FLORIDA DEPARTMENT OF TRANSPORTATION

FLORIDA'S TURNPIKE

SR 869 (SAWGRASS EXPRESSWAY) WIDENING PROJECT DEVELOPMENT & ENVIRONMENT (PD&E) STUDY

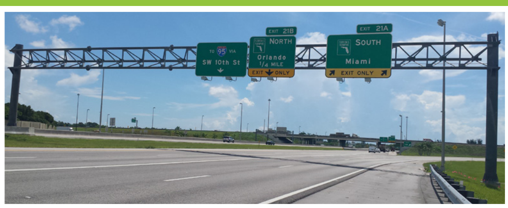
From West of US 441 (SR 7) to Powerline Road (SR 845)

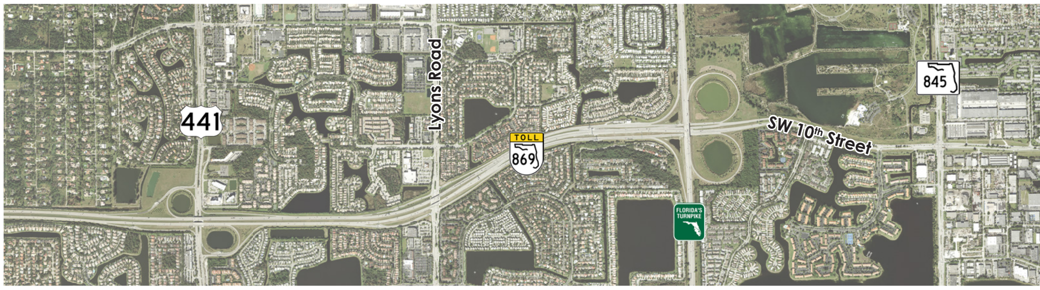
FPID No.: 437153-1-22-01 • ETDM No.: 14280 • Broward County

PRELIMINARY ENGINEERING REPORT
VOLUME 1 OF 2

DRAFT

FEBRUARY 2024





PRELIMINARY ENGINEERING REPORT

Volume 1 of 2

Florida Department of Transportation
Florida's Turnpike Enterprise

SR 869/Sawgrass Expressway Widening
Project Development and Environment (PD&E) Study
From West of US 441 (SR 7) to Powerline Road (SR 845)
Broward County, Florida

Financial Project ID Number: 437153-1-22-01

ETDM Number: 14280

DRAFT

FEBRUARY 2024

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 14, 2016 and executed by FHWA and FDOT.

PROFESSIONAL ENGINEER CERTIFICATION

PRELIMINARY ENGINEERING REPORT

Project: SR 869/Sawgrass Expressway Widening from West of US 441/SR 7 to Powerline Road (SR 845) Project Development and Environment Study

ETDM Number: 14280

Financial Project ID: 437153-1-22-01

Federal Aid Project Number: N/A

This preliminary engineering report contains engineering information that fulfills the purpose and need for the SR 869/Sawgrass Expressway Project Development and Environment Study from West of US 441/SR 7 to Powerline Road (SR 845) in Broward County, Florida. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

I hereby certify that I am a registered professional engineer in the State of Florida practicing with The Corradino Group, and that I have prepared or approved the evaluation, findings, opinions, conclusions, or technical advice for this project.

This item has been digitally signed and sealed by ***Ryan Solis-Rios, P.E***. on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

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1.0 PROJECT SUMMARY

1.1 PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT), Florida's Turnpike Enterprise (FTE), is performing a Project Development and Environment (PD&E) Study for State Road 869 (SR 869)/Sawgrass Expressway from west of US 441/SR 7 to Powerline Road (SR 845), a distance of approximately 4 miles (see ***Figure 1.1***). The objective of this PD&E Study is to evaluate corridor modifications to improve operations and interchange access. The proposed improvements will address existing and future traffic needs, improve travel time reliability, enhance safety, and provide long-term mobility options along the corridor. The study is evaluating additional lanes, new collector distributor roadway systems and interchange improvements.

The study also includes 2.7 miles of the Florida's Turnpike (SR 91) from Wiles Road to the Broward/Palm Beach County Line. The study area is located in Broward County and traverses the cities of Parkland, Coral Springs, Coconut Creek, and Deerfield Beach, as well as an area of unincorporated Broward County.

The Sawgrass Expressway is a tolled 21-mile limited access facility located in northern Broward County. Between west of US 441 and the Florida's Turnpike, the corridor consists primarily of six travel lanes (three in each direction). This segment of the corridor is functionally classified as a Divided Urban Principal Arterial Expressway and has a posted speed limit of 65 miles per hour. Between the Florida's Turnpike and Powerline Road the corridor changes to SW 10th Street with primarily six non-tolled travel lanes (three in each direction) and a functional classification of Urban Principal Arterial Other. The posted speed of this section is 45 miles per hour. The access management classification of the corridor is Class 1.

The Florida's Turnpike is also a tolled limited access facility that runs north-south from Interstate 95 to Interstate 75. Between Wiles Road and the County Line, the corridor consists primarily of six travel lanes (three in each direction). This segment of the corridor is functionally classified as a Divided Urban Principal Arterial Expressway and has a posted speed limit of 65 miles per hour. The access management classification of the corridor is Class 1.

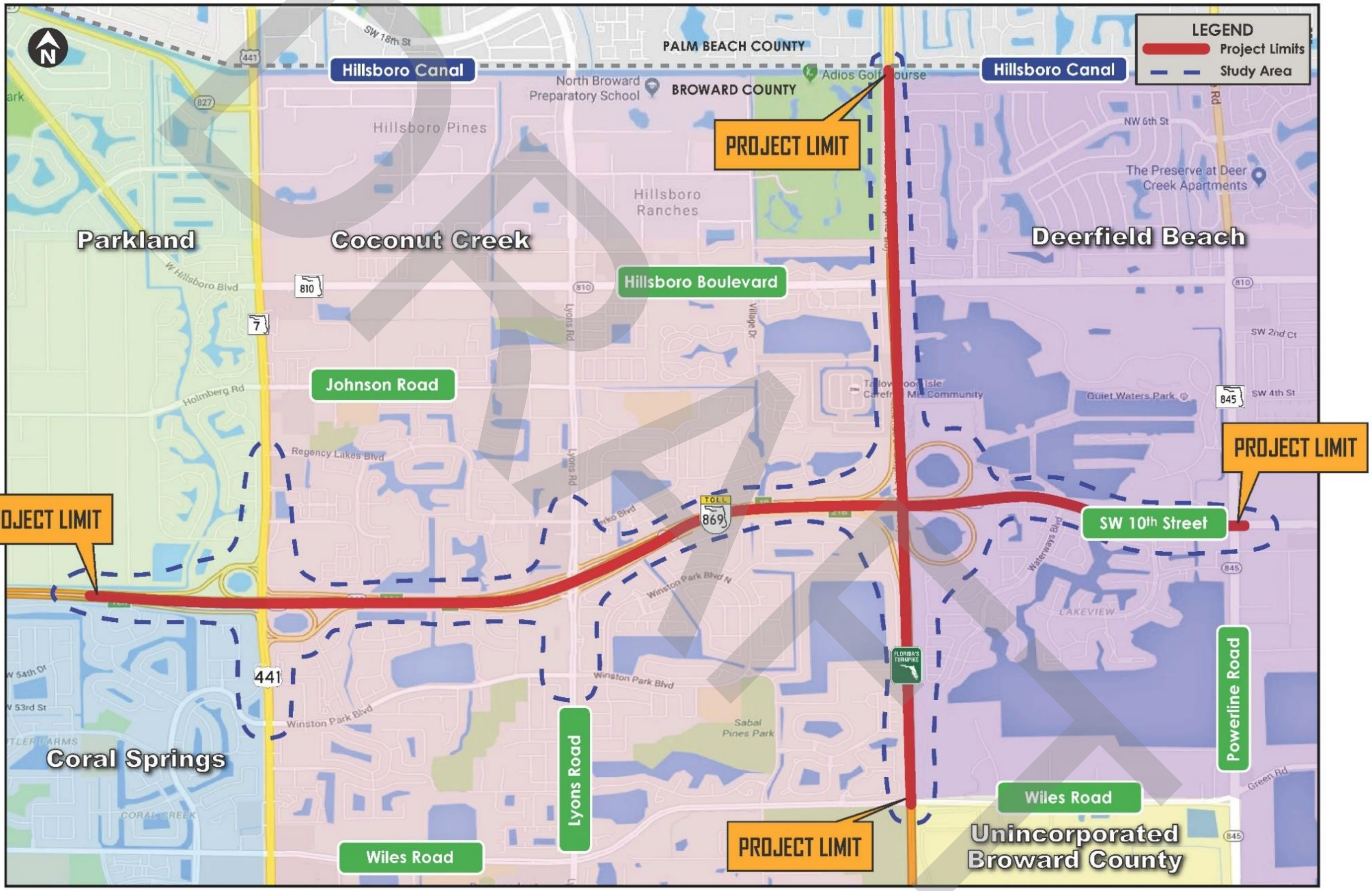


Figure 1.1 – Project Location Map

There are three existing interchanges within the project limits. Two of the three interchanges provide connections to arterial/collector facilities (US 441 and Lyons Road). The third interchange is a system-to-system interchange with the Florida's Turnpike (SR 91).

1.2 Purpose and Need

The primary purpose of this project is to add lanes to meet future transportation demand, improve travel time reliability and provide long-term mobility options. The project also includes operational and safety enhancements to the US 441, Lyons Road, and Florida's Turnpike interchanges.

The need for the project is based on the following factors:

Capacity – A *Systems Interchange Modification Report* dated January 2024 was prepared by FTE for this PD&E Study. The existing 2016 and future 2045 Annual Average Daily Traffic (AADT) volumes are listed in ***Table 1.1*** and ***Table 1.2***.

In 2016, the Sawgrass Expressway carried an AADT volume of 86,200 vehicles west of US 441 and 81,700 vehicles between US 441 and Lyons Road. The segment between Lyons Road and Florida's Turnpike carried 81,700 vehicles and the segment east of Florida's Turnpike up to Powerline Road carried 37,700 vehicles.

The 2045 AADT forecast estimate is 131,100 vehicles west of US 441 and 128,900 vehicles between US 441 and Lyons Road. The segment between Lyons Road and Florida's Turnpike is estimated to carry 138,900 vehicles and the segment east of Florida's Turnpike up to Powerline Road is estimated at 71,900 vehicles. The 2045 AADT volumes represent a 52-91% increase in traffic from the year 2016 to 2045.

Table 1.1 – Sawgrass Expressway Annual Average Daily Traffic (AADT) Volumes

Roadway	Segment	2016 AADT	2045 AADT	% Increase
Sawgrass Expressway	West of US 441	86,200	131,100	52%
	US 441 and Lyons Road	81,700	128,900	58%
	Lyons Road and Florida's Turnpike	81,700	138,900	70%
SW 10th Street	Florida's Turnpike and Powerline Road	37,700	71,900	91%

Source: Systems Interchange Modification Report – January 2024

According to the *Systems Interchange Modification Report*, additional lanes are needed along the Sawgrass Expressway corridor by the year 2025. West of US 441, one additional lane is needed by the year 2025 and two additional lanes are needed by the year 2033. Between US 441 and Lyons Road, one additional lane is needed by the year 2025 and two lanes by 2028. Between Lyons Road and Florida's Turnpike, one additional lane is needed by the year 2025 and two additional lanes are needed by the year 2028. Between Florida's Turnpike and Powerline Road, one additional lane is needed by the year 2025.

Table 1.2 – Florida's Turnpike Annual Average Daily Traffic (AADT) Volume

Roadway	Segment	2016 AADT	2045 AADT	% Increase
Florida's Turnpike	Glades Road and Sawgrass Expressway	106,800	153,100	43%
	Sawgrass Expressway and Sample Road	90,800	130,300	44%

Source: Systems Interchange Modification Report – January 2024

According to the *Systems Interchange Modification Report*, additional lanes are needed along the Florida's Turnpike corridor by the year 2025. South of the Sawgrass Expressway, one additional lane is needed by the year 2026, and north of the Sawgrass Expressway, one additional lane is needed by the year 2025 and two additional lanes by 2045.

Several interchanges and adjacent intersections are operating at an unacceptable level of service. If additional lanes are not added to the corridor, the congestion within the project limits will get considerably worse with longer peak periods, more crashes and deteriorating travel time reliability.

Travel Time Reliability – In urban areas, many motorists have accepted traffic congestion as an unpleasant fact and have adjusted their schedules or allowed extra time for work, school, and other time-sensitive trips. However, they are less tolerant of unexpected delays that cause them to be late for work or important meetings, miss appointments, or lose money due to disruption of shipping and just-in-time deliveries.

Travel time reliability measures the extent of this unexpected delay. Travel time reliability is defined as the consistency or dependability in travel times, as measured from day-to-day and/or across different times of the day.

To gauge travel reliability on the Sawgrass Expressway, the average travel speeds between US 441 and Florida's Turnpike were obtained for a 7-day period (March 14, 2016 through March 20, 2016) and plotted. The results are shown in ***Figure 1.2***. As shown on the figure, the average travel speeds in the northbound/eastbound direction are dropping below 50 miles per hour during the morning peak with 95th percentile dropping to below 20 miles per hour.

Traffic volumes along the Sawgrass Expressway are expected to increase by 52% to 91% in the next 25 years. Without any improvements, the increasing traffic congestion will further deteriorate travel reliability along the corridor. Residents and workers will avoid destinations along the Sawgrass Expressway negatively affecting the economic vitality of the area.

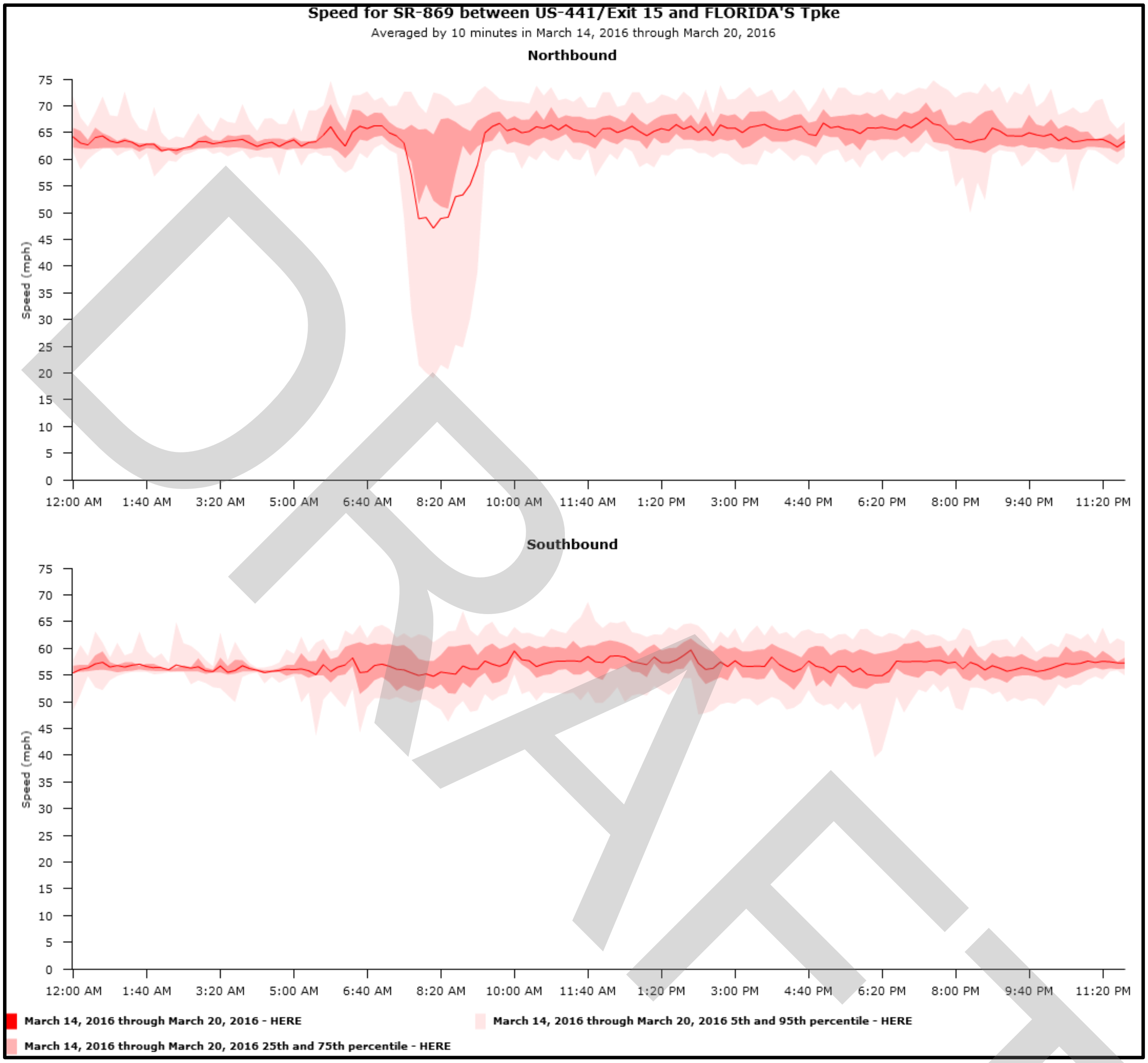


Figure 1.2 – Sawgrass Expressway Travel Time Reliability

System Linkage – Continuity in the transportation system is essential for efficient vehicle movements, travel patterns and safety. The Sawgrass Expressway is part of the State's Strategic Intermodal System (SIS) and the National Highway System (NHS) providing connectivity to Interstate 595, Interstate 75, Florida's Turnpike, and Interstate 95. The corridor also connects the local multi-modal transportation network by providing access to the Sunrise Park and Ride at the Amerant Bank Arena (formerly known as BB&T Center) and linking the existing Express Bus service along I-595 to Downtown Fort Lauderdale and Downtown Miami.

Additional lanes are proposed on the Sawgrass Expressway from south of Sunrise Boulevard to west of US 441 and on Florida's Turnpike both north and south of the Sawgrass Expressway. The segment corridor from US 441 to Florida's Turnpike is the last segment missing the needed additional lanes to continue to provide a reliable system linkage with the Florida's Turnpike and to the east.

Modal Interrelationships – The Sawgrass Expressway is part of the SIS and NHS networks. Additional lanes along the corridor will enhance the mobility of goods by alleviating current and future congestion along the corridor and surrounding freight and transit networks.

Transportation Demand – The continued growth within Broward County, particularly by the number of Developments of Regional Impact that have been approved in western Broward County, will drive the need for further infrastructure improvements including the widening of the Sawgrass Expressway. The existing 2016 AADT volumes measured along the corridor range from 37,700 between Florida's Turnpike and Powerline Road to as high as 86,200 west of US 441. The 2045 AADT forecasts show this traffic will grow to 71,900 between Florida's Turnpike and Powerline Road and to as high as 131,100 between US 441 and Lyons Road. This increase in demand reflects a 52% to 91% increase in future traffic necessitating capacity and operational improvement strategies to address this need.

Social Demands and Economic Development – The Sawgrass Expressway connects the cities of Coral Springs, City of Parkland, Coconut Creek, and Deerfield Beach to the Florida's Turnpike. Travel demand on the Sawgrass Expressway is directly related to population and employment changes within Broward County and the cities within the corridor. The projected population of Broward County and cities adjacent to the Sawgrass Expressway is shown in ***Table 1.3***.

Table 1.3 – 2020 and 2045 Population

Year	Broward County	City of Coral Springs	City of Parkland	City of Coconut Creek	Deerfield Beach
2020[1]	1,944,375	134,394	34,670	57,833	86,859
2045[2]	2,237,840	142,885	32,848	64,885	93,188
2020-2045 Change	15%	6%	-5%	12%	7%

Source: [1] – United States Census 2020, [2] – Broward MPO 2045 Long Range Transportation Plan & Broward County and Municipal Population Forecast and Allocation Model 2017

The population of Broward County is expected to increase by 15% from 2020 to 2045 while the cities directly adjacent to the Sawgrass Expressway are projected to grow between 6% and 12%, except for the City of Parkland. This projected increase in population will result in increased traffic on Sawgrass Expressway and adjacent roadway network.

Emergency Evacuation – Sawgrass Expressway serves as part of the emergency evacuation route network designated by the Florida Division of Emergency Management and by Broward County. This corridor is critical in facilitating traffic movement during emergency evacuation periods as it connects to other major arterials and highways of the state evacuation route network (i.e., I-595, I-75, Florida's Turnpike and to I-95 via the arterial portion of THE SAWGRASS EXPRESSWAY known as SW 10th Street to the east). Increasing the capacity of the Sawgrass Expressway will reduce evacuation times needed for residents of Broward County during emergency and hurricane evacuations.

Long Term Mobility Option – Sawgrass Expressway, within the project limits, is currently operating at LOS D or better with several intersections operating at LOS F. The 2045 traffic forecasts, based on population and employment projections, show an increase of 43% to 91% in future traffic volumes. A long-term mobility option is needed that will not only serve current traffic volumes but will accommodate future projected growth. Without this option, the residents and workers in the surrounding area will face severe congestion leading to decreasing productivity that would affect the economic viability of cities surrounding the Sawgrass Expressway.

1.3 Commitments

FTE has made a series of commitments and recommendations during the PD&E Study pertaining to the Sawgrass Expressway project. The following section summarizes the commitments and recommendations that will be adhered to during future transportation phases.

1. Minimize adverse impacts to the eastern indigo snake during construction, by implementing the USFWS Standard Protection Measures for the Eastern Indigo Snake (USFWS 2021).
2. Provide compensatory mitigation for unavoidable impacts to wood stork Suitable Foraging Habitat at a USFWS approved mitigation bank, in accordance with the USFWS Wood Stork Effect Determination Key.

The commitments list is currently underway by FTE. This section will be updated once the list is completed and approved.

1.4 Alternatives Analysis Summary

The objective of this PD&E Study is to evaluate corridor modifications to improve operations and interchange access. To keep up with the growing traffic demand within the study area, multiple conceptual alternatives were considered during the initial phase of the study, including a No-Build Alternative. The No-Build Alternative maintains the existing roadway configuration and any other planned improvements along the corridor.

All conceptual alternatives were screened based on travel demand, capacity, tolling, signing, access, geometrics, and right of way availability in order to select a preferred alternative. The alternatives analysis process consisted of six steps throughout the study (see ***Figure 1.3***). All conceptual alternatives were closely coordinated with the FDOT SW 10th Street project and other adjacent projects. Details about each conceptual alternative are documented in ***Section 5.4.***

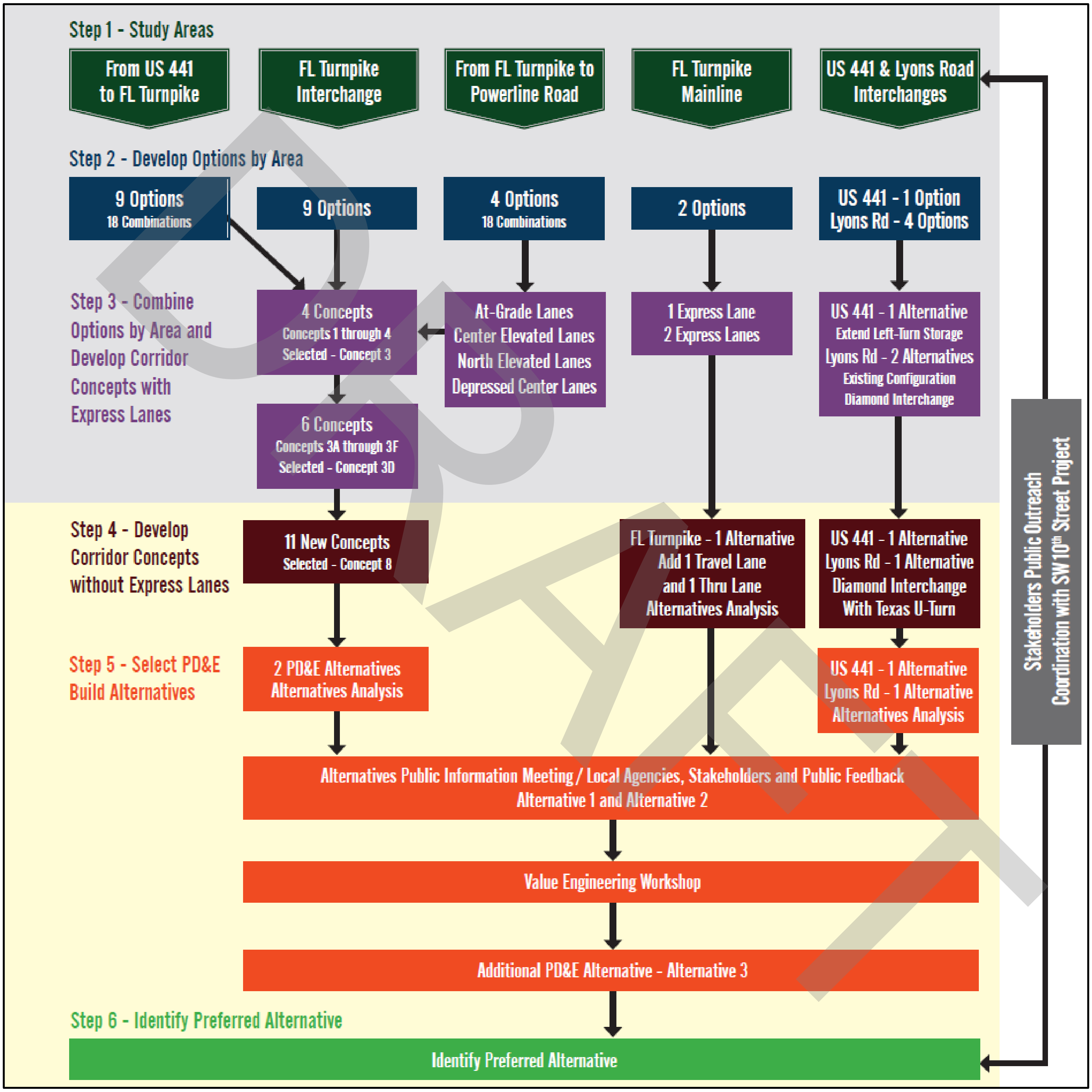


Figure 1.3 – Alternatives Analysis Process

Step 1 and Step 2 – The first step of the process was to divide the study area based on roadway characteristics. Once divided, the second step was to develop options with improvements that will meet the needs of the divided areas. The improvements varied by area including, but not limited to, adding express lanes, combining off-ramp exits, adding lanes to the on- and off-ramps, new interchange ramp connections, interchange modifications, and extending the existing collector distributor roadway systems.

Nine options were considered on the Sawgrass Expressway between US 441 and Florida's Turnpike (see ***Figure 1.4***). All nine options propose adding two express lanes in each direction.

Nine options were considered at the Florida's Turnpike Interchange. All nine options propose adding new ramp connections to and from the east with different geometric conceptual designs (see ***Figure 1.5***). Also, all nine options assume express lanes along the Sawgrass Expressway and Florida's Turnpike.

Four options were considered on the Sawgrass Expressway/SW 10th Street between Florida's Turnpike and Powerline Road. All options were coordinated with the FDOT D4 SW 10th Street project. Options considered adding at-grade travel lanes, adding elevated express lanes along the center median, adding elevated express lanes along the north side of the corridor, and adding depressed express lanes along the center median.

Two options were considered on the Florida's Turnpike mainline, adding one or two express lanes in each direction.

One option was considered at the US 441 Interchange, extending the storage length of the two left-turn lanes entering the Sawgrass Expressway in the northbound and southbound directions.

Four options were considered at the Lyons Road Interchange. Modify the existing interchange configuration to a Diamond Interchange, to a Displaced Left-Turn (DLT) Interchange, to a Single Point Urban Interchange (SPUI) and to a Diverging Diamond Interchange (DDI).

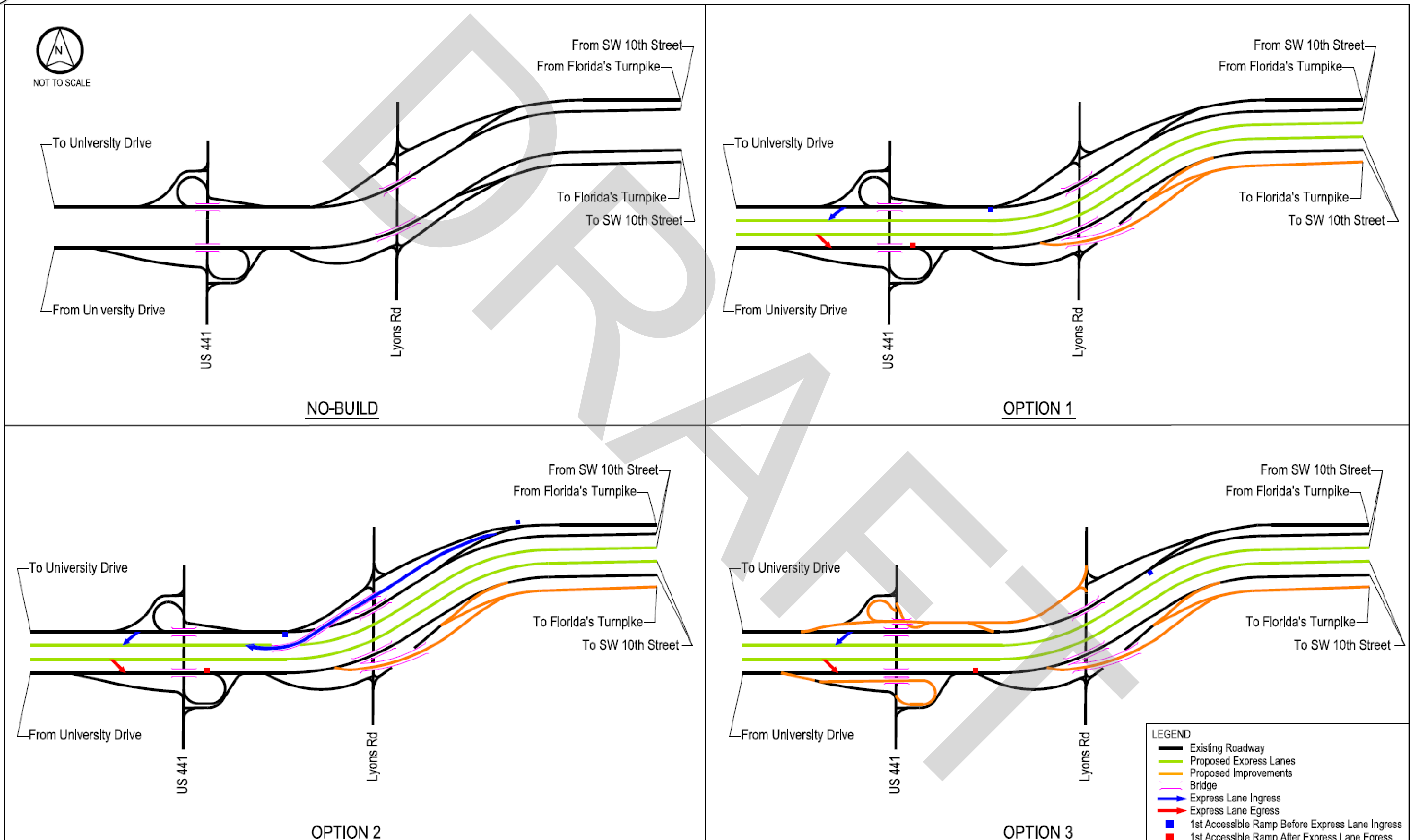


Figure 1.4 – Options Considered from US 441 to Florida's Turnpike

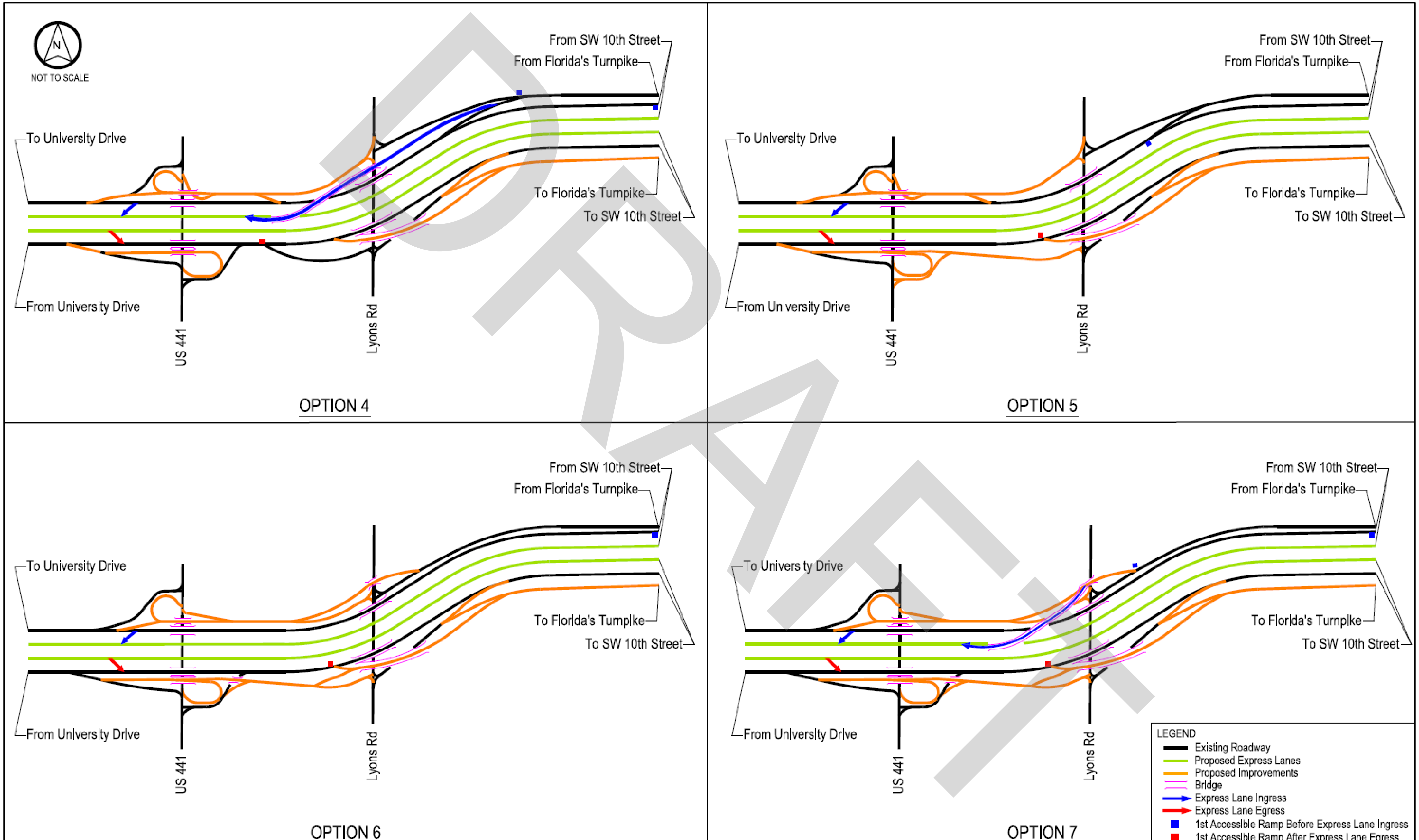


Figure 1.4 – Options Considered from US 441 to Florida's Turnpike (Continued)

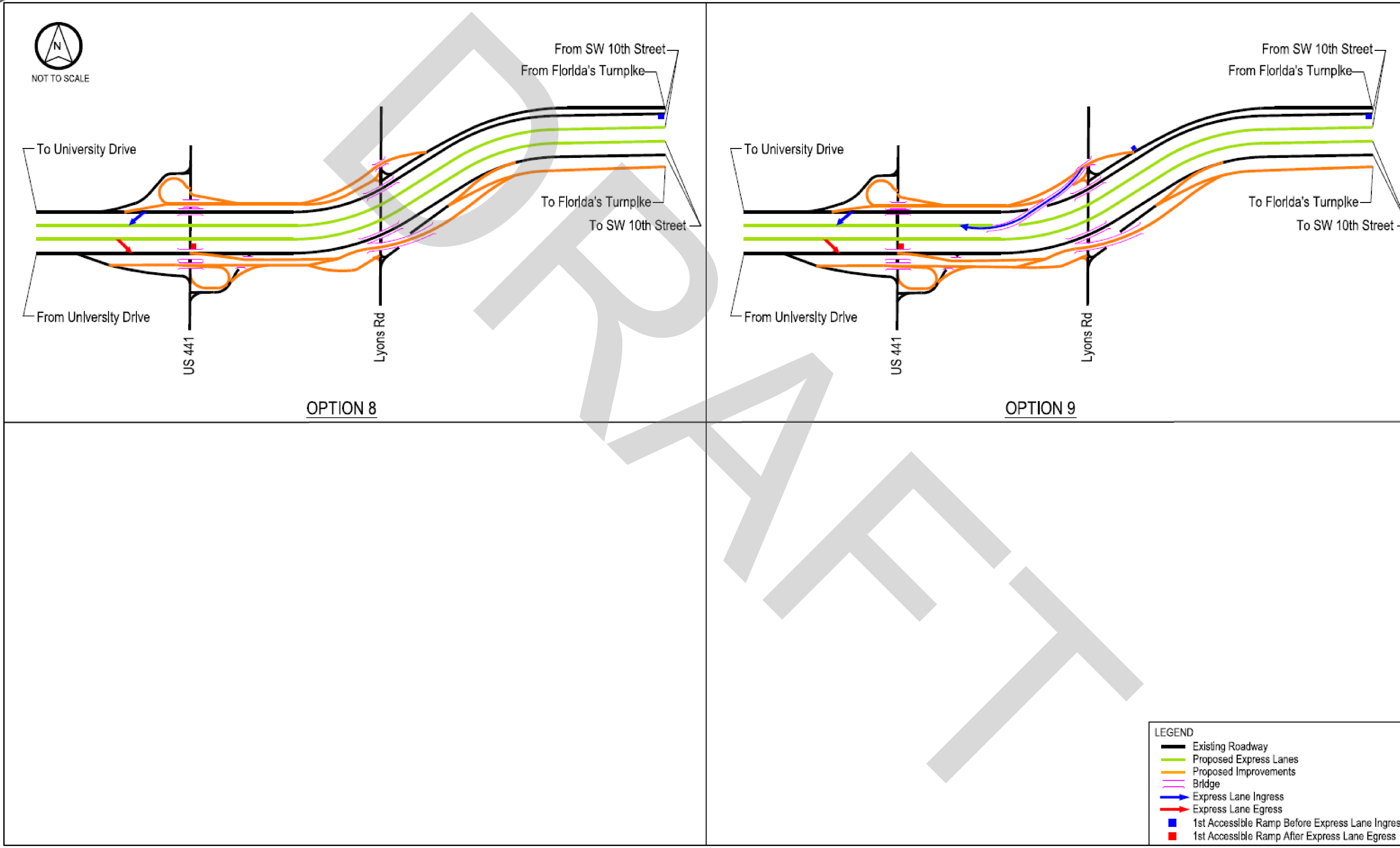


Figure 1.4 – Options Considered from US 441 to Florida's Turnpike (Continued)

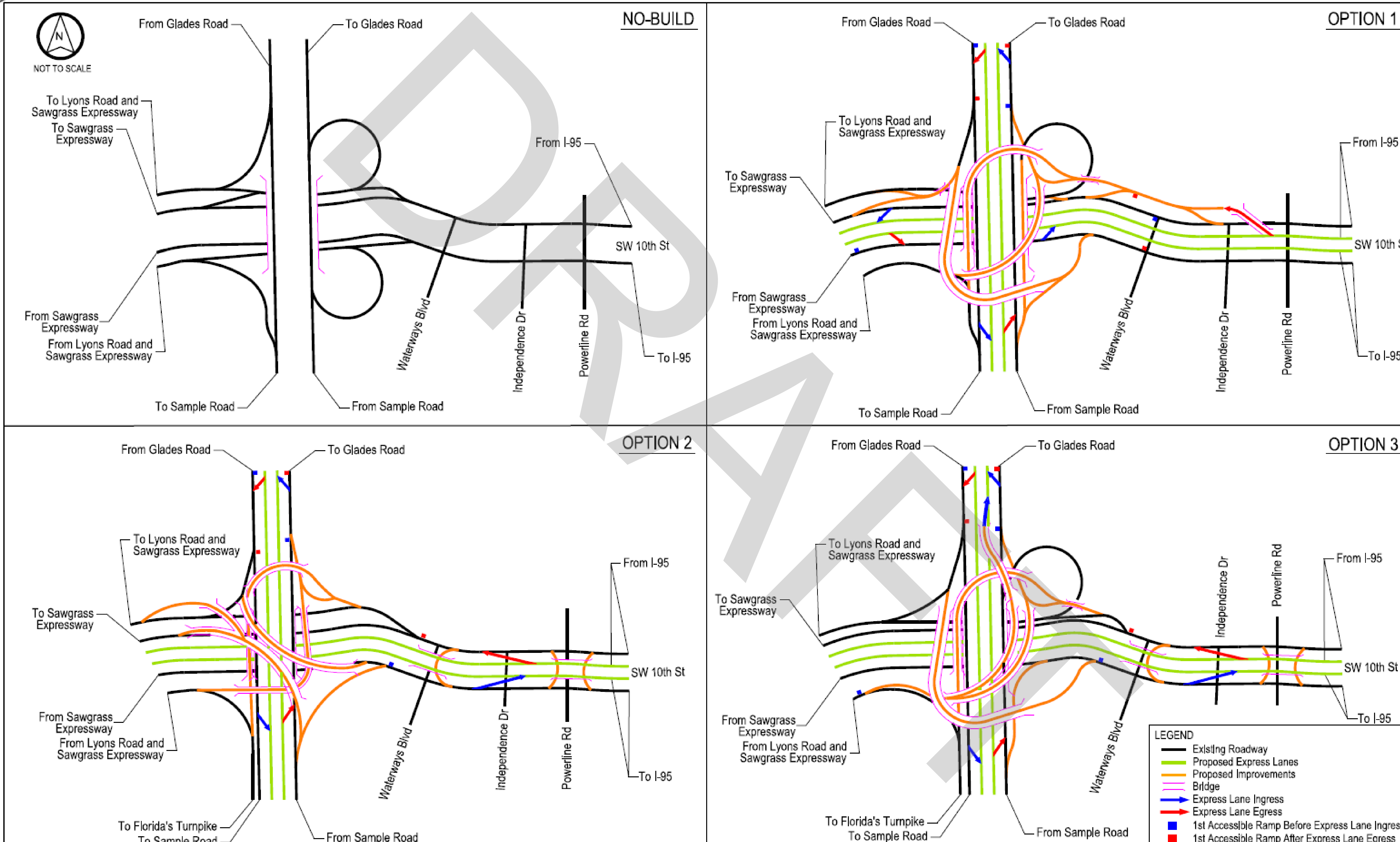


Figure 1.5 – Options Considered at the Florida's Turnpike Interchange

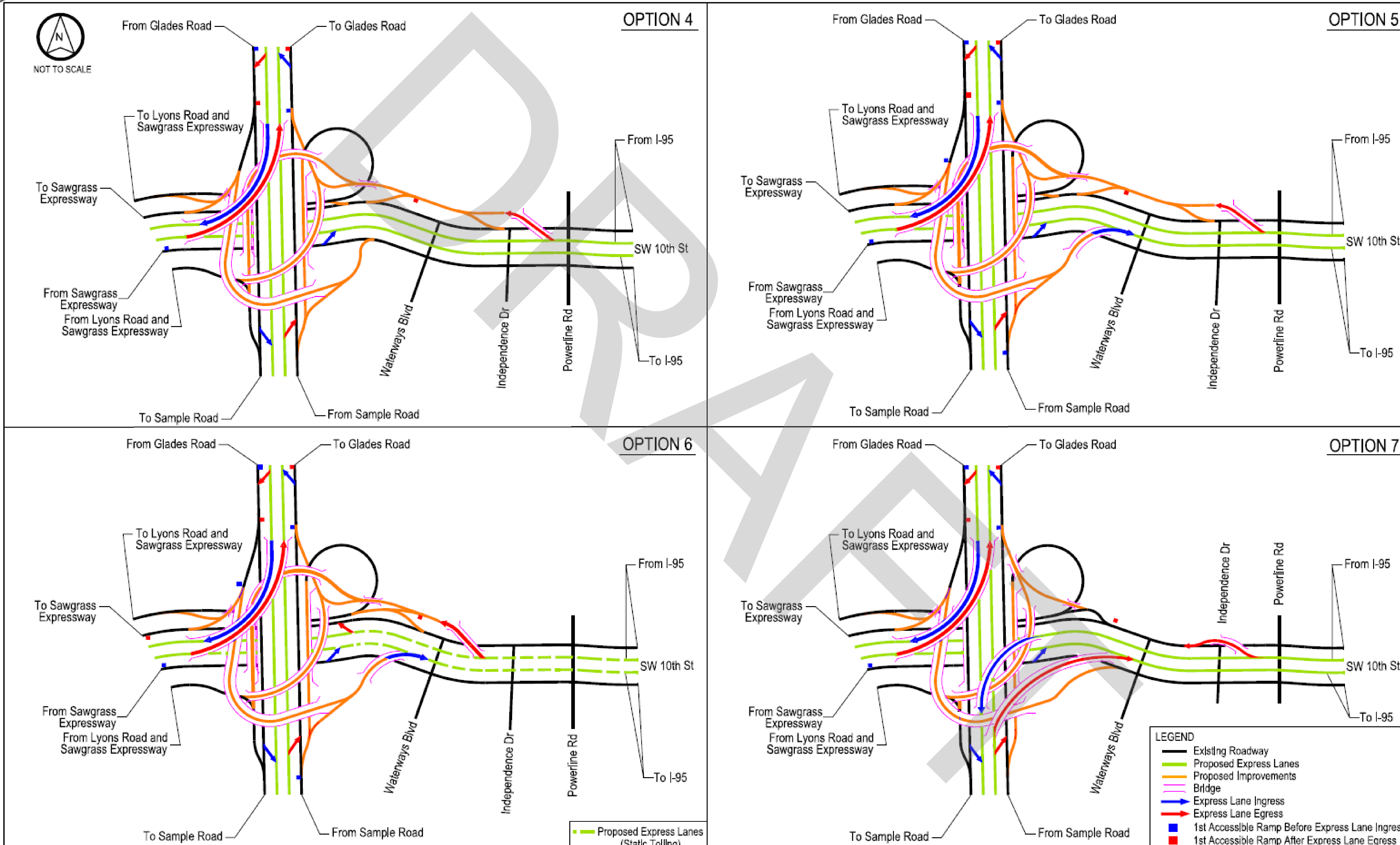


Figure 1.5 – Options Considered at the Florida's Turnpike Interchange (Continued)

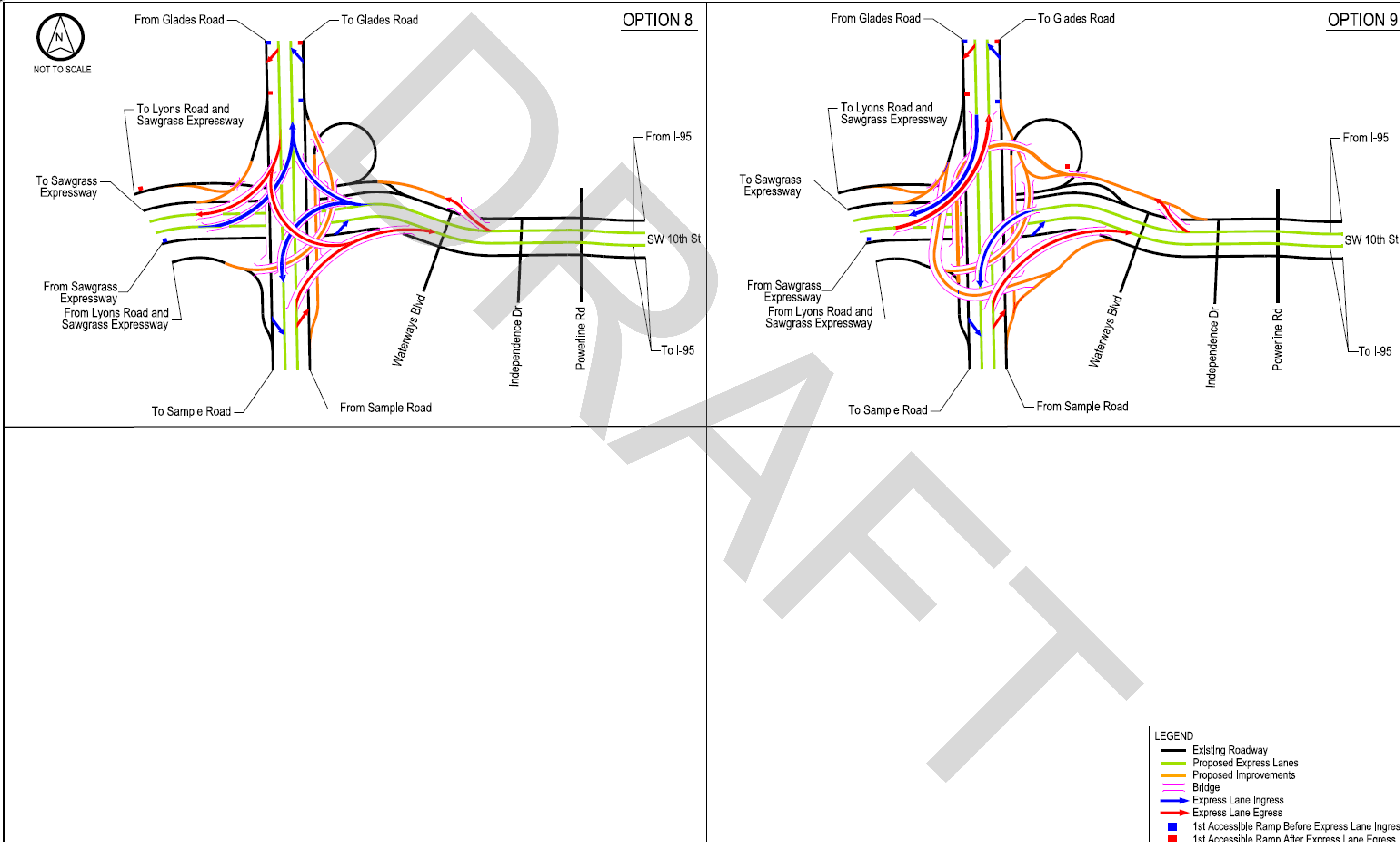


Figure 1.5 – Options Considered at the Florida's Turnpike Interchange (Continued)

Step 3 – During the third step, selected improvement options were combined by area and developed corridor concepts that covered the entire study area. These corridor improvements included the implementation of express lanes along both the Sawgrass Expressway and Florida's Turnpike.

Four corridor concepts were considered on the Sawgrass Expressway between US 441 and Powerline Road (see ***Figure 1.6***). Concept 3 was selected the best corridor concept. Concept 3 proposes a bidirectional express lane ramp connection to and from the north and to and from the west, relocates the existing Florida's Turnpike northbound to Sawgrass Expressway westbound off-ramp to the south and combines it with the new Florida's Turnpike northbound to SW 10th Street eastbound off-ramp into one exit. It also proposes a new SW 10th Street westbound to Florida's Turnpike northbound and southbound off-ramps combined into one exit.

FTE Planning Office began running several travel demand forecasting models to understand the new traffic patterns created by the new Florida's Turnpike Interchange ramps, the additional lanes added by Concept 3 and the SW 10th Street Project. Therefore, Concept 3 was further refined with other improvements to address the traffic needs of the area. These improvements focused mostly on additional express lane access points between Florida's Turnpike, Sawgrass Expressway and SW 10th Street.

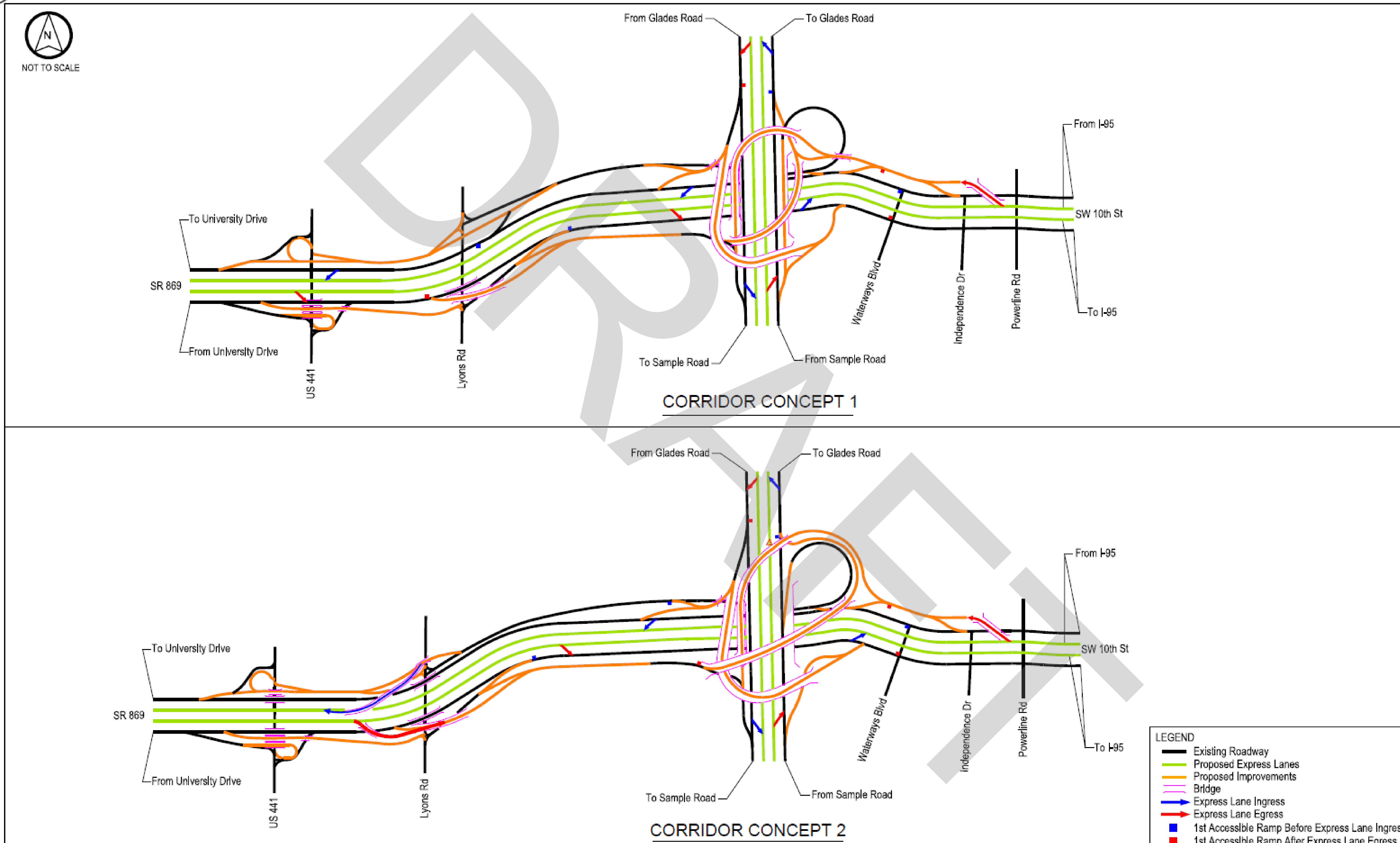


Figure 1.6 – Corridor Concepts Considered from US 441 to Powerline Road

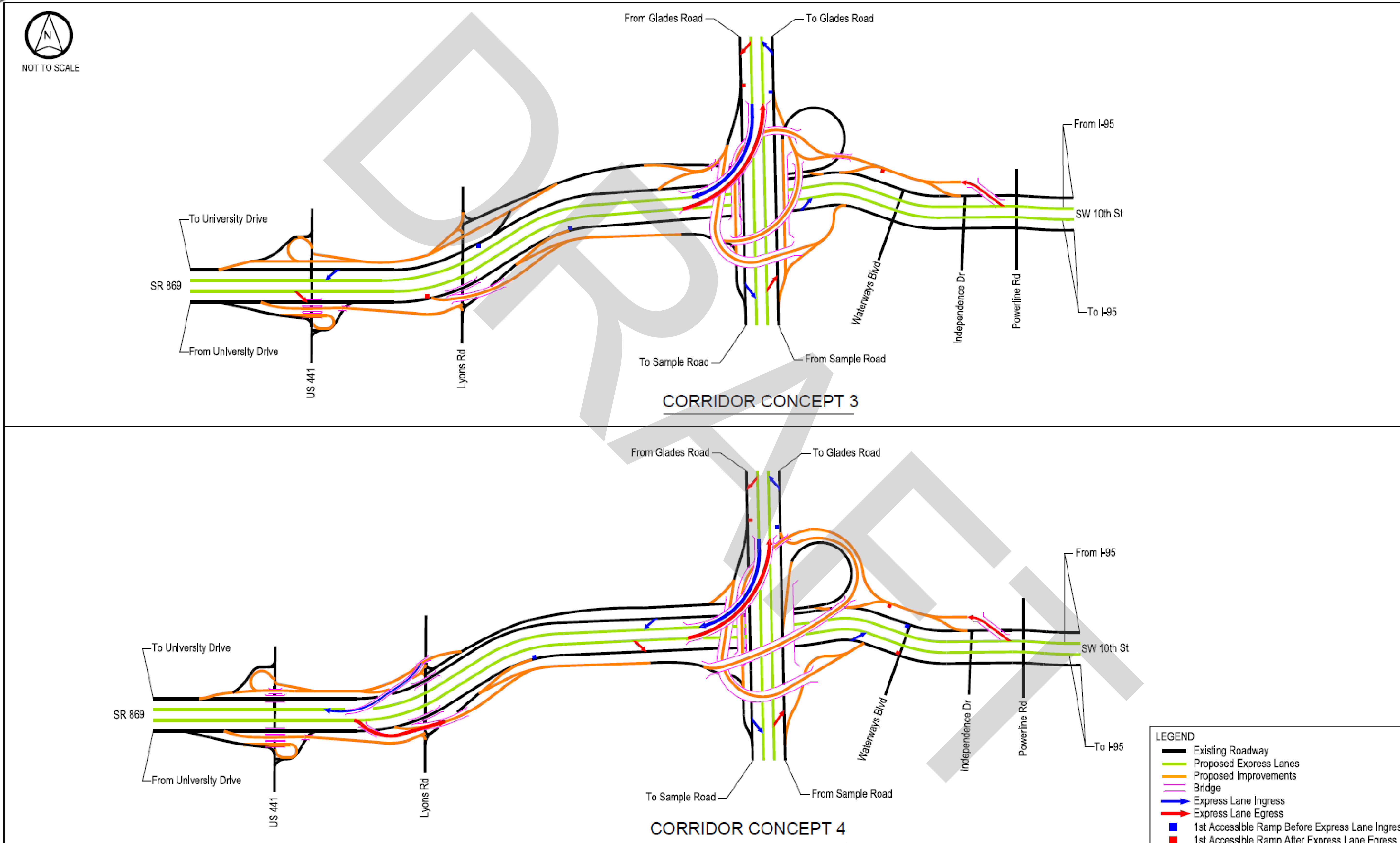
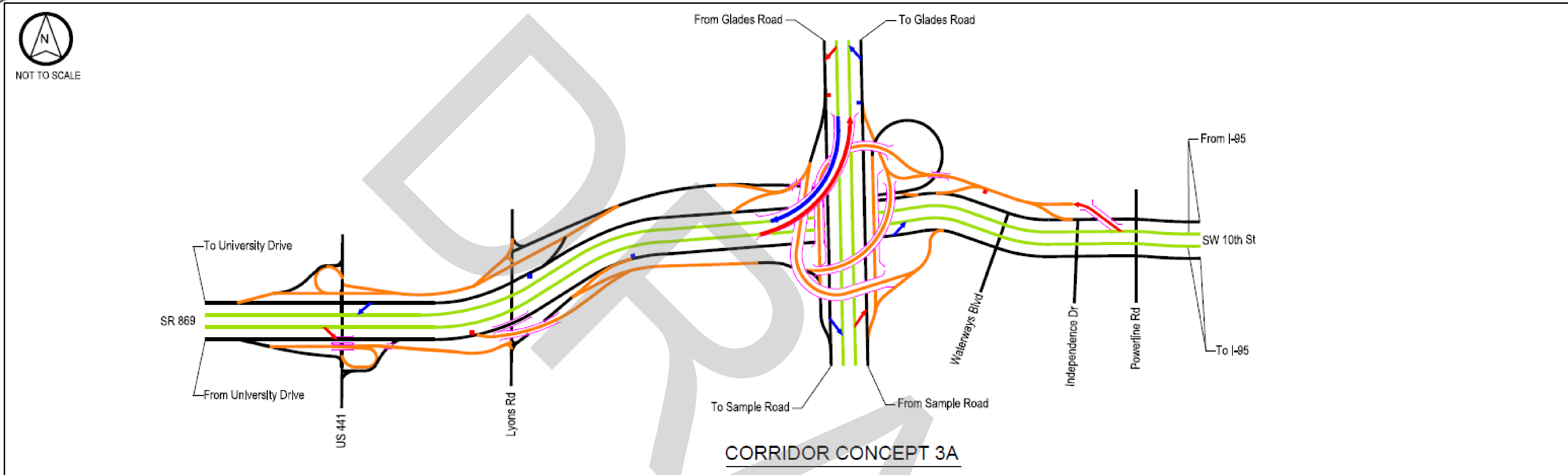


Figure 1.6 – Corridor Concepts Considered from US 441 to Powerline Road (Continued)

Six additional corridor concepts (Concepts 3A through 3F) were considered on the Sawgrass Expressway between US 441 and Powerline Road (see ***Figure 1.7***). Based on a preliminary travel demand forecasting analysis, Concept 3D was selected to move forward during Step 3 for the following reasons:

- It provides a bidirectional express lane direct connection between Florida's Turnpike to and from the north and Sawgrass Expressway to and from the west, which is the movement with the highest demand.
- It provides a bidirectional express lane direct connection between Florida's Turnpike to and from the south, and SW 10th Street to and from the east, which is the movement that serves the missing regional connection between Florida's Turnpike and I-95.
- No need for new ramps connecting Florida's Turnpike northbound to SW 10th Street eastbound nor SW 10th Street westbound to Florida's Turnpike southbound. These movements are forecasted to be low, and they can continue to be served by traveling west to Lyons Road and performing a U-turn to head east.

Two options moved forward at the Lyons Road Interchange, maintain the existing interchange configuration, and modify the existing interchange configuration to a Diamond Interchange.



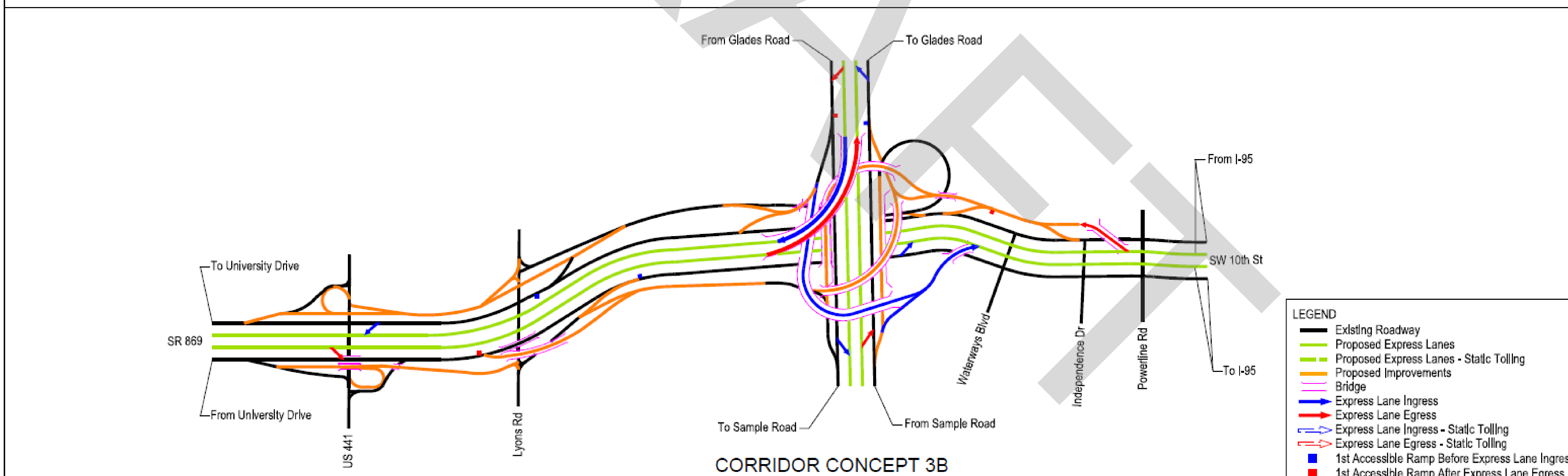


Figure 1.7 – Corridor Concepts (3A – 3F) Considered from US 441 to Powerline Road

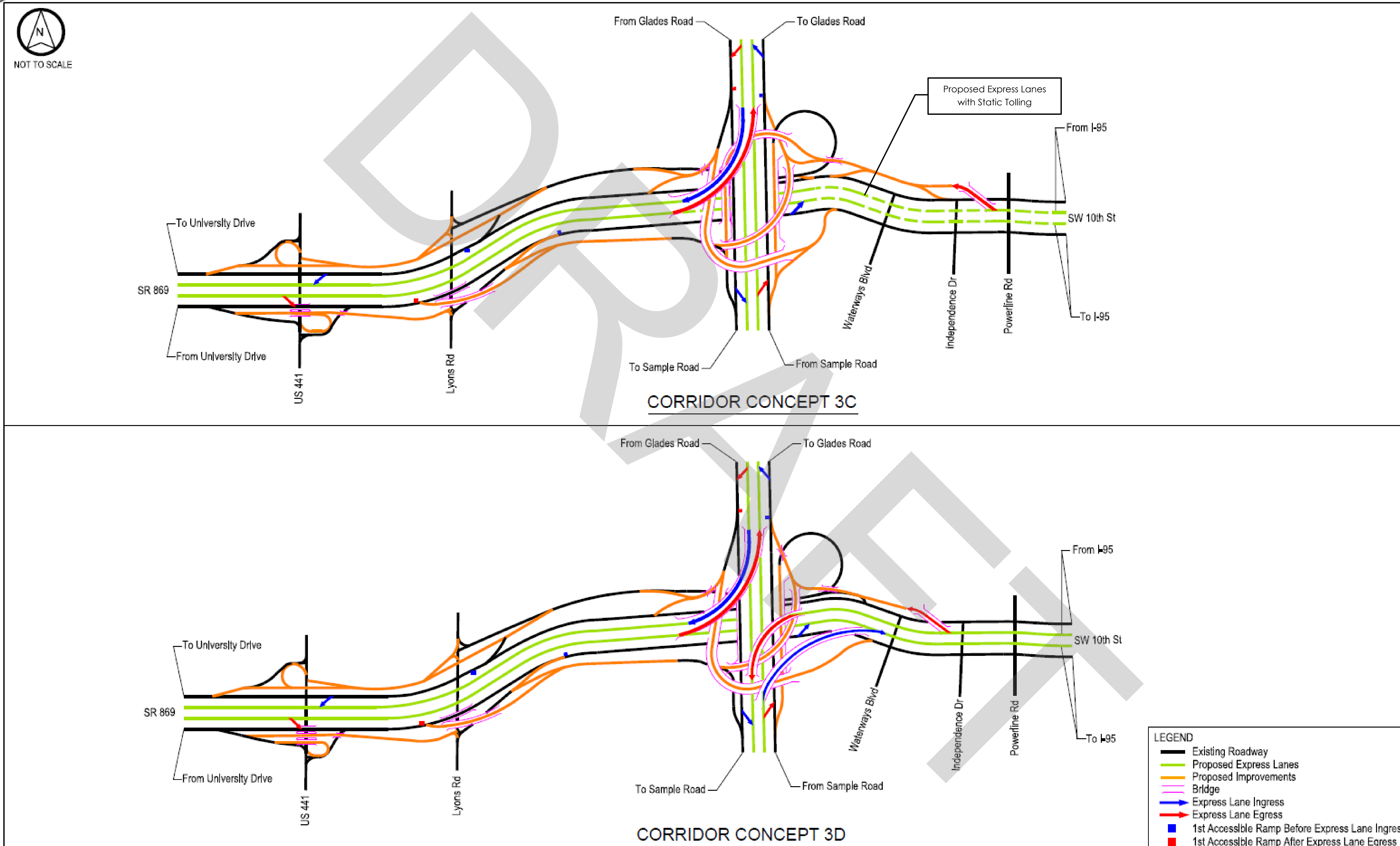


Figure 1.7 – Corridor Concepts (3A – 3F) Considered from US 441 to Powerline Road (Continued)

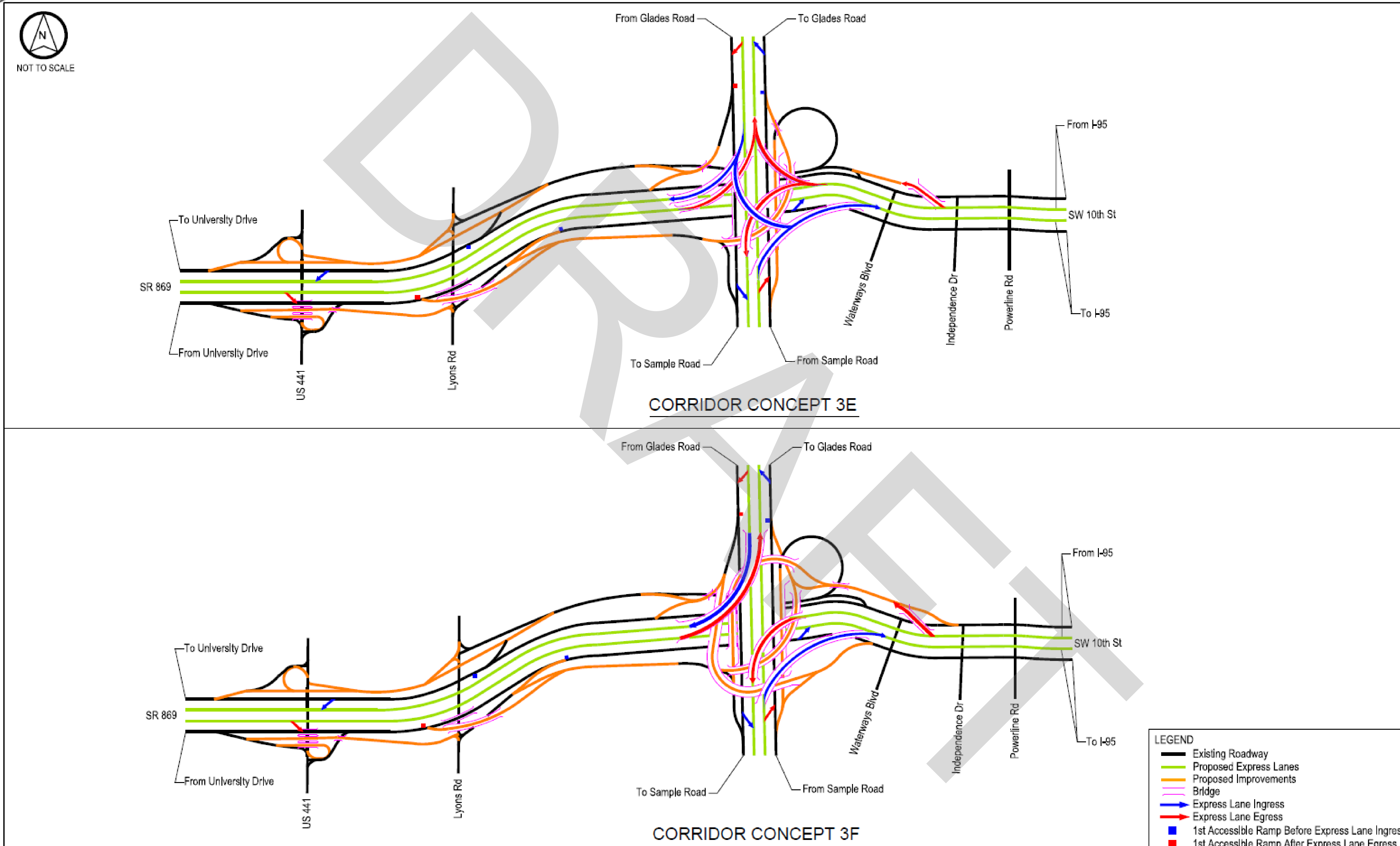


Figure 1.7 – Corridor Concepts (3A – 3F) Considered from US 441 to Powerline Road (Continued)

Step 4 – In 2020, FTE no longer considered adding express lanes to both Sawgrass Expressway and Florida's Turnpike. Policy changes at the time allowed for FDOT and FTE to look at other freeway widening alternatives. Therefore, during step four, a series of new corridor concepts were developed with additional travel lanes, interchange modifications and other corridor improvements. During this step a corridor concept was selected to be evaluated further during the alternatives analysis. At SW 10th Street, between Florida's Turnpike and I-95, FDOT also eliminated considering tolled express lanes and moved forward with a similar concept but without a toll. This new limited access facility is now called SW 10th Street Connector Lanes. During this step, FDOT selected to construct the connector lanes on the north side of the existing SW 10th Street local lanes. The connector lanes begin eastbound and end westbound just west of Florida's Turnpike.

Eleven new corridor concepts were considered on the Sawgrass Expressway between US 441 and Powerline Road (see ***Figure 1.8***). All corridor concepts propose to add an additional travel lane in each direction along the Sawgrass Expressway and a combination of collector distributor roadway systems and ramp modifications. The main differences between corridor concepts are the conceptual design along Sawgrass Expressway in the eastbound direction and ramp connections with Florida's Turnpike.

Along Florida's Turnpike, all corridor concepts propose to add one additional travel lane and a thru lane in each direction for a total of ten lanes. Thru lanes are additional travel lanes that help provide congestion relief in high traffic areas. These lanes offer customers making longer, more regional trips, the ability to bypass the local traffic entering and exiting the corridor.

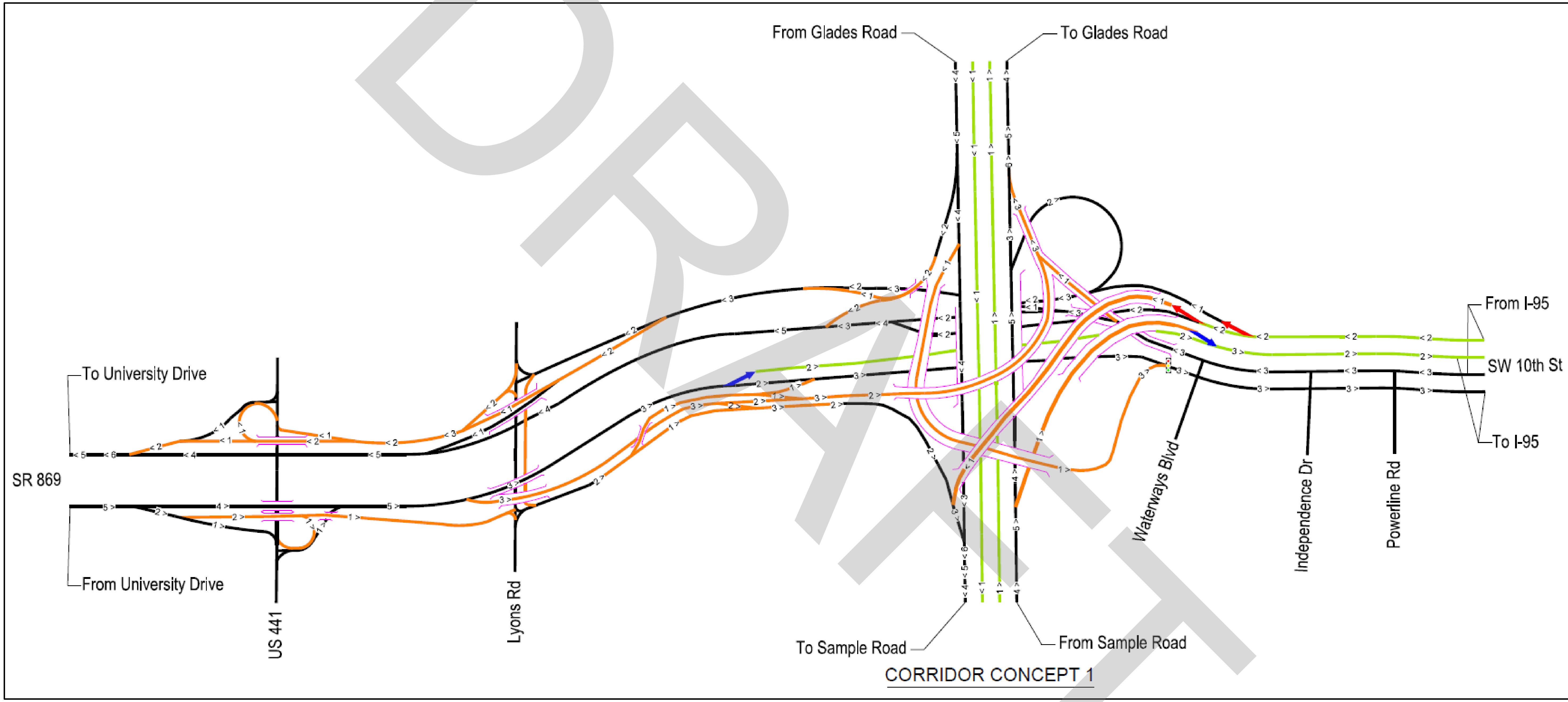


Figure 1.8 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road

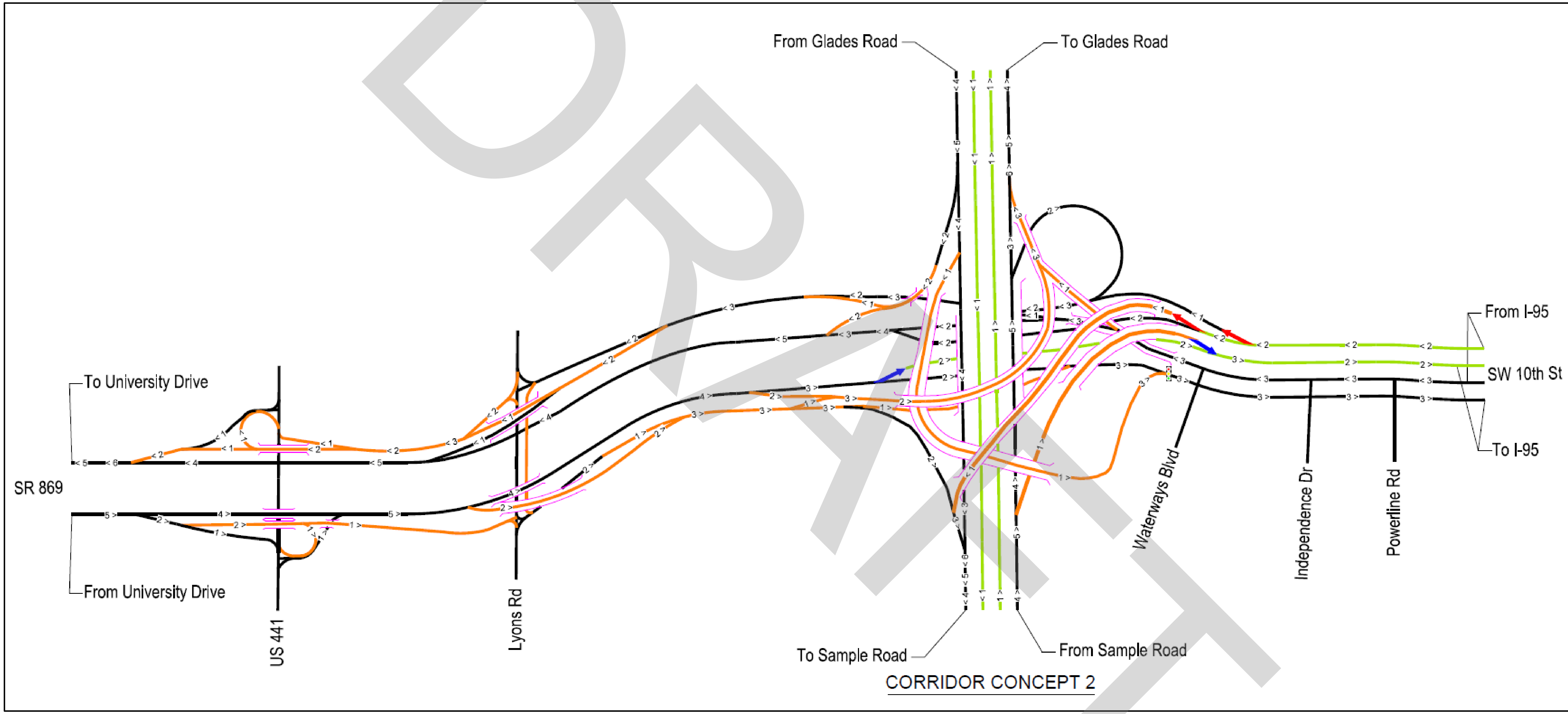


Figure 1.8 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

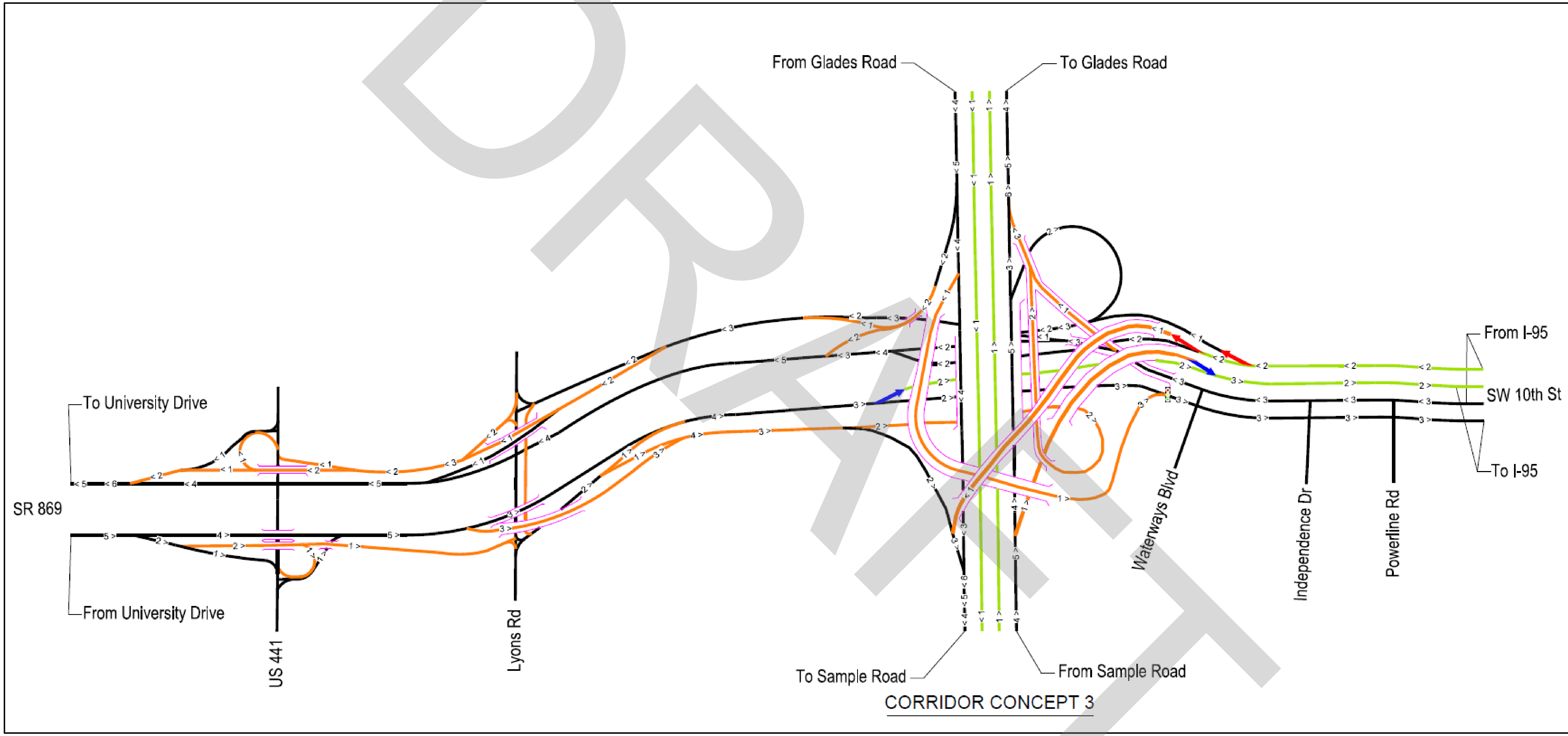


Figure 1.8 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

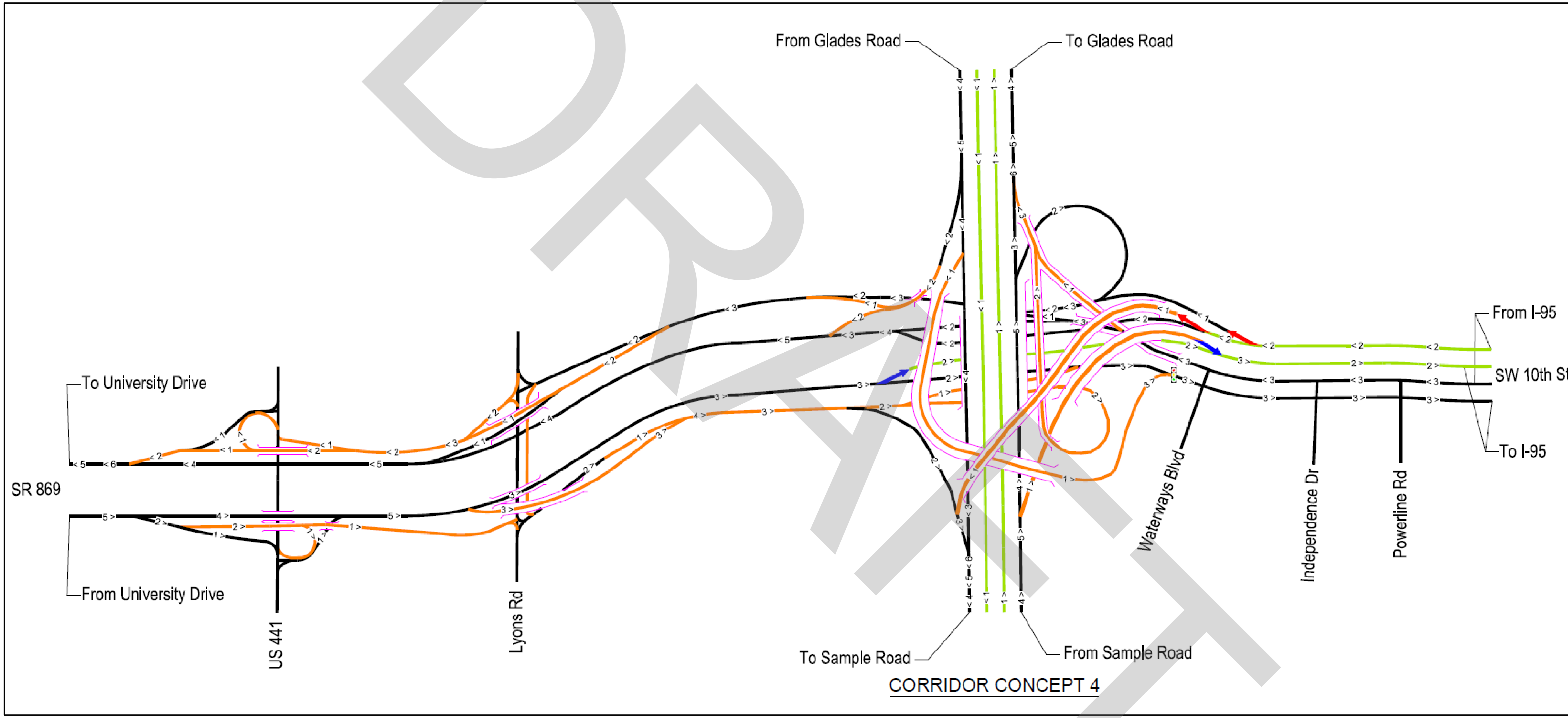
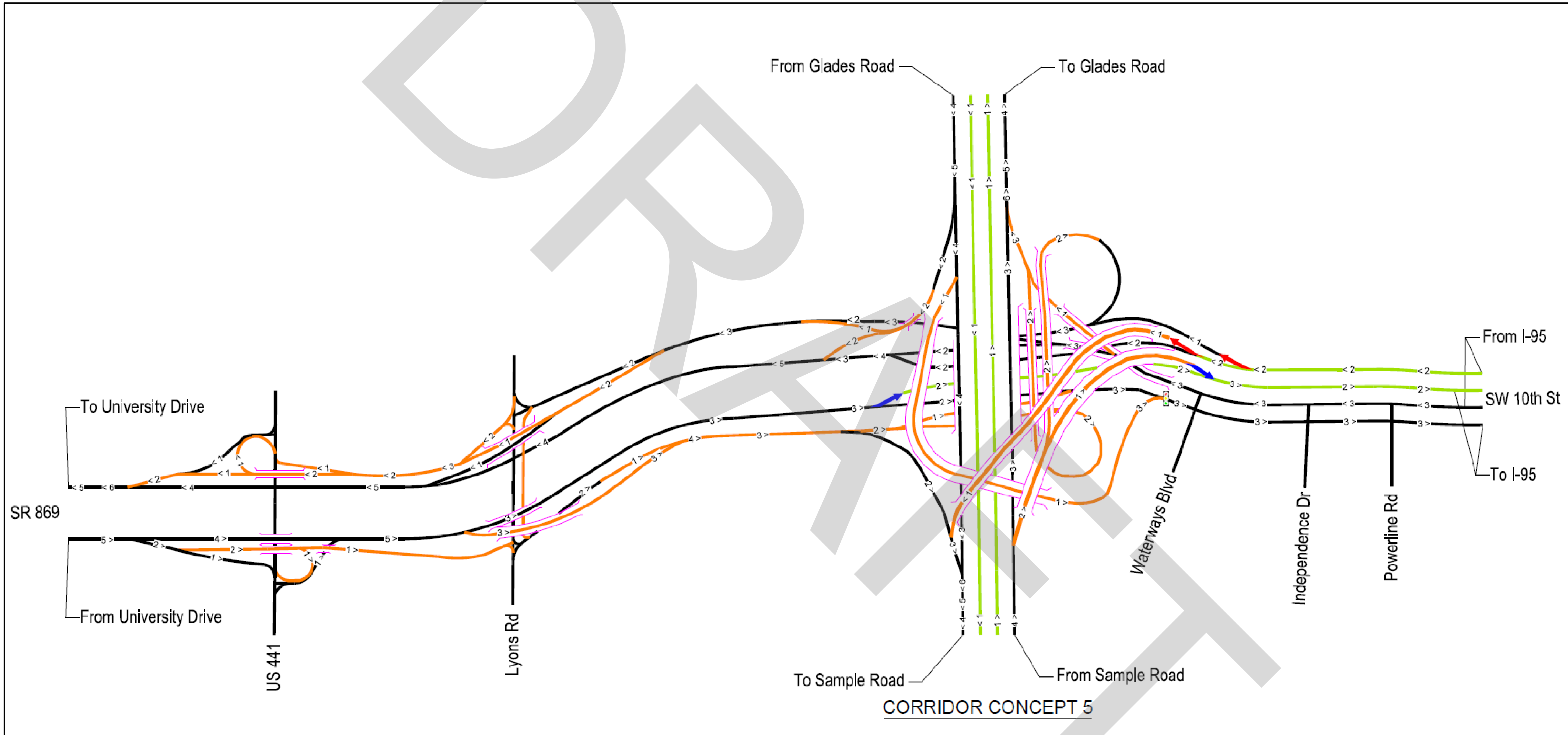


Figure 1.8 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)



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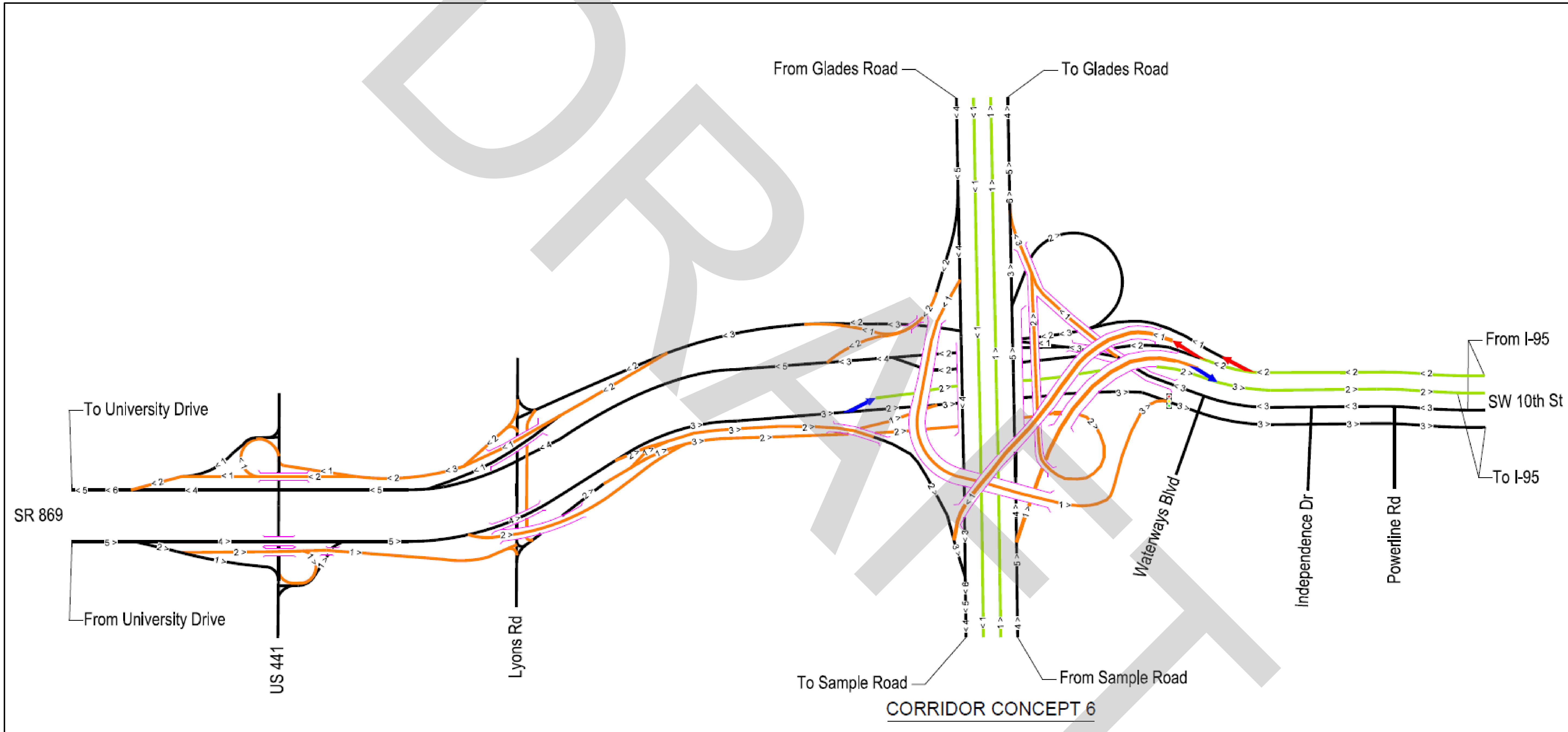


Figure 1.8 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

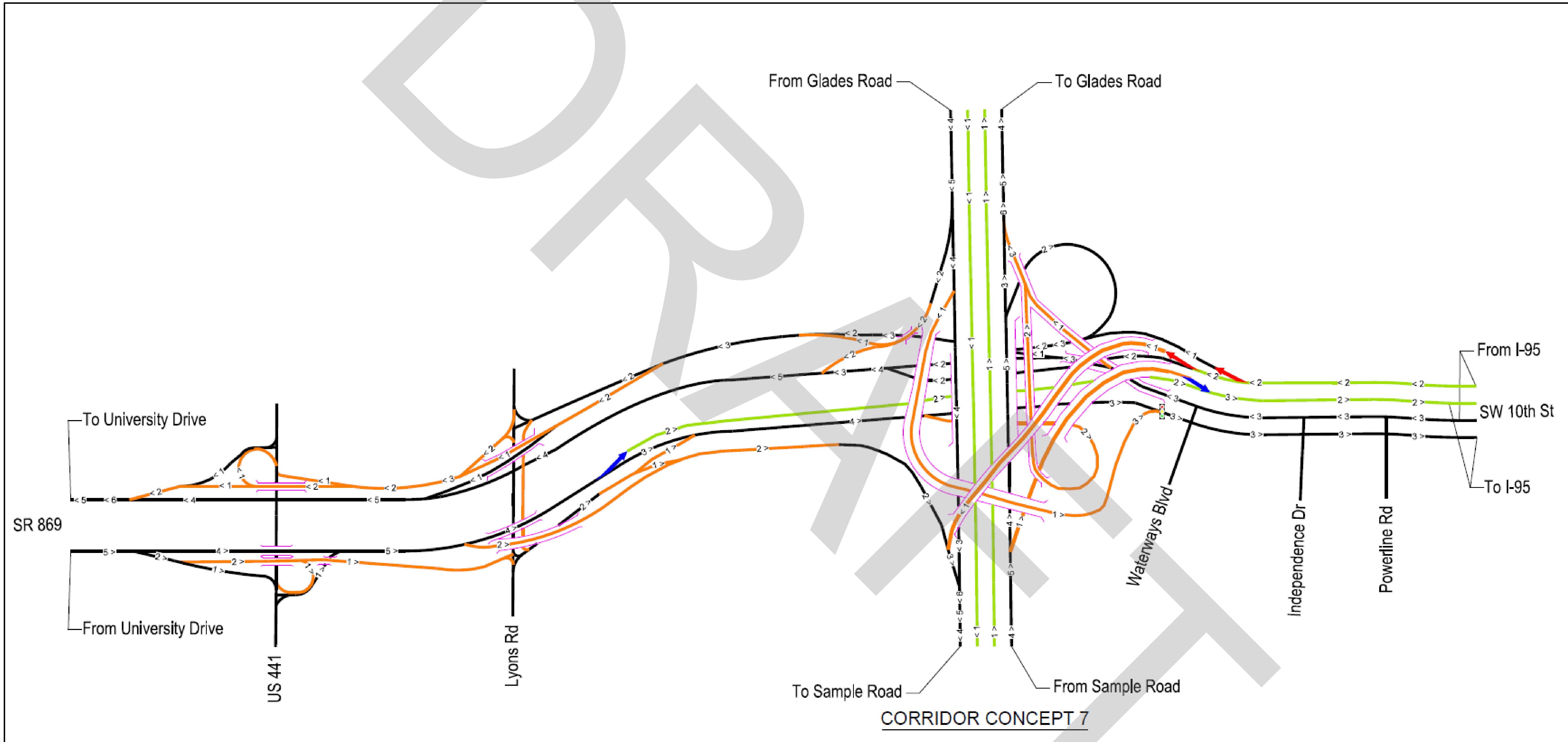


Figure 1.8 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

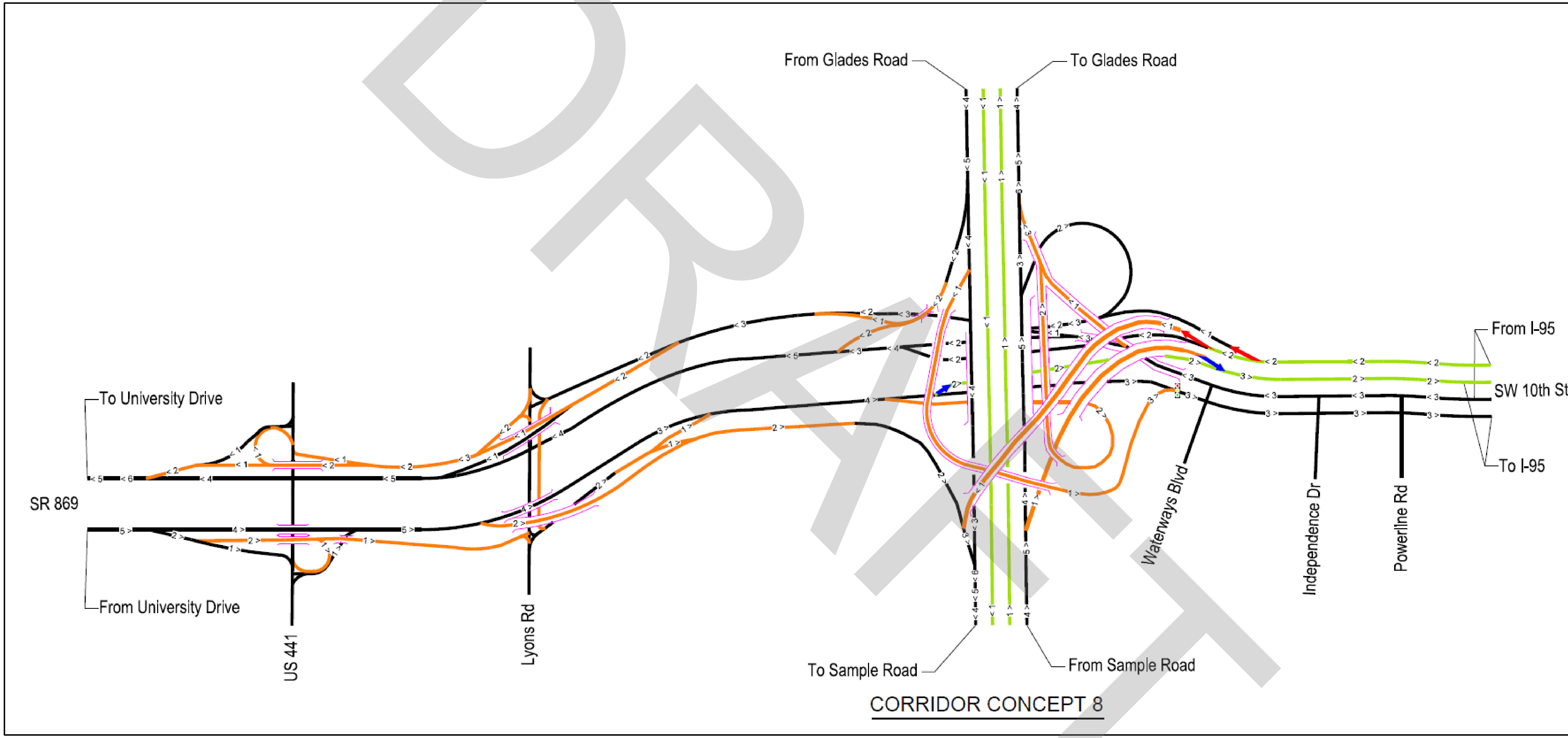


Figure 1.8 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

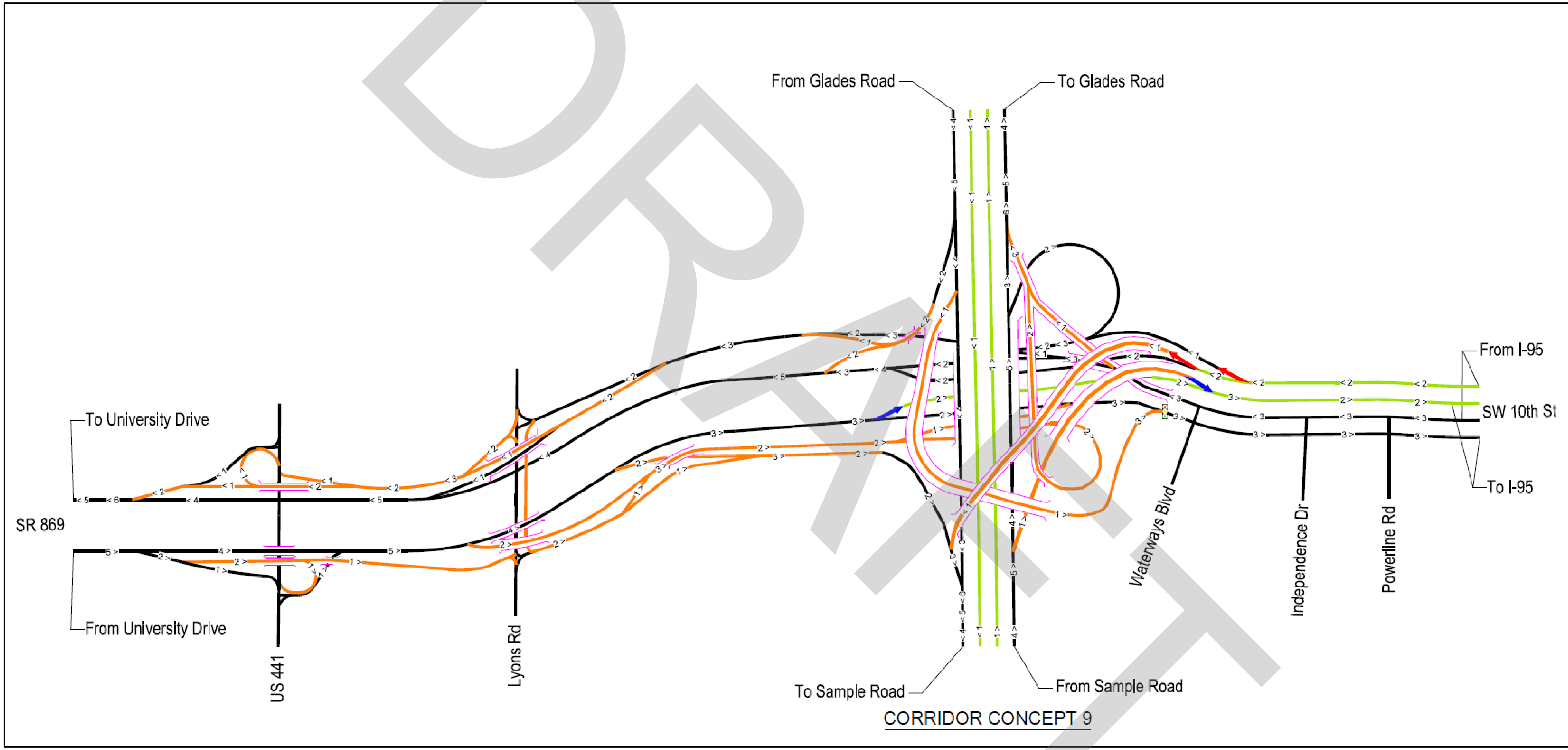


Figure 1.8 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

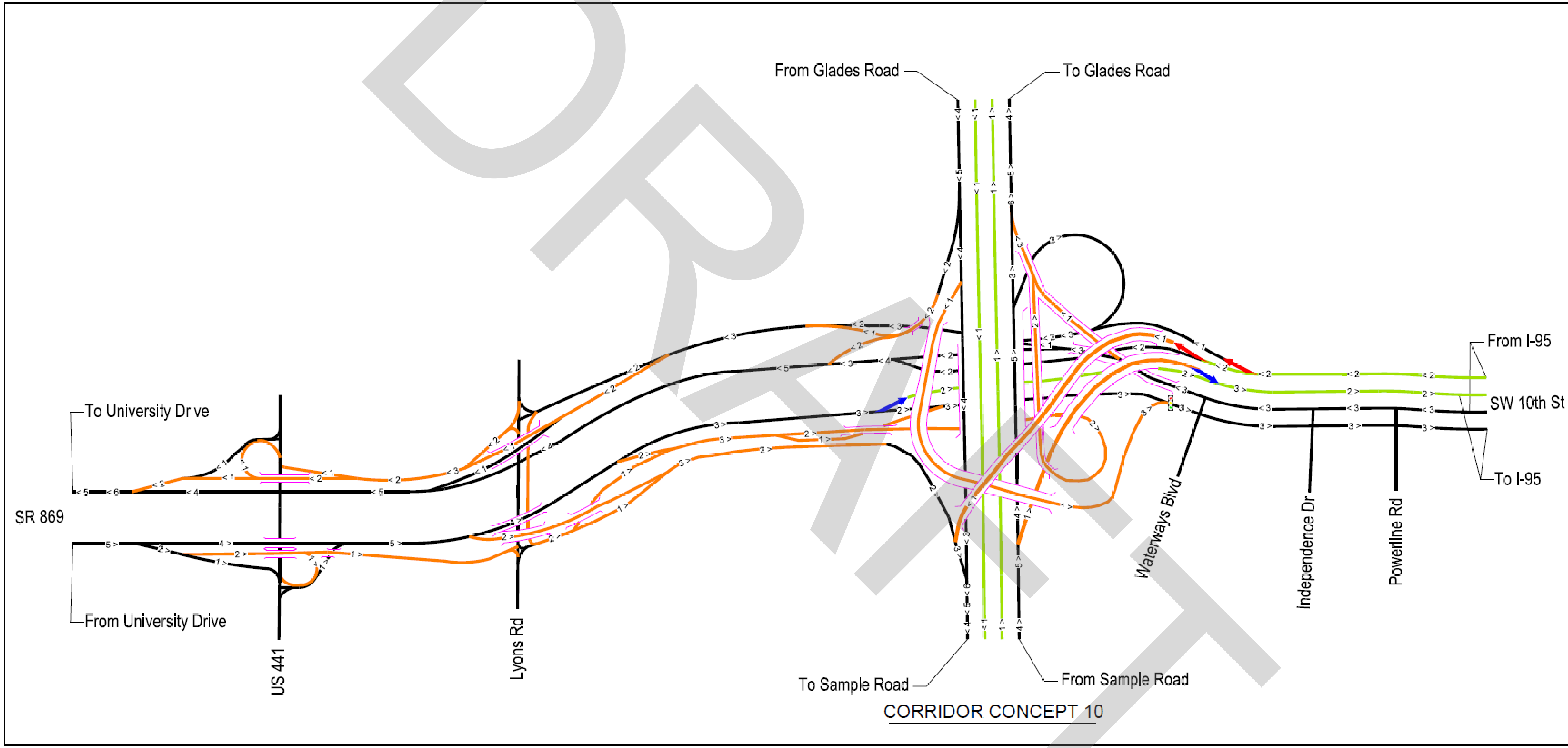


Figure 1.8 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

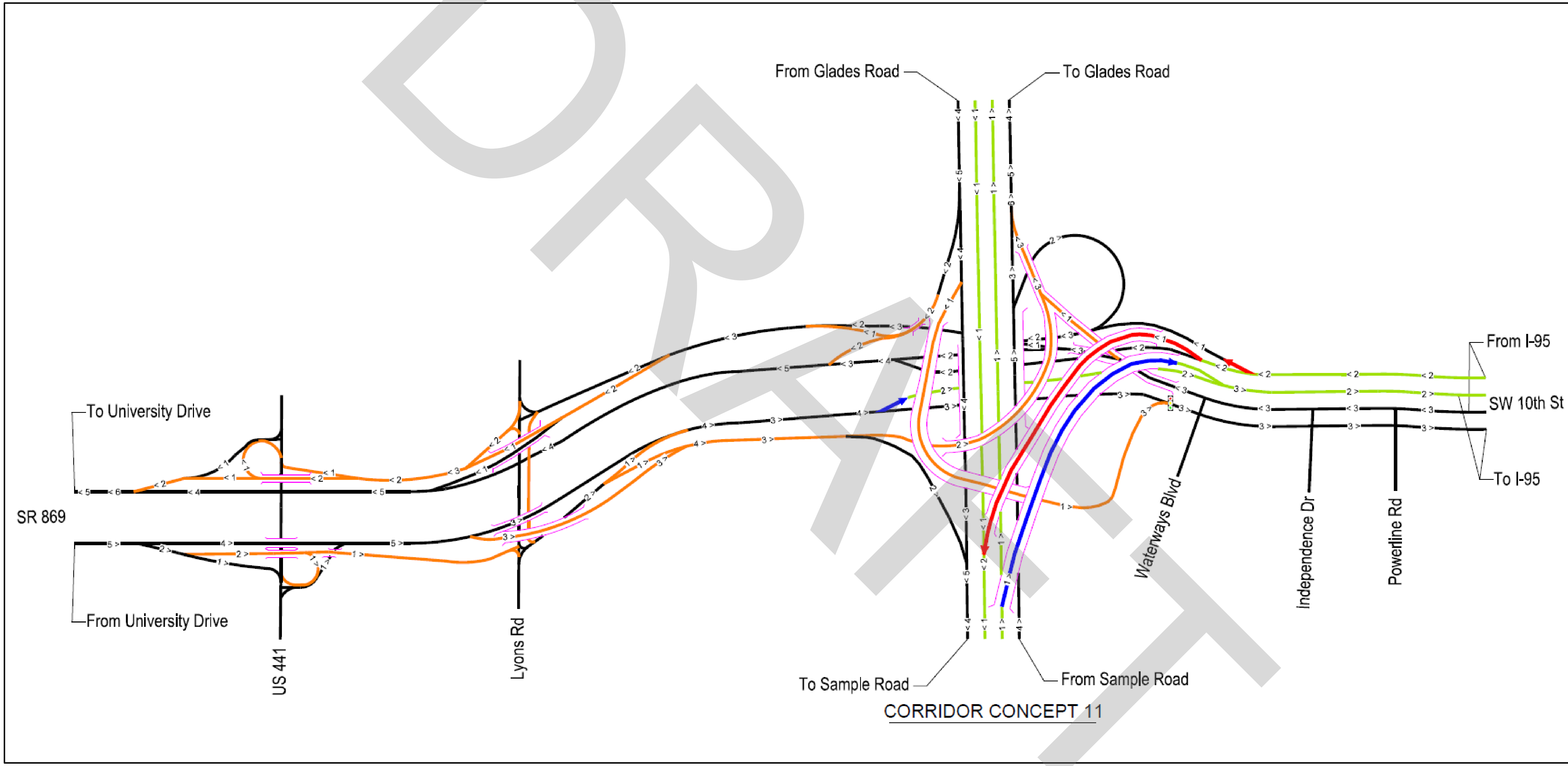


Figure 1.8 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

During this step, an advantages and disadvantages evaluation was performed for each corridor concept. Based on this evaluation, Corridor Concept 8 was selected to move forward to the PD&E alternatives analysis. Corridor Concept 8 provides the following benefits and opportunities to the project:

- Seamless connection and access to and from the new SW 10th Street Connector Lanes to the east.
- Maximizes the use of the existing Florida's Turnpike Interchange footprint in the southeast quadrant to address the weaving deficiency between the two loop northbound ramps.
- Reduces the number of third level ramps over the Florida's Turnpike Interchange.
- Requires fewest bridge structures.
- Minimizes the number of grade separations in the Sawgrass Expressway eastbound direction between Lyons Road and Florida's Turnpike.
- Redistributes traffic by separating mainline, ramp and local traffic with the implementation of collector distributor roadway systems and combining off-ramps.
- Addresses the existing and future travel demand by adding new ramps serving the local traffic needs and regional connectivity needs and by adding additional travel lanes to the existing ramps and corridors to address the future growth of the area.
- No right of way impacts along the Sawgrass Expressway.
- Consistent with the proposed improvements east, west, north, and south of the project limits.

One option moved forward at the Lyons Road Interchange, modify the existing interchange configuration to a Diamond Interchange with a Texas U-Turn east of Lyons Road.

Step 5 – During step 5, the PD&E Build Alternatives 1 and 2 were developed, analyzed, and selected from the corridor concept. Both were presented to the local agencies, stakeholders, and public during an Alternatives Public Information Meeting (see ***Figure 1.9*** and ***Figure 1.10***). ***Section 5.4.1*** summarizes Alternatives 1 and 2.

FTE received feedback from the local agencies, stakeholders, and public about Alternatives 1 and 2. During this step, FTE conducted a Value Engineering (VE) Workshop. Refinements to the build alternatives were considered based on public feedback. These refinements, together with the recommendations from the VE team, created an additional alternative, Alternative 3 (see ***Figure 1.11***). ***Section 5.4.3*** summarizes Alternative 3.

Alternatives 1, 2 and 3 propose the same improvements along the Sawgrass Expressway and Florida's Turnpike. The only difference is that Alternative 3 enhances the geometry and alignment at the three interchanges and addresses the feedback and concerns from the local agencies, stakeholders, and the public. Therefore, Alternative 3 was recommended to move forward as the Build Alternative to be analyzed further as part of this study.

Step 6 – During step six, FTE identified a preferred alternative. The evaluation methodology used in this study involved a combination of both comparative qualitative and quantitative analyses to compare the No-Build Alternative versus the Build Alternative (Alternative 3) to determine a preferred alternative. The methodology focused on engineering, socio-economic, environmental and project cost. The key components of the alternatives analysis were purpose and need, travel demand forecasting, geometrics, right of way impacts, project cost and operational analysis. The alternatives analysis was geared to determine which improvements were necessary to improve traffic operations, safety, system linkage, regional connectivity, interchange access and emergency evacuation. Build Alternative 3 was selected as the preferred alternative based on the evaluation results documented in this report. ***Section 7.0*** summarizes the preferred alternative.

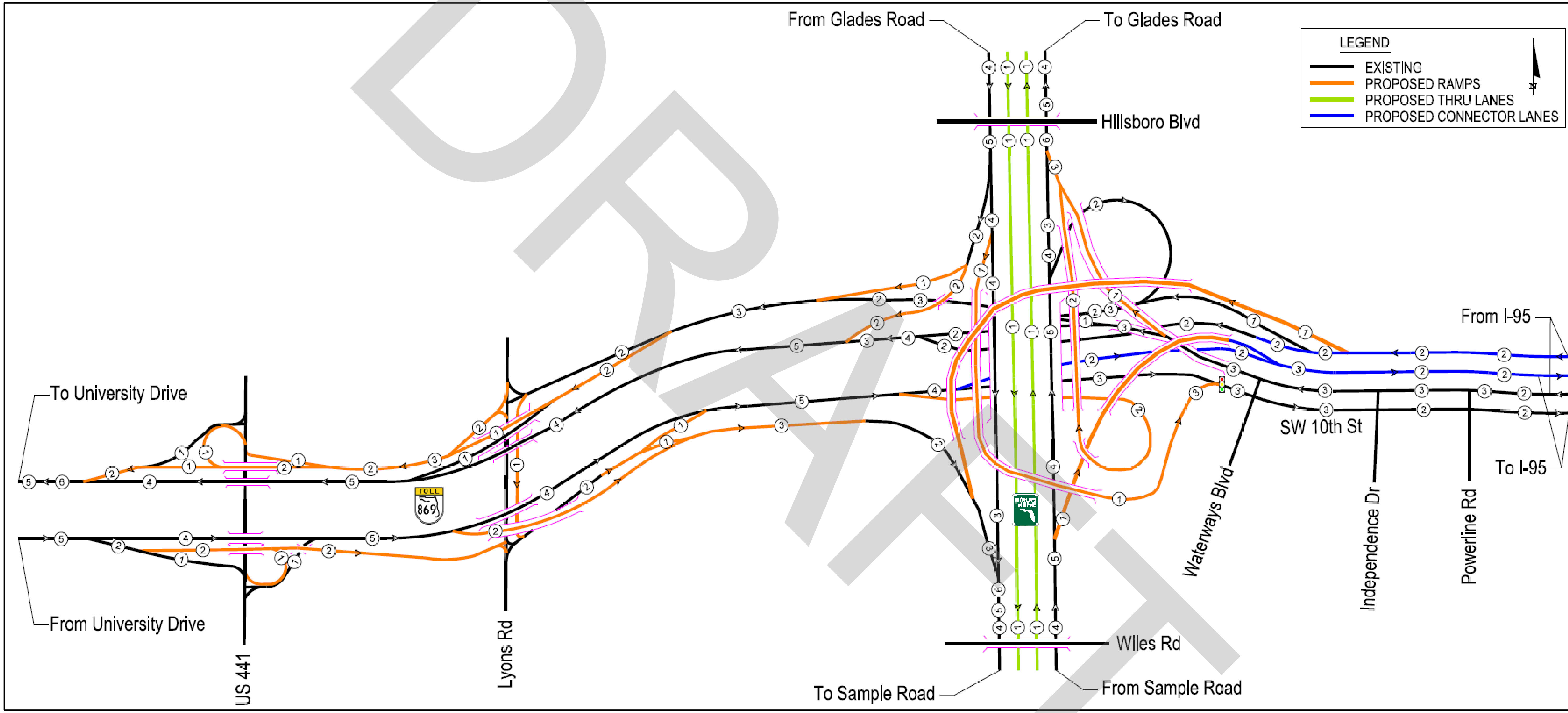


Figure 1.9 – Alternative 1 Schematic Line Diagram

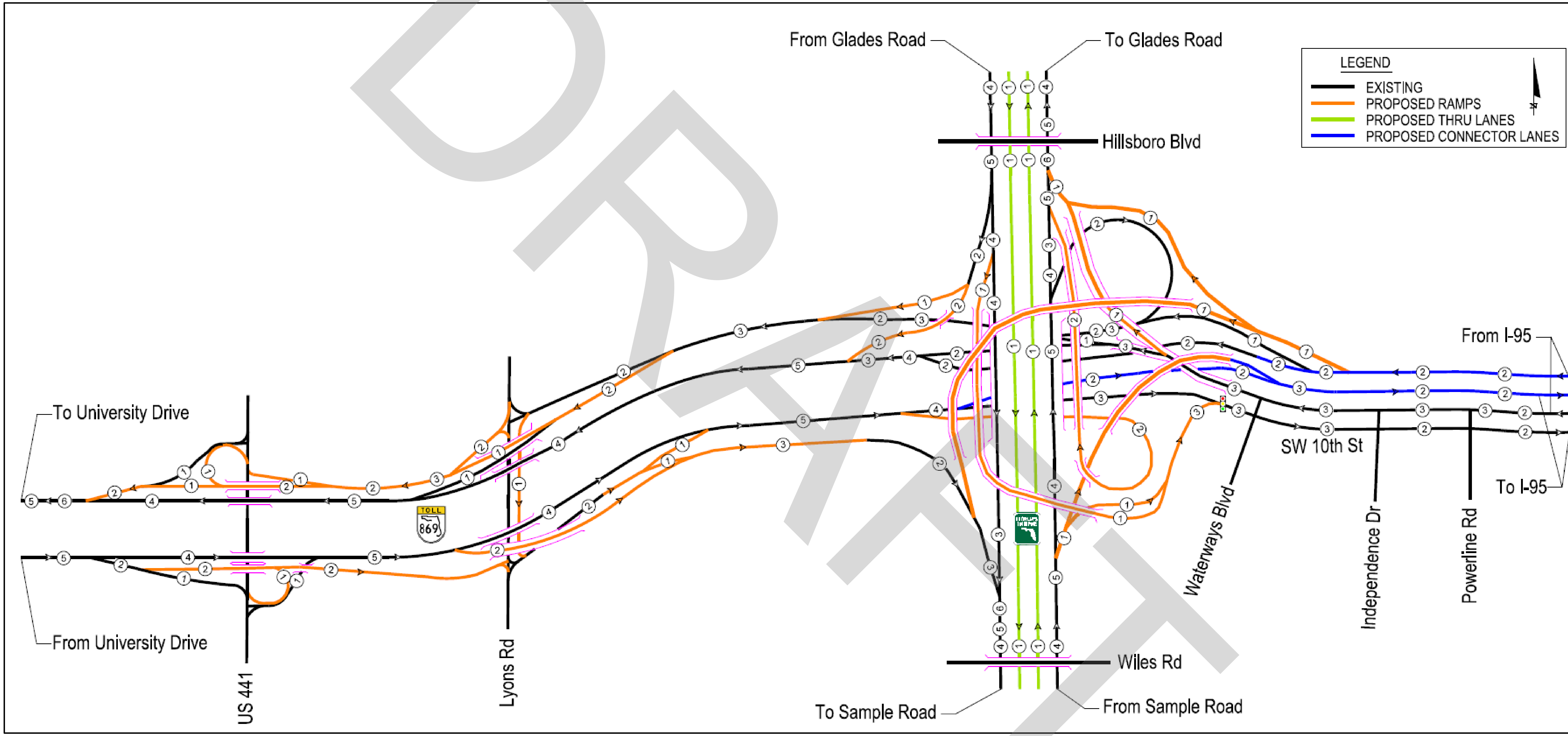


Figure 1.10 – Alternative 2 Schematic Line Diagram

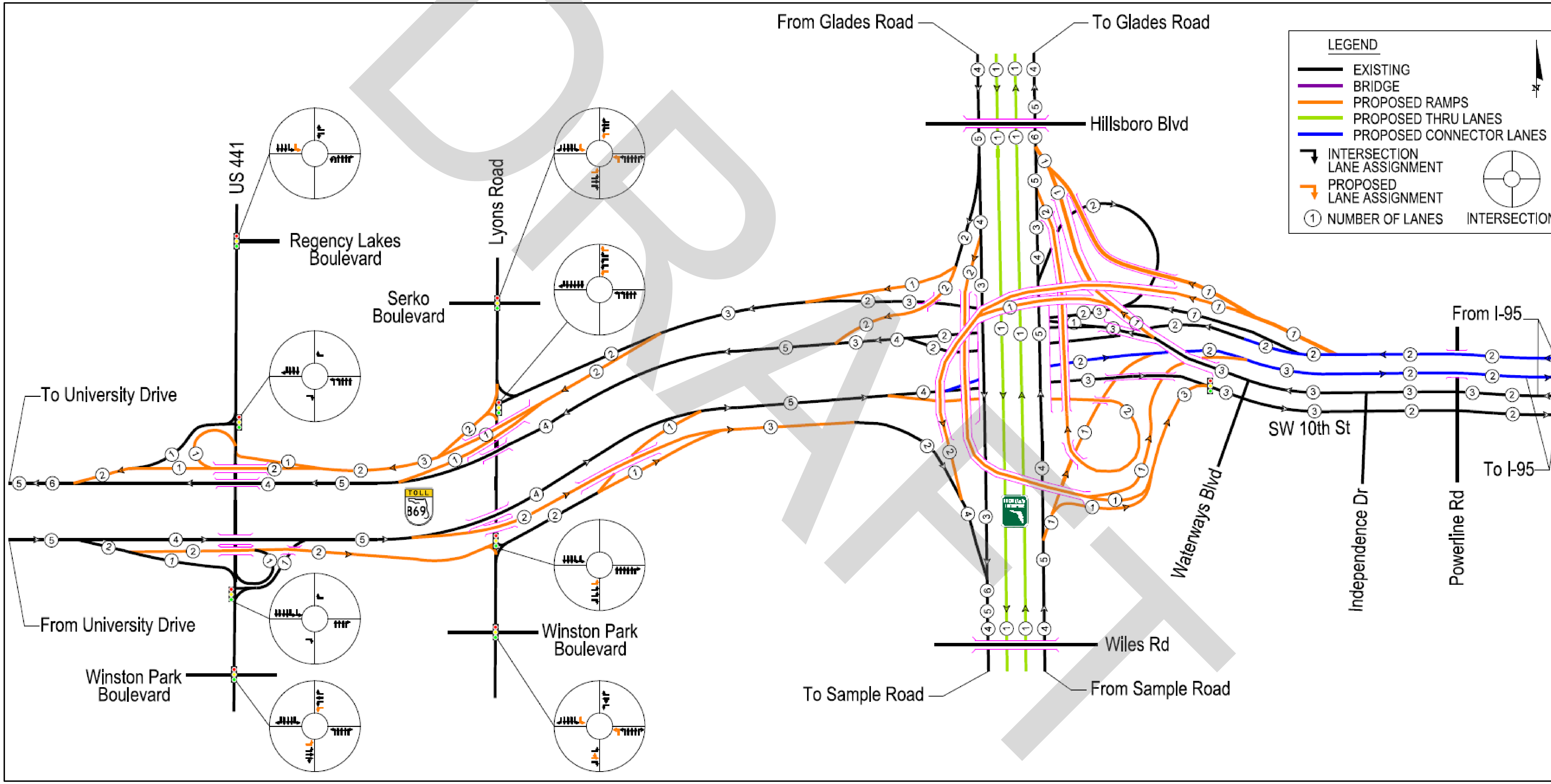


Figure 1.11 – Alternative 3 Schematic Line Diagram

1.5 Description of Preferred Alternative

Sawgrass Expressway – The preferred alternative proposes to widen the Sawgrass Expressway to four travel lanes in each direction with auxiliary lanes at select locations. The preferred alternative also includes collector distributor roadway systems on both sides of the corridor. The collector distributor roadway systems will separate local traffic and interchange traffic from the mainline traffic. Separating traffic patterns reduces lane changes, weaving maneuvers, speed differentials and friction along the corridor. The collector distributor roadway systems will be barrier separated from the Sawgrass Expressway mainline lanes.

Sawgrass Expressway, west of US 441, will consist of 12-foot wide travel lanes and auxiliary lanes with 15-foot wide inside shoulders, 12-foot wide outside shoulders and a 2-foot wide median barrier wall (see ***Figure 1.12***). This section is consistent with the proposed Sawgrass Expressway widening project to the west between Atlantic Boulevard and west of US 441 (FPID# 435461-1). Between US 441 and Lyons Road, the roadway section will consist of 12-foot wide travel lanes and auxiliary lanes with 15-foot wide inside shoulders, 12-foot wide outside shoulders and a 2-foot wide median barrier wall. The collector distributor roadway systems begin at US 441 and end at the Florida's Turnpike. Between US 441 and Lyons Road, the collector distributor roadway system will consist of two 12-foot wide travel lanes with varying inside and outside shoulders widths between 8-12 feet wide separated from the mainlines lanes with a 2-foot wide barrier wall (see ***Figure 1.13***).

Between Lyons Road and Florida's Turnpike, the roadway section will consist of 12-foot wide travel lanes and auxiliary lanes with varying inside and outside shoulders widths between 12-14 feet wide and a 2-foot wide median barrier wall. The collector distributor roadway system will consist of two 12-foot wide travel lanes and one auxiliary lane with varying inside and outside shoulders widths between 8-12 feet wide separated from the mainlines lanes with a 2-foot wide barrier wall (see ***Figure 1.14***).

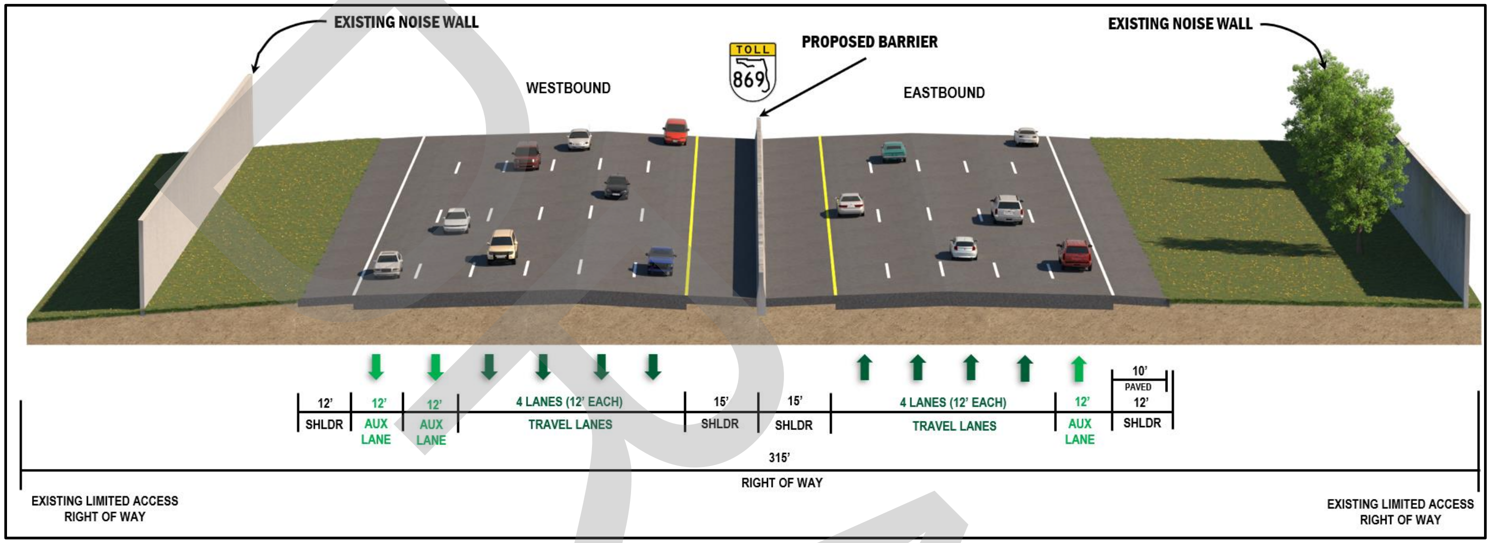


Figure 1.12 – Preferred Alternative Roadway Section West of US 441

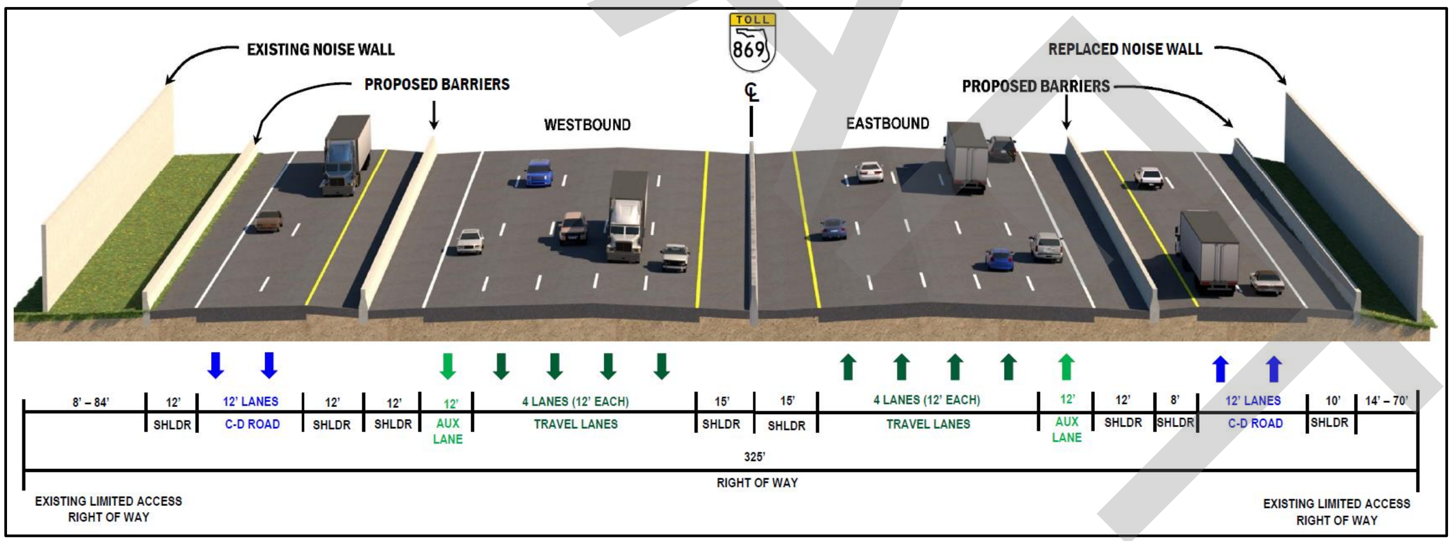


Figure 1.13 – Preferred Alternative Roadway Section between US 441 and Lyons Road

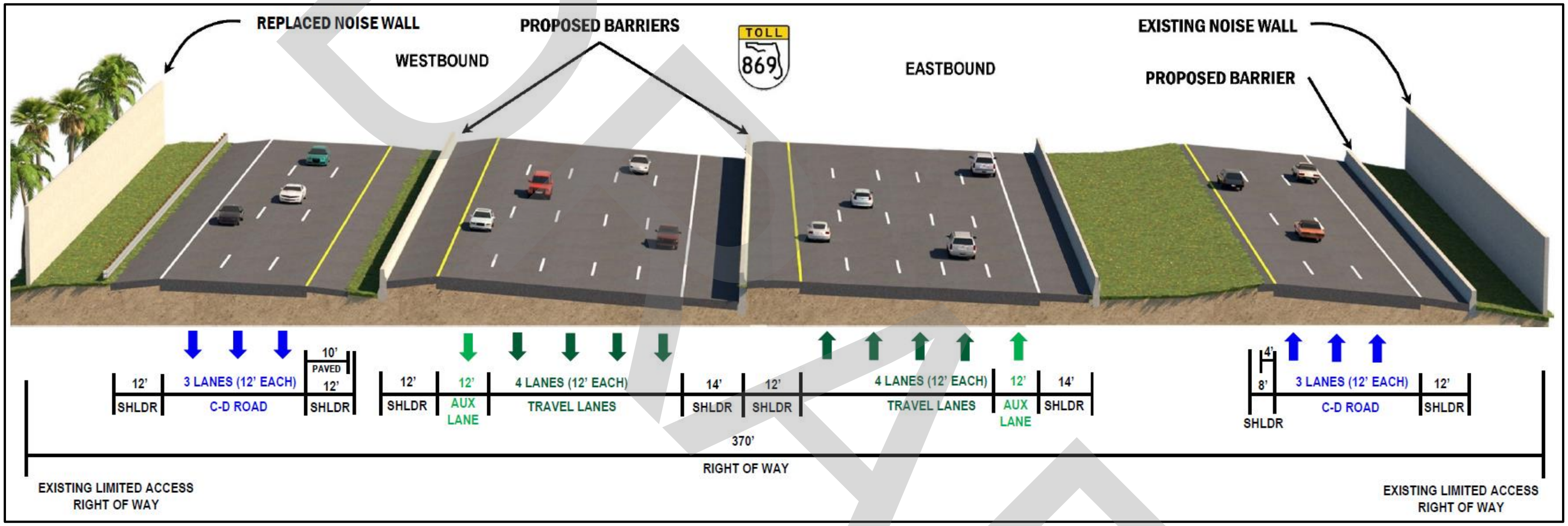


Figure 1.14 – Preferred Alternative Roadway Section between Lyons Road and Florida's Turnpike

SW 10th Street – SW 10th Street, between Florida's Turnpike and Powerline Road, will consist of two separate roadway corridors: 1) SW 10th Street and 2) SW 10th Street Connector. This roadway section overlaps with the SW 10th Street project currently underway by FDOT District Four (FPID# 439891-1). This project is proposing to add two limited access connector lanes in each direction on the north side of the existing SW 10th Street corridor between Florida's Turnpike and I-95. The FDOT District 4 project is also proposing other corridor improvements along the SW 10th Street existing corridor (see ***Figure 1.15***). Some of the major improvements within this roadway section between Florida's Turnpike and Powerline Road are listed below:

- Realign the existing SW 10th Street corridor to the south to leave space on the north side for the new connector lanes. The new south corridor alignment will consist of 11-foot wide travel lanes, auxiliary lanes and turn lanes. The corridor will also have a raised center median and a shared-use path along the south side of the roadway.
- The connector lanes will begin and end at the Sawgrass Expressway within the Florida's Turnpike Interchange and will be grade separated over Powerline Road.
- A new SW 10th Street westbound bridge structure will be constructed just east of the Florida's Turnpike to allow the new connector lanes to cross under from the north side to the inside to merge with the Sawgrass Expressway to the west.
- Intersection improvements at Waterways Boulevard, Independence Drive and Powerline Road.

All the improvements listed above are expected to be constructed and opened to traffic before the implementation of the Sawgrass Expressway project. The Sawgrass Expressway widening project will tie to the FDOT SW 10th Street project east of the Florida's Turnpike.

Florida's Turnpike – The preferred alternative proposes to widen the Florida's Turnpike between Wiles Road and the County Line to four travel lanes and one thru lane in each direction for a total of ten lanes, with auxiliary lanes at select locations (see ***Figure 1.16*** and ***Figure 1.17***). Thru lanes are additional travel lanes that help provide congestion relief in high traffic areas. These lanes offer customers making longer, more regional trips, the ability to bypass the local traffic entering and exiting the road. Customers pay the same amount to use the thru lanes as they do in any other lane on the toll road. All mainline lanes and shoulders are 12-foot wide, with a 2-foot wide median barrier wall.

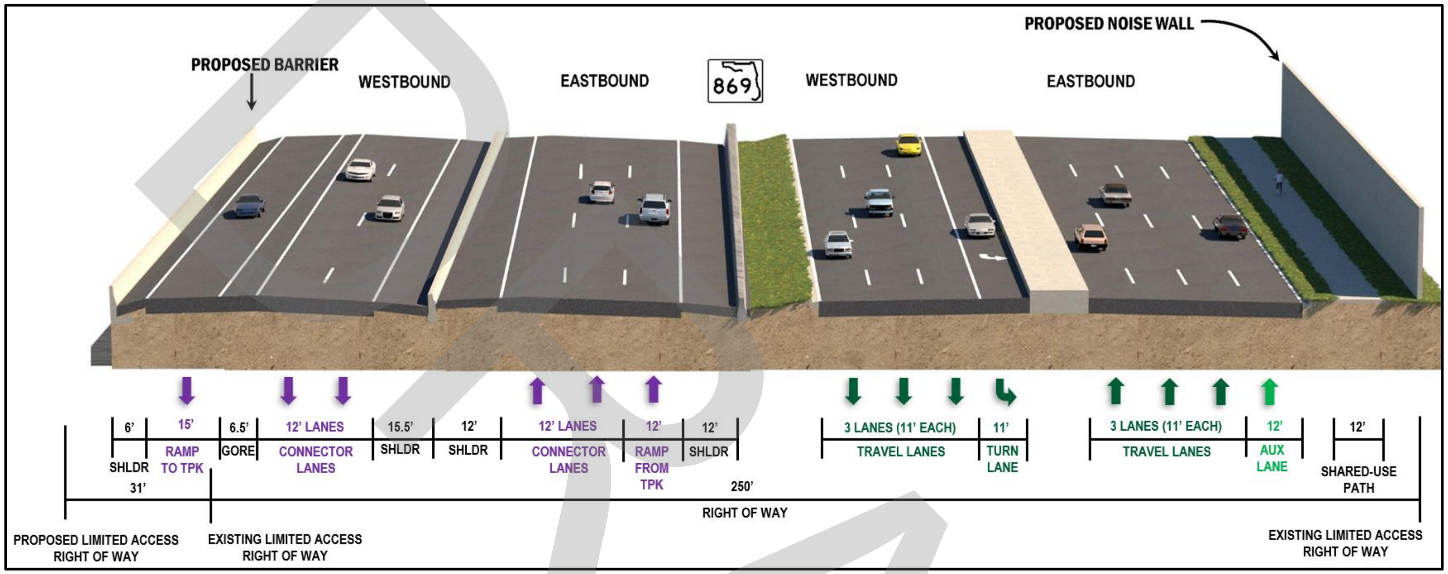


Figure 1.15 – Preferred Alternative Roadway Section between Florida's Turnpike and Powerline Road

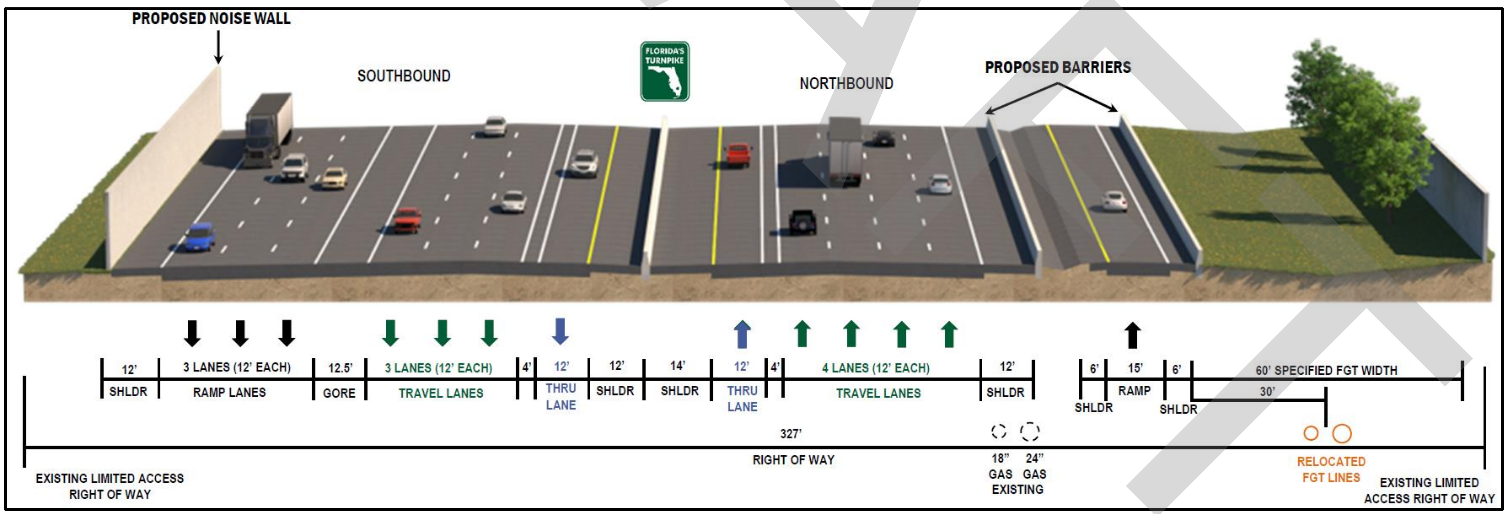


Figure 1.16 – Preferred Alternative Roadway Section between Wiles Road and Sawgrass Expressway

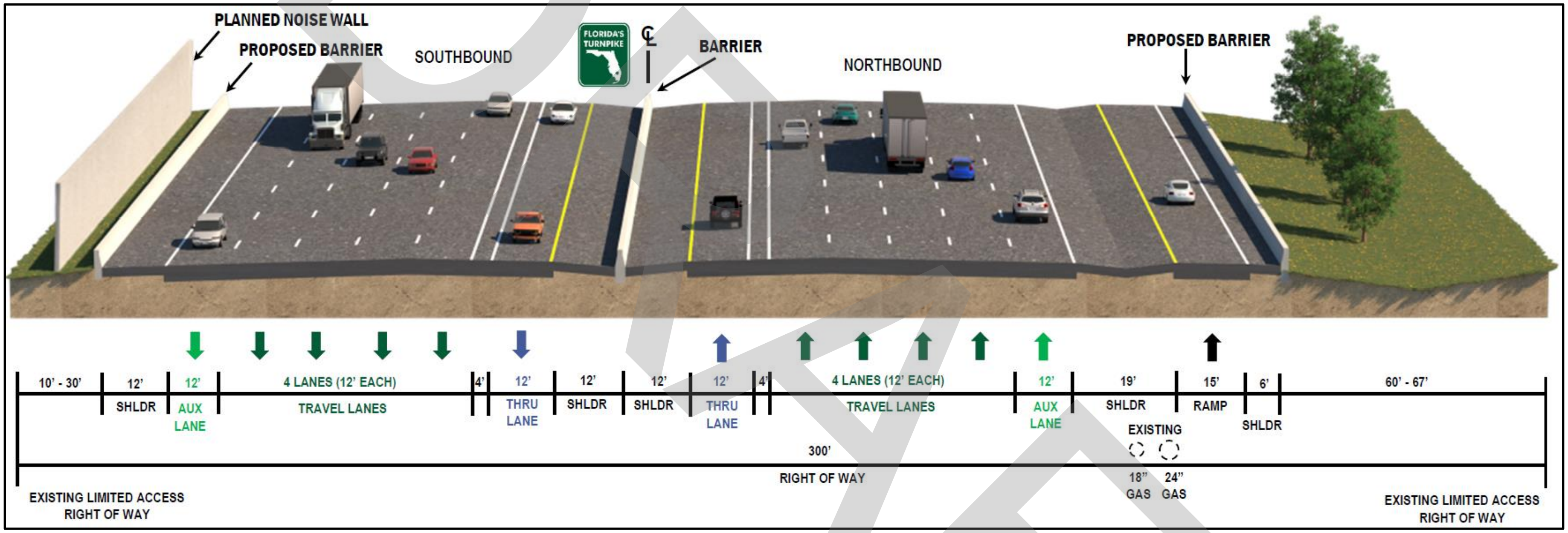


Figure 1.17 – Preferred Alternative Roadway Section between Sawgrass Expressway and the County Line

US 441 – The preferred alternative proposes one new bridge structure over US 441 for the westbound collector distributor roadway system. At the ramp terminals, additional lane storage is proposed for the left-turn lanes in both directions on US 441 to enter the Sawgrass Expressway. At the north ramp terminal, the loop ramp will end as an intersection with three lanes turning right to the south. The preferred alternative also proposes intersection improvements at the adjacent signalized intersections, Winston Park Boulevard to the south and Regency Lakes Boulevard to the north. At Winston Park Boulevard, the recommendation is to add a second left-turn lane eastbound and westbound. At Regency Lakes Boulevard, the recommendation is to add a second left-turn lane southbound.

Lyons Road – The preferred alternative proposes two new bridge structures over Lyons Road for the eastbound and westbound collector distributor roadway systems. Another improvement at Lyons Road is the reconfiguration of the Sawgrass Expressway Interchange to a diamond interchange plus additional turn lanes at the ramp terminals. The preferred alternative also proposes intersection improvements at the adjacent signalized intersections, Winston Park Boulevard to the south and Serko Boulevard to the north. At Winston Park Boulevard, the recommendation is to add a second left-turn lane southbound and northbound and a through-left-shared lane eastbound and westbound. At Serko Boulevard, the recommendation is to add a second left-turn lane southbound, northbound, eastbound, and westbound. The project also proposes to extend the existing bike lanes north to the Serko Boulevard intersection. This improvement will provide full multimodal connectivity under the Sawgrass Expressway and a safer route for bicyclists enhancing the mobility within the corridor.

Florida's Turnpike Interchange – The preferred alternative widens and improves the existing ramps. Some of these improvements include:

- Eliminating the northbound weaving section between the two loop ramps.
- Eastbound to northbound loop ramp widening to two lanes.
- Adding a southbound to westbound direct connection to the Sawgrass Expressway westbound lanes.
- Northbound to westbound loop ramp widening to two lanes.
- Eastbound to southbound ramp widening to two lanes.

The preferred alternative also adds the missing direct connection ramps between SW 10th Street and Florida's Turnpike. The proposed new direct connections are:

- Florida's Turnpike southbound to SW 10th Street eastbound
- Florida's Turnpike southbound to SW 10th Street Connector eastbound
- SW 10th Street westbound to Florida's Turnpike southbound
- SW 10th Street Connector westbound to Florida's Turnpike southbound
- SW 10th Street westbound to Florida's Turnpike northbound
- SW 10th Street Connector westbound to Florida's Turnpike northbound
- Florida's Turnpike northbound to SW 10th Street eastbound
- Florida's Turnpike northbound to SW 10th Street Connector eastbound

Figure 1.18 shows a schematic line diagram of the preferred alternative.

As part of the preferred alternative 20 new bridges are anticipated to be added, four bridges are anticipated to be widened, and three are anticipated to be replaced (see ***Figure 1.19***).

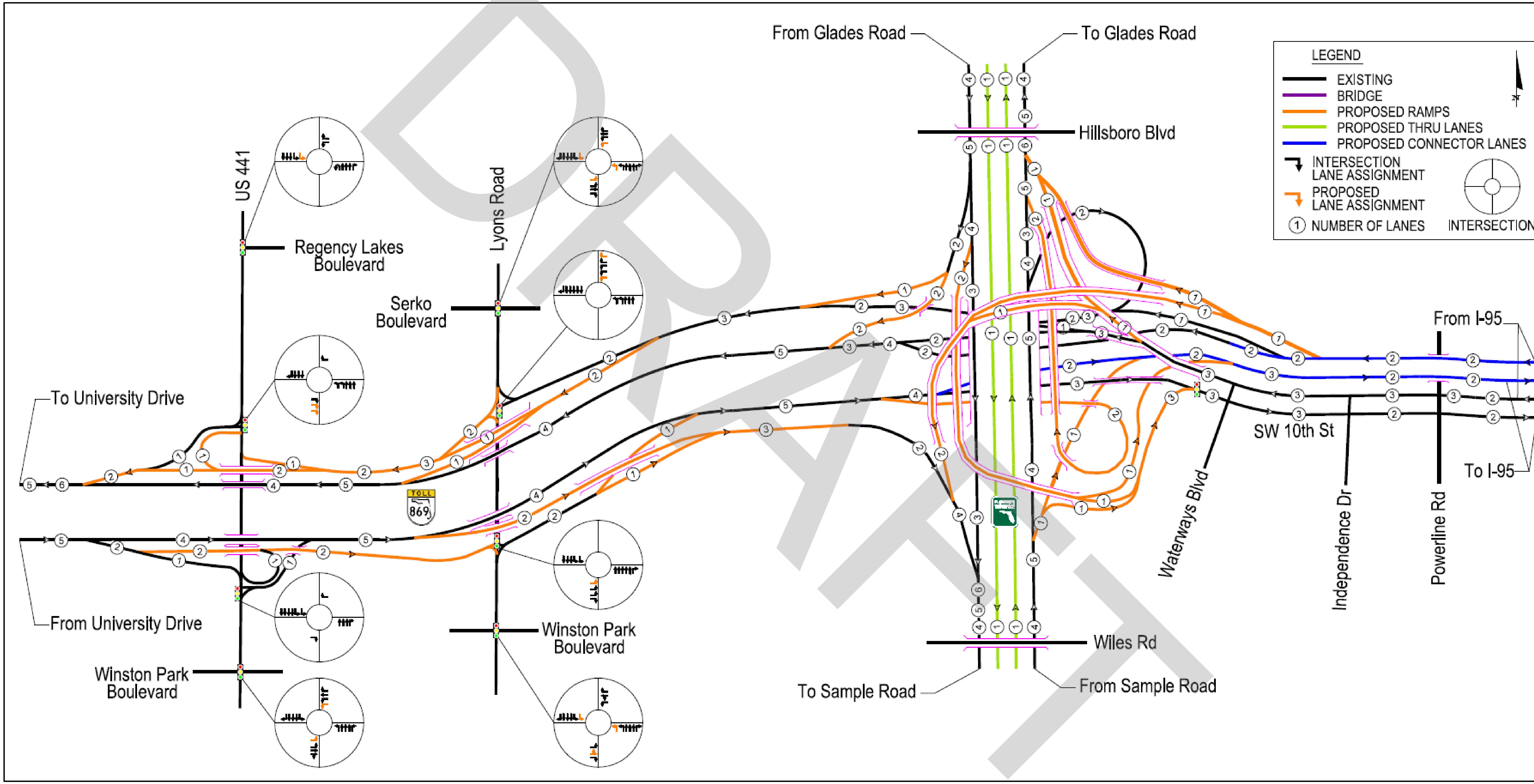


Figure 1.18 – Preferred Alternative Schematic Line Diagram

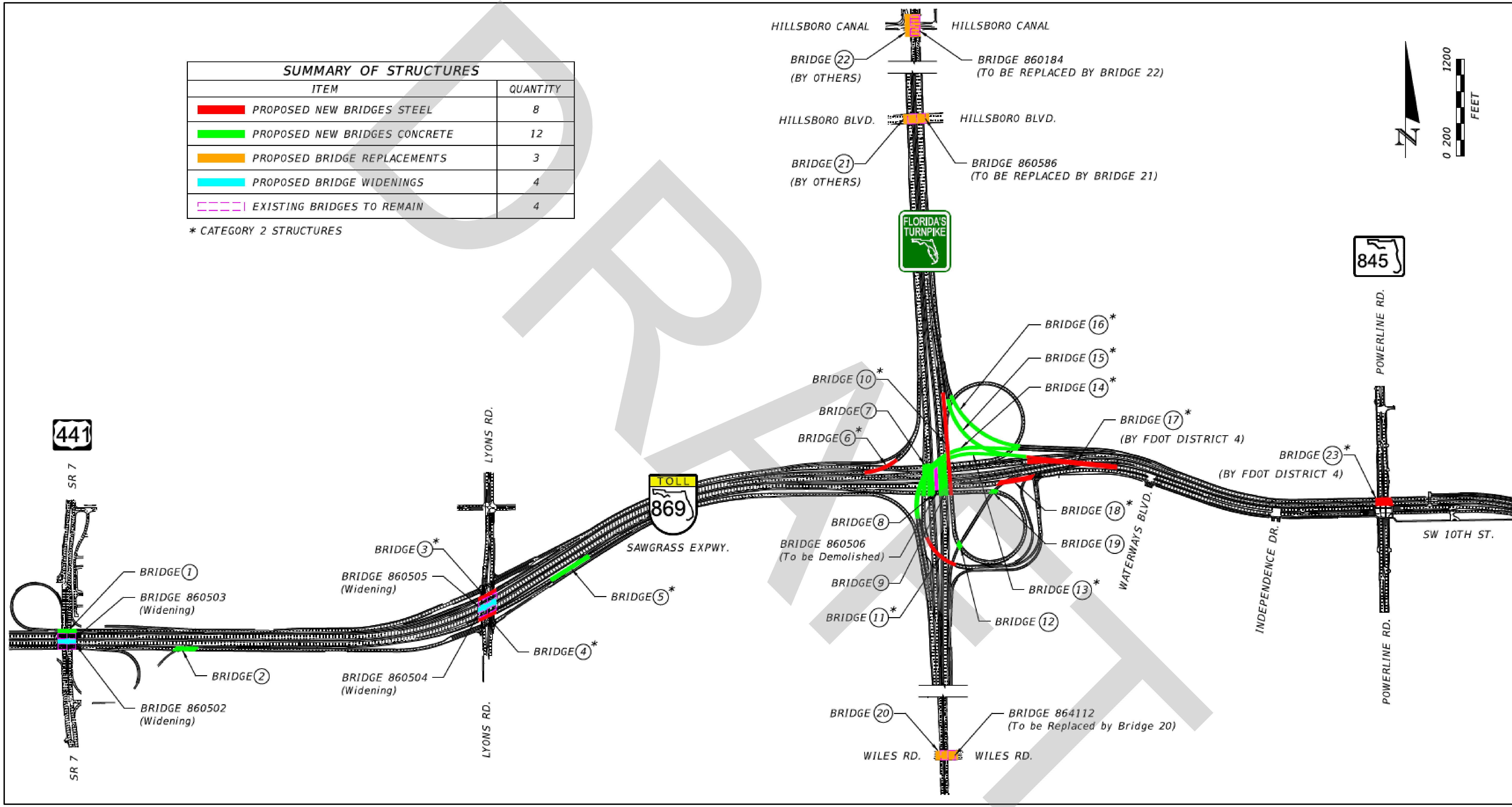


Figure 1.19 – Preferred Alternative Bridge Layout

The total cost estimate for the preferred alternative is approximately $989 million. As shown in ***Table 1.4***.

Table 1.4 – Preferred Alternative Cost Estimate

Category	Cost
Construction Cost	$768 million
Construction Engineering and Inspection (10%)	$76 million
Design (6%)	$46 million
Right of Way	$6 million
Utilities	$93 million
Total Cost Estimate	$989 million

Note: Estimate does not include environmental cost.

Build Alternative 3 was selected as the preferred alternative for both corridors based on the evaluation results summarized in the evaluation matrix. The Build Alternative will add the additional lanes and interchange modifications necessary to improve traffic operations, safety, transit, system linkage, regional connectivity, freight, interchange access and emergency evacuation. The Build Alternative meets the purpose and need of the project. It is the most prudent alternative when compared to the No-Build Alternative for the following reasons:

Capacity – The additional lanes and ramps proposed along both corridors will meet the future traffic demand achieving acceptable level of service along the mainlines, interchanges and adjacent intersections.

Travel Time Reliability – The additional lanes, ramps and collector distributor roadway systems address the projected traffic demand, reduce crashes, separate traffic streams, and move traffic at higher speeds, which improves travel time reliability.

System Linkage – The additional lanes and ramps will provide a reliable system linkage with the Florida's Turnpike and a seamless connection with SW 10th Street and I-95 to the east.

Modal Interrelationships – The additional lanes and ramps enhance the mobility of goods by alleviating current and future congestion within the project area, surrounding freight and transit networks.

Transportation Demand – The additional lanes, ramps and collector distributor roadway systems address the transportation demand within the project limits. These improvements are consistent with the local and State transportation plans.

Social Demand and Economic Development – The proposed improvements will add the necessary roadway needs to improve access to the surrounding cities, which will allow the economic development to take advantage of the roadway improvements to reach the destinations of Sawgrass Expressway, Florida's Turnpike, I-95, and surrounding cities.

Evacuation Route – In the case of an evacuation event, the Sawgrass Expressway and Florida's Turnpike will have additional lanes. The additional lanes will make the corridors more effective during emergency evacuation events and emergency response.

Long Term Mobility Option – The proposed corridor modifications will improve the mobility and access in and out of the three interchanges.

Regional Network Connectivity – The new direct connections with SW 10th Street will improve regional connectivity, which is consistent with the FDOT/FTE vision of having a series of direct ramps connecting Sawgrass Expressway, Florida's Turnpike, and I-95.

Transit Envelope – The additional lanes and ramps will provide opportunities for transit expansions within the study area.

Safety – Florida's Turnpike improvements will be able to separate long trips from short trips with the use of the thru lanes. Separating traffic from the general travel lanes will alleviate traffic congestion approaching the interchanges, reduce weaving maneuvers within interchange segments and maximize throughput along the corridor. The Sawgrass Expressway collector distributor roadway systems and interchange modifications are anticipated to reduce crashes related to heavy congestion, weaving maneuvers, speed differentials and interchange access.

Based on the evaluation conducted and documented in this report, it is clear that the Build Alternative will meet the purpose and need of the project and the overall project objectives of this PD&E Study.

1.6 List of Technical Documents

Table 1.5 – List of Technical Documents

Technical Document	Date
Public Involvement:	
Public Involvement Plan	September 2016
Engineering:	
Preliminary Engineering Report (PER)	February 2024
Systems Interchange Modification Report	February 2024
Location Hydraulics Memorandum	January 2024
Pond Siting Report (PSR)	January 2024
Bridge Analysis Report (Appendix to PER)	November 2023
Tolling Site Technical Memorandum	TBD - Underway
Cost Risk Analysis Value Engineering (CRAVE)	May 2023
Environmental:	
State Environmental Impact Report (SEIR)	February 2024
Water Quality Impact Evaluation (WQIE) Checklist	January 2024
Cultural Resources Assessment Survey	December 2023
Noise Study Report	February 2024
Contamination Screening Evaluation Report	January 2024
Sociocultural Effects Technical Memorandum	February 2024
Natural Resources Evaluation (NRE)	January 2024

2.0 EXISTING CONDITIONS

The methodology utilized for evaluating the existing conditions within the study area consisted of data gathering in the areas of roadway, bridge, and engineering characteristics. The existing conditions assessment began with the collection and review of all data pertaining to the existing facilities through reviewing existing documents, conducting on-site inventories, and collecting pertinent data that would serve as a basis for evaluation. The assessment was performed for the following three facilities:

1. Sawgrass Expressway between west of US 441 and Florida's Turnpike (Limited Access Segment)
2. SW 10th Street between Florida's Turnpike and Powerline Road (Arterial Segment)
3. Florida's Turnpike between Wiles Road and the Broward/Palm Beach County Line (Limited Access)

The following sections summarize the existing conditions within the study limits.

2.1 PREVIOUS PLANNING STUDIES

No previous planning studies have been completed proposing conceptual plans to add improvements to the Sawgrass Expressway and Florida's Turnpike. However, *Turnpike Annual Traffic Trends* have been showing that additional lanes are needed along both corridors for many years prior to this PD&E Study.

Florida's Turnpike – Project needs along the Florida's Turnpike were originally identified and assessed as part of the *Southern Coin Build Out Study* completed in 2017. The study was a 43-mile section extending from the Golden Glades Interchange to the Lantana Toll Plaza. The study evaluated the need to widen Florida's Turnpike to ten lanes.

SW 10th Street – The need to improve SW 10th Street has been a longstanding identified need by Broward County and FDOT. Previous proposals for improvements to SW 10th Street have focused on moving vehicles, with little consideration for livability issues that concern the adjacent residents, resulting in strong opposition by the public to the proposed recommendations.

In 2015, the Broward Metropolitan Planning Organization (MPO) acknowledging the importance of additional capacity within the corridor set up a consensus-building initiative with the communities along the SW 10th Street corridor to discuss the future of the corridor between Florida's Turnpike and I-95. The goal of the *SW 10th Street Consensus and Visioning Study* was to identify citizen concerns on current and future conditions and to develop consensus on potential near-term and long-term transportation improvements.

As a result of the *SW 10th Street Consensus and Visioning Study,* FDOT conducted a PD&E Study proposing to add two limited access connector lanes in each direction and other corridor improvements along SW 10th Street between Florida's Turnpike and I-95. Location Design Concept Acceptance was obtained in June 2021. These improvements added further justification to evaluate additional lanes along the Sawgrass Expressway and Florida's Turnpike to address the additional traffic generated by this new limited access connection to and from I-95.

2.2 Existing Roadway Conditions

2.2.1 Roadway Typical Sections

Sawgrass Expressway – Sawgrass Expressway, between west of US 441 and Florida's Turnpike, consists of four to six 12-foot wide travel lanes (two to three lanes in each direction) with 12-foot wide auxiliary lanes at select locations and 12-foot wide inside and outside shoulders. The median width varies within this segment of the corridor. The section between west of US 441 and east of Lyons Road has a 64-foot wide depressed grassed median separated by guardrail (see ***Figure 2.1*** and ***Figure 2.2***). The section between east of Lyons Road and Florida's Turnpike narrows down to a 2-foot wide median barrier wall (see ***Figure 2.3***). This section also has a two-lane collector-distributor roadway system with 12-foot wide travel lanes and 12-foot wide auxiliary lanes on both sides of the corridor providing ramp access to and from the Florida's Turnpike. Inside and outside shoulder widths vary depending on the number on lanes, tolling point locations and ramp gores.

SW 10th Street – SW 10th Street, between Florida's Turnpike and Powerline Road, consists of six 12-foot wide travel lanes (three lanes in each direction) and a raised grassed curbed median. The median width varies between 30-65 feet wide. The median currently accommodates landscape vegetation and exclusive left-turn lanes at the intersections (see ***Figure 2.4***).

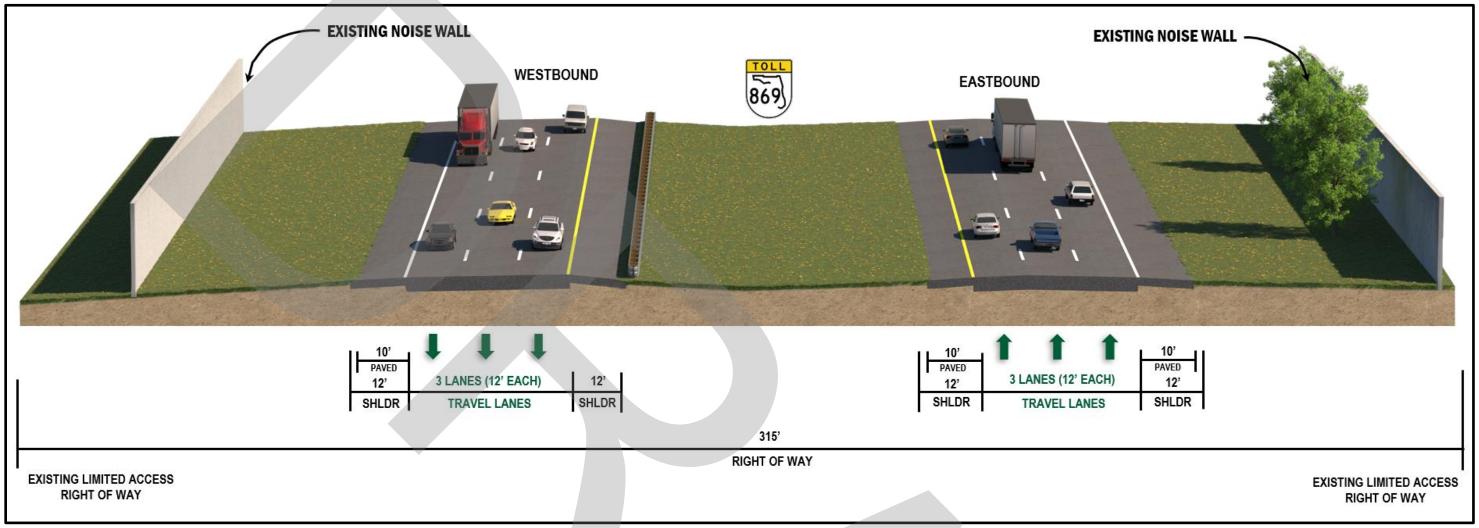


Figure 2.1 – Sawgrass Expressway Existing Roadway Section West of US 441

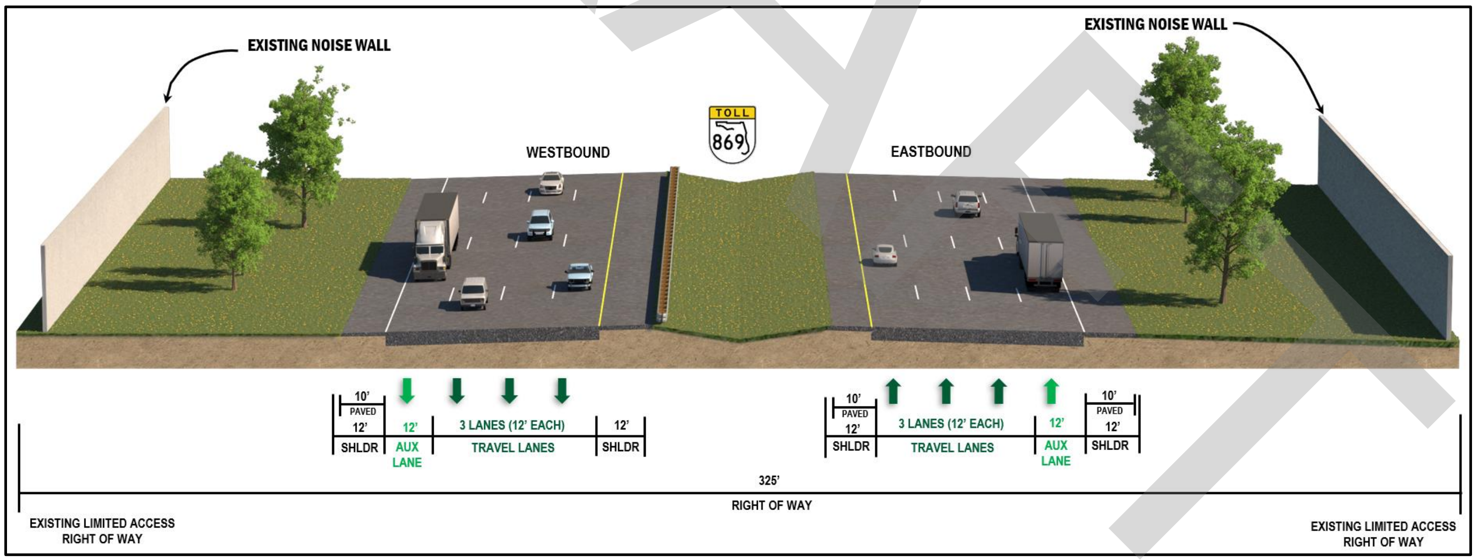


Figure 2.2 – Sawgrass Expressway Existing Roadway Section between US 441 and Lyons Road

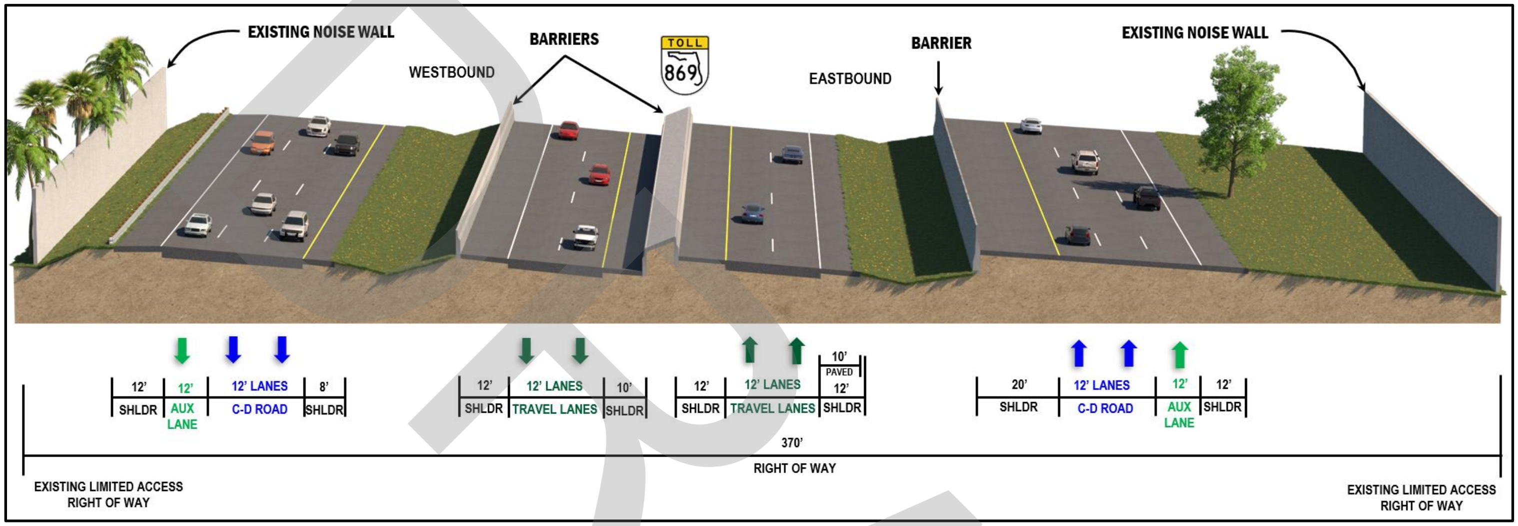


Figure 2.3 – Sawgrass Expressway Existing Roadway Section between Lyons Road and Florida's Turnpike

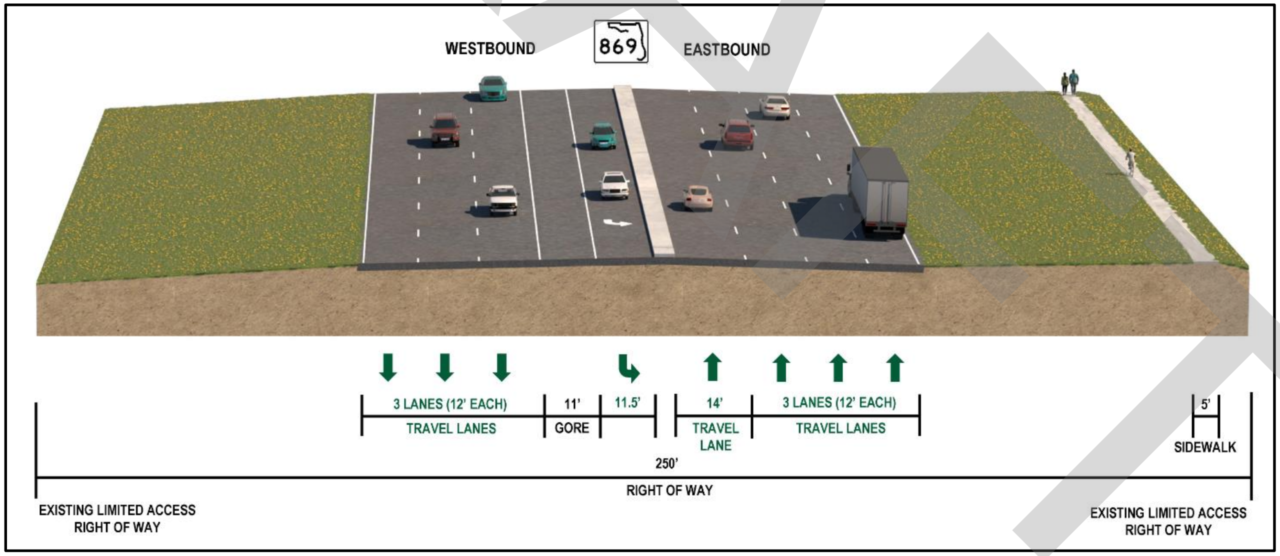


Figure 2.4 – SW 10th Street Existing Roadway Section between Florida's Turnpike and Powerline Road

Florida's Turnpike – Florida's Turnpike, between Wiles Road and the County Line, consists of six 12-foot wide travel lanes (three lanes in each direction) with 8.5-10-foot wide inside shoulders, 12-foot wide outside shoulders and a 2-foot wide median barrier wall (see ***Figure 2.5*** and ***Figure 2.6***).

There are four roadway improvement projects committed within the study area.

1. FDOT District Four FPID# 439891-1 – This project is adding two limited access connector lanes in each direction and other corridor improvements along SW 10th Street between Florida's Turnpike and I-95.
2. FTE FPID# 446024-2 – This project is extending the southbound on-ramp acceleration lane from Sawgrass Expressway eastbound by 1,436 feet.
3. FTE FPID# 415927-4 – This project is adding one more travel lane in each direction along Florida's Turnpike between Sawgrass Expressway and north of Glades Road.
4. FTE FPID# 442062-1 and 442062-2 – This project is milling, resurfacing, and enhancing safety along the Sawgrass Expressway between west of US 441 and east of Florida's Turnpike. This project will be completed as a recommendation from the Existing Roadway Conditions Assessment Report (ERCAR), dated November 2021.

These improvement projects are expected to be opened to traffic before the implementation of this project.

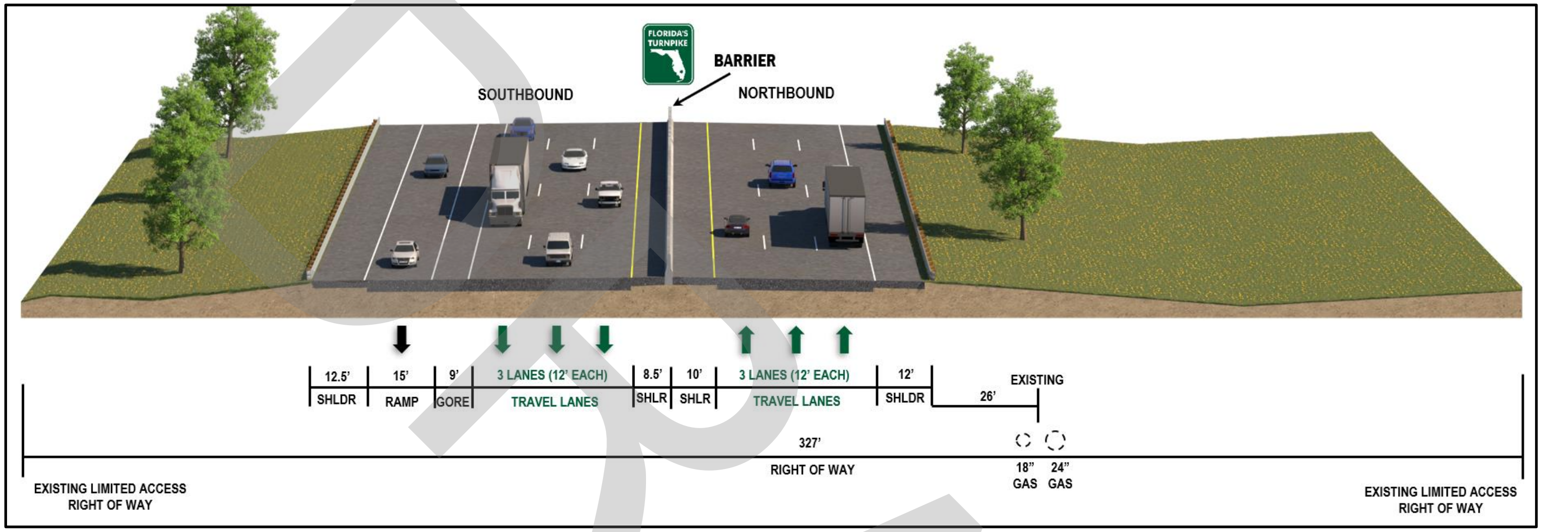


Figure 2.5 – Florida's Turnpike Existing Roadway Section between Wiles Road and Sawgrass Expressway

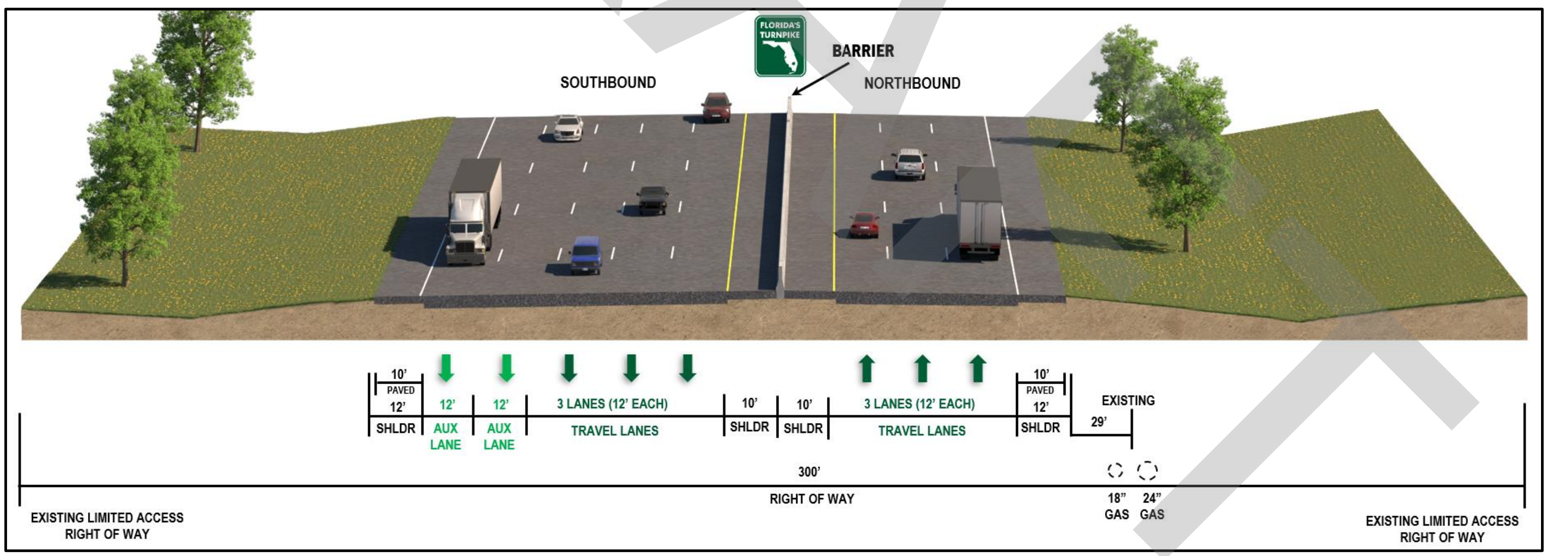


Figure 2.6 – Florida's Turnpike Existing Roadway Section between Sawgrass Expressway and the County Line

2.2.2 Roadway Functional and Context Classifications

Sawgrass Expressway, between west of US 441 and Florida's Turnpike, is functionally classified as a Divided Urban Principal Arterial Expressway. Context classification does not apply to limited access facilities.

Sawgrass Expressway, between Florida's Turnpike and Powerline Road, is functionally classified as a Divided Urban Principal Arterial Other. The context classification of this section based on land use is C4-Urban General.

Florida's Turnpike, between Wiles Road and the County Line, is functionally classified as a Divided Urban Principal Arterial Expressway. Context classification does not apply to limited access facilities.

2.2.3 Access Management Classification

The access management classification of the Sawgrass Expressway between west of US 441 and Florida's Turnpike is Class 1 Area Type 2, Freeway in an existing urbanized area with limited access.

The access management classification of the Sawgrass Expressway between Florida's Turnpike and Powerline Road is Class 3, Restrictive where medians physically prevent vehicles from crossing between intersections.

The access management classification of Florida's Turnpike between Wiles Road and the County Line is Class 1 Area Type 2, Freeway in an existing urbanized area with limited access.

2.2.4 Right of Way

The Sawgrass Expressway existing right of way varies within the study limits due to the number of closely spaced interchanges, where it varies to accommodate entrance and exit ramps.

The Florida's Turnpike existing right of way also varies within the study limits. The right of way is generally consistent throughout the corridor except when approaching the Sawgrass Expressway Interchange, where it varies to accommodate entrance and exit ramps. ***Table 2.1*** summarizes the right of way along both corridors.

Table 2.1 – Summary of Existing Right of Way

Roadway	Roadway Section	Type of Right Away	Right of Way Width (feet)
Sawgrass Expressway	University Drive – US 441	Limited Access	315
	US 441 – Lyons Road	Limited Access	325
	Lyons Road – Florida's Turnpike	Limited Access	370
SW 10th Street	Florida's Turnpike – Powerline Road	Controlled Access	250
Florida's Turnpike	Wiles Road – Sawgrass Expressway	Limited Access	327
	Sawgrass Expressway – Broward/Palm Beach County Line	Limited Access	300

Source: FDOT Right of Way Survey

2.2.5 Adjacent Land Use

Land use cover descriptions provided for both uplands and wetlands are classified utilizing the Florida Land Use Cover and Forms Classifications System (FLUCCS) designations. Previous and existing land uses in the project area were initially determined utilizing United States Geological Survey (USGS) maps, historical images, aerial photographs, and land use mapping from the South Florida Water Management District (SFWMD) (2017-2019). Land use categories in the project area reported by SFWMD were verified in the field. Field reviews generally confirmed the SFWMD land use mapping with very minor adjustments. Land use categories in the project area as mapped by SFWMD are shown in ***Figure 2.7*** and ***Figure 2.8***.

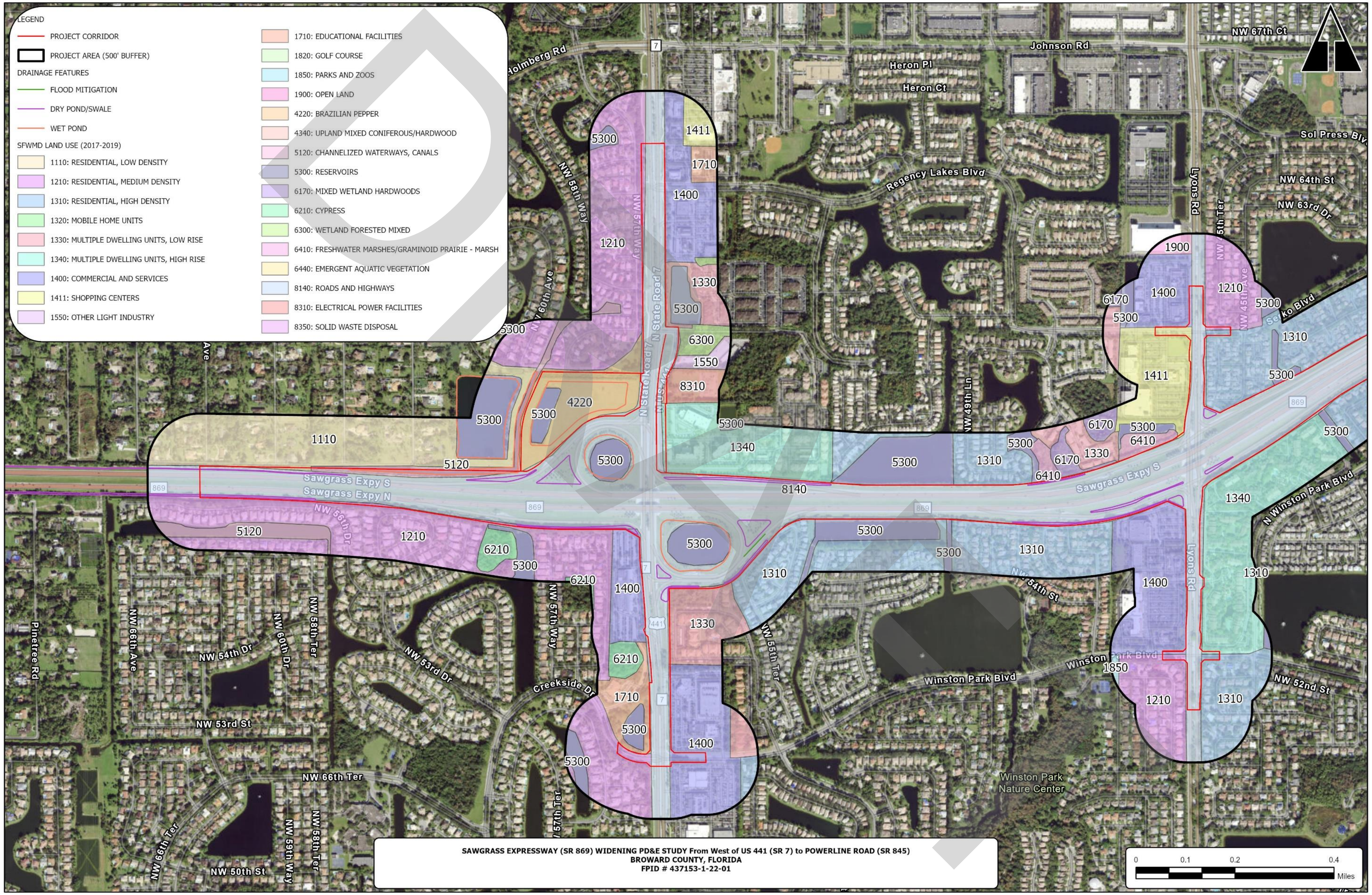


Figure 2.7 – Existing Land Use in Western Project Area

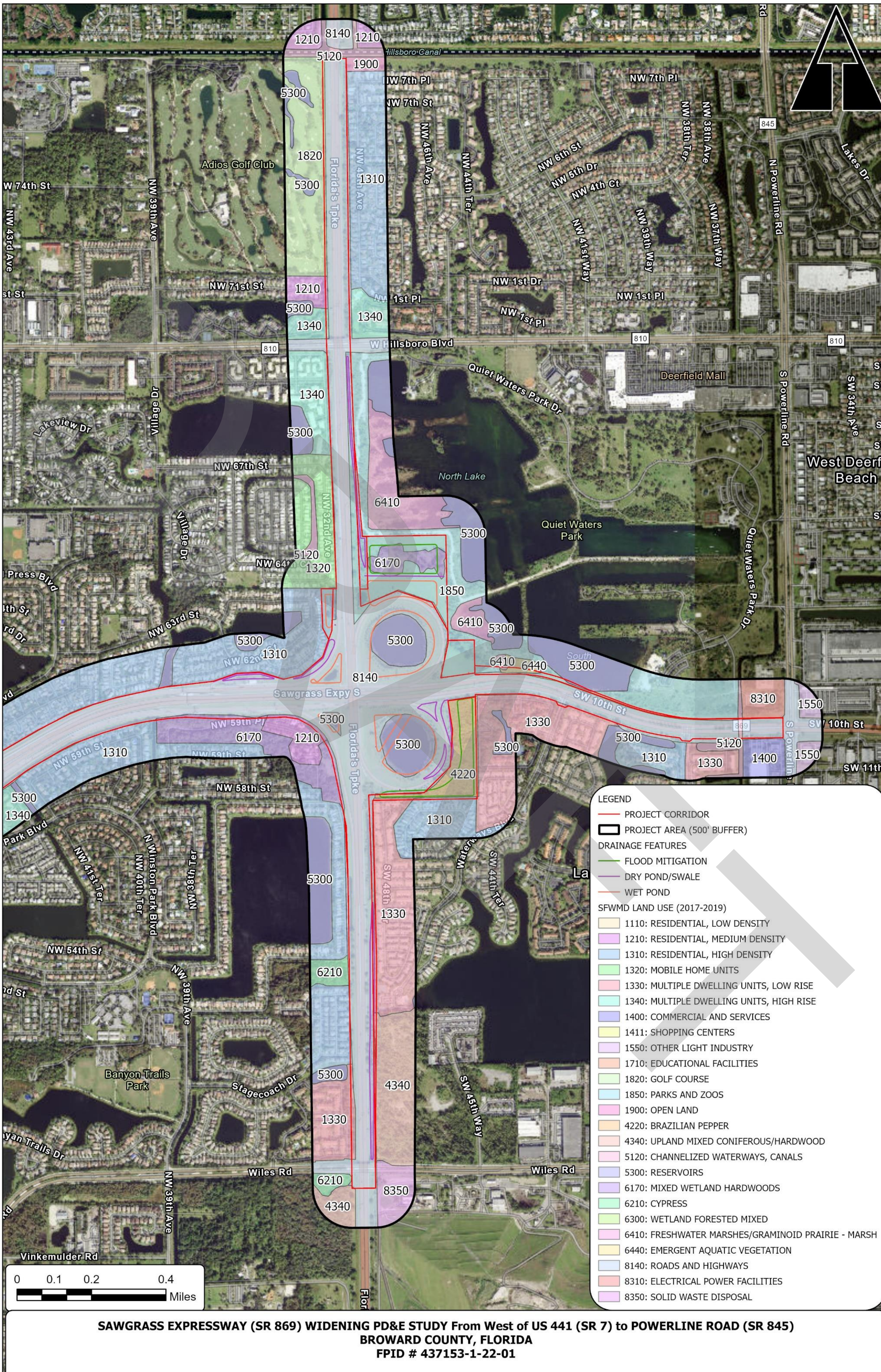


Figure 2.8 – Existing Land Use in Eastern Project Area

2.2.6 Pavement Type and Condition

The FDOT Pavement Condition Unit conducts annual surveys of the entire State highway system in support of FDOT's Pavement Management Program. The data collected (in terms of crack, ride, and rut measurements) is used to assess the condition and performance of the State's roadways as well as to predict future rehabilitation needs. Each section of pavement is rated on a 0-10 scale: with 0 being the worst and 10 the best. A crack rating of 6.4 or less is considered deficient. The minimum threshold for the ride criteria is 5.5 for speed limits less than 45 mph and 6.5 for speed limits greater than 45 mph. Pavement condition ratings for roadway segments within the study limits were extracted from the *2023 Pavement Survey and Evaluation Report (PSER)*.

For the Sawgrass Expressway, the southbound direction has a crack rating of 10 and ride rating of 7.4. The northbound direction has a crack rating of 10.0 and ride rating of 7.5.

For the Florida's Turnpike, the southbound direction has a crack rating of 6.5 and ride rating of 7.7. The northbound direction has a crack rating of 6.0 and ride rating of 7.2.

Based on the ratings from the *PSER*, pavement deficiencies were only identified at the Florida's Turnpike northbound direction within the study limits.

2.2.7 Existing Design and Posted Speed

The Sawgrass Expressway design and posted speeds varies between 45 and 70 mph. The Florida's Turnpike design speed is 70 mph, and the posted speed is 65 mph. ***Table* 2.2** summarizes the design and posted speeds within the study limits.

Table 2.2 – Summary of Design and Posted Speeds

Roadway	Roadway Section	Design Speed	Posted Speed
Sawgrass Expressway	US 441 – Lyons Road	70	65
	Lyons Road – Florida's Turnpike	65	65
	West Florida's Turnpike – East Florida's Turnpike	55	55
	Florida's Turnpike – Powerline Road	45	45
Florida's Turnpike	Wiles Road – Palm Beach/Broward County Line	70	65

2.2.8 Horizontal Alignment

The existing horizontal alignment was determined from the review of available existing roadway plans and as-builts. Below are the available roadway plans and as-builts during this evaluation:

- State Project Number (SPN) 86620-3605
- State Project Number (SPN) 86620-3606
- Financial Project Identification Number (FPID) 406153-1-52-01
- Financial Project Identification Number (FPID) 420289-6-52-01
- Financial Project Identification Number (FPID) 431281-6-52-01

The horizontal alignments were evaluated for compliance with criteria for minimum length of horizontal curves as per *2023 FDM, Section 211.7.2, Table 211.7.1*, based on the information available from the existing roadway plans and as-built plans review. Depending on the design speed of each curve, FDM provides a corresponding desirable and minimum horizontal curve length. The desirable and minimum lengths of curve for mainline and ramps for an interstate based on a design speed ranging between 50 and 70 mph are 750 to 1,050 feet and 1,500 to 2,100 feet, respectively. In accordance with 2018 AASHTO, on high-speed controlled-access facilities, the desirable length for curve should be 30 times the design speed. However, the minimum length of curve is not less than 15 times the design speed. For instance, a 70 mph design speed yields a desired curve length of 2,100 feet, and a minimum length of curve of 1,050 feet. These AASHTO factors of 15x and 30x yield the same values for desired and minimum curve lengths as FDM for each design speed from 50 to 70 mph. FDM desirable lengths for ramps from 30 mph to 45 mph are 15 times the design speed, while the minimum is 400 feet for each of those design speeds. For 25 mph ramps the desired and minimum length is 400 feet. For compound curves, the ratio of the flatter radius to the sharper radius is not to exceed 1.5:1 in the direction of travel. For compound curves on turning roadways and at intersections, a ratio 2:1 may be used where the flatter radius precedes the sharper radius in the direction of travel. According to the 2018 AASHTO, turning roadways include interchange ramps and intersection curves for right-turning vehicles. The minimum length for compound curves is based on curve radii in accordance with *2023 FDM Table 210.8.3 and 2018 AASHTO Table 3-14.*

Horizontal curve length is not listed as one of the ten Controlling Design Elements for high-speed roadways and limited access ramps. Therefore, insufficient curve length is not considered a design exception, but is considered a design variation.

The following nine curves do not meet the desired curve length, but meet the minimum curve length in accordance with FDM criteria:

RAMPA-1	RAMPC-2	RAMPE-2	RAMPI-2	RAMPJ-1	RAMPM-5
RAMPN-1	RAMPCD-3	RAMPCD-7			

The following six curves do not meet the desired curve length, but meet the minimum curve length in accordance with FDM and AASHTO criteria:

CL869-01	CL869-04	CL869-06	CL869-07	NB869-3	SB869-4

The following four curves do not meet the desired and minimum curve length in accordance with FDM and AASHTO criteria:

CL869-05	NB869-2	SB869-2	SB869-3	SR91

The following 16 curves do not meet the desired and minimum curve length in accordance with FDM criteria:

RAMPA-2	RAMPB-2	RAMPB-3	RAMPC-1	RAMPC-3	RAMPE-1
RAMPF-1	RAMPF-2	RAMPH-1	RAMPH-2	RAMPI-1	RAMPJ-2
RAMPK-3	RAMPL-3	RAMPM-4	RAMPN-2		

The following two curves meet the minimum compound curve length in accordance with FDM and AASHTO criteria, but do not meet the maximum flatter to sharper curve radius ratio (2:1), in the direction of travel.

RAMPCD-1	RAMPCD-2

Table 2.3 summarizes the geometric characteristics for the existing horizontal alignment. For location and stationing references see ***Appendix A***, Corridor Base Maps.

Table 2.3 – Existing Horizontal Curve Data

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / Minimum	Length (ft) Compliance	Design (Variation/ Exception)
CL869-01[1,2,3]	70	NC	998+70.24	1016+75.96	1007+73.51	903.26	1805.7	24555.3	04° 12' 48.00" RT	00° 14' 00.00"	2,100	✗	None
											1,050	✓	
CL869-02[1,2,3]	70	NC	1016+75.96	1038+85.24	1027+81.35	1105.4	2209.3	24555.3	05° 09' 18.00" LT	00° 14' 00.00"	2,100	✓	None
											1,050	✓	
CL869-03[1,2,3]	65	0.058	1075+93.80	1096+05.53	1086+23.58	1029.8	2011.7	3819.72	30° 10' 32.99" LT	01° 30' 00.00"	1,950	✓	None
											975	✓	
CL869-04[1,2,3]	65	N/A	1112+72.15	1131+27.94	1122+18.74	946.59	1855.8	3819.72	27° 50' 13.00" RT	01° 30' 00.00"	1,950	✗	None
											975	✓	
CL869-05[1,2,3]	55	N/A	1161+39.81	1167+21.65	1164+30.85	291.05	581.84	8030.09	04° 09' 05.46" LT	00° 42' 48.65"	1,650	✗	Exception
											825	✗	
CL869-06[1,2,3]	50	0.033	1169+83.14	1178+25.58	1174+13.20	430.06	842.44	1700	28° 23' 34.95" RT	03° 22' 13.22"	1,650	✗	None
											825	✓	
CL869-07[1,2,3]	50	0.028	1188+04.23	1198+71.30	1193+43.46	539.23	1067.1	3000	20° 22' 46.34" LT	01° 54' 35.49"	1,500	✗	None
											750	✓	
NB869-1[4,5]	65	0.048	113+08.38	133+33.23	123+44.88	1036.5	2024.9	3844	30° 10' 51.64" RT	01° 29' 25.89"	1,950	✓	None
											975	✓	
NB869-2[4,5]	55	NC	142+20.36	149+82.55	146+01.56	381.2	762.19	13164	03° 19' 02.66" RT	00° 26' 06.89"	1,650	✗	Exception
											825	✗	

Table 2.3 – Existing Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / Minimum	Length (ft) Compliance	Design (Variation/ Exception)
NB869-3[4,5]	55	NC	152+23.00	163+08.38	157+66.23	543.23	1085.4	9950	06° 14' 59.97" LT	00° 34' 33.01"	1,650	✗	None
											825	✓	
NB869-4[4,5]	45	NC	163+08.38	166+27.60	164+68.00	159.62	319.22	11574.5	01° 34' 48.72" LT	00° 29' 42.07"	N/A	N/A	Exception
											N/A	N/A	
SB869-1[4,5]	65	0.048	216+48.20	236+38.89	226+66.40	1018.2	1990.7	3844	29° 40' 18.16" RT	01° 29' 25.89"	1,950	✓	None
											975	✓	
SB869-2[4,5]	65	NC	236+38.89	243+46.52	239+92.73	353.84	707.63	25000	01° 37' 18.40" LT	00° 13' 45.06"	1,950	✗	Exception
											975	✗	
SB869-3[4,5]	55	NC	246+05.68	252+68.02	249+36.89	331.22	662.35	17000	02° 13' 56.40" RT	00° 20' 13.32"	1,650	✗	Exception
											750	✗	
SB869-4[4,5]	55	NC	252+68.02	265+38.36	259+03.84	635.82	1270.3	11459	06° 21' 06.37" LT	00° 30' 00.02"	1,650	✗	None
											750	✓	
SB869-5[4,5]	45	NC	267+22.61	273+12.61	270+17.67	295.07	590.01	11738.9	02° 52' 47.08" LT	00° 29' 17.10"	N/A	N/A	Exception
											N/A	N/A	
RAMPA-1[1,2]	45	0.027	146+76.48	152+34.94	149+56.24	279.76	558.46	3700	08° 38' 52.66" LT	01° 32' 54.72"	675	✗	None
											400	✓	
RAMPA-2[1,2]	25	0.05	158+31.65	160+00.00	159+22.82	91.17	168.35	176.76	54° 34' 09.03" RT	32° 24' 52.02"	400	✗	Variation
											400	✗	

Table 2.3 – Existing Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / *Minimum*	Length (ft) Compliance	Design (Variation/ Exception)
RAMPB-1[1,2]	35	0.1	150+00.00	157+10.31	156+89.93	689.93	710.31	308.86	131° 46' 00.50" RT	18° 33' 02.62"	**525**	✓	None
											400	✓	
RAMPB-2[1,2]	35	0.1	157+10.31	158+33.47	157+73.34	63.03	123.16	235	30° 01' 43.77" RT	24° 22' 52.26"	**525**	✗	Variation
											400	✗	
RAMPB-3[1,2]	35	0.097	160+91.44	164+31.62	162+84.89	193.45	340.18	286	68° 08' 56.67" RT	20° 02' 00.56"	**525**	✗	Variation
											400	✗	
RAMPC-1[1,2]	55	0.04	130+00.00	132+75.45	131+37.80	137.8	275.45	3295	04° 47' 22.89" LT	01° 44' 19.93"	**1,650**	✗	Variation
											825	✗	
RAMPC-2[1,2]	45	0.1	138+48.63	142+51.22	140+59.42	210.79	402.58	550	41° 56' 19.64" LT	10° 25' 02.69"	**675**	✗	None
											400	✓	
RAMPC-3[1,2]	35	0.089	146+97.64	149+77.87	148+45.33	147.69	280.23	359	44° 43' 24.49" RT	15° 57' 35.38"	**525**	✗	Variation
											400	✗	
RAMPD-1[1,2]	35	0.1	220+00.00	233+18.50	224+99.08	499.08	1318.5	310	243° 41' 30.80" RT	18° 28' 57.03"	153	✓	None
											102	✓	
RAMPD-2[1,2]	30	0.1	233+18.50	234+49.74	233+85.26	66.76	131.24	290	25° 55' 45.49" RT	19° 45' 25.80"	144	✗	None
											97	✓	
RAMPE-1[1,2]	35	0.08	545+65.95	548+65.95	547+25.34	159.38	300	359	47° 52' 46.10" LT	15° 57' 35.38"	**525**	✗	Variation
											400	✗	

Table 2.3 – Existing Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / Minimum	Length (ft) Compliance	Design (Variation/ Exception)
RAMPE-2[1,2]	45	0.1	553+49.48	558+16.61	555+98.18	248.69	467.12	550	48° 39' 43.00" RT	10° 25' 02.69"	675	✗	None
											400	✓	
RAMPF-1[1,2]	25	0.05	340+00.00	342+35.70	341+50.08	150.08	235.7	150	90° 01' 44.66" LT	38° 11' 49.87"	400	✗	Variation
											400	✗	
RAMPF-2[1,2]	55	0.04	346+83.68	349+50.71	348+17.25	133.57	267.04	3825	04° 00' 00.00" RT	01° 29' 52.54"	1,650	✗	Variation
											825	✗	
RAMPG-1[1,2]	45	0.058	174+58.46	181+87.42	178+30.03	371.56	728.96	1527	27° 21' 06.70" LT	03° 45' 07.85"	675	✓	None
											400	✓	
RAMPH-1[1,2]	55	0.028	905+32.71	910+35.75	907+84.39	251.68	503.04	5730	05° 01' 48.15" LT	00° 59' 59.73"	1,650	✗	Variation
											825	✗	
RAMPH-2[1,2]	55	0.025	915+34.22	923+55.44	919+45.53	411.31	821.22	5730	08° 12' 41.63" RT	00° 59' 59.73"	1,650	✗	Variation
											825	✗	
RAMPI-1[1,2]	35	NC	601+42.34	604+08.18	602+75.31	132.98	265.84	3820	03° 59' 14.50" RT	01° 29' 59.60"	525	✗	Variation
											400	✗	
RAMPI-2[1,2]	45	NC	609+41.85	614+92.13	612+17.11	275.26	550.28	7630	04° 07' 55.86" LT	00° 45' 03.34"	675	✗	None
											400	✓	
RAMPI-3[1,2]	45	0.028	619+12.67	631+58.37	625+42.08	629.41	1245.7	3525	20° 14' 51.51" RT	01° 37' 31.48"	675	✓	None
											400	✓	

Table 2.3 – Existing Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / *Minimum*	Length (ft) Compliance	Design (Variation/ Exception)
RAMPJ-1[1,2]	55	0.04	160+00.00	171+76.72	165+93.06	593.06	1176.7	3819.72	17° 39' 02.96" LT	01° 30' 00.00"	**1,650**	✗	None
											825	✓	
RAMPJ-2[1,2,6]	45	Varies[6]	171+76.72	174+14.47	172+95.64	118.92	237.75	3536	03° 51' 08.34" RT	01° 37' 13.28"	**675**	✗	Variation
											400	✗	
RAMPK-1[4,5]	40	0.069	43+63.19	47+48.05	45+61.25	198.05	384.85	661	33° 21' 33.58" RT	08° 40' 04.96"	200	✓	N/A
											150	✓	
RAMPK-2[4,5]	50	0.1	47+48.05	53+56.73	50+70.27	322.23	608.69	750	46° 30' 01.06" RT	07° 38' 21.97"	200	✓	N/A
											150	✓	
RAMPK-3[4,5]	50	0.055	61+16.53	65+15.51	63+16.53	200	398.98	2286.01	09° 59' 59.64" RT	02° 30' 22.92"	**1,500**	✗	Variation
											750	✗	
RAMPL-1[4,5]	35	0.086	58+12.21	66+11.57	63+14.53	502.32	799.36	521	87° 54' 29.12" RT	10° 59' 50.17"	200	✓	N/A
											150	✓	
RAMPL-2[4,5]	45	0.1	66+11.57	82+25.36	118+95.54	5284	1613.8	550	168° 06' 54.49" RT	10° 25' 02.69"	200	✓	N/A
											150	✓	
RAMPL-3[4,5]	45	0.08	82+25.36	84+68.43	83+47.50	122.14	243.06	998.76	13° 56' 37.66" RT	05° 44' 12.09"	**675**	✗	Variation
											400	✗	

Table 2.3 – Existing Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE (Desired / *Minimum*)	Length (ft) Compliance	Design (Variation/ Exception)
RAMPM-1[4,5]	45	0.08	46+62.80	48+84.26	47+73.98	111.18	221.46	1000.65	12° 40' 49.63" RT	05° 43' 33.08"	200	✓	N/A
											150	✓	
RAMPM-2[4,5]	45	0.1	48+84.26	67+33.80	98+36.47	4952.2	1849.6	550	192° 40' 29.19" RT	10° 25' 02.69"	200	✓	N/A
											150	✓	
RAMPM-3[4,5]	35	0.086	67+33.80	73+03.34	70+50.23	316.43	569.54	525	62° 09' 24.54" RT	10° 54' 48.53"	**525**	✓	None
											400	✓	
RAMPM-4[4,5]	45	NC	80+12.77	83+99.31	82+06.08	193.31	386.54	7663	02° 53' 24.60" RT	00° 44' 51.70"	**675**	✗	Variation
											400	✗	
RAMPM-5[4,5]	45	NC	83+99.31	88+10.54	86+04.95	205.64	411.23	11435	02° 03' 37.78" LT	00° 30' 03.80"	**675**	✗	None
											400	✓	
RAMPN-1[4,5]	50	0.033	4185+00.00	4197+65.15	4191+39.56	639.56	1265.2	3500	20° 42' 39.08" RT	01° 38' 13.28"	**1,500**	✗	None
											750	✓	
RAMPN-2[4,5]	50	0.028	4197+98.34	4202+38.88	4200+18.90	220.56	440.54	3500	07° 12' 42.08" RT	01° 38' 13.28"	**1,500**	✗	Variation
											750	✗	
RAMPN-3[4,5]	45	0.098	4215+09.89	4218+94.60	4217+08.06	198.17	384.71	650	33° 54' 40.33" LT	08° 48' 53.05"	200	✓	N/A
											150	✓	

Table 2.3 – Existing Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / *Minimum*	Length (ft) Compliance	Design (Variation/ Exception)
RAMPN-4[4,5]	45	0.098	4218+94.60	4225+74.38	4222+59.69	365.09	679.78	752	51° 47' 34.37" LT	07° 37' 08.83"	200	✓	N/A
											150	✓	
RAMPCD-1[4,5]	45	0.025	89+17.96	94+54.78	91+86.55	268.59	536.82	6000	05° 07' 34.43" RT	00° 57' 17.75"	200	✓	N/A
											150	✓	
RAMPCD-2[4,5]	45	0.048	94+54.78	105+56.40	100+12.31	557.53	1101.6	2901	21° 45' 26.73" RT	01° 58' 30.13"	200	✓	N/A
											150	✓	
RAMPCD-3[4,5]	45	NC	130+80.39	136+37.66	133+59.07	278.68	557.27	13000	02° 27' 22.01" LT	00° 26' 26.65"	**675**	✗	None
											400	✓	
RAMPCD-4[4,5]	45	NC	136+37.66	143+53.82	139+96.06	358.4	716.15	6878	05° 57' 56.81" LT	00° 49' 58.91"	**675**	✓	None
											400	✓	
RAMPCD-5[4,5]	50	NC	15+00.00	21+52.65	18+26.41	326.41	652.65	11459	03° 15' 47.82" LT	00° 30' 00.02"	200	✓	N/A
											150	✓	
RAMPCD-6[4,5]	50	NC	21+52.65	23+00.18	22+26.42	73.77	147.53	11474	00° 44' 12.18" LT	00° 29' 57.67"	200	✓	N/A
											150	✓	
RAMPCD-7[4,5]	45	RC	135+96.39	141+78.13	138+87.51	291.12	581.74	5730	05° 49' 00.95" LT	00° 59' 59.73"	**675**	✗	None
											400	✓	
SR 91	70	NC	1217+48.78	1227+12.11	1222+30.48	481.70	963.33	34377.47	01° 36' 20"	00° 10' 00"	**2100**	✗	Exception
											1050	✗	

Footnote

[1]State Project Number (SPN) 86620-3605
[2]State Project Number (SPN) 86620-3606
[3]Financial Project ID (FPID) 406153-1-52-01
[4]Financial Project ID (FPID) 420289-6-52-01
[5]Financial Project ID (FPID) 431281-6-52-01
[6]Financial Project ID (FPID) 431281-1-52-01

Compliance ✓: Meets criteria ✗: Does not meet criteria

2.2.9 Vertical Alignment

An analysis was performed to check the parameters of each existing vertical curve in the project limits. The parameters are the curve lengths, the back and forward grades of each curve, and the K values.

The maximum allowable grade for a limited access facility with a design speed from 60 to 70 mph is 3% in accordance with the *2023 FDM, Section 211.9.1, Table 211.9.1* and *2018 AASHTO, Section 8.2.7, Table 8-1*. The maximum ramp grades for design speeds ranging from 30 to 55 mph are 7% to 4% in accordance with the *2023 FDM, Table 211.9.1,* and 7% to 3% in accordance with the *2018 AASHTO Section 10.9.6, Table 10-2,* respectively. The minimum allowable grade is 0.3 percent for drainage purposes.

The minimum curve length on limited access facilities for crest curves is 1,000 feet for open highway, 1,800 feet within interchanges, and 800 feet for sag curves in accordance with the *2023 FDM, Section 211.9.2, Table 211.9.3*. The minimum curve length on ramps with a design speed of 35 mph is 105 feet for both crest and sag curves and ramps with a design speed of 55 mph is 350 feet for a crest curve and 250 feet for a sag curve, in accordance with the *2023 FDM Section 211.9.2, Table 211.9.3.*

A vertical curve is identified by a curve length which is equal to the product of the K value and the algebraic difference in grades. The K value is controlled by the required stopping sight distance (SSD). If a vertical curve meets the K value criteria, it meets the SSD criteria. *FDM Table 211.9.2* lists the required K values. Following is a list of some design speeds and associated K value minimums in accordance with the FDM:

- Interstate with a design speed of 55 mph
  - 245 for crest curves (new construction)
  - 151 for crest curves (resurfacing)
  - 136 for sag curves

- Interstate with a design speed of 70 mph
  - 506 for crest curves (new construction)
  - 312 for crest curves (resurfacing)
  - 206 for sag curves

- Ramps with a design speed of 35 mph
    - 47 for crest curves (new construction)
    - 29 for crest curves (resurfacing)
    - 49 for sag curves

- Ramps with a design speed of 55 mph
    - 185 for crest curves (new construction)
    - 114 for crest curves (resurfacing)
    - 115 for sag curves

In accordance with the *2018 AASHTO Section 3.4.6, Table 3-35 and Table 3-37*, the minimum K values for various design speeds are listed below. The minimum length of vertical curves in accordance with AASHTO is simply the algebraic difference of grades along the curve times the minimum K value.

- Roadway design speed of 35 mph
    - 29 for crest curves
    - 49 for sag curves

- Roadway design speed of 55 mph
    - 114 for crest curves
    - 115 for sag curves

- Roadway design speed of 70 mph
    - 247 for crest curves
    - 181 for sag curves

Interstate resurfacing projects that do not meet the criteria in accordance with the *2023 FDM Chapter 211* may use the AASHTO interstate standards that were in effect at the time of original construction or inclusion into the interstate system for vertical alignment elements.

Table 2.4 lists the vertical curve parameters and existing characteristics. For stationing references, see ***Appendix A***, Corridor Base Maps.

Table 2.4 – Existing Vertical Geometry Analysis

Curve	Design Speed (MPH)	PVC Station	PVT Station	Type	Length (ft)					Grades								K-Values					Design (Variation/Exception)
					Existing	FDM/FTE	Compliance	AASHTO[1]	Compliance	Existing Back (%)	Existing Forward (%)	FDOT/FTE (Max %)	Compliance		AASHTO (Max %)	Compliance		Existing	FDOT/FTE	Compliance	AASHTO	Compliance	
													Back	Forward		Back	Forward						
SR 869 Centerline																							
CL-01	70	1020+57.50	1028+57.50	Sag	800.00	800	✓	359.00	✓	0.000	2.000	3.000	✓	✓	3.00	✓	✓	400	206	✓	181	✓	None
CL-02	70	1030+75.00	1051+75.00	Crest	2,100.00	1,800	✓	979.00	✓	2.000	-2.000	3.000	✓	✓	3.00	✓	✓	525	506[2] 312[3]	✓ ✓	247	✓	None
CL-03	65	1071+15.00	1082+50.00	Sag	1,135.00	800	✓	312.00	✓	0.000	2.000	3.000	✓	✓	3.00	✓	✓	568	181	✓	157	✓	None
CL-04	65	1082+50.00	1105+00.00	Crest	2,250.00	1,800	✓	768.00	✓	2.000	-2.000	3.000	✓	✓	3.00	✓	✓	563	401[2] 247[3]	✓ ✓	193	✓	None
CL-05	65	1106+67.50	1114+67.50	Sag	800.00	800	✓	359.00	✓	-2.000	0.300	3.000	✓	✓	3.00	✓	✓	348	181	✓	157	✓	None

Table 2.5 – Existing Vertical Geometry Analysis (Continued)

Curve	Design Speed (MPH)	PVC Station	PVT Station	Type	Length (ft)					Grades								K-Values					Design (Variation/Exception)
					Existing	FDM/FTE	Compliance	AASHTO[1]	Compliance	Existing Back (%)	Existing Forward (%)	FDOT/FTE (Max %)	Compliance Back	Compliance Forward	AASHTO (Max %)	Compliance Back	Compliance Forward	Existing	FDOT/FTE	Compliance	AASHTO	Compliance	
NB SR 869																							
NB-01	65	102+75.00	108+75.00	Crest	700.00	1,000	✗	293.00	✓	-0.358	-1.880	3.000	✓	✓	3.00	✓	✓	460	401[2] 247[3]	✓ ✓	193	✓	Variation - Curve Length
NB-02	65	112+57.00	120+57.00	Sag	800.00	800	✓	482.00	✓	-1.880	0.627	3.000	✓	✓	3.00	✓	✓	319	181	✓	157	✓	None
NB-03	65	120+57.00	130+57.00	Crest	1,000.00	1,000	✓	190.00	✓	0.627	-0.360	3.000	✓	✓	3.00	✓	✓	1013	401[2] 247[3]	✓ ✓	193	✓	None
NB-04	65	130+57.00	138+57.00	Sag	800.00	800	✓	127.00	✓	-0.360	0.300	3.000	✓	✓	3.00	✓	✓	1212	181	✓	157	✓	None
NB-05	55	140+12.00	148+12.00	Crest	800.00	1,000	✗	75.00	✓	0.300	-0.372	4.000	✓	✓	4.00	✓	✓	1190	245[2] 151[3]	✓ ✓	114	✓	Variation - Curve Length

Table 2.5 – Existing Vertical Geometry Analysis (Continued)

Curve	Design Speed (MPH)	PVC Station	PVT Station	Type	Length (ft)					Grades								K-Values					Design (Variation/Exception)
					Existing	FDM/FTE	Compliance	AASHTO[1]	Compliance	Existing Back (%)	Existing Forward (%)	FDOT/FTE (Max %)	Compliance Back	Compliance Forward	AASHTO (Max %)	Compliance Back	Compliance Forward	Existing	FDOT/FTE	Compliance	AASHTO	Compliance	
SB SR 869																							
SB-01	65	190+90.00	209+30.00	Crest	940.00	1,000	✗	303.00	✓	-0.510	-2.085	3.000	✓	✓	3.00	✓	✓	597	401[2] 247[3]	✓	193	✓	Variation - Curve Length
SB-02	65	210+00.00	218+00.00	Sag	800.00	800	✓	428.00	✓	-2.085	0.141	3.000	✓	✓	3.00	✓	✓	359	181	✓	157	✓	None
SB-03	65	231+00.00	239+00.00	Sag	800.00	800	✓	94.00	✓	-0.144	0.344	3.000	✗	✓	3.00	✗	✓	1639	181	✓	157	✓	Exception - Backgrade (insufficient for drainage)
SB-04	55	239+00.00	249+00.00	Crest	1,000.00	1,000	✓	82.00	✓	0.344	-0.387	4.000	✓	✓	4.00	✓	✓	1368	245[2] 151[3]	✓ ✓	114	✓	None
SR 91																							
TPK-1	70	_	18.14	Sag	800	800	✓	450	✓	0.014	2.500	3	✓	✓	3	✓	✓	321.8	206	✓	181	✓	None
TPK-2	70	_	51.85	Crest	1800	1800	✓	1235	✓	2.500	-2.500	3	✓	✓	3	✓	✓	360.0	506 312	✗ ✓	247	✓	None
TPK-3	70	_	19.34	Sag	800	800	✓	461	✓	-2.500	0.045	3	✓	✓	3	✓	✓	314.3	206	✓	181	✓	None

Table 2.5 – Existing Vertical Geometry Analysis (Continued)

Curve	Design Speed (MPH)	PVC Station	PVT Station	Type	Length (ft) Existing	Length (ft) FDM/ FTE	Length (ft) Compliance	Length (ft) AASHTO[1]	Length (ft) Compliance	Grades Existing Back (%)	Grades Existing Forward (%)	Grades FDOT/ FTE (Max %)	Grades Compliance Back	Grades Compliance Forward	Grades AASHTO (Max %)	Grades Compliance Back	Grades Compliance Forward	K-Values Existing	K-Values FDOT/ FTE	K-Values Compliance	K-Values AASHTO	K-Values Compliance	Design (Variation/ Exception)
SR 869 Ramps																							
RampA-01	45	140+61.04	143+21.04	Sag	260.00	135	✓	37.00	✓	-0.18	0.29	5.00	✓	✓	5.00	✓	✓	553	79	✓	79	✓	None
RampB-01	35	150+00.00	151+50.00	Crest	150.00	105	✓	66.00	✓	-1.04	-4.00	6.00	✓	✓	7.00	✓	✓	51	47[2] 29[3]	✓ ✓	29	✓	None
RampB-02	35	154+84.34	156+84.34	Sag	200.00	105	✓	177.00	✓	-4.00	0.00	6.00	✓	✓	7.00	✓	✓	50	49	✓	49	✓	None
RampC-01	55	131+27.00	132+83.00	Sag	156.00	250	✗	70.00	✓	-0.19	0.42	4.00	✓	✓	4.00	✓	✓	256	115	✓	115	✓	Variation Curve Length
RampD-01	35	222+00.00	224+00.00	Crest	200.00	105	✓	99.00	✓	-0.79	-4.00	6.00	✓	✓	7.00	✓	✓	62	47[2] 29[3]	✓ ✓	29	✓	None
RampD-02	35	227+40.75	229+40.75	Sag	200.00	105	✓	177.00	✓	-4.00	0.00	6.00	✓	✓	7.00	✓	✓	50	49	✓	49	✓	None
RampE-01	45	551+46.39	554+26.39	Sag	280.00	135	✓	139.00	✓	-0.32	1.46	5.00	✓	✓	5.00	✓	✓	157	79	✓	79	✓	None
RampE-02	45	554+84.21	558+16.61	Crest	332.40	135	✓	118.00	✓	1.46	-1.30	5.00	✓	✓	5.00	✓	✓	120	98[2] 61[3]	✓ ✓	61	✓	None

Table 2.5 – Existing Vertical Geometry Analysis (Continued)

Curve	Design Speed (MPH)	PVC Station	PVT Station	Type	Length (ft)					Grades								K-Values					Design (Variation/ Exception)
					Existing	FDM/ FTE	Compliance	AASHTO[1]	Compliance	Existing Back (%)	Existing Forward (%)	FDOT/ FTE (Max %)	Compliance Back	Compliance Forward	AASHTO (Max %)	Compliance Back	Compliance Forward	Existing	FDOT/ FTE	Compliance	AASHTO	Compliance	
RampF-01	55	351+78.28	353+70.48	Sag	192.20	250	✗	136.00	✓	-0.19	1.00	4.00	✓	✓	4.00	✓	✓	162	115	✓	115	✓	None
RampF-02	55	353+70.48	358+70.48	Crest	500.00	350	✓	225.00	✓	1.00	-0.97	4.00	✓	✓	4.00	✓	✓	254	185[2] 114[3]	✓ ✓	114	✓	None
RampF-03	55	358+70.48	361+97.57	Sag	327.09	250	✓	136.00	✓	-0.97	0.22	4.00	✓	✓	4.00	✓	✓	275	115	✓	115	✓	None
RampG-01	45	172+62.96	174+18.56	Sag	155.60	135	✓	58.00	✓	-0.21	0.54	5.00	✓	✓	5.00	✓	✓	207	79	✓	79	✓	None
RampG-02	45	174+18.56	176+68.56	Crest	250.00	135	✓	41.00	✓	0.54	0.01	5.00	✓	✓	5.00	✓	✓	472	98[2] 61[3]	✓ ✓	61	✓	None
RampH-01	55	908+42.95	910+42.95	Sag	200.00	250	✗	86.00	✓	-0.05	0.70	4.00	✓	✓	4.00	✓	✓	267	115	✓	115	✓	Variation Curve Length
RampH-02	55	914+48.13	917+32.31	Crest	284.18	350	✗	194.00	✓	0.70	-1.00	4.00	✓	✓	4.00	✓	✓	167	185[2] 114[3]	✗ ✓	114	✓	Variation Curve Length Variation K-Value
RampI-01	35	601+90.23	603+30.23	Crest	140.00	105	✓	48.00	✓	1.00	0.00	6.00	✓	✓	7.00	✓	✓	140	47[2] 29[3]	✓ ✓	29	✓	None

Table 2.5 – Existing Vertical Geometry Analysis (Continued)

Curve	Design Speed (MPH)	PVC Station	PVT Station	Type	Length (ft)					Grades								K-Values					Design (Variation/ Exception)
					Existing	FDM/ FTE	Compliance	AASHTO[1]	Compliance	Existing Back (%)	Existing Forward (%)	FDOT/ FTE (Max %)	Compliance		AASHTO (Max %)	Compliance		Existing	FDOT/ FTE	Compliance	AASHTO	Compliance	
													Back	Forward		Back	Forward						
RampI-02	35	607+19.08	609+19.08	Sag	200.00	105	✓	78.00	✓	0.00	1.62	6.00	✓	✓	7.00	✓	✓	123	49	✓	49	✓	None
RampI-03	35	609+77.66	612+77.66	Crest	300.00	105	✓	88.00	✓	1.62	-0.21	6.00	✓	✓	7.00	✓	✓	164	47[2] 29[3]	✓ ✓	29	✓	None
RampJ-01	55	162+89.39	164+07.04	Sag	117.65	250	✗	78.00	✓	0.00	0.68	4.00	✓	✓	4.00	✓	✓	173	115	✓	114	✓	Variation Curve Length
RampJ-02	55	164+36.46	166+86.46	Crest	250.00	350	✗	155.00	✓	0.68	-0.68	4.00	✓	✓	4.00	✓	✓	184	185[2] 114[3]	✗ ✓	114	✓	Variation Curve Length Variation K-Value
RampJ-03	55	167+35.00	169+55.00	Sag	220.00	250	✗	78.00	✓	-0.68	0.00	4.00	✓	✓	4.00	✓	✓	324	115	✓	114	✓	Variation Curve Length
RampK-01	40	43+95.30	45+20.30	Sag	125.00	120	✓	51.00	✓	-1.06	0.72	6.00	✓	✓	6.00	✓	✓	70	64	✓	44	✓	None
RampL-01	35	58+06.66	60+06.66	Sag	200.00	105	✓	40.00	✓	-0.61	0.22	6.00	✓	✓	7.00	✓	✓	243	49	✓	29	✓	None
RampM-01	45	49+85.00	51+85.00	Crest	200.00	135	✓	53.00	✓	-0.36	-1.04	5.00	✓	✓	5.00	✓	✓	293	98[2] 61[3]	✓ ✓	61	✓	None

Table 2.5 – Existing Vertical Geometry Analysis (Continued)

Curve	Design Speed (MPH)	PVC Station	PVT Station	Type	Length (ft)					Grades								K-Values					Design (Variation/ Exception)
					Existing	FDM/ FTE	Compliance	AASHTO[1]	Compliance	Existing Back (%)	Existing Forward (%)	FDOT/ FTE (Max %)	Compliance Back	Compliance Forward	AASHTO (Max %)	Compliance Back	Compliance Forward	Existing	FDOT/ FTE	Compliance	AASHTO	Compliance	
RampM-02	45	53+10.00	55+10.00	Sag	200.00	135	✓	166.00	✓	-1.04	1.09	5.00	✓	✓	5.00	✓	✓	94	79	✓	61	✓	None
RampM-03	45	55+10.00	57+10.00	Crest	200.00	135	✓	119.00	✓	1.09	-0.44	5.00	✓	✓	5.00	✓	✓	131	98[2] 61[3]	✓ ✓	61	✓	None
RampM-04	45	58+60.00	60+60.00	Sag	200.00	135	✓	28.00	✓	-0.44	-0.08	5.00	✓	✓	5.00	✓	✓	556	79	✓	61	✓	None
RampN-01	45	4211+40.00	4213+40.00	Crest	200.00	135	✓	121.00	✓	0.71	-0.85	5.00	✓	✓	5.00	✓	✓	128	98[2] 61[3]	✓ ✓	61	✓	None
RampCD-01	45	87+25.00	91+75.00	Sag	450.00	135	✓	117.00	✓	-1.00	0.50	4.00	✓	✓	4.00	✓	✓	301	115	✓	114	✓	None
RampCD-02	45	104+62.50	107+87.50	Sag	325.00	135	✓	65.32	✓	-0.53	0.22	4.00	✓	✓	4.00	✓	✓	433	115	✓	114	✓	None

Legend:

Compliance

✓ : Meets criteria

✗: Does not meet criteria

Footnotes:

[1]Minimum vertical curve length is based on vertical stopping sight distance calculations in accordance to 2018 AASHTO Equation 3-41,3-42,3-43,3-44,3-48, & 3-50

[2]2023 FDM Table 211.9.2 Crest (New Construction) Vertical Curve

[3]2023 FDM Table 211.9.2 Crest (Resurfacing) Vertical Curve

2.2.10 Multi-Modal Facilities

2.2.10.1 Pedestrian Accommodations

The Sawgrass Expressway and Florida's Turnpike are limited access facilities. There will continue to be no designated pedestrian accommodations as pedestrians are not permitted on limited access corridors.

The crossing roadway interchanges have existing pedestrian accommodations. These accommodations are summarized below:

US 441 – The corridor has a ten-foot wide sidewalk along both sides of the roadway and continues through the interchange. Designated pedestrian crossings exist at all the corridor intersections.

Lyons Road – The corridor has a six-foot wide sidewalk along both sides of the roadway and continues through the interchange. Designated pedestrian crossings exist at all the corridor intersections.

SW 10th Street – The corridor has a five-foot wide sidewalk along the south side of the roadway from Waterways Boulevard to Powerline Road. Designated pedestrian crossings exist at all the corridor intersections.

Wiles Road – The corridor has a six-foot wide sidewalk along both sides of the roadway and continues through the Florida's Turnpike overpass.

Hillsboro Boulevard – The corridor has a six-foot wide sidewalk along both sides of the roadway and continues through the Florida's Turnpike overpass.

Powerline Road – The corridor has a five-foot wide sidewalk along both sides of the roadway and continues through the interchange. Designated pedestrian crossings exist at all the corridor intersections.

2.2.10.2 BICYCLE FACILITIES

The Sawgrass Expressway and Florida's Turnpike are limited access facilities. There will continue to be no bicycle accommodations as bicycles are not permitted on limited access corridors. US 441 has a five-foot wide bike lane on both sides of the roadway and through the interchange. Lyons Road has a five-foot wide bike lane on both sides of the roadway south of the Sawgrass Expressway. The bikes lanes do not continue north through the Sawgrass Expressway Interchange. Wiles Road has a five-foot wide bike lane on both sides of the roadway and through the Florida's Turnpike overpass. Hillsboro Boulevard has a five-foot wide bike lane on both sides of the roadway and through the Florida's Turnpike overpass. Powerline Road has a five-foot wide bike lane on both sides of the roadway and through the interchange

2.2.10.3 TRANSIT FACILITIES

There is a variety of transit services provided within the limits of the study. Within Broward County is Broward County Transit (BCT), which is regionally coordinated by the South Florida Regional Transportation Authority (SFRTA).

BCT provides fixed-stop bus service within and across the study area. BCT bus routes 14, 19, and 31 operate within the study limits (see ***Appendix B***). BCT also assists the City of Coconut Creek with their community bus services.

In addition to general bus service, BCT provides the following services within the study area:

- TOPS – TOPS (Transportation Options Paratransit Service) is for ADA-eligible citizens, on a reservation basis.
- Emergency Services – BCT uses their bus fleet for emergency evacuation services during hurricane events.

FDOT offers a regional commuter assistance program, the South Florida Commuter Services (SFCS) Program, to promote alternatives to drive-alone commuting. SFCS includes car-pool (for 2-4 people) and vanpool (7-12 people) programs.

2.2.11 Intersections

There are three existing interchanges within the project limits. Two of the three interchanges provide connection to arterial/collector facilities. The other interchange is a major system-to-system interchange, Sawgrass Expressway with Florida's Turnpike. This system-to-system interchange provides a connection between major expressways, which services and distributes traffic originating from or destined to the north, south, east, and west portions of Broward County.

There are 11 signalized intersections within the study area. These intersections are listed below:

1. US 441/Regency Lakes Boulevard
2. US 441 Southbound Ramp Terminal
3. US 441 Northbound Ramp Terminal
4. US 441/Winston Park Boulevard
5. Lyons Road/Serko Boulevard
6. Lyons Road Southbound Ramp Terminal
7. Lyons Road Northbound Ramp Terminal
8. Lyons Road/Winston Park Boulevard
9. SW 10th Street/Waterways Boulevard
10. SW 10th Street/Independence Drive
11. SW 10th Street/Powerline Road

The signalized intersections were analyzed in Vissim microsimulation to assess operations at a detailed level. The 2016 intersection output from Vissim is presented in ***Table 2.5***. The results show that most of the intersections operate at an overall intersection Level of Service (LOS) D or better, except the intersection of SW 10th Street and Powerline Road, which operates at LOS E in both the AM and PM peak hours.

Table 2.5 – 2016 Existing Intersection Operational Analysis

Intersection Name	Movement	AM Peak Hour		PM Peak Hour	
		Delay (S)	LOS	Delay (S)	LOS
US 441 Southbound Ramp Terminal	NBT	8	A	4	A
	NBR	10	A	6	A
	SBL	65	E	72	E
	SBT	1	A	1	A
	WBR	3	A	3	A
	Overall	**10**	**A**	**4**	**A**
US 441 Northbound Ramp Terminal	NBL	**80**	**F**	75	E
	NBT	1	A	1	A
	SBT	6	A	5	A
	SBR	7	A	5	A
	EBR	2	A	4	A
	Overall	**7**	**A**	**6**	**A**
Lyons Road Southbound Ramp Terminal	NBT	16	B	13	B
	NBR	2	A	1	A
	SBL	32	C	22	C
	SBT	4	A	3	A
	EBL	39	D	36	D
	EBR	1	A	1	A
	Overall	**14**	**B**	**10**	**A**
Lyons Road Northbound Ramp Terminal	NBL	13	B	16	B
	NBT	5	A	4	A
	SBT	14	B	13	B
	SBR	2	A	3	A
	WBL	35	C	36	D
	WBR	19	B	18	B
	Overall	**10**	**B**	**10**	**B**
SW 10th Street/Waterways Blvd	NBL	40	D	44	D
	NBR	8	A	6	A
	EBT	45	D	4	A
	EBR	4	A	2	A
	WBL	3	A	15	B
	WBT	11	B	3	A
	Overall	**31**	**C**	**4**	**A**

Table 2.5 – 2016 Existing Intersection Operational Analysis (Continued)

Intersection Name	Movement	AM Peak Hour		PM Peak Hour	
		Delay (S)	LOS	Delay (S)	LOS
SW 10th Street/Independence Dr	NBL	44	D	46	D
	NBR	26	C	7	A
	EBT	35	D	2	A
	EBR	4	A	1	A
	WBL	36	D	9	A
	WBT	3	A	2	A
	Overall	**24**	**C**	**2**	**A**
SW 10th Street/Powerline Rd	NBL	**83**	**F**	**123**	**F**
	NBT	63	E	58	E
	NBR	22	C	12	B
	SBL	78	E	**93**	**F**
	SBT	68	E	58	E
	SBR	16	B	38	D
	EBL	77	E	**98**	**F**
	EBT	72	E	37	D
	EBR	53	D	8	A
	WBL	**81**	**F**	**118**	**F**
	WBT	74	E	60	E
	WBR	18	B	38	D
	Overall	**65**	**E**	**59**	**E**

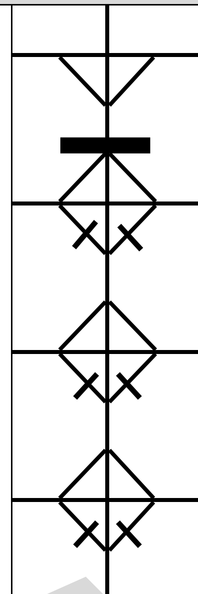
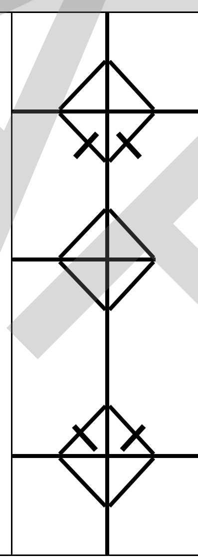
2.2.12 Physical or Operational Restrictions

There are no physical or operational restrictions such as multimodal use lanes, parking, or fixed objects. Barrier walls exist throughout the corridor to protect bridge piers, separate traffic streams, and at-grade separations (bridges and elevated ramps). Roadway guardrails exist throughout the corridor where clear zone requirements are not meet.

2.2.13 Traffic Data

The study area AM and PM peak-hour volumes were calculated using data for the four-highest consecutive 15-minute periods in the morning and evening at each count location. The peak hours generally occurred between 7:30 AM and 8:30 AM and between 5:00 PM and 6:00 PM but varied slightly based on the location. The 2016 data was then aggregated and balanced to ensure continuity of flow and consistency. Intersection turning movement counts were adjusted using daily tube counts where applicable. ***Table 2.6*** and ***Table 2.7*** summarize the 2016 Annual Average Daily Traffic (AADT) and AM and PM peak-hour volumes, respectively for the freeway mainline, ramps and arterials. ***Figure 2.9*** graphically depicts the 2016 AM and PM peak-hour volumes. Tables and figures include traffic information and data from some of the adjacent interchanges and intersections from the study area to understand the traffic entering and leaving the project limits.

Table 2.6 – 2016 Existing AADT Volumes

Milepost – Roadway		AADTs
Sawgrass Expressway		
To SW 10th Street		**37,700**
21A/B – Florida's Turnpike		44,000
20 – Deerfield Toll Point		**81,700**
		9,600
19 – Lyons Road		9,600
		81,700
		12,400
18A/B – US 441 (SR 7)		16,900
		86,200
15 – University Drive		19,400
		5,400
		72,200
Florida's Turnpike (Southern Coin)		
		**98,900**
75 – Boca Raton (Glades Road)		13,100
		21,000
		106,800
71 – Sawgrass Expressway		30,000
(Sawgrass Expressway access to/from west only)		14,000
		90,800
69 – Sample Road		9,600
		19,400
		100,600

Bold = Mainline Volumes

Table 2.7 – 2016 Existing AM and PM Peak-Hour Traffic Volumes

Milepost - Roadway	AM		PM	
	SB / WB	NB / EB	SB / WB	NB / EB
Sawgrass Expressway				
To SW 10th Street	**1,730**	**2,780**	**2,925**	**1,535**
21A/B – Florida's Turnpike	1,940	3,540	2,790	1,930
20 – Deerfield Toll Point	**3,080**	**5,590**	**4,990**	**2,950**
19 – Lyons Road	590	730	725	515
	850	820	610	660
	3,930	**6,410**	**5,600**	**3,610**
18A/B – US 441 (SR 7)	460	920	850	400
	1,210	950	940	1,030
	4,680	**6,440**	**5,690**	**4,240**
15 – University Drive	900	1,660	1,410	730
	400	300	240	330
	4,180	**5,080**	**4,520**	**3,840**
Florida's Turnpike (Southern Coin)				
	5,280	**4,190**	**4,160**	**5,220**
75 – Boca Raton (Glades Road)	950	540	580	740
	970	1,950	1,660	1,060
	5,300	**5,600**	**5,240**	**5,540**
71 – Sawgrass Expressway	1,460	1,920	1,800	1,390
(Sawgrass Expressway access	1,620	480	540	990
To/from west only)	**5,460**	**4,160**	**3,980**	**5,140**
	690	550	400	640
69 – Sample Road	970	1,200	1,030	1,060
	5,740	**4,810**	**4,610**	**5,560**

Bold = Mainline Volumes

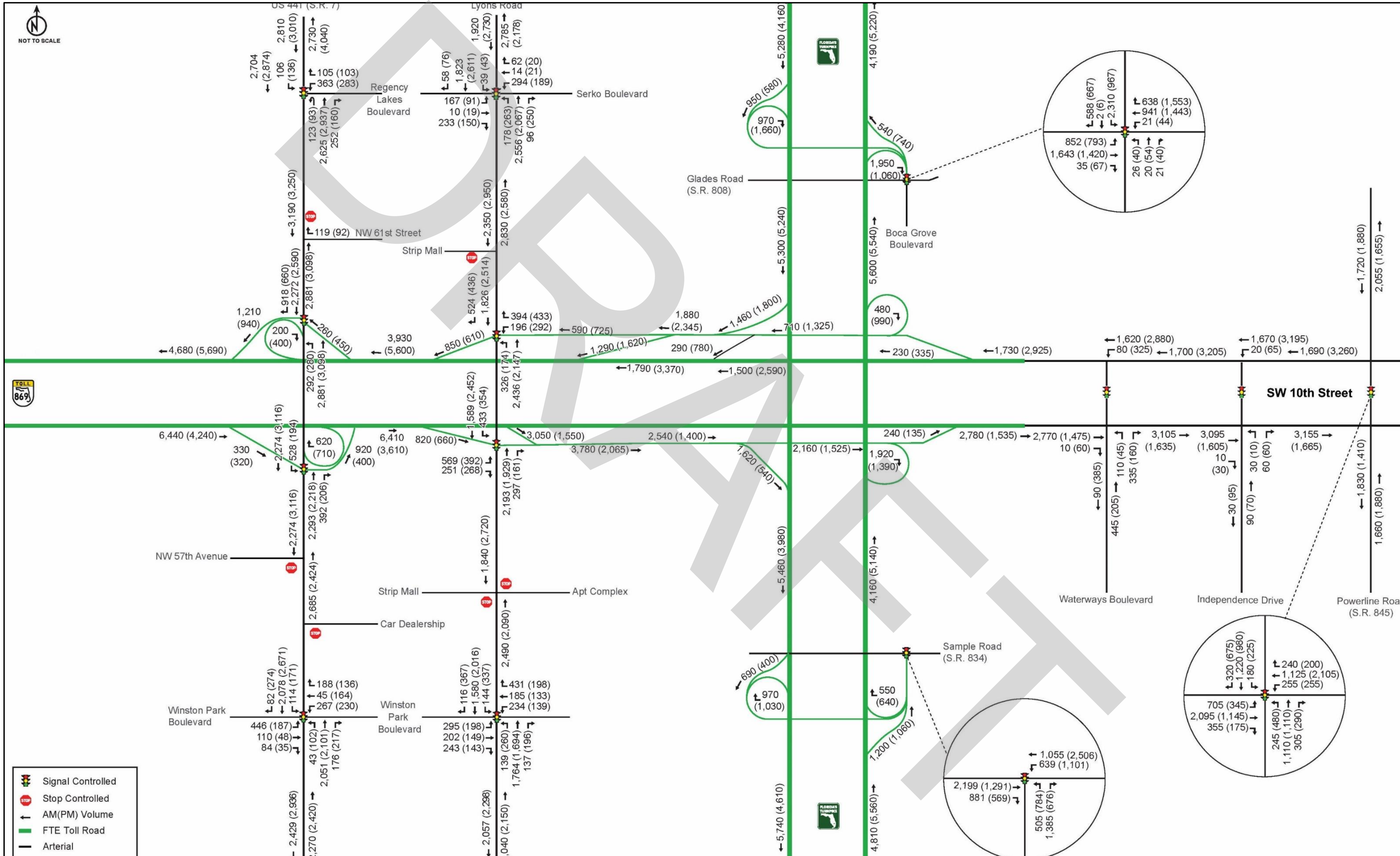


Figure 2.9 – 2016 Existing Traffic Volumes

2.2.14 Roadway Operational Conditions

This section provides a summary of traffic performance results for 2016 existing conditions. The Vissim model Version 22-07 was used for the operational analysis. The model was calibrated for 2016 AM and PM peak period conditions: four hours of simulation with 30-minute seeding time. Calibration of the model was based on traffic volumes, travel time, speed, and observed queues at selected critical locations to accurately represent field conditions. Analysis was based on the average of 10 random seed runs to account for the stochasticity of the microsimulation model.

Table 2.8 and ***Table 2.9*** highlight the measures of effectiveness (MOEs) for the peak-hour for the Sawgrass Expressway and Florida's Turnpike freeway segments. All freeway segments operate at LOS D or better, except at two locations:

5. Sawgrass Expressway eastbound off-ramp to US 441 southbound, which is reported at LOS E during the AM peak-hour.
6. Florida's Turnpike northbound off-ramp to Glades Road, which is reported at LOS E during the AM peak-hour.

Tables and figures include traffic information from some of the adjacent interchanges and intersections from the study area to understand the traffic operations next to the project limits.

Table 2.8 – 2016 AM Existing Peak-Hour Vissim Freeway Segment Analysis

Segment	Demand	Processed	% Served	Speed	Density pc/mi/ln	Estimated LOS
Sawgrass Expressway Eastbound						
SR 7 / US 441 SB Off-ramp_Diverge	6,440	6,447	100%	63	37	E
SR 7 / US 441 SB Off-ramp to SR 7 / US 441 NB Off-ramp_Basic	6,110	6,124	100%	64	35	D
SR 7 / US 441 NB Off-ramp_Diverge	6,110	6,120	100%	64	26	C
SR 7 / US 441 NB Off-ramp to SR 7 / US 441 On-ramp_Basic	5,490	5,493	100%	65	30	D
SR 7 / US 441 On-ramp to Lyon Road Off-ramp_Weave	6,410	6,390	100%	62	28	C
Lyons Road Off-ramp to CD Road Off_ramp_Basic	5,590	5,591	100%	63	32	D
CD Road Off-ramp_Diverge	5,590	5,526	99%	48	31	D
CD Road off-ramp to 10th street_Basic	2,540	2,507	99%	56	16	B
Sawgrass Expressway Westbound						
SW 10th Street on-ramp_Basic	1,730	1,698	98%	47	13	B
Florida's Turnpike off ramp to On ramp_basic	1,500	1,475	98%	53	15	B
Florida's Turnpike on-ramp_Merge	1,790	1,701	95%	55	11	B
Turnpike on-ramp to CD Road on-ramp_Basic	1,790	1,702	95%	54	17	B
CD Road on-ramp_merge	3,080	2,968	96%	55	15	B
CD Road on-ramp to Lyons Road on-ramp_Basic	3,080	2,980	97%	63	17	B
Lyons Road on-ramp to SR 7 / US 441 NB off-ramp_Weave	3,930	3,837	98%	66	16	B
SR 7 / US 441 SB off-ramp_Diverge	3,670	3,590	98%	65	15	B
SR 7 / US 441 SB off-ramp to SR 7 / US 441 on-ramp_Basic	3,470	3,392	98%	65	19	C
SR 7 / US 441 on-ramp_Merge	4,680	4,462	95%	57	21	C
Downstream of SR 7 / US 441_Basic	4,680	4,596	98%	64	26	C
Florida's Turnpike Northbound						
Upstream of Sample Road_Basic	4,810	4,763	99%	61	28	D
Sample Road off-ramp_Diverge	4,810	4,707	98%	57	23	C
Sample off-ramp to on-ramp_Basic	3,610	3,570	99%	70	18	B
Sample Road on-ramp_Merge	4,160	4,106	99%	70	16	B
Sample Road on-ramp to CD Road on-ramp_Basic	4,160	4,123	99%	70	21	C
CD Road on-ramp to CD Road off-ramp_Weave	6,080	6,029	99%	58	28	C
CD Road off-ramp to Glades Road off-ramp_Basic	5,600	5,617	100%	60	34	D
Glades Road off-ramp_Diverge	5,600	5,521	99%	33	44	E
Glades Road off-ramp to on-ramp_Basic	3,650	3,616	99%	70	18	B
Glades Road on-ramp_Merge	4,190	4,144	99%	70	16	B
Downstream of Glades Road_Basic	4,190	4,141	99%	70	21	C
Florida's Turnpike Southbound						
Upstream of Glades Road_Basic	5,280	5,278	100%	69	27	D
Glades Road off-ramp_Diverge	5,280	5,245	99%	70	20	B
Glades Road off-ramp to on-ramp_Basic	4,330	4,358	101%	70	22	C
Glades Road on-ramp_Merge	5,300	5,295	100%	51	28	C
Glades Road on-ramp to CD Road off-ramp_Basic	5,300	5,294	100%	68	28	D
CD Road off-ramp_Diverge	5,300	5,272	99%	71	16	B
CD Road off-ramp to on-ramp_Basic	3,840	3,795	99%	71	19	C
CD Road on-ramp_Merge	5,460	5,436	100%	53	28	C
CD Road on-ramp to Sample Road off-ramp_Basic	5,460	5,433	99%	67	29	D
Sample Road off-ramp_Diverge	5,460	5,219	96%	60	23	C
Sample Road off-ramp to on-ramp_Basic	4,770	4,709	99%	65	25	C
Sample Road on-ramp_Merge	5,740	5,667	99%	66	23	C
Downstream of Sample Road_Basic	5,740	5,667	99%	67	30	D

Table 2.9 – 2016 PM Existing Peak-Hour Vissim Freeway Segment Analysis

Segment	Demand	Processed	% Served	Speed	Density pc/mi/ln	Estimated LOS
Sawgrass Expressway Eastbound						
SR 7 / US 441 SB Off-ramp_Diverge	4,240	4,250	100%	72	21	C
SR 7 / US 441 SB Off-ramp to SR 7 / US 441 NB Off-ramp_Basic	3,920	3,928	100%	72	20	C
SR 7 / US 441 NB Off-ramp_Diverge	3,920	3,922	100%	72	15	B
SR 7 / US 441 NB Off-ramp to SR 7 / US 441 On-ramp_Basic	3,210	3,243	101%	73	16	B
SR 7 / US 441 On-ramp to Lyon Road Off-ramp_Weave	3,610	3,616	100%	72	13	B
Lyons Road Off-ramp to CD Road Off_ramp_Basic	2,950	2,999	102%	73	15	B
CD Road Off-ramp_Diverge	2,950	2,962	100%	67	12	B
CD Road off-ramp to 10th street_Basic	1,400	1,408	101%	67	8	A
Sawgrass Expressway Westbound						
SW 10th Street on-ramp_Basic	2,925	2,742	94%	50	20	C
Florida's Turnpike off ramp to On ramp_basic	2,590	2,413	93%	51	25	C
Florida's Turnpike on-ramp_Merge	3,370	3,167	94%	48	24	C
Turnpike on-ramp to CD Road on-ramp_Basic	3,370	3,187	95%	51	33	D
CD Road on-ramp_merge	4,990	4,746	95%	54	24	C
CD Road on-ramp to Lyons Road on-ramp_Basic	4,990	4,761	95%	63	27	D
Lyons Road on-ramp to SR 7 / US 441 NB off-ramp_Weave	5,600	5,374	96%	67	22	C
SR 7 / US 441 SB off-ramp_Diverge	5,150	4,916	95%	65	20	B
SR 7 / US 441 SB off-ramp to SR 7 / US 441 on-ramp_Basic	4,750	4,556	96%	65	25	C
SR 7 / US 441 on-ramp_Merge	5,690	5,304	93%	56	25	C
Downstream of SR 7 / US 441_Basic	5,690	5,458	96%	65	30	D
Florida's Turnpike Northbound						
Upstream of Sample Road_Basic	5,560	5,532	99%	66	30	D
Sample Road off-ramp_Diverge	5,560	5,474	98%	64	23	C
Sample off-ramp to on-ramp_Basic	4,500	4,488	100%	70	23	C
Sample Road on-ramp_Merge	5,140	5,103	99%	69	20	B
Sample Road on-ramp to CD Road on-ramp_Basic	5,140	5,116	100%	69	26	C
CD Road on-ramp to CD Road off-ramp_Weave	6,530	6,494	99%	54	32	D
CD Road off-ramp to Glades Road off-ramp_Basic	5,540	5,524	100%	68	29	D
Glades Road off-ramp_Diverge	5,540	5,475	99%	58	25	C
Glades Road off-ramp to on-ramp_Basic	4,480	4,457	99%	69	23	C
Glades Road on-ramp_Merge	5,220	5,167	99%	70	20	B
Downstream of Glades Road_Basic	5,220	5,198	100%	69	27	D
Florida's Turnpike Southbound						
Upstream of Glades Road_Basic	4,160	4,064	98%	70	21	C
Glades Road off-ramp_Diverge	4,160	4,019	97%	71	15	B
Glades Road off-ramp to on-ramp_Basic	3,580	3,461	97%	71	18	B
Glades Road on-ramp_Merge	5,240	4,937	94%	51	26	C
Glades Road on-ramp to CD Road off-ramp_Basic	5,240	4,962	95%	68	26	C
CD Road off-ramp_Diverge	5,240	4,945	94%	71	15	B
CD Road off-ramp to on-ramp_Basic	3,440	3,220	94%	71	16	B
CD Road on-ramp_Merge	3,980	3,758	94%	69	15	B
CD Road on-ramp to Sample Road off-ramp_Basic	3,980	3,756	94%	70	19	C
Sample Road off-ramp_Diverge	3,980	3,608	91%	68	14	B
Sample Road off-ramp to on-ramp_Basic	3,580	3,369	94%	71	16	B
Sample Road on-ramp_Merge	4,610	4,396	95%	67	18	B
Downstream of Sample Road_Basic	4,610	4,391	95%	69	23	C

Red Highlight: % Served < or = 95%

Table 2.10 indicates the MOEs for AM and PM peak hours for the collector distributor (CD) roadway segments. All the segments operate at LOS D or better, except for the basic segment between the eastbound off-ramp to Florida's Turnpike southbound and eastbound off-ramp to Florida's Turnpike northbound, which operates at LOS F during the AM peak-hour.

Table 2.10 – 2016 AM and PM Existing Peak-Hour Vissim Collector Distributor Roadway Segment Analysis

Segment	Demand	Processed	% Served	Speed	Density pc/mi/ln	Estimated LOS
AM Peak Hour						
CD Road Westbound						
Turnpike NB on-ramp to Sawgrass off-ramp_Weave	710	477	67%	45	6	A
Sawgrass Expressway off-ramp to Turnpike SB on-ramp_Basic	420	403	96%	51	9	A
Turnpike SB on-ramp to Lyons Road off-ramp_Weave	1,880	1,869	99%	55	12	B
CD Road Eastbound						
Lyons Road on-ramp to Turnpike SB off-ramp_Basic	3,780	3,786	100%	45	31	D
Turnpike SB off-ramp to Turnpike NB off-ramp_Basic	2,160	2,122	98%	27	**48**	**F**
PM Peak Hour						
CD Road Westbound						
Turnpike NB on-ramp to Sawgrass off-ramp_Weave	1,325	801	60%	44	10	A
Sawgrass Expressway off-ramp to Turnpike SB on-ramp_Basic	545	554	102%	50	12	B
Turnpike SB on-ramp to Lyons Road off-ramp_Weave	2,345	2,275	97%	55	15	B
CD Road Eastbound						
Lyons Road on-ramp to Turnpike SB off-ramp_Basic	2,065	2,079	101%	46	16	B
Turnpike SB off-ramp to NB off-ramp_Basic	1,525	1,526	100%	41	20	C

Red Highlight: % Served < or = 95%

2.2.15 Toll Facilities

The existing toll facilities within the project limits are All-Electronic Tolling (AET) consisting of a combination of ramp and mainline tolling facilities. Entries to and exits from the Sawgrass Expressway at I-75, I-595, Florida's Turnpike, and SW 10th Street are tolled by the mainline Sunrise Plaza located at Mile Post 1, outside the project limits, and at the mainline Deerfield Plaza located at Mile Post 20, within the project limits.

The Deerfield Plaza collects toll revenue for the northbound entry and traffic movements from Coral Ridge Drive, Mile Post 14 (outside the project limits), north to the Florida's Turnpike, and SW 10th Street. The Deerfield Plaza collects toll revenue for all Sawgrass Expressway southbound movements from the Florida's Turnpike and SW 10th Street. The Deerfield Plaza consists of the following:

- A signature gantry and toll equipment building (No. 4755) with tolling entry traffic from northbound Florida's Turnpike and SW 10th Street to southbound Sawgrass Expressway.
- An accessible gantry, also utilizing equipment building No. 4755, tolling entry traffic from northbound and southbound Florida's Turnpike and SW 10th Street to southbound Sawgrass Expressway and Lyons Road.
- An accessible gantry utilizing equipment building No. 4797 tolling exit traffic from the Sawgrass Expressway and Lyons Road to the Florida's Turnpike and SW 10th Street.

Northbound exit movements from north of Coral Ridge Drive to the Deerfield Plaza are tolled via ramp plazas at University Drive, US 441, and Lyons Road. South of the Deerfield Plaza and within the project limits, tolling for southbound entry movements is accomplished via ramp toll facilities at US 441 and at Lyons Road.

The Lyons Road interchange includes a northbound exit and a southbound entry ramp. The northbound exit ramp plaza consists of a non-accessible span gantry and equipment building No. 4953 located in the southwest corner of the interchange. The southbound entry ramp plaza consists of a non-accessible span gantry and equipment building No. 4956 located in the northwest quadrant of the interchange. The northbound entry from Lyons Road is tolled at the Deerfield Plaza.

The US 441 interchange toll facilities consist of three ramp plazas for northbound exit to southbound US 441, northbound exit to northbound US 441, and southbound entry to southbound Sawgrass Expressway. The southbound Sawgrass Expressway exit to southbound US 441 and the northbound entry from US 441 are tolled at the Deerfield Plaza. The northbound exit ramp to southbound US 441 consists of a non-accessible span gantry and equipment building No. 4949 located in the southwest quadrant of the interchange. The northbound exit ramp to northbound US 441 consists of a non-accessible span gantry and equipment building No. 4944 located in the southeast quadrant of the interchange. The southbound entry ramp consists of a non-accessible span gantry and equipment building No. 4978 located in the northwest quadrant of the interchange.

2.2.16 Crash Data

Crash data for existing facilities were obtained from the state's Crash Analysis Reporting System (CARS) and Signal 4 Analytics, for years 2013 through 2017. The data reports were analyzed for each mainline roadway, interchange ramp, and intersection within the study area. Detailed crash reports (CARS long forms) were reviewed to verify the accuracy of the information obtained from the database.

Sawgrass Expressway Mainline (MP 17.507 to MP 21.835)
The Sawgrass Expressway, from west of US 441 to its terminus at Florida's Turnpike currently has six general toll lanes (three in each direction) with auxiliary lanes. A CD road exists between the Lyons Road interchange and the Florida's Turnpike. A total of 301 crashes were reported along the Sawgrass Expressway mainline during the five-year analysis period from 2013 through 2017 with an average of 60 crashes per year. Rear-end crashes (34%) constituted the majority of the crashes. Based on the crash data, 27% of crashes occurred within less than a mile from the US 441 Interchange (between mileposts 18.33-19.16), 16% of crashes occurred within less than half a mile from the Florida's Turnpike Interchange (between mileposts 20.46-20.84), and 13% of crashes occurred within less than half a mile from the Lyons Road Interchange (between mileposts 19.48-19.82). One fatal crash was reported, which was an off-road single vehicle crash occurred on SW 10th Street west of Independence Drive. At least 59% of the total crashes resulted in property damage only. Three crashes were reported with unknown crash severity as two of the vehicles were abandoned by drivers and one vehicle had left the scene prior to the officer arrival.

As shown in ***Figure 2.10***, 60% of the crashes occurred on dry roadway conditions and 73% of the crashes occurred during daylight condition. ***Figure 2.11*** graphically depicts the location of crashes by severity within the study area.

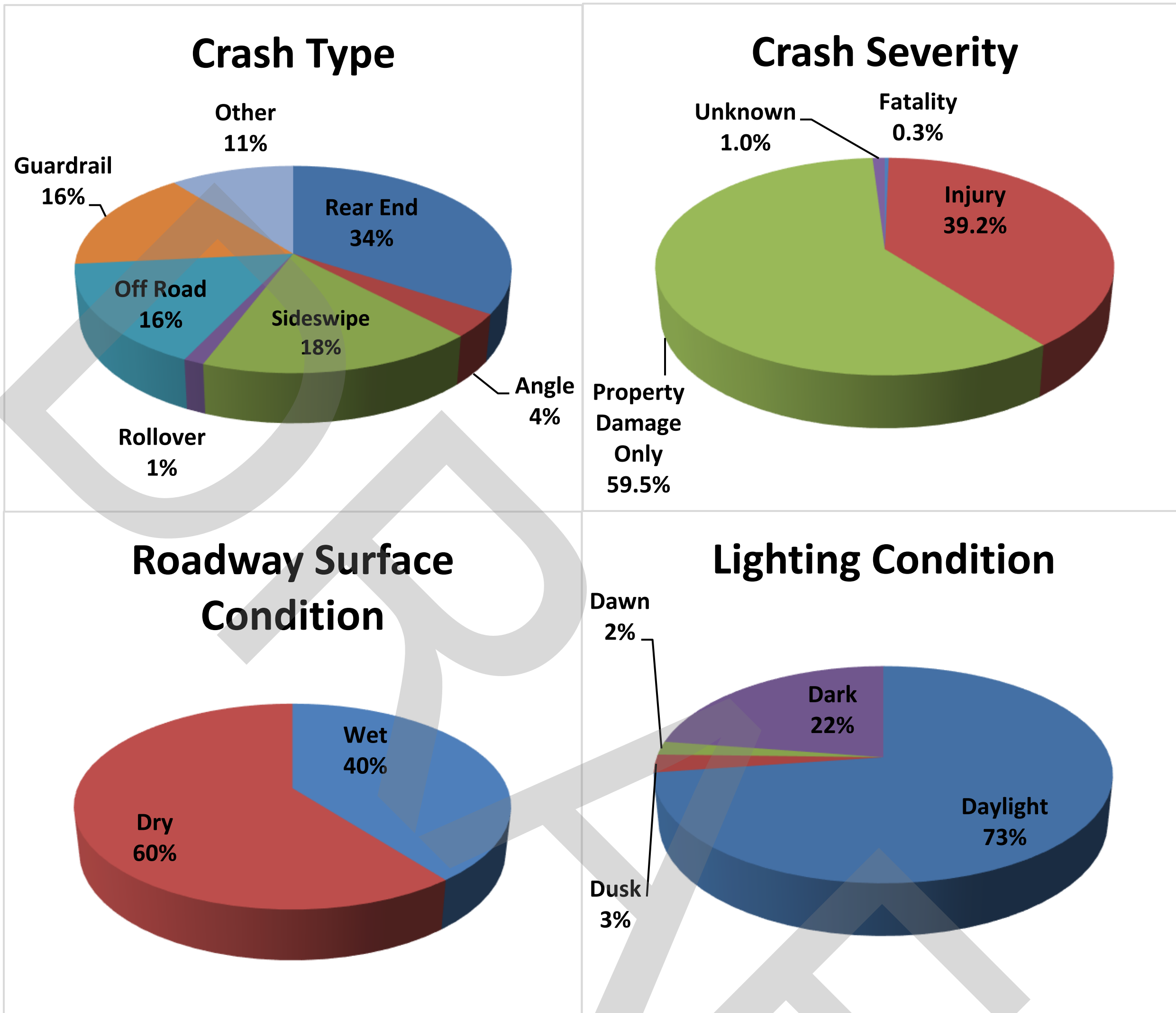


Figure 2.10 – 2013 through 2017 Crash Data Summary – Sawgrass Expressway Mainline

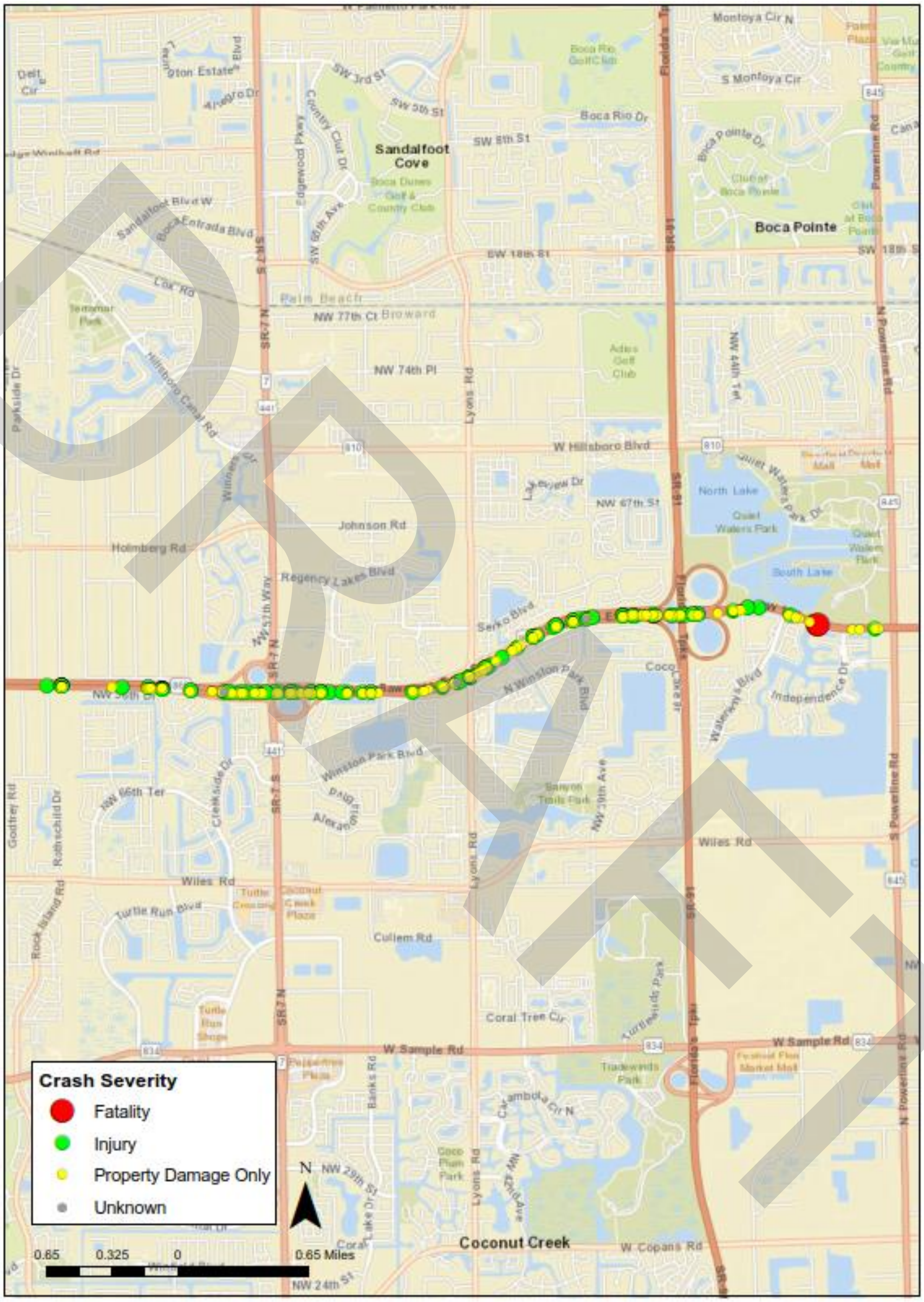


Figure 2.11 – 2013 through 2017 Sawgrass Expressway Study Area Severity of Crashes

Florida's Turnpike Mainline (MP 0.0 to MP 3.837 Palm Beach County and MP 21.0 to MP 25.912 Broward County)

A total of 1,021 crashes were reported along Florida's Turnpike from south of Sample Road to north of Glades Road during the five-year analysis period from 2013 through 2017 with an average of 204 crashes per year. Rear-end crashes (46%) constituted the majority of the crashes. Based on the crash data, 33 % of crashes occurred within 1.7 miles between Palmetto Park Road (milepost 1.62) and Glades Road (milepost 3.34), and 17% of crashes occurred within less than a mile from the Sample Road Interchange (between mileposts 21.64-22.46). A total of four fatal crashes were reported. Three of the four fatal crashes occurred between Wiles Road (milepost 23.2) and Sawgrass Expressway (milepost 24.2), and one fatal crash occurred at milepost 1.3. Three crashes were reported with unknown crash severity as the vehicles were abandoned by the driver. At least 62% of the total crashes resulted in property damage only. As shown in ***Figure 2.12***, 72% of the crashes occurred on dry roadway conditions and 71% of the crashes occurred during daylight condition. ***Figure 2.13*** graphically depicts the location of crashes by severity within the study area. Figures and reporting include crash information from some of the adjacent interchanges from the study area to understand the operations next to the project limits.

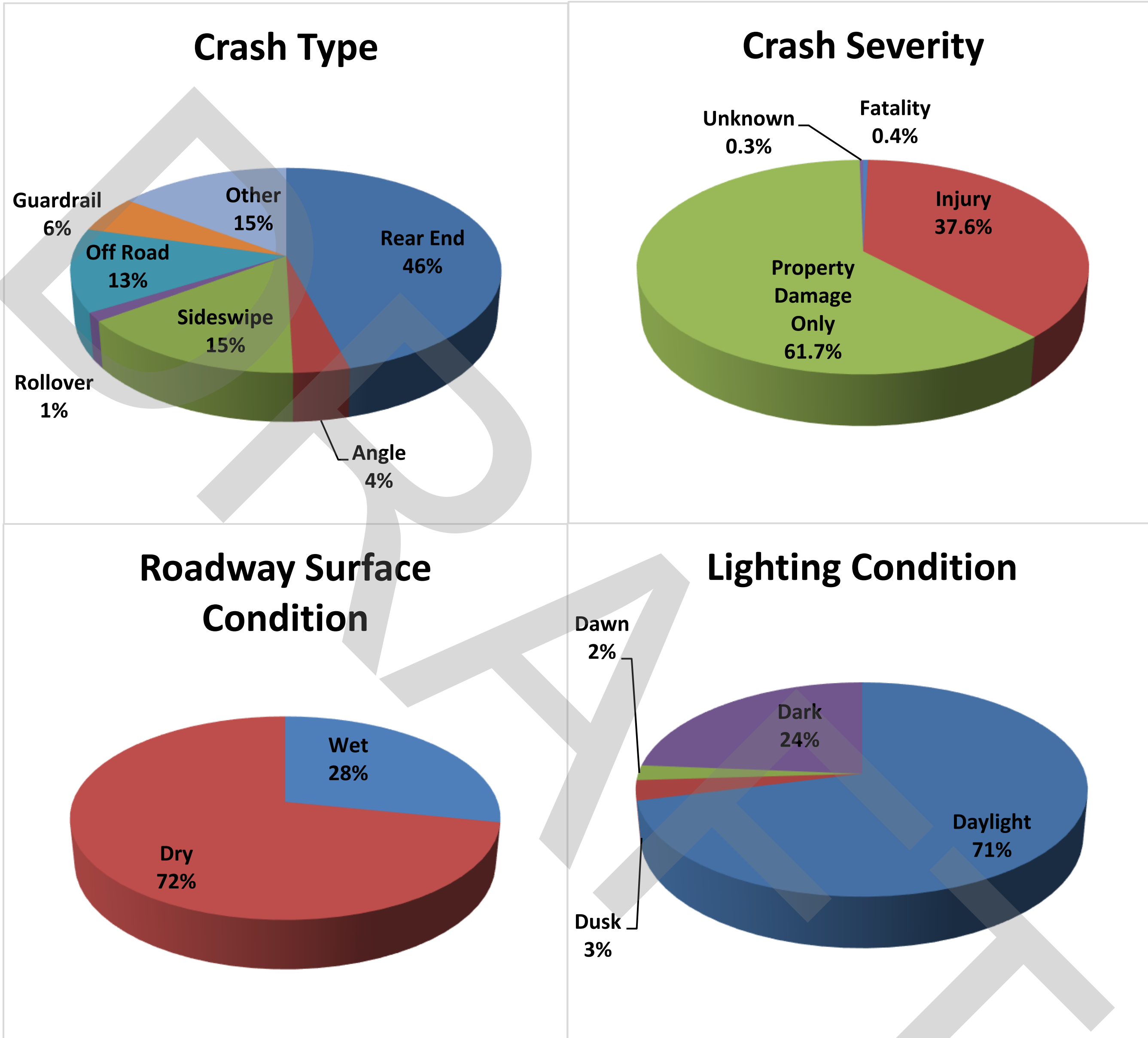


Figure 2.12 – 2013 through 2017 Crash Data Summary – Florida's Turnpike Mainline

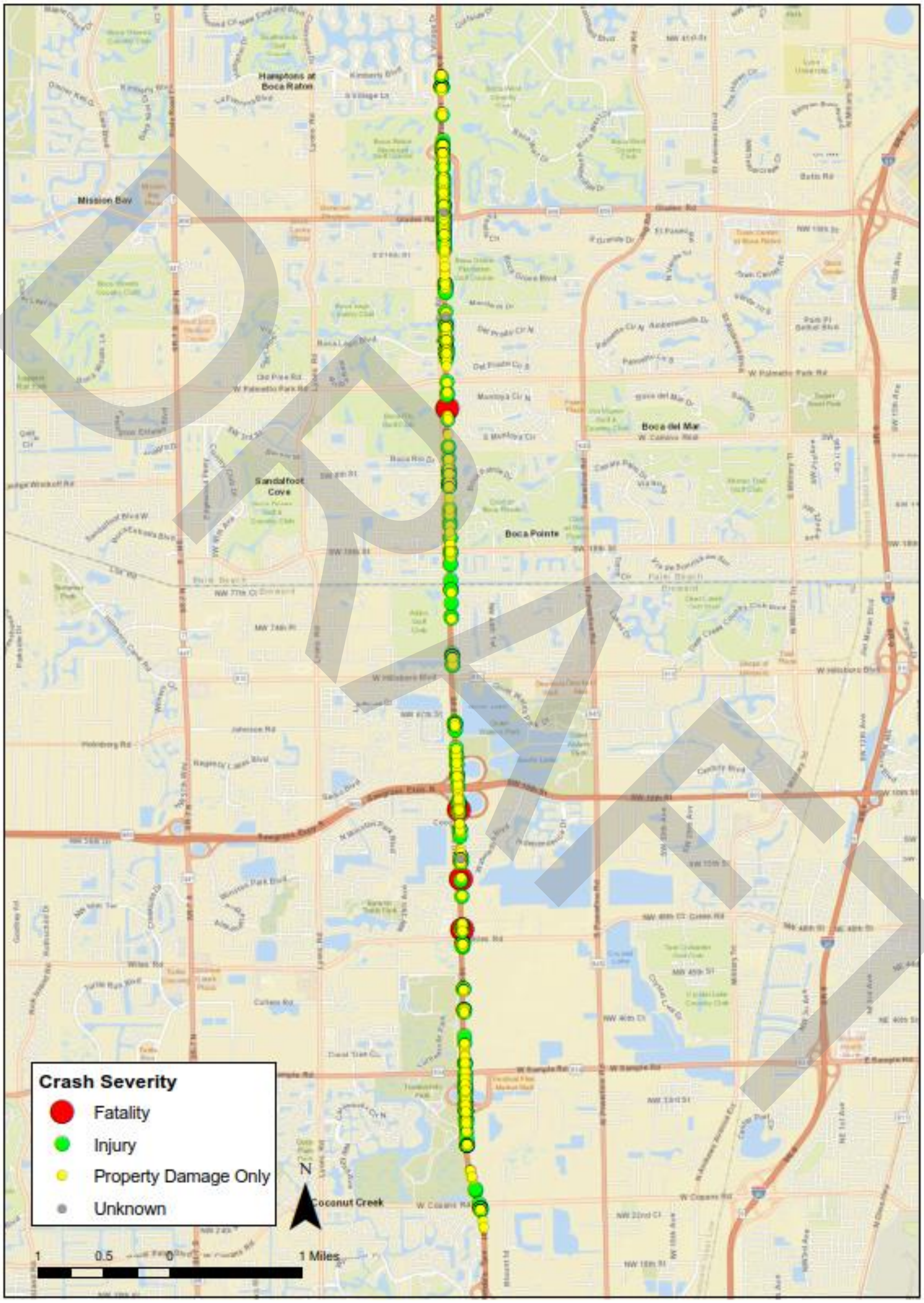


Figure 2.13 – 2013 through 2017 Florida's Turnpike Study Area Severity of Crashes

Sawgrass Expressway at Florida's Turnpike Interchange Ramps (Exit 21 AB)

The Sawgrass Expressway at Florida's Turnpike Interchange ramps experienced a total of 50 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 34% of the total crashes resulted in injuries. Two crashes were reported with unknown crash severity as vehicles had left the scene prior to the officer arrival. As shown on ***Figure 2.14***, off-road crashes (approximately 38%) were the prominent crash types along the interchange ramps. Reports indicated that 60% of the crashes occurred during wet roadway conditions and 26% crashes occurred during night-time hours.

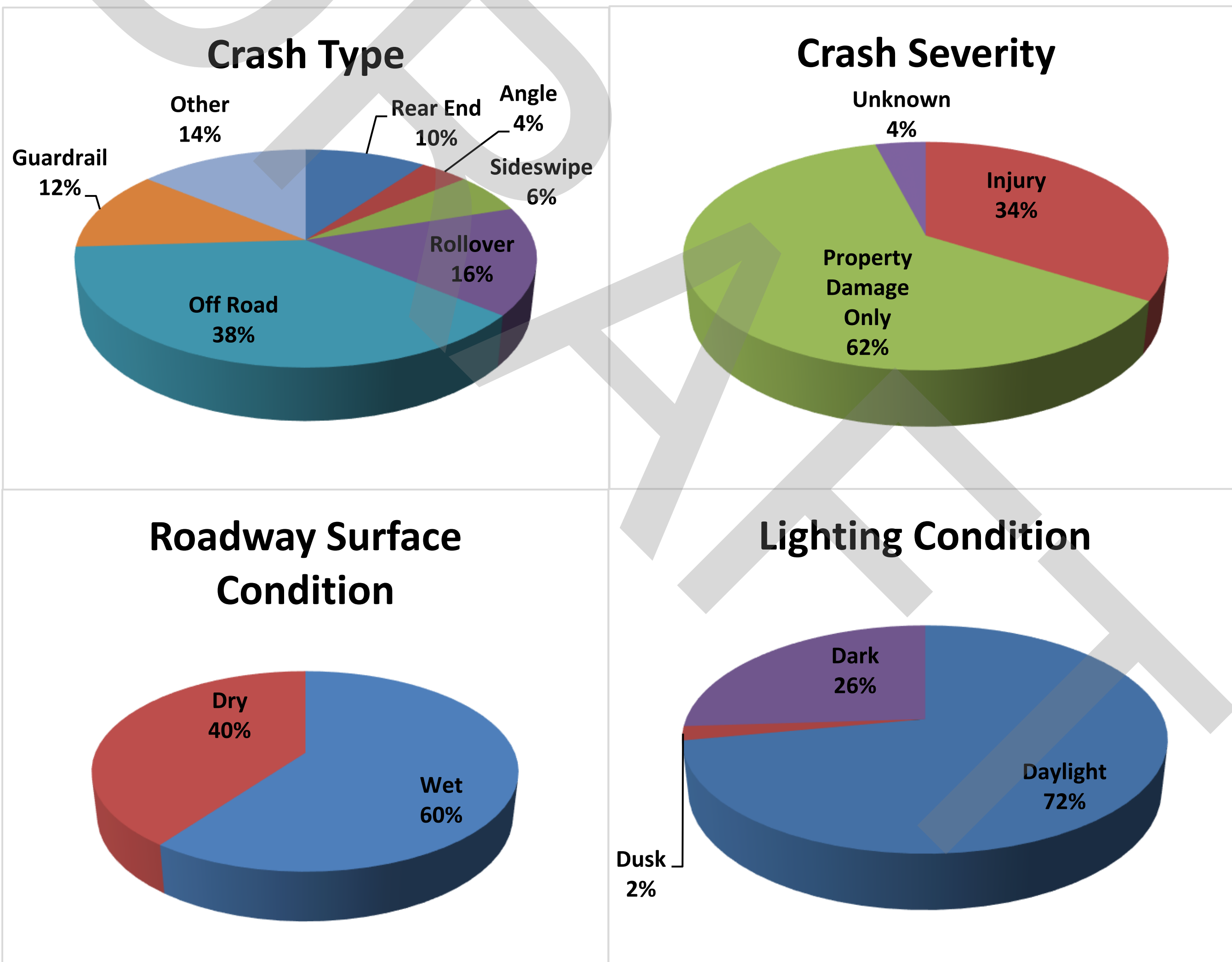


Figure 2.14 – 2013 through 2017 Crash Data Summary – Sawgrass Expressway at Florida's Turnpike Interchange Ramps

Sawgrass Expressway at Collector-Distributor (CD) Roadway between Lyons Road and Florida's Turnpike

The Sawgrass Expressway CD Road between Lyons Road and Florida's Turnpike experienced a total of 21 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 52% of the total crashes resulted in injuries. As shown on ***Figure 2.15***, rear end crashes (approximately 62%) were the prominent crash types along the CD road. Reports indicated that 29% of the crashes occurred during wet roadway conditions and 19% crashes occurred during night-time hours.

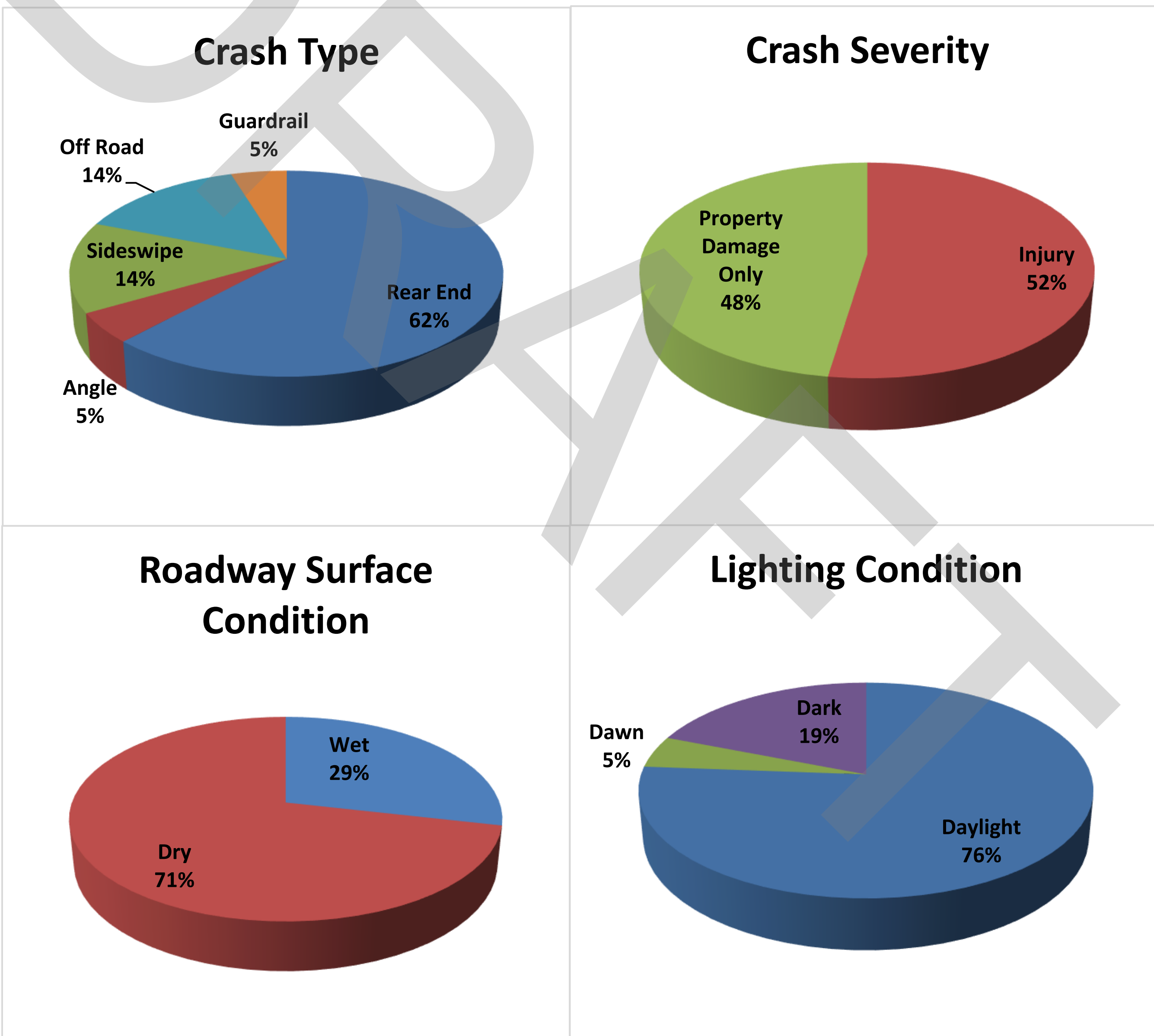


Figure 2.15 – 2013 through 2017 Crash Data Summary – Sawgrass Expressway CD Roadway between Lyons Road and Florida's Turnpike

Sawgrass Expressway at US 441 Interchange Ramps

The Sawgrass Expressway at US 441 interchange ramps experienced a total of 62 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 39% of the total crashes resulted in injuries. Two crashes were reported with unknown crash severity as vehicles had left the scene prior to the officer arrival. As shown on ***Figure 2.16***, off-road crashes (approximately 57%) were the prominent crash type along the interchange ramps. Reports indicated that 66% of the crashes occurred during wet roadway conditions and 31% crashes occurred during night-time hours.

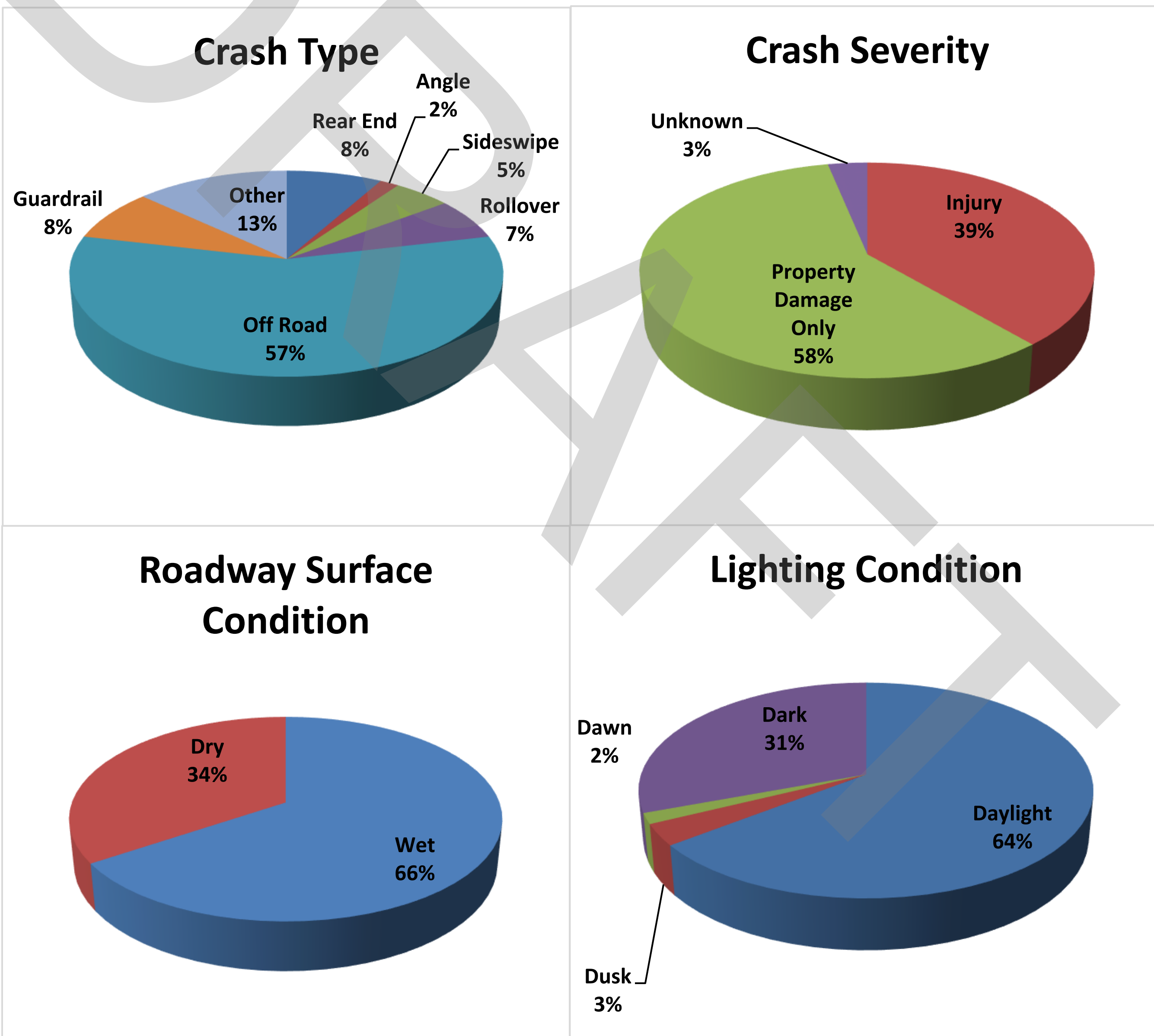


Figure 2.16 – 2013 through 2017 Crash Data Summary – Sawgrass Expressway at US 441 Interchange Ramps

Sawgrass Expressway at Lyons Road Interchange Ramps

The Sawgrass Expressway at Lyons Road interchange ramps experienced a total of 9 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 44% of the total crashes resulted in injuries. As shown on ***Figure 2.17***, rear end crashes (approximately 34%) were the prominent crash types along the interchange ramps. Reports indicated that 44 % of the crashes occurred during wet roadway conditions and 11% crashes occurred during night-time hours.

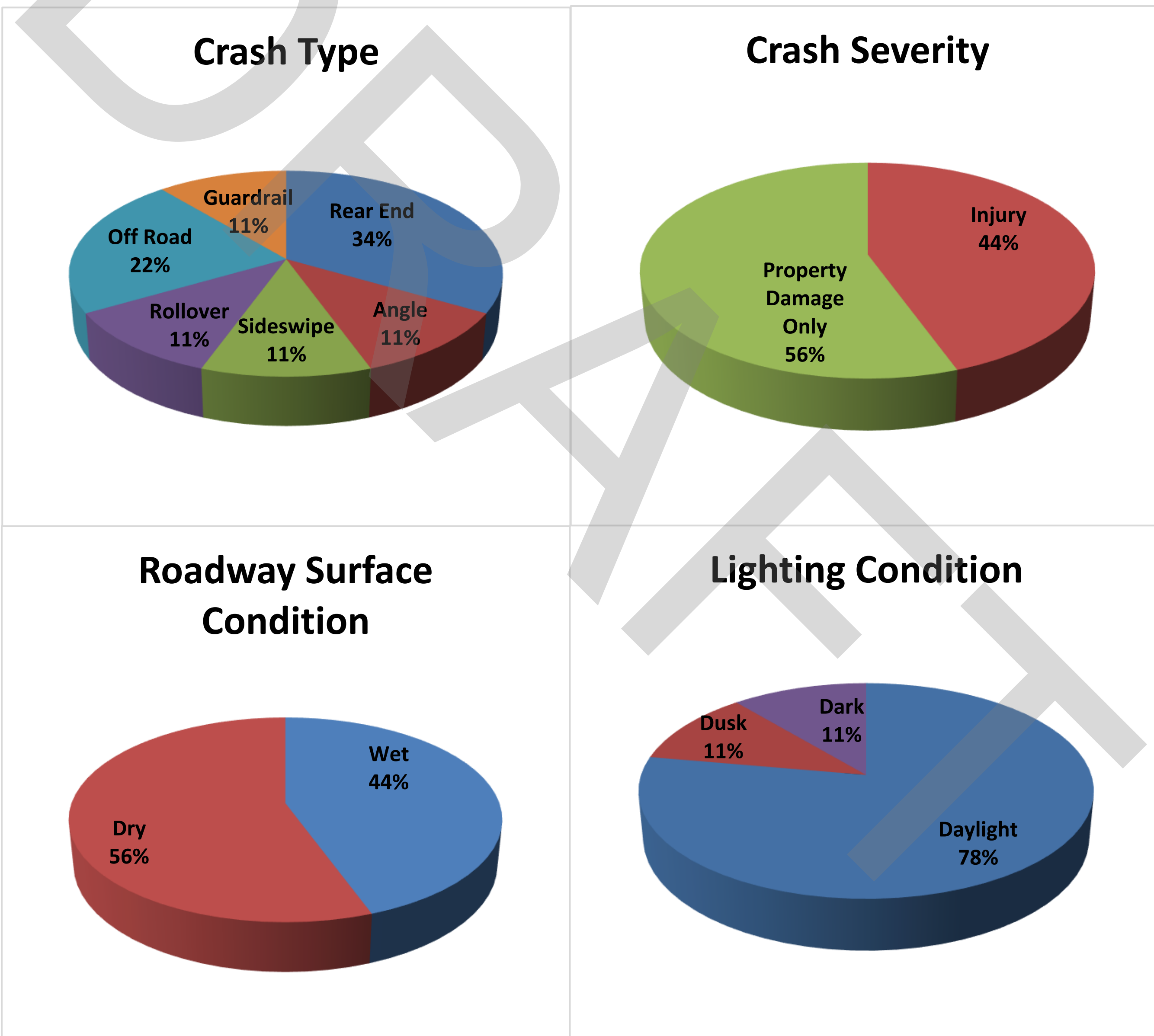


Figure 2.17 – 2013 through 2017 Crash Data Summary – Sawgrass Expressway at Lyons Road Interchange Ramps

Actual crash rates for the freeway mainline and ramp segments were computed and compared with average crash rates for similar facilities across the state utilizing the statewide five-year average crash rate (2013-2017). The existing Sawgrass Expressway and Florida's Turnpike segments within the study area are under urbanized area. Critical crash rates and safety ratios were also estimated. Crash rates for the roadways were estimated as crashes per Million Vehicles Miles Travelled (MVMT). The critical crash rate is based on the average crash rate for a similar facility adjusted by vehicle exposure and a probability constant. The safety ratio represents the actual crash rate divided by the critical crash rate. If a segment has an actual crash rate higher than the critical crash rate (i.e., safety ratio > 1.0), it may have a safety deficiency. Florida's Turnpike and Sawgrass Expressway within the study area have actual crash rates lower than the critical crash rate (i.e., safety ratio < 1.0) as shown in ***Table 2.11***.

Table 2.11 – 2013 through 2017 Mainline and Ramps Crash Rates and Safety Ratios

Description	Total Crashes	Actual Crash Rate	Average Crash Rate*	Critical Crash Rate	Safety Ratio
Sawgrass Expressway Mainline					
West of US 441 (SR 7) to Powerline Road	301	0.69	0.766	0.99	0.70
Florida's Turnpike Mainline					
North of Glades Road to South of Sample Road	1,021	0.70	0.766	0.89	0.79
Sawgrass Expressway Interchange Ramps					
Sawgrass Expressway at Turnpike interchange ramps	50	0.44	0.766	1.21	0.36
Sawgrass Expressway at Collector-Distributor (CD) Road between Lyons Road and Florida's Turnpike	21	0.19	0.766	1.26	0.15
Sawgrass Expressway at US 441 Interchange Ramps	62	0.61	0.766	1.24	0.49
Sawgrass Expressway at Lyons Road Interchange Ramps	9	0.20	0.766	1.50	0.13

*Florida Statewide five-year Average Crash Rate (2013 - 2017)
Freeway and Interchanges Crash Rate used for "Toll Road Urban"
Freeways: Crashes per Million Vehicle Miles Travelled (MVMT)

Signal four, a FDOT-funded database developed in coordination with the state's CARS, was used to obtain crash data for side streets that are not included in the FDOT crash database. Intersection crashes were extracted by providing a 250-foot influence area.

US 441 and Regency Lake Boulevard Intersection

The US 441/Regency Lake Boulevard intersection experienced a total of 143 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 41% of the total crashes resulted in injuries. As shown in ***Figure 2.18***, rear end crashes (approximately 55%) was the prominent crash type at the intersection. Reports indicated that 15 % of the crashes occurred during wet roadway conditions and 23% crashes occurred during night-time hours.

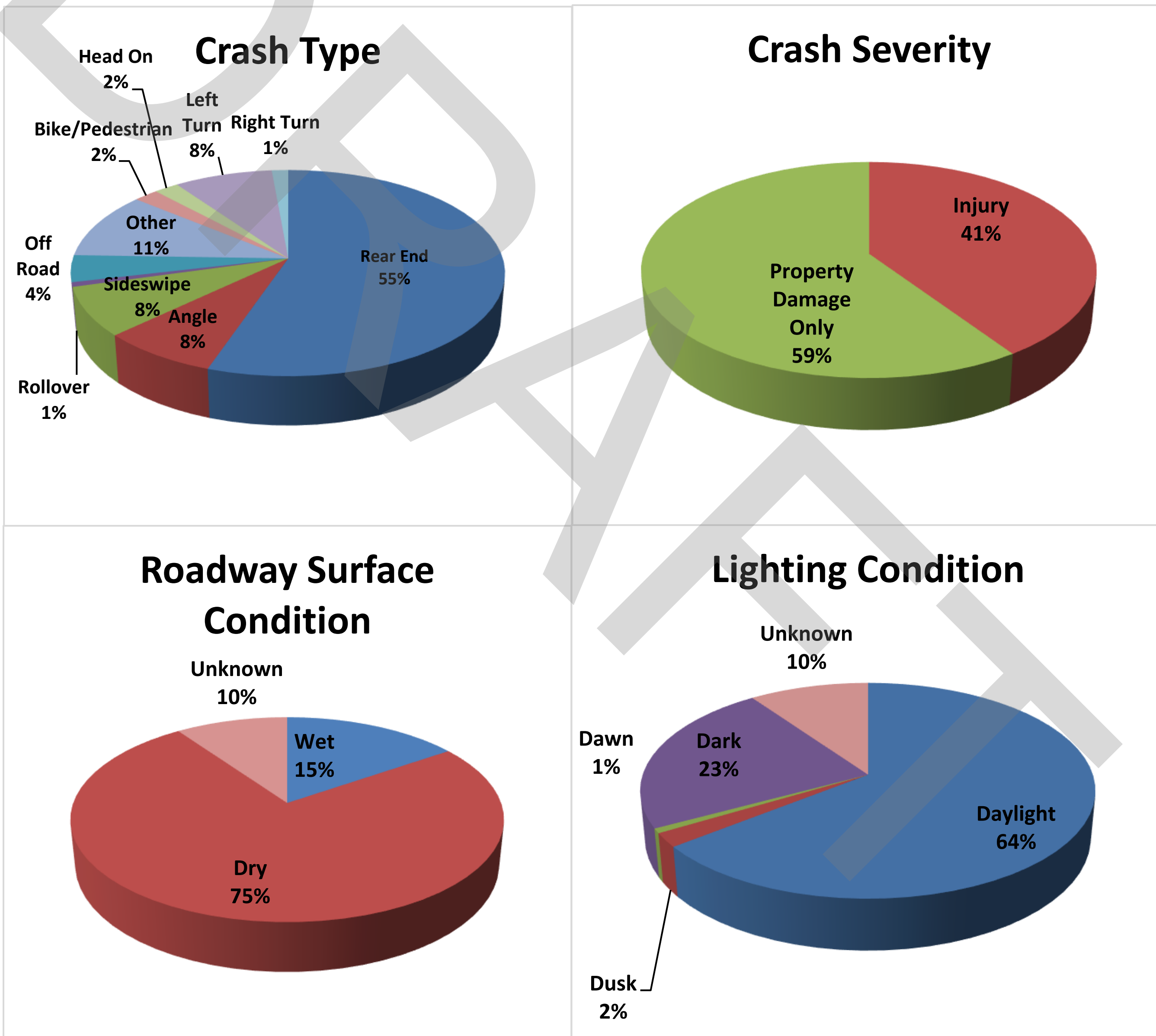


Figure 2.18 – 2013 through 2017 Crash Data Summary – US 441 and Regency Lake Boulevard Intersection

US 441 and Winston Park Boulevard Intersection

The US 441 and Winston Park Boulevard intersection experienced a total of 134 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 24% of the total crashes resulted in injuries. Three crashes were reported with unknown crash severity as vehicles had left the scene prior to the officer arrival. As shown in ***Figure 2.19***, rear-end crashes (approximately 64%) was the prominent crash type at the intersection. Reports indicated that 16% of the crashes occurred during wet roadway conditions and 31% crashes occurred during night-time hours.

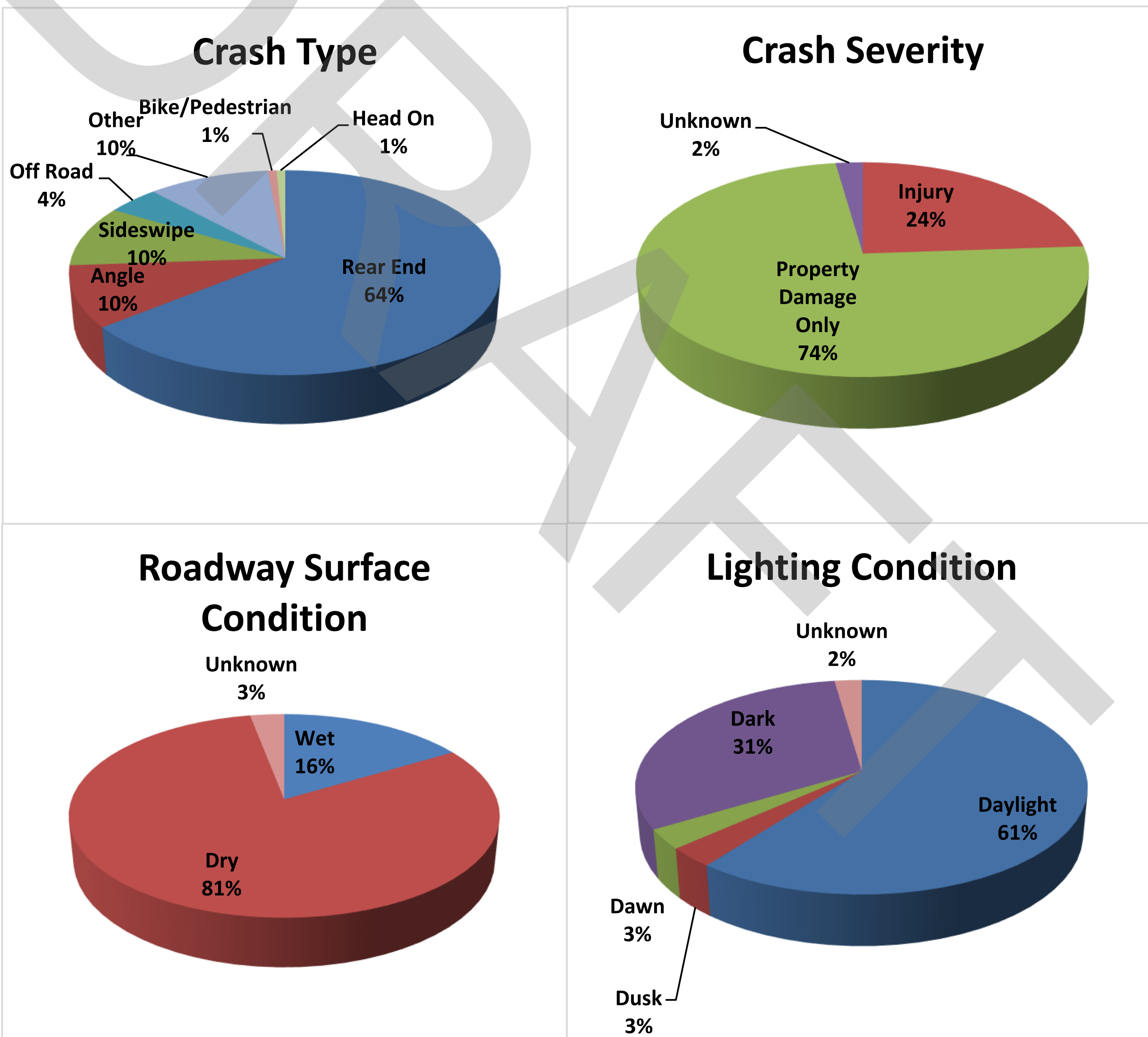


Figure 2.19 – 2013 through 2017 Crash Data Summary – US 441 and Winston Park Boulevard Intersection

Lyons Road and Serko Boulevard Intersection

The Lyons Road and Serko Boulevard intersection experienced a total of 181 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 27% of the total crashes resulted in injuries. As shown in ***Figure 2.20***, rear-end crashes (approximately 46%) was the prominent crash type at the intersection. Reports indicated that 15% of the crashes occurred during wet roadway conditions and 13% crashes occurred during night-time hours.

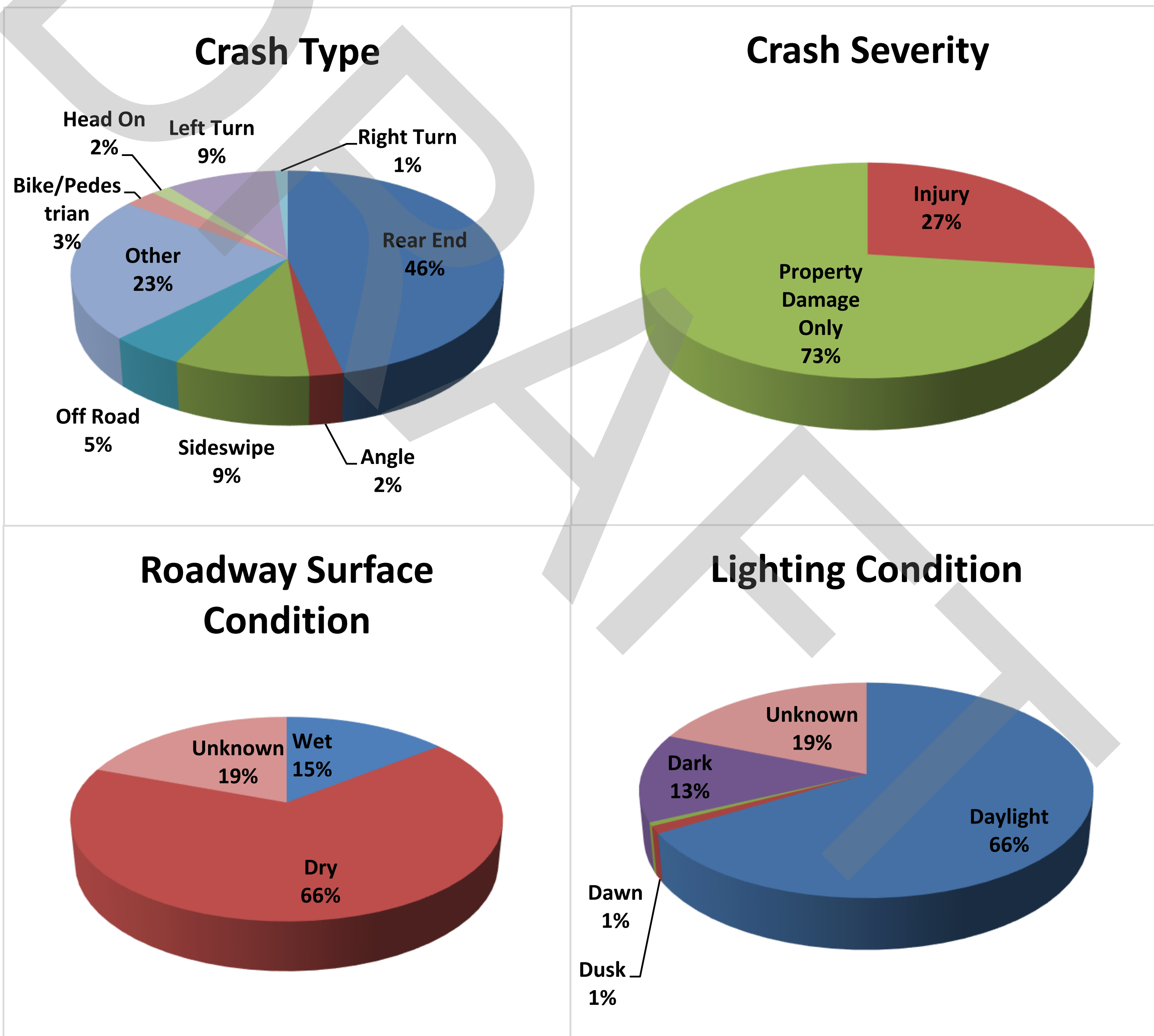


Figure 2.20 – 2013 through 2017 Crash Data Summary – Lyons Road and Serko Boulevard Intersection

Lyons Road and Winston Park Boulevard Intersection

The Lyons Road and Winston Park Boulevard intersection experienced a total of 247 crashes during the five-year analysis period. There was one fatality reported during the study period when a pedestrian was hit by a vehicle at the intersection. At least 27% of the total crashes resulted in injuries. As shown in ***Figure 2.21***, rear-end crashes (approximately 36%) was the prominent crash type at the intersection. Reports indicated that 11% of the crashes occurred during wet roadway conditions and 18% crashes occurred during night-time hours.

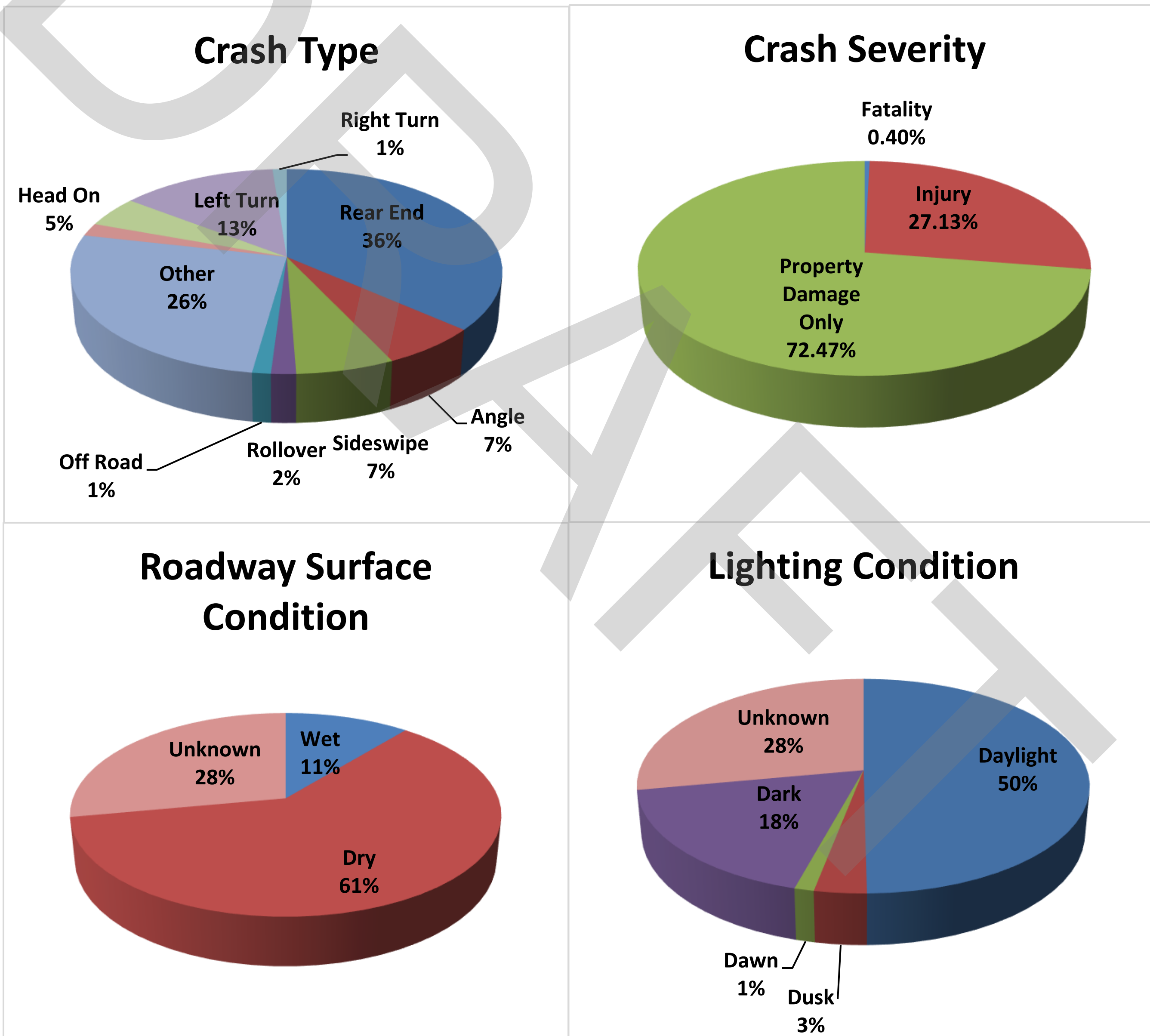


Figure 2.21 – 2013 through 2017 Crash Data Summary – Lyons Road and Winston Park Boulevard Intersection

SW 10th Street and Waterway Boulevard Intersection

The SW 10th Street and Waterway Boulevard intersection experienced a total of 77 crashes during the five-year analysis period There were no fatal crashes reported during the study period. At least 36% of the total crashes resulted in injuries. As shown in ***Figure 2.22***, rear-end crashes (approximately 55%) was the prominent crash type at the intersection. Reports indicated that 12 % of the crashes occurred during wet roadway conditions and 25% crashes occurred during night-time hours.

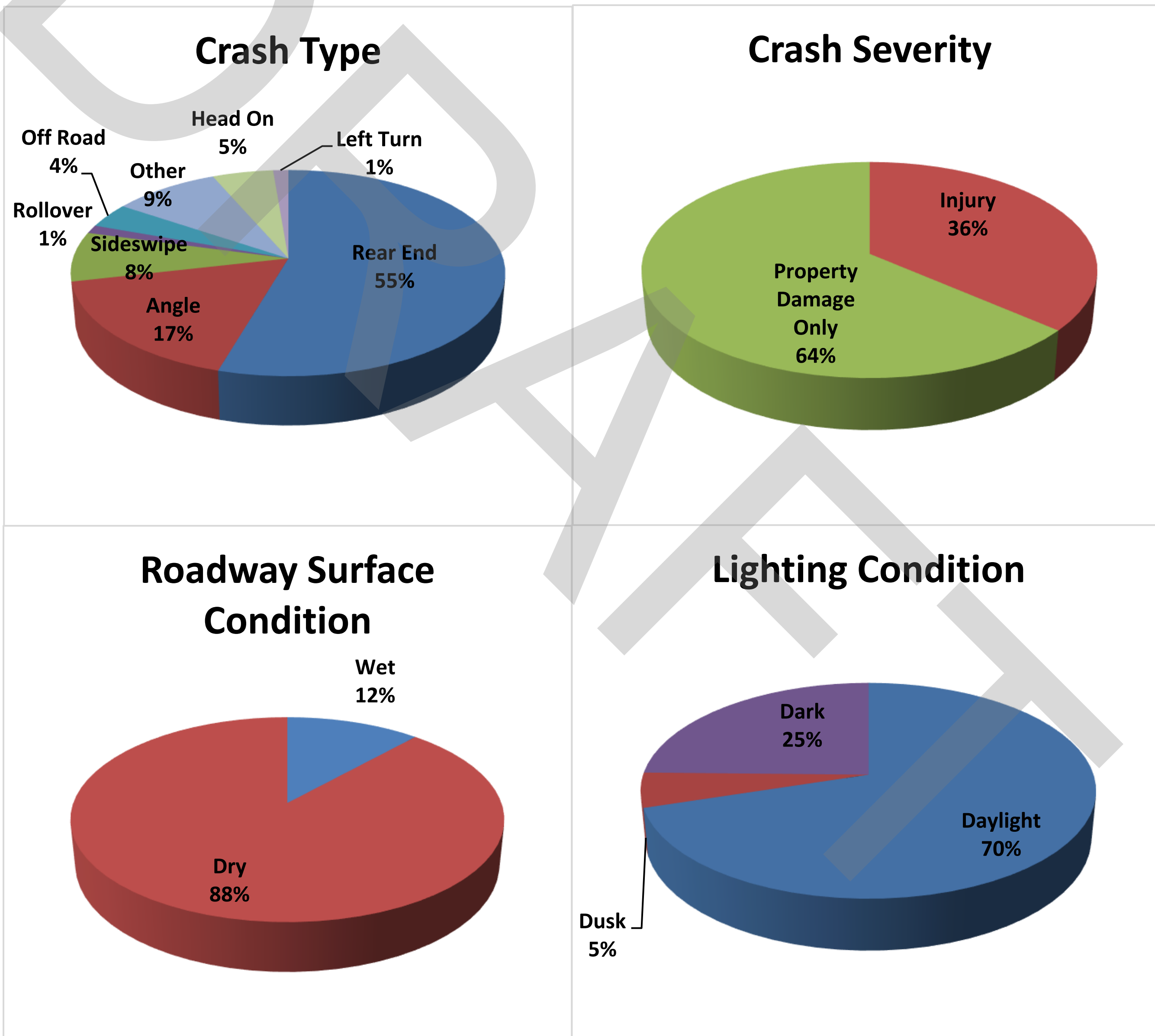


Figure 2.22 – 2013 through 2017 Crash Data Summary – SW 10th Street and Waterway Boulevard Intersection

SW 10th Street and Independence Drive Intersection

The SW 10th Street and Independence Drive Intersection experienced a total of 53 crashes during the five-year analysis period. At least 21 % of the total crashes resulted in injuries. As shown in ***Figure 2.23***, rear-end crashes (approximately 68%) was the prominent type of crashes at the intersection. Reports indicated that 9% of the crashes occurred during wet roadway conditions and 23% crashes occurred during night-time hours.

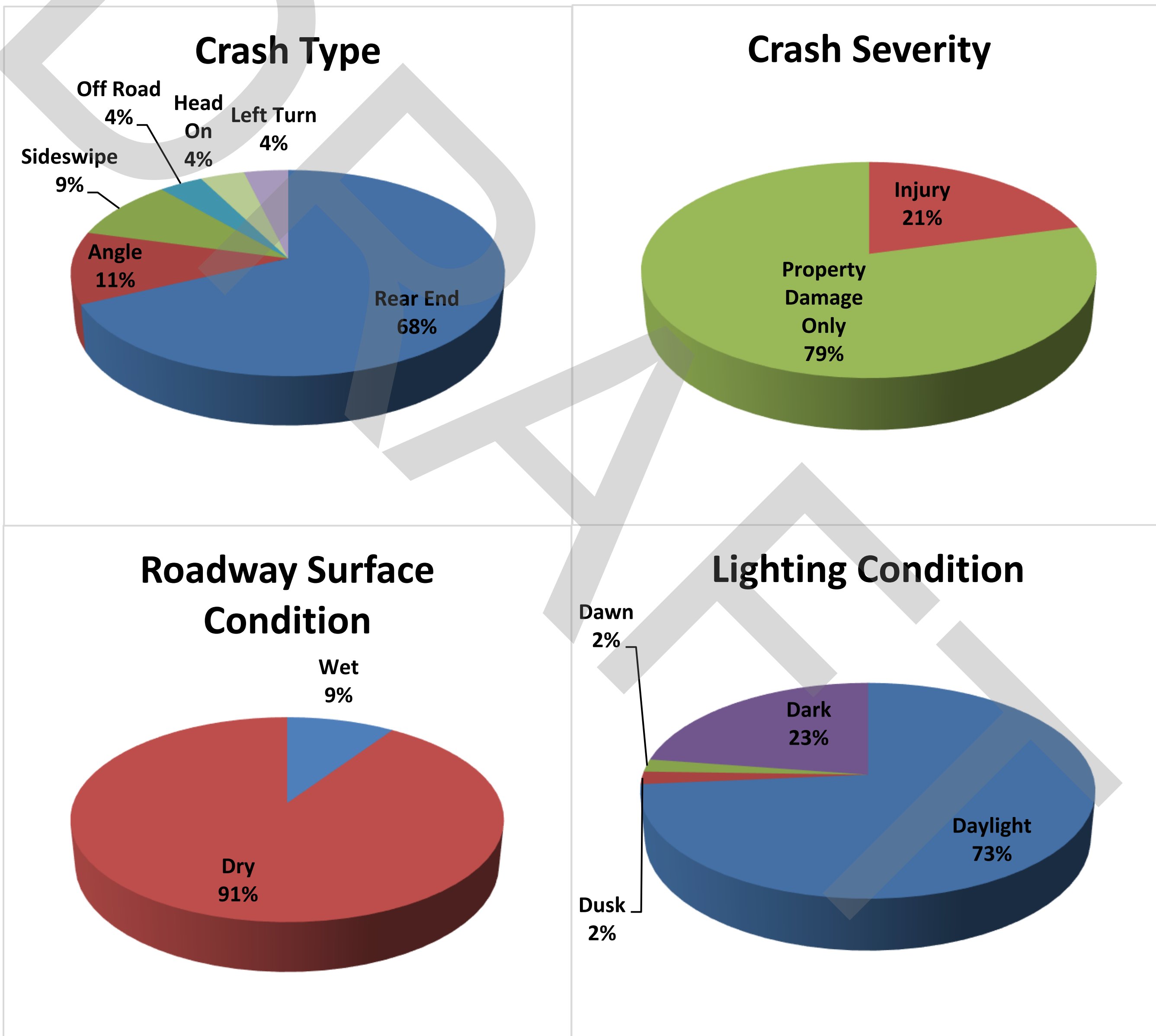


Figure 2.23 – 2013 through 2017 Crash Data Summary – SW 10th Street and Independence Drive Intersection

SW 10th Street and Powerline Road Intersection

The SW 10th Street and Powerline Road Intersection experienced a total of 122 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 39% of the total crashes resulted in injuries. As shown in **Figure 2.24**, rear-end crashes (approximately 63%) was the prominent crash type at the intersection. Reports indicated that 20 % of the crashes occurred during wet roadway conditions and 27% crashes occurred during night-time hours.

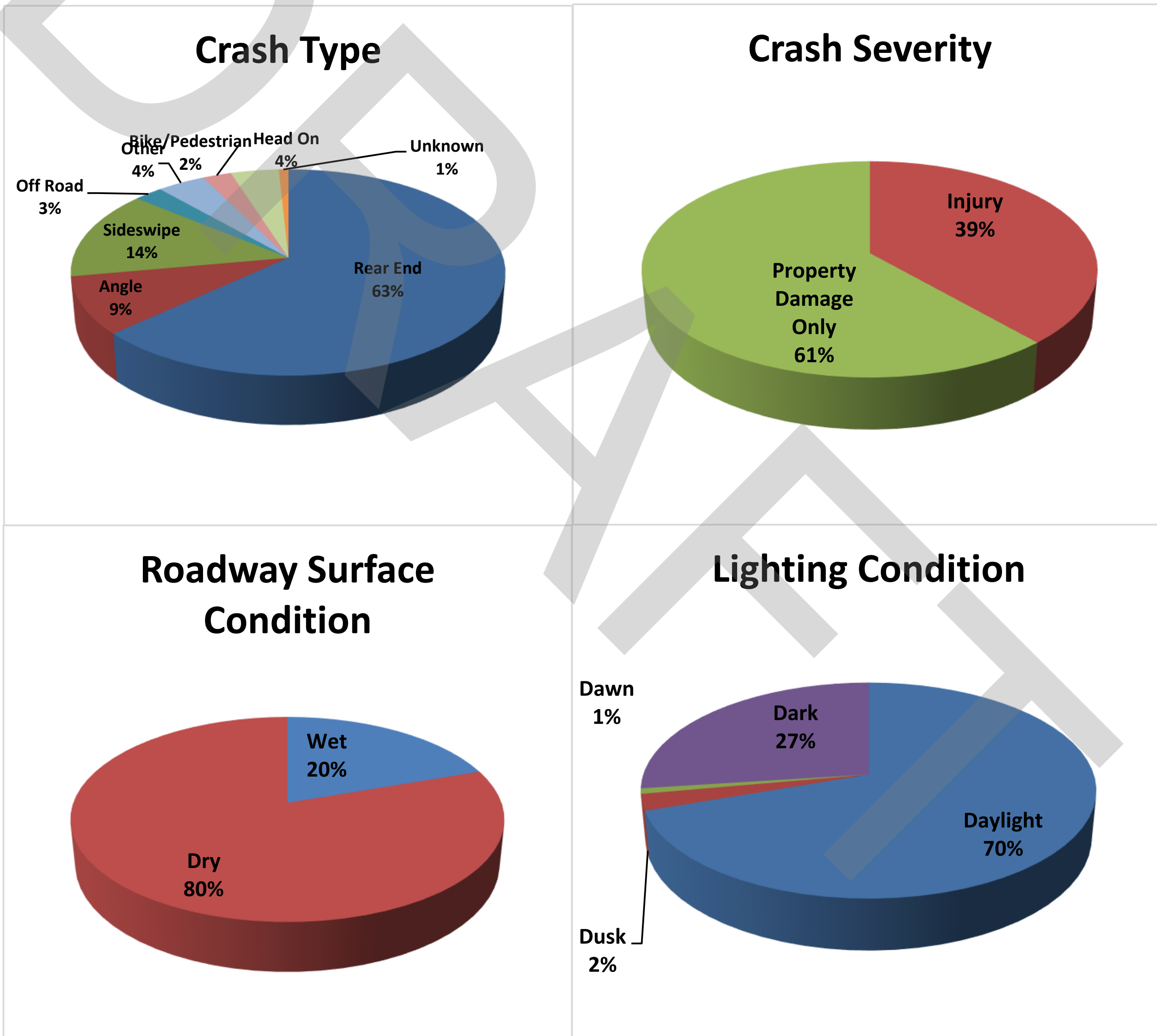


Figure 2.24 – 2013 through 2017 Crash Data Summary – SW 10th Street and Powerline Road Intersection

Sawgrass Expressway Eastbound Ramps and US 441 Intersection

The Sawgrass Expressway Eastbound Ramps and US 441 intersection experienced a total of 39 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 51% of the total crashes resulted in injuries. As shown on **Figure 2.25**, rear-end crashes (approximately 36%) were the prominent crash types at the intersection. Reports indicated that 31 % of the crashes occurred during wet roadway conditions and 28% crashes occurred during night-time hours.

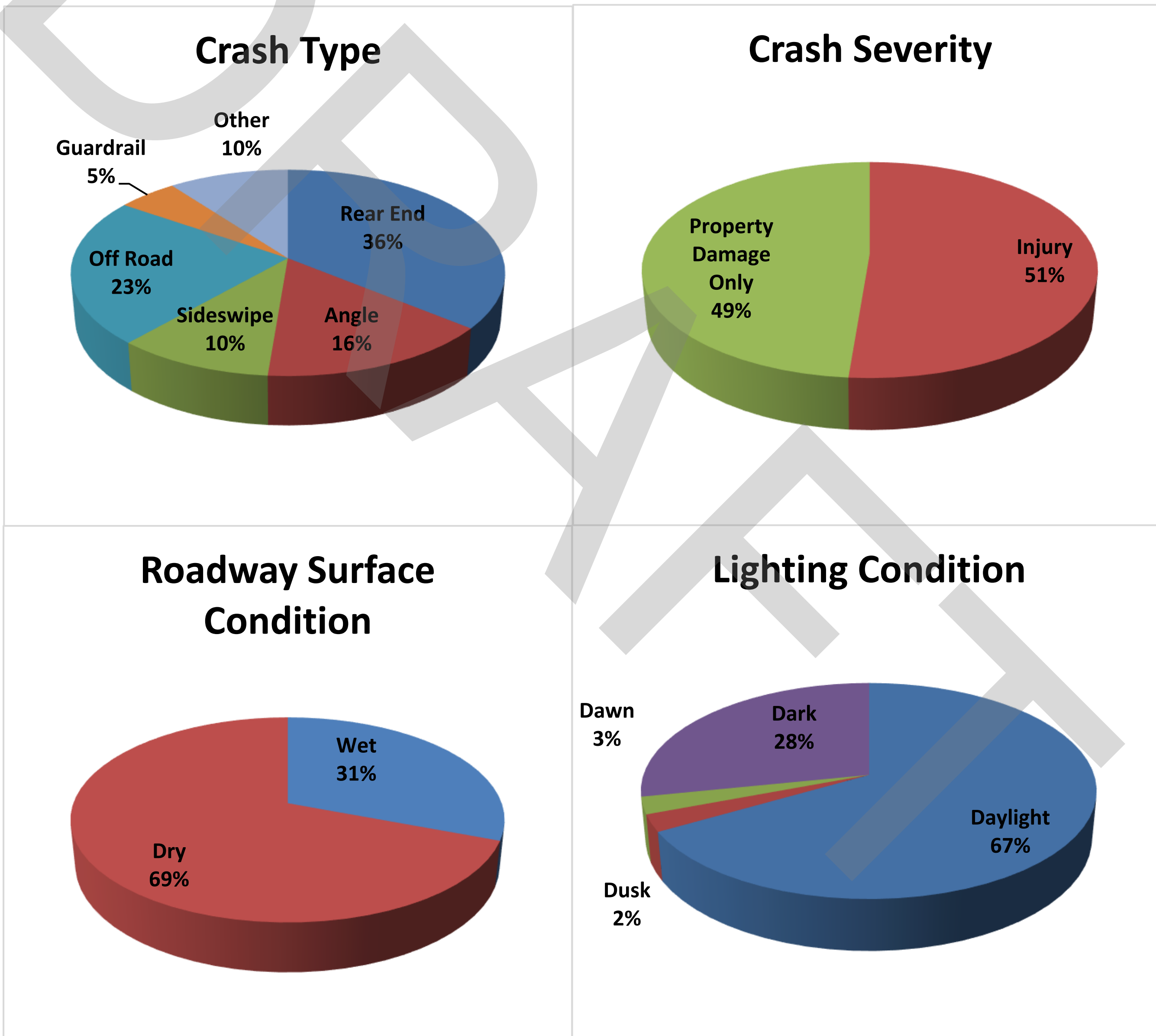


Figure 2.25 – 2013 through 2017 Crash Data Summary – Sawgrass Expressway Eastbound Ramps and US 441 Intersection

Sawgrass Expressway Westbound Ramps and US 441 Intersection

The Sawgrass Expressway Westbound Ramps and US 441 intersection experienced a total of 54 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 39% of the total crashes resulted in injuries. One crash was reported with unknown crash severity as the vehicle was abandoned by the driver. As shown on ***Figure 2.26***, rear-end crashes (approximately 46%) were the prominent crash types at the intersection. Reports indicated that 20 % of the crashes occurred during wet roadway conditions and 24% crashes occurred during night-time hours.

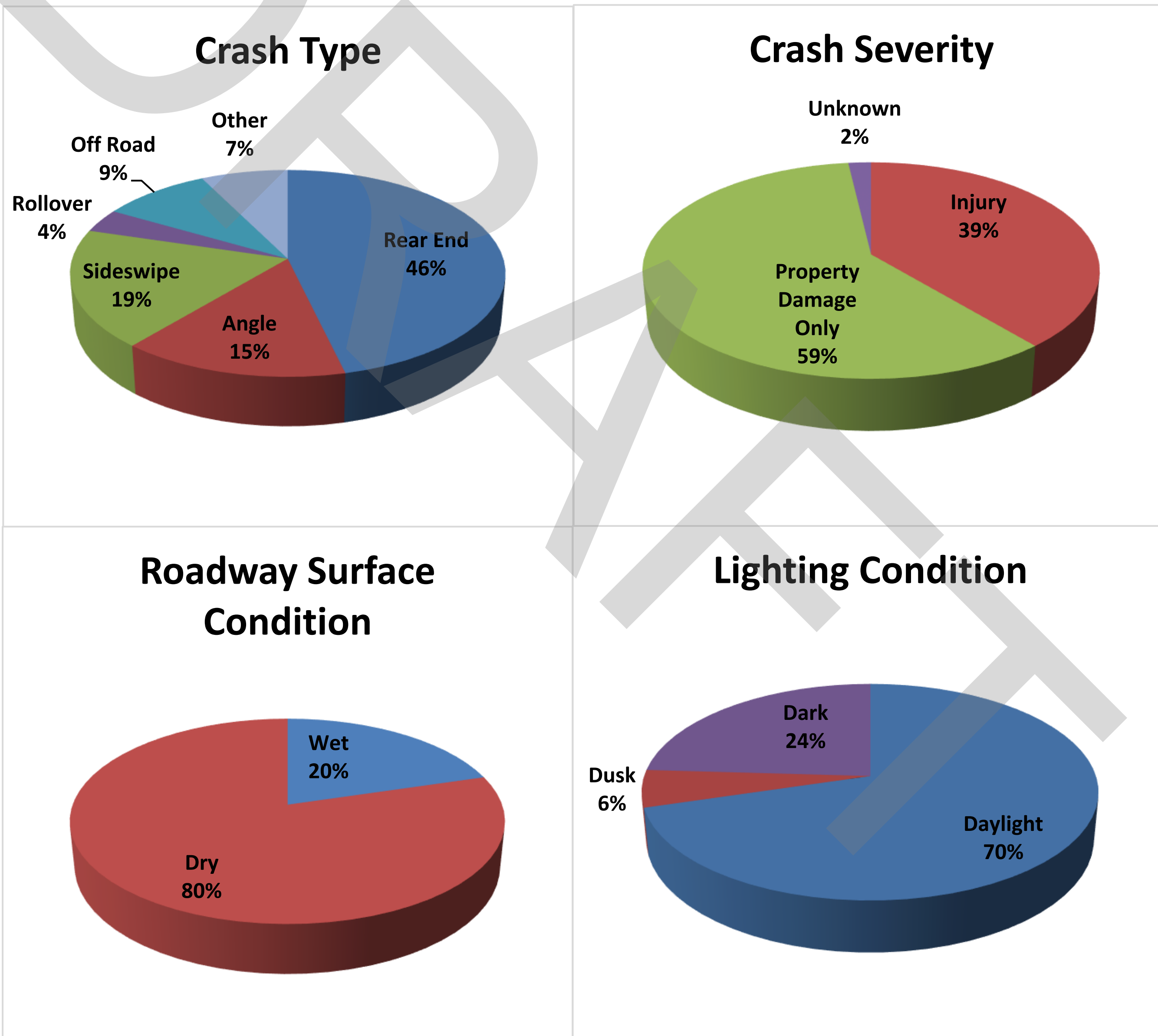


Figure 2.26 – 2013 through 2017 Crash Data Summary – Sawgrass Expressway Westbound Ramps and US 441 Intersection

Sawgrass Expressway Eastbound Ramps and Lyons Road Intersection

The Sawgrass Expressway Eastbound Ramps and Lyons Road intersection experienced a total of 87 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 41% of the total crashes resulted in injuries. As shown on ***Figure 2.27***, rear-end crashes (approximately 37%) were the prominent crash types at the intersection. Reports indicated that 16% of the crashes occurred during wet roadway conditions and 20% crashes occurred during night-time hours.

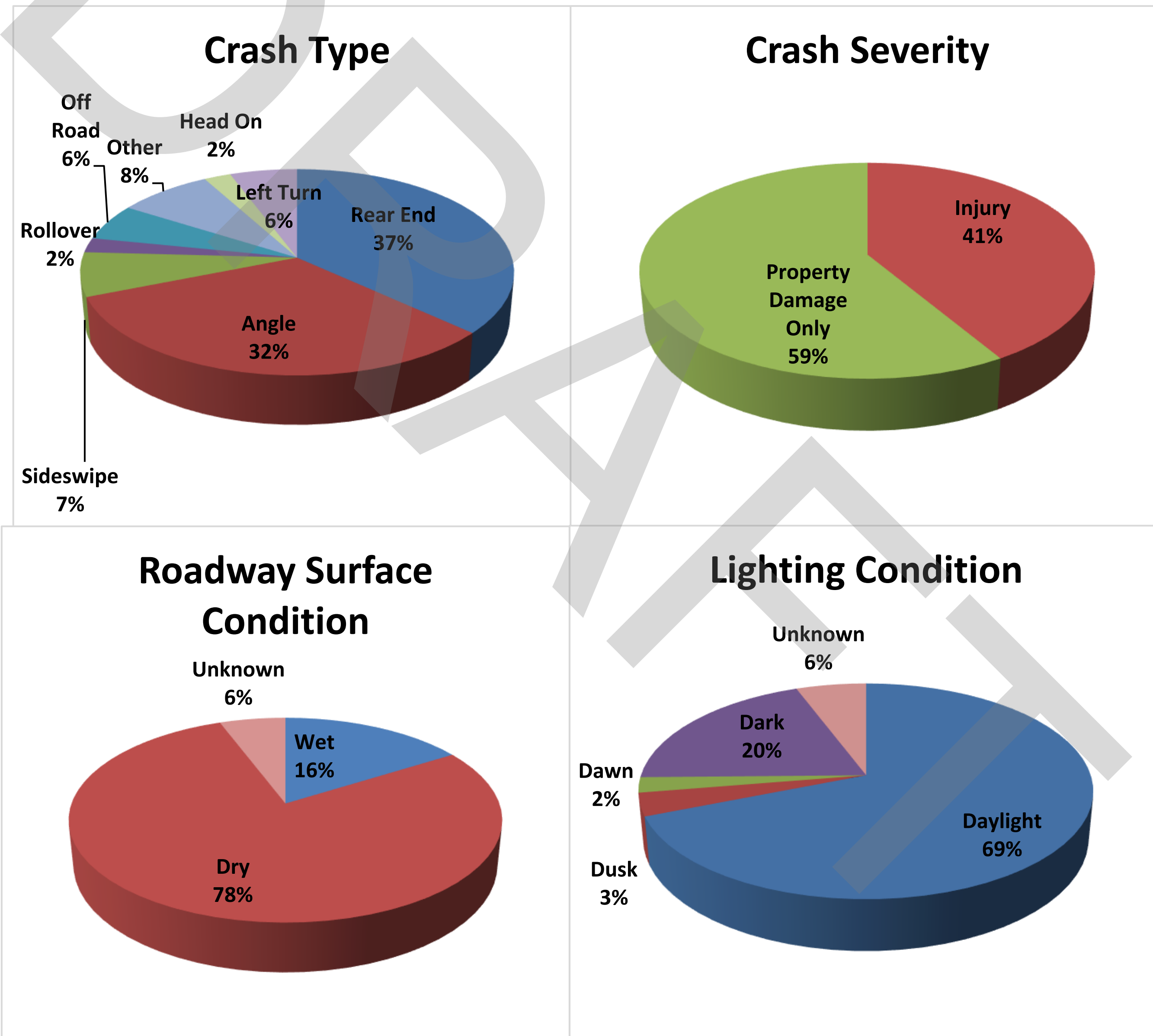


Figure 2.27 – 2013 through 2017 Crash Data Summary – Sawgrass Expressway Eastbound Ramps and Lyons Road Intersection

Sawgrass Expressway Westbound Ramps and Lyons Road Intersection

The Sawgrass Expressway Westbound Ramps and Lyons Road intersection experienced a total of 31 crashes during the five-year analysis period. There were no fatal crashes reported during the study period. At least 29% of the total crashes resulted in injuries. As shown on ***Figure 2.28***, rear end crashes (approximately 48%) were the prominent crash types at the intersection. Reports indicated that 16% of the crashes occurred during wet roadway conditions and 29% crashes occurred during night-time hours.

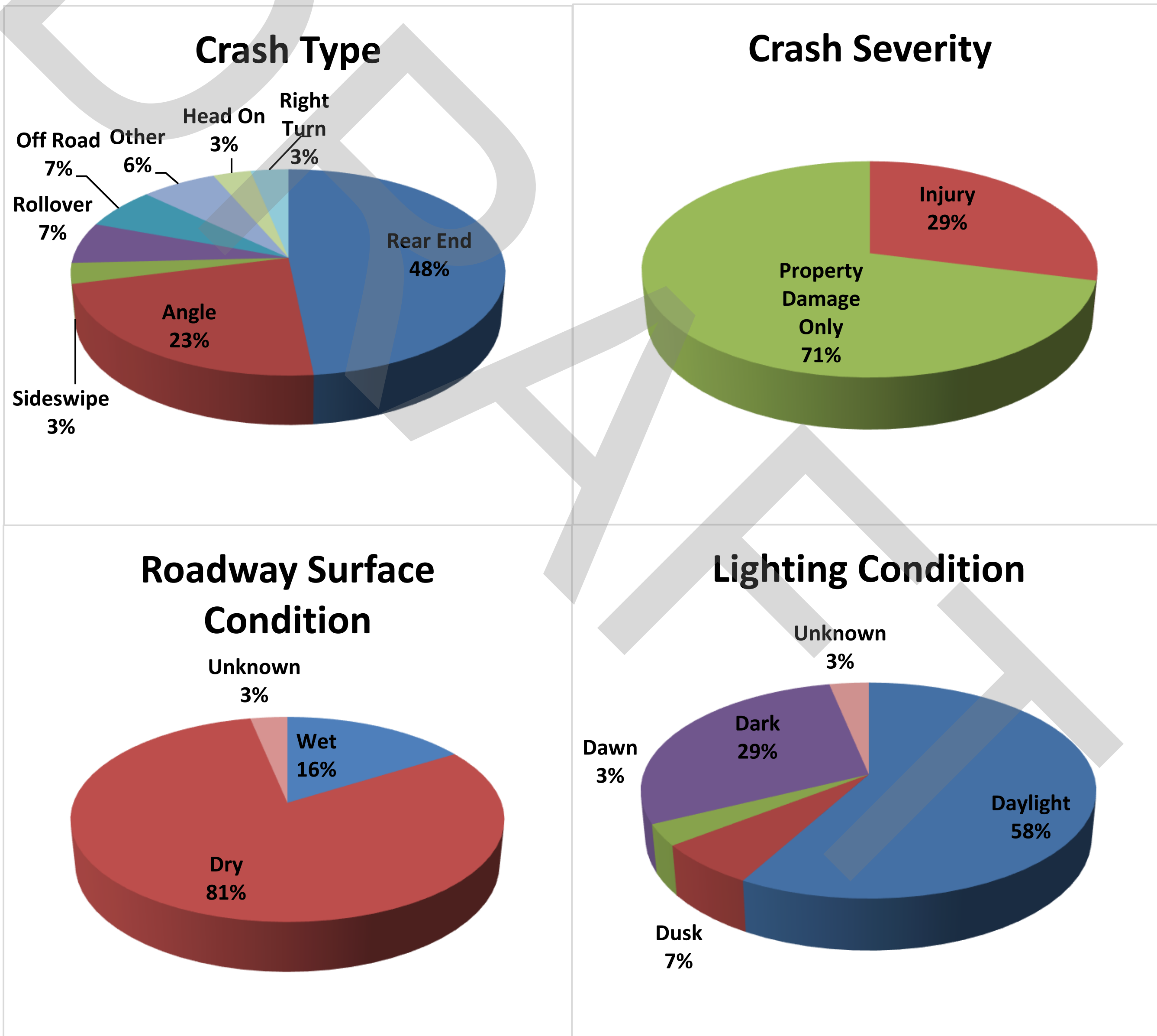


Figure 2.28 – 2013 through 2017 Crash Data Summary – Sawgrass Expressway Westbound Ramps and Lyons Road Intersection

Actual crash rates at the intersections were computed and compared with average crash rates for similar facilities across the State utilizing the Statewide five-year average crash rate (2013-2017). Critical crash rates and safety ratios were also estimated. Crash rates for the intersections were estimated as crashes per Million Entering Vehicles (MEV). The critical crash rate is based on the average crash rate for a similar facility adjusted by vehicle exposure and a probability constant. The safety ratio represents the actual crash rate divided by the critical crash rate. If an intersection has an actual crash rate higher than the critical crash rate (i.e., safety ratio > 1.0), it may have a safety deficiency. The crash rates are presented in ***Table 2.12***. Safety ratios are greater than 1.0 for these intersections from 2013 through 2017, indicating that these may be higher crash locations:

1. US 441and Regency Lake Boulevard
2. Lyons Road and Serko Boulevard
3. Lyons Road and Winston Park Boulevard
4. SW 10th Street and Waterways Boulevard

Table 2.12 – 2013 through 2017 Intersection Crash Rates and Safety Ratios

Description	Total Crashes	Actual Crash Rate	Average Crash Rate*	Critical Crash Rate	Safety Ratio
US 441					
Regency Lake Boulevard	143	1.22	0.479	0.83	1.46
Winston Park Boulevard	134	1.23	0.884	1.38	0.89
Lyons Road					
Serko Boulevard	181	1.62	0.884	1.37	1.18
Winston Park Boulevard	247	2.26	0.884	1.38	1.64
SW 10th Street					
Waterways Boulevard	77	1.04	0.479	0.93	1.12
Independence Drive	53	0.72	0.479	0.93	0.77
Powerline Road	122	0.89	0.884	1.32	0.67
Interchange Ramp Terminal					
Sawgrass Expressway Eastbound Ramps at US 441	39	0.33	0.884	1.36	0.24
Sawgrass Expressway Westbound Ramps at US 441	54	0.46	0.884	1.36	0.34
Sawgrass Expressway Eastbound Ramps at Lyons Road	87	0.81	0.884	1.38	0.59
Sawgrass Expressway Westbound Ramps at Lyons Road	31	0.27	0.884	1.36	0.20

Intersections: Crashes per Million Entering Vehicles
Highlighted Safety Ratio >1.0
Crash Rate Category Used
30 - URBAN 6+LN 2WY DIVD RASD for three and four legged intersections

Pedestrian and Bicycle Safety Analysis – Bicycle and pedestrian crashes were extracted from the CARS database and Signal Four Analytics tool for the study area. A total of 20 pedestrian and bicycle crashes were reported within the study area for years 2013 through 2017. As shown in the ***Table 2.13***, 11 pedestrian and bicycle crashes occurred at the Lyons Road intersections with Winston Park Boulevard and Serko Boulevard. One fatal crash was reported at the Lyons Road and Winston Palk Boulevard intersection. ***Figure 2.29*** illustrates the summary of the crash severity of all reported pedestrian and bicycle crashes from 2013 through 2017.

Table 2.13 – 2013 through 2017 Pedestrian and Bicycle Crash Severity

Intersection	Fatality	Injury	Property Damage Only	Total
SW 10th Street and Powerline Road	0	3	0	3
US 441 and Winston Park Boulevard	0	1	0	1
US 441 and 61st Street	0	2	0	2
US 441 and Regency Lake Boulevard	0	3	0	3
Lyons Road and Winston Park Boulevard	1	4	0	5
Lyons Road and Serko Boulevard	0	5	1	6
Total	**1**	**18**	**1**	**20**
Percentage	**5%**	**90%**	**5%**	**100%**

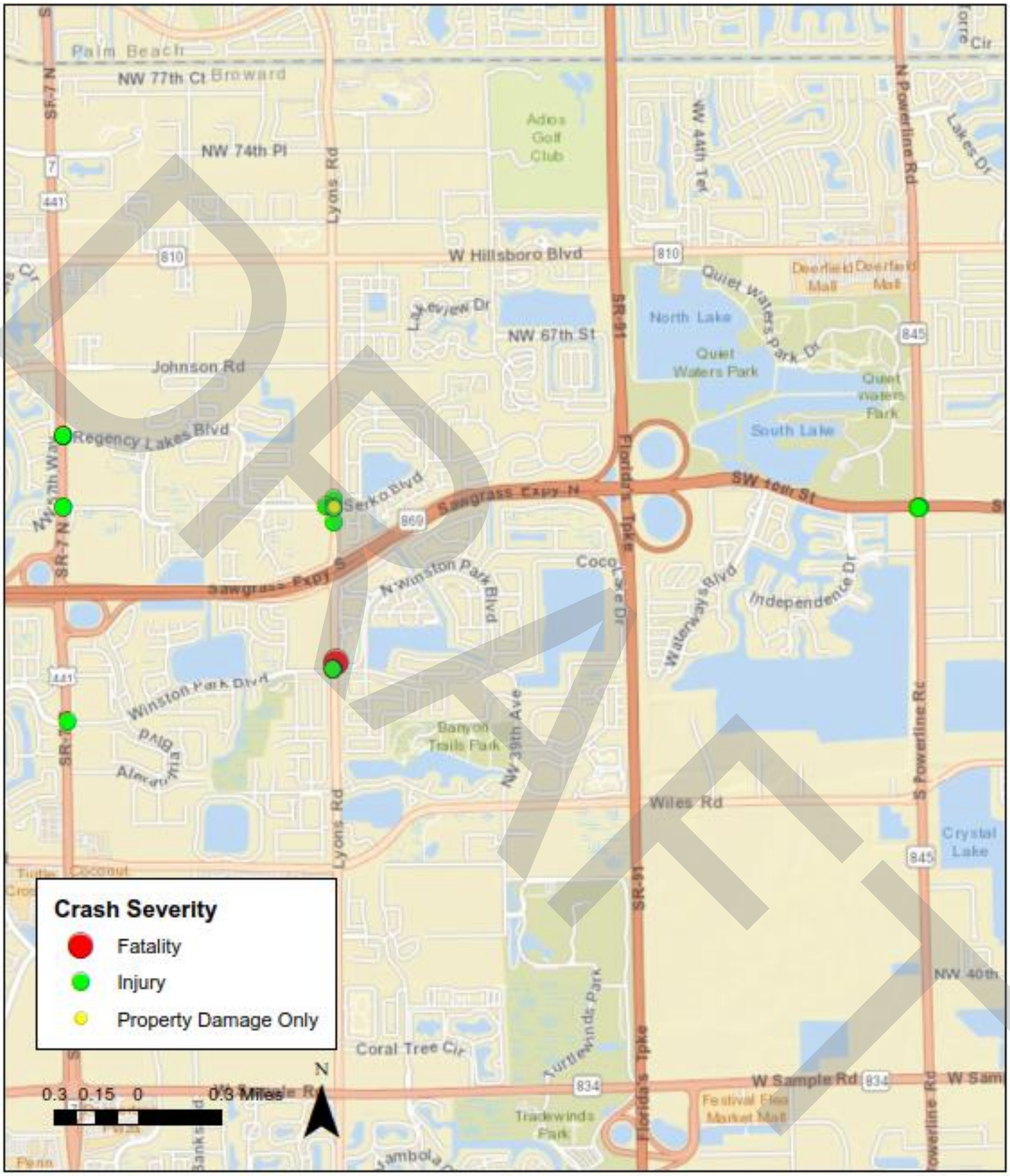


Figure 2.29 – 2013 through 2017 Pedestrian and Bicycle Study Area Crash Severity

2.2.17 Railroad Crossing

There are no railroad crossings within the study limits.

2.2.18 DRAINAGE

Information was obtained from field review, planning documents, construction drawings, aerial photographs, and permit applications to identify the existing stormwater management system serving the study corridor, which is 4.68 miles long and covers an area of 430.56 acres.

The original 21-mile Sawgrass Expressway corridor project between I-595 and Florida's Turnpike (four-lane divided expressway) was separated into six sections for design purposes. The original stormwater management system for the Sawgrass Expressway, permitted by SFWMD on February 14, 1985, was approved for an ultimate eight-lane typical section. The water treatment was provided within the median and the roadside swales. Most of the former borrow pits and the interchange inland areas were not designed to provide water quality treatment. Subsequent projects during the 2000s decade widen the Sawgrass Expressway from four to six lanes. The additional travel lanes were added on the median, but the water management facilities remained the same with minor alterations based on the eight-lane typical section originally permitted. Improvements to the interchange ramps, the addition of sound barrier walls and landscape have been reducing the original swales gradually.

Basin 1 – This basin begins east of Riverside Drive and ends at US 441 including the west side of the US 441 interchange. The existing drainage system consists of catch basins, gutter drains, cross drain and storm sewer that convey the stormwater runoff into roadside swales and ponds. The roadside swales and the interchange ponds discharge into the PTWCD canals. The minimum roadway grade elevation is 16.50 feet NAVD, roadside ditch bottom elevation is 11.00 feet NAVD and PTWCD Control Elevation is 10.05 feet NAVD. There is also an FDOT parcel available at the NW quadrant of the interchange beyond the Sawgrass Expressway right of way.

Basin 2 – This basin begins at US 441 and ends at Lyons Road including the east side of the US 441 interchange and discharges to the local canal under the jurisdiction of CWCD. Ditch blocks are regularly located along the ditches dividing them into subsystems. The local canals are interconnected with two 72" cross drains, both located west and east of Lyons Road. The minimum roadway grade elevation is 16.50 feet NAVD, roadside ditch bottom elevation is 11.00 feet NAVD and CWCD Control Elevation is 9.45 feet NAVD.

Basin 3 – This basin is located between Lyons Road and west of the Florida's Turnpike Interchange. It discharges to the local canal under the jurisdiction of CWCD. The local canals are interconnected through a 72" cross drain located west of the Florida's Turnpike interchange. The local canals ultimately discharge into the Hillsboro Canal. The minimum roadway grade elevation is 17.50 feet NAVD. The roadside ditch bottom elevation is 11.00 feet NAVD. CWCD Control Elevation is 9.45 feet.

Basin 4 – This basin begins east of Florida's Turnpike at station 1145+00.00 and ends up at station 1168+39.00, just west of Waterways Boulevard. Along the Florida's Turnpike, the basin begins at Wiles Road at station 5570+0.00 and ends up at station 5665+00.00, just south of Hillsboro Boulevard. It includes the east and west bound to the Sawgrass Expressway and north and south bounds of the Florida's Turnpike. The existing drainage system consists of catch basins, gutter drains, cross drains, and storm sewer that convey the runoff into roadside swales and ponds. Treatment for water quality is provided along the roadside swales using ditch blocks and raised ditch bottom inlets. Ditch blocks are regularly located along the ditches dividing them into subsystems. The existing ponds and swales located within the Florida's Turnpike right of way are all operated and maintained by Florida's Turnpike Enterprise. The runoff that accumulates in the ditches infiltrates into the ground and the excess is discharge by outfall structures, primary earthen weirs, into the receiving ponds at the Sawgrass Expressway Interchange. It then flows through a 48" culvert to the lake located at the southeast quadrant of the interchange. it continues within a residential community through a 20-foot drainage easement. The lake discharges into the C-3 Canal and Hillsboro Canal. The minimum roadway grade elevation is 17.50 feet NAVD. The roadside ditch bottom elevation is 11.00 feet NAVD. CWCD Control Elevation is 9.45 feet NAVD and BCWCD#2 Control Elevation is 9.45 feet NAVD.

Basin 5 – This basin begins east of the Florida's Turnpike at station 1168+39.00 and ends at station 1193+17.00, just west of Independence Drive. It includes the east and west bound of SW 10th Street. It also includes half of the road and the roadside swale of the west bound of SW 10th Street between station 1193+17.00 and station 1209+25.00. The existing drainage system consist of catch basins, cross drain and storm sewer that convey the stormwater runoff into roadside treatment swales along the west and east bound of SW 10th Street into the Florida's Turnpike drainage system at the SE quadrant of the interchange through a raised ditch bottom inlet that is connected to the wet pond. The minimum roadway grade elevation is 12.00 feet NAVD and roadside ditch bottom elevation is 11.00 feet NAVD. No water treatments as per permit but DBI's in the median and roadside swales are higher that the bottom. CWCD Control Elevation is 9.45 feet NAVD and BCWCD#2 Control Elevation is 9.50 feet NAVD.

Basin 6 – This basin begins west of Independence Drive at station 1193+17.00 and ends up at station 1209+25.00 at Powerline Road. The existing drainage system consists of catch basins, cross drain and storm sewer that conveys the stormwater runoff into the roadside swales along the westbound of SW 10th Street. The roadside swale along the south side of the road is connected to the local canal/lake through a 30" pipe, which is connected to the 2-60" cross drain. This cross drain is west of Powerline Road and is part of the C-3 Canal. This system ultimately discharges into the Hillsboro Canal. The minimum roadway grade elevation is 14.00 feet NAVD. The roadside ditch bottom elevation is 11.0 feet NAVD. No water treatments as per permit but DBI's in the median and roadside swales are higher that the bottom. CWCD Control Elevation is 9.45 feet NAVD. BCWCD#2 Control Elevation is 9.50 feet NAVD. Existing drainage features are summarized in ***Table 2.14*** and ***Appendix C***.

Table 2.14 – Existing Drainage Features

Sawgrass Expressway: Permitted Water Management Systems											
Existing Basin	Station		Length		Acres	Outfalls			Cross Drains	SFWMD Basin	Jurisdiction
	From	To	(ft.)	(mile)		(Each)	Weir	Bleeder			
1	962+30.00	1060+00.00	9770	1.85	129.73	8	0	0	4	Hillsboro Canal	PTWCD, CWCD SFWMD WPA
2	1060+00.00	1110+00.00	5000	0.95	49.35	2	0	0	2		CWCD SFWMD WPA
3	1110+00.00	1145+00.00	3500	0.66	34.70	0	0	0	1		CWCD
4	1145+00.00	1168+39.00	2339	0.44	183.90	3	0	0	5		CWCD, BCWCD#2
5	1168+39.00	1193+17.00	2478	0.47	26.66	1	0	0	0		BCWCD#2
6	1193+17.00	1209+25.00	1608	0.30	6.22	1	0	0	0		BCWCD#2

2.2.19 LIGHTING

Existing lighting within the project limits along the Sawgrass Expressway was evaluated in accordance with FDM and TDH requirements. The existing lighting is mostly single phase, either 240/480V or 480V/0V, #6 service wire system, and consists of 400-watt mongoose head HPS light fixtures mounted on aluminum poles for mainline and 250-watt mongoose head HPS light fixtures mounted on aluminum poles for ramps. Separate lighting segments are described below:

- From MP 18 to west of Deerfield Toll Plaza: single phase, 480V, #6 service wire, and consists of 400-watt mongoose head HPS light fixtures mounted on aluminum poles for mainline and 250-watt mongoose head HPS light fixtures mounted on aluminum poles for ramps. Mounting height varies from 35' to 40' based on as-built plans.

- From Deerfield Toll Plaza to Waterways Boulevard: single phase, 480V, #6 service wire, and consists of a mix of single and double 400-watt mongoose head HPS light fixtures mounted on aluminum poles for mainline and 250-watt mongoose head HPS light fixtures mounted on aluminum poles for ramps. Mounting height varies from 35' to 50' based on as-built plans.

- From Waterways Boulevard to MP 21.88: single phase, 480V, #6 service wire, and consists of 250-watt cobra head HPS light fixtures mounted on aluminum poles. Mounting height is 40' based on as-built plans.

The corridor lighting is powered from the following load centers/service points:

- Load Center "C", 240/480V (two 240V ungrounded conductors and one 0V grounded conductor), located on the Sawgrass Expressway eastbound mainline, approximately 2,800' west of exit 18A. Based on as-built plans, within the project limits, Load Center "C" feeds all C circuits from MP 18.00 to just west of US 441 interchange.

- Load Center "D", 240/480V (two 240V ungrounded conductors and one 0V grounded conductor), located on US 441 northbound just south of the Sawgrass Expressway. Based on as-built plans, within the project limits, Load Center "D" feeds all D circuits from US 441 interchange to just west of Lyons Road interchange.

- Load Center "E", 240/480V (two 240V ungrounded conductors and one 0V grounded conductor), located on Lyons Road northbound just north of the Sawgrass Expressway. Based on as-built plans, within the project limits, Load Center "E" feeds all E circuits from Lyons Road interchange to west of Deerfield Toll Plaza. This load center appears to be heavily rusted from the field review. Therefore, it is recommended for replacement.

- Service Point 20, 240/480V (two 240V ungrounded conductors and one 0V grounded conductor), located just west of the entrance/exit point of Deerfield Toll Building. Based on as-built plans, within the project limits, Service Point 20 feeds all 20 series circuits from Deerfield Toll Plaza to just west of MP 21.

- Service Point "B", 480V to ground (one 480V ungrounded conductor and one 0V grounded conductor), located at approximately 300' west of Powerline Road on the south side of SW 10th Street. Based on as-built plans, this load center feeds all lighting circuits from west of MP 21 to MP 21.88 within project limits. Based on coordination with FTE maintenance staff, this non-standard outdated load center is recommended for replacement. Also, per FTE maintenance staff, existing pull boxes at each light pole location are very small and have metal covers which could be a safety concern. Therefore, these pull boxes are recommended for replacement.

- Load Center (L/C 20A), 480V to ground (one 480V ungrounded conductor and one 0V grounded conductor), located behind sound wall along NB Sawgrass Expressway just before the Toll Gantry. Based on as-built plans, this load center feeds high mast luminaires around Turnpike/Sawgrass interchange. Based on coordination with FTE maintenance staff, this non-standard outdated load center is recommended for replacement.

There is currently no existing conventional lighting north and south of the Florida's Turnpike/Sawgrass Expressway Interchange. However, there are eight existing approximately 100' tall high mast light poles within the interchange area. The existing high mast lighting is single phase, 480V, #2 service wire system, and consists of four 1000-watt high pressure sodium light fixtures.

2.2.20 Utilities

The existing utility facilities within the study area were identified throughout the project corridor as part of this PD&E Study. A list of the existing Utility Agencies Owners (UAOs) was obtained by contacting Sunshine 811 (see ***Appendix D***). The existing UAOs, the identified UAO contacts, and facility type are summarized in ***Table 2.15***. Plans showing the approximate location of the utility facilities are provided in ***Appendix E***.

Intelligent Transportation Systems (ITS), traffic control, interconnect, lighting, and irrigation facilities owned or operated by the Florida Department of Transportation, Florida's Turnpike Enterprise, Broward County, and local municipalities are considered non-UAO facilities and are not included.

Table 2.15 – Existing Utility Agency Owners

	Utility Agency Owner	Facilities	Contact Person	Email
1	Advanced Cable Communications, DBA Blue Stream	CATV	Steven Lencse	slencse@mybluestream.com
2	AT&T Distribution	Telephone; Fiber Optic	Otis Keeve	ok1184@att.com
3	AT&T Transmission	Fiber Optic	Gregory Jacobson	gj1529@att.com
4	Broward County Water and Wastewater Services	Sewer; Water	Halina Pluta	hpluta@broward.org
5	Lumen	Fiber	Michael Nunez	michael.nunez@level3.com
6	City of Deerfield Beach	Drainage; Wastewater; Water	Suzanne Horvath	SHorvath@deerfield-beach.com
7	City of Coconut Creek	Fiber; Storm Water; Water	Eileen Cabrera	ecabrera@cocnutcreek.net
8	City of Coral Springs	Force Main; Sewer; Water	Najla Zerrouki	nzerrouki@coralsprings.org
9	Comcast Cable	CATV; Fiber	Christopher Taylor	ChristopherT@cwsifl.com

Table 2.15 – Existing Utility Agency Owners (Continued)

	Utility Agency Owner	Facilities	Contact Person	Email
10	Crown Castle	Fiber	Danny Haskett	danny.haskett@fpl.com
11	CVE Master Management	Irrigation; Water	Amanda Denton	adenton@craigasmith.com
12	Florida Gas Transmission	Gas	Joseph Sanchez	joseph.e.sanchez@energytransfer.com
13	FP&L Distribution	Electric	Byron Sample	Byron.A.Sample@fpl.com
14	FP&L Transmission	Electric	George Beck	GEORGE.BECK@fpl.com
15	Verizon/MCI	Communication, Fiber	Unknown	Unknown / Pending Response
16	SICE, Inc.	ITS	Katherine Rico	krico@sice.com
17	Teco Peoples Gas South Florida	Gas	Max Chamorro	MJChamorro@tecoenergy.com

2.2.21 Soils and Geotechnical Data

The Natural Resources Conservation Service (NRCS) indicates 11 soil types occur in the project area, and nine soil types exist within the project corridor, where soil disturbance may occur with the proposed improvements (see ***Figure 2.31*** and ***Figure 2.32***). The soil types in the project area are listed in ***Table 2.16*** along with descriptions and ratings from NRCS. One hydric soil is known to occur in the project area: Plantation Muck. Neither prime farmland soils nor farmland soils of unique importance occur within the project area.

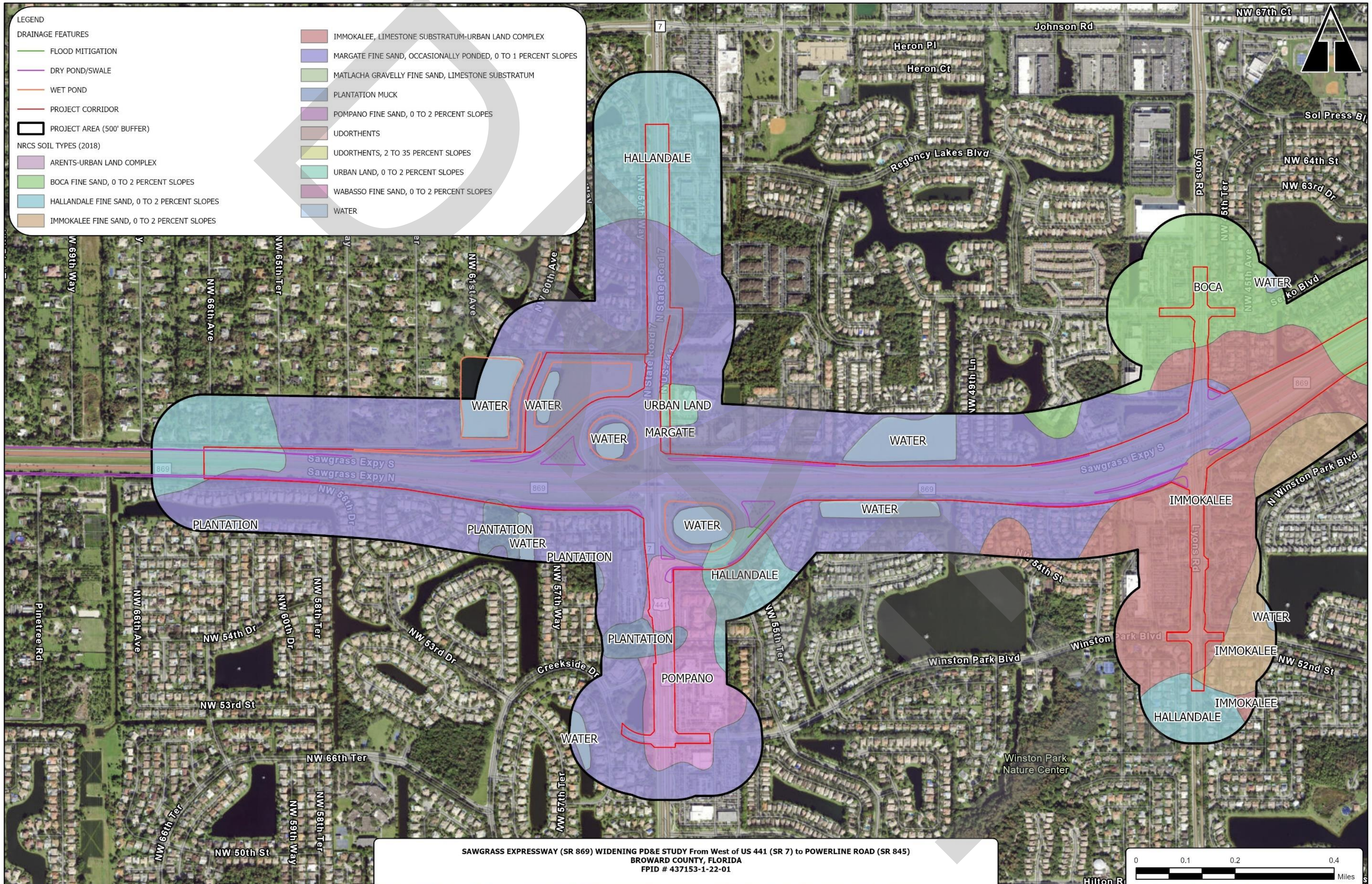


Figure 2.30 – Soil Map in Western Project Area

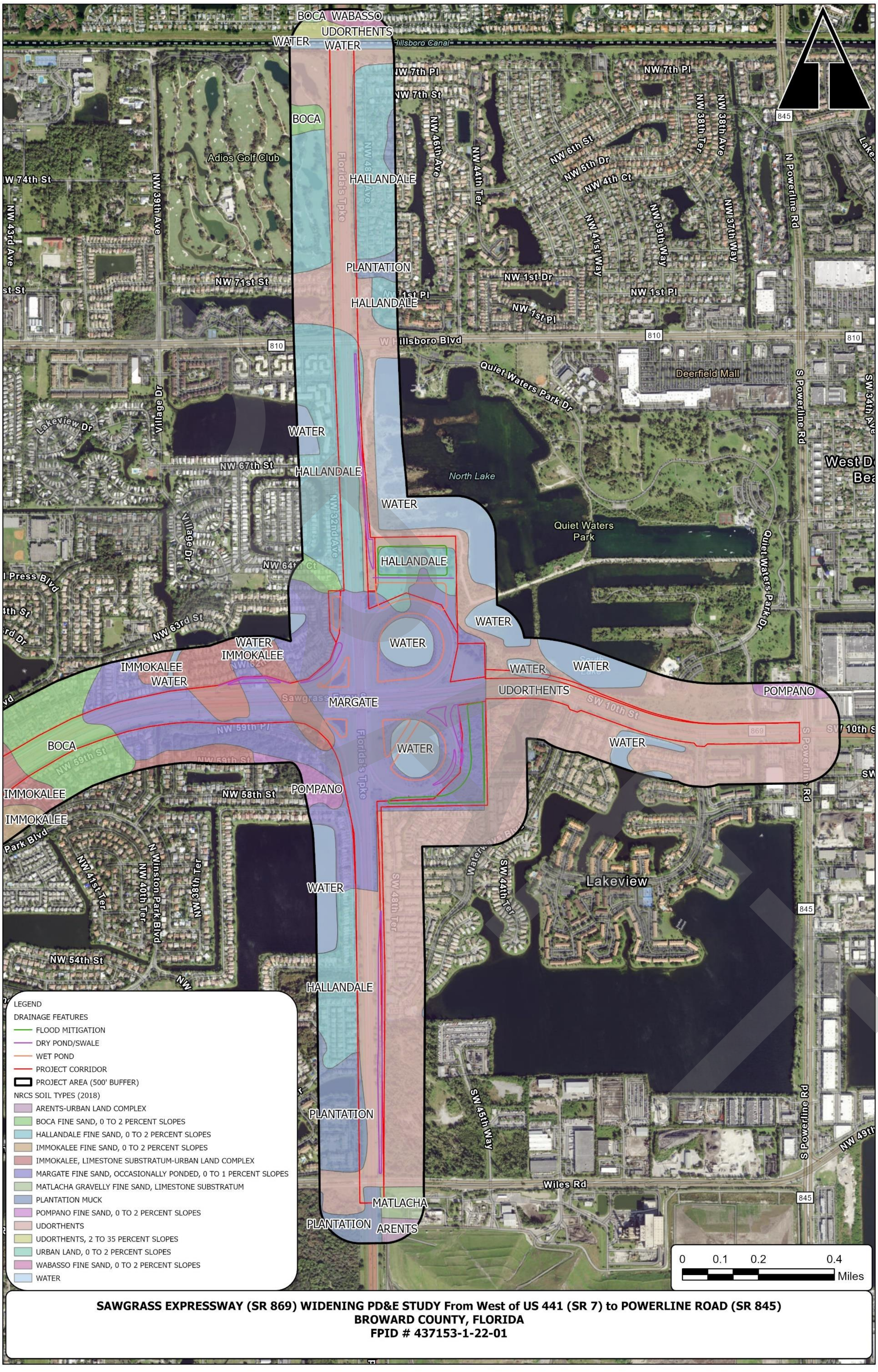


Figure 2.31 – Soil Map in Eastern Project Area

Table 2.16 – NRCS Soil Types in Project Area

Soil Type	Environmental Association	Approximate Percent of Project Area
Arents- Urban Land Complex	This soil type consists of soils that have been filled, graded, and shaped for urban development. It is found north of Port Everglades, where the natural soils have been extensively modified by excavation for canals and open water areas and filling in of adjacent areas. There is little natural vegetation. This is not a hydric soil.	1.1%
Boca fine sand	This soil type consists of nearly level, poorly drained, sandy soil underlain by limestone. It is in low, broad, wet areas and along grassy, poorly defined drainageways. **This is a hydric soil**.	3.7%
Hallandale fine sand	This soil type consists of nearly level, poorly drained, sandy soil underlain by limestone. It is in broad flats east of the Everglades and west of the Atlantic Coastal Ridge. **This is a hydric soil**.	17.2%
Immokalee fine sand	This soil type consists of nearly level, deep, poorly drained, sandy soil that has a layer well coated with organic matter. It is on broad, low ridges in the eastern part of the survey area. This is not a hydric soil.	4.0%
Immokalee, limestone substratum- Urban land complex	This complex consists of Immokalee, limestone substratum, and Urban land. Depth to the water table depends on the established drainage in the area and the amount of fill material that has been added, but the water table is deeper in most areas than is normal for undrained Immokalee soils. This is not a hydric soil.	6.1%
Margate fine sand	This soil type consists of nearly level, poorly drained, sandy soil that is underlain by limestone. It is on nearly level, low terraces between the Everglades and the low, sandy Atlantic Coastal Ridge. **This is a hydric soil**.	34.6%
Matlacha gravelly fine sand- limestone substratum	This soil type consists of soils that are nearly level, somewhat poorly drained that form as a result of earthmoving operations in areas that are underlain by limestone bedrock. Most natural vegetation has been removed. The existing vegetation consists of South Florida slash pine and various scattered weeds. This is not a hydric soil.	0.7%
Plantation muck	This soil type consists of nearly level, very poorly drained soil that has a muck surface layer over sandy mineral material. **This is a hydric soil.**	3.3%
Pompano fine sand	This soil type consists of nearly level, poorly drained soil. A large part of the acreage is natural vegetation- St. John's wort and wax myrtle. **This is a hydric soil**.	3.3%
Udorthents	This soil type consists of moderately well drained to excessively drained soils that have been disturbed by cuffing or filling, and areas that are covered by buildings and pavement. The areas are mostly larger than five acres. This is not a hydric soil.	18.4%
Urban land	This map unit consists of areas that are more than 70 percent covered by airports, shopping centers, parking lots, large buildings, streets and sidewalks, and other structures, so that the natural soil is not readily observable. This is not a hydric soil.	0.2%
Water	-	7.4%
	TOTAL	100%

2.2.22 Aesthetic Features

This portion of the Sawgrass Expressway contains a richly varied mix of South Florida Native trees and palms along with ornamental non-native trees and palms that provide an array of seasonal colors and textures that enhance the aesthetics of the Sawgrass Expressway. More importantly, this designed mix provides the critical environmental benefits of tree canopy, shade, species biodiversity, carbon sequestration, and stormwater mitigation (which includes rainfall interception, root uptake, evapotranspiration, reduced runoff, and increased infiltration) that are vital to the micro-climate of the Sawgrass Expressway and surrounding communities, and overall climate of Broward County and South Florida. In addition to the man-made landscape of the Sawgrass Expressway, there are also numerous natural landscapes at Quiet Waters Park along the Florida's Turnpike.

Between Florida's Turnpike and Powerline Road there are grand views to the north of Quiet Waters Park that provide a desirable vast and open natural scenery. Adding to this desirable scenery is a wide median with portions of large canopy trees and vast open green space, sidewalks, and buffer trees from adjacent residential communities on the south side. Additionally, there are also desirable scenic views along the east and west sides of the Florida's Turnpike between Wiles Road and the County Line. These scenic vistas are a result of an open green space and an established buffer of mature trees along Florida's Turnpike, Quiet Waters Park, preserved pockets of natural areas, and a golf course.

Preservation of adequate green space, mature trees, and natural areas are vital to maintaining and enhancing scenic views while reducing environmental impacts and ameliorating the environment.

2.2.23 Traffic Signs

As part of this PD&E study, an existing corridor sign inventory was performed within the project limits. A reconnaissance was undertaken during the week of July 18, 2017. The existing signs are typically mounted on a single or multi-post, overhead cantilever, overhead truss, or bridge mounted and are classified as guide signs. As part of the documentation effort, each major roadway sign was photographed, inventoried, numbered, classified, and located on aerial photography. A total of 42 major signs were identified within the study limits. ***Table***

2.17 shows the number of major signs categorized by mounting type. ***Appendix F*** provides the locations and descriptions of the signs.

Table 2.17 – Existing Signing Inventory

Mounting Type	Classification Guide
Overhead Cantilever	25
Overhead Truss (Span)	6
Single or Multi-Post (On ground)	10
Bridge Mounted	3
Grand Total	**42**

2.2.24 Noise Walls and Perimeter Walls

The Sawgrass Expressway contains four existing noise walls between US 441 and the Florida's Turnpike. There are no noise walls along Powerline Road or the Florida's Turnpike.

2.2.25 Intelligent Transportation Systems (ITS)/Transportation System Management and Operations (TSM&O) Features

FTE strives to provide its roadways with safe and efficient travel using Intelligent Transportation Systems (ITS). Based on as-built plans, the ITS configuration includes a backbone Fiber Optic Cable (FOC) and power infrastructure within the entire limits of the analysis. Lateral FOC and electrical service wire drops have been installed under the Sawgrass Expressway and Florida's Turnpike to service dynamic message signs (DMS), microwave vehicle detection system (MVDS), Bluetooth Travel Time System (BTTS), Roadside Units (RSUs), and closed-circuit television (CCTV) cameras deployed on the project corridors. Furthermore, the limits of this PD&E Study overlap with the adjacent SW 10th Street Connector Lane project (FPIDs: 436964-2-52-01, 436964-2-56-02, 439891-1-52-01, 439891-1-56-02, 439891-1-56-03, 439891-5-52-01, and 439891-5-52-01) being completed by FDOT District 4. As part of the SW 10th Street Connector project, FTE and FDOT ITS devices from the Sawgrass Expressway/Florida's Turnpike Interchange to Powerline Road will be installed and will be impacted by this PD&E project. All proposed ITS infrastructure by the SW 10th Street Connector project will be considered existing under the analysis of this PD&E project.

Existing ITS sites were identified from the information provided by the as-built documentation and through the SW 10th Street Connector conceptual plans (subject to change). The ITS sites generally consist of devices pole-mounted to concrete poles of variable height with the exceptions of DMS sites. Most of the ITS sites are located beyond the minimum required clear zone offset from the governing physical feature (e.g., edge of travel lane, face of guardrail, tope of barrier wall, face of curb, etc.). Existing devices are operated and maintained by FTE.

Pan-Tilt-Zoom (PTZ) Closed Circuit Television (CCTV) cameras – Incident Management CCTV cameras currently provide nearly 100 percent coverage of the project corridor and enable traffic monitoring and early incident detection capabilities. There are also verification CCTV, which provide confirmation of DMS messaging. The existing CCTV locations are listed in ***Table 2.18***.

Table 2.18 – CCTV Camera Location and Structure Type

Roadway	ID Number	Location	CCTV Type	Structure Type
SR 869	869-018_5-NB	NB SR 869 west of US 441	Incident Management	On Pole
SR 869	869-019_5-NB	NB SR 869 west of Lyons Road	Incident Management	On Pole
SR 869	**	NB SR 869 west of Lyons Road	Verification	On Pole
SR 869	869-020_0-NB	NB SR 869 east of Lyons Road	Incident Management	On Pole
SR 869	*	NB SR 869 west of SR 91	Verification	On Pole
SR 869	869-021_1-SB	SB SR 869 west of SR 91	Incident Management	On Pole
SR 91	091-072_6-SB	SB SR 91 north of Hillsboro Boulevard	Incident Management	On Pole
SR 91	091-071_5-SB	SB SR 91 north of SR 869	Incident Management	On Pole
SR 91	091-070_5-SB	SB SR 91 north of Wiles Road	Incident Management	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes east of SR 91	Verification	On-Pole
SW 10th Street	**	EB SW 10th Street Local Lanes east of SR91	Incident Management	On Pole

Table 2.18 – CCTV Camera Location and Structure Type (Continued)

Roadway	ID Number	Location	CCTV Type	Structure Type
SW 10th Street	*	EB SW 10th Street Local Lanes west of Waterway's Boulevard	Incident Management	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes east of Waterways Boulevard	Incident Management	On-Pole
SW 10th Street	**	EB SW 10th Street Local Lanes west of Independence Drive	Incident Management	On-Pole
SW 10th Street	*	WB SW 10th Street Connector Lanes east of Independence Drive	Incident Management	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes east of Powerline Road	Incident Management	On Pole
SW 10th Street	**	EB SW 10th Street Connector Lanes east of Powerline Road	Incident Management	On Pole
SW 10th Street	**	WB SW 10th Street Local Lanes west of SW 30th Avenue	Verification	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes east of SW 30th Avenue	Verification	On Pole
SW 10th Street	**	EB SW 10th Street Connector Lanes east of SW 30th Avenue	Incident Management	On Pole
SW 10th Street	*	WB SW 10th Street Local Lanes west of Powerline Road	Verification	On Pole

* Potential FTE ITS device to be installed by the SW 10th Street Connector project (currently under conceptual design).
**Potential FDOT District 4 ITS device to be installed by the SW 10th Street Connector project (currently under conceptual design).

Dynamic Message Signs (DMS) – Full color DMS signs are currently deployed along the project limits to inform motorists of current traffic conditions and incidents such as crashes, disabled vehicles, road work, car fires, hazmat spills, evacuations, and emergency alerts. Walk-In DMS are provided over the travel lanes. Arterial, Lane Status and Toll Amount DMS will be proposed by the SW 10th Street Connector project. The existing DMS locations are listed in ***Table 2.19***.

Table 2.19 – Dynamic Message Sign Location and Structure Type

Roadway	ID Number	Location	DMS Type	Structure Type
SR 869	**	NB SR 869 west of Lyons Road	General Purpose	Overhead Truss
SR 869	SR 869 SB at MM 019.2	SB SR 869 west of Lyons Road	General Purpose	Overhead Truss
SR 869	**	NB SR 869 west of Lyons Road	Lane Status	Cantilever
SR 869	**	NB SR 869 west of SR 91	Lane Status	Cantilever
SW 10th Street	**	EB SW 10th Street Connector Lanes east of SR 91	Lane Status	Overhead Truss
SW 10th Street	**	EB SW 10th Street Connector Lanes at SW 30th Avenue	General Purpose	Overhead Truss
SW 10th Street	**	EB SW 10th Street Connector Lanes east of SW 30th Avenue	Toll Amount	Cantilever
SW 10th Street	*	WB SW 10th Street Local Lanes west of Powerline Road	Arterial Lanes	Overhead Truss

* Potential FTE ITS device to be installed by the SW 10th Street Connector project (currently under conceptual design).
**Potential FDOT District IV ITS device to be installed by the SW 10th Street Connector project (currently under conceptual design).

Microwave Vehicle Detection System – MVDS sensors are deployed within the project limits as part of the FTE Vehicle Detection System. These devices are non-intrusive typically mounted on poles along the shoulders and collect volume, average speed, and lane occupancy data. The existing MVDS locations are listed in ***Table 2.20***.

Table 2.20 – Microwave Vehicle Detection System Location and Structure Type

Roadway	ID Number	Location	Structure Type
SR 869	869-18.0-NB	NB SR 869 west of US 441	On Pole
SR 869	869-18.5-NB	NB SR 869 west of US 441	On Pole
SR 869	869-19.0-NB	NB SR 869 east of US 441	On Pole
SR 869	869-19.5-NB	NB SR 869 west of Lyons Road	On Pole
SR 869	NA	SB SR 869 west of SR 91	On Pole
SR 869	869-20.0-NB	NB SR 869 east of Lyons Road	On Pole
SR 869	*	NB SR 869 west of SR 91	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes east of SR 91	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes east of SR 91	On Pole

Table 2.20 – Microwave Vehicle Detection System Location and Structure Type (Continued)

Roadway	ID Number	Location	Structure Type
SW 10th Street	**	EB SW 10th Street Connector Lanes east of SR 91	On Pole
SW 10th Street	**	WB SW 10th Street Connector Lanes east of SR 91	On Pole
SW 10th Street	*	EB SW 10th Street Local Lanes west of Waterways Boulevard	On Pole
SW 10th Street	**	WB SW 10th Street Connector Lanes west of Waterways Boulevard	On Pole
SW 10th Street	**	EB SW 10th Street Connector Lanes west of Independence Drive	On Pole
SW 10th Street	**	EB SW 10th Street Connector Lanes west of Powerline Road	On Pole
SW 10th Street	**	EB SW 10th Street Connector Lanes east of Powerline Road	On Pole
SW 10th Street	**	WB SW 10th Street Local Lanes west of SW 30th Avenue	On Pole
SW 10th Street	**	EB SW 10th Street Connector Lanes east of SW 30th Avenue	On Pole
SR 91	091-70.7-SB	SB SR 91 north of Wiles Road	On Pole
SR 91	091-72.7-SB	SB SR 91 north of Hillsboro Boulevard	On Pole
SR 91	091-73.0-SB	SB SR 91 north of Hillsboro Boulevard	On Pole

* Potential ITS device to be installed by the SW 10th Street Connector project (currently under conceptual design).
**Potential FDOT District 4 ITS device to be installed by the SW 10th Street Connector project (currently under conceptual design).

Bluetooth Travel Time System – For travel time data collection, BTTS equipment will collect raw MAC address data and associated time stamps to determine travel times. ***Table 2.21*** shows Bluetooth devices proposed by the SW 10th Street Connector project, which is considered existing for this PD&E Study.

Table 2.21 – Bluetooth Travel Time System Location and Structure Type

Roadway	ID Number	Location	Structure Type
SW 10th Street	**	EB SW 10th Street Local Lanes east of SR 91	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes east of Waterways Boulevard	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes west of Independence Drive	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes east of Powerline Road	On Pole

**Potential FDOT District 4 ITS device to be installed by the SW 10th Street Connector project (currently under conceptual design).

Roadside Units – Roadside Units (RSU) are part of the roadside equipment from the proposed Connected Vehicle (CV) system from the SW 10th Street Connector project. The existing RSU locations are listed in ***Table 2.22***.

Table 2.22 – Roadside Units Location and Structure Type

Roadway	ID Number	Location	Structure Type
SW 10th Street	**	EB SW 10th Street Local Lanes east of SR 91	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes east of Waterways Boulevard	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes west of Independence Drive	On Pole
SW 10th Street	**	EB SW 10th Street Local Lanes east of Powerline Road	On Pole

**Potential FDOT District 4 ITS device to be installed by the SW 10th Street Connector project (currently under conceptual design).

Fiber Optic Communication System – The Fiber Optic Communication system provides communications between the FTE operations center to the existing ITS equipment. Along the Sawgrass Expressway, there are 2-96 count single-mode fiber optic cable (SMFOC) that run along both the northbound and southbound side of the road with lateral drop cables to the ITS device cabinets and tolling cabinets. Along Florida's Turnpike, there is 1-96 count SMFOC that runs along the southbound side of the road with lateral cables. Along SW 10th Street, there will be 1-144 existing SMFOC that will run on the eastbound side of the local lanes with lateral drop cables as well. Furthermore, the SW 10th Street Connector project will be installing one Master HUB within the project limits located in the northwest quadrant of the Sawgrass Expressway/Florida's Turnpike Interchange that will also be considered existing infrastructure for this PD&E Study.

An *ERCAR*, dated November 2021, was completed that documented the operational needs and infrastructure requirements.

2.3 Existing Bridges and Structures

There are eight existing bridge structures within the limits of the project, four along the Sawgrass Expressway, and four on Florida's Turnpike (see ***Figure 2.32***). The four bridges along the Sawgrass Expressway are bridges 860502, 860503, 860504, and 860505. Bridges 860502 and 860503 carry Sawgrass Expressway eastbound and westbound traffic, respectively, over US 441. They are both two-span bridges that consist of prestressed concrete AASHTO beams supported on concrete end bents and multi-column framed piers. Bridges 860504 and 860505 carry Sawgrass Expressway eastbound and westbound traffic, respectively, over Lyons Road. They are both two-span bridges which have been previously widened and consist of prestressed concrete AASHTO beams supported on concrete end bents and multi-column framed piers with an additional single column pier at the widenings. All pier columns are round and supported on isolated footings with prestressed concrete pile foundations.

The four bridges along Florida's Turnpike are bridges 864112, 860506, 860586 and 860184. Bridge 864112 carries Wiles Road eastbound and westbound traffic over Florida's Turnpike. It is a two-span bridge that consists of prestressed concrete AASHTO beams supported on concrete end bents and multi-column framed piers. Bridge 860506 carries Florida's Turnpike northbound and southbound traffic over Sawgrass Expressway. It is a four-span bridge that consists of prestressed concrete AASHTO beams supported on concrete end bents and multi-column framed piers. Bridge 860586 carries Hillsboro Boulevard eastbound and westbound traffic over Florida's Turnpike. It is a two-span bridge that consists of prestressed concrete AASHTO beams supported on concrete end bents and multi-column framed piers.

All pier columns are round and supported on isolated footings with prestressed concrete pile foundations. Bridge 860184 carries Florida's Turnpike northbound and southbound traffic over the Hillsboro Canal. It is a six-span bridge that consists of AASHTO beams supported on concrete end bents and intermediate pile bents. ***Table 2.23*** summarizes the existing bridge characteristics. ***Appendix G***, Bridge Analysis Report dated November 2023, documents additional details about the bridge structures.

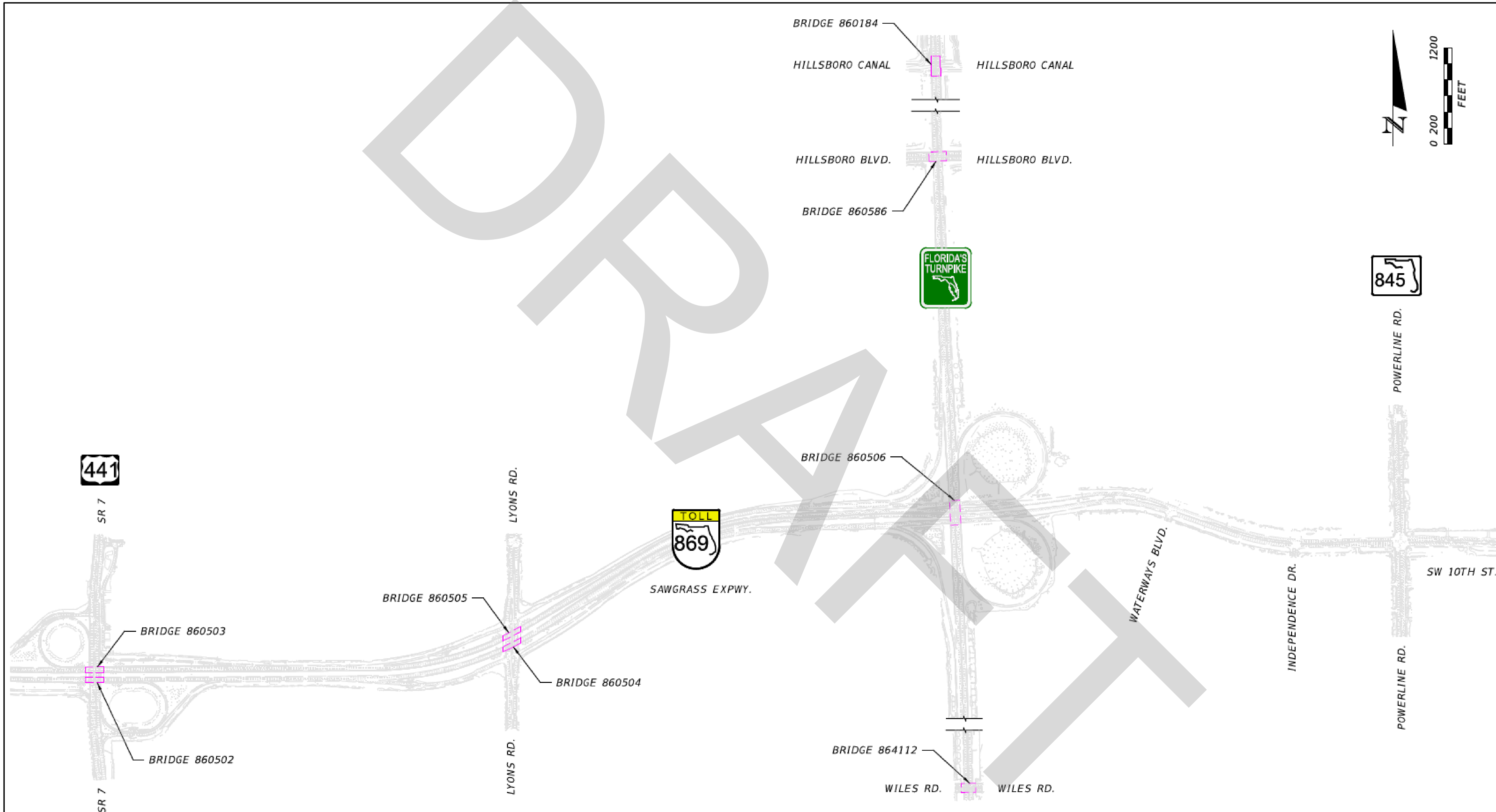


Figure 2.32 – Existing Bridge Location Map

Table 2.23 – Existing Bridge Characteristics

LOCATION			GEOMETRICS					ALIGNMENT					STRUCTURAL					CONDITION						
Bridge ID No.	Bridge Location	Direction	Structure Length (ft)	Deck Width	Shoulder Width		No. of Lanes	Skew Angles (Degrees)	Min Horizontal Clearance**		Min. Vertical Clearance*	Underneath Roadway Designation	Number of Spans	Max. Span	Superstructure Type	Exterior Beam Type	Substructure Type	Year Built/ Widened	Load Rating	Calcs	Sufficiency Rating (%)	Health Index	Inspection Date	Deficiencies
					Inside	Outside			Inside (LF)	Outside (RT)														
860502	Sawgrass Expwy. EB over US 441	EB	225.93	70.92	10	10	4	0	14'-0"	10'-9" NB	16.40	Urban Principal Arterial Other	2	113.02	Prestressed Concrete Beams w/ CIP Concrete Deck	Prestressed Beam Type V	Reinforced Concrete Column Piers and Abutments	1986/2006	RF=1.43 51.6 tons (Inv. LFR)	Yes	92.10	99.81	2/9/2016	None (Existing Vertical Clearence 16.4')
860503	Sawgrass Expwy.WB over US 441	WB	225.85	70.92	10	10	4	0	14'-0"	11'-8" NB	16.40	Urban Principal Arterial Other	2	112.94	Prestressed Concrete Beams w/ CIP Concrete Deck	Prestressed Beam Type V	Reinforced Concrete Column Piers and Abutments	1986/2006	RF=1.43 51.6 tons (Inv. LFR)	Yes	91.10	99.82	2/9/2016	Vertical Clearance
860504	Sawgrass Expwy. EB over Lyons Road	EB	247.79	58.92	10	10	3	26.69	15'-10" SB	7'-0" NB	16.60	Urban Minor Arterial	2	125.00	Prestressed Concrete Beams w/ CIP Concrete Deck	Prestressed Beam Type V	Reinforced Concrete Column Piers and Abutments	1986/2006	RF=1.73 62.4 tons (Inv. LFR)	Yes	94.20	99.80	2/9/2016	W-beam guardrail attach. on right side
860505	Sawgrass Expwy. WB over Lyons Road	WB	248.71	58.92	10	10	3	26.69	16'-6" NB	7'-0" NB	16.60	Urban Minor Arterial	2	125.35	Prestressed Concrete Beams w/ CIP Concrete Deck	Prestressed Beam Type V	Reinforced Concrete Column Piers and Abutments	1986/2006	RF=1.79 64.4 tons (Inv. LFR)	Yes	90.00	99.94	2/9/2016	Vertical Clearance
860184[1,2]	Turnpike over Hillsboro Canal	NB/SB	249.84	114.76	10	9.66 NB** 7.66 SB**	6	0	N/A	N/A	9.50	Canal	6	42	Prestressed Concrete Beams and T-Beams w/ CIP Concrete Deck	Prestressed Beam Type II	Reinforced Concrete Piles and Abutments	1956/1985	RF=0.74 26.7 tons (Inv. LFR)	No	70.40	90.23	9/29/2015	None visible
860586[1]	Hillsboro Boulevard EB/WB over Turnpike	EB/WB	217	119.67	N/A	2.5	6	0	10'-0" NB	15'-0" NB	15.90	Urban Principal Arterial Expressway	2	108.5	Prestressed Concrete Beams w/ CIP Concrete Deck	Prestressed Beam Type IV	Reinforced Concrete Column Piers and Abutments	1990	RF=2.00 72.2 tons (Inv. LFR)	No	84.00	99.57	6/27/2013	Vertical Clearance
860506	Turnpike NB/SB over Sawgrass Expwy	NB/SB	308	126.75	10	10	7	0	9'-0" EB	11'-10" WB	16.90	Urban Principal Arterial Expressway	4	83	Prestressed Concrete Beams w/ CIP Concrete Deck	Prestressed Beam Type III	Reinforced Concrete Column Piers and Abutments	1985	RF=1.05 37.8 tons (Inv. LRFR)	Yes	79.00	85.93	9/29/2015	None visible
864112	Wiles Road EB/WB over Turnpike	EB/WB	180.4	115.40	9	6.45	4	0	9'-0"	40'-4" SB	16.80	Urban Principal Arterial Expressway	2	90.2	Prestressed Concrete Beams w/ CIP Concrete Deck	Prestressed Beam Type IV	Reinforced Concrete Column Piers and Abutments	2009	RF=1.07 38.5 tons (Inv. LRFR)	No	90.20	99.89	1/26/2016	None visible

Note: EB - Eastbound, WB - Westbound, NB - Northbound, SB - Southbound, LF - Left, RT - Right, CIP - Cast in Place
* From Inspection Report
** per Field Visit
[1]By others
[2]From lowest member to Design High Water is 9.9

2.4 Existing Environmental Features

The project is located in northern Broward County near the communities of Coral Springs, Parkland, Coconut Creek, and Deerfield Beach. The project area is heavily urbanized and generally lacks undisturbed natural plant communities. Predominant land uses include residential, commercial, and industrial. Quiet Waters Park is located in the northeast quadrant of the interchange of Sawgrass Expressway and Florida's Turnpike. The project corridor extends north on Florida's Turnpike and terminates at the Hillsboro Canal, which forms the boundary between Broward and Palm Beach Counties.

The study area is located on relatively flat land with a ground elevation ranging between approximately 81 and 101 feet above sea level. According to the flow pattern map from the SFWMD, groundwater flow in the project area is generally to the east-southeast. The project is underlain by the Biscayne Aquifer which is a Sole Source Aquifer as identified by the U.S. Environmental Protection Agency.

The study area contains low income and Limited English Proficiency populations. No archaeological sites were identified within the Area of Potential Effect for cultural resources. The historic resources survey resulted in the identification of six historic resources, not all of them eligible for listing on the National Register of Historic Places.

The US Fish and Wildlife Service National Wetlands Inventory maps Freshwater Emergent Wetlands, Freshwater Forested/Shrub Wetlands, Freshwater Ponds, Lakes, and Riverine areas in the project area. Most of the Riverine and freshwater Ponds are stormwater features, but wetlands occur in Quiet Waters Park and in two areas south of Sawgrass Expressway and immediately west of Florida's Turnpike. The project is within the USFWS consultation area for Everglade snail kite. The project occurs within the Core Foraging Areas of the Wakodahatchee, Lox NC-4, Sawgrass Ford, and Emerald Estates 1 and 2 Griffin Wood Stork Colonies.

Bald eagle nest BO003 was located in a tree approximately 500 feet north of the project, in the northeast quadrant of the interchange of Sawgrass Expressway and Florida's Turnpike. That nest was damaged in storms and is no longer present. The most recently active nest location in this area is within Quiet Waters Park and is located more than 660 feet from the project. USFWS and FWC generally do not require any special protective measure if a bald eagle nest is further than 660 feet from the project.

Noise levels were modeled at 1,269 receptor locations representing 3,660 residential and 262 special land use noise sensitive sites. Within the study area, twelve existing or planned noise barriers will be retained in the future design. A total of 19 sites of potential contamination risk were identified, including seven Medium Risk, and 12 Low Risk sites. None of these potentially contaminated sites are proposed for right of way acquisition.

3.0 FUTURE CONDITIONS

3.1 FUTURE CONDITIONS CONSIDERATIONS

This project is not expected to affect the current or future land use of the area. Roadway functional and context classifications are not proposed to change in the future or with the proposed improvements.

There are a total of 12 adjacent studies/projects with four immediately to the east, west, north, and south of the study limits (see ***Figure 3.1***).

There are no local plans or policies that affect the project alternatives.

In 2016, the Sawgrass Expressway carried an Annual Average Daily Traffic (AADT) volume of 86,200 daily vehicles west of US 441 and 81,700 daily vehicles between US 441 and Lyons Road. The segment between Lyons Road and Florida's Turnpike carried 81,700 daily vehicles and the segment east of Florida's Turnpike up to Powerline Road carried 37,700 daily vehicles.

The 2045 No-Build AADTs forecast estimate is 131,100 daily vehicles west of US 441 and 128,900 daily vehicles between US 441 and Lyons Road. The segment between Lyons Road and Florida's Turnpike is estimated to carry 115,100 daily vehicles and the segment east of Florida's Turnpike up to Powerline Road is estimated at 71,900 daily vehicles. The 2045 AADT volumes represent a 52-91% increase in traffic from the year 2016 to 2045.

Project	Facility/FPID #	Location	Description
1	Sawgrass Expressway 437153-1	South of US 441/SR 7 to Powerline Road	PD&E Study Widen from 8 to 10 lanes and interchange improvements
2	SW 10th Street 439891-1	Florida's Turnpike to SW 24th Avenue	Design Project Add four connector lanes (by FDOT D4)
3	I-95 and SW 10th Street 436964-2	I-95 from North of Sample Road to Hillsboro Boulevard SW 10th Street from SW 24th Avenue to I-95	Design Project I-95/SW 10th Street connector interchange (by FDOT D4)
4	Florida's Turnpike 442212-1	I-595 to Wiles Road	PD&E Study Widen to 10 lanes and interchange improvements
5	Sawgrass Expressway 435461-5	University Drive to SR 7	Design Project Widening and interchange improvements
6	Sawgrass Expressway 435461-4	Sample Road to University Drive	Design Project Widening and interchange improvements
7	Sawgrass Expressway 435461-1	Atlantic Boulevard to Sample Road	Design Project Widening and interchange improvements
8	Sawgrass Expressway 443956-1	Atlantic Boulevard interchange	Construction Project Widening and interchange improvements
9	Sawgrass Expressway 437155-6	Oakland Park Boulevard to Atlantic Boulevard	Design Project Widening and interchange improvements
10	Sawgrass Expressway 437155-1	Sunrise Boulevard to Oakland Park Boulevard	Design Project Widening and interchange improvements
11	Sawgrass Expressway 437155-5	NW 8th Street to Sunrise Boulevard	Design Project Widening and new interchange at NW 8th Street
12	Florida's Turnpike 415927-1	Sawgrass Expressway to Glades Road	Design Project Widen to 8 lanes

Note: Projects 1 and 2 have overlapping limits between Florida's Turnpike and Powerline Road.
Projects 1 and 12 have overlapping limits between Sawgrass Expressway and the County Line.

Figure 3.1 – Adjacent Studies/Projects

The Florida's Turnpike Enterprise (FTE) version of the Southeast Regional Planning Model (SERPM-FTE) 6.5.4 was used to develop the travel demand forecasting for this study. SERPM-FTE includes model network enhancements such as the recoding of interchange configurations along the major freeway networks in Southeast Florida and updates to the future land use data to reflect the best-known information at the time. The Express Lane Time-of-Day Model (ELToD) v2.2 was used in conjunction with the SERPM-FTE to derive the 'Thru Lanes' volumes along the Turnpike. The ELToD provides the means to forecast traffic by hour and direction in the 'Thru Lanes' via supply and demand equilibrium process. A detailed travel demand forecasting methodology was developed and approved, as documented in the Florida Department of Transportation Interchange Access Request Methodology Letter of Understanding (MLOU) dated August 2019 and an addendum dated June 2023, a companion document to this study.

As part of this PD&E Study, 2040 No-Build and Build networks were developed during the modeling process. The 2045 daily traffic volumes were extrapolated using the 2040 balanced volumes. The future Design Hour Volumes (DHVs) and Directional Design Hour Volumes (DDHVs) were derived from the future year AADT volumes using the appropriate Design Hour Factor (K) and Directional Distribution Factor (D). The development of the future intersection turning movement volumes (TMVs) involved multiple steps. The first step was to develop the existing turning movement percentages from the existing counts. These existing turning movement percentages were adjusted, where warranted, based on the turning movement splits produced from the future conditions model runs. The second step was to develop the cross street DDHVs, which were developed by applying K and D factors to the cross street AADTs produced from the future condition model runs. The No-Build and Build model results were checked for reasonableness using Historic Trend Line Forecasts and Compound Growth Factors, which are independent projection methods. Additional details about the travel demand forecasting are documented in the SW 10th Street PD&E Project Traffic Forecasting Memorandum, dated January 2019.

4.0 DESIGN CONTROLS AND CRITERIA

Design standards are well defined for Florida's limited access facilities. Design standards and criteria provide the framework for evaluating the current geometry, existing deficiencies, and future design to meet the mobility needs of the corridor. Specifically, they help establish the roadway typical section, cross sections, and acceptable interchange configurations. Roadway design elements and applicable design standards considered in the design of the proposed improvements for the corridors are summarized in ***Sections 4.1*** and ***4.2***.

4.1 Design Controls

Roadway context classifications provides information to planners and engineers of the type of users and the intensity of the use based on the existing or future land use characteristics, development patterns, and roadway connectivity of an area. ***Table 4.1*** lists the design controls used to determine the design criteria of the project alternatives.

Table 4.1 – Design Controls

#	Design Control	Sawgrass Expressway	Florida's Turnpike
1	Roadway context classification	Does not apply to Limited Access Facility	
2	Functional classification and SIS designation	Divided Urban Principal Arterial Expressway	
3	Access management class and applicable standards	Class 1 Area Type 2	
4	Design speed and Target Speed	Design Speed = 45 – 70 mph Target Speed Does Not Apply	Design Speed = 70 mph Target Speed Does Not Apply
5	Capacity* and LOS Target	Design Hour Directional Capacity for 10 lanes = 9,470 Target LOS D	Design Hour Directional Capacity for 10 lanes = 9,280 Target LOS D
6	Design vehicle	WB-62 FL	
7	Pedestrian and bicycle requirements	Does not apply to Limited Access Facility	
8	Physical constraints (e.g., existing ROW, approach roads, intersecting roads, railroads, major utilities)	Existing ROW, intersecting roads (US 441, Lyons Road)	Existing ROW, Quiet Waters Park, FGT Lines
9	Environmental constraints (e.g., public parks, historic and cultural features, wetlands, floodplains)	Quiet Waters Park, Wetlands, Former Eagle Nest Locations	Quiet Waters Park, Wetlands, Former Eagle Nest Locations
10	Type of stormwater management facilities (e.g., closed or open drainage systems)	Open Drainage System	Open Drainage System
11	Navigational requirements	Does Not Apply	
12	Design high water, including impacts from projections	12.50 ft	10.90 ft
13	Design wave heights for coastal bridges, including impacts from sea level rise projections	Does Not Apply	

*Refer to Systems Interchange Modification Report (SIMR) for more detail.

4.2 DESIGN CRITERIA

The design criteria and standards are based on design parameters outlined in the *2018 American Association of State Highway Transportation Officials (AASHTO) - A Policy on Geometric Design of Highways and Streets, FDOT Design Manual (FDM) (FDOT, 2023), and FDOT Standard Plans for Road and Bridge Construction 2023*. **Table 4.2** lists the design criteria established for the project.

Table 4.2 – Design Criteria

<table>
<tr><th>Design Element</th><th colspan="8">Design Standard</th><th>Source</th></tr>
<tr><td colspan="10">Lane Width</td></tr>
<tr><td>Mainline</td><td colspan="8">12 ft</td><td>FDM, Section 211.2</td></tr>
<tr><td>One Lane Ramp</td><td colspan="8">15 ft (Tangent)</td><td rowspan="2">FDM, Table 211.2.1</td></tr>
<tr><td>Two Lanes Ramp</td><td colspan="8">24 ft (Tangent)</td></tr>
<tr><td colspan="10">Median Width</td></tr>
<tr><td>With Barrier</td><td colspan="8">26 ft</td><td>FDM, Table 211.3.1</td></tr>
<tr><td rowspan="3">Shoulder Width</td><td colspan="4">Without Shoulder Gutter</td><td colspan="4">With Shoulder Gutter</td><td rowspan="3"></td></tr>
<tr><td colspan="2">Full Width</td><td colspan="2">Paved Width</td><td colspan="2">Full Width</td><td colspan="2">Paved Width</td></tr>
<tr><td>Outside</td><td>Median /Left</td><td>Outside</td><td>Median /Left</td><td>Outside</td><td>Median /Left</td><td>Outside</td><td>Median /Left</td></tr>
<tr><td>Mainline</td><td>12 ft</td><td>12 ft</td><td>10 ft</td><td>10 ft</td><td>15.5 ft</td><td>15.5 ft</td><td>8 ft</td><td>8 ft</td><td rowspan="3">FDM, Table 211.4.1</td></tr>
<tr><td>One Lane Ramp</td><td>6 ft</td><td>6 ft</td><td>4 ft</td><td>4 ft</td><td>11.5 ft</td><td>11.5 ft</td><td>4 ft</td><td>4 ft</td></tr>
<tr><td>Two Lanes Ramp</td><td>12 ft</td><td>8 ft</td><td>10 ft</td><td>4 ft</td><td>15.5 ft</td><td>13.5 ft</td><td>8 ft</td><td>6 ft</td></tr>
<tr><td colspan="10">Bridge Shoulder Width</td></tr>
<tr><td>Mainline-Two Lanes</td><td colspan="8">6 ft Inside, 10 ft Outside</td><td rowspan="4">FDM, Figures 260.1.1 – 260.1.4</td></tr>
<tr><td>Mainline-Three Lanes +</td><td colspan="8">10 ft Inside and Outside</td></tr>
<tr><td>Ramp-One Lane</td><td colspan="8">6 ft Inside and Outside</td></tr>
<tr><td>Ramp-Two Lanes</td><td colspan="8">6 ft Inside, 10 ft Outside</td></tr>
<tr><td colspan="10">Roadway Cross Section Slope</td></tr>
<tr><td rowspan="2">Roadway Standard Pavement (Tangent)</td><td colspan="8">0.03 maximum (> 45 MPH)</td><td rowspan="2">FDM, Figure 211.2.1, Figure 210.2.1</td></tr>
<tr><td colspan="8">0.04 maximum (≤ 45 MPH)</td></tr>
<tr><td>Inside Shoulder</td><td colspan="8">0.05 (0.06 if inside lane is sloping to the inside)</td><td rowspan="3">FDM, Section 211.4.2</td></tr>
<tr><td>Outside Shoulder</td><td colspan="8">0.06</td></tr>
<tr><td>Maximum Shoulder Cross Slope Break</td><td colspan="8">0.07</td></tr>
<tr><td>Bridge Deck</td><td colspan="8">0.02</td><td>FDM, Section 260.4</td></tr>
<tr><td>Maximum algebraic difference in cross slope at turning roadway terminals</td><td colspan="8">Less than 35 mph: 0.06
35 mph and more: 0.05
Adjacent travel lanes: 0.04</td><td>FDM, Table 211.2.2</td></tr>
<tr><td rowspan="4">Front Slope</td><td colspan="8">1:6 when the height of fill is between 0 ft to 5 ft</td><td rowspan="6">FDM, Table 215.2.3</td></tr>
<tr><td colspan="8">1:6 to edge of clear zone then 1:4 when the height of fill is between 5 ft to 10 ft</td></tr>
<tr><td colspan="8">1:6 to edge of clear zone then 1:3 when the height of fill is between 10 ft to 20 ft</td></tr>
<tr><td colspan="8">1:2 with guardrail when height of fill is greater than 20 ft</td></tr>
<tr><td>Back Slope</td><td colspan="8">1:4 or 1:3 with a standard width trapezoidal ditch and 1:6 front slope</td></tr>
<tr><td>Transverse Slope</td><td colspan="8">1:10 or flatter (freeway), 1:4 (others)</td></tr>
<tr><td colspan="10">Border Width</td></tr>
<tr><td>Mainline</td><td colspan="8">94 ft
Measured from the edge of the outside traveled way to the right of way line</td><td>FDM, Section 211.6</td></tr>
</table>

Table 4.2 – Design Criteria (Continued)

Design Element	Design Standard	Source
Recoverable Terrain (Clear Zone)		
Mainline	36 ft	FDM, Table 215.2.1
One Lane Ramp	10 - 18 ft	
Two or more Lane Ramp	12 - 30 ft	
Auxiliary Lane	24 ft	
Roadway Base Clearance		
	3.0 ft above the Base Clearance Water Elevation	FDM, Section 210.10.3
Travel Lanes	Travel through lanes are to be above the FEMA floodplain elevations	FDM, Section 211.9
Design Vehicle		
Mainline	WB-62FL	FDM, Figure 201.5.1
Design Speed		
Mainline	50-70 MPH	FDM, Table 201.4.1
Ramps	30-60 MPH	FDM, Table 201.4.2
Maximum Deflection without curve		
Mainline	0° 45' 00" for V ≥ 45 MPH	FDM, Section 210.8.1
Ramps (without Curb and Gutter)	0° 45' 00" for V ≥ 45 MPH	
	2° 00' 00" for V ≤ 40 MPH	
Length of Horizontal Curve		
Mainline (Desired Length=30x Design Speed)	1800 ft for V = 60 MPH 2100 ft for V = 70 MPH	FDM, Table 211.7.1 FDM, Table 210.8.1
Mainline (Minimum Length=15x Design Speed)	900 ft for V = 60 MPH 1050 ft for V = 70 MPH	
Ramps (Length=15x Design Speed)	450 ft for V = 30 MPH	
Ramps (Length=15x Design Speed)	825 ft for V = 55 MPH	
Ramps (Minimum)	400 ft (up to 45mph)	
Maximum Degree of Curve		
Mainline	3° 30' (70 mph) with R = 1640	FDM, Table 210.9.1
Ramps	24° 45' (30 mph) with R = 231.5 ft	
	6° 30' (55 mph) with R = 882 ft	
Minimum Horizontal Curve Radius		
Mainline	1637 ft (70 mph), 1091 ft (60 mph)	FDM, Table 210.8.2
Ramps	231 ft (30 mph)	
	694 ft (50 mph)	
Maximum Profile Grade		
Mainline	3%	FDM, Table 211.9.1
Ramps	7% (25-30 MPH)	
	6% (35-40 MPH)	
	5% (45-50 MPH)	
Maximum Change in Grade without Vertical Curve		
Mainline	0.4% (60 mph), 0.2% (70 mph)	FDM, Table 210.10.2
Ramps	1.00% - 0.5%	
Minimum Stopping Sight Distance		
Mainline	Sawgrass and Turnpike 820 ft, Connector Lanes 570'	FDM, Table 211.10.1; 211.10.2
Ramps	200 ft - 495 ft	FDM, Table 211.10.2
Minimum Decision Sight Distance		
Mainline	60 mph - 1280 ft; 70mph - 1445 ft (Urban E)	AASHTO Table 3-3

Table 4.2 – Design Criteria (Continued)

Design Element	Design Standard	Source
Minimum Crest Vertical Curve Length		
Mainline	1000 ft (open highway)	FDM, Table 211.9.3
	1800 ft (within interchanges)	
Ramps	90 ft (30 mph) - 350 ft (55 mph)	
K value for Crest Vertical Curve		
Mainline	506 (70 MPH) - Interstate	FDM, Table 211.9.2
Ramps	31 (30 mph) -185 (55 mph)	
Minimum Sag Vertical Curve Length		
Mainline	800 ft	FDM, Table 211.9.3
Ramps	90 ft (30 mph) – 250 (55 mph)	
K value for Sag Vertical Curve		
Mainline	206 (70 mph) - Interstate	FDM, Table 211.9.2
Ramps	37 (30 mph) – 115 (55 mph)	
Superelevation (e)		
Maximum Superelevation	0.1	FDM, Table 210.9.1
Minimum Length of full superelevation within a horizontal curve	100 ft 45 mph or less 200 ft 50 mph or more	FDM, Section 210.9
Superelevation Transition Rate	1:200 for 6 lanes; 1:190 for 8 lanes	FDM, Table 210.9.3
	Ramps: 1:175(25-40mph); 1:200(45-50mph); 1:225(55-60mpn)	
Superelevation Transition Ratio (Curve:Tangent)	20:80 preferred	FDM, Section 210.9.1
	50:50 minimum	
Minimum Vertical Clearances		
Bridge over Roadways	16.5 ft	FDM, Table 260.6.1
Roadway over Railroad	23.5 ft	
Pedestrian Bridge over Roadway	17.5 ft	
Overhead Sign Structure	17.5 ft	FDM, Section 210.10.3
Overhead DMS Structures	19.5 ft	
Minimum Spacing Between Ramps		
Off-ramp to Off-ramp	1000 ft (800' CD Road)	FDM, Figure 211.12.1
On-ramp to On-ramp	1000 ft (800' CD Road)	
On-ramp to Off-ramp (Weaving)	1600 ft-2000 ft (Mainline, conditional) 1000 ft-1600 ft (CD Road, conditional)	
Off-ramp to On-ramp	500 ft (400' CD Road)	

4.2.1 Drainage Criteria

The design criteria presented in this section are based on the design parameters outlined in the following references:

- 2023 FDOT, Drainage Manual (DM)
- 2023 FDOT, Florida Design Manual (FDM)
- 2020 FDEP, ERP Applicant's Handbook Volume I
- 2016 SFWMD, ERP Applicant's Handbook Volume II
- 2020 SFWMD, B.M.P. for South Florida Urban Stormwater Management Systems
- USDA-NRCS Soil Survey Of Broward County, FL
- FEMA Flood Insurance Rate Maps

Design criteria considered in the development of the drainage for this project are summarized in ***Table 4.3***.

Table 4.3 – Drainage Design Criteria

Design Element	Design Standard	Source
Open Channel Design Frequency	10 Year for Ditches/Swales 25 Year for Outfall Ditches and Canals	DM Section 2.2 Table 2.1
Open Channel Minimum Slope	0.0005 ft/ft	DM Section 2.4.2
Channel Velocity (Maximum)	4 fps for Sod Lining 5 fps for Stake Sod Lining 6 fps for Riprap Rubble Lining 10 fps for Rigid Lining	DM Table 2.5
Storm Drain Design Frequency	3 Year for General Design 10 Year for Interstate Facilities	DM Section 3.3 Table 3.1
Storm Drain Design Tailwater	Stormwater Ponds: Peak stage in the pond during storm drain design event French Drains: Design Head over the outlet control structure Regulated Canals: Agency regulated control elevation	DM Section 3.4
Minimum Time of Concentration	10 Minutes	DM Section 3.5.1
Minimum Pipe Slope	Minimum Slope which produces a storm drain velocity of 2.5 fps when full and no greater than 15 fps when the storm drain is flowing full	DM Section 3.6.1
Hydraulic Gradient	When minor the Hydraulic Grade Line (HGL) energy losses are not considered, HGL shall be 1 ft below the theoretical gutter elevation	DM Section 3.6.2
Outlet Velocity	When outlet velocity exceeds 6 fps provide special channel lining and/or energy dissipater	DM Section 3.6.3
Spread Standards	Spread resulting from 4 inches per hour shall be limited to: ½ lane for < 45 MPH 8 ft of lane clear for 45 MPH to 55 MPH No encroachment for > 55 MPH	DM Section 3.9 Table 3.9.1
Minimum Pipe Size	18 inches	DM Section 3.10.1
Maximum Pipe Length	Pipe without French Drains 300 ft for 18 inches pipes 400 ft for 24 to 36 inches pipes 500 ft for > 42 inches pipes French Drains (Minimum Length from Access) 150 ft for 18 to 30 inches pipes 200 ft for > 36 inches pipes	DM Section 3.10.1
Cross Drains Design Frequency	50 years for Mainline Interstate and Facilities with projected 20 year ADT > 1500 25 years for Facilities with projected 20 year ADT < 1500 10 years for roadside ditch culverts	DM Section 4.3
Wet Detention and Retention Ponds Maintenance Berm	20 ft minimum between top edge of normal pool elevation and right of way line, 15 ft adjacent to the water sloped at 1:8 or flatter	DM Section 5.4.4.2 SFWMD ERP Manual Section 7.5
Detention and Retention Ponds Freeboard	1 ft freeboard required above peak design stage for ponds and 0.5 foot minimum freeboard for linear treatment swales	DM Section 5.4.4.2
Wet Detention and Retention Ponds Requirements	Total Area = 0.5 acre minimum Slopes between control elevation and 2 ft below it shall be 1:4 or flatter	DM Figure 5-1 SFWMD ERP Manual Section 7.4
Water Quality Requirements	Wet Detention: Greater of 1 inch over total project area or 2.5 inches over total impervious Dry Detention: 75% of wet detention Wet/Dry Retention: 50% of wet or dry detention accordingly	SFWMD ERP Manual Section 5.2.1
Water Quality Requirements	Post Development discharge rate equal to or less than pre development discharge rate for 25 year – 3 day storm event, or rates specified in district criteria	SFWMD ERP Manual Section 6.2 and 6.3
Floodplain Encroachment	No encroachment allowed	SFWMD ERP Manual Section 6.4
Outfall Structures	Structures shall include baffles systems. Structures shall include bleed down notch or orifice that allows ½ inches of the detention volume to be discharged within 24 hours.	SFWMD ERP Manual Section 7.1 and 7.2

5.0 ALTERNATIVES ANALYSIS

5.1 NO-BUILD (NO-ACTION) ALTERNATIVE

The No-Build Alternative proposes to keep the existing corridors into the future without corridor improvements. No traffic capacity, operation, or safety improvements would be implemented throughout the corridor. The effect associated with this alternative includes the acceptance of existing highly congested traffic conditions. Also, travel demand and truck traffic will increase significantly over the next 20 years, given the continued growth expected in this area of Broward County. This alternative is considered to be a viable alternative to serve as a comparison to the study's proposed corridor alternatives.

This alternative has a number of positive aspects, since it would not require expenditure of funds for design, construction, right of way and/or utility relocation. Traffic would not be temporarily disrupted due to construction, avoiding inconveniences to local residents and businesses. Also, there would be no direct or secondary impacts to the environment, the socio-economic characteristics, community cohesion, or system linkage of the area.

The No-Build Alternative includes the existing transportation network and any funded, planned, or programmed improvements open to traffic by the design year 2045. The No-Build Alternative includes improvements that are elements of the MPO's Transportation Improvement Program, the 2045 Metropolitan Transportation Plan (MTP), FTE's Adopted Five-Year Work Program, any local government comprehensive plans and/or any development mitigation improvement projects that are elements of approved development orders.

The No-Build Alternative will not address the 301 crashes along the Sawgrass Expressway and the 1,021 crashes along the Florida's Turnpike (five-year crash period), within the study limits. The leading crash types include rear-end (34-46%) and sideswipe (15-18%). Rear-end and sideswipe type crashes are typical of highly congested roadways with frequent stop-and-go traffic conditions, which are the current conditions along these corridors.

As a result of the corridors being over capacity, travel demand is shifting vehicles onto less appropriate facilities. This, in turn, is negatively impacting the quality of life in local neighborhoods, as well as increasing driver frustration, reducing safety and increasing trip travel time. The expected traffic congestion offers no time savings to carpools/vanpools and transit users on these corridors. Without improvements, the project corridors will continue to experience high delays and will continue to operate at LOS F. Driving conditions for residents and commuters along the adjacent corridors connecting with these two corridors will also deteriorate well below acceptable LOS standards. The No-Build Alternative operational analysis results are summarized at the end of this section.

The No-Build roadway typical sections, within the study limits, are the same as the existing sections plus any future planned improvements not part of this study.

Sawgrass Expressway – Sawgrass Expressway, between west of US 441 and Florida's Turnpike, consists of four to six 12-foot wide travel lanes (two to three lanes in each direction) with 12-foot wide auxiliary lanes at select locations and 12-foot wide inside and outside shoulders. The median width varies within this segment of the corridor. The section between west of US 441 and east of Lyons Road has a 64-foot wide depressed grassed median separated by guardrail (see ***Figure 5.1*** and ***Figure 5.2***). The section between east of Lyons Road and Florida's Turnpike narrows down to a 2-foot wide median barrier wall (see ***Figure 5.3***). This section also has a two-lane collector-distributor roadway system with 12-foot wide travel lanes and 12-foot wide auxiliary lanes on both sides of the corridor providing ramp access to and from the Florida's Turnpike. Inside and outside shoulder widths vary depending on the number on lanes, tolling point locations and ramp gores.

SW 10th Street – SW 10th Street, between Florida's Turnpike and Powerline Road, consists of six 12-foot wide travel lanes (three lanes in each direction) and a raised grassed curbed median. The median width varies between 30-65 feet wide. The median currently accommodates landscape vegetation and exclusive left-turn lanes at the intersections (see ***Figure 5.4***).

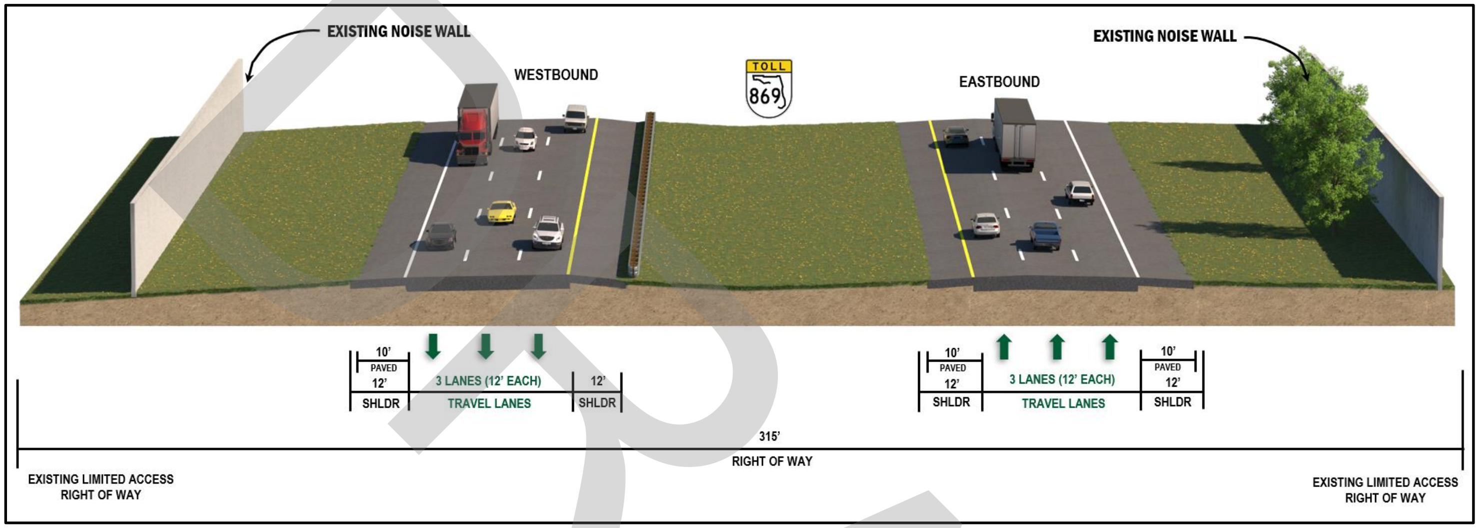


Figure 5.1 – No-Build Alternative Sawgrass Expressway Roadway Section West of US 441

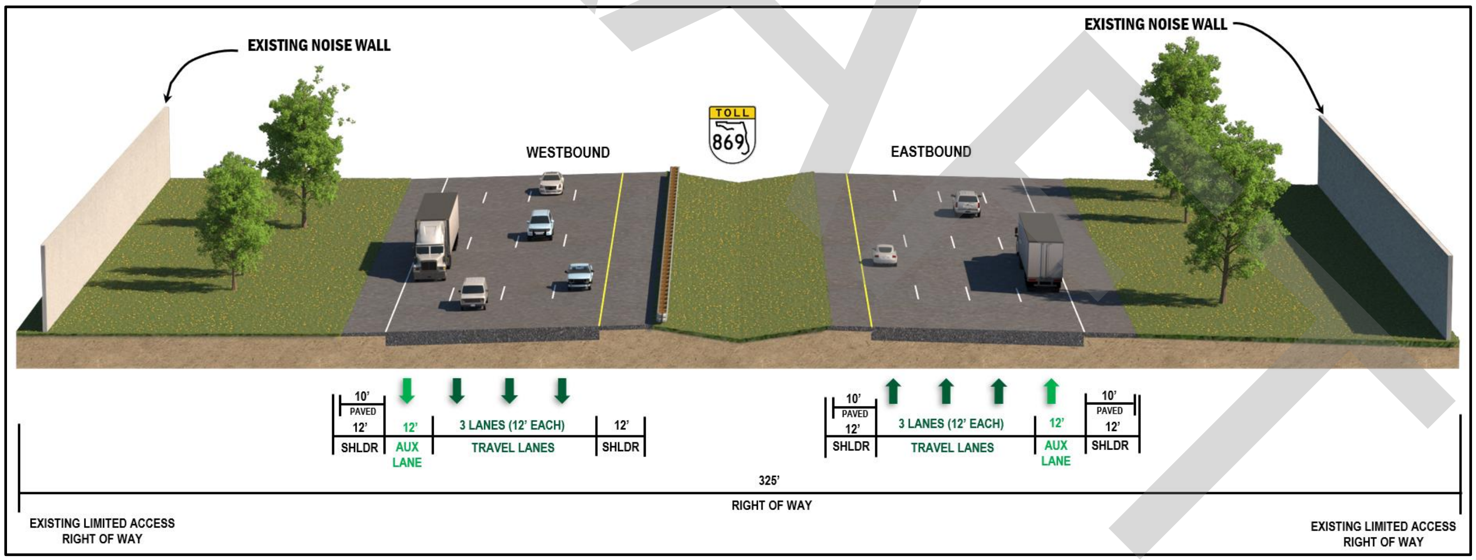


Figure 5.2 – No-Build Alternative Sawgrass Expressway Roadway Section between US 441 and Lyons Road

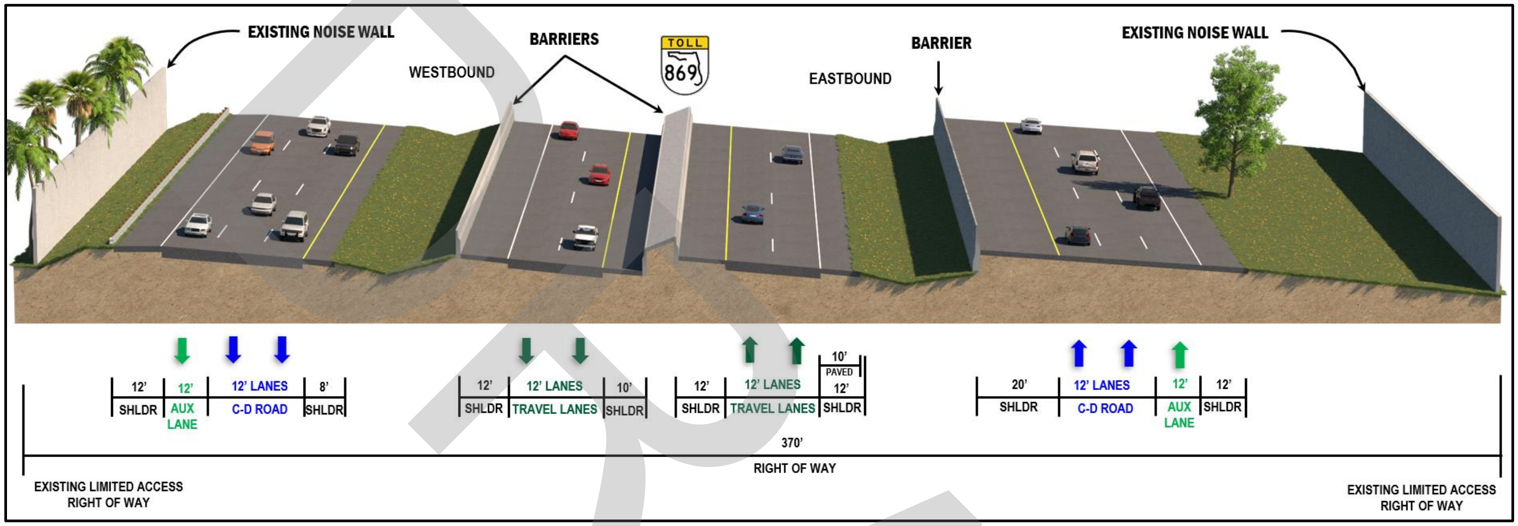


Figure 5.3 – No-Build Alternative Sawgrass Expressway Roadway Section between Lyons Road and Florida's Turnpike

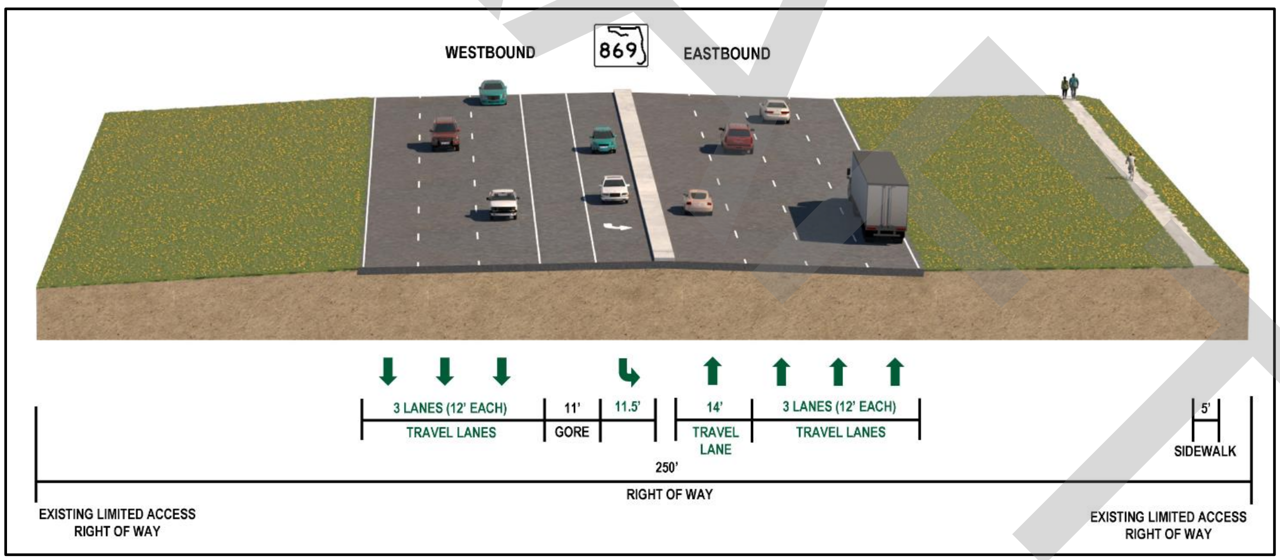


Figure 5.4 – No-Build Alternative SW 10th Street Roadway Section between Florida's Turnpike and Powerline Road

Florida's Turnpike – Florida's Turnpike, between Wiles Road and the County Line, consists of six 12-foot wide travel lanes (three lanes in each direction) with 8.5-10-foot wide inside shoulders, 12-foot wide outside shoulders and a 2-foot wide median barrier wall (see ***Figure 5.5*** and ***Figure 5.6***).

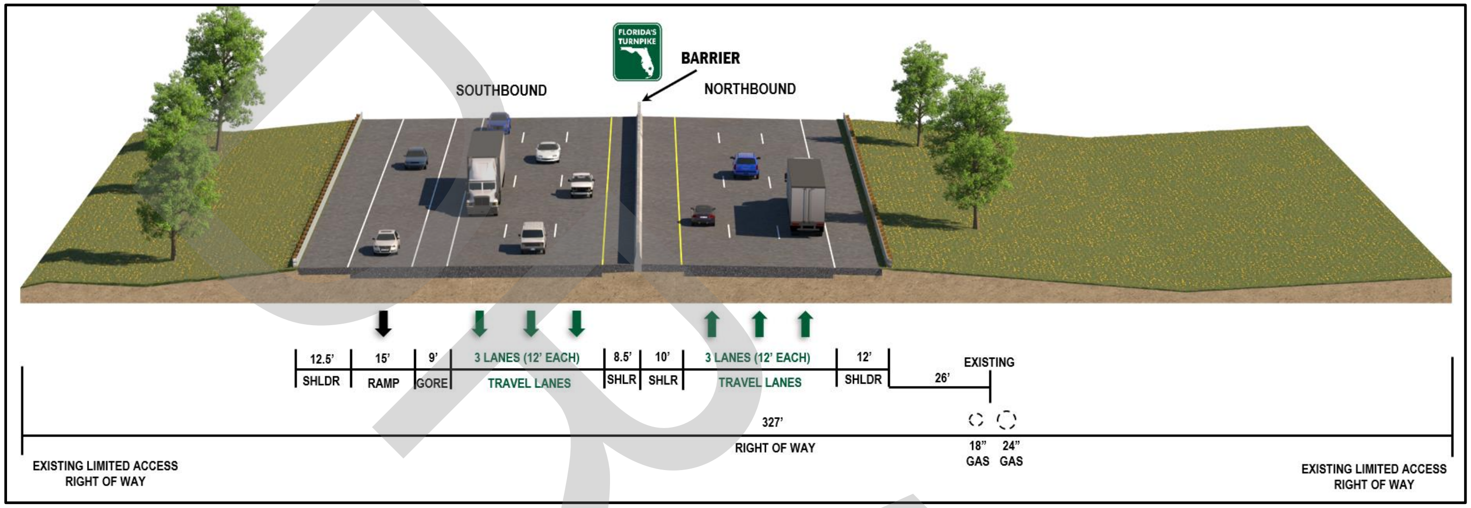


Figure 5.5 – No-Build Alternative Florida's Turnpike Roadway Section between Wiles Road and Sawgrass Expressway

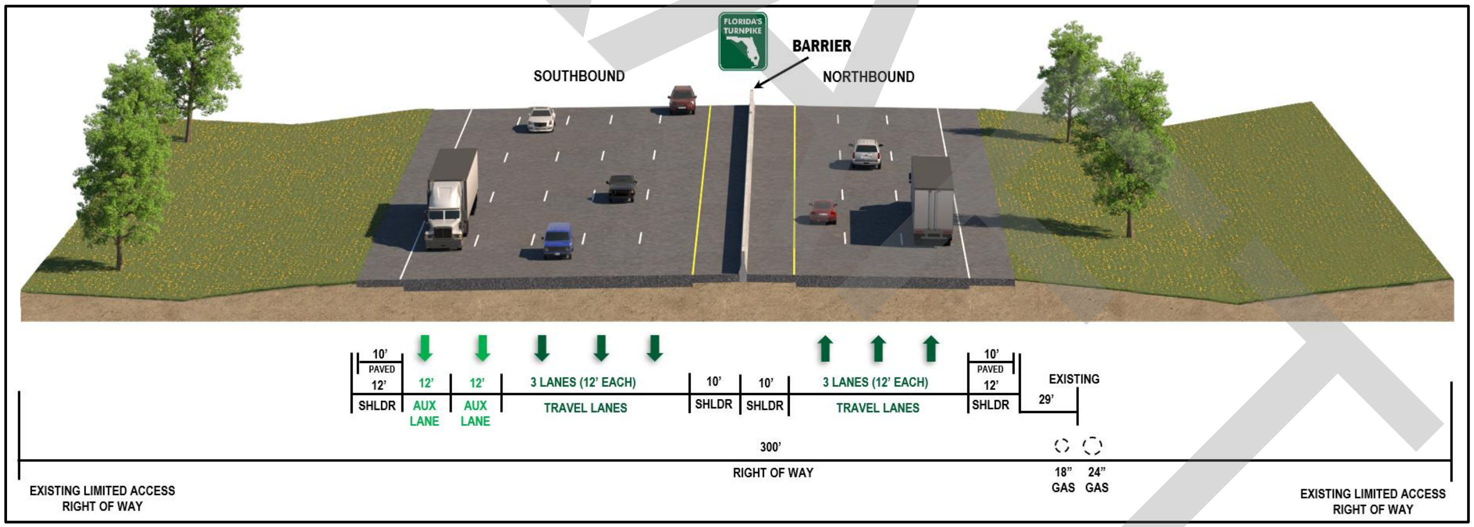


Figure 5.6 – No-Build Alternative Florida's Turnpike Roadway Section between Sawgrass Expressway and the County Line

There are four upcoming roadway improvement projects committed within the study area.

1. FDOT District Four FPID# 439891-1 – This project is adding two limited access connector lanes in each direction and other corridor improvements along SW 10th Street between Florida's Turnpike and I-95.
2. FTE FPID# 446024-2 – This project is extending the southbound on-ramp acceleration lane from Sawgrass Expressway eastbound by 1,436 feet.
3. FTE FPID# 415927-4 – This project is adding one more travel lane in each direction along Florida's Turnpike between Sawgrass Expressway and north of Glades Road.
4. FTE FPID# 442062-1 and 442062-2 – This project is milling, resurfacing, and enhancing safety along the Sawgrass Expressway between west of US 441 and east of Florida's Turnpike. This project will be completed as a recommendation from the ERCAR, dated November 2021.

These other improvement projects are expected to be opened to traffic before the implementation of this project.

No-Build Alternative Operational Analysis Results – This analysis followed the same process and methodology as the existing traffic operational analysis.

Vissim Operational Analysis Results for Intersections

An intersection analysis for ramp terminals and adjacent intersections was performed using Vissim to determine the LOS and delay time. The results summaries are presented in ***Table 5.1***.

2045 No-Build Intersection Analysis – In No-Build conditions, several ramp roadways will be operating at overcapacity conditions thereby resulting in heavy backup on the mainline and high unmet demand. Several intersections will not process the full demand and will appear less congested indicating better LOS, for example as shown in ***Table 5.1***, the Lyons Road intersection with Sawgrass (SR 869) ramps and Serko Boulevard and SW 10th Street intersections with Waterways Boulevard and Independence Drive which will operate at an acceptable LOS.

Table 5.1 – 2045 No-Build Peak Hours Vissim Intersection Level of Service and Delay (s/veh)

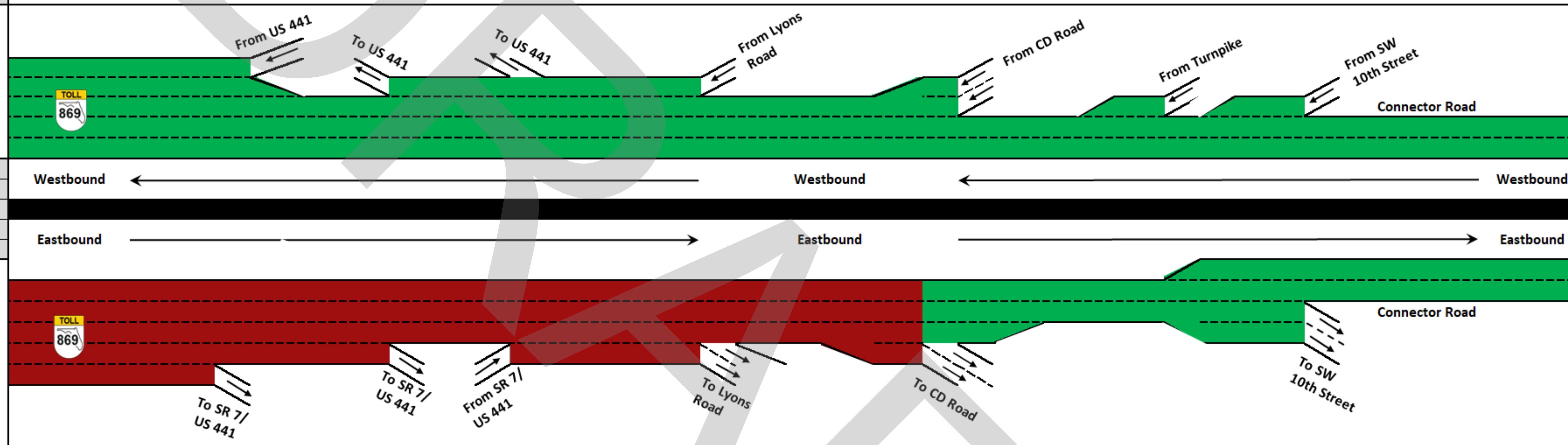
Arterial	Intersection	2045 No-Build			
		AM		PM	
		LOS	Delay	LOS	Delay
Sample Road	Turnpike Ramps	F	204	F	733
Glades Road	Turnpike Ramps	F	350	F	775
SR 7/US 441	Winston Park Boulevard	F	184	F	299
	Sawgrass Expy (SR 869) EB Ramps	F	85	F	146
	Sawgrass Expy (SR 869) WB Ramps	E	77	F	144
	Regency Lake Boulevard	F	151	F	195
Lyons Road	Winston Park Boulevard	F	149	F	367
	Sawgrass Expy (SR 869) EB Ramps	B	19	F	309
	Sawgrass Expy (SR 869) WB Ramps	B	16	F	174
	Serko Boulevard	C	26	F	522
SW 10th Street	Waterways Boulevard	A	9	F	870
	Independence Drive	A	6	F	647
	Powerline Road	E	64	F	673

<u>**Vissim Operational Analysis Results for Mainline Segments**</u>

2045 No-Build Analysis - Overall the No-Build alternative will fail due to overcapacity conditions at the northbound Turnpike to westbound Sawgrass Expressway off ramp and the U-turn at Lyons Road. As shown in ***Figure 5.7*** and ***Figure 5.8***, the eastbound Sawgrass (SR 869) freeway segments upstream of the C-D Road off-ramp and C-D Road will operate with an unacceptable LOS. Mainline congestion will result in high unmet demand.

Segment Type	Basic	Merge	Basic	Diverge	Weave	Basic	Merge	Basic	Merge	Merge	Basic
Demand Volume (vph)	6,690	6,690	5,270	5,980	6,380	5,430	5,430	3,110	3,110	2,320	1,510
Processed Volume (vph)	4,953	4,599	3,828	4,343	4,636	3,784	3,772	2,899	2,915	2,309	1,497
% Demand Served	74%	69%	73%	73%	73%	70%	69%	93%	94%	100%	99%
Speed (mph)	66	66	65	65	66	65	62	64	62	54	66
Density (pcpmpl)	17	15	20	18	20	22	17	25	17	20	13
Estimated LOS	B	B	C	B	B	C	B	C	B	B	B

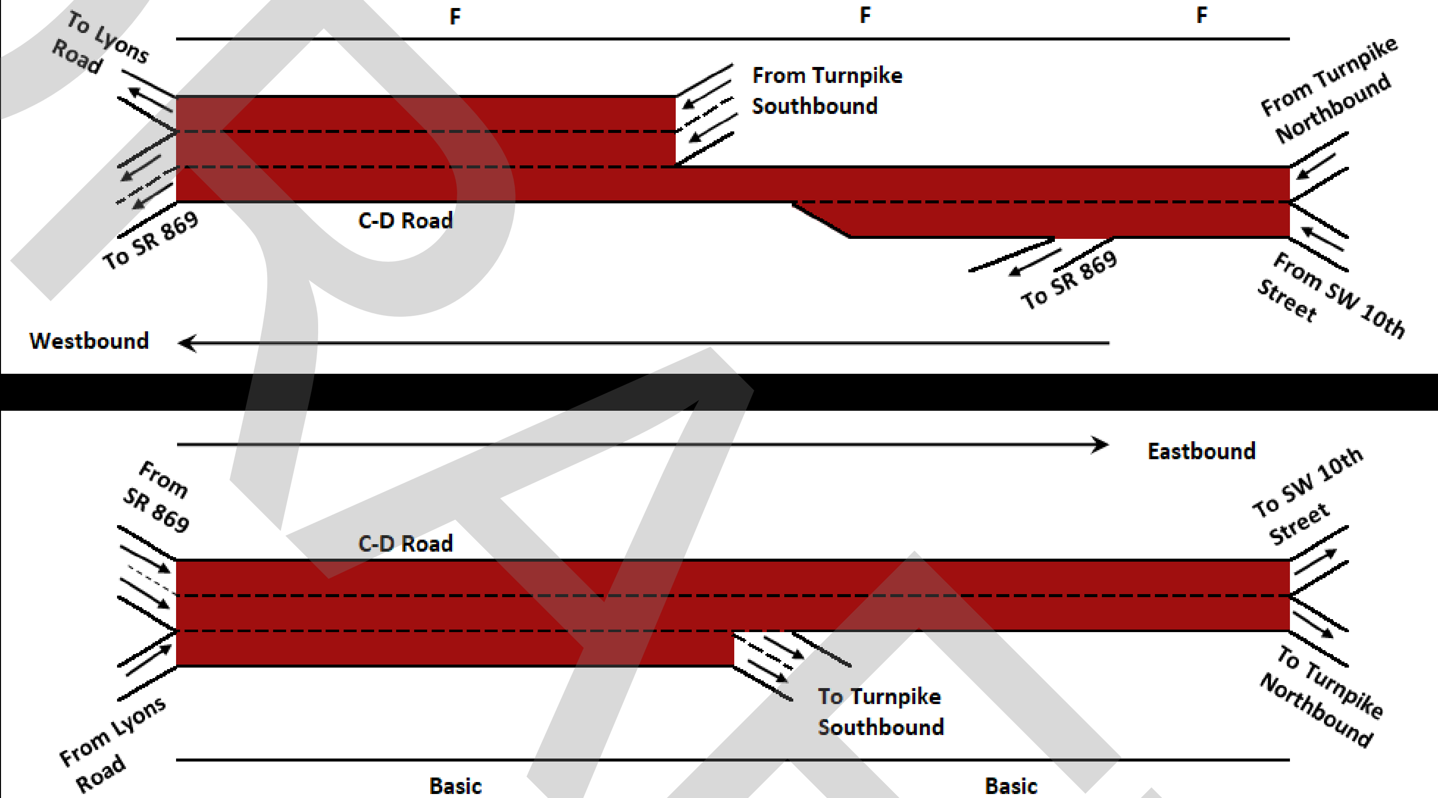
	Travel Condition
LOS C or Better	Uncongested
LOS D	Light
LOS E	Moderate
LOS F	Heavy



Segment Type	Diverge	Basic	Diverge	Basic	Weave	Basic	Diverge	Basic	Diverge	Basic
Demand Volume (vph)	8,670	8,250	8,250	7,470	9,480	8,590	8,590	3,940	3,940	2,400
Processed Volume (vph)	5,122	4,598	4,528	4,061	5,354	4,744	4,663	2,178	2,178	1,342
% Demand Served	59%	56%	55%	54%	56%	55%	54%	55%	55%	56%
Speed (mph)	8	14	14	13	13	17	28	55	56	62
Density (pcpmpl)	140	110	87	114	116	104	52	20	11	12
Estimated LOS	F	F	F	F	F	F	F	C	B	B

Figure 5.7 – 2045 AM No-Build Peak Hour Vissim Sawgrass Expressway Freeway Segment Performance

Segment Type	Weave	Basic	Weave
Demand Volume (vph)	3,750	1,110	1,900
Processed Volume (vph)	1,578	741	1,375
% Demand Served	42%	67%	72%
Speed (mph)	3	5	7
Density (pcpmpl)	181	90	117
Estimated LOS	F	F	F

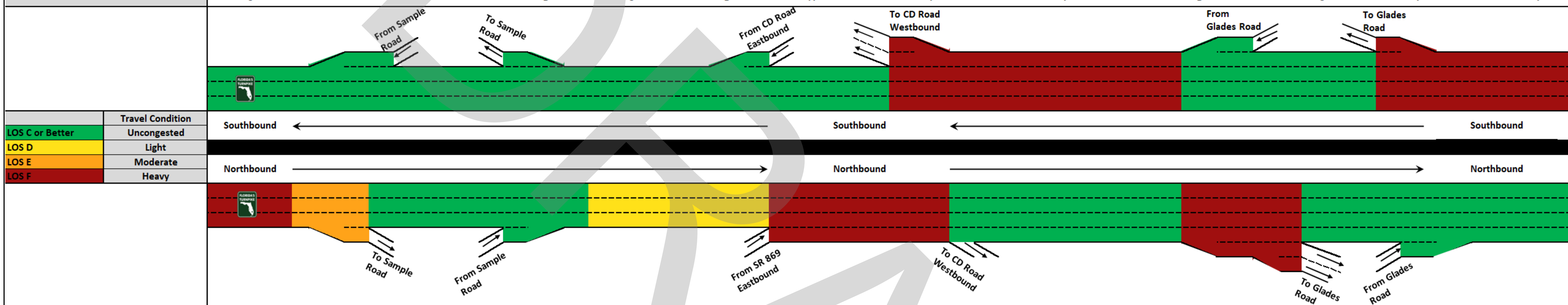


	Travel Condition
LOS C or Better	Uncongested
LOS D	Light
LOS E	Moderate
LOS F	Heavy

Segment Type	Basic	Basic
Demand Volume (vph)	6,360	3,910
Processed Volume (vph)	3,495	1,983
% Demand Served	55%	51%
Speed (mph)	23	12
Density (pcpmpl)	68	105
Estimated LOS	F	F

Figure 5.7 – 2045 AM No-Build Peak Hour Vissim CD Road Freeway Segment Performance (Continued)

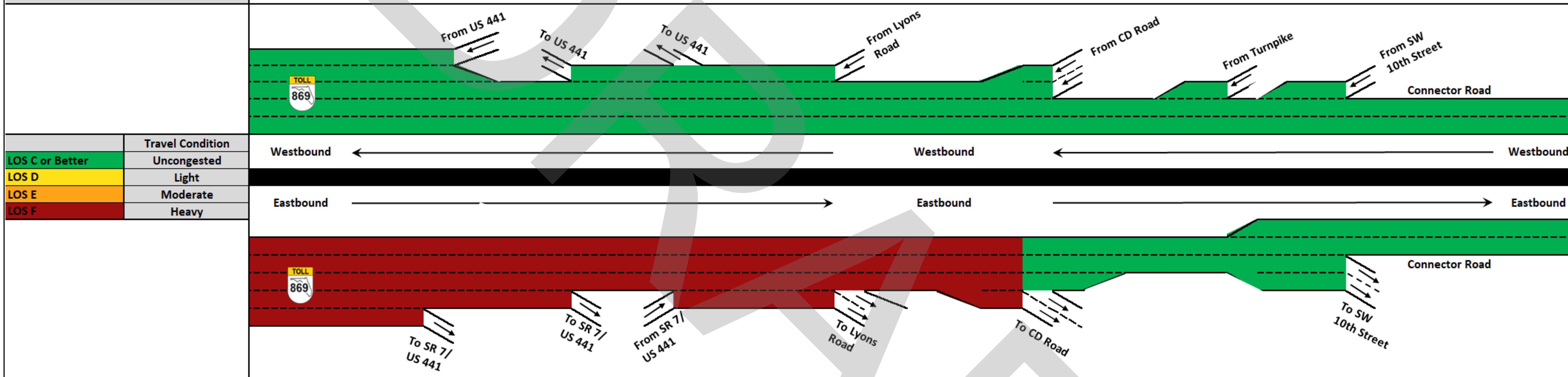
Segment Type	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic
Demand Volume (vph)	7,300	7,300	5,740	6,870	6,870	6,870	4,420	7,060	7,060	7,060	5,520	6,960	6,960
Processed Volume (vph)	4,273	4,237	3,034	3,599	3,588	3,542	2,129	3,404	4,733	5,548	4,534	5,667	6,105
% Demand Served	59%	58%	53%	52%	52%	52%	48%	48%	67%	79%	82%	81%	88%
Speed (mph)	68	64	70	67	68	67	69	6	21	65	62	14	48
Density (pcpmpl)	24	19	16	16	20	15	11	131	67	19	20	91	47
Estimated LOS	C	B	B	B	C	B	A	F	F	B	C	F	F



Segment Type	Basic	Diverge	Basic	Merge	Basic	Weave	Basic	Diverge	Basic	Merge	Basic
Demand Volume (vph)	6,330	6,330	4,230	5,070	5,070	8,160	6,850	6,850	4,140	5,100	5,100
Processed Volume (vph)	5,572	5,443	3,662	4,315	4,228	5,570	4,649	4,341	2,649	3,283	3,354
% Demand Served	88%	86%	87%	85%	83%	68%	68%	63%	64%	64%	66%
Speed (mph)	31	43	68	68	53	29	57	16	68	70	70
Density (pcpmpl)	67	40	20	18	30	60	25	69	11	10	17
Estimated LOS	F	E	C	B	D	F	C	F	A	A	B

Figure 5.7 – 2045 AM No-Build Peak Hour Vissim Florida's Turnpike Freeway Segment Performance (Continued)

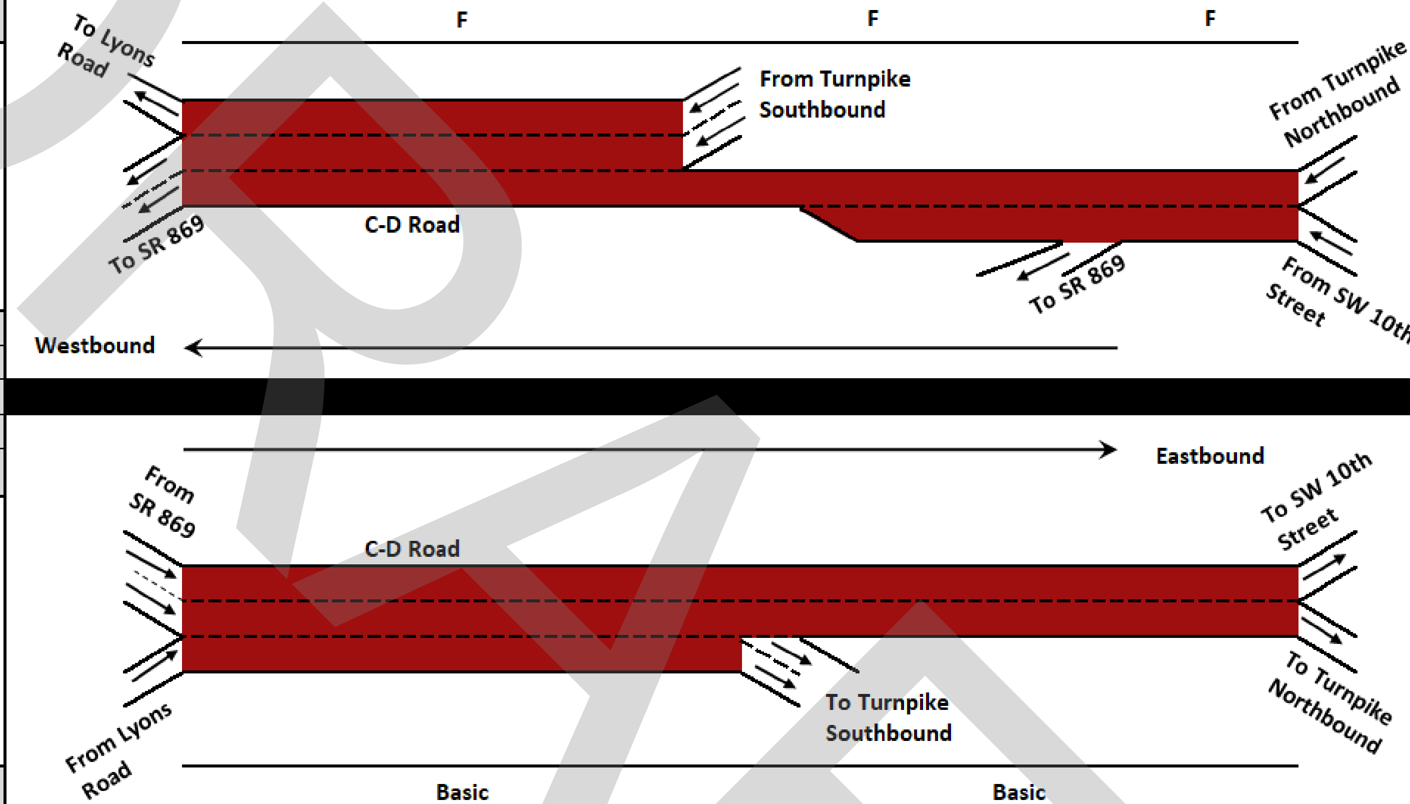
Segment Type	Basic	Merge	Basic	Diverge	Weave	Basic	Merge	Basic	Merge	Merge	Basic
Demand Volume (vph)	12,710	12,710	7,670	8,680	9,280	8,390	8,390	5,610	5,610	3,670	2,400
Processed Volume (vph)	2,663	2,480	2,300	2,602	2,763	2,641	2,637	2,573	2,592	2,488	2,385
% Demand Served	21%	20%	30%	30%	30%	31%	31%	46%	46%	68%	99%
Speed (mph)	67	67	66	66	67	66	66	65	64	60	65
Density (pcpmpl)	9	8	12	11	12	15	11	22	15	19	20
Estimated LOS	A	A	B	B	B	B	B	C	B	B	C



Segment Type	Diverge	Basic	Diverge	Basic	Weave	Basic	Diverge	Basic	Diverge	Basic
Demand Volume (vph)	6,690	6,200	6,200	5,270	6,180	5,230	5,230	2,070	2,070	5,040
Processed Volume (vph)	483	445	432	380	462	393	389	157	155	116
% Demand Served	7%	7%	7%	7%	7%	8%	7%	8%	7%	2%
Speed (mph)	0	1	1	1	1	1	0	56	57	62
Density (pcpmpl)	234	233	168	231	234	244	229	1	1	1
Estimated LOS	F	F	F	F	F	F	F	A	A	A

Figure 5.8 – 2045 PM No-Build Peak Hour Vissim Sawgrass Expressway Freeway Segment Performance

Segment Type	Weave	Basic	Weave
Demand Volume (vph)	4,690	1,600	3,540
Processed Volume (vph)	97	80	175
% Demand Served	2%	5%	5%
Speed (mph)	0	0	0
Density (pcpmpl)	248	239	247
Estimated LOS	F	F	F

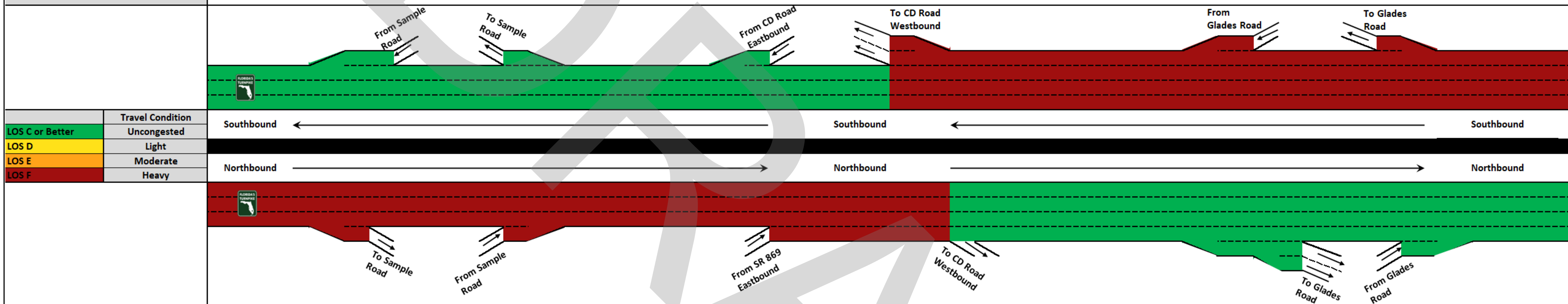


	Travel Condition
LOS C or Better	Uncongested
LOS D	Light
LOS E	Moderate
LOS F	Heavy

Segment Type	Basic	Basic
Demand Volume (vph)	4,790	3,420
Processed Volume (vph)	293	193
% Demand Served	6%	6%
Speed (mph)	0	0
Density (pcpmpl)	250	237
Estimated LOS	F	F

Figure 5.8 – 2045 PM No-Build Peak Hour Vissim CD Road Freeway Segment Performance (Continued)

Segment Type	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic
Demand Volume (vph)	6,330	6,330	4,230	5,070	5,070	5,070	3,700	6,790	6,790	6,790	4,080	5,040	5,040
Processed Volume (vph)	213	210	133	157	158	159	72	149	169	193	174	216	1,698
% Demand Served	3%	3%	3%	3%	3%	3%	2%	2%	2%	3%	4%	4%	34%
Speed (mph)	72	68	72	72	72	69	67	0	0	0	0	0	3
Density (pcpmpl)	1	1	1	1	1	1	0	231	233	233	232	185	174
Estimated LOS	A	A	A	A	A	A	A	F	F	F	F	F	F



Segment Type	Basic	Diverge	Basic	Merge	Basic	Weave	Basic	Diverge	Basic	Merge	Basic
Demand Volume (vph)	7,230	7,230	5,670	6,800	6,800	9,380	6,930	6,930	5,390	6,830	6,830
Processed Volume (vph)	1,010	909	724	730	668	767	590	590	469	511	544
% Demand Served	14%	13%	13%	11%	10%	8%	9%	9%	9%	7%	8%
Speed (mph)	2	2	1	1	1	1	71	70	72	72	72
Density (pcpmpl)	202	152	204	210	212	218	2	2	2	2	3
Estimated LOS	F	F	F	F	F	F	A	A	A	A	A

Figure 5.8 – 2045 PM No-Build Peak Hour Vissim Florida's Turnpike Freeway Segment Performance (Continued)

5.2 Transportation Systems Management and Operations Alternative (TSM&O)

Transportation Systems Management and Operations (TSM&O) alternatives are comprised of minor improvement options that are typically developed to alleviate specific traffic congestion and safety problems, or to get the maximum utilization out of the existing facility by improving operational efficiency. TSM&O alternatives may include, but not limited to, the following improvements to the mainline and interchanges:

- Add auxiliary lanes between interchanges
- Add exclusive turn lanes at the interchange ramp terminals and adjacent intersections
- Increase turn-lane storage at the interchange ramp terminals and adjacent intersections
- Capacity improvements at the ramp junctions
- Signal optimization
- Enhance signage
- New ITS technologies and infrastructure

A TSM&O Alternative will not significantly improve the system capacity and/or linkage needs within the study area. Long-term improvements are necessary to mitigate the existing traffic conditions and increase capacity to accommodate future travel demand. The TSM&O Alternative will not significantly reduce congestion on the system, nor will it provide the regional area interconnections needed to enhance mobility for this section of Broward County.

The TSM&O Alternative would provide some short-term relief throughout the corridor. However, the TSM&O Alternative alone would not be consistent with the purpose and need of this project. TSM&O improvements are only viable in combination with the build alternative improvements. FTE is in the process of discussing internally with the District TSM&O Group what strategies are planned along the corridors and which ones should be considered in the build alternatives. These strategies will be listed and documented in the *System Interchange Modification Report*, a companion document to this PD&E Study.

5.3 Multimodal Alternatives

Multi-modal alternatives are comprised of a range of improvements to each of the modal systems (roadway, transit and non-motorized) within a specific study area. The most common are Travel Demand Management and the expansion of current facilities and/or development of new facilities.

A review of the Ten-Year Recommended Service Plan for Fiscal Years 2023-2032 and other transit agencies in the Broward County Transportation Development Plan did not have any future multi-modal plans along the project corridors. Therefore, future transit demand was not evaluated as part of this study.

Sawgrass Expressway and Florida's Turnpike are limited access facilities. There will continue to be no designated pedestrian or bicycle accommodations along these corridors, as pedestrians and bicycles are not permitted on limited access corridors. There are no planned future changes to the existing US 441 and Lyons Road sidewalks. There are no planned future changes to the existing US 441 designated bicycle lanes. The project proposes to extend the existing Lyons Road bicycle lanes north to the Serko Boulevard intersection. This improvement will provide full multimodal connectivity under the Sawgrass Expressway and a safer route for bicyclists enhancing the mobility within the corridor. No other future non-motorized facilities were evaluated as part of this study. However, crosswalks and ADA compliant curb ramps will be provided at all intersections impacted by the project.

5.4 Build Alternatives

The objective of this PD&E Study is to evaluate improvements that will address existing and projected operating deficiencies along this section of the Sawgrass Expressway and Florida's Turnpike. To keep up with the growing traffic demand within the study area, multiple conceptual alternatives were considered. All conceptual alternatives were closely coordinated with the FDOT SW 10th Street project and other adjacent projects.

All conceptual alternatives were screened based on travel demand, capacity, tolling, signing, access, geometrics, and right of way availability in order to select a preferred alternative. The alternatives analysis process consisted of six steps throughout the study (see ***Figure 5.9***). These steps summarize the engineering elements that were considered during the concept development process.

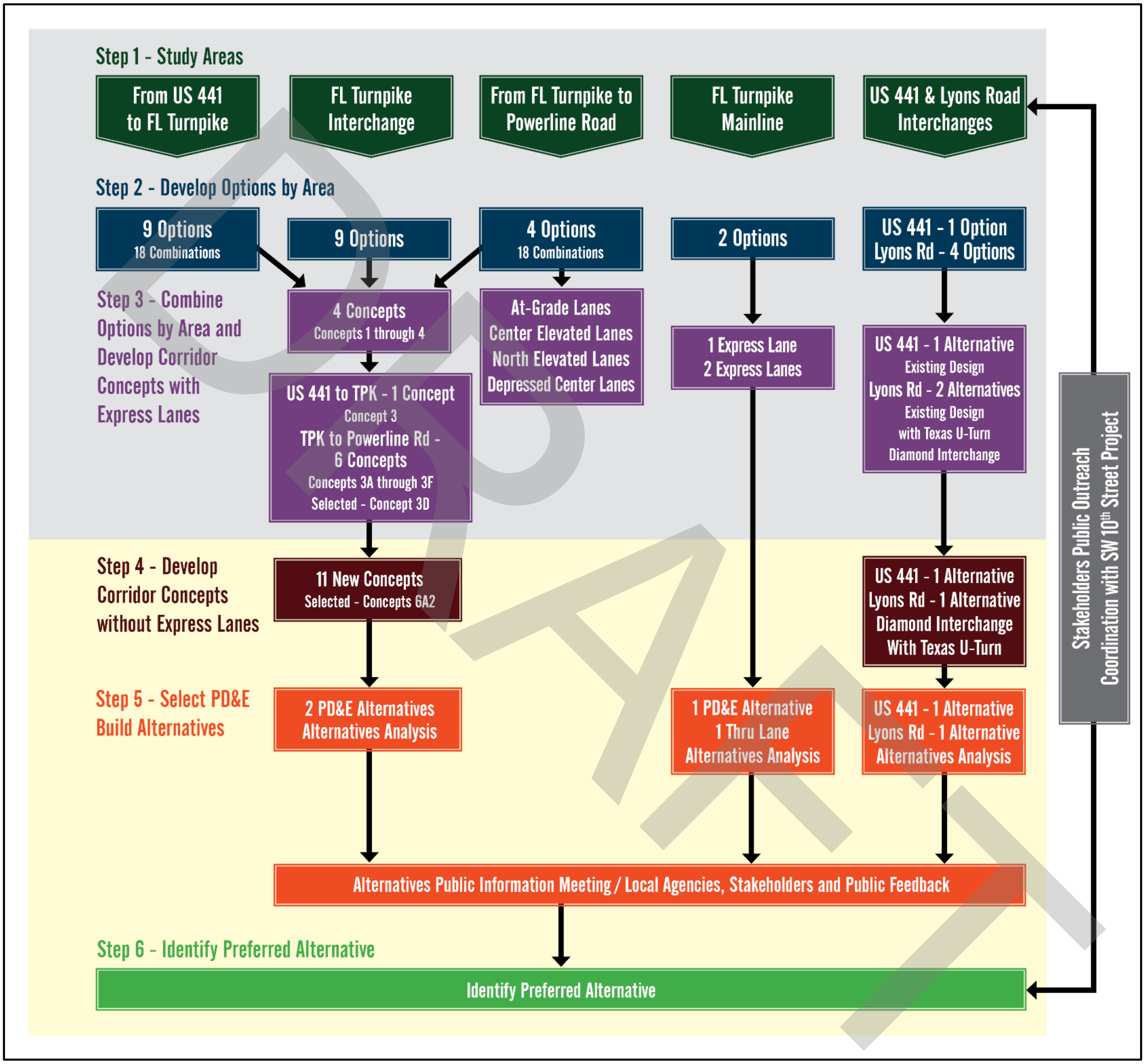


Figure 5.9 – Alternatives Analysis Process

Step 1 and Step 2 – The first step of the process was to divide the study area based on roadway characteristics. Once divided, the second step was to develop options with improvements that will meet the needs of the divided areas. The improvements varied by area including, but not limited to, adding express lanes, express lane access points, combining off-ramp exits, adding lanes to the on- and off-ramps, new interchange ramp connections, interchange modifications, and extending the existing collector distributor roadway systems.

Nine options were considered on the *Sawgrass Expressway between US 441 and Florida's Turnpike* (see ***Figure 5.10***). All nine options propose adding two express lanes in each direction. All options were preliminarily identified to be tolled. However, toll sites and buildings were not conceptually design.

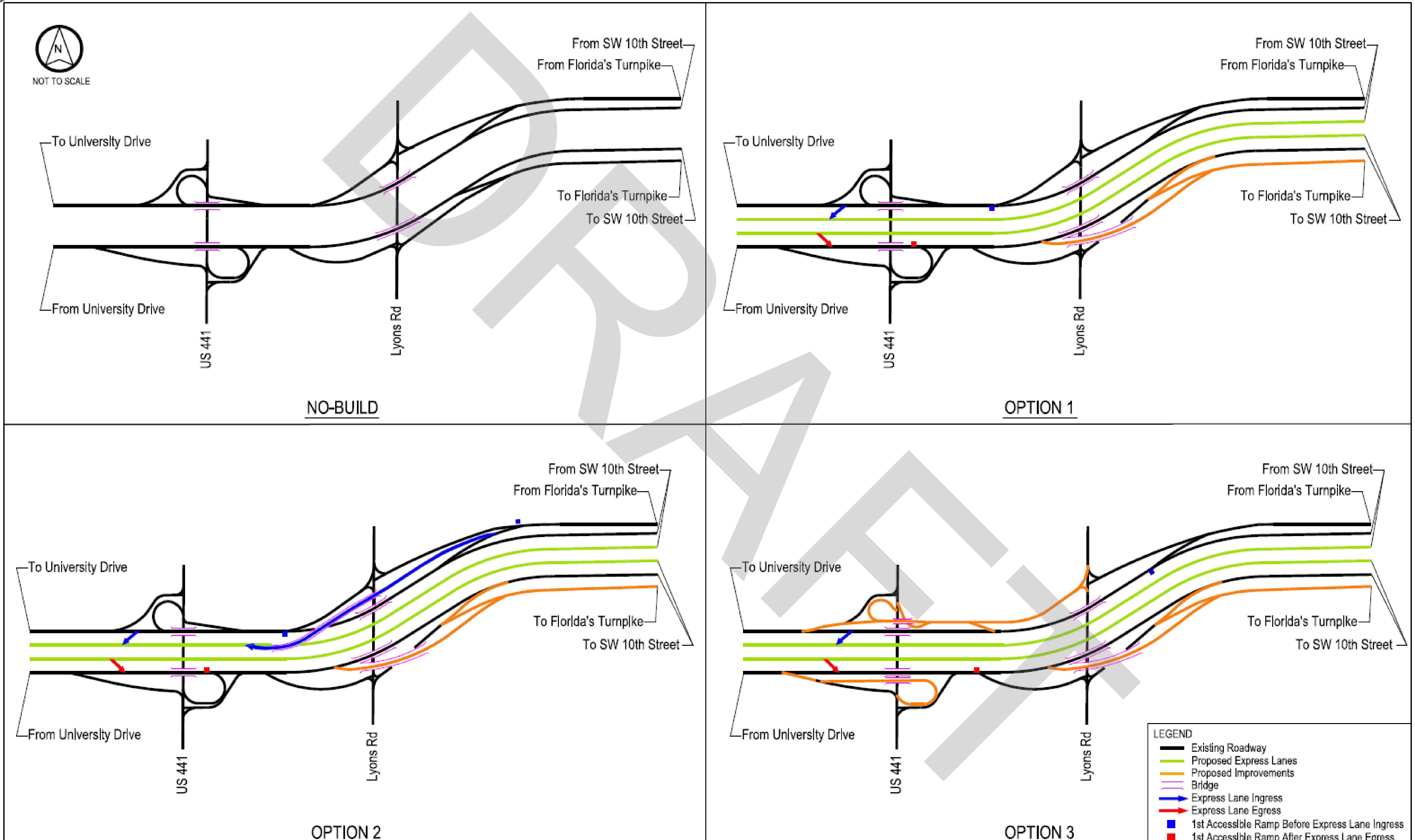


Figure 5.10 – Options Considered from US 441 to Florida's Turnpike

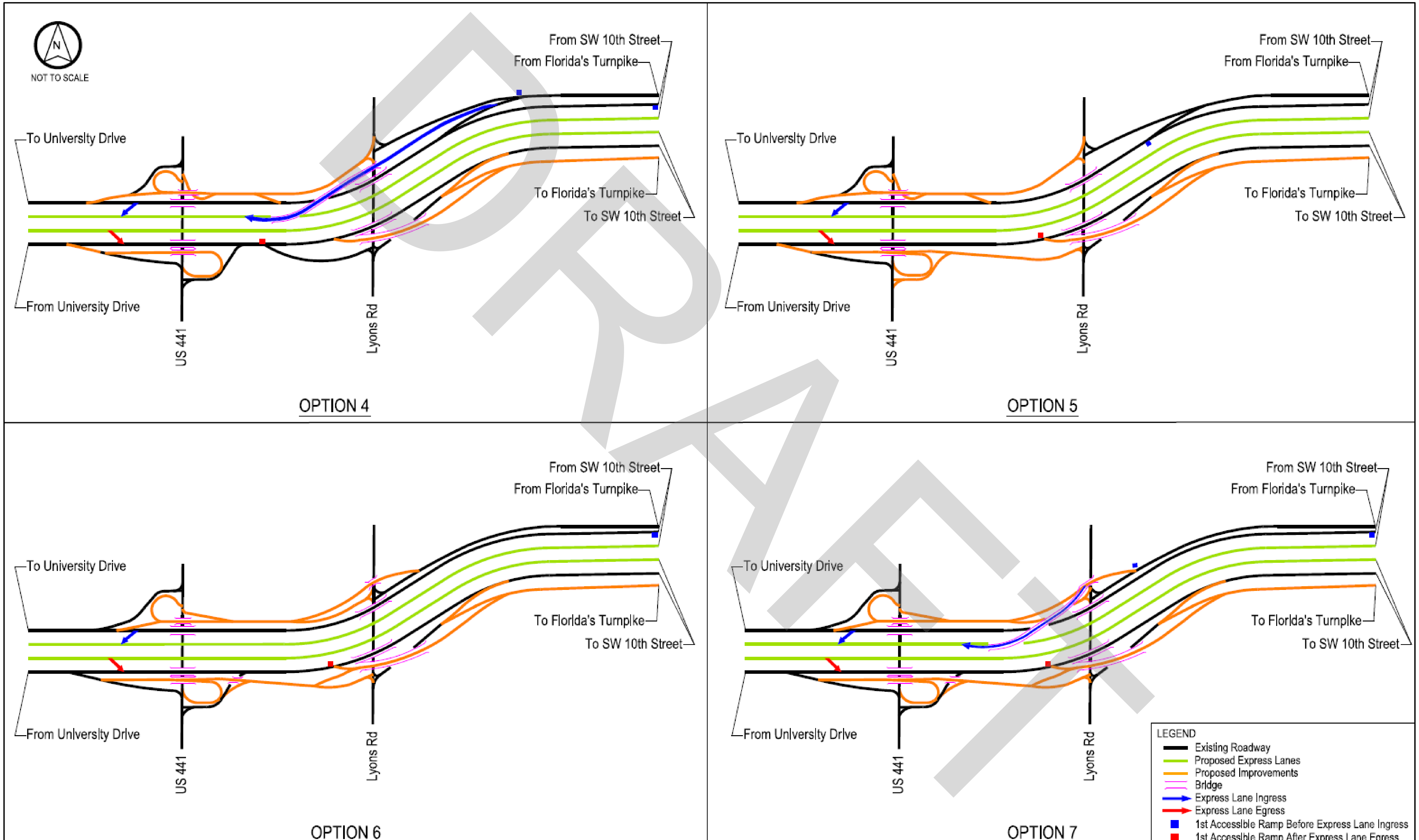


Figure 5.10 – Options Considered from US 441 to Florida's Turnpike (Continued)

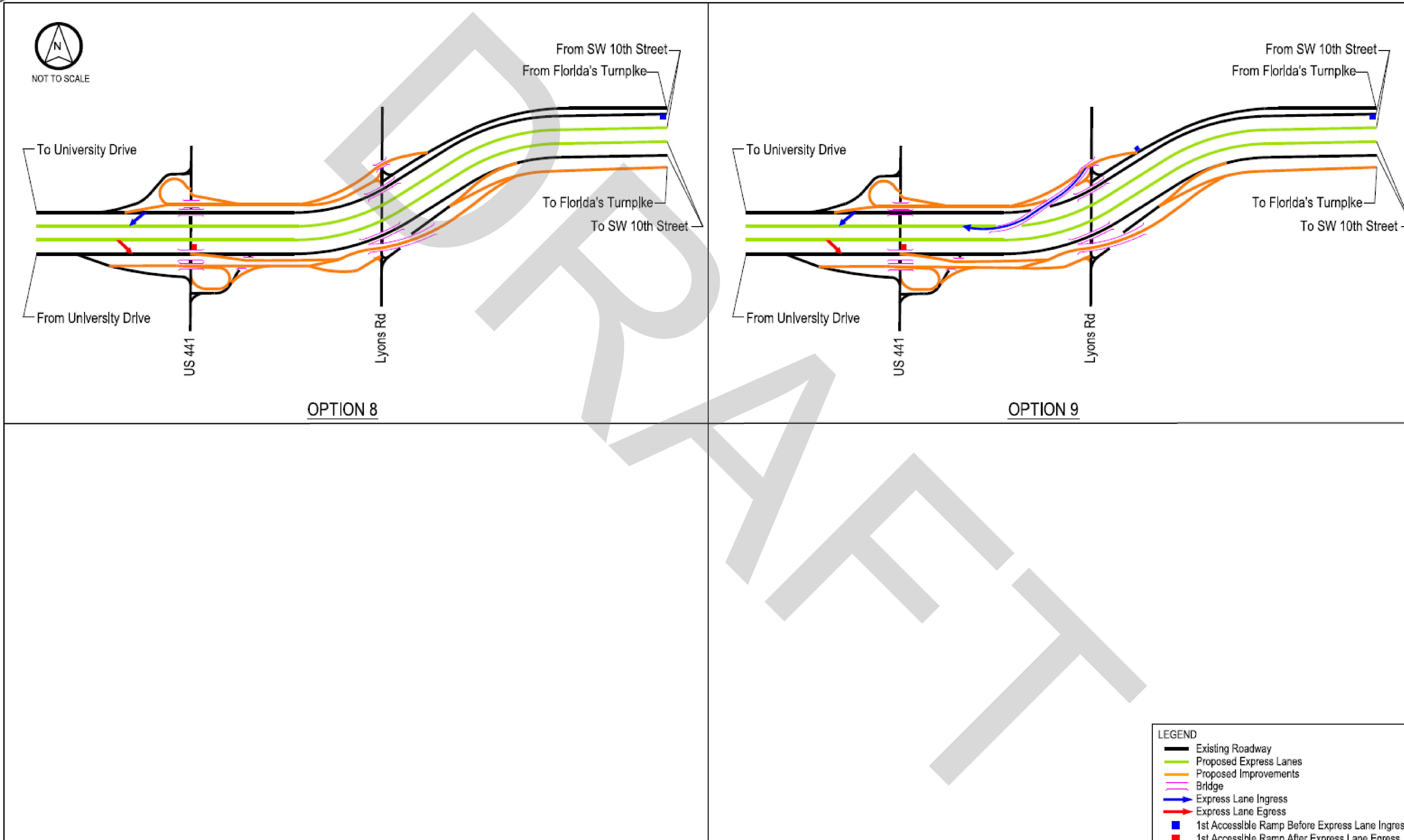


Figure 5.10 – Options Considered from US 441 to Florida's Turnpike (Continued)

All options are briefly described below:

- Option 1
    - Extend the existing eastbound collector distributor roadway system to the west to Lyons Road, serving Lyons Road and Florida's Turnpike.
    - Relocate the eastbound on-ramp from Lyons Road to just east of Lyons Road.
    - The express lanes include an eastbound at-grade egress access point serving US 441 and corridors to the east. It also includes a westbound at-grade ingress access point serving Lyons Road and corridors to the east.

- Option 2
    - Same as Option 1 with the addition of an express lane westbound braided ramp ingress access point serving Florida's Turnpike.

- Option 3
    - Combine the two eastbound off-ramps to US 441.
    - Extend the existing eastbound collector distributor roadway system to the west to Lyons Road, serving Lyons Road and Florida's Turnpike.
    - Relocate west the eastbound on-ramp from Lyons Road to just east of Lyons Road.
    - Relocate west the westbound on-ramp from Lyons Road to just west of US 441.
    - Combine the two westbound off-ramps to US 441.
    - The express lanes include an eastbound at-grade egress access point serving Lyons Road and corridors to the east. It also includes a westbound at-grade ingress access point serving Florida's Turnpike and corridors to the east.

- Option 4
    - Same as Option 3 with the addition of an express lane westbound braided ramp ingress access point serving Florida's Turnpike. The westbound at-grade ingress access point serves SW 10th Street and corridors to the east.

- Option 5
  - New eastbound collector distributor roadway system serving US 441 and Lyons Road.
  - Extend the existing eastbound collector distributor roadway system to the west to Lyons Road, serving Florida's Turnpike and Lyons Road.
  - Relocate the eastbound on-ramp from Lyons Road to just east of Lyons Road.
  - Relocate west the westbound on-ramp from Lyons Road to just west of US 441.
  - Combine the two westbound off-ramps to US 441.
  - The express lanes include an eastbound at-grade egress access point serving Florida's Turnpike and corridors to the east. It also includes a westbound at-grade ingress access point serving Florida's Turnpike and corridors to the east.

- Option 6
  - Extend the existing eastbound collector distributor roadway system to the west to US 441, serving US 441, Lyons Road, and Florida's Turnpike.
  - Relocate the eastbound on-ramp from Lyons Road to just east of Lyons Road.
  - Extend the existing westbound collector distributor roadway system to the west to US 441, serving US 441 and Lyons Road.
  - The express lanes include an eastbound at-grade egress access point serving Florida's Turnpike and corridors to the east. It also includes a westbound at-grade ingress access point serving SW 10th Street and corridors to the east.

- Option 7
  - Same as Option 6 with the addition of an express lane westbound braided ramp ingress access point serving Florida's Turnpike.

- Option 8
  - Extend the existing eastbound collector distributor roadway system to the west to US 441, serving US 441, Lyons Road, and Florida's Turnpike.

- Relocate the eastbound on-ramp from Lyons Road to just east of Lyons Road.
- Relocate the eastbound off-ramp to Florida's Turnpike to just west of US 441.
- Extend the existing westbound collector distributor roadway system to the west to US 441, serving US 441 and Lyons Road.
- The express lanes include an eastbound at-grade egress access point serving Florida's Turnpike and corridors to the east. It also includes a westbound at-grade ingress access point serving SW 10th Street and corridors to the east.

- Option 9
  - Same as Option 8 with the addition of an express lane westbound braided ramp ingress access point serving Florida's Turnpike.

Appendix H includes a table that summarizes 18 possible combinations considered when combining the nine options within this segment of the Sawgrass Expressway.

Nine options were considered at the *Florida's Turnpike Interchange* (see ***Figure 5.11***). All nine options propose adding new ramp connections to and from the east with different geometric conceptual designs. Also, all nine options assume express lanes along the Sawgrass Expressway and Florida's Turnpike.

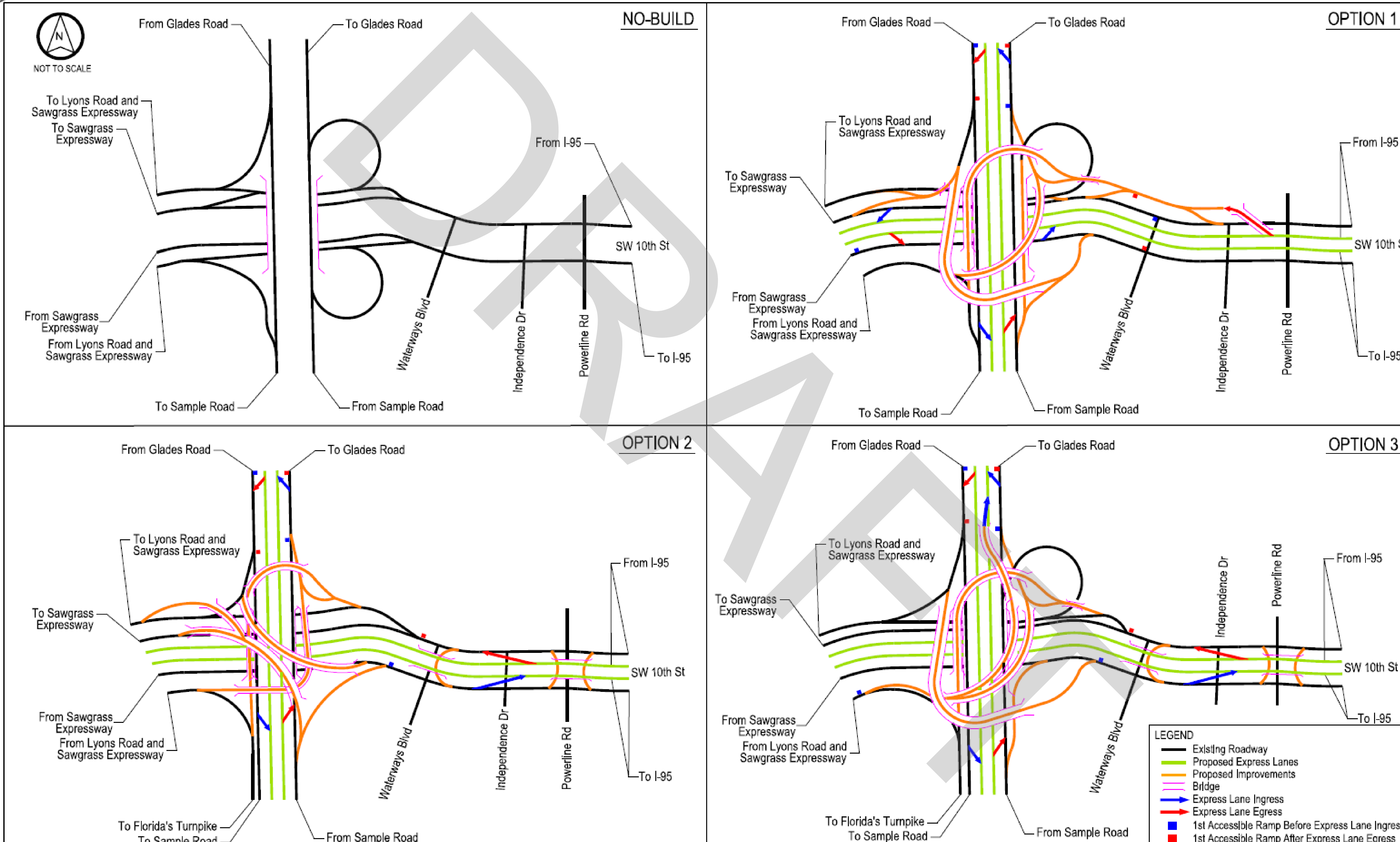


Figure 5.11 – Options Considered at the Florida's Turnpike Interchange

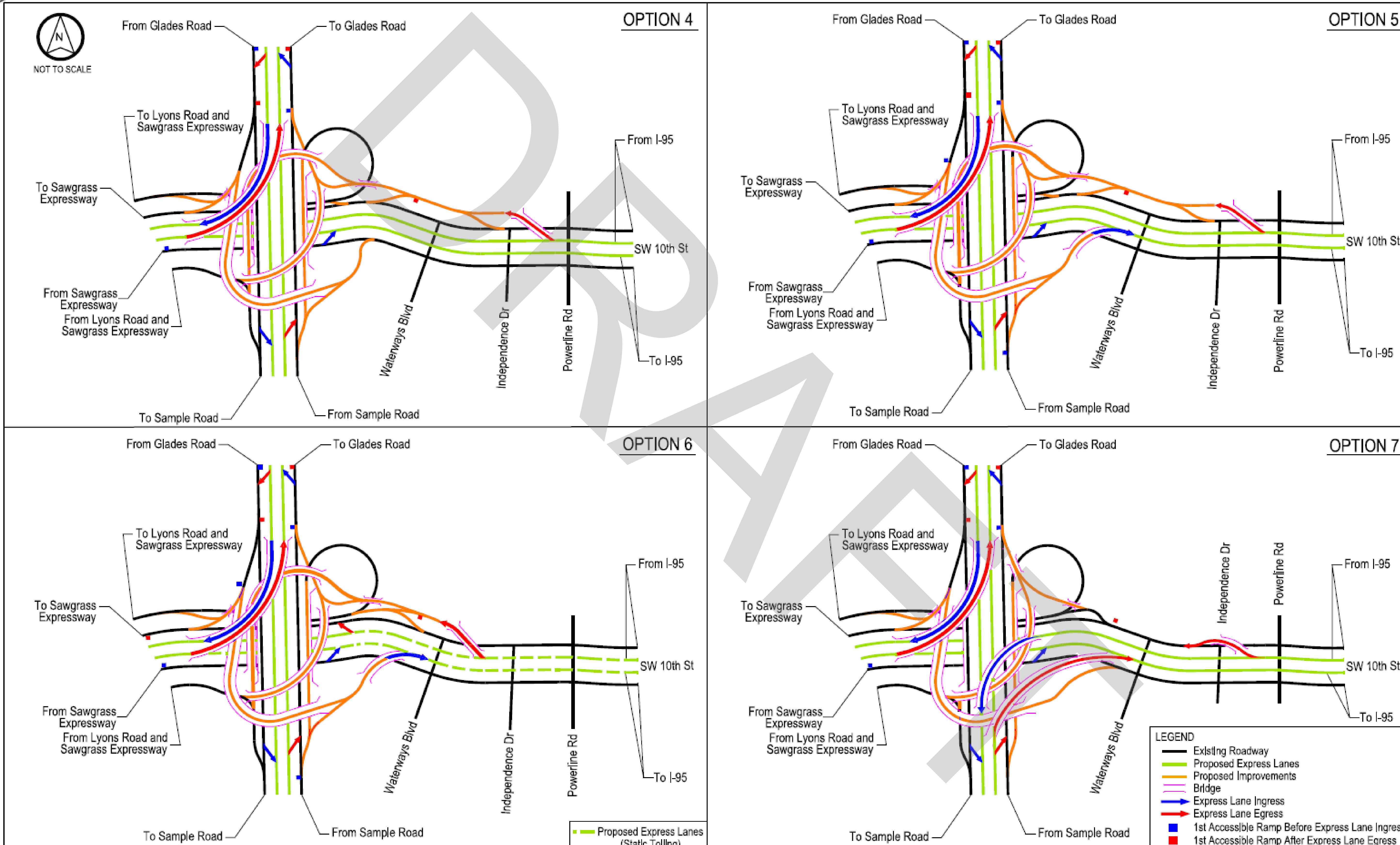


Figure 5.11 – Options Considered at the Florida's Turnpike Interchange (Continued)

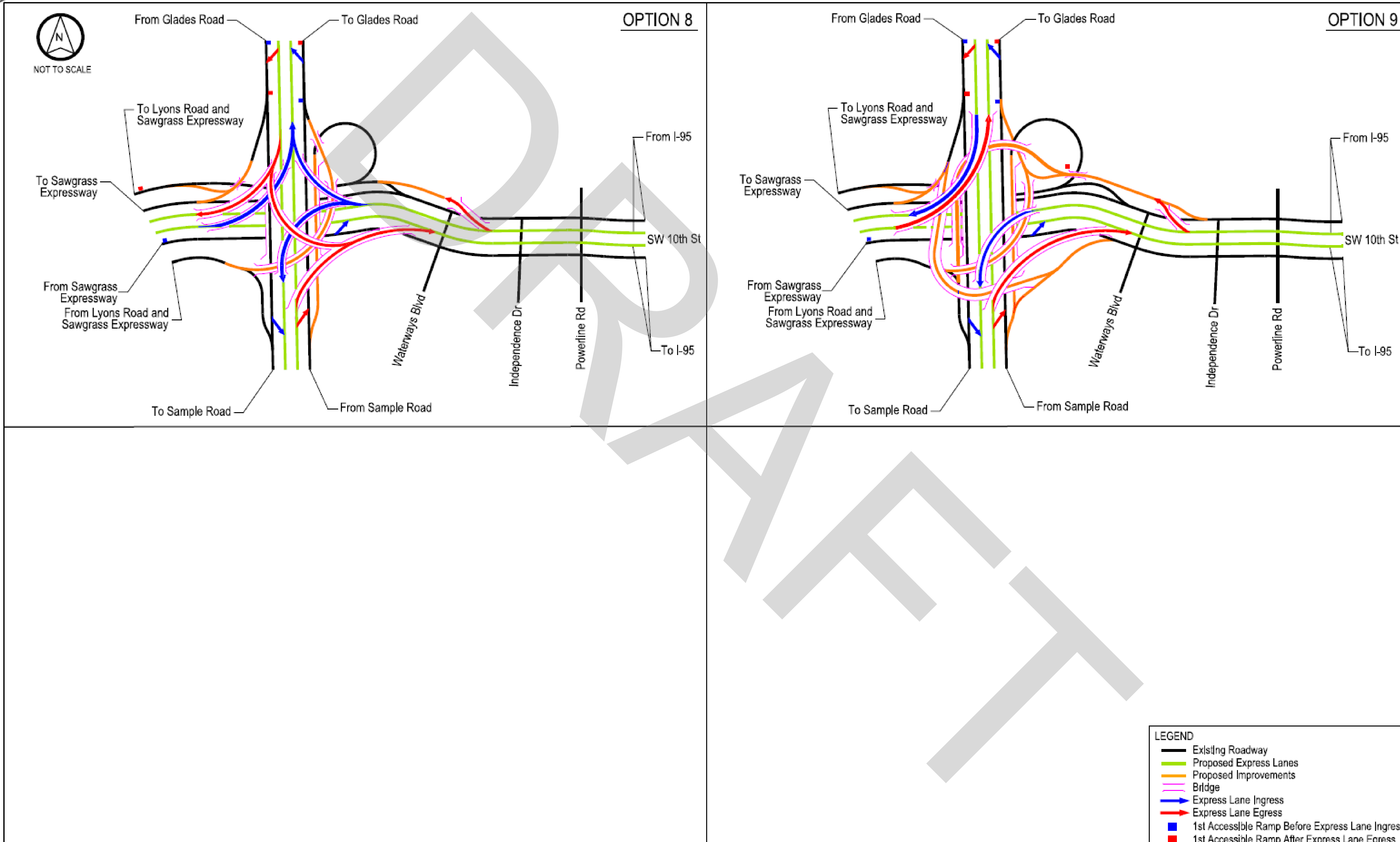


Figure 5.11 – Options Considered at the Florida's Turnpike Interchange (Continued)

All options are briefly described below:

- Option 1
    - New northbound to eastbound off-ramp.
    - Relocate the existing northbound to westbound off-ramp to the south and combine it with the new northbound to eastbound ramp off-ramp into one exit.
    - Replace the existing eastbound to northbound loop off-ramp with a direct connection flyover ramp.
    - New westbound to northbound and westbound to southbound off-ramps combined into one exit.
    - New southbound to eastbound off-ramp combined with the new northbound to eastbound off-ramp into one entrance.
    - The existing southbound to westbound off-ramp splits into two ramps serving the Sawgrass Expressway and collector distributor roadway system.
    - The express lanes include at-grade egress access points before the interchange and ingress access points after the interchange in all directions.

- Option 2
    - New northbound to eastbound off-ramp.
    - Relocate the existing northbound to westbound off-ramp to the south and combine it with the new northbound to eastbound ramp off-ramp into one exit.
    - Replace the existing northbound to westbound loop off-ramp with a direct connection flyover ramp, serving the Sawgrass Expressway and collector distributor roadway system.
    - Replace the existing eastbound to northbound loop off-ramp with a direct connection flyover ramp.
    - New westbound to northbound and westbound to southbound off-ramps combined into one exit.
    - New southbound to eastbound off-ramp.
    - The existing southbound to westbound off-ramp splits into two ramps serving the Sawgrass Expressway and collector distributor roadway system.

  - East of the interchange, three Texas U-tuns are proposed to provide access in both directions to and from Independence Drive and traffic east of Powerline Road.
  - The express lanes include at-grade egress access points before the interchange and ingress access points after the interchange in three out of the four directions.

- Option 3
  - New northbound to eastbound off-ramp.
  - Replace the existing eastbound to northbound loop off-ramp with a direct connection flyover ramp. This ramp splits serving as an ingress to the Florida's Turnpike express lanes.
  - New westbound to northbound and westbound to southbound off-ramps combined into one exit.
  - New southbound to eastbound off-ramp.
  - East of the interchange, three Texas U-tuns are proposed to provide access in both directions to and from Independence Drive and traffic east of Powerline Road.
  - The express lanes include at-grade egress access points before the interchange and ingress access points after the interchange in three out of the four directions.

- Option 4
  - Same as Option 1.
  - Adds an express lane direct connection flyover ramp to and from the north and to and from the west. No other express lane access point west of the interchange.

- Option 5
  - Same as Option 4.
  - New southbound to eastbound off-ramp and northbound to eastbound off-ramp. These ramps do not connect with SW 10th Street local, they connect directly with the SW 10th Street express lanes.

- Option 6
  - Same as Option 5.

  - New southbound to eastbound off-ramp and northbound to eastbound off-ramp. These ramps do not connect with SW 10th Street local, they connect directly with the SW 10th Street express lanes with static tolling.

- Option 7
  - Relocate the existing northbound to westbound off-ramp to the south.
  - Replace the existing eastbound to northbound loop off-ramp with a direct connection flyover ramp.
  - New westbound to northbound off-ramp.
  - New southbound to eastbound off-ramp.
  - The existing southbound to westbound off-ramp splits into two ramps serving the Sawgrass Expressway and collector distributor roadway system.
  - Adds an express lane direct connection flyover ramp to and from the north and to and from the west. No other express lane access points west of the interchange.
  - Adds an express lane direct connection flyover ramp to and from the south and to and from the east.
  - The express lanes include at-grade egress access points before the interchange and ingress access points after the interchange in three out of the four directions.

- Option 8
  - Relocate the existing northbound to westbound off-ramp to the south.
  - Replace the existing eastbound to northbound loop off-ramp with a direct connection flyover ramp.
  - The existing southbound to westbound off-ramp splits into two ramps serving the Sawgrass Expressway and collector distributor roadway system.
  - Adds express lane direct connection flyover ramps to and from the north and to and from the west.
  - Adds express lane direct connection flyover ramp southbound to eastbound, northbound to eastbound, westbound to northbound, and westbound to southbound.

- The express lanes include at-grade egress access points before the interchange and ingress access points after the interchange in three out of the four directions.

- Option 9
  - New northbound to eastbound off-ramp.
  - Relocate the existing northbound to westbound off-ramp to the south and combine it with the new northbound to eastbound ramp off-ramp into one exit.
  - Replace the existing eastbound to northbound loop off-ramp with a direct connection flyover ramp.
  - New westbound to northbound and westbound to southbound off-ramps combined into one exit.
  - New southbound to eastbound off-ramp combined with the new northbound to eastbound off-ramp into one entrance.
  - The existing southbound to westbound off-ramp splits into two ramps serving the Sawgrass Expressway and collector distributor roadway system.
  - Adds an express lane direct connection flyover ramp to and from the north and to and from the west. No other express lane access points west of the interchange.
  - Adds an express lane direct connection flyover ramp to and from the south and to and from the east.
  - The express lanes include at-grade egress access points before the interchange and ingress access points after the interchange in three out of the four directions.

Four options were considered on the *Sawgrass Expressway/SW 10th Street between Florida's Turnpike and Powerline Road*. All options were coordinated with the FDOT D4 SW 10th Street project.

- Option 1 – Add additional at-grade travel lanes.
- Option 2 – Add elevated express lanes along the center median.
- Option 3 – Add elevated express lanes along the north side of the corridor.
- Option 4 – Add depressed express lanes along the center median.

Appendix I includes a table that summarizes 18 possible combinations considered when combining the four options within this segment of the Sawgrass Expressway/SW 10th Street.

Two options were considered on the *Florida's Turnpike.*

- Option 1 – Add one express lane in each direction.
- Option 2 – Add two express lanes in each direction.

One option was considered at the *US 441 Interchange*.

- Option 1 – Extend the storage length of the two left-turn lanes entering the Sawgrass Expressway in the northbound and southbound directions.

Four options were considered at the *Lyons Road Interchange*.

- Option 1 – Modify the existing interchange configuration to a Diamond Interchange.
- Option 2 – Modify the existing interchange configuration to a Displaced Left-Turn (DLT) Interchange.
- Option 3 – Modify the existing interchange configuration to a Single Point Urban Interchange (SPUI).
- Option 4 – Modify the existing interchange configuration to a Diverging Diamond Interchange (DDI).

Step 3 – During the third step, selected improvement options were combined by area and developed corridor concepts that covered the entire study area. These corridor improvements included the implementation of express lanes along both the Sawgrass Expressway and Florida's Turnpike.

Four corridor concepts were considered on the *Sawgrass Expressway between US 441 and Powerline Road* (see ***Figure 5.12***).

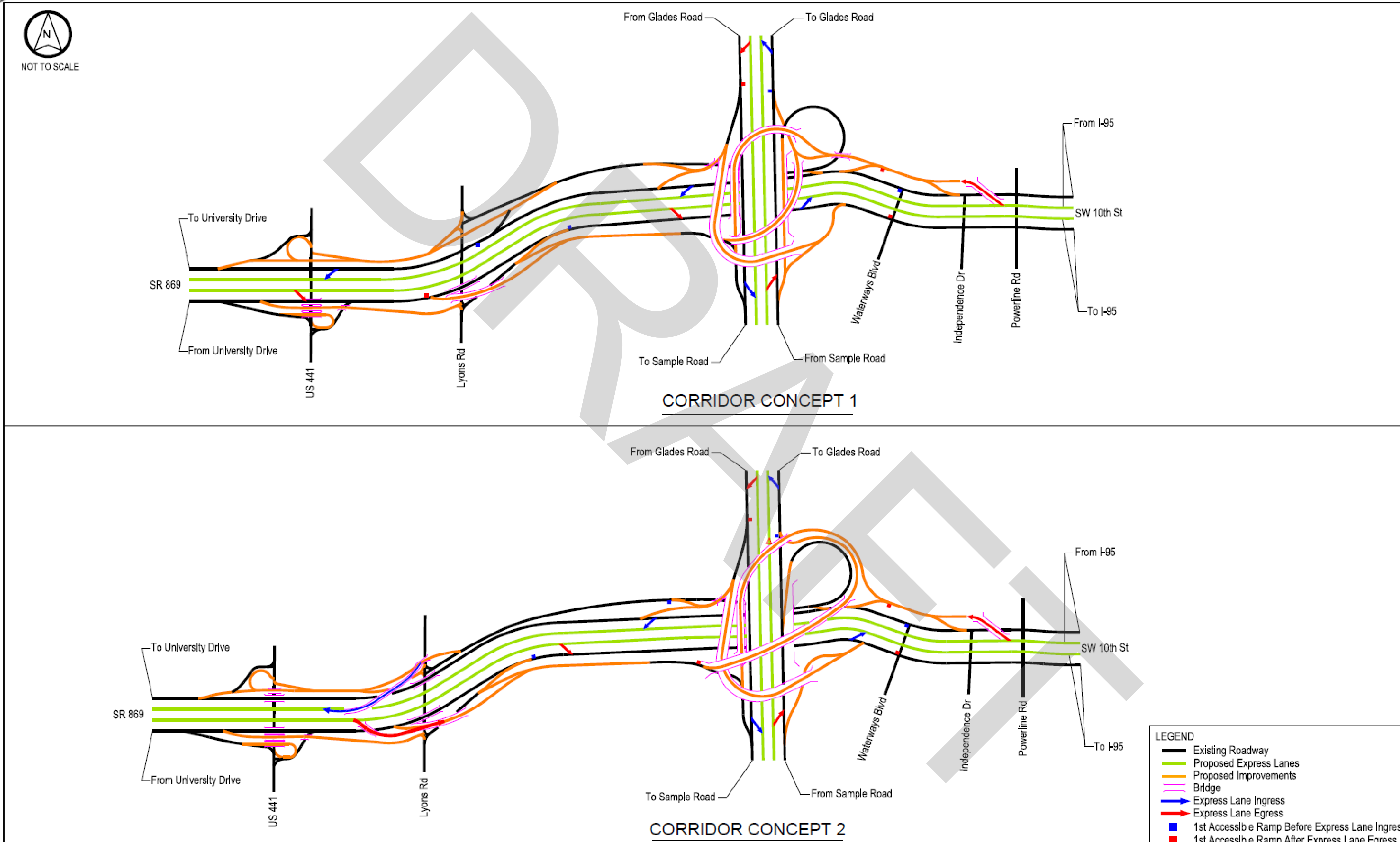


Figure 5.12 – Corridor Concepts Considered from US 441 to Powerline Road

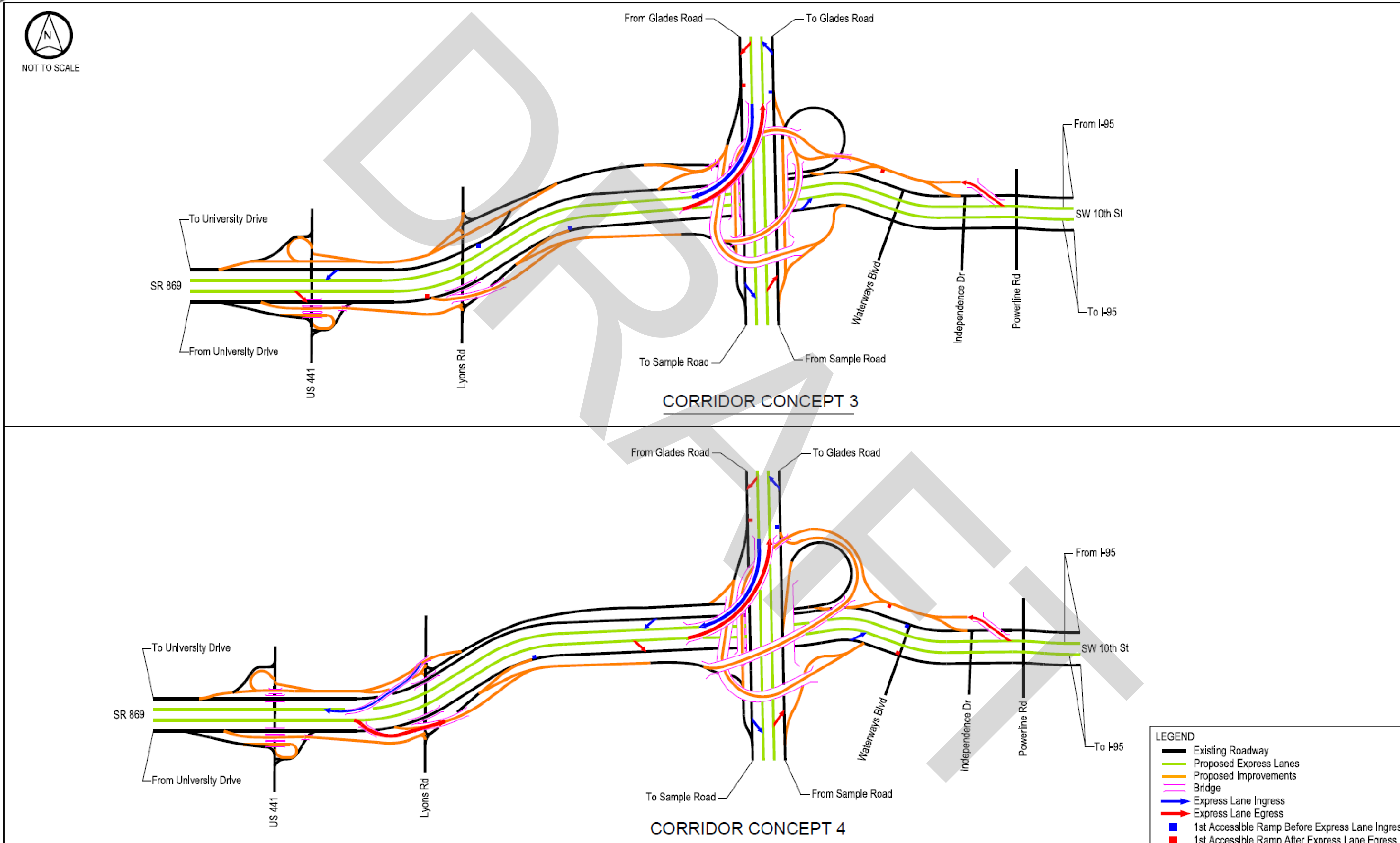


Figure 5.12 – Corridor Concepts Considered from US 441 to Powerline Road (Continued)

All corridor concepts are briefly described below:

- Corridor Concept 1
  - Combine the two eastbound off-ramps to US 441 into one exit.
  - Relocate west the eastbound off-ramp to Lyons Road to west of US 441.
  - Relocate west the eastbound off-ramp to Florida's Turnpike to west of Lyons Road.
  - Relocate west the eastbound on-ramp from Lyons Road to just east of Lyons Road.
  - Replace the existing eastbound to northbound loop off-ramp with a direct connection flyover ramp.
  - New Florida's Turnpike northbound to SW 10th Street eastbound off-ramp.
  - Relocate the existing Florida's Turnpike northbound to Sawgrass Expressway westbound off-ramp to the south and combine it with the new Florida's Turnpike northbound to SW 10th Street eastbound off-ramp into one exit.
  - New Florida's Turnpike southbound to SW 10th Street eastbound off-ramp.
  - New SW 10th Street westbound to Florida's Turnpike northbound and southbound off-ramps combined into one exit.
  - The existing Florida's Turnpike southbound off-ramp splits into three ramps, serving Sawgrass Expressway westbound, collector distributor roadway system westbound and SW 10th Street eastbound.
  - Extend the existing westbound collector distributor roadway system to the west to US 441, serving US 441 and Lyons Road.
  - The express lanes include two eastbound egress at-grade access points and one ingress at-grade access point.
  - The express lanes include two westbound ingress at-grade access points and one egress braided ramp access point.
  - The express lanes include one northbound egress at-grade access points and one ingress at-grade access point.
  - The express lanes include one southbound egress at-grade access point and one ingress at-grade access point.

- Corridor Concept 2
    - Combine the two eastbound off-ramps to US 441 into one exit.
    - Relocate the eastbound off-ramp to Lyons Road to west of US 441.
    - Relocate the eastbound off-ramp to Florida's Turnpike to west of Lyons Road.
    - Relocate the eastbound on-ramp from Lyons Road to just east of Lyons Road.
    - Replace the existing Sawgrass Expressway eastbound to Florida's Turnpike northbound loop off-ramp with a direct connection flyover ramp (lower design speed).
    - New Florida's Turnpike northbound to SW 10th Street eastbound off-ramp.
    - New Florida's Turnpike southbound to SW 10th Street eastbound off-ramp.
    - New SW 10th Street westbound to Florida's Turnpike southbound off-ramp.
    - The existing Florida's Turnpike southbound off-ramp splits into three ramps, serving Sawgrass Expressway westbound, collector distributor roadway system westbound and SW 10th Street eastbound.
    - Extend the existing westbound collector distributor roadway system to the west to US 441, serving US 441 and Lyons Road.
    - The express lanes include one eastbound egress braided ramp access point, one egress at-grade access point and one ingress at-grade access point.
    - The express lanes include one westbound egress braided ramp access point, one ingress at-grade access point and one ingress braided ramp access point.
    - The express lanes include one northbound egress at-grade access point and one ingress at-grade access point.
    - The express lanes include one southbound egress at-grade access point and one ingress at-grade access point.

- Corridor Concept 3
    - Same as Concept 1 with the addition of an express lanes' direct connection between the Sawgrass Expressway and Florida's Turnpike to and from the west and to and from the north.

- Corridor Concept 4
    - Same as Concept 2 with the addition of an express lanes' direct connection between the Sawgrass Expressway and Florida's Turnpike to and from the west and to and from the north.

Concept 3 was selected the best corridor concept because of the following three improvements:

- Bi-directional express lane connections to and from the north and to and from the west. This is the movement with the highest traffic volumes, which improves regional connectivity and decreases the number of traffic volumes by redistributing them between the regular interchange ramps and the express lane ramps, improving the operations of the interchange.
- Relocates the existing Florida's Turnpike northbound to Sawgrass Expressway westbound off-ramp to the south and combines it with the new Florida's Turnpike northbound to SW 10th Street eastbound off-ramp into one exit.
- New SW 10th Street westbound to Florida's Turnpike northbound and southbound off-ramps combined into one exit.

FTE Planning began running several travel demand forecasting models to understand the new traffic patterns created by the new Florida's Turnpike Interchange ramps and the additional lanes added by Concept 3 and the SW 10th Street project. Therefore, Concept 3 was further refined with other improvements to address the needs of the area. These improvements focused mostly on additional express lane access points between Florida's Turnpike, Sawgrass Expressway and SW 10th Street.

Six additional corridor concepts (Concepts 3A through 3F) were considered on the _Sawgrass Expressway between US 441 and Powerline Road_ (see ***Figure 5.13***).

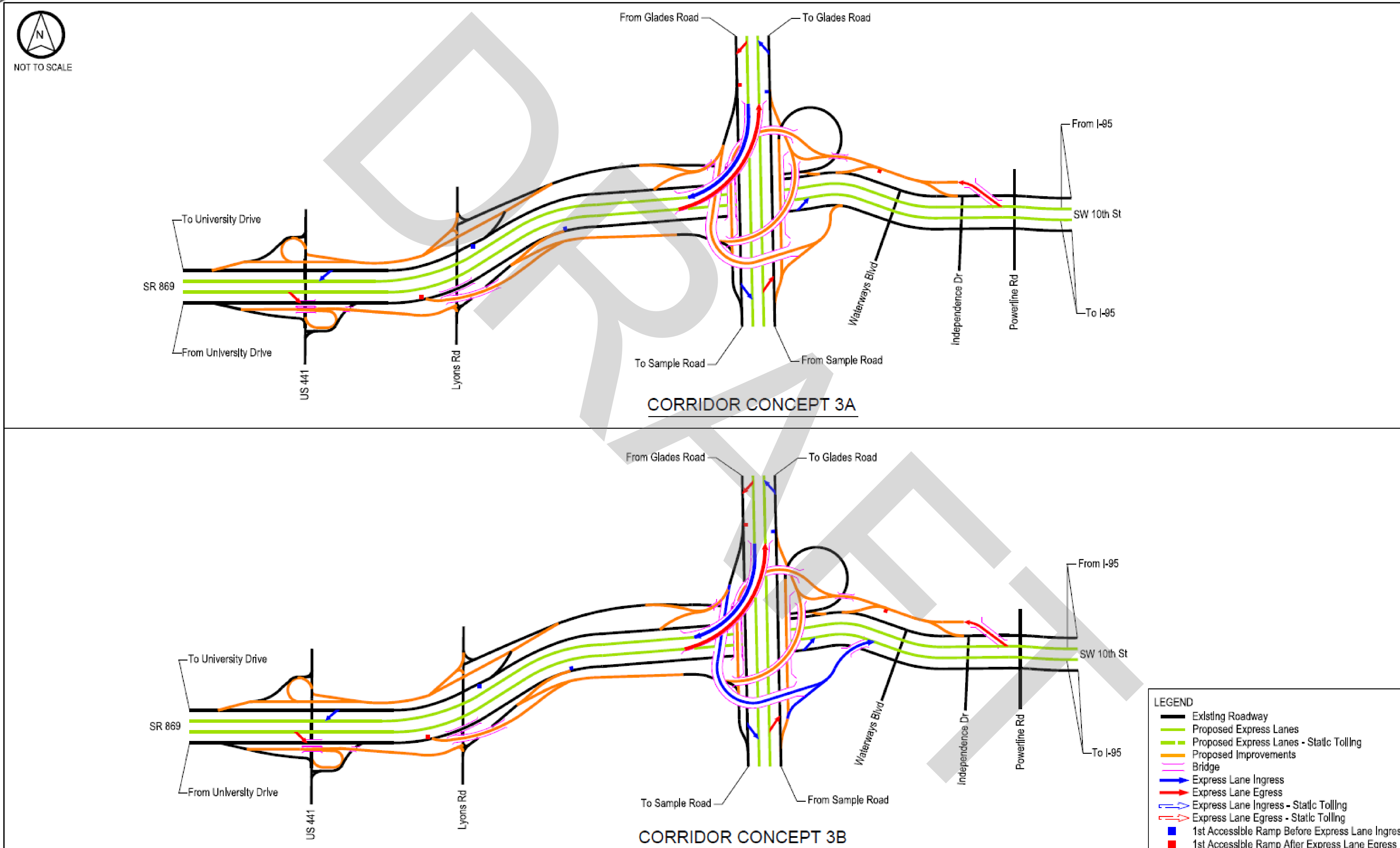


Figure 5.13 – Corridor Concepts (3A – 3F) Considered from US 441 to Powerline Road

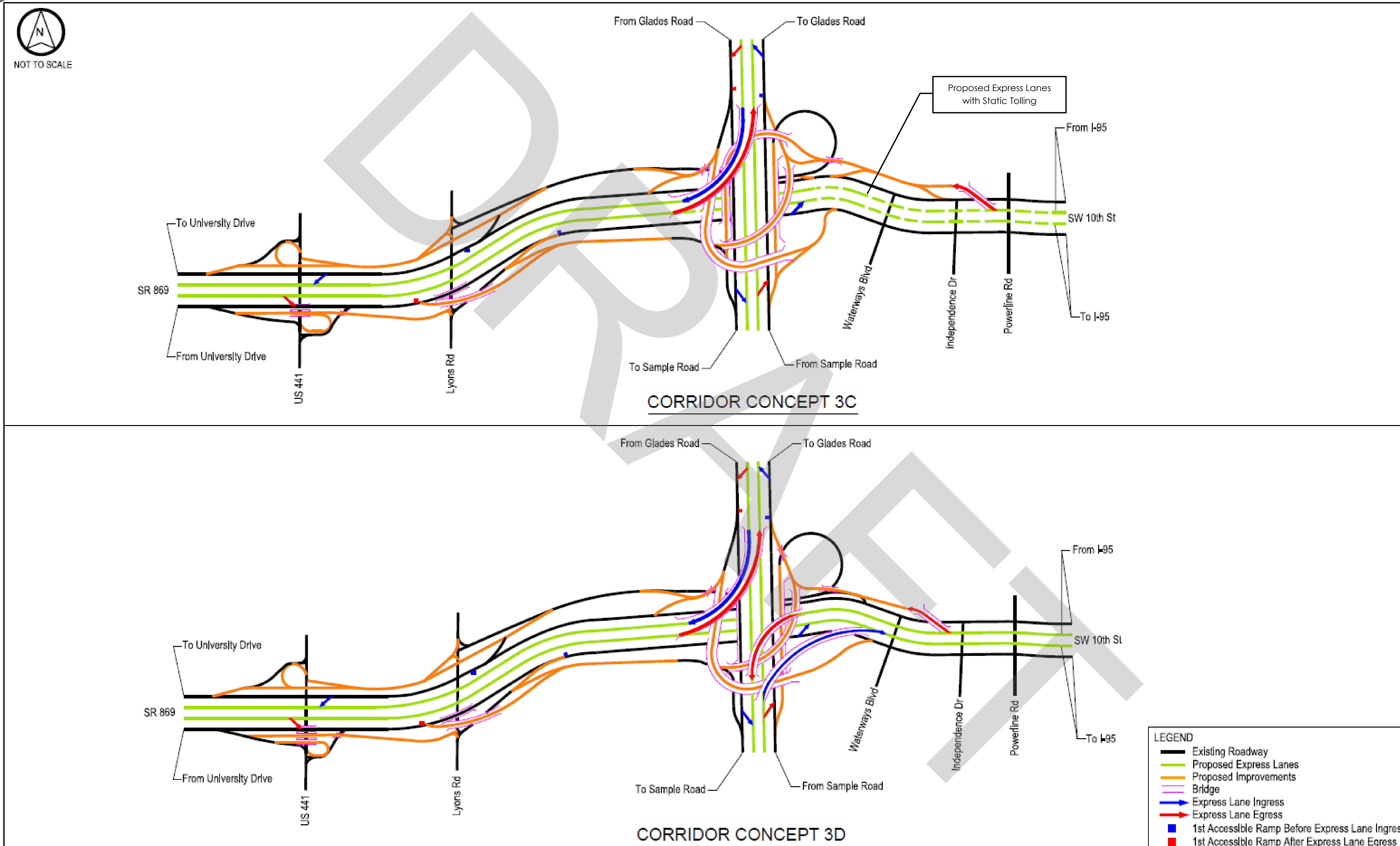
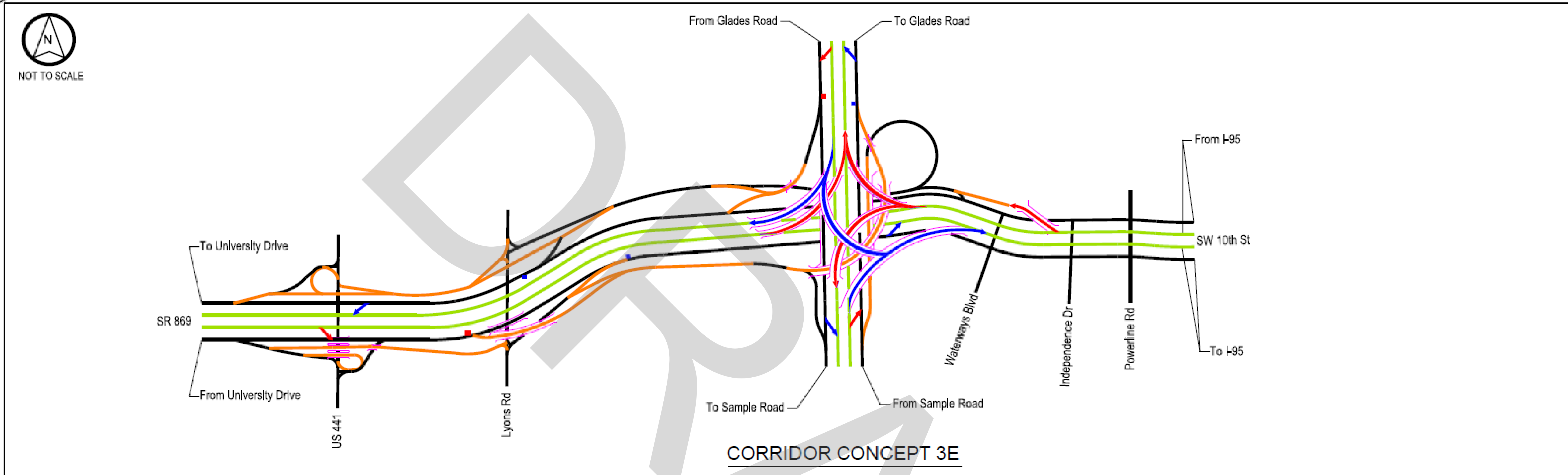


Figure 5.13 – Corridor Concepts (3A – 3F) Considered from US 441 to Powerline Road (Continued)



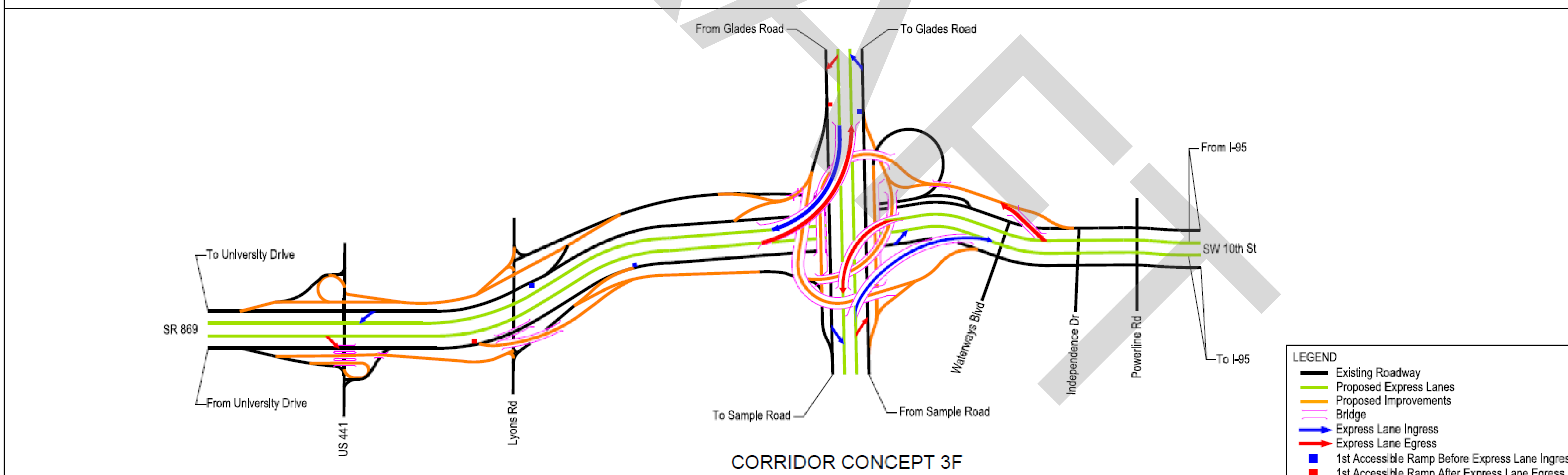


Figure 5.13 – Corridor Concepts (3A – 3F) Considered from US 441 to Powerline Road (Continued)

The main differences between concepts are listed below.

- Concept 3A
  - New Florida's Turnpike northbound to SW 10th Street eastbound off-ramp.
  - Relocate the existing Florida's Turnpike northbound to Sawgrass Expressway westbound off-ramp to the south and combine it with the new Florida's Turnpike northbound to SW 10th Street eastbound off-ramp into one exit.
  - New Florida's Turnpike southbound to SW 10th Street eastbound off-ramp.
  - New SW 10th Street westbound to Florida's Turnpike northbound and southbound off-ramps combined into one exit.
  - The existing Florida's Turnpike southbound off-ramp splits into three ramps, serving Sawgrass Expressway westbound, Sawgrass Expressway collector distributor roadway system westbound and SW 10th Street eastbound.
  - Bi-directional express lane direct connection between Sawgrass Expressway to and from the west, and Florida's Turnpike to and from the north.

- Concept 3B
  - Same as Concept 3A.
  - New Florida's Turnpike northbound to SW 10th Street express lanes eastbound off-ramp.
  - New Florida's Turnpike southbound to SW 10th Street express lanes eastbound off-ramp.
  - No new Florida's Turnpike northbound nor southbound off-ramps to SW 10th Street local lanes.

- Concept 3C
  - Same as Concept 3A.
  - SW 10th Street express lanes operate with static tolling instead of dynamic tolling.

- Concept 3D
  - Same as Concept 3A.
  - Bi-directional express lane direct connection between SW 10th Street to and from the east, and Florida's Turnpike to and from the south.
  - No new SW 10th Street westbound to Florida's Turnpike southbound off-ramp.
  - No new Florida's Turnpike northbound to SW 10th Street eastbound off-ramp.

- Concept 3E
  - Same as Concept 3D.
  - Bi-directional express lane direct connection between SW 10th Street to and from the east, and Florida's Turnpike to and from the north.
  - No Florida's Turnpike southbound to SW 10th Street local lanes eastbound off-ramp.
  - No SW 10th Street westbound to Florida's Turnpike off-ramp.

- Concept 3F
  - Same as Concept 3D.
  - New SW 10th Street westbound to Florida's Turnpike northbound and southbound off-ramps combined into one exit.

According to the 2045 travel demand forecasting the movement with the highest demand at the Florida's Turnpike Interchange is Sawgrass Expressway eastbound to Florida's Turnpike northbound and the reciprocal movement Florida's Turnpike southbound to Sawgrass Expressway westbound.

Interaction between Florida's Turnpike and I-95 occurs daily, as drivers move from one roadway to another. According to the regional weekday daily trips between Broward and Palm Beach Counties, 51,000 daily trips travel between west Broward County and east Palm Beach County (see ***Figure 5.14***), which is the primary movement. There are 23,000 daily trips that travel between west Palm Beach County and east Broward County. This interaction helps identify which movements would best be served by direct connections between Florida's Turnpike and the SW 10th Street to improve regional connectivity and relieve the local roadway network.

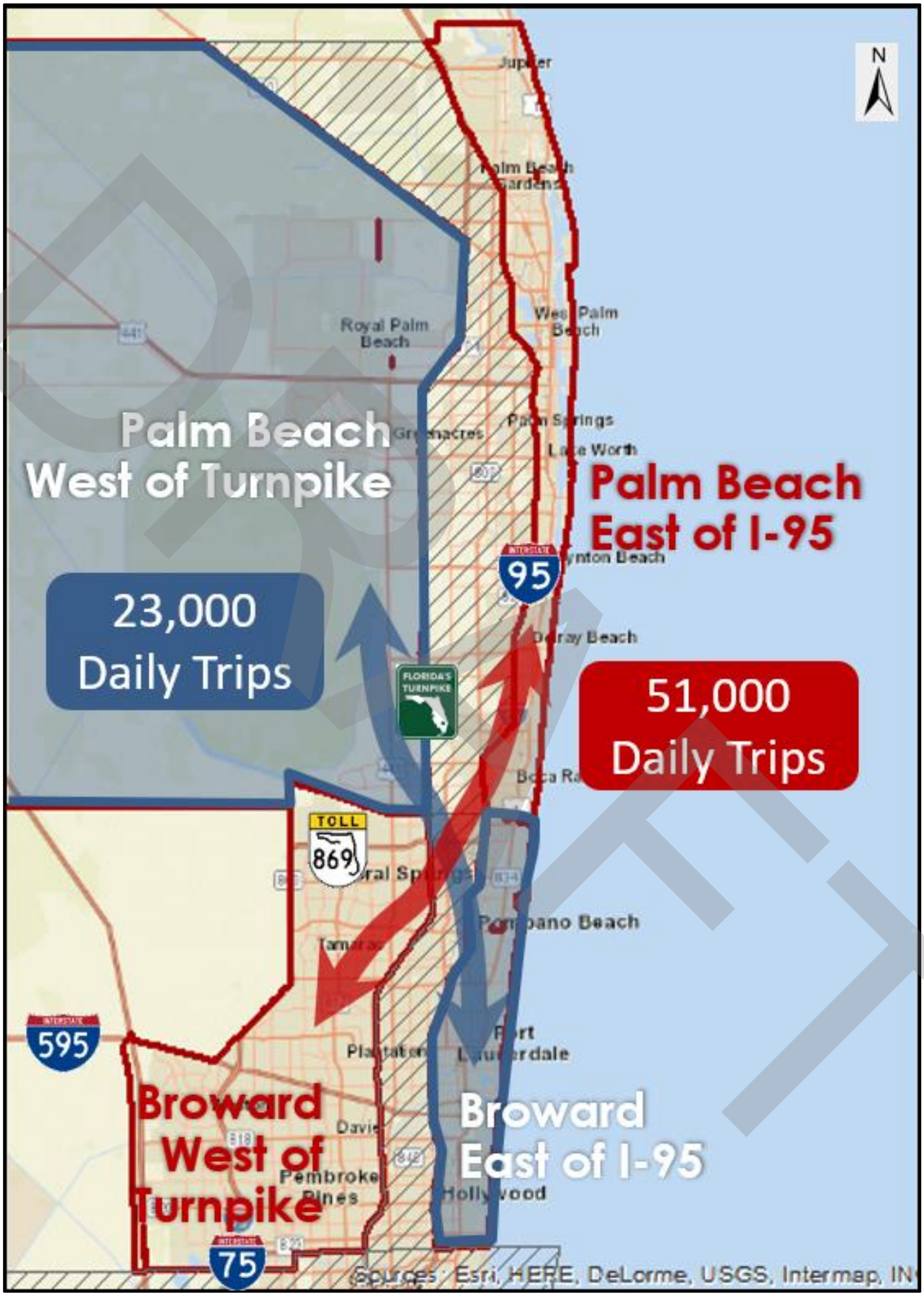


Figure 5.14 – Regional Weekday Daily Trips between Broward and Palm Beach Counties

When looking at the future traffic patterns, it was found that the origin-destination between Florida's Turnpike south and I-95 to the east was 63% of the total traffic. The remaining of the traffic was 23% to Military Trail and 16% to Powerline Road. Therefore, most of the traffic travelling from Florida's Turnpike south to SW 10th Street is regional traffic bypassing SW 10th Street.

Based on the above preliminary travel demand forecasting, Concept 3D was selected to move forward for the following reasons:

- It provides a bi-directional express lane direct connection between Sawgrass Expressway to and from the west, and Florida's Turnpike to and from the north, which is the movement with the highest demand.
- It provides a bi-directional express lane direct connection between Florida's Turnpike to and from the south, and SW 10th Street to and from the east, which is the movement that serves the missing regional connection between Florida's Turnpike and I-95.
- No need for new ramps connecting Florida's Turnpike northbound to SW 10th Street eastbound nor SW 10th Street westbound to Florida's Turnpike southbound. These movements are forecasted to be low, and they can continue to be served by traveling west to Lyons Road and performing a U-turn to head east.

Step 4 – In 2020, FTE no longer considered adding express lanes to both Sawgrass Expressway and Florida's Turnpike. Policy changes at the time allowed for FDOT and FTE to look at other freeway widening alternatives. Therefore, during step four, new corridor concepts were developed with additional travel lanes, interchange modifications and other corridor improvements. During this step a corridor concept was selected to be evaluated further during the alternatives analysis. At SW 10th Street, between Florida's Turnpike and I-95, FDOT also eliminated considering tolled express lanes and moved forward with a similar concept but without a toll. This new limited access facility is now called connector lanes. During this step, FDOT selected to construct the connector lanes on the north side of the existing SW 10th Street local lanes. The connector lanes begin eastbound and end westbound just west of Florida's Turnpike.

Eleven new corridor concepts were considered on the *Sawgrass Expressway between US 441 and Powerline Road* (see ***Figure 5.15***). All corridor concepts propose to add an additional travel lane in each direction along the Sawgrass Expressway and a combination of collector distributor roadway systems and ramp modifications. Along Florida's Turnpike, all corridor concepts propose to add one additional travel lane and a thru lane in each direction for a total of ten lanes. The main differences between corridor concepts are the conceptual designs along Sawgrass Expressway in the eastbound direction and ramp connections with Florida's Turnpike.

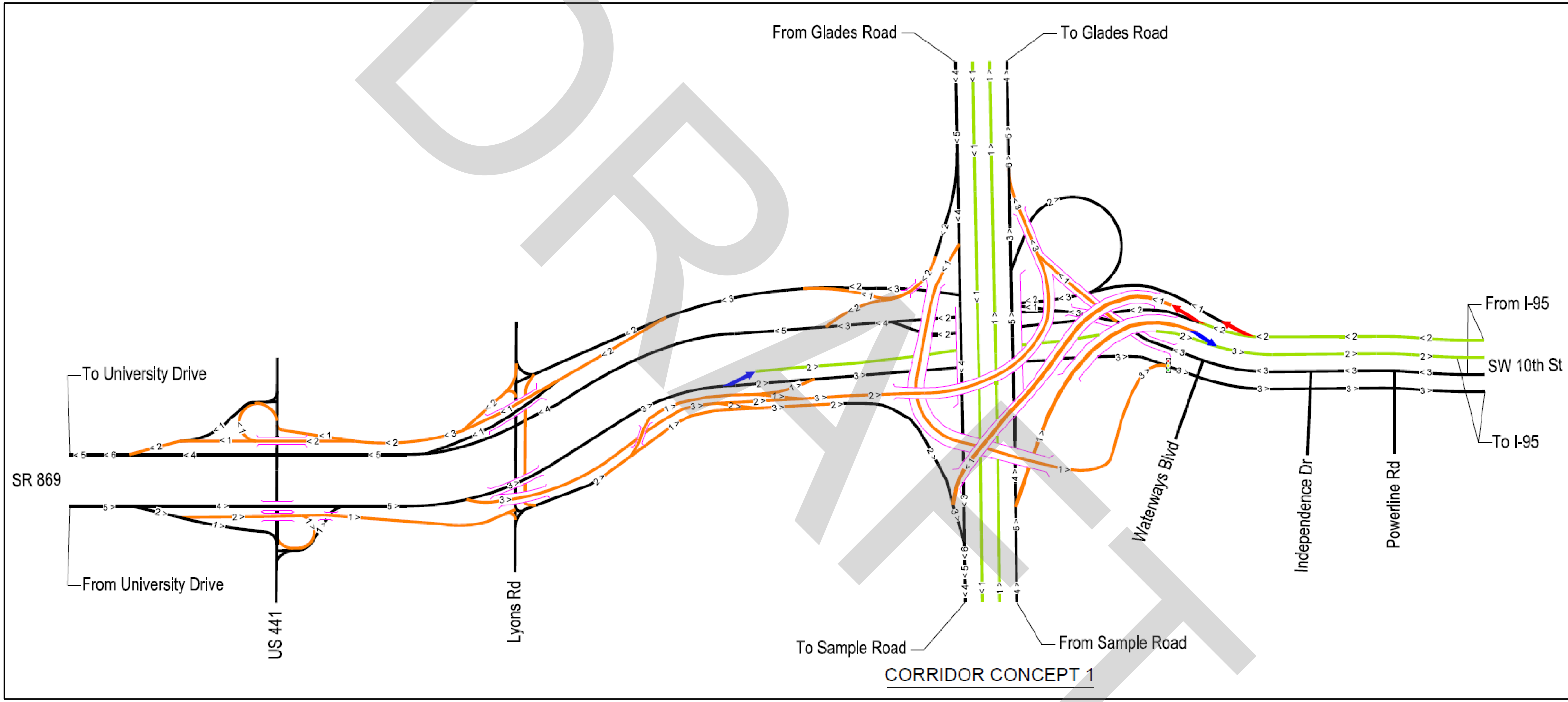


Figure 5.15 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road

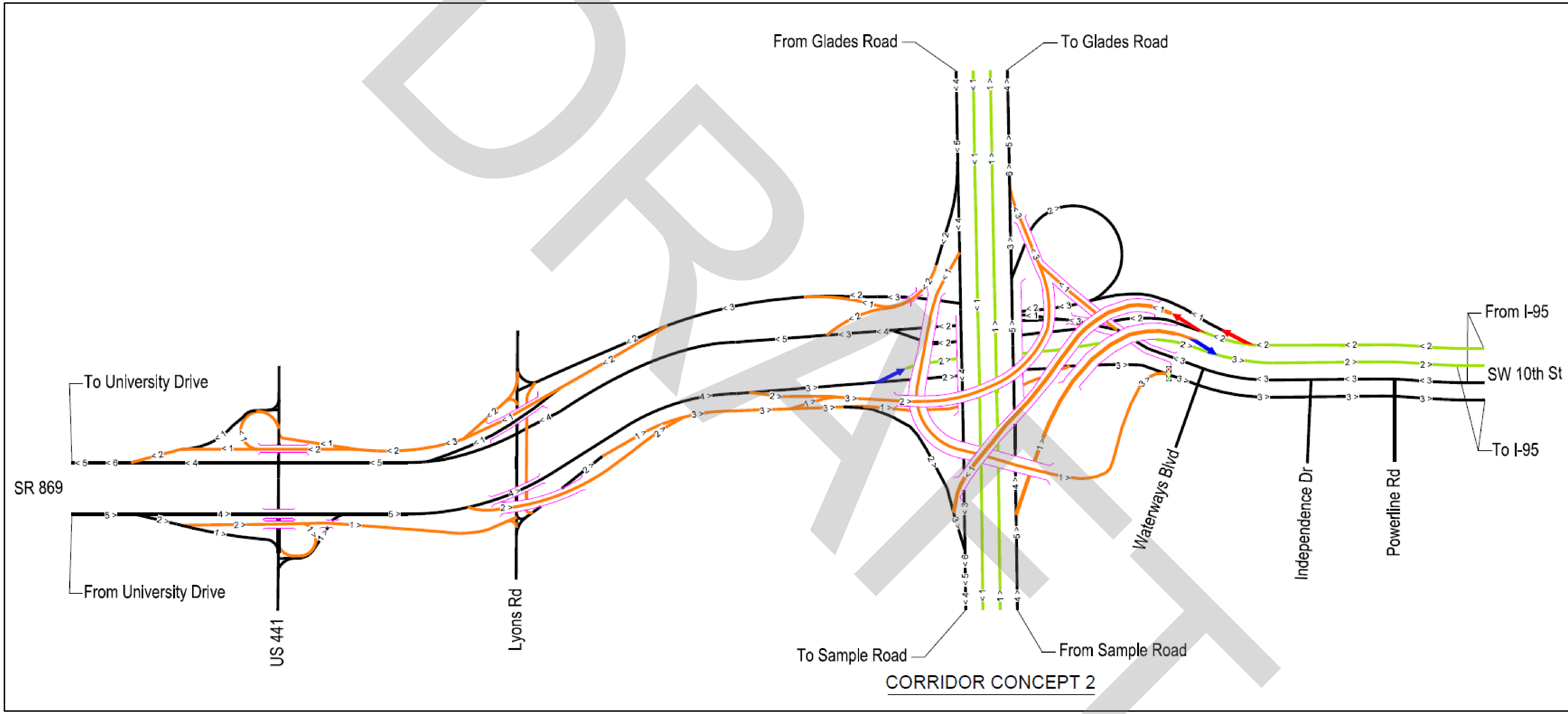


Figure 5.15 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

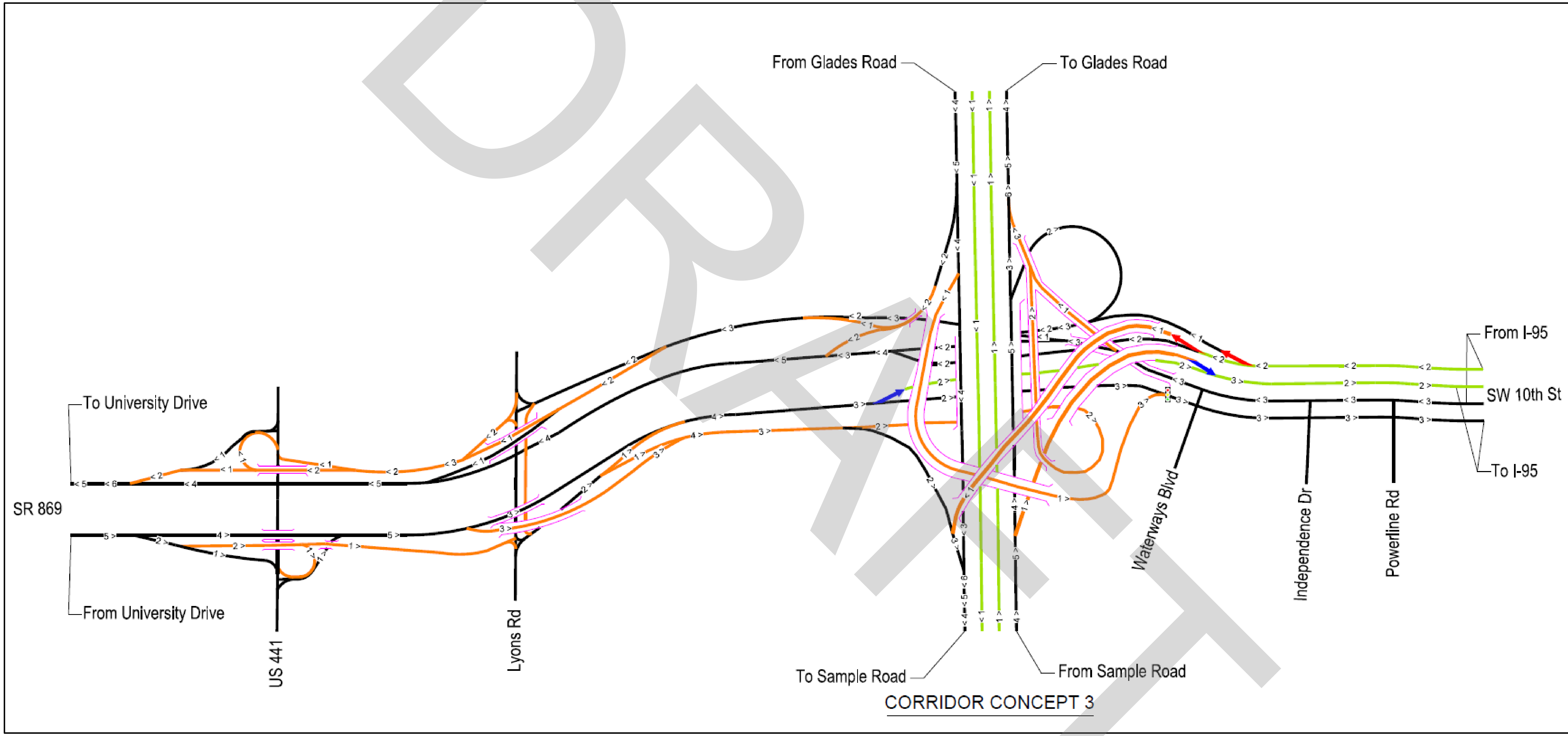


Figure 5.15 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

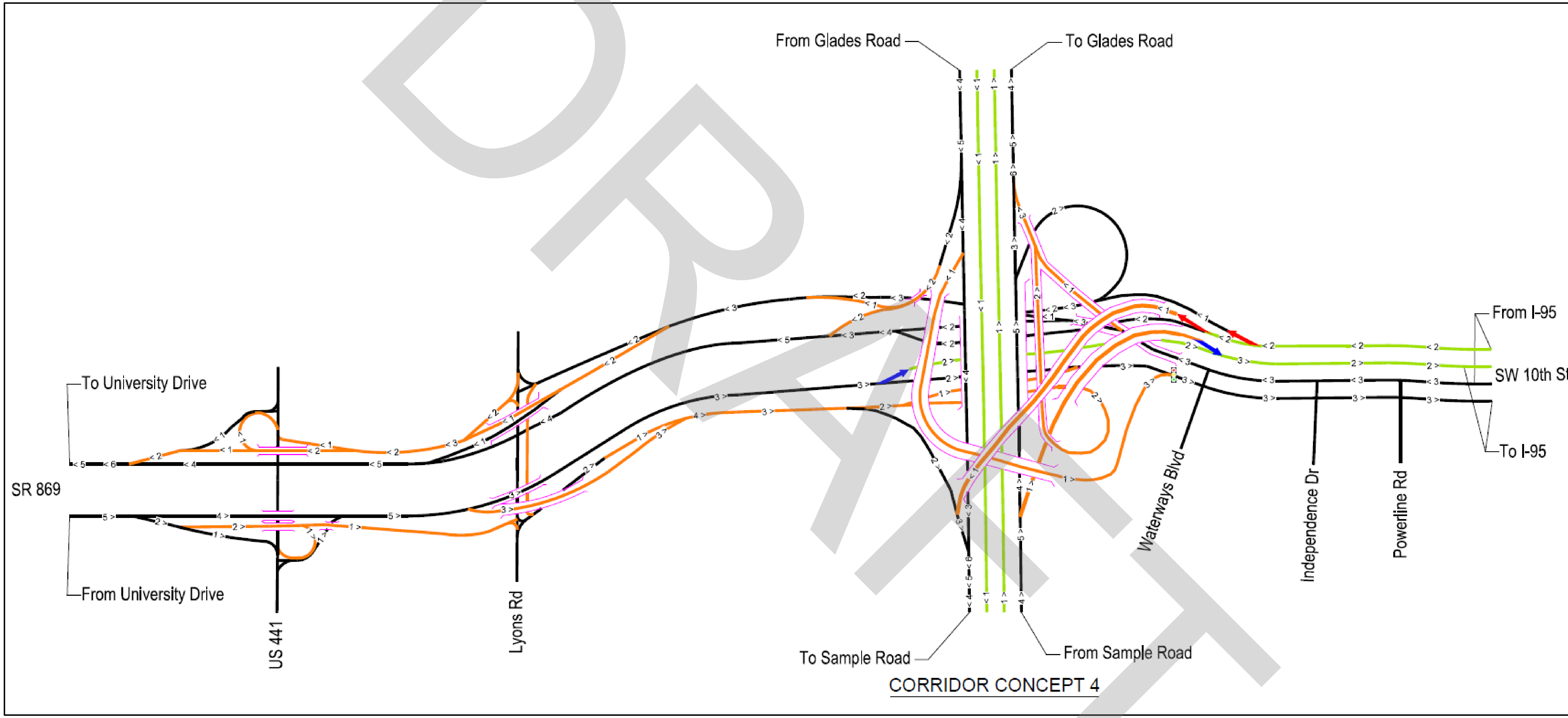


Figure 5.15 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

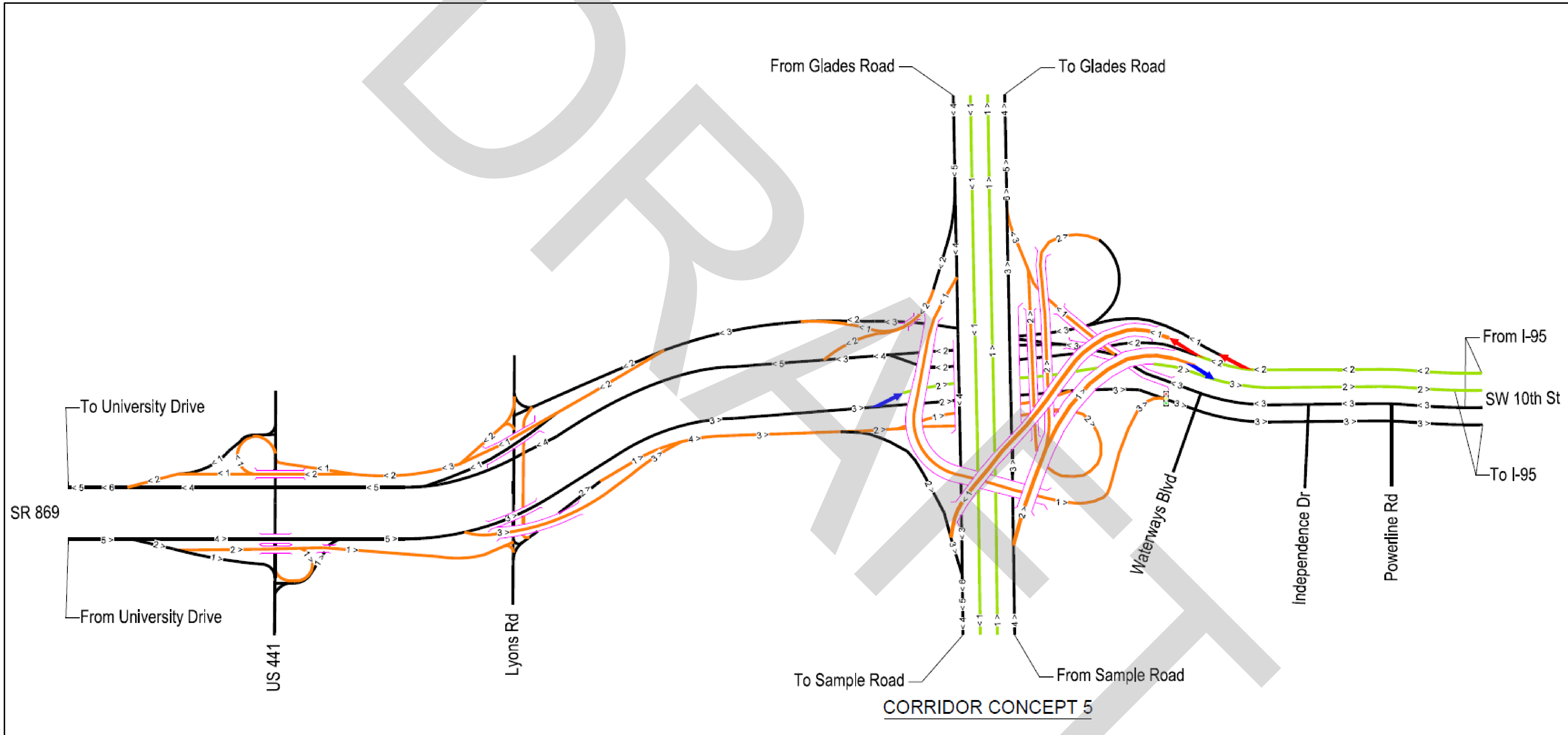


Figure 5.15 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

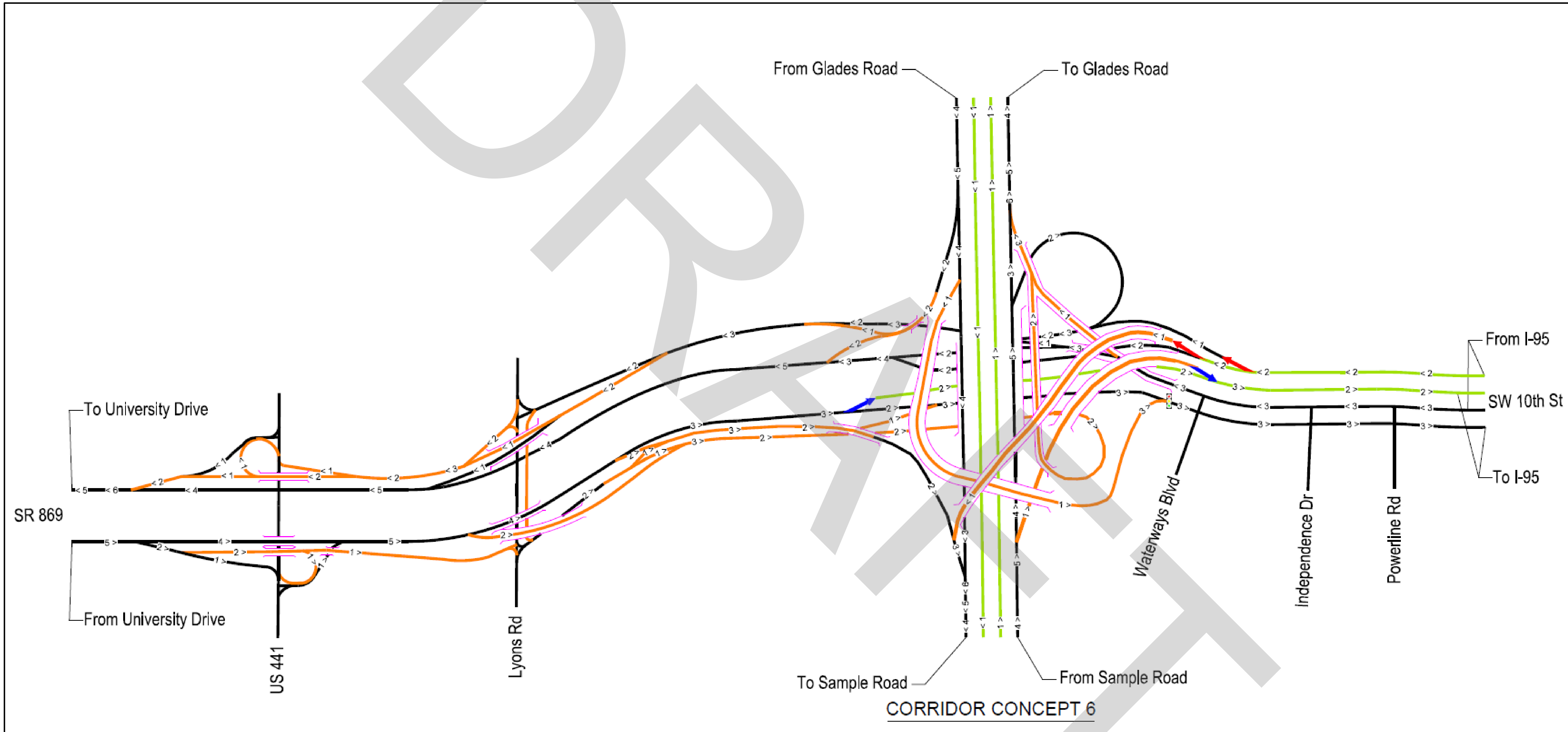


Figure 5.15 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

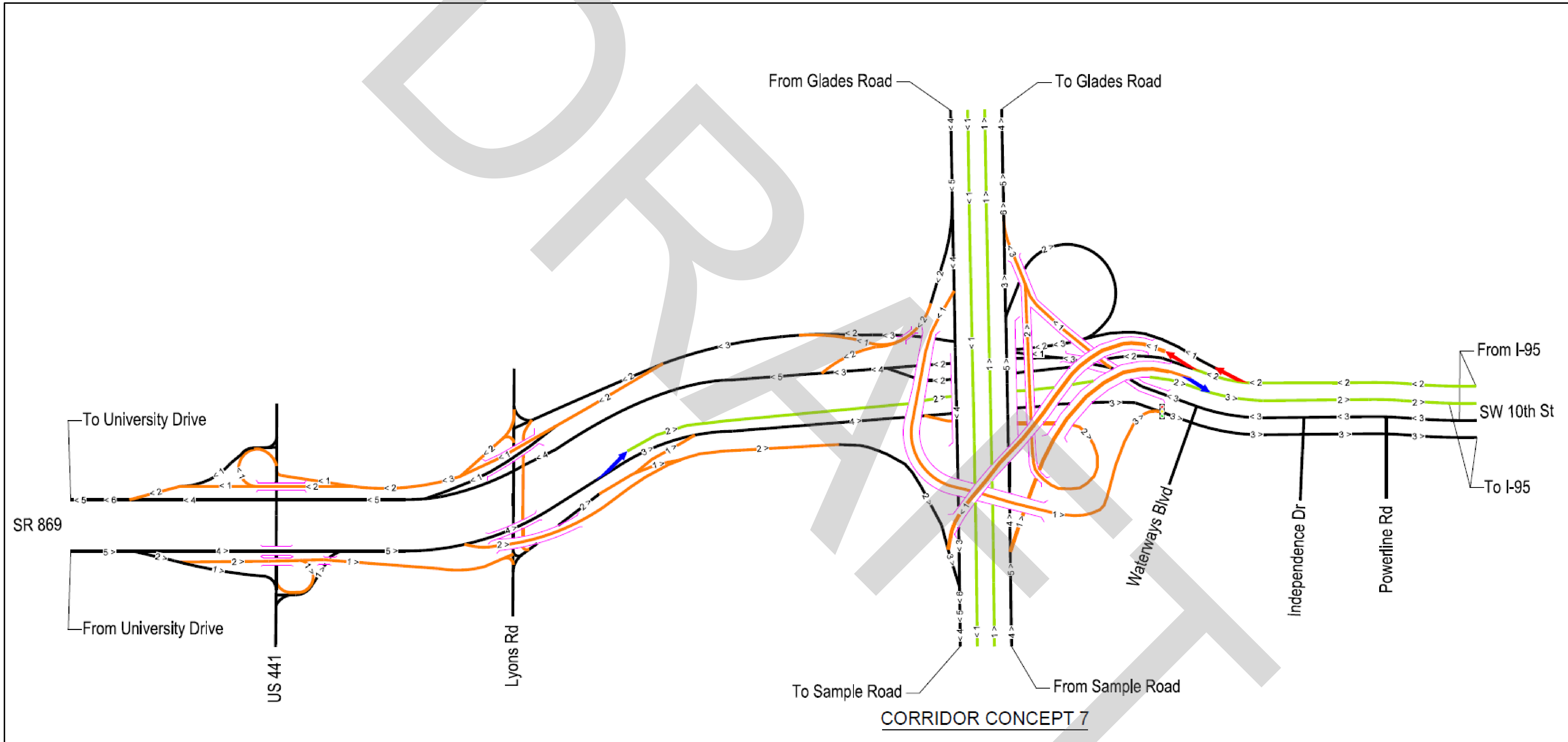


Figure 5.15 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

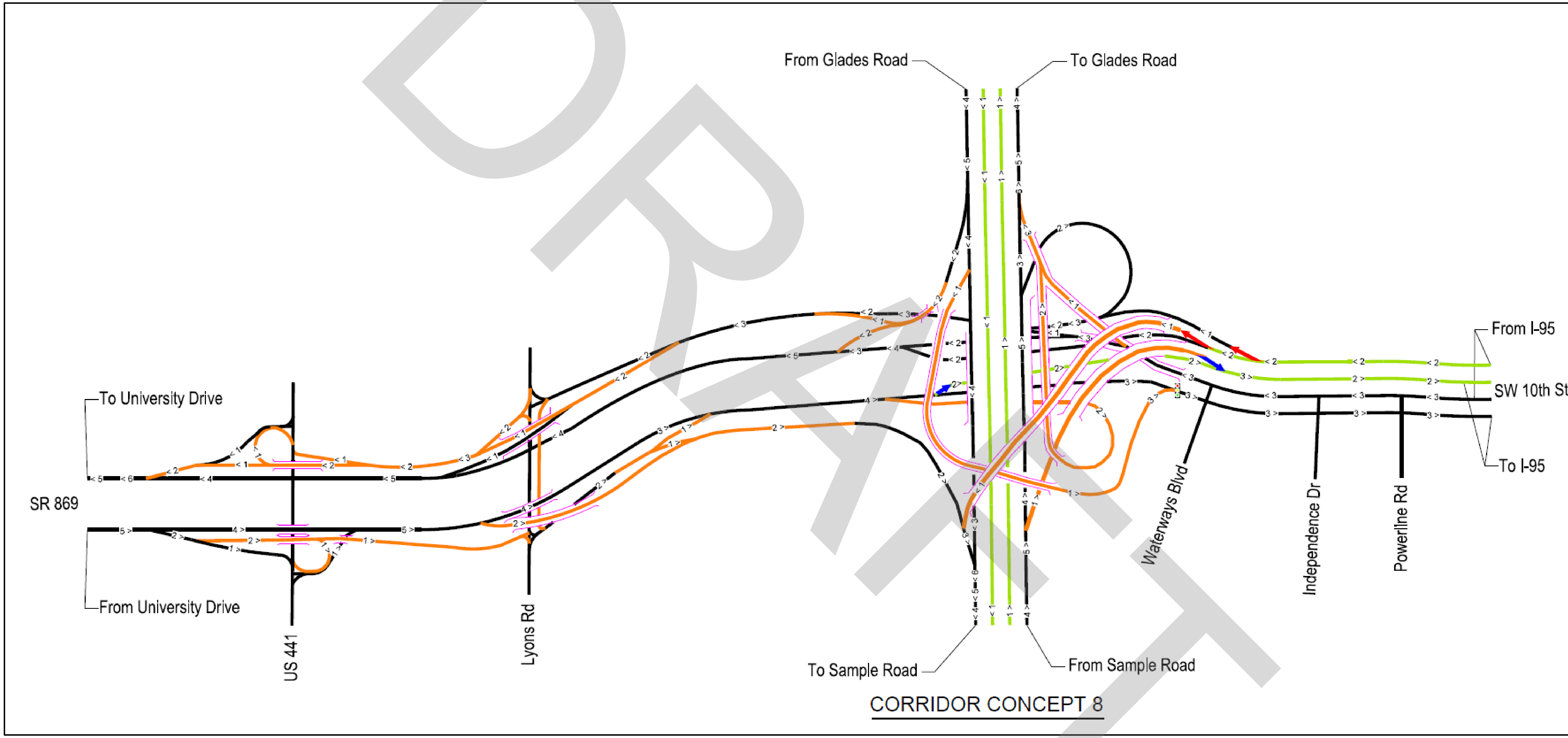


Figure 5.15 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

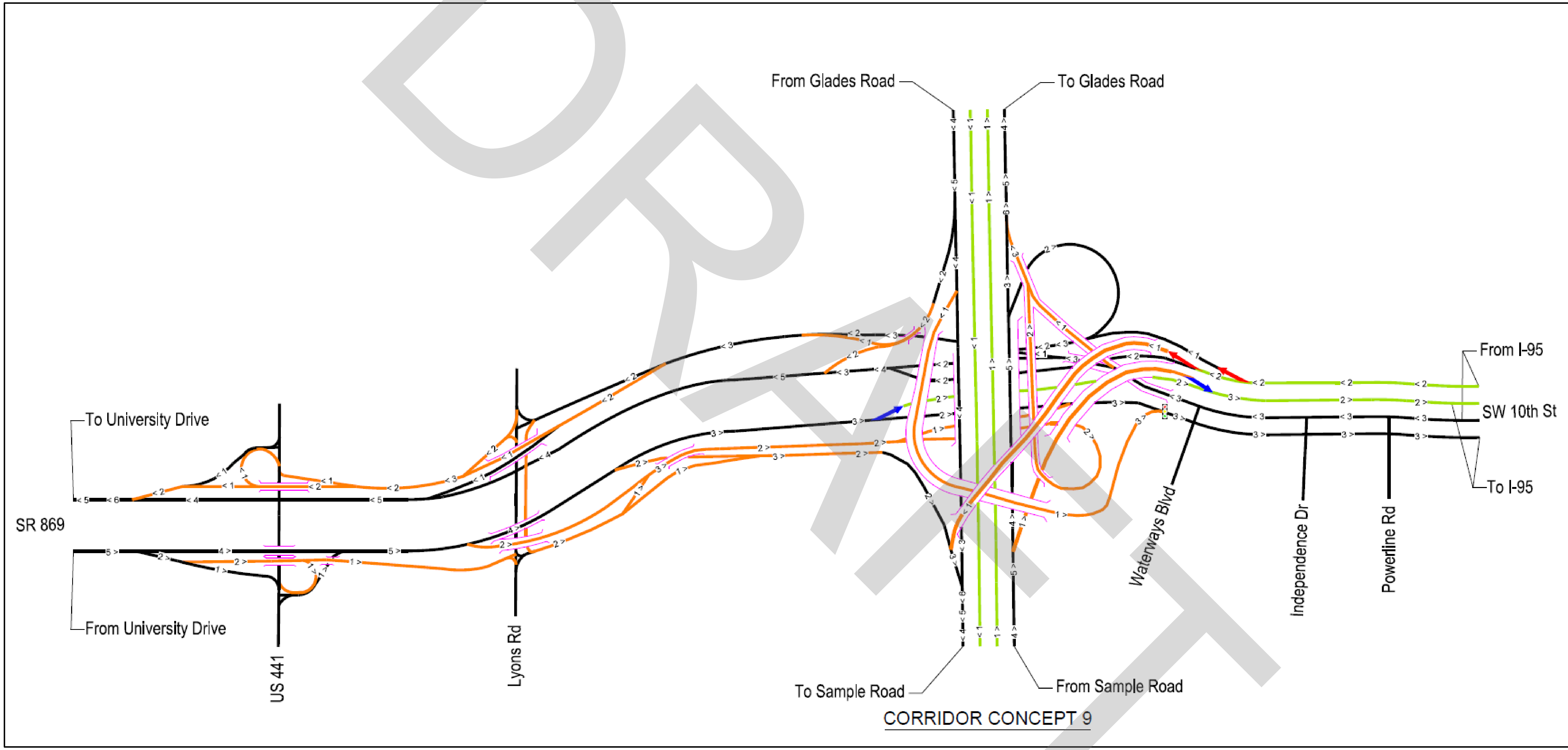


Figure 5.15 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

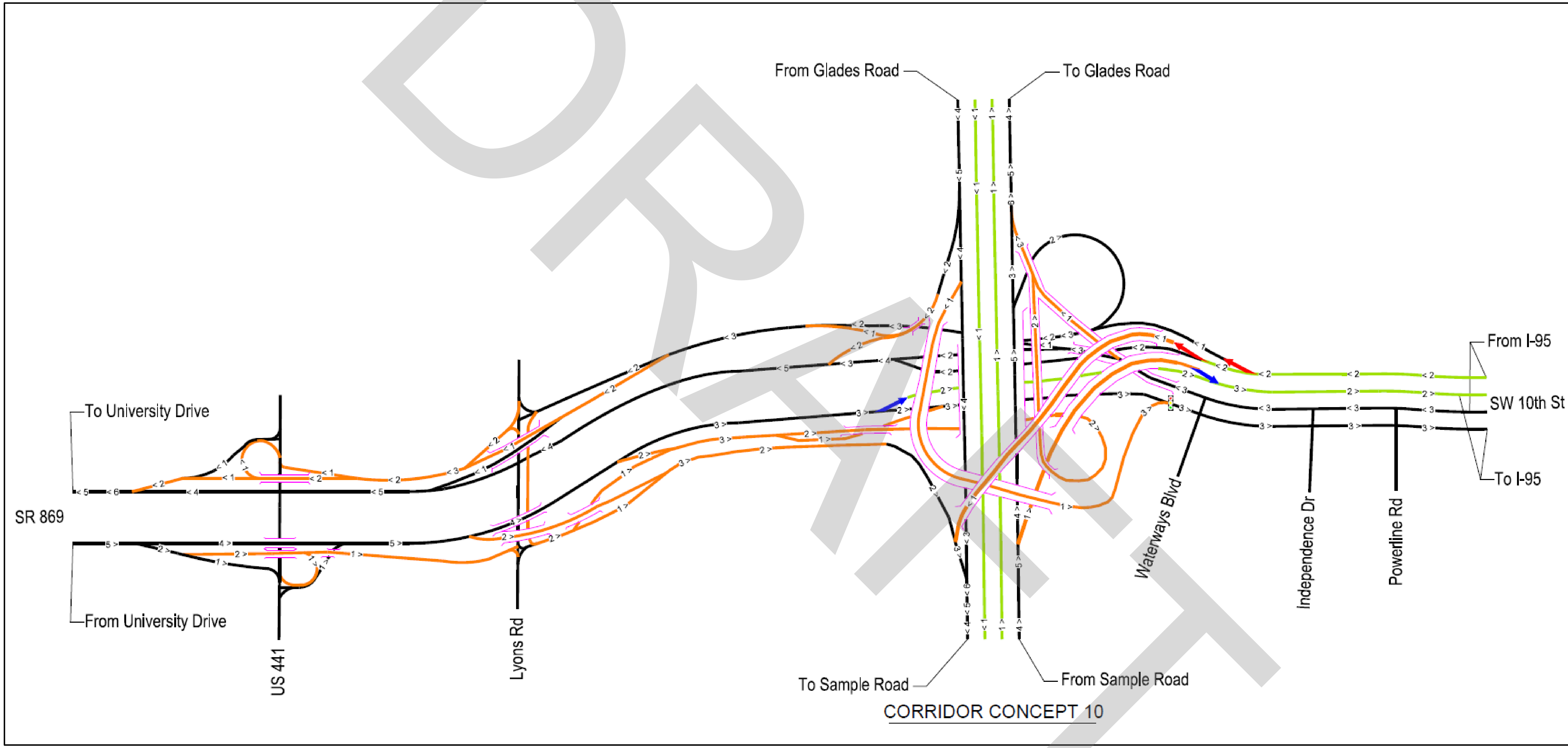


Figure 5.15 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

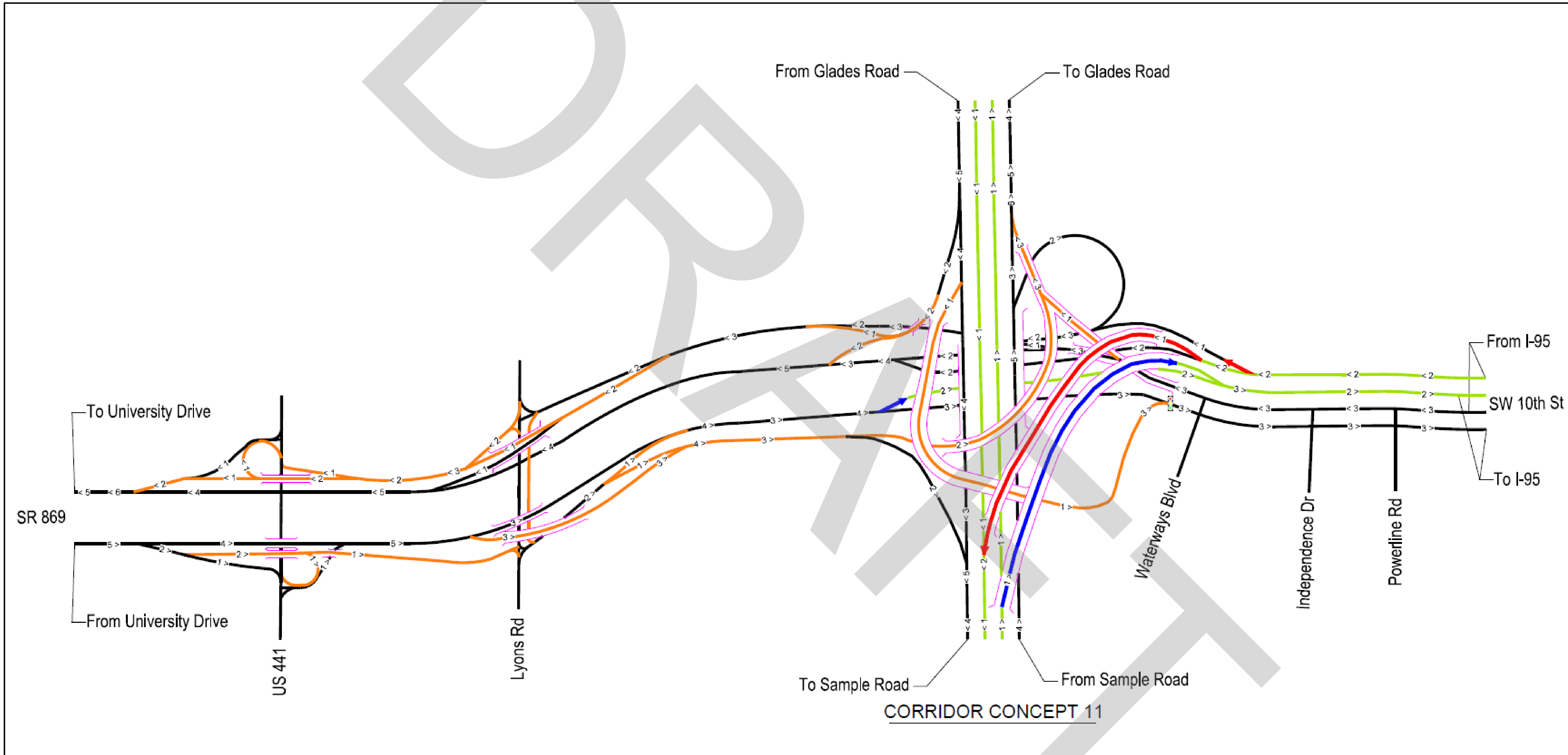


Figure 5.15 – Corridor Concepts (1 – 11) Considered from US 441 to Powerline Road (Continued)

All corridor concepts are briefly described below:

- Corridor Concept 1
  - Combine the three existing eastbound off-ramps to US 441 and Lyons Road into one exit.
  - Relocate west the existing eastbound off-ramp to Florida's Turnpike to west of Lyons Road.
  - Relocate west the existing eastbound on-ramp from Lyons Road to east of Lyons Road.
  - Replace the existing eastbound to northbound loop off-ramp with a direct connection flyover ramp.
  - New Florida's Turnpike northbound to SW 10th Street Connector Lanes eastbound off-ramp.
  - New SW 10th Street Connector Lanes westbound to Sawgrass Expressway collector distributor roadway system westbound off-ramp.
  - New SW 10th Street Connector Lanes westbound to Florida's Turnpike southbound off-ramp.
  - New SW 10th Street westbound to Florida's Turnpike northbound off-ramp.
  - New Florida's Turnpike southbound to SW 10th Street eastbound off-ramp.
  - The existing Florida's Turnpike southbound off-ramp splits into two ramps, serving Sawgrass Expressway westbound, and collector distributor roadway system westbound.
  - Extend the existing westbound collector distributor roadway system to the west to US 441, serving US 441 and Lyons Road.
  - Lyons Road Interchange – New Texas U-Turn westbound to eastbound.

- Corridor Concept 2
  - Same as Concept 1, except that the Sawgrass Expressway eastbound off-ramp to Florida's Turnpike is split into two exits.
  - The Sawgrass Expressway eastbound to Florida's Turnpike southbound off-ramp is west of Lyons Road.
  - The Sawgrass Expressway eastbound to Florida's Turnpike northbound off-ramp is just west of Florida's Turnpike.

  - Existing eastbound on-ramp from Lyons Road is east of Florida's Turnpike.

- Corridor Concept 3
  - Same as Concept 1, except that the existing Sawgrass Expressway eastbound to Florida's Turnpike northbound loop off-ramp is modified to travel north parallel to the mainline northbound lanes, over the Florida's Turnpike northbound to Sawgrass Expressway westbound loop ramp to later enter Florida's Turnpike.

- Corridor Concept 4
  - Same as Concept 3, except that the existing Lyons Road eastbound on-ramp is located just west of Florida's Turnpike.

- Corridor Concept 5
  - Same as Concept 4, except that it relocates the existing Florida's Turnpike northbound to Sawgrass Expressway westbound loop off-ramp to the south and combines it with the new Florida's Turnpike northbound to SW 10th Street Connector Lanes eastbound off-ramp into one exit.

- Corridor Concept 6
  - Same as Concept 4, except that the Sawgrass Expressway eastbound off-ramp to Florida's Turnpike is split into two exits.
  - The Sawgrass Expressway eastbound to Florida's Turnpike northbound off-ramp is west of Lyons Road.
  - The Sawgrass Expressway eastbound to Florida's Turnpike southbound off-ramp is east of Lyons Road and is grade separated with a braided ramp over the Sawgrass Expressway eastbound off-ramp to Florida's Turnpike northbound ramp.

- Corridor Concept 7
  - Same as Concept 3, except that the Sawgrass Expressway eastbound off-ramp to Florida's Turnpike is split into two exits.
  - The Sawgrass Expressway eastbound to Florida's Turnpike southbound off-ramp is just east of Lyons Road.
  - The Sawgrass Expressway eastbound to Florida's Turnpike northbound off-ramp is just west of Florida's Turnpike.

  - The SW 10th Street Connector Lanes eastbound entrance is west of the Lyons Road eastbound on-ramp to Sawgrass Expressway.

- Corridor Concept 8
  - Same as Concept 7, except that the SW 10th Street Connector Lanes eastbound entrance is east of the Lyons Road eastbound on-ramp to Sawgrass Expressway.

- Corridor Concept 9
  - Same as Concept 6, except that the eastbound ramp geometry between Lyons Road and Florida's Turnpike is slightly different. Both concepts serve the same movements.

- Corridor Concept 10
  - Similar to Concept 6, except that the eastbound ramp geometry between Lyons Road and Florida's Turnpike is slightly different.
  - The Sawgrass Expressway eastbound to Florida's Turnpike southbound off-ramp is just east of Lyons Road.
  - The Sawgrass Expressway eastbound to Florida's Turnpike northbound off-ramp is east of Lyons Road.

- Corridor Concept 11
  - Similar to Concept 1.
  - New Florida's Turnpike Thru Lane northbound to SW 10th Street Connector Lanes eastbound off-ramp.
  - New SW 10th Street Connector Lanes westbound to Florida's Turnpike Thru Lane southbound off-ramp.
  - No new Florida's Turnpike northbound to SW 10th Street Connector Lanes eastbound off-ramp.
  - No new SW 10th Street Connector Lanes westbound to Florida's Turnpike southbound off-ramp.

Table 5.2 summarizes the advantages and disadvantages evaluation of each corridor concept being considered from US 441 to Powerline Road. Based on this evaluation Corridor Concept 8 was selected to move forward to the PD&E alternatives analysis. Concept 8 provides the following benefits and opportunities to the project:

5. Seamless connection and access to and from the new SW 10th Street Connector Lanes to the east.
6. Maximizes the use of the existing Florida's Turnpike Interchange footprint in the southeast quadrant to address the weaving deficiency between the two loop northbound ramps.
7. Reduces the number of third level ramps over the Florida's Turnpike Interchange.
8. Requires fewest bridge structures.
9. Minimizes the number of grade separations in the Sawgrass Expressway eastbound direction between Lyons Road and Florida's Turnpike.
10. Redistributes traffic by separating mainline, ramp and local traffic with the implementation of collector distributor roadway systems and combining off-ramps.
11. Addresses the existing and future travel demand by adding new ramps serving the local traffic needs and regional connectivity needs and by adding additional travel lanes to the existing ramps and corridors to address the future growth of the area.
12. No right of way impacts along the Sawgrass Expressway.
13. Consistent with the proposed improvements east, west, north, and south of the project limits.

Table 5.2 – Corridor Concepts Advantages and Disadvantages Considered from US 441 to Powerline Road

	Advantages	Disadvantages
Corridor Concept 1	Lyons Rd EB on-ramp will braid over the 3-lane Sawgrass Exp EB off-ramp to TPK NB and SB. This is a 1-lane ramp resulting in a relatively inexpensive bridge. No EB weaving movements (Sawgrass Exp and CD). Single EB exit off-ramp from Sawgrass Exp EB to TPK NB and SB.	Lyons Rd and the U-turn cannot access SW 10th St EB connector to I-95 until after Powerline Rd. The 3rd level EB to NB flyover length of the upgrade/beginning of retaining walls limits the available distance for all the proposed at-grade. connections/ramps/gores. Several separate ramp movements and gores in a short distance. Potential right of way impacts EB between Lyons Rd and TPK. Sawgrass Exp EB off-ramp to TPK braids over Lyons Rd with 3 lanes, which makes the bridge wider.
Corridor Concept 2	Sawgrass Exp EB off-ramp to TPK NB and SB are separate. The braided ramp over Lyons Rd is 2 lanes, which reduces the area and complexity of the bridge design. No EB weaving movements (Sawgrass Exp and CD).	Lyons Rd and the U-turn cannot access SW 10th St EB connector to I-95 until after Powerline Rd. The 3rd level EB to NB flyover length of the upgrade/beginning of retaining walls limits the available distance for all the proposed at-grade. connections/ramps/gores. Slip ramp from the CD EB to TPK NB may need to be raised vertically to tie to the TPK NB ramp (Lyons Rd traffic to TPK NB). Successive EB exit off-ramps from Sawgrass EB to TPK NB and SB.
Corridor Concept 3	Lyons Rd/U-turn can access SW 10th St EB connector to I-95 at the TPK overpass instead of after Powerline Rd. The EB weaving distance along the CD is 3,500 ft. No TPK NB weaving between the loop ramps. Loops ramps are braided. TPK SE loop ramp design speed will be the same or better than the replaced 3rd level flyover (between 35-40 MPH). The replacement of the 3rd level EB to NB flyover decreases the overall cost and provides the opportunity for more options EB between Lyons Rd and TPK. Single EB exit off-ramp from Sawgrass Exp EB to TPK NB and SB.	Two weaving segments: 1) CD decision between TPK NB and SB, 2) Sawgrass Exp between Lyons Rd on-ramp and SW 10th St connector off-ramp. TPK loop ramp in the SE quadrant will push the 2nd level TPK SB to EB ramp closer to the ROW line. Additional separate NB 2-lane bridge structure adjacent to the NB mainline TPK bridge. Sawgrass Exp EB off-ramp to TPK braids over Lyons Rd with 3 lanes, which makes the bridge wider.

Table 5.2 – Corridor Concepts Advantages and Disadvantages Considered from US 441 to Powerline Road (Continued)

	Advantages	Disadvantages
Corridor Concept 4	The EB weaving distance along the CD is 4,500 ft. No TPK NB weaving between the loop ramps. Loops ramps are braided. TPK SE loop ramp design speed will be the same or better than the replaced 3rd level flyover (between 35-40 MPH). The replacement of the 3rd level EB to NB flyover decreases the overall cost and provides the opportunity for more options EB between Lyons Rd and TPK. No Sawgrass Exp EB weaving segment. Single EB exit off-ramp from Sawgrass Exp EB to TPK NB and SB.	Lyons Rd and the U-turn cannot access SW 10th St EB connector to I-95 until after Powerline Rd. One weaving segment: 1) CD decision between TPK NB and SB. TPK loop ramp in the SE quadrant will push the 2nd level TPK SB to EB ramp closer to the ROW line. Additional separate NB 2-lane bridge structure adjacent to the NB mainline TPK bridge.
Corridor Concept 5	The EB weaving distance along the CD is 3,500 ft. No TPK NB weaving between the loop ramps. Loops ramps are braided. TPK SE loop ramp design speed will be the same or better than the replaced 3rd level flyover (between 35-40 MPH). The replacement of the 3rd level EB to NB flyover decreases the overall cost and provides the opportunity for more options EB between Lyons Rd and TPK. No Sawgrass Exp EB weaving segment. Due to the change in vertical geometry, the TPK NB 3-lane on-ramp can enter further south, lessening ROW impacts along the park. The width of the TPK NB overpass is reduced by 2 lanes (24'). The EB to NB and WB to NB ramps merge at-grade, rather than on a bridge. Single EB exit off-ramp from Sawgrass Exp EB to TPK NB and SB.	CD EB weaving segment between TPK NB and SB. Lyons Rd and the U-turn cannot access SW 10th St EB connector to I-95 until after Powerline Rd. The TPK loop ramp in the SE quadrant will push the 2nd level TPK SB to EB ramp closer to the ROW line. Two additional separate NB 2-lane bridge structures adjacent to the NB mainline TPK bridge. TPK NB off-ramp in the SE quadrant will be a 3rd level ramp. TPK NB off-ramp serves Sawgrass Exp WB and SW 10th St EB Connector. Potential signing and tolling challenges may occur when serving the SW 10th St Connector Lanes. Design occupies more interchange space, which impacts stormwater design.

Table 5.2 – Corridor Concepts Advantages and Disadvantages Considered from US 441 to Powerline Road (Continued)

	Advantages	Disadvantages
Corridor Concept 6	Sawgrass EB off-ramp to TPK NB braids over Lyons Rd EB on-ramp as 2 lanes instead of 3, which reduces the area and complexity of the bridge design. No EB weaving movements (Sawgrass Exp and CD). No TPK NB weaving between the loop ramps. Loop ramps are braided. TPK SE loop ramp design speed will be the same or better than the replaced 3rd level flyover (between 35-40 MPH). The replacement of the 3rd level EB to NB flyover decreases the overall cost and provides the opportunity for more options EB between Lyons Rd and TPK.	Lyons Rd and the U-turn cannot access SW 10th St EB connector to I-95 until after Powerline Rd. The TPK loop ramp in the SE quadrant will push the 2nd level TPK SB to EB ramp closer to the ROW line. An additional 2-lane bridge is needed where the Sawgrass Exp EB off-ramps cross over just west of TPK. Successive EB exit off-ramps from Sawgrass Exp EB to TPK NB and SB. Potential right of way impacts EB between Lyons Rd and TPK.
Corridor Concept 7	Sawgrass EB off-ramp to TPK SB braids over Lyons Rd EB on-ramp as 2-lanes instead of 3, which reduces the area and complexity of the bridge design. No TPK NB weaving between the loop ramps. Loops ramps are braided. TPK SE loop ramp design speed will be the same or better than the replaced 3rd level flyover (between 35-40 MPH). The replacement of the 3rd level EB to NB flyover decreases the overall cost and provides the opportunity for more options EB between Lyons Rd and TPK.	Successive EB exit off-ramps from Sawgrass Exp EB to TPK NB and SB. Lyons Rd and the U-turn cannot access SW 10th St EB connector to I-95 until after Powerline Rd. TPK loop ramp in the SE quadrant will push the 2nd level TPK SB to EB ramp closer to the ROW line. Sawgrass Exp EB weaving segment between Lyons Rd EB on-ramp and TPK NB off-ramp.
Corridor Concept 8	Lyons Rd/U-turn can access SW 10th St EB connector to I-95 at the TPK overpass instead of after Powerline Rd. Sawgrass EB off-ramp to TPK SB braids over Lyons Rd EB on-ramp as 2-lanes instead of 3, which reduces the area and complexity of the bridge design. No TPK NB weaving between the loop ramps. Loops ramps are braided. TPK SE loop ramp design speed will be the same or better than the replaced 3rd level flyover (between 35-40 MPH). The replacement of the 3rd level EB to NB flyover decreases the overall cost and provides the opportunity for more options EB between Lyons Rd and TPK.	Successive EB exit off-ramps from Sawgrass Exp EB to TPK NB and SB. TPK loop ramp in the SE quadrant will push the 2nd level TPK SB to EB ramp closer to the ROW line. Sawgrass Exp EB weaving segment between Lyons Rd EB on-ramp and TPK NB off-ramp.

Table 5.2 – Corridor Concepts Advantages and Disadvantages Considered from US 441 to Powerline Road (Continued)

	Advantages	Disadvantages
Corridor Concept 9	Lyons Rd/U-turn can access SW 10th St EB connector to I-95 at the TPK overpass instead of after Powerline Rd. Sawgrass EB off-ramp to TPK NB braids over Lyons Rd as 2 lanes instead of 3, which reduces the area and complexity of the bridge design. Lyons Rd EB on-ramp no longer braids under the EB off-ramp. No TPK NB weaving between the loop ramps. Loops ramps are braided. TPK SE loop ramp design speed will be the same or better than the replaced 3rd level flyover (between 35-40 MPH). The replacement of the 3rd level EB to NB flyover decreases the overall cost and provides the opportunity for more options EB between Lyons Rd and TPK.	Successive EB exit off-ramps from Sawgrass Exp EB to TPK NB and SB. Lyons Rd and the U-turn cannot access SW 10th St EB connector to I-95 until after Powerline Rd. TPK loop ramp in the SE quadrant will push the 2nd level TPK SB to EB ramp closer to the ROW line. Sawgrass EB off-ramp to TPK NB occurs further west of Lyons Rd, which reduces the weaving segment distance between US 441 on-ramp and Sawgrass Exp off-ramp. Sawgrass Exp EB off-ramp to TPK NB braid proposes a 3-lane long bridge. Weaving segment after the 3-lane bridge braid EB between SW 10th St on-ramp and TPK NB ramp. Additional 3-lane bridge is required to braid over the Sawgrass Exp EB off-ramp to TPK SB. Potential right of way impacts EB between Lyons Rd and TPK.
Corridor Concept 10	Sawgrass Exp EB off-ramp to TPK SB braids over Lyons Rd as 2 lanes instead of 3, which reduces the area and complexity of the bridge design. No EB weaving movements (Sawgrass Exp and CD). No TPK NB weaving between the loop ramps. Loops ramps are braided. TPK SE loop ramp design speed will be the same or better than the replaced 3rd level flyover (between 35-40 MPH). The replacement of the 3rd level EB to NB flyover decreases the overall cost and provides the opportunity for more options EB between Lyons Rd and TPK.	Lyons Rd and the U-turn cannot access SW 10th St EB connector to I-95 until after Powerline Rd. TPK loop ramp in the SE quadrant will push the 2nd level TPK SB to EB ramp closer to the ROW line. Sawgrass EB off-ramp to TPK NB occurs further west of Lyons Rd, which reduces the weaving segment distance between US 441 on-ramp and Sawgrass Exp off-ramp. Proposes two new 2-lane bridges for the Lyons Rd EB on-ramp to avoid having weaving segments. Potential right of way impacts EB between Lyons Rd and TPK.
Corridor Concept 11	Direct connection between TPK thru lanes (to/from south) and SW 10th St connector lanes (to/from east). Lyons Rd/U-turn can access SW 10th St EB connector to I-95 at the TPK overpass instead of after Powerline Rd. Single EB exit off-ramp from Sawgrass Exp EB to TPK NB and SB.	No new TPK NB to SW 10th St connector EB off-ramp. No new SW 10th St connector WB to TPK SB off-ramp. Sawgrass Exp off-ramp to TPK is 3 lanes, which is a large and wide bridge over Lyons Rd.

Step 5 – During step 5, the PD&E Build Alternatives 1 and 2 were developed, analyzed, and selected from the corridor concept. Both were presented to the local agencies, stakeholders, and public during an Alternatives Public Information Meeting. ***Section 5.4.1*** summarizes Alternatives 1 and 2.

FTE received feedback from the local agencies, stakeholders, and public about Alternatives 1 and 2. FTE also conducted a VE Workshop. Refinements to the build alternatives were considered based on public feedback. These refinements, together with the recommendations from the VE team, created an additional alternative, Alternative 3. ***Section 5.4.3*** summarizes Alternative 3.

Step 6 – During step six, FTE identified a preferred alternative. ***Section 7.0*** summarizes the preferred alternative.

5.4.1 ALTERNATIVES 1 AND 2

Alternatives 1 and 2 are very similar. The main difference between the two alternatives is that Alternative 2 provides additional new ramp connections between Florida's Turnpike and SW 10th Street (see ***Figure 5.16*** and ***Figure 5.17***).

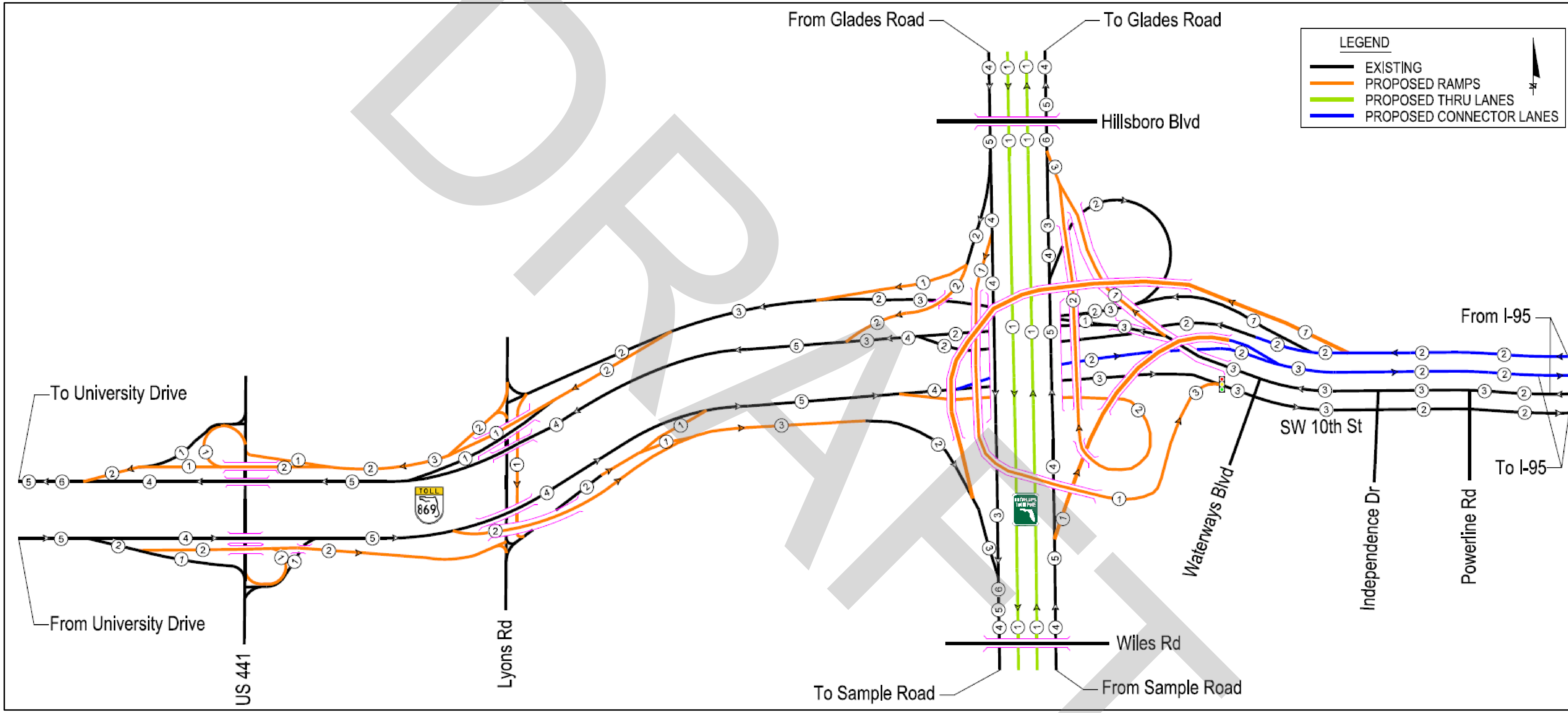


Figure 5.16 – Alternative 1 Schematic Line Diagram

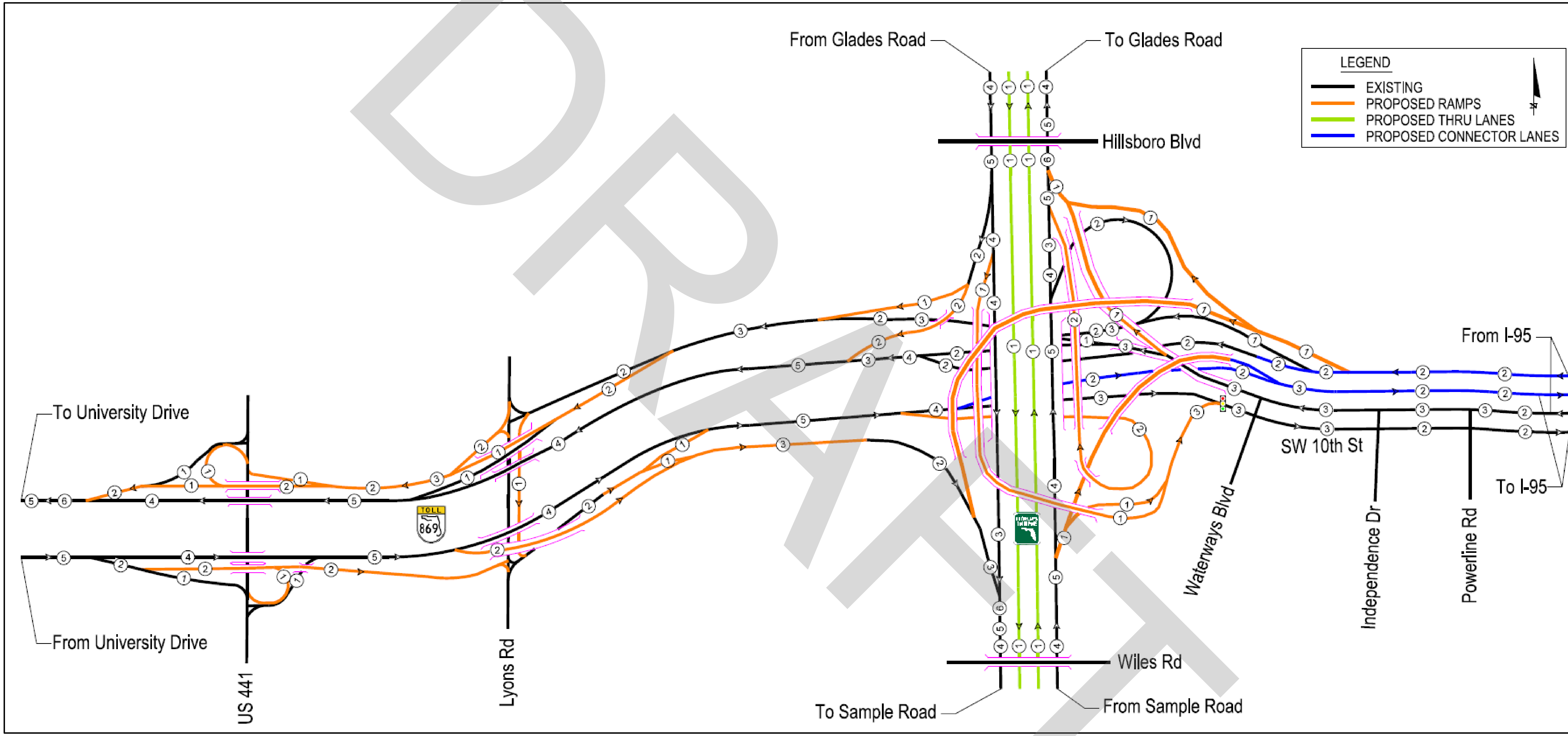


Figure 5.17 – Alternative 2 Schematic Line Diagram

Sawgrass Expressway – Both alternatives propose to widen the Sawgrass Expressway to four travel lanes in each direction with auxiliary lanes at select locations, and a collector distributor roadway system along both sides. The collector distributor roadway system will be barrier separated from the Sawgrass Expressway mainline and will improve safety by reducing merging and moving vehicle lane changing away from the high-speed traffic.

There are three closely spaced interchanges - US 441, Lyons Road, and Florida's Turnpike within the project limits. These interchanges together along the Sawgrass Expressway have three back-to-back ramps in the eastbound direction and six back-to-back ramps in the westbound direction. Today, congestion at the interchanges impacts the speed and operations of the Sawgrass Expressway mainline.

In the eastbound direction, the proposed collector distributor roadway system will combine the exits to US 441 and Lyons Rd into one exit, reducing the number of ramps from three to one. In the westbound direction, the existing collector distributor roadway system will be extended west to serve Lyons Road and US 441, reducing the number of ramps from six to three. If you are traveling on Florida's Turnpike and your destination is Lyons Road or US 441, you will exit the corridor and continue along the westbound collector distributor roadway system without entering the Sawgrass Expressway mainline. Proper signage will direct drivers to their desired destination.

US 441 – Both alternatives propose two new bridge structures over US 441 for the eastbound and westbound collector distributor roadway systems. Both alternatives are also proposing intersection improvements at the ramp terminals and at the adjacent signalized intersections, Winston Park Boulevard to the south and Regency Lakes Boulevard to the north. At the ramp terminals the improvements are to extend the left-tun storage to enter the Sawgrass Expressway in both directions. At Winston Park Boulevard, the improvements are to add a second left-turn lane eastbound and westbound. At Regency Lakes Boulevard, the improvement is to add a second left-turn lane southbound.

Lyons Road – Both alternatives propose two new bridge structures over Lyons Road for the eastbound and westbound collector distributor roadway systems. Today, to enter the Sawgrass Expressway from Lyons Road, left-turning vehicles cross opposing traffic. Both alternatives propose to eliminate this condition by reconfiguring the interchange to a diamond interchange plus additional turn lanes at the ramp terminals. Both alternatives are also proposing intersection improvements at the adjacent signalized intersections, Winston Park Boulevard to the south and Serko Boulevard to the north. At Winston Park Boulevard, the improvements are to add a second left-turn lane southbound and northbound and a through-left-shared lane eastbound and westbound. At Serko Boulevard, the improvements are to add a second left-turn lane southbound, northbound, eastbound, and westbound. Another proposed improvement is to extend the existing bike lanes north to the Serko Boulevard intersection. This improvement will provide full multimodal connectivity under the Sawgrass Expressway and a safer route for bicyclists enhancing the mobility within the corridor.

Another proposed improvement at the interchange is the addition of a Texas U-turn. The Texas U-turn will be located on the east side of the interchange and will remove u-turning traffic from the Lyons Road intersections. Today, there is no direct connection between SW 10th Street and Florida's Turnpike. Drivers must instead drive west and perform a U-turn at the Lyons Road interchange. The Texas U-Turn maneuver is proposed to happen before the Lyons Road intersection, under the overpass bridge. This will remove u-turning vehicles from the two Lyons Road intersections and from interacting with pedestrian and bicycle traffic.

Florida's Turnpike Interchange – Both alternatives propose to widen and improve the existing ramps. Some of these improvements include:

- Eliminating the northbound weaving section between the two loop ramps.
- Eastbound to northbound loop ramp widening to two lanes.
- Adding a southbound to westbound direct connection to the Sawgrass Expressway westbound lanes.
- Northbound to westbound loop ramp widening to two lanes.
- Eastbound to southbound ramp widening to two lanes.

Alternative 1 proposes to add four direct connection ramps between SW 10th Street and Florida's Turnpike. The proposed four new direct connections are:

1. Florida's Turnpike southbound to SW 10th Street eastbound
2. SW 10th Street westbound to Florida's Turnpike northbound
3. Florida's Turnpike northbound to SW 10th Street Connector eastbound

4. SW 10th Street Connector westbound to Florida's Turnpike southbound

Alternative 2 proposes to add six direct connection ramps between SW 10th Street and Florida's Turnpike. Alternative 2 proposes to construct the same four direct connections from Alternative 1, plus two additional direct connections. The proposed six new direct connections are:

1. Florida's Turnpike southbound to SW 10th Street eastbound
2. SW 10th Street westbound to Florida's Turnpike northbound
3. Florida's Turnpike northbound to SW 10th Street Connector eastbound
4. SW 10th Street Connector westbound to Florida's Turnpike southbound
5. Florida's Turnpike northbound to SW 10th Street eastbound
6. SW 10th Street Connector westbound to Florida's Turnpike northbound

Florida's Turnpike – Both alternatives propose to widen the Florida's Turnpike between Wiles Road and the County Line to four travel lanes and one thru lane in each direction for a total of ten lanes, with auxiliary lanes at select locations. Thru lanes are additional travel lanes that help provide congestion relief in high traffic areas. These lanes offer customers making longer, more regional trips, the ability to bypass the local traffic entering and exiting the road. Customers pay the same amount to use the thru lanes as they do in any other lane on the toll road.

Appendix J shows the conceptual plans roll plot for both alternatives including, but not limited to, the following elements:

- Project corridor study limits
- Existing limited access right of way
- Existing right of way
- Existing bridge structures
- Proposed corridor improvements
- Proposed new/widened bridge structures
- Bridge structure modifications
- Proposed shoulder pavement
- Proposed barrier/retaining walls
- Proposed limited access right of way
- Proposed right of way
- Right of way impacts
- Median/Greenspace
- SW 10th Street corridor improvements (by FDOT D4)

Both alternatives address the purpose and need of the project.

Capacity – Additional lanes are proposed within the project limits, achieving acceptable level of service along the mainlines, interchanges and adjacent intersections.

Travel Time Reliability – The additional lanes, ramps and collector distributor roadway systems address the projected traffic demand, reduce crashes, separate traffic streams, and move traffic at higher speeds, which improves travel time reliability.

System Linkage – Both alternatives provide the needed additional lanes within the project limits to continue to provide a reliable system linkage with the Florida's Turnpike and to the east. Also, the new direct connections with SW 10th Street will improve regional connectivity.

Modal Interrelationships – The additional lanes enhance the mobility of goods by alleviating current and future congestion within the project area and surrounding freight and transit networks.

Transportation Demand – The additional lanes, ramps and collector distributor roadway systems address the transportation demand within the project limits. These improvements are consistent with the local and State transportation plans.

Social Demand and Economic Development – Social and economic demands within the project limits will continue to increase as population and employment increase. The proposed improvements will add the necessary roadway needs to improve access to the surrounding cities, which will allow the economic development to take advantage of the roadway improvements to reach the destinations of Sawgrass Expressway, Florida's Turnpike, I-95 and surrounding cities.

Evacuation Route – In the case of an evacuation event, the Sawgrass Expressway and Florida's Turnpike will have additional lanes. The additional lanes will make the corridors more effective during emergency evacuation events and emergency response.

Long Term Mobility Option – Both alternatives match the planned improvements for all the adjacent projects. The proposed corridor modifications will improve the mobility and access in and out of the three interchanges.

Environmental Considerations – The key environmental considerations included avoiding and minimizing impacts to the following features within the study limits:

1. Wetlands – There will be unavoidable impacts to wetlands. These impacts occur within the current boundaries of Quiet Waters Park.
2. Eagle's Nest within Quiet Water Park – Because the nearest active bald eagle nest is located greater than 660 feet from project activities, no additional coordination, permits, or special construction conditions are required.
3. Sensitive Noise Receptors – Noise levels were modeled at 1,269 receptor locations representing 3,660 residential and 262 special land use noise sensitive sites.
4. Historic and Archaeological Sites – No archaeological sites were identified within the Area of Potential Effect. Six shovel tests were excavated. No cultural material was recovered.
5. Special Populations – No impacts to religious facilities, schools, cemeteries, or historical sites are expected other than minor changes to access during construction.

The wetlands and eagle's nest are documented in the *Natural Resources Evaluation* report. The sensitive noise receptors are documented in the *Noise Study Report*. The historic and archaeological sites are documented in the *Cultural Resources Assessment Survey*. The special populations are documented in the *Sociocultural Evaluation Report*. These are all companion documents to the PD&E Study.

5.4.2 VALUE ENGINEERING

A Cost Risk and Value Engineering (CRAVE) Workshop was conducted on March 28, 2023 through March 30, 2023 and on April 17, 2023 through April 21, 2023. The CRAVE team developed 14 VE recommendations and presented their findings on April 21, 2023. The PD&E Study team presented their proposed resolutions to the recommendations on June 20, 2023. A summary of the recommendations and responses are documented below. VE resolutions are identified as *Yes* for accepted into the PD&E Study phase or *No* for not recommended for implementation.

VE No. 1 Utilize Turbine Interchange – Consider a Turbine Interchange Concept to separate freeway traffic from local traffic and accommodate all needed ramp movements within the interchange area. According to the VE team, the possible savings are $7,947,886.

<u>Response and Recommendation –</u> The Turbine Concept separates freeway traffic from local traffic, reduces right of way impacts and allows ramp geometry to be designed for higher design speeds. This concept improves regional connectivity by providing an interchange layout that accommodates all the missing movements to and from the east.

Due to the additional ramp movements to separate freeway traffic from local traffic, the interchange footprint increased, having ramps closer to the right of way line and closer to the surrounding neighborhoods, including SOS Children's Village. Visual impacts will be expected on all four quadrants. The new local traffic at-grade ramps will add additional intersections to the east/west corridor, which adds more conflict points to the facility. The proposed concept adds additional bridge structures with a more complex design, maintenance of traffic and construction. The concept geometry has a high number of horizontal curves creating tolling design challenges and the need for additional tolling sites not included in the VE evaluation. Also, the concept is expected to impact the SW 10th Street project to the east increasing the overall cost of the project.

No – This recommendation was not considered for implementation.

VE No. 2 Shift Gore Points – Consider moving the eastbound Sawgrass Expressway to northbound Florida's Turnpike off-ramp gore point to the east and moving the eastbound Sawgrass Expressway to eastbound connector off-ramp gore point to the west. According to the VE team, the possible savings are approximately $109,908.

<u>Response and Recommendation –</u> These two recommendations together will open space under the Florida's Turnpike bridges to optimize the design and placement of piers with uniform bridge spans, reducing the cost of the bridges.

Moving the first ramp to the east will locate the gore point immediately east of the Florida's Turnpike mainline bridge structures, which will hinder the view of the exit and accompanying signs. Moving the second ramp to the west reduces the lane change distance from the eastbound Lyons Road on-ramp to the eastbound connector off-ramp (from 4,160' to 3,660'), which creates a safety concern in an area with multiple off-ramps and decision points.

No – This recommendation was not considered for implementation.

VE No. 3 Reconfigure Northeast Quadrant of the Sawgrass Expressway/Florida's Turnpike Interchange (three recommendations) – Recommendation 3A: Move west the westbound SW 10th Street to northbound Florida's Turnpike off-ramp gore point from the westbound SW 10th Street bridge structure eliminating the proposed bridge spur.

<u>Response and Recommendation 3A –</u> Moving the gore point west will eliminate the need to design and construct the spur section, simplifying the design, construction, and maintenance of this structure. Also, eliminating the spur will reduce the overall cost of this bridge.

Moving the gore point west will impact the vertical profile having to change it to as high as 5.5% to be able to clear the Florida's Turnpike bridges to the west. Implementing this recommendation will preclude accepting VE Recommendation No. 8, which proposes to add one of the interchange missing ramp movements, SW 10th Street westbound to Florida's Turnpike southbound. Adding this new ramp and moving the gore point west occupy the same space of the NW quadrant of the interchange.

No – This recommendation was not considered for implementation.

VE Recommendation 3B – Flip the westbound connector to southbound Florida's Turnpike off-ramp with the westbound connector to northbound Florida's Turnpike off-ramp.

<u>Response and Recommendation 3B –</u> Flipping the ramps provide the opportunity to combine the westbound connector to northbound Florida's Turnpike off-ramp with the westbound SW 10th Steet to northbound Florida's Turnpike off-ramp into one bridge structure. Combining the ramps will have less impacts to the existing

loop ramp pond area. Eliminating one structure and minimizing impacts to the loop ramp pond area will reduce the overall cost of the project.

One safety concern is that flipping the ramps will not be consistent with drivers' expectancy. In this case, the driver will either exit right to go south or will exit left to go north.

No – This recommendation was not considered for implementation.

VE Recommendation 3C – Realign the westbound connector to westbound collector-distributor off-ramp from the inside to the outside. According to the VE team, the possible savings of all three recommendations combined are $3,866,914.

<u>Response and Recommendation 3C –</u> Realigning this ramp will not meet gore spacing criteria as required by FDOT/AASHTO (800' vs. 100'). This change in realignment will encroach into the Quiet Waters Park property increasing right of way impacts. Also, this realignment will have some vertical alignment challenges with not enough distance to clear under the bridge from westbound connector to southbound Florida's Turnpike.

No – This recommendation was not considered for implementation.

VE No. 4 Utilize a Pergola Structure – Build a Pergola Structure for the eastbound SW 10th Street bridge over the northbound Florida's Turnpike to westbound connector off-ramp. According to the VE team, the possible savings are $30,176.

<u>Response and Recommendation 4 –</u> The Pergola design will reduce the span length (from 205' to 142') and skew angle of the bridge.

Other refinements recently completed to the preferred alternative by the PD&E Study team reduced the span length of this bridge from 205 feet to 148 feet and reduced the skew angle. The refinements made the bridge more conventional, cost effective and smaller. Therefore, considering a Pergola Structure no longer applies.

No – This recommendation was not considered for implementation.

VE No. 5 Use Emergency Access Gates in Barrier Walls – Add Emergency Access Gates (EAG) in the concrete barrier walls between the collector-distributor systems and the mainline. According to the VE team, the possible increase in cost is $1,318,680.

Response and Recommendation 5 – This emergency feature will improve access to emergency operations, improve accident response times, help with accident mitigation, and improve travel time reliability. However, adding EAGs will increase construction, operations, and maintenance costs. Therefore, in discussions with the FTE TSM&O group and maintenance staff, it was recommended to consider, during the Design phase, evaluating barrier wall breaks with impact attenuators instead of adding EAGs.

No – This recommendation was not considered for implementation.

VE No. 6 Increase Radius of Northbound Florida's Turnpike to Eastbound SW 10th Street Ramp Terminal – Increase the radius turning right at the ramp terminal to improve operations and reduce queuing length. The VE Team did not calculate a cost for this recommendation.

Response and Recommendation 6 – Increasing the turning radius will improve operations at the signal with a higher turning speed, which will process more vehicles at the intersection.

Modifying the geometry with a larger radius at the ramp terminal introduces difficulties to see the signal from the northbound approaching tangent. The modification will create a potential stopping sight distance issue while going up to a second level ramp terminal intersection. It also decreases the tangent length between the two proposed horizontal curves approaching the ramp terminal. The ramp terminal will be operated by a two-phase signal with minimum queue. At this location, is not necessary to increase the turning speed since the design speed of SW 10th Street is only 35 mph and already has three downstream signals metering traffic going eastbound.

No – This recommendation was not considered for implementation.

VE No. 7 Provide a Direct Southbound Florida's Turnpike to Eastbound Connector Movement – Add a new southbound Florida's Turnpike to eastbound connector ramp movement to the interchange. According to the VE team, the possible increase in cost is $2,940,769.

Response and Recommendation 7 – Due to the low volume of this movement, it is currently being proposed to happen at the Lyons Road Interchange by adding a Texas U-Turn to complete the movement. Adding this ramp to the Florida's Turnpike Interchange will eliminate the need of proposing a Texas U-Turn at Lyons Road (in combination with VE No. 8), improving regional connectivity by having all the ramps at one interchange. This new ramp will address the Coconut Creek request of eliminating the Texas U-turn from this project.

Yes – This recommendation was considered for implementation.

VE No. 8 Provide a Direct Westbound SW 10th Street to Southbound Florida's Turnpike Movement – Add a new westbound SW 10th Street to southbound Florida's Turnpike movement to the interchange. According to the VE team, the possible increase in cost is $610,752.

Response and Recommendation 8 – Due to the low volume of this movement, it is currently being proposed to happen at the Lyons Road Interchange by adding a Texas U-Turn to complete the movement. Adding this ramp to the Florida's Turnpike Interchange will eliminate the need of proposing a Texas U-Turn at Lyons Road (in combination with VE No. 7), improving regional connectivity by having all the ramps at one interchange. This new ramp will address the Coconut Creek request of eliminating the Texas U-turn from this project.

Yes – This recommendation was considered for implementation.

VE No. 9 Design Flyover Bridges into Two Lanes – Design and construct four of the single lane flyover bridge ramps as two lanes to accommodate increases in future traffic demand beyond the design year traffic volumes. According to the VE team, the possible increase in cost is $20,083,655.

Response and Recommendation 9 – Constructing these bridges as two lanes now will provide minimal future reconstruction and/or redesign after this project is in place. It will improve flexibility to accommodate future traffic demands.

The new two-lane bridges will require special pavement markings delineating wider shoulders than required by design standards. These wider shoulders may create a safety issue with vehicles potentially using these wide shoulders as passing lanes and/or creating an environment for higher speeds. These bigger structures will also increase the project cost and maintenance efforts. These ramps as one lane, will continue to have between 19-82% estimated capacity left by the design year. Future widening of these ramps to two lanes approaching these proposed two-lane bridge structures, beyond the design year, will require additional right of way impacts from Quiet Waters Park, except for Bridge 1. Bridge 1 also is the ramp that has the least estimated capacity left by the design year.

Yes – Recommendation for Bridge 1 was considered for implementation.
No – Recommendation for Bridges 2, 3 and 4 was not considered for implementation.

VE No. 10 Convert Dry Ponds to Wet Ponds – Convert some of the dry detention ponds and swales to wet detention ponds. According to the VE team, the possible increase in cost is $283,759.

Response and Recommendation 10 – Converting these ponds and swales to wet detention ponds will improve capacity, water quality, and will provide aesthetic opportunities.

Increase in storage is offset by the increase in runoff generated by wet ponds as they become impervious area as opposed to a pervious surface. The gain in storage is also offset by the required increase in treatment volume necessary by the SFWMD design requirements. Dry ponds are typically linear systems which do not allow for sufficient excavation depth to limit vegetation growth. Shallow linear ponds typically fill up with wetland vegetation, which increases maintenance.

No – This recommendation was not considered for implementation.

VE No. 11 Optimize Tolling Locations – Reevaluate four tolling locations (2, 3, 6 & 7) to improve the constructability and reduce the construction cost. The VE Team did not calculate a cost for this recommendation.

Response and Recommendation 11 (Location 2) – Moving this toll site location to the east will be too close to the US 441 intersection (approximately 200'). The proposed VE location will have a greater grade separation between the ramp and the mainline, which will require a taller retaining wall between the toll equipment building and the mainline. It will also require additional construction costs for an additional toll equipment building since co-location with the proposed mainline location would no longer be an option as proposed by the PD&E Study team.

Response and Recommendation 11 (Locations 3 & 6) – A median toll site and pull off locations are a deviation from the standard GTR configuration. Having pull off locations to and from the median is a safety concern. A deviation from the GTR accessible gantry and gantry electrical configuration would be needed, which will require additional equipment. Also, cable distances are longer than the GTR requirement.

Response and Recommendation 11 (Location 7) – Moving this toll site location to the east will be too close to the Lyons Road intersection. Maintenance of traffic during construction will be challenging. The new VE recommended location falls on top of an existing toll site. Therefore, the existing toll site will not be able to stay in operation during construction.

No – This recommendation was not considered for implementation.

VE No. 12 Build Wall at U-Turn at Lyons Road – Build a concrete noise wall on top of the median traffic railing in between the sidewalk and the adjacent Texas U-Turn. According to the VE team, the possible savings are $18,041,192.

Response and Recommendation 12 – Adding the concrete noise wall to the adjacent Texas U-turn concept will improve pedestrian comfort and will reduce overall project cost and constructability when compared against the separated Texas U-turn concept.

The proposed wall location will create safety concerns with homeless people using this area under the bridge as shelter. It will also create additional maintenance efforts for lighting and the wall itself. This wall would also create possible opposition from Coconut Creek, which is opposed to the Texas U-turn concept within the Lyons Road Interchange. If VE Recommendation Nos. 7 and 8 are accepted, this recommendation will no longer apply.

No – This recommendation was not considered for implementation.

VE No. 13 Shift the Westbound Collector-Distributor bridge to the north at Lyons Road – Shift the westbound collector-distributor bridge to the north at Lyons Road to avoid the partial demolition of the westbound Sawgrass Expressway mainline bridge. According to the VE team, the possible savings are $1,609,672.

<u>Response and Recommendation 13 –</u> Shifting the bridge to the north will require a longer structure. It will also require deflections/curves to provide separation from the westbound Sawgrass Expressway bridge.

The shift will avoid the partial demolition of the existing westbound Sawgrass Expressway bridge, improving maintenance of traffic.

Yes – This recommendation was considered for implementation.

VE No. 14 Utilize Groundwater Recharge for the County – Convert dry detention ponds/swales to infiltration basins (or groundwater recharge basins) to increase the infiltration capacity of the basin as well as the recharge of groundwater. According to the VE team, the possible increase in cost is $2,071,147.

<u>Response and Recommendation 14 –</u> Converting the ponds/swales to infiltration basins will reduce runoff, reduce treatment requirements, and improve water quality.

This approach is only feasible if runoff can be conveyed to the recharge facility in a cost-effective manner, which will increase cost and maintenance efforts. This system will not work well when water table is high. As part of this project, all the runoff can we retained and treated within the existing right of way. No benefits to the project were found with this recommendation.

No – This recommendation was not considered for implementation.

5.4.3 ALTERNATIVE 3

FTE received feedback from local agencies, stakeholders, and the public after conducting the Alternatives Public Information Meeting. Several follow-up meetings occurred with local agencies and stakeholders to discuss the feedback provided and how they could be implemented in the PD&E Study. Addressing the feedback from local agencies and stakeholders ended with refinements to the build alternatives. These refinements, together with the recommendations from the VE team, created an additional alternative to be considered in the PD&E Study, Alternative 3.

Alternative 3 maintains the same conceptual design as Alternatives 1 and 2 but with some enhancements to the geometry and alignment at the three interchanges. The Sawgrass Expressway and Florida's Turnpike proposed mainline and collector distributor roadway system improvements continue to be the same as in Alternatives 1 and 2. Below is the summary of the refinements that make up for Alternative 3:

US 441 Interchange – Redesign the Sawgrass Expressway center median east and west of the interchange with a closed median with barrier wall design instead of an open grassed median with guardrail design. The redesign widens the eastbound lanes to the inside to close the median, which provides the opportunity for the new eastbound collector distributor roadway system to share the same bridge as the eastbound mainline lanes. This eliminates the need to construct a new bridge structure for the eastbound collector distributor roadway. It also avoids impacting the existing eastbound off-ramp to southbound US 441 toll site. The redesign also locates the corridor improvements further away from the south right of way line.

Lyons Road – The proposed interchange reconfiguration no longer needs a Texas U-turn. Removing the Texas U-turn reduced the overall footprint of the interchange. The eastbound off-ramp to Florida's Turnpike southbound was realigned to be parallel to the Sawgrass Expressway eastbound mainline bridge, reducing the length of the bridge ramp. This ramp is now further away from the existing south right of way, reducing visual impacts from the adjacent properties.

Florida's Turnpike – Two additional new ramp connections were added to the interchange to complete all the missing movements to and from SW10th Street. The two additional ramp connections are:

6. Florida's Turnpike southbound to SW 10th Street Connector eastbound
7. SW 10th Street westbound to Florida's Turnpike southbound

These new ramp connections eliminate the need for the Texas U-Turn at Lyons Road and improves regional connectivity and mobility by having direct connections at this interchange.

The new Florida's Turnpike northbound to SW 10th Street Connector eastbound ramp alignment was modified from being at a third level to a first level/at-grade. This modification reduced the footprint of the east side of the Florida's Turnpike interchange, reducing adjacent visual impacts and impacts to Quiet Waters Park.

The new SW 10th Street Connector westbound to Florida's Turnpike northbound ramp is now elevated over the existing loop ramp in the NE quadrant of the interchange. Moving the ramp to the west reduces impacts to Quiet Water Park.

Figure 5.18 depicts the Alternative 3 modifications.

Summary – Alternatives 1, 2 and 3 propose the same improvements along the Sawgrass Expressway and Florida's Turnpike. The only difference is that Alternative 3 enhancements the geometry and alignment at the three interchanges and addresses the feedback and concerns from the local agencies, stakeholders, and the public. Therefore, Alternative 3 is recommended to move forward as the Build Alternative to be analyzed further as part of this study.

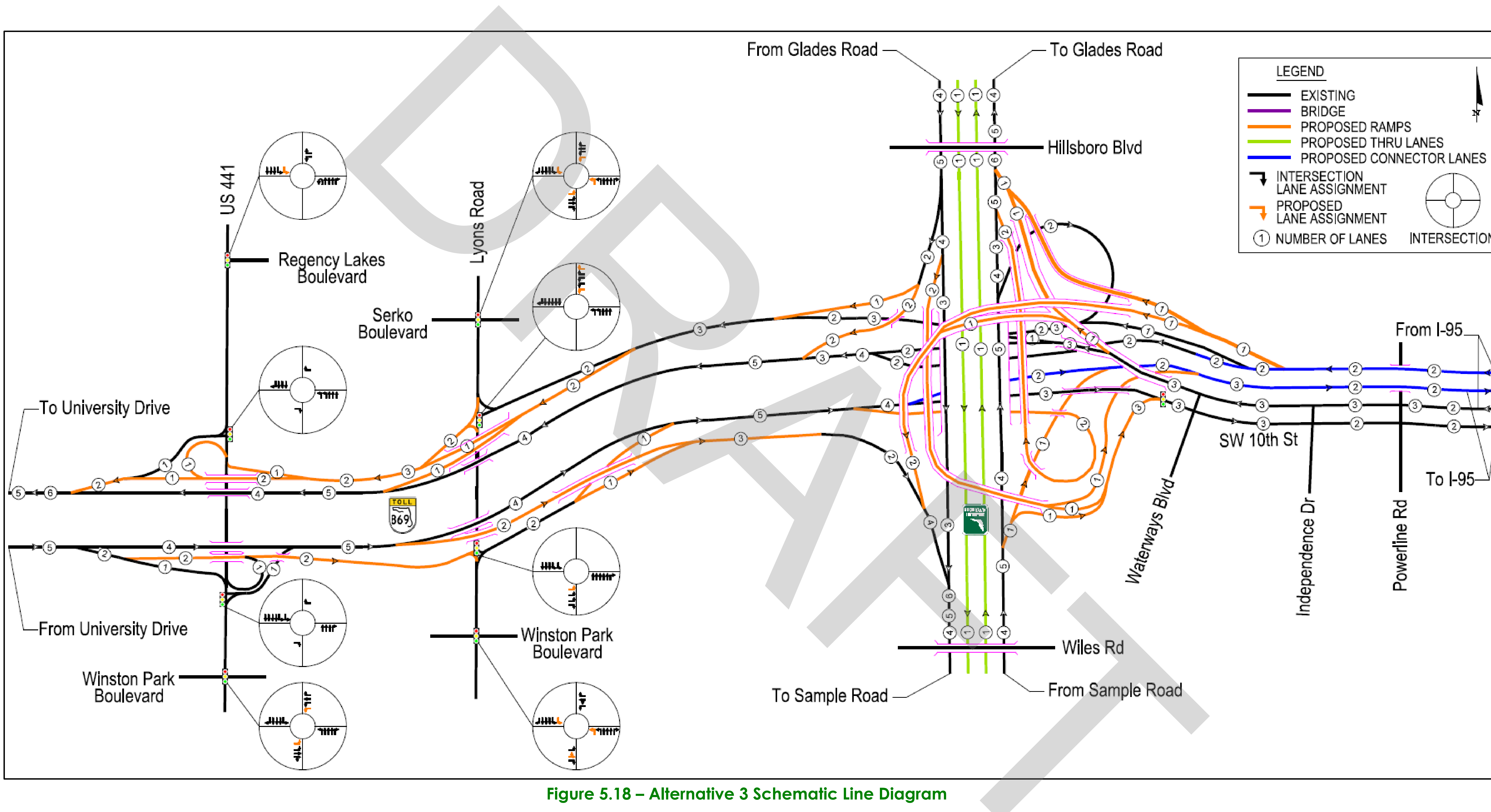


Figure 5.18 – Alternative 3 Schematic Line Diagram

Vissim Operational Analysis Results for intersections

An intersection analysis for ramp terminals and adjacent intersections was performed using Vissim to determine the LOS and delay time. The results summaries are presented in ***Table 5.3***.

Table 5.3 – 2045 Build Peak Hours Vissim Intersection Level of Service and Delay (s/veh)

Arterial	Intersection	2045 Build			
		AM		AM	
		LOS	Delay	LOS	Delay
Sample Road	Turnpike Ramps	F	134	F	209
Glades Road	Turnpike Ramps	F	319	F	277
SR 7/US 441	Winston Park Boulevard	F	86	F	85
	Sawgrass Expy (SR 869) EB Ramps	C	32	E	68
	Sawgrass Expy (SR 869) WB Ramps	F	91	E	57
	Regency Lake Boulevard	F	197	E	56
Lyons Road	Winston Park Boulevard	F	153	E	74
	Sawgrass Expy (SR 869) EB Ramps	C	32	B	16
	Sawgrass Expy (SR 869) WB Ramps	E	60	C	22
	Serko Boulevard	E	61	F	105
SW 10th Street	Waterways Boulevard	A	10	B	16
	Independence Drive	B	19	A	8
	Powerline Road	E	63	F	204

2045 Build Intersection Analysis – In Build conditions, the traffic operations improved over No-Build due to capacity improvements at ramp roadways, new ramp connections and C-D roads. As shown in ***Table 5.3***, Turnpike ramp terminals will operate at lower delays compared to No-Build. Sawgrass (SR 869) ramp terminals at SR 7/US 441 and Lyons Road will operate within the capacity, except the west Sawgrass ramp terminal at SR 7/US 441 at the AM peak hour. The SW 10th Street intersection with Waterway Boulevard and Independence Drive will operate at an acceptable LOS.

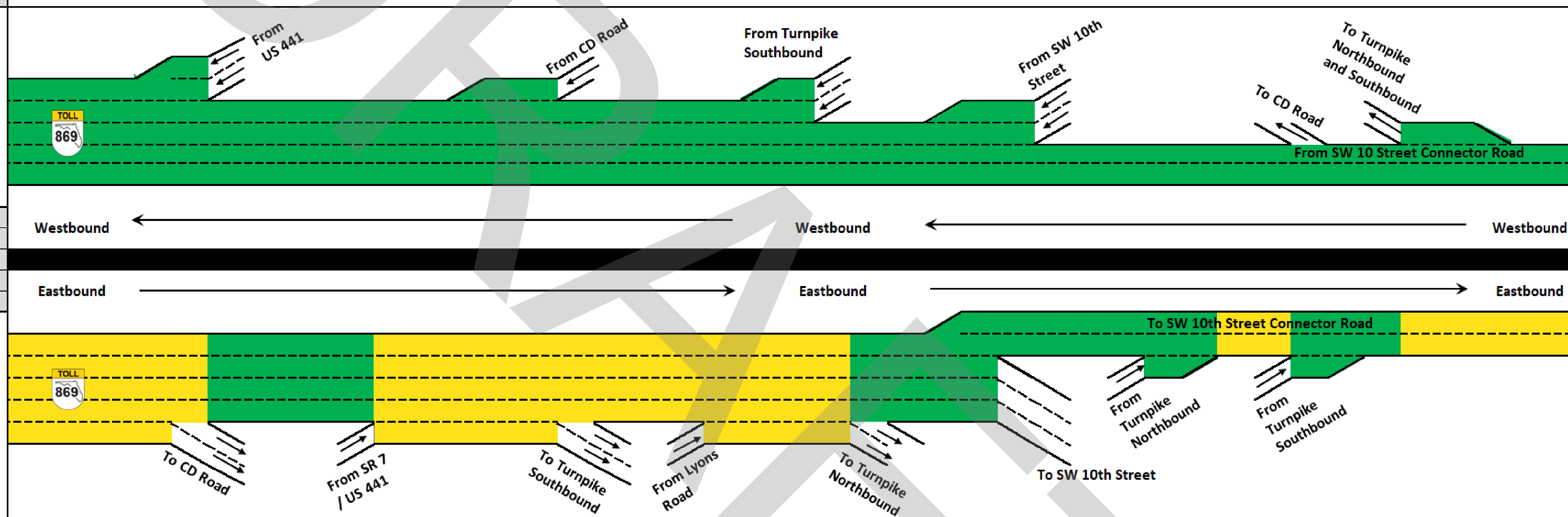
Overall, the intersections evaluations shows that intersections and ramp terminals within the study area will have lower delay times in the Build alternative for both the AM and PM peak periods.

Vissim Operational Analysis Results for mainline segments

2045 Build Analysis – In Build conditions, the traffic operations improved over No-Build due to capacity improvements at ramp roadways, new ramp connections and C-D Road. According to ***Figure 5.19*** and ***Figure 5.20***, Sawgrass (SR 869), CD Road, and Florida's Turnpike freeway segments will operate within the capacity by the year 2045 in the study area. The only exceptions are Glades Roads off-ramp diverge segments which will operate at LOS F.

Overall, the mainline freeway segments evaluation shows that the Build alternative performs better than the No-Build conditions with improved travel speeds and LOS. The improvement in travel speeds is because of the introduction of the C-D road system which expands the merge-diverge distance between ramps along the Sawgrass Expressway/SR 869 mainline and widening the Turnpike mainline and Sawgrass Expressway. Furthermore, the proposed new flyover ramps from northbound and southbound Turnpike to eastbound SW 10th Street eliminates the need for making U-turns at Lyons Road thereby improving the freeway operations and reducing congestion within the area of influence.

Segment Type	Basic	Merge	Basic	Merge	Basic	Merge	Basic	Merge	Basic	Diverge	Diverge	Basic
Demand Volume (vph)	6,540	6,540	4,450	4,450	4,050	4,050	1,940	1,940	1,190	1,510	2,320	2,320
Processed Volume (vph)	5,839	5,748	4,226	4,212	3,846	3,844	1,889	1,921	1,196	1,516	2,312	2,317
% Demand Served	89%	88%	95%	95%	95%	95%	97%	99%	101%	100%	100%	100%
Speed (mph)	63	63	65	65	66	65	67	63	66	66	66	66
Density (pcpmpl)	21	17	18	14	16	13	11	8	10	13	13	20
Estimated LOS	C	B	B	B	B	B	B	A	A	B	B	C



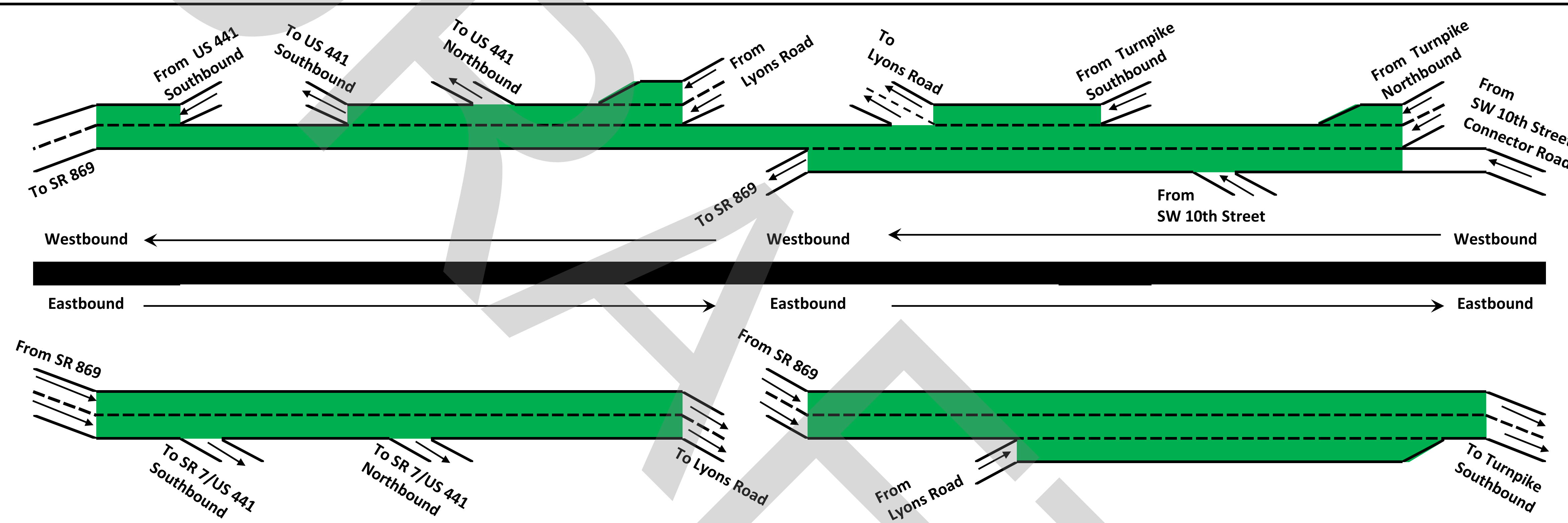
	Travel Condition
LOS C or Better	Uncongested
LOS D	Light
LOS E	Moderate
LOS F	Heavy

Segment Type	Diverge	Basic	Weave	Basic	Weave	Diverge	Basic	Merge	Basic	Merge	Basic
Demand Volume (vph)	8,540	6,270	8,280	6,750	7,100	4,090	2,200	3,390	3,390	3,620	3,620
Processed Volume (vph)	8,383	6,140	7,588	6,195	6,508	3,711	2,021	3,180	3,169	3,372	3,397
% Demand Served	98%	98%	92%	92%	92%	91%	92%	94%	93%	93%	94%
Speed (mph)	63	65	62	59	54	55	56	57	61	62	63
Density (pcpmpl)	29	26	27	29	27	19	20	20	29	20	30
Estimated LOS	D	C	D	D	D	B	B	C	D	C	D

Figure 5.19 – 2045 AM Build Peak Hour Vissim Sawgrass Expressway Freeway Segment Performance

Segment Type	Basic	Basic	Basic	Basic	Basic	Basic	Weave	Basic	Basic	Basic
Demand Volume (vph)	2,090	670	1,380	1,780	640	1,040	1,970	1,680	1,510	320
Processed Volume (vph)	1,632	602	1,278	1,642	607	998	1,893	1,632	1,466	319
% Demand Served	78%	90%	93%	92%	95%	96%	96%	97%	97%	100%
Speed (mph)	60	55	55	55	56	56	51	55	49	66
Density (pcpmpl)	15	12	13	15	12	10	15	12	13	5
Estimated LOS	B	B	B	B	B	A	B	B	B	A

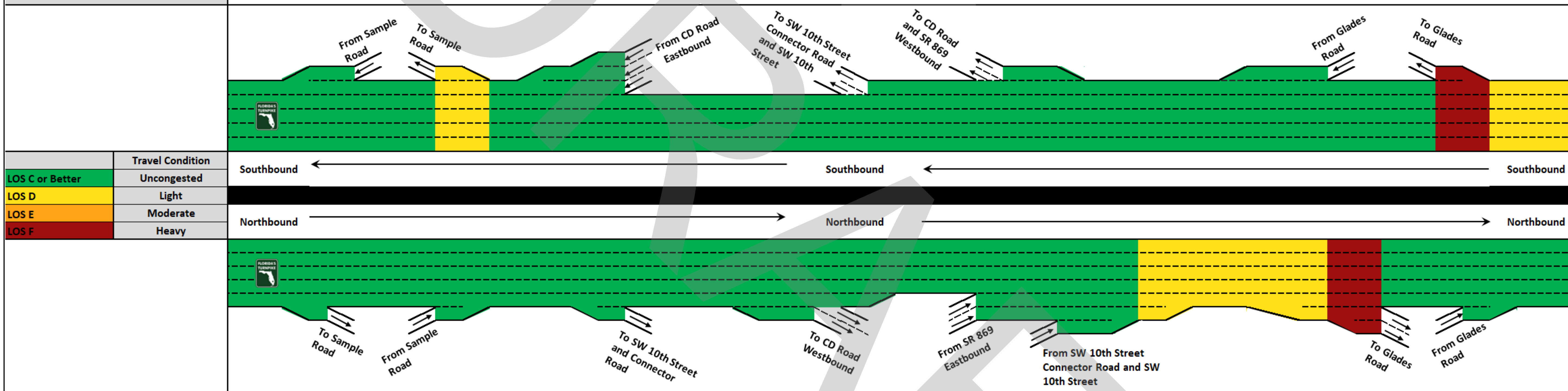
	Travel Condition
LOS C or Better	Uncongested
LOS D	Light
LOS E	Moderate
LOS F	Heavy



Segment Type	Basic	Basic	Basic	Basic	Basic
Demand Volume (vph)	2,270	1,850	1,070	1,530	2,390
Processed Volume (vph)	2,208	1,795	1,035	1,390	2,137
% Demand Served	97%	97%	97%	91%	89%
Speed (mph)	54	55	55	65	66
Density (pcpmpl)	23	18	10	12	12
Estimated LOS	C	B	A	B	B

Figure 5.19 – 2045 AM Build Peak Hour Vissim CD Road Freeway Segment Performance (Continued)

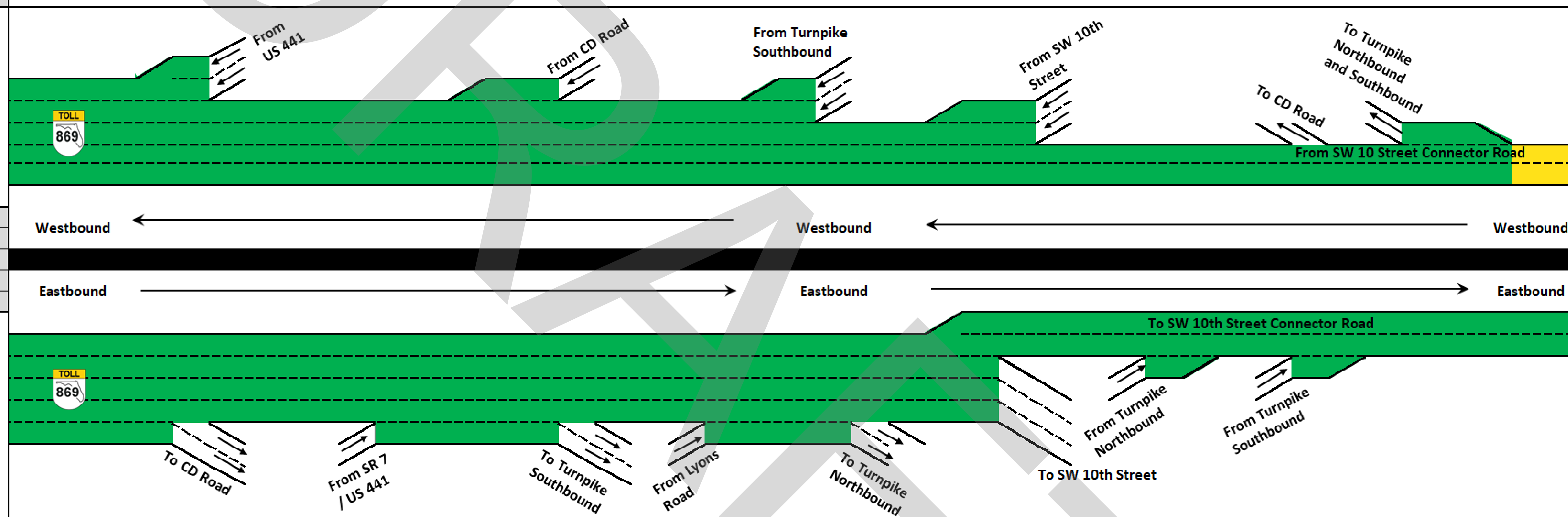
Segment Type	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Diverge	Basic	Merge	Basic	Diverge	Basic
Demand Volume (vph)	8,170	8,170	7,030	8,100	8,100	8,100	4,660	5,930	8,330	8,330	8,330	6,930	8,170	8,170
Processed Volume (vph)	7,417	7,399	6,446	7,393	7,452	7,404	4,296	5,402	7,618	7,625	7,572	6,529	7,627	8,128
% Demand Served	91%	91%	92%	91%	92%	91%	92%	91%	91%	92%	91%	94%	93%	99%
Speed (mph)	70	67	69	54	66	69	71	69	69	69	67	62	19	63
Density (pcpmpl)	24	20	21	32	25	17	17	17	21	25	21	24	75	30
Estimated LOS	C	B	C	D	C	B	B	B	C	C	C	C	F	D



Segment Type	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Diverge	Basic	Merge	Merge	Basic	Diverge	Basic	Merge	Basic
Demand Volume (vph)	7,090	7,090	5,560	6,360	6,360	6,360	4,530	4,530	3,340	6,350	7,020	7,020	7,020	4,550	5,380	5,380
Processed Volume (vph)	7,076	7,028	5,542	6,185	6,208	6,165	4,411	4,363	3,247	5,970	6,655	6,639	5,867	3,949	4,577	4,608
% Demand Served	100%	99%	100%	97%	98%	97%	97%	96%	97%	94%	95%	95%	84%	87%	85%	86%
Speed (mph)	68	64	70	70	69	58	71	71	71	71	71	46	16	69	70	71
Density (pcpmpl)	23	21	18	16	20	21	14	12	11	16	15	33	72	13	12	15
Estimated LOS	C	C	B	B	C	C	B	B	A	B	B	D	F	B	B	B

Figure 5.19 – 2045 AM Build Peak Hour Vissim Florida's Turnpike Freeway Segment Performance (Continued)

Segment Type	Basic	Merge	Basic	Merge	Basic	Merge	Basic	Merge	Basic	Diverge	Diverge	Basic
Demand Volume (vph)	8,670	8,670	6,960	6,960	6,030	6,030	3,530	3,530	1,980	2,200	3,620	3,620
Processed Volume (vph)	7,815	7,687	6,252	6,238	5,370	5,365	3,115	3,166	1,959	2,186	3,598	3,616
% Demand Served	90%	89%	90%	90%	89%	89%	88%	90%	99%	99%	99%	100%
Speed (mph)	61	62	62	63	65	64	66	61	66	66	64	64
Density (pcpmpl)	28	23	28	22	23	19	18	14	16	18	21	32
Estimated LOS	C	C	C	C	C	C	B	B	B	B	C	D



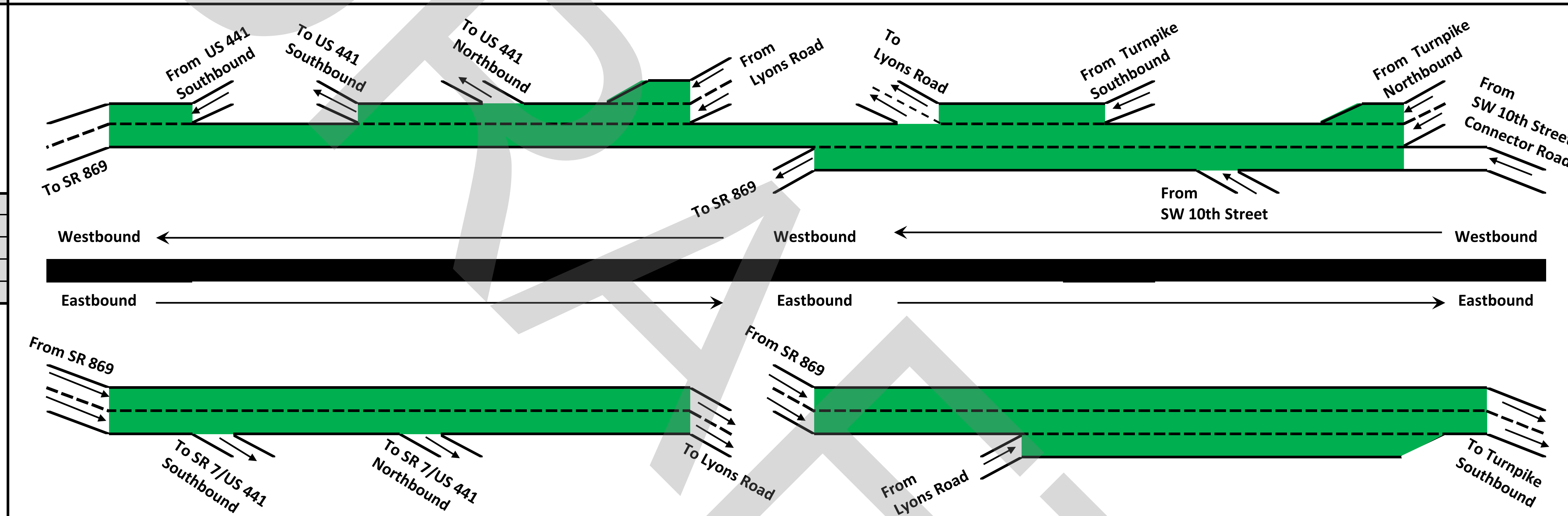
	Travel Condition
LOS C or Better	Uncongested
LOS D	Light
LOS E	Moderate
LOS F	Heavy

Segment Type	Diverge	Basic	Weave	Basic	Weave	Diverge	Basic	Merge	Basic	Merge	Basic
Demand Volume (vph)	6,890	4,330	5,240	4,610	4,780	2,340	1,510	2,190	2,190	2,320	2,320
Processed Volume (vph)	6,812	4,279	5,119	4,494	4,657	2,262	1,468	2,115	2,108	2,212	2,231
% Demand Served	99%	99%	98%	97%	97%	97%	97%	97%	96%	95%	96%
Speed (mph)	64	66	65	61	55	56	57	61	65	65	65
Density (pcpmpl)	24	18	17	20	19	11	14	13	18	13	19
Estimated LOS	C	B	C	B	C	B	B	B	B	B	B

Figure 5.20 – 2045 PM Build Peak Hour Vissim Sawgrass Expressway Freeway Segment Performance

Segment Type	Basic	Basic	Basic	Basic	Basic	Basic	Weave	Basic	Basic	Basic
Demand Volume (vph)	1,710	510	1,520	2,120	1,050	1,980	3,100	2,830	2,410	220
Processed Volume (vph)	1,581	430	1,338	1,884	934	1,842	2,856	2,623	2,316	227
% Demand Served	92%	84%	88%	89%	89%	93%	92%	93%	96%	103%
Speed (mph)	61	55	34	53	55	54	56	53	45	66
Density (pcpmpl)	14	9	28	17	19	19	19	20	23	4
Estimated LOS	B	A	C	B	B	B	B	B	C	A

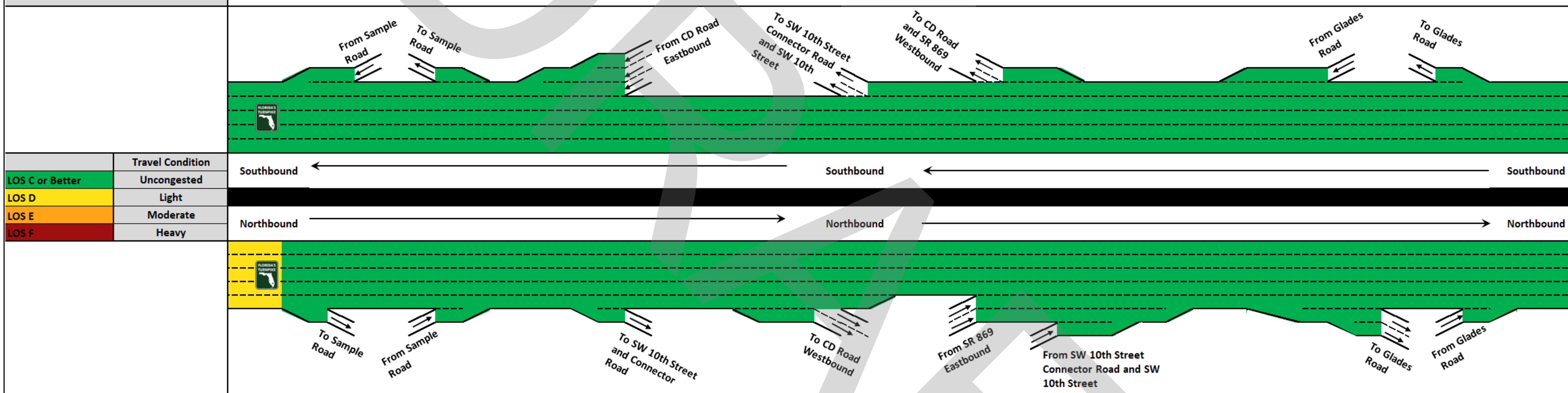
	Travel Condition
LOS C or Better	Uncongested
LOS D	Light
LOS E	Moderate
LOS F	Heavy



Segment Type	Basic	Basic	Basic	Basic	Basic
Demand Volume (vph)	2,560	2,070	1,140	630	1,300
Processed Volume (vph)	2,510	2,024	1,118	621	1,204
% Demand Served	98%	98%	98%	99%	93%
Speed (mph)	55	55	56	67	66
Density (pcpmpl)	26	20	11	5	7
Estimated LOS	C	C	A	A	A

Figure 5.20 – 2045 PM Build Peak Hour Vissim CD Road Freeway Segment Performance (Continued)

Segment Type	Basic	Merge	Basic	Diverge	Basic	Merge	Basic	Diverge	Diverge	Basic	Merge	Basic	Diverge	Basic
Demand Volume (vph)	7,390	7,390	5,860	6,660	6,660	6,660	3,530	4,200	6,970	6,970	6,970	4,500	5,330	5,330
Processed Volume (vph)	6,417	6,419	5,293	6,008	6,029	5,970	3,139	3,679	6,127	6,156	6,145	4,467	5,291	5,316
% Demand Served	87%	87%	90%	90%	91%	90%	89%	88%	88%	88%	88%	99%	99%	100%
Speed (mph)	70	68	71	68	70	70	71	71	70	70	67	71	69	71
Density (pcpmpl)	20	18	17	17	18	14	12	12	16	20	17	14	14	17
Estimated LOS	B	B	B	B	B	B	B	B	B	C	B	B	B	B



Segment Type	Basic	Diverge	Basic	Merge	Basic	Diverge	Basic	Diverge	Basic	Merge	Merge	Basic	Diverge	Basic	Merge	Basic
Demand Volume (vph)	8,100	8,100	6,960	8,030	8,030	8,030	6,980	6,980	4,790	7,230	8,500	8,500	8,500	7,100	8,340	8,340
Processed Volume (vph)	8,082	8,038	6,939	7,670	7,697	7,642	6,680	6,611	4,573	6,902	7,984	7,984	7,933	6,638	7,468	7,474
% Demand Served	100%	99%	100%	96%	96%	95%	96%	95%	95%	95%	94%	94%	93%	93%	90%	90%
Speed (mph)	67	64	68	70	69	69	69	69	70	71	70	69	61	69	69	70
Density (pcpmpl)	27	24	23	21	25	21	22	18	16	18	18	25	26	22	20	24
Estimated LOS	D	C	C	C	C	C	C	B	B	B	B	C	C	C	C	C

Figure 5.20 – 2045 PM Build Peak Hour Vissim Florida's Turnpike Freeway Segment Performance (Continued)

5.5 COMPARATIVE ALTERNATIVES EVALUATION

Evaluation of transportation projects to select the most desirable alternative is often based on a wide range of performance criteria that reflect the concerns of all the key stakeholders. The No-Build Alternative and Build Alternative (Alternative 3) were evaluated based on a selected criterion of variables and parameters.

The evaluation methodology used in this study involves a combination of both comparative qualitative and quantitative analyses to determine the preferred alternative. The evaluation matrix is presented in ***Table 5.4***.

The TSM&O Alternative would provide some short-term relief throughout the corridor. However, the TSM&O Alternative alone would not be consistent with the purpose and need of this project. TSM&O improvements are only viable in combination with the build alternative improvements. Therefore, a TSM&O Alternative was not evaluated in this PD&E Study.

A VE Study was performed. The accepted VE recommendations are included in the proposed Build Alternative.

Details about the environmental analyses and results are documented in the *State Environmental Impact Report (SEIR)* and supporting environmental documents, all companion documents to this PD&E Study.

Table 5.4 – Evaluation Matrix

Evaluation Criteria	Build Alternative	No-Build Alternative
Purpose and Need		
Meets Purpose and Need	✓	✘
Traffic Effectiveness		
Enhances safety	✓	✘
Accommodates travel demands (Year 2045)	✓	✘
Improves travel time reliability	✓	✘
Improves regional connectivity	✓	✘
Enhances Emergency Response and Evacuation	✓	✘
Potential Right-of-Way Impacts		
Right of way impacts (acres)	5.01	0
Number of parcels impacted	2	0
Natural/Cultural/Physical Environmental Effects		
Archaeological/historical sites	6	0
Public parks, recreation areas (acres)	4.88	0
Wetlands and other surface waters (acres)	0.80	0
Floodplains (acres)	48.24	0
Protected Species and habitat	Low	0
Potential Contamination Sites (medium or high)	7	0
New Noise walls	12	0
Other Factors		
Potential utility impacts	Low	0
Estimates in 2023 Present Day Costs ($ millions)		
Construction (Includes Maintenance of Traffic, Mobilization and Project Unknown)	$768	$0
Final Design	$46	$0
Construction Engineering and Inspection	$76	$0
Right of Way	$6	$0
Utilities Relocation	$93	$0
Total Costs	**$989**	**$0**

5.6 Selection of the Preferred Alternative

The Build Alternative was selected as the preferred alternative for both corridors based on the evaluation results summarized in the evaluation matrix. The Build Alternative will add the additional lanes and interchange modifications necessary to improve traffic operations, safety, transit, system linkage, regional connectivity, freight, interchange access and emergency evacuation. The Build Alternative meets the purpose and need of the project. It is the most prudent alternative when compared to the No-Build Alternative for the following reasons:

Capacity – The additional lanes and ramps proposed along both corridors will meet the future traffic demand achieving acceptable level of service along the mainlines, interchanges and adjacent intersections.

Travel Time Reliability – The additional lanes, ramps and collector distributor roadway systems address the projected traffic demand, reduce crashes, separate traffic streams, and move traffic at higher speeds, which improves travel time reliability.

System Linkage – The additional lanes and ramps will provide a reliable system linkage with the Florida's Turnpike and a seamless connection with SW 10th Street and I-95 to the east.

Modal Interrelationships – The additional lanes and ramps enhance the mobility of goods by alleviating current and future congestion within the project area, surrounding freight and transit networks.

Transportation Demand – The additional lanes, ramps and collector distributor roadway systems address the transportation demand within the project limits. These improvements are consistent with the local and State transportation plans.

Social Demand and Economic Development – The proposed improvements will add the necessary roadway needs to improve access to the surrounding cities, which will allow the economic development to take advantage of the roadway improvements to reach the destinations of Sawgrass Expressway, Florida's Turnpike, I-95, and surrounding cities.

Evacuation Route – In the case of an evacuation event, the Sawgrass Expressway and Florida's Turnpike will have additional lanes. The additional lanes will make the corridors more effective during emergency evacuation events and emergency response.

Long Term Mobility Option – The proposed corridor modifications will improve the mobility and access in and out of the three interchanges.

Regional Network Connectivity – The new direct connections with SW 10th Street will improve regional connectivity, which is consistent with the FDOT/FTE vision of having a series of direct ramps connecting Sawgrass Expressway, Florida's Turnpike, and I-95.

Transit Envelope – The additional lanes and ramps will provide opportunities for transit expansions within the study area.

Safety – Florida's Turnpike improvements will be able to separate long trips from short trips with the use of the thru lanes. Separating traffic from the general travel lanes will alleviate traffic congestion approaching the interchanges, reduce weaving maneuvers within interchange segments and maximize throughput along the corridor. The Sawgrass Expressway collector distributor roadway systems and interchange modifications are anticipated to reduce crashes related to heavy congestion, weaving maneuvers, speed differentials and interchange access.

Based on the evaluation conducted and documented in this report, it is clear that the Build Alternative will meet the purpose and need of the project and the overall project objectives of this PD&E Study.

6.0 PROJECT COORDINATION AND PUBLIC INVOLVEMENT

6.1 AGENCY COORDINATION

Efficient Transportation Decision Making (ETDM) comments were used to provide the Environmental Technical Advisory Team (ETAT) feedback for all PD&E environmental impact topics. ETAT comments were considered with the environmental analysis that was conducted for each alternative. The comments provided gave us preliminary insight to the perceived environmental concerns within the project area. Each comment was addressed through the analysis of the respective environmental impact topic and the results of the analysis was used to develop the alternatives to avoid and/or minimize the potential for significant environmental impacts to result from construction. In addition, if impacts were determined to be unavoidable, the ETDM comments assisted the PD&E team with analyzing potential mitigation options for any unavoidable impacts.

A Public Involvement Plan (PIP) was developed and implemented for this PD&E Study. The PIP incorporated the public involvement policies and techniques during the life of the project. The PIP outlined the public involvement approach and activities required to be undertaken with the project, including lists of the contact persons, such as citizens, private groups (residential/business), officials, agencies, stakeholders, media, and the means used to involve them in the process.

Briefings were held with the following elected officials, agencies, and stakeholders prior to the scheduled public meetings:

- FDOT D4 District Interchange Review Committee (DIRC)
- Broward Metropolitan Planning Organization (MPO)
- Broward County
- City of Coral Springs
- City of Parkland
- Broward County Parks & Recreation
- Mountain Bike Trail Group
- City of Deerfield Beach
- City of Coconut Creek
- S.O.S. Children's Villages

A PD&E Study newsletter and project exhibits were presented during these briefings.

6.2 Public Involvement

The PIP focused on the ETDM process, elected official and agency meetings, a series of public informational meetings and several community outreach techniques including a project website and project newsletters. These elements are described herein and in ***Appendix K***, Public Information Records.

Public information meetings began in the winter of 2017 and have continued throughout the study process. Exhibits and project information have been provided for public review and comment at each meeting. Exhibits and project information were also available on the project website. FDOT representatives have been available at each meeting to discuss the project and answer questions, as well as members of the consultant team.

Elected Officials/Agencies/Stakeholders Briefings – Briefings have been held with the previously listed Elected Officials/Agencies/Stakeholders prior to the Kick-Off Meetings.

Kick-Off Meetings – Both an Elected Officials/Agency and Public Kick-Off Meetings were held in November 2016 in Broward County. The purpose of these meetings was to provide the officials and the community a forum through which to learn about the improvements being studied as well as the PD&E process in general, and to provide FTE with initial concerns and areas to investigate as part of the study. Numerous exhibits and project information were provided for public review. A project newsletter describing the PD&E Study was distributed to all the attendees.

The following is a summary of the items discussed in the meeting:

- PD&E Study Process
- Project Study Area
- Needs of the Project
- No-Build Alternative Conditions
- Existing Conditions
- Adjacent Projects
- PD&E Study Milestone Schedule

The in-person Kick-off meetings were held on Tuesday, November 15, 2016, from 5:30 – 7:30 PM at the Fort Lauderdale Marriott Coral Springs Hotel located at 11775 Heron Bay Boulevard, Coral Springs, Florida 33076. A total of seven written comments were received at these meetings. Approximately 58 people attended these meetings.

The following are some of the comment topics provided at the meetings:

- Noise Walls
- Project Schedule

Elected Officials/Agencies/Stakeholders Briefings – Briefings have been held with the previously listed Elected Officials/Agencies/Stakeholders prior to the Alternatives Public Information Meeting.

Alternatives Public Information Meeting – A hybrid Alternatives Public Information Meeting was held in January 2023 in Broward County. The purpose of this meeting was to present the PD&E Build Alternatives considered within the study area. Numerous exhibits and project information were provided for review. A project newsletter with information on the PD&E Study to date was distributed to all the attendees.

The following is a summary of the items discussed in the meeting:

- PD&E Study Process
- Project Study Area
- Needs of the Project
- Existing Conditions
- No-Build Alternative Conditions
- Milestone Project Schedule
- Alternatives Considered
- Roadway Typical Sections
- Evaluation Matrix
- Environmental Features

The virtual meeting was held on Monday, January 30, 2023, from 5:30 – 7:30 PM on the GoToWebinar Platform. A total of 11 comments were received at this workshop. Approximately 65 people attended the meeting.

The in-person meeting was held on Tuesday, January 31, 2023, from 5:30 – 7:30 PM at the Fort Lauderdale Marriott Coral Springs Hotel located at 11775 Heron Bay Boulevard, Coral Springs, Florida 33076. A total of 11 written comments were received at this meeting. An additional 556 comments were received through the project website. Approximately 57 people attended the meeting.

The following are some of the comment topics provided at the meetings:

- Over 500 comments were about impacts to Quiet Waters Park
- Traffic Noise
- Visual Impacts
- Missing Interchange Movements

6.3 Public Hearing

Public Hearing – *Tentative date February 2024. This section will be completed after the Public Hearing.*

7.0 PREFERRED ALTERNATIVE

7.1 TYPICAL SECTIONS

Sawgrass Expressway – The preferred alternative proposes to widen the Sawgrass Expressway to four travel lanes in each direction with auxiliary lanes at select locations. The preferred alternative also includes collector distributor roadway systems on both sides of the corridor. The collector distributor roadway systems will separate local traffic and interchange traffic from the mainline traffic. Separating traffic patterns reduces lane changes, weaving maneuvers, speed differentials and friction along the corridor. The collector distributor roadway systems will be barrier separated from the Sawgrass Expressway mainline lanes.

Sawgrass Expressway, west of US 441, will consist of 12-foot wide travel lanes and auxiliary lanes with 15-foot wide inside shoulders, 12-foot wide outside shoulders and a 2-foot wide median barrier wall (see ***Figure 7.1***). This section is consistent with the proposed Sawgrass Expressway widening project to the west between Atlantic Boulevard and west of US 441 (FPID# 435461-1). Between US 441 and Lyons Road, the roadway section will consist of 12-foot wide travel lanes and auxiliary lanes with 15-foot wide inside shoulders, 12-foot wide outside shoulders and a 2-foot wide median barrier wall. The collector distributor roadway systems begin at US 441 and end at the Florida's Turnpike. Between US 441 and Lyons Road, the collector distributor roadway system will consist of two 12-foot wide travel lanes with varying inside and outside shoulders widths between 8-12 feet wide separated from the mainlines lanes with a 2-foot wide barrier wall (see ***Figure 7.2***).

Between Lyons Road and Florida's Turnpike, the roadway section will consist of 12-foot wide travel lanes and auxiliary lanes with varying inside and outside shoulders widths between 12-14 feet wide and a 2-foot wide median barrier wall. The collector distributor roadway system will consist of two 12-foot wide travel lanes and one auxiliary lane with varying inside and outside shoulders widths between 8-12 feet wide separated from the mainlines lanes with a 2-foot wide barrier wall (see ***Figure 7.3***).

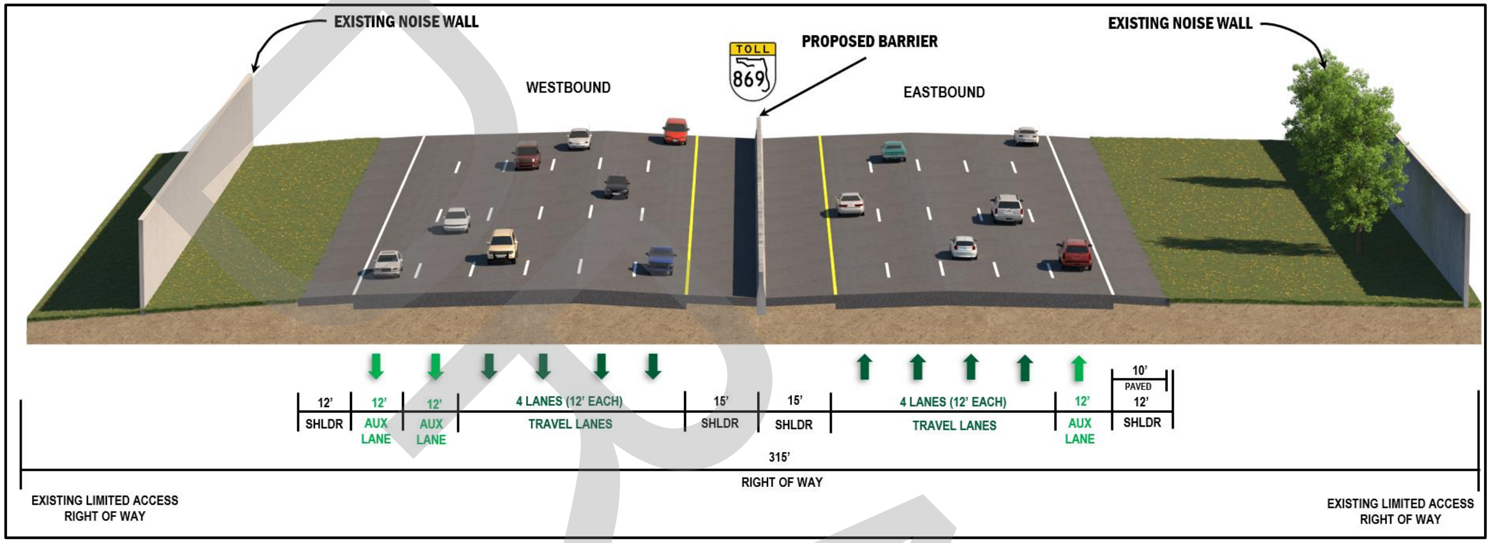


Figure 7.1 – Sawgrass Expressway Preferred Alternative Roadway Section West of US 441

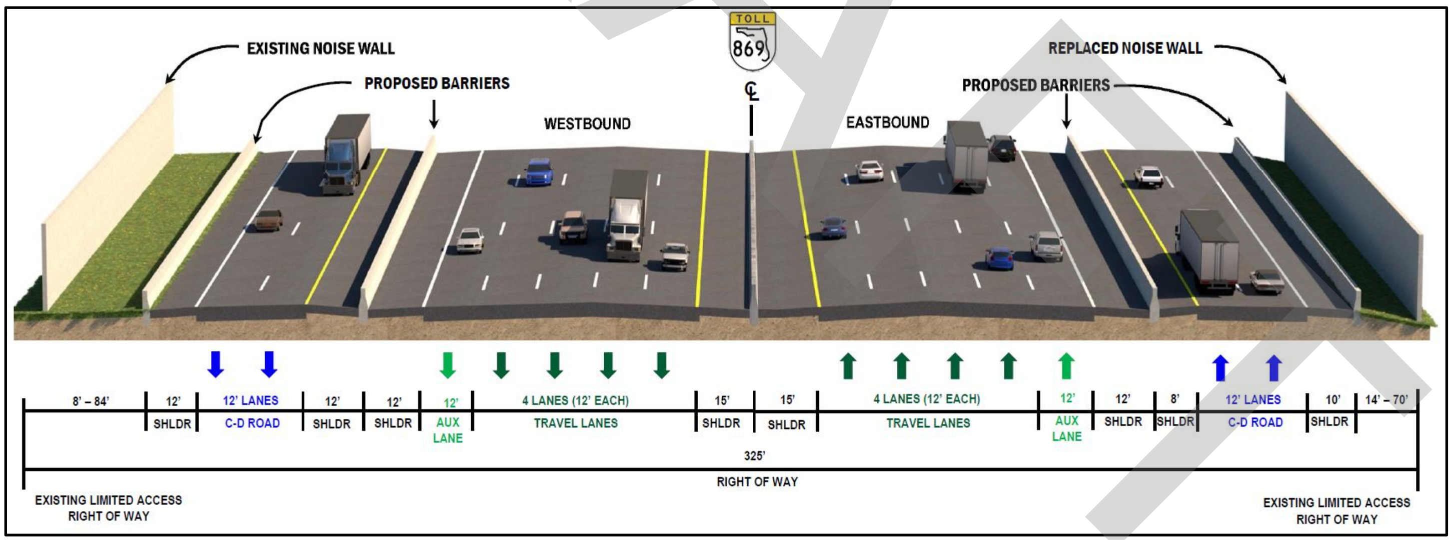


Figure 7.2 – Sawgrass Expressway Preferred Alternative Roadway Section between US 441 and Lyons Road

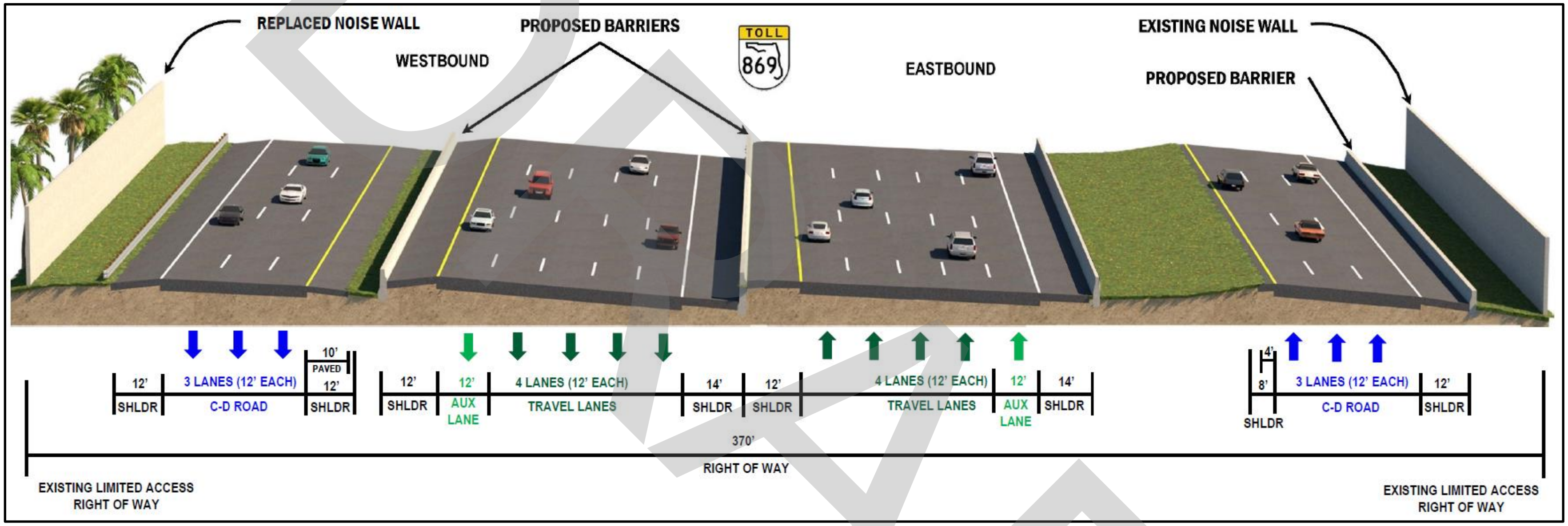


Figure 7.3 – Preferred Alternative Roadway Section between Lyons Road and Florida's Turnpike

SW 10th Street – SW 10th Street, between Florida's Turnpike and Powerline Road, will consist of two separate roadway corridors: 1) SW 10th Street and 2) SW 10th Street Connector. This roadway section overlaps with the SW 10th Street project currently underway by FDOT District Four (FPID# 439891-1). This project is proposing to add two limited access connector lanes in each direction on the north side of the existing SW 10th Street corridor between Florida's Turnpike and I-95. The FDOT project is also proposing other corridor improvements along the SW 10th Street existing corridor (see ***Figure 7.4***). Some of the major improvements within this roadway section between Florida's Turnpike and Powerline Road are listed below:

- Realign the existing SW 10th Street corridor to the south to leave space on the north side for the new connector lanes. The new south corridor alignment will consist of 11-foot wide travel lanes, auxiliary lanes and turn lanes. The corridor will also have a raised center median and a shared-use path along the south side of the roadway.
- The connector lanes will begin and end at the Sawgrass Expressway within the Florida's Turnpike Interchange and will be grade separated over Powerline Road.
- A new SW 10th Street westbound bridge structure will be constructed just east of the Florida's Turnpike to allow the new connector lanes to cross under from the north side to the inside to merge with the Sawgrass Expressway to the west.
- Intersection improvements at Waterways Boulevard, Independence Drive and Powerline Road.

All the improvements listed above are expected to be constructed and opened to traffic before the implementation of the Sawgrass Expressway project. The Sawgrass Expressway widening project will tie to the FDOT SW 10th Street project east of the Florida's Turnpike.

Florida's Turnpike – The preferred alternative proposes to widen the Florida's Turnpike between Wiles Road and the County Line to four travel lanes and one thru lane in each direction for a total of ten lanes, with auxiliary lanes at select locations (see ***Figure 7.5*** and ***Figure 7.6***). Thru lanes are additional travel lanes that help provide congestion relief in high traffic areas. These lanes offer customers making longer, more regional trips, the ability to bypass the local traffic entering and exiting the corridor. Customers pay the same amount to use the thru lanes as they do in any other lane on the toll road. All mainline lanes are 12-foot wide, shoulders vary 12-14-foot wide, and a 2-foot wide median barrier wall.

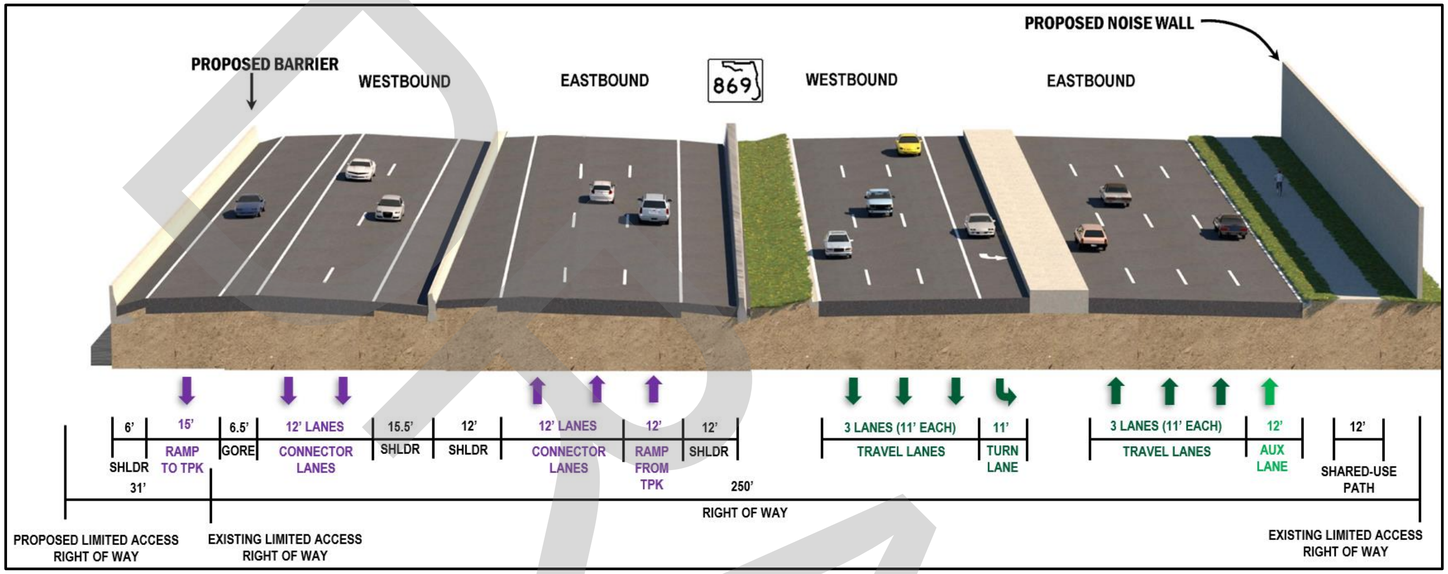


Figure 7.4 – SW 10th Street Preferred Alternative Roadway Section between Florida's Turnpike and Powerline Road

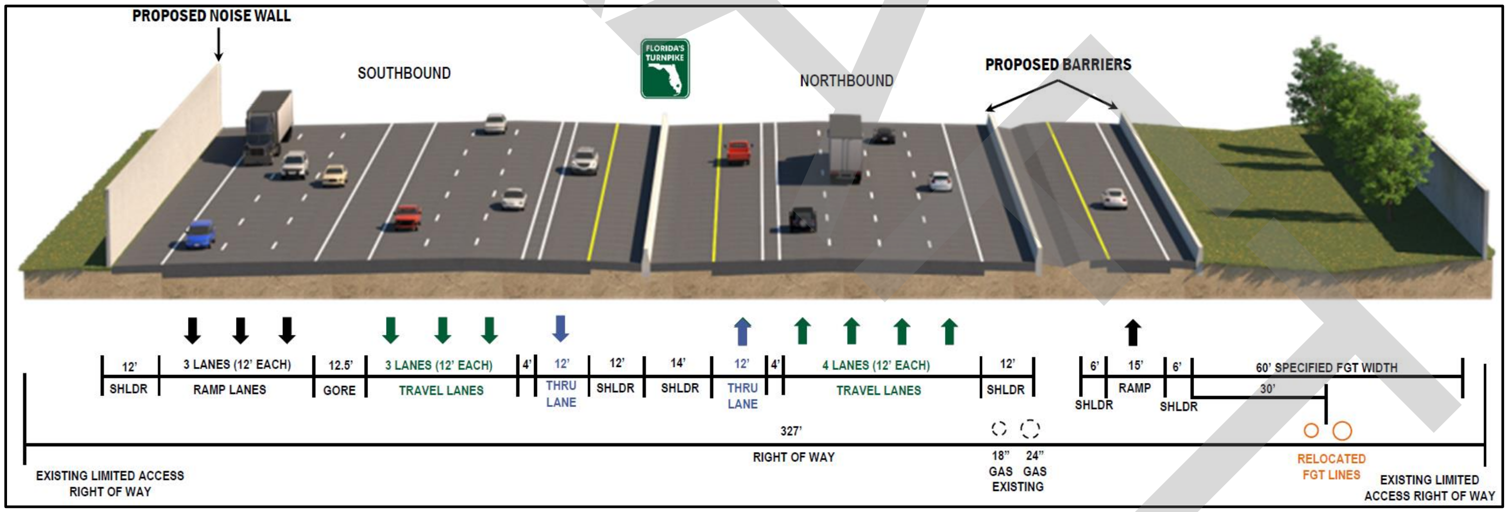


Figure 7.5 – Florida's Turnpike Preferred Alternative Roadway Section between Wiles Road and Sawgrass Expressway

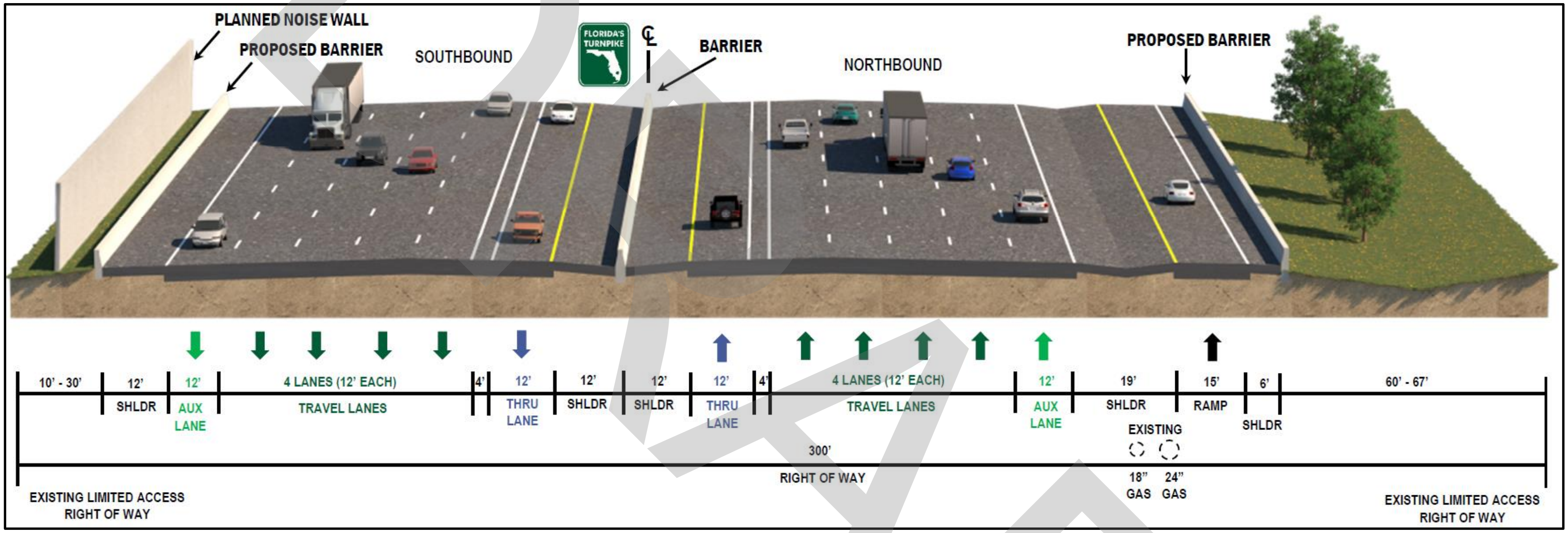


Figure 7.6 – Florida's Turnpike Preferred Alternative Roadway Section between Sawgrass Expressway and the County Line

7.2 Access Management

No access management modifications are proposed as part of the preferred alternative.

Based on the access and type, the minimum interchange spacing allowed is two miles in accordance with the *FDM, Part 2, Chapter 201, Table 201.4.1*. The interchange spacing along the corridor is not in compliance with the FDOT Access Management Guideline Rule 14.97 (see ***Table 7.1***). The project is not changing the access management classification for the corridors. Therefore, it is in compliance with 335.199, FS.

Table 7.1 – Interchange Spacing

Cross Street	Current Spacing to Next Interchange (Miles)	Complies with Interchange Spacing?
US 441 to Lyons Road	0.97	No
Lyons Road to Turnpike Interchange	1.10	No

7.3 Right of Way

The preferred alternative proposed improvements require 5.01 acres of right of way. No relocations are required. The number of parcels impacted are summarized in ***Table 7.2.***

Table 7.2 – Right of Way impacts

Type of Parcel	Partial Impact
Residential	1
Forest, Parks, Recreational areas	1
Total Parcel Impacts	2
Total Area Impact (S.F.)	218,235
Total Area Impact (Acre)	5.01
Estimated Right of Way Cost	$ 6 M

7.4 HORIZONTAL AND VERTICAL GEOMETRY

The design of the preferred alternative strives to adhere to the design standards depicted in ***Section 4.0*****.** The section below summarizes the proposed geometric changes for the proposed horizontal and vertical alignments within the study limits.

Horizontal Alignment – The preferred alternative proposes major modifications to the Sawgrass Expressway and Florida's Turnpike. Numerous new ramps, collector distributor roadway systems, interchange modifications and additional travel lanes are included in these improvements. Because of these major modifications, there are numerous new horizontal alignments along the ramps and collector distributor roadway system connections. The alignments of both corridors have been shifted to maximize the use of the existing right of way. All of the proposed alignments' horizontal curves are depicted in ***Table 7.3*****.** The table lists each curve along each proposed alignment chain and provides the design speed, curve information, super-elevation, radius, and length, and has a check to ensure that the length meets criteria specified in the FDOT *Design Manual (FDM) 2023*. Roll plot in ***Appendix L*** depicts the locations of each alignment chain. Each alignment chain contains the curves of the same name in ***Table 7.3.***

As previously described in ***Section 2.2.8*** of this report, the FDM has established "desired" and "minimum" horizontal curve length criteria. In summary, about half of the curves meet the desired length, while the others meet the minimum length. The design speed determines the rate of superelevation for each curve radius. These were calculated using the guidelines as depicted in *FDM 2023 Section 210.9*. Every curve meets radius and superelevation criteria except the mainline Sawgrass Expressway curves that pass along the existing bridges over Lyons Road (curves WB869-4 and EB869-4). The calculated superelevation for these curves is 0.054 while the existing on the bridges is 0.058. For the length of each bridge plus a short transition, a design exception will be required to avoid having to replace the bridges.

Table 7.3 – Preferred Alternative Horizontal Curve Data

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired Minimum	Length (ft) Compliance	Design (Variation/ Exception)
SB91-1	70	NC	11045+44.16	11056+01.49	11050+72.86	529	1057	34,972.00	1° 43' 56.12" (LT)	0° 09' 49.80"	2,100 1,050	✗ ✓	None
SB91-2	70	NC	11104+43.38	11114+29.43	11109+36.44	493	1051	34,449.47	1° 38' 23.92" (RT)	0° 09' 58.75"	2,100 1,050	✗ ✓	None
NB91-1	70	NC	10038+36.02	10049+08.73	10043+72.42	536	1073	35,812.00	1° 42' 58.44" (RT)	0° 09' 35.97"	2,100 1,050	✗ ✓	None
NB91-2	70	NC	10049+08.73	10059+63.70	10054+36.37	528	1055	17,528.00	3° 26' 54.55" (LT)	0° 19' 36.77"	2,100 1,050	✗ ✓	None
NB91-3	70	NC	10064+82.51	10075+57.78	10070+20.38	538	1075	14,742.00	4° 10' 44.70" (LT)	0° 23' 19.16"	2,100 1,050	✗ ✓	None
NB91-4	70	NC	10075+57.78	10086+99.61	10081+28.86	571	1142	18,972.00	3° 26' 54.09" (RT)	0° 18' 07.21"	2,100 1,050	✗ ✓	None
NB91-5	70	NC	10104+49.03	10114+32.73	10109+40.91	492	1051	34,367.47	1° 38' 23.92" (RT)	0° 10' 00.17"	2,100 1,050	✗ ✓	None
700SBEB-1	35	0.082	710+32.08	719+69.24	716+43.42	611	937	573.00	93° 42' 32.23" (LT)	9° 59' 57.35"	525 400	✓ ✓	None
700SBEB-2	30	0.086	723+42.15	730+40.59	728+40.15	498	698	380.00	105° 18' 32.64" (LT)	15° 04' 40.21"	525 400	✓ ✓	None
700SBEB-3[1]	30	0.1	733+93.55	737+28.52	735+90.43	197	335	254.00	75° 33' 33.89" (RT)	22° 33' 26.62"	450 400	✗	None
700SBEB-4[1]	30	0.1	737+28.52	738+07.80	737+68.63	40	79	254.00	21° 31' 44.06" (RT)	22° 33' 26.62"		✓	None

Table 7.3 – Preferred Alternative Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / *Minimum*	Length (ft) Compliance	Design (Variation/ Exception)
800EBNB-1	50	NC	805+60.52	814+17.54	809+89.41	429	857	8,337.00	5° 53' 23.45" (LT)	0° 41' 14.09"	1500 *750*	✗ ✓	None
800EBNB-2[1]	40	0.1	818+19.70	828+87.27	828+92.28	1073	1068	457.00	133° 50' 41.55" (RT)	12° 32' 14.53"	600 400	✓	None
800EBNB-3[1]	40	0.1	828+87.27	839+54.83	839+59.85	1073	1068	457.00	133° 50' 41.55" (RT)	12° 32' 14.53"		✓	None
800EBNB-4	45	NC	854+44.97	861+29.87	857+87.56	343	685	9,793.00	4° 00' 25.84" (LT)	0° 35' 06.25"	675 *400*	✓ ✓	None
800EBNB-5	45	NC	865+10.80	870+84.13	867+97.60	287	573	7,663.00	4° 17' 12.17" (RT)	0° 44' 51.70"	675 *400*	✗ ✓	None
SW10WB-1	45	RC	224+31.10	230+11.72	227+21.60	290	581	6,642.00	5° 00' 31.18" (LT)	0° 51' 45.46"	675 *400*	✗ ✓	None
SW10WB-2	35	0.023	242+54.26	248+57.19	245+56.89	303	603	2,812.00	12° 17' 05.90" (RT)	2° 02' 15.16"	525 *400*	✓ ✓	None
SW10WB-3	35	0.03	253+97.26	258+30.04	256+14.44	217	433	2,078.68	11° 55' 43.34" (RT)	2° 45' 22.88"	525 *400*	✗ ✓	None
SW10WB-4	45	NC (e max=0.05 table)	266+30.54	277+73.88	272+08.48	578	1143	3,172.00	20° 39' 08.00" (LT)	1° 48' 22.67"	675 *400*	✓ ✓	None
9100EB10-1	50	0.028	9103+52.30	9111+23.51	9107+38.97	387	771	4,250.00	10° 23' 48.92" (LT)	1° 20' 53.29"	1500 *750*	✗ ✓	None
9100EB10-2[1]	45	NC (e max=0.05 table)	9115+88.06	9123+58.30	9119+75.91	388	770	2,652.06	16° 38' 25.94" (RT)	2° 09' 37.54"	675 400	✓	None
9100EB10-3[1]	45	NC (e max=0.05 table)	9123+58.30	9127+85.39	9125+72.63	214	427	2,045.35	11° 57' 49.93" (RT)	2° 48' 04.58"		✓	None

Table 7.3 – Preferred Alternative Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired Minimum	Length (ft) Compliance	Design (Variation/ Exception)
600WBSB-1	40	0.084	600+00.00	606+88.57	603+73.53	374	689	716	55° 06' 02.65" (RT)	8° 00' 07.93"	600 400	✓ ✓	None
600WBSB-2	40	0.041	622+73.36	630+00.75	626+41.68	368	727	1,875.00	22° 13' 38.86" (RT)	3° 03' 20.79"	600 400	✓ ✓	None
100WBNB-1	40	0.041	100+00.00	104+70.08	102+36.28	236	470	1,874.00	14° 22' 20.01" (LT)	3° 03' 26.66"	600 400	✗ ✓	None
100WBNB-2	40	0.067	113+35.02	127+13.29	121+51.58	817	1378	1,023.00	77° 11' 37.81" (RT)	5° 36' 02.74"	600 400	✓ ✓	None
100WBNB-3	45	NC	132+65.16	137+61.31	135+13.34	248	496	7,087.97	4° 00' 38.08" (RT)	0° 48' 30.07"	675 400	✗ ✓	None
100WBNB-4	45	NC	147+62.30	155+14.00	151+38.18	376	752	23,513.80	1° 49' 53.93" (RT)	0° 14' 37.21"	675 400	✓ ✓	None
200WBLNB-1	35	0.066	202+30.98	212+88.66	208+52.09	621	1058	804	75° 22' 26.19" (LT)	7° 07' 34.83"	525 400	✓ ✓	None
300WBLSB-1	40	0.026	303+43.05	307+47.67	305+45.63	203	405	3,224.00	7° 11' 26.45" (LT)	1° 46' 37.79"	600 400	✗ ✓	None
300WBLSB-2[1]	40	0.083	314+82.36	319+10.43	317+03.18	221	428	707	34° 41' 27.66" (RT)	8° 06' 14.65"	600 400	✓	None
300WBLSB-3[1]	35	0.086	319+10.43	322+25.31	320+72.84	162	315	521	34° 37' 41.31" (RT)	10° 59' 50.17"		✓	None
300WBLSB-4	35	0.065	322+25.31	326+98.09	324+68.49	243	473	819	33° 04' 29.48" (RT)	6° 59' 44.96"	525 400	✗ ✓	None

Table 7.3 – Preferred Alternative Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / *Minimum*	Length (ft) Compliance	Design (Variation/ Exception)
EB869-1	70	NC	12000+00.00	12011+81.94	12005+91.08	591	1182	24,539.33	2° 45' 34.73" (RT)	0° 14' 00.55"	2,100 / *1,050*	✗ / ✓	None
EB869-2[1]	70	NC	12024+64.02	12028+28.84	12026+46.43	182	365	25,079.19	0° 50' 00.47" (LT)	0° 13' 42.45"	2100 / 1050	✗	None
EB869-3[1]	70	NC	12028+28.84	12037+41.52	12032+85.24	456	913	22,998.00	2° 16' 25.68" (LT)	0° 14' 56.88"		✓	None
EB869-4	70	0.054	12077+22.68	12099+02.62	12088+42.75	1120	2180	3,848.72	32° 27' 09.45" (LT)	1° 29' 19.31"	2,100 / *1,050*	✓ / ✓	None
EB869-5	70	0.049	12112+03.72	12135+83.74	12124+25.72	1222	2380	4,257.00	32° 01' 59.41" (RT)	1° 20' 45.31"	2,100 / *1,050*	✓ / ✓	None
WB869-1	70	NC	13000+00.00	13011+83.48	13005+91.85	592	1183	24,571.33	2° 45' 34.73" (RT)	0° 13' 59.45"	2,100 / *1,050*	✗ / ✓	None
WB869-2[1]	70	NC	13024+65.56	13028+29.80	13026+47.68	182	364	25,047.19	0° 49' 59.50" (LT)	0° 13' 43.50"	2100 / 1050	✗	None
WB569-3[1]	70	NC	13028+29.80	13037+41.09	13032+85.50	456	911	22,966.00	2° 16' 24.62" (LT)	0° 14' 58.13"		✓	None
WB569-4	70	0.054	13077+22.14	13098+33.04	13088+05.37	1083	2111	3,815.00	31° 42' 09.45" (LT)	1° 30' 06.68"	2,100 / *1,050*	✓ / ✓	None
WB569-5	70	0.049	13111+84.48	13134+94.16	13123+68.12	1184	2310	4,285.00	30° 52' 59.90" (RT)	1° 20' 13.65"	2,100 / *1,050*	✓ / ✓	None
7100WBSB441-1[1]	30	0.098	14+20.01	21+73.19	27+38.60	1319	753	276	156° 21' 20.22" (RT)	20° 45' 33.63"	450 / 400	✓	None
7100WBSB441-2[1]	30	0.093	21+73.19	27+87.41	26+28.01	455	614	321.3433	109° 30' 53.46" (RT)	17° 49' 48.29"		✓	None
EBCONN-1	60	0.027	4+39.13	13+52.56	8+96.58	457	913	6,600.00	7° 55' 46.92" (LT)	0° 52' 05.22"	1,800 / *900*	✗ / ✓	None

Table 7.3 – Preferred Alternative Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / *Minimum*	Length (ft) Compliance	Design (Variation/ Exception)
EBCONN-2	60	0.083	21+45.97	30+66.25	26+17.36	471	920	1,724.00	30° 35' 05.01" (RT)	3° 19' 24.32"	**1,800**	✗	None
											900	✓	
EBCONN-3	60	0.053	38+88.11	50+01.83	44+51.40	563	1114	3,011.19	21° 11' 28.96" (LT)	1° 54' 09.93"	**1,800**	✗	None
											900	✓	
WBCONN-1	60	0.03	50+00.00	59+10.62	54+56.26	456	911	5,754.00	9° 04' 03.03" (LT)	0° 59' 44.72"	**1,800**	✗	None
											900	✓	
WBCONN-2	60	0.082	67+46.23	76+82.01	72+25.53	479	936	1,755.00	30° 33' 02.32" (RT)	3° 15' 52.98"	**1,800**	✗	None
											900	✓	
WBCONN-3	60	0.053	84+74.52	95+97.11	90+42.52	568	1123	2,985.19	21° 32' 46.64" (LT)	1° 55' 09.59"	**1,800**	✗	None
											900	✓	
6200EBCD-1	55	NC	6200+00.00	6220+16.10	6210+09.57	1010	2016	15,000.00	7° 42' 03.43" (LT)	0° 22' 55.10"	**1650**	✓	None
											825	✓	
6200EBCD-2	40	0.046	6269+57.84	6275+56.27	6272+60.43	303	598	1,637.00	20° 56' 43.06" (LT)	3° 30' 00.17"	**600**	✗	None
											400	✓	
900EBSB-1[1]	60	0.053	900+00.00	909+75.64	904+92.10	492	976	3,024.00	18° 29' 07.72" (LT)	1° 53' 40.93"	**1800** 900	✓	None
900EBSB-2[1]	60	0.029	909+75.64	917+99.49	913+88.21	413	824	6,024.00	7° 50' 09.12" (LT)	0° 57' 04.05"		✓	None
900EBSB-3	60	0.045	929+58.06	949+84.45	939+97.96	1040	2026	3,660.00	31° 43' 20.20" (RT)	1° 33' 55.65"	**1,800**	✓	None
											900	✓	
900EBSB-4	45	0.098	961+81.14	970+54.27	967+05.98	525	873	625	80° 02' 35.97" (RT)	9° 10' 02.37"	**675**	✓	None
											400	✓	

Table 7.3 – Preferred Alternative Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / *Minimum*	Length (ft) Compliance	Design (Variation/ Exception)
900EBSB-5	45	0.034	976+73.10	980+75.01	978+74.38	201	402	2,900.00	7° 56' 26.45" (RT)	1° 58' 32.58"	**675** *400*	✗ ✓	None
5100EB-1	45	NC	5108+28.76	5112+30.27	5110+29.57	201	402	7,015.00	3° 16' 45.75" (LT)	0° 49' 00.34"	**675** *400*	✗ ✓	None
5100EB-2	45	0.033	5112+95.30	5117+28.68	5115+12.37	217	433	3,006.84	8° 15' 29.35" (RT)	1° 54' 19.86"	**675** *400*	✗ ✓	None
6100EB-1	45	0.034	6120+24.87	6128+15.04	6124+22.48	398	790	2,865.00	15° 48' 08.41" (RT)	1° 59' 59.47"	**675** *400*	✓ ✓	None
3100SBWB-1	55	0.023	3100+00.00	3110+52.58	3105+27.42	527	1053	6,576.00	9° 10' 15.69" (RT)	0° 52' 16.63"	**1650** *825*	✗ ✓	None
3100SBWB-2	40	0.084	3116+74.75	3128+13.39	3123+91.37	717	1139	740	88° 09' 41.21" (LT)	7° 44' 33.62"	**600** *400*	✓ ✓	None
4100SBWCD-1	45	0.026	4100+96.89	4107+20.81	4104+09.54	313	624	3,820.00	9° 21' 29.04" (RT)	1° 29' 59.60"	**675** *400*	✗ ✓	None
4100SBWCD-2	40	0.09	4110+49.17	4116+74.09	4113+89.75	341	625	633	56° 33' 53.52" (LT)	9° 03' 05.28"	**600** *400*	✓ ✓	None
7100WBCD-1[1]	55	0.053	7100+00.00	7101+86.86	7100+93.45	93	187	3,767.00	2° 50' 31.57" (LT)	1° 31' 15.57"	**1650** 825	✗	None
7100WBCD-2[1]	55	0.053	7101+86.86	7104+84.93	7103+36.06	149	298	2,565.00	6° 39' 29.78" (LT)	2° 14' 01.51"			
7100WBCD-3[1]	55	0.053	7104+84.93	7110+56.78	7107+71.42	286	572	3,716.16	8° 49' 00.37" (LT)	1° 32' 30.49"		✓	None
7100WBCD-4[1]	45	0.027	7110+56.78	7113+07.09	7111+81.98	125	250	3,716.16	3° 51' 33.30" (LT)	1° 32' 30.49"			

Table 7.3 – Preferred Alternative Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / *Minimum*	Length (ft) Compliance	Design (Variation/ Exception)
7100WBCD-5	45	NC	7114+34.33	7118+98.37	7116+66.38	232	464	11,459.00	2° 19' 12.82" (LT)	0° 30' 00.02"	675	✗	None
											400	✓	
7100WBCD-6	60	0.037	7128+09.98	7147+20.31	7137+79.85	970	1910	4,485.00	24° 24' 16.15" (RT)	1° 16' 38.99"	1,800	✓	None
											900	✓	
8100WBCDW-1	45	NC	8118+66.64	8126+28.68	8122+47.73	381	762	16,300.00	2° 40' 43.03" (LT)	0° 21' 05.43"	675	✓	None
											400	✓	
8100WBCDW-2	45	0.034	8167+24.67	8177+61.68	8172+48.85	524	1037	2,880.00	20° 37' 49.86" (LT)	1° 59' 21.97"	675	✓	None
											400	✓	
2100NECON-1	50	NC	2103+36.68	2110+88.68	2107+12.93	376	752	8,337.00	5° 10' 05.15" (LT)	0° 41' 14.09"	1500	✗	None
											750	✓	
2100NECON-2	45	NC	2110+88.68	2117+20.80	2114+04.82	316	632	11,474.00	3° 09' 23.49" (RT)	0° 29' 57.67"	675	✗	None
											400	✓	
2100NECON-3	45	0.08	2118+59.40	2124+09.56	2121+41.42	282	550	1,015.00	31° 03' 22.40" (RT)	5° 38' 41.66"	675	✗	None
											400	✓	
2100NECON-4	45	0.095	2130+15.60	2135+56.87	2132+99.32	284	541	731	42° 25' 28.22" (RT)	7° 50' 16.80"	675	✗	None
											400	✓	
1100NE10-1	30	0.098	1105+37.69	1109+22.86	1107+77.28	240	408	256	86° 12' 25.41" (RT)	22° 22' 52.19"	450	✗	None
											400	✓	
1100NE10-2	30	0.086	1113+97.99	1120+54.89	1118+31.22	433	657	395	95° 17' 10.20" (LT)	14° 30' 18.94"	450	✓	None
											400	✓	

Table 7.3 – Preferred Alternative Horizontal Curve Data (Continued)

Curve	Design Speed (MPH)	Superelevation (e)	PC Station	PT Station	PI Station	Tangent (ft)	Length (ft)	Radius (ft)	Delta (RT/LT)	Degree	Length (ft) FDM/FTE Desired / Minimum	Length (ft) Compliance	Design (Variation/ Exception)
1100NE10-3	–	–	1126+93.55	1128+28.44	1127+77.29	84	135	90	85° 52' 13.75" (RT)	63° 39' 43.12"	N/A N/A	N/A N/A	None
400NBWB-1[1]	40	0.099	404+40.62	415+74.35	415+32.56	1092	1134	495	131° 13' 41.39" (RT)	11° 34' 29.66"	**600** 400	✓	None
400NBWB-2[1]	40	0.099	415+74.35	427+08.08	426+66.29	1092	1134	495	131° 13' 41.39" (RT)	11° 34' 29.66"		✓	None
400NBWB-3	45	RC	432+74.45	440+27.38	436+51.59	377	753	5,124.00	8° 25' 08.97" (RT)	1° 07' 05.46"	**675** *400*	✓ ✓	None
400NBWB-4	55	0.029	444+12.44	452+48.67	448+31.53	419.09	836	5,012.00	9° 33' 34.54" (LT)	1° 08' 35.42"	**1650** *825*	✗ ✓	None

Footnote

[1]Compound Curve

Vertical Alignment – An analysis was performed to check the parameters of each proposed vertical curve in the project limits. The parameters are curve lengths, back and forward grades of each curve, and K values. For a description of these parameters and criteria, please see ***Section 2.2.9*** of this report.

Table 7.4 summarizes the vertical curve parameters and characteristics of the interchange ramps. See the roll plot in ***Appendix L*** for the locations of each alignment chain. The names of the vertical curves depicted in the table are based on the alignment chain names. ***Appendix L2*** depicts the preliminary roadway vertical profiles.

Table 7.4 – Preferred Alternative Vertical Geometry Analysis

Curve	Design Speed (MPH)	VPI Station	VPI Elevation	Type	Length (ft)					Grades								K-Values					Design (Variation/ Exception)
					Proposed	FDOT/FTE	Comp.	AASHTO[1]	Comp.	Proposed Back (%)	Proposed Forward (%)	FDOT/FTE (Max %)	Compliance		AASHTO (Max %)[2]	Compliance		Proposed	FDOT/ FTE	Comp.	AASHTO	Comp.	
													Back	Forward		Back	Forward						
SB91-1	70	11033+00.00	18.54	Crest	1000	1000	✓	148	✓	0.3	-0.3	3	✓	✓	3	✓	✓	1666.7	506	✓	247	✓	None
SB91-2	70	11044+80	15.00	Sag	800	800	✓	453	✓	-0.3	2.204	3	✓	✓	3	✓	✓	319.5	206	✓	181	✓	None
SB91-3	70	11061+94	52.78	Crest	2232	1800	✓	1089	✓	2.204	-2.203	3	✓	✓	3	✓	✓	506.4	506	✓	247	✓	None
SB91-4	70	11077+10	19.38	Sag	800	800	✓	344	✓	-2.203	-0.300	3	✓	✓	3	✓	✓	420.4	206	✓	181	✓	None
SB91-5	70	11085+10	16.98	sag	800	800	✓	109	✓	-0.300	0.300	3	✓	✓	3	✓	✓	1333.3	206	✓	181	✓	None
SB91-6	70	11097+50	20.70	Crest	1000	1000	✓	148	✓	0.300	-0.300	3	✓	✓	3	✓	✓	1666.7	506	✓	247	✓	None
NB91-1	70	10029+83	19.75	Crest	1000	1000	✓	148	✓	0.300	-0.300	3	✓	✓	3	✓	✓	1666.7	506	✓	247	✓	None
NB91-2	70	10038+83	17.05	Sag	800	800	✓	109	✓	-0.300	0.300	3	✓	✓	3	✓	✓	1333.3	206	✓	181	✓	None
NB91-3	70	10046+83	19.45	Sag	800	800	✓	344	✓	0.300	2.200	3	✓	✓	3	✓	✓	421.1	206	✓	181	✓	None
NB91-4	70	10061+98	52.78	Crest	2230	1800	✓	1087	✓	2.200	-2.200	3	✓	✓	3	✓	✓	506.8	506	✓	247	✓	None
NB91-5	70	10078+00	17.54	Sag	800	800	✓	453	✓	-2.200	0.300	3	✓	✓	3	✓	✓	320.0	206	✓	181	✓	None
NB91-6	70	10091+00	21.44	Crest	1000	1000	✓	148	✓	0.300	-0.300	3	✓	✓	3	✓	✓	1666.7	506	✓	247	✓	None
NB91-7	70	10100+00	18.74	Sag	800	800	✓	109	✓	-0.300	0.300	3	✓	✓	3	✓	✓	1333.3	206	✓	181	✓	None
800EBNB-1	40	813+72	15.58	Sag	340	120	✓	335	✓	0.051	5.292	6	✓	✓	7	✓	✓	64.9	64	✓	64	✓	None
800EBNB-2	40	820+82	53.16	Crest	590	120	✓	365	✓	5.292	-3.000	6	✓	✓	7	✓	✓	71.2	70	✓	44	✓	None
800EBNB-3	40	829+80	26.22	Sag	400	120	✓	318	✓	-3.000	1.970	6	✓	✓	7	✓	✓	80.5	64	✓	64	✓	None
800EBNB-4	40	849+22	62.31	Crest	650	120	✓	255	✓	1.970	-3.817	6	✓	✓	7	✓	✓	112.3	70	✓	44	✓	None
800EBNB-5	40	863+28	16.84	Sag	420	120	✓	268	✓	-3.817	0.378	6	✓	✓	7	✓	✓	100.1	64	✓	64	✓	None

Table 7.4 – Preferred Alternative Vertical Geometry Analysis (Continued)

Curve	Design Speed (MPH)	VPI Station	VPI Elevation	Type	Length (ft) Proposed	Length (ft) FDOT/FTE	Length (ft) Comp.	Length (ft) AASHTO[1]	Length (ft) Comp.	Grades Proposed Back (%)	Grades Proposed Forward (%)	Grades FDOT/FTE (Max %)	Grades Compliance Back	Grades Compliance Forward	Grades AASHTO (Max %)[2]	Grades Compliance Back	Grades Compliance Forward	K-Values Proposed	K-Values FDOT/FTE	K-Values Comp.	K-Values AASHTO	K-Values Comp.	Design (Variation/ Exception)
400NBWB-1	40	404+35	31.62	Crest	206	120	✓	92	✓	-2.400	-4.500	6	✓	✓	7	✓	✓	98.1	70	✓	44	✓	None
400NBWB-2	40	407+41	17.85	Sag	300	120	✓	262	✓	-4.500	-0.400	6	✓	✓	7	✓	✓	73.2	64	✓	64	✓	None
700SBEB-1	35	707+00	42.00	Sag	200	105	✓	113	✓	0.800	3.114	6	✓	✓	7	✓	✓	86.4	49	✓	49	✓	None
700SBEB-2	35	714+49.38	65.34	Crest	340	105	✓	199	✓	3.114	-3.763	6	✓	✓	7	✓	✓	49.4	47	✓	29	✓	None
700SBEB-3	35	727+75	15.46	Sag	200	105	✓	170	✓	-3.763	-0.300	6	✓	✓	7	✓	✓	57.8	49	✓	49	✓	None
WILES-1	45	15+13	14.63	Sag	292	135	✓	292	✓	0.308	4.000	6	✓	✓	6	✓	✓	79.1	79	✓	79	✓	None
WILES-2	45	24+65.5	52.73	Crest	800	135	✓	488	✓	4.000	-4.000	6	✓	✓	6	✓	✓	100.0	98	✓	61	✓	None
WILES-3	45	34+18	14.63	Sag	292	135	✓	292	✓	-4.000	-0.304	6	✓	✓	6	✓	✓	79.0	79	✓	79	✓	None
1100NE10-1	30	1107+75	16.38	Sag	100	90	✓	34	✓	-0.617	0.315	7	✓	✓	7	✓	✓	107.3	37	✓	37	✓	None
1100NE10-2	30	1117+91	15.30	Sag	350	90	✓	161	✓	-0.354	4.000	7	✓	✓	7	✓	✓	80.4	37	✓	37	✓	None
1100NE10-3	30	1125+40	45.26	Crest	350	90	✓	66	✓	4.000	0.542	7	✓	✓	7	✓	✓	101.2	31	✓	19	✓	None
9100EB10-1	45	9104+84	18.86	Sag	400	135	✓	321	✓	0.902	4.964	5	✓	✓	5	✓	✓	98.5	79	✓	79	✓	None
9100EB10-2	45	9110+30	45.96	Crest	500	135	✓	284	✓	4.964	0.301	5	✓	✓	5	✓	✓	107.2	98	✓	61	✓	None
9100EB10-3	40	9115+70	46.68	Crest	260	120	✓	163	✓	-0.301	-3.998	6	✓	✓	7	✓	✓	70.3	70	✓	44	✓	None
9100EB10-4	40	9123+70	14.70	Sag	250	120	✓	237	✓	-3.998	-0.301	6	✓	✓	7	✓	✓	67.6	64	✓	64	✓	None
3100SBWB-1	40	3109+60	21.02	Sag	397	120	✓	179	✓	0.300	3.090	6	✓	✓	7	✓	✓	142.3	64	✓	64	✓	None
3100SBWB-2	40	3118+36	48.09	Crest	500	120	✓	212	✓	3.090	-1.718	6	✓	✓	7	✓	✓	104.0	70	✓	44	✓	None
4100SBWCD-1	35	4109+46	19.49	Sag	400	105	✓	181	✓	0.308	4.000	6	✓	✓	7	✓	✓	108.3	49	✓	49	✓	None
4100SBWCD-2	35	4113+95	37.45	Crest	230	105	✓	136	✓	4.000	-0.700	6	✓	✓	7	✓	✓	48.9	47	✓	29	✓	None

Table 7.4 – Preferred Alternative Vertical Geometry Analysis (Continued)

Curve	Design Speed (MPH)	VPI Station	VPI Elevation	Type	Length (ft)					Grades								K-Values					Design (Variation/ Exception)
					Proposed	FDOT/FTE	Comp.	AASHTO[1]	Comp.	Proposed Back (%)	Proposed Forward (%)	FDOT/FTE (Max %)	Compliance		AASHTO (Max %)[2]	Compliance		Proposed	FDOT/ FTE	Comp.	AASHTO	Comp.	
													Back	Forward		Back	Forward						
900EBSB-1	60	925+45	51.74	Crest	940	400	✓	570	✓	0.575	-3.198	4	✓	✓	5	✓	✓	249.2	245	✓	151	✓	None
900EBSB-2	60	936+00	18.00	Sag	430	300	✓	394	✓	-3.198	-0.301	4	✓	✓	5	✓	✓	148.4	136	✓	136	✓	None
5100LYEB-1	45	5109+00	17.00	Sag	200	135	✓	100	✓	0.501	1.762	5	✓	✓	7	✓	✓	158.6	79	✓	79	✓	None
5100LYEB-2	45	5112+84	23.77	Crest	272	135	✓	169	✓	1.762	-1.006	5	✓	✓	7	✓	✓	98.3	98	✓	61	✓	None
6100LYSB - 1	45	6118+80	33.07	Crest	440	135	✓	273	✓	1.727	-2.749	5	✓	✓	7	✓	✓	98.3	98	✓	61	✓	None
7100WBCD-1	45	7107+83	36.60	Sag	220	135	✓	116	✓	0.600	2.071	5	✓	✓	5	✓	✓	149.5	79	✓	79	✓	None
7100WBCD-2	50	7112+20	45.65	Crest	610	300	✓	374	✓	2.071	-2.383	5	✓	✓	5	✓	✓	136.9	136	✓	84	✓	None
7100WBCD-3	60	7122+42	21.29	Sag	500.9	300	✓	256	✓	-2.383	-0.501	4	✓	✓	4	✓	✓	266.1	136	✓	136	✓	None
6200EBCD-1	45	6235+83	36.34	Sag	300	135	✓	179	✓	-0.500	1.768	5	✓	✓	5	✓	✓	132.3	79	✓	79	✓	None
6200EBCD-2	45	6244+38	51.45	Crest	620	135	✓	382	✓	1.768	-4.500	5	✓	✓	5	✓	✓	98.9	98	✓	61	✓	None
6200EBCD-3	45	6252+20	16.26	Sag	400	135	✓	383	✓	-4.500	0.350	5	✓	✓	5	✓	✓	82.5	79	✓	79	✓	None
2100NEC-1	45	2114+43	16.05	Sag	200	135	✓	122	✓	-0.301	1.244	5	✓	✓	7	✓	✓	129.4	79	✓	79	✓	None
2100NEC-2	45	2119+06	21.81	Crest	200	135	✓	105	✓	1.244	-0.471	5	✓	✓	7	✓	✓	116.6	98	✓	61	✓	None
100WBNB-1	40	103+00	15.93	Sag	220	120	✓	219	✓	0.580	4.000	6	✓	✓	7	✓	✓	64.3	64	✓	64	✓	None
100WBNB-2	40	106+50	29.93	Crest	300	120	✓	102	✓	4.000	1.684	6	✓	✓	7	✓	✓	129.5	70	✓	44	✓	None
100WBNB-3	40	115+50	45.09	Crest	300	120	✓	52	✓	1.684	0.500	6	✓	✓	7	✓	✓	253.4	70	✓	44	✓	None
100WBNB-4	40	125+50	50.09	Crest	300	120	✓	154	✓	0.500	-3.000	6	✓	✓	7	✓	✓	85.7	70	✓	44	✓	None
100WBNB-5	40	136+90	15.89	Sag	300	120	✓	224	✓	-3.000	0.498	6	✓	✓	7	✓	✓	85.8	64	✓	64	✓	None

Table 7.4 – Preferred Alternative Vertical Geometry Analysis (Continued)

Curve	Design Speed (MPH)	VPI Station	VPI Elevation	Type	Length (ft)					Grades								K-Values					Design (Variation/ Exception)
					Proposed	FDOT/FTE	Comp.	AASHTO[1]	Comp.	Proposed Back (%)	Proposed Forward (%)	FDOT/FTE (Max %)	Compliance		AASHTO (Max %)[2]	Compliance		Proposed	FDOT/ FTE	Comp.	AASHTO	Comp.	
													Back	Forward		Back	Forward						
200WBLNB-1	35	208+70	66.39	Crest	400	105	✓	109	✓	2.000	-1.750	6	✓	✓	7	✓	✓	106.7	47	✓	29	✓	None
200WBLNB-2	35	217+00	51.87	Sag	400	105	✓	122	✓	-1.750	0.740	6	✓	✓	7	✓	✓	160.6	49	✓	49	✓	None
300WBLSB-1	40	304+00	19.93	Sag	400	120	✓	268	✓	0.815	5.000	6	✓	✓	7	✓	✓	95.6	64	✓	64	✓	None
300WBLSB-2	40-35	321+60	107.93	Crest	800	0	✓	484	✓	5.000	-6.000	6	✓	✓	7	✓	✓	72.7	70	✓	44	✓	None
300WBLSB-3	35	327+20	74.33	Sag	320	105	✓	89	✓	-6.000	-4.190	6	✓	✓	7	✓	✓	176.8	49	✓	49	✓	None
300WBLSB-4	35	333+30.38	54.71	Sag	300	105	✓	104	✓	-2.557	-0.444	6	✓	✓	7	✓	✓	142.0	49	✓	49	✓	None
600WBSB-1	40	605+50	103.15	Crest	500	120	✓	273	✓	1.210	-5.000	6	✓	✓	7	✓	✓	80.5	70	✓	44	✓	None
600WBSB-2	40	623+00	15.65	Sag	400	120	✓	296	✓	-5.000	-0.373	6	✓	✓	7	✓	✓	86.4	64	✓	64	✓	None
00WBS7-1	45	6+00	30.00	Sag	300	135	✓	134	✓	0.300	2.500	5	✓	✓	7	✓	✓	136.4	98	✓	61	✓	None
00WBS7-2	40	10+00	37.50	Crest	400	120	✓	220	✓	2.500	-2.500	6	✓	✓	7	✓	✓	80.0	70	✓	44	✓	None
00WBS7-3	30	19+00	17.50	Sag	300	90	✓	70	✓	-2.500	-0.600	7	✓	✓	7	✓	✓	157.9	37	✓	37	✓	None

Legend:

Compliance (Comp.)

✓ : Meets criteria

✗: Does not meet criteria

Footnotes:

[1]Minimum vertical curve length is based on vertical stopping sight distance (K Value), L=KA (A = algebraic differnece of slopes)

[2]AASHTO GRADE CRITERIA: Assumed CDs are consedered arterials, ramps are considered collectors.

7.5 Design Variations and Design Exceptions

One Design Exception and one Design Variation are proposed as part of the preferred alternative:

1. Design Exception – Superelevation on the Sawgrass Expressway mainline bridges over Lyons Road is 0.058. The proposed curves require 0.054.
2. Border Width – Border width is less than 94 feet along the Sawgrass Expressway and Florida's Turnpike corridors, including the interchanges.

The Design Variation/Exception have not been approved at this point. The Design Variation/Exception package will be prepared during the Design phase.

7.6 Multi-Modal Accommodations

Sawgrass Expressway and Florida's Turnpike are limited access facilities. Therefore, the preferred alternative does not include bicycle or pedestrian accommodations. Bicycle and pedestrian accommodations will be maintained at the two interchanges, US 441, and Lyons Road. At the Lyons Road Interchange, the bicycle lanes will be extended north of the Sawgrass Expressway to Serko Boulevard. This improvement will provide full multimodal connectivity under the Sawgrass Expressway and a safer route for bicyclists enhancing the mobility within the corridor. No other future non-motorized facilities were evaluated as part of this study. However, crosswalks and ADA compliant curb ramps will be provided at all intersections impacted by the project.

There are no planned transit services along the Sawgrass Expressway or Florida's Turnpike. Proposed improvements to the interchanges will maintain accommodations for cross streets providing existing and planned transit services.

7.7 Intersection/ Interchange Concepts and Signal Analysis

The preferred alternative is proposing interchange and intersection improvements to support the optimal operations of the corridor. ***Figure 7.7*** depicts all the improvements proposed by the preferred alternative. The preferred alternative proposes interchange improvements to all three interchanges. The improvements will vary from minor to major capacity enhancements (see ***Appendix M***, Preferred Concept Plans Roll Plot).

The approach to evaluate the proposed interchange improvements is summarized below:

- Maintain the existing interchange configuration and freeway bridge structures by adding capacity to the ramps and ramp terminal intersections.
- Additional lane capacity was determined by incrementally increasing the number of lanes until the desired LOS was achieved. This process was limited based on impacts to right of way, adjacent properties and impacts to the existing freeway bridge structures.
- Maximum allowed number of intersections turn lanes were set to three left turn lanes and three right turn lanes.

US 441 Interchange – The preferred alternative is keeping the configuration of the Sawgrass Expressway Interchange.

Lyons Road – The preferred alternative is proposing the reconfiguration of the Sawgrass Expressway Interchange to a Diamond Interchange plus additional turn lanes at the ramp terminals.

Florida's Turnpike – The preferred alternative adds the eight missing direct connection ramps between SW 10th Street and Florida's Turnpike.

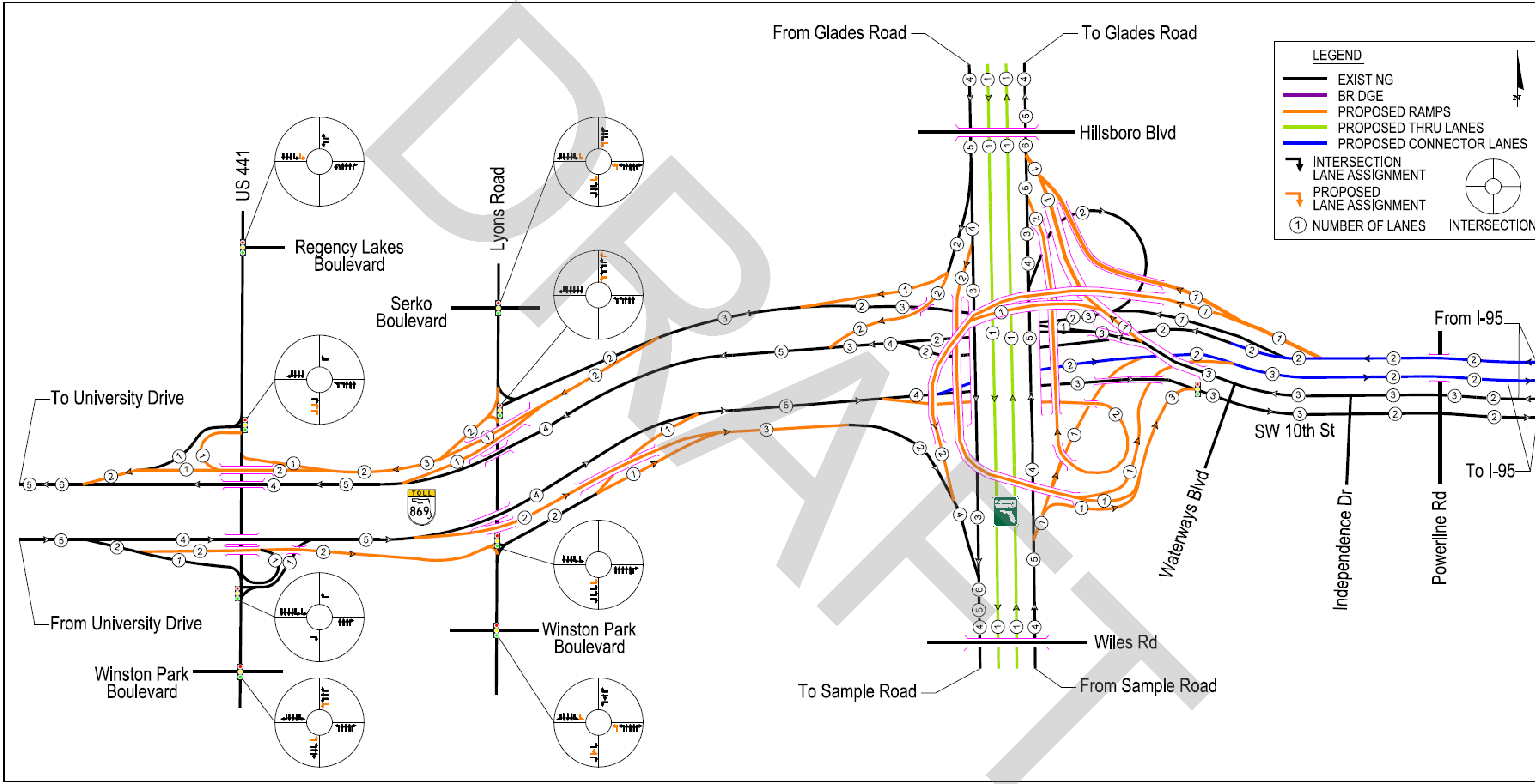


Figure 7.7 – Preferred Alternative Schematic Line Diagram

7.8 Tolled Projects

The PD&E Study project limits are within the Southern Coin system. Several of the existing toll sites were constructed as part of the All-Electronic Tolling (AET) Conversion Phase 5A. ***Table 7.5*** is a summary of the preferred alternative toll sites within the project's study limits.

Table 7.5 – Preferred Alternative Toll Sites

#	Location	Description	Type of gantry	Existing Maintain/New
1	WB On-Ramp from US 441	Standard non-accessible toll site, 1 lane, single movement	AET span gantry	Existing Maintain
2	EB Off-Ramp to SB US 441	Standard non-accessible toll site, 1 lane, single movement	AET span gantry	Existing Maintain
3	EB Sawgrass Accessible Gantry	Standard accessible toll site, 4 lane, single movement	132' span gantry	New
4	EB Off-Ramp to US 441	Standard non-accessible toll site, 1 lane, single movement	AET span gantry	Existing Maintain
5	EB On-Ramp from US 441	Standard non-accessible toll site, 2 lanes, single movement	42' Cantilever gantry	New
6	WB Sawgrass Accessible Gantry	Standard accessible toll site	144' span gantry	New
7	EB Off-Ramp to Lyons Road	Standard non-accessible toll site, 2 lane, single movement	48' Cantilever gantry	New
8	WB Collector Distributor to US 441	Non-standard non-accessible toll site, 1 lane, single movement	42' Cantilever gantry	New
9	WB On-Ramp from Lyons Road	Non-standard non-accessible toll site, 3 lane, 2 single movement plazas	74' Span gantry	New
10	EB On-Ramp from Lyons Road	Standard non-accessible toll site, 2 lane, single movement plaza	48' Cantilever gantry	New
11	WB Off-Ramp to Lyons Road	Non-standard non-accessible toll site, 2 lane, single movement	48' Cantilever gantry	New
12	Turnpike NB Off-Ramp to EB SW 10th Street Connector and Local	Standard non-accessible toll site, 1 lane, single movement	48' Cantilever gantry	New
13	Turnpike SB Off-Ramp to EB SW 10th Street Connector and Local	Standard non-accessible toll site, 2 lane, single movement	54' Span gantry	New
14	WB SW 10th Street Connector and Local to SB Turnpike On-Ramp	Standard non-accessible toll site, on MSE wall, 2 lane, single movement	48' Cantilever gantry	New
15	WB SW 10th Street Connector and Local to NB Turnpike On-Ramp	Standard non-accessible toll site, 2 lane, single movement	48' Cantilever gantry	New

7.9 INTELLIGENT TRANSPORTATION SYSTEM AND TSM&O STRATEGIES

The preferred alternative is proposing to install ITS and Connected Vehicle (CV) infrastructure along Sawgrass Expressway and Florida's Turnpike within the project limits (see ***Figure 7.8***). The proposed subsystems include Dynamic Message Signs (DMS) for dissemination of traffic information, Closed Circuit Television (CCTV) cameras for traffic monitoring, Microwave Vehicle Detection System (MVDS) for volume, speed, and occupancy detection, Bluetooth Travel Time System (BTTS) for travel times, Wrong Way Vehicle Detection System (WWVDS) for detecting wrong way vehicles entering the system, and CV infrastructure such as Roadside Units (RSUs) and On-Board Units (OBUs).

The limits of the PD&E Study overlap with the adjacent SW 10th Street project (FPIDs# 436964-2-52-01, 436964-2-56-02, 439891-1-52-01, 439891-1-56-02, 439891-1-56-03, 439891-5-52-01, and 439891-5-52-01) being completed by FDOT District 4. The SW 10th Street project will be installing ITS devices west of Powerline Road that will be impacted by this PD&E Study. Close coordination will need to occur throughout the design of both projects to ensure all devices are coordinated between the two projects. The SW 10th Street project is currently in procurement and the ITS devices are only designed to a conceptual level. Therefore, it is likely that the final ITS locations will vary from the current conceptual locations. The SW 10th Street project is estimated to complete construction around 2030 and will be considered existing for the purposes of this PD&E Study.

TSM&O improvements for this project are only viable in combination with the preferred alternative improvements. FTE is in the process of discussing internally with the TSM&O Group what strategies are planned along the corridor and which ones should be considered in the preferred alternative. These strategies will be listed and documented during the design phase.

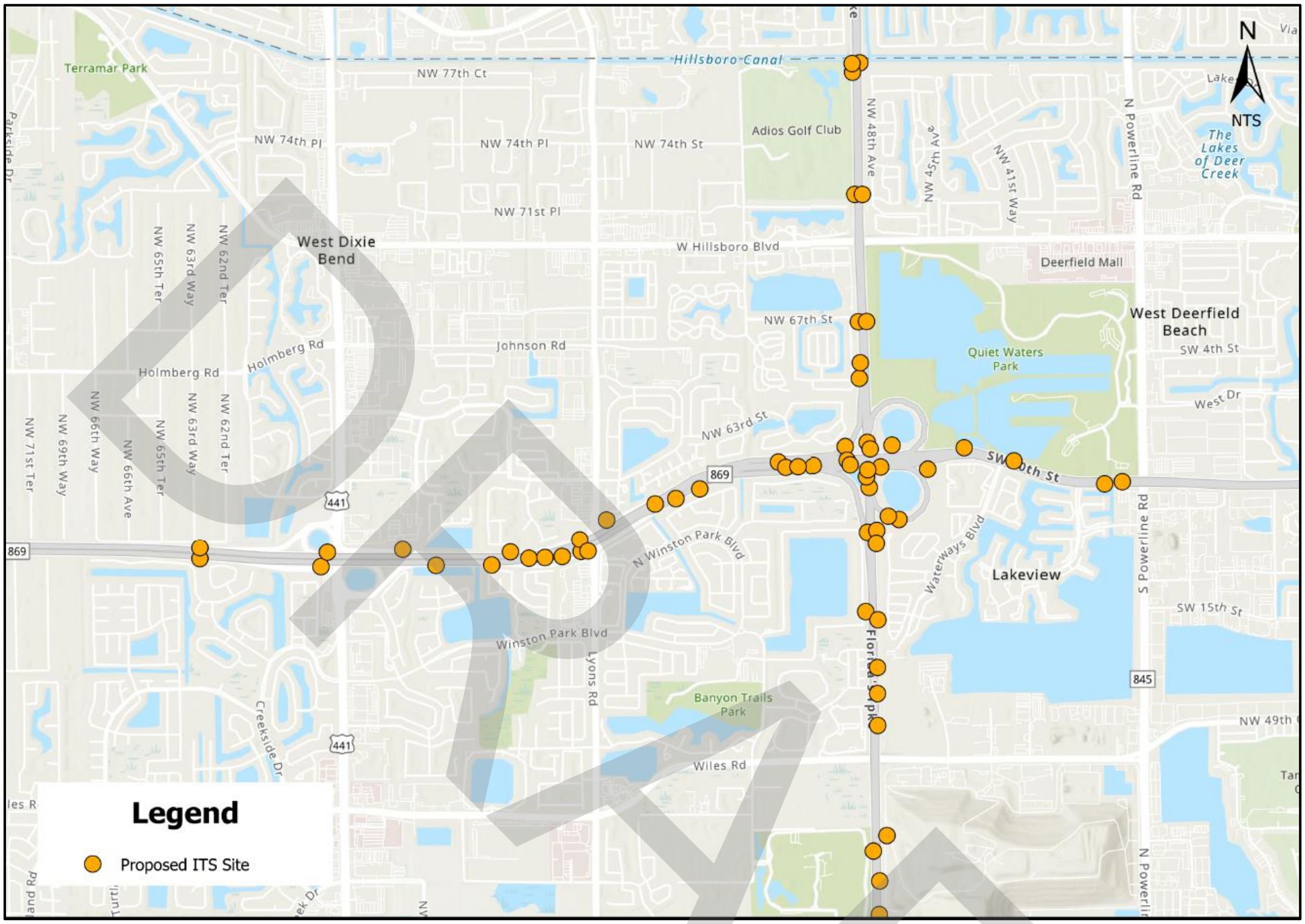


Figure 7.8 – Preferred Alternative ITS Proposed Sites

7.10 LANDSCAPE

The Sawgrass Expressway between US 441 and Florida's Turnpike currently is lined with a precast concrete noise wall with a special pattern located at intervals. Existing plantings are grouped to capture that rhythm and accentuate it. This landscape treatment would remain in the areas with the possible addition of wildflowers at intervals. It is also proposed to continue this treatment on the south side of the corridor where property is available between Florida's Turnpike and Powerline Road. There are plans by the City of Deerfield Beach to extend a reclaimed water line to this portion of the corridor allowing the wider variety of plant types.

The interchange with the Florida's Turnpike has the most opportunity for landscape vegetation. Elevated portions of the interchange provide an opportunity to enhance views primarily toward the interior of the interchange where existing plantings performed in conjunction with stormwater ponds. These areas can be improved with additional types of plantings to enhance their function as a gateway to the community of Deerfield Beach.

Levels I, II and III landscaping opportunities and other features were identified within the study limits (see ***Appendix N***).

Level I – This level covers the low-profile areas with visual screens, slope stabilization and reforestation. Visual screens include planting areas to frame a view with natives and non-natives species that require low maintenance. Slope stabilization includes generally native shrub species, which require minimal maintenance. Reforestations are locations outside the higher focus areas for purposes of screening views to serve as a backdrop to high impact landscaping areas.

Level II – This level covers the areas outside the roadway improvements, clear zones, etc. These areas are suitable for a mix of planting that support the overall design.

Level III – This level covers high visibility areas consisting of large signature palms, trees and flowering plants that require enhanced level of maintenance. Shrubs will be considered for embankment slopes for erosion control stability.

7.11 Lighting

Lighting features for the preferred alternative will be evaluated during the design phase.

7.12 Wildlife Crossings

There are no wildlife crossings within the study limits.

7.13 Permits

No impacts to jurisdictional wetlands are anticipated. Therefore, no wetlands permitting will be required. Under the proposed project there would be no work in, on, or over the Hillsboro Canal, and no work would occur within the Hillsboro Canal right of way. A SFWMD Environmental Resource Permit/Modification to existing permits will be required for impacts to the existing stormwater management system and because of an increase in impermeable cover. Two existing Environmental Resource Permits were identified that may require additional research or modification. Those two permits are SFWMD Permit No. 06-00629-S for the Sawgrass Expressway in Broward County (issued on February 14, 1985), and SFWMD Permit No. 06-10034-S for the Florida's Turnpike in Broward County (issued on February 14, 1985). A Dewatering Permit is anticipated for any dewatering during construction, and a National Pollution Discharge Elimination System Permit will be necessary. The project is not anticipated to fall within the jurisdiction of the US Army Corps of Engineers. FTE is exempt from Broward County permitting within FTE right of way. Therefore, no permits from the County are anticipated.

7.14 Drainage and Stormwater Management Facilities

A preliminary drainage analysis was performed to determine the locations and sizes of the required water management facilities for the preferred alternative. The use of roadside treatment swales, former borrow pit areas and infield areas in the three interchanges were the first option to consider. Off-site ponds requiring right of way acquisition was considered as a last resort.

The project has been primarily divided into five basins to analyze the preferred alternative.

Basin 1 – Basin 1 includes the west side of the US 441 interchange. Roadside swales and dry and wet detention ponds at the interchange are available for stormwater management. An FDOT owned parcel at the NW quadrant of the interchange beyond the Sawgrass Expressway right of way is available, but not included in the calculations. Basin 1 discharges to the Pine Tree Water Control District Canals and is within the SFWMD Water Preserve Area.

Basin 2 – This basin begins at US 441 and ends up at station 1110+00.00, just east of Lyons Road. It includes the east side of the US 441 interchange, the ramps and bridges over Lyons Road, Lyons Road interchange as well as the east and westbound roadway of the Sawgrass Expressway. For stormwater management both dry treatment swales and wet detention ponds are available within this basin. Basin 2 discharges to the Cocomar Water Control District Canals and is within the SFWMD Water Preserve Area.

Basin 3A – This basin begins east of Lyons Road at station 1110+00.00 and ends at station 1153+00.00 at the Florida's Turnpike. It includes the eastbound Sawgrass Expressway, eastbound ramps between Sawgrass Expressway and Florida's Turnpike and a portion of southbound Florida's Turnpike. For stormwater management both dry treatment swales and wet detention ponds are available within this basin. Basin 3A discharges to Cocomar Water Control District Canals.

Basin 3B – This basin begins at east of Lyons Road at station 1145+00.00 and ends just west of Waterways Boulevard, at station 1168+39.00. It includes the Sawgrass Expressway east and westbound roadway and the Florida's Turnpike north and southbound roadway. Interchange wet detention ponds are available for treatment and attenuation of this basin before it discharges to the existing outfall at the southeast corner of the interchange. An FTE-owned parcel at the northeast corner of the interchange is available for stormwater management, which will be converted to a wet detention pond. Basin 3B discharges to BCWCD#2.

Basin 3B-1 – The basin begins along the Florida's Turnpike north of the Sawgrass Expressway Interchange (Sta. 5652+50) and ends at the Broward/Palm Beach County Line (Sta. 5716+70). The basin flows to the interchange wet pond through a dry swale. The swale also provides partial treatment and attenuation.

Basin 3B-2 – The basin begins along the Florida's Turnpike from Wies Road (Sta. 5575+50) to south of the Sawgrass Expressway Interchange (Sta. 5622+00). The basin flows to the interchange wet pond through swales where partially treatment and attenuation is provided.

Basin 4 – This basin begins west of Independence Drive at station 1193+17.00 and ends at station 1209+50.00 at the Powerline Road intersection. In the proposed condition, existing swales are filled by the widening. Therefore, runoff from the basin area will be directed to the interchange ponds for treatment and attenuation. Since in the existing conditions runoff from the area does not flow to the interchange pond, no credit is taken for existing treatment and attenuation for the basin. Basin 4 discharges to BCWCD#2.

Figure 7.9 depicts the proposed overall drainage map of all the systems. Additional details about the drainage features are documented in the *Pond Siting Report*, and *Location Hydraulics Memorandum,* companion documents to this PD&E Study.

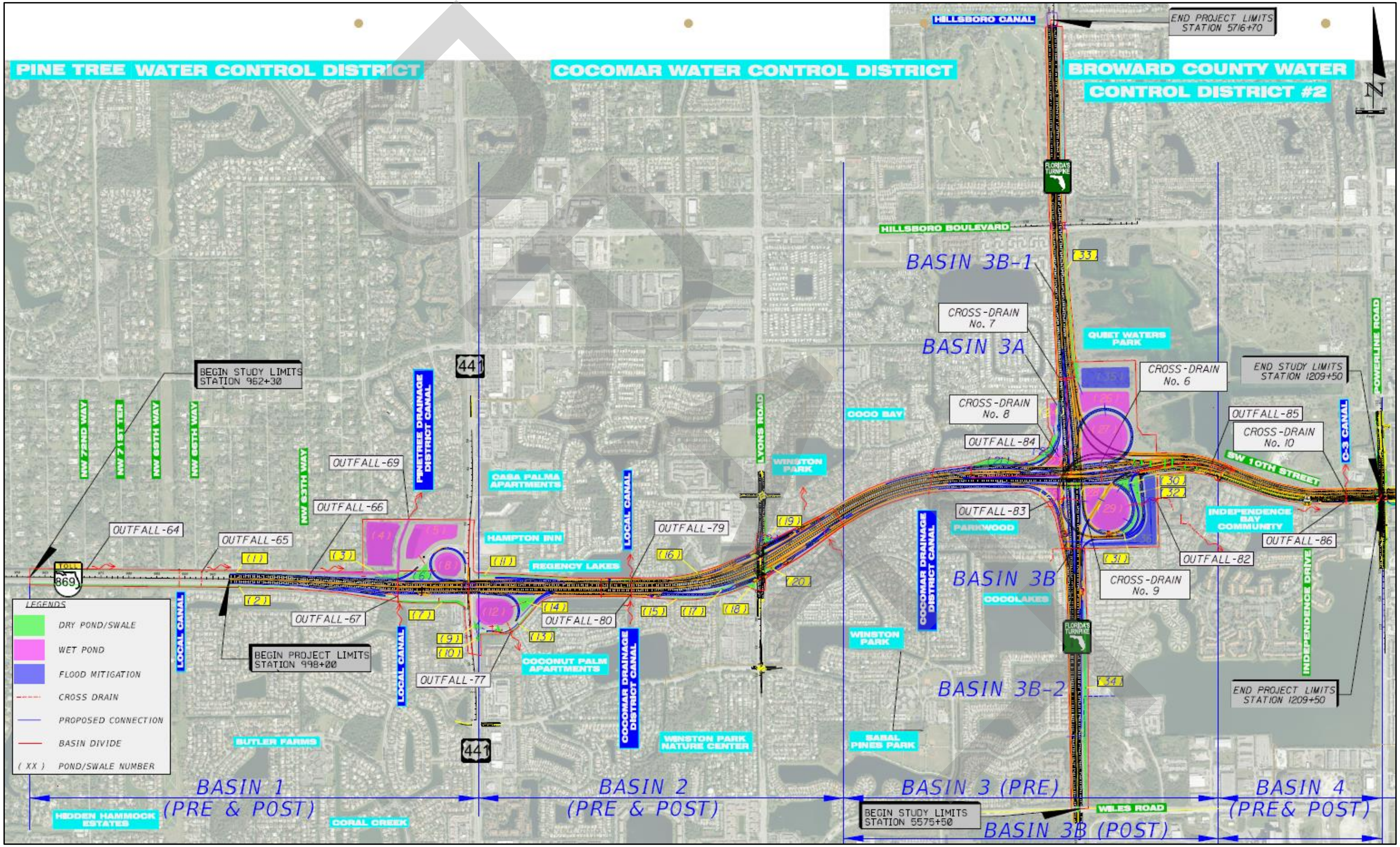


Figure 7.9 – Proposed Drainage Map

7.15 Floodplain Analysis

FEMA FIRMS have been reviewed to evaluate the floodplain impacts and required floodplain. In general, the Sawgrass Expressway corridor is outside of the FEMA 100-year floodplain. However, some ramps, interchange ponds and the vicinity of Sawgrass Expressway are surrounded by the FEMA Special Flood Hazard Areas Zones AE and AH with determined flood elevations. From US 441 to the Florida's Turnpike Interchange the FEMA flood elevations range from elevation 10 feet NAVD to elevation 14 feet NAVD on the south side and from elevation 12 feet NAVD to elevation 18 feet NAVD on the north side. Excavation and fill volume between the seasonal high water and the 100-year flood elevation needs to be accounted for at those areas. Some of the FTE owned parcels are being converted to wet detention ponds, which will compensate for the loss of storage of 100-year floodplains. ***Table 7.6*** summarizes the floodplain compensation calculations. While the overall project meets floodplain mitigation requirements, there is a floodplain mitigation deficit within Basin 2. This deficit can be reduced by expanding the pond using MSE walls along the ramps.

Table 7.6 – Summary of Floodplain Compensation Calculations

LOCAL WATER MANAGEMENT DISTRICT	PROJECT BASIN	FLOODPLAIN ENCROACHMENT (AC-FT)	Provided Storage In	FLOODPLAIN COMPENSATIO N (AC-FT)
Pinetree Water Management District	BASIN 1	0.98	POND 1-1	1.26
Cocomar Water Management District	BASIN 2 & 3A	8.50	POND 2-1	5.17
Broward County Water Management District # 2	BASIN 3B, 3B-1, 3B-2 & 4	38.76	FLOOD MITIGATION 3B-1	18.70
			FLOOD MITIGATION 3B-2	23.26
	PROJECT TOTAL =	**48.24**		**48.39**

7.16 Bridges and Structure Analysis

As part of the preferred alternative 20 new bridges are anticipated to be added, four bridges are anticipated to be widened, and three are anticipated to be replaced.

1. 7 new Category 1 bridges
2. 13 new Category 2 bridges
3. 3 bridge replacements
4. 4 bridge widenings

Figure 7.10 illustrates the Bridge layout of these structures along the corridor and ***Table 7.7*** describes the Proposed Bridge Characteristics for the preferred alternative. The proposed widenings, new bridges, replacements, and bridge demolitions are color-coded, facilitating their identification. Additional details on the proposed bridge improvements within the project limits are documented in the *Bridge Analysis Report (BAR)*, ***Appendix G***.

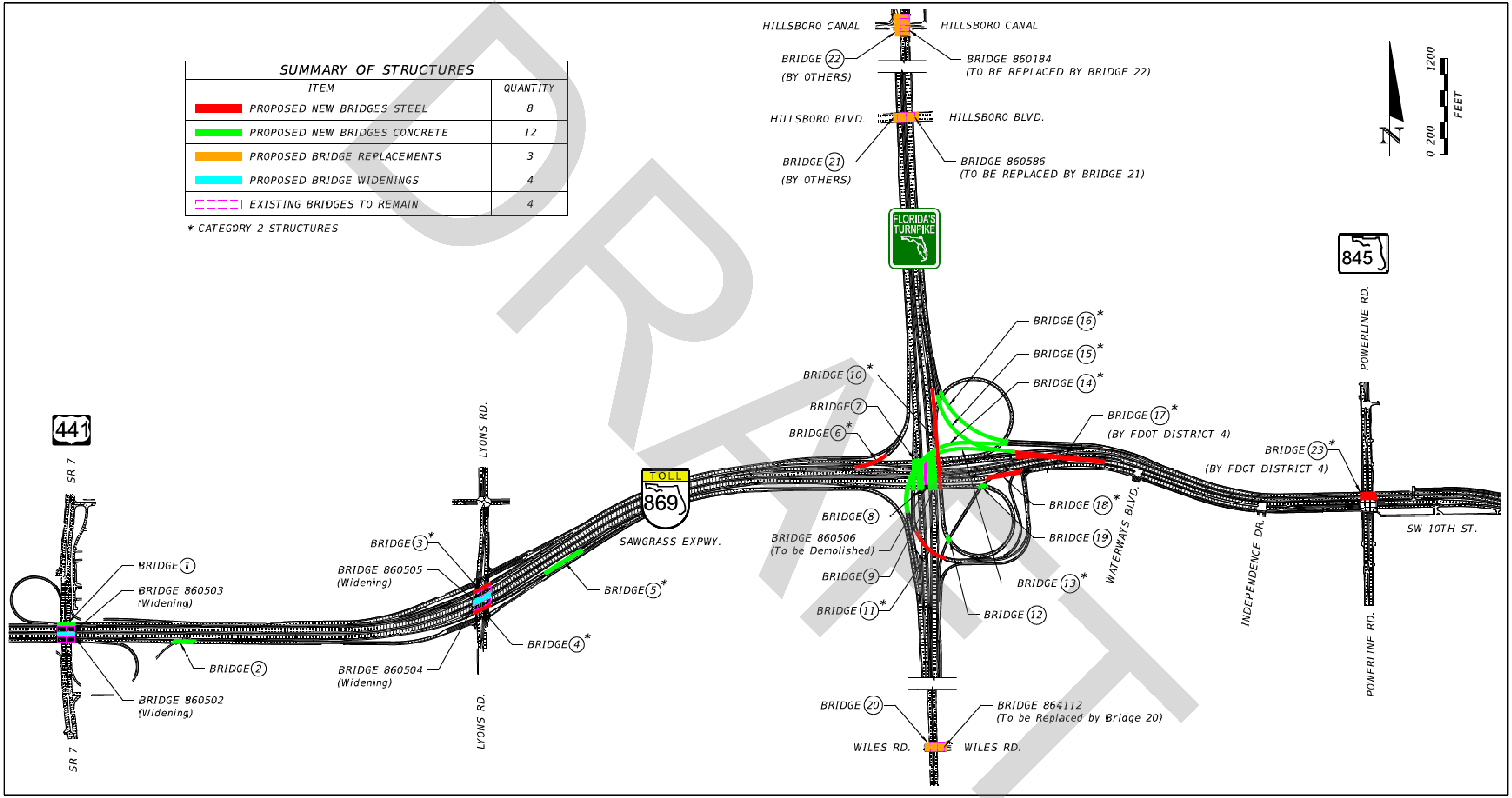


Figure 7.10 – Preferred Alternative Bridge Layout

Table 7.7 – Preferred Alternative Bridge Characteristics

LOCATION			GEOMETRICS				STRUCTURAL				Bridge Category	Bridge Type
Bridge ID No.	**Bridge Location**	**Direction**	**Overall Bridge Length / Span Arrangement (ft)**	**Deck Width (ft)**	**Min. Vertical Clearence**	**Underneath Roadway Designation**	**Number of Spans**	**Max. Span (ft.)**	**Superstructure Type**	**Substructure Type**		
1	CD WB over US 441	WB	112.91 + 112.86 = 225.77	44.67	16.5	US 441/SR-7	2	112.91	Prestressed Concrete Beams	Reinforce Concrete Column Piers and Abutments	1	New
860503	Sawgrass Expwy. WB over 441	WB	112.94 + 112.89 = 225.82	7.33	16.4	US 441/SR-7	2	112.94	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforce Concrete Column Piers	1	Widening
860502	Sawgrass Expwy. EB over 441	EB	113.02 + 112.91 = 225.93	51.33	16.4	US 441/SR-7	2	113.02	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforce Concrete Column Piers	1	Widening
2	CD EB over 441 EB on-ramp to Sawgrass Expwy.	EB	152 + 114 = 266	44.67	16.5	US 441 EB on-ramp	1	152	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforce Concrete Piles and Abutments	1	New
3	CD WB over Lyons Road	WB	250.5	42.67	16.5	SB and NB Lyons Rd.	1	250.5	Steel	Reinforce Concrete Piles and Abutments	1	New
860505	Sawgrass Expwy. WB over Lyons Road	WB	123.36 + 125.35 = 248.71	±44.96	16.5	SB and NB Lyons Rd.	2	125.35	Prestressed Concrete Beams	Reinforce Concrete Column Piers	1	Widening (Partial Demo)
860504	Sawgrass Expwy. EB over Lyons Road	EB	122.79 + 125 = 247.79	±23.95	16.5	SB and NB Lyons Rd.	2	125	Prestressed Concrete Beams	Reinforce Concrete Column Piers	1	Widening
4	CD EB over Lyons Road	EB	244.92	42.67	16.5	SB and NB Lyons Rd.	1	244.92	Steel	Reinforce Concrete Piles and Abutments	1	New
5	Sawgrass Expwy. EB off-ramp to Turnpike over EB on-ramp to Sawgrass Expwy.	EB	142+142+142+120=546	42.67	16.5	EB on-ramp to Sawgrass Expwy.	4 (FIBs)	139 (FIBs)	Prestressed Concrete Beams w/ CIP Concrete Deck	Reinforce Concrete Column Piers	2	New
6	Turnpike SB off-ramp to Sawgrass Expwy. over CD WB	WB	126 + 180 + 126 = 432	44.67	16.5	CD WB to Sawgrass Expwy.	3	180	Steel	Reinforce Concrete Column Piers and Abutments	1	New
7	Turnpike SB off-ramp to SW 10th St. EB	SB	64+116+71+132 = 383	42.67	16.5	WB Sawgrass Expwy. and EB Sawgrass Expwy.	4	132	Prestressed Concrete Beams	Reinforce Concrete Column Piers	2	New
8 (850506)	Turnpike over Sawgrass Expwy.	SB	134+69+116+70 = 389	78.67	16.75	WB Sawgrass Expwy. and EB Sawgrass Expwy.	4	134	Prestressed Concrete Beams	Reinforce Concrete Column Piers	1	Replacement
9 (850506)	Turnpike over Sawgrass Expwy.	NB	143+69+116+75 = 403	Varies 102.67 to 109.42	16.75	WB Sawgrass Expwy. and EB Sawgrass Expwy.	4	143	Prestressed Concrete Beams	Reinforce Concrete Column Piers	1	Replacement
10	Turnpike NB on-ramp from Sawgrass Expwy. EB over Sawgrass Expwy.	NB	199+204+197+250+250+175 = 1275	42.67	16.5	WB Sawgrass Expwy. and EB Sawgrass Expwy.	6	250	Steel	Reinforce Concrete Column Piers and Abutments	2	New
11	Turnpike SB off-ramp to SW 10th St. EB	SB	250+250 =500	42.67	16.5	NB and SB Turnpike	2	250	Steel	Reinforce Concrete Column Piers and Abutments	2	New
12	Turnpike NB on-ramp from Sawgrass Expwy. EB over NB Turnpike off-ramp to EB Sawgrass Expwy. Connector	NB	72	47.67	16.5	NB Turnpike off-ramp to EB Sawgrass Expwy.	1	72	Prestressed Concrete Beams	Reinforce Concrete Piles and Abutments	1	New
13	Local SW 10th Street WB Flyover to Turnpike SB over Turnpike NB on ramp from EB sawgrass Expwy., Bridge 10	WB	245+245+208 = 698	Varies 29.67 to 31.67	16.5	Turnpike NB on ramp from EB sawgrass Expwy., Bridge 10	3	245	Concrete Segmental	Reinforce Concrete Column Piers	2	New
14	SW 10th Street Connector WB to Turnpike SB over NB and SB Turnpike and over on-ramps to Turnpike NB, Flyover Bridges 10 and 15	WB/SB	145+200+245+245+208+208+208+208+146 = 1813	Varies 29.67 to 33.68	16.5	on-ramps to Turnpike NB, Flyover Bridges 10 and 15	9	245	Concrete Segmental	Reinforce Concrete Column Piers and Abutment	2	New
15	Local SW 10th Street WB Flyover ramp to SR91 NB (Beginning at the terminus of Bridge 17) over SR 91 NB off-ramp to SR 869 WB	WB/NB	184+235+235+235+235+191 = 1315	33.67	16.5	Turnpike NB off-ramp to Sawgrass Expwy. WB	6	235	Concrete Segmental	Reinforce Concrete Column Piers and Abutment	2	New
16	SW 10th Street Connector WB on-ramp to Turnpike NB over Turnpike NB off-ramp to Sawgrass Expwy. WB	WB/NB	185+245+245+245+182 = 1102	32.67	16.5	Turnpike NB off-ramp to Sawgrass Expwy. WB	5	245	Concrete Segmental	Reinforce Concrete Column Piers and Abutments	2	New
17*	EB SW 10th St. GP Braid over SW 10th St. ML	WB	119+164+255+130+230+217 = 1115	Varies 58.67 - (58.67+29.67)	16.5	SW 10 st ML	6	255	Steel boxes	Reinforce Concrete Column Piers and Abutments	2	New
18	EB off-ramp to Waterways over NB Turnpike off-ramp to EB Sawgrass Expwy. Connector and Turnpike SB off-ramp to Sawgrass Expwy EB	EB	218+224 = 442	58.67	16.5	NB Turnpike off-ramp to EB Sawgrass Expwy. Connector and Turnpike SB off-ramp to Sawgrass Expwy. EB	2	224	Steel	Reinforce Concrete Column Piers and Abutments	2	New
19	Sawgrass Expwy. EB off-ramp to NB Turnpike over NB Turnpike off-ramp to EB Sawgrass Expwy.	EB	78	47.67	16.5	NB Turnpike off-ramp to EB Sawgrass Expwy.	1	78	Prestressed Concrete Beams	Reinforce Concrete Piles and Abutments	1	New
20 (864112)	Wiles Rd over Turnpike	EB/WB	120+153 = 273	115.42	16.5	Turnpike NB and SB	2	153	Prestressed Concrete Beams	Reinforce Concrete Piles and Abutments	1	Replacement
21 (860586)*	Hillsboro Boulevard EB/WB over SR 91	EB/WB	129 + 194 = 323	118.92	16.5	SR 91	2	193.88	Prestressed Concrete Beams	Reinforced concrete pers on piles and drilled shaft	1	Replacement
22(860184)*	SR869 over Hillsboro Canal	NB/SB	407.5	178.67	8' min over CS-17w Building roof	Hillsboro Canal	4	140'	Prestressed Concrete Beams	Pile cap supported on piles	1	Replacement
23*	SW 10th St. ML over Powerline Road	EB/WB	221.81	100.67	16.5	Powerline Rd	1	221.81	Steel boxes	Reinforce Concrete Piles and Abutments	1	New

Note: EB - Eastbound, WB - Westbound, NB - Northbound, SB - Southbound, CD - Collector Distributer, FIB - Florida I-Beam, PT – Postension / *By others

7.17 Transportation Management Plan

A project segmentation approach was performed for the preferred alternative. The evaluation consisted of the following steps:

1. Identified Logical Project Splits
2. Prepared Conceptual Layouts
3. Developed Construction Costs Estimates (LRE)
4. Validated Projects and Segmentations
5. Conducted a Delivery Method Assessment
6. Developed Preliminary Construction Schedule
7. Summarized Segmentation Plan

The evaluation recommended two projects (see ***Figure 7.11***):

- Project 1 – Sawgrass Expressway Corridor
    - Sawgrass Expressway mainline and collector distributor roadway systems
    - US 441 Interchange improvements
    - Lyons Road Interchange improvements
    - Florida's Turnpike Interchange Improvements, existing ramps to and from the west only

The benefit of this project is that it can be constructed as one single corridor project. It eliminates temporary transitions between different corridor projects. One single corridor project reduces overall construction time and allows for tolling integration under a single project. It provides the flexibility to transition the east end of the project into the SW 10th Street Connector project and Project 2. This project has complex geometry, multiple interchanges, collector distributor roadway systems and multiple tolling points. Complexity of the project allows for multiple design segments and innovative construction sequencing to reduce overall project time and minimize risks. Therefore, the recommended delivery method is Adjusted Score Design Build.

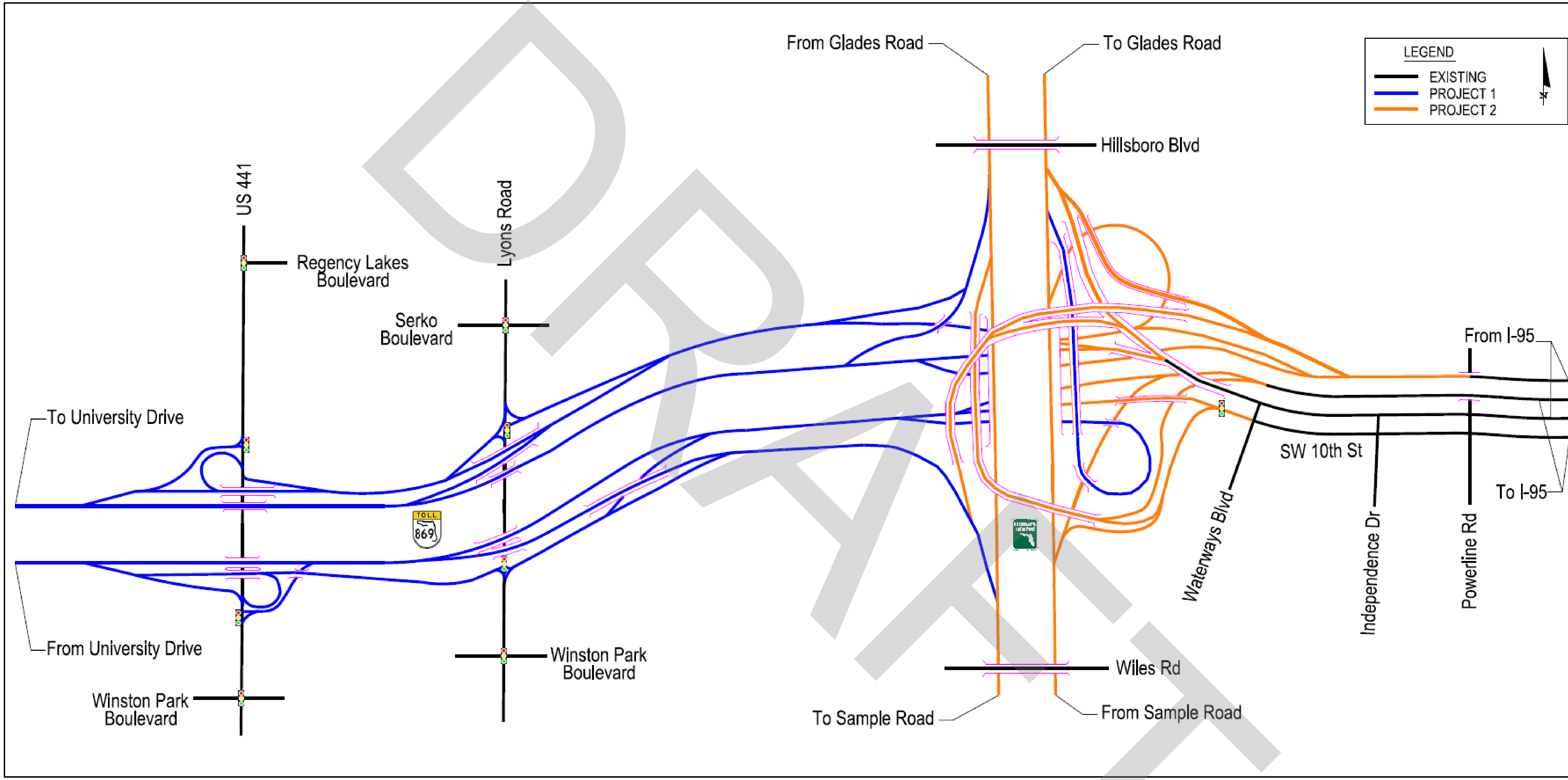


Figure 7.11 – Project Segmentation Line Diagram

- Project 2 – Florida's Turnpike Corridor
  - Florida's Turnpike mainline
  - Sawgrass Expressway/Florida's Turnpike Interchange, new ramps to and from the east only
  - FGT Lines Relocation

The FGT lines relocation will occur before constructing Project 2. The construction of the projects to the east and west will begin before Project 2. FGT equivalent plans will be needed to acquire right of way and get approval from FGT to relocate the lines. The advantage of constructing this project at once is that it provides the ability to deliver all the new interchange improvements, including the missing movements to and from the east, and avoids rework of the Florida's Turnpike mainline during future projects. The recommended delivery method is Design Bid Build. This delivery method allows for maximum flexibility to accommodate the FGT line relocation.

A detailed Conceptual Transportation Management Plan will be prepared during the Design phase once the projects are segmented further. The plan will evolve as the project progresses towards construction. The plan must include traffic control strategies and may also include additional work zone management strategies based upon the expected work zone impacts.

7.18 Constructability

A preliminary construction phasing plan was evaluated as part of this PD&E Study to determine constructability and the ability to maintain traffic for the preferred alternative. Many of the components required to develop a plan will be developed in accordance with FDOT standards during the subsequent phases of the project. The plan proposes to keep all travel lanes always open during construction. Short lane closures may be necessary during off-peaks to change construction phases. Advance notice of any lane closure will be given to minimize disruption to roadway users. ***Figure 7.12*** and ***Figure 7.13*** depict the preliminary construction phasing plan for each project. The construction of the SW 10th Street project is expected to be completed before Projects 1 and 2.

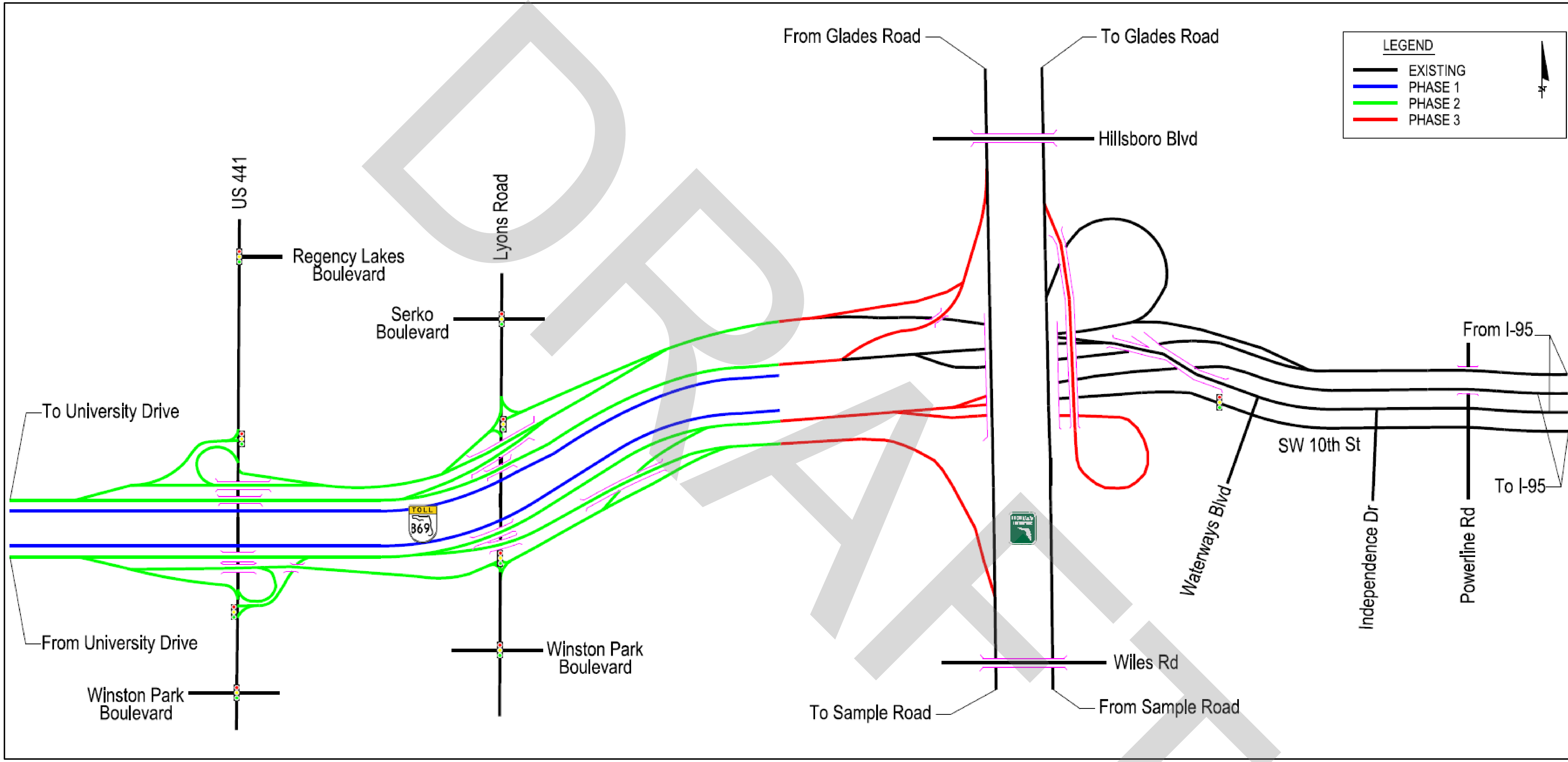


Figure 7.12 – Project 1 Phasing Line Diagram (Sawgrass Expressway Corridor)

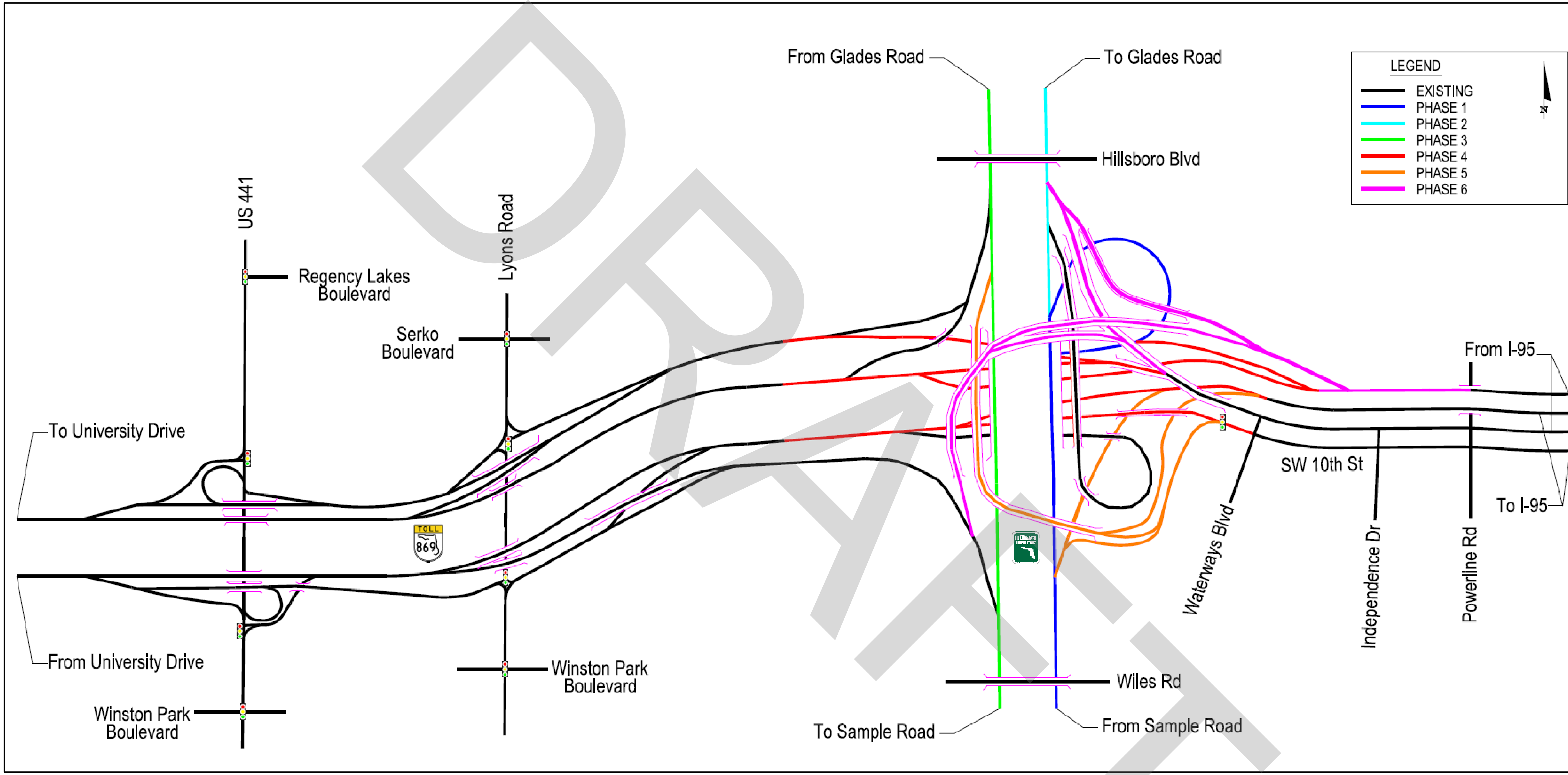


Figure 7.13 – Project 2 Phasing Line Diagram (Florida's Turnpike Corridor)

Project 1 – Sawgrass Expressway Corridor

- Phase 1 – Shift traffic to the outside by reducing travel lane and shoulder widths to construct the inside proposed widening sections.
- Phase 2 – Shift traffic to the inside with reduced travel lane and shoulder widths to construct the outside proposed widening sections. The collector distributor roadway systems and ramp modifications will also be constructed during this phase.
- Phases 1 and 2 will be constructed from west to east. The eastern limit will end just before the existing mainline Deerfield Plaza toll sites, keeping tolling operations during construction. The new toll sites replacing these toll sites will also be constructed during these two phases.
- Phase 3 – Construct the Florida's Turnpike Interchange existing ramp Improvements, ramps to and from the west. Before beginning phase 3, existing toll sites will be shut down and all the new toll sites constructed under phases 1 and 2 will begin operations.

Project 2 – Florida's Turnpike Corridor

- Phase 1 – Construct northbound mainline lanes from Wiles Road to the Sawgrass Expressway westbound off-ramp loop exit. This phase also constructs the loop ramp improvements. After the phase is complete, this traffic stream will be shifted to the new northbound lanes and ramp.
- Phase 2 - Construct northbound mainline lanes from the Sawgrass Expressway westbound off-ramp loop exit to the County Line. After the phase is complete, northbound traffic will be shifted to the outside to the new northbound lanes.
- Phase 3 – Southbound traffic will be moved to the former existing northbound lanes while the existing southbound lanes are demolished and reconstructed.
- Phase 4 – Construct the east/west ultimate roadway conditions connecting Project 1 with SW 10th Street.
- Phase 5 – Construct the following four ramps:
    - Florida's Turnpike southbound to SW 10th Street Connector eastbound
    - Florida's Turnpike southbound to SW 10th Street eastbound
    - Florida's Turnpike northbound to SW 10th Street Connector eastbound
    - Florida's Turnpike northbound to SW 10th Street eastbound
- Phase 6 – Construct the following four ramps:

- SW 10th Street Connector westbound to Florida's Turnpike northbound
- SW 10th Street Connector westbound to Florida's Turnpike southbound
- SW 10th Street westbound to Florida's Turnpike northbound
- SW 10th Street westbound to Florida's Turnpike southbound

Construction phases will include temporary concrete barrier systems and temporary retaining walls (as needed) to separate the construction working zones from traffic. Some phases and/or components of other phases may be able to be constructed simultaneously with other phases to accelerate the construction.

7.19 Construction Impacts

Wetlands – Under the preferred alternative, 0.8 acres of unavoidable impacts are anticipated to wetlands and wood stork Suitable Foraging Habitat. Those impacts include 0.16 acre of impacts to areas mapped by SFWMD as Reservoirs (FLUCCS 5300), 0.57 acre of impacts to Emergent Aquatic Vegetation (FLUCCS 6440), and 0.07 acre of impacts to area mapped as Freshwater Marshes/Graminoid Prairie (FLUCCS 6410).

Public Facility – Quiet Waters Park is located in the northeast quadrant of the Sawgrass Expressway/Florida's Turnpike Interchange. Acquisition of new right of way is proposed under the preferred alternative along the southern and western edges of Quiet Waters Park. A temporary construction easement may be needed to construct parts of the project and to possibly relocate the two FGT lines.

Noise and Access – Temporary effects during construction that could affect disadvantaged or historically marginalized populations include construction-related traffic congestion, temporary travel pattern disruptions, noise, and difficult pedestrian street crossings. Best Management Practices will be employed during construction to minimize impacts.

Contamination – A total of 19 sites of potential contamination risk were identified, including seven Medium Risk, and 12 Low Risk sites. None of these potentially contaminated sites are proposed for right of way acquisition. Level II Contamination Assessment investigations are recommended where proposed dewatering or subsurface work (e.g., pole foundations, drainage features, soil excavation, etc.) would occur at or adjacent to any sites rated High or Medium Risk. If dewatering is necessary during construction, a SFWMD Dewatering Permit will be required. The contractor will be held responsible for ensuring compliance with any necessary dewatering permit(s). A dewatering plan will be necessary to avoid potential exacerbation of any contamination plumes. All permits will be obtained in accordance with Federal, state, and local laws and regulations, and in coordination with the District Contamination Impact Coordinator.

7.20 Special Features

The corridor currently has noise walls. These noise walls and new ones have been evaluated as part of a Noise Study Analysis. ***Appendix O*** depicts the preliminary reasonable and feasible noise barrier locations. As to aesthetics, the proposed walls will match the theme and features of the existing walls along the project corridor.

A Noise Study Report (NSR) was prepared for this project and the findings of the study are provided below. For the year 2045 proposed build conditions, noise levels were modeled in the Federal Highway Administration (FHWA) Traffic Noise Model (TNM) at 1,269 receptor locations representing 3,660 residential and 262 special land use noise sensitive sites. Noise levels at 1,584 residences and 130 nonresidential "special land use" sites are predicted to approach or exceed the Noise Abatement Criteria (NAC) for the year 2045 Preferred Alternative and are therefore considered "impacted."

Within the study area, twelve existing or planned noise barriers will be retained in the future design. To determine if noise barriers were feasible and reasonable in areas with existing/planned barriers, the base condition for determining impacts and benefits in the barrier analysis assumed no barriers as part of the Preferred Alternative.

Within the study area, twelve existing or planned noise barriers on adjoining projects (Florida's Turnpike Widening project FPID# 415927-4 from the Sawgrass Expressway to the Broward/Palm Beach County Line and FDOT District 4 SW 10th Street Connector Lanes project FPID# 436964-1) will be retained in the future design. To determine if noise barriers were feasible and reasonable in areas with existing/planned barriers, the Existing Noise Barrier Methodology was used to analyze an area with an existing/planned barrier or where a noise barrier system will be in place in the design year.

The first step in this analysis was to determine if there are impacts behind existing or planned noise barriers in the future build condition. For five barrier locations no impacts were predicted behind existing or planned noise barriers. Those five existing or planned noise barriers were considered fully effective and no additional noise analyses were conducted for those areas.

Existing or planned noise barriers in seven other locations still had impacts that were not benefited by the existing or planned noise barriers. In these locations the base condition for determining impacts and benefits in the barrier analysis assumed no barriers as part of the Preferred Alternative. For consistency with other FDOT projects, the criteria for reasonableness and feasibility were applied to a future condition that included both existing and new barriers compared against this "no-barrier" condition. It should be noted that not all the existing barriers are adequate by themselves to eliminate all noise impacts behind those barriers within this project. Therefore, additional new barriers were considered to supplement these existing noise barriers being retained, where applicable.

Analyses of the impacted locations were performed to determine if noise abatement was feasible and reasonable under FDOT policy, including the no-barrier analysis of existing noise barriers. The noise barrier analysis performed to date indicates that noise barriers could potentially provide reasonable and feasible noise abatement for 1,381 of the 1,584 impacted residences (including existing barrier "no-barrier" analysis impacts), as well as provide a 5 dB(A) noise reduction benefit to 810 non-impacted residences. Noise abatement was not determined feasible and reasonable for any of the 130 impacted special use sites; however, some of the special use locations will receive incidental benefits from noise barriers for the residential areas.

The Florida Department of Transportation is committed to the construction of feasible and reasonable noise abatement measures at the noise impacted locations identified in Table 4.1 of the Noise Study Report contingent upon the following conditions:

1. Final recommendations on the construction of abatement measures is determined during the project's final design and through the public involvement process
2. Detailed noise analyses during the final design process support the need, feasibility and reasonableness of providing abatement
3. Cost analysis indicates that the cost of the noise barrier(s) will not exceed the cost reasonable criterion
4. Community input supporting types, heights, and locations of the noise barrier(s) is provided to the District Office
5. Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed and any conflicts or issues resolved

For all the reasons outlined above, it was determined that the project will have no substantial impact on noise.

The preferred alternative will include mechanically stabilized earth (MSE) walls for most of the bridge approaches.

The widening of both corridors will impact existing landscape on both sides of the right of way. The existing landscaping will be evaluated for relocation prior to construction. Final landscaping plans will be developed during the Design phase of the project.

7.21 Utilities

A preliminary evaluation of potential impacts to utilities was performed based on the proposed improvements. Additional conflicts may be identified during the Design phase due to proposed drainage, lighting, noise walls, signals, foundations, or any other future design changes that are not included in the preferred alternative. Subsurface Utility Engineering (SUE) for vertical and horizontal information will provide the necessary data to make decisions regarding relocations for potential utility conflicts.

Most of the Utility Agency Owner (UAO) facilities appear located in FTE right of way by permit, except for the Florida Gas Transmission (FGT) pipelines, AT&T Corporation long lines, and Florida Power and Light (FPL) transmission facilities. The FGT gas pipelines are in the FTE right of way under the August 2013 Agreement and Global Settlement. More than 90 percent of the total utility relocation costs result from the relocation of the FGT gas pipelines. The Florida's Turnpike corridor proposed widening will impact the two existing FGT gas pipelines east of the corridor. To accommodate the additional lanes, the pipelines are proposed to be moved east mostly within existing right of way, preserving the required 60-foot wide specified width in accordance with the August 2013 Agreement and Global Settlement. Within the Sawgrass Expressway Interchange, the pipelines will be moved about 45' underground within the existing right of way for a distance of one mile. The FGT relocation costs will be funded 50% by FGT and 50% by FTE. Additional coordination with FGT will continue during the Design phase to identify the final locations of the gas pipelines.

AT&T Corporation long line facilities are in an easement in the Florida's Turnpike median and will also be impacted. All impacted utilities will be relocated prior to construction. Coordination with all the UAOs will continue through the Design phase.

Most utility conflicts were identified at major intersections where facilities cross below proposed retaining walls, bridges, and areas with roadway being widened. Drainage swales and ponds also contribute to the anticipated relocation costs.

Table 7.8 summarizes the utility impacts. FGT relocation costs listed in ***Table 7.8*** were calculated and provided by FGT directly to FTE.

Table 7.8 – Utility Impact Cost Estimate

Utility Agency Owner	Description	Area of Conflict	General Location	Station (to/from)	Conflict with	Cost Estimate
Advanced Cable Communications, DBA Blue Stream						
Advanced Cable Communications, DBA Blue Stream	CATV	US 441 Mainline	Crossing Sawgrass Expy at US 441	22+00 to 25+50	Roadway retaining walls	$ 91,000.00
					Subtotal	$ 91,000.00
AT&T Distribution						
AT&T Distribution	2-4" PVC	US 441 Mainline	Crossing Sawgrass Expy Northbound Frontage Rd east side of US 441	16+20 to 17+60	Drainage swale	$ 72,800.00
AT&T Distribution	OT	US 441 Mainline	East side of US 441 south of Sawgrass Expy	18+00 to 21+00	Drainage pond	$ 7,800.00
AT&T Distribution	2-4" PVC	US 441 Mainline	Crossing Sawgrass Expy along east side of US 441	22+00 to 25+50	Bridge retention and widening	$ 182,000.00
AT&T Distribution	Buried Copper	US 441 Mainline	Crossing Sawgrass Expy along east side of US 441	22+00 to 25+50	Bridge retention and widening	$ 91,000.00
AT&T Distribution	2-4" PVC	Sawgrass Expressway Mainline	North side	1136+00 to 1143+00	Drainage swale	$ 364,000.00
AT&T Distribution	2-4" PVC	Sawgrass Expressway Mainline	North side of Sawgrass Expy west of TPK intersection	1143+50 to 1146+00	Roadway retaining walls	$ 130,000.00
AT&T Distribution	2-4" PVC	Sawgrass Expressway Mainline	North side of Sawgrass Expy west of TPK SB lane	1151+30 to 1151+50	ITS Equipment	$ 10,400.00
AT&T Distribution	2-4" PVC	Sawgrass Expressway Mainline	Crossing TPK along north side of Sawgrass Expy	1151+50 to 1155+00	Bridge columns, retention and widening	$ 182,000.00
AT&T Distribution	2-4" PVC	Sawgrass Expressway Mainline	North side	1160+50	Roadway retaining walls	$ 52,000.00
AT&T Distribution	2-4" PVC	Sawgrass Expressway Mainline	North side	1165+00 to 1170+00	Bridge columns and retention	$ 260,000.00

Table 7.8 – Utility Impact Cost Estimate (Continued)

Utility Agency Owner	Description	Area of Conflict	General Location	Station (to/from)	Conflict with	Cost Estimate
AT&T Distribution	Buried Copper	Sawgrass Expressway Mainline	South side	1167+50 to 1169+00	Roadway retaining wall	$ 39,000.00
AT&T Distribution	6-4" PVC	TPK Mainline	Crossing TPK at Hillsboro Blvd. north side	5680+50	Roadway barrier walls	$ 514,800.00
AT&T Distribution	Buried Copper	Lyons Rd Mainline	Crossing Sawgrass Expy along the west side of Lyons Rd mainline	28+00 to 32+00	Bridge retention and roadway widening	$ 104,000.00
AT&T Distribution	3-4" PVC	Lyons Rd Mainline	Crossing Sawgrass Expy along the west side of Lyons Rd mainline	28+00 to 32+00	Bridge retention and roadway widening	$ 312,000.00
					Subtotal	$ 2,009,800.00
AT&T Transmission						
AT&T Transmission	2-2" PVC	TPK Mainline	West side of TPK south of Sawgrass Expy	5622+00 to 5629+00	Roadway retaining walls, roadway widening, ITS equipment	$ 182,000.00
AT&T Transmission	2-2" PVC	TPK Mainline	West side of TPK crossing Sawgrass Expy	5633+00 to 5637+00	Roadway retaining walls, bridge retention and bridge columns	$ 104,000.00
					Subtotal	$ 286,000.00
City of Coconut Creek						
City of Coconut Creek	12" DIP Water	US 441 Mainline	East side of US 441 south of Sawgrass Expy	14+00 to 15+50	Drainage swale	$ 37,050.00
City of Coconut Creek	16" DIP Sewer FM	US 441 Mainline	East side of US 441 south of Sawgrass Expy	14+00 to 15+50	Drainage swale	$ 36,075.00
City of Coconut Creek	12" DIP Water	US 441 Mainline	East side of US 441 south of Sawgrass Expy	16+35 to 16+75	Drainage swale	$ 9,880.00
City of Coconut Creek	16" DIP Sewer FM	US 441 Mainline	East side of US 441 south of Sawgrass Expy	16+35 to 16+75	Drainage swale	$ 9,620.00

Table 7.8 – Utility Impact Cost Estimate (Continued)

Utility Agency Owner	Description	Area of Conflict	General Location	Station (to/from)	Conflict with	Cost Estimate
City of Coconut Creek	12" DIP Water	US 441 Mainline	Crossing Sawgrass Expy Northbound Frontage Rd east side of US 441	18+00 to 22+00	Drainage pond	$ 98,800.00
City of Coconut Creek	16" DIP Sewer FM	US 441 Mainline	Crossing Sawgrass Expy Northbound Frontage Rd east side of US 441	18+00 to 22+00	Drainage pond	$ 96,200.00
City of Coconut Creek	12" DIP Water	US 441 Mainline	Crossing Sawgrass Expy along east side of US 441	22+00 to 25+50	Bridge retention and widening	$ 86,450.00
City of Coconut Creek	16" DIP Sewer FM	US 441 Mainline	Crossing Sawgrass Expy along east side of US 441	22+00 to 25+50	Bridge retention and widening	$ 84,175.00
City of Coconut Creek	12" DIP Water	Sawgrass Expy Mainline	Crossing Sawgrass Expy	1071+00	Roadway retaining wall and widening	$ 79,040.00
City of Coconut Creek	24" DIP Sewer FM	Lyons Rd Mainline	Crossing Sawgrass Expy along west side of Lyons Rd	28+00 to 32+00	Bridge retention and roadway widening	$ 130,000.00
City of Coconut Creek	18" DIP Water	Lyons Rd Mainline	Crossing Sawgrass Expy along west side of Lyons Rd	28+00 to 32+00	Bridge retention and roadway widening	$ 122,200.00
City of Coconut Creek	12" DIP Water	Sawgrass Expy Mainline	Crossing Sawgrass Expy	1111+00	Roadway retaining walls and widening	$ 86,450.00
					Subtotal	$ 875,940.00
City of Deerfield Beach						
City of Deerfield Beach	Water, Sewer	All facilities are within future SW 10th Street Connector Project and are subject to future coordination.				
					Subtotal	TBD
Comcast						
Comcast	BCATV	US 441 Mainline	East side of US 441 south of Sawgrass Expy	16+30 to 17+50	Drainage swale	$ 31,200.00

Table 7.8 – Utility Impact Cost Estimate (Continued)

Utility Agency Owner	Description	Area of Conflict	General Location	Station (to/from)	Conflict with	Cost Estimate
Comcast	BCATV	US 441 Mainline	Crossing Sawgrass Expy along east side of US 441	22+00 to 25+50	Bridge retention and widening	$ 91,000.00
Comcast	BCATV	US 441 Mainline	Crossing Sawgrass Expy along west side of US 441	22+00 to 25+50	Bridge retention and widening	$ 91,000.00
Comcast	BCATV	Lyons Rd Mainline	Crossing Sawgrass Expy along west side of Lyons Rd	28+00 to 32+00	Bridge retention and roadway widening	$ 104,000.00
Comcast	BCATV	TPK Mainline	Crossing TPK	5681+00	Bridge retention	$ 54,600.00
Comcast	BCATV	Sawgrass Expy Mainline	South side of Sawgrass Expy Mainline west of Waterways Blvd. intersection	1179+00 to 1179+50	ITS Conduit crossing	$ 13,000.00
					Subtotal	$ 371,800.00
Crown Castle						
Crown Castle	BFOC	US 441 Mainline	East side of US 441 south of Sawgrass Expy	16+30 to 17+50	Drainage swale	$ 31,200.00
Crown Castle	BFOC	US 441 Mainline	Crossing Sawgrass Expy along east side of US 441	22+00 to 25+50	Bridge retention and widening	$ 91,000.00
					Subtotal	$ 122,200.00
Florida Gas Transmission						
Florida Gas Transmission	18" Gas	TPK Mainline	East side of TPK south of Sawgrass Expy crossing	5590+00 to 5706+00	Roadway walls and grade change	$ 44,000,000.00
Florida Gas Transmission	24" Gas	TPK Mainline	East side of TPK south of Sawgrass Expy crossing	5590+00 to 5706+00	Roadway barrier wall	$ 44,000,000.00
					Subtotal	$ 88,000,000.00
FP&L Distribution						
FP&L Distribution	BE	Sawgrass Expy Mainline	North R/W	1024+50 to 1028+50	Drainage swale	$ 104,000.00
FP&L Distribution	OE	US 441 Mainline	East side of US 441 south of Sawgrass Expy	17+80 to 21+00	Drainage pond	$ 45,000.00

Table 7.8 – Utility Impact Cost Estimate (Continued)

Utility Agency Owner	Description	Area of Conflict	General Location	Station (to/from)	Conflict with	Cost Estimate
FP&L Distribution	BE	US 441 Mainline	East side of US 441 south of Sawgrass Expy	20+00 to 21+00	Drainage pond	$ 26,000.00
FP&L Distribution	BE	US 441 Mainline	East side of US 441 south of Sawgrass Expy	21+00 to 22+00	Drainage pond	$ 26,000.00
FP&L Distribution	BE	US 441 Mainline	Crossing Sawgrass Expy along east side of US 441	22+00 to 25+50	Bridge retention and widening	$ 91,000.00
FP&L Distribution	BE	Sawgrass Expy Mainline	Crossing Sawgrass Expy	1068+00	Roadway retaining wall and widening	$ 52,000.00
FP&L Distribution	BE	Lyons Rd Mainline	West side of Lyons Rd south of Sawgrass Expy	25+50 to 26+50	Drainage swale	$ 26,000.00
FP&L Distribution	BE	Lyons Rd Mainline	Crossing Sawgrass Expy along west side of Lyons Rd	28+00 to 32+00	Bridge retention and roadway widening	$ 104,000.00
FP&L Distribution	OE	Sawgrass Expy Mainline	North side of Sawgrass Expy west of TPK intersection	1136+00 to 1141+00	Drainage swale	$ 45,000.00
FP&L Distribution	OE	TPK Mainline	Crossing TPK	5681+50	Roadway wall barriers and widening	$ 30,000.00
					Subtotal	$ 549,000.00
Lumen						
Lumen	12-1.25" PVC Conduits (FOC)	US 441 Mainline	East side of US 441 south of Sawgrass Expy	16+30 to 17+50	Drainage swale	$ 234,000.00
Lumen	12-1.25" PVC Conduits (FOC)	US 441 Mainline	Crossing Sawgrass Expy along east side of US 441	22+00 to 25+50	Bridge retention and widening	$ 682,500.00
					Subtotal	$ 916,500.00

Table 7.8 – Utility Impact Cost Estimate (Continued)

Utility Agency Owner	Description	Area of Conflict	General Location	Station (to/from)	Conflict with	Cost Estimate
			SICE, Inc.			
SICE, Inc.	3-1.25" BFOC	Sawgrass Expy Mainline	South side of Sawgrass Expy	1109+50 to 1116+00	Roadway retaining wall	$ 338,000.00
SICE, Inc.	1-2" BE	Sawgrass Expy Mainline	South side of Sawgrass Expy	1109+50 to 1116+00	Roadway retaining wall	$ 169,000.00
					Subtotal	$ 507,000.00
			TECO Peoples Gas			
TECO Peoples Gas	Gas	US 441 Mainline	Crossing Sawgrass Expy along west side of US 441	22+00 to 25+50	Bridge retention and widening	$ 84,175.00
					Subtotal	$ 84,175.00
					TOTAL	**$ 93,306,415.00**

Final design activities should consider the following:

1. The accurate location and designation of all underground and aerial facilities to confirm or clear each conflict.
2. Design improvements that avoid existing utilities where possible and minimize the impact to these facilities, particularly at major intersections.
3. Phasing of utility relocation work to clear utility conflicts before construction starts in each segment of the project.
4. Plan to minimize the duration of service disruptions to the community due to relocation work. These disruptions should only be allowed during periods of minimum usage.
5. Removing Occupational Safety and Health Administration (OSHA) crane conflicts, utilize appropriate low overhead construction techniques/operations.

7.22 Cost Estimates

The PD&E Study developed a project cost estimate for the preferred alternative. The estimated construction cost was generated using the FDOT Long Range Estimate (LRE) cost estimating system. The project cost estimate includes the major cost components typically associated with highway construction and right of way acquisition. The total cost estimate for the preferred alternative is approximately $989 million. ***Table 7.9*** summarizes the construction cost estimate and total cost estimate. These costs are preliminary in nature and will be refined as the project enters subsequent transportation phases.

Table 7.9 – Total Cost Estimate

Category	Cost
Construction Cost	$768 million
Construction Engineering and Inspection (10%)	$76 million
Design (6%)	$46 million
Right of Way	$6 million
Utilities	$93 million
Total Cost Estimate	$989 million

Note: Estimate does not include environmental cost.

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