

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION  
**TECHNICAL REPORT COVERSHEET**

650-050-38  
ENVIRONMENTAL  
MANAGEMENT  
08/22

PRELIMINARY ENGINEERING REPORT

Florida Department of Transportation

District Four

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

Limits of Project: From South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)

Broward County, Florida

Financial Management Number: 436903-1-22-02

ETDM Number: 14254

Date: June 2025

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

# PRELIMINARY ENGINEERING REPORT

Volume 1 of 2

This preliminary engineering report contains detailed engineering information that fulfills the purpose and need for project on:

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

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

From South of Hallandale Beach Boulevard (SR 858) to  
North of Hollywood Boulevard (SR 820), Broward County  
Mileposts 0.0 – 3.1

Broward County  
FPID Number 436903-1-22-02  
ETDM Number 14254

### **Prepared for:**



Florida Department of Transportation – District Four  
2300 West Commercial Boulevard  
Fort Lauderdale, FL 33309

### **Prepared by:**

*The Corradino Group*  
5200 NW 33<sup>rd</sup> Avenue, Suite 203  
Fort Lauderdale, FL 33309

**JUNE 2025**

# FINAL

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





## PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered engineer in the State of Florida practicing with The Corradino Group, a Florida Corporation authorized to operate as an engineering business, P.E. #7665, by the State of Florida Department of Professional Regulation, Board of Engineers, and that I have prepared or approved the evaluation, findings, opinions, or technical advice hereby reported for:

FPID Number: 436903-1-22-02  
FAP Number: D419-102-B  
ETDM Number: 14254  
Project: Interstate 95 (I-95) / State Road 9 (SR 9)  
Project Development and Environment Study  
County: Broward  
FDOT Project Manager: Leslie Wetherell, P.E.

I acknowledge that the procedure and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

Signature Ryan Solis-Rios

**Name:** Ryan Solis-Rios, P.E.

**P.E. No.:** 63345

**Consultant Firm:** The Corradino Group



## **PROFESSIONAL ENGINEER CERTIFICATION**

### **PRELIMINARY ENGINEERING REPORT**

**Project:** Interstate 95 (I-95) / State Road 9 (SR 9)  
Project Development and Environment Study

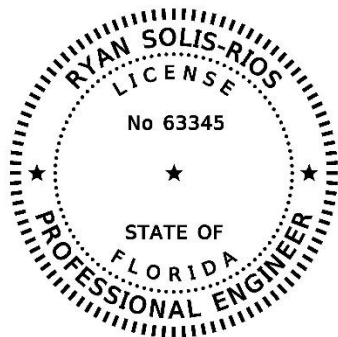
**ETDM Number:** 14254

**Financial Project ID:** 436903-1-22-02

**Federal Aid Project Number:** D419-102-B

This preliminary engineering report contains engineering information that fulfills the purpose and need for the I-95 (SR 9) Project Development and Environment Study from south of Hallandale Beach Boulevard to north of Hollywood Boulevard in Broward County, Florida. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of transportation engineering as applied through professional judgment and experience.

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



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

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

**Ryan Solis-Rios**

Digitally signed by Ryan Solis-Rios  
Date: 2025.10.08  
15:35:27 -04'00'



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## 1.0 PROJECT SUMMARY

### 1.1 PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT) District Four is conducting a Project Development and Environment (PD&E) Study for Interstate 95 (I-95) from south of Hallandale Beach Boulevard (SR 858) to north of Hollywood Boulevard (SR 820), a distance of approximately three miles (see **Figure 1.1**). The PD&E Study is proposing improvements to the Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard interchanges. The project is located in Broward County, Florida, and is contained within the municipalities of Hallandale Beach, Pembroke Park, and Hollywood.

I-95 is the primary north-south interstate facility that links all major cities along the Atlantic Seaboard and is one of the most important transportation systems in southeast Florida. I-95 is one of the two major expressways, Florida's Turnpike being the other, that connects major employment centers and residential areas within the South Florida tri-county area. I-95 is part of the State's Strategic Intermodal System (SIS), the National Highway System, and is designated as an evacuation route along the east coast of Florida.

I-95, within the project limits, currently consists of eight general use lanes (four in each direction) and four dynamically tolled express lanes (two in each direction). This segment of I-95 is functionally classified as a Divided Urban Principal Arterial Interstate and has a posted speed limit of 65 miles per hour. The access management classification for this corridor is Class 1.2, Freeway in an existing urbanized area with limited access.

There are three existing full interchanges within the project limits located at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. All three roadways are classified as Divided Urban Principal Arterials. Hallandale Beach Boulevard consists of four lanes west of I-95 and six lanes east of I-95. Pembroke Road and Hollywood Boulevard each have six lanes west of I-95 and four lanes east of I-95.

This PD&E Study is evaluating the potential modification of existing entrance and exit ramps serving the three interchanges within the project limits. Widening and turn lane modifications at the ramp terminals were evaluated to facilitate the ramp modifications and improve the access and operation of the interchanges.

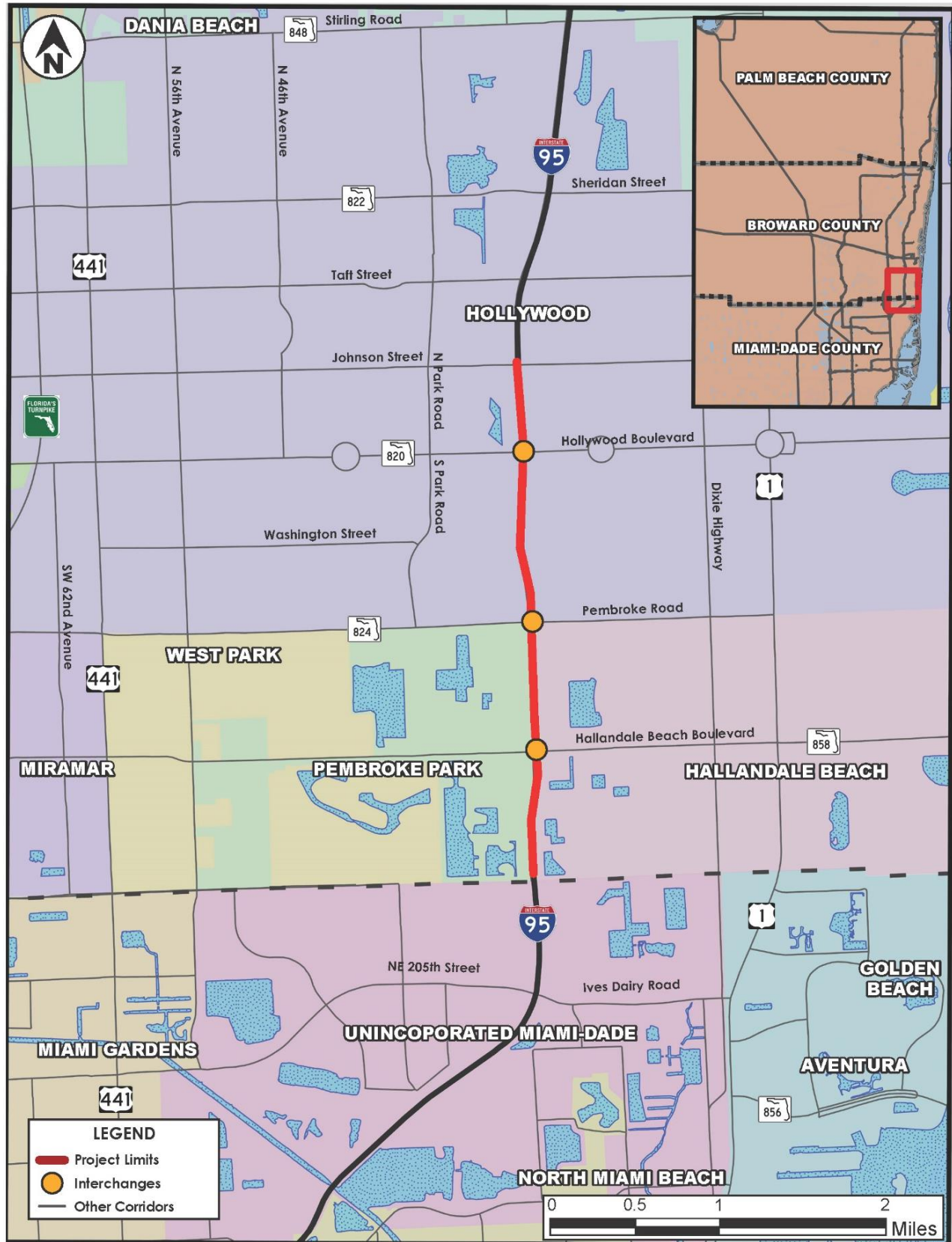


Figure 1.1 – Project Location Map



## 1.2 PURPOSE AND NEED OF THE PROJECT

The primary purpose and need for this project is to address interchange and ramp terminal intersection capacity issues at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. Secondary considerations for the purpose and need of this project include safety, system linkage, modal interrelationships, transportation demand, social demands, economic development, and emergency evacuation. The primary and secondary needs for the project are discussed in further detail below:

**Capacity** – The I-95 ramps at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard are currently congested, and affecting traffic operations along I-95 between the interchange ramps and at the arterial intersections near I-95.

The Systems Interchange Modification Report (SIMR) capacity analysis, completed as part of this PD&E Study, shows that all basic freeway segments are currently operating at an acceptable Level of Service (LOS) D or better except for the I-95 northbound segment between the Ives Dairy Road on-ramp and Hallandale Beach Boulevard off-ramp. This segment is operating at LOS F in the PM peak-hour. FDOT recommends a target LOS D for roadways in urban areas.

The existing intersection operational analysis results from the SIMR indicate that all intersections operate at LOS D or better except for the Hallandale Beach Boulevard and I-95 northbound ramp intersection and the Hollywood Boulevard and 28th Avenue intersection. They are both operating at LOS E.

Without future improvements, the driving conditions will continue to deteriorate well below the acceptable LOS D recommendation. The following I-95 freeway segments will operate below LOS D within at least one peak-hour period before the year 2045:

- Ives Dairy Road northbound on-ramp to Hallandale Beach Boulevard northbound off-ramp
- Hallandale Beach Boulevard northbound on-ramp to Pembroke Road northbound off-ramp
- Pembroke Road northbound on-ramp to Hollywood Boulevard northbound off-ramp
- Hollywood Boulevard northbound on-ramp to Sheridan Street northbound off-ramp





- Sheridan Street southbound on-ramp to Hollywood Boulevard southbound off-ramp
- Hollywood Boulevard southbound on-ramp to Pembroke Road southbound off-ramp
- Hallandale Beach Boulevard southbound on-ramp to Ives Dairy Road southbound off-ramp

Additionally, the following intersections will fall below LOS D during at least one peak-hour period before the year 2045:

- Hallandale Beach Boulevard northbound ramp terminal
- Hallandale Beach Boulevard southbound ramp terminal
- Hollywood Boulevard southbound ramp terminal
- Hollywood Boulevard/28<sup>th</sup> Avenue

**Safety** – The crash safety analysis indicates that the I-95 study area segments have experienced greater overall number of crashes for the years 2012 through 2014 than what would typically be anticipated on similar facilities.

**System Linkage** – I-95 is part of the State's SIS and the National Highway System. I-95 provides limited access connectivity to other major arterials such as I-595 and Florida's Turnpike. The project is not proposing to change system linkage. However, potential interchange modifications would improve movements within the existing network systems.

In May 2021, District Six began an I-95 PD&E Study, FPID#414964-1-22-01, between south of Miami Gardens Drive (SR 860) and the Miami-Dade/Broward County Line.

**Modal Interrelationships** – There are sidewalks in both directions and public transit routes along Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. Additionally, there is the Hollywood Tri-Rail Station in the northwest quadrant of the I-95/Hollywood Boulevard Interchange. Current and future congestion at the interchanges and on the surrounding freight and transit networks is impacting the mobility of people and goods.

**Social Demands and Economic Development** – Social and economic demands on the I-95 corridor will continue to increase as population and employment increase. The Broward Metropolitan Planning Organization (MPO) Long Range Transportation Plan (LRTP) predicted that the population would grow from 1.9



million in 2018 to 2.2 million by 2045, an estimated increase of 16 percent. Jobs were predicted to increase from 0.9 to 1.2 million during the same period, an increase of 25 percent.

The project intersects the cities of Hallandale Beach, Pembroke Park, and Hollywood, the third largest city in Broward County.

**Emergency Evacuation** – I-95, Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard serve as part of the emergency evacuation route network designated by the Florida Division of Emergency Management and by Broward County. Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard move traffic from the east to I-95. I-95 is critical in facilitating traffic during emergency evacuation periods as it connects to other major arterials and highways in the state evacuation route network (i.e., I-595 and the Florida's Turnpike).

**Status** - The I-95 PD&E Study phase from south of Hallandale Beach Boulevard to north of Hollywood Boulevard is included in the Broward MPO 2045 and 2050 LRTP, Transportation Improvement Program (TIP), FDOT Work Program, FDOT State TIP (STIP), and FDOT SIS Five-Year Plan. Design funds were previously allocated and authorized in Fiscal Year 2022 for the entire project.





### 1.3 COMMITMENTS

FDOT has made a series of commitments during the PD&E Study pertaining to the I-95 PD&E Study project. The following list summarizes the commitments that will be adhered to during future transportation phases.

1. The FDOT will continue to coordinate with the City of Hollywood, Town of Pembroke Park and City of Hallandale Beach regarding landscaping within the interchanges.
2. The most recent USFWS Standard Protection Measures for the Eastern Indigo Snake will be adhered to during construction.
3. In coordination with USFWS, FDOT will perform another Florida bonneted bat survey during design, as applicable.
4. The Florida Department of Transportation is committed to the construction of feasible and reasonable noise abatement measures at the noise impacted locations identified in the Noise Study Report contingent upon the following conditions:
  - a. Final recommendations on the construction of abatement measures is determined during the project's final design and through the public involvement process;
  - b. Detailed noise analyses during the final design process support the need, feasibility and reasonableness of providing abatement;
  - c. Cost analysis indicates that the cost of the noise barrier(s) will not exceed the cost reasonable criterion;
  - d. Community input supporting types, heights, and locations of the noise barrier(s) is provided to the District Office; and
  - e. Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed and any conflicts or issues resolved.
5. FDOT will continue to coordinate with Broward County Incident Management and Traffic Operations Division to identify strategic locations for emergency vehicles to access I-95 from Hallandale Beach Boulevard, Pembroke Road, Hollywood Boulevard, and the new ramps system. FDOT will also continue to coordinate with the surrounding cities for concurrency of the recommended locations for the emergency vehicles access points.



6. FDOT will continue to coordinate with the City of Hollywood a plan and approach to discuss the opportunities to potentially use the Orangebrook Golf Course and newly acquired Sunset Property to address and meet the drainage stormwater plan needs as part of this project.
7. FDOT will continue to coordinate with the City of Hollywood for the potential to use the Sunset Property as a potential Watershed Approach to Evaluating Regional Stormwater Solutions (WATERSS) site.
8. A Lighting Justification Report will be conducted during the Design phase. The report will recommend the needed lighting enhancements to light the new and widened ramps to continue with the night visibility of the facility and meet safety requirements.
9. FDOT will evaluate the railroad crossings impacted by the project during the Design phase in coordination with the South Florida Regional Transportation Authority (SFRTA) and CSX Transportation.

#### **1.4 ALTERNATIVES ANALYSIS SUMMARY**

The objective of this PD&E Study is to evaluate interchange alternatives that will address existing and projected traffic operating deficiencies along this section of I-95. In order to keep up with the growing traffic demand within the study area, three build alternatives (Alternatives 1, 2 and 3) were considered in this PD&E Study. All three alternatives propose potential modifications to the existing entrance and exit ramps serving the three interchanges within the project limits. Ramp terminal intersection modifications were evaluated at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard to improve the access and operations to and from I-95.

The PD&E Study Build Alternatives analysis and evaluation were performed and completed between September 2016 and December 2018, prior to the hold of the study in 2019. In 2019, FDOT District Six completed an I-95 Planning Study between US 1 (Downtown Miami) and the Miami-Dade/Broward County Line. Around the same time, FDOT District Four was moving forward with geometric changes from an Alternative Technical Concept (ATC) as part of the I-95 Express Phase 3C Construction Project, which covers from south of Hollywood Boulevard to north of Interstate 595 (I-595). Because of the overlapping limits of these two projects with the I-95 PD&E Study and changes to the I-95 Express Lanes access points by both districts, FDOT District Four decided to put the I-95 PD&E Study on



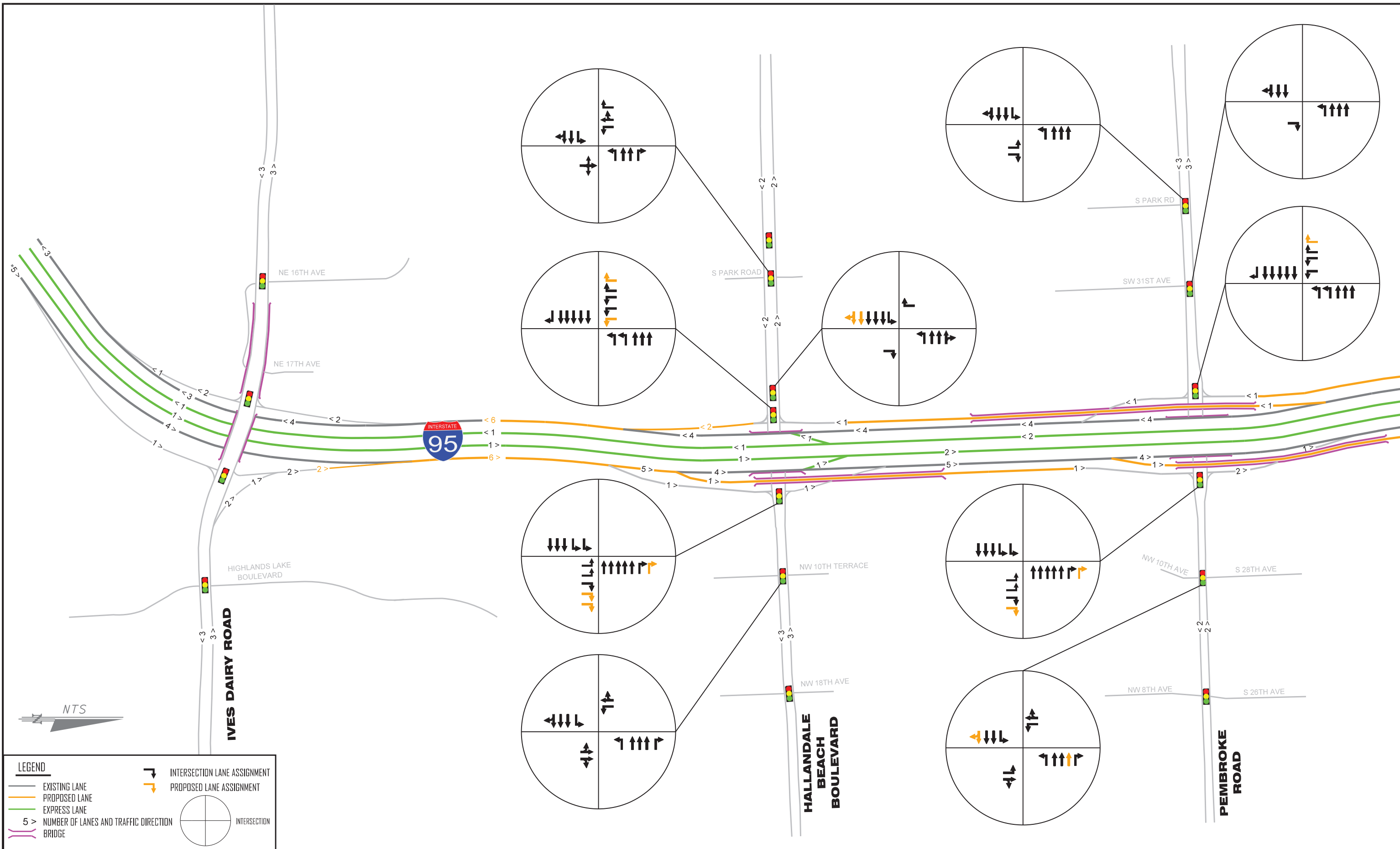
hold and perform an I-95 Corridor Planning Study (CPS) to evaluate how these three projects will interact with each other. Therefore, the analysis summarized in this section did not include the FDOT District Six I-95 Planning Study, District Four I-95 CPS, and the recent changes to the I-95 Express Phase 3C Project.

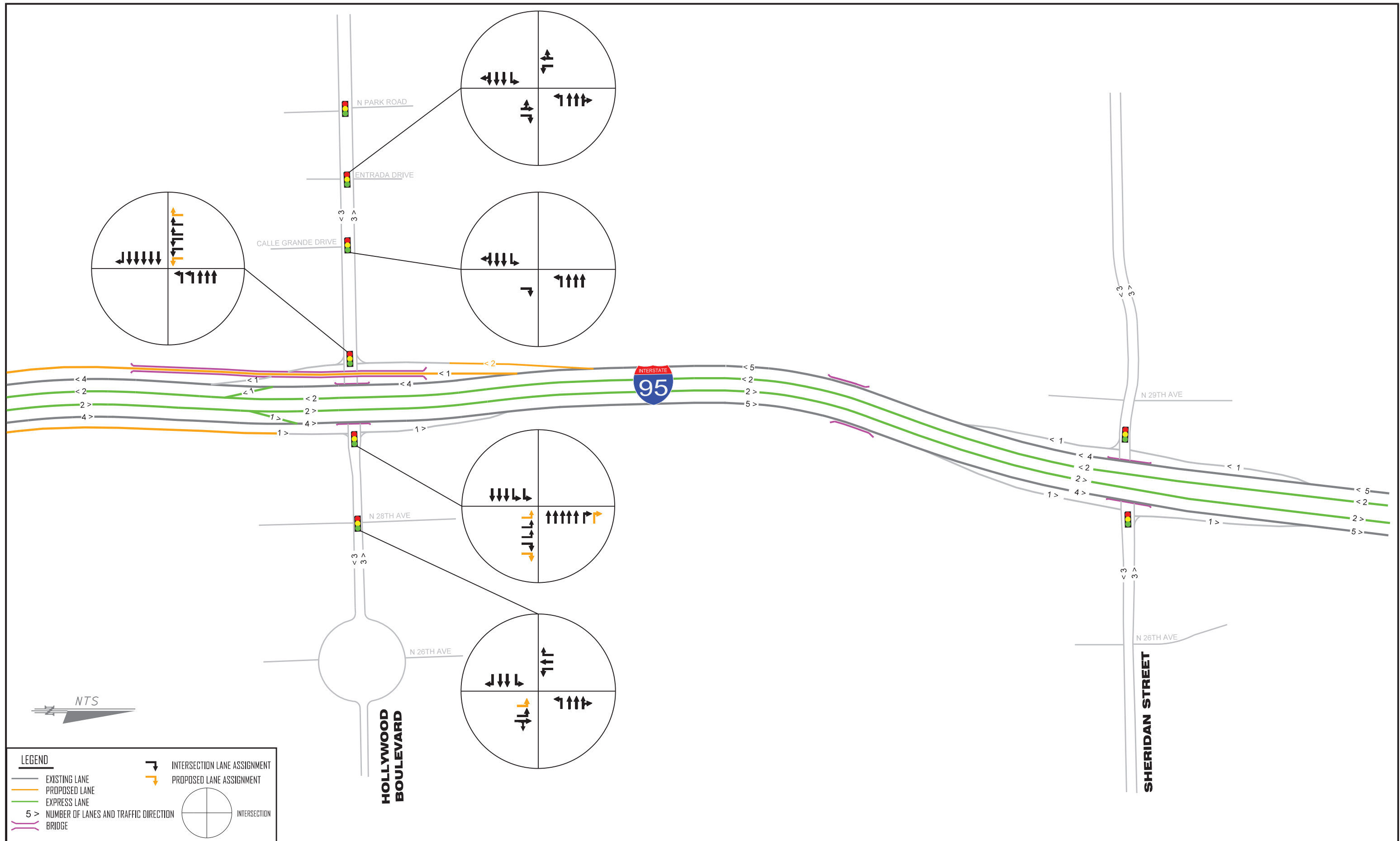
**Alternative 1** – Alternative 1 proposes braided ramps between interchanges to improve substandard weaving movements along I-95. In this alternative, the on-ramps from each interchange will remain unchanged. However, the off-ramps to Pembroke Road and Hollywood Boulevard in the northbound direction and to Pembroke Road and Hallandale Beach Boulevard in the southbound direction will be located one interchange prior to the destination interchange. For example, travelers destined northbound to Pembroke Road would use an exit ramp located just south of the Hallandale Beach Boulevard corridor right after the Hallandale Beach Boulevard off-ramp. The new exit ramp will continue separated from the I-95 mainline braiding over the Hallandale Beach Boulevard on-ramp and continuing along the right of way line until reaching the cross-street ramp terminal. This new exit ramp bypasses and avoids conflicts with the Hallandale Beach Boulevard on-ramp. The same design continues northbound to Hollywood Boulevard and southbound to Pembroke Road and Hallandale Beach Boulevard. **Figure 1.2** shows the schematic geometric layout of Alternative 1.

**Alternative 2** – Alternative 2 proposes a collector distributor roadway system within the I-95 mainline project area. The collector distributor roadway system will remove the Pembroke Road Interchange from directly interacting with the I-95 mainline. In the northbound direction, all exiting traffic to Pembroke Road and Hollywood Boulevard will utilize a new collector distributor off-ramp just south of Hallandale Beach Boulevard. The collector distributor roadway system will extend to just north of Hollywood Boulevard serving the exit traffic to Pembroke Road, entry traffic from Pembroke Road and entry traffic from Hollywood Boulevard. In the southbound direction, the new collector distributor roadway system will not be continuous, it will end and begin at Pembroke Road. The first section combines the off-ramps to Hollywood Boulevard and Pembroke Road and the second section moves the Pembroke Road on-ramp to enter I-95 south of the Hallandale Beach Boulevard on-ramp. **Figure 1.3** shows the schematic geometric layout of Alternative 2.



**Alternative 3** – Alternative 3 proposes to eliminate all left-turn movements from the off-ramp terminal intersections. The left-turn movements will be converted to right-turn movements by relocating the left-turn movements to a successive off-ramp that becomes a U-turn ramp over the interstate touching down to the opposite ramp terminal intersection. For example, the northbound exiting interstate traffic destined westbound will conventionally use the northbound off-ramp and make a left turn. However, in this alternative, the northbound exiting interstate traffic destined westbound will use the interstate U-turn off-ramp to access the southbound off-ramp right-turn movement. This alternative reduces the number of phases needed at the interchange ramp terminals. **Figure 1.4** shows the schematic geometric layout of Alternative 3.





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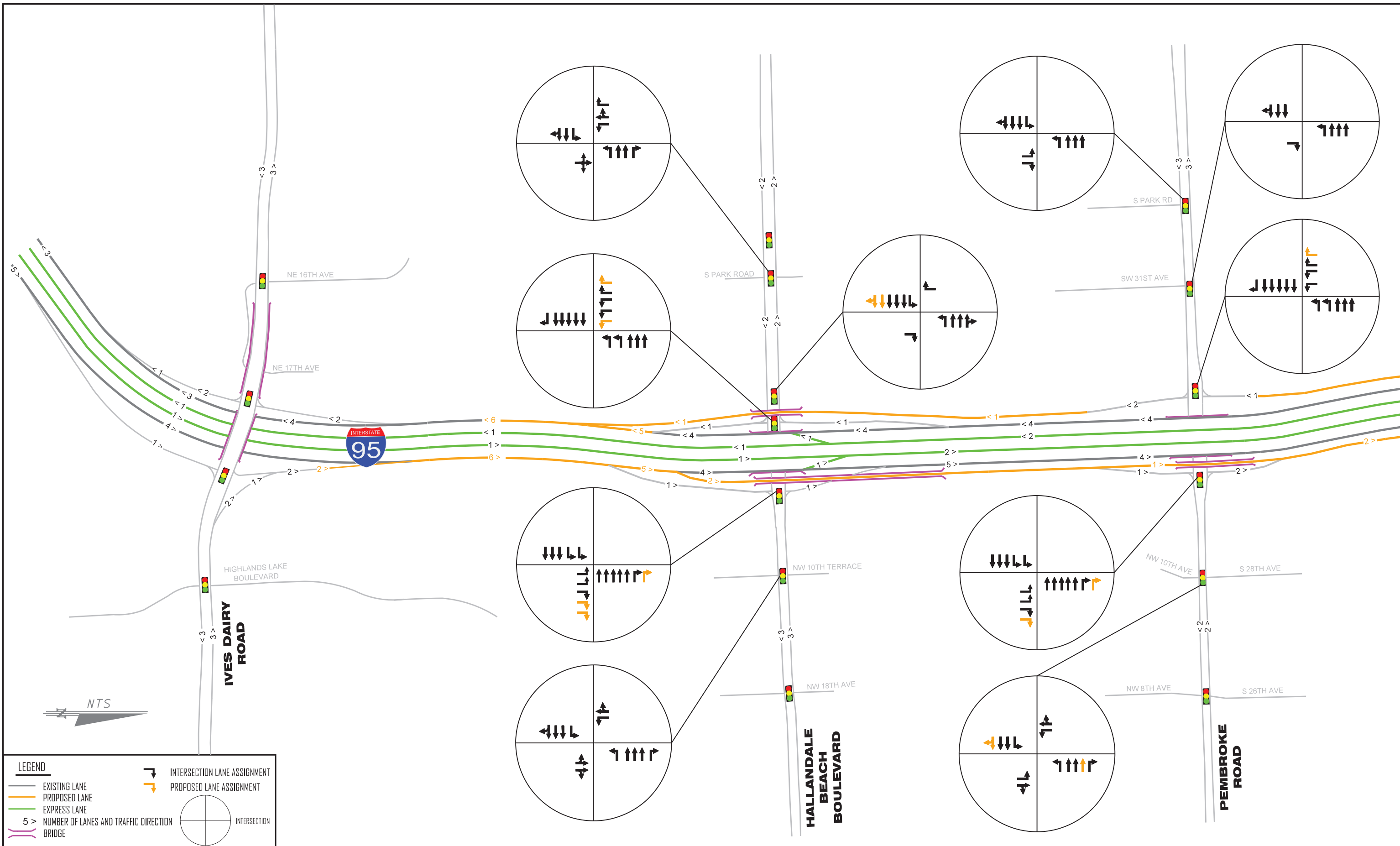


**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-1-22-02  
ETDM No.: 14254

**SR 9 (INTERSTATE 95)  
LANE GEOMETRY AND CONFIGURATIONS  
ALTERNATIVE 1 - SCHEMATIC LINE DIAGRAM**

**FIGURE  
1.2**

**1-11**



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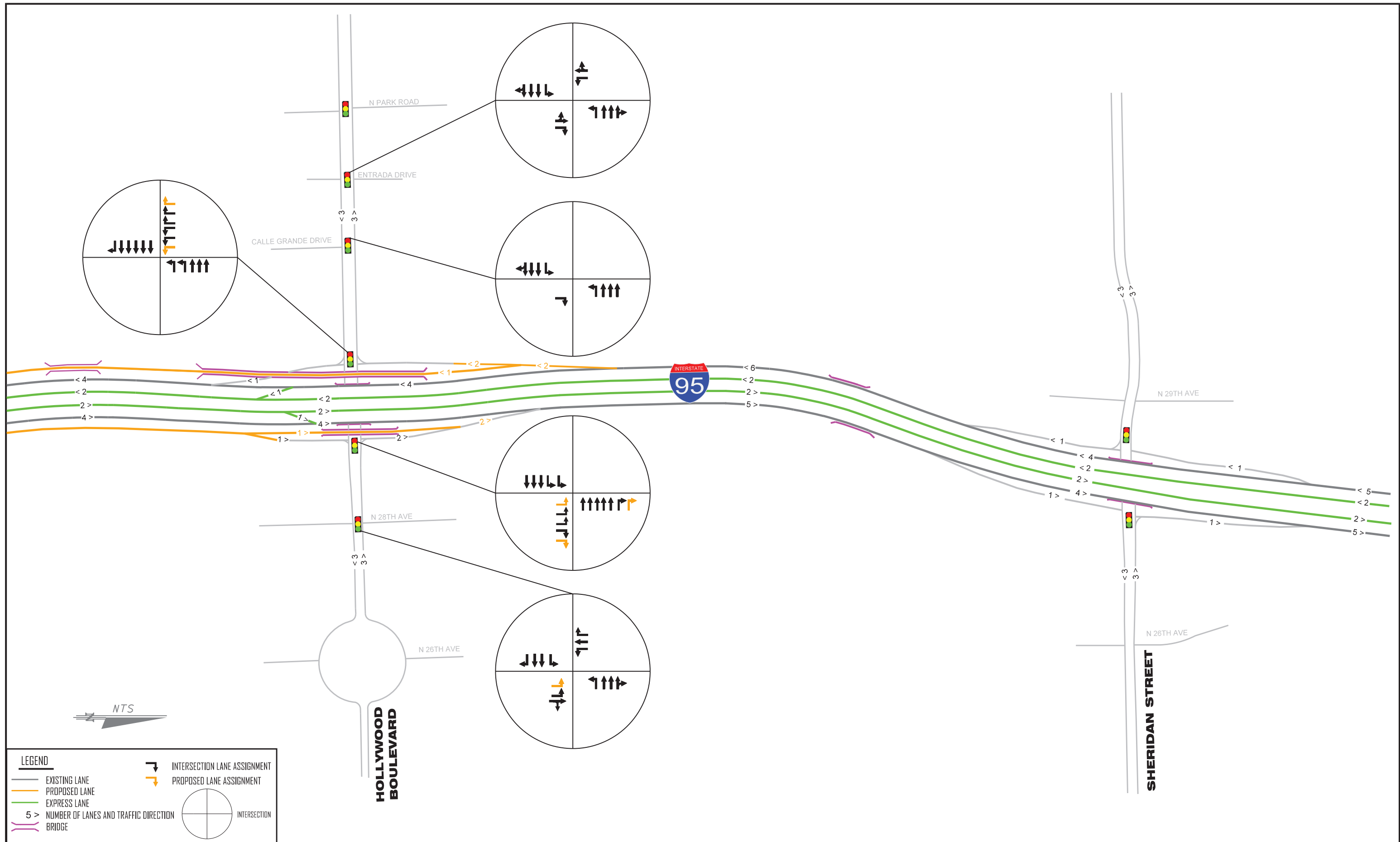
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**SR 9 (INTERSTATE 95)  
LANE GEOMETRY AND CONFIGURATIONS  
ALTERNATIVE 2 - SCHEMATIC LINE DIAGRAM**

**FIGURE  
1.3**

**1-12**





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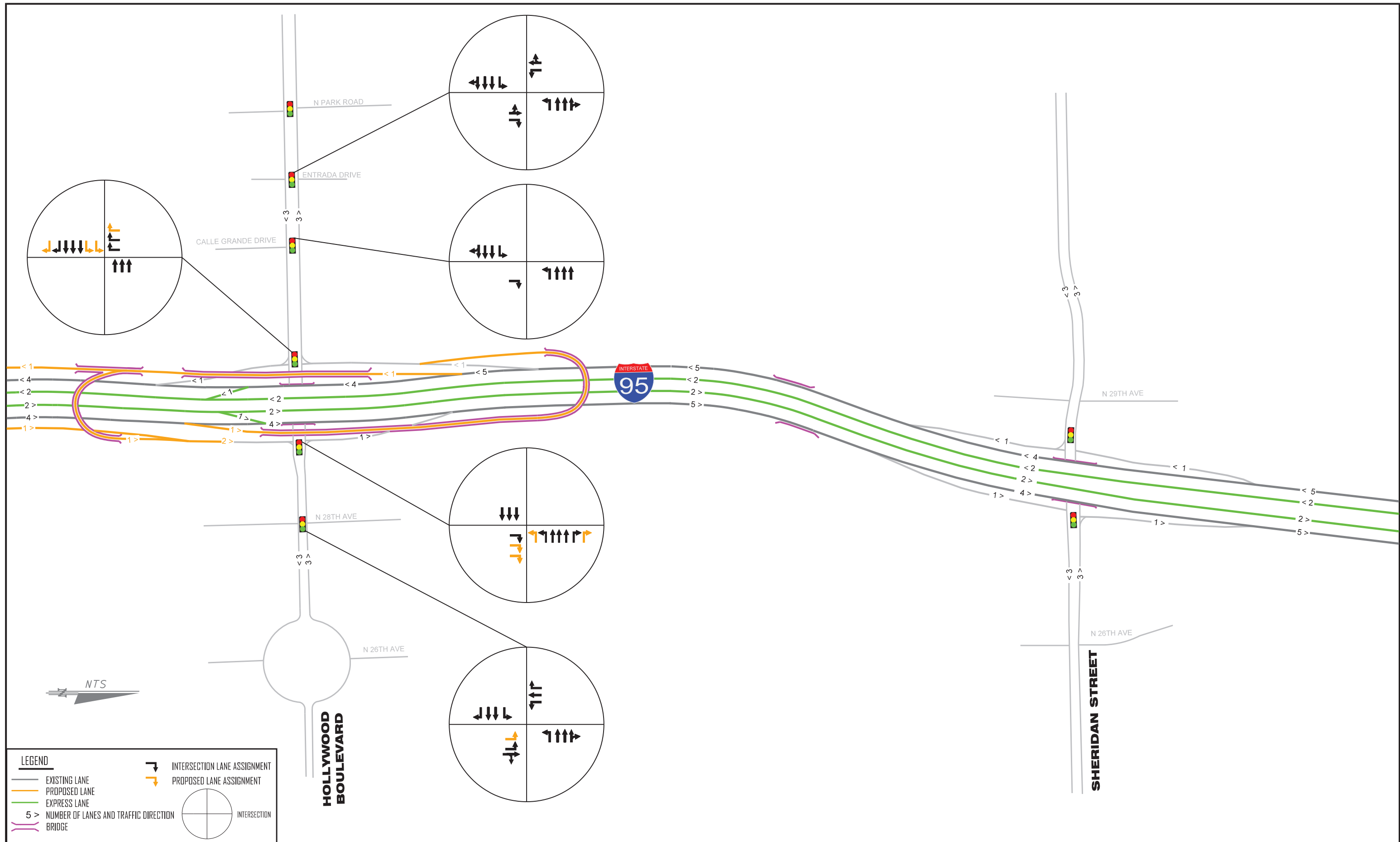
**SR 9 (INTERSTATE 95)  
LANE GEOMETRY AND CONFIGURATIONS  
ALTERNATIVE 2 - SCHEMATIC LINE DIAGRAM**

**FIGURE  
1.3**

**1-13**







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**SR 9 (INTERSTATE 95)  
LANE GEOMETRY AND CONFIGURATIONS  
ALTERNATIVE 3 - SCHEMATIC LINE DIAGRAM**

**FIGURE  
1.4**

**1-15**



**Interchange Alternatives** – Four types of interchange configurations were evaluated along each cross street for each I-95 interchange at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard.

1. Diamond Interchange
2. Diverging Diamond Interchange (DDI)
3. Displaced Left-Turn Lane Interchange (DLT)
4. Continuous Flow Intersection (CFI)

**Alternatives Eliminated** – During the alternative analysis and geometrics evaluation, the following alternatives were eliminated from further consideration:

- Alternative 3 – This alternative was eliminated from the PD&E Study for the following reasons:
  - Low U-turn ramp design speed (20 MPH).
  - U-turn bridge ramps will need median piers, which will require a complex maintenance of traffic along I-95. The maintenance of traffic will impact the operations of the express lanes system.
  - Interchange design is not uniform with the other interchanges, upstream, downstream, and throughout the corridor, which impacts driver expectancy and a potential increase in crashes.
  - Interchange design footprint is not compatible with the future I-95 projects north and south of the study limits.
- Diverging Diamond Interchange – This alternative was eliminated from the PD&E Study for the following reasons:
  - Low crossing lanes path design speed (30-35 MPH).
  - Railroad at-grade crossing is too close to the crossing lanes path, which could create wrong way vehicle maneuvers and a complex operation of the railroad crossing gates.
- Displaced Left-Turn Lane Interchange – This alternative was eliminated from the PD&E Study for the following reasons:
  - Requires a larger footprint within the off-ramp interchange quadrants, which increases right of way impacts.
  - The railroad at-grade crossing is too close to the new upstream intersection on the west side.
  - The design requires additional railroad crossing gates and a more complex crossing gate operation.



- Continuous Flow Intersection – This alternative was eliminated from the PD&E Study because this interchange configuration will work with mainline Alternative 3 only, which was eliminated from the PD&E Study.

**Selection of Preferred Alternative** – The evaluation methodology used in this study involved a combination of both comparative qualitative and quantitative analyses to determine a preferred alternative, which focused on engineering, socio-economic, environmental, and project costs. The key components of the alternative's analysis were purpose and need, travel demand forecasting, geometrics, right of way impacts, construction cost, and operational analysis. The alternatives analysis was geared to determine which capacity improvements were necessary to improve traffic operations, safety, transit, system linkage, modal interrelationships, transportation demand, social demand, economic development, interchange access, and emergency evacuation. Alternative 2 was selected as the preferred alternative based on the alternatives alignment analysis and the evaluation results documented in this report.

The preferred alternative was selected in early 2019 prior to FDOT District Four decided to put the I-95 PD&E Study on hold and perform the I-95 CPS. The I-95 CPS was completed in April 2020. The I-95 PD&E Study restarted in June 2020 and consisted of the same purpose and need. However, the main difference was that the study assumed that both projects, District Six I-95 Planning Study and District Four I-95 Express Phase 3C improvements, will be in place by the design year 2045. The I-95 PD&E Study restart approach was to redesign the preferred alternative to fit within the I-95 CPS Alternative 1A footprint and be compatible with the future projects north and south of the study limits. The preferred alternative redesign was completed in September 2021 and presented to the local municipalities.

Subsequent coordination with the local municipalities after the first public hearing generated several requests to modify the preferred alternative in specific areas to meet their local needs. Therefore, FDOT addressed these requests and evaluated several modifications to the preferred alternative. Between 2023 and 2024, FDOT completed the evaluation and finalized the refinements to the preferred alternative.

A Public Kickoff Meeting, an Alternatives Public Workshop, and two Public Hearings were held for this PD&E Study. Public feedback was minimal, with comments related to project schedule, future noise, new noise walls, safety and



congestion concerns at the ramp terminals, and railroad operations at the adjacent crossings during peak hours. Local municipalities' feedback included future drainage needs, right of way impacts, future emergency access, and interchange local access modifications.

The preferred alternative refinements and further analyses are documented in **Sections 1.5** and **6.0**.

## 1.5 DESCRIPTION OF PREFERRED ALTERNATIVE

The PD&E Study proposes a combination of ramp modifications and collector distributor roads adjacent to the I-95 mainline lanes. Collector distributor roads are extra lanes between the interstate freeway lanes and local frontage/crossing roads. Their primary purpose is to move vehicle lane changes away from the high-speed traffic on the interstate lanes. Lane changes occur on the collector distributor roads as vehicles move from the interstate to the frontage roads or other connecting roadways and vice versa. **Figure 1.5** shows a schematic line diagram of the preferred alternative.

**Northbound Direction** – In the northbound direction, the preferred alternative is proposing two auxiliary lanes between Ives Dairy Road and Hallandale Beach Boulevard. The outside auxiliary lane becomes the exit ramp to Hallandale Beach Boulevard. The inside auxiliary lane becomes the exit ramp to Pembroke Road, which happens just south of the I-95/Hallandale Beach Boulevard bridge overpass. With this design, the existing exit ramp to Pembroke Road was relocated from south of Pembroke Road to south of Hallandale Beach Boulevard. The exit ramp to Pembroke Road crosses over the entry ramp from Hallandale Beach Boulevard and stays elevated until reaching Pembroke Road. The preferred alternative is proposing a new local ramp connection between Hallandale Beach Boulevard and Pembroke Road. This connection will allow local traffic to travel between the two crossing roadways in the northbound direction without entering the I-95 mainline lanes.

The preferred alternative also proposes a collector distributor road between Pembroke Road and north of Hollywood Boulevard. The existing exit ramp to Hollywood Boulevard was relocated from south of Hollywood Boulevard to just north of the I-95/Pembroke Road bridge overpass. The entry ramp from Pembroke Road merges with the exit ramp to Hollywood Boulevard becoming a two-lane

collector distributor road. The outside lane of the collector distributor road becomes the exit to Hollywood Boulevard and the inside lane becomes the Pembroke Road entry ramp to I-95. The Hollywood Boulevard entry ramp merges with the Pembroke Road entry ramp becoming a two-lane on-ramp to I-95.

**Southbound Direction** – In the southbound direction, the preferred alternative is also proposing a collector distributor road between north of Hollywood Boulevard and Pembroke Road. The collector distributor road begins with a two-lane exit ramp just south of Johnson Street serving Hollywood Boulevard and Pembroke Road. The two lanes continue south until reaching Hollywood Boulevard. Before reaching Hollywood Boulevard, a one-lane left-hand exit ramp opens to continue traveling south to Pembroke Road. The exit ramp to Pembroke Road continues south over Hollywood Boulevard and crosses over the entry ramp from Hollywood Boulevard until reaching Pembroke Road. The preferred alternative is proposing a new local ramp connection between Hollywood Boulevard and Pembroke Road. This connection will allow local traffic to travel between the two crossing roadways in the southbound direction without entering the I-95 mainline lanes.

The preferred alternative is proposing to relocate the existing southbound entry ramp from Pembroke Road to south of Hallandale Beach Boulevard. This entry ramp from Pembroke Road crosses over the southbound exit ramp to Hallandale Beach Boulevard, and stays elevated over Hallandale Beach Boulevard and over the entry ramp from Hallandale Beach Boulevard. The ramp comes down with a slip ramp to the right to exit to Ives Dairy Road before entering I-95 southbound.

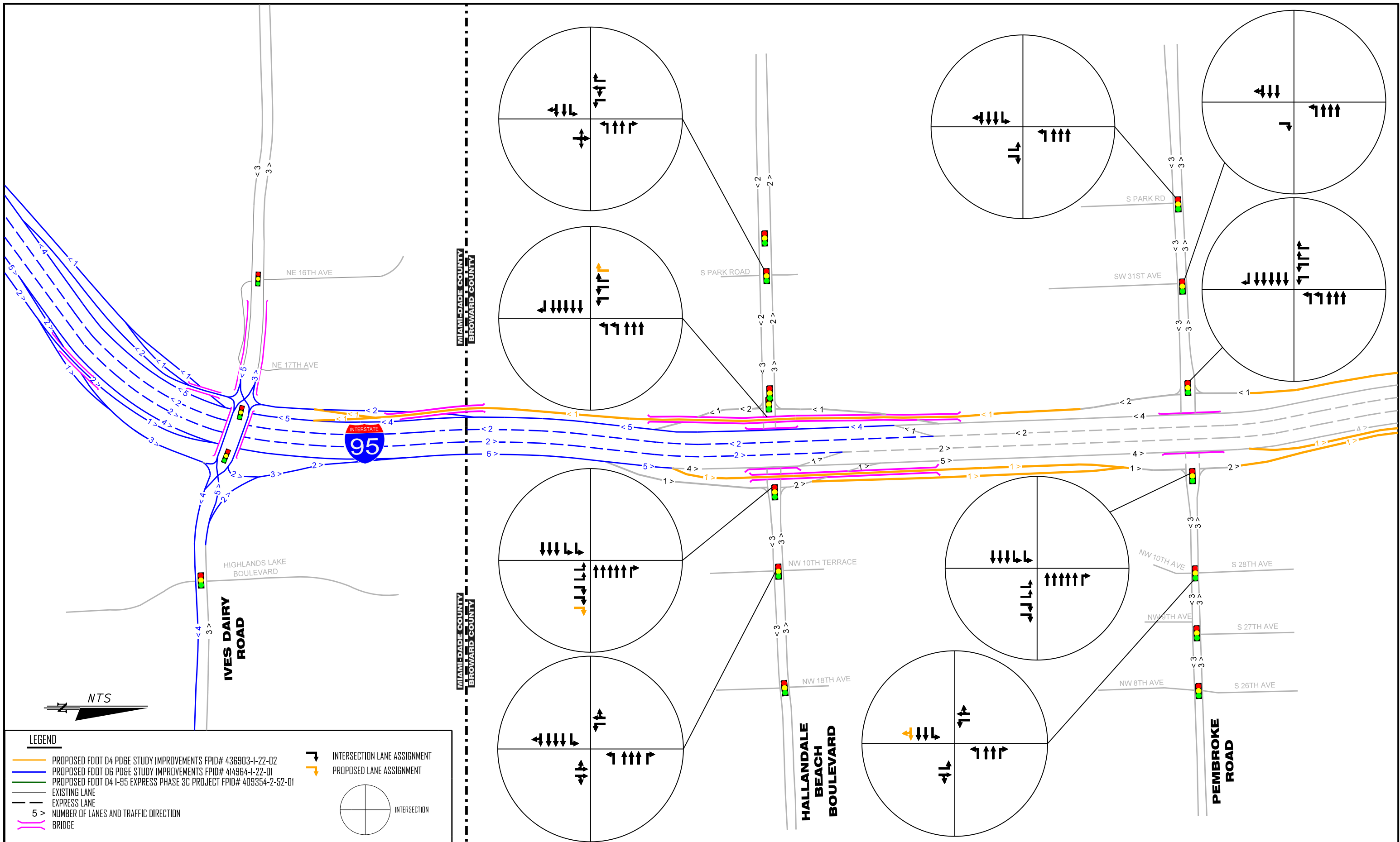
**Intersection Improvements** – Ramp terminal intersection modifications were identified at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard to improve the access and operations to and from I-95. **Figure 1.5** depicts these improvements.

The three I-95 roadway cross sections between interchanges are depicted in **Figure 1.6 – Figure 1.8**.

The PD&E Study is proposing two ramp Design Variations (Design Speed and Border Width), one ramp Design Exception (Shoulder Width), and one crossing arterial Design Variation (Bicycle Lane Width).

The preferred alternative proposes seven new bridges and two bridge widenings.





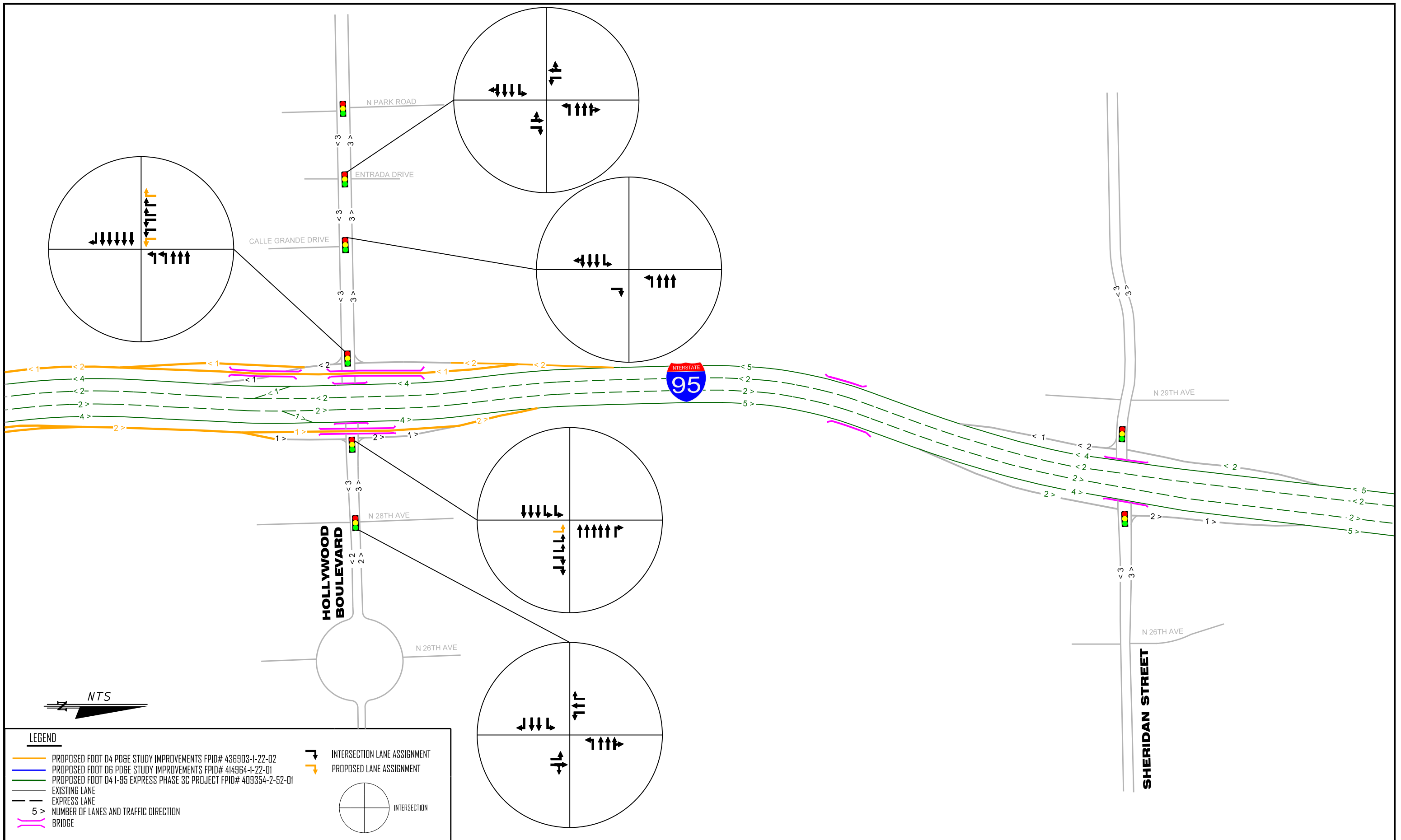
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**SR 9 (INTERSTATE 95)**  
**LANE GEOMETRY AND CONFIGURATIONS**  
**PREFERRED ALTERNATIVE**

**FIGURE**  
**1.5**  
**1-20**



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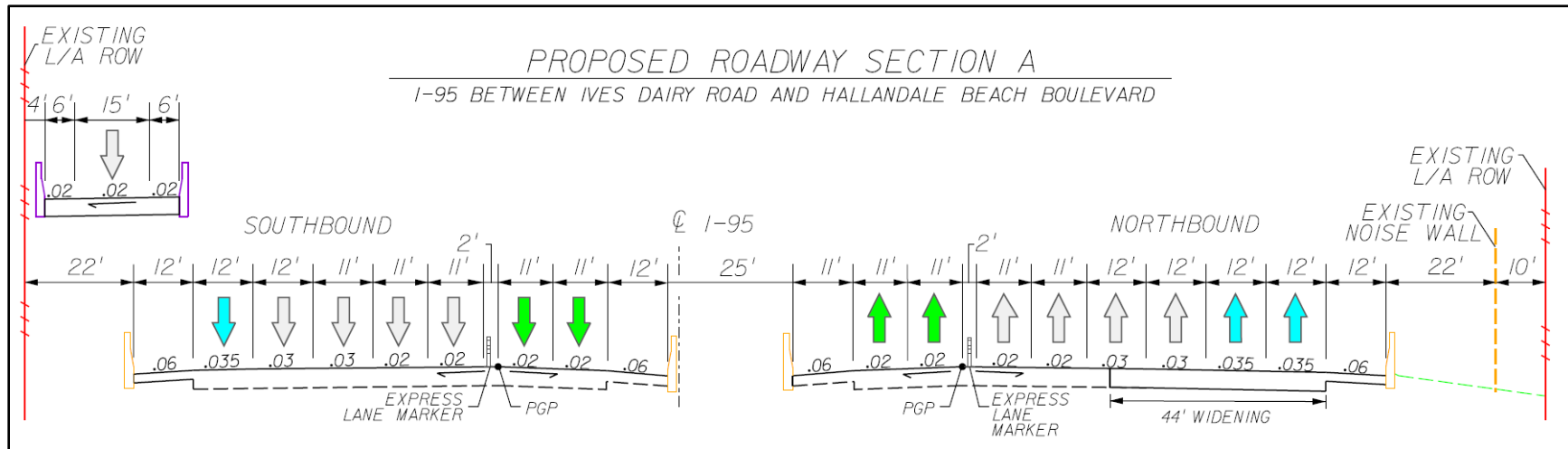


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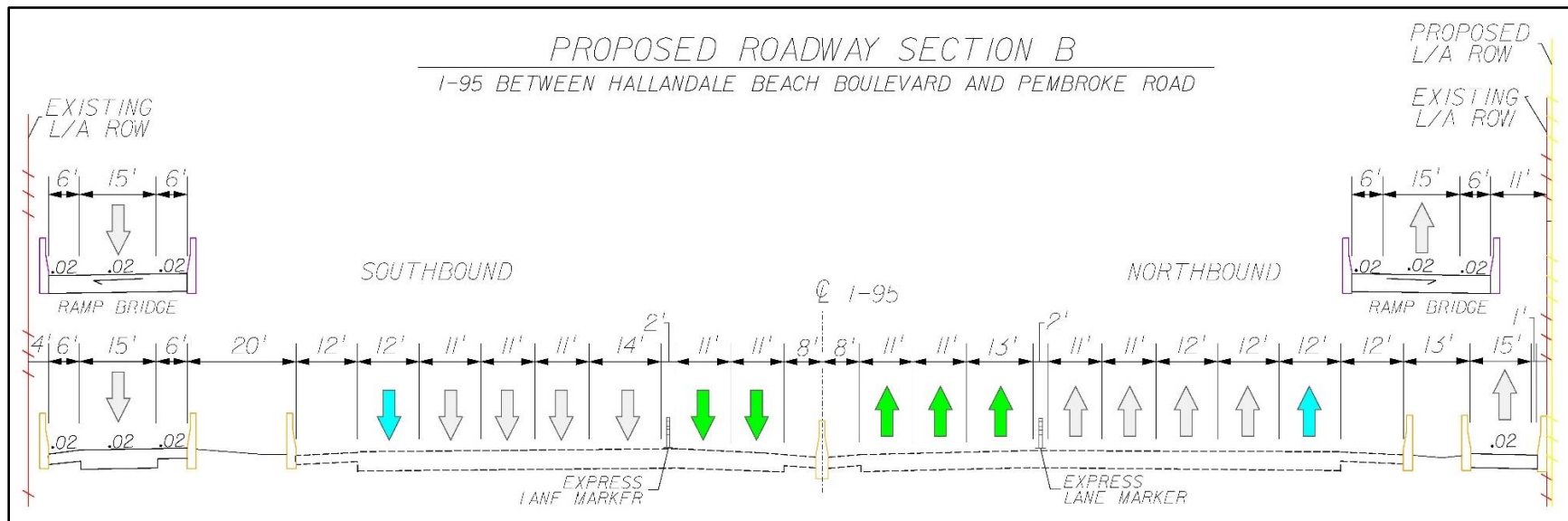
**SR 9 (INTERSTATE 95)**  
**LANE GEOMETRY AND CONFIGURATIONS**  
**PREFERRED ALTERNATIVE**

**FIGURE**  
**1.5**  
**1-21**

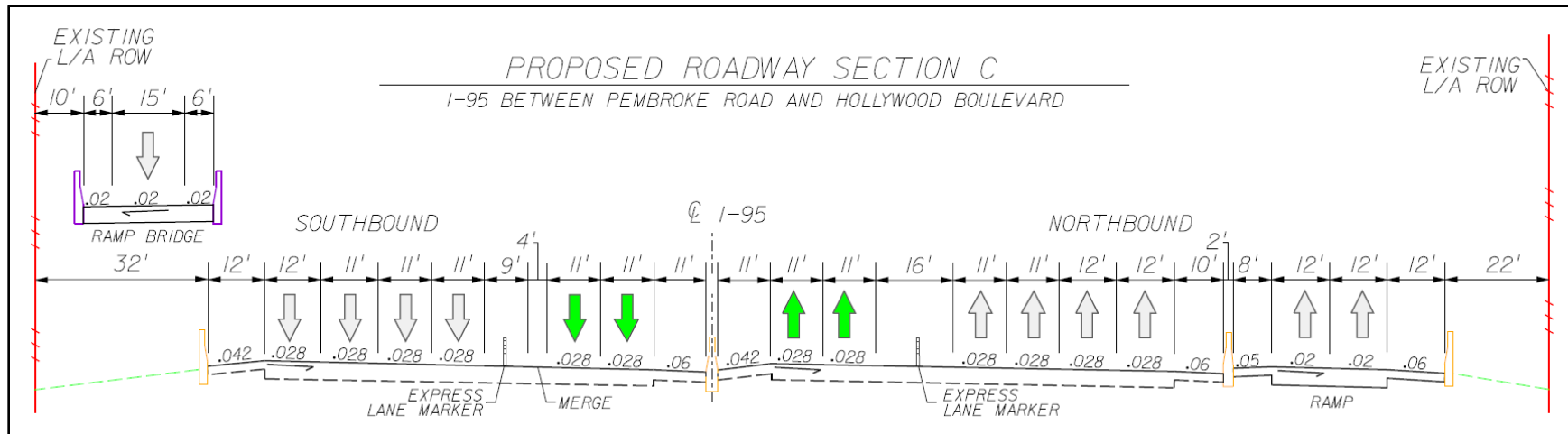




**Figure 1.6 – Preferred Alternative Roadway Section between Ives Dairy Road and Hallandale Beach Boulevard**



**Figure 1.7 – Preferred Alternative Roadway Section between Hallandale Beach Boulevard and Pembroke Road**



**Figure 1.8 – Preferred Alternative Roadway Section between Pembroke Road and Hollywood Boulevard**



The total cost estimate for the preferred alternative is approximately \$316.3 million (see **Table 1.1**).

**Table 1.1 – Total Cost Estimate**

| Category                                                   | Cost                   |
|------------------------------------------------------------|------------------------|
| Construction Cost                                          | \$223 million          |
| Utilities                                                  | \$4.3 million          |
| Design (9%) <sup>1</sup>                                   | \$20 million           |
| Right of Way                                               | \$33 million           |
| Construction Engineering and Inspection (16%) <sup>2</sup> | \$36 million           |
| <b>Total Cost Estimate</b>                                 | <b>\$316.3 million</b> |

<sup>1</sup> 9% of Construction Cost

<sup>2</sup> 16% of Construction Cost

Alternative 2 was selected based on the alternative alignment analysis and the evaluation results summarized as part of the PD&E Study. Alternative 2 will add the improvements necessary to improve traffic operations, safety, transit, system linkage, modal interrelationships, transportation demand, social demand, economic development, interchange access, and emergency evacuation. Alternative 2, with refinements, is the most prudent when compared with Alternative 1 for the following reasons:

- **Capacity** – The collector distributor roadway system and new parallel ramps remove I-95 mainline traffic, providing more capacity to several mainline segments of I-95. Alternative 2 will add the additional lanes necessary to improve the traffic operations of the I-95 mainline and interchanges.
- **Safety** – It reduces the number of entrances and exits to and from I-95, improving the overall operations of the I-95 mainline, ramps, and interchanges. It also reduces long-term crashes related to heavy congestion, mainline weaving maneuvers, mainline and ramp speed



differentials, and interstate access. Due to fewer access points, it provides more off-ramp storage and requires less signage on the mainline.

- **System Linkage** – Alternative 2 will match the planned improvements for the adjacent projects south and north of the project limits. Redesigning the ramps to and from the interchanges will improve mobility and access in and out of the interchanges and adjacent roadways.
- **Modal Interrelationships** – The additional capacity allows for enhancing/improving bus service, which offers an alternative to auto travel and addresses the needs of low-income users and disadvantaged groups.
- **Transportation Demand** – Alternative 2 adds additional laneage to I-95. The new collector distributor roadway system and interchange ramps address the transportation demand within the study limits. These improvements are consistent with the local and State transportation plans.
- **Social Demand and Economic Development** – Social and economic demands within the study limits will continue to increase as population and employment increase. The proposed improvements will add the necessary improvements to improve access to the cities of Hallandale Beach, Pembroke Park, and Hollywood, which will allow the economic development to take advantage of the added connections to reach the destinations of I-95 and surrounding cities.
- **Evacuation Route** – In the case of an evacuation event, I-95 will have additional lanes and connections with Alternative 2. The extra lanes will make the corridor more effective during emergency evacuation events and emergency response.

Based on the evaluation conducted and documented in this report, Alternative 2, with refinements, will clearly meet the project's purpose and needs and the overall project objectives of this PD&E Study.



## 1.6 LIST OF TECHNICAL DOCUMENTS

Table 1.2 – List of Technical Documents

| Technical Document                                                  | Date           |
|---------------------------------------------------------------------|----------------|
| <b>Public Involvement:</b>                                          |                |
| Public Involvement Plan                                             | May 2017       |
| <b>Engineering:</b>                                                 |                |
| Methodology Letter of Understanding                                 | September 2017 |
| Methodology Letter of Understanding Addendum                        | June 2021      |
| Design Traffic Technical Memorandum                                 | June 2021      |
| Traffic Analysis Technical Memorandum                               | June 2021      |
| VISSIM Existing Conditions Model Development and Calibration Report | April 2021     |
| Systems Interchange Modification Report                             | June 2025      |
| Location Hydraulics Report                                          | January 2025   |
| Conceptual Drainage Report                                          | February 2025  |
| Pond Siting Report                                                  | February 2025  |
| Preliminary Engineering Report (PER)                                | June 2025      |
| Bridge Analysis Report                                              | February 2025  |
| Preliminary Geotechnical Report                                     | May 2021       |
| Value Engineering Study Report                                      | July 2019      |
| <b>Environmental:</b>                                               |                |
| Cultural Resource Assessment Report                                 | August 2018    |
| Cultural Resource Assessment Addendum                               | January 2024   |
| Sociocultural Effects Technical Memorandum                          | March 2024     |
| Natural Resources Evaluation                                        | March 2024     |
| Contamination Screening Evaluation Report                           | April 2024     |
| Type 2 Categorical Exclusion Report                                 | June 2025      |
| Noise Report Study                                                  | May 2025       |
| Conceptual Stage Relocation Plan                                    | April 2024     |



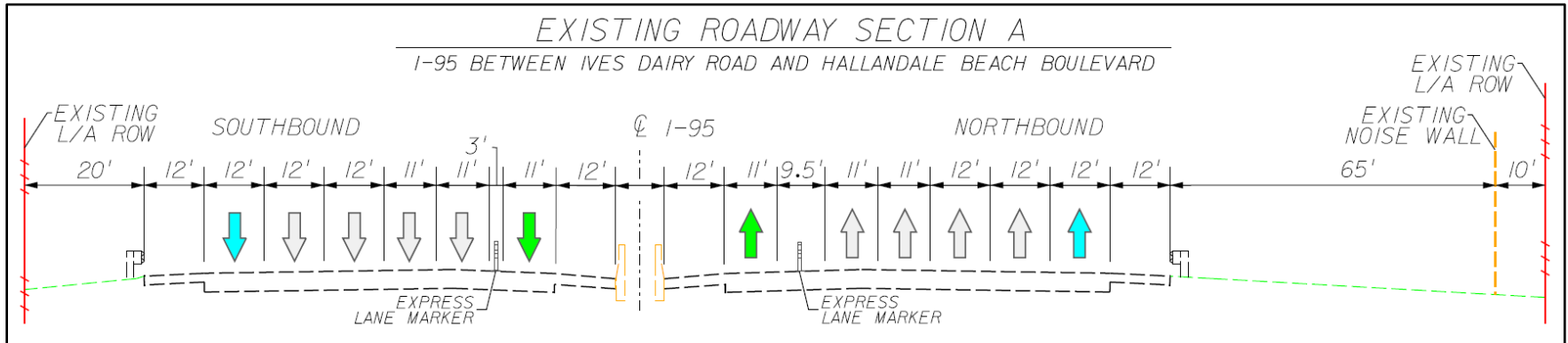
## 2.0 EXISTING CONDITIONS

The methodology utilized for evaluating the existing conditions along I-95 consisted of data gathering in the areas of roadway, bridge, and environmental characteristics. The existing conditions assessment began with the collection and review of all data pertaining to the existing facility through reviewing existing documents, conducting on-site inventories and collecting pertinent data that would serve as a basis for evaluation. The following sections describe the existing conditions within the study limits.

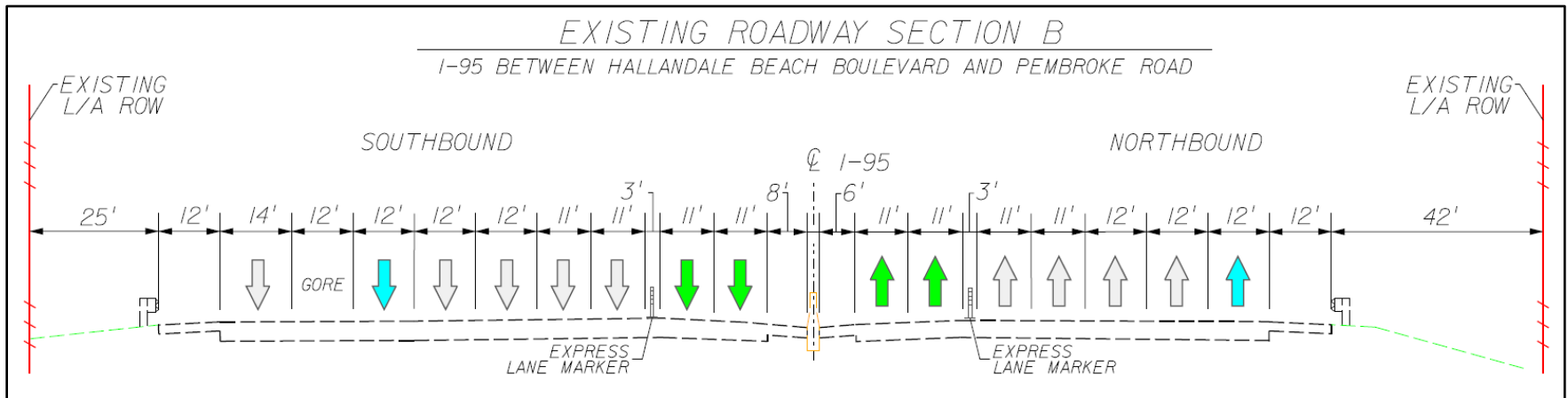
### 2.1 ROADWAY

The existing I-95 mainline roadway section varies slightly. It consists primarily of four 11-foot wide express lanes (two in each direction) and eight 11-foot to 12-foot wide general use lanes (four in each direction) with 12-foot wide auxiliary lanes at select locations. A 3-foot wide buffer area with pavement markings and express lane markers separates the general use lanes from the express lanes with 5-foot to 12-foot wide inside shoulders, 12-foot wide outside shoulders, and a 2.5-foot wide center barrier wall. One express lane exists in each direction between Miami-Dade County and Hallandale Beach Boulevard in Broward County.

**Figures 2.1 – 2.3** show the existing I-95 roadway cross sections within the study limits between interchanges.

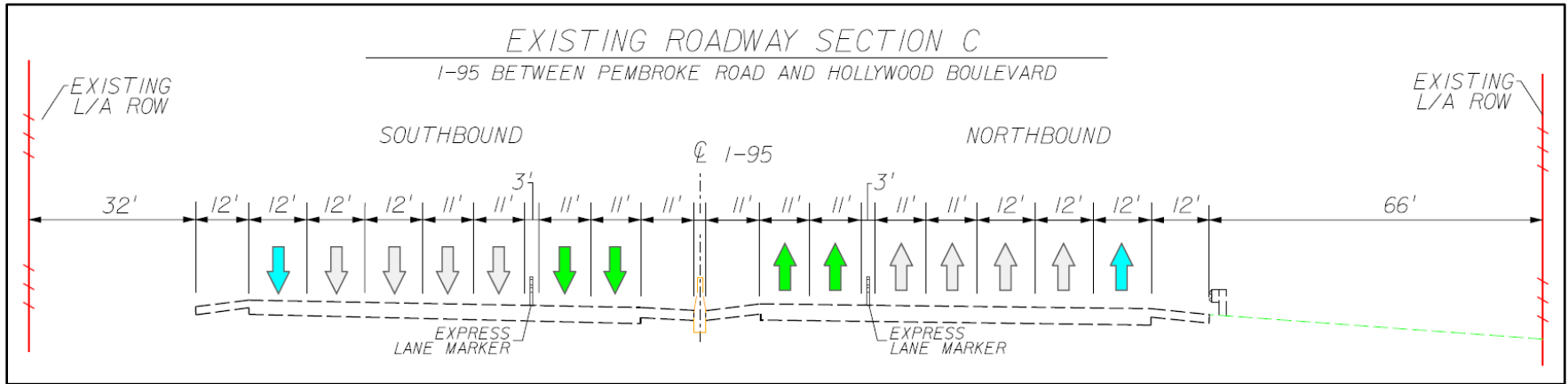


**Figure 2.1 – Existing Roadway Section between Ives Dairy Road and Hallandale Beach Boulevard**



**Figure 2.2 – Existing Roadway Section between Hallandale Beach Boulevard and Pembroke Road**





**Figure 2.3 – Existing Roadway Section between Pembroke Road and Hollywood Boulevard**



## 2.2 RIGHT OF WAY

The existing limited access right of way varies slightly within the study limits. The right of way is generally consistent throughout the corridor except at the interchanges, where it varies to accommodate entrance and exit ramps. **Table 2.1** summarizes the available right of way along the corridor. **Appendix A**, Corridor Base Maps, illustrates the existing right of way within the study limits.

**Table 2.1 – Summary of Existing Limited Access Right of Way**

| Roadway Section                                             | Right of Way Width (feet) |
|-------------------------------------------------------------|---------------------------|
| Miami-Dade/Broward County Line – Hallandale Beach Boulevard | 303                       |
| Hallandale Beach Boulevard – Pembroke Road                  | 300                       |
| Pembroke Road – Hollywood Boulevard                         | 315                       |
| Hollywood Boulevard – Sheridan Street                       | 343                       |

## 2.3 ROADWAY CLASSIFICATION & CONTEXT CLASSIFICATION

I-95, within the study limits, is classified as an urban principal arterial interstate. The access management classification is Class 1.2, a Freeway in an Existing Urbanized Area with Limited Access. I-95 is an integral part of the Strategic Intermodal System (SIS) and National Highway System (NHS) networks. Context classification is not applied to limited-access facilities.

Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard, within the study limits, are classified as an urban principal arterial other and have a context classification of C4 – Urban General.



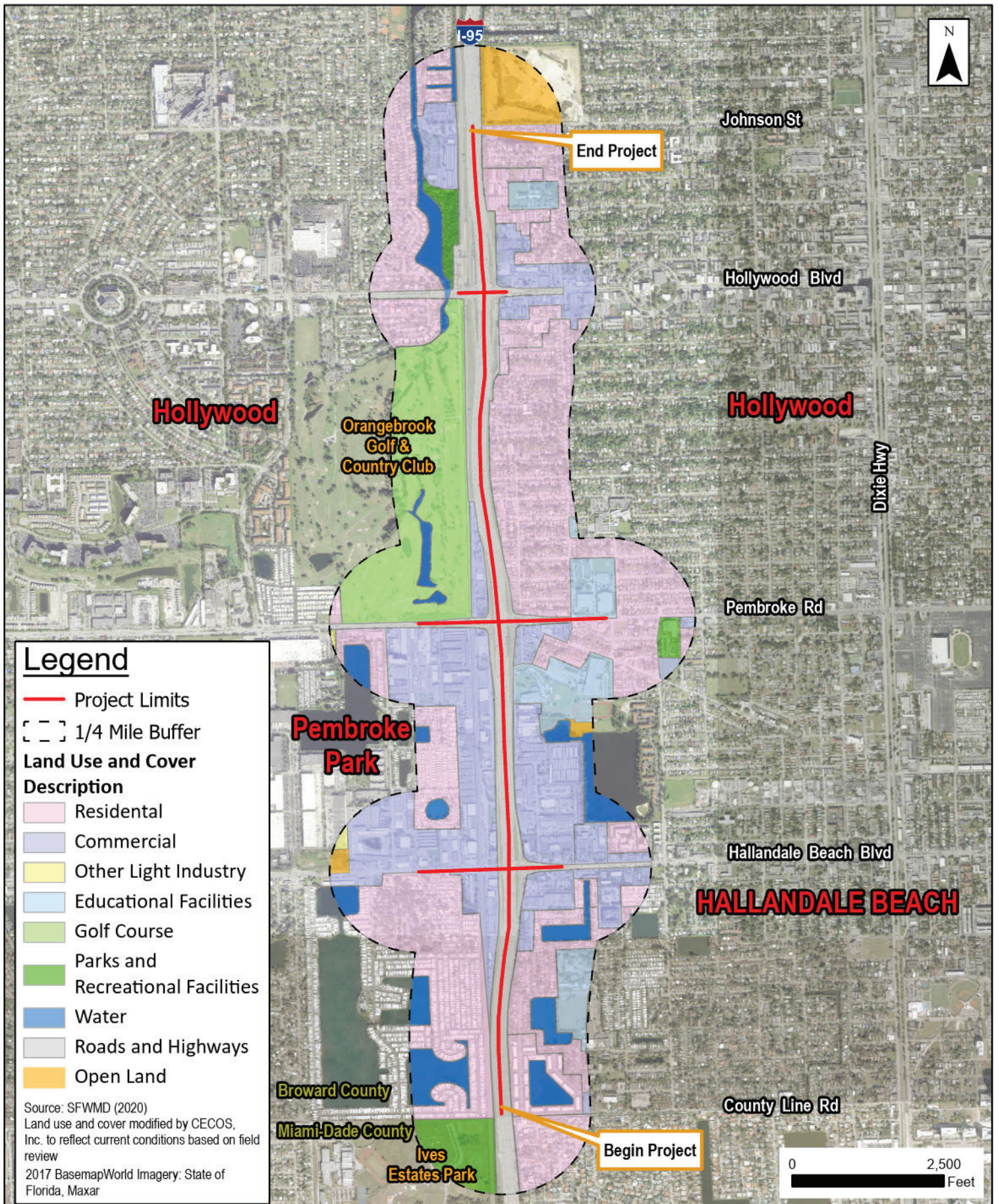
## **2.4 ADJACENT LAND USE**

The I-95 project corridor segment is located within Broward County and crosses three municipalities (City of Hallandale Beach, Town of Pembroke Park, and the City of Hollywood). Land use was classified using the South Florida Water Management District (SFWMD) land use and cover nomenclature. The project corridor traverses a number of land use categories which are illustrated in **Figure 2.4**. In general, the project study area encompasses the following land uses:

- Residential
- Commercial
- Other Light Industrial
- Educational Facilities
- Golf Courses
- Parks and Recreational Facilities
- Water
- Roads and Highways
- Open Land

The project is located within a completely urban landscape with the above land use comingled throughout.







## **2.5 ACCESS MANAGEMENT CLASSIFICATION**

The I-95 access management classification is Class 1.2, a Freeway in an existing urbanized area with limited access.

Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard are designated as Class 5 for access management, where the highway is distinguished by restrictive medians, and the adjacent land is highly developed.

## **2.6 DESIGN AND POSTED SPEEDS**

The design and posted speed for I-95 is 65 miles per hour (mph). The design and posted speed for Hallandale Beach Boulevard is 40 mph east of I-95 and 35 mph west of I-95. The design and posted speed for Pembroke Road is 35 mph east of I-95 and 40 mph west of I-95. The design and posted speed for Hollywood Boulevard is 35 mph.

## **2.7 VERTICAL AND HORIZONTAL ALIGNMENT**

The I-95 existing geometric elements information was obtained from the as-built plans provided by the FDOT and from the project survey.

### **2.7.1 CROSS SECTIONS**

The existing typical pavement cross slope of the corridor is consistent throughout the study limits except for the segments within horizontal curves, where the superelevation rates range from reverse crown (RC) to 0.056.

### **2.7.2 HORIZONTAL ALIGNMENT**

The existing horizontal alignment was reviewed and evaluated in order to identify the existing geometric characteristics along the corridor. The evaluation also verified if the existing facility meets the current design standards for horizontal curves and sight distance. The design elements reviewed during the evaluation of the existing horizontal alignment conditions included curve radius, curve length, stopping sight distance (SSD), and superelevation of the roadway surface.



The mainline alignment contains eleven horizontal curves within the study limits. The radius of each horizontal curve meets current American Association of State Highway and Transportation Officials (AASHTO) criteria for 65 MPH. **Table 2.2** and **Table 2.3** summarize the geometric characteristics for the existing horizontal alignment. For stationing references, see **Appendix A**, Corridor Base Maps. Based on the current design standards for horizontal curves and sight distance, **Table 2.2** shows that the I-95 corridor does not meet superelevation FDOT requirements and has four locations that does not meet FDOT stopping sight distance requirements. **Table 2.3** shows that the ramps meet all minimum requirements.



Table 2.2 – Existing I-95 Horizontal Alignment Geometric Characteristics

| Location/Adjacent Cross Road                | Station                                      | Milepost                | Direction | Radius of Curve (ft.) | Length of Curve (ft.) | Degree of Curve D | Deflection Angle | Design Speed | Superelevation e | Superelevation per FDM e | Existing SSD | SSD per FDM | SSD per AASHTO | Meets FDOT Criteria Superelevation/SSD | Meets AASTHO Criteria SSD | Curve No. |
|---------------------------------------------|----------------------------------------------|-------------------------|-----------|-----------------------|-----------------------|-------------------|------------------|--------------|------------------|--------------------------|--------------|-------------|----------------|----------------------------------------|---------------------------|-----------|
| North of SW 11th Street                     | PC 212+81.15<br>PI 220+88.75<br>PT 228+90.63 | 0.120<br>0.273<br>0.425 | NB & SB   | 7,813.11              | 1,609.49              | 0°44'00"          | 11°48'10" (RT)   | 65           | 0.023            | 0.025                    | 964          | 730         | 645            | X/J                                    | J                         | B1        |
| South of Hallandale Beach Blvd. Interchange | PC 234+30.66<br>PI 238+67.88<br>PT 243+03.41 | 0.527<br>0.610<br>0.693 | NB & SB   | 5,729.58              | 872.74                | 1°00'00"          | 8°43'39" (LT)    | 65           | 0.030            | 0.033                    | 857          | 730         | 645            | X/J                                    | J                         | B2        |
| North of Pembroke Road (SR 824) Interchange | PC 291+89.96<br>PI 294+51.08<br>PT 297+11.10 | 1.618<br>1.668<br>1.717 | NB & SB   | 3,274.04              | 521.15                | 1°45'00"          | 9°07'12" (LT)    | 65           | 0.050            | 0.056                    | 658          | 730         | 645            | X/X                                    | J                         | B3        |
| Washington Street                           | PC 303+76.77<br>PI 312+51.06<br>PT 321+16.01 | 1.843<br>2.008<br>2.172 | NB & SB   | 6,875.49              | 1,739.24              | 0°50'00"          | 14°29'37" (RT)   | 65           | 0.025            | 0.028                    | 953          | 730         | 645            | X/J                                    | J                         | B4        |
| South of Hollywood Blvd. Interchange        | PC 330+33.30<br>PI 333+47.41<br>PT 336+61.16 | 2.346<br>2.405<br>2.465 | NB & SB   | 7,639.44              | 627.87                | 0°45'00"          | 4°42'32" (LT)    | 65           | 0.023            | 0.025                    | 948          | 730         | 645            | X/J                                    | J                         | B5        |
| North of Hollywood Blvd. Interchange        | PC 346+71.57<br>PI 349+56.20<br>PT 352+40.50 | 2.656<br>2.710<br>2.764 | NB & SB   | 6,875.49              | 568.92                | 0°50'00"          | 4°44'28" (LT)    | 65           | 0.023            | 0.028                    | 899          | 730         | 645            | X/J                                    | J                         | B6        |
| Pierce Street                               | PC 358+78.49<br>PI 361+59.15<br>PT 364+39.50 | 2.885<br>2.938<br>2.991 | NB & SB   | 6,875.49              | 561.01                | 0°50'00"          | 4°40'30" (RT)    | 65           | 0.023            | 0.028                    | 899          | 730         | 645            | X/J                                    | J                         | B7        |

X = Does not meet criteria    ✓ = Meets required criteria



Table 2.3 – Existing Ramps Horizontal Alignment Geometric Characteristics

| Location/Adjacent Cross Road | Station                                      | Direction | Radius of Curve (ft.) | Length of Curve (ft.) | Degree of Curve D | Deflection Angle | Design Speed | Superelevation e | Superelevation per FDM e | Existing SSD | SSD per FDM | SSD per AASHTO | Meets FDOT Criteria Superelevation/SSD | Meets AASTHO Criteria SSD | Curve No. |
|------------------------------|----------------------------------------------|-----------|-----------------------|-----------------------|-------------------|------------------|--------------|------------------|--------------------------|--------------|-------------|----------------|----------------------------------------|---------------------------|-----------|
| NB OFF-RAMP TO HALLANDALE    | PC 236+67.58<br>PI 238+25.40<br>PT 239+82.90 | NB        | 2,864.79              | 315.32                | 2° 00' 00"        | 06° 18' 23"      | 45           | 0.034            | 0.034                    | >360         | 360         | 360            | √/√                                    | √                         | 7         |
| SB ON-RAMP FROM HALLANDALE   | PC 338+29.56<br>PI 339+48.72<br>PT 340+67.74 | SB        | 2,864.79              | 238.18                | 2° 00' 00"        | 04° 45' 49"      | 45           | 0.034            | 0.034                    | >360         | 360         | 360            | √/√                                    | √                         | 9         |
|                              | PC 340+67.74<br>PI 341+53.29<br>PT 342+38.79 | SB        | 2,879.79              | 171.05                | 1° 59' 23"        | 03° 24' 11"      | 45           | 0.034            | 0.034                    | >360         | 360         | 360            | √/√                                    | √                         | 10        |
| SB OFF-RAMP TO HALLANDALE    | PC 463+01.67<br>PI 464+01.71<br>PT 465+01.67 | SB        | 2,864.79              | 200.00                | 2° 00' 00"        | 4° 00' 00"       | 45           | 0.034            | 0.034                    | >360         | 360         | 360            | √/√                                    | √                         | 11        |
| NB ON-RAMP FROM HALLANDALE   | PC 551+56.51<br>PI 555+35.21<br>PT 559+12.82 | NB        | 5,729.58              | 756.31                | 1° 00' 00"        | 7° 33' 47"       | 40           | NC               | NC                       | >305         | 305         | 305            | √/√                                    | √                         | 12        |
|                              | PC 559+92.95<br>PI 560+50.14<br>PT 561+07.31 | NB        | 3,834.72              | 114.37                | 1° 29' 39"        | 1° 42' 32"       | 45           | 0.030            | 0.030                    | >360         | 360         | 360            | √/√                                    | √                         | 13        |
|                              | PC 561+07.31<br>PI 563+02.62<br>PT 564+97.60 | NB        | 3,819.72              | 390.29                | 1° 30' 00"        | 5° 51' 15"       | 45           | 0.030            | 0.030                    | >360         | 360         | 360            | √/√                                    | √                         | 15        |
| NB OFF-RAMP TO PEMBROKE      | PC 276+80.74<br>PI 278+14.13<br>PT 279+47.41 | NB        | 3,819.72              | 266.67                | 1° 30' 00"        | 4° 00' 00"       | 45           | 0.026            | 0.026                    | >360         | 360         | 360            | √/√                                    | √                         | 22        |
|                              | PC 282+33.50<br>PI 284+04.20<br>PT 285+74.66 | NB        | 3,819.72              | 341.16                | 1° 30' 00"        | 5° 07' 03"       | 35           | RC               | RC                       | >250         | 250         | 250            | √/√                                    | √                         | 24        |
| SB ON-RAMP FROM PEMBROKE     | PC 376+82.90<br>PI 379+22.16<br>PT 381+61.14 | SB        | 5,729.58              | 478.24                | 1° 00' 00"        | 4° 46' 57"       | 45           | 0.030            | RC                       | >360         | 360         | 360            | √/√                                    | √                         | 26        |
|                              | PC 381+61.14<br>PI 381+92.35<br>PT 382+23.56 | SB        | 5,744.58              | 62.42                 | 0° 59' 51"        | 0° 37' 21"       | 45           | 0.030            | RC                       | >360         | 360         | 360            | √/√                                    | √                         | 27        |
|                              | PC 382+52.57<br>PI 385+23.02<br>PT 387+93.07 | SB        | 5,729.58              | 540.5                 | 1° 00' 00"        | 5° 24' 18"       | 30           | NC               | NC                       | >200         | 200         | 200            | √/√                                    | √                         | 28        |





Table 2.3 – Existing Ramps Horizontal Alignment Geometric Characteristics (Continued)

| Location/Adjacent Cross Road | Station                                         | Direction | Radius of Curve (ft.) | Length of Curve (ft.) | Degree of Curve D | Deflection Angle | Design Speed | Superelevation e | Superelevation per FDM e | Existing SSD | SSD per FDM | SSD per AASHTO | Meets FDOT Criteria Superelevation/SSD | Meets AASTHO Criteria SSD | Curve No. |
|------------------------------|-------------------------------------------------|-----------|-----------------------|-----------------------|-------------------|------------------|--------------|------------------|--------------------------|--------------|-------------|----------------|----------------------------------------|---------------------------|-----------|
| SB OFF-RAMP TO PEMBROKE      | PC 395+08.51<br>PI 397+09.84<br>PT 399+09.51    | SB        | 2,864.79              | 400.00                | 2° 00' 00"        | 8° 00' 00"       | 30           | RC               | RC                       | >200         | 200         | 200            | √/√                                    | √                         | 30        |
|                              | PC 406+95.56<br>PI 408+99.00<br>PT 411+02.05    | SB        | 3,819.72              | 406.49                | 1° 30' 00"        | 6° 05' 51"       | 45           | 0.026            | 0.026                    | >360         | 360         | 360            | √/√                                    | √                         | 32        |
| NB ON-RAMP FROM PEMBROKE     | PC 493+03.58<br>PI 496+03.44<br>PT 499+01.13    | NB        | 2,864.79              | 597.55                | 2° 00' 00"        | 11° 57' 04"      | 30           | RC               | RC                       | >200         | 200         | 200            | √/√                                    | √                         | 33        |
|                              | PC 506+09.65<br>PI 508+67.75<br>PT 511+25.30    | NB        | 4,583.66              | 515.65                | 1° 15' 00"        | 6° 26' 44"       | 45           | 0.030            | 0.030                    | >360         | 360         | 360            | √/√                                    | √                         | 35        |
| NB OFF-RAMP TO HOLLYWOOD     | PC 231+68.95<br>PI 233+55.09<br>PT 235+40.93    | NB        | 3,819.72              | 371.98                | 1° 30' 00"        | 5° 34' 47"       | 45           | 0.026            | 0.026                    | >360         | 360         | 360            | √/√                                    | √                         | 42        |
| SB ON-RAMP FROM HOLLYWOOD    | PC 330+75.57<br>PI 332.74.98<br>PT 334+74.02    | SB        | 3,819.72              | 398.45                | 1° 30' 00"        | 5° 58' 36"       | 45           | 0.030            | 0.026                    | >360         | 360         | 360            | √/√                                    | √                         | 43        |
|                              | PC 334+74.02<br>PI 335+38.33<br>PT 336+02.62    | SB        | 3,834.72              | 128.60                | 1° 29' 39"        | 1° 55' 17"       | 45           | 0.030            | 0.026                    | >360         | 360         | 360            | √/√                                    | √                         | 44        |
| SB OFF-RAMP TO HOLLYWOOD     | PC 1450+79.12<br>PI 1452+79.14<br>PT 1454+79.13 | SB        | 16,000                | 400.01                | 0° 21' 29"        | 1° 25' 57"       | 45           | NC               | NC                       | >360         | 360         | 360            | √/√                                    | √                         | 1         |
|                              | PC 1454+79.13<br>PI 1456+79.15<br>PT 1458+79.14 | SB        | 16,000                | 400.01                | 0° 21' 29"        | 1° 25' 57"       | 45           | NC               | NC                       | >360         | 360         | 360            | √/√                                    | √                         | 2         |
| NB ON-RAMP FROM HOLLYWOOD    | PC 547+11.33<br>PI 549+74.90<br>PT 552+37.63    | NB        | 3,819.72              | 526.30                | 1° 30' 00"        | 7° 53' 40"       | 35           | RC               | RC                       | >250         | 250         | 250            | √/√                                    | √                         | 45        |
|                              | PC 559+49.07<br>PI 562+84.94<br>PT 566+20.05    | NB        | 5,729.58              | 670.98                | 1° 00' 00"        | 6° 42' 35"       | 45           | 0.030            | RC                       | >360         | 360         | 360            | √/√                                    | √                         | 47        |



### 2.7.3 VERTICAL ALIGNMENT

The existing vertical alignment was reviewed and evaluated in order to identify the existing geometric characteristics along the corridor. The evaluation also verified if the existing facilities meet the current design standards for vertical curves and sight distance. The following components were verified during the review: percent grade, changes in grade, SSD, length of vertical curve, and K value.

The K value of a vertical curve is simply the length of the curve divided by the change in grade of the curve. The minimum K value set forth in the FDOT *Florida Design Manual FDM Part 2, Chapter 210, Table 210.10.3* and *Chapter 211, Table 211.9.2* is based on design speed. If the curve K value meets the minimum criteria, the SSD criterion is also met. The minimum K value assigned to a crest vertical curve is based on the driver's ability to see over the curve, while for a sag vertical curve is based on the headlight illumination distance. The minimum lengths of the vertical curves and the percent grades were also verified against the criteria in *Table 210.10.4 and Table 211.9.3 of the FDM*.

**Table 2.4** and **Table 2.5** list the vertical curve parameters and existing characteristics. For stationing references, see **Appendix A**, Corridor Base Maps.



Table 2.4 – Existing I-95 Vertical Alignment Geometric Characteristics

| Facility/Location                           | Type of Curve | VPI Station | Mile Post | VPI Elevation (ft) | PGL High/Low (ft) | Grade (Back) % | Grade (Ahead) % | Length of Curve (ft) | K-Value | Design Speed (MPH) | K-Value Required for FDOT | K-Value Required for AASHTO | Min. Length FDOT | Meets FDOT Criteria K-Value/Length | Meets AASHTO Criteria K-Value |
|---------------------------------------------|---------------|-------------|-----------|--------------------|-------------------|----------------|-----------------|----------------------|---------|--------------------|---------------------------|-----------------------------|------------------|------------------------------------|-------------------------------|
| South of Hallandale Beach Blvd. interchange | Sag           | 38+33.33    | 0.537     | 11.47              | 10.67             | 0.20           | 2.69            | 800                  | 321     | 65                 | 181                       | 157                         | 800              | ✓/✓                                | ✓                             |
| Hallandale Beach Blvd. Interchange          | Crest         | 50+58.53    | 0.769     | 44.42              | 33.33             | 2.69           | -2.69           | 1,650                | 307     | 65                 | 401                       | 193                         | 1800             | X/X                                | ✓                             |
| North of Hallandale Beach Blvd. interchange | Sag           | 63+04.43    | 1.005     | 10.90              | 10.90             | 2.69           | 0.00            | 800                  | 297     | 65                 | 181                       | 157                         | 800              | ✓/✓                                | ✓                             |
| South of Pembroke Road (SR 824) Interchange | Sag           | 78+47.78    | 1.297     | 10.90              | 10.90             | 0.00           | 2.88            | 800                  | 278     | 65                 | 181                       | 157                         | 800              | ✓/✓                                | ✓                             |
| Pembroke Road (SR 824) Interchange          | Crest         | 91+22.78    | 1.539     | 47.62              | 35.02             | 2.88           | -2.88           | 1,750                | 304     | 65                 | 401                       | 193                         | 1800             | X/X                                | ✓                             |
| North of Pembroke Road (SR 824) Interchange | Sag           | 104+35.97   | 1.787     | 9.80               | 9.80              | 2.88           | 0.00            | 800                  | 278     | 65                 | 181                       | 157                         | 800              | ✓/✓                                | ✓                             |
| South of Hollywood Blvd. Interchange        | Sag           | 132+65.29   | 2.323     | 9.80               | 9.80              | 0.00           | 2.78            | 800                  | 289     | 65                 | 181                       | 157                         | 800              | ✓/✓                                | ✓                             |
| Hollywood Blvd. Interchange                 | Crest         | 145+17.81   | 2.561     | 44.62              | 32.80             | 2.78           | -2.78           | 1,700                | 306     | 65                 | 401                       | 193                         | 1800             | X/X                                | ✓                             |
| North of Hollywood Blvd. Interchange        | Sag           | 159+57.59   | 2.833     | 4.59               | 10.75             | -2.78          | 2.70            | 900                  | 164     | 65                 | 181                       | 157                         | 800              | X/✓                                | ✓                             |
| Johnson Street                              | Crest         | 172+60.52   | 3.080     | 39.77              | 28.57             | 2.70           | -2.70           | 1,650                | 306     | 65                 | 401                       | 193                         | 1000             | X/✓                                | ✓                             |

✓ = Meets required criteria    X = Does not meet criteria



Table 2.5 – Existing Ramps Vertical Alignment Geometric Characteristics

| Facility/Location                               | Type of Curve | VPI Station | VPI Elevation (ft) | PGL High/Low (ft) | Grade (Back) % | Grade (Ahead) % | Length of Curve (ft) | K-Value | Design Speed (MPH) | K-Value Required for FDOT | K-Value Required for AASHTO | Min. Length FDOT | Meets FDOT Criteria K-Value/Length | Meets AASHTO Criteria K-Value | Curve No. |
|-------------------------------------------------|---------------|-------------|--------------------|-------------------|----------------|-----------------|----------------------|---------|--------------------|---------------------------|-----------------------------|------------------|------------------------------------|-------------------------------|-----------|
| I-95 NB Off-Ramp to Hallandale Beach Boulevard  | Sag           | 234+71.00   | 8.86               | 8.89              | -0.03          | 2.00            | 175                  | 86.2    | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             | Ramp A    |
| I-95 NB Off-Ramp to Hallandale Beach Boulevard  | Crest         | 237+50.00   | 14.44              | 13.75             | 2.00           | -0.60           | 300                  | 115.4   | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             | Ramp A    |
| I-95 SB On-Ramp from Hallandale Beach Boulevard | Sag           | 338+50.00   | 11.48              | 10.43             | 0.70           | 2.00            | 300                  | 230.7   | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             | Ramp B    |
| I-95 SB On-Ramp from Hallandale Beach Boulevard | Crest         | 343+00.00   | 20.99              | 18.97             | 2.00           | 2.00            | 400                  | 100     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             | Ramp B    |
| I-95 SB Off-Ramp to Hallandale Beach Boulevard  | Sag           | 461+30.00   | 9.16               | 9.16              | 0.00           | 0.48            | 100                  | 208.3   | 30                 | 37                        | 37                          | 90               | ✓/✓                                | ✓                             | Ramp C    |
| I-95 SB Off-Ramp to Hallandale Beach Boulevard  | Crest         | 463+30.00   | 9.88               | 9.88              | 0.48           | 0.00            | 100                  | 208.3   | 30                 | 31                        | 19                          | 90               | ✓/✓                                | ✓                             | Ramp C    |
| I-95 SB Off-Ramp to Hallandale Beach Boulevard  | Crest         | 464+65.00   | 9.88               | 9.88              | 0.00           | -0.69           | 100                  | 144.9   | 30                 | 31                        | 19                          | 90               | ✓/✓                                | ✓                             | Ramp C    |
| I-95 SB Off-Ramp to Hallandale Beach Boulevard  | Sag           | 466+40.00   | 8.67               | 8.76              | -0.69          | 0.19            | 100                  | 113.6   | 30                 | 37                        | 37                          | 90               | ✓/✓                                | ✓                             | Ramp C    |
| I-95 NB On-Ramp from Hallandale Beach Boulevard | Crest         | 559+50.00   | 17.81              | 16.69             | 1.40           | -1.60           | 300                  | 100     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             | Ramp D    |
| I-95 NB Off-Ramp to Pembroke Road               | Sag           | 275+40.00   | 8.64               | 8.77              | -0.21          | 1.00            | 150                  | 123.7   | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             | Ramp A    |
| I-95 NB Off-Ramp to Pembroke Road               | Crest         | 277+80.74   | 11.05              | 10.66             | 1.00           | -0.65           | 200                  | 121.2   | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             | Ramp A    |
| I-95 NB Off-Ramp to Pembroke Road               | Sag           | 280+19.20   | 9.50               | 9.50              | -0.65          | 0.00            | 100                  | 153.8   | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             | Ramp A    |
| I-95 SB On-Ramp from Pembroke Road              | Crest         | 384+50.00   | 24.01              | 21.01             | 2.00           | -3.00           | 500                  | 100     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             | Ramp B    |
| I-95 SB Off-Ramp to Pembroke Road               | Sag           | 403+83.50   | 8.70               | 8.91              | -0.20          | 1.00            | 200                  | 166.7   | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             | Ramp C    |
| I-95 SB Off-Ramp to Pembroke Road               | Crest         | 407+20.50   | 12.07              | 12.01             | 1.00           | -0.08           | 150                  | 138.8   | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             | Ramp C    |
| I-95 NB On-Ramp from Pembroke Road              | Crest         | 502+55.95   | 15.18              | 14.52             | 0.61           | -1.60           | 300                  | 135.7   | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             | Ramp D    |
| I-95 NB On-Ramp from Pembroke Road              | Sag           | 507+04.70   | 8.00               | 8.04              | -1.60          | 0.03            | 250                  | 153.3   | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             | Ramp D    |
| I-95 NB Off-Ramp to Hollywood Boulevard         | Sag           | 229+50.00   | 7.32               | 7.28              | -0.21          | 1.17            | 200                  | 144.9   | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             | Ramp A    |
| I-95 NB Off-Ramp to Hollywood Boulevard         | Crest         | 232+50.00   | 11.02              | 10.85             | 1.17           | -0.20           | 200                  | 146     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             | Ramp A    |
| I-95 SB On-Ramp from Hollywood Boulevard        | Crest         | 337+00.00   | 18.65              | 17.00             | 1.82           | -1.50           | 400                  | 120.5   | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             | Ramp B    |
| I-95 SB Off-Ramp to Hollywood Boulevard         | Sag           | 1446+32.14  | 5.84               | 6.06              | -2.25          | 0.42            | 120                  | 44.9    | 30                 | 37                        | 37                          | 90               | ✓/✓                                | ✓                             | 1         |
| I-95 NB On-Ramp from Hollywood Boulevard        | Crest         | 555+50.00   | 13.87              | 13.22             | 0.75           | -1.02           | 300                  | 169.5   | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             | Ramp D    |
| I-95 NB On-Ramp from Hollywood Boulevard        | Sag           | 561+30.00   | 7.85               | 9.64              | -1.02          | 2.58            | 450                  | 125     | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             | Ramp D    |

✓ = Meets required criteria    ✗ = Does not meet criteria



The existing vertical components of the corridor meet all the current FDOT and AASHTO criteria for 65 MPH, except at the following locations within the study limits:

- The length of a crest vertical curve along the mainline on an Interstate is not to be less than 1,000 feet for open highway and 1,800 feet within interchanges as per FDM Part 2, Chapter 211, Table 211.9.3. The following crest vertical curves do not meet the criteria for minimum length of curve:
  - Hallandale Beach Boulevard, Station 50+58.53
  - Pembroke Road Interchange, Station 91+22.78
  - Hollywood Boulevard Interchange, Station 145+17.81
- The required K-value of a crest vertical curve is 401 as per FDM Part 2, Chapter 211, Table 211.9.2 (65 MPH, interstate). The following crest vertical curves do not meet the criteria for minimum K-value:
  - Hallandale Beach Boulevard, Station 50+58.53
  - Pembroke Road Interchange, Station 91+22.78
  - Hollywood Boulevard Interchange, Station 145+17.81
  - Johnson Street, Station 172+60.52
- The required K-value of a sag vertical curve is 181 as per FDM Part 2, Chapter 211, Table 211.9.2 (65 MPH, interstate). The following sag vertical curves do not meet the criteria for minimum K-value:
  - North of Hollywood Boulevard Interchange, Station 159+57.59

Based on the current design standards for vertical curves and sight distance, the evaluation shows that the I-95 corridor has five locations that do not meet FDM stopping sight distance requirements and three locations that do not meet FDM length of curve requirements. The ramps meet all minimum requirements. The I-95 corridor and ramps met AASHTO criteria.



#### 2.7.4 HORIZONTAL AND VERTICAL CLEARANCES

**Horizontal Clearance** – The horizontal clearance relates to the lateral clearance between the travel way and any roadside obstruction. This roadside recovery area, called recoverable terrain, can be used by an errant vehicle to potentially regain control of the vehicle or by disabled vehicles as a place of refuge. Horizontal clearance requirements vary depending on the design speed, typical section, traffic volumes, lane type and roadside obstruction or feature.

Highways with flush shoulders where right of way is not restricted have sufficient widths to provide clear zones. Therefore, the horizontal clearance requirements for certain features and objects are based on maintaining a clear zone wide enough to provide the recoverable terrain. As set forth in the *FDM, Part 2, Chapter 215, Table 215.2.1*, the recoverable terrain widths for a design speed greater than 55 MPH are as follows:

- Travel lanes and multilane ramps: 36 feet.
- Auxiliary lanes and single lane ramps: 24 feet.

Another horizontal clearance component is the border width. A border width is a roadside area that accommodates signing, drainage features, guardrail, fencing, maintenance access and utilities. Border width on limited access facilities is measured from the edge of the outside traffic lane to the right of way line. The criteria shown in the *FDM, Part 2, Chapter 211, Section 211.6*, for freeways including interchanges ramps, indicates a required border width of 94 feet. The border widths along the mainline and within the interchanges (for each quadrant) are included in **Table 2.6** and **Table 2.7**.

Based on the current design standards for border width, **Table 2.6** and **Table 2.7** show that the project corridor, within the study limits, does not meet border width requirements.

**Table 2.6 – Summary of Existing Border Width – Mainline**

| Roadway Section                              | Border Width (Feet) |            |               | Border Width Required (Feet) |   |
|----------------------------------------------|---------------------|------------|---------------|------------------------------|---|
|                                              | Northbound          | Southbound | Length (feet) |                              |   |
| Ives Dairy Road - Hallandale Beach Boulevard | 50 - 105            | 30 - 65    | 7,638         | 94                           | ✗ |
| Hallandale Beach Boulevard - Pembroke Road   | 65 - 80             | 65 - 85    | 4,054         | 94                           | ✗ |
| Pembroke Road - Hollywood Boulevard          | 50 - 120            | 22 - 160   | 5,414         | 94                           | ✗ |
| Hollywood Boulevard - Sheridan Street        | 30 - 172            | 50 - 150   | 8,094         | 94                           | ✗ |

✗ = Does not meet criteria

✓ = Meets required criteria

**Table 2.7 – Summary of Existing Border Width – Interchanges**

| Interchange                | Border Width (feet) |                 |                 |                 | Border Width Required |   |
|----------------------------|---------------------|-----------------|-----------------|-----------------|-----------------------|---|
|                            | NW <sup>1</sup>     | NE <sup>1</sup> | SW <sup>1</sup> | SE <sup>1</sup> |                       |   |
| Hallandale Beach Boulevard | 8-35                | 10-130          | 10-15           | 10-145          | 94                    | ✗ |
| Pembroke Road              | 12-65               | 12-50           | 6-25            | 7-60            | 94                    | ✗ |
| Hollywood Boulevard        | 6-65                | 7-150           | 12-60           | 10-150          | 94                    | ✗ |

Source: Project Survey

✗ = Does not meet criteria

✓ = Meets required criteria

Note: <sup>1</sup>Interchange Quadrant

**Vertical Clearance** – The vertical clearance relates to the adequate clear height of an overpass/overhead or underpass structure/facility to the roadway and shoulder areas. In accordance with the *FDM Part I, Chapter 260, Section 260.6, Table 260.6.1*, the vertical clearance criteria for a bridge over a roadway is 16'-6", for a roadway over railroad is 23'-6", and for a pedestrian bridge over a roadway is 23'-6". AASHTO requires a minimum vertical clearance of 16' for structures passing over a roadway. The vertical clearance along the I-95 corridor is below the FDM minimum clearance for two bridges in one direction and below the AASHTO minimum clearance for two bridges in one direction. The characteristics for each bridge, including vertical clearance, are later summarized in **Table 2.25** (see **Section 2.22**).





## 2.8 PEDESTRIAN ACCOMMODATIONS

I-95 is a limited access facility. There will continue to be no designated pedestrian accommodations along I-95, as pedestrians are not permitted on limited access corridors.

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

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

**Pembroke Road** – The corridor has a five-foot wide sidewalk along both sides of the roadway east of the interchange and continues through the interchange. West of the interchange the corridor has five-foot to seven-foot wide sidewalks along both sides of the roadway, which continues through the interchange. Designated pedestrian crossings exist at all the corridor intersections.

**Hollywood Boulevard** – The corridor has a five-foot wide sidewalk along both sides of the roadway west of the interchange and continues through the interchange. East of the interchange the corridor has five-foot to seven-foot wide sidewalks along both sides of the roadway, which continues through the interchange. Designated pedestrian crossings exist at all the corridor intersections.

## 2.9 BICYCLE FACILITIES

I-95 is a limited access facility. There will continue to be no bicycle accommodations along I-95, as bicycles are not permitted on limited access corridors.

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

**Hallandale Beach Boulevard** – The corridor has a four-foot wide bicycle lane along both sides of the roadway and continues through the interchange.

**Pembroke Road** – The corridor has a four-foot wide bicycle lane along both sides of the roadway and continues through the interchange.

**Hollywood Boulevard** – The corridor has a four-foot wide paved shoulder (undesignated bicycle lane) along both sides of the roadway and continues through the interchange.



## 2.10 TRANSIT FACILITIES

Along the corridor, within the study limits, there is a wide variety of modes of public transportation. Some of these modes of public transportation are:

- Transit Services
- Railroads
- Van-Pool/Car-Pool
- Park and Ride Facilities
- Multimodal/Intermodal Facilities
- Private Passenger Services

**Appendix A**, Corridor Base Maps, depicts the location of these facilities along the corridor within the study limits.

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

The BCT provides fixed-stop bus service within and across the study area. The BCT bus routes 5, 6, 7, 9, 15, 28, 110 and 114 operate within the study limits (see **Appendix B**). BCT also assists the following municipalities with their community bus services.

- City of Hallandale Beach – Routes 3 and 4
- City of Hollywood – Hollywood Trolley

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

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

SFRTA has shuttle bus services (bus routes SS-1 and FLA-1) that originate from selected Tri-Rail stations.



**Railroads** – The South Florida Rail Corridor is a dual railroad track that runs parallel to the west side of the I-95 project corridor. This railroad line is currently under the jurisdiction of the SFRTA and owned by the FDOT. It was formerly owned by CSX Transportation and continues to carry CSX freight trains. The SFRTA also operates the commuter rail service called Tri-Rail on these tracks. Within the study limits, there is one Tri-Rail station called Hollywood Boulevard Station, located in the northwest quadrant of the I-95/Hollywood Boulevard Interchange.

Amtrak also operates passenger trains on the South Florida Rail Corridor. North of the study limits, the Sheridan Amtrak Station is co-located with the Tri-Rail Station at the I-95/Sheridan Street Interchange.

**Van-Pool/Car-Pool** – The FDOT offers a regional commuter assistance program, the South Florida Commuter Services (SFCS) Program, to promote alternatives to drive-alone commuting. SFCS includes car-pool (for 2-4 people) and van-pool (7-12 people) programs. These car-pool and van-pool services use daily the park and ride facilities within the I-95 study corridor.

**Park and Ride Facilities** – Within the study limits, there is one Park and Ride lot located at the Hollywood Boulevard Tri-Rail Station.

**Multimodal/Intermodal Facilities** – A multimodal facility is any facility which combines two or more modes of travel, for example from bus to airplane, or from ship to rail. Within the study limits there is one intermodal facility located at the Hollywood Boulevard Tri-Rail Station (Taxi, Amtrak, Park and Ride).

**Private Passenger Services** – In addition to the public transportation modes noted above, Greyhound bus lines, a private passenger service, also serves the general I-95 project corridor area. The nearest bus terminal is located at the Sheridan Tri-Rail Station.

## 2.11 PAVEMENT CONDITION

The FDOT annually performs an evaluation of pavement referred to as a pavement condition survey. Each section of pavement is rated for cracking, ride, and rutting on a 0-10 scale: with 0 being the worst and 10 the best. If any of these categories falls under its respective critical value, the pavement is considered deficient. A crack rating of 6.4 or less is considered deficient. The minimum threshold for the ride criteria is 6.5 for speed limits greater than 45 MPH. For speed



limits less than or equal to 45 MPH, ride rating of 5.4 or less is considered deficient. Based on the FDOT's *Pavement Conditions Forecast Report* dated January 2018, the rated pavement conditions within the study area is summarized in **Table 2.8**.

**Table 2.8 – Pavement Condition Survey**

| Direction                      | Section BMP | Section EMP | 2019  |      |      |
|--------------------------------|-------------|-------------|-------|------|------|
|                                |             |             | Crack | Ride | Rut  |
| I-95 Mainline – Broward County |             |             |       |      |      |
| Northbound                     | 0.000       | 0.755       | 10.0  | 8.1  | 9.0  |
|                                | 0.755       | 3.100       | 10.0  | 8.2  | 9.0  |
| Southbound                     | 0.000       | 0.755       | 10.0  | 8.4  | 9.0  |
|                                | 0.755       | 3.100       | 9.0   | 8.6  | 9.0  |
| Hallandale Beach Boulevard     |             |             |       |      |      |
| Eastbound                      | 2.235       | 3.568       | 10.0  | 6.1  | 9.0  |
| Westbound                      | 2.235       | 3.568       | 9.0   | 6.0  | 9.0  |
| Pembroke Road                  |             |             |       |      |      |
| Eastbound                      | 4.760       | 6.097       | 10.0  | 7.3  | 10.0 |
| Westbound                      | 4.760       | 6.097       | 9.0   | 6.6  | 10.0 |
| Hollywood Boulevard            |             |             |       |      |      |
| Eastbound                      | 16.042      | 16.807      | 8.5   | 6.8  | 10.0 |
| Westbound                      | 16.042      | 16.807      | 6.0   | 6.0  | 9.0  |

**BMP** – Begin Mile Post

**EMP** – End Mile Post

Based on **Table 2.8**, the project corridor pavement conditions are within acceptable thresholds except for the crack rating of westbound Hollywood Boulevard.

## 2.12 TRAFFIC VOLUMES AND OPERATIONAL CONDITIONS

### 2.12.1 DATA COLLECTION

FDOT collected 2016 traffic data prior to the PD&E Study. The collected traffic data documentation included the following information:

- Traffic data collection efforts
- Existing conditions peak-hour arterial traffic volumes
- Existing conditions peak-hour interchange ramp traffic volumes
- Existing conditions peak-hour interstate mainline traffic volumes (combined express lane and general use lane)
- Existing conditions AADT interstate mainline volumes
- Existing conditions AADT arterials volumes



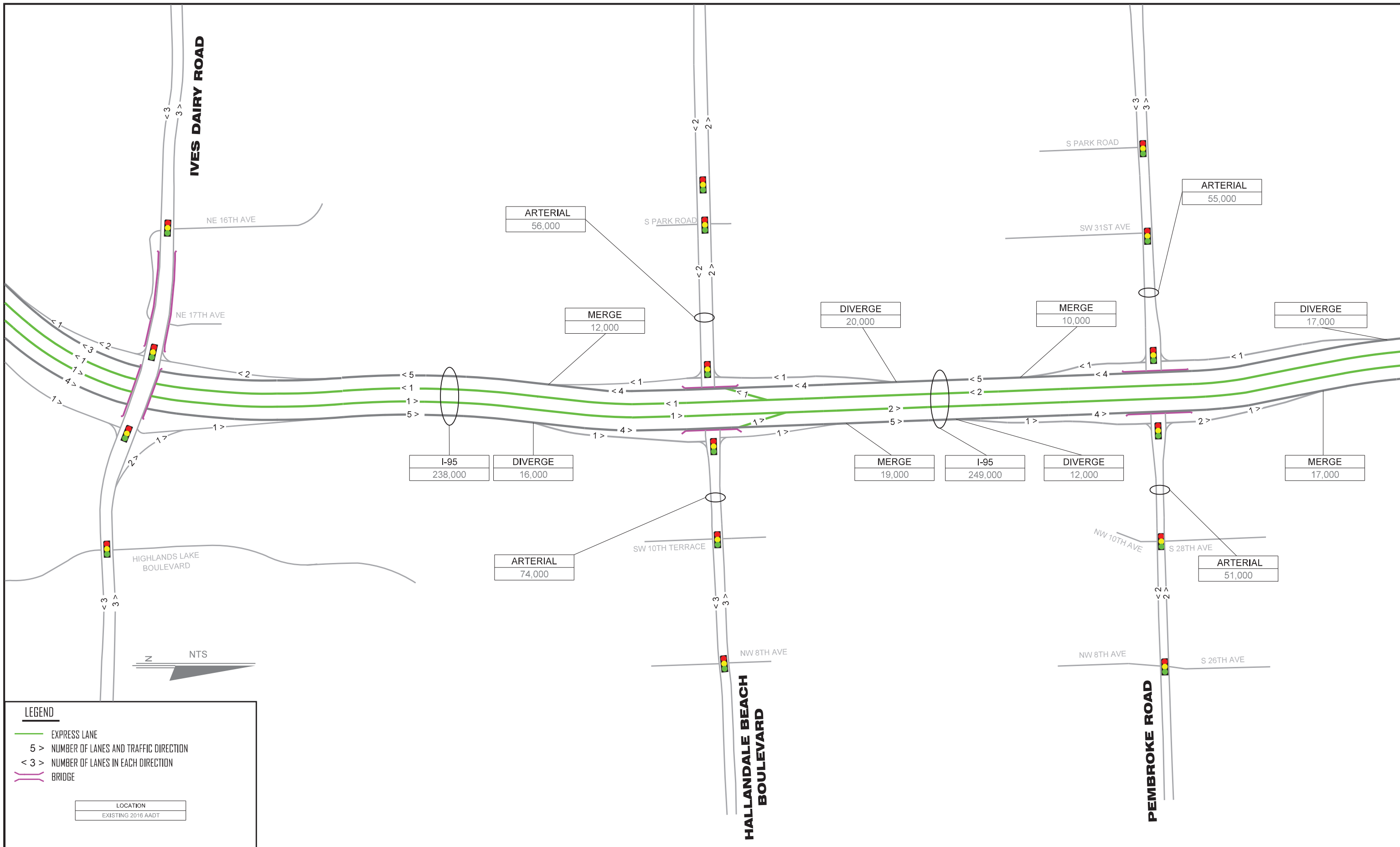
Traffic data from the following sources were obtained during the PD&E Study:

- Telemetered Traffic Monitoring Site (TTMS)
- SunGuide Intelligent Transportation System (ITS)
- Regional Integrated Transportation Information System (RITIS)
- 2015 and 2016 Florida Traffic Information (FTI)

A TTMS dataset received from FDOT included traffic volume data from two TTMS locations (Station ID #862493, and Station ID #862499) for February 15, 2015. These stations were located along I-95 near Davie Boulevard and Sunrise Boulevard, respectively. SunGuide ITS was another data source used for the analysis. This dataset was received from FDOT and had traffic volume data for the January - February 2017 period for northbound traffic only. Because the TTMS and SunGuide ITS traffic data locations were outside the PD&E Study limits and the SunGuide data did not have the southbound traffic volumes, neither of these data sets was utilized in the analysis. Traffic data from RITIS was obtained for the period of January 1 to February 28, 2017.

Seasonal factors and volumes were reviewed for volume development and checks using the 2015 and 2016 FTI (TTMS sites #86-0331 and #86-0384). This effort was completed and documented in the FDOT 2016 traffic data collection efforts prior to the PD&E Study. The existing truck factors along Hallandale Beach Boulevard range between 4.17 – 8.94%, along Pembroke Road between 3.50 – 9.07%, along Hollywood Boulevard between 2.12 – 7.04%, and 5.9% along I-95.

Existing intersection and ramp traffic data were collected from March to April 2016 on typical weekdays (Tuesday, Wednesday, and Thursday). Due to construction activity south of Hallandale Beach Boulevard along I-95, mainline traffic counts were not collected. Traffic data obtained from the I-95 station north of Hallandale Beach Boulevard (TTMS Site: #86-0331) was used as anchor point for the I-95 mainline traffic volume development. Existing AADT volumes are summarized in **Figure 2.5**. Peak-hour traffic volumes and intersection turning movement volumes are summarized in **Figure 2.6** and **Figure 2.7**. The mainline existing peak-hour volumes documented along I-95 combined the express lanes and general use lanes traffic.



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DISTRICT FOUR  
3400 WEST COMMERCIAL BOULEVARD  
FORT LAUDERDALE, FL 33309

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**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: I4254

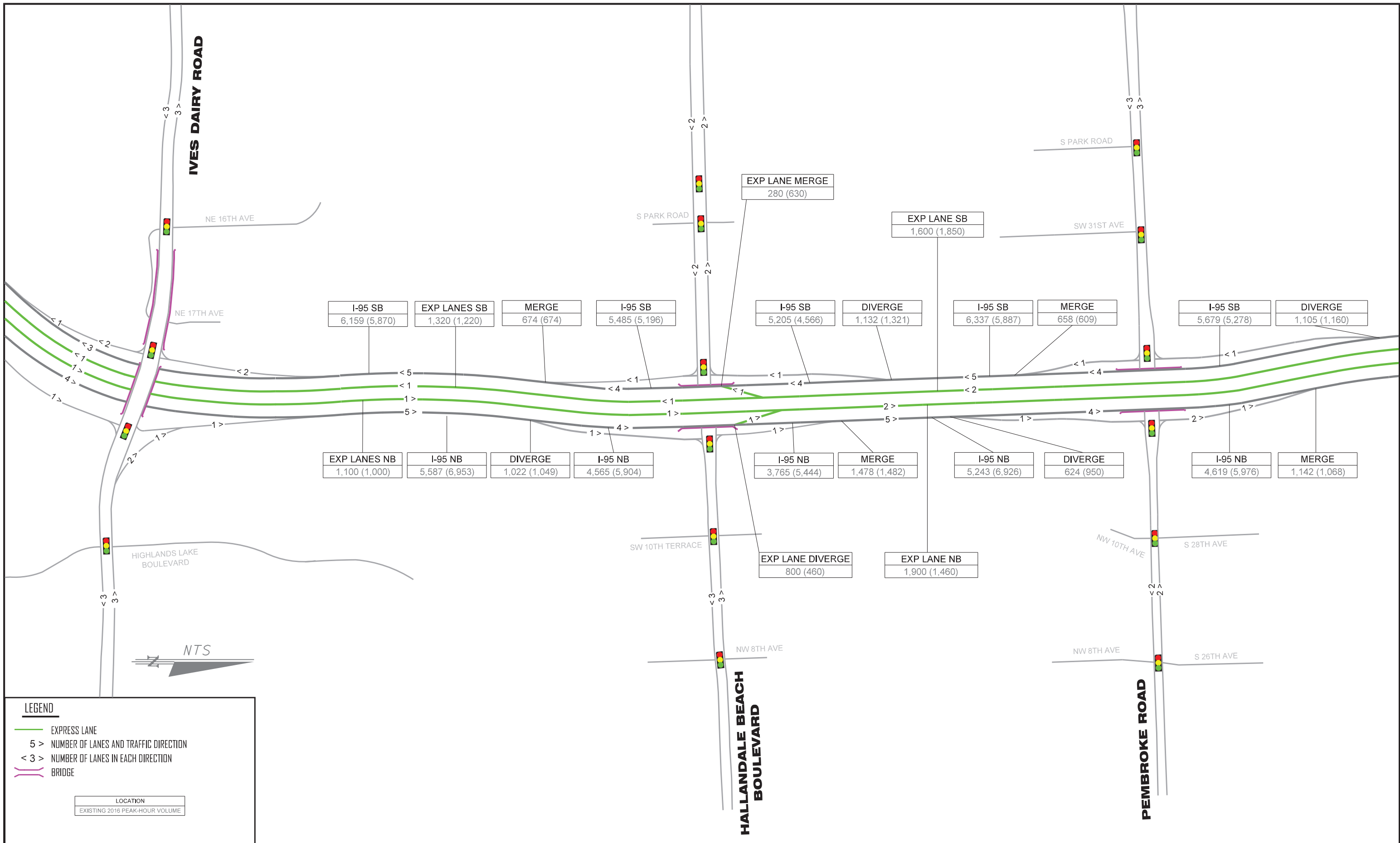
2016 ANNUAL AVERAGE DAILY TRAFFIC (AADT) VOLUMES

FIGURE  
2.5

2-23







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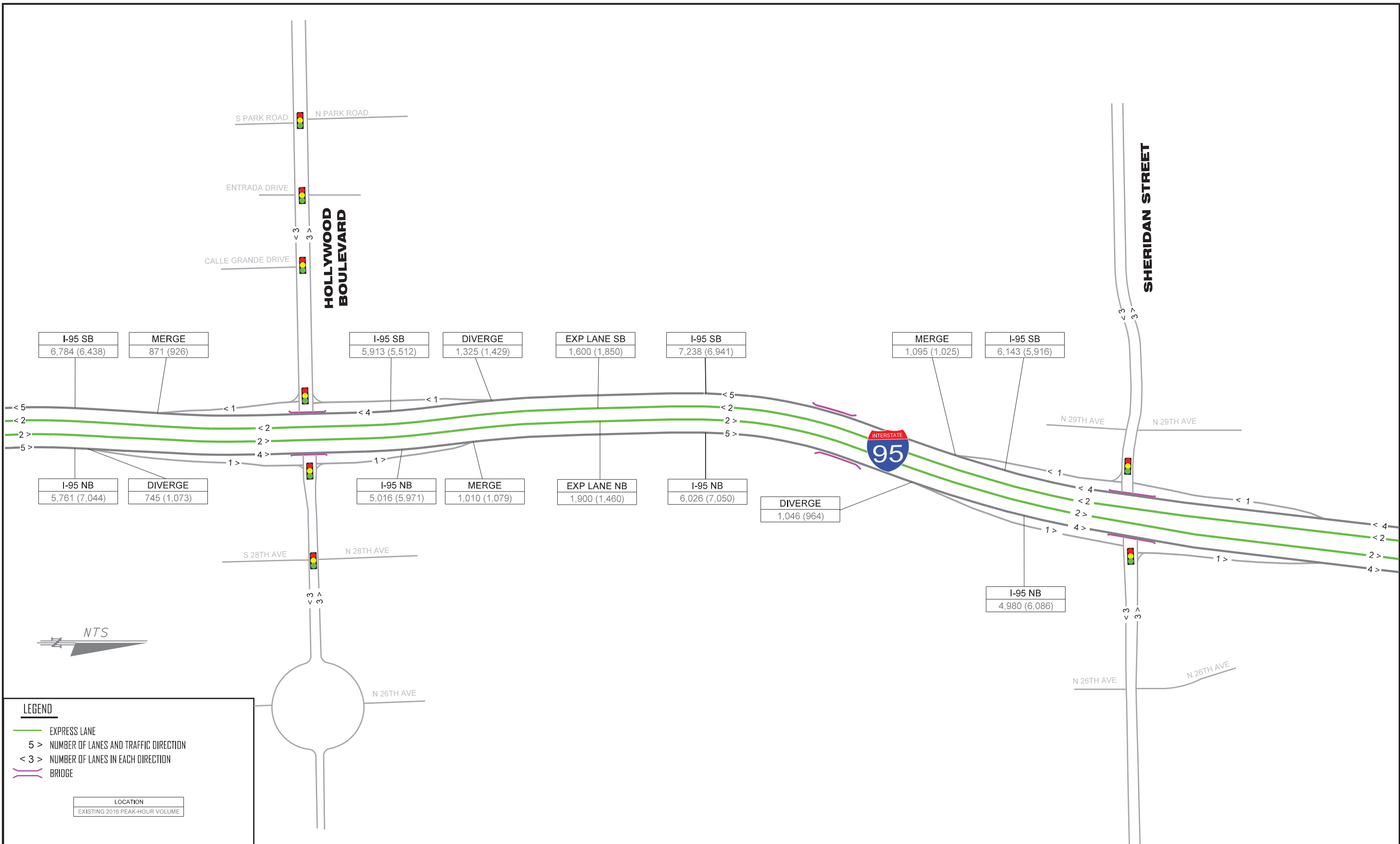


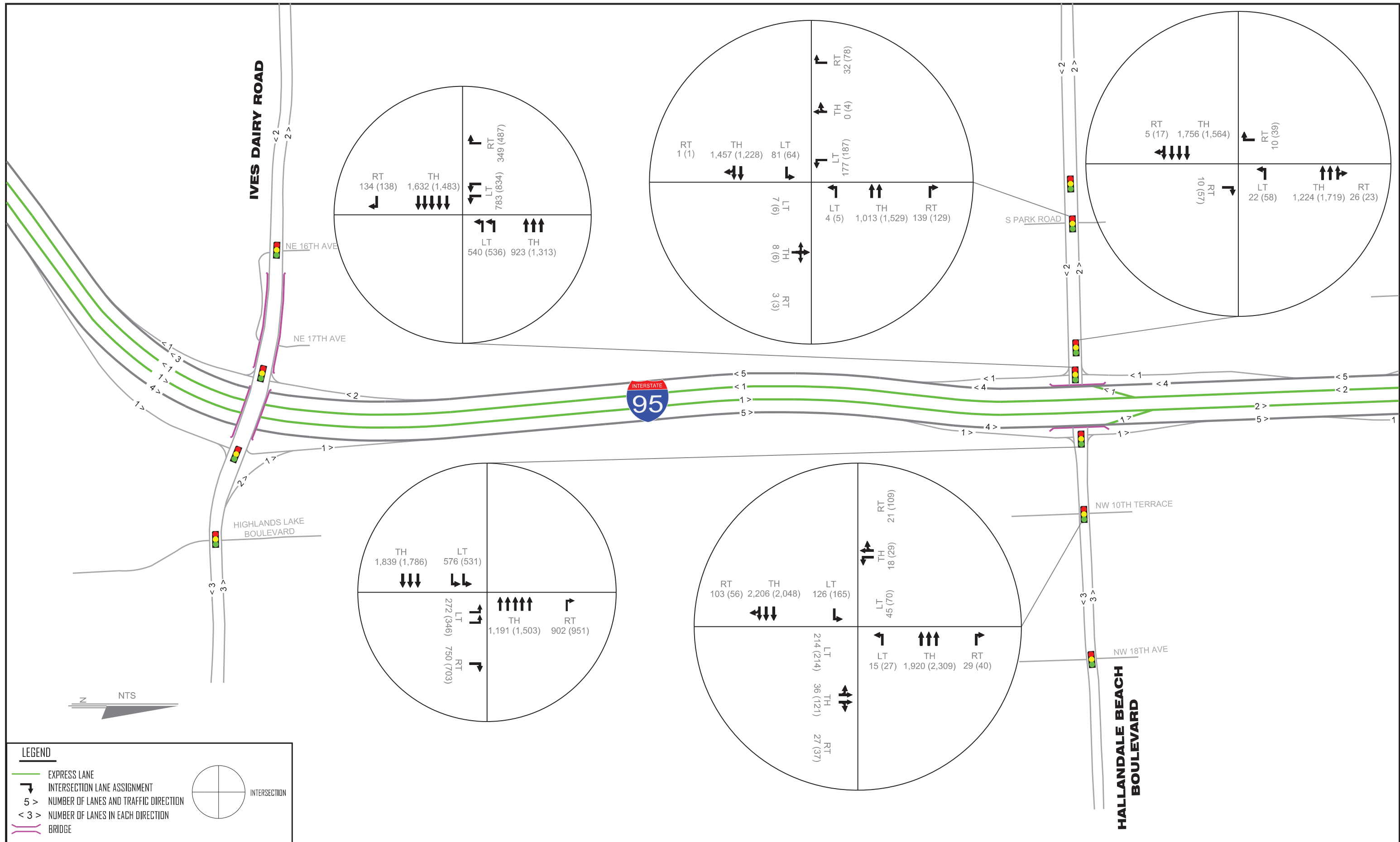
**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
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FPID No.: 436903-I-22-02  
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2016 I-95 PEAK-HOUR VOLUMES

FIGURE  
2.6

2-25





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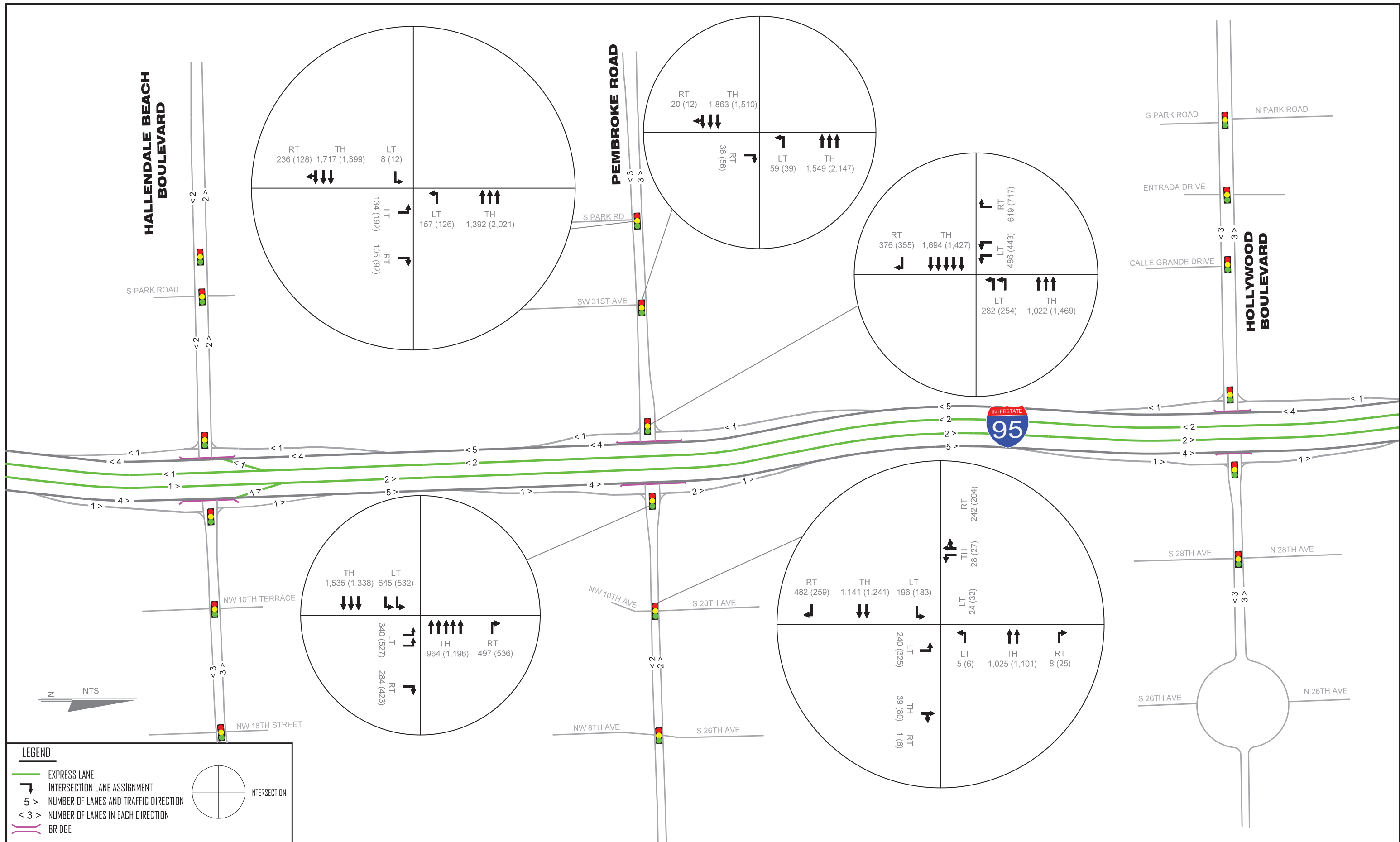


**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
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2016 INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE  
2.7

2-27



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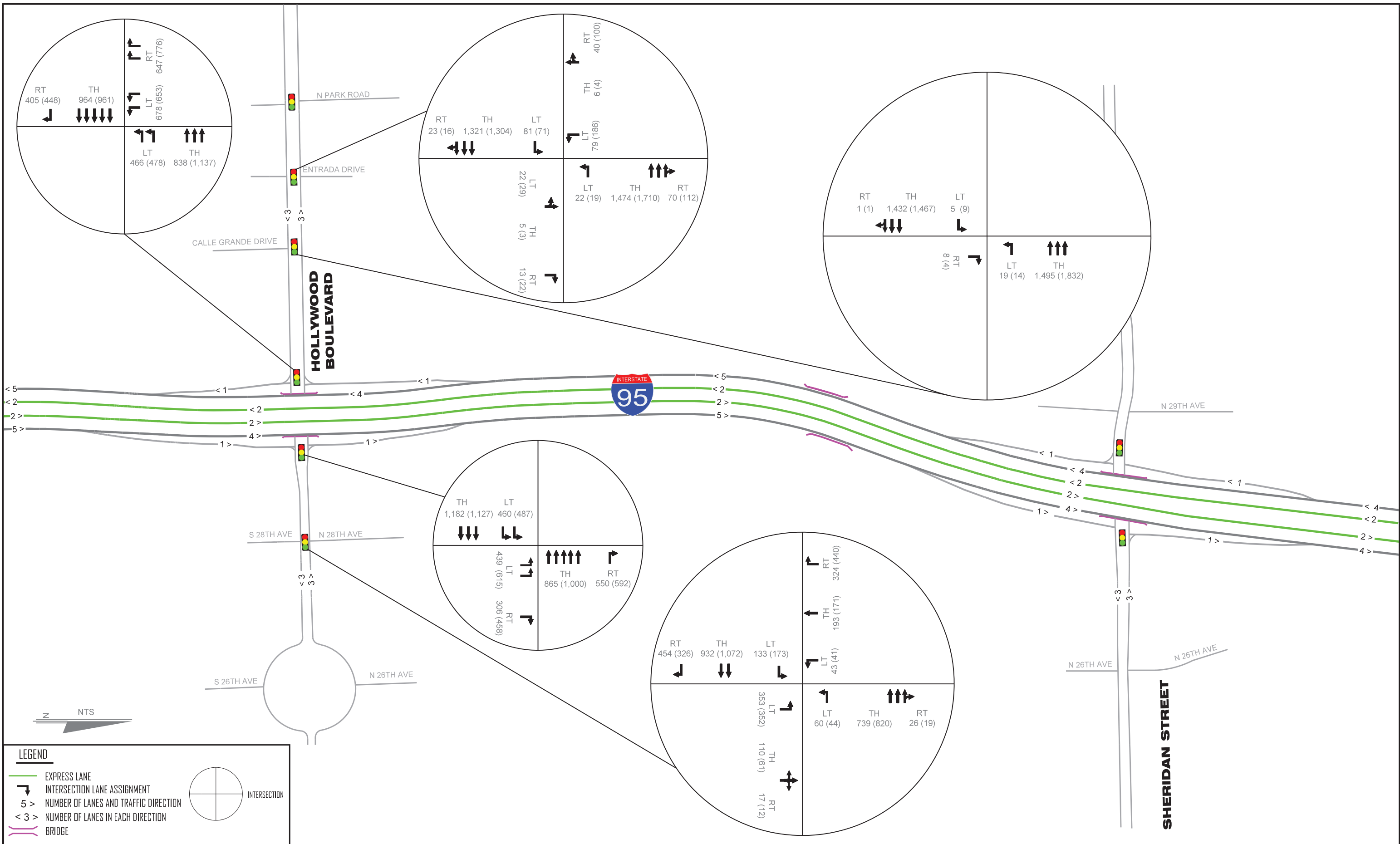


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from South of Hallendale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: I4254

2016 INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE  
2.7

2-28





## 2.12.2 TRAFFIC OPERATIONAL ANALYSIS

The information presented in this section is a summary of the traffic operational analysis conducted as part of this PD&E Study.

The Highway Capacity Manual (HCM), 2010 Edition, as well as the Highway Capacity Software Version 6.6 (HCS) and Synchro/SimTraffic Version 9.0 were used for the operational analysis. Operational analyses were performed on mainline segments, ramp merge/diverge junctions, weaving sections, and ramp terminals. The HCS was used for the interstate mainline segments, ramp merge/diverge junctions and weaving sections. Synchro was used for the evaluation of the intersections and arterial segments. This software uses the methodology of the HCM to determine intersection/arterial capacity and LOS.

The I-95 freeway segments were analyzed as a single facility to accommodate the effects of the adjacent interchanges and the express lane facility. Due to the proximity of the Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard interchanges, each of the interchanges has an influence on the adjacent interchanges. Also, the presence of express lane ingress and egress access points makes it difficult to investigate the performance of facilities independently.

Based on the HCM 2010 methodology, the maximum length over which weaving movements may exist is greater than the actual distance for the segment between Hallandale Beach Boulevard and Pembroke Road, the segment between Pembroke Road and Hollywood Boulevard, and the segment between Pembroke Road and Sheridan Street, respectively. Therefore, these segments were treated as weaving segments. In accordance with the approved Methodology Letter of Understanding (MLOU), speed, density and LOS of each freeway facility were included as measures of effectiveness (MOEs).

The mainline/basic, weaving, and ramp merge/diverge analysis results for the northbound and southbound directions are summarized in **Table 2.9**, **Table 2.10**, and in **Figure 2.8**.



**Table 2.9 – 2016 Existing Northbound Freeway Analysis Results**

| #  | I-95 Northbound Segment<br>2016 Existing                              | Analysis<br>Type | No. of<br>Lanes | Demand vph<br>AM(PM) | Freeway            | Ramp        | Density<br>(pc/mi/ln) | LOS          |
|----|-----------------------------------------------------------------------|------------------|-----------------|----------------------|--------------------|-------------|-----------------------|--------------|
|    |                                                                       |                  |                 |                      | V/C Ratio          |             |                       |              |
| 19 | Sheridan Street Off-Ramp                                              | Diverge          | 1               | 1,046 (964)          | -                  | 0.50 (0.46) | -                     | -            |
| 18 | Hollywood Boulevard On-Ramp to<br>Sheridan Street Off-Ramp            | Weave            | 5               | 6,026 (7,050)        | 0.80 (0.79)        | -           | 29.1 (30.6)           | D (D)        |
| 17 | Hollywood Boulevard On-Ramp                                           | Merge            | 1               | 1,010 (1,079)        | -                  | 0.48 (0.51) | -                     | -            |
| 16 | Hollywood Boulevard Off-Ramp to<br>Hollywood Boulevard On-Ramp        | Basic            | 4               | 5,016 (5,971)        | 0.62 (0.67)        | -           | 23.5 (23.3)           | C (C)        |
| 15 | Hollywood Boulevard Off-Ramp                                          | Diverge          | 1               | 745 (1,073)          | -                  | 0.35 (0.51) | -                     | -            |
| 14 | Pembroke Road On-Ramp to<br>Hollywood Boulevard Off-Ramp              | Weave            | 5               | 5,761 (7,044)        | 0.70 (0.82)        | -           | 25.4 (31.1)           | C (D)        |
| 13 | Pembroke Road On-Ramp                                                 | Merge            | 1               | 1,142 (1,068)        | -                  | 0.54 (0.51) | -                     | -            |
| 12 | Pembroke Road Off-Ramp to On-<br>Ramp                                 | Basic            | 4               | 4,619 (5,976)        | 0.52 (0.67)        | -           | 18.7 (23.4)           | C (C)        |
| 11 | Pembroke Road Off-Ramp                                                | Diverge          | 1               | 624 (950)            | -                  | 0.30 (0.45) | -                     | -            |
| 10 | Hallandale Beach Boulevard On-<br>Ramp to Pembroke Road Off-Ramp      | Weave            | 5               | 5,243 (6,926)        | 0.77 (0.93)        | -           | 23.7(32.2)            | C (D)        |
| 9  | Hallandale Beach Boulevard On-<br>Ramp                                | Merge            | 1               | 1,478 (1,482)        | -                  | 0.70 (0.71) | -                     | -            |
| 8  | Express Lane Ingress to Hallandale<br>Beach Boulevard On-Ramp         | Basic            | 4               | 3,765 (5,444)        | 0.40 (0.58)        | -           | -                     | -            |
| 7  | Express Lane North of Hallandale<br>Beach Boulevard                   | Basic            | 2               | 1,900 (1,460)        | 0.46 (0.36)        | -           | -                     | -            |
| 6  | Express Lane Ingress                                                  | Diverge          | 1               | 800 (460)            | 0.52 (0.65)        | 0.39 (0.22) | 15.3 (18.0)           | B (B)        |
| 5  | Hallandale Beach Blvd Off-Ramp to<br>Express Lane Ingress             | Basic            | 4               | 4,565 (5,904)        | 0.52 (0.67)        | -           | 18.6 (23.0)           | C (C)        |
| 4  | Hallandale Beach Boulevard Off-<br>Ramp                               | Diverge          | 1               | 1,022 (1,049)        | -                  | 0.49 (0.50) | -                     | -            |
| 3  | Ives Dairy Road On-Ramp to<br>Hallandale Beach Boulevard Off-<br>Ramp | Weave            | 5               | 5,587 (6,953)        | 0.99 <b>(1.08)</b> | -           | 25.8 (45.0)           | C <b>(F)</b> |
| 2  | Express Lane South of Hallandale<br>Beach Boulevard                   | Basic            | 1               | 1,100 (1,000)        | 0.65 (0.59)        | -           | -                     | -            |
| 1  | Ives Dairy Road On-Ramp                                               | Merge            | 1               | 1,923 (1,859)        | -                  | 0.92 (0.89) | -                     | -            |

# - segment number

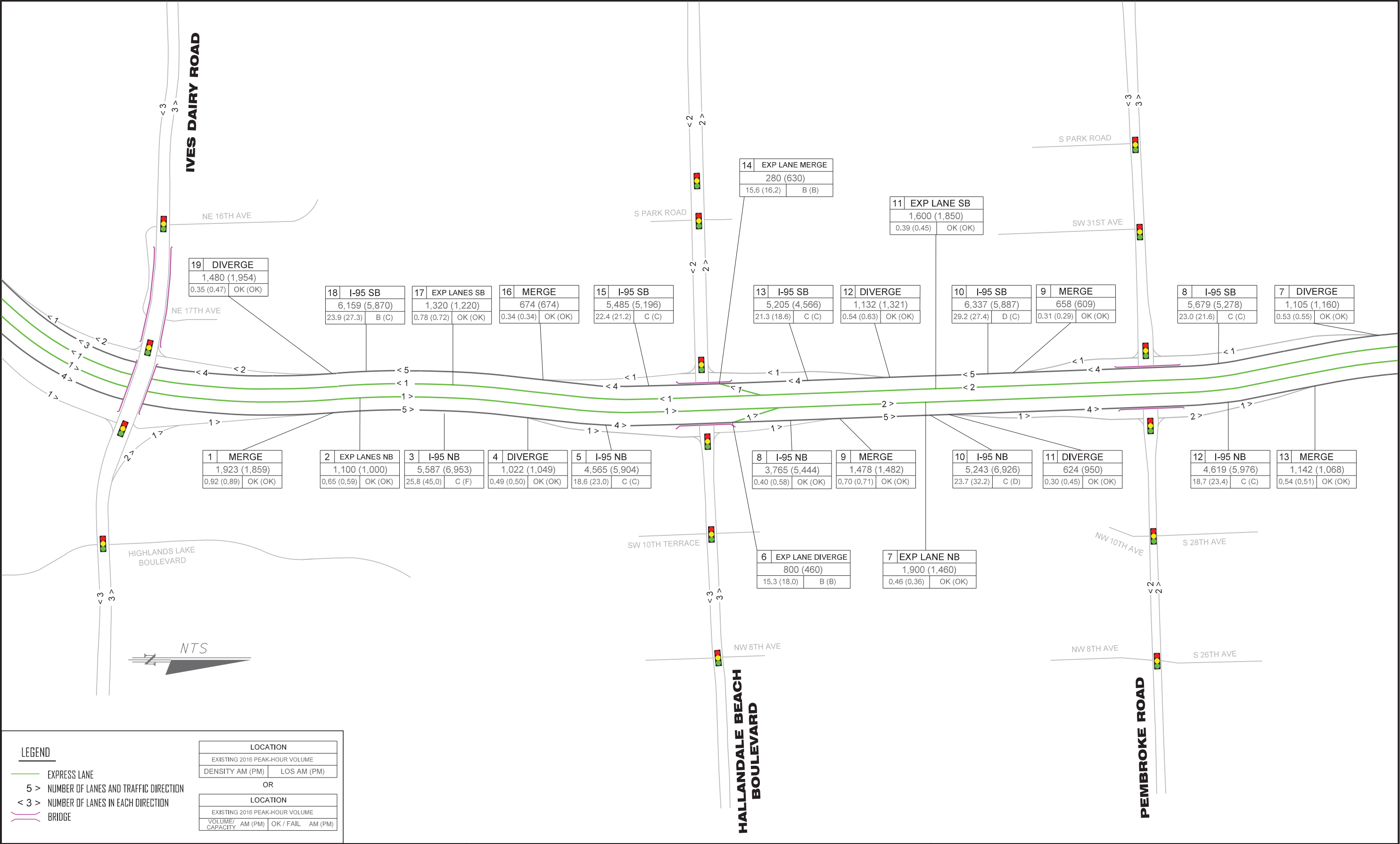




**Table 2.10 – 2016 Existing Southbound Freeway Analysis Results**

| #  | I-95 Southbound Segment<br>2016 Existing                              | Analysis<br>Type | No. of<br>Lanes | Demand vph<br>AM(PM) | Freeway     | Ramp        | Density<br>(pc/mi/ln) | LOS   |
|----|-----------------------------------------------------------------------|------------------|-----------------|----------------------|-------------|-------------|-----------------------|-------|
|    |                                                                       |                  |                 |                      | V/C Ratio   |             |                       |       |
| 1  | Sheridan Street On-Ramp                                               | Merge            | 1               | 1,095 (1,025)        | -           | 0.52 (0.49) | -                     | -     |
| 2  | Sheridan Street On-Ramp to<br>Hollywood Boulevard Off-Ramp            | Weave            | 5               | 7,238 (6,941)        | 0.87 (0.90) | -           | 26.9 (32.6)           | C (D) |
| 3  | Hollywood Boulevard Off-Ramp                                          | Diverge          | 1               | 1,325 (1,429)        | -           | 0.63 (0.68) | -                     | -     |
| 4  | Hollywood Boulevard Off-Ramp to<br>Hollywood Boulevard On-Ramp        | Basic            | 4               | 5,913 (5,512)        | 0.66 (0.62) | -           | 24.0 (22.5)           | C (C) |
| 5  | Hollywood Boulevard On-Ramp                                           | Merge            | 1               | 871 (926)            |             | 0.41 (0.44) | -                     | -     |
| 6  | Hollywood Boulevard On-Ramp to<br>Pembroke Road Off-Ramp              | Weave            | 5               | 6,784 (6,438)        | 0.74 (0.77) | -           | 30.7 (29.5)           | D (D) |
| 7  | Pembroke Road Off-Ramp                                                | Diverge          | 1               | 1,105 (1,160)        | -           | 0.53 (0.55) | -                     | -     |
| 8  | Pembroke Road Off-Ramp to<br>On-Ramp                                  | Basic            | 4               | 5,679 (5,278)        | 0.63 (0.60) | -           | 23.0 (21.6)           | C (C) |
| 9  | Pembroke Road On-Ramp                                                 | Merge            | 1               | 658 (609)            | -           | 0.31 (0.29) | -                     | -     |
| 10 | Pembroke Road On-Ramp to<br>Hallandale Beach Boulevard<br>Off-Ramp    | Weave            | 5               | 6,337 (5,887)        | 0.69 (0.73) | -           | 29.2 (27.4)           | D (C) |
| 11 | Express Lane North of Hallandale<br>Beach Boulevard                   | Basic            | 2               | 1,600 (1,850)        | 0.39 (0.45) | -           | -                     | -     |
| 12 | Hallandale Beach Boulevard<br>Off-Ramp                                | Diverge          | 1               | 1,132 (1,321)        | -           | 0.54 (0.63) | -                     | -     |
| 13 | Hallandale Beach Blvd Off-<br>Ramp to Express Lane Ingress            | Basic            | 4               | 5,205 (4,566)        | 0.59 (0.52) | -           | 21.3 (18.6)           | C (C) |
| 14 | Express Lane Ingress                                                  | Merge            | 1               | 280 (630)            | 0.62 (0.59) | 0.14 (0.30) | 15.6 (16.2)           | B (B) |
| 15 | Express Lane Ingress to<br>Hallandale Beach Boulevard<br>On-Ramp      | Basic            | 4               | 5,485 (5,196)        | 0.62 (0.59) | -           | 22.4 (21.2)           | C (C) |
| 16 | Hallandale Beach Boulevard<br>On-Ramp                                 | Merge            | 1               | 674 (674)            | -           | 0.34 (0.34) | -                     | -     |
| 17 | Express Lane South of<br>Hallandale Beach Boulevard                   | Basic            | 1               | 1,320 (1,220)        | 0.78 (0.72) | -           | -                     | -     |
| 18 | Hallandale Beach Boulevard<br>On-Ramp to Ives Dairy Road Off-<br>Ramp | Weave            | 5               | 6,159 (5,870)        | 0.56 (0.96) | -           | 23.9 (27.3)           | B (C) |
| 19 | Ives Dairy Road Off-Ramp                                              | Diverge          | 2               | 1,480 (1,954)        | -           | 0.35 (0.47) | -                     | -     |

# - segment number



**LEGEND**

EXPRESS LANE

5 > NUMBER OF LANES AND TRAFFIC DIRECTION

< 3 > NUMBER OF LANES IN EACH DIRECTION

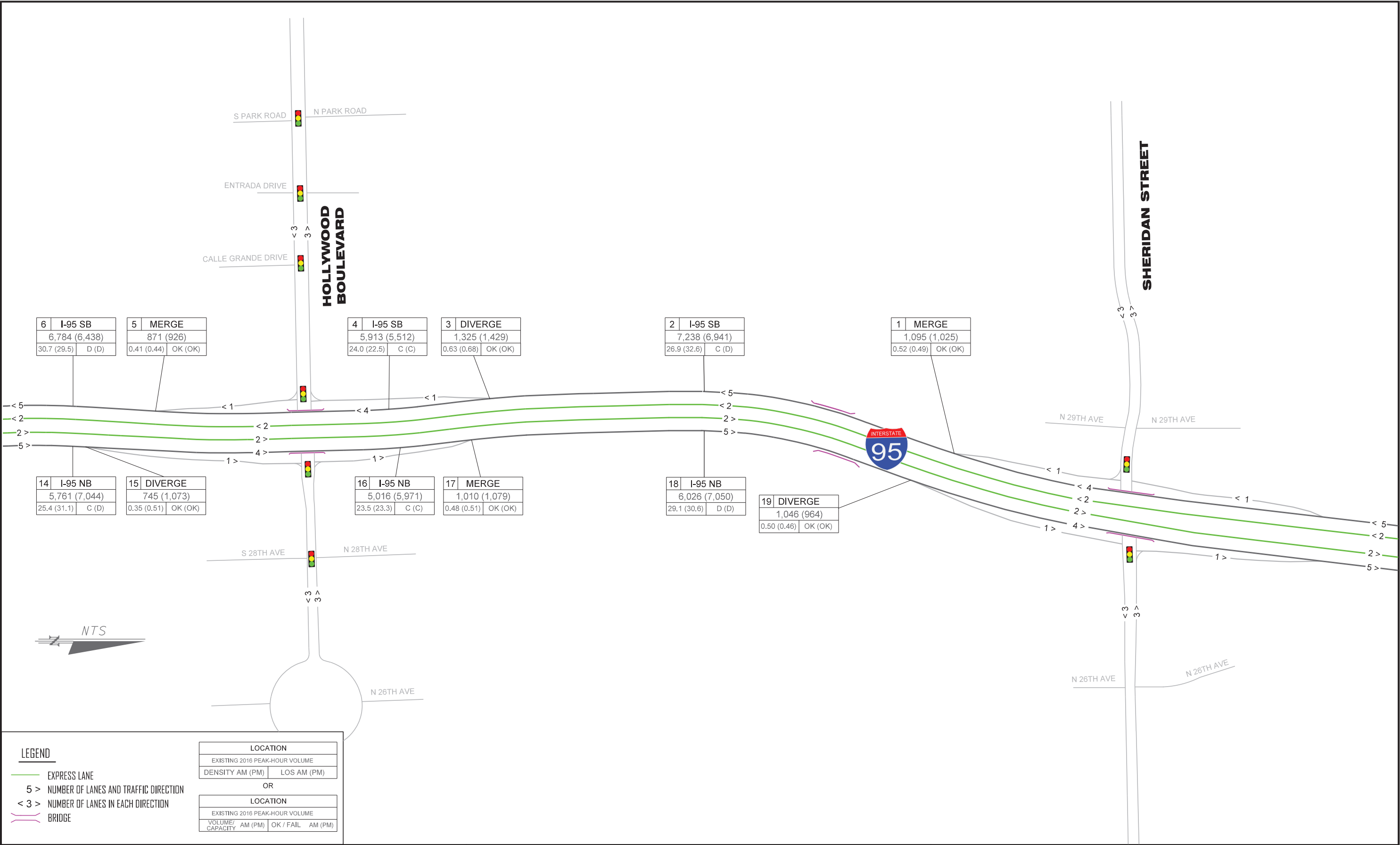
BRIDGE

| LOCATION                       |  |             |  |
|--------------------------------|--|-------------|--|
| EXISTING 2016 PEAK-HOUR VOLUME |  |             |  |
| DENSITY AM (PM)                |  | LOS AM (PM) |  |

OR

| LOCATION                       |         |           |         |
|--------------------------------|---------|-----------|---------|
| EXISTING 2016 PEAK-HOUR VOLUME |         |           |         |
| VOLUME/                        | AM (PM) | OK / FAIL | AM (PM) |
| CAPACITY                       |         |           |         |





FLORIDA DEPARTMENT OF TRANSPORTATION  
DISTRICT FOUR  
3400 WEST COMMERCIAL BOULEVARD  
FORT LAUDERDALE, FL 33309

JANUARY 2021



**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: 14254

2016 EXISTING YEAR  
OPERATIONAL ANALYSIS RESULTS

FIGURE  
2.8  
2-34



**Basic Freeway Analysis** – The freeway mainline, within the study limits, was divided into segments for the purpose of evaluating each segment for the existing conditions. The capacity analysis shows that all basic freeway segments are currently operating at an acceptable LOS D or better except for the I-95 northbound segment between Ives Dairy Road on-ramp and Hallandale Beach Boulevard off-ramp. This segment is operating at LOS F in the PM peak-hour.

**Micro-Simulation** – The existing year traffic operations micro-simulation models were calibrated to replicate the observed traffic conditions. Traffic congestion is experienced for several hours of the day within the study area due to high traffic volume on the I-95 ramps and congestion from outside the study area for extended periods of the day. Peak direction during the AM peak period is southbound, while the peak direction during the PM peak period is northbound. The following traffic conditions are typical for average weekday AM and PM peak periods in the existing year.

**AM Peak Period** – The I-95 AM peak direction of flow is southbound. The AM peak period is 6:00 AM to 10:00 AM. Simulation included a 30-minute seed time. Hour 1 is considered a pre-peak-hour, Hour 2 is the peak-hour, and Hours 3 and 4 are the post-peak hours. Therefore, the simulation duration is 4.5 hours. Congestion tends to form during the AM peak period on I-95 southbound south of the Ives Dairy Road off-ramp. In addition, congestion occurs northbound on the northern portion of the corridor north of Sheridan Street, which is considered outside the project area.

**PM Peak Period** – The PM peak period is 3:00 PM to 7:00 PM. The simulation hours breakdown is the same as the AM peak with a simulation duration of 4.5 hours. The PM peak period is generally the reversal of the AM peak period in terms of directionality. The northbound direction is the peak direction of flow during the PM peak. However, major congestion is evident on I-95 southbound at the Ives Dairy Road off-ramp and south of the Ives Dairy Road interchange outside of the project area. This congestion is a result of capacity constraints at Ives Dairy Road as well as spillback from interchanges further south of the project area. Congestion from the Ives Dairy Road southbound off-ramp spillbacks onto the mainline and impacts traffic operations at the upstream interchanges.

A major north-south railroad corridor exists within the project area with three at-grade crossings and a railroad station. The railroad corridor is located to the west



of I-95. The at-grade crossings are located at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. The Tri-Rail Station is located at Hollywood Boulevard. To accurately simulate the train activities during both peak periods, the Tri-Rail train schedule was obtained and cross-referenced with the *2016 Railroad Grade Crossing Data Collection and Analysis Report* to determine at what times the train stops at the Hollywood Boulevard Tri-Rail Station during the peak periods. Using an average transit speed of 40 mph, it was determined that the train takes approximately two minutes and 58 seconds to reach the station from the southbound entry link and approximately seven minutes and 53 seconds from the northbound entry link. The time at which the train stops at the station along with the time it takes for the train to travel from the entry link to the Hollywood Boulevard Station and the simulation start time was used to back calculate the time the train should enter the network in order to arrive at the station according to schedule. This process was done for both the northbound and southbound trains for both peak periods. According to the data obtained from the aforementioned report, the average time the train remains at the station is approximately 27 seconds. Therefore, a dwell time of 30 seconds was used.

Information regarding the gate closure durations was also obtained from the aforementioned report and used to estimate the average duration for the gates to remain closed at the at-grade crossings. To simulate the at-grade crossings, signal control elements were placed in the model to replicate the gate closures. The gate closure duration along with the train speed was then used to calculate the distance in which the detector must be placed on the railroad corridor to allow for the needed gate closure time at each at-grade crossing in both directions. Pre-emption data from the signal timing plans was also referenced to determine the correct phases for track clear, dwell, and return for each at-grade crossing and corresponding interchange.

Additional traffic micro-simulation information can be found in the *Systems Interchange Modification Report (SIMR)*, a companion document to this PD&E Study.



## 2.13 INTERSECTION LAYOUT AND TRAFFIC CONTROL

Within the study limits, there are three interchanges. All interchanges have a conventional diamond configuration. The interchanges provide system-to-service connections to and from three major arterial/collector facilities.

There are 16 signalized intersections within the area of influence along the arterials. These intersections are listed below:

1. Hallandale Beach Boulevard/Park Road/1<sup>st</sup> Street
2. Hallandale Beach Boulevard/SW 30<sup>th</sup> Avenue
3. I-95/Hallandale Beach Boulevard southbound Ramp Terminal
4. I-95/Hallandale Beach Boulevard northbound Ramp Terminal
5. Hallandale Beach Boulevard/10<sup>th</sup> Terrace
6. Pembroke Road/Park Road
7. Pembroke Road/SW 31<sup>st</sup> Avenue
8. Pembroke Road/SW 30<sup>th</sup> Avenue
9. I-95/Pembroke Road southbound Ramp Terminal
10. I-95/Pembroke Road northbound Ramp Terminal
11. Pembroke Road/NW 10<sup>th</sup> Avenue/S 28<sup>th</sup> Avenue
12. Hollywood Boulevard /Entrada Drive
13. Hollywood Boulevard/Calle Grande Drive
14. I-95/Hollywood Boulevard southbound Ramp Terminal
15. I-95/Hollywood Boulevard northbound Ramp Terminal
16. Hollywood Boulevard/28<sup>th</sup> Avenue

**Intersection Analysis** – Intersection analysis for ramp terminals and adjacent intersections was performed at all interchanges using existing turning movement volumes, existing lane geometry, signal timing, other relevant information obtained from Broward County and field reviews. The data was input to the Synchro software to determine the LOS and delay based on HCM methodology. A summary of the results is presented in **Table 2.11** and in **Figure 2.9**.



Table 2.11 – 2016 Existing Intersection LOS and Delay Results

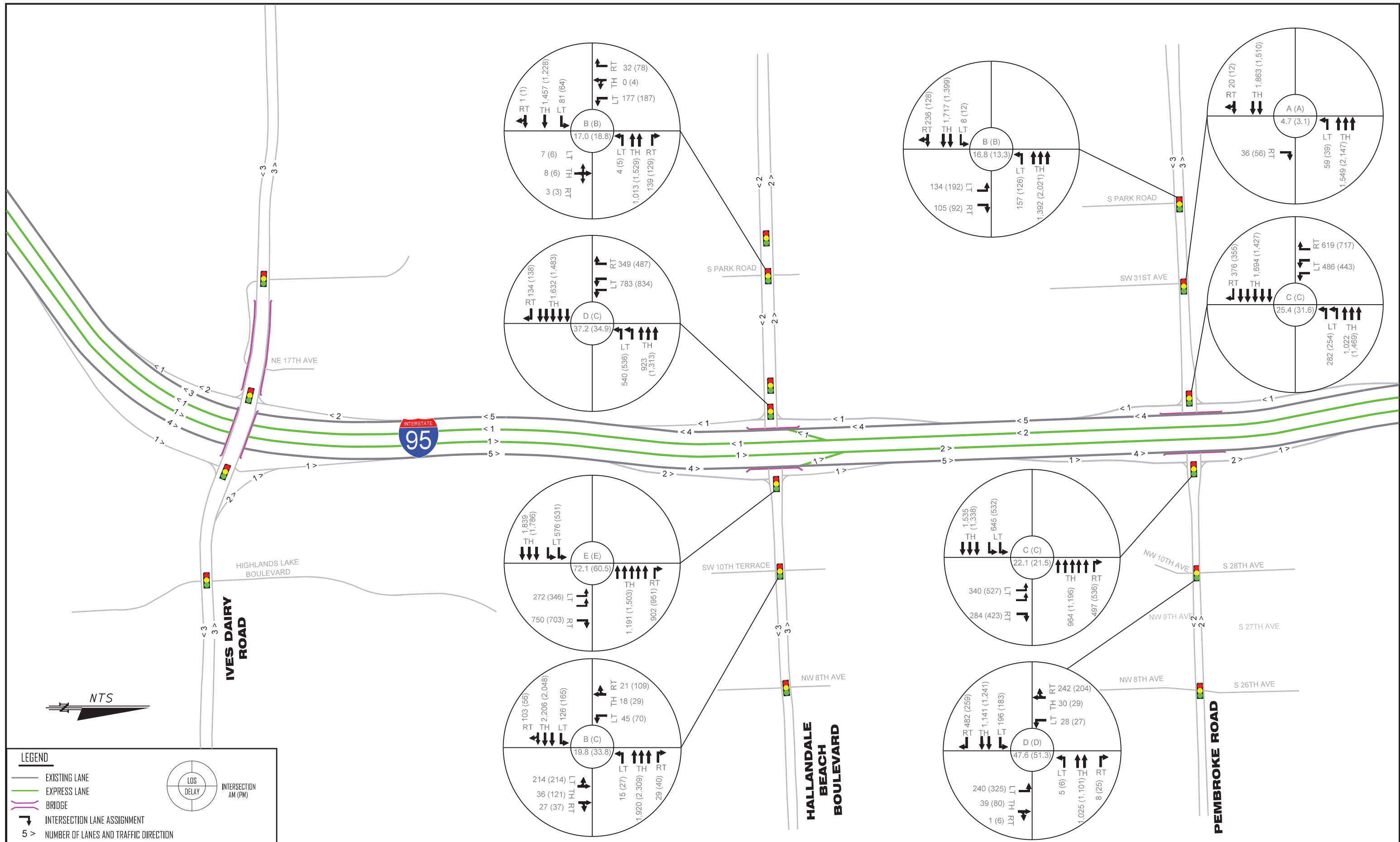
| Arterial                   | Intersection                  | AM            |     | PM            |     |
|----------------------------|-------------------------------|---------------|-----|---------------|-----|
|                            |                               | Delay (s/veh) | LOS | Delay (s/veh) | LOS |
| Hallandale Beach Boulevard | Park Road*                    | 17.0          | B   | 18.8          | B   |
|                            | I-95 Southbound Ramps*        | 37.2          | D   | 34.9          | C   |
|                            | I-95 Northbound Ramps*        | 72.1          | E   | 60.5          | E   |
|                            | NW 10th Terrace               | 19.8          | B   | 33.8          | C   |
| Pembroke Road              | Park Road*                    | 16.8          | B   | 13.3          | B   |
|                            | SW 31st Avenue*               | 4.7           | A   | 3.1           | A   |
|                            | I-95 Southbound Ramps*        | 25.4          | C   | 31.6          | C   |
|                            | I-95 Northbound Ramps*        | 22.1          | C   | 21.5          | C   |
|                            | NW 10th Avenue / 28th Avenue* | 47.6          | D   | 51.3          | D   |
| Hollywood Boulevard        | Entrada Drive                 | 7.2           | A   | 27.8          | C   |
|                            | Calle Grande Drive*           | 2.6           | A   | 2.2           | A   |
|                            | I-95 Southbound Ramps*        | 28.2          | C   | 33.6          | C   |
|                            | I-95 Northbound Ramps*        | 37.5          | D   | 37.1          | D   |
|                            | 28th Avenue*                  | 50.2          | D   | 57.2          | E   |

\*HCM 2000 results reported

**Intersection Analysis** – The capacity analysis shows that the following two intersections are currently operating at an unacceptable LOS (worst peak period LOS):

- Hallandale Beach Boulevard/ Northbound Ramp Terminal (LOS E-AM/PM)
- Hollywood Boulevard/ South 28<sup>th</sup> Street (LOS E-PM)





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JANUARY 2021

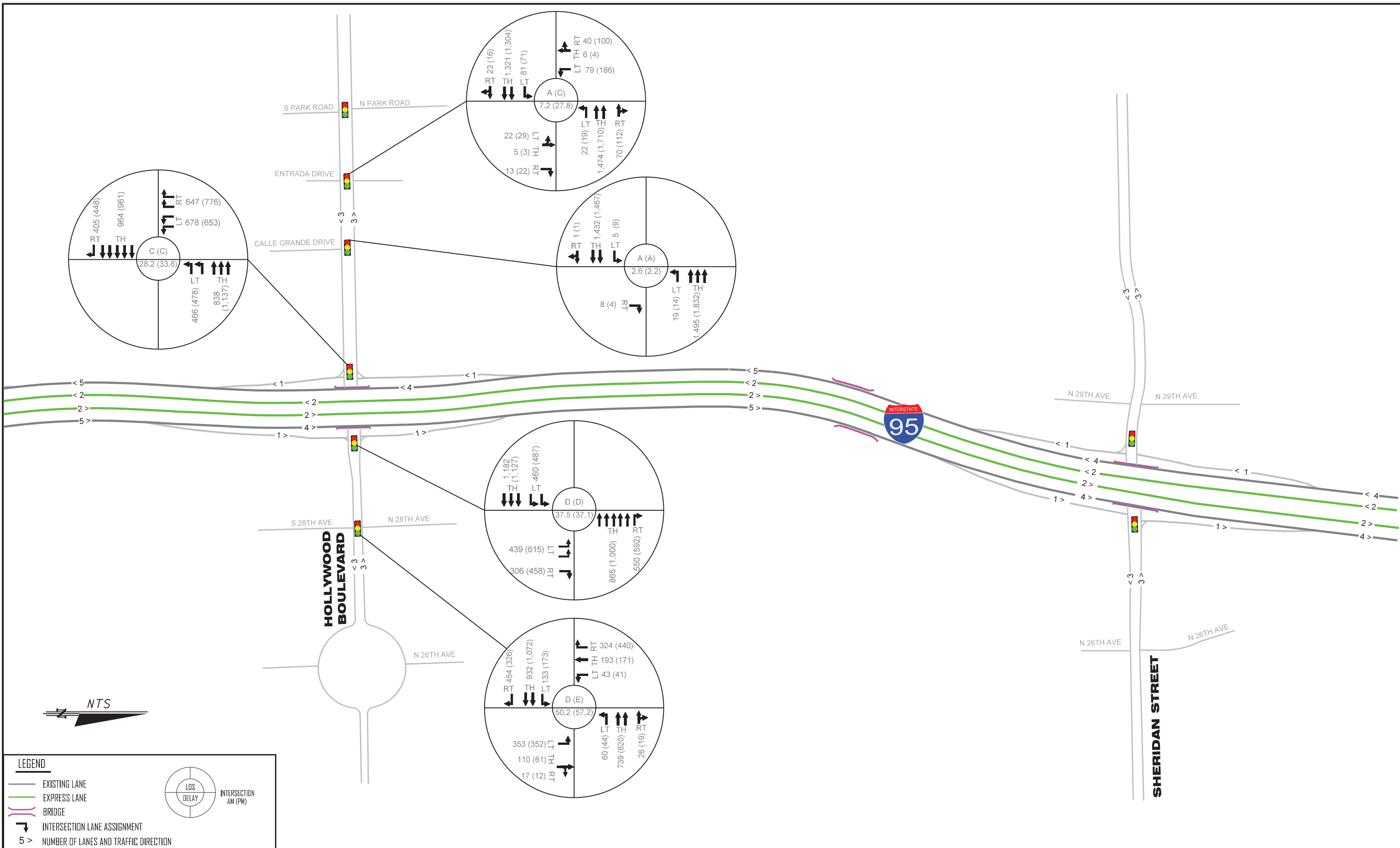


**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
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**2016 EXISTING YEAR**  
**INTERSECTION OPERATIONAL ANALYSIS RESULTS**

**FIGURE**  
**2.9**

**2-39**





## 2.14 RAILROAD CROSSING

The South Florida Rail Corridor is a dual railroad track that runs parallel to the west side of the I-95 project corridor. This railroad line is currently under the jurisdiction of the SFRTA and owned by the FDOT. It was formerly owned by CSX Transportation and continues to carry CSX freight trains. The SFRTA also operates the commuter rail service called Tri-Rail on these tracks. Within the study limits, there is one Tri-Rail station called Hollywood Boulevard Station, located in the northwest quadrant of the I-95/Hollywood Boulevard Interchange.

Amtrak also operates passenger trains on the South Florida Rail Corridor. North of the study limits, the Sheridan Amtrak Station is co-located with the Tri-Rail Station at the I-95/Sheridan Street Interchange.

## 2.15 CRASH DATA AND SAFETY ANALYSIS

The crash analysis efforts were completed by the FDOT Traffic Operations Office prior to the PD&E Study. Four separate Safety Studies were conducted covering I-95, Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard. More than five years of crash data was collected along I-95 due to the corridor being under construction as part of the I-95 Express Phase 2 project (pre-construction and during construction). Three years of crash data was collected along Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard as part of interim construction projects at each interchange, which had different timelines.

**I-95** – The I-95 Safety Study was completed in July 2017 between south of Hallandale Beach Boulevard (MP 0.408) and north of Hollywood Boulevard (MP 2.927). Crash data was obtained from the Department's Crash Analysis Reporting (CAR) system and organized into the periods of Pre-Construction (November 2008 – October 2011) and During Construction (November 2011 – December 2015) of the I-95 Express Lanes Phase 2 Project. A total of 2,805 crashes occurred within the study corridor between November 2008 and December 2015. These crashes included 1,250 injury crashes and eight fatal crashes. The total number of crashes increased During Construction. However, the proportion of injury crashes decreased during the same period. **Table 2.12** summarizes the number of crashes per year.



**Table 2.12 – Existing I-95 Crashes by Year**

| Year           | Crashes      |
|----------------|--------------|
| 2008 (Nov-Dec) | 53           |
| 2009           | 331          |
| 2010           | 303          |
| 2011           | 330          |
| 2012           | 480          |
| 2013           | 523          |
| 2014           | 480          |
| 2015           | 377          |
| <b>Total:</b>  | <b>2,805</b> |

Notable peak period crash locations are summarized below:

- Hollywood Boulevard southbound off-ramp – AM and PM peaks
- Hallandale Beach Boulevard southbound off and on-ramps – AM and PM peaks
- Pembroke Road southbound off and on-ramps – PM peak
- Hollywood Boulevard northbound on-ramp – PM peak
- Hallandale Beach Boulevard northbound off-ramp – AM and PM peaks

Overall, 56% of the crashes (1,573 crashes) occurred in the southbound direction and 44% of the crashes (1,232 crashes) occurred in the northbound direction. The most frequent crash types are rear-end (49%), sideswipe (24%), and lane departure crashes (17%). The lane departure crashes include collisions with concrete barrier walls, guardrails, run off road, and other fixed object crashes. Other than a three percent (3%) increase in sideswipe crashes, the proportions of crash types are similar before and during construction periods.

Crashes were grouped by interchange using the straight-line diagram mileposts. The highest number of crashes occurred at the Hallandale Beach Boulevard interchange, followed by the Hollywood Boulevard and Pembroke Road interchanges. After normalizing for crash data periods, the Hallandale Beach Boulevard and Hollywood Boulevard interchanges each experienced a 57% monthly increase in crashes between the Pre-Construction and During Construction periods, whereas the Pembroke Road interchange experienced an 8% monthly increase during the same period. Based on the increasing trend of crashes during the analysis period, the Hallandale Beach Boulevard and



Hollywood Boulevard interchanges are priority locations for improvements. **Table 2.13** summarizes the crashes by interchange.

**Table 2.13 – Existing Crashes by Interchange**

| Description                       | Pre-Construction*<br>(36 months) | During Construction**<br>(50 months) | Total | Percentage of Total |
|-----------------------------------|----------------------------------|--------------------------------------|-------|---------------------|
| <b>Hallandale Beach Boulevard</b> |                                  |                                      |       |                     |
| Rear End                          | 190                              | 399                                  | 589   | 54%                 |
| Sideswipe                         | 82                               | 184                                  | 266   | 24%                 |
| Fixed Object                      | 51                               | 106                                  | 157   | 14%                 |
| Other Types                       | 21                               | 63                                   | 84    | 8%                  |
| Total                             | 344                              | 752                                  | 1,096 |                     |
| <b>Pembroke Road</b>              |                                  |                                      |       |                     |
| Rear End                          | 157                              | 234                                  | 391   | 48%                 |
| Sideswipe                         | 62                               | 123                                  | 185   | 23%                 |
| Fixed Object                      | 63                               | 74                                   | 137   | 17%                 |
| Other Types                       | 41                               | 53                                   | 94    | 12%                 |
| Total                             | 323                              | 484                                  | 807   |                     |
| <b>Hollywood Boulevard</b>        |                                  |                                      |       |                     |
| Rear End                          | 121                              | 283                                  | 404   | 45%                 |
| Sideswipe                         | 69                               | 160                                  | 229   | 25%                 |
| Fixed Object                      | 55                               | 109                                  | 164   | 18%                 |
| Other Types                       | 38                               | 67                                   | 105   | 12%                 |
| Total                             | 283                              | 619                                  | 902   |                     |

\*Pre-construction period – Nov. '08 – Oct. '11    \*\*During Construction period – Nov. '11 – Dec. '15

The study limits were identified as a high crash segment in each year between 2009 and 2014. The 2015 high crash listing was not available at the time this analysis was prepared. In addition, the following nodes were identified as high crash locations in multiple years:

- Northbound exit to Hallandale Beach Boulevard (MP 0.508)
- Southbound exit to Hallandale Beach Boulevard (MP 1.044)
- Southbound exit to Pembroke Road (MP 1.815)
- Northbound exit to Hollywood Boulevard (MP 2.296)
- Northbound entrance from Hollywood Boulevard (MP 2.771)
- Southbound exit to Hollywood Boulevard (MP 2.827)



**Hallandale Beach Boulevard** – The Hallandale Beach Boulevard Safety Study was completed in July 2014 covering the interchange limits between MP 2.528 and MP 2.587. Crash data was obtained from the Department's CAR system and organized for the three-year period from 2009 to 2011. A total of 199 crashes occurred within the three-year period. These crashes included 85 injury crashes and no fatalities. **Table 2.14** summarizes the number of crashes per year.

**Table 2.14 – Existing Hallandale Beach Boulevard Crashes by Year**

| Year          | Crashes    |
|---------------|------------|
| 2009          | 63         |
| 2010          | 79         |
| 2011          | 57         |
| <b>Total:</b> | <b>199</b> |

The most frequent crash types are rear-end (54%), left-turn (13%), and angle crashes (12%). A review of the crash data indicates that "careless driving" was stated as a contributing cause for 28% of the crashes, followed by "disregarded traffic signal" at 10% and, "followed too closely" at 9.5%. A review of the FDOT High Crash Spot/Segment Lists for the three-year period from 2009 to 2011 indicates that this location was on the High Crash Segment List for the years 2010 and 2011.

**Pembroke Road** – The Pembroke Road Safety Study was completed in July 2017 covering the interchange limits between MP 5.048 and MP 5.123. Crash data was obtained from the Department's CAR system and organized for the three-year period from 2013 to 2015. A total of 285 crashes occurred within the three-year period. These crashes included 68 injury crashes and one fatality crash. **Table 2.15** summarizes the number of crashes per year.

**Table 2.15 – Existing Pembroke Road Crashes by Year**

| Year          | Crashes    |
|---------------|------------|
| 2013          | 89         |
| 2014          | 108        |
| 2015          | 88         |
| <b>Total:</b> | <b>285</b> |



The most frequent crash types are rear-end (56%), sideswipe (22%), and angle crashes (9%). A review of the crash data indicates that “careless or negligent manner” was stated as a contributing cause for 34% of the crashes, followed by “failed to keep in proper lane” at 8.4% and, “followed too closely” at 7.4%. A review of the Department’s High Crash Spot Lists for the three-year period indicates that the interchange was identified as a high crash spot for all three years.

**Hollywood Boulevard** – The Hollywood Boulevard Safety Study was completed in July 2016 covering the interchange limits between MP 16.56 and MP 16.639. Crash data was obtained from the Department’s CAR system and organized for the three-year period from 2010 to 2012. A total of 251 crashes occurred within the three-year period. These crashes included 25 injury crashes and no fatalities. **Table 2.16** summarizes the number of crashes per year.

**Table 2.16 – Existing Hollywood Boulevard Crashes by Year**

| Year          | Crashes    |
|---------------|------------|
| 2010          | 58         |
| 2011          | 87         |
| 2012          | 106        |
| <b>Total:</b> | <b>251</b> |

The most frequent crash types are rear-end (60%), sideswipes (14%), and left-turn crashes (6%). A review of the crash data indicates a steady increase in crashes from 2010 to 2012. A review of the FDOT High Crash Spot/Segment Lists for the three-year period from 2010 to 2012 indicates that all three intersections were identified as high crash locations.





## 2.16 DRAINAGE

This section summarizes the existing drainage systems within the study area.

The project area is located within Broward County, Florida under Township 51S, Range 42E, and Sections 16, 17, 20, 21, 28 and 29 and is contained within the municipalities of Hallandale Beach, Pembroke Park, and Hollywood. The agency having stormwater permitting jurisdiction over the study area is the South Florida Water Management District (SFWMD). SFWMD has authority over the C-9 and C-10 Canals, which are the water bodies receiving the stormwater runoff for the project area.

The existing drainage system is divided into three separate basins, typically divided by major east-west arterial crossings at Hallandale Beach Boulevard, Pembroke Road and Johnson Street. The basins have been identified in the latest FDOT I-95 improvement project documents under FPID# 422796-1-52-01 and 422796-2-52-01 as System 4, 5 and 6.

**System 4 (Basin 1)** - This drainage basin encompasses I-95 between Ives Dairy Road interchange and Hallandale Beach Boulevard. Runoff from the I-95 sheet flows into roadside swales located along both sides of I-95. These dry detention roadside swales provide for water quality treatment and stormwater attenuation using ditch block weirs. Basin 1 has a swale bottom elevation of 2.5 feet North American Vertical Datum of 1988 (NAVD 88) and a discharge elevation of 3.5 feet NAVD 88. The excess stormwater runoff overflows these weirs and discharges south into infield ponds at the I-95 and Ives Dairy Road interchange, which ultimately discharges to the C-9/Snake Creek Canal. This basin is located within the SFWMD's C-9 East Canal Basin.

**System 5 (Basin 2)** - This drainage basin encompasses I-95 from Hallandale Beach Boulevard to Pembroke Road. Runoff from I-95 sheet flows into roadside dry detention swales located along both sides of I-95 and a dry pond located at the corner of Hallandale Beach Boulevard and I-95 northbound on-ramp. These dry detention roadside swales provide water quality treatment and stormwater attenuation using ditch block weirs. This system consists of swales with a bottom elevation of 1.5 feet NAVD 88 and discharge elevation of 4.0 feet NAVD 88. According to existing permit information this basin discharges into an FDOT borrow pit called Chaves Lake, which is located at the northeast quadrant of I-95 and Hallandale Beach Boulevard. However, no drainage connection was observed



during our field investigation. Excess stormwater runoff from Chaves Lake overflows to the C-10 Canal through a pump station located within the west side of the I-95 right of way between Hallandale Beach Boulevard and Pembroke Road. This basin is located within the SFWMD's C-10 Basin.

**System 6 (Basin 3 & 4)** – This drainage basin encompasses I-95 from Pembroke Road to Johnson Street. Runoff from I-95 sheet flows into the roadside dry detention swales located along both sides of the I-95 and Hollywood Boulevard interchange infield areas. This system has a swale bottom elevation of 1.5 feet NAVD 88 and discharge elevation of 2.5 feet NAVD 88. These roadside swales and interchange infield areas provide water quality treatment and stormwater attenuation using ditch block weirs. Excess stormwater runoff overflows these weirs and discharges into the C-10 Canal just north of Johnson Street. This basin is located within the SFWMD's C-10 Basin.

**Side Street/Arterial Street Drainage** – There are three arterial streets within the project limits of the I-95 corridor: Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard. Each of those side streets, beyond the interchanges, has its own drainage system. Since the improvements are mostly at the interchanges, the impact to the existing drainage systems of the side streets beyond interchanges is considered minor.

**Offsite Systems** – An offsite storm-sewer system exists along the I-95 corridor within the project limits. The system is designed to alleviate the adverse flooding conditions for the City of Hallandale Beach and the Town of Pembroke Park as described in the SFWMD permit No. 06-02942-P, application 010601-42, dated October 2001. The permitted system includes the Chaves Lake, located within the City of Hallandale Beach, connected to the adjacent Hallandale Beach High School Lake via an open channel. The school lake is connected through an 84" pipe to a main pump station on the west side of I-95 just south of the CSX Railroad. From the pump station a 64" stormwater force main is installed along the west side of I-95 to discharge into the modified CSX western channel. A 42" force main from another pump station located on Behan Lake, within the Town of Pembroke Park, is connected to a 64" force main outfall of the I-95 Pump Station. At the end of the conveyance channel, along the CSX Railroad, a ditch bottom inlet with a 72" diameter pipe is located to discharge the flow to the C-10 canal. This system is not expected to be impacted by the proposed I-95 improvements.



**Offsite Drainage Area** – There are 2.38 Ac (Basin 3) and 0.93 Ac (Basin 4) on the west side of the I-95 and east of the Railroad Tracks that are contributing to the FDOT drainage system.

There is also an offsite contribution area that was not previously identified in any FDOT project, nor it was included in the existing permits. On the east side of the I-95 between Hollywood Blvd. and Johnson Street, approximately 106 Acres from the adjacent neighborhood are interconnected with FDOT I-95 drainage system. The stormwater runoff coming from the neighborhood sheet flows into the FDOT conveyance swale running along the east side of the I-95. Therefore, any future improvement project in this segment should include the offsite contribution from the adjacent neighborhood.

An existing drainage map is provided in **Appendix C**.



## 2.17 SOILS AND GEOTECHNICAL DATA

The information presented in this section is a summary of the *Geotechnical Report, Roadway Soils Survey and Bridge Structures*, a companion document to this PD&E Study. The Soil Map of Broward County published by the United States Department of Agriculture (USDA) was reviewed for general near-surface soil information within the general project vicinity (see **Figure 2.10**).

This information indicates that there are five soil mapping units. The map soil units encountered are as follows:

- Arents, organic substratum-Urban land complex
- Dade fine sand
- Dade-Urban land complex
- Udorthents shaped
- Urban land

The most encountered soil was Udorthents shaped, which is characterized by somewhat poorly drained soil.

A description of the general profile of the existing soils, within the study limits, was determined by test borings performed throughout the study limits. The test boring depths ranged from 6 to 15 feet. Soils and soil profiles found in borings drilled for the roadway alignment study generally consisted of five general types:

1. Dark brown sand with trace roots (Topsoil / A-8).
2. Light brown to brown sand with silt, sometimes with trace to few limerock fragments (A-3).
3. Brown silty sand with few to some limerock fragments (A-2-4).
4. Light Brown silty limestone.
5. Black organic Silt (A-8).



# Custom Soil Resource Report Soil Map

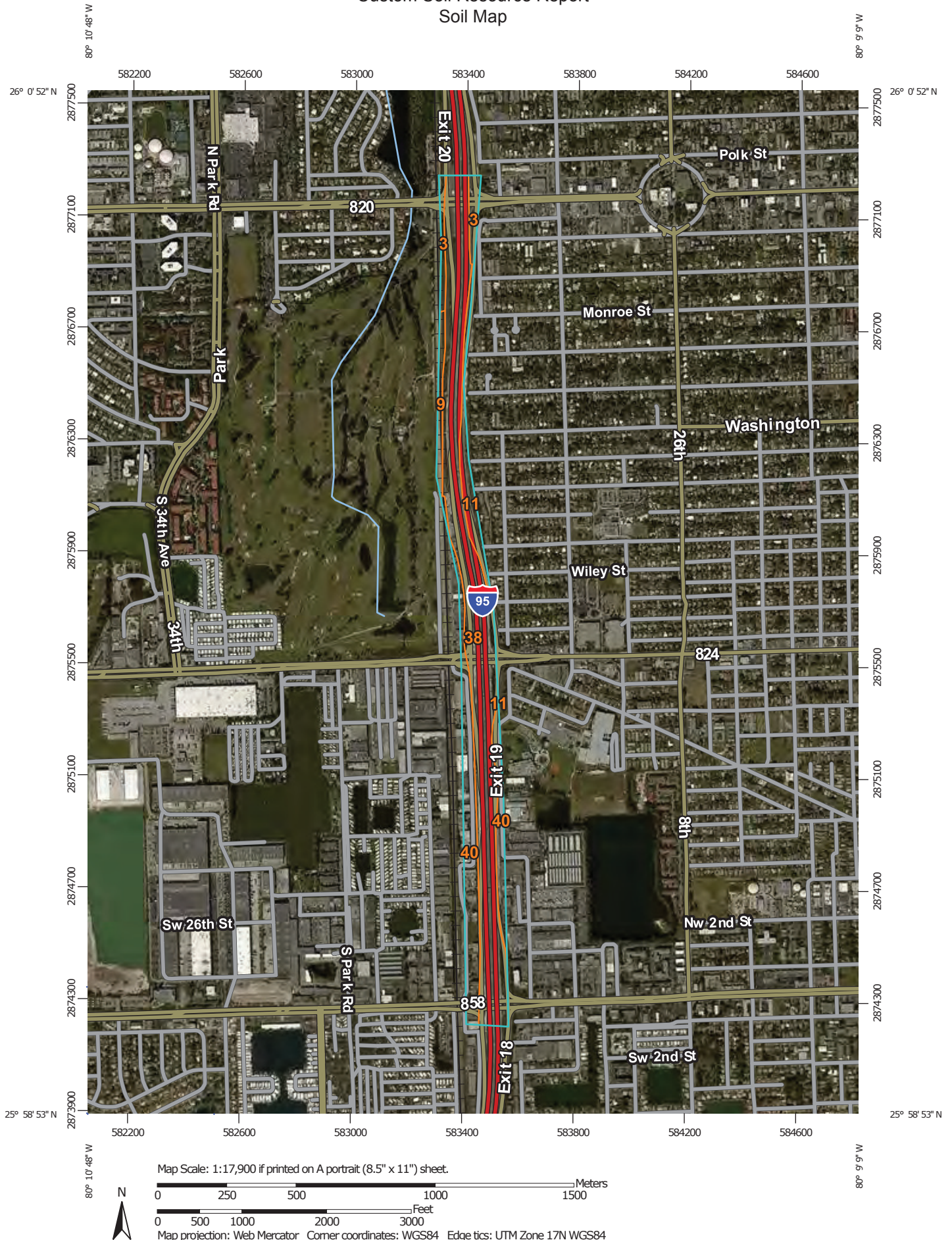


Figure 2.10 - Soil Survey Map



Much of the project corridor is underlain with interlayering of Strata 1 and 2. However, Stratum 3 and 4 soils were found at numerous boring locations at various depths along the project corridor. Stratum 5 soils were found at only two boring locations between four and six feet depth interval.

Stratum 1 is topsoil and shall be removed during clearing and grubbing in accordance with section 110 of the FDOT Standard Specifications.

Stratum 2 consists of select material and is adequate for subgrade and embankment support, and should be utilized according to Standard Plans, Index 120-001. However, portions may have slightly fine content and are likely to retain some excess moisture and could be difficult to handle, place and compact compared to ordinary A-3 materials.

Stratum 3 soils are classified as A-2-4 and have a fine content ranging between 11 to 21 percent (with average fines content at 14 percent). Stratum 3 consists mainly of soils with high fines content and are likely to retain some excess moisture and could be difficult to handle, place and compact compared to ordinary A-3 materials. However, these soils may be used in the subgrade with extra caution, and proper supervision and quality control. A-2-4 material placed below the existing water level must contain less than 15% passing the No. 200 U.S. Standard sieve.

Stratum 4 consists of limestone. Specialized tools and equipment are necessary to excavate and/or penetrate the limestone layer.

Stratum 5 soils are classified as A-8. However, only two samples are classified as A-8 with organic content 24 to 80 percent and are between four and six feet below existing grade. In accordance with the FDOT Standard Plans, Index 120-002, these soils need to be removed and replaced with select embankment fill.

The depths of groundwater tables were measured at the locations of the structural bridge borings drilled proximate to the existing bridge structures. In the borings drilled proximate to the I-95 bridges, the groundwater table depths ranged between 0 and 9.5 feet below existing grade of the borings. The depth to the water table was measured in each of the roadway borings. Depth to groundwater measured in the borings drilled for the roadway ranged between 4.0 feet and 8.5 feet below ground surface. However, in many locations,



groundwater was not encountered within the depth of the borings. The wide variation in groundwater table depths is attributed to the difference in site grades.

Nine structural borings were performed at selected bridges to depths of 100 feet and fourteen roadway borings to depths of six feet to fifteen feet were also performed. The structural borings, drilled at approximate locations of the proposed bridge structures, generally indicated that the sites are underlain with interlayering of sands, limestone, sometimes mixed with silty sands. Based on the conditions encountered by the structural borings, the soil conditions will provide the required bearing capacity support for a deep foundation system such as 18 to 24-inch square prestressed concrete piles and 36 to 48-inch diameter drilled shafts. The existing substructures are in a slightly aggressive environment, based on four corrosion tests at the proposed structure locations to determine the environment of the area.

Six Borehole Permeability Tests (BHP) were performed along the project corridor. The BHP tests were performed using the usual open-hole, constant head methodology advocated by South Florida Water Management District (SFWMD). The boreholes were ten feet deep and completed as an open well with gravel pack (6-20 silica sand).





## 2.18 UTILITIES

Utility Agency Owners (UAOs) located in the vicinity of the I-95 were contacted and requested to provide information regarding their utility facilities within the project area. Existing UAOs are provided in **Table 2.17**. Plans showing the approximate location of the utility facilities are provided in **Appendix D**.

**Table 2.17 - Existing UAO Contact List**

| Utility Company                    | Facility          | Contact Information                                                          |                                                                                    |
|------------------------------------|-------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| American Traffic Solutions         | Not Available     | Santiago Martinez<br>1150 North Alma School Road<br>Mesa, AZ 85201           | (480) 596-4595                                                                     |
| AT&T Corporation (International)   | Fiber Optic       | Stefan Eriksson<br>6000 Metro West Blvd., Suite 201<br>Orlando, FL 32835     | (407) 578-8000<br><a href="mailto:seriksson@pea-inc.net">seriksson@pea-inc.net</a> |
| AT&T Corporation (Transmission)    | Telephone         | Stefan Eriksson<br>6000 Metro West Blvd., Suite 201<br>Orlando, FL 32835     | (407) 578-8000<br><a href="mailto:seriksson@pea-inc.net">seriksson@pea-inc.net</a> |
| AT&T Distribution                  | Telephone & Fiber | Keeve Otis<br>1120 South Rogers Circle<br>Boca Raton, FL 33487               | (305) 428-0510<br><a href="mailto:ok1184@att.com">ok1184@att.com</a>               |
| Broward County Traffic Engineering | Fiber Optic       | Robert Blount<br>2300 West Commercial Boulevard<br>Fort Lauderdale, FL 33309 | (954) 847-2745<br><a href="mailto:rblount@broward.org">rblount@broward.org</a>     |



**Table 2.17 – Existing UAO Contact List (Continued)**

| Utility Company                              | Facility        | Contact Information                                                                           |                                                                                                                                                                                                                            |
|----------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Broward County Water and Wastewater Services | Water and Sewer | Halina Pluta<br>2555 West Copans Road<br>Pompano Beach, FL 33069                              | (954) 831-0917<br><a href="mailto:HPLUTA@broward.org">HPLUTA@broward.org</a>                                                                                                                                               |
| Century Link                                 | Fiber Optic     | Mike Fitzgerald<br>Jack Brady<br>5908-A Hampton Oaks Parkway<br>Tampa, FL 33610               | (941) 661-7557<br>(786) 495-2170<br><a href="mailto:mike.fitzgerald@centurylink.com">mike.fitzgerald@centurylink.com</a><br><a href="mailto:jack.brady@centurylink.com">jack.brady@centurylink.com</a>                     |
| City of Hallandale Beach                     | Water and Sewer | Manga Ebbe<br>630 NW 2nd Street<br>Hallandale Beach, FL 33009                                 | (954) 457-3043<br><a href="mailto:mebbe@hallandalebeachfl.gov">mebbe@hallandalebeachfl.gov</a>                                                                                                                             |
| City of Hollywood Public Works Department    | Water & Sewer   | Raul Carbonell<br>7777 Glades Road Suite 410<br>Boca Raton, FL 33434                          | (561) 791-9280<br><a href="mailto:rcarbonell@craigasmith.com">rcarbonell@craigasmith.com</a>                                                                                                                               |
| Comcast Cable                                | Cable TV        | Christopher Taylor<br>Leonard Maxwell-Newbold<br>2601 SW 145th Avenue<br>Miramar, FL 33322    | (954) 239-8386<br>(954) 447-8405<br><a href="mailto:Cable-utilities@cwsifl.com">Cable-utilities@cwsifl.com</a><br><a href="mailto:Leonard_Maxwell-Newbold@cable.comcast.com">Leonard_Maxwell-Newbold@cable.comcast.com</a> |
| Crown Castle NG                              | Fiber Optic     | Rebecca Caldwell<br>2000 Corporate Drive<br>Canonsburg, PA 15317                              | (888) 632-0931<br><a href="mailto:fiber.dig@crowncastle.com">fiber.dig@crowncastle.com</a>                                                                                                                                 |
| Fiberlight LLC.                              | Not Available   | Troy Gaeta<br>11700 Great Oaks Way Suite 100<br>Alpharetta, Ga 33022                          | (954) 213-3367<br><a href="mailto:troy.gaeta@fiberlight.com">troy.gaeta@fiberlight.com</a>                                                                                                                                 |
| Fibernet Direct                              | Fiber           | Danny Haskett<br>Crown Castle Office<br>1601 NW 136th Avenue Suite A-200<br>Sunrise, FL 33323 | (786) 246-7827<br><a href="mailto:danny.haskett@fibernetdirect.com">danny.haskett@fibernetdirect.com</a>                                                                                                                   |

**Table 2.17 – Existing UAO Contact List (Continued)**

| Utility Company                                          | Facility                     | Contact Information                                                                      |                                                                                                                                                                                    |
|----------------------------------------------------------|------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Florida City Gas                                         | Gas                          | Oscar Paez<br>4045 NW 97th Avenue<br>Doral, FL 33178                                     | (305) 835-3622<br><a href="mailto:fcgeng@aglresources.com">fcgeng@aglresources.com</a><br><a href="mailto:opaez@southernco.com">opaez@southernco.com</a>                           |
| Florida Department of Transportation District 4 - ITS    | Fiber Optic                  | Maria Rosado<br>2300 West Commercial Boulevard<br>Fort Lauderdale, FL 33309              | (954) 847-2690<br><a href="mailto:mrosado@smartsunguide.com">mrosado@smartsunguide.com</a>                                                                                         |
| Florida Department of Transportation - Eland Engineering | Fiber Optic                  | Chris Beaudry/April Rizzo<br>3323 West Commercial Boulevard<br>Fort Lauderdale, FL 33309 | (954) 847-1996<br><a href="mailto:chris.beaudry@dot.state.fl.us">chris.beaudry@dot.state.fl.us</a><br><a href="mailto:april.rizzo@dot.state.fl.us">april.rizzo@dot.state.fl.us</a> |
| Florida Power & Light                                    | Electric                     | Byron Sample<br>10705 Quail Roost Drive<br>Miami, FL 33157                               | (386) 586-6403<br><a href="mailto:Byron.A.Sample@fpl.com">Byron.A.Sample@fpl.com</a>                                                                                               |
| HEICO Corporation                                        | Fiber Optic                  | Joe Asher<br>3000 Taft Street<br>Hollywood, FL 33021                                     | (954) 984-4000<br><a href="mailto:jasher@heico.com">jasher@heico.com</a>                                                                                                           |
| Level 3 Communications                                   | Fiber Optic                  | Network Relations<br>1025 El Dorado Boulevard<br>Broomfield, CO 80021                    | (877) 366-8344 Ext. 2<br><a href="mailto:level3.networkrelocations@level3.com">level3.networkrelocations@level3.com</a>                                                            |
| MCI                                                      | Communications / Fiber Optic | Todd Mars<br>16563 NW 15th Ave<br>Miami, FL 33169                                        | (786) 886-4238<br><a href="mailto:todd.mars@one.verizon.com">todd.mars@one.verizon.com</a>                                                                                         |
| Miami-Dade County Public Works and Traffic               | Not Available                | Octavio Vidal<br>13284 SW 120th Street<br>Miami, FL 33186                                | (305) 412-0891 Ext. 201<br><a href="mailto:ovidal@htlocating.com">ovidal@htlocating.com</a>                                                                                        |
| Miami-Dade County Water & Sewer                          | Water and Sewer              | Sergio Garcia<br>3575 South Lejeune Road<br>Miami, FL 33146                              | (786) 268-5320<br><a href="mailto:sergio.garcia@miamidade.gov">sergio.garcia@miamidade.gov</a>                                                                                     |
| Sprint                                                   | Fiber Optic                  | Mark Caldwell<br>851 Rafalgar Court Suite 300<br>Maitland, FL 32751                      | (321) 287-9942<br><a href="mailto:mark.d.caldwell@sprint.com">mark.d.caldwell@sprint.com</a>                                                                                       |

**Table 2.17 – Existing UAO Contact List (Continued)**

| Utility Company                      | Facility              | Contact Information                                                                                      |                                                                                                        |
|--------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| TECO People Gas South Florida        | Gas                   | David Rivera<br>5101 NW 21st Avenue<br>Suite 460<br>Fort Lauderdale, FL 33309                            | (954) 453-0794<br><a href="mailto:drrivera@tecoenergy.com">drrivera@tecoenergy.com</a>                 |
| Town of Davie – Utilities Department | Water and Sewer       | Laura Borgesi<br>6591 Orange Drive<br>Davie, FL 33314                                                    | (954) 797-1096<br><a href="mailto:laura_borgesi@davie-fl.gov">laura_borgesi@davie-fl.gov</a>           |
| Town of Pembroke Park                | Sanitary, Sewer Storm | Raul Carbonell<br>Craig A. Smith and Associates<br>7777 Glades Road<br>Suite 410<br>Boca Raton, FL 33434 | (561) 791-9280<br><a href="mailto:rcarbonell@craigasmith.com">rcarbonell@craigasmith.com</a>           |
| Windstream Communications            | Fiber Optic           | David F. Ackerman<br>929 Marthas Way<br>Hiawatha, IA 52233                                               | (800) 289-1901<br><a href="mailto:David.F.Ackerman@Windstream.com">David.F.Ackerman@Windstream.com</a> |
| XO Communications                    | Fiber Optic           | Tony Kowaleski<br>16563 NW 15th Avenue<br>Miami, FL 33169                                                | (305) 356-3160<br><a href="mailto:anthony.kowaleski@xo.com">anthony.kowaleski@xo.com</a>               |

**Notes:** The UAO contact list was developed based on letters sent to each UAO or via responses received from the UAO within the I-95 corridor.

The following is a summary of existing utility facilities within the study limits. The crossing roadways and distances described below are approximate locations.

**American Traffic Solutions** – The location of the facilities was not provided by American Traffic Solution at this phase. Potential impacts (if any) are to be coordinated with American Traffic Solutions in future phases of the project.



**AT&T Corporation (International)** – AT&T fiber optic cable (FOC) locations within the study corridor were provided by the UAO. The information was provided via base map markups during the coordination phase. The FOC utilities are indicated to be HDPE in clusters of 6-4" and 4-4". The following are the locations indicated by the UAO:

- Taft Street
- Hallandale Beach Boulevard

**AT&T Corporation (Transmission)** – According to the review conducted by AT&T Corporation Long Line (Transmission), the UAO does not have existing facilities within the limits of this project. No involvement is anticipated.

**AT&T Distribution** – AT&T has substantial utility facilities located within the study corridor. The information was provided via base map markups during the coordination phase. These include cabinets, manholes, buried and overhead telephone running from west to east of I-95. The UAO indicated that the depth of existing facilities varies and should be at a minimum of 30 inches cover from existing grades. The following are the locations indicated by the UAO:

- Hallandale Beach Boulevard, ducts with copper, PVC, and flexible pipelines – underground and overhead
- Pembroke Road, ducts with copper and flexible pipe - underground
- Johnson Street, telephone and fiber clusters of 12-4", 18-4" and 6-4" PVC - underground
- Taft Street, ducts with copper pipes – buried
- Sheridan Street, ducts with clusters of 4-4" PVC and 2-3 ½" TRD – underground

**Broward County Traffic Engineering** – Broward County Traffic Engineering provided a map showing their facilities in the project area. The UAO indicated that the County has fiber optic communication lines on I-95 and other infrastructure may exist in the project area such as streetlights and school flashers. The following is the location indicated by the UAO:

- Buried Underground Fiber – from Hallandale Beach Boulevard to Johnson Street running along the east side of I-95.



**Broward County Water and Wastewater Services** – Broward County Water and Wastewater Engineering provided ten record drawing sets for the project area with facilities as built plans along Pembroke Road, Hallandale Beach Boulevard, and SW 30<sup>th</sup> Avenue. The following are the locations indicated by the UAO:

- Along Hallandale Beach Boulevard, 6" CIP water main, 8" water main and 18" water main casing within CSX railroad right of way running on the north side of the road, 8" CAP water main on the south side of the road west of I-95.
- Hallandale Beach Boulevard at SW 30<sup>th</sup> Avenue – 10" HDPE water main
- Hallandale Beach Boulevard at 31<sup>st</sup> Avenue – 8" water main
- Hallandale Beach Boulevard at South Park Road – 8" CIP force main
- Along Pembroke Road, 12" water main, 8" force main, valves, and manholes from SW 40<sup>th</sup> street to west of I-95 running on the south side of the road.
- Along Pembroke Road – 24" raw water main with 42" steel casings within the CSX railroad right of way.
- Pembroke Road at I-95 southbound on-ramp termini and I-95 northbound off-ramp termini crossings running from west of SW 31<sup>st</sup> Avenue to I-95 off-ramp termini.
- Pembroke Road from west of South Park Road to the golf course west of I-95 on the north side of the road – 4" Water main

**Century Link** – The UAO identified buried underground FOC facilities within the study limits. The UAO provided the locations of Century Link and Level 3 Communications facilities via base map markups. The following are the locations indicated by the UAO:

- Hallandale Beach Boulevard – fiber optic underground
- Pembroke Road – fiber optic underground
- Along Hallandale Beach Boulevard on the north side – fiber optic underground
- Along Pembroke Road on the north side – fiber optic underground



**City of Hallandale Beach** – City of Hallandale Beach provided utility records within the study limits. Their facilities are located east of I-95 and consist of water and sanitary sewer mains along the study corridor. The following are the locations indicated by the UAO:

- Along Hallandale Beach Boulevard – 8", 12" and 16" sanitary sewer from Ansin Boulevard to NW 6<sup>th</sup> Avenue
- NW 10<sup>th</sup> Terrace – 10" sanitary sewer
- NW 10<sup>th</sup> Avenue – 10" sanitary sewer
- NW 9<sup>th</sup> Terrace – 12" sanitary sewer
- Along Hallandale Beach Boulevard – 8" and 10" water main from Ansin Boulevard to NW 6<sup>th</sup> Avenue and 14" water main east of NW 6<sup>th</sup> Avenue
- NW 10<sup>th</sup> Terrace – 8" water main
- NW 10<sup>th</sup> Avenue – 6" water main
- NW 9<sup>th</sup> Terrace – 6" water main
- Martin Luther King Jr./SW 8<sup>th</sup> Ave – 6" water main
- NW 7<sup>th</sup> Avenue – 6" water main
- NW 6<sup>th</sup> Avenue – 10" water main

**City of Hollywood Public Works Department** – City of Hollywood Public Works Department provided a base map showing the location of their facilities from north of Pembroke Road to Hollywood Boulevard. The following are the locations indicated by the UAO:

- Along Hollywood Boulevard from east of Calle Grande Drive to west of 28<sup>th</sup> Avenue – 8" and 30" water main
- Along Hollywood Boulevard from Calle Largo Drive to west of Jaycee Boulevard – 8" VCP sanitary sewer
- I-95 crossing at Washington Street – 24" water main
- I-95 crossing at Fletcher Street – 8" water main

**Comcast Cable** – Comcast Cable facilities include underground and aerial lines. The following are the locations indicated by the UAO:

- I-95 at Miami-Dade/Broward County line – underground crossing
- Along Hallandale Beach Boulevard north side of the road – aerial
- Hallandale Beach Boulevard at CSX railroad and I-95 – underground crossing





- Hallandale Beach Boulevard – aerial crossing at South Park Road
- Hallandale Beach Boulevard – aerial crossing at Bryan Road
- Hallandale Beach Boulevard – underground crossing at SW 30<sup>th</sup> Avenue
- Hallandale Beach Boulevard – aerial crossing at NW 10<sup>th</sup> Terrace
- Along the west side of I-95 limited access right of way line south of Pembroke Road
- Pembroke Road – aerial crossing east of SW 30<sup>th</sup> Avenue
- Hollywood Boulevard – underground crossing at NW 31<sup>st</sup> Avenue
- Hollywood Boulevard – underground crossing at NW 28<sup>th</sup> Avenue
- Along Johnson Street south side of the road Boulevard – aerial
- Johnson Street – underground crossing at NW 30<sup>th</sup> Road
- Johnson Street – underground crossing at I-95
- Along Taft Street north side of the road – aerial
- Sheridan Street – underground crossing at I-95

**Crown Castle NG** – Fiber optic cable (FOC) locations within the study corridor were provided by the UAO. The FOC utilities are indicated to be buried underground. The following are the locations indicated by the UAO:

- Hallandale Beach Boulevard from west of SW 40<sup>th</sup> Avenue to east of Dixie Highway – buried

**Fiberlight LLC** – The location of the facilities was not provided by Fiberlight LLC at this phase. Potential impacts (if any) are to be coordinated with Fiberlight LLC in future phases of the project.

**Florida City Gas** – Florida City Gas has substantial utility facilities located within the study corridor. The UAO provided maps to show the location and material of their gas utilities within the study corridor. Florida City Gas utilities are located within or adjacent the right of way of the study limits. The following are the locations indicated by the UAO:

- Hallandale Beach Boulevard from west of SW 40<sup>th</sup> Avenue to South Park Road north side – 2" and 4" steel gas main
- Hallandale Beach Boulevard from South Park Road to SW 31<sup>st</sup> Avenue north side – 4" steel gas main
- Pembroke Road line from SW 40<sup>th</sup> Avenue to 1<sup>st</sup> Street south side – 4" steel gas main



**Fibernet Direct** – The UAO provided the location of FOC within the PD&E Study limits. The FOC utilities are indicated to be buried underground. The following are the locations indicated by the UAO:

- Buried Underground Fiber – Within the existing I-95 right of way (west side), from north of I-95 southbound off-ramp to Ives Dairy Road to Hallandale Beach Boulevard and from I-95 southbound off-ramp to Hallandale Beach Boulevard to I-95 northbound off-ramp to Pembroke Road
- Buried Underground Fiber – west of I-95 right of way (west side), from north of off-ramp to Ives Dairy Road to Hallandale Beach Boulevard
- Buried Underground Fiber – in the vicinity of the existing I-95 right of way (east side), from of I-95 northbound off-ramp to Pembroke Road to Pembroke Road ramp termini
- I-95 crossing north of Ives Dairy Road overpass – buried
- Along Hallandale Beach Boulevard on the south side from west of the I-95 southbound on ramp termini to Ansin Boulevard and on the south side from NW 10<sup>th</sup> Terrace to the east of Hallandale Beach Boulevard
- Hallandale Beach Boulevard at Ansin Boulevard crossing – buried
- Hallandale Beach Boulevard at NW 10<sup>th</sup> Terrace crossing – aerial
- Along Pembroke Road on the south side from NW 31<sup>st</sup> Avenue to east of NW 8<sup>th</sup> Avenue – buried
- Pembroke Road at 28<sup>th</sup> Avenue crossing – buried
- Pembroke Road at 27<sup>th</sup> Avenue crossing – buried
- Along Hollywood Boulevard on both side of the road from 28<sup>th</sup> Avenue to the Arts Park at Young Circle – buried
- Hollywood Boulevard at 28<sup>th</sup> Avenue crossing – buried
- Along Johnson Street on the south side from west of CSX railway to east of I-95 – buried
- Along Taft Street on the south side from west of I-95 to east of I-95 – buried
- Along Sheridan Street on the north side from west of CSX railway to east of I-95 – buried

**Florida Department of Transportation (ITS)** – The Florida Department of Transportation ITS provided as built plans of the location of buried fiber optic within the study limits. The following are the location indicated by the agency:

- Along I-95 northbound on the east side from Miami-Dade County/Broward County line to north of Johnson Street



- Along Hallandale Beach Boulevard on the south side from Lake Shore Drive to SW 10<sup>th</sup> Terrace and from NW 9<sup>th</sup> Avenue to SW 8<sup>th</sup>
- Along Pembroke Road on the south side from I-95 to South 26<sup>th</sup> Avenue
- Along Hollywood Boulevard from west of Entrada Drive to east of S 28<sup>th</sup> Avenue.

**Florida Power & Light** – The UAO provided documentation of the location of existing distribution facilities, which consist of overhead and underground lines within the study limits. The following are the locations of FPL's distribution lines:

- Miami-Dade/Broward County Line – overhead 13K power line
- Running in the proximity of to I-95 northbound right of way line 300 feet north from Miami-Dade/Broward County Line – overhead 13K power line
- Running parallel to CSX railroad right of way line east and west side from Ives Dairy Road to Hallandale Beach Boulevard – buried and overhead 13K power line
- Hallandale Beach Boulevard – overhead 13k power line
- Pembroke Road – overhead 13k power line
- I-95 crossing at Washington Street crossing – overhead 13k power line
- I-95 crossing south of Johnson Street – underground 13k power line
- Johnson Street – overhead 13k power line
- Taft Street – overhead 13k power line

**HEICO Corporation** – According to the review conducted by HEICO Corporation, the UAO does not have existing facilities within the limits of this project. No involvement is anticipated.

**Level 3 Communications** – The UAO provided the locations of Level 3 Communications and Century Link facilities via base map markups. The following are the locations indicated by the UAO:

- Hallandale Beach Boulevard – fiber optic underground
- Pembroke Road – fiber optic underground
- Along Hallandale Beach Boulevard on the north side – fiber optic underground
- Along Pembroke Road on the north side – fiber optic underground

**MCI** – According to the review conducted by MCI/Verizon, the UAO does have existing facilities within the limits of this project. The location of their facilities is



within CSX railway right of way. Potential impacts within these areas are to be coordinated with MCI.

**Miami-Dade County Public Works and Traffic** – The location of the facilities was not provided by Miami-Dade Public Works and Traffic at this phase. Potential impacts to street lighting and traffic signals (if any) are to be coordinated with Miami-Dade County Public Works and Traffic in future phases of the project.

**Miami-Dade Water & Sewer** – According to the review conducted by Miami Dade Water and Sewer Department, the UAO does not have existing facilities within the limits of this project. No involvement is anticipated.

**Sprint** – The location of the facilities was not provided by Sprint at this phase. Potential impacts (if any) are to be coordinated with Sprint in future phases of the project.

**TECO Peoples Gas South Florida** – The UAO indicated that does not have existing facilities that would be affected within the PD&E study limits. The following is the location indicated by the UAO:

- 2" Gas main along Ansin Boulevard and parallel to I-95 in Hallandale Beach

**Town of Davie (Utilities Department)** – According to the review conducted by the Town of Davie Utilities Department, the UAO does not have existing facilities within the limits of this project. No involvement is anticipated.

**Town of Pembroke Park** – According to the review conducted by the Town of Pembroke Park, the UAO does not have existing facilities within the limits of this project. No involvement is anticipated.

**Windstream Communications** – The UAO provided the location of FOC within the PD&E Study limits. The following is the location indicated by the UAO:

- Hallandale Beach Boulevard from SW 40<sup>th</sup> Avenue to NW 8<sup>th</sup> Avenue south side

**XO Communications** – According to the review conducted by the XO Communications, the UAO does have existing facilities within the limits of this



project. Fibernet Direct controls and maintains these area facilities. The location of XO Communications facilities was not provided by Fibernet Direct at this phase.

## 2.19 LIGHTING

The existing lighting system along the I-95 corridor consists of conventional High-Pressure Sodium cobra head luminaires mounted on aluminum poles within the project limits. Lighting is provided along the I-95 mainline concrete median barrier. Roadway lighting on the ramps and arterials also consist of conventional cobra head luminaires located adjacent to the travel lanes. The maintaining agency for roadway lighting along the I-95 corridor and ramps is the Florida Department of Transportation.

## 2.20 SIGNS

### 2.20.1 ROADWAY SIGNING

An existing corridor sign inventory was performed along the I-95 mainline within the study limits. Signs are typically classified as regulatory, warning, guide, motorist information signs (general service signs) and Intelligent Transportation System (ITS).

As part of the documentation effort, each major roadway sign was photographed, inventoried, numbered, classified, and located on aerial photography. The sign structure numbers were also collected where available. As summarized in **Table 2.18**, a total of 115 major signs were found within the study limits. **Appendix E** depicts the locations of all the signs. The following quantities of major signs and classifications were identified within the study limits:

**Table 2.18 – Roadway Signing Inventory**

| Type of Sign                      | Quantity   |
|-----------------------------------|------------|
| Regulatory Signs                  | 13         |
| Warning Signs                     | 2          |
| Guide Signs                       | 83         |
| Motorist Information Signs        | 11         |
| Intelligent Transportation System | 6          |
| <b>Total</b>                      | <b>115</b> |

Source: Sign Inventory and Field Review



## 2.20.2 INTELLIGENT TRANSPORTATION SYSTEM

The I-95 corridor within the project limits is currently monitored, analyzed, and managed from the FDOT District Four SunGuide<sup>SM</sup> Transportation Management Center (TMC) using SunGuide<sup>SM</sup> software to control and monitor ITS. **Appendix F** graphically shows the existing system within the study limits.

The ITS System was recently reconstructed within the project limits by the I-95 Express Phase 2 project (FPID# 422796-1-52-01 and 422796-2-52-01), which completed construction in 2016. The purpose of the Phase 2 project was to construct one to two express lanes in the northbound and southbound directions. The ITS scope included the installation of two 144 count single-mode (SM) fiber optic cable (FOC) backbones, replacement and installation of Microwave Vehicle Detection System (MVDS) approximately every 1/3 mile, replacement and installation of Closed Circuit Television (CCTV) Cameras for surveillance and dedicated use, relocation of existing Wireless Access Points (WAP), relocation of the existing Highway Advisory Radio (HAR) Beacons, removal of existing Voice over IP (VoIP) devices, replacement and installation of Dynamic Message Signs (DMS) for both general use lanes and express lanes, and installation of Lane Status DMS (LS-DMS), Toll Rate DMS (TR-DMS), and toll gantries for express lanes operation.

There are three arterials within the project limits: Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. The ITS system along Hallandale Beach Boulevard includes an arterial DMS, MVDS, and CCTV in the eastbound direction east of Park Road. Along Pembroke Road there is an arterial DMS, MVDS, and CCTV in the westbound direction west of S 27<sup>th</sup> Avenue. Along Hollywood Boulevard there is an arterial DMS and WAP in the westbound direction east of 28<sup>th</sup> Avenue.

The following is a description of the existing ITS components:

- **Pan-Tilt-Zoom (PTZ) Closed Circuit Television (CCTV) cameras:** Surveillance CCTV cameras currently provide nearly 100 percent coverage of the project corridor and enable traffic monitoring and early incident detection capabilities. Within or approaching the project limits, the District Four SunGuide<sup>SM</sup> TMC operates 14 surveillance CCTV cameras. There are also dedicated CCTV (D-CCTV), which provide verification of DMS messaging throughout the corridor. The District Four SunGuide<sup>SM</sup> TMC operates 7 D-CCTV cameras within the project limits. The existing CCTV locations are listed in **Table 2.19**.



**Table 2.19 – Closed-Circuit Television Location and Structure Type**

| ID Number       | Location                                          | Station | CCTV Type     | Structure Type           |
|-----------------|---------------------------------------------------|---------|---------------|--------------------------|
| CCTV-95-16.51   | NB I-95 S of Ives Dairy Rd                        | 170+00  | Surveillance  | On Pole                  |
| D-CCTV 95-16.61 | SB I-95 N of Ives Dairy Rd                        | 175+50  | Dedicated     | Sign Structure           |
| D-CCTV 95-17.17 | NB I-95 S of the Miami-Dade / Broward county line | 204+84  | Dedicated     | On Pole                  |
| CCTV 95-17.28   | NB I-95 N of the Miami-Dade / Broward county line | 211+05  | Surveillance  | On Pole                  |
| D-CCTV 95-17.38 | NB I-95 N of the Miami-Dade / Broward county line | 216+22  | Dedicated     | Sign Structure (Phase 3) |
| D-CCTV 95-17.53 | NB I-95 N of the Miami-Dade / Broward county line | 224+31  | Dedicated     | On Pole                  |
| D-CCTV 95-17.66 | NB I-95 S of Hallandale Beach Blvd                | 232+00  | Dedicated     | Sign Structure           |
| D-CCTV 95-17.85 | SB I-95 S of Hallandale Beach Blvd on ramp        | 242+22  | RSS Dedicated | Pole (Phase 3)           |
| CCTV 95-17.95   | NB I-95 S of Hallandale Beach Blvd                | 246+08  | Surveillance  | On Pole                  |
| D-CCTV 95-17.95 | NB I-95 S of Hallandale Beach Blvd                | 246+08  | Dedicated     | On Pole                  |
| D-CCTV 95-18.02 | NB I-95 N of Hallandale Beach Blvd on ramp        | 249+63  | RSS Dedicated | Pole (Phase 3)           |
| N/A             | EB Hallandale Beach Blvd W of I-95                | 143+75  | Surveillance  | On Mast Arm              |
| N/A             | EB Pembroke Rd W of I-95                          | 08+90   | Surveillance  | On Pole                  |
| CCTV 95-18.47   | NB I-95 S of Pembroke Rd                          | 273+62  | Dedicated     | On Pole (Phase 3)        |
| D-CCTV 95-18.59 | SB I-95 S of Pembroke Rd                          | 280+00  | Dedicated     | On Pole (Phase 3)        |
| D-CCTV 95-18.61 | NB I-95 S of Pembroke Rd                          | 280+80  | Dedicated     | On Pole (Phase 3)        |
| CCTV 95-18.71   | NB I-95 N of Pembroke Rd                          | 289+78  | Surveillance  | On Pole                  |
| D-CCTV 95-18.90 | NB I-95 N of Pembroke Rd                          | 300+00  | Dedicated     | On Pole (Phase 3)        |
| D-CCTV 95-18.91 | NB I-95 N of Pembroke Rd                          | 300+30  | Dedicated     | On Pole (Phase 3)        |
| CCTV 95-19.13   | SB I-95 N of Pembroke Rd                          | 308+50  | Surveillance  | On Pole                  |
| D-CCTV 95-19.28 | SB I-95 N of Pembroke Rd                          | 316+63  | Dedicated     | On Pole (Phase 3)        |
| CCTV 95-19.28   | SB I-95 N of Pembroke Rd                          | 316+63  | Surveillance  | On Pole (Phase 3)        |



**Table 2.19 – Closed-Circuit Television Location and Structure Type (Continued)**

| ID Number       | Location                                   | Station | CCTV Type    | Structure Type    |
|-----------------|--------------------------------------------|---------|--------------|-------------------|
| D-CCTV 95-19.47 | NB I-95 S of Hollywood Blvd                | 326+52  | Dedicated    | On Pole           |
| D-CCTV 95-19.53 | SB I-95 S of Hollywood Blvd                | 329+60  | Dedicated    | On Pole (Phase 3) |
| D-CCTV 95-19.67 | SB I-95 S of Hollywood Blvd                | 337+00  | Dedicated    | On Pole (Phase 3) |
| CCTV 95-19.73   | NB I-95 S of Hollywood Blvd                | 340+47  | Surveillance | On Pole           |
| NA              | EB Hollywood Blvd E of I-95                | 297+37  | Surveillance | On Mast Arm       |
| N/A             | WB Hollywood Blvd W of I-95                | 294+80  | Surveillance | On Pole           |
| D-CCTV 95-19.86 | SB I-95 N of Hollywood Blvd                | 347+00  | Dedicated    | Sign Structure    |
| D-CCTV 95-19.94 | SB I-95 N of Hollywood Blvd                | 351+00  | Dedicated    | Pole (Phase 3)    |
| D-CCTV 95-19.95 | NB I-95 N of Hollywood Blvd                | 351+56  | Dedicated    | Pole (Phase 3)    |
| D-CCTV 95-20.52 | SB I-95 N of Johnson St                    | 382+00  | Dedicated    | Pole (Phase 3)    |
| CCTV 95-20.78   | NB I-95 S of Taft St                       | 395+63  | Surveillance | On Pole           |
| CCTV 95-21.37   | NB I-95 N of Sheridan St                   | 426+59  | Surveillance | On Pole           |
| N/A             | EB Hallandale Beach Blvd E of Park Rd      | 130+00  | Surveillance | Sign Structure    |
| N/A (Sheet 22)  | WB Pembroke Rd W of S 27 <sup>th</sup> Ave | 25+44   | Surveillance | Sign Structure    |

- Dynamic Message Signs (DMS):** Full color DMS signs are currently deployed along the project corridor to inform motorists of current traffic conditions and incidents such as crashes, disabled vehicles, road work, car fires, hazmat spills, evacuations, and emergency alerts. Walk-In DMS are provided over the general use lanes and front-access DMS are provided over the express lanes. In addition, Lane Status and Toll Rate DMS are deployed to provide pricing and status information related to the express lanes. Front access arterial DMS are also provided along the arterials. The District Four SunGuide<sup>SM</sup> TMC currently operates 3 general use lane DMS, 2 express lanes DMS, 2 Toll Rate DMS, 3 Lane Status DMS, and 3 arterial DMS within the project limits. The existing DMS locations are listed in **Table 2.20**.



**Table 2.20 – Dynamic Message Sign Location and Structure Type**

| ID Number          | Location                                          | Station | DMS Type        | Structure Type      |
|--------------------|---------------------------------------------------|---------|-----------------|---------------------|
| DMS 95-17.08-SB    | SB I-95 S of the Miami-Dade / Broward county line | 200+40  | General Purpose | Overhead Truss      |
| TR-DMS 95-17.25-NB | NB I-95 N of the Miami-Dade / Broward county line | 209+50  | Toll Rate       | Overhead Truss      |
| DMS 95-17.38-NB    | NB I-95 N of the Miami-Dade / Broward county line | 216+22  | General Purpose | Overhead Truss      |
| S-DMS 95-17.53-NB  | NB I-95 N of the Miami-Dade / Broward county line | 224+00  | Lane Status     | Overhead Cantilever |
| TR-DMS 95-17.66-NB | NB I-95 S of Hallandale Beach Blvd                | 232+00  | Toll Rate       | Overhead Truss      |
| S-DMS 95-17.89-NB  | NB I-95 S of Hallandale Beach Blvd                | 243+00  | Lane Status     | Overhead Truss      |
| S-DMS 95-18.04-NB  | NB I-95 N of Hallandale Beach Blvd                | 251+00  | Lane Status     | Overhead Cantilever |
| T-DMS 95-18.36-SB  | SB I-95 S of Pembroke Rd                          | 268+00  | Toll Rate       | Overhead Truss      |
| S-DMS 95-18.55-NB  | NB I-95 S of Pembroke Rd                          | 278+00  | Lane Status     | Overhead Cantilever |
| T-DMS 95-18.70-NB  | NB I-95 S of Pembroke Rd                          | 286+00  | Toll Rate       | Overhead Truss      |
| DMS 95-18.85-SB    | SB I-95 N of Pembroke Rd                          | 294+00  | General Purpose | Overhead Truss      |
| E-DMS 95-18.98-SB  | SB I-95 N of Pembroke Rd                          | 301+00  | Express Lane    | Overhead Truss      |
| E-DMS 95-19.06-NB  | NB I-95 N of Pembroke Rd                          | 305+00  | Express Lane    | Overhead Truss      |
| E-DMS 95-19.39-SB  | SB I-95 N of Pembroke Rd                          | 322+50  | Express Lane    | Overhead Cantilever |
| E-DMS 95-19.69-SB  | SB I-95 S of Hollywood Blvd                       | 338+00  | Express Lane    | Overhead Butterfly  |
| E-DMS 95-19.69-NB  | NB I-95 S of Hollywood Blvd                       | 338+00  | Express Lane    | Overhead Cantilever |
| DMS 95-19.73-SB    | SB I-95 S of Hollywood Blvd                       | 340+00  | General Purpose | Overhead Truss      |
| DMS 95-20.14-NB    | NB I-95 S of Hollywood Blvd                       | 361+68  | General Purpose | Overhead Truss      |
| S-DMS 95-20.35-SB  | SB I-95 N of Johnson St                           | 373+00  | Lane Status     | Overhead Cantilever |
| N/A                | EB Hallandale Beach Blvd E of Park Rd             | 130+00  | Arterial        | Overhead Cantilever |
| N/A                | WB Pembroke Rd W of Park Rd                       | 25+44   | Arterial        | Overhead Cantilever |
| N/A                | WB Hollywood Blvd E of N 28 <sup>th</sup> Ave     | N/A     | Arterial        | Overhead Cantilever |



- **Microwave Vehicle Detection System:** Microwave Vehicle Detection System (MVDS) sensors are deployed within the project limits as part of the District Four Vehicle Detection System. These devices are non-intrusive mounted on poles or sign structures along the shoulders and collect volume, vehicle type, average speed, lane occupancy, and long vehicle count data. The data from the MVDS are also used to calculate the dynamic toll pricing for the express lanes. Within the project limits, the District Four SunGuide<sup>SM</sup> TMC currently operates 45 MVDS. The existing MVDS locations are listed in **Table 2.21**.

**Table 2.21 – Microwave Vehicle Detection System Location and Structure Type**

| ID Number          | Location                                          | Station | Structure Type |
|--------------------|---------------------------------------------------|---------|----------------|
| MVDS 95-16.64-NB   | SB I-95 N of Ives Dairy Rd                        | 177+15  | On Pole        |
| MVDS 95-16.64-SB   | SB I-95 N of Ives Dairy Rd                        | 177+15  | On Pole        |
| MVDS 95-16.98-NB   | NB I-95 N of Ives Dairy Rd                        | 195+00  | On Pole        |
| MVDS 95-16.98-SB   | NB I-95 N of Ives Dairy Rd                        | 195+00  | On Pole        |
| MVDS 95-17.36-SB-A | SB I-95 S of the Miami-Dade / Broward county line | 215+00  | Sign Structure |
| MVDS 95-17.36-SB-B | SB I-95 S of the Miami-Dade / Broward county line | 215+00  | Sign Structure |
| MVDS 95-17.38-NB-A | NB I-95 N of the Miami-Dade / Broward county line | 216+22  | Sign Structure |
| MVDS 95-17.38-NB-B | NB I-95 N of the Miami-Dade / Broward county line | 216+22  | Sign Structure |
| MVDS 95-17.66-A    | NB I-95 S of Hallandale Beach Blvd                | 231+00  | Pole (Phase 3) |
| MVDS 95-17.66-R    | NB I-95 S of Hallandale Beach Blvd                | 232+00  | Sign Structure |
| MVDS 95-17.91-SB-A | SB I-95 S of Hallandale Beach Blvd                | 244+00  | On Pole        |
| MVDS 95-17.91-SB-B | SB I-95 S of Hallandale Beach Blvd                | 244+00  | On Pole        |
| MVDS 95-17.95-NB-A | NB I-95 S of Hallandale Beach Blvd                | 246+08  | On Pole        |
| MVDS 95-17.95-NB-B | NB I-95 S of Hallandale Beach Blvd                | 246+08  | On Pole        |
| MVDS 95-18.13-NB-A | NB I-95 N of Hallandale Beach Blvd                | 255+61  | On Pole        |
| MVDS 95-18.13-NB-B | NB I-95 N of Hallandale Beach Blvd                | 255+61  | On Pole        |
| MVDS 95-18.14-NB-A | SB I-95 N of Hallandale Beach Blvd                | 256+00  | On Pole        |
| MVDS 95-18.14-NB-B | SB I-95 N of Hallandale Beach Blvd                | 256+00  | On Pole        |
| MVDS 95-18.36-SB-A | SB I-95 N of Hallandale Beach Blvd                | 267+67  | Sign Structure |
| MVDS 95-18.36-SB-B | SB I-95 N of Hallandale Beach Blvd                | 267+67  | Sign Structure |



**Table 2.21 – Microwave Vehicle Detection System Location and Structure Type  
(Continued)**

| ID Number          | Location                           | Station | Structure Type    |
|--------------------|------------------------------------|---------|-------------------|
| MVDS 95-18.36-NB-A | NB I-95 N of Hallandale Beach Blvd | 267+95  | Sign Structure    |
| MVDS 95-18.36-NB-B | NB I-95 N of Hallandale Beach Blvd | 267+95  | Sign Structure    |
| MVDS 95-18.59-SB   | SB I-95 S of Pembroke Rd           | 280+00  | On Pole           |
| MVDS 95-18.61-NB   | NB I-95 S of Pembroke Rd           | 280+80  | On Pole           |
| MVDS 95-18.71-NB   | NB I-95 N of Pembroke Rd           | 289+78  | On Pole           |
| MVDS 95-18.71-SB   | NB I-95 N of Pembroke Rd           | 289+78  | On Pole           |
| MVDS 95-18.85-SB-A | SB I-95 N of Pembroke Rd           | 294+00  | Sign Structure    |
| MVDS 95-18.85-SB-B | SB I-95 N of Pembroke Rd           | 294+00  | Sign Structure    |
| MVDS 95-18.91-NB-A | NB I-95 N of Pembroke Rd           | 300+30  | On Pole           |
| MVDS 95-18.91-NB-B | NB I-95 N of Pembroke Rd           | 300+30  | On Pole           |
| MVDS 95-19.13-SB-A | SB I-95 N of Pembroke Rd           | 308+50  | On Pole           |
| MVDS 95-19.13-SB-B | SB I-95 N of Pembroke Rd           | 308+50  | On Pole           |
| MVDS 95-19.20-NB-A | NB I-95 N of Pembroke Rd           | 312+40  | Sign Structure    |
| MVDS 95-19.20-NB-B | NB I-95 N of Pembroke Rd           | 312+40  | Sign Structure    |
| MVDS 95-19.28-SB   | SB I-95 N of Pembroke Rd           | 316+63  | On Pole           |
| MVDS 95-19.31-NB   | NB I-95 N of Pembroke Rd           | 318+00  | On Pole           |
| MVDS 95-19.39-R    | NB I-95 S of Hollywood Blvd        | 322+11  | Sign Structure    |
| MVDS 95-19.53-SB   | SB I-95 S of Hollywood Blvd        | 329+60  | Pole (Phase 3)    |
| MVDS 95-19.53-SB   | SB I-95 S of Hollywood Blvd        | 329+60  | Pole (Phase 3)    |
| MVDS 95-19.67-R    | SB I-95 S of Hollywood Blvd        | 337+00  | Pole (Phase 3)    |
| MVDS 95-19.67-SB   | SB I-95 S of Hollywood Blvd        | 337+00  | Pole (Phase 3)    |
| MVDS 95-19.69-SB-A | SB I-95 S of Hollywood Blvd        | 338+10  | On Pole           |
| MVDS 95-19.69-SB-B | SB I-95 S of Hollywood Blvd        | 338+10  | On Pole           |
| MVDS 95-19.73-NB-A | NB I-95 S of Hollywood Blvd        | 340+47  | On Pole           |
| MVDS 95-19.73-NB-B | NB I-95 S of Hollywood Blvd        | 340+47  | On Pole           |
| MVDS 95-19.94-SB   | SB I-95 N of Hollywood Blvd        | 351+00  | On Pole (Phase 3) |
| MVDS 95-19.95-NB   | NB I-95 N of Hollywood Blvd        | 351+56  | On Pole (Phase 3) |
| MVDS 95-20.06-NB   | NB I-95 N of Hollywood Blvd        | 358+00  | On Pole (Phase 3) |
| MVDS 95-20.14-SB-A | SB I-95 S of Johnson St            | 362+00  | Sign Structure    |
| MVDS 95-20.14-SB-B | SB I-95 S of Johnson St            | 362+00  | Sign Structure    |
| MVDS 95-20.30-NB-A | NB I-95 N of Johnson St            | 370+30  | On Pole           |
| MVDS 95-20.30-NB-B | NB I-95 N of Johnson St            | 370+30  | On Pole           |

**Table 2.21 – Microwave Vehicle Detection System Location and Structure Type  
(Continued)**

| ID Number          | Location                                   | Station | Structure Type    |
|--------------------|--------------------------------------------|---------|-------------------|
| MVDS 95-20.31-NB-A | SB I-95 N of Johnson St                    | 370+86  | On Pole (Phase 3) |
| MVDS 95-20.31-NB-B | NB I-95 N of Johnson St                    | 370+90  | On Pole (Phase 3) |
| MVDS 95-20.52-NB-A | SB I-95 N of Johnson St                    | 382+00  | On Pole (Phase 3) |
| MVDS 95-20.52-NB-B | NB I-95 N of Johnson St                    | 382+00  | On Pole (Phase 3) |
| MVDS 95-20.75-SB-A | SB I-95 S of Taft St                       | 394+00  | Sign Structure    |
| MVDS 95-20.75-SB-B | SB I-95 S of Taft St                       | 394+00  | Sign Structure    |
| MVDS 95-20.78-NB-A | NB I-95 S of Taft St                       | 395+63  | On Pole           |
| MVDS 95-20.78-NB-B | NB I-95 S of Taft St                       | 395+63  | On Pole           |
| MVDS 95-20.98-R    | NB I-95 N of Taft St                       | 406+12  | Sign Structure    |
| MVDS 95-21.30-SB-A | SB I-95 S of Sheridan St                   | 423+00  | On Pole           |
| MVDS 95-21.30-SB-B | SB I-95 S of Sheridan St                   | 423+00  | On Pole           |
| MVDS 95-21.37-NB-A | NB I-95 N of Sheridan St                   | 426+59  | On Pole           |
| MVDS 95-21.37-NB-B | NB I-95 N of Sheridan St                   | 426+59  | On Pole           |
| N/A                | EB Hallandale Beach Blvd E of Park Rd      | 130+00  | Sign Structure    |
| N/A                | WB Pembroke Rd W of S 27 <sup>th</sup> Ave | 25+44   | Sign Structure    |

- **Highway Advisory Radio (HAR) System:** The corridor HAR system includes TMC equipment which is connected to each transmitter site over a fiber optic communications link. This allows complete remote control of each transmitter from the TMC, via downloading of messages in digital form. The existing HAR location is listed in **Table 2.22**.

**Table 2.22 – Highway Advisory Radio Location and Structure Type**

| ID Number       | Location                           | Station | Structure Type |
|-----------------|------------------------------------|---------|----------------|
| HAR 95-17.47-NB | NB I-95 S of Hallandale Beach Blvd | 221+00  | HAR Beacon     |

- **Wireless Access Point (WAP) System:** The corridor WAP system is typically utilized for wireless communication between arterial DMS and the FOC backbone for locations where FOC is not installed. Within the project limits, the District Four SunGuide<sup>SM</sup> TMC currently operates 7 WAP. The existing WAP locations are listed in **Table 2.23**.

**Table 2.23 – Wireless Access Point Location and Structure Type**

| ID Number       | Location                                      | Station | Structure Type |
|-----------------|-----------------------------------------------|---------|----------------|
| WAP 95-17.95-WB | NB I-95 S of Hallandale Beach Blvd            | 246+08  | On Pole        |
| WAP 95-17.95-EB | NB I-95 S of Hallandale Beach Blvd            | 246+08  | On Pole        |
| WAP 95-19.73-EB | NB I-95 S of Hollywood Blvd                   | 340+47  | On Pole        |
| WAP 95-19.78-WB | NB I-95 N of Hollywood Blvd                   | 342+75  | On Pole        |
| WAP 95-21.37-EB | NB I-95 N of Sheridan St                      | 426+59  | On Pole        |
| WAP 95-21.37-WB | NB I-95 N of Sheridan St                      | 426+59  | On Pole        |
| N/A             | WB Hollywood Blvd E of N 28 <sup>th</sup> Ave | N/A     | Sign Structure |

- **Toll Gantry System:** With the installation of the express lanes with I-95 Phase 2, toll gantries were installed along the corridor to collect tolls from motorists choosing to utilize the express lanes. The toll sites include a full span gantry, toll building, pull-off area, median pull-boxes, and loop detectors. There is currently one toll gantry within the project limits as per **Table 2.24**.

**Table 2.24 – Toll Gantry Location and Structure Type**

| ID Number   | Location                    | Station | Structure Type |
|-------------|-----------------------------|---------|----------------|
| Toll Site 2 | NB I-95 S of Hollywood Blvd | 324+50  | Overhead Truss |

- **Fiber Optic Communication System:** The Fiber Optic Communication system for the currently deployed ITS equipment was installed by the I-95 Express Phase 2 Project and is typically located along the east side of I-95 near the right of way. The FOC backbone consists of 144 count single-mode (SM) FOC with 24 SM FOC for the drop cables. There is one Master HUB within the project limits located in the toll building at Toll Site 2 south of Hollywood Boulevard. Multiple MVDS along the southbound side of the roadway are connected to cabinets on the northbound side utilizing composite cable.

## 2.21 AESTHETICS FEATURES

There are no scenic views, vistas, or special landscaping within the I-95 study limits. I-95 is an urban limited access freeway corridor. However, there are some minor vegetation at the interchanges with welcome signs to the local cities, maintained by the Department of Public Works, Utilities & Engineering.



## 2.22 BRIDGES AND STRUCTURES

There are six existing bridges located within the study limits. **Figure 2.11** depicts the location of the bridges.

- Five bridges over roadways – Hallandale Beach Boulevard, Pembroke Road, Hollywood Boulevard, and Johnson Street
- One bridge over water – Hollywood Canal

**Table 2.25** identifies the locations, descriptions, and specific details about each of the bridges within the study limits. Location, geometrics, alignment, type of structure, and condition data was collected and analyzed for each structure.

The project corridor includes eight existing noise barriers/systems along I-95 from Ives Dairy Road to north of Hollywood Boulevard. There are no perimeter walls located along the project corridor. The information presented in this section is a summary of the *Bridge Analysis Report*, a companion document to this PD&E Study.

### 2.22.1 TYPE OF STRUCTURE

All the existing bridges, within the study limits, are composed of prestressed concrete girder superstructures (AASHTO Beams) supported on multi-column bents, except for the Hollywood Boulevard bridge over the Hollywood Canal (Bridge No. 860599), which is a Concrete Deck Slab (CIP).

The type of structure for each bridge along the corridor is summarized in **Table 2.25**.

### 2.22.2 CONDITION

The FDOT performs biennial inspections and evaluations of all fixed bridges under its jurisdiction as part of the “National Bridge Inventory (NBI) and Structural Inventory and Appraisal Program” required by the Federal Highway Administration (FHWA). The latest available bridge inspection reports were obtained through the FDOT for all the existing bridges. These reports were reviewed for every bridge and the pertinent information was recorded, including the sufficiency rating, the health index, vertical and horizontal clearances, and noted deficiencies.



| SUMMARY OF STRUCTURES                                                                                |          |
|------------------------------------------------------------------------------------------------------|----------|
| ITEM                                                                                                 | QUANTITY |
|  EXISTING BRIDGES | 6        |



Figure 2.11 - Existing Bridge Location Map



Table 2.25 – Existing Bridge Characteristics

| LOCATION      |                                                      |           | GEOMETRICS            |                              |                          |                            |                              | ALIGNMENT             |                      |              |                              | STRUCTURAL                     |                 |                |                                                 |                    | CONDITION                                                                                          |                                                   |                        |              |                                 |                 |                          |
|---------------|------------------------------------------------------|-----------|-----------------------|------------------------------|--------------------------|----------------------------|------------------------------|-----------------------|----------------------|--------------|------------------------------|--------------------------------|-----------------|----------------|-------------------------------------------------|--------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|------------------------|--------------|---------------------------------|-----------------|--------------------------|
| Bridge ID No. | Bridge Location                                      | Direction | Structure Length (ft) | Deck Width (ft)              | Shoulder Width           |                            | No. of Lanes                 | Skew Angles (Degrees) | Horizontal Clearance |              | Min. Vertical Clearance (ft) | Underneath Roadway Designation | Number of Spans | Max. Span (ft) | Superstructure Type                             | Exterior Beam Type | Substructure Type                                                                                  | Year Built/ Widened                               | Sufficiency Rating (%) | Health Index | Load Rating                     | Inspection Date | Significant Deficiencies |
|               |                                                      |           |                       |                              | Inside                   | Outside                    |                              |                       | Inside (LF)          | Outside (RT) |                              |                                |                 |                |                                                 |                    |                                                                                                    |                                                   |                        |              |                                 |                 |                          |
| 860529        | SR 9 / I-95 Over Hallandale Beach Boulevard (SR 858) | NB/SB     | 244                   | 187.08                       | NB = 6'-8"<br>SB = 8'-0" | NB = 13'-4"<br>SB = 12'-0" | 12 ( 6 in each direction)    | 0.00                  | 13.00                | 14.67        | 16.50                        | SR 858 Hallandale Beach Blvd.  | 4               | 84             | Prestressed Concrete Beams w/ CIP Concrete Deck | Prestressed FIB 45 | Reinforced Concrete Column Piers and Abutments                                                     | Built in 1990, Widened in 2013                    | 98.00                  | 99.96        | RF = 1.04, 37.4 Tons (Inv LRFR) | 8/20/2015       | None Visible             |
| 860531        | SR 9 / I-95 Over Pembroke Road (SR 824)              | NB/SB     | 243.5                 | 187.08                       | NB = 6'-6"<br>SB = 7'-9" | NB = 13'-6"<br>SB = 12'-3" | 12 ( 6 in each direction)    | 0.00                  | 14.25                | 15.25        | 16.50                        | SR 824 Pembroke Road           | 4               | 84             | Prestressed Concrete Beams w/ CIP Concrete Deck | Prestressed FIB 45 | Reinforced Concrete Column Piers and Abutments                                                     | Built in 1990, Widened in 2013                    | 98.00                  | 99.89        | RF = 1.00, 36.0 Tons (Inv LRFR) | 8/20/2015       | None Visible             |
| 860530        | SR 9 / I-95 Over Hollywood Blvd.(SR 820)             | NB/SB     | 244.00                | 187.08                       | NB = 6'-3"<br>SB = 6'-3" | NB = 13'-9"<br>SB = 13'-9" | 12 ( 6 in each direction)    | 0.00                  | 13.00                | 15.00        | 16.50                        | SR 820 Hollywood Blvd.         | 4               | 84             | Prestressed Concrete Beams w/ CIP Concrete Deck | Prestressed FIB 45 | Reinforced Concrete Column Piers and Abutments                                                     | Built in 1990, Widened in 2013                    | 98.00                  | 99.86        | RF = 1.04, 37.4 Tons (Inv LRFR) | 8/20/2015       | None Visible             |
| 860599        | SR 820 Over Hollywood Canal                          | EB/WB     | 20.25                 | Varies from 137.83 to 141.41 | EB = 0'-0"<br>WB = 0'-0" | EB = 1'-0" *<br>WB = 1'-0" | EB = 6 lanes<br>WB = 3 lanes | 0.00                  | N/A                  | N/A          | 1.85 over DHW                | Bridge Over Canal              | 1               | 20.25          | CIP Concrete Deck Slab                          | N/A                | Reinforced Conc. Abutments Supported on 18" sq Prest. Conc. Piles and Type II Anchor Beams         | 1971-1996                                         | 90.80                  | 98.92        | RF = 1.27 45.7 Tons (Inv LFR)   | 8/21/2015       | None Visible             |
| 860102        | I-95 OverJohnson St. SB                              | SB        | 147.00                | 97.67                        | 10'-10 1/2"              | 10'-0"                     | 6 Lanes                      | 0.00                  | N/A                  | 14.17        | 14.42                        | Johnson St.                    | 3               | 71             | Prestressed Concrete Beams w/ CIP Concrete Deck | AASHTO Type III    | Reinforced Concrete Column Piers and Abutments (Bridges 860102 and 860101 share same substructure) | Built in 1962, Widened in 1990, 2nd widening 2020 | 89.70                  | 99.95        | RF = 1.28 46.1 Tons (Inv LRFR)  | 12/12/2017      | Vertical Clearance       |
| 860202        | I-95 OverJohnson St. NB                              | NB        | 147.00                | 97.67                        | 10-10 1/2"               | 10'-0"                     | 6 Lanes                      | 0.00                  | N/A                  | 15.47        | 15.47                        | Johnson St.                    | 3               | 71             | Prestressed Concrete Beams w/ CIP Concrete Deck | AASHTO Type III    |                                                                                                    | Built in 1962, Widened in 1990, 2nd widening 2020 | 89.70                  | 99.95        | RF = 1.28 46.1 Tons (Inv LRFR)  | 12/12/2017      | Vertical Clearance       |



The health index is a tool that measures the overall condition of a bridge. A lower health index indicates that more work is needed to bring the bridge to an ideal condition. The sufficiency rating is an index tool used to determine whether a bridge that is structurally deficient or functionally obsolete should be repaired or replaced and is not a direct reflection of the bridges' ability to carry traffic loads. The sufficiency rating considers several factors, approximately half of which relates to the condition of the bridge itself and the rest relates to the obsolescence of its design and its importance to the public.

The sufficiency ratings are assigned on a scale of 0 to 100, with 0 failing and 100 excellent. The sufficiency rating is the formula used to evaluate the remaining service of a bridge by rating four groups of factors:

1. Structural Adequacy and Safety
2. Serviceability and Functional Obsolescence
3. Essential for Public Use
4. Special Reductions

A review of the existing bridge inspection reports indicated that all bridges have acceptable health indexes varying from 98.92 to 99.96 and acceptable sufficiency ratings varying from 89.7 to 98.0. Bridge load rating capacity forms were also obtained from FDOT and reviewed to verify the structural capacity for each bridge. The forms indicate both the inventory and operating ratings. Based on the inspection reports, all bridges are in good condition with some deficiencies. In the case of the I-95 bridge over Johnson Street, load rating information of the 2020 widening indicates that another bridge widening is feasible. The condition of each of the bridges is summarized in **Table 2.25**. The *Bridge Analysis Report* includes additional detailed information about the existing bridge structure conditions.

### 2.22.3 VERTICAL CLEARANCE

**Vertical Clearance** – The vertical clearance relates to the adequate clear height of an overpass/overhead or underpass structure/facility to the roadway and shoulder areas. In accordance with the *FDM Part I, Chapter 260, Section 260.6, Table 260.6.1*, the vertical clearance criteria for a bridge over a roadway is 16'-6", for a roadway over railroad is 23'-6", and for a pedestrian bridge over a roadway is 17'-6". AASHTO requires a minimum vertical clearance of 16' for



structures passing over a roadway. The two I-95 bridges over Johnson Street do not meet the FDM minimum vertical clearance criteria. As part of this study, the existing clearance at these bridges will be maintained at their current level. In order to move forward with a bridge widening where there is a substandard vertical clearance, an approval will be required through an FDOT design variation or exception.



## **2.23 EXISTING ENVIRONMENTAL FEATURES**

The project area is heavily urbanized and generally lacks undisturbed natural communities. Predominant land uses include residential and commercial uses. The project is underlain by the Biscayne Aquifer which is a Sole Source Aquifer as identified by the U.S. Environmental Protection Agency.

There are five recreational Section 4(f) Resources located within the project area: Oreste Blake Johnson Park, McNichol Community Center, Orangebrook Golf Course, Lions Park, and Stanley Goldman Memorial Park. No archaeological sites were identified within the Area of Potential Effect for cultural resources. The historic resources survey identified one National Register-eligible resource, the Seaboard Air Line (CSX) Railroad.

One mangrove wetland and several other surface waters/swales are present. The project is within the US Fish and Wildlife Service (USFWS) Consultation Area for American crocodile, Florida bonneted bat, and Everglade snail kite. There are no Critical Habitats present. There is no Essential Fish Habitat present. The project occurs within the Core Foraging Areas of two wood stork colonies.

Noise measurements were collected at three representative locations representing six monitoring sites within the project limits. Noise barriers were evaluated for 201 of 203 residences and for five of the special land use sites. A total of 38 potentially contaminated sites were identified, including three High Risk, 22 Medium Risk, 11 Low Risk, and two No Risk.



## 3.0 PROJECT DESIGN CONTROLS AND CRITERIA

### 3.1 ROADWAY CONTEXT CLASSIFICATION

Context classification does not apply to limited-access facilities.

### 3.2 DESIGN CONTROL AND CRITERIA

Design standards are well defined for Florida's limited access facilities. Design standards and criteria provide the framework for evaluating the current geometry, existing deficiencies, and future design to meet the mobility needs of the corridor. Specifically, they help establish the roadway typical section, cross-sections, and acceptable interchange configurations.

Roadway design elements and applicable design standards considered in the design of the proposed improvements for the corridor are summarized in [Table 3.1](#).

Design controls are established parameters or physical characteristics that affect the selection of criteria and standards for the geometric design of project alternatives. The applicable design controls for this project are:

- Functional classification and SIS designation
- Access management class and applicable standards
- Design speed
- Capacity and LOS Target
- Design vehicle
- Pedestrian and bicycle requirements
- Physical constraints (ROW, approach roads, intersecting roads, railroads, major utilities)
- Environmental constraints
- Type of stormwater management facilities
- Design high water

The design controls guide the selection of the appropriate design criteria to be used in developing project alternatives.



Table 3.1 – Roadway Design Elements and Standards

| Design Element                                                           | Design Standard                                              |             |             |                    |                      |             |                          |             | Source                                                                      |
|--------------------------------------------------------------------------|--------------------------------------------------------------|-------------|-------------|--------------------|----------------------|-------------|--------------------------|-------------|-----------------------------------------------------------------------------|
| Lane Width                                                               |                                                              |             |             |                    |                      |             |                          |             |                                                                             |
| Mainline I-95                                                            | 12 ft                                                        |             |             |                    |                      |             |                          |             | FDM, Part 2, Section 211.2                                                  |
| Arterial Urban                                                           | Travel (feet)                                                |             |             | Auxiliary (feet)   |                      |             | Two-Way Left Turn (feet) |             | FDM, Part 2, Table 210.2.1                                                  |
|                                                                          | Design Speed (mph)                                           |             |             | Design Speed (mph) |                      |             | Design Speed (mph)       |             |                                                                             |
|                                                                          | 23-35                                                        | 40-45       | ≥50         | 23-35              | 40-45                | ≥50         | 25-35                    | 40          |                                                                             |
|                                                                          | 10                                                           | 11          | N/A         | 10                 | 11                   | N/A         | 11                       | 12          |                                                                             |
| One Lane Ramp                                                            | 15 ft (Tangent)                                              |             |             |                    |                      |             |                          |             | FDM, Part 2, Table 211.2.1                                                  |
| Two Lanes Ramp                                                           | 24 ft (Tangent)                                              |             |             |                    |                      |             |                          |             |                                                                             |
| Median Width                                                             |                                                              |             |             |                    |                      |             |                          |             |                                                                             |
| Mainline With Barrier                                                    | 26 ft                                                        |             |             |                    |                      |             |                          |             | FDM, Part 2, Table 211.3.1                                                  |
| Arterial Urban                                                           | Curbed Roadways and Flush Shoulder Roadways (feet)           |             |             |                    |                      |             |                          |             | FDM, Part 2, Table 210.3.1                                                  |
|                                                                          | Design Speed (mph)                                           |             |             |                    |                      |             |                          |             |                                                                             |
|                                                                          | 25-35                                                        |             |             |                    | 40-45                |             |                          |             |                                                                             |
|                                                                          | 15.5 ft                                                      |             |             |                    | 22 ft                |             |                          |             |                                                                             |
| Shoulder Width                                                           | Without Shoulder Gutter                                      |             |             |                    | With Shoulder Gutter |             |                          |             |                                                                             |
|                                                                          | Full Width                                                   |             | Paved Width |                    | Full Width           |             | Paved Width              |             |                                                                             |
|                                                                          | Outside                                                      | Median/Left | Outside     | Median/Left        | Outside              | Median/Left | Outside                  | Median/Left |                                                                             |
| Mainline I-95                                                            | 12 ft                                                        | 12 ft       | 10 ft       | 10 ft              | 15.5 ft              | 15.5 ft     | 8 ft                     | 8 ft        | FDM, Part 2, Table 211.4.1, N/A BECAUSE OF DELINEATORS, NO OUTSIDE SHOULDER |
| One Lane Ramp                                                            | 6 ft                                                         | 6 ft        | 4 ft        | 2 ft               | 11.5 ft              | 11.5 ft     | 4 ft                     | 4 ft        |                                                                             |
| Two Lanes Ramp (Interstate)                                              | 12 ft                                                        | 8 ft        | 10 ft       | 4 ft               | 15.5 ft              | 13.5 ft     | 8 ft                     | 6 ft        |                                                                             |
| One Lane (Managed Lane)                                                  | N/A                                                          | 12 ft       | N/A         | 12 ft              | 15.5 ft              | 13.5 ft     | 8 ft                     | 6 ft        |                                                                             |
| Two Lanes (Managed Lane)                                                 | N/A                                                          | 12 ft       | N/A         | 12 ft              | 15.5 ft              | 13.5 ft     | 8 ft                     | 6 ft        |                                                                             |
| Arterial 4-Lanes or more                                                 | 10 ft                                                        | 10 ft       | 5 ft        | 4 ft               | 15.5 ft              | 15.5 ft     | 8 ft                     | 8 ft        | FDM, Part 2, Table 210.4.1,                                                 |
| Arterial 3-Lanes                                                         | 10 ft                                                        | 10 ft       | 5 ft        | 4 ft               | 15.5 ft              | 15.5 ft     | 8 ft                     | 8 ft        |                                                                             |
| Arterial 1-Lane & 2-Lanes                                                | 10 ft                                                        | 8 ft        | 5 ft        | 4 ft               | 15.5 ft              | 13.5 ft     | 8 ft                     | 6 ft        |                                                                             |
| Arterial Auxiliary Lanes                                                 | 10 ft                                                        | 8 ft        | 5 ft        | 4 ft               | 15.5 ft              | 11.5 ft     | 4 ft                     | 4 ft        |                                                                             |
| Bridge Shoulder Width                                                    |                                                              |             |             |                    |                      |             |                          |             |                                                                             |
| Mainline-Two Lanes                                                       | 6 ft Inside, 10 ft Outside                                   |             |             |                    |                      |             |                          |             | FDM, Part 2, Figures 260.1.1 – 260.1.4                                      |
| Mainline-Three Lanes +                                                   | 10 ft Inside and Outside                                     |             |             |                    |                      |             |                          |             |                                                                             |
| Arterial                                                                 | 6 ft Inside, 10 ft Outside                                   |             |             |                    |                      |             |                          |             |                                                                             |
| Ramp-One Lane                                                            | 6 ft Inside and Outside                                      |             |             |                    |                      |             |                          |             |                                                                             |
| Ramp-Two Lanes                                                           | 6 ft Inside, 10 ft Outside                                   |             |             |                    |                      |             |                          |             |                                                                             |
| Separation Width for Managed Lane                                        |                                                              |             |             |                    |                      |             |                          |             |                                                                             |
| Managed Lanes                                                            | Maximum buffer width is 3 ft                                 |             |             |                    |                      |             |                          |             | FDM 211.3.3                                                                 |
| Roadway Mainline Cross Section Slope                                     |                                                              |             |             |                    |                      |             |                          |             |                                                                             |
| Roadway Standard Pavement                                                | 0.03-0.035 maximum                                           |             |             |                    |                      |             |                          |             | FDM, Part 2, Figure 211.2.1                                                 |
| Inside Shoulder                                                          | 0.05 (Can use 0.06 when inside lane is sloped to the median) |             |             |                    |                      |             |                          |             | FDM, Part 2, Section 211.4.2                                                |
| Outside Shoulder                                                         | 0.06                                                         |             |             |                    |                      |             |                          |             |                                                                             |
| Maximum Shoulder Cross Slope Break                                       | 0.07                                                         |             |             |                    |                      |             |                          |             |                                                                             |
| Bridge Deck                                                              | 0.02                                                         |             |             |                    |                      |             |                          |             | FDM, Part 2, Section 260.4                                                  |
| Maximum algebraic difference between adjacent through lanes              | 0.04                                                         |             |             |                    |                      |             |                          |             | FDM, Part 2, Table 211.2.2                                                  |
| Maximum Algebraic Difference in Cross Slope at Turning Roadway Terminals | 5.0                                                          |             |             |                    |                      |             |                          |             | FDM, Part 2, Table 211.2.2                                                  |
| Ramp Terminal Design                                                     |                                                              |             |             |                    |                      |             |                          |             |                                                                             |
| Taper Type Exit Ramp Terminal Ramp Divergence Angle                      | 2-5 degrees                                                  |             |             |                    |                      |             |                          |             | FDM, Part 2, Figure 211.13.2                                                |
| Parallel Design Type Exit Ramp Terminal                                  | See Figure 211.13.5                                          |             |             |                    |                      |             |                          |             | FDM, Part 2, Figure 211.13.5                                                |





Table 3.1 – Roadway Design Elements and Standards (Continued)

| Design Element                   | Design Standard                                 |       |                                   | Source                        |
|----------------------------------|-------------------------------------------------|-------|-----------------------------------|-------------------------------|
| Border Width                     |                                                 |       |                                   |                               |
| Mainline I-95                    | 94 ft <sup>(1)</sup>                            |       |                                   | FDM, Part 2, Section 211.6    |
| Arterial Urban                   | Curbed and High-Speed Curbed Design Speed (mph) |       | Flush Shoulder Design Speed (mph) | FDM, Part 2, Table 210.7.1    |
|                                  | 25-40                                           | 45    | 25-45                             |                               |
|                                  | 12 ft                                           | 14 ft | 33 ft                             |                               |
| Recoverable Terrain (Clear Zone) |                                                 |       |                                   |                               |
| Mainline I-95                    | 36 ft                                           |       |                                   | FDM, Part 2, Table 215.2.1    |
| One Lane Ramp                    | 10 - 18 ft                                      |       |                                   |                               |
| Two Lane Ramp                    | 12 - 30 ft                                      |       |                                   |                               |
| Auxiliary Lane                   | 24 ft                                           |       |                                   |                               |
| Arterial                         | 12 - 24 ft                                      |       |                                   |                               |
| Roadway Base Clearance           |                                                 |       |                                   |                               |
|                                  | 3.0 ft above the Base Clearance Water Elevation |       |                                   | FDM, Part 2, Section 210.10.3 |

**Note:** FDOT Design Manual, January 1, 2025

<sup>1</sup> Measured from the edge of the outside travel lane to the right of way line.



### 3.2.1 HORIZONTAL AND VERTICAL ALIGNMENT

Design elements and applicable design standards considered in the design of the horizontal and vertical alignments such as profiles, curves, and vertical clearances are summarized in **Table 3.2**.

**Table 3.2 – Horizontal and Vertical Alignment Design Elements and Standards**

| Design Element                                                                | Design Standard                                | Source                                    |
|-------------------------------------------------------------------------------|------------------------------------------------|-------------------------------------------|
| <b>Design Vehicle</b>                                                         |                                                |                                           |
| Mainline I-95                                                                 | WB-62FL                                        | FDM, Part 2, Figure 201.6.1               |
| For Structural Loading                                                        | HL-93                                          | AASHTO, LRFR                              |
| <b>Design Speed</b>                                                           |                                                |                                           |
| Mainline I-95                                                                 | 65 MPH                                         | FDM Part 2, Table 201.5.1                 |
| CD Systems                                                                    | 55 MPH                                         | FDM, Part 2, Section 201.5.1.1            |
| Ramps                                                                         | 30-50 MPH                                      | FDM Part 2, Table 201.5.2                 |
| Arterials (Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard) | 35-45 MPH                                      | FDM Part 2, Section 201.5                 |
| <b>Maximum Deflection without curve</b>                                       |                                                |                                           |
| Mainline I-95                                                                 | 0° 45' 00" for V ≥ 50 MPH                      | FDM, Part 2, Section 210.8.1              |
| Ramps (without Curb and Gutter)                                               | 0° 45' 00" for V ≥ 45 MPH                      |                                           |
|                                                                               | 2° 00' 00" for V ≤ 40 MPH                      |                                           |
| Arterials                                                                     | 1° 00' 00" for V = 45<br>2° 00' 00" for V ≤ 40 |                                           |
| <b>Length of Horizontal Curve</b>                                             |                                                |                                           |
| Mainline I-95<br>(Desired Length=30x Design Speed)                            | 1950 ft for V = 65 MPH                         | FDM, Part 2, Table 210.8.1, Table 211.7.1 |
| Mainline I-95<br>(Minimum Length=15x Design Speed)                            | 975 ft for V = 65 MPH                          |                                           |
| Ramps, Arterials (Length=15x Design Speed)                                    | 450 ft for V = 30 MPH                          |                                           |
| Ramps, (Length=15x Design Speed)                                              | 750 ft for V = 50 MPH                          |                                           |
| Ramps, Arterials (Minimum)                                                    | 400 ft for V ≤ 45                              |                                           |



**Table 3.2 – Horizontal and Vertical Alignment Design Elements and Standards  
(Continued)**

| Design Element                                 | Design Standard                       | Source                         |
|------------------------------------------------|---------------------------------------|--------------------------------|
| Maximum Degree of Curve                        |                                       |                                |
| Mainline I-95                                  | 4° 15' (65 mph)<br>with R = 1348      | FDM, Part 2, Table<br>210.9.1  |
| Ramps                                          | 24° 45' (30 mph)<br>with R = 231.5 ft |                                |
|                                                | 8° 15' (50 mph)<br>with R = 695 ft    |                                |
| Arterials                                      | 14° 15' (35 mph)<br>with R = 402 ft   | FDM, Part 2, Table<br>210.9.2  |
|                                                | 10° 45' (40 mph)<br>with R = 533 ft   |                                |
| Maximum Profile Grade                          |                                       |                                |
| Mainline I-95                                  | 3%                                    | FDM, Part 2, Table<br>211.9.1  |
| Ramps                                          | 7% (25-30 MPH)                        |                                |
|                                                | 6% (35-40 MPH)                        |                                |
|                                                | 5% (45-50 MPH)                        |                                |
| Maximum Change in Grade without Vertical Curve |                                       |                                |
| Mainline I-95                                  | 0.30%                                 | FDM, Part 2, Table<br>210.10.2 |
| Ramps                                          | 1.00% - 0.6%                          |                                |
| Minimum Stopping Sight Distance                |                                       |                                |
| Mainline I-95                                  | 730 ft                                | FDM, Part 2, Table<br>211.10.1 |
| Ramps                                          | 200 ft - 425 ft                       | FDM, Part 2, Table<br>211.10.2 |
| Arterials                                      | 250 ft – 305 ft                       | FDM, Part 2, Table<br>210.11.1 |



**Table 3.2 – Horizontal and Vertical Alignment Design Elements and Standards  
(Continued)**

| Design Element                                  | Design Standard                           | Source                        |
|-------------------------------------------------|-------------------------------------------|-------------------------------|
| Minimum Crest Vertical Curve Length             |                                           |                               |
| Mainline I-95                                   | 1,000 ft (Expressway open highway)        | FDM, Part 2, Table 211.9.3    |
|                                                 | 1,800 ft (Expressway within interchanges) |                               |
| Ramps (Length=3x Design Speed)                  | 90 ft (30 MPH) - 300 ft (50 MPH)          |                               |
| K value for Crest Vertical Curve                |                                           |                               |
| Mainline I-95                                   | 313(65 MPH)                               | FDM, Part 2, Table 211.9.2    |
| Minimum Sag Vertical Curve Length               |                                           |                               |
| Mainline I-95                                   | 800 ft (Interstate)                       | FDM, Part 2, Table 211.9.3    |
| Ramps (Length=3x Design Speed)                  | 90 ft (30 MPH) – 200 (50 MPH)             |                               |
| K value for Sag Vertical Curve                  |                                           |                               |
| Mainline I-95                                   | 181 (65 MPH)                              | FDM, Part 2, Table 211.9.2    |
| Superelevation (e)                              |                                           |                               |
| Maximum Superelevation for Interstate           | 0.1                                       | FDM, Part 2, Table 210.9.1    |
| Superelevation Transition Rate (65-70 mph)      | 1:200 for 3 lanes                         | FDM, Part 2, Table 210.9.3    |
|                                                 | 1:190 for 4 lanes                         |                               |
| Superelevation Transition Ratio (Curve:Tangent) | 20:80 preferred                           | FDM, Part 2, Section 210.9.1  |
|                                                 | 50:50 minimum                             |                               |
| Minimum Vertical Clearances                     |                                           |                               |
| Bridge over Roadways                            | 16.5 ft                                   | FDM, Part 2, Table 260.6.1    |
| Roadway over Railroad                           | 23.5 ft                                   |                               |
| Pedestrian Bridge over Roadway                  | 17.5 ft                                   |                               |
| Overhead Sign Structure                         | 17.5 ft                                   | FDM, Part 2, Section 210.10.3 |
| Overhead DMS Structures                         | 19.5 ft                                   |                               |



**Table 3.2 – Horizontal and Vertical Alignment Design Elements and Standards  
(Continued)**

| Design Element                                               | Design Standard   | Source                        |
|--------------------------------------------------------------|-------------------|-------------------------------|
| <b>Minimum Spacing Between Ramps (I-95 mainline/CD road)</b> |                   |                               |
| Off-ramp to Off-ramp                                         | 1,000 ft/800 ft   | FDM, Part 2, Section 211.12.1 |
| On-ramp to On-ramp                                           | 1,000 ft/800 ft   |                               |
| On-ramp to Off-ramp (Weaving)                                | 2,000 ft/1,600 ft |                               |
| Off-ramp to On-ramp                                          | 500 ft/400 ft     |                               |

### 3.2.2 DRAINAGE CRITERIA

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

- 2025 FDOT, Drainage Manual (DM)
- 2025 FDOT, Florida Design Manual (FDM)
- 2024-25 FDOT Standard Plans for Roadway and Bridge Construction
- 2024-25 FDOT, Specifications for Roadway and Bridge Construction
- 2024 SFWMD, Environmental Resource3 Permit Applicant's Handbook Volume II

Design criteria considered in the development of the drainage for this project are summarized in **Table 3.3**.



Table 3.3 – Drainage Design Criteria

| Design Element                | Design Standard                                                                                                                                                                                                                                              | Source                        |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Open Channel Design Frequency | 10 Year for Ditches/Swales                                                                                                                                                                                                                                   | DM Section 2.2<br>Table 2.1   |
|                               | 25 Year for Outfall Ditches and Canals                                                                                                                                                                                                                       |                               |
| Open Channel Minimum Slope    | 0.0005 ft/ft                                                                                                                                                                                                                                                 | DM Section 2.4.2              |
| Channel Velocity (Maximum)    | 4 fps for Sod Lining                                                                                                                                                                                                                                         | DM Table 2.5                  |
|                               | 5 fps for Stake Sod Lining                                                                                                                                                                                                                                   |                               |
|                               | 6 fps for Riprap Rubble Lining                                                                                                                                                                                                                               |                               |
|                               | 10 fps for Rigid Lining                                                                                                                                                                                                                                      |                               |
| Storm Drain Design Frequency  | 3 Year for General Design                                                                                                                                                                                                                                    | DM Section 3.3<br>Table 3.1   |
|                               | 10 Year for Interstate Facilities                                                                                                                                                                                                                            |                               |
| Storm Drain Design Tailwater  | Stormwater Ponds: Peak stage in the pond during storm drain design event                                                                                                                                                                                     | DM Section 3.4                |
|                               | French Drains: Design Head over the outlet control structure                                                                                                                                                                                                 |                               |
|                               | Regulated Canals: Agency regulated control elevation                                                                                                                                                                                                         |                               |
| Minimum Time of Concentration | 10 Minutes                                                                                                                                                                                                                                                   | DM Section 3.5.1              |
| Minimum Pipe Slope            | Minimum Slope which produces a storm drain velocity of 2.5 fps when full and no greater than 15 fps when the storm drain is flowing full                                                                                                                     | DM Section 3.6.1              |
| Hydraulic Gradient            | When minor the Hydraulic Grade Line (HGL) energy losses are not considered, HGL shall be 1 ft below the theoretical gutter elevation                                                                                                                         | DM Section 3.6.2              |
| Outlet Velocity               | When outlet velocity exceeds 6 fps provide special channel lining and/or energy dissipater                                                                                                                                                                   | DM Section 3.6.3              |
| Spread Standards              | Spread resulting from 4 inches per hour shall be limited to:<br>½ lane for < 45 MPH<br>8 ft of lane clear for 45 MPH to 55 MPH<br>No encroachment for > 55 MPH                                                                                               | DM Section 3.9<br>Table 3.9.1 |
| Minimum Pipe Size             | 18 inches                                                                                                                                                                                                                                                    | DM Section 3.10.1             |
| Maximum Pipe Length           | <u>Pipe without French Drains</u><br>300 ft for 18 inches pipes<br>400 ft for 24 to 36 inches pipes<br>500 ft for > 42 inches pipes<br><u>French Drains (Minimum Length from Access)</u><br>150 ft for 18 to 30 inches pipes<br>200 ft for > 36 inches pipes | DM Section 3.10.1             |

**Table 3.3 – Drainage Design Criteria (Continued)**

| Design Element                                            | Design Standard                                                                                                                                                                                                                                                                                                | Source                                             |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <b>Cross Drains Design Frequency</b>                      | 50 years for Mainline Interstate and Facilities with projected 20 year ADT > 1500<br>25 years for Facilities with projected 20 year ADT < 1500<br>10 years for roadside ditch culverts                                                                                                                         | DM Section 4.3                                     |
| <b>Wet Detention and Retention Ponds Maintenance Berm</b> | 20 ft minimum between top edge of normal pool elevation and right of way line, 15 ft adjacent to the water sloped at 1:8 or flatter                                                                                                                                                                            | DM Section 5.4.4.2<br>SFWMD ERP Manual Section 7.5 |
| <b>Detention and Retention Ponds Freeboard</b>            | 1 ft freeboard required above peak design stage for ponds and 0.5 foot minimum freeboard for linear treatment swales                                                                                                                                                                                           | DM Section 5.4.4.2                                 |
| <b>Wet Detention and Retention Ponds Requirements</b>     | Total Area = 0.5 acre minimum<br>Slopes between control elevation and 2 ft below it shall be 1:4 or flatter                                                                                                                                                                                                    | DM Figure 5-1<br>SFWMD ERP Manual Section 7.4      |
| <b>Water Quality Requirements</b>                         | Wet Detention: Greater of 1 inch over total project area or 2.5 inches over total impervious<br>Dry Detention: 75% of wet detention<br>Wet/Dry Retention: 50% of wet or dry detention accordingly                                                                                                              | SFWMD ERP Manual Section 5.2.1                     |
| <b>Water Quality Requirements</b>                         | Post Development discharge rate equal to or less than pre development discharge rate for 25 year – 3 day storm event, or rates specified in district criteria                                                                                                                                                  | SFWMD ERP Manual Section 6.2 and 6.3               |
| <b>Floodplain Encroachment</b>                            | No encroachment allowed                                                                                                                                                                                                                                                                                        | SFWMD ERP Manual Section 6.4                       |
| <b>Outfall Structures</b>                                 | Structures shall include baffles systems.<br>Structures shall include bleed down notch or orifice that allows ½ inches of the detention volume to be discharged within 24 hours.                                                                                                                               | SFWMD ERP Manual Section 7.1 and 7.2               |
| <b>Detention Pond Side Slopes</b>                         | wet pond side slopes cannot be steeper than 4:1 (horizontal: vertical) from the top of bank out to a minimum depth of two feet below the control elevation. Side slopes shall be topsoiled and stabilized through seeding or planting from the top of bank to a depth of two feet below the control elevation. | SFWMD ERP Manual Section 5.4.2                     |
| <b>Detention Pond Littoral Zones</b>                      | The minimum shallow, littoral areas shall be provided at a minimum of 20 percent of the wet detention area or 2.5 percent of the total detention area (including side slopes plus the basin contributing area).                                                                                                | SFWMD ERP Manual Section 5.4.2                     |





**Table 3.3 – Drainage Design Criteria (Continued)**

| Design Element           | Design Standard                                                                                                                                                                                                                                                                | Source                       |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| <b>Maintenance Berms</b> | SFWMD requires a minimum width of 20 feet for all perimeter maintenance berms. However, per previous agreements between FDOT and SFWMD, a minimum perimeter maintenance berm for ponds of 15 feet with slopes no steeper than 4:1 beyond the control elevation is permissible. | SFWMD ERP Manual Section 5.5 |



## 4.0 ALTERNATIVE ANALYSIS

### 4.1 PREVIOUS PLANNING STUDIES

**I-95 Broward Interchanges Masterplan** – In 2016, FDOT District Four evaluated the feasibility of implementing interchange improvements on I-95 at 16 of the 19 interchanges in Broward County (see **Figure 4.1**). The planning study, called *I-95 Broward Interchanges Masterplan* FPID# 432785-2, evaluated and screened concepts, which focused on preliminary engineering efforts and future traffic projections. The conceptual design analysis evaluated interchange concepts to identify logical project termini, a preliminary typical section, and the alignment of the proposed improvements. The objective of the study was to address traffic spillback onto I-95, improve interchange operations, reduce congestion, and increase safety. The planning study evaluation process followed seven steps:

1. Existing Conditions Analysis – The analysis consisted of data gathering in the areas of roadway, bridge, and engineering characteristics. The existing conditions assessment began with the collection and review of all data pertaining to the existing facility through reviewing existing documents, conducting on-site inventories, and collecting pertinent data that would serve as a basis for evaluation.
2. Travel Demand Forecasting — This step focused on the validation and calibration of the I-95 Corridor Planning Study model, which was an enhanced version of the Southeast Regional Planning Model (SERPM) 6.5. This model was used to develop 2040 design year traffic.
3. Engineering and Geometrics — This step included the identification and evaluation of several short-term and long-term interchange improvements plus the No-Build scenario. The study area included the I-95 freeway segments, interchanges, ramp terminals and selected adjacent signalized intersections.
4. Traffic Conceptual Analysis — This step evaluated the conditions of the study area future traffic projected for the 2040 design year for each of the interchange improvements evaluated. This effort also included the evaluation of the No-Build scenario and a safety analysis.

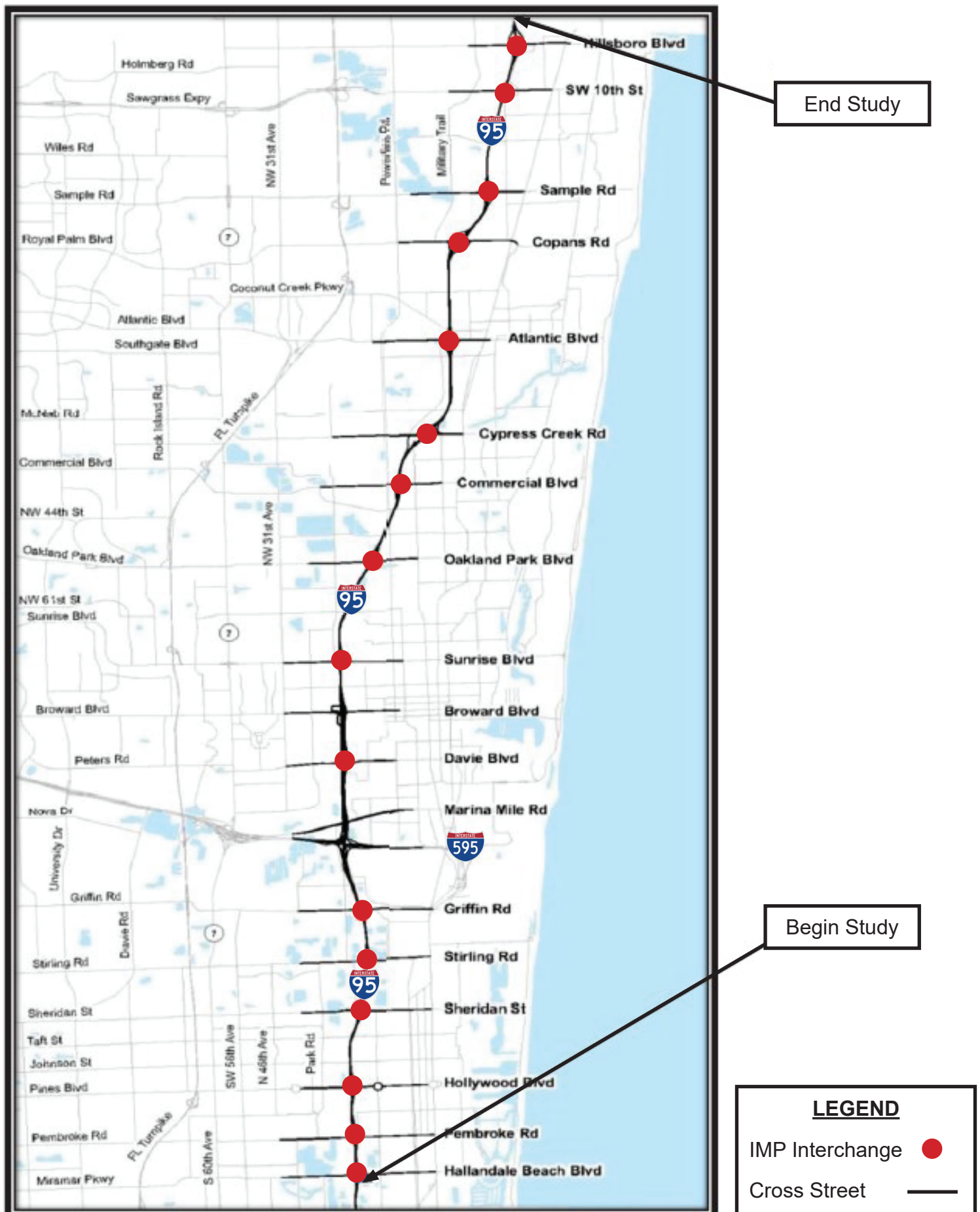


Figure 4.1 - I-95 Broward Interchanges Masterplan Location Map



5. Right of Way Impacts — This step evaluated the right of way impacts of each of the considered alternatives. The impacts were categorized by land use.
6. Construction Costs — This step developed an estimated construction cost of each of the proposed improvements evaluated. The construction costs were developed using the FDOT Long Range Estimate (LRE) cost estimating system.
7. Other Impacts — This step evaluated, listed, and documented all potential impacts for each of the proposed improvements evaluated.

The planning study determined that the proposed improvements were feasible, viable and constructible. The study recommended a detailed analysis and further evaluations to support the feasibility and viability of these improvements during the PD&E Study phase. The planning study was documented in separate reports for each interchange called *Interchange Concept Development Report*, dated January 2016.

No future policy assumptions were used in the transportation planning process during the planning study. The only two changes that occurred in the area after the planning study were the final construction of I-95 Express Phase 2 and the beginning of the I-95 Express Phase 3C construction. The recommended planning study concept is depicted in **Figures 4.2 – 4.4**.

**I-95 Corridor Planning Study** – In April 2019, FDOT District Six completed an I-95 Planning Study between US 1 (Downtown Miami) and the Miami-Dade/Broward County Line. Around the same time, FDOT District Four was moving forward with geometric changes from an Alternative Technical Concept (ATC) as part of the I-95 Express Phase 3C Construction Project, which covers from south of Hollywood Boulevard to north of Interstate 595 (I-595). Because of the overlapping limits of these two projects with the I-95 PD&E Study and changes to the I-95 Express Lanes access points by both districts, FDOT District Four decided to put the I-95 PD&E Study on hold and perform an I-95 Corridor Planning Study (CPS) to evaluate how these three projects will interact with each other.



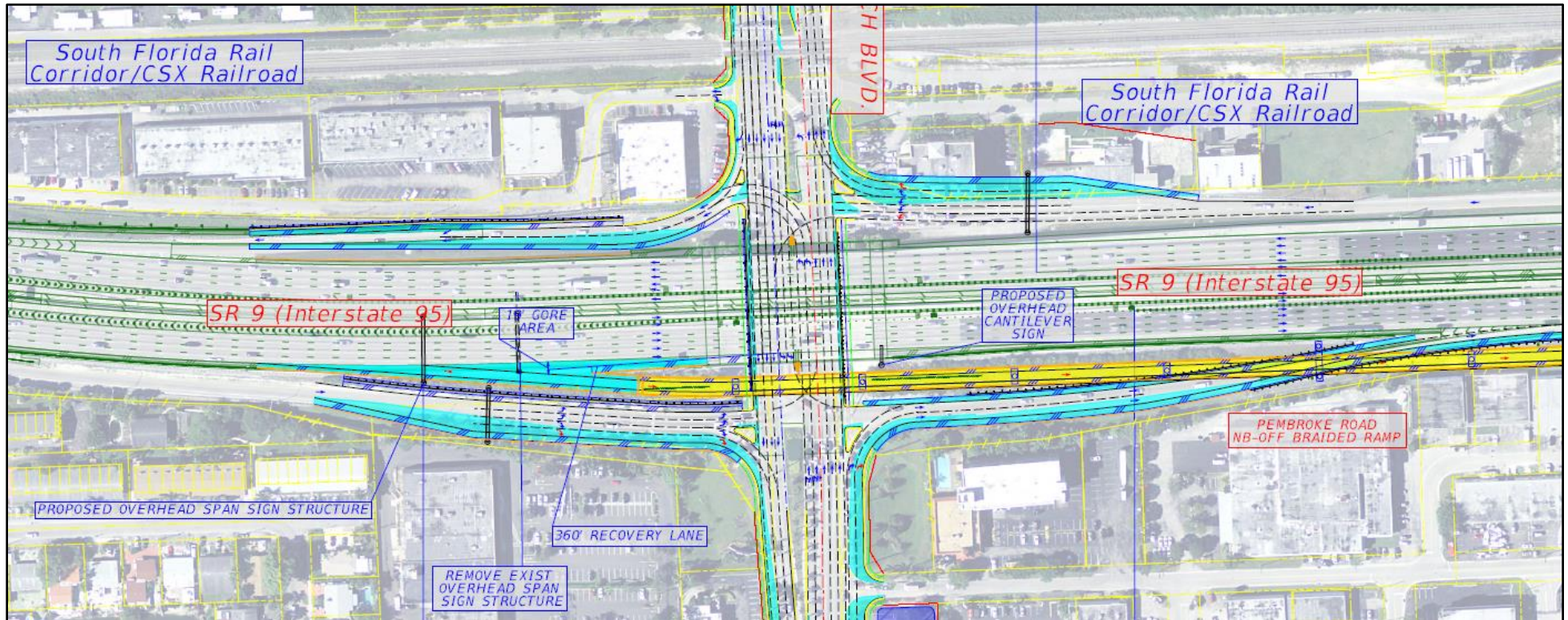


Figure 4.2 – I-95/Hallandale Beach Boulevard Interchange Planning Study Concept



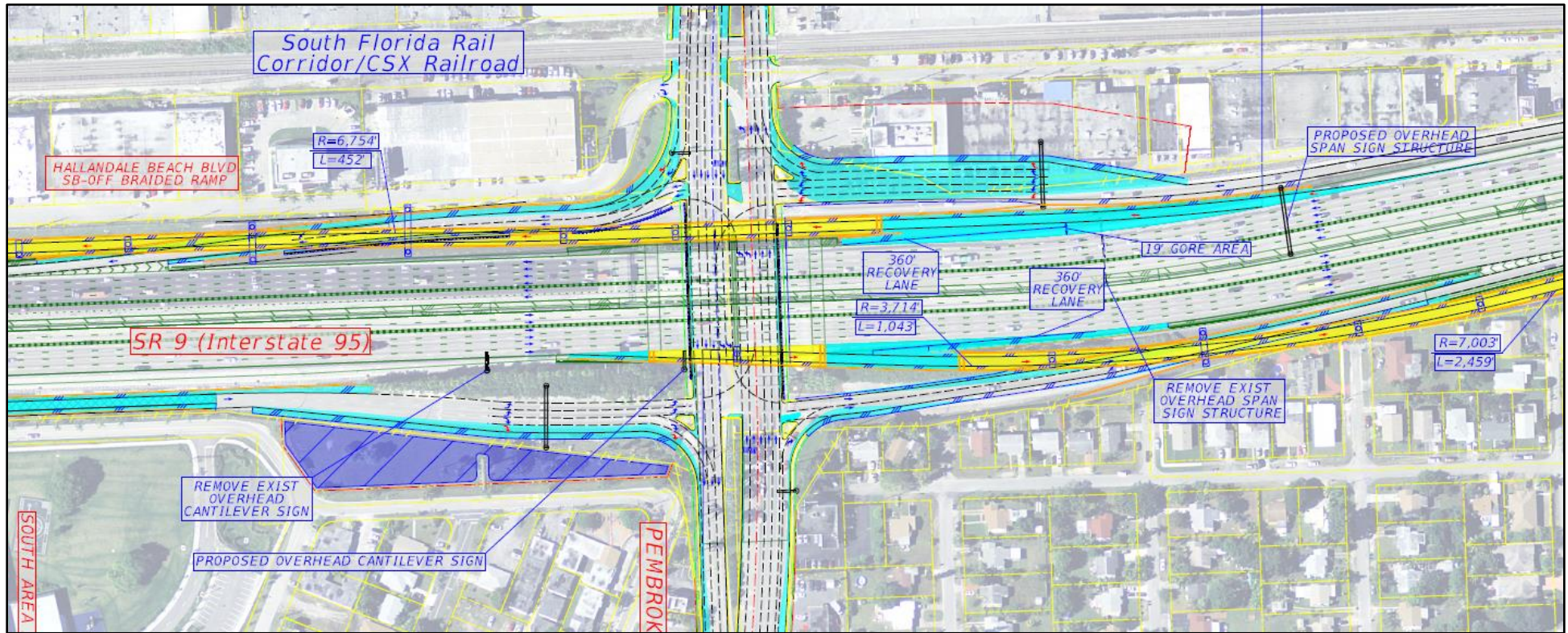


Figure 4.3 – I-95/Pembroke Road Interchange Planning Study Concept



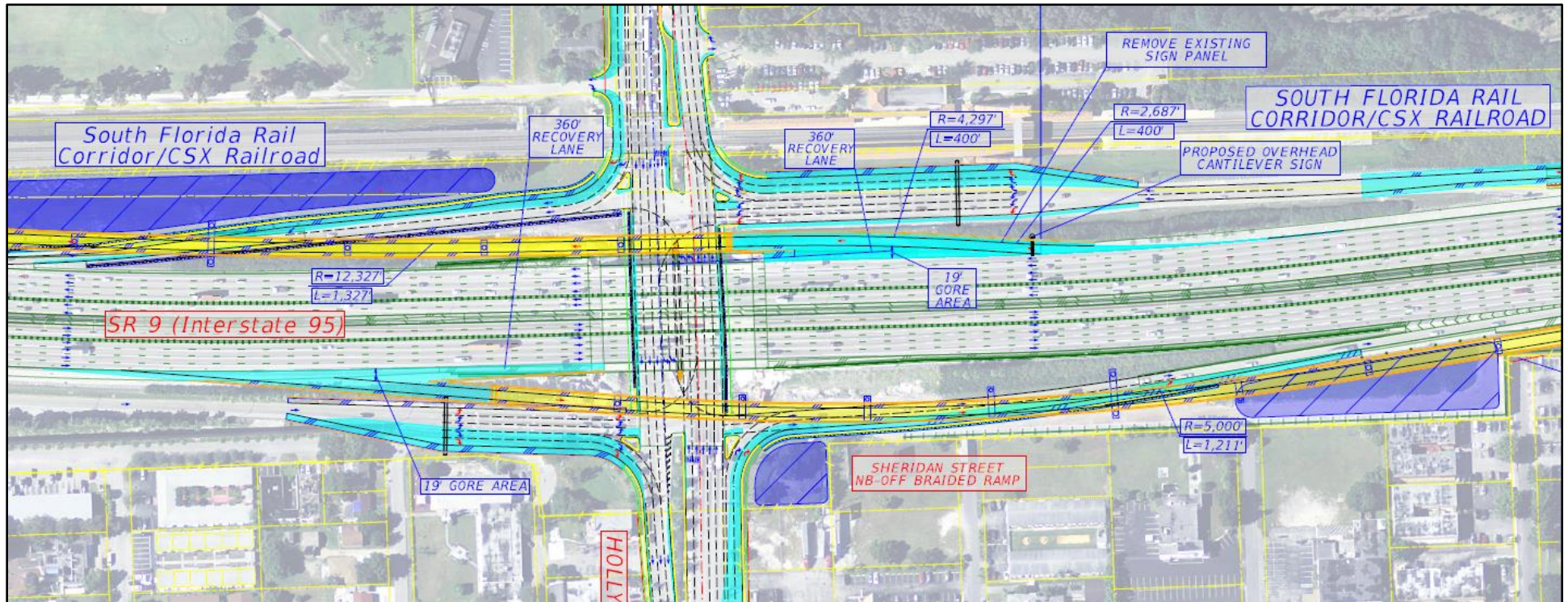


Figure 4.4 – I-95/Hollywood Boulevard Interchange Planning Study Concept





The FDOT District Four CPS began in December 2019 and was completed by April 2020. The limits of the study were from the Golden Glades Interchange (GGI) in Miami-Dade County to I-595 in Broward County (see **Figure 4.5**). The study had two objectives: 1) the evaluation of converting the I-95 Express Lanes at-grade access points to elevated braided ramps over the I-95 mainline and 2) understand the traffic demand along the corridor with all potential I-95 future projects in place in Miami-Dade and Broward Counties. Alternative 1A was chosen as the CPS recommended alternative. This alternative connects and combines all the improvements from the three projects: District Six Planning Study, District Four PD&E Study, and District Four Construction Project.

The I-95 PD&E Study restarted in June 2020 and consisted of the same purpose and need. However, the main difference is that the study now assumes that both projects, District Six I-95 Planning Study and District Four I-95 Express Phase 3C improvements, will be in-place by the design year 2045. The I-95 PD&E Study restart approach was to design an alternative to fit within the CPS Alternative 1A footprint and be compatible with the future projects north and south of the study limits.

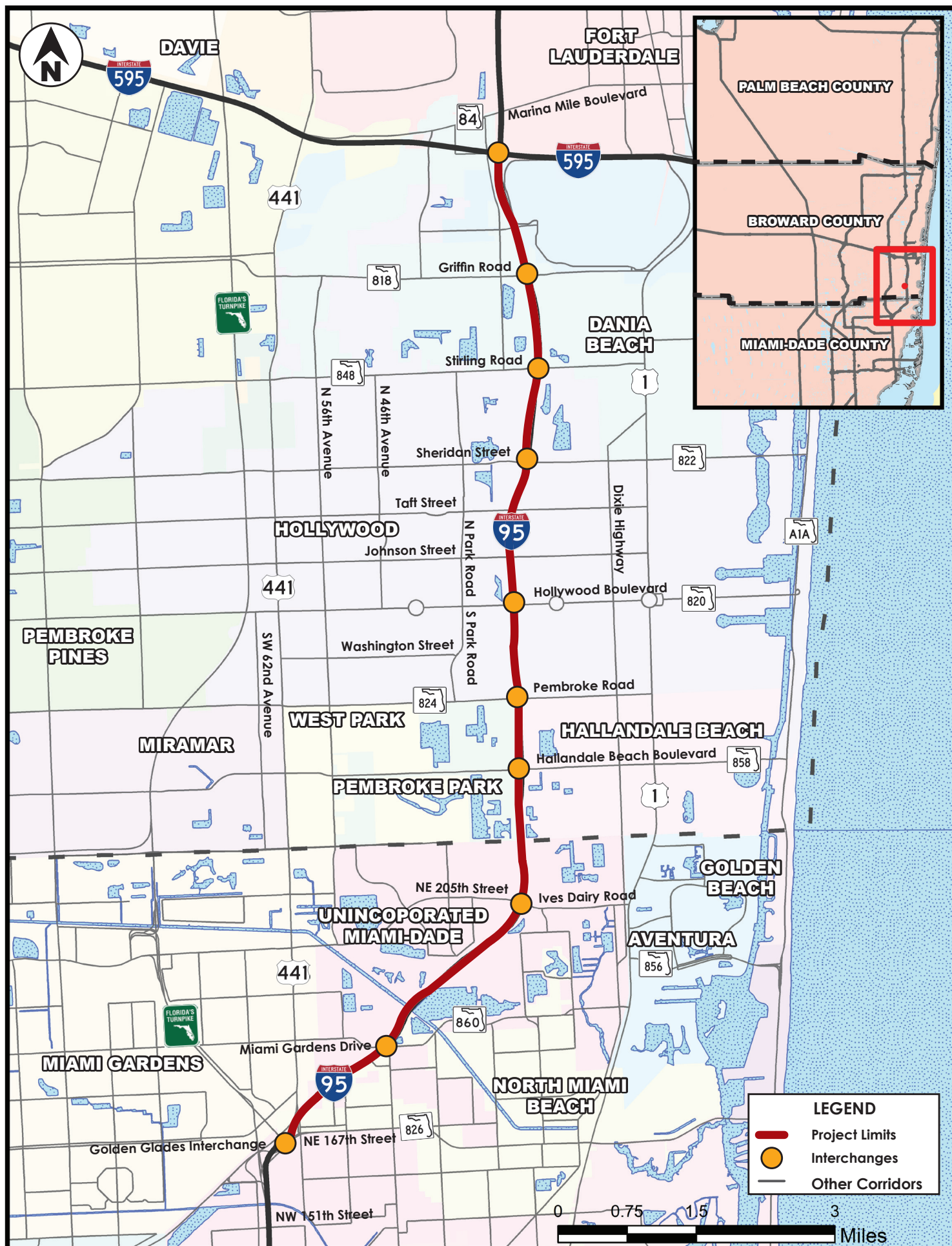


Figure 4.5 - I-95 Corridor Planning Study Limits



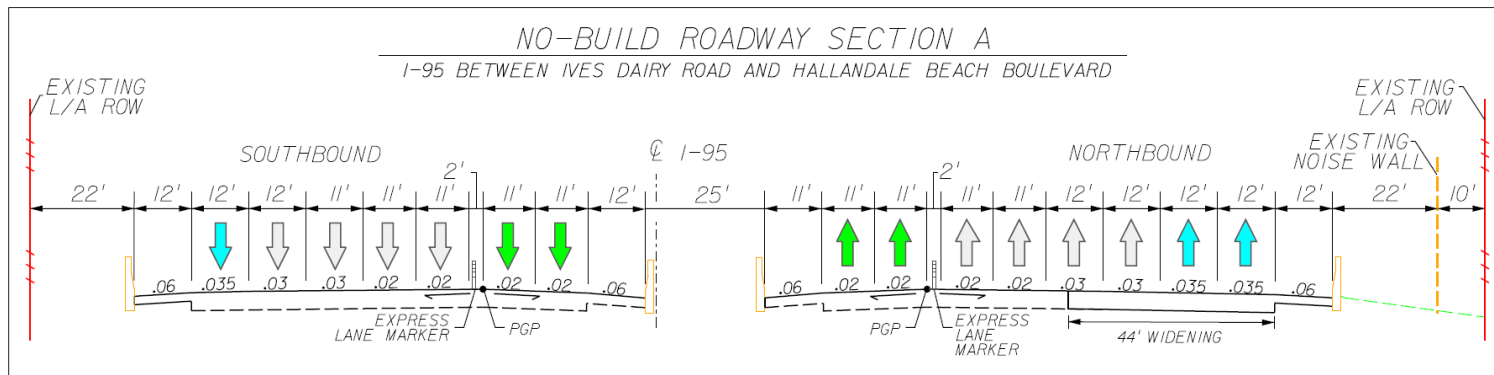
## 4.2 NO-BUILD (NO-ACTION) ALTERNATIVE

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

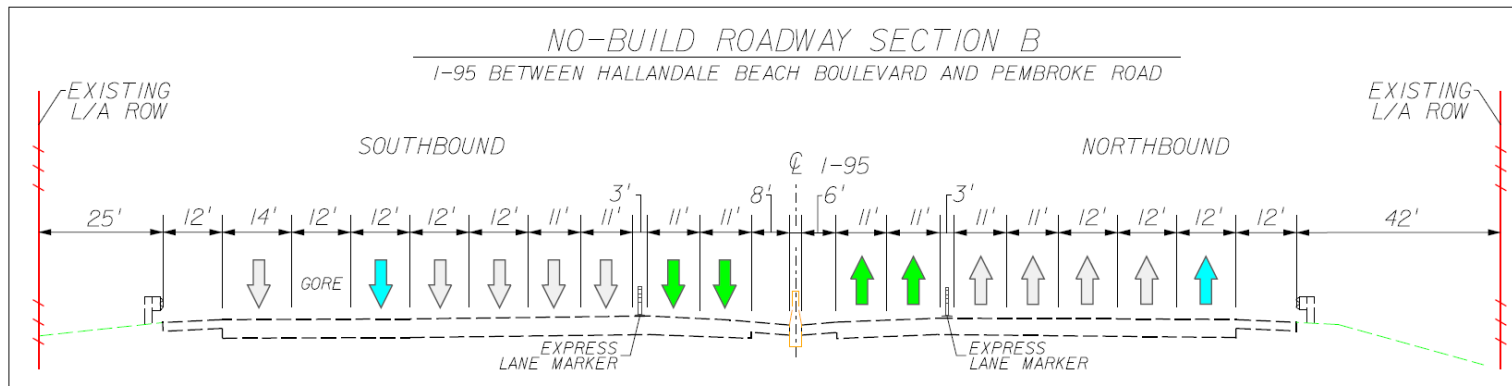
The No-Build Alternative includes currently planned and programmed improvements. One of the programmed improvements is the safety short-term interim improvements at the Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard interchanges. The No-Build Alternative includes the ongoing District Four I-95 Express Phase 3C Construction Project between south of Hollywood Boulevard and north of I-595. This project will add additional express lane access points (northbound egress and southbound ingress) within the Hollywood Boulevard Interchange. The No-Build Alternative also includes the District Six I-95 Planning Study between US 1 (Downtown Miami) and the Miami-Dade/Broward County Line. This study is proposing to add mainline capacity and interchange improvements.

In May 2021, District Six began an I-95 PD&E Study, FPID#414964-1-22-01, between south of Miami Gardens Drive (SR 860) and the Miami-Dade/Broward County Line. The objective of the PD&E Study was to evaluate the recommendations from the District Six I-95 Planning Study. The preferred alternative from the District Six PD&E Study was considered part of the No-Build Alternative conditions.

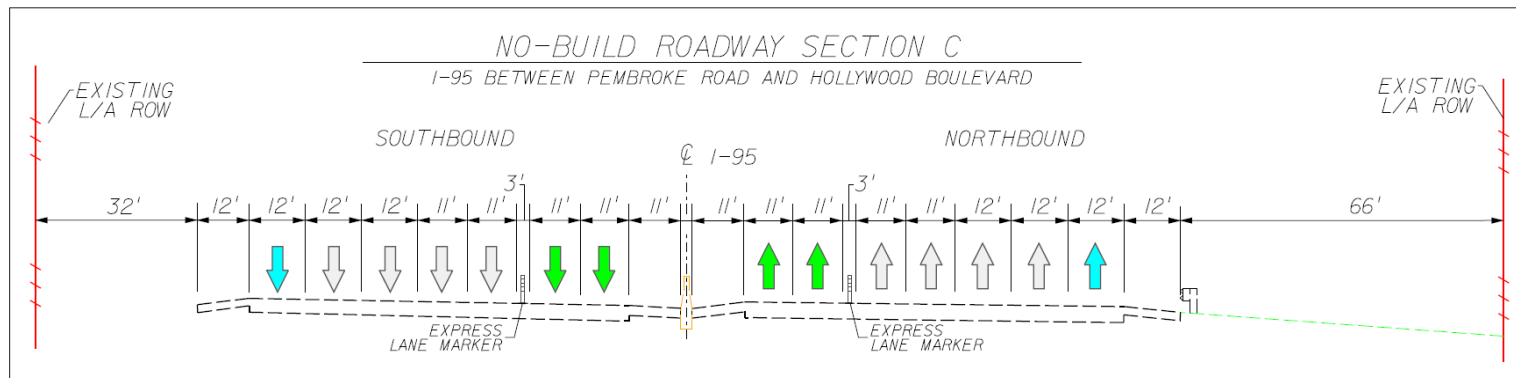
The No-Build Alternative served as a comparison to the proposed Build Alternatives. The No-Build Alternative examines what happens if no improvements other than scheduled maintenance occur. Advantages include no impacts on the social, cultural, physical, or natural environment and no additional right of way or construction cost. Disadvantages include increased congestion, safety issues, and slower emergency evacuation and response times. Furthermore, there are no improvements to the interchange ramp terminal intersections, which cannot accommodate the future growth of the study area. Consequently, the needs of the area will not be satisfied, and existing congested traffic conditions will persist. The No-Build Alternative will not provide relief throughout the study area and will not be consistent with the purpose and need of this project. The three I-95 No-Build roadway cross sections between interchanges are depicted in **Figures 4.6 – 4.8**. **Figure 4.9** shows the No-Build Alternative schematic line diagram.



**Figure 4.6 – No-Build Alternative Roadway Section between Ives Dairy Road and Hallandale Beach Boulevard**



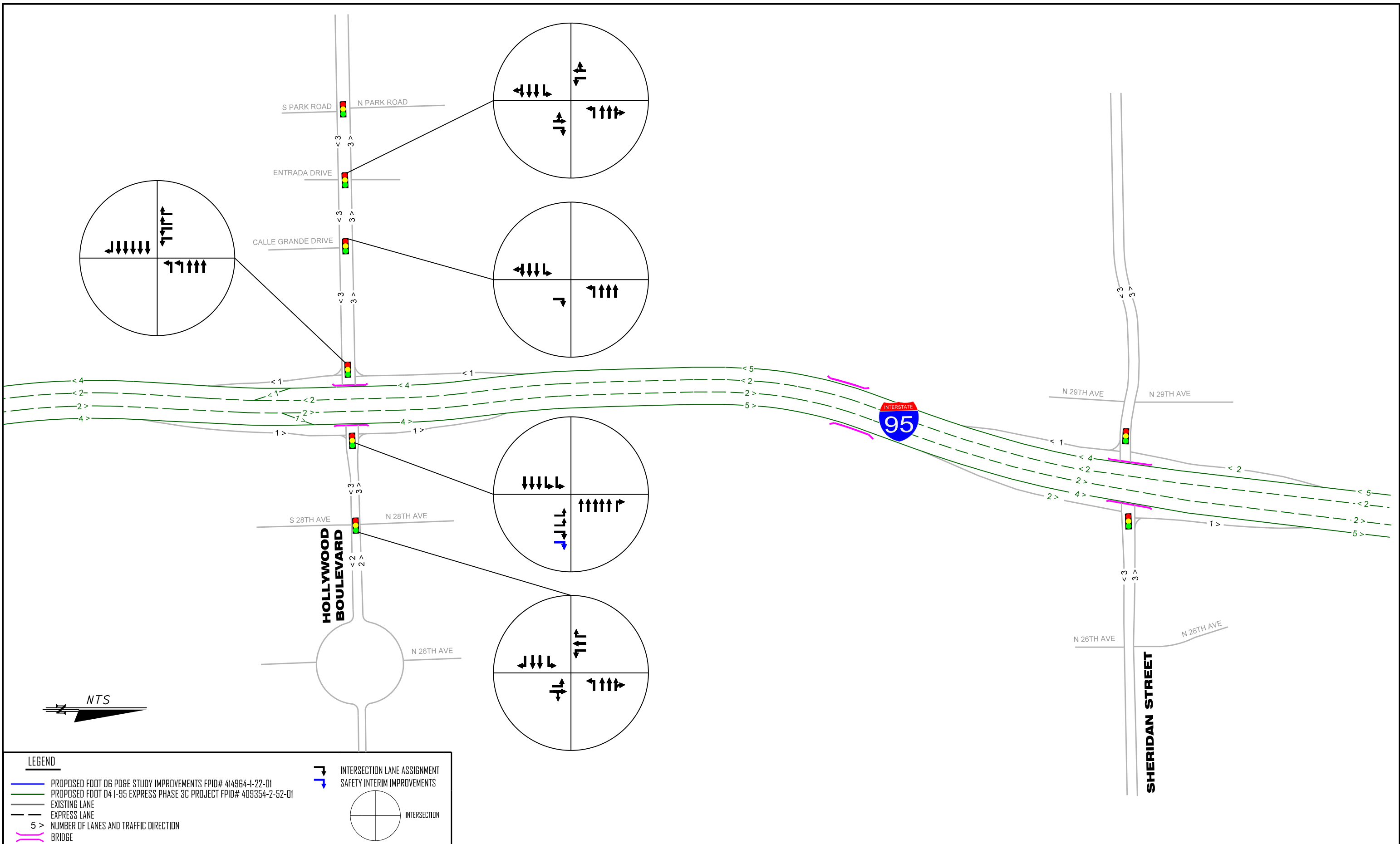
**Figure 4.7 – No-Build Alternative Roadway Section between Hallandale Beach Boulevard and Pembroke Road**



**Figure 4.8 – No-Build Alternative Roadway Section between Pembroke Road and Hollywood Boulevard**











#### 4.2.1 MAINLINE NO-BUILD ALTERNATIVE ANALYSIS RESULTS

##### **HCM Operational Analysis Results**

Speed, density and LOS of each freeway facility were used as measures of effectiveness (MOEs), which is consistent with the existing conditions analysis. The mainline/basic, weaving, and ramp merge/diverge analysis results for each alternative are summarized in the following sections.

**2030 No-Build Alternative** – The capacity analysis shows that four location northbound and three locations southbound will operate at an unacceptable LOS (worst peak period LOS) by the year 2030 within the area of influence. **Tables 4.1 – 4.2** and **Figure 4.10** summarize the 2030 results.



Table 4.1 – 2030 No-Build Alternative Northbound Freeway Analysis Results

| #  | I-95 Northbound Segment<br>2030 No-Build Alternative                  | Analysis<br>Type | No.<br>of<br>Lanes | Demand<br>vph<br>AM(PM) | Freeway                | Ramp           | Density<br>(pc/mi/ln) | LOS             |
|----|-----------------------------------------------------------------------|------------------|--------------------|-------------------------|------------------------|----------------|-----------------------|-----------------|
|    |                                                                       |                  |                    |                         | V/C Ratio<br>AM(PM)    |                |                       |                 |
| 22 | Sheridan Street Off-Ramp                                              | Diverge          | 2                  | 1,161(1,202)            | -                      | 0.28<br>(0.29) | -                     | -               |
| 21 | Hollywood Boulevard On-Ramp to<br>Sheridan Street Off-Ramp            | Weave            | 5                  | 8,410(7,910)            | 1.0 <b>(1.01)</b>      | -              | 19.2(16.8)            | B<br><b>(F)</b> |
| 20 | Express Lane North of Hollywood<br>Boulevard                          | Basic            | 2                  | 1,332(1,243)            | 0.32<br>(0.30)         | -              | -                     | -               |
| 19 | Hollywood Boulevard On-Ramp                                           | Merge            | 1                  | 1,234(1,198)            | -                      | 0.59<br>(0.57) | -                     | -               |
| 18 | Express Lane Egress to Hollywood<br>Boulevard On-Ramp                 | Basic            | 4                  | 7,176(6,712)            | 0.73<br>(0.67)         | -              | 14.5(12.4)            | B(B)            |
| 17 | Express Lane Egress                                                   | Merge            | 1                  | 649(519)                | 0.73<br>(0.67)         | 0.32<br>(0.26) | 15.3 (13.0)           | B(B)            |
| 16 | Hollywood Boulevard Off-Ramp to<br>Express Lane Egress                | Basic            | 4                  | 6,527(6,193)            | 0.66<br>(0.61)         | -              | 11.8 (10.2)           | B(A)            |
| 15 | Hollywood Boulevard Off-Ramp                                          | Diverge          | 1                  | 1,092(1,351)            | -                      | 0.52<br>(0.64) | -                     | -               |
| 14 | Pembroke Road On-Ramp to<br>Hollywood Boulevard Off-Ramp              | Weave            | 5                  | 7,619(7,544)            | 0.99<br><b>(1.04)</b>  | -              | 17.8 (17.3)           | B<br><b>(F)</b> |
| 13 | Pembroke Road On-Ramp                                                 | Merge            | 1                  | 1,313(1,179)            | -                      | 0.63<br>(0.56) | -                     | -               |
| 12 | Pembroke Road Off-Ramp to On-<br>Ramp                                 | Basic            | 4                  | 6,306(6,365)            | 0.63<br>(0.63)         | -              | 11.5 (11.7)           | B(B)            |
| 11 | Pembroke Road Off-Ramp                                                | Diverge          | 1                  | 1,065(1,295)            | -                      | 0.51<br>(0.62) | -                     | -               |
| 10 | Hallandale Beach Boulevard On-<br>Ramp to Pembroke Road Off-Ramp      | Weave            | 5                  | 7,371(7,660)            | <b>1.12 (1.2)</b>      | -              | 18.4 (20.3)           | <b>F (F)</b>    |
| 9  | Hallandale Beach Boulevard On-<br>Ramp                                | Merge            | 1                  | 1,677(1,684)            | -                      | 0.80<br>(0.80) | -                     | -               |
| 8  | Express Lane Ingress to Hallandale<br>Beach Boulevard On-Ramp         | Basic            | 4                  | 5,694(5,976)            | 0.61<br>(0.64)         | -              | -                     | -               |
| 7  | Express Lane North of Hallandale<br>Beach Boulevard                   | Basic            | 2                  | 1,981(1,762)            | 0.48<br>(0.43)         | -              | -                     | -               |
| 6  | Express Lane Ingress                                                  | Diverge          | 1                  | 850(581)                | 0.69<br>(0.69)         | 0.41 (0.28)    | 13.7 (13.7)           | B(B)            |
| 5  | Hallandale Beach Blvd Off-Ramp to<br>Express Lane Ingress             | Basic            | 4                  | 6,544(6,557)            | 0.69<br>(0.69)         | -              | 13.3 (13.5)           | B<br>(B)        |
| 4  | Hallandale Beach Boulevard Off-<br>Ramp                               | Diverge          | 1                  | 1,233(1,282)            | -                      | 0.59(0.61)     | -                     | -               |
| 3  | Ives Dairy Road On-Ramp to<br>Hallandale Beach Boulevard Off-<br>Ramp | Weave            | 5                  | 7,777(7,839)            | <b>1.47<br/>(1.45)</b> | -              | 20.2(20.7)            | <b>F (F)</b>    |
| 2  | Express Lane South of Hallandale<br>Beach Boulevard                   | Basic            | 2                  | 1,131(1,181)            | 0.28<br>(0.29)         | -              | -                     | -               |
| 1  | Ives Dairy Road On-Ramp                                               | Merge            | 2                  | 2,524(2,432)            | -                      | 0.57(0.55)     | -                     | -               |

Note:

- 1) I-95 is operating at over capacity when compared to existing conditions in some locations. The disclaimer in the HCS software indicates that density results from freeway, ramp merge/diverge are not be reliable for oversaturated conditions. Operational results from Vissim microsimulation software should be considered.
- 2) Additionally, 2030 conditions include the following improvements: new EL access point over Hollywood Blvd and a two-lane northbound off-ramp to Sheridan Street. The redistribution of traffic and operations between the ELs and GULs are different, with more vehicles bypassing the PD&E Study limits cause 2030 No-Build operating better than existing in some locations.
- 3) # - segment number



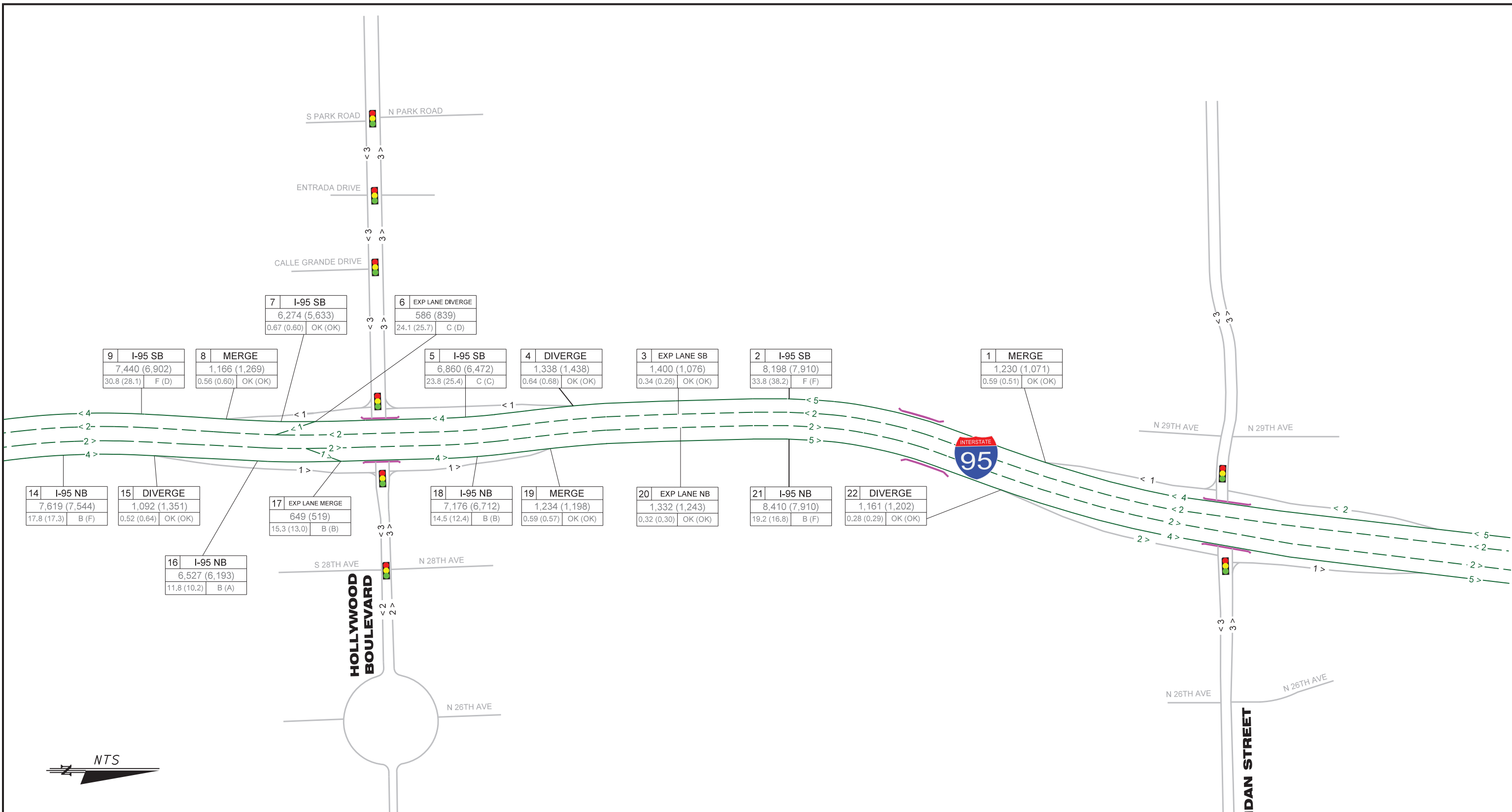
Table 4.2 – 2030 No-Build Alternative Southbound Freeway Analysis Results

| #  | I-95Southbound Segment<br>2030 No-Build Alternative               | Analysis<br>Type | No.<br>of<br>Lanes | Demand<br>vph<br>AM(PM) | Freeway             | Ramp        | Density<br>(pc/mi/ln) | LOS      |
|----|-------------------------------------------------------------------|------------------|--------------------|-------------------------|---------------------|-------------|-----------------------|----------|
|    |                                                                   |                  |                    |                         | V/C Ratio<br>AM(PM) |             |                       |          |
| 1  | Sheridan Street On-Ramp                                           | Merge            | 1                  | 1,230(1,071)            | -                   | 0.59 (0.51) | -                     | -        |
| 2  | Sheridan Street On-Ramp to Hollywood<br>Boulevard Off-Ramp        | Weave            | 5                  | 8,198(7,910)            | 1.01(1.02)          | -           | 33.8(33.6)            | F(F)     |
| 3  | Express Lane North of Hollywood<br>Boulevard                      | Basic            | 2                  | 1,400(1,076)            | 0.34 (0.26)         | -           | -                     | -        |
| 4  | Hollywood Boulevard Off-Ramp                                      | Diverge          | 1                  | 1,338(1,438)            | -                   | 0.64 (0.68) | -                     | -        |
| 5  | Hollywood Boulevard Off-Ramp to<br>Express Lane Ingress           | Basic            | 4                  | 6,860(6,472)            | 0.74 (0.71)         | -           | 23.8 (22.8)           | C<br>(C) |
| 6  | Express Lane Ingress                                              | Diverge          | 1                  | 586(839)                | 0.74 (0.71)         | 0.28 (0.40) | 24.1 (23.3)           | C(D)     |
| 7  | Express Lane Ingress to Hollywood<br>Boulevard On-Ramp            | Basic            | 4                  | 6,274(5,633)            | 0.67(0.60)          | -           | -                     | -        |
| 8  | Hollywood Boulevard On-Ramp                                       | Merge            | 1                  | 1,166(1,269)            | -                   | 0.56 (0.60) | -                     | -        |
| 9  | Hollywood Boulevard On-Ramp to<br>Pembroke Road Off-Ramp          | Weave            | 5                  | 7,440(6,902)            | 1.01<br>(0.95)      | -           | 30.8 (28.1)           | F (D)    |
| 10 | Pembroke Road Off-Ramp                                            | Diverge          | 1                  | 1,338(1,260)            | -                   | 0.64 (0.60) | -                     | -        |
| 11 | Pembroke Road Off-Ramp to On-Ramp                                 | Basic            | 4                  | 6,102(5,642)            | 0.64 (0.57)         | -           | 19.9 (17.8)           | C(B)     |
| 12 | Pembroke Road On-Ramp                                             | Merge            | 1                  | 919(707)                | -                   | 0.44 (0.34) | -                     | -        |
| 13 | Pembroke Road On-Ramp to<br>Hallandale Beach Boulevard Off-Ramp   | Weave            | 5                  | 7,021(6,349)            | 0.86 (0.88)         | -           | 27.4 (23.7)           | C(C)     |
| 14 | Express Lane North of Hallandale<br>Beach Boulevard               | Basic            | 2                  | 1,986(1,915)            | 0.48 (0.47)         | -           | -                     | -        |
| 15 | Hallandale Beach Boulevard Off-Ramp                               | Diverge          | 1                  | 1,211(1,419)            | -                   | 0.58 (0.68) | -                     | -        |
| 16 | Hallandale Beach Blvd Off-Ramp to<br>Express Lane Ingress         | Basic            | 4                  | 5,810(4,930)            | 0.59 (0.47)         | -           | 18.0 (14.3)           | B(B)     |
| 17 | Express Lane Ingress                                              | Merge            | 1                  | 498(668)                | 0.65 (0.55)         | 0.24 (0.32) | 21.3 (18.0)           | B(B)     |
| 18 | Express Lane Ingress to Hallandale<br>Beach Boulevard On-Ramp     | Basic            | 4                  | 6,308(5,598)            | 0.65 (0.55)         | -           | 20.0 (17.0)           | C(B)     |
| 19 | Hallandale Beach Boulevard On-Ramp                                | Merge            | 1                  | 1,504(1,069)            | -                   | 0.75 (0.53) | -                     | -        |
| 20 | Express Lane South of Hallandale<br>Beach Boulevard               | Basic            | 1                  | 1,488(1,247)            | 0.88 (0.73)         | -           | -                     | -        |
| 21 | Hallandale Beach Boulevard On-Ramp<br>to Ives Dairy Road Off-Ramp | Weave            | 5                  | 7,362(6,667)            | 1.06<br>(1.18)      | -           | 23.4 (18.6)           | F(F)     |
| 22 | Ives Dairy Road Off-Ramp                                          | Diverge          | 2                  | 1,617(1,951)            | -                   | 0.39 (0.46) | -                     | -        |

Note:

- 1) I-95 is operating at over capacity when compared to existing conditions in some locations. The disclaimer in the HCS software indicates that density results from freeway, ramp merge/diverge are not be reliable for oversaturated conditions. Operational results from Vissim microsimulation software should be considered.
- 2) Additionally, 2030 conditions include the following improvements: new EL access point over Hollywood Blvd and a two-lane northbound off-ramp to Sheridan Street. The redistribution of traffic and operations between the ELs and GULs are different, with more vehicles bypassing the PD&E Study limits cause 2030 No-Build operating better than existing in some locations.
- 3) # - segment number







**2045 No-Build Alternative** – The capacity analysis shows that four locations northbound and three locations southbound will operate at an unacceptable LOS (worst peak period LOS) by the year 2045 within the area of influence. **Tables 4.3 – 4.4** and **Figure 4.11** summarize the 2045 results.





**Table 4.3 – 2045 No-Build Alternative Northbound Freeway Analysis Results**

| #  | I-95 Northbound Segment<br>2045 No-Build Alternative              | Analysis<br>Type | No.<br>of<br>Lanes | Demand vph<br>AM(PM) | Freeway             | Ramp        | Density<br>(pc/mi/ln) | LOS   |
|----|-------------------------------------------------------------------|------------------|--------------------|----------------------|---------------------|-------------|-----------------------|-------|
|    |                                                                   |                  |                    |                      | V/C Ratio<br>AM(PM) |             |                       |       |
| 22 | Sheridan Street Off-Ramp                                          | Diverge          | 2                  | 1,285 (1,457)        | -                   | 0.31 (0.35) | -                     | -     |
| 21 | Hollywood Boulevard On-Ramp to<br>Sheridan Street Off-Ramp        | Weave            | 5                  | 9,073 (8,601)        | 1.15 (1.14)         | -           | 15.7 (13.5)           | F (F) |
| 20 | Express Lane North of Hollywood<br>Boulevard                      | Basic            | 2                  | 1,332 (1,243)        | 0.32 (0.30)         | -           | -                     | -     |
| 19 | Hollywood Boulevard On-Ramp                                       | Merge            | 1                  | 1,475 (1,325)        | -                   | 0.70 (0.63) | -                     | -     |
| 18 | Express Lane Egress to Hollywood<br>Boulevard On-Ramp             | Basic            | 4                  | 7,598 (7,276)        | 0.77 (0.70)         | -           | 9.8 (8.7)             | A(A)  |
| 17 | Express Lane Egress                                               | Merge            | 1                  | 736 (843)            | 0.77 (0.70)         | 0.36 (0.40) | 10.3 (8.7)            | A(A)  |
| 16 | Hollywood Boulevard Off-Ramp to<br>Express Lane Egress            | Basic            | 4                  | 6,862 (6,433)        | 0.68 (0.64)         | -           | 6.7 (5.3)             | A(A)  |
| 15 | Hollywood Boulevard Off-Ramp                                      | Diverge          | 1                  | 1,464 (1,648)        | -                   | 0.70 (0.78) | -                     | -     |
| 14 | Pembroke Road On-Ramp to<br>Hollywood Boulevard Off-Ramp          | Weave            | 5                  | 8,326 (8,081)        | 1.23 (1.20)         | -           | 14.0 (13.1)           | F (F) |
| 13 | Pembroke Road On-Ramp                                             | Merge            | 1                  | 1,499 (1,298)        | -                   | 0.71 (0.62) | -                     | -     |
| 12 | Pembroke Road Off-Ramp to On-<br>Ramp                             | Basic            | 4                  | 6,827 (6,783)        | 0.68 (0.67)         | -           | 7.4 (7.6)             | A(A)  |
| 11 | Pembroke Road Off-Ramp                                            | Diverge          | 1                  | 1,444 (1,570)        | -                   | 0.69 (0.75) | -                     | -     |
| 10 | Hallandale Beach Boulevard On-Ramp<br>to Pembroke Road Off-Ramp   | Weave            | 5                  | 8271 (8,353)         | 1.34 (1.37)         | -           | 15.5 (16.6)           | F (F) |
| 9  | Hallandale Beach Boulevard On-Ramp                                | Merge            | 1                  | 1,798 (1,807)        | -                   | 0.86 (0.86) | -                     | -     |
| 8  | Express Lane Ingress to Hallandale<br>Beach Boulevard On-Ramp     | Basic            | 4                  | 6,473 (6,546)        | 0.69 (0.70)         | -           | -                     | -     |
| 7  | Express Lane North of Hallandale<br>Beach Boulevard               | Basic            | 2                  | 2,068 (2,086)        | 0.50 (0.51)         | -           | -                     | -     |
| 6  | Express Lane Ingress                                              | Diverge          | 1                  | 904 (711)            | 0.77 (0.76)         | 0.44(0.34)  | 10.9 (11.0)           | A(A)  |
| 5  | Hallandale Beach Blvd Off-Ramp to<br>Express Lane Ingress         | Basic            | 4                  | 7,377 (7,257)        | 0.77 (0.76)         | -           | 10.5 (10.7)           | A(A)  |
| 4  | Hallandale Beach Boulevard Off-Ramp                               | Diverge          | 1                  | 1,460 (1,531)        | -                   | 0.70 (0.73) | -                     | -     |
| 3  | Ives Dairy Road On-Ramp to<br>Hallandale Beach Boulevard Off-Ramp | Weave            | 5                  | 8,837 (8,788)        | 1.79 (1.75)         | -           | 18.5 (19.0)           | F (F) |
| 2  | Express Lane South of Hallandale<br>Beach Boulevard               | Basic            | 2                  | 1,164 (1,375)        | 0.28 (0.34)         | -           | -                     | -     |
| 1  | Ives Dairy Road On-Ramp                                           | Merge            | 2                  | 3,150 (2,956)        | -                   | 0.72 (0.67) | -                     | -     |

Note:

- 1) I-95 is operating at over capacity when compared to existing conditions in some locations. The disclaimer in the HCS software indicates that density results from freeway, ramp merge/diverge are not be reliable for oversaturated conditions. Operational results from Vissim microsimulation software should be considered.
- 2) Additionally, 2045 No-Build conditions include the following improvements: new EL access point over Hollywood Blvd and a two-lane northbound off-ramp to Sheridan Street. The redistribution of traffic and operations between the ELs and GULs are different, with more vehicles bypassing the PD&E Study limits cause 2045 No-Build operating better than existing in some locations.
- 3) # - segment number

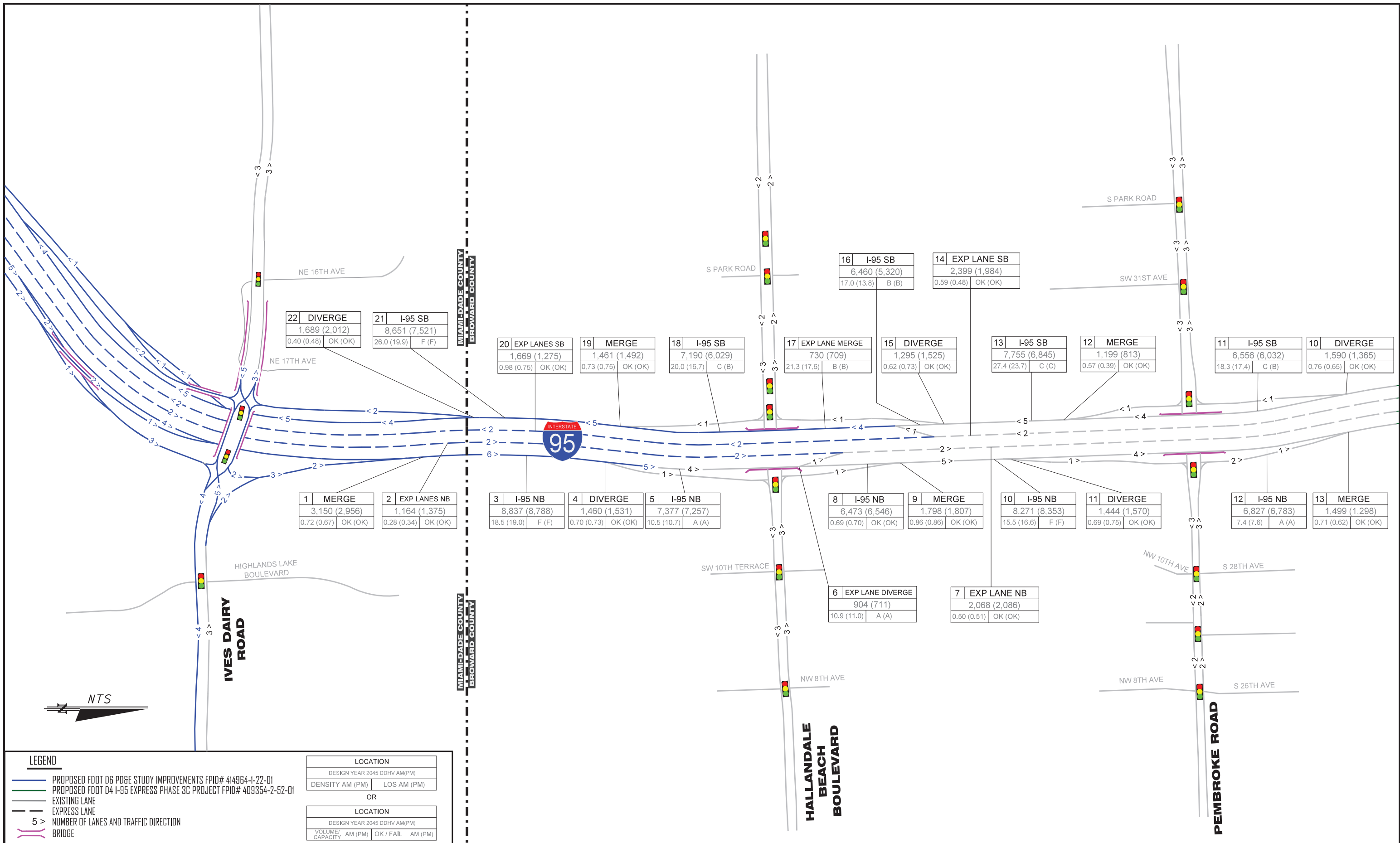


Table 4.4 – 2045 No-Build Alternative Southbound Freeway Analysis Results

| #  | I-95 Southbound Segment<br>2045 No-Build Alternative              | Analysis<br>Type | No.<br>of<br>Lanes | Demand vph<br>AM(PM) | Freeway             | Ramp        | Density<br>(pc/mi/ln) | LOS      |
|----|-------------------------------------------------------------------|------------------|--------------------|----------------------|---------------------|-------------|-----------------------|----------|
|    |                                                                   |                  |                    |                      | V/C Ratio<br>AM(PM) |             |                       |          |
| 1  | Sheridan Street On-Ramp                                           | Merge            | 1                  | 1,374 (1,121)        | -                   | 0.65 (0.53) | -                     | -        |
| 2  | Sheridan Street On-Ramp to Hollywood<br>Boulevard Off-Ramp        | Weave            | 5                  | 9,016 (8,117)        | 1.07 (1.04)         | -           | 35.3 (33.6)           | F (F)    |
| 3  | Express Lane North of Hollywood<br>Boulevard                      | Basic            | 2                  | 1,400 (1,076)        | 0.34 (0.26)         | -           | -                     | -        |
| 4  | Hollywood Boulevard Off-Ramp                                      | Diverge          | 1                  | 1,351 (1,448)        | -                   | 0.64 (0.69) | -                     | -        |
| 5  | Hollywood Boulevard Off-Ramp to<br>Express Lane Ingress           | Basic            | 4                  | 7,665 (6,669)        | 0.83(0.73)          | -           | 25.0 (22.8)           | C<br>(C) |
| 6  | Express Lane Ingress                                              | Diverge          | 1                  | 999 (908)            | 0.83 (0.73)         | 0.48 (0.44) | 25.5 (23.3)           | D<br>(C) |
| 7  | Express Lane Ingress to Hollywood<br>Boulevard On-Ramp            | Basic            | 4                  | 6,666(5,761)         | 0.71(0.61)          | -           | -                     | -        |
| 8  | Hollywood Boulevard On-Ramp                                       | Merge            | 1                  | 1,480 (1,636)        | -                   | 0.70 (0.78) | -                     | -        |
| 9  | Hollywood Boulevard On-Ramp to<br>Pembroke Road Off-Ramp          | Weave            | 5                  | 8,146 (7,397)        | 1.24 (1.22)         | -           | 30.6(27.6)            | F (F)    |
| 10 | Pembroke Road Off-Ramp                                            | Diverge          | 1                  | 1,590 (1,365)        | -                   | 0.76 (0.65) | -                     | -        |
| 11 | Pembroke Road Off-Ramp to On-Ramp                                 | Basic            | 4                  | 6,556 (6,032)        | 0.68 (0.63)         | -           | 18.3 (17.4)           | C(B)     |
| 12 | Pembroke Road On-Ramp                                             | Merge            | 1                  | 1,199 (813)          | -                   | 0.57 (0.39) | -                     | -        |
| 13 | Pembroke Road On-Ramp to<br>Hallandale Beach Boulevard Off-Ramp   | Weave            | 5                  | 7,755 (6,845)        | 1.0 (0.96)          | -           | 27.4 (23.7)           | C(C)     |
| 14 | Express Lane North of Hallandale Beach<br>Boulevard               | Basic            | 2                  | 2,399 (1,984)        | 0.59 (0.48)         | -           | -                     | -        |
| 15 | Hallandale Beach Boulevard Off-Ramp                               | Diverge          | 1                  | 1,295 (1,525)        | -                   | 0.62 (0.73) | -                     | -        |
| 16 | Hallandale Beach Blvd Off-Ramp to<br>Express Lane Ingress         | Basic            | 4                  | 6,460 (5,320)        | 0.65 (0.53)         | -           | 17.0 (13.8)           | B(B)     |
| 17 | Express Lane Ingress                                              | Merge            | 1                  | 730 (709)            | 0.73 (0.61)         | 0.35 (0.34) | 21.3 (17.6)           | B(B)     |
| 18 | Express Lane Ingress to Hallandale<br>Beach Boulevard On-Ramp     | Basic            | 4                  | 7,190 (6,029)        | 0.73 (0.61)         | -           | 20 (16.7)             | C(B)     |
| 19 | Hallandale Beach Boulevard On-Ramp                                | Merge            | 1                  | 1,461 (1,492)        | -                   | 0.73 (0.75) | -                     | -        |
| 20 | Express Lane South of Hallandale Beach<br>Boulevard               | Basic            | 1                  | 1,669 (1,275)        | 0.98 (0.75)         | -           | -                     | -        |
| 21 | Hallandale Beach Boulevard On-Ramp<br>to Ives Dairy Road Off-Ramp | Weave            | 5                  | 8,651 (7,521)        | 1.23 (1.33)         | -           | 26(19.9)              | F (F)    |
| 22 | Ives Dairy Road Off-Ramp                                          | Diverge          | 2                  | 1,689 (2,012)        | -                   | 0.40 (0.48) | -                     | -        |

Note:

- 1) I-95 is operating at over capacity when compared to existing conditions in some locations. The disclaimer in the HCS software indicates that density results from freeway, ramp merge/diverge are not be reliable for oversaturated conditions. Operational results from Vissim microsimulation software should be considered.
- 2) Additionally, 2045 No-Build conditions include the following improvements: new EL access point over Hollywood Blvd and a two-lane northbound off-ramp to Sheridan Street. The redistribution of traffic and operations between the ELs and GULs are different, with more vehicles bypassing the PD&E Study limits cause 2045 No-Build operating better than existing in some locations.
- 3) # - segment number



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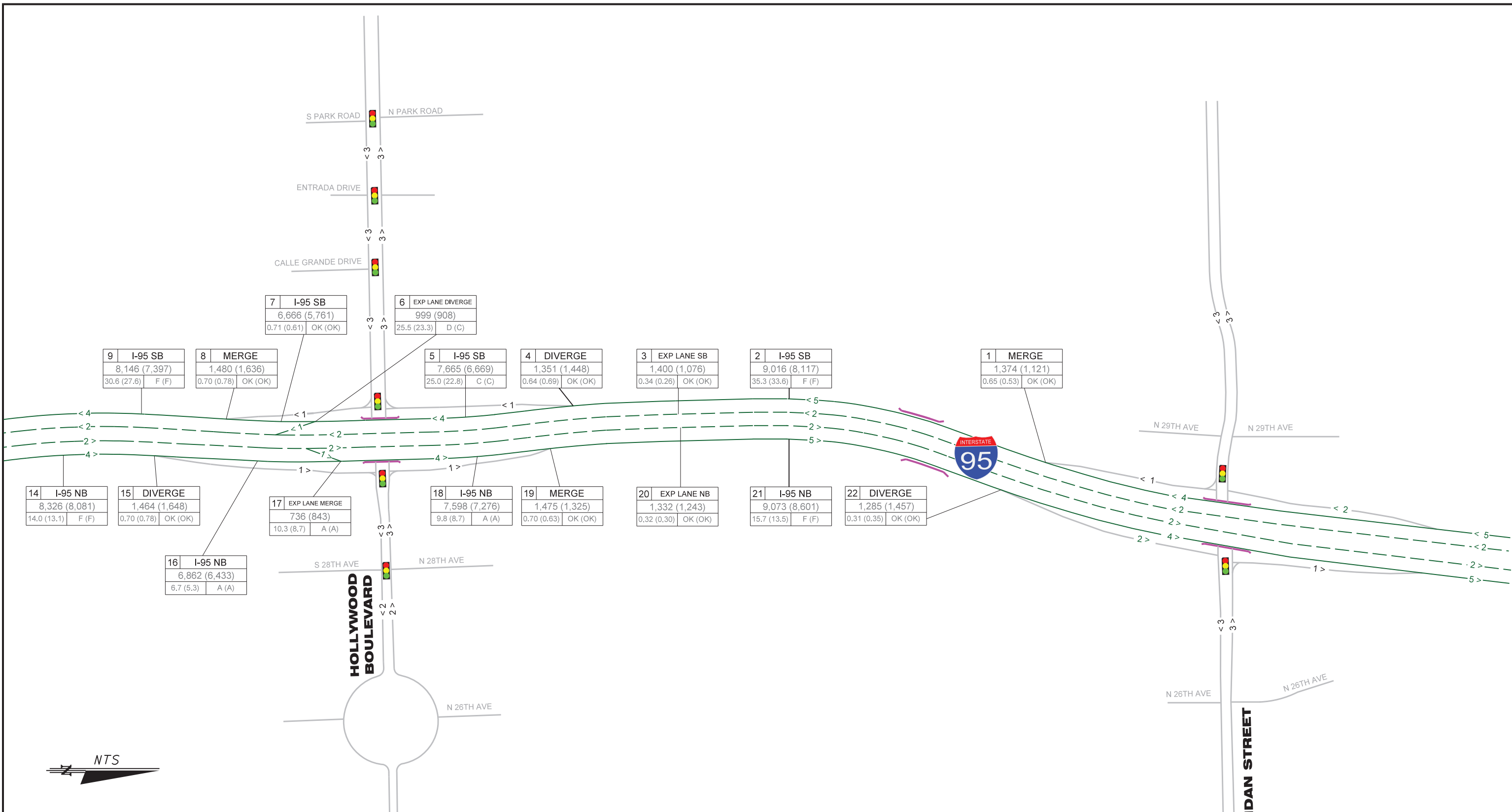
NOVEMBER 2024



**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: I4254

2045 DESIGN YEAR NO-BUILD ALTERNATIVE  
OPERATIONAL ANALYSIS RESULTS

FIGURE  
4.11  
4-21





#### 4.2.2 INTERSECTION NO-BUILD ALTERNATIVE ANALYSIS RESULTS

Intersection delay and LOS were used as MOEs, which is consistent with the existing conditions analysis. The results are presented in **Tables 4.5 – 4.10** and in **Figures 4.12 – 4.13**.



**Table 4.5 – 2030 No-Build Alternative Hallandale Beach Boulevard Intersection  
LOS and Delay Results**

| Hallandale<br>Beach<br>Boulevard<br>Intersection | Movement   | No-Build Alternative |          |             |          |
|--------------------------------------------------|------------|----------------------|----------|-------------|----------|
|                                                  |            | AM Peak              |          | PM Peak     |          |
|                                                  |            | Delay                | LOS      | Delay       | LOS      |
|                                                  |            | (s/veh)              |          | (s/veh)     |          |
| South Park<br>Road*                              | EBL        | 11.7                 | B        | 24.2        | C        |
|                                                  | EBT        | 13.6                 | B        | 11.8        | B        |
|                                                  | WBL        | 6.4                  | A        | 4.6         | A        |
|                                                  | WBT        | 6.8                  | A        | 9.4         | A        |
|                                                  | WBR        | 1.9                  | A        | 1.1         | A        |
|                                                  | NBT        | 77.8                 | E        | 78.9        | E        |
|                                                  | SBL        | 76.2                 | E        | 76.5        | E        |
|                                                  | SBT        | 76.5                 | E        | 75.9        | E        |
|                                                  | SBR        | 55.5                 | E        | 57.0        | E        |
|                                                  | <b>Int</b> | <b>14.7</b>          | <b>B</b> | <b>14.9</b> | <b>B</b> |
| I-95 West<br>Ramp<br>Terminal*                   | EBT        | 39.1                 | D        | 41.8        | D        |
|                                                  | EBR        | 17.0                 | B        | 27.6        | C        |
|                                                  | WBL        | 73.7                 | E        | 64.1        | E        |
|                                                  | WBT        | 12.8                 | B        | 30.7        | C        |
|                                                  | SBL        | 58.1                 | E        | 43.1        | D        |
|                                                  | SBR        | 53.9                 | D        | 90.4        | F        |
|                                                  | <b>Int</b> | <b>42.6</b>          | <b>D</b> | <b>46.0</b> | <b>D</b> |
| I-95 East<br>Ramp<br>Terminal*                   | EBL        | 44.3                 | D        | 44.4        | D        |
|                                                  | EBT        | 29.2                 | C        | 30.8        | C        |
|                                                  | WBT        | 26.9                 | C        | 20.5        | C        |
|                                                  | WBR        | 97.7                 | F        | 100.2       | F        |
|                                                  | NBL        | 44.3                 | D        | 47.2        | D        |
|                                                  | NBR        | 122.4                | F        | 112.6       | F        |
|                                                  | <b>Int</b> | <b>55.3</b>          | <b>E</b> | <b>53.0</b> | <b>D</b> |
| NW 10th<br>Terrace                               | EBL        | 72.6                 | E        | 88.8        | F        |
|                                                  | EBT        | 5.1                  | A        | 11.6        | B        |
|                                                  | WBL        | 18.2                 | B        | 24.3        | C        |
|                                                  | WBT        | 24.1                 | C        | 34.4        | C        |
|                                                  | WBR        | 11.9                 | B        | 15.0        | B        |
|                                                  | NBL        | 85.4                 | F        | 96.1        | F        |
|                                                  | NBT        | 50.1                 | D        | 49.1        | D        |
|                                                  | SBL        | 50.8                 | D        | 48.7        | D        |
|                                                  | SBT        | 49.3                 | D        | 47.1        | D        |
|                                                  | <b>Int</b> | <b>19.7</b>          | <b>B</b> | <b>29.4</b> | <b>C</b> |

\*HCM 2000 results reported





**Table 4.6 – 2030 No-Build Alternative Pembroke Road Intersection LOS and Delay Results**

| Pembroke Road Intersection         | Movement   | No-Build Alternative |          |             |          |
|------------------------------------|------------|----------------------|----------|-------------|----------|
|                                    |            | AM Peak              |          | PM Peak     |          |
|                                    |            | Delay                | LOS      | Delay       | LOS      |
|                                    |            | (s/veh)              |          | (s/veh)     |          |
| Park Road*                         | EBU        | 10.1                 | B        | 14.8        | B        |
|                                    | EBT        | 19.6                 | B        | 15.7        | B        |
|                                    | WBL        | 68.3                 | E        | 45.7        | D        |
|                                    | WBT        | 4.0                  | A        | 1.9         | A        |
|                                    | NBL        | 59.5                 | E        | 60.6        | E        |
|                                    | NBR        | 46.3                 | D        | 43.4        | D        |
|                                    | <b>Int</b> | <b>17.1</b>          | <b>B</b> | <b>12.6</b> | <b>B</b> |
| SW 31st Avenue*                    | EBT        | 0.5                  | A        | 0.7         | A        |
|                                    | WBL        | 70.1                 | E        | 66.9        | E        |
|                                    | WBT        | 0.2                  | A        | 0.2         | A        |
|                                    | NBR        | 55.0                 | D        | 56.5        | E        |
|                                    | <b>Int</b> | <b>1.9</b>           | <b>A</b> | <b>1.9</b>  | <b>A</b> |
| I-95 West Ramp Terminal*           | EBT        | 18.4                 | B        | 20.2        | C        |
|                                    | EBR        | 22.4                 | C        | 11.6        | B        |
|                                    | WBL        | 52.2                 | D        | 45.4        | D        |
|                                    | WBT        | 15.3                 | B        | 18.4        | B        |
|                                    | SBL        | 35.4                 | D        | 33.4        | C        |
|                                    | SBR        | 49.3                 | D        | 54.7        | D        |
|                                    | <b>Int</b> | <b>27.2</b>          | <b>C</b> | <b>26.6</b> | <b>C</b> |
| I-95 East Ramp Terminal*           | EBL        | 36.1                 | D        | 37.9        | D        |
|                                    | EBT        | 10.9                 | B        | 13.8        | B        |
|                                    | WBT        | 20.4                 | C        | 20.0        | B        |
|                                    | WBR        | 5.2                  | A        | 7.6         | A        |
|                                    | NBL        | 46.1                 | D        | 44.5        | D        |
|                                    | NBR        | 57.6                 | E        | 57.3        | E        |
|                                    | <b>Int</b> | <b>24.5</b>          | <b>C</b> | <b>26.9</b> | <b>C</b> |
| NW 10th Avenue / South 28th Avenue | EBL        | 54.0                 | D        | 80.1        | F        |
|                                    | EBT        | 7.8                  | A        | 11.8        | B        |
|                                    | WBL        | 20.2                 | C        | 25.9        | C        |
|                                    | WBT        | 31.2                 | C        | 42.1        | D        |
|                                    | WBR        | 18.9                 | B        | 22.0        | C        |
|                                    | NBL        | 55.8                 | E        | 59.0        | E        |
|                                    | NBT        | 35.6                 | D        | 32.0        | C        |
|                                    | SBL        | 46.0                 | D        | 47.5        | D        |
|                                    | SBT        | 52.2                 | D        | 57.6        | E        |
|                                    | <b>Int</b> | <b>23.7</b>          | <b>C</b> | <b>31.7</b> | <b>C</b> |

\*HCM 2000 results reported



**Table 4.7 – 2030 No-Build Alternative Hollywood Boulevard Intersection LOS and Delay Results**

| Hollywood Boulevard Intersection | Movement   | No-Build Alternative |          |             |          |
|----------------------------------|------------|----------------------|----------|-------------|----------|
|                                  |            | AM Peak              |          | PM Peak     |          |
|                                  |            | Delay                | LOS      | Delay       | LOS      |
|                                  |            | (s/veh)              |          | (s/veh)     |          |
| Entranda Drive                   | EBL        | 6.1                  | A        | 18.7        | B        |
|                                  | EBT        | 6.6                  | A        | 12.4        | B        |
|                                  | WBL        | 1.0                  | A        | 3.0         | A        |
|                                  | WBT        | 1.4                  | A        | 8.0         | A        |
|                                  | NBT        | 63.2                 | E        | 55.2        | E        |
|                                  | NBR        | 61.2                 | E        | 53.7        | D        |
|                                  | SBL        | 76.3                 | E        | 83.6        | F        |
|                                  | SBT        | 61.6                 | E        | 56.0        | E        |
|                                  | <b>Int</b> | <b>7.1</b>           | <b>A</b> | <b>15.4</b> | <b>B</b> |
| Calle Grande Drive*              | EBU        | 87.9                 | F        | 72.9        | E        |
|                                  | EBT        | 0.6                  | A        | 1.1         | A        |
|                                  | WBL        | 93.9                 | F        | 79.7        | E        |
|                                  | WBT        | 0.7                  | A        | 0.4         | A        |
|                                  | NBR        | 0.6                  | A        | 0.7         | A        |
|                                  | <b>Int</b> | <b>1.3</b>           | <b>A</b> | <b>1.2</b>  | <b>A</b> |
| I-95 West Ramp Terminal*         | EBT        | 27.0                 | C        | 26.8        | C        |
|                                  | EBR        | 23.5                 | C        | 51.3        | D        |
|                                  | WBL        | 58.1                 | E        | 81.6        | F        |
|                                  | WBT        | 12.3                 | B        | 19.3        | B        |
|                                  | SBL        | 56.7                 | E        | 53.0        | D        |
|                                  | SBR        | 54.9                 | D        | 96.2        | F        |
|                                  | <b>Int</b> | <b>34.9</b>          | <b>C</b> | <b>48.1</b> | <b>D</b> |
| I-95 East Ramp Terminal*         | EBL        | 50.2                 | D        | 59.0        | E        |
|                                  | EBT        | 11.2                 | B        | 17.4        | B        |
|                                  | WBT        | 19.7                 | B        | 24.6        | C        |
|                                  | WBR        | 25.5                 | C        | 28.1        | C        |
|                                  | NBL        | 65.9                 | E        | 56.1        | E        |
|                                  | NBR        | 65.6                 | E        | 84.1        | F        |
|                                  | <b>Int</b> | <b>32.3</b>          | <b>C</b> | <b>38.5</b> | <b>D</b> |

\*HCM 2000 results reported



**Table 4.7 – 2030 No-Build Alternative Hollywood Boulevard Intersection LOS and Delay Results (Continued)**

| Hollywood Boulevard Intersection | Movement | No-Build Alternative |     |         |     |
|----------------------------------|----------|----------------------|-----|---------|-----|
|                                  |          | AM Peak              |     | PM Peak |     |
|                                  |          | Delay                | LOS | Delay   | LOS |
|                                  |          | (s/veh)              |     | (s/veh) |     |
| S 28th Avenue*                   | EBL      | 37.6                 | D   | 48.9    | D   |
|                                  | EBT      | 45.7                 | D   | 75.1    | E   |
|                                  | EBR      | 37.1                 | D   | 17.2    | B   |
|                                  | WBL      | 47.1                 | D   | 42.3    | D   |
|                                  | WBT      | 48.6                 | D   | 45.5    | D   |
|                                  | NBL      | 117.1                | F   | 153.9   | F   |
|                                  | NBT      | 110.0                | F   | 154.9   | F   |
|                                  | SBL      | 177.4                | F   | 210.2   | F   |
|                                  | SBT      | 52.4                 | D   | 59.3    | E   |
|                                  | SBR      | 64.8                 | E   | 161.6   | F   |
|                                  | Int      | 57.2                 | E   | 79.6    | E   |

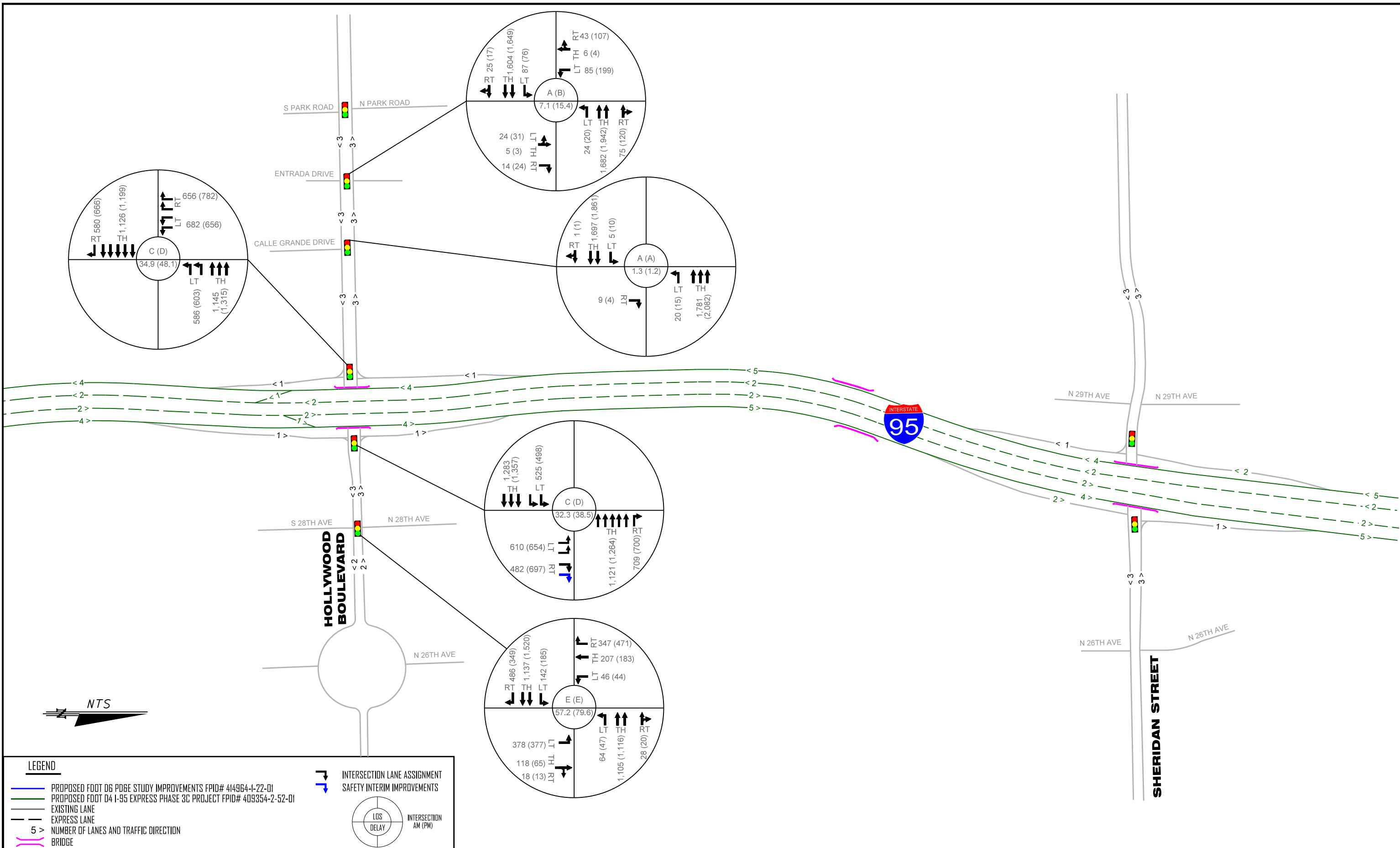
\*HCM 2000 results reported

As shown in **Table 4.5**, the 2030 No-Build Alternative intersection operational results indicate three intersections will operate at a LOS D or better and one intersection will operate at a LOS E during the AM peak-period.

As shown in **Table 4.6**, the 2030 No-Build Alternative intersection operational results indicate all five intersections will operate at a LOS D or better.

As shown in **Table 4.7**, the 2030 No-Build Alternative operational results indicate four intersections will operate at a LOS D or better and one intersection will operate at a LOS E during the AM and PM peak-period.







**Table 4.8 – 2045 No-Build Alternative Hallandale Beach Boulevard Intersection  
LOS and Delay Results**

| Hallandale<br>Beach<br>Boulevard<br>Intersection | Movement   | No-Build Alternative |          |             |          |
|--------------------------------------------------|------------|----------------------|----------|-------------|----------|
|                                                  |            | AM Peak              |          | PM Peak     |          |
|                                                  |            | Delay                | LOS      | Delay       | LOS      |
|                                                  |            | (s/veh)              |          | (s/veh)     |          |
| South Park<br>Road*                              | EBL        | 16.4                 | B        | 65.6        | E        |
|                                                  | EBT        | 14.5                 | B        | 17.9        | B        |
|                                                  | WBL        | 5.6                  | A        | 6.6         | A        |
|                                                  | WBT        | 6.4                  | A        | 12.8        | B        |
|                                                  | WBR        | 0.8                  | A        | 1.1         | A        |
|                                                  | NBT        | 97.6                 | F        | 94.5        | F        |
|                                                  | SBL        | 92.5                 | F        | 105.2       | F        |
|                                                  | SBT        | 92.5                 | F        | 105.2       | F        |
|                                                  | SBR        | 66.6                 | F        | 68.4        | E        |
|                                                  | <b>Int</b> | <b>16.0</b>          | <b>B</b> | <b>21.3</b> | <b>C</b> |
| I-95 West<br>Ramp<br>Terminal*                   | EBT        | 43.9                 | D        | 41.3        | D        |
|                                                  | EBR        | 33.5                 | C        | 37.2        | D        |
|                                                  | WBL        | 167.6                | F        | 235.2       | F        |
|                                                  | WBT        | 10.9                 | B        | 40.5        | D        |
|                                                  | SBL        | 106.5                | F        | 54.1        | D        |
|                                                  | SBR        | 150.7                | F        | 206.7       | F        |
|                                                  | <b>Int</b> | <b>80.0</b>          | <b>F</b> | <b>86.0</b> | <b>F</b> |
| I-95 East<br>Ramp<br>Terminal*                   | EBL        | 59.8                 | E        | 54.5        | D        |
|                                                  | EBT        | 36.6                 | D        | 40.6        | D        |
|                                                  | WBT        | 31.4                 | C        | 28.2        | C        |
|                                                  | WBR        | 115.5                | F        | 175.9       | F        |
|                                                  | NBL        | 54.5                 | D        | 57.1        | E        |
|                                                  | NBR        | 168.3                | F        | 214.3       | F        |
|                                                  | <b>Int</b> | <b>69.6</b>          | <b>E</b> | <b>87.0</b> | <b>F</b> |
| NW 10th<br>Terrace                               | EBL        | 106.1                | F        | 153.5       | F        |
|                                                  | EBT        | 14.2                 | B        | 18.3        | B        |
|                                                  | WBL        | 22.5                 | C        | 36.7        | D        |
|                                                  | WBT        | 33.0                 | C        | 57.0        | E        |
|                                                  | WBR        | 13.3                 | B        | 17.9        | B        |
|                                                  | NBL        | 107.1                | F        | 134.4       | F        |
|                                                  | NBT        | 59.3                 | E        | 56.2        | E        |
|                                                  | SBL        | 60.0                 | E        | 55.6        | E        |
|                                                  | SBT        | 58.2                 | E        | 54.1        | D        |
|                                                  | <b>Int</b> | <b>30.2</b>          | <b>C</b> | <b>45.9</b> | <b>D</b> |

\*HCM 2000 results reported





**Table 4.9 – 2045 No-Build Alternative Pembroke Road Intersection LOS and Delay Results**

| Pembroke Road Intersection         | Movement   | No-Build Alternative |          |             |          |
|------------------------------------|------------|----------------------|----------|-------------|----------|
|                                    |            | AM Peak              |          | PM Peak     |          |
|                                    |            | Delay                | LOS      | Delay       | LOS      |
|                                    |            | (s/veh)              |          | (s/veh)     |          |
| Park Road*                         | EBU        | 10.7                 | B        | 18.2        | B        |
|                                    | EBT        | 22.7                 | C        | 18.2        | B        |
|                                    | WBL        | 96.0                 | F        | 55.2        | E        |
|                                    | WBT        | 0.5                  | A        | 2.8         | A        |
|                                    | NBL        | 82.2                 | F        | 62.1        | E        |
|                                    | NBR        | 58.6                 | E        | 42.8        | D        |
|                                    | <b>Int</b> | <b>19.7</b>          | <b>B</b> | <b>14.6</b> | <b>B</b> |
| SW 31st Avenue*                    | EBT        | 0.5                  | A        | 0.5         | A        |
|                                    | WBL        | 81.6                 | F        | 65.6        | E        |
|                                    | WBT        | 0.2                  | A        | 0.2         | A        |
|                                    | NBR        | 68.2                 | E        | 59.2        | E        |
|                                    | <b>Int</b> | <b>2.2</b>           | <b>A</b> | <b>1.8</b>  | <b>A</b> |
| I-95 West Ramp Terminal*           | EBT        | 24.4                 | C        | 19.5        | B        |
|                                    | EBR        | 10.4                 | B        | 10.3        | B        |
|                                    | WBL        | 98.2                 | F        | 46.7        | D        |
|                                    | WBT        | 17.1                 | B        | 15.9        | B        |
|                                    | SBL        | 49.6                 | D        | 36.1        | D        |
|                                    | SBR        | 101.8                | F        | 84.5        | F        |
|                                    | <b>Int</b> | <b>42.5</b>          | <b>D</b> | <b>29.9</b> | <b>C</b> |
| I-95 East Ramp Terminal*           | EBL        | 63.7                 | E        | 48.5        | D        |
|                                    | EBT        | 16.4                 | B        | 15.7        | B        |
|                                    | WBT        | 25.6                 | C        | 27.2        | C        |
|                                    | WBR        | 7.6                  | A        | 4.7         | A        |
|                                    | NBL        | 64.1                 | E        | 44.8        | D        |
|                                    | NBR        | 96.5                 | F        | 66.2        | E        |
|                                    | <b>Int</b> | <b>39.8</b>          | <b>D</b> | <b>32.2</b> | <b>C</b> |
| NW 10th Avenue / South 28th Avenue | EBL        | 71.1                 | E        | 105.6       | F        |
|                                    | EBT        | 15.4                 | B        | 25.9        | C        |
|                                    | WBL        | 28.0                 | C        | 26.7        | C        |
|                                    | WBT        | 40.7                 | D        | 43.6        | D        |
|                                    | WBR        | 23.7                 | C        | 22.1        | C        |
|                                    | NBL        | 66.8                 | E        | 79.1        | E        |
|                                    | NBT        | 41.5                 | D        | 31.8        | C        |
|                                    | SBL        | 58.0                 | E        | 46.3        | D        |
|                                    | SBT        | 71.0                 | E        | 64.7        | E        |
|                                    | <b>Int</b> | <b>32.5</b>          | <b>C</b> | <b>41.2</b> | <b>D</b> |

\*HCM 2000 results reported



**Table 4.10 – 2045 No-Build Alternative Hollywood Boulevard Intersection LOS and Delay Results**

| Hollywood Boulevard Intersection | Movement   | No-Build Alternative |          |             |          |
|----------------------------------|------------|----------------------|----------|-------------|----------|
|                                  |            | AM Peak              |          | PM Peak     |          |
|                                  |            | Delay                | LOS      | Delay       | LOS      |
|                                  |            | (s/veh)              |          | (s/veh)     |          |
| Entranda Drive                   | EBL        | 18                   | B        | 48.4        | D        |
|                                  | EBT        | 8.3                  | A        | 17.2        | B        |
|                                  | WBL        | 2.7                  | A        | 7.6         | A        |
|                                  | WBT        | 2.2                  | A        | 7.0         | A        |
|                                  | NBT        | 61.9                 | E        | 59.5        | E        |
|                                  | NBR        | 60                   | E        | 57.9        | E        |
|                                  | SBL        | 77.3                 | E        | 93.1        | F        |
|                                  | SBT        | 60.5                 | E        | 60.4        | E        |
|                                  | <b>Int</b> | <b>8.3</b>           | <b>A</b> | <b>18.0</b> | <b>B</b> |
| Calle Grande Drive*              | EBU        | 87.6                 | F        | 97.2        | F        |
|                                  | EBT        | 0.7                  | A        | 0.7         | A        |
|                                  | WBL        | 93.2                 | F        | 107.7       | F        |
|                                  | WBT        | 1                    | A        | 0.9         | A        |
|                                  | NBR        | 0.6                  | A        | 0.6         | A        |
|                                  | <b>Int</b> | <b>1.5</b>           | <b>A</b> | <b>1.4</b>  | <b>A</b> |
| I-95 West Ramp Terminal*         | EBT        | 23.9                 | C        | 22.1        | C        |
|                                  | EBR        | 26.1                 | C        | 42.2        | D        |
|                                  | WBL        | 70.2                 | E        | 173.2       | F        |
|                                  | WBT        | 11.1                 | B        | 20.4        | C        |
|                                  | SBL        | 74.1                 | E        | 73.5        | E        |
|                                  | SBR        | 67.9                 | E        | 190.9       | F        |
|                                  | <b>Int</b> | <b>38.1</b>          | <b>D</b> | <b>70.8</b> | <b>E</b> |
| I-95 East Ramp Terminal*         | EBL        | 50.7                 | D        | 62.5        | E        |
|                                  | EBT        | 13.6                 | B        | 25.9        | C        |
|                                  | WBT        | 23.2                 | C        | 32.8        | C        |
|                                  | WBR        | 46.3                 | D        | 26.8        | C        |
|                                  | NBL        | 78.6                 | E        | 56.1        | E        |
|                                  | NBR        | 91.8                 | F        | 144.9       | F        |
|                                  | <b>Int</b> | <b>43</b>            | <b>D</b> | <b>52.7</b> | <b>D</b> |

\*HCM 2000 results reported



**Table 4.10 – 2045 No-Build Alternative Hollywood Boulevard Intersection LOS and Delay Results (Continued)**

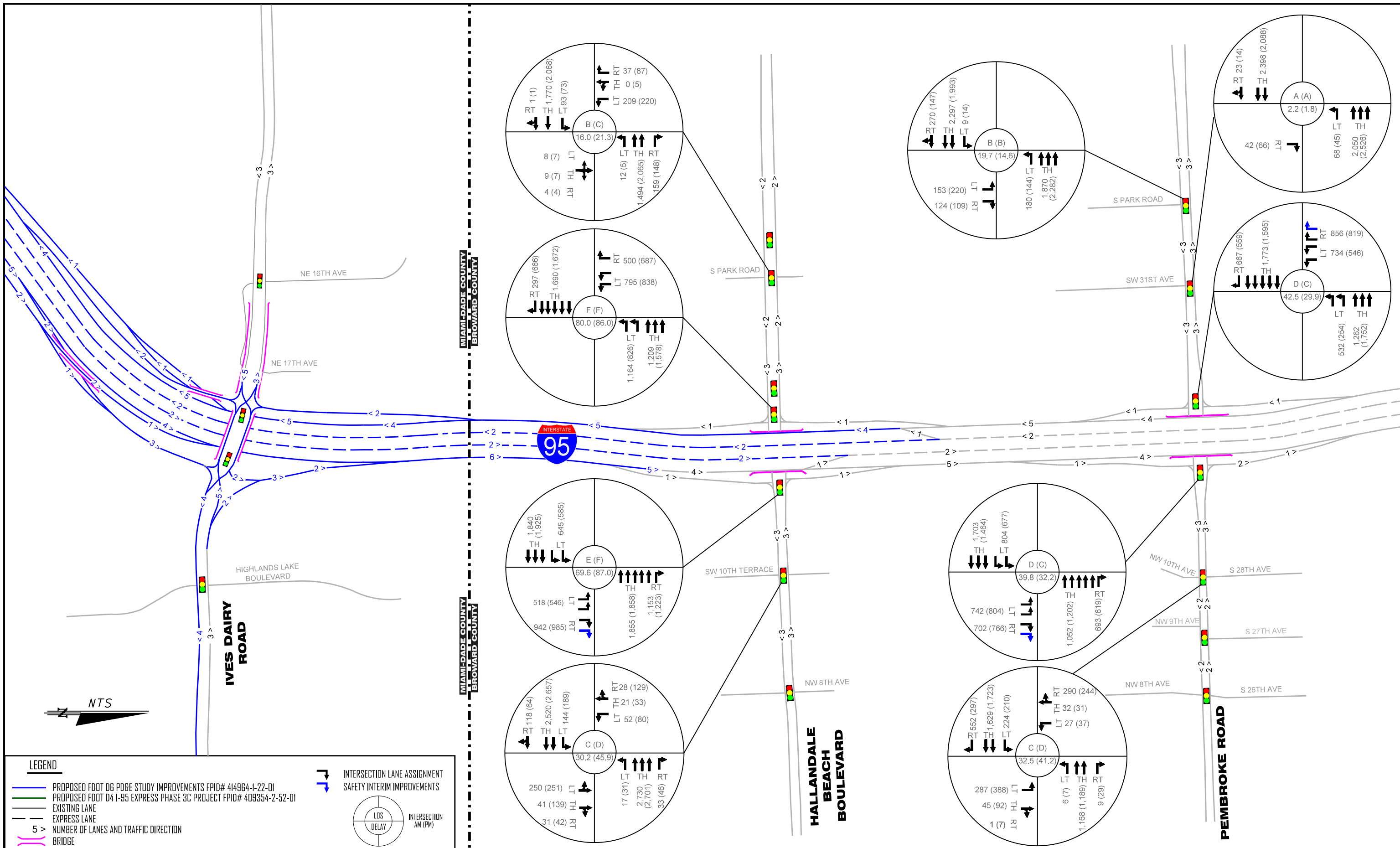
| Hollywood Boulevard Intersection | Movement | No-Build Alternative |     |                  |     |
|----------------------------------|----------|----------------------|-----|------------------|-----|
|                                  |          | AM Peak              |     | PM Peak          |     |
|                                  |          | Delay<br>(s/veh)     | LOS | Delay<br>(s/veh) | LOS |
| S 28th Avenue*                   | EBL      | 89.5                 | F   | 96.0             | F   |
|                                  | EBT      | 90.9                 | F   | 199.1            | F   |
|                                  | EBR      | 35.1                 | D   | 19.5             | B   |
|                                  | WBL      | 44.2                 | D   | 53.4             | D   |
|                                  | WBT      | 53.5                 | D   | 57.6             | E   |
|                                  | NBL      | 168.3                | F   | 194.5            | F   |
|                                  | NBT      | 163.4                | F   | 193.6            | F   |
|                                  | SBL      | 206.4                | F   | 274.7            | F   |
|                                  | SBT      | 55.8                 | E   | 63.6             | E   |
|                                  | SBR      | 111.2                | F   | 231.6            | F   |
|                                  | Int      | 82.8                 | F   | 141.6            | F   |

\*HCM 2000 results reported

As shown in **Table 4.8**, the 2045 No-Build Alternative intersection operational results indicate two intersections will operate at a LOS D or better and two intersections will operate at a LOS E or F.

As shown in **Table 4.9**, the 2045 No-Build Alternative intersection operational results indicate all five intersections will operate at a LOS D or better.

As shown in **Table 4.10**, the 2045 No-Build Alternative operational results indicate three intersections will operate at a LOS D or better and two intersections will operate at a LOS E or F.



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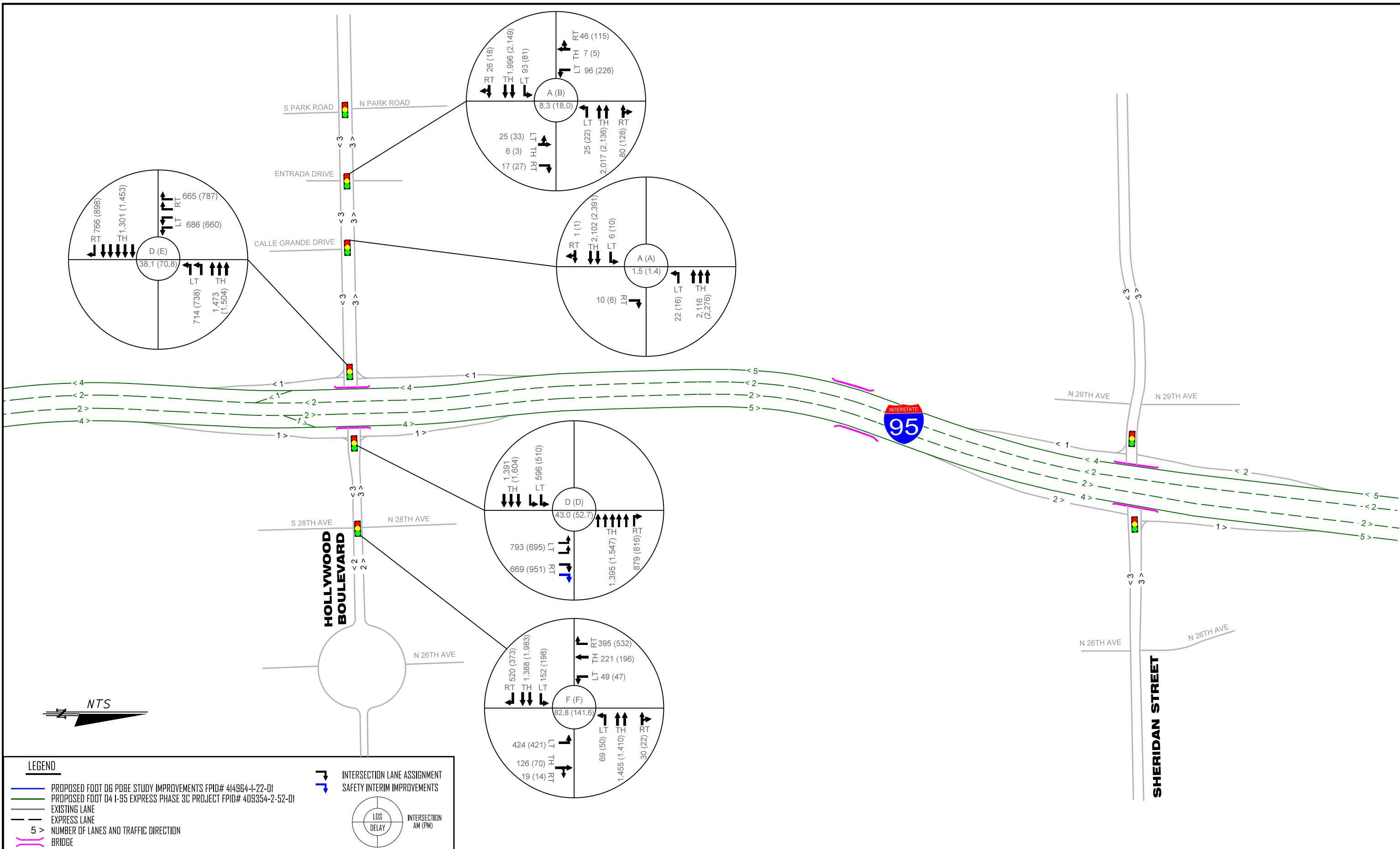


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FPID No.: 436903-I-22-02  
ETDM No.: I4254

**2045 DESIGN YEAR NO-BUILD ALTERNATIVE**  
**INTERSECTION OPERATIONAL ANALYSIS RESULTS**

FIGURE  
4.13

4-34





### 4.2.3 EXIT RAMP QUEUE RESULTS

Exit off-ramp queue results were used to check the queues against the available storage at each interchange. The results for each interchange are summarized in **Table 4.11** and **Table 4.12**. Storage distances including deceleration distances were measured from the stop bar to the painted gore point on I-95.

**Table 4.11 – 2030 Interchange Queue Results**

| Interchange                | Movement    | No-Build Alternative                            |                                                 |
|----------------------------|-------------|-------------------------------------------------|-------------------------------------------------|
|                            |             | AM Peak                                         | PM Peak                                         |
|                            |             | 95 <sup>th</sup> Queue*<br>(Storage)<br>in feet | 95 <sup>th</sup> Queue*<br>(Storage)<br>in feet |
| Hollywood Boulevard        | NB Off-Ramp | 363 (1,500)                                     | #589 (1,500)                                    |
|                            | SB Off-Ramp | 346 (1,500)                                     | #661 (1,500)                                    |
| Pembroke Road              | NB Off-Ramp | #337 (1,500)                                    | #404 (1,500)                                    |
|                            | SB Off-Ramp | #441 (1,500)                                    | #476 (1,500)                                    |
| Hallandale Beach Boulevard | NB Off-Ramp | #690 (1,500)                                    | #719 (1,500)                                    |
|                            | SB Off-Ramp | 402 (1,500)                                     | #902 (1,500)                                    |

Notes: 95th percentile queue from Synchro, Storage measured from stop bar (does not include deceleration distance) and capped at 1,500 feet.

# 95th percentile volume exceeds capacity and queue may be longer

**Table 4.12 – 2045 Interchange Queue Results**

| Interchange                | Movement    | No-Build Alternative                           |                                                |
|----------------------------|-------------|------------------------------------------------|------------------------------------------------|
|                            |             | AM Peak                                        | PM Peak                                        |
|                            |             | 95 <sup>th</sup> Queue<br>(Storage)<br>in feet | 95 <sup>th</sup> Queue<br>(Storage)<br>in feet |
| Hollywood Boulevard        | NB Off-Ramp | #548 (1,500)                                   | #932 (1,500)                                   |
|                            | SB Off-Ramp | #402 (1,500)                                   | #831 (1,500)                                   |
| Pembroke Road              | NB Off-Ramp | #569 (1,500)                                   | #496 (1,500)                                   |
|                            | SB Off-Ramp | #698 (1,500)                                   | #549 (1,500)                                   |
| Hallandale Beach Boulevard | NB Off-Ramp | #932 (1,500)                                   | #1023 (1,500)                                  |
|                            | SB Off-Ramp | #805 (1,500)                                   | #1324 (1,500)                                  |

Notes: 95th percentile queue from Synchro, Storage measured from stop bar (does not include deceleration distance) and capped at 1,500 feet.

# 95th percentile volume exceeds capacity and queue may be longer



### 4.3 TRANSPORTATION SYSTEM MANAGEMENT AND OPERATIONS ALTERNATIVE

Transportation Systems Management and Operations (TSM&O) alternatives are comprised of minor improvement options that are typically developed to alleviate specific traffic congestion and safety problems, or to get the maximum utilization out of the existing facility by improving operational efficiency.

Short-term safety improvements were evaluated at all three interchanges after the planning study (FPID#s 436111-1, 436303-1, and 439911-1). The improvements at Hallandale Beach Boulevard and Pembroke Road were constructed in 2019. The Hollywood Boulevard improvements were constructed in 2021. These improvements bring an immediate relief to the interchange areas but will not significantly improve the system capacity and/or linkage needs within the entire study area. Long-term improvements are necessary to mitigate the existing traffic conditions and increase capacity to accommodate future travel demand. A TSM&O Alternative will not significantly reduce congestion on the system, nor will it provide the regional area interconnections needed to enhance mobility for this section of Broward County.

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

The following TSM&O elements are included in the preferred alternative:

- Auxiliary lanes between interchanges
- Additional exclusive turn lanes at the interchange ramp terminals
- Additional turn-lane storage at the interchange ramp terminals
- Capacity improvements at the ramp junctions
- Signal optimization
- Enhanced signage
- New ITS technologies and infrastructure

FDOT is in the process of discussing internally with the District TSM&O Group what strategies are planned along the I-95 corridor and which ones should be





considered further in the preferred alternative. These strategies will be listed and documented during the Design phase.

#### **4.4 FUTURE CONDITIONS**

This project is not expected to affect the current or future land use of the area, other than the localized effects of potential relocations for the build alternatives.

The year 2045 travel demand forecasting along I-95 is expected to increase to an average of 303,500 vehicles per day between south of Hallandale Beach Boulevard and north of Hollywood Boulevard (an increase of 22%). The compounded annual growth rate between the years 2016 and 2045 is expected to vary between 0.03% and 2.4% for the ramps, and between 0.5% and 1.7% for the crossing arterials. During peak-hours, the rate is expected to vary between 0.05% and 4% for the ramps, and between 0.2% and 1.9% for the crossing arterials. The Southeast Florida Regional Planning Model Version (SERPM) 7.071 was used to develop the travel demand forecasting for this study. A detailed travel demand forecasting methodology was developed and approved, as documented in the FDOT *Interchange Access Request Methodology Letter of Understanding (MLOU)* dated September 2017, and later updated in June 2021, a companion document to this study.

The I-95 CPS 2045 AADT and DDHV volumes were obtained to develop the design traffic for the PD&E Study. The I-95 mainline and ramp volumes south of Hallandale Beach Boulevard were used as control totals in the future traffic development effort. Ramp terminals were post-processed to ensure there is no negative growth between the projected subarea model turning movements and the corresponding 2016 turning movement counts. Once the ramp terminal volumes were post-processed to avoid any negative turning movements, these were locked as control points for forecasting the adjacent intersections. The through volumes along the crossing arterials east and west of the ramp terminals were established as control points, approaching the adjacent intersections. These volumes were adjusted using left-turn and right-turn volumes. The left and right turns of the adjacent intersections have minor movements, which were determined by using a 0.5% growth rate using the 2016 turning movements counts. The adjacent intersections are in an already built out area. Therefore, a conservative growth rate of 0.5% was appropriate. Once the left-turn and right-turn volumes were calculated, the through volumes were calculated by



subtracting the sum of left-turn and right-turn from the volume leaving the terminal/intersection.

The PD&E Study forecasted volumes were verified by performing two reasonableness checks:

- Principle of Reciprocity – Number of vehicles during peak-hour traffic going northbound or eastbound should be similar in range of number of vehicles during peak-hour traffic going southbound or westbound.
- Growth Check – Base year counts and future year volumes were compared to account for a growing trend.

Additional details about the travel demand forecasting are documented in the *Design Traffic Technical Memorandum* and in the *Systems Interchange Modification Report (SIMR)*, both companion documents to this study.

#### 4.5 BUILD ALTERNATIVES

The PD&E Study Build Alternatives analysis and evaluation were performed and completed between September 2016 and December 2018, prior to the hold of the study in 2019 (as discussed in **Section 4.1**). Therefore, the analysis documented in this section did not include the FDOT District Six I-95 Planning Study, District Four I-95 CPS, and the recent changes to the I-95 Express Phase 3C Project.

The objective of this PD&E Study is to evaluate interchange alternatives that will address existing and projected traffic operating deficiencies along this section of I-95. In order to keep up with the growing traffic demand within the study area, three build alternatives (Alternatives 1, 2 and 3) were considered in this PD&E Study. All three alternatives propose potential modifications to the existing entrance and exit ramps serving the three interchanges within the project limits. Ramp terminal intersection modifications were evaluated at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard to improve the access and operation to and from I-95.

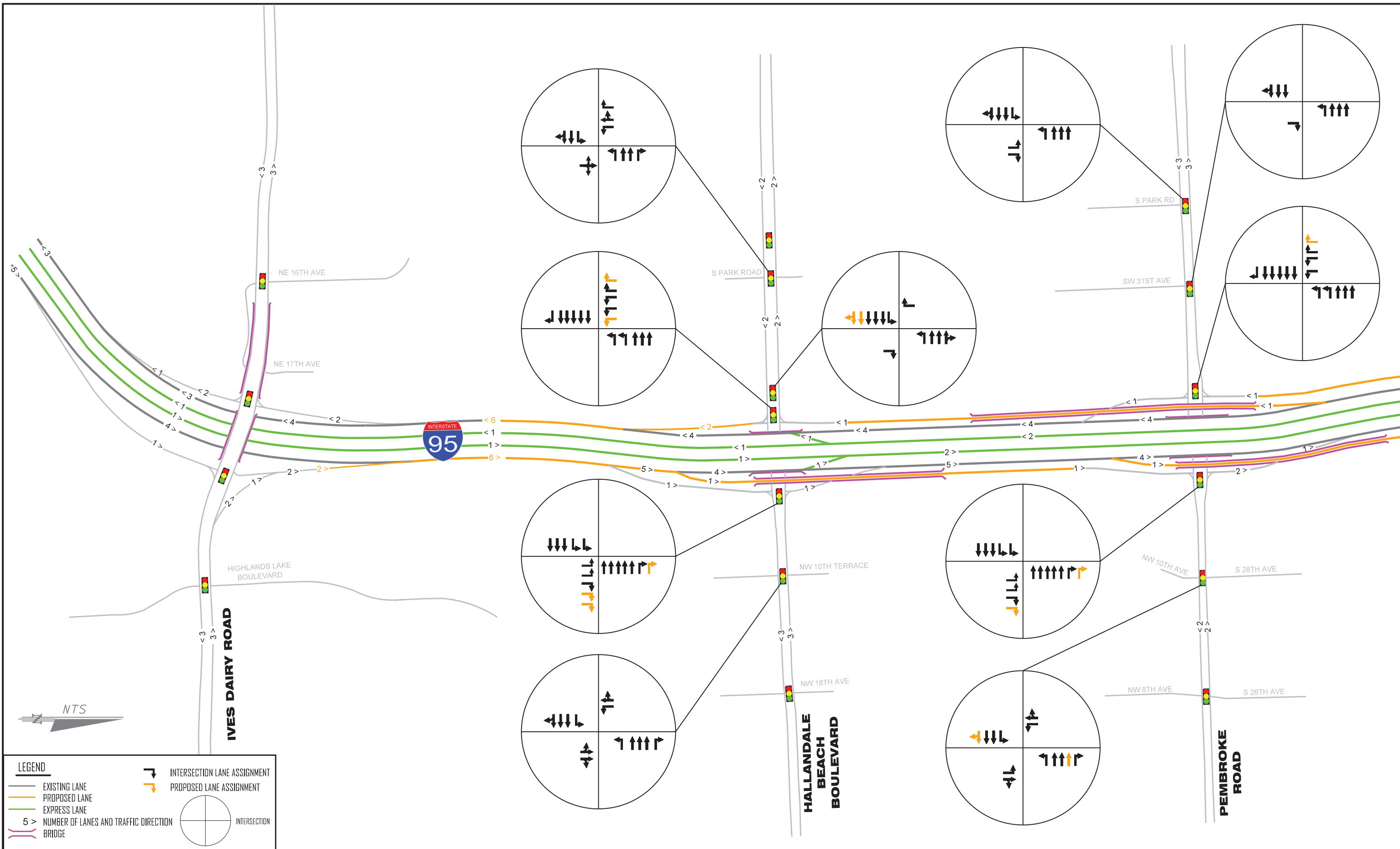


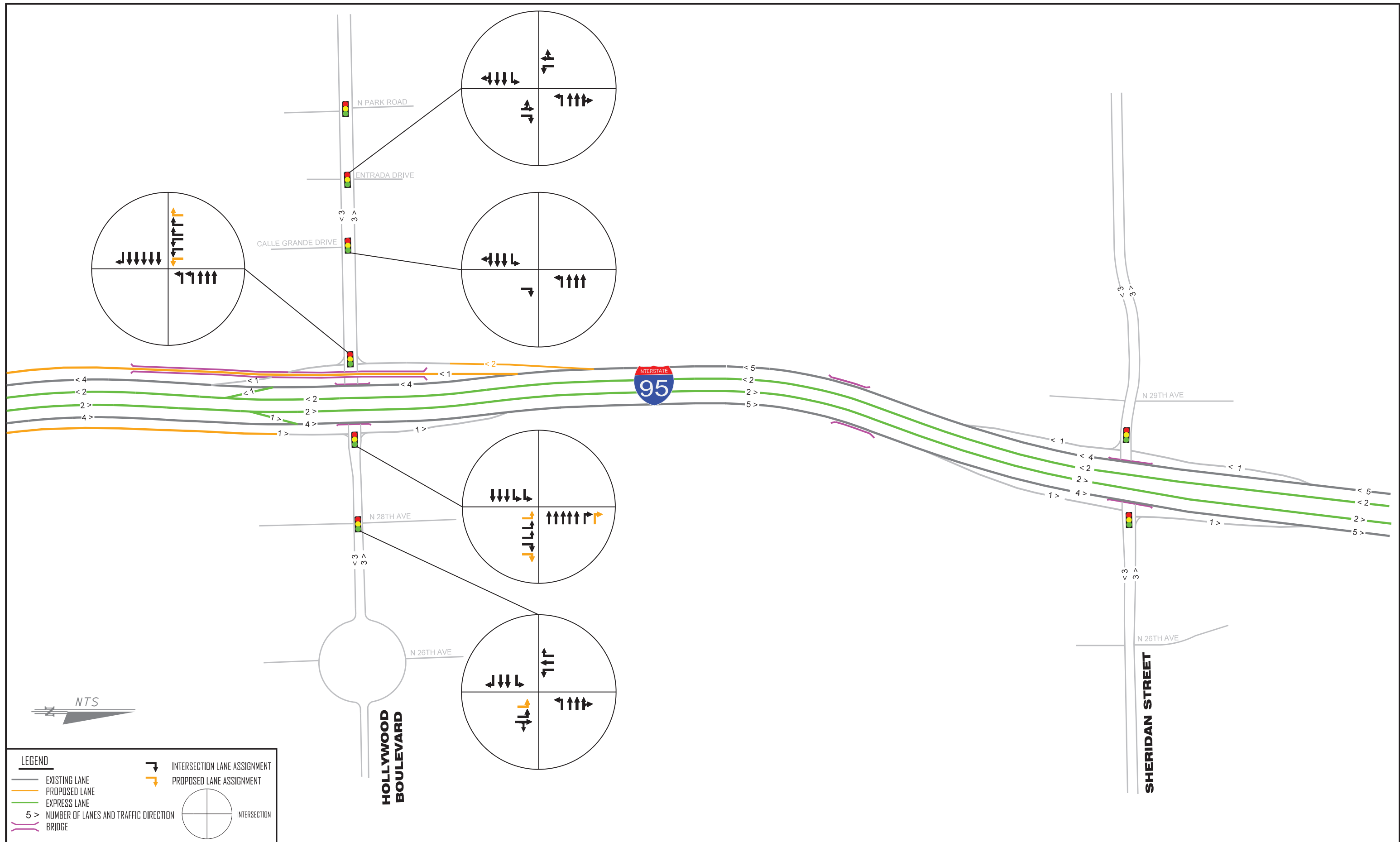
**Appendix G** shows the conceptual plans for all three alternatives including, but not limited to, the following elements:

- Project corridor study limits
- Existing limited access right of way
- Existing right of way
- Existing centerline of construction
- Existing bridge structures
- Existing barrier walls
- Proposed corridor improvements
- Proposed new/widened bridge structures
- Bridge structure modifications
- Proposed shoulder pavement
- Proposed barrier/retaining walls
- Proposed limited access right of way
- Proposed pavement markings
- Impacted parcel properties
- Sidewalk
- Median/Greenspace

#### 4.5.1 ALTERNATIVE 1 – BRAIDED RAMPS

Alternative 1 proposes braided ramps between interchanges to improve the substandard weaving movements along I-95. In this alternative, the on-ramps from each interchange will remain unchanged. However, the off-ramps to Pembroke Road and Hollywood Boulevard in the northbound direction and to Pembroke Road and Hallandale Beach Boulevard in the southbound direction will be located one interchange prior to the destination interchange. For example, travelers destined northbound to Pembroke Road would use an exit ramp located just south of the Hallandale Beach Boulevard corridor right after the Hallandale Beach Boulevard off-ramp. The new exit ramp will continue separated from the I-95 mainline braiding over the Hallandale Beach Boulevard on-ramp and continuing along the right of way line until reaching the cross-street ramp terminal. This new exit ramp bypasses and avoids conflicts with the Hallandale Beach Boulevard on-ramp. The same design continues northbound to Hollywood Boulevard and southbound to Pembroke Road and Hallandale Beach Boulevard. **Figure 4.14** shows the schematic geometric layout of Alternative 1.





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from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-1-22-02  
ETDM No.: 14254

**SR 9 (INTERSTATE 95)  
LANE GEOMETRY AND CONFIGURATIONS  
ALTERNATIVE 1 - SCHEMATIC LINE DIAGRAM**

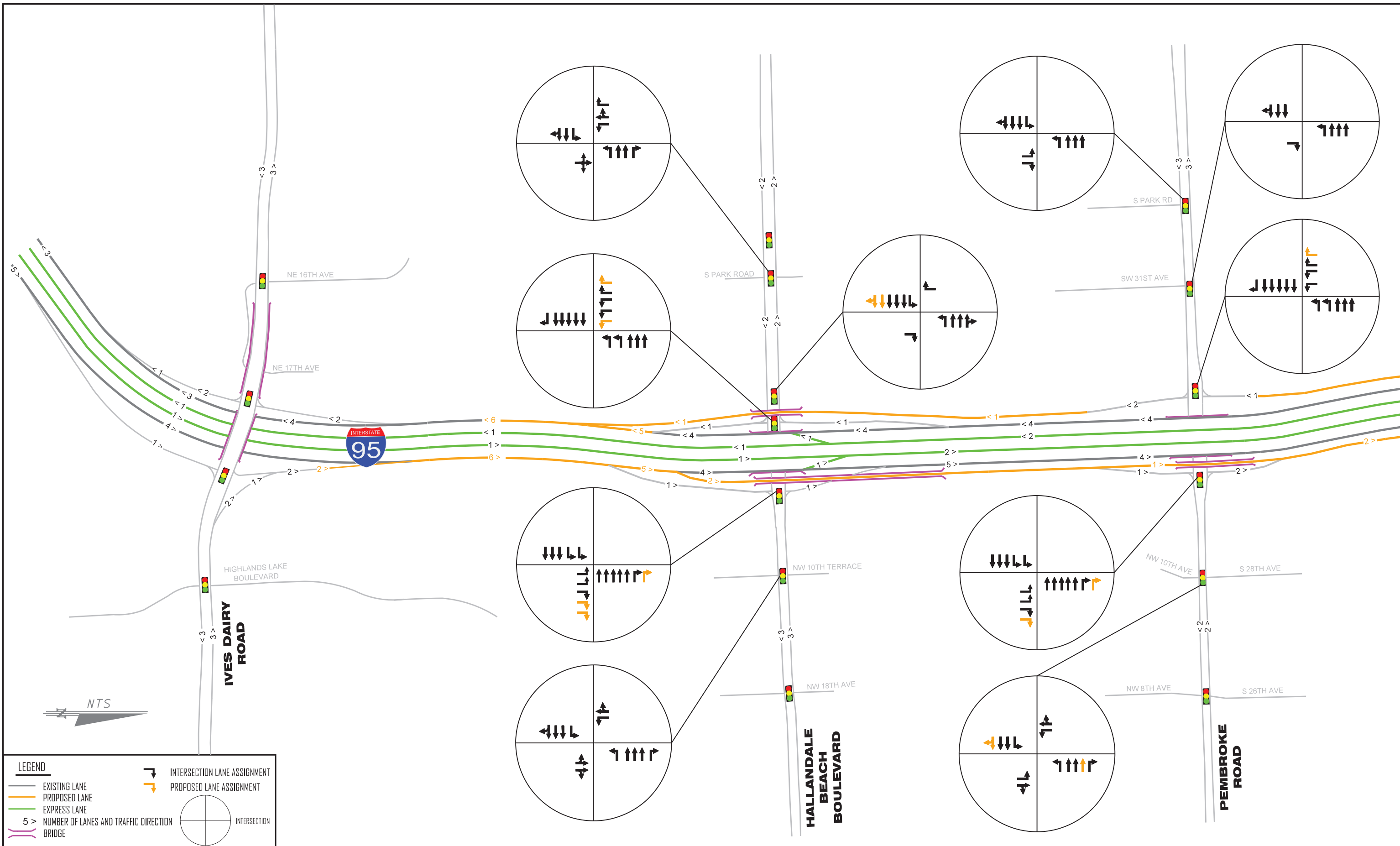
**FIGURE  
4.14**

**4-42**



#### 4.5.2 ALTERNATIVE 2 – COLLECTOR DISTRIBUTOR ROADWAYS

Alternative 2 proposes a collector distributor roadway system within the I-95 mainline project area. The collector distributor roadway system will remove the Pembroke Road Interchange from directly interacting with the I-95 mainline. In the northbound direction, all exiting traffic to Pembroke Road and Hollywood Boulevard will utilize a new collector distributor off-ramp just south of Hallandale Beach Boulevard. The collector distributor roadway system will extend to just north of Hollywood Boulevard serving the exit traffic to Pembroke Road, entry traffic from Pembroke Road, exit traffic to Hollywood Boulevard, and entry traffic from Hollywood Boulevard. In the southbound direction, the new collector distributor roadway system will not be continuous, it will end and begin at Pembroke Road. The first section combines the off-ramps to Hollywood Boulevard and Pembroke Road and the second section moves the Pembroke Road on-ramp to enter I-95 south of the Hallandale Beach Boulevard on-ramp. **Figure 4.15** shows the schematic geometric layout of Alternative 2.



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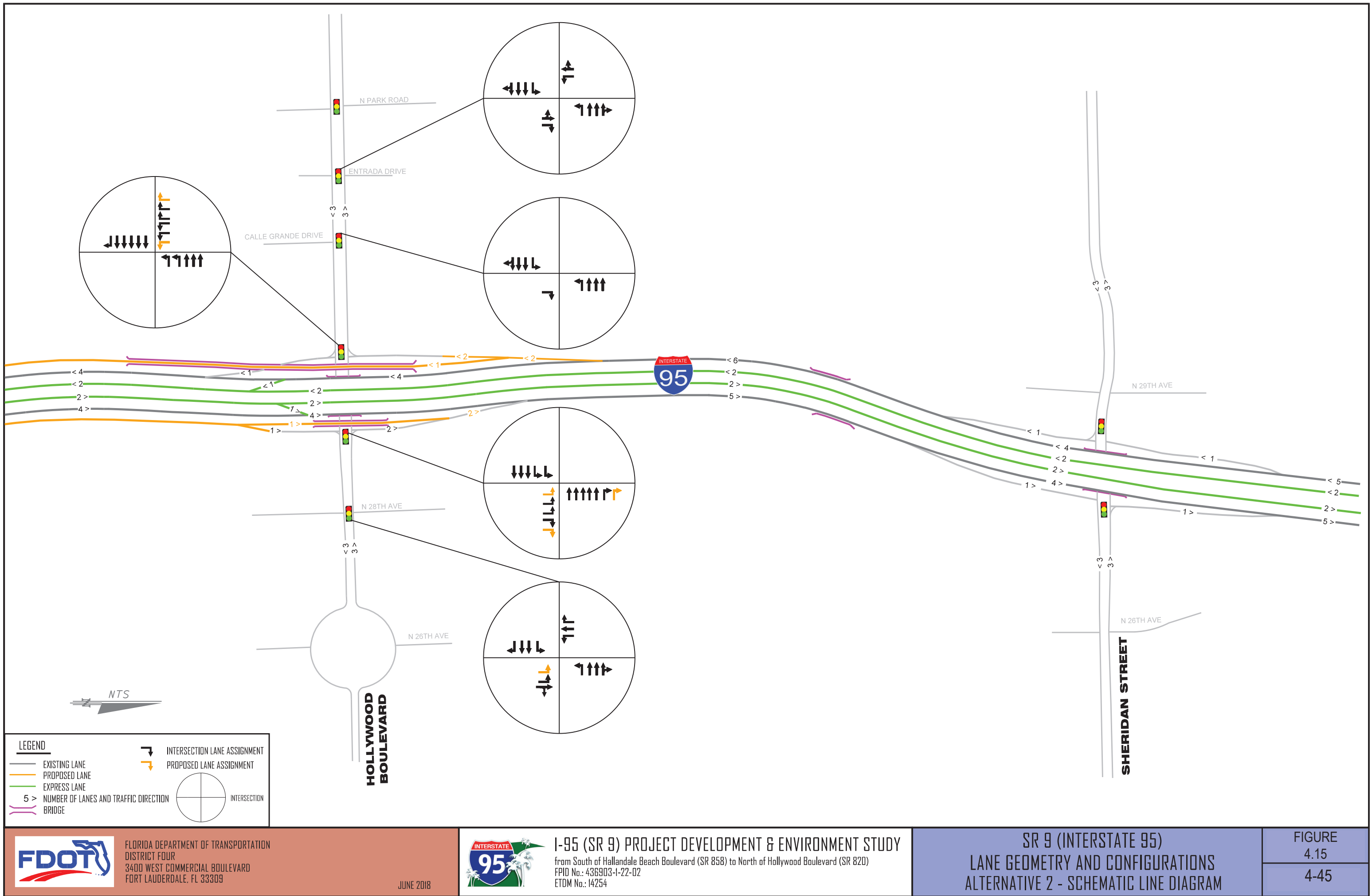
**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
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**SR 9 (INTERSTATE 95)  
LANE GEOMETRY AND CONFIGURATIONS  
ALTERNATIVE 2 - SCHEMATIC LINE DIAGRAM**

**FIGURE  
4.15**

**4-44**

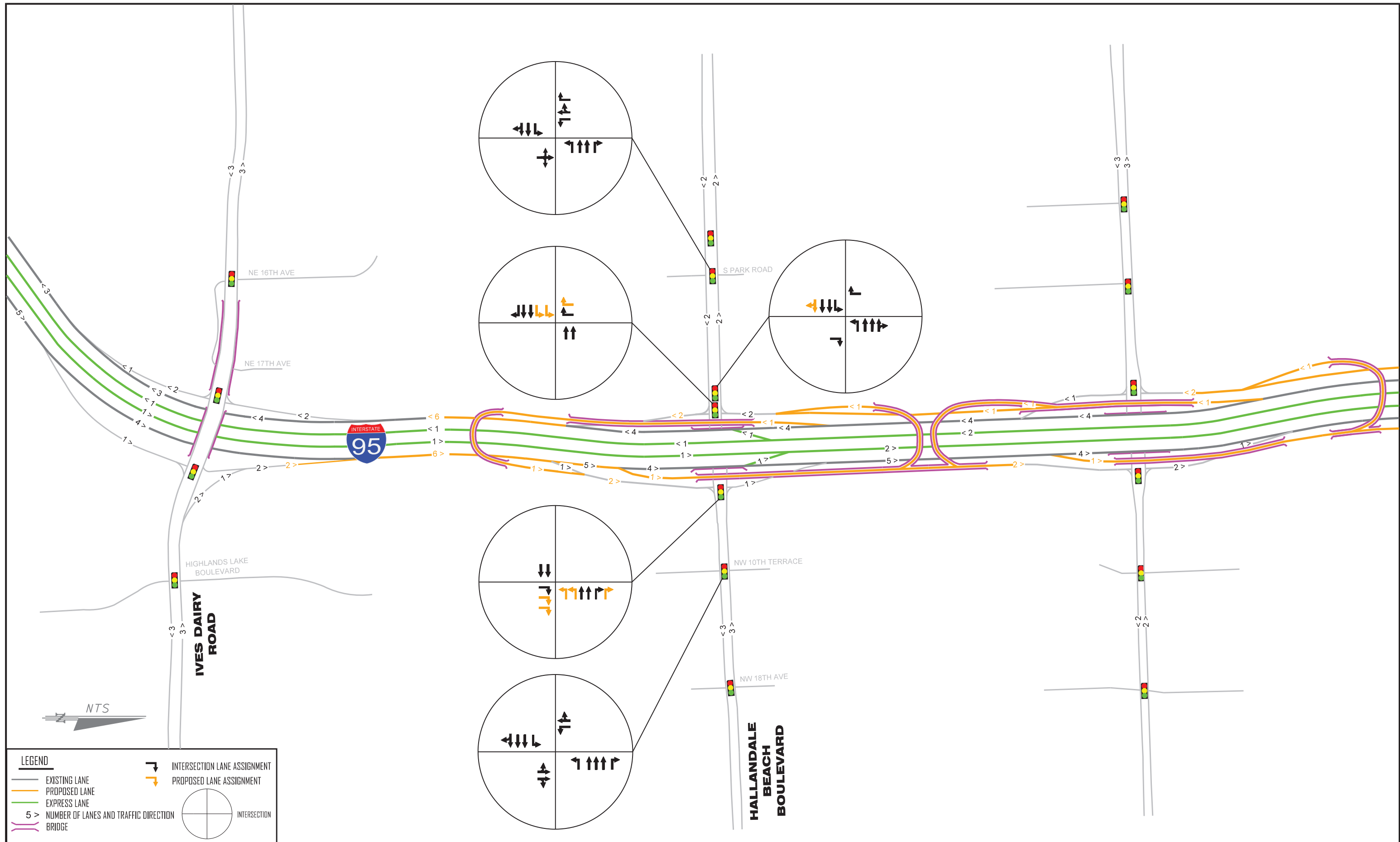






#### 4.5.3 ALTERNATIVE 3 – U-TURN RAMPS

Alternative 3 proposes to eliminate all left-turn movements from the off-ramp terminal intersections. The left-turn movements will be converted to right-turn movements by relocating the left-turn movements to a successive off-ramp that becomes a U-turn ramp over the interstate touching down to the opposite ramp terminal intersection. For example, the northbound exiting freeway traffic destined westbound will conventionally use the northbound off-ramp and make a left turn. However, in this alternative, the northbound exiting freeway traffic destined westbound will use the freeway U-turn off-ramp to access the southbound off-ramp right-turn movement. This alternative reduces the number of phases needed at the interchange ramp terminals. **Figure 4.16** shows the schematic geometric layout of Alternative 3.



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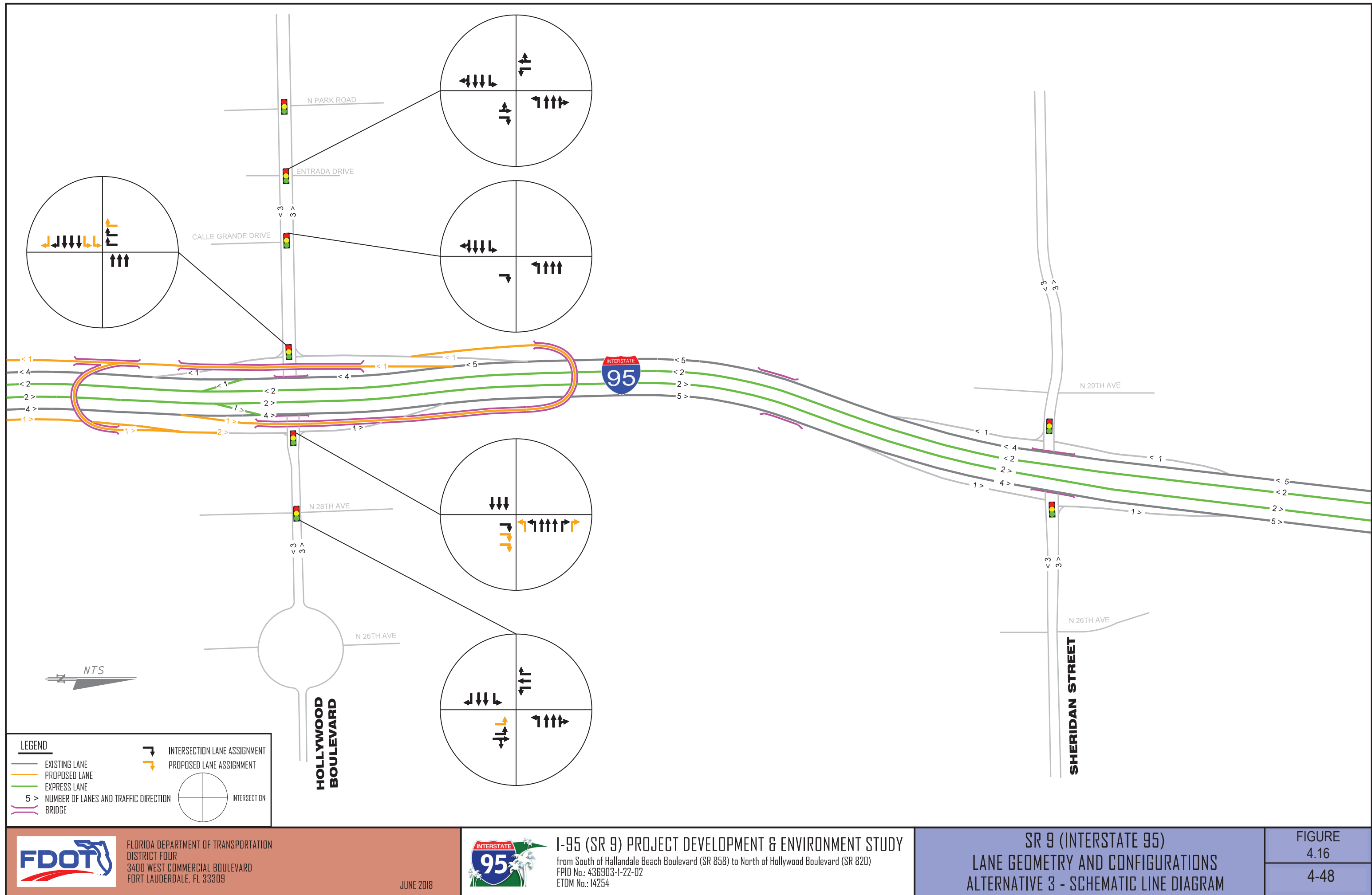


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**SR 9 (INTERSTATE 95)  
LANE GEOMETRY AND CONFIGURATIONS  
ALTERNATIVE 3 - SCHEMATIC LINE DIAGRAM**

**FIGURE  
4.16**

**4-47**



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**SR 9 (INTERSTATE 95)**  
**LANE GEOMETRY AND CONFIGURATIONS**  
**ALTERNATIVE 3 - SCHEMATIC LINE DIAGRAM**

**FIGURE**  
**4.16**

**4-48**



#### 4.5.4 INTERCHANGE ALTERNATIVES

Four types of interchange configurations were evaluated along each cross street for each I-95 interchange at Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard.

- **Diamond Interchange** – This interchange configuration maintains the existing interchange layout but with additional turn lanes, through lanes and/or extended storage bays. **Figures 4.17 – 4.19** show the proposed improvements at each interchange. The red arrows depict the locations where additional turn lanes, through lanes and/or extended storage bays are being proposed. This interchange configuration is compatible with mainline Alternatives 1 and 2.
- **Diverging Diamond Interchange (DDI)** – This interchange configuration eliminates the need for on-ramp left-turning vehicles to cross the paths of approaching through vehicles, reducing signal phases at each ramp terminal, and improving safety. The two directions of traffic along the arterials cross to the opposite side on both sides of the bridge at the freeway. **Figures 4.20 – 4.22** show the proposed improvements at each interchange. This interchange configuration is compatible with mainline Alternatives 1 and 2.
- **Displaced Left-Turn Lane Interchange** – This interchange configuration main geometric feature is the removal of the left-turn movements from the main intersection to an upstream signalized location. Traffic that would turn left at the main intersection in a conventional design now has to cross opposing through lanes at a signal-controlled intersection several hundred feet upstream and then travel on a new roadway parallel to the opposing lanes. This traffic is now able to execute the left-turn simultaneously with the through traffic at the main intersection. **Figures 4.23 – 4.25** show the proposed improvements at each interchange. This interchange configuration will work with mainline Alternatives 1 and 2.
- **Continuous Flow Intersection (CFI)** – This interchange configuration reduces signal phases at the ramp terminal intersections by displacing the on-ramp left-turn movements and by removing the off-ramp left-turn movements. The incoming arterial through traffic only encounters a single signal through the interchange. **Figures 4.26 – 4.28** show the proposed improvements at each interchange. This interchange configuration will work with mainline Alternative 3 only.





858

INTERSTATE  
95

NTS

NW 10TH TERRACE

HALLANDALE BEACH  
BOULEVARD

**LEGEND:**

|  |                                       |  |                                |
|--|---------------------------------------|--|--------------------------------|
|  | EXISTING LIMITED ACCESS RIGHT OF WAY  |  | PROPOSED CORRIDOR IMPROVEMENTS |
|  | EXISTING RIGHT OF WAY                 |  | PROPOSED SHOULDER PAVEMENT     |
|  | PROPOSED LIMITED ACCESS RIGHT OF WAY  |  | BRIDGE STRUCTURE MODIFICATIONS |
|  | PROPOSED RIGHT OF WAY                 |  | GENERAL USE LANE               |
|  | EXISTING BRIDGE STRUCTURE             |  | ADDITIONAL LANE/STORAGE        |
|  | PROPOSED NEW/WIDENED BRIDGE STRUCTURE |  |                                |
|  | PROPOSED BARRIER/RETAINING WALL       |  |                                |
|  | SIDEWALK                              |  |                                |



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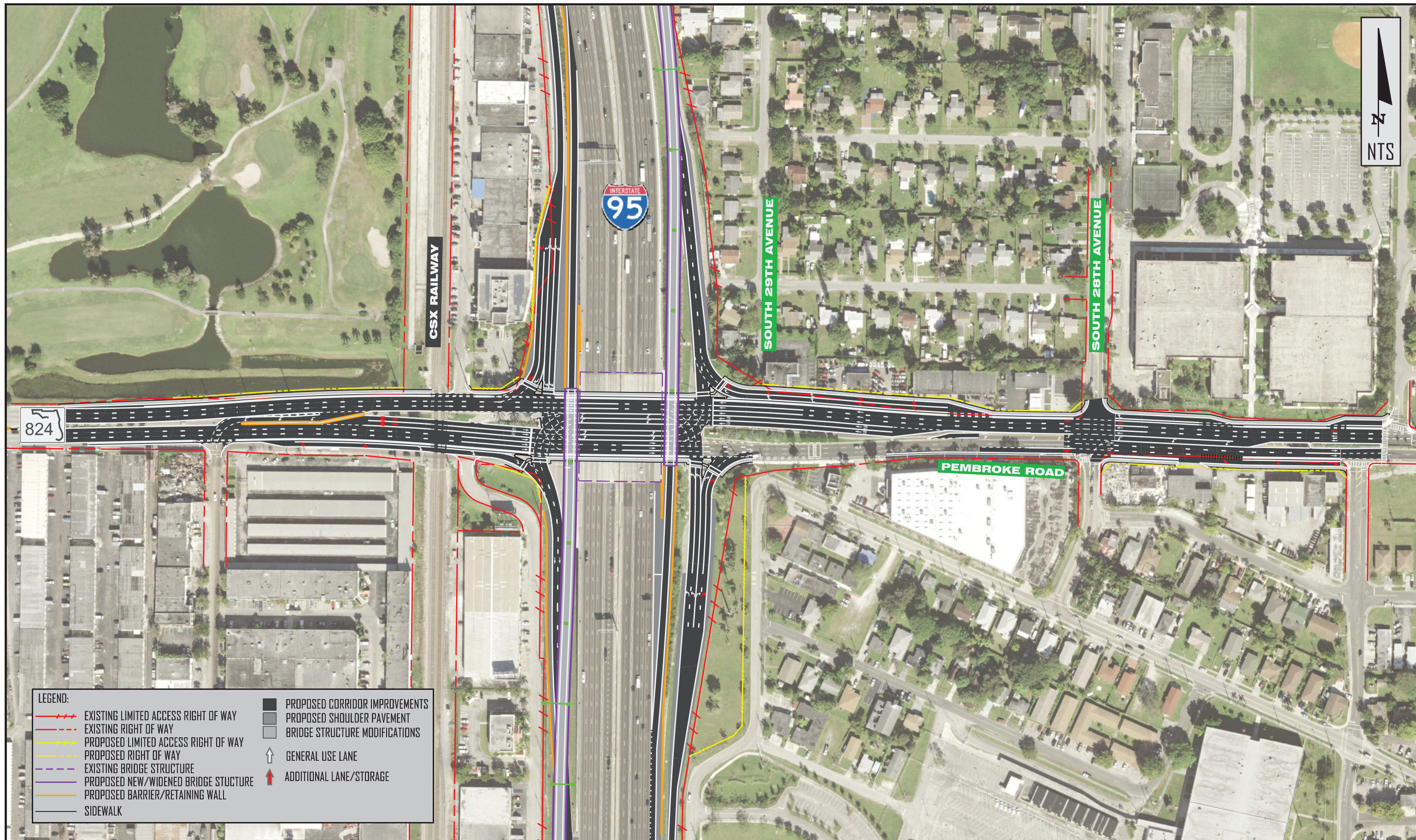


**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: 14254

**HALLANDALE BEACH BOULEVARD  
DIAMOND INTERCHANGE**

**FIGURE  
4.17  
4-50**





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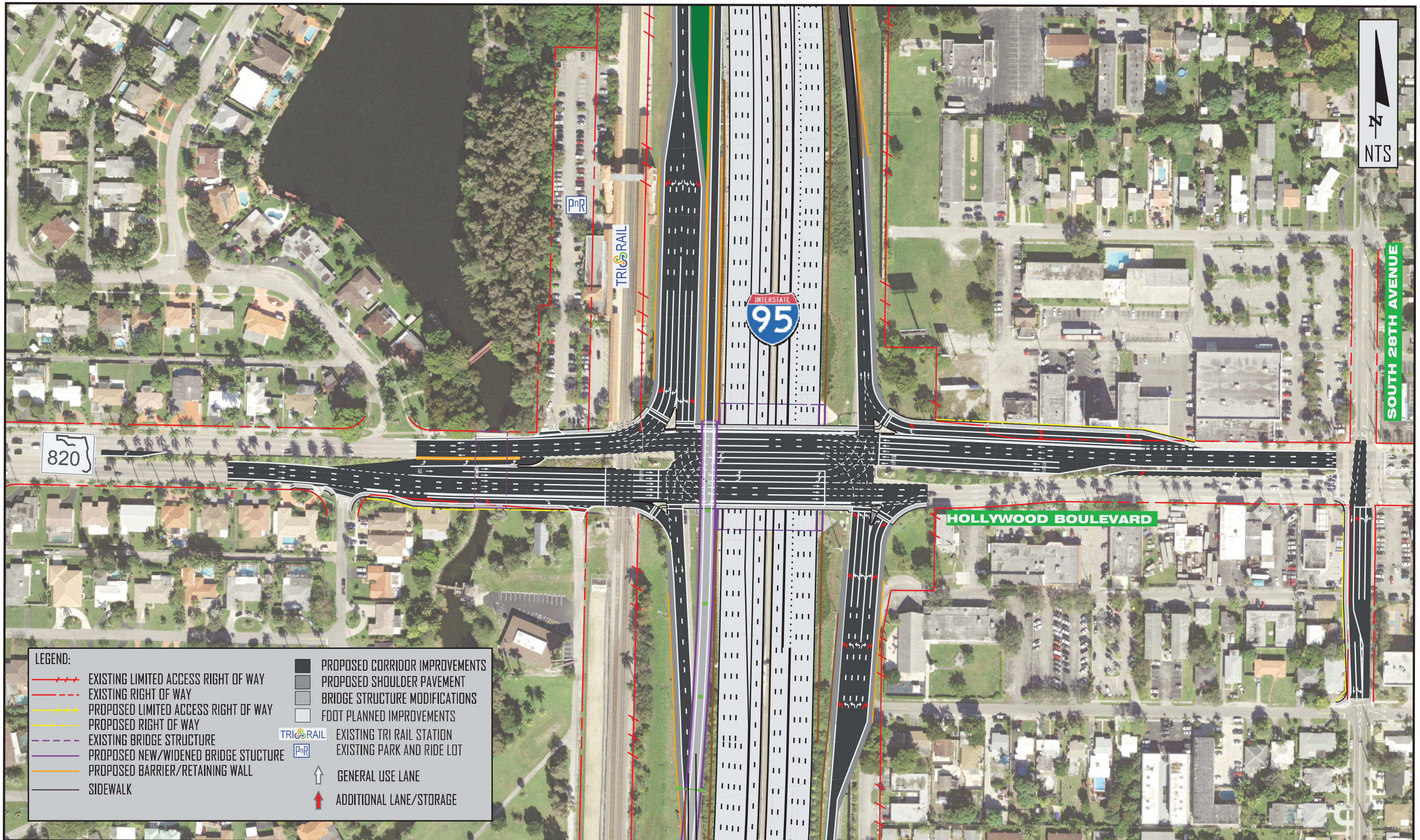
## I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
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PEMBROKE ROAD  
DIAMOND INTERCHANGE

FIGURE  
4.18  
4-51





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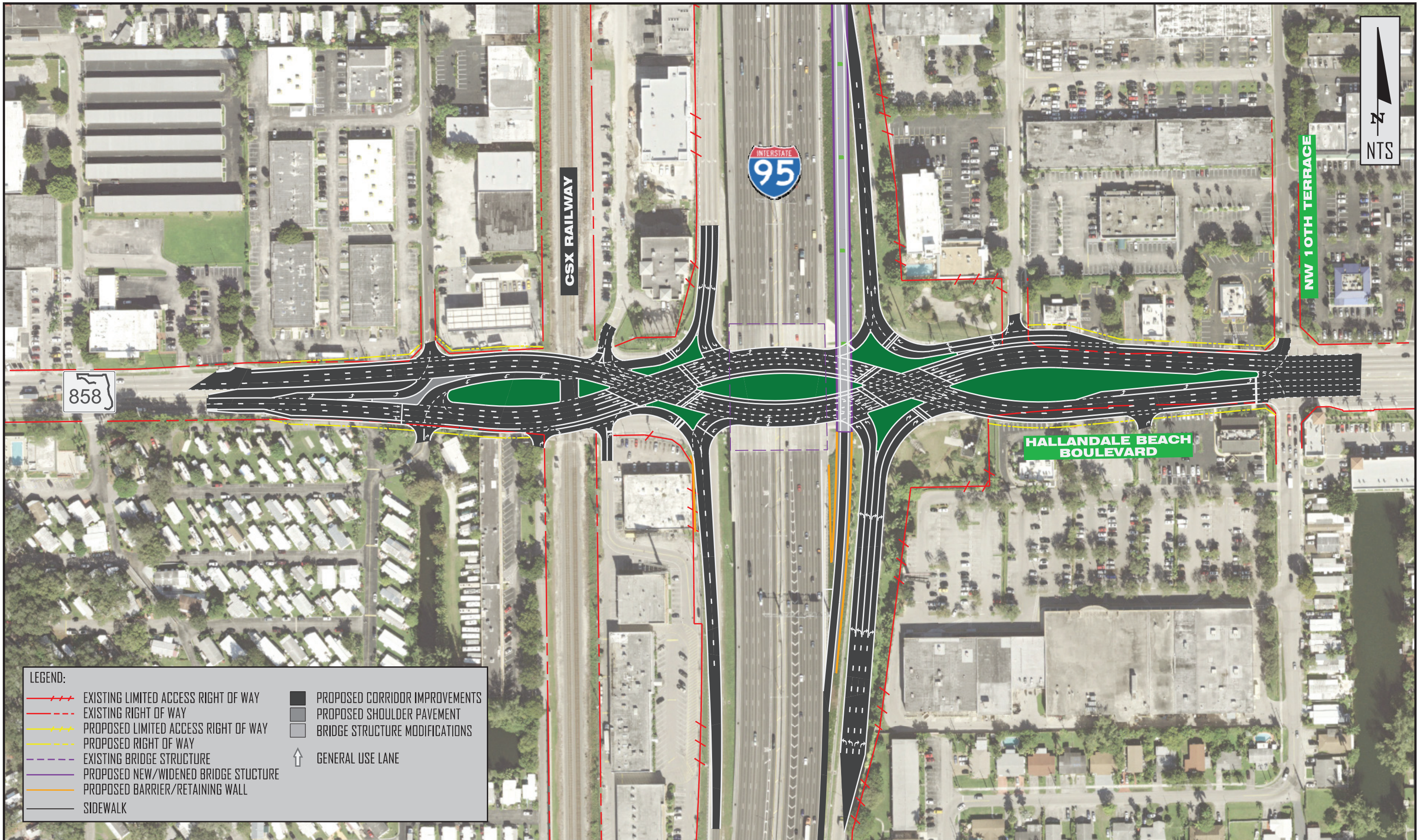


**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
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**HOLLYWOOD BOULEVARD  
DIAMOND INTERCHANGE**

**FIGURE  
4.19  
4-52**





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## I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

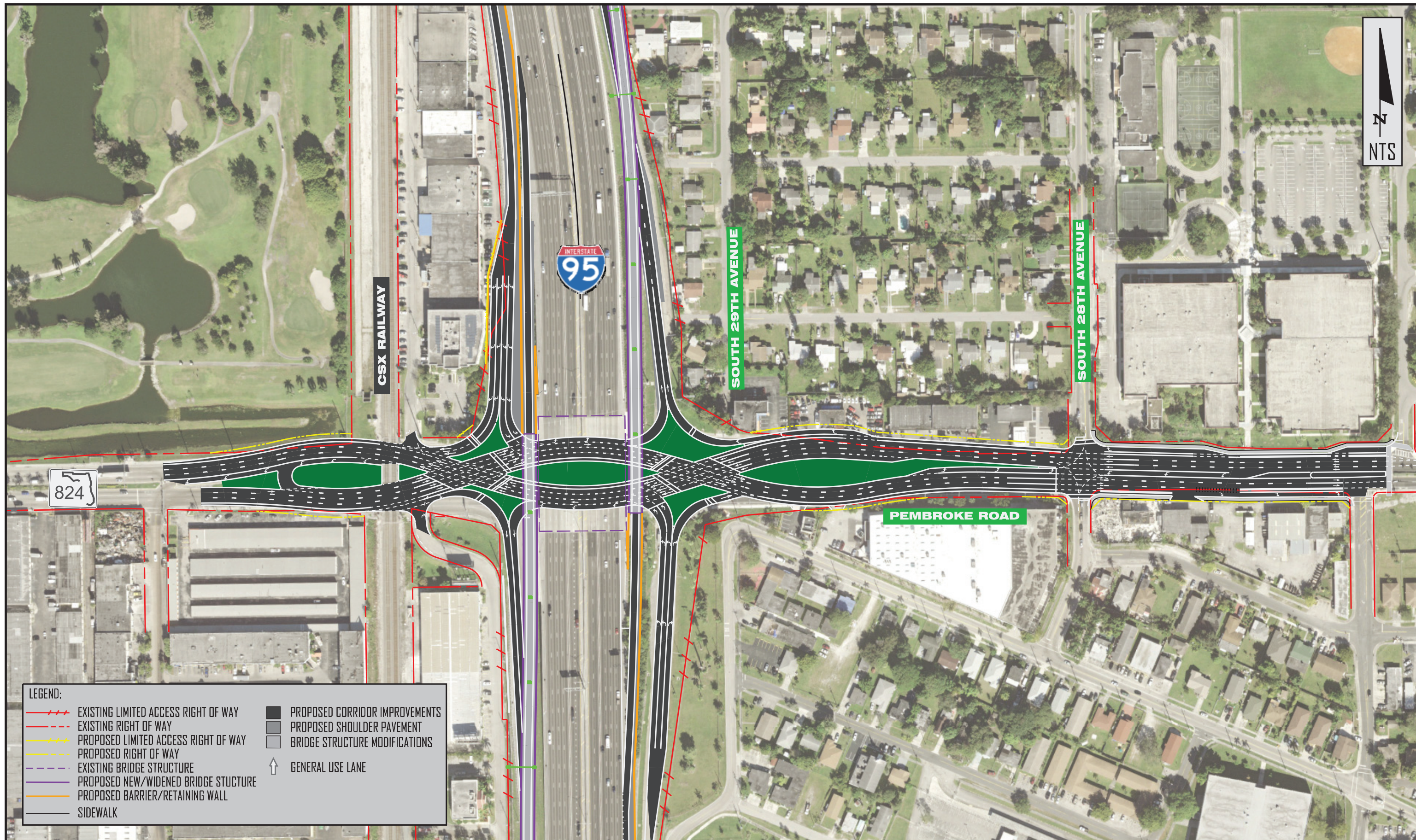
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: 14254

HALLANDALE BEACH BOULEVARD  
DIVERGING DIAMOND INTERCHANGE - 35 MPH

FIGURE  
4.20

4-53





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## I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

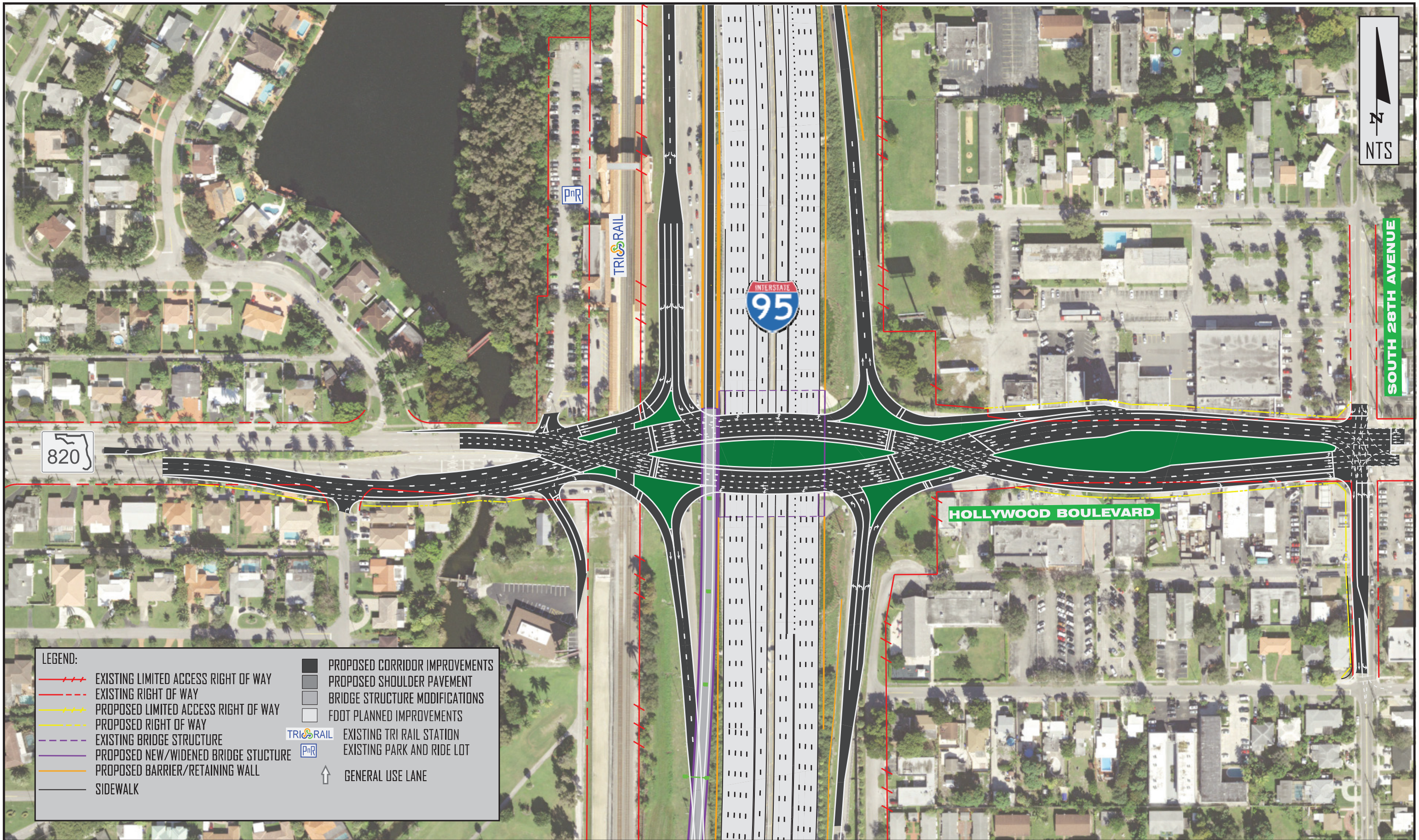
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
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ETDM No.: 14254

PEMBROKE ROAD  
DIVERGING DIAMOND INTERCHANGE - 35 MPH

FIGURE  
4.21

4-54





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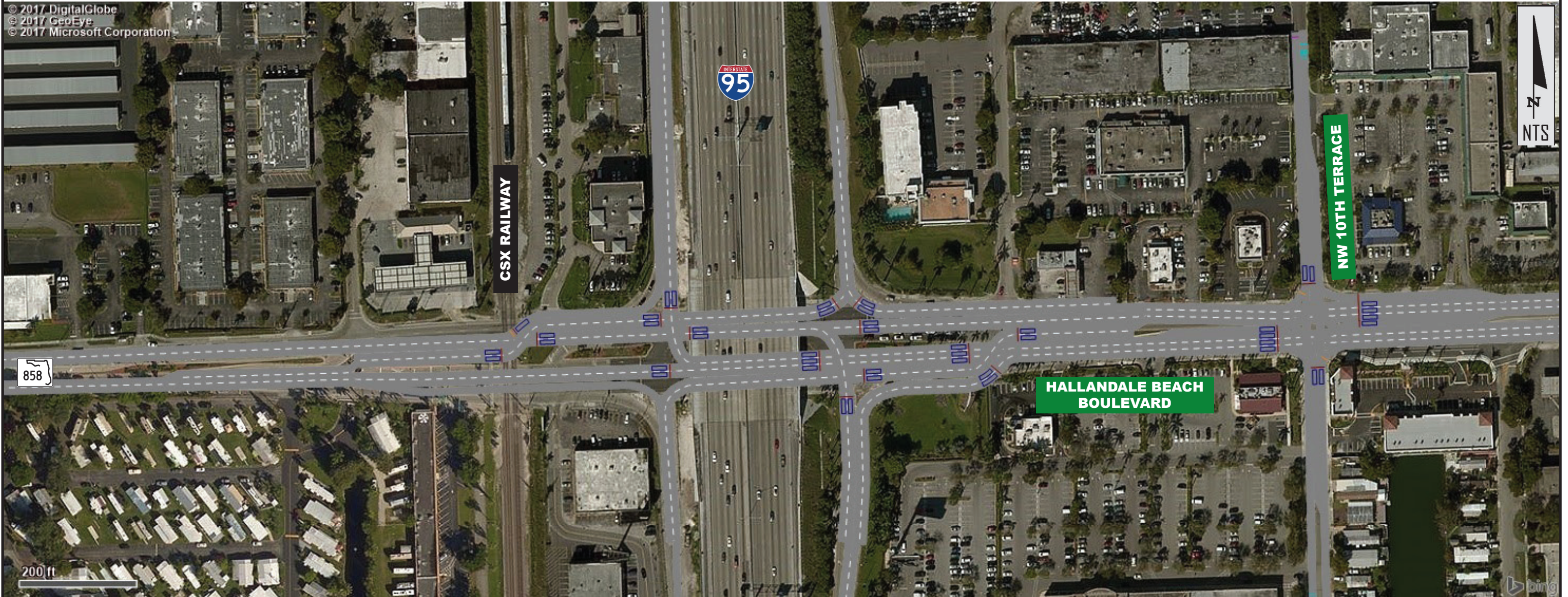


**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
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**HOLLYWOOD BOULEVARD  
DIVERGING DIAMOND INTERCHANGE - 35 MPH**

**FIGURE  
4.22  
4-55**





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## I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: 14254

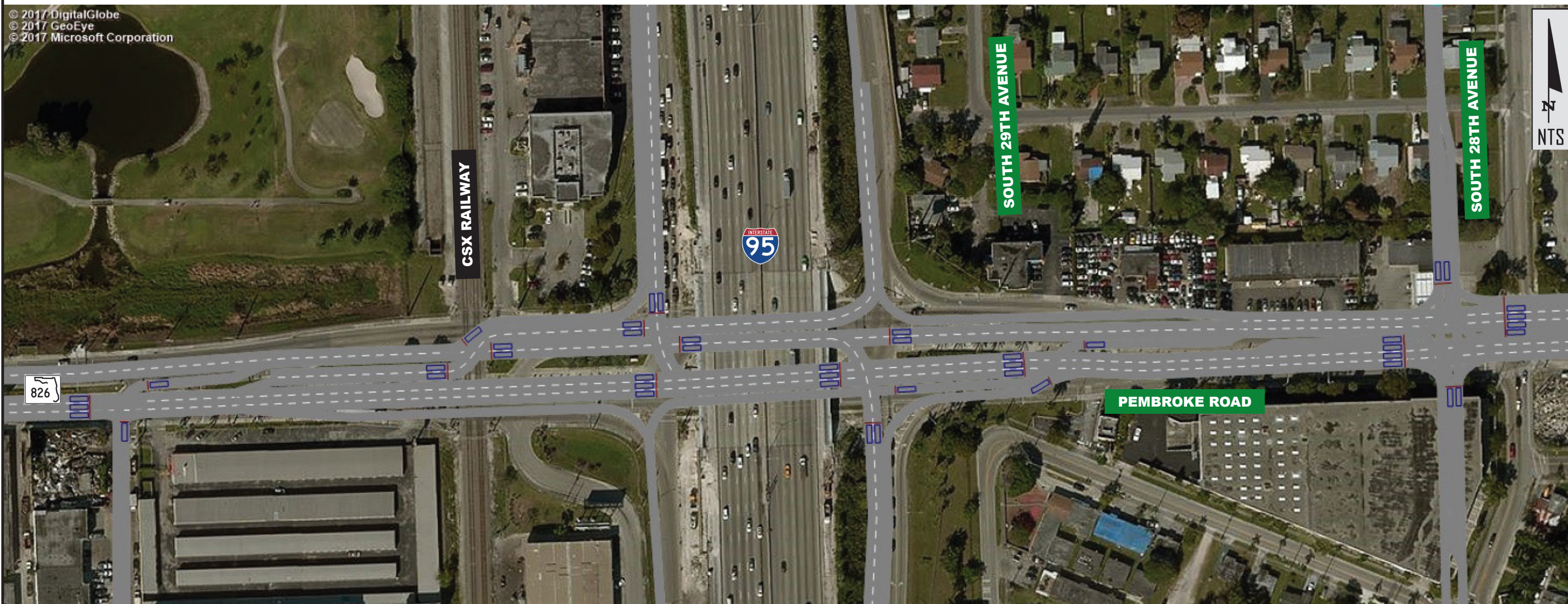
HALLANDALE BEACH BOULEVARD  
DISPLACED LEFT TURN LANE INTERCHANGE

FIGURE

4.23

4-56





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# I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)

FPID No.: 436903-I-22-02

ETDM No.: 14254

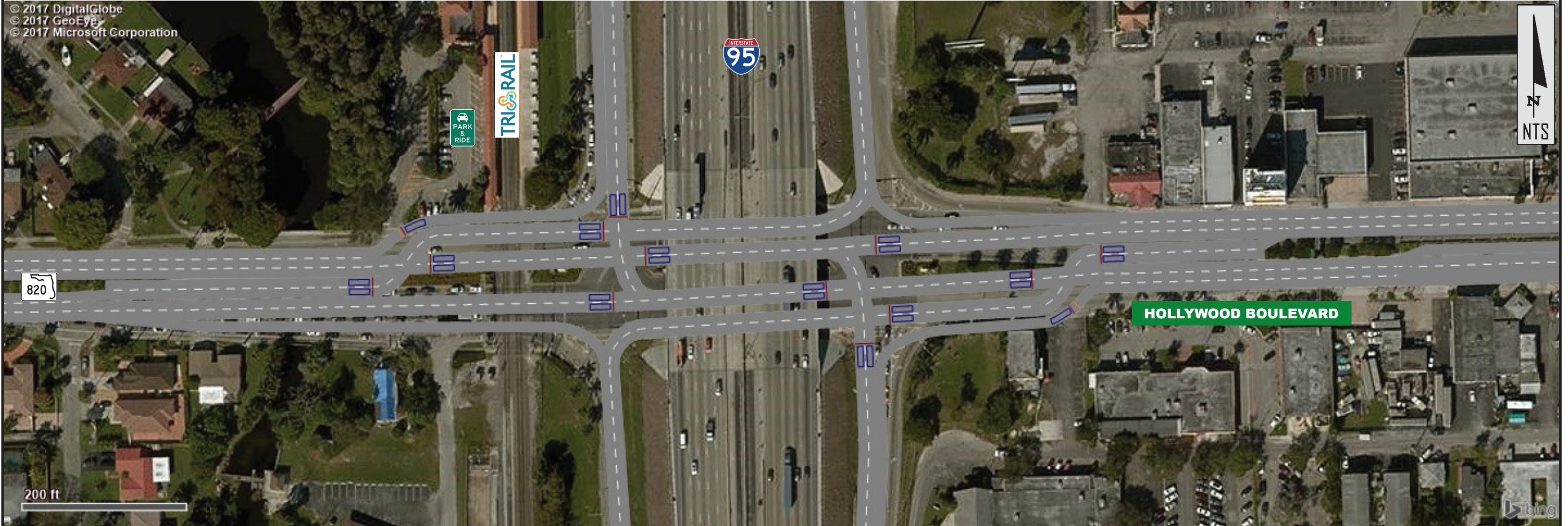
PEMBROKE ROAD  
DISPLACED LEFT TURN LANE INTERCHANGE

FIGURE

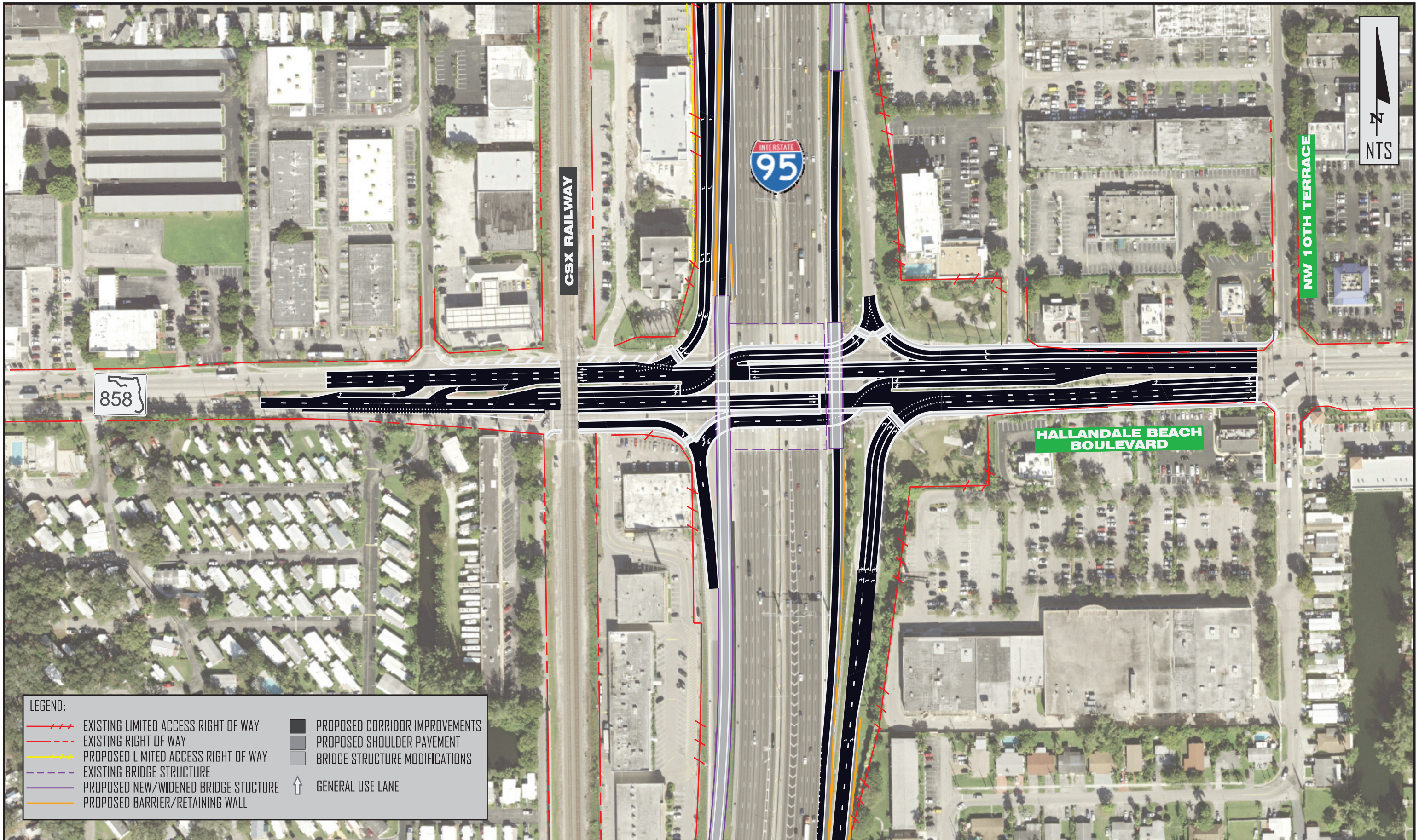
4.24

4-57









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## I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-1-22-02  
ETDM No.: 14254

HALLANDALE BEACH BOULEVARD  
CONTINUOUS FLOW INTERSECTION

FIGURE  
4.26

4-59





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## I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY

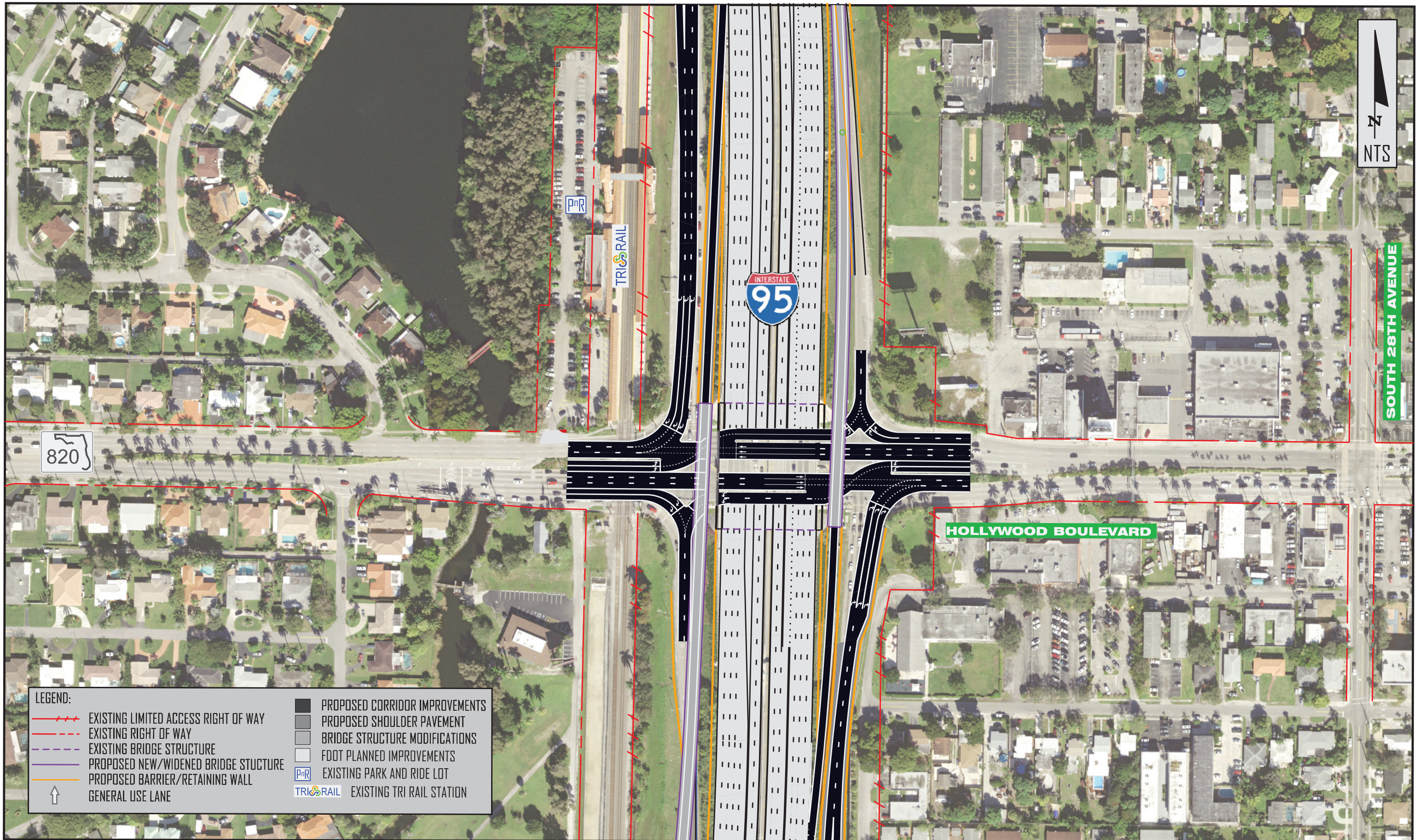
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: 14254

PEMBROKE ROAD  
CONTINUOUS FLOW INTERSECTION

FIGURE  
4.27

4-60





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**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: 14254

**HOLLYWOOD BOULEVARD  
CONTINUOUS FLOW INTERSECTION**

**FIGURE  
4.28  
4-61**





#### 4.5.5 ALTERNATIVES ELIMINATED

During the alternative analysis and geometrics evaluation, the following alternatives were eliminated from further consideration:

- **Alternative 3** – This alternative was eliminated from the PD&E Study for the following reasons:
  - Low U-turn ramp design speed (20 MPH).
  - U-turn bridge ramps will need median piers, which will require a complex maintenance of traffic along I-95. The maintenance of traffic will impact the operations of the express lanes system.
  - Interchange design is not uniform with the other interchanges, upstream, downstream and throughout the corridor, which impacts driver expectancy and a potential increase in crashes.
  - Interchange design footprint is not compatible with the future I-95 projects north and south of the study limits.
- **Diverging Diamond Interchange** – This alternative was eliminated from the PD&E Study for the following reasons:
  - Low crossing lanes path design speed (30-35 MPH).
  - Railroad at-grade crossing is too close to the crossing lanes path, which could create wrong way vehicle maneuvers and a complex operation of the railroad crossing gates.
- **Displaced Left-Turn Lane Interchange** – This alternative was eliminated from the PD&E Study for the following reasons:
  - Requires a larger footprint within the off-ramp interchange quadrants, which increases right of way impacts.
  - Railroad at-grade crossing is too close to the new upstream intersection on the west side.
  - The design requires additional railroad crossing gates and a more complexed crossing gate operation.

**Continuous Flow Intersection (CFI)** – This alternative was eliminated from the PD&E Study because this interchange configuration will work with mainline Alternative 3 only, which was eliminated from the PD&E Study.



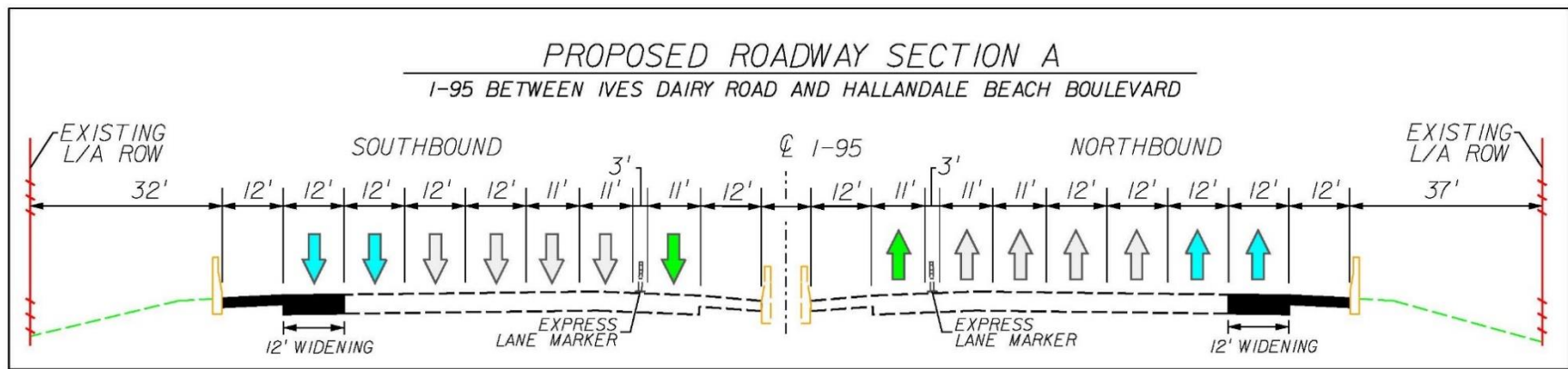
#### 4.5.6 TYPICAL SECTIONS

**Alternative 1** – The I-95 typical section will remain relatively the same as the No-Build Alternative. The roadway typical section varies slightly and consists primarily of four 11-foot wide express lanes (two in each direction), four 12-foot wide general use lanes (two in each direction), four 11-foot wide general use lanes (two in each direction), a three-foot wide buffer area with pavement markings and express lane markers separating the general use lanes from the express lanes, five-foot to 12-foot wide inside shoulders, 12-foot wide outside shoulders, 12-foot wide auxiliary lanes at select locations, and a 2.5-foot wide center barrier wall.

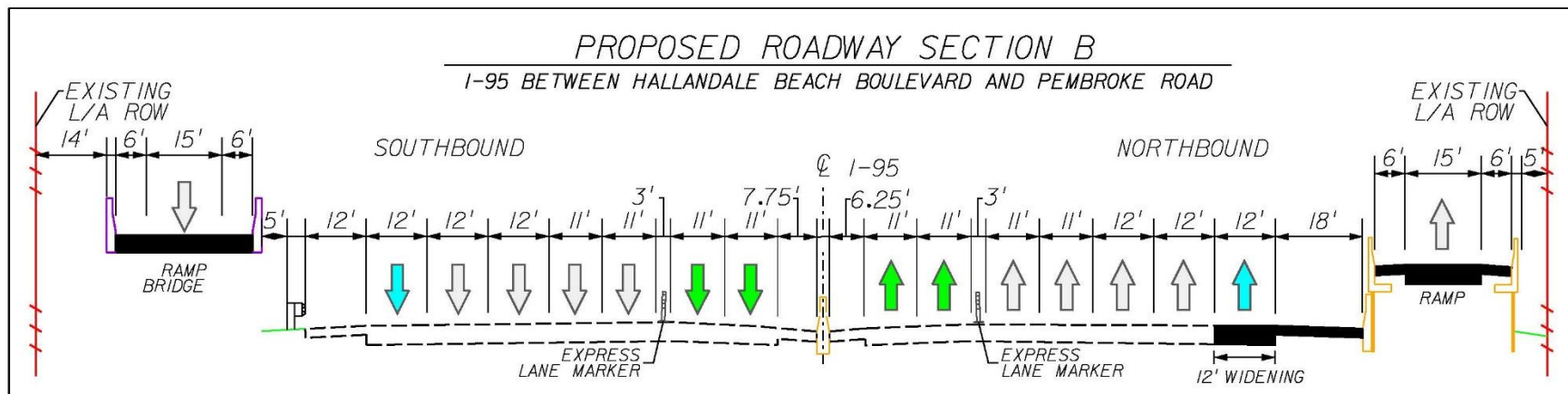
The only changes to the corridor roadway sections are listed below:

- Two 12-foot wide auxiliary lanes in each direction between Ives Dairy Road and Hallandale Beach Boulevard.
- 15-foot wide braided ramps with 6-foot wide inside and outside shoulders.

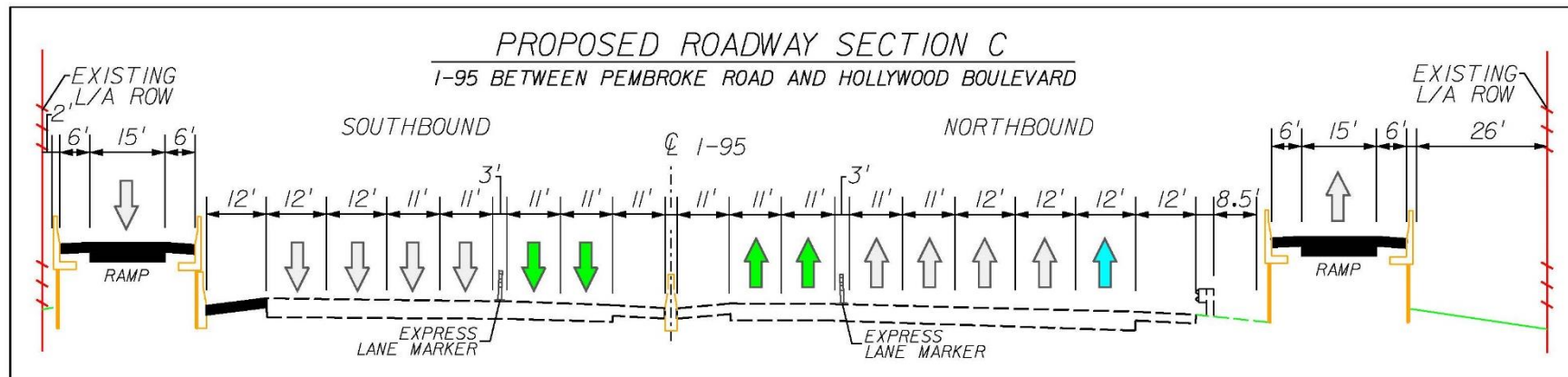
The three Alternative 1 I-95 roadway cross sections between interchanges are depicted in **Figures 4.29 – 4.31**.



**Figure 4.29 – Alternative 1 Roadway Section between Ives Dairy Road and Hallandale Beach Boulevard**



**Figure 4.30 – Alternative 1 Roadway Section between Hallandale Beach Boulevard and Pembroke Road**



**Figure 4.31 – Alternative 1 Roadway Section between Pembroke Road and Hollywood Boulevard**



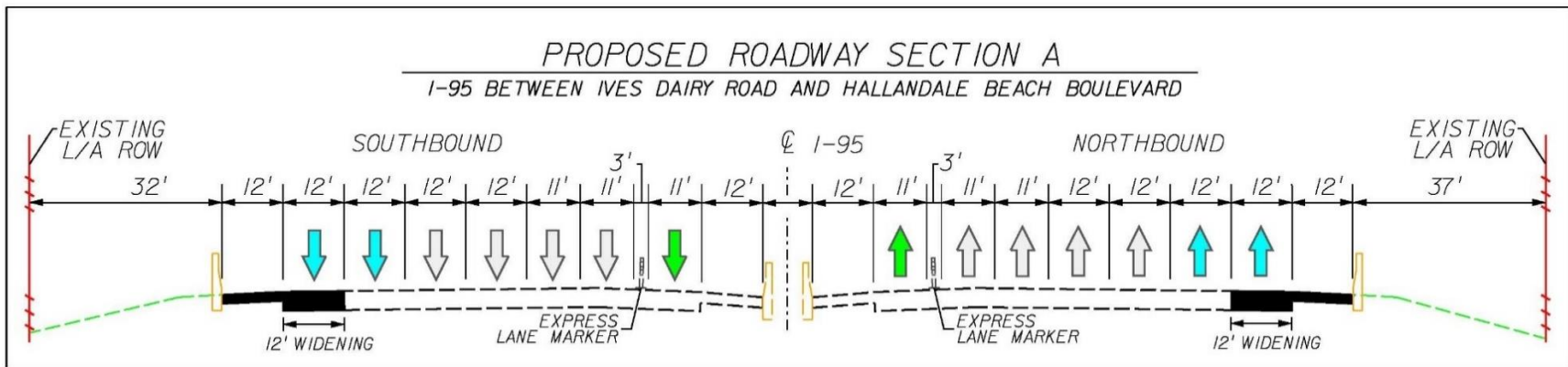
**Alternative 2** – The I-95 typical section will remain relatively the same as the No-Build Alternative. The roadway typical section varies slightly and consists primarily of four 11-foot wide express lanes (two in each direction), four 12-foot wide general use lanes (two in each direction), four 11-foot wide general use lanes (two in each direction), a three-foot wide buffer area with pavement markings and express lane markers separating the general use lanes from the express lanes, five-foot to 12-foot wide inside shoulders, 12-foot wide outside shoulders, 12-foot wide auxiliary lanes at selected locations, and a 2.5-foot wide center barrier wall.

The only changes to the corridor roadway sections are listed below:

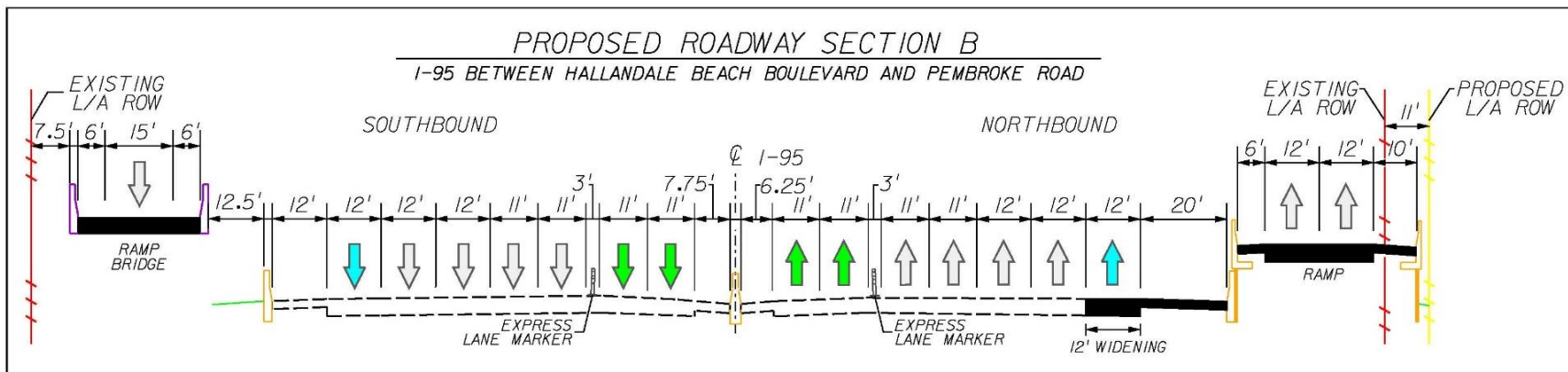
- Two 12-foot wide auxiliary lanes in each direction between Ives Dairy Road and Hallandale Beach Boulevard.
- Two-lane 24-foot wide collector distributor roadway ramp between south of Hallandale Beach Boulevard and north of Hollywood Boulevard. with six-foot wide inside shoulder and 10-foot wide outside shoulder.
- On-lane 15-foot wide southbound collector distributor roadway ramp with six-foot wide inside and outside shoulders.

The three I-95 roadway cross sections between interchanges are depicted in **Figures 4.32 – 4.34.**

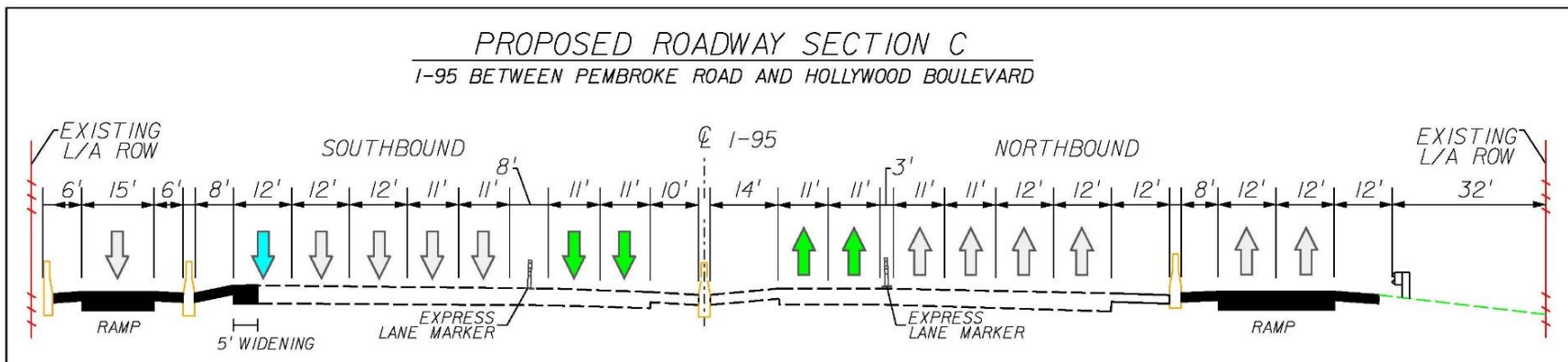




**Figure 4.32 – Alternative 2 Roadway Section between Ives Dairy Road and Hallandale Beach Boulevard**



**Figure 4.33 – Alternative 2 Roadway Section between Hallandale Beach Boulevard and Pembroke Road**



**Figure 4.34 – Alternative 2 Roadway Section between Pembroke Road and Hollywood Boulevard**



#### 4.5.7 HORIZONTAL AND VERTICAL ALIGNMENT

The design of the build alternatives strives to adhere to the design standards depicted in **Section 3.0**. The section below summarizes the proposed geometric changes for the proposed horizontal and vertical alignments within the study limits.

##### **Horizontal Alignment**

The two build alternatives propose to maintain the I-95 and cross streets existing horizontal alignment designs except for the new interchange on- and off-ramps alignment construction areas. Both alternatives consider widening I-95 to the outside between Ives Dairy Road and Hallandale Beach Boulevard to accommodate two auxiliary lanes in each direction.

**Alternative 1** – This alternative proposes new construction of braided ramps at each interchange and the widening of other ramp terminals in order to add additional lanes and/or storage areas to accommodate the projected traffic and queue.

**Alternative 2** – This alternative proposes new construction of collector distributor roadways in both directions and the widening of ramp terminals in order to add additional lanes and/or storage areas to accommodate the projected traffic and queue. This alternative effectively removes the Pembroke Road access from the I-95 mainline and contains it within the collector distributor systems.

The horizontal footprint of the corridor and interchanges will be wider with the proposed improvements. The extent of the ramp realignments is depicted in **Appendix G**, Alternatives Concept Plans.

##### **Vertical Alignment**

The two build alternatives propose to maintain the I-95 and cross streets existing vertical alignment designs except for the new interchange on- and off-ramps alignment construction areas. Both alternatives consider new grade separations at each interchange to accommodate several on- and off-ramps.



**Alternative 1** – This alternative proposes four new braided ramps within the study limits.

1. Northbound off-ramp to Pembroke Road over Hallandale Beach Boulevard and the Hallandale Beach Boulevard northbound on-ramp
2. Northbound off-ramp to Hollywood Boulevard over Pembroke Road and the Pembroke Road northbound on-ramp
3. Southbound off-ramp to Pembroke Road over Hollywood Boulevard and the Hollywood Boulevard southbound on-ramp
4. Southbound off-ramp to Hallandale Beach Boulevard over Pembroke Road, the Pembroke Road southbound on-ramp and the existing pump station

**Alternative 2** – This alternative proposes collector distributor roadways in both directions with five braided ramps within the study limits.

1. Northbound off-ramp to Pembroke Road and Hollywood Boulevard over Hallandale Beach Boulevard and the Hallandale Beach Boulevard northbound on-ramp
2. Northbound collector distributor roadway over Pembroke Road
3. Northbound collector distributor roadway over Hollywood Boulevard
4. Southbound off-ramp to Pembroke Road over Hollywood Boulevard and the Hollywood Boulevard southbound on-ramp
5. Southbound on-ramp from Pembroke Road over the existing pump station and Hallandale Beach Boulevard

The design of the new grade separations are depicted in **Appendix G**, Alternatives Concept Plans.



#### 4.5.8 RIGHT OF WAY

A right of way cost was determined based on the proposed geometry of each build alternative. The estimated cost was generated based on the proposed conceptual design plans. The cost includes property, support, relocation of personal property/signs and administrative costs. The parcels impacted are business/commercial, residential properties, industrial and vacant. The number of parcels impacted and estimated right of way cost is summarized in **Table 4.13**.

**Table 4.13 – Right of Way Impacts**

| Type of Parcel              | ROW Impact    |               |
|-----------------------------|---------------|---------------|
|                             | Alternative 1 | Alternative 2 |
| Commercial                  | 27            | 27            |
| Residential                 | 2             | 5             |
| Vacant                      | 3             | 3             |
| Total Parcel Impacts        | 32            | 35            |
| Estimated Right of Way Cost | \$53M         | \$57M         |

#### 4.5.9 ACCESS MANAGEMENT

**I-95 Mainline** – The FDOT Access Management Classification System determines the access class and type of each roadway based on the segment location, spacing between cross streets, posted speed, median type and/or median opening spacing. The access management classification for I-95 is Class 1.2, Freeway in an existing urbanized area with limited access. Based on the access and type, the minimum interchange spacing allowed is two miles in accordance with the *FDM, Part 2, Chapter 201, Table 201.4.1*. The interchange spacing along the corridor is not in compliance with the FDOT Access Management Guideline Rule 14.97 (see **Table 4.14**).





**Table 4.14 – I-95 Access Management/Interchange Spacing**

| Cross Street                                      | Current Spacing to Next Interchange (Miles) | Complies with Interchange Spacing? |
|---------------------------------------------------|---------------------------------------------|------------------------------------|
| <b>Existing</b>                                   |                                             |                                    |
| Hallandale Beach Boulevard to Pembroke Road       | 0.773                                       | No                                 |
| Pembroke Road to Hollywood Boulevard              | 1.01                                        | No                                 |
| <b>Proposed – Alternative 1</b>                   |                                             |                                    |
| Hallandale Beach Boulevard to Pembroke Road       | 0.773                                       | No                                 |
| Pembroke Road to Hollywood Boulevard              | 1.01                                        | No                                 |
| <b>Proposed – Alternative 2</b>                   |                                             |                                    |
| Hallandale Beach Boulevard to Hollywood Boulevard | 1.79                                        | No                                 |

Alternative 1 maintains the current interchange spacing. Therefore, no access management modifications are proposed as part of Alternative 1.

Alternative 2 proposes a collector distributor roadway system, which removes the Pembroke Road Interchange from directly interacting with the I-95 mainline. The interchange spacing is still less than 2 miles. However, Alternative 2 improves the interchange spacing by adding an additional mile.

**Arterials** – Alternatives 1 and 2 maintain the existing access management along the crossing arterials. The improvements proposed by both alternatives are additional lanes, exclusive turn lanes and/or turn-lane modifications at selective locations. Therefore, access management is not impacted and will remain as existing.

#### 4.5.9.1 EXPRESS LANES

Alternatives 1 and 2 propose to maintain the existing configuration and proposed designs (by the projects to the north and south of this PD&E Study) of the express lanes system.



Two express lanes access points exist within the PD&E Study limits:

1. Within the Hallandale Beach Boulevard Interchange – Northbound Ingress and Southbound Egress
2. Within the Hollywood Boulevard Interchange – Northbound Egress and Southbound Ingress

#### 4.5.10 BRIDGES AND STRUCTURES

##### **Alternative 1**

Build Alternative 1 includes four proposed new bridges (two concrete and two steel), two proposed bridge widenings and six existing bridges to remain. The proposed improvements of each bridge structure along the corridor are summarized in **Figure 4.35** and **Table 4.15**.

##### **Alternative 2**

Build Alternative 2 includes five proposed new bridges (four concrete and one steel), two proposed bridge widenings and six existing bridges to remain. The proposed improvements of each bridge structure along the corridor are summarized in **Figure 4.36** and **Table 4.16**.

| SUMMARY OF STRUCTURES                                                                                             |          |
|-------------------------------------------------------------------------------------------------------------------|----------|
| ITEM                                                                                                              | QUANTITY |
|  PROPOSED NEW BRIDGES STEEL    | 2        |
|  PROPOSED NEW BRIDGES CONCRETE | 2        |
|  PROPOSED BRIDGE WIDENINGS     | 2        |
|  EXISTING BRIDGES TO REMAIN    | 6        |

\* CATEGORY 2 STRUCTURES

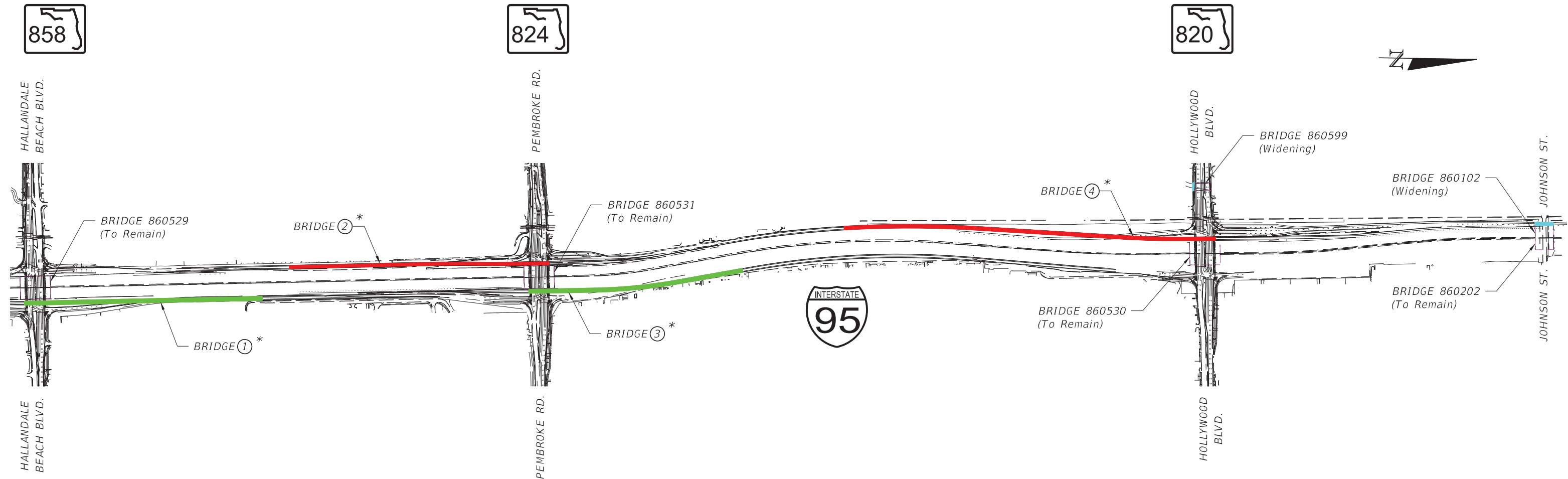


Figure 4.35 - Alternative 1 Bridge Location Map



Table 4.15 – Alternative 1 Proposed Bridge Characteristics

| Proposed Bridge Characteristics Alternative 1 |                                                                |           |                                               |                            |                         |                       |                                                                                           |                 |           |                                                 |                                                                   |                           |                 |
|-----------------------------------------------|----------------------------------------------------------------|-----------|-----------------------------------------------|----------------------------|-------------------------|-----------------------|-------------------------------------------------------------------------------------------|-----------------|-----------|-------------------------------------------------|-------------------------------------------------------------------|---------------------------|-----------------|
| LOCATION                                      |                                                                |           | GEOMETRICS                                    |                            |                         |                       |                                                                                           | STRUCTURAL      |           |                                                 |                                                                   | Approach / Bridge Type    | Bridge Category |
| Bridge ID No.                                 | Bridge Location                                                | Direction | Overall Bridge Length / Span Arrangement (ft) | Deck Width (ft)            | Min. Vertical Clearance | Skew Angles (Degrees) | Underneath Roadway Designation                                                            | Number of Spans | Max. Span | Superstructure Type                             | Substructure Type                                                 |                           |                 |
| 1                                             | SR 9 / I-95 NB off-ramp to Pembroke Rd.(SR824)                 | NB        | 170+(9x180)+126= 1916                         | 29.67                      | 16.50                   | 0.00                  | SR 858 Hallandale Beach Blvd. and SR 9/I-95 NB on-ramp from SR 858 Hallandale Beach Blvd. | 11              | 180       | Prestressed Concrete Beams w/ CIP Concrete Deck | Reinforced Concrete Column Piers and Abutments                    | Curved Steel, Single Lane | 2               |
| 2                                             | SR 9 / I-95 SB off-ramp to Hallandale Beach Boulevard (SR 858) | SB        | 126+(3x180)+200+170+(5x180)+166= 2102         | 29.67                      | 16.50                   | 0.00                  | SR 824 Pembroke Road and SR 9/ I-95 SB on-ramp from SR 824 Pembroke Road                  | 12              | 200       | Steel                                           | Reinforced Concrete Column Piers and Abutments                    | Curved Steel, Single Lane | 2               |
| 3                                             | SR 9 / I-95 NB off-ramp to Hollywood Blvd. (SR820)             | NB        | 167+(8x180)+126= 1733                         | 29.67                      | 16.50                   | 0.00                  | SR 824 Pembroke Road and SR 9/ I-95 NB on-ramp from SR 824 Pembroke Road                  | 10              | 180       | Prestressed Concrete Beams w/ CIP Concrete Deck | Reinforced Concrete Column Piers and Abutments                    | Curved Steel, Single Lane | 2               |
| 4                                             | SR 9 / I-95 SB off-ramp to Pembroke Rd. (SR824)                | SB        | 126+(15x180)+174= 3000                        | 29.67                      | 16.50                   | 0.00                  | SR 820 Hollywood Blvd.and SR 9 / I-95 SB on-ramp from SR 820 Hollywood Blvd               | 17              | 180       | Steel                                           | Reinforced Concrete Column Piers and Abutments                    | Curved Steel, Single Lane | 2               |
| 860599                                        | SR 820 Over Hollywood Canal                                    | EB/WB     | 61.00                                         | Varies from 10.73 to 11.92 | 1.85 over DHW           | 0.00                  | N/A Over Canal                                                                            | 1               | 61        | CIP Concrete Deck Slab                          | Reinforced Conc. Abutments Supported on 18" sq Prest. Conc. Piles | Widening FIBs             | 1               |
| 860102                                        | SR 9 / I-95 Over Johnson Street                                | SB        | 38+71+38= 147                                 | Varies from 21.96 to 36.59 | 14.42                   | 0.00                  | Johnson St.                                                                               | 3               | 71        | Prestressed Concrete Beams w/ CIP Concrete Deck | Reinforced Concrete Column Piers and Abutments                    | Widening FIBs             | 1               |



| SUMMARY OF STRUCTURES                                                                                             |          |
|-------------------------------------------------------------------------------------------------------------------|----------|
| ITEM                                                                                                              | QUANTITY |
|  PROPOSED NEW BRIDGES STEEL    | 1        |
|  PROPOSED NEW BRIDGES CONCRETE | 4        |
|  PROPOSED BRIDGE WIDENINGS     | 2        |
|  EXISTING BRIDGES TO REMAIN    | 6        |

\* CATEGORY 2 STRUCTURES

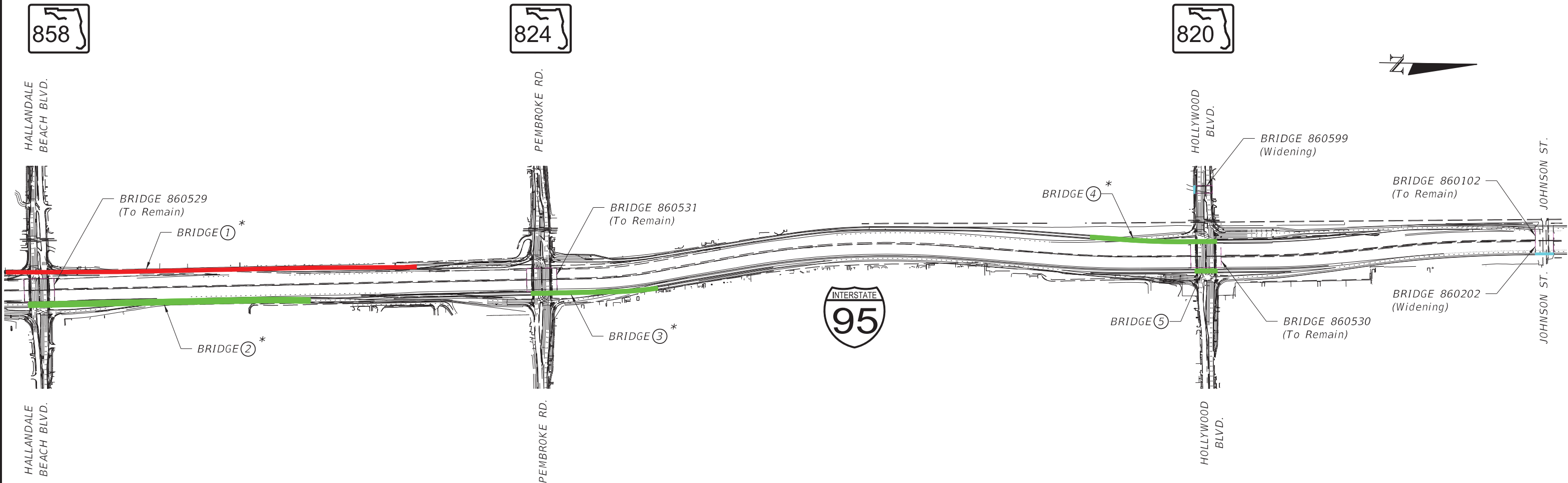


Figure 4.36 - Alternative 2 Bridge Location Map



Table 4.16 – Alternative 2 Proposed Bridge Characteristics

| Proposed Bridge Characteristics Alternative 2 |                                                            |           |                                               |                             |                         |                       |                                                                                                                                     |                 |           |                                                 |                                                                   |                                      |                 |
|-----------------------------------------------|------------------------------------------------------------|-----------|-----------------------------------------------|-----------------------------|-------------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------|-------------------------------------------------|-------------------------------------------------------------------|--------------------------------------|-----------------|
| LOCATION                                      |                                                            |           | GEOMETRICS                                    |                             |                         |                       |                                                                                                                                     | STRUCTURAL      |           |                                                 |                                                                   | Approach / Bridge Type               | Bridge Category |
| Bridge ID No.                                 | Bridge Location                                            | Direction | Overall Bridge Length / Span Arrangement (ft) | Deck Width (ft)             | Min. Vertical Clearance | Skew Angles (Degrees) | Underneath Roadway Designation                                                                                                      | Number of Spans | Max. Span | Superstructure Type                             | Substructure Type                                                 |                                      |                 |
| 1                                             | SR 9 / I-95 SB on-ramp over Hallandale Beach Blvd. (SR858) | SB        | (15x180)+(2x140)+200+140= 3320                | Varies from 29.667 to 34.13 | 16.50                   | 0.00                  | SR 858 Hallandale Beach Blvd., SR 9/ I-95 SB off-ramp to SR 858 Hallandale Beach Blvd. and I-95 on ramp from Hallandale Beach Blvd. | 19              | 200       | Steel                                           | Reinforced Concrete Column Piers and Abutments                    | Curved Steel, Single Lane            | 2               |
| 2                                             | SR 9 / I-95 NB off-ramp to Pembroke Rd.(SR824)             | NB        | 171+(11x180)+126= 2277                        | 42.67                       | 16.50                   | 0.00                  | SR 858 Hallandale Beach Blvd.                                                                                                       | 13              | 180       | Prestressed Concrete Beams w/ CIP Concrete Deck | Reinforced Concrete Column Piers and Abutments                    | Curved Steel, Single Lane            | 2               |
| 3                                             | SR 9 / I-95 NB Ramp Over Pembroke Road (SR 824)            | NB        | 170+(4x180)+130= 1020                         | 29.67                       | 16.50                   | 0.00                  | SR 824 Pembroke Road                                                                                                                | 6               | 180       | Prestressed Concrete Beams w/ CIP Concrete Deck | Reinforced Concrete Column Piers and Abutments                    | Curved Steel, Single Lane            | 3               |
| 4                                             | SR 9 / I-95 SB off-ramp to Pembroke Rd. (SR824)            | SB        | 126+(180x4)+174= 1020                         | 29.67                       | 16.50                   | 1.00                  | SR 820 Hollywood Blvd.and SR 9 / I-95 SB on-ramp from SR 820 Hollywood Blvd                                                         | 6               | 180       | Prestressed Concrete Beams w/ CIP Concrete Deck | Reinforced Concrete Column Piers and Abutments                    | Curved Steel, Single Lane            | 2               |
| 5                                             | SR 9 / I-95NB Ramp over Hollywood Blvd.(SR 820)            | SB        | 177                                           | 29.67                       | 16.50                   | 0.00                  | SR 820 Hollywood Blvd.                                                                                                              | 1               | 177       | Prestressed Concrete Beams w/ CIP Concrete Deck | Reinforced Concrete Column Piers and Abutments                    | New Bridge, Prestress Concrete, FIBs | 1               |
| 860599                                        | SR 820 Over Hollywood Canal                                | EB/WB     | 61.00                                         | Varies from 10.73 to 11.92  | 1.85 over DHW           | 0.00                  | N/A Over Canal                                                                                                                      | 1               | 61        | CIP Concrete Deck Slab                          | Reinforced Conc. Abutments Supported on 18" sq Prest. Conc. Piles | Widening FIBs                        | 1               |
| 860202                                        | SR 9 / I-95 Over Johnson Street                            | NB        | 38+71+38= 147                                 | 17.62                       | 13.14                   | 0.00                  | Johnson St.                                                                                                                         | 3               | 71        | Prestressed Concrete Beams w/ CIP Concrete Deck | Reinforced Concrete Column Piers and Abutments                    | Widening FIBs                        | 1               |



#### 4.5.11 TRANSIT ACCOMMODATIONS AND BICYCLE/PEDESTRIAN FACILITIES

Alternatives 1 and 2 do not include any additional Transit Accommodations. The following transit projects in **Table 4.17** are included in the 2045 LRTP.

**Table 4.17 – 2045 LRTP Transit Projects in Study Area**

| Project                                 | Location                                                 | Description                                                                                                                                                                                                                    | Plan Period |
|-----------------------------------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Federal Transit Formula Funding Program | Broward County                                           | Provide Federal transit funding for Broward County Transit                                                                                                                                                                     | 2025 - 2045 |
| Hollywood/Pines Blvd Rapid Bus          | Flamingo Rd (Pembroke Pines) To Hollywood (Young Circle) | Implement 10-15 min limited stop bus service, mixed traffic or semi-exclusive Business Access and Transit (BAT) lanes, level boarding stations, use of Transit Signal Priority (TSP)/Queue Jump technologies, mobile ticketing | 2026 - 2030 |

I-95 is a limited access facility. There will continue to be no designated pedestrian or bicycle accommodations along this corridor, as pedestrians and bicycles are not permitted on limited access corridors. Below are the pedestrian and bicycle improvements proposed within the crossing roadway interchange limits:

1. Bicycle lane widths were improved to between five and seven-foot wide where possible.
2. Sidewalk widths were improved to between five and six-foot wide where possible.

#### 4.5.12 TRAFFIC VOLUMES AND OPERATIONAL CONDITIONS

The PD&E Study Build Alternatives analysis and evaluation were performed and completed between September 2016 and December 2018, prior to the hold of the study in 2019 (as discussed in **Section 4.1**). Prior to the hold of the study, the design year of the PD&E Study was 2040. Therefore, the information presented in this section is a summary of the 2040 design year traffic operational analysis completed as part of the alternative's analysis. Also, the analysis documented in this section did not include the FDOT District Six I-95 Planning Study, District Four I-95 CPS, and the recent changes to the I-95 Express Phase 3C Project, which were added later to the PD&E Study in 2020.



The purpose of the operational analysis is to present the preliminary results of the future traffic conditions proposed as part of the PD&E process. The objective of the operational analysis is to document the analysis and the screening process of the alternatives considered. This analysis followed the same process and methodology as the existing traffic operational analysis.

The Highway Capacity Manual (HCM), 6th Edition, as well as the Highway Capacity Software Version 7 (HCS7) and Synchro Version 10.0 were used for the operational analysis in this study. Operational analyses were performed on freeway basic segments, ramp merge/diverge junctions, weaving sections, ramp terminals, arterial segments and intersections. The HCS was used for the freeway basic segments, ramp merge/diverge junctions and weaving sections. Synchro was used for the evaluation of the intersections and arterial segments. This software uses the methodology of the HCM to determine intersection/arterial capacity and LOS.

**Tables 4.18 – 4.21** and **Figures 4.37 – 4.40** summarize the future operational analysis results as well as link-by-link traffic volumes.

#### 4.5.12.1 MAINLINE ALTERNATIVE ANALYSIS RESULTS

##### **HCM Operational Analysis Results**

**Alternative 1** – The I-95 capacity analysis shows that the corridor will operate at LOS D or better by the year 2040 within the area of influence.

**Alternative 2** – The I-95 capacity analysis shows that the corridor will operate at LOS D or better by the year 2040 within the area of influence.





**Table 4.18 – 2040 Alternative 1 Northbound Freeway Analysis Results**

| #  | I-95 Northbound Segment<br>2040 Alternative 1              | Analysis<br>Type | Freeway         |                           | Ramp            |                          | Density<br>pc/mi/ln<br>AM (PM) | LOS<br>AM (PM) |
|----|------------------------------------------------------------|------------------|-----------------|---------------------------|-----------------|--------------------------|--------------------------------|----------------|
|    |                                                            |                  | No. of<br>Lanes | Demand*<br>vph<br>AM (PM) | No. of<br>Lanes | Demand<br>vph<br>AM (PM) |                                |                |
| 11 | North of Sheridan St                                       | Basic            | 4               | 6,198 (7,007)             | -               | -                        | 25.3 (30.6)                    | C (D)          |
| 10 | Hollywood Blvd On-Ramp to<br>Sheridan St Off-Ramp          | Weaving          | 5               | 6,201 (6,912)             | -               | -                        | 30.1 (34.2)                    | D (D)          |
| 9  | EL Egress to Hollywood Blvd On-<br>Ramp                    | Basic            | 4               | 5,429 (5,918)             | 1               | 772 (994)                | 25.7 (24.3)                    | C (C)          |
| 8  | Pembroke Rd On-Ramp to EL<br>Egress                        | Basic            | 4               | 5,429 (5,918)             | -               | -                        | 22.2 (24.3)                    | C (C)          |
| 7  | Pembroke Rd On-Ramp                                        | Merge            | 4               | 4,174 (4,411)             | 1               | 1255 (1507)              | 28.2 (31)                      | D (D)          |
| 6  | Hollywood Blvd Off-Ramp to<br>Pembroke Rd On-Ramp          | Basic            | 4               | 4,174 (4,411)             | -               | -                        | 17 (18)                        | B (B)          |
| 5  | EL Ingress                                                 | Weave            | 5               | 3,304 (3,600)             | -               | -                        | 22.1 (25.7)                    | C (C)          |
| 4  | Pembroke Rd Off-Ramp                                       | Diverge          | 4               | 4,554 (4,579)             | 1               | 1250 (979)               | 23.6 (22.2)                    | C (C)          |
| 3  | Hallandale Beach Blvd Off-Ramp<br>to Pembroke Rd Off-Ramp  | Diverge          | 4               | 5,238 (5,617)             | 1               | 684 (1038)               | 28.6 (32)                      | D (D)          |
| 2  | Ives Dairy Rd On-Ramp to<br>Hallandale Beach Blvd Off-Ramp | Weave            | 6               | 4,272 (4,816)             | -               | -                        | 29.8 (25.2)                    | D (C)          |
| 1  | South Ives Dairy Rd                                        | Basic            | 4               | 4,272 (4,816)             | -               | -                        | 17.4 (19.7)                    | B (C)          |

\*freeway demand entering segment / # - segment number

**Table 4.19 – 2040 Alternative 1 Southbound Freeway Analysis Results**

| #  | I-95 Southbound Segment<br>2040 Alternative 1                   | Analysis<br>Type | Freeway         |                           | Ramp            |                          | Density<br>pc/mi/ln<br>AM (PM) | LOS<br>AM (PM) |
|----|-----------------------------------------------------------------|------------------|-----------------|---------------------------|-----------------|--------------------------|--------------------------------|----------------|
|    |                                                                 |                  | No. of<br>Lanes | Demand*<br>vph<br>AM (PM) | No. of<br>Lanes | Demand<br>vph<br>AM (PM) |                                |                |
| 1  | North of Sheridan St                                            | Basic            | 4               | 7,184 (7,061)             | -               | -                        | 31.1 (30.3)                    | D (D)          |
| 2  | Sheridan St On-Ramp to<br>Hollywood Blvd Off-Ramp               | Weave            | 5               | 7,184 (7,061)             | -               | -                        | 34.8 (23.1)                    | D (C)          |
| 3  | Pembroke Rd Off-Ramp                                            | Diverge          | 4               | 6,959 (6,614)             | 1               | 1282 (1166)              | 31.4 (29.4)                    | D (D)          |
| 4  | EL Ingress                                                      | Diverge          | 4               | 5,677 (5,448)             | 1               | 775 (782)                | 29 (28)                        | D (C)          |
| 5  | Hollywood On-Ramp                                               | Merge            | 4               | 4,902 (4,666)             | 1               | 943 (1220)               | 19.7 (21.1)                    | B (C)          |
| 6  | Hallandale Off-Ramp                                             | Diverge          | 4               | 5,845 (5,886)             | 1               | 1307 (1357)              | 34.3 (34.7)                    | D (D)          |
| 7  | Hallandale Off-Ramp to<br>Pembroke Rd On-Ramp                   | Basic            | 4               | 4,538 (4,529)             | -               | -                        | 18.5 (18.5)                    | C (C)          |
| 8  | Pembroke Rd On-Ramp                                             | Merge            | 4               | 4,538 (4,529)             | 1               | 706 (659)                | 21.1 (20.7)                    | C (C)          |
| 9  | Pembroke Rd On-Ramp to EL<br>Egress                             | Basic            | 4               | 5,244 (5,188)             | -               | -                        | 21.4 (21.2)                    | C (C)          |
| 10 | EL Egress                                                       | Merge            | 4               | 5,244 (5,188)             | 1               | 805 (957)                | 19.8 (20.8)                    | B (C)          |
| 11 | EL Egress to Hallandale Beach<br>Blvd On-Ramp                   | Basic            | 4               | 6,049 (6,145)             | -               | -                        | 24.9 (25.4)                    | C (C)          |
| 12 | Hallandale Beach Blvd On-<br>Ramp to Ives Dairy Rd Off-<br>Ramp | Weave            | 6               | 6,049 (6,145)             | -               | -                        | 26.4 (27.2)                    | C (C)          |
| 13 | South of Ives Dairy Rd                                          | Basic            | 4               | 5,033 (4,703)             | -               | -                        | 20.6 (19.2)                    | C (C)          |

\*freeway demand entering segment / # - segment number

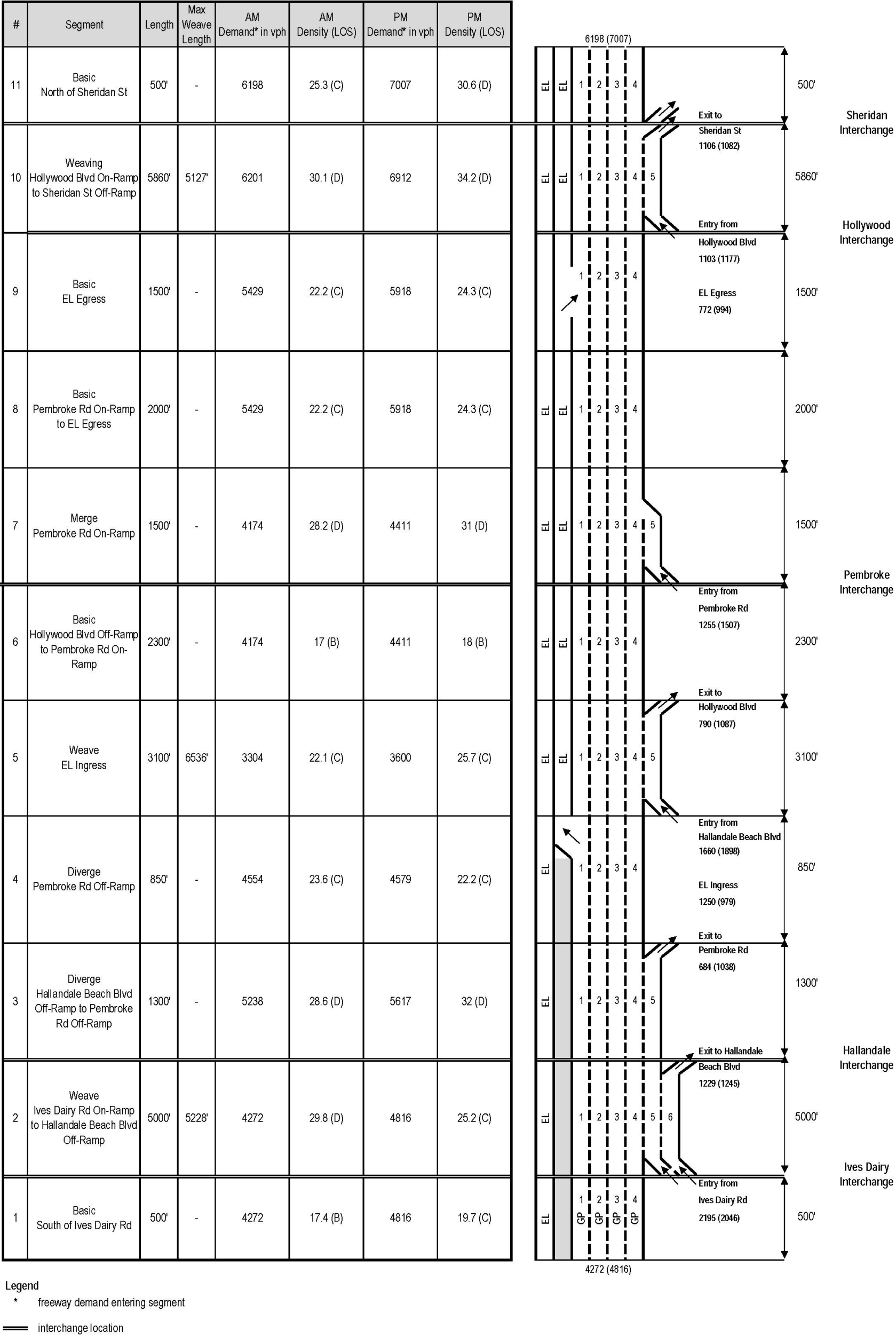


Figure 4.37 – 2040 Alternative 1 Northbound Freeway Analysis Results

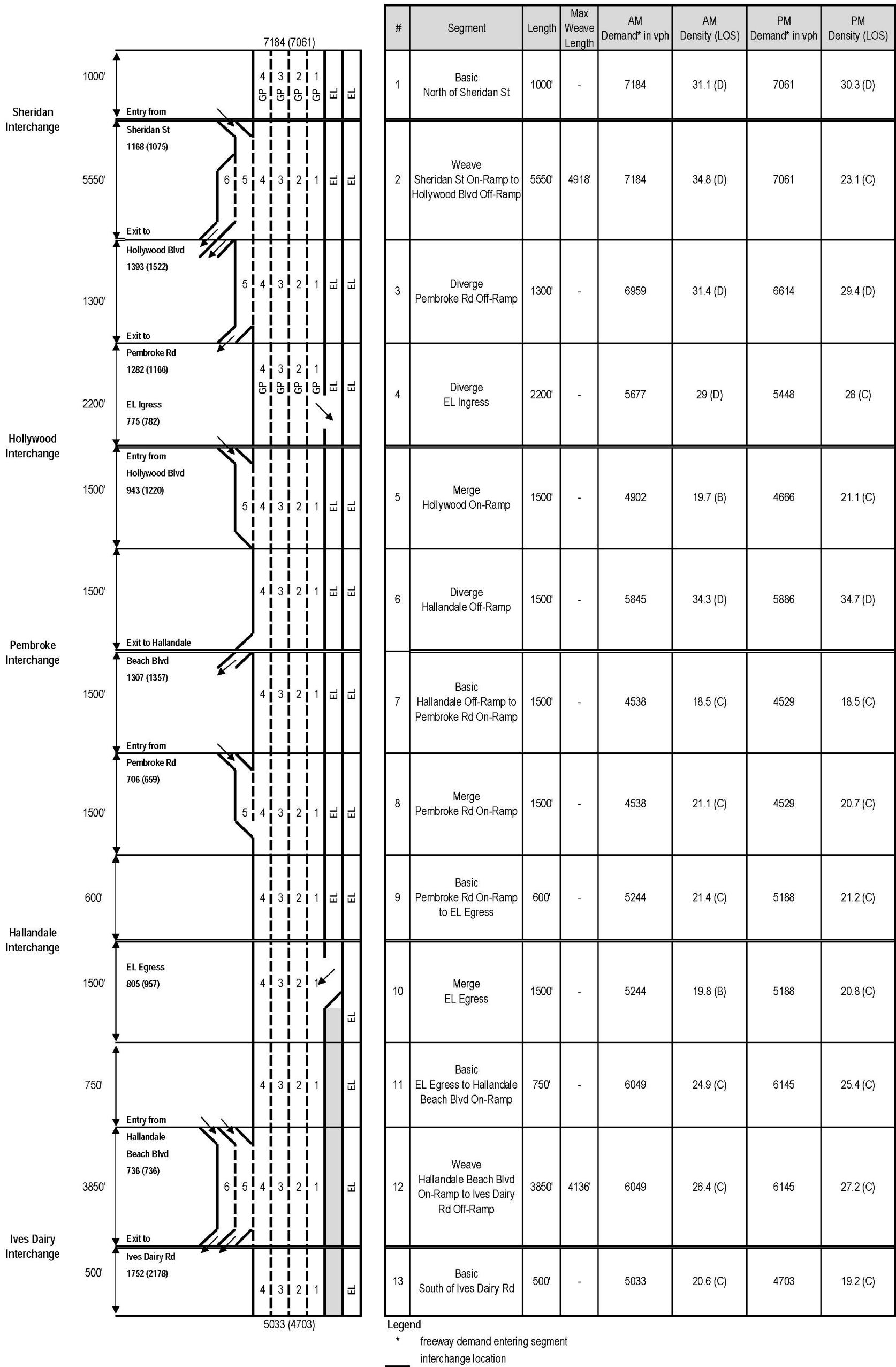


Figure 4.38 – 2040 Alternative 1 Southbound Freeway Analysis Results



**Table 4.20 – 2040 Alternative 2 Northbound Freeway Analysis Results**

| #  | I-95 Northbound Segment<br>2040 Alternative 2              | Analysis<br>Type | Freeway         |                           | Ramp            |                          | Density<br>pc/mi/ln<br>AM (PM) | LOS<br>AM (PM) |
|----|------------------------------------------------------------|------------------|-----------------|---------------------------|-----------------|--------------------------|--------------------------------|----------------|
|    |                                                            |                  | No. of<br>Lanes | Demand*<br>vph<br>AM (PM) | No. of<br>Lanes | Demand<br>vph<br>AM (PM) |                                |                |
| 13 | North of Sheridan St                                       | Basic            | 4               | 6,198 (7,007)             | -               | -                        | 25.6 (30)                      | C (D)          |
| 12 | Sheridan St Off-Ramp                                       | Diverge          | 4               | 7,304 (8,089)             | 2               | 1106 (1082)              | 25.5 (28.5)                    | C (D)          |
| 11 | C-D/Hollywood Blvd On-Ramp to<br>Sheridan St Off-Ramp      | Basic            | 5               | 7,304 (8,089)             | -               | -                        | 24 (27)                        | C (D)          |
| 10 | C-D/Hollywood Blvd On-Ramp                                 | Basic            | 4               | 4,946 (5,405)             | 2               | 2358 (2684)              | 31.8 (22.1)                    | D (C)          |
| 9  | EL Egress to C-D/Hollywood Blvd<br>On-Ramp                 | Basic            | 4               | 4,946 (5,405)             | -               | -                        | 20.2 (22.1)                    | C (C)          |
| 8  | EL Egress                                                  | Merge            | 4               | 4,174 (4,411)             | 1               | 772 (994)                | 22.3 (18.5)                    | C (B)          |
| 7  | Hallandale Beach Blvd On-Ramp<br>to EL Egress              | Basic            | 4               | 4,174 (4,411)             | -               | -                        | 17 (18)                        | B (B)          |
| 6  | Hallandale Beach Blvd On-Ramp                              | Merge            | 4               | 2,514 (2,513)             | 1               | 1660 (1898)              | 17.4 (19.3)                    | B (B)          |
| 5  | EL Ingress to Hallandale Beach<br>Blvd On-Ramp             | Basic            | 4               | 2,514 (2,513)             | -               | -                        | 10.3 (10.3)                    | A (A)          |
| 4  | EL Ingress                                                 | Diverge          | 4               | 3,764 (3,492)             | 1               | 1250 (979)               | 23.3 (20.6)                    | C (C)          |
| 3  | C-D                                                        | Diverge          | 4               | 5,238 (5,617)             | 2               | 1474 (2125)              | 26.6 (31.9)                    | C (D)          |
| 2  | Ives Dairy Rd On-Ramp to<br>Hallandale Beach Blvd Off-Ramp | Weave            | 6               | 4,272 (4,816)             | -               | -                        | 22.9 (25.2)                    | C (C)          |
| 1  | South of Ives Dairy Rd                                     | Basic            | 4               | 4,272 (4,816)             | -               | -                        | 17.4 (19.7)                    | B (C)          |

\*freeway demand entering segment

# - segment number





**Table 4.21 – 2040 Alternative 2 Southbound Freeway Analysis Results**

| #  | I-95 Southbound Segment<br>2040 Alternative 2          | Analysis<br>Type | Freeway         |                           | Ramp            |                          | Density<br>pc/mi/ln<br>AM (PM) | LOS<br>AM (PM) |
|----|--------------------------------------------------------|------------------|-----------------|---------------------------|-----------------|--------------------------|--------------------------------|----------------|
|    |                                                        |                  | No. of<br>Lanes | Demand*<br>vph<br>AM (PM) | No. of<br>Lanes | Demand<br>vph<br>AM (PM) |                                |                |
| 1  | North of Sheridan St                                   | Basic            | 4               | 7,184 (7,061)             | -               | -                        | 31.1 (30.3)                    | D (D)          |
| 2  | Sheridan St On-Ramp to<br>Hollywood Blvd Off-Ramp      | Weave            | 5               | 7,184 (7,061)             | -               | -                        | 34 (32.8)                      | D (D)          |
| 3  | Hollywood Blvd Off-Ramp to EL<br>Ingress               | Basic            | 4               | 5,677 (5,448)             | -               | -                        | 23.3 (22.2)                    | C (C)          |
| 4  | EL Ingress                                             | Diverge          | 4               | 5,677 (5,448)             | 1               | 775 (782)                | 29 (28)                        | D (C)          |
| 5  | EL Ingress to Hollywood On-<br>Ramp                    | Basic            | 4               | 4,902 (4,666)             | -               | -                        | 20 (19)                        | C (C)          |
| 6  | Hollywood On-Ramp                                      | Merge            | 4               | 4,902 (4,666)             | 1               | 943 (1220)               | 19.7 (21.1)                    | B (C)          |
| 7  | Hollywood On-Ramp to<br>Hallandale Beach Blvd Off-Ramp | Basic            | 4               | 5,845 (5,886)             | -               | -                        | 24 (24.2)                      | C (C)          |
| 8  | Hallandale Beach Blvd Off-Ramp                         | Diverge          | 4               | 5,845 (5,886)             | 1               | 1307 (1357)              | 23.5 (23.9)                    | C (C)          |
| 9  | Hallandale Beach Blvd Off-Ramp<br>to EL Egress         | Basic            | 4               | 4,538 (4,529)             | -               | -                        | 18.5 (18.5)                    | C (C)          |
| 10 | EL Egress                                              | Merge            | 4               | 4,538 (4,529)             | 1               | 805 (957)                | 21.8 (23)                      | C (C)          |
| 11 | Hallandale Beach Blvd On-Ramp                          | Basic            | 4               | 5,343 (5,486)             | 1               | 736 (736)                | 21.8 (22.4)                    | C (C)          |
| 12 | Pembroke Rd On-Ramp to Ives<br>Dairy Rd Off-Ramp       | Weave            | 6               | 6,079 (6,222)             | -               | -                        | 23.3 (22.9)                    | C (C)          |
| 13 | South of Ives Dairy Rd                                 | Basic            | 4               | 5,033 (4,703)             | -               | -                        | 20.6 (19.2)                    | C (C)          |

\*freeway demand entering segment

# - segment number

| #  | Segment                                                       | Length | Max Weave Length | AM Demand* in vph | AM Density (LOS) | PM Demand* in vph | PM Density (LOS) |
|----|---------------------------------------------------------------|--------|------------------|-------------------|------------------|-------------------|------------------|
| 13 | Basic North of Sheridan St                                    | 500'   | -                | 6198              | 25.6 (C)         | 7007              | 30 (D)           |
| 12 | Diverge Sheridan St Off-Ramp                                  | 1500'  | -                | 7304              | 25.5 (C)         | 8089              | 28.5 (D)         |
| 11 | Basic C-D/Hollywood Blvd On-Ramp to Sheridan St Off-Ramp      | 3780'  | -                | 7304              | 24 (C)           | 8089              | 27 (D)           |
| 10 | Basic C-D/Hollywood Blvd On-Ramp                              | 1500'  | -                | 4946              | 31.8 (D)         | 5405              | 22.1 (C)         |
| 9  | Basic EL Egress to C-D/Hollywood Blvd On-Ramp                 | 400'   | -                | 4946              | 20.2 (C)         | 5405              | 22.1 (C)         |
| 8  | Merge EL Egress                                               | 1500'  | -                | 4174              | 22.3 (C)         | 4411              | 18.5 (B)         |
| 7  | Basic Hallandale Beach Blvd On-Ramp to EL Egress              | 6300'  | -                | 4174              | 17 (B)           | 4411              | 18 (B)           |
| 6  | Merge Hallandale Beach Blvd On-Ramp                           | 1500'  | -                | 2514              | 17.4 (B)         | 2513              | 19.3 (B)         |
| 5  | Basic EL Ingress to Hallandale Beach Blvd On-Ramp             | 750'   | -                | 2514              | 10.3 (A)         | 2513              | 10.3 (A)         |
| 4  | Diverge EL Ingress                                            | 850'   | -                | 3764              | 23.3 (C)         | 3492              | 20.6 (C)         |
| 3  | Diverge C-D                                                   | 1300'  | -                | 5238              | 26.6 (C)         | 5617              | 31.9 (D)         |
| 2  | Weave Ives Dairy Rd On-Ramp to Hallandale Beach Blvd Off-Ramp | 5000'  | 5115'            | 4272              | 22.9 (C)         | 4816              | 25.2 (C)         |
| 1  | Basic South of Ives Dairy Rd                                  | 500'   | -                | 4272              | 17.4 (B)         | 4816              | 19.7 (C)         |

Legend  
 \* freeway demand entering segment  
 — interchange location  
 CD elevated C-D Road

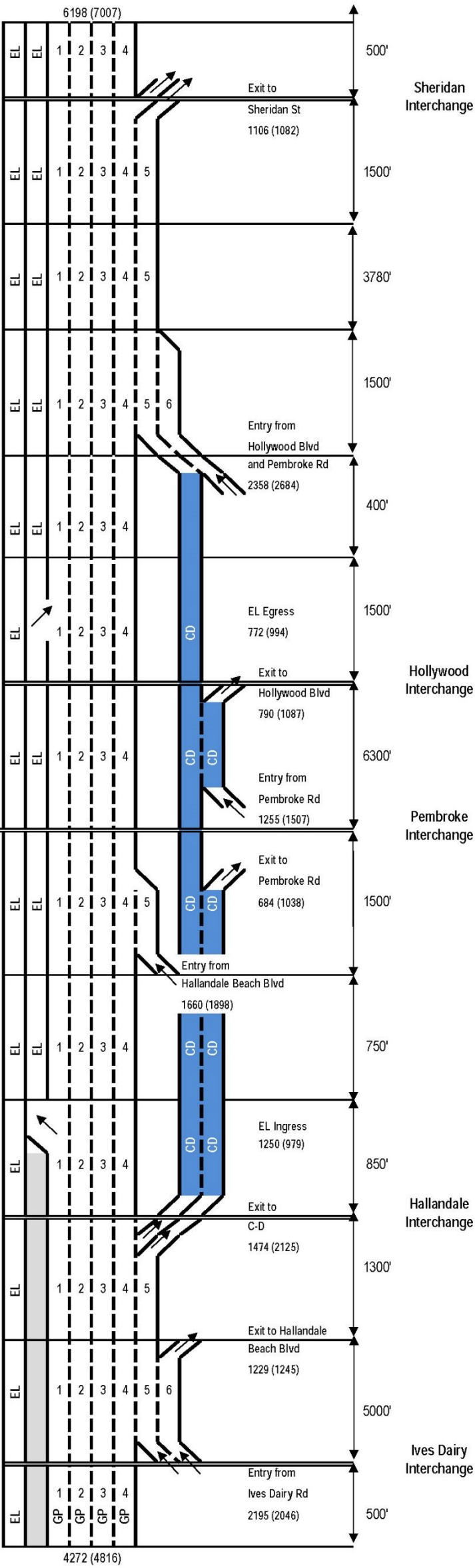


Figure 4.39 – 2040 Alternative 2 Northbound Freeway Analysis Results

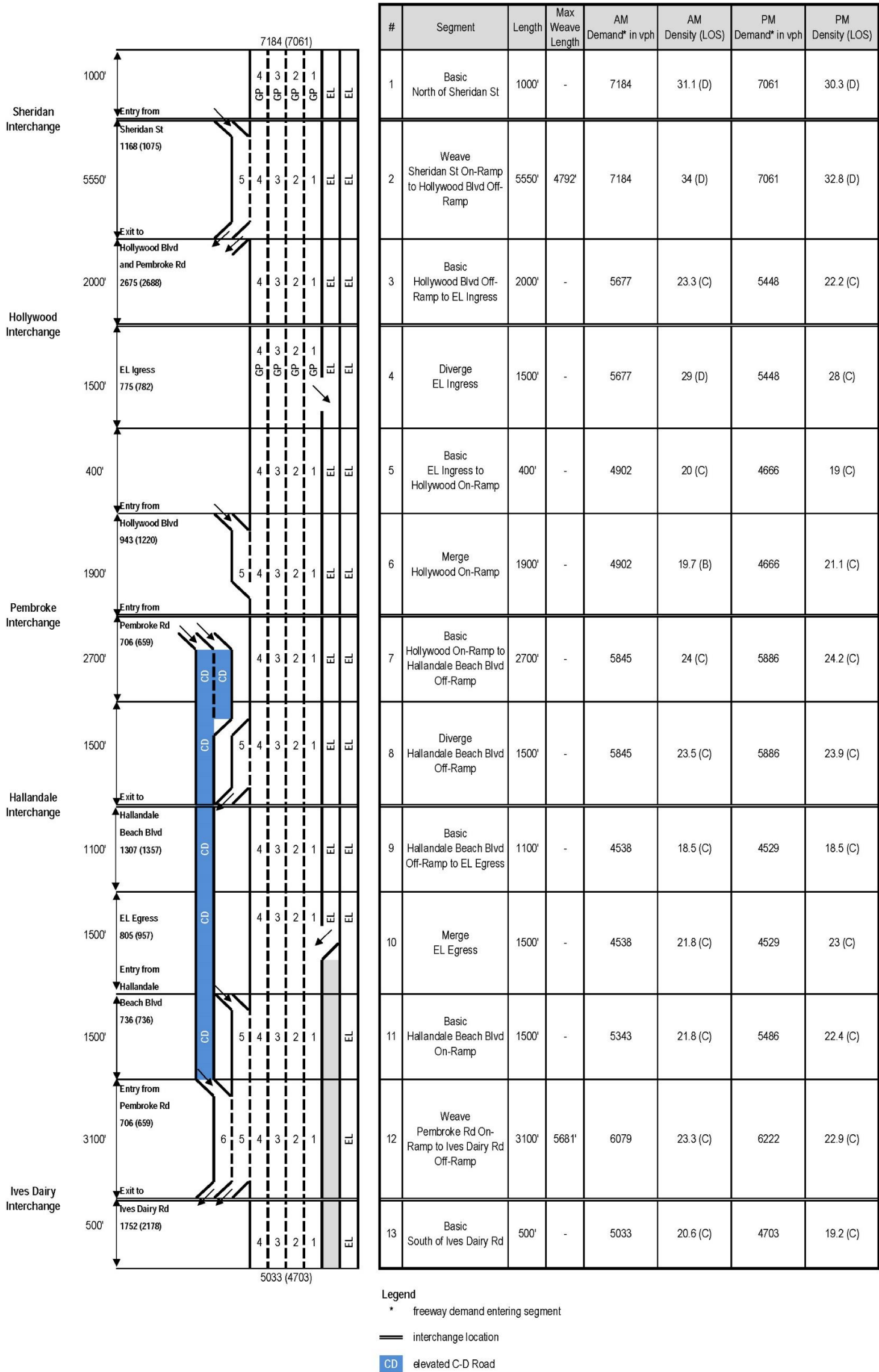


Figure 4.40 – 2040 Alternative 2 Southbound Freeway Analysis Results



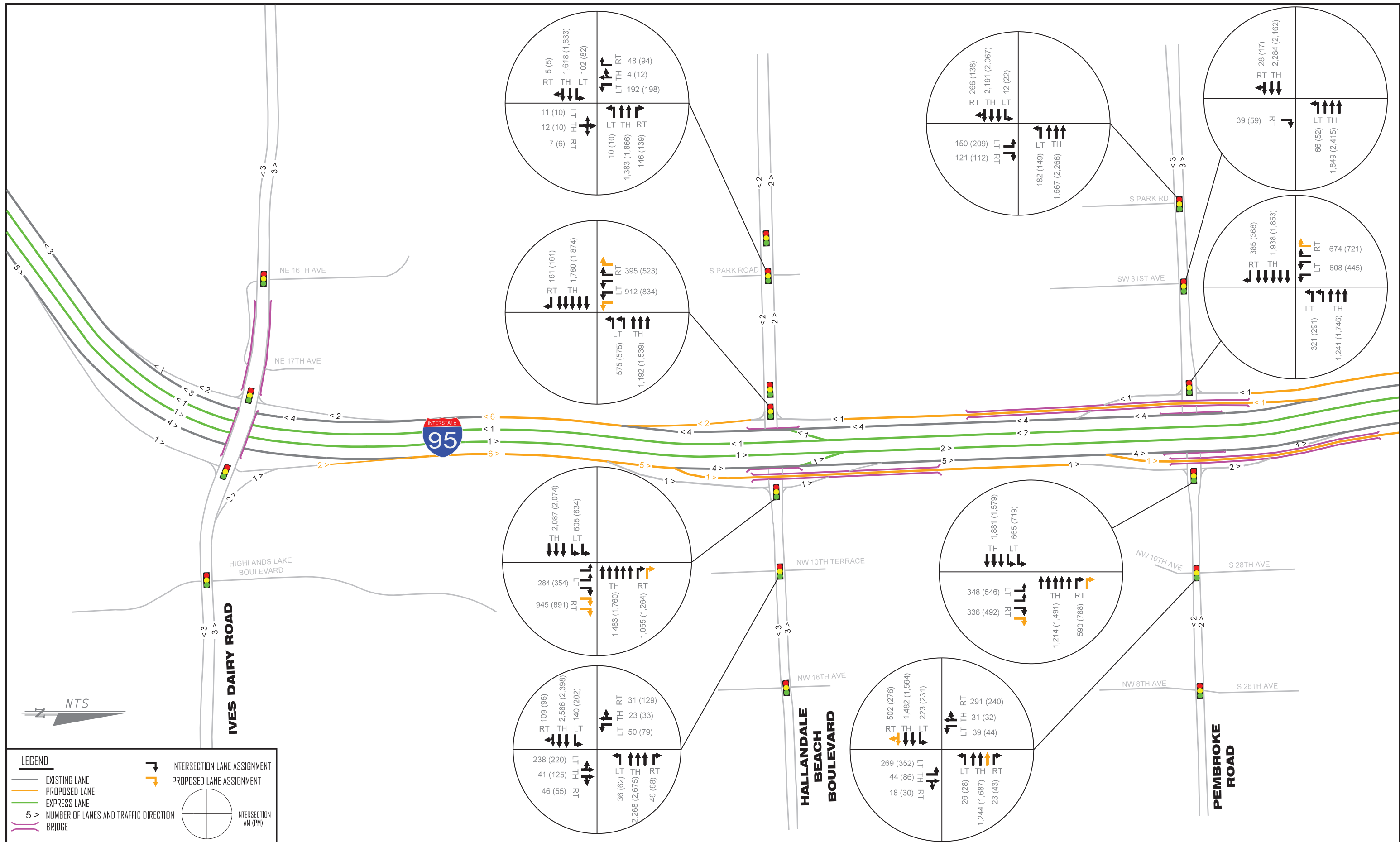
#### 4.5.12.2 INTERCHANGE ALTERNATIVE ANALYSIS RESULTS

Design year turning movement volumes for Alternatives 1 and 2 are depicted in **Figure 4.41** and **Figure 4.42**. The turning movement volumes are the same for both alternatives. The results are presented in **Tables 4.22 – 4.24**.

Intersection delay and LOS were used as MOEs, which is consistent with the existing conditions analysis. Exit ramp queue results were also used to check the queues against available storage in each alternative.

The signalized intersections have no geometric differences between the two build alternatives. Therefore, the intersections will operate at the same LOS for both 2040 build alternatives.





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FORT LAUDERDALE, FL 33309

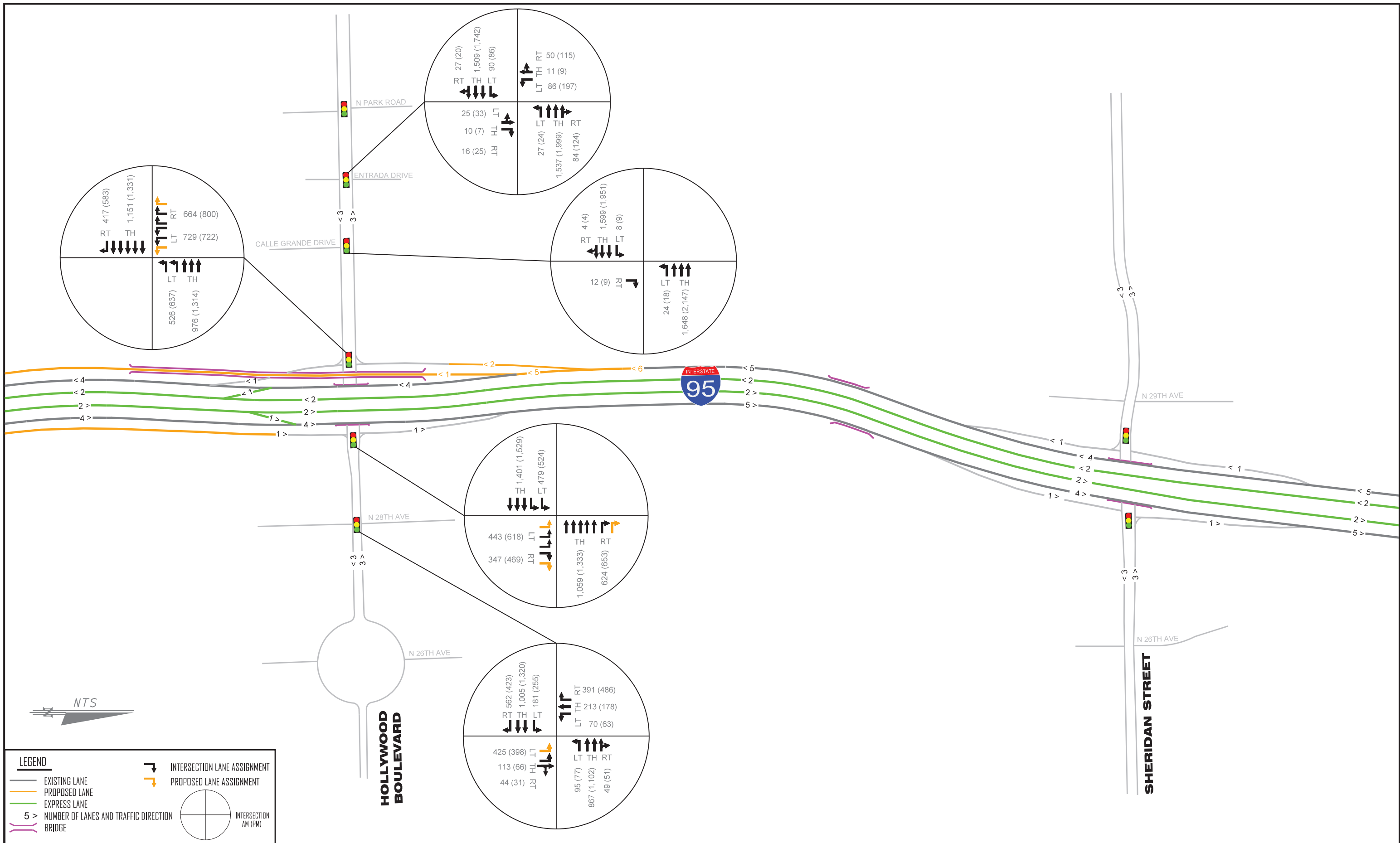
NOVEMBER 2018



**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: I4254

**ALTERNATIVE 1  
2040  
INTERSECTION TURNING MOVEMENT VOLUMES**

**FIGURE  
4.41  
4-86**



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DISTRICT FOUR  
3400 WEST COMMERCIAL BOULEVARD  
FORT LAUDERDALE, FL 33309

NOVEMBER 2018



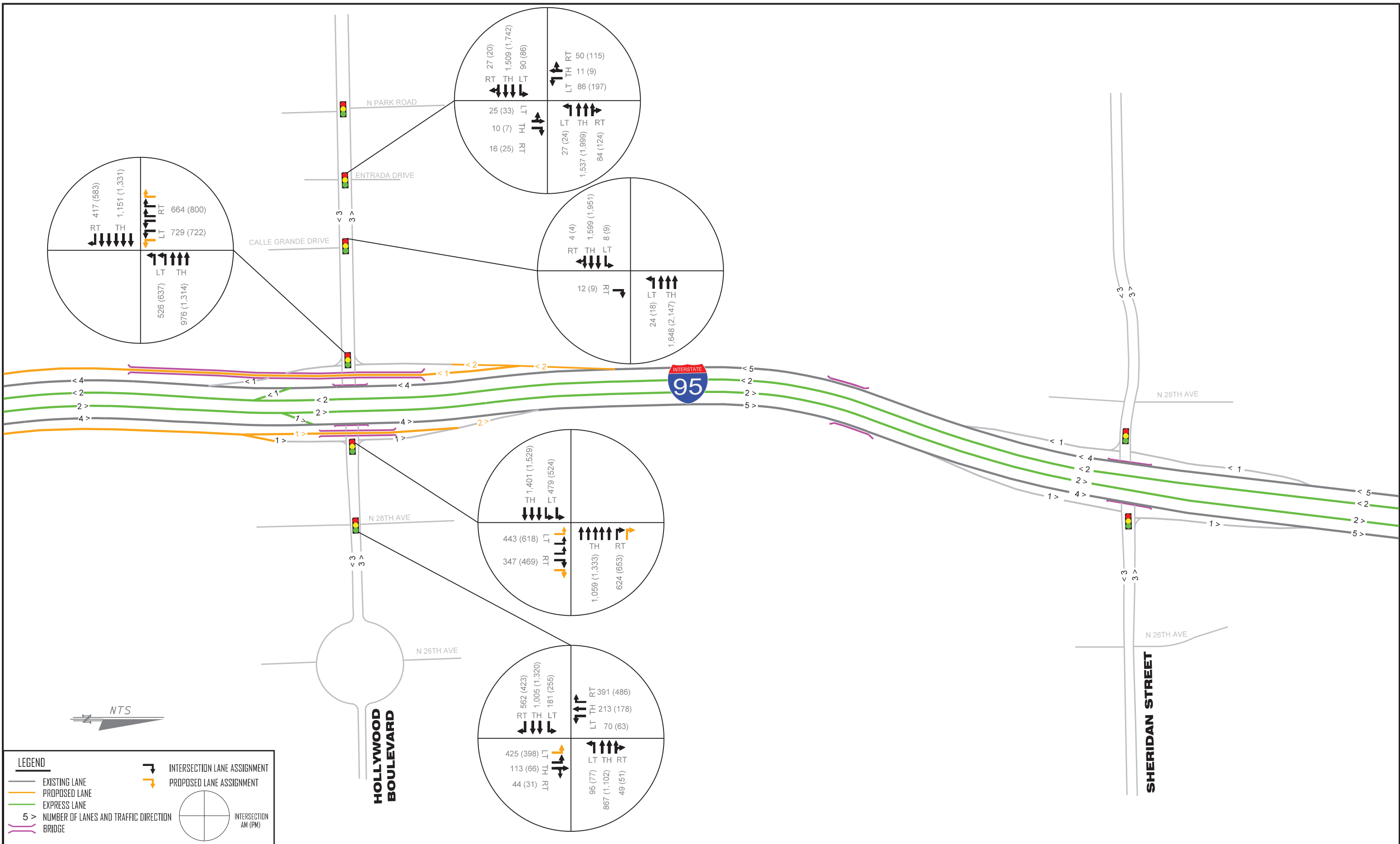
**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-1-22-02  
ETDM No.: I4254

**ALTERNATIVE 1  
2040  
INTERSECTION TURNING MOVEMENT VOLUMES**

**FIGURE  
4.41**

**4-87**









**Table 4.22 – 2040 Build Alternatives Hallandale Beach Boulevard Interchange  
LOS and Delay Results**

| Hallandale Beach<br>Boulevard<br>Intersection | Movement            | Build Alternatives |          |             |          |
|-----------------------------------------------|---------------------|--------------------|----------|-------------|----------|
|                                               |                     | AM Peak            |          | PM Peak     |          |
|                                               |                     | Delay              | LOS      | Delay       | LOS      |
|                                               |                     | (s/veh)            |          | (s/veh)     |          |
| Park Road*                                    | EBL                 | 17.9               | B        | 46.7        | D        |
|                                               | EBT                 | 16.5               | B        | 17.1        | B        |
|                                               | EBR                 | 16.5               | B        | 17.1        | B        |
|                                               | WBL                 | 23.2               | C        | 23.6        | C        |
|                                               | WBT                 | 18.6               | B        | 25.4        | C        |
|                                               | WBR                 | 11.0               | B        | 10.1        | B        |
|                                               | NBT                 | 77.2               | E        | 79.9        | E        |
|                                               | SBL                 | 79.1               | E        | 79.5        | E        |
|                                               | SBT                 | 79.1               | E        | 79.0        | E        |
|                                               | SBR                 | 56.6               | E        | 57.7        | E        |
|                                               | <b>Int</b>          | <b>21.7</b>        | <b>C</b> | <b>25.8</b> | <b>C</b> |
| I-95 West Ramp<br>Terminal*                   | EBT                 | 49.5               | D        | 45.6        | D        |
|                                               | EBR                 | 38.1               | D        | 34.6        | C        |
|                                               | WBL                 | 16.9               | B        | 24.9        | C        |
|                                               | WBT                 | 8                  | A        | 10.8        | B        |
|                                               | SBL                 | 45.5               | D        | 45.3        | D        |
|                                               | SBR                 | 41.2               | D        | 45.1        | D        |
|                                               | <b>Intersection</b> | <b>34.2</b>        | <b>C</b> | <b>33.3</b> | <b>C</b> |
| I-95 East Ramp<br>Terminal*                   | EBL                 | 38.8               | D        | 38.2        | D        |
|                                               | EBT                 | 20.8               | C        | 17.8        | B        |
|                                               | WBT                 | 43.7               | D        | 44.2        | D        |
|                                               | WBR                 | 39.2               | D        | 40.4        | D        |
|                                               | NBL                 | 39.7               | D        | 41.5        | D        |
|                                               | NBR                 | 54.9               | D        | 54.1        | D        |
|                                               | <b>Intersection</b> | <b>36.6</b>        | <b>D</b> | <b>36.6</b> | <b>D</b> |

\*HCM 2000 results reported



**Table 4.22 – 2040 Build Alternatives Hallandale Beach Boulevard Interchange  
LOS and Delay Results (Continued)**

| Hallandale Beach<br>Boulevard<br>Intersection | Movement   | Build Alternatives |          |             |          |
|-----------------------------------------------|------------|--------------------|----------|-------------|----------|
|                                               |            | AM Peak            |          | PM Peak     |          |
|                                               |            | Delay              | LOS      | Delay       | LOS      |
|                                               |            | (s/veh)            |          | (s/veh)     |          |
| NW 10th Terrace                               | EBL        | 47.6               | D        | 73.0        | E        |
|                                               | EBT        | 29.3               | C        | 20.9        | C        |
|                                               | EBR        | 33.5               | C        | 22.7        | C        |
|                                               | WBL        | 37.5               | D        | 29.4        | C        |
|                                               | WBT        | 29.1               | C        | 44.0        | D        |
|                                               | WBR        | 14.5               | B        | 15.3        | B        |
|                                               | NBL        | 76.1               | E        | 280.7       | F        |
|                                               | NBT        | 50.1               | D        | 59.0        | E        |
|                                               | NBR        | 50.1               | D        | 59.0        | E        |
|                                               | SBL        | 55.1               | E        | 71.2        | E        |
|                                               | SBT        | 48.5               | D        | 58.6        | E        |
|                                               | SBR        | 48.5               | D        | 58.6        | E        |
|                                               | <b>Int</b> | <b>33.0</b>        | <b>C</b> | <b>45.0</b> | <b>D</b> |

**Table 4.23 – 2040 Build Alternatives Pembroke Road Interchange LOS and Delay  
Results**

| Pembroke Road<br>Intersection | Movement   | Build Alternatives |          |             |          |
|-------------------------------|------------|--------------------|----------|-------------|----------|
|                               |            | AM Peak            |          | PM Peak     |          |
|                               |            | Delay              | LOS      | Delay       | LOS      |
|                               |            | (s/veh)            |          | (s/veh)     |          |
| Park Road*                    | EBU        | 19.8               | B        | 21.9        | C        |
|                               | EBT        | 44.9               | D        | 17.6        | B        |
|                               | EBR        | 44.9               | D        | 17.6        | B        |
|                               | WBL        | 54.8               | D        | 75.2        | E        |
|                               | WBT        | 9                  | A        | 8           | A        |
|                               | NBL        | 62.8               | E        | 89.4        | F        |
|                               | NBR        | 54.1               | D        | 60.7        | E        |
|                               | <b>Int</b> | <b>33.0</b>        | <b>C</b> | <b>18.9</b> | <b>B</b> |
| SW 31st Avenue*               | EBT        | 1                  | A        | 3.2         | A        |
|                               | EBR        | 1                  | A        | 3.2         | A        |
|                               | WBL        | 54.2               | D        | 77.9        | E        |
|                               | WBT        | 0.2                | A        | 0.4         | A        |
|                               | NBR        | 52.5               | D        | 74.3        | E        |
|                               | <b>Int</b> | <b>2.0</b>         | <b>A</b> | <b>3.5</b>  | <b>A</b> |



**Table 4.23 – 2040 Build Alternatives Pembroke Road Interchange LOS and Delay Results (Continued)**

| Pembroke Road Intersection         | Movement   | Build Alternatives |          |             |          |
|------------------------------------|------------|--------------------|----------|-------------|----------|
|                                    |            | AM Peak            |          | PM Peak     |          |
|                                    |            | Delay              | LOS      | Delay       | LOS      |
|                                    |            | (s/veh)            |          | (s/veh)     |          |
| I-95 West Ramp Terminal*           | EBT        | 52.4               | D        | 55          | D        |
|                                    | EBR        | 40.6               | D        | 42.5        | D        |
|                                    | WBL        | 54.7               | D        | 52.5        | D        |
|                                    | WBT        | 12.1               | B        | 20.7        | C        |
|                                    | SBL        | 46.6               | D        | 41.9        | D        |
|                                    | SBR        | 52                 | D        | 54.2        | D        |
|                                    | <b>Int</b> | <b>41.2</b>        | <b>D</b> | <b>41.8</b> | <b>D</b> |
| I-95 East Ramp Terminal*           | EBL        | 52.3               | D        | 53.9        | D        |
|                                    | EBT        | 16.3               | B        | 10.7        | B        |
|                                    | WBT        | 48.5               | D        | 52.9        | D        |
|                                    | WBR        | 42.7               | D        | 44.6        | D        |
|                                    | NBL        | 41.5               | D        | 43.6        | D        |
|                                    | NBR        | 41.8               | D        | 43.9        | D        |
|                                    | <b>Int</b> | <b>35.3</b>        | <b>D</b> | <b>38.3</b> | <b>D</b> |
| NW 10th Avenue / South 28th Avenue | EBL        | 38.2               | D        | 82.6        | F        |
|                                    | EBT        | 22                 | C        | 23.6        | C        |
|                                    | EBR        | 22                 | C        | 23.6        | C        |
|                                    | WBL        | 53.6               | D        | 52.6        | D        |
|                                    | WBT        | 31.8               | C        | 45.4        | D        |
|                                    | WBR        | 23                 | C        | 27.1        | C        |
|                                    | NBL        | 61                 | E        | 73.3        | E        |
|                                    | NBT        | 47.8               | D        | 44.4        | D        |
|                                    | NBR        | 47.8               | D        | 44.4        | D        |
|                                    | SBL        | 61.2               | E        | 64.4        | E        |
|                                    | SBT        | 82.3               | F        | 85.4        | F        |
|                                    | SBR        | 82.3               | F        | 85.4        | F        |
|                                    | <b>Int</b> | <b>33.8</b>        | <b>C</b> | <b>43.1</b> | <b>D</b> |

\*HCM 2000 results reported



**Table 4.24 – 2040 Build Alternatives Hollywood Boulevard Interchange LOS and Delay Results**

| Hollywood Boulevard Intersection | Movement   | Build Alternatives |          |             |          |
|----------------------------------|------------|--------------------|----------|-------------|----------|
|                                  |            | AM Peak            |          | PM Peak     |          |
|                                  |            | Delay              | LOS      | Delay       | LOS      |
|                                  |            | (s/veh)            |          | (s/veh)     |          |
| Entranda Drive                   | EBL        | 5.3                | A        | 32.3        | C        |
|                                  | EBT        | 8.4                | A        | 18.7        | B        |
|                                  | EBR        | 8.8                | A        | 19.6        | B        |
|                                  | WBL        | 6.2                | A        | 14.8        | B        |
|                                  | WBT        | 1.2                | A        | 36.8        | D        |
|                                  | WBR        | 1.6                | A        | 38.4        | D        |
|                                  | NBL        | 65.2               | E        | 53.6        | D        |
|                                  | NBT        | 65.2               | E        | 53.6        | D        |
|                                  | NBR        | 61.1               | E        | 46.0        | D        |
|                                  | SBL        | 74.8               | E        | 78.9        | E        |
|                                  | SBT        | 63.3               | E        | 49.5        | D        |
|                                  | SBR        | 63.3               | E        | 49.5        | D        |
|                                  | <b>Int</b> | <b>8.5</b>         | <b>A</b> | <b>32.2</b> | <b>C</b> |
| Calle Grande Drive*              | EBU        | 45.1               | D        | 42.6        | D        |
|                                  | EBT        | 10.0               | A        | 14.5        | B        |
|                                  | EBR        | 10.0               | A        | 14.5        | B        |
|                                  | WBL        | 48.6               | D        | 51.6        | D        |
|                                  | WBT        | 10.1               | B        | 10.2        | B        |
|                                  | NBR        | 6.4                | D        | 5.3         | D        |
|                                  | <b>Int</b> | <b>10.3</b>        | <b>B</b> | <b>12.4</b> | <b>B</b> |
| I-95 West Ramp Terminal*         | EBT        | 41.9               | D        | 46.7        | D        |
|                                  | EBR        | 39                 | D        | 45.2        | D        |
|                                  | WBL        | 37.1               | D        | 52.7        | D        |
|                                  | WBT        | 14.6               | B        | 14.9        | B        |
|                                  | SBL        | 54.9               | D        | 49.3        | D        |
|                                  | SBR        | 53.6               | D        | 54.7        | D        |
|                                  | <b>Int</b> | <b>38.9</b>        | <b>D</b> | <b>41</b>   | <b>D</b> |
| I-95 East Ramp Terminal*         | EBL        | 51.4               | D        | 54.2        | D        |
|                                  | EBT        | 8.3                | A        | 14.7        | B        |
|                                  | WBT        | 33.9               | C        | 32.7        | C        |
|                                  | WBR        | 31.9               | C        | 29.7        | C        |
|                                  | NBL        | 54.2               | D        | 54.1        | D        |
|                                  | NBR        | 52.8               | D        | 54.3        | D        |
|                                  | <b>Int</b> | <b>30.9</b>        | <b>C</b> | <b>33.7</b> | <b>C</b> |





**Table 4.24 – 2040 Build Alternatives Hollywood Boulevard Interchange LOS and Delay Results (Continued)**

| Hollywood Blvd Intersection | Movement | Build Alternatives |     |               |     |
|-----------------------------|----------|--------------------|-----|---------------|-----|
|                             |          | AM Peak            |     | PM Peak       |     |
|                             |          | Delay (s/veh)      | LOS | Delay (s/veh) | LOS |
| S 28th Ave*                 | EBL      | 27.1               | C   | 46.3          | D   |
|                             | EBT      | 38.8               | D   | 49.5          | D   |
|                             | EBR      | 36.2               | D   | 32.4          | C   |
|                             | WBL      | 38.9               | D   | 52.2          | D   |
|                             | WBT      | 54.2               | D   | 68.5          | E   |
|                             | WBR      | 54.2               | D   | 68.5          | E   |
|                             | NBL      | 73.4               | E   | 73.1          | E   |
|                             | NBT      | 63.2               | E   | 60.5          | E   |
|                             | NBR      | 63.2               | E   | 60.5          | E   |
|                             | SBL      | 54.9               | D   | 53.7          | D   |
|                             | SBT      | 63.1               | E   | 58.1          | E   |
|                             | SBR      | 90.9               | F   | 108.6         | F   |
|                             | Int      | 52.7               | D   | 61.9          | E   |

\*HCM 2000 results reported

As shown in **Table 4.22**, the 2040 Build Alternatives intersection operational results indicate all four intersections will operate at a LOS D or better.

As shown in **Table 4.23**, the 2040 Build Alternatives intersection operational results indicate all five intersections will operate at a LOS D or better.

As shown in **Table 4.24**, the 2040 Build Alternatives operational results indicate four intersections will operate at a LOS D or better and one intersection will operate at a LOS E during the PM peak-period.



#### 4.5.12.3 EXIT RAMP QUEUE RESULTS

The results for the diamond interchange configuration are summarized in **Table 4.25**. Storage distances were measured from the stop bar to the gore point on I-95. Queues for Alternatives 1 and 2 are accommodated in the available storage.

**Table 4.25 – 2040 Interchange Exit Ramp Queue Results**

| Interchange           | Movement    | Diamond                                                        |                                                                |                                                                |                                                                |
|-----------------------|-------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|
|                       |             | AM                                                             |                                                                | PM                                                             |                                                                |
|                       |             | (Alt 1)                                                        | (Alt 2)                                                        | (Alt 1)                                                        | (Alt 2)                                                        |
|                       |             | 95 <sup>th</sup><br>Queue <sup>1</sup><br>(Storage)<br>in feet | 95 <sup>th</sup><br>Queue <sup>1</sup><br>(Storage)<br>in feet | 95 <sup>th</sup><br>Queue <sup>1</sup><br>(Storage)<br>in feet | 95 <sup>th</sup><br>Queue <sup>1</sup><br>(Storage)<br>in feet |
| Hollywood Blvd        | NB Off-Ramp | 190 (5,950)                                                    | 190<br>(10,000)                                                | 260 (5,950)                                                    | 260<br>(10,000)                                                |
|                       | SB Off-Ramp | 285 (2,650)                                                    | 285 (2,400)                                                    | 350 (2,650)                                                    | 350 (2,400)                                                    |
| Pembroke Rd           | NB Off-Ramp | 195 (4,600)                                                    | 195 (4,650)                                                    | 310 (4,600)                                                    | 310 (4,650)                                                    |
|                       | SB Off-Ramp | 415 (6,500)                                                    | 415 (7,800)                                                    | 475 (6,500)                                                    | 475 (7,800)                                                    |
| Hallandale Beach Blvd | NB Off-Ramp | 415 (1,700)                                                    | 415 (2,100)                                                    | 380 (1,700)                                                    | 380 (2,100)                                                    |
|                       | SB Off-Ramp | 320 (4,800)                                                    | 320 (1,950)                                                    | 290 (4,800)                                                    | 290 (1,950)                                                    |

<sup>1</sup> 95th percentile queue from Synchro

## 4.6 COMPARATIVE ALTERNATIVES EVALUATION

### 4.6.1 EVALUATION MATRIX

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

The various criteria used in the evaluation are summarized in **Table 4.26**. The evaluation methodology used in this study involves a combination of both comparative qualitative and quantitative analyses to determine the preferred alternative. The evaluation matrix is presented in **Table 4.27**. The evaluation matrix was completed in 2019 during the alternative analysis process. Alternative 2 was later refined in 2023.



Table 4.26 – Performance Evaluation Criteria

| Engineering                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Geometric Compliance to Design Criteria:</b> Checks design elements and applicable design standards considered in the study are in compliance with the FDM and AASHTO.                                                                                                                         |
| <b>Multimodal Facilities:</b> Measures the availability of multi-modal facilities and their amenities and how each alternative enhances the ability to promote other transportation modes.                                                                                                        |
| <b>Mobility:</b> Measures the ability of an alternative to provide adequate capacity and minimize travel time delay through the corridor.                                                                                                                                                         |
| <b>Safety Improvements:</b> Provides consideration for an alternative's physical, geometric, and operational features identifying to what extent they would minimize actual or potential safety hazards.                                                                                          |
| <b>Drainage Analysis:</b> Evaluates storm water treatment and attenuation within the project limits. Determines and estimates the storm water management facility requirements to serve the drainage needs of the proposed improvements.                                                          |
| <b>Structures Analysis:</b> Evaluates the needed structural improvements of all the bridges within the project limits. This analysis also determines if new bridges are required to accommodate the proposed improvements.                                                                        |
| <b>Utility Impacts:</b> Measures the utility impacts of the alternatives. This includes potential conflicts and relocation of the utility lines that are located within the FDOT right of way.                                                                                                    |
| <b>Maintenance of Traffic:</b> Measures the effectiveness of the proposed traffic control schemes during construction to minimize effects on the residents, businesses, traveling public and emergency management services.                                                                       |
| <b>Purpose and Need:</b> Measures the ability of an alternative to comply with the purpose and need of the project.                                                                                                                                                                               |
| <b>Traffic:</b> Identifies substandard operations, measures the level of service, evaluates mainline and interchange access and signage requirements.                                                                                                                                             |
| Socio-Economic                                                                                                                                                                                                                                                                                    |
| <b>Right of Way Impacts:</b> Identifies the level and type of any residential and/or business disruptions associated with an alternative.                                                                                                                                                         |
| <b>Social and Neighborhood Impacts:</b> Identifies whether an alternative has impacts on social and neighborhood issues, including visual and aesthetic concerns.                                                                                                                                 |
| <b>Economic and Employment Impacts:</b> Identifies whether an alternative impacts economic issues along the corridor.                                                                                                                                                                             |
| <b>Community Services/Features:</b> Measures the effect and/or compatibility of an alternative to meet the surrounding visual environment needs from both the roadway user and the supporting community. Also provides a degree of impact to the community's services (Fire, Police, Parks, etc.) |
| Environmental                                                                                                                                                                                                                                                                                     |
| <b>Air Quality:</b> Measures the ability of an alternative to meet pre-established air quality standards.                                                                                                                                                                                         |
| <b>Contamination:</b> Measures the potential impact on existing or potential hazardous material sites and/or generators.                                                                                                                                                                          |
| <b>Listed Species:</b> Identifies the degree of potential effect of threatened and endangered species.                                                                                                                                                                                            |
| <b>Wetland Impacts:</b> Identifies the degree of potential impacts to wetland habitat.                                                                                                                                                                                                            |
| <b>Cultural/Historic/Archaeological Impacts:</b> 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.                                                                               |
| Project Cost                                                                                                                                                                                                                                                                                      |
| <b>Construction Cost:</b> Compares each alternative based on construction costs. Cost includes construction cost, mobilization, maintenance of traffic and project unknown.                                                                                                                       |
| <b>Right of Way/Business Damages:</b> Addresses variations in right of way costs between alternatives.                                                                                                                                                                                            |

Table 4.27 – Evaluation Matrix

| EVALUATION MATRIX                       |                                                                         |                                                                                                                                                                                                   |                                                                                                                                                                                                                |                        |               |
|-----------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| Variables/Parameters                    | No-Build Alternative                                                    | Build Alternative 1                                                                                                                                                                               | Build Alternative 2                                                                                                                                                                                            | Best Build Alternative |               |
|                                         |                                                                         |                                                                                                                                                                                                   |                                                                                                                                                                                                                | Alternative 1          | Alternative 2 |
| Engineering                             |                                                                         |                                                                                                                                                                                                   |                                                                                                                                                                                                                |                        |               |
| Geometric Compliance to Design Criteria | No change                                                               | Meets criteria<br>Substandard interchange spacing<br>Relocation of off-ramps impacts uniformity of the corridor                                                                                   | Meets criteria<br>Combines ramps improving interchange spacing<br>Maintains ramp uniformity                                                                                                                    |                        | ✓             |
| Multimodal Facilities                   | No change                                                               | Provides the ability to enhance bus service operations<br>Improves bicycle and pedestrian facilities<br>Impacts public transportation shuttle route between Pembroke Road and Hollywood Boulevard | Provides the ability to enhance bus service operations<br>Improves bicycle and pedestrian facilities<br>Impacts public transportation shuttle route between Pembroke Road and Hollywood Boulevard              | ✓                      | ✓             |
| Mobility                                | Increased congestion                                                    | Adds capacity<br>Improves the traffic operations of the area                                                                                                                                      | Adds capacity<br>Improves the traffic operations of the area<br>Removing the Pembroke Road interchange from directly interacting with I-95 improves the mobility and access in and out of Pembroke Road        |                        | ✓             |
| Safety Improvements                     | Includes planned/<br>programmed ramp<br>terminal safety<br>improvements | Reduces long-term crashes related to heavy congestion,<br>mainline weaving maneuvers, mainline and ramp speed<br>differentials and interstate access                                              | Reduces long-term crashes related to heavy congestion,<br>mainline weaving maneuvers, mainline and ramp speed<br>differentials and interstate access<br>Reduces the number of entrances and exits to/from I-95 |                        | ✓             |
| Drainage Analysis                       | No impact                                                               | Less impacts than Alternative 2<br>Alternative 1 requires a smaller roadway footprint                                                                                                             | More impacts than Alternative 1<br>Alternative 2 requires a larger roadway footprint                                                                                                                           | ✓                      |               |
| Structures Analysis                     | No change                                                               | New bridges = 4<br>Bridge widenings = 2<br>Less new bridges than Alternative 2                                                                                                                    | New bridges = 5<br>Bridge widenings = 2<br>More new bridges than Alternative 1                                                                                                                                 | ✓                      |               |
| Utility Impacts                         | No impact                                                               | 5 Major impacts, 7 Minor impacts                                                                                                                                                                  | 5 Major impacts, 7 Minor impacts                                                                                                                                                                               | ✓                      | ✓             |
| Maintenance of Traffic                  | No impact                                                               | Moderate impacts during construction<br>Less impacts than Alternative 2                                                                                                                           | Moderate impacts during construction<br>More impacts than Alternative 1                                                                                                                                        | ✓                      |               |
| Purpose and Need                        | Does not meet                                                           | Meets                                                                                                                                                                                             | Meets                                                                                                                                                                                                          | ✓                      | ✓             |



Table 4.7 – Evaluation Matrix (Continued)

| EVALUATION MATRIX                                     |                                                                                     |                                                                                                                                                |                                                                                                                                            |                        |               |
|-------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| Variables/Parameters                                  | No-Build Alternative                                                                | Build Alternative 1                                                                                                                            | Build Alternative 2                                                                                                                        | Best Build Alternative |               |
|                                                       |                                                                                     |                                                                                                                                                |                                                                                                                                            | Alternative 1          | Alternative 2 |
| Traffic                                               |                                                                                     |                                                                                                                                                |                                                                                                                                            |                        |               |
| I-95 Mainline Weave Locations                         | Northbound = 4<br>Southbound = 4                                                    | Northbound = 3<br>Southbound = 2                                                                                                               | Northbound = 1<br>Southbound = 2<br>Alternative 2 has less weave locations than Alternative 1                                              |                        | ✓             |
| I-95 Locations with better than LOS D by 2040 AM (PM) | 15 (14) = 29                                                                        | 15 (17) = 32                                                                                                                                   | 22 (20) = 42<br>More locations with LOS A, B & C                                                                                           |                        | ✓             |
| I-95 Locations with LOS D by 2040 AM (PM)             | 5 (6) = 11                                                                          | 9 (7) = 16<br>More locations with LOS D                                                                                                        | 4 (6) = 10                                                                                                                                 | ✓                      |               |
| I-95 Locations with LOS E/F by 2040 AM (PM)           | 4 (4) = 8                                                                           | 0 (0) = 0                                                                                                                                      | 0 (0) = 0                                                                                                                                  | ✓                      | ✓             |
| Number of mainline access points                      | 6 locations Northbound<br>6 locations Southbound                                    | 6 locations Northbound<br>6 locations Southbound                                                                                               | 4 locations Northbound<br>4 locations Southbound<br>Less mainline access points                                                            |                        | ✓             |
| Northbound Mainline Access                            | Hallandale to Pembroke access maintained<br>Pembroke to Hollywood access maintained | Hallandale to Pembroke access not provided<br>Pembroke to Hollywood not provided                                                               | Hallandale to Pembroke access not provided<br>Pembroke to Hollywood access maintained via CD<br>Pembroke to Hollywood access is maintained |                        | ✓             |
| Southbound Mainline Access                            | Hollywood to Pembroke access maintained<br>Pembroke to Hallandale access maintained | Hollywood to Pembroke not provided<br>Pembroke to Hallandale not provided                                                                      | Hollywood to Pembroke not provided<br>Pembroke to Hallandale not provided                                                                  | ✓                      | ✓             |
| *Northbound Off-Ramp Storage                          | Hallandale ~ 1,550 ft<br>Pembroke ~ 1,760 ft<br>Hollywood ~ 1,920 ft                | Hallandale ~ 1,800 ft<br>Pembroke ~ 4,575 ft<br>Hollywood ~ 5,950 ft                                                                           | Hallandale ~ 2,100 ft<br>Pembroke ~ 4,575 ft<br>Hollywood > 5,950 ft<br>Provides more storage for off ramps                                |                        | ✓             |
| *Southbound Off-Ramp Storage                          | Hollywood ~ 1,875 ft<br>Pembroke ~ 2,050 ft<br>Hallandale ~ 1,950 ft                | Hollywood ~ 2,625 ft<br>Pembroke ~ 6,500 ft<br>Hallandale ~ 4,880 ft<br>Overall Alternative 1 has more storage when compared to Alternative 2. | 1. Hollywood ~ 2,575 ft<br>2. Pembroke ~ 7,800 ft<br>3. Hallandale ~ 1.950 ft                                                              | ✓                      |               |
| Mainline Traffic                                      | No change                                                                           | Some traffic is removed from the mainline with the relocation of the off-ramps                                                                 | More traffic is removed from the mainline with the addition of the C-D system                                                              |                        | ✓             |

Table 4.7 – Evaluation Matrix (Continued)

| EVALUATION MATRIX                         |                                                                                                              |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                   |                        |               |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| Variables/Parameters                      | No-Build Alternative                                                                                         | Build Alternative 1                                                                                                                                                                                                                                                                                               | Build Alternative 2                                                                                                                                                                                                                                                                                               | Best Build Alternative |               |
|                                           |                                                                                                              |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                   | Alternative 1          | Alternative 2 |
| Mainline Signage                          | No change                                                                                                    | Similar to No-Build                                                                                                                                                                                                                                                                                               | Less signage on mainline due to less access points                                                                                                                                                                                                                                                                |                        | ✓             |
| Socio-Economic                            |                                                                                                              |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                   |                        |               |
| Right of Way Impacts                      | None                                                                                                         | Total Number of Parcels Affected = 32<br>Commercial = 27<br>Residential = 2<br>Vacant = 3<br>Less right of way impacts than Alternative 2                                                                                                                                                                         | Total Number of Parcels Affected = 35<br>Commercial = 27<br>Residential = 5<br>Vacant = 3                                                                                                                                                                                                                         | ✓                      |               |
| Social and Neighborhood Impacts           | None/No change                                                                                               | Provides the ability to enhance/improve bus service which offers an alternative to auto travel and addresses needs of low-income users and disadvantaged groups. Aesthetic effects anticipated to the Highland Garden neighborhood, which is adjacent to an elevated on-ramp                                      | Provides the ability to enhance/improve bus service which offers an alternative to auto travel and addresses needs of low-income users and disadvantaged groups. Aesthetic effects not anticipated to the Highland Garden neighborhood                                                                            |                        | ✓             |
| Economic, Mobility and Employment Impacts | No change                                                                                                    | Improves mobility, throughput, travel speeds and travel time for this vital SIS facility and cross streets<br>Supports economic development and reduces congestion                                                                                                                                                | Improves mobility, throughput, travel speeds and travel time for this vital SIS facility and cross streets<br>Supports economic development and reduces congestion                                                                                                                                                | ✓                      | ✓             |
| Community Services/Features               | No change                                                                                                    | Government facilities and public parks are located adjacent to the corridor but no disruption in their function and/or the services provided are anticipated; Service access to St. John's Lutheran Church will be modified. No other access conflicts anticipated, no impacts to emergency services anticipated. | Government facilities and public parks are located adjacent to the corridor but no disruption in their function and/or the services provided are anticipated. Service access to St. John's Lutheran Church will be modified. No other access conflicts anticipated; No impacts to emergency services anticipated. | ✓                      | ✓             |
| Environment                               |                                                                                                              |                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                   |                        |               |
| Air Quality                               | Project is located within an attainment area. Minimal potential impacts may occur from increased congestion. | The project is located within an attainment area, no significant air quality impacts are anticipated. Project is anticipated to decrease congestion.                                                                                                                                                              | The project is located within an attainment area, no significant air quality impacts are anticipated. Project is anticipated to decrease congestion.                                                                                                                                                              | ✓                      | ✓             |
| Contamination                             | No change                                                                                                    | 6-High and 6-Medium known/potentially contaminated sites<br>Less impacts than Alternative 2                                                                                                                                                                                                                       | 8-High and 6 -Medium known/potentially contaminated sites                                                                                                                                                                                                                                                         | ✓                      |               |

Table 4.7 – Evaluation Matrix (Continued)

| EVALUATION MATRIX                         |                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                          |                        |               |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------------|
| Variables/Parameters                      | No-Build Alternative                                                                                                                | Build Alternative 1                                                                                                                                                     | Build Alternative 2                                                                                                                                                      | Best Build Alternative |               |
|                                           |                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                          | Alternative 1          | Alternative 2 |
| Listed Species/Wetland Impacts            | No impact                                                                                                                           | Impacts to OSW 4, OSW 5, and Swale 1<br>Less impacts than Alternative 2                                                                                                 | Impacts to OSW 4, OSW 5, Swale 1 and Swale 2                                                                                                                             | ✓                      |               |
| Water Quality                             | No impact/No improvement (portions of Hollywood Boulevard, Pembroke Road and Hallandale Beach Boulevard are not permitted by SFWMD) | Equivalent water quality treatment will be provided that meets state water quality criteria<br>Potential for improvement possible based on the proposed drainage system | Equivalent water quality treatment will be provided that meets state water quality criteria<br>Potential for improvement possible based on the proposed drainage system. | ✓                      | ✓             |
| Cultural/Historic/ Archaeological Impacts | No impact                                                                                                                           | 3 National Register– eligible historic resources<br>No adverse effects                                                                                                  | 3 National Register– eligible historic resources<br>No adverse effects                                                                                                   | ✓                      | ✓             |
| Cost                                      |                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                          |                        |               |
| Construction Cost                         | No construction, No cost involved = \$0                                                                                             | \$127 Million                                                                                                                                                           | \$105 Million<br>Lower cost when compared to Alternative 1                                                                                                               |                        | ✓             |
| Right of Way/Business Damages             | None = \$0                                                                                                                          | \$53 Million                                                                                                                                                            | \$57 Million                                                                                                                                                             | ✓                      |               |
| Totals                                    |                                                                                                                                     |                                                                                                                                                                         |                                                                                                                                                                          | 19                     | 22            |



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

The following TSM&O elements are included in the Build Alternatives:

- Auxiliary lanes between interchanges
- Additional exclusive turn lanes at the interchange ramp terminals
- Additional turn-lane storage at the interchange ramp terminals
- Capacity improvements at the ramp junctions
- Signal optimization
- Enhanced signage
- New ITS technologies and infrastructure

#### 4.6.2 VALUE ENGINEERING

A Value Engineering (VE) Study was conducted during the week of April 8, 2019 through April 12, 2019. A VE preferred alternative was not identified during the VE Study. However, the VE team developed ten design alternatives and six design recommendations. The PD&E Study team reviewed and accepted three of the VE recommendations. Most of the recommendations will be evaluated further during the Design phase of the project. Details about the Value Engineering Study are documented in the *Value Engineering Study Report* dated May 2019, a companion document to the PD&E Study.

#### 4.7 SELECTION OF PREFERRED ALTERNATIVE

The preferred alternative for the I-95 corridor is Alternative 2. Alternative 2 was selected based on the alternative alignment analysis and the evaluation results summarized as part of the PD&E Study. Alternative 2 will add the capacity improvements necessary to improve traffic operations, safety, transit, system linkage, modal interrelationships, transportation demand, social demand, economic development, interchange access and emergency evacuation.





Alternative 2 is the most prudent when compared with Alternative 1 for the following reasons:

- **Capacity** – The collector distributor roadway system removes I-95 mainline traffic, which provides more capacity to several mainline segments of I-95. Alternative 2 will add the capacity improvements necessary to improve traffic operations of the I-95 mainline and interchanges.

In Alternative 2, average operating speeds along the northbound direction (AM peak, peak direction) increase by at least 10 mph (from 30-45 mph to 55 mph). In the southbound direction (PM peak, peak direction), average operating speeds show an increase of at least 21 mph (from 20-35 mph to 56 mph). At the networkwide level, in terms of average speed, Alternative 2 shows better performance than the No-Build during both peak periods with speed increases of 8% (AM) and 5% (PM). Network delay time reductions were 29% (AM) and 24% (PM).

The operational analysis conducted in the PD&E Study confirmed that the proposed improvements to the I-95 mainline and interchange modifications will not have any significant adverse impacts on safety and operations along I-95. The proposed modifications will improve traffic operations and enhance safety. When compared with the No-Build Alternative, Alternative 2 significantly improves operations along I-95 and its interchanges.

- **Safety** – Reduces the number of entrances and exits to and from I-95, which improves the overall operations of the I-95 mainline, ramps, and interchanges. Reduces long-term crashes related to heavy congestion, mainline weaving maneuvers, mainline and ramp speed differentials, and interstate access. Provides more off-ramp storage and requires less signage on the mainline due to less access points.

Alternative 2 will enhance safety by addressing the capacity needs and improving the operations and access between the I-95 mainline and interchanges. The proposed improvements will reduce the number of entrances and exits to and from I-95 from 12 to 8, which improves the overall operations of the I-95 mainline, ramps, and interchanges. The proposed improvements are expected to reduce crashes related to mainline weaving maneuvers. Alternative 2 reduces the number of weaving movements from 8 to 3 and eliminates speed differentials between the



mainline and ramps. The additional ramp terminal capacity and the proposed collector distributor roadway system will provide more off-ramp storage, which eliminates the queue from the ramps extending to the I-95 mainline. Adding the proposed collector distributor roadway system and parallel on and off-ramps will require less signage on the I-95 mainline between interchanges due to less proposed access points. Removing the Pembroke Road Interchange and combining interchange exit and entry ramps improves interchange spacing from 0.7 to 1.8 miles. The proposed improvements will address the safety issues at the interchange entry and exit points by increasing gaps along the general use lanes providing more space for vehicles entering and exiting I-95 without weaving conflicts and/or last-minute lane changes.

Data from historical crash records identified multiple high crash segments and high crash spots along I-95. Traffic congestion along I-95 is a contributing factor for much of the crashes experienced along the corridor. The potential for future increase in crashes is largely alleviated by the improvements proposed by Alternative 2. Closely spacing between the three interchanges was maximized to eliminate the existing substandard weaving segments. On-ramp traffic entering I-95 will have a better gap acceptance when merging in with the I-95 mainline traffic.

- **System Linkage** – Alternative 2 will match the planned improvements for the adjacent projects south and north of the project limits. Removing the Pembroke Road interchange from directly interacting with I-95 improves the mobility and access in and out of Pembroke Road and adjacent roadways.
- **Modal Interrelationships** – The additional capacity provides the ability to enhance/improve bus service, which offers an alternative to auto travel and addresses needs of low-income users and disadvantaged groups.
- **Transportation Demand** – Alternative 2 adds capacity to I-95. The additional auxiliary lanes, collector distributor roadway system and interchange ramps address the transportation demand within the study limits. These improvements are consistent with the local and State transportation plans.

The additional capacity improvements will provide added operational benefits to support future Bus Services, Emergency Response Services and improved travel time reliability in and out of the interstate. Significant improvements were also shown for the latent delay/demand, and total stops.



- **Social Demand and Economic Development** – Social and economic demands within the study limits will continue to increase as population and employment increase. The proposed improvements will add the necessary capacity to improve access to the cities of Hallandale Beach, Pembroke Park, and Hollywood, which will allow the economic development to take advantage of the added capacity to reach the destinations of I-95 and surrounding cities.
- **Evacuation Route** – In the case of an evacuation event, I-95 will have additional lanes with Alternative 2. The additional lanes will make the corridor more effective during emergency evacuation events and emergency response.

Based on the evaluation conducted and documented in this report, it is clear that Alternative 2 will meet the purpose and need of the project and the overall project objectives of this PD&E Study.

The preferred alternative was selected in early 2019 prior to FDOT District Four decided to put the I-95 PD&E Study on hold and perform the I-95 CPS (see **Section 4.1** for details). The I-95 CPS was completed in April 2020. The I-95 PD&E Study restarted in June 2020 and consisted of the same purpose and need. However, the main difference was that the study assumed that both projects, District Six I-95 Planning Study and District Four I-95 Express Phase 3C improvements, will be in-place by the design year 2045. The I-95 PD&E Study restart approach was to redesign the preferred alternative to fit within the I-95 CPS Alternative 1A footprint and be compatible with the future projects north and south of the study limits.

The preferred alternative refinements and further analyses are documented in **Section 6.0**.



## **5.0 PROJECT COORDINATION AND PUBLIC INVOLVEMENT**

### **5.1 AGENCY COORDINATION**

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

The adjacent railroad corridor is owned by FDOT. Coordination was conducted with the FDOT Intermodal Office and with other agencies in the early stages of the study. No impacts are anticipated to the railroad crossings.

A Public Involvement Plan (PIP) was developed and is being implemented for the I-95 PD&E Study from south of Hallandale Beach Boulevard to north of Hollywood Boulevard in Broward County. The PIP is a working document that is updated and amended throughout the project development process to incorporate the latest public involvement policies and techniques as they evolve during the life of the project. The PIP outlines the public involvement approach and activities required to be undertaken with the project, including lists of the contact persons, such as citizens, private groups (residential/business), officials, agencies, stakeholders, and media, and the means used to involve them in the process.

Briefings were held with the following Elected Officials/Agencies/Stakeholders prior to the Public Meetings:

- City of Hallandale Beach
- Town of Pembroke Park
- City of Hollywood
- City of West Park





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

## 5.2 PUBLIC INVOLVEMENT

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

Public information meetings began in Spring 2017 and have continued throughout the study process. Exhibits and project information has been provided for public review and comment at each meeting. Exhibit and project information is also available on the project website. Florida Department of Transportation (FDOT) representatives have been available at each meeting to discuss the project and answer questions, as well as members of the consultant team.

**Elected Officials/Agencies/Stakeholders Briefings** – Briefings were held with the following Elected Officials/Agencies/Stakeholders prior to the Kick-Off Meetings:

- City of Hallandale Beach
- Town of Pembroke Park
- City of Hollywood
- City of West Park

**Kick-Off Meeting** – On Thursday, May 25, 2017, the FDOT hosted an in-person Public Kick-off Meeting. The meeting was held at the Orangebrook Golf & Country Club located at 400 Entrada Drive, Hollywood, Florida 33021 and was attended by 30 people. The meeting started with a short presentation introducing the project, project purpose, and schedule. After the presentation the meeting was then opened for questions and responses. Throughout the evening, project information was available for informal review, and members of the project team were available to hold one-on-one conversations and to respond to individual questions. Written comments received from the public included:

- Request for posting of notifications
- Eliminate at least one toll lane



- Request to evaluate the train crossings at the three interchanges
- Request for a noise wall
- I-95 is not a safe roadway
- Request for an increase in public transportation stops/schedule
- Evaluate traffic congestion and noise
- Evaluate safety for traffic exiting I-95

**Elected Officials/Agencies/Stakeholders Briefings** – Briefings were held with the following Elected Officials/Agencies/Stakeholders prior to the Alternatives Public Workshop:

- City of Hallandale Beach
- Town of Pembroke Park
- City of Hollywood
- City of West Park

**Alternatives Public Workshop** – On Thursday, June 7, 2018, the FDOT hosted an in-person Alternatives Public Workshop. The meeting was held at the Orangebrook Golf & Country Club located at 400 Entrada Drive, Hollywood, Florida 33021 and was attended by 33 people. The meeting was conducted as a workshop with the project information made available for informal review. Members of the project team were available to hold one-on-one conversations and to respond to individual questions. Written comments provided from the public included:

- Request for additional lighting
- Request of aesthetic improvements (landscaping, for example)
- Request for additional accident data
- Request to eliminate the Tri-Rail Station at Hollywood Boulevard
- Request for drainage improvements/maintenance

**Public Hearing** – A Public Hearing was held virtually via GoToMeeting on Thursday, August 21, 2021, and in- person on Thursday, September 2, 2021, in Broward County. The purpose of this hearing was to present to the public the preferred alternative and seek public input. The following summary is for the virtual hearing. Numerous exhibits and project information were provided for review. A project newsletter with information on the PD&E Study to date was distributed to all the attendees. All documents were translated to Spanish.



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

- PD&E Study Process
- Project Study Area
- Needs of the Project
- No-Build Conditions
- PD&E Study Schedule
- Project Cost Estimate
- Environmental Features
- Existing Conditions Roll Plot
- 2045 Preferred Alternative Roll Plot Design
- 2045 Preferred Alternative Operations and Benefits
- Noise Wall Recommendations
- Alternative 1 Roll Plot Design
- Alternative 2 Roll Plot Design
- Evaluation Matrix

A total of 44 written comments were received at this hearing. Approximately 112 people attended the meeting. A court reporter was present for the hearing. The comment period was from August 26, 2021, to September 22, 2021.

The following are some of the comment topics provided at the virtual meeting:

- Future Drainage Design, Needs and Impacts
- Right of Way Impacts
- Project Schedule
- Emergency Access
- Construction Timeline
- Interchange Local Access Modifications

The in-person hearing was held on Thursday, September 2, 2021 at the Holiday Inn Fort Lauderdale-Airport Hotel, 2905 Sheridan Street, Hollywood, Florida 33020. The same exhibits and project information provided at the virtual hearing was also provided at the in-person hearing. The following summary is for the in-person hearing.



A total of three written comments were received at this hearing. Approximately 48 people attended the meeting. A court reporter was present for the hearing. The comment period was from September 02, 2021 to September 22, 2021.

The following are some of the comment topics provided at the in-person meeting:

- Right of Way Impacts
- Project Schedule
- City Population Size

The Public Hearing transcripts are included in **Appendix H**.

On September 8, 2021, shortly after the Public Hearing, the Town Commission of the Town of Pembroke Park submitted a resolution to FDOT requesting to remove the impacts to the existing business properties at the I-95/Hallandale Beach Boulevard Interchange within the Town of Pembroke Park from the I-95 PD&E Study proposed improvements. The resolution also requested to consider other improvements that do not include impacts to these properties within the Town's limits.

On September 14, 2021, the City Commission of the City of Hollywood submitted a resolution rejecting the I-95 PD&E Study preferred alternative recommendations. The resolution recommended to move forward with the No-Build Alternative or modify the preferred alternative recommendations. The City had the following concerns with respect to the preferred alternative:

- Elimination of the direct access between Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard with I-95 and the impact on local roadway network.
- Elimination of the City of Hollywood emergency vehicle access to this segment of the I-95 corridor.
- FDOT's drainage needs for the new improvements and their intention to utilize approximately eight acres of the newly acquired Sunset Property or Orangebrook Golf Course.

In 2023, modifications to the preferred alternative were made and presented to the local municipalities. A resolution from the City of Hollywood was then passed





on April 4, 2023, supporting FDOT's new preferred alternative. The City of Hallandale Beach sent a letter supporting the project on July 10, 2023. The Town Commission of the Town of Pembroke Park passed a resolution on December 13, 2023, agreeing with the proposed project improvements. Therefore, all concerns and issues raised by the local municipalities were addressed by FDOT.

A copy of these resolutions is included in **Appendix H**.

FDOT held multiple post Public Hearing meetings with the municipalities to discuss an approach to address the issues and concerns raised during the Public Hearing opposing to the preferred alternative proposed improvements.

- Town of Pembroke Park, Town Commission Meeting (9/8/21) - Officially presented the PD&E Study recommendations to the Town Commission.
- City of Hollywood (9/9/21) - 2nd Briefing to staff about the PD&E Study recommendations.
- City of Hollywood, City Commission Meeting (9/14/21) - Officially presented the PD&E Study recommendations to the City Commission.
- City of Hollywood (9/16/21) - Meeting with City's emergency response team to discuss current routes within the study area.
- Broward County Traffic Incident Management Team (10/27/21) - Discussed the proposed improvements with the Broward County Traffic Team and First Responder Groups who responds within the study area.
- Town of Pembroke Park, Follow-up Meeting with Staff (11/3/21) - The objective of the meeting was to follow-up with the town staff and discuss the solutions being considered by the Department to address the town's concerns about the preferred alternative.
- City of Hollywood, Follow-up Meeting with City Staff (11/9/21) - The objective of the meeting was to follow-up with city staff and discuss the solutions being considered by the Department to address the city's concerns about the preferred alternative.
- Town of Pembroke Park, Town Resolution Discussion with Town Manager (6/23/22) - The objective of this meeting was to introduce the newly hired design team and to discuss the Town of Pembroke Park's Resolution in opposition to the PD&E Preferred Alternative and what needed to be done



from a design refinement standpoint to gain the Town of Pembroke Park's support of the project.

- City of West Park, Follow-up Meeting with City Staff (7/19/22) - The objective of this meeting was to introduce the newly hired design team and to discuss the PD&E Preferred Alternative to see if the City of West Park had any concerns.
- City of Hallandale Beach, Follow-up Meeting with City Staff (7/26/22) - The objective of this meeting was to introduce the newly hired design team and to discuss the PD&E Preferred Alternative to see if the City of Hallandale Beach had any concern.
- City of Hollywood Civic Association, Follow-up Meeting (9/8/22) - The objective of this meeting was to present the current PD&E Preferred Alternative and garner any feedback from the Civic Association on the current Preferred Alternative.
- City of Hollywood, Follow-up Meeting with City Staff (11/14/22) - The objective of this meeting was to introduce the newly hired design consultant that is addressing the City of Hollywood's concerns with the PD&E Preferred Alternative and to present the current refinements which have been developed to gather feedback from the City in order to continue moving toward gaining the City of Hollywood's support of the project.
- Town of Pembroke Park, Follow-up Meeting with the Town Manager (12/29/22) - The objective of the meeting was to show the Town Manager (JC Jimenez) the latest design refinements as the design team continued to progress towards the elimination of the ponds at the NE quadrant of the Hallandale Beach Boulevard and I-95 interchange.
- City of Hollywood, Follow-up Meeting with City Staff and Mayor Levy (1/23/23) - The objective of the meeting was to show Mayor Levy and the City Staff the latest design refinements to the PD&E Preferred Alternative to gain approval of the project from the City of Hollywood. This meeting was held at the request of Mayor Levy prior to the upcoming City Commission meeting where a vote was to be taken to rescind the prior resolution in opposition to the project and to grant the City's approval of the newly refined alternative which addressed many of the City's previous concerns.



- City of Hollywood, One-on-One Meeting with Commissioner Linda Hill Anderson (1/30/23) - The objective of the was to show Commissioner Anderson the latest design refinements to the PD&E Preferred Alternative to gain approval of the project from the City of Hollywood. This meeting was held at the request of the Commissioner prior to the upcoming City Commission meeting where a vote was to be taken to rescind the prior resolution in opposition to the project and to grant the City's approval of the newly refined alternative which addressed many of the City's previous concerns.
- City of Hollywood, Commission Meeting (2/1/23) - The objective was to present the newly refined project alternative which addressed many of the City of Hollywood's concerns summarized in the resolution opposing the PD&E Preferred Alternative. A vote was taken, and support of the refined alternative was given by the City of Hollywood.
- Town of Pembroke Park, Follow-up Meeting with the Town Manager (2/16/23) - The objective of the meeting was to update the Town Manager on the refinements to the PD&E Preferred Alternative and how the refinements to address the Town's concerns were progressing.
- City of Hallandale Beach, Follow-up Meeting with City Staff and City Manager (2/21/23) - The objective of the meeting was to update the City Staff and City Manager on the design refinements to the PD&E Preferred Alternative and to garner any feedback from them as to concerns with the latest refinements and project impacts to the City of Hallandale Beach.
- Miami-Dade / Broward Traffic Incident Management (4/5/24) - Presented the latest project refinements to garner any feedback from the Miami-Dade / Broward Traffic Incident Management Group.
- Town of Pembroke Park, Follow-up Meeting with Town Manager (6/6/23) - The objective of the meeting was to update the Town Manager on the refinements to the PD&E Preferred Alternative and to show that all right of way impacts of concern had been removed via design refinements.
- Project Update for Local Emergency Responders (6/13/23) - The objective of the meeting was to present the latest refined alternative and the changes from the PD&E Preferred Alternative that was previously presented to the police and fire departments of the City of Hallandale Beach, Town



of Pembroke Park and City of Hollywood. The presentation was also made to representatives from Florida Highway Patrol.

- City of Hallandale Beach, Follow-up Meeting with City Staff and City Manager (6/28/23) - The objective of the meeting was to update the City Staff and City Manager on the refinements made to the project alternative in order to address the right of way impact concerns brought forth on the 2/21/23 meeting and that they had all been addressed to best extent possible and to ask for the City's written support of the latest refined alternative. Letter of support for the project was received from the City of Hallandale Beach on 7/10/23.
- Town of Pembroke Park, Meeting with New Town Manager (9/21/23) - The objective of the meeting was to introduce the project team to the New Town Manager, Mr. Aleem Ghany, PE, and to show that all of the Town's concerns summarized in the resolution opposing the project had been addressed through design refinements. FDOT also requested that Mr. Ghany assist in getting the Town's support of the project in writing.
- Town of Pembroke Park, Commission Workshop (10/25/23) - The objective of the meeting was to present the newly refined concept and how it addressed all of the Town of Pembroke Park's previous concerns with the right of way impacts to the Town from the PD&E Preferred Alternative and to ensure that all Commissioners and the Mayor were satisfied prior to the upcoming Commission Meeting so that all could vote in favor of the newly refined alternative.
- Town of Pembroke Park Commission Meeting (12/13/23) - The objective was to present the newly refined project alternative which addressed many of the Town's concerns summarized in the resolution opposing the PD&E Preferred Alternative. A vote was taken, and support of the refined alternative was given by the Town of Pembroke Park.

A preferred alternative was selected in 2021 and presented at a Public Hearing in September 2021. Subsequent coordination with the local municipalities after the Public Hearing generated several requests to modify the preferred alternative in specific areas to meet their local needs. Therefore, FDOT addressed these requests and evaluated several modifications to the preferred alternative. Between 2023 and 2024, FDOT completed the evaluation and finalized the





refinements to the preferred alternative. The refinements were presented to the local municipalities, obtaining concurrence to complete the PD&E Study.

**2<sup>nd</sup> Public Hearing** – A second hybrid Public Hearing was held in April 2025 in Broward County. The purpose of this hearing was to present to the public the refined preferred alternative and seek public input. Numerous exhibits and project information were provided for review. A project newsletter with information on the PD&E Study to date was distributed to all the attendees.

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

- PD&E Study Process
- Project Study Area
- Needs of the Project
- No-Build Conditions
- PD&E Study Schedule
- Project Cost Estimate
- Environmental Features
- Preferred Alternative Roll Plot Design
- Preferred Alternative Operations and Benefits
- Noise Wall Recommendations

The virtual hearing was held on Thursday, April 3, 2025 on the GoToWebinar Platform. A total of four comments were received at this hearing. Approximately 56 people attended the meeting. A court reporter was present for the hearing.

The following are some of the comment topics provided at the virtual meeting:

- Light Pollution
- Consider a Second Level Corridor
- Traffic Bottleneck Issues at the Interchanges

The in-person hearing was held on Tuesday, April 8, 2025 at the Holiday Inn Fort Lauderdale-Airport Hotel, 2905 Sheridan Street, Hollywood, Florida 33020. A total of two comments were received at this hearing. Approximately 40 people attended the meeting. A court reporter was present for the hearing. The comment period was from April 8, 2025 to April 28, 2025.



The following are some of the comment topics provided at the in-person meeting:

- Right of Way Timeline and Process
- Construction Timeline and Funding
- Consider Real-Time Detection Equipment at the Railroad Crossings

All comments received during the Public Hearing have been recorded and documented as part of the PD&E Study process. All comments received during the 20-day period following the Public Hearing were included in the Public Transcript. Comments have been responded to via email and/or mail.

The Public Hearing transcripts are included in **Appendix H**.



## 6.0 DESIGN FEATURES OF THE PREFERRED ALTERNATIVE

### 6.1 ENGINEERING DETAILS OF THE PREFERRED ALTERNATIVE

#### 6.1.1 TYPICAL SECTIONS

The preferred alternative roadway typical section varies slightly. It consists primarily of four 11-foot wide express lanes (two in each direction), eight 11 to 12-foot wide general use lanes (four in each direction), a two to four-foot wide buffer area with pavement markings and express lane markers separating the general use lanes from the express lanes, eight to 12-foot wide inside shoulders, 12-foot wide outside shoulders, 12-foot wide auxiliary lanes at select locations, and a 2.5-foot wide center barrier wall.

Modifications along the mainline result from the FDOT District Six I-95 PD&E Study and FDOT District Four 95 Express 3C Construction project. The three I-95 roadway cross sections between interchanges are depicted in **Figure 6.1 – Figure 6.3**.

The PD&E Study proposes a combination of ramp modifications and collector distributor roads adjacent to the I-95 mainline lanes.

Between Ives Dairy Road and Hallandale Beach Boulevard, the PD&E Study proposes relocating the Pembroke Road southbound on-ramp to enter south of Hallandale Beach Boulevard. This roadway section includes a one-lane 15-foot wide ramp/bridge with 6-foot wide inside and outside shoulders parallel to I-95.

Between Hallandale Beach Boulevard and Pembroke Road, the PD&E Study proposes relocating the Pembroke Road southbound on-ramp to enter south of Hallandale Beach Boulevard. This roadway section includes a one-lane 15-foot wide ramp/bridge with 6-foot wide inside and outside shoulders parallel to I-95 and grade separated over the Hallandale Beach Boulevard southbound off-ramp.

In the northbound direction, the PD&E Study proposes relocating the Pembroke Road northbound off-ramp to enter south of Hallandale Beach Boulevard. The off-ramp crosses over the on-ramp from Hallandale Beach Boulevard and stays elevated until reaching Pembroke Road. The preferred alternative is proposing a



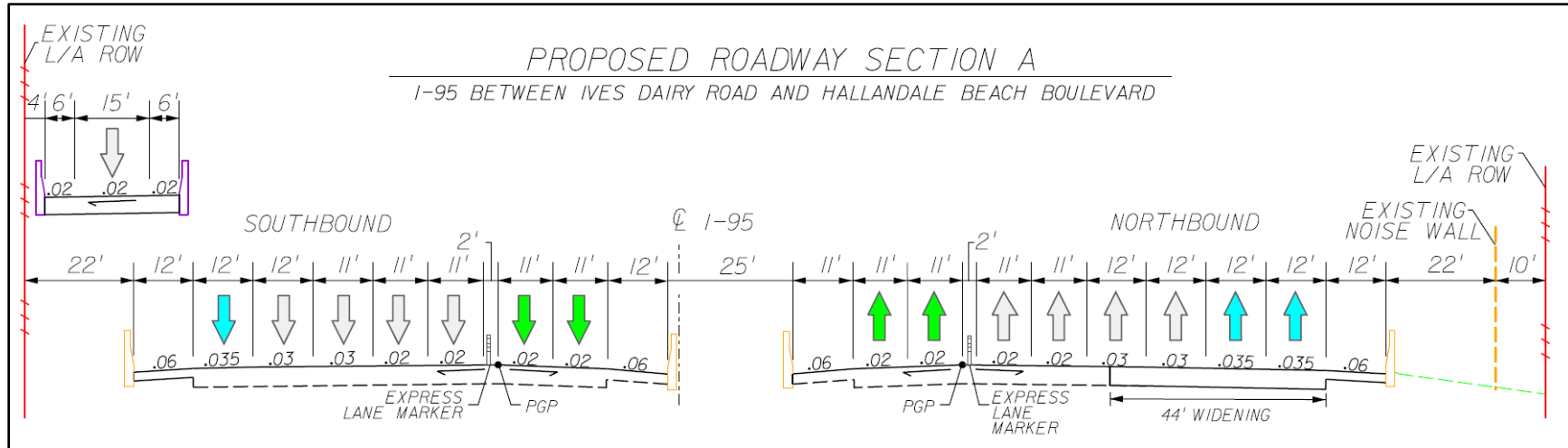
new local ramp connection between Hallandale Beach Boulevard and Pembroke Road. This connection will allow local traffic to travel northbound between the two crossing roadways without entering the I-95 mainline lanes. This roadway section includes a one-lane 15-foot wide ramp/bridge with 6-foot wide inside and outside shoulders parallel to I-95 and grade separated over the local connection. The local connection has a one-lane 15-foot wide roadway with inside and outside shoulders varying from 0 – 6 foot wide, parallel to I-95.

Between Pembroke Road and Hollywood Boulevard, the PD&E Study proposes a northbound collector distributor road. The existing off-ramp to Hollywood Boulevard is relocated from south of Hollywood Boulevard to just north of the I-95/Pembroke Road bridge overpass. The on-ramp from Pembroke Road merges with the off-ramp to Hollywood Boulevard, becoming a two-lane collector distributor road. This roadway section includes two 12-foot wide lanes with an eight-foot wide inside shoulder and 12-foot wide outside shoulder.

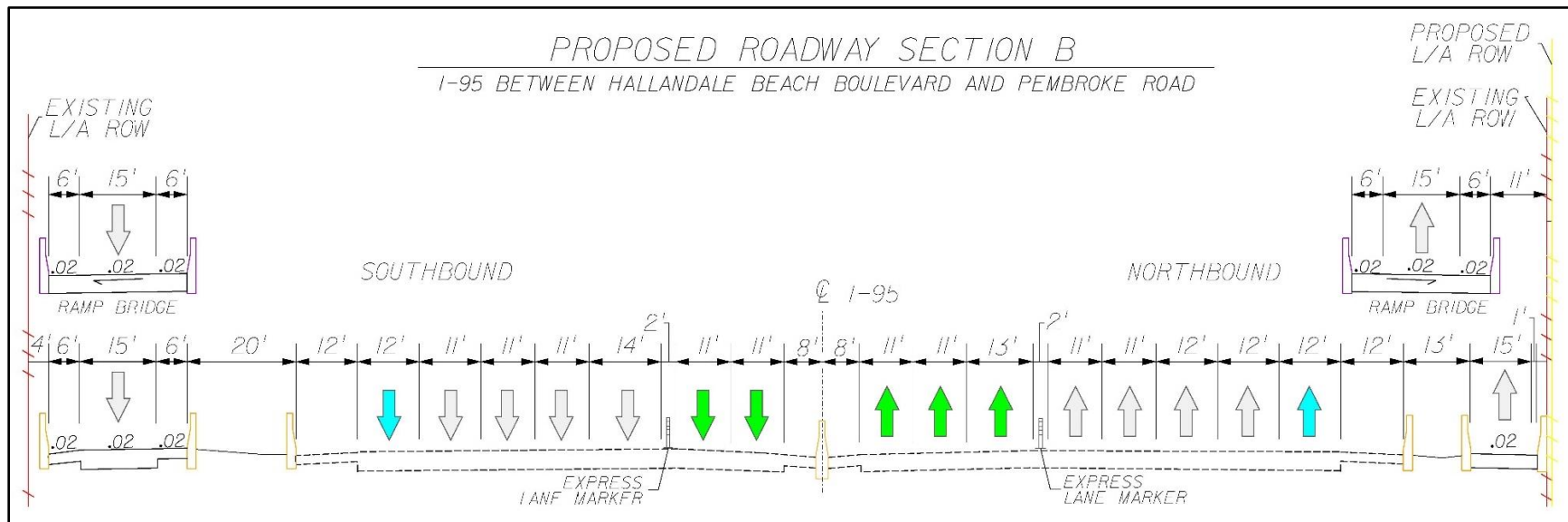
In the southbound direction, the preferred alternative also proposes a collector distributor road between north of Hollywood Boulevard and Pembroke Road. This roadway section includes a one-lane 15-foot wide ramp/bridge with 6-foot wide inside and outside shoulders parallel to I-95.

A typical section package was prepared as part of the Initial Design Engineering efforts at the end of the PD&E Study. **Appendix I** includes the typical section package.

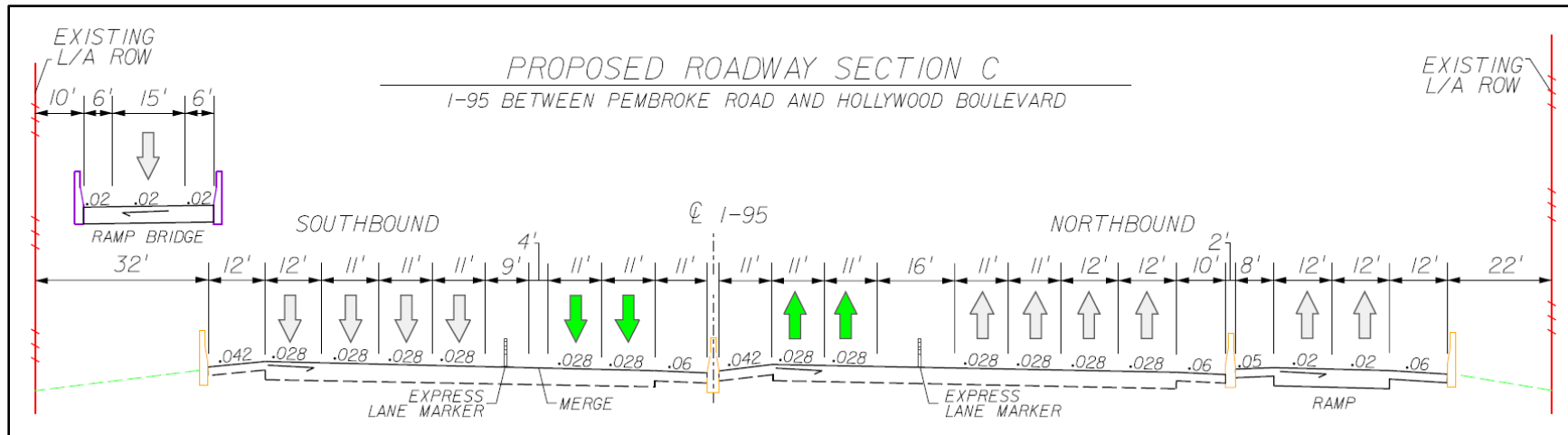




**Figure 6.1 – Preferred Alternative Roadway Section between Ives Dairy Road and Hallandale Beach Boulevard**



**Figure 6.2 – Preferred Alternative Roadway Section between Hallandale Beach Boulevard and Pembroke Road**



**Figure 6.3 – Preferred Alternative Roadway Section between Pembroke Road and Hollywood Boulevard**



### 6.1.2 BRIDGES AND STRUCTURES

The preferred alternative includes seven new bridges (two concrete, three steel, one with a combination of steel and concrete spans, and one pile-supported slab structure), two bridge widenings, and six existing bridges to remain as is (see **Figure 6.4**). The proposed information for each bridge structure along the corridor is summarized in **Table 6.1** and in the BAR. The BAR documents the details of each proposed bridge structure design and widening approach.

**Table 6.1** summarizes the proposed geometrics, alignment, minimum vertical clearance, widening, and type of structure.

The study considered two different superstructure alternatives. The superstructure types are prestressed concrete I-girders and composite steel plate girders. Prestressed I-girders are typically used in concrete widenings and second-level bridges. However, they are not considered for aesthetic consideration in structures with high visibility and/or third-level bridges. Other aesthetic considerations include cantilever piers (C piers) and straddle piers to accommodate the various roadway alignments while minimizing structural depth and optimizing the vertical clearance under the proposed flyover structures.

Different span arrangements were studied in order to maximize the efficiency of the proposed superstructure, enhance appearance, and satisfy geometric constraints. The proposed concrete spans are made of Florida I-Beams (FIB) 36, 54, 78, and 96. The widening over Johnson Street is proposed using modified AASHTO Type II beams. Steel plate girders are proposed where span lengths are beyond the limits allowed for concrete FIBs, areas of long spans with alignment curvature, and where integral straddle bents are required to accommodate the required profile grade.

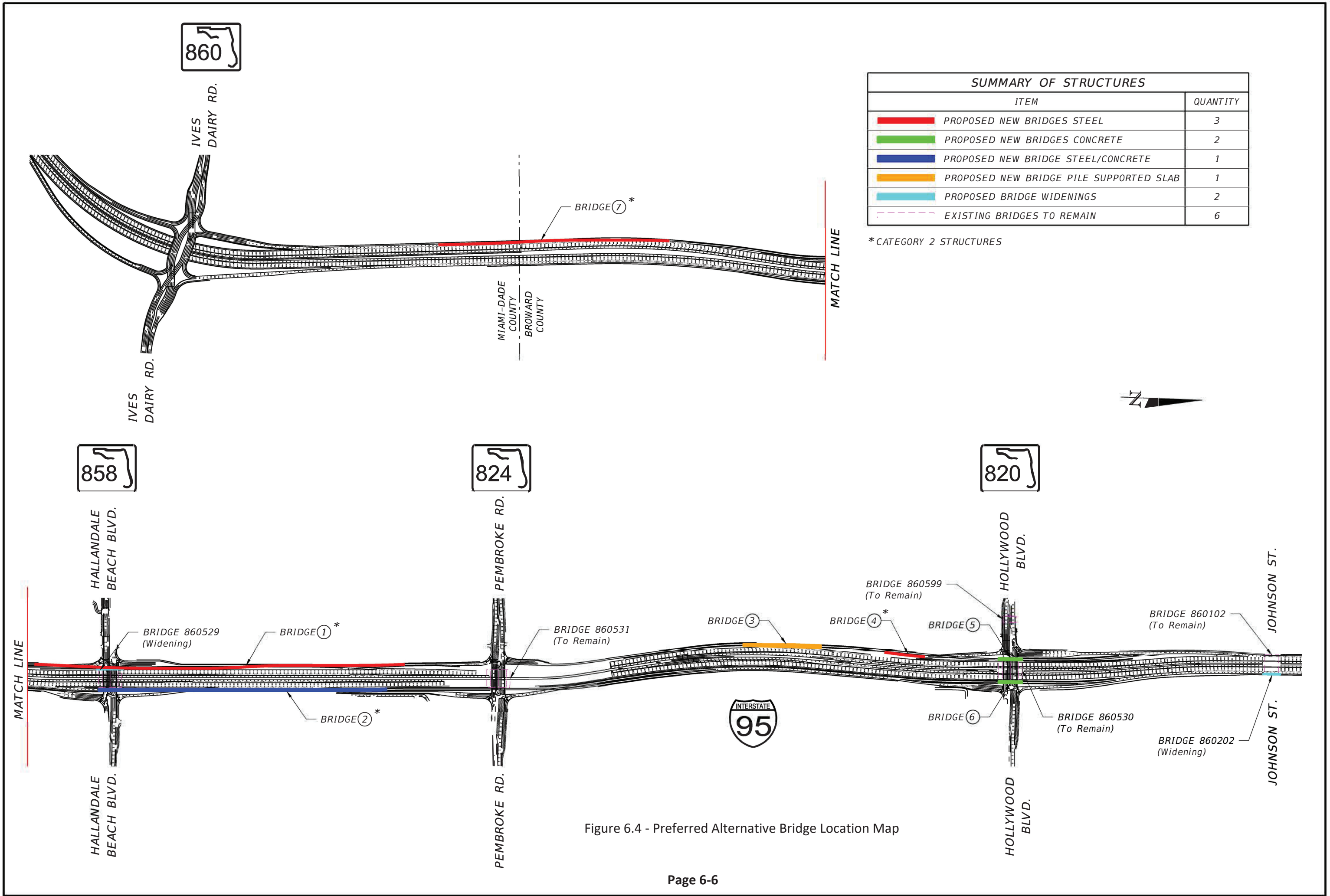


Figure 6.4 - Preferred Alternative Bridge Location Map





**Table 6.1 – Preferred Alternative Proposed Bridge Characteristics**

| Bridge Summary   |                                                                         |           |                       |                         |                        |            |                                                 |                 |                  |                                           |                                                |                 |
|------------------|-------------------------------------------------------------------------|-----------|-----------------------|-------------------------|------------------------|------------|-------------------------------------------------|-----------------|------------------|-------------------------------------------|------------------------------------------------|-----------------|
| Bridge ID Number | Bridge Location                                                         | Direction | Overall Bridge Length | Deck Width              | Min Vertical Clearance | Skew Angle | Intersecting Feature                            | Number of Spans | Max Span         | Superstructure Type                       | Substructure Type                              | Bridge Category |
| 1                | SB CD from Pembroke Road to I-95 over Hallandale Beach Blvd             | SB        | 3823 LF               | 29'-8"                  | 16.5 ft                | 0°         | Hallandale Beach Blvd and Existing Pump Station | 22              | 205 ft           | Steel Plate Girder                        | Hammerhead, C-Pier, Offset Hammerhead          | 2               |
| 2                | NB CD from NB I-95 to Pembroke Road over Hallandale Beach Blvd          | NB        | 2964 LF               | 29'-8"                  | 16.5 ft                | 0°         | Hallandale Beach Blvd                           | 18              | 317 ft           | Steel Plate Girder / Florida-I Beam (FIB) | Hammerhead, Integral Straddle                  | 2 / 1           |
| 3                | SB CD from Hollywood Blvd to Pembroke Road                              | SB        | 832 LF                | Varies 29'-8" to 38'-8" | 16.5 ft                | 0°         | Overhangs SB I-95                               | N/A             | 18 ft Cantilever | Pile Supported Slab                       | Slab with Integral Pile Bents                  | 1               |
| 4                | SB CD from I-95 SB to Pembroke Road over SB On-Ramp from Hollywood Blvd | SB        | 338 LF                | 29'-8"                  | 16.5 ft                | 0°         | SB On-Ramp from Hollywood Blvd                  | 2               | 183 ft           | Steel Plate Girder                        | Integral straddle                              | 2               |
| 5                | SB CD from I-95 SB to Pembroke Road over SB On-Ramp from Hollywood Blvd | SB        | 194 LF                | 29'-8"                  | 16.5 ft                | 0°         | Hollywood Blvd                                  | 1               | 194 ft           | Florida I-Beam (FIB)                      | N/A                                            | 1               |
| 6                | NB CD from Pembroke Road I-95 NB over Hollywood Blvd                    | NB        | 194 LF                | 29'-8"                  | 16.5 ft                | 0°         | Hollywood Blvd                                  | 1               | 194 ft           | Florida I-Beam (FIB)                      | N/A                                            | 1               |
| 7                | SB CD from Pembroke Road to I-95 over off ramp to Ives Dairy Road       | SB        | 241 LF                | 29'-8"                  | 16.5 ft                | 0°         | SB I-95 off-ramp to Ives Dairy Road             | 12              | 241 ft           | Steel                                     | Reinforced Concrete Column Piers and Abutments | 2               |
| 860102           | NB I-95 over Johnson Street                                             | SB        | 147 LF                | 18'-11.5"               | 16.5 ft                | 0°         | Hallandale Beach Blvd                           | 3               | 71 ft            | Florida I-Beam (FIB) Widening             | Hammerhead                                     | 1               |
| 860529           | NB I-95 over Hallandale Beach Blvd                                      | SB        | 244 LF                | 12'-3.25"               | 16.5 ft                | 0°         | Hallandale Beach Blvd                           | 4               | 84 ft            | Florida I-Beam (FIB) Widening             | Hammerhead                                     | 1               |



### 6.1.3 RIGHT OF WAY AND RELOCATIONS

A right of way cost was determined based on the proposed geometry of the preferred alternative. The estimated cost was generated based on the proposed conceptual design plans. The cost includes property, support, relocation of personal property/signs and administrative costs. The parcels impacted are commercial, residential, governmental, and vacant land. Approximately 13.17 acres of additional right of way will be necessary to accommodate the proposed improvements. The number of parcels impacted and estimated right of way cost is summarized in **Table 6.2**.

**Table 6.2 – Right of Way Impacts**

| Affected Properties                         |                     |
|---------------------------------------------|---------------------|
| Type of Parcel                              | Impact              |
| Commercial                                  | 18                  |
| Residential                                 | 10                  |
| Vacant                                      | 3                   |
| Governmental                                | 15                  |
| Total Impacts                               |                     |
| Total Parcel Impacts                        | 46                  |
| Total Area Impact (S.F.)                    | 574,073             |
| Total Area Impact (Acre)                    | 13.17               |
| Estimated Relocations and Right of Way Cost |                     |
| Residential Relocations                     | 3                   |
| Business Relocations                        | 4                   |
| Potential Business Relocations              | 3                   |
| Potential Personal Property Relocations     | 5                   |
| <b>Estimated Right of Way Cost</b>          | <b>\$33 Million</b> |



#### 6.1.4 HORIZONTAL AND VERTICAL GEOMETRY

The design of the preferred alternative strives to adhere to the design standards depicted in **Section 3.0**. The section below summarizes the proposed geometric changes for the proposed horizontal and vertical alignments within the study limits.

##### **Horizontal Alignment**

The preferred alternative proposes to maintain the I-95 and cross streets existing horizontal alignment designs except for the new interchange on- and off-ramps alignment construction areas at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. The preferred alternative is to consider widening I-95 to the outside between Ives Dairy Road and Hallandale Beach Boulevard to accommodate auxiliary lanes and two express lanes in both directions by the year 2045.

The preferred alternative proposes new construction of ramps and collector distributor roadways in both the northbound and southbound directions and the widening of ramp terminals in order to add additional lanes and/or storage areas to accommodate the projected traffic and queue.

The horizontal footprint of the corridor and interchanges will be wider with the proposed improvements. The extent of the ramp realignments is depicted in **Appendix J**, Preferred Alternative Concept Plans. **Table 6.3** summarizes the horizontal alignment geometric characteristics of the interchange ramps. Roll plot in **Appendix J2** depicts the locations of each alignment chain.

Table 6.3 – Preferred Alternative Horizontal Alignment Geometric Characteristics

| Location/Adjacent Cross Road               | Station                                         | Direction | Radius of Curve (ft.) | Length of Curve (ft.) | Degree of Curve D | Deflection Angle | Design Speed | Superelevation e | Superelevation per FDM e | Existing SSD | SSD per FDM | SSD per AASHTO | Meets FDOT Criteria Superelevation/SSD | Meets AASTHO Criteria SSD | Curve No.   |
|--------------------------------------------|-------------------------------------------------|-----------|-----------------------|-----------------------|-------------------|------------------|--------------|------------------|--------------------------|--------------|-------------|----------------|----------------------------------------|---------------------------|-------------|
| I-95 NB Off-Ramp to Pembroke Road          | PC 1211+86.32<br>PI 1215+81.25<br>PT 1219+74.87 | NB        | 5,583.79              | 788.54                | 1° 01' 34"        | 8° 05' 29" (LT)  | 45           | RC               | RC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBCDROAD12  |
| I-95 NB Off-Ramp to Pembroke Road          | PC 1251+25.58<br>PI 1253+37.41<br>PT 1255+48.38 | NB        | 2,726.33              | 422.80                | 2° 06' 05"        | 8° 53' 07" (RT)  | 45           | 0.036            | 0.036                    | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBCDROAD13  |
| I-95 NB Off-Ramp to Pembroke Road          | PC 1255+48.38<br>PI 1256+54.29<br>PT 1257+60.14 | NB        | 4,000.00              | 211.76                | 1° 25' 57"        | 3° 01' 60" (LT)  | 45           | 0.025            | 0.025                    | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBCDROAD14  |
| I-95 NB Off-Ramp to Pembroke Road          | PC 1257+60.14<br>PI 1258+61.87<br>PT 1259+63.46 | NB        | 2,214.16              | 203.32                | 2° 35' 16"        | 5° 15' 41" (LT)  | 45           | 0.043            | 0.043                    | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBCDROAD15  |
| I-95 NB Off-Ramp at Pembroke Road          | PC 306+94.09<br>PI 312+95.60<br>PT 318+94.06    | NB        | 6,878.00              | 1,199.96              | 0° 49' 59"        | 9° 59' 46" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBI95_CD211 |
| I-95 NB Off-Ramp at Pembroke Road          | PC 320+10.62<br>PI 324+33.10<br>PT 328+63.93    | NB        | 9,023.88              | 862.31                | 0° 38' 06"        | 5° 28' 30" (RT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBI95_CD212 |
| I-95 NB On-Ramp from Pembroke Road         | PC 400+33.52<br>PI 403+03.30<br>PT 405+72.40    | NB        | 4,384.00              | 538.88                | 1° 18' 25"        | 7° 02' 34" (LT)  | 30           | NC               | NC                       | >200         | 200         | 200            | ✓/✓                                    | ✓                         | NBPEM_HOLL1 |
| I-95 NB On-Ramp from Pembroke Road         | PC 414+62.97<br>PI 416+79.81<br>PT 418+96.56    | NB        | 8,884.79              | 433.59                | 0° 38' 42"        | 2° 47' 46" (RT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBPEM_HOLL2 |
| I-95 NB On-Ramp from Pembroke Road         | PC 422+34.65<br>PI 424+37.47<br>PT 426+39.91    | NB        | 3,864.00              | 405.26                | 1° 28' 58"        | 6° 00' 33" (RT)  | 45           | 0.026            | 0.026                    | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBPEM_HOLL3 |
| I-95 NB On-Ramp from Pembroke Road         | PC 426+39.91<br>PI 429+56.10<br>PT 432+71.83    | NB        | 6,735.49              | 631.92                | 0° 51' 02"        | 5° 22' 32" (RT)  | 45           | RC               | RC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBPEM_HOLL4 |
| I-95 NB Off-Ramp to Hollywood Boulevard    | PC 442+58.03<br>PI 445+17.89<br>PT 445+17.89    | NB        | 5,675.00              | 519.37                | 1° 00' 35"        | 5° 14' 37" (LT)  | 45           | RC               | RC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBPEM_HOLL5 |
| I-95 NB CD System Over Hollywood Boulevard | PC 642+70.85<br>PI 645+69.83<br>PT 648+68.53    | NB        | 7,784.83              | 597.68                | 0° 44' 10"        | 4° 23' 56" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBCDROAD211 |

✓ = Meets required criteria   ✗ = Does not meet criteria





Table 6.3 – Preferred Alternative Horizontal Alignment Geometric Characteristics (Continued)

| Location/Adjacent Cross Road               | Station                                      | Direction | Radius of Curve (ft.) | Length of Curve (ft.) | Degree of Curve D | Deflection Angle | Design Speed | Superelevation e | Superelevation per FDM e | Existing SSD | SSD per FDM | SSD per AASHTO | Meets FDOT Criteria Superelevation/SSD | Meets AASTHO Criteria SSD | Curve No.    |
|--------------------------------------------|----------------------------------------------|-----------|-----------------------|-----------------------|-------------------|------------------|--------------|------------------|--------------------------|--------------|-------------|----------------|----------------------------------------|---------------------------|--------------|
| I-95 NB CD System Over Hollywood Boulevard | PC 659+22.16<br>PI 662+52.61<br>PT 665+81.70 | NB        | 4,215.00              | 659.54                | 1° 21' 34"        | 8° 57' 55" (LT)  | 45           | 0.024            | 0.026                    | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBCDROAD212  |
| I-95 NB On-Ramp from Hollywood Boulevard   | PC 105+59.45<br>PI 108+11.18<br>PT 110+62.26 | NB        | 4,030.00              | 502.8                 | 1° 25' 18"        | 7° 08' 55" (LT)  | 45           | 0.025            | 0.026                    | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBHOLL_I951  |
| I-95 NB On-Ramp from Hollywood Boulevard   | PC 112+35.79<br>PI 115+20.62<br>PT 118+04.97 | NB        | 5,686.00              | 569.19                | 1° 00' 28"        | 5° 44' 08" (RT)  | 45           | RC               | RC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | NBHOLL_I952  |
| I-95 SB Off-Ramp to Ives Dairy Road        | PC 131+84.97<br>PI 134+16.76<br>PT 136+48.32 | SB        | 6,000.00              | 463.35                | 0° 57' 18"        | 4° 25' 29" (RT)  | 45           | RC               | RC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_I953     |
| I-95 SB Off-Ramp to Ives Dairy Road        | PC 136+48.32<br>PI 138+53.02<br>PT 140+57.48 | SB        | 4,800.00              | 409.16                | 1° 11' 37"        | 4° 53' 03" (RT)  | 45           | 0.021            | 0.021                    | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_I954     |
| I-95 SB On-Ramp from Pembroke Road         | PC 209+69.61<br>PI 213+43.46<br>PT 217+17.05 | SB        | 11,500.00             | 747.44                | 0° 29' 54"        | 3° 43' 26" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_CDROAD21 |
| I-95 SB On-Ramp from Pembroke Road         | PC 219+41.65<br>PI 221+53.06<br>PT 223+64.46 | SB        | 18,000.00             | 422.81                | 0° 19' 06"        | 1° 20' 45" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_CDROAD22 |
| I-95 SB On-Ramp from Pembroke Road         | PC 226+87.58<br>PI 228+87.71<br>PT 230+87.76 | SB        | 8,100.00              | 400.18                | 0° 42' 26"        | 2° 49' 51" (RT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_CDROAD23 |
| I-95 SB On-Ramp from Pembroke Road         | PC 236+62.57<br>PI 243+16.03<br>PT 249+66.86 | SB        | 8,415.00              | 1,304.29              | 0° 40' 51"        | 8° 52' 50" (RT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_CDROAD24 |
| I-95 SB On-Ramp from Pembroke Road         | PC 249+66.86<br>PI 254+19.81<br>PT 258+71.90 | SB        | 8,485.00              | 905.03                | 0° 40' 31"        | 6° 06' 41" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_CDROAD25 |
| I-95 SB On-Ramp from Pembroke Road         | PC 262+95.89<br>PI 266+81.99<br>PT 270+67.95 | SB        | 15,985.00             | 772.06                | 0° 21' 30"        | 2° 46' 02" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_CDROAD26 |
| I-95 SB On-Ramp from Pembroke Road         | PC 274+80.92<br>PI 277+32.38<br>PT 279+83.68 | SB        | 8,000.00              | 502.76                | 0° 42' 58"        | 3° 36' 03" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_CDROAD27 |

✓ = Meets required criteria   ✗ = Does not meet criteria

Table 6.3 – Preferred Alternative Horizontal Alignment Geometric Characteristics (Continued)

| Location/Adjacent Cross Road                    | Station                                         | Direction | Radius of Curve (ft.) | Length of Curve (ft.) | Degree of Curve D | Deflection Angle | Design Speed | Superelevation e | Superelevation per FDM e | Existing SSD | SSD per FDM | SSD per AASHTO | Meets FDOT Criteria Superelevation/SSD | Meets AASTHO Criteria SSD | Curve No.     |
|-------------------------------------------------|-------------------------------------------------|-----------|-----------------------|-----------------------|-------------------|------------------|--------------|------------------|--------------------------|--------------|-------------|----------------|----------------------------------------|---------------------------|---------------|
| I-95 SB On-Ramp from Pembroke Road              | PC 279+83.68<br>PI 282+35.00<br>PT 284+86.16    | SB        | 8,000.00              | 502.48                | 0° 42' 58"        | 3° 35' 55" (RT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_CDROAD28  |
| I-95 SB On-Ramp from Pembroke Road              | PC 291+44.83<br>PI 293+72.53<br>PT 296+00.17    | SB        | 12,000.00             | 455.34                | 0° 28' 39"        | 2° 10' 27" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_CDROAD29  |
| I-95 SB On-Ramp from Pembroke Road              | PC 296+00.17<br>PI 299+37.56<br>PT 302+74.88    | SB        | 19,650.00             | 674.71                | 0° 17' 30"        | 1° 58' 02" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | IDR_CDROAD210 |
| I-95 SB On-Ramp from Hallandale Beach Boulevard | PC 3200+00.00<br>PI 3203+44.36<br>PT 3206+87.63 | SB        | 5,000.00              | 687.63                | 1° 08' 45"        | 7° 52' 47" (LT)  | 45           | 0.021            | 0.021                    | >360         | 360         | 360            | ✓/✓                                    | ✓                         | SBHALL_I9511  |
| I-95 SB On-Ramp from Hallandale Beach Boulevard | PC 3207+90.13<br>PI 3209+93.98<br>PT 3211+97.81 | SB        | 17,200.00             | 407.67                | 0° 19' 59"        | 1° 21' 29" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | SBHALL_I9521  |
| I-95 SB CD System to Pembroke Road              | PC 5206+29.07<br>PI 5208+73.78<br>PT 5211+17.79 | SB        | 3,730.08              | 488.71                | 1° 32' 10"        | 7° 30' 25" (LT)  | 45           | 0.027            | 0.027                    | >360         | 360         | 360            | ✓/✓                                    | ✓                         | SBCDROAD21    |
| I-95 SB CD System to Pembroke Road              | PC 5214+90.91<br>PI 5219+14.09<br>PT 5223+36.73 | SB        | 9,685.00              | 845.82                | 0° 35' 30"        | 5° 00' 14" (RT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | SBCDROAD22    |
| I-95 SB CD System to Pembroke Road              | PC 5223+36.73<br>PI 5225+35.07<br>PT 5227+33.09 | SB        | 4,000.00              | 396.36                | 1° 25' 57"        | 5° 40' 39" (RT)  | 45           | 0.025            | 0.025                    | >360         | 360         | 360            | ✓/✓                                    | ✓                         | SBCDROAD23    |
| I-95 SB CD System to Pembroke Road              | PC 5233+37.53<br>PI 5237+33.53<br>PT 5241+28.68 | SB        | 7,000.00              | 791.15                | 0° 49' 07"        | 6° 28' 32" (RT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | SBCDROAD24    |
| I-95 SB CD System to Pembroke Road              | PC 5241+28.68<br>PI 5245+21.96<br>PT 5249+14.13 | SB        | 6,000.00              | 785.45                | 0° 57' 18"        | 7° 30' 02" (LT)  | 45           | RC               | RC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | SBCDROAD25    |
| I-95 SB CD System to Pembroke Road              | PC 5258+10.88<br>PI 5262+72.65<br>PT 5267+33.96 | SB        | 12,077.82             | 923.08                | 0° 28' 28"        | 4° 22' 44" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | ✓/✓                                    | ✓                         | SBCDROAD26    |
| I-95 SB CD System to Pembroke Road              | PC 5270+41.91<br>PI 5272+30.84<br>PT 5274+19.60 | SB        | 5,000.00              | 377.70                | 1° 08' 45"        | 4° 19' 41" (RT)  | 45           | 0.021            | 0.021                    | >360         | 360         | 360            | ✓/✓                                    | ✓                         | SBCDROAD27    |

✓ = Meets required criteria    ✗ = Does not meet criteria



Table 6.3 – Preferred Alternative Horizontal Alignment Geometric Characteristics (Continued)

| Location/Adjacent Cross Road             | Station                                         | Direction | Radius of Curve (ft.) | Length of Curve (ft.) | Degree of Curve D | Deflection Angle | Design Speed | Superelevation e | Superelevation per FDM e | Existing SSD | SSD per FDM | SSD per AASHTO | Meets FDOT Criteria Superelevation/SSD | Meets AASTHO Criteria SSD | Curve No.   |
|------------------------------------------|-------------------------------------------------|-----------|-----------------------|-----------------------|-------------------|------------------|--------------|------------------|--------------------------|--------------|-------------|----------------|----------------------------------------|---------------------------|-------------|
| I-95 SB CD System to Pembroke Road       | PC 5274+19.60<br>PI 5276+11.75<br>PT 5278+03.70 | SB        | 5,000.00              | 384.10                | 1° 08' 45"        | 4° 24' 05" (RT)  | 45           | 0.021            | 0.021                    | >360         | 360         | 360            | √/√                                    | √                         | SBCDROAD28  |
| I-95 SB On-Ramp to Pembroke Road         | PC 7203+53.66<br>PI 7205+55.30<br>PT 7207+56.92 | SB        | 15,000.00             | 403.26                | 0° 22' 55"        | 1° 32' 25" (LT)  | 45           | NC               | NC                       | >360         | 360         | 360            | √/√                                    | √                         | SBPEM_CD21  |
| I-95 SB On-Ramp to Pembroke Road         | PC 7208+89.42<br>PI 7210+99.19<br>PT 7213+08.79 | SB        | 5,800.00              | 419.37                | 0° 59' 16"        | 4° 08' 34" (RT)  | 45           | RC               | RC                       | >360         | 360         | 360            | √/√                                    | √                         | SBPEM_CD22  |
| I-95 SB On-Ramp from Hollywood Boulevard | PC 6203+03.75<br>PI 6205+14.00<br>PT 6207+23.27 | SB        | 2,500.00              | 419.52                | 2° 17' 31"        | 9° 36' 53" (LT)  | 45           | 0.038            | 0.038                    | >360         | 360         | 360            | √/√                                    | √                         | SBPEM_I951  |
| I-95 SB Off-Ramp to Hollywood Boulevard  | PC 8219+81.67<br>PI 8221+93.80<br>PT 8224+05.67 | SB        | 5,024.00              | 424.00                | 1° 08' 26"        | 4° 50' 08" (RT)  | 45           | 0.021            | 0.022                    | >360         | 360         | 360            | √/√                                    | √                         | SBI95_HOLL1 |

✓ = Meets required criteria   ✕ = Does not meet criteria



## **Vertical Alignment**

The preferred alternative proposes to maintain the I-95 and cross streets existing vertical alignment designs except for the new interchange on- and off-ramps alignment construction areas at Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. The preferred alternative considers new grade separations at each interchange to accommodate several on- and off-ramps.

1. Northbound off-ramp to Pembroke Road over Hallandale Beach Boulevard, Hallandale Beach Boulevard northbound on-ramp, and local connection between Hallandale Beach Boulevard and Pembroke Road.
2. Northbound collector distributor roadway over Hollywood Boulevard.
3. Southbound ramp to Pembroke Road over Hollywood Boulevard, Hollywood Boulevard southbound on-ramp, and I-95 southbound outside shoulder.
4. Southbound on-ramp from Pembroke Road over the existing pump station, Hallandale Beach Boulevard southbound off-ramp, Hallandale Beach Boulevard, Hallandale Beach Boulevard on-ramp, I-95 southbound outside shoulder, and Ives Dairy Road off-ramp.

**Appendices J** and **K**, Preferred Alternative Plan and Profiles, depict the design of the new grade separations. **Table 6.4** summarizes the vertical curve parameters and characteristics of the interchange ramps.



Table 6.4 – Preferred Alternative Vertical Alignment Geometric Characteristics

| Facility/Location                          | Type of Curve | VPI Station | VPI Elevation (ft) | PGL High/Low (ft) | Grade (Back) % | Grade (Ahead) % | Length of Curve (ft) | K-Value | Design Speed (MPH) | K-Value Required for FDOT | K-Value Required for AASHTO | Min. Length FDOT | Meets FDOT Criteria K-Value/Length | Meets AASHTO Criteria K-Value |
|--------------------------------------------|---------------|-------------|--------------------|-------------------|----------------|-----------------|----------------------|---------|--------------------|---------------------------|-----------------------------|------------------|------------------------------------|-------------------------------|
| I-95 NB Off-Ramp to Pembroke Road          | Sag           | 1224+25.12  | 36.20              | 35.20             | 0.80           | 2.50            | 250                  | 147     | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 NB Off-Ramp to Pembroke Road          | Crest         | 1230+41.20  | 51.60              | 46.98             | 2.50           | -2.00           | 833                  | 185     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 NB Off-Ramp to Pembroke Road          | Sag           | 1237+85.65  | 36.71              | 37.30             | -2.00          | 0.40            | 353                  | 147     | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 NB Off-Ramp to Pembroke Road          | Crest         | 1243+61.28  | 39.02              | 37.57             | 0.40           | -3.90           | 796                  | 185     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 NB Off-Ramp to Pembroke Road          | Sag           | 1251+71.36  | 7.42               | 7.77              | -3.90          | 0.18            | 404                  | 99      | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 NB Off-Ramp at Pembroke Road          | Sag           | 320+45.64   | 8.00               | 8.48              | -2.75          | 0.30            | 355                  | 116     | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 NB Off-Ramp to Hollywood Boulevard    | Crest         | 451+58.35   | 7.05               | 7.27              | -0.29          | -0.91           | 150                  | 240     | 30                 | 31                        | 19                          | 90               | ✓/✓                                | ✓                             |
| I-95 NB Off-Ramp to Hollywood Boulevard    | Sag           | 453+02.43   | 5.74               | 6.04              | -0.91          | 1.70            | 100                  | 38      | 30                 | 37                        | 37                          | 90               | ✓/✓                                | ✓                             |
| I-95 NB CD System Over Hollywood Boulevard | Sag           | 645+48.92   | 8.33               | 8.56              | -0.13          | 3.50            | 360                  | 99      | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 NB CD System Over Hollywood Boulevard | Crest         | 654+93.99   | 41.41              | 34.27             | 3.50           | -3.00           | 884                  | 136     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 NB CD System Over Hollywood Boulevard | Sag           | 665+00.00   | 11.23              | 10.15             | -3.00          | -0.86           | 250                  | 117     | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB Off-Ramp to Ives Dairy Road        | Sag           | 110+82.34   | 3.98               | 5.71              | -4.75          | 0.81            | 500                  | 90      | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB Off-Ramp to Ives Dairy Road        | Crest         | 115+36.33   | 7.67               | 7.39              | 0.81           | -0.30           | 250                  | 225     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB Off-Ramp to Ives Dairy Road        | Sag           | 120+36.33   | 6.17               | 6.47              | -0.30          | 0.21            | 500                  | 982     | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp from Pembroke Road         | Sag           | 515+65.79   | 7.00               | 7.23              | -0.16          | 3.50            | 292                  | 80      | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp from Pembroke Road         | Sag           | 211+41.59   | 8.96               | 9.17              | -0.09          | 3.90            | 459                  | 115     | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp from Pembroke Road         | Crest         | 220+31.87   | 43.68              | 46.18             | 3.90           | 0.90            | 555                  | 185     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp from Pembroke Road         | Crest         | 228+33.42   | 50.90              | 49.95             | 0.90           | -0.70           | 480                  | 300     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |

✓ = Meets required criteria   ✗ = Does not meet criteria

Table 6.4 – Preferred Alternative Vertical Alignment Geometric Characteristics (Continued)

| Facility/Location                        | Type of Curve | VPI Station | VPI Elevation (ft) | PGL High/Low (ft) | Grade (Back) % | Grade (Ahead) % | Length of Curve (ft) | K-Value | Design Speed (MPH) | K-Value Required for FDOT | K-Value Required for AASHTO | Min. Length FDOT | Meets FDOT Criteria K-Value/Length | Meets AASHTO Criteria K-Value |
|------------------------------------------|---------------|-------------|--------------------|-------------------|----------------|-----------------|----------------------|---------|--------------------|---------------------------|-----------------------------|------------------|------------------------------------|-------------------------------|
| I-95 SB On-Ramp from Pembroke Road       | Crest         | 235+08.32   | 46.17              | 48.38             | -0.70          | -2.80           | 630                  | 300     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp from Pembroke Road       | Sag           | 247+49.82   | 11.41              | 15.15             | -2.80          | 3.00            | 516                  | 89      | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp from Pembroke Road       | Crest         | 267+34.96   | 70.96              | 69.52             | 3.00           | -0.80           | 456                  | 120     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp from Pembroke Road       | Crest         | 293+31.12   | 50.19              | 52.21             | -0.80          | -5.00           | 504                  | 120     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp from Pembroke Road       | Sag           | 301+88.33   | 7.33               | 8.09              | -5.00          | 0.31            | 520                  | 98      | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB CD System to Pembroke Road       | Crest         | 5208+15.00  | 8.41               | 8.37              | 0.06           | -0.55           | 150                  | 244     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB CD System to Pembroke Road       | Sag           | 5211+12.55  | 6.77               | 7.63              | -0.55          | 1.94            | 400                  | 161     | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB CD System to Pembroke Road       | Crest         | 5230+83.05  | 44.91              | 42.18             | 1.94           | -2.04           | 550                  | 138     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB CD System to Pembroke Road       | Sag           | 5235+99.09  | 34.39              | 35.06             | -2.04          | 0.54            | 316                  | 123     | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB CD System to Pembroke Road       | Crest         | 5244+65.76  | 39.04              | 38.70             | 0.54           | -0.30           | 350                  | 418     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB CD System to Pembroke Road       | Crest         | 5256+78.29  | 35.40              | 36.24             | -0.30          | -2.84           | 560                  | 220     | 45                 | 98                        | 61                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB CD System to Pembroke Road       | Sag           | 5267+58.86  | 4.71               | 8.98              | -2.84          | 2.20            | 690                  | 137     | 45                 | 79                        | 79                          | 135              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp to Pembroke Road         | Crest         | 7208+96.65  | 35.69              | 35.69             | 0.00           | -4.00           | 298                  | 75      | 40                 | 70                        | 44                          | 120              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp to Pembroke Road         | Sag           | 7215+32.73  | 10.24              | 9.09              | -4.00          | -0.92           | 250                  | 81      | 40                 | 64                        | 64                          | 120              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp to Pembroke Road         | Sag           | 7219+35.47  | 6.54               | 6.78              | -0.92          | 0.49            | 150                  | 106     | 40                 | 64                        | 64                          | 120              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp from Hollywood Boulevard | Sag           | 6206+35.93  | 8.52               | 8.09              | 0.58           | 2.32            | 150                  | 86      | 40                 | 64                        | 64                          | 120              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp from Hollywood Boulevard | Crest         | 6208+84.24  | 14.29              | 12.69             | 2.32           | -1.87           | 309                  | 74      | 40                 | 70                        | 44                          | 120              | ✓/✓                                | ✓                             |
| I-95 SB On-Ramp from Hollywood Boulevard | Sag           | 6211+16.07  | 9.96               | 11.36             | -1.87          | -0.71           | 150                  | 129     | 40                 | 64                        | 64                          | 120              | ✓/✓                                | ✓                             |

✓ = Meets required criteria   ✗ = Does not meet criteria



### 6.1.5 BICYCLE AND PEDESTRIAN ACCOMMODATIONS

I-95 is a limited access facility. There will continue to be no designated pedestrian or bicycle accommodations along this corridor, as pedestrians and bicycles are not permitted on limited access corridors. Below are the pedestrian and bicycle improvements proposed within the crossing roadway interchange limits:

Hallandale Beach Boulevard west of I-95:

1. The bicycle lane was improved to seven feet wide.
2. The sidewalk width was improved to six feet wide.

Hallandale Beach Boulevard within the interchange area:

1. The bicycle lane was improved to seven feet wide.
2. The sidewalk width was improved to six feet wide.

Hallandale Beach Boulevard east of I-95 (Westbound direction only):

1. The bicycle lane was improved to seven feet wide.
2. The sidewalk width was improved to six feet wide.

Pembroke Road west of I-95:

1. The bicycle lane was improved to seven feet wide.
2. The sidewalk width was improved to six feet wide.

Pembroke Road within the interchange area:

1. The bicycle lane was improved to seven feet wide.
2. The sidewalk width was improved to six feet wide, except under the I-95 bridge.

Pembroke Road east of I-95:

1. The bicycle lane was improved to seven feet wide, within certain segments.
2. The sidewalk width was improved to six feet wide, westbound only.

Hollywood Boulevard within the interchange area:

1. The bicycle lane was improved to seven feet wide.
2. The sidewalk width was improved to six feet wide.



#### 6.1.6 MULTI-MODAL ACCOMMODATIONS

The additional capacity provides the ability to enhance/improve bus service, which offers an alternative to auto travel and addresses the needs of low-income users and disadvantaged groups. The preferred alternative improvements focused on the interchange influence areas with minor arterial improvements. Therefore, no other multi-modal accommodations are being proposed as part of the preferred alternative.

The adjacent railroad corridor is owned by FDOT. Coordination was conducted with the FDOT Intermodal Office. No impacts are anticipated to the railroad crossings.

#### 6.1.7 ACCESS MANAGEMENT

**I-95 Mainline** – The FDOT Access Management Classification System determines the access class and type of each roadway based on the segment location, spacing between cross streets, posted speed, median type and/or median opening spacing. The access management classification for I-95 is Class 1.2, Freeway in an existing urbanized area with limited access. Based on the access and type, the minimum interchange spacing allowed is two miles in accordance with the *FDM, Part 2, Chapter 201, Table 201.4.1*. The interchange spacing along the corridor does not comply with the FDOT Access Management Guideline Rule 14.97 (see **Table 6.5**).

**Table 6.5 – I-95 Access Management/Interchange Spacing**

| Cross Street                                | Spacing to Next Interchange (Miles) | Complies with Interchange Spacing? |
|---------------------------------------------|-------------------------------------|------------------------------------|
| <b>Preferred Alternative</b>                |                                     |                                    |
| Hallandale Beach Boulevard to Pembroke Road | 0.77                                | No                                 |
| Pembroke Road to Hollywood Boulevard        | 1.02                                | No                                 |

The preferred alternative proposes ramp modifications to eliminate substandard mainline weaving sections and maximize the spacing between ramps. The primary purpose of the ramp modifications is to move vehicle lane changing





away from the high-speed traffic. In the northbound direction, relocating the existing off-ramp to Pembroke Road south of Hallandale Beach Boulevard, building a new local ramp connection between Hallandale Beach Boulevard and Pembroke Road, and combining the Pembroke Road and Hollywood Boulevard on-ramps increases the spacing between ramps improving the operations of the I-95 mainline corridor.

The same occurs in the southbound direction. Combining the off-ramps to Hollywood Boulevard and Pembroke Road and moving the Pembroke Road on-ramp south of Hallandale Beach Boulevard increases the spacing between ramps, improving the operations of the I-95 mainline corridor. The interchange spacing is still less than 2 miles. However, the preferred alternative improves and maximizes the ramp spacing.

**Arterials** – The preferred alternative maintains the existing access management along the crossing arterials. The improvements proposed are additional lanes, exclusive turn lanes, and/or turn-lane modifications at select locations. Therefore, access management will not be impacted and will remain the same.

#### 6.1.7.1 EXPRESS LANES

The preferred alternative proposes to maintain the existing express lanes system configuration and proposed designs of the projects to the north and south of this PD&E Study.

Two express lane access points exist within the PD&E Study limits:

1. Within the Hallandale Beach Boulevard Interchange – Northbound Ingress and Southbound Egress
2. Within the Hollywood Boulevard Interchange – Northbound Egress and Southbound Ingress

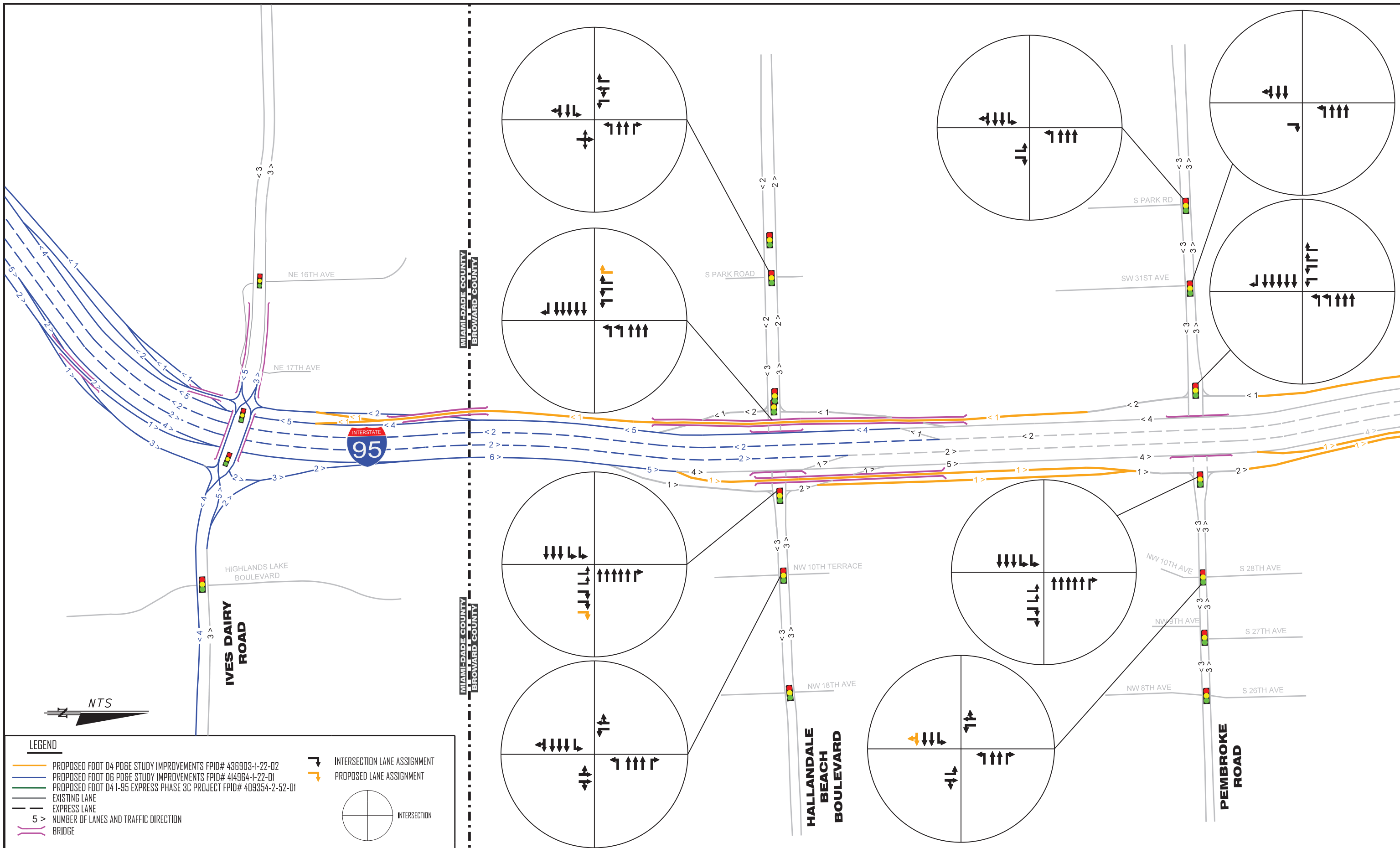


### 6.1.8 INTERSECTION AND INTERCHANGE CONCEPTS

The preferred alternative is proposing interchange, ramp and intersection improvements to support the optimal operations of the corridor. The express lane access points at Hollywood Boulevard are currently under construction by the 95 Express Phase 3C project. **Figure 6.5** depicts all the improvements proposed by the preferred alternative. **Appendix J** shows the Preferred Alternative Concept Plans.

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

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



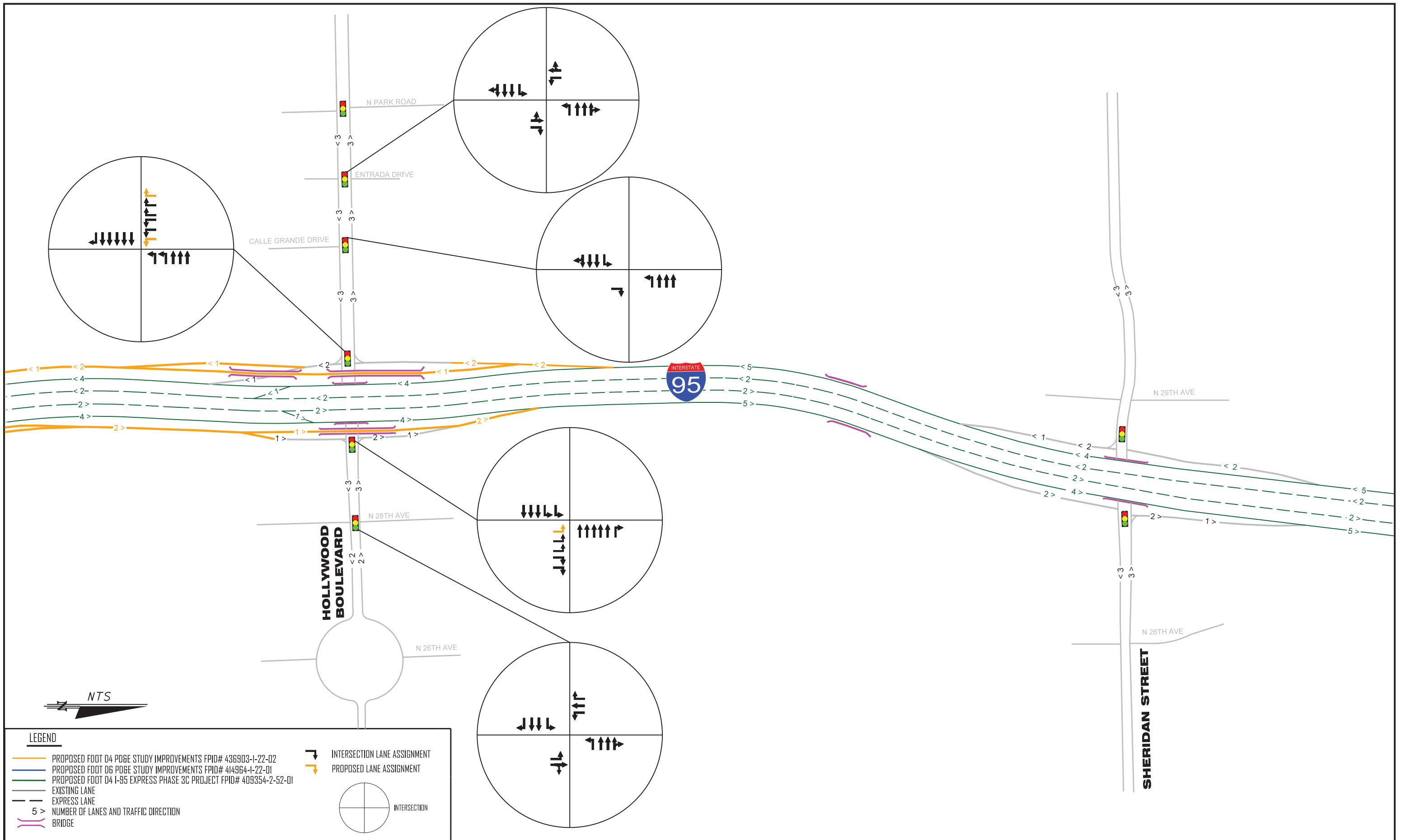
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FORT LAUDERDALE, FL 33309



**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: I4254

**SR 9 (INTERSTATE 95)**  
**LANE GEOMETRY AND CONFIGURATIONS**  
**PREFERRED ALTERNATIVE**

**FIGURE**  
**6-5**  
**6-20**



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**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-1-22-02  
ETDM No.: 14254

**SR 9 (INTERSTATE 95)**  
**LANE GEOMETRY AND CONFIGURATIONS**  
**PREFERRED ALTERNATIVE**

**FIGURE**  
**6-5**  
**6-21**





The preferred alternative is proposing interchange, ramp, and intersection improvements to support the optimal operations of the corridor. The PD&E Study is proposing the following improvements:

#### Hallandale Beach Boulevard

- Northbound off-ramp terminal intersection widening to triple right turn lanes and additional storage
- Southbound off-ramp terminal intersection widening to dual right-turn lanes and additional storage
- Westbound to northbound right-turn lane extension
- Eastbound to southbound right-turn lane extension

#### Pembroke Road

- Westbound to northbound right-turn lane extension
- Eastbound to southbound right-turn lane extension and additional storage
- Northbound off-ramp terminal intersection additional storage
- Southbound off-ramp terminal intersection additional storage
- Additional eastbound through right-turn shared at NW 10<sup>th</sup> Avenue

#### Hollywood Boulevard

- Northbound off-ramp terminal intersection widening to triple left-turn lanes and additional storage
- Southbound off-ramp terminal intersection widening to triple left-turn lanes, triple right-turn lanes, and additional storage

A Conceptual Signing Master Plan (CSMP) was developed to confirm that the proposed improvements signage approach is according to the current design guidelines. The plan depicts all the guide signs needed within the study limits for the preferred alternative design configuration. The CSMP is documented in the *Systems Interchange Modification Report*, a companion document to the PD&E Study.



### 6.1.9 TRAFFIC VOLUMES AND OPERATIONAL CONDITIONS

This section summarizes the operational analysis of the preferred alternative.

#### **HCM Operational Analysis Results**

**2030 Preferred Alternative** – The capacity analysis shows that all locations will operate at LOS D or better by the year 2030 within the area of influence.

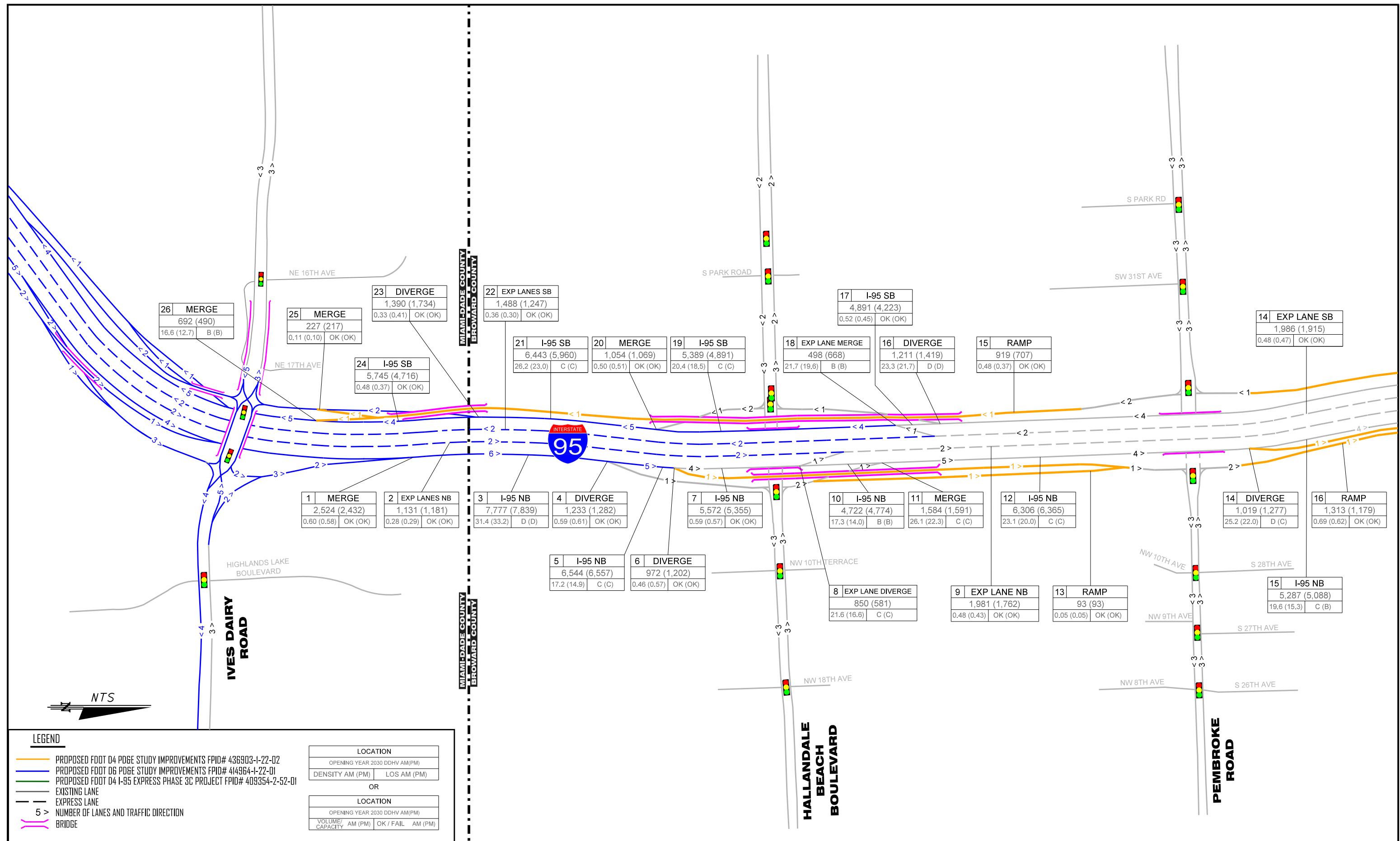
**2045 Preferred Alternative** – The capacity analysis shows that one location northbound and three locations southbound will operate below LOS D (worst peak period LOS) by the year 2045 within the area of influence.

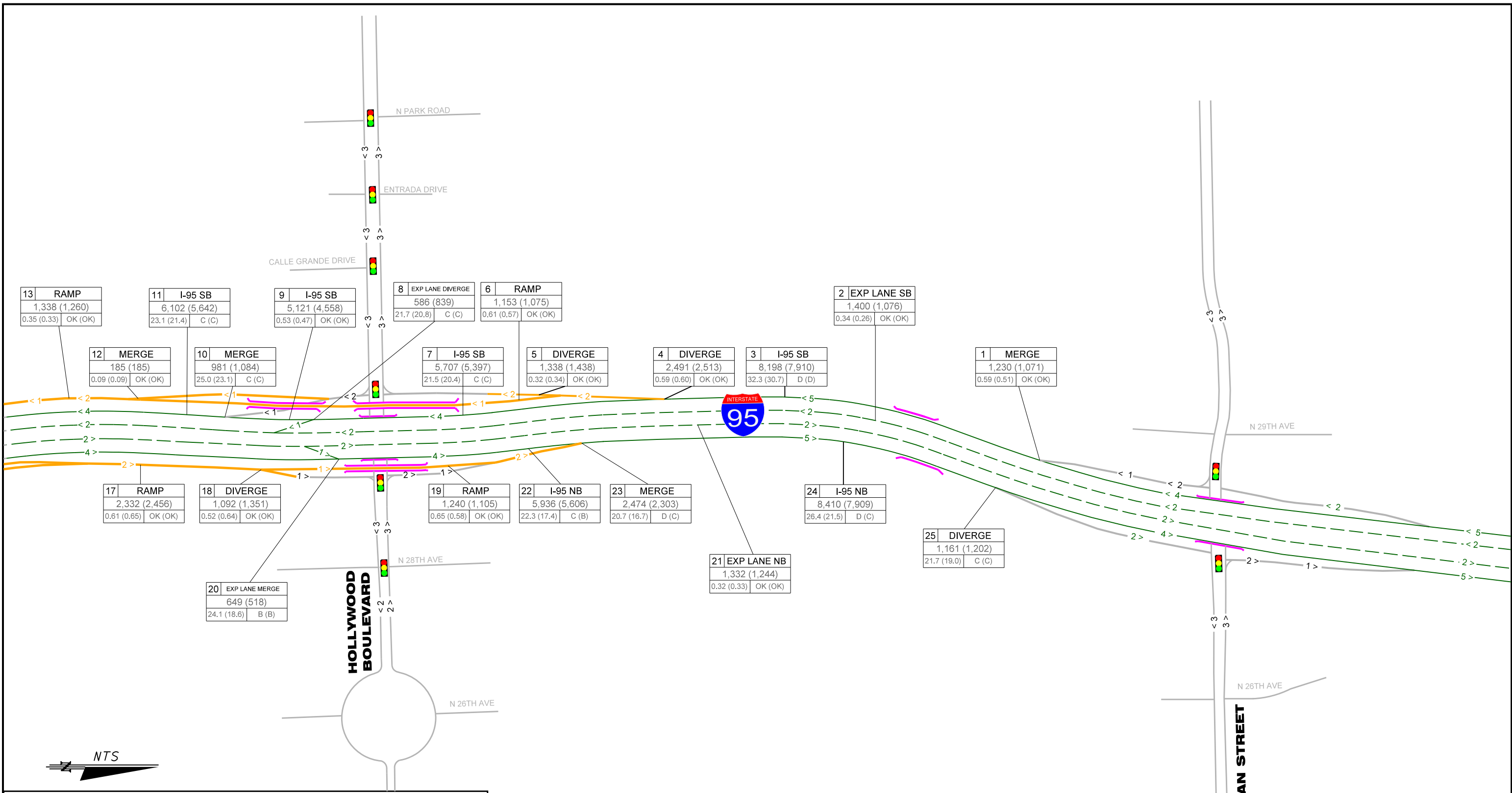
**Figure 6.6** summarizes the 2030 results and **Figure 6.7** summarizes the 2045 results.

**Intersection Analysis** – An intersection analysis for ramp terminals and adjacent intersections was performed at all the interchanges. **Figure 6.8** summarizes the 2030 results and **Figure 6.9** summarizes the 2045 results.

As shown in **Figure 6.8**, the 2030 Preferred Alternative intersection operational results indicate all intersections will operate at a LOS D or better.

As shown in **Figure 6.9**, the 2045 Preferred Alternative intersection operational results indicate all intersections will operate at a LOS D or better except for one location on Hallandale Beach Boulevard and three locations on Hollywood Boulevard.





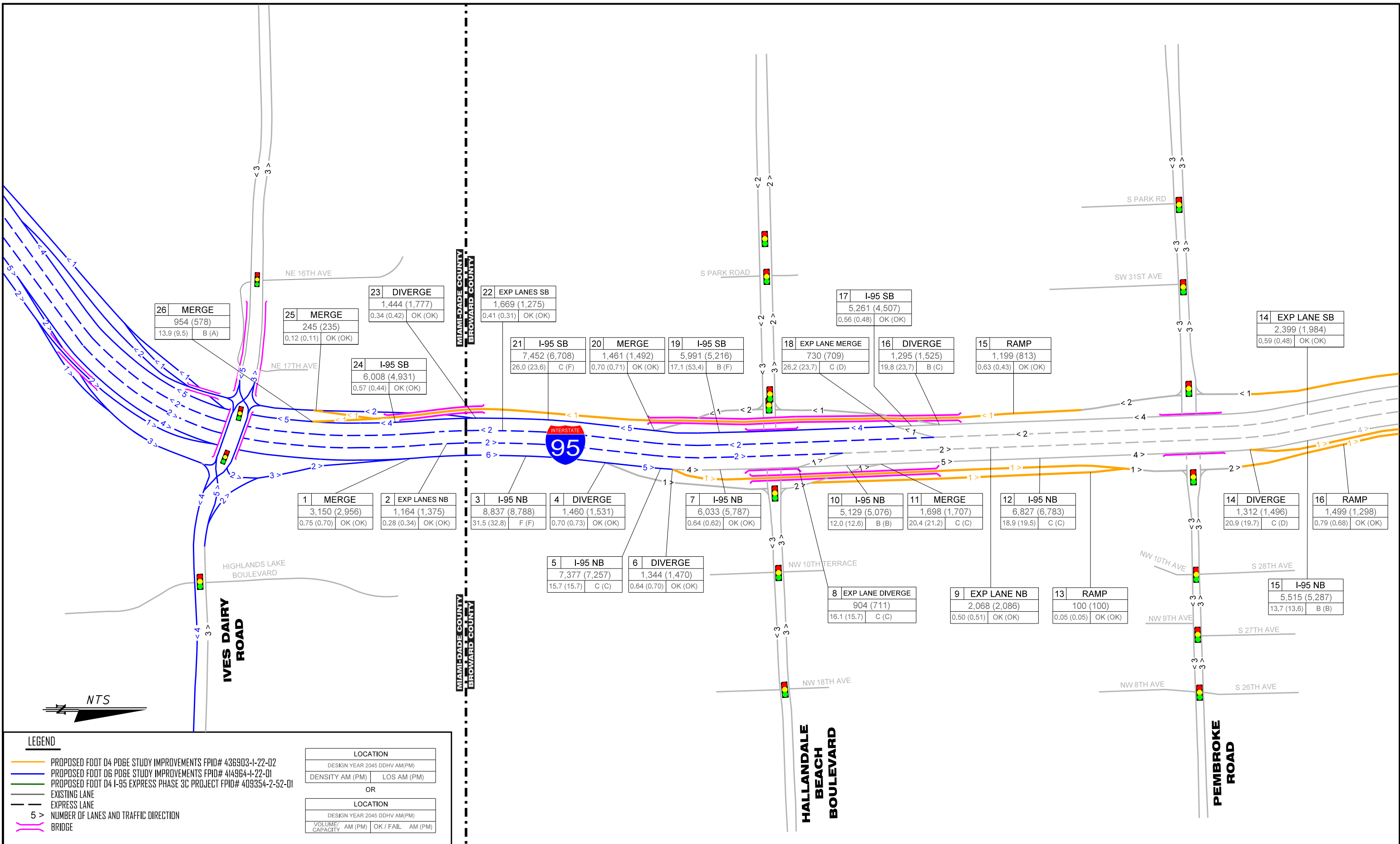
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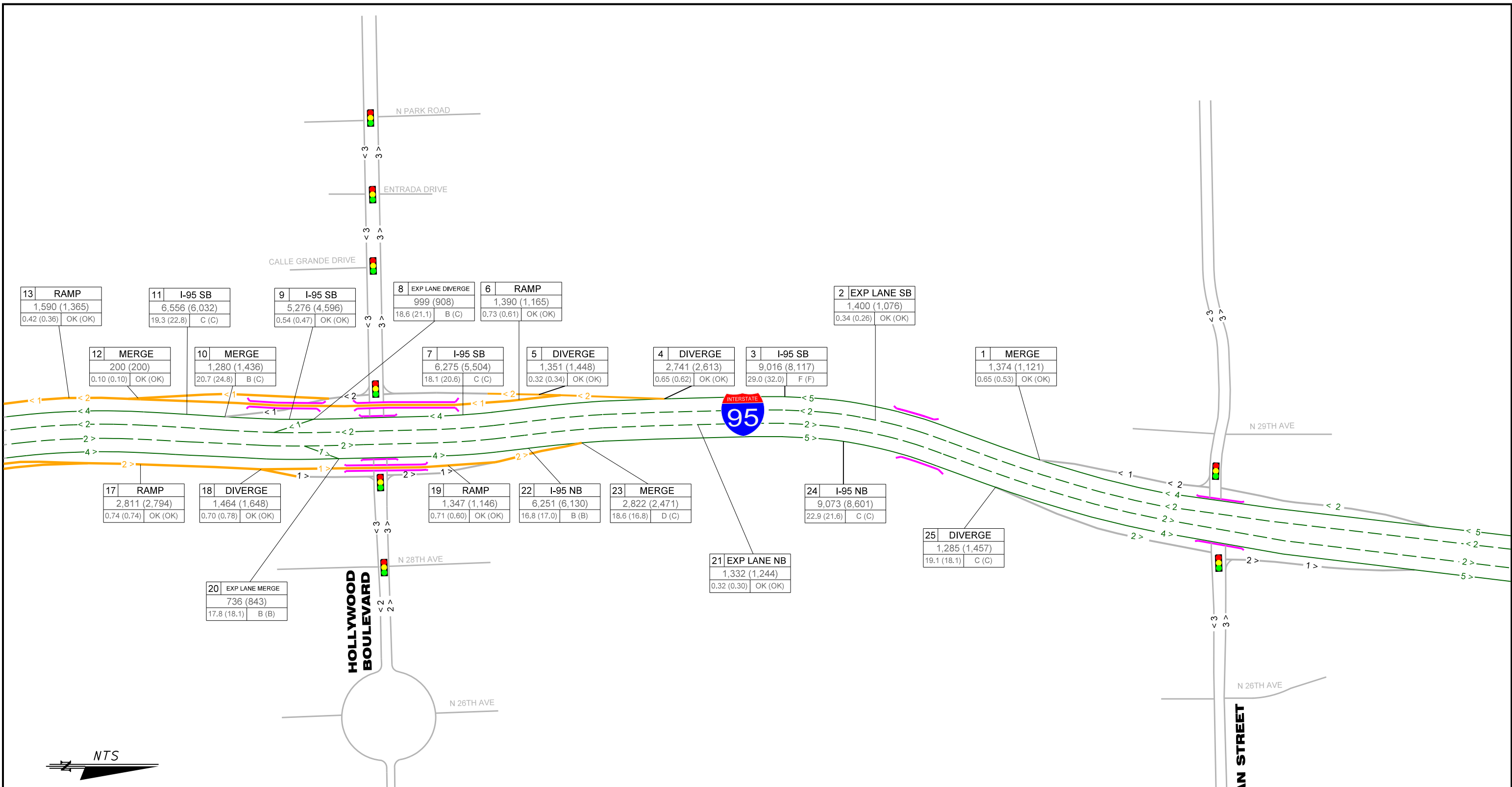
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from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
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2030 OPENING YEAR PREFERRED ALTERNATIVE  
OPERATIONAL ANALYSIS RESULTS

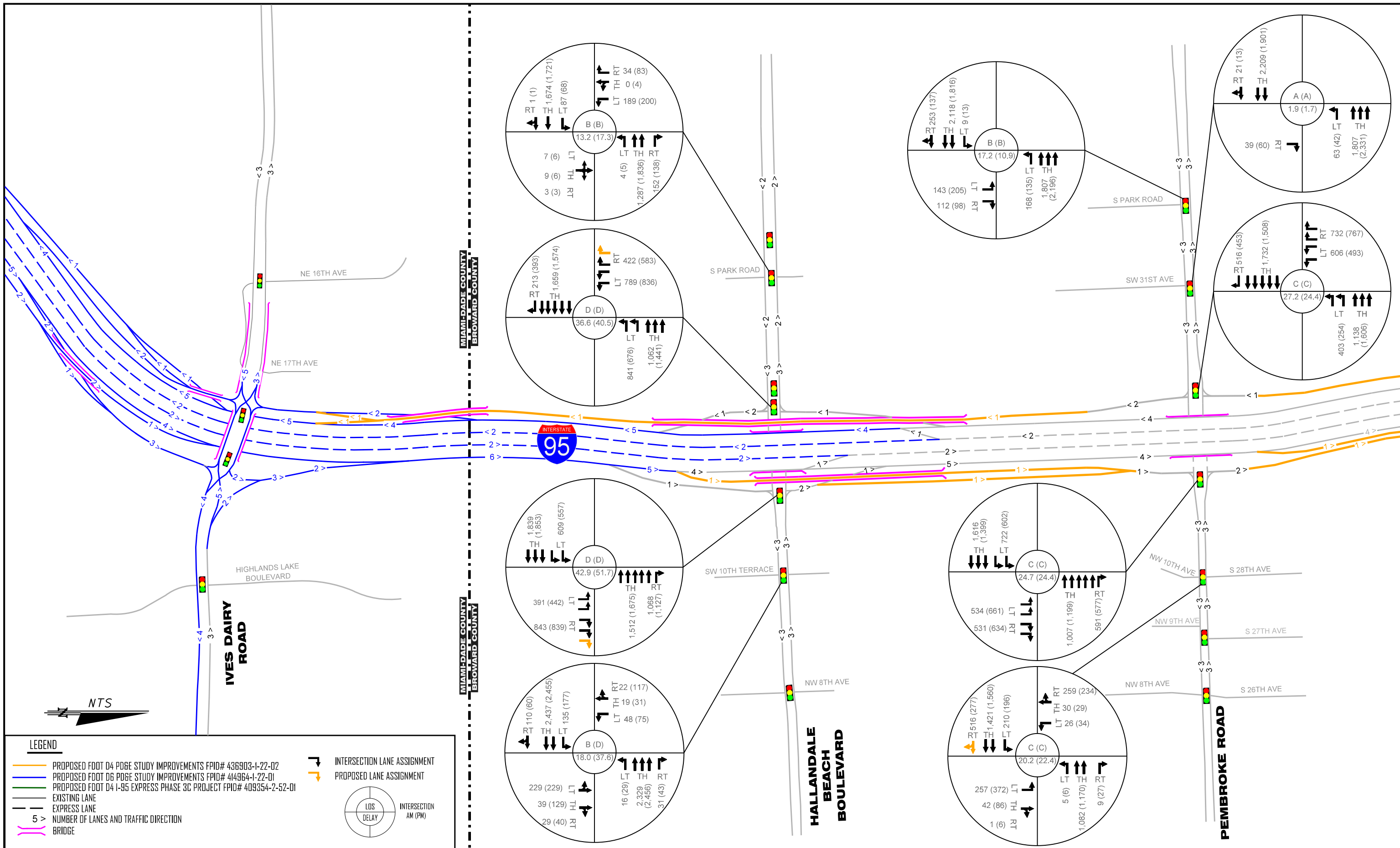
FIGURE 6.6  
6-26







| LEGEND                                 |                                                                     |
|----------------------------------------|---------------------------------------------------------------------|
| <span style="color: orange;">—</span>  | PROPOSED FOOT D4 PD&E STUDY IMPROVEMENTS FPID# 436903-I-22-02       |
| <span style="color: blue;">—</span>    | PROPOSED FOOT D6 PD&E STUDY IMPROVEMENTS FPID# 414964-I-22-01       |
| <span style="color: green;">—</span>   | PROPOSED FOOT D4 I-95 EXPRESS PHASE 3C PROJECT FPID# 409354-2-52-01 |
| <span style="color: grey;">—</span>    | EXISTING LANE                                                       |
| <span style="color: black;">—</span>   | EXPRESS LANE                                                        |
| 5 >                                    | NUMBER OF LANES AND TRAFFIC DIRECTION                               |
| <span style="color: magenta;">—</span> | BRIDGE                                                              |



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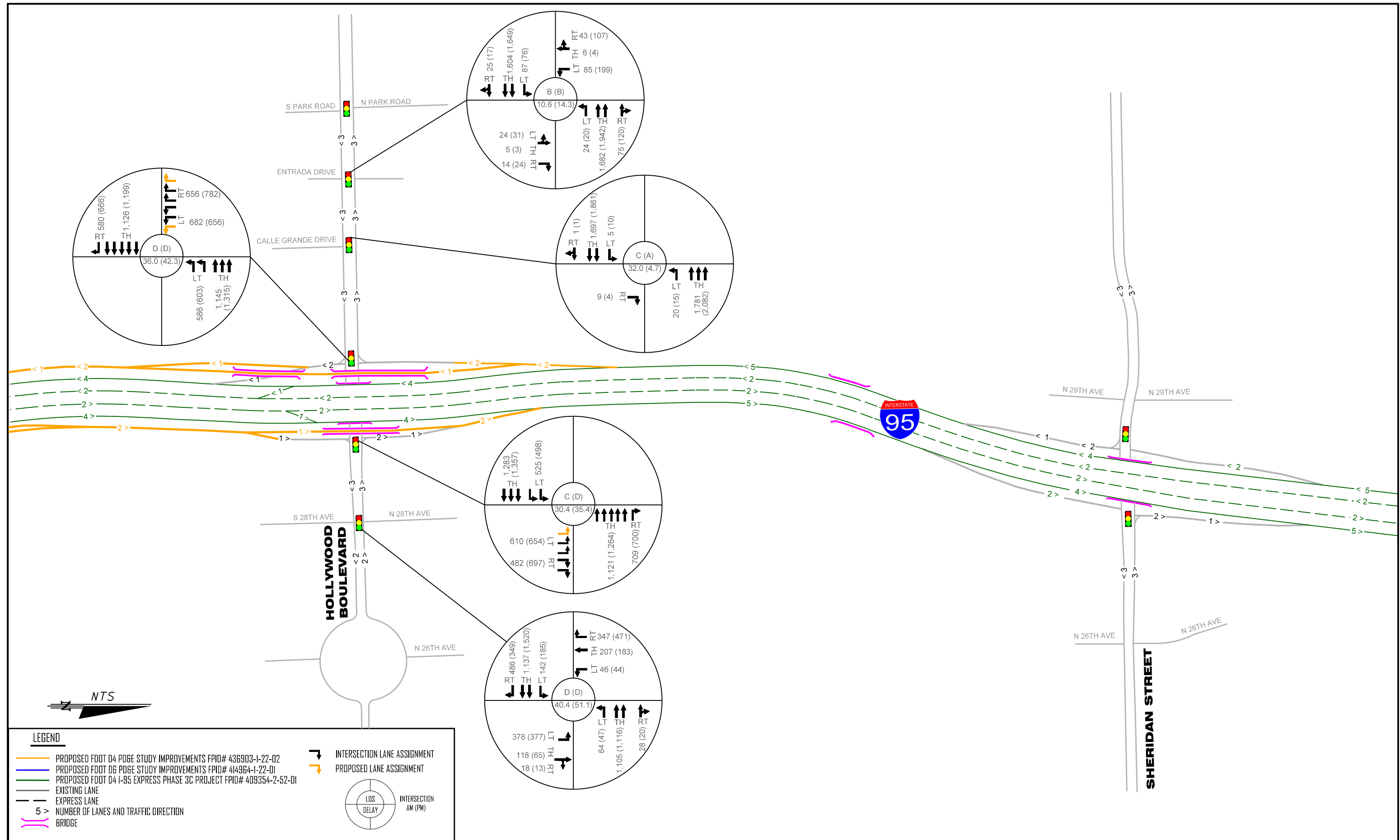


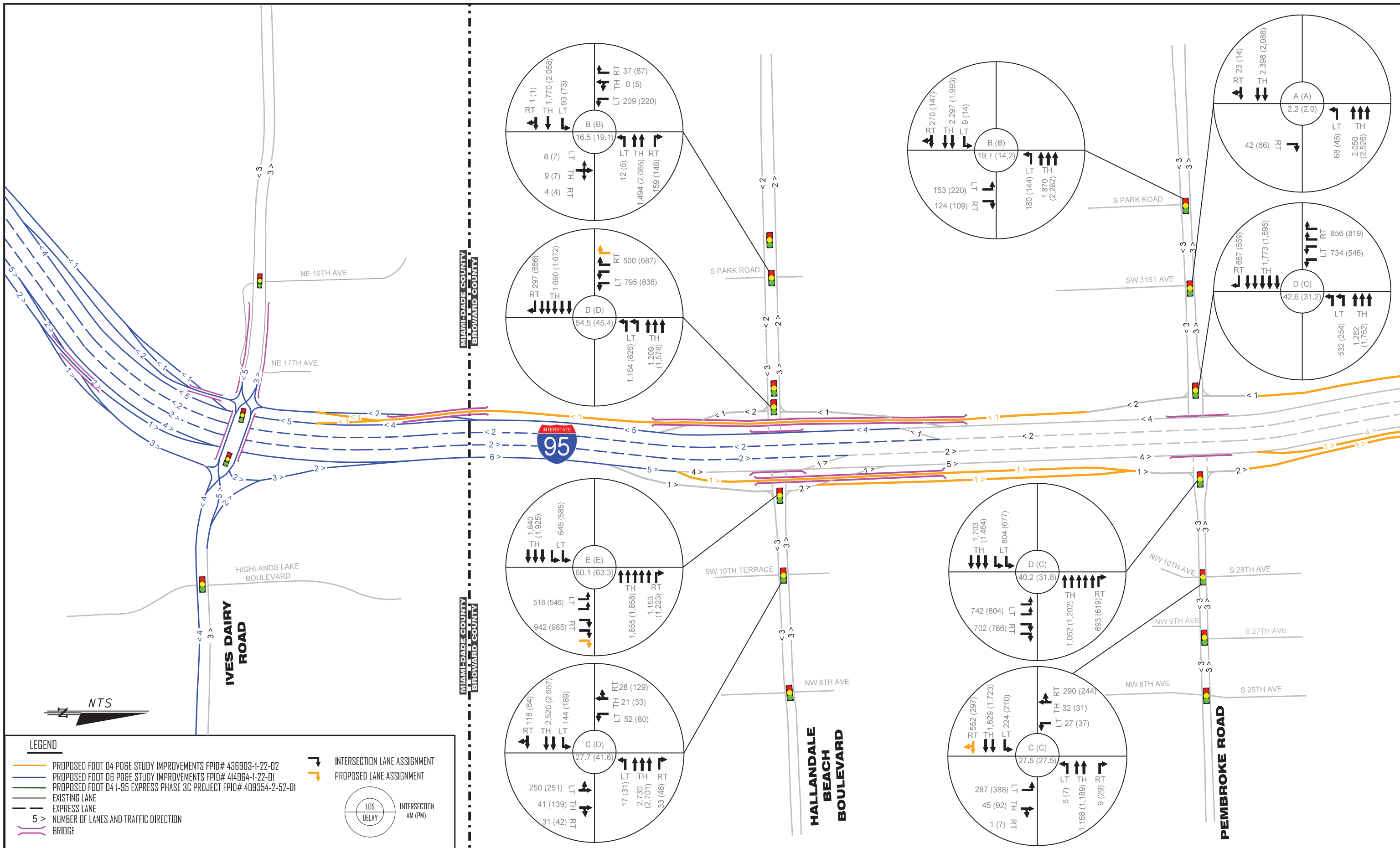
**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
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**2030 OPENING YEAR PREFERRED ALTERNATIVE  
INTERSECTION OPERATIONAL ANALYSIS RESULTS**

FIGURE  
6.8

6-29





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DISTRICT FOUR  
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NOVEMBER 2024

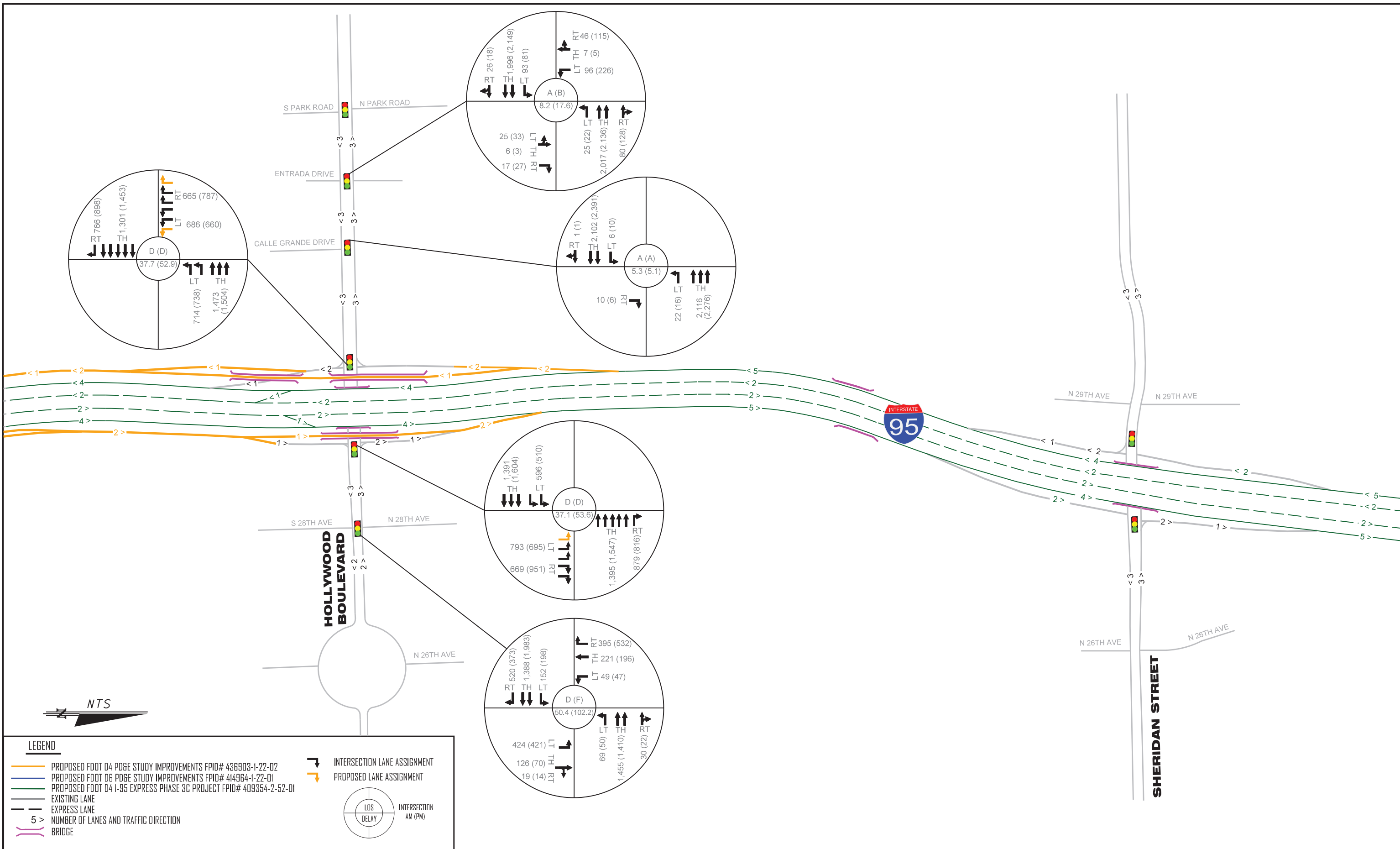


**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
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**2045 DESIGN YEAR PREFERRED ALTERNATIVE  
INTERSECTION OPERATIONAL ANALYSIS RESULTS**

**FIGURE  
6.9**

**6-31**







## **Micro-Simulation Operational Analysis Results**

The information presented in this section is a summary of the I-95 Systems *Interchange Modification Report* (SIMR), companion document to this study. The micro-simulation operational analysis conducted for the SIMR confirmed that the proposed I-95 interchange modifications will not have any significant adverse impacts on safety and operations along I-95. The proposed modifications will improve traffic operations and enhance safety. When compared with the No-Build Alternative, the preferred alternative significantly improves operations along I-95.

**Figure 6.10** shows the 2045 Preferred Alternative results for the AM peak hour. These results show significant improvements over the No-Build due to capacity improvements on the mainline and at study interchanges. In the AM peak period, I-95 northbound operates at 55 mph or better for all four hours of simulation throughout the project area (see **Figure 6.11**). The additional lane available within the northbound weave segment between Ives Dairy Road and Hallandale Beach Boulevard significantly improves operations at this location. The Preferred Alternative geometry eliminated the short weave segments between Hallandale Beach Boulevard and Pembroke Road as well as Pembroke Road and Hollywood Boulevard which significantly improved reliability on the mainline. The additional left turn lane and increased right turn lane storage at the Hollywood Boulevard northbound off ramp, in addition to the proposed C-D road servicing Pembroke Road on ramp volume and Hollywood Boulevard off ramp volume, significantly reduces the risk of queue spillback from the ramp terminal intersection to the I-95 mainline. The proposed northbound C-D road shifts the reduced off ramp queue off the mainline lanes. Note that the Tri-Rail train activity prevents vehicles from traveling westbound in both the No-Build and Preferred Alternative at the interchanges while passing through the arterial. Train events were the primary cause for the longer queues at the Hollywood Boulevard off ramp.

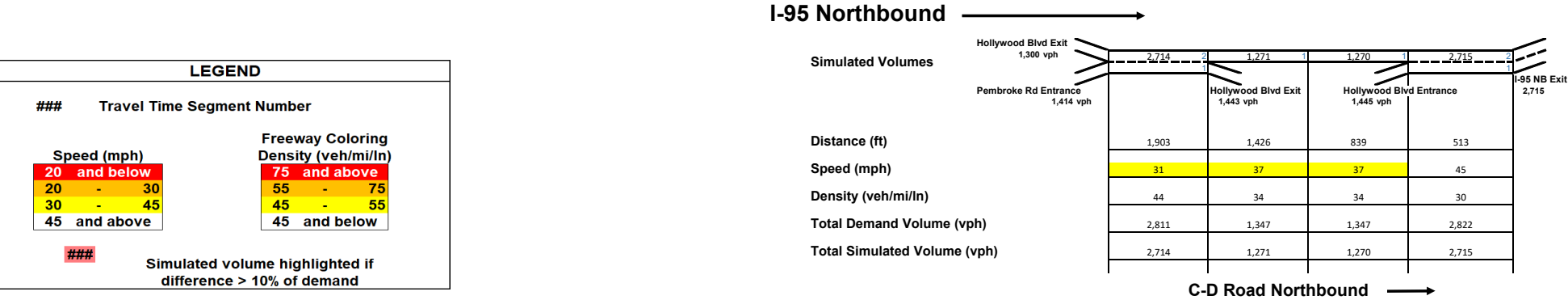
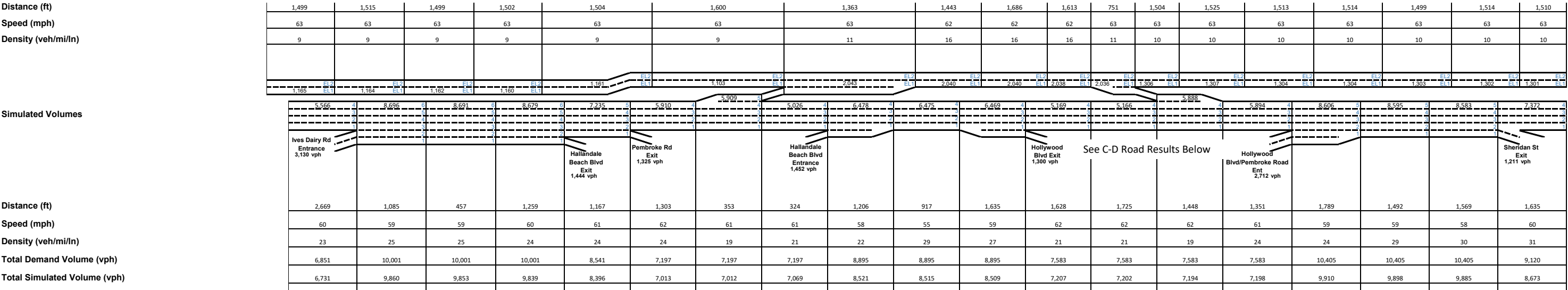
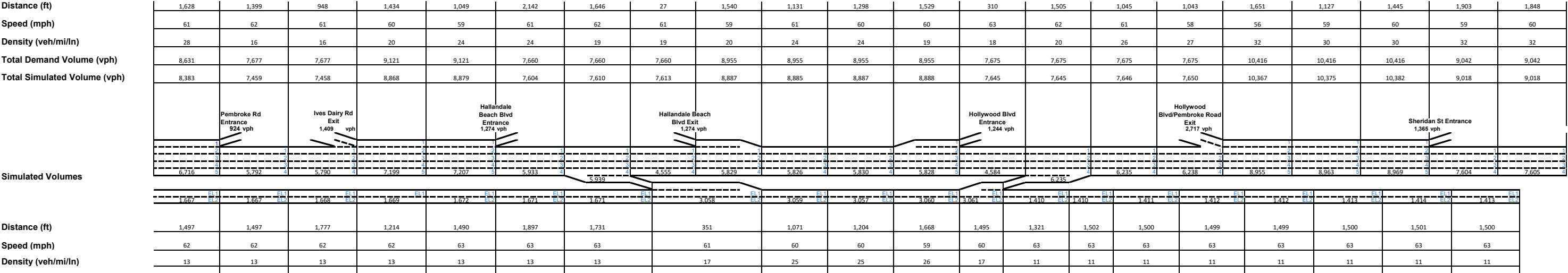
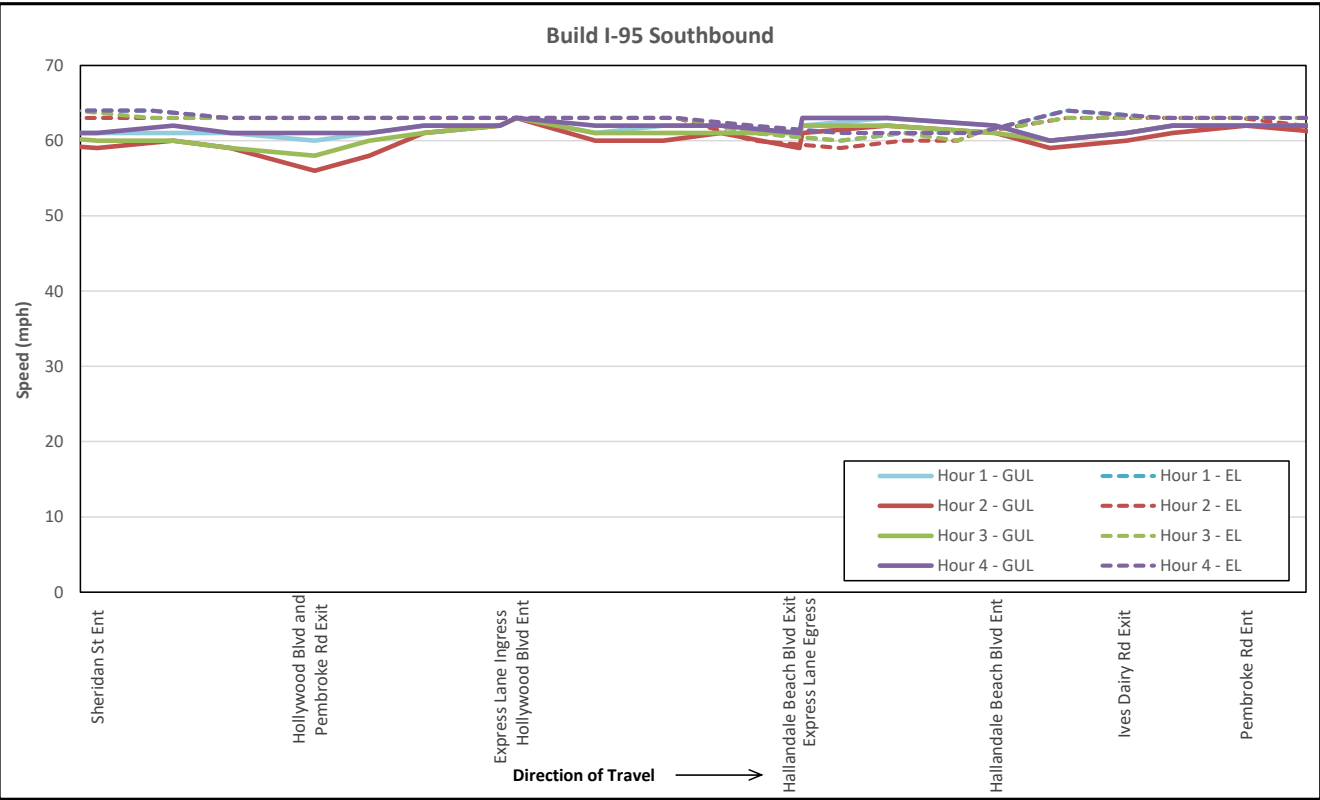
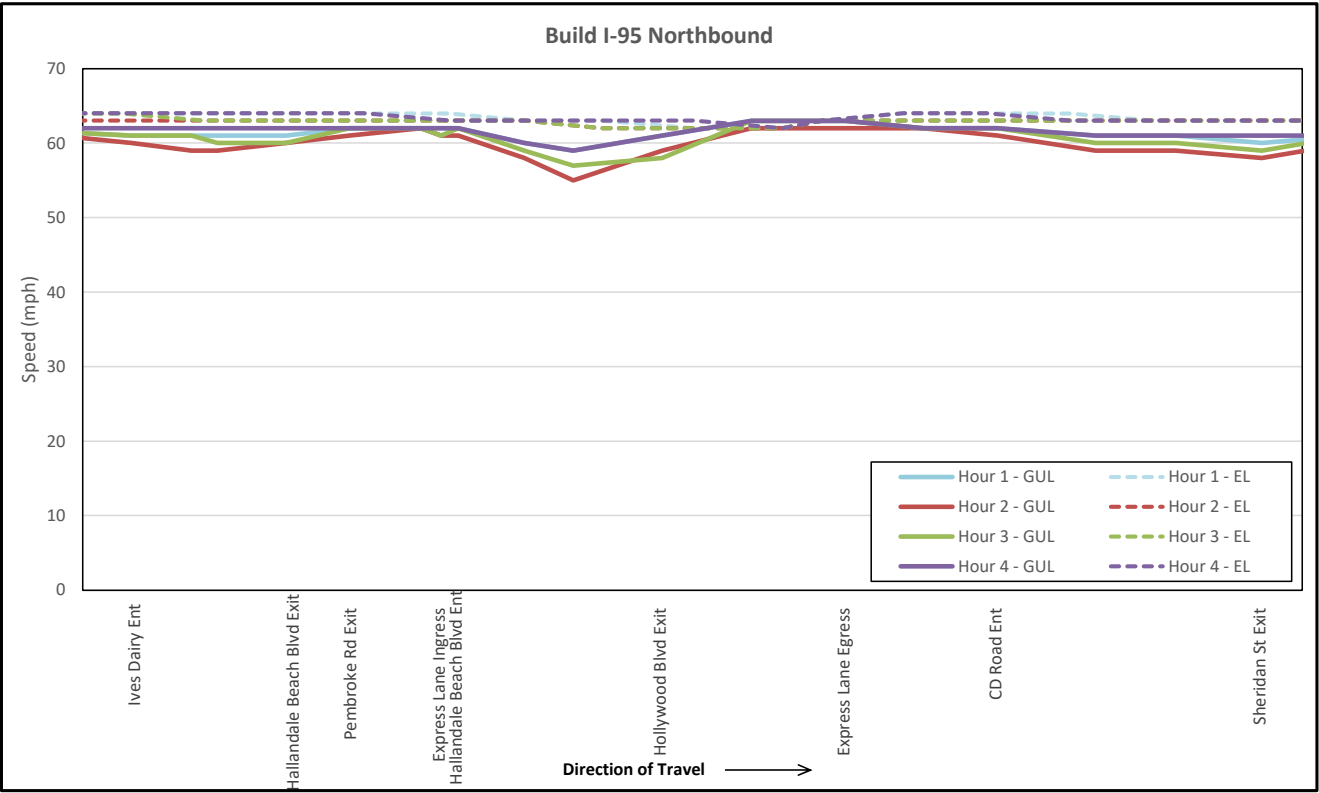


Figure 6.10 - Preferred Alternative AM Peak Lane Schematic

AM Peak Period Speed Profiles for I-95



AM Peak Period Volume Profiles for I-95

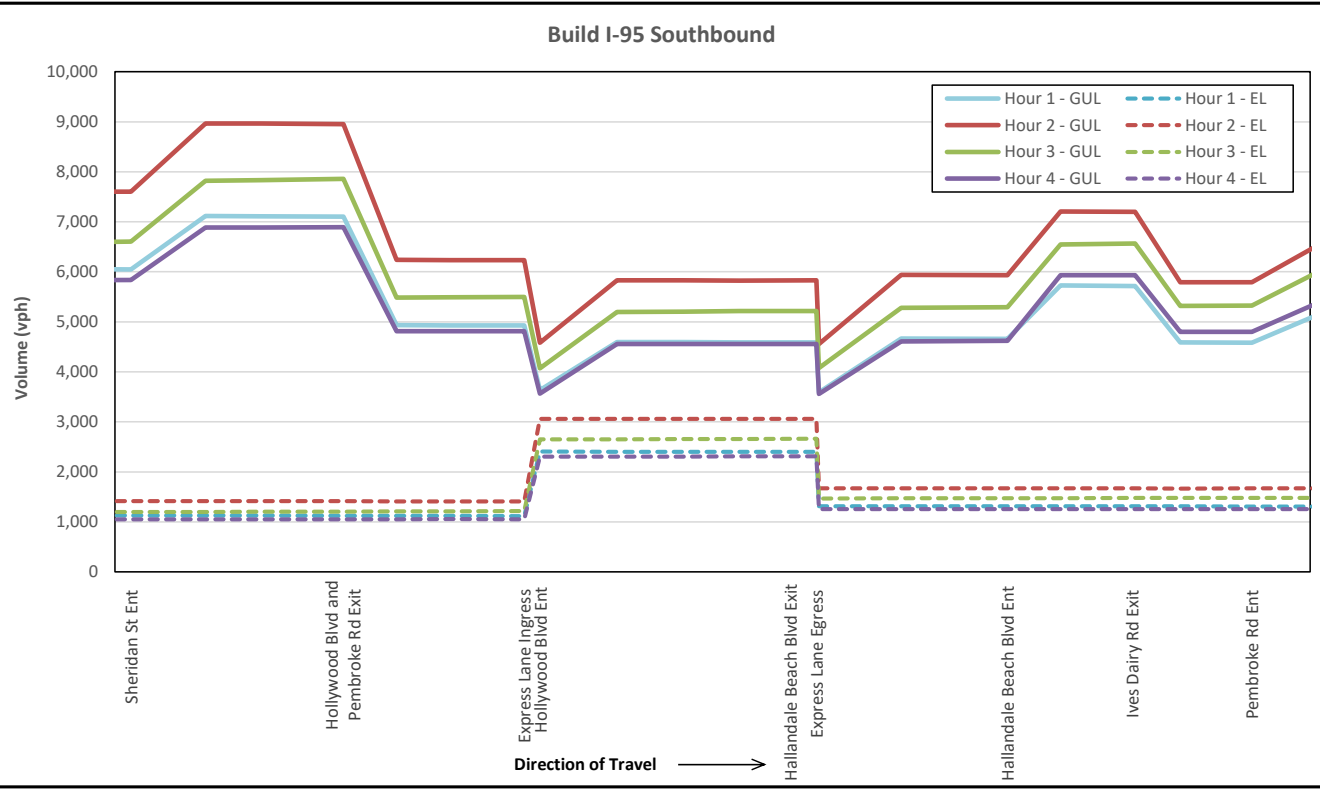
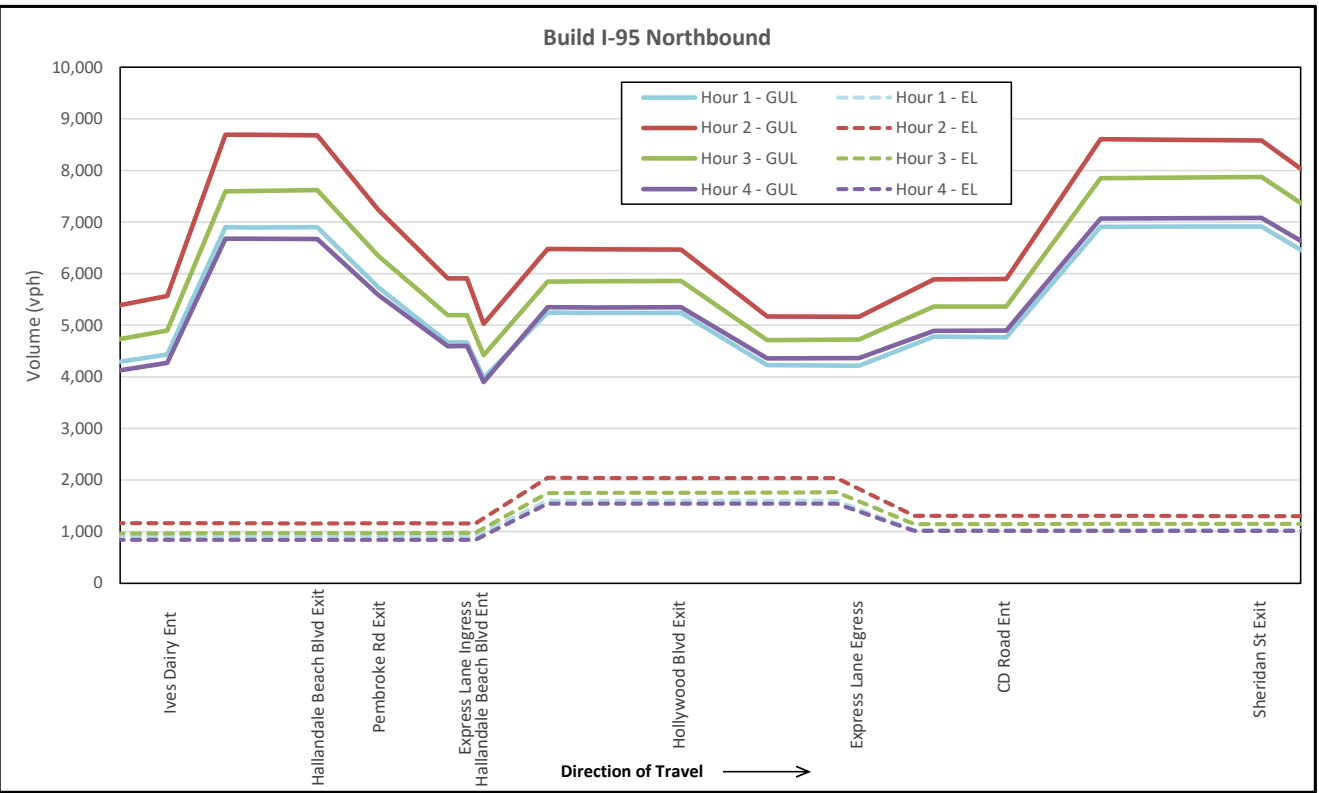
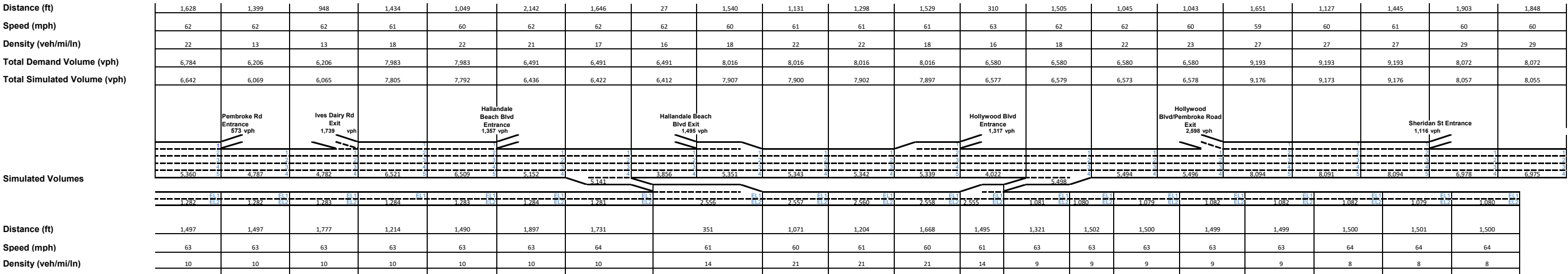


Figure 6.11 - Preferred Alternative AM Peak Speed and Volume Profiles

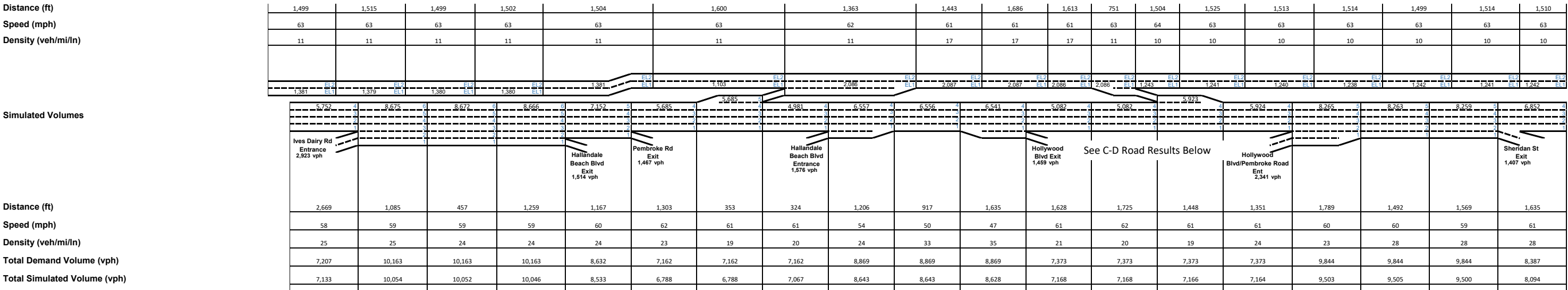


I-95 in the southbound direction operates at or near free-flow conditions throughout the project area during the AM peak period. The weave segment upstream of the proposed Hollywood Boulevard and Pembroke Road combined off ramp experiences speeds of 56 mph and greater in Hour 2. While the weave segment created by the Sheridan Street single lane on ramp and Hollywood Boulevard/Pembroke Road two-lane off ramp is approximately 4,000 feet in length, minor turbulence exists with over 2,700 vehicles staging to use the off ramp. This location improves to a speed of 58 mph in Hour 3 and a speed of 61 mph in Hour 4. The proposed relocation of the Pembroke Road southbound on ramp to south of the Hallandale Beach Boulevard on ramp eliminated the turbulence experienced in the No-Build weave segment between the Pembroke Road on ramp and Hallandale Beach Boulevard off ramp.

**Figure 6.12** shows the 2045 Preferred Alternative results for the PM peak hour. These results show significant improvements over the No-Build due to improvements on the mainline and at study interchanges. I-95 northbound operates at 55 mph or better throughout the project area for hours 1, 3, and 4 of simulation (see **Figure 6.13**). Hour 2 experiences a short duration of queue spillback from the Hollywood Boulevard off ramp CD road system resulting in a speed of 47 mph at the Hollywood Boulevard off ramp. This location is significantly improved compared to the No-Build alternative which has significant congestion on I-95 mainline and speeds as low as 21 mph throughout the simulation duration. The additional left turn lane and increased right turn lane storage at the Hollywood Boulevard northbound off ramp significantly reduced the ramp queueing. Similar to the AM peak hour, the additional lane between Ives Dairy Road and Hallandale Beach Boulevard significantly improves operations at this location. The Preferred Alternative geometry also eliminated the short weave segments between Hallandale Beach Boulevard and Pembroke Road as well as Pembroke Road and Hollywood Boulevard which significantly improved reliability on the mainline. In the southbound direction speeds of 59 mph or higher are observed for all four hours of simulation during the PM peak period.



I-95 Southbound



I-95 Northbound

**LEGEND**

### Travel Time Segment Number

Speed (mph)

Freeway Coloring Density (veh/mi/ln)

### Simulated volume highlighted if difference > 10% of demand

Simulated Volumes

Distance (ft)

Speed (mph)

Density (veh/mi/ln)

Total Demand Volume (vph)

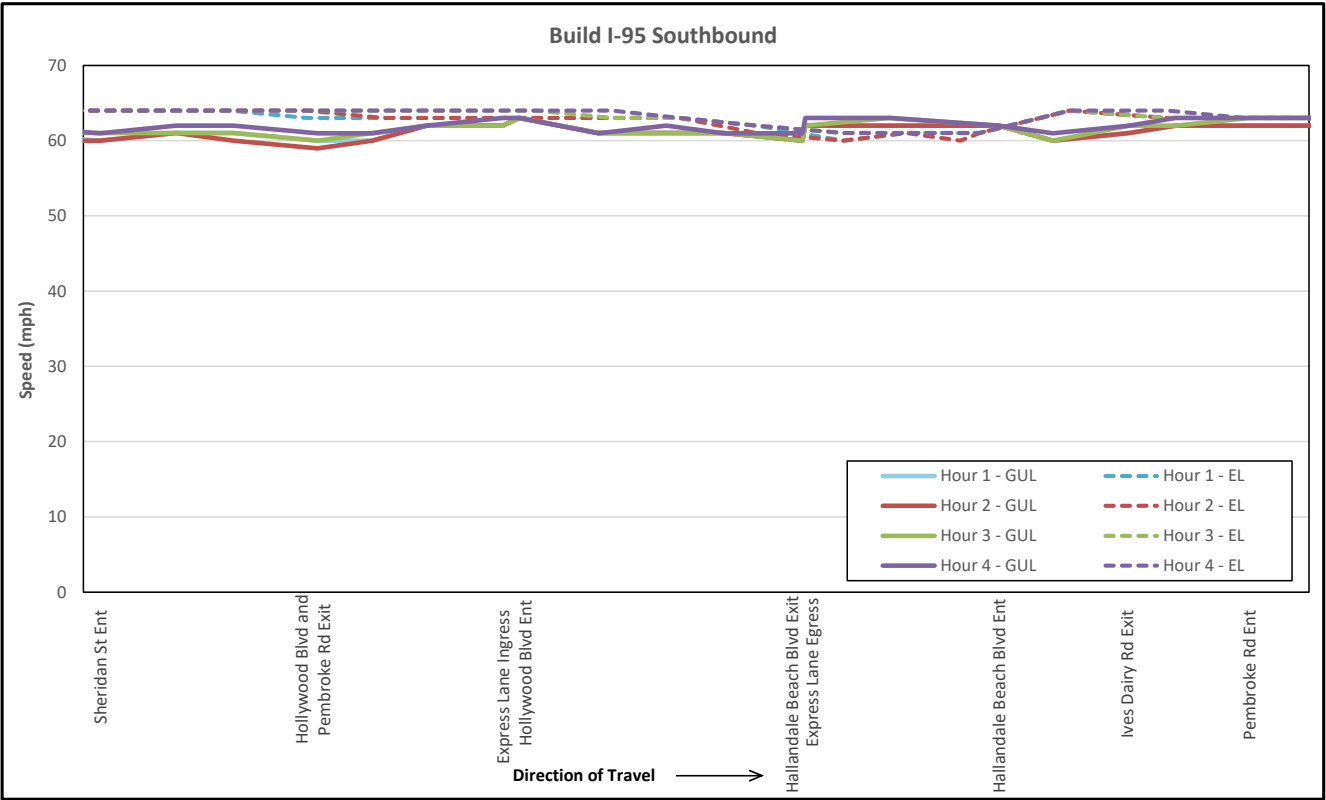
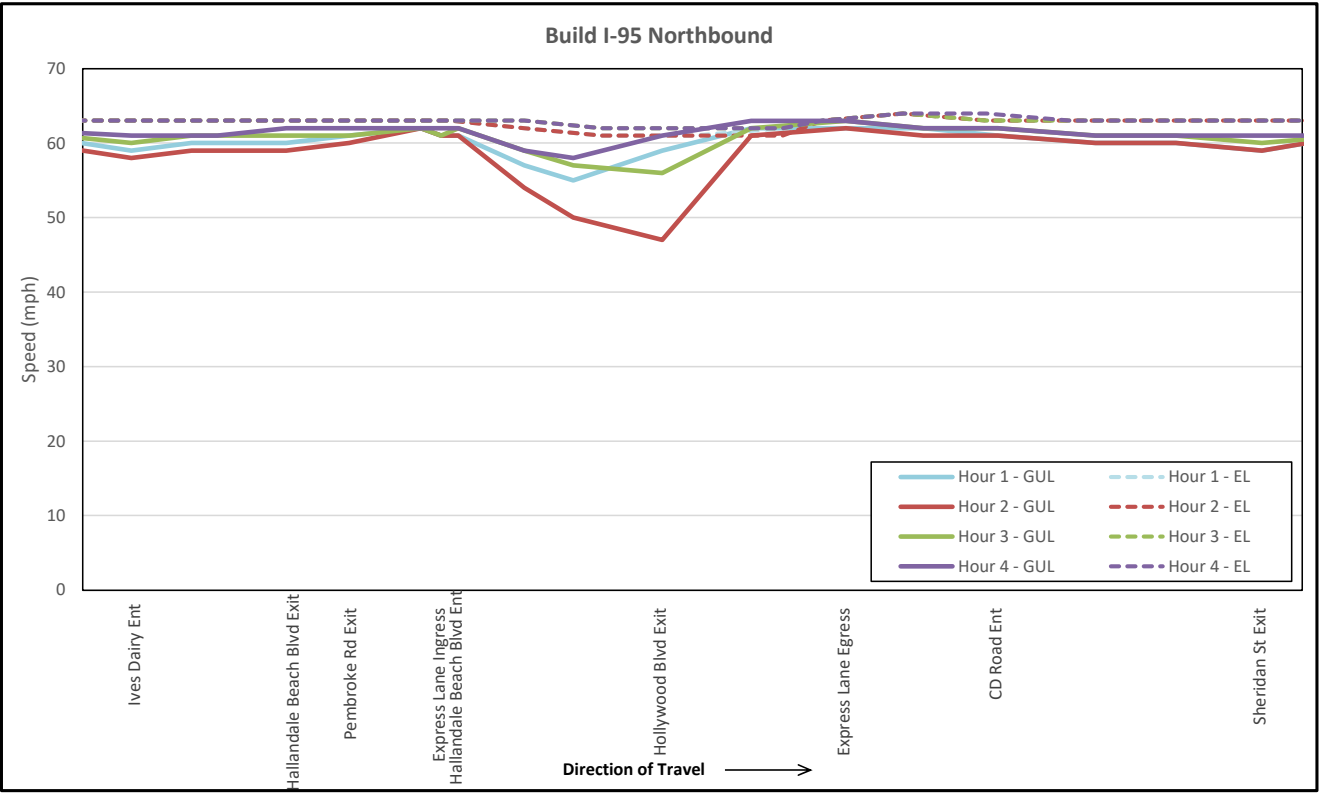
Total Simulated Volume (vph)

C-D Road Northbound

Figure 6.12 - Preferred Alternative PM Peak Lane Schematic



PM Peak Period Speed Profiles for I-95



PM Peak Period Volume Profiles for I-95

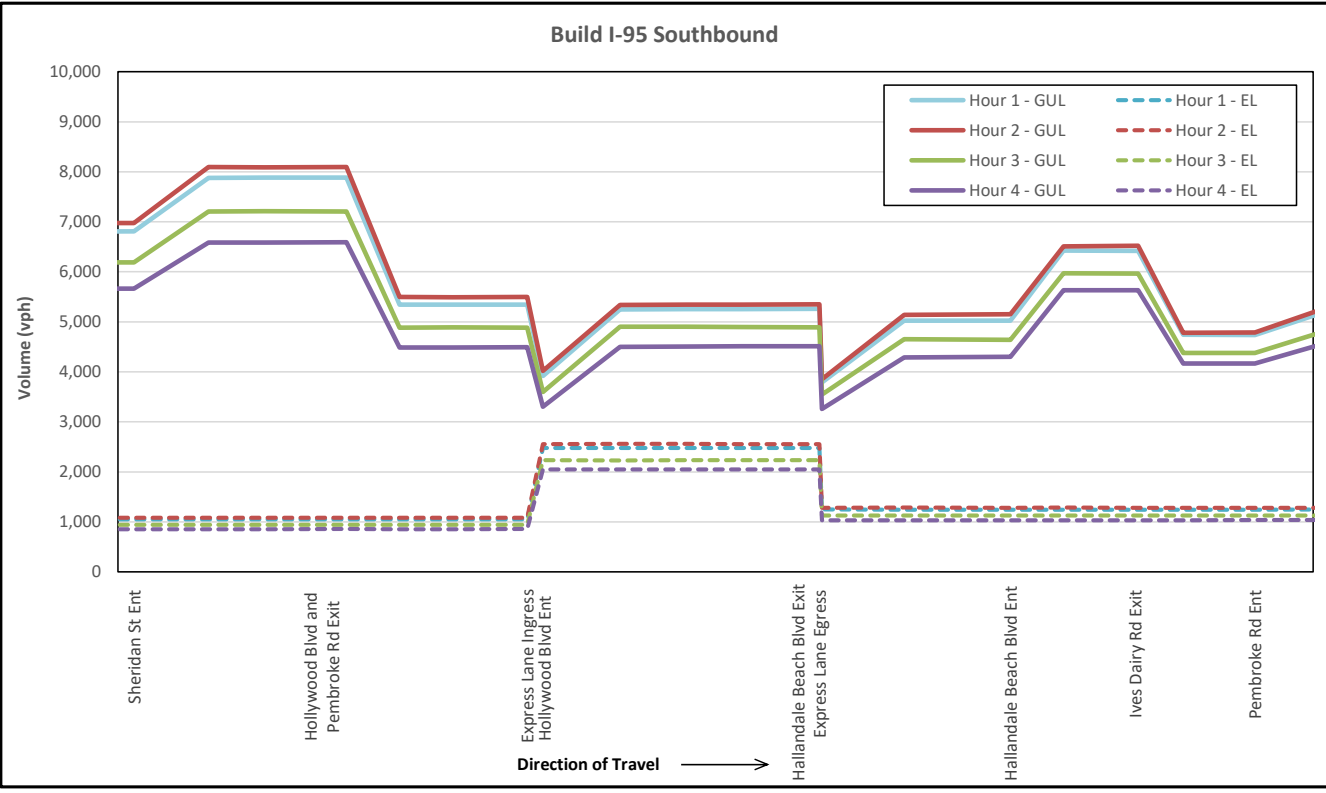
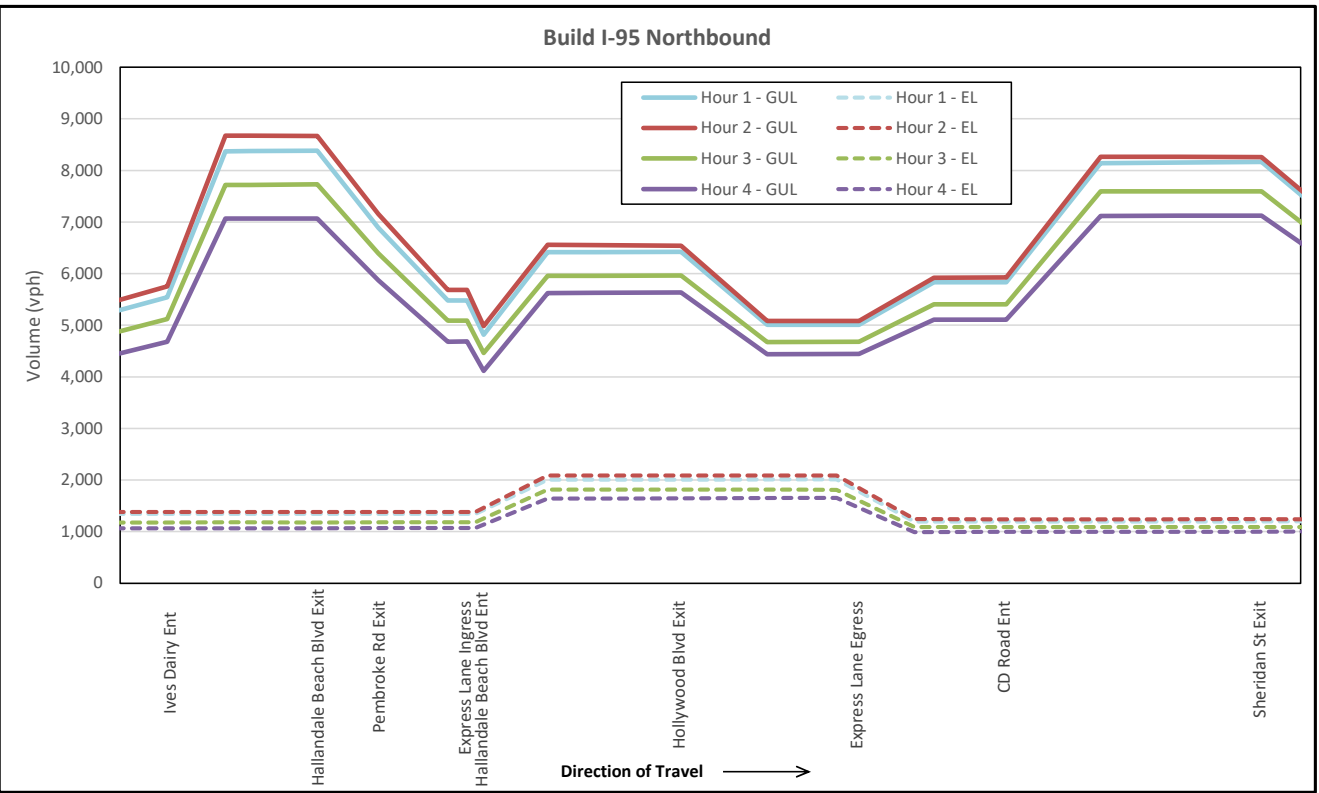


Figure 6.13 - Preferred Alternative PM Peak Speed and Volume Profiles



#### 6.1.10 INTELLIGENT TRANSPORTATION SYSTEM AND TSM&O STRATEGIES

The I-95 corridor within the project limits is currently monitored, analyzed, and managed from the FDOT District Four SunGuide® Transportation Management Center (TMC) using SunGuide® software to control and monitor ITS. **Figure 6.14** graphically shows the existing system within the study limits.

The ITS System was recently reconstructed within the project limits by the I-95 Express Phase 2 project (FPID# 422796-1-52-01 and 422796-2-52-01), which completed construction in 2016. The purpose of the Phase 2 project was to construct one to two express lanes in the northbound and southbound directions. The ITS scope included the installation of two 144-count single-mode (SM) fiber optic cable (FOC) backbones, replacement and installation of Microwave Vehicle Detection System (MVDS) approximately every 1/3 mile, replacement and installation of Closed Circuit Television (CCTV) Cameras for surveillance and dedicated use, relocation of existing Wireless Access Points (WAP), relocation of the existing Highway Advisory Radio (HAR) Beacons, removal of existing Voice over IP (VoIP) devices, replacement and installation of Dynamic Message Signs (DMS) for both general use lanes and express lanes, and installation of Lane Status DMS (LS-DMS), Toll Rate DMS (TR-DMS), and toll gantries for express lanes operation.

The ITS system along Hallandale Beach Boulevard includes an arterial DMS, MVDS, and CCTV in the eastbound direction east of Park Road. Along Pembroke Road, there is an arterial DMS, MVDS, and CCTV in the westbound direction west of S 27th Avenue. Along Hollywood Boulevard, there is an arterial DMS and WAP in the westbound direction east of N 28th Avenue.

In addition, I-95 Express Phase 3C is currently under construction, which will enhance the Phase 2 ITS by replacing the 144 SM FOC backbone, upgrading CCTV cameras, adding a toll-amount DMS, relocating DMS, retrofitting existing TR-DMS, deploying Ramp Signaling Systems (RSS), and rearrangement of MVDS spacing to approximately ¼ miles.

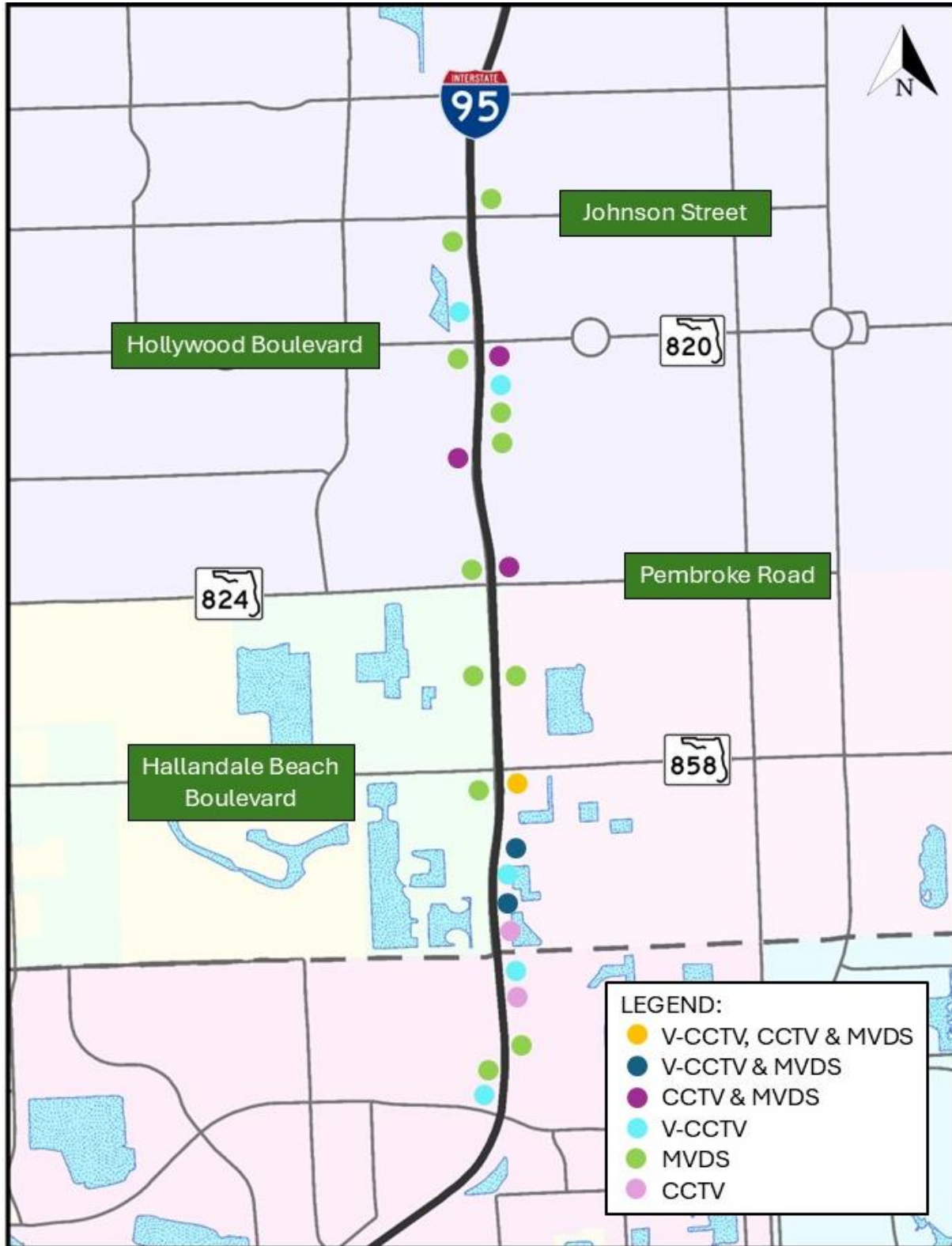


Figure 6.14 – High-Level Overview of the ITS System



Considering the Phase 3C project is currently working on the ITS, the PD&E Study will include those devices being installed in 3C as existing conditions. **Appendix L** summarizes the added ITS components by 3C within the study area.

Widening the corridor with the proposed improvements will impact the existing ITS infrastructure. Therefore, the existing infrastructure would have to be upgraded to accommodate the preferred alternative. The proposed ITS infrastructure would include new DMS, ADMS, LSDMS, DMS, CCTV, VCCTV, MVDS, RSS, fiber optic cable trunk line, drop cable system, power distribution system, and ITS cabinets. The preferred alternative also proposes to relocate the toll building site north of Pembroke Road from the east to the west side to accommodate the new northbound two-lane collector distributor roadway.

A System Engineering document such as the Concept of Operations, Project Systems Engineering Management Plan (PSEMP), and ITS functional requirements will be developed during the Design phase of the project.

### 6.1.11 UTILITIES

Utility Agency Owners (UAOs) located in the vicinity of the I-95 were contacted and requested to provide information regarding their utility facilities within the project area. UAOs and contact information are provided in **Table 6.6**.

**Table 6.6 – UAO Contact List**

| Utility Company                              | Facility          | Contact Information                                                          |                                                                                    |
|----------------------------------------------|-------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| American Traffic Solutions                   | Not Available     | Santiago Martinez<br>1150 North Alma School Road<br>Mesa, AZ 85201           | (480) 596-4595                                                                     |
| AT&T Corporation (International)             | Fiber Optic       | Stefan Eriksson<br>6000 Metro West Blvd., Suite 201<br>Orlando, FL 32835     | (407) 578-8000<br><a href="mailto:seriksson@pea-inc.net">seriksson@pea-inc.net</a> |
| AT&T Corporation (Transmission)              | Telephone         | Stefan Eriksson<br>6000 Metro West Blvd., Suite 201<br>Orlando, FL 32835     | (407) 578-8000<br><a href="mailto:seriksson@pea-inc.net">seriksson@pea-inc.net</a> |
| AT&T Distribution                            | Telephone & Fiber | Keeve Otis<br>1120 South Rogers Circle<br>Boca Raton, FL 33487               | (305) 428-0510<br><a href="mailto:ok1184@att.com">ok1184@att.com</a>               |
| Broward County Traffic Engineering           | Fiber Optic       | Robert Blount<br>2300 West Commercial Boulevard<br>Fort Lauderdale, FL 33309 | (954) 847-2745<br><a href="mailto:rblount@broward.org">rblount@broward.org</a>     |
| Broward County Water and Wastewater Services | Water and Sewer   | Halina Pluta<br>2555 West Copans Road<br>Pompano Beach, FL 33069             | (954) 831-0917<br><a href="mailto:HPLUTA@broward.org">HPLUTA@broward.org</a>       |



**Table 6.6 – UAO Contact List (Continued)**

| Utility Company                           | Facility        | Contact Information                                                                           |                                                                                                                                                                                                                            |
|-------------------------------------------|-----------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Century Link                              | Fiber Optic     | Mike Fitzgerald<br>Jack Brady<br>5908-A Hampton Oaks Parkway<br>Tampa, FL 33610               | (941) 661-7557<br>(786) 495-2170<br><a href="mailto:mike.fitzgerald@centurylink.com">mike.fitzgerald@centurylink.com</a><br><a href="mailto:jack.brady@centurylink.com">jack.brady@centurylink.com</a>                     |
| City of Hallandale Beach                  | Water and Sewer | Manga Ebbe<br>630 NW 2nd Street<br>Hallandale Beach, FL 33009                                 | (954) 457-3043<br><a href="mailto:mebbe@hallandalebeachfl.gov">mebbe@hallandalebeachfl.gov</a>                                                                                                                             |
| City of Hollywood Public Works Department | Water & Sewer   | Raul Carbonell<br>7777 Glades Road Suite 410<br>Boca Raton, FL 33434                          | (561) 791-9280<br><a href="mailto:rcarbonell@craigasmith.com">rcarbonell@craigasmith.com</a>                                                                                                                               |
| Comcast Cable                             | Cable TV        | Christopher Taylor<br>Leonard Maxwell-Newbold<br>2601 SW 145th Avenue<br>Miramar, FL 33322    | (954) 239-8386<br>(954) 447-8405<br><a href="mailto:Cable-utilities@cwsifl.com">Cable-utilities@cwsifl.com</a><br><a href="mailto:Leonard_Maxwell-Newbold@cable.comcast.com">Leonard_Maxwell-Newbold@cable.comcast.com</a> |
| Crown Castle NG                           | Fiber Optic     | Rebecca Caldwell<br>2000 Corporate Drive<br>Canonsburg, PA 15317                              | (888) 632-0931<br><a href="mailto:fiber.dig@crowncastle.com">fiber.dig@crowncastle.com</a>                                                                                                                                 |
| Fiberlight LLC.                           | Not Available   | Troy Gaeta<br>11700 Great Oaks Way Suite 100<br>Alpharetta, Ga 33022                          | (954) 213-3367<br><a href="mailto:troy.gaeta@fiberlight.com">troy.gaeta@fiberlight.com</a>                                                                                                                                 |
| Fibernet Direct                           | Fiber           | Danny Haskett<br>Crown Castle Office<br>1601 NW 136th Avenue Suite A-200<br>Sunrise, FL 33323 | (786) 246-7827<br><a href="mailto:danny.haskett@fibernetdirect.com">danny.haskett@fibernetdirect.com</a>                                                                                                                   |



Table 6.6 – UAO Contact List (Continued)

| Utility Company                                          | Facility                     | Contact Information                                                                      |                                                                                                                                                                                    |
|----------------------------------------------------------|------------------------------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Florida City Gas                                         | Gas                          | Oscar Paez<br>4045 NW 97th Avenue<br>Doral, FL 33178                                     | (305) 835-3622<br><a href="mailto:fcgeng@aglresources.com">fcgeng@aglresources.com</a><br><a href="mailto:opaez@southernco.com">opaez@southernco.com</a>                           |
| Florida Department of Transportation District 4 - ITS    | Fiber Optic                  | Maria Rosado<br>2300 West Commercial Boulevard<br>Fort Lauderdale, FL 33309              | (954) 847-2690<br><a href="mailto:mrosado@smartsunguide.com">mrosado@smartsunguide.com</a>                                                                                         |
| Florida Department of Transportation - Eland Engineering | Fiber Optic                  | Chris Beaudry/April Rizzo<br>3323 West Commercial Boulevard<br>Fort Lauderdale, FL 33309 | (954) 847-1996<br><a href="mailto:chris.beaudry@dot.state.fl.us">chris.beaudry@dot.state.fl.us</a><br><a href="mailto:april.rizzo@dot.state.fl.us">april.rizzo@dot.state.fl.us</a> |
| Florida Power & Light                                    | Electric                     | Byron Sample<br>10705 Quail Roost Drive<br>Miami, FL 33157                               | (386) 586-6403<br><a href="mailto:Byron.A.Sample@fpl.com">Byron.A.Sample@fpl.com</a>                                                                                               |
| HEICO Corporation                                        | Fiber Optic                  | Joe Asher<br>3000 Taft Street<br>Hollywood, FL 33021                                     | (954) 984-4000<br><a href="mailto:jasher@heico.com">jasher@heico.com</a>                                                                                                           |
| Level 3 Communications                                   | Fiber Optic                  | Network Relations<br>1025 El Dorado Boulevard<br>Broomfield, CO 80021                    | (877) 366-8344 Ext. 2<br><a href="mailto:level3.networkrelocations@level3.com">level3.networkrelocations@level3.com</a>                                                            |
| MCI                                                      | Communications / Fiber Optic | Todd Mars<br>16563 NW 15th Ave<br>Miami, FL 33169                                        | (786) 886-4238<br><a href="mailto:todd.mars@one.verizon.com">todd.mars@one.verizon.com</a>                                                                                         |
| Miami-Dade County Public Works and Traffic               | Not Available                | Octavio Vidal<br>13284 SW 120th Street<br>Miami, FL 33186                                | (305) 412-0891 Ext. 201<br><a href="mailto:ovidal@htlocating.com">ovidal@htlocating.com</a>                                                                                        |

**Table 6.6 – UAO Contact List (Continued)**

| Utility Company                      | Facility              | Contact Information                                                                                      |                                                                                                        |
|--------------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Miami-Dade County Water & Sewer      | Water and Sewer       | Sergio Garcia<br>3575 South Lejeune Road<br>Miami, FL 33146                                              | (786) 268-5320<br><a href="mailto:sergio.garcia@miamidade.gov">sergio.garcia@miamidade.gov</a>         |
| Sprint                               | Fiber Optic           | Mark Caldwell<br>851 Rafalgar Court<br>Suite 300<br>Maitland, FL 32751                                   | (321) 287-9942<br><a href="mailto:mark.d.caldwell@sprint.com">mark.d.caldwell@sprint.com</a>           |
| TECO People Gas South Florida        | Gas                   | David Rivera<br>5101 NW 21st Avenue<br>Suite 460<br>Fort Lauderdale, FL 33309                            | (954) 453-0794<br><a href="mailto:drrivera@tecoenergy.com">drrivera@tecoenergy.com</a>                 |
| Town of Davie – Utilities Department | Water and Sewer       | Laura Borgesi<br>6591 Orange Drive<br>Davie, FL 33314                                                    | (954) 797-1096<br><a href="mailto:laura_borgesi@davie-fl.gov">laura_borgesi@davie-fl.gov</a>           |
| Town of Pembroke Park                | Sanitary, Sewer Storm | Raul Carbonell<br>Craig A. Smith and Associates<br>7777 Glades Road<br>Suite 410<br>Boca Raton, FL 33434 | (561) 791-9280<br><a href="mailto:rcarbonell@craigasmith.com">rcarbonell@craigasmith.com</a>           |
| Windstream Communications            | Fiber Optic           | David F. Ackerman<br>929 Marthas Way<br>Hiawatha, IA 52233                                               | (800) 289-1901<br><a href="mailto:David.F.Ackerman@Windstream.com">David.F.Ackerman@Windstream.com</a> |
| XO Communications                    | Fiber Optic           | Tony Kowaleski<br>16563 NW 15th Avenue<br>Miami, FL 33169                                                | (305) 356-3160<br><a href="mailto:anthony.kowaleski@xo.com">anthony.kowaleski@xo.com</a>               |

**Notes:** The UAO contact list was developed based on letters sent to each UAO or via responses received from the UAO within the I-95 corridor at the beginning of the PD&E Study.



The following summarizes potential conflicts with the existing utility facilities within the study area. The crossing roadways and distances described below are approximate locations.

**American Traffic Solutions** – The location of the facilities was not provided by American Traffic Solutions at this phase. Potential impacts (if any) are to be coordinated with American Traffic Solutions in future phases of the project.

**AT&T Corporation (International)** – Potential impacts to buried fiber optics were identified at the north side of Hallandale Beach Boulevard between South Park Road and NW 10<sup>th</sup> Terrace.

**AT&T Distribution** – Potential impacts to aerial and buried fiber optic were identified at the following locations:

- On the south side of Hallandale Beach Boulevard between South Park Road and Ansin Boulevard, there are ducts with copper, PVC, and flexible pipelines underground.
- North side of Hallandale Beach Boulevard between South Park Road and SW 31<sup>st</sup>. Avenue: overhead lines.
- North side of Pembroke Road between the I-95 southbound off-ramp and NW 10<sup>th</sup> Avenue: ducts with copper and flexible pipe underground and overhead lines.
- South side of Pembroke Road underneath I-95: underground.
- South side of Pembroke Road between South Park Road and SW 31<sup>st</sup> Avenue: underground.

**Broward County Traffic Engineering** – Potential impacts to buried fiber optic were identified at the following location:

- Buried Underground Fiber – from Hallandale Beach Boulevard to Johnson Street running along the east side of I-95.



**Broward County Water and Wastewater Services** – Potential impacts were identified at the following locations:

- Along Hallandale Beach Boulevard, 6" CIP water main, 8" water main, and 18" water main casing within CSX railroad right of way running on the north side of the road, 8" CAP water main on the south side of the road west of I-95.
- Along Pembroke Road, 12" water main, valves, and manholes from South Park Road to west of I-95.

**Century Link** – Potential impacts were identified at the following locations:

- North side of Hallandale Beach Boulevard from South Park Road to NW 10<sup>th</sup> Terrace: fiber optic underground.
- North side of Pembroke Road from South Park Road to east of I-95: fiber optic underground.

**City of Hallandale Beach** – No impacts.

**City of Hollywood Public Works Department** – No impacts.

**Comcast Cable** – Potential impacts were identified at the following locations:

- I-95 at the Miami-Dade/Broward County line: underground crossing
- Along the Hallandale Beach Boulevard north side of the road: aerial
- Hallandale Beach Boulevard at CSX railroad and I-95: underground crossing
- Hallandale Beach Boulevard: aerial crossing at Bryan Road
- Hallandale Beach Boulevard: underground crossing at SW 30<sup>th</sup> Avenue
- Along the west side of I-95 limited access right of way line south of Pembroke Road: aerial.

**Crown Castle NG** – Potential impacts were identified at the following locations:

- North side of Hallandale Beach Boulevard from west of SW 40<sup>th</sup> Avenue to east of Dixie Highway: buried





**Fiberlight LLC** – Fiberlight LLC did not provide the location of the facilities at this phase. Potential impacts (if any) will be coordinated with Fiberlight LLC in future phases of the project.

**Florida City Gas** – Potential impacts were identified at the following location:

- Hallandale Beach Boulevard from South Park Road to SW 31<sup>st</sup> Avenue north side: 4" steel gas main

**Fibernet Direct** – Potential impacts were identified at the following locations:

- Buried Underground Fiber – Within the existing I-95 right of way (west side), from north of the I-95 southbound off-ramp to Ives Dairy Road to Hallandale Beach Boulevard and from I-95 southbound off-ramp to Hallandale Beach Boulevard to I-95 northbound off-ramp to Pembroke Road
- Buried Underground Fiber – west of the I-95 right of way (west side), from north of the off-ramp to Ives Dairy Road to Hallandale Beach Boulevard
- Buried Underground Fiber – in the vicinity of the existing I-95 right of way (east side), from the I-95 northbound off-ramp to Pembroke Road to the ramp terminal
- Along Hallandale Beach Boulevard on the south side from west of the I-95 southbound on-ramp ramp terminal to Ansin Boulevard: buried
- Hallandale Beach Boulevard at Ansin Boulevard crossing: buried
- Along Pembroke Road on the south side from SW 31<sup>st</sup> Avenue to east of NW 8<sup>th</sup> Avenue: buried

**Florida Department of Transportation (ITS)** – Potential impacts were identified at the following locations:

- Along I-95 northbound on the east side from Miami-Dade County/Broward County line to north of Johnson Street
- Along Hallandale Beach Boulevard on the south side from S. Park Rd. to Ansin Blvd.
- Along Pembroke Road on the south side from S. Park Rd. to NW 9<sup>th</sup> Ave.
- Along Hollywood Boulevard from CSX Crossing to east of I-95 NB off-ramp.



**Florida Power & Light** – Potential impacts were identified at the following locations:

- Miami-Dade/Broward County Line – overhead 13K power line
- Hallandale Beach Boulevard – overhead 13k power line
- Pembroke Road – overhead 13k power line
- Washington Street crossing I-95 – overhead 13k power line

**Level 3 Communications** – Potential impacts were identified at the following locations:

- North side of Hallandale Beach Boulevard – fiber optic underground
- North side of Pembroke Road – fiber optic underground

**MCI** – According to the review conducted by MCI/Verizon, the UAO does have existing facilities within the project's limits. Their facilities are located within the CSX railway right of way. Potential impacts within these areas are to be coordinated with MCI.

**Miami-Dade County Public Works and Traffic** – Miami-Dade Public Works and Traffic did not provide the location of the facilities at this phase. Potential impacts to street lighting and traffic signals (if any) will be coordinated with Miami-Dade County Public Works and Traffic in future phases of the project.

**Sprint** – Sprint did not provide the location of the facilities at this phase. Potential impacts (if any) will be coordinated with Sprint in future phases of the project.

**Windstream Communications** – Potential impacts were identified at the following location:

- South side of Hallandale Beach Boulevard from 1<sup>st</sup> St. to Ansin Blvd.

**XO Communications** – According to the review conducted by XO Communications, the UAO does have existing facilities within the project's limits. Fibernet Direct controls and maintains these area facilities. Fibernet Direct did not provide the location of XO Communications facilities at this phase.

Coordination with the UAOs will continue during the Design phase. The proposed design and utility field verification (verified vertical and horizontal (VVH) data) will be further refined during this phase. Special construction equipment and techniques may be utilized to avoid utility conflicts.



### 6.1.12 DRAINAGE AND STORMWATER FACILITIES

The agencies with stormwater permitting jurisdiction over the proposed study area and the required permits include:

- South Florida Water Management District (SFWMD) – General Environmental Resource Permit (ERP) and Consumptive Water Use Permit for dewatering and irrigation.
- United States Army Corps of Engineers – Dredge and fill permits are required for proposed work in, under or above surface waters or wetlands.
- Florida Department of Environmental Protection – An NPDES (Erosion Control Plans, Stormwater Pollution Prevention Plan, Notice of Intent and Notice of Termination) Permit is required due to the disturbance of more than one acre of soil.

During the PD&E development process, coordination was conducted with FDOT. The meeting included discussions on existing drainage conditions, potential impacts to the current drainage system, and opportunities for stormwater management. Key topics addressed included the 25-year, 72-hour storm event and the application of the pre- versus post-development runoff rule for attenuation. FDOT staff confirmed the use of a volumetric approach for estimating stormwater attenuation.

SFWMD has established several criteria for water quality, depending on the proposed type of stormwater treatment facility. All proposed stormwater management facilities will provide the necessary water quality treatment volume and limit the post-development peak discharge rate to the pre-development peak discharge rate. Water quality treatment and discharge attenuation will be provided via existing and proposed dry and wet detention/retention ponds, linear swales and French drains. The proposed stormwater management facilities have been designed to maintain all offsite flows into FDOT right of way while maintaining maximum pre-development flood elevations.

Based on the conceptual drainage design evaluation for the proposed improvements, the stormwater management facilities will meet FDOT drainage criteria as well as SFWMD criteria. The improvements will have no negative drainage impacts to the surrounding areas and the proposed stormwater management facilities will have the capacity to adequately treat and attenuate roadway runoff within the project limits.



A description of the post development conditions at each system is summarized below. Additional details about the drainage features are documented in the *Conceptual Drainage Report*, a companion document to this PD&E Study. A Preferred Alternative drainage map is provided in **Appendix M**.

Proposed drainage basins differ from the existing drainage basins/systems identified in the latest I-95 improvement documents (FDOT project FPID 422796-1-52-01 and 422796-2-52-01) as Basins 1-4/Systems 4-6. As a result of our research, it has been determined that Basins 3 and 4 have two different outfalls and therefore, it is more appropriate to separate them into two different basins/drainage systems for water quality treatment and attenuation purposes. Therefore, in the proposed conditions, there are five independent drainage basins and six drainage systems.

**Basin 1 (Systems 3 & 4)** – This drainage basin encompasses I-95 between station limits 177+50 and 247+38 between the Ives Dairy Road interchange and Hallandale Beach Boulevard. The basin is subdivided into 1A-L, 1B-L, 1C-L, 1D-L & 1E-L at the I-95 west side and 1A-R, 1B-R, 1C-R, & 1D-R at the east side. Runoff from I-95 sheet flows into roadside swales and French drains located along the east side of I-95. These roadside swales will provide part of the water quality treatment and stormwater attenuation using ditch block weirs. Basin 1L and 1R are comprised of swales S-L1A, S-L1B, S-L1C, S-L1D, S-R1 and S-R4. Dry detention pond S-L2 is in a new parcel. This system consists of dry swales with a bottom elevation of 2.0 feet and berm at between 5.0 & 6.50 feet NAVD 88. Weir control elevation is raised to 4.20 feet NAVD 88 to provide partial treatment and attenuation volume for this basin. The excess stormwater runoff overflows these weirs and discharges into infield ponds at the I-95 and Ives Dairy Road interchange, which ultimately discharges to the C-9/Snake Creek Canal. This basin is located within the SFWMD's C-9 East Basin.

**Basin 2 (System 5)** – This drainage basin encompasses I-95 between station limits 247+38 and 287+92 between Hallandale Beach Boulevard and Pembroke Road. The basin is subdivided into 2A-L, 2B-L, 2C-L, 2D-L, 2E-L & 2F-L at the west side and 2A-R, 2B-R, 2C-R & 2D-R at the I-95 east side. Runoff from this segment of I-95 sheet flows into the remaining roadside swales, ponds and swales located along both sides of I-95 identified as SL-4 at the west side and S-R5, S-R6, S-R7A and SR-8 at the east side of I-95. Among those, only SR-8 are in a new parcel. These roadside ponds and swales will provide water quality treatment and stormwater attenuation using ditch block weirs. This system consists of dry swales with a bottom elevation of 1.5 feet NAVD 88 to provide partial treatment and attenuation for this basin and a weir control



elevation raised to 4.45 feet NAVD 88. Excess stormwater runoff overflows these weirs and discharges into the 84" pipe that crossed under I-95 at approximately station 274+90.00 which discharges to the existing Pump Station (Financial Project ID: 409733-1-52-01) located east of SW 30th Ave. From this pump station the water will be pumped through a pressurized 64" pipe that runs under the railroad line and Pembroke Road to discharge into an existing canal southeast of the Orangebrook Golf Course which, ultimately discharges to the SFWMD C-10 Canal.

**Basin 3 (System 6)** – This drainage basin encompasses I-95 between station limits 287+92 and 341+98, between Pembroke Road and Hollywood Boulevard. The basin is subdivided into 3A-L, 3B-L, 3C-L, 3D-L, 3E-L & 3F-L at the I-95 west side, and 3A-R, 3B-R, 3C-R, 3D-R & 3E-R. Runoff from this segment of I-95 sheet flows into remaining roadside swales and french drains located along both sides of I-95 identified as SR-9, SR-10 & SR-11 at the east side and SL-5A-1, SL-5A-2, SL-5B, SL-5C & SL-5D at the I-95 west side. Modified roadside swales provide partial water quality treatment and stormwater attenuation using ditch block weirs. This system consists of dry detention swales with a bottom elevation of 1.5 feet NAVD 88 and a weir control elevation raised to 3.5 feet NAVD 88, except the swales located to north of Pembroke Road interchange (SL-5A-1 & SR-9) whose bottom elevation is 3 feet NAVD 88 and a weir control elevation raised to 6.5 feet NAVD 88. A new proposed Pump Station located in the northeast of Basin 3 (south of Hollywood Boulevard) will pump the excess stormwater runoff to the proposed stormwater pond within the Sunset Golf Course on the east side of the I-95 corridor and ultimately will be discharged to the SFWMD' C-10 Canal. This basin is located within the SFWMD's C-10 Basin.

**Basin 3 Offsite Drainage Area** – There are 2.38 Acres on the west side of the I-95 and east of the Railroad Tracks that are contributing to the FDOT drainage system. The runoff contribution from this adjacent offsite area has been included in the water quality and quantity calculations for the proposed conditions.

**Basin 4 (System 7)** – This drainage basin encompasses I-95 between station limits 341+98 and 369+46, between Hollywood Boulevard and Johnson Street. The basin is subdivided into 4A-L, 4B-L, 4C-L & 4D-L at the west side, and 4A-R & 4B-R at the east of I-95. Runoff from this segment of I-95 sheet flows into the remaining roadside swales located along both sides of I-95 identified as SL6, S-R12, S-R13, S-R14 and S-R15. Among those, swale S-R13 is in two (2) new parcels. This system consists of dry swales with a bottom elevation of 1.5 feet NAVD 88 and a weir control elevation raised to 3.5 feet





NAVD 88. These modified roadside swales provide water quality treatment and stormwater attenuation using ditch block weirs. The excess stormwater runoff will be discharged to the ditch to the west proposed stormwater pond within the Sunset Golf Course on the east side of the I-95 corridor and ultimately discharged into the C-10 Canal just north of Johnson Street. This basin is located within the SFWMD's C-10 Basin.

**Basin 4 Offsite Drainage Area** – There are 0.93 Acres on the west side of the I-95 and east of the Railroad Tracks that are contributing to the FDOT drainage system. The runoff contribution from this adjacent offsite area has been included in the water quality and quantity calculations for the proposed conditions.

There are also approximately 106 Acres from the adjacent neighborhood that are interconnected with the FDOT I-95 drainage system that sheet flows into the FDOT conveyance swale running of the east side of the I-95. The stormwater runoff coming from the neighborhood sheet flows into the FDOT conveyance swale, running along the east side of the I-95. Currently, there is ongoing coordination between the FDOT, the City of Hollywood and SFWMD regarding the treatment and attenuation of the offsite area that is interconnected with the FDOT drainage system.

**Basin 5 (System 8)** – This drainage basin encompasses I-95 between Johnson Street and approximately 800 feet to the North, where the northbound widening is ending. Basically, the I-95 improvements north of Johnson Street are included in the Sheridan interchange project. The basin is subdivided into 5 AL basin on the west side and 5 AR on the east side. Since no improvements in the southbound direction are happening under this project, no analysis has been performed for Basin 5 AL. The stormwater runoff from the 5 AR basin is being routed to a new proposed retention Pond located in the adjacent Sunset Golf Course, which will provide water quality and attenuation for this basin as well for basins 3 & 4. In addition, a total of 4.6 Ac-Ft of stormwater runoff pertaining to the Sheridan Street interchange project has been included to be treated and attenuated withing the proposed pond at Sunset Golf Course. This basin is located within the SFWMD's C-10 Basin.

**Side Street/Arterial Street Drainage** – There are three arterial streets within the project limits of the I-95 corridor: Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard. Each of those side streets, beyond the interchanges, has its own drainage system. Exfiltration trenches will be provided as necessary to accommodate the improvements within the interchange areas.



### 6.1.13 FLOODPLAIN ANALYSIS

The project corridor lies within Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) panel numbers 12011C0568H and 12011C731H in Broward County. The project is predominantly located within the 100-year floodplain, within flood zones AE, AH, and X. Zone AE designates flood hazard areas inundated by 100-year flood; Zone AH designates shallow flooding areas where average depths are between 1 and 3 feet for the 100-year flood; and Zone X designates flood hazard areas outside the 100-year flood zone but within the 500-year flood zone.

In accordance with Executive Order 11988 "Floodplain Management", USDOT Order 5650.2, "Floodplain Management Protection", and Federal-Aid Policy Guide 23 CFR 650A, floodplains must be protected. The intent of these regulations is to avoid or minimize highway encroachments within the base floodplains, and to avoid supporting land use development incompatible with floodplain values.

Preliminary flood encroachment was estimated using existing roadway cross-sections for project FPID# 422796-1-52-01. **Table 6.6A** shows estimated required floodplain compensation.

**Table 6.6A – Summary of Floodplain Encroachment**

| SFWMD BASIN   | BASIN   | FLOODPLAIN ENCROACHMENT (AC-FT) |
|---------------|---------|---------------------------------|
| C-9           | BASIN 1 | 5.90                            |
| C-10          | BASIN 2 | 4.34                            |
|               | BASIN 3 | 9.33                            |
|               | BASIN 4 | 1.08                            |
| <b>Total:</b> |         | <b>20.66</b>                    |

The preliminary evaluation indicates that the volume of excavation proposed by the ponds at the Sunset Golf Course will mitigate the expected encroachment. The proposed improvements included in this project will result in an insignificant change in their capacity to carry floodwater. This change will cause minimal increases in flood heights and flood limits. These minimal increases will not result in any significant change in flood risks or damage. There will not be a significant change in the potential for interruption or termination of emergency services or



emergency evacuation routes. Therefore, it has been determined that the proposed encroachment is not significant.

Detailed floodplain encroachment calculations will be completed when roadway geometry and cross sections are developed further during the Design phase. Given the increase in storage within the corridor for stormwater management, there is no change in flood “risk” or adverse floodplain impacts associated with this project.

#### 6.1.14 TRANSPORTATION MANAGEMENT PLAN

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

1. Identified Logical Project Splits
2. Prepared Schematic Line Diagrams
3. Developed Construction Costs Estimates (LRE)
4. Summarized Segmentation Plan

The evaluation recommended four projects (see **Figure 6.15**):

##### Project 1 – FPID# 436903-2

I-95 Southbound between Johnson Street and Pembroke Road. This project includes the following improvements:

- Southbound off-ramp to Hollywood Boulevard and Pembroke Road
- Southbound on-ramp from Hollywood Blvd
- Southbound local connection ramp between Hollywood Boulevard and Pembroke Road
- Hollywood Boulevard improvements from the centerline of I-95 to the west
- Pembroke Road improvements from the centerline of I-95 to the west (westbound lanes only)
- Relocation of Toll Site from east side to west side
- Joint Use Pond at former Sunset Golf Course property

##### Project 2 – FPID# 436903-3

I-95 Southbound between Pembroke Road and Ives Dairy Road. This project includes the following improvements:



- Pembroke Road improvements from the centerline of I-95 to the west (eastbound lanes only)
- Southbound on-ramp from Pembroke Road
- Southbound off-ramp to Hallandale Beach Boulevard
- Southbound on-ramp from Hallandale Beach Boulevard
- Southbound local connection ramp between Pembroke Road and Ives Dairy Road
- Hallandale Beach Boulevard improvements from centerline of I-95 to the west

Project 3 – FPID# 436903-4

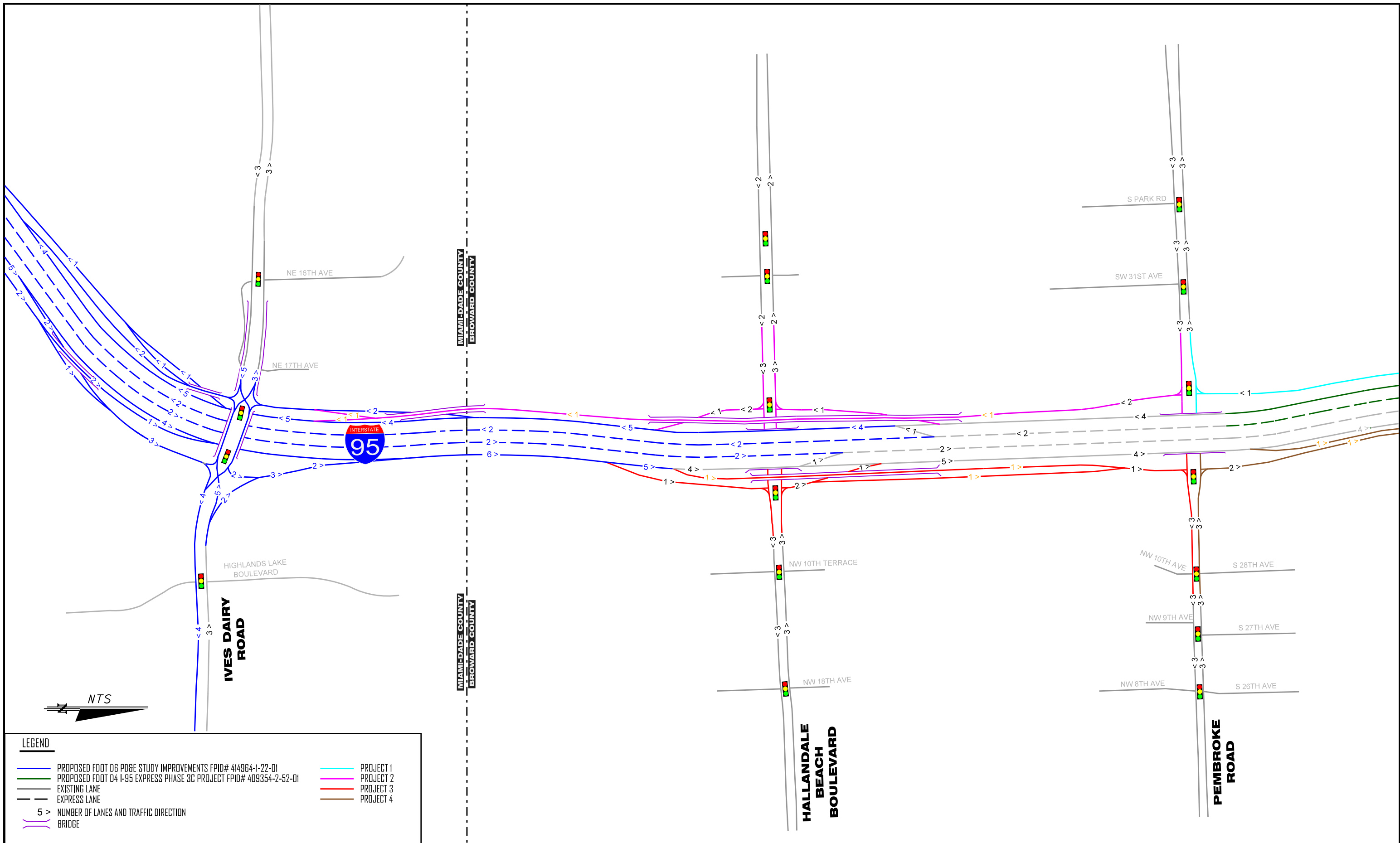
I-95 Northbound between south of Hallandale Beach Boulevard and Pembroke Road. This project includes the following improvements:

- Northbound off-ramp to Hallandale Beach Boulevard
- Northbound off-ramp to Pembroke Road
- Northbound on-ramp from Hallandale Beach Boulevard
- Northbound local connection ramp between Hallandale Beach Boulevard and Pembroke Road
- Improvements along Ansin Boulevard
- Hallandale Beach Boulevard improvements from the centerline of I-95 to the east
- Pembroke Road improvements from the centerline of I-95 to the east (eastbound lanes only)

Project 4 – FPID# 436903-5

I-95 Northbound between Pembroke Road and Johnson Street. This project includes the following improvements:

- Northbound on-ramp from Pembroke Road
- Northbound off-ramp to Hollywood Boulevard
- Pembroke Road improvements from the centerline of I-95 to the east (westbound lanes only)
- Northbound collector distributor roadway between Pembroke Road and Hollywood Boulevard
- Hollywood Boulevard improvements from the centerline of I-95 to the east
- Northbound on-ramp from Hollywood Boulevard
- Northbound Johnson Street bridge widening



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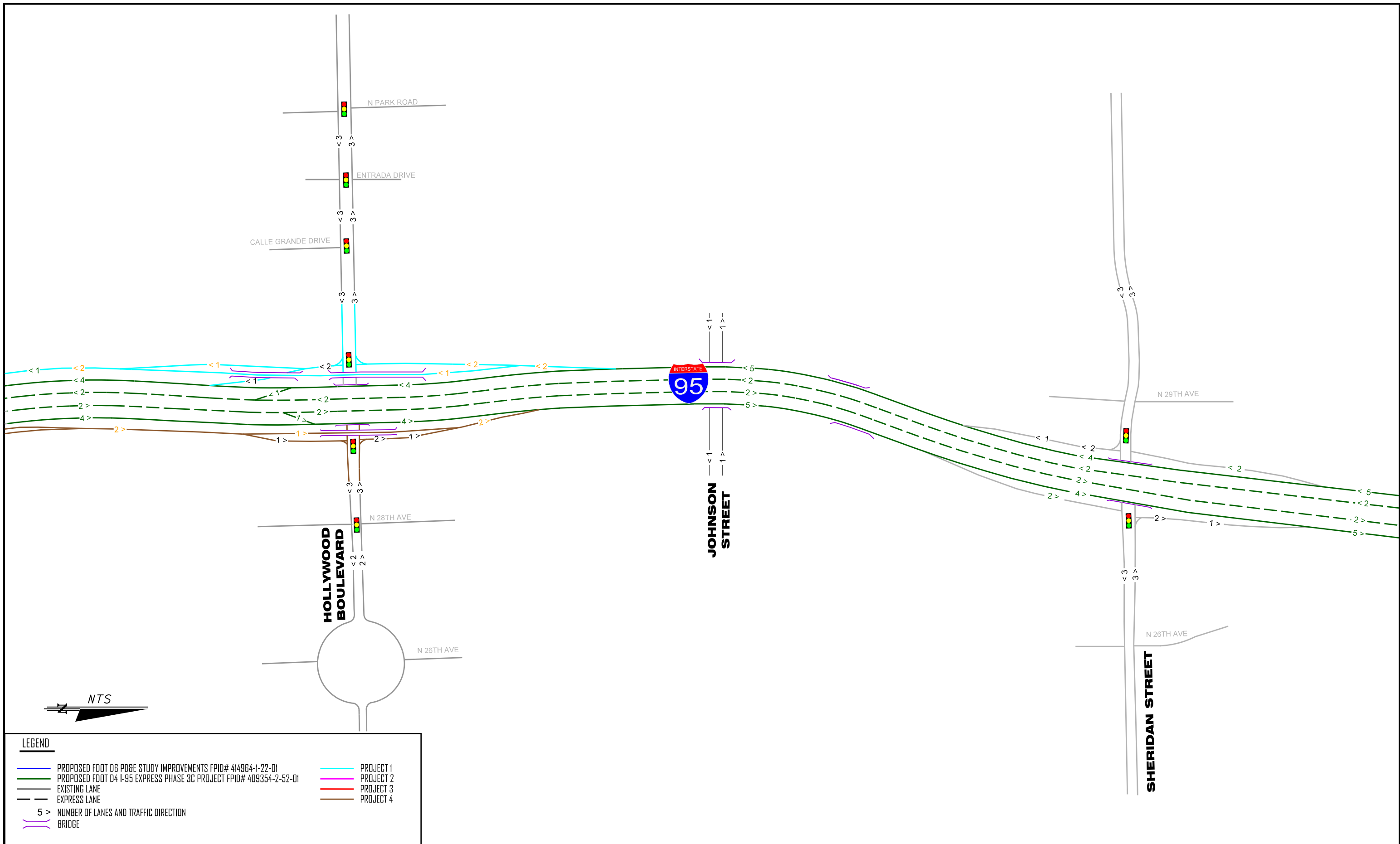


**I-95 (SR 9) PROJECT DEVELOPMENT & ENVIRONMENT STUDY**  
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)  
FPID No.: 436903-I-22-02  
ETDM No.: 14254

**SR 9 (INTERSTATE 95)**  
**PROJECT SEGMENTATION PLAN**  
**PREFERRED ALTERNATIVE LINE DIAGRAM**

**FIGURE**  
**6.15**  
**6-57**





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**SR 9 (INTERSTATE 95)  
PROJECT SEGMENTATION PLAN  
PREFERRED ALTERNATIVE LINE DIAGRAM**

**FIGURE  
6.15  
6-58**



### 6.1.15 SPECIAL FEATURES

Existing noise walls are located within the project corridor. These noise walls have been evaluated as part of a Noise Study Analysis and are summarized under **Section 6.2.7**.

Retained earth support systems are proposed to retain the roadway approach embankments at bridge ends. When determining the appropriate wall type, the FDOT's Structures Design Guidelines (SDG) require the consideration of site, aesthetics, economics, maintenance, and constructability. As is typical of projects within the I-95 corridor, considering these factors quickly leads to selecting mechanically stabilized earth (MSE) walls as the predominant permanent wall type. For the proposed structures, it is anticipated that all new Bridges 1 through 8 will use MSE walls at both ends, front and sides.

Drainage requirements, maintenance of traffic, and various other site-specific challenges will complicate the design and construction of these walls. Some of these unique challenges are discussed in more detail below. Additional coordination with other disciplines will be required in later stages of design.

- Back-to-Back MSE Walls – The narrow single lane roadway approaches may require back-to-back walls. These back-to-back systems should be coordinated with the geotechnical engineer to ensure that the additional requirements of *SDG Section 3.13.2* are satisfied.
- MSE Walls Adjacent to the Right of Way – The proposed alternative limits right of way acquisition by maximizing use of the existing right of way. As such, MSE walls are proposed directly adjacent to the existing right of way along the roadway approach to Bridges 1 and 3. Temporary construction easements may be required to facilitate the construction of these walls. Furthermore, the FDOT Maintenance Office will be consulted regarding future access requirements for inspection and maintenance. *FDM Section 211.16* requires a 10-foot wide maintenance berm in front of the wall face to provide suitable access for maintenance vehicles and inspection.
- MSE Wall Height Limit – The maximum allowable MSE wall height is 40 feet, measured as the vertical distance from the top of the leveling pad to the top of the coping. The walls in the vicinity of Bridge 6 are approaching this



limit. During the later stages of design, careful attention should be paid to the profile in this area to ensure this limit is not exceeded.

- Previous MSE Wall Widening by Direct Connection to Existing MSE Wall – The portions of MSE wall along I-95 southbound, to the north and south of Hallandale Beach Boulevard and Pembroke Road were widened by connecting the MSE reinforcing strips directly to the face of the existing MSE wall panels. With this connection detail, the newly constructed wall depends entirely on the existing wall for external stability. Based on previous experience and coordination with proprietary wall companies, this type of connection cannot be extended in a similar manner. In other words, the panels of a proposed wall cannot be connected directly to the panels of a wall that are directly connected to another wall. The existing wall plans for this type of connection will be carefully reviewed. Alternate wall types may need to be investigated at these locations, or portions of the existing wall may need to be removed and reconstructed.
- Proposed Ponds/Swales at the Base of Proposed Walls – Swales and ponds located at the base of proposed MSE walls will force leveling pads lower and may trigger coarse aggregate backfill requirements. Pond/swale locations and elevations will be coordinated with the drainage engineer. Furthermore, the D4 Maintenance Office will be consulted about any specific maintenance access requirements or concerns.
- Excavation for Bridge Foundations at the Base of Existing MSE Walls – Due to the location of proposed bridges, several bridge foundations will need to be constructed in proximity to existing MSE walls. Excavation for these foundations at the base of the existing MSE wall may adversely affect the external stability of the wall system, resulting in global instability. Temporary sheet or soldier pile walls will need to be constructed to allow excavation. Careful attention must be paid to construction vibration impacts on the existing wall during the installation of sheet piles or soldier piles. To design these walls, the pressured-in sheet piles or predrilling of the soldier piles will need to be evaluated by the geotechnical engineer.
- In addition to MSE walls, other more complex permanent wall types may be required at Hallandale Beach Boulevard and Pembroke Road. Currently, drainage ponds/swales are proposed at the base of existing MSE walls in the northeast corner of the Hallandale Beach Boulevard interchange and the northwest and southwest corners of the Pembroke Road interchange.



Excavating these ponds/swales in front of the existing MSE wall may adversely affect the external stability of the wall system, resulting in global instability. One alternative would be to construct a bulkhead wall at the base of the existing MSE wall to allow for the pond/swale excavation.

The proposed walls will match the theme and features of the existing walls along the project corridor in terms of aesthetics.

#### 6.1.16 DESIGN VARIATION AND DESIGN EXCEPTIONS

The PD&E Study limits overlap with the I-95 Express Phase 2 and Phase 3C projects. The I-95 Express Phase 2 opened to traffic in 2016. I-95 Express Phase 3C is currently under construction. Both projects documented Design Exceptions and Variations along the I-95 mainline, which includes the limits of this PD&E Study. The focus of this PD&E Study was to evaluate and propose interchange improvements only. Therefore, the study did not propose geometric improvements along the I-95 mainline.

**Table 6.7** summarizes design controls and criteria that will need a Design Variation or Design Exception due to the PD&E Study's preferred alternative improvements.

**Table 6.8** summarizes Design Variations and Exceptions that currently exist along the corridor and may need to be updated during the Design phase.



**Table 6.7 – Preferred Alternative Design Variations and Design Exceptions**

| Description                                                  | Begin                          | End                           | Length  | Proposed (Top)<br>Required (Bottom) | Explanations/ Comments                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------|--------------------------------|-------------------------------|---------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Design Speed Variation</b>                                |                                |                               |         |                                     |                                                                                                                                                                                                                                                                                                                         |
| Collector Distributor Roadway                                | Pembroke Road                  | Hollywood Boulevard           | -       | 45 MPH<br>55MPH                     | FDM Requires 55 MPH – 10 MPH less than the mainline design speed<br>The 45 MPH design speed is dictated by the vertical geometry of the collector distributor systems. Substandard Interchange spacing along with right of way constraints and limitations prohibit a vertical geometry that meets the 55 MPH standard. |
| <b>Border Width Design Variation</b>                         |                                |                               |         |                                     |                                                                                                                                                                                                                                                                                                                         |
| Border Width (throughout the project)                        | Miami-Dade/Broward County Line | Johnson Street                | 16,340' | Varies                              | Existing and proposed condition. Necessary to avoid significant right of way impacts along both sides of the corridor and interchanges.                                                                                                                                                                                 |
| <b>Bicycle Lane Width Variation</b>                          |                                |                               |         |                                     |                                                                                                                                                                                                                                                                                                                         |
| Westbound Pembroke Road                                      | West of I-95                   | I-95                          | 540'    | 4'-7'<br>7'                         | Necessary to avoid impacting the Orangebrook Golf Course, which is a Section 4(f) Site                                                                                                                                                                                                                                  |
| Eastbound Pembroke Road                                      | East of I-95                   | South 28 <sup>th</sup> Avenue | 400'    | 4'<br>7'                            | Necessary to avoid right of way impacts and potential relocations                                                                                                                                                                                                                                                       |
| <b>Shoulder Width Design Exception</b>                       |                                |                               |         |                                     |                                                                                                                                                                                                                                                                                                                         |
| Northbound Direct Access to Pembroke Road (Inside Shoulder)  | Hallandale Beach Boulevard     | Pembroke Road                 | 2315'   | 0-2'<br>6'                          | Necessary to avoid right of way impacts and reconstruction of Ansin Boulevard.                                                                                                                                                                                                                                          |
| Northbound Direct Access to Pembroke Road (Outside Shoulder) | Hallandale Beach Boulevard     | Pembroke Road                 | 2415'   | 1'<br>6'                            | Necessary to avoid right of way impacts and reconstruction of Ansin Boulevard.                                                                                                                                                                                                                                          |





**Table 6.8 – Existing Design Variations and Design Exceptions**

| Description                                                    | Begin                                                     | End                                                       | Length  | Proposed (Top)<br>Required (Bottom) |
|----------------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|---------|-------------------------------------|
| <b>Shoulder Width Design Variation</b>                         |                                                           |                                                           |         |                                     |
| Northbound I-95 Express Lanes                                  | Just north of the Miami-Dade/Broward County Line (208+82) | South of Hallandale Beach Boulevard (225+13)              | 1,631'  | 10'-12'<br>12'                      |
| Northbound I-95 Express Lanes                                  | North of Pembroke Road (310+39)                           | South of Hollywood Boulevard (321+96)                     | 1,157'  | 10'-12'<br>12'                      |
| Southbound I-95 Express Lanes                                  | South of Hollywood Boulevard (323+74)                     | North of Pembroke Road (295+49)                           | 2,825'  | 10'-12'<br>12'                      |
| Southbound I-95 Express Lanes                                  | South of Hallandale Beach Boulevard (217+86)              | Just north of the Miami-Dade/Broward County Line (212+66) | 520'    | 10'-12'<br>12'                      |
| <b>Shoulder Width Design Exception</b>                         |                                                           |                                                           |         |                                     |
| Northbound I-95 Express Lanes                                  | South of Hallandale Beach Boulevard (225+13)              | North of Pembroke Road (310+39)                           | 8,526'  | 5'-10'<br>10'                       |
| Northbound I-95 Express Lanes                                  | South of Hollywood Boulevard (321+96)                     | Johnson Street (370+14)                                   | 4,818'  | 5'-10'<br>10'                       |
| Southbound I-95 Express Lanes                                  | Johnson Street (370+14)                                   | South of Hollywood Boulevard (323+74)                     | 4,640'  | 5'-10'<br>10'                       |
| Southbound I-95 Express Lanes                                  | North of Pembroke Road (295+49)                           | South of Hallandale Beach Boulevard (217+86)              | 7,763'  | 5'-10'<br>10'                       |
| <b>Lane Width Design Exception</b>                             |                                                           |                                                           |         |                                     |
| Northbound I-95 Express Lanes and Two Inside General Use Lanes | Miami-Dade/Broward County Line                            | Johnson Street                                            | 16,340' | 11'<br>12'                          |
| Southbound I-95 Express Lanes and Two Inside General Use Lanes | Johnson Street                                            | Miami-Dade/Broward County Line                            | 16,340' | 11'<br>12'                          |
| <b>Buffer Width Design Variation</b>                           |                                                           |                                                           |         |                                     |
| Northbound I-95                                                | Miami-Dade/Broward County Line                            | Johnson Street                                            | 16,340' | 3'<br>4'                            |
| Southbound I-95                                                | Johnson Street                                            | Miami-Dade/Broward County Line                            | 16,340' | 3'<br>4'                            |



**Table 6.8 – Existing Design Variations and Design Exceptions (Continued)**

| Description                                                        | Begin                               | End                                 | Length | Proposed (Top)<br>Required (Bottom) |
|--------------------------------------------------------------------|-------------------------------------|-------------------------------------|--------|-------------------------------------|
| <b>Length of Horizontal Curve Design Exception</b>                 |                                     |                                     |        |                                     |
| I-95 South of Hallandale Beach Boulevard (Northbound & Southbound) | PC 234+30                           | PT 243+03                           | 873'   | 873'<br>975'                        |
| I-95 North of Pembroke Road (Northbound & Southbound)              | PC 291+90                           | PT 297+11                           | 521'   | 521'<br>975'                        |
| I-95 South of Hollywood Boulevard (Northbound & Southbound)        | PC 330+33                           | PT 336+61                           | 628'   | 628'<br>975'                        |
| I-95 North of Hollywood Boulevard (Northbound & Southbound)        | PC 346+72                           | PT 352+41                           | 569'   | 569'<br>975'                        |
| I-95 South of Johnson Street (Northbound & Southbound)             | PC 358+78                           | PT 364+39                           | 561'   | 561'<br>975'                        |
| <b>Length of Vertical Curve Design Variation</b>                   |                                     |                                     |        |                                     |
| I-95 (Crest Vertical Curve)                                        | South of Hallandale Beach Boulevard | North of Hallandale Beach Boulevard | 1,650' | 1,650'<br>1,800'                    |
| I-95 (Crest Vertical Curve)                                        | South of Pembroke Road              | North of Pembroke Road              | 1,750' | 1,750'<br>1,800'                    |
| I-95 (Crest Vertical Curve)                                        | South of Hollywood Boulevard        | North of Hollywood Boulevard        | 1,700' | 1,700'<br>1,800'                    |
| <b>Vertical Curve K-Value Design Variation</b>                     |                                     |                                     |        |                                     |
| I-95 (Crest Vertical Curve)                                        | South of Hallandale Beach Boulevard | North of Hallandale Beach Boulevard | -      | 307<br>401                          |
| I-95 (Crest Vertical Curve)                                        | South of Pembroke Road              | North of Pembroke Road              | -      | 304<br>401                          |
| I-95 (Crest Vertical Curve)                                        | South of Hollywood Boulevard        | North of Hollywood Boulevard        | -      | 306<br>401                          |
| I-95 (Crest Vertical Curve)                                        | South of Johnson Street             | North of Johnson Street             | -      | 306<br>401                          |
| I-95 (Sag Vertical Curve)                                          | North of Hollywood Boulevard        | North of Hollywood Boulevard        | -      | 164<br>181                          |



**Table 6.8 – Existing Design Variations and Design Exceptions (Continued)**

| Description                                                                             | Begin                                            | End                                      | Length | Proposed (Top)<br>Required (Bottom) |
|-----------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------|--------|-------------------------------------|
| <b>Stopping Sight Distance Design Variation</b>                                         |                                                  |                                          |        |                                     |
| Northbound I-95 Inside Express Lane                                                     | North of Pembroke Road (291+90)                  | North of Pembroke Road (297+11)          | 521'   | 658'<br>730'                        |
| <b>Potential Stopping Sight Distance Design Exception (Due to Express Lane markers)</b> |                                                  |                                          |        |                                     |
| Northbound I-95 Inside General Use Lane                                                 | Just north of Pembroke Road                      | North of Pembroke Road                   | 526'   | 423'<br>645'                        |
| Northbound I-95 Outside Express Lane                                                    | North of Hollywood Boulevard                     | South of Johnson Street                  | 560'   | 608'<br>645'                        |
| Southbound I-95 Inside General Use Lane                                                 | South of Johnson Street                          | North of Hollywood Boulevard             | 564'   | 611'<br>645'                        |
| Southbound I-95 Outside Express Lane                                                    | North of Pembroke Road                           | Just north of Pembroke Road              | 516'   | 419'<br>645'                        |
| <b>Potential Superelevation Variation</b>                                               |                                                  |                                          |        |                                     |
| I-95                                                                                    | Just north of the Miami-Dade/Broward County Line | South of Hallandale Beach Boulevard      | -      | 0.023<br>0.025                      |
| I-95                                                                                    | South of Hallandale Beach Boulevard              | Just south of Hallandale Beach Boulevard | -      | 0.030<br>0.033                      |
| I-95                                                                                    | Just north of Pembroke Road                      | North of Pembroke Road                   | -      | 0.050<br>0.056                      |

**Note:** These Design Exceptions and Variations are existing conditions and are already documented as part of the I-95 Express Phase 2 and Phase 3C projects. This PD&E Study does not propose geometric improvements along the I-95 mainline.



### 6.1.17 PROJECT COSTS

The total project cost for the preferred alternative is approximately \$316.3 million (see **Table 6.9**).

**Table 6.9 – Total Project Costs**

| Category                                                   | Cost                   |
|------------------------------------------------------------|------------------------|
| Construction Cost                                          | \$223 million          |
| Utilities                                                  | \$4.3 million          |
| Design (9%) <sup>1</sup>                                   | \$20 million           |
| Right of Way                                               | \$33 million           |
| Construction Engineering and Inspection (16%) <sup>2</sup> | \$36 million           |
| <b>Total Cost Estimate</b>                                 | <b>\$316.3 million</b> |

<sup>1</sup> 9% of Construction Cost

<sup>2</sup> 16% of Construction Cost



## 6.2 SUMMARY OF ENVIRONMENTAL IMPACTS OF THE PREFERRED ALTERNATIVE

### 6.2.1 FUTURE LAND USE

The existing land use within and adjacent to the project corridor was mapped using South Florida Water Management District (SFWMD) land use and cover nomenclature (see **Figure 6.16**). **Table 6.10** summarizes the existing land use and cover within the study area. The primary land uses adjacent to the project corridor are residential.

**Table 6.10 – Existing Land Use and Cover within the Study Area**

| Land Use and Cover                        | % Within Study Area |
|-------------------------------------------|---------------------|
| Channelized Waterways, Canals, Reservoirs | 6.19                |
| Commercial and Services                   | 21.21               |
| Educational Facilities                    | 5.09                |
| Golf Courses                              | 9.76                |
| Residential                               | 39.46               |
| Open Land                                 | 2.32                |
| Other Light Industry                      | 0.13                |
| Parks/Recreation                          | 2.95                |
| Roads                                     | 12.9                |

These plans include Future Land Use Elements as well as Transportation Elements. Refer to **Appendix N** for each municipality's and Broward County's future land use maps. As the existing corridor is developed, its future land use is anticipated to be very similar to the existing land use. The proposed improvements may result in redevelopment within the proposed study area, but this redevelopment will occur on land previously developed.



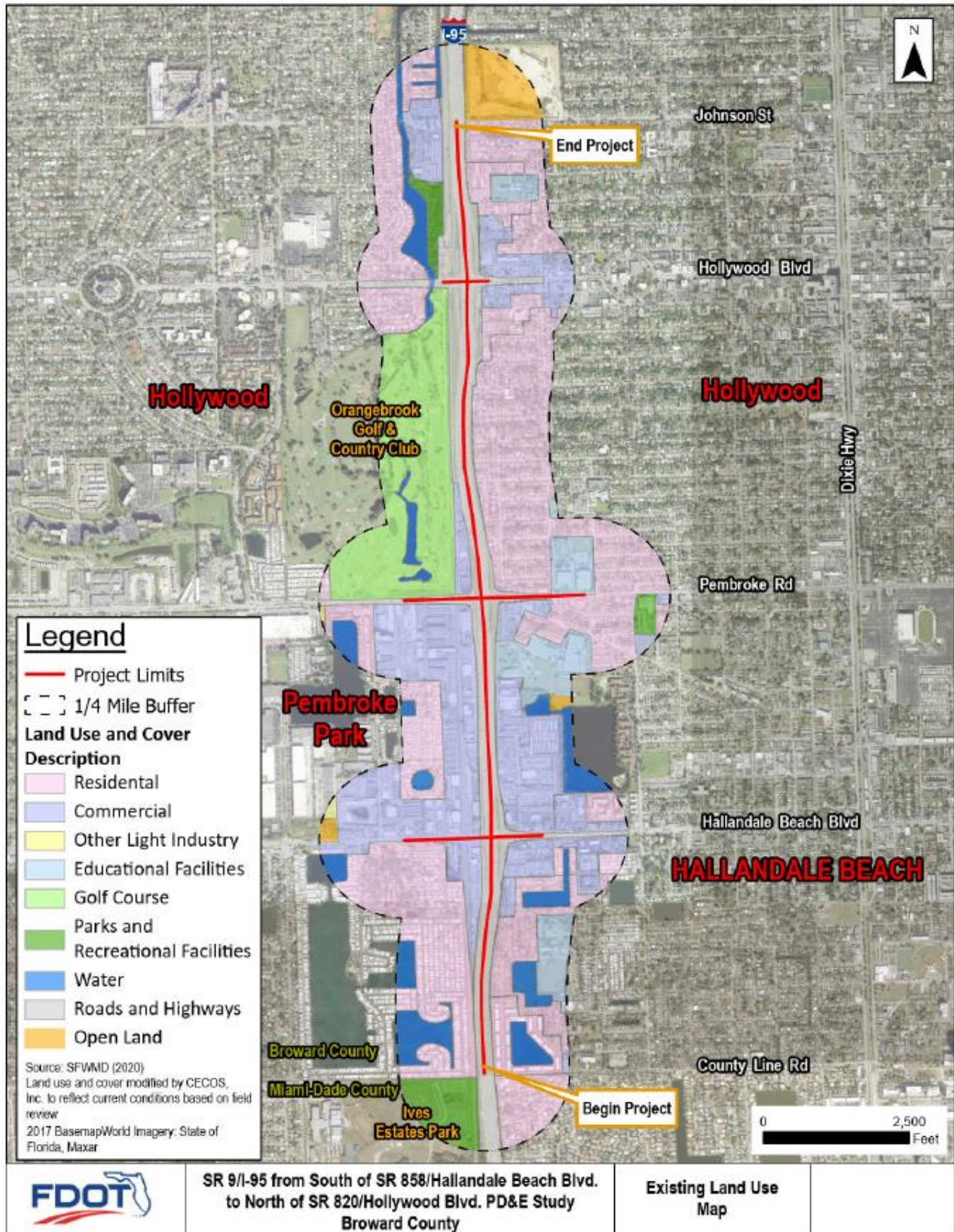


Figure 6.16 – Existing Project Corridor Land Use/Land Cover Map



As depicted on the City of Hallandale Beach's Future Land Use Map (completed as part of the City's Comprehensive Plan), the existing and future land uses area are similar in that both identify residential, commercial, and educational uses adjacent to I-95. The Town of Pembroke Park's existing land use in the project area is generally residential and commercial uses. As depicted on the City of Hollywood's Future Land Use Map (completed as part of the City's Comprehensive Plan), the project corridor consists of residential, commercial, parks and open space, educational facilities, and Regional Activity Center (RAC). A future RAC is proposed along Hollywood Boulevard, east of I-95 within the study limits. A RAC is a high intensity, high density multi-use area designed as appropriate for growth by the local government or jurisdiction. A RAC is intended to encourage attractive and functional mixed living, working, shopping, education, and recreation centers and encourages mass transit and reduction in auto travel. The existing land use and future land use are similar except for the RAC. Incorporating a potential regional bus service and maintaining the existing shuttle service is consistent with the goals of the City of Hollywood's RAC.

The Broward County Future Land Use Plan was included to show surrounding future land use outside the project area. Overall, the existing and future land use maps of the municipalities are similar, as they both show residential, commercial and activity centers adjacent to the project boundaries.

Based on the above, adverse effects (direct/indirect) to land use are not anticipated as a result of this project.

#### 6.2.2 SECTION 4(F)

In accordance with *FDOT PD&E Manual, Part 2, Chapter 7, Section 4(f) Evaluations*, dated July 1, 2024, this project was evaluated for potential Section 4(f) involvement. Section 4(f) resources can be divided into three categories: historic/archaeological sites, publicly-owned parks and recreation areas, wildlife and waterfowl refuges. The potential Section 4(f) park resources adjacent to the corridor and evaluated as part of this PD&E Study are shown in **Table 6.11**. No use is anticipated at these potential Section 4(f) resources.



**Table 6.11 – Potential Section 4(f) Resources**

| Park Name                                | Address                  | Official with Jurisdiction (OWJ) |
|------------------------------------------|--------------------------|----------------------------------|
| Oreste Blake (OB) Johnson Park           | 1000 NW 8th Avenue       | City of Hallandale Beach         |
| McNicol Community Center                 | 1411 S 28th Avenue       | City of Hollywood                |
| Orangebrook Golf Course and Country Club | 400 Entrada Drive        | City of Hollywood                |
| Lions Park                               | 3003 Hollywood Boulevard | City of Hollywood                |
| Stanley Goldman Memorial Park            | 800 Knights Road         | City of Hollywood                |

The five park/recreational areas adjacent to the study limits are briefly described below.

**Oreste Blake (OB) Johnson Park** – This Park is in the City of Hallandale Beach and encompasses 6.17-acres. It offers public access/use of a gymnasium, computer lab, fitness center, playground, tennis, turf surfacing, multi-purpose athletic field, afterschool programming, and pathways. City sports leagues also use the facilities at this park. This facility is located adjacent to Pembroke Road.

**McNicol Community Center** – This 0.14-acre recreational center is in the City of Hollywood on property owned by the School Board of Broward County. The center provides aftercare, camps, programs, community meeting areas and playgrounds open to the public. This facility is located adjacent to Pembroke Road.

**Orangebrook Golf Course and Country Club** – This golf course encompasses 255 acres and located within the City of Hollywood. The facility offers, golf, disc golf, banquet hall, and restaurant; all of which are open to the public. The golf course is located between Hollywood Boulevard and Pembroke Road.

**Lions Park** – This small park consists of a 0.36-acre passive recreation area located west of I-95 and west of the CSX railroad tracks in the City of Hollywood. The Park provides walkways and benches to the public. It is located adjacent to Hollywood Boulevard.

**Stan Goldman Memorial Park** – This Park is 11.8-acre and located west of I-95 and west of the CSX railroad tracks in the City of Hollywood. This resource provides





walkways, dog park, skate park, and pickleball courts for public use. It is in the vicinity of Hollywood Boulevard.

The FDOT evaluated the preferred alternative in relation to the Section 4(f) resources (Lions Park, Stan Goldman Memorial Park, Orangebrook Golf Course and Country Club, McNicol Community Center, and OB Johnson Community Center) and “No Use” Determinations were made.

Short-term impacts caused by construction activities, such as traffic congestion/delays, noise from construction equipment, and dust from roadway construction may occur temporarily during construction. Once construction is complete, these will no longer be present. No other direct or indirect effects to recreational areas are anticipated because of the preferred alternative.

Copies of the Official with Jurisdiction (OWJ) responses (City of Hollywood and the City of Hallandale Beach) were included in the project file and uploaded to the Statewide Environmental Project Tracker (SWEPT) project file.

### 6.2.3 CULTURAL RESOURCES

A Cultural Resource Assessment Survey (CRAS), conducted in accordance with 36 CFR Part 800, was performed for the project, and the resources listed below were identified within the project Area of Potential Effect (APE). FDOT found that some of these resources meet the eligibility criteria for inclusion in the National Register of Historic Places (NRHP), and State Historic Preservation Officer (SHPO) has concurred with this determination. After application of the Criteria of Adverse Effect, and in consultation with SHPO, FDOT has determined that the proposed project will have No Adverse Effect on these resources.

In 2018, FDOT conducted a CRAS for the current PD&E Study and a follow-up Section 106 Case Study, which was finalized in December 2018. In summary, the CRAS Report included the evaluation of the following National Register-eligible historic resources found within the APE: Hollywood Seaboard Air Line Railway Station (8BD163), Seaboard Air Line (CSX) Railroad (8BD4649), and Stratford's (8BD6648). The Hollywood Seaboard Air Line Railway Station was determined National Register-eligible in 1999. The Seaboard Air Line (CSX) Railroad and Stratford's



have been determined eligible for inclusion in the National Register as part of the 2018 PD&E Study. The proposed project will have no adverse effect on the Hollywood Seaboard Air Line Railway Station (8BD163), Seaboard Air Line (CSX) Railroad (8BD4649), and Stratford's (8BD6648). SHPO concurred with that determination in their concurrence letter dated August 29, 2018.

In 2020, changes to the design of the project improvements necessitated the expansion of the APE and an additional field survey. No archaeological resources were identified within the archaeological APE as a result of the subsurface testing and pedestrian survey. One judgmental shovel test was excavated. No cultural material was recovered. Shovel testing was not conducted within most of the project area due to the presence of buried utilities, berms, ditches, pavement, existing ponds, and standing water.

In accordance with the 2020 addendum, a historic resources survey resulted in the identification of ten previously recorded (8BD4649/8DA10753, 8BD6496, 8BD6524-8BD6527, 8BD6633, 8BD6647, 8BD6671, 8BD6672) and eight newly recorded historic resources (8BD7709-8BD7715, 8BD7738) within the current project APE. Among the ten previously recorded resources, only the Seaboard Air Line (CSX) Railroad (8BD4649/8DA10753), which was recorded as part of the 2018 CRAS, was determined eligible for listing in the National Register. The remaining resources were determined ineligible for listing on the NRHP, and the SHPO concurred with this determination on January 7, 2021.

In 2024, changes to the design of the project improvements necessitated an additional field survey. No archaeological resources were identified within the archaeological APE as a result of the pedestrian survey. The historic resource survey resulted in the identification of two new segments of the previously recorded resource group, the Seaboard Air Line (CSX) Railroad (8BD4649/8DA10753), and one newly identified standing structure located at 2919 Arthur Street (8BD9446). The railroad is considered National Register eligible throughout the state and the new resource segments within the current project APE are considered to be contributing segments to the overall resource. The standing structure located at 2919 Arthur Street is considered ineligible for listing in the National Register under Criteria A, B, C, or D, individually or as part of a historic district.





#### 6.2.4 WETLANDS AND OTHER SURFACE WATERS

In accordance with the FDOT PD&E Manual, Chapter 9 (July 1, 2024), *Executive Order 11990, Protection of Wetlands* as well as applicable federal and state regulatory requirements (Section 404 of the Clean Water Act and Chapter 373, Florida Statute, respectively) a wetland and other surface waters (OSW) evaluation was conducted for this project. The objectives of this evaluation were to identify existing wetlands and OSW's, evaluate potential impacts to them, and assess the function and value of wetlands potentially impacted by the project.

Additional ROW is being acquired primarily for drainage purposes/ponds. Pedestrian transect surveys and windshield reviews were used to conduct the field reviews and confirm identified wetland and/or OSW areas. Existing conditions field reviews were conducted on February 24 and 27, 2017, and then verification surveys were conducted to confirm previously identified wetlands, swales, or OSW's conditions within a 500-foot buffer of the project on September 22, 2020, and November 20 and 21, 2023.

**Figure 6.17** illustrates the location of wetlands and OSWs, and **Table 6.12** summarizes those areas found within 500 feet of the project corridor. The size, hydrologic contiguity, and vegetative structural diversity are described in this table. One mangrove wetland (WL-1) adjacent to the C-10 Canal is present with hydric soils, and hydrology. This wetland is considered jurisdictional to SFWMD and the Florida Department of Environmental Protection (FDEP) and the hydrology of this area is hydrologically connected to the C-10 Canal. In addition, four man-made stormwater swales are present along I-95. These swales contain standing water and hydrophytic vegetation. Hydric soils are not present, and their hydrology appeared dependent on rainfall, stormwater runoff, and groundwater. These swales are part of an existing SFWMD permitted stormwater drainage system. Other man-made surface waters were observed within the project area, including stormwater ponds associated with developments. Most of these stormwater ponds do not contain littoral vegetation although some contained spike rush (*Eleocharis* spp.), water hyssop (*Bacopa* spp.), and bald cypress (*Taxodium distichum*) at the time of the field reviews.

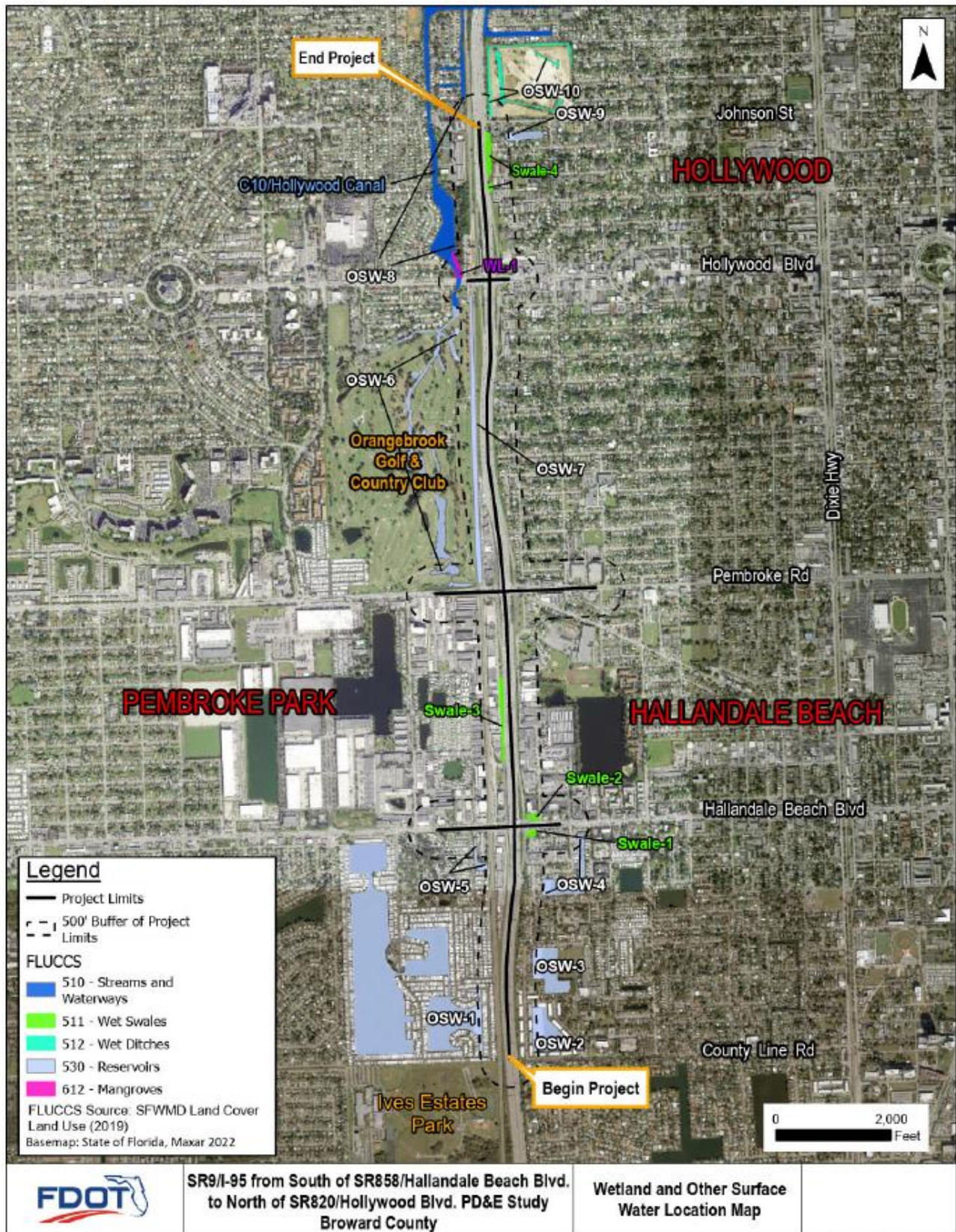


Figure 6.17 – Wetland and Surface Water Location Map





Table 6.12 – Wetland and Surface Water Locations

| ID                          | FLUCCS Code | NWI Code      | Approx. Area Within 500' Buffer (AC) | Dominant Wetland Vegetation                                                                                                                                                                                                                                      | Hydric Soils (Historic)     | Hydrologic Connection to Waters of the US |
|-----------------------------|-------------|---------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------|
| <b>Wetlands</b>             |             |               |                                      |                                                                                                                                                                                                                                                                  |                             |                                           |
| WL-1                        | 612         | E1UBLx        | 0.39                                 | White mangrove ( <i>Laguncularia racemosa</i> ) fringe, co-mingled with bald cypress ( <i>Taxodium distichum</i> ), leather fern ( <i>Acrostichum danaeifolium</i> ), Everglades palm ( <i>Acoelorrhapha wrightii</i> ), and pond apple ( <i>Annona glabra</i> ) | Yes (Ok)                    | Yes                                       |
| <b>Other Surface Waters</b> |             |               |                                      |                                                                                                                                                                                                                                                                  |                             |                                           |
| Swale-1                     | 511         | N/A           | 0.15                                 | Water hyssop ( <i>Bacopa monieri</i> ), bald cypress                                                                                                                                                                                                             | No (Ur)                     | No                                        |
| Swale-2                     | 511         | N/A           | 0.17                                 | Water hyssop, bald cypress, Pennywort ( <i>Hydrocotyle spp.</i> ), and primrose willow ( <i>Ludwigia spp.</i> )                                                                                                                                                  | No (Ur)                     | No                                        |
| Swale-3                     | 511         | N/A           | 0.48                                 | Duck potato ( <i>Sagittaria latifolia</i> ), spike rush, and primrose willow                                                                                                                                                                                     | No (Ur)                     | No                                        |
| Swale-4                     | 511         | N/A           | 0.80                                 | Bald cypress appears as part of existing landscaping within FDOT ROW between I-95 and adjacent residences                                                                                                                                                        | No (Us)                     | No                                        |
| OSW-1                       | 530         | N/A           | 1.11                                 | Not present                                                                                                                                                                                                                                                      | N/A (W)                     | No                                        |
| OSW-2                       | 530         | N/A           | 1.14                                 | Not present                                                                                                                                                                                                                                                      | N/A (W)                     | No                                        |
| OSW-3                       | 530         | N/A           | 0.48                                 | Not present                                                                                                                                                                                                                                                      | N/A (W)                     | No                                        |
| OSW-4                       | 530         | N/A           | 0.43                                 | Not present                                                                                                                                                                                                                                                      | N/A (W)                     | No                                        |
| OSW-5                       | 530         | N/A           | 0.38                                 | Bald cypress and marsh fern ( <i>Thelypteris palustris</i> )                                                                                                                                                                                                     | No (Ur)                     | No                                        |
| OSW-6                       | 530         | N/A           | 2.17                                 | Torpedo grass ( <i>Panicum repens</i> ), water hyssop, spike rush, and primrose willow                                                                                                                                                                           | Yes (DF), No (ArO), Yes (I) | Yes                                       |
| OSW-7                       | 530         | N/A           | 7.65                                 | Not present                                                                                                                                                                                                                                                      | Yes (DF), No (ArO)          | Yes                                       |
| OSW-8                       | 510         | E1UBLx/R5UBHx | 1.49                                 | Cocoplum ( <i>Chrysobalanus icaco</i> ) and pond apple on bank, no submerged aquatic vegetation (SAV)                                                                                                                                                            | No (ArO), N/A (W)           | Yes                                       |
| OSW-9                       | 530         | N/A           | 0.11                                 | Not present                                                                                                                                                                                                                                                      | No (ArO)                    | Yes                                       |
| OSW-10                      | 512         | N/A           | 4.65                                 | Australian pine ( <i>Casuarina equisetifolia</i> ), Brazilian pepper ( <i>Schinus terebinthifolia</i> ), cattails ( <i>Typha spp.</i> )                                                                                                                          | Yes (Ok)                    | No                                        |

**FLUCCS:** 510 = Streams and Waterways; 511 = Wet swales; 512 = Wet ditches; 530 = Reservoirs; 612 = Mangroves

**NWI:** E1UBLx = Estuarine, subtidal, unconsolidated bottom, subtidal, excavated; R5UBHx = Riverine, unknown perennial, unconsolidated bottom, permanently flooded, excavated

**Soils:** Ok = Okeelanta muck, W = Water; Us = Udorthents, shaped; Ur = Urban Land 0-2% slopes; DF = Dade Fine Sand; ArO = Arents, organic substratum- urban land complex; I = Immokalee, limestone substratum- urban land complex



#### 6.2.4.1 DIRECT AND SECONDARY IMPACTS

Direct impacts include fill/excavation of stormwater swales. For the purposes of this wetland impact assessment, impacts to wet swales and OSWs were calculated based on the preferred alternative. No natural wetland systems will be impacted by the project. Direct impacts to permitted stormwater swales within the existing I-95 right of way and the wet ditch/stormwater pond at the Sunset Property are anticipated due to construction activities. It is estimated that a total of 2.22 acres of OSWs (stormwater features) will be impacted. **Table 6.13** summarizes the direct impacts on stormwater swales (acreage) for the preferred alternative. Swales being impacted will be replaced with swales.

**Table 6.13 – Summary of Potential Wetland and Other Surface Water Impacts**

| ID                          | FLUCCS Code | Size (Ac)* | Direct Impacts |                      |
|-----------------------------|-------------|------------|----------------|----------------------|
|                             |             |            | Wetlands       | Other Surface Waters |
| WL-1                        | 612         | 0.39       | 0.00           | -                    |
| Swale-1                     | 511         | 0.15       | -              | 0.00                 |
| Swale-2                     | 511         | 0.17       | -              | 0.00                 |
| Swale-3                     | 511         | 0.43       | -              | 0.43                 |
| Swale-4                     | 511         | 0.72       | -              | 0.72                 |
| OSW-1                       | 530         | 1.11       | -              | 0.00                 |
| OSW-2                       | 530         | 1.14       | -              | 0.00                 |
| OSW-3                       | 530         | 0.48       | -              | 0.00                 |
| OSW-4                       | 530         | 0.43       | -              | 0.00                 |
| OSW-5                       | 530         | 0.38       | -              | 0.00                 |
| OSW-6                       | 530         | 2.17       | -              | 0.00                 |
| OSW-7                       | 530         | 7.65       | -              | 0.00                 |
| OSW-8                       | 510         | 1.49       | -              | 0.00                 |
| OSW-9                       | 530         | 0.11       | -              | 0.00                 |
| OSW-10*                     | 512         | 4.65       | -              | 1.07                 |
| <b>Total Direct Impacts</b> |             |            | <b>0.00</b>    | <b>2.22</b>          |

\* Size-based wetland/surface water within a 500 ft buffer, except OSW 10, which is based on the area within the pond footprint.



#### 6.2.4.2 AVOIDANCE AND MINIMIZATION

One mangrove wetland is located within the C-10 Canal, just north of Hollywood Boulevard and west of I-95 (WL-1). Impacts to WL-1 have been avoided. Man-made stormwater swales and surface water littoral shelves are located immediately adjacent to the existing roadway. Therefore, complete avoidance and minimization of impacts to these swales and surface waters is not possible or practicable and still meets the project's purpose and needs. Avoidance and minimization will continue to be incorporated as practical throughout the Design process.

The proposed roadway improvements' stormwater management facilities for the preferred alternative will meet FDOT drainage criteria, SFWMD permit criteria, and use best management practices (BMPs) in accordance with the current *FDOT's Standard Specifications for Road and Bridge Construction*.

#### 6.2.4.3 WETLAND FUNCTIONAL ASSESSMENT AND MITIGATION

Impacts to WL-1 are not anticipated. Therefore, a Uniform Mitigation Assessment Method (UMAM) evaluation was not prepared. Impacts to surface waters do not require a functional assessment, and mitigation is not anticipated for this project.

#### 6.2.5 PROTECTED SPECIES AND HABITAT

The project was evaluated for impacts to wildlife and habitat resources, including protected species, in accordance with 50 Code CFR Part 402 of the Endangered Species Act (ESA) of 1973, as amended, Florida Department of Agriculture and Consumer Services (FDACS) Regulations 581.185 Florida Statutes and Chapter 5B-40 of the Florida Administrative Code, and the FDOT PD&E Manual. Wildlife and plant species are protected under the ESA, the Migratory Bird Treaty Act (MBTA), and the State of Florida, pursuant to Florida Statute 379.411. US Fish and Wildlife Service (USFWS) concurred with the determinations in 2021 (see **Appendix O**) and the determinations have not changed with this update.

Remnant wetland habitats and manmade surface waters (canals, ponds) exist within the project corridor, providing potential nesting and foraging habitat for federal and state-listed species. The C-10 Canal, west of I-95, is accessible to the Florida manatee and American crocodile, and brackish mangrove wetlands in





this canal provide suitable foraging habitat for listed wading birds. However, no work is proposed within this canal or wetlands. OSWs adjacent to the project area, including stormwater ponds, may contain some foraging habitat for wading birds. Four wet swales and other maintained grassed areas/swales are located within the project's ROW. These areas provide marginal habitat for the eastern indigo snake, burrowing owl, gopher tortoise, and associated commensal species. Habitat for listed plant species and observations of these species were not observed during field reviews.

Road improvements associated with the preferred alternative are primarily contained within the existing right of way of I-95, Hollywood Boulevard, Pembroke Road, and Hallandale Beach Boulevard. Additional right of way is being acquired primarily for drainage purposes, including ponds and swales. Throughout the urban, developed corridor, a combination of windshield and pedestrian surveys were used to conduct the field reviews. Existing conditions field reviews were originally conducted on February 24 and 27, 2017. Additional field reviews were conducted to update previously identified resources. These field verification reviews were conducted on September 22, 2020, November 18, 2020, and November 20 and 21, 2023. Benthic surveys were conducted in the C-10 Canal on August 23, 2017, and September 16, 2020, during daylight hours. The benthic surveys involved transects within the canal, extending 100 feet from the northern and southern end of the Hollywood Boulevard Bridge. An updated benthic survey was not conducted since no work was proposed in the canal. Florida bonneted bat (FBB) visual roosting surveys were conducted on the bridges at the intersections and all trees adjacent to the project corridor on July 29, 2021, and surveys were updated November 20 and 21, 2023.

The project is located within the USFWS Consultation Areas for the Everglade snail kite (*Rostrhamus sociabilis plumbeus*), American Crocodile (*Crocodylus acutus*), and the Florida bonneted bat (*Eumops floridanus*).

#### 6.2.5.1 SPECIES EFFECT DETERMINATIONS

The potential effect of the preferred alternative on each federally listed and state-listed species is summarized in **Tables 6.14** and **Table 6.15**, respectively. Note that species listed as federally endangered or threatened are also listed by the State of Florida as endangered or threatened. Seven federally listed species were



identified based on the database review (IPaC) and existing habitat to potentially occur in the project area.

**Table 6.14 – Federally Listed Species Determination of Effect**

| Scientific Name                       | Common Name          | Listing Status* | Potential of Occurrence | Determination of Effect** |
|---------------------------------------|----------------------|-----------------|-------------------------|---------------------------|
| <b>REPTILES</b>                       |                      |                 |                         |                           |
| <i>Drymarchon corais couperi</i>      | Eastern Indigo Snake | FT              | Low                     | <b>MANLAA</b>             |
| <i>Crocodylus acutus</i>              | American Crocodile   | FT              | Moderate                | <b>NE</b>                 |
| <b>BIRDS</b>                          |                      |                 |                         |                           |
| <i>Mycteria americana</i>             | Wood Stork           | FT              | High                    | <b>MANLAA</b>             |
| <i>Rostrhamus sociabilis plumbeus</i> | Everglade Snail Kite | FE              | Low                     | <b>NE</b>                 |
| <b>MAMMALS</b>                        |                      |                 |                         |                           |
| <i>Trichechus manatus</i>             | Florida Manatee      | FT              | High                    | <b>NE</b>                 |
| <i>Eumops floridanus</i>              | Florida Bonneted Bat | FE              | High                    | <b>MANLAA</b>             |

**Note:** FT = Federally-designated Threatened; FE = Federally-designated Endangered

\*\* NE = No Effect; MANLAA = May Affect, Not Likely to Adversely Affect

**Table 6.15 – State Listed Species Determination of Effect**

| Scientific Name                     | Common Name           | Listing Status* | Potential of Occurrence | Determination of Effect              |
|-------------------------------------|-----------------------|-----------------|-------------------------|--------------------------------------|
| <b>REPTILES</b>                     |                       |                 |                         |                                      |
| <i>Gopherus polyphemus</i>          | Gopher Tortoise       | ST              | <b>Low</b>              | <b>No Effect Anticipated</b>         |
| <b>BIRDS</b>                        |                       |                 |                         |                                      |
| <i>Athene cunicularia floridana</i> | Florida Burrowing Owl | ST              | <b>High</b>             | <b>No Adverse Effect Anticipated</b> |
| <i>Egretta caerulea</i>             | Little Blue Heron     | ST              | <b>High</b>             | <b>No Adverse Effect Anticipated</b> |
| <i>Egretta tricolor</i>             | Tricolored Heron      | ST              | <b>High</b>             | <b>No Adverse Effect Anticipated</b> |

**Note:** ST = State Threatened



A discussion of potential impacts on each species listed in the above tables is included in the *Natural Resources Evaluation (NRE)*, a companion document to this PD&E Study. During the construction of this project, the FDOT's contractor will adhere to the most recent version of the USFWS's Standard Protection Measures for the Eastern Indigo Snake to minimize the potential for adverse effects. A copy of the NRE has been appended to the environmental document and uploaded to the SWEPT project file.

#### 6.2.5.2 CRITICAL HABITATS

A critical habitat is a specific, federally designated geographic area that is essential for the conservation of a threatened or endangered species that may require special management and protection. According to the USFWS IPaC database, there are no critical habitats in this area.

#### 6.2.5.3 CONCURRENCE

FDOT is currently coordinating with USFWS to obtain concurrence on the determination of effects on federally listed species.

#### 6.2.6 ESSENTIAL FISH HABITAT

This project was evaluated for impacts on Essential Fish Habitat (EFH) in accordance with the Magnuson-Stevens Fishery Conservation and Management Act and the FDOT PD&E Manual. EFH describes all waters and substrates necessary for fish to spawn, breed, feed, or grow to maturity. The National Marine Fisheries Service (NMFS) is the agency with jurisdiction, and although the NMFS EFH Mapper does not indicate EFH or Habitat Areas of Particular Concern (HAPC) in the project area, the ETDM Summary Report #14254 references the presence of moderate quality estuarine (mangrove) wetlands which are designated as EFH and HAPC. HAPC's are subsets of EFH that are rare, ecologically important, susceptible to human-induced degradation, or located in an environmentally stressed area.

Due to the presence of EFH (mangroves) within the project corridor, two benthic resource surveys were conducted by a team of biologists on August 23, 2017, and September 16, 2020. The survey on September 16, 2020, was conducted during an ebb tide, high tide was approximately at 9:20 am. The purpose of these surveys



was to ascertain the presence of SAV (e.g., seagrass), listed fish species, or any other significant benthic resource in the vicinity where the Hollywood Boulevard Bridge crosses this canal. An additional benthic survey was not conducted in 2023 as no in-water work is proposed in the canal.

Potential EFH (mangroves- WL-1) were observed north of the Hollywood Boulevard Bridge, which occurs along the east and west sides of the C-10 Canal and consists of white mangroves. This area may provide foraging, nursery, and refuge habitat for juvenile fish. No other EFH was observed during the field reviews. Designated HAPC's are present within the project area in the form of mangrove habitats. HAPCs are high-priority areas for conservation, management, and research and are necessary for sustainable fisheries and ecosystems. Federally managed fishery species associated with mangrove habitat include species in the snapper-grouper complex.

No widening of the Hollywood Bridge over the C-10 Canal is proposed, and no in-water work is proposed within the C-10 Canal. Therefore, there will be no direct, indirect, or cumulative impacts on the mangroves, and no involvement with EFH, HAPC, or managed species is anticipated.

#### 6.2.7 HIGHWAY TRAFFIC NOISE

The information presented in this section is a summary of the I-95 Noise Study Report (NSR), companion document to this study. A traffic noise study was performed in accordance with 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise (July 13, 2010), the FDOT's PD&E Manual, Part 2, Chapter 18, Highway Traffic Noise (July 1, 2023), and FDOT's Traffic Noise Modeling and Analysis Practitioners Handbook (December 31, 2018).

Design year (2045) traffic noise levels for the preferred alternative will approach [i.e., within 1 dB(A)], meet, or exceed the Noise Abatement Criteria (NAC) at 203 residences and seven special land use sites within the project limits within 12 Noise Study Areas (NSAs). In accordance with FHWA and FDOT policies, the feasibility and reasonableness of noise barriers were considered for these impacted noise sensitive sites.

Noise barriers were not considered a feasible abatement measure at two of the 12 impacted NSAs [i.e., 12W and 18W (Lions Park)] since an effective noise barrier



at these locations would block direct access to these noise sensitive areas. NSA 12W represents two impacted residences within Central Golf Section of Hollywood subdivision located west of I-95 and south of Hollywood Boulevard. The southern portion of NSA 18W represents the outdoor use areas associated with Lions Park, a special land use site, located west of I-95 and north of Hollywood Boulevard. The locations of this subdivision and park are depicted in **Figure 6.18**.





I-95 (SR 9) PD&E Study from  
South of Hallandale Beach Boulevard (SR 858)  
to North of Hollywood Boulevard (SR 820)  
Broward County, Florida  
FPID No. 436903-1-22-02

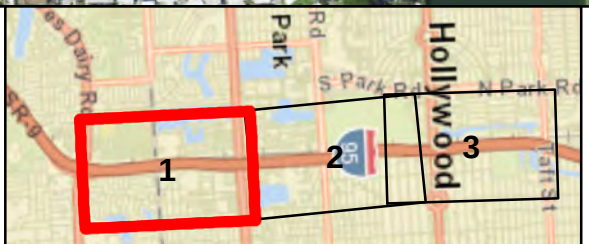


**Noise Barriers**

- Existing Noise Barrier to Remain
- Replacement of Existing Noise Barrier
- Supplemental Noise Barrier
- Noise Barrier Not Feasible
- Not Recommended Noise Barrier

— Proposed Improvements

February 2025



**Figure 6.18**  
**Noise Barrier**  
**Recommendation Map**  
**Sheet 1 of 3** 6-83





I-95 (SR 9) PD&E Study from  
South of Hallandale Beach Boulevard (SR 858)  
to North of Hollywood Boulevard (SR 820)  
Broward County, Florida  
FPID No. 436903-1-22-02

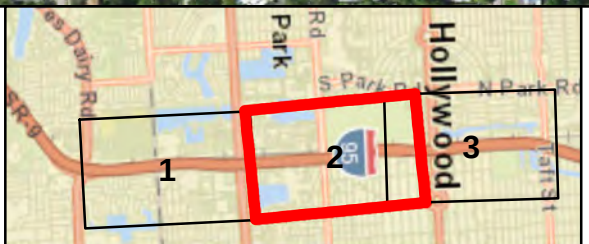


**Noise Barriers**

- Existing Noise Barrier to Remain
- Replacement of Existing Noise Barrier
- Supplemental Noise Barrier
- Noise Barrier Not Feasible
- Not Recommended Noise Barrier

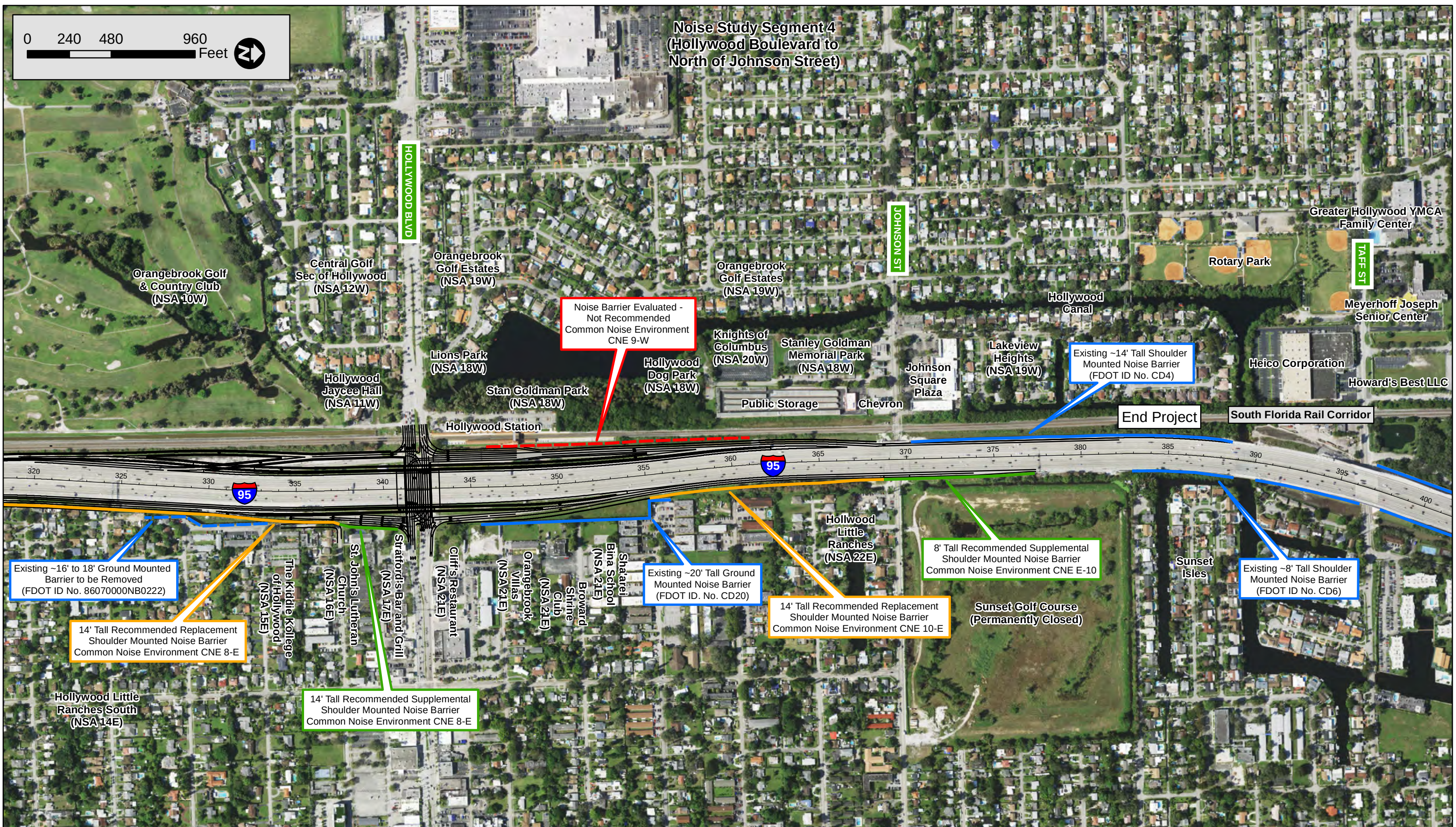
— Proposed Improvements

February 2025



**Figure 6.18**  
**Noise Barrier**  
**Recommendation Map**  
**Sheet 2 of 3** 6-84





I-95 (SR 9) PD&E Study from  
South of Hallandale Beach Boulevard (SR 858)  
to North of Hollywood Boulevard (SR 820)  
Broward County, Florida  
FPID No. 436903-1-22-02

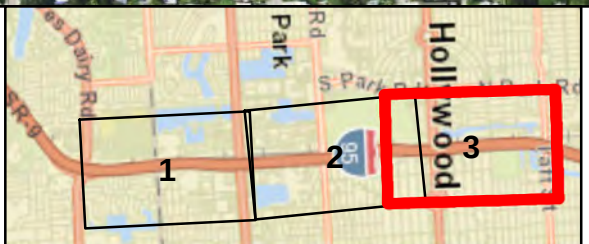


**Noise Barriers**

- Existing Noise Barrier to Remain
- Replacement of Existing Noise Barrier
- Supplemental Noise Barrier
- Noise Barrier Not Feasible
- Not Recommended Noise Barrier

— Proposed Improvements

February 2025



**Figure 6.18**  
**Noise Barrier**  
**Recommendation Map**  
Sheet 3 of 3 6-85





Noise barriers were evaluated for 201 of 203 residences and five of the special land use sites that approach, meet, or exceed the NAC [i.e., NSAs 1W, 7E, 9E, 10W, and 18W (Stan Goldman Park)]. Ten separate Common Noise Environments (CNEs) were used to assess noise barriers at these locations (i.e., CNE 1-W through CNE 10-E). The results of the noise barrier analysis for each of these CNEs are summarized in **Table 6.16**. Of the 10 CNEs presented in **Table 6.16**, noise barriers are recommended for further consideration during the project's Design phase and for public input at five locations (CNEs 2-W, 3-E, 5-E, 8-E, and 10-E). Noise barriers are not recommended for further consideration at five locations (CNEs 1-W, 4-E, 6-E, 7-W, and 9-W). The locations and limits of the noise barriers (both recommended and not recommended) are depicted on **Figure 6.18** and presented in **Table 6.16**.

Noise barriers at one (i.e., CNE 2-W) of the five CNEs where noise barriers have been recommended for further consideration during the project's design phase are not currently considered feasible. The optimal conceptual barrier design at this location meets FDOT's noise barrier cost criteria of equal to or less than \$42,000 per benefited receptor site and FDOT's noise reduction reasonableness criteria of 7 dB(A) at one or more benefited sites. However, there does not appear to be sufficient right of way to construct a noise barrier at this location along the southside of Hallandale Beach Boulevard in the vicinity of the Green Acres Villages and Holiday Mobile Estates communities. Although noise barriers are not currently considered feasible, they are recommended for further evaluation at this location during the project's Design phase when additional design information including topographical survey would be available to confirm the available right of way at this location. The recommended noise barrier system at this location is expected to reduce traffic noise by at least 5 dB(A) at 20 residences, including the three impacted residences within these residential communities. The estimated cost of the recommended noise barrier system is \$228,000.

Table 6.16 - Noise Barrier Evaluation Summary and Recommendations

| Noise Study Area Name / Number                                                                                                                                                                                                          | Common Noise Environment (CNE) Identification Number/ (Conceptual Noise Barrier Design Number) | Optimized Conceptual Noise Barrier Design                     |               |               |                      |                    | Number of Impacted Receptor Sites | Number of Impacted/ Benefited Receptor Sites | Number of Benefited Receptor Sites/ Not Impacted | Total Number of Benefited Receptor Sites | Average Noise Reduction for all Benefited Receptor Sites dB(A) | Maximum Noise Reduction for all Benefited Receptor Sites dB(A) | Cost (\$30 per square foot) | Average Cost/Site Benefited | Optimal Barrier Design Meet FDOT's Reasonable Noise Abatement Criteria of \$42,000 per Benefited Receptor Site and 7.0 dB(A) Noise Reduction Design Goal and Feasible? | Noise Barrier Recommended for Further Consideration and Public Input? | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------|---------------|----------------------|--------------------|-----------------------------------|----------------------------------------------|--------------------------------------------------|------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|-----------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                         |                                                                                                | Noise Barrier Type (Segment)                                  | Height (feet) | Length (feet) | Begin Station Number | End Station Number |                                   |                                              |                                                  |                                          |                                                                |                                                                |                             |                             |                                                                                                                                                                        |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Ives Estates Park - West of I-95 between Ives Dairy Road and Miami-Dade / Broward County Line / NSA 1 W                                                                                                                                 | CNE 1-W (CD 1W-4)                                                                              | Ground Mounted                                                | 22            | 1,730         | 179+20               | 196+50             | Special Land Use                  | --                                           | --                                               | --                                       | 8.1                                                            | 12.2                                                           | \$1,141,800                 | --                          | NO (Usage of Park Recreational Facilities Less Than Required to be Cost Reasonable)                                                                                    | NO                                                                    | Represents the optimal conceptual noise barrier design; Does not meet the Reasonableness Cost Criteria for special land uses; Noise barriers are not recommended for further consideration and public input during the project's design phase at this location.                                                                                                                                                                                                                                                                                      |
| Green Acres Village and Holiday Mobile Estates - South of Hallandale Beach Boulevard and West of I-95 / NSA 3W                                                                                                                          | CNE 2-W (CD 2W-2)                                                                              | Ground Mounted (Segment 1 of 2)                               | 10            | 590           | 132+00               | 137+90             | 3                                 | 3                                            | 17                                               | 20                                       | 6.8                                                            | 8.8                                                            | \$228,000                   | \$11,400                    | NO (Not Feasible - Insufficient Right-of-way to Constructed Noise Barrier)                                                                                             | Yes (See Comments)                                                    | Not considered a feasible abatement measure due to insufficient existing right-of-way to accommodate a noise barrier at this location; Noise barriers are recommended to be further evaluated at this location during the project's design phase when additional design information including topographical survey would be available.                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                         |                                                                                                | Ground Mounted (Segment 2 of 2)                               | 10            | 170           | 138+30               | 140+00             |                                   |                                              |                                                  |                                          |                                                                |                                                                |                             |                             |                                                                                                                                                                        |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Highland Gardens and Parkside Manor Communities - East of I-95 and between Ives Dairy Road and Hallandale Beach Boulevard / NSA 4E                                                                                                      | CNE 3-E (CD 3E-1S and CD 3E-4N)                                                                | South Segment - Replacement Ground Mounted Noise Barrier      | 16            | 200           | 204+80               | 206+80             | 10                                | 2                                            | 0                                                | 2                                        | 9.5                                                            | 12.4                                                           | \$96,000                    | \$48,000                    | NO (Not Required - In-Kind Replacement Noise Barrier)                                                                                                                  | Yes (Replacement Noise Barriers)                                      | Two segments of the existing ground mounted noise barrier are physically impacted by the widening of I-95 and require replacement; Represents the optimal conceptual replacement noise barrier system design and is recommended for further consideration and public input in the project's design phase.                                                                                                                                                                                                                                            |
|                                                                                                                                                                                                                                         |                                                                                                | North Segment - Replacement Shoulder Mounted Noise Barriers   | 14            | 1,080         | 231+00               | 241+80             | 49                                | 42                                           | 6                                                | 48                                       | 7.8                                                            | 11.5                                                           | \$621,600                   | \$12,950                    | YES (Not Required - Replacement Noise Barrier System)                                                                                                                  |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                         |                                                                                                | North Segment - Supplemental Shoulder Mounted Noise Barrier   | 8             | 700           | 235+80               | 242+80             |                                   |                                              |                                                  |                                          |                                                                |                                                                |                             |                             |                                                                                                                                                                        |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Lanier James Education Center - East of I-95 and South of Pembroke Road / NSA 7E                                                                                                                                                        | CNE 4-E (CD 4E-4)                                                                              | Shoulder Mounted (I-95 Northbound)                            | 14            | 800           | 277+00               | 285+00             | Special Land Use                  | ---                                          | ---                                              | ---                                      | 6.2                                                            | 6.5                                                            | \$336,000                   | ---                         | NO (Not Reasonable - Does not meet FDOT's required abatement design goal of 7.0 dB(A)                                                                                  | NO                                                                    | Represents the optimal conceptual noise barrier design; Does not meet the minimum noise reduction design goal of 7 dB(A); Noise barriers are not recommended for further consideration or public input during the project's design phase at this location. However, would Receive Incidental Noise Reduction Benefit from Conceptual Noise Barrier Design CD 5E-4 Recommended for Meekins Addition No.1 Subdivision and Johnson Apartments (NSA 8E).                                                                                                 |
| Meekins Addition No.1 Subdivision and Johnson Apartments - East of I-95 and South of Pembroke Road / NSA 8E                                                                                                                             | CNE 5-E (CD 5E-4)                                                                              | Outside Shoulder: I-95 Northbound                             | 14            | 1,000         | 277+00               | 287+00             | 3                                 | 3                                            | 16                                               | 19                                       | 7.4                                                            | 9.3                                                            | \$672,000                   | \$35,368                    | YES                                                                                                                                                                    | YES                                                                   | Represents the optimal conceptual noise barrier design; Does meet the Cost Reasonable Criteria and the minimum noise reduction design goal of 7 dB(A); Noise barriers are recommended for further consideration and public input during the project's design phase at this location. Segments of the 14-foot tall shoulder mounted noise barrier on an MSE wall will require a design variation; Lanier James Education Center and Choices Children's Academy playground would receive incidental benefit from this conceptual noise barrier design. |
|                                                                                                                                                                                                                                         |                                                                                                | Outside Shoulder: I-95 Northbound Off Ramp to Pembroke Road   | 14            | 600           | 281+00               | 287+00             |                                   |                                              |                                                  |                                          |                                                                |                                                                |                             |                             |                                                                                                                                                                        |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Choices Children's Academy - East of I-95 and South of Pembroke Road / NSA 9E                                                                                                                                                           | CNE 6-E (CD 6E-4)                                                                              | Ground Mounted (I-95 Eastern Right-of-Way Line)               | 18            | 460           | 284+00               | 287+60             | Special Land Use                  | ---                                          | ---                                              | ---                                      | 6.4                                                            | 7.0                                                            | \$584,400                   | ---                         | NO (Usage of Park Recreational Facilities Less Than Required to be Cost Reasonable)                                                                                    | NO                                                                    | Represents the optimal conceptual noise barrier design; Does not meet the Reasonableness Cost Criteria for special land uses; Noise barriers are not recommended for further consideration or public input during the project's design phase at this location. However, would Receive Incidental Noise Reduction Benefit from Conceptual Noise Barrier Design CD 5E-4 Recommended for Meekins Addition No.1 Subdivision and Johnson Apartments (NSA 8E).                                                                                             |
|                                                                                                                                                                                                                                         |                                                                                                | Shoulder Mounted (I-95 Northbound Off Ramp to Pembroke Road)  | 14            | 800           | 279+00               | 287+00             |                                   |                                              |                                                  |                                          |                                                                |                                                                |                             |                             |                                                                                                                                                                        |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Orangebrook Golf & Country Club - West of I-95 between Pembroke Road and Hollywood Boulevard / NSA 10W                                                                                                                                  | CNE 7-W (CD 7W-4)                                                                              | Ground Mounted Noise Barrier (South Segment)                  | 22            | 260           | 289+40               | 292+00             | Special Land Use                  | --                                           | --                                               | --                                       | 6.1                                                            | 7.0                                                            | \$171,600                   | --                          | NO (Usage of Golf Course Less Than Required to be Cost Reasonable)                                                                                                     | NO                                                                    | Represents the optimal conceptual noise barrier design; Does not meet the Reasonableness Cost Criteria for special land uses; Noise barriers are not recommended for further consideration or public input during the project's design phase at this location.                                                                                                                                                                                                                                                                                       |
| South Hollywood, Bermack Heights, The Town Colony Condominiums, Jaxon Heights, and Hollywood Little Ranches Communities - East of I-95 between Pembroke Road and Hollywood Boulevard / NSA 14E and St. John's Lutheran Church / NSA 16E | CNE 8-E (CD 8E-3)                                                                              | Segment 1 of 4 - Replacement Shoulder Mounted Noise Barrier   | 14            | 3,350         | 293+80               | 327+30             | 111                               | 96                                           | 0                                                | 96                                       | 8.2                                                            | 12.6                                                           | \$1,982,400                 | \$20,650                    | YES (Not Required - Replacement Noise Barrier System)                                                                                                                  | Yes (Replacement Noise Barriers)                                      | Segments of the existing noise barrier are physically impacted by the widening of I-95 and require replacement; Represents the optimal conceptual replacement noise barrier system design and is recommended for further consideration and public input in the project's design phase; St. John's Lutheran Church playground would receive incidental benefit from this conceptual noise barrier design.                                                                                                                                             |
|                                                                                                                                                                                                                                         |                                                                                                | Segment 2 of 4 - Replacement Shoulder Mounted Noise Barrier   | 14            | 470           | 327+30               | 332+00             |                                   |                                              |                                                  |                                          |                                                                |                                                                |                             |                             |                                                                                                                                                                        |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                         |                                                                                                | Segment 3 of 4 - Replacement Shoulder Mounted Noise Barrier   | 14            | 540           | 332+00               | 337+40             |                                   |                                              |                                                  |                                          |                                                                |                                                                |                             |                             |                                                                                                                                                                        |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                         |                                                                                                | Segment 4 of 4 - Supplemental Shoulder Mounted Noise Barrier  | 14            | 360           | 337+40               | 341+00             |                                   |                                              |                                                  |                                          |                                                                |                                                                |                             |                             |                                                                                                                                                                        |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Stan Goldman Park and Hollywood Dog Park - West of I-95 and North of Hollywood Boulevard / NSA 18W                                                                                                                                      | CNE 9-W (CD 9W-4)                                                                              | Ground Mounted Noise Barrier (I-95 Western Right-of-Way Line) | 22            | 1,500         | 346+00               | 361+00             | Special Land Use                  | ---                                          | ---                                              | ---                                      | 5.9                                                            | 6.1                                                            | \$990,000                   | ---                         | NO (Not Reasonable - Does not meet FDOT's required abatement design goal of 7.0 dB(A)                                                                                  | NO                                                                    | Represents the optimal conceptual noise barrier design; Does not meet the minimum noise reduction design goal of 7 dB(A); Noise barriers are not recommended for further consideration or public input during the project's design phase at this location.                                                                                                                                                                                                                                                                                           |
| Hollywood Little Ranches - East of I-95 and North of Hollywood Boulevard / NSA 22E                                                                                                                                                      | CNE 10-E (CD 10E-4)                                                                            | Segment 1 of 2 - Replacement Shoulder Mounted Noise Barrier   | 14            | 1,350         | 355+20               | 368+70             | 25                                | 25                                           | 3                                                | 28                                       | 8.0                                                            | 12.4                                                           | \$773,400                   | \$27,621                    | YES (Not Required - Replacement Noise Barrier System)                                                                                                                  | Yes (Replacement Noise Barriers)                                      | Represents the optimal conceptual replacement noise barrier system design and is recommended for further consideration and public input in the project's design phase; Segments of the existing noise barrier are physically impacted by the widening of I-95 and require replacement; 14-foot tall shoulder mounted noise barrier will require a design variation since it will be on an MSE wall.                                                                                                                                                  |
|                                                                                                                                                                                                                                         |                                                                                                | Segment 2 of 2 - Supplemental Shoulder Mounted Noise Barrier  | 8             | 860           | 368+70               | 377+30             |                                   |                                              |                                                  |                                          |                                                                |                                                                |                             |                             |                                                                                                                                                                        |                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |





Noise barriers at three of the five CNEs where noise barriers have been recommended for further consideration represent replacement noise barrier systems (i.e., CNEs 3-E, 8-E, and 10-E). At these three locations, the existing noise barriers or segments of the existing noise barriers would be physically impacted by the proposed improvements and would require removal and replacement. The conceptual designs of these replacement noise barriers would be, at a minimum, an in-kind replacement or optimized with supplemental noise barriers to maximize the amount of noise reduction at the impacted noise sensitive receptors. In addition, the recommended conceptual noise barrier designs will meet the minimum noise reduction design goal of 7 dB(A) for at least one benefited residence. Since these are replacement noise barriers, the reasonable cost criteria of equal to or less than \$42,000 per benefited receptor site is not applicable in accordance with FDOT's noise policy. The recommended replacement noise barriers at these three CNEs are expected to reduce traffic noise by at least 5 dB(A) at 174 residences, including 165 of the 195 impacted residences within these areas. In addition, the recommended noise barrier system for CNE 8-E would provide an average of 5.6 dB(A) of incidental benefit to one of the impacted special land uses (i.e., NSA 16E representing a playground associated with St. John's Lutheran Church).

The estimated cost of the recommended noise barriers is \$4,145,400. Additional noise barrier analysis will be performed during the project's Design phase when more detailed project design information is available. During the project's Design phase, final decisions regarding noise barrier length and height are made, an engineering constructability review is conducted to confirm that the noise barrier is feasible, and support for a noise barrier from the benefited noise sensitive sites is determined. Note that any of the 14-foot-tall shoulder mounted noise barriers recommended for construction on a retaining or MSE wall will need approval in writing by the State Structures Design Engineer.

It is during the project's Design phase that final decisions regarding noise barrier length and height are made, an engineering constructability review is conducted to confirm that the noise barrier is feasible, and support for a noise barrier from the benefited noise sensitive sites is determined.

Noise barriers were not found to be feasible or cost reasonable at five CNEs that represent non-residential/special land use sites (i.e., CNEs 1-W, 4-E, 6-E, 7-W, and



9-W). The usage of the special land use sites was less than required to be cost-reasonable. Although noise barriers are not recommended for further consideration at these five impacted special land uses, the recommended noise barrier system for CNE 5-E would provide an average of 6.9 dB(A) of incidental benefit to CNE 4E representing a basketball court and a playground associated with Lanier James Education Center and 3.0 dB(A) to CNE 6E representing a playground associated with Choices Children's Academy.

Based on the noise analysis performed to date, no apparent solutions are available to mitigate the noise impacts at 35 of the 203 impacted residences or at six special land use sites along the project corridor. Therefore, impacts to these and other noise sensitive sites along the project corridor are an unavoidable consequence of the project.

### Statement of Likelihood

FDOT is committed to the construction of reasonable and feasible noise abatement measures (i.e., recommended noise barriers) at the noise impacted locations identified in **Table 6.16** and **Figure 6.18** contingent upon the following conditions:

- Final recommendations on the construction of abatement measures are determined during the project's Design and through the public involvement process.
- Detailed noise analyses during the final design process support the need, feasibility, and reasonableness of providing abatement.
- Cost analysis indicates that the noise barrier(s) cost will not exceed the cost reasonable criterion.
- Community input supporting types, heights, and locations of the noise barrier(s) is provided to the District Office.
- Safety and engineering aspects related to the roadway user and the adjacent property owner have been reviewed, and any conflicts or issues have been resolved.

The noise abatement measures for the identified locations will likely be constructed if found feasible based on the contingencies listed above. If, during the project's Design phase, any of the contingency conditions listed above cause abatement to no longer be considered reasonable or feasible for a given



location(s), such determination(s) will be made before requesting approval for construction advertisement. Commitments regarding the exact abatement measure locations, heights, and types (or approved alternatives) will be made during project reevaluation and before the construction advertisement is approved.

#### 6.2.8 CONTAMINATION

A Level 1 Contamination Screening Evaluation Report (CSER) was prepared using the *FDOT PD&E Manual, Part 2, Chapter 20*, and standard contamination screening evaluation practices such as: reviewing regulatory agency records, site reconnaissance, literature review and when necessary, personal interviews of knowledgeable parties within the limits of the project.

A total of 38 potentially contaminated sites were identified and reviewed for potential impacts to the project. Of these, three were ranked "High", 22 were ranked "Medium", 11 were ranked "Low", and two were ranked "No" for potential contamination concerns. See **Figure 6.19**, **Figure 6.20** and **Figure 6.21** for the locations of these sites and see **Table 6.17** for site names, descriptions, and risk ratings. For sites assigned a risk rating of "Medium" or "High", a Level II Assessment is needed if construction activities are proposed in the site vicinity. These sites have been determined to have known contaminants, which may impact the proposed project. A soil and groundwater sampling plan should be developed for each site, as applicable. Based on the findings of a future review and Level II Assessment, the design engineers may be required to avoid areas of concern or include special provisions with the plans to require that construction activities performed in areas of concern be conducted or supervised by a contamination assessment and remediation contractor specified by FDOT.

Additional information may become available or site-specific conditions may change from the time this report was prepared and should be considered prior to acquiring right of way and/or proceeding with roadway construction.





Figure 6.19 – Contamination Site Map (North)



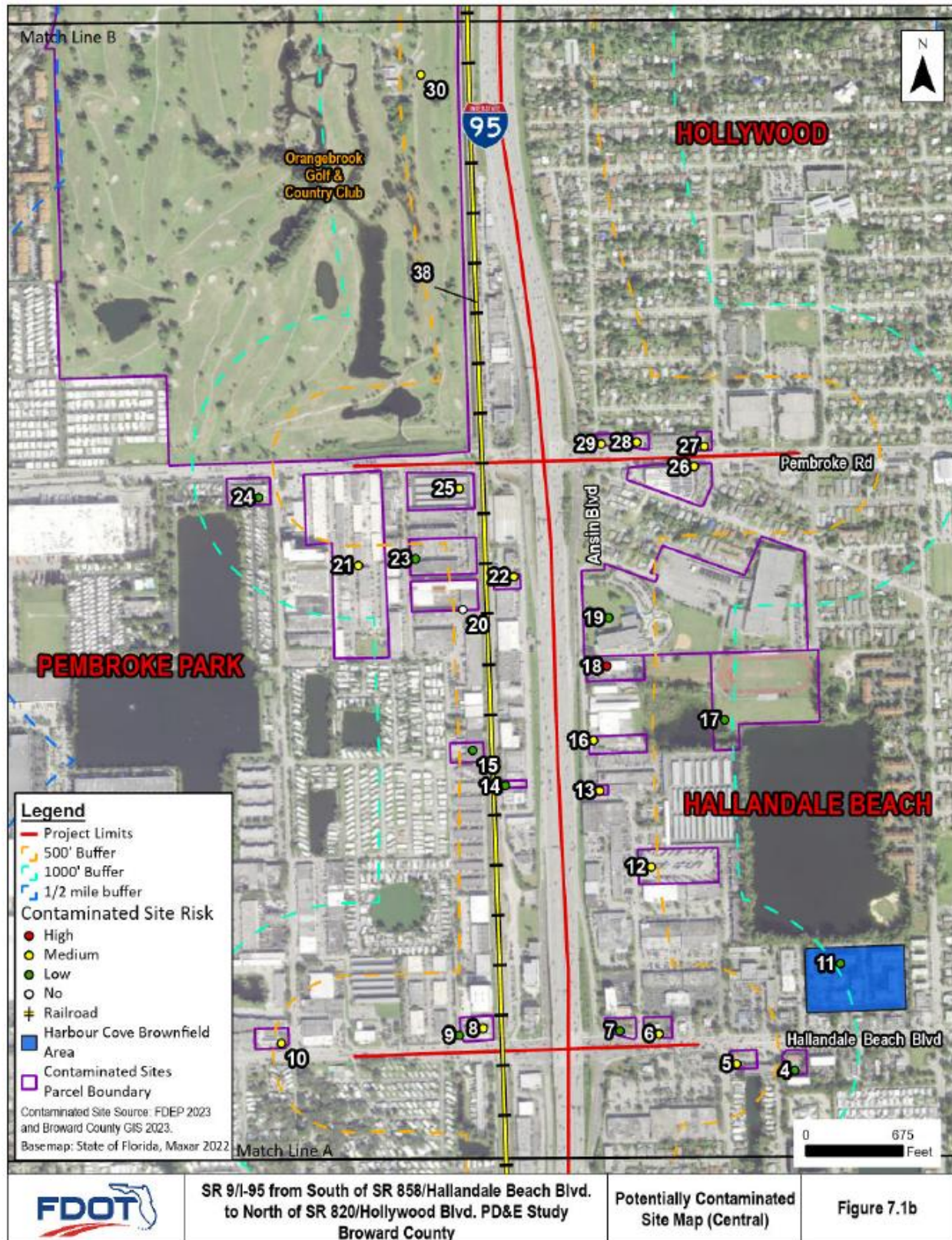


Figure 6.20 – Contamination Site Map (Central)





Figure 6.21 – Contamination Site Map (South)



**Table 6.17 – Potential Contamination Sites**

| Site ID | Facility Name                              | Address                                                                                    | County Permit or ID Number | FDEP Facility ID    | Contamination Concern     | Distance from Project                              | Status                                                                                                  | Risk Rating |
|---------|--------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------|---------------------|---------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------|
| 1       | City of North Miami Beach<br>OJUS Landfill | 20735 NE 16th Avenue<br>Miami, FL 33139                                                    | SW-1179/File-12839         | 57134<br>ERIC_15135 | Methane,<br>ammonia       | 150' southwest of<br>project beginning             | Ongoing biennial groundwater monitoring for<br>ammonia and annual groundwater<br>monitoring for methane | M           |
| 2       | Penn Tank Lines Inc.<br>Roadside Spill     | Southbound I-95<br>0.75 miles South of Exit 18<br>Hallandale Beach, FL 33020               | None Recovered             | 9816414             | Petroleum                 | Within project<br>corridor                         | NFAP submitted                                                                                          | M           |
| 3       | City of Hallandale Beach<br>DDMS #1        | Field Behind 1000 SW 3rd Street<br>Hallandale Beach, FL 33009                              | None Identified            | 99011               | None Recorded             | 700' East of I-95                                  | NFA issued                                                                                              | N           |
| 4       | Hallandale Beach U-Gas                     | 999 W Hallandale Beach<br>Boulevard<br>Hallandale Beach, FL 33009                          | ST-04111-20<br>04111       | 8502072             | Petroleum<br>Hydrocarbons | 525' East - along<br>Hallandale Beach<br>Boulevard | NAM ongoing                                                                                             | L           |
| 5       | HB 1000-18 LLC                             | 1021 W Hallandale Beach<br>Boulevard<br>Hallandale Beach, FL 33009                         | 04094                      | 8501728             | Petroleum<br>Hydrocarbons | 200' East - along<br>Hallandale Beach<br>Boulevard | Quarterly monitoring ongoing                                                                            | M           |
| 6       | Exxon                                      | 1080 W Hallandale Beach<br>Boulevard<br>Hallandale Beach, FL 33009                         | ST-04662-20<br>04662       | 8502695             | Petroleum<br>Hydrocarbons | Adjacent                                           | SRCO Issued- proposed for acquisition                                                                   | M           |
| 7       | Burger King                                | 1090 W Hallandale Beach<br>Boulevard<br>Hallandale Beach, FL 33009                         | 09827<br>09693             | 8501967<br>8502027  | Petroleum                 | Adjacent                                           | NFA issued- proposed for acquisition                                                                    | L           |
| 8       | Racetrac #491                              | 3031 W Hallandale Beach<br>Boulevard<br>Pembroke Park, FL 33009                            | ST-02341-20<br>02341       | 9602003<br>9101088  | Petroleum<br>Hydrocarbons | Adjacent                                           | SRCO Issued                                                                                             | M           |
| 9       | Energy Dispatch LLC Tanker<br>Truck Spill  | East and West Sides of SW 31st<br>Avenue & Hallandale Boulevard<br>Pembroke Park, FL 33009 | 09884                      | 9803721             | Petroleum<br>Hydrocarbons | Adjacent                                           | SRCO Issued                                                                                             | L           |
| 10      | MOIL Gas Station                           | 3151 W Hallandale Beach<br>Boulevard<br>Pembroke Park, FL 33009                            | 02181<br>ST-02181-20       | 9800048             | Petroleum                 | 400' West - along<br>Hallandale Beach<br>Boulevard | TCAR showed levels above SCTLs                                                                          | M           |
| 11      | Harbour Cove Associates<br>(Brownfield)    | 100 NW 9th Terrace<br>Hallandale Beach, FL 33020                                           | BF060401001                | ERIC_6725           | Petroleum                 | 700' East of I-95                                  | SRCO Issued                                                                                             | L           |
| 12      | Vintage Ansin Truck Parking                | 310 Ansin Boulevard<br>Hallandale Beach, FL 33009                                          | None                       | 53352               | None recorded             | 400' East of I-95                                  | Offsite notice issued for contamination                                                                 | M           |
| 13      | Pharmco Rx                                 | 400 Ansin Boulevard<br>Hallandale Beach, FL 33009                                          | None                       | 9802375             | None Recorded             | 100' East of I-95                                  | No contamination identified                                                                             | M           |



Table 6.17 – Potential Contamination Sites (Continued)

| Site ID | Facility Name                                            | Address                                           | County Permit or ID Number                 | FDEP Facility ID | Contamination Concern     | Distance from Project                                | Status                                  | Risk Rating |
|---------|----------------------------------------------------------|---------------------------------------------------|--------------------------------------------|------------------|---------------------------|------------------------------------------------------|-----------------------------------------|-------------|
| 14      | Messingschlager Properties                               | 2514 SW 30th Avenue<br>Hallandale Beach, FL 33009 | None                                       | 9401806          | Petroleum                 | 75' West of I-95                                     | SRCO Issued                             | L           |
| 15      | 95 Warehouse LTD                                         | 2401 SW 31st Avenue<br>Pembroke Park, FL 33009    | 06862                                      | 8942651          | Petroleum<br>Hydrocarbons | 350' West of I-95                                    | SRCO Issued                             | L           |
| 16      | Gallo Marble Enterprises                                 | 500 Ansin Boulevard<br>Hallandale Beach, FL 33009 | None                                       | 8627989          | Ammonia                   | 100' East of I-95                                    | DRC issued; in compliance               | M           |
| 17      | James Lanier Education<br>Center – grass field           | 700 NW 7 Street<br>Hallandale Beach, FL 33009     | None                                       | 99353            | Ammonia                   | 875' East of I-95                                    | Offsite notice issued for contamination | L           |
| 18      | Park Shore Pharmacy                                      | 600 Ansin Boulevard<br>Hallandale Beach, FL 33009 | NF-2701<br>09924                           | 9700906          | Ammonia                   | 70' East of I-95                                     | Offsite notice issued for contamination | H           |
| 19      | James Lanier Education<br>Center                         | 1050 NW 7th Court<br>Hallandale Beach, FL 33009   | 07879                                      | 9100221          | Petroleum                 | 50' East of I-95                                     | SRCO issued                             | L           |
| 20      | BW Recycling                                             | 2035 SW 31st Avenue<br>Pembroke Park, FL 33009    | None                                       | None             | None Recorded             | 350' West of I-95                                    | No contamination identified             | N           |
| 21      | Petroleum Products<br>Corporation (Superfund Site)       | 3130 SW 19th Street<br>Pembroke Park, FL 33009    | 54384655<br>ERIC_3796<br>54391722<br>09535 | 8732818          | Petroleum<br>Hydrocarbons | Adjacent                                             | Remediation to begin                    | M           |
| 22      | Orkin Extermination Co                                   | 1820 SW 30th Avenue<br>Hallandale Beach, FL 33009 | HM-01149-19<br>01149                       | 8502427          | None Recorded             | 60' West of I-95                                     | No contamination identified             | M           |
| 23      | Waste Connections -<br>Pembroke Park Transfer<br>Station | 1899 SW 31st Avenue<br>Pembroke Park, FL 33009    | FL0000871996<br>00014                      | 55464<br>105719  | None Recorded             | 300' West of I-95,<br>500' South of<br>Pembroke Road | No contamination identified             | L           |
| 24      | Flowers Baking Company<br>(Out of Business)              | 3262 Pembroke Road<br>Pembroke Park, FL 33009     | None                                       | 8622371          | Petroleum                 | 530' West - along<br>Pembroke Road                   | Remediation recommended                 | L           |
| 25      | A&B Recycling                                            | 1708 SW 31st Avenue<br>Pembroke Park, FL 33009    | 03206<br>HM-03206-20                       | None             | None Recorded             | Adjacent                                             | No contamination identified             | M           |
| 26      | Sun Yi Cafe                                              | 1051 W Pembroke Road<br>Pembroke Park, FL 33010   | 04369                                      | 8732177          | None Recorded             | Adjacent                                             | No contamination identified             | M           |
| 27      | Shell FCE #3828                                          | 2801 Pembroke Road<br>Pembroke Park, FL 33020     | 03950<br>ST-03950-20                       | 8502153          | Petroleum                 | Adjacent                                             | SRCO issued                             | M           |
| 28      | Family Tire Distributors                                 | 2817 Pembroke Road<br>Hollywood, FL 33020         | 15361<br>HM-15361-20                       | None             | None Recorded             | Adjacent                                             | No contamination identified             | M           |
| 29      | Kosher Motors                                            | 2829 Pembroke Road<br>Hollywood, FL 33020         | 15905<br>01535                             | 9500022          | Petroleum                 | Adjacent                                             | SRCO issued                             | M           |





Table 6.17 – Potential Contamination Sites (Continued)

| Site ID | Facility Name                            | Address                                           | County Permit or ID Number                                        | FDEP Facility ID | Contamination Concern  | Distance from Project                 | Status                                                   | Risk Rating |
|---------|------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------|------------------|------------------------|---------------------------------------|----------------------------------------------------------|-------------|
| 30      | Orangebrook Golf Course and Country Club | 4000 Entrada Street<br>Hollywood, FL 33021        | 01360<br>HM-01360-20                                              | 8944879          | Arsenic                | Adjacent                              | No contamination identified, but arsenic presence likely | M           |
| 31      | Shell-First Coast Energy #3829           | 2800 Hollywood Boulevard<br>Hollywood, FL 33020   | 13297<br>HM-13297-20                                              | 8502526          | Petroleum Hydrocarbons | 750' East - along Hollywood Boulevard | SRCO issued                                              | L           |
| 32      | Dabern Auto Center                       | 2828 Hollywood Boulevard<br>Hollywood, FL 33020   | 54397828<br>0969                                                  | 8502583          | Petroleum Hydrocarbons | 350' East - along Hollywood Boulevard | NAM ongoing                                              | M           |
| 33      | Goodyear Tires                           | 2911 Hollywood Boulevard<br>Hollywood, FL 33020   | 54401456<br>09656                                                 | 8502126          | Petroleum              | Adjacent                              | CAR showed levels above SCTLs and GCTLs                  | H           |
| 34      | Chevron                                  | 3000 Johnson Street<br>Hallandale Beach, FL 33020 | None                                                              | 8502723          | Petroleum              | 150' West - along Johnson Street      | SRCO issued                                              | M           |
| 35      | Clean Paws Pet Salon and Resort          | 3030 Johnson Street<br>Hallandale Beach, FL 33020 | ERIC_4112<br>AIR_0112286<br>FLD059858167<br>FLR000031617<br>01888 | 9501066          | Solvents PCE/TCE       | 375' West - along Johnson Street      | Biennial groundwater sampling ongoing                    | M           |
| 36      | Marathon                                 | 3034 Johnson Street<br>Hallandale Beach, FL 33021 | None                                                              | 8502207          | Petroleum              | 450' West - along Johnson Street      | Additional testing recommended                           | M           |
| 37      | Former Sunset Golf Club                  | 2727 Johnson Street<br>Hollywood, FL 33020        | NF-2088<br>19544<br>FLR10TJ71                                     | None             | Arsenic                | Adjacent                              | NFAC issued                                              | H           |
| 38      | CSX Railroad                             | Along west side of I-95                           | None                                                              | None             | Arsenic, creosote      | Varies 60'-215'                       | No contamination identified                              | M           |



Dewatering is anticipated to occur. Therefore, a dewatering permit will be required from FDEP/SFWMD. The contractor will be held responsible for ensuring compliance with any necessary dewatering permit(s). The dewatering plan will need to consider the radius of the influence of any dewatering activity on nearby contamination plumes to avoid potential contamination plume exacerbation. The status of the sites will be updated accordingly at each future design phase. All permits will be obtained in accordance with Federal, State, and local laws and regulations and coordination with the District Contamination Impact Coordinator (DCIC).

If dewatering activities are proposed within 500 feet of a contaminated site, an FDOT Contamination Assessment Remediation (CAR) Contractor will assist in the preparation of the dewatering permit application and assist in the permit process. Roadway plans will have a general note listing any area of dewatering concerns with applicable stationing. See *Part 2, Chapter 20 Contamination, paragraph 22.2.5.2 Dewatering During Construction* for further details. Additionally, see *Part 1, Chapter 12, Environmental Permits, and Part 2, Chapter 11, Water Quality Impact Evaluation*, for guidance on NPDES permitting.

For more information about contamination, please refer to the CSER, which is included in the SWEPT project file.