INTERSTATE 95 (I-95) / STATE ROAD 9 (SR 9)
SYSTEMS INTERCHANGE MODIFICATION REPORT

VOLUME 1 OF 2

FDOT Financial Project Identification Number: 436903-1-22-02
Efficient Transportation Decision Making (ETDM) Number: 14254

Project Study Limits:
From South of Hallandale Beach Boulevard (SR 858) to
North of Hollywood Boulevard (SR 820)
Broward County, Florida

Prepared for:

FDOT DISTRICT FOUR
2300 WEST COMMERCIAL BOULEVARD
FORT LAUDERDALE, FL 33309

DRAFT

August 2021

SYSTEMS INTERCHANGE MODIFICATION REPORT (SIMR)
Interstate 95 (I-95) / State Road 9 (SR 9) PD&E Study
From South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)

FPID Number: 436903-1-22-02
ETDM Number: 14254

Florida Department of Transportation
Determination of Engineering and Operational Acceptability

Acceptance of this document indicates successful completion of the review and determination of engineering and operational acceptability of the Interchange Access Request. Approval of the access request is contingent upon compliance with applicable Federal requirements, specifically the National Environmental Policy Act (NEPA) or Department's Project Development and Environment (PD&E) Procedures. Completion of the NEPA/PD&E process is considered approval of the project location design concept described in the environmental document.

____________________________ Date____________________
Kenzot Jasmin, PE
FDOT District Four Project Manager
Requestor

____________________________ Date____________________
Cesar Martinez, P.E.
FDOT District Four Project Development Manager
Interchange Review Coordinator

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Jenna Bowman, P.E.
FDOT Central Office
Systems Management Manager

____________________________ Date____________________
Will Watts, P.E.
FDOT Central Office
Chief Engineer

QUALITY CONTROL CERTIFICATION FOR INTERCHANGE ACCESS REQUEST SUBMITTAL

AUGUST 2021

FPID Number: 436903-1-22-02
ETDM Number: 14254

I-95 (SR 9) from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
District Four

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Document Type ☐ MLOU ☐ IJR ☐ IMR ☐ IOAR ☒ SIMR

DRAFT

This document has been prepared following FDOT Procedure Topic No. 525-030-260 (New or Modified Interchanges) and complies with the FHWA two policy requirements. Appropriate District level quality control reviews have been conducted and all comments and issues have been resolved to their satisfaction. A record of all comments and responses provided during QC review is available in the project file or Electronic Review Comments (ERC) system.

Requestor

____________________________ ____________

Kenzot Jasmin, P.E. — *Date*
FDOT District Four Project Manager

Interchange Review Coordinator

____________________________ ____________

Cesar Martinez, P.E. — *Date*
FDOT District Four
Project Development Manager
Interchange Review Coordinator

PROFESSIONAL ENGINEER CERTIFICATE

I hereby certify that I am a registered professional 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, conclusions or technical advice hereby reported for:

Project:	**Interstate 95 (I-95) / State Road 9 (SR 9)** **Project Development and Environment Study**
ETDM Number:	**14254**
Financial Project Identification Number:	**436903-1-22-02**
Federal Aid Project Number:	**TBD**
County:	**Broward**
FDOT Project Manager:	**Kenzot Jasmin, P.E.**

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.

SIGNATURE: ______________________

Name: Ryan Solis-Rios, P.E., PTOE
Date: ________________
P.E. No.: 63345
Consultant Firm: The Corradino Group

EXECUTIVE SUMMARY

INTRODUCTION

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 ES.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.

This Systems Interchange Modification Report (SIMR) was prepared in support of the I-95 PD&E Study. The SIMR documents the results of the traffic analyses for the considered alternatives and provides an assessment of the proposed roadway improvements in accordance with the *FHWA's Policy on Access to The Interstate System*. The SIMR was prepared in accordance with the FDOT's policies and procedures and serves as part of the necessary documentation for receiving Location Design Concept Acceptance (LDCA) for the proposed project.

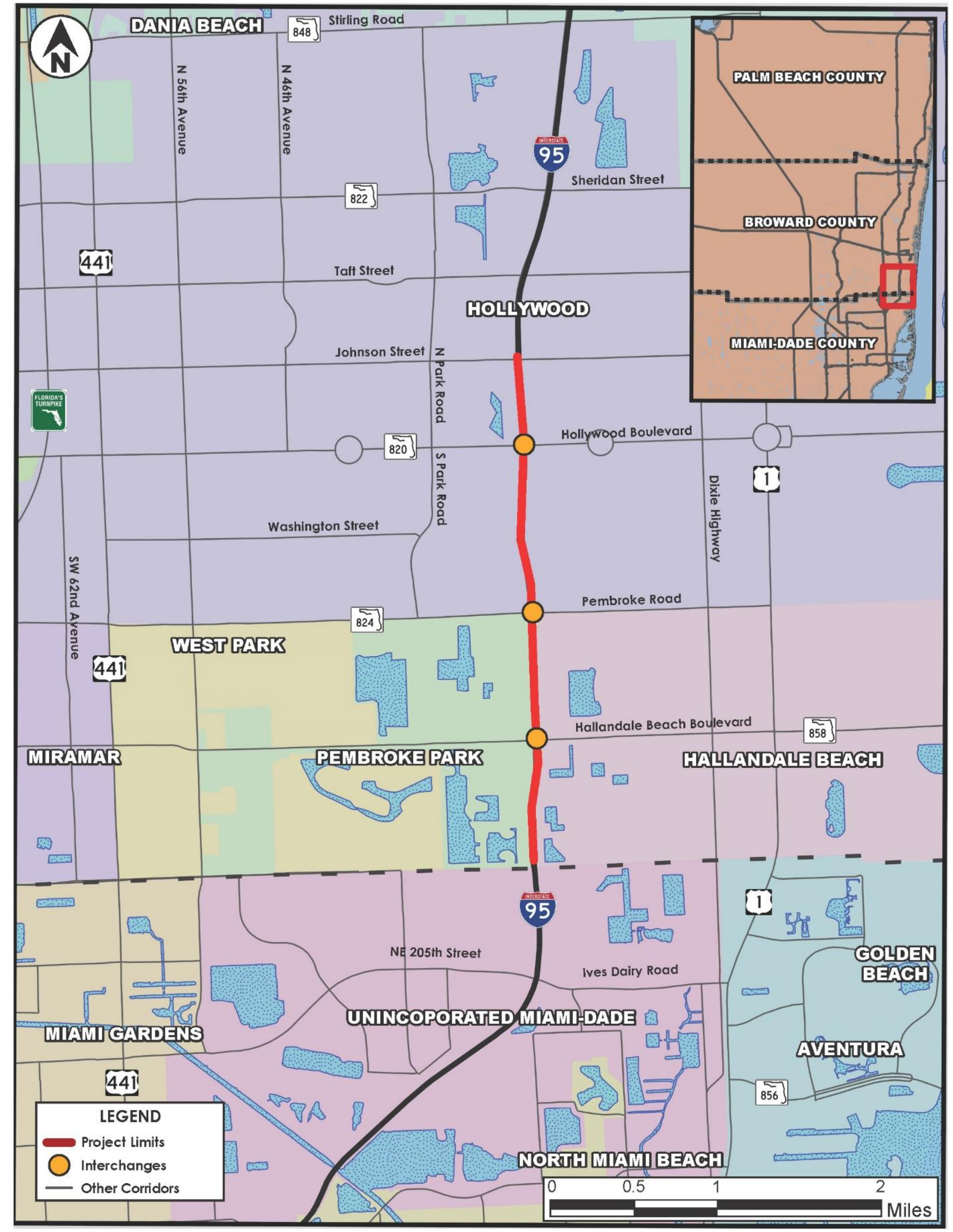


Figure ES.1 - Project Location Map

PURPOSE AND NEED FOR PROJECT

The purpose of this project is to develop recommendations for the proposed improvements of I-95 between south of Hallandale Beach Boulevard and north of Hollywood Boulevard. The need for this project is to increase interchange and ramp terminals intersection capacity at Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard. Other 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 overall goals and objectives of this PD&E Study are described below:

- Evaluate the implementation of potential interchange and intersection improvements that will improve capacity, operations, safety, mobility, and emergency evacuation.
- Identify the appropriate interstate/interchange access improvements that, combined with Transportation Systems Management and Operations (TSM&O) improvements, will service the users of the area, and achieve the Purpose and Need.
- Provide relief from existing and projected traffic congestion.
- Improve the safety of the I-95 mainline corridor by addressing speed differentials and lane weaving deficiencies between interchanges.
- Support the optimal operations of the existing roadway network.
- Maintain consistency with the current I-95 Express Lanes and local projects.
- Prioritize the proposed improvements based on the area needs (short-term vs. long-term), logical segmentation and funding.

METHODOLOGY

The methodology applied for this I-95 SIMR is documented in the Methodology Letter of Understanding (MLOU), dated September 2017, and later updated in June 2021. The MLOU was approved by FDOT District Four and FDOT Central Office Systems Implementation. The MLOU outlines the criteria, assumptions, processes, analyses, and documentation requirements for the project. The MLOU was prepared in accordance with the FDOT's Interchange Access Request User's Guide and related standards. The interchange modifications proposed in this SIMR were developed in coordination with FDOT. The viability of future interchange modifications within the I-95 project area was established and documented in the *I-95 Broward Interchanges Masterplan*, dated January 2016. The Masterplan Study 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.

EXISTING CONDITIONS

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.

Existing Annual Average Daily Traffic (AADT) volumes vary between 238,000 and 268,000. 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. 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 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, which is considered 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.

NO-BUILD ALTERNATIVE

The No-Build Alternative proposes to keep the existing study area without future corridor improvements. The effect associated with this alternative includes the acceptance of existing highly congested traffic conditions. Also, travel demand and truck traffic will increase significantly over the next 20 years, given the continued growth expected in this area. Future 2045 AADT volumes vary between 303,000 and 316,000. Traffic analysis results indicate that operations along I-95 are expected to be at LOS E or F during the AM and PM peak period at selected locations.

Average operating speeds are expected to range from approximately 24 to 57 mph at certain locations. The No-Build Alternative will not improve the system capacity needs within the study area. Long-term improvements are necessary to mitigate the existing traffic conditions and increase capacity to accommodate future travel demand. The No-Build Alternative will not reduce congestion on the system, nor will it provide mobility for this section of Broward County.

During the AM peak-hour, two areas of congestion are present on I-95 in the northbound direction. Between Ives Dairy Road and Hallandale Beach Boulevard, the high demand volume coupled with weaving maneuvers between the two interchanges cause congestion and speeds between 30-45 mph to occur. The Hallandale Beach Boulevard northbound off-ramp queues on the mainline. Speeds as low as 41 mph are observed at the Hollywood Boulevard northbound off-ramp, extending upstream within the Pembroke Road interchange. This occurs because the northbound off-ramp turning movements experience significant delay and queueing. The congestion and queueing from the Hollywood Boulevard off-ramp reach a mainline speed of approximately 24 mph. In the southbound direction, congestion within the 800-foot-long weave segment between Pembroke Road and Hallandale Beach Boulevard is observed with an approximate mainline speed of 47 mph. The southbound off-ramp at Hallandale Beach Boulevard queues onto the mainline causing operational issues within the short weave segment.

During the PM peak-hour, congestion is observed on I-95 northbound at similar locations to the AM peak-hour. Between Ives Dairy Road and Hallandale Beach Boulevard, the high demand volume coupled with weaving maneuvers between the two interchanges cause congestion and speeds between 20-35 mph to occur. The Hallandale Beach Boulevard northbound off-ramp queues on the mainline. The Hollywood Boulevard diverge also begins to degrade with speeds between 39-51 mph. Significant queueing is observed spilling back from the off-ramp. In the southbound direction there is minor turbulence upstream of the Hollywood Boulevard off-ramp, this is in part due to the Hollywood Boulevard off-ramp queueing on the mainline. Also, there is minor turbulence within the 800 foot-long weave segment between Pembroke Road and Hallandale Beach Boulevard with mainline speed of 57 mph.

ALTERNATIVES CONSIDERED

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.

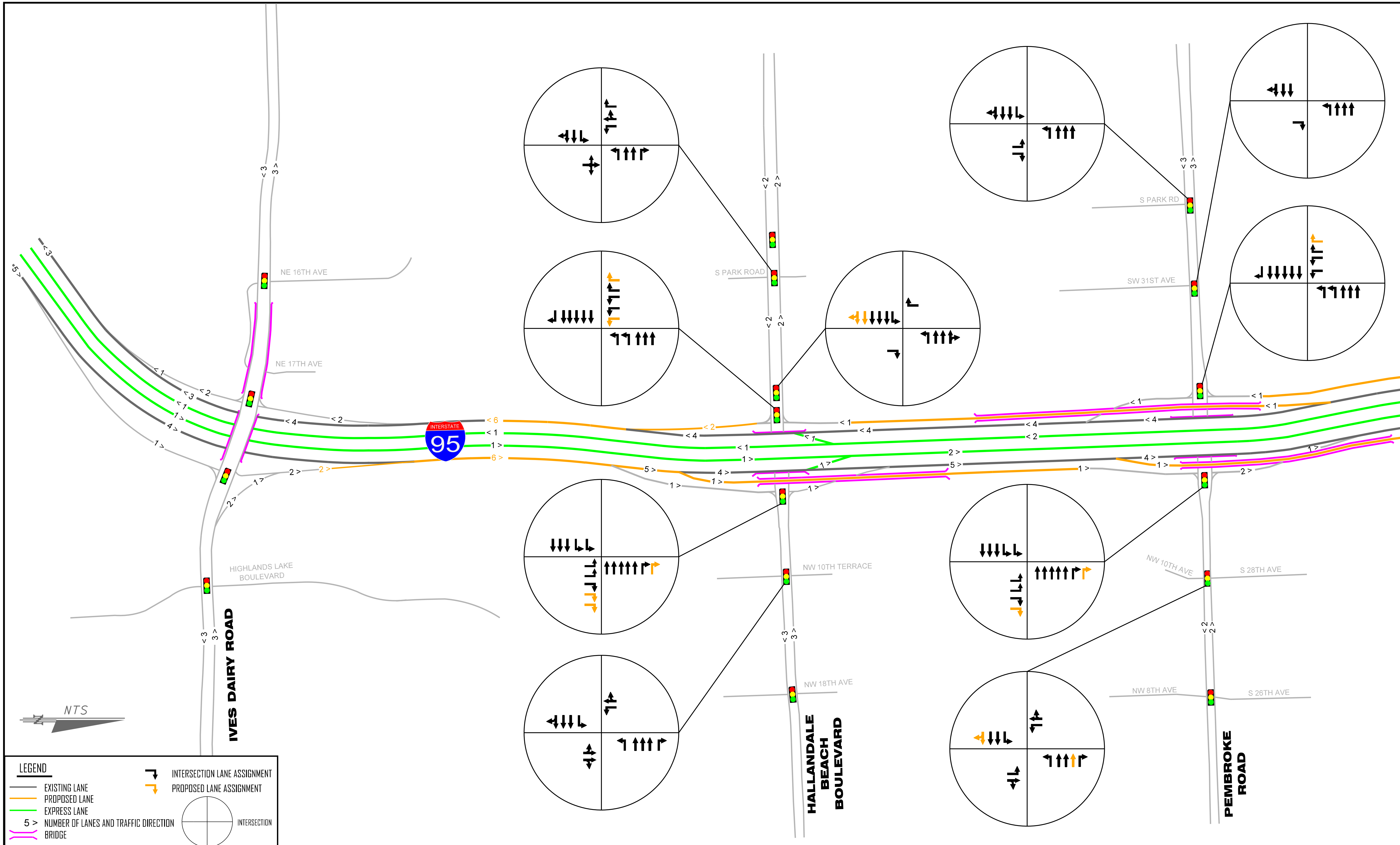
Alternative 1 – Alternative 1 proposes braided ramps between interchanges to improve substandard weaving movements along I-95. In this alternative, the on-ramps from each interchange remains unchanged. However, the off-ramps to Pembroke Road and Hollywood Boulevard in the northbound direction and to Pembroke Road and Hallandale Beach Boulevard in the southbound direction were 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 continues 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 ES.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 removes 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 utilizes a new collector distributor off-ramp just south of Hallandale Beach Boulevard. The collector distributor roadway system extends 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 is not continuous, it ends and begins 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 ES.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 were 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 conventionally uses the northbound off-ramp and make a left turn. However, in this alternative, the northbound exiting interstate traffic destined westbound uses 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 ES.4*** shows the schematic geometric layout of Alternative 3.

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)



FDOT

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

JUNE 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.: 14254

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

FIGURE ES.2

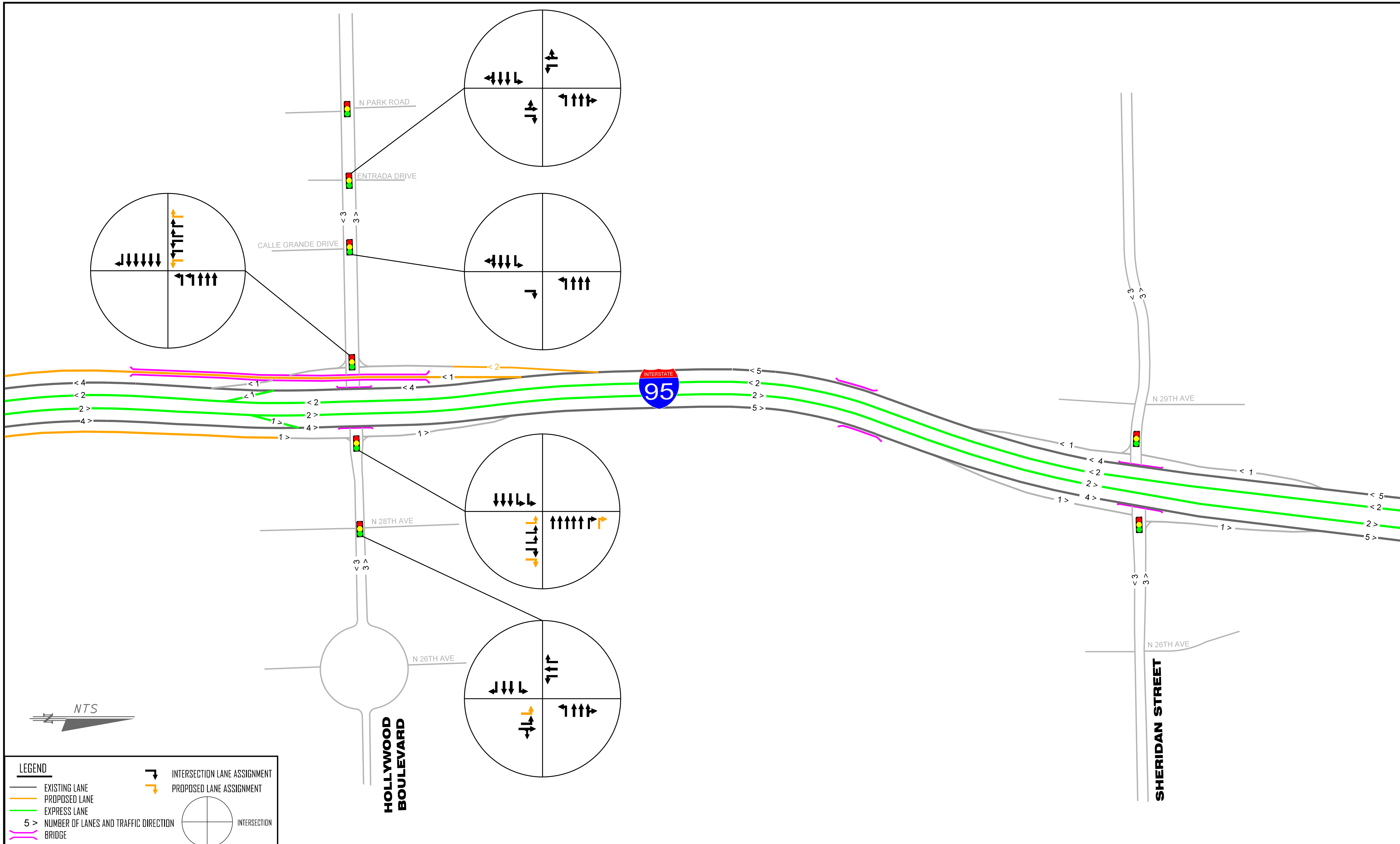


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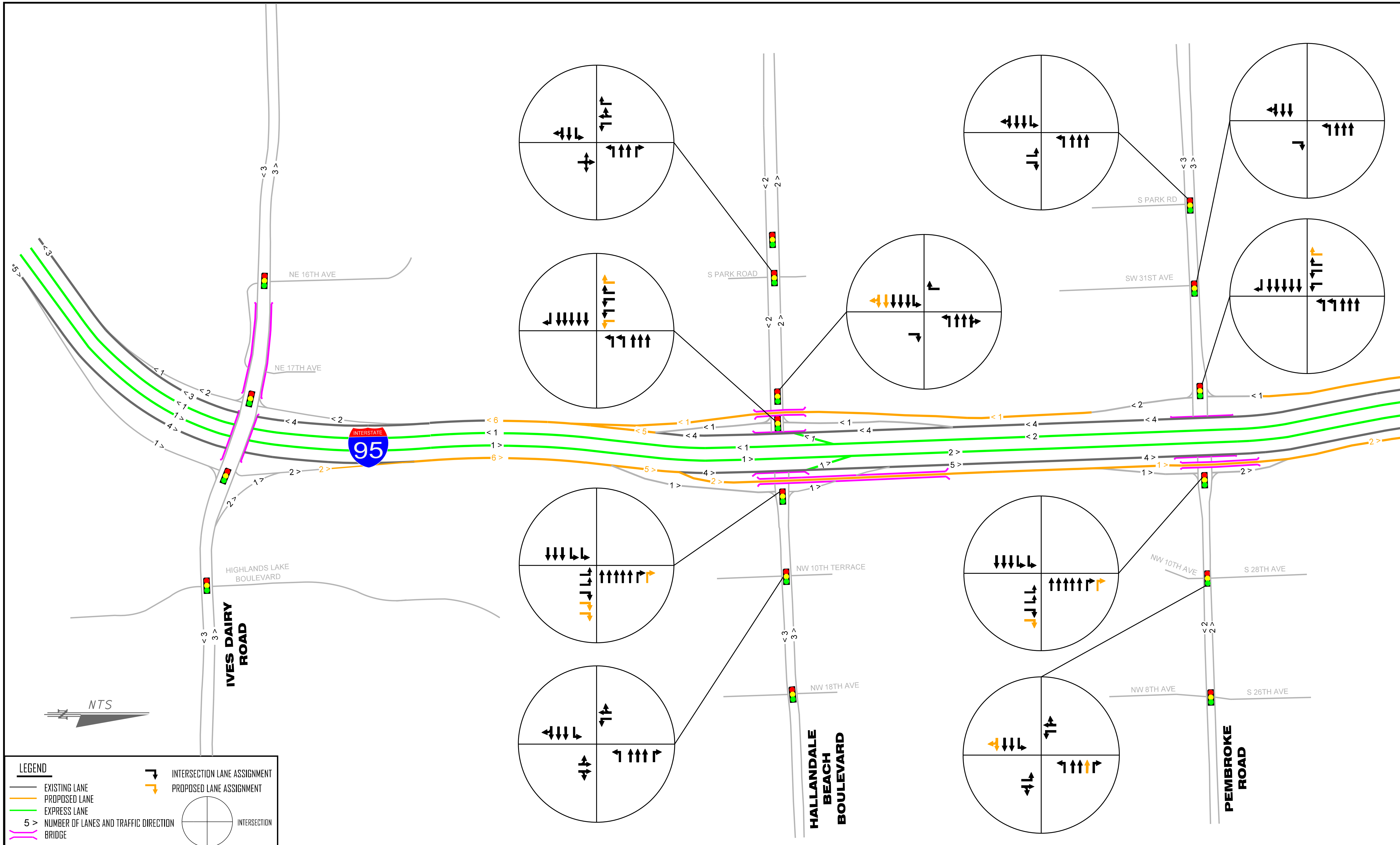
FIGURE
ES.2



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

FIGURE ES.3

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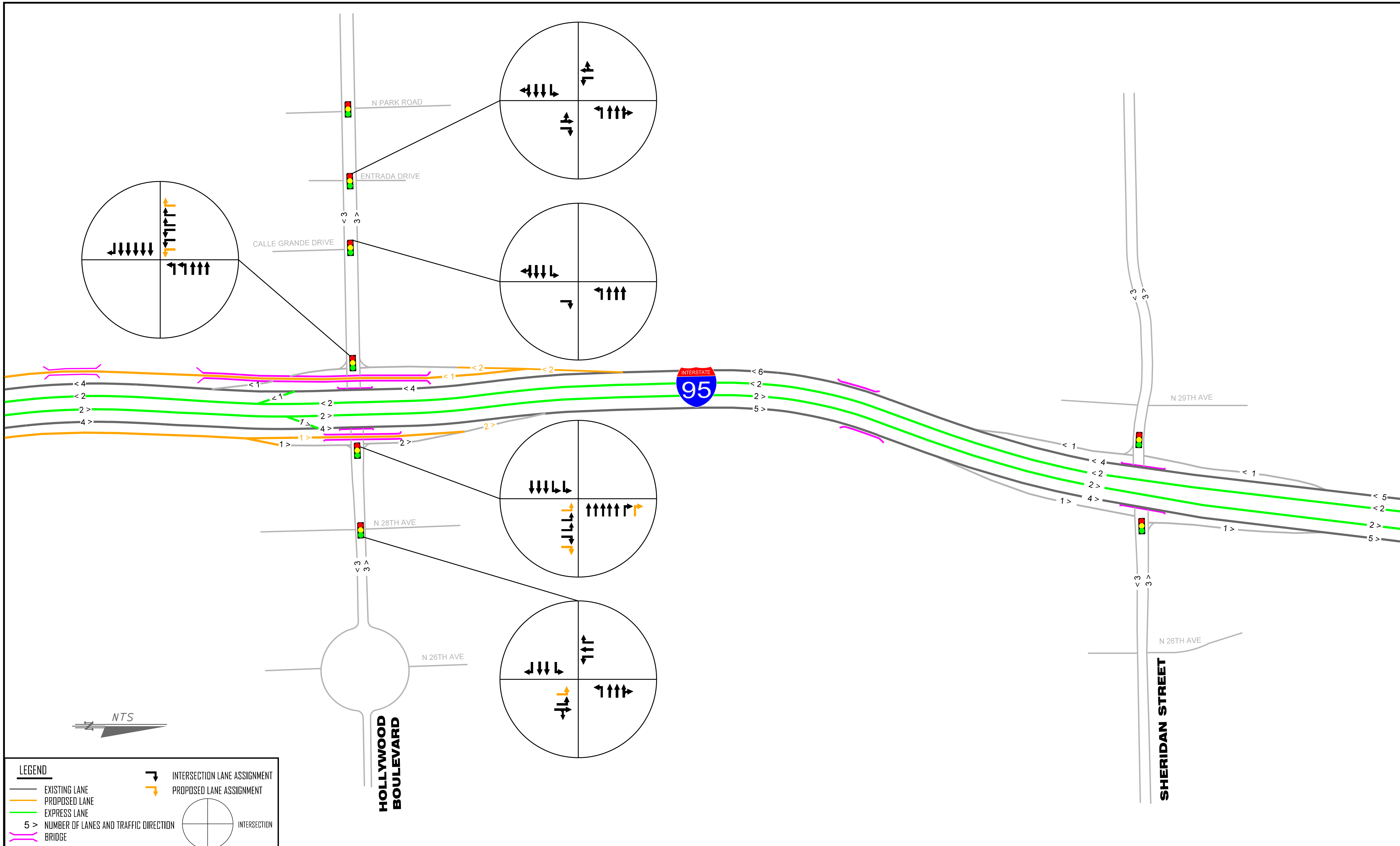

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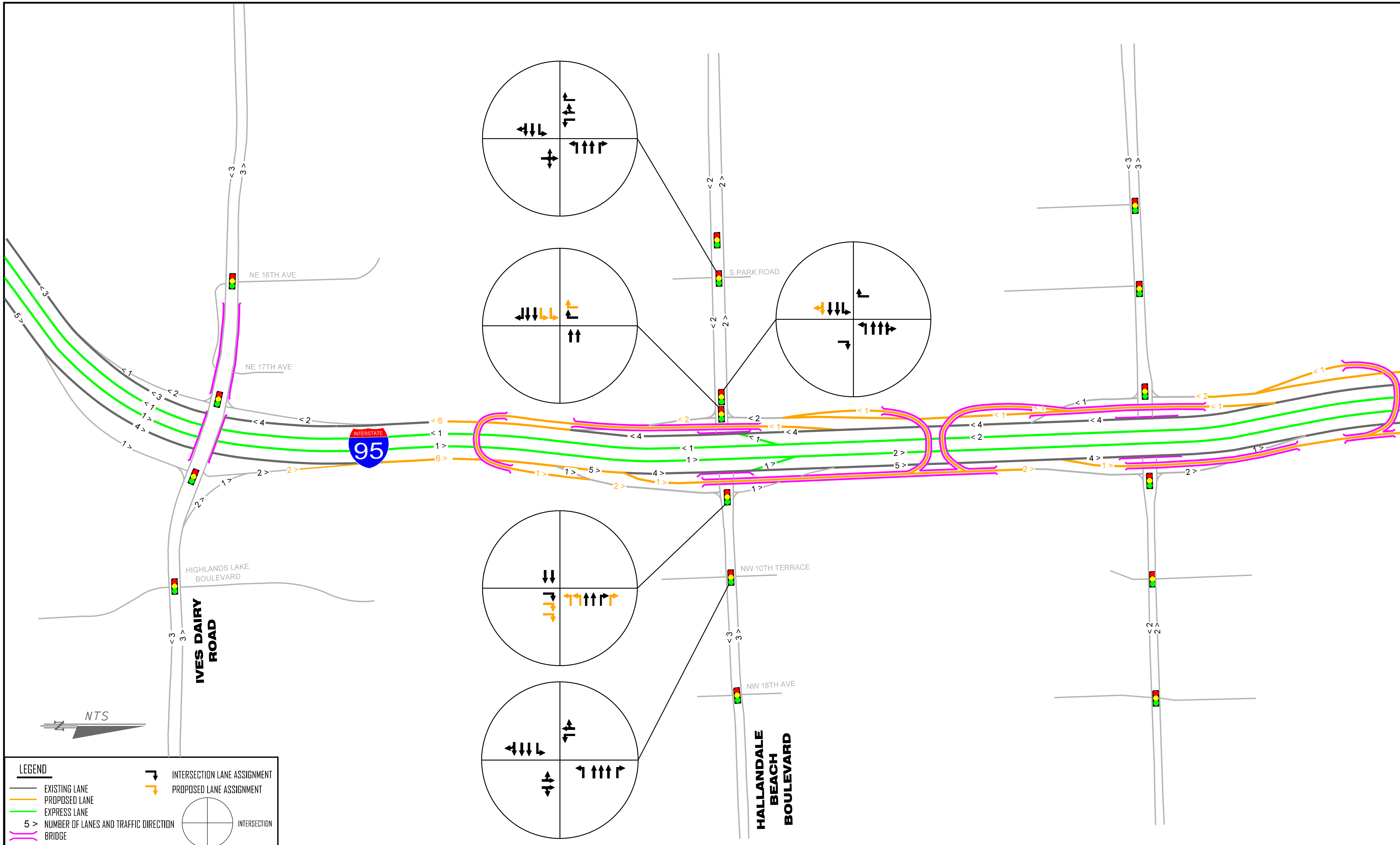
SR 9 (INTERSTATE 95) LANE GEOMETRY AND CONFIGURATIONS ALTERNATIVE 2 - SCHEMATIC LINE DIAGRAM

FIGURE ES.3



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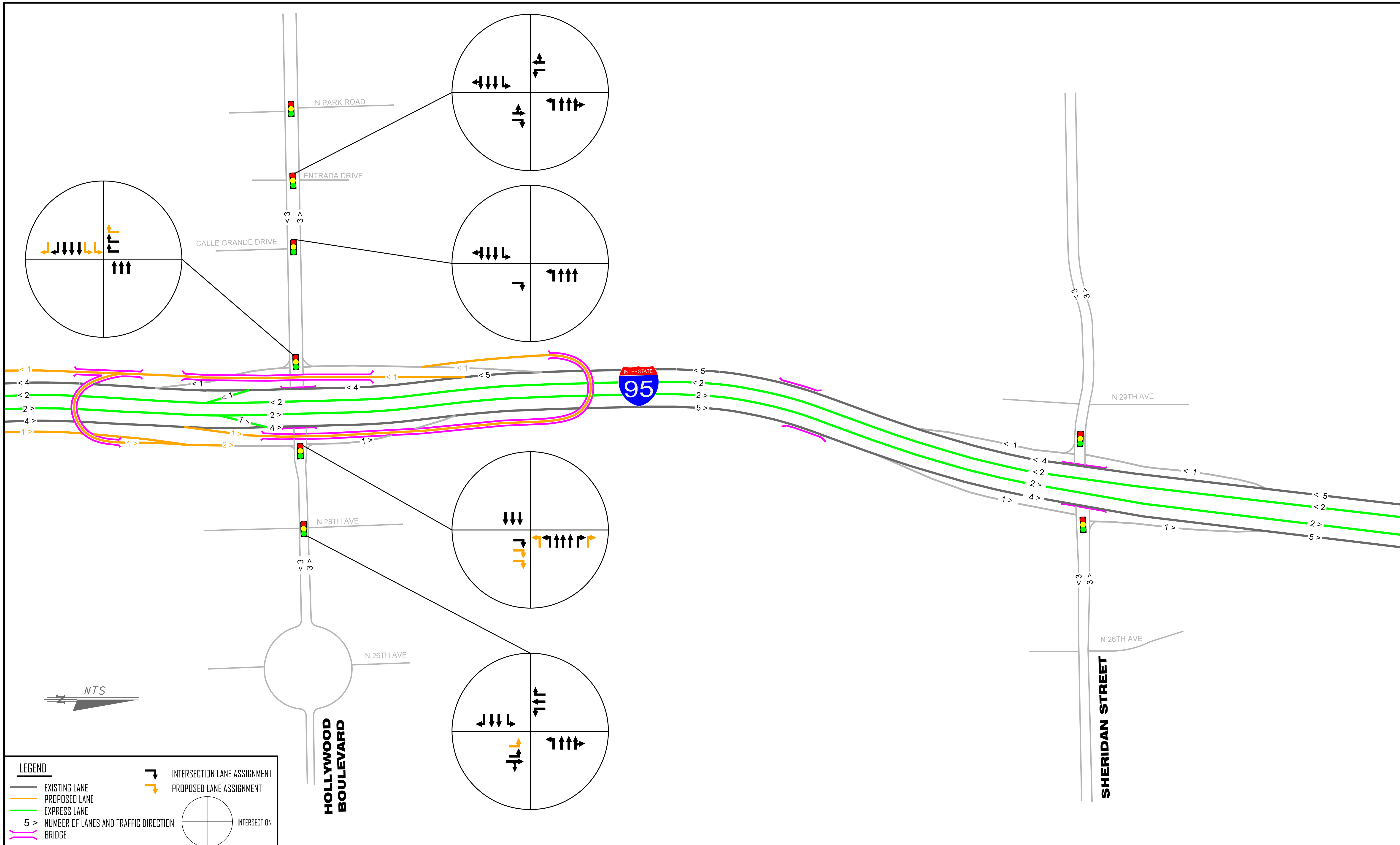
SR 9 (INTERSTATE 95) LANE GEOMETRY AND CONFIGURATIONS ALTERNATIVE 3 - SCHEMATIC LINE DIAGRAM

FIGURE ES.4



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

FIGURE
ES.4

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 uniformed 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 – 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.

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, traffic, socio-economic, environmental and project cost. The key components of the alternatives analysis were purpose and need, travel demand forecasting, geometrics, right of way impacts, construction cost and operational analysis. The alternatives analysis was geared to determine which capacity improvements were necessary to improve traffic operations, safety, interchange access, system linkage, modal interrelationships, social demand, economic development, and emergency evacuation. Alternative 2 was selected as the preferred alternative based on the alternatives alignment analysis and the evaluation results documented during the PD&E Study.

INTERSECTION AND INTERCHANGE IMPROVEMENTS

Alternative 2 was selected as the Preferred Alternative based on the alternatives alignment analysis and the evaluation results documented during the PD&E Study. The Preferred Alternative 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.

The preferred alternative is proposing interchange and intersection improvements to support the optimal operations of the corridor. The preferred alternative proposes interchange improvements to all three interchanges. The improvements will vary from minor to major capacity enhancements (see ***Appendix M*** and ***M2***, Preferred Concept Plans).

Below is a summary of the overall interchange ramps improvements:

- Hallandale Beach Boulevard
    - Northbound off-ramp terminal intersection widening to triple right-turn lanes
    - Southbound off-ramp terminal intersection widening to triple left-turn lanes and dual right-turn lanes
    - 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
    - Additional eastbound through right-turn shared at NW 10th Avenue

- Hollywood Boulevard
    - Northbound off-ramp terminal intersection widening to triple left-turn lanes

- Southbound off-ramp terminal intersection widening to triple left-turn lanes and triple right-turn lanes

COMPARISON OF NO-BUILD ALTERNATIVE AND PREFERRED ALTERNATIVE – HCM ANALYSIS

A comparative assessment was performed for the No-Build Alternative and the Preferred Alternative for the design year 2045 based on HCM analytical procedures. The tables below provide the summary of the comparative assessment of the HCM analyses.

HCM Freeway Segments Analysis – No-Build vs. Preferred

Year	Alternative	I-95 Freeway Segments		
		Total Locations	LOS D or better	LOS E or F
2030	No-Build	43	39	4
	Preferred	43	43	0
2045	No-Build	43	32	11
	Preferred	43	40	3

HCM Intersection Analysis – No-Build vs. Preferred

Year	Alternative	Signalized Intersections		
		Total Intersections	LOS D or better	LOS E or F
2030	No-Build	14	13	1
	Preferred	14	14	0
2045	No-Build	14	10	4
	Preferred	14	13	1

As shown in the two tables, the results from the assessment indicated that the Preferred Alternative performs better than the No-Build Alternative.

NO-BUILD ALTERNATIVE AND PREFERRED ALTERNATIVE – MICROSIMULATION ANALYSES

A detailed assessment of operating conditions for the No-Build and Preferred Alternatives was performed using VISSIM microsimulation models. VISSIM models were developed for the AM peak period (6:30 AM to 10:30 AM) and PM peak period (3:30 PM to 7:30 PM) in the design year 2045. The results from the microsimulation analyses indicate that the Preferred Alternative generates overall better operating conditions for all considered Measures of Effectiveness (MOE) in both the AM and PM peak periods within the study area.

The 2045 Preferred Alternative results for the AM peak-hour show significant improvements over the No-Build due to the capacity improvements on the mainline and at study interchanges. I-95 northbound operates at 57 mph or better for all four hours of simulation throughout the project area. The additional lane available within the northbound weave segment between Ives Dairy Road and Hallandale Beach Boulevard significantly improves operations at this location. The additional left turn lane and increased right turn lane storage at the Hollywood Boulevard northbound off-ramp, in addition to the proposed collector distributor roadway, significantly reduces the risk of queue spillback from the ramp terminal intersection to the I-95 mainline.

I-95 in the southbound direction operates at or near free-flow conditions throughout the project area. 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.

The 2045 results for the PM peak-hour show significant improvements over the No-Build Alternative due to the improvements on the mainline and at study interchanges. I-95 northbound operates at 56 mph or better throughout the project area for all four hours of simulation. Similar to the AM peak-hour, the additional lane between Ives Dairy Road and Hallandale Beach Boulevard significantly improves operations at this location. The additional left turn lane and increased right turn lane storage at the Hollywood Boulevard northbound off-ramp significantly reduced the ramp queueing. In the southbound direction speeds of 59 mph or higher are observed for all four hours of simulation.

All but four intersections in the Preferred Alternative operate with lower intersection delay than the No-Build Alternative. Additionally, more volume is being processed at each of these intersections in the Preferred Alternative due to improved operations on the I-95 mainline.

In terms of average speed, the Preferred Alternative shows better performance than the No-Build during both peak periods with speed increases of 8% (AM) and 5% (PM). Network delay time reductions for the Preferred Alternative were 29% (AM) and 24% (PM).

OTHER CONSIDERATIONS

An assessment was made of other relevant factors that could potentially impact the viability of the proposed project. These other considerations included environmental considerations, consistency with Master Plans/Local Government Comprehensive Plans/Development of Regional Impacts, project constructability and maintenance of traffic, safety, anticipated design exceptions and variations, and conceptual signing master plan. The assessment of these factors did not find any issues that would prohibit the implementation of the proposed project.

JUSTIFICATION FOR PROJECT

An assessment was made of the FHWA's Policy on Access to the Interstate System. The FHWA Policy defines the requirements that must be addressed for the justification and documentation necessary to substantiate any proposed change in access to the Interstate System. The results from this SIMR provided information necessary to demonstrate compliance with the FHWA's requirements and justification for the proposed modifications to I-95. The following provides a summary of the responses to the FHWA's policy requirements (detailed responses are provided under ***Section 9*** of the SIMR):

Policy #1 – An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility or on the local street network based on both the current and the planned future traffic projections.

Response to Policy Requirement # 1 – The operational analysis conducted for the SIMR 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, the Preferred Build Alternative significantly improves operations along I-95 and its interchanges.

In the Preferred Build Alternative, 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, the Preferred Alternative shows better performance than the No-Build during both peak periods with speed increases of 8% (AM) and 5% (PM). Network delay time reductions for the Preferred Alternative were 29% (AM) and 24% (PM). Significant improvements were also shown for the latent delay/demand, and total stops.

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 intestate.

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. Under the No-Build Alternative, traffic congestion is expected to increase along I-95 in future years with a corresponding increase in crash risk along the corridor. This potential for future increase in crash risk is largely alleviated by the improvements proposed in the Preferred Alternative. In addition, 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 mering in with the I-95 mainline traffic.

Policy #2 – The proposed access connects to a public road only and will provide for all traffic movements. The proposed access will be designed to meet or exceed current standards.

Response to Policy Requirement # 2 – The SIMR proposes no new interchanges along any of the freeway facilities within the project limits. All existing interchanges provide access to public roads only. The improvements proposed at the interchanges will maintain full access to I-95 and all movements will be accommodated at all cross streets. The proposed access modifications will be designed to meet or exceed all applicable design standards, to the extent possible. Any design variations or exceptions that are identified, will be processed per FHWA and FDOT standards.

CONCEPTUAL FUNDING PLAN

The project is included in the 2045 MPO MTP, 2021-2025 TIP and 2021-2025 STIP. The design phase is listed in the FDOT Work Program under project number 436903-1. The right of way and construction phases are not currently funded. The project is anticipated to be funded with federal and state funds. The project is proposed to be phased in two phases: 1) Northbound Improvements and 2) Southbound Improvements. A funding plan for the opening year 2030 will be developed based on the results, costs, and recommendations from the PD&E Study. The project is in the 2021-2025 FDOT Five-Year Work Program with funds allocated for the PD&E and Preliminary Engineering phases. Funding for future phases is anticipated for Fiscal Years 2022-2027 and is currently being coordinated to ensure that the project is consistent with the local government comprehensive plans and that required project funding is identified in the MTP, TIP, STIP, and Work Program.

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1.0 PROJECT OVERVIEW

1.1 INTRODUCTION

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.

1.2 PURPOSE AND NEED FOR THE PROJECT

The overall goals and objectives of this PD&E Study are described below:

- Evaluate the implementation of potential interchange and intersection improvements that will improve capacity, operations, safety, mobility, and emergency evacuation.

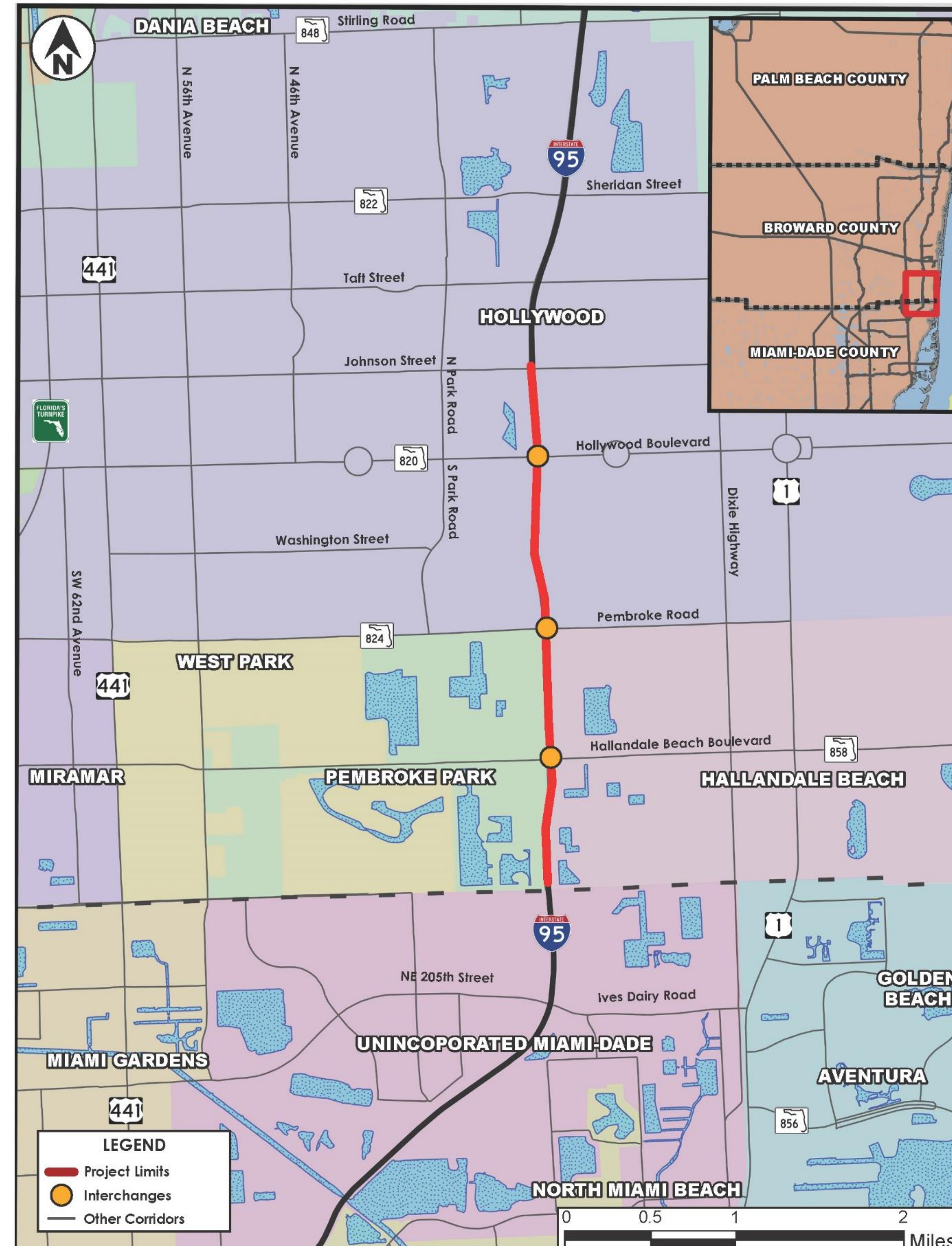

Figure 1.1 - Project Location Map

- Identify the appropriate interstate/interchange access improvements that, combined with Transportation Systems Management and Operations (TSM&O) improvements, will service the users of the area, and achieve the Purpose and Need.
- Provide relief from existing and projected traffic congestion.
- Improve the safety of the I-95 mainline corridor by addressing speed differentials and lane weaving deficiencies between interchanges.
- Support the optimal operations of the existing roadway network.
- Maintain consistency with the current I-95 Express Lanes and local projects.
- Prioritize the proposed improvements based on the area needs (short-term vs. long-term), logical segmentation and funding.

The need for this project is to increase interchange and ramp terminals intersection capacity at Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard. Other considerations for the purpose and need of this project include safety, system linkage, modal interrelationships, transportation demand, social demands, economic development, and emergency evacuation. An extended discussion of the need for the project is provided under ***Section 4*** of this SIMR.

1.3 Project Description

The PD&E Study is evaluating the potential modification of existing entrance and exit ramps serving the Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard 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.

1.4 Project Location

The project location is depicted in ***Figure 1.1***. The study area for this I-95 SIMR incorporates the limits of the I-95 PD&E Study from south of Hallandale Beach Boulevard (SR 858) to north of Hollywood Boulevard (SR 820) in Broward County.

1.5 Related Projects within Study Area

This SIMR will maintain consistency with the Broward Metropolitan Planning Organization (MPO) Adopted Metropolitan Transportation Plan (MTP, formerly Long Range Transportation Plan or LRTP), Broward County Comprehensive Plan, Miami-Dade Transportation Planning Organization (TPO) Adopted LRTP and any approved Development of Regional Impacts (DRI) within the area of influence.

The SIMR will also maintain consistency with the following specific projects:

- Broward Interchanges Master Plan FPID# 432785-2
- I-95/Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard Interchange Safety Projects FPID#s 436111-1, 436303-1, and 439911-1
- I-95 FDOT District Four 95 Express Phase 3C Construction Project FPID# 409354-2
- I-95 FDOT District Four Corridor Planning Study (completed under FPID# 436903-1)
- I-95 FDOT District Six Planning Study FPID# 414964-6
- I-95 FDOT District Six PD&E Studies FPID# 414964-7, 414964-8 and 414964

Where the request is inconsistent with any plan, steps to bring the plan into consistency will be developed.

1.6 Project Manager Information

The I-95 SIMR has been prepared for the Florida Department of Transportation, District Four. For Information on the I-95 PD&E Study and this SIMR, please contact the Department's Project Manager at the following address:

Kenzot Jasmin, PE
Project Manager
FDOT District Four
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Phone: (954) 777-4462
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2.0 METHODOLOGY

The methodology applied for this I-95 SIMR is documented in the Methodology Letter of Understanding (MLOU), dated September 2017, and later updated in June 2021. The MLOU was approved by FDOT District Four and FDOT Central Office Systems Implementation. The MLOU outlines the criteria, assumptions, processes, analyses, and documentation requirements for the project. The approved MLOU is included as ***Appendix A***. The following sections summarize some of the more prominent issues covered under the MLOU.

2.1 Area of Influence

The area of influence (AOI) along I-95 extends from the I-95 northbound merge/southbound diverge ramp junctions located north of Ives Dairy Road to the I-95 southbound merge/northbound diverge ramp junctions located south of Sheridan Street (see ***Figure 2.1***).

There are 16 signalized intersections under consideration within the AOI along the arterials. These intersections are listed below:

1. Hallandale Beach Boulevard/Park Road/1st Street
2. Hallandale Beach Boulevard/SW 30th Avenue
3. I-95/Hallandale Beach Boulevard southbound Ramp Terminal
4. I-95/Hallandale Beach Boulevard northbound Ramp Terminal
5. Hallandale Beach Boulevard/10th Terrace
6. Pembroke Road/Park Road
7. Pembroke Road/SW 31st Avenue
8. Pembroke Road/SW 30th Avenue
9. I-95/Pembroke Road southbound Ramp Terminal
10. I-95/Pembroke Road northbound Ramp Terminal
11. Pembroke Road/NW 10th Avenue/S 28th 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/28th Avenue

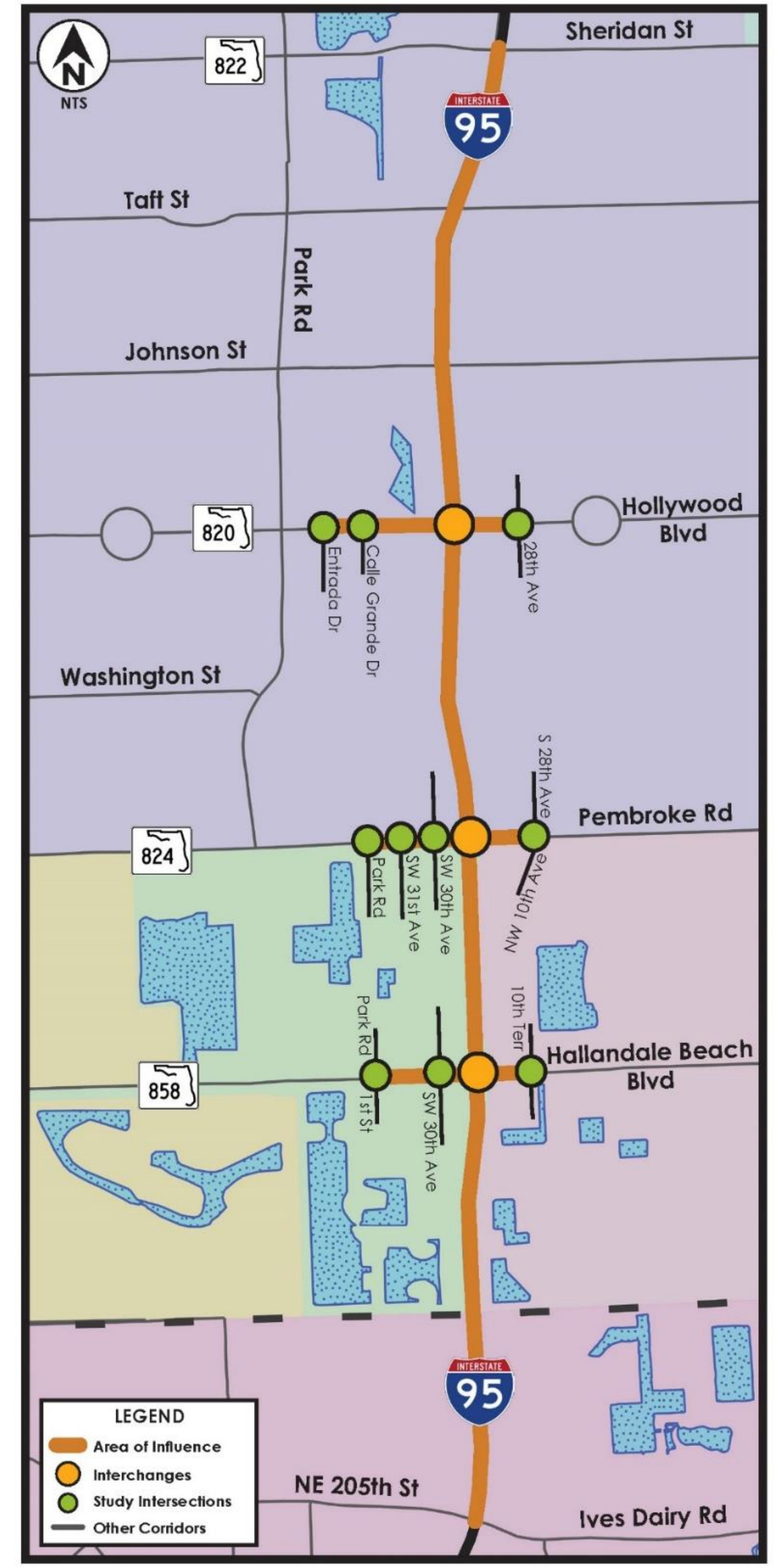


Figure 2.1 - Area of Influence Map

2.2 Analysis Years

A. Traffic Forecasting

The forecasting years for the project are as follows:

- Base year: 2010
- Horizon year: 2040

B. Traffic Operational Analysis

The 2010 and 2040 base and horizon years were used to produce opening year and design year traffic. The design year for this project is 2045, which was completed by extrapolation. The analysis years for this project are as follows:

- Existing year: 2016
- Opening year: 2030
- Design year: 2045

2.3 Travel Demand Forecasting

The PD&E Study design traffic was developed based on the design traffic estimates from the I-95 Corridor Planning Study (I-95 CPS). FDOT D4 completed the I-95 CPS between the Golden Glades Interchange (GGI) and Interstate 595 (I-595) in July 2020. As part of the CPS, the design traffic estimates were developed for the I-95 mainline and ramps for the entire study corridor limits. The PD&E Study covers a portion of the I-95 CPS study corridor, including the section between Ives Dairy Road and Sheridan Street. In addition to the I-95 mainline and ramp segments, the PD&E Study area also includes the ramp terminal intersections and adjacent cross-street intersections along Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard. Therefore, additional forecasting analysis was needed at the ramp terminal intersections and adjacent intersections as part of the PD&E Study design traffic development. The I-95 CPS calibrated the subarea model and its 2045 forecasts were used in the PD&E Study design traffic development. No additional model runs were performed as part of the PD&E Study.

A. Selected Travel Demand Model

The Southeast Florida Regional Planning Model 7.071 (SERPM 7.071), updated on March 31, 2017, was used to develop the travel demand forecasting for this study. The SERPM model is based on the Coordinated Travel Regional Activity Based Modeling Platform (CT-RAMP). The SERPM 7.071 model is an activity-based time of day model that is capable of forecasting traffic into future years for various highway and transit scenarios. The SERPM model was used to develop the 2040 LRTP. The SERPM 7.071 was the official model for the FDOT District Four region with a 2010 base year and 2040 horizon year. The 2040 horizon year scenario in this model has the approved 2040 Cost Feasible LRTP network, population, and employment forecasts.

The five periods that are modeled in SERPM are as follows:

1. Early AM Period (10:00 PM – 5:59 AM)
2. AM-Peak Period (6:00 AM – 8:59 AM)
3. Midday Period (9:00 AM – 2:59 PM)
4. PM-Peak Period (3:00 PM – 6:59 PM)
5. Evening Period (7:00 PM – 9:59 PM)

A detailed subarea model calibration was performed to the SERPM 7.071 regional model as part of the I-95 CPS. The study gathered year 2018 traffic counts from the Florida Transportation Information (FTI) Online and FDOT Districts Four and Six. 2045 No-Build and Build Alternative networks were developed during the modeling process.

The subarea model calibration and forecasting process is described in detail in the *Corridor Analysis Technical Memorandum*, dated July 2020, a companion document to the I-95 CPS (see ***Appendix B***).

B. Project Traffic Forecast Development Methodology

The future year traffic volumes were developed using the time of day assignments. Since this study included express lanes, time of day information is critical. Research has shown that peak-to-daily ratios of express lanes are different from general use freeway lanes. Most of the express lanes' utilization is expected to happen during the peak periods. Therefore, the project team used the three-hour AM peak period and four-hour PM peak period volumes to forecast the one-hour AM and one-hour PM peak-hour directional volumes. This peak-hour volume set with the highest demand within the peak period was selected for the design traffic development. Separate peak-hour volumes for general use and express lanes were developed. Origin-destination matrices were developed for the three-hour AM peak period and the four-hour PM peak period. These matrices were sliced to develop an AM peak-hour matrix and a PM peak-hour matrix. The Annual Average Daily Traffic (AADT) volumes were forecasted from the summation of all the time periods.

The 2045 No-Build and Build scenarios were modeled in the I-95 CPS. AADT and Directional Design Hourly Volumes (DDHV) were obtained from this study.

2045 SERPM No-Build and Build scenarios were developed as part of the future forecasts' development process. The 2045 No-Build scenario was first developed by using the 2040 Cost Feasible LRTP network as baseline. The No-Build scenario development was closely coordinated with FDOT to only include the existing and committed projects on the I-95 corridor. The AADT volume forecasts were compared against the independently developed historical trend line forecasts and the compound growth rates-based forecasts. The population and employment forecasts of the 2-mile corridor subarea were used to develop the compound growth rates after conducting a desktop review of the corridor 2-mile subarea socioeconomic data. The AM and PM peak-hour volumes were determined by using diurnal factors. Since the traffic volumes of the cross streets near I-95 are mainly driven by the I-95 mainline volumes, major emphasis was given to the I-95 traffic profile.

The forecasting approach required extensive subarea validation to match the AM and PM volumes to the traffic counts. A 2018 model scenario was developed for this effort. The detailed 2018 subarea validation approach is described in the next section. The approach primarily focused on post-processing the 2018 model origin-destination matrix to improve the model assigned volumes. The CUBE Analyst origin-destination matrix estimation software was used for this effort. The subarea matrix consisted of internal-internal flows of all traffic analysis zones within the subarea plus the external-internal, internal-external and external-external flows. This matrix was developed using the CUBE Subarea extraction process, which automatically renumbered the matrix zones and extracted the flows from the regional SERPM origin-destination into the subarea SERPM origin destination. Any trips that cross the subarea boundary only once were tabulated into external-internal or internal-external flows. Any trips that cross the subarea boundary twice were tabulated into external-external flows.

Once satisfactory validation results were achieved at the subarea level, the 2018 subarea origin-destination was used as a starting point for the future year forecasting efforts. The growth matrix between the 2018 SERPM origin-destination and the 2045 SERPM origin-destination matrices was developed by subtraction. The growth was added to the 2018 CUBE Analyst origin-destination at the subarea level.

The model subarea validation ensured reasonable origin-destination flows and good agreement between the volumes and counts. The future year total demand on the corridor was verified against historical and socioeconomic growth trends. Once sufficient confidence was achieved, the split between general use lane and express lane loads was verified. However, the future year express lane volumes in highly congested corridors like I-95 are expected to be at capacity. The future loads were verified against the expected peak period and daily volumes. The project traffic forecasting methodology is illustrated in ***Figure 2.2***.

The PD&E Study *Design Traffic Technical Memorandum*, dated December 2020, and later updated in June 2021, is included as ***Appendix C***. This memorandum summarizes the traffic volumes development process, methodologies, and analysis standards as part of the PD&E process. This document describes the diurnal factors development, volumes balancing methods specific to the study, procedures, and results. This memorandum also documents the existing and future traffic data analyses and calculation of the study area AADT, existing peak-hour volumes and DDHV volumes.

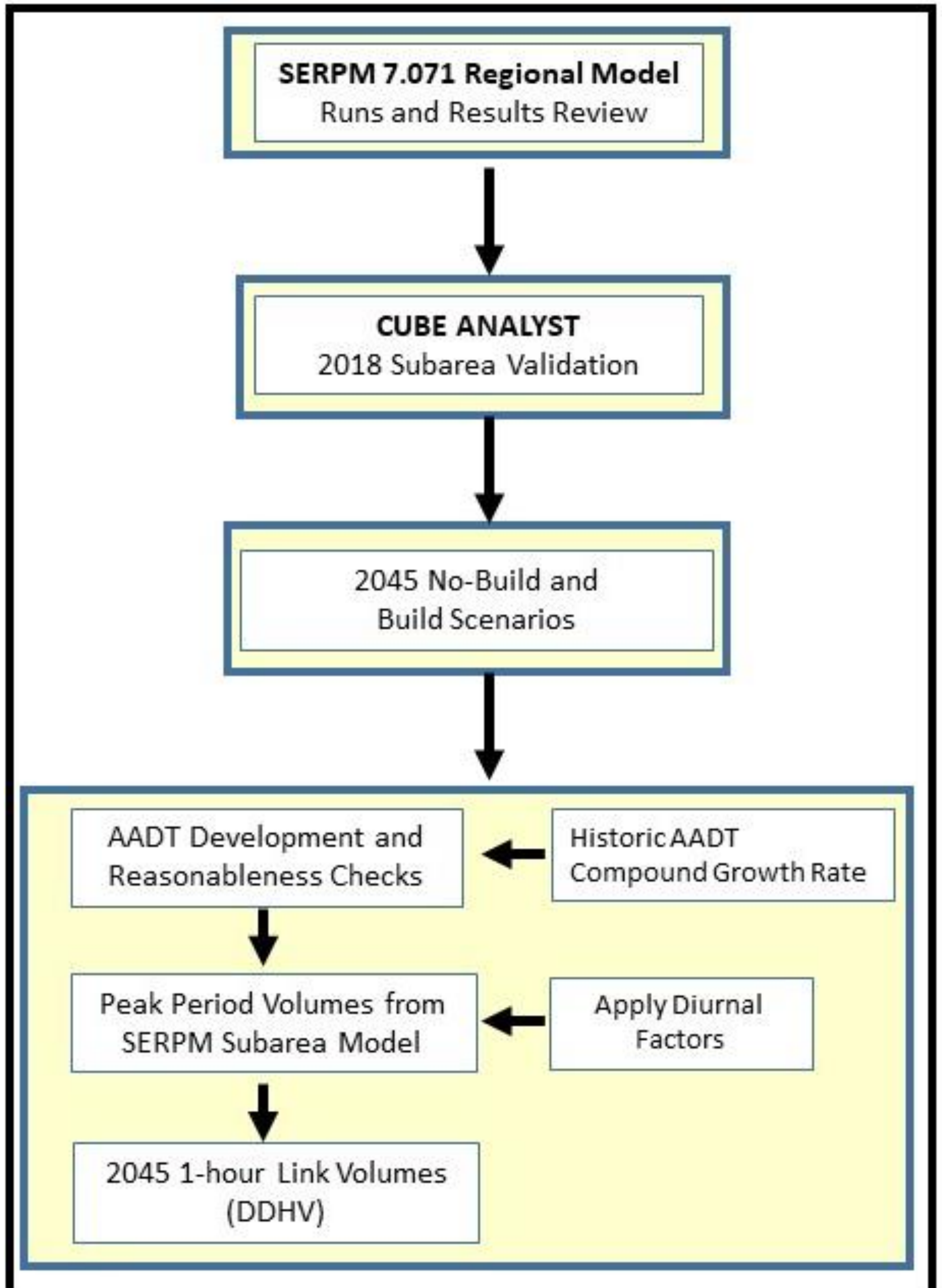


Figure 2.2 - Travel Demand Forecasting Methodology Flowchart

C. Validation Methodology

Several modifications to the travel demand model were performed to refine the subarea forecasts of the I-95 corridor. A tight subarea was defined as part of this task, including I-95 mainline, interchange ramps and the ramp terminal intersections, as part of the I-95 CPS. A 2018 SERPM model scenario was developed using 2018 networks and socioeconomic data. The 2018 socioeconomic data was developed by interpolating between the 2010 and 2040 socioeconomic data sets. The 2018 networks were developed by desktop review of the 2010 network and updating it to 2018 conditions. Time of day traffic counts were coded into the 2018 network for the tight subarea. Within the corridor limits, the existing traffic count data was coded into the network. Various model network attributes, within the subarea, were reviewed and corrected. These included facility types, number of lanes, area types, posted speed, tolls for tolled lanes, geometric connections, turn penalties, centroid location and connections. All the subarea network changes were propagated to the future years. An iterative validation using the CUBE Analyst origin-destination estimation process was conducted as part of this task. The process needs the SERPM 2018 subarea origin-destination matrix and the time of day traffic counts. The origin-destination estimation process was conducted separately for each of the 5-time periods. The resulting origin-destination matrix was assigned back to the highway network to verify a satisfactory output of results. Root Mean Square Error (RMSE) and Volume-to-count ratio targets were used to evaluate the model validation outputs in accordance with the FSUTMS CUBE Framework Phase 2.

D. Adjustment Procedures

The model results were post-processed using the FDOT 2019 Project Traffic Forecasting Handbook and NCHRP 765 recommendations. The project team developed a corridor prototype spreadsheet with separate workbooks for AM peak-hour, PM peak-hour and AADT volumes. The existing volumes and traffic counts were verified. It was noted that the model volumes are all within 15% of the traffic counts and no additional post-processing adjustments were needed to this effect. However, during the I-95 CPS forecasts comparison against the 2016 PD&E Study traffic counts comparison, a few ramps with negative growths were observed. Additional post-processing adjustment was performed to ensure the 2045 forecasts were at least equal to the 2016 traffic counts at these locations. It should be noted that all these ramps are operating at capacity. Therefore, additional growth was not forecasted on these locations.

The volumes were balanced and smoothed as needed. The growth rates of the forecasted volumes were compared against the growth trends. Any outlier links were postprocessed. The turning movement forecast was developed from the subarea origin-destination assignments. This way, the subarea origin-destination matrices and the turning movements were ensured to be consistent. The future year turns were forecasted to ensure enough growth between base and future year turns from the subarea traffic assignment model. If by any chance any negative/unreasonable turns were forecasted in the model at few locations, adjustments were performed to the turning movement forecasts to match with the existing 2016 turns. Again, additional growth on these links was not forecasted as most of the intersections operated at capacity in the 2016 conditions. Secondly, if the model has projects volumes slightly less than the 2016 conditions on certain turning movements, this indicated not much demand for those movements in the future conditions. To comply with design traffic forecasting principals, efforts were made to avoid any turning movements with negative growth in the subarea.

2.4 Traffic Factors

The corridor design traffic was based on diurnal factors, as opposed to using the traditional K and D factors. The diurnal factors are the peak period to peak-hour conversion factors and were determined based on the traffic data collected. The diurnal factors were compared against the values used in the previous planning study. The corridor traffic count profile by hour was examined within the peak periods as well as the diurnal factors for the various I-95 mainline stations by direction. An average of the factors was considered in the development of the design traffic. The variation in diurnal factors in an urban area is not significant from one station to the other.

A reasonableness check was performed by comparing the DDHV volumes produced by the diurnal factor method with the corresponding DDHV volumes developed using the "traditional approach". The "traditional approach" involves applying K and D traffic factors to the AADT volumes to derive DDHV volumes. The corridor K and D factors were computed using 2018 peak-hour counts and AADT volumes. The average K factor is 6.5% and the average D factor is 51%. The reasonableness check was performed using the 2045 No-Build scenario.

Table 2.1 presents the results comparison between the two approaches. The DDHVs developed using the traditional approach are higher due to this approach not considering the true peak spreading throughout the day. The I-95 corridor is a vibrant corridor that has heavy traffic extending in most hours of the day. The peak-hour forecasts can be more accurately estimated using the correct time of day distribution. Therefore, the diurnal factor method is deemed more appropriate in this case.

Table 2.1 – Comparison between Traffic Factors and Diurnal Factors

I-95 Segment South of Interchange	K Factor	D Factor	2045 AADT	K Factor Approach		Diurnal Factors		Percent Difference	
				SB PM	NB AM	SB PM	NB AM	SB PM	NB AM
Broward Boulevard	6.5%	51%	334,000	11,072	11,072	10,500	9,889	5.2%	10.7%
Davie Boulevard	6.5%	51%	280,000	9,282	9,282	7,984	8,672	14.0%	6.6%
SR 84	6.5%	51%	230,000	7,625	7,625	7,902	9,017	-3.6%	-18.3%
Griffin Road	6.5%	51%	320,000	10,608	10,608	8,874	11,442	16.3%	-7.9%
Stirling Road	6.5%	51%	342,000	11,337	11,337	10,051	11,314	11.3%	0.2%
Sheridan Street	6.5%	51%	330,000	10,940	10,940	9,605	10,670	12.2%	2.5%
Hollywood Boulevard	6.5%	51%	319,000	10,575	10,575	9,232	10,205	12.7%	3.5%
Pembroke Road	6.5%	51%	316,000	10,475	10,475	9,221	9,842	12.0%	6.0%
Hallandale Beach Boulevard	6.5%	51%	304,000	10,078	10,078	8,829	9,840	12.4%	2.4%
Ives Dairy Road	6.5%	51%	309,000	10,243	10,243	8,996	10,201	12.2%	0.4%
Miami Gardens Drive	6.5%	51%	293,000	9,713	9,713	10,189	8,950	-4.9%	7.9%
GGI	6.5%	51%	286,000	9,481	9,481	9,796	8,501	-3.3%	10.3%

The K and D factors were calculated based on the collected traffic data and forecasted traffic volumes from the PD&E Study and were compared to the ranges specified in the *FDOT Project Traffic Forecasting Handbook*.

The T_{24} factor is the adjusted annual 24-hour percentage of truck traffic. The T_{24} factor was obtained from the classification counts and compared to the factors obtained from the FDOT permanent count stations to assess reasonableness of the data. The Design Hour Truck (DHT) factor is the percentage of truck traffic during the peak-hour in the design year and can be estimated as half of the T_{24} factor. DHT at the ramp terminals and intersections were determined from the turning movement counts. The Peak Hour Factor (PHF) for existing year was based on field collected traffic counts (turning movement counts and mechanical counts) and from the FDOT count stations. PHF for future years was set at 0.95. The PHF is applied to the traffic counts to convert hourly flow to peak 15-minute flow rate for capacity analysis.

2.5 Operational Analyses

A. Existing Area Type/Traffic Conditions

Area Type	Conditions	
	Under Saturated	Saturated
Rural	☐	☐
Urban Area/Transitioning Area	☐	☒

B. Existing Area Type/Traffic Conditions

Software		System Component					
		Freeway				Crossroad	
Name	Version	Basic Segment	Weaving	Ramp Merge	Ramp Diverge	Arterials	Intersections
HCS/ HCM	7/ HCM 6th Edition	☒	☒	☒	☒	☐	☐
Synchro*	9 & 10	☐	☐	☐	☐	☒	☒
SimTraffic		☐	☐	☐	☐	☐	☐
CORSIM		☐	☐	☐	☐	☐	☐
VISSIM	9	☒	☒	☒	☒	☒	☒
Other		☐	☐	☐	☐	☐	☐

***Synchro 9 was used for the existing conditions, completed back in 2018. Synchro 10 was used for the future conditions.**

Detailed operational analyses were performed for all analysis years for both AM and PM peak hours. The following operational analyses were conducted utilizing the design traffic forecasts:

- Freeway Analysis
- Freeway Weaving Analysis
- Ramp Merge and Diverge Analysis
- Queuing Analysis
- Intersection Analysis
- Express Lanes Analysis

The HCM Module in Synchro 9 and 10 was used for intersection level of service and queue length analyses. VISSIM 9 models were developed for the 2016 existing year for model calibration and for the 2045 design year to compare the No-Build Alternative against the Preferred Alternative. All other operational analyses (existing year, opening year, and design year) were performed based on the HCM procedures using HCS7 and/or Synchro 9 and 10.

C. Calibration Methodology

Traffic microsimulation models were developed using VISSIM, Version 9.0. VISSIM models were developed for the 2016 existing year (for model calibration) and for comparing the 2045 No-Build and preferred alternative. The spatial limits of the VISSIM models included all freeway and arterial segments within the area of influence, including I-95 from north of Ives Dairy Road to south of Sheridan Street.

The simulation calibration incorporated the guidance and criteria from the FDOT's Traffic Analysis Handbook and FHWA's Traffic Analysis Toolbox Volume III. Traffic volume data, travel time data, and field observations were used in the calibration of the VISSIM models. Four-hour AM and PM peak periods analysis were conducted using 15-minute flow rates.

Several calibration measures were used to ensure that the models accurately replicate existing year field conditions. The calibration process consisted of measuring and comparing volume, travel time, and visual audits. The freeway mainline volumes were calibrated using criteria specified in the FHWA Traffic Analysis Toolbox (Volume III). The individual link flow targets are listed below:

- Within 15% of field traffic flows for more than 85% of cases where flows range from 700 veh/hr to 2,700 veh/hr
- Within 100 veh/hr for more than 85% of cases where flows are less than 700 veh/hr
- Within 400 veh/hr for more than 85% of cases where flows are greater than 2,700 veh/hr

Travel time targets were within 15 percent (or 1 minute if higher) of the field measured travel times for more than 85 percent of cases. Travel speed profiles were compared against speed data from the FDOT ITS system with the simulation outputs to ensure that the simulation provided similar trends and areas of congestion.

The major bottlenecks within the study area were calibrated to replicate the capacity and congestion based on field data. Visual audits of the simulation were performed to the analyst's satisfaction to observe speed-flow relationships for individual links and acceptable queuing at intersections and other bottlenecks in the network.

The existing conditions analysis has a simulation duration that allows congestion to build and dissipate, eliminating the potential for unmet demand. Latent demand and delay were reported and compared among the alternatives. To determine the required number of simulations runs, statistical tests were performed using a 95 percent confidence level and an allowable error of 10 percent. VISSIM default vehicle characteristics were used in the model as a starting point. Any parameters that were changed from the default value were documented and justified accordingly.

All future year No-Build and Build models were created from the calibrated 2016 existing model. The calibration process for the arterial roadways consisted of comparing the peak-hour volumes and visual audits. Reasonableness checks were performed by comparing the model simulated peak-hour volumes and the demand peak-hour volumes along the arterial segments.

D. Selection of Measures of Effectiveness (MOE)

Both qualitative and quantitative measures of performance or effectiveness (MOEs) were used to differentiate between the alternatives. The MOEs that were assessed from the VISSIM models include the following:

- Freeway: Volume, Speed and Density
- Intersections: Volume, Delay, and Queue Length
- Network-wide: Total travel time, Total delay time, Vehicle-miles of travel, Average speed, and Latent demand

The volume, delay and queue length were reported for every movement at every intersection.

The VISSIM analysis compared MOEs for the No-Build and preferred alternative. VISSIM MOEs were assessed for a simulation period covering a total of 4 ½ hours in the AM period and 4 ½ hours in the PM period for each alternative scenario. The simulation periods included the following:

- AM Period: ½ hour seeding + 4-hour AM peak period
- PM Period: ½ hour seeding + 4-hour PM peak period

The MOEs that were assessed from the HCS and Synchro analyses included the following:

- Freeway Analysis: Speed, Density, and LOS
- Intersection Analysis: Total Delay, LOS, volume over capacity ratio, and 95th Percentile queue length.

The freeway analysis includes basic freeway, merge analysis, diverge analysis and weaving analysis.

2.6 Level of Service Standards

FDOT recommends a target LOS D for roadways in urban areas. Therefore, LOS D or better was considered an acceptable LOS.

2.7 Express Lanes Consideration

The existing year conditions along I-95 have a northbound ingress and a southbound egress express lane access point within the Hallandale Beach Boulevard Interchange. After this PD&E Study was awarded, an additional express lane access point was added by the I-95 Express Lanes Phase 3C project within the AOI. This additional access includes a northbound egress and a southbound ingress within the Hollywood Boulevard Interchange. This new express lane access point is programmed for construction and will be opened prior to the PD&E Study's 2030 opening year. Therefore, this new access point was included in the PD&E Study's 2030/2045 No-Build and Build conditions.

Express lane volumes were obtained from the I-95 CPS. These volumes were established as controlled points around which the I-95 general use lane traffic volumes were balanced. These volumes were cross-checked and reviewed against the 2016 base year counts. The ingress and egress point volumes were calculated by subtracting the link volumes before and after the access point.

The PD&E Study proposes 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.

Express lanes operations were assessed using the VISSIM microsimulation models. Traffic flows in the express lanes were evaluated in 15-minute increments. Traffic volumes for each 15-minute time interval were estimated based on the traffic flow profiles along the I-95 mainline.

3.0 EXISTING CONDITIONS

3.1 Existing 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 3.1***. In general, the project study area encompasses the following land uses:

- Fixed Single Family Units
- Mobile Home Units
- Multiple Dwelling Units
- Commercial
- Retail Sales and Services
- Oil and Gas Processing
- Other Light Industrial
- Institutional
- Educational Facilities
- Golf Courses
- Recreational Parks
- Disturbed Lands/Vacant
- Roads and Highways
- Water Supply Plants

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

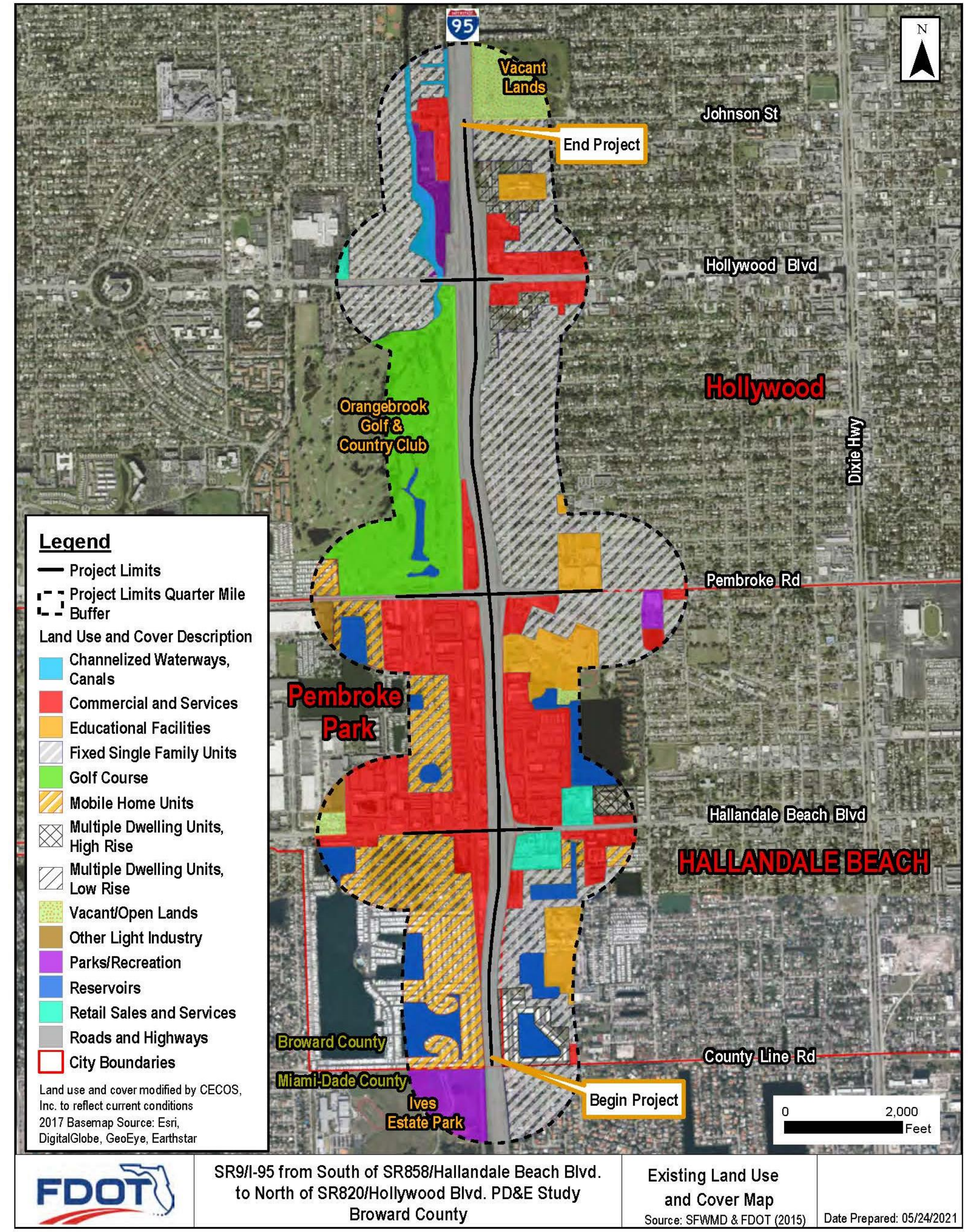


Figure 3.1 - Existing Land Use

3.2 Existing Roadway Network

The existing I-95 mainline roadway typical section varies slightly and consists primarily of four 11-foot (11') wide express lanes (two in each direction), four 12-foot (12') wide general use lanes (two in each direction), four 11-foot (11') wide general use lanes (two in each direction), a 3-foot (3') wide buffer area with pavement markings and express lane markers separating the general use lanes from the express lanes, 5-foot to 12-foot (5' – 12') wide inside shoulders, 12-foot (12') wide outside shoulders, 12-foot (12') wide auxiliary lanes at selected locations, and a 2.5-foot (2.5') wide center barrier wall.

Figures 3.2 – 3.5 show the existing I-95 roadway cross sections within the study limits between interchanges.

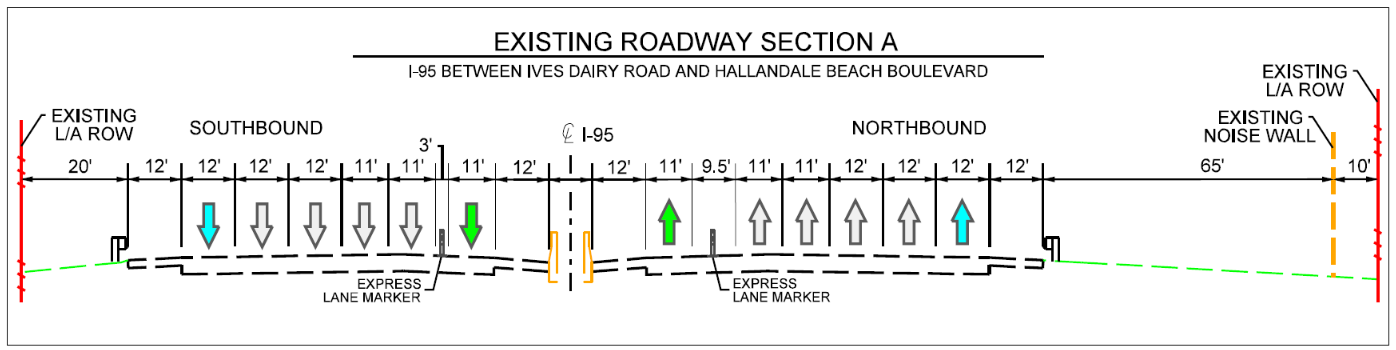


Figure 3.2 – Existing Roadway Section A

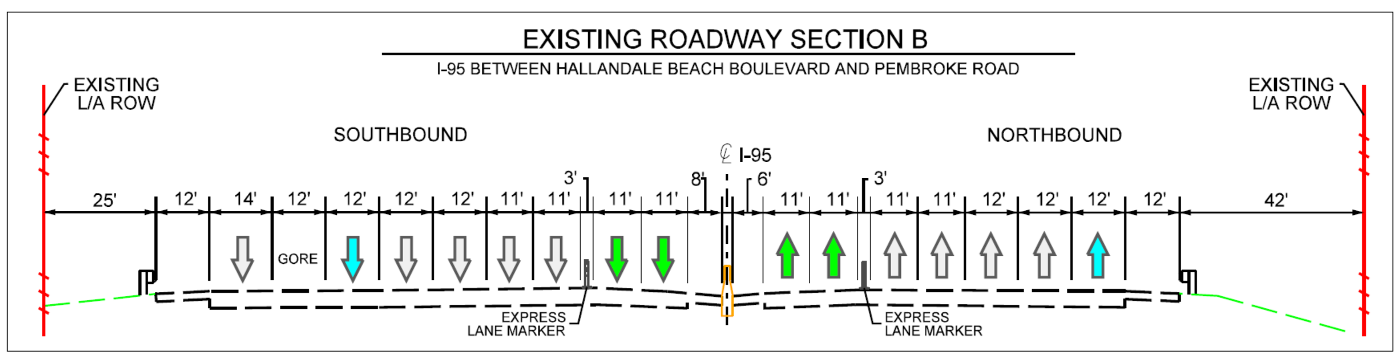


Figure 3.3 – Existing Roadway Section B

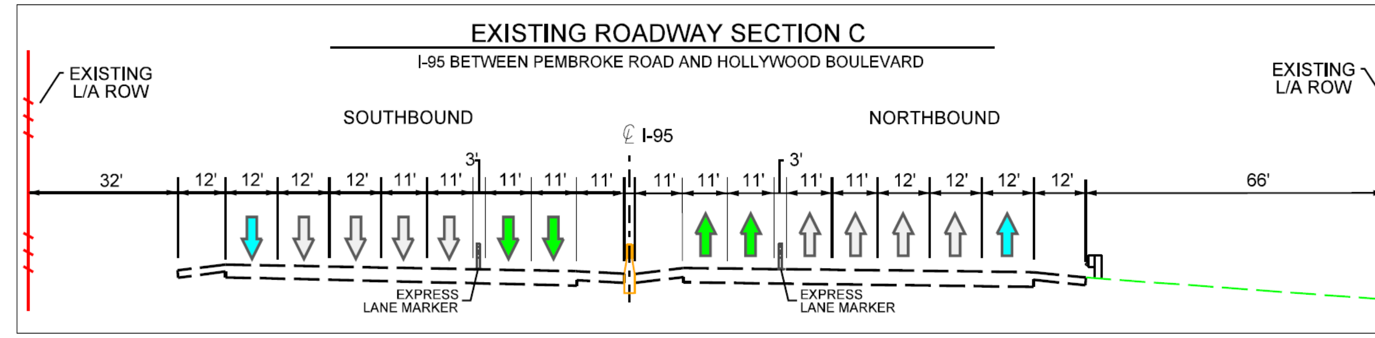


Figure 3.4 – Existing Roadway Section C

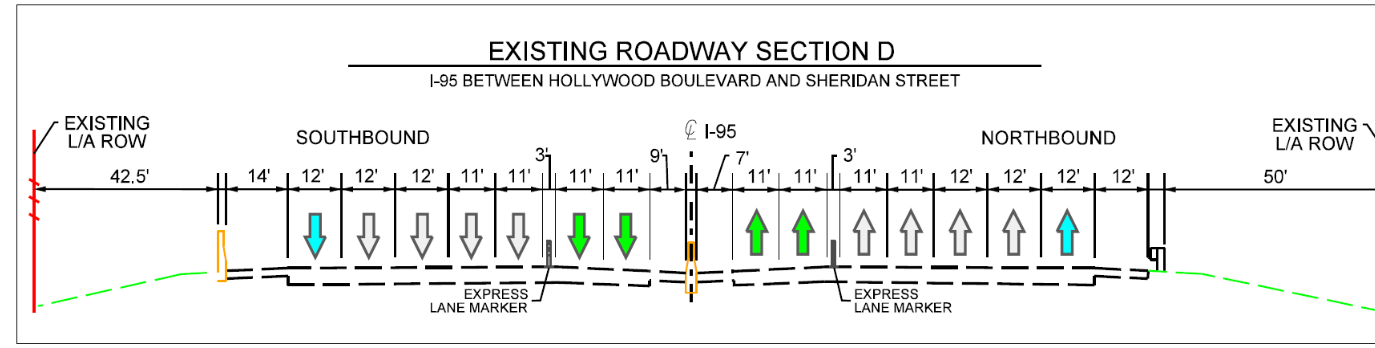


Figure 3.5 – Existing Roadway Section D

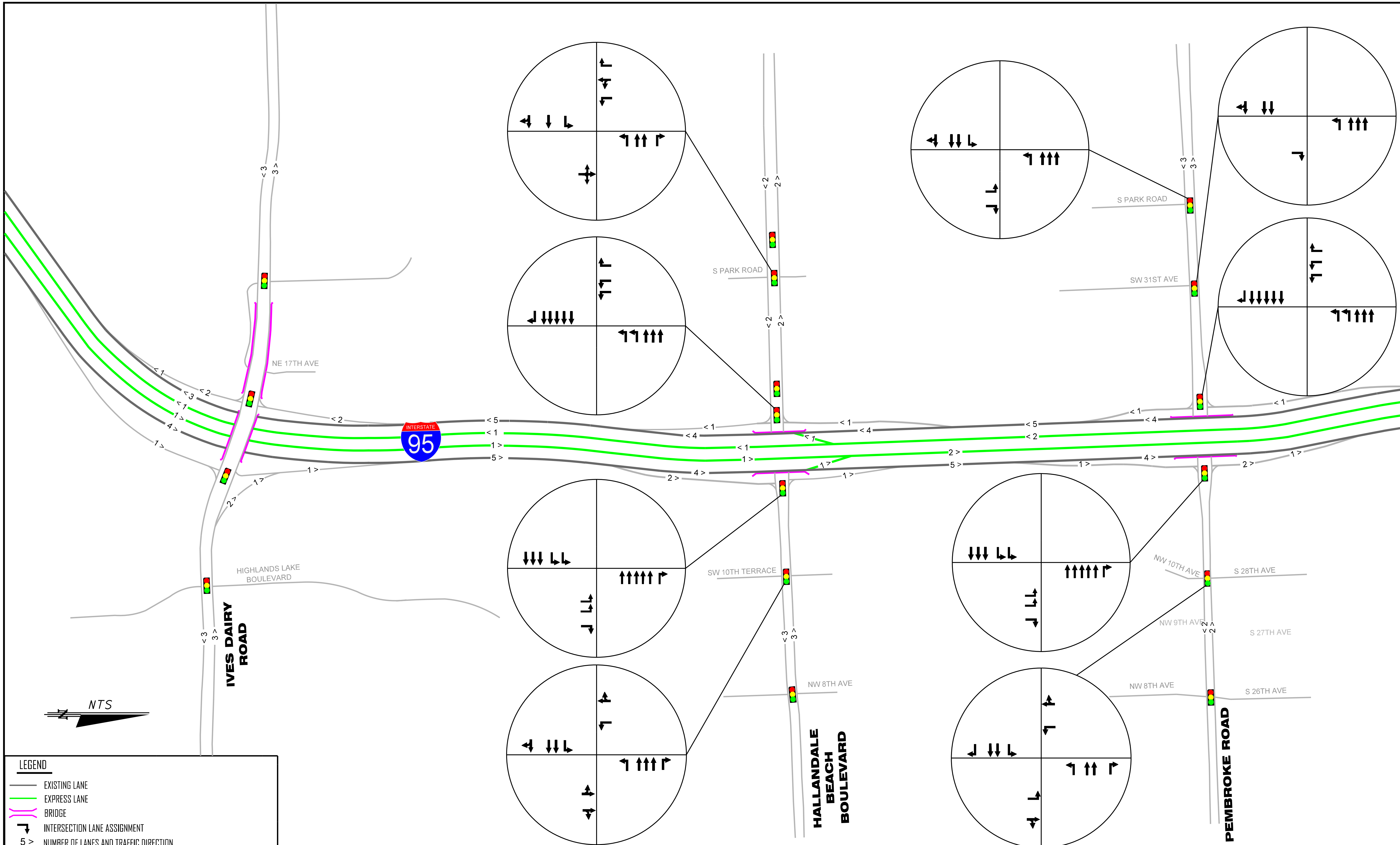
Arterial Corridors

There are three existing full interchanges within the project limits. ***Figure 3.6*** depicts the existing lane geometry and configuration.

Hallandale Beach Boulevard – This corridor consists of four lanes west of I-95 and six lanes east of I-95, with a posted speed of 35 mph west of I-95 and 40 mph east of I-95, and five signalized intersections. Hallandale Beach Boulevard is functionally classified as a Divided Urban Principal Arterial.

Pembroke Road – This corridor consists of six lanes west of I-95 and four lanes east of I-95, with a posted speed of 40 mph west of I-95 and 35 mph east of I-95, and six signalized intersections. Pembroke Road is functionally classified as a Divided Urban Principal Arterial.

Hollywood Boulevard – This corridor consists of six lanes west of I-95 and four lanes east of I-95, with a posted speed of 35 mph, and five signalized intersections. Hollywood Boulevard is functionally classified as a Divided Urban Principal Arterial.



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DISTRICT FOUR
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FORT LAUDERDALE, FL 33309

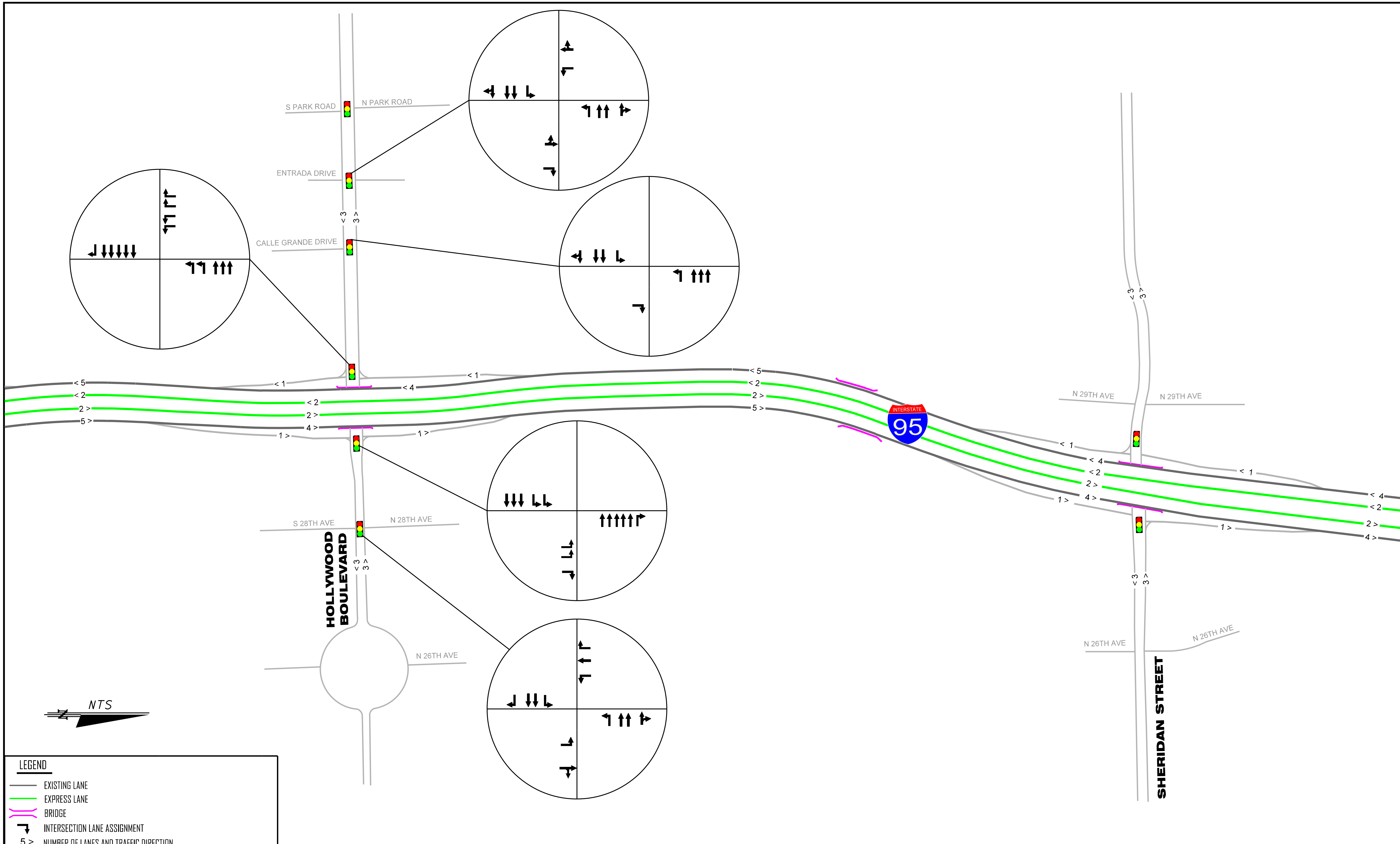
JANUARY 2021

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.: 436903-1-22-02
ETDM No.: 14254

2016 EXISTING YEAR LANE GEOMETRY AND CONFIGURATIONS

FIGURE 3.6



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2016 EXISTING YEAR
INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE
3.6

3.3 Existing Traffic Volumes

FDOT collected 2016 traffic data prior to the PD&E Study (see ***Appendix D***). 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

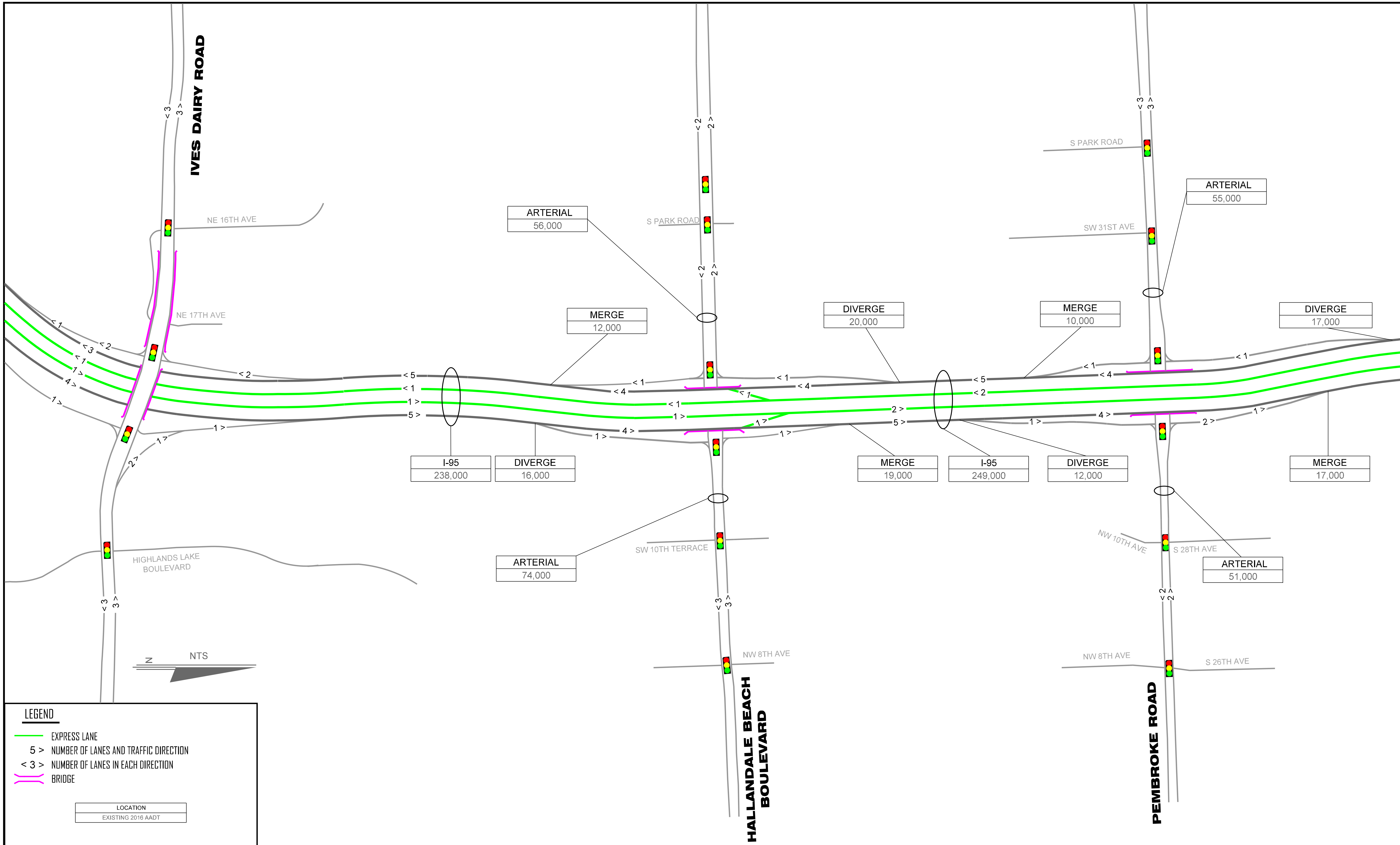
Traffic data from the following sources were obtained during the PD&E Study:

- 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.

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 3.7***. Peak-hour traffic volumes and intersection turning movement volumes are summarized in Figure **3.8** and Figure **3.9**. The mainline existing peak-hour volumes documented along I-95 combined the express lanes and general use lanes traffic.



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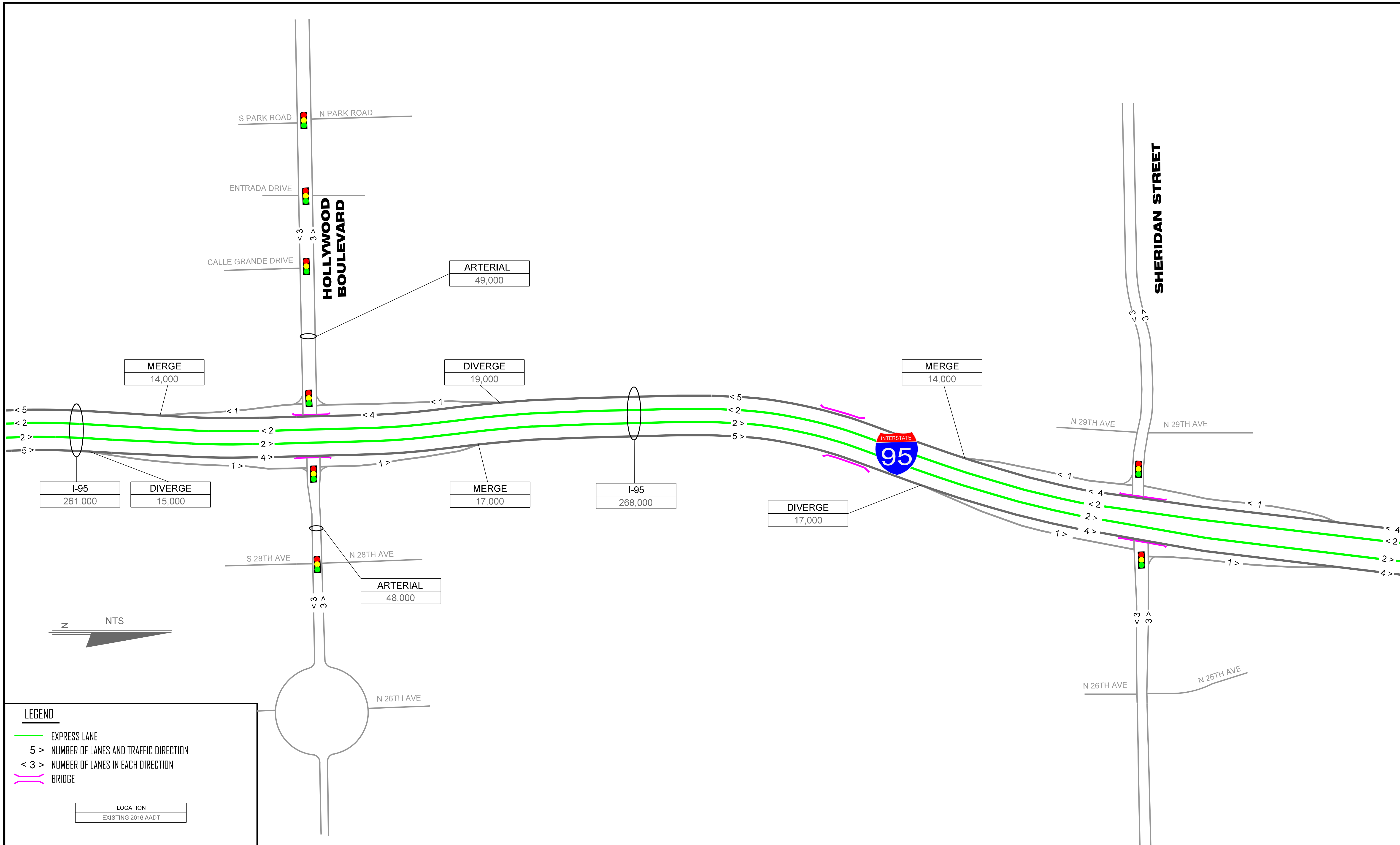
2016 ANNUAL AVERAGE DAILY TRAFFIC (AADT) VOLUMES

FIGURE
3.7



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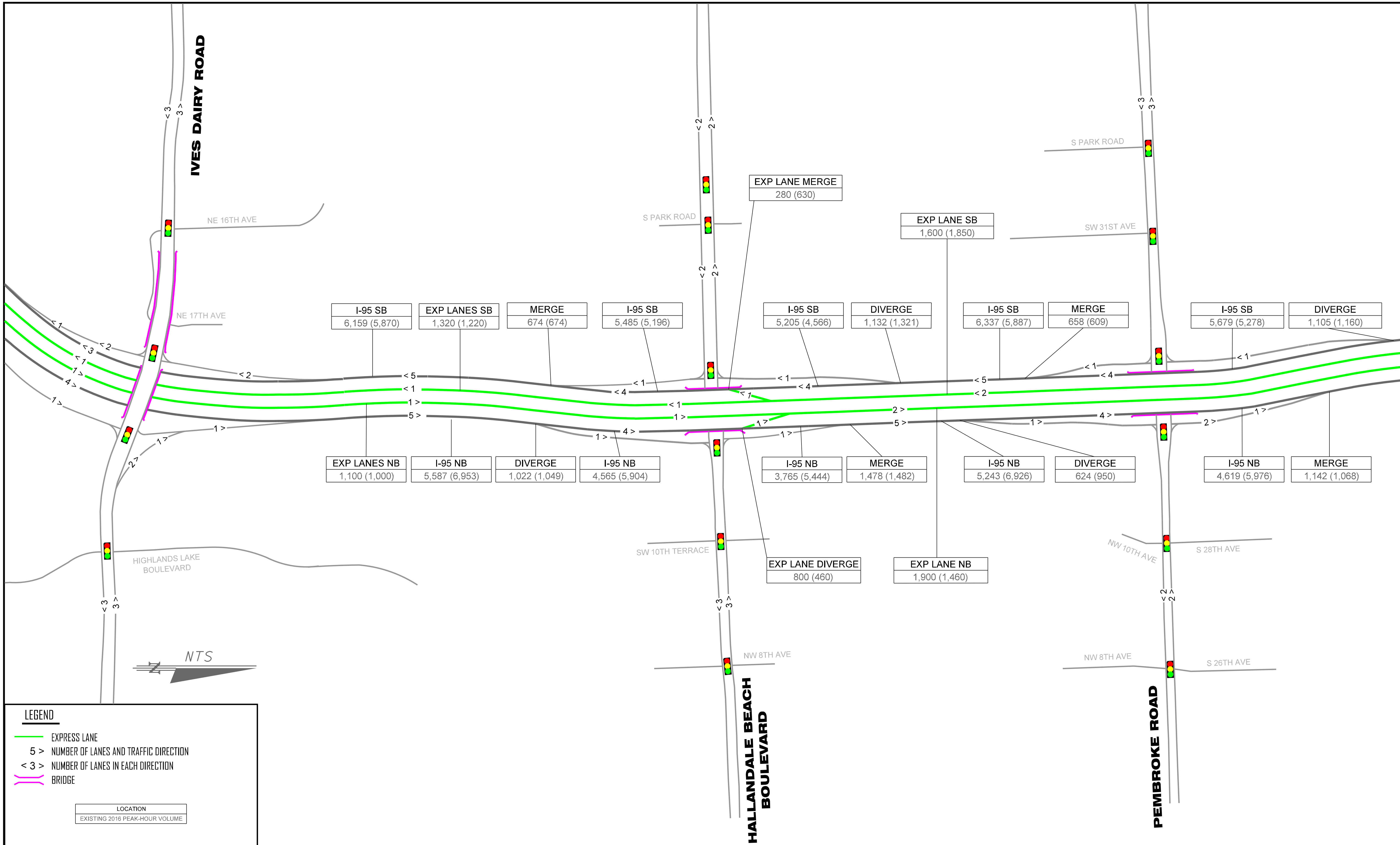
2016 ANNUAL AVERAGE DAILY TRAFFIC (AADT) VOLUMES

FIGURE 3.7



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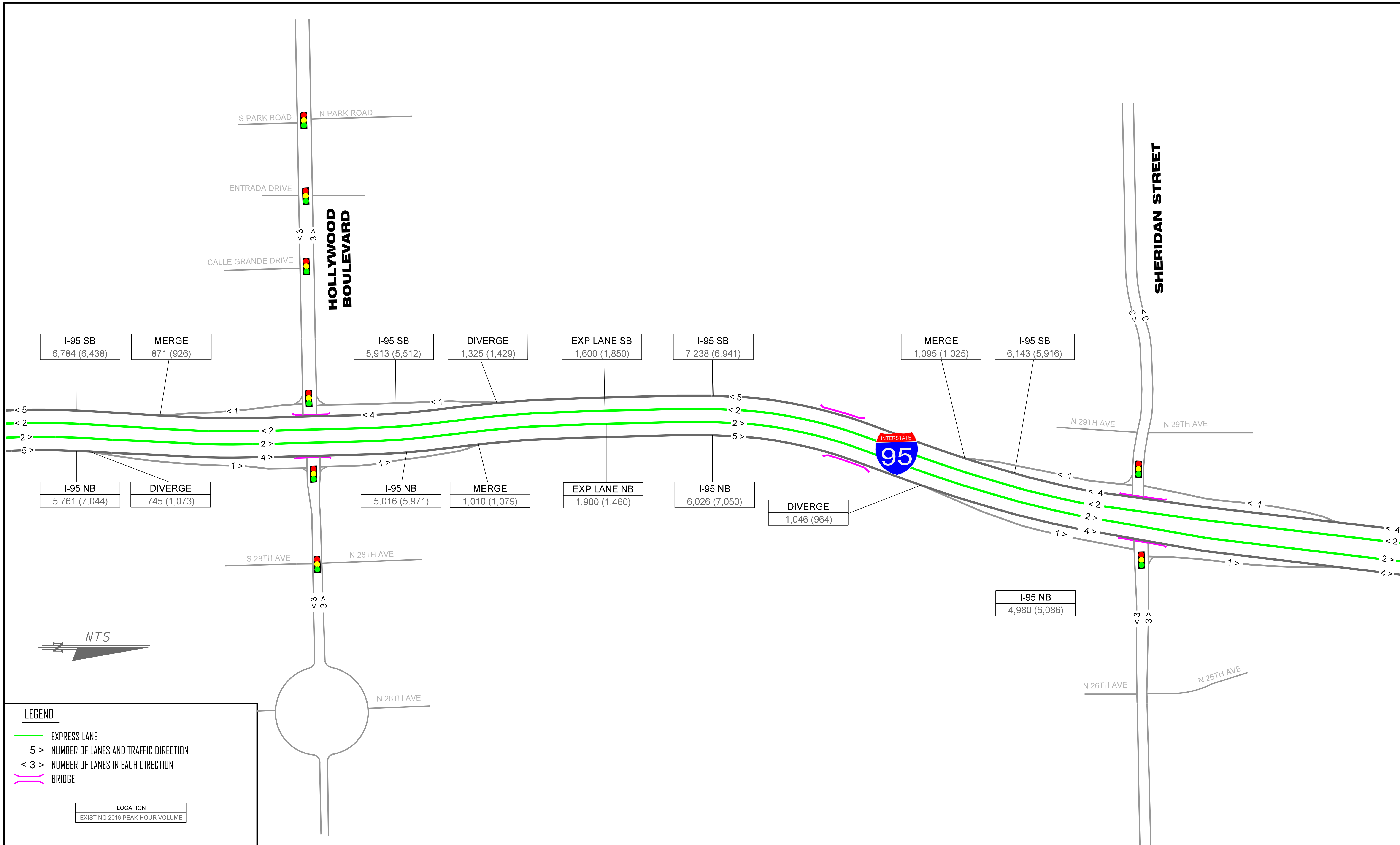
2016 I-95 PEAK-HOUR VOLUMES

FIGURE 3.8



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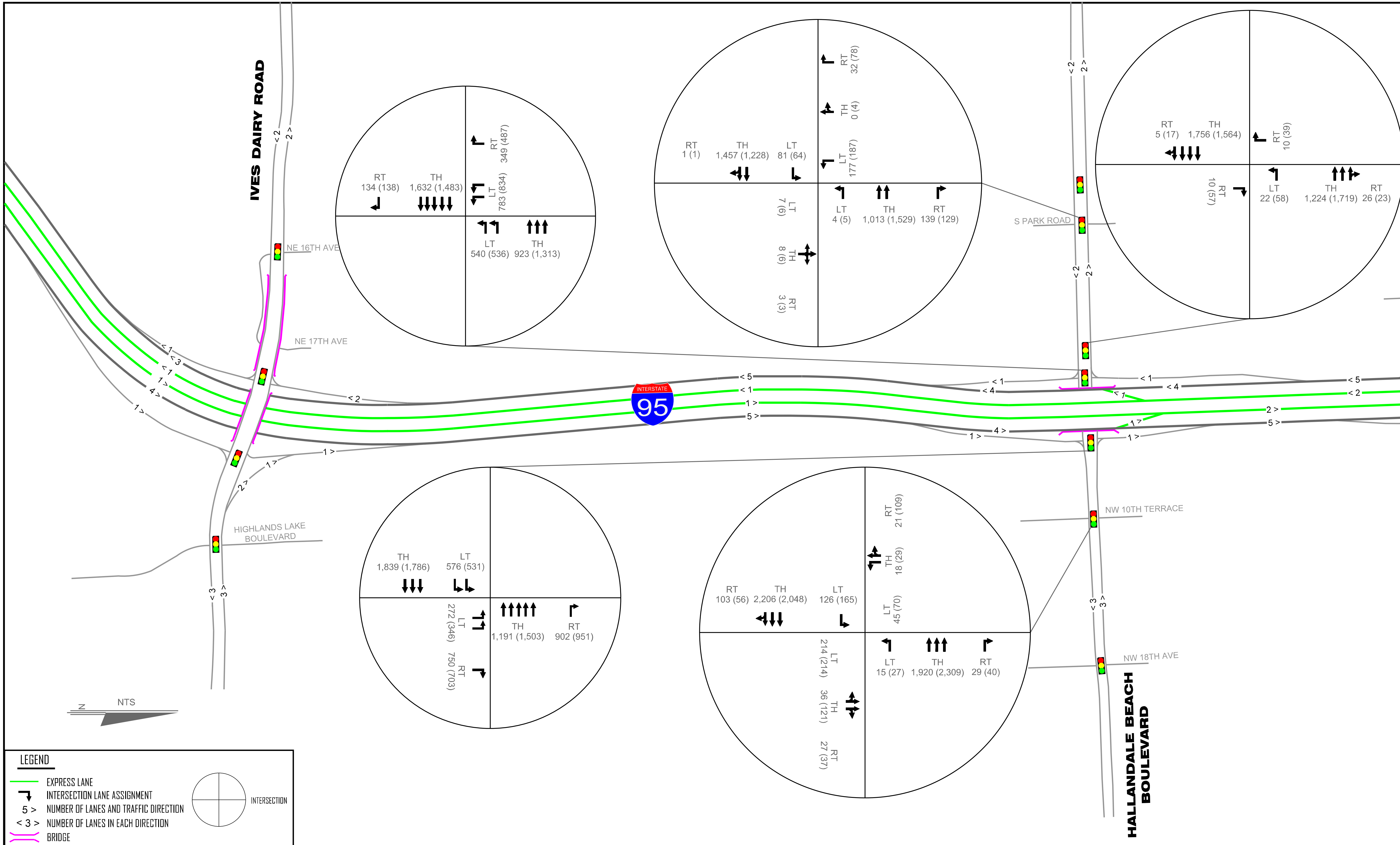
2016 I-95 PEAK-HOUR VOLUMES

FIGURE
3.8



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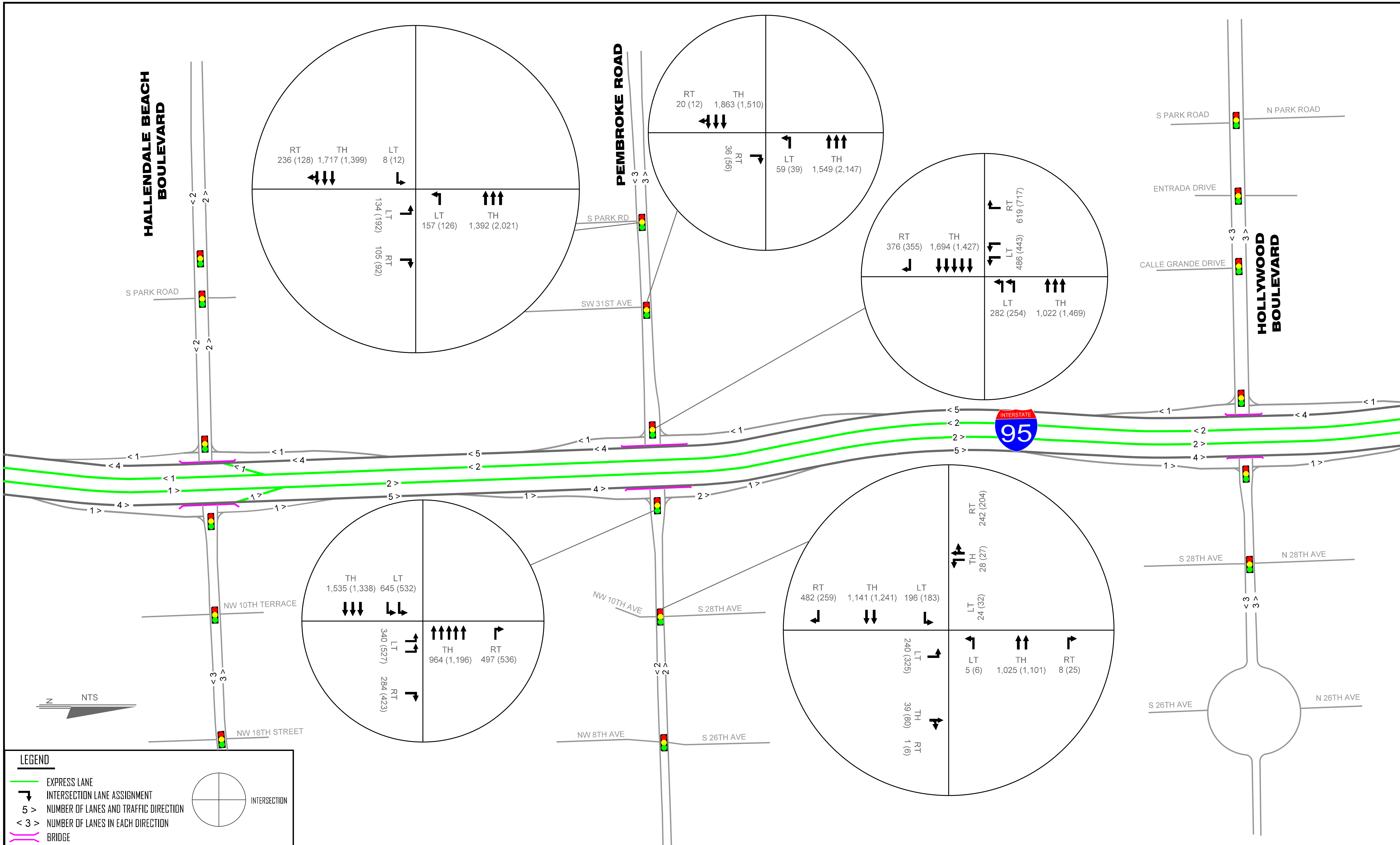
2016 INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE 3.9



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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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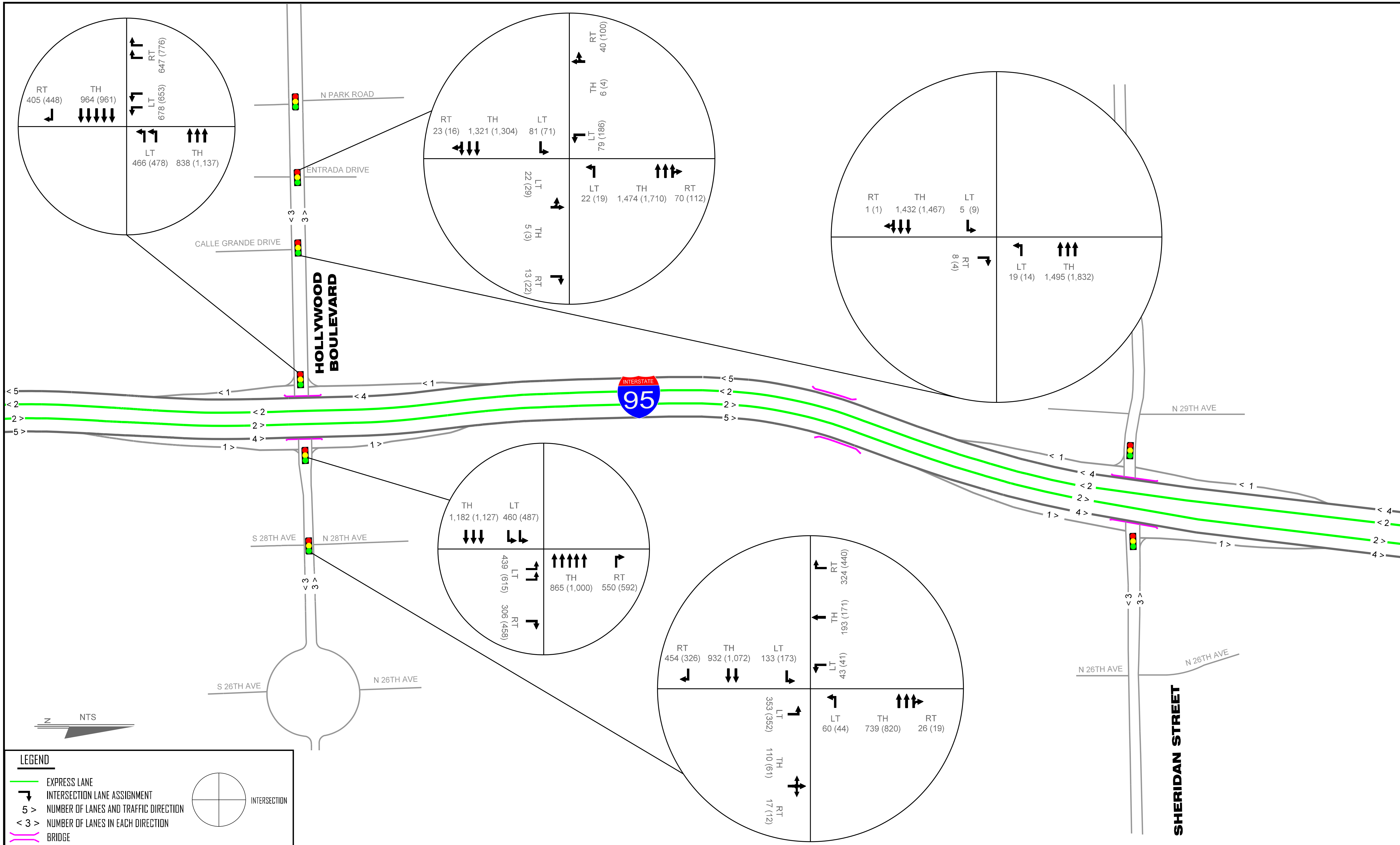
ETDM No.: 14254

2016 INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE 3.9



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INTERSTATE 95

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

2016 INTERSECTION TURNING MOVEMENT VOLUMES

FIGURE 3.9

3.4 Existing Traffic Operations

3.4.1 I-95 Operational Analysis

This section presents the Highway Capacity Methodology analysis results for the existing lane configuration under existing traffic conditions. The Highway Capacity Manual (HCM), as well as the Highway Capacity Software (HCS) and Synchro Software 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, express lanes, 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 arterial intersections. This software uses the methodology of the HCM to determine intersection capacity and LOS.

An existing traffic operational analysis was conducted for the 2016 base condition for the freeway mainline and interchange ramps. The first part of the analysis consisted of a basic freeway segment analysis used to determine the current conditions under which the freeway mainline is operating. The second part of the analysis consisted of a ramp merge, diverge and weaving analysis used to determine the current operating conditions of the ramps entering and exiting the freeways.

Results – The freeway, weaving and ramp junction analysis results for northbound and southbound directions are summarized in ***Table 3.2*** and ***Table 3.3***. The analysis results are also schematically summarized in ***Figure 3.10***. Output HCS reports can be found in ***Appendix E***.

Findings – 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.

Table 3.1 – 2016 Existing Northbound Freeway Analysis Results

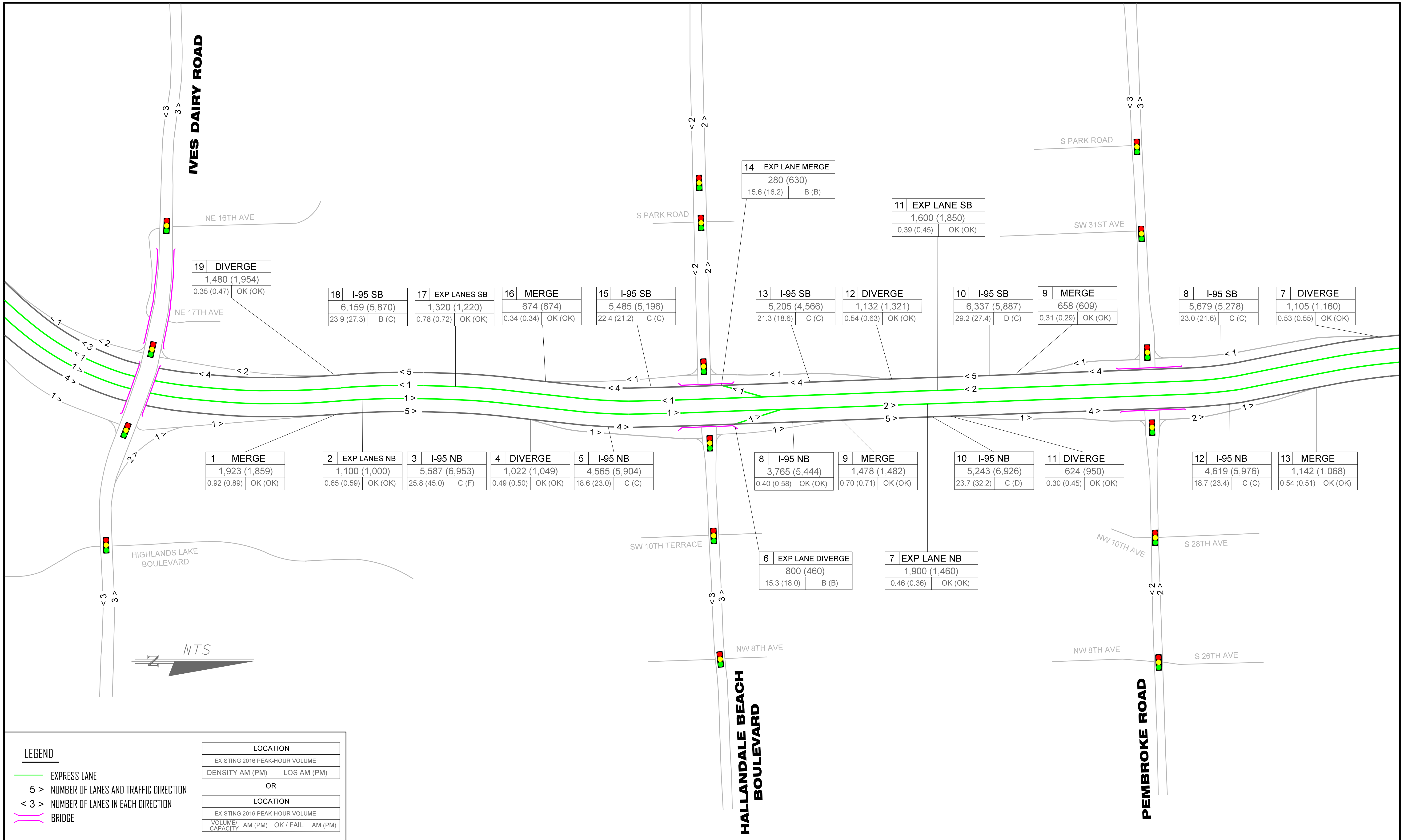
#	I-95 Northbound Segment 2016 Existing	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/C Ratio	Ramp V/C Ratio	Density (pc/mi/ln)	LOS
19	Sheridan Street Off-Ramp	Diverge	1	1,046 (964)	-	0.50 (0.46)	-	-
18	Hollywood Boulevard On-Ramp to Sheridan Street Off-Ramp	Weave	5	6,026 (7,050)	0.80 (0.79)	-	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 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 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-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-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-Ramp	Merge	1	1,478 (1,482)	-	0.70 (0.71)	-	-
8	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	3,765 (5,444)	0.40 (0.58)	-	-	-
7	Express Lane North of Hallandale 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 Express Lane Ingress	Basic	4	4,565 (5,904)	0.52 (0.67)	-	18.6 (23.0)	C (C)
4	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,022 (1,049)	-	0.49 (0.50)	-	-
3	Ives Dairy Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	5	5,587 (6,953)	0.99 **(1.08)**	-	25.8 (45.0)	C **(F)**
2	Express Lane South of Hallandale 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 3.2 – 2016 Existing Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2016 Existing	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/C Ratio	Ramp V/C Ratio	Density (pc/mi/ln)	LOS
1	Sheridan Street On-Ramp	Merge	1	1,095 (1,025)	-	0.52 (0.49)	-	-
2	Sheridan Street On-Ramp to 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 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 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 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 Hallandale Beach Boulevard Off-Ramp	Weave	5	6,337 (5,887)	0.69 (0.73)	-	29.2 (27.4)	D (C)
11	Express Lane North of Hallandale Beach Boulevard	Basic	2	1,600 (1,850)	0.39 (0.45)	-	-	-
12	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,132 (1,321)	-	0.54 (0.63)	-	-
13	Hallandale Beach Blvd Off-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 Hallandale Beach Boulevard On-Ramp	Basic	4	5,485 (5,196)	0.62 (0.59)	-	22.4 (21.2)	C (C)
16	Hallandale Beach Boulevard On-Ramp	Merge	1	674 (674)	-	0.34 (0.34)	-	-
17	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,320 (1,220)	0.78 (0.72)	-	-	-
18	Hallandale Beach Boulevard On-Ramp to Ives Dairy Road Off-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



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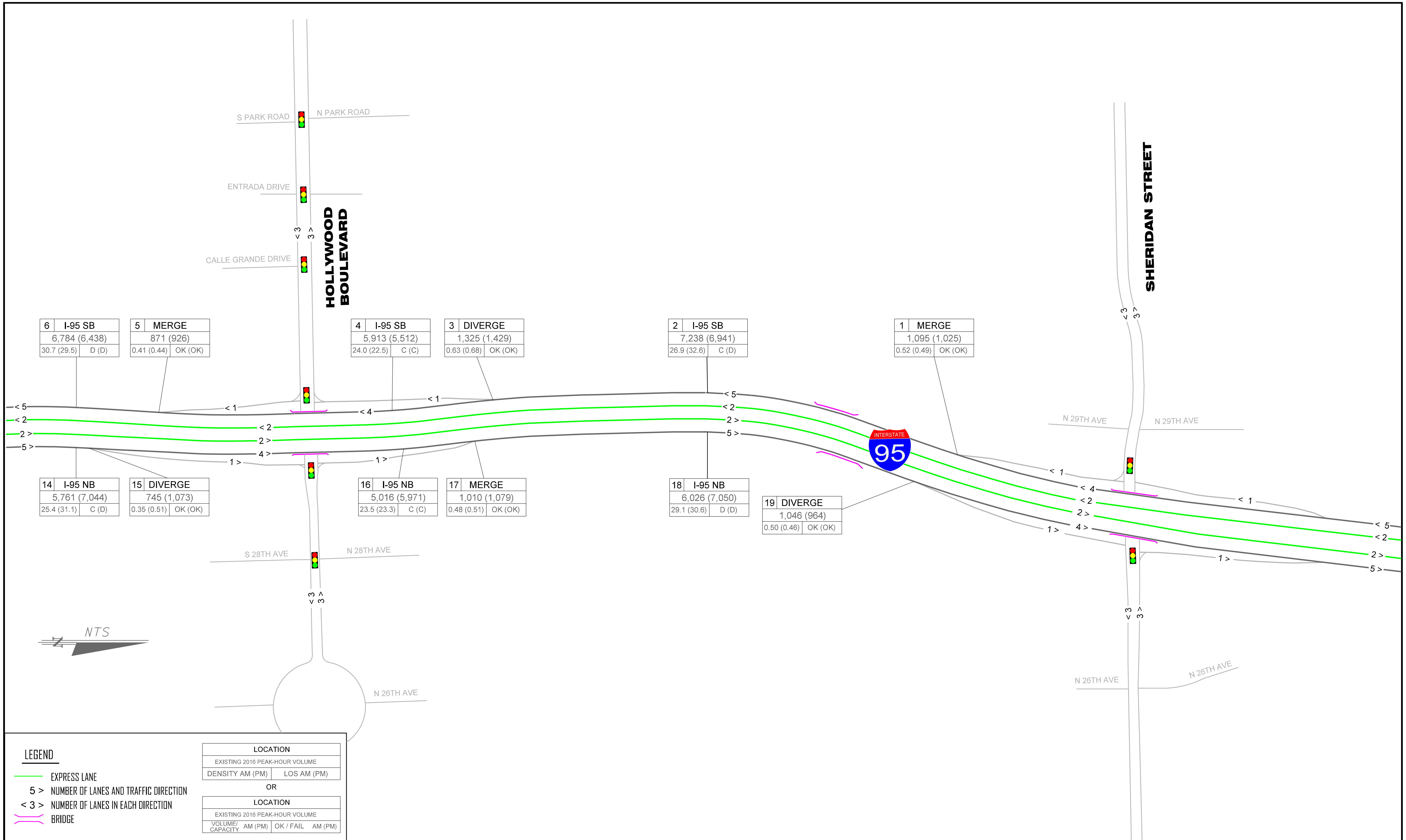
2016 EXISTING YEAR
OPERATIONAL ANALYSIS RESULTS

FIGURE 3.10



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2016 EXISTING YEAR OPERATIONAL ANALYSIS RESULTS

FIGURE 3.10

3.4.2 Crossing Roadways Operational Analysis

An intersection analysis for ramp terminals and adjacent intersections was performed at all interchanges within the area of influence 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 using the HCM methodology.

Results – The intersection analysis results are summarized in ***Tables 3.3 – 3.5***. The analysis results are also schematically summarized in ***Figure 3.11.*** Output Synchro reports can be found in ***Appendix F***.

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

Table 3.3 – 2016 Existing Hallandale Beach Boulevard Intersection LOS and Delay Results

Hallandale Beach Boulevard Intersection	Movement	AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
South Park Road*	EBL	9.0	A	16.0	B
	EBT	12.3	B	10.5	B
	WBL	14.5	B	10.6	B
	WBT	12.3	B	16.3	B
	WBR	8.9	A	8.6	A
	NBT	79.1	E	83.2	F
	SBL	79.1	E	78.7	E
	SBT	79.1	E	79.2	E
	SBR	59.6	E	59.3	E
	Int	**17.0**	**B**	**18.8**	**B**
I-95 West Ramp Terminal*	EBT	42.2	D	39.8	D
	EBR	31.4	C	31.4	C
	WBL	72.1	E	64.6	E
	WBT	17.2	B	20.3	C
	SBL	31.4	C	31.6	C
	SBR	28.2	C	33.4	C
	Int	**37.2**	**D**	**34.9**	**C**
I-95 East Ramp Terminal*	EBL	200.2	F	158.6	F
	EBT	17.8	B	16.9	B
	WBT	28.6	C	30.5	C
	WBR	41.4	D	53.5	D
	NBL	33.7	C	34.6	C
	NBR	226.6	F	183.6	F
	Int	**72.1**	**E**	**60.5**	**E**
NW 10th Terrace	EBL	17.3	B	100.1	F
	EBT	14.9	B	16.1	B
	EBR	15.6	B	14.0	B
	WBL	13.6	B	24.4	C
	WBT	15.4	B	11.8	B
	WBR	9.3	A	222.2	F
	NBL	88.0	F	59.8	E
	NBR	56.3	E	59.6	E
	SBL	60.8	E	56.4	E
	Int	**19.8**	**B**	**33.8**	**C**

*HCM 2000 results reported

Table 3.4 – 2016 Existing Pembroke Road Intersection LOS and Delay Results

Pembroke Road Intersection	Movement	AM Peak Delay (s/veh)	AM Peak LOS	PM Peak Delay (s/veh)	PM Peak LOS
Park Road*	EBU	9.5	A	9.6	A
	EBT	16.3	B	10.5	B
	WBL	44.2	D	8.3	A
	WBT	4.4	A	6.7	A
	NBL	83.8	F	86.0	F
	NBR	64.3	E	60.2	E
	Int	**16.8**	**B**	**13.3**	**B**
SW 31st Avenue*	EBT	3.9	A	2.5	A
	WBL	79.3	E	80.1	F
	WBT	0.2	A	0.3	A
	NBR	72.9	E	73.6	E
	Int	**4.7**	**A**	**3.1**	**A**
I-95 West Ramp Terminal*	EBT	26.7	C	24.3	C
	EBR	20.8	C	20.7	C
	WBL	52.7	D	40.6	D
	WBT	7.5	A	11.0	B
	SBL	19.4	B	19.1	B
	SBR	46.6	D	98.3	F
	Int	**25.4**	**C**	**31.6**	**C**
I-95 East Ramp Terminal*	EBL	49.0	D	30.1	C
	EBT	6.0	A	6.3	A
	WBT	29.4	C	32.6	C
	WBR	27.2	C	27.5	C
	NBL	18.2	B	19.7	B
	NBR	18.4	B	21.6	C
	Int	**22.1**	**C**	**21.5**	**C**
NW 10th Avenue / South 28th Avenue	EBL	17.4	B	16.7	B
	EBT	12.8	B	12.5	B
	EBR	10.6	B	8.8	A
	WBL	14.1	B	14.8	B
	WBT	21.1	C	22.7	C
	WBR	13.8	B	14.5	B
	NBL	406.3	F	330.8	F
	NBT	57.4	E	60.2	E
	SBL	58.4	E	62.6	E
	SBT	76.7	E	78.1	E
	Int	**47.6**	**D**	**51.3**	**D**

***HCM 2000 results reported**

Table 3.5 – 2016 Existing Hollywood Boulevard Intersection LOS and Delay Results

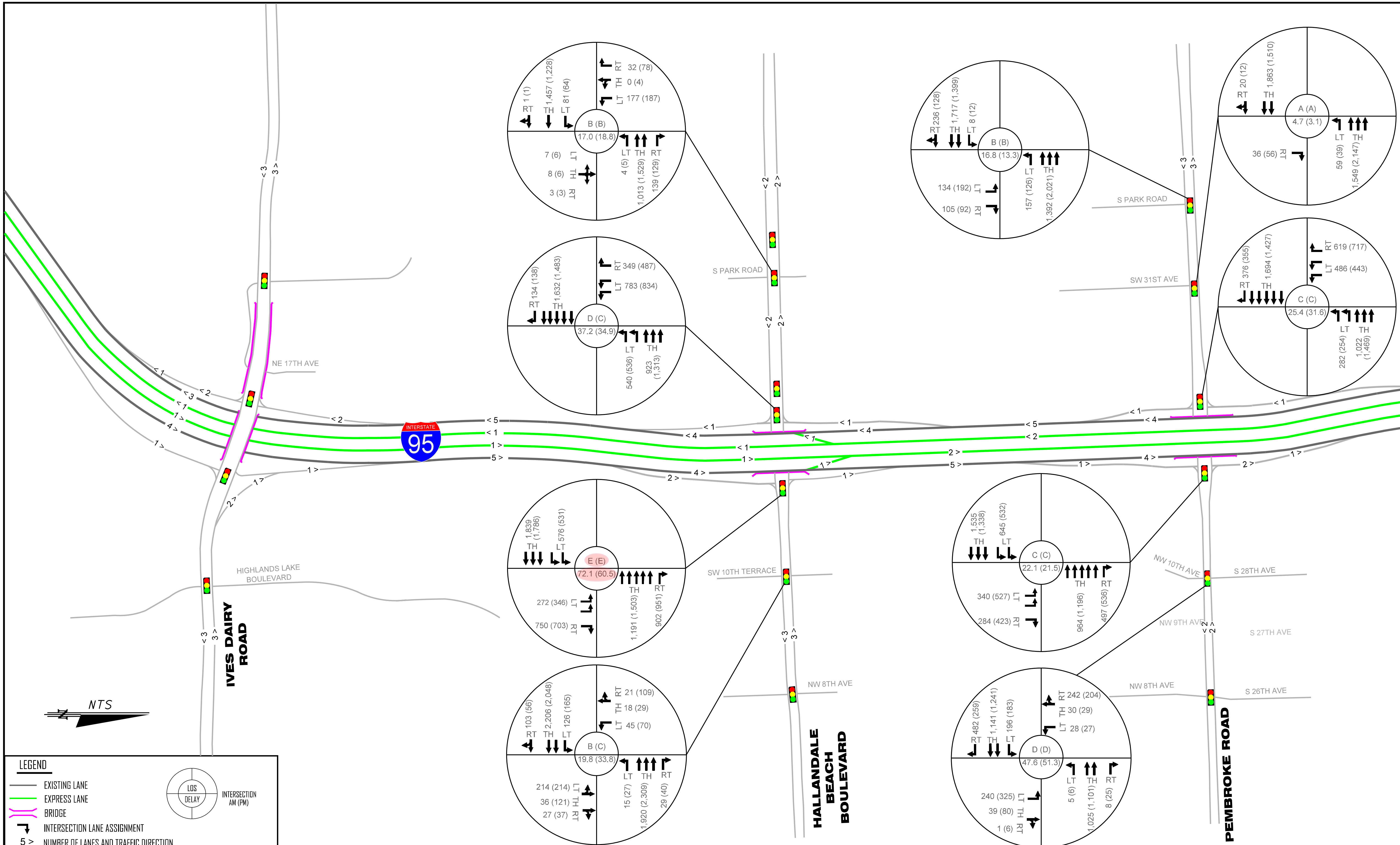
Hollywood Boulevard Intersection	Movement	AM Peak Delay (s/veh)	AM Peak LOS	PM Peak Delay (s/veh)	PM Peak LOS
Entranda Drive	EBL	4.6	A	19.6	B
	EBT	7.0	A	14.5	B
	EBR	7.4	A	15.0	B
	WBL	5.2	A	11.5	B
	WBT	0.7	A	31.1	C
	WBR	1.1	A	32.1	C
	NBL	66.8	E	55.1	E
	NBR	63.1	E	48.0	D
	SBL	75.3	E	70.7	E
	SBR	64.9	E	51.1	D
	Int	**7.2**	**A**	**27.8**	**C**
Calle Grande Drive*	EBU	111.2	F	144.3	F
	EBT	3.1	A	0.6	A
	WBL	91.2	F	93.7	F
	WBT	0.7	A	2.0	A
	NBR	0.5	A	0.6	A
	Int	**2.6**	**A**	**2.2**	**A**
I-95 West Ramp Terminal*	EBT	20.8	C	22.1	C
	EBR	63.7	E	97.0	F
	WBL	26.8	C	28.3	C
	WBT	3.8	A	3.9	A
	SBL	45.5	D	41.4	D
	SBR	31.8	C	51.7	D
	Int	**28.2**	**C**	**33.6**	**C**
I-95 East Ramp Terminal*	EBL	26.8	C	27.7	C
	EBT	4.5	A	5.2	A
	WBT	22.6	C	22.5	C
	WBR	156.0	F	142.7	F
	NBL	25.8	C	29.8	C
	NBR	30.8	C	30.4	C
	Int	**37.5**	**D**	**37.1**	**D**

***HCM 2000 results reported**

Table 3.5 – 2016 Existing Hollywood Boulevard Intersection LOS and Delay Results (Continued)

Hollywood Boulevard Intersection	Movement	AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
S 28th Avenue*	EBL	26.3	C	32.6	C
	EBT	39.6	D	37.4	D
	EBR	34.5	C	27.2	C
	WBL	33.2	C	33.1	C
	WBT	39.6	D	39.0	D
	NBL	88.3	F	128.9	F
	NBT	83.8	F	128.3	F
	SBL	198.2	F	187.0	F
	SBT	62.4	E	58.3	E
	SBR	60.9	E	92.4	F
	Int	**50.2**	**D**	**52.7**	**E**

*HCM 2000 results reported



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.: 436903-1-22-02
ETDM No.: 14254

2016 EXISTING YEAR
INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE 3.11

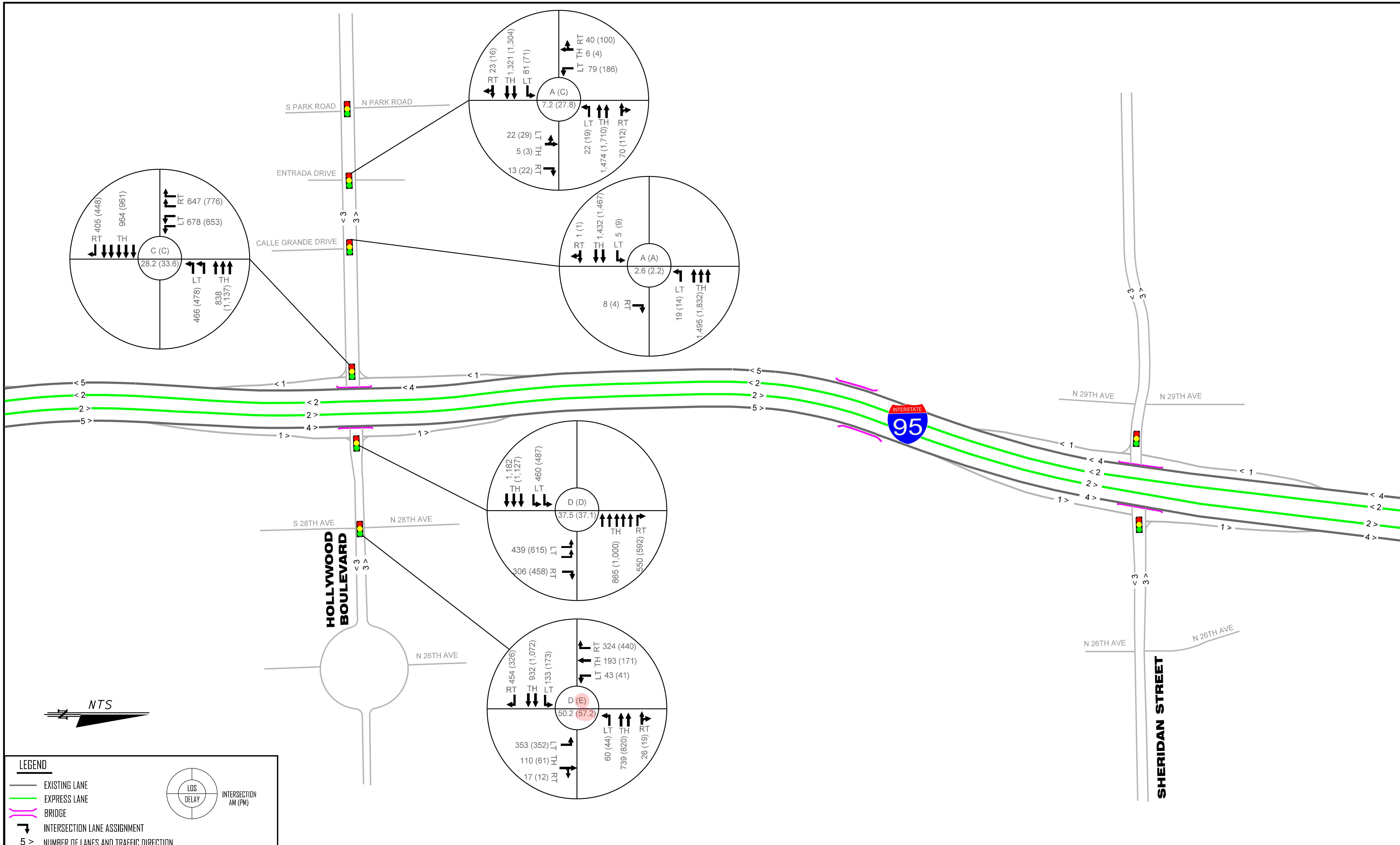


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FIGURE 3.11

3.5 Existing Transit Operations

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 G, 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 H***). 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 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, Hollywood Boulevard Station.

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.

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 Trai-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.

3.6 Corridor Crash 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.

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 3.6*** summarizes the number of crashes per year.

Table 3.6 – 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
Total:	**2,805**

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 3.7*** summarizes the crashes by interchange.

Table 3.7 – Existing Crashes by Interchange

Description	Pre-Construction* (36 months)	During Construction** (50 months)	Total	Percentage of Total
Hallandale Beach Boulevard				
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	
Pembroke Road				
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	
Hollywood Boulevard				
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 3.8*** summarizes the number of crashes per year.

Table 3.8 – Existing Hallandale Beach Boulevard Crashes by Year

Year	Crashes
2009	63
2010	79
2011	57
Total:	**199**

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 to 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 3.9*** summarizes the number of crashes per year.

Table 3.9 – Existing Pembroke Road Crashes by Year

Year	Crashes
2013	89
2014	108
2015	88
Total:	**285**

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 3.10*** summarizes the number of crashes per year.

Table 3.10 – Existing Hollywood Boulevard Crashes by Year

Year	Crashes
2010	58
2011	87
2012	106
Total:	**251**

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 2020 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.

4.0 NEED

4.1 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.

Without future improvements, the driving conditions will continue to deteriorate well below acceptable Level of Service (LOS) standards. 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
- Pembroke Road southbound on-ramp to Hallandale Beach Boulevard 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/28th Avenue

The improvements proposed as part of this project will increase the capacity of the interchanges and the ramp terminal intersections.

4.2 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. A review of the crash data indicates that traffic operational improvements could address some of the safety issues.

Additional I-95 entry and exit ramp capacity at these interchanges will improve the safety and overall flow of traffic within the project corridor and adjacent intersections.

4.3 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.

4.4 Modal Interrelationships

There are sidewalks in both directions and public transit routes along Hallandale Beach Boulevard, Pembroke Road, and Hollywood Boulevard. Additionally, there is a Tri-Rail Station in the northwest quadrant of the I-95/Hollywood Boulevard Interchange.

Capacity improvements within the study area will enhance the mobility of people and goods by alleviating current and future congestion at the interchanges and on the surrounding freight and transit networks. Reduced congestion will serve to maintain and improve viable access to the major transportation facilities and businesses in the area.

4.5 Transportation Demand

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 MTP, Transportation Improvement Program (TIP), FDOT Work Program, FDOT State TIP, and FDOT SIS Five Year Plan.

4.6 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 County MPO MTP predicted that the population would grow from 1.9 million in 2018 to 2.2 million by 2045, an 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.

4.7 Emergency Evacuation

The project is anticipated to improve emergency evacuation capabilities by enhancing connectivity and accessibility to major arterials designated on the state evacuation route. 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).

5.0 FUTURE NO-BUILD CONDITIONS

5.1 Future Land Use

Land Use and cover was classified using the South Florida Water Management District (SFWMD) Land Use and Cover nomenclature (see ***Figure 5.1***). Table ***5.1*** summarizes the existing land use and cover within the study area.

The land use and cover within the right of way (ROW) is transportation (road and highway) with supporting features such as drainage swales.

Table 5.1 – Existing Land Use and Cover within the Study Area

Land Use and Cover
Channelized Waterways, Canals
Commercial and Services
Educational Facilities
Golf Course
Fixed Single Family Units
Mobile Home Units
Multiple Dwelling Units: Low and High Rise
Open Land
Other Light Industry
Parks/Recreation
Reservoirs
Retail Sales and Services
Roads and Highways

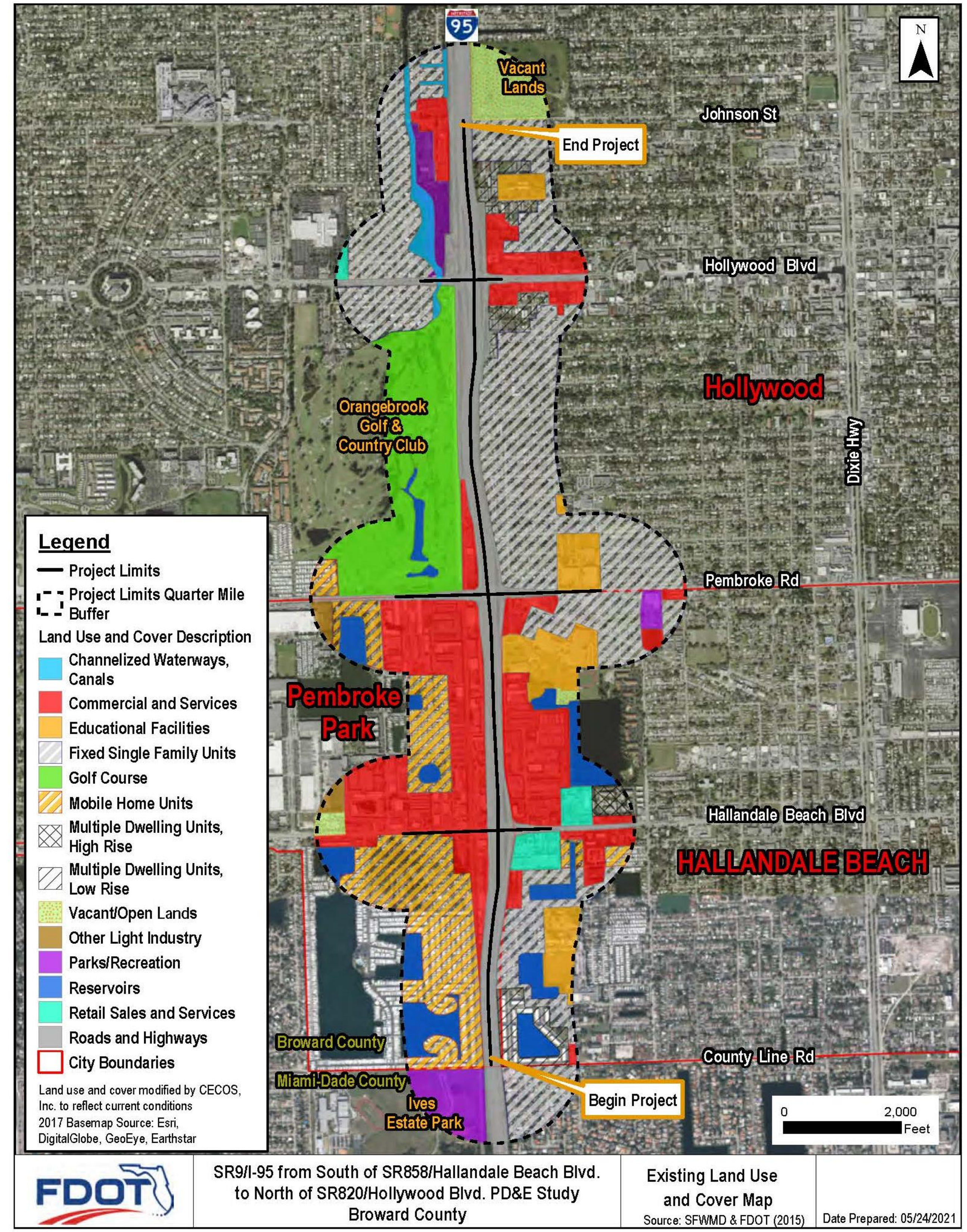


Figure 5.1 – Existing Project Corridor Land Use/Land Cover Map

The Town of Pembroke Park and the Cities of Hallandale Beach and Hollywood, as well as Broward County, adopted comprehensive plans to establish goals, objectives and policies for future growth pursuant to Chapter 163, Florida Statutes. These plans include Future Land Use Elements as well as Transportation Elements. ***Figures 5.2-5.5*** depicts each municipality and Broward County's future land use maps.

This I-95 project is included in the Broward County MPO MTP, TIP, FDOT Work Program, FDOT STIP, and the FDOT SIS Five Year Work Program. The Broward County MPO 2045 MTP included improvements to all I-95 interchanges in Broward County. As the existing corridor is developed, the future land use associated with it 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 re-development will occur on land previously developed.

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 typically residential and commercial uses. As depicted on the Town of Pembroke Park's Future Land Use Map, (completed as part of the City's Comprehensive Plan), the eastern side of the Town's limits (adjacent to I-95) are predominately residential, commercial, and industrial uses. The west side of the Town's future land use consists primarily of residential, commercial, educational/community facilities and recreational. This portion of the Town is outside the proposed study area.

The City of Hollywood's existing land use consists of residential, golf course, educational facilities, and commercial/services. As depicted on the City of Hollywood's Future Land Use Map, (completed as part of the City's Comprehensive Plan), both sides of the project corridor consist of residential, commercial, parks and open space, educational facilities, and a 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 also 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 Land Use Plan was included to show the 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. While the project may result in redevelopment of parcels, this redevelopment would occur over previously developed land. Therefore, based on the above, adverse effects (direct/indirect) to land use are not anticipated as a result of this project.

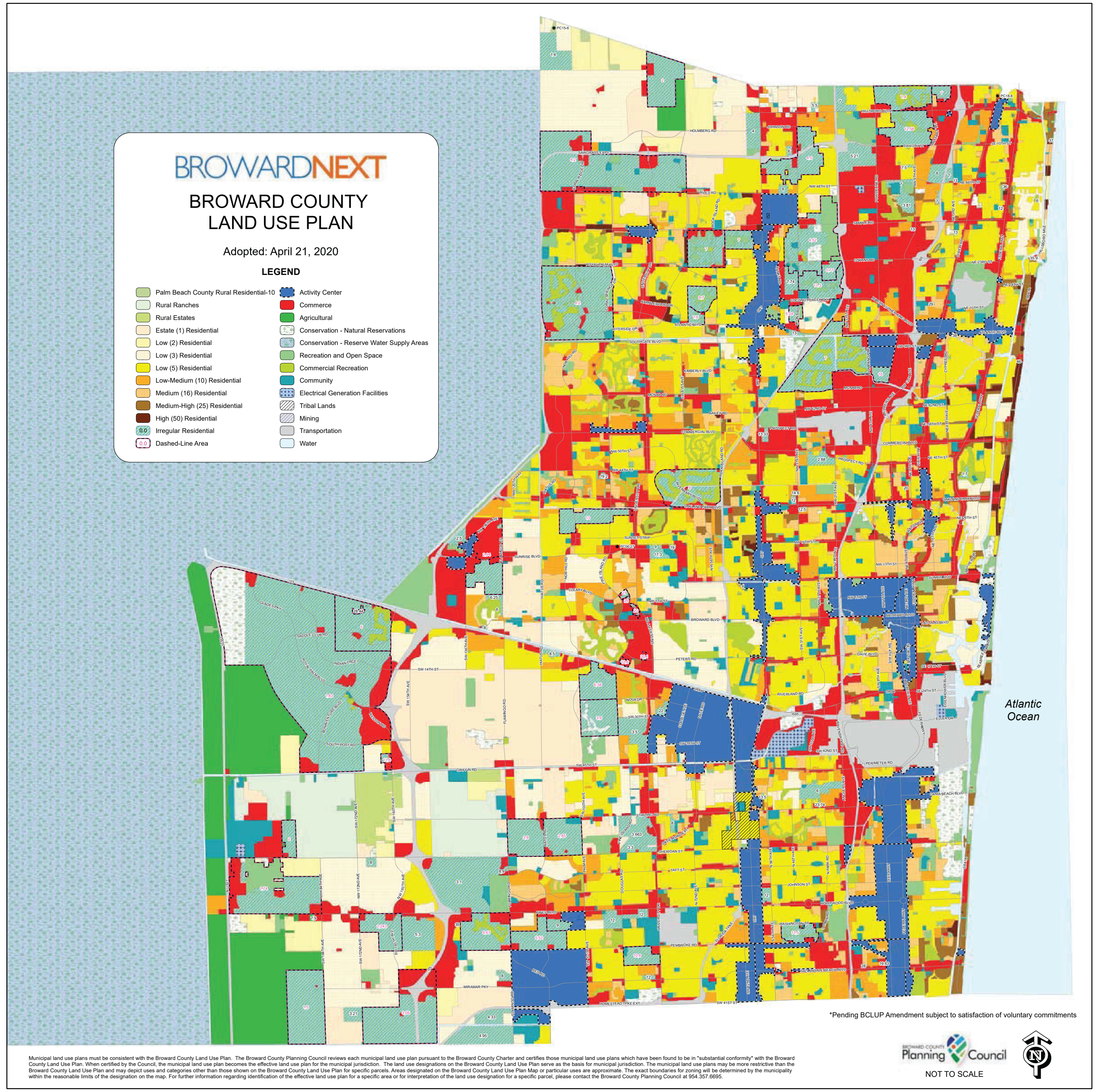


Figure 5.2 - Broward County Future Land Use Map

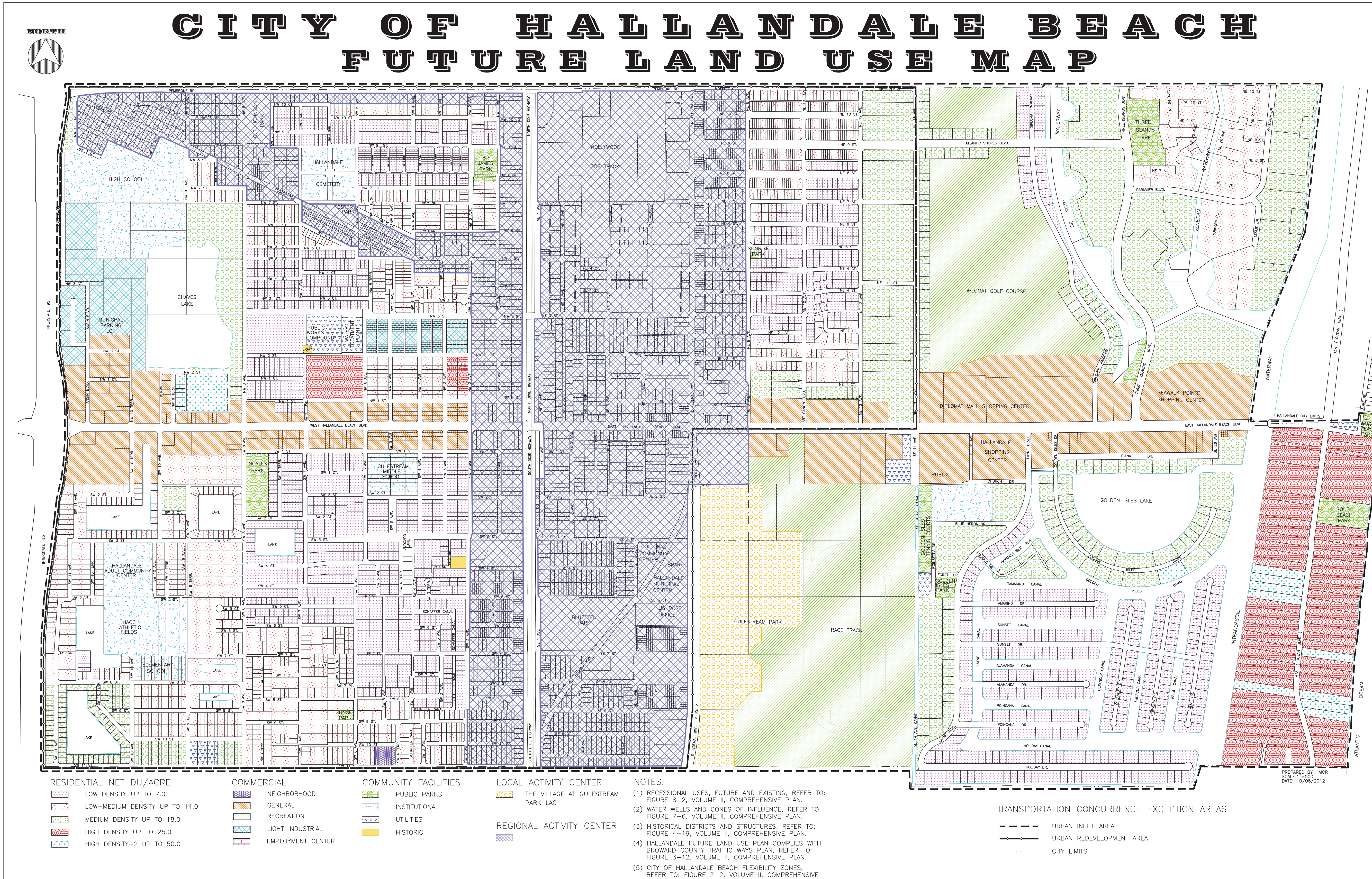


Figure 5.3 - City of Hallandale Beach Future land Use Map

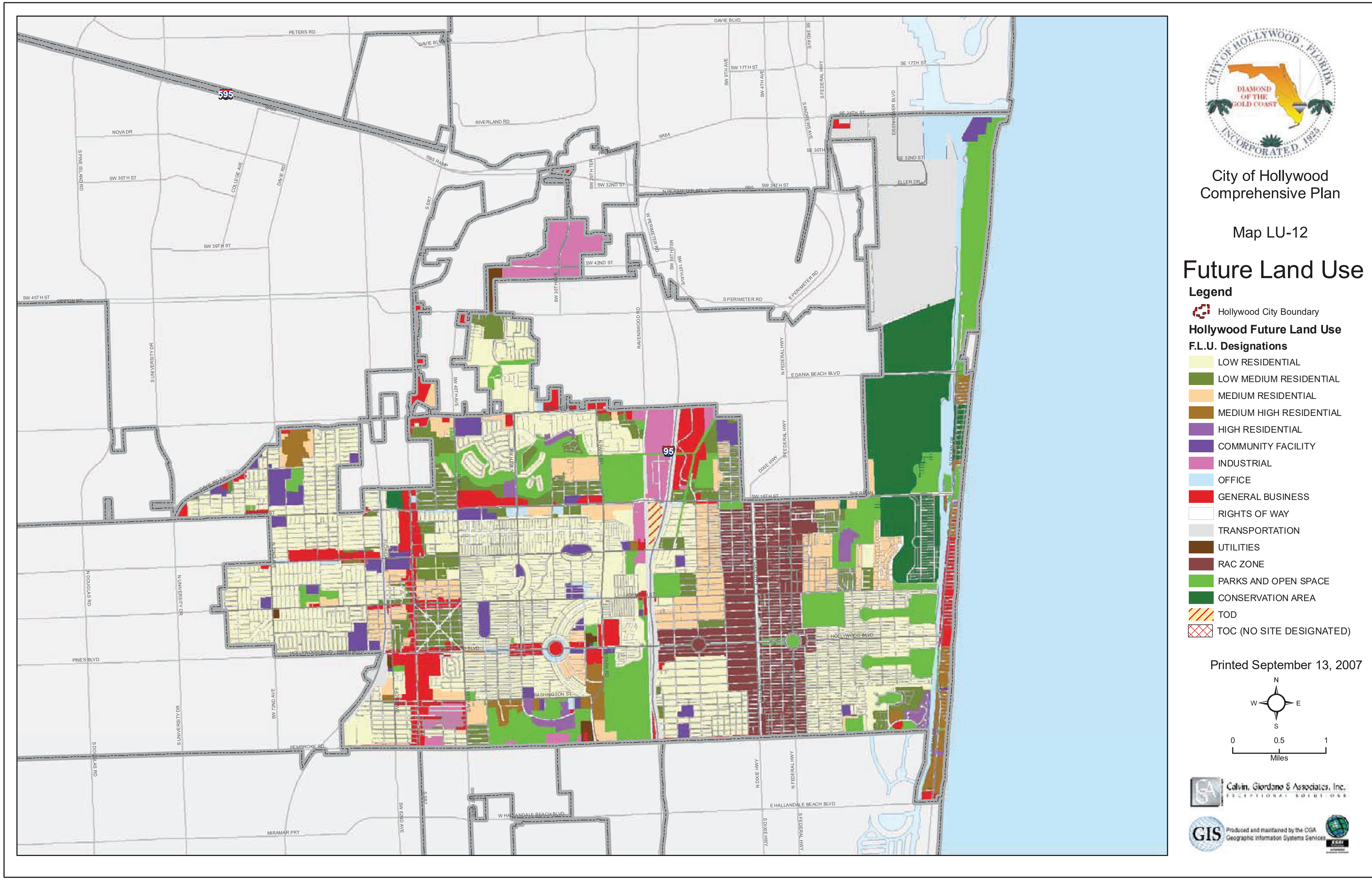


Figure 5.4 - City of Hollywood Future land Use Map

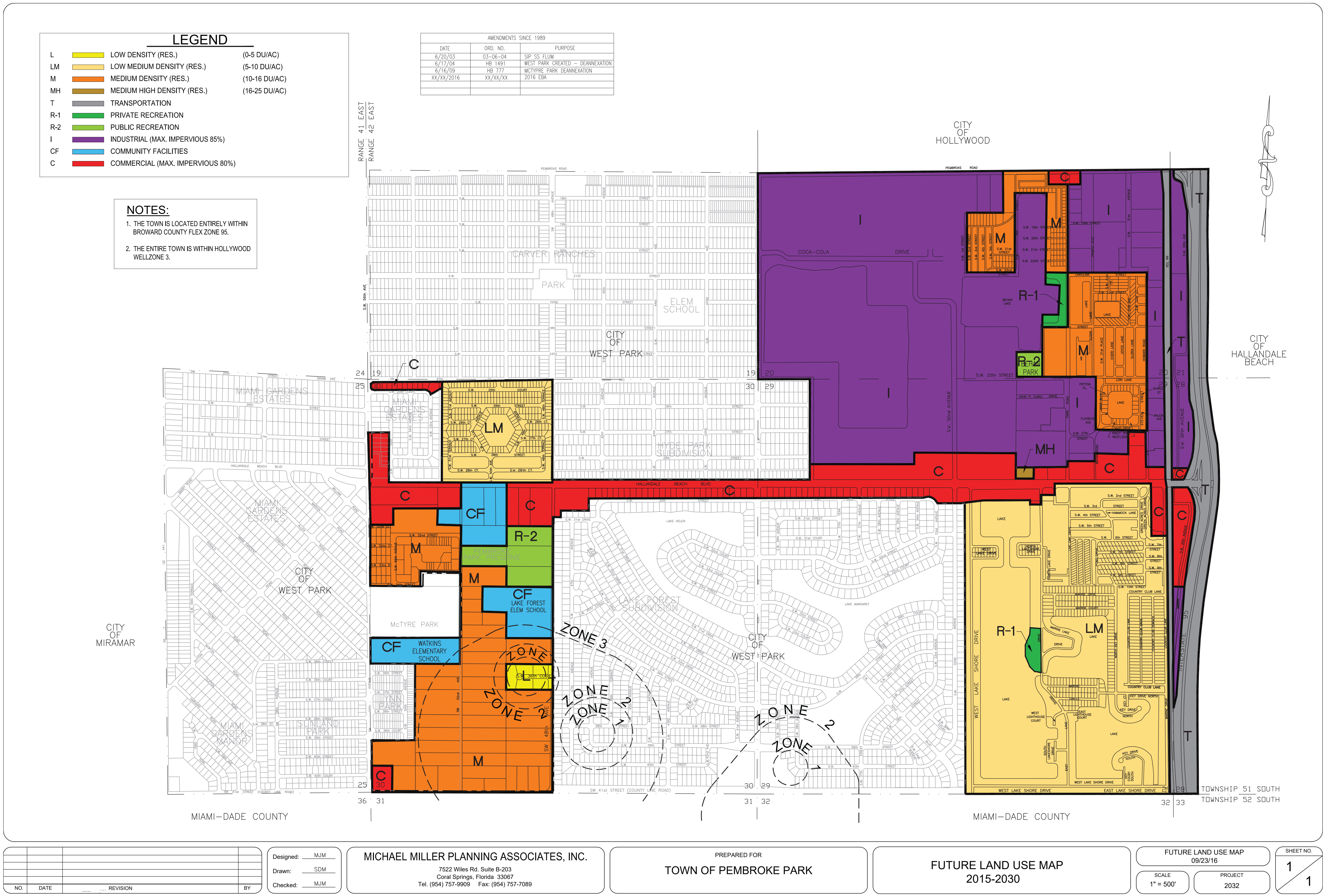


Figure 5.5 - Town of Pembroke Park Future land Use Map

5.2 No-Build Alternative – Roadway Network

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 Plans, 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.

2045 – The 2045 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.

2030 – The 2030 No-Build Alternative includes currently planned and programmed improvements. One of the programmed improvements are the safety short-term interim improvements at the Hallandale Beach Boulevard, Pembroke Road and Hollywood Boulevard interchanges. The 2030 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. There are no planned improvements on the I-95 mainline south of Pembroke Road.

The three I-95 No-Build roadway cross sections between interchanges are depicted in ***Figures 5.6 – 5.8***.

Figure 5.9 shows the 2030 No-Build Alternative schematic line diagram. ***Figure 5.10*** shows the 2045 No-Build Alternative schematic line diagram.

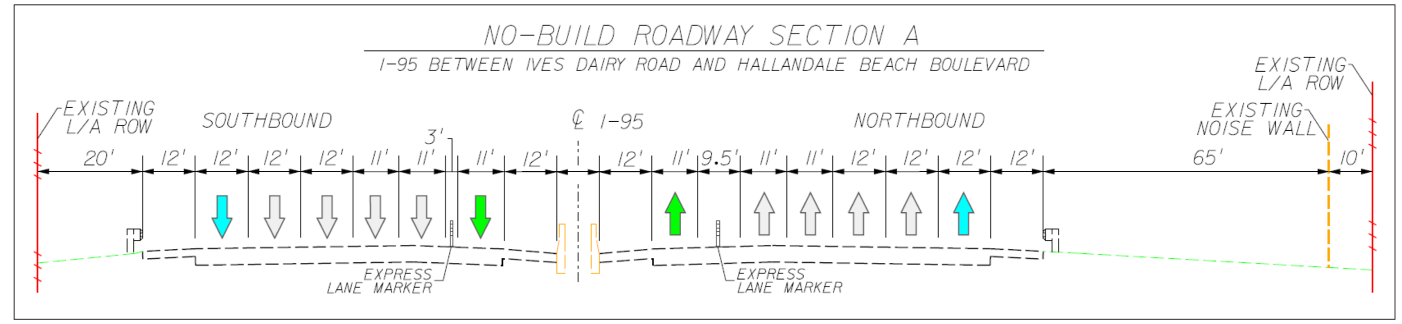


Figure 5.6 – No-Build Alternative Roadway Section A

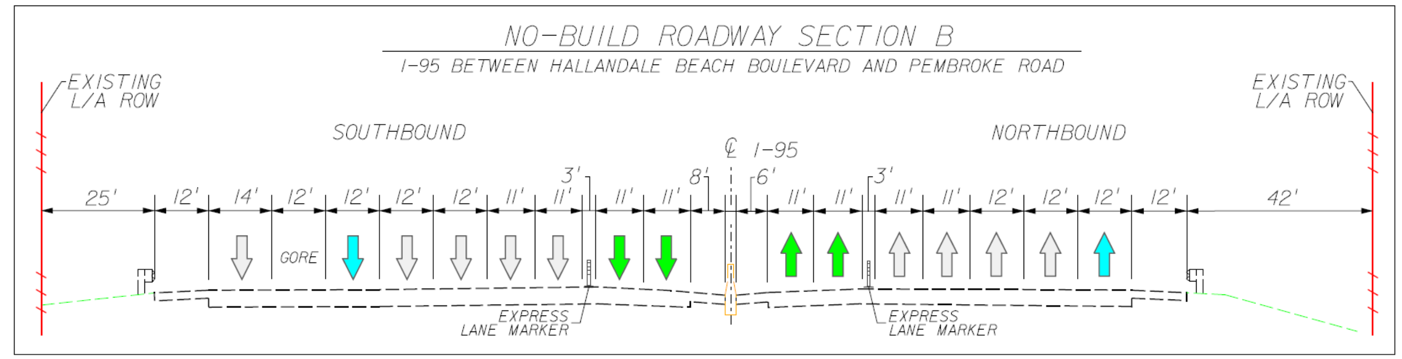


Figure 5.7 – No-Build Alternative Roadway Section B

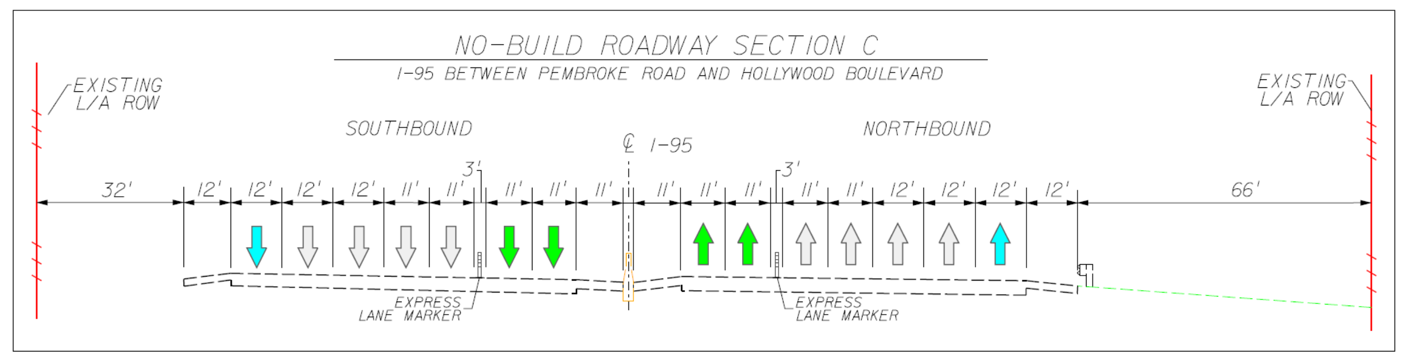
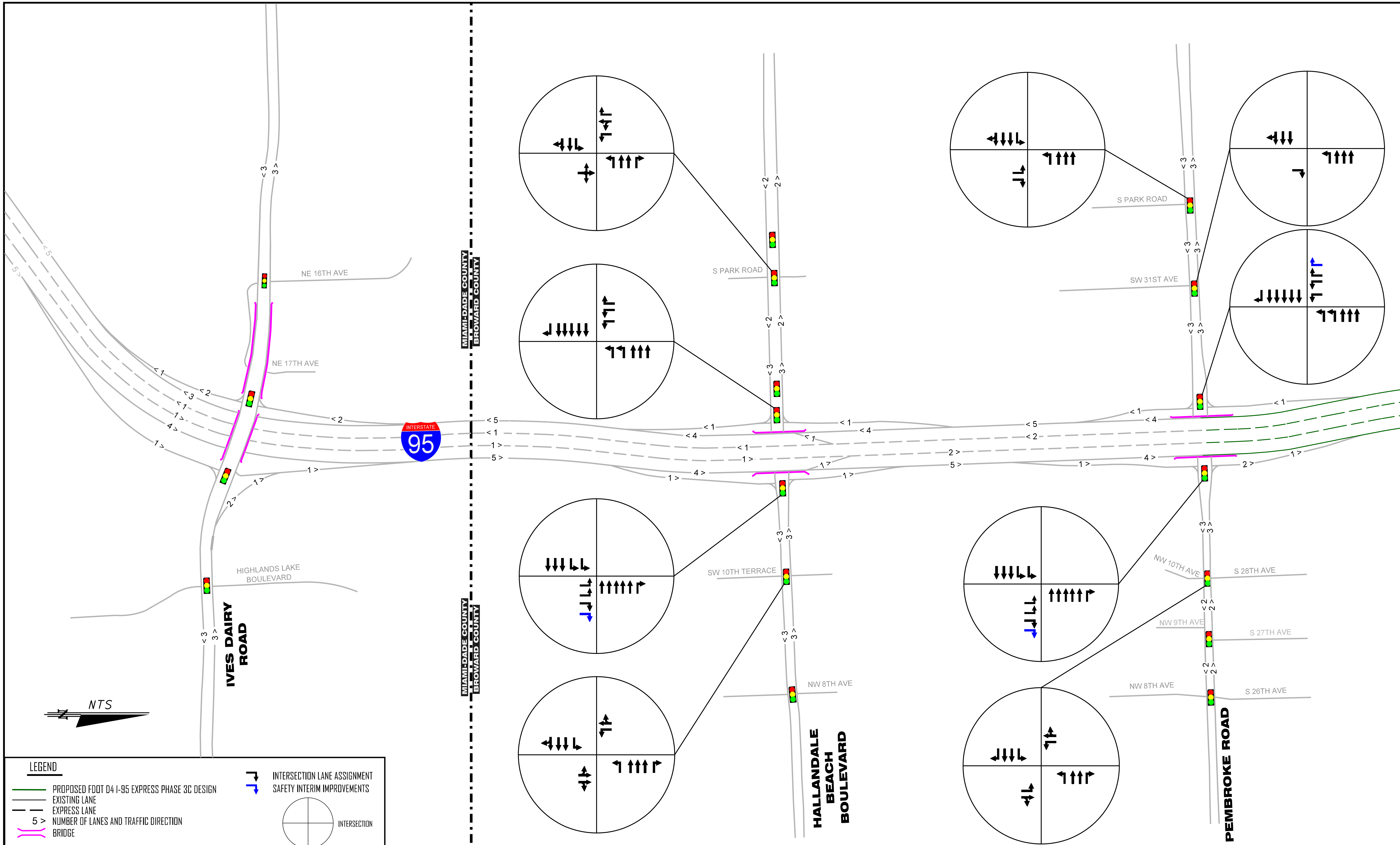


Figure 5.8 – No-Build Alternative Roadway Section C



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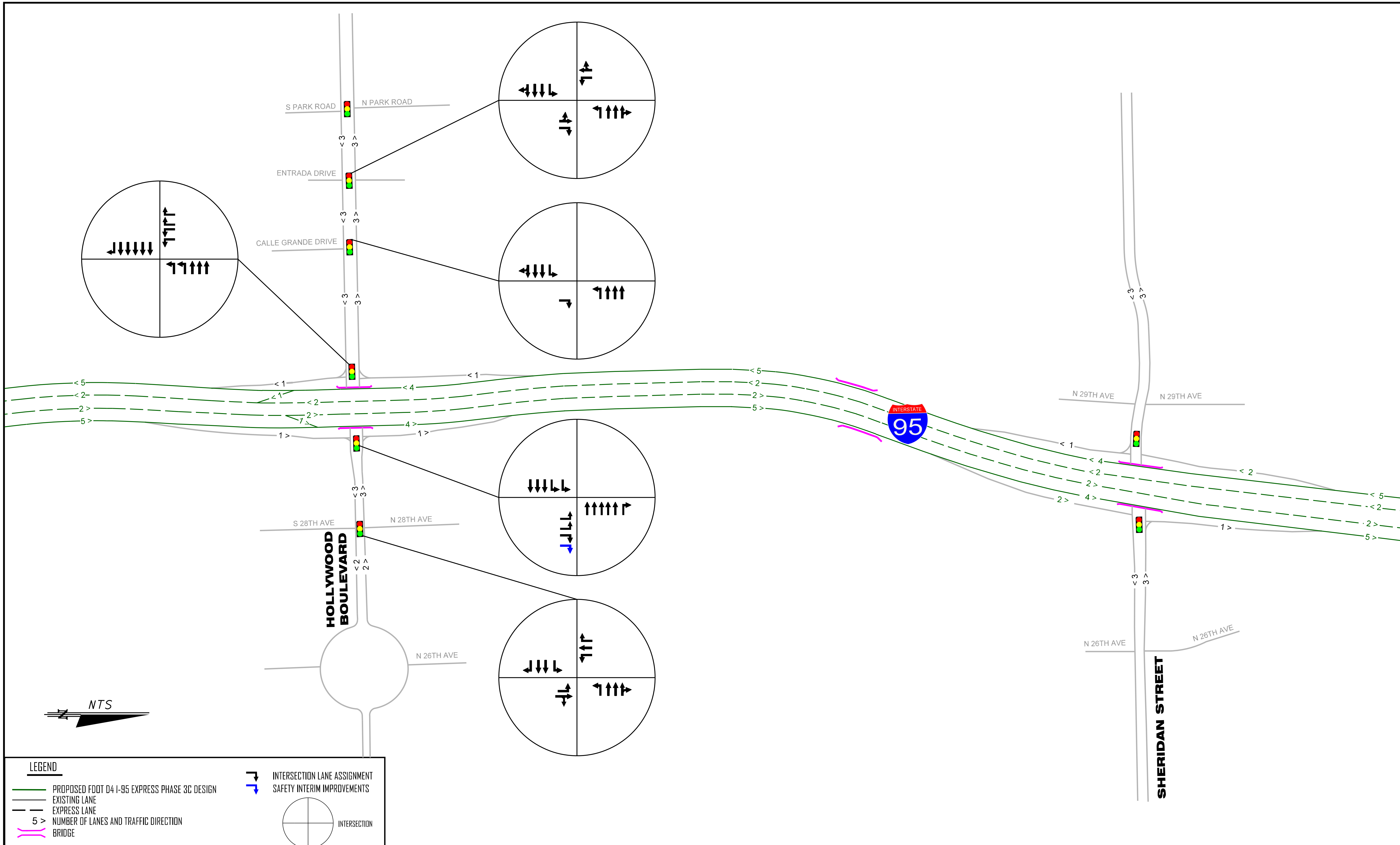
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

SR 9 (INTERSTATE 95) LANE GEOMETRY AND CONFIGURATIONS 2030 NO-BUILD LINE DIAGRAM

FIGURE 5.9



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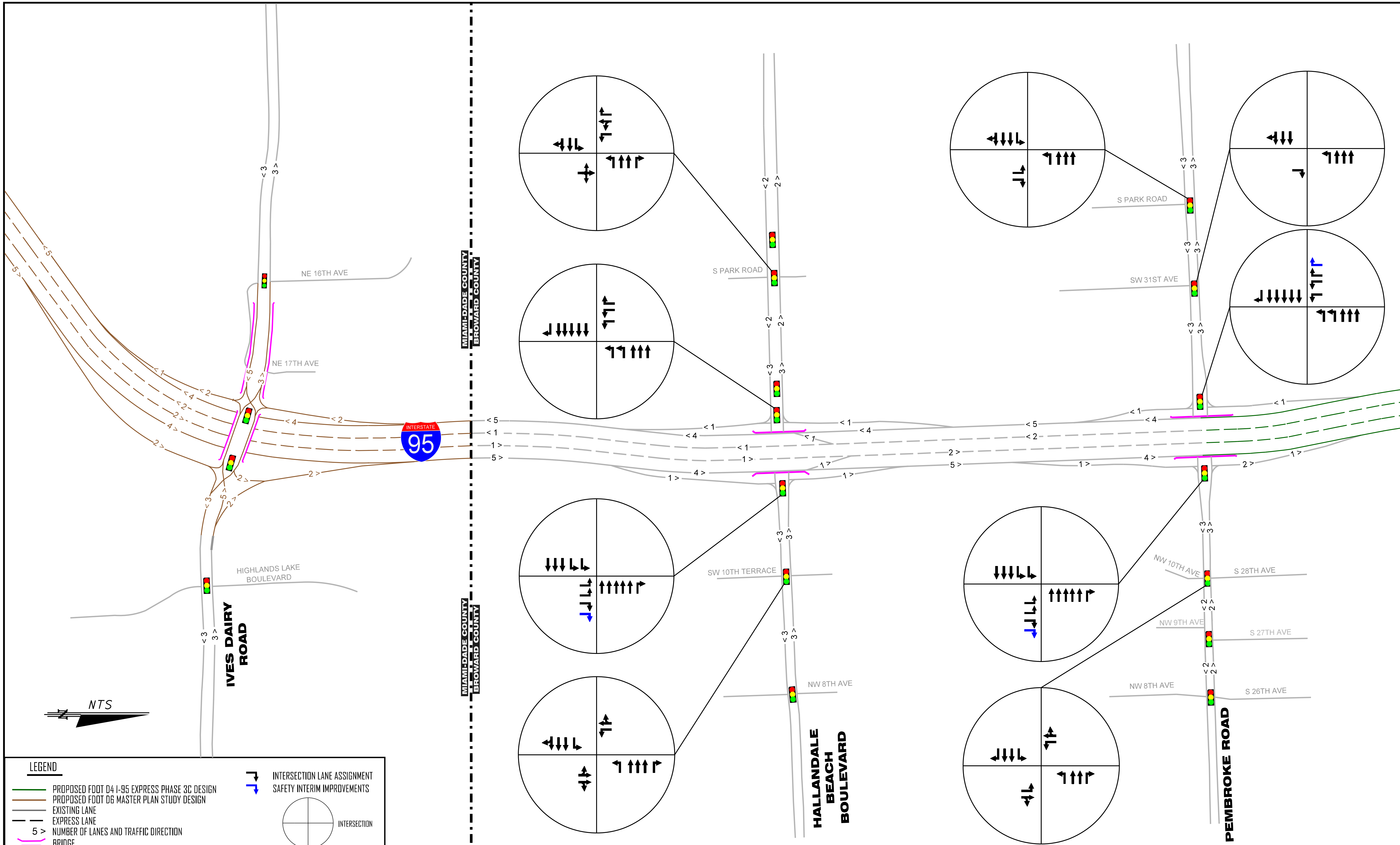
SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
2030 NO-BUILD LINE DIAGRAM

FIGURE
5.9



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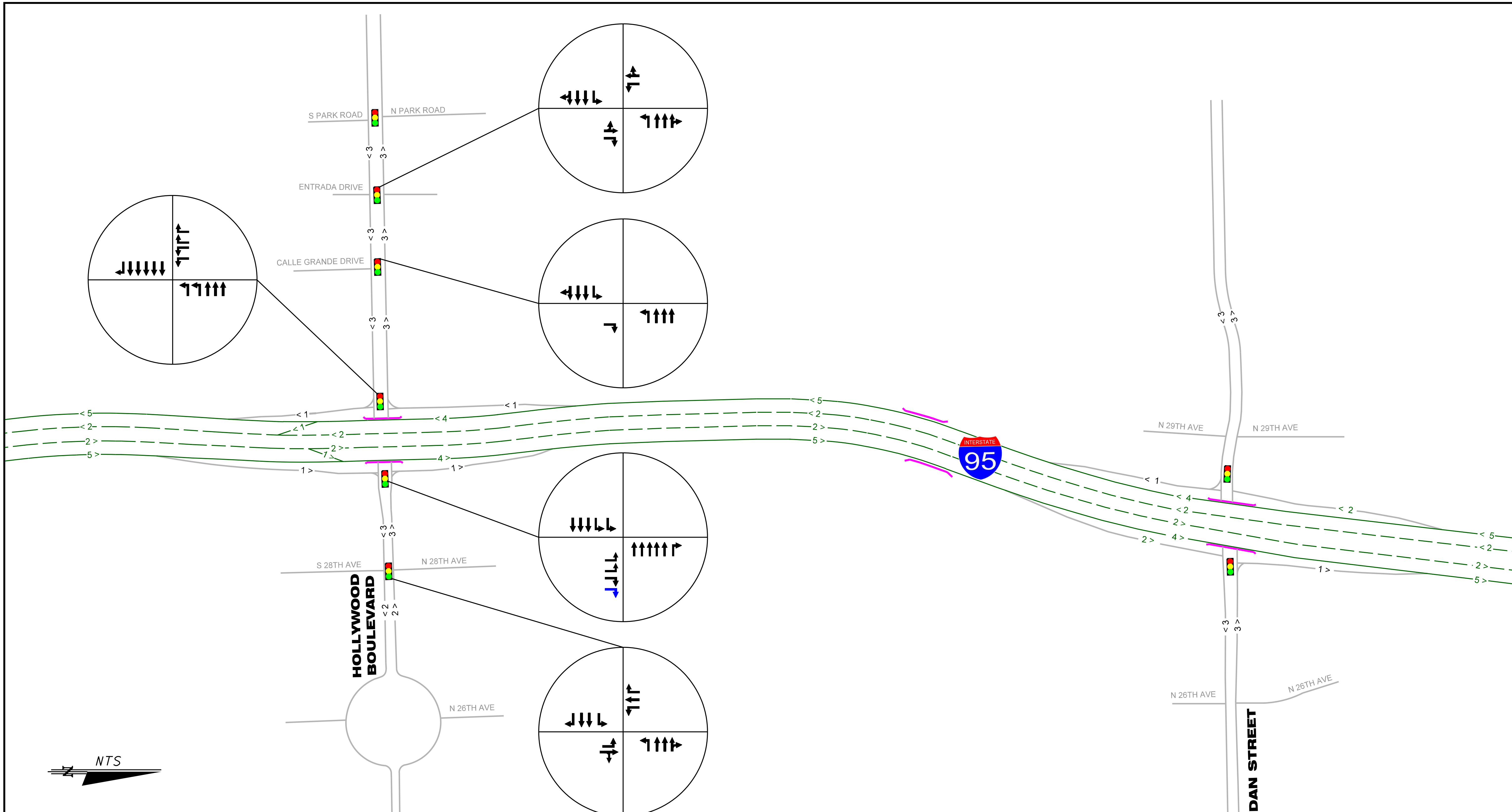
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
2045 NO-BUILD LINE DIAGRAM

FIGURE
5.10



LEGEND

- PROPOSED FDOT D4 I-95 EXPRESS PHASE 3C DESIGN
- PROPOSED FDOT D6 MASTER PLAN STUDY DESIGN
- EXISTING LANE
- EXPRESS LANE
- 5 > NUMBER OF LANES AND TRAFFIC DIRECTION
- BRIDGE
- INTERSECTION LANE ASSIGNMENT
- SAFETY INTERIM IMPROVEMENTS
- INTERSECTION

FDOT
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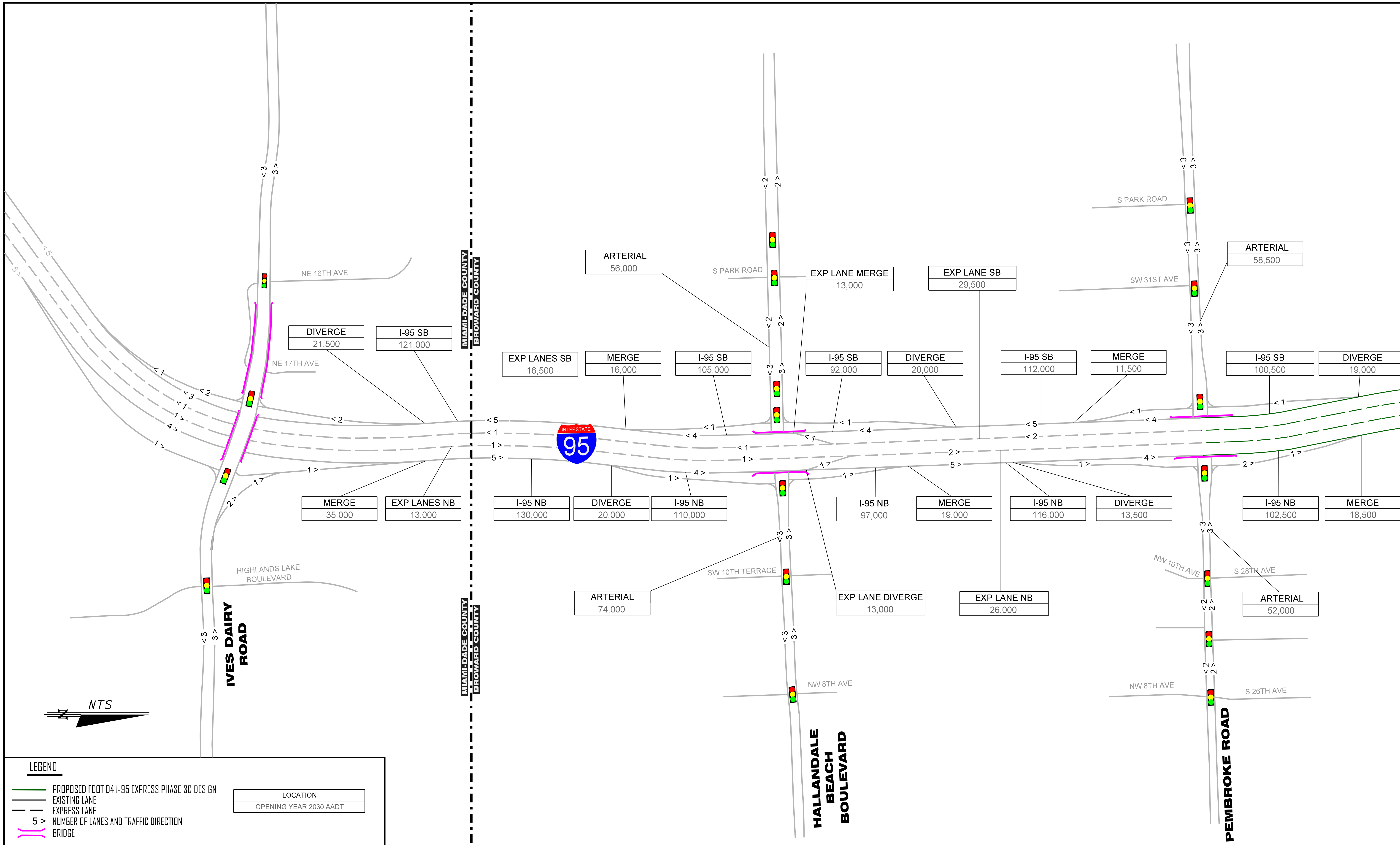
SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
2045 NO-BUILD LINE DIAGRAM

FIGURE
5.10

5.3 No-Build Alternative – 2030 Traffic Forecast

A 2030 opening year traffic operational analysis was performed for the AM and PM peak hours. ***Figure 5.11*** shows the No-Build Alternative 2030 AADT volumes for the study area. ***Figure 5.12*** shows the No-Build Alternative 2030 DDHV for the study area. ***Figure 5.13*** shows the No-Build Alternative 2030 turning movement volumes for the study area.



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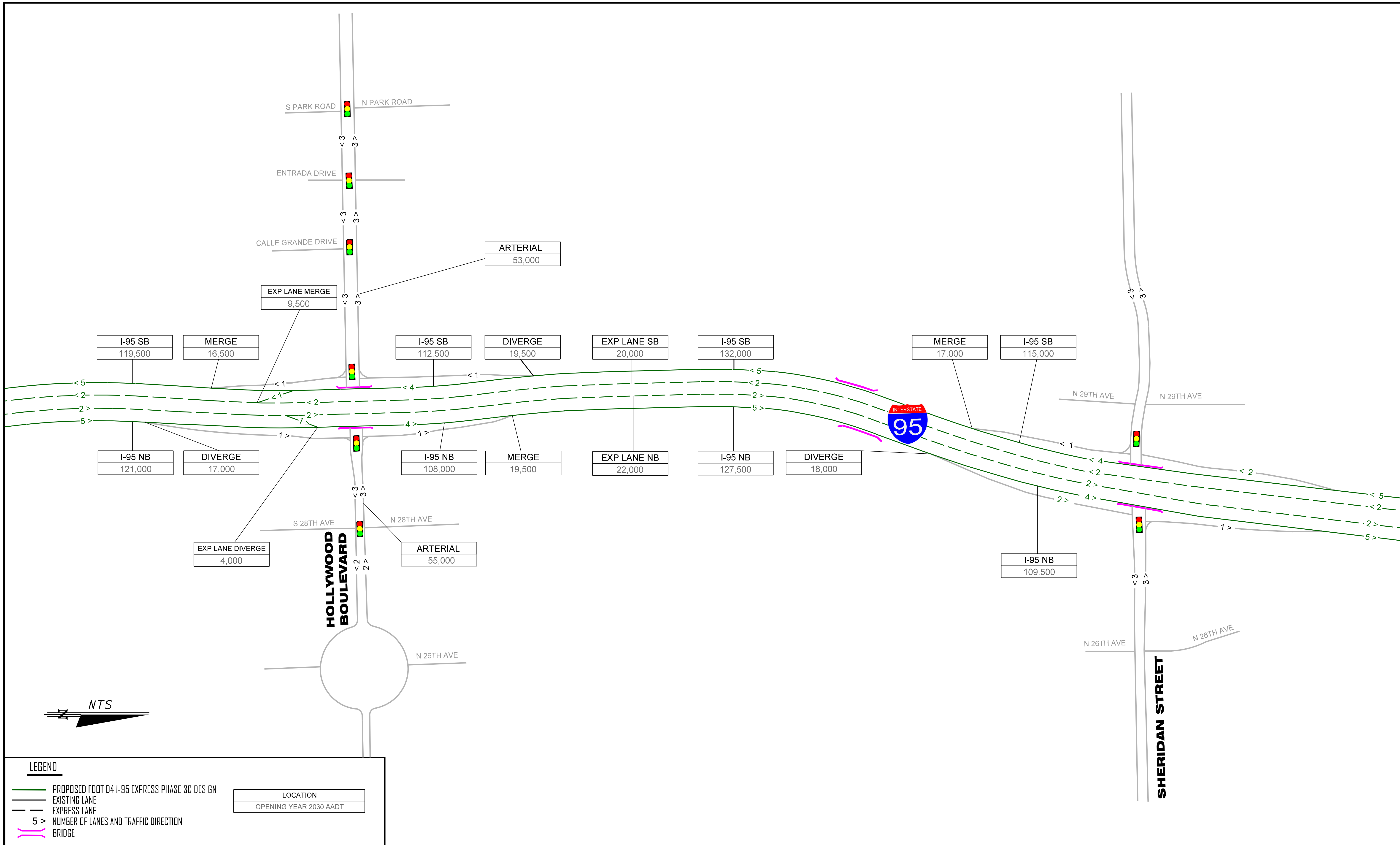
ANNUAL AVERAGE DAILY TRAFFIC (AADT)
2030 OPENING YEAR NO-BUILD ALTERNATIVE

FIGURE 5.11



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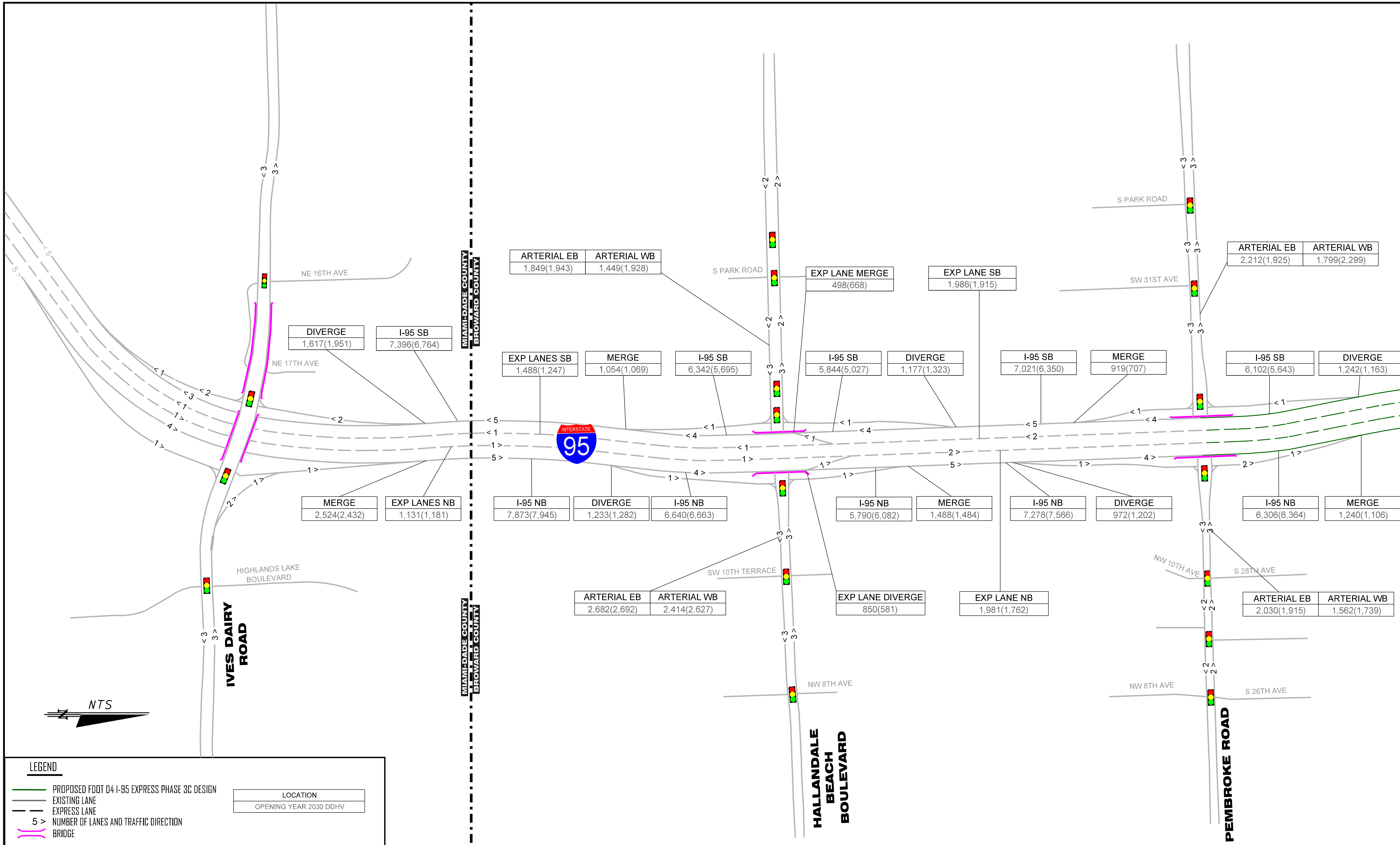
ANNUAL AVERAGE DAILY TRAFFIC (AADT)
2030 OPENING YEAR NO-BUILD ALTERNATIVE

FIGURE
5.11



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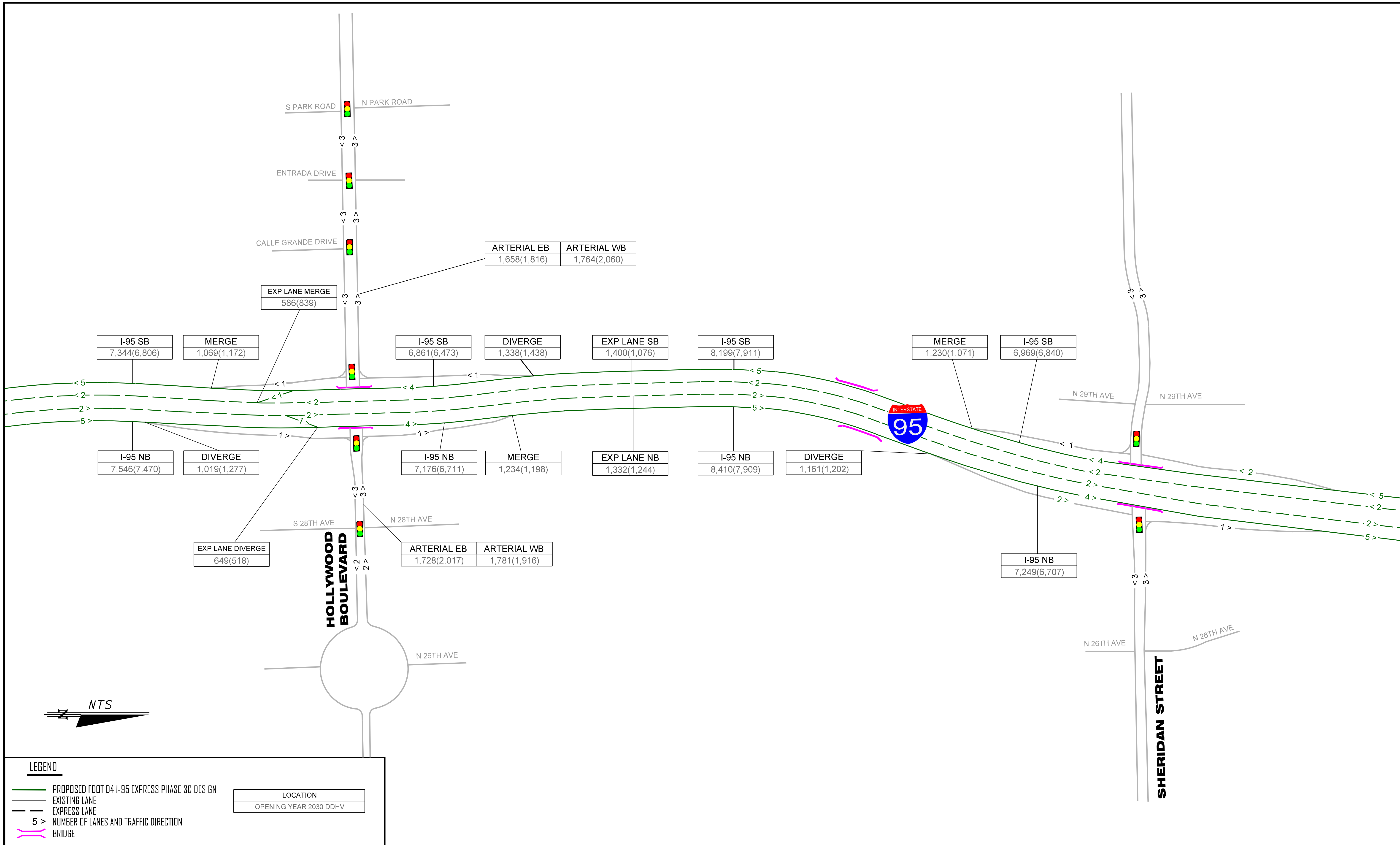
DIRECTIONAL DESIGN HOURLY VOLUMES (DDHV)
2030 OPENING YEAR NO-BUILD ALTERNATIVE

FIGURE 5.12



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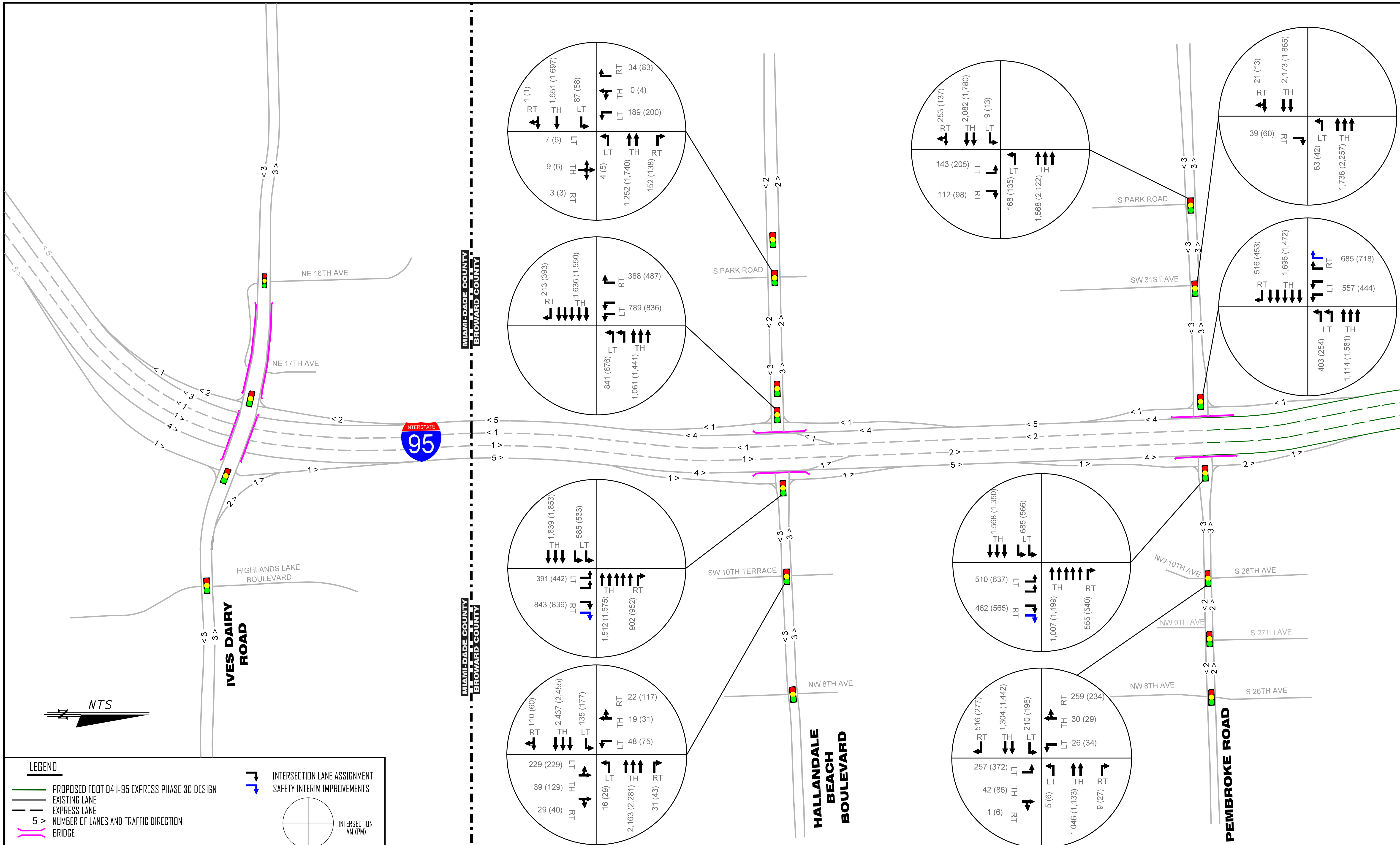
DIRECTIONAL DESIGN HOURLY VOLUMES (DDHV)
2030 OPENING YEAR NO-BUILD ALTERNATIVE

FIGURE 5.12



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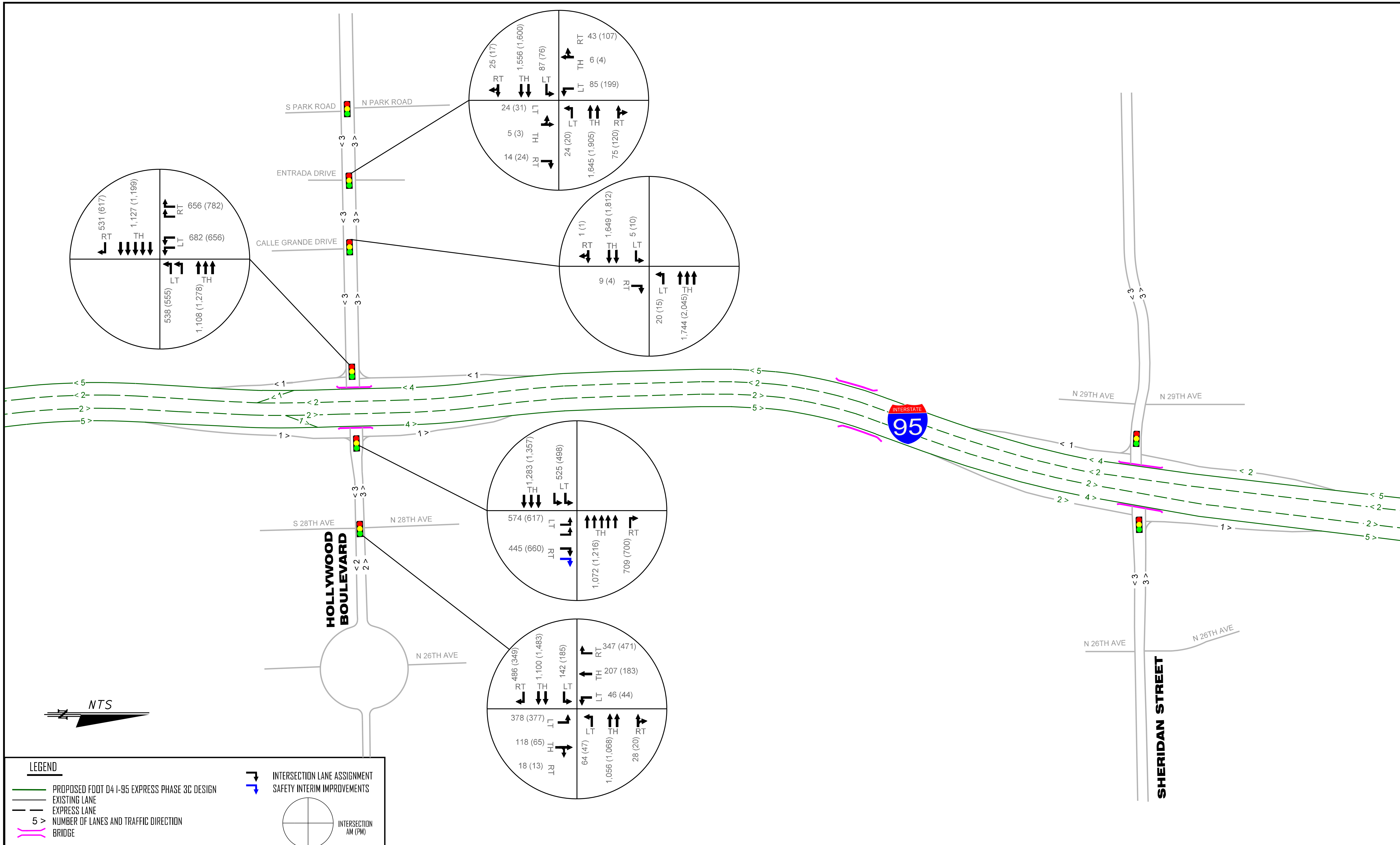
INTERSECTION TURNING MOVEMENT VOLUMES 2030 OPENING YEAR NO-BUILD ALTERNATIVE

FIGURE 5.13



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INTERSECTION TURNING MOVEMENT VOLUMES
2030 OPENING YEAR NO-BUILD ALTERNATIVE

FIGURE
5.13

5.4 No-Build Alternative – 2030 Operational Analysis

5.4.1 I-95 Mainline Operational Analysis

Density, volume/capacity ratio, and LOS of each freeway facility were used as MOEs, which is consistent with the existing conditions analysis. The No-Build Alternative 2030 mainline/basic, weaving, and ramp merge/diverge analysis results are summarized in ***Tables 5.2 – 5.3***. The analysis results are also schematically summarized in ***Figure 5.14***. Output HCS reports are included as ***Appendix I.***

Findings – The capacity analysis shows that one 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.

Table 5.2 – 2030 No-Build Alternative Northbound Freeway Analysis Results

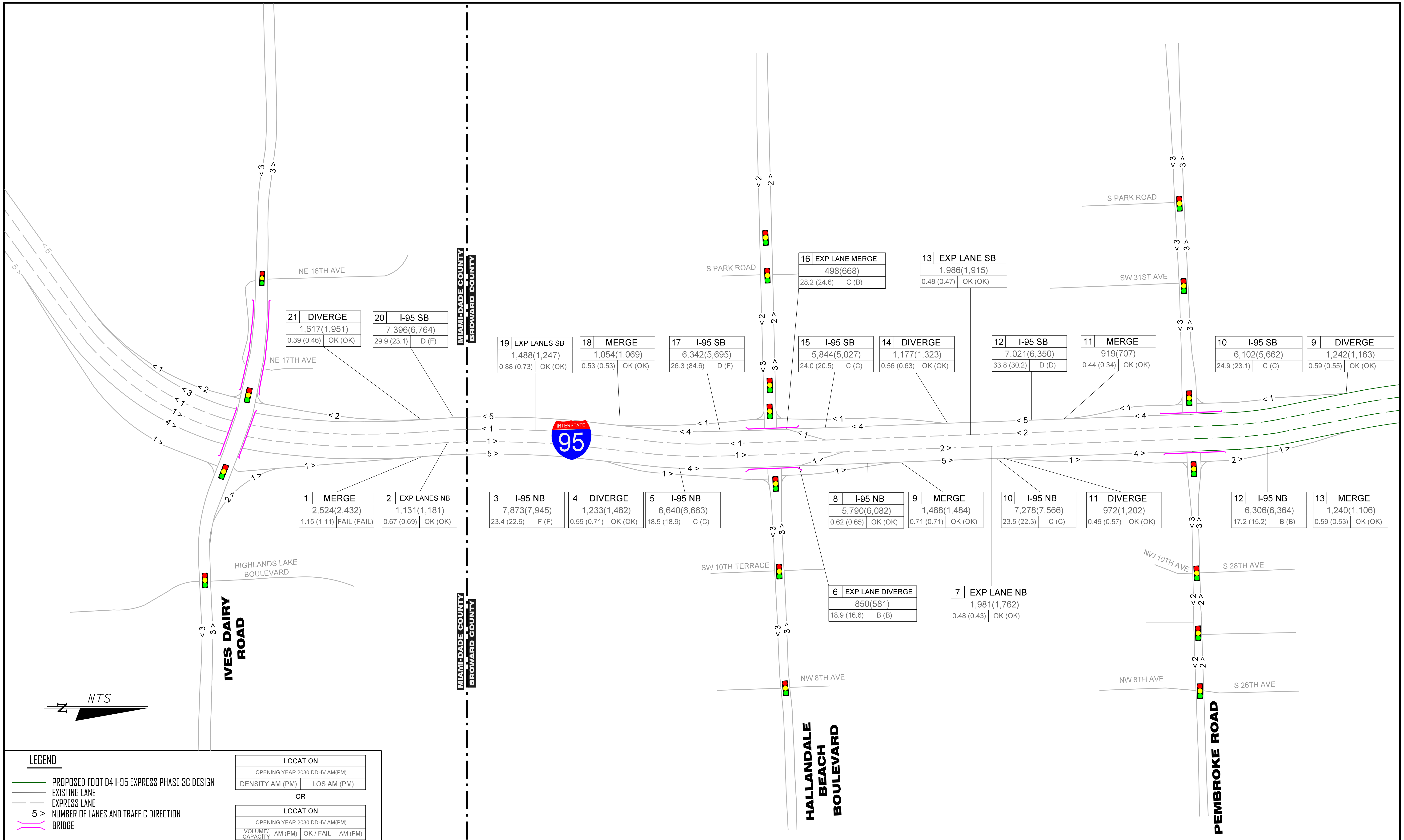
#	I-95 Northbound Segment 2030 No-Build Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/C Ratio	Ramp V/C Ratio	Density (pc/mi/ln)	LOS
22	Sheridan Street Off-Ramp	Diverge	2	1,161 (1,202)	-	0.28 (0.29)	-	-
21	Hollywood Boulevard On-Ramp to Sheridan Street Off-Ramp	Weave	5	8,410 (8,234)	0.82 (0.91)	-	21.1(21.1)	C (C)
20	Express Lane North of Hollywood Boulevard	Basic	2	1,332 (1,244)	0.32 (0.30)	-	-	-
19	Hollywood Boulevard On-Ramp	Merge	1	1,234 (1,198)	-	0.59 (0.57)	-	-
18	Express Lane Egress to Hollywood Boulevard On-Ramp	Basic	4	7,176 (7,036)	0.83 (0.73)	-	20.8(16.6)	C (B)
17	Express Lane Egress	Merge	1	649 (518)	0.83 (0.73)	0.32(0.25)	22.3(17.7)	B (B)
16	Hollywood Boulevard Off-Ramp to Express Lane Egress	Basic	4	6,527 (6,193)	0.75 (0.67)	-	18.1(14.5)	C (B)
15	Hollywood Boulevard Off-Ramp	Diverge	1	1,019 (1,277)	-	0.49(0.61)	-	-
14	Pembroke Road On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	7,546 (7,470)	0.86 (0.89)	-	24.0(20.9)	C (C)
13	Pembroke Road On-Ramp	Merge	1	1,240 (1,106)	-	0.59 (0.53)	-	-
12	Pembroke Road Off-Ramp to On-Ramp	Basic	4	6,306 (6,364)	0.71 (0.69)	-	17.2(15.2)	B (B)
11	Pembroke Road Off-Ramp	Diverge	1	972 (1,202)	-	0.46 (0.57)	-	-
10	Hallandale Beach Boulevard On-Ramp to Pembroke Road Off-Ramp	Weave	5	7,278 (7,566)	0.93 (0.98)	-	23.5(22.3)	C (C)
9	Hallandale Beach Boulevard On-Ramp	Merge	1	1,488 (1,484)	-	0.71 (0.71)	-	-
8	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	5, 790 (6,082)	0.62 (0.65)	-	-	-
7	Express Lane North of Hallandale Beach Boulevard	Basic	2	1,981 (1,762)	0.48 (0.43)	-	-	-
6	Express Lane Ingress	Diverge	1	850 (581)	0.75 (0.73)	0.41(0.28)	18.9(16.6)	B (B)
5	Hallandale Beach Blvd Off-Ramp to Express Lane Ingress	Basic	4	6,640 (6,663)	0.75 (0.73)	-	18.5(18.9)	C (C)
4	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,233 (1,482)	-	0.59 (0.71)	-	-
3	Ives Dairy Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	5	7,873 (7,945)	**1.27 (1.34)**	-	23.4 (22.6)	**F (F)**
2	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,131 (1,181)	0.67 (0.69)	-	-	-
1	Ives Dairy Road On-Ramp	Merge	1	2,524 (2,432)	-	**1.15 (1.11)**	-	-

Notes: # - segment number
Ramp volume to capacity ratios were provided for merge/diverge areas for information only.

Table 5.3 – 2030 No-Build Alternative Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2030 No-Build Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/C Ratio	Ramp V/C Ratio	Density (pc/mi/ln)	LOS
1	Sheridan Street On-Ramp	Merge	1	1,230 (1,071)	-	0.59 (0.51)	-	-
2	Sheridan Street On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	8,199 (7,911)	0.93 (0.93)	-	38.8 (38.6)	**E (E)**
3	Express Lane North of Hollywood 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 Express Lane Egress	Basic	4	6,861 (6,473)	0.77 (0.73)	-	28.7 (27.0)	D (D)
6	Express Lane Ingress	Diverge	1	586 (839)	0.77 (0.73)	0.28 (0.41)	28.3 (27.1)	D (D)
7	Hollywood Boulevard On-Ramp	Merge	1	1,069 (1,172)	-	0.51 (0.56)	-	-
8	Hollywood Boulevard On-Ramp to Pembroke Road Off-Ramp	Weave	5	7,344 (6,806)	0.86 (0.88)	-	34.7 (32.3)	D (D)
9	Pembroke Road Off-Ramp	Diverge	1	1,242 (1,163)	-	0.59 (0.55)	-	-
10	Pembroke Road On-Ramp to Off-Ramp	Basic	4	6,102 (5,662)	0.68 (0.64)	-	24.9 (23.1)	C (C)
11	Pembroke Road On-Ramp	Merge	1	919 (707)	-	0.44 (0.34)	-	-
12	Pembroke Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	5	7,021 (6,350)	0.76 (0.77)	-	33.8 (30.2)	D (D)
13	Express Lane North of Hallandale Beach Boulevard	Basic	2	1,986 (1,915)	0.48 (0.47)	-	-	-
14	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,177 (1,323)	-	0.56 (0.63)	-	-
15	Hallandale Beach Blvd Off-Ramp to Express Lane Ingress	Basic	4	5,844 (5,027)	0.66 (0.57)	-	24.0 (20.5)	C (C)
16	Express Lane Ingress	Merge	1	498 (668)	0.72 (0.64)	0.24 (0.32)	28.2 (24.6)	C (B)
17	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	6,342 (5,695)	0.72 (0.64)	-	26.3 (84.6)	D **(F)**
18	Hallandale Beach Boulevard On-Ramp	Merge	1	1,054 (1,069)	-	0.53 (0.53)	-	-
19	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,488 (1,247)	0.88 (0.73)	-	-	-
20	Hallandale Beach Boulevard On-Ramp to Ives Dairy Road Off-Ramp	Weave	5	7,396 (6,764)	**0.94 (1.02)**	-	29.9 (23.1)	D **(F)**
21	Ives Dairy Road Off-Ramp	Diverge	2	1,617 (1,951)	-	0.39 (0.46)	-	-

Notes: # - segment number
Ramp volume to capacity ratios were provided for merge/diverge areas for information only.



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2030 OPENING YEAR NO-BUILD ALTERNATIVE OPERATIONAL ANALYSIS RESULTS

FIGURE 5.14

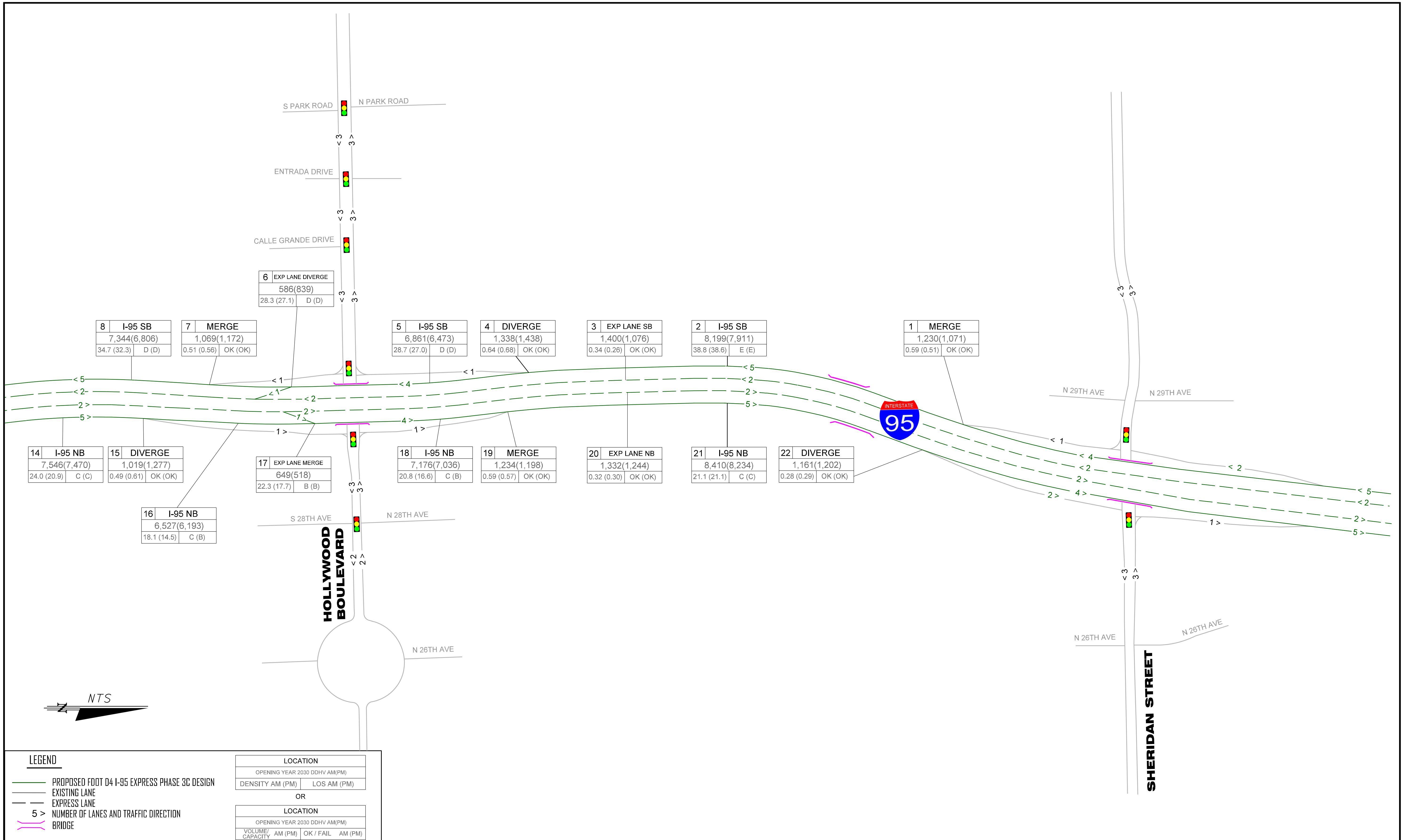

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FIGURE 5.14

5.4.2 Crossing Roadways Operational Analysis

Tables 5.4 – 5.6 and ***Figure 5.15*** document the intersections operational analysis results by crossing roadway. Synchro output reports are provided in ***Appendix J***.

As shown in ***Table 5.4***, the 2030 No-Build Alternative intersection operational results indicate all four intersections will operate at a LOS D or better.

As shown in ***Table 5.5***, the 2030 No-Build Alternative intersection operational results indicate all five intersections will operate at a LOS D or better.

As shown in ***Table 5.6***, 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 5.4 – 2030 Hallandale Beach Boulevard Intersection LOS and Delay Results

Hallandale Beach Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBL	11.3	B	22.7	C
	EBT	13.5	B	13.1	B
	WBL	6.3	A	4.8	A
	WBT	6.6	A	9.3	A
	WBR	1.8	A	1.2	A
	NBT	77.8	E	90.7	F
	SBL	75.2	E	82.5	F
	SBT	75.5	E	81.8	F
	SBR	55.3	E	59.3	E
	Int	**14.6**	**B**	**16.0**	**B**
I-95 West Ramp Terminal*	EBT	35.0	D	38.3	D
	EBR	14.5	B	23.7	C
	WBL	84.1	F	68.6	E
	WBT	11.4	B	30.1	C
	SBL	65.9	E	53.4	D
	SBR	53.0	D	93.2	F
	Int	**43.8**	**D**	**46.2**	**D**
I-95 East Ramp Terminal*	EBL	45.8	D	53.1	D
	EBT	31.9	C	41.3	D
	WBT	32.5	C	26.2	C
	WBR	54.1	D	56.9	E
	NBL	41.1	D	43.9	D
	NBR	87.1	F	83.8	F
	Int	**44.9**	**D**	**46.5**	**D**
NW 10th Terrace	EBL	29.6	C	69.0	E
	EBT	19.6	B	29.5	C
	EBR	21.2	C	32.1	C
	WBL	19.4	B	31.3	C
	WBT	20.2	C	38.4	D
	WBR	11.0	B	18.3	B
	NBL	68.7	E	90.8	F
	NBR	49.4	D	48.1	D
	SBL	53.6	D	57.2	E
	SBR	48.6	D	47.9	D
	Int	**23.4**	**C**	**35.8**	**D**

*HCM 2000 results reported

Table 5.5 – 2030 Pembroke Road Intersection LOS and Delay Results

Pembroke Road Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBT	19.2	B	15.5	B
	WBL	69.0	E	40.8	D
	WBT	4.1	A	1.7	A
	NBL	59.5	E	61.8	E
	NBR	46.3	D	43.6	D
	Int	**17.7**	**B**	**12.5**	**B**
SW 31st Avenue*	EBT	0.5	A	0.4	A
	WBL	68.6	E	66.9	E
	WBT	0.2	A	0.2	A
	NBR	54.8	D	56.4	E
	Int	**2.0**	**A**	**1.8**	**A**
I-95 West Ramp Terminal*	EBT	16.7	B	21.6	C
	EBR	24.9	C	11.1	B
	WBL	49.6	D	45.3	D
	WBT	14.9	B	19.2	B
	SBL	36.3	D	32.2	C
	SBR	49.7	D	45.6	D
	Int	**26.6**	**C**	**25.5**	**C**
I-95 East Ramp Terminal*	EBL	30.4	C	38.0	D
	EBT	9.5	A	14.5	B
	WBT	21.4	C	20.3	B
	WBR	7.9	A	9.5	A
	NBL	48.4	D	43.5	D
	NBR	54.4	D	47.7	D
	Int	**23.3**	**C**	**25.8**	**C**
NW 10th Avenue / South 28th Avenue	EBL	31.7	C	39.5	D
	EBT	22.2	C	29.0	C
	EBR	22.1	C	18.3	B
	WBL	34.2	C	45.0	D
	WBT	33.9	C	43.9	D
	WBR	20.8	C	23.5	C
	NBL	70.8	E	55.1	E
	NBR	31.9	C	30.4	C
	SBL	40.4	D	44.4	D
	SBR	160.1	F	255.6	F
	Int	**40.5**	**D**	**51.4**	**D**

*HCM 2000 results reported

Table 5.6 – 2030 Hollywood Boulevard Intersection LOS and Delay Results

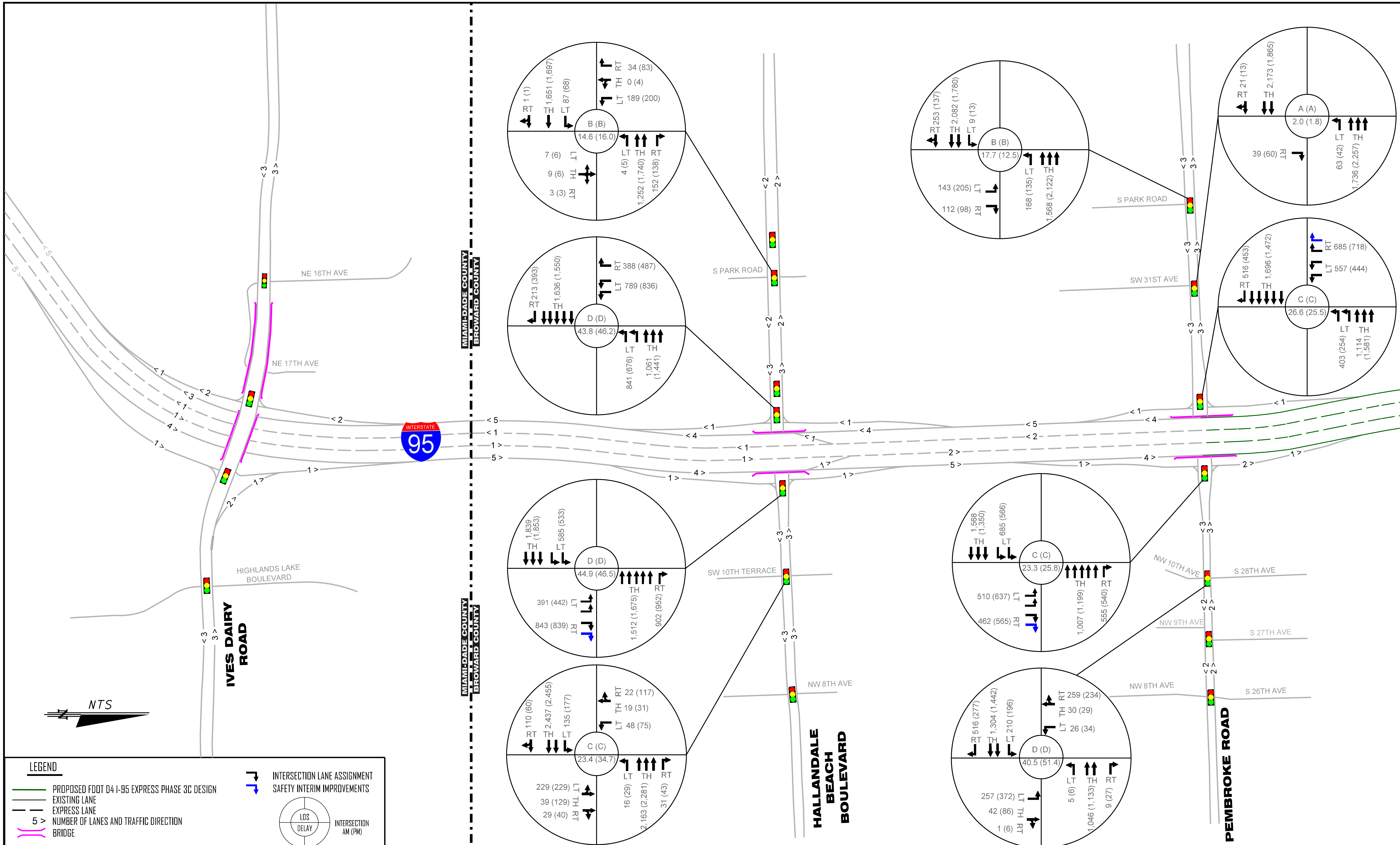
Hollywood Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Entranda Drive	EBL	4.9	A	10.9	B
	EBT	7.9	A	17.0	B
	EBR	8.4	A	17.7	B
	WBL	5.9	A	13.1	B
	WBT	1.2	A	1.5	A
	WBR	1.7	A	2.8	A
	NBL	62.0	E	54.2	D
	NBR	58.4	E	46.7	D
	SBL	70.4	E	76.0	E
	SBR	60.1	E	49.8	D
	Int	**7.6**	**A**	**13.7**	**B**
Calle Grande Drive*	EBU	88.2	F	72.7	E
	EBT	0.6	A	1.1	A
	WBL	91.6	F	77.2	E
	WBT	0.9	A	0.4	A
	NBR	0.6	A	0.7	A
	Int	**1.4**	**A**	**1.2**	**A**
I-95 West Ramp Terminal*	EBT	28.6	C	27.0	C
	EBR	26.1	C	68.8	E
	WBL	56.1	E	81.4	F
	WBT	12.9	B	21.2	C
	SBL	53.1	D	50.7	D
	SBR	51.9	D	82.8	F
	Int	**34.6**	**C**	**48.2**	**D**
I-95 East Ramp Terminal*	EBL	52.5	D	58.0	E
	EBT	12.0	B	17.0	B
	WBT	19.2	B	24.9	C
	WBR	28.7	C	26.6	C
	NBL	59.8	E	55.7	E
	NBR	58.9	E	78.4	E
	Int	**31.3**	**C**	**37.0**	**D**

*HCM 2000 results reported

Table 5.6 – 2030 Hollywood Boulevard Intersection LOS and Delay Results (Continued)

Hollywood Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
28th Avenue*	EBL	35.1	D	44.0	D
	EBT	42.8	D	71.4	E
	EBR	36.1	D	16.7	B
	WBL	47.2	D	42.5	D
	WBT	48.6	D	45.3	D
	NBL	107.7	F	153.9	F
	NBT	99.9	F	154.9	F
	SBL	177.4	F	209.7	F
	SBT	52.4	D	58.1	E
	SBR	63.8	E	147.2	F
	Int	**55.0**	**E**	**76.8**	**E**

*HCM 2000 results reported



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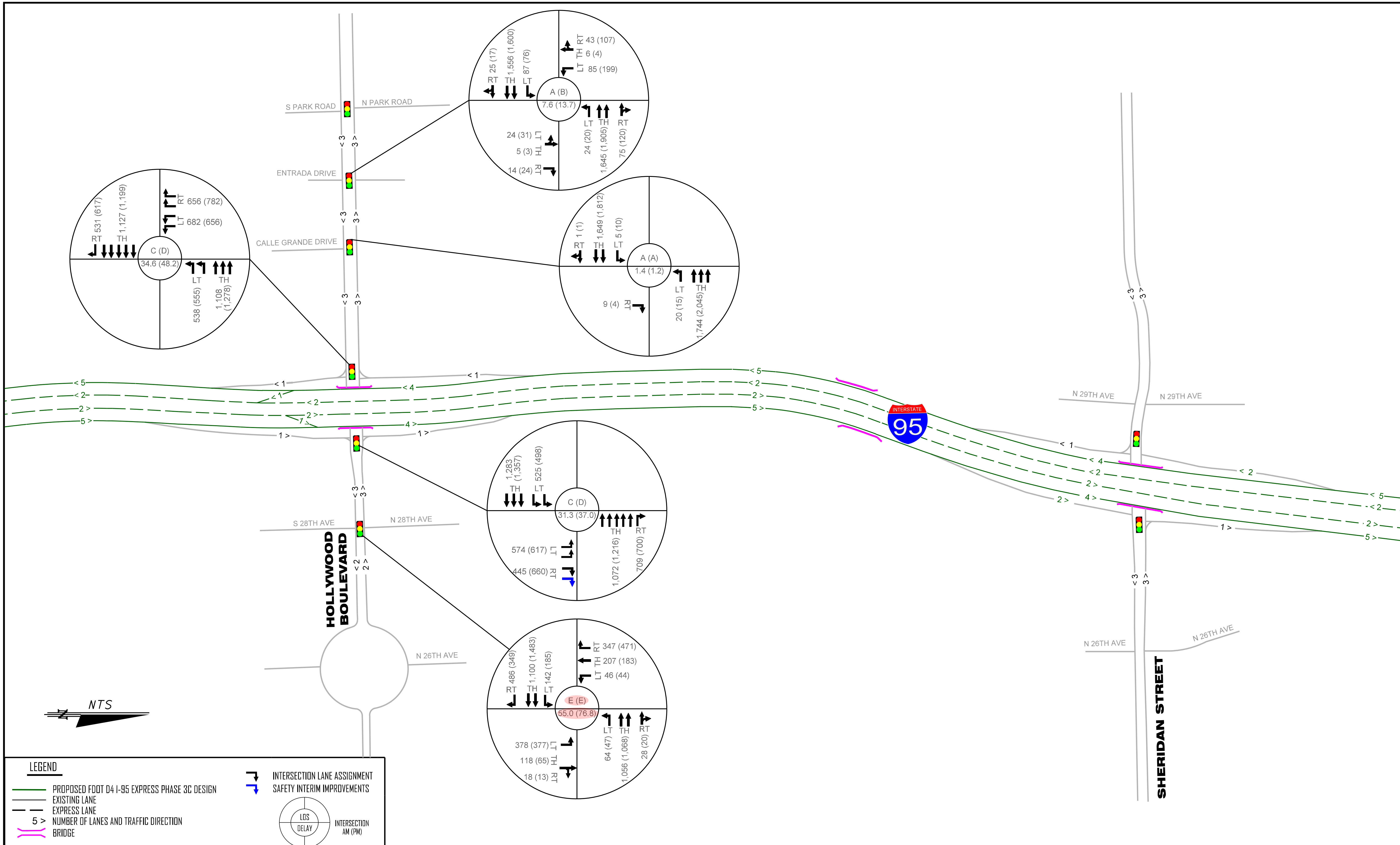
2030 OPENING YEAR NO-BUILD ALTERNATIVE INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE 5.15



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JANUARY 2021

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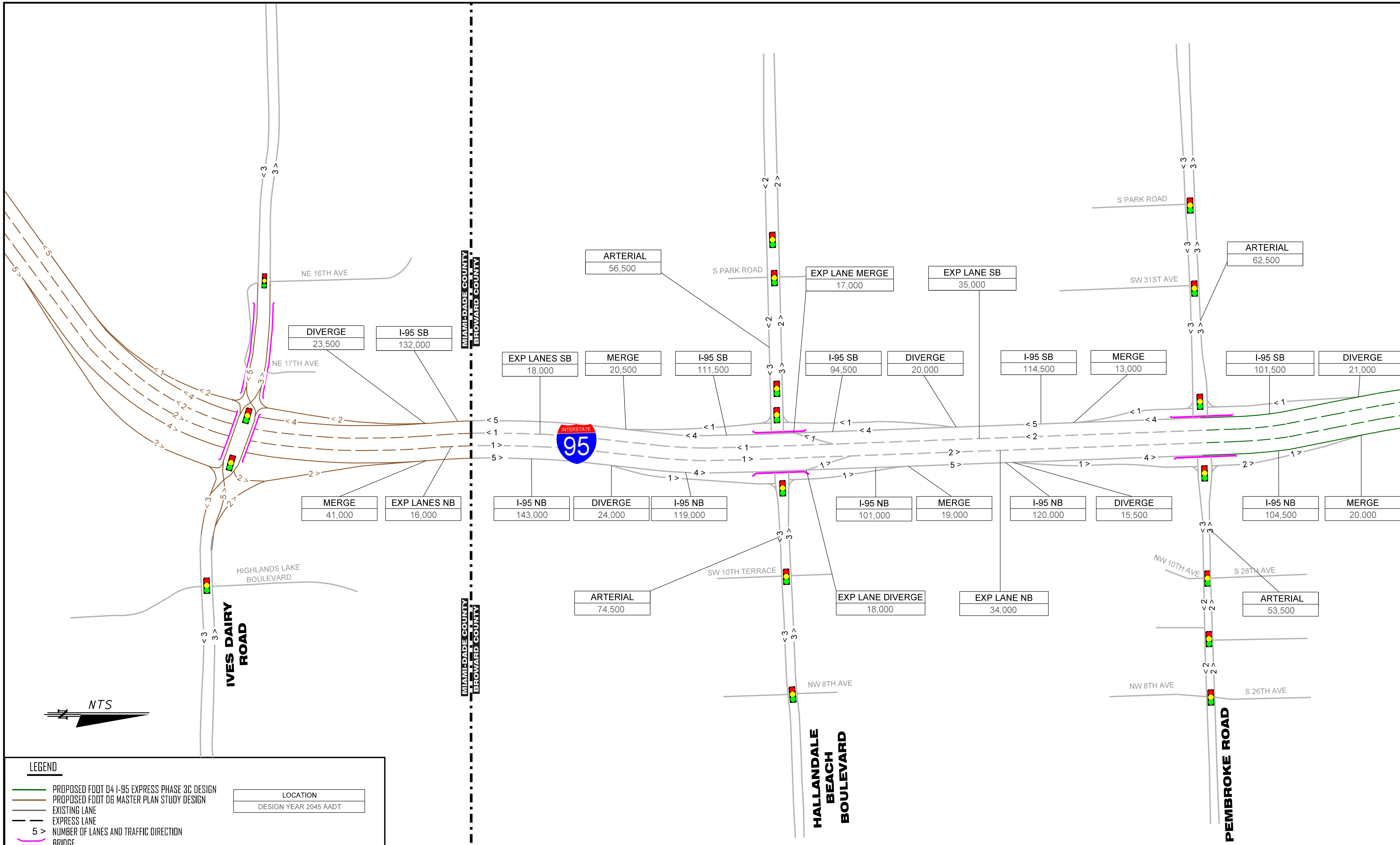
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

2030 OPENING YEAR NO-BUILD ALTERNATIVE INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE 5.15

5.5 No-Build Alternative – 2045 Traffic Forecast

A 2045 design year traffic operational analysis was performed for the AM and PM peak hours. Design year 2045 traffic data was obtained from the *Design Traffic Technical Memorandum*, dated December 2020. ***Figure 5.16*** shows the No-Build Alternative 2045 AADT volumes for the study area. ***Figure 5.17*** shows the No-Build Alternative 2045 DDHV for the study area. ***Figure 5.18*** shows the No-Build Alternative 2045 turning movement volumes for the study area.



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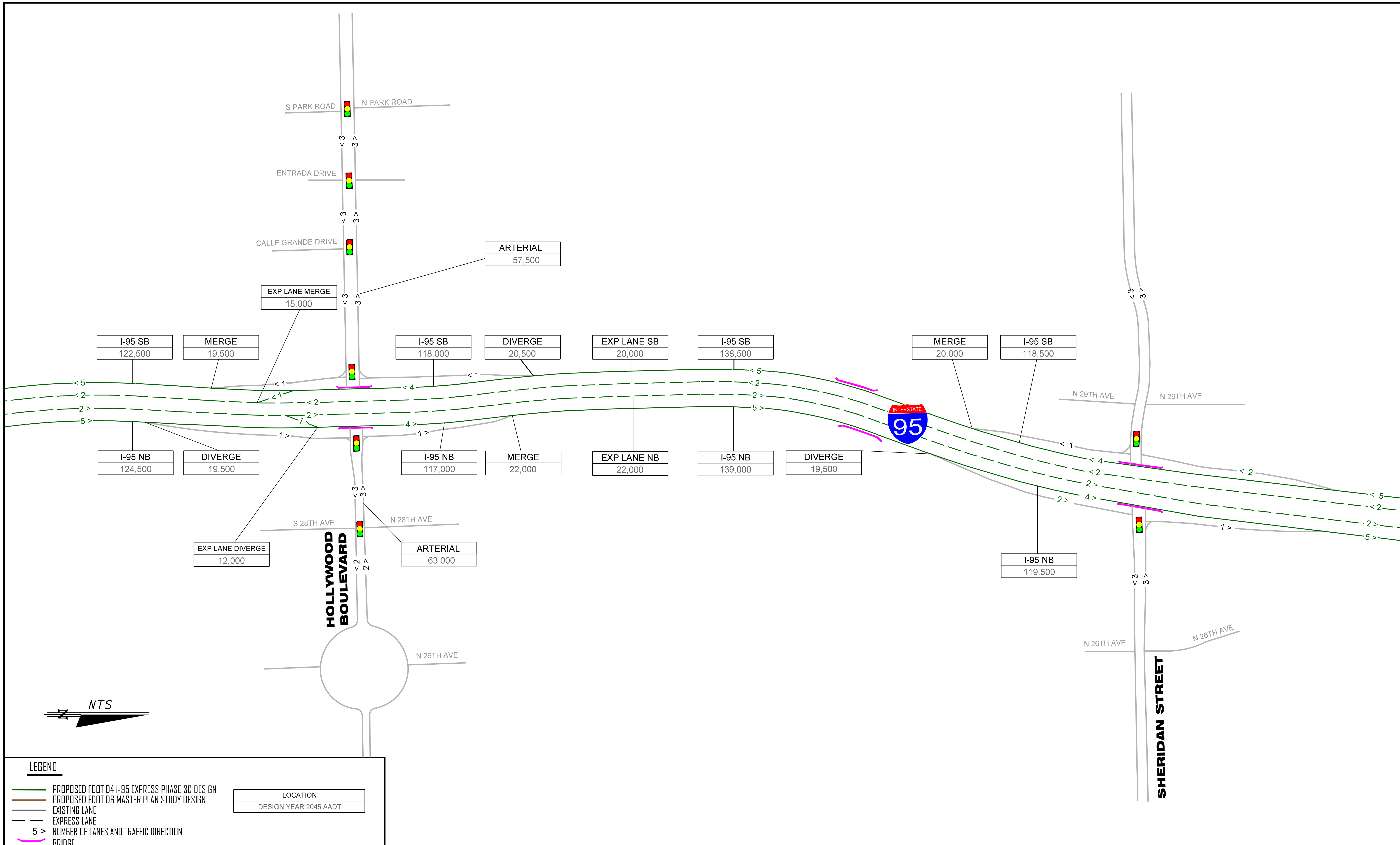
ANNUAL AVERAGE DAILY TRAFFIC (AADT)
2045 DESIGN YEAR NO-BUILD ALTERNATIVE

FIGURE 5.16



FDOT

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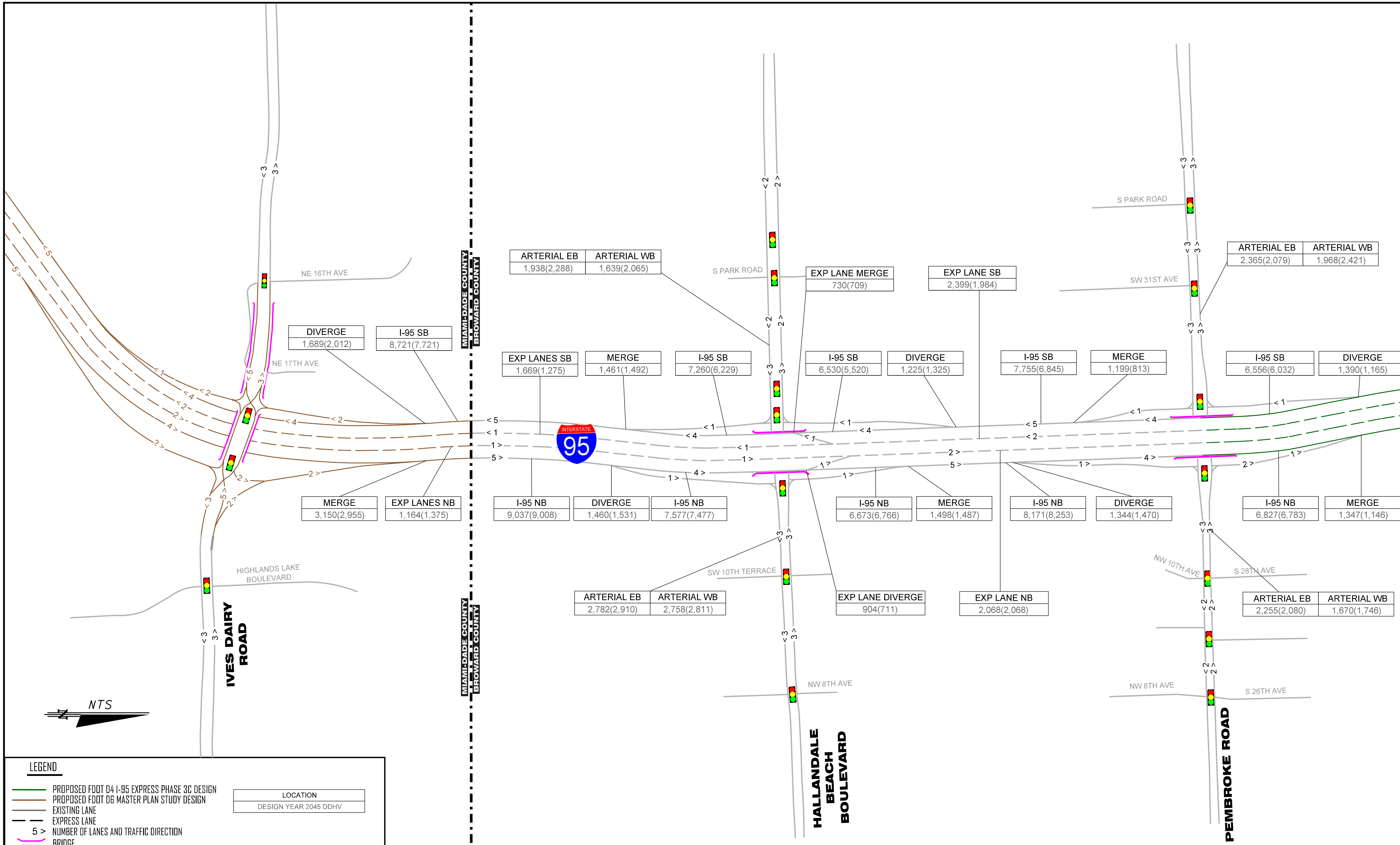
ANNUAL AVERAGE DAILY TRAFFIC (AADT)
2045 DESIGN YEAR NO-BUILD ALTERNATIVE

FIGURE 5.16



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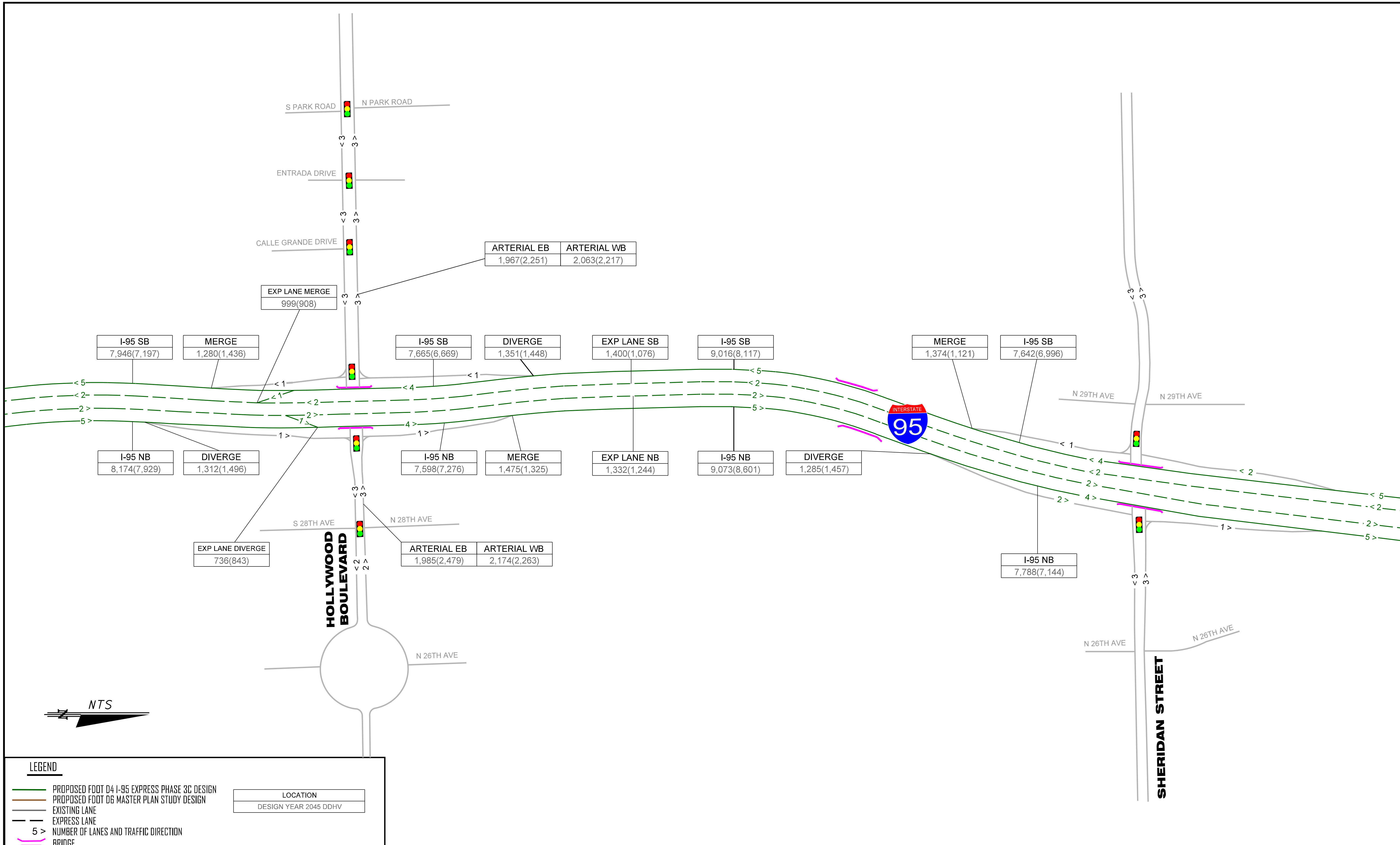
DIRECTIONAL DESIGN HOURLY VOLUMES (DDHV) 2045 DESIGN YEAR NO-BUILD ALTERNATIVE

FIGURE 5.17



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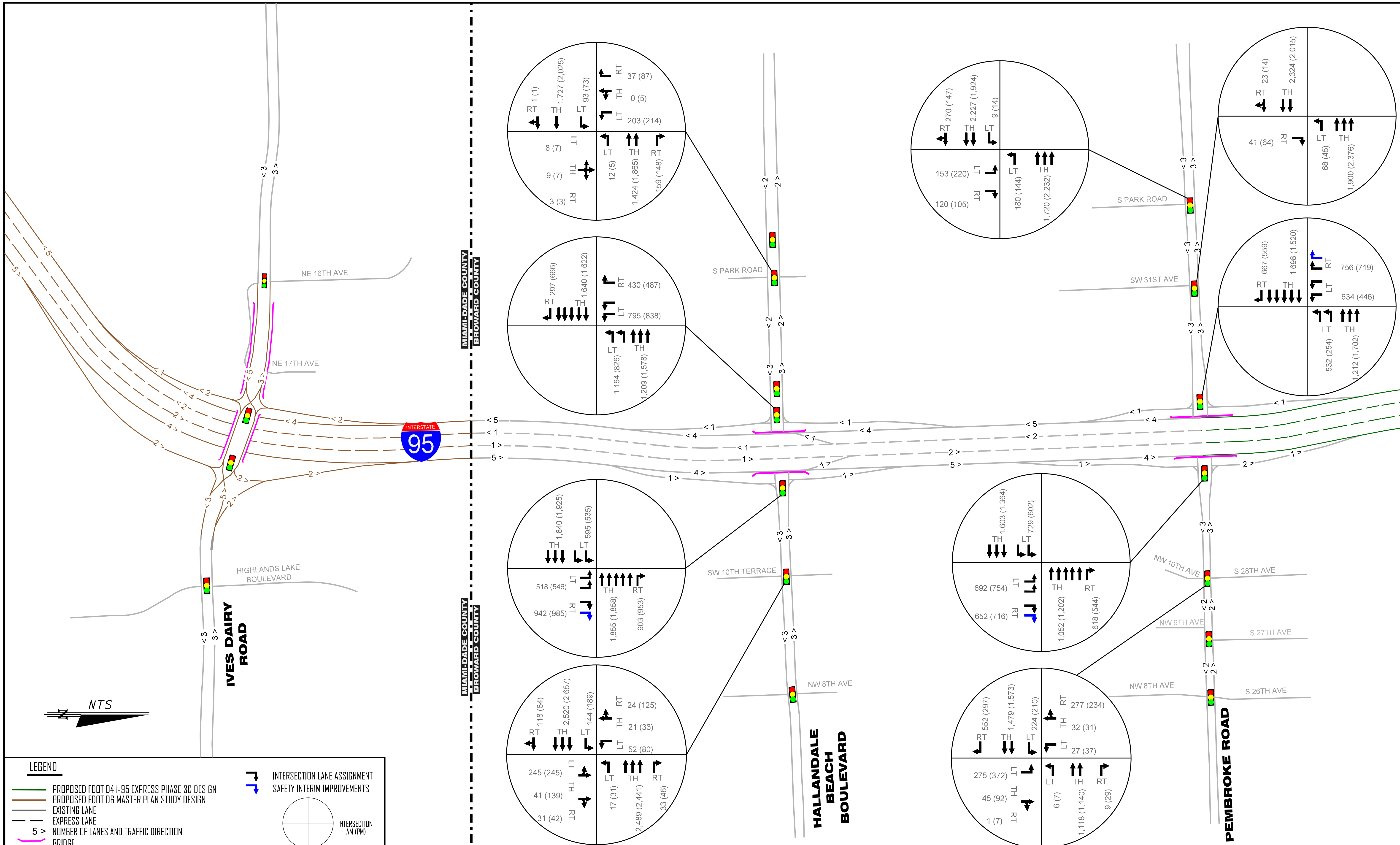
DIRECTIONAL DESIGN HOURLY VOLUMES (DDHV) 2045 DESIGN YEAR NO-BUILD ALTERNATIVE

FIGURE 5.17



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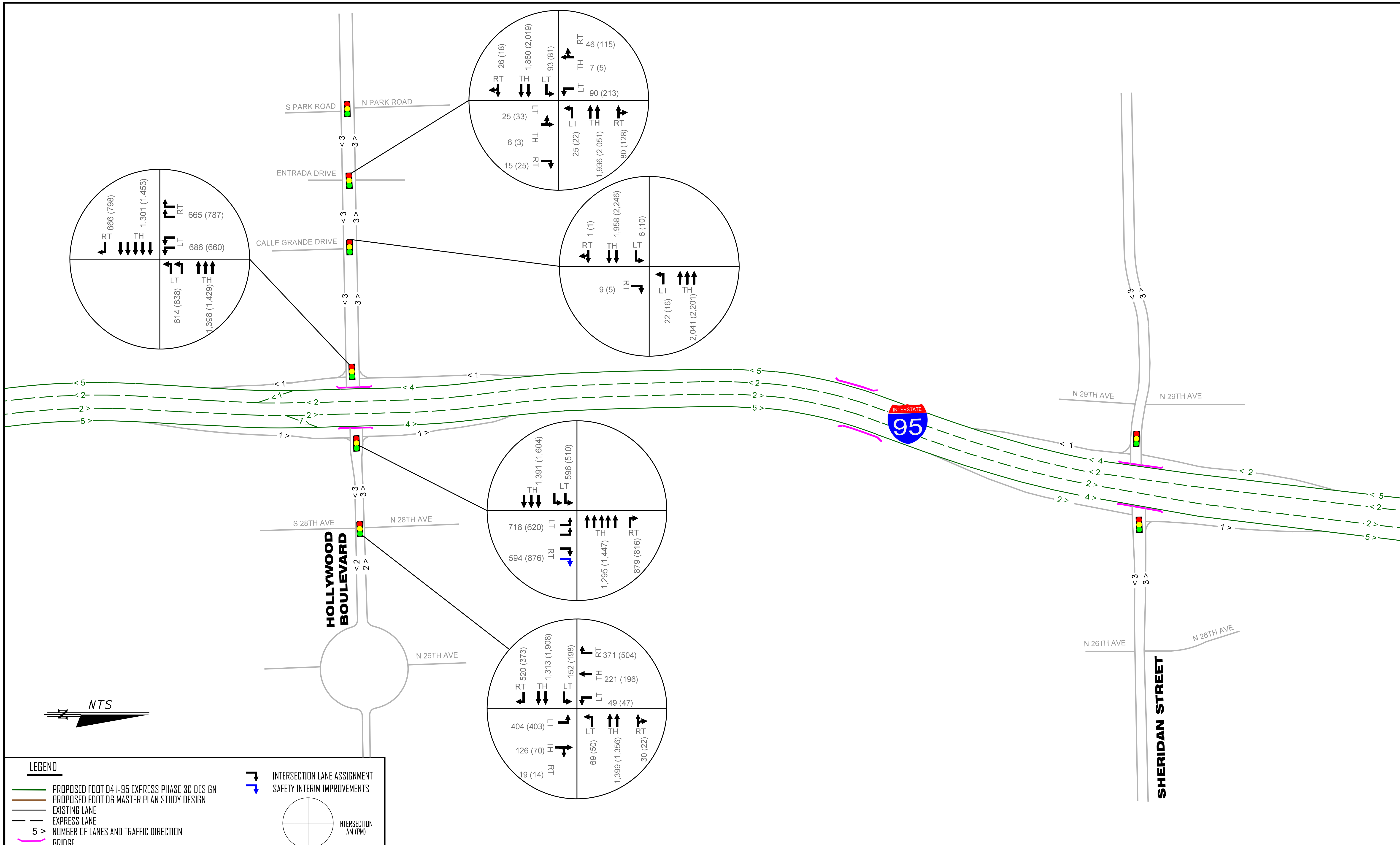
INTERSECTION TURNING MOVEMENT VOLUMES 2045 DESIGN YEAR NO-BUILD ALTERNATIVE

FIGURE 5.18



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INTERSECTION TURNING MOVEMENT VOLUMES
2045 DESIGN YEAR NO-BUILD ALTERNATIVE

FIGURE 5.18

5.6 No-Build Alternative – 2045 Operational Analysis

5.6.1 I-95 Mainline Operational Analysis

Density, volume/capacity ratio, and LOS of each freeway facility were used as MOEs, which is consistent with the existing conditions analysis. The No-Build Alternative 2045 mainline/basic, weaving, and ramp merge/diverge analysis results are summarized in ***Tables 5.7 – 5.8***. The analysis results are also schematically summarized in ***Figure 5.19***. Output HCS reports are included as ***Appendix K***.

Findings – The capacity analysis shows that four locations northbound and seven locations southbound will operate at an unacceptable LOS (worst peak period LOS) by the year 2045 within the area of influence.

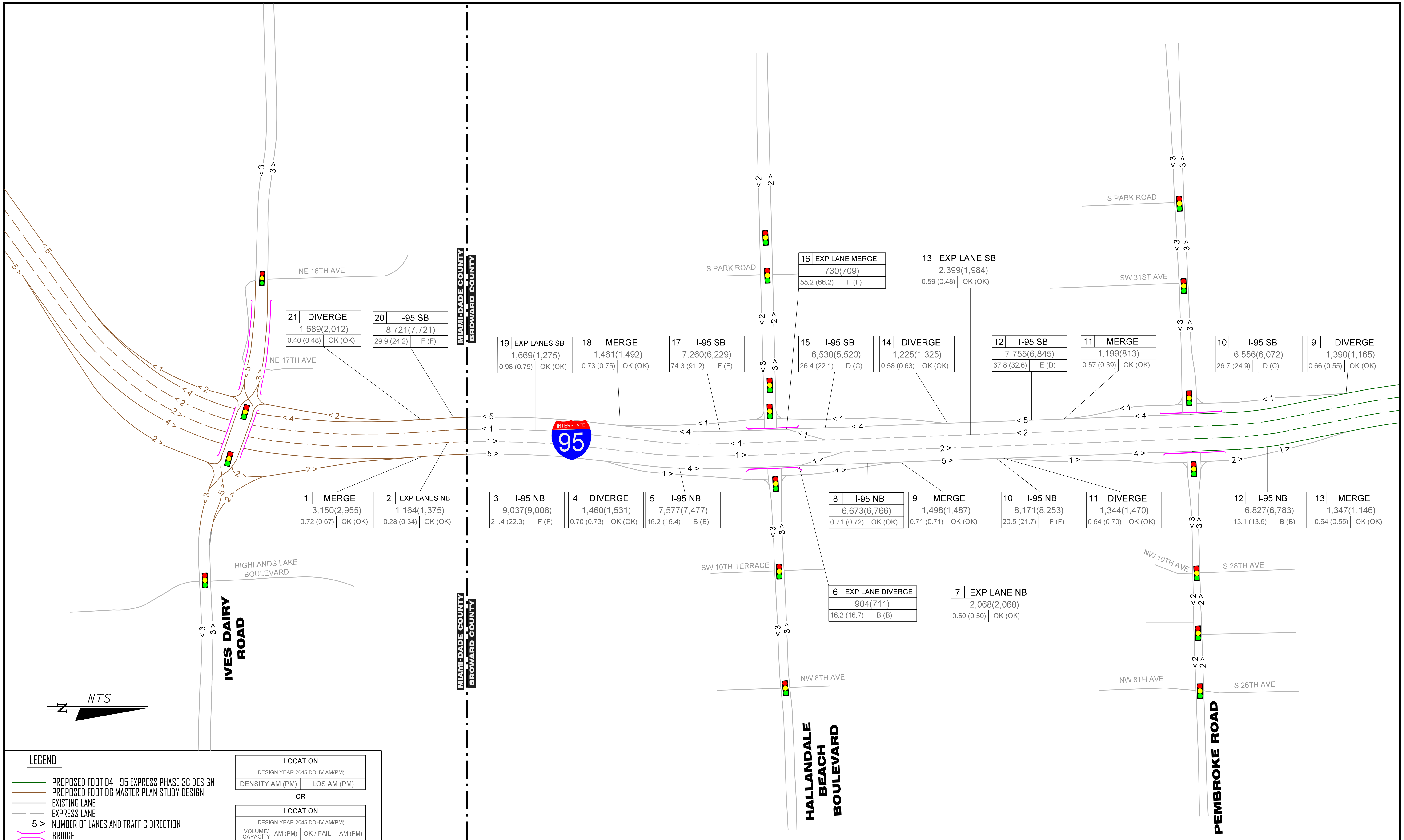
Table 5.7 – 2045 No-Build Alternative Northbound Freeway Analysis Results

#	I-95 Northbound Segment 2045 No-Build Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/c Ratio AM(PM)	Ramp V/c Ratio AM(PM)	Density (pc/mi/ln)	LOS
22	Sheridan Street Off-Ramp	Diverge	2	1,285 (1,457)	-	0.28 (0.35)	-	-
21	Hollywood Boulevard On-Ramp to Sheridan Street Off-Ramp	Weave	5	9,073 (8,601)	**1.04 (1.06)**	-	22.8 (20.7)	**F (F)**
20	Express Lane North of Hollywood Boulevard	Basic	2	1,332 (1,244)	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 Boulevard On-Ramp	Basic	4	7,598 (7,276)	0.88 (0.81)	-	16.3 (15.6)	B (B)
17	Express Lane Egress	Merge	1	736 (843)	0.88 (0.81)	0.36 (0.40)	17.3 (16.5)	B (B)
16	Hollywood Boulevard Off-Ramp to Express Lane Egress	Basic	4	6,862 (6,433)	0.79 (0.72)	-	13.3 (12.2)	B (B)
15	Hollywood Boulevard Off-Ramp	Diverge	1	1,312 (1,496)	-	0.62 (0.71)	-	-
14	Pembroke Road On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	8,174 (7,929)	**1.02 (1.00)**	-	19.8 (19.1)	**F** (B)
13	Pembroke Road On-Ramp	Merge	1	1,347 (1,146)	-	0.64 (0.55)	-	-
12	Pembroke Road Off-Ramp to On-Ramp	Basic	4	6,827 (6,783)	0.76 (0.76)	-	13.1 (13.6)	B (B)
11	Pembroke Road Off-Ramp	Diverge	1	1,344 (1,470)	-	0.64 (0.70)	-	-
10	Hallandale Beach Boulevard On-Ramp to Pembroke Road Off-Ramp	Weave	5	8,171 (8,253)	**1.10 (1.10)**	-	20.5 (21.7)	**F (F)**
9	Hallandale Beach Boulevard On-Ramp	Merge	1	1,498 (1,487)	-	0.71 (0.71)	-	-
8	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	6,673 (6,766)	0.71 (0.72)	-	-	-
7	Express Lane North of Hallandale Beach Boulevard	Basic	2	2,068 (2,068)	0.50 (0.50)	-	-	-
6	Express Lane Ingress	Diverge	1	904 (711)	0.86 (0.84)	0.44(0.34)	16.6 (16.7)	B (B)
5	Hallandale Beach Blvd Off-Ramp to Express Lane Ingress	Basic	4	7,577 (7,477)	0.86 (0.84)	-	16.2 (16.4)	B (B)
4	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,460 (1,531)	-	0.70 (0.73)	-	-
3	Ives Dairy Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	5	9,037 (9,008)	**1.55 (1.51)**	-	21.4 (22.3)	**F (F)**
2	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,164 (1,375)	0.28 (0.34)	-	-	-
1	Ives Dairy Road On-Ramp	Merge	2	3,150 (2,955)	-	0.72 (0.67)	-	-

Notes: # - segment number
Ramp volume to capacity ratios were provided for merge/diverge areas for information only.

Table 5.8 – 2045 No-Build Alternative Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2045 No-Build Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/c Ratio AM(PM)	Ramp V/c Ratio AM(PM)	Density (pc/mi/ln)	LOS
1	Sheridan Street On-Ramp	Merge	1	1,374 (1,121)	-	0.65 (0.53)	-	-
2	Sheridan Street On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	9,016 (8,117)	0.97 (0.95)	-	44.8 (40.0)	**F (E)**
3	Express Lane North of Hollywood 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 Express Lane Ingress	Basic	4	7,665 (6,669)	0.86 (0.75)	-	33.2 (28.1)	D (D)
6	Express Lane Ingress	Diverge	1	999 (908)	0.86 (0.75)	0.48 (0.44)	31.7 (28.1)	**E** (D)
7	Hollywood Boulevard On-Ramp	Merge	1	1,280 (1,436)	-	0.61 (0.68)	-	-
8	Hollywood Boulevard On-Ramp to Pembroke Road Off-Ramp	Weave	5	7,946 (7,197)	0.99 (0.96)	-	38.9 (35.4)	**E (E)**
9	Pembroke Road Off-Ramp	Diverge	1	1,390 (1,165)	-	0.66 (0.55)	-	-
10	Pembroke Road On-Ramp to Off-Ramp	Basic	4	6,556 (6,032)	0.73 (0.68)	-	26.7 (24.9)	D (C)
11	Pembroke Road On-Ramp	Merge	1	1,199 (813)	-	0.57 (0.39)	-	-
12	Pembroke Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	5	7,755 (6,845)	0.86 (0.80)	-	37.8 (32.6)	**E** (D)
13	Express Lane North of Hallandale Beach Boulevard	Basic	2	2,399 (1,984)	0.59 (0.48)	-	-	-
14	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,225 (1,325)	-	0.58 (0.63)	-	-
15	Hallandale Beach Blvd Off-Ramp to Express Lane Ingress	Basic	4	6,530 (5,520)	0.74 (0.62)	-	26.4 (22.1)	D (C)
16	Express Lane Ingress	Merge	1	730 (709)	0.82 (0.70)	0.35 (0.34)	55.2 (66.2)	**F (F)**
17	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	7,260 (6,229)	0.82 (0.70)	-	74.3 (91.2)	**F (F)**
18	Hallandale Beach Boulevard On-Ramp	Merge	1	1,461 (1,492)	-	0.73 (0.75)	-	-
19	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,669 (1,275)	0.98 (0.75)	-	-	-
20	Hallandale Beach Boulevard On-Ramp to Ives Dairy Road Off-Ramp	Weave	5	8,721 (7,721)	**1.06 (1.11)**	-	29.9 (24.2)	**F (F)**
21	Ives Dairy Road Off-Ramp	Diverge	2	1,689 (2,012)	-	0.40 (0.48)	-	-



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2045 DESIGN YEAR NO-BUILD ALTERNATIVE OPERATIONAL ANALYSIS RESULTS

FIGURE 5.19

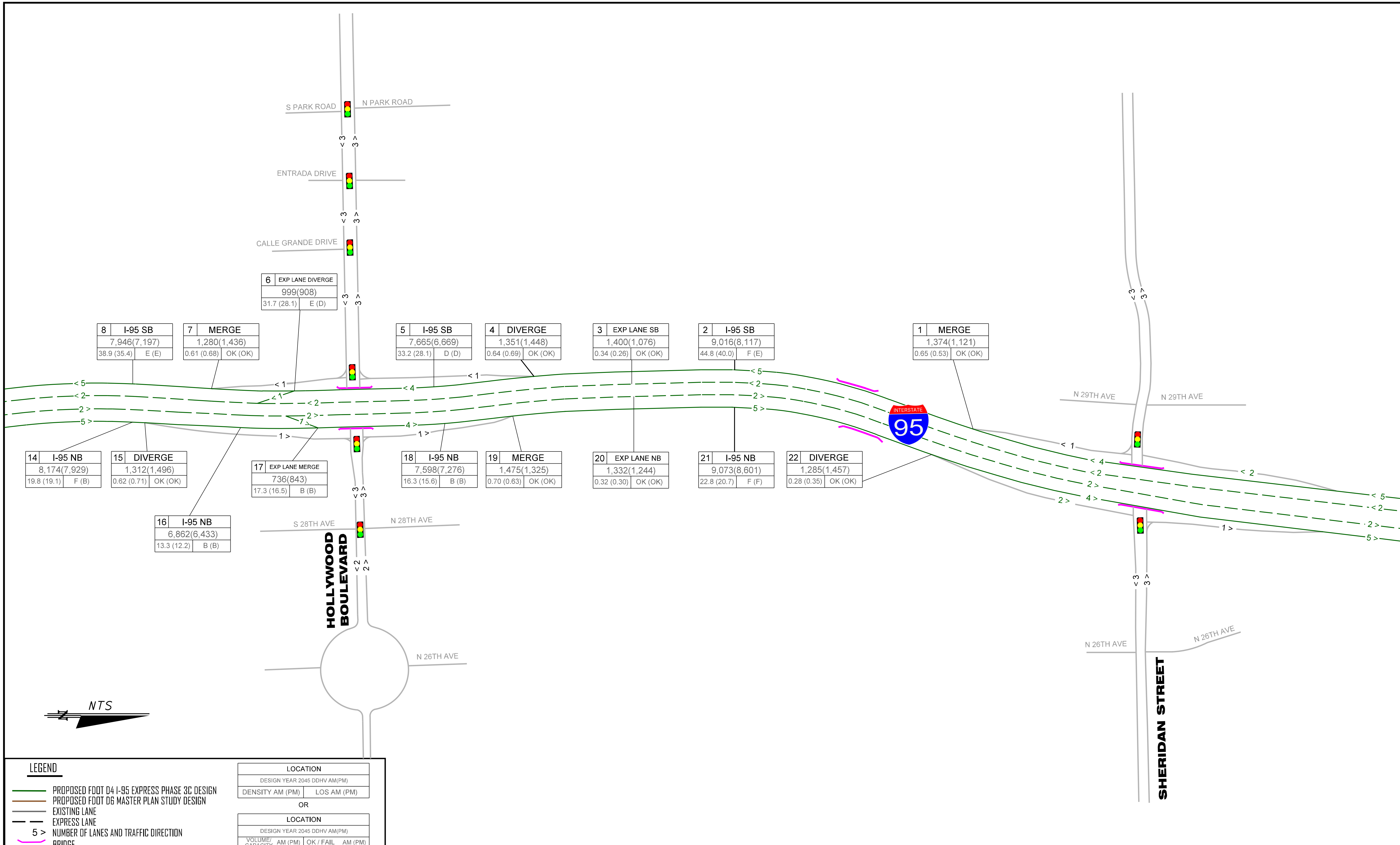

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FIGURE 5.19

5.6.2 Crossing Roadways Operational Analysis

Tables 5.9 – 5.11 and ***Figure 5.20*** document the intersections operational analysis results by crossing roadway. Synchro output reports are provided in ***Appendix L***.

As shown in ***Table 5.9***, 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.

As shown in ***Table 5.10***, the 2045 No-Build Alternative intersection operational results indicate all five intersections will operate at a LOS D or better.

As shown in ***Table 5.11***, the 2045 No-Build Alternative operational results indicate three intersections will operate at a LOS D or better, one intersection will operate at a LOS E, and one at a LOS F.

Table 5.9 – 2045 Hallandale Beach Boulevard Intersection LOS and Delay Results

Hallandale Beach Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBL	14.2	B	33.3	C
	EBT	13.8	B	17.5	B
	WBL	6.3	A	6.0	A
	WBT	6.6	A	10.2	B
	WBR	1.2	A	1.0	A
	NBT	97.6	F	94.5	F
	SBL	93.0	F	98.1	F
	SBT	93.0	F	97.2	F
	SBR	67.1	E	67.3	E
	Int	**15.8**	**B**	**19.3**	**B**
I-95 West Ramp Terminal*	EBT	44.9	D	34.9	C
	EBR	31.2	C	29.4	C
	WBL	129.2	F	135.1	F
	WBT	9.4	A	28.1	C
	SBL	123.6	F	78.2	E
	SBR	105.7	F	163.3	F
	Int	**70.2**	**E**	**62.7**	**E**
I-95 East Ramp Terminal*	EBL	68.8	E	57.1	E
	EBT	41.9	D	44.6	D
	WBT	30.6	C	34.3	C
	WBR	40.9	D	68.9	E
	NBL	51.0	D	50.7	D
	NBR	131.3	F	142.4	F
	Int	**54.4**	**D**	**60.8**	**E**
NW 10th Terrace	EBL	66.3	E	92.5	F
	EBT	22.6	C	33.3	C
	EBR	24.4	C	36.5	D
	WBL	24.1	C	41.0	D
	WBT	28.3	C	47.3	D
	WBR	13.4	B	20.1	C
	NBL	84.8	F	133.0	F
	NBR	57.6	E	54.8	D
	SBL	63.0	E	66.0	E
	SBR	56.8	E	54.6	D
	Int	**30.2**	**C**	**46.8**	**D**

*HCM 2000 results reported

Table 5.10 – 2045 Pembroke Road Intersection LOS and Delay Results

Pembroke Road Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBT	21.7	C	17.4	B
	WBL	96.4	F	55.2	E
	WBT	0.4	A	2.1	A
	NBL	82.2	F	63.4	E
	NBR	58.6	E	42.9	D
	Int	**19.6**	**B**	**14.1**	**B**
SW 31st Avenue*	EBT	0.6	A	0.4	A
	WBL	81.3	F	67.0	E
	WBT	0.2	A	0.2	A
	NBR	67.9	E	57.6	E
	Int	**2.3**	**A**	**1.8**	**A**
I-95 West Ramp Terminal*	EBT	26.2	C	20.2	C
	EBR	13.7	B	9.6	A
	WBL	75.4	E	44.2	D
	WBT	16.4	B	15.4	B
	SBL	46.2	D	35.3	D
	SBR	68.9	E	60.2	E
	Int	**35.4**	**D**	**25.5**	**C**
I-95 East Ramp Terminal*	EBL	54.1	D	41.8	D
	EBT	17.5	B	16.3	B
	WBT	22.6	C	20.9	C
	WBR	9.1	A	4.8	A
	NBL	59.0	E	42.2	D
	NBR	77.8	E	54.5	D
	Int	**35.3**	**D**	**28.2**	**C**
NW 10th Avenue / South 28th Avenue	EBL	43.7	D	47.6	D
	EBT	30.3	C	34.1	C
	EBR	27.7	C	18.8	B
	WBL	51.3	D	53.1	D
	WBT	41.3	D	47.4	D
	WBR	24.8	C	24.2	C
	NBL	69.3	E	55.1	E
	NBR	37.1	D	30.7	C
	SBL	49.9	D	44.3	D
	SBR	183.3	F	259.2	F
	Int	**48.3**	**D**	**54.2**	**D**

*HCM 2000 results reported

Table 5.11 – 2045 Hollywood Boulevard Intersection LOS and Delay Results

Hollywood Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Entranda Drive	EBL	5.6	A	12.5	B
	EBT	9.4	A	22.3	C
	EBR	10.1	B	23.5	C
	WBL	7.2	A	18.1	B
	WBT	1.8	A	1.8	A
	WBR	2.5	A	3.4	A
	NBL	61.2	E	59.8	E
	NBR	57.5	E	50.8	D
	SBL	70.1	E	90.2	F
	SBR	59.3	E	54.4	D
	Int	**8.4**	**A**	**17.4**	**B**
Calle Grande Drive*	EBU	87.6	F	90.7	F
	EBT	0.6	A	0.8	A
	WBL	88.3	F	101.5	F
	WBT	1.1	A	0.4	A
	NBR	0.6	A	0.6	A
	Int	**1.4**	**A**	**1.1**	**A**
I-95 West Ramp Terminal*	EBT	28.8	C	26.3	C
	EBR	19.9	B	43.9	D
	WBL	58.6	E	113.5	F
	WBT	13.1	B	23.2	C
	SBL	54.0	D	64.4	E
	SBR	55.1	E	135.1	F
	Int	**33.5**	**C**	**56.8**	**E**
I-95 East Ramp Terminal*	EBL	54.2	D	67.5	E
	EBT	14.0	B	28.0	C
	WBT	18.2	B	28.9	C
	WBR	40.5	D	33.8	C
	NBL	72.0	E	52.8	D
	NBR	78.1	E	104.2	F
	Int	**38.2**	**D**	**46.5**	**D**

*HCM 2000 results reported

Table 5.11 – 2045 Hollywood Boulevard Intersection LOS and Delay Results (Continued)

Hollywood Boulevard Intersection	Movement	No-Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
28th Avenue*	EBL	74.7	E	95.8	F
	EBT	72.8	E	158.2	F
	EBR	33.2	C	16.6	B
	WBL	44.8	D	53.0	D
	WBT	54.9	D	54.3	D
	NBL	141.3	F	176.2	F
	NBT	132.4	F	179.0	F
	SBL	206.4	F	275.7	F
	SBT	55.8	E	65.8	E
	SBR	90.5	F	205.0	F
	Int	**72.1**	**E**	**120.6**	**F**

*HCM 2000 results reported

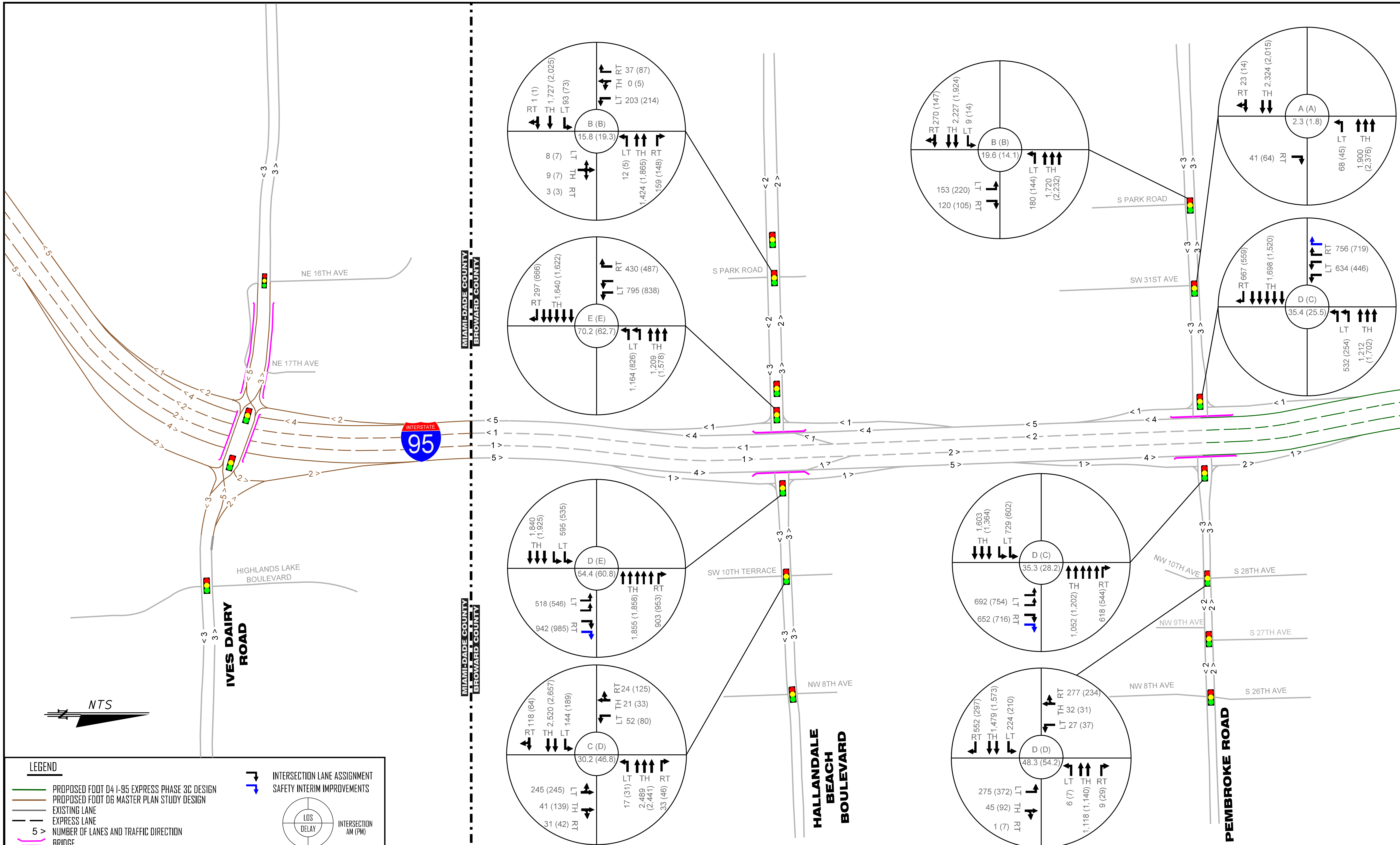

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FIGURE 5.20

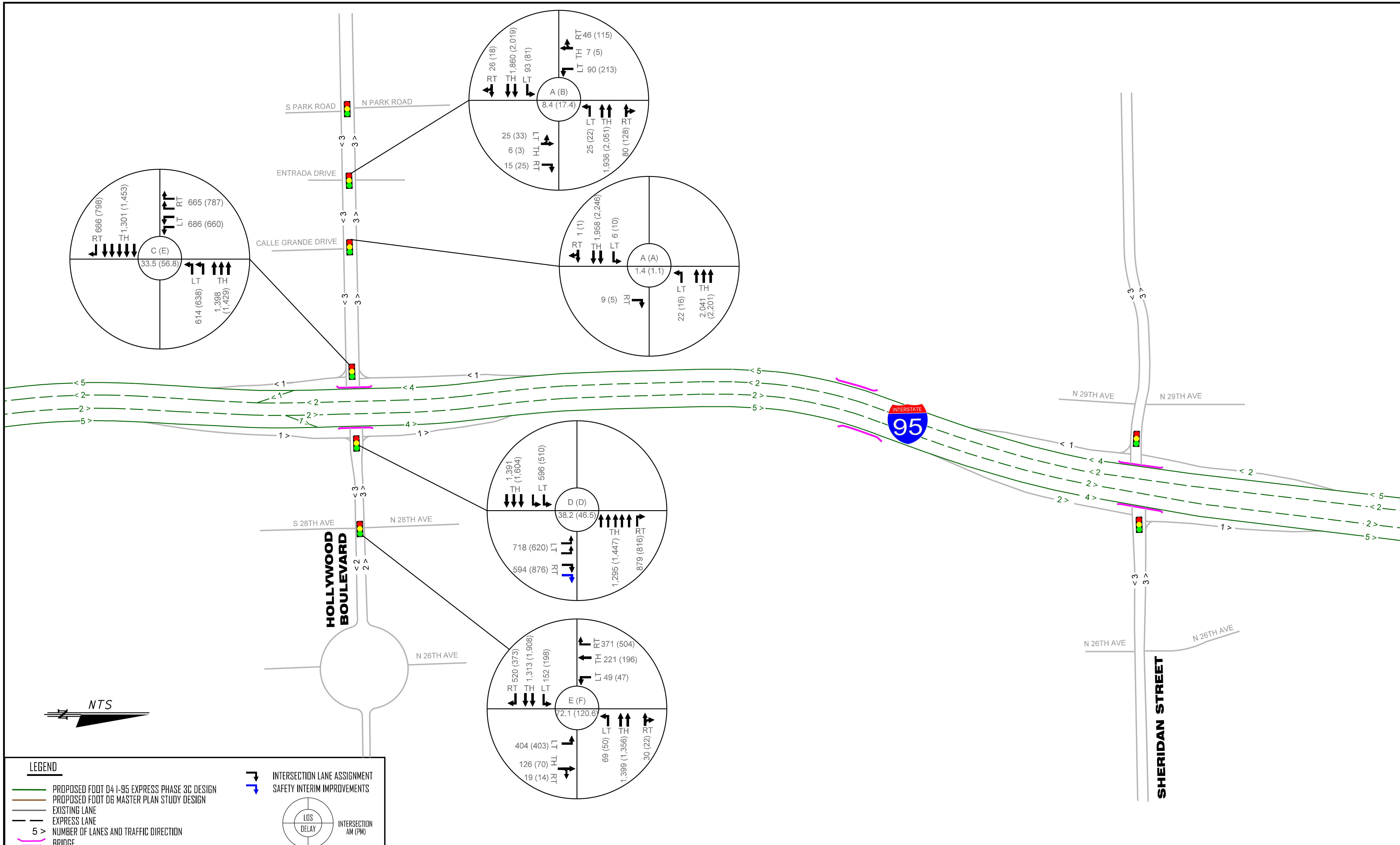

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FIGURE 5.20

6.0 BUILD ALTERNATIVES

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.

6.1 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.

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 6.1***). 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 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.

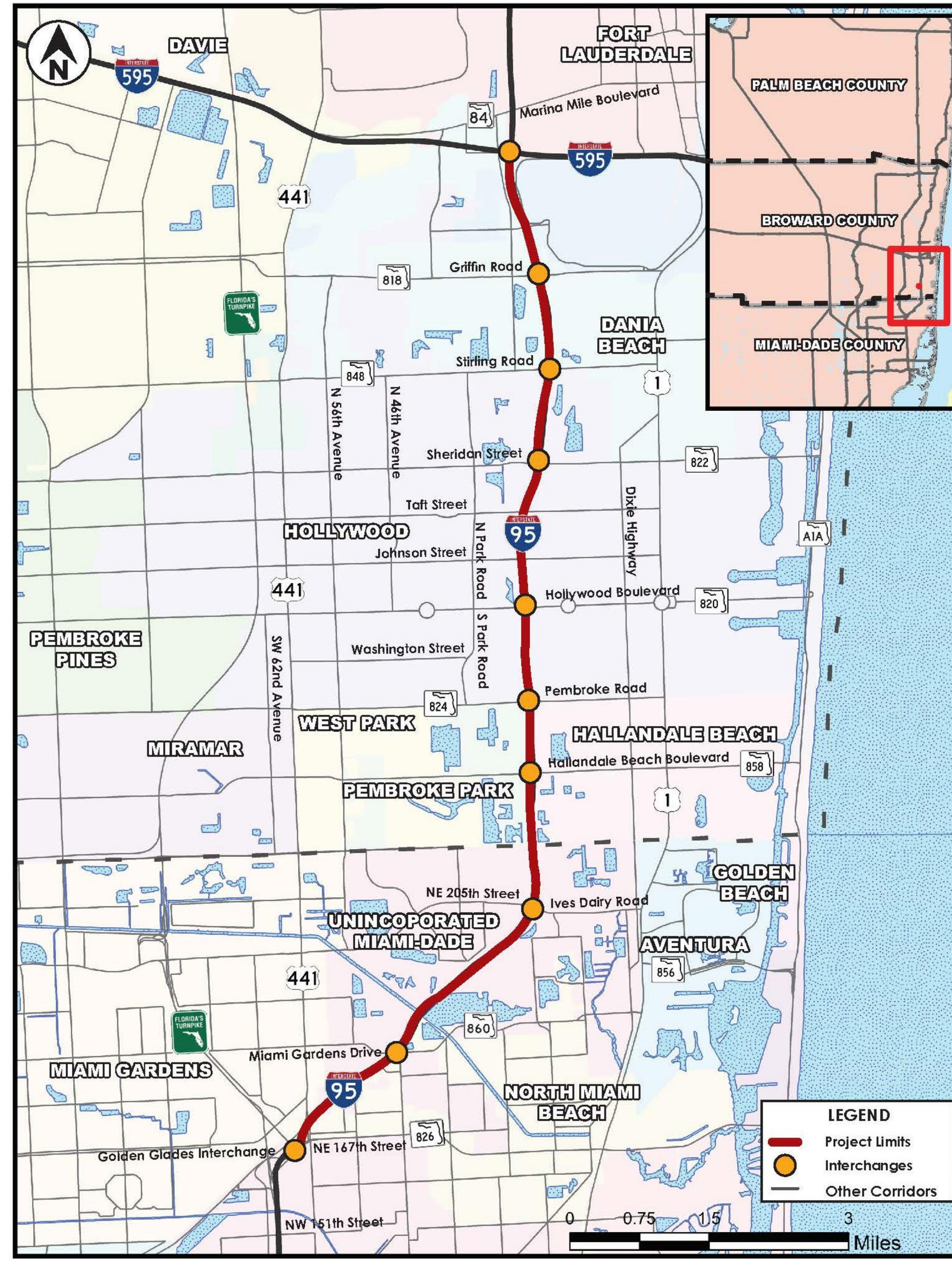


Figure 6.1 – I-95 Corridor Planning Study Limits

6.2 Alternatives Considered

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 6.1***). 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.

Three alternatives were considered in the PD&E Study. All three alternatives examined interchange alternatives and ramp alternatives. The evaluation of the alternatives considered relocating interchange ramps and added exclusive turn lanes at the ramp terminal intersections.

6.2.1 Alternative 1 – Braided Ramps

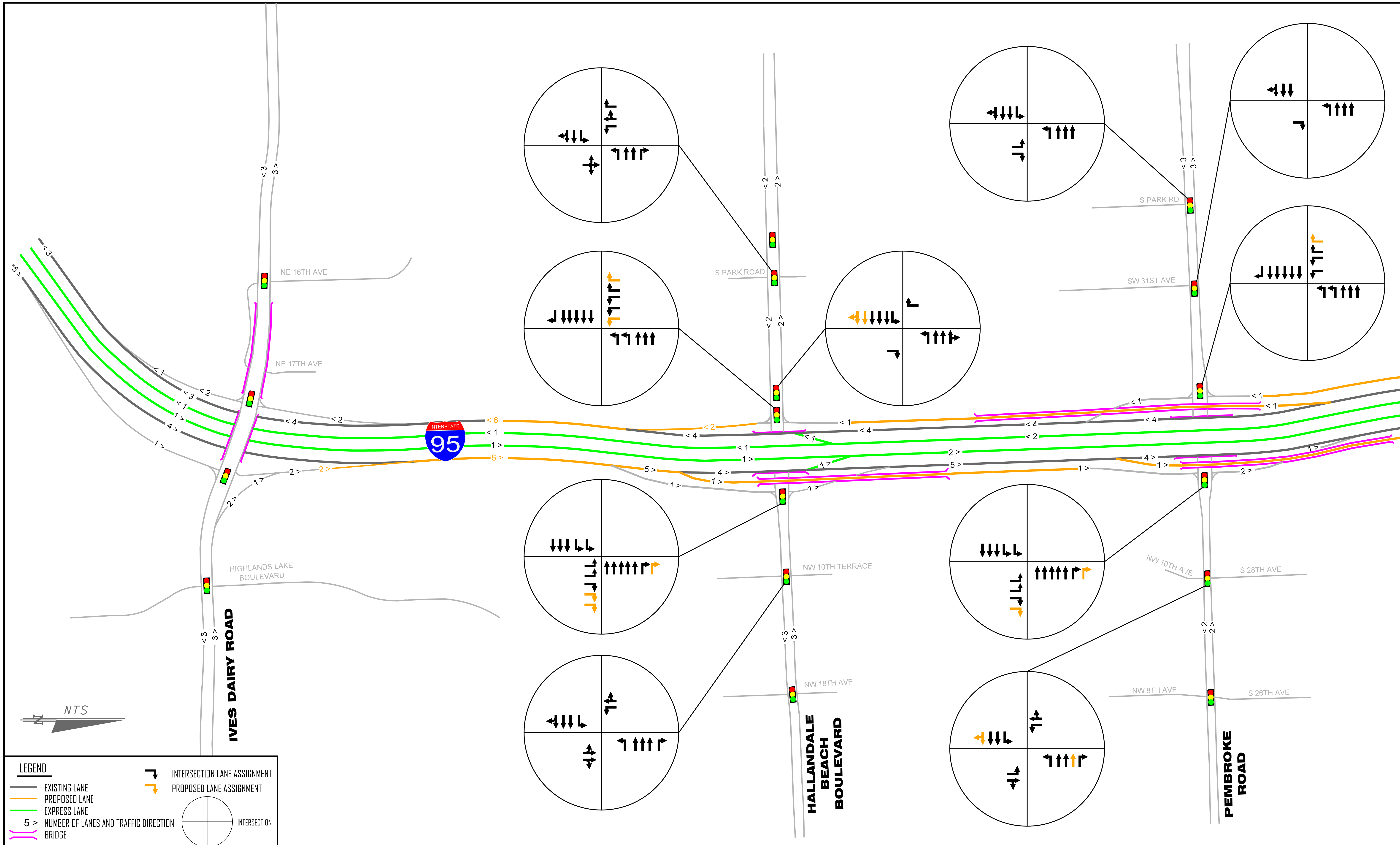
Alternative 1 proposes braided ramps between interchanges to improve the substandard weaving movements along I-95. In this alternative, the on-ramps from each interchange will remain unchanged. However, the off-ramps to Pembroke Road and Hollywood Boulevard in the northbound direction and to Pembroke 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 6.2*** shows the schematic geometric layout of Alternative 1.

6.2.2 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 6.3*** shows the schematic geometric layout of Alternative 2.

6.2.3 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 6.4*** shows the schematic geometric layout of Alternative 3.



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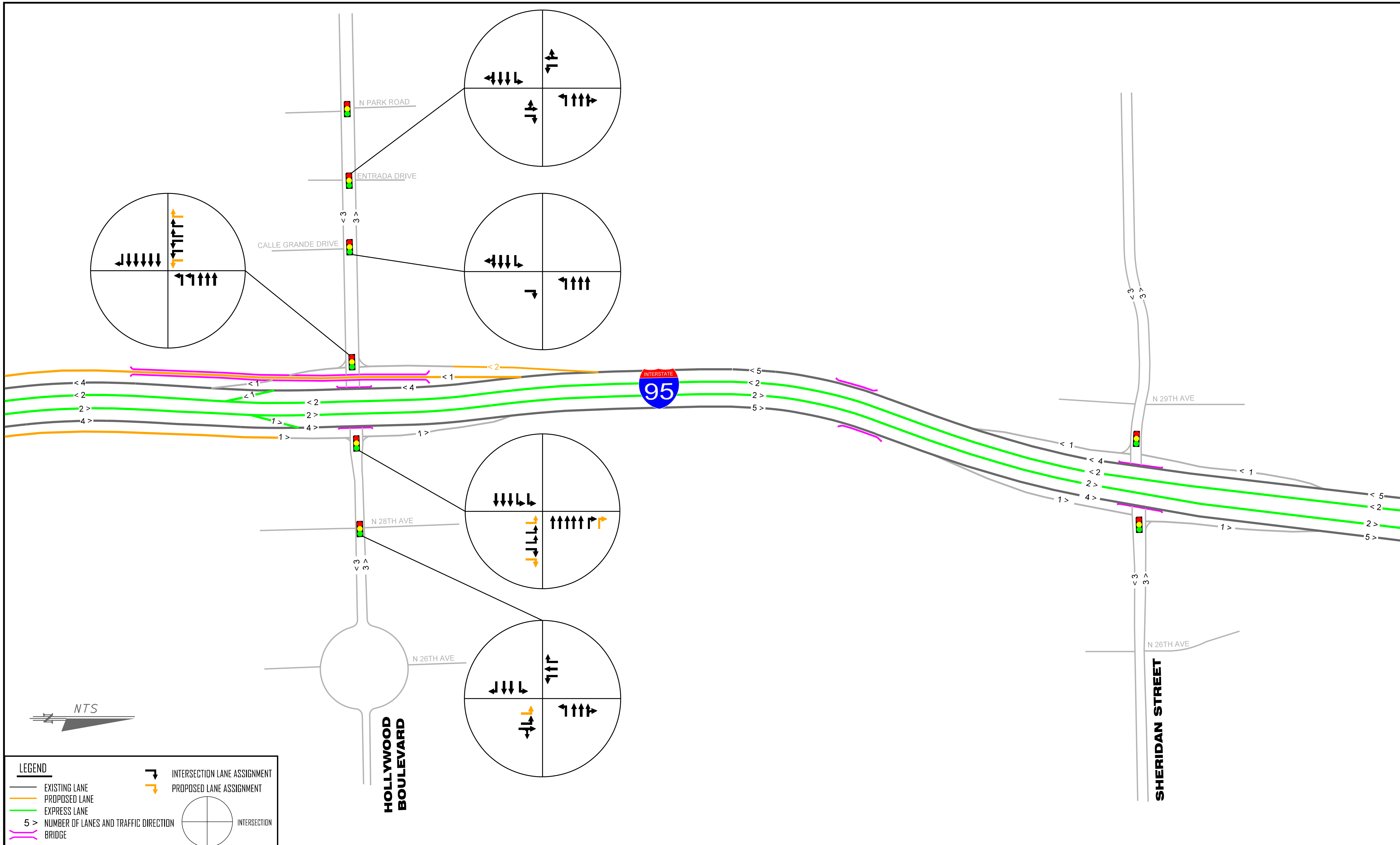
ETDM No.: 14254

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

FIGURE 6.2



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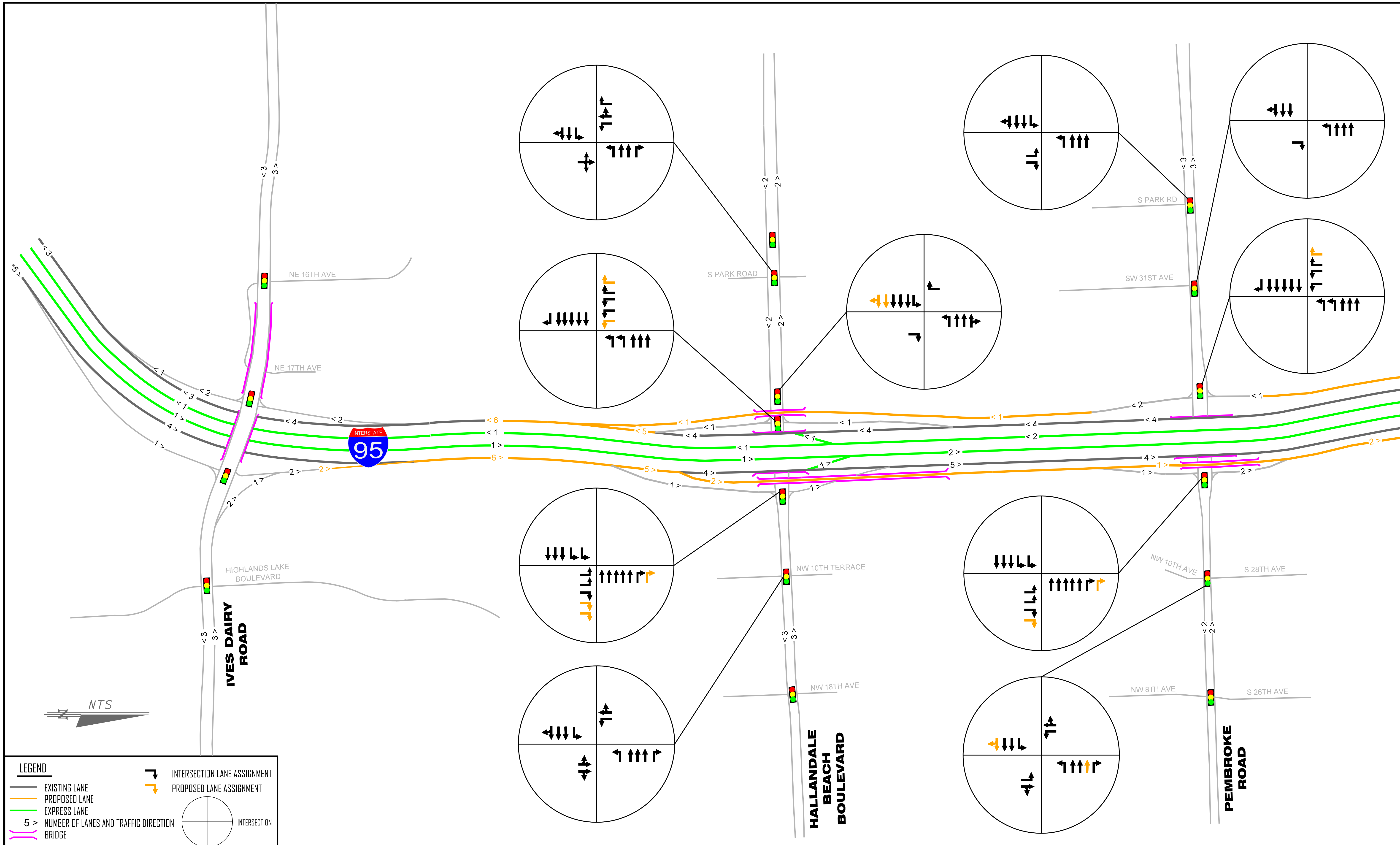
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 1 - SCHEMATIC LINE DIAGRAM

FIGURE
6.2

6-4



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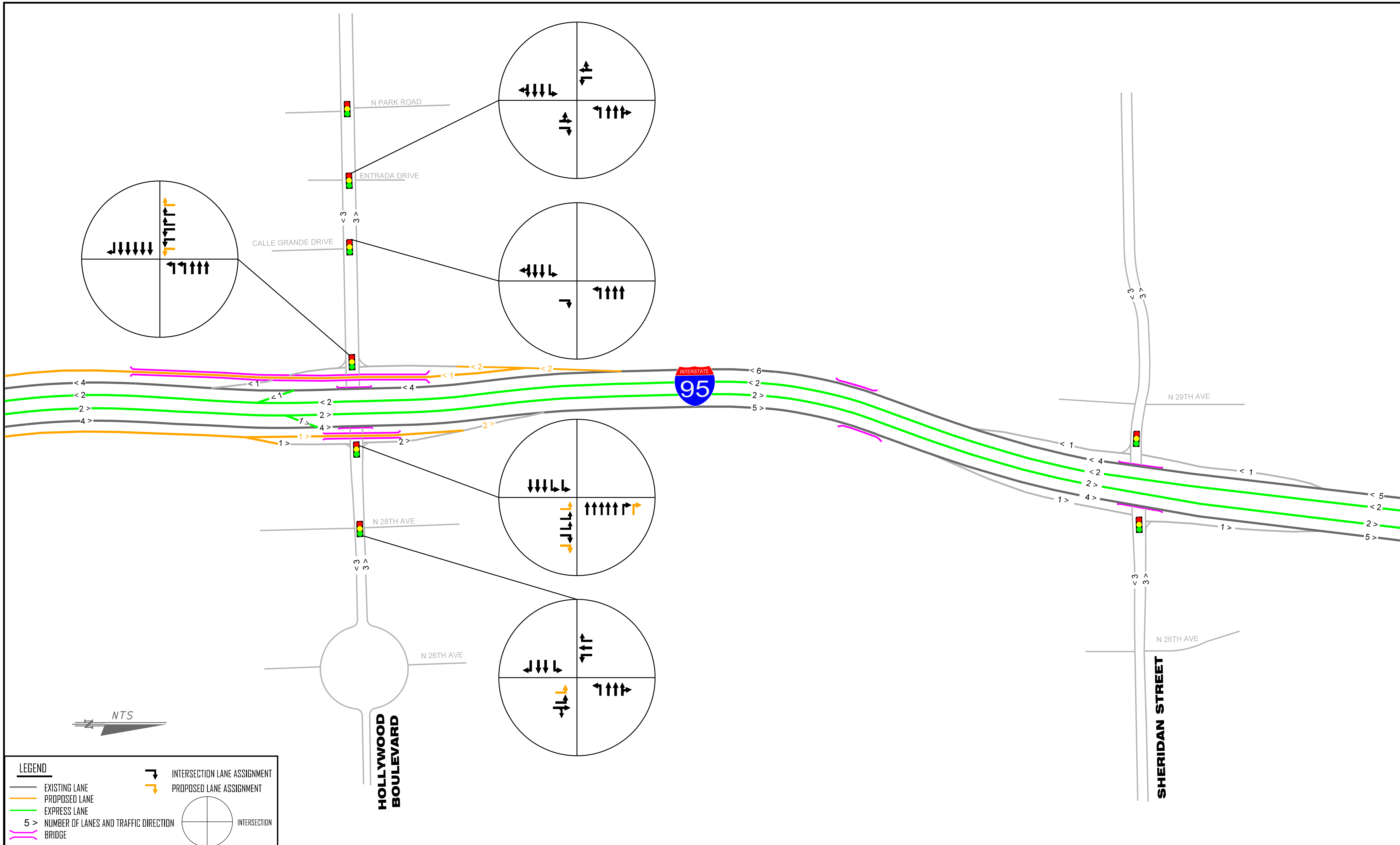
SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 2 - SCHEMATIC LINE DIAGRAM

FIGURE
6.3



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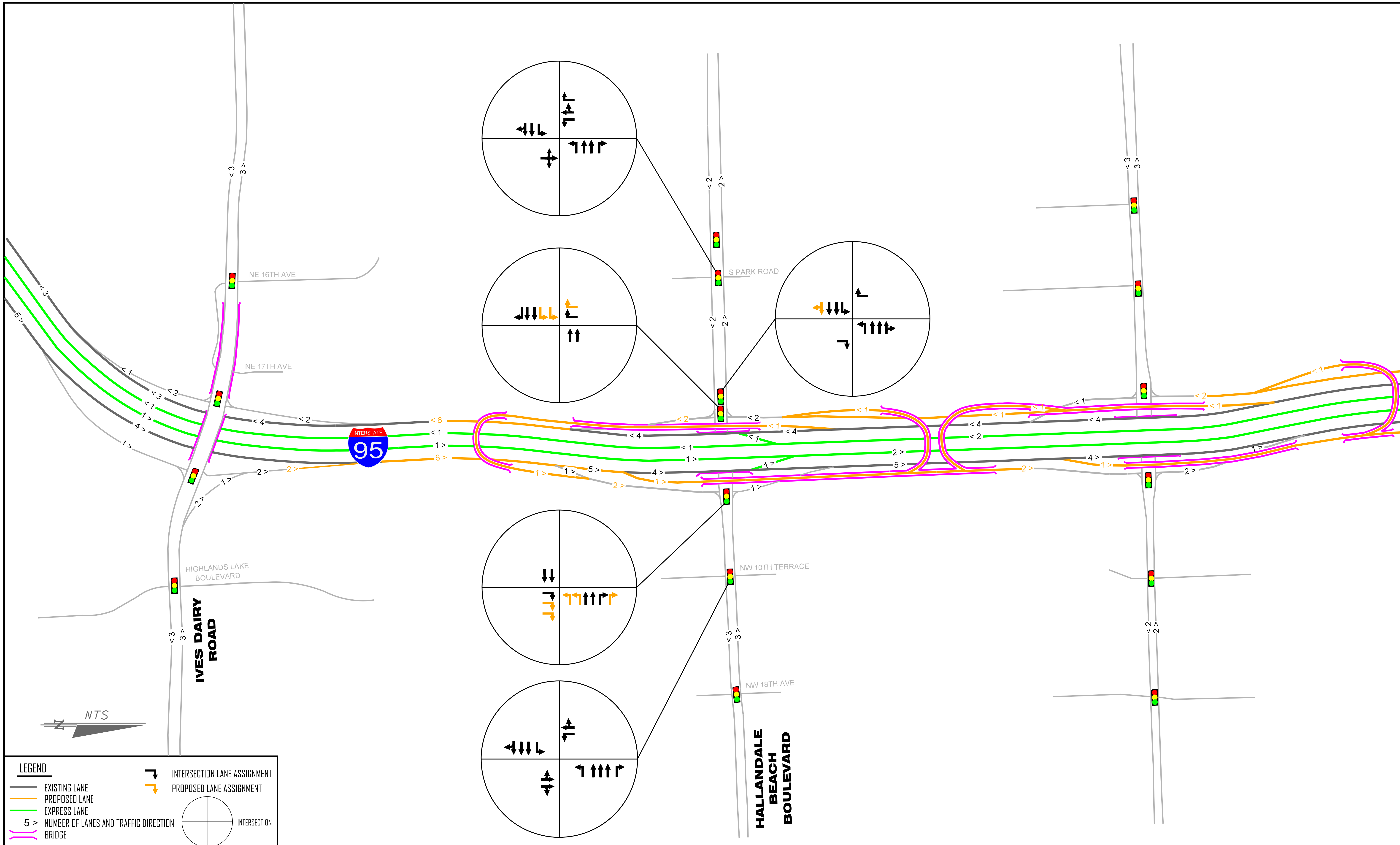
SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 2 - SCHEMATIC LINE DIAGRAM

FIGURE
6.3



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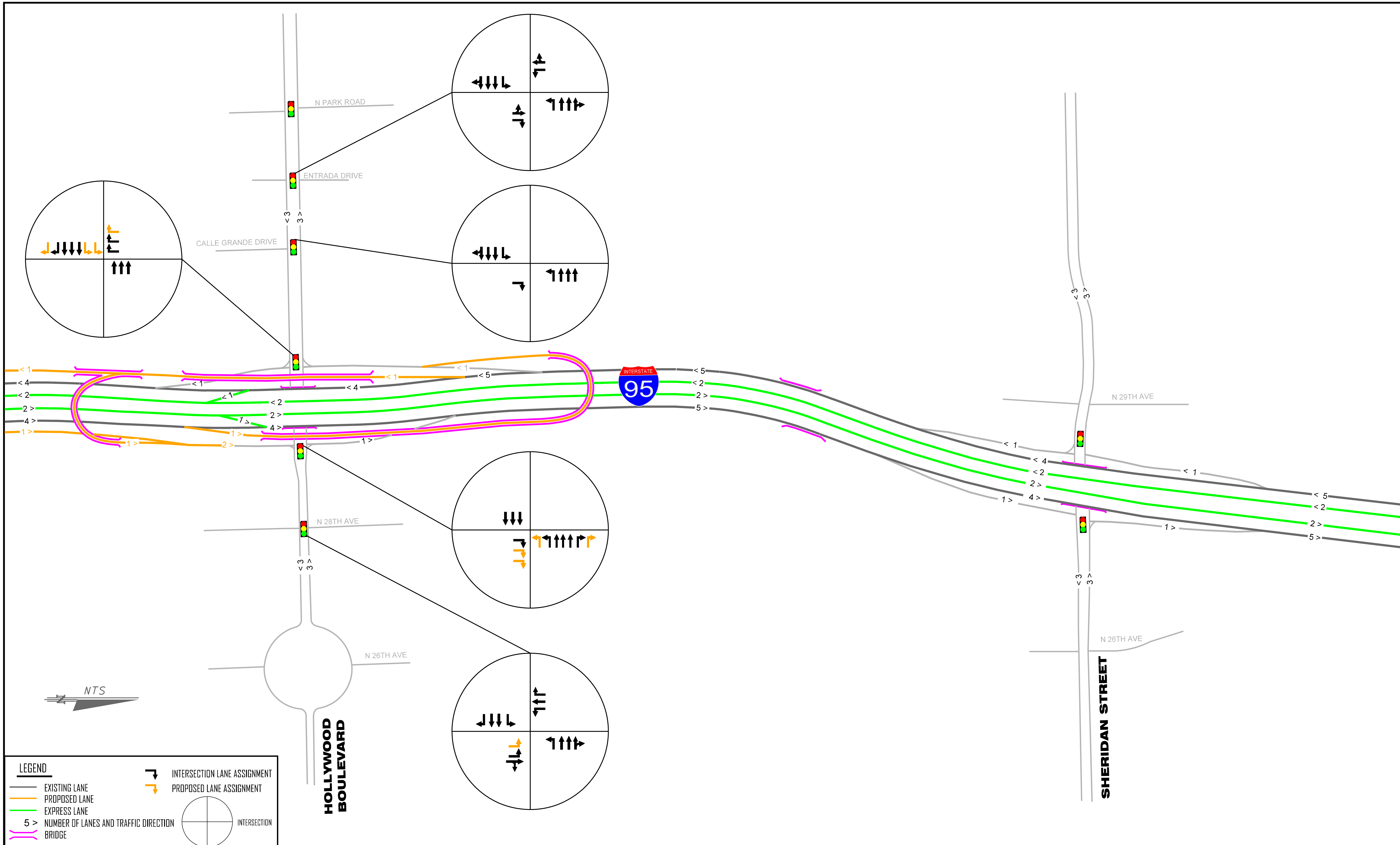
SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 3 - SCHEMATIC LINE DIAGRAM

FIGURE
6.4



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LANE GEOMETRY AND CONFIGURATIONS
ALTERNATIVE 3 - SCHEMATIC LINE DIAGRAM

FIGURE
6.4

6.2.4 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.

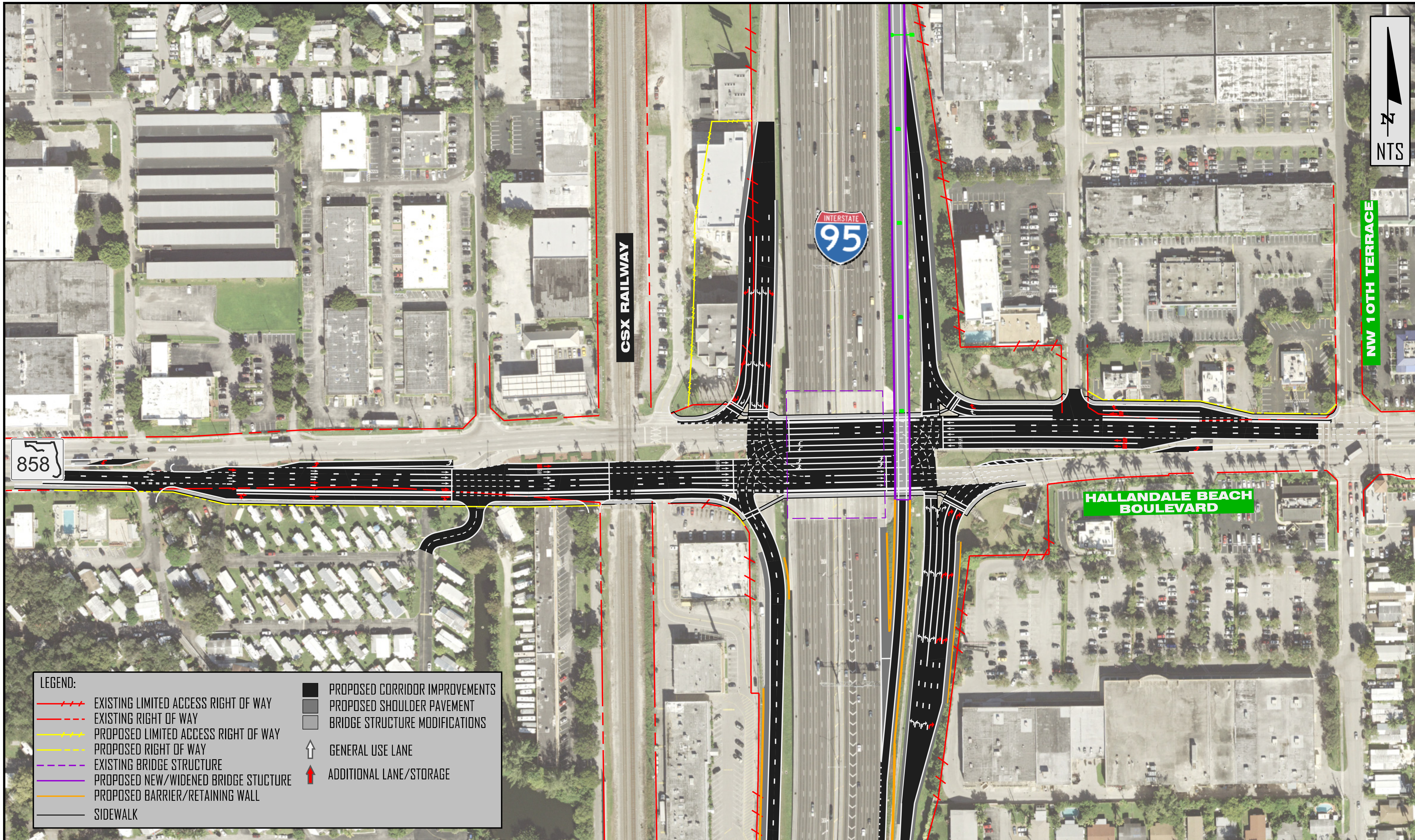
- **Diamond Interchange –** This interchange configuration maintains the existing interchange layout but with additional turn lanes, through lanes and/or extended storage bays. ***Figures 6.5 – 6.7*** show the proposed improvements at each interchange. The red arrows depict the locations were additional 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 6.8 – 6.10*** 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 6.11 – 6.13*** 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 6.14 – 6.16*** show the proposed improvements at each interchange. This interchange configuration will work with mainline Alternative 3 only.

All the interchange alternatives considered are at-grade under the I-95 corridor. The only exception are the U-turn ramps that are part of the CFI configuration. As described under Alternative 3, the U-turn ramps go over the interstate touching down on the opposite ramp terminal intersection.



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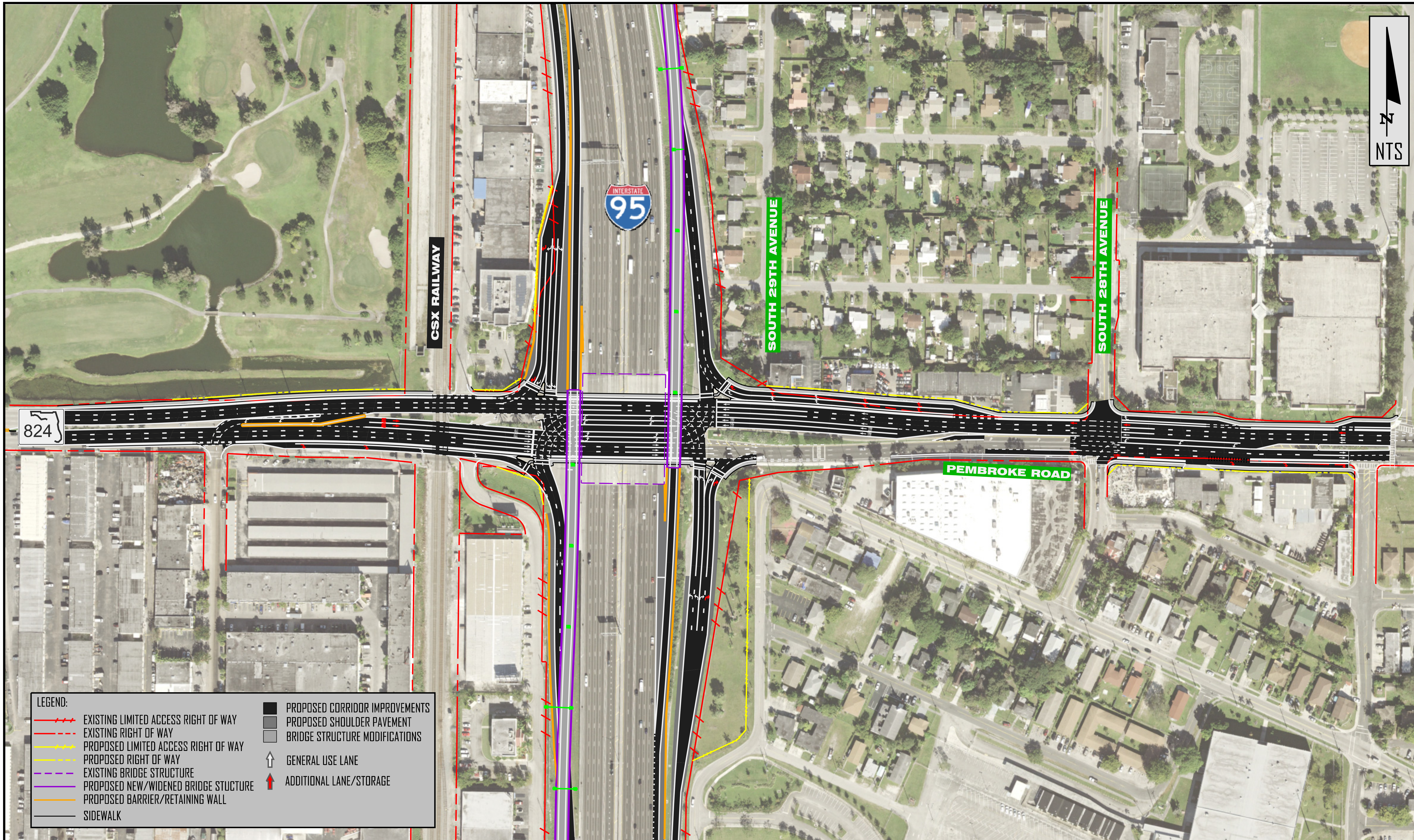
HALLANDALE BEACH BOULEVARD
DIAMOND INTERCHANGE

FIGURE
6.5



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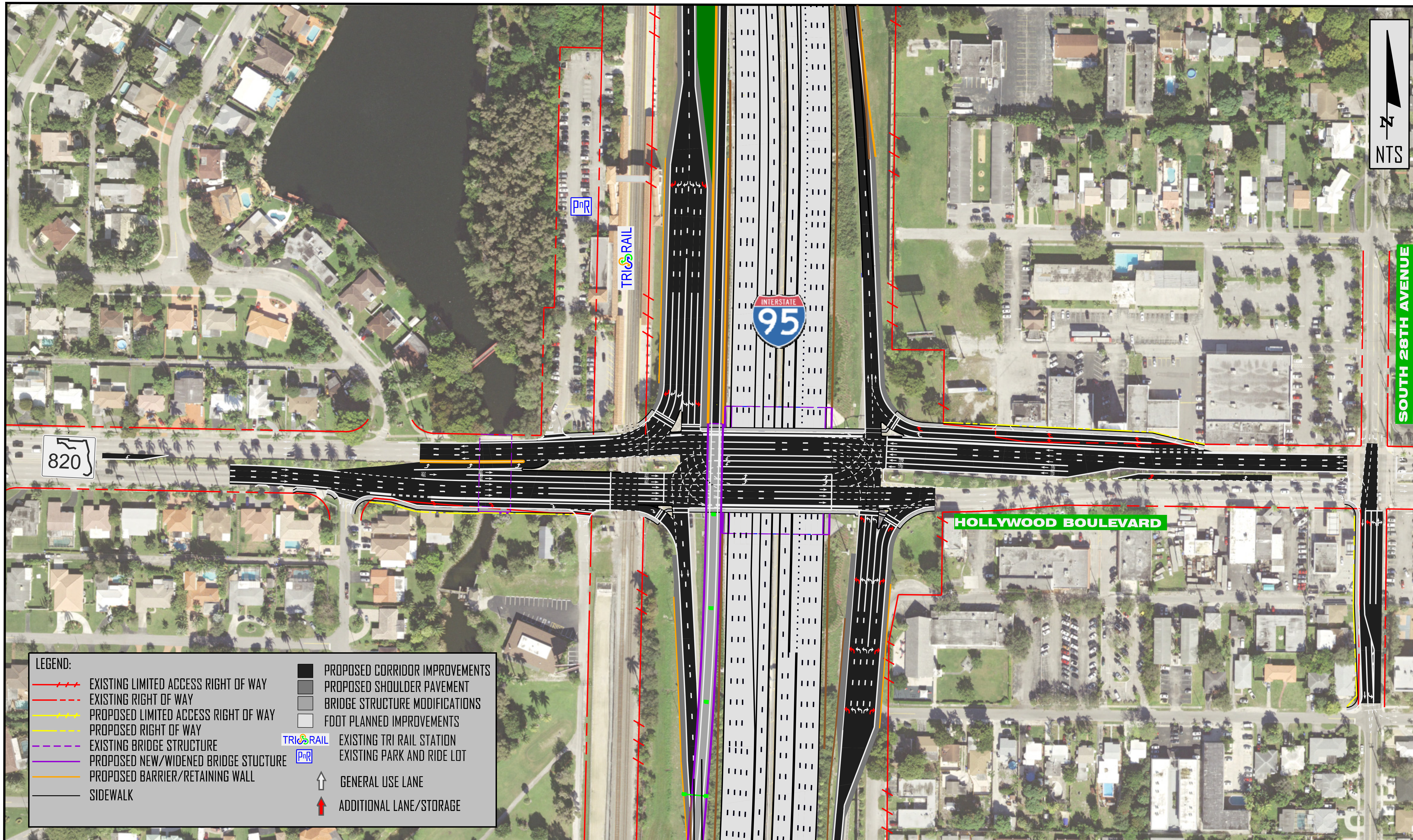
PEMBROKE ROAD
DIAMOND INTERCHANGE

FIGURE
6.6

6-11



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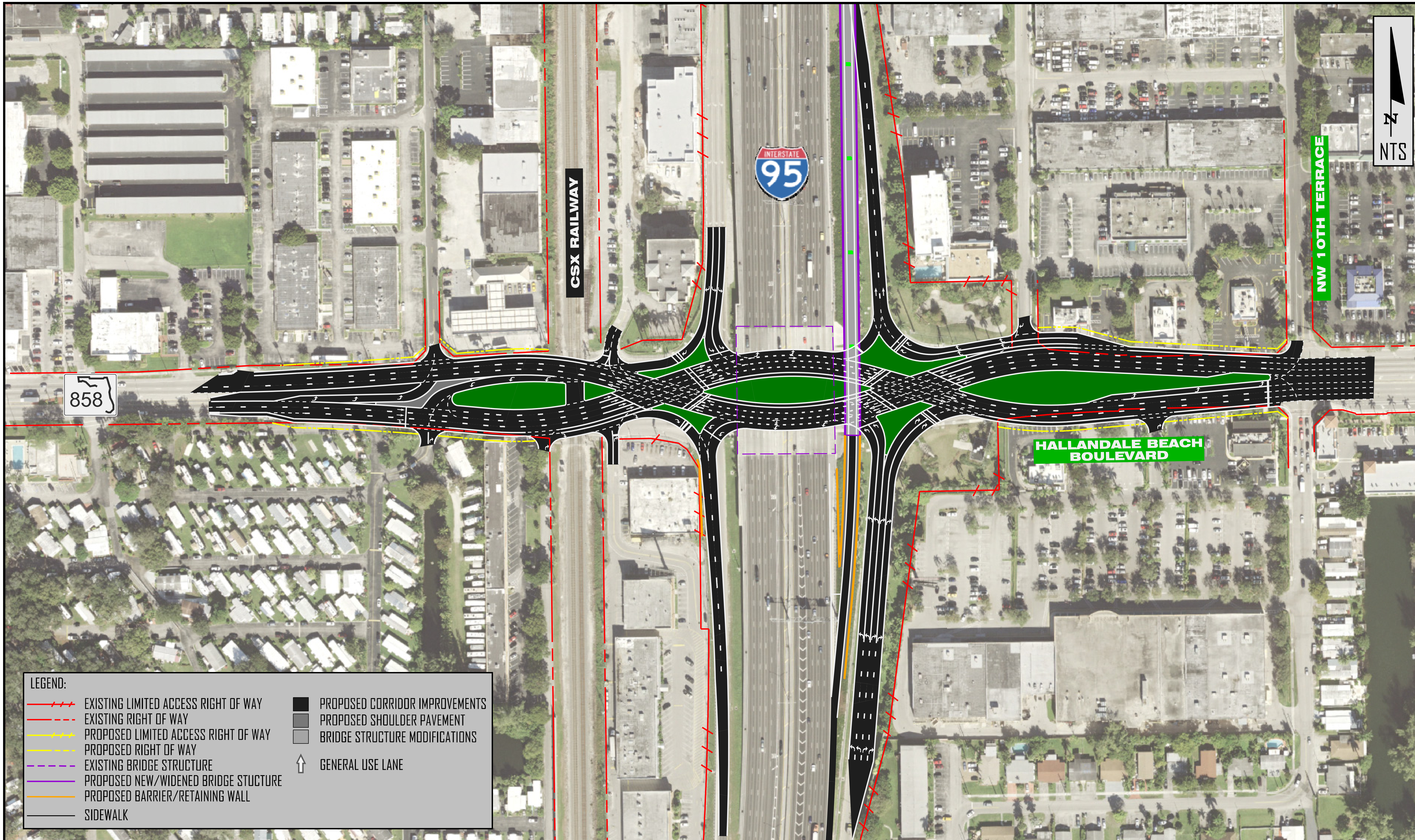
HOLLYWOOD BOULEVARD
DIAMOND INTERCHANGE

FIGURE
6.7



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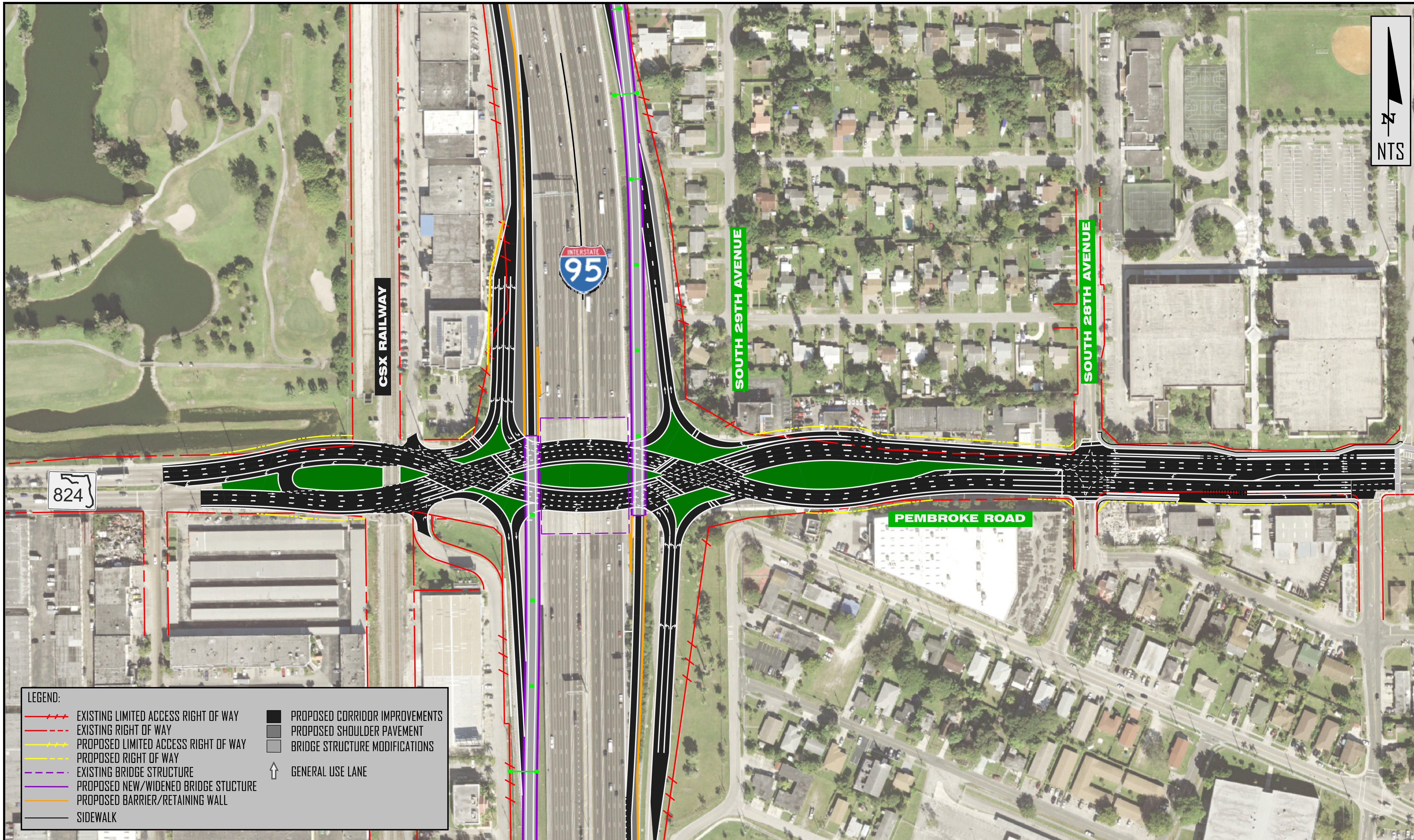
HALLANDALE BEACH BOULEVARD
DIVERGING DIAMOND INTERCHANGE - 35 MPH

FIGURE
6.8



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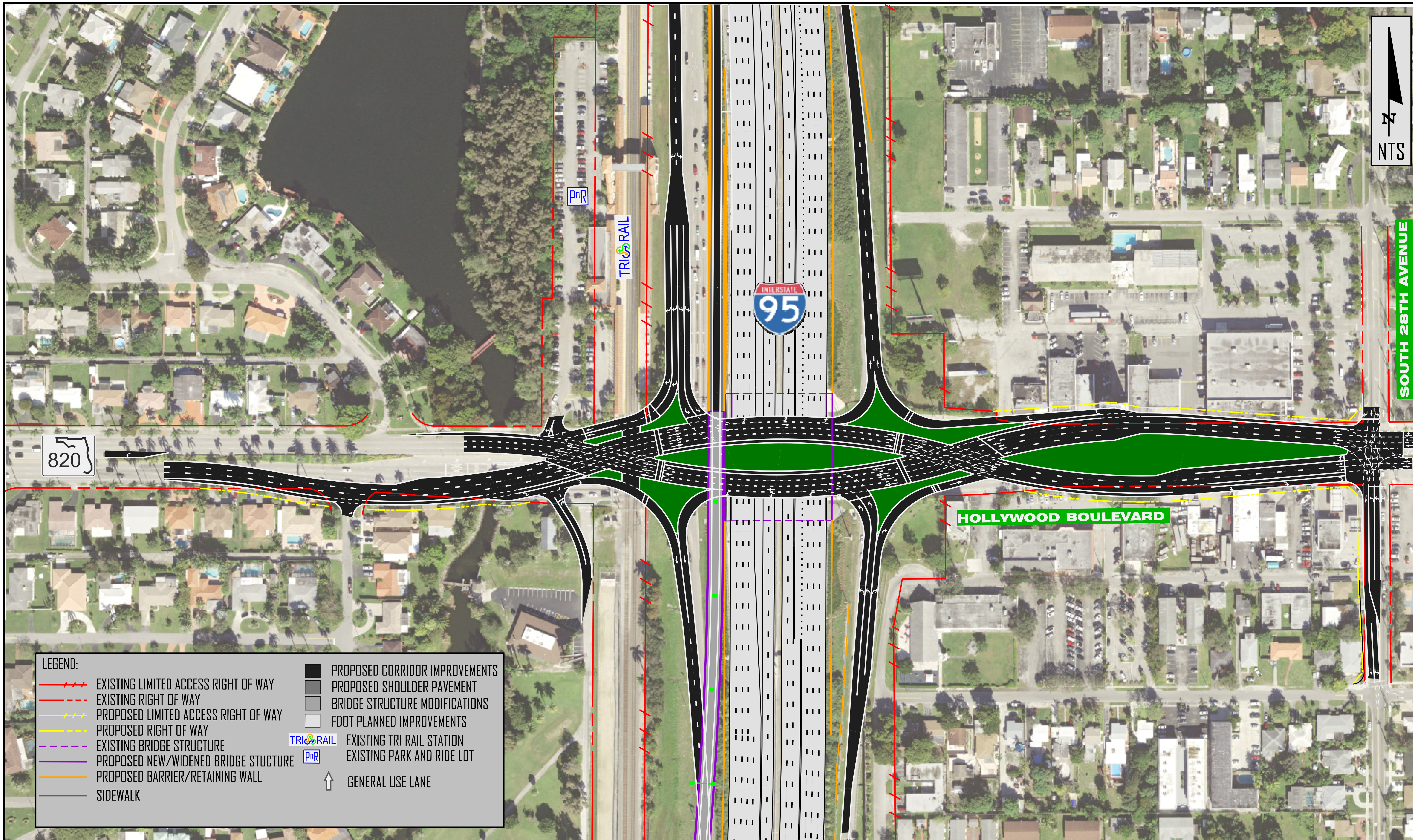
PEMBROKE ROAD
DIVERING DIAMOND INTERCHANGE - 35 MPH

FIGURE
6.9



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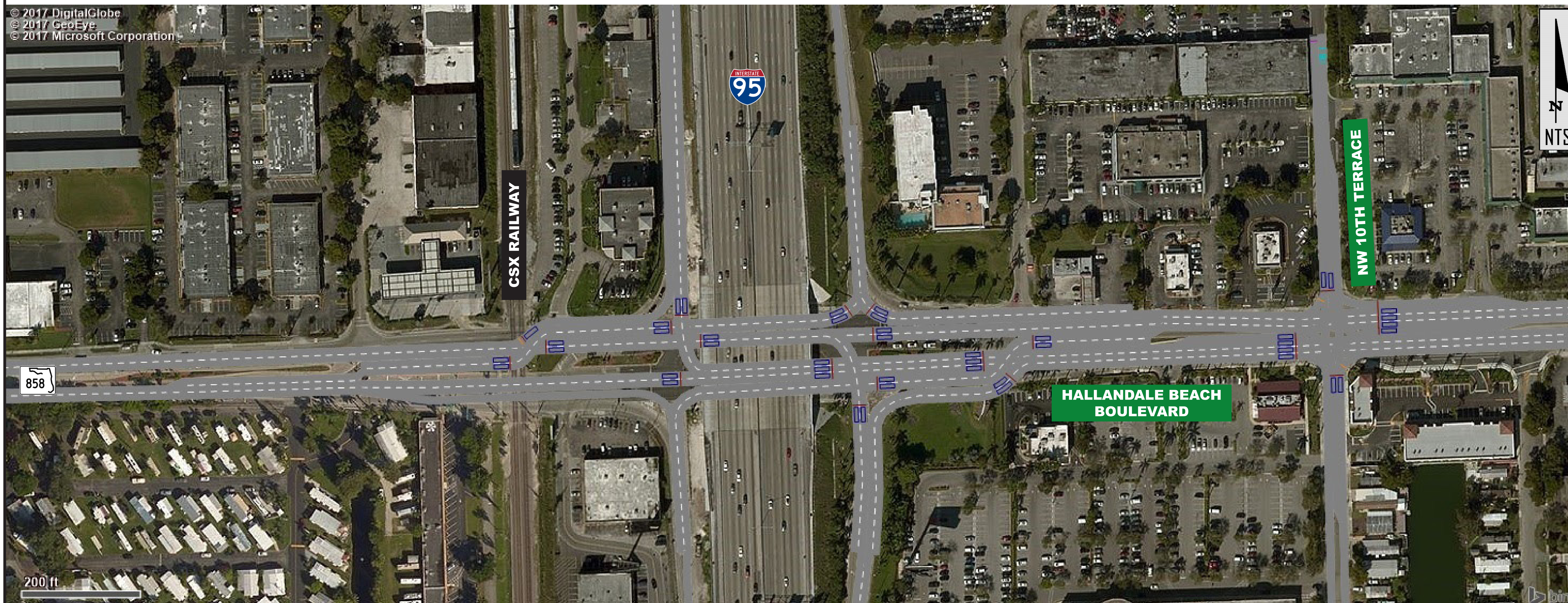
HOLLYWOOD BOULEVARD
DIVERGING DIAMOND INTERCHANGE - 35 MPH

FIGURE 6.10



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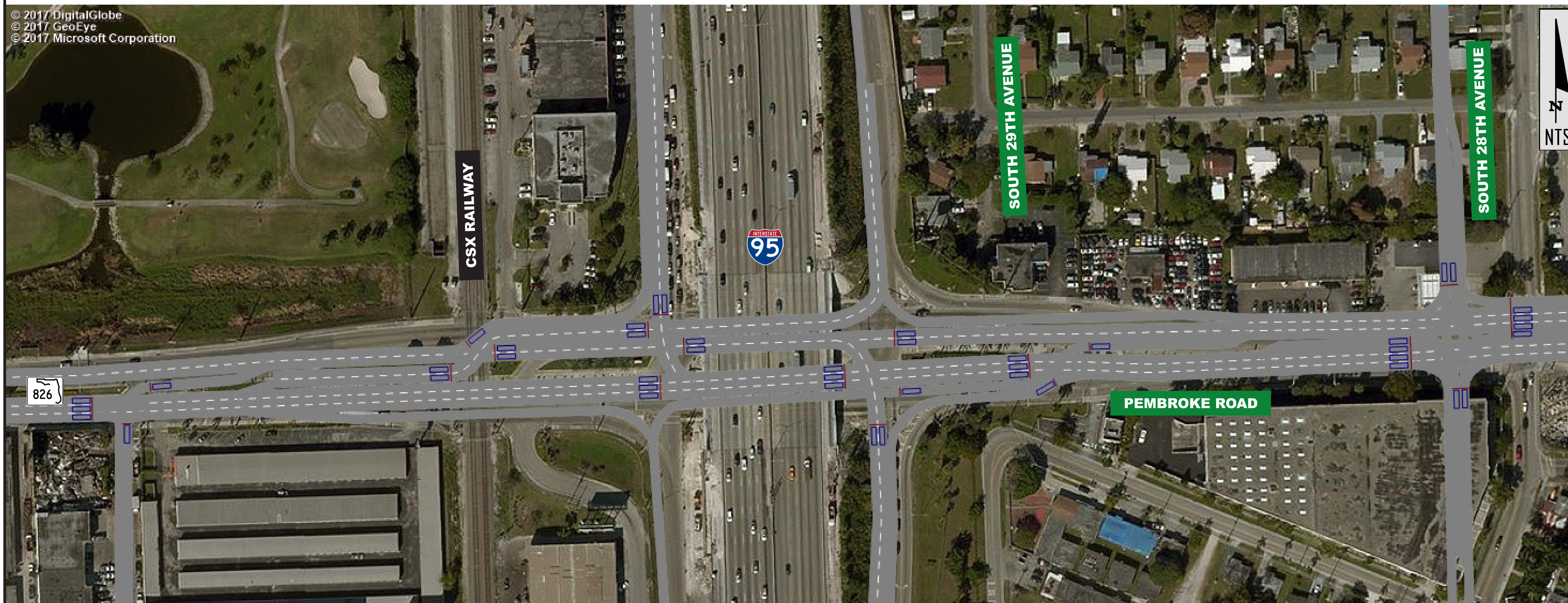
HALLANDALE BEACH BOULEVARD
DISPLACED LEFT TURN LANE INTERCHANGE

FIGURE
6.11



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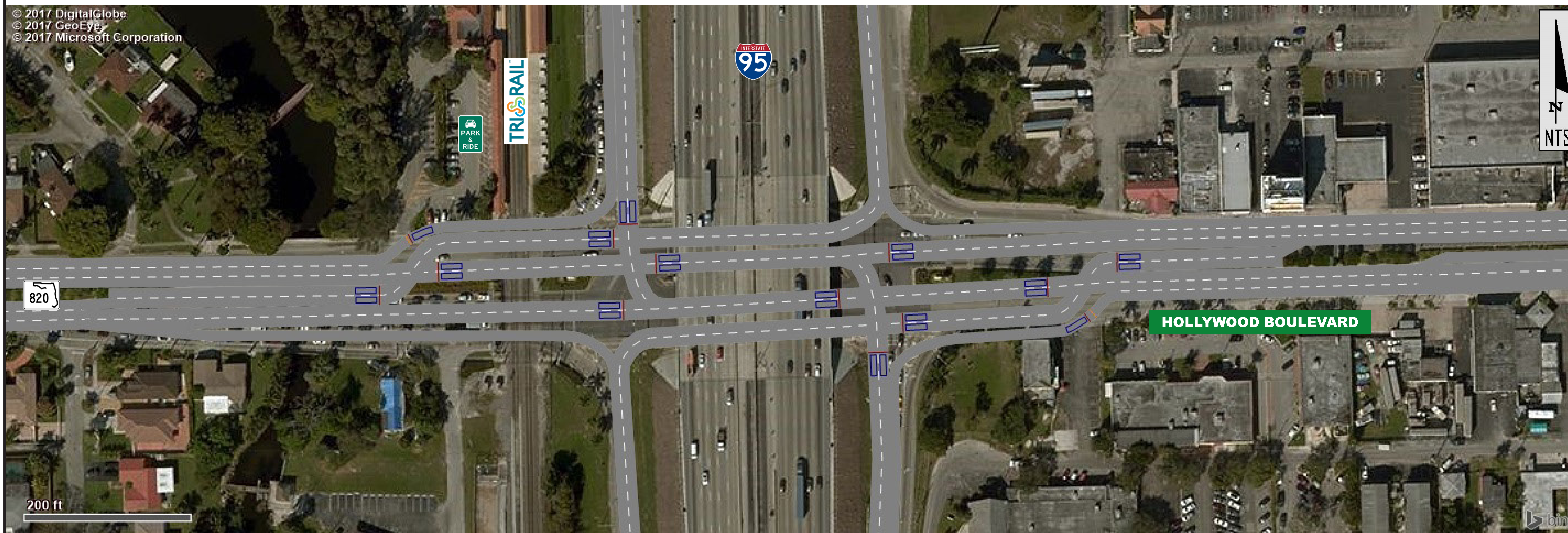
PEMBROKE ROAD
DISPLACED LEFT TURN LANE INTERCHANGE

FIGURE
6.12



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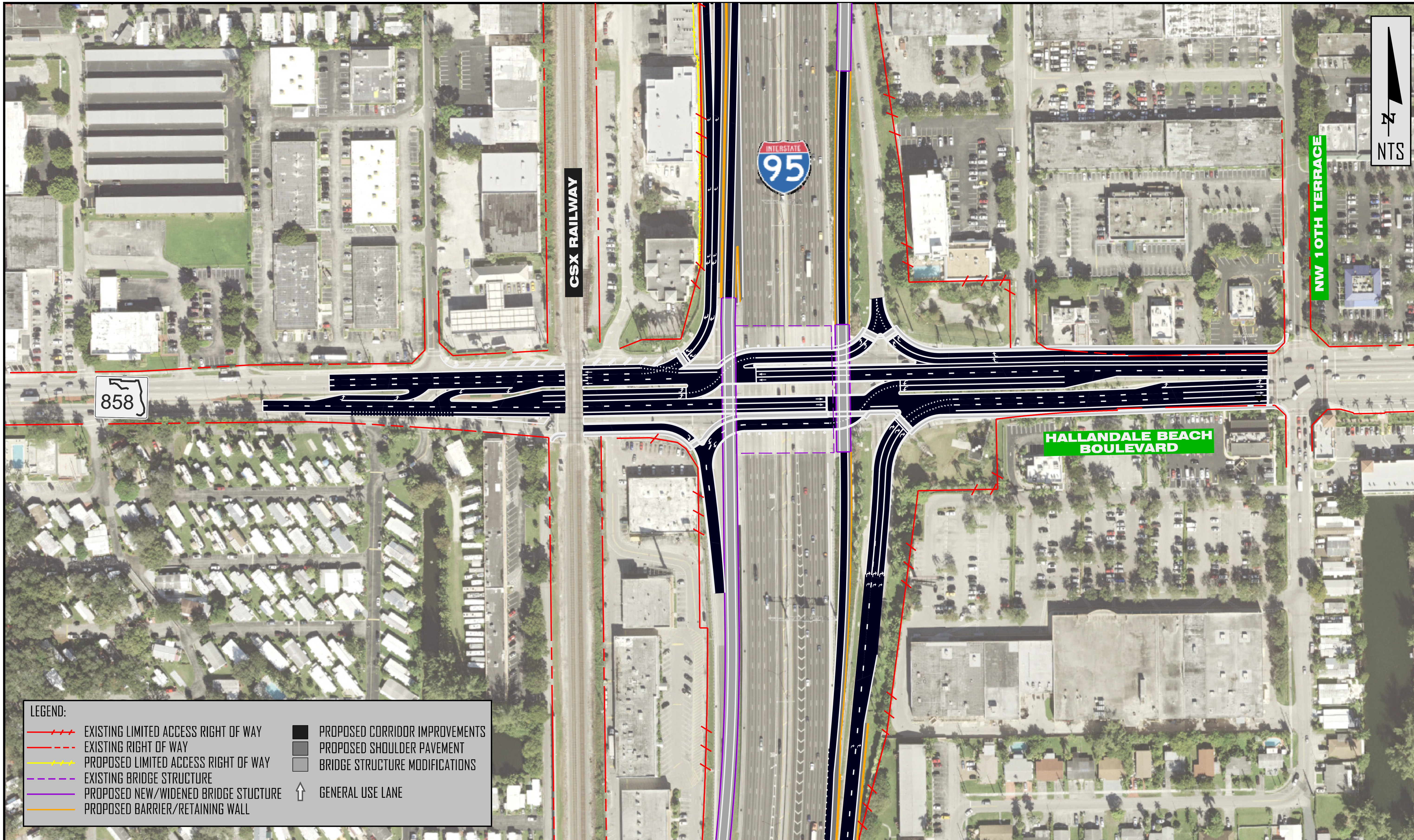
HOLLYWOOD BOULEVARD
DISPLACED LEFT TURN LANE INTERCHANGE

FIGURE
6.13



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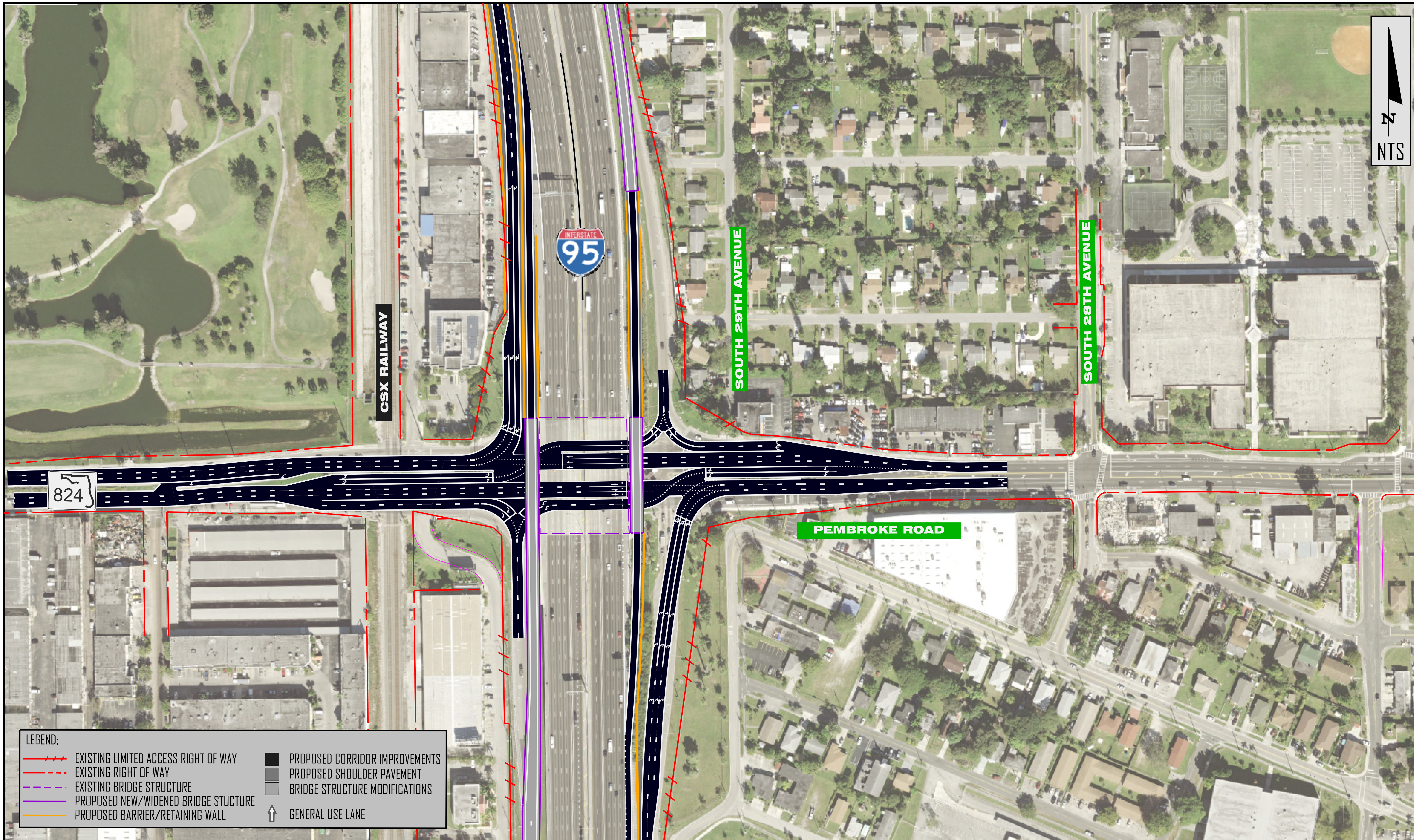
HALLANDALE BEACH BOULEVARD
CONTINUOUS FLOW INTERSECTION

FIGURE
6.14



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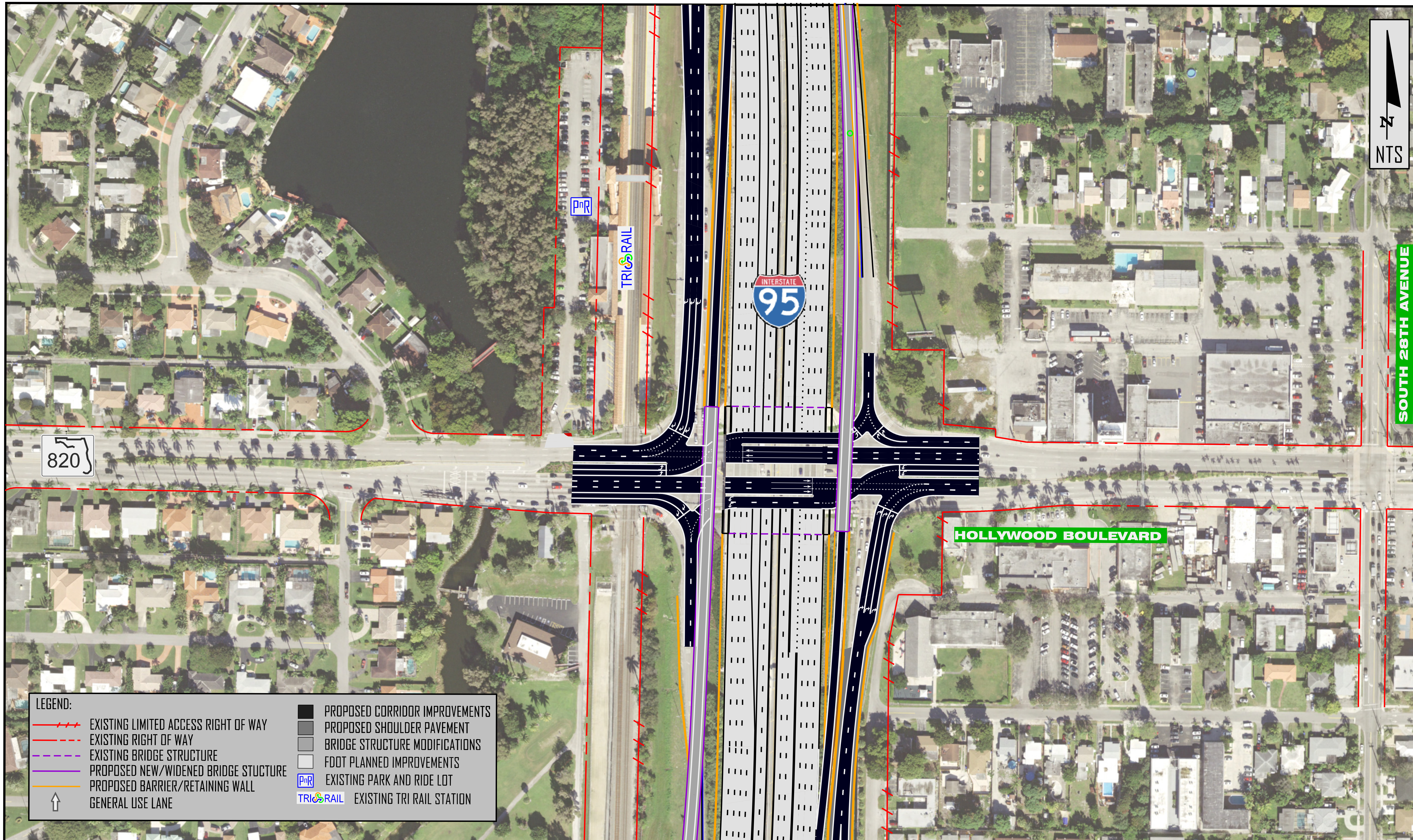
PEMBROKE ROAD
CONTINUOUS FLOW INTERSECTION

FIGURE 6.15



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HOLLYWOOD BOULEVARD
CONTINUOUS FLOW INTERSECTION

FIGURE
6.16

6.3 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.

6.4 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 6.1***). 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) were used for the operational analysis in this study. Operational analyses were performed on freeway basic segments, ramp merge/diverge junctions, and weaving sections. ***Tables 6.1 – 6.4*** and ***Figures 6.17 – 6.20*** summarize the future operational analysis results as well as link-by-link traffic volumes.

Findings – 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 for both Alternatives 1 and 2.

Table 6.1 – 2040 Alternative 1 Northbound Freeway Analysis Results

#	I-95 Northbound Segment 2040 Alternative 1	Analysis Type	Freeway		Ramp		Density pc/mi/ln AM (PM)	LOS AM (PM)
			No. of Lanes	Demand* vph AM (PM)	No. of Lanes	Demand vph 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 Sheridan St Off-Ramp	Weaving	5	6,201 (6,912)	-	-	30.1 (34.2)	D (D)
9	EL Egress to Hollywood Blvd On-Ramp	Basic	4	5,429 (5,918)	1	772 (994)	25.7 (24.3)	C (C)
8	Pembroke Rd On-Ramp to EL 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 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 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 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 6.2 – 2040 Alternative 1 Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2040 Alternative 1	Analysis Type	Freeway		Ramp		Density pc/mi/ln AM (PM)	LOS AM (PM)
			No. of Lanes	Demand* vph AM (PM)	No. of Lanes	Demand vph 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 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 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 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 Blvd On-Ramp	Basic	4	6,049 (6,145)	-	-	24.9 (25.4)	C (C)
12	Hallandale Beach Blvd On-Ramp to Ives Dairy Rd Off-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

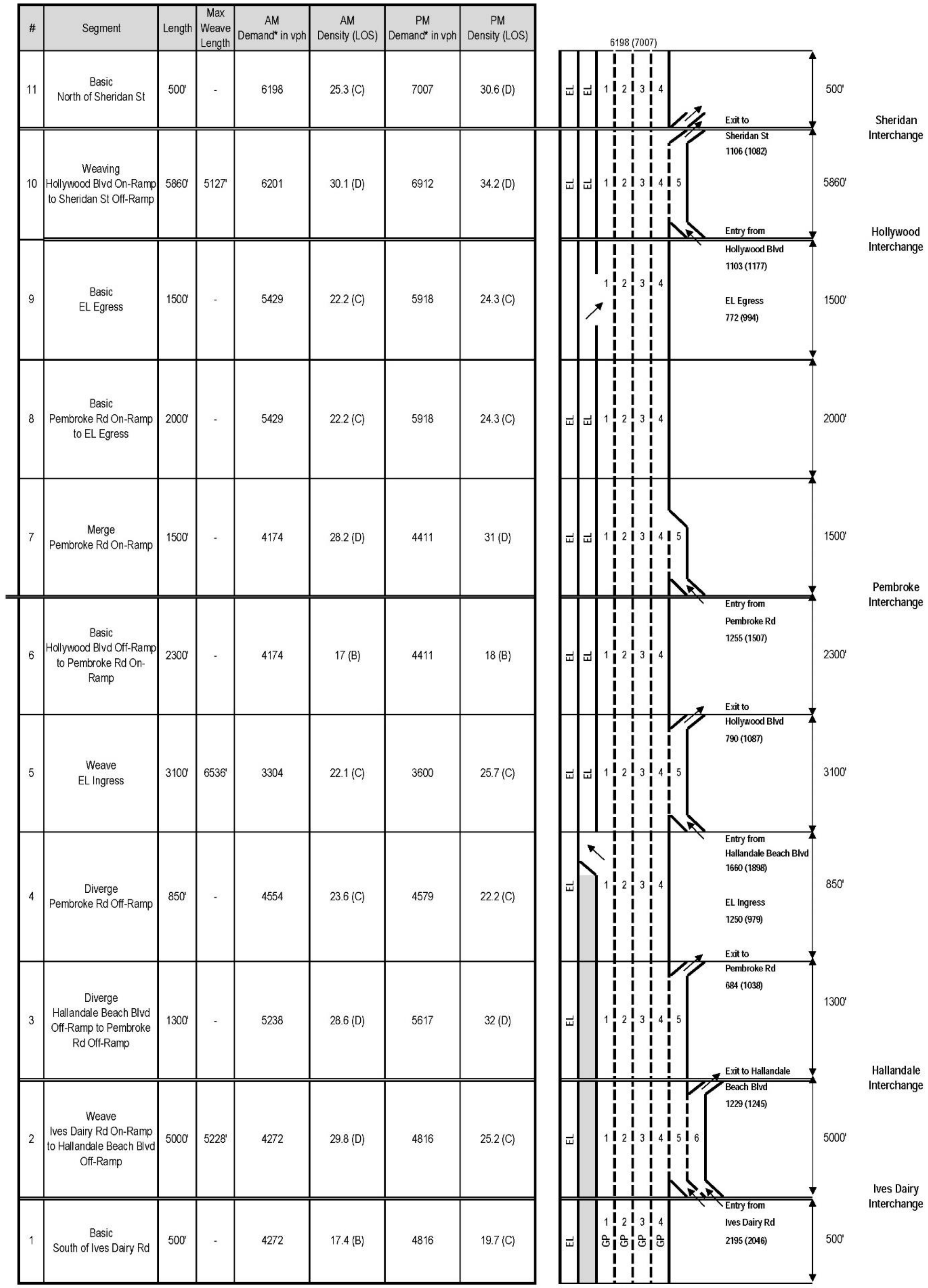
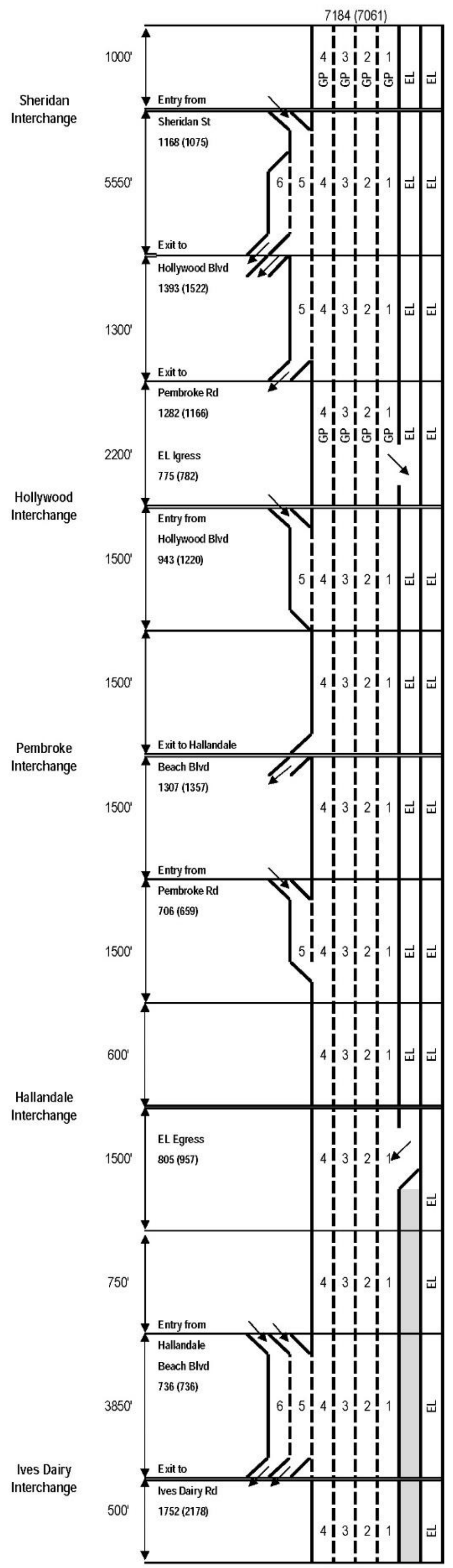


Figure 6.17 – 2040 Alternative 1 Northbound Freeway Analysis Results



#	Segment	Length	Max Weave Length	AM Demand* in vph	AM Density (LOS)	PM Demand* in vph	PM Density (LOS)
1	Basic North of Sheridan St	1000'	-	7184	31.1 (D)	7061	30.3 (D)
2	Weave Sheridan St On-Ramp to Hollywood Blvd Off-Ramp	5550'	4918'	7184	34.8 (D)	7061	23.1 (C)
3	Diverge Pembroke Rd Off-Ramp	1300'	-	6959	31.4 (D)	6614	29.4 (D)
4	Diverge EL Ingress	2200'	-	5677	29 (D)	5448	28 (C)
5	Merge Hollywood On-Ramp	1500'	-	4902	19.7 (B)	4666	21.1 (C)
6	Diverge Hallandale Off-Ramp	1500'	-	5845	34.3 (D)	5886	34.7 (D)
7	Basic Hallandale Off-Ramp to Pembroke Rd On-Ramp	1500'	-	4538	18.5 (C)	4529	18.5 (C)
8	Merge Pembroke Rd On-Ramp	1500'	-	4538	21.1 (C)	4529	20.7 (C)
9	Basic Pembroke Rd On-Ramp to EL Egress	600'	-	5244	21.4 (C)	5188	21.2 (C)
10	Merge EL Egress	1500'	-	5244	19.8 (B)	5188	20.8 (C)
11	Basic EL Egress to Hallandale Beach Blvd On-Ramp	750'	-	6049	24.9 (C)	6145	25.4 (C)
12	Weave Hallandale Beach Blvd On-Ramp to Ives Dairy Rd Off-Ramp	3850'	4136'	6049	26.4 (C)	6145	27.2 (C)
13	Basic South of Ives Dairy Rd	500'	-	5033	20.6 (C)	4703	19.2 (C)

Figure 6.18 – 2040 Alternative 1 Southbound Freeway Analysis Results

Table 6.3 – 2040 Alternative 2 Northbound Freeway Analysis Results

#	I-95 Northbound Segment 2040 Alternative 2	Analysis Type	Freeway		Ramp		Density pc/mi/ln AM (PM)	LOS AM (PM)
			No. of Lanes	Demand* vph AM (PM)	No. of Lanes	Demand vph 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 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 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 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 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 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 6.4 – 2040 Alternative 2 Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2040 Alternative 2	Analysis Type	Freeway		Ramp		Density pc/mi/ln AM (PM)	LOS AM (PM)
			No. of Lanes	Demand* vph AM (PM)	No. of Lanes	Demand vph 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 Hollywood Blvd Off-Ramp	Weave	5	7,184 (7,061)	-	-	34 (32.8)	D (D)
3	Hollywood Blvd Off-Ramp to EL 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-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 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 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 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)

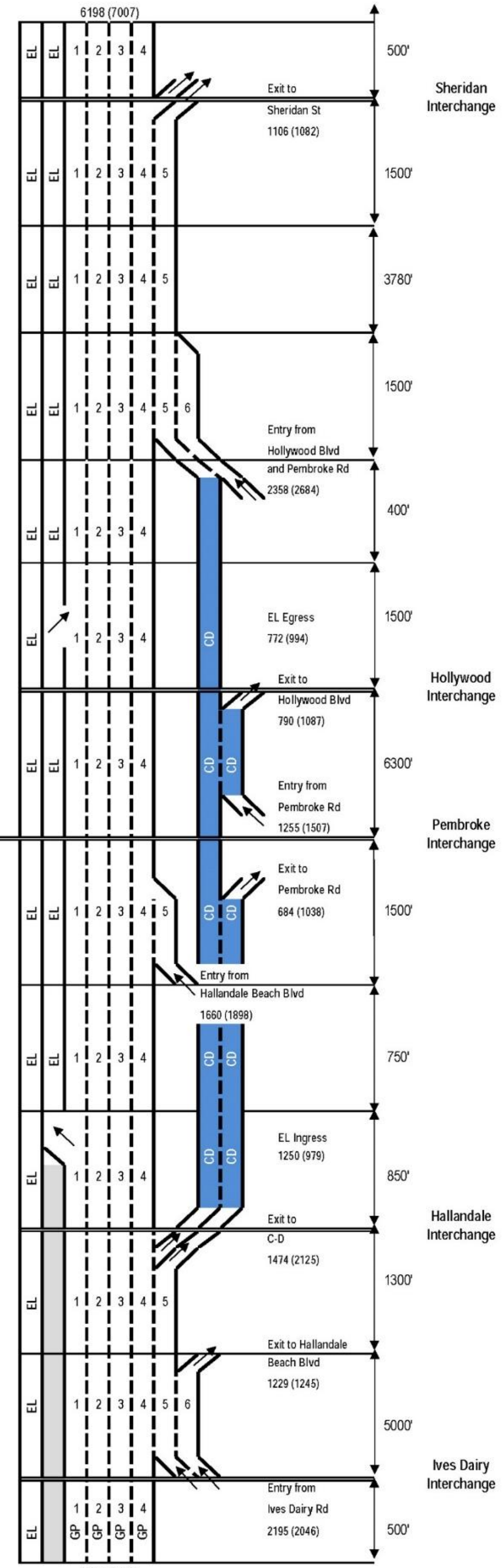
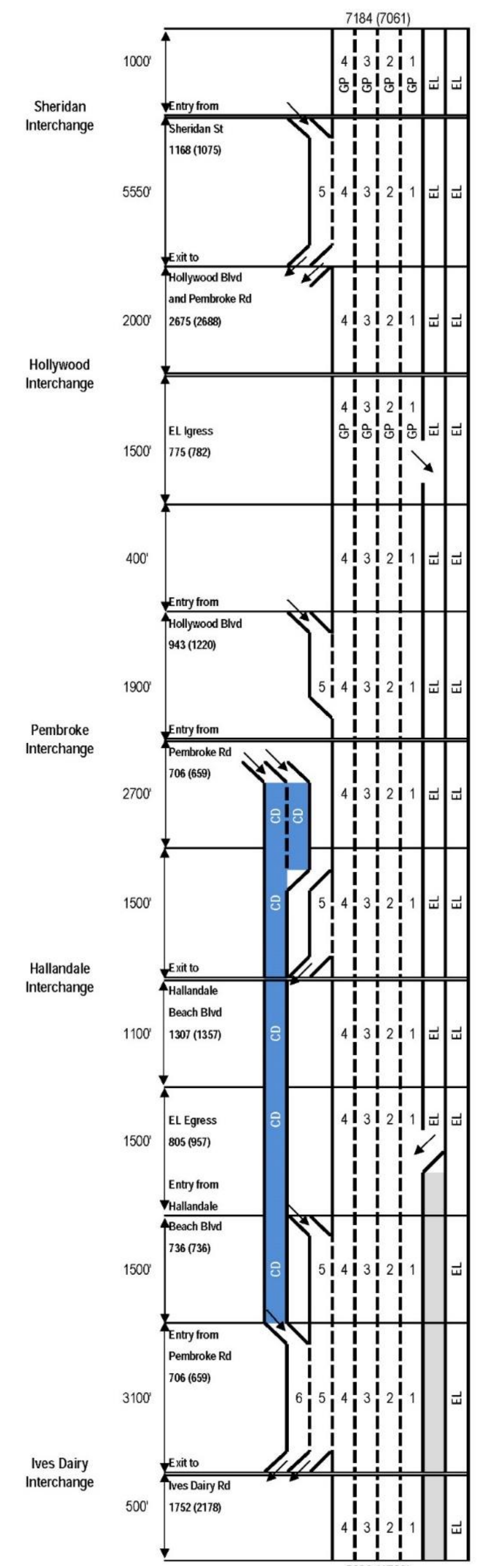


Figure 6.19 – 2040 Alternative 2 Northbound Freeway Analysis Results



#	Segment	Length	Max Weave Length	AM Demand* in vph	AM Density (LOS)	PM Demand* in vph	PM Density (LOS)
1	Basic North of Sheridan St	1000'	-	7184	31.1 (D)	7061	30.3 (D)
2	Weave Sheridan St On-Ramp to Hollywood Blvd Off-Ramp	5550'	4792'	7184	34 (D)	7061	32.8 (D)
3	Basic Hollywood Blvd Off-Ramp to EL Ingress	2000'	-	5677	23.3 (C)	5448	22.2 (C)
4	Diverge EL Ingress	1500'	-	5677	29 (D)	5448	28 (C)
5	Basic EL Ingress to Hollywood On-Ramp	400'	-	4902	20 (C)	4666	19 (C)
6	Merge Hollywood On-Ramp	1900'	-	4902	19.7 (B)	4666	21.1 (C)
7	Basic Hollywood On-Ramp to Hallandale Beach Blvd Off-Ramp	2700'	-	5845	24 (C)	5886	24.2 (C)
8	Diverge Hallandale Beach Blvd Off-Ramp	1500'	-	5845	23.5 (C)	5886	23.9 (C)
9	Basic Hallandale Beach Blvd Off-Ramp to EL Egress	1100'	-	4538	18.5 (C)	4529	18.5 (C)
10	Merge EL Egress	1500'	-	4538	21.8 (C)	4529	23 (C)
11	Basic Hallandale Beach Blvd On-Ramp	1500'	-	5343	21.8 (C)	5486	22.4 (C)
12	Weave Pembroke Rd On-Ramp to Ives Dairy Rd Off-Ramp	3100'	5681'	6079	23.3 (C)	6222	22.9 (C)
13	Basic South of Ives Dairy Rd	500'	-	5033	20.6 (C)	4703	19.2 (C)

Figure 6.20 – 2040 Alternative 2 Southbound Freeway Analysis Results

6.5 Selection of Preferred Alternative

Alternative 2 was selected as the preferred alternative based on the alternatives alignment analysis and the evaluation results documented during the PD&E Study. 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, traffic, socio-economic, environmental and project cost (see ***Table 6.5*** – Evaluation Matrix). The key components of the alternatives 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, interchange access, system linkage, modal interrelationships, social demand, economic development 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.

- **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.

- **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.

- **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 6.1*** 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 7.0***.

Table 6.5 – 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 Substandard interchange spacing Relocation of off-ramps impacts uniformity of the corridor	Meets criteria Combines ramps improving interchange spacing Maintains ramp uniformity		✓
Multimodal Facilities	No change	Provides the ability to enhance bus service operations Improves bicycle and pedestrian facilities Impacts public transportation shuttle route between Pembroke Road and Hollywood Boulevard	Provides the ability to enhance bus service operations Improves bicycle and pedestrian facilities Impacts public transportation shuttle route between Pembroke Road and Hollywood Boulevard	✓	✓
Mobility	Increased congestion	Adds capacity Improves the traffic operations of the area	Adds capacity Improves the traffic operations of the area 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/ programmed ramp terminal safety improvements	Reduces long-term crashes related to heavy congestion, mainline weaving maneuvers, mainline and ramp speed differentials and interstate access	Reduces long-term crashes related to heavy congestion, mainline weaving maneuvers, mainline and ramp speed differentials and interstate access Reduces the number of entrances and exits to/from I-95		✓
Drainage Analysis	No impact	Less impacts than Alternative 2 Alternative 1 requires a smaller roadway footprint	More impacts than Alternative 1 Alternative 2 requires a larger roadway footprint	✓	
Structures Analysis	No change	New bridges = 4 Bridge widenings = 2 Less new bridges than Alternative 2	New bridges = 5 Bridge widenings = 2 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 Less impacts than Alternative 2	Moderate impacts during construction More impacts than Alternative 1	✓	
Purpose and Need	Does not meet	Meets	Meets	✓	✓

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 Southbound = 4	Northbound = 3 Southbound = 2	Northbound = 1 Southbound = 2 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 More locations with LOS A, B & C		✓
I-95 Locations with LOS D by 2040 AM (PM)	5 (6) = 11	9 (7) = 16 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 6 locations Southbound	6 locations Northbound 6 locations Southbound	4 locations Northbound 4 locations Southbound Less mainline access points		✓
Northbound Mainline Access	Hallandale to Pembroke access maintained Pembroke to Hollywood access maintained	Hallandale to Pembroke access not provided Pembroke to Hollywood not provided	Hallandale to Pembroke access not provided Pembroke to Hollywood access maintained via CD Pembroke to Hollywood access is maintained		✓
Southbound Mainline Access	Hollywood to Pembroke access maintained Pembroke to Hallandale access maintained	Hollywood to Pembroke not provided Pembroke to Hallandale not provided	Hollywood to Pembroke not provided Pembroke to Hallandale not provided	✓	✓
*Northbound Off-Ramp Storage	Hallandale ~ 1,550 ft Pembroke ~ 1,760 ft Hollywood ~ 1,920 ft	Hallandale ~ 1,800 ft Pembroke ~ 4,575 ft Hollywood ~ 5,950 ft	Hallandale ~ 2,100 ft Pembroke ~ 4,575 ft Hollywood > 5,950 ft Provides more storage for off ramps		✓
*Southbound Off-Ramp Storage	Hollywood ~ 1,875 ft Pembroke ~ 2,050 ft Hallandale ~ 1,950 ft	Hollywood ~ 2,625 ft Pembroke ~ 6,500 ft Hallandale ~ 4,880 ft Overall Alternative 1 has more storage when compared to Alternative 2.	1. Hollywood ~ 2,575 ft 2. Pembroke ~ 7,800 ft 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		✓

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		✓
Cost					
Construction Cost	No construction, No cost involved = $0	$127 Million	$105 Million Lower cost when compared to Alternative 1		✓
Right of Way/Business Damages	None = $0	$53 Million	$57 Million	✓	

*** The total ramp storage is measured as the distance from the stop bar to the painted nose of the gore. This ramp length is utilized for both vehicle storage and vehicle deceleration.**

7.0 PREFERRED ALTERNATIVE

7.1 PREFERRED ALTERNATIVE ROADWAY NETWORK

Alternative 2 was selected as the preferred alternative based on the alternatives alignment analysis and the evaluation results documented during the PD&E Study. The preferred alternative proposes a collector distributor roadway system within the I-95 mainline project area and ramp terminal improvements. 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.

The preferred alternative roadway typical section varies slightly and consists primarily of four 11-foot (11') wide express lanes (two in each direction), four 12-foot (12') wide general use lanes (two in each direction), four 11-foot (11') wide general use lanes (two in each direction), a three-foot (3') wide buffer area with pavement markings and express lane markers separating the general use lanes from the express lanes, five-foot to 12-foot (5'–12') wide inside shoulders, 12-foot (12') wide outside shoulders, 12-foot (12') wide auxiliary lanes at selected locations, and a 2.5-foot (2.5') wide center barrier wall.

The PD&E Study proposed changes to the I-95 corridor roadway section by the year 2030 are listed below:

- Two 12-foot (12') wide auxiliary lanes in each direction between Ives Dairy Road and Hallandale Beach Boulevard.
- Two-lane 24-foot (24') wide collector distributor roadway ramp between south of Hallandale Beach Boulevard and north of Hollywood Boulevard with six-foot (6') wide inside shoulder and 10-foot (10') wide outside shoulder.
- One-lane 15-foot (15') wide southbound collector distributor roadway ramp with 6-foot wide inside and outside shoulders.

The three I-95 roadway cross sections between interchange are depicted in ***Figure 7.1 – Figure 7.3***. These figures depict the 2030 and 2045 preferred alternative roadway cross sections. The 2045 roadway section includes the District Six I-95 Planning Study, District Four I-95 CPS and District Four I-95 Express Phase 3C improvements.

The Preferred Alternative is also proposing interchange and ramp terminal intersection improvements to support the optimal operations of the corridor. ***Figure 7.4*** and ***Appendix M*** and ***M2*** depict all the improvements proposed by the Preferred Alternative.

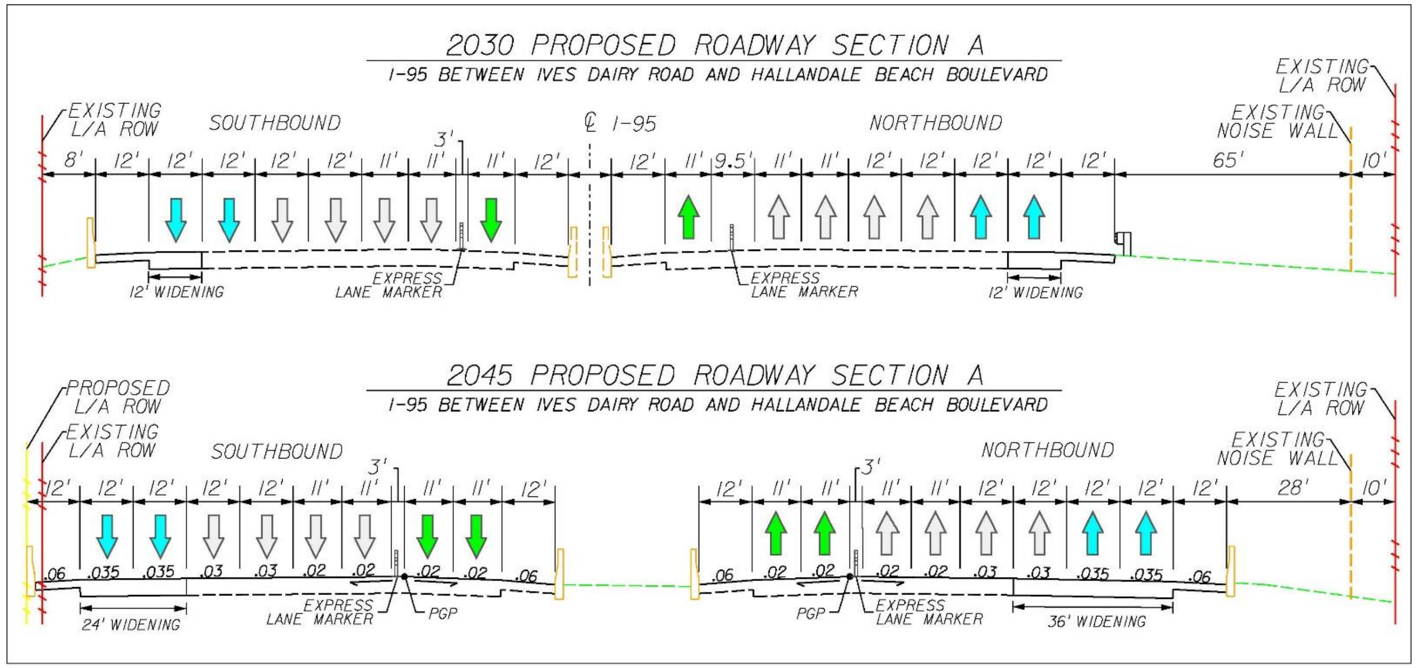


Figure 7.1 – Preferred Alternative Roadway Section A

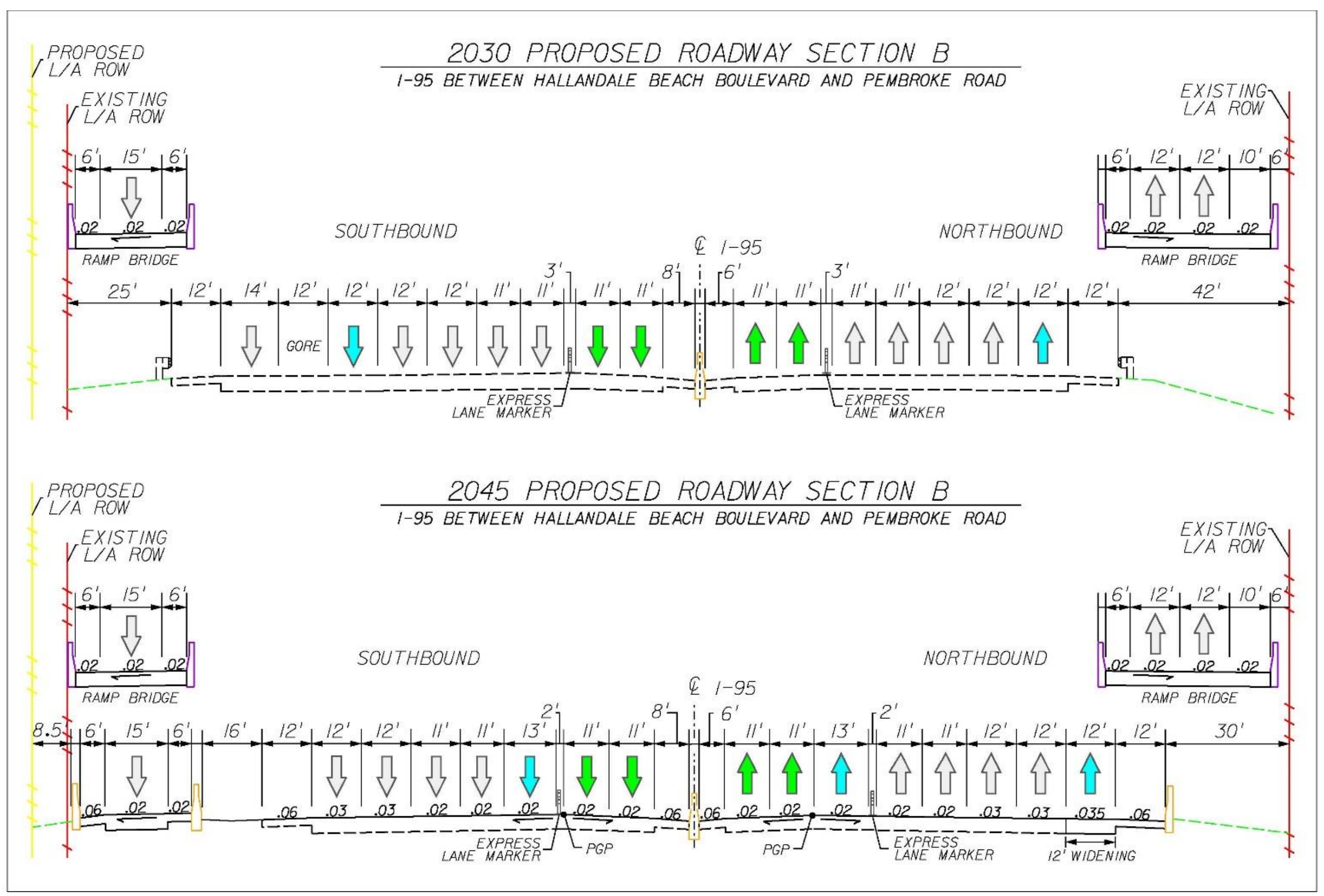


Figure 7.2 – Preferred Alternative Roadway Section B

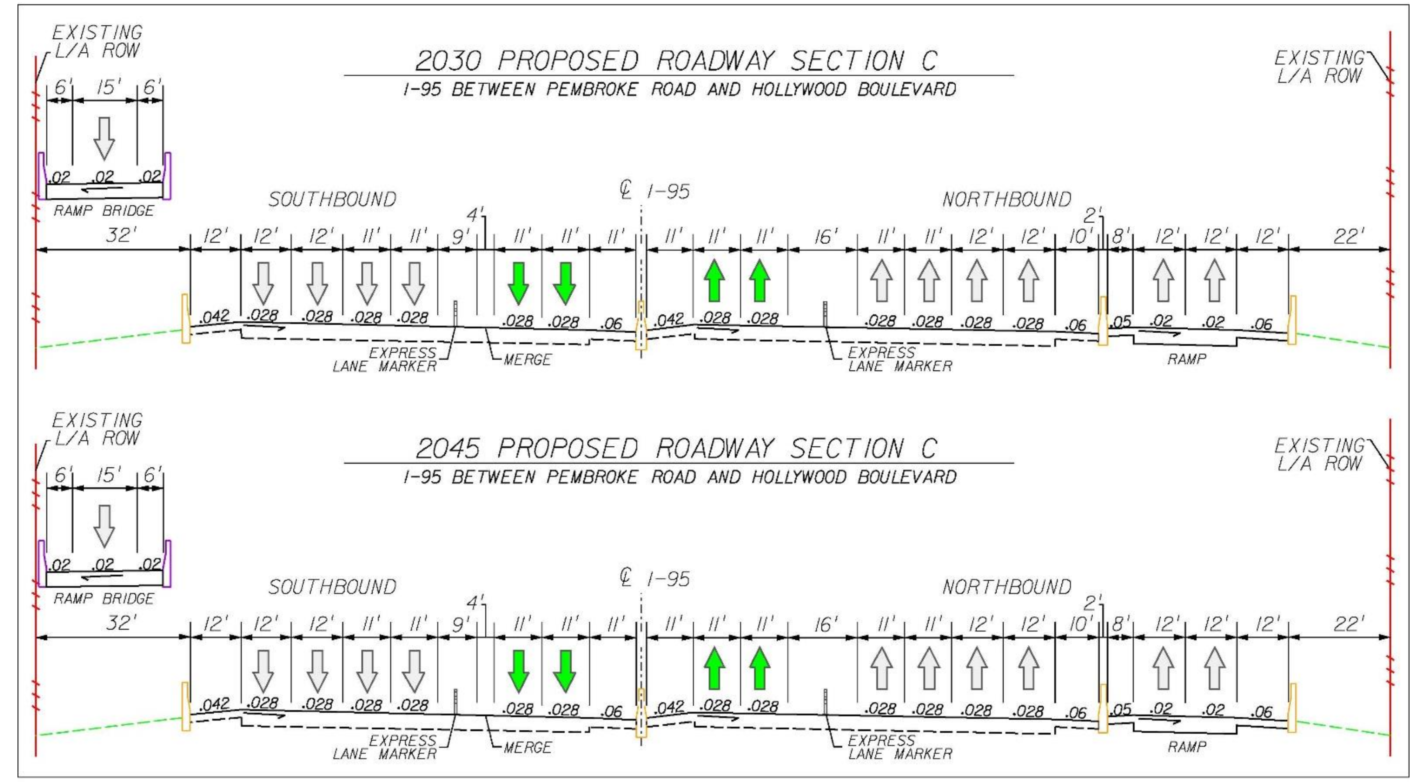
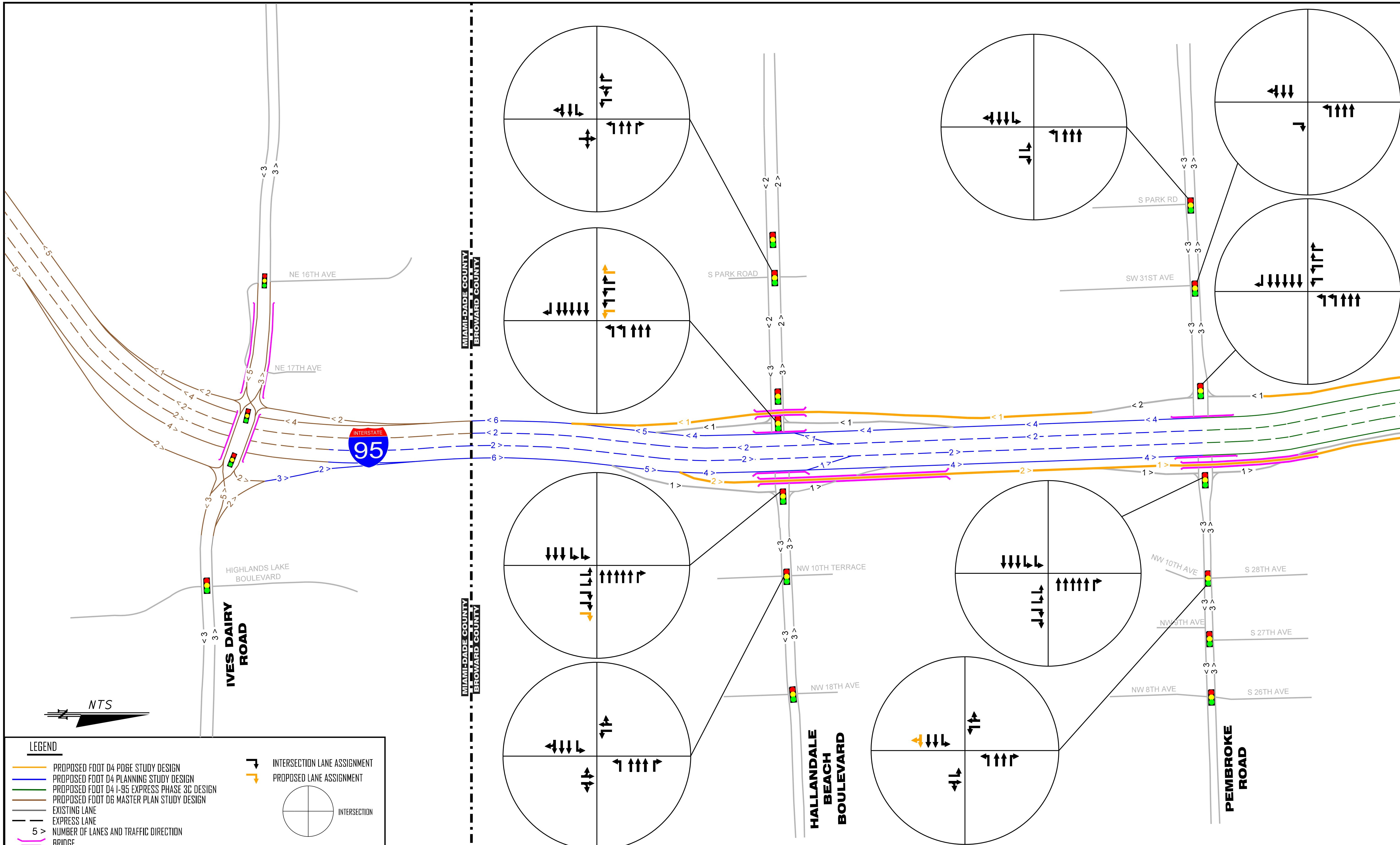


Figure 7.3 – Preferred Alternative Roadway Section C



FDOT

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

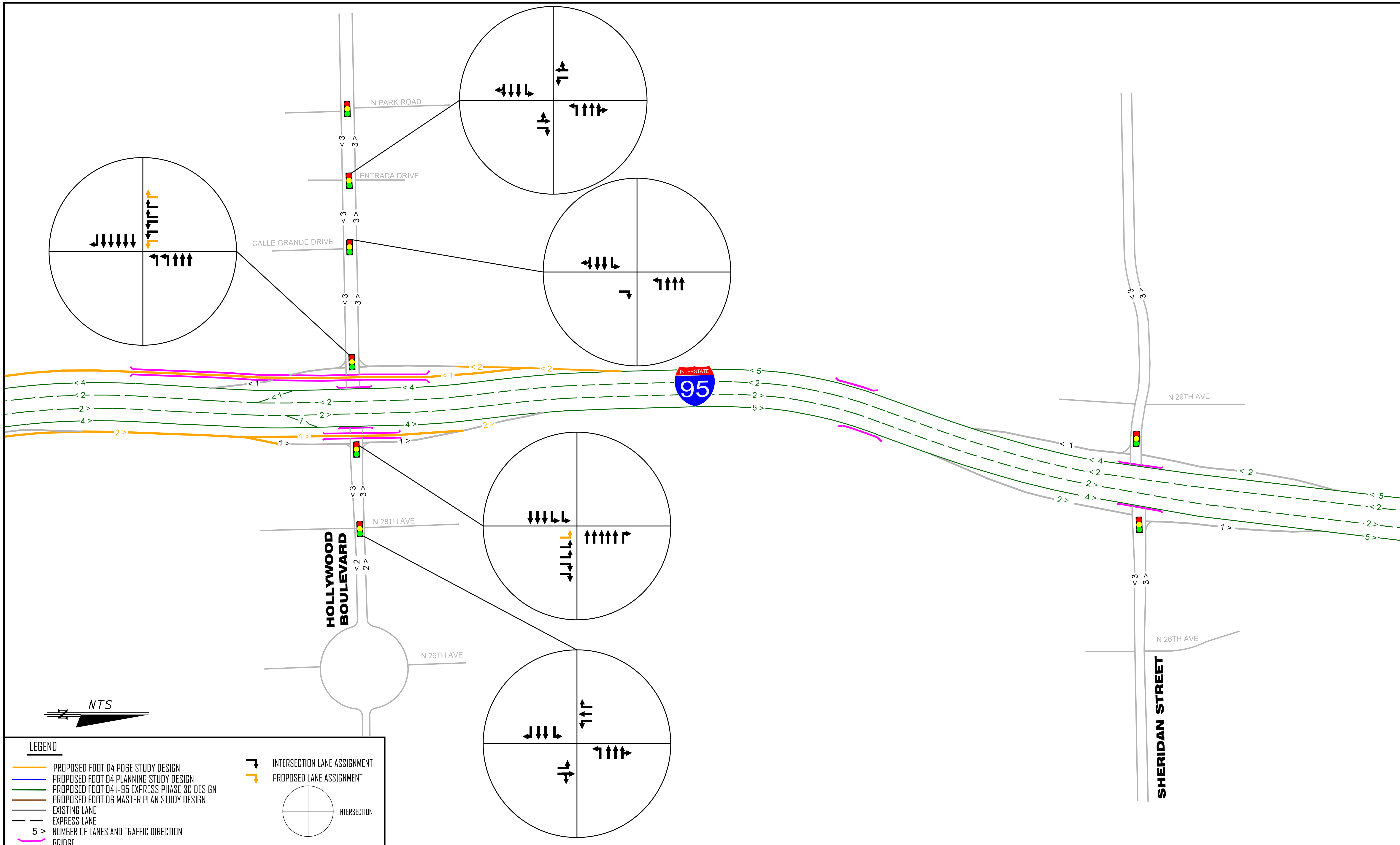
OCTOBER 2020

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
2045 PREFERRED ALTERNATIVE LINE DIAGRAM

FIGURE 7.4

7-3



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

OCTOBER 2020

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

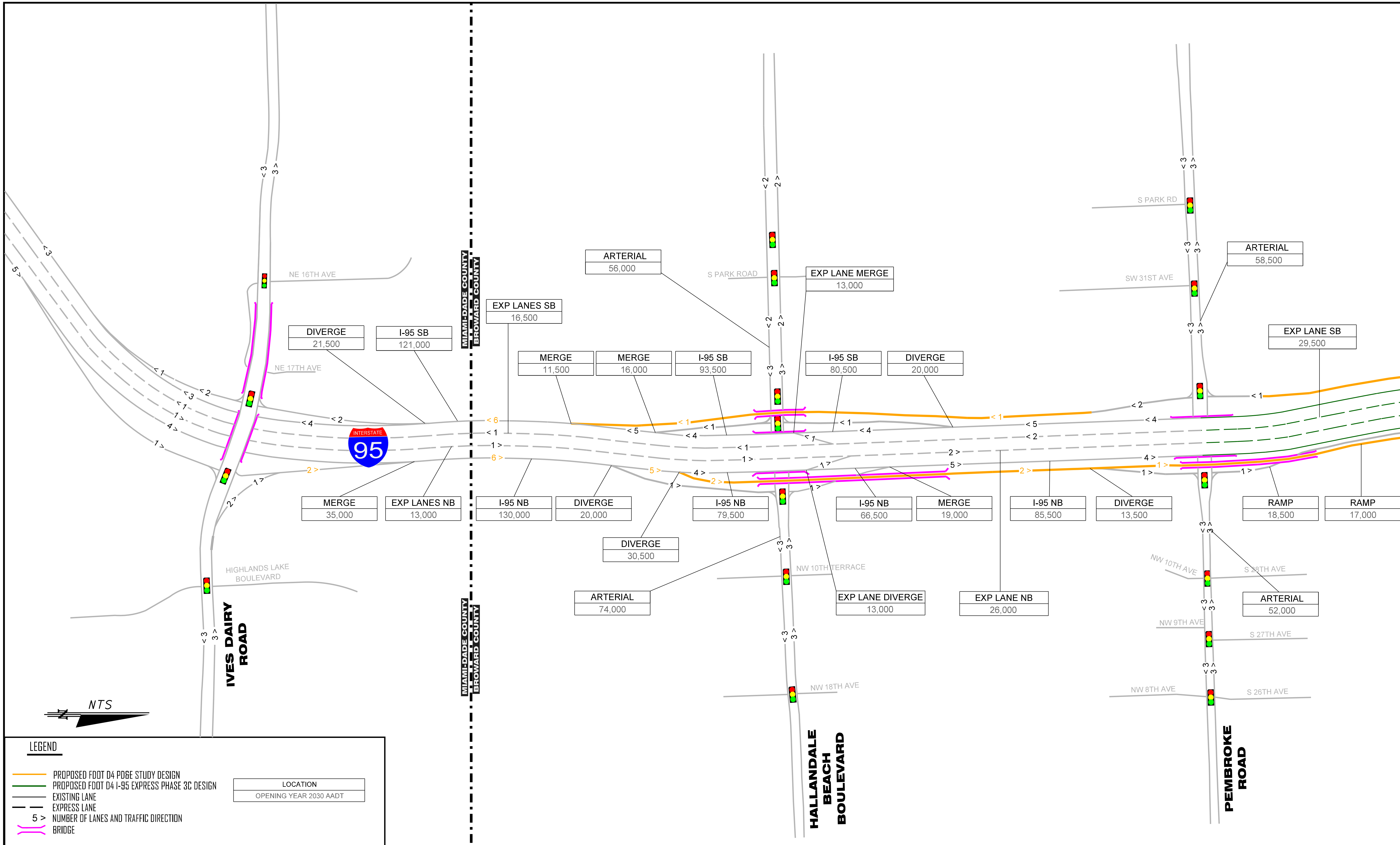
from South of Hallandale Beach Boulevard (SR 858) to North of Hollywood Boulevard (SR 820)
FPID No.: 436903-1-22-02
ETDM No.: 14254

SR 9 (INTERSTATE 95)
LANE GEOMETRY AND CONFIGURATIONS
2045 PREFERRED ALTERNATIVE LINE DIAGRAM

FIGURE
7.4

7.2 Preferred Alternative – 2030 Traffic Forecast

Opening year 2030 traffic forecast was developed for the Preferred Alternative consistent with the methodology defined in ***Section 2.0*** of this SIMR. Opening year traffic was developed by interpolation between the years 2016 and 2045. ***Figure 7.5*** shows the Preferred Alternative 2030 AADT volumes for the study area.



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

SEPTEMBER 2020

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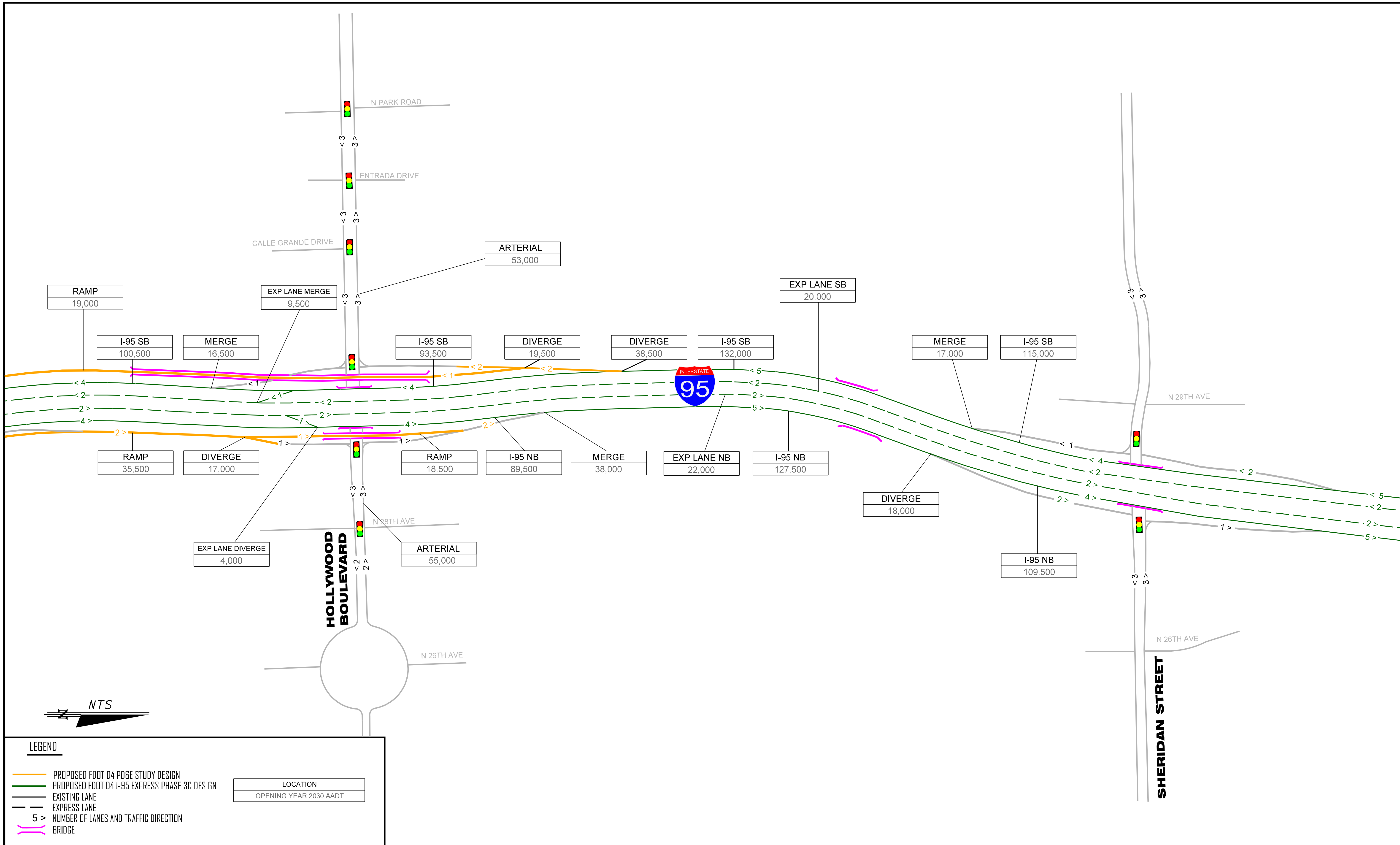
ANNUAL AVERAGE DAILY TRAFFIC (AADT)
2030 OPENING YEAR BUILD ALTERNATIVE

FIGURE 7.5



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ANNUAL AVERAGE DAILY TRAFFIC (AADT) 2030 OPENING YEAR BUILD ALTERNATIVE

FIGURE 7.5

7.3 Preferred Alternative – 2030 Operational Analysis

7.3.1 I-95 Operational Analysis

Density, volume/capacity ratio, and LOS of each freeway facility were used as MOEs, which is consistent with the existing conditions analysis. The Preferred Alternative 2030 mainline/basic, weaving, and ramp merge/diverge analysis results are summarized in ***Tables 7.1 – 7.2***. The analysis results are also schematically summarized in ***Figure 7.6***. Output HCS reports are included as ***Appendix N***.

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

Table 7.1 – 2030 Preferred Alternative Northbound Freeway Analysis Results

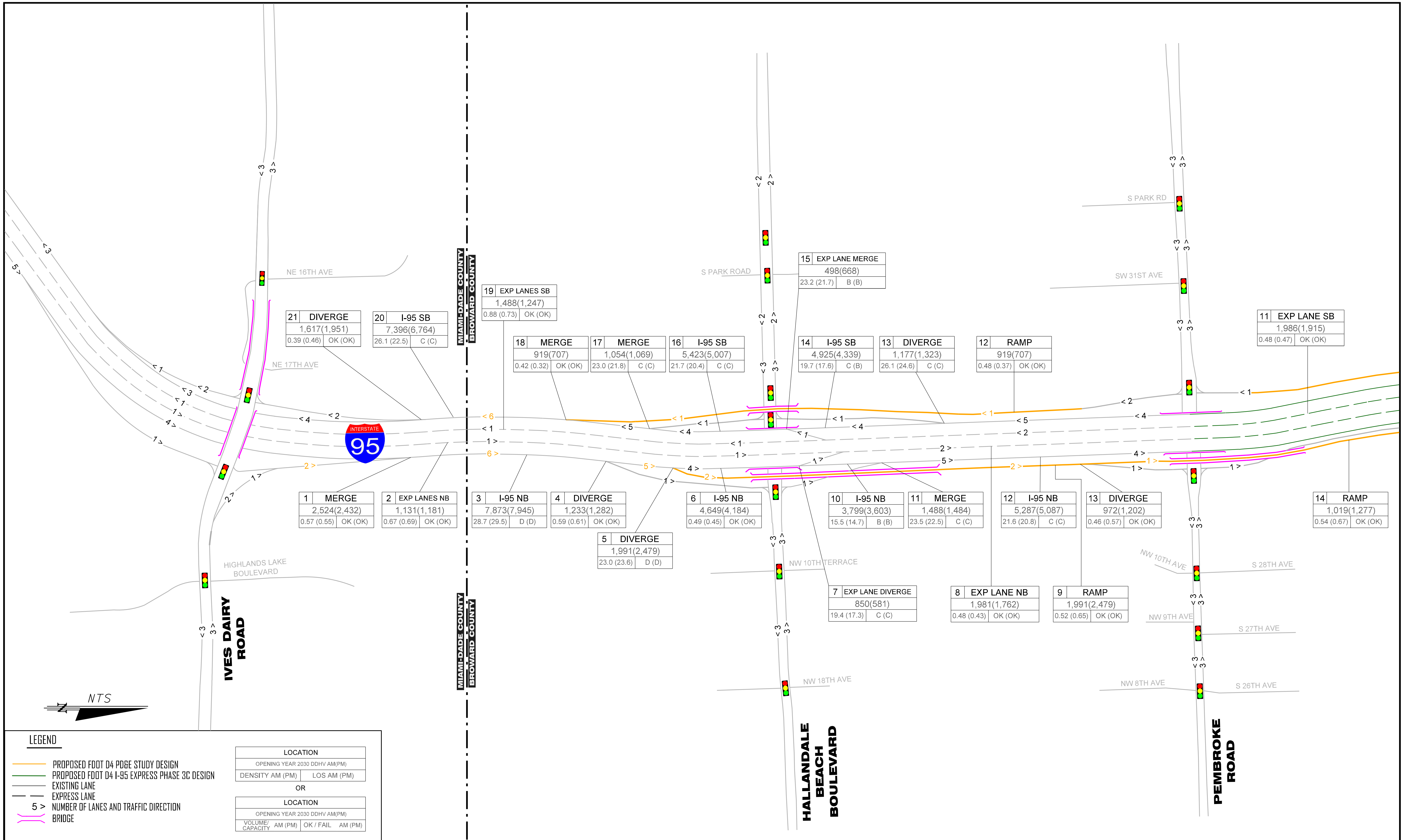
#	I-95 Northbound Segment 2030 Preferred Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/C Ratio	Ramp V/C Ratio	Density (pc/mi/ln)	LOS
22	Sheridan Street Off-Ramp	Diverge	2	1,161 (1,202)	0.76 (0.71)	0.30 (0.30)	28.9 (27.1)	D (C)
21	Hollywood Boulevard On-Ramp to Sheridan Street Off-Ramp	Basic	5	8,410 (8,234)	0.76 (0.71)	-	28.4 (26.3)	D (D)
20	Express Lane North of Hollywood Boulevard	Basic	2	1,332 (1,244)	0.32 (0.30)	-	-	-
19	Hollywood Boulevard/Collector Distributor Road On-Ramp	Merge	2	2,474 (2,304)	0.76 (0.71)	0.64 (0.58)	32.4 (29.2)	D (C)
18	Express Lane Egress to Hollywood Boulevard On-Ramp	Basic	4	5,936 (5,930)	0.67 (0.63)	-	24.4 (22.9)	C (C)
17	Collector Distributor Road north of Hollywood Boulevard	Ramp	1	1,240 (1,106)	-	0.65 (0.58)	-	-
16	Express Lane Egress	Merge	1	649 (518)	0.67 (0.63)	0.32 (0.25)	26.5 (24.7)	C (B)
15	Collector Distributor Road south of Hollywood Boulevard	Ramp	2	2,259 (2,383)	0.59 (0.63)	-	-	-
14	Collector Distributor Road north of Pembroke Road	Ramp	1	1,019 (1,277)	-	0.54 (0.67)	-	-
13	Pembroke Road Off-Ramp	Diverge	1	972 (1,202)	-	0.46 (0.57)	-	-
12	Hallandale Beach Boulevard On-Ramp to Express Lane Egress	Basic	4	5,287 (5,087)	0.60 (0.57)	-	21.6 (20.8)	C (C)
11	Hallandale Beach Boulevard On-Ramp	Merge	1	1,488 (1,484)	0.60 (0.57)	0.75 (0.75)	23.5 (22.5)	C (C)
10	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	3, 799 (3,603)	0.43 (0.41)	-	15.5 (14.7)	B (B)
9	Collector Distributor Road north of Hallandale Beach Boulevard	Ramp	2	1,991 (2,479)	0.52 (0.65)	-	-	-
8	Express Lane North of Hallandale Beach Boulevard	Basic	2	1,981 (1,762)	0.48 (0.43)	-	-	-
7	Express Lane Ingress	Diverge	1	850 (581)	0.53 (0.47)	0.41 (0.28)	19.4 (17.3)	C (C)
6	Collector Distributor Road to Express Lane Ingress	Basic	4	4,649 (4,184)	0.49 (0.45)	-	-	-
5	Collector Distributor Road	Diverge	2	1,991(2,479)	0.60 (0.60)	0.50 (0.62)	23.0 (23.6)	D (D)
4	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,233 (1,282)	-	0.59 (0.61)	-	-
3	Ives Dairy Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	6	7,873 (7,945)	0.85 (0.86)	-	28.7 (29.5)	D (D)
2	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,131 (1,181)	0.67 (0.69)	-	-	-
1	Ives Dairy Road On-Ramp	Merge	2	2,524 (2,432)	-	0.57 (0.55)	-	-

Notes: # - segment number
Ramp volume to capacity ratios were provided for merge/diverge areas for information only.

Table 7.2 – 2030 Preferred Alternative Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2030 Preferred Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/C Ratio	Ramp V/C Ratio	Density (pc/mi/ln)	LOS
1	Sheridan Street On-Ramp	Merge	1	1,230 (1,071)	-	0.59 (0.51)	-	-
2	Express Lane North of Hollywood Boulevard	Basic	2	1,400 (1,076)	0.34 (0.26)	-	-	-
3	Sheridan Street On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	8,199 (7,911)	0.89 (0.90)	-	32.8 (31.9)	D (D)
4	Collector Distributor Road Off-Ramp	Basic	2	2 ,580 (2,601)	0.63 (0.60)	-	22.6 (21.7)	C (C)
5	Hollywood Boulevard Off-Ramp	Diverge	1	1,338 (1,438)	-	0.64 (0.68)	-	-
6	Hollywood Boulevard Off-Ramp to Express Lane Ingress	Basic	4	5,619 (5,310)	0.63 (0.60)	0.28 (0.41)	22.9 (22.2)	C (C)
7	Express Lane Ingress	Basic	1	586 (839)	0.56 (0.51)	-	20.2 (18.3)	C (C)
8	Hollywood Boulevard On-Ramp	Merge	1	1,069 (1,172)	0.68 (0.64)	0.53 (0.59)	26.8 (25.0)	C (C)
9	Hollywood Boulevard On-Ramp to Hallandale Beach Off-Ramp	Basic	4	6,102 (5,643)	0.68 (0.64)	-	24.7 (23.1)	C (C)
10	Collector Distributor Road south of Hollywood Boulevard	Ramp	1	1,242 (1,163)	-	0.65 (0.61)	-	-
11	Express Lane North of Hallandale Beach Boulevard	Basic	2	1,986 (1,915)	0.48 (0.47)	-	-	-
12	Collector Distributor Road south of Pembroke Road	Ramp	1	919 (707)	0.48 (0.37)	-	-	-
13	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,177 (1,323)	0.68 (0.64)	0.60 (0.67)	26.1 (24.6)	C (C)
14	Hallandale Beach Blvd Off-Ramp to Express Lane Egress	Basic	4	4,925 (4,339)	0.56 (0.49)	-	19.7 (17.6)	C (B)
15	Express Lane Egress	Merge	1	498 (668)	0.61 (0.56)	0.24 (0.32)	23.2 (21.7)	B (B)
16	Express Lane Egress to Hallandale Beach Boulevard On-Ramp	Basic	4	5,423 (5,007)	0.61 (0.56)	-	21.7 (20.4)	C (C)
17	Hallandale Beach Boulevard On-Ramp	Merge	1	1,054 (1,069)	0.59 (0.55)	0.53 (0.54)	23.0 (21.8)	C (C)
18	Collector Distributor Road On-Ramp	Merge	1	919 (707)	-	0.42 (0.32)	-	-
19	Express Lane South of Hallandale Beach Boulevard	Basic	1	1,488 (1,247)	0.88 (0.73)	-	-	-
20	Collector Distributor Road On-Ramp to Ives Dairy Road Off-Ramp	Weave	6	7,396 (6,764)	0.63 (0.62)	-	26.1 (22.5)	C (C)
21	Ives Dairy Road Off-Ramp	Diverge	2	1,617 (1,951)	-	0.39 (0.46)	-	-

Notes: # - segment number
Ramp volume to capacity ratios were provided for merge/diverge areas for information only.



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INTERSTATE 95

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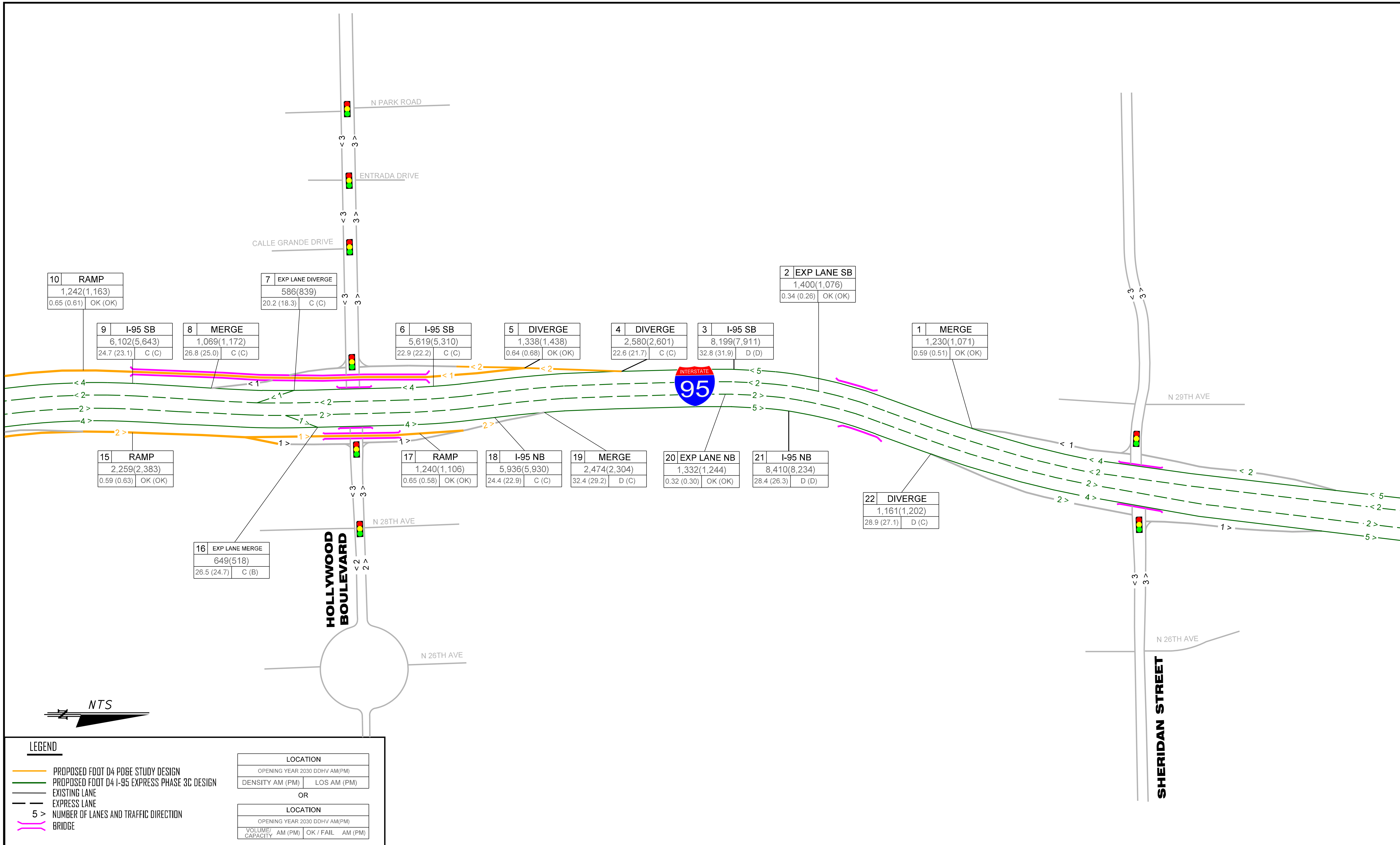
2030 OPENING YEAR PREFERRED ALTERNATIVE OPERATIONAL ANALYSIS RESULTS

FIGURE 7.6



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2030 OPENING YEAR PREFERRED ALTERNATIVE OPERATIONAL ANALYSIS RESULTS

FIGURE 7.6

7.3.2 Crossing Roadways Operational Analysis

Tables 7.3 – 7.5 and ***Figure 7.7*** document the intersections operational analysis by crossing roadway. Synchro output reports are provided in ***Appendix O***.

As shown in ***Table 7.3***, the 2030 preferred alternative intersection operational results indicate all four intersections will operate at a LOS D or better.

As shown in ***Table 7.4***, the 2030 preferred alternative intersection operational results indicate all five intersections will operate at a LOS D or better.

As shown in ***Table 7.5***, the 2030 preferred alternative intersection operational results indicate all five intersections will operate at a LOS D or better.

Table 7.3 – 2030 Hallandale Beach Boulevard Intersection LOS and Delay Results

Hallandale Beach Boulevard Intersection	Movement	Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
South Park Road*	EBL	10.2	B	22.7	C
	EBT	12.3	B	13.1	B
	WBL	5.0	A	4.7	A
	WBT	5.5	A	9.9	A
	WBR	2.4	A	1.7	A
	NBT	72.1	E	90.7	F
	SBL	67.9	E	82.5	F
	SBT	68.3	E	81.8	F
	SBR	52.0	D	59.3	E
	Int	**13.1**	**B**	**16.3**	**B**
I-95 West Ramp Terminal*	EBT	44.9	D	44.6	D
	EBR	37.8	D	57.2	E
	WBL	20.4	C	26.1	C
	WBT	7.9	A	22.5	C
	SBL	51.4	D	53.1	D
	SBR	50.1	D	54.9	D
	Int	**33.9**	**C**	**39.5**	**D**
I-95 East Ramp Terminal*	EBL	29.7	C	41.2	D
	EBT	24.3	C	35.0	D
	WBT	29.2	C	30.7	C
	WBR	43.5	D	58.3	E
	NBL	40.3	D	43.1	D
	NBR	49.8	D	51.7	D
	Int	**33.5**	**C**	**40.7**	**D**
NW 10th Terrace	EBL	27.2	C	71.4	E
	EBT	17.7	B	29.9	C
	EBR	19.5	B	32.9	C
	WBL	16.4	B	31.3	C
	WBT	17.7	B	38.4	D
	WBR	9.7	A	18.3	B
	NBL	63.4	E	90.8	F
	NBR	48.1	D	48.1	D
	SBL	51.8	D	57.2	E
	SBR	47.5	D	47.9	D
	Int	**21.1**	**C**	**38.9**	**D**

*HCM 2000 results reported

Table 7.4 – 2030 Pembroke Road Intersection LOS and Delay Results

Pembroke Road Intersection	Movement	Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBU	9.5	A	12.3	B
	EBT	19.2	B	13.8	B
	WBL	68.7	E	32.5	C
	WBT	4.1	A	1.2	A
	NBL	59.5	E	53.1	D
	NBR	46.3	D	41.9	D
	Int	**17.7**	**B**	**10.8**	**B**
SW 31st Avenue*	EBT	0.5	A	0.3	A
	WBL	69.5	E	62.7	E
	WBT	0.2	A	0.2	A
	NBR	54.8	D	53.2	D
	Int	**2.0**	**A**	**1.7**	**A**
I-95 West Ramp Terminal*	EBT	18.7	B	21.5	C
	EBR	25.7	C	13.1	B
	WBL	49.6	D	40.1	D
	WBT	15.3	B	17.8	B
	SBL	34.6	C	30.3	C
	SBR	44.7	D	40.6	D
	Int	**26.5**	**C**	**24.1**	**C**
I-95 East Ramp Terminal*	EBL	33.3	C	32.8	C
	EBT	10.5	B	14.5	B
	WBT	19.0	B	19.3	B
	WBR	7.7	A	4.1	A
	NBL	46.6	D	39.4	D
	NBR	51.2	D	42.0	D
	Int	**23.0**	**C**	**23.1**	**C**
NW 10th Avenue / South 28th Avenue	EBL	21.1	C	20.3	C
	EBT	22.6	C	21.2	C
	EBR	25.1	C	23.1	C
	WBL	35.6	D	32.1	C
	WBT	28.6	C	28.5	C
	WBR	21.7	C	21.4	C
	NBL	49.3	D	47.1	D
	NBR	31.0	C	29.5	C
	SBL	40.4	D	41.1	D
	SBR	160.1	F	186.8	F
	Int	**37.5**	**D**	**37.8**	**D**

*HCM 2000 results reported

Table 7.5 – 2030 Hollywood Boulevard Intersection LOS and Delay Results

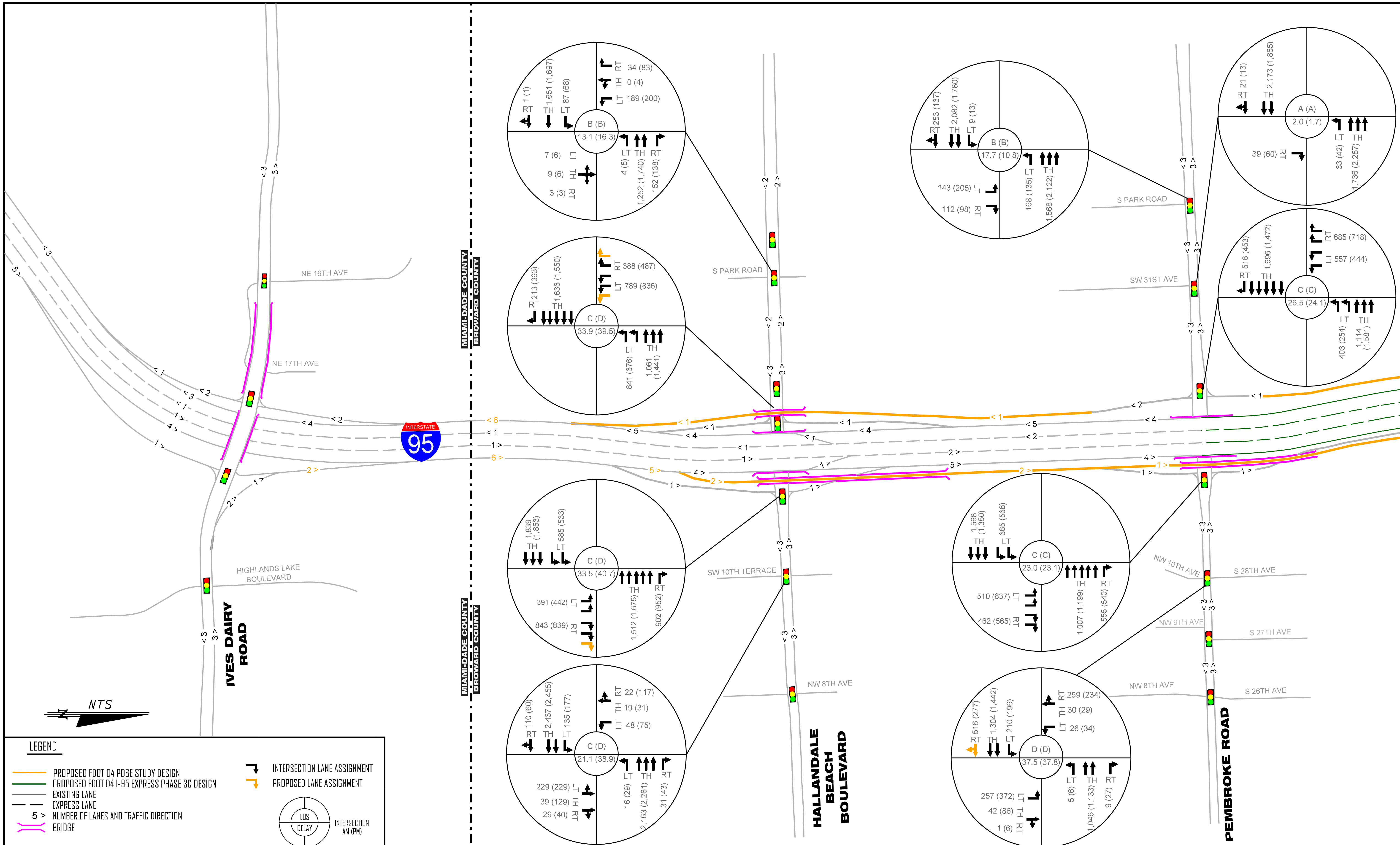
Hollywood Boulevard Intersection	Movement	Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Entranda Drive	EBL	4.9	A	10.9	B
	EBT	8	A	17.0	B
	EBR	8.4	A	17.7	B
	WBL	5.8	A	13.1	B
	WBT	0.6	A	1.3	A
	WBR	1.0	A	2.4	A
	NBL	61.2	E	53.4	D
	NBR	58.4	E	46.8	D
	SBL	70.4	E	76.0	E
	SBR	60.1	E	49.9	D
	Int	**7.3**	**A**	**13.6**	**B**
Calle Grande Drive*	EBU	52.0	D	54.3	D
	EBT	8.1	A	8.5	A
	WBL	60.2	E	69.1	E
	WBT	3.3	A	3.1	A
	NBR	5.9	A	5.8	A
	Int	**6.0**	**A**	**6.0**	**A**
I-95 West Ramp Terminal*	EBT	19.2	B	28.7	C
	EBR	59.8	E	61.8	E
	WBL	53.4	D	31.6	C
	WBT	12.0	B	12.0	B
	SBL	46.1	D	47.0	D
	SBR	50.4	D	56.3	E
	Int	**34.4**	**C**	**35.4**	**D**
I-95 East Ramp Terminal*	EBL	57.2	E	30.8	C
	EBT	14.4	B	15.1	B
	WBT	21.4	C	28.1	C
	WBR	33.1	C	31.8	C
	NBL	45.4	D	46.2	D
	NBR	49.3	D	62.3	E
	Int	**31.0**	**C**	**32.1**	**C**

*HCM 2000 results reported

Table 7.5 – 2030 Hollywood Boulevard Intersection LOS and Delay Results (Continued)

Hollywood Boulevard Intersection	Movement	Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
S 28th Avenue*	EBL	20.4	C	37.6	D
	EBT	18.2	B	30.3	C
	EBR	18.1	B	11.2	B
	WBL	31.0	C	41.5	D
	WBT	44.1	D	50.6	D
	NBL	68.2	E	74.0	E
	NBT	59.7	E	61.3	E
	SBL	53.8	D	52.6	D
	SBT	65.1	E	57.6	E
	SBR	79.4	E	110.5	F
	Int	**39.8**	**D**	**48.9**	**D**

*HCM 2000 results reported



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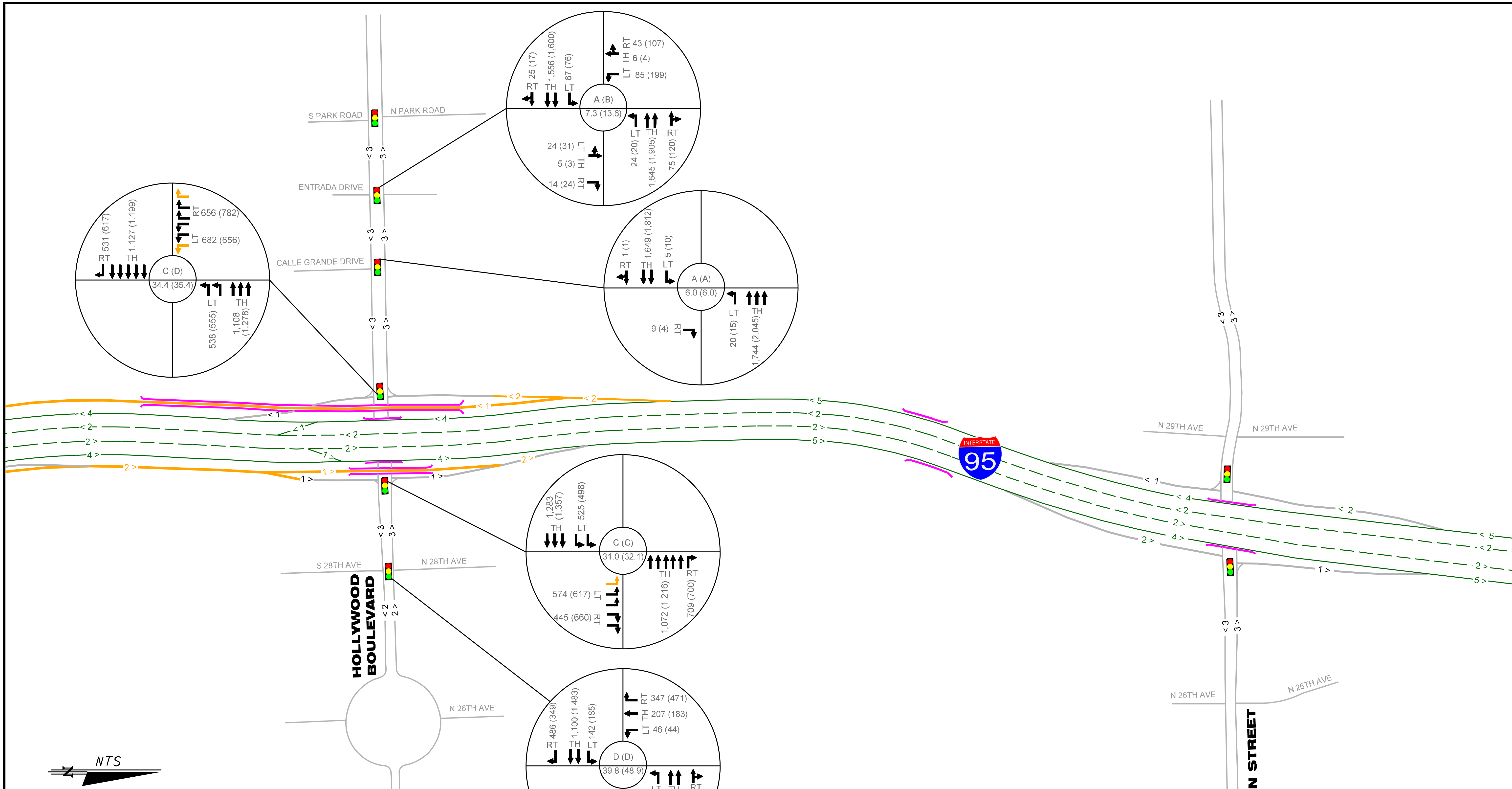
2030 OPENING YEAR PREFERRED ALTERNATIVE INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE 7.7



LEGEND

- PROPOSED FDOT D4 PD&E STUDY DESIGN
- PROPOSED FDOT D4 I-95 EXPRESS PHASE 3C DESIGN
- EXISTING LANE
- EXPRESS LANE
- 5 > NUMBER OF LANES AND TRAFFIC DIRECTION
- BRIDGE
- INTERSECTION LANE ASSIGNMENT
- PROPOSED LANE ASSIGNMENT
- LOS / DELAY — INTERSECTION AM (PM)

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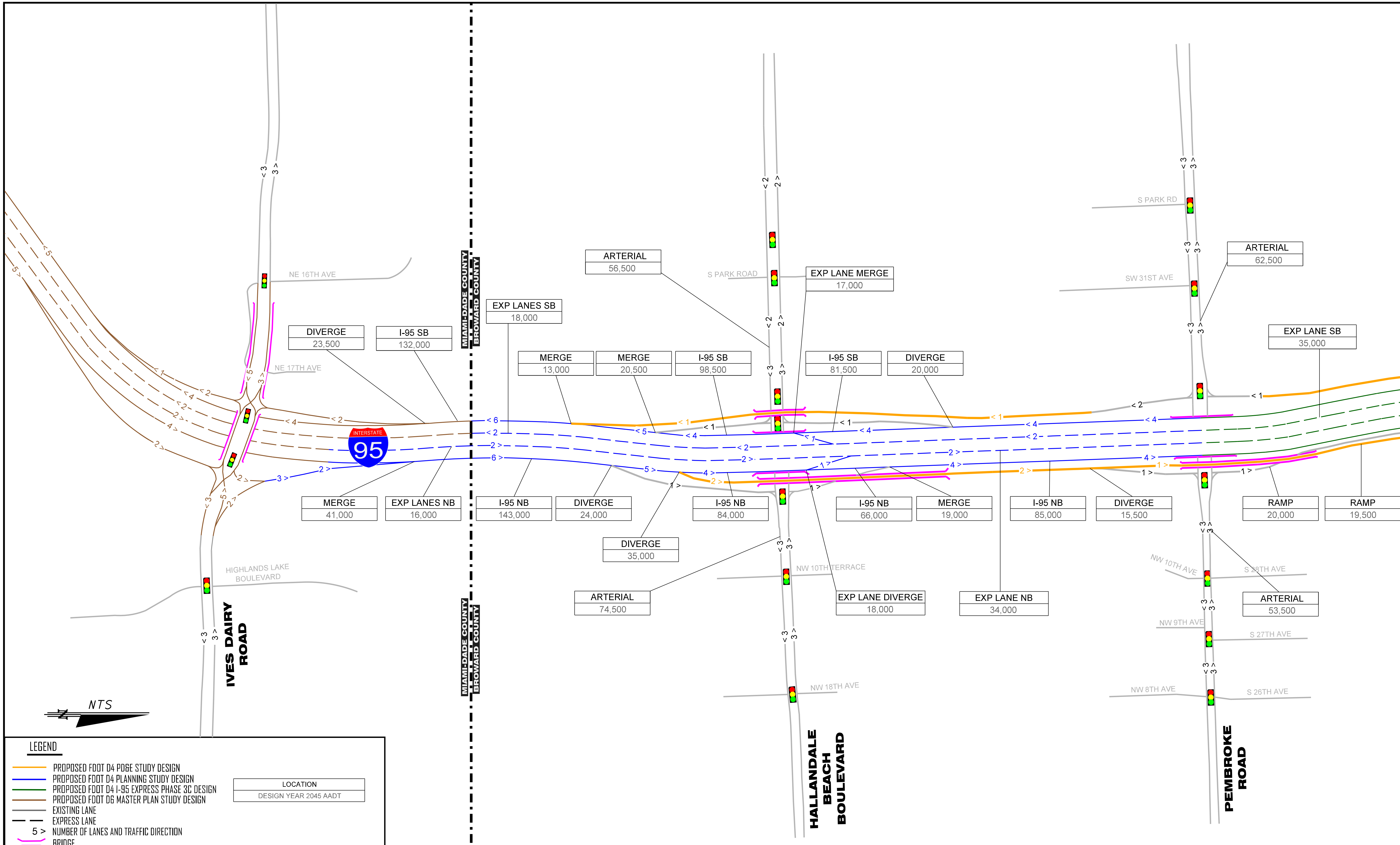
2030 OPENING YEAR PREFERRED ALTERNATIVE INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE 7.7

7.4 Preferred Alternative – 2045 Traffic Forecast

Design year 2045 traffic forecast was developed for the Preferred Alternative consistent with the methodology defined in ***Section 2.0*** of this SIMR. ***Figure 7.8*** shows the Preferred Alternative 2045 AADT volumes for the study area.



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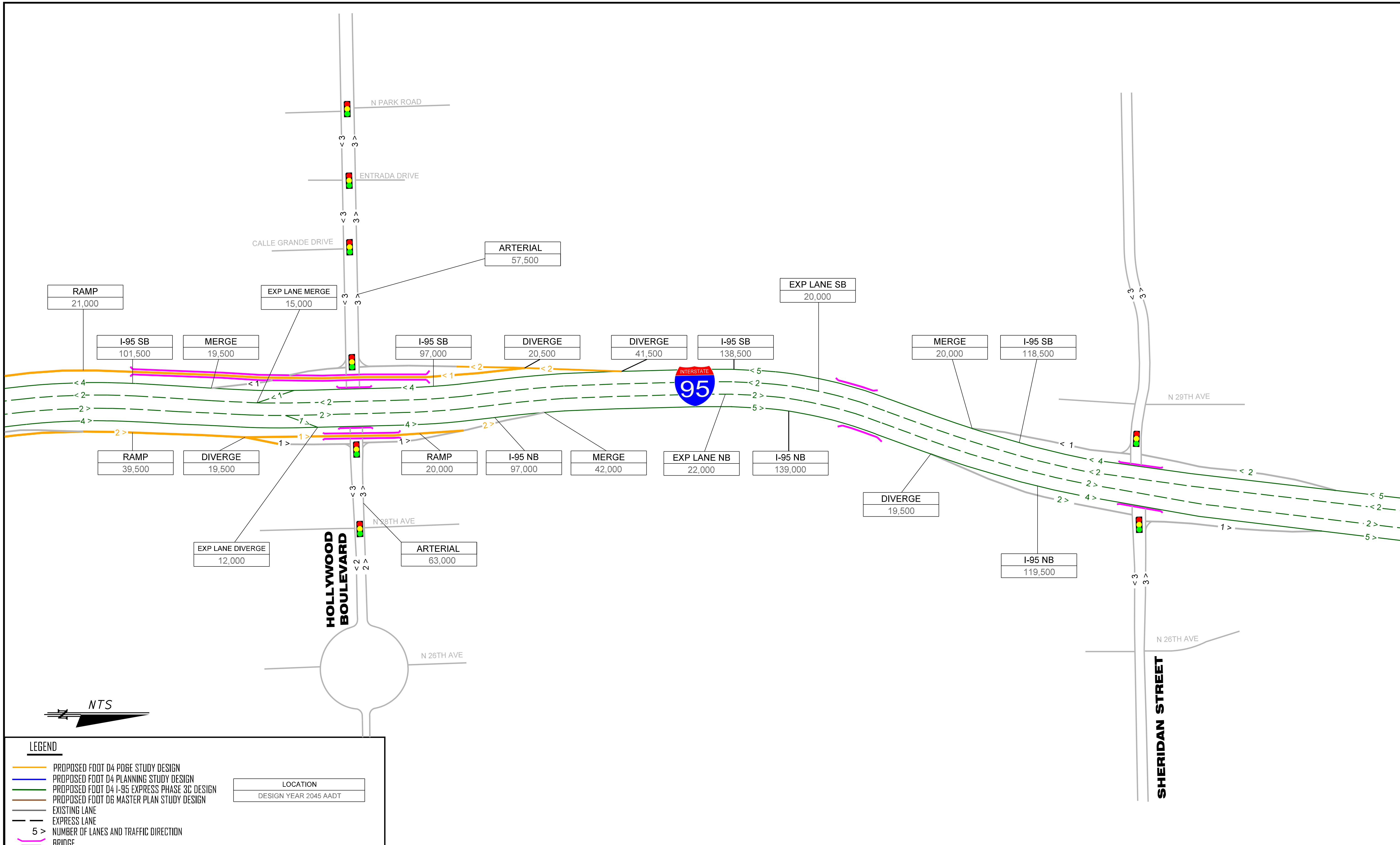
ANNUAL AVERAGE DAILY TRAFFIC (AADT)
2045 DESIGN YEAR BUILD ALTERNATIVE

FIGURE 7.8



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ANNUAL AVERAGE DAILY TRAFFIC (AADT)
2045 DESIGN YEAR BUILD ALTERNATIVE

FIGURE
7.8

7.5 Preferred Alternative – 2045 Operational Analysis

7.5.1 I-95 Operational Analysis

Density, volume/capacity ratio, and LOS of each freeway facility were used as MOEs, which is consistent with the existing conditions analysis. The Preferred Alternative 2045 mainline/basic, weaving, and ramp merge/diverge analysis results are summarized in ***Tables 7.6 – 7.7***. The analysis results are also schematically summarized in ***Figure 7.9***. Output HCS reports are included as ***Appendix P***.

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

Table 7.6 – 2045 Preferred Alternative Northbound Freeway Analysis Results

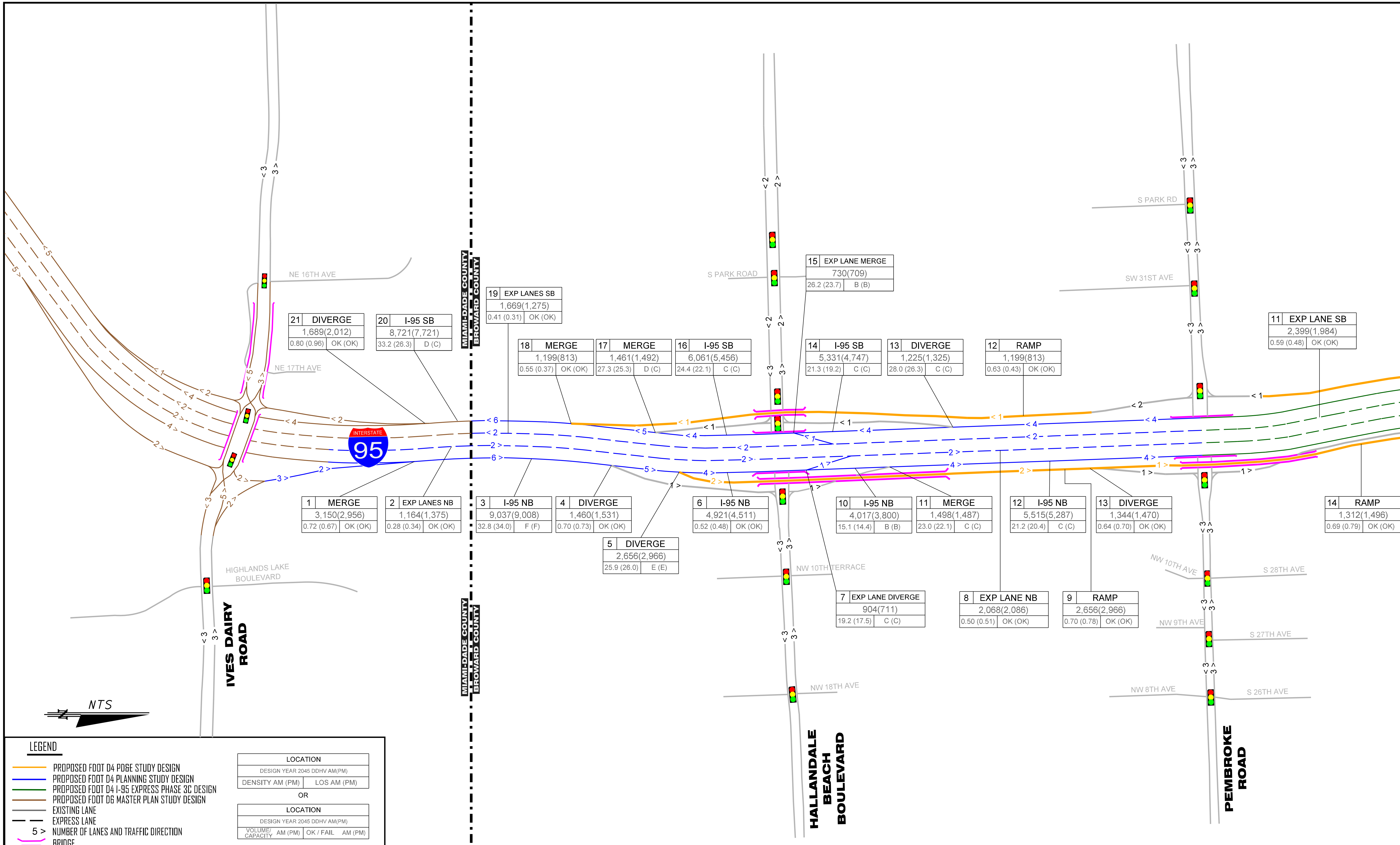
#	I-95 Northbound Segment 2045 Preferred Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/c Ratio AM(PM)	Ramp V/c Ratio AM(PM)	Density (pc/mi/ln)	LOS
22	Sheridan Street Off-Ramp	Diverge	2	1,285 (1,457)	0.82 (0.78)	0.33 (0.36)	30.5 (28.6)	D (D)
21	Hollywood Boulevard On-Ramp to Sheridan Street Off-Ramp	Basic	5	9,073 (8,601)	0.82 (0.78)	-	30.3 (27.8)	D (D)
20	Express Lane North of Hollywood Boulevard	Basic	2	1,332 (1,244)	0.32 (0.30)	-	-	-
19	Hollywood Boulevard/Collector Distributor Road On-Ramp	Merge	2	2,822 (2,471)	0.83 (0.77)	0.73 (0.62)	35.8 (31.3)	D (D)
18	Express Lane Egress to Hollywood Boulevard On-Ramp	Basic	4	6,251 (6,130)	0.71 (0.69)	-	24.4 (23.9)	D (C)
17	Collector Distributor Road north of Hollywood Boulevard	Ramp	1	1,347 (1,146)	-	0.71 (0.60)		
16	Express Lane Egress	Merge	1	736 (843)	0.71 (0.69)	0.36 (0.40)	26.4 (25.9)*	C (C)*
15	Collector Distributor Road south of Hollywood Boulevard	Ramp	2	2,659 (2,642)	0.70 (0.70)	-	-	-
14	Collector Distributor Road north of Pembroke Road	Ramp	1	1,312 (1,496)	-	0.69 (0.79)	-	-
13	Pembroke Road Off-Ramp	Diverge	1	1,344 (1,470)	-	0.64 (0.70)	-	-
12	Hallandale Beach Boulevard On-Ramp to Express Lane Egress	Basic	4	5,515 (5,287)	0.62 (0.60)	-	21.2 (20.4)	C (C)
11	Hallandale Beach Boulevard On-Ramp	Merge	1	1,498 (1,487)	0.62 (0.60)	0.76 (0.75)	23.0 (22.1)	C (C)
10	Express Lane Ingress to Hallandale Beach Boulevard On-Ramp	Basic	4	4,017 (3,800)	0.45 (0.43)	-	15.1 (14.4)	B (B)
9	Collector Distributor Road north of Hallandale Beach Boulevard	Ramp	2	2,656 (2,966)	0.70 (0.78)	-	-	-
8	Express Lane North of Hallandale Beach Boulevard	Basic	2	2,068 (2,086)	0.50 (0.51)	-	-	-
7	Express Lane Ingress	Diverge	1	904 (711)	0.56 (0.51)	0.44 (0.34)	19.2 (17.5)**	C(C)
6	Collector Distributor Road to Express Lane Ingress	Basic	4	4,921 (4,511)	0.52 (0.48)	-	-	-
5	Collector Distributor Road	Diverge	2	2,656 (2,966)	0.68 (0.68)	0.67 (0.74)	25.9 (26.0)	**E (E)**
4	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,460 (1,531)	-	0.70 (0.73)	-	-
3	Ives Dairy Road On-Ramp to Hallandale Beach Boulevard Off-Ramp	Weave	6	9,037 (9,008)	**1.04 (1.04)**	-	32.8 (34.0)	**F (F)**
2	Express Lane South of Hallandale Beach Boulevard	Basic	2	1,164 (1,375)	0.28 (0.34)	-	-	-
1	Ives Dairy Road On-Ramp	Merge	2	3,150 (2,955)	-	0.72 (0.67)	-	-

Notes: # - segment number
Ramp volume to capacity ratios were provided for merge/diverge areas for information only.
*** In this area, downstream from the access point, the collector distributor northbound on-ramp comes is with a much higher volume when compared against the No-Build Alternative, which is a one-lane on-ramp. Operational results from the VISSIM microsimulation software should be considered. However, as expected, the V/C ratio is better than the No-Build.**
****In this area, upstream from the access point, the collector distributor northbound off-ramp diverges with a much higher volume when compared against the No-Build, which is a one-lane off-ramp. This is another area where HCS has limitations with express lane access points and weaving maneuvers. Operational results from the VISSIM microsimulation software should be considered. However, as expected, the V/C ratio is better than the No-Build.**

Table 7.7 – 2045 Preferred Alternative Southbound Freeway Analysis Results

#	I-95 Southbound Segment 2045 Preferred Alternative	Analysis Type	No. of Lanes	Demand vph AM(PM)	Freeway V/c Ratio AM(PM)	Ramp V/c Ratio AM(PM)	Density (pc/mi/ln)	LOS
1	Sheridan Street On-Ramp	Merge	1	1,374 (1,121)	-	0.65 (0.53)	-	-
2	Express Lane North of Hollywood Boulevard	Basic	2	1,400 (1,076)	0.34 (0.26)	-	-	-
3	Sheridan Street On-Ramp to Hollywood Boulevard Off-Ramp	Weave	5	9,016 (8,117)	0.95 (0.91)	-	36.8 (33.0)	E (D)
4	Collector Distributor Road Off-Ramp	Basic	2	2,741 (2,613)	0.70 (0.62)	-	25.5 (22.5)	C (C)
5	Hollywood Boulevard Off-Ramp	Diverge	1	1,351 (1,448)	-	0.64 (0.69)	-	-
6	Hollywood Boulevard Off-Ramp to Express Lane Ingress	Basic	4	6,275 (5,504)	0.70 (0.62)	0.48 (0.44)	25.9 (23.0)	D (D)
7	Express Lane Ingress	Basic	1	999 (908)	0.59 (0.52)	-	21.1 (18.8)	C (C)
8	Hollywood Boulevard On-Ramp	Merge	1	1,280 (1,436)	0.73 (0.68)	0.64 (0.73)	29.0 (27.0)	C (C)
9	Hollywood Boulevard On-Ramp to Hallandale Beach Off-Ramp	Basic	4	6,556 (6,032)	0.73 (0.68)	-	26.9 (24.9)	D (C)
10	Collector Distributor Road south of Hollywood Boulevard	Ramp	1	1,390 (1,165)	-	0.73 (0.61)	-	-
11	Express Lane North of Hallandale Beach Boulevard	Basic	2	2,399 (1,984)	0.59 (0.48)	-	-	-
12	Collector Distributor Road south of Pembroke Road	Ramp	1	1,199 (813)	0.63 (0.43)	-	-	-
13	Hallandale Beach Boulevard Off-Ramp	Diverge	1	1,225 (1,325)	0.73 (0.68)	0.62 (0.67)	28.0 (26.3)	C (C)
14	Hallandale Beach Blvd Off-Ramp to Express Lane Egress	Basic	4	5,331 (4,707)	0.60 (0.53)	-	21.3 (19.2)	C (C)
15	Express Lane Egress	Merge	1	730 (709)	0.68 (0.61)	0.35 (0.34)	26.2 (23.7)	B (B)
16	Express Lane Egress to Hallandale Beach Boulevard On-Ramp	Basic	4	6,061 (5,416)	0.68 (0.61)	-	24.4 (22.1)	C (C)
17	Hallandale Beach Boulevard On-Ramp	Merge	1	1,461 (1,492)	0.68(0.62)	0.74 (0.75)	27.3 (25.3)	D (C)
18	Collector Distributor Road On-Ramp	Merge	1	1, 199 (813)	-	0.55 (0.37)	-	-
19	Express Lane South of Hallandale Beach Boulevard	Basic	2	1,669 (1,275)	0.41 (0.31)	-	-	-
20	Collector Distributor Road On-Ramp to Ives Dairy Road Off-Ramp	Weave	6	8,721 (7,721)	0.69 (0.64)	-	33.2 (26.3)	D (C)
21	Ives Dairy Road Off-Ramp	Diverge	2	1,689 (2,012)	-	0.80 (0.96)	-	-

Notes: # - segment number
Ramp volume to capacity ratios were provided for merge/diverge areas for information only.



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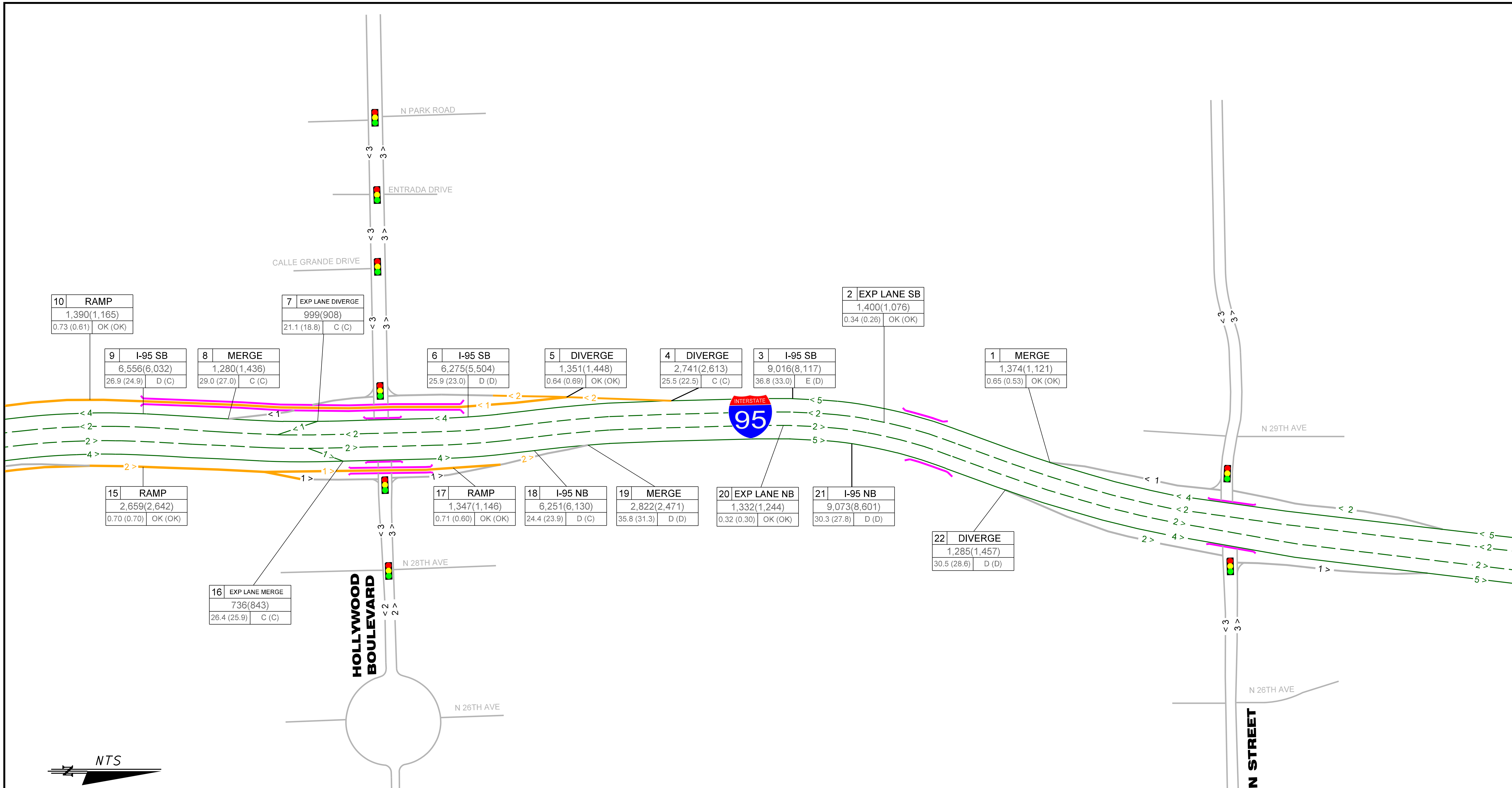
JANUARY 2021

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

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

2045 DESIGN YEAR PREFERRED ALTERNATIVE OPERATIONAL ANALYSIS RESULTS

FIGURE 7.9



LEGEND

- PROPOSED FDOT D4 PD&E STUDY DESIGN
- PROPOSED FDOT D4 PLANNING STUDY DESIGN
- PROPOSED FDOT D4 I-95 EXPRESS PHASE 3C DESIGN
- PROPOSED FDOT D6 MASTER PLAN STUDY DESIGN
- EXISTING LANE
- EXPRESS LANE
- 5 > NUMBER OF LANES AND TRAFFIC DIRECTION
- BRIDGE

LOCATION	
DESIGN YEAR 2045 DDHV AM(PM)	
DENSITY AM (PM)	LOS AM (PM)

OR

LOCATION			
DESIGN YEAR 2045 DDHV AM(PM)			
VOLUME/ CAPACITY	AM (PM)	OK / FAIL	AM (PM)

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FIGURE 7.9

7.5.2 Crossing Roadways Operational Analysis

Tables 7.8 – 7.10 and ***Figure 7.10*** document the intersections operational analysis by crossing roadway. Synchro output reports are provided in ***Appendix Q***.

As shown in ***Table 7.8***, the 2045 preferred alternative intersection operational results indicate all four intersections will operate at a LOS D or better.

As shown in ***Table 7.9***, the 2045 preferred alternative intersection operational results indicate all five intersections will operate at a LOS D or better.

As shown in ***Table 7.10***, the 2045 preferred alternative operational results indicate four intersections will operate at a LOS D or better and one intersection will operate at a LOS F during the PM peak-period.

Several off-ramp movements are expected to operate at LOS E. These movements in the 2045 build conditions will operate better than the No-Build Alternative. At the HCM level, these analyses have the best timing combination possible at each location. The microsimulation analysis (see ***Section 7.6***) evaluated these locations further confirming that the queues from these ramps do not impact the I-95 mainline.

Table 7.8 – 2045 Hallandale Beach Boulevard Intersection LOS and Delay Results

Hallandale Beach Boulevard Intersection	Movement	Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
South Park Road*	EBL	14.2	B	28.7	C
	EBT	13.8	B	16.0	B
	WBL	5.1	A	3.7	A
	WBT	6.1	A	9.4	A
	WBR	1.2	A	0.5	A
	NBT	97.6	F	87.6	F
	SBL	93.0	F	87.5	F
	SBT	93.0	F	87.0	F
	SBR	67.1	E	64.0	E
	Int	**15.6**	**B**	**17.6**	**B**
I-95 West Ramp Terminal*	EBT	52.8	D	35.1	D
	EBR	79.8	E	39.2	D
	WBL	73.4	E	40.2	D
	WBT	6.5	A	16.1	B
	SBL	65.7	E	66.2	E
	SBR	66.6	E	69.7	E
	Int	**51.4**	**D**	**38.4**	**D**
I-95 East Ramp Terminal*	EBL	45.9	D	41.4	D
	EBT	40.9	D	32.9	C
	WBT	48.8	D	37.9	D
	WBR	58.1	E	68.0	E
	NBL	50.1	D	50.7	D
	NBR	63.6	E	67.1	E
	Int	**49.8**	**D**	**46.2**	**D**
NW 10th Terrace	EBL	55.5	E	75.2	E
	EBT	23.2	C	31.5	C
	EBR	25.3	C	35.1	D
	WBL	24.3	C	37.4	D
	WBT	28.6	C	43.0	D
	WBR	13.5	B	18.9	B
	NBL	78.2	E	111.4	F
	NBR	57.4	E	53.0	D
	SBL	62.8	E	63.6	E
	SBR	56.6	E	53.4	D
	Int	**30.0**	**C**	**42.8**	**D**

*HCM 2000 results reported

Table 7.9 – 2045 Pembroke Road Intersection LOS and Delay Results

Pembroke Road Intersection	Movement	Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Park Road*	EBU	10.3	B	16.9	B
	EBT	21.7	C	17.4	B
	WBL	94.3	F	55.0	D
	WBT	0.5	A	1.4	A
	NBL	82.2	F	63.4	E
	NBR	58.6	E	42.9	D
	Int	**19.6**	**B**	**13.8**	**B**
SW 31st Avenue*	EBT	0.5	A	0.4	A
	WBL	82.1	F	67.0	E
	WBT	0.2	A	0.2	A
	NBR	67.9	E	57.9	E
	Int	**2.3**	**A**	**1.8**	**A**
I-95 West Ramp Terminal*	EBT	29.3	C	19.7	B
	EBR	20.7	C	13.6	B
	WBL	64.0	E	47.4	D
	WBT	17.0	B	17.1	B
	SBL	44.2	D	34.4	C
	SBR	61.0	E	54.9	D
	Int	**35.0**	**C**	**25.7**	**C**
I-95 East Ramp Terminal*	EBL	45.8	D	35.7	D
	EBT	16.2	B	15.0	B
	WBT	26.0	C	27.0	C
	WBR	12.8	B	4.1	A
	NBL	55.2	E	42.2	D
	NBR	67.6	E	54.5	D
	Int	**33.1**	**C**	**28.4**	**C**
NW 10th Avenue / South 28th Avenue	EBL	26.5	C	26.2	C
	EBT	28.2	C	24.9	C
	EBR	31.8	C	27.2	C
	WBL	50.3	D	39.7	D
	WBT	33.1	C	32.2	C
	WBR	24.8	C	24.0	C
	NBL	69.3	E	55.1	E
	NBR	37.1	D	30.7	C
	SBL	49.9	D	44.3	D
	SBR	183.3	F	259.2	F
	Int	**45.0**	**D**	**45.9**	**D**

*HCM 2000 results reported

Table 7.10 – 2045 Hollywood Boulevard Intersection LOS and Delay Results

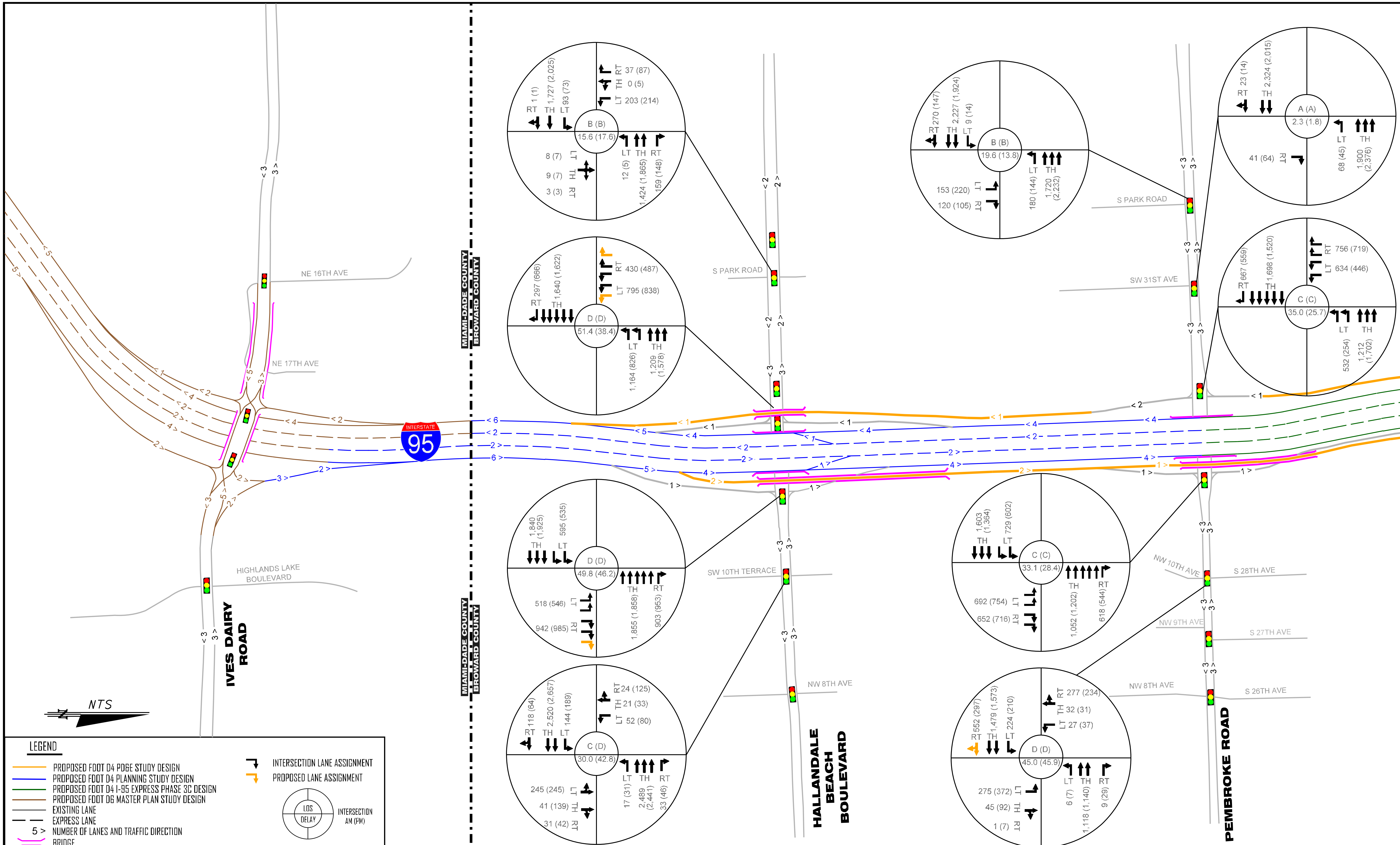
Hollywood Boulevard Intersection	Movement	Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
Entranda Drive	EBL	5.4	A	12.6	B
	EBT	9.4	A	22.4	C
	EBR	10.1	B	23.7	C
	WBL	7.1	A	18.2	B
	WBT	0.7	A	1.6	A
	WBR	1.4	A	3.0	A
	NBL	61.2	E	59.7	E
	NBR	57.5	E	50.6	D
	SBL	70.1	E	88.6	F
	SBR	59.3	E	54.3	D
	Int	**7.8**	**A**	**17.3**	**B**
Calle Grande Drive*	EBU	48.8	D	66.0	E
	EBT	8.7	A	9.3	A
	WBL	60.4	E	81.9	F
	WBT	3.6	A	2.3	A
	NBR	5.9	A	5.6	A
	Int	**6.4**	**A**	**6.2**	**A**
I-95 West Ramp Terminal*	EBT	26.3	C	27.2	C
	EBR	43.8	D	78.9	E
	WBL	44.1	D	55.0	D
	WBT	10.3	B	19.0	B
	SBL	48.6	D	52.0	D
	SBR	54.4	D	61.4	E
	Int	**32.7**	**C**	**42.9**	**D**
I-95 East Ramp Terminal*	EBL	48.0	D	44.6	D
	EBT	13.1	B	31.5	C
	WBT	20.0	C	37.9	D
	WBR	49.5	D	59.3	E
	NBL	50.2	D	44.0	D
	NBR	67.9	E	75.9	E
	Int	**35.2**	**D**	**46.0**	**D**

*HCM 2000 results reported

Table 7.10 – 2045 Hollywood Boulevard Intersection LOS and Delay Results

Hollywood Boulevard Intersection	Movement	Build Alternative			
		AM Peak		PM Peak	
		Delay (s/veh)	LOS	Delay (s/veh)	LOS
S 28th Avenue*	EBL	46.9	D	80.3	F
	EBT	23.5	C	103.3	F
	EBR	18.7	B	11.2	B
	WBL	37.8	D	51.2	D
	WBT	52.9	D	53.8	D
	NBL	66.9	E	85.5	F
	NBT	58.6	E	69.0	E
	SBL	51.8	D	58.5	E
	SBT	61.9	E	64.6	E
	SBR	93.2	F	196.3	F
	Int	**45.4**	**D**	**87.2**	**F**

*HCM 2000 results reported



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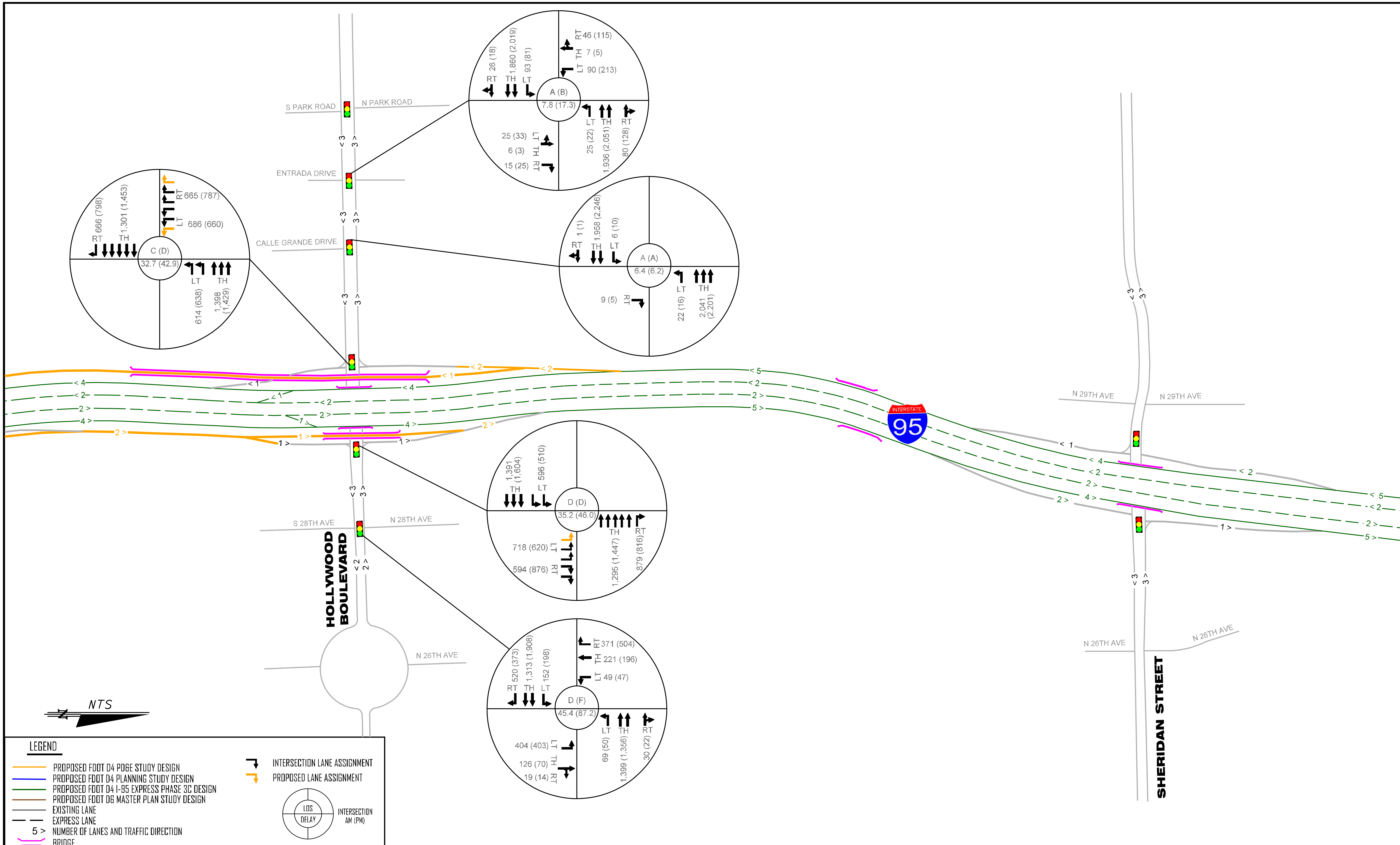
2045 DESIGN YEAR PREFERRED ALTERNATIVE
INTERSECTION OPERATIONAL ANALYSIS RESULTS

FIGURE
7.10



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2045 DESIGN YEAR PREFERRED ALTERNATIVE
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FIGURE
7.10

7.6 No-Build Alternative and Preferred Alternative – Microsimulation Analyses

7.6.1 Vissim Analysis Procedure

The operational analysis for this study was performed using Vissim 9 (Release 9.00-10) and Synchro 10. Vissim microsimulation was used to assess the study area on a network-wide basis. Microsimulation was used to assess the traffic operation conditions of individual facilities, such as freeway mainline, ramps, and signalized intersections. Synchro 10 was used primarily to aid in signal timing optimization for future year scenarios.

The microsimulation analysis using the Vissim software was conducted to evaluate the system-wide operational performance. Microsimulation analysis enhances the capability of capturing the network-wide vehicular interaction between the individual roadway elements (mainline segments, ramp junctions and arterial intersections). The microsimulation model was calibrated to the existing year traffic counts and speeds obtained from StreetLight Data. The simulation model was modified accordingly to reflect future conditions. A four-hour AM and PM peak period analysis was conducted using 15-minute flow rates with microsimulation for the 2016 existing year. The microsimulation was performed consistently with guidelines provided in the FDOT 2014 Traffic Analysis Handbook. Ramp, mainline, and entry volumes were calibrated to within 10% of counts. Travel time was calibrated to within 15% for all the study locations using the StreetLight collected travel time data.

Vissim is a stochastic model that produces different results by changing the random seed numbers. To ensure model variation does not skew the results, a certain number of model runs is required. A sample size of ten runs was used for the initial test and the results from these runs were averaged. The number of required runs was calculated from the Student's t-test using a 95% confidence level with 10% allowable error. The results of the 2016 existing year statistical analyses are provided in ***Appendix R***. The existing and design year analyses averaged ten model runs, which satisfied the Student's t-test in each case.

The following sections document the modeling methodology used for performing the Vissim microsimulation operational analysis for this study.

Modeling Analysis Years and Alternatives – The Vissim models were developed for the AM and PM peak periods for the following analysis years and alternatives:

- 2016 Existing Year
- 2045 No-Build Alternative Design Year
- 2045 Preferred Alternative Design Year

Model Traffic Volumes – All Vissim model scenarios include AM and PM peak period volumes using 15-minute volume intervals. The 15-minute volumes were developed using volume profiles from the 2016 existing year. Traffic was distributed via the I-95 mainline, I-95 express lanes, and arterials using static routes based on the 2045 design year peak-hour demand volumes.

Model Spatial Limits – The Vissim model spatial limits are based on the area of influence. The area of influence covers the area that could be affected by the construction of the proposed project and/or future improvements. For this study, the influence area for the Vissim analysis includes I-95 from Ives Dairy Road to south of Sheridan Street.

Model Temporal Limits – The temporal limits of the modeling period relate to the location of the project, the length of peak periods, and the duration of the expected congestion. The model temporal limit assumed for this study was a four-hour AM and four-hour PM peak period for existing calibration and four-hour AM and four-hour PM peak period for future year models. The four-hour AM and PM peak period models were achieved by developing "shoulder hours" to the AM and PM peaks, which were based on the existing traffic counts in the study area. The shoulder hours allowed the modeling to capture the buildup to the congestion, the potential failure, and the recovery of the transportation network in the area of influence for this study. A 30-minute seed period was used to load traffic prior to the start of the four-hour period. Fifteen-minute volumes were developed for each hour of the peak period.

Model Calibration – A calibration of the existing models was performed by adjusting the driving behavior parameter sets such that travel time results along the facility reasonably replicate travel time data. The calibration efforts used criteria from the FDOT's Traffic Analysis Handbook, and all reasonable efforts were made to calibrate the Vissim model to the proposed criteria. The calibration efforts are summarized in the *Vissim Existing Conditions Model Development and Calibration Report* (see ***Appendix S***), dated April 2021.

Vissim Measures of Effectiveness – The MOEs used in the Vissim analysis results to evaluate the operational performance of the study elements are listed and described below:

- Operating speed, volume, and density were provided for the freeway mainline segments of the general use lanes and express lanes.
- Speed and volume information were provided in hourly speed and volume profiles.
- Lane schematics provide speed, volume throughput and density along the freeway mainline segments.
- Intersection/interchange performance were assessed using delay, volume, and maximum queue lengths.
- Network-wide MOEs (average speed, total delay, latent delay, latent demand, total travel time, total stops, and vehicles arrived) were used to evaluate and compare network-wide operational performance between the alternatives.

Traffic volume throughput was included as one of the MOEs for freeway segments as significant differences in demand volumes (observed volume or throughput in the field) vs. simulated volumes from Vissim can indicate operational deficiencies and/or congestion on upstream freeway segments or at arterial intersections. The key MOEs listed above were used to assess the traffic operation conditions for the various alternatives by comparing MOEs between the No-Build and Preferred Alternatives.

7.6.2 Existing Operational Analysis

A detailed microsimulation analysis using Vissim 9 (Revision 9.00-10) was conducted to evaluate the system-wide operational performance. Vissim models were prepared for the 2016 existing year AM and PM peak periods. The primary objective of the existing conditions analysis was to establish the current operational conditions along I-95 and the study interchanges and intersections.

Speed data summarized from StreetLight Data was used to plot speed profiles for the AM and PM peak periods. These speed profiles were used in the calibration of the existing peak period models. Simulated speeds for AM and PM peak periods were plotted against the StreetLight Data speeds to evaluate how well the Vissim models replicate existing operations.

Fifteen-minute volume profiles were developed for the analysis area and input into Vissim for the four-hour AM and PM peak periods with an additional 30-minute seed time. The volume profiles were developed from the 15-minute variation in traffic observed in the traffic counts collected for this project. The signal timing and phasing data for the AM and PM peak periods were provided by Broward and Miami-Dade Counties.

Ten model iterations with different random seed numbers were executed for the AM and PM peak periods. The results provided in this report represent an average of the ten simulation runs. This section provides a summary of the results of the existing Vissim operational analysis. Additional information on the existing conditions calibration effort is provided in ***Appendix R***.

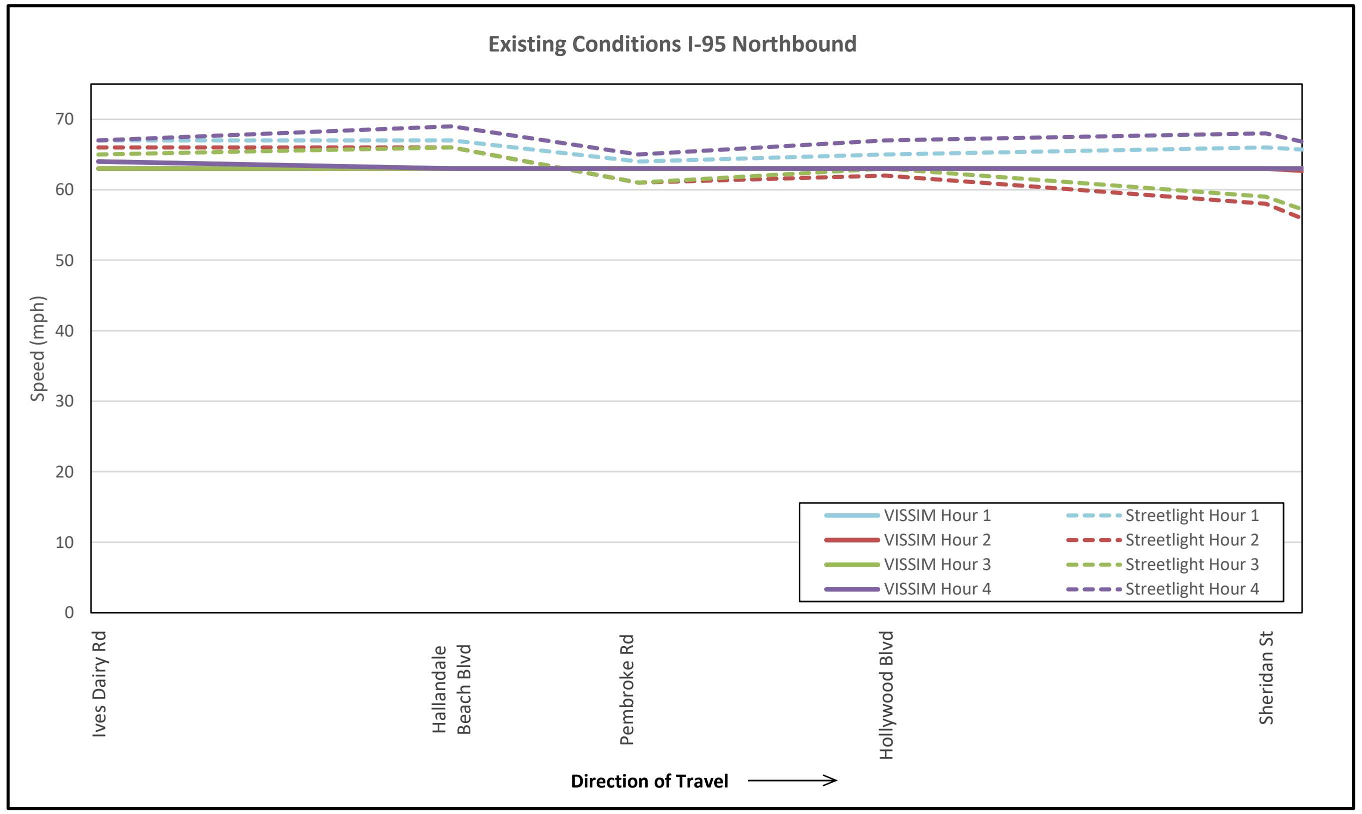
Existing Speed Profiles – The speed profiles (derived from Vissim travel time output) for the 2016 existing AM and PM peak periods can be found in ***Figure 7.11***, which presents the average speed output from Vissim for each of the four hours along with the StreetLight speed data and show that the final calibration parameters provide reasonable speed/congestion trends in both the AM and PM peak periods.

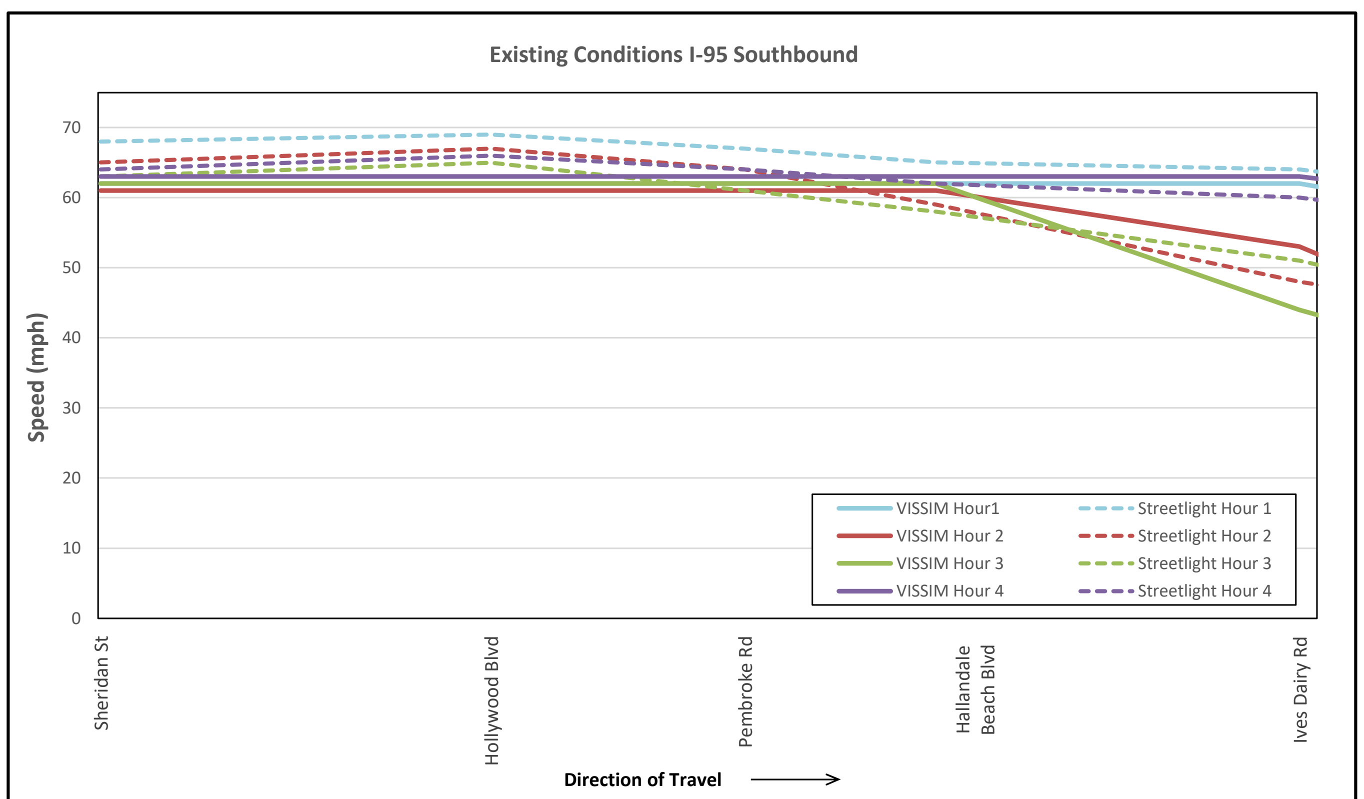
During the AM peak period, the northbound direction operates near free-flow speed, which is between 60 and 65 mph. The southbound direction experienced congestion south of Hallandale Beach Boulevard, which originates outside of the project study area. Average speeds approach 50 mph during the peak-hour, and speeds lower than 45 mph are observed during hour 3. Full recovery to free-flow conditions is observed during hour 4.

During the PM peak period, the northbound direction operates near free-flow speed, which is between 60 and 65 mph. The southbound direction experienced congestion south of Pembroke Road, which originates outside of the project study area. Average speeds approach 30 mph in the peak-hour and recover to approximately 35 mph during hour 3. Full recovery to free-flow conditions is observed during hour 4.

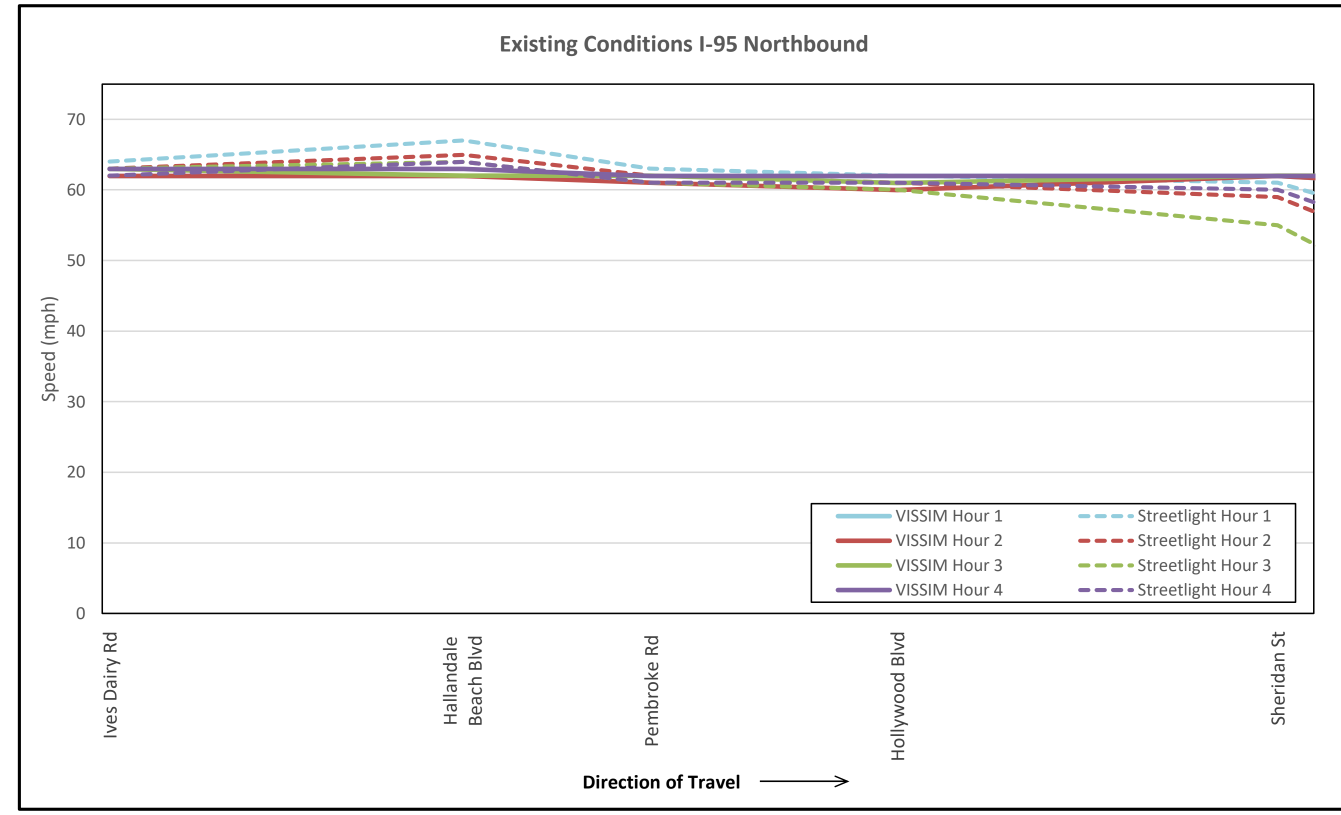
Existing Study Intersection Operations – The existing conditions intersection operational analysis results are shown in ***Table 7.11***. The results indicate that the study intersections operate under acceptable delay time (<80 seconds/vehicle) in the existing conditions. The I-95 northbound on-ramp from Ives Dairy Road is near capacity, approximately 1,950 vehicles per lane, causing congestion on Ives Dairy Road at the interchange.

2016 AM Peak Period Speed Profiles for I-95





2016 PM Peak Period Speed Profiles for I-95



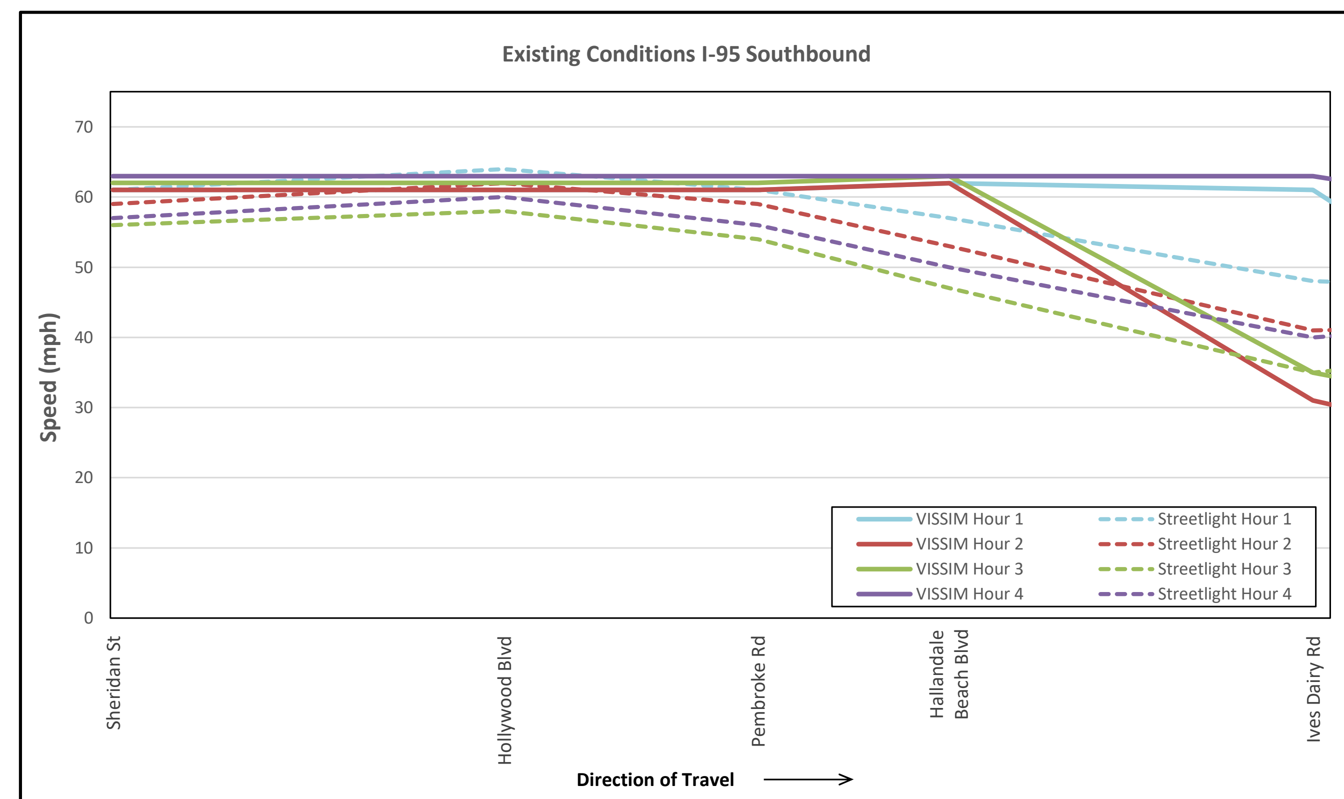


Figure 7.11: Existing Conditions Speed Profiles

Table 7.11 – 2016 Existing Intersection/Interchange Analysis Summary

Intersection Location	Delay (seconds/vehicle)	
	AM Peak	PM Peak
Hallandale Beach Boulevard and Park Road	25.5	17.2
Hallandale Beach Boulevard and SW 30th Avenue	54.0	30.0
Hallandale Beach Boulevard and I-95 Ramps	31.6	33.6
Hallandale Beach Boulevard and 10th Terrace	14.8	20.8
Pembroke Road and Park Road	17.6	11.3
Pembroke Road and SW 31st Avenue	26.2	9.8
Pembroke Road and SW 30th Avenue	16.8	12.9
Pembroke Road and I-95 Ramps	23.2	26.3
Pembroke Road and NW 10th Avenue/S. 28th Avenue	21.3	58.0
Hollywood Boulevard and Entrada Drive	6.6	10.6
Hollywood Boulevard and Calle Grande Drive	0.9	1.6
Hollywood Boulevard and Tri-Rail Station	23.6	22.2
Hollywood Boulevard and I-95 Ramps	41.2	63.0
Hollywood Boulevard and SW 28th Avenue	37.5	34.2

7.6.3 2045 Design Year I-95 Operational Analysis

The 2045 design year Vissim models analyzed four-hour AM and PM peak periods. Fifteen-minute flow rates based on the trends observed in the existing conditions data collection were used to develop the four-hour AM and PM peak period Vissim models. The 2045 design year simulation model parameters are based on those used for the 2016 existing year calibrated model. The simulation time consisted of a 30-minute seed time to load traffic into the network, followed by a 4-hour peak period consisting of a preceding shoulder hour, the peak-hour, and two subsequent off-peak hours. The purpose of the off-peak hours was to allow all or most of the congestion built during the peak-hour to subside during the simulation period. Traffic was distributed using static routes based on the 2045 design year peak-hour demand volumes.

The following MOEs were used to evaluate the network's operational performance:

- Freeways
  - Travel Speed
  - Simulated (Throughput) Volume
  - Density
  - Queue Length
- Intersections
  - Intersection Delay
  - Travel Time

- Network-Wide Performance
  - Total Network Delay
  - Average Network Speed
  - Latent Demand

The MOEs listed above were used to compare the operational performance of the 2045 No-Build and Build Alternatives. ***Appendix R*** contains supplemental simulation output related to the intersection performance for each analysis alternative. The following sections provide a summary of the operational performance based on the Vissim modeling results.

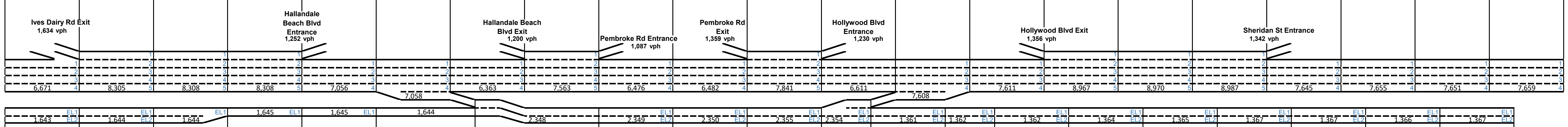
2045 Peak Period Analysis – The lane schematics presented in the following discussion provide an operational overview of the freeway facilities during the peak hours of each simulation. Therefore, the speed, density and throughput presented in these figures only represents data collected during the peak-hour (Hour 2) of the simulations. The speed and volume profiles also presented in the following discussion provide operational results for all four hours of simulation to illustrate buildup and dissipation of the congestion that occurs during the peak hour.

2045 No-Build Alternative Results – *Figure 7.12* shows the 2045 No-Build results for the AM peak-hour. During the AM peak-hour, two areas of congestion are present on I-95 in the northbound direction. Between Ives Dairy Road and Hallandale Beach Boulevard, the high demand volume coupled with weaving maneuvers between the two interchanges cause congestion and speeds between 30-45 mph to occur. The Hallandale Beach Boulevard northbound off-ramp also queues on the mainline. During Hour 3, the congestion at the Ives Dairy Road merge remains like the peak-hour with low speeds of 34 mph, which recovers to 60 mph in Hour 4 (see ***Figure 7.13***). Additionally, speeds as low as 41 mph are observed in Hour 2 at the Hollywood Boulevard northbound off-ramp, extending upstream within the Pembroke Road interchange. This occurs because the northbound off-ramp turning movements experience significant delay and queueing. The congestion and queueing from the Hollywood Boulevard off-ramp worsen in Hour 3 and reaches a mainline speed of approximately 24 mph. Operations upstream of Hollywood Boulevard recover in Hour 4 with speeds of 59 mph or better.

I-95 Southbound

Distance (ft)	1,620	1,499	1,626	1,506	350	1,523	1,647	810	2,003	1,508	1,828	345	701	2,207	1,461	1,803	1,445	1,903	1,848	1,625	1,426
Speed (mph)	61	59	60	60	59	60	59	47	56	59	58	58	59	58	58	55	59	59	60	60	60
Density (veh/mi/ln)	27	28	28	28	30	24	27	32	29	27	27	28	26	33	31	33	30	32	32	32	32
Total Demand Volume (vph)	8,701	10,390	10,390	10,390	8,929	8,929	8,929	10,154	8,955	8,955	10,345	9,065	9,065	9,065	10,416	10,416	10,416	9,042	9,042	9,042	9,042
Total Simulated Volume (vph)	8,314	9,949	9,952	9,953	8,701	8,702	8,711	9,911	8,825	8,832	10,196	8,965	8,969	8,973	10,331	10,335	10,354	9,012	9,021	9,018	9,026

Simulated Volumes

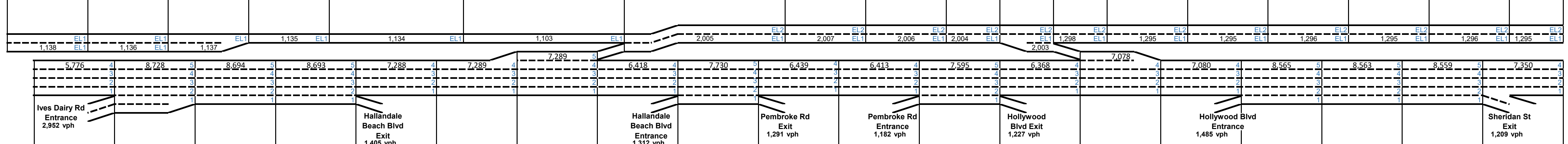


Distance (ft)	1,497	1,500	1,774	1,212	1,500	1,499	1,512	1,733	1,511	1,744	1,084	1,655	1,502	1,500	1,499	1,499	1,500	1,501	1,500	1,500
Speed (mph)	63	63	64	59	59	59	57	60	62	61	62	62	62	63	63	63	63	63	63	63
Density (veh/mi/ln)	13	13	13	28	28	28	21	20	19	19	13	11	11	11	11	11	11	11	11	11

I-95 Northbound

Distance (ft)	1,506	1,502	1,496	1,500	1,500	1,605	1,500	1,500	1,500	1,613	751	1,504	1,524	1,513	1,514	1,499	1,514	1,510
Speed (mph)	63	62	60	60	61	60	63	62	62	62	63	63	63	63	63	63	63	63
Density (veh/mi/ln)	9	9	9	19	19	19	16	16	16	16	11	10	10	10	10	10	10	10

Simulated Volumes



Distance (ft)	1,629	654	1,866	1,506	665	657	843	709	986	1,687	1,721	2,070	579	1,067	1,671	1,470	1,873	1,569	1,635
Speed (mph)	59	34	43	57	58	60	61	59	56	58	51	41	59	60	60	61	60	58	60
Density (veh/mi/ln)	24	43	40	31	31	30	24	27	28	28	31	37	27	24	30	28	29	30	31
Total Demand Volume (vph)	7,051	10,201	10,201	10,201	8,741	8,741	8,741	8,741	10,239	8,895	8,895	10,242	8,930	8,930	8,930	10,405	10,405	10,405	9,120
Total Simulated Volume (vph)	6,914	9,864	9,831	9,828	8,422	8,392	8,392	8,423	9,735	8,446	8,419	9,599	8,371	8,373	8,375	9,861	9,858	9,855	8,645

LEGEND

Travel Time Segment Number

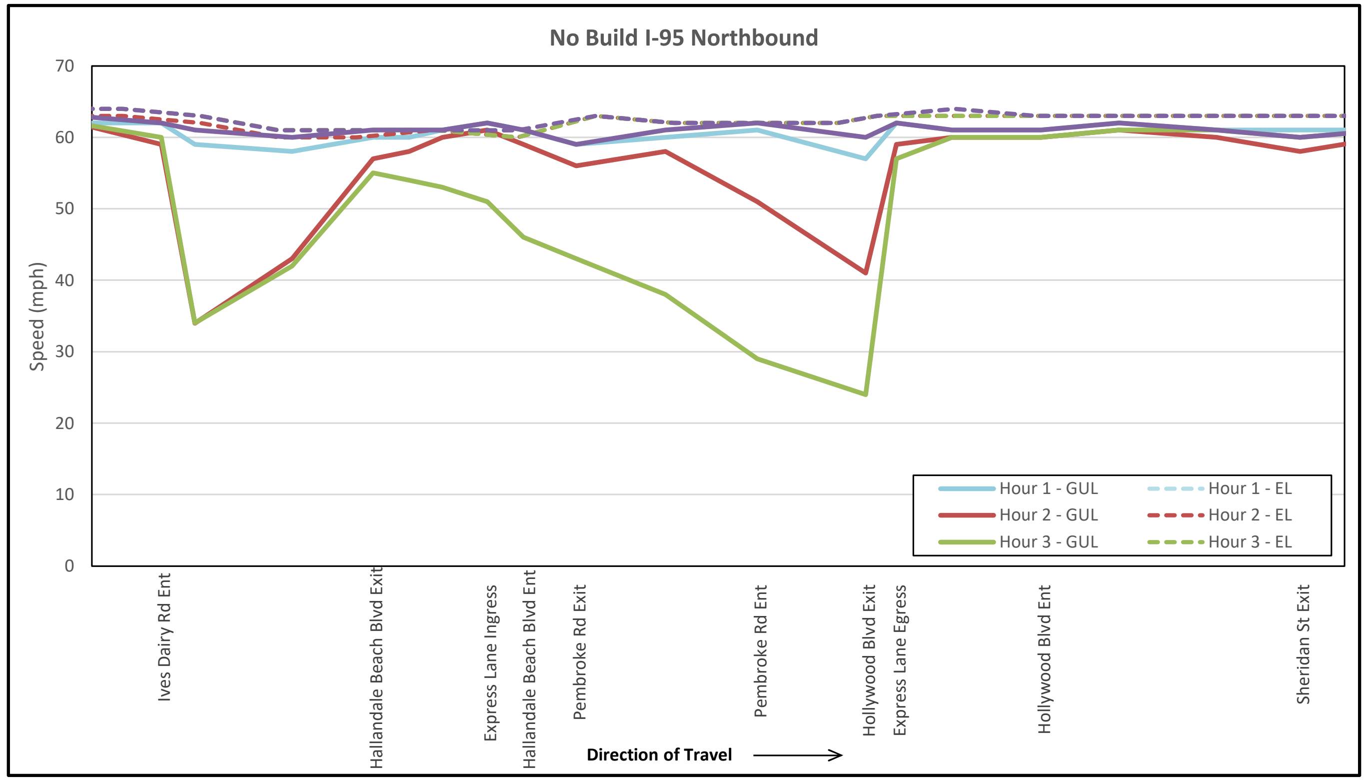
Speed (mph)	
20	and below
20 -	30
30 -	45
45	and above

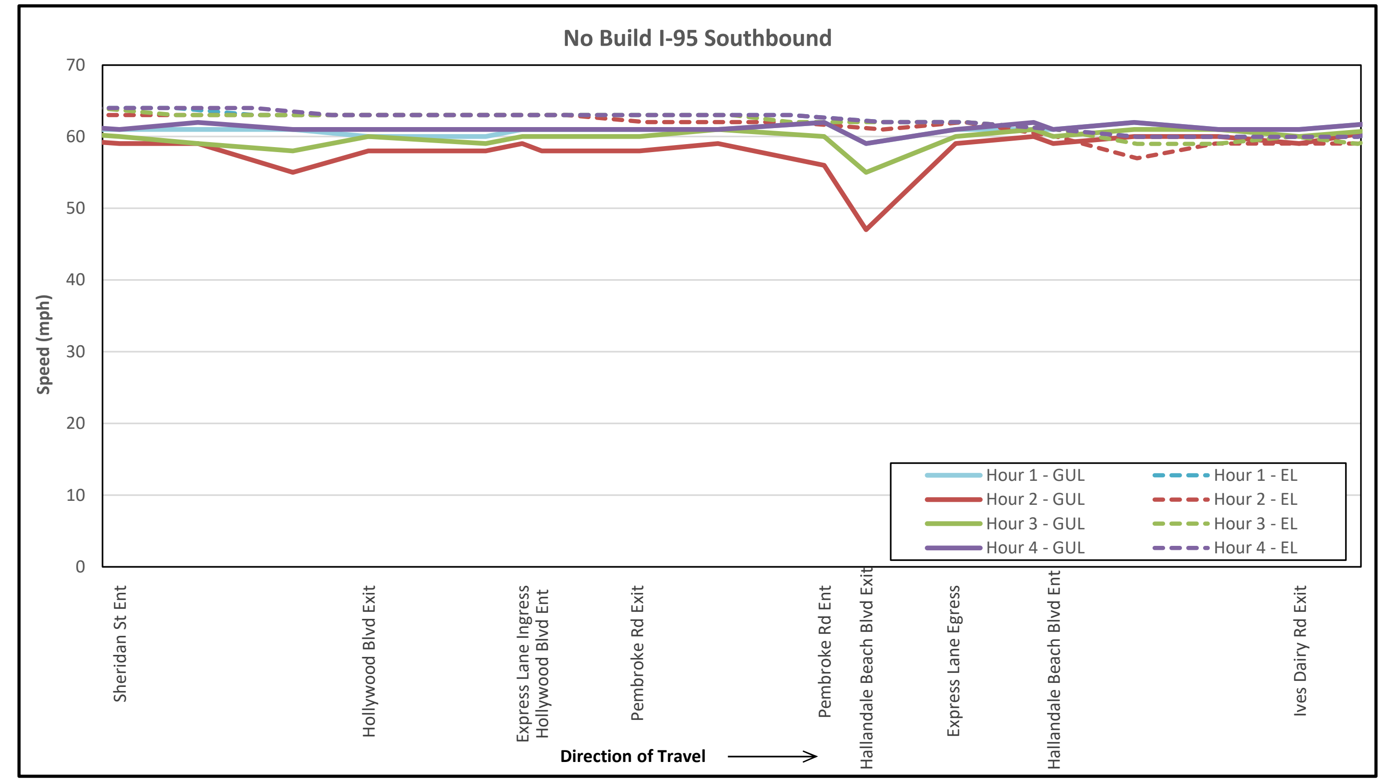
Freeway Coloring Density (veh/mi/ln)	
75	and above
55 -	75
45 -	55
45	and below

Simulated volume highlighted if difference > 10% of demand

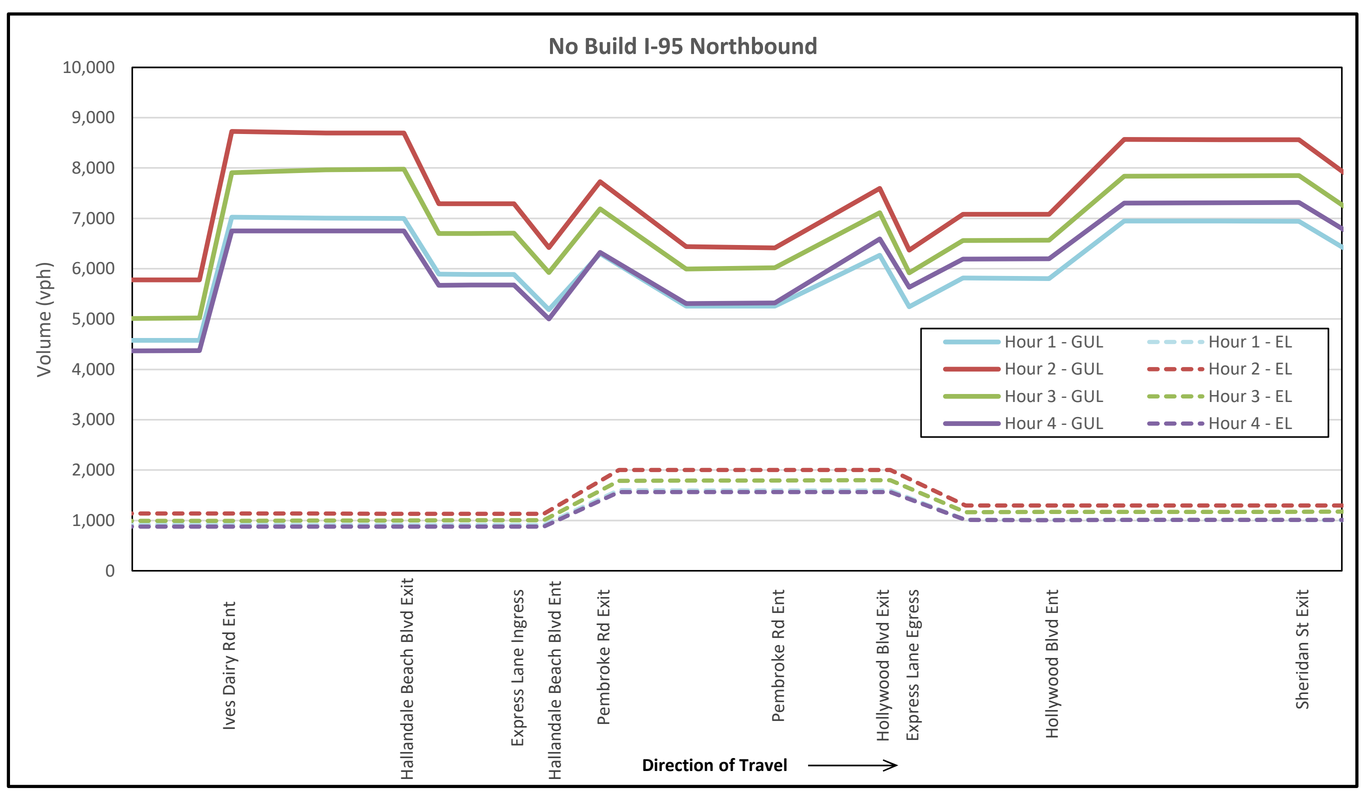
Figure 7.12: No-Build Alternative AM Peak Lane Schematic

AM Peak Period Speed Profiles for I-95





AM Peak Period Volume Profiles for I-95



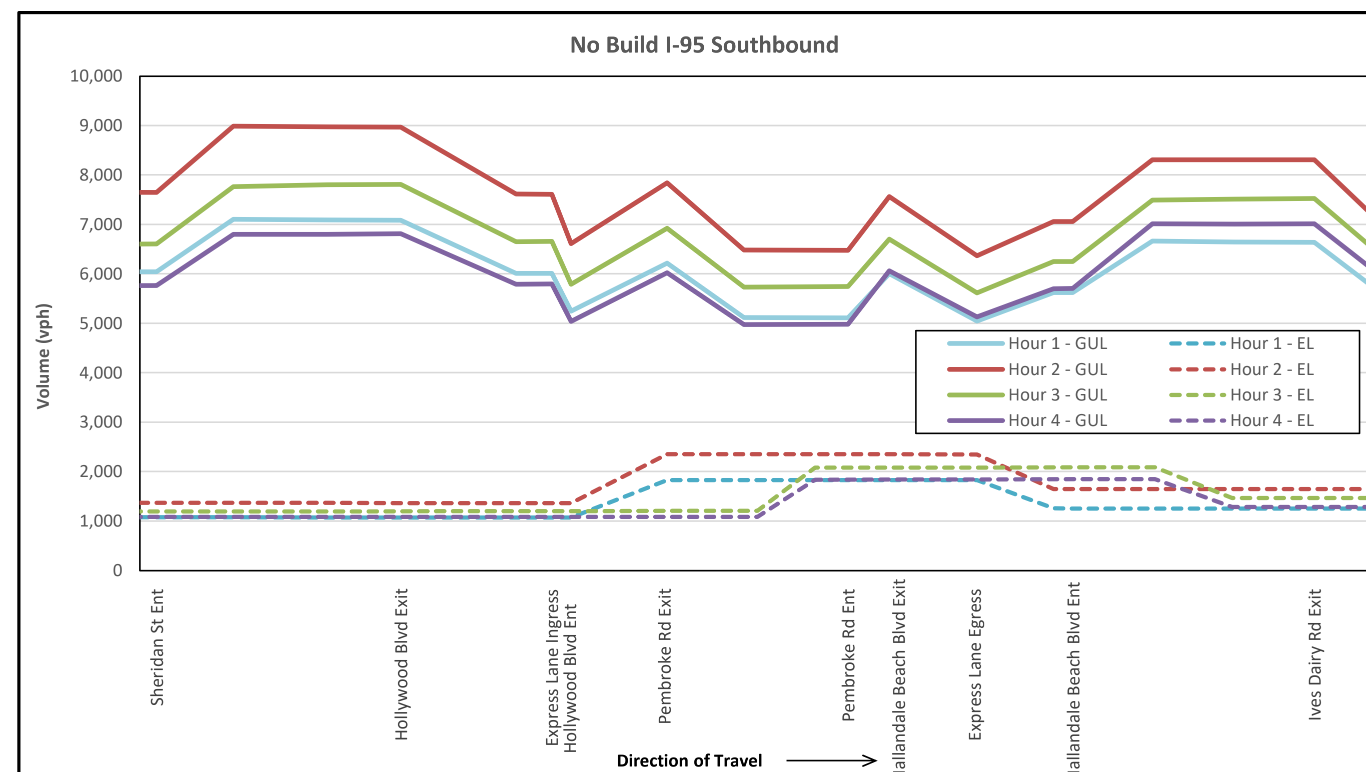


Figure 7.13: No-Build Alternative AM Peak Speed and Volume Profiles

In the southbound direction there is minor turbulence in Hour 2 upstream of the Hollywood Boulevard off-ramp reaching a speed of 55 mph. Also in the southbound direction, congestion within the 800-foot-long weave segment between Pembroke Road and Hallandale Beach Boulevard is observed with an approximate mainline speed of 47 mph in Hour 2. The southbound off-ramp at Hallandale Beach Boulevard queues onto the mainline causing operational issues within the short weave segment. This location improves to a speed of 55 mph in Hour 3 and a speed of 59 mph in Hour 4.

During the PM peak-hour (as shown in ***Figure 7.14***), congestion is observed on I-95 northbound at similar locations to the AM peak-hour. Between Ives Dairy Road and Hallandale Beach Boulevard, the high demand volume coupled with weaving maneuvers between the two interchanges cause congestion and speeds between 20-35 mph to occur. The Hallandale Beach Boulevard northbound off-ramp also queues on the mainline in Hour 2. Operations begin to deteriorate in Hour 1 at this location reaching speeds as low as 31 mph (see ***Figure 7.15***). In Hour 3 congestion begins to recover with an approximate speed of 36 mph and continues to improve in Hour 4 with a speed of 58 mph. The Hollywood Boulevard diverge also begins to degrade in Hour 1 with a low speed of 51 mph. Operations continue to worsen in Hours 2 and 3 with approximate speeds of 48 mph and 39 mph, respectively. Significant queueing is observed spilling back from the off-ramp. Hour 4 conditions recover to speeds of 56 mph or greater.

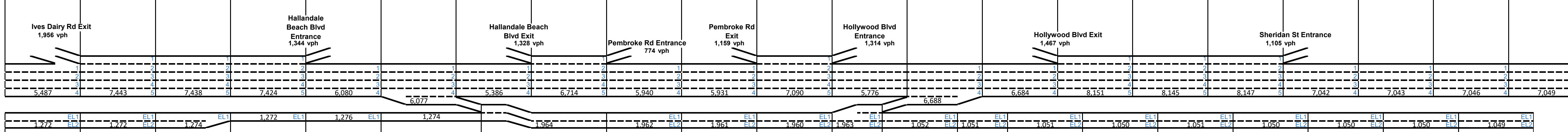
In the southbound direction there is minor turbulence upstream of the Hollywood Boulevard off-ramp in Hour 2 reaching a speed of 56 mph. This is in part due to the Hollywood Boulevard off-ramp queueing on the mainline. Also in the southbound direction in Hour 2, minor turbulence within the 800-foot-long weave segment between Pembroke Road and Hallandale Beach Boulevard is observed with an approximate mainline speed of 57 mph. Speeds of 59 mph or greater observed in Hours 3 and 4 for the entire southbound direction.

2045 Preferred Alternative Results – *Figure 7.16* 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. I-95 northbound operates at 57 mph or better for all four hours of simulation throughout the project area (see ***Figure 7.17***). The additional lane available within the northbound weave segment between Ives Dairy Road and Hallandale Beach Boulevard significantly improves operations at this location. Furthermore, the proposed northbound two-lane collector distributor roadway exit is approximately 1,000 feet downstream of the Hallandale Beach Boulevard off-ramp with a total of approximately 4,100 vehicles maneuvering to the right when combining the Hallandale Beach Boulevard off-ramp and collector distributor roadway off-ramp volumes. The peak-hour volume profile figure illustrates the impact of the proposed collector distributor roadway. When comparing the Preferred Alternative volume profile to the No-Build Alternative volume profile, a significant amount of traffic volume is removed from the I-95 mainline lanes by the collector distributor roadway. Within the collector distributor roadway influence area the No-Build volume profile ranges between a processed volume of 6,400 vph and 7,700 vph while the Preferred Alternative ranges between 4,000 vph and 6,000 vph. The additional left turn lane and increased right turn lane storage at the Hollywood Boulevard northbound off-ramp, in addition to the proposed collector distributor roadway, significantly reduces the risk of queue spillback from the ramp terminal intersection to the I-95 mainline. The proposed northbound collector distributor roadway shifts the reduced off-ramp queue off the mainline lanes. On average, the maximum queue from the Hollywood northbound off-ramp did not exceed beyond the upstream Pembroke Road on-ramp merge on the collector distributor roadway. Note that the Tri-Rail train activity prevents vehicles from traveling westbound in both the No-Build and Preferred Alternatives at the interchanges while passing through the arterial. Train events were the primary cause for the longer queues at the Hollywood Boulevard off-ramp.

I-95 in the southbound direction operates at or near free-flow conditions throughout the project area, similar to the No-Build. The weave segment upstream of the proposed Hollywood Boulevard and Pembroke Road combined off-ramp experiences speeds of 55 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.

Distance (ft)	1,620	1,499	1,626	1,506	350	1,523	1,647	810	2,003	1,508	1,828	345	701	2,207	1,461	1,803	1,445	1,903	1,848	1,625	1,426
Speed (mph)	62	60	60	61	61	61	61	57	61	60	59	60	61	60	56	58	61	60	61	61	61
Density (veh/mi/ln)	22	25	25	24	25	20	22	24	24	25	24	24	22	28	29	28	27	29	29	29	29
Total Demand Volume (vph)	6,984	8,996	8,996	8,996	7,504	7,504	7,504	8,829	8,016	8,016	9,181	7,745	7,745	7,745	9,193	9,193	9,193	8,072	8,072	8,072	8,072
Total Simulated Volume (vph)	6,759	8,715	8,712	8,696	7,356	7,351	7,350	8,678	7,902	7,892	9,050	7,739	7,740	7,735	9,201	9,196	9,197	8,092	8,093	8,095	8,100

Simulated Volumes

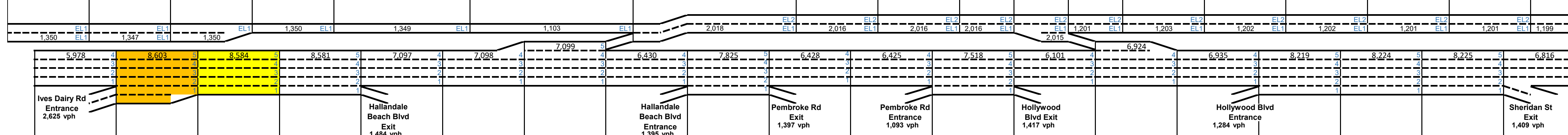


Distance (ft)	1,497	1,500	1,774	1,212	1,500	1,499	1,512	1,733	1,511	1,744	1,084	1,655	1,502	1,500	1,499	1,499	1,500	1,501	1,500	1,500
Speed (mph)	63	64	64	60	60	60	60	61	62	62	63	63	63	63	63	63	63	63	64	64
Density (veh/mi/ln)	10	10	10	21	21	21	16	16	16	16	10	8	8	8	8	8	8	8	8	8

I-95 Southbound ←

Distance (ft)	1,506	1,502	1,496	1,500	1,500	1,605	1,500	1,500	1,500	1,613	751	1,504	1,524	1,513	1,514	1,499	1,514	1,510
Speed (mph)	63	62	58	59	60	60	63	62	62	62	63	63	63	63	63	63	63	63
Density (veh/mi/ln)	11	11	12	23	22	22	16	16	16	16	11	10	10	10	10	10	10	10

Simulated Volumes



Distance (ft)	1,629	654	1,866	1,506	665	657	843	709	986	1,687	1,721	2,070	579	1,067	1,671	1,470	1,873	1,569	1,635
Speed (mph)	54	23	34	56	58	60	61	58	55	58	53	48	60	60	60	61	60	59	61
Density (veh/mi/ln)	28	62	50	31	31	30	23	28	28	28	30	31	25	23	29	27	27	28	28
Total Demand Volume (vph)	7,428	10,384	10,384	10,384	8,853	8,853	8,853	8,853	10,340	8,870	8,870	10,016	8,520	8,520	8,520	9,845	9,845	9,845	8,388
Total Simulated Volume (vph)	7,328	9,950	9,934	9,931	8,446	8,201	8,202	8,448	9,843	8,444	8,441	9,534	8,116	8,127	8,137	9,421	9,425	9,426	8,015

I-95 Northbound →

LEGEND

Travel Time Segment Number

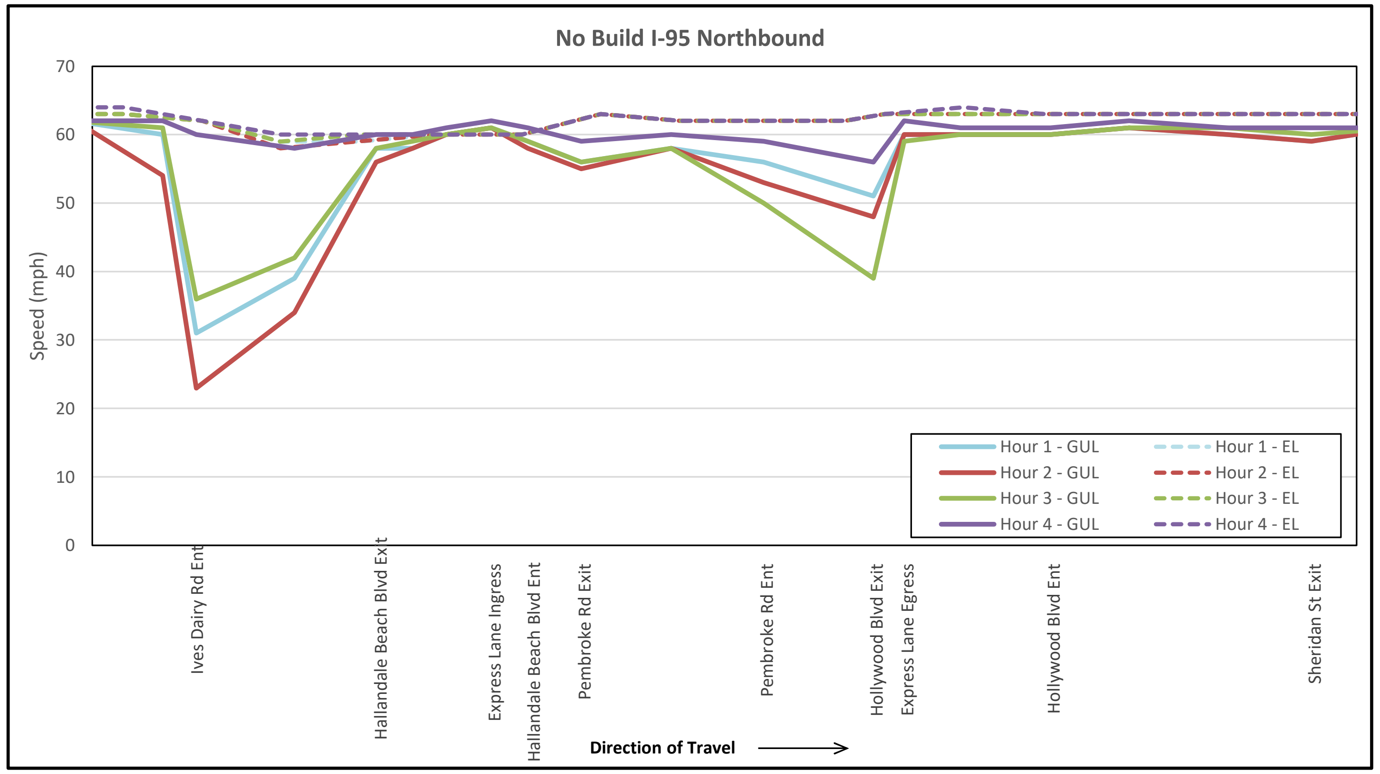
Speed (mph)	
20	and below
20 -	30
30 -	45
45	and above

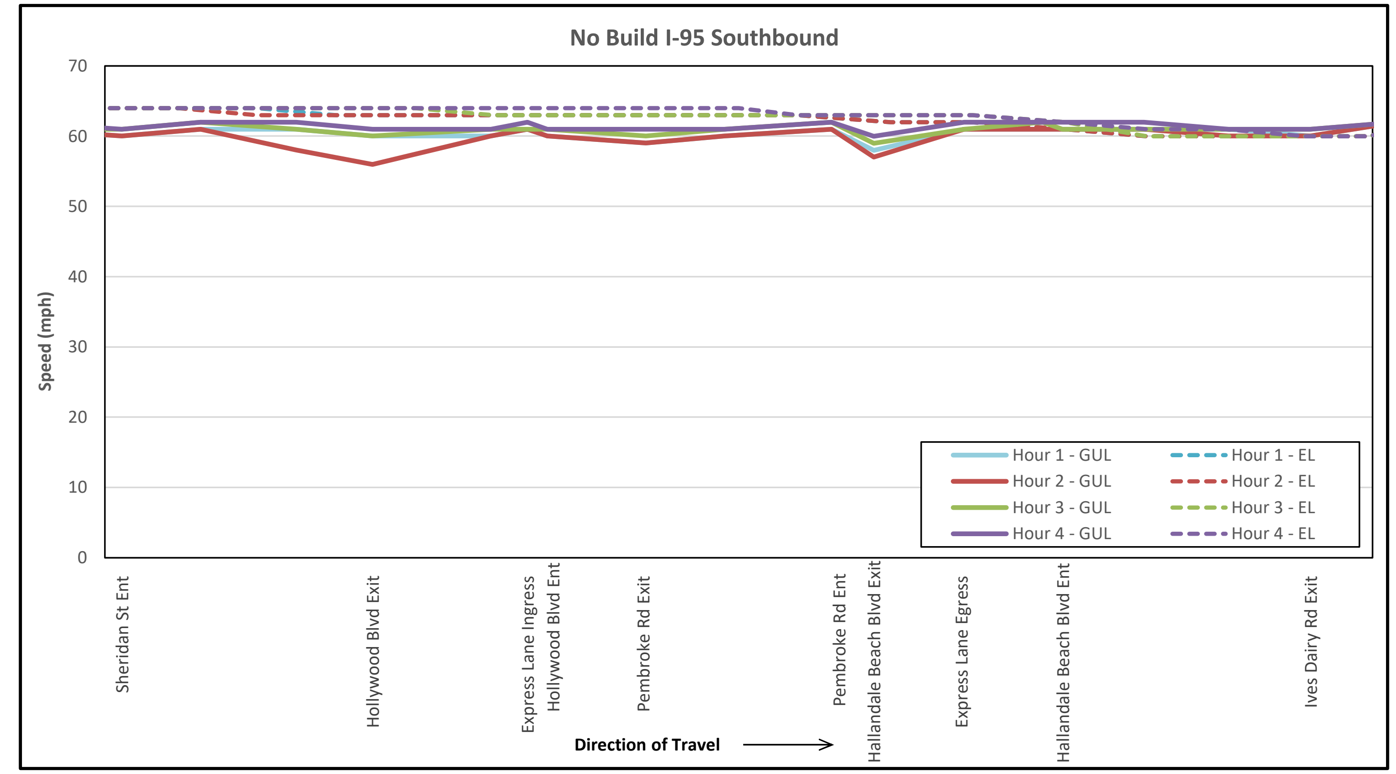
Freeway Coloring Density (veh/mi/ln)	
75	and above
55 -	75
45 -	55
45	and below

Simulated volume highlighted if difference > 10% of demand

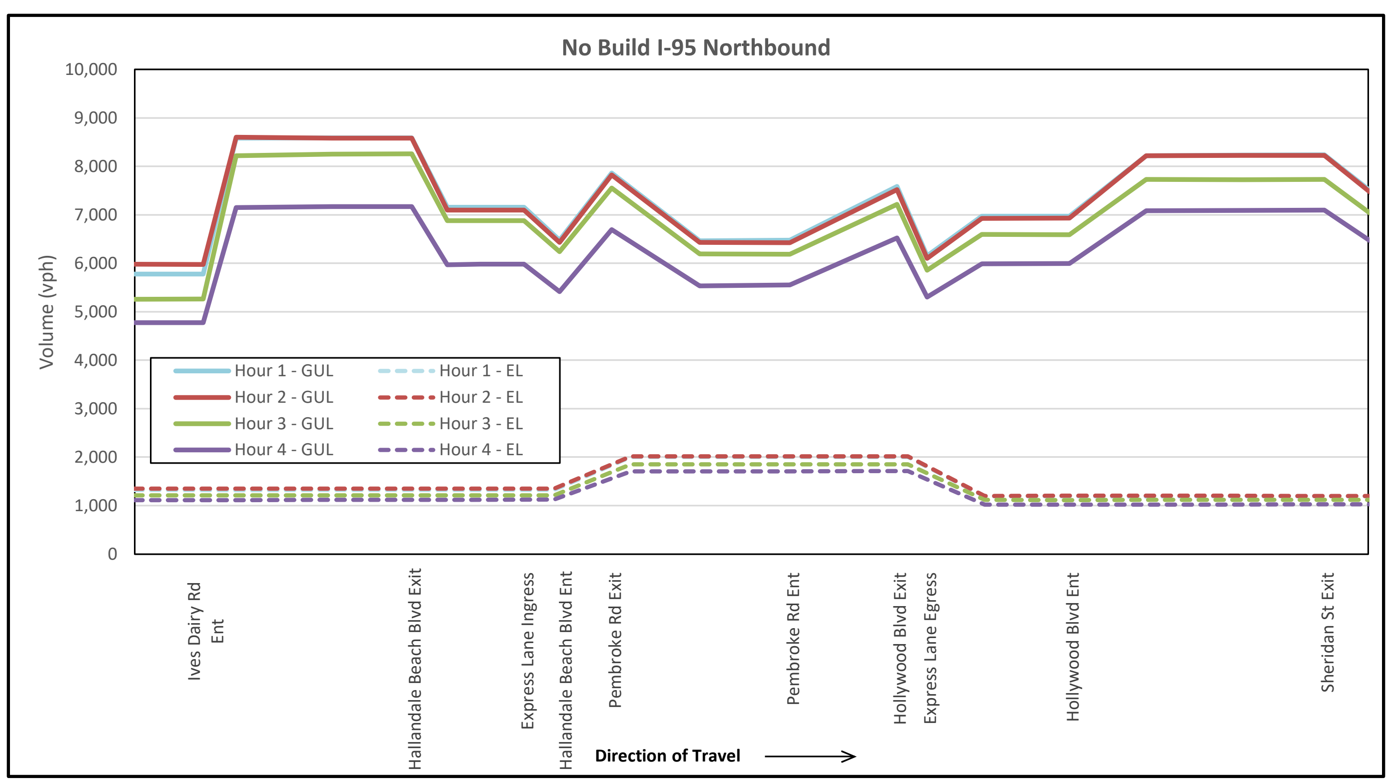
Figure 7.14: No-Build Alternative PM Peak Lane Schematic

PM Peak Period Speed Profiles for I-95





PM Peak Period Volume Profiles for I-95



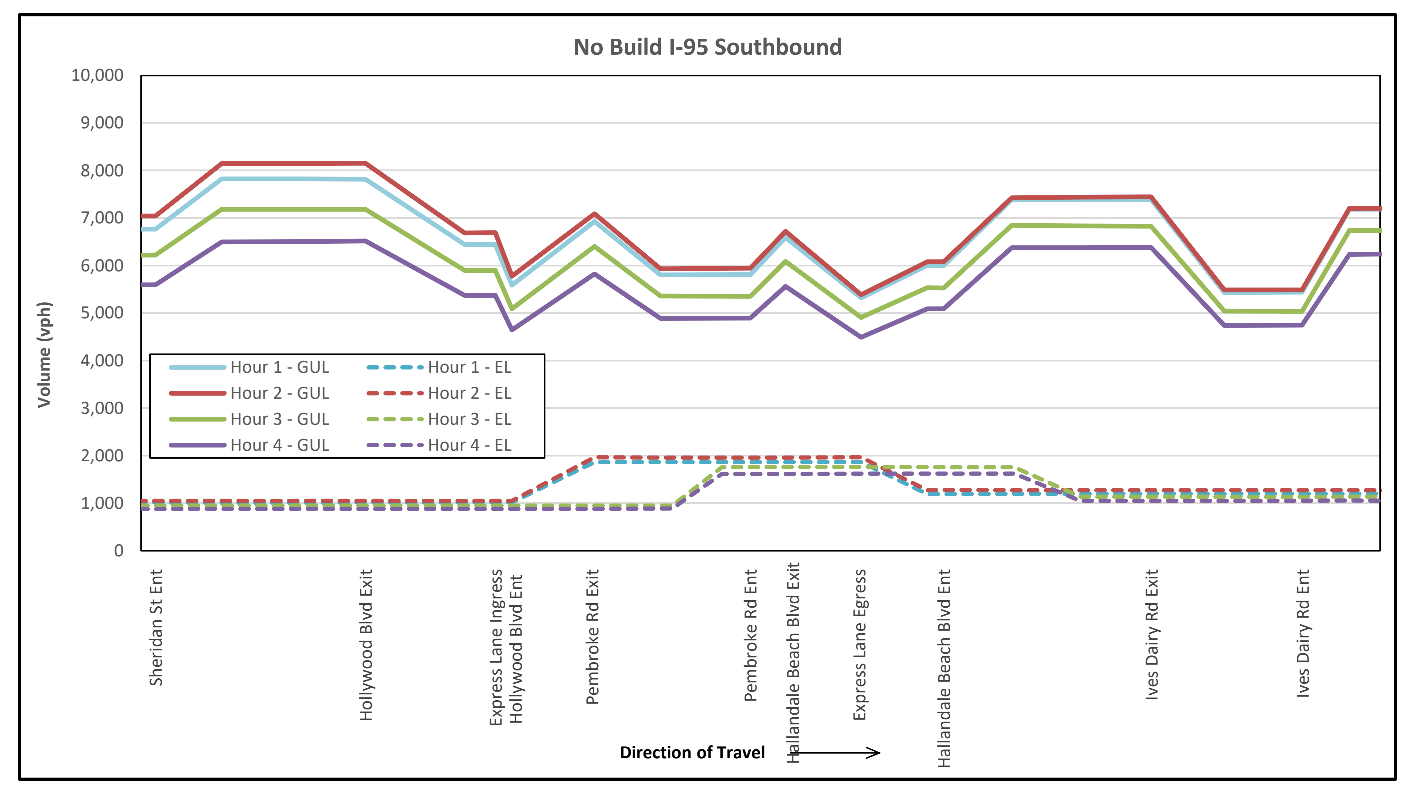
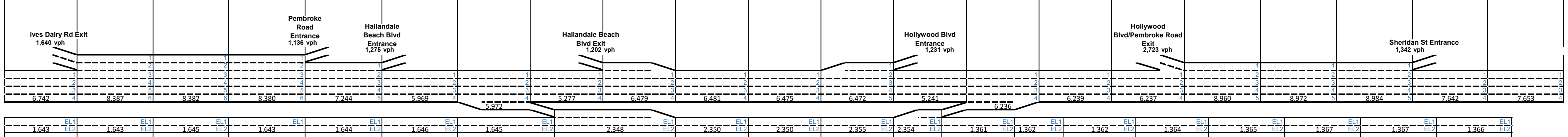


Figure 7.15: No-Build Alternative PM Peak Speed and Volume Profiles

Distance (ft)	1,643	1,426	905	1,476	1,180	2,009	1,644	307	1,021	1,366	1,543	1,439	345	704	1,310	1,579	1,449	1,127	1,445	1,903	1,848
Speed (mph)	61	60	60	60	61	61	62	62	62	61	58	58	62	62	61	60	55	55	58	58	60
Density (veh/mi/ln)	28	23	23	23	24	24	19	21	21	27	28	22	21	20	26	26	33	33	31	33	32
Total Demand Volume (vph)	8,701	10,390	10,390	10,390	9,191	7,730	7,730	7,730	8,955	8,955	8,955	8,955	7,675	7,675	7,675	7,675	10,416	10,416	10,416	9,042	9,042
Total Simulated Volume (vph)	8,385	10,030	10,027	10,023	8,888	7,615	7,617	7,625	8,827	8,831	8,825	8,827	7,595	7,597	7,601	7,601	10,325	10,337	10,351	9,009	9,019

Simulated Volumes

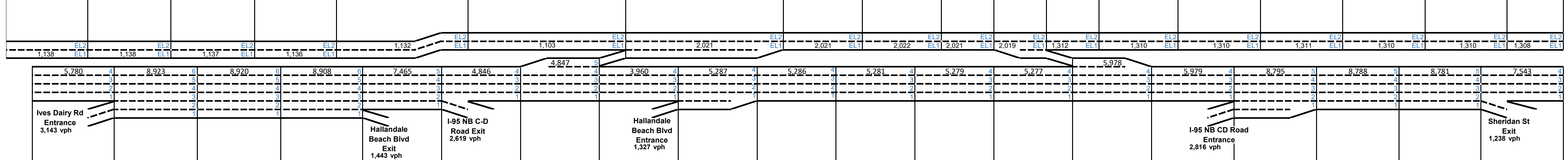


Distance (ft)	1,500	1,500	1,774	1,216	1,490	1,897	1,731	351	1,104	1,169	1,744	1,084	1,655	1,502	1,500	1,499	1,499	1,500	1,501	1,500
Speed (mph)	62	62	62	62	62	63	63	62	61	62	61	61	62	62	63	63	63	63	63	63
Density (veh/mi/ln)	13	13	13	13	13	13	13	13	19	19	19	13	11	11	11	11	11	11	11	11

I-95 Southbound

Distance (ft)	1,506	1,502	1,497	1,494	1,513	1,600	1,363	1,443	1,686	1,613	751	1,504	1,525	1,513	1,514	1,499	1,514	1,510
Speed (mph)	63	63	63	63	63	63	62	62	62	62	63	63	63	63	63	63	63	63
Density (veh/mi/ln)	9	9	9	9	9	9	11	16	16	16	11	10	10	10	10	10	10	10

Simulated Volumes



Distance (ft)	1,670	1,493	460	1,491	1,043	1,192	353	358	1,170	1,511	1,752	1,527	1,107	1,067	1,731	1,789	1,492	1,569	1,635
Speed (mph)	61	60	60	59	61	62	62	63	62	62	62	62	62	61	61	59	59	57	60
Density (veh/mi/ln)	24	25	25	25	24	20	16	16	17	21	21	21	21	20	25	25	30	31	31
Total Demand Volume (vph)	7,051	10,201	10,201	10,201	8,741	6,085	6,085	6,085	7,583	7,583	7,583	7,583	7,583	7,583	7,583	10,405	10,405	10,405	9,120
Total Simulated Volume (vph)	6,918	10,061	10,057	10,044	8,597	5,949	5,950	5,981	7,308	7,307	7,303	7,300	7,296	7,290	7,289	10,106	10,098	10,091	8,851

I-95 Northbound

LEGEND

Travel Time Segment Number

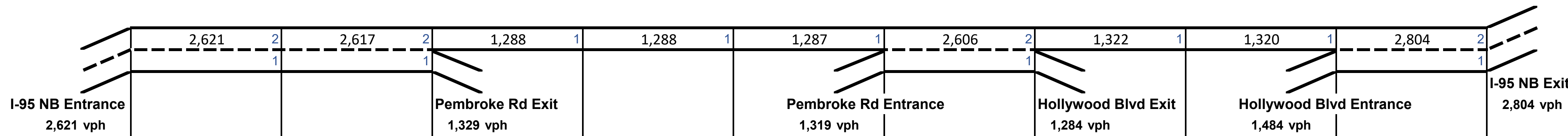
Speed (mph)	
20	and below
20 - 30	
30 - 45	
45	and above

Freeway Coloring Density (veh/mi/ln)	
75	and above
55 - 75	
45 - 55	
45	and below

Simulated volume highlighted if difference > 10% of demand

Figure 7.16 - Build Alternative AM Peak Lane Schematic

I-95 Northbound C-D Road →



Simulated Volumes	2,621	2,617	1,288	1,288	1,287	2,606	1,322	1,320	2,804
Distance (ft)	1,500	1,596	1,500	1,500	850	1,829	1,500	887	465
Speed (mph)	47	41	38	37	36	36	36	36	47
Density (veh/mi/ln)	28	32	34	35	36	36	37	37	30
Total Demand Volume (vph)	2,656	2,656	1,312	1,312	1,312	2,659	1,347	1,347	2,822
Total Simulated Volume (vph)	2,621	2,617	1,288	1,288	1,287	2,606	1,322	1,320	2,804

LEGEND

Travel Time Segment Number

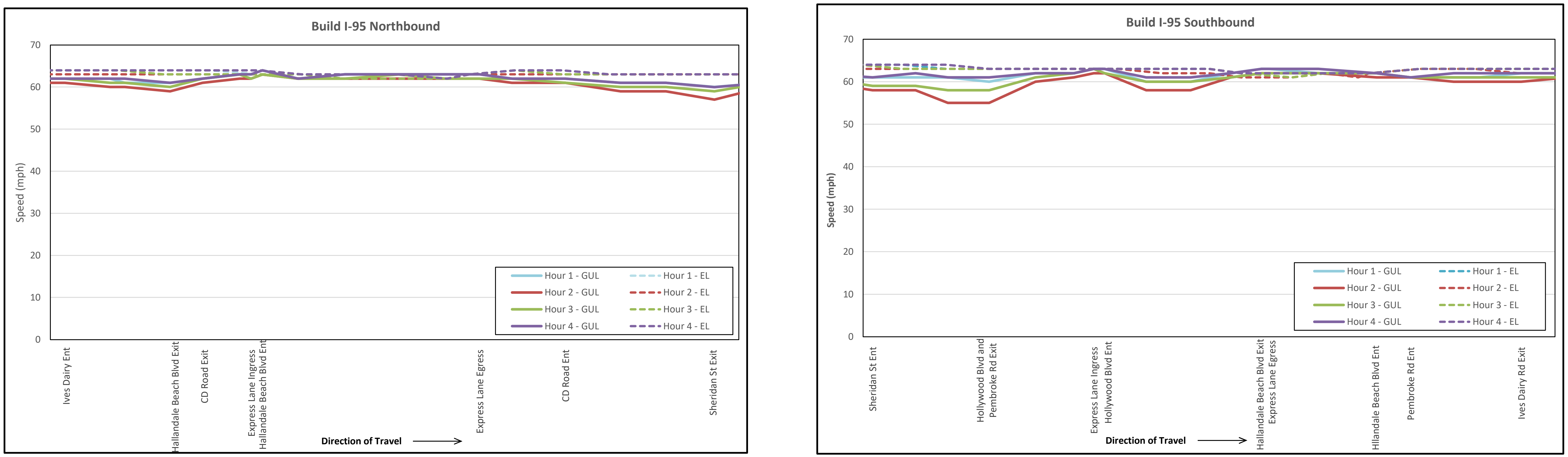
Speed (mph)		
25	and below	
25	-	30
30	-	35
35	and above	

Freeway Coloring Density (veh/mi/ln)		
75	and above	
55	-	75
45	-	55
45	and below	

Simulated volume highlighted if difference > 10% of demand

Figure 7.16 - Build Alternative AM Peak Lane Schematic

AM Peak Period Speed Profiles for I-95



AM Peak Period Volume Profiles for I-95

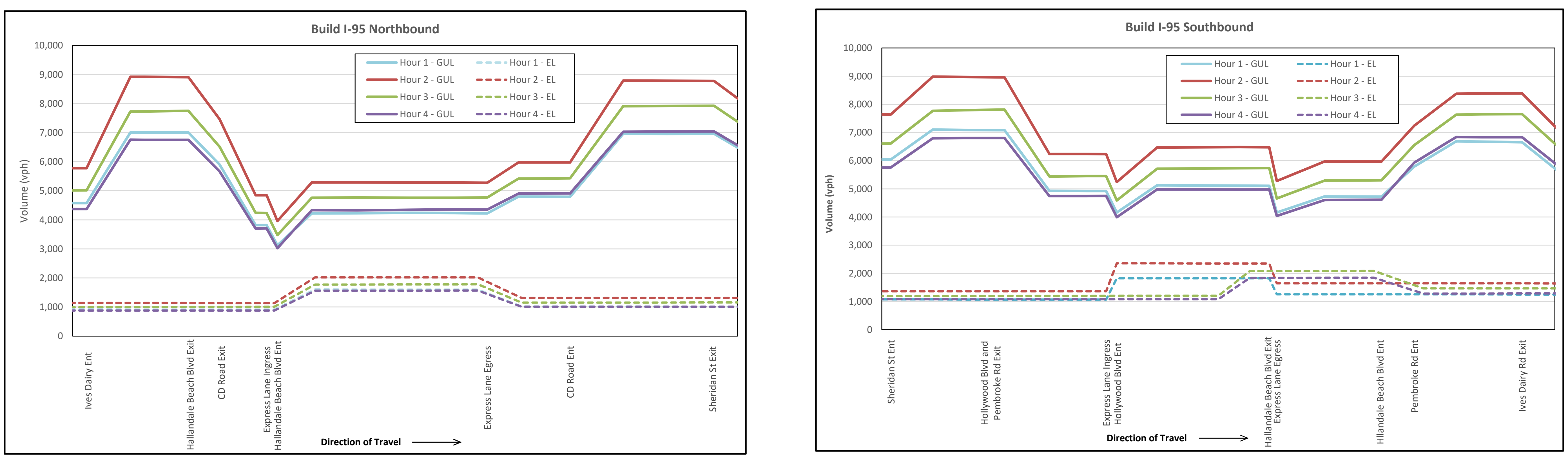
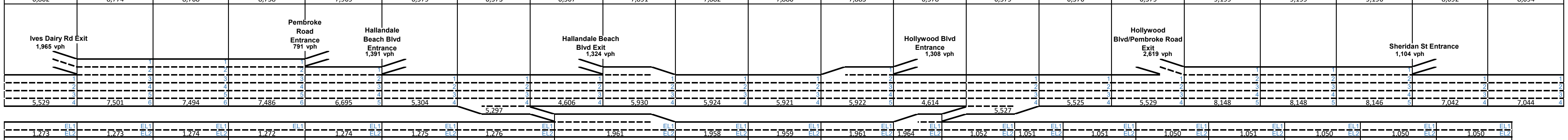


Figure 7.17: Build Alternative AM Peak Speed and Volume Profiles

Figure 7.18 shows the 2045 Preferred Alternative results for the PM peak-hour. These results show significant improvements over the No-Build Alternative due to the improvements on the mainline and at study interchanges. I-95 northbound operates at 56 mph or better throughout the project area for all four hours of simulation (see ***Figure 7.19***). Similar to the AM peak-hour, the additional lane between Ives Dairy Road and Hallandale Beach Boulevard significantly improves operations at this location. Furthermore, the proposed northbound two-lane collector distributor roadway exit is approximately 1,000 feet downstream of the Hallandale off-ramp with a total of approximately 4,500 vehicles maneuvering to the right when combining the Hallandale Beach Boulevard off-ramp and collector distributor roadway off-ramp volumes. The peak-hour volume profile figure illustrates the impact of the proposed collector distributor roadway. When comparing the Preferred Alternative volume profile to the No-Build Alternative volume profile, a significant amount of traffic volume is removed from the I-95 mainline lanes by the collector distributor roadway. Within the collector distributor roadway influence area, the No-Build volume profile ranges between a processed volume of 6,100 vph and 7,800 vph while the Preferred Alternative ranges between 3,800 vph and 6,000 vph. The additional left turn lane and increased right turn lane storage at the Hollywood Boulevard northbound off-ramp significantly reduced the ramp queueing. In addition, the proposed northbound collector distributor roadway shifts the reduced off-ramp queue off the mainline lanes. On average, the maximum queue from the Hollywood Boulevard northbound off-ramp did not exceed beyond the upstream Pembroke Road on-ramp merge on the collector distributor roadway. In the southbound direction speeds of 59 mph or higher are observed for all four hours of simulation.

I-95 Southbound

Distance (ft)	1,643	1,426	905	1,476	1,180	2,009	1,644	307	1,021	1,366	1,543	1,439	345	704	1,310	1,579	1,449	1,127	1,445	1,903	1,848
Speed (mph)	62	62	61	61	61	61	62	62	62	61	59	59	62	63	62	61	59	60	61	60	60
Density (veh/mi/ln)	22	20	20	20	22	22	17	19	19	24	25	20	19	18	22	23	28	27	27	29	29
Total Demand Volume (vph)	6,984	8,996	8,996	8,996	8,183	6,691	6,691	6,691	8,016	8,016	8,016	8,016	6,580	6,580	6,580	6,580	9,193	9,193	9,193	8,072	8,072
Total Simulated Volume (vph)	6,802	8,774	8,768	8,758	7,969	6,579	6,573	6,567	7,891	7,882	7,880	7,883	6,578	6,579	6,576	6,579	9,199	9,199	9,196	8,092	8,094



Simulated Volumes

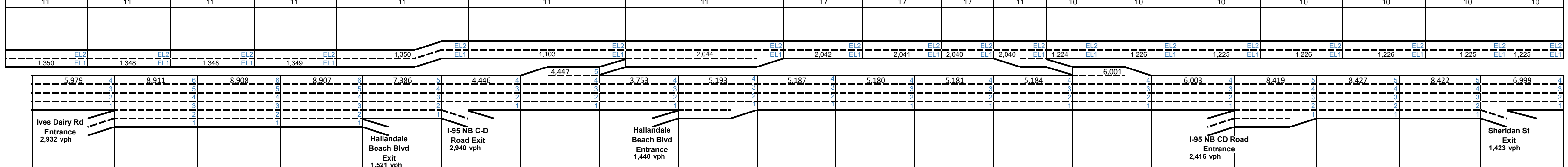
General purpose lanes	5,529	7,501	7,494	7,486	6,695	5,304	5,297	4,606	5,930	5,924	5,921	5,922	4,614	5,527	5,525	5,529	8,148	8,148	8,146	7,042	7,044

Express lanes	1,273	1,273	1,274	1,272	1,274	1,275	1,276	1,961	1,958	1,959	1,961	1,964	1,052	1,051	1,051	1,050	1,051	1,050	1,050	1,050
Distance (ft)	1,500	1,500	1,774	1,216	1,490	1,897	1,731	351	1,104	1,169	1,744	1,084	1,655	1,502	1,500	1,499	1,499	1,500	1,501	1,500
Speed (mph)	63	63	63	63	63	63	63	62	62	62	61	62	63	63	63	63	63	63	63	64
Density (veh/mi/ln)	10	10	10	10	10	10	10	11	16	16	16	11	8	8	8	8	8	8	8	8

←— **I-95 Southbound**

I-95 Northbound

Distance (ft)	1,506	1,502	1,497	1,494	1,513	1,600	1,363	1,443	1,686	1,613	751	1,504	1,525	1,513	1,514	1,499	1,514	1,510
Speed (mph)	63	63	63	63	63	62	62	61	61	61	63	63	63	63	63	63	63	63
Density (veh/mi/ln)	11	11	11	11	11	11	11	17	17	17	11	10	10	10	10	10	10	10
Express lanes	1,350	1,348	1,348	1,349	1,350	1,103	2,044	2,042	2,041	2,040	2,040	1,224	1,226	1,225	1,226	1,226	1,225	1,225



Simulated Volumes

General purpose lanes	5,979	8,911	8,908	8,907	7,386	4,446	4,447	3,753	5,193	5,187	5,180	5,181	5,184	6,001	6,003	8,419	8,427	8,422	6,999
Distance (ft)	1,670	1,493	460	1,491	1,043	1,192	353	358	1,170	1,511	1,752	1,527	1,107	1,067	1,731	1,789	1,492	1,569	1,635
Speed (mph)	61	59	57	56	60	62	62	63	62	62	62	62	62	61	61	59	59	58	60
Density (veh/mi/ln)	25	25	26	27	25	18	14	15	17	21	21	21	21	20	25	24	29	29	29
Total Demand Volume (vph)	7,428	10,384	10,384	10,384	8,853	5,887	5,887	5,887	7,374	7,374	7,374	7,374	7,374	7,374	7,374	9,845	9,845	9,845	8,388
Total Simulated Volume (vph)	7,329	10,259	10,256	10,256	8,736	5,549	5,550	5,797	7,237	7,229	7,221	7,221	7,224	7,225	7,228	9,645	9,653	9,647	8,224

I-95 Northbound —→

LEGEND

Travel Time Segment Number

Speed (mph)	Freeway Coloring Density (veh/mi/ln)
20 and below	75 and above
20 - 30	55 - 75
30 - 45	45 - 55
45 and above	45 and below

Simulated volume highlighted if difference > 10% of demand

Figure 7.18 - Build Alternative PM Peak Lane Schematic

I-95 Northbound C-D Road →

I-95 NB Entrance 2,944 vph; Pembroke Rd Exit 1,441 vph; Pembroke Rd Entrance 1,124 vph; Hollywood Blvd Exit 1,488 vph; Hollywood Blvd Entrance 1,259 vph; I-95 NB Exit 2,392 vph

Simulated Volumes	2,944	2,938	1,497	1,497	1,494	2,618	1,130	1,133	2,392
Distance (ft)	1,500	1,596	1,500	1,500	850	1,829	1,500	887	465
Speed (mph)	45	38	38	36	36	36	37	37	47
Density (veh/mi/ln)	33	39	39	42	42	36	31	31	25
Total Demand Volume (vph)	2,966	2,966	1,496	1,496	1,496	2,642	1,146	1,146	2,471
Total Simulated Volume (vph)	2,944	2,938	1,497	1,497	1,494	2,618	1,130	1,133	2,392

LEGEND

Travel Time Segment Number

Speed (mph)

25	and below
25 -	30
30 -	35
35	and above

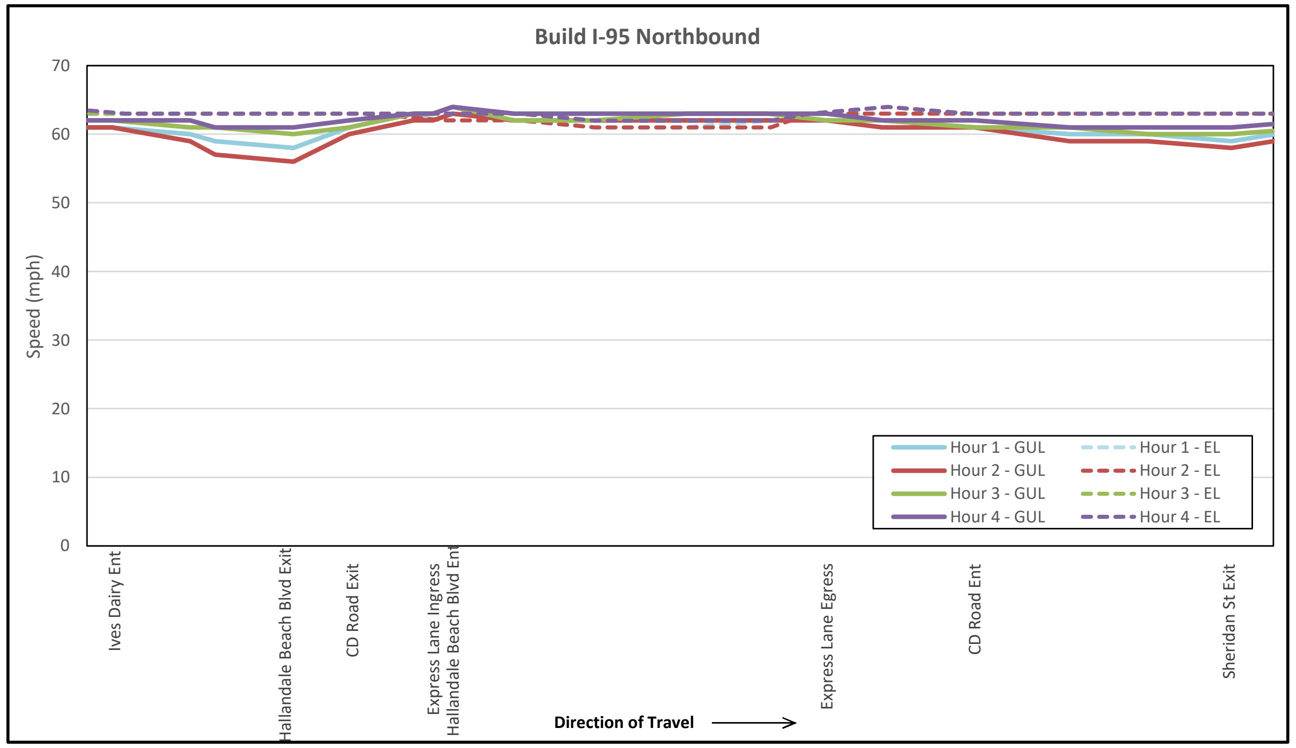
Freeway Coloring Density (veh/mi/ln)

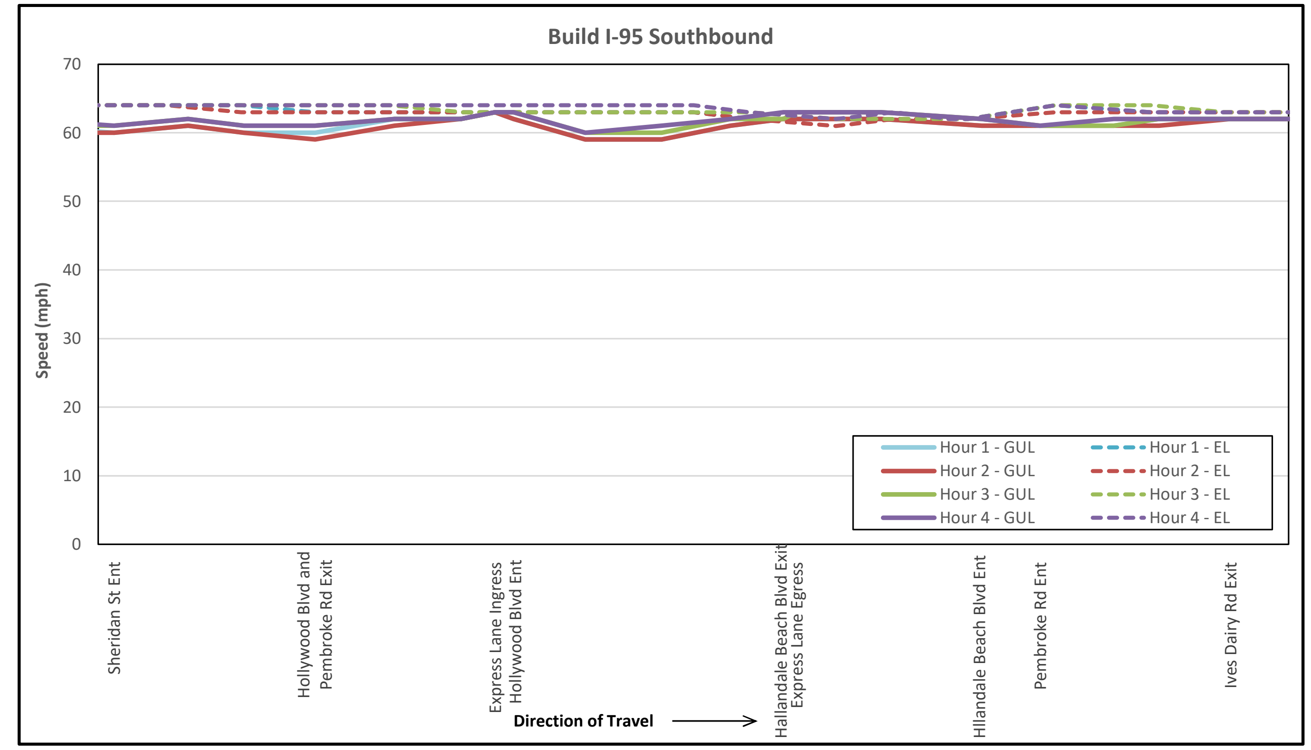
75	and above
55 -	75
45 -	55
45	and below

Simulated volume highlighted if difference > 10% of demand

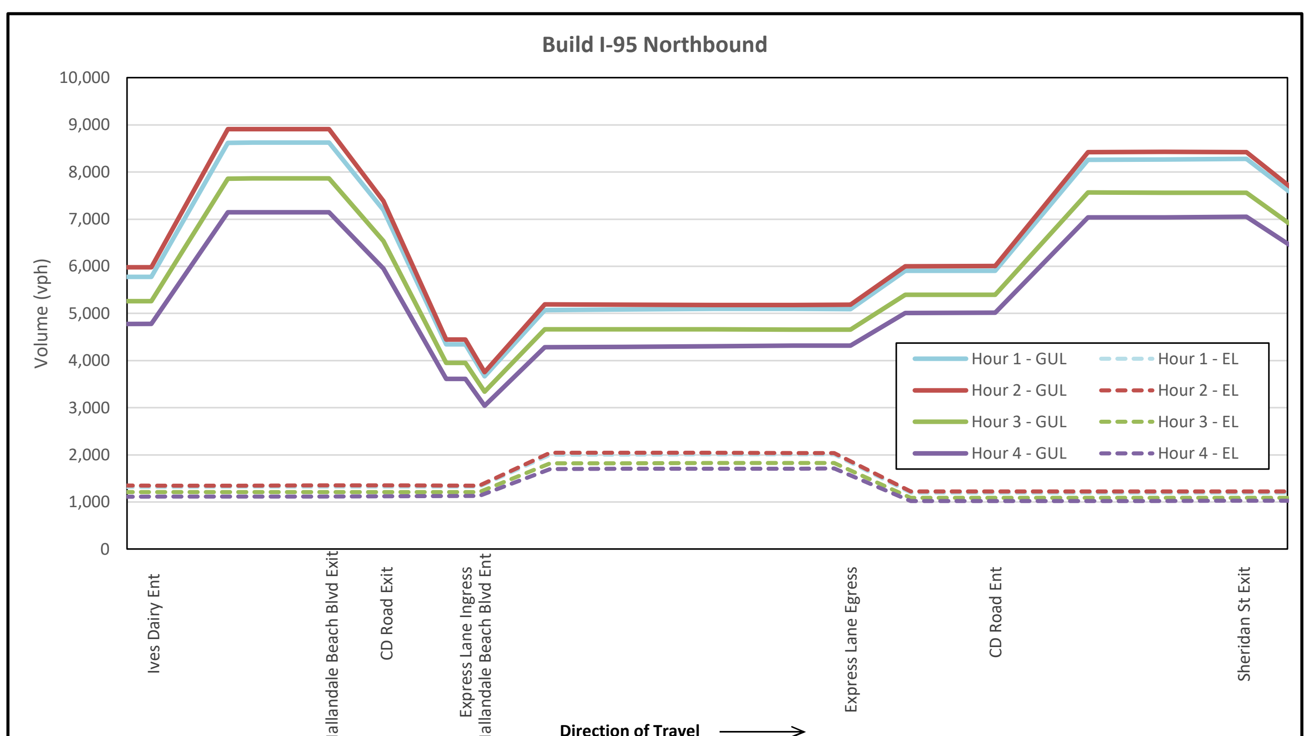
Figure 7.18 - Build Alternative PM Peak Lane Schematic

PM Peak Period Speed Profiles for I-95





PM Peak Period Volume Profiles for I-95



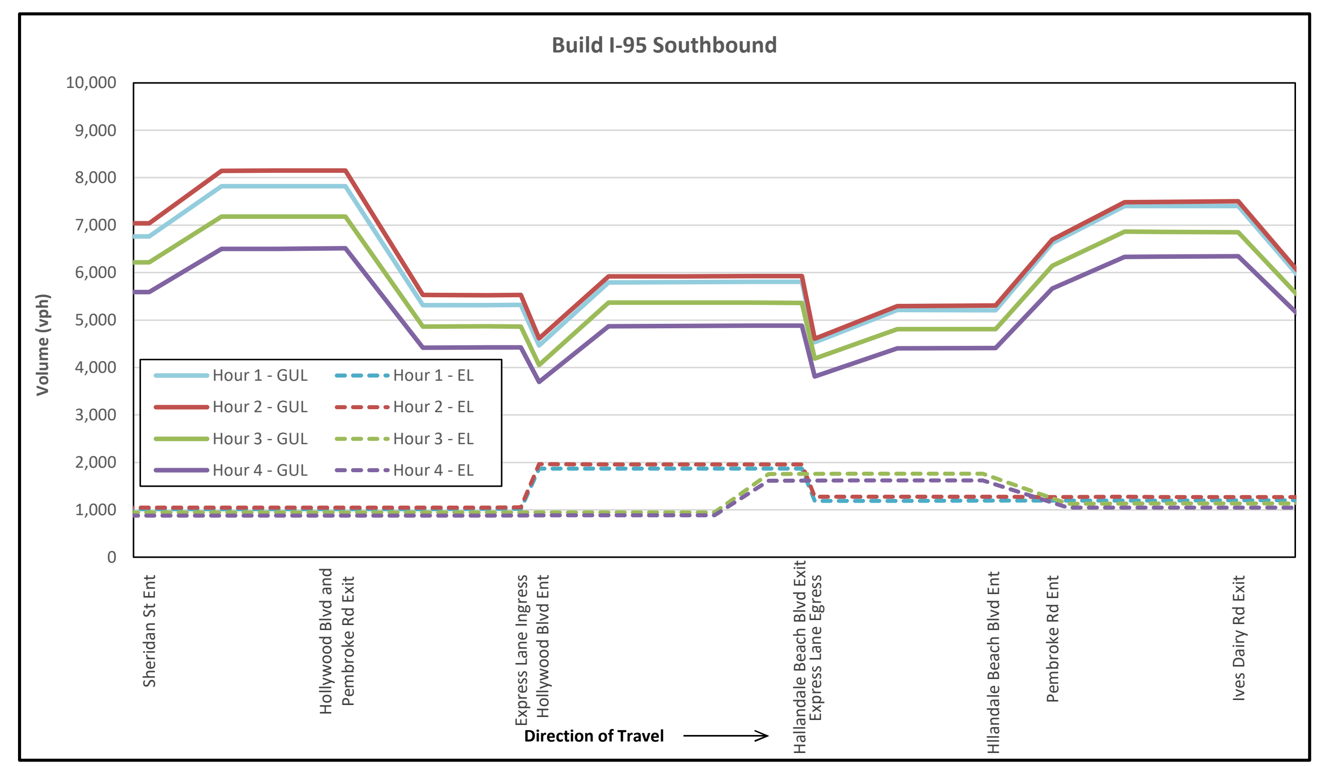


Figure 7.19: Build Alternative PM Peak Speed and Volume Profiles

Queue Length Analysis – *Table 7.12* and ***Table 7.13*** contains the No-Build and Preferred Alternatives queue length comparison, respectively. In the table, the available storage represents the left or right turn storage bay measured from the stop bar to the taper. The ramp length is measured from the stop bar to the gore point with the freeway with adjustment for deceleration, where applicable. If the off-ramp consists of an auxiliary lane which is adequate to accommodate deceleration from freeway speed to stop condition, then no adjustments were made to the ramp length. This condition is typical for parallel type off-ramps. If the off-ramp type does not accommodate deceleration, then the total ramp length was reduced by the minimum deceleration distance, in accordance with *AASHTO Greenbook, Table 10-5*. This condition is typical for taper type off-ramps.

In the No-Build Alternative, four ramps have maximum queues that are not contained within the ramp length in either the AM peak-hour, PM peak-hour, or both. These queues exceed the ramp length and spill onto I-95, which compromises the safety of vehicles traveling on the mainline.

- Hallandale Beach Boulevard northbound off-ramp (AM and PM peak)
- Hallandale Beach Boulevard southbound off-ramp (AM Peak)
- Hollywood Boulevard northbound off-ramp (AM and PM peak)
- Hollywood Boulevard southbound off-ramp (PM peak)

In the Preferred Alternative, two ramps have maximum queues that are not contained within the ramp length in either the PM peak-hour or both:

- Pembroke Road northbound off-ramp (AM Peak)
- Hollywood Boulevard northbound off-ramp (AM and PM peak)

However, the two ramp locations have queues that are accommodated by the proposed collector distributor roadway. Therefore, the queues do not impact operations on the I-95 mainline. The No-Build Alternative safety concern generated by queueing on the mainline is alleviated in the Preferred Alternative.

While the Pembroke Road northbound off-ramp right turn storage increased by 70 feet, the left turn storage decreased by approximately 300 feet when compared to the No-Build Alternative due to right of way impacts of the proposed collector distributor roadway. Also, the Hollywood Boulevard northbound off-ramp queues were significantly reduced, a decrease of 2,000 feet or greater when compared to the No-Build. The remaining queue of both ramps are contained to the proposed collector distributor roadway.

Table 7.12 – 2045 No-Build Alternative Interchange Queue Length

Ramp Location	Approach/ Movement		Available Storage[1] (ft)	Ramp Length (ft)	2045 No-Build AM Peak		2045 No-Build PM Peak	
					Max. Queue (ft)	Queue within Ramp?	Max. Queue (ft)	Queue within Ramp?
I-95 at Hallandale Beach Boulevard	NB	L	720	1,580	504	Yes	399	Yes
	NB	R	460	1,580	2,934	**No**	3,454	**No**
	SB	L	1,050	1,930	2,901	**No**	584	Yes
	SB	R	980	1,930	251	Yes	270	Yes
I-95 at Pembroke Road	NB	L	830	1,770	563	Yes	897	Yes
	NB	R	430	1,770	220	Yes	269	Yes
	SB	L	820	2,180	528	Yes	275	Yes
	SB	R	240	2,180	1,720	Yes	781	Yes
I-95 at Hollywood Boulevard	NB	L	540	1,690	4,384	**No**	4,093	**No**
	NB	R	300	1,690	813	Yes	2,965	**No**
	SB	L	590	1,890	915	Yes	1,596	Yes
	SB	R	580	1,890	1,497	Yes	3,716	**No**

[1]Length of left or right turn storage bay

Table 7.13 – 2045 Preferred Alternative Interchange Queue Length

Ramp Location	Approach/ Movement		Available Storage[1] (ft)	Ramp Length (ft)	2045 Preferred AM Peak		2045 Preferred PM Peak	
					Max. Queue (ft)	Queue within Ramp?	Max. Queue (ft)	Queue within Ramp?
I-95 at Hallandale Beach Boulevard	NB	L	540	1,690	1,112	Yes	659	Yes
	NB	R[2]	470	1,690	978	Yes	408	Yes
	SB	L[2]	510	2,710	359	Yes	318	Yes
	SB	R[2, 3]	470	2,710	697	Yes	639	Yes
I-95 at Pembroke Road	NB	L	530	1,440	1,115	Yes	1,958	**No[4]**
	NB	R	500	1,440	229	Yes	258	Yes
	SB	L	430	7,595	246	Yes	190	Yes
	SB	R	370	7,595	3,270	Yes	1,605	Yes
I-95 at Hollywood Boulevard	NB	L[2]	510	1,160	2,046	**No[4]**	2,073	**No[4]**
	NB	R	360	1,160	234	Yes	456	Yes
	SB	L[2]	580	2,580	385	Yes	368	Yes
	SB	R[2]	570	2,580	450	Yes	1,471	Yes

[1]Length of left or right turn storage bay
[2]Additional lane of storage provided in Preferred Alternative
[3]Right turn on red not allowed in Preferred Alternative
[4]Queue is contained to proposed C-D road

7.6.4 2045 Design Year Intersections Operational Analysis

The performance of the study area intersections was evaluated as part of the Vissim analysis. Signal optimization was performed to account for the 2045 peak-hour volumes. The 2045 design year intersection delay results are summarized in ***Table 7.14***. Additional details for the intersection analysis are provided in ***Appendix R***.

Table 7.14 – 2045 Intersection/Interchange Analysis Summary

Intersection	No-Build Delay (sec/veh)		Preferred Delay (sec/veh)	
	AM	PM	AM	PM
Hallandale Beach Boulevard and Park Road	123.8	109.3	105.7	25.2
Hallandale Beach Boulevard and SW 30th Avenue	71.1	46.2	**73.6**	43.1
Hallandale Beach Boulevard and I-95 Ramps	62	47	43.4	39.1
Hallandale Beach Boulevard and 10th Terrace	123.7	75.2	115.1	73
Pembroke Road and Park Road	112.2	19.1	41.4	14
Pembroke Road and SW 31st Avenue	41.1	20.3	27.1	12.6
Pembroke Road and SW 30th Avenue	16.7	13.6	**19.3**	**14.2**
Pembroke Road and I-95 Ramps	38.8	32.7	34.1	**32.8**
Pembroke Road and NW 10th Avenue/S 28th Avenue	32.9	63.6	26.8	56.2
Hollywood Boulevard and Entrada Drive	7.2	14.8	7.0	12.8
Hollywood Boulevard and Calle Grande Drive	3.1	6.1	2.5	5.2
Hollywood Boulevard and Tri-Rail Station	42.8	29.8	27.4	28
Hollywood Boulevard and I-95 Ramps	70	66.6	44.6	45.5
Hollywood Boulevard and SW 28th Avenue	57.5	85.1	**60.2**	**89.4**

Note: Values that have red, bolded text are instances where the Build intersection delay is greater than the No-Build intersection delay.

All but four intersections in the Preferred Alternative operate with lower intersection delay than the No-Build Alternative. Of the four intersections that have higher intersection delay in the Preferred Alternative, the difference is less than 5 seconds, which is not operationally significant. Additionally, more volume is being processed at each of these intersections in the Preferred Alternative due to the improved operations on the I-95 mainline, which contributes to slightly higher delays incurred on the arterials.

Two significant improvements to the intersection delay in the Preferred Alternative occur at the intersections of Hallandale Beach Boulevard at Park Road in the PM peak-hour and Pembroke Road at Park Road in the AM peak-hour. Both intersections are the furthest west adjacent intersection along their respective arterials. Both Hallandale Beach Boulevard and Pembroke Road have eastbound right turn lanes approaching the I 95 interchange, which were lengthened as part of the Preferred Alternative improvements. This right turn lane is signalized upstream of the railroad tracks for an opposing westbound left turn movement at SW 30th Avenue and for train events. The lengthened right turn lane provides an additional lane of capacity to store vehicles during stopped events and significantly reduces queueing on the eastbound arterial. The eastbound queue from the I-95 interchange still reaches the furthest west adjacent intersection. However, it is significantly reduced in comparison to the No-Build.

The travel time (minutes : seconds) along each arterial was measured from west of the furthest west adjacent intersection to east of the furthest east adjacent intersection (see ***Table 7.15***). All but the Pembroke Road westbound arterial in the PM peak-hour experienced the same or faster travel times in the Preferred Alternative when compared to the No-Build Alternative. The westbound direction on Pembroke Road experienced a marginal increase of three seconds of total arterial travel time while also processing more volumes than the No-Build Alternative, due to the freeway-level operational improvements discussed previously.

Table 7.15 – 2045 Arterial Travel Time

Arterial	Direction of Travel	AM Peak			PM Peak		
		No-Build	Preferred	Difference	No-Build	Preferred	Difference
Hallandale Beach Boulevard	Eastbound	09:28	08:50	00:38	08:17	04:42	03:35
	Westbound	08:07	07:45	00:22	05:55	05:49	00:06
Pembroke Road	Eastbound	08:12	05:17	02:55	04:36	03:58	00:38
	Westbound	03:56	03:46	00:10	04:03	04:06	**-00:03**
Hollywood Boulevard	Eastbound	05:19	04:40	00:39	04:54	04:44	00:10
	Westbound	04:56	04:56	00:00	04:41	04:37	00:04

Note: Values that have red, bolded text are instances where the Build arterial travel time is greater than the No-Build arterial travel time.

Overall, the Preferred Alternative performs better than the No-Build Alternative at the arterial level. The Preferred Alternative results in an overall reduction in intersection delays and travel times along the arterials. In instances where there is a marginal increase in intersection delays or travel times results from the increase in throughput, is due to the operational improvements on the freeway segments and ramp terminals.

7.6.5 2045 Network-Wide Performance

Table 7.16 summarizes the network-wide performance results for the No-Build and Preferred Alternatives during the 2045 AM and PM peak periods. Comparison of the alternatives shows that the Preferred consistently exhibited better performance than the No-Build Alternative in terms of delay, average speed, number of stops and latent demand.

In terms of average speed, the Preferred Alternative shows better performance than the No-Build during both peak periods with speed increases of 8% (AM) and 5% (PM). Network delay time reductions for the Preferred Alternative were 29% (AM) and 24% (PM). Significant improvements were realized for the latent delay/demand, and total stops.

Table 7.16 – 2045 Network-Wide Performance

AM PEAK	No-Build	Preferred	Percent Difference
Average Speed (mph)	39	42	8%
Total Delay (hr)	4,692	3,347	-29%
Latent Delay (hr)	1,648	909	-45%
Latent Demand	93	25	-73%
Total Travel Time (hr)	15,593	14,485	-7%
Total Stops	281,124	201,483	-28%
Vehicles Arrived	137,643	137,780	0%
PM PEAK	**No-Build**	**Preferred**	**Percent Difference**
Average Speed (mph)	40	42	5%
Total Delay (hr)	4,497	3,430	-24%
Latent Delay (hr)	2,324	1,318	-43%
Latent Demand	438	319	-27%
Total Travel Time (hr)	15,846	15,017	-5%
Total Stops	249,855	192,785	-23%
Vehicles Arrived	148,899	149,072	0%

The analysis presented in this section shows that the Preferred Alternative provides acceptable operations within the study area through the 2045 design year, while the No-Build Alternative is expected to experience critical failures along the I-95 mainline and study area arterials. This analysis supports the conclusion that the proposed roadway enhancements within the area of influence for the Preferred Alternative will benefit both the interstate and regional transportation systems.

The 2045 design year operational analysis results show that the I-95 facility performs significantly better under the Preferred Alternative (Preferred Alternative). The No-Build Alternative operates under severe congestion during both peak periods in the northbound direction of I-95. During the AM and PM peak periods, the Preferred Alternative provides substantial operational improvements along I-95 in the northbound direction with free-flow operations observed along most of the facility.

8.0 OTHER CONSIDERATIONS

8.1 CONSISTENCY WITH MASTER PLANS, LGCP AND DRIS

The I-95 project from south of Hallandale Beach Boulevard to north of Hollywood Boulevard is identified in the following transportation plans (see ***Appendix T*** for details):

- 2045 Broward County Metropolitan Transportation Plan (MTP) with funds allocated for Preliminary Engineering.
- Broward MPO's 2021-2025 Transportation Improvement Plan (TIP) with funds allocated for the PD&E Study.
- FDOT 2021-2025 Statewide Transportation Improvement Plan (STIP) with funds allocated for the PD&E Study.
- 2021-2025 FDOT Five-Year Work Program with funds allocated for the PD&E Study and Preliminary Engineering.

Funding for future phases (Right of Way and Construction) is currently being coordinated by the FDOT to ensure that the project is consistent with the local government comprehensive plans and that the required project funding is identified in the MTP, TIP, STIP, and Work Program.

8.2 SAFETY

The conceptual design plans for the proposed I-95 corridor improvements were developed in accordance with the FDOT's Design Standards, *Florida Design Manual and AASHTO's Policy on Geometric Design of Highways and Streets*. Adherence to these standards will facilitate safety and efficient traffic operations along the corridor.

Additional I-95 entry and exit ramp capacity at these interchanges will improve the safety and overall flow of traffic within the project corridor and adjacent intersections. The collector distributor roadway system removes I-95 mainline traffic, which provides more capacity to several mainline segments of I-95. The proposed improvements will reduce the number of entrances and exits to and from I-95, which improves the overall operations of the I-95 mainline, ramps, and interchanges. The proposed improvements are expected to reduce long-term crashes related to heavy congestion, mainline weaving maneuvers, mainline and ramp speed differentials, and interstate access. The additional ramp capacity and new collector distributor roadway system will provide more off-ramp storage and will require less signage on the I-95 mainline due to less proposed access points. 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. In the case of an evacuation event, I-95 will have additional lanes with the proposed improvements. The additional lanes will make the corridor more effective during emergency evacuation events and emergency response.

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. No negative impacts to safety were identified with the proposed improvements. Therefore, design mitigation measures were not required.

8.3 TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS (TSM&O)

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

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 are expected to begin construction in late 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.

8.4 Anticipated Design Exceptions and Variations

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.
Design controls and criteria that will need a Design Variation or Design Exception due to the PD&E Study preferred alternative improvements are summarized in ***Table 8.1***.

Design Variations and Design Exceptions that currently exist along the corridor that may need to be updated are summarized in ***Table 8.2***.

The Design Variations/Exceptions have not been approved at this point. The Design Variations and Exceptions Package will be prepared during the Design phase.

Table 8.1 – Preferred Alternative Design Variations and Design Exceptions

Description	Begin	End	Length	Proposed/ Required
Shoulder Width Design Variation				
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' 12'
Northbound I-95 Express Lanes	North of Pembroke Road (310+39)	South of Hollywood Boulevard (321+96)	1,157'	10'-12' 12'
Southbound I-95 Express Lanes	South of Hollywood Boulevard (323+74)	North of Pembroke Road (295+49)	2,825'	10'-12' 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' 12'
Shoulder Width Design Exception				
Northbound I-95 Express Lanes	South of Hallandale Beach Boulevard (225+13)	North of Pembroke Road (310+39)	8,526'	5'-10' 10'
Northbound I-95 Express Lanes	South of Hollywood Boulevard (321+96)	Johnson Street (370+14)	4,818'	5'-10' 10'
Southbound I-95 Express Lanes	Johnson Street (370+14)	South of Hollywood Boulevard (323+74)	4,640'	5'-10' 10'
Southbound I-95 Express Lanes	North of Pembroke Road (295+49)	South of Hallandale Beach Boulevard (217+86)	7,763'	5'-10' 10'
Lane Width Design Exception				
Northbound I-95 Express Lanes and Two Inside General Use Lanes	Miami-Dade/Broward County Line	Johnson Street	16,340'	11' 12'
Southbound I-95 Express Lanes and Two Inside General Use Lanes	Johnson Street	Miami-Dade/Broward County Line	16,340'	11' 12'
Buffer Width Design Variation				
Northbound I-95	Miami-Dade/Broward County Line	Johnson Street	16,340'	3' 4'
Southbound I-95	Johnson Street	Miami-Dade/Broward County Line	16,340'	3' 4'

Table 8.2 – Existing Design Variations and Design Exceptions

Description	Begin	End	Length	Proposed/ Required	Explanations/Comments
Design Speed Variation					
Collector Distributor Roadway	Hallandale Beach Boulevard	Hollywood Boulevard	-	45 MPH 55 MPH	FDM Requires 55 MPH - 10 MPH less than the mainline design speed 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.
Border Width Design Variation					
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.
Bicycle Lane Width Variation					
Westbound Pembroke Road	West of I-95	I-95	540'	4'-7' 7'	Necessary to avoid impacting the Orangebrook Golf Course, which is a Section 4(f) Site
Eastbound Pembroke Road	East of I-95	South 28th Avenue	400'	4' 7'	Necessary to avoid right of way impacts and potential relocations
Westbound Hollywood Boulevard	Tri-Rail Station	West of Tri-Rail Station	320'	4' 7'	Necessary to avoid impact adjacent park and canal

Table 8.2 – Existing Design Variations and Design Exceptions (Continued)

Description	Begin	End	Length	Proposed/ Required
Length of Horizontal Curve Design Exception				
I-95 South of Hallandale Beach Boulevard (Northbound & Southbound)	PC 234+30	PT 243+03	873'	873' 975'
I-95 North of Pembroke Road (Northbound & Southbound)	PC 291+90	PT 297+11	521'	521' 975'
I-95 South of Hollywood Boulevard (Northbound & Southbound)	PC 330+33	PT 336+61	628'	628' 975'
I-95 North of Hollywood Boulevard (Northbound & Southbound)	PC 346+72	PT 352+41	569'	569' 975'
I-95 South of Johnson Street (Northbound & Southbound)	PC 358+78	PT 364+39	561'	561' 975'
Length of Vertical Curve Design Variation				
I-95 (Crest Vertical Curve)	South of Hallandale Beach Boulevard	North of Hallandale Beach Boulevard	1,650'	1,650' 1,800'
I-95 (Crest Vertical Curve)	South of Pembroke Road	North of Pembroke Road	1,750'	1,750' 1,800'
I-95 (Crest Vertical Curve)	South of Hollywood Boulevard	North of Hollywood Boulevard	1,700'	1,700' 1,800'
Vertical Curve K-Value Design Variation				
I-95 (Crest Vertical Curve)	South of Hallandale Beach Boulevard	North of Hallandale Beach Boulevard	-	307 401
I-95 (Crest Vertical Curve)	South of Pembroke Road	North of Pembroke Road	-	304 401
I-95 (Crest Vertical Curve)	South of Hollywood Boulevard	North of Hollywood Boulevard	-	306 401
I-95 (Crest Vertical Curve)	South of Johnson Street	North of Johnson Street	-	306 401
I-95 (Sag Vertical Curve)	North of Hollywood Boulevard	North of Hollywood Boulevard	-	164 181

Table 8.2 – Existing Design Variations and Design Exceptions (Continued)

Description	Begin	End	Length	Proposed/ Required
Stopping Sight Distance Design Variation				
Northbound I-95 Inside Express Lane	North of Pembroke Road (291+90)	North of Pembroke Road (297+11)	521'	658' 730'
Potential Stopping Sight Distance Design Exception (Due to Express Lane markers)				
Northbound I-95 Inside General Use Lane	Just north of Pembroke Road	North of Pembroke Road	526'	423' 645'
Northbound I-95 Outside Express Lane	North of Hollywood Boulevard	South of Johnson Street	560'	608' 645'
Southbound I-95 Inside General Use Lane	South of Johnson Street	North of Hollywood Boulevard	564'	611' 645'
Southbound I-95 Outside Express Lane	North of Pembroke Road	Just north of Pembroke Road	516'	419' 645'
Potential Superelevation Variation				
I-95	Just north of the Miami-Dade/Broward County Line	South of Hallandale Beach Boulevard	-	0.023 0.025
I-95	South of Hallandale Beach Boulevard	Just south of Hallandale Beach Boulevard	-	0.030 0.033
I-95	Just north of Pembroke Road	North of Pembroke Road	-	0.050 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 is not proposing geometric improvements along the I-95 mainline.

8.5 Conceptual Signing Master Plan

An I-95 Conceptual Signing Master Plan (CSMP) was developed to include in the 2045 proposed improvements as part of the I-95 PD&E Study. The plan depicts all the guide signs needed within the study limits for the preferred alternative design configuration. ***Appendix U*** contains the CSMP developed for the 2045 proposed improvements.

9.0 JUSTIFICATION FOR PROJECT

9.1 Assessment of FHWA's Policy on Access to Interstate System

The FHWA's Policy on Access to the Interstate System provides the requirements for the justification and documentation necessary to substantiate any proposed changes in access to the Interstate System. The policy is published under the Federal Register, Volume 74, Number 165, which was updated on May 22, 2017. The responses provided herein for both of the policy statements demonstrate compliance with these requirements and justification for the proposed interchange modifications at I-95 from south of Hallandale Beach Boulevard to north of Hollywood Boulevard in Broward County, Florida.

Policy:
It is in the national interest to preserve and enhance the Interstate System to meet the needs of the 21st Century by assuring that it provides the highest level of service in terms of safety and mobility. Full control of access along the Interstate mainline and ramps, along with control of access on the crossroad at interchanges, is critical to providing such service. Therefore, FHWA's decision to approve new or revised access points to the Interstate System under Title 23, United States Code (U.S.C.), Section 111, must be supported by substantiated information justifying and documenting that decision. The FHWA's decision to approve a request is dependent on the proposal satisfying and documenting the following requirements.

Considerations and Requirements:

1. ***An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).***

The operational analysis conducted for the SIMR 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, the Preferred Build Alternative significantly improves operations along I-95 and its interchanges.

In the Preferred Build Alternative, 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, the Preferred Alternative shows better performance than the No-Build during both peak periods with speed increases of 8% (AM) and 5% (PM). Network delay time reductions for the Preferred Alternative were 29% (AM) and 24% (PM). Significant improvements were also shown for the latent delay/demand, and total stops.

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.

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. Under the No-Build Alternative, traffic congestion is expected to increase along I-95 in future years with a corresponding increase in crash risk along the corridor. This potential for future increase in crash risk is largely alleviated by the improvements proposed in the Preferred Alternative. In addition, 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 mering in with the I-95 mainline traffic.

The I-95 project will include the development of a comprehensive signing plan for the corridor. A conceptual signing master plan is presented under ***Appendix U***. The signing plan will be fully coordinated with FHWA in advance of construction.

2. ***The proposed access connects to a public road only and will provide for all traffic movements. Less than ``full interchanges" may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).***

   The SIMR proposes no new interchanges along any of the freeway facilities within the project limits. All existing interchanges provide access to public roads only. The improvements proposed at the interchanges will maintain full access to I-95 and all movements will be accommodated at all cross streets. The proposed access modifications will be designed to meet or exceed all applicable design standards, to the extent possible. Any design variations or exceptions that are identified, will be processed per FHWA and FDOT standards.

10.0 CONCEPTUAL FUNDING PLAN

The project is included in the 2045 MPO MTP, 2021-2025 TIP and 2021-2025 STIP. The design phase is listed in the FDOT Work Program under project number 436903-1. The right of way and construction phases are not currently funded. The project is anticipated to be funded with federal and state funds. The project is proposed to be phased in two phases: 1) Northbound Improvements and 2) Southbound Improvements. A funding plan for the opening year 2030 will be developed based on the results, costs, and recommendations from the PD&E Study. The project is in the 2021-2025 FDOT Five-Year Work Program with funds allocated for the PD&E and Preliminary Engineering phases. Funding for future phases is anticipated for Fiscal Years 2022-2027 and is currently being coordinated to ensure that the project is consistent with the local government comprehensive plans and that required project funding is identified in the MTP, TIP, STIP, and Work Program.

Interstate 95 (I-95) / State Road 9 (SR 9) PD&E Study

From South of Hallandale Beach Boulevard (SR 858) to
North of Hollywood Boulevard (SR 820)
Broward County, Florida