

STATE OF FLORIDA  
DEPARTMENT OF TRANSPORTATION

OFFICE OF PLANNING AND ENVIRONMENTAL MANAGEMENT



**SR 9 (I-95) INTERCHANGE OPERATIONAL ANALYSIS REPORT**  
**I-95 at Hollywood Boulevard (SR 820)**

Financial Project ID No: 439911-1-32-01

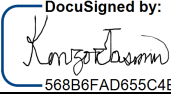
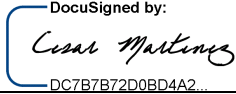
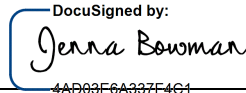
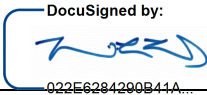
STATE OF FLORIDA DEPARTMENT OF  
TRANSPORTATION DISTRICT 4  
3400 WEST COMMERCIAL BOULEVARD  
FORT LAUDERDALE, FL 33309

**October 2020**

**Interstate 95 at Hollywood Boulevard (SR 820)**  
**Interchange Operational Analysis Report**  
Financial Project ID No: 439911-1-32-01

**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.

Requestor	 DocuSigned by: 568B6FAD655C4BC...	10/23/2020   4:36 PM EST
	Kenzot Jasmin, PE District Four	Date
Interchange Review Coordinator	 DocuSigned by: DC7B7B72D0BD4A2...	10/23/2020   4:37 PM EST
	Cesar Martinez, PE District Four	Date
Systems Management Administrator	 DocuSigned by: 4AD83E6A337F4C1...	11/2/2020   10:08 AM EST
	Jenna Bowman, PE Systems Implementation Office – Central Office	Date
State Chief Engineer	 DocuSigned by: 022E6284290B41A...	11/2/2020   10:10 AM EST
	Will Watts, P.E. Central Office	Date

SYSTEMS IMPLEMENTATION OFFICE  
**QUALITY CONTROL CERTIFICATION FOR  
INTERCHANGE ACCESS REQUEST SUBMITTAL**

Submittal Date: Click or tap to enter a date.

FM Number: 439911-1-32-01

Project Title: SR 9 (I-95) Interchange Operational Analysis Report:  
I-95 at Hollywood Boulevard (SR 820)

District: Four

Requestor: Kenzot Jasmin, P.E.

Phone: 954-777-4462

District IRC: Cesar Martinez, P.E.

Phone: 954-777-4653

Document Type:  MLOU  IJR  IMR  IOAR  OTHER \_\_\_\_\_ (Specify)

Status of Document (Only complete documents will be submitted for review; however, depending on the complexity of the project, interim reviews may be submitted as agreed upon in the MLOU)

Quality Control (QC) Statement

This document has been prepared following FDOT Procedure Topic No. 525-030-160 (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 \_\_\_\_\_  
  
[SIGNATURE]

Date: 10/23/2020 | 4:36 PM EDT

IRC \_\_\_\_\_  
  
[SIGNATURE]

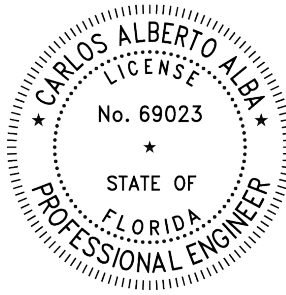
Date: 10/23/2020 | 4:37 PM EDT



### Engineer’s Certification

I, Carlos Alba, PE, PTOE, PE number 69023, certify that I currently hold an active Professional Engineer’s License in the State of Florida, and I am competent through education or experience to provide engineering services in the civil and traffic engineering disciplines contained in this report. I further certify that this report was prepared by me or under my responsible charge as defined in Chapter 61G15-18.001 F.A.C. and that all statements, conclusions and recommendations made herein are true and correct to the best of my knowledge and ability.

Project Description: SR 9 (I-95) Interchange Operational Analysis Report: I-95 at Hollywood Boulevard (SR820)



Carlos A. Alba, P.E., PTOE  
Florida Registration P.E. No. 69023  
WSP USA, Inc.  
Miami, Florida 33126

Digitally signed by Carlos A Alba  
DN: cn=Carlos A Alba, c=US, o=WSP USA,  
ou=A01410C00000171EFD29E4D0000CA54,  
email=carlos.alba@wsp.com  
Date: 2020.10.23 11:11:50 -04'00'





## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	X
1 PROJECT OVERVIEW .....	1
1.1 Introduction .....	1
1.2 Purpose and Need .....	1
1.3 Project Location.....	1
2 METHODOLOGY .....	3
2.1 Overview .....	3
2.2 Analysis Years .....	3
2.3 Area of Influence .....	3
2.4 Data Collection .....	5
2.5 Travel Demand Forecasting .....	5
2.6 Traffic Factors .....	7
2.7 Traffic Operational Analysis .....	7
3 EXISTING CONDITIONS.....	7
3.1 Existing Land Use.....	7
3.2 Freeway Operational Analysis .....	8
3.3 Signalized Intersections Operational Analysis.....	12
3.4 Safety Analysis.....	15
3.4.1 Crash Data Analysis .....	15
3.4.1.1 Intersection at Hollywood Boulevard and Southbound I-95 Ramps .....	17
3.4.1.2 Intersection at Hollywood Boulevard and Northbound I-95 Ramps .....	19
3.4.1.3 Intersection at Hollywood Boulevard and 28 <sup>th</sup> Avenue .....	21
3.4.1.4 Crash Data Analysis Conclusion .....	23
3.4.2 Previous Safety Studies .....	23
4 FUTURE CONDITIONS .....	24
4.1 No-Build Alternative .....	24
4.2 Build Alternative .....	24
4.3 Freeway Operational Analysis .....	28
4.4 Signalized Intersections Operational Analysis.....	29
4.5 Safety Analysis.....	39
5 INTERCHANGE IMPROVEMENT SCHEDULE .....	40



6	ENVIRONMENTAL CONSIDERATIONS .....	40
7	COORDINATION .....	41
8	ANTICIPATED DESIGN EXCEPTIONS AND VARIATIONS .....	41
9	PROJECT COST.....	41
10	ACCESS MANAGEMENT PLAN .....	41
11	FHWA POLICY POINTS .....	41
	11.1 FHWA Policy Points 1.....	41
	11.2 FHWA Policy Points 2.....	42
12	CONCLUSION.....	42



## List of Tables

Table 1: Validation of Travel Demand Forecast – Traffic Volumes Comparison	6
Table 2: Trend Analysis	6
Table 3: Recommended K and D Factors	7
Table 4: Traffic Factors	7
Table 5: Weaving Segment - Existing Year 2018	8
Table 6: Intersection Delay and LOS for Existing Year 2018	13
Table 7: Queue Analysis for Existing Year 2018	14
Table 8: Summary of crashes within the Study Area	16
Table 9: Summary of crashes for the Intersection at Hollywood Boulevard and SB I-95 Ramps	18
Table 10: Summary of crashes for the Intersection at Hollywood Boulevard and NB I-95 Ramps	20
Table 11: Summary of crashes for the intersection at Hollywood Boulevard and 28 <sup>th</sup> Avenue	22
Table 12: Weaving Segment - Opening Year 2021 and Design Year 2040	28
Table 13: Intersection Delay and LOS for Opening Year 2021 – No-Build Scenario	30
Table 14: Intersection Delay and LOS for Opening Year 2021 - Build Alternative	32
Table 15: Intersection Delay and LOS for Design Year 2040 – No-Build Scenario	34
Table 16: Intersection Delay and LOS for Design Year 2040 – Build Alternative	36
Table 17: Queue Analysis for Opening Year 2021 and Design Year 2040 – No- Build Scenario	38
Table 18: Queue Analysis for Opening Year 2021 and Design Year 2040 – Build Alternative	38
Table 19: Predictive Crash Analysis Summary	40
Table 20: Predictive Crash Reduction by Crash Type	40



## List of Figures

Figure 1: Project Location	2
Figure 2: Area of Influence	4
Figure 3: City of Hollywood Existing Land Use Map	9
Figure 4: 2018 Lane Configuration and Existing Freeway Peak Hour Volumes	10
Figure 5: 2018 Lane Configuration and Existing Intersection Peak Hour Volumes	11
Figure 6: Weaving Segment v/c Distribution for Existing Year 2018	12
Figure 7: Intersections Delay for Existing Year 2018	14
Figure 8: Crashes for the Intersection at Hollywood Boulevard and SB I-95 Ramps by Crash Severity	17
Figure 9: Crashes for the Intersection at Hollywood Boulevard and NB I-95 Ramps by Crash Severity	19
Figure 10: Crashes for the Intersection at Hollywood Boulevard and 28 <sup>th</sup> Avenue by Crash Severity	21
Figure 11: Crash Type Comparison for the Intersections at Hollywood Boulevard and the I-95 (SB and NB)	23
Figure 12: Conceptual Signing Plan	25
Figure 13: 2021 & 2040 Lane Configuration and Freeway Peak Hour Volumes	26
Figure 14: 2021 & 2040 Lane Configuration and Intersection Peak Hour Volumes	27
Figure 15: Weaving Segment v/c Distribution for Opening Year 2021 and Design Year 2040	28
Figure 16: Intersections Delay for Opening Year 2021 – No-Build Scenario	31
Figure 17: Intersections Delay for Opening Year 2021 – Build Alternative	33
Figure 18: Intersections Delay for Design Year 2040 – No-Build Scenario	35
Figure 19: Intersections Delay for Design Year 2040 – Build Alternative	37



## APPENDICES

- Appendix A: Executed Methodology Letter of Understanding (MLOU)**
- Appendix B: Historical AADT Reports and Trend Analysis Calculation**
- Appendix C: Historical Crash Data**
- Appendix D: Safety Study SR 820 (Hollywood Boulevard) at SR 9 (I-95) and S 28 Avenue**
- Appendix E: Freeway Analysis - HCS Reports**
- Appendix F: Intersection Analysis – Synchro Reports**
- Appendix G: Queue Analysis - Synchro Reports**
- Appendix H: Crash Modification Factors**



## EXECUTIVE SUMMARY

The primary purpose of the IOAR is to perform an analysis of the performance of the proposed interchange modifications in comparison to the No-Build scenario. The Florida Department of Transportation (FDOT) completed a safety study in July 2016 that evaluated safety improvements at the intersections of Hollywood Boulevard and the northbound I-95 off-ramp, and Hollywood Boulevard and 28<sup>th</sup> Avenue. This safety study found that there was a high incidence of rear end crashes on the northbound off-ramp. It was then recommended that a second right-turn lane on the northbound off-ramp was added, as well as signaling the turning movement. This IOAR advances the project to the design phase and final implementation.

A Methodology Letter of Understanding (MLOU) was prepared to document the methodology for the safety and traffic analyses included in this IOAR. The MLOU was approved by the FDOT District 4 Interchange Review Coordinator and the Central Office Systems Management Administrator in July 2020. Traffic data was collected in 2016 by FDOT for typical weekday AM and PM peak periods (6-9 AM, 4-7 PM) as part of the PD&E Study work efforts. SERPM 7.061 was used for the travel demand forecast.

The traffic analysis in this IOAR includes the northbound I-95 weaving segment between Pembroke Road and Hollywood Boulevard and the following signalized intersections:

- Hollywood Boulevard and SB I-95 Ramps
- Hollywood Boulevard and NB I-95 Ramps
- Hollywood Boulevard and 28<sup>th</sup> Avenue

The traffic operational analysis found that there will be an approximate 8 second reduction in delay during the PM peak hour for the intersection at Hollywood Boulevard and northbound I-95 Ramps in the design year 2040, which represents a 17% reduction. The other intersections have an unchanged level of delay. The Build Alternative does not change the performance of the freeway weaving area.

Crash data was collected from the FDOT Crash Analysis Reporting System (CAR Online) for the five most recent years (January 2013 to December 2017) at the study intersections. Crash summaries were developed for the five years based on the crash data. Review of the crash summaries provides insight into the historical crash patterns at the study intersections. A summary of the crashes within the entire study area is shown in Table 8. There was a total of 408 crashes within the study area from 2013 to 2017, an average of 82 per year. The data shows the following:

- 57% of crashes were rear end incidents, and 22% were angle impacts
- 77% of crashes resulted in property damage only
- 69% of crashes occurred during the daytime
- 86% of crashes occurred during dry road conditions



The safety analysis for future conditions found that a 5% total crash reduction is estimated due to the proposed improvements in the study area. This includes approximately 15% reduction in fatal crashes, and 12% reduction in injury crashes.

The Federal Highway Administration (FHWA) Interchange Access Policy was checked to ensure that an adequate level of service is provided in terms of safety and mobility. The proposed Build Alternative does not modify any current access arrangements.

Based on the conclusions above, the proposed Build Alternative will provide both safety and performance improvements to the road network within the study area.



# 1 PROJECT OVERVIEW

## 1.1 Introduction

The Florida Department of Transportation (FDOT) is preparing an Interchange Operational Analysis Report (IOAR) for SR 9/I-95 ramp improvements at SR 820/Hollywood Boulevard, located in Broward County, Florida.

## 1.2 Purpose and Need

The primary purpose of the IOAR is to evaluate the performance of the proposed interchange modifications in comparison to the No-Build scenario. FDOT completed a safety study in July 2016 that evaluated safety improvements at the intersections of Hollywood Boulevard and the northbound I-95 off-ramp, and Hollywood Boulevard and 28<sup>th</sup> Avenue. This safety study found that there was a high incidence of rear end crashes on the northbound off-ramp and consequently recommended that a second right-turn lane on the northbound off-ramp was added, as well as signaling the right-turn movement. This IOAR will advance the project to the design phase and final implementation.

I-95 is a 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 part of the State's Strategic Intermodal System and the National Highway System. In addition, I-95 is designated as an evacuation route along the east coast of Florida. I-95 within the project limits, currently consists of ten general purpose lanes (five in each direction) and four dynamically tolled express lanes (two in each direction). Two of the general purpose lanes (one in each direction) are auxiliary lanes between Hollywood Boulevard and the adjacent interchanges. The segment of I-95 within the interchange at Hollywood Boulevard is functionally classified as a Divided Urban Principal Arterial Interstate and has a posted speed limit of 65 miles per hour. Hollywood Boulevard is classified as Divided Urban Principal Arterial, has six lanes west of I-95 and four lanes east of I-95 and has a posted speed limit of 35 mph.

## 1.3 Project Location

The project is in south Broward County, Florida. The I-95 at Hollywood Boulevard study interchange is located approximately 1.6 miles south of the I-95 and Sheridan Street interchange and 1 mile north of the I-95 and Pembroke Road interchange. The project location is shown in Figure 1.



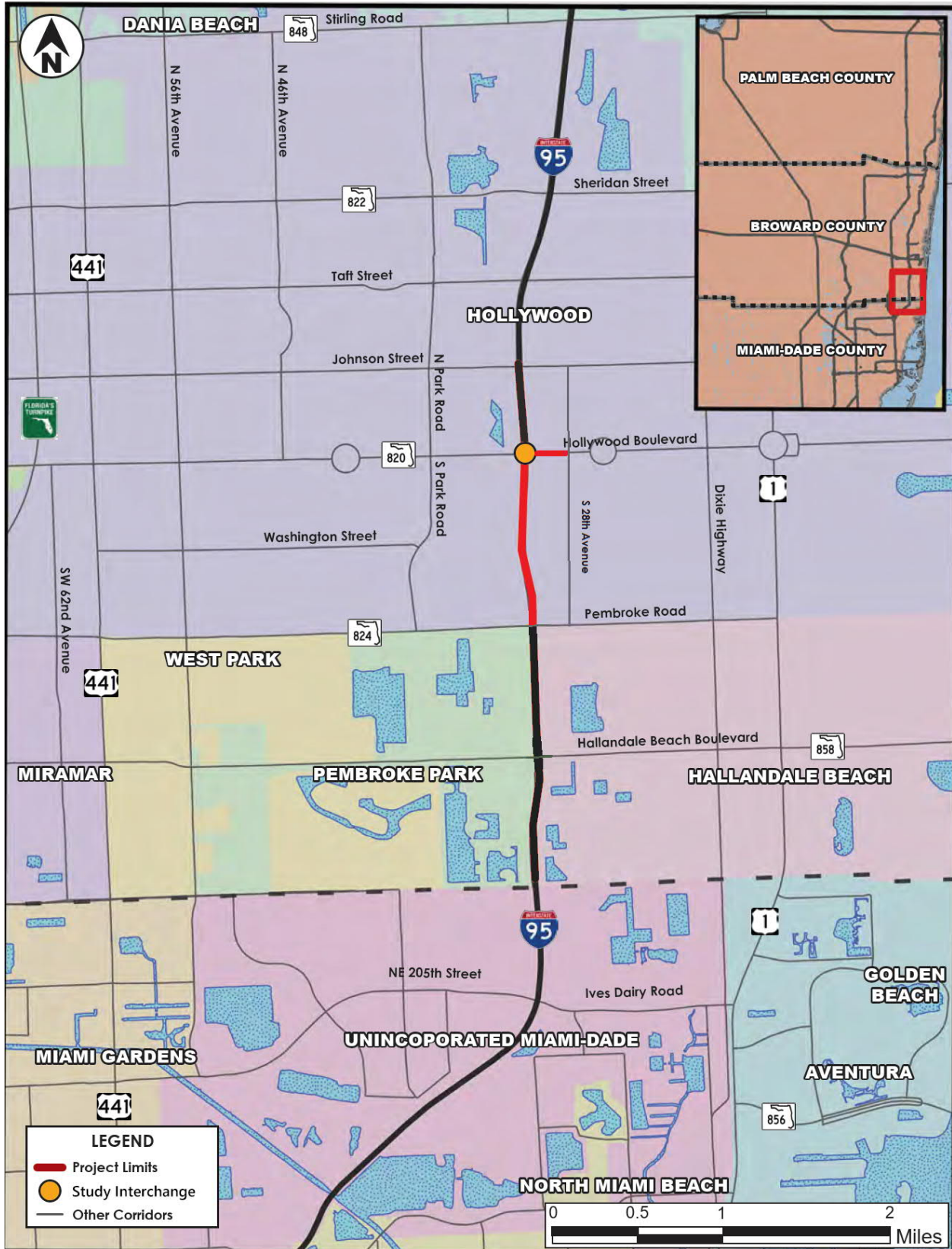


Figure 1: Project Location



## 2 METHODOLOGY

### 2.1 Overview

A Methodology Letter of Understanding (MLOU) was prepared to document the methodology for the traffic and safety analyses included in this IOAR. The approved MLOU is provided in Appendix A.

### 2.2 Analysis Years

#### A. Traffic Forecasting

This IOAR used the traffic forecast developed for the PD&E study (FM# 436903-1).

- Base year 2010
- Horizon year 2040

#### B. Traffic Operational Analysis

Historical growth rates using FDOT traffic monitoring sites in the study area were used to verify if it was necessary to adjust previously developed traffic volumes. As shown in the MLOU, such adjustment was not necessary and previously calculated volumes were used for the traffic operational analysis in the IOAR.

- Existing year 2018
- Opening year 2021
- Design year 2040

### 2.3 Area of Influence

Figure 2 illustrates the Area of Influence (AOI) for this project. The AOI includes the northbound I-95 weaving segment between Pembroke Road and Hollywood Boulevard and the following signalized intersections:

- Hollywood Boulevard and SB I-95 Ramps
- Hollywood Boulevard and NB I-95 Ramps
- Hollywood Boulevard and 28<sup>th</sup> Avenue

The sections of Hollywood Boulevard west of I-95 or southbound I-95 are not included in the analysis, as roadway improvements under consideration are limited to the northbound I-95 off-ramp terminal and the intersection at Hollywood Boulevard and 28<sup>th</sup> Avenue.



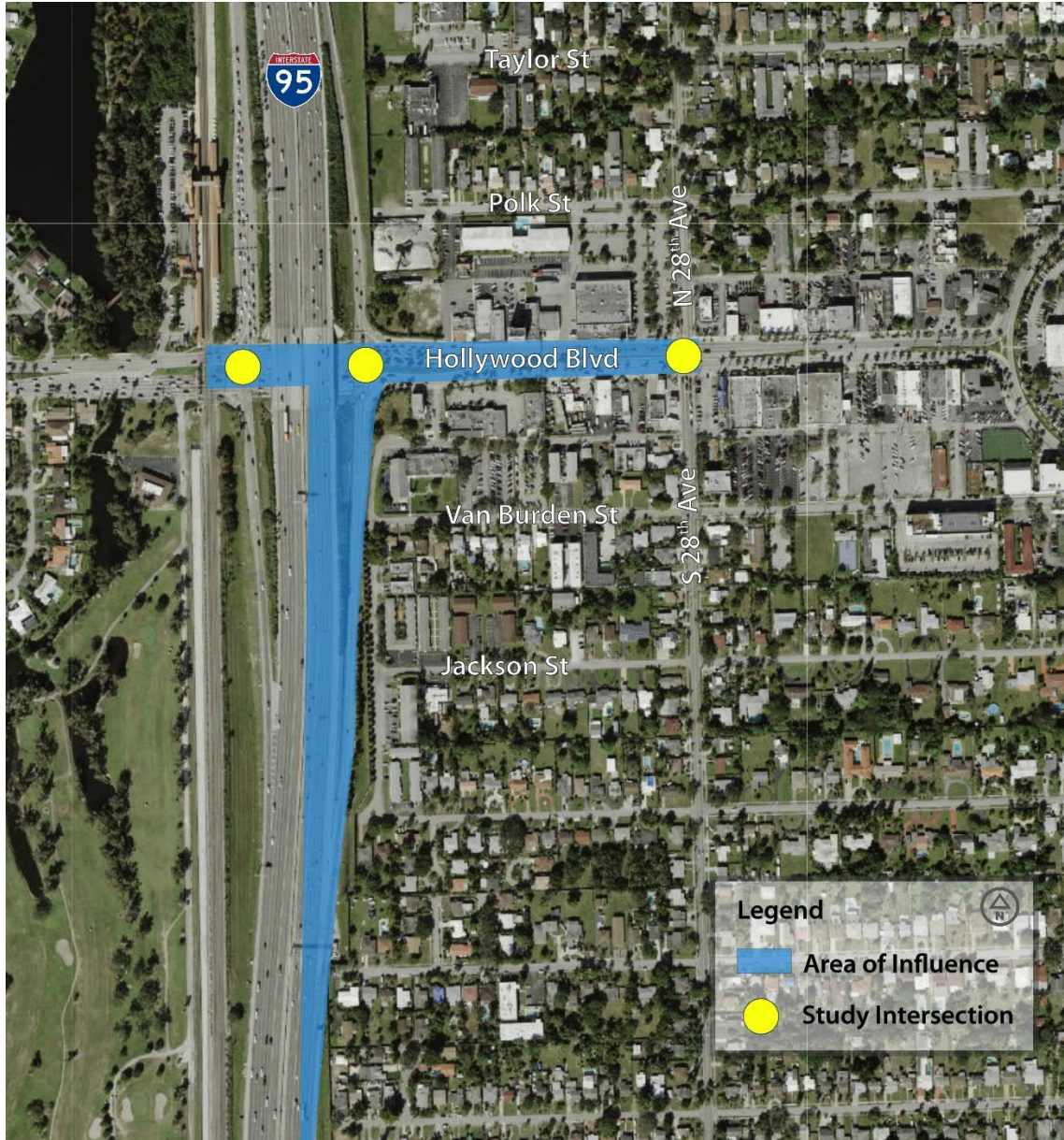


Figure 2: Area of Influence



## 2.4 Data Collection

Traffic data utilized in this IOAR included the following:

- Safety Study SR 820 (Hollywood Boulevard) at SR 9 (I-95) and S 28<sup>th</sup> Avenue completed in 2016.
- Safety Review SR 9 (I-95) between SR 858 (Hallandale Beach Boulevard) and SR 820 (Hollywood Boulevard) completed in 2017.
- PD&E Study Interstate 95 (I-95) / SR 9 from South of Hallandale Beach Boulevard to North of Hollywood
- Broward County Traffic and Engineering Division signal timing information
- Field traffic counts
- Crash data from CAR Online

No roadway improvements along SR 820 (Hollywood Boulevard) within the limits of this study have been implemented since 2016.

## 2.5 Travel Demand Forecasting

Traffic data was collected in 2016 by FDOT for typical weekday AM and PM peak periods (6-9 AM, 4-7 PM) as part of the PD&E Study work efforts. SERPM 7.061 was used for the travel demand forecasting in the study. It is important to note that given the nature of the proposed roadway improvements, there are not changes in traffic demand between the No-Build scenario and the Build Alternative.

AM and PM peak-hour intersection and ramp volumes were developed using the FDOT TMTTool spreadsheet. The TMTTool spreadsheet utilizes existing traffic counts, growth rates and AADT forecasts from the Pre-PD&E Report and recommended traffic factors. Future peak-hour intersection traffic projections obtained from the TMTTool were further checked for reasonableness and balanced consistently with existing conditions. Ramp volumes obtained from the peak-hour intersection traffic projections were established as controlled points around which the I-95 mainline traffic volumes were balanced.

The I-95 mainline combined total (express lane plus general purpose lane) peak hour traffic volumes were obtained by applying the recommended K and D factors to the 2020 and 2040 Pre-PD&E Report AADT volumes. 2040 combined total traffic volumes resulted from this process were compared with the CTAR Update Report combined total traffic volumes. The comparison shows that volume differences for the combined total traffic are within 10% or less.



To confirm that the original forecast is still valid, count data from 2018 was compared to the 2016 volumes to ensure that the expected traffic growth has occurred. As shown in Table 1, when comparing 2018 count data from FDOT traffic monitoring sites against 2018 volumes calculated from SERPM runs in the PD&E study, the difference is less than 10 percent. Likewise, when comparing the final 2040 traffic volumes selected in the PD&E against the raw volumes from the 2040 SERPM 7 runs, the difference is only 5 percent.

Table 1: Validation of Travel Demand Forecast – Traffic Volumes Comparison

FDOT Site	Location	FDOT Count	FDOT Count	PD&E	2018	PD&E	SERPM 7	2040
		2016 AADT	2018 AADT	2018 AADT (1)	Count vs. 2018 PD&E	2040 AADT	2040 AADT	SERPM 7 vs. 2040 PD&E
864008	NB I-95 off-ramp to Hollywood Blvd	14,500	14,500	15,848	-9%	17,000	15,952	6%
860248	Hollywood Blvd east of I-95	49,000	53,000	46,406	12%	57,000	54,182	5%
	<i>All locations</i>		67,500	62,254	8%	74,000	70,134	5%

Notes:

(1) Interpolated from the 2010 and 2040 volumes from the SERPM 7 Model

(2) Travel demand forecast volumes in this table come from the Traffic Data Collection & Traffic Projections (Pre-PD&E Report) for the I-95 PD&E Study from Hallandale Beach Blvd to Hollywood Blvd

A trend analysis was also completed using 10-years (2009-2018) of historical AADTs for the FDOT stations at the northbound I-95 off-ramp and at Hollywood Boulevard just east of I-95. This calculation was made to check that the growth rate calculated when including AADTs from recent years, was comparable or lower (to be on the conservative side) than the one calculated in the PD&E study. As shown in Table 2 the growth rate calculated for the northbound I-95 off-ramp including recent years of data (-2.24%) is very similar to the one calculated in the PD&E study from historical data (-3.84%) and lower than the one assumed in the PD&E for this segment (0.03%). Similarly, the growth rate calculated for Hollywood Boulevard east of I-95 considering recent years of data (-0.84%) is very similar to the one calculated in the PD&E from historical data (0.11%) and lower than the one assumed in the PD&E for this segment (0.74%).

Table 2: Trend Analysis

FDOT Site	Location	Linear		Exponential		Decaying Exponential		AADT (2018)	GR <sup>(1)</sup> (Highest R <sup>2</sup> )
		R <sup>2</sup>	GR <sup>(1)</sup>	R <sup>2</sup>	GR <sup>(1)</sup>	R <sup>2</sup>	GR <sup>(1)</sup>		
864008	NB I-95 off-ramp to Hollywood Blvd	40.60%	-1.61%	39.28%	-1.72%	<b>62.67%</b>	<b>-2.24%</b>	14,500	-2.24%
860248	Hollywood Blvd - east of I-95	11.32%	-0.84%	12.29%	-0.93%	<b>13.78%</b>	<b>-1.03%</b>	53,000	-0.84%

Notes:

(1) GR = Growth Rate

(2) Data included for trend analysis from 2009 to 2018

Weighted Average: -1.14%

The information presented in Table 1 and Table 2 shows that it is not necessary to adjust 2016 volumes based on traffic demand in 2018. Also, the future volumes calculated in the PD&E study are still valid and do not need be adjusted when performing the traffic analysis required for this IOAR. Historical AADT reports from FDOT traffic monitoring sites and detail trend calculations are included in Appendix B.





## 2.6 Traffic Factors

Recommended K and D factors shown in Table 3 were calculated for the I-95 from South of Hallandale Beach Boulevard (SR 858) to north of Hollywood Boulevard (SR 820) Systems Interchange Modification Report (SIMR). The traffic analysis performed as part of this IOAR uses traffic volumes developed from these factors.

Table 3: Recommended K and D Factors

Roadway	Recommended K Factor		Recommended D Factor	
	AM	PM	AM	PM
I-95 from Pembroke Park Road to Hollywood Boulevard	6.3	6.8	51.2	51.9
Hollywood Boulevard	6.0	7.0	50.8	50.8

Daily Trucks Factor ( $T_{24}$ ), Design Hour Trucks Factor ( $DHT_f$ ) and Peak Hour Factor (PHF) values for the study area are shown in Table 4. Five-year average truck factors were collected from stations 862394 (I-95) and 860248 (Hollywood Boulevard). The most conservative peak hour factor calculated in the SIMR was used for this analysis.

Table 4: Traffic Factors

Roadway	$T_{24}$	$DHT_f$	PHF
I-95	5.7	2.9	0.95
Hollywood Boulevard	5.0	2.5	0.95

## 2.7 Traffic Operational Analysis

Traffic operational analysis was conducted using the Highway Capacity Software (HCS) 7.8.5 for the freeway weaving section and Synchro 10.3 for intersection analysis. Signal timing plans incorporated in the Synchro files from the Safety Study were not modified and used as a base for the traffic analysis in the IOAR. It is important to note that FDOT has not implemented any significant signal timing changes in the study area since 2016 when the safety study was conducted.

## 3 EXISTING CONDITIONS

### 3.1 Existing Land Use

The interchange of I-95 at Hollywood Boulevard is located within the City of Hollywood. Figure 3 presents the City of Hollywood zoning and land use map. The study area is located within a Transit Oriented Development zoning district.

Figure 4 shows the existing lane configuration and peak hour volumes along I-95. Figure 5 shows the existing lane configuration and peak hour volumes for the intersections along Hollywood Boulevard.



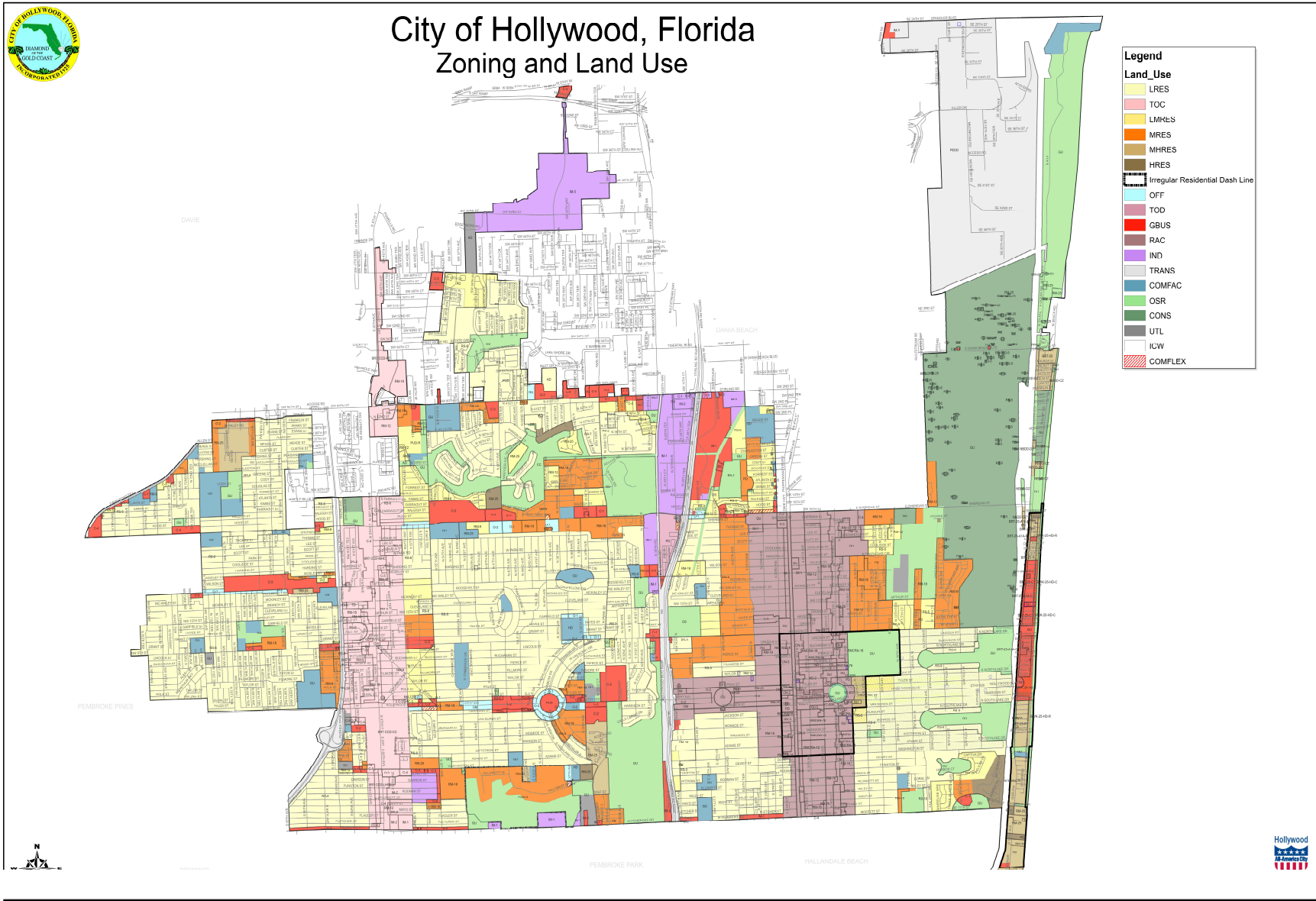
### 3.2 Freeway Operational Analysis

A freeway operational analysis was conducted using the HCS for the existing year 2018. The freeway facility analyzed was the five-lane weaving segment along the northbound I-95 general purpose lanes between the on-ramp from Pembroke Road and the off-ramp to Hollywood Boulevard. This weaving analysis does to take into consideration any of the future improvements being considered on the ongoing PD&E study along I-95. Table 5 presents a summary of the results of the freeway evaluation. Figure 6 is a graphical representation of Table 5 and allows for an easy comparison between the periods being analyzed. As shown in Table 5 and Figure 6 the weaving segment operates at acceptable level of service C and D during the AM and PM peak hours in the existing year 2018.

Table 5: Weaving Segment - Existing Year 2018

	Year 2018				
	DDHV (veh/h)	v/c	Speed (mi/h)	Density (pc/mi/ln)	LOS
AM Peak Hour	5,761	0.85	50.8	24.6	C
(PM Peak Hour)	(7,044)	(0.97)	47.9	(31.9)	(D)

Note: Values on the table calculated from HCM 6<sup>th</sup> Edition





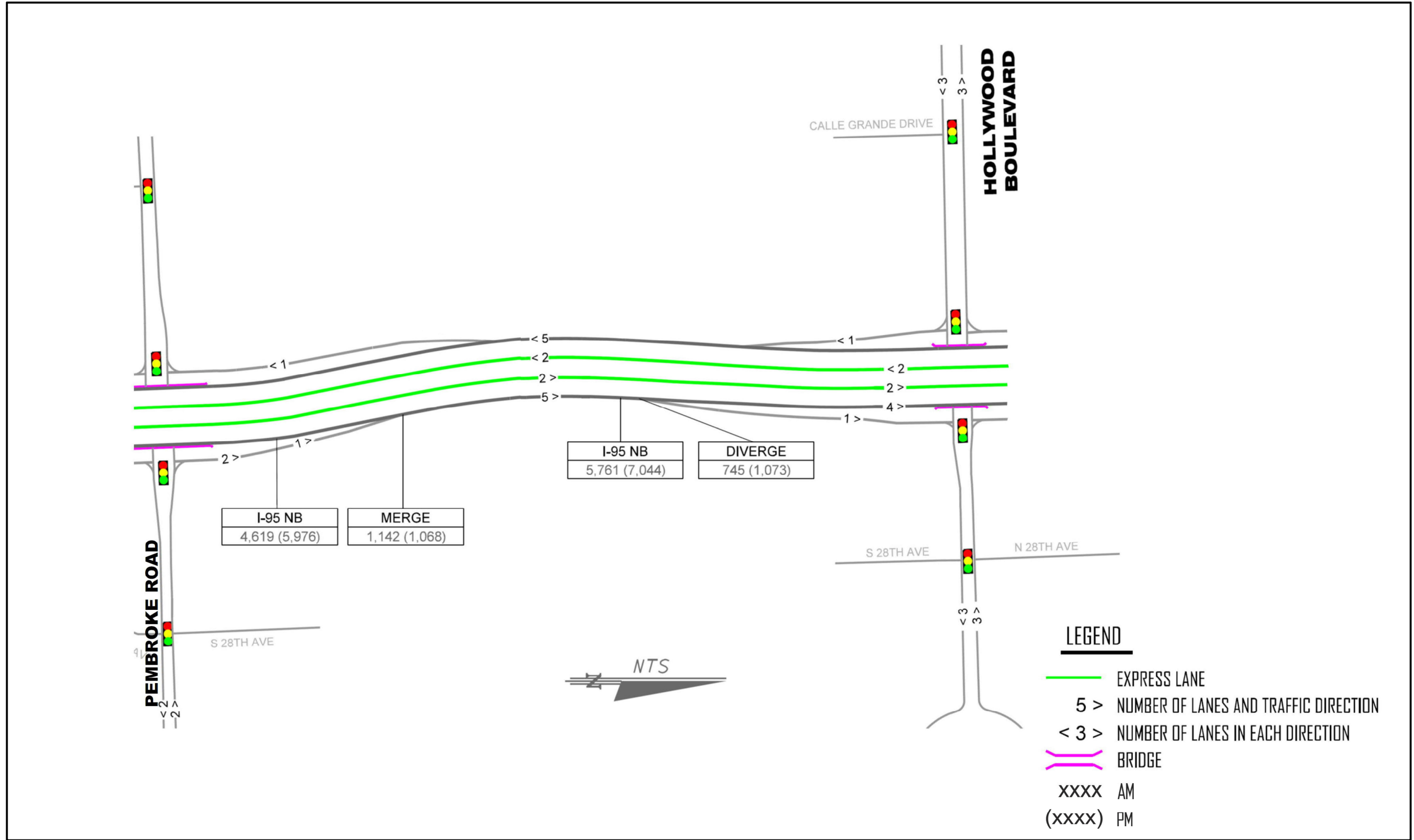


Figure 4: 2018 Lane Configuration and Existing Freeway Peak Hour Volumes

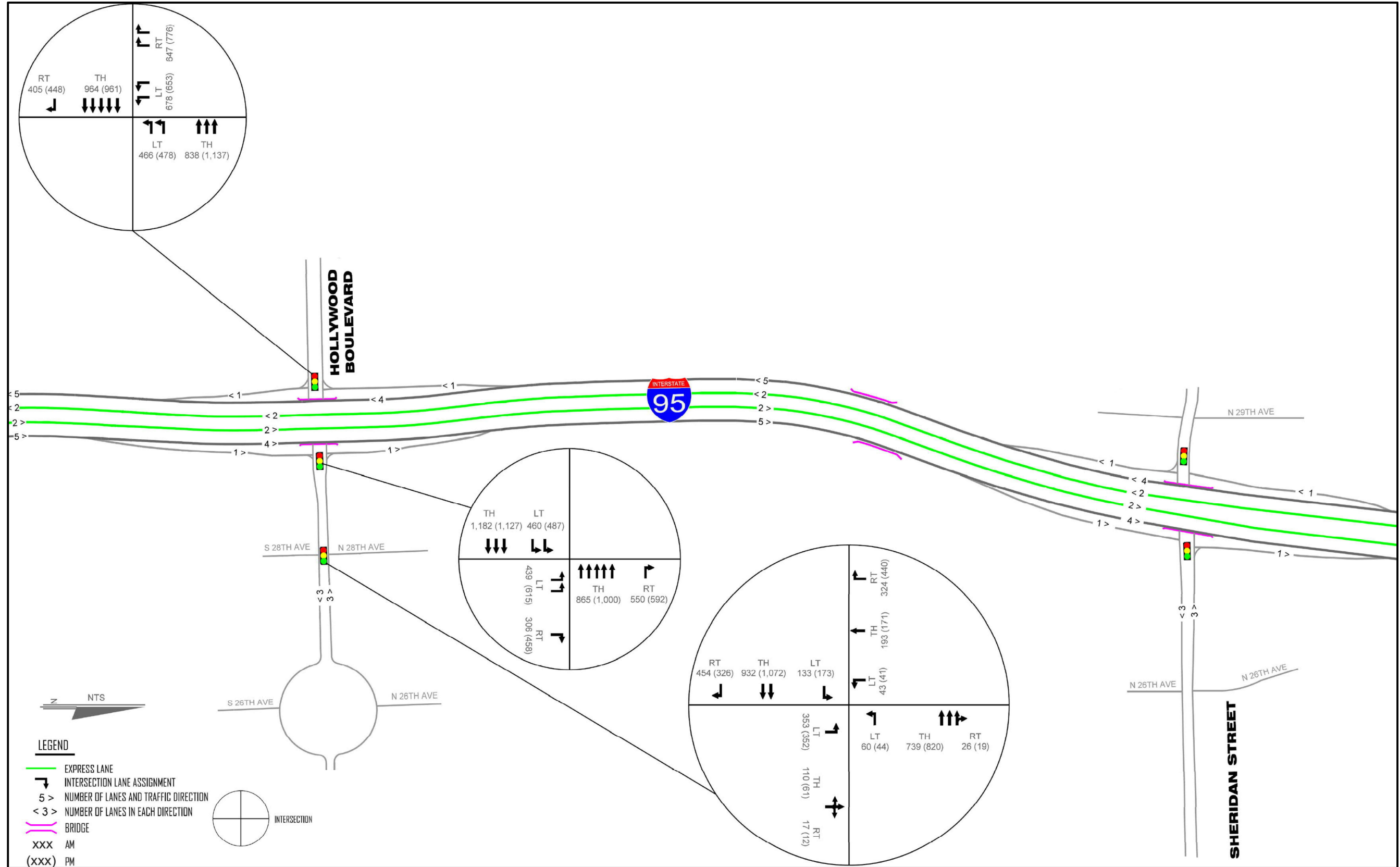


Figure 5: 2018 Lane Configuration and Existing Intersection Peak Hour Volumes

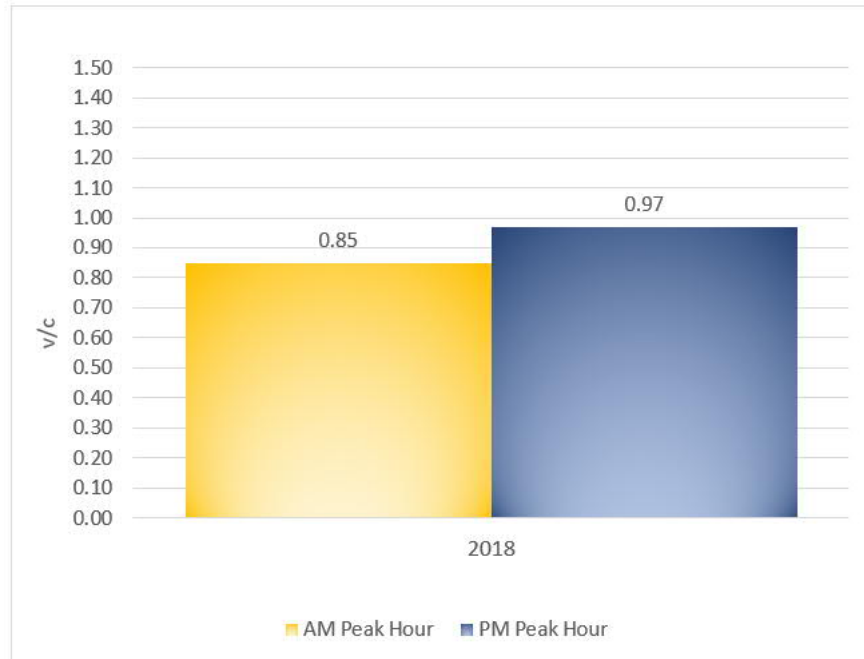


Figure 6: Weaving Segment v/c Distribution for Existing Year 2018

### 3.3 Signalized Intersections Operational Analysis

An intersection capacity analysis was conducted using Synchro for the existing year 2018. The existing year 2018 traffic operational analysis is shown in Table 6. Figure 7 is a graphical representation of Table 6 and allows for an easy comparison between the periods being analyzed.

Overall, the delay for the intersections is higher during the PM peak period when compared to the AM peak period. Southbound I-95 ramp terminal experience long delays, which result in a LOS E during the PM peak hour. The northbound approach at the I-95 ramp terminal as well as the northbound and southbound approaches for the intersection at 28<sup>th</sup> Avenue experience long delays, which result in a LOS F during the PM peak hour.

Most of intersections are operating at acceptable levels of service except for the intersection at Hollywood Boulevard and the southbound I-95 ramps. This intersection operates at LOS E during the PM peak hour, which is just outside of the LOS D target for facilities in the State Highway System (SHS) in urbanized areas according to Florida's LOS policy. The intersection at Hollywood Boulevard and the northbound I-95 ramps operates at acceptable LOS but its northbound approach, which is the focus on this IOAR, operates at LOS E during the AM peak hour and at LOS F during the PM peak hour.



Table 6: Intersection Delay and LOS for Existing Year 2018

Intersection	AM Peak Hour					PM Peak Hour				
	Intersection Delay (sec/veh) / LOS	Approach	Approach Delay (sec/veh) / LOS	Movement	Movement Delay (sec/veh) / LOS	Intersection Delay (sec/veh) / LOS	Approach	Approach Delay (sec/veh) / LOS	Movement	Movement Delay (sec/veh) / LOS
Hollywood Boulevard & SB I-95 Ramps	46.8 / D	EB	33.1 / C	EBT	38.7 / D	61.3 / E	EB	46.2 / D	EBT	52.7 / D
				EBR	19.6 / B				EBR	32.1 / C
		WB	8.8 / A	WBL	16.7 / B		WB	7.9 / A	WBL	12.7 / B
				WBT	4.4 / A				WBT	5.9 / A
		SB	98.3 / F	SBL	167.3 / F		SB	136.6 / F	SBL	245.3 / F
				SBR	25.9 / C				SBR	45.2 / D
		NB	-	-	-		NB	-	-	-
				-	-				-	-
Hollywood Boulevard & NB I-95 Ramps	31.5 / C	EB	6.8 / A	EBL	19.7 / B	46.6 / D	EB	9.3 / A	EBL	26.4 / C
				EBT	1.8 / A				EBT	1.9 / A
		WB	42.6 / D	WBT	49.1 / D		WB	43.7 / D	WBT	51.5 / D
				WBR	32.5 / C				WBR	30.6 / C
		NB	64.8 / E	NBL	63.7 / E		NB	107.1 / F	NBL	76.5 / E
				NBR	66.3 / E				NBR	148.3 / F
		SB	-	-	-		SB	-	-	-
				-	-				-	-
Hollywood Boulevard & 28 <sup>th</sup> Avenue	43.1 / D	EB	28.5 / C	EBL	18.2 / B	48.8 / D	EB	31.1 / C	EBL	20.7 / C
				EBT	30.2 / C				EBT	34.0 / C
				EBR	27.9 / C				EBR	27.1 / C
		WB	28.0 / C	WBL	23.0 / C		WB	31.9 / C	WBL	26.5 / C
				WBT	28.4 / C				WBT	32.1 / C
				WBR	-				WBR	-
		NB	77.2 / E	NBL	78.3 / E		NB	85.7 / F	NBL	86.3 / F
				NBT	76.1 / E				NBT	85.2 / F
				NBR	-				NBR	-
		SB	75.8 / E	SBL	61.2 / E		SB	90.2 / F	SBL	55.4 / E
				SBT	82.6 / F				SBT	60.8 / E
				SBR	73.6 / E				SBR	104.9 / F

Note: Values on the table calculated from HCM 2000

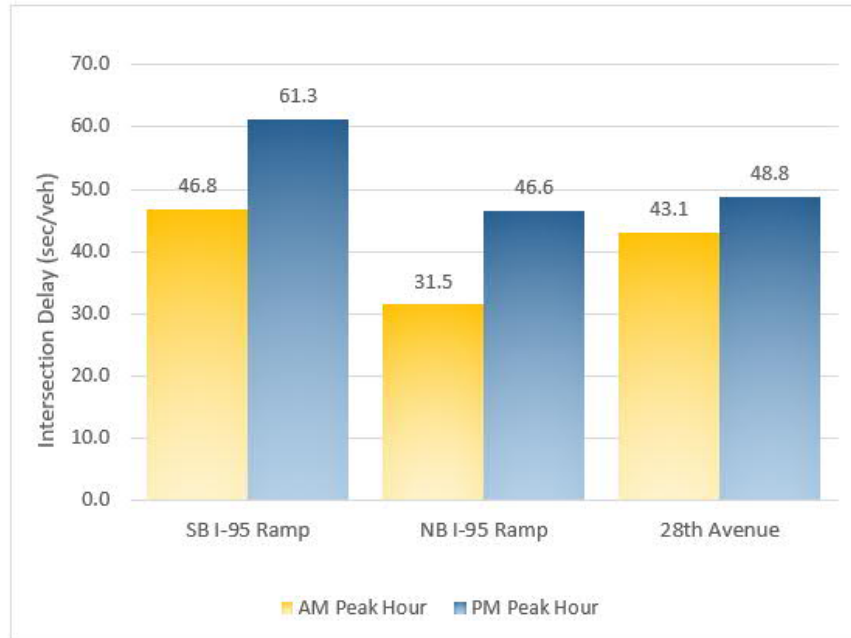


Figure 7: Intersections Delay for Existing Year 2018

Table 7 shows a comparison of the available storage length and modeled queue length from the Synchro models for the existing year 2018. The available storage length for the northbound right turn pocket at the northbound I-95 off-ramp and the southbound left turn pocket at the southbound I-95 off-ramp are exceeded by the queue length formed during both the AM and PM peak hours. In contrast, Table 7 shows that the available storage length for the eastbound left turn movement for the intersection at Hollywood and 28<sup>th</sup> Avenue is not exceeded by the queue length formed at any of the peak periods analyzed. A queue analysis was only performed for the movements affected by the interim improvements evaluated in this IOAR.

Values that exceed the storage length are shown in red and a # symbol indicates a location where the queue may be longer than calculated, as the 95<sup>th</sup> percentile volume exceeds capacity.

Table 7: Queue Analysis for Existing Year 2018

Intersection	Movement	Ramp Length (ft)	Available Storage (ft)	AM Peak Hour	PM Peak Hour
				Queue 95 <sup>th</sup> (ft)	Queue 95 <sup>th</sup> (ft)
Hollywood Boulevard & SB I-95 Ramps	SB LT	2,150	475	#584	#653
Hollywood Boulevard & NB I-95 Ramps	NB RT	2,140	245	302	#715
Hollywood Boulevard & 28 <sup>th</sup> Avenue	EB LT	-	245	132	156



### **3.4 Safety Analysis**

#### **3.4.1 Crash Data Analysis**

Crash data was collected from CAR Online for the five most recent years (January 2013 to December 2017) of available data at the study intersections. Review of the crash summaries provides insight into the historical crash patterns at the study intersections. Raw crash data is provided in Appendix C.

A summary of the crashes within the entire study area is shown in Table 8. There was a total of 408 crashes within the study area from 2013 to 2017, an average of 82 per year. The data shows the following:

- 57% of crashes were rear end incidents, and 22% were angle impacts
- 77% of crashes resulted in property damage only
- 69% of crashes occurred during the daytime
- 86% of crashes occurred during dry road conditions

Table 8 shows that the number of crashes during dark conditions is higher than the districtwide average. The consultants working on the final design for this project are proposing to upgrade lighting along the widened section of the northbound I-95 off-ramp and at the ramp terminal intersection to comply with the latest Florida Design Manual (FDM) criteria.

Table 8 shows that there were two fatal crashes during the five years evaluated. One of the fatal crashes took place on Saturday October 8<sup>th</sup>, 2016 at 10:25 PM on eastbound Hollywood Boulevard approaching the intersection of 28<sup>th</sup> Avenue. Drivers involved on this crashed were under the influence of alcohol. The second fatal crash took place on Tuesday September 26<sup>th</sup>, 2017 at 5:51 AM on the westbound approach of the intersection at Hollywood Boulevard and 28<sup>th</sup> Avenue.



Table 8: Summary of crashes within the Study Area

Crashes in Study Area		Number of Crashes					Total Crashes	Average Per Year	Percentage (%)
		Year							
		2013	2014	2015	2016	2017			
Crash Type	Rear End	49	42	39	61	42	233	47	57%
	Head On	0	0	0	1	1	2	0	0%
	Angle	5	15	17	22	30	89	18	22%
	Sideswipe, Same Direction	12	5	7	7	14	45	9	11%
	Sideswipe, Opposite Direction	0	0	0	0	1	1	0	0%
	Other/Unknown	6	3	10	11	8	38	8	9%
Severity	PDO Crashes	55	52	57	76	75	315	63	77%
	Injury Crashes	17	13	16	25	20	91	18	22%
	Fatal Crashes	0	0	0	1	1	2	0	0%
Lighting Conditions	Dawn	3	3	0	0	0	6	1	1%
	Daylight	50	47	52	69	65	283	57	69%
	Dusk	2	3	3	1	2	11	2	3%
	Dark	17	12	18	32	29	108	22	26%
Surface Conditions	Dry	62	51	59	89	89	350	70	86%
	Wet	10	14	14	13	7	58	12	14%
Total Crashes		72	65	73	102	96	408	82	100%



### 3.4.1.1 Intersection at Hollywood Boulevard and Southbound I-95 Ramps

The crash summary for the intersection at Hollywood Boulevard and the southbound I-95 ramps is shown in Table 9. A total of 114 crashes were reported at the intersection in the five (5) years from 2013 through 2017, an average of 23 crashes per year. The data shows that:

- 53% of crashes were rear end incidents, and 23% were angle impacts
- 78% of crashes resulted in property damage only
- 69% of crashes occurred during the daytime
- 75% of crashes occurred during dry road conditions

The number of crashes over the five-year period has been relatively consistent. There were zero (0) fatal crashes at the intersection during the years analyzed. Figure 8 displays the severity of crashes over time at the Hollywood Boulevard and southbound I-95 ramps intersection. The number of crashes that occurred during dark and wet conditions exceed statewide averages. The final design for this project is proposing to improve the drainage and correct the cross slope along the I-95 off ramp and along Hollywood Boulevard.

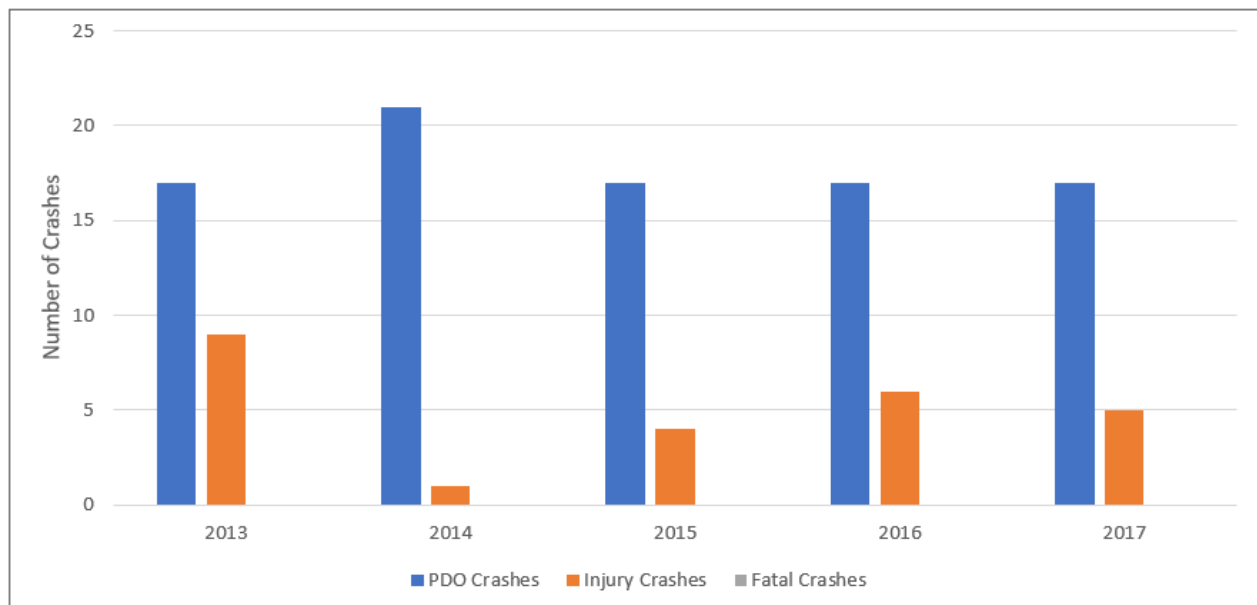


Figure 8: Crashes for the Intersection at Hollywood Boulevard and SB I-95 Ramps by Crash Severity





Table 9: Summary of crashes for the Intersection at Hollywood Boulevard and SB I-95 Ramps

Crashes at Hollywood Boulevard and SB I-95 Ramps		Number of Crashes					Total Crashes	Average Per Year	Percentage (%)
		Year							
		2013	2014	2015	2016	2017			
Crash Type	Rear End	14	12	9	14	11	60	12	53%
	Head On	0	0	0	0	0	0	0	0%
	Angle	3	6	6	5	6	26	5	23%
	Sideswipe, Same Direction	5	2	3	2	3	15	3	13%
	Sideswipe, Opposite Direction	0	0	0	0	0	0	0	0%
	Other/Unknown	4	2	3	2	2	13	3	11%
Severity	PDO Crashes	17	21	17	17	17	89	18	78%
	Injury Crashes	9	1	4	6	5	25	5	22%
	Fatal Crashes	0	0	0	0	0	0	0	0%
Lighting Conditions	Dawn	0	2	0	0	0	2	0	2%
	Daylight	19	15	16	15	14	79	16	69%
	Dusk	1	1	1	0	1	4	1	4%
	Dark	6	4	4	8	7	29	6	25%
Surface Conditions	Dry	19	14	15	19	19	86	17	75%
	Wet	7	8	6	4	3	28	6	25%
Total Crashes		26	22	21	23	22	114	23	100%



### 3.4.1.2 Intersection at Hollywood Boulevard and Northbound I-95 Ramps

The crash summary for the intersection at Hollywood Boulevard and the northbound I-95 ramps is shown in Table 10. A total of 170 crashes were reported at the intersection in the five (5) years from 2013 through 2017, an average of 34 crashes per year. The data shows that:

- 68% of crashes were rear end incidents, and 14% were angle impacts
- 74% of crashes resulted in property damage only
- 68% of crashes occurred during the daytime
- 90% of crashes occurred during dry road conditions

The number of crashes over the five-year period has been decreasing. There were zero (0) fatal crashes at the intersection in the years analyzed. Figure 9 displays the severity of crashes over time at the Hollywood Boulevard and northbound I-95 ramps intersection. The number of crashes that occurred during dark conditions is higher than the districtwide average. The final design for this project is proposing to upgrade lighting along the widened section of the northbound I-95 off-ramp and at the ramp terminal intersection to comply with the latest FDM criteria.

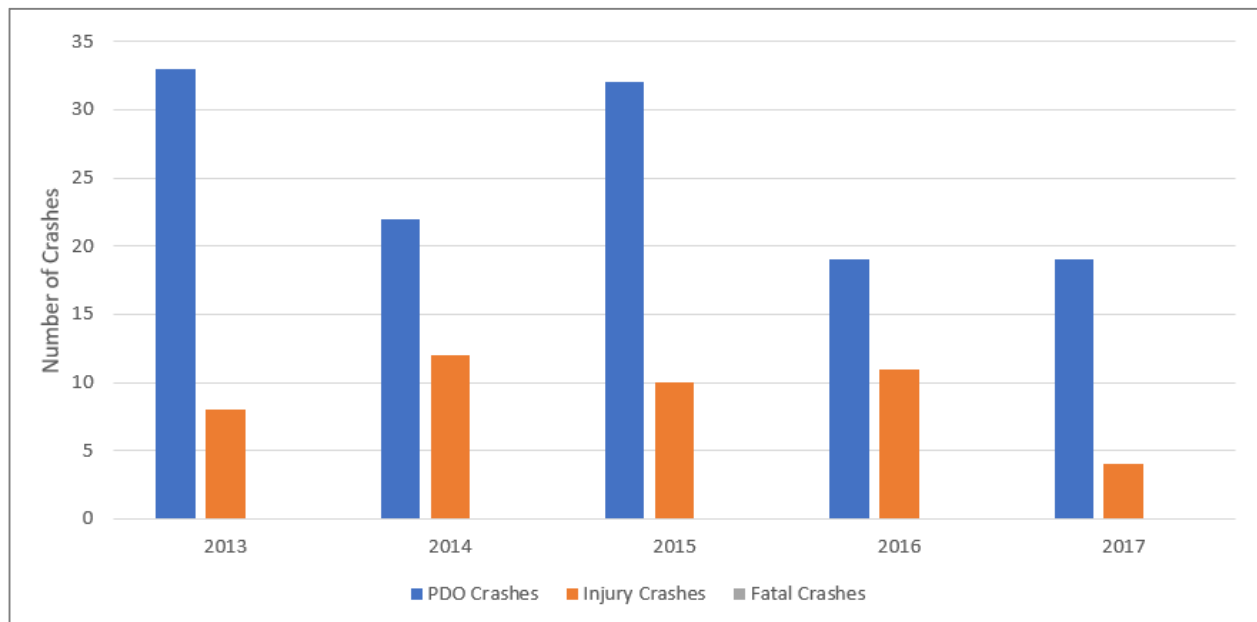


Figure 9: Crashes for the Intersection at Hollywood Boulevard and NB I-95 Ramps by Crash Severity



Table 10: Summary of crashes for the Intersection at Hollywood Boulevard and NB I-95 Ramps

Crashes at Hollywood Boulevard and NB I-95 Ramps		Number of Crashes					Total Crashes	Average Per Year	Percentage (%)
		Year							
		2013	2014	2015	2016	2017			
<b>Crash Type</b>	Rear End	32	25	26	22	11	116	23	68%
	Head On	0	0	0	1	0	1	0	1%
	Angle	2	7	7	3	4	23	5	14%
	Sideswipe, Same Direction	6	1	3	1	6	17	3	10%
	Sideswipe, Opposite Direction	0	0	0	0	0	0	0	0%
	Other/Unknown	1	1	6	3	2	13	3	8%
<b>Severity</b>	PDO Crashes	33	22	32	19	19	125	25	74%
	Injury Crashes	8	12	10	11	4	45	9	26%
	Fatal Crashes	0	0	0	0	0	0	0	0%
<b>Lighting Conditions</b>	Dawn	2	1	0	0	0	3	1	2%
	Daylight	28	25	27	21	15	116	23	68%
	Dusk	0	2	2	0	0	4	1	2%
	Dark	11	6	13	9	8	47	9	28%
<b>Surface Conditions</b>	Dry	38	30	36	27	22	153	31	90%
	Wet	3	4	6	3	1	17	3	10%
<b>Total Crashes</b>		<b>41</b>	<b>34</b>	<b>42</b>	<b>30</b>	<b>23</b>	<b>170</b>	<b>34</b>	<b>100%</b>



### 3.4.1.3 Intersection at Hollywood Boulevard and 28<sup>th</sup> Avenue

The crash summary for the intersection at Hollywood Boulevard and 28<sup>th</sup> Avenue is shown in Table 11. A total of 124 crashes were reported at the intersection in the five (5) years from 2013 through 2017, an average of 25 crashes per year. The data shows that:

- 46% of crashes were rear end incidents, and 32% were angle impacts
- 81% of crashes resulted in property damage only
- 71% of crashes occurred during the daytime
- 90% of crashes occurred during dry road conditions

The number of crashes over the five-year period increased significantly in the last two years analyzed. There were two (2) fatal crashes in the five-year period. Figure 10 displays the severity of crashes over time at the Hollywood Boulevard and 28<sup>th</sup> Avenue intersection.

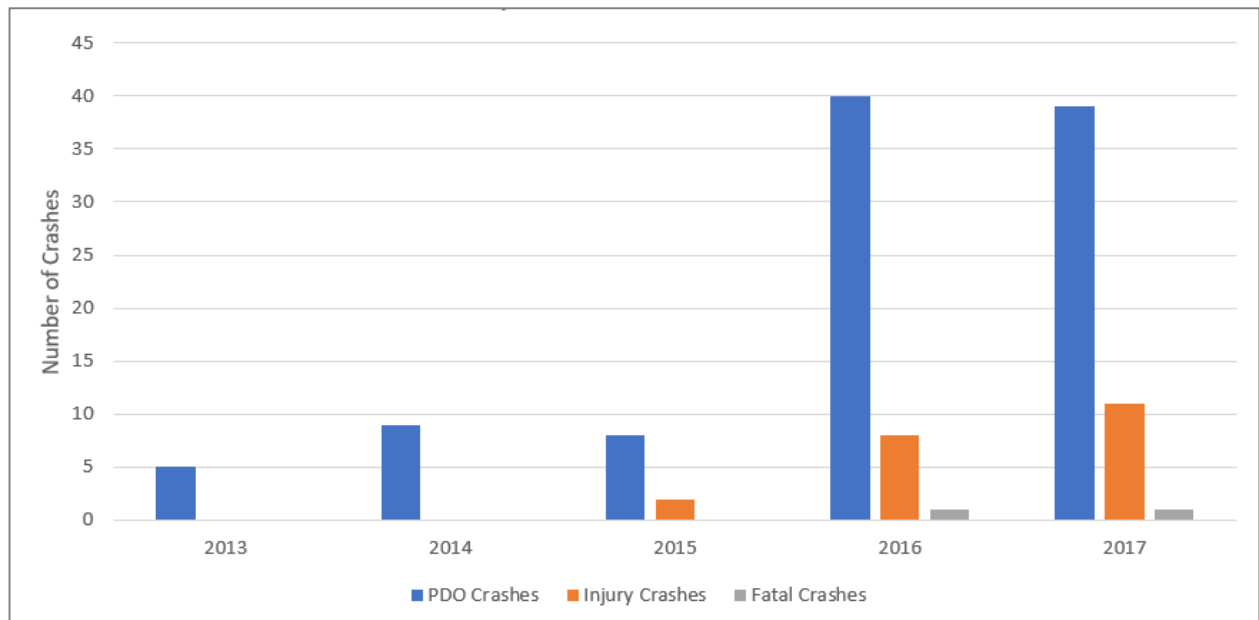


Figure 10: Crashes for the Intersection at Hollywood Boulevard and 28<sup>th</sup> Avenue by Crash Severity

Table 11: Summary of crashes for the intersection at Hollywood Boulevard and 28<sup>th</sup> Avenue

Crashes at Hollywood Boulevard and 28 <sup>th</sup> Avenue		Number of Crashes					Total Crashes	Average Per Year	Percentage (%)
		Year							
		2013	2014	2015	2016	2017			
Crash Type	Rear End	3	5	4	25	20	57	11	46%
	Head On	0	0	0	0	1	1	0	1%
	Angle	0	2	4	14	20	40	8	32%
	Sideswipe, Same Direction	1	2	1	4	5	13	3	10%
	Sideswipe, Opposite Direction	0	0	0	0	1	1	0	1%
	Other/Unknown	1	0	1	6	4	12	2	10%
Severity	PDO Crashes	5	9	8	40	39	101	20	81%
	Injury Crashes	0	0	2	8	11	21	4	17%
	Fatal Crashes	0	0	0	1	1	2	0	2%
Lighting Conditions	Dawn	1	0	0	0	0	1	0	1%
	Daylight	3	7	9	33	36	88	18	71%
	Dusk	1	0	0	1	1	3	1	2%
	Dark	0	2	1	15	14	32	6	26%
Surface Conditions	Dry	5	7	8	43	48	111	22	90%
	Wet	0	2	2	6	3	13	3	10%
Total Crashes		5	9	10	49	51	124	25	100%



### 3.4.1.4 Crash Data Analysis Conclusion

The intersections at the southbound I-95 ramps and at the northbound I-95 ramps were expected to have a similar number of crashes. However, the safety analysis shows that the intersection at the northbound I-95 ramps has significant more crashes due to the absence of a signalized movement for the right turn as shown in Figure 11. The angle, sideswipe and other crash types are consistent between the two intersections. However, there were an additional 56 rear end crashes at the northbound I-95 ramps intersection in the five (5) year period.

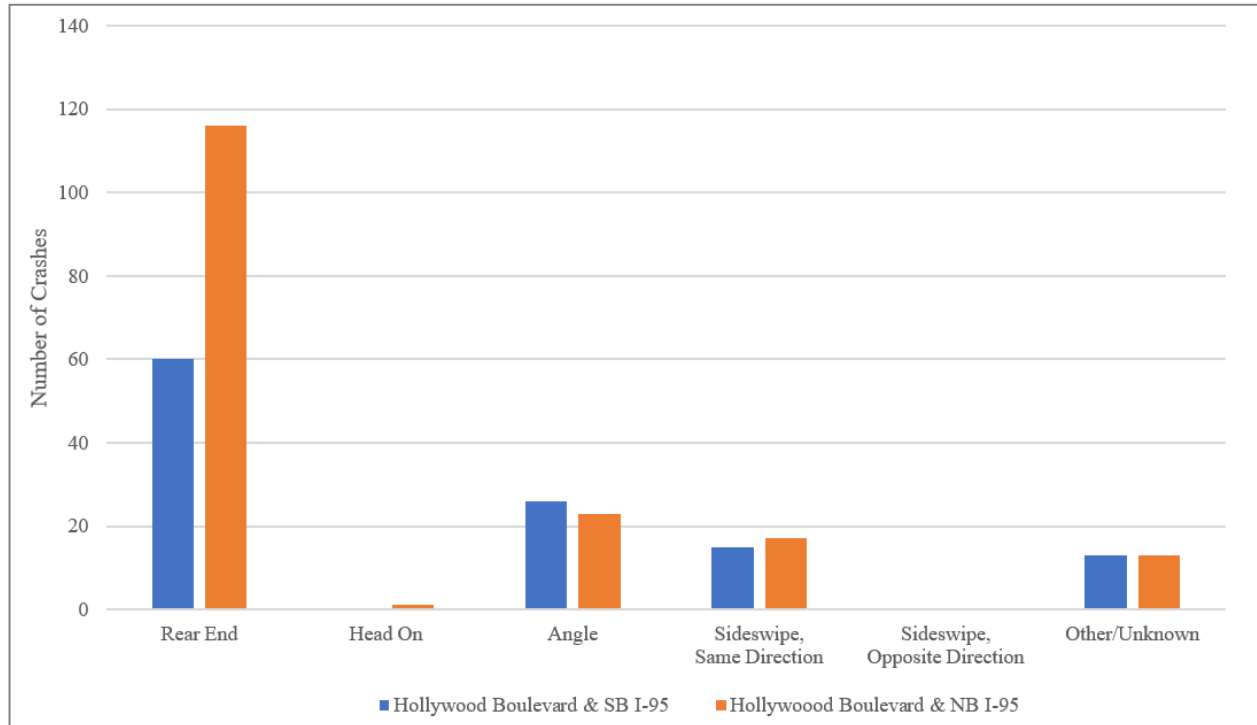


Figure 11: Crash Type Comparison for the Intersections at Hollywood Boulevard and the I-95 (SB and NB)

### 3.4.2 Previous Safety Studies

Safety Study SR 820 (Hollywood Boulevard) at SR 9 (I-95) and S 28<sup>th</sup> Avenue conducted a safety analysis for the signalized intersections included in this IOAR using crash data from 2010 to 2012. Collision diagrams and crash summaries relevant to this IOAR are included in Appendix D. This safety study provided further evaluation and refinement of preliminary recommendations developed and presented during a Traffic Operations Steering Committee meeting by FDOT staff. Based on the results of the analysis, the proposed roadway improvements evaluated in this IOAR were developed.



## 4 FUTURE CONDITIONS

### 4.1 No-Build Alternative

The No-Build scenario incorporates the existing intersection layouts within the study area. The No-Build scenario also includes the existing transportation network and any funded, planned or programmed improvements open to traffic by the design year 2040. The No-Build scenario includes only those improvements that are elements of the MPO's Transportation Improvement Program, the 2040 Cost Feasible LRTP, the FDOT's Adopted Five Year Work Program, any local government comprehensive plans and/or any development mitigation improvement projects that are elements of approved development orders.

The lane configuration as well as the opening year 2021 and design year 2040 peak hour volumes along I-95 are shown in Figure 13. The lane configuration as well as the opening year 2021 and design year 2040 peak hour volumes for the intersections along Hollywood Boulevard are shown in Figure 14.

### 4.2 Build Alternative

The Build Alternative evaluated as part of this IOAR is based on the concept developed by the SR 820 (Hollywood Boulevard) at SR9 (I-95) and S 28<sup>th</sup> Avenue Safety Study, which has been refined by FDOT design consultants.

The improvements at the northbound I-95 off-ramp include:

- Extending the northbound right turn pocket from 245 feet to 300 feet
- An additional northbound right turn lane.
- Signalizing the new dual northbound right turn

The improvements at the Hollywood Boulevard & 28<sup>th</sup> Avenue intersection include:

- Extending the length of the eastbound left turn pocket from 245 feet to 435 feet.

These roadway improvements are shown in Figure 12. The lane configuration and the opening year 2021 and design year 2040 peak hour volumes along I-95 are shown in Figure 13. The lane configuration and the opening year 2021 and design year 2040 peak hour volumes for the intersections along Hollywood Boulevard are shown in Figure 14.



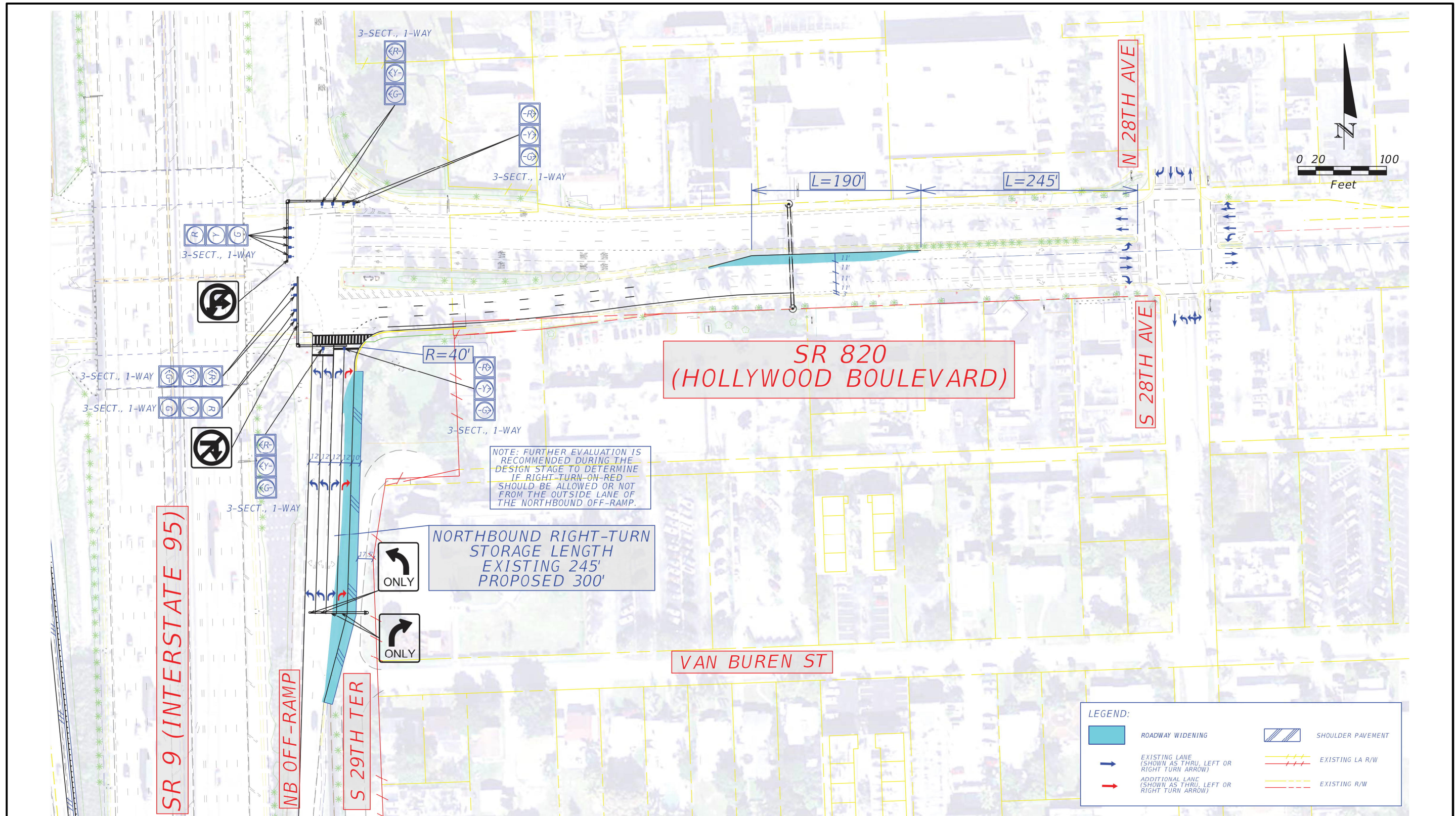


Figure 12: Conceptual Signing Plan



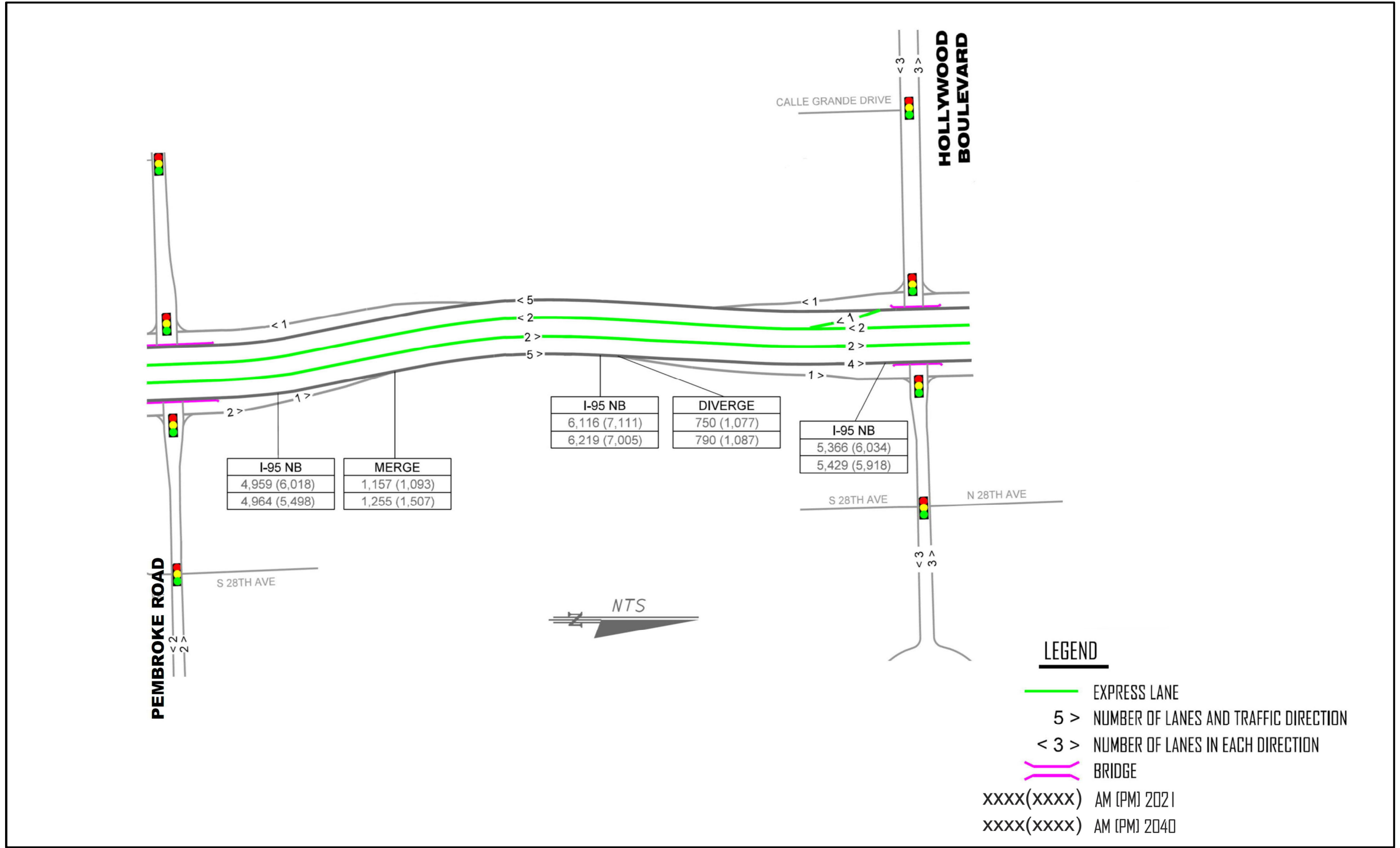


Figure 13: 2021 & 2040 Lane Configuration and Freeway Peak Hour Volumes

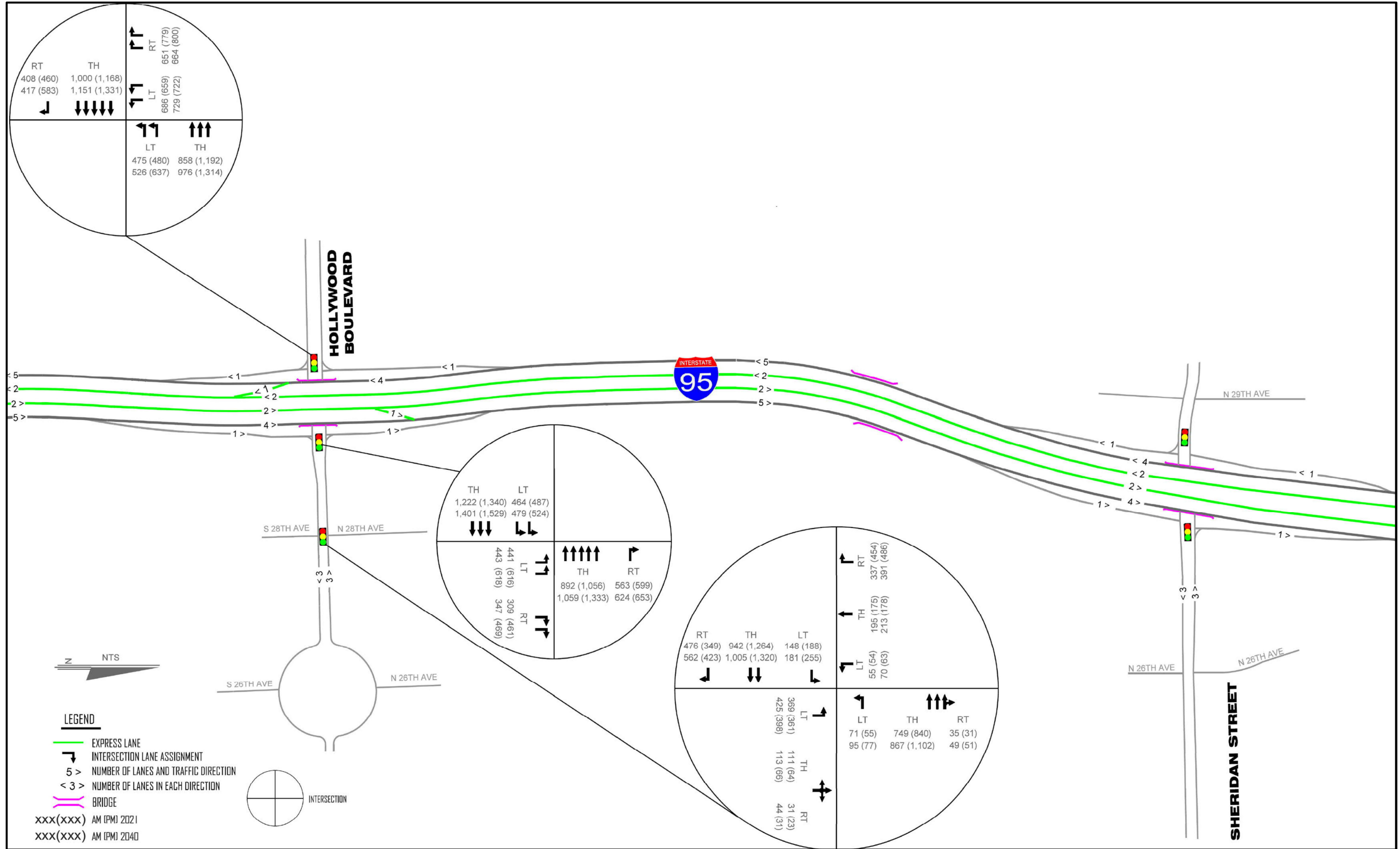


Figure 14: 2021 & 2040 Lane Configuration and Intersection Peak Hour Volumes



### 4.3 Freeway Operational Analysis

A freeway operational analysis was conducted using the HCS for the opening year 2021 and design year 2040. The freeway facility analyzed was the five (5) lane weaving segment along the northbound I-95 general purpose lanes between the on-ramp from Pembroke Road and the off-ramp to Hollywood Boulevard. Given that the roadway improvements proposed at the northbound I-95 off-ramp terminal and along eastbound Hollywood Boulevard do not affect the configuration of the weaving segment, the existing roadway configuration along I-95 was used in the analysis.

Table 12 presents a summary of the results for the freeway evaluation. Figure 15 is a graphical representation of Table 12 and allows for an easy comparison between the periods being analyzed. As shown in Table 12 and Figure 15 the weaving segment is expected to operate at acceptable level of service C during the AM peak hour even for the design year. However, the level of service of the weaving segment during the PM peak hour is only expected to operate at acceptable level of service D during the existing and opening years. During the design year 2040 the weaving segment operates at a LOS F, which means that the demand exceeds its capacity. Detailed HCS reports are shown in Appendix E.

Table 12: Weaving Segment - Opening Year 2021 and Design Year 2040

	Year 2021					Year 2040				
	DDHV (veh/h)	v/c	Speed (mi/h)	Density (pc/mi/ln)	LOS	DDHV (veh/h)	v/c	Speed (mi/h)	Density (pc/mi/ln)	LOS
AM Peak Hour	6,116	0.86	50.3	26.3	C	6,219	0.92	49.4	27.3	C
(PM Peak Hour)	(7,111)	(0.98)	47.7	(32.3)	(D)	(7,005)	(1.17)	-	-	(F)

Note: Values on the table calculated from HCM 6<sup>th</sup> Edition

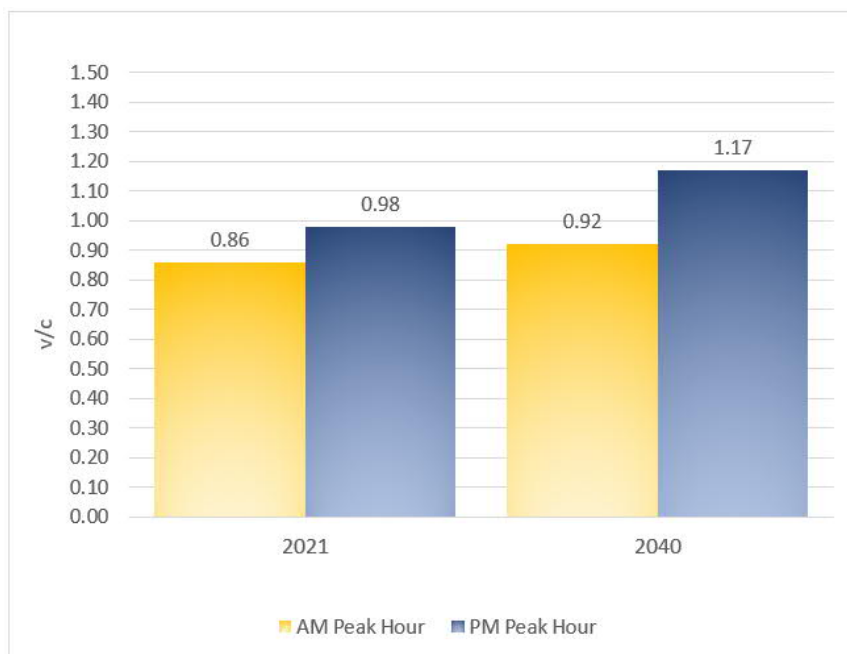


Figure 15: Weaving Segment v/c Distribution for Opening Year 2021 and Design Year 2040



It was noted that traffic volumes along the weaving segment for year 2040 during the PM peak hour are slightly higher than for year 2021. This information came directly from the travel demand forecasting performed for the PD&E study along I-95. The deficiencies shown for the weaving segment along northbound I-95 in Table 12 are being addressed by the PD&E study. Three build alternatives were evaluated under I-95 (SR 9) PD&E Study for improving traffic operations within the study area for the I-95 mainline. The first alternative proposes braided ramps between interchanges to improve substandard weaving movements. In this alternative, the on-ramps from each interchange will remain unchanged. However, the off-ramps to Hollywood Boulevard in the northbound direction will be located one interchange prior to the destination interchange at Pembroke Road. The second alternative proposes a collector distributor roadway system within the project area. The collector distributor roadway system will basically remove the Pembroke Road interchange from interacting with the I-95 mainline. In the northbound direction, all exiting traffic to Pembroke Road and Hollywood Boulevard will utilize a collector distributor off-ramp just south of Hallandale Beach Boulevard. The collector distributor roadway system will extend to just north of Hollywood Boulevard serving the exit traffic to Pembroke Road, entry traffic from Pembroke Road and entry traffic from Hollywood Boulevard. The northbound collector distributor roadway will have a weaving segment between Pembroke Road and Hollywood Boulevard. The third proposes to eliminate left-turn movements from the off-ramp at Hollywood Boulevard. 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.

#### **4.4 Signalized Intersections Operational Analysis**

An intersection capacity analysis was conducted using Synchro for the opening year 2021 and design year 2040.

The results for the traffic analysis for the opening year 2021 are shown in Table 13 and Table 14 and Figure 16 and Figure 17. Similar to the existing conditions, intersections experience higher delay during the PM peak hour when compared to the AM peak hour. Also, most intersections are still operating at acceptable level of service except for the intersection at Hollywood Boulevard and the southbound I-95 ramps. This intersection would operate at LOS E during the PM peak hour, which is higher than Florida's LOS targets. The intersection at Hollywood Boulevard and the northbound I-95 ramps operates at acceptable LOS D but its northbound approach, which is the focus of this IOAR, operates at LOS E during the AM peak hour and LOS F during the PM peak hour. The implementation of the proposed roadway improvements for the intersection at the northbound I-95 off-ramp reduces the intersection delay in the opening year 2021 from 31.8 sec/veh to 31.2 sec/veh during the AM peak hour (close to a 2% reduction) and from 44.9 sec/veh to 37.3 sec/veh during the PM peak hour (17% reduction). The extension of the left turn lane on the eastbound approach for the intersection at 28<sup>th</sup> Avenue does not result in a quantifiable improvement on the level of service. Please note that the roadway improvements analyzed as part of the IOAR are short term interim improvements that are intended to address the safety problems identified in the safety study completed in 2016. Capacity constrains at some of the intersections or intersection approaches not affected by the proposed changes are being addressed by the interchange alternatives considered in the ongoing PD&E study along I-95.



Table 13: Intersection Delay and LOS for Opening Year 2021 – No-Build Scenario

Intersection	AM Peak Hour					PM Peak Hour							
	Intersection Delay (sec/veh) / LOS	Approach	Approach Delay (sec/veh) / LOS	Movement	Movement Delay (sec/veh) / LOS	Intersection Delay (sec/veh) / LOS	Approach	Approach Delay (sec/veh) / LOS	Movement	Movement Delay (sec/veh) / LOS			
Hollywood Boulevard & SB I-95 Ramps	47.9 / D	EB	33.3 / C	EBT	38.9 / D	61.5 / E	EB	48.4 / D	EBT	54.7 / D			
				EBR	19.7 / B				EBR	32.5 / C			
		WB	8.7 / A	WBL	16.5 / B		WB	7.7 / A	WBL	12.2 / B			
				WBT	4.4 / A				WBT	5.9 / A			
		SB	102.3 / F	SBL	174.8 / F		SB	138.7 / F	SBL	251.2 / F			
				SBR	25.9 / C				SBR	43.6 / D			
		Hollywood Boulevard & NB I-95 Ramps	31.8 / C	EB	6.7 / A		EBL	19.4 / B	44.9 / D	EB	7.9 / A	EBL	22.9 / C
							EBT	1.8 / A				EBT	2.5 / A
WB	43.4 / D			WBT	49.7 / D	WB	44.4 / D	WBT		52.0 / D			
				WBR	33.6 / C			WBR		31.0 / C			
NB	65.5 / E			NBL	64.1 / E	NB	108.5 / F	NBL		76.6 / E			
				NBR	67.3 / E			NBR		151.2 / F			
SB	-			-	-	SB	-	-		-			
				-	-			-		-			
Hollywood Boulevard & 28 <sup>th</sup> Avenue	45.5 / D	EB	31.2 / C	EBL	19.9 / B	52.5 / D	EB	38.1 / D	EBL	24.0 / C			
				EBT	33.2 / C				EBT	42.3 / D			
				EBR	30.8 / C				EBR	30.1 / C			
		WB	29.9 / C	WBL	24.4 / C		WB	34.9 / C	WBL	32.6 / C			
				WBT	30.4 / C				WBT	35.0 / D			
				WBR	-				WBR	-			
		NB	76.8 / E	NBL	77.6 / E		NB	85.8 / F	NBL	87.0 / F			
				NBT	76.1 / E				NBT	84.6 / F			
				NBR	-				NBR	-			
		SB	79.3 / E	SBL	61.3 / E		SB	92.8 / F	SBL	54.8 / D			
				SBT	80.7 / F				SBT	59.6 / E			
				SBR	81.4 / F				SBR	110.2 / F			

Note: Values on the table calculated from HCM 2000

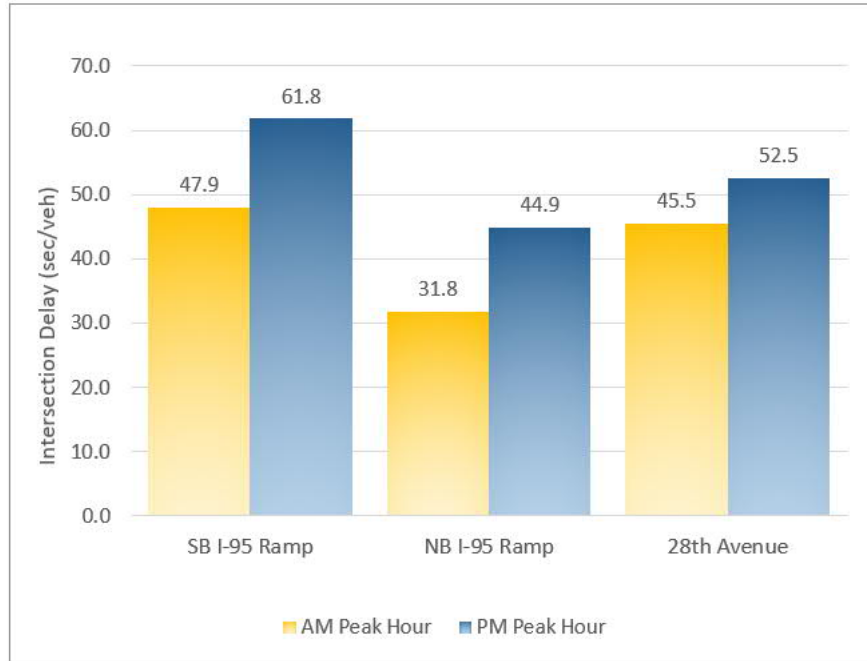


Figure 16: Intersections Delay for Opening Year 2021 – No-Build Scenario



Table 14: Intersection Delay and LOS for Opening Year 2021 - Build Alternative

Intersection	AM Peak Hour					PM Peak Hour				
	Intersection Delay (sec/veh) / LOS	Approach	Approach Delay (sec/veh) / LOS	Movement	Movement Delay (sec/veh) / LOS	Intersection Delay (sec/veh) / LOS	Approach	Approach Delay (sec/veh) / LOS	Movement	Movement Delay (sec/veh) / LOS
Hollywood Boulevard & SB I-95 Ramps	47.9 / D	EB	33.3 / C	EBT	38.9 / D	60.9 / E	EB	47.9 / D	EBT	54.1 / D
				EBR	19.7 / B				EBR	32.0 / C
		WB	8.7 / A	WBL	16.5 / B		WB	8.0 / A	WBL	13.1 / B
				WBT	4.4 / A				WBT	6.0 / A
		SB	102.3 / F	SBL	174.8 / F		SB	137.1 / F	SBL	248.4 / F
				SBR	25.9 / C				SBR	43.0 / D
		NB	-	-	-		NB	-	-	-
				-	-				-	-
Hollywood Boulevard & NB I-95 Ramps	31.2 / C	EB	6.7 / A	EBL	19.4 / B	37.3 / D	EB	7.8 / A	EBL	22.6 / C
				EBT	1.8 / A				EBT	2.5 / A
		WB	43.4 / D	WBT	49.7 / D		WB	44.1 / D	WBT	51.5 / D
				WBR	33.6 / C				WBR	31.1 / C
		NB	62.7 / E	NBL	64.1 / E		NB	76.7 / E	NBL	78.7 / E
				NBR	60.7 / E				NBR	73.9 / E
		SB	-	-	-		SB	-	-	-
				-	-				-	-
Hollywood Boulevard & 28 <sup>th</sup> Avenue	45.5 / D	EB	31.2 / C	EBL	19.9 / B	52.5 / D	EB	38.1 / D	EBL	24.0 / C
				EBT	33.2 / C				EBT	42.3 / D
				EBR	30.8 / C				EBR	30.1 / C
		WB	29.9 / C	WBL	24.4 / C		WB	34.9 / C	WBL	32.6 / C
				WBT	30.4 / C				WBT	35.0 / D
				WBR	-				WBR	-
		NB	76.8 / E	NBL	77.6 / E		NB	85.8 / F	NBL	87.0 / F
				NBT	76.1 / E				NBT	84.6 / F
				NBR	-				NBR	-
		SB	79.3 / E	SBL	61.3 / E		SB	92.8 / F	SBL	54.8 / D
				SBT	80.7 / F				SBT	59.6 / E
				SBR	81.4 / F				SBR	110.2 / F

Note: Values on the table calculated from HCM 2000



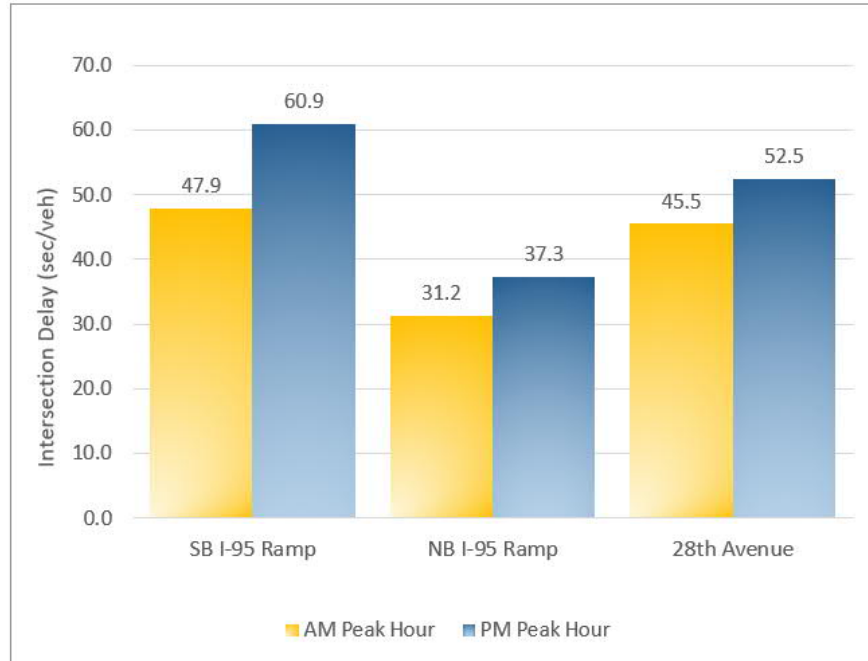


Figure 17: Intersections Delay for Opening Year 2021 – Build Alternative

The results for the traffic operational analysis for the design year 2040 are shown in Table 15 and Table 16 and Figure 18 and Figure 19. Similar to the existing conditions and opening year scenarios, intersections experience higher delays during the PM peak hour when compared to the AM peak hour. Given the traffic growth expected for the design year 2040, it is anticipated that the intersections at the southbound I-95 ramps and at 28<sup>th</sup> Avenue would operate at LOS E during the PM peak hour, which is higher than the Florida’s LOS targets. The implementation of the proposed roadway improvements for the intersection at the northbound I-95 off-ramp reduces the intersection delay in the design year 2040 from 34.4 sec/veh to 32.8 sec/veh during the AM peak hour (5% reduction) and from 45.8 sec/veh to 38.0 sec/veh during the PM peak hour (17% reduction). The extension of the left turn lane on the eastbound approach for the intersection at 28<sup>th</sup> Avenue does not result in a quantifiable improvement on the level of service.





Table 15: Intersection Delay and LOS for Design Year 2040 – No-Build Scenario

Intersection	AM Peak Hour					PM Peak Hour				
	Intersection Delay (sec/veh) / LOS	Approach	Approach Delay (sec/veh) / LOS	Movement	Movement Delay (sec/veh) / LOS	Intersection Delay (sec/veh) / LOS	Approach	Approach Delay (sec/veh) / LOS	Movement	Movement Delay (sec/veh) / LOS
Hollywood Boulevard & SB I-95 Ramps	53.7 / D	EB	34.5 / C	EBT	39.6 / D	68.8 / E	EB	51.8 / D	EBT	56.5 / E
				EBR	20.1 / C				EBR	40.9 / D
		WB	7.9 / A	WBL	14.7 / B		WB	7.3 / A	WBL	11.1 / B
				WBT	4.3 / A				WBT	5.4 / A
		SB	124.8 / F	SBL	214.9 / F		SB	169.1 / F	SBL	307.3 / F
				SBR	26.0 / C				SBR	44.3 / D
		NB	-	-	-		NB	-	-	-
				-	-				-	-
Hollywood Boulevard & NB I-95 Ramps	34.4 / C	EB	6.3 / A	EBL	18.5 / B	45.8 / D	EB	7.8 / A	EBL	22.2 / C
				EBT	2.2 / A				EBT	2.9 / A
		WB	47.4 / D	WBT	52.5 / D		WB	48.2 / D	WBT	54.9 / D
				WBR	38.8 / D				WBR	34.6 / C
		NB	73.3 / E	NBL	65.0 / E		NB	113.0 / F	NBL	77.1 / E
				NBR	83.9 / F				NBR	160.3 / F
		SB	-	-	-		SB	-	-	-
				-	-				-	-
Hollywood Boulevard & 28 <sup>th</sup> Avenue	54.4 / D	EB	42.0 / D	EBL	29.9 / C	65.4 / E	EB	52.2 / D	EBL	70.2 / E
				EBT	44.3 / D				EBT	53.8 / D
				EBR	41.9 / D				EBR	36.3 / D
		WB	39.4 / D	WBL	33.0 / C		WB	46.3 / D	WBL	42.1 / D
				WBT	40.1 / D				WBT	46.6 / D
				WBR	-				WBR	-
		NB	75.9 / E	NBL	75.9 / E		NB	90.4 / F	NBL	91.2 / F
				NBT	76.0 / E				NBT	89.6 / F
				NBR	-				NBR	-
		SB	90.6 / F	SBL	57.4 / E		SB	116.7 / F	SBL	54.1 / D
				SBT	68.2 / E				SBT	58.5 / E
				SBR	108.8 / F				SBR	146.1 / F

Note: Values on the table calculated from HCM 2000

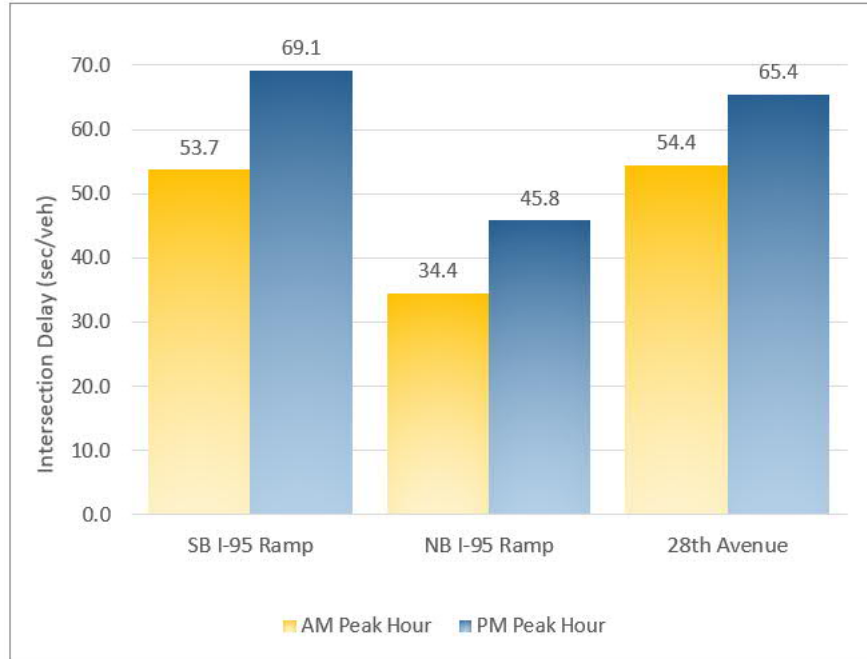


Figure 18: Intersections Delay for Design Year 2040 – No-Build Scenario



Table 16: Intersection Delay and LOS for Design Year 2040 – Build Alternative

Intersection	AM Peak Hour					PM Peak Hour				
	Intersection Delay (sec/veh) / LOS	Approach	Approach Delay (sec/veh) / LOS	Movement	Movement Delay (sec/veh) / LOS	Intersection Delay (sec/veh) / LOS	Approach	Approach Delay (sec/veh) / LOS	Movement	Movement Delay (sec/veh) / LOS
Hollywood Boulevard & SB I-95 Ramps	53.5 / D	EB	34.4 / C	EBT	39.5 / D	68.4 / E	EB	51.3 / D	EBT	56.1 / E
				EBR	20.0 / C				EBR	40.4 / D
		WB	8.0 / A	WBL	15.0 / B		WB	7.5 / A	WBL	11.7 / B
				WBT	4.3 / A				WBT	5.5 / A
		SB	124.2 / F	SBL	213.8 / F		SB	168.1 / F	SBL	305.7 / F
				SBR	25.9 / C				SBR	43.8 / D
		NB	-	-	-		NB	-	-	-
				-	-				-	-
Hollywood Boulevard & NB I-95 Ramps	32.8 / C	EB	6.3 / A	EBL	18.5 / B	38.0 / D	EB	7.8 / A	EBL	22.0 / C
				EBT	2.2 / A				EBT	2.9 / A
		WB	47.3 / D	WBT	52.3 / D		WB	48.0 / D	WBT	54.4 / D
				WBR	38.9 / D				WBR	34.8 / C
		NB	65.1 / E	NBL	65.3 / E		NB	76.8 / E	NBL	78.5 / E
				NBR	64.8 / E				NBR	74.7 / E
		SB	-	-	-		SB	-	-	-
				-	-				-	-
Hollywood Boulevard & 28 <sup>th</sup> Avenue	54.4 / D	EB	42.1 / D	EBL	30.3 / C	65.4 / E	EB	52.2 / D	EBL	70.2 / E
				EBT	44.3 / D				EBT	53.8 / D
				EBR	41.9 / D				EBR	36.3 / D
		WB	39.3 / D	WBL	32.9 / C		WB	46.3 / D	WBL	42.1 / D
				WBT	39.9 / D				WBT	46.6 / D
				WBR	-				WBR	-
		NB	75.9 / E	NBL	75.9 / E		NB	90.4 / F	NBL	91.2 / F
				NBT	76.0 / E				NBT	89.6 / F
				NBR	-				NBR	-
		SB	90.6 / F	SBL	57.4 / E		SB	116.7 / F	SBL	54.1 / D
				SBT	68.2 / E				SBT	58.5 / E
				SBR	108.8 / F				SBR	146.1 / F

Note: Values on the table calculated from HCM 2000

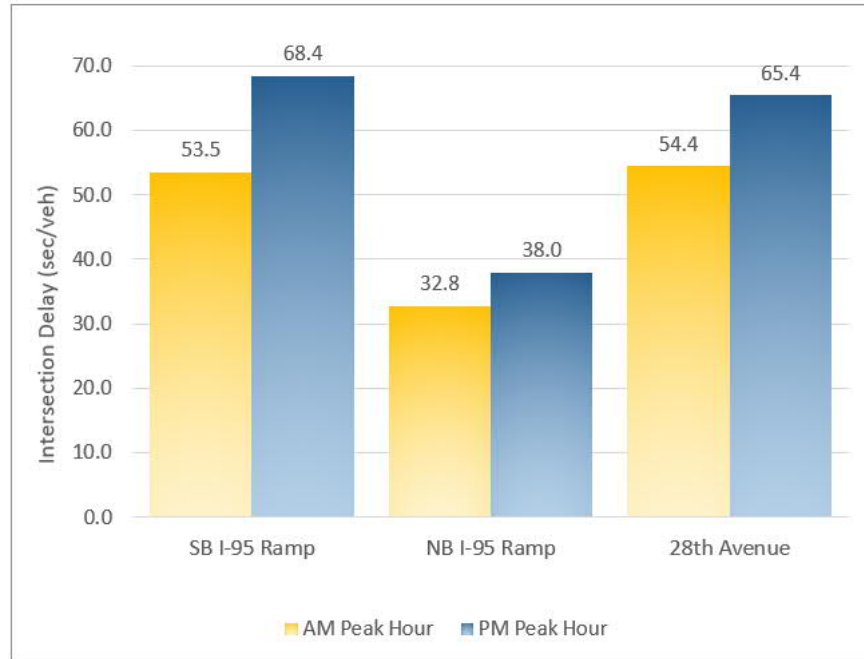


Figure 19: Intersections Delay for Design Year 2040 – Build Alternative

Table 17 and Table 18 show a comparison of the available storage length and modeled queue lengths from the Synchro models for the opening year 2021 and design year 2040. The available storage length for the northbound right turn lane at the northbound I-95 off-ramp was increased from one lane of 245 feet in the No-Build scenario to two lanes of 300 feet in the Build Alternative.

Table 17 shows that without making any improvements to the northbound I-95 off-ramp the queue will exceed the available storage length as early as 2021 during both the AM and PM peak hours. In contrast, Table 18 shows that by implementing the proposed improvements on the off-ramp, the queue will not exceed the available storage length during the AM peak hour, even for the design year 2040. However, the modeled queue will exceed the available storage length during the PM peak hour as early as for the opening year 2021. The advantages of the proposed improvements should not be underestimated. In fact, the implementation of the proposed changes at the off-ramp result in a reduction of the queue length of at least 133 feet during the AM peak and of at least 359 feet during the PM peak hour for the design year 2040. Note that there will be no improvements to the southbound I-95 off-ramp. The queue for left turn movement will exceed the available storage length in 2021 and 2040 during both the AM and PM peak hours.

The available storage length for the eastbound left turn movement at the intersection at Hollywood and 28<sup>th</sup> Avenue was increased from 245 feet in the No-Build scenario to 435 feet in the Build Alternative. However, the queue length for this movement remains unchanged for the opening and design years during both the AM and PM peak hours. This means that there are not capacity issues with this storage lane and that the forecasted traffic demand is not big enough to expect problems in the near future. This is in line with the information presented in Table 16 that shows that the eastbound approach for the intersection at Hollywood Boulevard and 28<sup>th</sup> Street is operating at an adequate level of service in 2040.



Values that exceed the storage length are shown in red and a # symbol indicates a location where the queue may be longer than calculated, as the 95<sup>th</sup> percentile volume exceeds capacity. A queue analysis was only performed for the movements affected by the interim improvements evaluated in this IOAR.

Table 17: Queue Analysis for Opening Year 2021 and Design Year 2040 – No-Build Scenario

Intersection	Movement	Ramp Length (ft)	Available Storage (ft)	2021		2040	
				AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
				Queue 95 <sup>th</sup> (ft)	Queue 95 <sup>th</sup> (ft)	Queue 95 <sup>th</sup> (ft)	Queue 95 <sup>th</sup> (ft)
Hollywood Boulevard & SB I-95 Ramps	SB LT	2,150	475	#593	#661	#644	#747
Hollywood Boulevard & NB I-95 Ramps	NB RT	2,140	245	306	#720	#396	#745
Hollywood Boulevard & 28 <sup>th</sup> Avenue	EB LT	-	245	149	169	#203	#385

Table 18: Queue Analysis for Opening Year 2021 and Design Year 2040 – Build Alternative

Intersection	Movement	Ramp Length (ft)	Available Storage (ft)	2021		2040	
				AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
				Queue 95 <sup>th</sup> (ft)	Queue 95 <sup>th</sup> (ft)	Queue 95 <sup>th</sup> (ft)	Queue 95 <sup>th</sup> (ft)
Hollywood Boulevard & SB I-95 Ramps	SB LT	2,150	475	#593	#661	#644	#747
Hollywood Boulevard & NB I-95 Ramps	NB RT	2,140	300	234	378	263	386
Hollywood Boulevard & 28 <sup>th</sup> Avenue	EB LT	-	435	149	169	#203	#385

Detailed Synchro reports for the intersection analysis are included in Appendix F. Detailed Synchro reports for the queue analysis are included in Appendix G.

Four types of interchange configurations were evaluated under I-95 (SR 9) PD&E Study to reduce congestion and delay at the I-95 and Hollywood Boulevard interchange. Note that the deficiencies for the intersection at 28<sup>th</sup> Avenue are on the City street approached and do not impact interchange operations.



- Diamond Interchange – Adds turn lanes, through lanes and/or extended storage bays under existing interchange layout.
- Diverging Diamond Interchange (DDI) – Eliminates the need for on-ramp left-turning vehicles to cross the paths of approaching through vehicles, reducing signal phases at each ramp terminal.
- Displaced Left Turn Lane Interchange – Removes left-turn movements from the main intersection to an upstream signalized location.
- Continuous Flow Intersection (CFI) – Displaces the on-ramp left-turn movements and removes the off-ramp left-turn movements to reduce signal phases at the ramp terminal intersections.

#### 4.5 Safety Analysis

The safety impact of the proposed improvements at the northbound I-95 off-ramp and the eastbound approach of the intersection at Hollywood Boulevard and 28<sup>th</sup> Avenue was analyzed using the predictive methodology documented in the Highway Safety Manual (HSM). The following proposed improvements were evaluated:

- Addition of a second right-turn lane onto I-95 northbound off-ramp
- Signalize the right-turn movement at the I-95 northbound off-ramp terminal
- Extending the eastbound left-turn storage length at the Hollywood Boulevard and 28<sup>th</sup> Avenue intersection

The analysis followed the interchange access request safety procedure guidelines per the FDOT's Systems Implementation Office. Based on the guidelines and given that IOAR projects include minor modifications to the existing interchange, the safety analysis doesn't include the safety performance functions (SPFs) or the empirical-Bayes (E-B) method. Rather, the available crash modification factors (CMFs) for the proposed improvements are obtained which are then applied to the existing crashes in order to estimate future crashes. CMFs were only applied to the crashes that would be affected by the proposed improvement. It is important to note that CMFs for the proposed improvements were not available for an interchange setting. However, the CMFs utilized in the IOAR are the most applicable and are not expected to have a large deviation from an interchange setting.

The safety analysis summarized in Table 19 shows that an approximate 5% total crash reduction is estimated due to the proposed improvements at the study locations. Table 20 shows that there will be an approximately 15% reduction in fatal crashes, and 12% reduction in injury crashes. These numbers were calculated by comparing the crash frequencies before and after the implementation of the roadway improvements and taking into consideration the corresponding CMFs. A copy of the crash modifications factors used in the analysis is included in Appendix H.





Table 19: Predictive Crash Analysis Summary

Location	Improvement	CMF					Crash Frequency	
		K	A	B & C	O	Combined	Before	After
NB I-95 off-Ramp at Hollywood Blvd	Addition of a right-turn lane	0.96	0.96	0.96	0.96	0.91 (K, A, B, C, O)	12.6	11.6
	Signalize the right-turn movement	0.95	0.95	0.95	0.95			
Hollywood Blvd at 28 <sup>th</sup> Avenue	Extending the left-turn storage	0.85	0.85	0.85	1.00	0.85 (K, A, B & C) 1.00 (O)	18.6	18.1

Source: CMF Clearance House

K: Fatal injury

A: Suspected serious injury

B: Suspected minor injury

C: Possible injury

O: No apparent injury

Table 20: Predictive Crash Reduction by Crash Type

Crash Type	Crash Frequency (per year) Before	Crash Frequency (per year) After	Reduction
Fatal	0.40	0.34	15%
Injury	5.60	4.91	12%

## 5 INTERCHANGE IMPROVEMENT SCHEDULE

Below is the latest schedule as per the FDOT consultant working on the design of the proposed improvements:

- Production date: 12/7/2020
- Plans to Tallahassee: 1/25/2021
- Letting Date: 3/31/2021

## 6 ENVIRONMENTAL CONSIDERATIONS

Environmental impacts have been evaluated in the PD&E study (FM# 436903-1). A Section 106 (historical) and Section 4F (noise study) will be undertaken to further examine the impacts of the proposed modifications. No additional environmental impacts are expected.



## **7 COORDINATION**

FDOT consultants working on the project have coordinated with the I-95 segment 1A design-build project. The design firm in the design-build team was contacted to be able to match the limits of construction along the northbound I-95 off-ramp. Coordination has also taken place with City of Hollywood to restore impacted sidewalk pavers and retrofit a light pole under their jurisdiction.

## **8 ANTICIPATED DESIGN EXCEPTIONS AND VARIATIONS**

Design exceptions and variations are not anticipated, but if an exception or variation should arise, it will be processed per FDOT and FHWA procedures during the design phase.

## **9 PROJECT COST**

The anticipated cost of this project based on the FDOT Long Range Estimating (LRE) System is \$1.1M. It is anticipated that this project will use safety fund.

## **10 ACCESS MANAGEMENT PLAN**

Access management within the area of influence will not be changed by the proposed improvements to the interchange.

## **11 FHWA POLICY POINTS**

### **11.1 FHWA Policy Points 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, and ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis should, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (Title 23, Code of Federal Regulations (CFR), paragraphs 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, should 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 should 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 should 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 and safety analysis conducted in this IOAR shows that the Build Alternative results in quantifiable improvements for safety, especially with an expected 15 percent reduction



in fatal crashes. The proposed changes at the northbound I-95 off ramp result in a reduction of the queue length of at least 133 feet during the AM peak and of at least 359 feet during the PM peak hour for the design year 2040. The implementation of the proposed roadway improvements for the intersection at the northbound I-95 off-ramp reduces the intersection delay from 34.4 sec/veh to 33.1 sec/veh during the AM peak hour (4% reduction) and from 45.8 sec/veh to 38.0 sec/veh during the PM peak hour (17% reduction). The operations of the freeway weaving segment along northbound I-95 between Pembroke Road and Hollywood Boulevard are not affected by the proposed improvements at the interchange based on the HCS analysis. The modifications to the two intersections are limited to extensions of turn bays and the installation of a signalized movement. These changes provide safety and performance improvements.

## 11.2 FHWA Policy Points 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, such as managed lanes (e.g., transit or high occupancy vehicle and high occupancy toll 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)). In rare instances where all basic movements are not provided by the proposed design, the report should include a full-interchange option with a comparison of the operational and safety analyses to the partial-interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.*

The proposed Build Alternative does not modify access within the study area. Access for all traffic movements at the interchange are maintained.

## 12 CONCLUSION

The Interchange Operational Analysis Report (IOAR) for I-95 at Hollywood Boulevard evaluated the proposed modifications to the northbound freeway off-ramp and the adjacent Hollywood Boulevard & 28<sup>th</sup> Avenue intersection. The Build Alternative provides both safety and performance improvements for the study area by:

- Providing an additional right turn lane at the I-95 northbound off-ramp to Hollywood Boulevard
- Signalizing the right turn movement at the I-95 northbound off-ramp to Hollywood Boulevard
- Extending the eastbound left-turn storage at the Hollywood Boulevard & 28<sup>th</sup> Avenue intersection

The historical crash analysis shows that there was a total of 408 crashes within the study area from 2013 to 2017, an average of 82 per year. Most of the crashes were rear end crashes, and there were 2 fatalities in the 5-year study period.



The analysis using the predictive method found an approximately 5% crash reduction due to the proposed improvements at the study locations. This includes approximately 15% reduction in fatal crashes and 12% reduction in injury crashes.

The traffic operational analysis found that the implementation of the proposed roadway improvements for the intersection at the northbound I-95 off-ramp reduces the intersection delay from 34.4 sec/veh to 32.8 sec/veh during the AM peak hour (5% reduction) and from 45.8 sec/veh to 38.0 sec/veh during the PM peak hour (17% reduction) in the design year 2040. This translates to an improvement to the Level of service for the northbound approach from a LOS F to E.

The extension of the storage length and the addition of the turn lane will at the off-ramp result in a reduction of the queue length of at least 133 feet during the AM peak and of at least 359 feet during the PM peak hour for the design year 2040, despite the fact that this movement is now signalized. The other intersections have an unchanged delay and level of service. However, the extension of the turning lane for the eastbound left turn at the Hollywood Boulevard and 28<sup>th</sup> Avenue intersection is likely going to reduce the chance of queues spilling back onto Hollywood Boulevard.

The level of service for the northbound I-95 weaving section approaching Hollywood Boulevard is LOS C during the AM peak hour for all analysis years. During the PM peak hour, the LOS is D for 2018 and 2021 and LOS F for 2040. The Build Alternative does not incorporate changes to the freeway configuration. Deficiencies along I-95 are likely going to be addressed by the ongoing PD&E study.

The proposed roadway improvements considered in this IOAR provide safer conditions for pedestrians and bicyclists. Please note that the right turn movement for the northbound ramp terminal currently provides a wide radius with a yield to pedestrian condition, which does not promote slower speeds for automobiles. The proposed concept introduces a signalized condition for pedestrians and automobiles and a smaller radius. Pedestrians will be protected by the signalized crossing. The combined effect of a smaller radius and the new signalized condition for right turners will force automobiles to reduce their speed, which in turn creates safer conditions for bicyclists.

The Federal Highway Administration (FHWA) policy points were reviewed to ensure that the proposed changes to the interchange do not have adverse impacts on the safety and operation of the interstate facility. The proposed Build Alternative does not modify any current access arrangements.

Based on the conclusions above, the proposed Build Alternative will provide both safety and performance improvements to the roadway network within the study area.