposes of this ConOps, high-level assumptions were identified including the following:

- Proper resources for TMC Operations, Incident Response, Engineering/Technical Support, Public Information, and ITS Maintenance will be budgeted to achieve and maintain the project's goals.
- A comprehensive public information campaign will be developed to assist commuters with new I-95/SR 9 GPL and I-95/SR 9 EL access locations.
- No changes in tolling procedures or additional software development will be needed to facilitate the new I-95/SR 9 EL access locations.
- Any existing mutual aid agreements will be evaluated, and new agreements will be developed to support any improvements, if necessary.
- The systems and components required to operate and manage the system are defined in the Regional ITS Architecture (RITSA) or will be updated to be included as needed.
- The performance measures that are currently in place will be carried over to any new components, connections, or systems to serve as the basis for future evaluations and assessments.

### 4.7. Risks

The risks associated with proposed changes to the system, or with the management of the schedule or budget, are listed in Table 6. This risk register should be updated by the Engineer-of-Record (EOR) and the Construction Engineering & Inspection (CE&I) staff as the project advances from planning to the design and construction phases.

Table 6 – Risk Register

Risk #	Risk Owner	Description of Risk and Impact	Likelihood (1-4)	Impact (1-4)	Rating (L + I) (2-8)	Mitigation Strategy
1	FDOT D6	Blockage in Elevated NB Collector/Distributor Ramp to ELs, thereby causing delays, queuing, and potential for secondary crashes	2	4	6	Road Ranger Staging at interchange area and predefined incident response plan.
2	FDOT FTE	Emerging Technologies to replace Legacy ITS/Toll Collection Systems, thereby providing opportunities for O&M cost efficiency	3	3	6	Coordination with FTE and FDOT Central Office Emerging Technology Division.
3	FDOT D4/6 FTE	Cut in Fiber Optic Communications during construction, thereby resulting in temporary outages	2	4	6	Coordination with CE&I firms to share as-builts with Contractors to avoid fiber optic cuts
4	FDOT D4/6 FTE	Construction Timing in relation to FDOT District Four I-95/SR 9 ELs, thereby impacting Signing and Tolling Systems	2	3	5	Coordination with FDOT District Four to schedule adjacent projects to minimize throw-aways.

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Risk #	Risk Owner	Description of Risk and Impact	Likelihood (1-4)	Impact (1-4)	Rating (L + I) (2-8)	Mitigation Strategy
5	FDOT D6	DDI Safety / Operational Risk at CR 854/Ives Dairy Road	2	3	5	Public Education and Outreach program prior to operational start-up.
6	FDOT FTE	Changes in Pricing Policies to address either congestion in ELs and/or public acceptance	2	2	4	Analysis of toll pricing changes and anticipated impact on travel behavior and free flow traffic.
7	FDOT FTE	Cybersecurity Risks impacting reliability of ITS / Tolling Systems	1	3	4	Strict compliance with FDOT IT standards.

**Note:** This table uses estimates of likelihood (1-4) and impact (1-4) of the risk. When added, they become a risk rating (2-8), which can be used to rank the risks.

# 4.8. Support Environment

The District Six SunGuide® TMC will be responsible for setting tolls for its segments and maximum trip tolls and communicating the toll amounts to FTE for back-office services. Operating procedures will be developed and maintained by the District Six SunGuide® TMC for toll setting operations. These procedures will include notification protocols between the District Six SunGuide® TMC and FTE for equipment and communication failures. The software applications for toll setting will be developed and maintained by the FDOT Central Office and District Six. The District Six SunGuide® TMC will be responsible for monitoring, maintaining, and responding to ITS device failures along the corridor. The District Six SunGuide® TMC will develop maintenance plans to meet the following requirements:

- EL-MVDS accuracy greater than or equal to 95% for all time periods for volumes and speeds within each tolling segment.
- System Availability:
  - O DMS Subsystem > 98.0%
  - o CCTV Camera Subsystem > 99.0%
  - Detector Subsystem > 97.0%
  - Ramp Signaling Subsystem > 99.0%
- Response to any failure of EL ITS devices will be considered a critical response as defined in the FDOT District Six ITS Maintenance contract.
- Fiber Communications/Servers/Switches greater than or equal to 99.99%.

During the design and construction phases, updates to the incident management procedures will be considered among responding agencies for the preferred alternative. The District Six SunGuide® TMC will be responsible for incident management dispatch, response, and clearance for EL segments within Miami-Dade County. The I-95/SR 9 EL Incident Management Plan identified mutual aid agreements among all incident responders and established incident management resources to support the following performance targets:

- Incident Verification (Event Creation to Event Confirmation) < 2 minutes
- Incident Response (Road Rangers/IRV Notification to Road Rangers/IRV Arrival) < 5 minutes</li>
- Travel Lane Blocking Duration (First Travel Blockage to All Travel Lanes Open) < 20 minutes</li>
- Facility Closed due to Non-Recurring Events < 3% of the time</li>

FTE will be responsible for Electronic Toll Collection (ETC), which includes account management, customer service, and maintaining the electronic tolling system (SunPass) at the toll gantries and inside the toll buildings. FDOT District Six will be responsible for maintaining the gantry structures and toll buildings located in Miami-Dade County. FDOT District Six owns the tolling equipment in their respective District and FTE is only responsible for maintaining the equipment. The business rules for account management will be developed, maintained, and managed by the FTE.

Public Information Services will be a joint effort among all agencies involved, with FDOT District Six Public Information Office (PIO) taking a lead role. A common public information software application will be used by all agencies, as applicable. Incident management and general inquiries will be supported by FDOT District Six.

FTE will take the lead on SunPass/account management public inquiries. South Florida Commuter Services will take the lead regarding exemption registrations. Each transit agency will be responsible for inquiries regarding their respective transit services. Performance reporting for the ELs will be the responsibility of the District Six SunGuide® TMC, i.e., Central Office quarterly reports. The District Six SunGuide® TMC will be responsible for all reporting along the corridor. FTE will be responsible for toll and revenue reports. Additional user profiles will be considered during the design and construction phases of the project.

# 5. Operational Scenarios

This section illustrates hypothetical scenarios that are anticipated to occur with the PD&E proposed alternative. The below scenarios contain details of multiple tasks occurring simultaneously with multiple District Six SunGuide® TMC Operations staff involved and are not necessarily in chronological order as depicted. Note, it is typical that the TMC Operator and TMC EL Operator will be notified of an incident from the FHP or Road Ranger before changes are noticed within SunGuide®. This applies for all operations listed below.

# 5.1. Normal Operations Scenario

John, a resident of North Miami, is running late for a 5:00 pm delivery for an important customer. His smartphone app indicates that I-95/SR 9 "best route with toll, despite heavier traffic than usual." He decides to take the recently constructed braided ramp which provides him with direct access to the I-95/SR 9 ELs without being subjected to delays on the GPLs. The TADMS approaching I-95/SR 9 display a toll amount of \$1.50 to the Sheridan Street interchange which he is willing to pay for a more reliable travel time. John is a SunPass account holder and uses the EL only when necessary.

Meanwhile, the District Six SunGuide® TMC operators are actively monitoring congestion along I-95/SR 9 GPLs and use the CCTV cameras to verify there are no events along I-95/SR 9, only recurring peak period congestion. The RSS Operators monitor their computer screens and observe the release rates of the ramp signals reducing due to the congestion along I-95/SR 9 GPLs in the northbound direction. TMC EL Operators are monitoring the SELS map and speed graphs based on the data collected in real-time from the vehicle detectors as well as checking the CCTV cameras along I-95/SR 9. TMC EL Operators see demand increasing in the ELs, but the speeds are free flowing. The SELS notifies them that the tolls have adjusted in response to increasing demand for the ELs. The SunGuide® software presents a video snapshot of the TADMS and the toll amounts that should be displayed. They confirm everything is working properly.

FTE's back-office software processes the data collected from the toll and data gantries John passes under and rebuilds his trip to the Sheridan Street interchange where he will exit. FTE's back-office software receives the toll amount data from SELS, which when combined from each toll gantry (tolling point), applies the total charge to John's SunPass account.

### 5.2. Crash in the Toll Lanes

During morning rush hour Sophia, a District Six SunGuide® TMC EL Operator, is monitoring performance of the ELs using the CCTV cameras and vehicle detectors along I-95/SR 9. She receives a call from an FHP officer indicating there is an incident in the southbound ELs between the CR 854/Ives Dairy Road and SR 860/Miami Gardens Drive interchanges. Sophia uses the nearest CCTV camera to view a single-vehicle crash with the median barrier which results in blocking both ELs.

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Sophia confirms the incident location and its impact to the ELs. Next, she changes the toll operating mode in the SELS from "Dynamic" to "Closed" for the blocked segment containing the incident. She logs the incident in the SELS and uses the Automated Vehicle Location (AVL) subsystem of SunGuide® that provides the locations of all Road Rangers in the vicinity to dispatch Road Rangers to close the southbound EL access at the CR 854/Ives Dairy Road interchange.

SunGuide® is used to change the messages on all DMSs (GPL DMS, LSDMS, and TADMS) on the approach to inform drivers of the incident blocking the southbound ELs. Sophia manually adjusts the variable toll to set it to the base toll amount, and the toll adjustment is made retroactively for 10 minutes before the adjustment to account for any motorists caught on the ramp or caught in the congestion queue created by the incident.

To begin clearing the incident, she dispatches additional Road Rangers and any necessary response vehicles to the scene where they block other entrances to the ELs, provide incident clearance support and divert any traffic in the ELs to the GPLs per predetermined plans.

FHP has notified Miami-Dade Fire Rescue of the incident, and they dispatch the nearest available unit to the scene. Miami-Dade Fire Rescue tends to any injuries and begins to transport injured motorists and passengers to the nearest hospital. The FHP officer on the scene coordinates with the other response vehicles on the scene to clear the ramp using the shoulders while relocating any damaged vehicles to the closest investigation area. Sophia continues to monitor the situation using the CCTV cameras and updates DMSs in the area based on new information she is able to confirm.

# 5.3. Crash in the General-Purpose Lanes

During the evening rush hour, Randy who is a District Six SunGuide® TMC Operator is monitoring the performance of I-95/SR 9 using the CCTV cameras and vehicle detectors. While turning the CCTV cameras, he observes a crash in the northbound GPLs between the CR854/Ives Dairy Road interchange and the Broward County Line. It is a multi-vehicle crash resulting in blocking all GPLs, but not the ELs.

Randy confirms the incident location and its impacts on I-95/SR 9 downstream traffic south of the CR854/Ives Dairy Road interchange. Within two minutes of incident detection, he dispatches Road Rangers and IRV to the scene. Next, he enters the event data into SunGuide® which automatically generates updated messages on all relevant DMSs downstream of the event within three minutes of event confirmation. Subsequently, he notifies all relevant agencies and partnering staff within 7 minutes of event confirmation and continues to monitor the event.

SunGuide® is used to update messages on applicable DMSs on the approach to the lane closures to inform drivers of the incident blocking the northbound GPLs. FHP has notified Miami-Dade Fire Rescue of the incident, and they dispatch the nearest available unit to the incident. Miami-Dade Fire Rescue tends to any injuries and begins to transport injured motorists and passengers to the nearest hospital. The FHP officer on the scene coordinates with the other response vehicles on the scene to clear the lanes as safely and efficiently as possible. Randy continues to monitor the situation using the CCTV cameras and updates DMSs in the area based on new information he's able to confirm.

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# 5.4. Blockage in Elevated Northbound Braided Ramp to Express Lanes

On a Saturday afternoon during the holiday season, Sophia notices an abnormal slowdown in the I-95/SR 9 northbound on-ramp from the CR854/Ives Dairy Road interchange. This was detected by the fixed Automated Incident Detection (AID) camera providing coverage of the collector/distributor (C/D) road and ramp entrance to the express lanes. The AID camera leverages AI and deep learning to detect traffic incidents quickly and accurately, significantly improving response times.

Sophia pans, tilts, and zooms other adjacent CCTV cameras within this section of I-95/SR 9 and notices that a crash is blocking the elevated ramp to access the express lanes. She confirms the incident and enters the event data into SunGuide which automatically generates FDOT preapproved messages on all relevant DMSs upstream of the event within three minutes of event confirmation, while simultaneously dispatching the Road Rangers and IRV to the scene within two minutes of identifying the blockage. As a result, the IM (Incident Management) DMS along the northbound on-ramp from CR854/Ives Dairy Road and the northbound C/D road south of CR854/Ives Dairy Road displays Incident Management (IM) messages indicating that access to the express lanes is closed. The Toll Amount and Lane Status DMS along the northbound on-ramp from CR854/Ives Dairy Road and the northbound C/D road south of CR854/Ives Dairy Road are manually posted via the SunGuide DMS subsystem to display closed status messaging indicating that the access to the express lanes is closed. Subsequently, she notifies first responders, relevant agencies and partnering staff within 7 minutes of event confirmation. Rapid deployment ensures that responders reach the scene before traffic backups become lengthy. Sophia continues to monitor the situation using the CCTV cameras and updates DMSs in the area based on new information she can confirm.

The shoulders on roads leading to the ramp, as well as on the elevated ramp itself, support emergency access when travel lanes are congested. FHP and Miami-Dade Fire Rescue are the first responders to reach the incident location primarily due to immediate calls from motorists near the incident. This is facilitated by roadway identification markers along the shoulders of the elevated ramp enabling motorists to call in the specific location of the lane-blockage. FHP officers dispatched to the location assess the incident, determine response needs, and coordinate with other response vehicles on the scene. Miami-Dade Fire Rescue tends to any injuries and transport injured motorists and passengers to the nearest hospital.

Road Rangers responding to the event position their vehicles at the ramp entrance and deploy temporary traffic control to direct traffic away from the elevated ramp. All responders work together, applying the approved response plan developed for braided ramp access, to ensure safety of the on-site personnel and clear the lanes as safely and efficiently as possible to minimize delays and the possibility for secondary crashes. If the blockage is determined to be long-term, then the warning gate system at the base of the ramp is activated after emergency vehicles have arrived at the scene and vehicles trapped behind the blockage have been removed.

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As this incident blocks the elevated ramp to access the express lanes, adequate use of temporary traffic control helps to mitigate congestion around the area. Traffic on the C/D road is guided to the dual-lane CR854/Ives Dairy Road northbound on-ramp. Once the C/D road under CR854/Ives Dairy Road is clear, the blocked access south of the DDI will ensure vehicles enter the general-purpose lanes instead of reaching the braided ramp. Traffic from CR854/Ives Dairy Road experience minimal disruption as the dual on-ramp is not blocked. Although this incident blockage does not affect northbound traffic on the express lanes or on the general-purpose lanes, some slowdown is experienced along the mainline. Sophia and other operators continue to monitor all traffic surrounding the incident and look for secondary crashes.

### 5.5. Maintenance Scenario

Sophia notices that one of the MVDSs, between the CR 854/Ives Dairy Road and SR 860/Miami Gardens Drive interchanges, is not working. This is a priority failure as the EL's variable pricing algorithm is reliant on the traffic volume, speed, and occupancy data the sensor provides to post updated toll amounts on the TADMSs. After unsuccessfully attempting to correct the problem from her workstation, she issues a trouble ticket to the ITS Maintenance Contractor. The ITS Maintenance Contractor acknowledges the failure within 30 minutes, then responds and completes repairs within 24 hours of the reported incident. Meanwhile, the variable pricing algorithm uses information generated by the adjacent sensors, taking the average of the two as a surrogate data point, until the failed MVDS is repaired and calibrated.

## 6. Summary of Impacts

As previously described, the operational impacts of the proposed system may increase the workload of the existing TMC Operations, Road Rangers, IRV, ITS Maintenance, and Roadway Maintenance resources. This additional workload may require additional funding for the operation and maintenance of the proposed system improvements. Subsequently, this will require additional cross training for the system users. This includes training for EL operational procedures/strategies, incident coordination/response, maintenance of traffic procedures and enforcement.

Benefits of the proposed improvements include the following:

- Improves the safety of motorists on the I-95/SR 9 Corridor
- Enhances regional connectivity
- Improves travel time reliability
- Improves emergency evacuations
- Addresses future population and employment growth
- Accommodates the growth in travel demand
- Provides uncongested routes for buses
- Provides relief to adjacent facilities

## 7. Analysis of the Proposed System

#### 7.1. Alternatives

The PD&E Study considered the following alternatives:

#### **No-Build Alternative**

The No-Build Alternative proposes to keep the existing corridor into the future without improvements, except for routine maintenance. Planned and approved adjacent projects in the area (both to the south at the Golden Glades Interchange and to the north in Broward County) are considered, without any proposed changes within the limits of this project. No traffic capacity, operation, safety, mobility, or evacuation improvements would be implemented to the I-95/SR 9 mainline, the ELs, or the two interchanges and arterials within the study area.

### **Build Alternative (preferred)**

The Build Alternative includes providing two express lanes throughout the corridor within the project area; introduction of braided ramps providing direct access from the arterial to the express lanes; reconfiguration of the SR 860/Miami Gardens Drive interchange; a Diverging Diamond Interchange at CR 854/Ives Dairy Road; a grade-separated bridge access to I-95/SR 9 from SR 860/Miami Gardens Drive; improvements to bicycle lanes and sidewalks along SR 860/Miami Gardens Drive; and the addition of an eastbound through lane, bicycle lanes, and one sidewalk along CR 854/Ives Dairy Road.

#### **Summary**

The effect of the No-Build Alternative includes the continuation of existing delays and congested traffic conditions. Also, as travel demand and truck traffic are projected to increase over the next 20 years, given the continued growth expected in this area of Miami-Dade County, under this alternative, congestion and delay will worsen; levels of service on the arterials will deteriorate; and no related environmental impacts, such as traffic noise levels, will be addressed. Therefore, the Build Alternative is recommended.

## 7.2. Cost, Schedule, and Procurement Options

Construction costs of the preferred alternative were estimated using the FDOT Long Range Estimates Program for the preferred alternative. The total estimate is \$591.8 million (see Table 7).

**Table 7 – Preferred Alternative Project Cost Estimate (subject to change)** 

Component	Cost	
Earthwork	\$29,649,861.94	
Roadway	\$111,391,913.77	
Shoulder	\$57,223,132.56	
Median	\$6,604,217.04	
Drainage	\$18,126,511.66	
Signing	\$16,749,686.87	
Lighting	\$10,531,186.44	
Signalizations	\$10,691,319.53	
Intelligent Traffic System (ITS)	\$7,890,541.91	
Bridges	\$178,507,207.10	
Retaining Walls	\$93,158.969.05	
Miscellaneous	\$54,062,878.93	
Sequences Subtotal	\$501,428,457.75	
Maintenance of Traffic (10%)	\$50,142,845.78	
Mobilization (8.0%)	\$40,114,276.62	
Sequences Total	\$591,685,580.15	
Non-Bid	\$156,000.00	
Total	\$591,841,580.15	

A preliminary schedule of the project phases is presented in Table 8. This schedule is subject to change as future project phases are funded.

Table 8 – Preliminary Project Schedule (subject to change)

Project Phase	Funding Year
Corridor Planning Study	2019-2020
PD&E Study	2021-2025
Final Design	2025-2030
ROW (Unfunded)	36 months
Construction (Unfunded)	5 years

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The proposed project is being implemented as a "Design-Bid-Build" procurement. Upon completion and approval of the PD&E study, FDOT District Six's consulting engineer will design the project, then FDOT will award the project to a contractor to build it. FDOT selects the contractor that provides the lowest bid when compared to the estimated project cost. A "Design-Bid-Build" project delivery method assigns the design risk to FDOT (or consulting engineer) and the construction cost risk to the contractor.

### 7.3. Systems Engineering Plan

A system validation plan will be developed during the design phase, by the Engineer-of-Record. This will follow the systems engineering process. Specifically, this includes the following steps:

- Refinement of the Project Systems Engineering Management Plan (PSEMP).
- Update of the Requirements Traceability Verification Matrix (RTVM) included in the PSEMP document.
- Development of a Systems Verification Plan.
- Design using the information in Section 4, "Concepts for the Proposed System."
- Preparation of a Systems Validation Plan that will take account of user needs and performance measures developed in this ConOps.

### 7.4. Performance Measurement for System Validation

To maintain optimal performance of I-95/SR 9 it is recommended that FDOT District Six maintain their comprehensive performance measure program to accurately measure how successful the system performs. The performance measures listed below should be maintained.

- Monthly Performance Reporting/General Data Requests
  - Total Trips
- Tolls (Generated and maintained by Florida's Turnpike)
  - Monthly Revenue
  - o Total Revenue
  - Minimum and Maximum Range
  - Average Weekday
  - Average Peak Period Average Weekend
  - Average Off Peak
  - o 85th Percentile Weekday
  - Exempt Vehicle data
  - o Toll Distribution by amount/by hour
- Volume (EL vs. GPL)
  - Average Peak Periods
  - Average Weekday
  - Average Weekend

- Speed (EL and GPL)
  - Percentage of Time Above 45 miles per hour
  - Average Overall
  - o Average Peak Periods
- Facility Availability
  - Percentage of Time Closed due to Non-Recurring Events
  - Percentage of Time Closed due to Planned Events
  - Additional analysis to be considered to maintain desirable system performance
  - Speeds below 45 MPH in the EL (peak periods)
  - Number of closures that impact the availability of ELs
    - Frequency
    - Incident duration of time spent above threshold of incident clearance goal
- Travel Time Reliability Measures
  - Travel Time Index
- Mobility Measures
  - Travel Time
  - Vehicle Miles Traveled
  - Vehicle Hours Traveled
  - Delay
- Safety Measures
  - Crash Rate by type
  - Crash Frequency by type

## 8. Notes

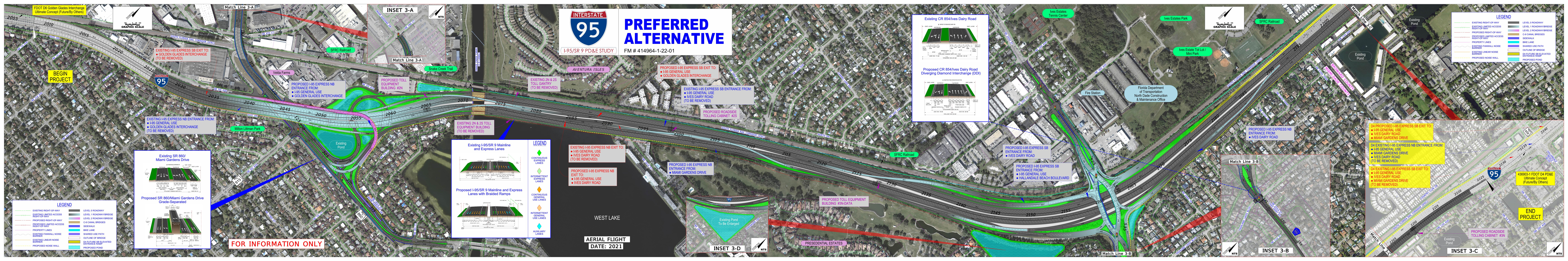
This section will be annotated, as needed, with changes to the approved ConOps document made over the course of the project. There are no notes at this time.

# 9. Appendix

APPENDIX A	Proposed Build Alternative Roll Plot
APPENDIX B	95 Express Phase 3C (Estimated Operating Year 2025)
APPENDIX C	D6 PD&E (From South of SR 860/Miami Gardens Drive to North of Broward County Line - 414964-1)
APPENDIX D	GGI Improvements Light (Estimated Operating Year 2031)
APPENDIX E	95 Express Ultimate (US-1 to I-595)

# APPENDIX A Proposed Build Alternative Roll Plot

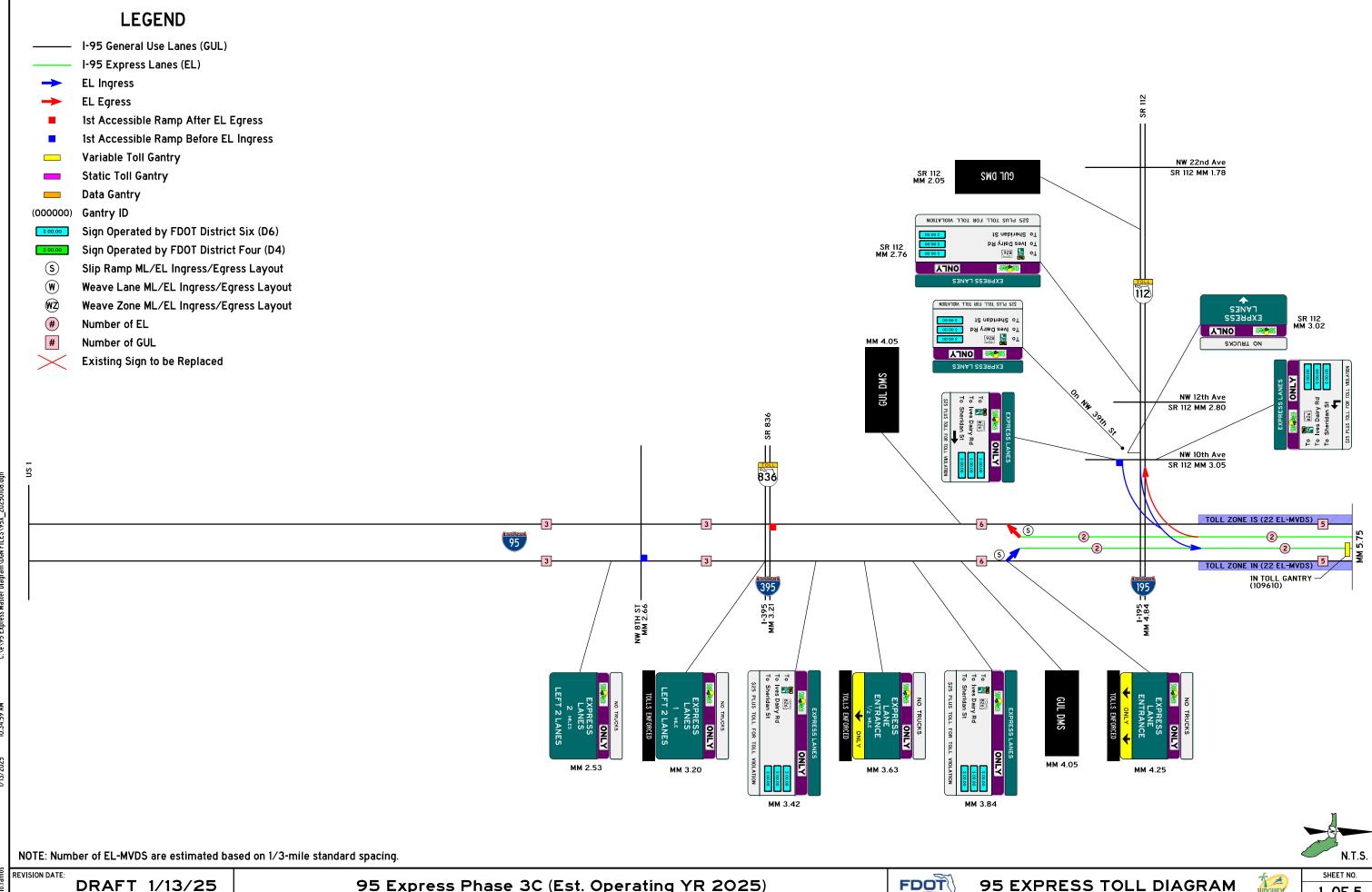
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# APPENDIX B 95 Express Phase 3C (Estimated Operating Year 2025)

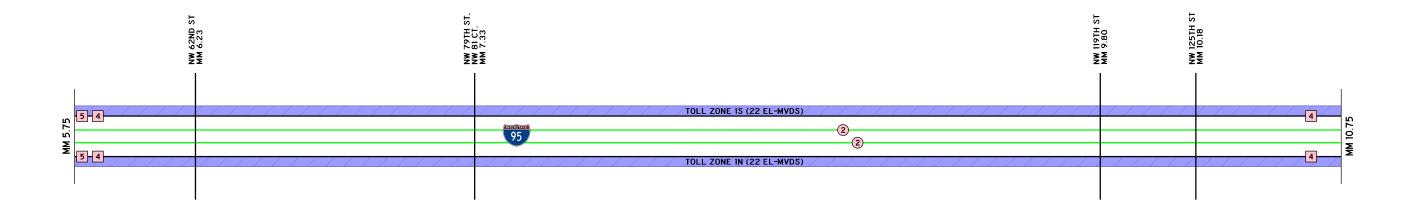
Estimated EL configuration from south of the I-395/SR 836 interchange in Miami-Dade County to north of the I-595 interchange in Broward County during Year 2025.

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- **EL Ingress**
- **EL Egress**
- 1st Accessible Ramp After EL Egress
- 1st Accessible Ramp Before EL Ingress
- Variable Toll Gantry
- Static Toll Gantry
- Data Gantry

- Sign Operated by FDOT District Six (D6)
- Sign Operated by FDOT District Four (D4)
- S Slip Ramp ML/EL Ingress/Egress Layout
- W Weave Lane ML/EL Ingress/Egress Layout
- (WZ) Weave Zone ML/EL Ingress/Egress Layout
- # Number of EL
- # Number of GUL
- Existing Sign to be Replaced

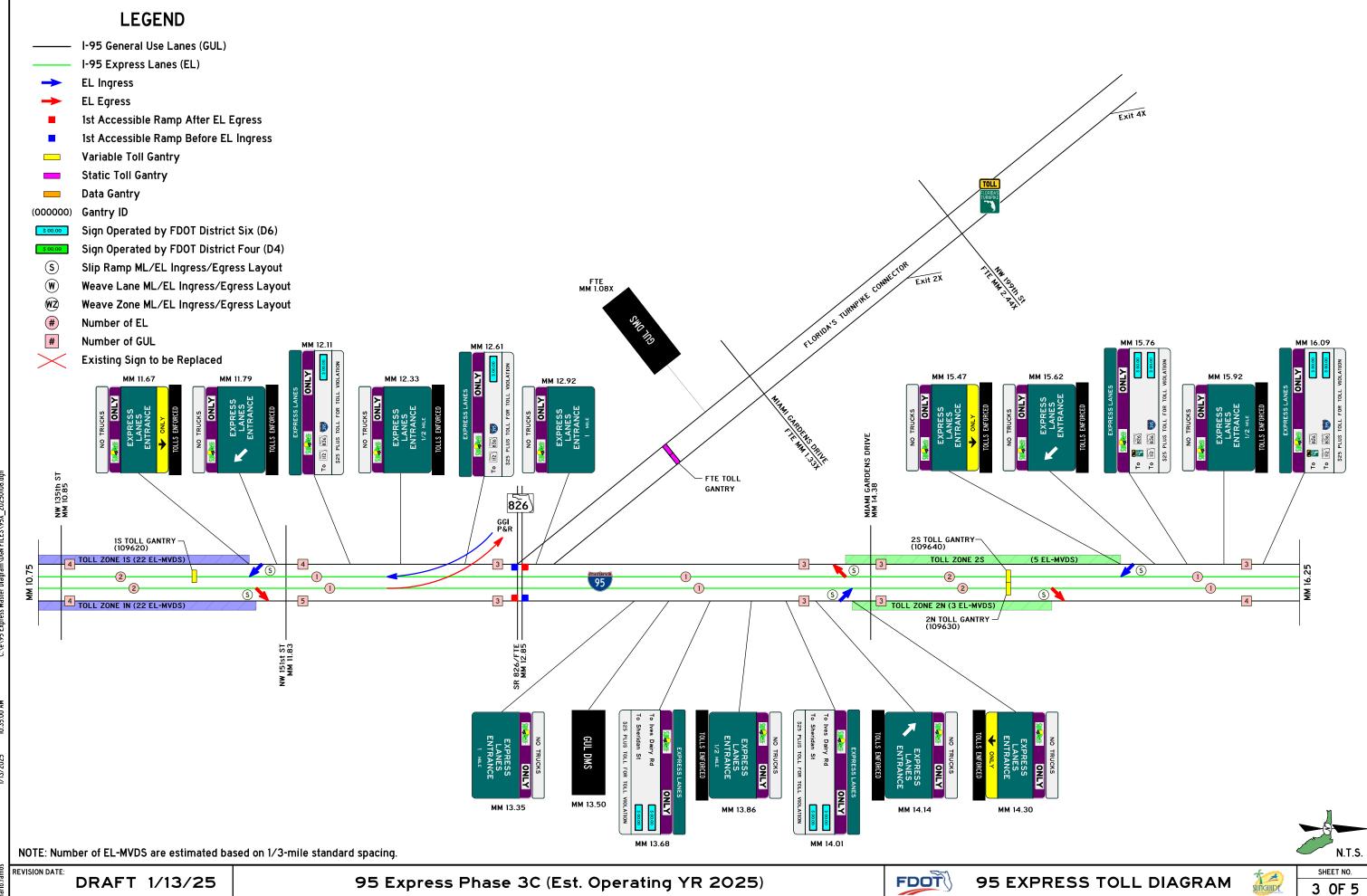


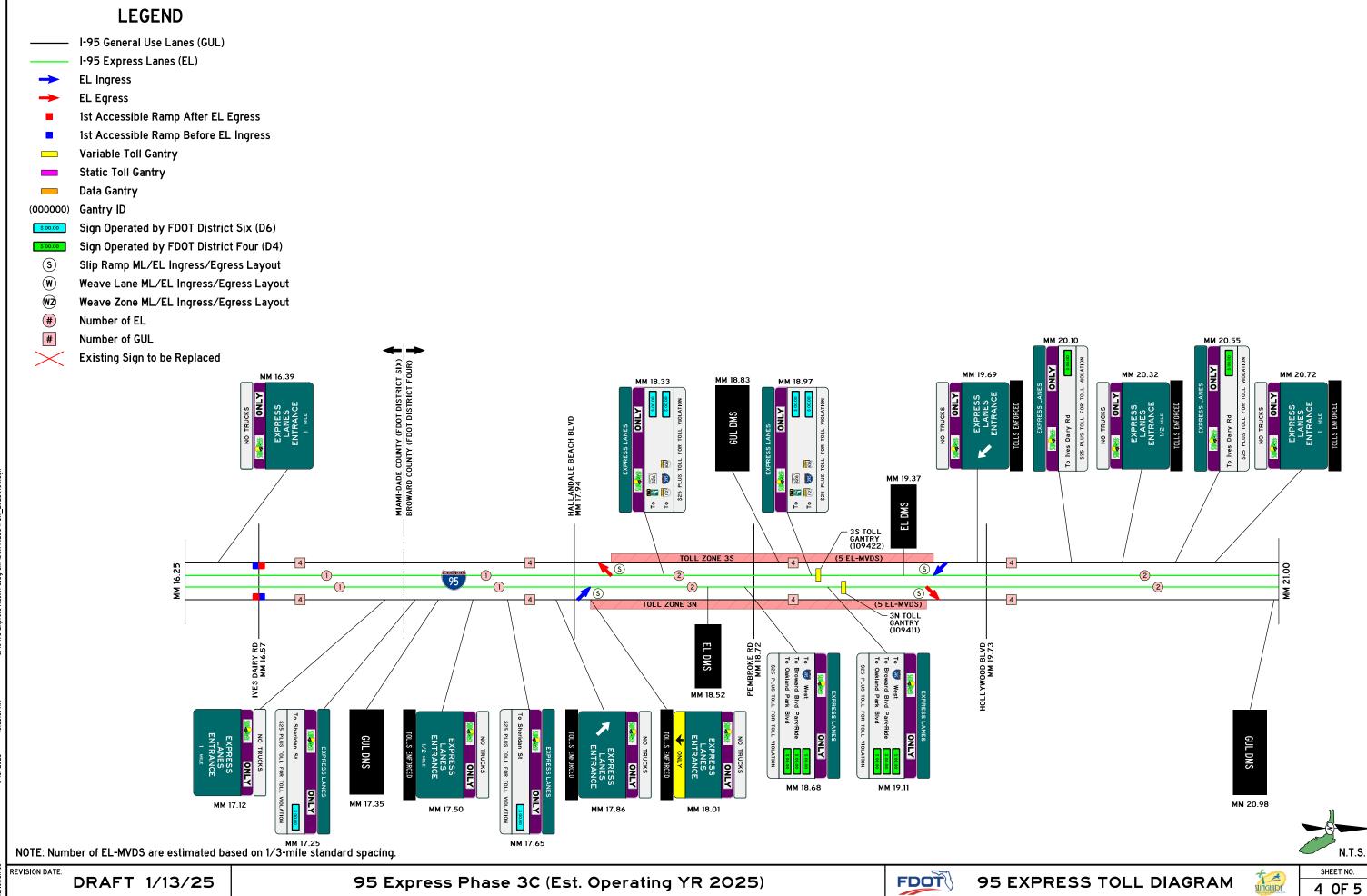
95 Express Phase 3C (Est. Operating YR 2025)

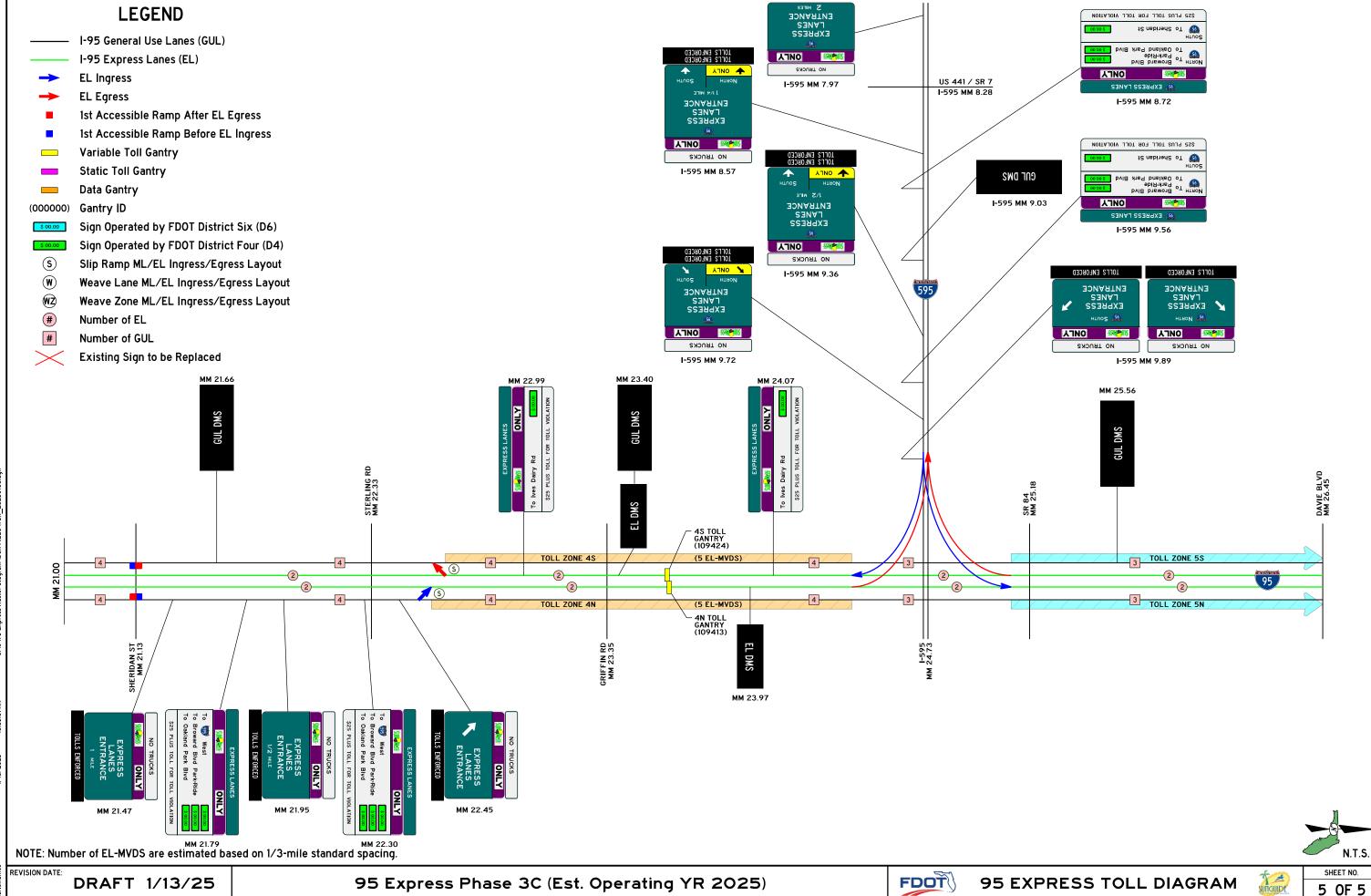
NOTE: Number of EL-MVDS are estimated based on 1/3-mile standard spacing. REVISION DATE:









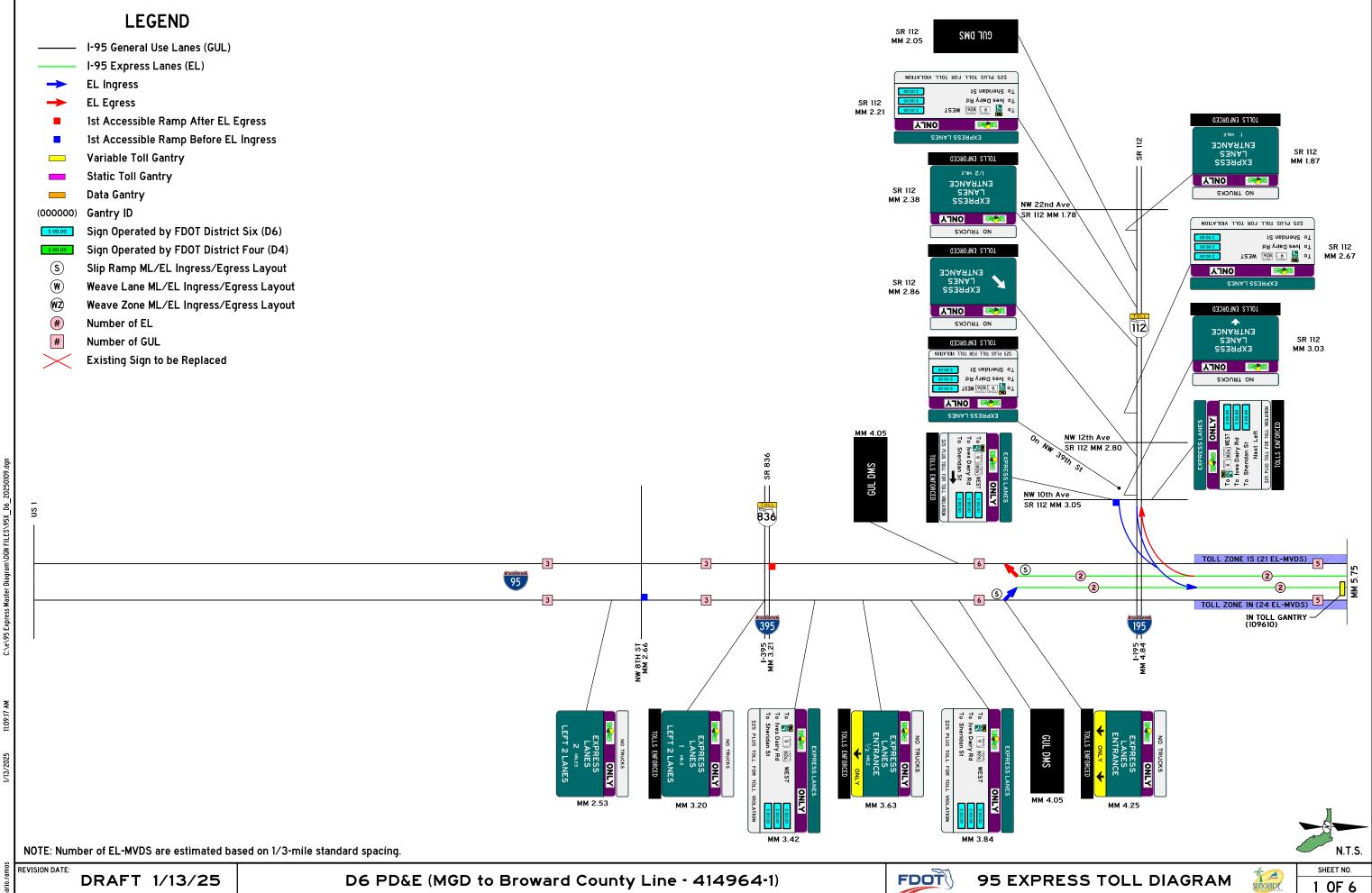


## **APPENDIX C**

# D6 PD&E (From South of SR 860/Miami Gardens Drive to North of Broward County Line - 414964-1)

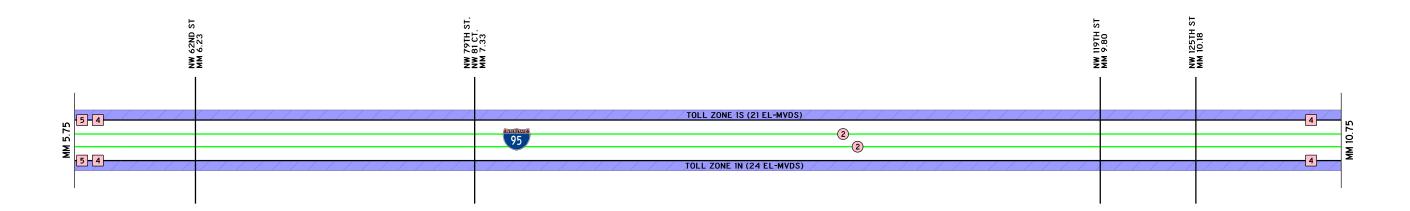
Proposed EL configuration from south of the I-395/SR 836 interchange in Miami-Dade County to north of the I-595 interchange in Broward County.

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- **EL Ingress**
- **EL Egress**
- 1st Accessible Ramp After EL Egress
- 1st Accessible Ramp Before EL Ingress
- Variable Toll Gantry
- Static Toll Gantry
- Data Gantry

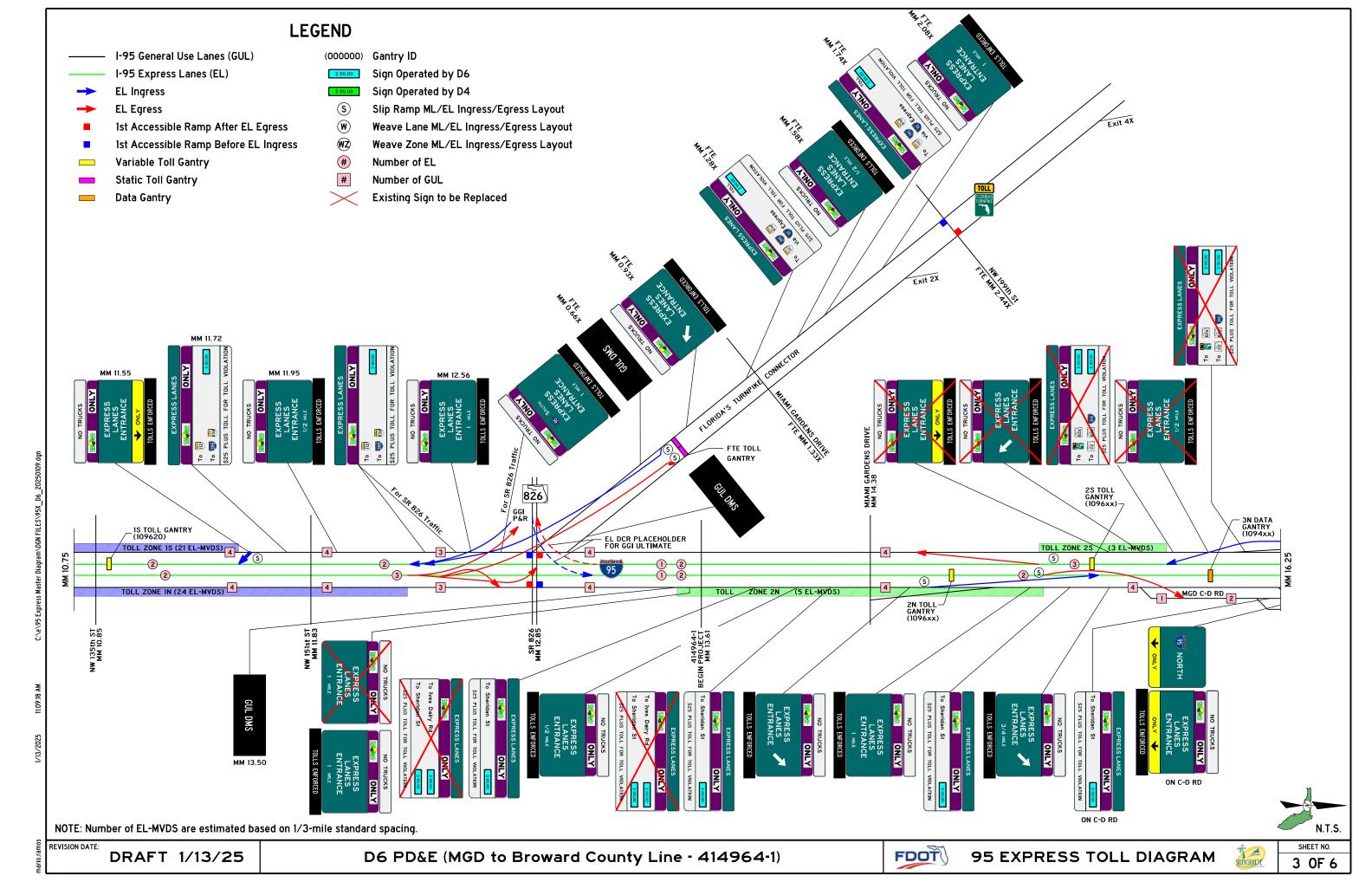
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- (WZ) Weave Zone ML/EL Ingress/Egress Layout
- # Number of EL
- # Number of GUL
- Existing Sign to be Replaced

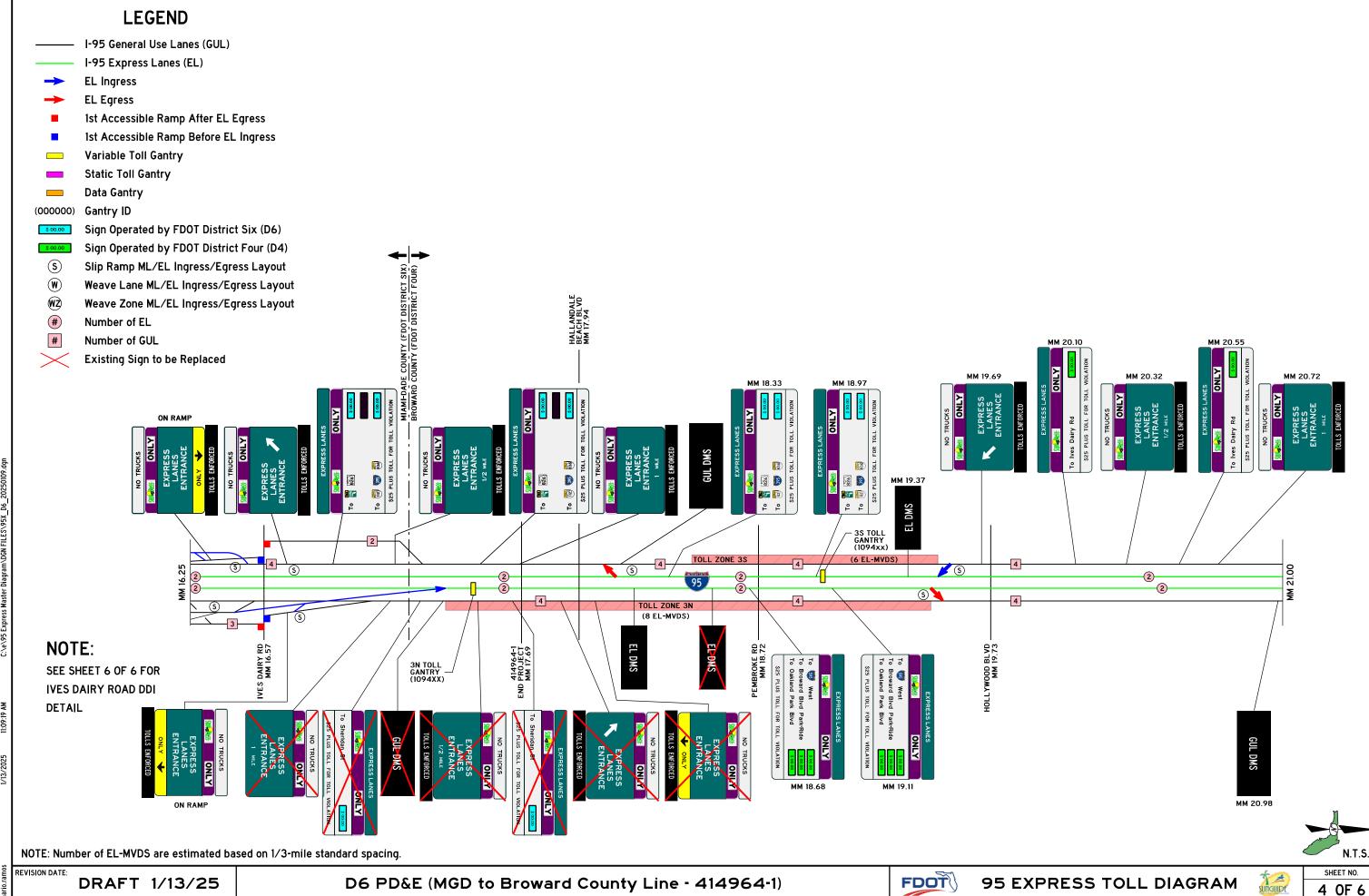


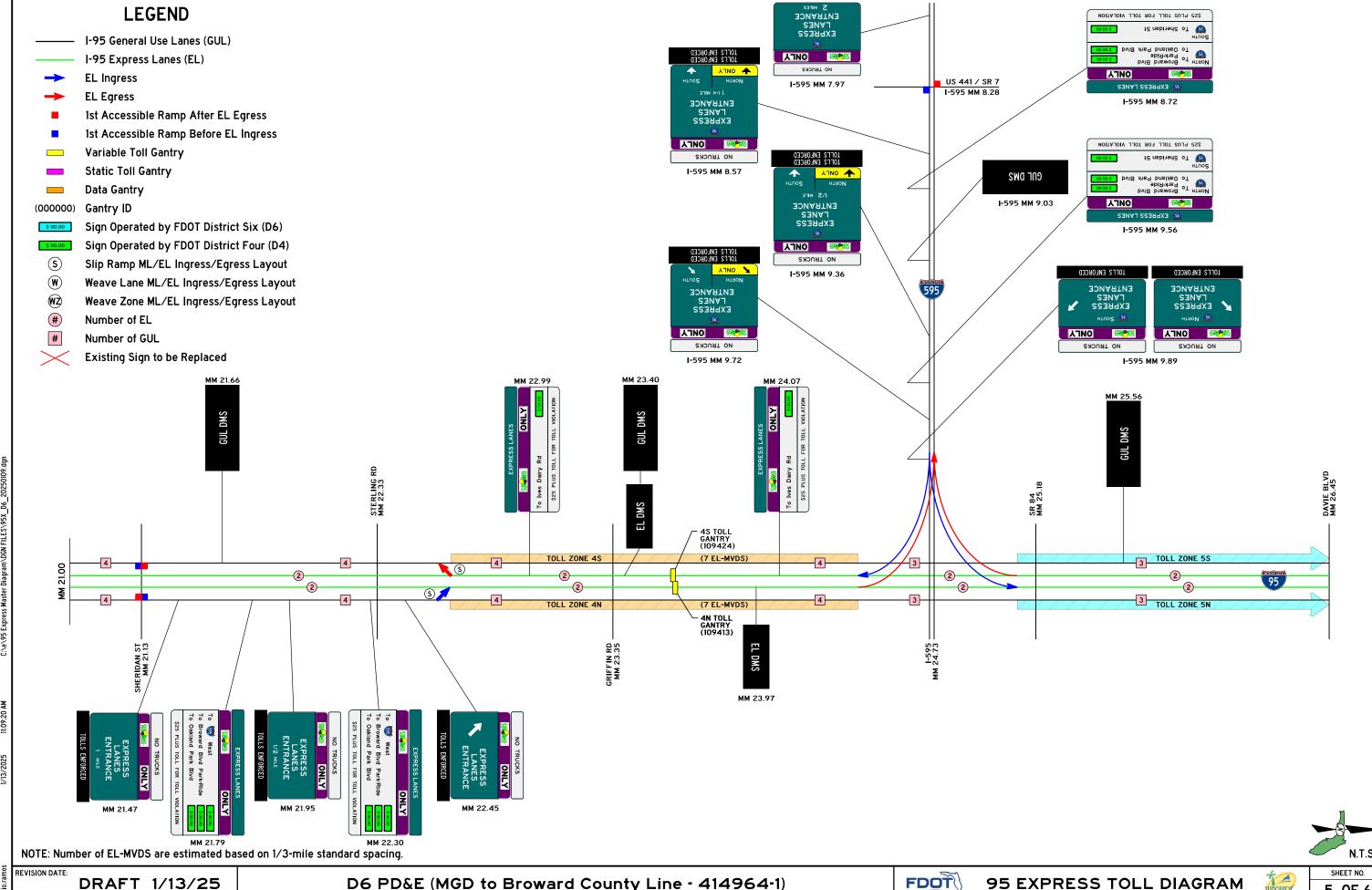
NOTE: Number of EL-MVDS are estimated based on 1/3-mile standard spacing. REVISION DATE:







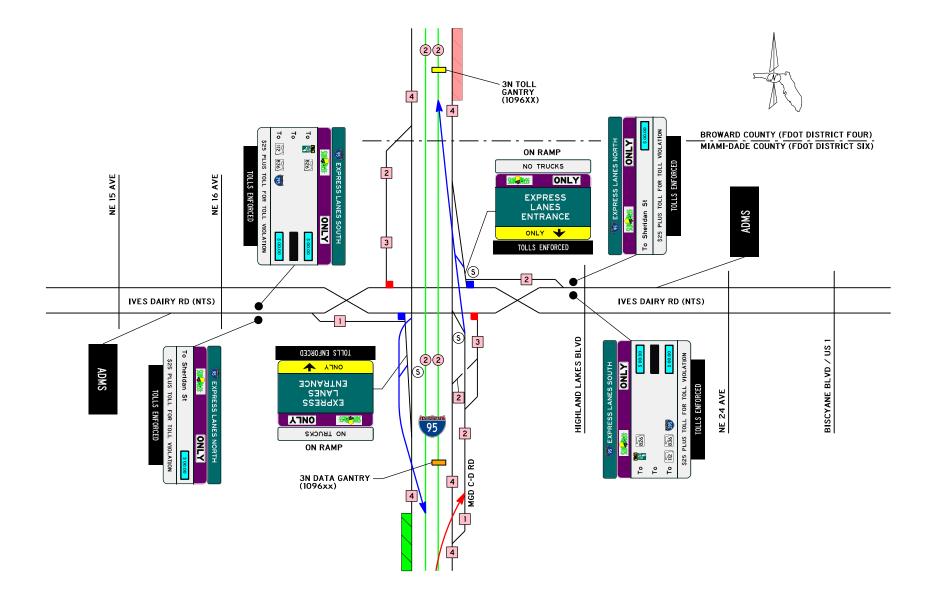






- **EL Ingress**
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- 1st Accessible Ramp After EL Egress
- 1st Accessible Ramp Before EL Ingress
- Variable Toll Gantry
- Static Toll Gantry
- Data Gantry

- Sign Operated by FDOT District Six (D6)
- Sign Operated by FDOT District Four (D4)
- S Slip Ramp ML/EL Ingress/Egress Layout
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- # Number of EL
- # Number of GUL
- Existing Sign to be Replaced



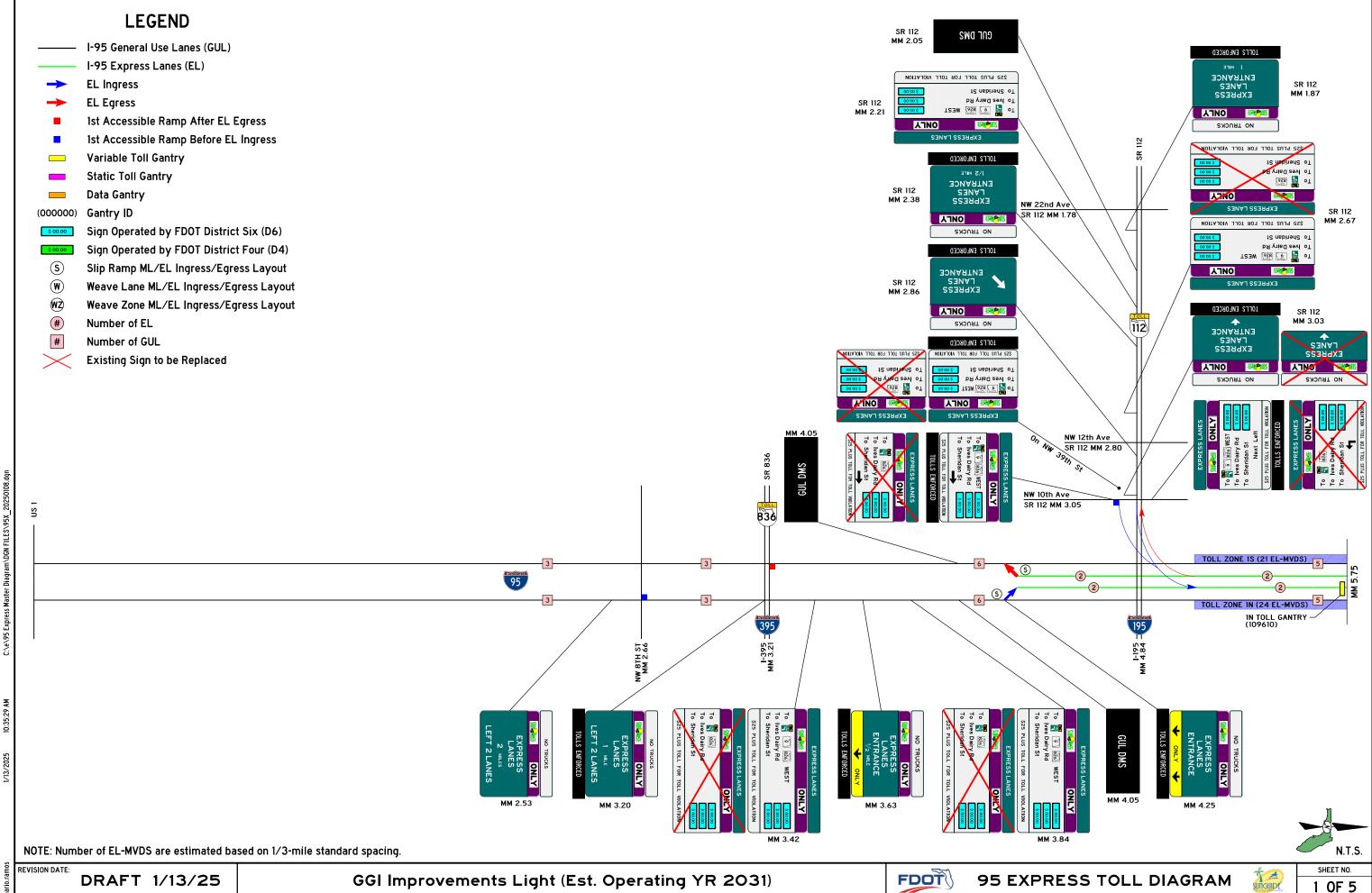
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95 EXPRESS TOLL DIAGRAM

# APPENDIX D GGI Improvements Light (Estimated Operating Year 2031)

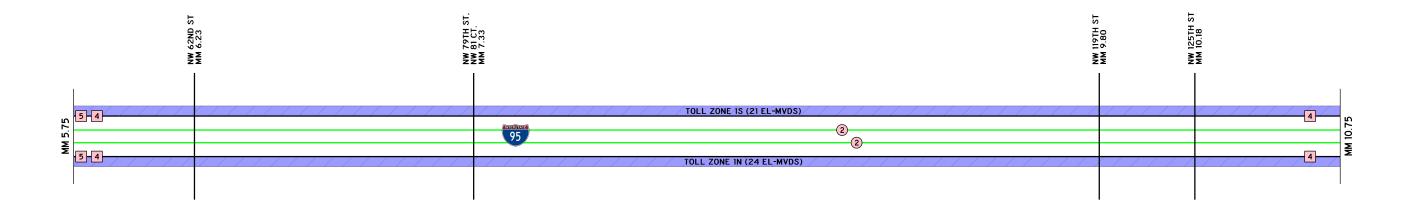
From south of the I-395/SR 836 interchange in Miami-Dade County to north of the I-595 interchange in Broward County.

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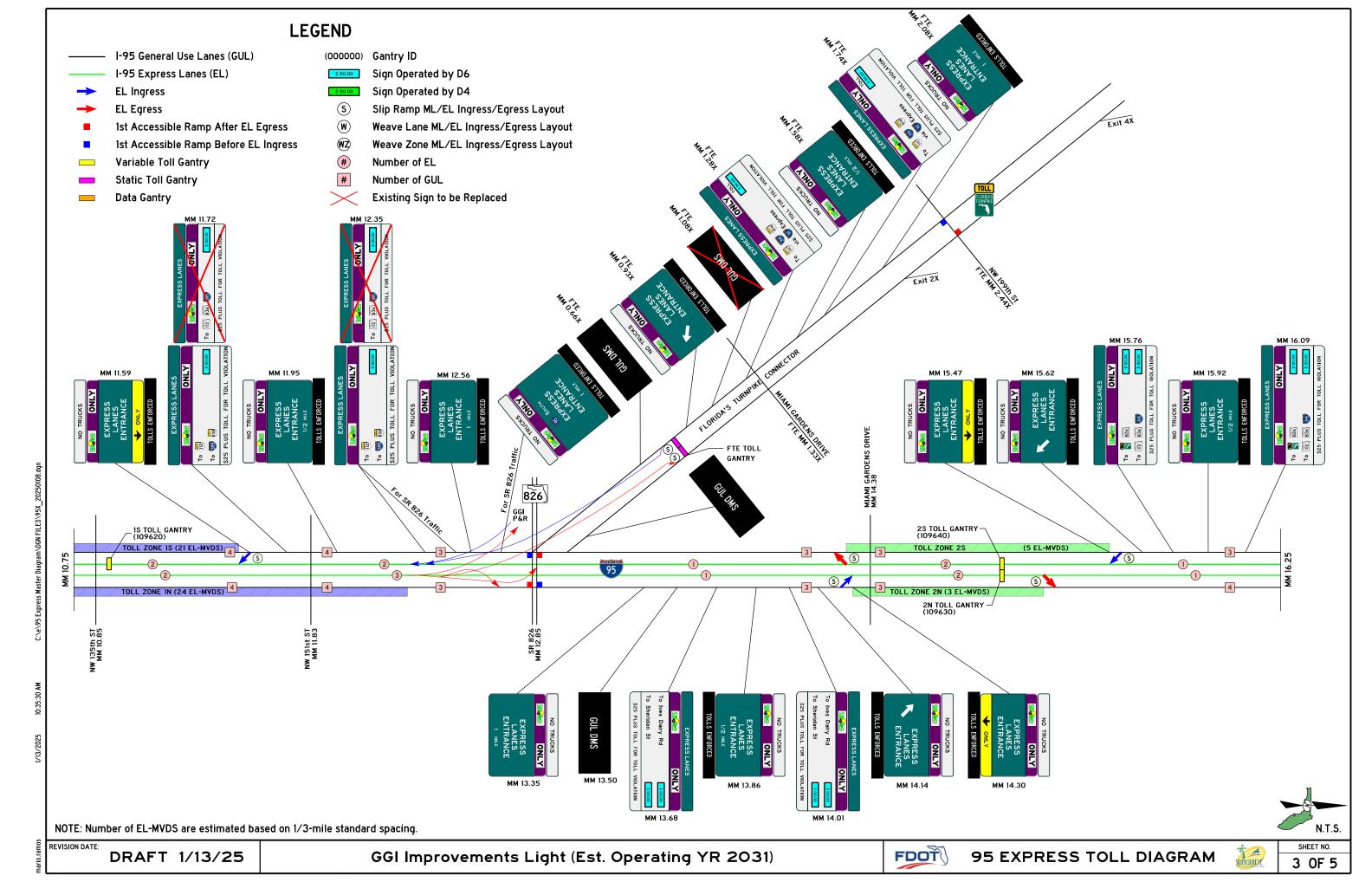


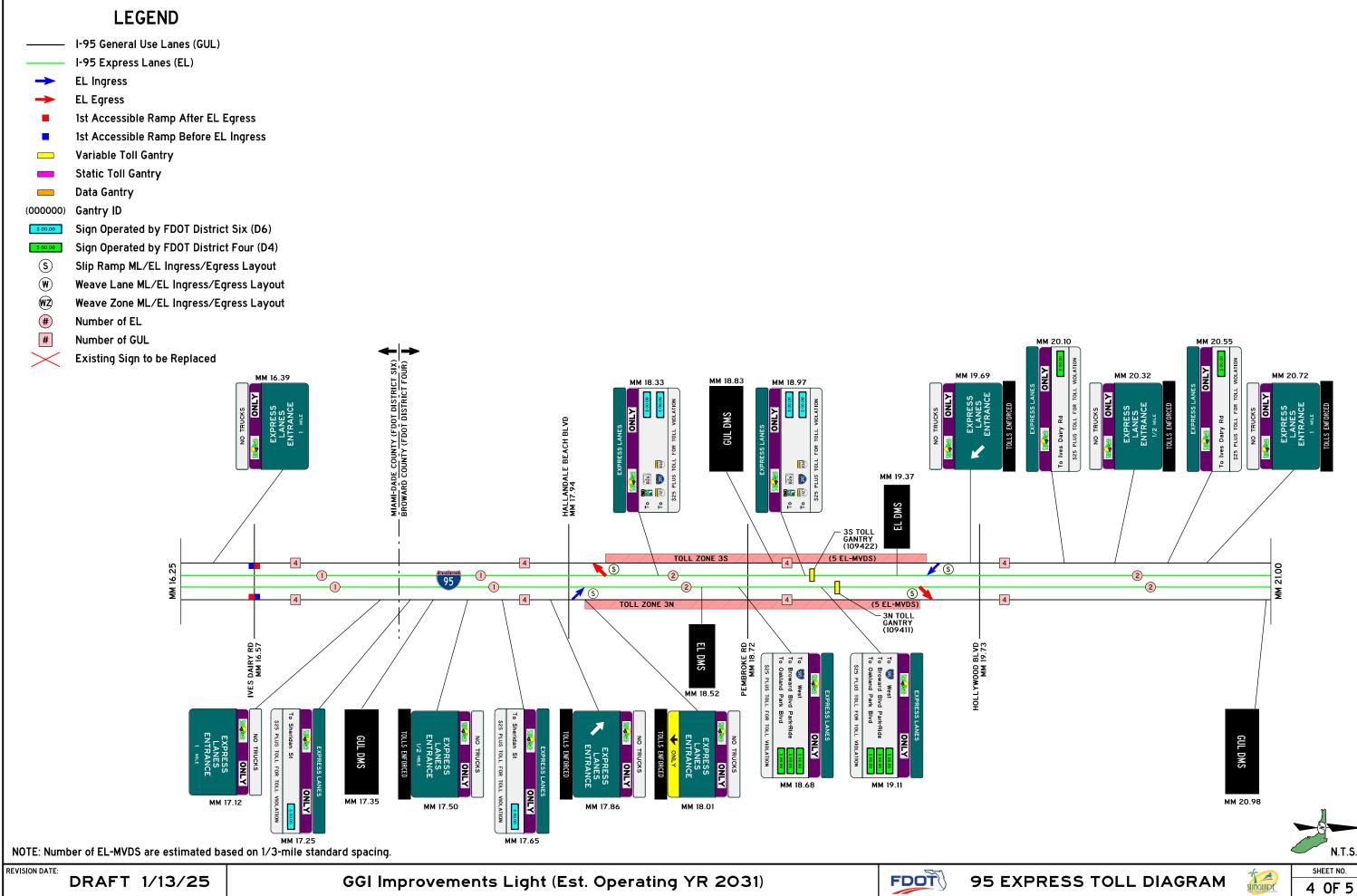
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- Static Toll Gantry
- Data Gantry

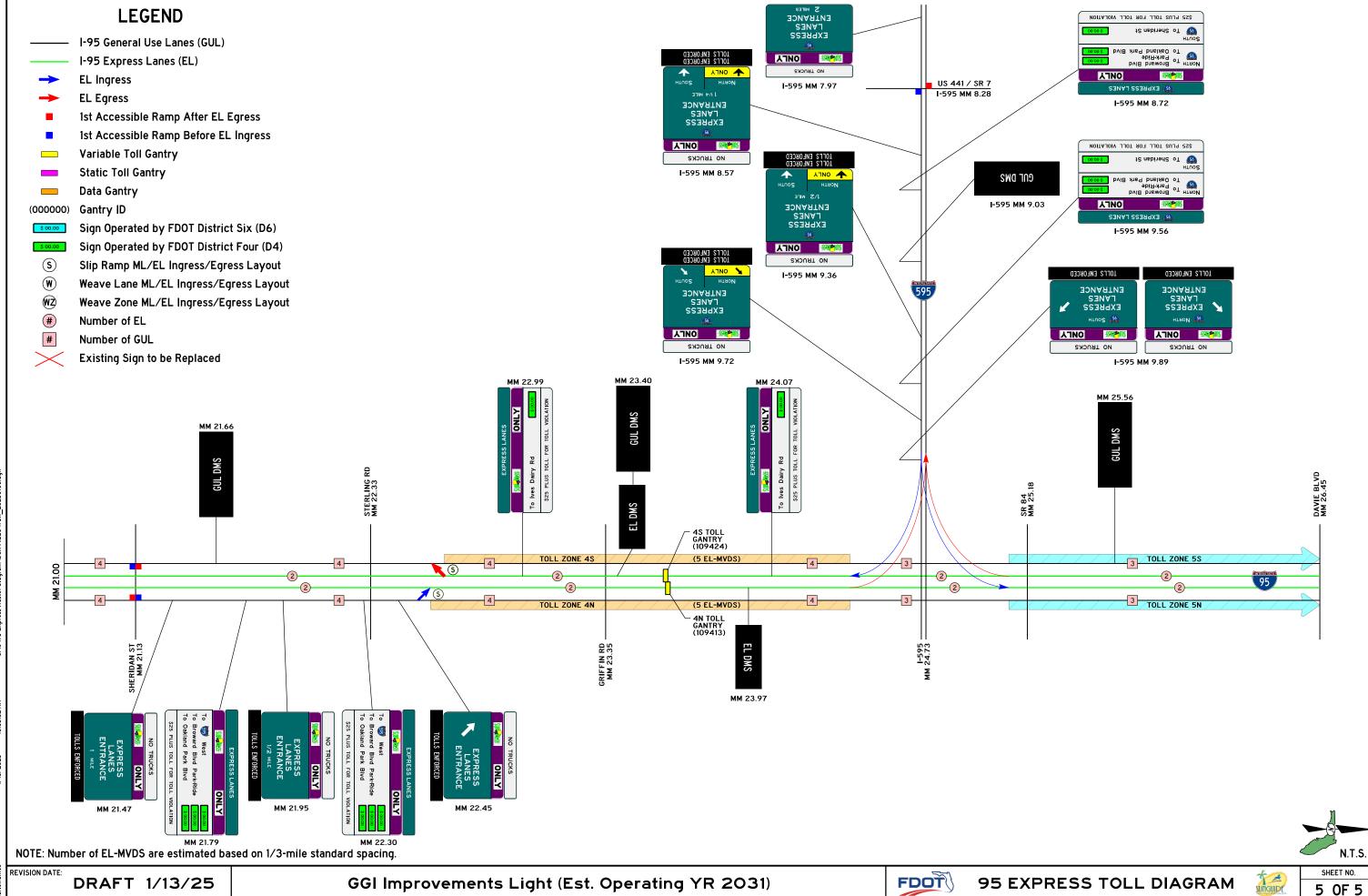
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- # Number of GUL
- Existing Sign to be Replaced



NOTE: Number of EL-MVDS are estimated based on 1/3-mile standard spacing.







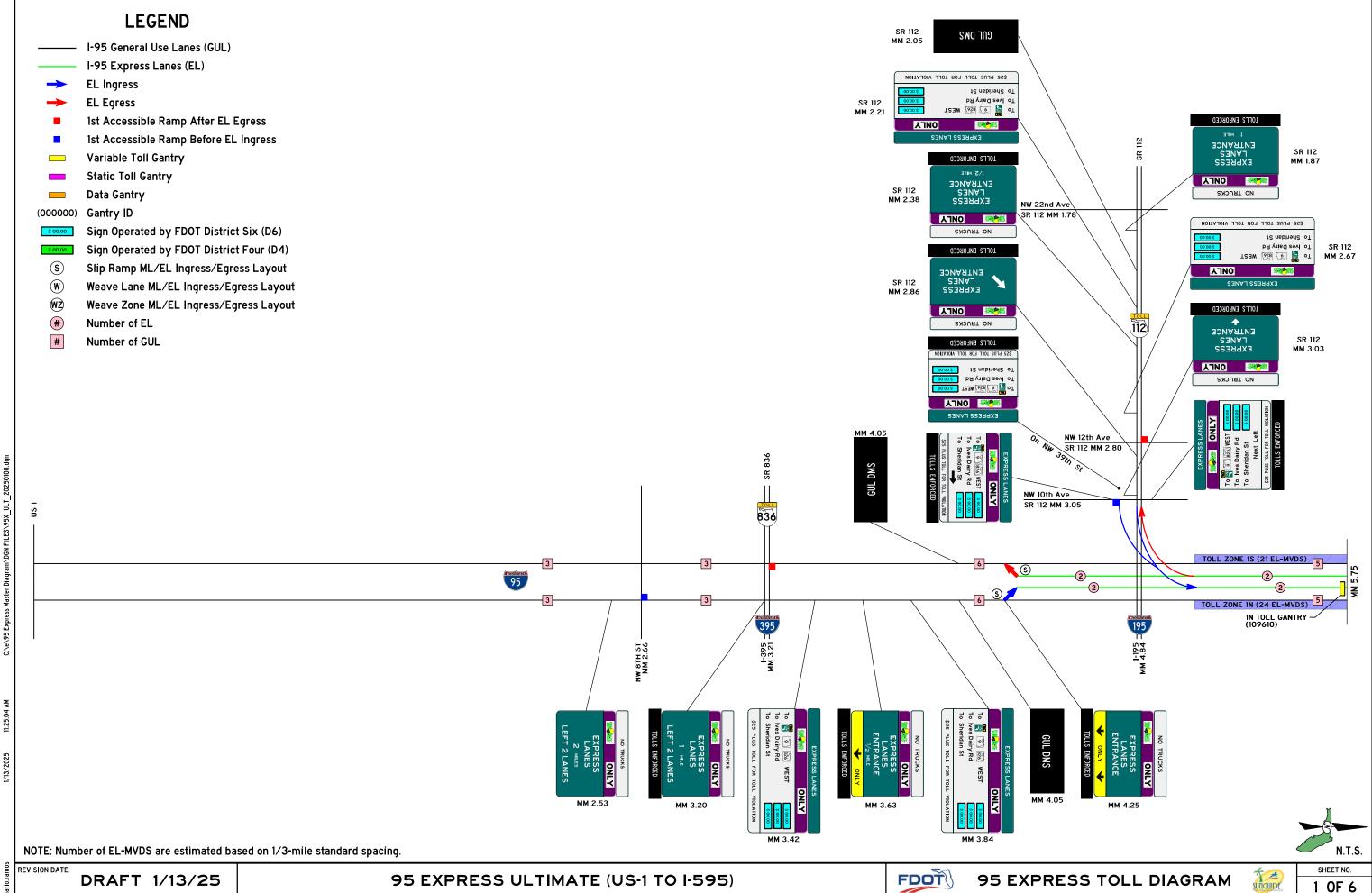
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# APPENDIX E 95 Express Ultimate (US-1 to I-595)

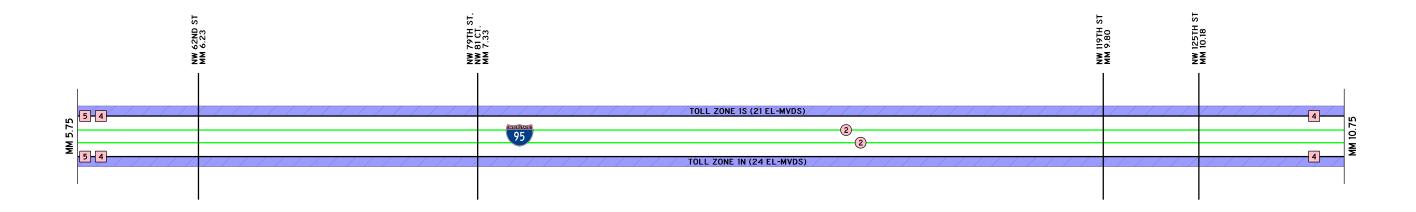
From south of the I-395/SR 836 interchange in Miami-Dade County to north of the I-595 interchange in Broward County.

Form FM-SE-01 Concept of Operations Template. 07/23/2024

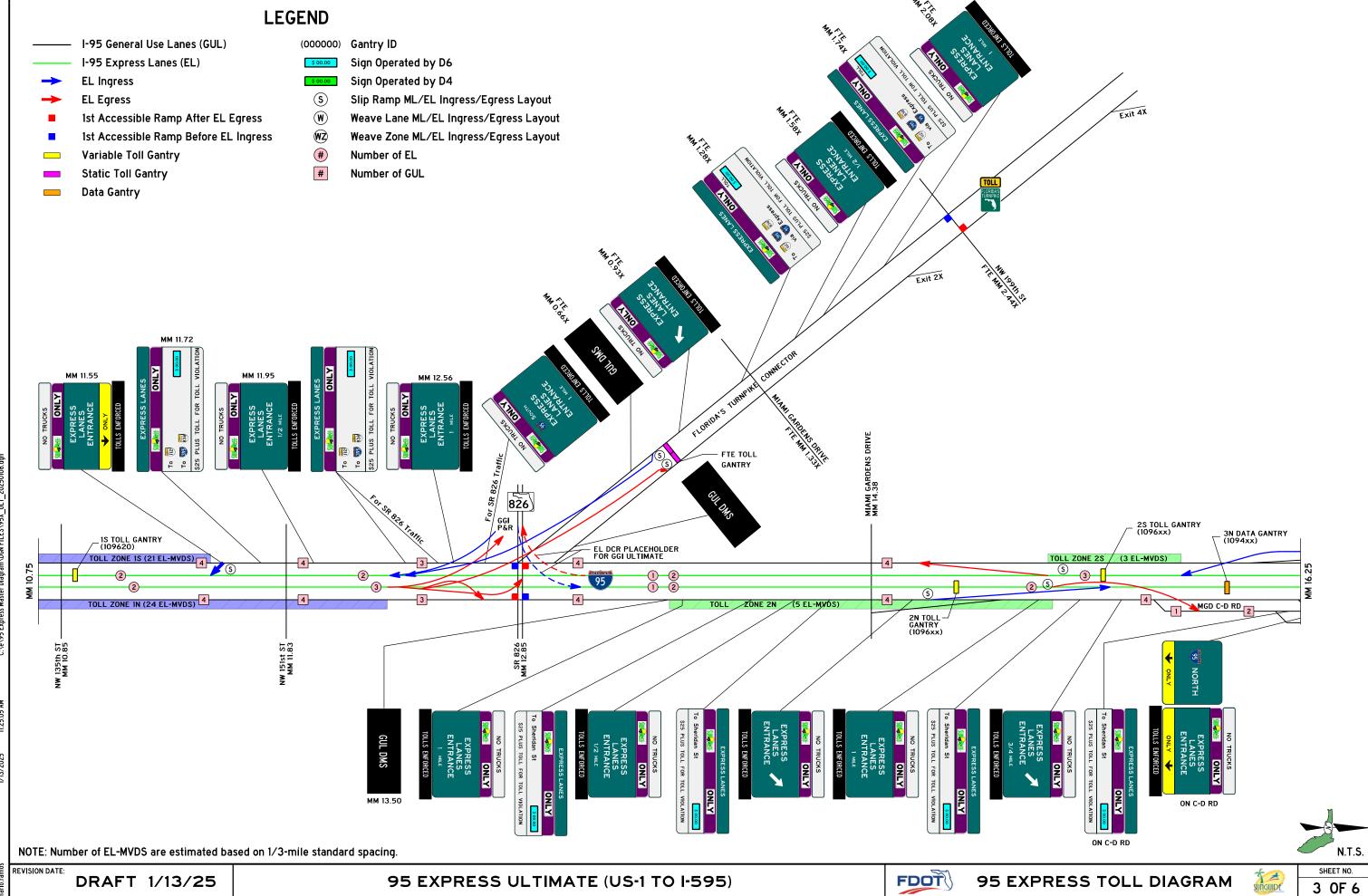


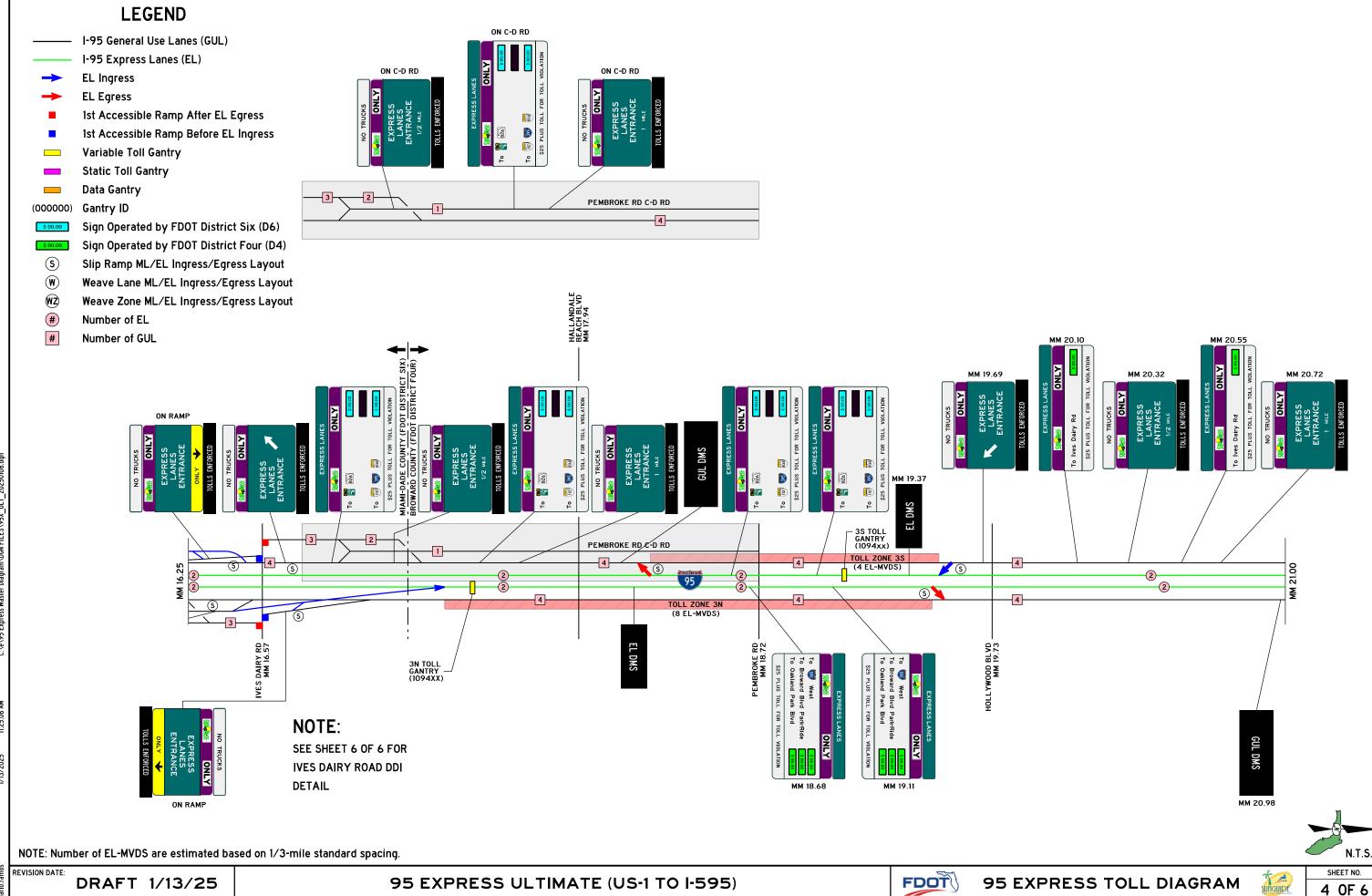
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- **EL Egress**
- 1st Accessible Ramp After EL Egress
- 1st Accessible Ramp Before EL Ingress
- Variable Toll Gantry
- Static Toll Gantry
- Data Gantry

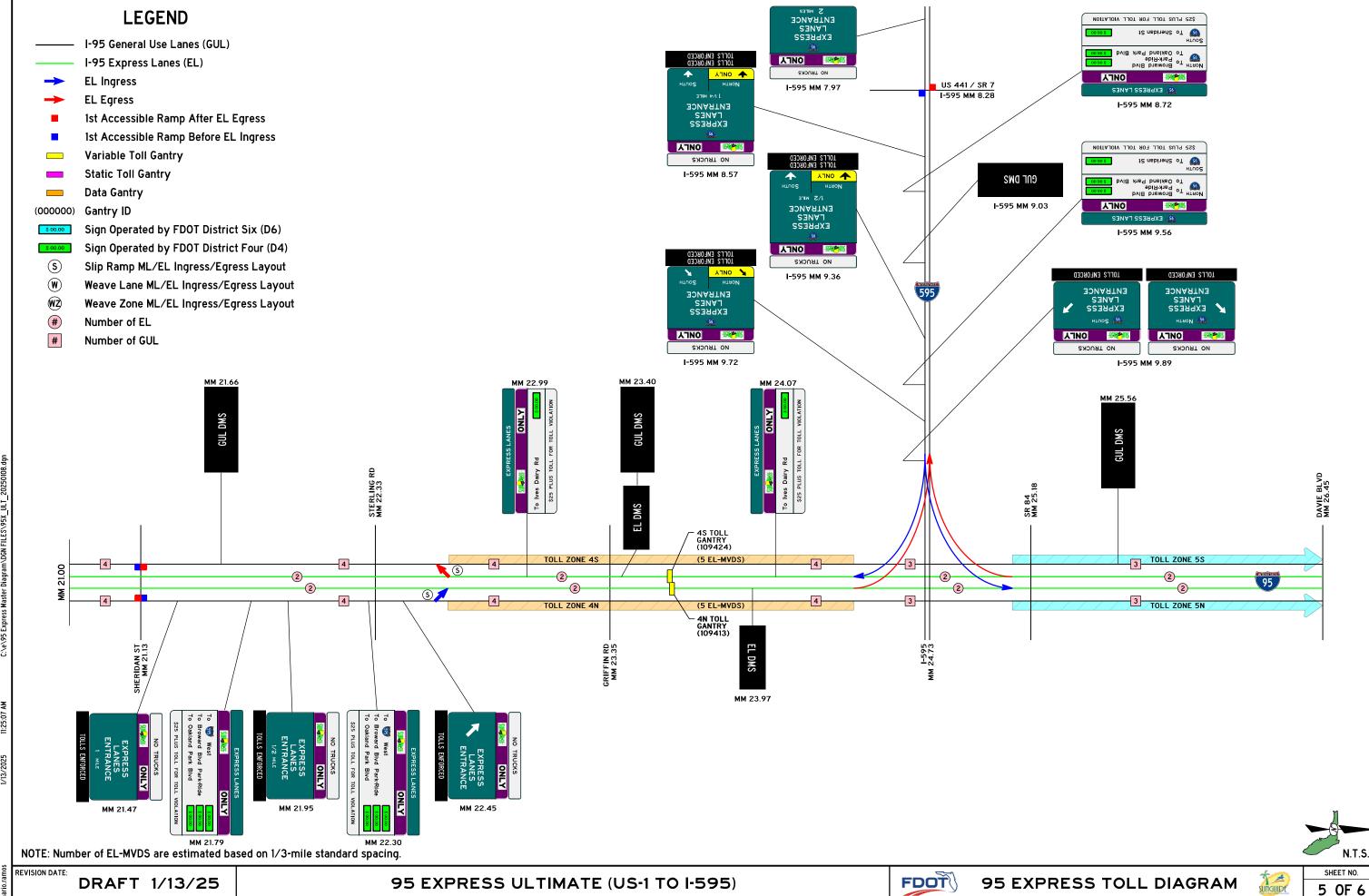
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- Sign Operated by FDOT District Four (D4)
- **S** Slip Ramp ML/EL Ingress/Egress Layout
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- # Number of EL
- # Number of GUL



NOTE: Number of EL-MVDS are estimated based on 1/3-mile standard spacing.

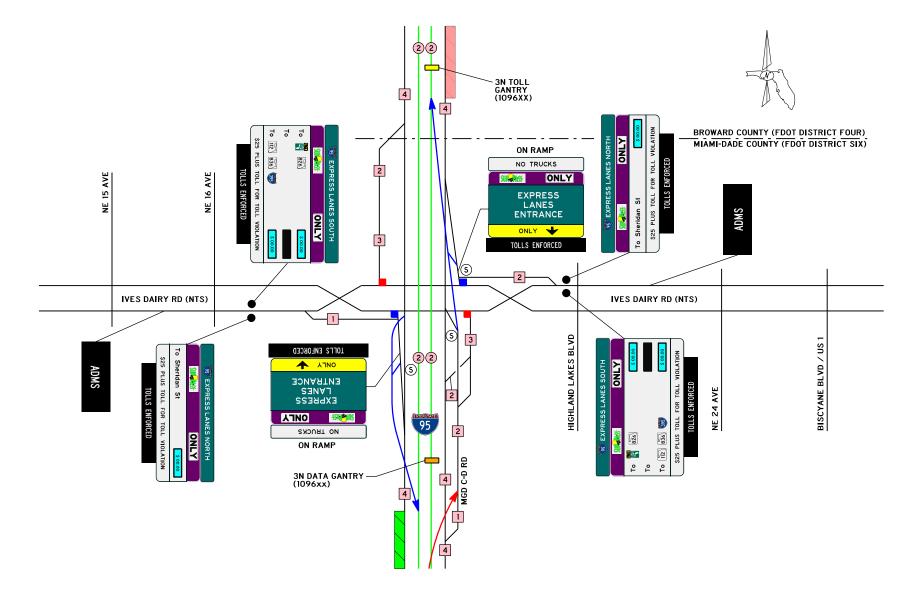






- **EL Ingress**
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- # Number of GUL



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95 EXPRESS TOLL DIAGRAM

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