FDOT

PRELIMINARY ENGINEERING REPORT

Project Development & Environment (PD&E) Study

GOLDEN GLADES INTERCHANGE

from SR 826 / Palmetto Expressway Eastbound to I-95 Northbound

Financial Management No.: 428358-1-22-01
Efficient Transportation Decision Making (ETDM) No.: 11300

September 2014

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From SR 826/Palmetto Expressway Eastbound to I-95 Northbound
Miami-Dade County, Florida

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Prepared for
Florida Department of Transportation - District Six
Miami, Florida

Prepared by:

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September 2014

I hereby certify that I am a registered professional engineer in the State of Florida practicing with Stantec Consulting Services Inc., a corporation, authorized to operate as an engineering business (EB 00027013), FEID No. 65-0039493001, by the State of Florida, Department of Professional Regulation, Board of Professional Engineers, and that I have reviewed or approved the evaluation, findings, opinions, conclusions, or technical advice hereby reported for:

Project:	Project Development and Environment (PD&E) Study for Golden Glades Interchange from SR 826/Palmetto Expressway Eastbound to I-95 Northbound
FPID:	428358-1-22-01
ETDM:	11300
FAP:	N/A
Location:	Miami-Dade County, Florida
Client:	Florida Department of Transportation District Six

This preliminary engineering report contains detailed engineering information that fulfills the purpose and need for the Golden Glades Interchange Project Development and Environment (PD&E) Study (FPID 428358-1-22-01). 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 and planning as applied through professional judgment and experience.

Name: Robert T. Carballo, P.E.

Signature:

P.E. Number: 42502

Date: 4/1/14

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1. SUMMARY OF PROJECT

This preliminary engineering report contains detailed engineering information that fulfills the purpose and need for the Golden Glades Interchange Project Development and Environment (PD&E) Study (FPID 428358-1-22-01). The Class of Action for this project is **Type 2 Categorical Exclusion** and has been developed in compliance with Title VI of the Civil Rights Act of 1964 and other federal and state nondiscrimination authorities. Neither FDOT nor this project will deny the benefits of, exclude from participation in, or subject to discrimination anyone on the basis of race, color, national origin, age, sex, disability, or family status.

1.1 Project Description

The Golden Glades Interchange (GGI), located in northeastern Miami-Dade County in Florida, is of regional importance providing connectivity to six major principal arterials and/or limited access expressway facilities including Interstate 95 (I-95), SR 826/Palmetto Expressway, Florida's Turnpike, SR 9, SR 7/US 441 and NW 167th Street. The project study area encompasses the GGI and portions of the major transportation corridors that converge at this interchange (see **Figure 1-1**). Given the nature of the GGI, the approximate equivalent length of the ramp and mainline components within the interchange area equate to over ten miles of roadway. The GGI also supports the I-95 Express Lanes System and the Golden Glades Multimodal Facility, which provides access to inter-county transit service including the existing GGI to Downtown Miami-Dade express bus service. The GGI has a direct impact on inter-county travel between Miami-Dade, Broward and Palm Beach Counties and is the backbone for the transportation of goods and services, as well as passenger trips in the northeast region of Miami-Dade County. This interchange is bordered by the City of Miami Gardens to the north and west, the City of North Miami Beach to the east and the Golden Glades Census Designated Place (CDP) and City of North Miami to the south. The South Florida Rail Corridor (SFRC) also traverses the interchange area.

Currently, there is no dedicated system-to-system connection from SR 826/Palmetto Expressway eastbound to I-95 northbound. The existing network connection for this system-to-system movement includes the use of surface streets with tight radii, traffic signals, and weaving segments that considerably slow down traffic through this interchange. In addition, southbound Florida's Turnpike connects to I-95 southbound via a two-lane ramp that transition to a single lane prior to merging with the SR 826/Palmetto Expressway eastbound to southbound movement. The lane drop combined with weaving movements from SR 826/Palmetto Expressway has resulted in peak period backups that extend beyond the Florida's Turnpike Golden Glades Mainline Toll Plaza.

Figure 1-1 Project Study Area

Over the years, this interchange and the surrounding multimodal facilities have been studied for the purpose of improving traffic operations and increasing user benefits by reducing congestion, increasing connectivity and improving travel delay caused by the circuitous routes in existence today. The Florida Department of Transportation (FDOT) District Six has also been evaluating, and in some cases implementing, modifications to existing ramp configurations to improve traffic operations within the GGI. This is evident by the improvements recently completed at the I-95 northbound ramps to Florida's Turnpike and westbound SR 826/Palmetto Expressway (FPID: 415456-4) and other planned operational and safety improvements along various interchange ramps (FPID: 425637-1 & 429134-1).

This GGI Project Development and Environment (PD&E) Study will focus on the development and evaluation of alternatives for a new system-to-system connection from SR 826/Palmetto Expressway eastbound to I-95 northbound and the feasibility of increasing the capacity of the southbound movement of the Florida's Turnpike to I-95 southbound to address traffic operations and safety issues and enhance multimodal (transit and freight) use. The study will also accommodate the connectivity of a potential express lanes system for SR 826/Palmetto Expressway and how it will connect to the existing I-95 Express Lanes system. The express lanes along SR 826/Palmetto Expressway are currently being evaluated under a separate adjacent PD&E Study (FPID: 418423-1-22-01). The PD&E concepts developed will be utilized to support the express lanes concepts being developed under the SR 826/Palmetto Expressway mainline PD&E Study, as well as to establish an Ultimate Master Plan for the interchange.

1.2 Purpose and Objectives

The primary purpose of this project is to provide a system-to-system connection for the SR 826/Palmetto Expressway eastbound to I-95 northbound movement and to improve the Florida's Turnpike southbound to I-95 southbound connection in order to address traffic operations and safety issues and enhance multimodal use for both transit and freight. The ultimate phase will evaluate a system-to-system connection between new express lanes on SR 826/Palmetto Expressway and the existing I-95 Express Lanes system. It also considers a direct future connection from southbound Florida's Turnpike to the southbound I-95 Express Lanes. The feasibility of express lanes along SR 826/Palmetto Expressway is currently being evaluated under a separate adjacent PD&E Study (FPID: 418423-1-22-01, ETDM #11241). In addition, interim operational improvements will also be identified within the GGI to be developed as integral components of an Ultimate Master Plan to be established for this interchange. The overall objectives of this PD&E Study include the following elements:

- Improve critical access to the Strategic Intermodal Systems (SIS) Facilities, Freight Activity Centers, Local and Regional Businesses / Hubs of Economic Importance
- Enhance safety, mobility and circulation

- Incorporate express lanes, bus rapid transit and multimodal options
- Address Transportation Systems Management and Operation concerns
- Address operational and physical deficiencies of the interchange
- Establish an Ultimate Master Plan
- Incorporate anticipated improvements into the Local Comprehensive Plan
- Maximize operational benefits with limited funds through a Master Plan
- Develop an implementation program
- Obtain Location Design Concept Acceptance (LDCA) from FHWA for the Interim Improvements

1.3 Need for the Project

1.3.1 Transportation Demand

The GGI connects major freeways and arterials including I-95, SR 826/Palmetto Expressway, Florida's Turnpike, SR 9, SR 7/US 441 and NW 167th Street. It carries over 400,000 vehicles per day and has a direct impact on inter-county travel between Miami-Dade, Broward and Palm Beach Counties. It is the backbone for the transportation of goods and services, as well as passenger trips in the northeastern region of Miami-Dade County. The GGI also supports the I-95 Express Lanes system and the Golden Glades Multimodal Facility, which provides access to inter-county transit service including the existing GGI to Downtown Miami-Dade express bus service.

In the last five decades, Miami-Dade and Broward counties have experienced significant population growth from 935,047 persons and 333,946 persons in 1960 to 2,496,435 persons and 1,748,066 persons in 2010, respectively. This represents an average annual growth rate of 1.98% for Miami-Dade County and 3.37% for Broward County. The rapid population growth has resulted in a significant increase in surface transportation demand, particularly along the major freeways and arterials linking the three counties. The population of Miami-Dade County is projected to increase by approximately 18% from 2010 to 2035 while that of Broward County is projected to increase by 11% within the same period (Source: Bureau of Economic and Business Research). As the population in these counties increase over time, transportation demand will continue to grow thereby increasing the amount of vehicular traffic using the interchange for both local and regional trips.

1.3.2 Capacity

Extended queues on SR 826 EB to I-95 NB

The GGI interchange study area is located within the City of Miami Gardens Transportation Concurrency Management Areas (TCMA) as well as the Transportation Concurrency Exemption Area / Urban Infill Area (TCEA/UIA) established by the City of North Miami Beach. These transportation concurrency areas influence the Level of Service (LOS) requirements and standards adopted for the roadway links within the GGI interchange study area. Based on field observations as well as results from the previous planning study prepared by FDOT District Six Planning Department, the existing roadway capacity within the interchange study area is deficient at several locations along SR 826/Palmetto Expressway eastbound, Florida's Turnpike southbound, SR 7/US 441, SR 9 and I-95 at merge, diverge, weave and/or intersection locations within the interchange area. Queues at these deficient locations extend upstream, creating additional mobility issues at nodes that would otherwise operate at acceptable levels of service. The SR 826/Palmetto Expressway eastbound to I-95 northbound and the Florida's Turnpike southbound to I-95 southbound movements are the two most critical links that are currently experiencing heavy congestion during the peak hours with insufficient link capacity. Currently, there is no dedicated system-to-system connection from SR 826/Palmetto Expressway eastbound to I-95 northbound. The existing network connection for this system-to-system movement includes the use of surface streets with tight radii, traffic signals, and weaving segments that considerably slow down traffic through this system interchange. In addition, the Florida's Turnpike's ramp to I-95 southbound is currently two lanes that transition to a single lane prior to the merge with SR 826/Palmetto Expressway eastbound to I-95 southbound movement. The lane drop combined with weaving movements from SR 826/Palmetto Expressway has resulted in peak period backups that extend beyond the Florida's Turnpike Golden Glades Mainline Toll Plaza. The congestion has *also contributed to a significant number of crashes in the southbound direction in the* vicinity of the toll plaza.

Weaving condition between NB Florida's Turnpike and NB SR 7/I-95

Over the years, this interchange and the surrounding multimodal facilities have been studied for the purpose of improving traffic operations and increasing user benefits by reducing congestion, increasing connectivity and improving travel delay caused by the circuitous routes in existence today. FDOT District Six has also been evaluating, and in some cases implementing, modifications to existing ramp configurations to improve traffic operations within the GGI. Recent improvements include the auxiliary lane addition for I-

95 northbound connector to Florida's Turnpike and westbound SR 826/Palmetto Expressway (FPID: 415456-4) and other planned operational and safety improvements along various interchange ramps (FPID: 425637-1 & 429134-1). However, these projects have not alleviated the chronic congestion on the SR 826/Palmetto Expressway eastbound to I-95 southbound and the Florida's Turnpike southbound to I-95 southbound movements during the peak periods.

The proposed improvements at the GGI will provide additional capacity to accommodate the anticipated transportation demand, improve connectivity for traffic destined to northbound and southbound I-95 from SR 826/Palmetto Expressway and Florida's Turnpike respectively, and ultimately improve safety, circulation and mobility for both commuter and multimodal (transit and freight) travel within both local and regional transportation networks.

1.3.3 Plan Consistency

The SR 826/Palmetto Expressway eastbound to I-95 northbound ramp connection and the proposed improvement along the Turnpike Connector to I-95 southbound are identified in the Miami-Dade County Metropolitan Planning Organization (MPO) 2035 LRTP Cost Feasible Plan (CFP) and amendments with funding for the planning, design and construction phases. The project is also identified in the Miami-Dade County approved 2015 Transportation Improvement Program (TIP) (FPIDs: 428358-1, 423373-2) with full funding for all the project phases as follows:

FPID	Funding	Project Phase			Total
		Design	ROW	Construction	
425358-1	Amount	$7,676,000	$45,926,000	$113,914,000	$167,516,000
	Year	2014-2015	2014-2016	2017-2018	
	Source	State Funds	State Funds	Federal Funds	
423373-2	Amount	$6,337,000	$6,743,000	$61,368,000	$74,448,000
	Year	2015, 2017	2016	2017	
	Source	State Funds	State Funds	State Funds	
Total Project Cost		**$14,013,000**	**$52,669,000**	**$175,282,000**	**$241,964,000**

Note: Funding shown in table based on 2015 approved TIP

The project is consistent with the Miami-Dade County Comprehensive Development Master plan (CDMP) as amended and the 2009 update of the MPO-approved Congestion Management System, which is federally required as an integral part of the metropolitan planning process in Transportation Management Areas. Additionally, the project is included in the FDOT 2035 SIS CFP, as well as the current 2015 State Transportation Improvement Program (STIP) with funding for the design, right of way and construction phases.

1.3.4 Social Demands and Economic Development

Evacuation and Emergency Response: The GGI serves as a critical transportation hub for the evacuation network established by the Florida Division of Emergency Management for Miami-Dade County. It plays an important role in facilitating traffic movement during emergency evacuation periods between three freeways (I-95, SR 826/Palmetto Expressway, and Florida's Turnpike) and two major principal arterials (SR 9 and SR 7/US-441), all of which are designated evacuation routes for Miami-Dade County residents. In addition, the GGI provides access to the emergency entrance for the Jackson North Medical Center.

Economic Development: The GGI is a regional transportation hub linking residents and businesses of Miami-Dade and Broward Counties, with many residents commuting between these two counties for work. According to the 2000 Census, approximately 6.5% of Miami-Dade residents commute to Broward County, while 15.5% of Broward County residents and 1% of Palm Beach County residents commute to Miami-Dade County. The proposed improvements will enhance mobility within the GGI and promote economic growth and development within the three counties, as well as the South Florida region by reducing congestion and enhancing the movement of goods and services.

The City of Miami Gardens has identified planned developments including two residential developments (Legacy Pointe-Sola Bella and Lakeside Point Townhomes) adjacent to the interchange area. In addition, a 40 acre world-class water park is proposed to be developed adjacent to the Sun Life Stadium with direct access to the Florida's Turnpike. These future potential residential and commercial developments will increase the traffic demand through this interchange and exacerbate the current congestion problem. The proposed improvements within the GGI will improve mobility and support the economic development of the area, as well as stimulate major construction activities that will contribute to economic growth within the South Florida Region.

1.3.5 System Linkage

The GGI is a vital transportation hub within southeast Florida, providing an inter-regional connection for Miami-Dade and Broward Counties. It serves as a confluence point for five major regional transportation corridors SR 826/Palmetto Expressway, I-95, Florida's Turnpike, SR 7/US 441 and SR 9. SR 826/Palmetto Expressway is one of the principal north-south corridors across the heart of Miami-Dade County which feeds traffic to Florida's Turnpike and I-95 via the GGI. The I-95 corridor carries local residents and serves millions of regional travelers along the eastern seaboard from Maine to Miami. The Florida's Turnpike mainline begins at the GGI and extends northwest linking Miami to Orlando. The two major arterials, SR 9 and SR 7/US 441, also funnel tens of thousands of commuters daily from neighboring residential and commercial areas into the GGI to connect to the expressways. These regional transportation corridors constitute major elements of the surface transportation system in Southeast Florida and facilitate the movement of goods

and people between airports, seaports, and major employment centers, residential and recreational areas.

The GGI also provides connections to several SIS highways and hubs. Established by the Florida Legislature in 2003, the SIS is a network of high-priority transportation facilities that are the workhorses of Florida's air, water and ground transportation system. SR 826/Palmetto Expressway, I-95 and Florida's Turnpike are designated as SIS highways. The GGI Park-n-Ride facility located within the interchange area is a SIS intermodal facility which provides connections to South Florida Regional Transportation Authority (SFRTA) commuter trains; Miami-Dade Transit (MDT) express and local buses, Broward County Transit (BCT) express and local buses, Greyhound intercity buses and carpool commuters. In addition, the interchange facilitates connections to the Miami International Airport and the Fort Lauderdale-Hollywood International Airport, both designated SIS commercial service airport hubs, via I-95.

The GGI is also the current end terminus of the I-95 Express lanes in Miami-Dade County and will serve as a begin terminus for the proposed I-95 Express lanes in Broward County. The interchange will also facilitate connection between the potential express lanes along SR 826/Palmetto Expressway and the I-95 Express lanes along I-95.

Consequently, the proposed capacity and mobility improvements within the GGI are critical in order to improve access to these major transportation facilities, as well as enhance mobility within the South Florida Region.

1.3.6 Traffic Safety

A review of crash data for the 2006 to 2010 period indicates that 3,238 crashes occurred along the roadway segments within the study area. A total of 1,496 injury and 18 fatal crashes occurred during the five-year analysis period with 19 fatalities; ten of these fatal crashes were located along the existing SR 826/Palmetto Expressway eastbound mainline and ramp to I-95 northbound and southbound. In addition, four freeway segments, three arterial segments and four signalized intersections are identified in the FDOT's list of High Crash Locations (HCL). Refer to Section 2.9.4 for the list of High Crash Locations.

The predominant crashes are rear-ended and sideswipe collisions which account for 44% and 18% respectively of the total crashes. Crashes of this type are typically attributed to the congested conditions along the interchange ramps and terminals during the peak periods. In addition, merging and weaving maneuvers between ramps due to the relatively short weaving distance between connecting ramps appear to be contributory causes for the frequent angle and sideswipe crashes.

In general, the proposed direct connection flyover ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound as well as the widening of the Turnpike Connector southbound lanes will alleviate traffic congestion and improve mobility for these critical

movements. This will potentially mitigate the crash rate and enhance overall public safety within the interchange.

1.3.7 Roadway Deficiencies

The GGI was originally constructed in 1964 consistent with the 1954 American Association of State Highway and Transportation Officials (AASHTO) publication "A Policy on Geometric Design for Rural Highways" (also known as the Blue Book) that was in place when the facility was designed in the early 1960s. In almost five decades of its existence, the only major geometric changes that have occurred are the construction of the flyover ramps to the Golden Glades Park-n-Ride Facility in the 1970s and the construction of the elevated HOV lanes in 1995. As such, several geometric elements such as vertical clearance, sight distance, curve length, superelevation and shoulder widths, do not meet the FDOT design standards (2013) or AASHTO requirements. The proposed project would evaluate these deficiencies and provide recommendations for roadway improvements that satisfy the design standards and enhance safety within the project area.

1.3.8 Modal Interrelationships

The GGI encompasses the Golden Glades Intermodal Center located in the southwest quadrant, which consists of Park-n-Ride Lots, an adjacent vacant parcel east of the Park-n-Ride Lot, and the connecting roadways and ramps. The Park-n-Ride Lots currently accommodates the following transportation modes: SFRTA commuter trains, MDT express and local buses, BCT express and local buses, Greyhound intercity buses, and carpool commuters. The FDOT plans to redevelop the existing Golden Glades Park-n-Ride Lots into a Multimodal Facility with improved access. The proposed improvements will facilitate this goal by removing the SR 826/Palmetto Expressway eastbound to I-95 northbound traffic from SR 7/US 441. This will provide additional capacity for the multimodal traffic along SR 7/US 441, thereby improving access and mobility to the multimodal facility.

The Miami-Fort Lauderdale region is creating a 21-mile express-lane facility on I-95, between I-395 and I-595, with a long-term goal of providing a network of express lanes throughout the region. On-going studies are also considering extending the express lanes further north to the Martin County Line. The GGI will serve as an access points to three express lane systems: 1) the existing I-95 Express lanes in Miami-Dade County, 2) the proposed I-95 Express lanes in Broward County and 3) the future potential express lanes along SR 826/Palmetto Expressway currently under evaluation. The express lane network will also serve as the back-bone of a proposed bus rapid transit (BRT) system with express feeder bus services running north-south along SR 7/US 441 and SR 817 (University Drive), and east-west along SR 820 (Hollywood/Pines Boulevard). Therefore, the proposed improvements will benefit multimodal uses and congestion management throughout the South Florida region.

The Miami-Dade Parks and Open Space Master Plan and North-Dade Greenways Master Plan identify the opportunity to develop the Gold Coast Trail. This trail consists of a 20 mile path occupying the easement of the SFRC. It provides an opportunity to create a multimodal access point at the GGI Park-n-Ride facility. The proposed interchange improvements will provide a clear envelope when placing bridge piers in order to accommodate the future planned trail.

1.4 Description of Proposed Action

The Recommended Alternative (Interim Build Alternative 4) involves the construction of a three lane off-ramp for SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound. A new flyover ramp for the SR 826/Palmetto Expressway eastbound to I-95 northbound will also be provided. The new flyover ramp begins from the SR 826/Palmetto Expressway eastbound to I-95 southbound ramp and continues over the Turnpike Connector and underneath the I-95 Express Flyover Ramps. It then goes over I-95 and merges with the existing SR 7/US 441 northbound to I-95 northbound ramp before joining I-95 using the existing on-ramp alignment.

The Recommended Alternative maintains the NW 12th Avenue on-ramp which provides access from the Sunshine Industrial Park to I-95 southbound and northbound with connectivity to Florida's Turnpike through SR 7/US 441. In order to eliminate the current weaving issue along the SR 826 mainline, the NW 12th Avenue on-ramp will not connect directly to the SR 826 mainline. Instead, it will be relocated and connected to the three lane off-ramp to I-95 northbound and southbound as a barrier separated auxiliary lane. The provision of the NW 12th Avenue on-ramp will require the removal of the eastbound frontage road east of NW 10th Avenue. The warehouse property on the southwest quadrant of the interchange within the Sunshine Industrial Park will be acquired due to the removal of the only access road for this property. The acquisition of this property will also be used to improve he geometry of the ramp from eastbound SR 826 to southbound I-95 as well as provide additional stormwater retention swales.

The Turnpike Connector southbound lanes will be reconstructed to shift the alignment to the west in order to accommodate a future direct express lane connection from the Florida's Turnpike southbound to the I-95 southbound express lanes. The Turnpike Connector southbound lanes will also be widened to accommodate two lanes from the Florida's Turnpike and three lanes from SR 826 eastbound to I-95 southbound. In order to increase the weaving distance along the Turnpike Connector southbound lanes, the off-ramp to SR 7/US 441 will be relocated approximately 1,150-ft south along SR 7/US 441 to the Biscayne River Drive intersection. This will require the acquisition of several commercial properties between SR 7 and I-95 north of the C-9 Biscayne Canal and the existing SR 7 off-ramp from the southbound Turnpike Connector to I-95.

The reconstruction along the Turnpike Connector will require widening of the Turnpike Connector southbound bridge over SR 826 (870601) and replacement of the southbound bridges over the SFRC (870159) and SR7/US 441 (870045). An additional auxiliary lane is also provided along I-95 southbound from the GGI to NW 151st Street to provide additional capacity. This will require widening of the I-95 southbound bridge over the C-8/Biscayne Canal (870348). The entrance to the I-95 southbound express lanes will be moved 300-ft south to accommodate weaving maneuvers from SR 826 and Florida's Turnpike to the I-95 Express southbound lanes.

Texas U-Turns (matching the existing bridge vertical clearances) will be provided underneath the SR 826/Palmetto Expressway mainline bridges over NW 17th Avenue and NW 12th Avenue to enhance access and mobility for the adjacent residents and the Sunshine Industrial Park. Along the SR 826/Palmetto Expressway westbound frontage road, the two through lanes from NW 12th Avenue are maintained. In addition, exclusive westbound right turn and left turn lanes are provided at the NW 17th Avenue westbound ramp terminal. On the eastbound frontage road, the two-way segment between NW 17th Avenue and NW 16th Court will be converted into a one-way road and the intersection at NW 16th Court will also be converted to a right-in right-out configuration.

The existing unsignalized single left turn lane from SR 826/Palmetto Expressway eastbound to Florida's Turnpike northbound will be upgraded to a signalized intersection with double left turn lanes. This will require provision of an auxiliary lane along SR 826/Palmetto Expressway eastbound from the Turnpike Connector overpass to the NW 7th Avenue intersection and widening of the Turnpike northbound on-ramp to accommodate the additional left turn lane. Capacity improvements are also provided along the westbound frontage road between NW 12th Avenue and NW 17th Avenue. An additional northbound left turn lane is also provided at the NW 2nd Avenue and NW 167th Street intersection to improve both the intersection operations and traffic flow along NW 167th Street.

Florida Gas Transmission (FGT) currently owns and operates two gas transmission mains along Florida's Turnpike and SR 826/Palmetto Expressway connecting to local distribution company facilities in the Opa-Locka area. These mains consist of an 18-inch and a 24-inch installed in an easement within Florida's Turnpike which terminates approximately 145 feet north of the SR 826/Palmetto Expressway. The portions of the gas mains which continue to the west within the SR 826/Palmetto Expressway were originally installed and granted a permit by the Florida Department of Transportation allowing them to be placed within FDOT's Right-of-Way. The 24-inch FGT gas main runs along the westbound NW 167th Street while the 18-inch FGT gas main crosses beneath SR 826/Palmetto Expressway and runs along eastbound NW 167th Street within the embankment between SR 826/Palmetto Expressway and NW 167th Street.

The proposed widening of the SR 826/Palmetto Expressway mainline together with the construction of a three lane off-ramp for SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound and the relocation of the NW 12th Avenue on-ramp will require

the relocation of the existing 18-inch gas main along the south side of SR 826/palmetto Expressway to a more accessible location. As part of this PD&E Study, several potential routes were identified and evaluated for the relocation of the existing 18-inch gas main (Refer to the **Florida Gas Transmission Utility Relocation Assessment Memorandum**). Three routes were recommended for further evaluation during the final design phase of this project. The FDOT will work with Florida Gas Transmission (FGT) to address the final disposition of the 18-inch gas main. As per the FGT Global Settlement Agreement with FDOT, FGT is responsible for the pipe installation cost while FDOT is responsible for the right of way cost.

1.5 Commitments and Recommendations

The following commitments and recommendations have been made by the Florida Department of Transportation (FDOT) and will be adhered to during the final design and/or construction phases.

1. The proposed interchange improvements will provide a clear envelope over the South Florida Rail Corridor (SFRC) when placing bridge piers in order to accommodate the future planned Miami-Dade County Gold Coast Trail. Further coordination with Miami-Dade County Park and Recreation staff regarding the status of this proposed greenway will occur during final design.
2. The most current version of the *Standard Protection Measures for the Eastern Indigo Snake* will be included in the construction documents and implemented during construction.
3. The most current version of the *Standard Manatee Conditions for In-Water Work* will be included in the construction documents and adhered to during construction for any canal work.
4. The loss of Wood Stork foraging habitat in the affected stormwater features will be mitigated through construction of new stormwater features within the project area and implementation of construction Best Management Practices (BMPs), or purchase of mitigation credits from an appropriate mitigation bank. This will be coordinated with the US Fish and Wildlife Service (USFWS) during final design.
5. Coordination with the Seminole Tribe of Florida and the Miccosukee Tribe of Indians of Florida will occur to notify them of the results of the Cultural Resources Assessment Survey (CRAS). In addition, the Federal Highway Administration (FHWA) will provide copies of this document to each of the Tribes.
6. The FDOT will carry out a Right-of-way and Relocation Program in accordance with Florida Statute 339.09 and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646 as amended by Public Law 100-17).
7. The FDOT will reevaluate the feasibility and reasonableness of noise abatement measures during Final Design if warranted by changes to the project's design.

8. A reassessment of the project corridor for additional sites particularly sensitive to construction noise and/or vibration will be performed during design to ensure that impacts to such sites are minimized.

9. Construction noise and vibration impacts will be minimized by adherence to the controls listed in the latest edition of the FDOT's *Standard Specifications for Road and Bridge Construction*. Coordination between the FDOT and the operators of any construction noise/vibration sensitive locations identified during design will occur, and if applicable, Technical Special Provisions (TSP) developed for the project's contract package in order to ensure that impacts to such businesses are minimized. If construction activities are to occur near the Jackson North Medical Center, alternative construction methods should be considered to reduce construction-related noise or vibration. These methods could include the following:

    a. Avoid impact pile-driving where possible in vibration-sensitive areas through the use of drilled piles or a sonic/vibratory pile driver where the geological conditions permit their use.

    b. Avoid vibratory rollers and packers near sensitive areas.

    c. Select demolition methods not involving impact, where possible. For example, sawing bridge decks in sections that can be loaded onto trucks results in lower vibration levels than impact demolition by pavement breakers.

10. Construction activities for the proposed action may potentially have short-term air quality impacts within the immediate vicinity of the project. Construction activities may generate temporary increases in air pollutant emissions in the form of dust from earthwork and unpaved roads. Such emissions and potential impacts will be minimized by adherence to all applicable State and local regulations and to the latest edition of the FDOT *Standard Specifications for Road and Bridge Construction.*

11. The FDOT is committed to coordinate with the appropriate regulatory agencies as required throughout the design and permitting phases of the project, as well as during and after construction. Any indirect (secondary) effects to Other Surface Waters (OSW) located within and outside the project limits, which include turbidity from construction activities, sedimentation resulting from erosion associated with soil disturbance, use of heavy equipment, and staging or stockpiling of materials and equipment, will be minimized. The FDOT will comply with the current National Pollutant Discharge Elimination System (NPDES) permit criteria, including preparation of a Stormwater Pollution Prevention Plan (SWPPP). Also, Best Management Practices (BMPs) typically associated with road and bridge construction projects will be implemented and maintained throughout all construction activities.

12. Water quality impacts resulting from erosion, sedimentation, and turbidity reduction will also be controlled through measures outlined in the latest edition of the FDOT *Standard Specifications for Road and Bridge Construction.* The removal of structures and debris will be in accordance with local and State regulation agencies permitting this operation. The Contractor is responsible for methods of controlling pollution on haul roads, in borrow pits, other material pits, and areas used for disposal of waste materials from the

project. Temporary erosion control features as specified in Section 104 of the FDOT *Standard Specifications for Road and Bridge Construction* may consist of temporary grassing, sodding, mulching, sandbagging, slope drains, sediment basins, sediment checks, artificial coverings, and berms.

13. The FDOT will coordinate with all of the government services and religious institutions regarding the project schedule at least six months prior to construction, to avoid disruption to the services they provide.

14. The sequence of construction will be planned in such a way as to minimize traffic delays. The project will involve the development and use of a Maintenance of Traffic (MOT) Plan. This Plan will include traffic management and signage, access to local businesses and residences, detour routes, public notification of alternate routes, emergency services coordination and project scheduling. The local news media will be notified in advance of road closings and other construction-related activities, which could excessively inconvenience the community so that business owners, residents, and/or tourists in the area can plan travel routes in advance. A sign providing the name, address, and telephone of an FDOT contact person will be displayed on-site to assist the public in obtaining answers to questions or complaints about project construction.

15. The FDOT will coordinate with both Miami-Dade County Transit (MDT) and Broward County Transit (BCT) regarding any temporary deviation of existing bus routes during the construction phase of this project.

16. The FDOT will coordinate with the City of Miami Gardens to participate in a Job Fair in order to facilitate interaction between potential contractors and small and/or disadvantaged business enterprises and encourage local participation on the proposed construction project.

17. The Florida Gas Transmission Utility Relocation Assessment memorandum prepared as part of this PD&E Study identified and evaluated several potential routes for the relocation of the existing 18-inch gas main along the south side of SR 826/Palmetto Expressway. Three routes were recommended for further evaluation during the final design phase of this project. The FDOT will work with Florida Gas Transmission (FGT) to address the final disposition of the 18-inch gas main. As per the FGT Global Settlement Agreement with FDOT, FGT is responsible for the pipe installation cost while FDOT is responsible for the right of way cost.

1.6 Permits Required

The following permits are anticipated to be required during the final design and construction phases of the project.

1. South Florida Water Management District (SFWMD) Environmental Resource Permit (ERP)
2. SFWMD Right of Way Occupancy Permit - for work over the C-8/Biscayne Canal
3. SFWMD Water Use Permit (Dewatering)
4. Florida Department of Environmental Protection (FDEP) National Pollutant Discharge Elimination System (NPDES) Permit
5. US Army Corps of Engineers (USACE) Section 404 Permit
6. USACE Nationwide Permit 14 (Linear Transportation Facilities)
7. USACE Section 408 Determination (It is anticipated that this will be a minor modification) - for proposed piers within C-8/Biscayne Canal
8. Railroad Permits (Required for Flagging operations due to bridge work over tracks)

2. EXISTING CONDITIONS

2.1 Functional Classification

The roadway network within the project study area is comprised of state roads, county roads and local roads which provide access and traffic circulation within residential, commercial and industrial areas. The Golden Glades Interchange (GGI) is also an important transportation hub within southeast Florida that provides inter-regional connection for Miami-Dade, Broward and Palm Beach Counties. There are six major regional transportation corridors that converge within this interchange and are functionally classified as follows:

- SR 826/Palmetto Expressway (Roadway ID: 87260000, MP 23.00 to 24.708) is functionally classified as an urban freeway/expressway. It is also designated as a Strategic Intermodal System (SIS) highway and part of the Florida Intrastate Highway System (FIHS).
- SR 9A/I-95 (Roadway ID: 87270000, MP 10.90 to MP 14.30) is functionally classified as an urban interstate. SR 9A/I-95 is an integral part of the Strategic Intermodal System (SIS) highway and the Florida Intrastate Highway System (FIHS).
- SR 91/Florida's Turnpike (Roadway ID: 87470000, MP 0.00 to MP 0.584) falls under the roadway functional class of urban freeways/expressways. It is also designated as both a Strategic Intermodal System (SIS) highway and Florida Intrastate Highway System (FIHS) highway.
- SR 7/US 441 (Roadway ID: 87140000, MP 10.48 to MP 11.88) is functionally classified as an urban minor arterial from MP 10.451 to 11.429, and an urban freeway/expressway from MP 11.429 to 11.88 within the interchange. North of the interchange, it is classified as an urban principal arterial. It is designated as a Strategic Intermodal System (SIS) highway within the interchange area between the Park and Ride facility and NW 2nd Avenue.
- SR 9 (Roadway ID: 87240000, MP 13.22 to MP 13.69) falls under the roadway functional class of urban principal arterial from its terminus at NW 27th Avenue to the GGI.
- SR 826/NW 167th Street (Roadway ID: 87170000, MP 0.000 to MP 0.73) is functionally classified as an urban principal arterial from the GGI to its terminus at SR A1A. It is also on the state highway system designated as SR 826.

The street network which provide access to surrounding land uses within the project limits are urban collectors or local roads under the jurisdiction of the municipality they traverse. **Figure 2-1** shows the functional classifications of the different roadways within the project study area. Refer to **Appendix A** for the Straight Line Diagrams of the major transportation corridors within the project study area.

Figure 2-1 Functional Classifications

2.2 Typical Sections

2.2.1 SR 826/Palmetto Expressway

The segment of SR 826/Palmetto Expressway (Roadway ID: 87260000) within the project study area extends approximately 1.71 miles from NW 17th Avenue (MP 23.00) to the intersection with SR 7/US 441 at the GGI (MP 24.708). The existing typical section consists of eight 12-ft travel lanes with four lanes in each direction. The travel lanes in each direction are separated by a fully paved 16-ft median which includes a 2-ft concrete barrier wall and 7-ft inside shoulders. The outside shoulders are 12-ft wide with 10-ft paved in both directions. There are 2-lane frontage roads on each side of the expressway. The existing typical section for the frontage roads consist of two 11.5-ft travel lanes in one direction with 4-ft paved outside shoulder. A 5-ft sidewalk is located adjacent to the right-of-way line along each frontage road and separated from the travel lanes by a 4-ft sod buffer strip. The design speed for this freeway segment is 60 mph. It reduces to 45 mph as the expressway terminates into an arterial roadway. The posted speed is 55 mph along the expressway segment. **Figure 2-2** shows the existing typical sections along SR 826/Palmetto Expressway.

2.2.2 SR 9A/I-95

The segment of SR 9A/I-95 (Roadway ID: 87270000) within the project study area extends approximately 3.4 miles from Opa-Locka Blvd. (MP 10.90) to Miami Gardens Drive (MP 14.30). From Opa-Locka Blvd. to the GGI, the existing typical section consist of four 11-ft general purpose travel lanes and two 11-ft express lanes in the northbound and southbound directions. The travel lanes in each direction are separated by a concrete barrier wall with varying inside shoulder widths ranging from 5-ft to 12-ft. The outside shoulder widths also vary from 6-ft to 10-ft on southbound and 10-ft on northbound direction and are fully paved. **Figure 2-3** shows the existing typical section along I-95 south of the GGI. The segment of I-95 within the GGI consists of three 12-ft general purpose travel lanes and one 12-ft auxiliary lane in the northbound and southbound directions. The travel lanes in each direction are separated by a 32-ft median which includes a 2-ft concrete barrier wall and 15-ft paved inside shoulders. The outside shoulders are typically 12-ft wide with 10-ft paved. **Figure 2-4** shows the existing typical section along I-95 within the GGI.

The segment of I-95 north of the GGI is currently under construction to convert the existing HOV lanes to express lanes similar to the southern segment (95 Express Phase II). The proposed typical section consists of three 11-ft general purpose travel lanes and two 11-ft express lanes in the northbound and southbound directions. The travel lanes in each direction are separated by a concrete barrier wall with 9-ft inside shoulder width. The outside shoulder widths is typically 12-ft with 10-ft paved. **Figure 2-5** shows the existing typical section along I-95 north of the GGI. The design speed is 60 mph north and south of the interchange and 50 mph within the interchange. The posted speed is 55 mph within the interchange.

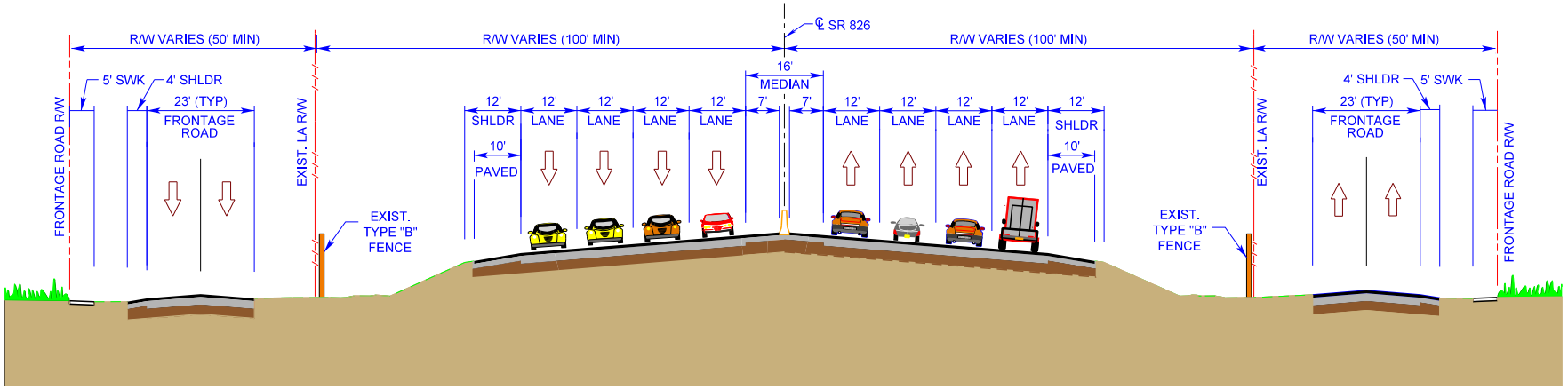


Figure 2-2 Existing Typical Section- SR826/ Palmetto Expressway

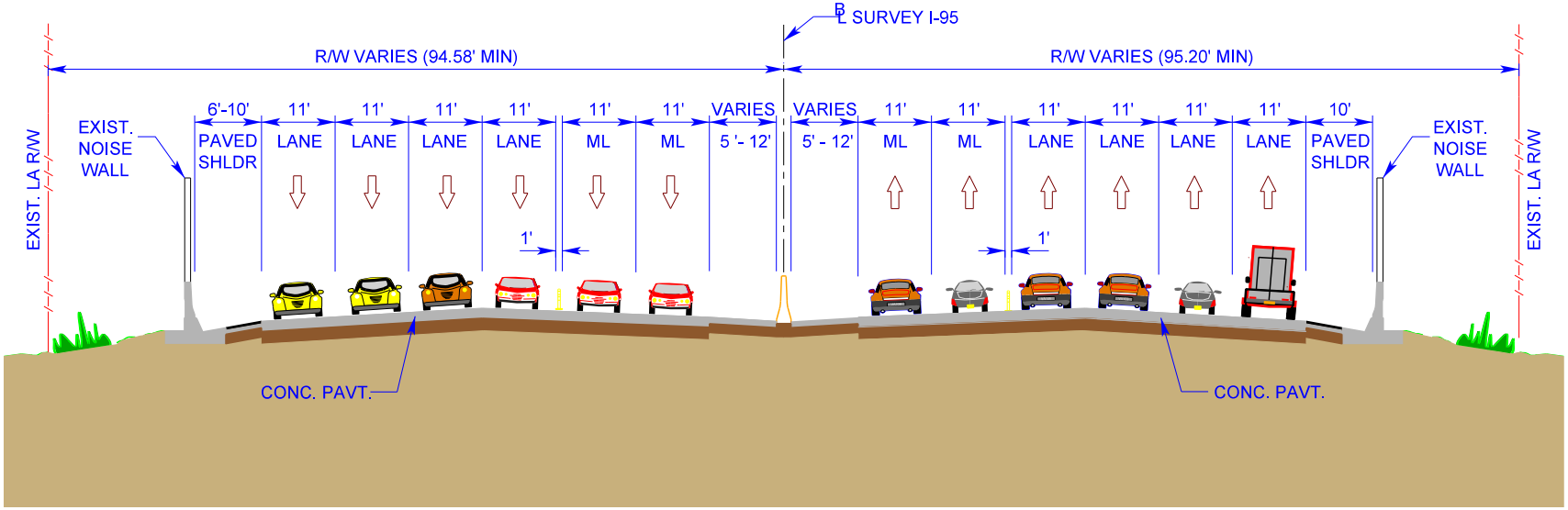


Figure 2-3 Existing Typical Section- I-95 South of Golden Glades Interchange

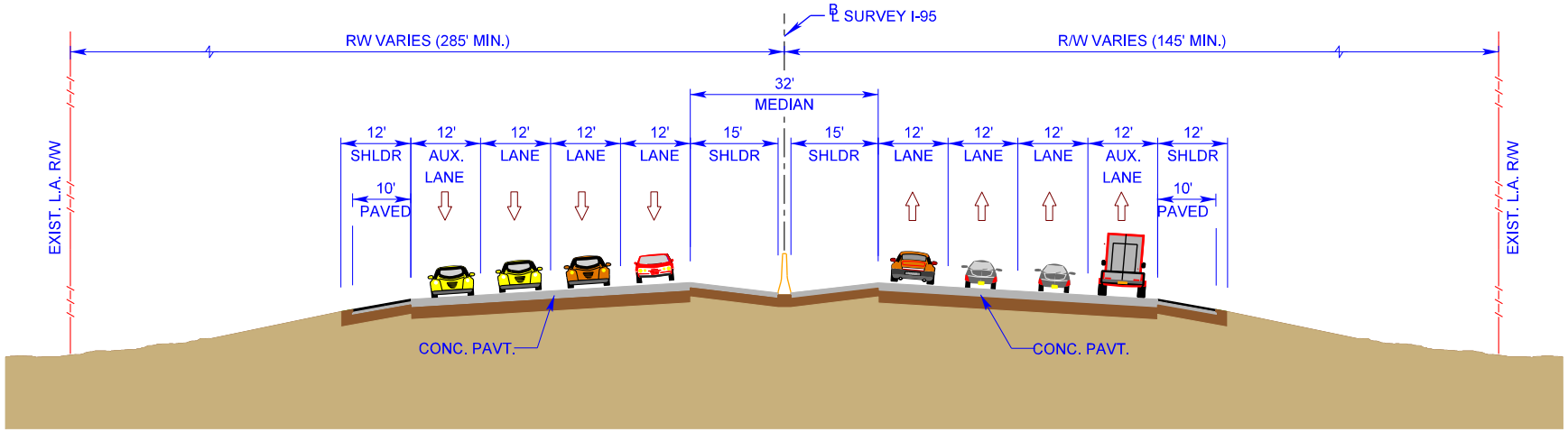


Figure 2-4 Existing Typical Section- I-95 within Golden Glades Interchange

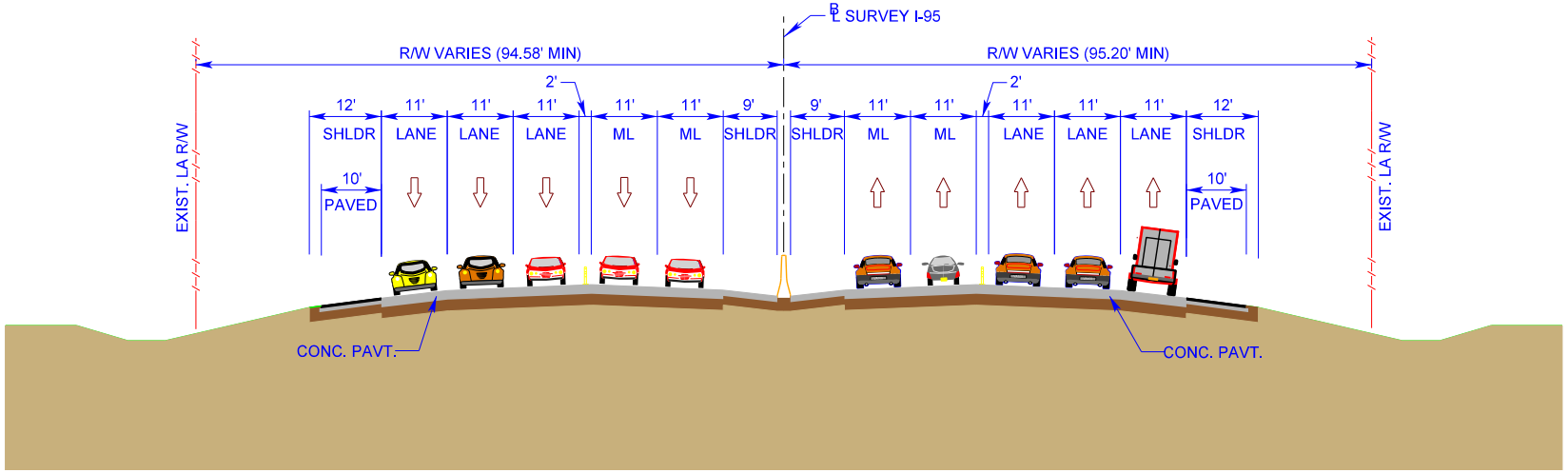


Figure 2-5 Existing Typical Section- I-95 North of Golden Glades Interchange

2.2.3 Florida's Turnpike

The Florida's Turnpike Mainline and Connector Ramp (Roadway ID: 87470000) within the project study area extend approximately 0.58 miles from SR 826/Palmetto Expressway and I-95 (MP 0.00) to the Golden Glades Toll Plaza (MP 0.584). The Florida's Turnpike mainline segment north of the GGI is currently under construction to convert the existing mixed cash toll plaza to an all-electronic toll plaza (AET Phase 4A) by 2014. The proposed mainline typical section under this project consists of three 12-ft travel lanes and one 12-ft auxiliary lane in the northbound and southbound directions. The travel lanes are separated by a concrete median barrier with 12-ft paved inside shoulders. The outside shoulders are 12-ft wide with 10-ft paved in both directions. The design and posted speed on the Florida's Turnpike mainline is 70 mph. **Figure 2-6** shows the existing typical sections along Florida's Turnpike Mainline.

Within the GGI area, the Turnpike Connector ramp connects Florida's Turnpike Mainline with I-95. The existing typical section consists of two 12-ft general purpose travel lanes and one 12-ft auxiliary travel lane in the northbound and southbound directions. The travel lanes in each direction are separated by a 32-ft median with guardrails on both sides. The inside shoulders are 10-ft wide and fully paved. The outside shoulders are typically 12-ft wide with 10-ft paved. At locations with shoulder gutter, the outside shoulders are 15.5-ft wide with 8-ft paved. The design and posted speed on the Turnpike Connector ramp is 45 mph. **Figure 2-7** shows the existing typical sections along Turnpike Connector Ramp.

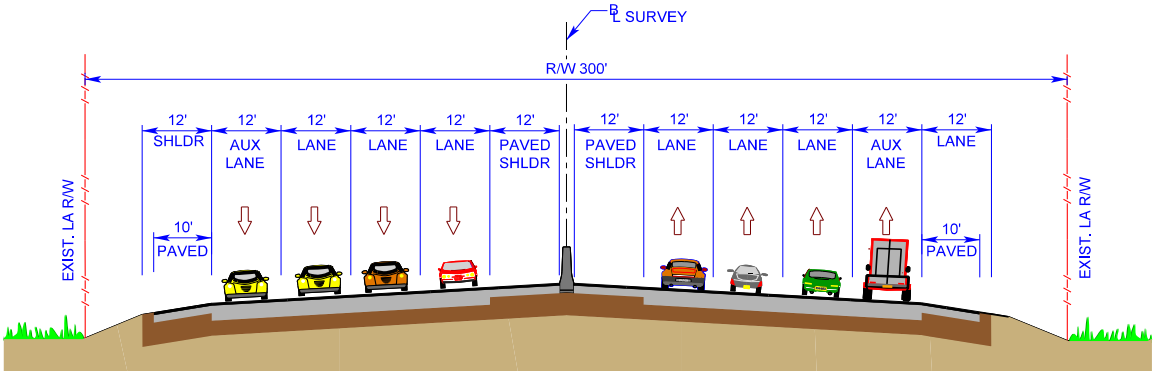


Figure 2-6 Existing Typical Section- Florida's Turnpike Mainline

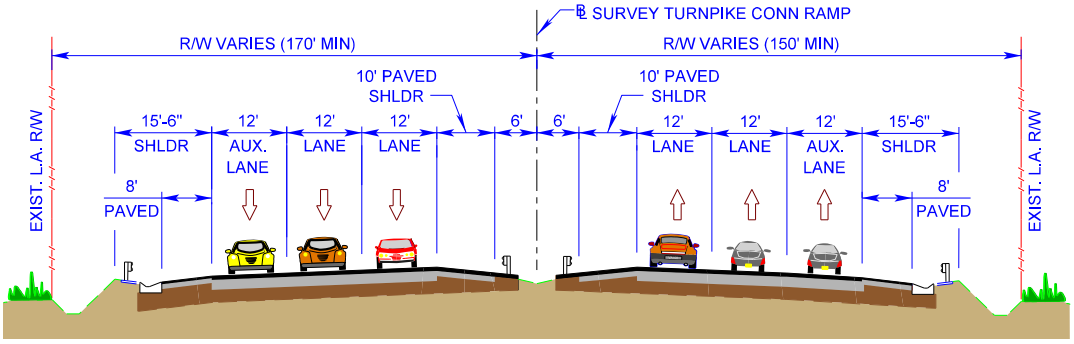


Figure 2-7 Existing Typical Section- Turnpike Connector Ramp

2.2.4 SR 7/US 441

SR 7/US 441 (Roadway ID: 87140000) within the project limits extends approximately 1.4 miles from north of the Biscayne Canal (MP 10.48) to NW 172nd Street (MP 11.88). The segment south of the GGI between the Biscayne Canal and the Park and Ride entrance generally consists of three 11-ft travel lanes northbound and southbound directions with curb and gutter on both sides of the roadway. The travel lanes in each direction are separated by an 18-ft raised median. A 5-ft sidewalk is located adjacent to the right-of-way line on each side of the roadway and separated from the travel lanes by a 4-ft sod buffer strip. **Figure 2-8** shows the existing typical section of SR 7/US 441 south of GGI.

Within the GGI area, the existing typical section generally consists of two 12-ft travel lanes with 6-ft inside shoulder (2-ft paved) and 7-ft outside shoulder (5-ft paved). **Figure 2-9** show the existing typical section along SR 7/US 441 within GGI.

The design speed along SR 7/US 441 within the project study area varies from 35- 45 mph. The posted speed limit also varies from 30-40 mph.

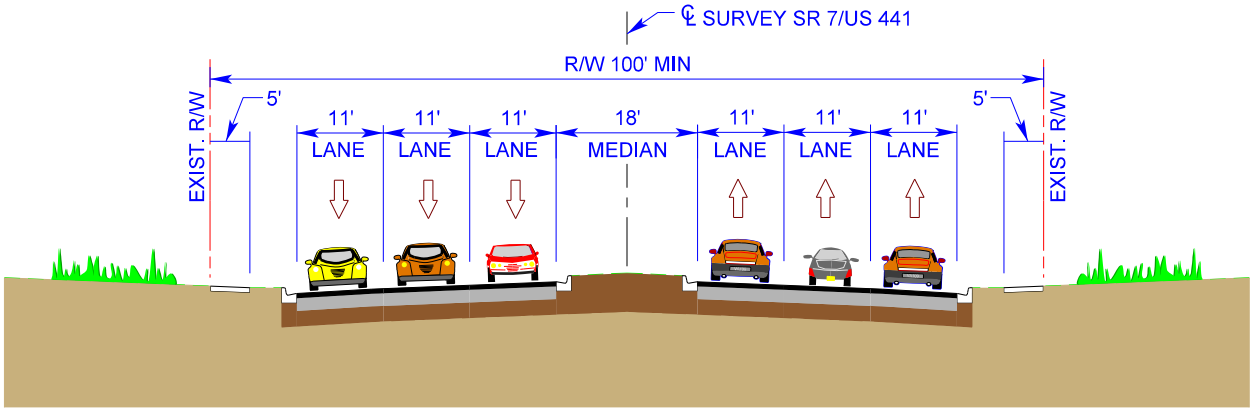


Figure 2-8 Existing Typical Section- SR 7/ US 441 south of GGI

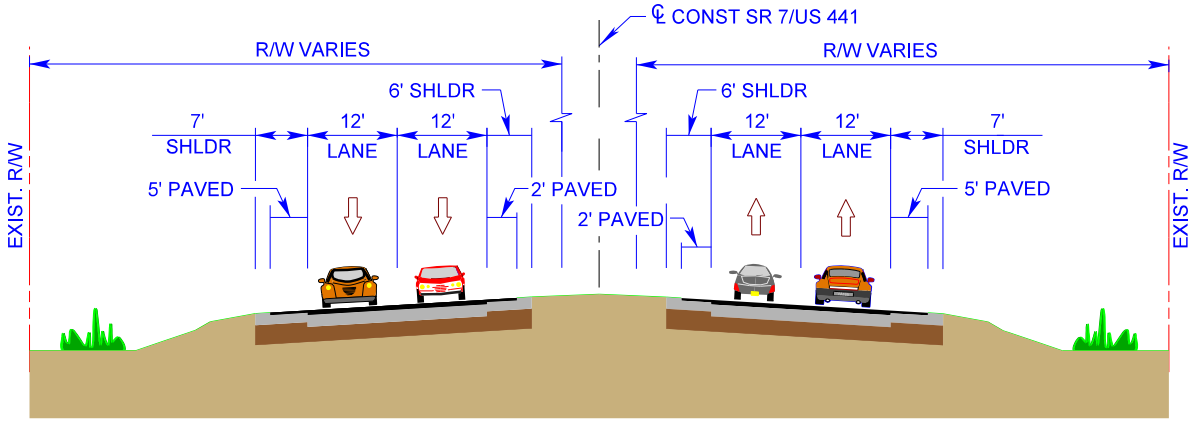


Figure 2-9 Existing Typical Section- SR 7/ US 441 within GGI

2.2.5 SR 9

SR 9 (Roadway ID: 87240000) within the project study area extends approximately 0.47 miles from the Golden Glades Park-and-Ride lot (MP 13.22) to merge at SR 7/US 441 (MP 13.69). It consists of two 12-ft travel lanes in the northbound and southbound directions, as shown in **Figure 2-10**. The travel lanes in each direction are separated by a grassed median with varying width from 40-50-ft. The inside shoulders are 4-ft wide with 2-ft paved. The outside shoulders are typically 10-ft wide with 4-ft paved. The posted speed limit along SR 9 is generally 50 mph within the project study area. No design speed information was found from the existing plans available.

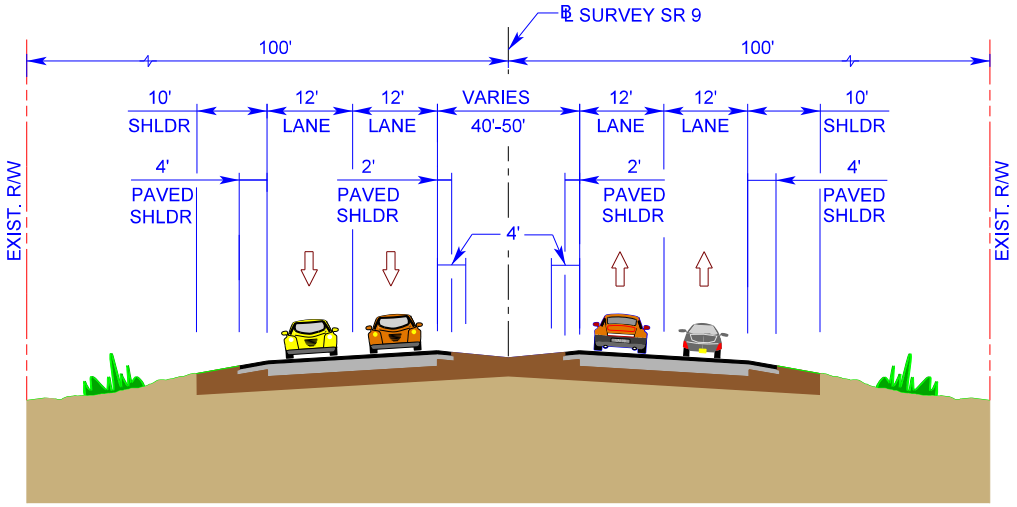


Figure 2-10 Existing Typical Section- SR 9

2.2.6 NW 167th Street

NW 167th Street (Roadway ID: 87170000) within the project study area extends approximately 0.728 miles from the NW 7th Avenue Extension west of the Turnpike Connector ramp (MP 0.00) to North Miami Avenue (MP 0.728). It is a six lane divided urban arterial with three 12-ft travel lanes in the eastbound and westbound directions, as shown in **Figure 2-11**. The travel lanes in each direction are separated by a 15.5-ft raised median. The roadway has Type F curb and gutter along both sides of the pavement with 5-ft wide sidewalks on both sides adjacent to the curb and gutter. The posted speed limit along this segment of NW 167th Street is 35 mph. No design speed information was found from the existing plans available.

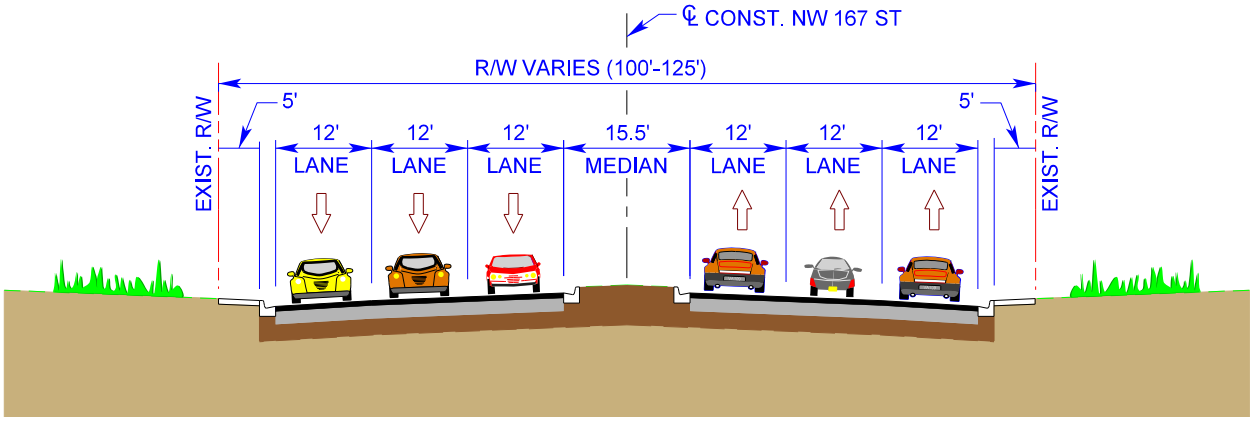


Figure 2-11 Existing Typical Section- NW 167th Street

2.3 Pedestrian and Bicycle Facilities

Florida Statute Title XXIII, Chapter 316, Section 316.091, prohibits pedestrians and bicycles from operating and/or traveling on any limited access facilities. As such, there are no pedestrian or bicycle facilities along the expressways (I-95, SR 826/Palmetto Expressway and Florida's Turnpike) and ramp connectors within the interchange area. Some of the non-limited access roadways within the study area have pedestrian facilities as listed below:

- The frontage roads along SR 826/Palmetto Expressway within the study area have 5-ft sidewalks adjacent to the northern and southern right-of-way lines along the frontage roads with the exception of the westbound frontage road between NW 15th Avenue and NW 17th Avenue.
- NW 12th Avenue has sidewalks along both sides of the roadway. The segment north of SR 826/Palmetto Expressway has a 5-ft sidewalk with a landscape buffer while the segment south has 6-ft sidewalks adjacent to the roadway curb and gutter.
- The segment of NW 17th Avenue north of SR 826/Palmetto Expressway has 5-ft sidewalks on both sides of the roadway. The southern segment has no existing sidewalks.
- Along SR 7/US 441, 5-ft sidewalks exist along both sides of the roadway. The sidewalks are typically separated from the roadway by a 3-ft landscape buffer. The sidewalks along SR 7/US441 terminate at the Golden Glades Park and Ride Facility.
- There are 5-ft sidewalks along both sides of NW 167th Street east of the GGI. The sidewalks are adjacent to the roadway curb and gutter.
- The segment of NW 2nd Avenue south of the GGI has 6-ft sidewalks on both sides of the roadway adjacent to the curb and gutter. The segment north of the GGI has 5-ft sidewalks on the eastern side of the roadway. There is currently no connection between the sidewalks on the north and south sides across the GGI.

There are currently no bicycle facilities along any of the non-limited access arterial roadways within the study area.

There are two pedestrian bridges within the study area. The first is located across SR 9 and provides access from the GGI park and ride facility on the east to the tri-rail station on the west of SR 9. The second pedestrian bridge is located across I-95 just south of NW 151st Street and provides access between the residential areas on the west and Thomas Jefferson Middle School on the east side of I-95.

The Miami-Dade Parks and Recreation Department has also identified the Gold Coast Trail within the study area. This trail is a potential 20.8 mile path occupying the easement of the South Florida Rail Corridor. The Gold Coast Trail will provide opportunity to create a multimodal access point at the Golden Glades Park and Ride facility and also provide bicycle and pedestrian access into Broward County.

2.4 Right-of-way

The existing limited access right-of-way for the GGI varies to accommodate the various ramps connecting the six major transportation corridors that converge within the interchange as well as the park and ride facility. The existing limited access within the interchange area is bisected by the South Florida Rail Corridor (SFRC) which is approximately 100-ft wide. An industrial property is also located within the limited access interchange area. **Table 2-1** shows the existing right-of-ways along the six principal transportation corridors within the interchange area.

Table 2-1
Existing Right-of-way

#	Roadway	Begin	End	Right-of-way Width
1	SR 826/ Palmetto Expressway including frontage roads	NW 17th Avenue	GGI	300’
2	SR 9A/I-95	Opa-Locka Blvd	Biscayne Canal	213’ – 350’
		Biscayne Canal	GGI	220’ – 421’
		NW 173rd Terrace	Miami Gardens Dr.	200’ – 245’
3	Florida’s Turnpike	Toll Plaza	GGI	300’ – 350’
4	NW 167th Street	GGI	N Miami Avenue	100’
5	SR 7/ US 441	Biscayne Canal	GGI	100’
6	SR 9	Biscayne Canal	GGI	200’

2.5 Geometric Elements

The existing geometric elements for the major transportation corridor and interchange ramps were obtained from the existing as-built plans obtained from the FDOT District Six. Since the original construction of the GGI in 1964, most of the ramps within the interchange have not been geometrically modified. The original as-built construction plans obtained for the interchange area are barely legible; consequently, the geometric alignments of most of the interchange ramps as well as SR 7/US 441 and SR 9 could not be verified. The geometric evaluation for the ramps that have been modified as well as the major roadways, connectors and flyover ramps are discussed in the following sections.

2.5.1 Horizontal Alignment

A review of the existing horizontal geometry for the major roadway segments and ramps was performed as part of this PD&E Study. The evaluation of the horizontal geometry for the roadway and ramps compared the existing alignments to design standards and were focused on the following design elements:

1. Radius of Curvature
2. Superelevation
3. Horizontal Curve Length
4. Horizontal Stopping Sight Distance

Tables 2-2 through **2-4** summarize the existing horizontal geometric characteristics for the major roadways and ramps within the project study area.

As shown in the tables below, several of the horizontal alignment design elements along the roadway or ramp segments either do not meet the FDOT PPM standards but satisfy the AASHTO 2011 requirements (Design Variation) or do not meet both the FDOT PPM and AASHTO 2011 standards (Design Exception) as identified below:

- <u>Radius of Curvature</u>
  - I-95 mainline - 1 design variation

- <u>Superelevation</u>
  - I-95 mainline - 6 design exceptions
  - SR 826 Connector – 3 design exceptions
  - Ramp A from EB SR 826 to SB Turnpike Connector – 1 design exception
  - Ramp M from NB SR7/ US441 to NB I-95 – 1 design exception

- <u>Horizontal Curve Length</u>
  - I-95 mainline - 6 design variations
  - 95 Express Flyover – 1 design variation
  - SR 826 Connector – 1 design variation
  - Ramp J from NB Turnpike Connector to WB SR 826 – 2 design variations
  - Ramp M from NB SR7/ US441 to NB I-95 – 2 design variations
  - Ramp T from NB I-95 to EB NW 167th street– 1 design variation

- Horizontal Stopping Sight Distance
  - I-95 mainline - 1 design exception and 3 variations
  - SR 826 Mainline – 1 design exception
  - SR 826 Connector – 2 design exceptions
  - Ramp U from NB SR 7/ US 441 to NB Turnpike – 1 design exception

A search of the FDOT District Six design database did not find any documentation for the existing horizontal alignment deficiencies on file. **Figure 2-12** shows the locations of the existing horizontal and vertical alignment deficiencies.

Table 2-2
Existing Horizontal Alignment- Radius of Curvature and Superelevation

Roadway	Curve No.	Existing Curve Parameters					Criteria		Variances & Exceptions
		Base line	Design Speed (mph)	R (ft)	Super elevation	L (ft)	PPM	AASHTO	
I-95	1	NB	60	1,432.69	0.072	978.66	0.093	0.093	Exception
	2	NB	60	2,932.39	0.040	671.64	0.054	0.054	Exception
	3	NB	60	1,910.08	0.060	868.39	0.077	0.077	Exception
	4	NB	60	1,909.86	0.060	805.16	0.077	0.077	Exception
	5	SB	60	9,750.00	0.020	1,033.47	0.02	0.02	OK
	6	SB	60	14,625	0.020	975.00	0.02	0.02	OK
	7	SB	60	1494.24	0.069	889.24	0.09	0.09	Exception
	8	SB	60	2,865	0.056	925.0	0.056	0.056	OK
	9	SB	60	2,864.79	0.053	762.47	0.055	0.055	Exception
95 Express Flyover	10	NB	55	5,729.58	0.026	372.01	0.025	0.025	OK
	11	NB	55	11,401	Varies	974.12	0.02	0.02	OK
	12	NB	55	2,390.00	0.065	1,482.46	0.056	0.056	OK
	13	SB	55	8,750.00	0.023	1,127.08	0.02	0.02	OK
	14	SB	55	2,588.48	0.065	1,500.71	0.053	0.053	OK
SR 826	15	EB/WB	45	1,145.92	0.074	803.28	0.072	0.072	OK
Turnpike Connector	16	NB	45	5,729.58	Unavailable	433.89	0.02	0.02	N/A
	17	NB	45	3,274.05	0.034	575.17	0.02	0.02	OK
	18	SB	45	1,530.24	Varies	270.540	0.059	0.059	OK
	19	SB	45	17,188	0.020	768.500	0.02	0.02	OK
	20	SB	45	1,934.00	0.052	239.280	0.048	0.048	OK
SR 826 Connector	21	EB/WB	45	525.2	0.06	736.9	0.12	0.12	Exception
	22	EB/WB	45	525.2	0.06	84.28	0.12	0.12	Exception
	23	EB/WB	45	688.97	NC	384.015	0.096	0.095	Exception
Ramp C	24	SB	40	500	0.1	651.08	0.05	0.05	OK
Ramp A	25	EB	45	3844	0.084	482.11	0.026	0.026	OK
	26	EB	30	340	0.08	508.08	0.091	0.091	Exception

Table 2-2
Existing Horizontal Alignment- Radius of Curvature and Superelevation

Roadway	Curve No.	Existing Curve Parameters					Criteria		Variances & Exceptions
		Base line	Design Speed (mph)	R (ft)	Super elevation	L (ft)	PPM	AASHTO	
Ramp L	27	NB	20	284.79	0.1	226.65	N/A	0.062	OK
	28	NB	20	150.00	0.1	495.49	N/A	0.081	OK
	29	NB	20	344.48	Varies	211.82	N/A	0.055	OK
Ramp J	30	NB	20	156.81	0.1	241.80	N/A	0.082	OK
	31	NB	20	151.58	0.1	312.00	N/A	0.081	OK
	32	NB	20	278.16	0.1	61.48	N/A	0.062	OK
	33	NB	20	568.30	0.1	92.43	N/A	0.039	OK
Ramp M	34	NB	30	660	0.06	344.12	0.062	0.061	OK
	35	NB	30	600	NC	54.07	0.066	0.064	Exception
	36	NB	30	600	0.055	136.98	0.066	0.064	Exception
Ramp K	37	SB	40	2864.79	0.03	365.4	0.028	0.028	OK
Ramp T	38	NB	40	1277.57	Varies	61.76	0.057	0.057	OK
Ramp U	39	NB	30	260	Unavailable	423.45	0.099	0.099	N/A
	40	NB	25	150	Unavailable	466.28	N/A	0.098	N/A
	41	NB	30	450	Unavailable	191.45	0.079	0.075	N/A

Table 2-3
Existing Horizontal Alignment- Curve Length

Roadway	Curve No.	Existing Curve Parameters					Criteria		Variances & Exceptions
		Base line	Design Speed (mph)	R (ft)	Super elevation	L (ft)	Desirable	Minimum	
I-95	1	NB	60	1,432.69	0.072	978.66	1800	900	OK
	2	NB	60	2,932.39	0.040	671.64	1800	900	Variation
	3	NB	60	1,910.08	0.060	868.39	1800	900	Variation
	4	NB	60	1,909.86	0.060	805.16	1800	900	Variation
	5	SB	60	9,750.00	0.020	1,033.47	1800	900	OK
	6	SB	60	14,625.0	0.020	975.00	1800	900	OK
	7	SB	60	1494.24	0.069	889.24	1800	900	Variation
	8	SB	60	2,865	0.056	925.0	1800	900	OK
	9	SB	60	2,864.79	0.053	762.47	1800	900	Variation
95 Express Flyover	10	NB	55	5,729.58	0.026	372.01	1650	825	Variation
	11	NB	55	11,401.1	Varies	974.12	1650	825	OK
	12	NB	55	2,390.00	0.065	1,482.46	1650	825	OK
	13	SB	55	8,750.00	0.023	1,127.08	1650	825	OK
	14	SB	55	2,588.48	0.065	1,500.71	1650	825	OK
SR 826	15	EB/WB	45	1,145.92	0.074	803.28	1350	675	OK
Turnpike Connector	16	NB	45	5,729.58	Unavailable	433.89	675	400	OK
	17	NB	45	3,274.05	0.034	575.17	675	400	OK
	18	SB	45	1,530.24	Varies	270.540	675	400	Variation
	19	SB	45	17,188.7	0.020	768.500	675	400	OK
	20	SB	45	1,934.00	0.052	239.280	675	400	Variation
SR 826 Connector	21	EB/WB	45	525.2	0.06	736.9	200	150	OK
	22	EB/WB	45	525.2	0.06	84.28	200	150	Variation
	23	EB/WB	45	688.97	NC	384.015	200	150	OK
Ramp C	24	SB	40	500	0.1	651.08	200	150	OK
Ramp A	25	EB	45	3844	0.084	482.11	200	150	OK
	26	EB	30	340	0.08	508.08	150	100	OK

Table 2-3
Existing Horizontal Alignment- Curve Length

Roadway	Curve No.	Existing Curve Parameters					Criteria		Variances & Exceptions
		Base line	Design Speed (mph)	R (ft)	Super elevation	L (ft)	Desirable	Minimum	
Ramp L	27	NB	20	284.79	0.1	226.65	150	100	OK
	28	NB	20	150.00	0.1	495.49	65	50	OK
	29	NB	20	344.48	Varies	211.82	180	115	OK
Ramp J	30	NB	20	156.81	0.1	241.80	65	50	OK
	31	NB	20	151.58	0.1	312.00	65	50	OK
	32	NB	20	278.16	0.1	61.48	150	100	Variation
	33	NB	20	568.30	0.1	92.43	200	150	Variation
Ramp M	34	NB	30	660	0.06	344.12	200	150	OK
	35	NB	30	600	NC	54.07	200	150	Variation
	36	NB	30	600	0.055	136.98	200	150	Variation
Ramp K	37	SB	40	2864.79	0.03	365.4	200	150	OK
Ramp T	38	NB	40	1277.57	Varies	61.76	200	150	Variation
Ramp U	39	NB	30	260	Unavailable	423.45	129	88	OK
	40	NB	30	150	Unavailable	466.28	65	50	OK
	41	NB	30	450	Unavailable	191.45	180	115	OK

Table 2-4
Existing Horizontal Alignment- Stopping Sight Distance

Roadway	Curve No.	Existing Curve Parameters					Criteria		Variances & Exceptions
		Base line	Design Speed (mph)	R (ft)	HSO (ft)	Sight Distance (ft)	PPM	AASHTO	
I-95	1	NB	60	1,432.69	Clear	Clear	645.00	570.00	OK
	2	NB	60	2,932.39	16.00	613	645.00	570.00	Variation
	3	NB	60	1,910.08	22.00	580	645.00	570.00	Variation
	4	NB	60	1,909.86	Clear	Clear	645.00	570.00	OK
	5	SB	60	9,750.00	Clear	Clear	645.00	570.00	OK
	6	SB	60	14,625.00	16.00	1368	645.00	570.00	OK
	7	SB	60	1,494.24	14.00	438	645.00	570.00	Exception
	8	SB	60	2,865.00	Clear	Clear	645.00	570.00	OK
	9	SB	60	2,864.79	16.00	606	645.00	570.00	Variation
95 Express Flyover	10	NB	55	5,729.58	17.38	893	570.00	495.00	OK
	11	NB	55	11,401.14	17.38	1259	570.00	495.00	OK
	12	NB	55	2,390.00	17.38	577	570.00	495.00	OK
	13	SB	55	8,750.00	17.38	1103	570.00	495.00	OK
	14	SB	55	2,588.48	17.38	600	570.00	495.00	OK
SR 826	15	EB/WB	45	1,145.92	13.00	346	360.00	360.00	Exception
Turnpike Connector	16	NB	45	5,729.58	Clear	Clear	360.00	360.00	OK
	17	NB	45	3,274.05	Clear	Clear	360.00	360.00	OK
	18	SB	45	1,530.24	Clear	Clear	360.00	360.00	OK
	19	SB	45	17,188.73	Clear	Clear	360.00	360.00	OK
	20	SB	45	1,934.00	Clear	Clear	360.00	360.00	OK
SR 826 Connector	21	EB/WB	45	525.2	12.00	225	360.00	360.00	Exception
	22	EB/WB	45	525.2	12.00	225	360.00	360.00	Exception
	23	EB/WB	45	688.97	Clear	Clear	360.00	360.00	OK
Ramp C	24	SB	40	500	Clear	Clear	305.00	305.00	OK
Ramp A	25	EB	45	3844	Clear	Clear	360.00	360.00	OK
	26	EB	30	340	16.00	209	200.00	200.00	OK

Table 2-4
Existing Horizontal Alignment- Stopping Sight Distance

Roadway	Curve No.	Existing Curve Parameters					Criteria		Variances & Exceptions
		Base line	Design Speed (mph)	R (ft)	HSO (ft)	Sight Distance (ft)	PPM	AASHTO	
Ramp L	27	NB	20	284.79	Clear	Clear	115.00	115.00	OK
	28	NB	20	150.00	17.50	146	115.00	115.00	OK
	29	NB	20	344.48	17.50	221	115.00	115.00	OK
Ramp J	30	NB	20	156.81	Clear	Clear	115.00	115.00	OK
	31	NB	20	151.58	Clear	Clear	115.00	115.00	OK
	32	NB	20	278.16	Clear	Clear	115.00	115.00	OK
	33	NB	20	568.30	16.00	270	115.00	115.00	OK
Ramp M	34	NB	30	660	17.50	305	200.00	200.00	OK
	35	NB	30	600	17.50	291	200.00	200.00	OK
	36	NB	30	600	17.50	291	200.00	200.00	OK
Ramp K	37	SB	40	2864.79	17.50	634	305.00	305.00	OK
Ramp T	38	NB	40	1277.57	10.50	328	305.00	305.00	OK
Ramp U	39	NB	30	260	Clear	Clear	200.00	200.00	OK
	40	NB	30	150	17.50	146	200.00	200.00	Exception
	41	NB	30	450	17.50	252	200.00	200.00	OK

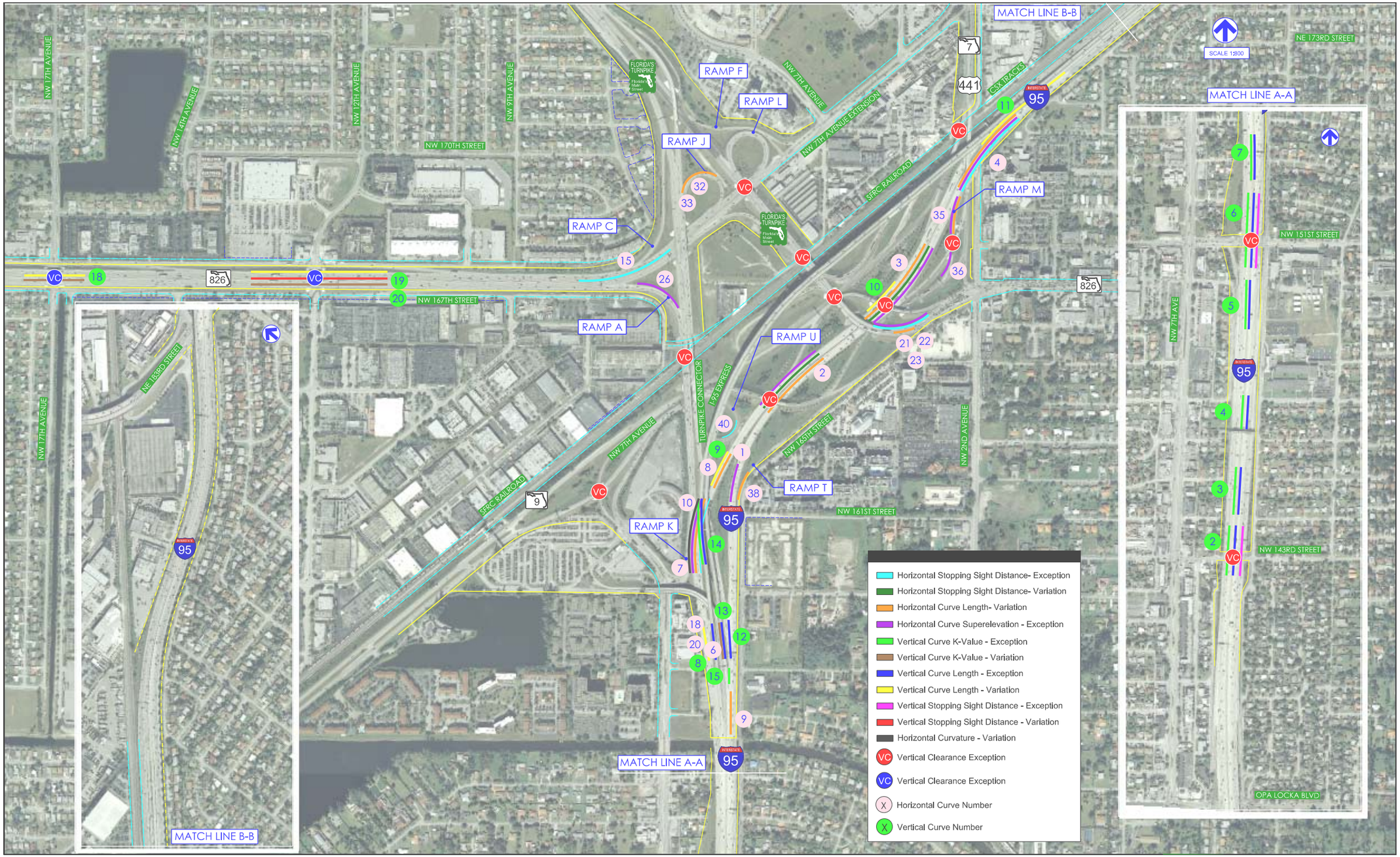


Figure 2-12 Existing Geometric Deficiencies

2.5.2 Vertical Alignment

Overview of the existing vertical geometry for the major roadway segments and ramps within the study area was also performed as part of this PD&E Study. The evaluation of the existing vertical geometry focused on the review of the following design elements:

1. Grades
2. Vertical Curve K-Values
3. Vertical Curve Length
4. Stopping Sight Distances

Tables 2-5 through **2-7** summarize the existing vertical geometric characteristics for the major roadways and ramps within the project study area.

As shown in these tables, the results of the vertical alignment evaluation identified several deficiencies along the roadways and ramp segments as follows:

- Grades
  - The maximum grade along the major roadway segments and interchange ramps within the study limits meets minimum FDOT standards for the design speed of each facility

- K-Values
  - I-95 mainline - 5 design exceptions
  - 95 Express Flyover – 3 design exceptions and 1 variation
  - SR 826/ Palmetto Expressway mainline – 3 design variations

- Vertical Curve Length
  - I-95 mainline - 5 design exceptions and 5 variations
  - 95 Express Flyover – 3 design exceptions and 1 variation
  - SR 826/Palmetto Expressway mainline – 3 design variations
  - Ramp L from NB Turnpike/ SR 826 connector to WB SR 826 – 1 design exception

- Vertical Stopping Sight Distance
  - I-95 mainline - 2 design exceptions
  - SR 826/Palmetto Expressway mainline – 2 design variations

A search of the FDOT District Six design database identified documentation for the existing vertical deficiencies along I-95 mainline between NW 135th Street and NW 151st Street that were obtained as part of the 95 Express Phase I project. No other documentation was found for the remaining identified vertical alignment deficiencies. **Figure 2-12** shows the locations of the existing horizontal and vertical alignment deficiencies.

Table 2-5
Existing Vertical Alignment- Grades and K Values

Roadway	Baseline	Curve No.	Design Speed (mph)	Vertical Curve Type	Grade		Δ G	Existing Curve Length (Ft)	Existing K-Value	Criteria- K Value		Variances & Exceptions
					Approach	Exit				PPM	AASHTO	
I-95	NB/SB	1	60	Sag	(-) 3.0	(+) 3.0	6.00	1400.00	233.00	157	136	OK
		2	60	Crest	(+) 3.0	(-) 3.0	6.00	500.00	83.00	313	151	Exception*
		3	60	Sag	(-) 3.0	(+) 0.3	3.30	400.00	121.00	157	136	Exception*
		4	60	Crest	(+) 0.3	(-) 0.3	0.60	400.00	667.00	313	151	OK
		5	60	Sag	(-) 0.3	(+) 3.0	3.300	400	121	157	136	Exception
		6	60	Crest	(+) 3.0	(-) 3.0	6.000	550	92	313	151	Exception
		7	60	Sag	(-) 3.0	(+) 0.52	3.520	400	114	157	136	Exception
		8	60	Crest	(+) 0.52	(-) 0.288	0.810	300	370	313	151	OK
		9	60	Sag	(-) 0.288	(+) 0.1733	0.461	300	650	157	136	OK
		10	60	Crest	(+) 0.172	(-) 0.226	0.400	300	750	313	151	OK
		11	60	Sag	(-) 0.226	0.00	0.226	300	1327	157	136	OK
95 Express Flyover	SB	12	55	Sag	(+) 0.11	(+) 6.00	5.890	600	102	136	115	Exception
		13	55	Crest	(+) 6.00	(-) 0.30	6.300	1,026	163	245	114	Variation
	NB	14	55	Sag	(-) 0.37	(+) 5.5	5.870	600	102	136	115	Exception
		15	55	Crest	(+) 5.0	(-) 0.3	5.300	1,100	208	245	114	Variation
	NB/SB	16	55	Crest	(-) 0.3	(-) 3.3	3.000	1,000	333	245	114	OK
		17	55	Sag	(-) 3.5	(-) 0.3	3.200	800	250	136	115	OK

Table 2-5
Existing Vertical Alignment- Grades and K Values

Roadway	Baseline	Curve No.	Design Speed (mph)	Vertical Curve Type	Grade		Δ G	Existing Curve Length (Ft)	Existing K-Value	Criteria- K Value		Variances & Exceptions
					Approach	Exit				PPM	AASHTO	
SR 826	EB/WB	18	60	Crest	(-) 3.0	(+) 3.0	6.000	1,200	200	245	151	Variation
		19	60	Crest	(+) 2.95	(+) 0.26	2.690	575	214	245	151	Variation
		20	60	Crest	(+) 0.26	(-) 2.53	2.790	600	215	245	151	Variation
		21	60	Sag	(-) 2.53	0.00	2.530	450	178	136	136	OK
		22	45	Crest	0.00	(-) 0.173	0.173	200	1156	98	61	OK
		23	45	Sag	(-) 0.173	(+) 0.10	0.273	200	733	79	79	OK
Turnpike Connector	NB/SB	24	45	Sag	(+) 0.3	(+) 3.0	2.700	500	185	79	79	OK
		25	45	Crest	(+) 3.0	(-) 2.36	5.360	550	103	98	61	OK
		26	45	Sag	(-) 2.36	(+) 0.86	3.220	300	93	79	79	OK
		27	45	Crest	(+) 0.86	(-) 2.85	3.710	400	108	98	61	OK
Ramp A	EB	28	30	Sag	(-) 0.51	(+) 5.00	5.510	300	54	37	37	OK
		29	30	Crest	(+) 5.00	(+) 1.52	3.480	287	83	31	19	OK
Ramp L	NB	30	20	Crest	(-) 0.2317	(-) 0.2670	0.035	30	850	10	7	OK
		31	20	Sag	(-) 0.2670	(+) 0.5379	0.805	89	110	17	17	OK
		32	20	Sag	(+) 0.0699	(+) 4.7639	4.694	322	68	17	17	OK
Ramp J	NB	33	20	Sag	(+) 0.81	(+) 3.50	2.690	177	66	17	17	OK
Ramp M	NB	34	30	Crest	(+) 0.44	(+) 0.40	0.840	110	131	31	19	OK

Note: Design exception documentation obtained as part of the 95 Express Phase I project*

Table 2-6
Existing Vertical Alignment- Curve Length

Roadway	Baseline	Curve No.	Design Speed (mph)	Vertical Curve Type	Grade		Δ G	Existing Curve Length (Ft)	Existing K-Value	Criteria- Curve Length		Variances & Exceptions
					Approach	Exit				PPM	AASHTO	
I-95	NB/SB	1	60	Sag	(-) 3.0	(+) 3.0	6.00	1400.00	233	800	816	OK
		2	60	Crest	(+) 3.0	(-) 3.0	6.00	500.00	83	1000	906	Exception*
		3	60	Sag	(-) 3.0	(+) 0.3	3.30	400.00	121	800	449	Exception*
		4	60	Crest	(+) 0.3	(-) 0.3	0.60	400.00	667	1000	180	Variation
		5	60	Sag	(-) 0.3	(+) 3.0	3.300	400	121	800	449	Exception
		6	60	Crest	(+) 3.0	(-) 3.0	6.000	550	92	1000	906	Exception
		7	60	Sag	(-) 3.0	(+) 0.52	3.520	400	114	800	479	Exception
		8	60	Crest	(+) 0.52	(-) 0.288	0.810	300	370	1000	180	Variation
		9	60	Sag	(-) 0.288	(+) 0.1733	0.461	300	650	800	180	Variation
		10	60	Crest	(+) 0.172	(-) 0.226	0.400	300	750	1000	180	Variation
		11	60	Sag	(-) 0.226	0.00	0.226	300	1327	800	180	Variation
95 Express Flyover	SB	12	55	Sag	(+) 0.11	(+) 6.00	5.890	600	102	677	677	Exception
		13	55	Crest	(+) 6.00	(-) 0.30	6.300	1,026	163	1166	718	Variation
	NB	14	55	Sag	(-) 0.37	(+) 5.5	5.870	600	102	675	675	Exception
		15	55	Crest	(+) 5.0	(-) 0.3	5.300	1,100	208	980	604	OK
	NB/SB	16	55	Crest	(-) 0.3	(-) 3.3	3.000	1,000	333	555	342	OK
		17	55	Sag	(-) 3.5	(-) 0.3	3.200	800	250	368	368	OK

Table 2-6
Existing Vertical Alignment- Curve Length

Roadway	Baseline	Curve No.	Design Speed (mph)	Vertical Curve Type	Grade		Δ G	Existing Curve Length (Ft)	Existing K-Value	Criteria- Curve Length		Variances & Exceptions
					Approach	Exit				PPM	AASHTO	
SR 826	EB/WB	18	60	Crest	(-) 3.0	(+) 3.0	6.000	1,200	200	1470	906	Variation
		19	60	Crest	(+) 2.95	(+) 0.26	2.690	575	214	659	406	Variation
		20	60	Crest	(+) 0.26	(-) 2.53	2.790	600	215	684	421	Variation
		21	60	Sag	(-) 2.53	0.00	2.530	450	178	344	344	OK
		22	45	Crest	0.00	(-) 0.173	0.173	200	1156	135	135	OK
		23	45	Sag	(-) 0.173	(+) 0.10	0.273	200	733	135	135	OK
Turnpike Connector	NB/SB	24	45	Sag	(+) 0.3	(+) 3.0	2.700	300	111	213	213	OK
		25	45	Crest	(+) 3.0	(-) 2.36	5.360	550	103	525	327	OK
		26	45	Sag	(-) 2.36	(+) 0.86	3.220	300	93	254	254	OK
		27	45	Crest	(+) 0.86	(-) 2.85	3.710	400	108	364	226	OK
Ramp A	EB	28	30	Sag	(-) 0.51	(+) 5.00	5.510	300	54	204	204	OK
		29	30	Crest	(+) 5.00	(+) 1.52	3.480	287	83	108	90	OK
Ramp L	NB	30	20	Crest	(-) 0.2317	(-) 0.2670	0.035	30	850	60	60	No Curve Required
		31	20	Sag	(-) 0.2670	(+) 0.5379	0.805	89	110	60	60	OK
		32	20	Sag	(+) 0.0699	(+) 4.7639	4.694	322	68	80	80	OK
Ramp J	NB	33	20	Sag	(+) 0.81	(+) 3.50	2.690	177	66	60	60	OK
Ramp M	NB	34	30	Crest	(+) 0.44	(+) 0.40	0.840	110	131	90	90	OK

Note: Design exception documentation obtained as part of the 95 Express Phase I project*

Table 2-7
Existing Vertical Alignment- Stopping Sight Distance

Roadway	Baseline	Curve No.	Vertical Curve Type	Grade		Δ G	Existing Curve Length (Ft)	Existing SSD		Criteria-SSD		Variances & Exceptions
				Approach	Exit			PPM	AASHTO	PPM	AASHTO	
I-95	NB/SB	2	Crest	(+) 3.0	(-) 3.0	6.00	500	361	430	645.00	570.00	Exception*
		4	Crest	(+) 0.3	(-) 0.3	0.60	400	941	1200	645.00	570.00	OK
		6	Crest	(+) 3.0	(-) 3.0	6.000	550	386	455	645.00	570.00	Exception
		8	Crest	(+) 0.52	(-) 0.288	0.810	300	702	894	645.00	570.00	OK
		10	Crest	(+) 0.172	(-) 0.226	0.400	300	998	1272	645.00	570.00	OK
95 Express Flyover	SB	13	Crest	(+) 6.00	(-) 0.30	6.300	1,026	618	684	570.00	495.00	OK
	NB	15	Crest	(+) 5.0	(-) 0.3	5.300	1,100	675	754	570.00	495.00	OK
	NB/SB	16	Crest	(-) 0.3	(-) 3.3	3.000	1,000	722	860	570.00	495.00	OK
SR 826	EB/WB	18	Crest	(-) 3.0	(+) 3.0	6.000	1,200	711	780	570.00	570.00	OK
		19	Crest	(+) 2.95	(+) 0.26	2.690	575	535	689	570.00	570.00	Variation
		20	Crest	(+) 0.26	(-) 2.53	2.790	600	538	687	570.00	570.00	Variation
		22	Crest	0.00	(-) 0.173	0.173	200	1240	1580	570.00	570.00	OK
Turnpike Connector	NB/SB	25	Crest	(+) 3.0	(-) 2.36	5.360	550	399	476	360.00	360.00	OK
		27	Crest	(+) 0.86	(-) 2.85	3.710	400	379	491	360.00	360.00	OK
Ramp A	EB	29	Crest	(+) 5.00	(+) 1.52	3.480	287	331	422	200.00	200.00	OK
Ramp L	NB	30	Crest	(-) 0.2317	(-) 0.2670	0.035	30	1054	1344	155.00	155.00	OK
Ramp M	NB	34	Crest	(+) 0.44	(+) 0.40	0.840	110	417	532	200.00	200.00	OK

Note: Design exception documentation obtained as part of the 95 Express Phase I project*

2.6 Existing Roadway Signage

An existing roadway sign inventory was performed within the project study area to identify major roadway sign structures and ITS signs that could be impacted as part of this project. Each major roadway sign was photographed, inventoried, numbered, classified and located on aerial photography using Global Positioning System (GPS) and Geographic Information Systems (GIS) technologies. A total of 121 major signs were identified and are summarized in **Table 2-8**. The detailed existing sign inventory is provided in **Appendix B**.

Table 2-8
Existing Roadway Sign Inventory

#	Roadway	Sign Type				
		Regulatory	Guide	Warning	Information	ITS
1	SR 826/ Palmetto Exwy.	0	15	0	2	0
2	SR 9A/I-95	11	25	0	6	1
3	Florida's Turnpike	2	12	1	2	0
4	NW 167th Street	0	10	0	2	0
5	SR 7/ US 441	0	11	0	1	0
6	SR 9	2	2	0	6	1
7	Golden Glades P&R Lot	0	9	0	0	0

2.7 Existing Drainage

2.7.1 Regional Watershed and Receiving Waterbodies

The study corridor lies within South Florida Water Management District (SFWMD) Basins C-7, C-8, and C-9 East (See **Figure 2-13**). The existing stormwater management system for GGI consists of dry detention and dry retention treatment areas located within the interchange infields. Discharge from the treatment areas is bifurcated by the South Florida Rail Corridor (SFRC). Runoff from the area north of the SFRC ultimately drains northwesterly, within the Florida's Turnpike swales, towards the C-9 Canal. The area south of the SFRC generally drains south, within two 72-in metal pipes under I-95, towards the C-8 Canal. For the purposes of this report, the area north of the SFRC is identified as Basin C-9 while the area south of the SFRC is identified as Basin C-8.

According to the SFWMD Permit Information Manual, Volume IV, the allowable off-site discharge is essentially unlimited by gravity connection for both the C-8 and C-9 Canals.

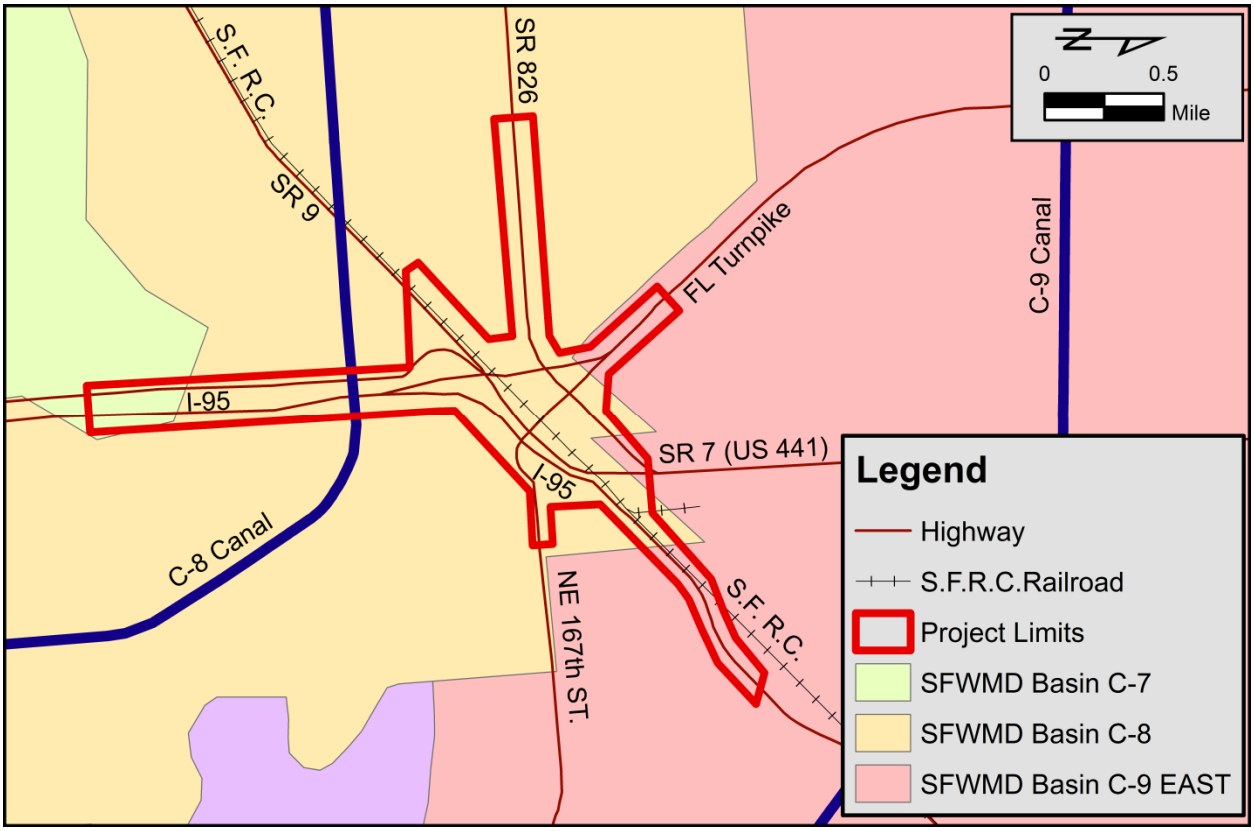


Figure 2-13 Regional Watersheds

2.7.2 Stormwater Management Systems

The project area was divided into seven main drainage systems, as shown below in **Figure 2-14**. System limits were determined using existing drainage divides, which included changes in elevation, transportation facilities and water bodies. The naming convention was chosen so that the first two characters represent the receiving water body followed by an abbreviation of the general location of the system.

The western portion of the study corridor is within the Anodyne contamination plume. A one-mile buffer around the contamination plume covers most of the study area. The Florida Department of Environmental protection (FDEP) discourages the use of wet ponds or exfiltration trenches within one mile of a superfund site. As such, water treatment facilities proposed by this study, which fall within the 1-mile Anodyne buffer, consist of dry-retention and/or dry-detention.

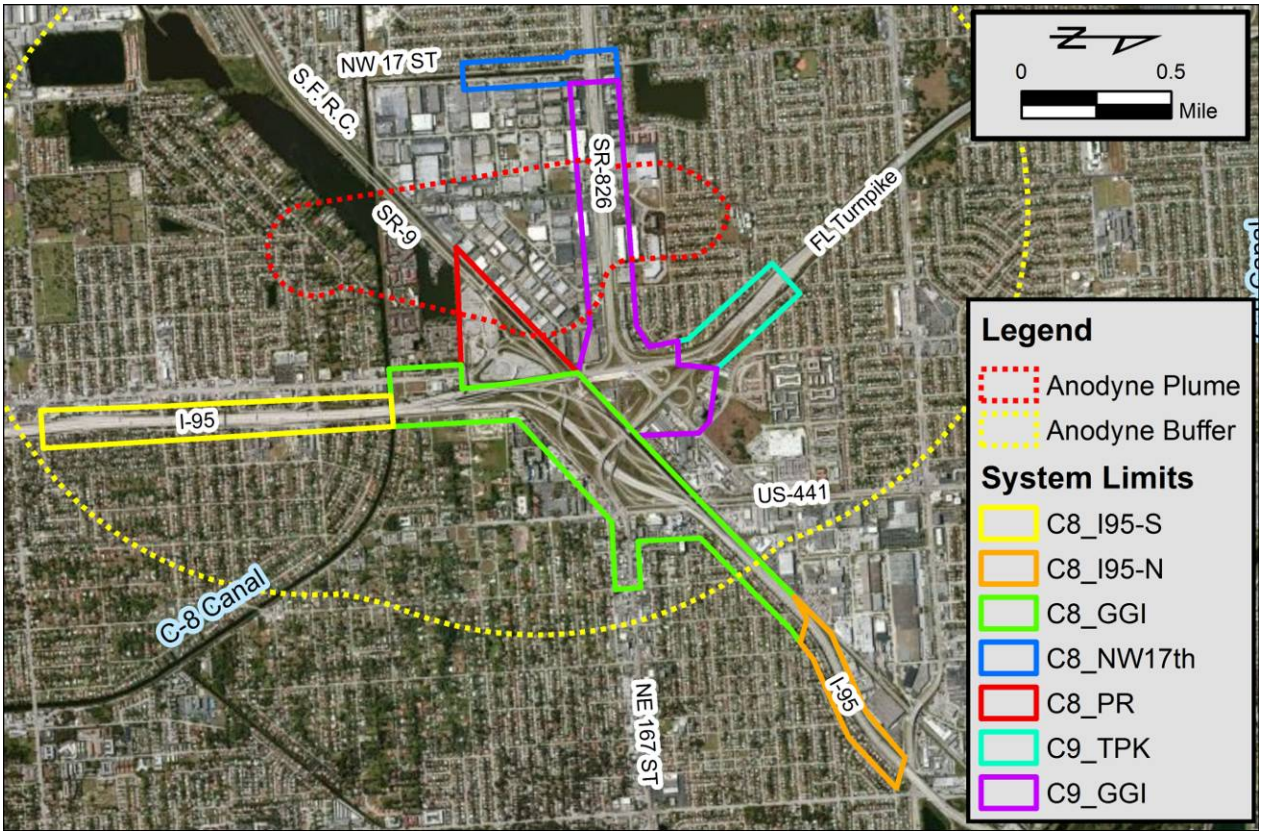


Figure 2-14 Stormwater Management Systems

2.7.2.1 System C8_I95-S

System C8_I95-S covers the area of I-95 between SR 916/NW 135TH Street/Opa-Locka Boulevard and the C-8 Canal. It is over a mile long and within the 1-mile buffer of the Anodyne contamination plume. Most of the drainage system consists of a network of inlets and closed pipes connecting to a main outfall trunk line, which discharges into the C-8 Canal. There is, nonetheless, a segment of the southbound lanes, between NW 151st Street and the C-8 canal, which has a small swale system with a 24-inch outfall pipe into the canal. The main outfall trunk line in this system consists of concrete culverts, which progress in size from 30-inch to 42-inch. The trunk line runs the length of the basin and is on the west side of I-95 from Opa-Locka Boulevard to just south of NW 151st Street. It then crosses under I-95 to connect to a 54-inch trunk line running east towards the canal. A desktop review of the limited plans available for the area indicates that the 54-inch trunk line services both I-95 and the adjacent residential community. The existing stormwater management system, for this segment of I-95, appears to be a direct discharge system with no formal water treatment being provided.

2.7.2.2 System C8_PR

System C8_PR consists of the Park & Ride, Municipal Parking facility and SR 9. The system is bound by the South Florida Rail Corridor (SFRC) on the north and the Turnpike Connector on the east. It is partially within the Anodyne contamination plume and completely within the 1-mile buffer of the plume. Stormwater runoff from this system is generally conveyed southeasterly through the Municipal Parking facility's piped drainage system. Ultimately, the runoff discharges through a 42-inch culvert into the adjacent drainage system (C8_GGI), which outfalls into the C-8 Canal. The existing stormwater management system appears to be a direct discharge system with no formal water treatment being provided.

2.7.2.3 System C8_GGI

System C8_GGI consists of the southern part of the GGI. The system is bound by the South Florida Rail Corridor (SFRC) on the north and the C-8 Canal on the south. Most of this drainage system is within the 1-mile buffer of the Anodyne contamination plume. This drainage system receives runoff from System C8_PR. A review of available plans and permit information indicates that stormwater in this system is being collected and treated via dry-retention in the various infield areas between ramps before being discharged to the C-8 Canal.

The I-95 northern segment of this drainage system has two concrete culvert trunk lines, which direct runoff south towards the GGI infield areas. One trunk line is located under each of the outside shoulders. Both trunk lines begin as an 18-inch round culvert near the northern limits of the drainage system and transition through several sizes of elliptical pipe before discharging into the GGI areas. The trunk line, located under the northbound outside shoulder ends as a 54-inch round culvert near NW 2nd Avenue while the trunk line under the southbound outside lane ends as a 36-inch round culvert near the infield are between I-95 and SR 9. Excess runoff generated within the interchange portion of the system is generally conveyed south towards a double 72-inch asphalt coated metal trunk line that is located under the southbound shoulder of I-95 between the Park & Ride ramp and the C-8 Canal.

The drainage report submitted to the Miami-Dade County Permitting, Environment and Regulatory Affairs (PERA[1]), to obtain permit OF 401 for project 87270-3419, states that 15.97 Ac-ft of retention/detention is being provided in the aforementioned infield areas. Improvements that have occurred in this drainage system, since the PERA permit was issued, have had little impacts to the amount of impervious area or treatment volume.

[1] *The acronyms PERA, DERM, and DRER refer to the same agency.*

2.7.2.4 System C8_I95-N

System C8_I95-N spans from just south of NE 1st Avenue to NE 183rd Street (Miami Gardens Drive). It is slightly less than a mile long and is outside of the Anodyne 1-mile buffer. This drainage system consists of roadside swales on both sides of the roadway with equalizer pipes connecting them and a retention area located in the western swale where I-95 turns away from the South Florida Rail Corridor (SFRC). The retention area provides 0.35 Ac-ft of dry-retention treatment. In general runoff is conveyed from the eastern swale to the western swale, which abuts the SFRC, and runs south towards Drainage System C8_GGI. A note is made that the drainage report for FPID 422796-2-52-01 states that the area served by this drainage system ultimately discharges to the C-9 Canal; however a review of existing plans did not show a connection to move runoff across NE 183rd Street. As such, the study team concluded that this drainage system ultimately discharges south along the SFRC swale towards the C-8 Canal rather than across NE 183rd Street towards the C-9 Canal.

2.7.2.5 System C8_NW17th

System C8_NW17th covers the area of NW 17th Avenue from NW 165th Street to the SR 826. It is slightly less than half a mile long and within the 1-mile buffer of the Anodyne contamination plume. NW 17th Avenue is a County owned two lane undivided rural road with no dedicated drainage system. There are, however, a few drainage inlets mostly along the western swale area, but there is no formal conveyance system to get runoff to the inlets. Construction plans for NW 17th Avenue were unavailable from Miami-Dade County at the time of this study. The assumption is made that each of the sparsely placed drainage inlets is connected to an exfiltration trench of undetermined length and condition. The roadway is crowned such that runoff from the southbound lane sheet-flows into a flat swale area shared with a residential neighborhood while runoff from the northbound lane sheet-flows into a 15-ft wide flat strip of sod before overflowing into the NW 17th Avenue canal. In general, runoff generated within this system overtops NW 17th Avenue and flows into the NW 17th Avenue canal, which discharges into the C-8 Canal.

2.7.2.6 System C9_GGI

System C9_GGI consists of the northern part of the GGI and an adjacent section of SR 826/Palmetto Expressway. It is partially within the Anodyne contamination plume and completely within the 1-mile buffer of the plume. Stormwater runoff from the SR 826 segment of this system is conveyed east, through trunk lines along both sides of the roadway, towards the GGI infield area. Runoff from the SR 826 southern swale is conveyed through a 24-inch x 38-inch cross drain under SR 826 to unite with runoff from the northern swale and flows north along the outside western Florida's Turnpike swale. In general, runoff generated within this drainage system is directed towards the GGI infield areas and then

north towards the Florida's Turnpike (Drainage System C9_TPK) where it is conveyed by a 36-inch culvert through the Toll Plaza area and ultimately into the C-9 Canal. Based on a review of available construction plans and permitting information, the existing stormwater management system was not designed to provide a specific amount of water quality treatment.

2.7.2.7 System C9_TPK

System C9_TPK covers the area of the Florida's Turnpike between the Toll Plaza and the GGI loop ramps. It is approximately half a mile long and is within the 1-mile buffer of the Anodyne contamination plume. In general, runoff from this system is conveyed along the Florida's Turnpike swales towards the C-9 Canal. This drainage system receives runoff from Drainage System C9_GGI.

For the purposes of quantifying the increase in impervious area, the existing condition in Drainage System C9_TPK was considered as the condition that will result once project FPID 415462-2-52-02 is constructed. Project FPID 415462-2-52-02 will convert the Toll Plaza to an All Electronic Tolling (AET) facility. Consequently, the facility's impervious footprint will be reduced allowing water quality treatment to be provided in the roadside swales. Documentation for permit 13-01013-P, Application 070314-4, indicates that the water quality treatment provided in the widened swales is to compensate future improvements to the Florida's Turnpike mainline.

2.8 Existing Traffic

An existing traffic operational analysis was performed as part of this study to document the existing conditions and identify operational hotspots within the project study area. Traffic data was collected in 2010 during the planning phase for this study in accordance with FDOT guidelines. The traffic count data included 72-hour weekday counts at all FDOT count stations located within the GGI interchange study area, as well as intersection turning movement counts, travel time runs and selective origin-destination surveys for calibration of the CORSIM model. The detailed traffic data collection effort and the existing traffic operational analysis are include in the Existing Traffic Conditions Memorandum prepared as part of this study.

2.8.1 AADT and Peak Hour Traffic Volumes

The existing Annual Average Daily Traffic (AADT) along the major roadway segments and peak hour traffic volumes for the morning and evening peak periods are summarized in **Table 2-9**. The existing AADT and peak hour volumes were obtained from the 72 hour volume counts collected from Tuesday and Thursday and adjusted for peak season and axle factors.

Table 2-9
Existing (2010) Traffic Volumes

#	Roadway	Segment	AADT (vpd)	Peak Period Traffic Volume (vph)	
				AM	PM
1	I-95 Mainline	From GGI to NW 151st Street	258,000	17,480	18,050
		From GGI to Miami Gardens Drive	160,000	11,030	11,020
2	I-95 Express Lanes	Within GGI (SB)	16,500	898	898
		Within GGI (NB)	11,500	673	1,207
3	SR 826/ Palmetto Exwy.	From NW 12th Ave. to Ramp to I-95 SB	164,000	11,150	11,910
		From NW 17th Ave. to NW 12th Ave.	150,000	9,735	10,500
4	Florida's Turnpike Mainline	From GGI to NW 199th Street	73,300	6,680	6,720
5	Turnpike Connector	Within GGI (NB)	44,000	3,257	3,533
		Within GGI (SB)	22,000	1,587	1,448
6	SR 7/US 441	Within GGI (NB)	22,500	1,550	1,690
		Within GGI (SB)	24,500	2,190	1,140
		From Biscayne Canal to GGI	28,000	2,070	2,230
7	SR 9	South of GGI	27,500	1,896	2,258
8	NW 167th Street	From NW 2nd Ave to N. Miami Ave	63,500	4,410	4,780

2.8.2 Freeway Segment Analysis

Basic freeway sections were analyzed using both HCM 2010 and CORSIM multiple run density averages. The analysis indicated that a number of freeway segments within GGI operate at a failing LOS. The HCM 2010 and CORSIM analysis results identifying failing and high density freeway segments and their corresponding LOS are shown in **Table 2-10**.

2.8.3 Ramp Merge/Diverge Analysis

Ramp merging and diverging segments were identified at 42 node locations within GGI. Of these, 13 individual locations were identified as being part of weaving segments. Those sections were evaluated separately in accordance with HCM 2010 weaving guidelines. The merge and diverge analysis was performed by extracting speed and densities calculated by CORSIM for the ramp segment and the 1500-feet influence area after or before the merge or diverge segments. It should be noted that CORSIM density is based on number of vehicles instead of equivalent passenger car. However, since peak hour truck percentages are relatively low within GGI, no adjustments were necessary. HCM states that currently there is no reliable empirical model for analyzing Major Merge and Major Diverge ramp junctions. As such, only CORSIM results will be used for all types of merge and diverge ramp analysis. The ramp analysis was conducted on the remaining 28 ramp junctions.

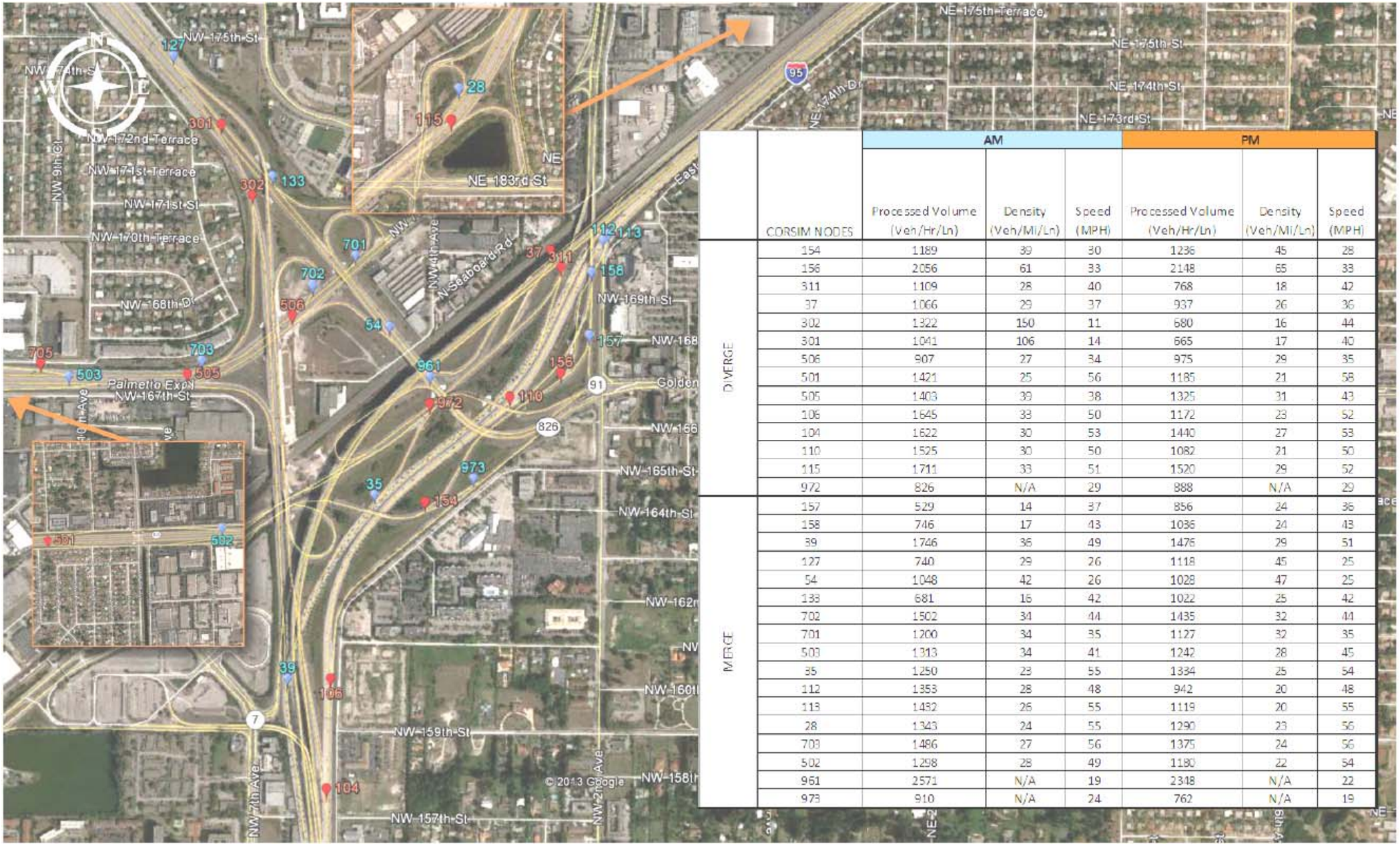
The merge and diverge analysis results are summarized in **Figure 2-15**. The merge/diverge analysis indicates that the majority of the key ramps operated at acceptable densities; however few locations operated at high density and were observed to be congested in the CORSIM simulation. The critical ramps merge/diverge sections operating at high traffic densities include:

- Turnpike SB Connector Merge to I-95 SB (Node 39)
- Turnpike SB to NW 167 Street After SR 826 EB On-Ramp Merge (Node 54)
- Turnpike NB Connector Merge to SR 826 WB (Node 702)
- Turnpike NB Merge to SR 826 (East Loop) (Node 701)
- SR 7 NB Merge with I-95 NB (Node 112)
- SR 7 NB Diverge to 167 Street on ramp (Node 154)
- Turnpike SB Diverge to SR 826 WB (Node 302)
- Turnpike SB Diverge to Turnpike Connector (Node 301)
- SR 826 EB Diverge to NW 7 Avenue Extension and NW 167 Street (Node 506)
- SR 826 EB Diverge to Turnpike SB Connector (Node 505)
- I-95 NB Diverge at NB Express Lanes (Node 104)

It should be noted that the proposed Turnpike AET Phase 4 project that converts the existing mixed cash toll plaza to an all-electronic toll plaza will improve traffic operations from southbound Turnpike to westbound SR 826 and NW 167 Street off-ramps.

Table 2-10
Existing Conditions Freeway Operational Analysis Results

Segment	Period	Direction	Volume (vph)	PHF	Speed (mph)	Density (pc/mi/ln)	Adopted LOS	LOS
I-95 S of GGI After NW 151 St Off	AM	NB	8096	0.94	54.0	40.3	E	E
I-95 S of GGI Before NW 151 St Off		SB	8156	0.97	55.0	38.6	E	E
SR 826 B/W NW 17th Ave Off and 17th Ave		EB	5644	0.91	60.0	26.2	D	D
SR 826 B/W NW 17th Ave Off and 17th Ave		WB	5255	0.97	60.0	22.6	D	C
Florida's Turnpike at Toll Plaza		SB	3611	0.96	60.0	21.3	D	C
Florida's Turnpike at Toll Plaza		NB	2725	0.92	60.0	16.8	D	B
I-95 between GGI and Miami Gardens Dr		SB	6429	0.92	49.7	47.3	E	F
I-95 between GGI and Miami Gardens Dr		NB	6426	0.94	51.1	45.1	E	F
I-95 South of NW 151 St		NB	7550	0.95	57.0	35.2	E	E
I-95 South of NW 151 St		SB	6637	0.95	59.5	29.6	E	D
I-95 S of GGI After NW 151 St Off	PM	NB	7197	0.94	58.0	33.3	E	D
I-95 S of GGI Before NW 151 St Off		SB	7658	0.97	57.2	34.8	E	D
SR 826 B/W NW 17th Ave Off and 17th Ave		EB	5017	0.91	60.0	23.3	D	C
SR 826 B/W NW 17th Ave Off and 17th Ave		WB	5481	0.97	60.0	23.9	D	C
Florida's Turnpike at Toll Plaza		SB	2542	0.96	60.0	15.0	D	B
Florida's Turnpike at Toll Plaza		NB	4470	0.92	60.0	27.6	D	D
I-95 between GGI and Miami Gardens Dr		SB	6611	0.92	47.8	50.6	E	F
I-95 between GGI and Miami Gardens Dr		NB	6435	0.94	51.0	45.2	E	F
I-95 South of NW 151 ST		NB	6316	0.95	59.9	28.0	E	D
I-95 South of NW 151 ST		SB	6158	0.95	60.0	27.3	E	D



	CORSIM NODES	AM			PM		
		Processed Volume (Veh/Hr/Ln)	Density (Veh/Mi/Ln)	Speed (MPH)	Processed Volume (Veh/Hr/Ln)	Density (Veh/Mi/Ln)	Speed (MPH)
DIVERGE	154	1189	39	30	1236	45	28
	156	2056	61	33	2148	65	33
	311	1109	28	40	768	18	42
	37	1066	29	37	937	26	36
	302	1322	150	11	680	16	44
	301	1041	106	14	665	17	40
	506	907	27	34	975	29	35
	501	1421	25	56	1185	21	58
	505	1403	39	38	1325	31	43
	106	1645	33	50	1172	23	52
	104	1622	30	53	1440	27	53
	110	1525	30	50	1082	21	50
	115	1711	33	51	1520	29	52
	972	826	N/A	29	888	N/A	29
MERGE	157	529	14	37	856	24	36
	158	746	17	43	1036	24	43
	39	1746	36	49	1476	29	51
	127	740	29	26	1118	45	25
	54	1048	42	26	1028	47	25
	133	681	16	42	1022	25	42
	702	1502	34	44	1435	32	44
	701	1200	34	35	1127	32	35
	503	1313	34	41	1242	28	45
	35	1250	23	55	1334	25	54
	112	1353	28	48	942	20	48
	113	1482	26	55	1119	20	55
	28	1343	24	55	1290	23	56
	703	1486	27	56	1375	24	56
	502	1298	28	49	1180	22	54
	961	2571	N/A	19	2348	N/A	22
	973	910	N/A	24	762	N/A	19

Figure 2-15 Existing Merge/Diverge Locations and Operations

2.8.4 Weaving Analysis

Weaving analysis was performed using HCM 2010 software for freeway sections where an on-ramp was followed closely by an off-ramp within the maximum weaving length estimated using HCM 2010 procedure. Six segments in total were identified as weaving. A summary of the weaving results is show in **Table 2-11** and **Figure 2-16**.

Table 2-11
Existing Weaving Operational Analysis Results

Mainline	CORSIM Nodes	Weave Length	AM				PM			
			v/c Ratio	Speed (mph)	Density	LOS	v/c Ratio	Speed (mph)	Density	LOS
SR 7 NB	150-151	350	0.51	33.5	20.8	B	0.74	31.4	36.7	E
SR 7 SB	312-314	1387	0.723	40.6	33.6	D	0.417	41.4	17.8	B
SR 7 SB	315-316	800	0.776	41.7	32.6	D	0.435	39.6	19.8	B
Florida's Turnpike SB	303-305	1530	0.968	55.9	26.9	C	0.883	56.8	23.5	B
NW 167th Street to Florida's Turnpike	131-132	1130	0.713	59.0	20.0	B	0.85	54.4	25.8	C
Turnpike Connector NB	123-124	1800	0.713	59.0	18.2	B	0.732	58.4	22.3	B

The results of the weaving analysis shown above indicate that all the weaving segments within the project study area operate at LOS D or better during either the AM or PM peak hours, with the exception of the NB segment of SR 7 which operates at LOS E. However, based on field observations and CORSIM simulation files, the critical weaving segments were determined to include the following segments:

- 7 between SR 9 merge ramp to NB Turnpike Loop Ramp in the PM peak period. This roadway segment is part of the signed route for SR 826 EB and Turnpike SB to I-95 NB (Node 150 -151)
- SR 7 SB between I-95 SB and the Golden Glades Park and Ride, in the AM peak period (Node 312-314 and 315-216)
- Turnpike connector NB between the SR 7 on-ramp and the off-ramp to SR 826 WB. FDOT District 6 recently completed at project along the Turnpike Connector Ramp northbound segment that provided an auxiliary lane between the SR 7 on-ramp and the off-ramp to SR 826 WB to improve the weaving operations within this segment (Node 123-124)

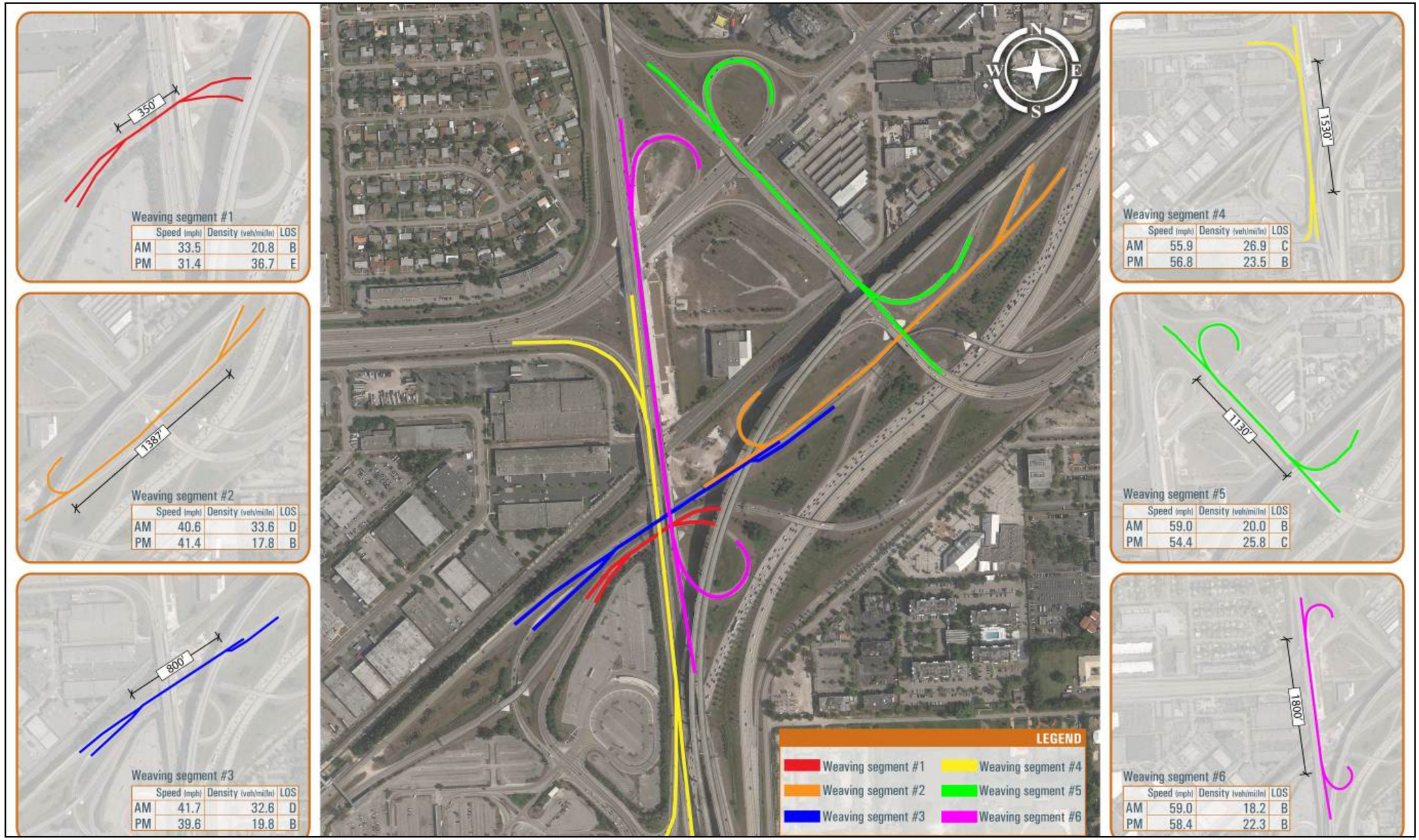


Figure 2-16 Existing Weaving Locations and Operations

2.8.5 Existing Intersection Operations

There are sixteen (16) intersections within the project study area as shown in **Table 2-12** below. Thirteen are signalized intersections and the remaining three are unsignalized intersections.

Table 2-12
Existing Intersections

#	Description	Control Type
1	NE 183 Street (Miami Gardens Drive) & NB I-95 ramps	Signalized
2	NW 2 Avenue (SR-7) and NW 7 Avenue Extension	Signalized
3	NW 171 Street & NW 7 Avenue Extension & NW 4 Avenue	Signalized
4	Turnpike NB Ramp & NW 7 Avenue Extension	Unsignalized
5	SR 826 (WB) & NW 12 Avenue	Signalized
6	SR 826 (EB) & NW 12 Avenue	Signalized
7	NW 167 Street & NW 2 Avenue	Signalized
8	NW 167 Street & N. Miami Avenue	Signalized
9	SR 7/NW 7 Avenue & Park & Ride (16000 Block)	Signalized
10	SR 7/NW 7 Avenue and NW 15900 Block (south of the P&R Lot)	Signalized
10A	SR7/US 441 SB to NW 167 Street EB Ramp and SR 826 Connector	Unsignalized
11	NW 151 Street & NW 7 Avenue	Signalized
12	NW 151 Street & I-95 SB on-ramp	Unsignalized
13	NW 151 Street & I-95 NB off-ramp	Signalized
14	SR 826 and NW 17 Avenue, diamond interchange intersection south of SR 826	Signalized
15	SR 826 and NW 17 Avenue, diamond interchange intersection north of SR 826	Signalized

The intersection of SR7/US 441 SB to NW 167 Street EB Ramp and SR 826 Connector (10A) is a one-way stop-controlled intersection; however due to the intersection location and the limitations of the modeling software this intersection was analyzed as a ramp junction.

The intersection analysis of existing conditions in 2010 identified significant traffic delays and queuing at the signalized intersections of NW 167 Street/NW 2 Avenue, NW 167 Street/North Miami Avenue, and NW 7 Avenue/GGI Park and Ride. For the intersections of NW 167 Street/NW 2 Avenue and NW 167 Street/North Miami Avenue the adopted LOS is dependent on the v/c ratio being less than 120%. For NW 167 Street/NW 2 Avenue the NB Left in the AM peak period and the NB Left and SB Thru exceed the 120% v/c threshold. For NW 167 Street/ North Miami Avenue the EB Left in the AM and the EB Left, NB Left, and SB Thru exceed the 120% v/c threshold. Furthermore, the analysis identified a number of intersections with inadequate turning movement storage lengths, including the intersections of NW 2 Avenue/NW 7 Avenue Extension, Turnpike Eastbound to I-95 SB/SR 7, NW 7 Avenue/Park and Ride entrance, NW 167 Street (Frontage Rd)/NW 12 Avenue (SR 826 EB Off-ramp), and NW 151 Street/NW 6 Avenue. The unsignalized intersection of NW 7 Avenue Extension and NB ramps to turnpike also showed deficiencies in the EB approach. The

intersection analysis results including delays and LOS for the AM and PM peak hours are provided in **Table 2-13** and **Figure 2-17**.

Table 2-13
Existing Intersections LOS

No	Intersection	Adopted LOS	Time	Approach Delay (s/veh)/LOS				Control Delay (s/veh)/LOS
				EB	WB	NB	SB	
1	Miami Gardens Dr/I-95 NB Exit	D	AM	51/D	47.8/D	0.8/A	43.8/D	31.7/C
			PM	50.2/D	85.9/F	0.7/A	45.3/D	49.7/D
2	NW 2 Ave (SR 7)/NW 7 Ave Ext	E	AM	89.5/F	-	12.2/B	59.9/E	51.9/D
			PM	112.8/F	-	16.7/B	21.9/C	35.3/D
4	NW 7 Ave Ext/NB Ramps to Turnpike* (EBL App)	E	AM	(631/F)	-	-	-	-
			PM	(876/F)	-	-	-	-
5	Frontage Rd (NW 167 St)/SR 826 WB Exit/NW 12 Ave	E	AM	0.0/A	53.4/D	12.6/B	9.0/A	30.5/C
			PM	0.0/A	54.6/D	3.9/A	8.5/A	22.4/C
6	Frontage Rd (NW 167 St)/SR 826 EB Exit/NW 12 Ave	E	AM	257.6/F	0.0/A	10.1/B	3.7/A	136.7/F
			PM	59.1/E	0.0/A	7.3/A	7.7/A	14.5/B
7	NW 167 St/NW 2 Ave	v/c<120 %	AM	68.9/E	56.6/E	351.2/F	-	97.4/F (v/c 1.19)
			PM	37.2/D	65.1/E	385.6/F	-	117.9/F (v/c 1.22)
8	NW 167 St/N Miami Ave	v/c<120 %	AM	92.5/F	30.0/C	46.4/D	60.3/E	67.1/E (v/c 1.49)
			PM	133.3/F	36.6/D	216.9/F	166.7/F	102.2/F (v/c 2.10)
9	NW 7 Ave/GGI Park and Ride**	D	AM	62.1/E	72.9/E	69.7/E	103.3/F	86.2/F
			PM	77.2/E	68.4/E	158.1/F	17.7/B	114.8/F
10	Florida's Turnpike Eastbound to I-95 SB Ramp/SR 7	D	AM	-	35.0/C	22.3/C	12.2/B	27.4/C
			PM	-	10.8/B	234.0/F	9.2/A	109.7/F
11	NW 151 St/NW 7 Ave	D	AM	45.8/D	13.5/B	24.4/C	27.0/C	25.1/C
			PM	44.5/D	43.6/D	17.0/B	8.9/A	19.3/B
12	NW 151 St/I-95 SB On Ramp* (WBL App)	D	AM	-	(1.1/A)	-	-	-
			PM	-	(3.6/A)	-	-	-
13	NW 151 St/I-95 NB Exit/NW 6 Ave	D	AM	129.7/F	61.6/E	47.1/D	15.2/B	62.0/E
			PM	1274/F	154.9/F	40.9/D	17.9/B	446.6/F
14	Frontage Rd (NW 167 St)/SR 826 EB Exit/NW 17 Ave	E	AM	60.4/E	45.1/D	38.1/D	12.2/B	42.9/D
			PM	69.2/E	30.0/C	42.4/D	2.2/A	41.0/D
15	Frontage Rd (NW 167 St)/SR 826 WB Exit/NW 17 Ave	E	AM	-	302.1/F	1.2/A	39.2/D	161.8/F
			PM	-	42.5/D	9.5/A	42.9/D	33.5/C

No	Intersection	Adopted LOS	Time	Approach Delay (s/veh)/LOS					Control Delay (s/veh)/ LOS
				NW 171 ST	NW 4 Ave	NW 7 Ave	NW 7 Ave Ext		
							NB	SB	
3	NW 7 Ave Ext/NW 171 ST	E	AM	65.2/E	71.0/E	69.8/E	18.2/B	18.0/B	27.2/C
			PM	68.0/E	81.3/F	86.1/F	18.0/B	24.0/C	32.4/C

*Notes: * Unsignalized Intersection*
*** EB, WB, NB and SB for SEB, NWB, NEB, and SWB*

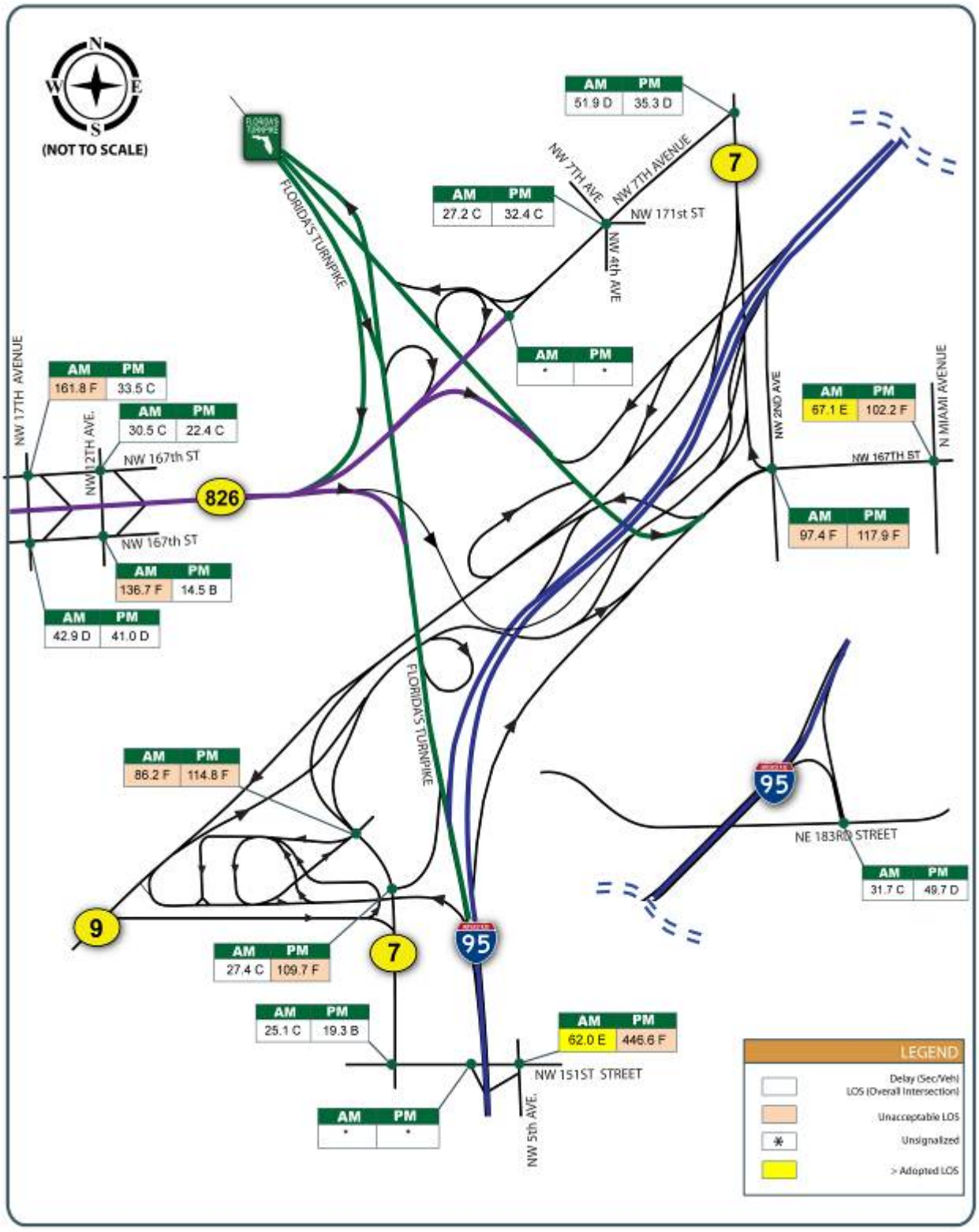


Figure 2-17 Existing Intersections LOS

2.9 Safety Analysis

Safety analysis was carried out as part of the GGI PD&E study to identify crash patterns, probable contributing cases, countermeasures and to provide recommendations for further studies, if needed. Crash analysis was performed for signalized intersections, arterial segments, ramps and freeway segments within the interchange study area of the GGI. The following sections summarize the safety analysis performed as part of this study. The detailed safety analysis is provided in the Safety Analysis Report.

2.9.1 Crash Data

Crash data for different roadway segments and intersections within the GGI was obtained from the FDOT Crash Analysis Reporting System (CAR) database from January 2006 to December 2010. The database provides roadway, environmental and driver characteristics that were existent at the time of each crash. This database provides the basis for the safety analysis.

2.9.2 Summary of Crash Frequency and Severity

Table 2-14 and Figure 2-18 shows a summary of the crash frequency, severity and historical trend for the different road classes within the project study area.

Table 2-14
Crash Frequency by Severity

Roadway Type	Severity	2006	2007	2008	2009	2010	5 Year Total	Mean Crashes Per Year
Freeway Segments (I-95, SR 826, Florida's Turnpike)	Fatal	3	1	4	2	0	10	2
	Injury	161	181	156	139	205	842	168
	PDO	183	188	173	184	246	974	195
	Total	***347***	***370***	***333***	***325***	***451***	***1826***	***365***
	Fatalities	***3***	***2***	***4***	***2***	***0***	***11***	**-**
Arterial Segments (SR 7, SR 9, NW 167th Street)	Fatal	0	1	1	0	0	2	1
	Injury	33	27	25	27	45	157	31
	PDO	40	36	41	31	42	190	38
	Total	***73***	***64***	***67***	***58***	***87***	***349***	***70***
	Fatalities	***0***	***1***	***1***	***0***	***0***	***2***	**-**
Interchange Ramps	Fatal	1	1	2	0	1	5	1
	Injury	34	37	45	41	56	213	43
	PDO	56	50	56	35	53	250	50
	Total	***91***	***88***	***103***	***76***	***110***	***468***	***94***
	Fatalities	***1***	***1***	***2***	***0***	***1***	***5***	**-**
Signalized Intersections	Fatal	0	0	0	1	0	1	0
	Injury	55	54	63	41	71	284	57
	PDO	50	67	77	58	58	310	62
	Total	***105***	***121***	***140***	***100***	***129***	***595***	***119***
	Fatalities	***0***	***0***	***0***	***1***	***0***	***1***	**-**
Total		**616**	**643**	**643**	**559**	**777**	**3,238**	**648**

PDO =Property Damage Only

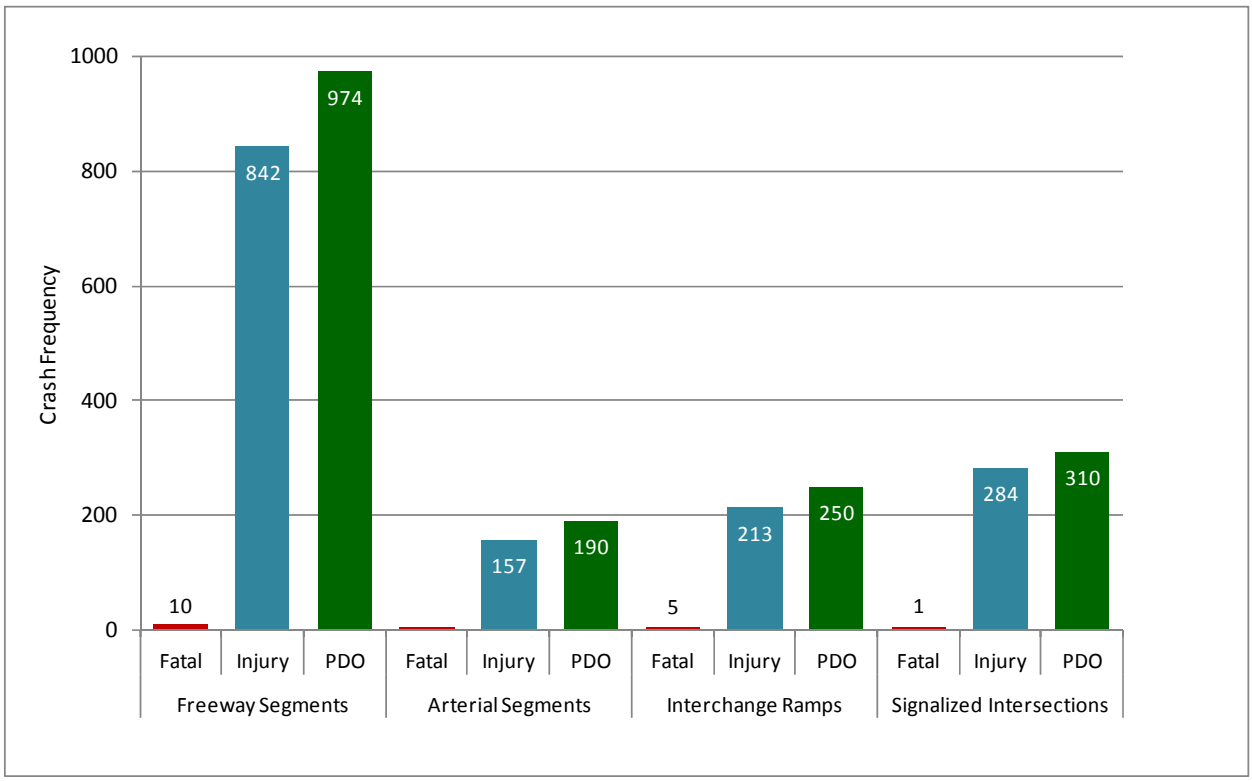


Figure 2-18 Crash Summary by Frequency and Severity

As indicated in the **Table 2-14**, a total of 3,238 crashes occurred within the study area over the five year analysis period. The majority of the crashes (56%) occurred within the freeway segments followed by the signalized intersections with 18% of the total crashes. This is indicative of the congested conditions along the freeways segments and signalized intersections within the study area.

A total of 18 fatal crashes with 19 fatalities occurred within the project study area during the five year analysis period. Out of the 18 fatal crashes within the study area, 10 occurred along the freeway segments. **Figure 2-19** shows the locations of the fatal crashes within the project study area.

2.9.3 Summary of Crash Distribution

Crashes were analyzed to identify predominant crash types along the project corridor. **Tables 2-15 through 2-23** summarize the crash distribution for the different roadway segments.

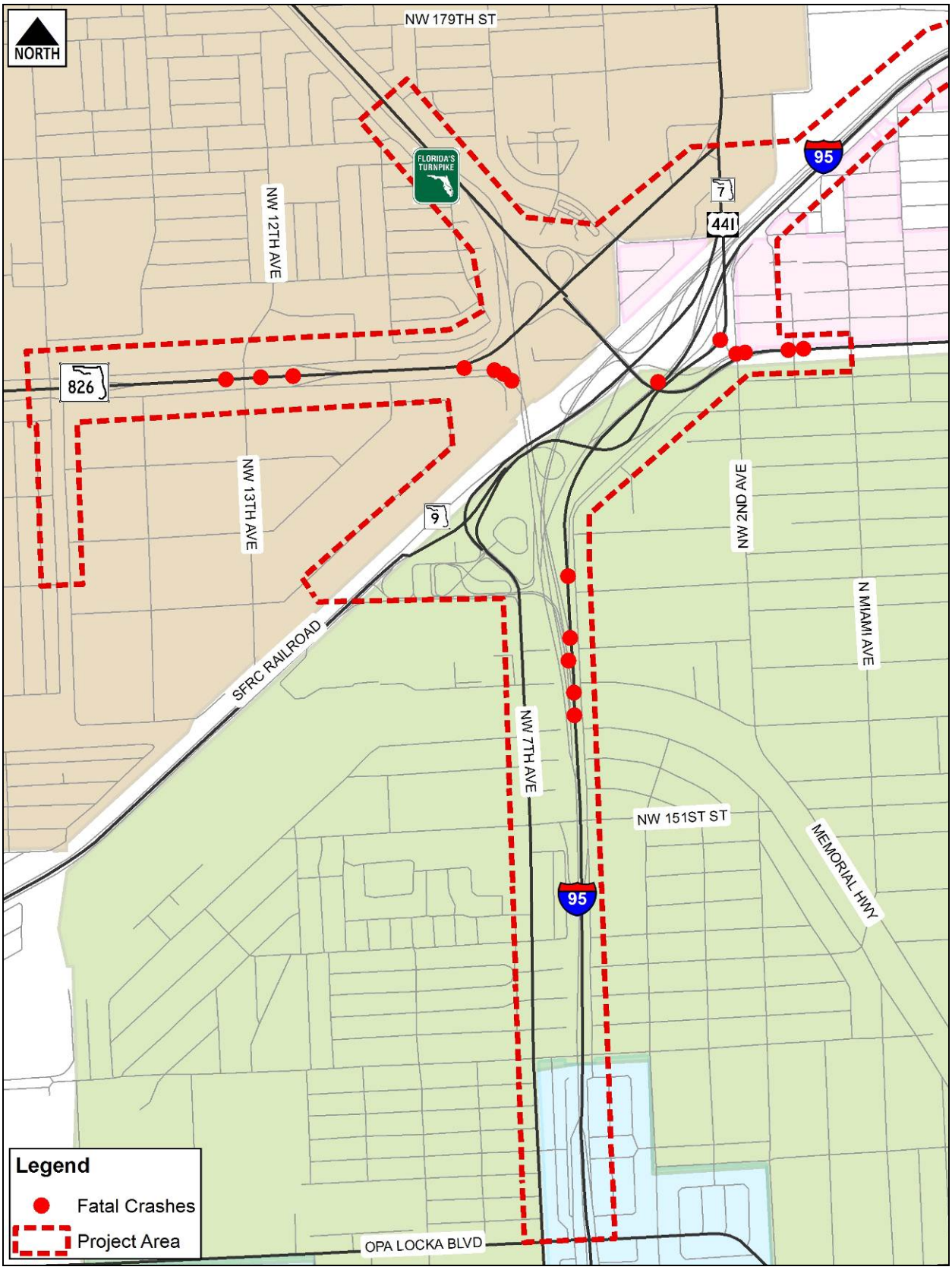


Figure 2-19 Fatal Crash Locations

Table 2-15
Crash Summary for SR 826/Palmetto Expressway (MP 23.00 to 24.708)

Crash Pattern		Number of Crashes					5 Year Total Crashes	Mean Crashes /Year	%
		2006	2007	2008	2009	2010			
CRASH TYPE	Rear End	31	24	41	41	49	186	37.20	43.3%
	Head On	1	2	2	1	1	7	1.40	1.6%
	Angle	9	9	11	16	8	53	10.60	12.3%
	Left Turn	0	2	0	0	0	2	0.40	0.5%
	Right Turn	1	0	0	0	0	1	0.20	0.2%
	Sideswipe	21	20	14	13	16	84	16.80	19.5%
	Backed Into	0	0	0	0	1	1	0.20	0.2%
	Coll. w/ Parked Car	1	0	0	1	0	2	0.40	0.5%
	Coll. w/ Pedestrian	0	0	0	0	1	1	0.20	0.2%
	Fixed Object	7	8	8	9	12	44	8.80	10.2%
	Ran Off Road	1	0	0	1	1	3	0.60	0.7%
	Overturned	0	1	1	1	1	4	0.80	0.9%
	Other	9	11	5	7	10	42	8.40	9.8%
WEATHER CONDITION	Clear	45	44	43	55	52	239	47.80	55.6%
	Cloudy	28	22	22	21	28	121	24.20	28.1%
	Rain	7	11	17	14	20	69	13.80	16.0%
	Other	1	0	0	0	0	1	0.20	0.2%
LIGHTING CONDITIONS	Daylight	53	51	54	61	70	289	57.80	67.2%
	Dusk	0	2	3	0	1	6	1.20	1.4%
	Dawn	1	2	1	1	3	8	1.60	1.9%
	Dark	26	22	24	28	26	126	25.20	29.3%
	Unknown	1	0	0	0	0	1	0.20	0.2%
SURFACE CONDITIONS	Dry	63	62	54	67	69	315	63.00	73.3%
	Wet	16	15	28	23	31	113	22.60	26.3%
	Others	2	0	0	0	0	2	0.40	0.5%
MONTH OF YEAR	January	5	4	11	6	5	31	6.20	7.2%
	February	4	5	7	7	6	29	5.80	6.7%
	March	4	4	5	6	8	27	5.40	6.3%
	April	0	8	5	9	9	31	6.20	7.2%
	May	8	3	8	11	9	39	7.80	9.1%
	June	8	8	8	4	8	36	7.20	8.4%
	July	9	11	7	10	3	40	8.00	9.3%
	August	9	8	4	11	10	42	8.40	9.8%
	September	11	5	7	4	5	32	6.40	7.4%
	October	5	4	8	5	15	37	7.40	8.6%
	November	11	5	5	8	9	38	7.60	8.8%
	December	7	12	7	9	13	48	9.60	11.2%
DAY OF WEEK	Sunday	8	14	7	10	5	44	8.80	10.2%
	Monday	12	14	9	15	20	70	14.00	16.3%
	Tuesday	2	11	16	7	14	50	10.00	11.6%
	Wednesday	12	6	10	17	19	64	12.80	14.9%
	Thursday	16	12	14	19	13	74	14.80	17.2%
	Friday	19	11	15	11	20	76	15.20	17.7%
	Saturday	12	9	11	11	9	52	10.40	12.1%
HOUR OF DAY	00:00-06:00	3	7	11	9	11	41	8.20	9.5%
	06:00-09:00	17	15	13	15	23	83	16.60	19.3%
	09:00-11:00	6	9	8	11	10	44	8.80	10.2%
	11:00-13:00	4	6	5	6	5	26	5.20	6.0%
	13:00-15:00	7	10	8	14	14	53	10.60	12.3%
	15:00-18:00	16	9	18	11	15	69	13.80	16.0%
	18:00-24:00	28	21	19	24	22	114	22.80	26.5%
Total Crashes		**81**	**77**	**82**	**90**	**100**	**430**	**86.00**	**100%**

Table 2-16
Crash Summary for SR 9A/I-95 (MP 10.90 to 14.30)

Crash Pattern		Number of Crashes					5 Year Total Crashes	Mean Crashes /Year	%
		2006	2007	2008	2009	2010			
CRASH TYPE	Rear End	107	88	86	65	129	475	95.00	47.0%
	Head On	3	0	1	0	5	9	1.80	0.9%
	Angle	10	14	11	16	17	68	13.60	6.7%
	Right Turn	0	0	0	0	0	0	0.00	0.0%
	Sideswipe	48	42	40	28	48	206	41.20	20.4%
	Backed Into	1	0	1	0	0	2	0.40	0.2%
	Coll. w/ Parked Car	1	0	0	1	1	3	0.60	0.3%
	Coll. w/ Pedestrian	0	0	1	0	0	1	0.20	0.1%
	Fixed Object	17	28	32	28	34	139	27.80	13.8%
	Ran Off Road	0	2	0	1	1	4	0.80	0.4%
	Overturned	0	1	1	1	2	5	1.00	0.5%
	Other	20	18	19	17	24	98	19.60	9.7%
WEATHER CONDITION	Clear	144	122	123	92	172	653	130.60	64.7%
	Cloudy	44	45	51	44	61	245	49.00	24.3%
	Rain	18	25	17	21	28	109	21.80	10.8%
	Fog	0	0	1	0	0	1	0.20	0.1%
	Other	1	1	0	0	0	2	0.40	0.2%
LIGHTING CONDITIONS	Daylight	130	124	126	107	188	675	135.00	66.8%
	Dusk	2	3	6	3	2	16	3.20	1.6%
	Dawn	2	1	2	1	4	10	2.00	1.0%
	Dark	72	64	58	46	67	307	61.40	30.4%
	Unknown	1	1	0	0	0	2	0.40	0.2%
SURFACE CONDITIONS	Dry	178	155	163	126	219	841	168.20	83.3%
	Wet	27	37	29	31	42	166	33.20	16.4%
	Others	2	1	0	0	0	3	0.60	0.3%
MONTH OF YEAR	January	35	12	21	11	11	90	18.00	8.9%
	February	19	10	7	10	18	64	12.80	6.3%
	March	13	26	15	11	17	82	16.40	8.1%
	April	7	13	22	15	18	75	15.00	7.4%
	May	19	10	21	14	25	89	17.80	8.8%
	June	15	20	17	11	31	94	18.80	9.3%
	July	16	14	16	13	28	87	17.40	8.6%
	August	15	14	18	10	23	80	16.00	7.9%
	September	15	14	15	25	20	89	17.80	8.8%
	October	17	23	12	11	20	83	16.60	8.2%
	November	18	20	11	7	22	78	15.60	7.7%
	December	18	17	17	19	28	99	19.80	9.8%
DAY OF WEEK	Sunday	25	31	27	19	31	133	26.60	13.2%
	Monday	26	22	23	24	28	123	24.60	12.2%
	Tuesday	44	30	25	21	38	158	31.60	15.6%
	Wednesday	26	21	30	24	40	141	28.20	14.0%
	Thursday	30	24	26	19	34	133	26.60	13.2%
	Friday	31	31	33	25	51	171	34.20	16.9%
	Saturday	25	34	28	25	39	151	30.20	15.0%
HOUR OF DAY	00:00-06:00	22	36	27	24	35	144	28.80	14.3%
	06:00-09:00	30	24	23	26	45	148	29.60	14.7%
	09:00-11:00	18	16	17	15	23	89	17.80	8.8%
	11:00-13:00	22	20	12	16	20	90	18.00	8.9%
	13:00-15:00	25	27	24	16	32	124	24.80	12.3%
	15:00-18:00	36	34	40	22	48	180	36.00	17.8%
	18:00-24:00	54	36	49	38	58	235	47.00	23.3%
Total Crashes		**207**	**193**	**192**	**157**	**261**	**1010**	**202.00**	**100%**

Table 2-17
Crash Summary for Florida's Turnpike (MP 0.00 to 0.584)

Crash Pattern		Number of Crashes					5 Year Total Crashes	Mean Crashes /Year	%
		2006	2007	2008	2009	2010			
CRASH TYPE	Rear End	26	44	30	35	31	166	33.20	43.0%
	Head On	1	1	0	0	2	4	0.80	1.0%
	Angle	2	7	3	7	3	22	4.40	5.7%
	Left Turn	0	0	0	0	0	0	0.00	0.0%
	Right Turn	0	0	0	0	0	0	0.00	0.0%
	Sideswipe	10	15	14	13	22	74	14.80	19.2%
	Backed Into	0	0	0	0	0	0	0.00	0.0%
	Coll. w/ Parked Car	0	0	0	0	0	0	0.00	0.0%
	Coll. w/ Pedestrian	0	0	0	0	0	0	0.00	0.0%
	Fixed Object	13	23	5	14	24	79	15.80	20.5%
	Ran Off Road	1	2	2	1	1	7	1.40	1.8%
	Overturned	2	4	2	1	1	10	2.00	2.6%
	Other	4	4	3	7	6	24	4.80	6.2%
WEATHER CONDITION	Clear	36	54	28	50	46	214	42.80	55.4%
	Cloudy	13	23	15	18	26	95	19.00	24.6%
	Rain	9	23	16	10	18	76	15.20	19.7%
	Other	1	0	0	0	0	1	0.20	0.3%
LIGHTING CONDITIONS	Daylight	41	65	44	55	59	264	52.80	68.4%
	Dusk	2	0	0	1	0	3	0.60	0.8%
	Dawn	1	0	1	0	0	2	0.40	0.5%
	Dark	14	35	14	22	31	116	23.20	30.1%
	Unknown	1	0	0	0	0	1	0.20	0.3%
SURFACE CONDITIONS	Dry	44	67	39	59	57	266	53.20	68.9%
	Wet	12	33	19	19	32	115	23.00	29.8%
	Others	3	0	1	0	1	5	1.00	1.3%
MONTH OF YEAR	January	3	8	9	6	10	36	7.20	9.3%
	February	5	4	7	8	7	31	6.20	8.0%
	March	5	3	3	8	5	24	4.80	6.2%
	April	2	5	11	6	6	30	6.00	7.8%
	May	1	9	4	7	12	33	6.60	8.5%
	June	7	8	7	9	7	38	7.60	9.8%
	July	3	13	5	5	8	34	6.80	8.8%
	August	4	8	3	3	7	25	5.00	6.5%
	September	4	10	0	8	14	36	7.20	9.3%
	October	9	9	2	10	4	34	6.80	8.8%
	November	5	5	5	2	4	21	4.20	5.4%
	December	11	18	3	6	6	44	8.80	11.4%
DAY OF WEEK	Sunday	5	14	7	7	13	46	9.20	11.9%
	Monday	9	15	12	13	17	66	13.20	17.1%
	Tuesday	7	13	10	14	18	62	12.40	16.1%
	Wednesday	9	14	4	10	11	48	9.60	12.4%
	Thursday	10	13	9	12	12	56	11.20	14.5%
	Friday	11	15	8	9	10	53	10.60	13.7%
	Saturday	8	16	9	13	9	55	11.00	14.2%
HOUR OF DAY	00:00-06:00	8	14	6	6	12	46	9.20	11.9%
	06:00-09:00	10	29	14	11	19	83	16.60	21.5%
	09:00-11:00	5	6	4	7	9	31	6.20	8.0%
	11:00-13:00	8	9	7	8	6	38	7.60	9.8%
	13:00-15:00	10	11	8	11	5	45	9.00	11.7%
	15:00-18:00	9	10	7	15	15	56	11.20	14.5%
	18:00-24:00	9	21	13	20	24	87	17.40	22.5%
Total Crashes		**59**	**100**	**59**	**78**	**90**	**386**	**77.20**	**100%**

Table 2-18
Crash Summary for SR 7/ US 441 (MP 10.81 to 11.88)

Crash Pattern		Number of Crashes					5 Year Total Crashes	Mean Crashes per Year	%
		2006	2007	2008	2009	2010			
CRASH TYPE	Rear End	20	21	19	19	27	106	21.20	45.7%
	Head On	1	1	1	1	1	5	1.00	2.2%
	Angle	7	3	5	1	2	18	3.60	7.8%
	Left Turn	0	0	0	0	0	0	0.00	0.0%
	Right Turn	0	0	0	0	0	0	0.00	0.0%
	Sideswipe	13	12	6	10	15	56	11.20	24.1%
	Backed Into	0	0	0	0	0	0	0.00	0.0%
	Coll. w/ Parked Car	0	0	0	0	0	0	0.00	0.0%
	Coll. w/ Pedestrian	2	0	0	0	1	3	0.60	1.3%
	Fixed Object	5	4	4	6	4	23	4.60	9.9%
	Ran Off Road	2	0	0	0	1	3	0.60	1.3%
	Overturned	0	1	0	0	0	1	0.20	0.4%
	Other	4	2	3	3	5	17	3.40	7.3%
WEATHER CONDITION	Clear	36	28	28	26	34	152	30.40	65.5%
	Cloudy	11	10	10	12	17	60	12.00	25.9%
	Rain	6	6	0	2	5	19	3.80	8.2%
	Other	1	0	0	0	0	1	0.20	0.4%
LIGHTING CONDITIONS	Daylight	32	30	32	25	39	158	31.60	68.1%
	Dusk	0	0	0	0	2	2	0.40	0.9%
	Dawn	1	0	0	1	0	2	0.40	0.9%
	Dark	20	14	6	14	15	69	13.80	29.7%
	Unknown	1	0	0	0	0	1	0.20	0.4%
SURFACE CONDITIONS	Dry	44	38	36	36	47	201	40.20	86.6%
	Wet	9	6	2	4	9	30	6.00	12.9%
	Others	1	0	0	0	0	1	0.20	0.4%
MONTH OF YEAR	January	5	6	2	6	3	22	4.40	9.5%
	February	5	4	3	1	4	17	3.40	7.3%
	March	5	4	5	1	5	20	4.00	8.6%
	April	2	3	4	5	5	19	3.80	8.2%
	May	5	3	4	2	2	16	3.20	6.9%
	June	2	3	0	3	6	14	2.80	6.0%
	July	5	3	5	4	5	22	4.40	9.5%
	August	3	3	3	1	3	13	2.60	5.6%
	September	6	4	3	3	4	20	4.00	8.6%
	October	6	5	3	6	4	24	4.80	10.3%
	November	3	3	3	4	4	17	3.40	7.3%
	December	7	3	3	4	11	28	5.60	12.1%
DAY OF WEEK	Sunday	5	6	1	4	5	21	4.20	9.1%
	Monday	9	13	8	8	13	51	10.20	22.0%
	Tuesday	14	1	5	4	8	32	6.40	13.8%
	Wednesday	8	7	5	7	9	36	7.20	15.5%
	Thursday	6	9	8	6	10	39	7.80	16.8%
	Friday	3	5	7	5	7	27	5.40	11.6%
	Saturday	6	3	4	6	4	23	4.60	9.9%
HOUR OF DAY	00:00-06:00	8	6	1	8	3	26	5.20	11.2%
	06:00-09:00	12	6	11	5	4	38	7.60	16.4%
	09:00-11:00	4	2	0	4	5	15	3.00	6.5%
	11:00-13:00	5	3	5	2	8	23	4.60	9.9%
	13:00-15:00	4	10	7	5	11	37	7.40	15.9%
	15:00-18:00	9	7	8	8	13	45	9.00	19.4%
	18:00-24:00	12	10	6	8	12	48	9.60	20.7%
Total Crashes		**54**	**44**	**38**	**40**	**56**	**232**	**46.40**	**100%**

Table 2-19
Crash Summary for SR 9 (MP 13.22 to 13.69)

Crash Pattern		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		2006	2007	2008	2009	2010			
CRASH TYPE	Rear End	0	1	3	2	7	13	2.60	38.2%
	Head On	0	0	0	0	0	0	0.00	0.0%
	Angle	0	2	0	0	0	2	0.40	5.9%
	Left Turn	0	0	0	0	0	0	0.00	0.0%
	Right Turn	0	0	0	0	0	0	0.00	0.0%
	Sideswipe	0	0	1	0	5	6	1.20	17.6%
	Backed Into	0	0	0	0	0	0	0.00	0.0%
	Coll. w/ Parked Car	0	0	0	0	0	0	0.00	0.0%
	Coll. w/ Pedestrian	0	0	0	0	0	0	0.00	0.0%
	Fixed Object	3	2	2	1	1	9	1.80	26.5%
	Ran Off Road	0	0	0	0	0	0	0.00	0.0%
	Overturned	0	2	0	0	0	2	0.40	5.9%
	Other	1	0	0	0	1	2	0.40	5.9%
WEATHER CONDITION	Clear	1	7	2	1	8	19	3.80	55.9%
	Cloudy	2	0	3	2	3	10	2.00	29.4%
	Rain	1	0	1	0	3	5	1.00	14.7%
	Other	0	0	0	0	0	0	0.00	0.0%
LIGHTING CONDITIONS	Daylight	1	5	3	0	8	17	3.40	50.0%
	Dusk	0	0	0	0	0	0	0.00	0.0%
	Dawn	0	0	0	0	0	0	0.00	0.0%
	Dark	3	2	3	3	6	17	3.40	50.0%
	Unknown	0	0	0	0	0	0	0.00	0.0%
SURFACE CONDITIONS	Dry	1	7	4	3	11	26	5.20	76.5%
	Wet	3	0	2	0	3	8	1.60	23.5%
	Others	0	0	0	0	0	0	0.00	0.0%
MONTH OF YEAR	January	0	2	1	1	0	4	0.80	11.8%
	February	0	1	1	0	0	2	0.40	5.9%
	March	0	2	1	0	3	6	1.20	17.6%
	April	0	2	0	0	0	2	0.40	5.9%
	May	1	0	0	2	0	3	0.60	8.8%
	June	0	0	2	0	2	4	0.80	11.8%
	July	0	0	0	0	2	2	0.40	5.9%
	August	0	0	0	0	0	0	0.00	0.0%
	September	0	0	0	0	1	1	0.20	2.9%
	October	1	0	0	0	1	2	0.40	5.9%
	November	0	0	0	0	4	4	0.80	11.8%
	December	2	0	1	0	1	4	0.80	11.8%
DAY OF WEEK	Sunday	2	0	2	0	4	8	1.60	23.5%
	Monday	0	0	1	0	4	5	1.00	14.7%
	Tuesday	1	2	2	0	2	7	1.40	20.6%
	Wednesday	0	2	0	1	1	4	0.80	11.8%
	Thursday	0	1	1	0	3	5	1.00	14.7%
	Friday	0	2	0	2	0	4	0.80	11.8%
	Saturday	1	0	0	0	0	1	0.20	2.9%
HOUR OF DAY	00:00-06:00	1	0	2	1	3	7	1.40	20.6%
	06:00-09:00	1	1	1	0	3	6	1.20	17.6%
	09:00-11:00	0	0	2	0	0	2	0.40	5.9%
	11:00-13:00	0	2	0	0	0	2	0.40	5.9%
	13:00-15:00	0	2	0	0	4	6	1.20	17.6%
	15:00-18:00	0	0	1	0	0	1	0.20	2.9%
	18:00-24:00	2	2	0	2	4	10	2.00	29.4%
Total Crashes		**4**	**7**	**6**	**3**	**14**	**34**	**6.80**	**100%**

Table 2-20
Crash Summary for NW 167th Street (MP 0.00 to 0.73)

Crash Pattern		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		2006	2007	2008	2009	2010			
CRASH TYPE	Rear End	2	1	6	1	5	15	3.00	39.5%
	Head On	1	0	0	0	0	1	0.20	2.6%
	Angle	1	2	0	1	1	5	1.00	13.2%
	Left Turn	0	0	0	0	0	0	0.00	0.0%
	Right Turn	0	0	0	0	0	0	0.00	0.0%
	Sideswipe	0	0	0	1	0	1	0.20	2.6%
	Backed Into	0	1	0	0	1	2	0.40	5.3%
	Coll. w/ Parked Car	0	0	0	0	0	0	0.00	0.0%
	Coll. w/ Pedestrian	0	1	3	0	0	4	0.80	10.5%
	Fixed Object	1	1	2	1	0	5	1.00	13.2%
	Ran Off Road	0	0	0	0	0	0	0.00	0.0%
	Overturned	0	0	0	0	1	1	0.20	2.6%
	Other	1	2	0	1	0	4	0.80	10.5%
WEATHER CONDITION	Clear	4	7	7	3	4	25	5.00	65.8%
	Cloudy	2	0	3	2	3	10	2.00	26.3%
	Rain	0	1	1	0	1	3	0.60	7.9%
	Other	0	0	0	0	0	0	0.00	0.0%
LIGHTING CONDITIONS	Daylight	6	5	5	3	7	26	5.20	68.4%
	Dusk	0	0	0	0	0	0	0.00	0.0%
	Dawn	0	1	1	0	0	2	0.40	5.3%
	Dark	0	2	5	2	1	10	2.00	26.3%
	Unknown	0	0	0	0	0	0	0.00	0.0%
SURFACE CONDITIONS	Dry	4	7	10	5	7	33	6.60	86.8%
	Wet	2	1	1	0	1	5	1.00	13.2%
	Others	0	0	0	0	0	0	0.00	0.0%
MONTH OF YEAR	January	0	1	1	2	0	4	0.80	10.5%
	February	0	0	2	0	1	3	0.60	7.9%
	March	0	1	0	1	1	3	0.60	7.9%
	April	2	2	1	0	0	5	1.00	13.2%
	May	0	0	1	0	1	2	0.40	5.3%
	June	0	0	1	1	1	3	0.60	7.9%
	July	2	0	2	0	0	4	0.80	10.5%
	August	0	0	0	0	1	1	0.20	2.6%
	September	0	2	1	0	0	3	0.60	7.9%
	October	0	0	1	1	1	3	0.60	7.9%
	November	0	2	0	0	1	3	0.60	7.9%
	December	2	0	1	0	1	4	0.80	10.5%
DAY OF WEEK	Sunday	0	3	1	1	1	6	1.20	15.8%
	Monday	0	2	4	0	2	8	1.60	21.1%
	Tuesday	1	0	1	1	0	3	0.60	7.9%
	Wednesday	1	1	0	0	1	3	0.60	7.9%
	Thursday	1	0	1	2	2	6	1.20	15.8%
	Friday	2	2	2	0	1	7	1.40	18.4%
	Saturday	1	0	2	1	1	5	1.00	13.2%
HOUR OF DAY	00:00-06:00	0	1	4	0	0	5	1.00	13.2%
	06:00-09:00	0	0	3	2	0	5	1.00	13.2%
	09:00-11:00	1	1	1	0	2	5	1.00	13.2%
	11:00-13:00	1	2	1	2	1	7	1.40	18.4%
	13:00-15:00	1	1	0	0	1	3	0.60	7.9%
	15:00-18:00	2	2	1	0	2	7	1.40	18.4%
	18:00-24:00	1	1	1	1	2	6	1.20	15.8%
Total Crashes		**6**	**8**	**11**	**5**	**8**	**38**	**7.60**	**100%**

Table 2-21
Crash Summary for NW 7th Ave Extension (MP 10.81 to 11.88)

Crash Pattern		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		2006	2007	2008	2009	2010			
CRASH TYPE	Rear End	0	2	4	2	2	10	2.00	22.2%
	Head On	0	0	0	0	0	0	0.00	0.0%
	Angle	1	1	3	6	2	13	2.60	28.9%
	Left Turn	1	0	1	0	1	3	0.60	6.7%
	Right Turn	0	0	1	0	0	1	0.20	2.2%
	Sideswipe	4	0	1	2	2	9	1.80	20.0%
	Backed Into	0	0	0	0	0	0	0.00	0.0%
	Coll. w/ Parked Car	0	0	0	0	0	0	0.00	0.0%
	Coll. w/ Pedestrian	0	0	0	0	0	0	0.00	0.0%
	Fixed Object	2	0	1	0	1	4	0.80	8.9%
	Ran Off Road	0	0	0	0	0	0	0.00	0.0%
	Overturned	0	0	0	0	1	1	0.20	2.2%
	Other	1	2	1	0	0	4	0.80	8.9%
WEATHER CONDITION	Clear	8	4	8	8	7	35	7.00	77.8%
	Cloudy	1	1	3	2	1	8	1.60	17.8%
	Rain	0	0	1	0	1	2	0.40	4.4%
	Other	0	0	0	0	0	0	0.00	0.0%
LIGHTING CONDITIONS	Daylight	5	5	11	8	5	34	6.80	75.6%
	Dusk	0	0	0	0	0	0	0.00	0.0%
	Dawn	0	0	0	0	0	0	0.00	0.0%
	Dark	4	0	1	2	4	11	2.20	24.4%
	Unknown	0	0	0	0	0	0	0.00	0.0%
SURFACE CONDITIONS	Dry	8	5	9	9	8	39	7.80	86.7%
	Wet	1	0	3	1	1	6	1.20	13.3%
	Others	0	0	0	0	0	0	0.00	0.0%
MONTH OF YEAR	January	0	0	0	0	1	1	0.20	2.2%
	February	2	0	1	1	0	4	0.80	8.9%
	March	2	1	2	1	0	6	1.20	13.3%
	April	0	0	1	0	2	3	0.60	6.7%
	May	1	0	1	1	0	3	0.60	6.7%
	June	0	2	2	2	0	6	1.20	13.3%
	July	1	0	1	1	0	3	0.60	6.7%
	August	0	0	0	1	0	1	0.20	2.2%
	September	0	2	1	1	1	5	1.00	11.1%
	October	2	0	2	1	1	6	1.20	13.3%
	November	1	0	0	0	2	3	0.60	6.7%
	December	0	0	1	1	2	4	0.80	8.9%
DAY OF WEEK	Sunday	0	0	0	0	1	1	0.20	2.2%
	Monday	2	0	0	2	1	5	1.00	11.1%
	Tuesday	2	1	2	2	1	8	1.60	17.8%
	Wednesday	2	1	1	1	1	6	1.20	13.3%
	Thursday	1	0	2	2	0	5	1.00	11.1%
	Friday	2	2	4	1	3	12	2.40	26.7%
	Saturday	0	1	3	2	2	8	1.60	17.8%
HOUR OF DAY	00:00-06:00	0	0	0	0	3	3	0.60	6.7%
	06:00-09:00	2	0	1	2	0	5	1.00	11.1%
	09:00-11:00	0	1	2	1	0	4	0.80	8.9%
	11:00-13:00	0	0	0	0	0	0	0.00	0.0%
	13:00-15:00	2	2	3	2	1	10	2.00	22.2%
	15:00-18:00	1	2	4	3	4	14	2.80	31.1%
	18:00-24:00	4	0	2	2	1	9	1.80	20.0%
	Total Crashes	**9**	**5**	**12**	**10**	**9**	**45**	**9.00**	**100%**

Table 2-22
Crash Summary for Interchange Ramps

Crash Pattern		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		2006	2007	2008	2009	2010			
CRASH TYPE	Rear End	38	40	44	45	58	225	45.00	48.1%
	Head On	1	1	1	0	5	8	1.60	1.7%
	Angle	3	6	7	4	6	26	5.20	5.6%
	Left Turn	2	0	0	0	0	2	0.40	0.4%
	Right Turn	1	0	0	0	0	1	0.20	0.2%
	Sideswipe	15	6	16	12	13	62	12.40	13.2%
	Coll. w/ Parked Car	0	0	0	0	1	1	0.20	0.2%
	Coll. w/ Pedestrian	0	0	0	0	0	0	0.00	0.0%
	Coll. w/ Bicycle	0	0	0	0	1	1	0.20	0.2%
	Fixed Object	18	22	15	6	14	75	15.00	16.0%
	Ran Off Road	3	4	2	1	1	11	2.20	2.4%
	Overturned	2	1	7	3	4	17	3.40	3.6%
	Other	8	8	11	5	7	39	7.80	8.3%
WEATHER CONDITION	Clear	61	53	52	53	67	286	57.20	61.1%
	Cloudy	20	19	39	16	21	115	23.00	24.6%
	Rain	10	15	12	7	22	66	13.20	14.1%
	Other	0	1	0	0	0	1	0.20	0.2%
LIGHTING CONDITIONS	Daylight	64	56	69	50	75	314	62.80	67.1%
	Dusk	0	1	0	2	3	6	1.20	1.3%
	Dawn	0	0	1	1	0	2	0.40	0.4%
	Dark	27	30	33	23	32	145	29.00	31.0%
	Unknown	0	1	0	0	0	1	0.20	0.2%
SURFACE CONDITIONS	Dry	71	70	81	65	83	370	74.00	79.1%
	Wet	19	18	22	10	27	96	19.20	20.5%
	Others	1	0	0	1	0	2	0.40	0.4%
MONTH OF YEAR	January	6	12	16	8	10	52	10.40	11.1%
	February	9	7	9	5	4	34	6.80	7.3%
	March	2	10	14	9	12	47	9.40	10.0%
	April	6	5	8	4	9	32	6.40	6.8%
	May	7	6	6	6	9	34	6.80	7.3%
	June	6	5	4	6	12	33	6.60	7.1%
	July	9	11	8	9	9	46	9.20	9.8%
	August	7	9	8	2	6	32	6.40	6.8%
	September	8	9	8	9	10	44	8.80	9.4%
	October	10	6	11	6	8	41	8.20	8.8%
	November	10	5	4	6	9	34	6.80	7.3%
	December	11	3	7	6	12	39	7.80	8.3%
DAY OF WEEK	Sunday	10	18	15	11	8	62	12.40	13.2%
	Monday	11	15	14	10	23	73	14.60	15.6%
	Tuesday	15	10	18	14	12	69	13.80	14.7%
	Wednesday	14	13	13	8	21	69	13.80	14.7%
	Thursday	13	12	16	8	20	69	13.80	14.7%
	Friday	10	9	11	13	14	57	11.40	12.2%
	Saturday	17	11	15	11	12	66	13.20	14.1%
HOUR OF DAY	00:00-06:00	13	7	14	12	10	56	11.20	12.0%
	06:00-09:00	7	18	13	11	13	62	12.40	13.2%
	09:00-11:00	12	8	4	5	13	42	8.40	9.0%
	11:00-13:00	10	9	1	8	11	39	7.80	8.3%
	13:00-15:00	15	9	22	13	11	70	14.00	15.0%
	15:00-18:00	16	13	20	13	21	83	16.60	17.7%
	18:00-24:00	18	24	29	14	31	116	23.20	24.8%
Total Crashes		**91**	**88**	**103**	**76**	**110**	**468**	**93.60**	**100%**

Table 2-23
Crash Summary for Intersections

Crash Pattern		Number of Crashes					5 Year Total Crashes	Mean Crashes Per Year	%
		2006	2007	2008	2009	2010			
CRASH TYPE	Rear End	39	47	46	43	54	229	45.80	38.5%
	Head On	1	1	4	2	6	14	2.80	2.4%
	Angle	20	20	33	27	22	122	24.40	20.5%
	Left Turn	12	13	13	4	6	48	9.60	8.1%
	Right Turn	1	2	4	0	0	7	1.40	1.2%
	Sideswipe	15	12	20	17	22	86	17.20	14.5%
	Backed Into	2	1	1	0	2	6	1.20	1.0%
	Coll. w/ Pedestrian	0	3	2	1	2	8	1.60	1.3%
	Coll. w/ Bicycle	0	0	1	0	0	1	0.20	0.2%
	Fixed Object	3	8	6	2	4	23	4.60	3.9%
	Ran Off Road	0	1	0	1	0	2	0.40	0.3%
	Overturned	0	0	2	0	1	3	0.60	0.5%
	Other	12	13	8	3	10	46	9.20	7.7%
WEATHER CONDITION	Clear	82	93	94	67	89	425	85.00	71.4%
	Cloudy	18	14	31	28	24	115	23.00	19.3%
	Rain	5	11	15	5	16	52	10.40	8.7%
	Other	0	3	0	0	0	3	0.60	0.5%
LIGHTING CONDITIONS	Daylight	74	81	102	68	79	404	80.80	67.9%
	Dusk	1	7	2	0	1	11	2.20	1.8%
	Dawn	3	2	5	2	1	13	2.60	2.2%
	Dark	27	28	31	30	48	164	32.80	27.6%
	Unknown	0	3	0	0	0	3	0.60	0.5%
SURFACE CONDITIONS	Dry	89	99	117	86	101	492	98.40	82.7%
	Wet	15	19	22	14	26	96	19.20	16.1%
	Others	1	3	1	0	2	7	1.40	1.2%
MONTH OF YEAR	January	5	12	14	12	11	54	10.80	9.1%
	February	10	8	7	11	11	47	9.40	7.9%
	March	7	12	14	10	10	53	10.60	8.9%
	April	5	11	13	8	12	49	9.80	8.2%
	May	10	8	14	7	12	51	10.20	8.6%
	June	7	9	15	10	9	50	10.00	8.4%
	July	16	12	9	6	7	50	10.00	8.4%
	August	6	11	12	4	14	47	9.40	7.9%
	September	15	9	8	8	13	53	10.60	8.9%
	October	12	12	14	11	9	58	11.60	9.7%
	November	6	8	6	5	8	33	6.60	5.5%
	December	6	9	14	8	13	50	10.00	8.4%
DAY OF WEEK	Sunday	11	18	14	11	18	72	14.40	12.1%
	Monday	20	15	24	10	18	87	17.40	14.6%
	Tuesday	17	20	39	29	17	122	24.40	20.5%
	Wednesday	20	12	16	16	18	82	16.40	13.8%
	Thursday	13	18	17	11	20	79	15.80	13.3%
	Friday	14	20	21	9	20	84	16.80	14.1%
	Saturday	10	18	9	14	18	69	13.80	11.6%
HOUR OF DAY	00:00-06:00	9	10	11	7	17	54	10.80	9.1%
	06:00-09:00	14	18	20	17	18	87	17.40	14.6%
	09:00-11:00	9	9	10	7	6	41	8.20	6.9%
	11:00-13:00	10	6	12	11	10	49	9.80	8.2%
	13:00-15:00	18	17	20	13	19	87	17.40	14.6%
	15:00-18:00	22	31	31	20	25	129	25.80	21.7%
	18:00-24:00	23	30	36	25	34	148	29.60	24.9%
Total Crashes		**105**	**121**	**140**	**100**	**129**	**595**	**119.00**	**100%**

2.9.4 High Crash Locations

Crash rates and safety ratios were computed for the different roadway segments within the project study area in order to identify any high crash locations. The evaluation process for this safety analysis involved the determination of the actual crash rate per million-vehicle-miles-travelled (MVMT) and the comparison of these values with the critical crash rates for similar type roadways. The critical crash rate and safety ratio were computed based on the average crash rate for a particular facility type and the vehicular exposure at the study location using the following equations:

$$Xc = Xb + k\sqrt{\frac{Xb}{m} + \frac{1}{2m}}$$

$$\text{Safety Ratio} = \frac{Xa}{Xc}$$

Where:

X_c = Critical crash rate for a particular location (Crash/MVMT)
X_a = Actual Crash Rate for a particular location (Crash/MVMT)
X_b = Average districtwide crash rate for similar roadways (Crash/MVMT)
m = Number of vehicles traversing a particular road section (millions of vehicle-miles)
k = Probability factor determined by the level of statistical significance (99.95%)

A safety ratio greater than one indicates that the roadway segment presents abnormally high crash occurrences, safety ratios less than one translates into random occurrences of crashes within normal ranges. Based on the safety ratio analysis the following roadway segments were identified as high crash locations and are further described in the following sections.

2.9.4.1 Freeway Segments

Table 2-24 provides the summary of the safety ratio analysis for the freeway high crash locations. Four freeway segments were identified as high crash locations. The following sections summarize the predominant crash patterns and probable causes at these freeway segments. The detailed analysis is provided in the Safety Analysis Report.

Table 2-24
High Crash Locations- Freeway Segments

Roadway	Section No.	Direction	BMP	EMP	Confidence Level*	Total Crashes	Maximum Five Year Safety Ratio
SR 826/Palmetto Expressway	87260000	Eastbound & Westbound	23.470	24.283	99.99%	325	1.710 (2010)
SR 9A/I-95	87270000	Northbound & Southbound	11.809	13.628	99.99%	970	1.146 (2006)
SR 826 Connector	87170000	Eastbound & Westbound	0.000	0.372	99.99%	106	1.417 (2008)
Turnpike Connector	87270212	Northbound	0.000	1.042	N/A	253	2.034 (2007)
	87270210	Southbound	0.000	0.758			

*Note: *Confidence values in the table reflect the calculated results*

SR 826/Palmetto Expressway from MP 23.470 to MP 24.283 (EB and WB)

A total of 325 crashes occurred along this freeway segment during the five year analysis period, including 4 fatal crashes, 163 (50.15%) injury crashes and 157 (48.3%) property damage only crashes. The frequency of night time crashes indicates that 34.78% of all crashes occurred under dark/dawn/dusk lighting conditions, which exceeds the statewide average of 34%. The distribution of crashes by type revealed that rear-end was the most predominant crash type along this segment, accounting for 42.5% of the total crashes, followed by sideswipe crashes accounting with 17.0%, angle type of crashes accounting for 15.1% and collisions with fixed objects accounting for 10.77%. The high occurrence of rear-end crashes may be due to high speed and congested conditions particularly in the eastbound direction approaching the GGI. In addition, the merging and weaving maneuvers from NW 12th Avenue on-ramp might be contributory causes for the frequent angle and sideswipe crashes within this segment.

SR 9A/I-95 from MP 11.809 to MP 13.628

A total of 970 crashes occurred along this freeway segment during the five-year analysis period including 438 (45.1%) injury crashes and 526 (54.2%) property damage only crashes. 6 fatal crashes were reported along the segment during the analysis period. The frequency of night time crashes indicates that 33.3% of all crashes occurred under dark/dawn/dusk lighting conditions, which is below the statewide average of 34%. The

distribution of crashes by type revealed that rear-end was the most predominant crash type along this segment, accounting for 445 (46.0%) of the total crashes, followed by sideswipe crashes accounting for 206 (21.2%), and collision with a fixed object accounting for 133 (13.7%). One collision with pedestrian was reported during the analysis period. The high occurrence of rear-end crashes may be due to congested conditions within the GGI during the peak periods. The merging and diverging maneuvers along this I-95 segment coupled with weavings to and from the express lanes might be contributory causes for the frequent sideswipe crashes within this segment. In addition, the presence of narrow shoulders within some segments might have contributed to collisions with fixed objects such as barrier walls or guardrails.

SR 826 Connector from MP 0.000 to MP 0.372

A total of 106 crashes occurred along this freeway segment during the five-year analysis period including 49 (46.2%) injury crashes and 57 (53.8%) property damage only crashes. No fatal crashes were reported along the segment during the analysis period. The distribution of crashes by type revealed that rear end was the most predominant crash type along this segment, accounting for 48 (45.3%) of the total crashes, followed by sideswipes accounting for 29 (27.4%) crashes. No collisions with pedestrians were reported during the analysis period. The high occurrence of rear-end and sideswipe crashes may be due to high speeds as vehicles exit the Florida's Turnpike and merge with the congested conditions and traffic back-up as drivers approach the signalized intersection at NW 2nd Avenue.

Turnpike Connector from MP 0.000 to MP 1.042 (NB) and 0.758 (SB)

A total of 253 crashes occurred along this freeway segment during the five-year analysis period including 115 (45.5%) injury crashes and 138 (54.5%) property damage only crashes. No fatal crashes were reported along the segment during the analysis period. The distribution of crashes by type revealed that rear end was the most predominant crash type along this segment, accounting for 115 (45.5%) of the total crashes, followed by collisions with fixed objects accounting for 48 (19.0%) crashes and sideswipes accounting for 43 (17.0%) of total crashes. No collisions with pedestrians were reported during the analysis period. During the morning peak period, the existing congestion backs up through the existing toll plaza sometimes extending as far as the Sunlife Stadium. As a result, drivers use the adjacent tandem parking area to join back onto the Turnpike Connector southbound within this segment in order to cut through the congestion. This results in uncontrolled merge and diverge maneuvers at this location as drivers try to get into the right lanes to their destinations. The presence of barrier walls and guardrails separating the tandem truck parking area from the ramp connector also increases the occurrence of fixed object crashes as the drivers try to navigate their way within this congested segment of the ramp connector. Construction activities along the Turnpike Connector northbound between 2009 and 2010 may have also contributed to the relatively high crashes along the Turnpike Connector during the analysis period.

2.9.4.2 Arterial Segments

Three arterial segments within the project study area were identified in the FDOT District Six in the 2010 High Crash Locations list at a confidence level of 99.99%. **Table 2-25** summarizes the locations and characteristics of these high crash arterial segments.

Table 2-25
High Crash Locations- Arterial Segments

Roadway	Section No.	Direction	BMP	EMP	Confidence Level*	Total Crashes	Maximum Five Year Safety Ratio
SR 7/ US441	87140000	Eastbound & Westbound	10.863	11.993	99.99%	251	0.696 (2010)
SR 9 from (ramp to GGI Parking Lot) to SR 7/US 441	87240000	Eastbound & Westbound	13.224	13.690	99.99%	24	0.270 (2010)
SR 826/NW 167 Street between NW 2 Ave and N Miami Ave	87170000	Eastbound & Westbound	0.525	0.677	99.99%	30	0.377 (2008)

*Note: *Confidence values in the table reflect the calculated results*

SR 7/ US 441 from MP 10.863 to MP 11.993

A total of 251 crashes occurred along this arterial roadway during the 5 years analysis period including 111 (44.2%) injury crashes and 136 (54.1%) Property Damage Only (PDO) crashes. One fatal crash was reported along the segment during the analysis period. The frequency of night time crashes indicates that 31% of all crashes occurred under dark/dawn/dusk lighting condition. The distribution of crashes by type revealed that rear end was the most predominant crash type along this segment, accounting for 115 (45.8%) of the total crashes, followed by sideswipe crashes accounting for 59 (23.5%), and collision with fixed objects accounting for 26 (10.4%). Three collisions with pedestrians were reported during the analysis period. The high occurrence of rear-end and sideswipe crashes may be due to congested conditions along this arterial segment. This segment of SR 7/US 441 is part of the signed route from SR 826 to I-95 NB and it is heavily congested during the peak periods. In addition, weaving maneuvers between the SR 7/US 441 and SR 9 traffic might be contributory causes for the frequent sideswipe crashes within this segment.

SR 9 from Ramp to GGI Parking Lot (MP 13.224) to SR 7/US 441 (MP 13.690)

A total of 24 crashes occurred along this arterial roadway during the 5 years analysis period including 11 (45.8%) injury crashes and 13 (54.2%) PDO crashes. No fatal crashes were reported along the segment during the analysis period. The frequency of night time crashes indicates that 33.3% of all crashes occurred under dark/dawn/dusk lighting conditions. The distribution of crashes by type revealed that rear end and collision with a fixed object were the most predominant crash types along this segment, each accounting for 8 crashes (33.3%) of the total crashes. No collisions with pedestrians were reported during the

analysis period. The predominance of rear-end crashes may be due to congested conditions resulting from merge and weaving maneuvers as SR 9 merges with SR 7/US 441.

SR 826/NW 167 St between NW 2nd Ave (MP 0.525) and N Miami Ave (MP 0.677)

A total of 30 crashes occurred along this arterial segment during the 5 years analysis period including 16 (53.3%) injury crashes and 12 (40.0%) PDO. Two fatal crashes were reported along the segment at night time during the analysis period. The frequency of night time crashes indicates that 33.4% of all crashes occurred under dark/dawn/dusk lighting conditions. The distribution of crashes by type revealed that rear-end was the most predominant crash type along this segment, accounting for 11 (36.7%) of the total crashes, followed by angle crashes accounting for 5 (16.7%). Four collisions with pedestrian were reported during the analysis period. The high occurrence of rear-end and sideswipe crashes may be due to congested conditions approaching NW 2nd Avenue signalized intersection. The lack of adequate pedestrian facilities connecting NW 167th Street to SR 7/US 441 and other major pedestrian generators such as the Jackson North Hospital may be attributed to the pedestrian crash occurrences.

2.9.4.3 Intersections

Four signalized intersections within the project study area were identified in the FDOT District Six 2010 High Crash Locations list at a confidence level of 99.99%. **Table 2-26** summarizes the locations and characteristics of these high crash signalized intersections.

Table 2-26
High Crash Locations- Intersections

#	Intersection	Section No	MP	Confidence Level*	Total Crashes	Maximum Five Year Safety Ratio
1	NW 12 Avenue and NW 167 St/ SR 826 EB Off-ramp	87260602	0.406	99.99%	13	1.264 (2008)
2	SR 826/NW 167 Street and NW 2 Avenue	87170000	0.474	99.99%	193	2.139 (2006)
3	SR 7/US 441/NW 2 Ave and NW 7 Avenue Ext	87140000	12.044	99.99%	148	2.354 (2008-2010)
4	SR 7/US 441 and GGI Ext (Park and Ride)	87140000	10.812	99.17%	30	0.821 (2006)

*Note: *Confidence values in the table reflect the calculated results*

NW 12 Ave and NW 167th Street (SR 826 EB Off-Ramp)

A total of 13 crashes occurred at this intersection during the five-year analysis period including 6 (46.2%) injury crashes and 7 (53.8%) PDO crashes. No fatal crashes were reported at the intersection during the analysis period. The frequency of night time crashes indicates that 46.2% of all crashes occurred under dark/dawn/dusk lighting conditions which

are higher than the statewide average of 34%. The distribution of crashes by type revealed that angle crashes were the most predominant crash type at the intersection, accounting for 4 (30.8%) of the total crashes, followed by left turns accounting for 3 (23.1%). One collision with pedestrian was reported during the analysis period. The predominance of left turn and angle crashes at this intersection may be attributed to large approach and left turn volume and inadequate signal clearance time.

SR 826/NW 167th Street and NW 2nd Avenue

A total of 193 crashes occurred at the intersection during the five-year analysis period including 80 (41.5%) injury crashes and 113 (58.5%) PDO crashes. No fatal crashes were reported at the intersection during the analysis period. The distribution of crashes by type revealed that rear end was the most predominant crash type at the intersection, accounting for 80 (41.5%) of the total crashes, followed by angle crashes accounting for 44 (22.8%), and sideswipe crashes accounting for 35 (18.1%). No collision with pedestrian was reported during the analysis period. The high rear-end and sideswipe crashes may be attributed to congested conditions approaching this intersection. The predominance of angle crashes may be due to inadequate signal clearance.

SR 7/US 441/NW 2 Ave and NW 7 Avenue Extension

A total of 148 crashes occurred at the intersection during the five-year analysis period including 68 (45.9%) injury crashes and 79 (53.4%) PDO crashes. One fatal crash was reported at the intersection during the analysis period. The frequency of night time crashes indicates that 34.5% of all crashes occurred under dark/dawn/dusk lighting conditions. The distribution of crashes by type revealed that rear end was the most predominant crash type at this intersection, accounting for 59 (39.9%) of the total crashes, followed by angle crashes accounting for 31 (20.9%) and sideswipe accounting for 20 (13.5%). One pedestrian crash was reported during the analysis period. The relatively high rear-end crash may be due to high approach speed in the eastbound direction as vehicles transition from the expressway to the arterial system. Short signal clearance time was also observed potentially contributing to the angle crash occurrences.

SR 7/US 441 and GGI Exit (Park and Ride)

A total of 30 crashes occurred at this intersection during the 5-year analysis period including 11 (36.7%) injury crashes and 19 (63.3%) PDO crashes. No fatal crashes were reported at the intersection during the analysis period. The distribution of crashes by type revealed that rear-end collision was the most predominant crash type at this intersection, accounting for 13 (43.3%) of the total crashes, followed by sideswipe crashes accounting for 5 (16.7%) and angle crashes accounting for 4 (13.3%). No collisions with pedestrians were reported during the analysis period. The high rear-end and sideswipe crashes may be attributed to congested conditions approaching this intersection during the peak periods.

2.9.5 Economic Loss

In order to calculate the economic loss per year for the crashes that took place in the last five years within the project study area, average crash cost values were used for fatal, injury and property damage crashes. The values were obtained from Chapter 23 of FDOT PPM Volume I, 2013 (see **Appendix C**). For the average crash cost of injury crashes, an arithmetic mean of the costs for severe, moderate and minor injury crashes were used.

Property Damage	=	$6,500 per crash
Injury Crash	=	$245,624 per crash
Fatal Crash	=	$6.82 million per crash

Using these values, the annual economic loss was estimated as follows:

Freeway Segments

Annual Economic Loss = (No of fatal crashes x $6.82 mil. + No of injury crashes x $245,624 + No of PDO crashes x $6,500) / no of years

= (10 x $6.82 mil. + 842 x $245,624 + 974 x $6,500)/5

= $56,269,282 ($56 million).

Arterial Segments

Annual Economic Loss = (No of fatal crashes x $6.82 mil. + No of injury crashes x $245,624 + No of PDO crashes x $6,500) / no of years

= (2 x $6.82 mil. + 157 x $245,624 + 190 x $6,500)/5

= $10,687,594 ($11 million).

Interchange Ramps

Annual Economic Loss = (No of fatal crashes x $6.82 mil. + No of injury crashes x $245,624 + No of PDO crashes x $6,500) / no of years

= (5 x $6.82 mil. + 213 x $245,624 + 250 x $6,500)/5

= $17,608,582 ($18 million).

Signalized Intersections

Annual Economic Loss = (No of fatal crashes x $6.82 mil. + No of injury crashes x $245,624 + No of PDO crashes x $6,500) / no of years

= (1 x $6.82 mil. + 284 x $245,624 + 310 x $6,500)/5

= $15,718,443 ($16 million).

Total Economic Loss = $101 million.

2.10 Lighting

The existing lighting varies throughout the project study area. A field investigation and reviews of the as-built plans revealed that conventional lighting exists along the freeway and arterial mainlines (I-95, SR 826, Florida's Turnpike, SR 7/US 441 and SR 9) as they approach the GGI. The conventional lighting along these roadway segments consist of standard 40 to 45-ft aluminum poles with high pressure sodium fixtures. The lighting within the GGI consists of highmast poles 100 to 120-ft in height with 1000 Watt high pressure sodium luminaires.

2.11 Utilities

There are 20 Utility Agency Owners (UAO) with facilities within the study area. **Table 2-27** below shows the list of utility agency owners and utility contact data obtained from Sunshine State One Call of Florida (SSOCOF).

Table 2-27
Existing Utilities

	Utility Agency Owner	Facilities	Contact Person	Phone	Master Agreement
1	AT&T Florida	Telecommunications	Steve Massie	305-222-8745	Yes
2	AT&T Long Distance	Telecommunications	Craig Petrie	407-578-8000	Yes
3	Comcast	Cable TV	Leonard Maxwell-Newbold	954-447-8405	Yes
4	City of North Miami	Water & Sewer	Aleem Ghany	305-895-9833	Yes
5	City of North Miami Beach	Water & Sewer	Karim Rossy	305-948-2980	Yes
6	City of Miami Gardens	Storm Sewer	Mariana Pitiriciu	305-622-8000	Yes
7	Fiberlight LLC	Telecommunications	Troy Gaeta	786-271-5149	Yes
8	Florida City Gas	Gas – Distribution	Michael Alexander	305-835-3632	Yes
9	FDOT District Six – ITS	ITS	Thomas Miller	305-470-5832	Yes
10	Florida's Turnpike - ITS	ITS	Rafael Sena	954-934-1624	Yes
11	Florida Gas Transmission	Gas – Transmission	Joseph Sanchez	407-838-7171	Yes
12	FPL FiberNet	Telecommunications	Danny Haskett	305-552-2931	Yes
13	FPL – Distribution	Electric	Angel Vargas	305-442-5129	Yes
14	FPL – Transmission	Electric	George Beck	561-904-3604	Yes
15	Level3 Communications LLC	Telecommunications	Rick Miller	720-888-4968	Yes
16	Verizon Business (f.k.a. MCI)	Telecommunications	John McNeil	904-355-0187	Yes
17	Miami-Dade Co. Water & Sewer	Water & Sewer	Patrick Chong	786-268-5255	Yes
18	Miami-Dade Co Traffic	Signalization	Vishnu Rajkumnr	305-375-2090	Yes
19	TECO Peoples Gas	Gas – Distribution	Angel Quant	954-453-0805	Yes
20	XO Communications	Telecommunications	Anthony Kowaleski	305-356-3160	Yes

Florida Gas Transmission (FGT) currently owns and operates two gas transmission mains along Florida's Turnpike and SR 826/Palmetto Expressway connecting to local distribution

company facilities in the Opa-Locka area. These mains consist of an 18-inch and a 24-inch installed in an easement within Florida's Turnpike which terminates approximately 145 feet north of the SR 826/Palmetto Expressway. The portions of the gas mains which continue to the west within the SR 826/Palmetto Expressway were originally installed and granted a permit by the Florida Department of Transportation allowing them to be placed within FDOT's Right-of-Way. The 24-inch FGT gas main runs along the westbound NW 167th Street while the 18-inch FGT gas main crosses beneath SR 826/Palmetto Expressway and runs along eastbound NW 167th Street within the embankment between SR 826/Palmetto Expressway and NW 167th Street.

Existing ITS buried fiber optic cable (BFO) and DMS signs run along the south side of SR 826/Palmetto Expressway, along both sides of the Turnpike Connector Ramp and along the east side of the Florida's Turnpike Mainline. Close coordination is anticipated with all the utility companies regarding any potential impacts.

The Utility Impact and Assessment Memorandum that details the utility impacts within the study is provided in **Appendix D**.

2.12 Railroads

CSX Transportation currently owns two sets of tracks within the GGI project corridor. Both tracks cross GGI running parallel to SR 9 in a northeasterly / southwesterly direction. There is a Tri-rail station located along this track close to the park and ride lot. These rail lines are currently operated for passenger transportation by Tri-rail and freight transportation by CSX Transportation to carry limerock and construction materials from quarries located in south and west Miami-Dade.

2.13 Pavement Conditions

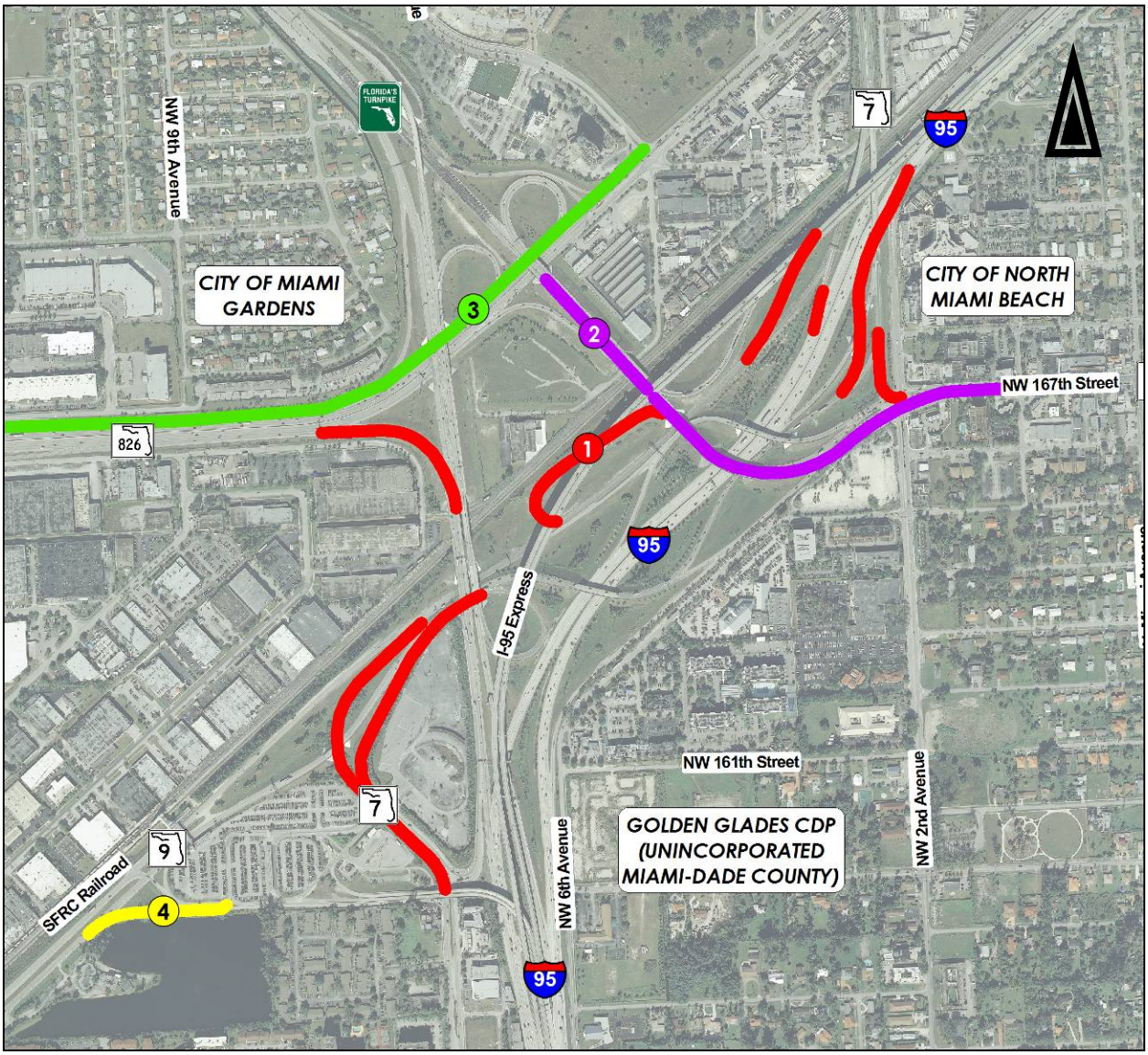
Pavement survey data is collected, reviewed, processed, and analyzed by the Pavement Systems Evaluation Section of the FDOT State Materials Office annually. Each section of pavement is rated for cracking, ride and rutting on a 0-10 scale with 0 the worst and 10 the best. A crack rating of 6.0 or less is considered deficient. A ride rating of 6.0 or less is considered deficient for facilities with speed limits greater than 45 mph. The following ratings shown in **Table 2-28** were assigned for the major roadway segments within the project study area based on a Pavement Condition Survey (PCS) conducted for the year 2012.

Several segments along I-95, SR 826/Palmetto Expressway, SR 7/US 441 and SR 9 were identified as having deficient cracking or ride rating. The crack rating along SR 826/Palmetto expressway, Florida's Turnpike, SR 9 and NW 167th Street are also projected to deteriorate by 2017. The FDOT has several planned resurfacing projects along SR 826 and the GGI ramps (FPID's 425637-1, 430821-1, 428476-2 and 429134-1) to improve pavement conditions within the interchange area as shown in **Figure 2-20**.

Table 2-28
Existing Pavement Conditions

Roadway	Begin Milepost	End Milepost	Direction	Existing (2012)		Future (2017)	
				Cracking	Ride	Cracking	Ride
SR 826 /Palmetto Expressway	22.273	23.814	EB	8.0	7.7	3.5	7.5
	23.814	24.140	EB	3.5	6.9	1.0	6.7
	23.814	24.209	WB	6.5	6.6	5.0	6.6
	22.273	23.814	WB	7.0	7.9	3.5	7.7
I-95	10.170	12.091	NB	7.2	5.8	9.0	7.4
	12.091	13.208	NB	7.4	7.9	9.0	7.8
	13.208	13.669	NB	4.5	7.7	10.0	8.1
	13.669	17.260	NB	5.5	8.0	10.0	7.9
	13.669	17.260	SB	5.5	7.8	10.0	7.9
	13.208	13.669	SB	3.5	6.6	10.0	8.1
	12.091	13.208	SB	4.6	7.1	8.5	6.8
	10.202	12.091	SB	3.7	5.7	8.5	6.8
Florida's Turnpike	0.000	0.167	NB	9.5	6.7	8.0	6.5
	0.167	0.730	NB	7.0	7.2	5.0	6.9
	0.730	1.537	NB	10.0	7.7	8.0	7.4
	0.650	1.537	SB	10.0	7.8	8.0	7.5
	0.243	0.650	SB	6.5	7.4	4.5	7.1
	0.000	0.243	SB	9.5	7.3	8.0	7.1
SR 7/US 441	10.491	10.812	NB	9.0	6.9	7.5	6.8
	10.812	11.087	NB/SB	4.5	5.5	10.0	6.9
	11.087	11.896	NB/SB	10.0	6.3	8.0	6.1
	8.050	10.812	SB	9.5	7.2	8.0	7.2
SR 9	13.281	13.690	NB	5.5	6.4	10.0	7.6
	11.345	13.690	SB	6.5	7.3	5.0	7.1
NW 167th Street	0.000	0.649	EB	6.5	6.6	5.0	6.6
	0.649	3.701	EB	10.0	7.7	8.5	7.6
	0.649	3.701	WB	10.0	7.7	8.5	7.6
	0.000	0.649	WB	6.5	6.7	5.0	6.7

Note: Highlighted values indicate deficient pavement



Notes

1. 425637-1 Resurfacing of Various Ramps along SR 7/SR 826/ SR-9A within GGI
2. 429134-1 Resurfacing of SR 826 Connector from Florida's Turnpike to east of NW 1st Avenue
3. 430821-1 Resurfacing of SR 826 / Palmetto Expressway from NW 12 Ave to south of NW 7th Ave
4. 428476-2 Resurfacing of SR 9 Ramp to Park & Ride and GGI

Figure 2-20 Planned Resurfacing Projects

2.14 Transit and Railroad Facilities

The GGI includes a Park and Ride (P&R) facility located east and west of SR 7/US 441. It is designated as a SIS intermodal hub and provides connections to other SIS and FIHS facilities, such as I-95 and SR 826 (Palmetto Expressway) and Florida's Turnpike. Within the footprint of the existing GGI, there are a variety of transit systems interacting within the surface Park and Ride lots and supporting regional connectivity to the Tri-Rail and extensive bus services via Miami-Dade Transit, Greyhound and Broward County Transit.

The west P&R lot is situated to provide surface parking in front of the pedestrian walkway connecting to the Golden Glades Tri-Rail Station over SR-9 on the western side of the lot. The west P&R lot hosts a central covered bus stop for three long-side buses loading locations via bus only lanes, with a drop off/pick up lane opposite the bus only side for individual cars. The central covered stop includes benches, bicycle stands, and newspaper stands for waiting passengers. The east P&R lot also hosts a covered bus stop along the northeastern boundary of the lot with similar supportive infrastructure. Additionally, a portion of the east P&R lot also is signed as a Tandem Staging Area to accommodate load switching of freight trucks. The following transit agencies provide service within the project study area.

2.14.1 Miami-Dade Transit

The Metrobus system operated by Miami-Dade Transit (MDT) provides bus service throughout Miami-Dade County. For the most part, the routes are designed to intersect with Metrorail and Metromover and serve all major business, shopping, entertainment, and cultural centers, as well as major hospitals and schools. MDT has over 850 buses which service 100 routes with over 30 million scheduled miles each year and an annual ridership of over 75 million passengers. All buses are wheelchair accessible. The following MDT Metrobus routes provide service to and from the GGI Park & Ride area (See **Figure 2-21**):

- Route 22: City of North Miami Beach, The Mall at 163rd Street, Golden Glades Park & Ride, NW 22nd Avenue, Earlington Heights Metrorail station, Clinics, Coconut Grove Metrorail station, Sunshine State Industrial Park
- Route 77: NW 199th Street/NW 2nd Avenue (SR 7/US 441), Golden Glades Park & Ride, NW 7th Avenue, Liberty City, Culmer Metrorail Station, Government Center Metrorail Station, Main Library, Historical Museum of South Florida, Miami Art Museum, Downtown (Miami) Bus Terminal
- Route 95 Golden Glades: Golden Glades Park & Ride lot, Civic Center, Veterans Hospital, Jackson Memorial Hospital, Norwood, Earlington Heights Metrorail Station, Downtown Miami, and Brickell.
- Route E/105 Golden Glades: Golden Glades Park & Ride, Jackson North, The Mall at 163rd Street, City of North Miami Beach, Eastern Shores, Winston Towers, Aventura Mall, Turnberry Isle, Diplomat Mall/Hallandale

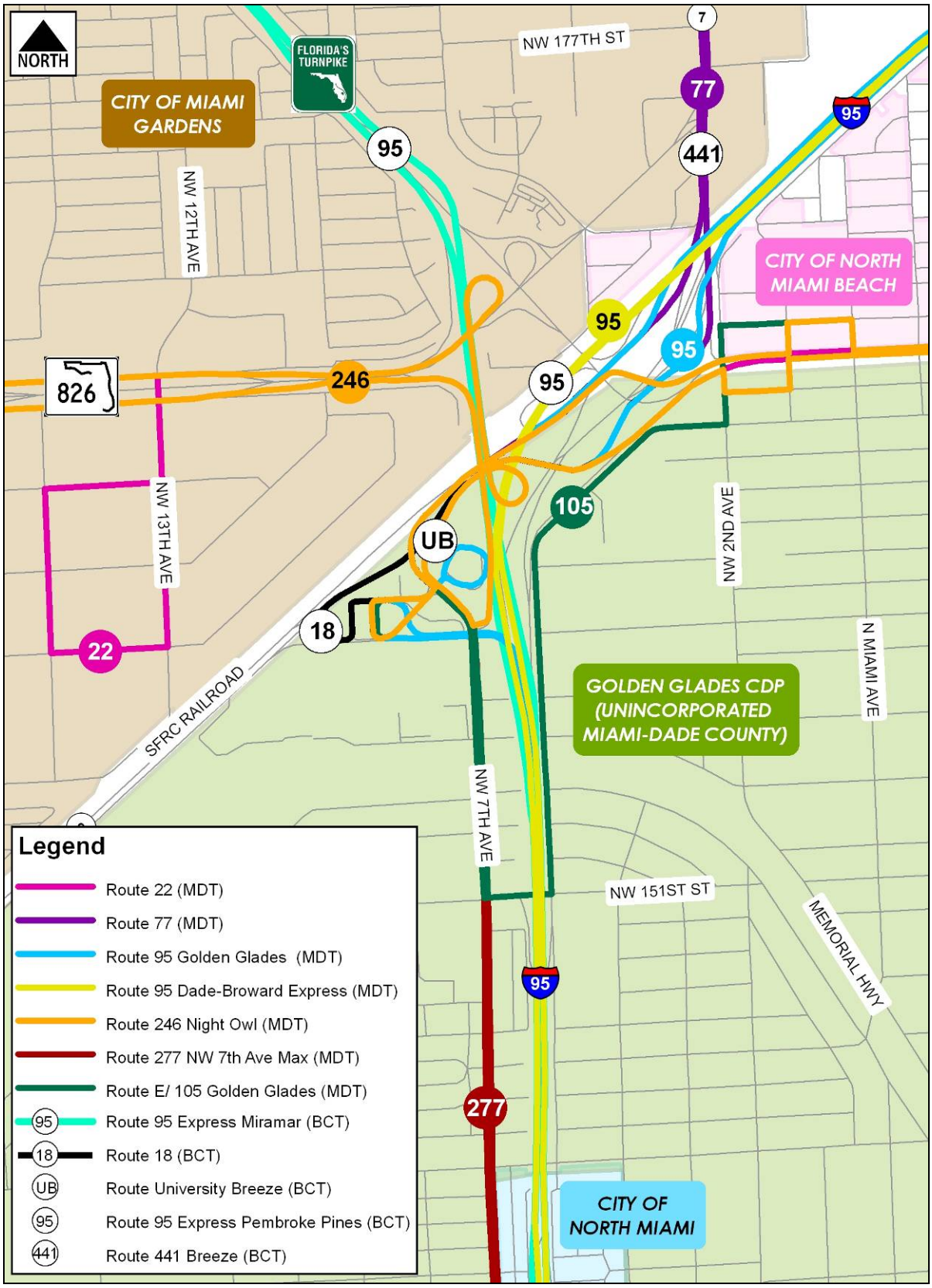


Figure 2-21 Miami-Dade Transit Routes

- Route 246 Night Owl: The Mall at 163rd Street, Downtown Miami, Government Center Metrorail Station, Overtown, Civic Center Metrorail station, University of Miami/Jackson Memorial Hospitals and clinics, Allapattah Metrorail station
- Route 277 NW 7th Avenue MAX: Downtown Miami, Government Center Metrorail Station, Culmer Metrorail Station, NW 7 Ave., Lindsey Hopkins, Edison Center, North Miami, Biscayne Gardens, Golden Glades Park & Ride
- Route 95 Dade-Broward Express: Southbound AM - 95 Dade-Broward Express, Downtown Miami. Northbound PM - 95 Dade-Broward Express, Sheridan St. (serving Sheridan Street Tri-Rail Station) and 95 Dade-Broward Express, Broward Blvd (serving Ft. Lauderdale Tri-Rail Station.

2.14.2 Broward County Transit

Broward County Transit (BCT) is the primary public transportation operator in Broward County. BCT provides bus service throughout Broward County – work, schools, shopping, libraries, parks, cultural and civic activities, and other places of interest. BCT also provide links to Miami-Dade and Palm Beach counties transit systems. The following BCT routes provide service to and from the GGI Park & Ride area (See **Figure 2-21**):

- Route 18: Golden Glades Park and Ride to Sandalfoot Cove Boulevard and US 441
- Route University Breeze: Glades/Tri-Rail Park and Ride to Westview Drive and University Drive via University Drive.
- Route 441 Breeze: Golden Glades/Tri-Rail Park and Ride to Sample Rd and US 441.
- Route 95 Express Pembroke Pines: CB Smith Park and Ride to downtown Miami.
- Route 95 Express Miramar: Miramar Civic Center to downtown Miami.

Both 95 Express routes operated by BCT traverse the GGI but do not stop at the GGI Park and Ride facility.

2.14.3 Tri-Rail

Tri-Rail is the tri-county commuter train service that operates along the South Florida Rail Corridor with station stops in Miami-Dade, Broward, and Palm Beach Counties. The Main Stations include: Miami International Airport, Metrorail Transfer, Golden Glades Park and Ride, Fort Lauderdale-Hollywood International Airport, and Palm Beach International Airport. South of the GGI, Tri-Rail also connects with the Miami-Dade Transit Metrorail Transfer Station located at 2567 East 11th Avenue, Hialeah 33013.

2.14.4 Amtrak

The name "Amtrak" is the blending of the words "America" and "track" With 21,000 route miles in 46 states, the District of Columbia and three Canadian provinces, Amtrak operates more than 300 trains each day at speeds up to 150 mph to more than 500 destinations. The Amtrak system utilizes the same tracks as Tri-Rail in this location. There is no actual stop at Golden Glades Park and Ride; however the nearest Amtrak Station is located at 8303 Northwest 37th Avenue, Miami, FL 33147, approximately 9 miles (20 Minutes) away from the Golden Glades Park and Ride Facility. The Amtrak Station is the southernmost stop within the Amtrak system and operates from 7:00 AM to 9:00 PM, seven days a week.

2.14.5 Greyhound

Greyhound is the largest provider of intercity bus transportation, serving more than 2,300 destinations with 13,000 daily departures across North America. Amtrak passengers use Greyhound to make connections to cities not served by rail on Amtrak Thruway service. Greyhound uses the west Golden Glades Park and Ride stop located at 16000 NW 7th Ave Miami North, FL 33169, and operates 20 hours per day from 5:00 AM to 1:00 AM, seven days a week.

2.15 Existing Structures Characteristics

There are twenty eight (28) bridge structures along the major roadway segments and interchange ramps evaluated as part of this PD&E study. **Figure 2-22** shows the locations of these bridge structures within the GGI project study area. **Table 2-29** summarizes the general geometry and structural information pertaining to the bridges within the project limits.

Most of these bridges were originally constructed between 1951 and 1965 and were widened or reconstructed between 1975 and 1994. The 95 Express Flyover bridges were constructed in 1994 while the Park and Ride flyover bridge was constructed in 1976. In 2010, the proposed widening along the Turnpike Connector ramp widened three bridges along the northbound Turnpike Connector. The majority of the existing bridges were designed using the AASHTO Standard Specification HS-20 design truck load in place at the time of construction. For additional details on the existing structures, refer to the Bridge Analysis Report prepared as part of the PD&E Study.

2.15.1 Type of Structure

The superstructure for the majority of the existing bridges consists of a cast-in-place (CIP) deck supported on pre-stressed AASHTO girders. However, a few of these bridge structures use steel girders (870470, 870601), Florida Bulb-T beams (870774, 870952), Concrete T-Beams (870046), precast pre-stressed units (870348) or a combination of steel and AASHTO beams (870243, 870642).

The substructure for most of the bridges consists of multicolumn piers or pile bents supported by square prestressed concrete piles ranging in size from 14 to 18 inches.

2.15.2 Condition of Existing Structures

The Department performs biannual inspections and evaluations of all bridge structures under its jurisdiction, as part of the "National Bridge Inventory (NBI) and Structural Inventory and Appraisal Program" required by FHWA.

The latest available Bridge Load Rating Reports and Bridge Inspection Reports were obtained for all the existing bridges. A review of the existing bridge inspection reports indicated that all bridges have an acceptable Sufficiency Rating varying from 66 to 96 and health indexes varying from 75.26 to 99.98 with no structural deficiency based on the HS-20 design truck load standards.

The Bridge Inspection Reports also identified several bridges as Functionally Obsolete (does not meet design standards) with substandard bridge railing, shoulder widths or lane widths. The functional obsolete rating is not associated with structural capacity.

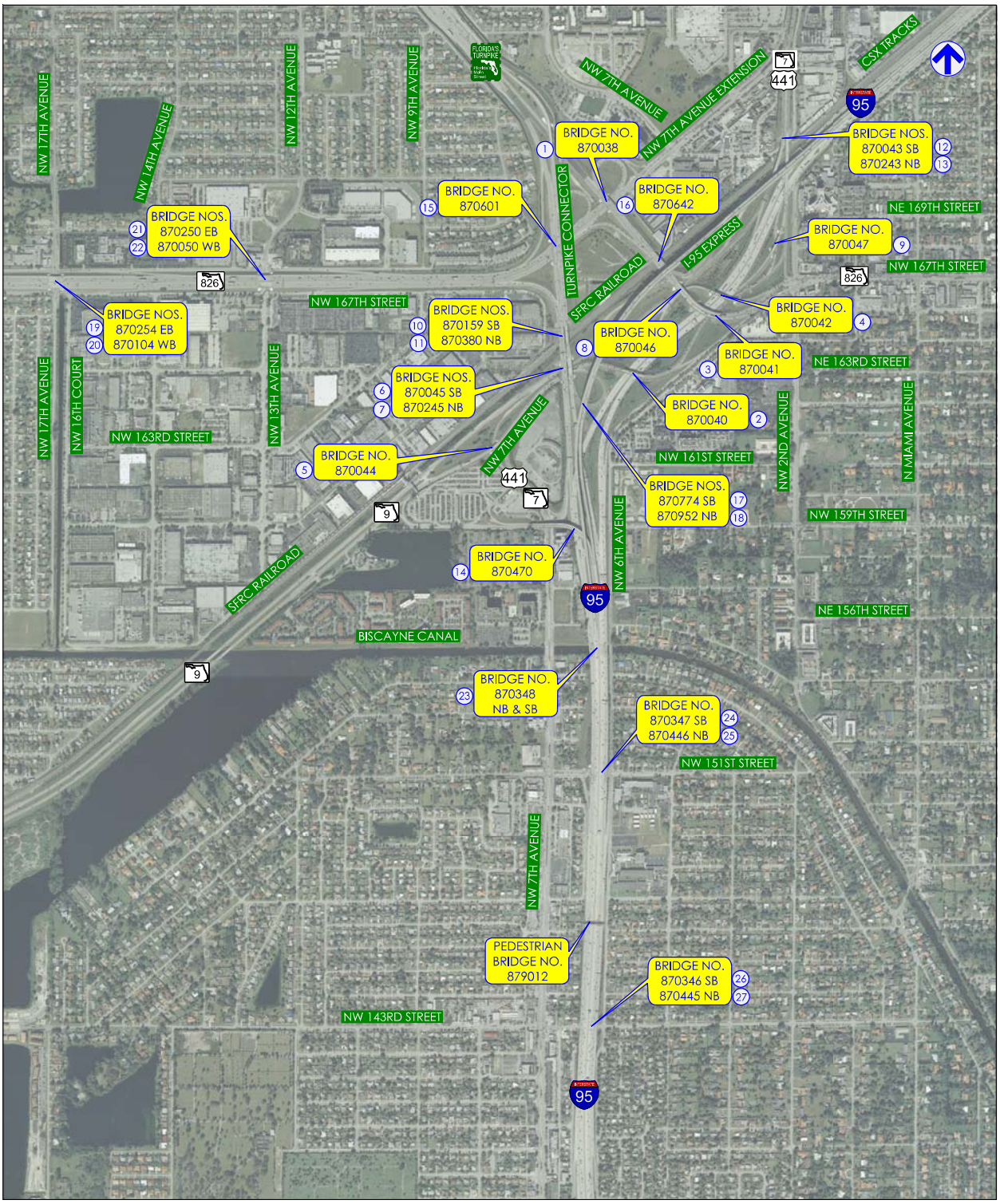


Figure 2-22 Existing Bridge Structures

Table 2-29
Existing Bridge Characteristics

#	Location	Bridge Numbers	Min. Vert. Cl. (Feet)	Superstructure Type	Substructure Type	Average Bridge Width (Feet)	Bridge Length (Feet)	No. of Spans	Max Span Length (Feet)	Load Rating	Sufficiency Rating	Health Index	Bridge Railings	Substructure	Restriction	Deficiency	Year Built / Reconst.
1	SR 826 Connector over NW 7th Avenue Extension	870038	15.34[1]	AASHTO Type III	Pier/Bents/18" Prest. piles	75.8	172.8	4	56.5	HS 20 (IRF 0.97)	68.60	99.49	Meets Standard	Very Good	Open, no Restriction	Functionally obsolete	1956/1987
2	SR-7/US 441 NB Ramp over I-95	870040	16.40[1]	AASHTO Type II/III	Pier/Bents/14"/ 18" Prest. piles	37.2	239	4	79.7	HS 20 (IRF 0.87)	76.50	90.05	Substandard	Good	Open, no Restriction	Functionally obsolete	1963
3	SR-826 Connector over I-95 & SR 7/US 441 NB	870041	16.57[1]	AASHTO Type III	Pier/Bents/18" Prest. piles	72.2	301	5	72.1	HS 20 (IRF 1.06)	90.00	85.16	Meets Standard	Very Good	Open, no Restriction	Functionally obsolete	1963
4	NW 167th Street over I-95 & SR 7/US 441 NB	870042	14.47[1]	AASHTO Type II/III/IV	Pier/Bents/14"/ 18" Prest. piles	30.2	320	5	92.6	HS 20 (IRF 0.90)	89.00	96.97	Substandard	Very Good	Open, no Restriction	Functionally obsolete	1963
5	SR-9 NB over SR-7/US 441 SB Ramp	870044	14.86[1]	AASHTO Type II	Pier/Bents/14"/ 18" Prest. piles	34.2	152	3	60	HS 20 (IRF 1.18)	76.00	99.52	Substandard	Good	Open, no Restriction	Functionally obsolete	1963
6	Turnpike Connector over SR 7/US 441 & SR 9	870045 (SB)	16.80[1]	AASHTO Type III	Pier/Bents/14"/ 18" Prest. piles	63.3	237.2	4	77.2	HS 20 (IRF 1.13)	87.40	99.83	Meets Standard	Good	Open, no Restriction	Not Deficient	1967/1986
7		870245 (NB)	17.03[1]			46.1				HS 20 (IRF 1.02)	75.50	99.90	Meets Standard			Functionally obsolete	1967/2010
8	SR-826 Connector over SR 7/US 441 SB	870046	14.41[1]	Concrete T-Beam	Pier/Bents/Steel piles	66.2	171	3	74	HS 20 (IRF 1.38)	76.00	88.08	Meets Standard	Good	Open, no Restriction	Functionally obsolete	1951/1963
9	I-95 NB to US-441 NB Ramp	870047	14.73[1]	AASHTO Type III	Pier/Bents/14"/ 18" Prest. piles	32.2	250	4	84	HS 20 (IRF 1.01)	94.20	98.70	Substandard	Good	Open, no Restriction	Not Deficient	1963
10	Turnpike Connector over SFRC	870159 (SB)	23.35[1]	AASHTO Type III	Pier/Bents/18" Prest. piles	63.3	205.3	3	81.9	HS 20 (IRF 1.09)	91.70	97.72	Meets Standard	Good	Open, no Restriction	Not Deficient	1964/1980
11		870380 (NB)	22.90[1]			34.1	187.9		63.5	HS 20 (IRF 1.00)	71.30	87.23					1957/2010
12	SR-7 over I-95	870043 (SB)	18.4/22.7[3]	AASHTO Type II, III+IV	Pier/Bents/14"/ 18" Prest. piles	34.15	523	7	95.7	HS 20 (IRF 1.25)	74.00	99.87	Substandard	Good	Open, no Restriction	Functionally obsolete	1963
13		870243 (NB)	16.50[1]	STEEL / AASHTO Type II, III+IV	Pier/Bents/18" Prest. piles	34.2	766	9	146	HS 20 (IRF 1.34)	79.00	81.64	Substandard	Good	Open, no Restriction	Functionally obsolete	1963
14	I-95 Ramp to Park and Ride Facility	870470	18.50[1]	Steel Girders	Pier/Bents/18" Prest. piles	46.8	902	6	216	HS 20 (IRF 1.35)	90.00	75.26	Substandard	Good	Open, no Restriction	Functionally obsolete	1976
15	Turnpike Connector over SR-826	870601	16.50[2]	Steel Girders	Pier/Bents/18" Prest. piles	114.9	290	3	95	HS 20 (IRF 1.12)	90.80	94.70	Meets Standard	Good	Open, no Restriction	Not Deficient	1956/1986 /2010

Table 2-29
Existing Bridge Characteristics

#	Location	Bridge Numbers	Min. Vert. Cl. (Feet)	Superstructure Type	Substructure Type	Average Bridge Width (Feet)	Bridge Length (Feet)	No. of Spans	Max Span Length (Feet)	Load Rating	Sufficiency Rating	Health Index	Bridge Railings	Substructure	Restriction	Deficiency	Year Built / Reconst.
16	SR-826 Connector over SFRC	870642	16.3/21.5[3]	Steel/AASHTO Type III	Pier/Bents/18" Prest. piles	90.8	200.3	4	57.8	HS 20 (IRF 1.34)	94.00	92.47	Meets Standard	Good	Open, no Restriction	Not Deficient	1987
17	I-95 express Flyover Ramps (SB & NB)	870774 (NB)	16.20[3]	FBT 78	Pier/Bents/18" Prest. piles	31.1/61.1	6308	48	153.8	HS 20 (IRF 1.06)	94.00	99.98	Meets Standard	Very Good	Open, no Restriction	Functionally obsolete	1994
18		870952 (SB)	16.40[3]	FBT 78		31.1	2313	18	150	HS 20 (IRF 1.20)	90.00	99.70					
19	SR 826 over NW 17th Avenue	870254 (EB)	14.3[3]	AASHTO Type II and III (spans 1 & 3); Type III (span 2)	Pier/Bents/18" Prest. piles	134.75	144.2	3	72.7	HS 20 (IRF 1.30)	94.00	99.65	Meets Standard	Good	Open, no Restriction	Not Deficient	1963/1978
20		870104 (WB)															
21	SR 826 over NW 12th Avenue	870250 (EB)	14.1[3]	AASHTO Type II and III (spans 1 & 3); Type III (span 2)	Pier/Bents/18" Prest. piles	134.8	140.8	3	68.3	HS 20 (IRF 1.10)	81.00	97.85	Substandard	Good	Open, no Restriction	Functionally obsolete	1965/1986
22		870050 (WB)															
23	I-95 over Biscayne Canal	870348 (NB & SB)	2.01[3]	21" Precast Prest. Units	18" Pile Bents	188.02/195.71	117	3	39'	HS 20 (IRF 1.70)	66.00	90.99	Meets Standard	Good	Open, no Restriction	Functionally obsolete	1961/1994
24	I-95 over NW 151st Street	870347 (SB)	14.63[1]	AASHTO Type II	Pier/Bents/18" Prest. piles	175.1	182	4	52	HS 20 (IRF 1.27)	96.00	99.52	Meets Standard	Very Good	Open, no Restriction	Not Deficient	1963/1976
25		870446 (NB)								HS 20 (IRF 1.29)	94.00	99.55					1963/1994
26	I-95 over NW 143rd Street	870346 (SB)	15.15[3]	AASHTO Type II, III, IV-II Mod	Pier/Bents/14"/18" Prest. piles	183.08	145	3	68	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1961/1972/1991
27		870445 (NB)															
28	Pedestrian Overpass over I-95	879012	17.5	Truss	Pier/Spread Footing	8.875	230	1	230	N/A	-2.0	99.89	N/A	Very Good	Open, no Restriction	Not Deficient	2006

Notes:
- NBI Bridge Condition; Deck, Superstructure & Substructure: Satisfactory to Very Good
- Load Rating; IRF (Inventory Rating Factor) in red is less than 1
- Vertical Clearance: 1- Field Measured, 2- Previous Widening Project, 3- Existing Plans
- Vertical clearance values in red do not meet the FDOT PPM recommended minimum of 16.5-ft (roadway over roadway), 23.5-ft (roadway over railroad) or (2-ft above design high water elevation), SFRC recommended minimum 24.25-ft (roadway over roadway)

Definitions:
- Load Rating - indicates the live-load capacity of the bridge based on current conditions
- Sufficiency Rating - a measure used to determine whether a bridge that is structurally deficient or functionally obsolete should be repaired or just replaced
- Functionally Obsolete - refers to a bridge that does not meet current roadway design standards
- Health Index - a measure used to indicate overall conditions of a bridge. A Health Index below 85 generally indicates that some repairs are needed.

The term structurally deficient means that the bridge should undergo a series of repairs. All structurally deficient bridge structures must be repaired or replace within six years of being designated as a structurally deficient structure. The term functionally obsolete means that the bridge section does not meet the latest road design standards. Health index is a tool that measures the overall condition of a bridge. The lower health index is the more work that is needed in order to bring the bridge to an ideal condition. Lastly, Sufficiency Rating is a tool used to determine whether a bridge that is structurally deficient or functionally obsolete should be repaired or replaced. The Sufficiency Rating considers several factors, only about half of which relate to the condition of the bridge itself. The sufficiency rating is not a direct reflection of the bridges' ability to carry traffic loads.

The Bridge Load Rating indicates the reserved capacity of the bridge to carry live loads. Bridges are rated at three different stress levels, referred to as Operating Rating, Inventory Rating and Legal (Posting) Rating.

A review of the Bridge Load Rating Reports and existing bridge plans analyzed using the HS-20 Design truck with American Association of State Highway Transportation Association (AASHTO), Load Factor Design (LFD) indicated that three (3) of the existing bridges (870038, 870040, and 870042) have an inventory rating factor (IRF) below 1.0. Bridges 870040 and 870042 are intended to be removed or replaced either in the interim or ultimate stages of the interchange improvements. As for Bridge 870038, we are not proposing any improvements in this area that may impact this bridge.

2.15.3 Vertical Clearance

The primary function of vertical clearance to structures going over roadways or railroads consists of providing safe passage to tall design vehicles and rail cars beneath these structures. The FDOT PPM specifies that the highest point on the roadway below a bridge structure has to measure a minimum of 16.5-ft to the lowest point (low member) beneath the structure. This includes provisions for a future underpass resurfacing of 6" over the existing pavement elevation. For railroad underpasses, a minimum 23.5-ft vertical clearance is recommended which includes allowance for 12" of railroad track adjustments. The South Florida Rail Corridor (SFRC) however, has a greater clearance requirement set at 24.25-ft.

AASHTO requires a minimum vertical clearance of 16-ft for structures passing over roadway including auxiliary lanes and the usable width of shoulders. Further guidance allows a minimum vertical clearance of 14-ft in highly urbanized areas provided there is an alternate

South Florida Water Management District (SFWMD) C-8 (Biscayne Canal), preliminary coordination with SFWMD indicated that any widening of the structure had to maintain the existing vertical clearance.

An evaluation of the existing bridges within the project limits indicates that 20 of the 28 existing bridge structures do not meet the FDOT minimum vertical clearance requirements. With the exception of the Turnpike Connector northbound bridges over SR 826 (870601), South Florida Rail Corridor (SFRC) (870380) and SR 7/US 441 & SR 9, which were recently widened or upgraded, no documentation of the existing bridge vertical clearance deficiencies were found in the FDOT District Six design database.

2.15.4 Horizontal Clearance

The horizontal clearance underneath the existing bridges is the lateral distance from the roadway edge of travel lane to the bridge abutment or piers. The horizontal clearance requirements for most roadside features and objects are based on providing the required clear zone.

Both the FDOT Plans Preparation Manual (PPM) and AASHTO require bridge piers and abutment walls to be placed outside the clear zone unless shielded by a crash worthy barrier. For roadway over railroads, the FDOT PPM requires 18-ft horizontal clearance with crash walls or 25-ft if no crash walls are provided from the centerline of the outside tracks to the face of pier cap, bent cap, or any other adjacent structure.

A field review of the project corridor indicated that most the bridge abutment or piers are adequately protected by either guardrail or barrier wall system with the exception of the Turnpike Connector bridges over the SFRC. The minimum horizontal clearance at this location is 8.96-ft which is less than the required 18-ft with crash walls. This existing horizontal clearance deficiency was documented during the recent widening of the northbound bridge and a design variation obtained.

2.15.5 Historical Significance

The existing bridges within the project study area were reviewed to determine if any are considered historic or possess any substantial community value. As previously mentioned the existing bridges were originally constructed between 1951 and 1965 and most were widened or reconstructed between 1975 and 1994. As such, most of these bridges are either non-historic or have non-historic reconstruction dates. For the eight bridges that have not been reconstructed, none of original construction dates before 1960. The Cultural Resources Assessment Survey (CRAS) performed as part of this study and approved by the State Historic Preservation Office (SHPO) confirmed that these bridges are not eligible for listing in the National Register of Historic Places (NRHP).

2.16 Existing Geotechnical Data

2.16.1 Regional Geology

The project study area is located on the southern flank of the Florida Plateau, a stable, carbonate platform on which thick deposits of limestones, dolomites, and evaporites have accumulated. In the study, the upper 200 feet of this platform is composed predominately of limestone and quartz sand. The sediments were deposited during several glacial and interglacial stages during the Pleistocene Epoch. Within the explored depths of this study, two distinct geological formations were encountered below the structural fill and silt layers. These formations are in descending order: The Miami Limestone Formation and the Fort Thompson Formation.

2.16.1.1 Miami Limestone

The Miami Limestone can be described as a soft tan white porous to very porous fossiliferous quartz sandy fine-grained slightly oolitic limestone. The solution channels in the limestone may be up to 2 inches in diameter at some locations, are filled with quartz fine sand and uncemented calcareous materials. The limestone varies in both thickness and competency within the investigated area. The Miami Limestone was deposited in a shallow near-shore marine carbonate bank environment. Spherical carbonate sand grains called oolites formed and were deposited in this environment. Near shore, processes transported quartz sand into the area and reworked some of the carbonate material. Encrusting organisms called bryozoans were locally abundant and formed patches on the substrate. After sea level receded, the carbonate deposit was exposed to fresh water and the cementation process was initiated. The degree of cementation, and therefore the competency of the rock, was influenced by both the abundance and the type of calcareous material in the original deposit.

2.16.1.2 Fort Thompson Formation

Underlying the Miami Limestone Formation, the Fort Thompson Formation was generally encountered. The Fort Thompson Formation is composed of sediments of variable lithologies. The lithologies include non-fossiliferous quartz fine sand, fossiliferous quartz sandy limestone, coralline limestone, freshwater limestone and quartz sandstone. These lithologies alternate abruptly in thickness and lateral extent.

The Fort Thompson limestone grades downward into a gray quartz and calcareous fine to medium sand. This sand has been cemented to varying degrees by carbonate material leached out of the overlying limestone. The cementation commonly takes the form of hard spherical sandstone nodules 1 to 2 inches in diameter occurring in a sand matrix. Sandstone lenses within the sand layer are the result of a more complete cementation.

2.16.2 Miami-Dade County Soil Survey Map

The Soil Map of Miami-Dade County Area, Florida, published by the United States Department of Agriculture (USDA) was reviewed for general near-surface soil information within the general project vicinity. This information indicates that there are four (4) mapping units in the vicinity of the project. The map soil units encountered are summarized in **Table 2-30**.

Table 2-30
Existing Geotechnical Characteristics

Map Unit Symbol	Soil Name	AASHTO Soil Classification	Typical Profile
10	Udorthents, limestone substratum-Urban land	A-2-4/A-4	0 to 55 inches: Extremely Gravely Loam 55 to 59 inches: Unweathered Bedrock
15	Urban land	A-3, A-1-b or A-2-4	N/A
40	Pomello sand	A-3	0 to 80 inches: Sand
99	Water	N/A	100 percent Water

Based on the information provided by the USDA map, it appears that unsuitable materials are not present within the study area.

2.16.3 Groundwater Conditions

The groundwater levels in the test borings were measured at the time of drilling. Groundwater levels in the test borings typically ranged from 0.5 to 1.0 feet (NAVD88). A Seasonal High Ground Water Table (SHGWT) of 4.6-ft (NGVD 29) or 3.0-ft-NAVD 88 is recommended for design. Fluctuation in the observed groundwater levels should be expected due to seasonal climatic changes, construction activity, rainfall variations, surface water runoff and other site-specific factors such as water elevation variations at the canals. Since groundwater level variations are anticipated, design drawing and specifications should accommodate such possibilities and construction planning should be based on the assumption that variations will occur.

3. PLANNING PHASE / CORRIDOR ANALYSIS

Over the past decade, the FDOT District Six has been evaluating several operational improvements to the Golden Glades Interchange (GGI), dubbed the spaghetti bowl, in order to improve reduce congestion and improve safety at this interchange. Several planning studies were completed prior to the PD&E phase. The three most prominent studies completed prior to this PD&E study are discussed below.

3.1 Golden Glades Interchange Improvements Study

In 2003, the FDOT District Six completed the GGI Improvements Study. This study developed a conceptual design that would improve the critical movement within the interchange from SR 826 EB to I-95 NB. The conceptual design proposed a single lane ramp beginning 400-ft from the NW 12th Avenue on-ramp over the Turnpike Connector, underneath the existing 95 Express flyover ramps before merging into the existing SR 7/US 441 northbound to I-95 northbound ramp. Refer to **Appendix E** for additional information.

3.2 2008 District Interchange Review Committee Preferred Alternative

In 2008, the District Planning Department further refined the 2003 proposed direct flyover ramp concept and completed the GGI System Assessment Studies. The primary objective of these studies was to improve access to the Golden Glades Multimodal Facility and to remove the weaving between SR 7/US 441 NB to I-95 NB and SR 9 NB to Florida's Turnpike movements. To eliminate this weaving condition, the studies proposed a signal at the SR 7/SR 9 intersection which separates the movements and meters the traffic. The studies also proposed a ramp connection from SR 7/US 441 NB to I-95 NB to keep the SR 7/US 441 NB destined traffic separated from the SR 826 EB to I-95 NB destined traffic. The studies culminated in the approval of the ***2008 DIRC Preferred Alternative*** for the GGI (See **Appendix E)**.

The 2008 DIRC Preferred Alternative was broken into two phases: the Phase 1 Plan and the Ultimate Plan. The Phase 1 Plan primarily provided a single direct flyover ramp from SR 826 EB to I-95 NB one lane ramp connection. The Ultimate Plan builds upon the Phase 1 Plan while incorporating additional features to improve various movements within the interchange. These include:

- Two-lane ramp direct connection ramp from SR 826 eastbound to I-95 northbound
- Turnpike Connector SB to I-95 northbound ramp connection
- SR 7/US 441/SR 9 northbound to I-95 northbound ramp connection
- SR 7/US 441 northbound realignment and widening (one to two lanes)
- I-95 northbound to SR 7/US 441 northbound ramp realignment
- SR 9/SR 7/US 441 intersection signalization
- SR 7/US 441/Turnpike Connector southbound off-ramp intersection improvements

3.3 2010 Refined DIRC Alternative

In 2010, the District Planning Department refined the conceptual design plans and the supporting operations analysis for the 2008 DIRC Preferred Alternative. The primary purpose of this work was to identify any fatal flaws and constructability constraints in the 2008 DIRC Preferred Alternative prior to the PD&E phase. In addition, the study also identified critical areas or areas in need of special attention during the subsequent PD&E study. The study resulted in the approval of the ***2010 Refined DIRC Alternative*** for the GGI. The 2010 Refined DIRC Alternative is the 2008 DIRC Preferred Alternative that has been refined to improve constructability and support an incremental construction sequencing plan. Refer to **Appendix E** for additional information about the 2010 Refined DIRC Alternative.

3.4 PD&E Scope Changes

Discussions held with both FDOT District Six and the Florida's Turnpike Enterprise (FTE) prior to the commencement of the PD&E Phase indicated that some of the concepts developed as part of the 2008 DIRC Preferred Alternative and the 2010 Refined DIRC Alternative were no longer supported and/or found to be in conflict with changed priorities. These changed priorities included:

- Introduction of express lanes along SR 826/Palmetto Expressway
- Improvements to the connection between southbound Florida's Turnpike and southbound I-95
- Removal of the Florida's Turnpike southbound to northbound I-95 direct connection

The district is currently evaluating the feasibility of express lanes along SR 826/Palmetto Expressway from SR 836/Dolphin Expressway to I-75 and from I-75 to the Golden Glades. If express lanes are found to be feasible, this PD&E Study will evaluate the feasibility of a direct connection between the express lanes on SR 826 and the existing 95 Express flyover ramps.

To further improve traffic operations within the interchange, the Florida's Turnpike Enterprise (FTE) partnered with FDOT District Six to evaluate the feasibility of increasing the capacity of the southbound movement of the Turnpike Connector ramp to I-95 southbound as part of this PD&E Study. In addition, FTE recommended that the proposed direct connection from Florida's Turnpike southbound to I-95 northbound be dropped from further considerations since the projected traffic volume for this movement does not operationally justify the cost of the improvement.

4. PROJECT DESIGN STANDARDS

4.1 Design Criteria

Several design standards and manuals were consulted to establish the final design criteria for this PD&E Study. The design criteria are based on design parameters outlined in the current editions of the following publications:

- A Policy on Geometric Design of Highways and Streets, American Association of State Highway Transportation Officials (AASHTO), 2011
- Computer-Aided Design and Drafting (CADD) Structures Standards and Guidelines, FDOT, 2013
- Design Standards, FDOT, 2014
- Drainage Manual, FDOT, 2014
- Flexible Pavement Design Manual, FDOT, 2008
- Rigid Pavement Design Manual, FDOT, 2009
- Pavement Type Selection Manual, FDOT, 2011
- Highway Capacity Manual, Transportation Research Board, 2010
- Highway Safety Manual, Transportation Research Board, 2010
- Manual of Uniform Minimum Standards for Design, Construction and Maintenance of Streets and Highways, FDOT, 2011
- Manual of Uniform Traffic Control Devices (MUTCD), FHWA, 2009
- Project Development and Environment Manual, FDOT, 2012
- Project Traffic Forecasting Handbook, FDOT, 2012
- Roadside Design Guide, AASHTO, 2011
- Plans Preparation Manual, FDOT, 2013
- Standard Drawings, Structures Design Office, FDOT, 2013
- Standard Specifications for Road and Bridge Construction, FDOT, 2013
- Structures Design Guidelines, FDOT, 2013
- The Interchange Handbook, FDOT, 2002
- Florida's Turnpike District Plans Preparation and Practices Handbook, FTE, 2013
- Utility Accommodation Manual, FDOT, 2010

4.1.1 Roadway Design Criteria

Tables 4-1 through 4-3 summarize the roadway design criteria for the Golden Glades Interchange (GGI) freeways, interchange ramps and arterials.

4.1.1.1 Freeways/Expressways Segments

Table 4-1
Design Criteria for Freeways/Expressways

Design Elements	Criteria	Source
Functional Classification	I-95: Urban Interstate SR 826: Urban Freeway/Expressway	FDOT Straight Line Diagram
Access Classification	Class 1 (Area Type 2)	PPM I, Table 1.8.1
Interchange Spacing	2 miles (Area Type 2)	PPM I, Table 1.8.1
Number of Lanes	I-95: 6-8 General Use lanes & 4 Express Lanes SR 826: 8 General Use Lanes	Existing Conditions
Design Vehicle	WB-62FL	PPM I, Section 1.12
Design Speed/Posted Speed	I-95 : 60 mph / 55 mph SR-826 : 60 mph / 55 mph	PPM I, Table 1.9.2
Lane Widths	12-ft	PPM I, Table 2.1.1
Outside / Right Shoulder Width	12-ft (10-ft paved)	PPM I Table 2.3.1
Inside / Left Shoulder Width	12-ft (10-ft paved)	
Bridge Width	Travel Lanes + 10' Shoulders	PPM I Fig 2.0.1
Structural Capacity	HL-93 Design Load	AASHTO LRFD 2010
Vertical Clearance		
Roadway over Roadway	16-ft – 6-inch	PPM I Table 2.10.1
Roadway Over Railroad	23-ft – 6-inch	PPM I Table 2.10.1
Overhead Sign Structure	17-ft – 6-inch	PPM Table 2.10.2
Roadway Over Canal	2-ft Min from Design Flood Stage and Bridge Low Member Elev. & 6-ft above Normal High Elevation or control elevation	PPM Section 2.10.1
Grades		
Maximum	3%	PPM I Table 2.6.1
Cross Slopes		
Travel Lanes	Inside lanes sloped towards the median @ 0.02 when more than 3 lanes Remaining lanes sloped towards the outside @ 0.02 for first two lanes and @ 0.03 thereafter	PPM I Fig 2.1.1
Outside / Right Shoulder Width	6%	PPM I Table 2.3.1
Inside / Left Shoulder Width	5% for 3-lanes or less 6% for 4-lanes or more	
Bridge Deck	2% in each direction with no break in slope	PPM I Section 2.1.5
Max algebraic difference between adjacent through lanes	4%	PPM I Figure 2.1.1
Max algebraic difference at turning road terminals	6% for ramp speed less than 35 mph 5% for 35 mph or more ramp speed	PPM I Table 2.1.4
Maximum Shoulder Cross Slope Break	7%	PPM I Figure 2.3.1

Table 4-1 Design Criteria for Freeways/Expressways		
Design Elements	**Criteria**	**Source**
Superelevation		
Maximum Superelevation Rate	emax = 10%	PPM I Table 2.9.1
Superelevation Transition Rate	1:180 for 6 lanes 1:170 for 8 lanes	PPM I Table 2.9.3
Superelevation Ratio	20:80 preferred, 50:50 minimum	PPM I Section 2.9 Standard Index 510
Horizontal Alignment		
Min. Length of Horizontal Curves	15V min = 900-ft 30V preferred = 1800-ft	PPM I Table 2.8.2a
Maximum deflection without curve	0° 45' 00"	PPM I Table 2.8.1a
Maximum curvature	Interstate: 3°00' Expressway: 5°15’	PPM I Table 2.8.3
Auxiliary lane length	Min 2500-ft in advance of the exit or after entry	AASHTO 2011 Figure 10-52 & 10-53
Vertical Alignment		
Max Change in Grade w/o Curve	0.40	PPM I Table 2.6.2
Min. Length of Crest Curve	Interstate - Open Highway: L=KA but not < 1000-ft Interstate – Interchange: L=KA but not < 1800-ft Expressway: L=KA	PPM I Table 2.8.5
Minimum Length of Sag Curve	Interstate : L=KA but not <800-ft Expressway: L=KA	PPM I Table 2.8.6
Minimum Crest K-Value	Interstate: 313, Expressway: 245	PPM I Table 2.8.5
Minimum Sag K-Value	Interstate: 157, Expressway: 136	PPM I Table 2.8.6
Stopping Sight Distance	Interstate: 645-ft + adjustments Expressway: 570-ft + adjustments	PPM I Table 2.7.1
Recoverable Terrain	36-ft	PPM I, Table 2.11.11
Horizontal Clearance		
Bridge Piers	Outside Clear Zone	PPM I Table 2.11.6
Above ground fixed objects (e.g. utility poles, ITS poles and other obstacles)	Outside Clear Zone	PPM I Table 2.11.3 PPM I Table 2.11.9 PPM I Table 2.11.10
Light Poles	20-ft from travel lanes 14-ft from auxiliary lanes 4-ft minimum behind guardrail	PPM I Table 2.11.2
Drop-off and Canal Hazards	60-ft from travel lanes (≥50 mph)	PPM I Table 2.11.8
Median Width	26-ft with Barrier wall	PPM I Table 2.2.1
Border Width	94-ft	PPM I Table 2.5.3
Roadway Base Clearance	3.0-ft above SHGW Elev.	PPM I Table 2.6.3
Roadside Slopes		
Front Slope	1:6 for fills <5-ft 1:6 to edge of CZ then 1:4 for fills 5-ft-10-ft 1:6 to edge of CZ then 1:3 for fills 10-ft-20-ft 1:2 (with guardrail) for fills >20-ft	PPM I, Table 2.4.1
Back Slope	1:4 or 1:3	
Transverse Slope	1:10 or Flatter	

4.1.1.2 Flyover, Connectors and Ramps

Table 4-2
Design Criteria for Flyovers, Connectors and Ramps

Design Elements	Criteria	Source
Design Vehicle	WB-62FL	PPM I, Figure 1.12.1
Design Speed/Posted Speed		
Flyover & Connector Ramps	40-50 mph / 40-50 mph	AASHTO 2011 Table 10-1
Loop and Other ramps	30 mph / 30 mph	
Lane Widths		
One-Lane Ramps	15-ft	PPM I, Table 2.1.3
Two-Lane Ramps	24-ft (12-ft each)	
Shoulder Width		
Outside / Right Shoulder Width	One-Lane Ramps: 6-ft (4-ft paved) – Interstates and Non-interstates Two-Lane Ramps: 12-ft (10-ft paved) – Interstates; 10-ft (8-ft paved) – Non-interstates	PPM I Table 2.3.1 TPPPH (2012) Section 2.3
Inside / Left Shoulder Width	6-ft (2-ft paved) – One-Lane Ramps 8-ft (4-ft paved) – Two-Lane Ramps	
Bridge Width		
One-Lane Ramps	Travel Lanes + 6-ft Shoulders	PPM I, Figure 2.0.1
Multi-Lane Ramps	Travel Lanes + 10-ft Outside and 6-ft Inside Shoulders	
Structural Capacity	HL-93 Design Load	AASHTO LRFD 2010
Vertical Clearance		
Ramp over Roadway	16-ft – 6-inch	PPM Table 2.10.1
Ramp Over Railroad	23-ft – 6-inch	PPM Table 2.10.1
Overhead Sign Structure	17-ft – 6-inch	PPM Table 2.10.2 TPPPH (2012) Section 2.10
Ramp Over Canal	2-ft Min from Design Flood Stage and Bridge Low Member Elev. & 6-ft above Normal High Elevation or control elevation	PPM Section 2.10.1
Grades	3% - 5% Max - Flyover and Connector Ramps 7% Max- Other Ramps	PPM I Table 2.6.1 TPPPH (2012) Section 2.6
Cross Slopes		
Travel Lanes	2% Min, varies for superelevated segments	PPM I Figure 2.1.1 TPPPH (2012) Section 2.1.5
Outside / Right Shoulder Width	6%	PPM I Table 2.3.1
Inside / Left Shoulder Width	5%	
Maximum Shoulder Cross Slope Break	7%	PPM I Figure 2.3.1
Superelevation (e)		
Maximum Superelevation Rate	emax = 10%	PPM I Table 2.9.1
Superelevation Transition Rate	1:200 – Flyover and Connector Ramps 1:100 – Loop and Other Ramps	PPM I Table 2.9.3 PPM I Table 2.9.4 TPPPH (2012) Section 2.9

Table 4-2 Design Criteria for Flyovers, Connectors and Ramps		
Design Elements	**Criteria**	**Source**
Superelevation Ratio	20:80 preferred 50:50 minimum	PPM I Section 2.9 Standard Index 510
Horizontal Alignment		
Min. Length of Horizontal Curves	15V min	PPM I Table 2.8.2a
Maximum deflection without curve	0° 45' 00" (Flyover and Connector Ramps) N/A (Loop and Other Ramps)	PPM I Table 2.8.1a
Maximum curvature	08°15'00" (50 mph) 10°15'00" (45 mph) 13°15'00" (40 mph) 24°45'00" (30 mph)	PPM I Table 2.8.3
Exit Ramp Taper Angle	4°±	Design Standards Index 525
Ramp Entrance Taper Length	1:50	Design Standards Index 525
Lane Drop Taper	1:50 min., 1:70 Desirable	AASHTO 2011 Figure 10-52
Ramp Terminal Spacing		
Entrance - Entrance or Exit - Exit	1000-ft for freeways 800-ft for C-D Road system	AASHTO 2011 Figure 10-68
Exit - Entrance	500-ft for freeways 400-ft for C-D Road system	
Turning Roadways	800-ft for system interchange 600-ft for service interchange	
Entrance - Exit	2000-ft for system to service – freeways 1600-ft for service to service – freeways 1600-ft for system to service – C-D Road 1000-ft for service to service – C-D Road	
Vertical Alignment		
Max Change in Grade w/o Curve	0.6-0.8% - Flyover & Connector Ramps 1.0% - Loop and Other Ramps	PPM I Table 2.6.2
Min. Length of Crest Curve	Varies L=KA but not <300-ft	PPM I Table 2.8.5
Minimum Length of Sag Curve	Varies L=KA but not < 200-ft	PPM I Table 2.8.6
Minimum Crest K-Value	136 (50 mph) 98 (45 mph) 70 (40 mph) 31 (30 mph)	PPM I Table 2.8.5
Minimum Sag K-Value	96 (50 mph) 79 (45 mph) 64 (40 mph) 37 (30 mph)	PPM Table 2.8.6
Stopping Sight Distance	425-ft (50 mph) 360-ft (45 mph) 305-ft (40 mph) 200-ft (30 mph)	PPM Table 2.7.1

Table 4-2
Design Criteria for Flyovers, Connectors and Ramps

Design Elements	Criteria	Source
Horizontal Clearance		
Bridge Piers	Outside Clear Zone	PPM Table 2.11.6
Above ground fixed objects (e.g. utility poles, ITS poles and other obstacles)	Outside Clear Zone	PPM Table 2.11.3 PPM Table 2.11.9 PPM Table 2.11.10
Light Poles	20-ft from travel lanes 14-ft from auxiliary lanes 4-ft minimum behind guardrail	PPM Table 2.11.2
Drop-off and Canal Hazards	60-ft from travel lanes (≥50 mph) 50-ft from travel lanes (< 50 mph)	PPM Table 2.11.8
Border Width	94-ft	PPM I Table 2.5.3
Recoverable Terrain	10-ft - One-Lane Ramps (<45 mph) 14-ft - One-Lane Ramps (45 mph and 50 mph) 18-ft –Two-Lane Ramps (<45 mph) 24-ft –Two-Lane Ramps (45 mph and 50 mph)	PPM, Table 2.11.11
Roadway Base Clearance		
Ramp Proper	2.0-ft above SHGW Elev.	PPM Table 2.6.3
Low Point on-ramps at Cross Roads	1.0-ft above SHGW Elev.	

4.1.1.3 Arterial Segments

Table 4-3
Design Criteria for Arterials

Design Elements	Criteria	Source
Functional Classification	Urban Principal Arterial	FDOT Straight Line Diagram
Access Classification	Class 1 (Area Type 2)	PPM I, Table 1.8.1
Design Vehicle	WB-62FL	PPM I, Figure 1.12.1
Design Speed/Posted Speed	40-45 mph / 30-40 mph	PPM I Section 1.9
Lane Widths		
Through Lane	12-ft	PPM I, Table 2.1.1
Turn Lane	12-ft	
Shoulder Width		
Outside / Right Shoulder Width	12-ft (5-ft Paved)	PPM I Table 2.3.2
Inside / Left Shoulder Width	8-ft (2-ft Paved)	
Bridge Width	2 Lanes (10-ft outside, 6-ft inside)	PPM I, Figure 2.0.4
Structural Capacity	HL-93 Design Load	AASHTO LRFD 2010
Vertical Clearance		
Over Roadway	16-ft – 6-inch	PPM Table 2.10.1
Over Railroad	23-ft – 6-inch	PPM Table 2.10.1
Overhead Sign Structure	17-ft – 6-inch	PPM Table 2.10.2
Over Canal	2-ft Min from Design Flood Stage and Bridge Low Member Elev. & 6-ft above Normal High Elevation or control elevation	PPM Section 2.10.1
Grades	5% max	PPM I Table 2.6.1
Cross Slopes		
Travel Lanes	2% Min, varies for superelevated segments	PPM I Figure 2.1.1
Outside / Right Shoulder Width	6%	PPM I Table 2.3.2
Inside / Left Shoulder Width	5%	
Maximum Shoulder Cross Slope Break	7%	PPM I Figure 2.3.1
Superelevation (e)		
Maximum Superelevation Rate	emax = 10%	PPM I Table 2.9.1
Superelevation Transition Rate	1:200	PPM I Table 2.9.3
Superelevation Ratio	20:80 preferred 50:50 minimum	PPM I Section 2.9 Standard Index 510
Horizontal Alignment		
Min. Length of Horizontal Curves	15V min	PPM I Table 2.8.2a
Maximum deflection without curve	0°45'00"	PPM I Table 2.8.1a

Table 4-3 Design Criteria for Arterials		
Design Elements	**Criteria**	**Source**
Maximum curvature	8°15'00"	PPM I Table 2.8.3
Vertical Alignment		
Max Change in Grade w/o Curve	0.7% (45 mph); 0.8% (40 mph)	PPM I Table 2.6.2
Min. Length of Crest Curve	Varies L=KA but not < 300-ft	PPM I Table 2.8.5
Minimum Length of Sag Curve	Varies L=KA but not < 200-ft	PPM I Table 2.8.6
Minimum Crest K-Value	45mph = 98; 40 mph = 70	PPM I Table 2.8.5
Minimum Sag K-Value	45mph = 79; 40 mph = 64	PPM Table 2.8.6
Stopping Sight Distance	360-ft + Adjustments (45 mph) 305-ft + Adjustments (40 mph)	PPM Table 2.7.1
Horizontal Clearance		
Bridge Piers	Outside Clear Zone	PPM Table 2.11.6
Above ground fixed objects (e.g. utility poles, ITS poles and other obstacles)	Outside Clear Zone	PPM Table 2.11.3 PPM Table 2.11.9 PPM Table 2.11.10
Light Poles	20-ft from travel lanes 14-ft from auxiliary lanes 4-ft minimum behind guardrail	PPM Table 2.11.2
Drop-off and Canal Hazards	50-ft from travel lanes (< 50 mph)	PPM Table 2.11.8
Border Width	33-ft	PPM I Table 2.5.1
Median Width	22-ft	PPM I Table 2.2.1
Recoverable Terrain	20-ft (45 mph)	PPM, Table 2.11.11

4.1.2 Drainage Design Criteria

Drainage design and construction criteria for the proposed improvements will adhere to FDOT Standards and will comply with the recommended standard practices as set forth in **Table 4-4**.

Table 4-4
Drainage Design Criteria

DESIGN ELEMENT	CRITERIA	SOURCE
Design Frequency		
Storm Sewer	- 10-Year design frequency standard (1, 8, 24-hour) - Check 100-Year storm (1,8, 24 hour) - 50-Year design frequency for interstate facility sag vertical curves which have no outlet other than a storm drain system	D.M. Section 3.3
Cross Drains	50-Year design frequency	D.M. Section 4.3
Design Tailwater		
All Conditions	Conditions vary with outfall	D.M. Section 3.4
Time Of Concentration (TOC)	Minimum T.O.C. of 10 Minutes Other T.O.C calculations to follow NRCS TR-55	D.M. Section 3.5.1
Pipe Slopes		
Minimum	Min. slope to produce v=2.5 ft/sec flowing full	D.M. Section 3.6.1
Manning's "n" Coefficient		
Pipes	0.012 (smooth pipes) 0.024 (corrugated pipe)	D.M. Section 3.6.4
Asphalt (rough texture)	0.016 Asphalt Pavement	S.D. Table 3-2
Grades		
Longitudinal Gutter Grade	minimum gutter grade is 0.3%	D.M. Section 3.8.1
Spread Standards		
Design Speed ≤ 45	Keep ½ lane clear	D.M. Section 3.9
45 < Design Speed ≤ 55	Keep 8-ft of lane clear	
Design Speed >55	No encroachment	
Pipe Size And Length		
Trunk Line	18-in Minimum Diameter.	D.M. Section 3.10.1
Length Between Structure	18-in Pipe=300ft., 24in – 36in=400ft,>42-in =500ft	D.M. Section 3.10.1
Exfiltration Trench		
Pipe Diameter	24-in minimum	D.M. Section 3.10.1
Pipe Lengths	Access through both ends: 300-ft 24-in to 30-in pipes; 400-ft for 36-in and larger pipes. Access through only one end: 150ft 24-in to 30-in pipes; 200-ft 36-in and larger pipes	D.M. 3.10.1
Pipe Perforations	Perforated pipes preferred in District 6	E.T.R.M Section 3.1
Skimmers/Baffles	Required at each entrance to exfiltration trench	
Trench Width	Minimum 4-ft , maximum 8-ft	
Trench Depth	Maximum of 20-ft	
Drainage Structures	2-foot sediment sump for inlets and catch basins	
Other District 6 Preferences	FDOT District 6 Exfiltration Trench Reference Manual	

Table 4-4
Drainage Design Criteria

DESIGN ELEMENT	CRITERIA	SOURCE
Ground Water Clearance		
Dry Retention	Pond bottom minimum 1-ft above SHGWT	B.M.P. Section VIII
Freeboard		
Storm Drain	Hydraulic Gradeline Minimum 1-ft below theoretical gutter elevation 1.13-ft below E.O.P. for Types E & F curb and gutter 1-ft below grate elevation for inlets Standard Index, 220-221, 230-235, 217-219.	S.D. Section 5.0
Ponds	Minimum 1-ft above peak design stage, measured from the inside edge of the maintenance berm.	D.M. Section 5.3.4.2
Permanent Pool Pond Depth		
Wet Detention	4-ft minimum depth, 8-ft maximum depth	S.M.F. Section 3.1.1
Stormwater Management System		
Water Quality	Water quality standards, as set forth in Chapter 62-302, Florida Administrative Code.	V - IV Section 5.0
Discharge Limitations	Historic Discharges, Post <= Pre	V - IV Section 6.1
Bridge Clearances		
Horizontal	Center span – 25 feet clear bent spacing, measured perpendicular to the channel. Approach bents – 20 feet between faces of bents.	V - V Section IX B
Vertical	6 feet above seasonal high optimum water control elevation, or 2 feet above the design water surface, whichever produces the greater elevation.	
	7 feet above mean high water for Miami-Dade Canals	RER Meeting 10/15/2012
Vertical	2 feet minimum clearance between design flood stage and the low member of bridge to allow for debris passage. 6 feet above Normal High Water for controlled canals	P.P.M. 2.10.1

Abbreviations
D.M. FDOT Drainage Manual; January 2014
E.T.R.M FDOT District 6 Exfiltration Trench Reference Manual; January 2008
P.P.M. Plans Preparation Manual Volume 1, January 2012
S.D. FDOT Storm Drain Handbook; January 2012
S.M.F. FDOT Stormwater Management Facility Handbook; January 2004
V-IV SFWMD Permit Information Manual Volume IV; 2012
V-V SFWMD Permit Information Manual Volume V; 1999
B.M.P SFWMD Best Management Practices for South Florida Urban Stormwater Management Systems; April 2002

5. ALTERNATIVE ALIGNMENT ANALYSIS

5.1 No-Build Alternative

The No-Build Alternative assumes no proposed improvements and serves as a baseline for comparison against the other alternatives. This is consistent with requirements of the National Environmental Policy Act (NEPA) and FHWA guidelines. The No-Build Alternative includes on-going construction projects and all funded or programmed improvements scheduled to be opened to traffic during the analysis years being considered. These improvements are part of the Department's adopted Five-Year Work Program, Miami-Dade County Metropolitan Planning Organization (MPO) cost feasible Long Range Transportation Plan (LRTP), transportation elements of Local Government Comprehensive Plans (LGCP), or developer-funded transportation improvements specified in approved development orders.

The advantage of the No-Build Alternative is that it requires no expenditure of public funds for design, right-of-way acquisition, construction or utility relocation. In addition, there would be no direct or indirect impacts to the environment or socio-economic characteristics from project. However, the No-Build Alternative does not alleviate the chronic congestion, operational, safety and mobility issues currently experienced within the Golden Glades Interchange (GGI) and along the adjoining roadways during the peak hours. If no improvements are made, these conditions will continue to deteriorate. Consequently, the No-Build Alternative does not satisfy the purpose and need for this project.

5.2 Transportation Systems Management and Operations

The Transportation Systems Management (TSM) alternative considers minor improvements to enhance operations and safety without the addition of through lanes. TSM may include low-cost improvements such as adding auxiliary lanes along freeways, adding turn lanes at intersections, adjusting signal phasing and timings, and considering opportunities to enhance alternate travel modes and implement Intelligent Transportation Systems (ITS). As part of this PD&E Study, the following TSM improvements were considered:

1. Widening of the southbound Turnpike Connector between SR 826/Palmetto Expressway and the off-ramp to SR 7/US 441 to provide an additional lane for Florida's Turnpike southbound to I-95 southbound movement
2. Signal timing improvements at the intersection of NW 2nd Avenue with NW 167th Street and Turnpike Connector southbound to SR 7/US 441 off-ramp intersection

These TSM improvements are near-term types of treatments that can improve the efficiency of the interchange. In order to mitigate the existing congestion as well as accommodate the projected design year traffic volumes using the GGI and adjoining roadways, long term capacity improvements are required within the interchange. Thus, the aforementioned TSM strategies would not fulfill the project need.

5.3 Preliminary Build Alternatives

The preliminary build alternatives considered for this PD&E study are generally based on the 2010 Refined District Interchange Review Committee (DIRC) Alternative developed for this interchange under the initial planning phase of this project. The 2010 Refined DIRC Alternative developed as part of the planning study was to be implemented in two phases as follows: Phase 1 represents the interim build conditions while Phase 2 represents the ultimate configuration. As part of the alternatives analysis for this PD&E Study, both Interim and Ultimate Build improvements were developed and evaluated; however, this PD&E Study focuses on the Interim Build improvements while the Ultimate Build improvements will be studied and included as part of a separate and adjacent SR 826/Palmetto Expressway PD&E Study (FPID: 418423-1-22-01). The Ultimate Build Alternatives will be studied as part of this PD&E Study to ensure that the Interim Build Alternatives are compatible with the Ultimate Build Alternative. This includes performing the engineering and environmental evaluations. In terms of documentation for FHWA approval purposes, the Interim Build Alternatives will be documented as part of this PD&E Study, while the Ultimate Build Alternatives will be documented as part of the SR 826 PD&E Study.

The primary purpose of the preliminary build alternatives analysis was to develop conceptual build alternatives that provided a direct flyover connection from SR 826 eastbound to I-95 northbound and also increase the capacity for Florida's Turnpike southbound to I-95 southbound movement. These conceptual interim build alternatives were evaluated based on preliminary geometric design, structural, traffic operations, drainage, utility, right-of-way and environmental impacts. Another major consideration was the need to preserve the improvements constructed during the interim phase to ensure that they would be compatible with the ultimate master plan for the interchange which includes the development of an elevated system of express lanes, connecting new express lanes from SR 826 to the I-95 express lanes system.

Four preliminary interim build alternatives were evaluated during the initial phase of the PD&E study and are described below. The detailed preliminary alternatives analyses are documented in the Preliminary Alternatives Analysis Report prepared as part of this PD&E Study.

5.3.1 Interim Build Alternative 1A

Description: Interim Build Alternative 1A involves the construction of a new system-to-system direct connection flyover from the SR 826/Palmetto Expressway eastbound to I-95 northbound. The flyover ramp will begin from the SR 826/Palmetto Expressway eastbound and continue over the Turnpike Connector, SFRC railroad and underneath the 95 Express Flyover Ramps. It then goes over I-95 and merges with the existing SR 7/US 441 northbound to I-95 northbound ramp before joining I-95 using the existing on-ramp alignment. The southbound Turnpike Connector lanes will also be widened from SR 826/Palmetto Expressway to provide three lanes merging with I-95 southbound under this

alternative. It will require the addition of an auxiliary lane along I-95 southbound from the GGI to NW 151st Street to provide the required capacity. To improve the weaving maneuvers from Florida's Turnpike to the I-95 express lanes, the I-95 SB entrance to the express lanes will be relocated approximately 300-ft south. The conceptual layout for Interim Build Alternative 1A is shown in **Figure 5-1**.

Evaluation: The preliminary engineering design under this alternative requires the reconstruction of the two-lane off-ramp from SR 826 eastbound to I-95 southbound and northbound and the construction of a new system-to-system flyover ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound with 40-45 mph design speed. The proposed ramp alignments were also set up to ensure that they will be compatible with the ultimate plan for GGI.

In order to ensure that both the interim and future proposed improvements can be accommodated within the constrained existing right-of-way along SR 826 reduced inside and outside shoulder widths will be required for the SR 826 eastbound to I-95 northbound and southbound ramp. The existing typical section for the SR 826 mainline will be maintained.

The NW 167th Street westbound to I-95 southbound bridge over I-95 (870042) will be replaced to provide adequate vertical clearance and to accommodate additional lanes underneath the bridge. The end span for the SR 826 Connector bridge over I-95 and SR 7/ US 441 (870041) will also be replaced to accommodate the direct flyover connection ramp and SR 7/US 441 northbound lanes.

The proposed improvements under this alternative will result in potential right-of-way impacts to three commercial properties along I-95 (two full and one partial acquisition) and one industrial property within the GGI (corner clip).

The Florida Gas Transmission (FGT) 18-inch steel gas line along the south side of SR 826 will be impacted by the reconstruction of the SR826/Palmetto Expressway eastbound to I-95 northbound and southbound ramp. It is anticipated that the gas line will have to be relocated onto a new corridor.

Preliminary traffic operational analysis based on the 2010 AM peak period traffic indicated that the travel speed for SR 826 EB to I-95 NB under this alternative will increase from 12 mph to 40 mph while the travel speed for Florida's Turnpike SB to I-95 SB movement will improve from 14 mph to 32 mph. This represents significant travel time savings over the existing conditions.

No significant environmental impacts were identified as a result of this alternative. The preliminary cost estimate for this alternative was approximately $83 Million. The preliminary evaluation is detailed in the Preliminary Alternatives Analysis Report.

5.3.2 Interim Build Alternative 1B

Description: Interim Build Alternative 1B also involves the provision of a direct connection flyover ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound similar to Interim Build Alternative 1A. The main difference is the improvements to the Florida's Turnpike southbound to I-95 southbound movement. Under this alternative, a third-level single-lane flyover ramp from Florida's Turnpike southbound to the 95 Express southbound flyover ramp will be provided. The single-lane flyover will be merged into the existing single-lane 95 Express flyover and will be maintained as a one-lane flyover. The proposed improvements terminate at the merge between the Turnpike Connector and I-95 mainline southbound lanes; hence, no impact to the I-95 mainline southbound lanes is expected beyond the merge influence area. The conceptual layout for Interim Build Alternative 1B is shown in **Figure 5-2**.

Evaluation: This alternative also requires the reconstruction of the two-lane off-ramp from SR 826 eastbound to I-95 southbound and northbound and the construction of a new system-to-system flyover ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound with 40-45 mph design speed. Reduced inside and outside shoulder widths will be required for the SR 826 eastbound to I-95 northbound and southbound ramp to accommodate both the interim and future proposed improvements within the constrained existing right-of-way along SR 826/Palmetto Expressway.

The Turnpike Connector under this build alternative consists of a single lane at-grade segment and an elevated express lane connector ramp tying into the 95 Express southbound flyover ramp. This involves widening of the southbound lanes, reconstruction of the inside lane and the replacement of the Turnpike Connector southbound bridge over the South Florida Rail Corridor (SFRC) to provide the necessary grade separation for the connector ramp to the 95 Express southbound flyover ramp.

Similar to Interim Build Alternative 1A, the NW 167th Street westbound to I-95 southbound bridge over I-95 (870042) and the end span for the SR 826 connector bridge (870041) will be replaced to provide adequate vertical clearance and to accommodate additional lanes underneath these bridges.

The proposed improvements under this alternative will result in less potential right-of-way impacts compared to Interim Build Alternative 1A. The right-of-way impact involves a corner clip to one industrial property within the GGI.

The Florida Gas Transmission (FGT) 18-inch steel gas line along the south side of SR 826 will have to be relocated onto a new corridor to accommodate reconstruction of the SR826/Palmetto Expressway eastbound to I-95 northbound and southbound ramp similar to that of Interim Build Alternative 1A.

Preliminary traffic operational analysis based on the 2010 AM peak period traffic indicated that the proposed improvements the travel speed for SR 826 EB to I-95 NB under this alternative will increase from 12 mph to 43 mph while the travel speed for Florida's

Turnpike SB to I-95 SB movement will improve from 14 mph to 45 mph. This represents significant travel time savings over both the existing conditions and Interim Build Alternative 1A. However, the merge operations between the Turnpike Connector express lane ramp and the 95 Express flyover ramp into a one-lane flyover was identified as a potential bottleneck for the projected traffic demand.

No significant environmental impacts were identified as a result of this alternative. The preliminary cost estimate for this alternative was approximately $120 Million. The preliminary evaluation is detailed in the Preliminary Alternatives Analysis Report.

5.3.3 Interim Build Alternative 2A

Description: Interim Build Alternative 2A provides a single exit for SR 826/Palmetto Expressway eastbound to I-95 northbound and to NW 167th Street movements before splitting the movements into separate ramps. The SR 826/Palmetto Expressway eastbound to I-95 northbound ramp consist of two semi-loop reverse S-curve alignment which goes over the South Florida Rail Corridor and continues underneath the 95 Express flyover ramps. It then goes over I-95 and merges with the existing SR 7/US 441 northbound to I-95 northbound ramp before joining I-95 using the existing on-ramp alignment. The improvements along the Turnpike Connector are similar to that of Interim Build Alternative 1A. **Figure 5-3** illustrates the conceptual layout for Interim Build Alternative 2A.

Evaluation: The preliminary engineering design under this alternative requires the construction of an auxiliary lane for the SR 826/Palmetto Expressway eastbound to I-95 northbound and NW 167th Street eastbound movements. Due to the physical constraints within the interchange, the design speed for the reverse S-curve alignment along the proposed SR 826/Palmetto Expressway to I-95 northbound flyover ramp is 25-30 mph. This lower design speed is required in order to provide adequate superelevation and transition lengths. The existing SR 826/Palmetto Expressway eastbound to I-95 southbound ramp will be maintained with no impacts to the frontage roads.

Similar to Interim Build Alternative 1A, the NW 167th Street westbound to I-95 southbound bridge over I-95 (870042) and the end span for the SR 826 connector bridge (870041) will be replaced to provide adequate vertical clearance and to accommodate additional lanes underneath the bridges.

The preliminary alignment of the SR 826/Palmetto Expressway eastbound to I-95 northbound ramp under alternative would impact the industrial property currently located within the GGI area. The right-of-way acquisition will include full acquisition of the industrial property within the GGI to accommodate the proposed improvements. In addition, the widening of the I-95 southbound lanes will also impact three commercial properties on the west side of I-95 similar to Interim Build Alternative 1A.

The impacts to the Florida Gas Transmission (FGT) 18-inch steel gas line along the south side of SR 826 under this alternative is less compared to Interim Build Alternatives 1A and 1B. The widening of the SR 826/ Palmetto Expressway Mainline to provide an additional

auxiliary lane between SR 826 eastbound to I-95 southbound and NW 167th Street eastbound ramps will require the relocation of 18-in gas line onto the south side of SR 826/ Palmetto Expressway.

The preliminary traffic operational analysis based on the 2010 AM peak period traffic indicated this alternative also provides improvements over the existing conditions, However, that the proposed lower speed (25-30 mph) for SR 826/Palmetto Expressway eastbound to I-95 direct flyover ramp due to the geometric constraints resulted in significant queues along SR 826/Palmetto Expressway mainline. In addition, the diverge operations of the single exit for SR 826/Palmetto Expressway eastbound to I-95 northbound and SR 826/Palmetto Expressway eastbound to NW 167th Avenue movements resulted in queue spill backs onto the SR 826 mainline thereby blocking the SR 826 eastbound to I-95 northbound movement during the peak periods. This does not meet the purpose and need for this project.

No significant environmental impacts were identified as a result of this alternative. The preliminary cost estimate for this alternative was approximately $80 Million. The preliminary evaluation is detailed in the Preliminary Alternatives Analysis Report.

5.3.4 Interim Build Alternative 2B

Description: Interim Build Alternative 2B is a combination of improvements under Interim Build Alternatives 2A and 1B. The proposed improvements under this alternative provides a single exit for SR 826/Palmetto Expressway eastbound to I-95 northbound and SR 826/Palmetto Expressway eastbound to NW 167th Avenue movements before splitting the movements into separate ramps similar to Interim Build Alternative 2A. However, the improvements along the Turnpike Connector are similar to that of Interim Build Alternative 1B which provides a third-level single-lane flyover ramp from Florida's Turnpike southbound merging with the 95 Express southbound flyover ramp. **Figure 5-4** illustrates the conceptual layout for Interim Build Alternative 2B.

Evaluation: Similar to Interim Build Alternatives 2A and 1B, the preliminary engineering design under this alternative requires the construction of a reverse S-curve alignment with 25-30 mph design speed for the SR 826/ Palmetto Expressway eastbound to I-95 northbound flyover ramp. The existing SR 826/ Palmetto Expressway eastbound to I-95 southbound ramp will be maintained with no impacts to the frontage roads.

In addition, the Turnpike Connector will require reconstruction of the inside lane and the replacement of the Turnpike Connector SB bridge over the South Florida Rail Corridor (SFRC) to provide the necessary grade separation to connect to the 95 Express southbound flyover ramp.

Similar to Interim Build Alternative 1B, the NW 167th Street westbound to I-95 southbound bridge over I-95 (870042) and the end span for the SR 826 connector bridge (870041) will

be replaced to provide adequate vertical clearance and to accommodate additional lanes underneath the bridge.

The preliminary alignments under this alternative would impact the industrial property currently located within the GGI area. The right-of-way acquisition will include full acquisition of the industrial property within the GGI to accommodate the proposed improvements.

The impact to the Florida Gas Transmission (FGT) 18-inch steel gas line along the south side of SR 826 under this alternative is similar to Interim Build Alternatives 2A. The widening of the SR 826 Mainline to provide an additional auxiliary lane between SR 826 eastbound to I-95 southbound and NW 167th Street eastbound ramps will require the relocation of 18-in gas line onto the south side of SR 826/Palmetto Expressway.

The preliminary traffic operational analysis for this alternatives resulted in similar results compared to Interim Build Alternative 2A. In addition, queue spill backs from the SR 826 eastbound to NW 167th Street eastbound ramp onto the SR 826 mainline were observed blocking the SR 826 eastbound to I-95 northbound movement during the peak periods which does not meet the purpose and need for this project. Similar to Interim Build Alternative 1B, the merge operations between the Turnpike Connector express lane ramp and the 95 Express flyover ramp into a one-lane flyover was identified as a potential bottleneck for the projected traffic demand.

No significant environmental impacts were identified as a result of this alternative. The preliminary cost estimate for this alternative was approximately $117 Million. The preliminary evaluation is detailed in the Preliminary Alternatives Analysis Report.

5.3.5 Preliminary Alternatives Analysis Summary & Recommendations

The proposed SR 826/Palmetto Expressway eastbound to I-95 northbound flyover ramp under Interim Build Alternatives 1A and 1B provides significant mobility improvements within the GGI due to the relatively higher speeds (40-45 mph) resulting from direct alignment for this movement. On the other hand, the proposed reverse S-curve alignment for the SR 826/Palmetto Expressway eastbound to I-95 northbound flyover ramp under Alternatives 2A and 2B results in lower design speeds (25-30 mph) with queues spill back extending onto the SR 826/Palmetto Expressway mainline and blocking the SR 826 eastbound to I-95 northbound movement during the peak periods. As such, Interim Build Alternatives 2A and 2B do not meet the purpose and need for this project.

Both the at-grade widening improvements for the Turnpike Connector under Build Alternatives 1A and 2A and the Turnpike Connector express lane ramp under Interim Build Alternatives 1B and 2B provide mobility improvements for the Florida's Turnpike southbound to I-95 southbound movement. However, the merge between the Turnpike Connector express lane ramp and the 95 Express flyover ramp into a one-lane flyover was identified as a potential bottleneck for the projected traffic demand. Due to the potential for operational

degradation of the express lane in attempting to accommodate the projected design year traffic demand, an additional dedicated lane for the Turnpike Connector ramp merging with the 95 Express southbound flyover ramp resulting in a two express lanes south of the merge point was recommended to be further evaluated as part of the refined alternatives. This will however significantly impact the geometric alignment along I-95 southbound while improving operations and safety.

Based on the above preliminary evaluation, Interim Build Alternatives 1A and 1B were recommended to be further evaluated and refined due to the significant operational benefit provided under these alternatives. Interim Build Alternatives 2A and 2B were recommended to be eliminated from further consideration since they do not meet the project purpose and need due to the inability of these alternatives to significantly improve mobility for the SR 826/Palmetto Expressway eastbound to I-95 northbound. In addition, Interim build Alternatives 2A and 2B resulted in more right-of-way impact compared to Interim Build Alternatives 1A and 1B.

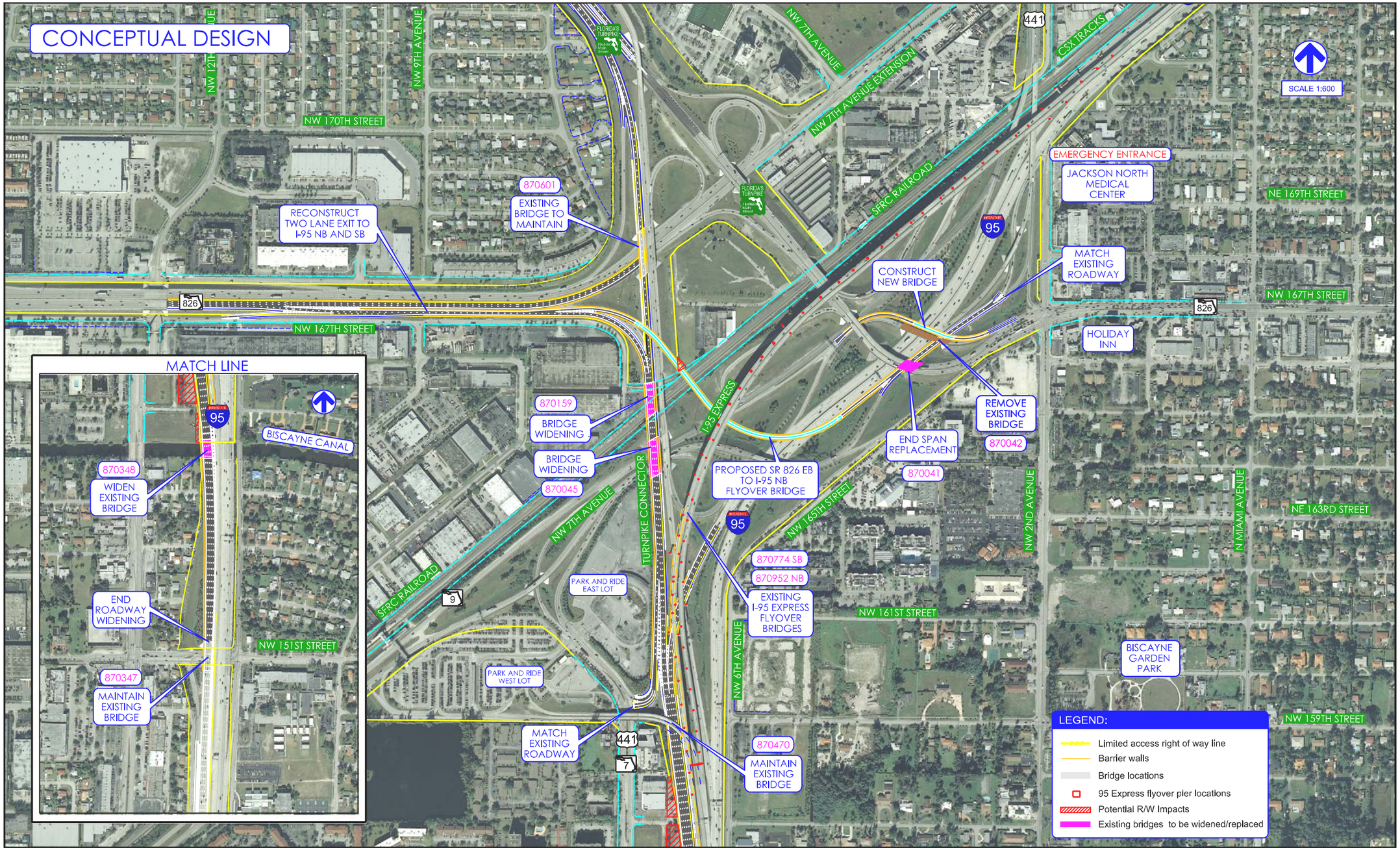


Figure 5-1 Conceptual Layout - Interim Build Alternative 1A

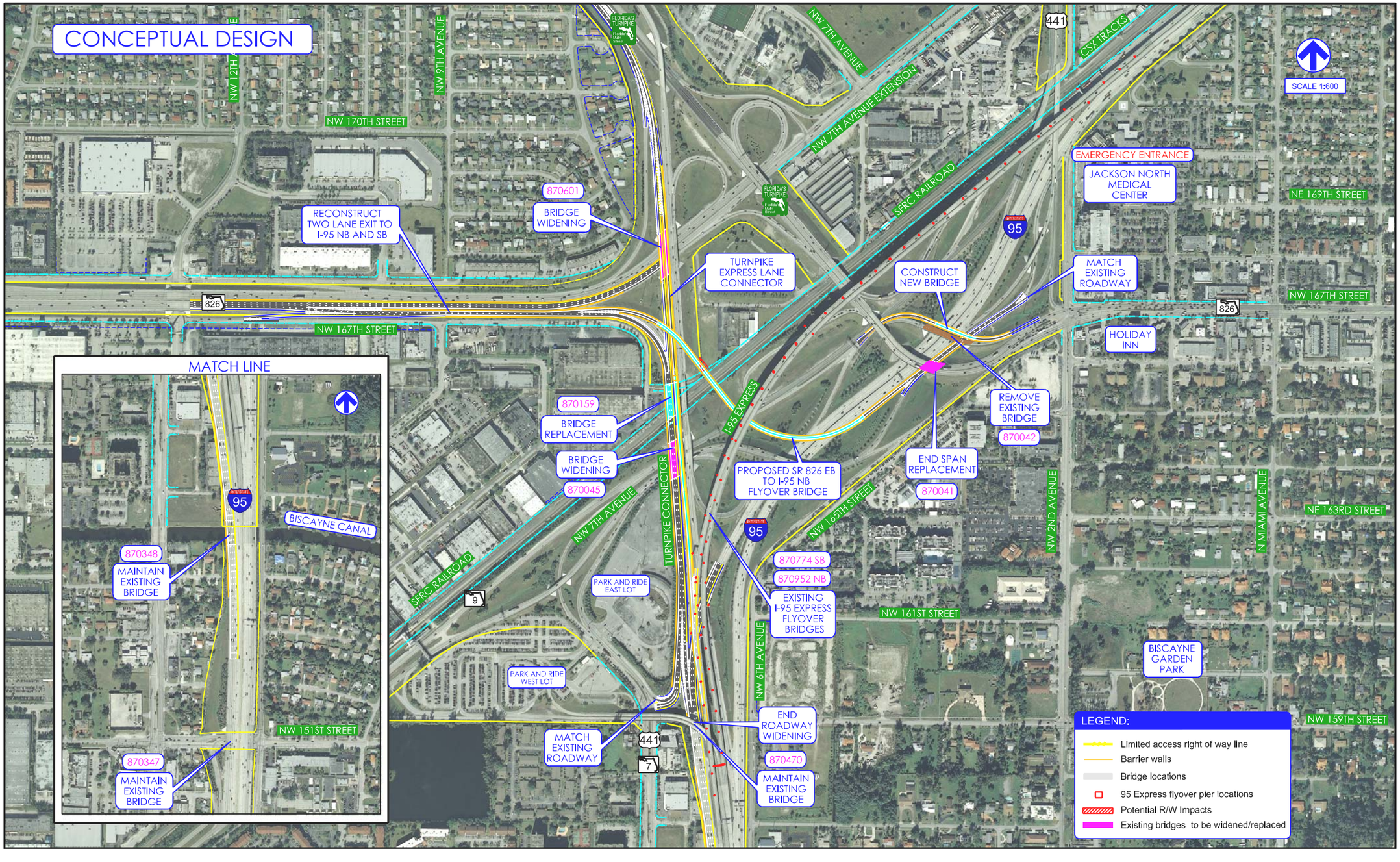


Figure 5-2 Conceptual Layout - Interim Build Alternative 1B

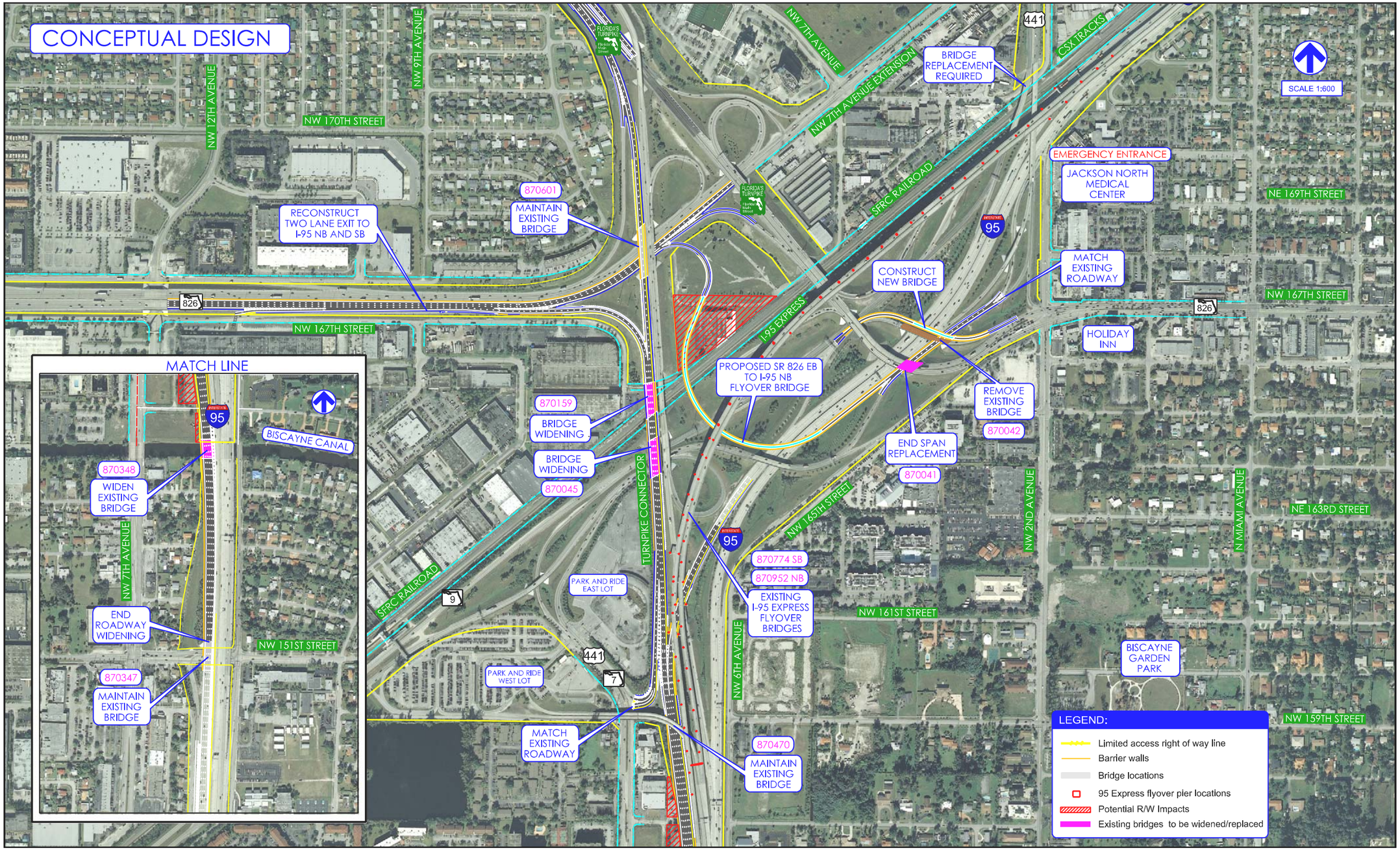


Figure 5-3 Conceptual Layout - Interim Build Alternative 2A

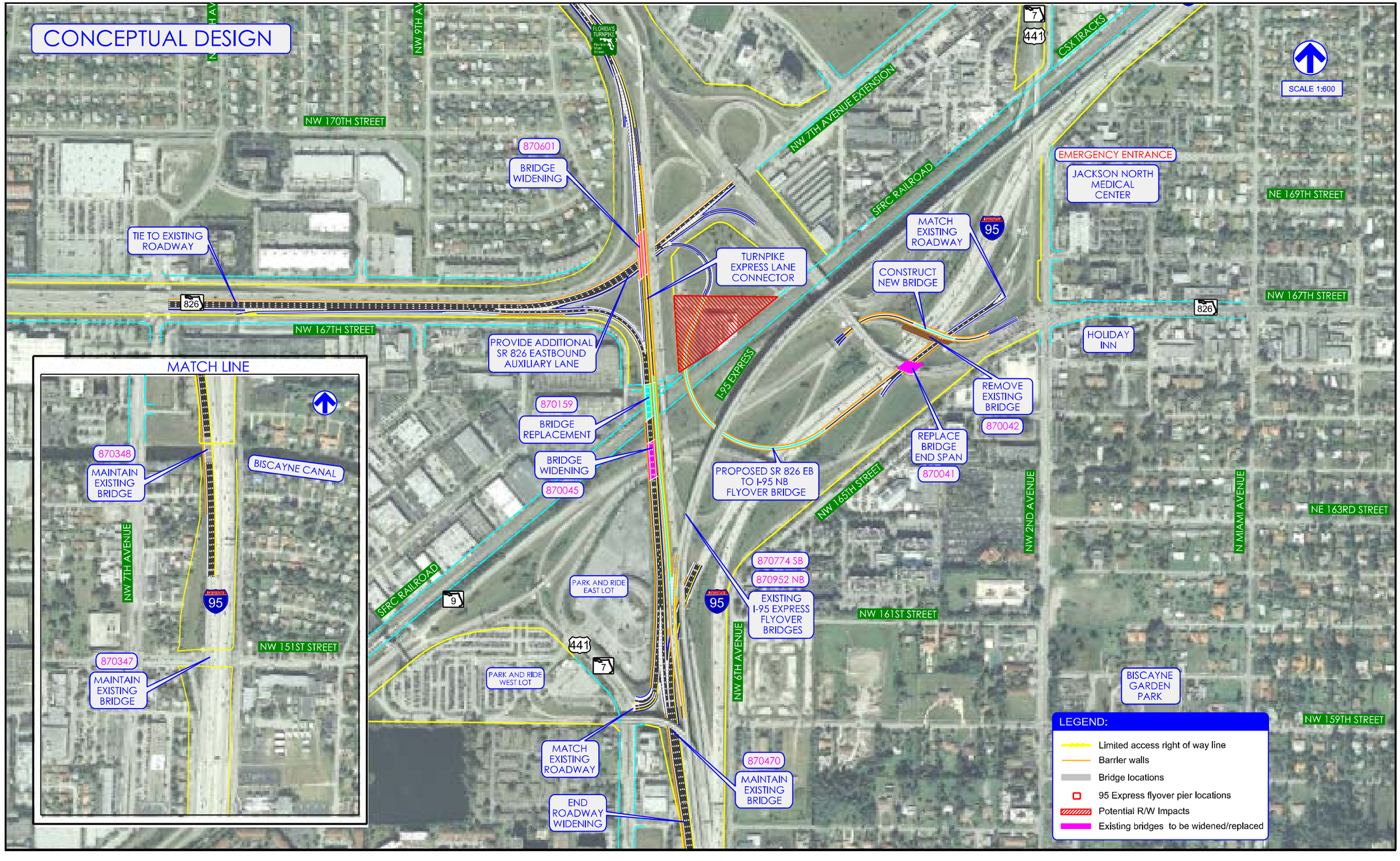


Figure 5-4 Conceptual Layout - Interim Build Alternative 2B

5.4 Refined Build Alternatives

The preliminary alternatives analysis was based on preliminary engineering and traffic analysis using the existing traffic volumes to eliminate alternatives that do not meet the project purpose and need. Following the preliminary alternatives analysis, a travel demand forecast model was developed for the project to estimate the projected traffic volumes for the opening year (2018), interim year (2030) and future year (2040) travel demand. **Table 5-1** shows the project traffic demand and lane requirements for five critical movements considered for improvements under the interim build alternatives.

Table 5-1
Projected Traffic Volumes and Lane Requirements

#	Description	Peak Period Volume (vph)			Lane Requirements		
		2018	2030	2040	2018	2030	2040
1	SR 826 EB Ramp to I-95 NB & SB	4,700	5,300	4,900	3	3	3
2	SR 826 EB to I-95 NB (New Ramp)	1,200	1,400	1,500	1	1	1
3	SR 826 EB to I-95 SB	3,500	3,900	3,400	2	3	2
4	Turnpike SB Connector (North of SR 826 EB to I-95 SB on-ramp)	2,100	2,500	3,200	1	2	2
5	Turnpike SB Connector (from SR 826 EB to I-95 SB on-ramp to SR 7 off-ramp)	5,600	6,400	6,600	3	4	4
6	TPK SB to I-95 SB (Express Ramp)	850	1,100	1,600	1	1	1

Notes:

1. Peak period volumes based on standard K_{30} values of 8% for Routes 1-3 and 9.5% for Routes 4-6
2. Ramp capacity based on HCM 2000 value of 1,900 vph for 20-30 mph design speed and 2,100 for 40-50 mph design speed

Based on the above projected traffic volumes and lane requirements, it is evident that three lanes will be required along the SR 826 eastbound off-ramp to I-95 northbound and southbound as well as the Florida's Turnpike southbound to I-95 southbound connector ramp to accommodate 2030 and 2040 traffic volumes. The volumes are based on the approved traffic forecast for the years 2030 and 2040. It is important to note that the models for the 2030 and 2040 design years have different networks with different assumptions which accounts for the reduction in the traffic volumes for the SR 826/Palmetto Expressway eastbound to I-95 southbound ramp from 2030 to 2040.

It is anticipated that the three lanes from the Turnpike Connector southbound will ultimately consist of two-at-grade lanes and one direct flyover express lane connection to the 95 Express southbound lane (i.e. combination of Interim Build Alternatives 1A and 1B). Subsequent discussions with FDOT District Six management indicated that the merge between the flyover connection from the Florida's Turnpike and the 95 Express southbound lane will require two lanes from the merge point to ensure no operational impact to the existing express lanes system along I-95. In addition, metering the single lane flyover

connection from the Florida's Turnpike will divert more traffic onto the at-grade lanes thereby degrading the traffic operations within this segment of the Turnpike Connector ramp.

Consequently, the recommended alternatives from the preliminary alternatives analysis were further refined into three Interim Build Alternatives 3A, 3B and 3C and presented at the Alternatives Public Workshop Update held on August 23, 2012. The refinements included detailed geometric design, structural analysis, traffic operations, drainage analysis, utility assessment, right-of-way evaluation and environmental evaluation needed to accommodate the projected traffic demands. The key features of the refined build alternatives included the provision of a three lane off ramp from SR 826 eastbound to I-95 northbound and southbound and the removal of the NW 12th Avenue on-ramp due to the right-of-way constraints as well as the adverse operational and safety impacts. In addition, the roadway geometry for the interim build alternatives was developed such that it will accommodate future express lanes connections between SR 826/Palmetto Expressway and the I-95 Express lanes to the north as well as provide an envelope to accommodate a future direct express lane connection from Florida's Turnpike southbound to the 95 Express southbound lanes.

Subsequent to the Alternatives Public Workshop Update, several meetings and discussions were held with the residents and businesses that may be potentially impacted by the closure of the NW 12th Avenue on-ramp. Both the business owners and residents recommended the study team to evaluate additional alternatives to maintain the on-ramp since its closure could inconvenience their operations and travel patterns. As such, an additional improvement alternative (Interim Build Alternative 4) was developed to maintain the NW 12th Avenue on-ramp as well as provide a three-lane off-ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound. The characteristics and features of the refined build alternatives are discussed in the following sub-sections.

5.4.1 Interim Build Alternative 3A

Interim Build Alternative 3A provides a three lane off-ramp for SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound. The new flyover ramp diverges from the SR 826/Palmetto Expressway eastbound to I-95 southbound ramp and continues over the Turnpike Connector and underneath the I-95 Express Flyover Ramps. It then goes over I-95 and merges with the existing SR 7/US 441 northbound to I-95 northbound ramp before joining I-95 using the existing on-ramp alignment. The Turnpike Connector southbound lanes will be reconstructed to shift the alignment to the west in order to accommodate a future direct express lane connection from the Florida's Turnpike southbound to the 95 Express southbound lanes.

The proposed three-lane off-ramp for SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound movements removes the NW 12th Avenue eastbound on-ramp to SR 826 eastbound and provides a connection from NW 165th Street to NW 17th Avenue

across the NW 17th Avenue Canal. It requires widening of NW 17th Avenue from two to four lanes between NW 165th Street and SR 826/Palmetto Expressway. The existing unsignalized single left turn lane from SR 826/eastbound to Florida's Turnpike northbound will also be upgraded to a signalized intersection with double left turn lanes. **Figure 5-5** illustrates the conceptual layout for Interim Build Alternative 3A.

5.4.2 Interim Build Alternative 3B

This build alternative also involves the construction of a three lane off-ramp for SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound movements and the provision of a direct connection flyover from SR 826/Palmetto Expressway eastbound to I-95 northbound similar to Interim Build Alternative 3A. The main differences are the improvements to the Turnpike Connector southbound and I-95 southbound movements.

Under this alternative, the southbound Turnpike Connector lanes will be reconstructed to shift the alignment to the west in order to accommodate a future direct express lane connection from Florida's Turnpike southbound to the 95 Express southbound express lanes. The Turnpike Connector southbound off-ramp to SR 7/US 441 is relocated approximately 1,150-ft south along SR 7/US 441 to Biscayne River Drive. The Turnpike Connector then merges with the I-95 southbound mainline lanes further south just after the Biscayne Canal Bridge. The I-95 southbound mainline lanes will also be reconstructed and realigned.

The Interim Build Alternative 3B also includes the removal of the NW 12th Avenue eastbound on-ramp to SR 826 eastbound and the provision of new a connection from NW 165th Street to NW 17th Avenue across the NW 17th Avenue canal. This alternative will also incorporate the widening of NW 17th Avenue from two to four lanes between NW 165th Street and SR 826/Palmetto Expressway as well as the provision of a new signalized intersection with double left turn lanes for SR 826/Palmetto Expressway eastbound to Florida's Turnpike northbound. The mentioned changes are similar to that of Interim Build Alternative 3A. Figure 5-6 illustrates the conceptual layout for Interim Build Alternative 3B.

5.4.3 Interim Build Alternative 3C

The proposed improvements along SR 826/Palmetto Expressway and the Turnpike Connector under Interim Build Alternative 3C are similar to Interim Build Alternative 3B. The main difference is the provision of a third-level single-lane flyover ramp from Florida's Turnpike southbound to the I-95 express southbound lanes. The single-lane flyover merges with the existing single-lane I-95 express flyover south of the Biscayne Canal Bridge to provide two express lanes south of the merge location. The improvements along the Turnpike Connector and I-95 southbound express lanes together with the direct connection flyover ramps from Florida's Turnpike to I-95 southbound express lanes represent the ultimate configuration necessary to accommodate the design year travel demand. **Figure 5-7** illustrates the conceptual layout for Interim Build Alternative 3C.

5.4.4 Interim Build Alternative 4

Interim Build Alternative 4 provides a three lane off-ramp for SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound and also maintains the NW 12th Avenue on-ramp. In order to eliminate the current weaving issue along the SR 826 mainline, the NW 12th Avenue on-ramp will not connect directly to SR 826 mainline. Instead, it will be relocated and connected to the three lane off-ramp to I-95 northbound and southbound as a barrier separated auxiliary lane. As such, the NW 12th Avenue on-ramp will provide direct access to I-95 southbound and indirect access to I-95 northbound and Florida's Turnpike through SR 7/US 441.

An auxiliary lane will also be added to the Turnpike Connector southbound lanes to increase the weaving distance, and the off-ramp to SR 7/US 441 will be relocated approximately 1,150-ft south along SR 7/US 441 to the Biscayne River Drive intersection. This will require the acquisition of several commercial properties between SR 7 and I-95 north of the C-9 Biscayne Canal and the existing SR 7 off-ramp from the southbound Turnpike Connector to I-95. An additional northbound left turn lane is also provided at the NW 2nd Avenue and NW 167th Street intersection to improve operations.

The provision of the NW 12th Avenue on-ramp will require the removal of the eastbound frontage road east of NW 10th Avenue. The warehouse property on the southwest quadrant of the interchange within the Sunshine Industrial Park will be acquired due to the removal of the only access road for this property. No improvements along NW 17th Avenue; however, Texas U-Turns (matching the existing bridge vertical clearances) will be provided underneath the SR 826/Palmetto Expressway mainline bridges over NW 17th Avenue and NW 12th Avenue to enhance access and mobility for the adjacent residents and the Sunshine Industrial Park.

The provision of a direct connection flyover from SR 826/Palmetto Expressway eastbound to I-95 northbound and a new signalized intersection with double left turn lanes for SR 826/Palmetto Expressway eastbound to Turnpike northbound is similar to that of Interim Build Alternative 3A. **Figure 5-8** illustrates the conceptual layout for Interim Build Alternative 4.

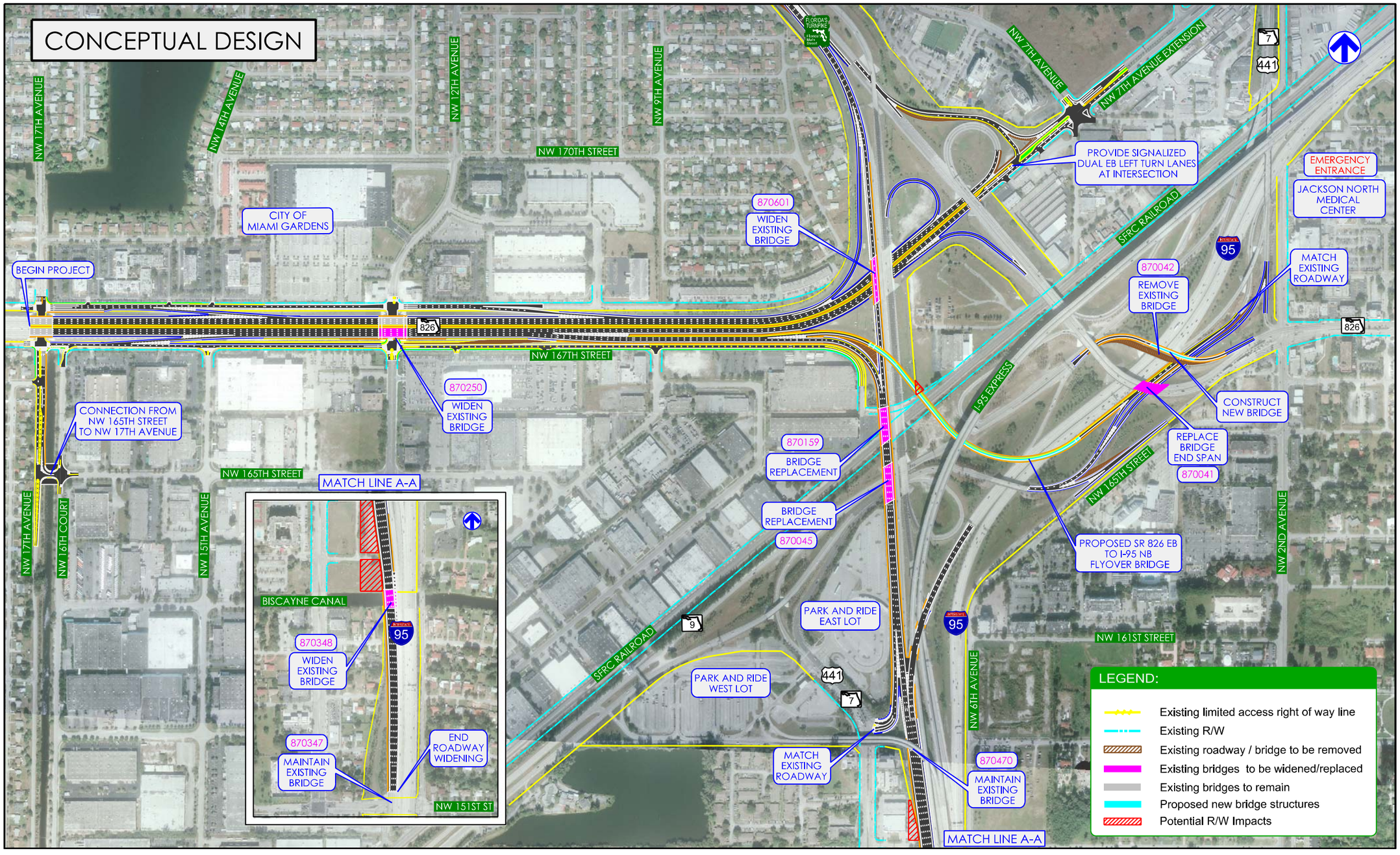


Figure 5-5 Conceptual Layout - Interim Build Alternative 3A

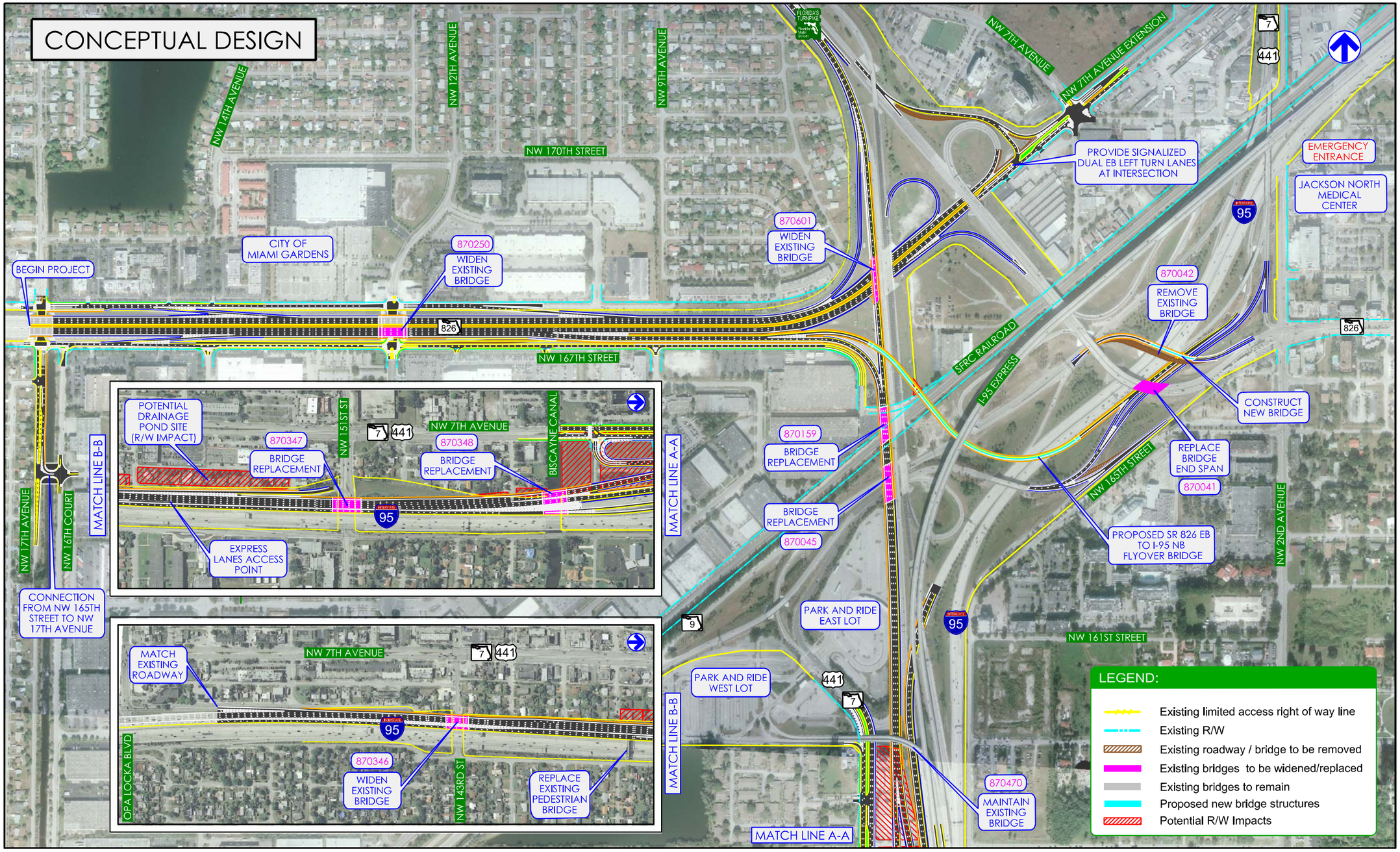


Figure 5-6 Conceptual Layout - Interim Build Alternative 3B

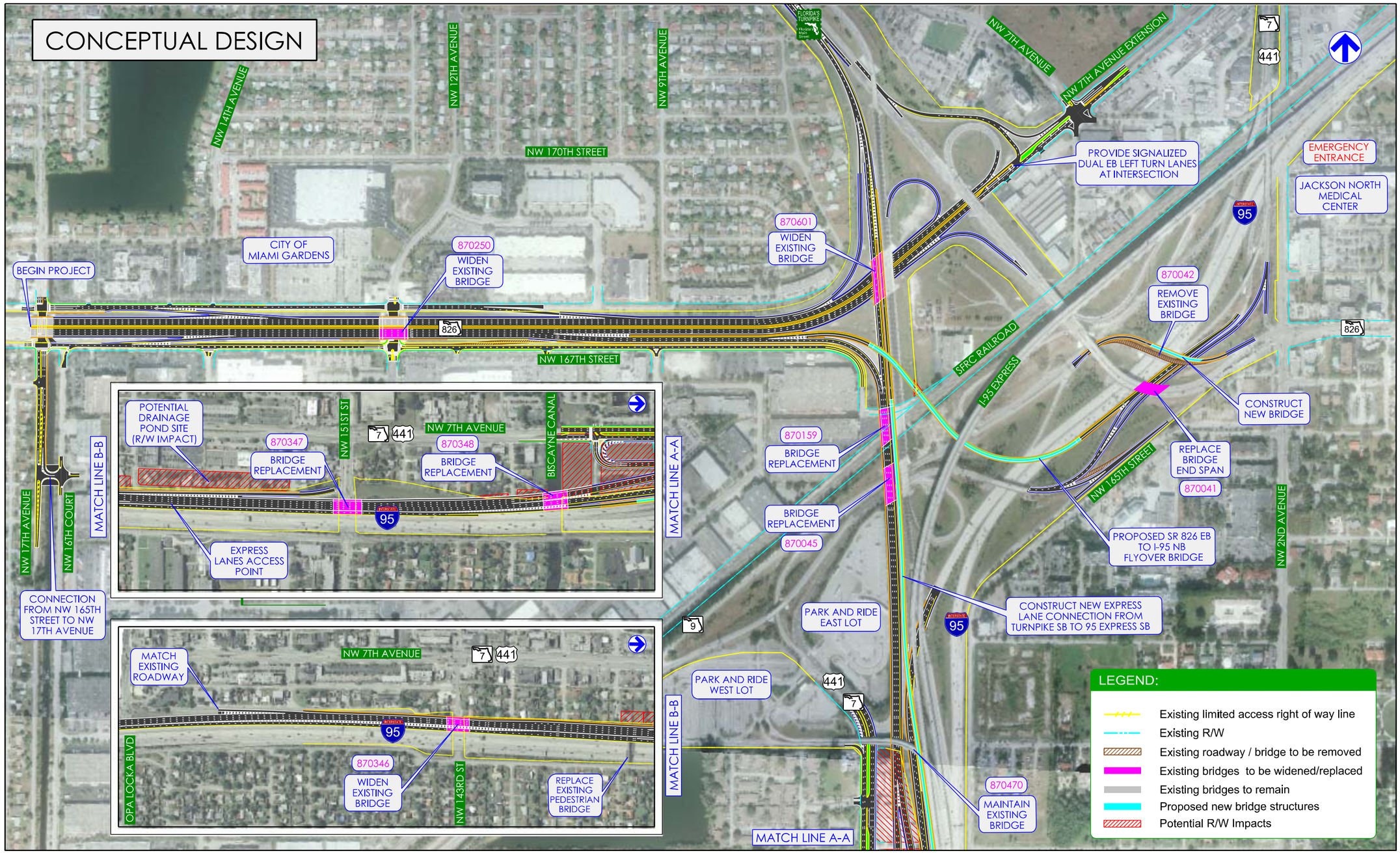


Figure 5-7 Conceptual Layout - Interim Build Alternative 3C

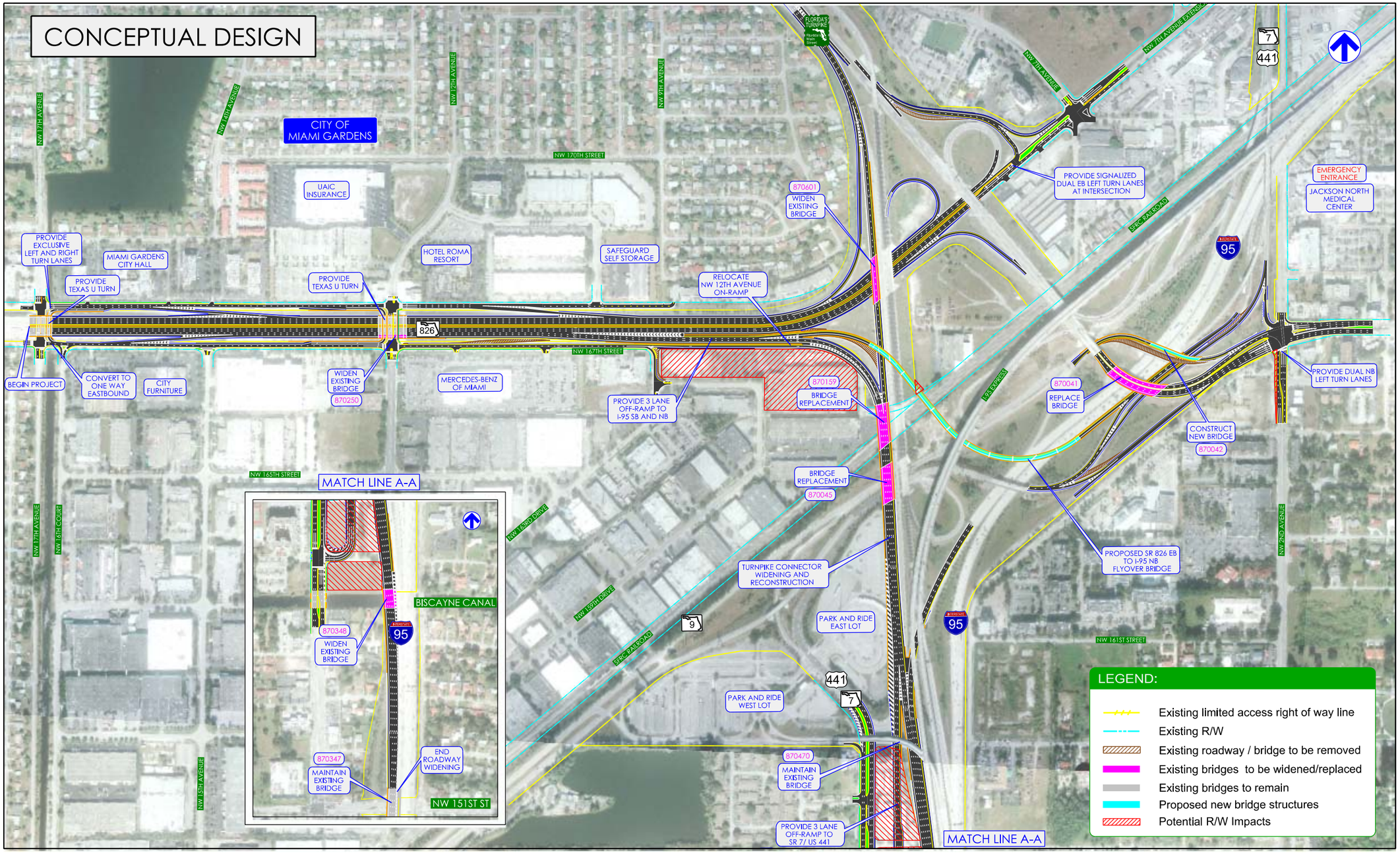


Figure 5-8 Conceptual Layout - Interim Build Alternative 4

5.4.5 Ultimate Build Alternative

The Ultimate Build Alternative represents the master plan to improve operations, safety and mobility within the GGI and provide a system-to-system connection between the new SR 826/Palmetto Expressway express lanes and the I-95 express lanes. The feasibility of express lanes along SR 826/Palmetto Expressway is currently being evaluated under a separate adjacent PD&E Study (FPID: 418423-1). In addition to the improvements provided in the recommended Interim Build Alternative, the following additional improvements are included in the Ultimate Build Alternative (See **Figure 5-9**):

1. Provide express lane connections between SR 826/Palmetto Expressway and I-95 to and from the north only with modifications to SR 826/Palmetto Expressway mainline between GGI and NW 17 Avenue to accommodate four general use lanes in each direction
2. Provide direct express lane connections between Florida's Turnpike and I-95 express southbound lanes and reconstruct I-95 southbound to accommodate new ramp
3. Provide a new ramp for the SR 9/SR 7/US 441 northbound to I-95 northbound movement that merges with the SR 826/Palmetto Expressway eastbound to I-95 northbound flyover ramp before joining I-95 as a two lane on-ramp
4. Provide an auxiliary lane along I-95 northbound between Golden Glades Interchange and Miami Gardens Drive to increase capacity along mainline
5. Widen the existing I-95 express flyover ramps from one to two lanes in each direction north of the merge/diverge locations with the new SR 826 express lanes flyover ramps
6. Widening of SR 826 connector to NW 167 Street to accommodate two lanes from SR 826/ Palmetto Expressway eastbound to NW 167 Street eastbound
7. Combination and realignment of the I-95 northbound to SR 7/US 441 northbound and NW 167 Street eastbound exit ramps
8. NW 2 Avenue and NW 167 Street intersection improvements

As previously mentioned, the Ultimate Build Alternatives will be studied as part of this PD&E Study to ensure that the Interim Build Alternatives are compatible with the Ultimate Build Alternative. This includes performing the engineering and environmental evaluations. In terms of documentation for FHWA approval purposes, the Ultimate Build Alternatives will be documented as part of the SR 826 PD&E Study.

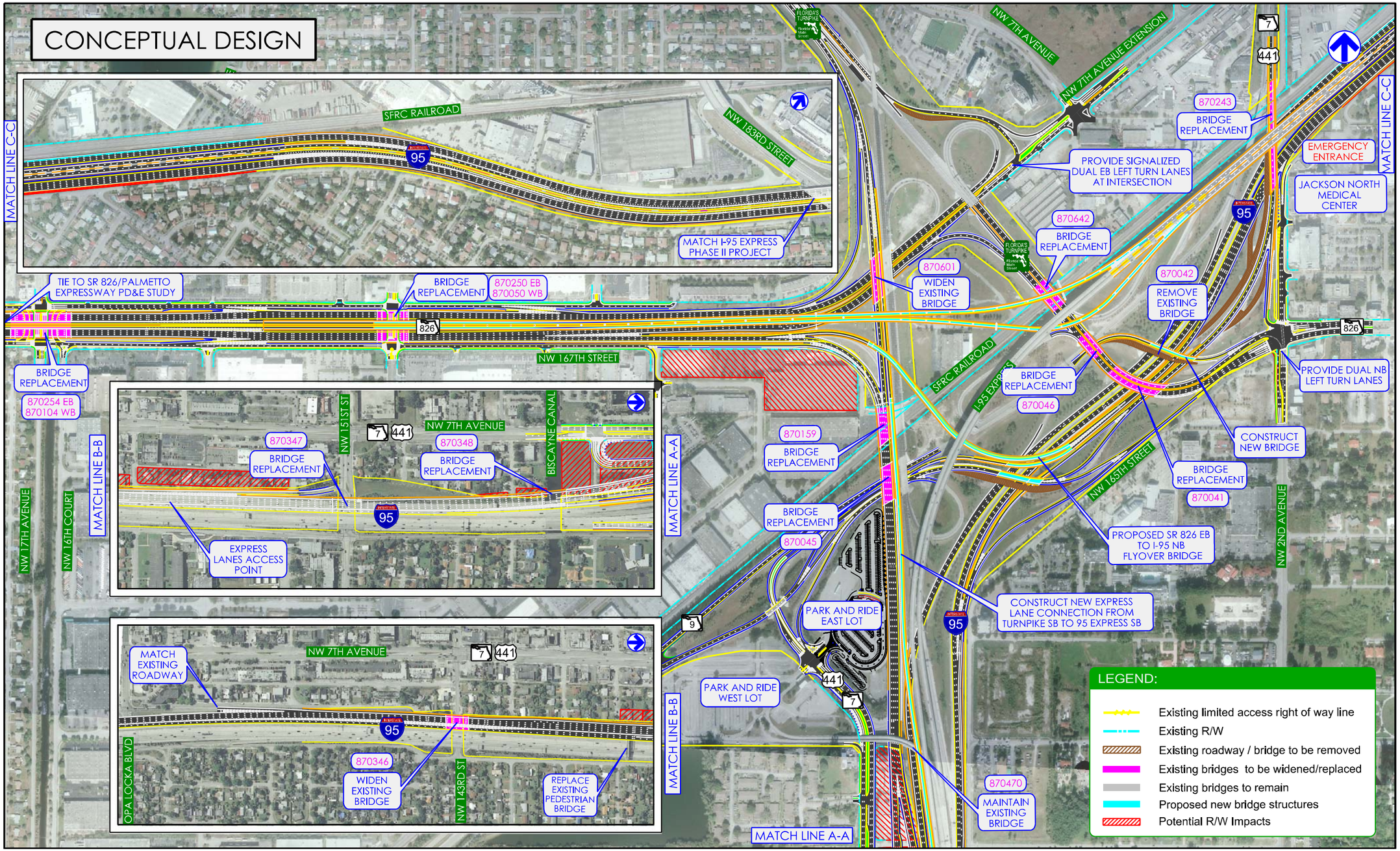


Figure 5-9 Conceptual Plan- Ultimate Build Alternative

5.4.6 Proposed Typical Sections

5.4.6.1 SR 826/Palmetto Expressway Mainline

The improvements along SR 826/Palmetto mainline under Interim Build Alternatives 3A, 3B, 3C and 4 involve widening of the existing eastbound lanes to provide five lanes between NW 17th Avenue and off-ramp to I-95 northbound and southbound. The proposed typical section as illustrated in **Figure 5-10** consists of the following features:

- Five 12-ft travel lanes in the eastbound direction
- Four 12-ft travel lanes in the westbound direction
- 16-ft median with 2-ft concrete barrier wall
- 12-ft outside shoulder with 10-ft paved
- 7-ft inside shoulder all paved

The proposed typical section maintains the existing 7-ft inside shoulder width and 16-ft median width along the SR 826/Palmetto Expressway mainline. Design variation and exception will be required to maintain the 10-ft outside and 7-ft inside shoulder widths respectively to avoid significant right-of-way impact to the frontage road and commercial properties on the south side of SR 826/Palmetto Expressway. A design variation will also be required to maintain the existing 16-ft median width.

5.4.6.2 SR 826/Palmetto Expressway EB to I-95 NB & SB off-Ramp

The construction of the new system-to-system direct connection flyover from SR 826/Palmetto Expressway eastbound to I-95 northbound under Interim Build Alternatives 3A, 3B and 3C will require reconstruction of the existing two lane off-ramp from SR 826/ Palmetto Expressway eastbound to I-95 southbound and northbound into a three-lane off-ramp while maintaining the existing typical section for the SR 826 mainline (See **Figure 5-11**). In addition, the one-way frontage road east of NW 12th Avenue is converted to a two-way lane road to facilitate circulation. The proposed typical section for the off-ramp consists of the following features:

- Three 12-ft travel lanes in the eastbound direction
- 8-ft outside shoulder all paved
- 6.5-ft inside shoulder all paved

The proposed reduced inside and outside shoulder widths ensure that both interim and future improvements can be accommodated within the constrained right-of-way along SR 826/Palmetto Expressway while preserving the existing frontage road. The reduced inside and outside shoulder widths do not meet the current design standards and will require a design variation. The proposed typical section under Interim Build Alternative 4 includes similar features as Interim Build Alternatives 3A, 3B, and 3C except that the inside and outside shoulders are 10-ft wide and the NW 12th Avenue on-ramp is maintained by relocating and connecting as a barrier separated auxiliary lane (see **Figure 5-12**).

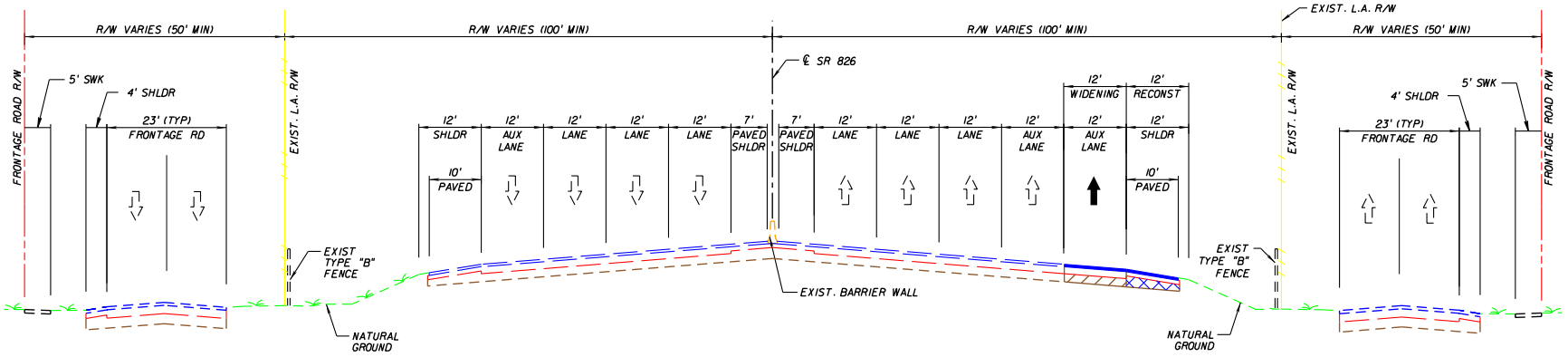


Figure 5-10 Proposed Typical Section – SR 826 west of NW 12th Avenue

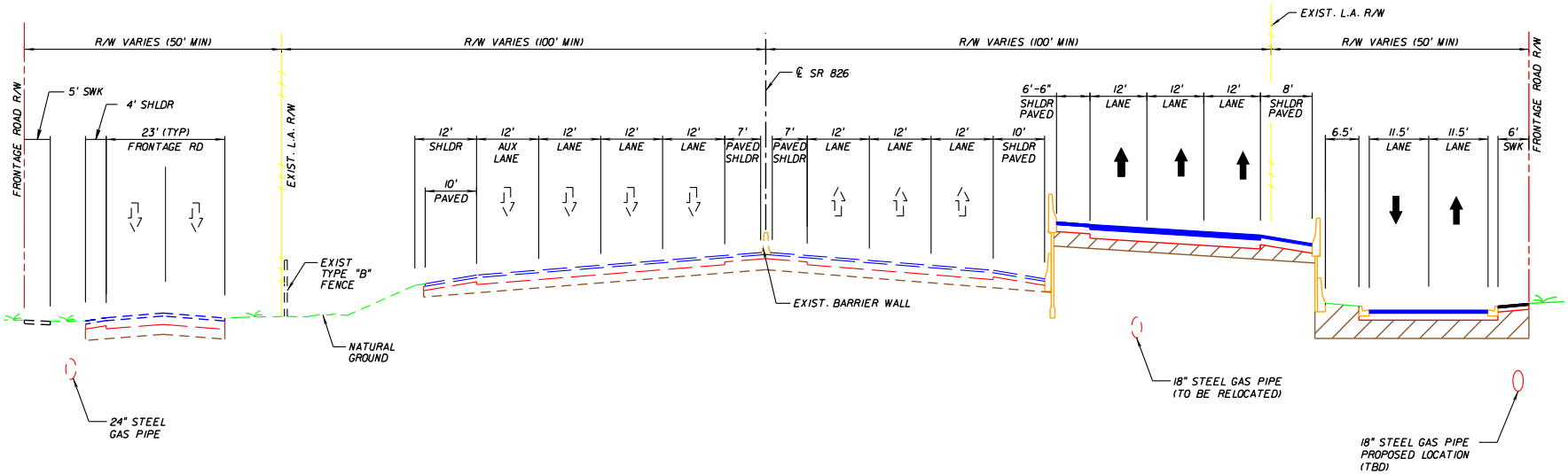


Figure 5-11 Proposed Typical Section– SR 826 E. of NW 12th Avenue– Alt. 3A, 3B & 3C

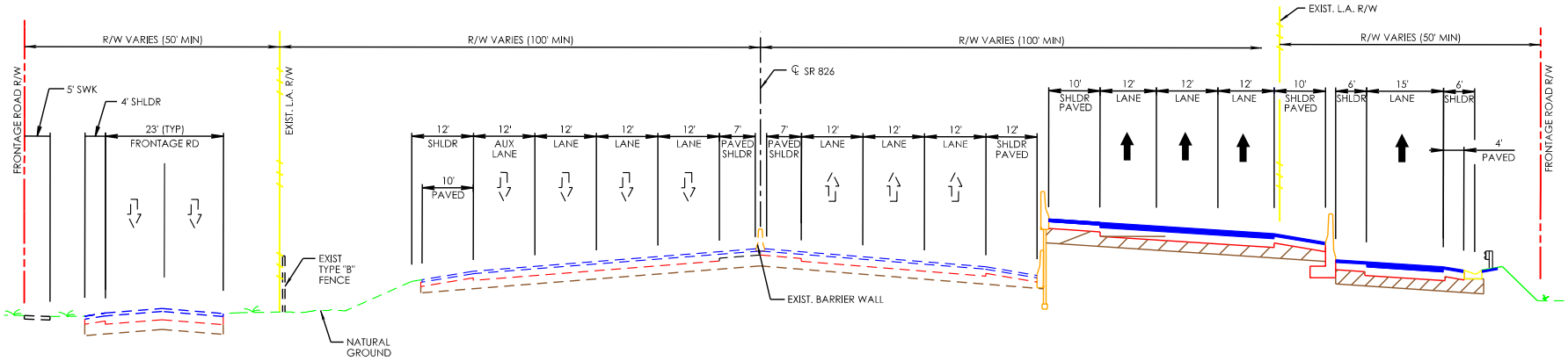


Figure 5-12 Proposed Typical Section– SR 826 W. of NW 12th Avenue– Alt. 4

This is accomplished by removing the eastbound frontage road east of NW 10th Avenue. The NW 12th Avenue on-ramp includes one 15-ft travel lane with 6-ft outside and inside shoulder width The proposed typical section for the SR 826/Palmetto Expressway eastbound to I-95 northbound is a single lane ramp with a 15-ft lane. The inside and outside shoulder widths vary from 6-12-ft to meet sight distance requirements along the reverse curves. The two-lane ramp from SR 826 eastbound to I-95 southbound under Interim Build Alternatives 3A, 3B and 3C features two 12-ft lanes with 8-10-ft paved outside shoulder and 8-ft inside shoulder with 4-ft paved (See **Figure 5-13**).

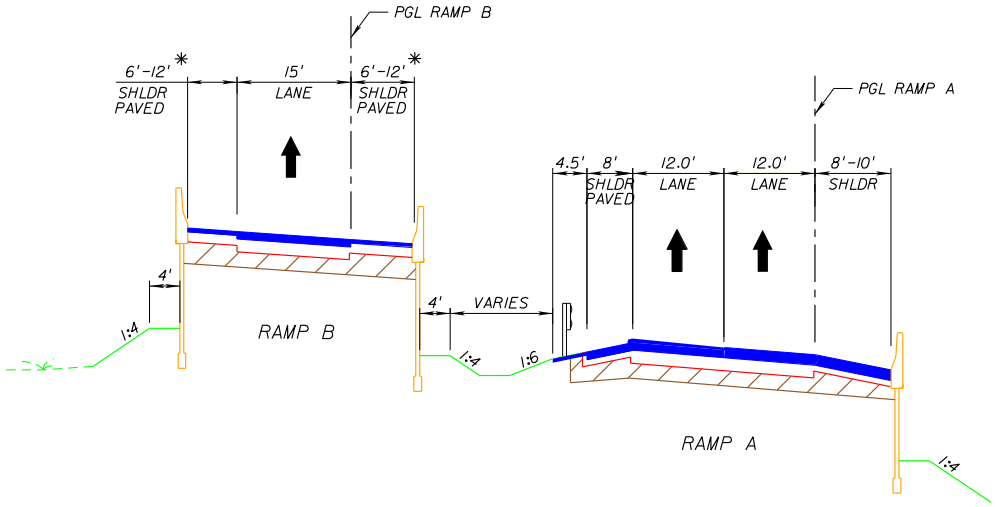


Figure 5-13 Proposed Typical– SR 826 EB to I-95 NB & SB Ramp– Alt. 3A, 3B & 3C

Under Interim Build Alternative 4, the two-lane ramp from SR 826 eastbound to I-95 southbound includes the NW 12th Avenue ramp separated by a gore (see **Figure 5-14**). The typical section includes an 8-ft inside shoulder, two 12-ft travel lanes and one 15-ft travel lane from NW 12th Avenue on-ramp, and an 8-ft outside shoulder.

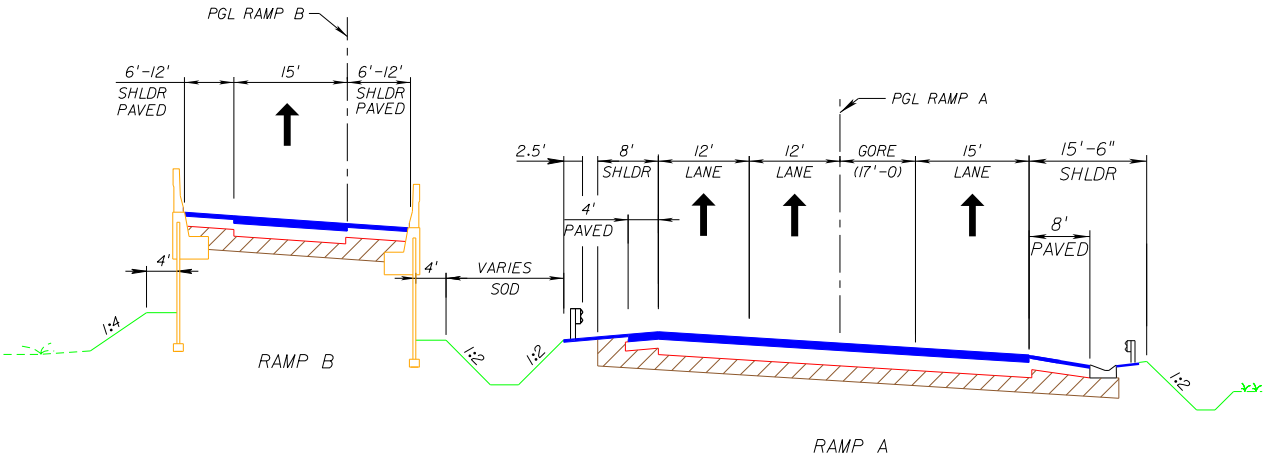


Figure 5-14 Proposed Typical Section – SR 826 EB to I-95 NB & SB Ramp – Alt. 4

5.4.6.3 Turnpike Connector

The proposed improvements along the Turnpike Connector under Interim Build Alternatives 3A and 3B provides an additional at-grade lane in the southbound direction. It involves reconstruction of the existing southbound pavement to shift the alignment west in order to preserve an envelope for the future direct express lane connection from Florida's Turnpike southbound to the I-95 southbound express lanes. The proposed typical section shown in **Figure 5-15** consists of the following features:

- Three 12-ft lanes and one 12-ft auxiliary lane southbound
- Two 12-ft lanes and one 12-ft auxiliary lane northbound
- 12-ft inside shoulders, fully paved southbound and 10-ft paved northbound
- 12-ft outside shoulders with 10-ft paved (10-ft paved shoulder provided at locations on embankment supported by MSE walls)

Interim Build Alternative 3C includes the direct express lane connection from Florida's Turnpike southbound to the 95 express southbound lanes. The proposed typical section is similar to that of Interim Build Alternatives 3A and 3B but includes a single lane ramp with 15-ft travel lane and 6-ft inside and outside shoulders for the express lane connection (See **Figure 5-16**).

The proposed typical section under Interim Build Alternative 4 is similar to 3A and 3B with the addition of an auxiliary lane to the Turnpike Connector southbound lanes. The weaving distance is also increased by relocating the off-ramp to SR 7/US 441 approximately 1,150-ft south along SR 7/US 441 to the Biscayne River Drive intersection (See **Figure 5-17**). The design features for the southbound lanes include five 12-ft travel lanes, 12-ft inside shoulders fully paved, and 12-ft outside shoulder with 10-ft paved. The northbound lanes typical section is similar to Interim Build Alternatives 3A and 3B.

For all of the interim build alternatives, at locations with shoulder gutter, the outside shoulder is 15.5-ft wide with 8-ft paved. For the segment adjacent to the park and ride facility, a 10-ft shoulder with barrier is utilized on the embankment supported by MSE walls. The proposed cross sectional features for all the interim build alternatives meet the FDOT PPM standards.

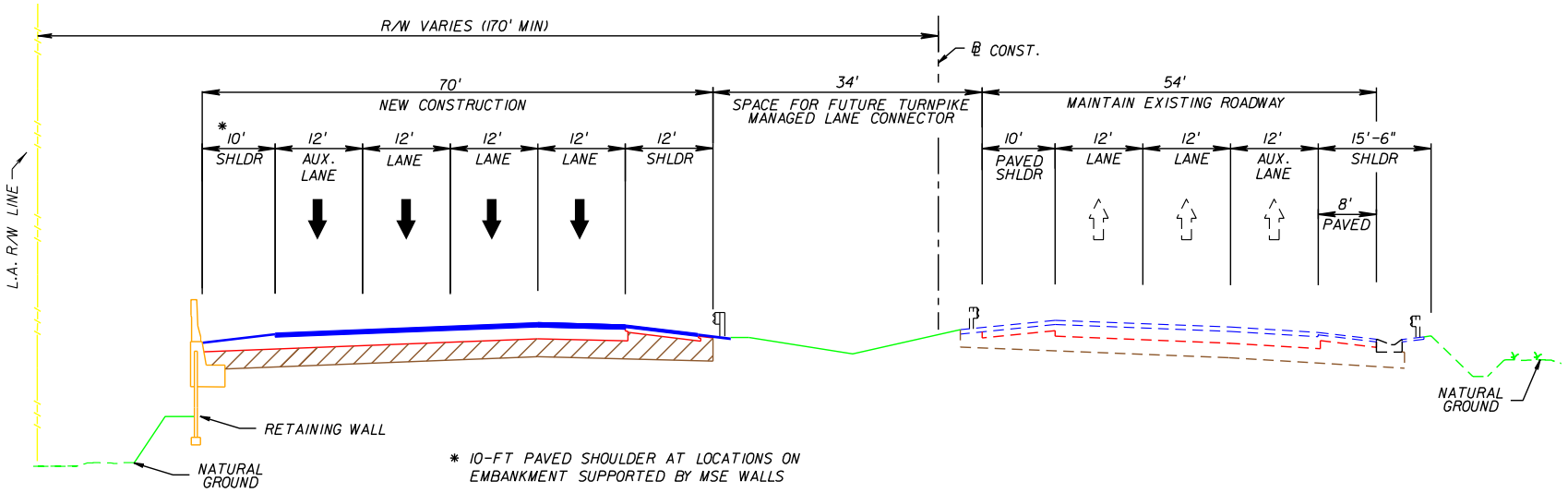


Figure 5-15 Proposed Typical Section – Turnpike Connector – Alt. 3A & 3B

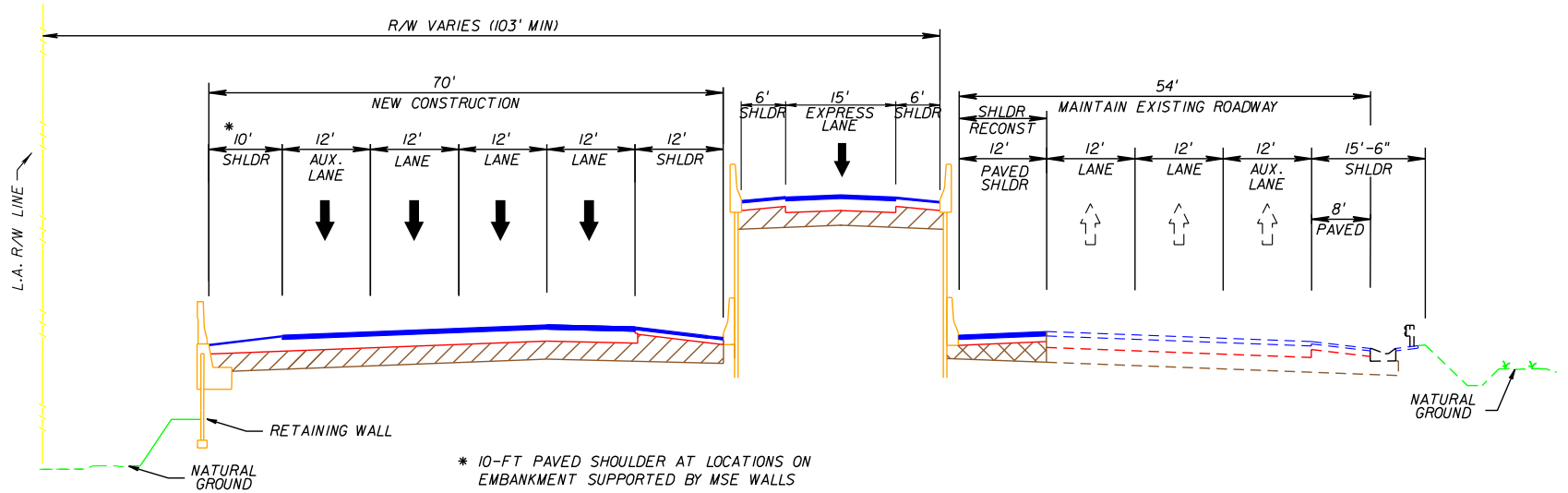


Figure 5-16 Proposed Typical Section – Turnpike Connector – Alt. 3C

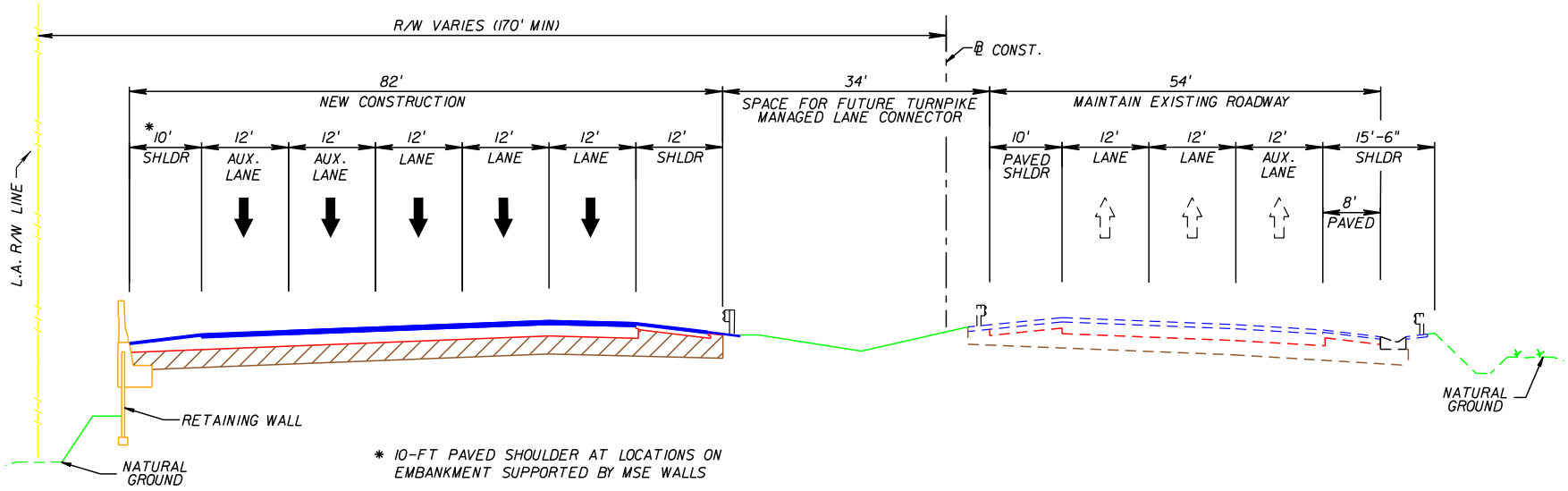


Figure 5-17 Proposed Typical Section – Turnpike Connector – Alt. 4

5.4.6.4 I-95 Southbound

The Turnpike Connector ramp under Interim Build Alternative 3A and 4 merges with the I-95 southbound mainline travel lanes at its current location just north of the Park and Ride flyover ramp. One of the three lanes from the Turnpike Connector southbound adds to the three travel lanes from I-95 southbound to provide a total of four general use lanes along I-95 southbound. The remaining two additional lanes from the Turnpike Connector continue along I-95 southbound as auxiliary lanes from the GGI to NW 151st Street.

The proposed typical section along I-95 southbound north of the Biscayne Canal consists of the following features (See **Figure 5-18**).

- Two 11-ft and two 12-ft travel lanes and two 12-ft auxiliary lanes
- 7-ft to 12-ft inside shoulder width fully paved
- 6-ft to 12-ft outside shoulder width fully paved

South of the Biscayne Canal, the proposed typical section consist of the following features (See **Figure 5-19**).

- Two 11-ft and two 12-ft travel lanes and one 12-ft auxiliary lanes
- Two 11-ft express lanes
- 7-ft to 12-ft inside shoulder width fully paved
- 12-ft outside shoulder width fully paved

The proposed 11-ft travel lane width, 6-ft minimum shoulder widths and 7-ft minimum inside shoulder width do not meet the FDOT PPM and AASHTO standards. Hence, design exceptions will be required for lane width and shoulder widths under Interim Build Alternative 3A and 4.

Under Interim Build Alternative 3B the Turnpike Connector merges with the I-95 southbound mainline lanes further south just after the Biscayne Canal Bridge. The two inside lanes from the Turnpike Connector southbound adds to the two outer lanes from I-95 to provide a total of four general use lanes along I-95 southbound. The inside lane along I-95 becomes the entry lane for the 95 Express lanes and merges with the existing two express lanes while the outer lane from the Turnpike Connector continue along I-95 southbound as auxiliary lanes between the Biscayne Canal and Opa-Locka Boulevard.

The proposed typical section along I-95 southbound north of the Biscayne Canal consists of the following features (See **Figure 5-20**).

- Three 12-ft travel lanes along I-95 SB merging with three 12-ft lanes from the Turnpike Connector.
- 12-ft inside shoulder width with 10-ft paved
- 12-ft outside shoulder width fully paved

South of the Biscayne Canal, the proposed typical section consist of the following features (See **Figure 5-21**).

- Four 12-ft travel lanes and one 12-ft auxiliary lane
- Two 12-ft express lanes
- 12-ft inside shoulder width fully paved
- 12-ft outside shoulder width fully paved

The proposed improvements along I-95 southbound under Interim Build Alternative 3C are similar to those of Interim Build Alternative 3B but include a single lane ramp with 15-ft travel lane and 6-ft inside and outside shoulders for the express lane connection from Florida's Turnpike southbound to I-95 southbound express lanes (See **Figure 5-22**).

The proposed cross sectional features for Interim Build Alternatives 3B and 3C along I-95 southbound meet the FDOT PPM standards.

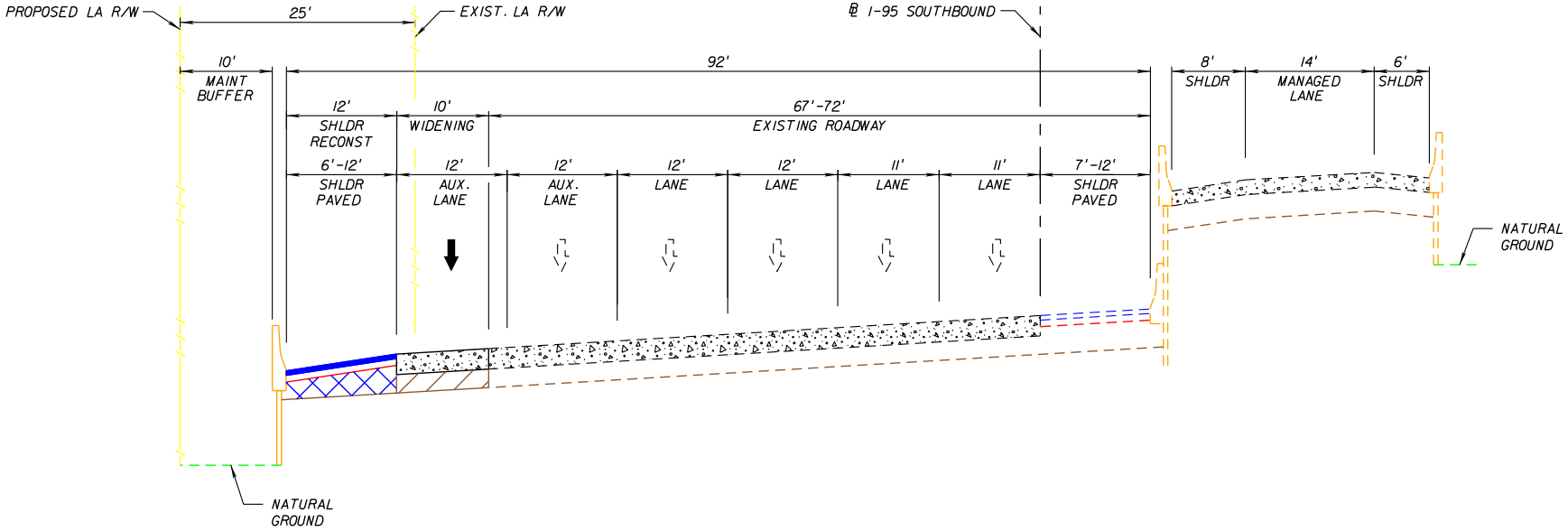


Figure 5-18 Proposed Typical– I-95 SB N. of Biscayne Canal – Alt. 3A and 4

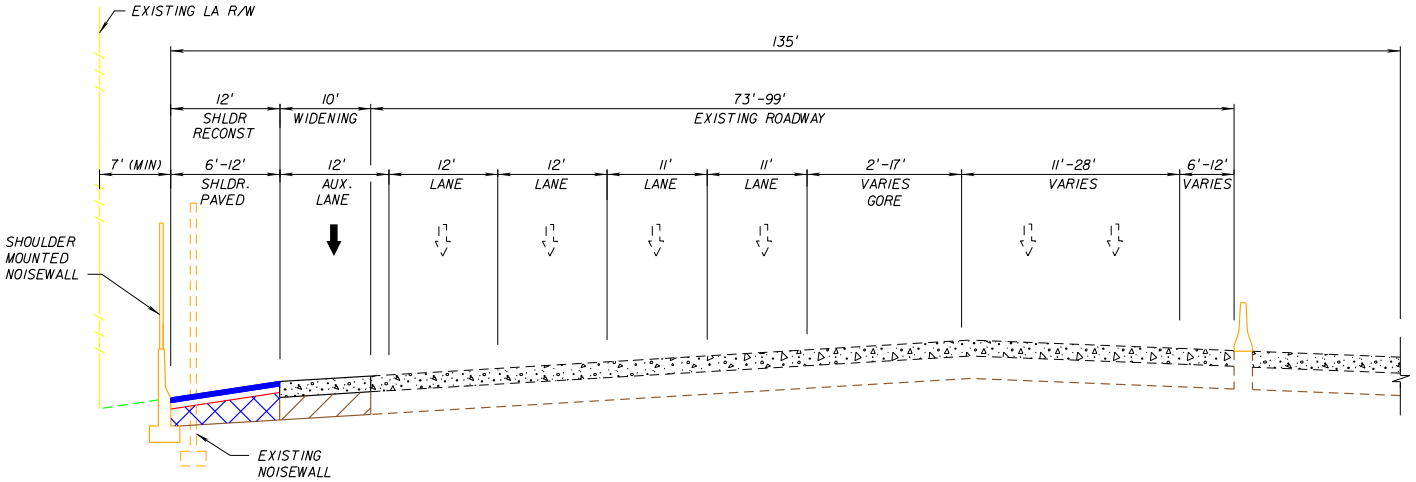


Figure 5-19 Proposed Typical Section – I-95 SB S. of Biscayne Canal – Alt. 3A and 4

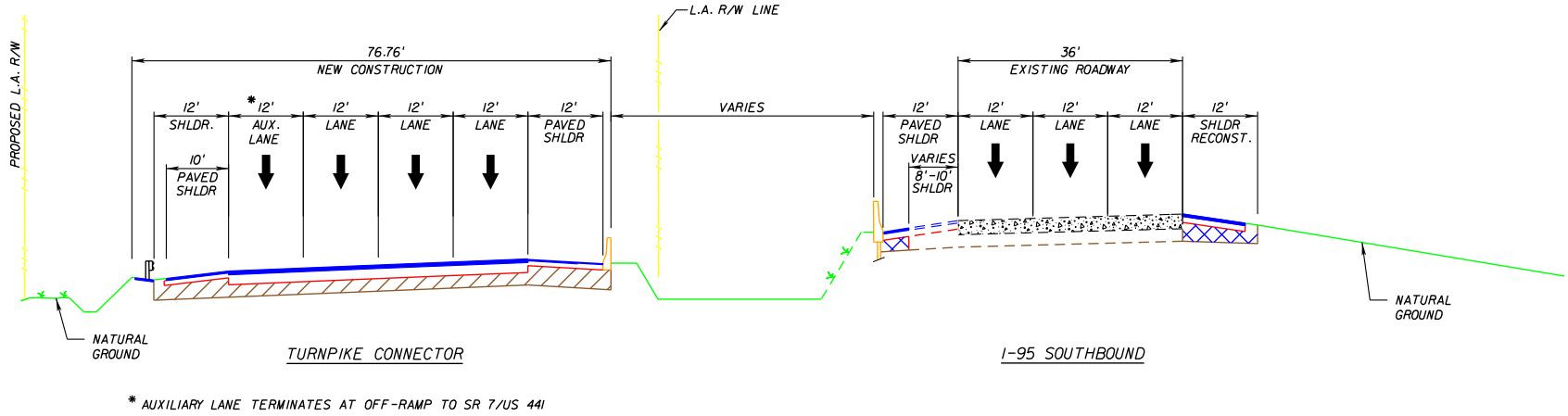


Figure 5-20 Proposed Typical Section – I-95 SB N. of Biscayne Canal – Alt. 3B

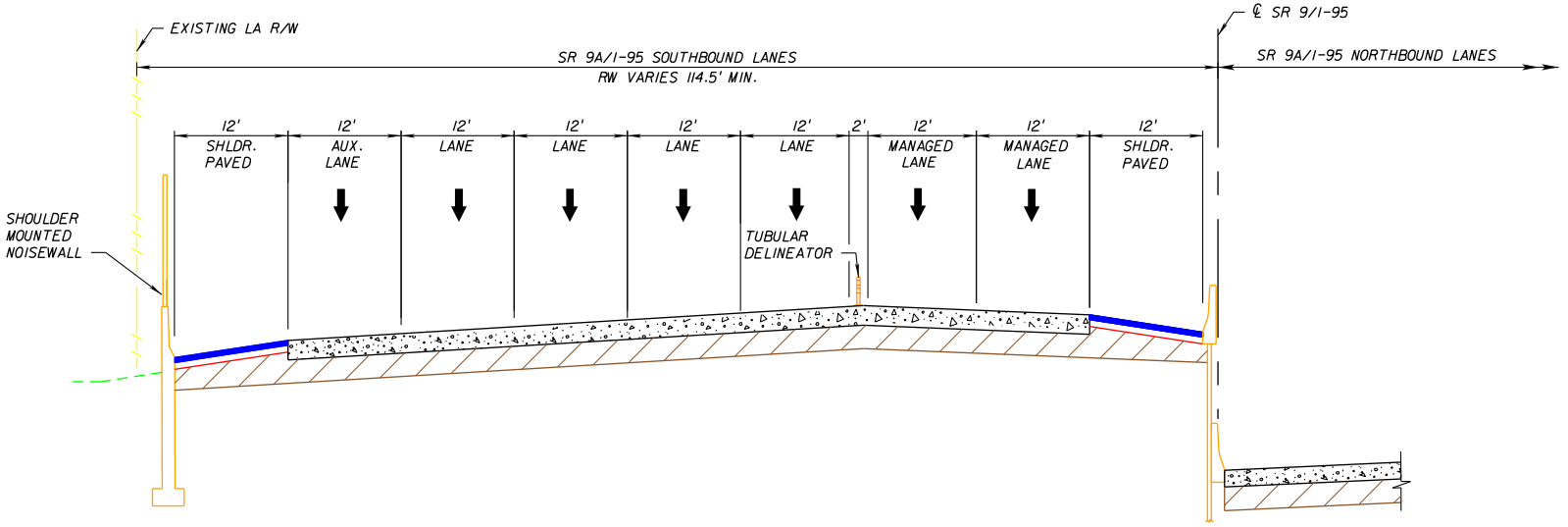


Figure 5-21 Proposed Typical Section–I-95 SB S. of Biscayne Canal–Alt. 3B & 3C

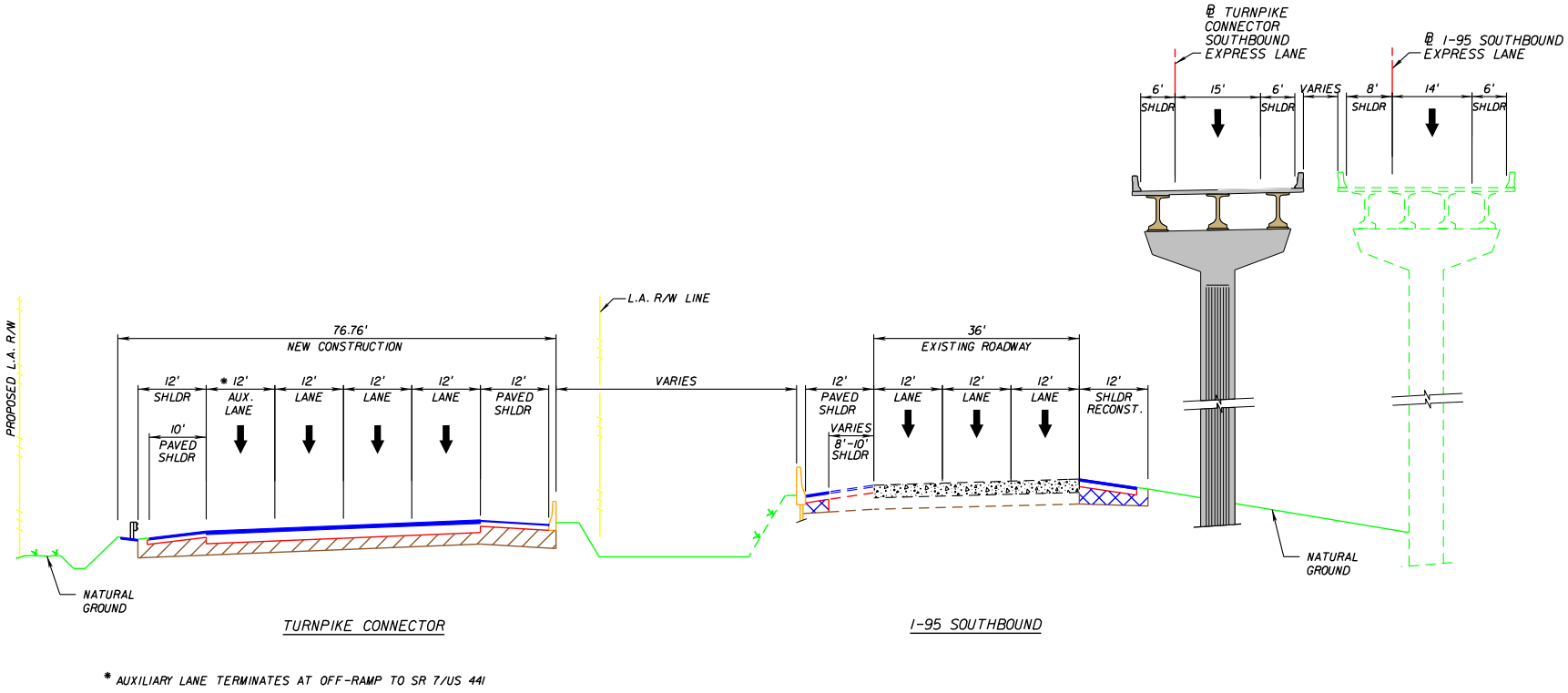


Figure 5-22 Proposed Typical Section – I-95 SB north of Biscayne Canal – Alt. 3C

5.4.7 Horizontal and Vertical Alignment

5.4.7.1 Interim Build Alternative 3A

Horizontal Alignment

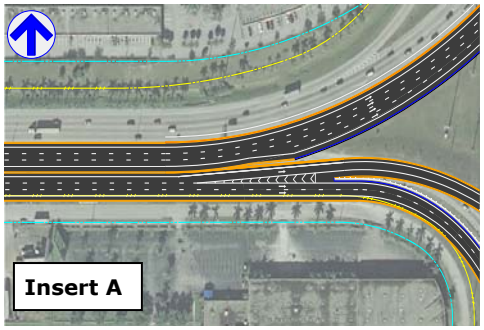
Table 5-2 summarizes the horizontal alignment for the proposed improvements under Interim Build Alternative 3A.

Table 5-2
Horizontal Alignment for Alternative 3A

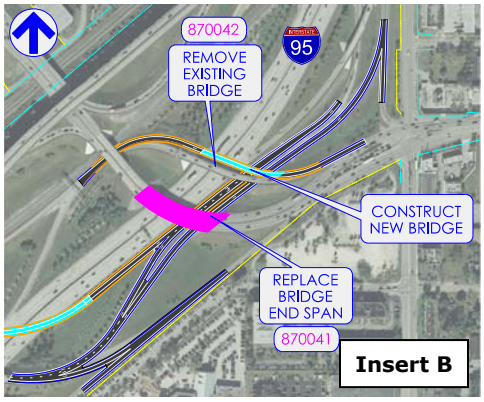
Roadway	Curve No.	Design Speed (mph)	Radius (ft)	Length (ft)	Super-elevation (e)	Stopping Sight Distance (ft)	Variation/ Exception
SR 826/ EB to I-95 SB Ramp	RAMPA_3A-1	45	7,036	491.21	0.020	Clear	None
	RAMPA_3A-2	30	350	523.04	0.090	215	None
SR 826 EB to I-95 NB Ramp	RAMPB-1	40	600	589.30	0.092	308	None
	RAMPB-2	40	615	975.93	0.092	308	None
	RAMPB-3	40	5,685	535.85	0.020	917	None
	RAMPB-4	30	415	412.75	0.083	214	None
	RAMPB-5	30	660	349.36	0.062	267	None
SR 826/ NW 167th Street WB to I-95 SB Ramp	SR826WB-1	30	365	317.07	0.088	201	None
	SR826WB-2	30	285	307.53	0.097	203	None
	SR826WB-3	30	700	292.54	0.059	Clear	None
Turnpike Connector Ramp	TPKCON3A-1	45	15,000	707.56	0.02	Clear	None
	TPKCON3A-2	45	22,918	680.44	0.02	Clear	None
	TPKCON3A-3	45	1,500	925.74	0.06	Clear	None
I-95 Mainline Southbound	I95SB3A-1	60	23,322	620.65	0.02	Clear	None
	I95SB3A-2	60	9,750	1033.47	0.020	Clear	None
	I95SB3A-3	60	14,625	975.00	0.020	Clear	None
	I95SB3A-4	60	1,340	684.46	0.069	374	Variation[2] Exception[1,3]
	I95SB3A-5	60	2,865	925.00	0.055	Clear	None

Note: 1 = Reduced Stopping Sight Distance, 2 = Reduced Curvature and Curve Length, 3 = Reduced Superelevation

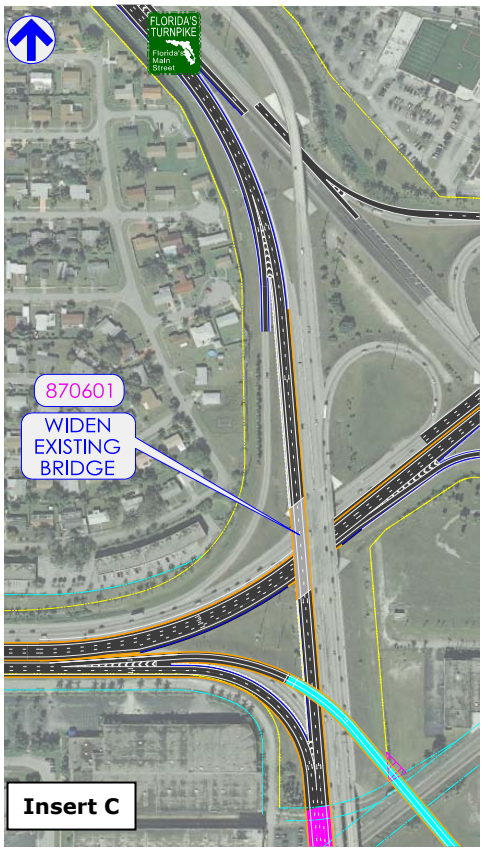
The horizontal curvature for the three-lane off-ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound was designed for speeds ranging from 30 mph to 45 mph due to physical and right-of-way constraints along SR 826/Palmetto Expressway (See **Insert A**). The SR 826/Palmetto Expressway eastbound to I-95 northbound flyover ramp was designed for 40 mph speed with 12-ft inside shoulders along the reverse curves to provide adequate sight distance for 40 mph design speed.

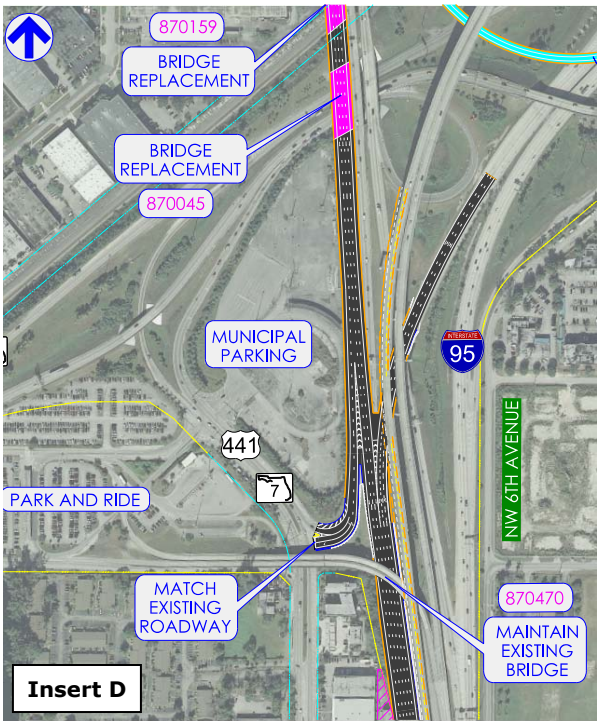


The NW 167th Street westbound to I-95 southbound bridge over I-95 (870042) will be replaced to provide adequate vertical clearance and to accommodate additional lanes underneath the bridge. This requires realignment of the ramp and bridge over I-95 and SR 7/US 441 (See **Insert B**). The proposed horizontal alignment meets the FDOT PPM requirements for the selected design speeds. The end span of the bridge of SR 826/ NW 167th Street connector over I-95 mainline will be replaced, but no alignment change is required.



The proposed alignment for the Turnpike Connector ties into the current improvements proposed under the Florida's Turnpike All Electronic Tolling Phase 4A (AET 4A) Project. Under the AET 4A project, a total of four southbound lanes approach the GGI from Florida's Turnpike southbound. The outer lane is dedicated lane for Florida's Turnpike southbound to SR 826/Palmetto Expressway westbound while the inside lane goes to NW 167th Street eastbound. The remaining two lanes then continue towards I-95 southbound (See **Insert C)**. As previously mentioned, the proposed southbound alignment is shifted west of the existing alignment to preserve an envelope for the future direct express lane connection from Florida's Turnpike southbound to the I-95 Express southbound lanes. The proposed reverse and compound curves along the new alignment meet the FDOT PPM design requirements for 45 mph design speed. No design variations or exceptions are required for this improvement.





The addition of an auxiliary lane along I-95 southbound from the GGI to NW 151st Street to provide the required capacity under this build alternative will require the realignment of the I-95 southbound lanes within the vicinity of the merge with the Turnpike Connector southbound lanes. In order to maintain the existing Park and Ride lot flyover bridge as well as to avoid impacts to the existing pier locations for the 95 Express Flyover ramps, the widening along I-95 will initially occur on the inside underneath the Park and Ride lot flyover bridge (See **Insert D**). It then transitions to the outside from the Park and Ride Bridge to NW 151st Street. The existing horizontal sight distance and curve lengths do not meet the FDOT PPM design standards for 60 mph design speed. The proposed realignment will maintain most of the existing horizontal alignment with the exception of the horizontal curve radius at the merge with the Turnpike Connector Ramp that will be modified from 1,494-ft to 1,340-ft. Correction of the horizontal alignment to meet the requirements for 60 mph design speed will require reconstruction of I-95 mainline and 95 Express flyover ramps. In order to preserve the existing roadway facility, design variations will be required for horizontal curve length and shoulder width while design exceptions will be required for stopping sight distance and superelevation.

Vertical Alignment

The existing GGI configuration features numerous constraints for the proposed vertical alignment to meet the desired design speeds. **Table 5-3** summarizes the vertical alignment for the proposed improvements under Interim Build Alternative 3A.

Table 5-3
Vertical Alignment for Alternative 3A

Baseline	Curve Number	Curve Type	Design Speed (mph)	K-Value	Curve Length (ft)	Max Grade	Stopping Sight Distance (ft)	Variation/ Exception
SR 826 EB to I-95 SB Ramp	1	Sag	45	100	300	2.53	Clear	None
	2	Sag	45	110	500	5.00	Clear	None
	3	Crest	30	71	515	5.00	390	None
	4	Sag	30	49	235	2.50	Clear	None
SR 826/ Palmetto Expressway EB to I-95 NB Ramp	1	Sag	45	167	300	4.00	Clear	None
	2	Crest	40	139	1,150	4.30	547*	None
	3	Sag	40	91	425	4.30	Clear	None
	4	Crest	30	462	300	0.35	Clear	None
SR 826/ NW 167th Street WB to I-95 SB Ramp	1	Sag	30	200	300	6.0	Clear	None
	2	Crest	30	31	360	6.0	260*	None
	3	Sag	30	52	300	5.5	Clear	None
	4	Crest	30	1,000	300	0.30	Clear	None
Turnpike Connector Ramp	1	Sag	45	167	500	3.5	Clear	None
	2	Crest	45	117	700	3.5	502	None
	3	Sag	45	119	400	2.5	Clear	None
	4	Crest	45	108	400	2.85	491	None
I-95 Mainline Southbound**	1	Sag	60	121	400	3.0	Clear	Exception[1,2]
	2	Crest	60	92	550	3.0	349	Exception[1,2,3]
	3	Sag	60	114	400	3.0	Clear	Exception[1,2]
	4	Crest	60	370	300	0.52	970	Variation[2]
	5	Sag	60	649	300	0.289	Clear	Variation[2]
	6	Crest	60	752	300	0.226	1811	Variation[2]
	7	Sag	60	1327	300	0.226	Clear	Variation[2]

Note: 1 = Reduced K value, 2 = Reduced Curve Length, 3 = Reduced Sight Distance
** Stopping Sight Distance controlled by horizontal geometry*
*** Maintain existing substandard profile*

The current exit location (physical gore point) for the SR 826/Palmetto Expressway eastbound to I-95 southbound (Ramp A) and northbound flyover ramp (Ramp B) will be moved approximately 1600-ft west to enable grade separation between the ramp and the SR 826/Palmetto Expressway mainline in order to provide the required vertical clearance over the Turnpike Connector. The proposed design profiles for these ramps meet the required design speeds and provide adequate vertical clearance over the Turnpike Connector, SFRC, I-95 mainline and SR 7/US 441 as well as underneath the 95 Express Flyover ramps and the SR 826/Palmetto Expressway connector.

The vertical alignment for the proposed NW 167th Street westbound to I-95 southbound ramp improves the existing vertical alignment by providing adequate vertical clearance over I-95 and underneath the SR 826 Connector. The proposed profile meets the requirements for 25-30 mph design speed.

The vertical alignment for the proposed reconstruction and widening of the Turnpike Connector southbound lanes was adjusted to provide adequate vertical clearance over the SFRC and SR 7/US 441. The proposed profile meets the requirements for 45 mph design speed.

The vertical alignment for the proposed widening along I-95 will match the existing roadway profile. The existing profile along I-95 southbound does not meet the FDOT PPM requirements for the 60 mph design speed. Correction of the vertical alignment to meet the requirements for 60 mph design speed will require reconstruction of I-95 mainline and bridge replacements over NW 151st Street and Biscayne Canal. In order to preserve the existing roadway facility, design variations and or exceptions would be required for K-value, curve length and stopping sight distance.

5.4.7.2 Interim Build Alternative 3B

Horizontal Alignment

Table 5-4 summarizes the horizontal alignment for the proposed improvements under Interim Build Alternative 3B.

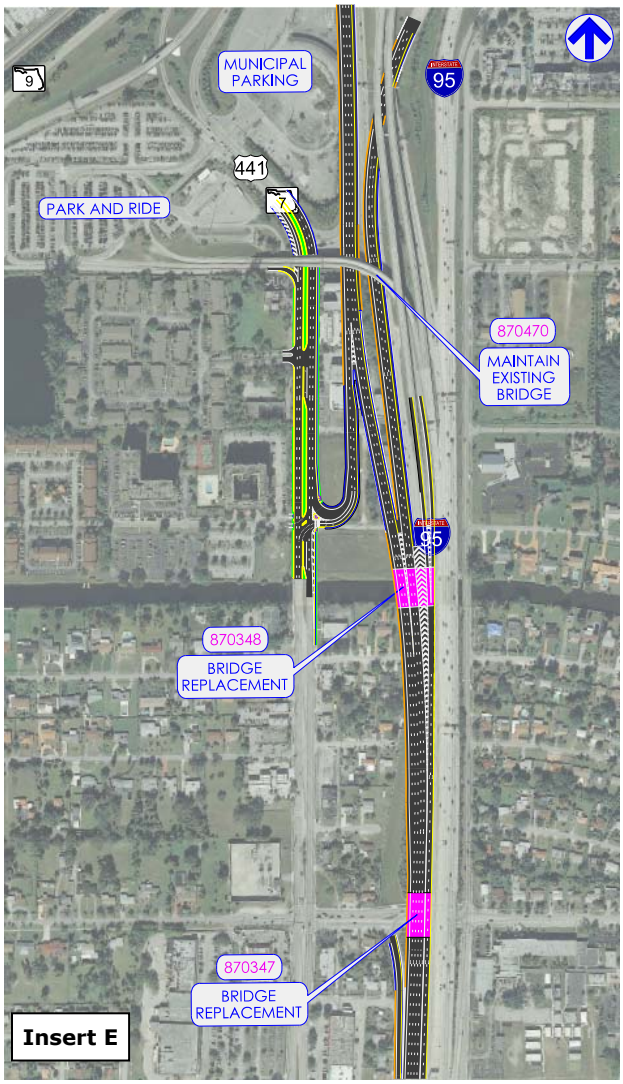
Table 5-4
Horizontal Alignment for Alternative 3B

Roadway	Curve No.	Design Speed (mph)	Radius (ft)	Length (ft)	Super-elevation (e)	Stopping Sight Distance (ft)	Variation/ Exception
SR 826/ EB to I-95 SB Ramp	RAMPA_3A-1	45	7,036	491.21	0.020	Clear	None
	RAMPA_3A-2	30	350	523.04	0.090	215	None
SR 826 EB to I-95 NB Ramp	RAMPB-1	40	600	593.68	0.092	307	None
	RAMPB-2	40	615	965.13	0.092	308	None
	RAMPB-3	40	5,835	481.87	0.020	917	None
	RAMPB-4	30	415	412.75	0.083	214	None
SR 826/ NW 167th Street WB to I-95 SB Ramp	SR826WB-1	30	365	317.07	0.088	201	None
	SR826WB-2	30	285	307.53	0.097	176	None
	SR826WB-3	30	700	292.54	0.059	Clear	None
Turnpike Connector Ramp	TPKCON3B-1	45	3,886	518.7	0.026	Clear	None
	TPKCON3B-2	45	3,832	772.10	0.026	Clear	None
	TPKCON3B-3	45	22,918	1,830.14	0.02	Clear	None
	TPKCON3B-4	45	1,500	925.74	0.059	Clear	None
I-95 Mainline Southbound	I95SB3B-1	60	14,785	1,692	0.02	Clear	None
	I95SB3B-2	60	17,141.7	462.15	0.02	Clear	None
	I95SB3B-3	60	8,338	1,169.33	0.021	1,033	None
	I95SB3B-4	60	1,707	935.32	0.069	414	Variation[2] Exception[1,3]
	I95SB3B-5	60	2,877	915.00	0.055	Clear	None

Note: 1 = Reduced Stopping Sight Distance, 2 = Reduced Curvature, 3 = Reduced Superelevation

The horizontal alignments for the SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound ramps as well as the NW 167th Street westbound to I-95 SB Ramp are similar to that of Interim Build Alternative 3A and described under **Section 5.4.7.1**.

The proposed alignment for the Turnpike Connector reconstructs the existing southbound lanes and shifts the alignment west to accommodate a future direct connection ramp from Florida's Turnpike southbound to the I-95 southbound express lanes. Two lanes from the Florida's Turnpike mainline merges with the two lanes from SR 826 eastbound to I-95 southbound to provide four lanes southbound along the Turnpike Connector. The four lanes go underneath the Park and Ride flyover ramp bridge along a new alignment then merges with the I-95 southbound mainline lanes further south just after the Biscayne Canal Bridge (See **Insert E**). The existing off-ramp to SR 7/US 441 is also relocated approximately 1,150-ft south along SR 7/US 441 to the Biscayne River Drive intersection to increases the signal spacing between the Park and Ride Lot signal and the SR 7/US 441 off-ramp signal. The proposed reverse and compound curves along the new alignment meet the design requirements for 45 mph design speed.



Interim Build Alternative 3B will also require the realignment of I-95 southbound lanes to preserve an envelope for the future direct connection ramp from Florida's Turnpike southbound to the I-95 southbound express lanes. In addition, the proposed realignment of the Turnpike Connector requires reconstruction of the existing bridges over the Biscayne Canal and NW 151st Street to provide adequate vertical clearance. The reconstruction of these bridges will also require reconstruction of the I-95 southbound mainline lanes from the Park and Ride Flyover ramp bridge to NW 143rd Street to meet the 2012 design standards. The proposed horizontal stopping sight distance, superelevations and curve lengths meet the 2012 criteria for 60 mph design speed with the exception of the horizontal curve between the existing 95 Express flyover piers (Curve I95SB3B-4) which does not meet the required superelevation and sight distance requirements. This correction of this curve to meet the requirements for 60 mph design speed will require reconstruction of 95

Express flyover ramps. In order to preserve the existing 95 Express flyover ramp bridges, design variations will be required for shoulder width while design exceptions will be required for stopping sight distance and superelevation.

Vertical Alignment

Table 5-5 summarizes the vertical alignment for the proposed improvements under Interim Build Alternative 3B.

The vertical alignments for the SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound ramps as well as the NW 167th Street WB to I-95 SB Ramp are similar to that of Interim Build Alternative 3A and described under **Section 5.4.7.1**.

The vertical alignment for the proposed reconstruction and widening of the Turnpike Connector southbound lanes was adjusted to provide adequate vertical clearance over the SFRC and SR 7/US 441, underneath the proposed SR 826/Palmetto Expressway eastbound to I-95 northbound flyover ramp and the existing park and ride flyover ramp bridge and over the Biscayne Canal. The proposed profile meets the requirements for 45 mph design speed.

The vertical alignment for the proposed reconstruction along I-95 begins from the Park and Ride Flyover ramp bridge and ties down to the existing roadway profile just north of NW 143rd Street. In order to meet the 2012 vertical alignment standards for this facility, the southbound lanes will be raised higher than the northbound lanes. This will require a retaining wall system to accommodate the split vertical profiles between the proposed profile for the southbound lanes and the existing profile along the northbound lanes. The proposed alignment provides adequate vertical clearance over the Biscayne Canal and NW 151st Street. However, the existing substandard vertical clearance at NW 141st Street will be maintained since the improvements along I-95 southbound lanes south of this location only involves minor widening. A design exception will be required for vertical clearance in order to maintain the existing vertical profile over NW 143rd Street.

Table 5-5
Vertical Alignment for Alternative 3B

Baseline	Curve Number	Curve Type	Design Speed (mph)	K-Value	Curve Length (ft)	Max Grade	Stopping Sight Distance (ft)	Variation/ Exception
SR 826 EB to I-95 SB Ramp	1	Sag	45	100	300	2.53	NA	None
	2	Sag	45	110	500	5.00	NA	None
	3	Crest	30	71	515	5.00	390	None
	4	Sag	30	52	250	2.50	NA	None
SR 826/ Palmetto Expressway EB to I-95 NB Ramp	1	Sag	45	167	300	4.00	Clear	None
	2	Crest	40	139	1,150	4.30	547[1]	None
	3	Sag	40	91	425	4.30	Clear	None
	4	Crest	30	462	300	0.35	Clear	None
SR 826/ NW 167th Street WB to I-95 SB Ramp	1	Sag	30	200	300	6.0	Clear	None
	2	Crest	30	31	360	6.0	260*	None
	3	Sag	30	52	300	5.5	Clear	None
	4	Crest	30	1,000	300	0.30	Clear	None
Turnpike Connector Ramp	1	Sag	45	386	400	0.737	Clear	None
	2	Sag	45	156	500	3.5	Clear	None
	3	Crest	45	117	700	3.5	502	None
	4	Sag	45	119	400	2.5	Clear	None
	5	Crest	45	108	400	2.85	491	None
I-95 Mainline Southbound	1	Sag	60	333	1,500	2.5	Clear	None
	2	Crest	60	450	1,800	2.0	985	None
	3	Sag	60	500	1,150	2.0	Clear	None
	4	Crest	60	1,667	1,000	2.0	2,298	Exception[2]

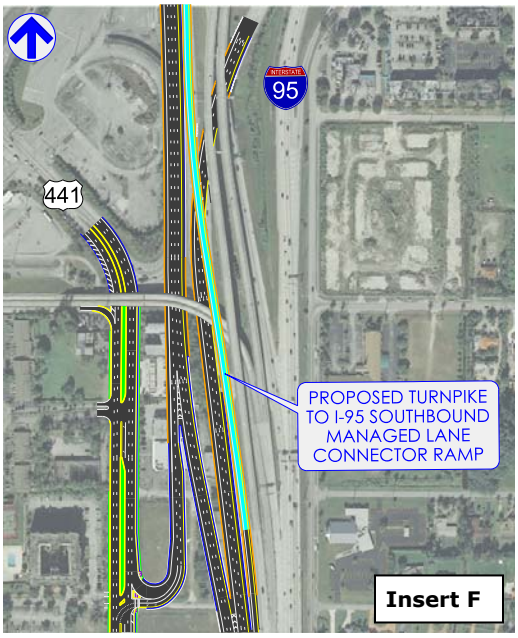
Note: 1=Stopping Sight Distance controlled by horizontal geometry, 2= Reduced Curve Length

5.4.7.3 Interim Build Alternative 3C

Horizontal Alignment

Table 5-6 summarizes the horizontal alignment for the proposed improvements under Interim Build Alternative 3C.

The horizontal alignments for the proposed improvements under interim Build Alternative 3C are similar to that of Interim Build Alternative 3B discussed under **Section 5.4.7.2**. The main difference is the inclusion of a third-level single-lane flyover ramp from Florida's Turnpike southbound to the I-95 southbound express lanes.



The horizontal alignment for this new express lanes connector ramp parallels the Turnpike Connector at-grade alignment from Florida's Turnpike mainline before splitting at the Park and Ride facility to merge with the I-95 southbound express lanes (see **Insert F**). The proposed reverse and compound curves within the horizontal alignment avoids the existing straddle piers for the existing 95 Express flyover ramps and merge with the existing I-95 southbound express lane. The proposed ramp meets the FDOT PPM design standards for 50 mph design speed.

Table 5-6 Horizontal Alignment for Alternative 3C							
Roadway	**Curve No.**	**Design Speed (mph)**	**Radius (ft)**	**Length (ft)**	**Super-elevation (e)**	**Stopping Sight Distance (ft)**	**Variation/ Exception**
SR 826/ EB to I-95 SB Ramp	RAMPA_3A-1	45	7,036	491.21	0.020	Clear	None
	RAMPA3A-2	30	350	523.04	0.090	215	None
SR 826 EB to I-95 NB Ramp	RAMPB-1	40	600	593.68	0.092	308	None
	RAMPB-2	40	615	965.13	0.092	308	None
	RAMPB-3	40	5,835	481.87	0.020	917	None
	RAMPB-4	30	415	410.59	0.083	214	None
SR 826/ NW 167th Street WB to I-95 SB Ramp	SR826WB-1	30	365	317.07	0.088	201	None
	SR826WB-2	30	285	307.53	0.097	178	None
	SR826WB-3	30	700	292.54	0.059	Clear	None
Turnpike Connector Ramp	TPKCON3C-1	45	3,886	518.7	0.026	Clear	None
	TPKCON3C-2	45	3,832	772.10	0.026	Clear	None
	TPKCON3C-3	45	22,918	1,830.14	0.02	Clear	None
	TPKCON3C-4	45	1,500	925.74	0.059	Clear	None
Turnpike Express Lane Connector to I-95 Express Flyover	TPKML-1	60	10,960	1,797.68	0.020	Clear	None
	TPKML-2	50	5,265	734.33	0.023	753*	None
	TPKML-3	50	12,000	727.91	0.020	1,138	None
	TPKML-4	50	8,500	574.94	0.020	958	None
	TPKML-5	45	1,503	837.58	0.059	404	None
I-95 Mainline Southbound	I95SB3B-1	60	14,785	1,692	0.02	Clear	None
	I95SB3B-2	60	17,141.7	462.15	0.02	Clear	None
	I95SB3B-3	60	8,338	1,169.33	0.021	1,033	None
	I95SB3B-4	60	1,707	935.32	0.069	414	Variation[2] Exception[1,3]
	I95SB3B-5	60	2,877	915.00	0.055	Clear	None

Note: 1 = Reduced Stopping Sight Distance, 2 = Reduced Curvature, 3 = Reduced Superelevation

** Stopping Sight Distance controlled by vertical geometry*

Vertical Alignment

Table 5-7 summarizes the vertical alignment for the proposed improvements under Interim Build Alternative 3C.

Table 5-7
Vertical Alignment for Alternative 3C

Baseline	Curve Number	Curve Type	Design Speed (mph)	K-Value	Curve Length (ft)	Max Grade	Sight Distance (ft)	Variation/ Exception
SR 826 EB to I-95 SB Ramp	1	Sag	45	100	300	2.53	NA	None
	2	Sag	45	110	500	5.00	NA	None
	3	Crest	30	71	515	5.00	390	None
	4	Sag	30	49	235	2.50	NA	None
SR 826/ Palmetto Expressway EB to I-95 NB Ramp	1	Sag	45	167	300	2.53	Clear	None
	2	Crest	40	139	1,150	4.30	547*	None
	3	Sag	40	91	425	4.30	Clear	None
	4	Crest	30	462	300	0.35	Clear	None
SR 826/ NW 167th Street WB to I-95 SB Ramp	1	Sag	30	200	300	6.0	Clear	None
	2	Crest	30	31	360	6.0	260*	None
	3	Sag	30	52	300	5.5	Clear	None
	4	Crest	30	1,000	300	0.30	Clear	None
Turnpike Connector Ramp	1	Sag	45	386	400	0.737	Clear	None
	2	Sag	45	156	500	3.5	Clear	None
	3	Crest	45	117	700	3.5	502	None
	4	Sag	45	119	400	2.5	Clear	None
	5	Crest	45	108	400	2.85	491	None
Turnpike Express Lane Connector to I-95 Express Flyover	1	Crest	60	464	650	2.0	1,096	None
	2	Sag	50	100	800	6.0	Clear	None
	3	Crest	50	145	1,200	6.0	560	None
	4	Sag	50	129	400	2.25	Clear	None
	5	Crest	45	108	400	2.85	491	None
I-95 Mainline Southbound	1	Sag	60	333	1,500	2.5	Clear	None
	2	Crest	60	450	1,800	2.0	985	Exception[1.2.3]
	3	Sag	60	500	1,150	2.0	Clear	None
	4	Crest	60	1,667	1,000	0.3	2,298	None

Note: 1 = Reduced K value, 2 = Reduced Curve Length, 3 = Reduced Sight Distance
** Stopping Sight Distance controlled by horizontal geometry*

The vertical alignments for the proposed improvements under interim Build Alternative 3C are similar to that of Interim Build Alternative 3B discussed under **Section 5.4.7.2**. The main difference is the inclusion of a third-level single-lane flyover ramp from Florida's Turnpike southbound to the I-95 southbound express lanes.

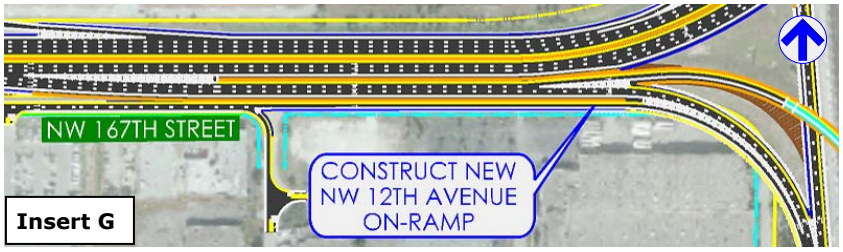
The vertical alignment for this new express lanes connector begins just after the new flyover ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound and rises quickly to provide adequate vertical clearance over the Park and Ride flyover ramp bridge before descending and merging with the I-95 southbound express lanes at the same grade. The proposed vertical alignment meets the design standards for 45 mph design speed.

5.4.7.4 Interim Build Alternative 4

Horizontal Alignment

Table 5-8 summarizes the horizontal alignment for the proposed improvements under Interim Build Alternative 4.

The horizontal curvature for the three-lane off-ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound was designed for speeds ranging from 30 mph to 45 mph similar to Interim Build Alternatives 3A. The main difference is that Interim Build Alternative 4 maintains the NW 12th Avenue on-ramp by relocating and connecting to the three lane off-ramp to I-95 northbound and southbound as a barrier separated auxiliary lane (see **Insert G**). The SR 826/Palmetto Expressway eastbound to I-95 southbound radius was also increased from 340-ft to 500-ft to enhance safety.



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The SR 826 connector bridge (870041) over the I-95 mainline as well as the SR 826/NW 167th Street westbound to I-95 southbound bridge (870042) over the I-95 mainline will be replaced to provide adequate vertical clearance and to accommodate additional lanes underneath these bridges from the direct flyover connection ramp and SR 7/US 441 northbound lanes. An additional northbound left turn lane is also provided at the NW 2nd Avenue and NW 167th Street intersection to improve both the intersection operations and traffic flow along NW 167th Street.

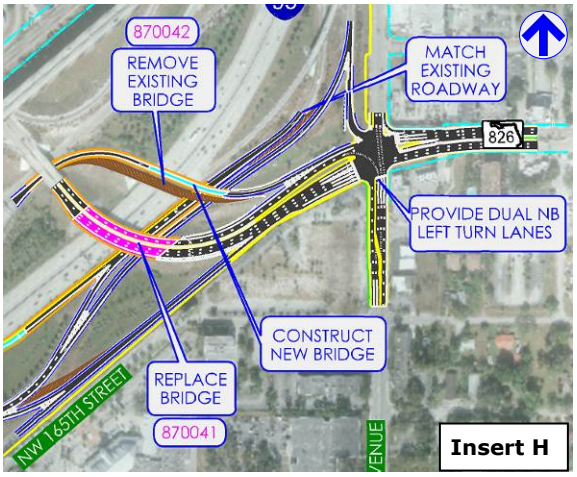

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Table 5-8
Horizontal Alignment for Alternative 4

Roadway	Curve No.	Design Speed (mph)	Radius (ft)	Length (ft)	Super-elevation (e)	Stopping Sight Distance (ft)	Variation/ Exception
SR 826/ EB to I-95 SB Ramp	RAMPA-1	45	7,036	491.21	0.02	Clear	None
	RAMPA-2	30	500	747.2	0.074	215	None
SR 826 EB to I-95 NB Ramp	RAMPB-1	40	600	593.68	0.092	308	None
	RAMPB-2	40	615	965.13	0.092	308	None
	RAMPB-3	40	5,835	481.87	0.02	917	None
	RAMPB-4	30	415	410.59	0.082	214	None
SR 826/ NW 167th Street WB to I-95 SB Ramp	SR826WB-1	30	365	320.9	0.088	201	None
	SR826WB-2	30	285	307.53	0.097	203	None
	SR826WB-3	30	700	292.54	0.059	Clear	None
Turnpike Connector Ramp	TPCON4-1	45	15,000	707.56	0.02	Clear	None
	TPCON4-2	45	22,918	680.44	0.02	Clear	None
	TPCON4-3	45	1,500	925.74	0.06	Clear	None
I-95 Mainline Southbound	I95SB4-1	60	23,322	620.65	0.02	Clear	None
	I95SB4-2	60	9,750	1033.47	0.02	Clear	None
	I95SB4-3	60	14,625	975	0.02	Clear	None
	I95SB4-4	60	1,340	684.46	0.069	374	Variation[2] Exception[1,3]
	I95SB4-5	60	2,865	925	0.055	Clear	None
SR 826 Connector to NW 167th Street	SR826CON-1	30	526	414.91	0.05	Clear	None
	SR826CON-2	30	471	471	0.02	Clear	None
	SR826CON-3	30	800	800	0.02	Clear	None

Note: 1 = Reduced Stopping Sight Distance, 2 = Reduced Curvature and Curve Length, 3 = Reduced Superelevation
** Stopping Sight Distance controlled by vertical geometry*

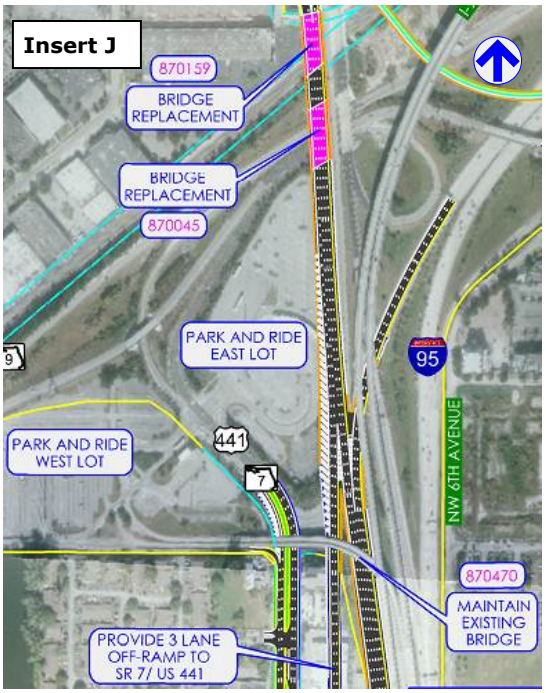
The alignment for the Turnpike Connector southbound lanes is reconstructed to shift the alignment west to accommodate a future direct connection ramp from Florida's Turnpike southbound to the I-95 southbound express lanes similar to Interim Build Alternative 3A. One design feature that is distinct for Interim Build Alternative 4 is that the Turnpike Connector southbound lanes will be widened to accommodate the additional lane from the NW 12th Street on-ramp. The weaving distance is also increased along the Turnpike

Connector southbound lanes by relocating the off-ramp to SR 7/US 441 approximately 1,150-ft south along SR 7/US 441 towards the intersection at Biscayne River Drive.

The reconstruction along the Turnpike Connector will require widening of the Turnpike Connector southbound bridge over SR 826 (870601) and replacement of the southbound bridges over the SFRC (870159) and SR7/US 441 (870045). An additional auxiliary lane is also provided along I-95 southbound from the GGI to NW 151st Street to provide additional capacity. This will require widening of the I-95 southbound bridge over the C-8/Biscayne Canal (870348) (see **Insert I**). The entrance to the I-95 southbound express lanes will be moved 300-ft south to accommodate weaving maneuvers from SR 826 and Florida's Turnpike to the I-95 Express southbound lanes.

Insert I

The addition of an auxiliary lane along I-95 southbound from the GGI to NW 151st Street to provide the required capacity under this build alternative will require the realignment of the I-95 southbound lanes within the vicinity of the merge with the Turnpike Connector southbound lanes. In order to maintain the existing Park and Ride lot flyover bridge as well as to avoid impacts to the existing pier locations for the 95 Express Flyover ramps, the widening along I-95 will initially occur on the inside underneath the Park and Ride lot flyover bridge (See **Insert J**). This design is similar to that of Interim Build Alternative 3A. The adjacent span underneath the Park and Ride flyover will accommodate the relocation of the Turnpike Connector southbound off-ramp to SR 7/US 441.



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Vertical Alignment

Table 5-9 summarizes the vertical alignment for the proposed improvements under Interim Build Alternative 4.

Table 5-9
Vertical Alignment for Alternative 4

Baseline	Curve Number	Curve Type	Design Speed (mph)	K-Value	Curve Length (ft)	Max Grade	Sight Distance (ft)	Variation/ Exception
SR 826 EB to I-95 SB Ramp	1	Sag	45	99	300	2.53	Clear	None
	2	Sag	45	110	500	5.0	Clear	None
	3	Crest	30	100	700	5.0	465	None
	4	Sag	30	83	250	2.0	Clear	None
SR 826/ Palmetto Expressway EB to I-95 NB Ramp	1	Crest	40	160	1,150	4.2	587*	None
	2	Sag	40	108	500	4.2	Clear	None
	3	Crest	30	428	1,692	0.4	Clear	None
SR 826/ NW 167th Street WB to I-95 SB Ramp	1	Sag	30	200	300	6.0	Clear	None
	2	Crest	30	31	360	6.0	260*	None
	3	Sag	30	52	300	5.5	Clear	None
	4	Crest	30	1,000	300	0.3	Clear	None
Turnpike Connector Ramp	1	Sag	45	167	500	3.5	Clear	None
	2	Crest	45	117	700	3.5	502	None
	3	Sag	45	119	400	2.5	Clear	None
	4	Crest	45	108	400	2.85	491	None
I-95 Mainline Southbound**	1	Sag	60	121	400	3.0	Clear	Exception[1,2]
	2	Crest	60	92	550	3.0	349	Exception[1,2,3]
	3	Sag	60	114	400	3.0	Clear	Exception[1,2]
	4	Crest	60	370	300	0.52	970	Variation[2]
	5	Sag	60	649	300	0.289	Clear	Variation[2]
	6	Crest	60	752	300	0.226	1811	Variation[2]
	7	Sag	60	1327	300	0.226	Clear	Variation[2]
SR 826 Connector	1	Crest	30	46	325	6.6	314	None
	2	Sag	30	44	275	6.6	Clear	None

Note: 1 = Reduced K value, 2 = Reduced Curve Length, 3 = Reduced Sight Distance
** Stopping Sight Distance controlled by horizontal geometry*
*** Maintain existing substandard profile*

The vertical alignment for Interim Build Alternative 4 is similar to 3A with a few differences. Along the ramps by SR 826/Palmetto eastbound to I-95 northbound and southbound, the vertical alignment is distinct due to the relocated NW 12th Street ramp. In order for the

design features to meet the minimum FDOT PPM requirements, one vertical curve was removed from the SR 826/Palmetto Expressway eastbound to I-95 northbound vertical alignment when compared to Interim Build Alternative 3A.

Additionally, a new vertical alignment was developed for the SR 826 Connector. Under Interim Build Alternative 4 this bridge will be replaced to accommodate the additional capacity and provide adequate vertical clearance.

5.4.8 Bridge Analysis

The proposed improvements under the Interim Build Alternatives 3A, 3B, 3C, and 4 will require eastbound widening of the SR 826/Palmetto Expressway mainline bridge over NW 12th Street (870250) and the construction of a new flyover bridge for the SR 826/Palmetto Expressway eastbound to I-95 northbound movement. This will also require end span replacement of the SR 826 Connector over I-95 and SR 7/US 441 (870041) and the full replacement of the NW 167th Street westbound to I-95 northbound ramp bridge (870042) to accommodate the new flyover ramp.

The reconstruction and widening of the southbound Turnpike Connector will require widening of the bridge over SR 826/Palmetto Expressway (870601) and the replacement of the bridges over the SFRC (870159) and SR 7/US 441 (870045) under all four interim build alternatives.

The proposed I-95 southbound widening under Interim Build Alternative 3A and 4 will require widening of the I-95 southbound bridge over the Biscayne Canal (870348). However the proposed realignment and reconstruction of the I-95 southbound lanes under Interim Build Alternatives 3B and 3C will require replacement of the I-95 southbound bridges over the Biscayne Canal (870348) and NW 151st Street (870347). In addition, the bridge over NW 143rd Street (870346) will also be widened under Interim Build Alternatives 3B and 3C to accommodate the improvements along I-95 southbound.

Interim Build Alternative 3C will also require the construction of a new flyover bridge for the direct express lane connection from Florida's Turnpike southbound to the I-95 southbound express lanes.

The recommended structural improvements under the different interim build alternatives are summarized in **Table 5-10**. The detailed structural analysis for this alternative is included in the Bridge Analysis Report prepared as part of this PD&E Study.

Table 5-10
Bridge Analysis Summary

#	Location	Bridge Number	Existing Min. Vert. Cl.	Recommended Improvements				Proposed Minimum Vertical Clearance				Variations /Exceptions
				Interim Build Alt. 3A	Interim Build Alt. 3B	Interim Build Alt. 3C	Interim Build Alt. 4	Interim Build Alt. 3A	Interim Build Alt. 3B	Interim Build Alt. 3C	Interim Build Alt. 4	
1	SR 826 over NW17th Ave	870104	14.3-ft	Maintain Existing	Maintain Existing	Maintain Existing	Texas U-Turn Underneath	14.3-ft	14.3-ft	14.3-ft	14.3-ft	Variation
1	SR 826 over NW12th Ave	870050	14.1-ft	EB Bridge Widening	EB Bridge Widening	EB Bridge Widening	EB Bridge Widening & Texas U-Turn	14.1-ft	14.1-ft	14.1-ft	14.1-ft	Variation
2	Turnpike Connector SB over SR 826	870601	16.5-ft	SB Bridge widening	SB Bridge widening	SB Bridge widening	SB Bridge widening	16.5-ft	16.5-ft	16.5-ft	16.5-ft	None
3	Turnpike Connector SB over SFRC	870159	23.35-ft	SB Bridge Replacement	SB Bridge Replacement	SB Bridge Replacement	SB Bridge Replacement	24.25-ft Min	24.25-ft Min	24.25-ft Min	24.25-ft Min	None
4	Turnpike Connector SB over SR 7/US 441	870045	16.80-ft	SB Bridge Replacement	SB Bridge Replacement	SB Bridge Replacement	SB Bridge Replacement	16.5-ft Min	16.5-ft Min	16.5-ft Min	16.5-ft Min	None
5	I-95 Flyover Ramp to Park & Ride Lot	870470	18.50-ft	Widen Roadway Underneath Bridge	Widen Roadway Underneath and Accommodate New Ramp	Widen Roadway Underneath and Accommodate New Ramp	Widen Roadway Underneath and Accommodate New Ramp	18.01-ft	18.5-ft	18.5-ft	18.01-ft	None
6	I-95 SB over Biscayne Canal	870348	2.01-ft	SB Bridge widening	Replacement	Replacement	SB Bridge widening	2.01-ft	6-ft Min above Normal High Water Elev.	6-ft Min above Normal High Water Elev.	2.01-ft	None
7	I-95 SB over NW 151st Street	870347	14.63-ft	N/A	Replacement	Replacement	N/A	N/A	16.5-ft Min	16.5-ft Min	N/A	None
8	I-95 SB over NW 143rd Street	370346	15.15-ft	N/A	Widening	Widening	N/A	N/A	15.15-ft	15.15-ft	N/A	Exception
9	SR 826 Connector over I-95 and SR 7/US 441	870041	16.57-ft	Bridge End Span Replacement	Bridge End Span Replacement	Bridge End Span Replacement	Replacement	16.5-ft Min	16.5-ft Min	16.5-ft Min	16.5-ft Min	None
10	NW 167th Street WB to I-95 Ramp over I-95 and SR 7/US 441	870042	14.47-ft	Bridge Replacement	Bridge Replacement	Bridge Replacement	Bridge Replacement	16.5-ft Min	16.5-ft Min	16.5-ft Min	16.5-ft Min	None
11	SR 826 EB to I-95 NB Flyover Ramp	N/A	N/A	New flyover ramp bridge	New flyover ramp bridge	New flyover ramp bridge	New flyover ramp bridge	16.5-ft Min	16.5-ft Min	16.5-ft Min	16.5-ft Min	None
12	Turnpike Connector SB Express Lane Connection to I-95 express SB	N/A	N/A	N/A	N/A	New flyover connector ramp bridge	N/A	N/A	N/A	16.5-ft Min	N/A	None
13	Pedestrian Bridge over I-95	N/A	N/A	N/A	Replace Pedestrian Bridge	Replace Pedestrian Bridge	N/A	N/A	17.5-ft min	17.5-ft min	N/A	None

5.4.9 Future Traffic Operational Analysis

Traffic operational analysis was performed for the future conditions under the No-Build and refined Interim Build Alternatives. Due to the location of the interchange, the close spacing of interchanges and intersections, and complexity of the GGI in conjunction with the saturated urban conditions of the area, CORSIM was used to evaluate the operating conditions of the main freeway sections and ramps. The CORSIM model limits generally include all the freeways, ramps and intersections within the study area to account for traffic backup from ramp intersections into the freeway facilities.

The CORSIM analysis for future conditions was based on two 4-hour periods that include the 2-hour peak period and the shoulder hours. The hourly volumes of the peak period and shoulder hours were developed for each entry location as a ratio of the global peak hour based on existing counts. These hourly ratios were maintained for future conditions. These percentages were applied to the future peak hour volumes estimated using the forecasted AADT, the standard K factor and the D_{30} factor for non-directional volumes.

5.4.9.1 Network-wide Comparison

Tables 5-11 and **5-12** show the results of the preliminary traffic operational analysis and the comparison to the No-Build Alternative for the 2030 AM and PM peak periods.

Table 5-11
Preliminary Traffic Operational Results (2030 AM Peak)

Network-Wide Statistics	Alternatives				
	No-Build	Interim Build Alternative 3A	Interim Build Alternative 3B	Interim Build Alternative 3C	Interim Build Alternative 4
Total Veh-Miles	345,567	466,585	470,169	472,960	470,840
Move Time (Veh-Hrs)	6,867	9,164	9,249	9,213	9,255
Delay Time (Veh-Hrs)	10,846	3,975	4,003	2,822	4,247
Total Time (Veh-Hrs)	17,713	13,139	13,251	12,035	13,503
Average Speed (mph)	19.55	35.53	35.50	39.31	34.89
Move/Total Ratio	0.39	0.70	0.70	0.77	0.69
Delay (min/mile)	1.89	0.51	0.51	0.36	0.54
Total Time (min/mile)	3.08	1.69	1.69	1.53	1.71

Table 5-12 Preliminary Traffic Operational Results (2030 PM Peak)					
Network-Wide Statistics	**Alternatives**				
	No-Build	**Interim Build Alternative 3A**	**Interim Build Alternative 3B**	**Interim Build Alternative 3C**	**Interim Build Alternative 4**
Total Veh-Miles	350,620	465,097	473,983	481,882	454,239
Move Time (Veh-Hrs)	7,011	9,161	9,362	9,440	8,975
Delay Time (Veh-Hrs)	13,701	8,753	9,990	10,029	11,086
Total Time (Veh-Hrs)	20,712	17,914	19,352	19,469	20,061
Average Speed (mph)	16.93	26.00	24.51	24.77	22.71
Move/Total Ratio	0.34	0.51	0.48	0.49	0.45
Delay (min/mile)	2.34	1.13	1.26	1.25	1.47
Total Time (min/mile)	3.55	2.31	2.45	2.42	2.65

The results shown above indicate that for 2030 AM peak period, the overall delay within the Golden Glades Interchange influence area will decrease by approximately 73%, 73%, 81% and 71% under Interim Build Alternatives 3A, 3B, 3C and 4 respectively compared to the No-Build Alternative. Also, the network average speed is projected to increase by approximately 82%, 82%, 101% and 78% under Interim Build Alternatives 3A, 3B, 3C and 4 respectively compared to the No-Build Alternative. These results represent significant improvements over the No-Build conditions.

Similar operational analysis results were obtained for the 2030 PM peak period. The overall delay within the Golden Glades Interchange influence area will decrease by approximately 52%, 46%, 47% and 37% under Interim Build Alternatives 3A, 3B, 3C and 4 respectively compared to the No-Build Alternative. Also, the network average speed is projected to increase by approximately 54%, 45%, 46% and 34% under Interim Build Alternatives 3A, 3B, 3C and 4 respectively compared to the No-Build Alternative. These results represent significant improvements over the No-Build conditions.

5.4.9.2 Travel Time and Speed Analysis

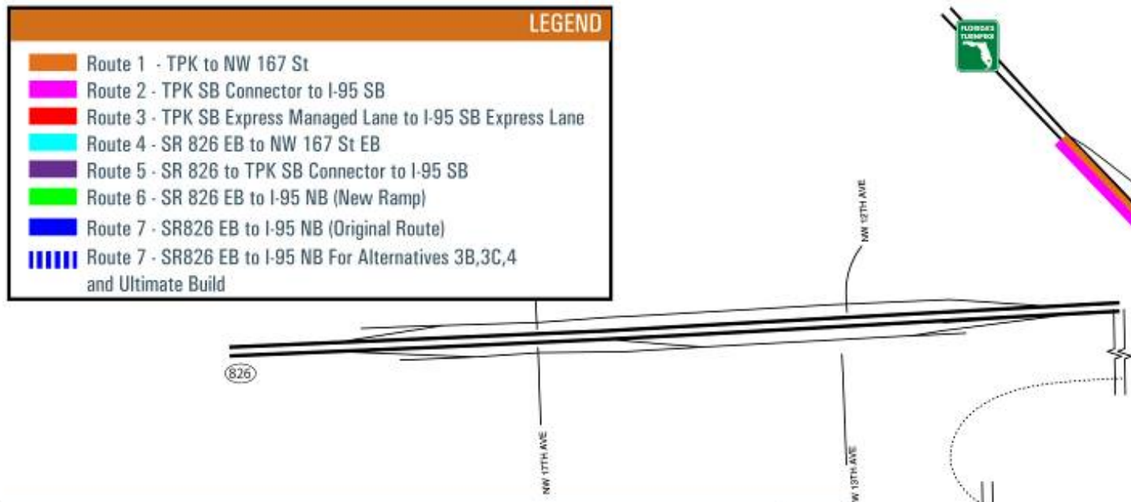
Travel time and speed analysis were also performed for the three interim build alternatives and compared to the No-Build Alternative. Six critical roadway links were selected for the comparison analysis and are shown in **Figure 5-23**. The results are summarized in **Tables 5-13** through **5-16**.

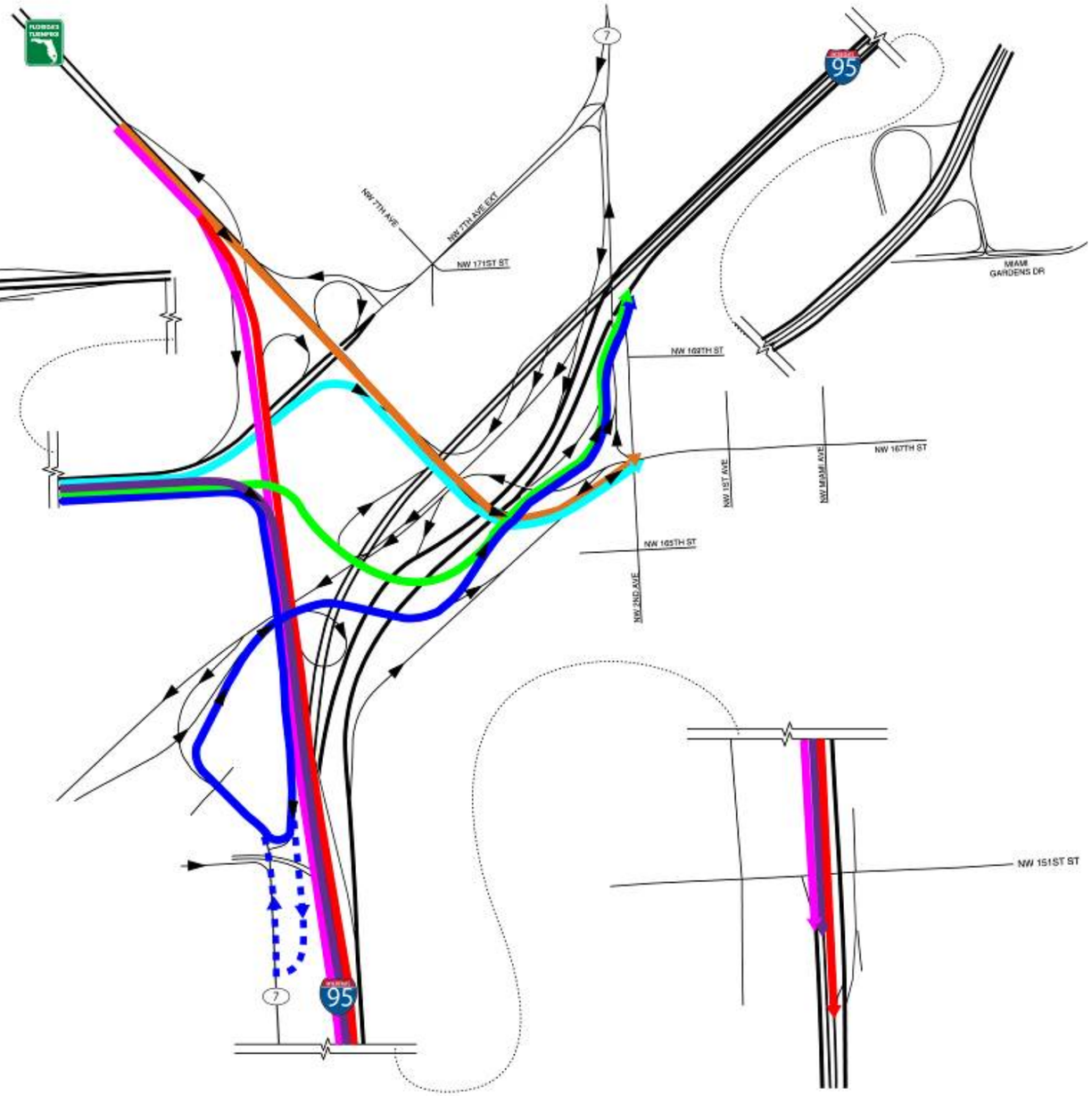
Table 5-13
Travel Time Summary (2030 AM Peak)

Route	Description	Travel Time (minutes)				
		No-Build	3A	3B	3C	4
Route 1	Turnpike SB to NW 2 Avenue	20.96	7.68	7.64	4.78	3.10
Route 2	Turnpike SB Connector to I-95 SB	16.44	6.41	6.26	4.01	5.48
Route 3	TPK SB to I-95 SB (Express Ramp)				3.01	
Route 4	SR 826 EB to NW 2 Avenue	6.08	4.18	4.35	3.87	3.00
Route 5	SR 826 EB to I-95 SB	2.05	3.35	3.14	2.70	4.10
Route 6	SR 826 EB to I-95 NB (New Ramp)		2.72	2.83	2.01	2.13
Route 7	SR 826 EB to I-95 NB (Existing Route)	5.86	4.41	5.35	4.60	8.00

Table 5-14
Travel Time Summary (2030 PM Peak)

Route	Description	Travel Time (minutes)				
		No-Build	3A	3B	3C	4
Route 1	Turnpike SB to NW 2 Avenue	24.17	4.99	2.98	3.18	3.02
Route 2	Turnpike SB Connector to I-95 SB	18.38	4.12	3.81	3.70	4.01
Route 3	TPK SB to I-95 SB (Express Ramp)				2.73	
Route 4	SR 826 EB to NW 2 Avenue	7.07	5.00	3.28	4.13	3.21
Route 5	SR 826 EB to I-95 SB	1.96	3.06	1.77	2.62	3.00
Route 6	SR 826 EB to I-95 NB (New Ramp)		4.14	2.07	2.49	1.86
Route 7	SR 826 EB to I-95 NB (Existing Route)	3.73	4.86	6.08	4.54	8.24





	Route	2018 NB AM*	2030 NB AM*	2040 NB AM*	2018 3A AM	2018 3B AM	2018 3C AM	2018 4 AM	2030 3A AM	2030 3B AM	2030 3C AM	2030 4 AM	2040 ULTIMATE
Travel Time (min)	1	16.93	20.96	22.28	2.91	2.92	2.91	2.90	7.68	7.64	4.78	3.10	10.29
	2	16.79	16.44	17.12	4.35	4.11	3.76	4.50	6.41	6.26	4.01	5.48	7.74
	3						2.78				3.01		6.36
	4	5.45	6.08	6.64	2.57	2.59	2.54	2.51	4.18	4.35	3.87	3.00	4.32
	5	2.19	2.05	1.97	3.25	1.80	2.67	2.08	3.35	3.14	2.70	4.10	3.10
	6				1.64	1.60	1.64	1.60	2.72	2.83	2.01	2.13	1.31
	7	3.71	5.86	3.69	3.57	4.27	4.12	4.39	4.41	5.35	4.60	8.00	7.62
Speed (mph)	1	7.81	6.05	5.69	42.69	42.67	42.75	43.24	20.78	21.03	34.91	41.12	12.09
	2	28.65	34.09	34.64	43.67	45.00	48.39	42.61	35.37	36.24	46.54	37.85	33.80
	3						58.23				56.18		44.09
	4	10.64	9.72	8.63	29.38	29.30	31.33	30.61	15.07	19.67	21.50	26.96	22.23
	5	38.88	41.40	42.50	39.45	42.34	46.11	38.53	37.93	39.99	45.65	33.55	42.51
	6				41.50	41.42	41.62	41.07	32.45	32.27	38.77	36.42	51.93
	7	30.98	25.42	31.84	35.83	35.39	38.38	35.41	24.73	31.93	36.21	28.00	38.79

	Route	2018 NB PM*	2030 NB PM*	2040 NB PM*	2018 3A PM	2018 3B PM	2018 3C PM	2018 4 PM	2030 3A PM	2030 3B PM	2030 3C PM	2030 4 PM	2040 ULTIMATE
Travel Time (min)	1	7.11	24.17	25.52	4.61	3.70	3.59	2.82	4.99	2.98	3.18	3.02	3.07
	2	3.87	18.38	20.67	3.72	3.70	3.67	3.71	4.12	3.81	3.70	4.01	3.87
	3						2.72				2.73		2.75
	4	7.09	7.07	7.86	7.58	5.02	4.19	3.70	5.00	3.28	4.13	3.21	2.47
	5	2.79	1.96	3.60	2.66	2.64	2.60	1.68	3.06	1.77	2.62	3.00	2.79
	6				1.74	1.61	1.72	1.71	4.14	2.07	2.49	1.86	1.31
	7	4.24	3.73	11.53	3.57	3.99	4.23	4.49	4.86	6.08	4.54	8.24	6.62
Speed (mph)	1	33.59	4.98	4.57	39.42	41.38	41.55	44.04	37.89	43.05	41.85	43.66	42.58
	2	48.36	34.64	31.16	48.89	49.03	41.98	48.37	45.79	47.99	49.21	45.91	47.83
	3						59.22				59.00		58.68
	4	7.94	7.86	7.03	10.23	18.24	18.67	24.22	14.49	25.93	20.47	27.54	28.91
	5	41.60	42.59	36.73	46.31	44.85	47.25	43.87	41.50	44.92	46.94	41.31	45.08
	6				39.99	39.12	40.39	39.50	24.50	36.40	35.80	37.71	52.05
	7	29.37	31.50	19.66	36.01	37.30	37.91	36.40	30.45	35.53	36.55	30.55	40.19

* No Build alternatives are constrained with traffic backing up at entry nodes, causing travel time and speed to appear more favorable.

Figure 5-23 Critical Routes for Network Analysis

Table 5-15 Travel Speed Summary (2030 AM Peak)						
Route	**Description**	**Travel Speed (mph)**				
		No-Build	**3A**	**3B**	**3C**	**4**
Route 1	Turnpike SB to NW 2 Avenue	6.05	20.78	21.03	34.91	41.12
Route 2	Turnpike SB Connector to I-95 SB	34.09	35.37	36.24	46.54	37.85
Route 3	TPK SB to I-95 SB (Express Ramp)				56.18	
Route 4	SR 826 EB to NW 2 Avenue	9.72	15.07	19.67	21.50	26.96
Route 5	SR 826 EB to I-95 SB	41.40	37.93	39.99	45.65	33.55
Route 6	SR 826 EB to I-95 NB (New Ramp)		32.45	32.27	38.77	36.42
Route 7	SR 826 EB to I-95 NB (Existing Route)	25.42	24.73	31.93	36.21	28.00

Table 5-16 Travel Speed Summary (2030 PM Peak)						
Route	**Description**	**Travel Speed (mph)**				
		No-Build	**3A**	**3B**	**3C**	**4**
Route 1	Turnpike SB to NW 2 Avenue	4.98	37.89	43.05	41.85	43.66
Route 2	Turnpike SB Connector to I-95 SB	34.64	45.79	47.99	49.21	45.91
Route 3	TPK SB to I-95 SB (Express Ramp)				59.00	
Route 4	SR 826 EB to NW 2 Avenue	7.86	14.49	25.93	20.47	27.54
Route 5	SR 826 EB to I-95 SB	42.59	41.50	44.92	46.94	41.31
Route 6	SR 826 EB to I-95 NB (New Ramp)		24.50	36.40	35.80	37.71
Route 7	SR 826 EB to I-95 NB (Existing Route)	31.50	30.45	35.53	36.55	30.55

The proposed improvements under the interim build alternatives will result in significant travel time savings and increased speed over the No-Build Alternative for both the AM and PM peak periods. For the SR 826/Palmetto Express eastbound to I-95 northbound route, the travel time on the new flyover ramp under Interim Build Alternatives 3A, 3B, 3C and 4 will decrease by an average of 59% during the AM peak period compared to the existing circuitous route under the No Build Alternative. The SR 826/Palmetto Expressway eastbound and Florida's Turnpike southbound to NW 2nd Avenue routes show significant improvements for build alternatives 3B, 3C and 4 compared to the No-Build due to the rerouting of SR 826 EB to I-95 NB traffic onto the new flyover ramp.

The proposed direct flyover connection from Florida's Turnpike Southbound to the I-95 southbound express lane under Interim Build Alternative 3C provides significant improvements over Interim Build Alternatives 3A, 3B and 4. This additional capacity improvement accommodates the traffic volume for the year 2030 by significantly reducing the traffic backing up at the Florida's Turnpike southbound entry node. As previously mentioned, Interim Build Alternatives 3A and 3B are constrained with traffic backing up at entry nodes. As such, the travel times and speeds may appear better than they are due to limited volume throughput in the system.

No significant improvements were observed for the SR 826/Palmetto Expressway eastbound to I-95 southbound route. This is due to the fact that the No-Build Alternative is constrained with traffic backing up at entry nodes so travel times and speeds may appear better than they are due to limited volume throughput.

5.4.10 Access Management

The existing eastbound on-ramp from NW 12th Avenue to SR 826/ Palmetto Expressway eastbound ties into an auxiliary lane along the freeway which also serves as an exit only lane for the exit ramp for SR 826/ Palmetto Expressway eastbound to I-95 southbound and northbound movements. The relatively heavy volumes for the exit ramp conflicts with the traffic from NW 12th Avenue on-ramp resulting in a major weaving condition within this segment of the freeway. This weaving condition may also be a contributing factor to the several rear-end and sideswipe collisions within this segment of the freeway.

The proposed improvements under Interim Build Alternatives 3A, 3B and 3C remove the direct connection from the NW 12th Avenue on-ramp to SR 826/ Palmetto Expressway eastbound auxiliary lane to accommodate the three-lane ramp for the SR 826 eastbound to I-95 northbound and southbound ramp. The traffic using this ramp will be routed along NW 165th Street onto NW 17th Avenue across a new connection over the NW 17th Street Canal. This access modification will alleviate potential traffic circulation impact to the business and warehouse district on the south side of SR 826/Palmetto Expressway and also provides access to SR 826/Palmetto expressway via the NW 17th Avenue on-ramp.

The proposed improvements under Interim Build Alternative 4, maintains the NW 12th Avenue on-ramp which provides access from the Sunshine Industrial Park to I-95 southbound and northbound with connectivity to Florida's Turnpike through the SR 7/US 441. In order to eliminate the current weaving issue along the SR 826 mainline, the NW 12th Avenue on-ramp will not connect directly to SR 826 mainline. Instead, it will be relocated and connected to the three lane off-ramp to I-95 northbound and southbound as a barrier separated auxiliary lane. The provision of the NW 12th Avenue on-ramp will require the removal of the eastbound frontage road east of NW 10th Avenue. The warehouse property on the southwest quadrant of the interchange within the Sunshine Industrial Park will be acquired due to the removal of the only access road for this property.

The proposed improvements under Interim Build Alternatives 3B, 3C and 4 relocates the Turnpike Connector southbound off-ramp to SR 7/US 441 approximately 1,150-ft south along SR 7/US 441 to the Biscayne River Drive intersection. This increases the signal spacing between the Park and Ride Lot signal and the SR 7/US 441 off-ramp signal from 500-ft to 1,650-ft. The increased signal spacing meets the FDOT Access Management Standards requirement of 1320-ft for signal spacing along this facility type. In addition, a new signalized intersection with double left turn lanes for SR 826/Palmetto Expressway eastbound to Florida's Turnpike northbound to improve operations and safety at this intersection.

A new signalized intersection is proposed at the eastbound SR 826 to northbound Florida's Turnpike with dual left-turns. The adjacent signal is about 500-ft which is less than the FDOT recommended 1,320-ft for controlled access facilities with design speed less than 45 mph. Therefore, a design variation will be required for this signal.

5.4.11 Right-of-way Impacts

Table 5-17 summarizes the potential right-of-way impacts among the different interim build alternatives. The detailed right-of-way impact analysis is provided in **Appendix F**.

Table 5-17
Potential Right-of-way Impact Summary (Parcels)

Property Type	Interim Build Alt. 3A	Interim Build Alt. 3B	Interim Build Alt. 3C	Interim Build Alt. 4
Residential	0	18	18	0
Commercial	2	5	5	10
Industrial	1	1	1	1
Vacant	1	11	11	12
FDOT Property (Park & Ride Lot)	1	1	1	1
Total number of Parcels	**5**	**36**	**36**	**24**

The proposed improvements under Interim Build Alternative 3A will require additional right-of-way to accommodate the reconstruction along Turnpike Connector and widening along I-95. Approximately 32-ft right-of-way acquisition along the park and ride lot west of the Turnpike Connector is required. In addition, two commercial properties and one vacant property west of I-95 between the Park and Ride and the Biscayne Canal will be affected. The right-of-way acquisition will include full acquisition of the two commercial properties and partial acquisition of the vacant property along I-95. A corner clip of the industrial property within the GGI will also be required to accommodate the proposed SR 826 eastbound to I-95 northbound flyover within the GGI.

The proposed reconstruction along I-95 southbound under Interim Build Alternatives 3B and 3C requires significant right-of-way impact to properties on the west side of I-95 between the Park and Ride Lot and NW 146th Street to accommodate the proposed improvements. This includes eighteen residential properties, five commercial properties and eleven vacant properties. The right-of-way acquisition will include full acquisition of sixteen residential and all the commercial and vacant properties. The remaining two residential properties involve partial acquisition. The right-of-way impacts to the Park and Ride Lot and the industrial property within the GGI under Interim Build Alternatives 3B and 3C are identical.

Interim Build Alternative 4 involves full acquisition of 8 commercial parcels and 9 vacant parcels west of I-95 between the Park and Ride and the Biscayne Canal to accommodate the proposed widening of the I-95 southbound lanes and the relocation of the SR 7/Us 441 off ramp. Full acquisition of 2 commercial parcels and 2 vacant parcels within the Sunshine Industrial Park located south of SR 826 will be required to accommodate the NW 12th Avenue eastbound on-ramp. Additionally, approximately 15-ft right-of-way to the west of NW 2nd Avenue, south of NW 167th Street will be required to accommodate the additional northbound left turn lane. The right-of-way impacts to the Park and Ride east lot has a slightly greater impact compared to Alternative 3A. However, right-of-way impacts to the industrial property within the GGI are similar to that of Interim Build Alternative 3A.

5.4.12 Preliminary Drainage

Stormwater management systems proposed by this study meet existing water quality standards as set forth in Chapter 62-302 of the Florida Administrative Code. The approach to meeting water quality requirements is to provide treatment for the increase in impervious area and restore or replace existing treatment facilities impacted by this project. This approach was discussed with SFWMD during an interagency monthly meeting held on April 19th 2012. The detailed drainage analysis is provided in the Stormwater Management Report prepared for this PD&E Study.

5.4.12.1 Interim Build Alternative 3A

Interim Build Alternative 3A increases the impervious area by approximately 3.84 Ac and 4.16 Ac in Basins C-8 and C-9, respectively. Using the SFWMD water quality criteria, this Alternative will need 0.41 Ac-ft of dry retention treatment in Basin C-8 and 0.43 Ac-ft of additional dry retention treatment in Basin C-9.

The required treatment volume for Basin C-8 can be provided by creating dry retention areas along the drainage swales within the individual or adjacent drainage systems. Right-of-way acquisition of two parcels, folios 30-2113-001-0850 and 30-2113-001-0920, is anticipated in Basin C-8 to accommodate I-95 roadway improvements. These parcels are located along the western edge of I-95 and near the C-8 Canal. They are ideally situated to capture and treat runoff from the I-95 increase in impervious area. Together, the parcels have an available area of 0.8 Acres that can be used for dry retention. A total of 1.97 Ac-ft of dry retention is provided for water treatment within this basin.

For Basin C-9, the required treatment volume can be provided by creating dry retention area in the FDOT owned vacant lot, Folio 34-2112-000-0083, located just north of the railroad and bordered by both the SR 826 and Turnpike Connectors. This vacant lot can accommodate a 3.5 Ac dry retention pond while avoiding impacting the Intelligent Transportation System (ITS) existing building on the site. A depth of 0.5-ft will be needed to create the 1.8 Ac-ft of dry retention required for Basin C-9.

The improvement along NW 17th Avenue is also within Basin C-8. The proposed treatment will require two shallow ditches within the swale for the southbound lane with outfall into the NW 17th Avenue Canal. The ditches would have side slopes of 1H:3V, average width of 5.5-ft, a combined length of 1,100-ft and a retention depth of 0.5-ft to provide 0.07 Ac-ft of dry-retention treatment.

In addition, the proposed widening improvements to the I-95 southbound lanes will move the travel lanes towards the west, which will result in the double 72-inch outfall pipes located between the GGI and the C-8 canal, and corresponding manholes, being in the travel lanes. Relocation of the double 72-inch outfall pipes (approximately 1,400-ft) is recommended to avoid having manholes in the travel lanes.

5.4.12.2 Interim Build Alternative 3B

Interim Build Alternative 3B increases the impervious area by approximately 6.5 Ac and 4.5 Ac in Basins C-8 and C-9, respectively. Using the SFWMD water quality criteria, this Alternative will need 0.67 Ac-ft of dry retention treatment in Basin C-8 and 0.47 Ac-ft of additional dry retention treatment in Basin C-9.

For Basin C-8, several parcels, in the vicinity of NW 6th Court between NW 146th Street and NW 151st, will be acquired to accommodate the roadway improvements. A review of the proposed roadway geometry suggests that 1.8 Acres will be available for storm water

treatment in the area where parcels will be acquired. This area can be used to accommodate a dry-retention pond with a bottom area of 1.2 Acres and a depth of 1.0-ft to provide a dry-retention treatment volume of 1.2 Ac-ft. A total of 3.59 Ac-ft of dry retention is provided for water treatment within this basin.

Similar to Interim Build Alternative 3A, the required treatment volume for Basin C-9 can be provided by creating a dry retention area in the FDOT owned vacant lot, Folio 34-2112-000-0083, located just north of the railroad and bordered by both the SR 826 and Turnpike Connectors. This vacant lot can accommodate a 3.5 Ac dry retention pond while avoiding impacting the Intelligent Transportation System (ITS) existing building on the site. A depth of 0.5 ft will be needed to create the 1.8 Ac-ft of dry retention required for Basin C-9.

The drainage treatment along NW 17th Avenue and the relocation of the double 72-inch outfall pipes located between the GGI and the C-8 canal and corresponding manholes to avoid having manholes in the travel lanes similar to Interim Build Alternative 3A.

5.4.12.3 Interim Build Alternative 3C

Interim Build Alternative 3C increases the impervious area by approximately 9.0 Ac and 4.7 Ac in Basins C-8 and C-9, respectively. Using the SFWMD water quality criteria, this Alternative will need 0.94 Ac-ft of dry retention treatment in Basin C-8 and 0.49 Ac-ft of additional dry retention treatment in Basin C-9.

The required treatment volume for Basins C-8 and C-9 is similar to that of Interim Build Alternative 3B. In addition, the drainage treatment along NW 17th Avenue and the relocation of the double 72-inch outfall pipes located between the GGI and the C-8 canal and corresponding manholes to avoid having manholes in the travel lanes similar to Interim Build Alternative 3A.

5.4.12.4 Interim Build Alternative 4

Interim Build Alternative 4 increases the impervious area by approximately 3.3 ac and 4.4 ac in Basins C-8 and C-9, respectively. Using the SFWMD water quality criteria, this will require 0.34 ac-ft of treatment in Basin C-8 and 0.45 ac-ft of additional treatment in Basin C-9.

The required treatment volume for Basin C-8 can be provided by creating dry retention areas along the drainage swales within the individual or adjacent drainage systems. Right-of-way acquisitions of several parcels are anticipated in Basin C-8 to accommodate the I-95 roadway improvements. These parcels are located west of I-95 and near the C-8/Biscayne Canal. They are ideally situated to capture and treat runoff from the I-95 increase in impervious area. Together, the parcels have an available area of approximately 7 acres that can be used for dry retention. A total of 2.62 ac-ft of dry retention is provided for water treatment within this basin.

For Basin C-9, the required treatment volume can be provided by creating dry retention area in the FDOT-owned vacant lot located just north of the railroad and bordered by both the SR 826/Palmetto Expressway and Turnpike Connectors. This vacant lot can accommodate a 3.5 ac dry retention pond while avoiding impacting the existing Intelligent Transportation System (ITS) building on the site. A depth of 0.5-ft will be needed to create the 1.8 ac-ft of dry retention required for Basin C-9. Right-of-way acquisition of four parcels is anticipated in Basin C-9 to accommodate the SR 826/Palmetto Expressway roadway improvements while maintaining the NW 12th Avenue on-ramp to I-95 southbound. The parcels are located in the Sunshine Industrial Park south of SR 826/Palmetto Expressway. It can provide an appropriate location for water quality treatment. This potentially acquired area can accommodate a 4.2-ac dry-retention pond.

In addition, the proposed widening improvements to the I-95 southbound lanes will move the travel lanes towards the west, which will result in the double 72-inch outfall pipes located between the GGI and the C-8/Biscayne Canal, and corresponding manholes, being in the travel lanes. Relocation of the double 72-inch outfall pipes (approximately 1,400-ft) is recommended to avoid having manholes in the travel lanes.

5.4.13 Utility and Facility Impacts

The proposed reconstruction of the three-lane ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound under Interim Build Alternatives 3A, 3B, 3C and 4 will impact the Florida Gas Transmission (FGT) 18-inch steel gas line along the south side of the SR 826 mainline. It is anticipated that the gas line will have to be relocated due to potential conflicts with the proposed Mechanically Stabilized Earth (MSE) walls. In discussion with the Florida Gas Transmissions (FGT) it is understood that given the future plan to widen SR 826/Palmetto Expressway from I-75 to GGI, it may be necessary for FGT to relocate the existing line to another corridor. Existing ITS buried fiber optic cable (BFO) and DMS signs running along the south side of SR-826/Palmetto Expressway may be impacted by the proposed widening and may require adjustments under all four Interim Build Alternatives.

The proposed flyover from SR 826/Palmetto Expressway eastbound to I-95 northbound under all four Interim Build Alternatives will impact existing Florida Power & Light Company's (FPL) 138KV overhead electric crossing and Verizon Business (f.k.a. MCI) fiber optic lines inside 2-2" PVC ducts running north and parallel to the SFRC railroad tracks. The proposed flyover ramp may also impact overhead fiber optics cables attached to the overhead electric poles.

The proposed widening and reconstruction the I-95 southbound lanes under Interim Build Alternatives 3B and 3C will impact several water and sewer mains crossing underneath I-95 between NW 151st Street and NW 135th Street. The BFO communications trunk line on the

west side of I-95 that links the various ITS facilities will also be impacted from the proposed reconstruction and widening under Interim Build Alternatives 3B and 3C.

In addition, the proposed relocation of the off-ramp from the Turnpike Connector southbound to SR 7/US 441 under Interim Build Alternatives 3B, 3C and 4 will impact water and sewer mains, and buried telephone cables along SR 7/US 441 between the Biscayne Canal and the GGI Park and Ride Lot.

The proposed elevated direct express lane connection from Florida's Turnpike southbound to the 95 Express southbound lanes under Interim Build Alternative 3C will also impact overhead electric lines crossing over I-95 at NW 157th Street.

Table 5-18 summarizes the potential utility impacts due to the proposed improvements under Interim Build Alternatives 3A, 3B, 3C and 4. The detailed utility impacts are provided in the utility impacts assessment memorandum prepared as part of this PD&E study.

Table 5-18
Summary of Potential Utility Impacts

Utility Agency Owner	Number of Facilities Impacted			
	Interim Build Alt. 3A	Interim Build Alt. 3B	Interim Build Alt. 3C	Interim Build Alt. 4
AT&T Florida	4	5	5	5
City of North Miami Beach	3	5	5	4
City of North Miami Water & Sewer Dept.	1	1	1	1
Comcast	1	1	1	1
FDOT ITS	4	5	5	5
FTE - ITS	2	2	2	2
Florida Gas Transmission	2	2	2	2
FPL Distribution	3	3	4	3
FPL FiberNet	2	2	2	2
FPL Transmission	2	2	2	2
Level 3 Communications	2	2	2	2
Miami-Dade Water and Sewer Department	3	8	8	5
TECO Peoples Gas	4	4	4	4
Verizon Business Solution	1	1	1	1
Total	**34**	**43**	**44**	**39**

All UAOs facilities appeared to be located on FDOT's right-of-way by permits with the exception of Verizon Business Solution (f.k.a. MCI) one (1) 4" PVC conduits located on SFRC right-of-way**.** No Utility Easement have been identified and No UAO's have claimed compensable interest along the corridor, however given the fact that this project will be

likely funded with federal funds and that portions of the work are along I-95 those utility relocation located along I-95 may be compensable. Funding should be program in the event. Amount of funding will be determined as the study progress.

All UAO(s) owning major facilities within the area of the Project have Master Agreements with FDOT. This should expedite the coordination process eliminating the need for individual work agreements.

5.4.14 Bicycle and Pedestrian Accommodations

No pedestrian or bicycle facilities are planned as part of the proposed improvements along the SR 826/Palmetto Expressway mainline and I-95 southbound corridors. The existing sidewalks along the SR 826/Palmetto Expressway frontage roads, SR 7/US 441, NW 17th Avenue and NW 12th Avenue will be maintained. However, in order to accommodate the relocated NW 12th Avenue on-ramp, the existing sidewalk along the eastbound frontage road east of NW 10th Avenue will be removed. The proposed widening of the westbound frontage road to accommodate an exclusive right-turn lane at NW 17th Avenue ramp terminal will also provide an adjacent 6-ft sidewalk between NW 15th Avenue and NW 17th Avenue to maintain sidewalk continuity. Additionally, a 6-ft sidewalk adjacent to the curb & gutter on the west side is proposed along NW 17th Avenue between NW 161st Street and SR 826/Palmetto Expressway for Interim Build Alternatives 3A, 3B and 3C. No improvements are proposed along NW 17th Avenue under Interim Build Alternative 4.

The replacement of the Turnpike Connector Southbound Bridge over the SFRC (870159) will also provide adequate horizontal and vertical clearance necessary to accommodate the proposed Gold Coast Trail which runs along the easement of the South Florida Rail Corridor (SFRC) for all the interim build alternatives.

The proposed reconstruction and widening along I-95 southbound mainline under Interim Build Alternatives 3B and 3C will require replacement of the pedestrian bridge across I-95 just south of NW 151st Street which provides access between the residential areas on the west and Thomas Jefferson Middle School on the east side of I-95.

5.4.15 Multi-modal Accommodations

Seven Miami-Dade Transit (MDT) bus routes (95 Golden Glades, 95 Dade-Broward Express, 22, 246, 77, 277) and five Broward County Transit bus routes (18, University Breeze, 441 Breeze, 95 Express Pembroke Pines, 95 Express Miramar) currently traverse the GGI or connect to the Park and Ride Lot. The improved mobility resulting from the proposed improvements under Interim Build Alternatives 3A, 3B, 3C and 4 will benefit transit operations within the interchange.

In addition, Interim Build Alternative 3C, which provides a direct express lanes connection from the Turnpike Connector ramp to the 95 Express will improve transit travel time for the I-95 Express Miramar service route. This route was recently added as part of the 95 Express transit service and begins at the Miramar Central Station, located at Miramar Town Center, Civic Center Place at Red Road, and travels along Red Road, the Florida's Turnpike Extension, and then proceeds on I-95 in the express lanes to downtown Miami.

5.4.16 Traffic Control Concepts

5.4.16.1 Interim Build Alternative 3A

The preliminary concept for maintenance of traffic for Interim Build Alternative 3A is shown in **Appendix G**. The maintenance of traffic can be accomplished in three phases as follows:

PHASE I of the construction sequence would include reconstruction of NW 17th Avenue, NW 165th Street including culvert at the canal along the NW 17th Avenue, widening, of SR 826/Palmetto Expressway eastbound to add lanes for relocated two-lane ramp from SR 826/Palmetto Expressway eastbound (Ramp A) to widened Turnpike Connector southbound and for a new flyover ramp (Ramp B) from SR 826/Palmetto Expressway eastbound to I-95 northbound. In this phase it is proposed to widen and reconstruct Turnpike Connector southbound to accommodate an additional lane, add one auxiliary lane to SR 826/Palmetto Expressway eastbound before ramp for Florida's Turnpike extension to NW 167th Street and add left turn lane from SR 826/Palmetto Expressway eastbound to Florida's Turnpike northbound, resurface SR 826/Palmetto Expressway eastbound from Florida's Turnpike overpass to NW 7th Avenue and widen I-95 southbound up to the NW 151st Street.

PHASE II of the construction sequence includes construction of SR 826/Palmetto Expressway eastbound flyover ramp to I-95 northbound (Ramp B) up to the merge with existing SR 7/US 441 northbound, construction of temporary ramp for SR 7/US 441 relocated closer to I-95 northbound to allow for extension/replacement of existing end span of Bridge No 870041, construction of new bridge and relocated ramp from NW 167th Street (SR 826/Palmetto Expressway westbound) to I-95 southbound, resurfacing and reconstruction of SR 826/Palmetto Expressway westbound from NW 7th Avenue to the interchange with Florida's Turnpike extension including ramps to Florida's Turnpike northbound.

PHASE III of the construction sequence includes widening of SR 7/US 441 under the new bridges No 870041 and 870042 and completion of SR 826/Palmetto Expressway eastbound ramp to I-95 northbound.

5.4.16.2 Interim Build Alternative 3B

The preliminary concept for maintenance of traffic for Interim Build Alternative 3B is shown in **Appendix G**. The maintenance of traffic can be accomplished in three phases as follows:

PHASE I of the construction sequence is identical with Phase I of Alternative 3A with the following exceptions: the proposed Southbound Turnpike Connector is shifted more to the west to provide space for future Florida's Turnpike Southbound Express Lane to be connected to existing I-95 southbound Express Lanes. In this phase the construction sequence would require relocation of Turnpike Connector southbound on new horizontal and vertical alignment, construction of new connecting ramp to SR 7/US 441, reconstruction of SR 7/US 441 and widening of westerly side of I-95 southbound roadway and bridges on new profile and partially on a new temporary alignment.

The next phases of construction on I-95 southbound are controlled by the phasing of replacement of bridges over the Biscayne Canal and over the NW 151st Street, geometric constraints of temporary shifts of I-95 southbound travel lanes and mandatory maintenance of existing access for all movements to I-95 southbound Express Lanes. The reconstruction of I-95 southbound in next phases will progress from the west to the east without split of three I-95 southbound lanes.

PHASE II of the construction sequence is identical with Phase II of Alternative 3A with the following additions: construct middle portion of the bridge over Biscayne Canal and the middle-west portion of the bridge over NW 151st Street. Reconstruct middle-west portion of I-95 SB roadway up to the south limit of the project.

PHASE III of the construction sequence is identical with Phase III of Alternative 3A with the following additions: complete reconstruction of the bridge over Biscayne Canal and reconstruct middle-easterly portion of the bridge over NW 151st Street. Reconstruct middle-east portion of I-95 southbound roadway up to the south limit of the project.

PHASE IV of the construction sequence includes completion of the replacement of the bridge over the NW 151st Street and reconstruction of the remaining portion of I-95 southbound on the east side up to the south limit of the project.

5.4.16.3 Interim Build Alternative 3C

The preliminary concept for maintenance of traffic for Interim Build Alternative 3C is shown in **Appendix G**. The construction sequence is identical with phasing of Alternative 3B with assumption, that the scope of work shown in Interim Build Alternative 3B is completed. This alternative would require to temporary shift apart Turnpike Connector southbound and northbound lanes to create work zone for construction of Florida's Turnpike southbound Express Lane flyover to be connected to existing I-95 southbound flyover.

5.4.16.4 Interim Build Alternative 4

The preliminary concept for maintenance of traffic for Interim Build Alternative 4 is shown in **Appendix G**. The maintenance of traffic can be accomplished in three phases as follows:

PHASE I of the construction sequence would include widening of SR 826/Palmetto Expressway eastbound to add lanes for relocated two-lane ramp from SR 826/Palmetto Expressway eastbound and the NW 12th Avenue on-ramp to widened Turnpike Connector southbound and for a new flyover ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound. In this phase it is proposed to widen and reconstruct Turnpike Connector southbound to accommodate an additional lane, add one auxiliary lane to SR 826/Palmetto Expressway eastbound before ramp for Florida's Turnpike extension to NW 167th Street and add left turn lane from SR 826/Palmetto Expressway eastbound to Florida's Turnpike northbound, resurface SR 826/Palmetto Expressway eastbound from Florida's Turnpike overpass to NW 7th Avenue, construct the new three lane off ramp from the Turnpike Connector to SR 7/US 441 and widen I-95 southbound up to the NW 151st Street.

PHASE II of the construction sequence includes construction of SR 826/Palmetto Expressway eastbound flyover ramp to I-95 northbound up to the merge with existing SR 7/US 441 northbound, Shift traffic on the existing SR 7 northbound ramp to allow for extension/replacement of existing end span of Bridge No 870041, construction of new bridge and relocated ramp from NW 167th Street (SR 826/Palmetto Expressway westbound) to I-95 southbound, resurfacing and reconstruction of SR 826/Palmetto Expressway westbound from NW 7th Avenue to the interchange with Florida's Turnpike extension including ramps to Florida's Turnpike northbound.

PHASE III of the construction sequence includes widening of the SR 7/US 441 ramp and the new single ramp under the new bridges No 870041 and 870042 and completion of SR 826/Palmetto Expressway eastbound ramp to I-95 northbound.

5.4.17 Design Variations and Exceptions

The proposed project study area along I-95 from NW 151st to Opa-Locka Blvd overlaps the construction limits for the 95 Express Phase I project completed in 2009. As part of that construction project, several design exceptions including lane width, shoulder width, bridge width, stopping sight distance, vertical clearance and vertical alignment were obtained within this segment of I-95. Design variations were also obtained for pavement cross slope, guardrail offset and horizontal clearance.

As part of this project, several variations and exceptions are necessary to implement the proposed improvements under each alternative and would result in reducing right-of-way needs as well as potential cost savings without compromising safety. **Table 5-19** summarizes the design variation and exceptions identified for the Interim Build Alternatives.

The design exception for the existing vertical alignment along I-95 south of NW 151st Street was obtained during the construction of the 95 Express Phase I project. Consequently,

documentation and approval of the design exception for the substandard K-value, curve length and stopping sight distance along the crest curve over NW 143rd Street may not be required since it is consistent with prior approvals along this segment of I-95.

In addition, the design variations for the substandard vertical clearance at the SR 826/Palmetto Expressway bridges over NW 12th Avenue and NW 17th Avenue as well as the design variations for the substandard median width and vertical alignment along SR 826/Palmetto Expressway mainline will be fixed as part of the Ultimate Build improvements. At that time, the segment of SR 826/Palmetto Expressway between NW 17th Avenue and GGI will be reconstructed to upgrade these deficient design elements.

Table 5-19
Design Variations & Exceptions Summary

Design Compliance	Design Element	Location/Description			
		Interim Build Alternative 3A	**Interim Build Alternative 3B**	**Interim Build Alternative 3C**	**Interim Build Alternative 4**
Design Variations	1. Shoulder Width	• 10-ft outside shoulder width along SR 826 mainline • 8-ft outside and 6.5-ft inside shoulder along SR 826 EB to I-95 NB & SB off Ramp	• 10-ft outside shoulder width along SR 826 mainline • 8-ft outside and 6.5-ft inside shoulder along SR 826 EB to I-95 NB & SB off Ramp	• 10-ft outside shoulder width along SR 826 mainline • 8-ft outside and 6.5-ft inside shoulder along SR 826 EB to I-95 NB & SB off Ramp	• None
	2. Median Width	• 16-ft median width along SR 826 mainline	• 16-ft median width along SR 826 mainline	• 16-ft median width along SR 826 mainline	• 16-ft median width along SR 826 mainline
	3. Vertical Alignment	• Reduced vertical curve length for four curves (Curves 4, 5, 6 and 7) along I-95 southbound mainline	• None	• None	• Reduced vertical curve length for four curves (Curves 4, 5, 6 and 7) along I-95 southbound mainline
	4. Horizontal Alignment	• Reduced horizontal curvature and curve length for one curve (Curve I95SB-3) along I-95 mainline southbound	• Reduced horizontal curvature for one curve (Curve I95SB3B-4) along I-95 mainline southbound	• Reduced horizontal curvature for one curve (Curve I95SB3C-4) along I-95 mainline southbound	• Reduced horizontal curvature and curve length for one curve (Curve I95SB-3) along I-95 mainline southbound
	5. Stopping Sight Distance	• Reduced vertical stopping sight distance for two curve along SR 826 mainline	• Reduced vertical stopping sight distance for two curve along SR 826 mainline	• Reduced vertical stopping sight distance for two curve along SR 826 mainline	• Reduced vertical stopping sight distance for two curve along SR 826 mainline

Table 5-19
Design Variations & Exceptions Summary

Design Compliance	Design Element	Location/Description			
		Interim Build Alternative 3A	**Interim Build Alternative 3B**	**Interim Build Alternative 3C**	**Interim Build Alternative 4**
Design Variations	6. Vertical Clearance	• Reduced vertical clearance for SR 826/Palmetto Expressway over NW 12th Avenue & NW 17th Avenue	• Reduced vertical clearance for SR 826/Palmetto Expressway over NW 12th Avenue & NW 17th Avenue	• Reduced vertical clearance for SR 826/Palmetto Expressway over NW 12th Avenue & NW 17th Avenue	• Reduced vertical clearance for SR 826/Palmetto Expressway over NW 12th Avenue & NW 17th Avenue
	7. Cross Slope	• 6-7 lanes sloping to one direction along I-95 SB	• 6-7 lanes sloping to one direction along I-95 SB	• 6-7 lanes sloping to one direction along I-95 SB	• 6-7 lanes sloping to one direction along I-95 SB
Design Exceptions	1. Lane Widths	• 11-ft lane widths along I-95 mainline and SR 826/NW 7th Ave Ext.	• 11-ft lane widths along SR 826/NW 7th Ave Ext.	• 11-ft lane widths along SR 826/NW 7th Ave Ext.	• 11-ft lane widths along I-95 mainline and SR 826/NW 7th Ave Ext.
	2. Shoulder Width	• 7-ft inside shoulder width along SR 826 mainline • 6-ft min outside shoulder widths and 7-ft min. inside shoulder width along I-95 mainline southbound lanes	• 7-ft inside shoulder width along SR 826 mainline	• 7-ft inside shoulder width along SR 826 mainline	• 7-ft inside shoulder width and 2.5-ft outside shoulder width along SR 826 mainline • 6-ft min outside shoulder widths along I-95 mainline southbound lanes

Table 5-19
Design Variations & Exceptions Summary

Design Compliance	Design Element	Location/Description			
		Interim Build Alternative 3A	**Interim Build Alternative 3B**	**Interim Build Alternative 3C**	**Interim Build Alternative 4**
	3. Stopping Sight Distance	• Reduced horizontal stopping sight distance for one curve (Curve I95SB-3) along I-95 southbound mainline • Reduced vertical stopping sight distance for one curve (Curve 2) along I-95 southbound mainline	• Reduced horizontal stopping sight distance for one curve (Curve I95SB3B-4) along I-95 southbound mainline • Reduced vertical stopping sight distance for one curve (Curve 2) along I-95 southbound mainline (see note)	• Reduced horizontal stopping sight distance for one curve (Curve I95SB3C-4) along I-95 southbound mainline • Reduced vertical stopping sight distance for one curve (Curve 2) along I-95 southbound mainline (see note)	• Reduced horizontal stopping sight distance for one curve (Curve I95SB-3) along I-95 southbound mainline • Reduced vertical stopping sight distance for one curve (Curve 2) along I-95 southbound mainline
Design Exceptions (continued)	4. Superelevation	• Reduced superelevation for one curve (Curve I95SB-3) along I-95 southbound mainline	• Reduced superelevation for one curve (Curve I95SB3B-4) along I-95 southbound mainline	• Reduced superelevation for one curve (Curve I95SB3C-4) along I-95 southbound mainline	• Reduced superelevation for one curve (Curve I95SB-3) along I-95 southbound mainline
	5. Vertical Alignment	• Reduced vertical curve K-value and vertical curve length for three curves (Curves 1, 2 and 3) along I-95 southbound mainline	• Reduced vertical curve K-value and vertical curve length for one curve (Curve 2) along I-95 southbound mainline (see note)	• Reduced vertical curve K-value and vertical curve length for one curve (Curve 2) along I-95 southbound mainline (see note)	• Reduced vertical curve K-value and vertical curve length for three curves (Curves 1, 2 and 3) along I-95 southbound mainline
	6. Vertical Clearance	• None	• Reduced vertical clearance for I-95 over NW 143rd Street	• Reduced vertical clearance for I-95 over NW 143rd Street	• None

Note: Design Exception for Lane Width processed as part of 95 Express Phase 2 project on file at the department

5.4.18 Cost Estimates

The estimated construction cost for the Interim Build Alternatives were developed using a combination of the FDOT Long Range Estimate (LRE) and the Basis of Estimate for individual pay items. The unit costs for the pay items were obtained from the FDOT Historical Average Item Unit Cost for Miami-Dade County. The right-of-way costs for the alternatives were obtained from the FDOT District Six Right-of-way Office. The right-of-way cost estimates include the additional fees associated with right-of-way acquisition. **Table 5-20** summarizes the preliminary cost estimates. The detailed Cost Estimates are provided in **Appendix H**.

Table 5-20
Preliminary Cost Estimates

Cost Components	Interim Build Alternative 3A	Interim Build Alternative 3B	Interim Build Alternative 3C	Interim Build Alternative 4
Roadway	$11,843,770	$22,216,334	$22,216,334	$13,430,711
Structures	$27,139,338	$34,828,234	$50,927,434	$32,140,365
Lighting	$619,500	$957,000	$957,000	$600,750
Drainage	$5,196,325	$6,614,900	$6,614,900	$4,683,837
Signalization	$1,050,000	$1,400,000	$1,400,000	$1,400,000
Sign Structures	$1,535,359	$2,107,236	$2,107,236	$1,643,971
Signing and Pavement Marking	$230,572	$315,986	$315,986	$231,364
ITS facilities	$2,155,000	$5,555,000	$5,555,000	$2,230,000
Utilities	$3,640,000	$5,340,000	$5,340,000	$2,700,000
Noise Walls	$661,952	$1,633,308	$1,633,308	$316,892
Park and Ride Restoration	$500,000	$500,000	$500,000	$800,000
Environmental Mitigation	$583,144	$1,190,184	$1,592,664	$683,566
Landscaping	$583,144	$1,138,259	$1,460,243	$683,566
Subtotal	**$55,738,104**	**$83,796,441**	**$100,620,105**	**$60,601,436**
Mobilization & MOT	$12,975,208	$20,094,488	$24,300,404	$14,339,145
Project Unknowns & Contingency	$17,928,997	$27,184,062	$32,651,752	$20,038,678
Construction Cost Total	**$86,642,309**	**$131,074,991**	**$157,572,261**	**$94,979,259**
Right-of-way	$5,633,600	$32,545,500	$32,545,500	$45,752,600
Eng. Design & CEI	$13,135,385	$19,969,894	$24,007,573	$15,282,413
Total	**$105,411,294**	**$183,590,384**	**$214,125,335**	**$156,014,272**

Note that the cost estimates shown in the table above are for comparative purposes only and do not include the cost of the FGT 18-inch gas main relocation. As such, they should not be used as the final estimates.

5.5 Engineering Evaluation of Environmental Impacts

5.5.1 Land Use

The project study area traverses a region of diverse land use designations such as low and medium-high density residential communities, business, industrial, office, institution and transportation land uses (see **Figure 5-24**). Along the SR 826/ Palmetto Expressway, corridor, the primary land uses are business and office to the north and industrial and office to the south. As SR 826/Palmetto Expressway converges with I-95 heading north, the land uses to the northwest are industrial and office and to the southeast are low density residential with pockets of medium density residential, transportation, business and office, and institution, utilities, and communication facilities.

A single, comprehensive future land use map for the study area is not available from Miami-Dade County due to the presence of cities and municipalities which govern their own land use designations. The cities and municipalities include the City of Miami Gardens, City of North Miami Beach, City of North Miami, and the Golden Glades Census Designated Place (CDP), which is unincorporated Miami-Dade County. Individual future land use maps were obtained from the City of Miami Gardens, North Miami Beach, North Miami and Miami-Dade County. These future land use maps were evaluated and they indicate that the existing commercial, industrial, office and single-family residential will retain their same land use designations. The following Future Land Use resources were reviewed:

- SEFL 2060: Baseline Future Land Use Map, Miami-Dade County, August 21, 2009
- Adopted 2015-2025 Land Use Plan Map, Miami-Dade County, Revised July 2011
- City of North Miami Beach Comprehensive Plan, Future Land Use Map, Adopted April 21, 1998; Revised September 2007
- City of North Miami Comprehensive Plan, Future Land Use Map, 2007
- City of Miami Gardens, Comprehensive Development Master Plan, Future Land Use Map, September 2005
- Generalized Land Use Derived from 2010 Parcels, FDOT District Six, Florida Geographic Data Library

The character of the study area remains relatively unchanged due to the similar land use designations from the Future Land Use Maps from the Cities of North Miami Beach and Miami Gardens to the 2015-2025 Miami-Dade Future Land Use Map. Therefore, the project improvements are not anticipated to significantly affect the land use in the area. However, the potential right-of-way acquisition required to accommodate the proposed improvements will impact the land uses within the affected properties. Interim Build Alternative 3A will result in less land use impacts than Interim Build Alternatives 3B, 3C and 4 due to the differences in right-of-way impacts.

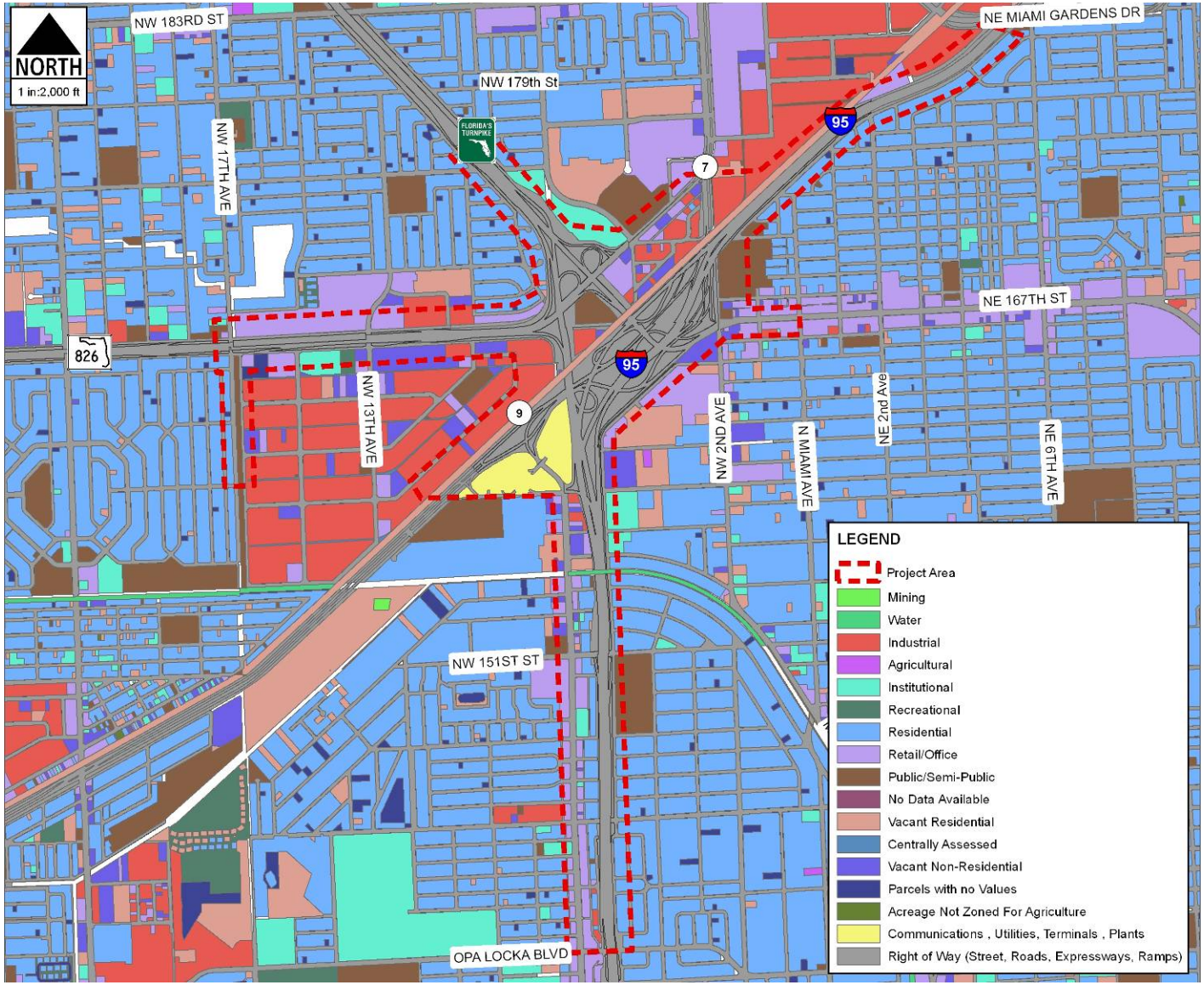


Figure 5-24 Land Use Designation

5.5.1.1 Religious Facilities

There are nineteen (19) religious facilities within 500-ft of the project study area. The religious facilities are listed below and are illustrated in **Figure 5-25**.

- AA Allen Gospel Ministries
- Baruch Christian Fellowship
- Bethesda Church Ministries
- Christ Community Church
- Damascus Road Baptist Church
- Eglise Baptist Samarie
- End Time Ministries
- Evangel Church International
- Faith Pentecostal Deliverance Center
- Faith Team Ministries
- International Church of Four Square Gospel
- Jesus is Lord Worship Center
- Liberty Fellowship Church
- North Dade Community Church
- Pass It On Ministries
- Seventh Day Church of God International Ministries
- Sunshine Christian Church
- Unity Light of the World
- World Deliverance Ministries

No impacts to the religious facilities identified within the study area are anticipated from any of the Interim Build Alternatives due to their relative distances from the roadway footprint and the right-of-way required for the proposed improvements.

5.5.1.2 Medical and Emergency Facilities

The Jackson North Medical Center is located within the project study area to the northeast. Additionally, several healthcare facilities are located near the study area, but outside its limits. Near the hospital is the Miami Regional Dialysis Center. There are several small medical and private practices along NW 167th Street and NW 2nd Avenue as well as along NE 3rd Court. One emergency facility in the vicinity of the project study area is the Miami-Dade County Fire Rescue Station #32. None of the medical facilities are anticipated to be impacted due their relative distances from the proposed improvements. These medical and emergency facilities are illustrated in the **Figure 5-26**.

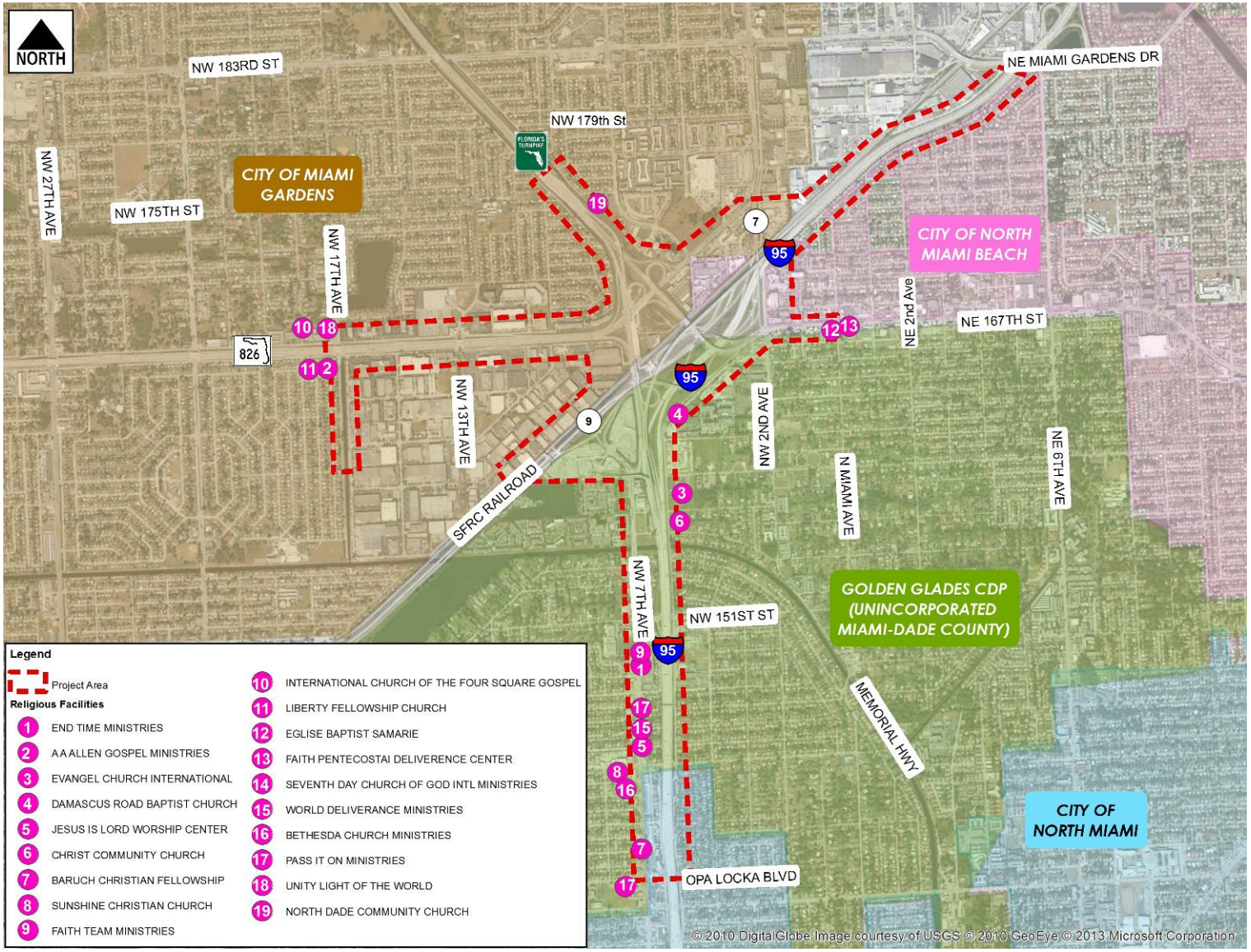


Figure 5-25 Religious Facilities

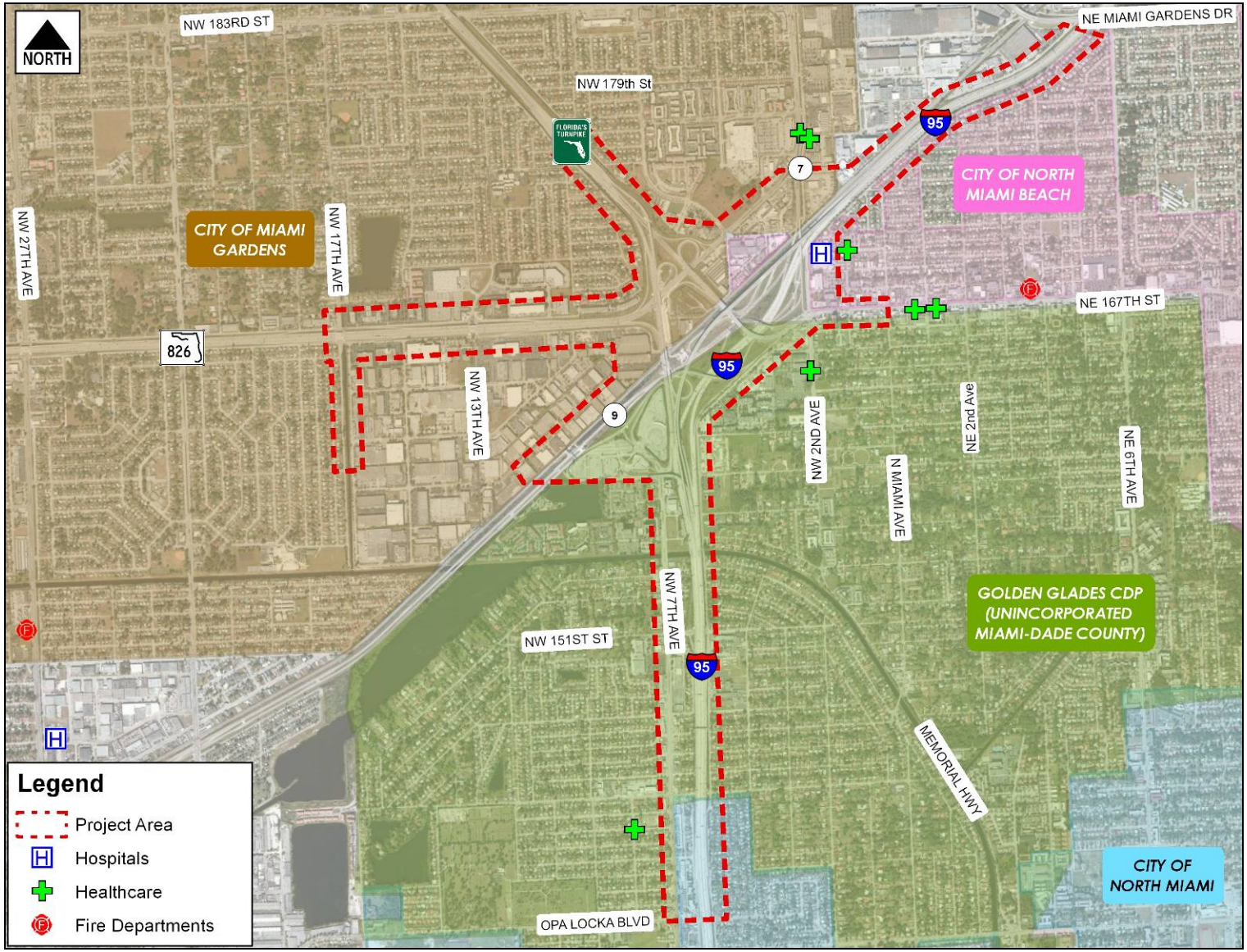


Figure 5-26 Medical and Emergency Facilities

5.5.1.3 Educational Facilities

There are thirteen educational facilities identified within 500-ft of the project study area. The first four institutions were identified as colleges/universities while the remaining nine educational facilities are either primary or secondary schools. **Figure 5-27** illustrates the location of these educational facilities which are also listed below.

- ATI Career Training Center
- Applied Technical Institute College of Health
- Miami Technical College
- Caribbean Training Educational Center
- Lubavitch Education Center
- Biscayne Gardens Elementary School
- Thomas Jefferson Middle School
- Son-Shine Child Care Academy
- Landow Yeshiva Center
- Primary Learning Center
- Neytz Hachochma
- GDS Christian Academy
- Work & Play Day Care Center

None of the educational facilities are expected to be impacted due to their relative distances from the proposed improvements.

5.5.1.4 Government Facilities

Three government facilities were identified along and within the proximity of the study area. These facilities include the City of Miami Gardens Public Works Department which is located within the project study area, as well as the City of Miami Gardens Police Department and the United States Federal Bureau of Investigation, which are located just outside the project study area. Impacts to these facilities are not anticipated. The government facilities are illustrated in **Figure 5-28**.

5.5.1.5 Community and Cultural Centers

Four community and cultural centers were identified within or in close proximity to the project study area. These include the Miami Gardens Junior Chamber of Commerce, Wentworth Gallery, the Cultural Arts Society of South Florida, and the Center of Family and Child Enrichment. Impacts to these community and cultural centers are not anticipated from the proposed improvements under any of the Interim Build Alternatives. The community and cultural centers are illustrated in **Figure 5-29**.

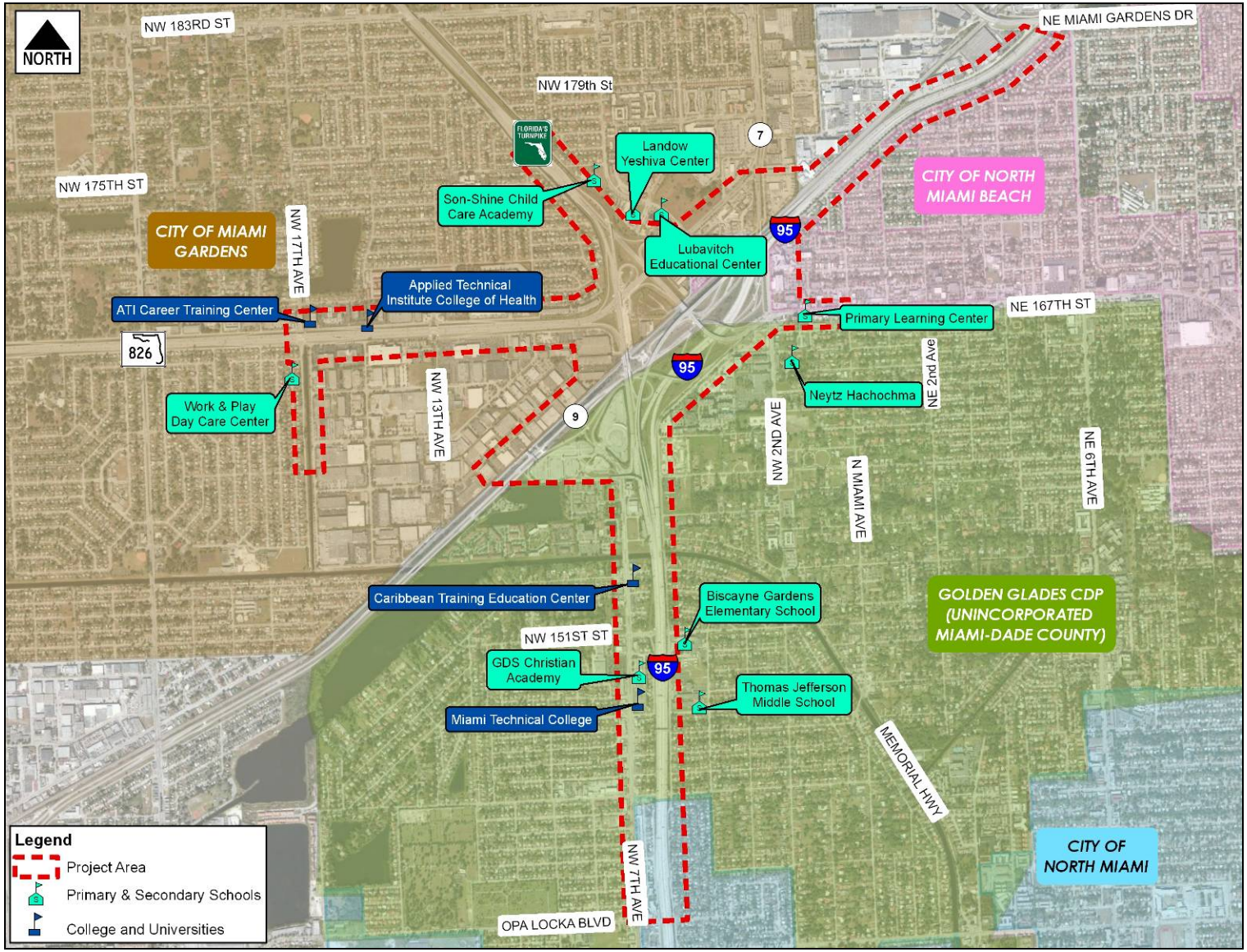


Figure 5-27 Educational Facilities

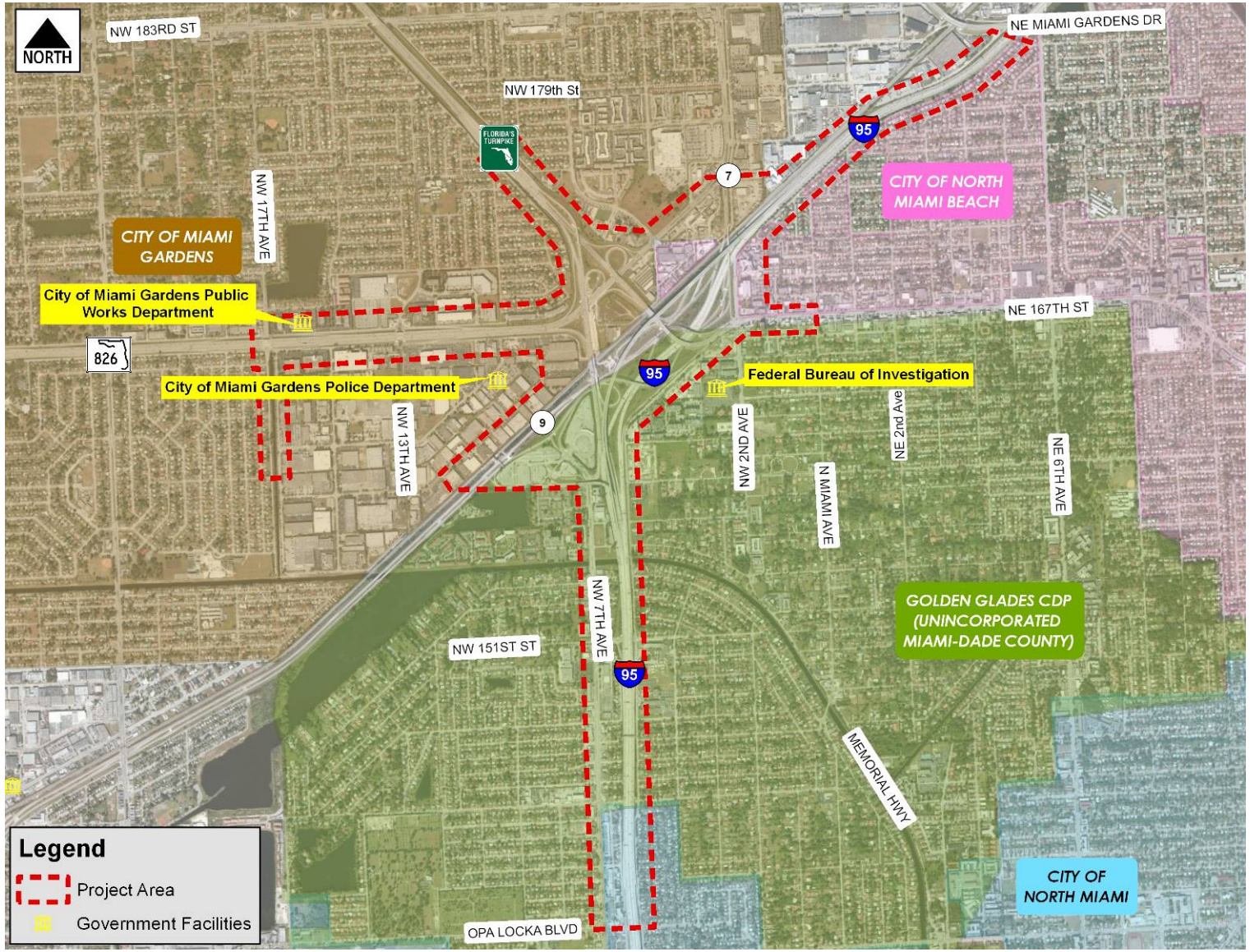


Figure 5-28 Government Facilities

Figure 5-29 Community and Cultural Centers

5.5.2 Economic Impacts

The proposed project will improve mobility and support the increasing economic development of the area, as well as stimulate major construction activities that will create jobs and contribute to economic growth within the South Florida region.

A recent publication by the National Cooperative Highway Research Program (NCHRP) titled "*Mining Recovery Act Data for Opportunities to Improve the State of Practice for Overall Economic Impact Analysis of Transportation Investment*s (NCHRP 08-36, Task 103)" estimates that approximately 16.8 jobs were created in the state of Florida for every million dollars spent on transportation improvement projects between 2009 and 2011 (See **Appendix I**).

Based on the estimated construction costs for the various alternatives, it is estimated that Interim Build alternative 3A will result in approximately 1,771 jobs, Interim Build Alternatives 3B will result in 3,084 while Interim Build Alternatives 3C and 4 will result in 3,597 and 2,481 jobs respectively within the south Florida region.

5.5.3 Visual Impacts and Aesthetics

The visual impacts of an area are ascertained by establishing the visual environment and identifying the key visual resources within the area. The evaluation of the visual and aesthetics impacts is based on two perspectives - 1) the view from the road and 2) the view of the road. The view from the road is the driver's perspective and leaves a lasting impression of the community or area on the driver or resident while the view of the road by the driver or resident contribute to the feeling of community value and pride.

The GGI is also known as the "Spaghetti Bowl" to drivers due to the numerous twists and turns required to navigate from one roadway to another. The view from the major roadways and interchange ramps comprises mainly of noise walls and Mechanically Stabilized Earth (MSE) walls and overhead bridge structures. Noise walls are located along Florida's Turnpike and I-95. The interchange area includes several green spaces with some isolated landscaping along SR 826, I-95 and Florida's Turnpike.

The proposed improvements under the Interim Build Alternatives provide opportunity for additional landscaping within the project study area. For Interim Build Alternative 3A, the potential right-of-way acquisition of the properties adjacent to the west right-of-way line along I-95 between the Park and Ride lot and the Biscayne (C-8) Canal will allow additional landscaping within this area. Interim Build Alternatives 3B, 3C and 4 involve additional right-of-way between the Park and Ride lot and NW 145th Street and provide significant green space for landscaping to enhance the visual environment within this area as well.

5.5.4 Relocation

All the Interim Build Alternatives under consideration as part of this PD&E Study require right-of-way acquisition to accommodate the proposed improvements. As identified in **Section 5.4.11**, Interim Build Alternative 3A will impact five properties, Interim Build Alternatives 3B and 3C will impact thirty six properties and Interim Build Alternative 4 will impact 24 properties. Relocation of a residential property or business is required when a full right-of-way acquisition is anticipated for the parcel. A parcel is generally considered a full acquisition if the construction impact limits encroach on a structure, remove all reasonable access, or acquire more than 20% of the parcel.

Based on the preliminary right-of-way estimates, Interim Build Alternative 3A will result in 2 business relocations located on 2 parcels. Interim Build Alternatives 3B and 3C will require 14 residential and 5 business relocations located on 22 parcels while Interim Build Alternative 4 will require 6 business relocations located on 10 parcels. FDOT will carry out a Right-of-way and Relocation Program in accordance with Florida Statute 339-09 and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, as amended by Public Law 100-17). **Table 5-21** shows the summary of relocations for all four alternatives.

Table 5-21
Summary of Relocations

#	Folio Number	Property Address	Land Use	Relocation
1	30-2113-001-0460	15901 NW 7th Avenue	Warehouse or Storage	3B, 3C & 4
2	30-2113-001-0480	15821 NW 7th Avenue	Service Station-Automotive	3B, 3C & 4
3	30-2113-001-0490			3B, 3C & 4
4	30-2113-001-0860	15781 NW 7th Avenue	Light MFG & Food Processing	3B, 3C & 4
5	30-2113-001-0880			3B, 3C & 4
6	30-2113-001-0890			3B, 3C & 4
7	30-2113-001-0850	651 NW 157th Street	Light MFG & Food Processing	3A, 3B, 3C & 4
8	30-2113-001-0920	655 N. Biscayne River Drive	Warehouse or Storage	3A, 3B, 3C & 4
9	34-2114-007-0380	16601 NW 8 Avenue	Warehouse or Storage	4
10	34-2114-000-0220			4
11	30-2124-006-0010	14940 NW 6 Court	Residential	3B & 3C
12	30-2124-006-0020	14920 NW 6 Court	Residential	3B & 3C
13	30-2124-006-0030	14910 NW 6 Court	Residential	3B & 3C
14	30-2124-006-0040	14900 NW 6 Court	Residential	3B & 3C
15	30-2124-006-0050	14832 NW 6 Court	Residential	3B & 3C

Table 5-21
Summary of Relocations

#	Folio Number	Property Address	Land Use	Relocation
16	30-2124-006-0060	14828 NW 6 Court	Residential	3B & 3C
17	30-2124-006-0070	14822 NW 6 Court	Residential	3B & 3C
18	30-2124-006-0080	14816 NW 6 Court	Residential	3B & 3C
19	30-2124-006-0090	14750 NW 6 Court	Residential	3B & 3C
20	30-2124-006-0100	14740 NW 6 Court	Residential	3B & 3C
21	30-2124-006-0110	14730 NW 6 Court	Residential	3B & 3C
22	30-2124-006-0120	14700 NW 6 Court	Residential	3B & 3C
23	30-2113-003-1490	644 NW 147 Street	Residential	3B & 3C
24	30-2113-003-1420	643 NW 146 Street	Residential	3B & 3C

5.5.5 Endangered Species Impacts

As part of the PD&E study, an Endangered Species Biological Assessment (ESBA) was performed to determine potential impacts of the proposed project on Federally Endangered and Threatened species and potential suitable habitat for these species that might occur within or adjacent to the study area. State protected species were also considered.

The project corridor is located within the Core Foraging Area (CFA) of two active wood stork colonies. However, direct impacts to wood storks and their critical habitat are not anticipated in association with any of the Interim Build Alternatives. Minor impacts to wood stork Suitable Foraging Habitat (SFH) in association with the proposed improvements may result from construction activities that directly impact existing swales, ditches and dry retention ponds adjacent to the interchange, as these stormwater features may serve as potential wood stork SFH. However, these impacts will be mitigated through the construction of new stormwater features and the implementation of best management practices for road and bridge construction projects. Therefore, no net loss of wood stork SFH is anticipated as a result of the construction of the Interim Build Alternatives.

The West Indian manatee (*Trichechus manatus)* is listed as endangered by both the USFWS and the Florida Fish and Wildlife (FWC). Manatee's habitat includes coastal waters, bays, rivers, canals, and (occasionally) lakes. The designated critical habitat for the manatee includes all of the marine and freshwater areas of Miami-Dade and Monroe Counties. The proposed improvements under the Interim Build Alternatives will widen or replace the bridge over the Biscayne (C-8) Canal, which is potentially inhabited by the federally endangered West Indian manatee. In addition, a bridge culvert is proposed across the NW 17th Avenue Canal at NW 165th Street. These improvements may affect, but are not likely

to adversely affect manatees within these canals. Standard Manatee Conditions for In-Water Work will be required during construction.

The eastern indigo snake frequents several habitat types, including forested uplands and wetlands as well as wet and dry prairies. It also occurs in human-altered habitats. Generally, in xeric (very dry environment) habitats, the presence of indigo snakes is associated with gopher tortoise (*Gopherus Polyphemus*) occurrences, as the burrows provide shelter for the snakes during the winter. Habitat within the project corridors considered to be xeric is limited to portions of the 16 acre vacant lot located to the north of the NW 7th Avenue Extension corridor. No gopher tortoise burrows were found within the lot. Due to the lack of suitable refugia and the developed/maintained nature of the area, the eastern indigo snake is unlikely to be encountered within and adjacent to the project corridors. Consequently, the proposed improvements under the Interim Build Alternatives are not likely to adversely affect eastern indigo snake.

State listed species including bald eagle, gopher tortoise and burrowing owl were also considered. There are no documented eagle nests or rookeries within or nearby the project corridor and no suitable foraging habitat was identified during the field survey. In addition, no burrows or gopher tortoises were observed within the project corridor during the field review.

A burrowing owl was observed within the project area approximately 250 feet southeast of the intersection between the NW 7th Avenue Extension and the Turnpike Connector/I-95 during the design of the Turnpike Connector Ramp Project. However, the area where the burrowing owl and the burrow were discovered was turned into a storm water retention system. Although the permit for the removal of the burrow was obtained, the burrow was abandoned before the project construction start date in May, 2010. This area is still used for stormwater retention purposes and no other burrow or burrowing owl was observed at this location during the field review.

5.5.6 Wetlands Impacts

A Wetland Impact Evaluation Technical Memorandum was prepared as part of this PD&E Study. The project's potential for impacts to wetlands and Other Surface Waters (OSW) was analyzed using literature reviews, agency database searches, and a field review of the project area conducted on June 20, 2011.

A review of GIS databases from the South Florida Water Management District (SFWMD) and the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) indicated that no wetlands are located within or adjacent to the project area. A 6.1-acre lacustrine wetland area is located within the 300-foot buffer, on the southwest side of the project area (See **Figure 5-30**). However, no construction activities associated with the Interim Build Alternatives will occur near or adjacent to this wetland. Therefore, no wetland impacts are anticipated from any of the proposed alternatives.

The NW 17th Avenue Canal and the Biscayne (C-8) Canal are two man-made features located within the study area. The NW 17th Avenue Canal is a conveyance canal off the Biscayne (C-8) Canal owned by Miami-Dade County while the Biscayne (C-8) Canal is under the jurisdiction of SFWMD. The NW 17th Avenue and the C-8/Biscayne Canals are both constructed features and considered OSW.

The proposed improvements under Interim Build Alternatives 3A and 4 will widen the bridge over the C-8/Biscayne Canal, while the proposed improvements under Interim Build Alternatives 3B and 3C will replace the bridge over the canal. This involves construction activities over the canal and may also require the installation of piers within the canal banks. In addition, a bridge culvert is proposed across the NW 17th Avenue Canal at NW 165th Street for Interim Build Alternatives 3A, 3B, and 3C; however, is not proposed in Interim Build Alternative 4. The proposed culvert crossing will impact surface waters.

Under Interim Build Alternative 3A OSW impacts are approximately 0.27 acres. Interim Build Alternatives 3B and 3C will both result in 0.46 acres of impact. The Interim Build Alternative 4 OSW impacts are approximately 0.16.

These potential impacts to the Biscayne and NW 17th Avenue Canals and their water quality will be minimized by adherence to all applicable State and local regulations and to the FDOT Standard Specifications for Road and Bridge Construction, including Best Management Practices (BMPs) for erosion control and the control of construction debris.

Wetland vegetation was also identified within the constructed elements of the stormwater management system for the GGI. Specifically, it was discovered during the field review in five man-made ditches and one dry retention pond adjacent to the expressway ramps. Four of the ditches and the dry retention pond are in close proximity to the proposed footprint of the Interim Build Alternatives and may be impacted during the reconfiguration of the drainage features in this area. However, they are existing features of the existing stormwater management system and do not constitute jurisdictional wetlands, but are typically categorized OSW. Impacts to OSW will be estimated during final design as a result of the possible reconfiguration of the drainage features in this area. Impacts to these drainage features will only occur if pilings are designed to be located within the ditches themselves.

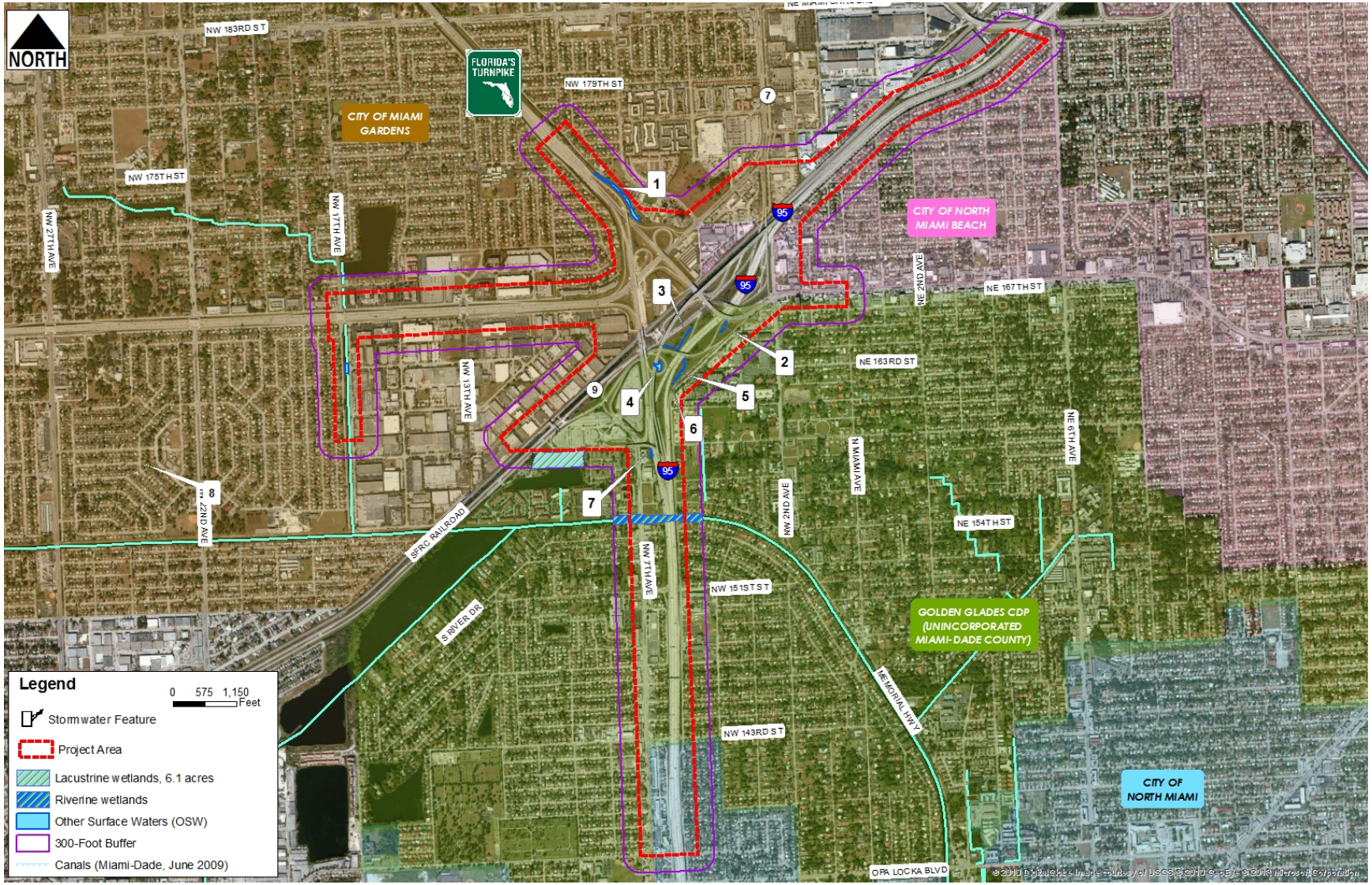


Figure 5-30 Wetlands and Other Surface Waters

5.5.7 Air Quality Impacts

Land uses surrounding the project study area include low and medium-high density residential communities, business, industrial, office, institution, and transportation. However, primary land uses along the project corridor are business and office to the north and industrial and office to the south. Residential land use with potential for sensitivity to changes in air quality is concentrated to the northwest of the GGI, with smaller residential areas along the east and west sides of I-95 south of SR 826. Other sites that may be sensitive to changes in air quality include the religious, social, and educational facilities and the community and cultural centers located within 500-feet of the study area.

The south Florida region is currently in attainment for all of the pollutants for which National Ambient Air Quality Standards (NAAQS) have been developed. As of June 2005, Miami-Dade County is located in an area which is designated as attainment for all of the NAAQS under the criteria provided in the Clean Air Act. Therefore, the project is located in an area which is designated as attainment under the criteria provided in the Clean Air Act; the Clean Air Act conformity requirements do not apply to the project and a project level air quality analysis is not necessary.

However, construction activities for the proposed action may potentially have short-term air quality impacts within the immediate vicinity of the project. Construction activities may generate temporary increases in air pollutant emissions in the form of dust from earthwork and unpaved roads and smoke from open burning. Such emissions and potential impacts will be minimized by adherence to all applicable State and local regulations and to the FDOT Standard Specifications for Road and Bridge Construction.

5.5.8 Contamination Screening Evaluation

A Contamination Screening Evaluation Report (CSER) was performed for this PD&E study. The purpose of the contamination screening is to identify and evaluate known or potential contamination issues, present recommendations concerning these issues, and discuss possible impacts to the proposed project. The contamination study area extended 500-feet in all directions beyond the project corridor. Sites found to have a history of contamination, or to house a hazardous substance, were evaluated for potential contamination involvement with the proposed project and a degree of risk was assigned for each site.

Risk ratings were assigned in accordance with Part 2, Chapter 22, Section 2.2.3 (01-17-08 revision) of the FDOT PD&E Manual. The contamination rating system is divided into four degrees of risk: High, Medium, Low and No risk. This system expresses the degree of likelihood for potential contamination problems that may impact project construction. Known problems may not necessarily present a high cause for concern if the regulatory agencies are aware of the situation and actions, where necessary, are either complete or are underway, and these actions will not have an adverse impact on the proposed project.

A review of the Miami-Dade County Department of Regulatory and Economy Resources (DRER[2]), Florida Department of Environmental Protection (FDEP), and the Environmental Protection Agency (EPA) files identified 118 permitted and/or known contaminated facilities within the primarily transportation-use project corridor including one Superfund site within a 1-mile buffer. Agency files were obtained for each site of potential concern for the contamination screening evaluation. The sites were assigned a risk rating for the potential impact to the proposed action after a review of all available data, including DERM[3], FDEP, and EPA files.

There are nine sites with a contamination history which indicated a high risk and six with medium risk of potential involvement with the proposed project alternatives. Six high risk sites and three medium risk sites are located along the I-95 and SR 7/US 441 corridors. One high risk site and two medium risk sites are located along SR 826. One high risk site is located along the Florida's Turnpike. The remaining high risk and medium risk sites are located along just south of SR 826. **Figure 5-31** shows the locations of the potential high and medium risk contamination sites within the project area.

Anodyne Inc. is a superfund site with volatile organic compound groundwater contamination is present and extends off-site. The contamination plume, as estimated in 2010 by the TerranearPMC groundwater remediation study, extends into the western portion of the study corridor. The Florida Department of Environmental protection (FDEP) discourages the use of wet ponds or exfiltration trenches within one mile of a superfund site. As such, water treatment facilities proposed by this study, which fall within the 1-mile Anodyne buffer, will consist of dry-retention and/or dry-detention.

In addition to the individual potentially contaminated properties identified, the project corridor passes through the Dade-Opa-Locka Area Brownfield. Brownfields are areas of perceived contamination and generally have a history of industrial and/or commercial use. Site No. 3 (Mercedes-Benz of Miami/Modern Age Furniture) described below is located within the Dade-Opa-Locka Area Brownfield. No other Brownfield impacts are anticipated.

Because a High or Medium Risk for soil and/or groundwater contamination has been documented for six sites within the project study area, a Level II Contamination Assessment investigation is warranted during the final design phase for the High and Medium Risk sites adjacent to the proposed construction areas, including any proposed drainage areas outside the FDOT right-of-way, to confirm the existence of soil and/or groundwater contamination at these sites.

Table 5-22 lists the potential contaminated sites and summarizes the contaminant of concern at each site.

[2, 3] *The acronyms PERA, DERM, and DRER refer to the same agency.*

Table 5-22
Potential Contamination Sites

Site No.	Facility Name	Facility Address	Contaminant of Concern	Risk
1	Anodyne Inc.	1270 NW 165 ST	Superfund Site. Volatile organic compound groundwater contamination is present and extends off-site.	High
2	Oasis Truck Spill	SR 826 WB Ramp To Florida's Turnpike	Groundwater and soil hydrocarbon contamination status is unknown.	High
3	D.B. Trucking Tanker Spill	SR 826 & I-95 Intersection	Groundwater and soil hydrocarbon contamination status is unknown.	High
4	Cloverleaf Service Center, Inc.	13705 NW 7 AVE	Groundwater hydrocarbon contamination status is unknown.	High
5	Cuties Island Take-Out Restaurant/Seavey Property	14005 NW 7 AVE	Groundwater hydrocarbon contamination status is unknown.	High
6	HP Performance Automotive, Inc./Jimmy's Shell	14601 NW 7 AVE	Groundwater and soil hydrocarbon contamination status is unknown.	High
7	Hi-Test Service Station	14301 NW 7 AVE	Groundwater and soil hydrocarbon contamination is present and extends off-site.	High
8	Mobil #12526	650 OPA LOCKA BLVD	Groundwater hydrocarbon contamination is present.	High
9	Exxon Station	16700 NW 17 AVE	Groundwater and soil hydrocarbon contamination is present and extends off-site.	High
10	Texaco Station (Previously Gables Service, Inc.)	1195 NW 167 ST	Groundwater and soil hydrocarbon contamination status is unknown.	Medium
11	Southern Wine and Spirits/Hart & Cooley	1600-1675 NW 163 ST	Groundwater and soil hydrocarbon contamination status is unknown.	Medium
12	Mercedes-Benz of Miami (Previously Modern Age Furniture)	1200 NW 167 ST	Groundwater hydrocarbon contamination status is unknown.	Medium
13	Howie Fina Service	13640 NW 7 AVE	Groundwater hydrocarbon contamination status is unknown.	Medium
14	Infantino Auto Tech, Inc.	14540 NW 7 AVE	Groundwater and soil hydrocarbon contamination status is unknown.	Medium
15	American Waste Srvc-Truck Accident	NB SR 9 @ TP & 826 WB	Groundwater and soil hydrocarbon contamination status is unknown.	Medium

Based on the above evaluation, Interim Build Alternative 3A and 4 may be impacted by four high risk and four medium risk sites. Interim Build Alternatives 3B and 3C may be impacted by all eight high risk and six medium risk sites.

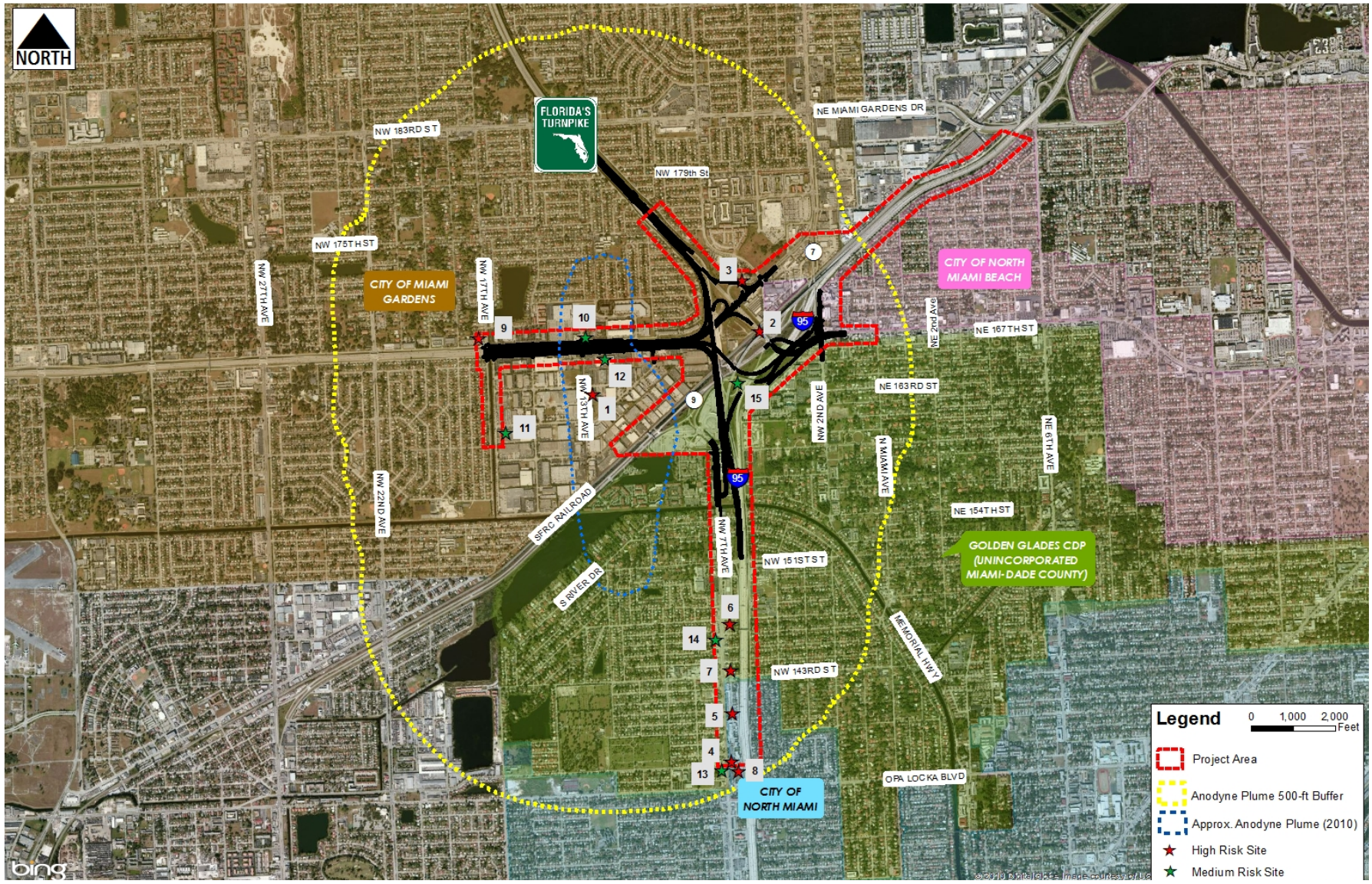


Figure 5-31 Potential Contamination Sites

5.5.9 Water Quality Impact

Possible long-term indirect impacts include water quality impacts to adjacent waters. With the construction of a new stormwater treatment system designed in accordance with the Miami-Dade County code and the SFWMD permitting standards, there will be no impacts in the quality of stormwater runoff after project completion. The Interim Build Alternatives will provide water quality treatment for all new impervious areas. In addition, part of the project design involves the restoration of stormwater treatment features impacted by the construction or rehabilitation activities associated with all the Interim Build Alternatives. The implementation of a new stormwater treatment system with all the Interim Build Alternatives will minimize secondary impacts to adjacent waters.

5.5.10 Noise Impacts

A GIS review identified several residential neighborhoods and healthcare facilities within 500-ft of the project study area. The noise sensitive areas with the greatest potential to be affected include the following single family neighborhoods (see **Figure 5-32**).

NSA-1. Single-family home neighborhood located west of NW 17th Avenue between NW 165th Street and SR 826/Palmetto Expressway

NSA-2. Single-family home neighborhood located west of the Turnpike Connector and north of SR 826/Palmetto Expressway

NSA-3. Single-family home neighborhood located west of I-95 between the Biscayne (C-8) Canal and NW 151st Street

NSA-4. Single-family home neighborhood located west of I-95 between NW 151st Street and Opa-Locka Blvd.

Existing noise barriers are located adjacent to these neighborhoods with the exception of the residential neighborhood located west of NW 17th Avenue. The noise sensitive area west of NW 17th Avenue (NSA-1) will be impacted by the proposed improvements from Interim Build Alternative 3A, 3B, and 3C due to the rerouted traffic from the industrial park to NW 17th Avenue. The single family areas located west of the Turnpike Connector (NSA-2) and also west of I-95 between the Biscayne (C-8) Canal and NW 151st Street (NSA-3) will be impacted by all of the proposed interim alternatives. The proposed reconstruction along I-95 southbound under Interim Build Alternatives 3B and 3C will impact the single-family home neighborhood located west of I-95 between NW 151st Street and Opa-Locka Blvd. (NSA-4). The existing noise walls on the west side of I-95 between the Biscayne Canal and Opa-Locka Blvd will be reconstructed to accommodate the proposed improvements.

Potential project-related impacts to noise and vibration sensitive land uses, as well as any measured proposals to abate the impacts, are addressed in the Noise Study Report prepared as part of this study.

Figure 5-32 Noise Sensitive Areas

5.5.11 Cultural Resource Assessment Survey (CRAS)

In order to comply with federal and state regulations, a Cultural Resource Assessment Survey (CRAS) was conducted to identify all historic and archaeological resources that may be affected by the project improvements. The Area of Potential Effect (APE) for this CRAS was established by considering the footprint of the proposed roadway improvements, right-of-way impacts and the potential effects these improvements could have on cultural resources. The CRAS is on file at the FDOT District Six Intermodal Systems Development (ISD) Office.

The CRAS' historic resources survey resulted in the identification of 187 historic resources within the APE. These resources include nine bridges, one canal, one railroad line segment, one parabolic arch, one gas pipeline facility, one historic district, and 173 buildings. Five previously recorded historic resources were identified: *Seaboard Air Line (CSX) Railroad (8DA10753)*, *Bunche Park Historic District (8DA11613)*, *Sunshine State Arch (8DA11167)*, *K&A Diagnostic Medical Centers (8DA5388)*, and *Biscayne/C-8 Canal (8DA6537).* One resource, *K&A Diagnostic Medical Centers* has been demolished. The remaining 183 resources identified are newly recorded.

Of the 187 identified historic resources, three (3) are considered eligible for listing on the National Register: *Seaboard Air Line (CSX) Railroad*, *Bunche Park Historic District*, and *Sunshine State Arch.* The remaining newly recorded resources, as well as the previously recorded *Biscayne/C-8 Canal*, are considered ineligible for listing in the National Register, either individually or as part of a historic district. These historic resources are identified in **Figure 5-33**.

No previously recorded archaeological sites were identified within the APE. In addition, no locally-designated archaeological sites or zones are located within one mile of the project's archaeological APE.

The CRAS was submitted to the FHWA/State Historic Preservation Office (SHPO) for review and eligibility concurrence on December 26, 2012; concurrence was provided by FHWA on January 28, 2013 and by the SHPO on February 8, 2013. The Section 106 Determination of Effects case study was prepared to evaluate the Recommended Alternative's proposed improvements in proximity to the National Register eligible resources identified during the CRAS. The determination is documented in a concurrence letter dated May 21, 2014 and signed by SHPO on June 26, 2014 **(See Categorical Exclusion Type II Report – Appendix C)**.

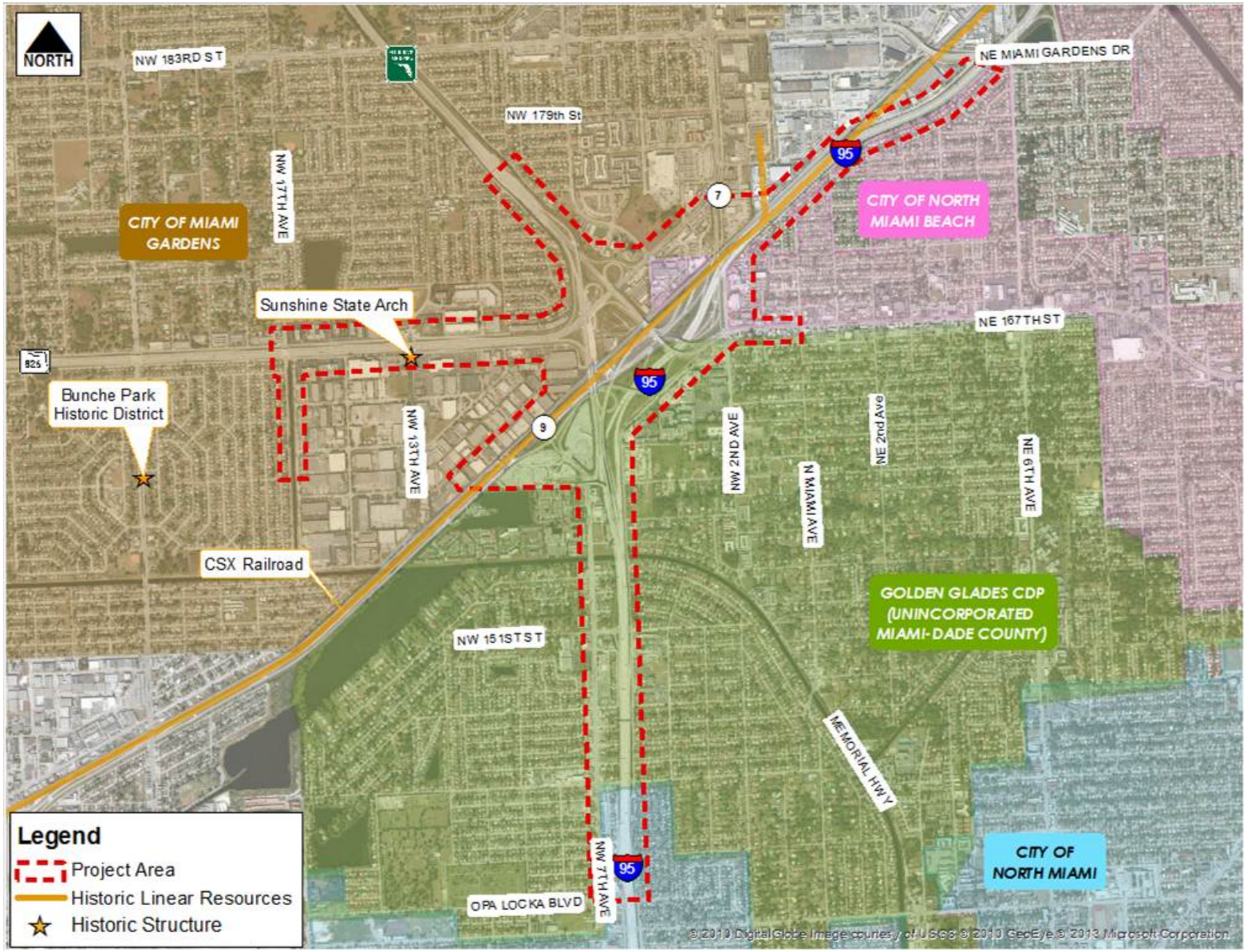


Figure 5-33 Archaeological and Historic Sites

6. EVALUATION MATRIX

The evaluation of transportation projects to select the most desirable alternative is often based on a wide range of performance criteria (i.e., traffic operations and safety, environmental impacts, construction costs, drainage impacts, travel time reduction etc.). The evaluation methodology used in this study involves a two-step process using both comparative (qualitative) and multi-criteria (quantitative) analysis to determine the recommended alternative.

6.1 Comparative Analysis

A comparative (qualitative) analysis of the advantages and disadvantages for the interim build alternatives was conducted based on the engineering and environmental impacts among the alternatives discussed in the previous chapter. **Table 6-1** presents a summary of this analysis.

Table 6-1
Comparative Analysis of Interim Build Alternatives

Alternative	Advantages	Disadvantages
No-Build Alternative	• No roadway design and construction costs • No right-of-way acquisition cost • No utility impacts • No inconveniences to commuters and adjacent property owners due to construction maintenance of traffic (MOT) • No social, business and neighborhood impacts due to construction	• Traffic operations may continue to deteriorate resulting in more congestion • Decrease in air quality due to increase congestion • Increase in accident rates due to increased congestion may compromise safety • Inconsistent with FDOT and FTE Work Program • Does not meet the purpose and need of the project
Interim Build Alternative 3A	• Significant traffic operational improvements for SR 826 EB to I-95 NB and Florida's Turnpike SB to I-95 SB movements over No-Build • Potential safety benefits due to reduced congestion and improved mobility over No-Build • Lowest overall construction cost compared to Build Alternatives 3B, 3C and 4 • Lowest right-of-way impacts compared to Build Alternative 3B, 3C and 4 • Lowest structural and drainage impacts compared to Build Alternatives 3B, 3C and 4 • Minimal environmental impacts compared to Build Alternatives 3B, 3C and 4 • Potential to create construction jobs for South Florida economy • Consistent with FDOT and FTE work program	• Relocation required for the Florida Gas Transmission line along the south side of SR 826/Palmetto Expressway • Several design variation and exceptions required to preserve existing roadway facility • Improvements can only accommodate traffic demand up to 2030 interim year • Significant reconstruction required along I-95 SB to accommodate 2040 design year traffic demand • Impacts to utilities and drainage • May impact operations for Sunshine Industrial Park

Table 6-1
Comparative Analysis of Interim Build Alternatives

Alternative	Advantages	Disadvantages
Interim Build Alternative 3B	• Additional traffic operational improvements for SR 826 EB to I-95 NB and Florida's Turnpike SB to I-95 SB movements over Interim Build Alternatives 3A and 4 • Additional safety benefits due to reduced congestion and improved mobility over Interim Build Alternatives 3A and 4 • Lower construction cost compared to Build Alternatives 3C • Lower structural and drainage impacts compared to Build Alternatives 3C • Improved geometry alignments with few design variations and exceptions compared to Interim Build Alternatives 3A and 4 • Less additional construction required to accommodate 2040 traffic demand compared to Interim Build Alternatives 3A and 4 • Potential to create construction jobs for South Florida economy	• Higher construction cost than Build Alternatives 3A and 4 • Significant right-of-way impacts to several residential and commercial properties along I-95 southbound • Relocation required for the Florida Gas Transmission line along the south side of SR 826/Palmetto Expressway • Additional impact to drainage and utilities compared to Interim Build Alternatives 3A and 4 • Additional environmental impacts compared to Interim Build Alternatives 3A and 4 • Construction of express lane connection between Florida's Turnpike and 95 Express southbound flyover ramp still required to accommodate 2040 traffic demand • May impact operations for Sunshine Industrial Park
Interim Build Alternative 3C	• Express lane connection between Florida's Turnpike and 95 Express southbound flyover ramp accommodates 2040 traffic demand and provides additional traffic operational improvements over Interim Build Alternatives 3A, 3B and 4 • Additional safety benefits due to reduced congestion and improved mobility over Interim Build Alternatives 3A, 3B and 4 • Improved geometry alignments with few design variations and exceptions compared to Interim Build Alternative 3A and 4 • No additional construction required along I-95 SB to accommodate 2040 future traffic demand • Potential to create construction jobs for South Florida economy	• Highest overall construction cost among the four alternatives • Significant right-of-way impacts to several residential and commercial properties along I-95 southbound • Relocation required for the Florida Gas Transmission line along the south side of SR 826/Palmetto Expressway • Additional impact to drainage and utilities compared to Interim Build Alternatives 3A and 4 • Additional environmental impacts compared to Interim Build Alternatives 3A and 4 • May impact operations for Sunshine Industrial Park

Table 6-1
Comparative Analysis of Interim Build Alternatives

Alternative	Advantages	Disadvantages
Interim Build Alternative 4	• Relocates and maintains NW 12th Avenue on-ramp to I-95 SB • Potential safety benefits due to reduced congestion and improved mobility over No-Build • Lower construction cost compared to Build Alternatives 3B and 3C • Less right-of-way impacts compared to Build Alternative 3B and 3C • Lowest structural and drainage impacts compared to Build Alternatives 3B and 3C • Minimal environmental impacts compared to Build Alternatives 3B and 3C • Potential to create construction jobs for South Florida economy • Consistent with FDOT and FTE work program	• Relocation required for the Florida Gas Transmission line along the south side of SR 826/Palmetto Expressway • Several design variation and exceptions required to preserve existing roadway facility • Improvements can only accommodate traffic demand up to 2030 interim year • Significant reconstruction required along I-95 SB to accommodate 2040 design year traffic demand • Impacts to utilities and drainage • Highest impact to Park & Ride East Lot • Additional right-of-way required within Sunshine Industrial park

6.2 Multi-criteria Evaluation Methodology

The Multi-criteria Evaluation methodology involves quantitative analysis to combine the different impacts for each alternative. These performance criteria are not all monetized and usually have different dimensions (units). Consequently, each performance criteria has to be converted to a dimensionless unit.

Several techniques have been proposed for decision making when multiple criteria with both monetary and non-monetary dimensions are involved. For this PD&E study, the Impact Index Method (*Transportation Decision Making – Principles of Project Evaluation and Programming*, Sinha & Labi, 2007) was used to estimate the combined effect of the various performance criteria for each alternative. The Impact Index Method involves establishing weights for each of the performance criterion and scaling or establishing a common unit of measurement so that all the performance criteria can be expressed in commensurable units to enable combination or comparison of the performance criteria.

The first task in this approach is establishing weights for the different performance criteria. The weights assigned to each performance criteria reflect the importance decision makers attach to the different criteria. For each performance criterion, the relative weight (Rj) is given by.

$$R_j = \frac{w_j}{\sum_{j=1}^{J} |w_j|}$$

Where

R_j = Relative weight of each performance criterion.
w_j = Arbitrary weight assigned for each performance criterion by decision makers.
J = 1, 2,…., J (total number of performance criterion under consideration).

For this study, identical weights will be used for the different performance criterion categories to ensure that each factor is of equal importance as follows.

- Engineering – 20%
- Traffic Operation and Safety – 20%
- Socio-Economic – 20%
- Environmental – 20%
- Project Cost – 20%

A negative sign is assigned to the weight if higher measured values for the performance criterion indicate a more negative effect.

The next task in this approach is scaling of the impacts. This involves converting each criterion from its original dimension to one that is uniform and commensurate across all the performance criteria. For each performance criteria, the scale factor is given by:

$$S_j = \frac{1}{Max(X_{1j}, X_{2j}, ..., X_{Nj})}$$

Where

S_j = Scale factor for each performance criterion
X_{ij} = Measured impact of each performance criterion under each alternative. For example, right-of-way acquisition (in acres) for each alternative
N = number of alternatives considered

The measured values for the performance criteria categories will be obtained from the engineering and environmental evaluation of the build alternatives developed for the project.

After all the performance criteria have been weighted and scaled, the product of the relative weight (R_j), scale factor (S_j) and the measured impact (X_{ij}) for each performance criterion under each alternative is computed. This is a dimensionless value which is summed up for the various performance criteria to obtain the Impact Index Value for each alternative and is expressed as:

$$I = \sum_{j=1}^{J} R_j S_j X_{ij}$$

The alternative with the highest Impact Index Value (less negative) is the most favorable alternative.

6.3 Performance Evaluation Criteria

Each Build Alternative was evaluated based on several engineering, traffic operations and environmental performance criteria. Construction costs and right-of-way impacts were also factored into this comparative analysis. The various criteria used in the evaluation are summarized below:

6.3.1 Engineering Impacts

- **Geometric Compliance to Design Controls:** Assesses the compliance of the Build alternatives with FDOT design standards (2013) and Plans Preparation Manuals (PPM) and the need for variations.

- **Utility and Facility Impacts:** Measures the utility impacts of the alternatives. This includes potential conflicts and relocation of the utility lines that are located within the project study area.

- **Multi-modal (Transit/Pedestrian/Bicycle Facilities):** Measures how a particular alternative enhances the ability to promote alternate forms of transportation such as transit, pedestrian and bicycle facilities.

6.3.2 Traffic Operation and Safety Impacts

- **Total Delay**: This criterion measures the ability of an alternative to provide adequate capacity and minimize travel time delay through the corridor and to the various access points within the corridor.

- **Average Speed**: This criterion measures the ability of an alternative to provide adequate travel speed through the corridor and to the various access points within the corridor.

- **Total Travel Time**: This criterion measures the ability of an alternative to provide adequate travel time through the corridor and to the various access points within the corridor.

- **Safety Benefits:** This criterion provides consideration for an alternative's physical, geometric and operational features identifying to what extent they would minimize actual or potential safety hazards.

6.3.3 Socio-Economic Impacts

- **Right-of-way/Business Impacts:** This criterion addresses variations in right-of-way requirements and business impacts among the different alternatives.

- **Economic & Employment Impacts:** This criterion identifies whether an alternative impacts the local economy. The measure of economic impact is the expected number of jobs created by the construction activity. This is based on FHWA estimates of 16.8 jobs per million dollars spent (see **Section 5.5.2**).

- **Visual & Aesthetics:** This criterion measures an alternative's potential effect on the aesthetics of the surrounding communities based on the landscaping improvement cost.

- **Inconvenience for Residents and Businesses:** This criterion measures an alternative's inconvenience to the mobility of residents and businesses.

6.3.4 Environmental Impacts

- **Wetlands/Surface Water Impacts:** This criterion measures an alternative's potential effect on surface water resources within the project limits.

- **Noise & Air Impacts:** This criterion measures the ability of an alternative to meet pre-established noise and air quality standards and the additional number of sites that would be impacted by the proposed project.

- **Contamination:** This criterion measures the potential impact on existing or potential hazardous material sites and or generators.

- **Cultural / Historic / Archaeological:** Measures the degree of impact associated with historic structures or archaeological sites that may be caused by the development of a specific corridor or concept.

6.3.5 Project Cost

- **Right-of-way Costs:** This criterion compares each alternative based on right-of-way costs.

- **Preliminary Construction:** This criterion compares each alternative based on construction costs.

- **Engineering Design:** This criterion compares each alternative based on design costs.

- **Construction Engineering & Inspection:** This criterion compares each alternative based on Construction Engineering & Inspection costs.

6.4 Project Alternatives Evaluation Matrix

The evaluation matrix for the project alternatives based on the multi-criteria evaluation methodology is provided in **Table 6-2**.

Table 6-2
Evaluation Matrix for Project Alternatives

Performance Criteria	Units	Weights (wi)	Relative Weights (Rj)	Scale Factor (Sj)	Project Alternatives									
					Measured Impact (Xij)					Impact Index Values (I)				
					No Build	Interim Build Alt. 3A	Interim Build Alt. 3B	Interim Build Alt. 3C	Interim Build Alt. 4	No Build	Interim Build Alt. 3A	Interim Build Alt. 3B	Interim Build Alt. 3C	Interim Build Alt. 4
Engineering														
Geometric Compliance to Design Controls	Locations	-0.067	-0.33	0.029	35	12	12	12	11	-0.333	-0.114	-0.114	-0.114	-0.105
Utility and Facility Impacts	Num	-0.067	-0.33	0.023	0	34	43	44	39	0.000	-0.258	-0.326	-0.333	-0.295
Multi-modal (Transit /Pedestrian / Bicycle Facilities)	Index	0.067	0.33	0.200	1	3	4	5	4	0.067	0.200	0.267	0.333	0.267
Traffic Operation and Safety														
Total Delay	veh-Hours	-0.050	-0.25	0.000	10,846	3,975	4,003	2,822	4,247	-0.250	-0.092	-0.092	-0.065	-0.098
Average Speed	mph	0.050	0.25	0.025	19.55	35.53	35.50	39.31	34.89	0.124	0.226	0.226	0.250	0.222
Travel Time	min/mile	-0.050	-0.25	0.325	3.08	1.69	1.69	1.53	1.71	-0.250	-0.137	-0.137	-0.124	-0.139
Potential Crash Reduction (CRF)	%	0.050	0.25	0.029	-25	30	30	35	30	-0.179	0.214	0.214	0.250	0.214
Socio-Economic														
Business Relocation	Num	-0.050	-0.25	0.053	0	2	19	19	6	0.000	-0.026	-0.250	-0.250	-0.079
Economic & Employment Impacts	Jobs	0.050	0.25	0.000	0	1771	3084	3597	2621	0.000	0.123	0.214	0.250	0.182
Aesthetics & Landscaping (4% of Construction Cost)	$ Million	0.050	0.25	0.159	0	3.47	5.24	6.30	3.80	0.000	0.137	0.208	0.250	0.151
Inconvenience for Residents and Businesses	Index	0.050	0.25	0.200	1	2	4	4	5	0.050	0.100	0.200	0.200	0.250
Environmental														
Wetlands/Surface Water Impacts	Acres	-0.050	-0.25	2.174	0	0.27	0.46	0.46	0.16	0.000	-0.147	-0.250	-0.250	-0.087
Noise Impacts	Sites	-0.050	-0.25	0.250	0	3	4	4	2	0.000	-0.188	-0.250	-0.250	-0.125
Contamination	Sites	-0.050	-0.25	0.071	0	8	14	14	8	0.000	-0.143	-0.250	-0.250	-0.143
Cultural / Historic / Archaeological	Index	-0.050	-0.25	0.333	3	3	3	3	3	-0.250	-0.250	-0.250	-0.250	-0.250
Project Cost														
Right-of-way Costs	$ Million	-0.050	-0.25	0.022	0	5.63	32.55	32.55	45.75	0.000	-0.031	-0.178	-0.178	-0.250
Preliminary Construction	$ Million	-0.050	-0.25	0.006	0	86.64	131.07	157.57	94.98	0.000	-0.137	-0.208	-0.250	-0.151
Engineering Design	$ Million	-0.050	-0.25	0.083	0	6.57	9.98	12.00	7.64	0.000	-0.137	-0.208	-0.250	-0.159
Construction Engineering & Inspection	$ Million	-0.050	-0.25	0.083	0	6.57	9.98	12.00	7.64	0.000	-0.137	-0.208	-0.250	-0.159
Sum of Scaled Impacts										**-1.021**	**-0.795**	**-1.392**	**-1.281**	**-0.754**
Ranking										**3**	**2**	**5**	**4**	**1**

6.5 Selection of Recommended Alternative

Based on the evaluation and analysis of several key evaluation parameters including horizontal and vertical alignment, right-of-way impacts, construction cost, potential utility impacts, bridge analysis, traffic operations and safety, maintenance of traffic, environmental impacts and transit considerations, in addition to extensive discussions with both FDOT and FTE management, the Interim Build Alternative 4 was selected as the Recommended Interim Build Alternative. The Recommended Interim Build Alternative offers several advantages when compared with the No-Build Alternative including the following:

- **Enhanced Safety:** The safety analysis prepared as part of this study identified five fatal crashes located along the existing SR 826/Palmetto Expressway eastbound ramp to I-95 southbound or SR 7/US 441, which leads to I-95 northbound. The proposed direct connection flyover ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound and widening of the Turnpike Connector southbound lanes will minimize the weaving condition within these roadway segments. The proposed design also eliminates weaving maneuvers by barrier separating NW 12th Avenue on-ramp from three-lane off-ramp from SR 826 eastbound to I-95 northbound and southbound to potentially reduce the frequent angle crashes as well as the resulting fatalities from this crash type. This will potentially mitigate the crash rate and enhance overall public safety within the interchange.
- **Reduced Travel Time and Delays:** The traffic operational analysis performed as part of this study indicated that, for the 2030 analysis year, the improvements proposed as part of Interim Build Alternative 4 will reduce the travel time for the SR 826 eastbound to I-95 northbound movement by 64% and 50% during the AM and PM peak periods respectively. Similarly, for the Florida's Turnpike southbound to I-95 southbound movement, the travel time will be reduced by 67% and 78% during the AM and PM peak periods respectively. These improvements will significantly alleviate traffic congestion, reduce delays and improve mobility for these critical movements.
- **Emergency Evacuation:** The improved mobility resulting from the improvements proposed as part of the Recommended Interim Build Alternative will also facilitate traffic movement during emergency evacuation periods between three freeways (I-95, SR 826 and Florida's Turnpike) and two major principal arterials (SR 9 and SR 7/US-441), all of which are designated evacuation routes for Miami-Dade County residents. In addition, the traffic operational analysis shows significant travel time reduction from either Florida's Turnpike or SR 826/Palmetto Expressway to the NW 2nd Avenue and NW 167th Street intersection. This intersection provides access to the emergency entrance for the Jackson North Medical Center.

Based on the above evaluation and the documentation presented in this report, Interim Build Alternative 4 meets the overall project objectives of this PD&E study as well as the purpose and need for this project.

7. RECOMMENDED ALTERNATIVE

7.1 Design Details of Recommended Alternative

The Recommended Interim Build Alternative (Interim Build Alternative 4) involves the construction of a three lane off-ramp for SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound. A new flyover ramp for the SR 826/Palmetto Expressway eastbound to I-95 northbound will also be provided. The new flyover ramp begins from the SR 826/Palmetto Expressway eastbound to I-95 southbound ramp and continues over the Turnpike Connector and underneath the I-95 Express Flyover Ramps. It then goes over I-95 and merges with the existing SR 7/US 441 northbound to I-95 northbound ramp before joining I-95 using the existing on-ramp alignment.

The Recommended Interim Build Alternative maintains the NW 12th Avenue on-ramp which provides access from the Sunshine Industrial Park to I-95 southbound and northbound with connectivity to Florida's Turnpike through SR 7/US 441 (See **Appendix J**). In order to eliminate the current weaving issue along the SR 826 mainline, the NW 12th Avenue on-ramp will not connect directly to the SR 826 mainline. Instead, it will be relocated and connected to the three lane off-ramp to I-95 northbound and southbound as a barrier separated auxiliary lane. The provision of the NW 12th Avenue on-ramp will require the removal of the eastbound frontage road east of NW 10th Avenue. The warehouse property on the southwest quadrant of the interchange within the Sunshine Industrial Park will be acquired due to the removal of the only access road for this property.

The Turnpike Connector southbound lanes will be reconstructed to shift the alignment to the west in order to accommodate a future direct express lane connection from the Florida's Turnpike southbound to the I-95 southbound express lanes. The Turnpike Connector southbound lanes will also be widened to accommodate two lanes from the Florida's Turnpike and three lanes from SR 826 eastbound to I-95 southbound. In order to increase the weaving distance along the Turnpike Connector southbound lanes, the off-ramp to SR 7/US 441 will be relocated approximately 1,150-ft south along SR 7/US 441 to the Biscayne River Drive intersection.

The reconstruction along the Turnpike Connector will require widening of the Turnpike Connector southbound bridge over SR 826 (870601) and replacement of the southbound bridges over the SFRC (870159) and SR7/US 441 (870045). An additional auxiliary lane is also provided along I-95 southbound from the Golden Glades Interchange (GGI) to NW 151st Street to provide additional capacity. This will require widening of the I-95 southbound bridge over the C-8/Biscayne Canal (870348). The entrance to the I-95 southbound express lanes will be moved 300-ft south to accommodate weaving maneuvers from SR 826 and Florida's Turnpike to the I-95 Express southbound lanes.

Texas U-Turns (matching the existing bridge vertical clearances) will be provided underneath the SR 826/Palmetto Expressway mainline bridges over NW 17th Avenue and NW 12th Avenue to enhance access and mobility for the adjacent residents and the

Sunshine Industrial Park. Along the SR 826/Palmetto Expressway westbound frontage road, the two through lanes from NW 12th Avenue are maintained. In addition, exclusive westbound right turn and left turn lanes are provided at the NW 17th Avenue westbound ramp terminal. On the eastbound frontage road, the two-way segment between NW 17th Avenue and NW 16th Court will be converted into a one-way road and the intersection at NW 16th Court will also be converted to a right-in right-out configuration.

The existing unsignalized single left turn lane from SR 826/Palmetto Expressway eastbound to Florida's Turnpike northbound will be upgraded to a signalized intersection with double left turn lanes. This will require provision of an auxiliary lane along SR 826/Palmetto Expressway eastbound from the Turnpike Connector overpass to the NW 7th Avenue intersection and widening of the Turnpike northbound on-ramp to accommodate the additional left turn lane. Capacity improvements are also provided along the westbound frontage road between NW 12th Avenue and NW 17th Avenue. An additional northbound left turn lane is also provided at the NW 2nd Avenue and NW 167th Street intersection to improve both the intersection operations and traffic flow along NW 167th Street.

7.1.1 Proposed Typical Section

The proposed typical sections for the freeways and interchange ramp improvements under the Recommended Interim Build Alternative are provided in the PD&E conceptual design plans prepared as part of this study and provided under a separate cover.

7.1.2 Access Management & Intersection Concepts

7.1.2.1 NW 12th Avenue On-ramp

The proposed improvements under the Recommended Interim Build Alternative maintains the NW 12th Avenue on-ramp; however, in order to eliminate the current weaving concerns along the SR 826 mainline, the ramp will not connect directly to SR 826 (see **Figure 7-1**). Instead, the ramp will be relocated by connecting to the three lane off-ramp to I-95 northbound and southbound as a barrier separated auxiliary lane to prevent weaving maneuvers from NW 12th Avenue to the new I-95 northbound flyover ramp.

The typical section in this area includes two travel lanes from SR 826 eastbound, one travel lane from the NW 12th Avenue on-ramp, and a gore between the ramps. An auxiliary lane will also be added to the Turnpike Connector southbound lanes to accommodate the additional lane from the NW 12th Avenue ramp. The weaving distance will be increased by relocating the off-ramp to SR 7/US 441 approximately 1,150-ft south along SR 7/US 441 to the Biscayne River Drive intersection. The provision of the NW 12th Avenue on-ramp will require the removal of the eastbound frontage road east of NW 10th Avenue. The warehouse property on the southwest quadrant of the interchange within the Sunshine Industrial Park will be acquired due to the removal of the only access road for this property.

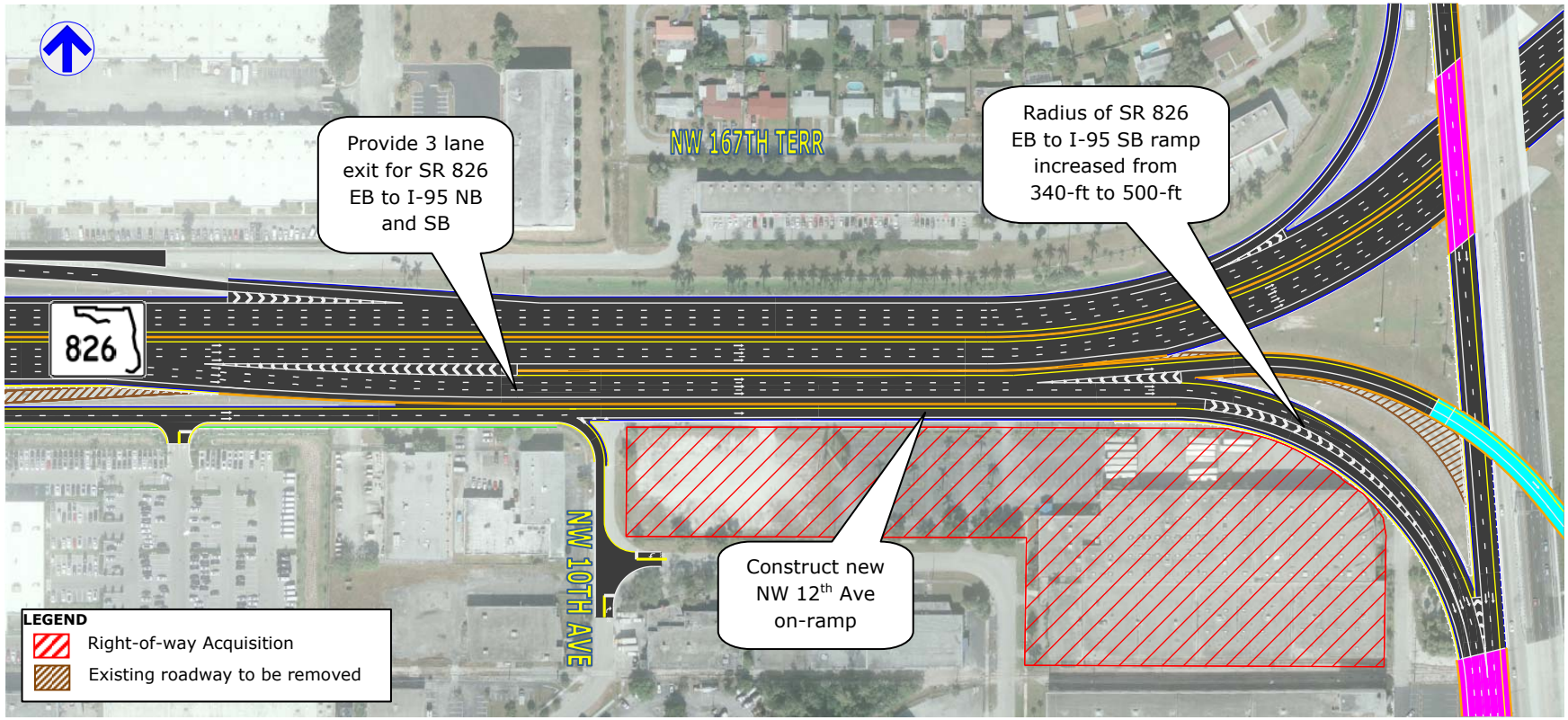


Figure 7-1 New NW 12th Avenue on-ramp

7.1.2.2 Texas U-Turns at NW 17th Avenue and NW 12th Avenue Interchanges.

Texas U-Turns (matching the existing bridge vertical clearances) will be provided underneath the SR 826/Palmetto Expressway mainline bridges over NW 17th Avenue and NW 12th Avenue to enhance access and mobility for the adjacent residents and the Sunshine Industrial Park. Figures **7-2** and **7-3** illustrates the location and geometry of the Texas U-Turns at NW 17th Avenue and 12th Avenue interchanges respectively.

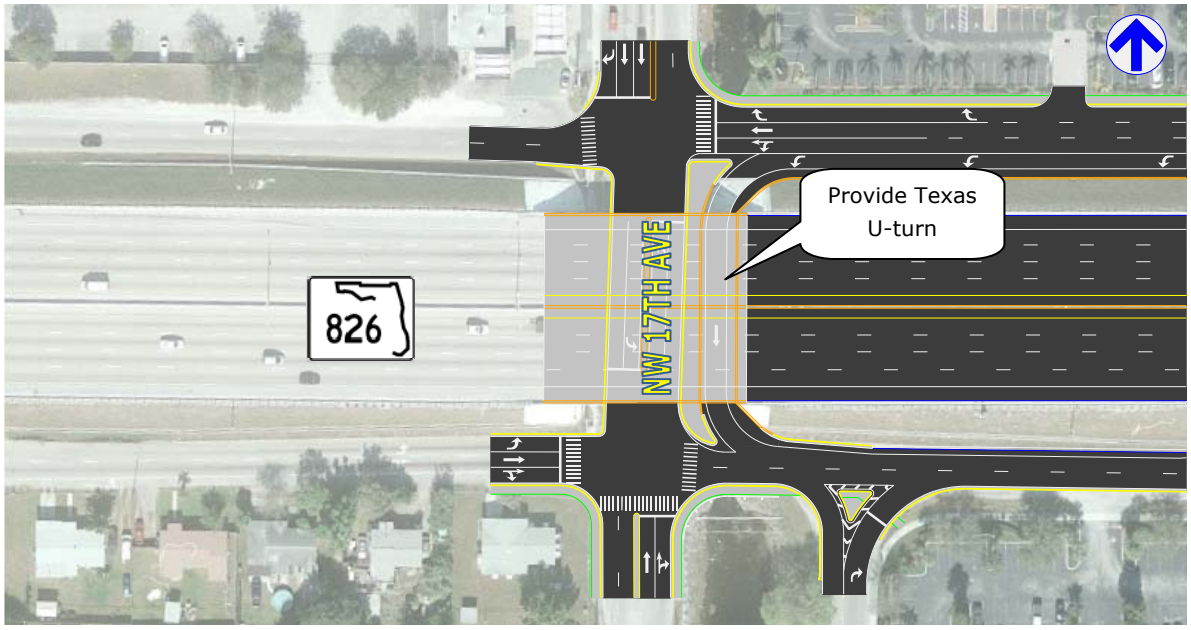


Figure 7-2 Texas U-Turn at NW 17th Avenue

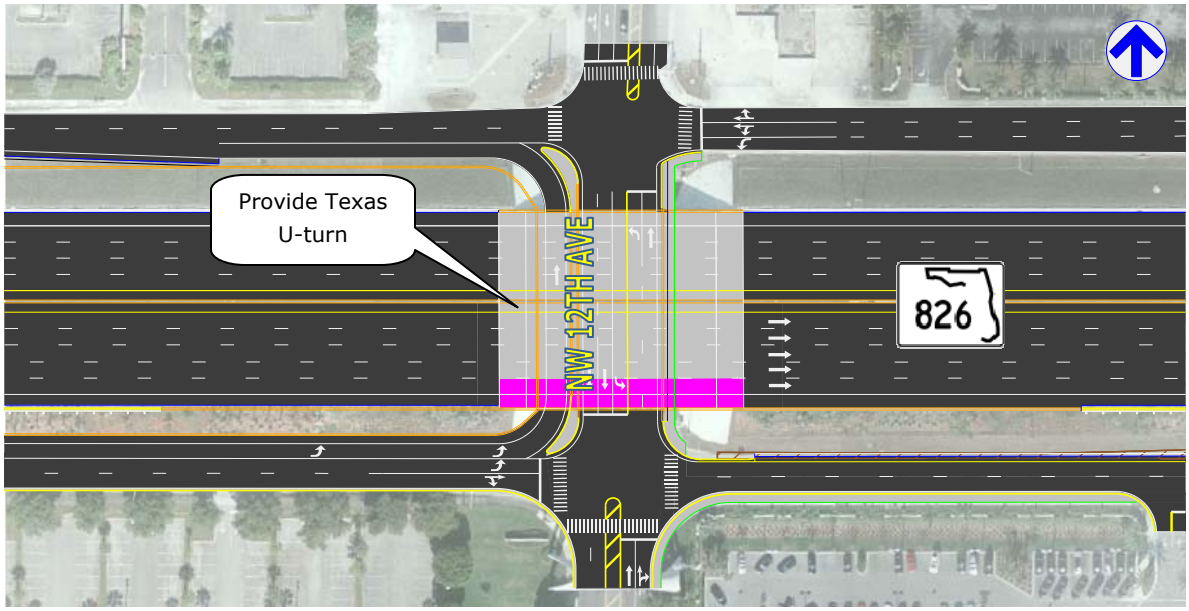


Figure 7-3 Texas U-Turn at NW 12th Avenue

7.1.2.3 SR 826 Frontage Roads at NW 17th Avenue

Figure 7-4 shows the conceptual layout of the proposed improvements for the SR 826 frontage roads at the NW 17th Avenue interchange under the Recommended Interim Build Alternative. On the eastbound frontage road, the two-way segment between NW 17th Avenue and NW 16th Court will be converted into a one-way road. The intersection at NW 16th Court will also be converted to a right-in right-out configuration to improve traffic operations at this interchange. On the westbound frontage road, an exclusive right turn lane is provided for the westbound to northbound movement at the westbound ramp terminal. In additional, the inside westbound lanes merging with the off-ramp will continue as a full lane. The proposed improvements will improve operations and enhance safety at this location.

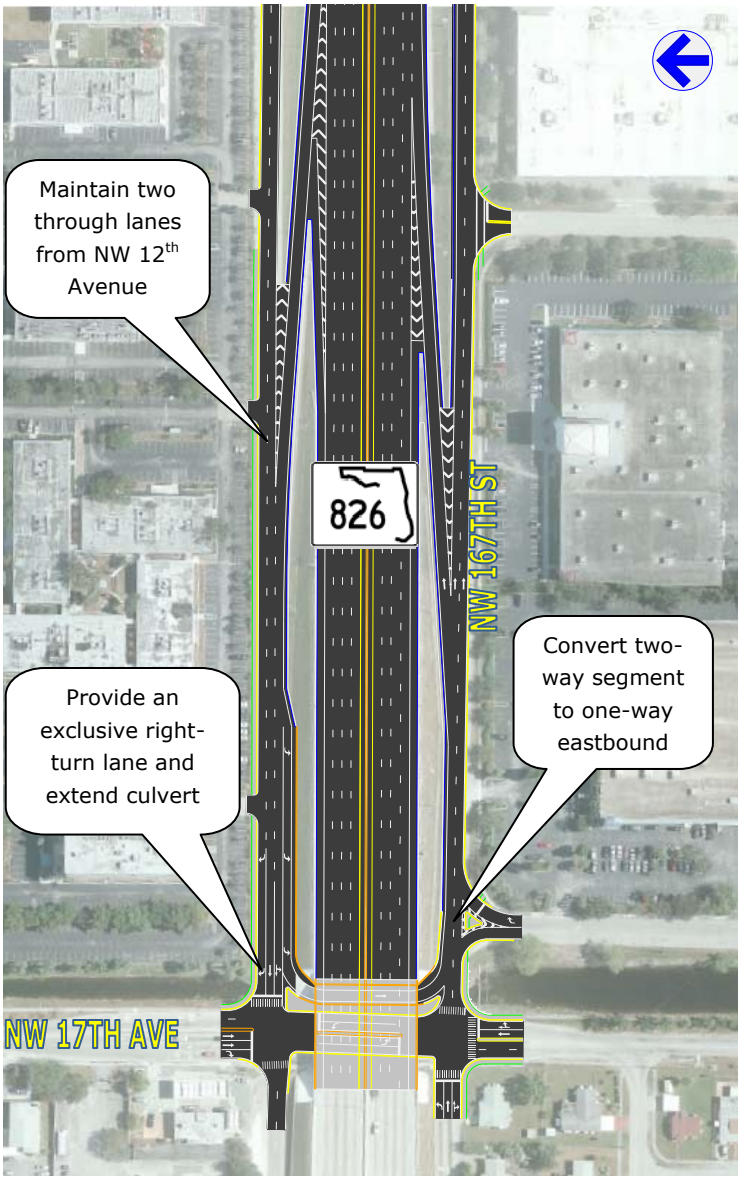


Figure 7-4 NW 17TH Avenue and NW 167TH Street

7.1.2.4 SR 826 Eastbound to Florida's Turnpike Northbound

Figure 7-5 shows the proposed improvements for the SR 826/Palmetto Expressway eastbound to Florida's Turnpike northbound intersection under the Recommended Interim Build Alternative. The existing unsignalized single left turn lane from SR 826/eastbound to Florida's Turnpike northbound will also be upgraded to a signalized intersection with double left turn lanes. The adjacent signalized intersection at NW 7th Avenue extension is located approximately 500-ft which does not meet does not meet the recommended 1,320-ft for access class 5 (see **Table 7-1**). Therefore, a design variation is required for the proposed signal spacing. The proposed dual left turn lanes will improve operations and mobility and enhance safety at this location.

Table 7-1
FDOT Access Management Standards

Access Class	Medians "Restrictive" physically prevent vehicle crossing. "Non-Restrictive" allow turns across at any point	Connection Spacing (feet)		Median Opening Spacing (feet)		Signal Spacing (feet)
		>45 mph	≤45 mph	Directional	Full	
2	Restrictive with Service Roads	1320	660	1,320	2,640	2,640
3	Restrictive	660	440	1,320	2,640	2,640
4	Non-Restrictive	660	440			2,640
5	Restrictive	440	245	660	***2,640/1,320**	***2,640/1,320**
6	Non-Restrictive	440	245			1,320
7	Both Median Types	125		330	660	1,320

* 2640 feet for >45 mph; 1320 feet for ≤45 mph

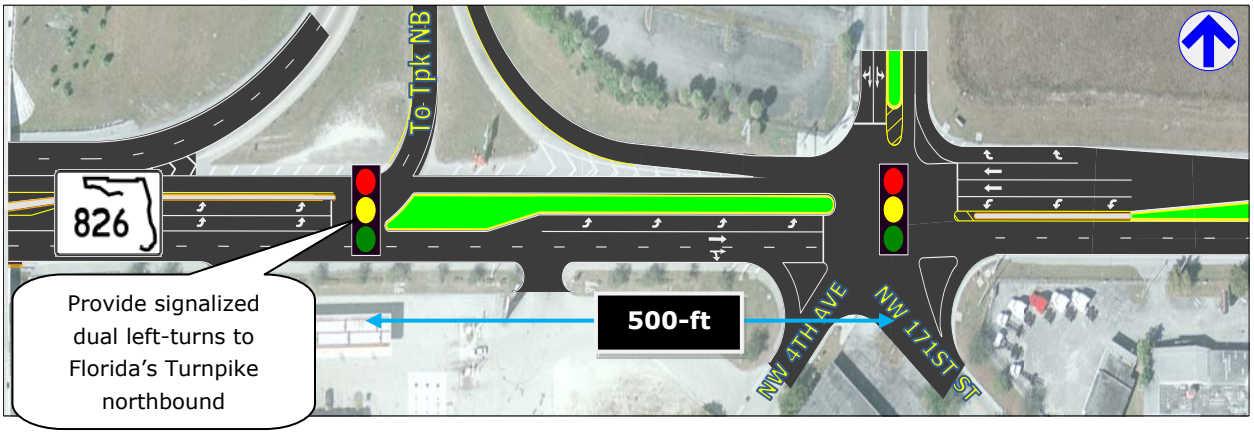


Figure 7-5 SR 826 EB and NW 7th Avenue Extension

7.1.2.5 Turnpike Connector southbound off-ramp to SR 7/US 441

Figure 7-6 shows the new configuration of the proposed off-ramp from southbound Turnpike Connector to SR 7/US 441 under the Recommended Interim Build Alternative. The proposed THREE lane off-ramp leads to a signalized intersection with an exclusive left turn lane, a shared left-right turn lane, and an exclusive right-turn lane. The exclusive right-turn lane is provided as a free-flow operational lane. The relocated ramp terminal signalized intersection is approximately 1700-ft south of the park and ride signalized intersection and approximately 1600-ft north of the NW 151st Street intersection. This meets the signal spacing requirements for the SR 7 corridor.

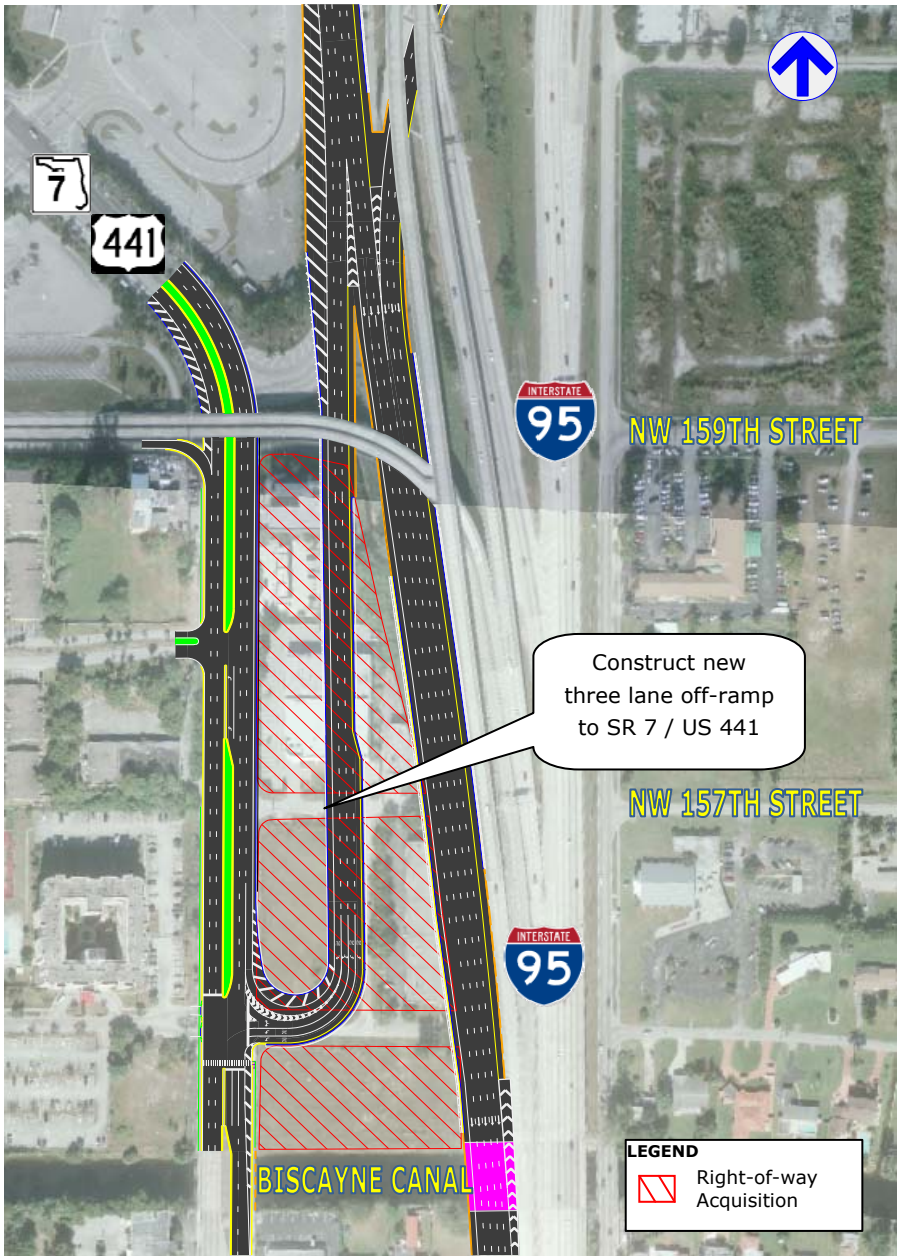


Figure 7-6 Turnpike Connector southbound off-ramp to SR 7/US 441

7.1.2.6 NW 2nd Avenue and NW 167th Street

Figure 7-7 shows the conceptual layout of the proposed modifications at the signalized intersection at NW 2nd Avenue and NW 167th Street under the Recommended Interim Build Alternative. The proposed improvements maintains all the movements at this intersection are and provides dual left turn lanes for the northbound to westbound movement. Approximately 15-ft of right-of-way will be required on the west side of the roadway to accommodate the proposed improvements. The proposed improvements will further improve traffic operations at this critical intersection within the interchange. This will also enhance the operations of emergency vehicles which use this intersection to access the emergency entrance at the Jackson North Memorial Hospital.

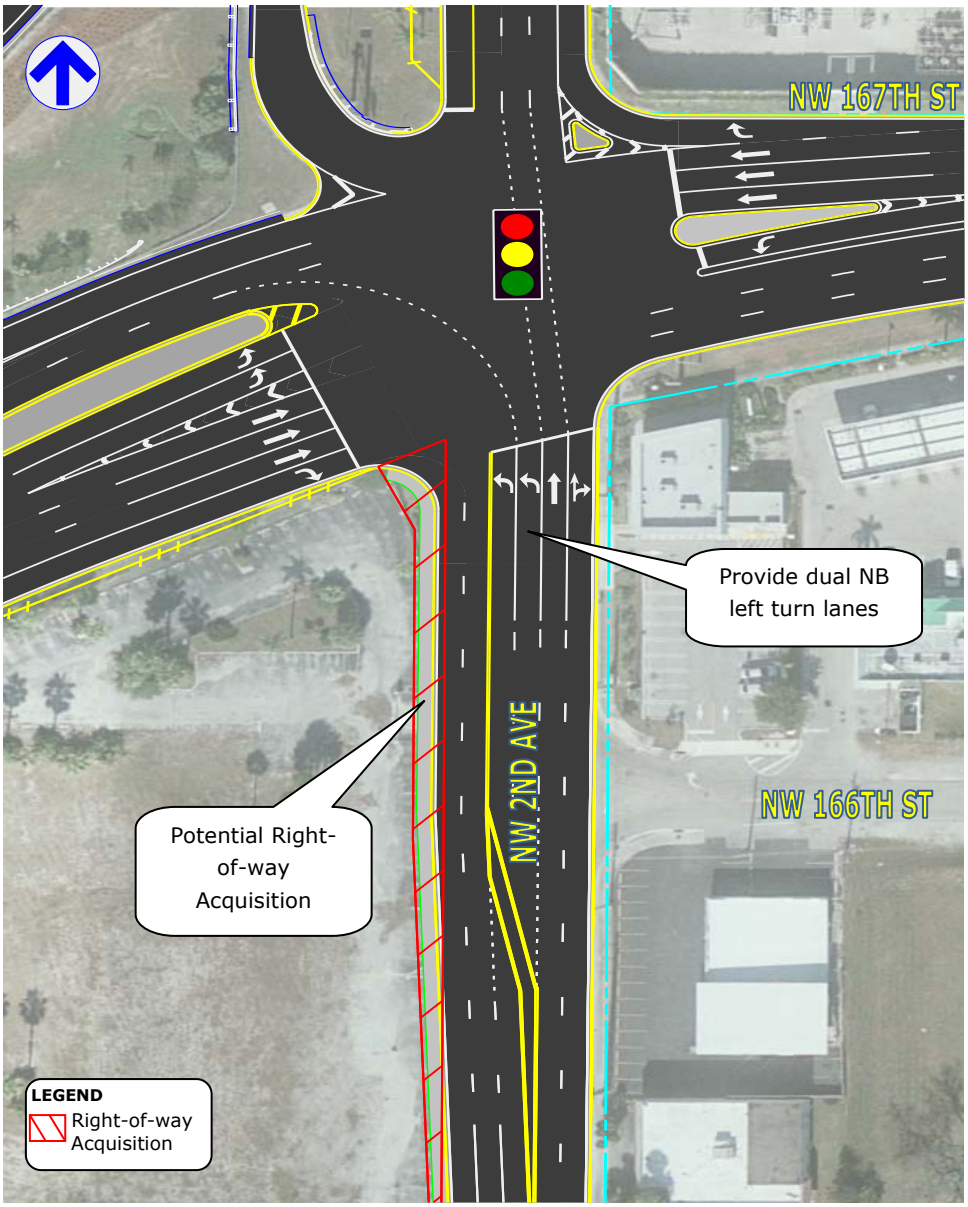


Figure 7-7 NW 2nd Avenue and NW 167th Street

7.1.2.7 I-95 Express Lanes Southbound Entrance

Figure 7-8 shows the conceptual layout of the proposed modifications to the I-95 southbound express lanes entrance. The addition of an auxiliary lane along I-95 southbound from the GGI to NW 151st Street to accommodate the additional lane from the Turnpike Connector requires the I-95 SB entrance to the express lanes to be relocated approximately 300-ft south in order to improve the weaving maneuvers from Florida's Turnpike to the I-95 express lanes. Coordination with regional partners (FDOT-D6, FDOT-D4 and FTE) will be required during final design phase to ensure that the project does not adversely impact the ITS operations during construction.

Figure 7-8 Relocation of I-95 Southbound Express Lane Entrance

7.1.3 Design Variations and Exceptions

Based on the preliminary design performed as part of the PD&E study, it is anticipated that the following design variations and exceptions will be necessary in order to implement the proposed improvements under the Recommended Interim Build Alternative. These would result in reduced right-of-way needs as well as potential cost savings without compromising safety. **Table 7-2** and **Table 7-3** summarize the design variation and exceptions identified for the Recommended Interim Build Alternative. The locations of the design variations and exceptions are depicted in **Figure 7-9** and **7-10**. The design variation for the substandard vertical clearance at the SR 826/Palmetto Expressway bridge over NW 17th Avenue and NW 12th Avenue as well as the design variation for the substandard median and shoulder widths along SR 826/Palmetto Expressway mainline will be upgraded to meet the design standards as part of the Ultimate Build improvements.

Table 7-2
Design Variations for Recommended Interim Build Alternative

#	Design Element	Location/ Description	Existing	Proposed	Criteria	Comment
1	Cross Slope	A. Reduce Cross-Slope for more than 5 lanes sloping outside along I-95 SB mainline	5-6 lanes sloping outside	6-7 lanes sloping outside	PPM: Max. 5 lanes sloping in same direction AASHTO: More than 3 lanes sloping in same direction	Maintain Existing Condition for Interim Build. Upgraded for Ultimate Build to PPM Standards.
2	Median Width	A. 16-ft median width along SR 826 mainline	16-ft	16-ft	PPM: 26-ft AASHTO: 22-ft	Maintain Existing for Interim Build. Upgraded for Ultimate Build to PPM Standards.
3	Vertical Alignment	A. Reduced vertical curve length for 4 curves along I-95 SB mainline	300-ft Min	300-ft Min	PPM: Sag800-ft, Crest 1000-ft AASHTO: 180-ft	Maintain Existing Profile for Interim Build.
		B. Reduced vertical K-values for 2 curves along SR 826 mainline	200 Min	200 Min	PPM: 245-ft AASHTO:151-ft	Maintain Existing Profile for Interim Build. Upgraded for Ultimate Build to PPM Standards.
4	Horizontal Alignment	A. Reduced horizontal curve length for one curve along I-95 SB mainline	R=1494-ft L= 839-ft	R=1340-ft L= 685-ft	PPM: R=1900-ft L= 900-ft AASHTO: R=1900-ft L= 900-ft	Required for widening along I-95 SB without impacts to 95 Express flyover piers.
5	Stopping Sight Distance	A. Reduced vertical stopping sight distance for two curve along SR 826 mainline	PPM: 535-ft AASHTO: 689-ft	PPM: 535-ft AASHTO: 689-ft	PPM: 570-ft AASHTO:570-ft	Maintain existing profile for Interim Build. Upgraded for Ultimate Build to PPM Standards.
6	Vertical Clearance	A. Reduced vertical clearance for SR 826 over NW 12th Ave & NW 17th Ave	14.3-ft & 14.1-ft Min	14.3-ft & 14.1-ft Min	PPM: 16.5-ft AASHTO: 14.0-ft	Maintain Existing for Interim Build. Upgraded for Ultimate Build to PPM Standards

Figure 7-9 Recommended Interim Build Alternative- Design Variations

Table 7-3
Design Exceptions for Recommended Interim Build Alternative

#	Design Element	Location/ Description	Existing	Proposed	Criteria	Comment
1	Lane Width	A. 11-ft Lanes widths along I-95 Mainline	12-ft	11-ft	PPM: 12-ft AASHTO: 12-ft	Reduced lane width to minimize impacts. Consistent with existing I-95 lane width
		B. 11-ft Lanes widths along SR 826/NW 7th Ave Ext. EB	12-ft	11-ft	PPM: 12-ft AASHTO: 12-ft	Reduced lane width to minimize impacts.
2	Shoulder Width	A. 2.5-ft outside shoulder width along NW 7th Avenue Ext.	10-ft	2.5-ft Min	PPM: 12-ft AASHTO: 10-ft	Maintain existing condition to avoid impact to existing bridge
		B. 7-ft inside shoulder width along SR 826 mainline	7-ft	7-ft	PPM: 12-ft AASHTO: 10-ft	Maintain existing condition to minimize R/W impacts
		C. 6-ft min outside shoulder widths along I-95 SB mainline	6-ft Min	6-ft Min	PPM: 12-ft AASHTO: 10-ft	Maintain existing condition to avoid impacts to existing bridges or to accommodate a greater horizontal sight distance along inside of shoulder
3	Stopping Sight Distance	A. Reduced horizontal stopping sight distance for one curve along I-95 SB mainline	397-ft Min	441-ft Min	PPM: 645-ft AASHTO: 570-ft	Required for widening along I-95 SB without impacts to 95 Express flyover piers
		B. Reduced vertical stopping sight distance for one curve along I-95 SB mainline	PPM: 386-ft AASHTO: 455-ft	PPM: 386-ft AASHTO: 455-ft	PPM: 645-ft AASHTO: 570-ft	Maintain existing profile for Interim Build. Upgraded for Ultimate Build to PPM Standards
4	Vertical Alignment	A. Reduced vertical curve K-value and vertical curve length for three curves along I-95 SB mainline	Sag 114-ft, Crest 92-ft	Sag 114-ft, Crest 92-ft	PPM: Sag 157-ft, Crest 313-ft AASHTO: Sag 136-ft, Crest 151-ft	Maintain existing profile for Interim Build. Upgraded for Ultimate Build to PPM Standards
5	Super-elevation	A. Reduced superelevation for one curve along I-95 southbound mainline	0.069	0.069	PPM: 0.093 AASHTO: 0.093	Maintain Existing Condition to avoid impacts to existing bridge clearances

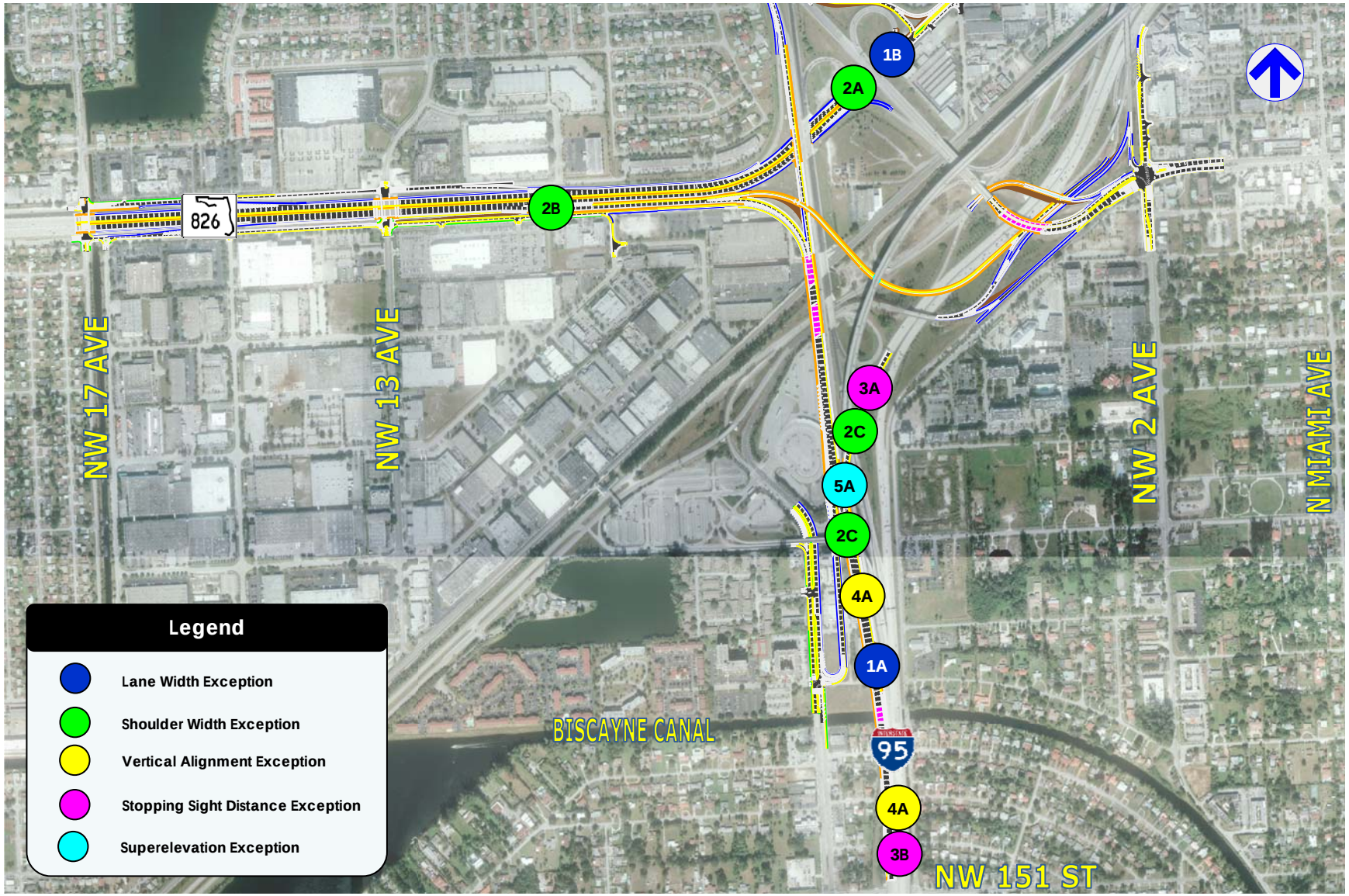


Figure 7-10 Recommended Interim Build Alternative- Design Exceptions

7.2 Traffic Operational Analysis

7.2.1 Future Annual Average Daily Traffic Volumes

Future daily traffic forecasts (AADTs) were developed for the following analysis years: opening year 2018, interim year 2030 and design year 2040. Traffic forecasts were based on SERPM 6.5 regional model. A sub-area model refinement was performed to improve model forecasting within study limits. One No Build and one Build model were developed for each analysis year. Future SERPM models were created by adjusting zonal (population, employment, school) and network data for each analysis phase using updated information obtained from State and private sources such as the Bureau of Economic and Business Research (BEBR), FDOT work plans, Miami- Dade MPO, and county and local comprehensive plans.

AADTs were adjusted to peak hour directional volumes using the approved Standard K and D factors. Intersections turning movement volumes were developed using TMTOOL and balanced with ramp volumes. Peak hour directional volumes throughout GGI were reviewed and adjustments were made to smooth and balance traffic throughout the system.

Figures 7-11 and **7-12** show the 2030 peak hour volumes for the No-Build and Recommended Interim Build Alternative.

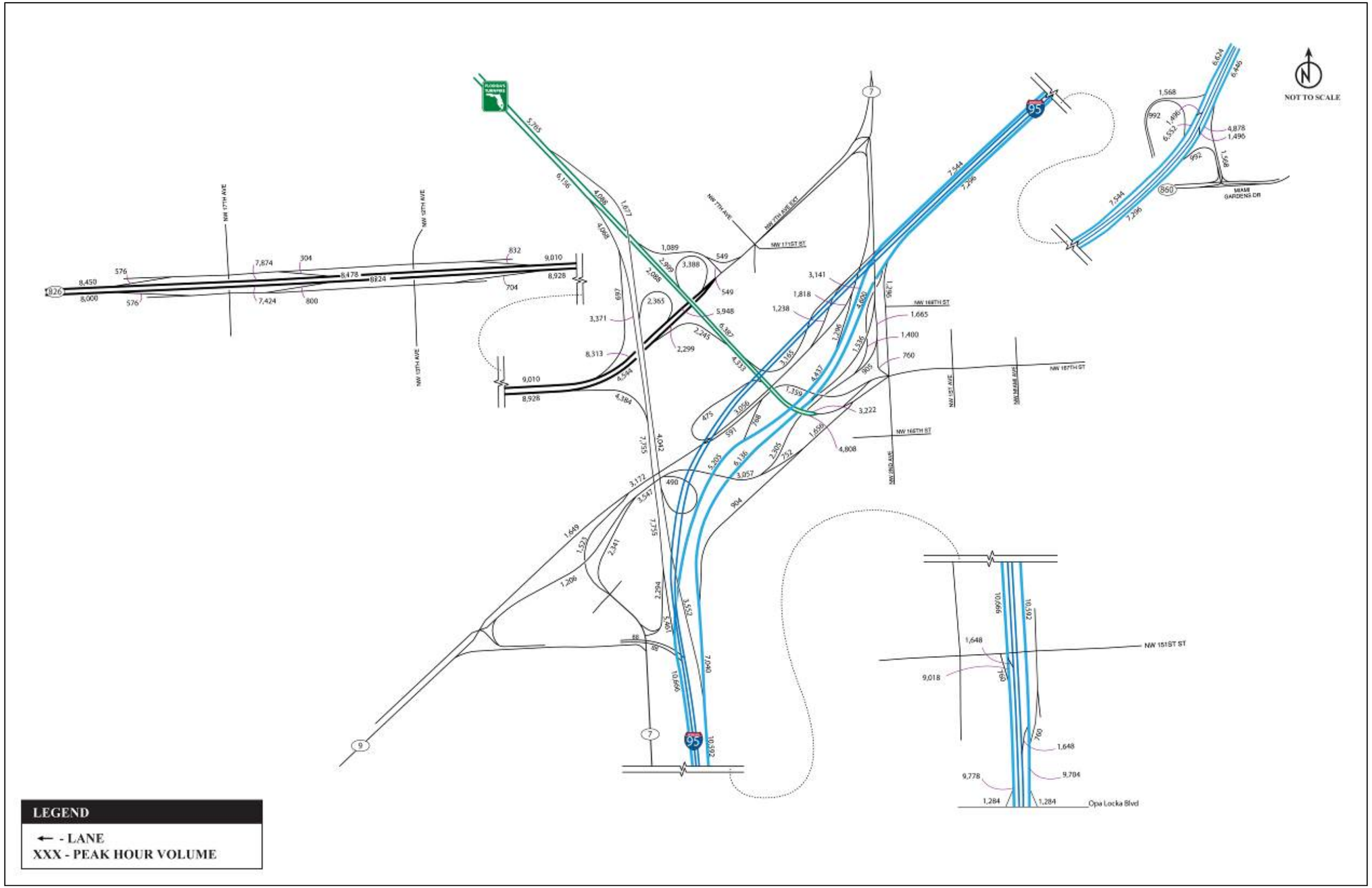


Figure 7-11 No-Build (2030) Peak Hour Volume

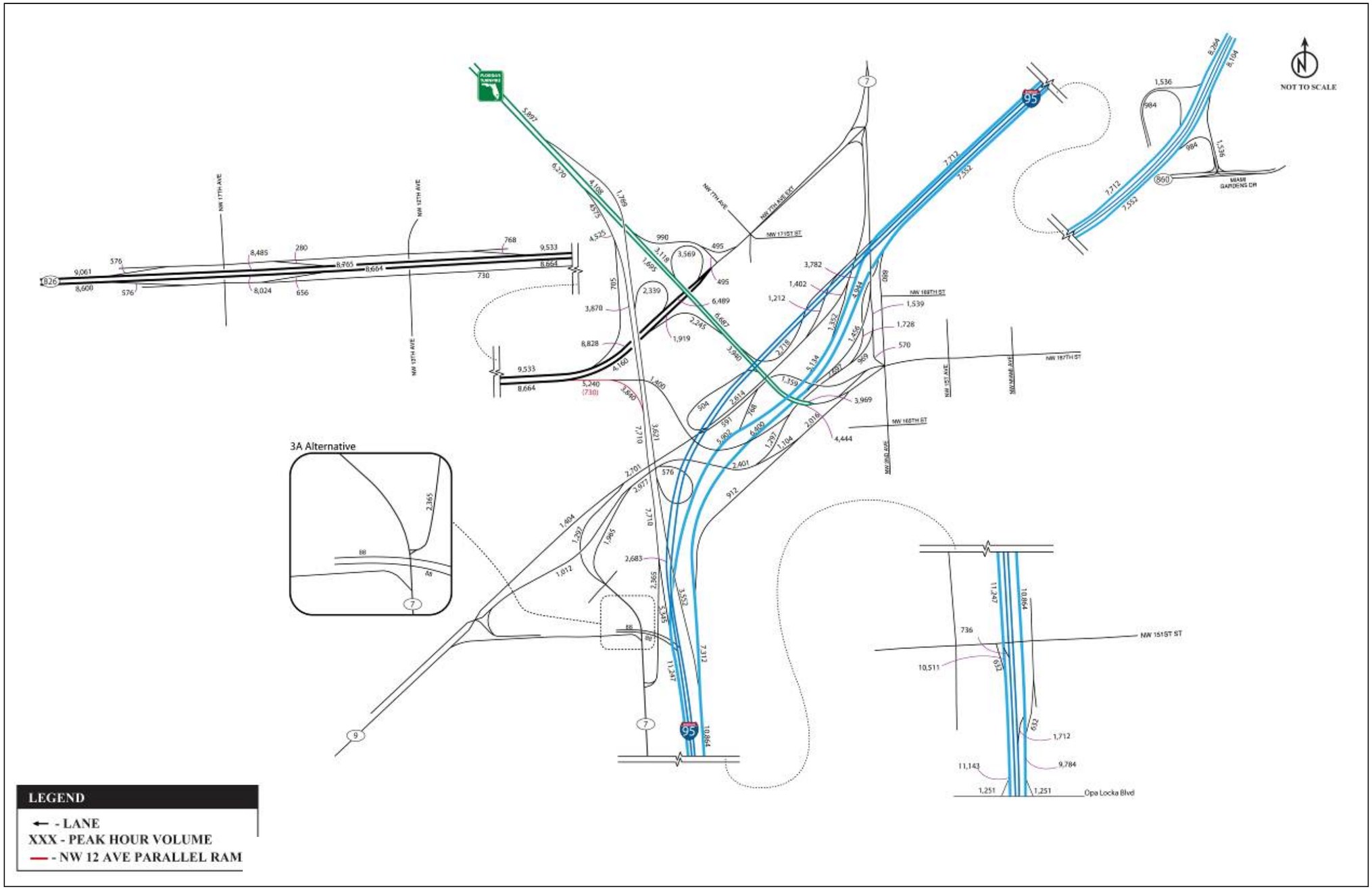


Figure 7-12 Recommended Build (2030) Peak Hour Volume

7.2.2 Future Network Analysis Results

Traffic operational analysis was performed for the future conditions under the No-Build and Recommended Interim Build Alternative. CORSIM was used to evaluate the operating conditions of the main freeway sections and ramps. **Tables 7-4** through **7-6** show the comparative traffic operational analysis for both AM and PM peak periods for the No-Build and Recommended Interim Build Alternative. The detailed traffic analysis results are provided in the Design Traffic Technical Memorandum (DTTM) prepared as part of this Study.

Table 7-4
Network Measures of Effectiveness

#	Network Statistics	AM Peak			PM Peak		
		No-Build	Recom-mended Build	% Change	No-Build	Recom-mended Build	% Change
1	Delay Time (Veh-Hrs)	10,486	4,247	**-60%**	13,701	11,086	**-19%**
2	Average Speed (mph)	19.55	34.89	**78%**	16.93	22.71	**34%**

Table 7-5
Travel Time Comparison

#	Route	AM Peak			PM Peak		
		No-Build	Recom-mended Build	% Change	No-Build	Recom-mended Build	% Change
1	Turnpike SB to NW 2 Avenue/ NW 167 St	20.96	3.10	**-85%**	24.17	3.02	**-88%**
2	Turnpike SB Connector to I-95 SB	16.44	5.48	**-67%**	18.38	4.01	**-78%**
4	SR 826 EB to NW 2 Avenue/ NW 167 St	6.08	3.00	**-51%**	7.07	3.21	**-55%**
5	SR 826 EB to I-95 SB*	2.05	4.10	**100%**	1.96	3.00	**53%**
6	SR 826 EB to I-95 NB (New Ramp)		2.13	**-64%**		1.86	**-50%**
7	SR 826 EB to I-95 NB (Existing Route)*	5.86			3.73		

**No-Build alternative is constrained with traffic backing up at entry nodes, as such, travel times appear better than they are due to limited volume throughput in the system*

Table 7-6
Travel Speed Comparison

#	Route	AM Peak			PM Peak		
		No-Build	Recom-mended Build	% Change	No-Build	Recom-mended Build	% Change
1	Turnpike SB to NW 2 Avenue/ NW 167 St	6.05	41.12	**580%**	4.98	43.66	**777%**
2	Turnpike SB Connector to I-95 SB	34.09	37.85	**11%**	34.64	45.91	**32%**
4	SR 826 EB to NW 2 Avenue/ NW 167 St	9.72	26.96	**177%**	7.86	27.54	**250%**
5	SR 826 EB to I-95 SB*	41.40	33.55	**-19%**	42.59	41.31	**-3%**
6	SR 826 EB to I-95 NB (New Ramp)		36.42	**43%**		37.71	**20%**
7	SR 826 EB to I-95 NB (Existing Route)*	25.42			31.50		

**No-Build alternative is constrained with traffic backing up at entry nodes, as such, travel speeds appear better than they are due to limited volume throughput in the system*

The overall network analysis for the No-Build and Recommended Interim Build Alternative for the year 2030 shows significant improvements in travel times and travel speeds for most of the critical routes within the GGI. The proposed new flyover will reduce travel time by 64% and 50% for AM and PM peak periods respectively for the Recommended Interim Build Alternative compared to the No-Build alternative. The rerouting of the traffic onto the proposed new flyover ramp will also significantly increase the travel speeds for the Turnpike southbound and SR 826 eastbound movements to NW 2 Avenue.

The SR 826 eastbound to I-95 southbound however, shows an increased travel time and reduced travel speed for the Recommended Interim Build Alternative compared to the No-Build. This is due to the fact that in the No-Build model, the entry node sustains starvation due to traffic backup at the upstream node, as such, the travel times and speeds appear better than they are due to limited volume throughput in the system.

7.2.3 Future Freeway Operations Results

Table 7-7 shows the basic freeway operational analysis results for the No-Build and Recommended Interim Build Alternative.

Table 7-7
Level of Service and Density Results (2030)

Basic Freeway Segment	Direction	No-Build		Recommended Alternative	
		Density	LOS	Density	LOS
AM					
I-95 S of GGI After NW 151 St Off	NB	40.5	E	30.2	D
I-95 S of GGI Before NW 151 St Off	SB	66.7	F	42.6	E
SR 826 B/W NW 17 Ave Off and 17 Ave	EB	44.5	E	29.9	D
SR 826 B/W NW 17 Ave Off and 17 Ave	WB	28.6	D	22.9	C
Turnpike at Toll Plaza	SB	37.8	E	26.7	D
Turnpike at Toll Plaza	NB	34.1	D	25.1	C
I-95 B/W GGI and Miami Gardens Dr	SB	55.4	F	33.0	D
I-95 B/W GGI and Miami Gardens Dr	NB	59.5	F	25.9	C
I-95 South OF NW 151 St	NB	35.0	E	35.4	E
I-95 South OF NW 151 St	SB	51.4	F	79.3	F
PM					
I-95 S of GGI After NW 151 St Off	NB	81.5	F	44.6	E
I-95 S of GGI Before NW 151 St Off	SB	52.5	F	37.0	E
SR 826 B/W NW 17 Ave Off and 17 Ave	EB	44.2	E	29.5	D
SR 826 B/W NW 17 Ave Off and 17 Ave	WB	46.7	F	32.2	D
Turnpike at toll plaza	SB	22.1	C	16.9	B
Turnpike at toll plaza	NB	20.7	C	15.9	B
I-95 B/W GGI and Miami Gardens Dr	SB	45.6	F	29.8	D
I-95 B/W GGI and Miami Gardens Dr	NB	59.5	F	34.8	D
I-95 South OF NW 151 St	NB	59.0	F	60.5	F
I-95 South OF NW 151 St	SB	43.0	E	59.4	F

The comparative analysis for the basic freeway segments show substantial improvements for the freeway segments under the Recommended Interim Build Alternative compared to the No-Build with the exception of the segments of I-95 south of NW 151st Street. No improvements are currently proposed for these segments under the Recommended Interim Build Alternative; however, the ultimate build alternative provides improvements for these segments to mitigate the congestion.

7.2.4 Future Weaving Analysis Results

The operational analysis results for weaving conditions are presented in **Table 7-8** for the No-Build and Recommended Interim Build Alternative. **Figure 7-13** and **Figure 7-14** shows the locations of the weaving segments.

Table 7-8
Weaving Analysis Results (2030)

#	Location	No Build		Recommended Alternative	
		AM	PM	AM	PM
1	SR 7/US 441 NB between SR 9 merge ramp and SR 7/US 441 NB traffic to NW 167th Street off-ramp and I-95 NB	C	E	C	D
2	SR 7/US 441 SB between NW 167th Street on-ramp traffic to SR 7/US 441 SB and SR 9 SB	E	D	D	C
3	SR 9 SB between NW 167th Street to SR 9 SB ramp and SR 7/ US 441 SB to SR 9 SB Traffic	E	E	D	C
4	Turnpike Connector SB between the SR 826 EB on-ramp and Florida's Turnpike SB traffic to SR 7/US 441 and I-95 SB	F	F	F	B
5	SR 826 Connector WB between I-95 SB on-ramp and NW 167th Street WB traffic to SR 826 WB and Florida's Turnpike NB	F	C	F	C
6	Turnpike Connector NB between the SR 7/US 441 on-ramp and I-95 NB traffic to SR 826 WB and Florida's Turnpike NB	B	C	B	B

The comparative analysis results show that significant improvements in the weaving conditions under the Recommended Interim Build Alternative compared to the No-Build. The critical weaving segment along the Turnpike Connector between the SR 826 eastbound on-ramp and the SR 7/US 441 off ramp shows a significant improvement from LOS F to LOS B for the PM peak period, However, for the AM peak period it operates at LOS F.

This weaving segment on the Turnpike connector SB was designed to incorporate the NW 12 Avenue Ramp. The resulting multi-weaving segment in conjunction with a merge segment is one of the listed limitations of the Highway Capacity methodologies, as outlined in the Highway Capacity Manual (2010), page 12-9. For the purpose of Highway Capacity Analysis, this merge was assumed to take place upstream of the expected point of convergence. While the results in the Highway Capacity Analysis do not reflect the practical application of the design, it is shown for informative purposes only.

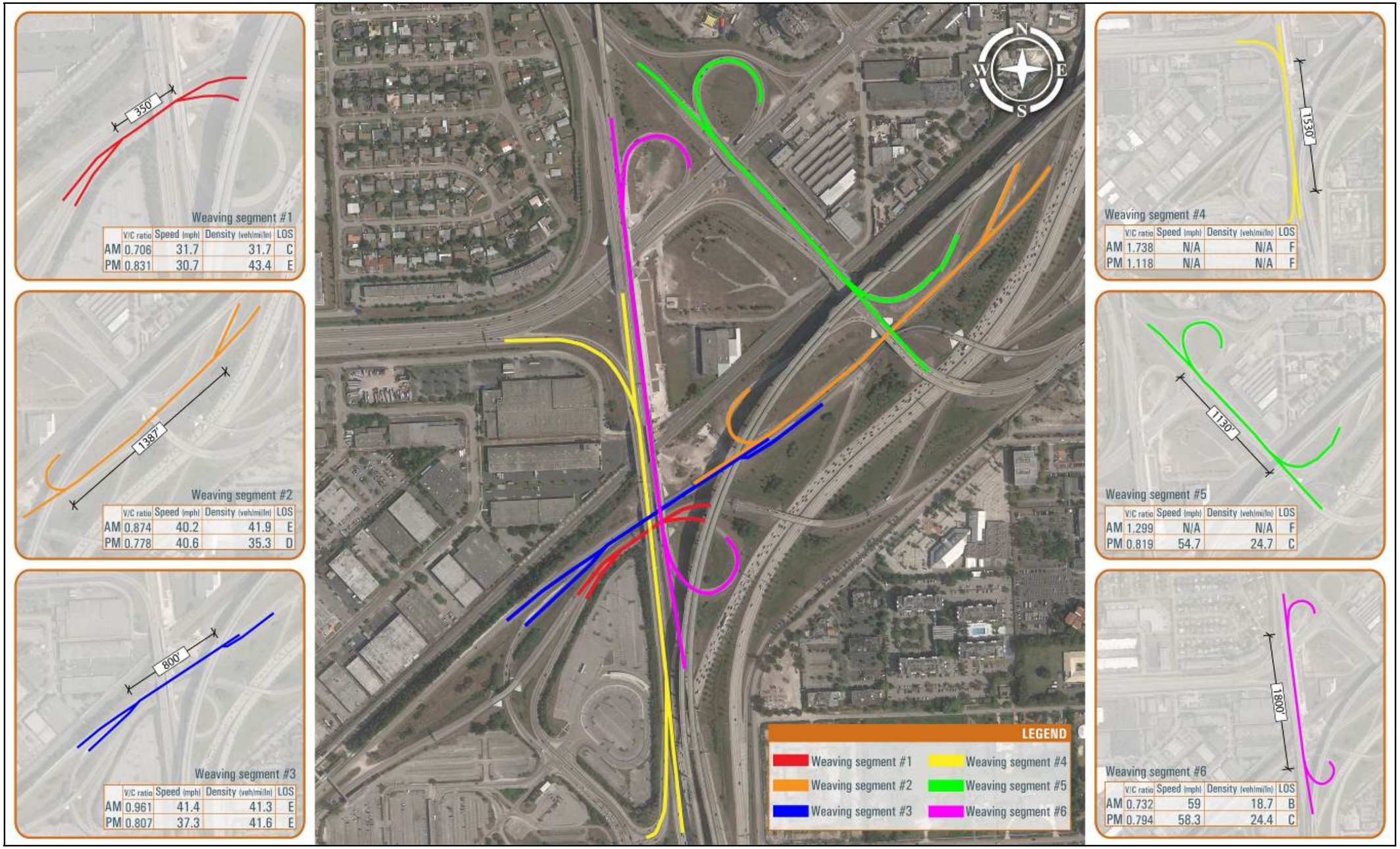


Figure 7-13 Weaving Analysis Results for No-Build (2030)

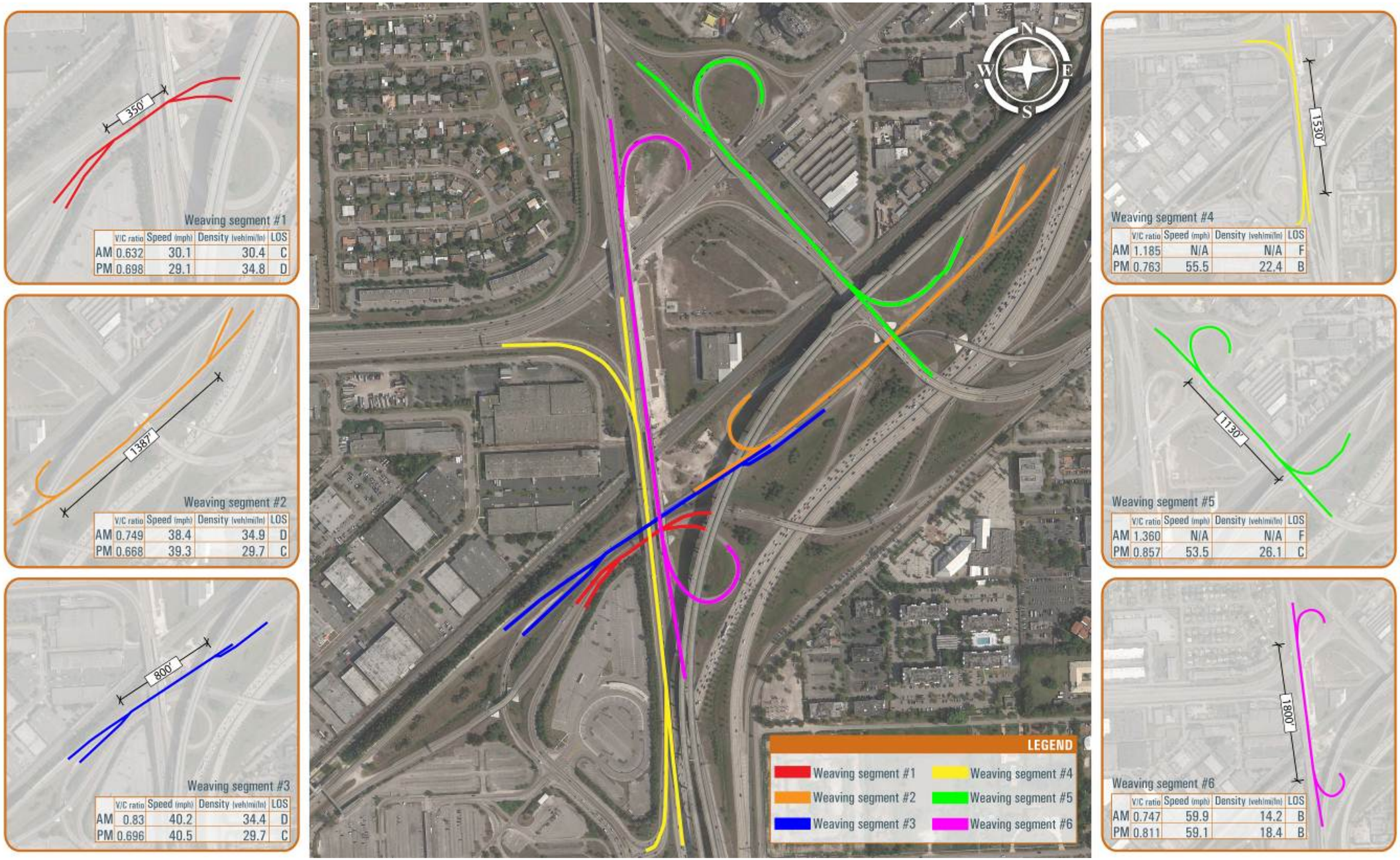


Figure 7-14 Weaving Analysis Results for Recommended-Build (2030)

7.2.5 Future Intersection Analysis Results

Operational analysis for the intersections was performed for the future conditions under the No-Build and Recommended Interim Build Alternative. SYNCHRO was used to evaluate the operating conditions of the intersection in terms of delay and level of service. **Table 7-9** shows the traffic operational analysis for both AM and PM peak periods for the No-Build and Recommended Interim Build Alternative.

Generally, the results of the intersection analysis show improvements under the Recommended Interim Build Alternative compared to the No-Build Alternative for both AM and PM peak periods. The level of service at the intersections of Miami Gardens Drive & I-95 northbound exit and NW 167 Street & North Miami Avenue will continue to operate at LOS F during the PM peak period. The intersections at NW 167th Street and NW 2nd Avenue will continue to operate at LOS F during both AM and PM peak periods for the Recommended Interim Build Alternative. The intersection at NW 7th Avenue and GGI Park and Ride will operate at LOS E in the PM peak period. All the other intersections show improvements over the No-Build Alternative.

Table 7-9
Comparison of Intersection LOS and Delay

No	Intersection	Adopted LOS	Time	Control Delay	
				No-Build	Recommended Build
1	Miami Gardens Dr/I-95 NB Exit	D	AM	34.0/C	31.6/C
			PM	114.2/F	112.1/F
2	NW 2 Ave (SR 7)/NW 7 Ave Ext	E	AM	89.4/F	53.6/D
			PM	91.4/F	55.8/E
3	NW 7 Ave Ext/NW 171 ST	E	AM	26.6/C	26.1/C
			PM	29.2/C	27.7/C
4	NW 7 Ave Ext/NB Ramps to Turnpike* (EBL)	E	AM	-	25.5/C
			PM	-	17.8/B
5	Frontage Rd (NW 167 St)/SR 826 WB Exit/NW 12 Ave	E	AM	12.5/B	14.0/B
			PM	20.1/C	17.3/B
6	Frontage Rd (NW 167 St)/SR 826 EB Exit/NW 12 Ave	E	AM	15.2/B	11.2/B
			PM	15.9/B	22.2/C
7	NW 167 St/NW 2 Ave	v/c<120%	AM	166.2/F (v/c 1.57)	137.2/F (v/c 1.36)
			PM	293.1/F (v/c 1.69)	214.4/F (v/c 1.50)
8	NW 167 St/N Miami Ave	v/c<120%	AM	45.0/D (v/c 1.04)	57.9/E (v/c 1.08)
			PM	132.3/F (v/c 1.30)	148.5/F (v/c 1.34)
9	NW 7 Ave/GGI Park and Ride**	D	AM	50.2/D	21.3/C
			PM	71.8/E	65.7/E
10	Turnpike Eastbound to I-95 SB Ramp/SR 7	D	AM	109.1/F	51.4/D
			PM	93.1/F	54.0/D
11	NW 151 St/NW 7 Ave	D	AM	34.7/C	33.8/C
			PM	31.7/C	24.4/C
12	NW 151 St/I-95 SB On Ramp* (WBL)	D	AM	-	-
			PM	-	-
13	NW 151 St/I-95 NB Exit/NW 6 Ave	D	AM	44.8/D	33.4/C
			PM	37.3/D	32.5/C
14	Frontage Rd (NW 167 St)/SR 826 EB Exit/NW 17 Ave	E	AM	48.9/D	18.7/B
			PM	30.6/C	17.9/B
15	Frontage Rd (NW 167 St)/SR 826 WB Exit/NW 17 Ave	E	AM	47.2/D	15.5/B
			PM	35.3/D	15.9/B

**Unsignalized Intersections*
*** EB, WB, NB and SB for SEB, NWB, NEB, and SWB*

7.2.6 Provision of Texas U-Turn

Based on several meetings and discussions with the City of Miami Gardens, adjacent residents and business owners within the Sunshine Industrial Park, Texas U-Turns were provided at both NW 12th Avenue and NW 17th Avenue as part of the interim project as a mitigation strategy to address the business community's circulation and access concerns until the ultimate project is constructed that implements the permanent Texas U-Turn at NW 17th Avenue. The interim Texas U-Turns are required in order to receive the MPO approval and support for the project. For this reason additional intersection level analysis was conducted for the signalized ramp terminal intersections at NW 12th Avenue and NW 17th Avenue interchanges using SYNCHRO.

In the ultimate build, where the NW 17th Avenue Texas U-Turn is permanent, the traffic projections model attributed 20% of traffic that wanted to do the turnaround would use the Texas U-Turn and 80% will remain using the circulation through the two signalized intersections. To maintain consistency, the same traffic split is assumed for the interim Texas U-Turns. **Table 7-10** presents the intersection analysis results for the recommended build alternative with and without the Texas U-Turns.

Table 7-10
Intersection Analysis of Interim Texas U-Turns (2030)

#	Intersection	Time Period	Without Texas U-Turns		With Texas U-Turns	
			Control Delay (sec/Veh)	LOS	Control Delay (sec/Veh)	LOS
14	Frontage Rd (NW 167 St)/ SR 826 EB Exit/ NW 17th Avenue	AM	18.7	B	17.8	B
		PM	17.9	B	18.0	B
15	Frontage Rd (NW 167 St)/ SR 826 WB Exit/ NW 17th Avenue	AM	15.5	B	15.5	B
		PM	15.9	B	15.6	B
6	Frontage Rd (NW 167 St)/ SR 826 EB Exit/ NW 12th Avenue	AM	11.2	B	10.9	B
		PM	22.2	C	22.0	C
5	Frontage Rd (NW 167 St)/ SR 826 WB Exit/ NW 12th Avenue	AM	14.0	B	14.4	B
		PM	17.3	B	17.2	B

The comparison of the values shows that the proposed Texas U-Turns will only result in very minor improvements to the intersection LOS. This is due to the low peak hour left turn volumes and the linked signal timing plans of these two intersections, which allows for more efficient signal timing coordination to move traffic through the signals.

7.3 Right-of-way Needs and Relocation

Based on the preliminary design preformed during this study, additional right-of-way will be required in order to implement the proposed improvements under the Recommended Interim Build Alternative. In implementing the recommended interim improvements, a total of 24 parcels will be impacted. The right-of-way acquisition will include full acquisition of 8 commercial parcels and 9 vacant parcels west of I-95 between the Park and Ride and the Biscayne Canal to accommodate the proposed widening of the I-95 southbound lanes and the relocation of the SR 7/US 441 off-ramp. Full acquisition of 2 commercial parcels and 2 vacant parcels within the Sunshine Industrial Park located south of SR 826 will be required to accommodate the NW 12th Avenue eastbound on-ramp. Approximately 58-ft right-of-way along the park and ride east lot will also be acquired to accommodate the reconstruction of the Turnpike Connector southbound lanes. A corner clip of the industrial property within the GGI will also be required to accommodate the proposed SR 826 eastbound to I-95 northbound flyover. Additionally, approximately 15-ft right-of-way to the west of NW 2nd Avenue, south of NW 167th Street will be required to accommodate the additional northbound left turn lane. **Table 7-11** summarizes the right-of-way impacts and the locations are shown in **Figure 7-15**.

Based on the preliminary right-of-way estimates, the Recommended Interim Build Alternative will result in will result in six (6) business relocations located on ten (10) commercial parcels. No residential relocations are anticipated as a result of the interim project. A Conceptual Stage Relocation Plan (CSRP) has been prepared for this project and is in accordance with the Project Development and Environment (PD&E) Manual. FDOT will carry out a Right-of-way and Relocation Program in accordance with Florida Statute 339-09 and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, as amended by Public Law 100-17).

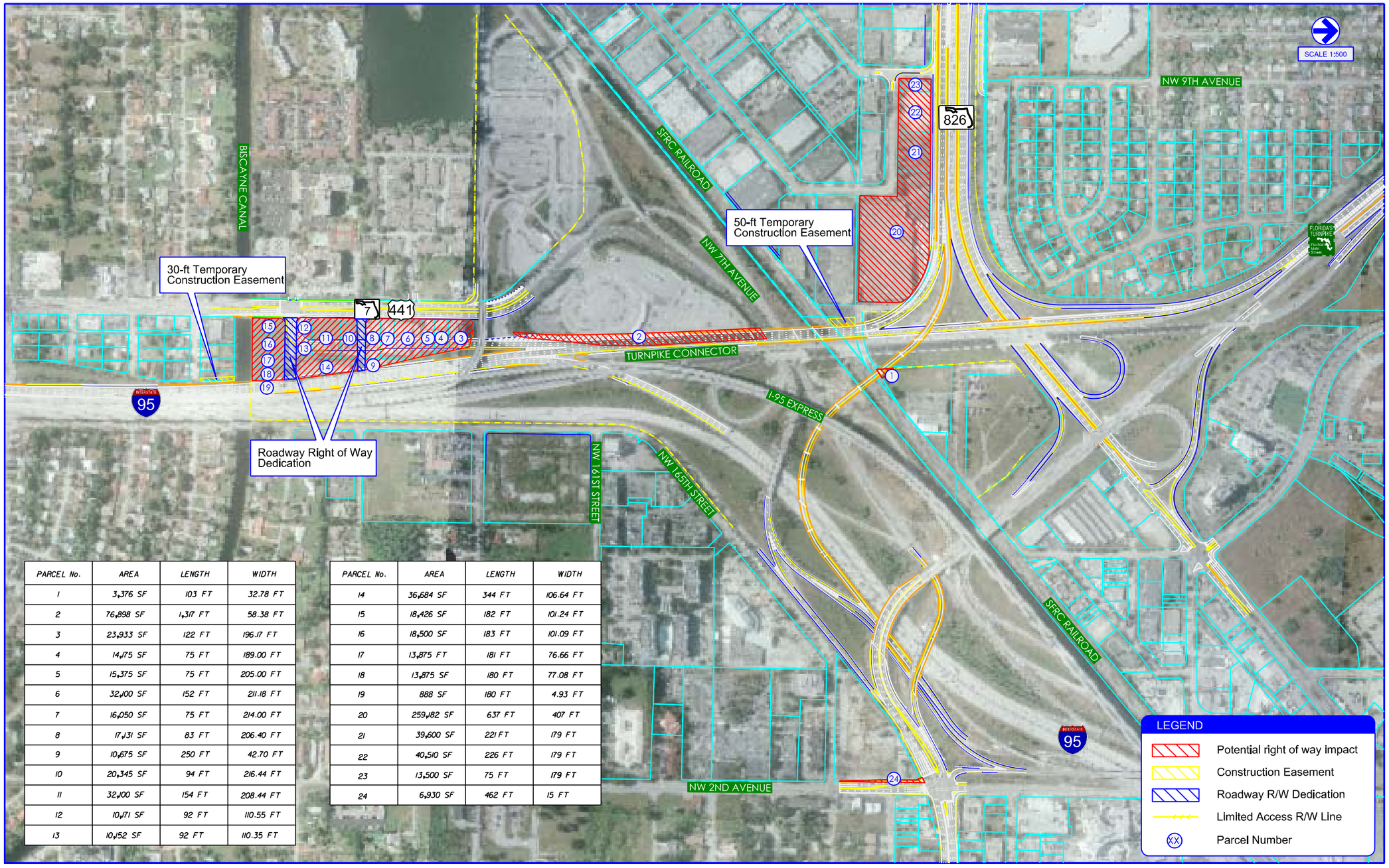
Additional right-of-way may also be required to accommodate the gas pipeline relocation depending on the final route selected during the next phase of the project (Refer to the **Florida Gas Transmission Utility Relocation Assessment Memorandum**). The right-of-way impacts are primarily associated with the purchase of easements or obtaining right-of-way occupancy permits. However, no business relocation is anticipated as a result of the gas pipeline relocation.

Table 7-11
Summary of Right-of-way Impacts

#	Folio Number	Owner	Property Address	Land Use	R/W Impact (Sq-ft)	Relocation Required
1	34-2113-000-0080	Lucius & Mary N Whatley	600 NW 167th St	Warehouse or Storage	3,376	No
2	N/A	FL Department of Transportation	Golden Glades Park and Ride East Lot	Park and Ride	76,898	No
3	30-2113-001-0460	Simon Sitbon	15901 NW 7th Avenue	Warehouse Or Storage	23,933	Yes

Table 7-11
Summary of Right-of-way Impacts

#	Folio Number	Owner	Property Address	Land Use	R/W Impact (Sq-ft)	Relocation Required
4	30-2113-001-0480	American Petro-leum of N. Miami	15821 NW 7th Avenue	Service Station-Automotive	14,175	Yes
5	30-2113-001-0490	American Petro-leum of N. Miami	15821 NW 7th Avenue	Service Station-Automotive	15,375	Yes
6	30-2113-001-0860	Marmur Inc.	15781 NW 7th Avenue	Light MFG & Food Processing	32,100	Yes
7	30-2113-001-0880	Marmur Inc.	15721 NW 7th Avenue	Light MFG & Food Processing	16,050	Yes
8	30-2113-001-0890	Marmur Inc.	15721 NW 7th Avenue	Light MFG & Food Processing	17,131	Yes
9	30-2113-001-0850	Mario Zacco	651 NW 157th Street	Light MFG & Food Processing	10,675	Yes
10	30-2113-001-0900	Angelo Napolitano	685 N. Biscayne River Drive	Vacant Land	20,345	No
11	30-2113-001-0910	Angelo Napolitano	685 N. Biscayne River Drive	Vacant Land	32,100	No
12	30-2113-001-0911	Angelo Napolitano	685 N. Biscayne River Drive	Vacant Land	10,171	No
13	30-2113-001-0912	Angelo Napolitano	685 N. Biscayne River Drive	Vacant Land	10,152	No
14	30-2113-001-0920	Angelo Napolitano	655 N. Biscayne River Drive	Warehouse Or Storage	36,684	Yes
15	30-2113-001-1340	7th Avenue Terminal INC	N/A	Vacant Land	18,426	No
16	30-2113-001-1350	7th Avenue Terminal INC	N/A	Vacant Land	18,500	No
17	30-2113-009-0010	7th Avenue Terminal INC	N/A	Vacant Land	13,875	No
18	30-2113-009-0020	7th Avenue Terminal INC	N/A	Vacant Land	13,875	No
19	30-2113-009-0030	7th Avenue Terminal INC	N/A	Vacant Land	888	No
20	34-2114-007-0380	Gerald D. Ross & W. Frances M	16601 NW 8 Avenue	Warehouse or Storage	259,182	Yes
21	34-2114-000-0220	Gerald D. Ross & W. Frances M	16601 NW 8 Avenue	Warehouse or Storage	39,600	Yes
22	34-2114-000-0190	Gerald D. Ross & W. Frances M	16601 NW 8 Avenue	Vacant Land	40,510	No
23	34-2114-000-0210	Gerald D. Ross & W. Frances M	16601 NW 8 Avenue	Vacant Land	13,500	No
24	30-2113-000-0050	FRL Automotive LLC	16600 NW 2 Avenue	Vacant Land	6,930	No



PARCEL No.	AREA	LENGTH	WIDTH
1	3,376 SF	103 FT	32.78 FT
2	76,898 SF	1,317 FT	58.38 FT
3	23,933 SF	122 FT	196.17 FT
4	14,175 SF	75 FT	189.00 FT
5	15,375 SF	75 FT	205.00 FT
6	32,100 SF	152 FT	211.18 FT
7	16,050 SF	75 FT	214.00 FT
8	17,131 SF	83 FT	206.40 FT
9	10,675 SF	250 FT	42.70 FT
10	20,345 SF	94 FT	216.44 FT
11	32,100 SF	154 FT	208.44 FT
12	10,171 SF	92 FT	110.55 FT
13	10,152 SF	92 FT	110.35 FT

PARCEL No.	AREA	LENGTH	WIDTH
14	36,684 SF	344 FT	106.64 FT
15	18,426 SF	182 FT	101.24 FT
16	18,500 SF	183 FT	101.09 FT
17	13,875 FT	181 FT	76.66 FT
18	13,875 SF	180 FT	77.08 FT
19	888 SF	180 FT	4.93 FT
20	259,182 SF	637 FT	407 FT
21	39,600 SF	221 FT	179 FT
22	40,510 SF	226 FT	179 FT
23	13,500 SF	75 FT	179 FT
24	6,930 SF	462 FT	15 FT

Figure 7-15 Right-of-way impacts for Recommended Interim Build Alternative

7.4 Preliminary Cost Estimates

Preliminary project costs for construction, preliminary engineering (PE), right-of-way and construction engineering and inspection (CEI) costs were developed for the Recommended Interim Build Alternative. The estimates included the major cost components typically associated with highway construction including roadway, bridge and interchange construction. The estimated construction cost was developed using the FDOT Long Range Estimate (LRE). It should be noted that the construction cost for the Recommended Interim Build Alternative shown in **Table 7-12**, includes milling and resurfacing of the SR 826 mainline and other interchange ramps within the GGI. These additional costs were not included in the cost estimates for the alternatives evaluation (See **Section 5.4.18**).

Table 7-12
Preliminary Cost Estimates for Roadway Construction

Component	Cost (2014$)
Construction Cost	$88,600,000
Project Unknowns/Contingency	$17,700,000
Subtotal Cost	**$106,300,000**
Engineering Design Cost	$11,400,000
Construction, Engineering, Inspection Service Costs	$10,600,000
Right-of-way Cost	$45,800,000
Total Cost (Roadway Construction)	**$174,100,000**

The total estimated construction cost is approximately $88.6 million and the total estimated project cost is approximately $174.1 million. The total estimated project cost includes 10% for Maintenance of Traffic, 10% for Mobilization and 20% for Project Unknowns /Contingency. This cost is preliminary in nature and will be refined as the project enters subsequent phases. FDOT estimated PE costs and CEI service costs as a percentage of the total construction cost. PE cost was estimated at 11% of the total construction cost, which includes preliminary engineering fees, final engineering design fees, legal fees, administration fees and post design services. CEI cost was estimated at 10%. The estimated right-of-way cost was prepared by FDOT based on the conceptual design plans for the Recommended Alternative. The cost includes property, support, relocation of personal property/signs and administrative costs. The detailed LRE cost estimates are provided in **Appendix K.**

In addition to the above construction estimates for the interim project, the relocation of the 18-inch gas main along the south side of SR 826/Palmetto Expressway will require additional construction and right-of-way costs not included in the cost estimate shown above. **Table 7-13** shows a summary of the preliminary cost estimates for the 18-inch gas main relocation (Refer to the **Florida Gas Transmission Utility Relocation Assessment Memorandum**).

Table 7-13 Preliminary Cost Estimates for FGT Gas Main Relocation	
Component	**Cost (2014$)**
Pipe Installation Cost	$24,800,000 - $45,000,000
Right-of-way Cost	$0 - $22,638,000
Total Cost (Gas Main Relocation)	**$27,800,000 - $47,500,000**

The preliminary cost for the pipe abandonment, installation of a new pipeline and right-of-way is estimated at approximately **$27.8 million to $47.5 million** depending on the final route selected during the next phase of this project. As per the FGT Global Settlement Agreement with FDOT, FGT is responsible for the pipe installation cost while FDOT is responsible for the right of way cost.

7.5 Schedule and Funding

The PD&E Phase of this project commenced in March 2011 and is anticipated to be completed by Summer 2014 with the approval of the Local Design Concept and Acceptance (LDCA) by FHWA in Fall 2014. The preparation of the final design plans is anticipated to be completed in Summer 2017. The right-of-way acquisition is anticipated to be completed by Fall 2018. Construction is anticipated to begin in 2019 and completed within 24 months. **Figure 7-16** lists the major milestones needed to accomplish the project tasks. The chart below reflects the project funding sources (See Section 1.3.3 Plan Consistency on page 6).

FPID	Funding	Project Phase			Total
		Design	ROW	Construction	
425358-1	Amount	$7,676,000	$45,926,000	$113,914,000	$167,516,000
	Year	2014-2015	2014-2016	2017-2018	
	Source	State Funds	State Funds	Federal Funds	
423373-2	Amount	$6,337,000	$6,743,000	$61,368,000	$74,448,000
	Year	2015, 2017	2016	2017	
	Source	State Funds	State Funds	State Funds	
Total Project Cost		**$14,013,000**	**$52,669,000**	**$175,282,000**	**$241,964,000**

Note: Funding shown in table based on 2015 approved TIP

The Department will also coordinate with Florida Gas Transmission (FGT) to address the final disposition of the 18-inch gas main. As per the FGT Global Settlement Agreement with FDOT, FGT is responsible for the pipe installation cost while FDOT is responsible for the right of way cost.

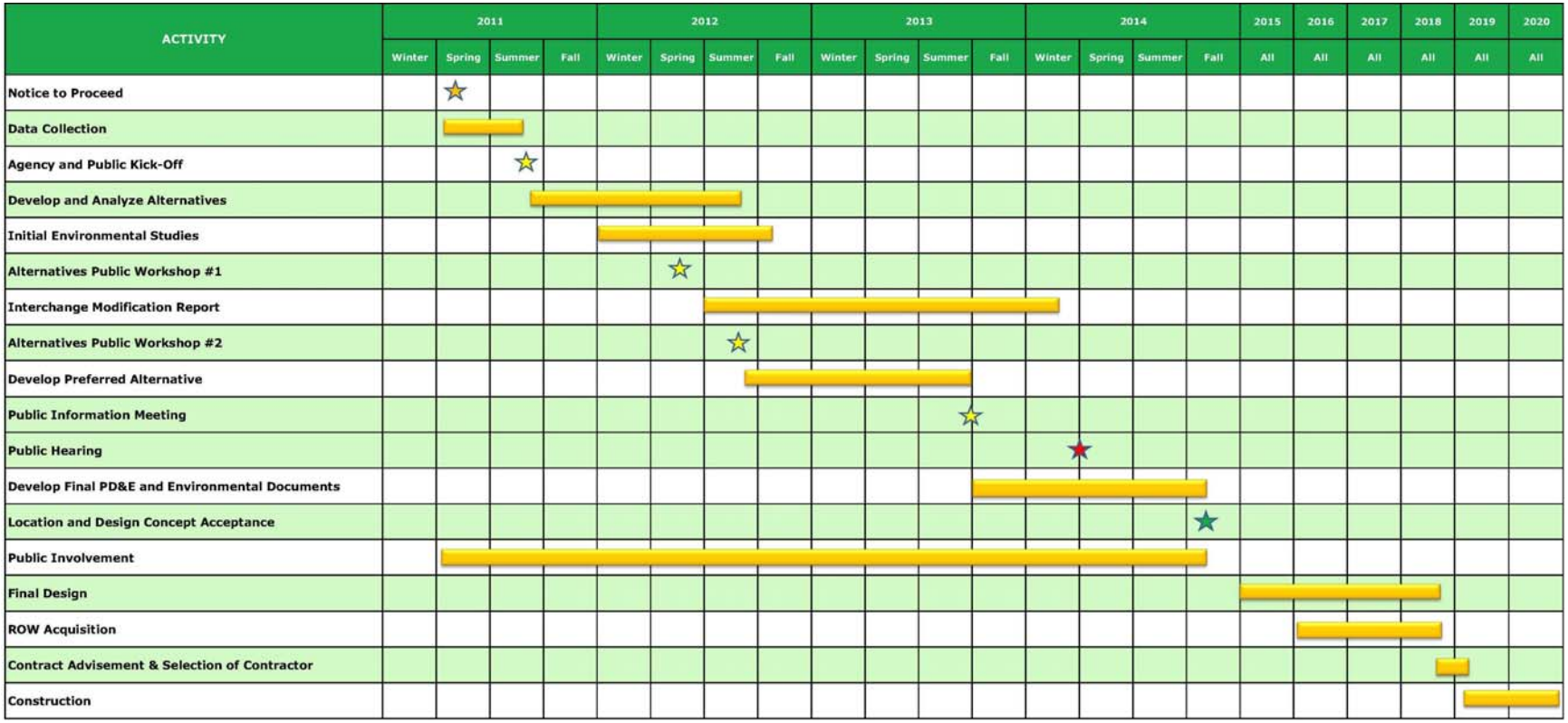


Figure 7-16 Project Schedule

7.6 Pedestrian and Bicycle Facilities

The Florida Statute Title XXIII, Chapter 316, Section 316.091, prohibits pedestrians and bicycles from operating and/or traveling on any limited access facilities. As such, no pedestrian or bicycle facilities are planned as part of the proposed improvements under the Recommended Interim Build Alternative along the expressways (I-95, SR 826/Palmetto Expressway and Florida's Turnpike) and ramp connectors within the interchange area.

The existing sidewalks along some of the non-limited access roadways within the study area will be maintained. These include:

- 5-ft sidewalks adjacent to the northern right-of-way line along the SR 826/Palmetto Expressway westbound frontage road east of NW 15th Avenue.
- 5-ft sidewalks adjacent to the southern right-of-way line along the SR 826/Palmetto Expressway eastbound frontage road west of NW 10th Avenue.
- 5-ft sidewalk with a landscape buffer along both sides of NW 12th Avenue north of SR 826/Palmetto Expressway and 6-ft sidewalks adjacent to the roadway curb and gutter along both sides of NW 12th Avenue south of SR 826/Palmetto Expressway.
- 5-ft sidewalks adjacent to the roadway curb and gutter on both sides of NW 17th Avenue north of SR 826/Palmetto Expressway.
- 5-ft sidewalks adjacent to the roadway curb and gutter along both sides of NW 167th Street east of the GGI.
- 6-ft sidewalks adjacent to the curb and gutter on both sides of NW 2nd Avenue south of the GGI.

Any pedestrian and bicycle facilities that are not compliant with the Americans with Disabilities Act (ADA) will be upgraded to meet the ADA standards.

Bicycle lanes were considered along NW 167th Street/frontage roads. However, no bicycle lanes were provided due to insufficient right of way to include bicycle lanes along this facility. The improvements to the frontage roads is primarily milling and resurfacing without substantial reconstruction of the roadway, drainage system and sidewalk. The westbound frontage road will be widened at NW 17th Avenue ramp terminal to accommodate an exclusive right-turn lane will also provide an adjacent 6-ft sidewalk between NW 15th Avenue and NW 17th Avenue to maintain sidewalk continuity. However, widening to provide bicycle lanes along the frontage road segment within the project limits will require significant right of way which will impact adjacent businesses as well as require relocation of the existing FGT gas main on the north side of westbound frontage road.

Similarly, bicycle lanes were considered along the SR 7/US 441 corridor; however, no bicycle lanes were provided. This corridor currently has limited right of way and narrow lanes and cannot accommodate bicycle lanes without significant right of way impact. The district is currently preparing the planning study along this facility from SW 8th Street to the

GGI which will define the future multimodal function of this corridor including bicycles (FM: 432639-2-22-01). Consequently, providing bicycle lanes along these arterial segments within the project limits will significantly impact the project budget, scope and schedule. Documentation in the form of a design variation supporting not providing bicycle lanes along these arterial segments will be required for the GGI interim project.

The replacement of the Turnpike Connector southbound Bridge over the SFRC (870159) will also provide adequate horizontal and vertical clearance necessary to accommodate the proposed Gold Coast Trail which runs along the easement of the South Florida Rail Corridor (SFRC). This trail is a potential 20.8 mile path occupying the easement of the South Florida Rail Corridor. The Gold Coast trail will provide opportunity to create a multimodal access point at the Golden Glades Park and Ride facility and also provide bicycle and pedestrian access into Broward County.

The proposed improvements under the Recommended Interim Build Alternative will not impact the two existing pedestrian bridges within the study area. The first is located across SR 9 and provides access from the GGI park and ride facility on the east to the tri-rail station on the west of SR 9. The second pedestrian bridge is located across I-95 just south of NW 151st Street and provides access between the residential areas on the west and Thomas Jefferson Middle School on the east side of I-95. However, in order to accommodate the relocated NW 12th Avenue on-ramp, the existing sidewalk along the eastbound frontage road east of NW 10th Avenue will be removed.

7.7 Lighting

The existing lighting conditions within the interchange and adjacent roadways should be evaluated as part of the design phase to ensure that the illumination levels meet the current FDOT requirements. **Table 7-14** shows the required lighting criteria for the interstate, expressways and major arterials within the GGI.

Table 7-14
Lighting Criteria

Facility	Conventional Lighting			High Mast Lighting		
	Illumination Level (HFC)	Illumination Uniformity Ratios		Illumination Level (HFC)	Illumination Uniformity Ratios	
		Avg/Min	Max/Min		Avg/Min	Max/Min
FDOT Facilities	1.5	4:1 or Less	10:1 or Less	0.8 to 1.0	3:1 or Less	10:1 or Less
FTE Facilities	1.7	4:1 or Less	10:1 or Less	1.0	3:1 or Less	10:1 or Less

For FTE facilities, conventional lighting would be used unless high mast lighting is proven to be the better and more cost efficient alternative. The preferred conventional lighting fixture along FTE facilities is the Mongoose for style consistency.

7.8 Utility Impacts

As part of the PD&E study, twenty (20) Utility Agency Owners (UAOs) known to have operations within the project corridor were contacted to obtain information on their respective facilities within the project's study limits. All the utility companies contacted have responded; four (4) of the twenty (20) UAO's contacted responded that they have no facilities within the project limits. These include City of Miami Gardens, Florida City Gas, AT&T Long Distance and XO Communications. **Table 7-15** shows the list of utility companies with potential for involvement within the project study limits.

A preliminary evaluation of potential utility conflicts within the project corridor based on the Recommended Alternative is provided in the Utility Impact Assessment Memorandum prepared for this study. All UAOs' facilities appeared to be located on FDOT's right-of-way by permits, with the exception of Verizon Business Solution (f.k.a. MCI), which has one 4-inch PVC conduit located on SFRC right-of-way. No utility easements have been identified along the corridor.

Table 7-15
Existing Utility Agencies/Owners

#	Utility Companies	Facilities	Contact Person	Phone Number	Master Agreement
1	AT&T Florida	Telecommunications	Steve Massie	305-222-8745	Yes
2	Comcast	Cable TV	Leonard Maxwell-Newbold	954-447-8405	Yes
3	City of North Miami	Water & Sewer	Aleem Ghany	305-895-9833	Yes
4	City of North Miami Beach	Water & Sewer	Karim Rossy	305-948-2980	Yes
5	Fiberlight LLC	Telecommunications	Troy Gaeta	786-271-5149	Yes
6	FDOT District Six – ITS	ITS	Sergio Bravo	305-499-2482	Yes
7	Florida's Turnpike - ITS	ITS	Rafael Sena	954-934-1624	Yes
8	Florida Gas Transmission	Gas – Transmission	Joseph Sanchez	407-838-7171	Yes
9	FPL FiberNet	Telecommunications	Danny Haskett	305-552-2931	Yes
10	FPL – Distribution	Electric	Angel Vargas	305-442-5129	Yes
11	FPL – Transmission	Electric	George Beck	561-904-3604	Yes
12	Level3 Communications LLC	Telecommunications	Rick Miller	720-888-4968	Yes
13	Verizon Business (f.k.a. MCI)	Telecommunications	John McNeil	904-355-0187	Yes
14	Miami-Dade Co. Water & Sewer	Water & Sewer	Patrick Chong	786-268-5255	Yes
15	Miami-Dade Co Traffic	Signalization	Vishnu Rajkumnr	305-375-2090	Yes
16	TECO Peoples Gas	Gas – Distribution	Angel Quant	954-453-0805	Yes

As previously mentioned in Section 2.11, Florida Gas Transmission (FGT) currently owns and operates two gas transmission mains along Florida's Turnpike and SR 826/Palmetto Expressway connecting to local distribution company facilities in the Opa-Locka area. These mains consist of an 18-inch and a 24-inch installed in an easement within Florida's Turnpike which terminates approximately 145-ft north of the SR 826/Palmetto Expressway. The portions of the gas mains which continue to the west within the SR 826/Palmetto Expressway were originally installed and granted a permit by the Florida Department of Transportation allowing them to be placed within FDOT's Right-of-Way. The 24-inch FGT gas main runs along the westbound NW 167th Street while the 18-inch FGT gas main crosses beneath SR 826/Palmetto Expressway and runs along eastbound NW 167th Street within the embankment between SR 826/Palmetto Expressway and NW 167th Street.

On August 21st, 2013 the Florida Department of Transportation entered into a global settlement agreement with Florida Gas Transmission regarding potential impacts to FGT facilities (on a statewide basis) and guidance procedures to address their disposition within FDOT Right-of-ways. Under permitted scenario's which is the case for the facilities located within FDOT's R/W along SR 826/Palmetto Expressway and its frontage roads along NW 167th Street: if relocation is warranted, alternative space for the relocation of the facility within FDOT's R/W is accommodated where practical. In the event that suitable space is not available within existing R/W; FDOT is responsible for acquiring suitable replacement R/W and FGT is responsible for the cost of relocation of those facilities to the available right-of-way. In the event that FDOT cannot secure the R/W, FGT has the ability to secure the R/W on FDOT's behalf including use of condemnation rights through the federal eminent domain process. FGT has this ability through the Federal Energy Regulatory Commission (FERC) issuance of a certificate of public convenience and necessity.

It is anticipated that the proposed widening of the SR 826/Palmetto Expressway mainline together with the construction of a three lane off-ramp for SR 826/Palmetto Expressway eastbound to I-95 northbound and southbound and the relocation of the NW 12th Avenue on-ramp will result in the existing 18-inch gas main being further buried behind proposed retaining walls and in several cases fall beneath the mainline expressway travel lanes. These conditions will restricts access to the gas main under emergency situations. As such, relocation of the existing 18-inch gas main along the south side of SR 826/palmetto Expressway to a more accessible location will be required. As part of this PD&E Study, several potential routes were identified and evaluated for the relocation of the existing 18-inch gas main (Refer to the **Florida Gas Transmission Utility Relocation Assessment Memorandum**). Three routes were recommended for further evaluation during the final design phase of this project. The FDOT will work with Florida Gas Transmission (FGT) to address the final disposition of the 18-inch gas main. As per the FGT Global Settlement Agreement with FDOT, FGT is responsible for the pipe installation cost while FDOT is responsible for the right of way cost.

The FDOT District Six Utility Office will maintain coordination with all the utility providers throughout the subsequent final design phase regarding any potential impacts. Based on early

coordination with the utility owners, no significant impacts to the utility services or disruptions of services to area businesses are expected to occur.

7.9 Temporary Traffic Control Plan

Proper traffic control will be critical in order to minimize impacts to the community and construction cost. Care should be taken to ensure the safety and mobility of both vehicular and pedestrian traffic, and impacts to transit and businesses should be minimized. As part of this PD&E Study, a preliminary traffic control plan for the construction of the proposed improvements under the Recommended Interim Build Alternative. Due to the high traffic volume along the freeways and interchange ramps, the existing number of travel lanes should be maintained during each construction phase. However, temporary lane closures may be required in some locations such as overhead construction over existing roadway and should be limited to off -peak hours. The preliminary temporary traffic control plan can be accomplished in three phases as follows:

PHASE I of the construction sequence would include widening of SR 826/Palmetto Expressway eastbound to add lanes for relocated two-lane ramp from SR 826/Palmetto Expressway eastbound and the NW 12th Avenue on-ramp to widened Turnpike Connector southbound and for a new flyover ramp from SR 826/Palmetto Expressway eastbound to I-95 northbound. In this phase it is proposed to widen and reconstruct Turnpike Connector southbound to accommodate an additional lane, add one auxiliary lane to SR 826/Palmetto Expressway eastbound before ramp for Florida's Turnpike extension to NW 167th Street and add left turn lane from SR 826/Palmetto Expressway eastbound to Florida's Turnpike northbound, resurface SR 826/Palmetto Expressway eastbound from Florida's Turnpike overpass to NW 7th Avenue, construct the new three lane off ramp from the Turnpike Connector to SR 7/US 441 and widen I-95 southbound up to the NW 151st Street.

PHASE II of the construction sequence includes construction of SR 826/Palmetto Expressway eastbound flyover ramp to I-95 northbound up to the merge with existing SR 7/US 441 northbound, Shift traffic on the existing SR 7 northbound ramp to allow for extension/replacement of existing end span of Bridge No 870041, construction of new bridge and relocated ramp from NW 167th Street (SR 826/Palmetto Expressway westbound) to I-95 southbound, resurfacing and reconstruction of SR 826/Palmetto Expressway westbound from NW 7th Avenue to the interchange with Florida's Turnpike extension including ramps to Florida's Turnpike northbound.

PHASE III of the construction sequence includes widening of SR 7/US 441 ramp and the new single ramp under the new bridges No 870041 and 870042 and completion of SR 826/Palmetto Expressway eastbound ramp to I-95 northbound.

The details of the temporary traffic control plans are included in the conceptual design plans under a separate cover.

7.10 Drainage

The proposed roadway improvements under the Recommended Interim Build Alternative will require major drainage improvements along the freeways and interchange ramps, including new drainage structures, pipes, and stormwater treatment facilities. In addition to the existing stormwater management facilities that will be impacted from the reconstruction, the project will result in an increase in impervious area. The Recommended Interim Build Alternative increases the impervious area by approximately 3.3 ac and 4.4 ac in the C-8 and Basins C-9, respectively. Using the SFWMD water quality criteria, this will require 0.34 ac-ft of treatment in Basin C-8 and 0.45 ac-ft of additional treatment in Basin C-9.

The required treatment volume for Basin C-8 can be provided by creating dry retention areas along the drainage swales within the individual or adjacent drainage systems. Right-of-way acquisition of several parcels is anticipated in Basin C-8 to accommodate the I-95 roadway improvements. These parcels are located west of I-95 and near the C-8/Biscayne Canal. They are ideally situated to capture and treat runoff from the I-95 increase in impervious area. Together, the parcels have an available area of approximately 7 acres that can be used for dry retention. A total of 2.62 ac-ft of dry retention is provided for water treatment within this basin.

For Basin C-9, the required treatment volume can be provided by creating dry retention area in the FDOT-owned vacant lot located just north of the railroad and bordered by both the SR 826/Palmetto Expressway and Turnpike Connectors. This vacant lot can accommodate a 3.5 ac dry retention pond while avoiding impacting the Intelligent Transportation System (ITS) existing building on the site. A depth of 0.5-ft will be needed to create the 1.8 ac-ft of dry retention required for Basin C-9. Right-of-way acquisition of four parcels is anticipated in Basin C-9 to accommodate the SR 826/Palmetto Expressway roadway improvements while maintaining the NW 12th Avenue on-ramp to I-95 southbound. The parcels are located in the Sunshine Industrial Park south of SR 826/Palmetto Expressway. It can provide an appropriate location for water quality treatment. This potentially acquired area can accommodate a 4.2-ac dry-retention pond.

In addition, the proposed widening improvements to the I-95 southbound lanes will move the travel lanes towards the west, which will result in the double 72-inch outfall pipes located between the GGI and the C-8/Biscayne Canal, and corresponding manholes, being in the travel lanes. Relocation of the double 72-inch outfall pipes (approximately 1,400-ft) is recommended to avoid having manholes in the travel lanes.

The preliminary drainage analysis which documents the existing drainage conditions, the proposed drainage concept (including the basins and pond size requirements), and the location analysis and recommendations are included in the Stormwater Management Report prepared as part of this PD&E Study.

7.11 Bridge Analysis

A comprehensive analysis of the existing bridge conditions and proposed improvements for each bridge structure was conducted as part of this PD&E study. There are twenty eight (28) bridge structures along the major roadway segments and interchange ramps within the study limits. As part of this study, each bridge was evaluated to determine if the bridge needed to be replaced, widened and/or remain in place. This assessment was based on the proposed roadway geometrics and alignment, horizontal and vertical clearance requirements and structural condition. Where practical, widening or retrofitting the existing structures was recommended instead of replacing them. However, there are several structures where the proposed improvement cannot be accommodated and as such, the existing bridges will have to be replaced.

The proposed improvements under the Recommended Interim Build Alternative involve, three bridge widening and four bridge replacements. A new flyover bridge structure for the SR 826 eastbound to I-95 northbound direct connection ramp will also be constructed. **Table 7-16** summarizes the proposed bridge improvements. The detailed bridge analysis and recommendations are provided in the Bridge Analysis Report.

Table 7-16
Recommended Bridge Structure Treatments

#	Location	Bridge Number	Proposed Improvement	Bridge Width (Feet)	Bridge Length (Feet)	Depth of Structure (Feet)	Minimum Vertical Clearance (Feet)	Super-structure Type	No. of Spans	Max Span Length (Feet)
1	SR 826 over NW 12th Ave	870104	Texas U-Turns Underneath	134.75	134.75	4.58	14.3-ft	Pre-stressed Beams	3	72.7
2	SR 826 over NW 12th Ave	870050	EB Bridge Widening & Texas U-Turns	79.62	140.08	4.58	14.1-ft	Pre-stressed Beams	3	68.3
3	Turnpike Connector SB over SR 826	870601	SB Bridge widening	75.54	290.0	3.25	16.5-ft	Pre-stressed Beams	3	95.0
4	Turnpike Connector SB over SFRC	870159	SB Bridge Replacement	83.05	289.0	4.75	24.25-ft Min	Pre-stressed Beams	3	107.83
5	Turnpike Connector SB over SR 7/US 441	870045	SB Bridge Replacement	83.05	140.0	4.0	16.5-ft Min	Pre-stressed Beams	2	80.0
6	I-95 SB over Biscayne Canal	870348	SB Bridge Widening	112.41 – 120.08	117.0	1.75	2.01-ft	Pre-stressed Slab Unit	3	39.0
7	SR 826 Connector over I-95 and SR 7/US 441	870041	Bridge End Span Replacement	91.08	332.5	4.75	16.5-ft Min	Pre-stressed Beams	3	132.42
8	NW 167th Street WB to I-95 Ramp over I-95 and SR 7/US 441	870042	Bridge Replacement	30.08	329.0	4.75	16.5-ft Min	Pre-stressed Beams	4	98.0
9	SR 826 EB to I-95 NB Flyover Ramp	N/A	New flyover ramp bridge	36.08	1,633.0	5.5	16.5-ft Min	Steel Box Girders	11	167.83

7.12 Special Features

7.12.1 Noise Barriers

A traffic noise study was performed in accordance with the Code of Federal Regulations Title 23, Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise and Title XXVI Chapter 335.17 of the Florida Statutes using the methodology established in the Florida Department of Transportation's (FDOT) Project Development and Environment (PD&E) Manual, Part 2 Chapter 17 (May 24, 2011). Predicted noise levels were determined using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM) version 2.5. A Noise Study Report (NSR) documenting the traffic noise analysis was prepared for this study and is available under separate cover.

Noise levels developed for this analysis are expressed in decibels (dB) using an "A" scale (dBA) weighting. This scale most closely approximates the response characteristics of the human ear. All predicted noise levels represent hourly equivalent levels (LAeq1h) consistent with the noise metric established in the Federal regulation. Traffic noise levels were predicted at noise sensitive sites for existing conditions and the design year No-Build and Recommended Interim Build Alternative.

Approximately 167 residences, all single-family homes, were identified along I-95, Florida's Turnpike and NW 17th Avenue within the project study area. Also, eight non-residential noise sensitive sites were identified within the project study area which includes three churches, a school, two outdoor areas at an educational center, a hospital, and a hotel. Under the existing conditions, the primary source of noise at the nearby noise sensitive sites is traffic on the nearby expressways (I-95, Florida's Turnpike and SR 826/palmetto Expressway) and on NW 17th Avenue. During the design year, the primary source of noise in the area is expected to remain traffic on the nearby expressways. Predicted design year traffic noise levels for the Recommended Interim Build Alternative were compared to the noise abatement criteria (NAC) and to the noise levels predicted for the existing conditions to assess potential noise impacts associated with the proposed improvements.

Traffic noise levels with the Recommended Alternative are expected to range from 37.1 to 44.9 dB(A) at interior locations and from 57.0 to 70.9 dB(A) at exterior locations Traffic noise levels are predicted to approach or exceed the FHWA Noise Abatement Criteria (NAC) at 11 homes, one church playground and one school playground along I-95; 52 condominiums in one condominium complex along SR 7/US 441; and three homes along Florida's Turnpike. In total, 66 residences, one church playground and one school playground are expected to be impacted by this project. Therefore, based on the FHWA and FDOT methodologies used to evaluate traffic noise levels in this study, modifications proposed with this project were determined to generate noise impacts at noise sensitive sites within the project study area. Consideration of noise abatement is required to mitigate these impacts. Although a number of sites approach or exceed the NAC, the proposed improvements do not result in any substantial noise increases (i.e., greater than 15 dB(A) over existing levels).

In accordance with FHWA requirements, noise abatement was considered for all noise sensitive locations where design-year traffic noise levels were predicted to equal or exceed the FDOT NAC. Conceptual noise barrier designs were evaluated for each impacted area to determine the most effective location, length, and height that would achieve the maximum noise level reduction at reasonable cost. A total of five noise barriers were evaluated for feasibility and reasonableness. Many of the locations where noise impacts are predicted to occur are near existing noise barriers. In these cases, alternatives such as increasing the length of an existing noise barrier or filling in gaps in noise barrier coverage were selected since increasing the height of an existing noise barrier is not possible without replacing the noise barrier completely with a new taller noise barrier. The results of the noise barrier analysis for this project segment are summarized in **Table 7-17**.

The results of the noise barrier analysis indicate that construction of the noise barriers appears feasible. However, none of the noise barriers are considered reasonable since they were unable to reduce noise levels by the FDOT's noise reduction design goal (7.0 dB(A) for at least one benefitted receptor). Thus, none of the noise barriers evaluated for this study are recommended for further consideration and there are no apparent solutions available to mitigate the noise impacts at the impacted locations. The traffic noise impacts to the 66 nearby residences and the playgrounds at Evangel Church International and Small World Montessori are considered to be an unavoidable consequence of the project.

For details, please refer to the **Noise Study Report** submitted as a separate cover as part of this PD&E study.

Table 7-17
Noise Barriers Under Consideration

General Location (Cross Streets)	Barrier Type	Height (feet)	Length (feet)	Maximum Noise Level Reduction [dB(A)]	Number of Receptors with Noise Level Reductions of at Least 7.0 dB(A)	Notes
I-95 Northbound - East side between NW 151st Street and NW 159th Street	Structure-Mounted	8	220	6.2	0	**Not Recommended** - Filling in the gaps in existing noise barrier coverage extend coverage to the north is not recommended since these additions do not meet FDOT's noise level reduction reasonableness criteria.
	Structure-Mounted	8	155			
	Ground-Mounted	22	1,510			
I-95 Northbound – East Side between NW 159th Street and NW 165th Street	Ground-Mounted	22	1,400	2.3	0	**Not Recommended** – This noise barrier does not meet FDOT's noise level reduction reasonableness criteria due to traffic on nearby elevated roadways and on adjacent local street.
I-95 Southbound – West Side between NW 151st Street and Biscayne Canal	Structure-Mounted	8	1,100	2.5	0	**Not Recommended** – This noise barrier does not meet FDOT's noise level reduction reasonableness criteria due to insufficient height.
SR 7/US 441 – West Side of Parkway Towers Condominium	Ground-Mounted	22	380	6.6	0	**Not Recommended** – This noise barrier does not meet FDOT's noise level reduction reasonableness criteria due to insufficient height.
Turnpike Connector – West Side between SR 826 and NW 168th Drive	Ground-Mounted	22	350	5.1	0	**Not Recommended** – This noise barrier does not meet FDOT's noise level reduction reasonableness since it is possible to only add a short noise barrier to the existing noise barrier.

7.12.2 Intelligent Transportation Systems

The Recommended Interim Build Alternative will include Intelligent Transportation System (ITS) elements to support traffic management and operations of the major roadways within the interchange. Existing ITS devices are currently being used to analyze and manage the major roadways within the interchange but the Recommended Interim Build Alternative will impact the ITS requiring the relocation of the devices and infrastructure. Following is a description of the existing ITS features within the project study area and potential impacts on them for the proposed improvements as part of the Recommended Interim Build Alternative. **Figure 7-17** shows the major ITS features within the project study area.

7.12.2.1 Closed Circuit Television (CCTV) cameras

CCTV cameras currently provide coverage on the major roadways within GGI and enables traffic monitoring and early incident detection capabilities. Within the study limits, the existing cameras are located along the following major roadways.

- I-95 – eight (8) CCTVs
- SR 826/Palmetto Expressway – one (1) CCTV close to NW 17th Avenue and one (1) at the merger/diverge point of SR 826, Florida's Turnpike and I-95 southbound
- Turnpike Connector – one (1) CCTV near Park and Ride area and one (1) CCTV at Turnpike Connector overpassing the SR 826 Connector

The proposed widening as part of the Recommended Interim Build Alternative may potentially impact the existing CCTVs along southbound I-95 near NW 151st Street, Biscayne Canal and Park and Ride. The CCTV near Park and Ride area along the Turnpike Connector as well as the CCTV along the SR 826 eastbound may be impacted by the proposed widening along these roadways. These cameras will have to be relocated as part of the proposed improvements. The CCTV on the northbound side of Turnpike will not be impacted. In addition, new CCTV cameras may be required to obtain 100% coverage of the new roadway configuration within the interchange.

7.12.2.2 Dynamic Message Signs (DMS)

DMSs are currently deployed along the corridor to inform motorists of current traffic conditions and incidents such as crashes, disabled vehicles, road work, car fires, hazmat spills, evacuations and AMBER alerts. Within the study limits, the existing DMSs are located along the following major roadways.

- I-95 – 4 DMSs
- SR 826/Palmetto Expressway – none
- Turnpike Connector – none

The proposed widening along I-95 southbound lanes as part of the Recommended Interim Build Alternative may potentially impact the existing 2 DMSs along southbound I-95 close to the express lane entrance and will be relocated as part of the project.

Figure 7-17 Major ITS Features within the Study Area

7.12.2.3 Vehicle Detection System

Microwave Vehicle Detection System (MVDS) sensors are part of the District Six Vehicle Detection System. These devices are non-intrusive, mounted on poles along the shoulders and collect volume, occupancy, average speed and long vehicle count data. Within the study limits, the existing MVDSs are located along the following major roadways.

- I-95 – 8 MVDSs
- SR 826/Palmetto Expressway – 6 MVDSs
- Turnpike Connector – 1 MVDS

The proposed widening along I-95 southbound lanes as part of the Recommended Interim Build Alternative may potentially impact the existing 2 MVDSs on southbound I-95 near the Park and Ride area and will be relocated as part of the project. In addition, new MVDS may be required to obtain 100% coverage of the new configuration within the interchange.

7.12.2.4 ITS Hubs

There are two ITS hubs located within the project study area: Whatley Plaza Hub and the Park and Ride Hub. As part of the proposed improvements, no relocation or modification of the existing hub is anticipated for the Whatley plaza hub. However, due to widening and reconstruction of the Turnpike Connector southbound lanes, the ITS hub within the Park and Ride area will have to be relocated south to the vacant area just north of the park and ride flyover bridge.

7.12.2.5 Ramp Metering Signals (RMS)

There are three ramp metering signals within the project area. These ramp metering signals are located on I-95 access ramps at NW 151st street to southbound I-95, NW 167th street to southbound I-95 and NW 2nd avenue to I-95 northbound. None of the RMSs will be impacted due to the proposed improvements as part of the Recommended Interim Build Alternative. No RMSs will be required since no new access point to I-95 are proposed as part of this interim project.

7.12.2.6 Fiber Optic Communication System

Fiber Optic (FO) infrastructure is already in place for the currently deployed ITS equipment. The current FO backbones will have to be relocated or modified as part of the modified locations to CCTV cameras, MVDS sensors and DMSs.

A detailed evaluation of the proposed ITS conflict should be done during the final design phase to identify any ITS conflict and potential modification or replacement of any dynamic message sign structure. A detailed ITS plans component will be required as part of the final design. In addition, coordination with regional partners (FDOT-D6, FDOT-D4 and FTE) will be required to ensure that the project does not adversely impact the ITS operations during construction.

7.12.3 Transit Considerations

The Recommended Interim Build Alternative on the Palmetto Expressway maintains the existing transit service entry and exit access through the GGI area, including the existing Park & Ride lots. There may be temporary delays due to construction activities for the proposed entrance and exit modifications between SR 826, the Turnpike Connector and I-95; however, existing transit routes should continue without re-routing during construction. Bus Routes 95 and 195 will continue to provide the express bus service to and from I-95 unaffected. Bus Route 105 should continue to run unimpeded on NW 6th Ave/NW 165th St. Routes 22 and 246 will go unaffected at the SR 9 fork onto I-95 and SR 7/US 441, since this fork will maintain access to both roadways despite the alterations to improve capacity at the fork.

The widening of the southbound Turnpike Connector to I-95 Southbound shows an encroachment into the Golden Glades Park & Ride east lot. It is estimated that 49 parking spaces will be removed due to the roadway widening. However, the impacts will be minimized with the construction of a vertical MSE wall to contain the fill required to widen the Turnpike Connector southbound lanes. The widening will impact the existing bus shelter resulting in a loss of one bus bay. In order to mitigate these impacts, the parking spaces within the east will be reconfigured as shown in **Figure 7-18**. Bus routes 77, 277 and 95 may encounter temporary construction delays due to construction activities and reconfiguration of the park and ride east lot.

The Recommended Interim Build Alternative will result in better connectivity of SR 826 to I-95 allowing for better access of the Miami-Dade Bus Transit links to and from Broward County, such as future 95 Express route expansions. While no additional direct impacts are anticipated to the existing transit service from the Recommended Interim Build Alternative, there may be delays in the bus routes due to traffic during the construction phase. Coordination will be required for construction over the railroad tracks to minimize potential impact to rail operations, including Tri-Rail service for the Turnpike Connector route to southbound I-95.

7.12.4 Landscaping

The proposed improvements under the recommended interim build alternative will impact the existing landscape along SR 826/Palmetto Expressway as well as within the interchange loop ramps. However, these areas will be restored when construction activities are completed. It is recommended to incorporate the "Bold Initiative" into the landscape plans during the final design phase whenever feasible. The "Bold Initiative" encourages the use of bold performing landscapes (i.e. large trees with few shrubs if any) that mimic natural processes (i.e. filter air, abate noise, shade pedestrians, conserve energy, provide habitat) and grow in value.

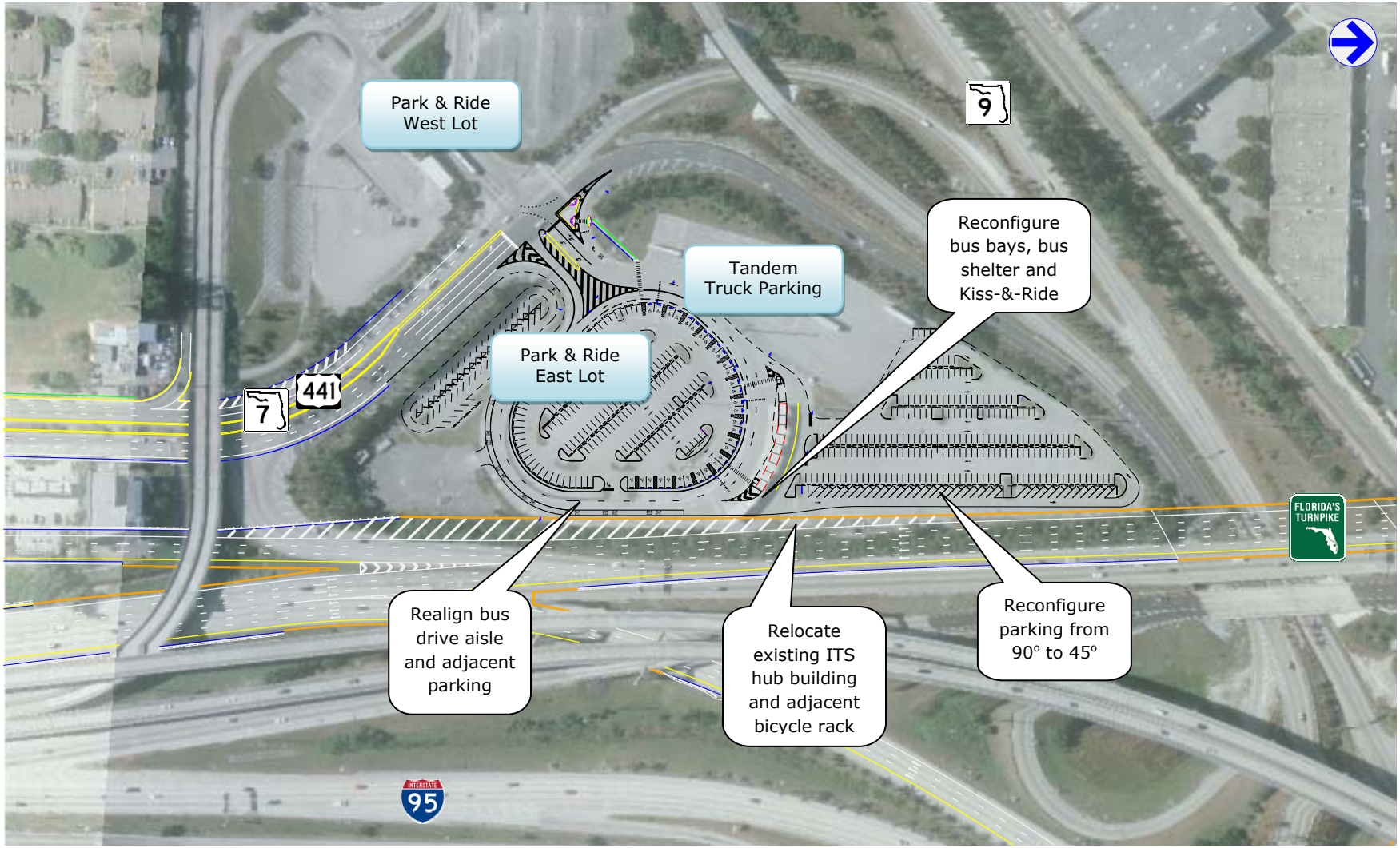


Figure 7-18 Proposed Modifications to GGI Park and Ride East Lot Parking

7.13 Cost Risk Analysis

A Cost Risk Analysis (CRA) workshop was conducted as part of this PD&E Study from July 31 through August 2, 2012. The purpose of the cost risk analysis is to manage the project risks related to performance, cost and schedule for the various project alternatives. During the CRA workshop, key risks to the project were identified and quantified. The discussion revolved around 125 risk and uncertainty items dealing with all aspects of the project, including: schedule, design, structures and geotechnical, right-of-way, utilities, construction, traffic management and maintenance, environmental and drainage, management and funding, contracting and procurement, and public and local government risks. The top ten cost risks factors identified, together with the targeted mitigation strategies are shown in **Table 7-18**.

Table 7-18
Targeted Mitigation Strategies for Top Cost Risks

Risk ID	Risk Name	Mitigation Strategy
DES.19	Reroute SB Florida's Turnpike traffic to a new roadway from about SR 826 to NW 2nd Avenue intersection that avoids temporary widening of the bridge over I-95 (870041).	The SR 826 connector bridge over I-95 (870041) will be replaced as part of the Recommended Interim Build Alternative. A detailed MOT scheme for the bridge replacement was evaluated to avoid the need for temporary widening.
UTL.03	Utility relocation costs may be responsibility of project	All UAO(s) owning major facilities within the area of the Project have Master Agreements with the Department. No utility easements have been identified and No UAO's have claimed compensable interest along the corridor. Coordination with the utility agencies will continue throughput the project.
DES.17	Replace full bridge (870041) in 3A rather than just End Span to avoid throw away cost.	This recommendation was incorporated. The Recommended Interim Build Alternative includes the replacement of the SR 826 connector bridge over I-95 (870041).
DES.04	Design Exceptions or Variations are not approved by FHWA	Coordination with FHWA has been on-going throughout the study. Approvals for the identified design variations and exceptions are anticipated prior to the completion of the PD&E Study.
ENV.25	Clean-up of contaminants located near I-95 & Florida's Turnpike to avoid additional right-of-way acquisition	The Recommended Interim Build Alternative includes the acquisition of additional right-of-way within the Sunshine Industrial Park to accommodate the NW 12th Avenue on-ramp. This additional right-of-way will provide additional area for stormwater treatment using dry retention ponds.
ENV.18	Design Changes for Ponds due to Superfund Site	The Recommended Interim Build Alternative includes the acquisition of additional right-of-way to accommodate the NW 12th Avenue on-ramp. This additional right-of-way will provide additional area for stormwater treatment using dry retention ponds as proposed.

Table 7-18 Targeted Mitigation Strategies for Top Cost Risks		
Risk ID	**Risk Name**	**Mitigation Strategy**
ROW.06	Drainage cannot be accommodated within Existing ROW near the I-95 Biscayne Bridge	The Recommended Interim Build Alternative includes right-of-way acquisition for the properties west of I-95 and north of the Biscayne Canal. This will provide adequate area for stormwater treatment as well as relocation of the double 72" drainage pipes currently draining this area.
DES.11	Unexpected Additional Drainage Costs due to the need for additional ROW	See mitigation strategy for previous risk.
TMT.09	Extraordinarily complex Staging/ Maintenance of Traffic	A requirement will be included in the design build criteria package based on lane closure analysis which will establish allowable traffic restrictions and work days/hours that will be placed on the contractor early to better quantify the cost/schedule impacts.
CNS.16	Other Construction Projects in Region Limit Supply / Cost of Materials	It is anticipated that most of the major construction projects within the tri-county area (I-595, I-75, SR 826, port of Miami) would be completed by the anticipated construction year of 2017. Thus there should be availability of construction materials for the project.

7.14 Value Engineering Summary

A Value Engineering (VE) Study was conducted from August 13 to August 17, 2012 for the interim project. The purpose of the Value Engineering Study is to ensure that the project objectives are addressed and the project remains cost effective, constructible, and makes the most efficient use of existing resources. The Value Engineering Report detailing the findings and recommendations from the VE Study Team was submitted to the Florida Department of Transportation – District Six on September 6, 2012. **Table 7-19** summarizes the Study Team's responses to the VE Team's recommendations. These recommendations are detailed in the Value Engineering Report.

Table 7-19
Value Engineering Recommendations

Recommendations		Description	Status	Reason
SR 826 to Northbound I-95	1A	Reduce the length of bridge by using a combination of Steepened slopes, MSE walls, fill and pavement.	Rejected	The VE Alternative will present significant problems for maintenance of the sloped vegetation. In addition, proposed MSE Walls with heights of 50-ft and a ramp width of 36-ft 1-inch will require a Bin Wall Special design since the strap lengths are constricted and not long enough.
	1B	Reduce the length of bridge by using a combination of MSE walls, fill and pavement.		
	2	Realign the new ramp under I-95 Express bridge then over the Turnpike Connector and NW 167th Street, then touchdown to NB I-95	Rejected	The VE alternative will require the replacement of the SR 7 NB bridge over I-95. In addition, alignment conflicts with the proposed alignment for the SR 826 express lanes connection to the I-95 express lanes under the ultimate improvements.
Southbound Turnpike Connection	3A	Restripe/reduce lanes to avoid widening bridge number 870601 or replacing bridges 870159 and 870045	Rejected	The MOT for the VE alternative will reduce the existing weaving distance between the two traffic streams from 1,650-ft to 850-ft and create significant traffic operational and safety problems for SR 826 EB to I-95 SB as well as Florida's Turnpike SB to I-95 NB and SR 7/US 441 traffic.
	3B	Restripe/reduce lanes to avoid widening bridge number 870601 or replacing bridges 870159 and 870045, but widen the roadway.	Rejected	
SB I-95 Widening	4	Purchase Right-of-way north of Biscayne Canal, construct the SR 7 Ramp exit at NW 156th Street and relocate the drainage	Accepted	The Recommended Interim Build Alternative requires relocation of the Turnpike Connector to SR 7 off-ramp to provide adequate weaving distance along the Turnpike Connector. This requires the right-of-way acquisition of the properties west of I-95 and north of the Biscayne Canal. This will provide additional area for stormwater treatment as well as relocation of the double 72" drainage pipes.
	5	Purchase enough right-of-way to relocate the existing double 72" drainage pipes	Accepted	
	6	Reroute the twin 72" RCP's away from I-95. The pipes will travel approximately 230' to the east edge of SR 7 from the current inlet. Then will turn south along SR 7 to the Biscayne Canal	Rejected	Alternative no longer applicable due to acquisition of adequate right-of-way to relocate double 72" drainage pipes.
NW 167th Street and NW 2nd Avenue	7	Make NW 2nd Avenue between NW 167th Street and I-95, northbound only as part of the interim improvements	Rejected	Based on discussions with the Hospital, the recommended VE improvements will significantly impact operations of the Hospital emergency vehicles.
NW 17th Avenue Reconstruction	8	Eliminate the 17th Avenue improvements entirely by redirecting traffic onto NW 16th Court so that the NB to EB traffic can turn right onto the south Frontage Road and enter the expressway at the On Ramp east of NW 17th Avenue	Rejected	The initial recommendation was applicable to Interim Build Alternative 3A which is no longer the Recommended Interim Build Alternative. There are no impacts to NW 17th Avenue under the current Recommended Interim Build Alternative (Interim Build Alternative 4).

The detailed responses to each of the above Value Engineering recommendations are provided in Value Engineering Response Memorandum (See **Appendix L**).

7.15 Conceptual Design Plans

The conceptual layouts that details typical sections, horizontal and vertical alignments, bridge improvements and right-of-way impacts for the Recommended Interim Build Alternative are provided in the PD&E Conceptual Design Plans prepared for this study.

7.16 List of Technical Reports Completed for the Project

Below is a list of technical studies performed during this PD&E Study and on file at the Florida Department of Transportation, District Six. The ones shown with an asterisk * are included as an appendix to this report.

Environmental Technical Studies

- Wetlands Evaluation Report
- Water Quality Impact Evaluation Checklist
- Endangered Species Biological Assessment
- Noise Study Report
- Air Quality Technical Memorandum
- Contamination Screening Evaluation Report
- Cultural Resource Assessment Survey
- Conceptual Stage Relocation Plan

Engineering Technical Studies

- Methodology Letter of Understanding
- Project Traffic Forecasting Report
- Interchange Modification Report
- Design Traffic Technical Memorandum
- Preliminary Alternatives Analysis Report
- Stormwater Management Report
- Location Hydraulics Memorandum
- Bridge Analysis Report
- Safety Analysis Report
- Preliminary Geotechnical Report
- Value Engineering Study Report
- Cost And Schedule Risk Assessment Report
- Utilities Impact and Assessment Memorandum *
- Florida Gas Transmission Utility Relocation Assessment Memorandum

APPENDIX A

(Straight Line Diagrams)

APPENDIX B

(Existing Sign Inventory)

APPENDIX C

(Crash Costs)

APPENDIX D

(Utility Impact and Assessment Memorandum)

APPENDIX E

(Excerpts from Previous Planning Studies)

APPENDIX F

(Preliminary Right-of-Way Cost Estimates)

APPENDIX G

(Preliminary Traffic Control Plan)

APPENDIX H

(Preliminary Project Cost Estimates)

APPENDIX I

(Excerpts from NCHRP Report 08-36, Task 103)

APPENDIX J

(NW 12th Avenue On-Ramp Improvement Alternatives)

APPENDIX K

(Long Range Cost Estimates)

APPENDIX L

(Value Engineering Responses Memorandum)