Interchange Modification Report

Hillsborough County, Florida
I-75 (SR 93A) at Gibsonton Drive Interchange

Financial Project Identification Number: 437650-2-22-01

Prepared For:
Florida Department of Transportation, District 7
11201 McKinley Dr, Tampa, FL 33612

January, 2023

SYSTEMS IMPLEMENTATION OFFICE

QUALITY CONTROL CERTIFICATION FOR INTERCHANGE ACCESS REQUEST SUBMITTAL

Submittal Date: 1/6/2023

WPI Segment No.: 437650-2

Project Title: I-75 (SR 93A) at Gibsonton Drive Interchange

District: Seven

Requestor: Richard Moss, PE Phone: 813/975-6000

District IRC: Waddah Farah Phone: 813/975-6440

Document Type: ☐ MLOU ☐ IJR ☒ IMR ☐ IOAR ☐ OTHER________________

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)

Interchange Modification Report (IMR)

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 ______ DocuSigned by: [signature] CADF49BFE536492... Date: 01/25/2023 | 11:11 AM EST

Richard A. Moss, PE

IRC ______ DocuSigned by: [signature] 9C8365A20D9447E... Date: 01/25/2023 | 12:48 PM EST

Waddah Farah, EI

Interchange Modification Report (IMR)

I-75 (SR 93A) at Gibsonton Drive

Hillsborough County, Florida

437650-2-22-01

Florida Department of Transportation

Determination of Safety, Operational and Engineering Acceptability

Acceptance of this document indicates successful completion of the review and determination of safety, operational and engineering 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
Requestor	DocuSigned by: [signature] CADF49BFE536492... Richard Moss, PE Director of Transportation Development, District Seven	01/25/2023 | 11:11 AM Date
Interchange Review Coordinator	DocuSigned by: [signature] 9C8365A20D9447F... Waddah Farah, EI, MSE District Seven	01/25/2023 | 12:48 PM Date
Systems Management Administrator	DocuSigned by: [signature] 4AD03E6A337F4C1... Jenna Bowman, PE Systems Implementation Office – Central Office	01/31/2023 | 12:08 PM Date
State Chief Engineer	DocuSigned by: [signature] C42B6FE133D643A... Dan Hurtado, P.E. Central Office	01/31/2023 | 12:43 PM Date

Professional Engineer's Certification

I hereby certify that I am a registered professional engineer in the State of Florida practicing with H.W. Lochner, Inc., a Florida Corporation authorized as an engineering business under provisions of Chapter 471, Florida Statutes, by the State of Florida Department of Business and Professional Regulation, Board of Professional Engineers, and I have prepared or approved the evaluation, findings, opinions, conclusions or technical advice hereby reported for:

WPI Segment No.: 437650-2

Project: I-75 (SR 93A) at Gibsonton Drive
Interchange Modification Report

County/State: Hillsborough, Florida

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

Signature: ______________________

Name: James E. Spinks III, PE, PTOE

Professional Engineer Number: 66775

Engineering Firm: H.W. Lochner
4350 W. Cypress Street, Suite 800
Tampa, FL 33607

Date: 1-24-2023

Executive Summary

The Florida Department of Transportation (FDOT) District Seven prepared an Interchange Modification Report (IMR) to identify safety, operational, and geometric improvements to mitigate the existing safety and operational deficiencies for the I-75 and Gibsonton Drive interchange, within Hillsborough County.

The objective of this IMR is to improve access from I-75 to Gibsonton Drive through interchange level improvements and improving ramp merge/diverge conditions. The area of influence (AOI) includes the I-75 merge/diverge areas at the Gibsonton Drive interchange and Gibsonton Drive from west of New East Bay Road to east of Fern Hill Drive. The existing operational and safety issues of greatest concern within the AOI are as follows:

- Significant AM congestion is present along Gibsonton Drive with vehicles attempting to access the northbound I-75 on-ramp from both the eastbound and westbound directions. Thereby, causing competition between both sides of Gibsonton Drive to use the on-ramp.
- In the PM peak hour, the drop lane condition at the southbound I-75 off-ramp to Gibsonton Drive is combined with significant southbound left turning demand at the ramp terminal, which leads to significant I-75 mainline queuing. Under typical conditions, congestion experienced due to the operation of the southbound off-ramp can begin to be observed nearly 3.0 miles upstream of the diverge, at the start of the auxiliary lane. This poses not only an operational concern, but also a significant safety problem during the PM peak as the speed differential between the auxiliary lane and general-purpose lanes can contribute to erratic driving behavior and resulting collisions.
- I-75 and Gibsonton Drive are prioritized hurricane evacuation routes, causing concern for the safety of motorists during an evacuation event; and
- The poor Level of Service (LOS) at the subject interchange during peak travel periods does not support the economic development and prosperity of the rapidly growing study area. This shortcoming will be further exacerbated with the onset of new developments planned in the area.

The following summarizes the results of the evaluation of existing and future traffic operations with and without proposed improvements.

A. Existing Traffic Conditions

Traffic Software Integrated System – Corridor Simulation (CORSIM), version 6.3, was used to evaluate the existing year (2020) operational characteristics of the I-75 and Gibsonton Drive interchange study area. Peak hour results of the CORSIM calibration analyses are as follows:

- AM and PM Peak Level of Service (LOS) indicate that southbound I-75 (north of Gibsonton Drive) and the southbound off-ramp failed to meet target LOS D.
- The I-75 ramps are not capacity constrained, however there are operational deficiencies causing congestion and queueing.
- Gibsonton Drive fails to operate at target LOS D eastbound to the west of New East Bay Road (during the AM and PM Peak hours), eastbound between New East Bay Road and the southbound I-75 ramp terminal, eastbound between the ramp terminals (during the AM peak hour), and westbound from east of Fern Hill Drive to Fern Hill Drive (during the AM and PM peak hours). On average through the study area, both directions of Gibsonton Drive operate at LOS C or D based on the speed threshold.

- There are several locations along Gibsonton Drive which have queues longer than the storage lengths. Through a visual audit of the CORSIM simulation, the unsignalized eastbound left turn at the northbound I-75 ramp terminal was identified as a primary contributor to congestion and queue spill backs in the study area.

Historical crash data, during the five-year period from 2016-2020, included a total of 557 crashes within the project study area. Of the 557 total crashes, there were three fatal crashes, 254 crashes involving personal injury, and 300 crashes that were property damage only. Crashes in the study area resulted in an estimated economic loss of approximately $105.4 million. Multiple high crash roadway segments and intersections were identified within the AOI, segment and intersection crash rates were detailed as follows:

- The segment crash rates range from 0.255 crashes per million vehicle miles traveled (MVMT) (on the southbound I-75 roadway segment, north of the off-ramp to Gibsonton Drive) to a high of 4.462 crashes per MVMT (along the Gibsonton Drive roadway segment, between the I-75 northbound ramps and Fern Hill Drive).
- The intersection crash rates range from a low of 1.006 crashes per million entering vehicles (MEV) at the Gibsonton Drive and southbound I-75 ramp terminal to a high of 3.551 crashes per MEV at the Gibsonton Drive and Fern Hill Drive intersection.

B. Future Traffic Conditions

To address the existing safety and operational concerns at the Gibsonton Interchange, several short-term/low-cost safety and operational improvements (e.g., widening the southbound I-75 off ramp to two lanes, new signalization and construction of dual eastbound left turn lanes and dual westbound right turn lanes at the northbound I-75 ramp terminal intersection) were proposed by FDOT District 7. Through an in-depth evaluation of regional travel demand forecasts and thorough review of area development plans, it was concluded that the short-term improvements would not provide the necessary roadway capacity to meet future travel demands within the interchange area. To minimize throw away costs, the District made the decision to forego implementation of the proposed short-term improvements and secured funding for the reconstruction of the I-75 at Gibsonton Drive interchange to form a new Diverging Diamond Interchange (DDI). The DDI interchange was selected as the preferred interchange configuration during the I-75 PD&E Study's alternatives analysis process and was found to minimize costs, reduce environmental impacts, and provide the greatest level of safety and mobility among the interchange alternatives that were analyzed. The traffic control features and geometric layout of the DDI, and the manner by which the interchange ramps transition into the I-75 mainline, were further refined during the interchange access request process. Below summarizes the improvements considered for No-Build and Build Alternatives.

No-Build Alternative:

Opening Year (2025):

- No-Build Alternative maintains the current I-75 and Gibsonton Drive Diamond Interchange configuration, existing year (2020) lane configuration and traffic control at the study intersections within the AOI.
- Additional transportation improvement includes three exclusive left turn lanes, one through and one exclusive right turn lane at the south leg of the Gibsonton Drive and Fern Hill Drive/Old Gibsonton Drive intersection.

Design Year (2045):

- No-Build Alternative is based on Opening Year No-Build Alternative.
- The construction of express lanes on I-75 from Moccasin Wallow Road to S of US 301.

Build Alternative:

Opening Year (2025):

- The Opening year (2025) Build Alternative includes of the current Diamond Interchange to a Diverging Diamond Interchange (DDI).
- Construction of a new 1,500-foot-long deceleration lane on I-75 northbound that becomes an exit lane to Gibsonton Drive, allowing the existing single lane exit to be converted to a two-lane exit. The two-lane off-ramp widens to four lanes, providing dual left and right turn lanes onto Gibsonton Drive.
- Reconfiguring the Gibsonton Drive access to I-75 northbound by separating the eastbound traffic from the westbound traffic. Eastbound Gibsonton Drive traffic has dual left turn lanes onto the northbound I-75 on-ramp which merges in a single lane on-ramp and enters I-75 northbound as an add lane south of the Alafia River. Westbound Gibsonton Drive traffic has dual right turn lanes onto the northbound I-75 on-ramp carried by a new bridge over the Alafia River and merges with I-75 north of the Riverview Drive overpass.
- Providing additional capacity for the Gibsonton Drive westbound to I-75 northbound on-ramp by extending the existing lane and constructing an additional lane, prior to the Gibsonton Drive and Fern Hill Drive intersection, resulting in three westbound through lanes, one left turn lane to Fern Hill Drive, and two auxiliary lanes that become the dual right turn lanes onto I-75 northbound.
- Converting the existing I-75 southbound off-ramp from a single exit to a two-lane exit. The two-lane exit widens to six-lanes, providing three right turn lane and three left turn lanes.
- Reconfiguring the I-75 southbound on-ramp to merge exclusive turn lanes from eastbound and westbound Gibsonton Drive.
- Widening Gibsonton Drive from a four-lane divided arterial typical section to a six-lane divided arterial between New East Bay Road and east of Fern Hill Drive.
- Providing a third eastbound Gibsonton Drive thru lane at the New East Bay Road intersection.
- Installing new traffic signals at the two crossovers of the DDI.
- Modifying the traffic signal timings at New East Bay Road and Fern Hill Drive and coordinating with the new traffic signals at the DDI crossovers.
- Providing pedestrian accommodations including 6-foot-wide sidewalks and high emphasis crosswalks on both sides of Gibsonton Drive between New East Bay Road and Fern Hill Drive. A single 10-foot-wide sidewalk is provided in the median within the DDI limits while ensuring continuity through the corridor.
- Providing bicyclist accommodations including dedicated bicycle lanes along Gibsonton Drive eastbound and westbound between New East Bay Road and Fern Hill Drive. Bicycle bailouts have been proposed approaching the DDI crossovers to provide an option for the bike to utilize the 10-foot-wide sidewalk.

Design Year (2045):

- Design Year (2045) Build Alternative is based on Opening Year Build Alternative.
- Optimizing the traffic signal timings at New East Bay Road and Fern Hill Drive and coordinating with the new traffic signals at the DDI crossovers for the design Year (2045) demand traffic. During the design year (2045), the opening year (2025)'s timing no longer works as the network reaches saturation and so the cycle length of 150 seconds (to equal the DDI signals) is more appropriate and services the design year (2045) vehicles more efficiently with less flow breakdown, particularly on the westbound approach to New East Bay Road.
- The construction of express lanes on I-75 from Moccasin Wallow Road to S of US 301.

To quantify the benefit of the Build Alternative or eliminate improvements from further considerations, a No-Build Alternative was also assessed and assumes that the current geometric configuration and traffic control operations of the I-75 and Gibsonton Drive interchange will remain unchanged. The anticipated opening year for proposed interchange improvements for the I-75 interchange at Gibsonton Drive is 2025.

Opening Year (2025)

During the opening year (2025), when comparing the No-Build and Build Alternatives, there are improvements throughout the network with serviced vehicles increasing at nearly every movement as congestion is relieved. During both the AM and PM peak hours there are improvements to delay and LOS, particularly at the I-75 ramp terminals which are no longer experiencing a failing LOS. Some increase in delay at specific locations can be expected as upstream bottlenecks are alleviated and vehicle throughput is improved. No movements are expected to fail during the AM and PM peak hours under the Build Alternative. Volume-to-capacity ratios were checked for each ramp of the I-75 at Gibsonton Drive interchange in the AM and PM time periods for the No-Build and Build Alternatives in the opening year (2025). This check indicated that the on-ramp to northbound I-75 during the AM peak hour and the off-ramp to Gibsonton Drive from southbound I-75 during the PM peak hour exceed the capacity of the ramp under the No-Build Alternative. Under the Build Alternative, the ramps will operate under capacity during the opening year (2025).

Design Year (2045)

During the design year (2045), when comparing the No-Build and Build Alternatives, there are improvements throughout the network with serviced vehicles increasing at nearly every movement as congestion is relieved. During both the AM and PM peak hours there are improvements to delay and LOS, particularly at the I-75 ramp terminals which are no longer experiencing a failing LOS. Some increase in delay at specific locations can be expected as upstream bottlenecks are alleviated and vehicle throughput is improved, such as the westbound left movement from Gibsonton Drive to southbound East Bay Road. No additional approaches or intersections fail during the AM or PM peak hour. Throughout the network, nearly any increase in delay from the No-Build Alternative, is accompanied by an increase in serviced volume and nearly any decrease in serviced volume is accompanied by a decrease in delay. These changes are due to either alleviating upstream or downstream bottlenecks, or by changes in signal timings to prioritize clearance of the DDI to avoid any impacts to the I-75 mainline. The only locations that have both an increase in delay and a decrease in serviced volume include the northbound left and northbound through movement at New East Bay Road which does already fail during the PM peak hour and the northbound through movement at Fern Hill Drive during the PM peak hour which only services three vehicles. Nearly, or all, of the vehicles at these locations are being serviced still, and improvements to these locations will adversely affect operations elsewhere in the network. Additionally, during the design year (2045), compared to the No-Build Alternative, queue lengths under the Build Alternative are improved and no queues exceed the available storage lengths. Volume-to-capacity ratios were checked for each ramp of the I-75 at Gibsonton Drive interchange in the AM and PM time periods for the No-Build and Build Alternatives in the design year (2045). This check indicated that compared to the opening year (2025) No-Build Alternative, congestion is expected to increase, particularly on the northbound on-ramp from Gibsonton Drive, and the southbound off-ramp to Gibsonton Drive which will both fail during both peak periods in the design year (2045). Under the Build Alternative, the ramps will continue to operate under capacity during the design year (2045).

C. Comparison of Alternatives

The modifications to the existing access of the I-75 and Gibsonton Drive interchange under the Build Alternative are expected to enhance traffic safety. Impacts on traffic safety will result from recommended enhancements aimed to reduce the crash frequency of several intersections in the AOI.

A comparison of the overall intersection delays associated with the Existing, No-Build, and Build Alternatives in the AM and PM peak hours can be found in **Table E.1** and **Table E.2**, respectively.

Table E.1: AM Intersection Analysis

Intersection	Existing		No-Build 2025		Build 2025		No-Build 2045		Build 2045	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
New East Bay Road	32.5	C	96.0	F	12.6	B	100.5	F	22.5	C
Southbound I-75 Ramp Terminal	58.8	E	86.4	F	23.8[2]	C	99.3	F	19.9[2]	B
Northbound I-75 Ramp Terminal	38.7*	E	58.8*	F	18.0	B	32.8*[1]	D	20.2	C
Fern Hill Drive	12.0[3]	B	9.4[3]	A	12.2	B	13.7	B	13.3	B

Red highlight indicates that the delay does not meet the LOS target, D

*Average intersection delay was used as overall delay for unsignalized intersections.

1. The overall average un-signalized intersection delay decreases because of unserviced EBL volumes in 2045. It is anticipated that this intersection will continue to deteriorate from 2025 No-Build condition, and operate at LOS F with greater delay.

2. 2045 Build condition delay results being reported are better than 2025 Build condition for the following reasons:
- More efficient eastbound-westbound thru-traffic movement along the corridor in 2045, due to optimized cycle length and off-set at adjacent intersections, as compared to 2025, and
- Slightly different turning movement percentages between 2025 and 2045

3. 2025 No-Build condition delay decreases from existing condition because of lane geometry improvements

Table E.2: PM Intersection Analysis

Intersection	Existing		No-Build 2025		Build 2025		No-Build 2045		Build 2045	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
New East Bay Road	23.8	C	30.9	C	19.1	B	72.9	E	47.7	D
Southbound I-75 Ramp Terminal	37.9	D	39.5	D	16.4[1]	B	102.0	F	12.1[1]	B
Northbound I-75 Ramp Terminal	3.1*	A	5.2*	A	16.3	B	20.3*	C	19.6	B
Fern Hill Drive	10.4[2]	B	9.6[2]	A	8.6	A	16.0	B	13.4	B

Red highlight indicates that the delay does not meet the LOS target, D

*Average intersection delay was used as overall delay for unsignalized intersections.

1. 2045 Build condition delay results being reported are better than 2025 Build condition for the following reasons:
- More efficient eastbound-westbound thru-traffic movment along the corridor in 2045 because of using different optimized cycle length and off-set at adjacent intersections from 2025 model, and
- Slightly different turning movement percentages between 2025 and 2045

2. 2025 No-Build condition delay decreases from existing condition because of lane geometry improvements

Table E.3 provides a comparison of maximum queue lengths compared to available storage lengths for the No-Build and Build Alternative in the design year (2045). In the table, the available storage represents the left or right turn storage bay measured from the stop bar to the taper. The available storage for the Off-ramp is measured from the stop bar to the gore point, with adjustment for deceleration length where applicable. Queue spillback is reduced, while vehicle throughput is increased through the AOI. No queues exceed the available storage lengths under the Build Alternative in the design year (2045).

Table E.3: Design Year (2045) Queue Analysis

Gibsonton Drive Intersection	Movement	No-Build Alternative			Build Alternative		
		Available Storage (Feet)	Maximum Vehicle Queue Length (Feet)		Available Storage (Feet)	Maximum Vehicle Queue Length (Feet)	
			AM Peak	PM Peak		AM Peak	PM Peak
New East Bay Road	EBL	190	50	50	190	75	100
	EBT	1,100	1,325	1,375	1,100	475	925
	EBR	250	100	225	250	50	250
	WBL	530	300	725	1,300	375	800
	WBT	730	600	375	1,780	375	275
	WBR	730	100	50	1,780	75	50
	NBTL	410	550	500	410	250	300
	NBR	390	575	500	390	325	200
	SBLTR	430	325	375	430	200	350
Southbound I-75 Ramp Terminal	EBT	730	1,625	1,600	1,780	525	350
	EBR	520	75	75	530	25	25
	WBL	640	850	850	900	150	150
	WBT	1,950	2,325	2,400	900	700	725
	SBL	1370	1,650	1,650	1,550	550	550
	SBR	1420	525	525	1,530	600	600
Northbound I-75 Ramp Terminal	EBL	640	875	875	900	475	75
	EBT	1,950	2,325	2,250	900	900	550
	WBT	730	550	1,225	1,810	475	625
	WBR	730	575	850	1,810	0	50
	NBL	375	275	325	1,700	150	125
	NBR	2,500	25	25	1,680	275	250
Fern Hill Drive	EBL	250	225	250	420	175	150
	EBT	730	600	650	1,810	225	950
	EBR	215	150	150	420	75	75
	WBL	330	200	175	350	175	150
	WBTR	1,170	1,375	1,475	580	500	400
	NBL	580	125	75	200	125	75
	NBT	580	25	50	580	25	25
	NBR	580	150	175	240	150	150
	SBTL	410	200	300	410	100	200
	SBR	200	50	50	200	75	75

Note: Red highlight indicates that maximum vehicle queue length exceeds available storage length

Based on the analyses documented in this IMR, the Build Alternative is expected to improve the operation and overall safety of the study intersections. The results of the CORSIM microsimulation analysis, as presented in **Table E.4**, provide evidence of substantial benefits associated with implementing the Build Alternative. Operational benefits under the Build Alternative were demonstrated by an increase in vehicle miles traveled and average speed. The increased vehicle miles traveled and average speeds for the opening year (2025) and design year (2045) were documented as follows:

- During the opening year (2025) the average speed increases by 80.5 percent during the AM peak period and by 23.5 percent during the PM peak period. The vehicle miles traveled (under static demand volumes) increases by 21.9 percent during the AM peak period and 3.9 percent during the PM peak period. Latent demand will decrease by 91.4 percent during the AM peak period and by 95.3 percent during the PM peak period.
- During the design year (2045), the average speed increases by 37.1 percent during the AM peak period and by 44.8 percent during the PM peak period. The benefits of vehicles serviced is significant with an increase in vehicle miles traveled (under static demand volumes) of 31.3 percent during the AM peak period and 23.8 percent during the PM peak period. Latent demand will decrease by 80.0 percent during the AM peak period and by 91.5 percent during the PM peak period.

Table E.4: Comparison of Network-Wide CORSIM MOEs for Opening Year (2025) and Design Year (2045) during AM and PM Peak Hour Periods

Network-Wide MOE	Analysis Time Period	Opening Year (2025)			Design Year (2045)		
		No-Build Alternative	Build Alternative	% Difference	No-Build Alternative	Build Alternative	% Difference
Vehicle Miles Traveled (veh-miles)	AM	338,022	412,070	21.9%	411,013	539,661	31.3%
	PM	399,953	415,387	3.9%	429,142	531,071	23.8%
Travel Time Total (hours)	AM	9,643	6,500	-32.6%	9,774	9,340	-4.4%
	PM	9,665	8,130	-15.9%	12,961	11,085	-14.5%
Speed Average (mph)	AM	35.1	63.4	80.5%	42.1	57.8	37.1%
	PM	41.4	51.1	23.5%	33.1	47.9	44.8%
Total Travel Delay (hours)	AM	4,802	576	-88.0%	3,719	1,420	-61.8%
	PM	3,916	2,162	-44.8%	6,683	3,286	-50.8%
Latent Demand (veh)	AM	12,090	1,036	-91.4%	16,889	3,385	-80.0%
	PM	10,990	518	-95.3%	19,942	1,692	-91.5%

*Latent demand at some of entry nodes exceeds maximum value reported by CORSIM of 9,999. 9,999 is assumed for these nodes, however the latent demand exceeds this value.

The quantitative safety analysis provided additional safety benefits to the operational benefits for implementing the Build Alternative. Using procedures from the Highway Safety Manual (HSM), all collisions associated with the ramp terminals and ramps are expected to be reduced by up to 14.2 percent and provide a 3.2 crash reduction per year.

Improvements to this interchange have local government support and are included in the Hillsborough County Metropolitan Planning Organization (MPO) 2045 Long Range Transportation Plan (LRTP), as it indicates the I-75 at Gibsonton Drive interchange as being a top regional priority for future funding.

The proposed improvements under Build Alternative will not require the acquisition of any ROW. Therefore, it is anticipated there will be minimal to no natural, cultural, or socio-economic impacts associated with implementing the proposed improvements.

There are no anticipated design exceptions or variations to FDOT or FHWA policies, rules, or standards anticipated for this project, but if any exception/variation should arise it will be processed per FHWA and FDOT standards.

The access management within the AOI of the I-75 and Gibsonton Drive interchange will not be changed by the proposed improvements to be implemented as part of the Build Alternative.

Based upon this analysis, the proposed modifications under Build Alternative provide significant improvements to corridor operation, mitigate congestion, and enhance safety within the study AOI.

D. FHWA Policy Points

This IMR follows the FHWA's Policy on Access to the Interstate System requirements for the justification and documentation needed to substantiate any proposed changes in access to the Interstate System. The Interstate System provides a key role in facilitating the distribution of goods and services sustaining the economic health, mobility and safety of a region and state. As part of the United States transportation system that provides access to local highways using a network of limited access freeways, it is important to invest in the preservation and enhancement of the Interstate System to meet the needs of the 21st century. All new or modified points of access must be approved by FHWA and developed in accordance with federal laws and regulations (as specified in 23 U.S.C. 109 and 111, 23 C.F.R. 625.4, and 49 C.F.R. 1.48(b)(1)). The following sections document the adherence of the proposed improvements to the two FHWA Policy Criteria (effective as of May 22, 2017).

Policy Point 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)).

Satisfaction of Policy Point 1

An operational and safety analysis was conducted to evaluate the Build and No-Build Alternatives. The Build Alternative consists primarily of reconstructing the current Diamond Interchange to a Diverging Diamond Interchange along with improvements at New East Bay Road and Fern Hill Drive while the No-Build Alternative maintains the current I-75 and Gibsonton Drive Diamond Interchange configuration, existing year (2020) lane configuration and traffic control, with the committed improvements at south leg of Fern Hill at the study intersections within the AOI.

The CORSIM microsimulation results of the I-75 basic freeway segments and ramp merge/diverge areas for the Build Alternative indicate that during the design year (2045), serviced vehicles on southbound I-75 increase during both the AM and PM peak hours compared to the No-Build Alternative. No new segments of southbound I-75 fail due to the improvements made on Gibsonton Drive. Additionally, the segment of southbound I-75 north of Gibsonton Drive and the diverge segment at the southbound I-75 off-ramp to Gibsonton Drive show increases in speed and decreases in density under the Build Alternative.

Volume-to-capacity ratios were checked for each ramp of the I-75 at Gibsonton Drive interchange in the AM and PM time periods for the No-Build and Build Alternatives in the design year (2045). This check indicated that compared to the opening year (2025) No-Build Alternative, congestion is expected to increase, particularly on the northbound on-ramp from Gibsonton Drive, and the southbound off-ramp to Gibsonton Drive which will both fail during both peak periods in the design year (2045). Under the Build Alternative, the ramps will continue to operate under capacity during the design year (2045).

The CORSIM microsimulation results of the I-75 ramp terminals and cross-streets at Gibsonton Drive for the design year (2045) indicate that during the design year (2045), when comparing the No-Build and Build Alternatives, there are improvements throughout the network with serviced vehicles increasing at nearly every movement as congestion is relieved. In the Build Alternative, during the AM and PM peak hours, all four study intersections have an LOS of D or better. The reduction of maximum queue spillbacks under the Build Alternative is also largely mitigated with no queues exceeding the available storage lengths in the design year (2045).

During the design year (2045), the average speed increases by 37.1 percent during the AM peak period and by 44.8 percent during the PM peak period. The benefits of vehicles serviced is significant with an increase in vehicle miles traveled (under static demand volumes) of 31.3 percent during the AM peak period and 23.8 percent during the PM peak period. Latent demand will decrease by 80.0 percent during the AM peak period and by 91.5 percent during the PM peak period.

When examining FDOT crash modification factors between the No-Build and Build Alternatives, the proposed improvements are expected to improve safety along the corridor. With the proposed improvements under the Build Alternative, all collisions associated with the ramp terminals and ramps are expected to be reduced by up to 14.2 percent and provide a 3.2 crash reduction per year.

Based upon this analysis, the Build Alternative provides significant improvements to the network configuration that improve corridor operation, mitigate congestion, and enhance safety within the study AOI.

Policy Point 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.

Satisfaction of Policy Point 2

The proposed Build Alternative will maintain full access to all traffic movements on Gibsonton Drive to and from I-75. The design will meet current standards for the projects on the interstate system and comply with the American Association of State Highway and Transportation Officials (AASHTO) and FDOT design standards. There are no design exceptions or variations to FDOT or FHWA policies, rules, or standards anticipated with the Build Alternative.

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Glossary of Terms

Term	Definition
AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AOI	Area of Influence
CAR	Crash Analysis Reporting
CFR	Code of Federal Regulations
CIP	Capital Improvement Program
CMF	Crash Modification Factor
CORSIM	Corridor Simulation
DDHV	Directional Design Hour Volume
DDI	Directional Diamond Interchange
DHT	Design Hour Truck
FDM	FDOT Design Manual
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
FPID	Financial Project Identification
FTO	Florida Traffic Online
GEH	Geoffrey E Havers
GIS	Geographic Information System
GLOS	Generalized Level of Service
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
HSM	Highway Safety Manual
HSMV	Highway Safety and Motor Vehicles
IARUG	Interchange Access Request User's Guide
IMR	Interchange Modification Report
LOS	Level of Service

LRTP	Long Range Transportation Plan
MOCF	Model Output Conversion Factor
MPH	Miles per Hour
MPO	Metropolitan Planning Organization
MUTCD	Manual on Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Program
PD&E	Project Development and Environment
RCI	Roadway Characteristics Inventory
RITIS	Regional Integrated Transportation Information System
SIO	Systems Implementation Office
SIS	Strategic Intermodal System
SLD	Straight Line Diagram
TBNEXT	Tampa Bay Next
TBRPM	Tampa Bay Regional Planning Model
TSM&O	Transportation Systems Management and Operations
TMC	Turning Movement Count
WPI	Work Program Item

1.0 Introduction

1.1 Project Overview

The Florida Department of Transportation (FDOT) District Seven conducted an Interchange Modification Report (IMR) to identify improvements that can mitigate existing operational deficiencies and safety concerns at the I-75 at Gibsonton Drive interchange. I-75 is a major north-south interstate highway that is part of the Strategic Intermodal System (SIS) from its southern terminus in South Florida (SR 826/Palmetto Expressway) to the Georgia State line in the north.

Hillsborough County has been experiencing significant population growth in recent years with growth rates that consistently outpace the statewide average. Much of this growth has been centered in southern Hillsborough County as communities in Riverview and Lithia continue to thrive and expand. Due to this growth, it is imperative to provide regional access to these communities for sustained economic viability, mobility, and emergency evacuation. As the area surrounding the Gibsonton Drive interchange has continued to grow and evolve, the interchange itself has not kept pace with these changes and currently fails to operate at current Level of Service (LOS) targets.

The Gibsonton Drive and Fern Hill Drive intersection, located immediately east of the interchange, was recently signalized in 2018. The signalization of the intersection was implemented to better accommodate truck traffic from Ring Power/Caterpillar, located on Fern Hill Drive, south of Gibsonton Drive. In keeping with the need to serve not only vehicular, but freight and goods traffic in a safe and effective manner, the impacts of truck traffic played a key role in the operations of the I-75 and Gibsonton Drive interchange and were accommodated as such in the development of the proposed alternatives.

1.2 Purpose and Need

The primary purpose of this IMR is to identify safety, operational, and engineering improvements needed for the I-75 and Gibsonton Drive interchange, that would not only provide for immediate relief to existing traffic congestion and highway safety deficiencies, but also allow for added highway capacity to support future growth and economic development. This IMR is developed following FDOT Procedure Topic No. 525-030-160 (New or Modified Interchanges) in accordance with the Florida Department of Transportation's (FDOT's) *Interchange Access Request User's Guide* (IARUG) prepared by the Systems Implementation Office (SIO). The need for this project is based on the following list of identified deficiencies:

- Significant AM congestion is present along Gibsonton Drive with vehicles attempting to access the northbound I-75 on-ramp from both the eastbound and westbound directions. Thereby, causing competition between both sides of Gibsonton Drive to use the on-ramp.
- In the PM, the drop lane condition at the southbound I-75 off-ramp to Gibsonton Drive is combined with significant southbound left turning demand at the ramp terminal, which leads to significant I-75 mainline queuing. Under typical conditions, congestion experienced due to the operation of the southbound off-ramp begins nearly 3.0 miles upstream of the diverge, at the start of the auxiliary lane. This poses not only an operational concern, but a significant safety problem during the PM peak as speed differential between the auxiliary lane and general-purpose lanes can contribute to erratic driving behavior and resulting collisions.

- I-75 and Gibsonton Drive are prioritized hurricane evacuation routes, causing concern for the safety of motorists during an evacuation event.
- The poor LOS at the subject interchange during peak travel periods does not support the economic development and prosperity of the rapidly growing study area. These shortcomings will be further exacerbated with the onset of new developments planned in the area.

1.3 Project Location

The I-75 at Gibsonton Drive interchange is in southern Hillsborough County, 4.2 miles north of CR 672 (Big Bend Road) and 3.6 miles south of US 301. The I-75 and Gibsonton Drive interchange serves as a major access point from I-75 to the unincorporated communities of Gibsonton, Riverview, Lithia, Boyette, Bloomingdale, and Fish Hawk in the greater Tampa Bay Region. The western quadrants of the interchange provide access to residential properties, a Walmart Supercenter, and serve as an access to several existing and planned developments. The northeast quadrant is occupied by RaceTrac, Florida Super Wash, and residential properties of The Preserve. The southeast quadrant of the interchange is predominantly occupied by Ring Power, Caterpillar and Lennar Development.

Gibsonton Drive also connects I-75 with US 41 (2.2 miles to the west) and US 301 (1.3 miles to the east) and is depicted in **Figure 1.1**.

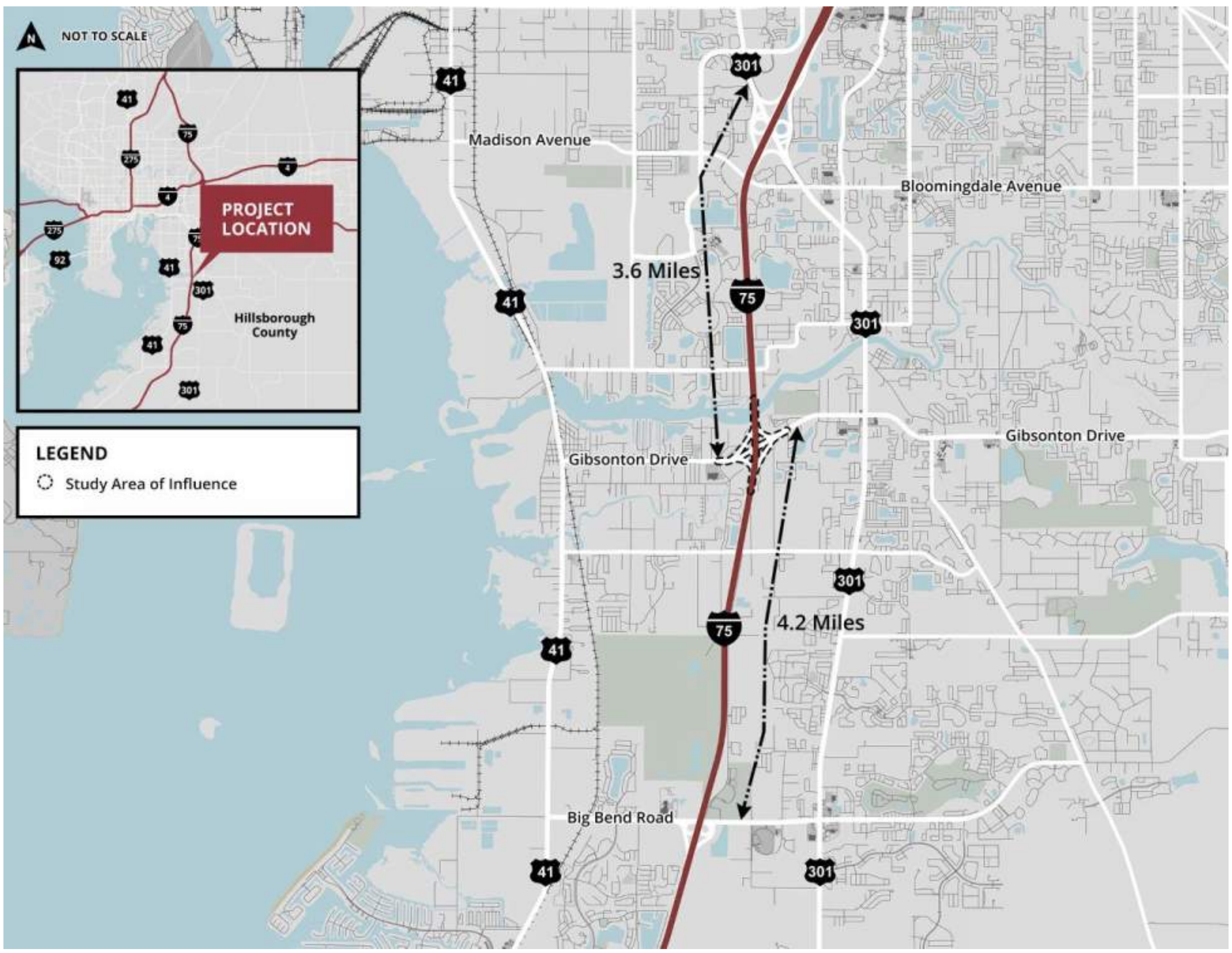


Figure 1.1: Project Location Map

1.4 Area of Influence

To effectively assess the safety and operational improvements that will be proposed for the I-75 at Gibsonton Drive interchange, this area of influence (AOI) includes the I-75 merge/diverge areas at the Gibsonton Drive interchange and Gibsonton Drive from west of New East Bay Road to east of Fern Hill Drive. Existing conditions at the adjacent interchanges will remain unaffected by improvements at the I-75 at Gibsonton Drive Interchange because the gore-to-gore distance is greater than three miles both north and south. The AOI is shown in **Figure 1.2** and is bordered by the following four intersections with Gibsonton Drive:

1. New East Bay Road
2. I-75 Southbound Ramps
3. I-75 Northbound Ramps
4. Fern Hill Drive

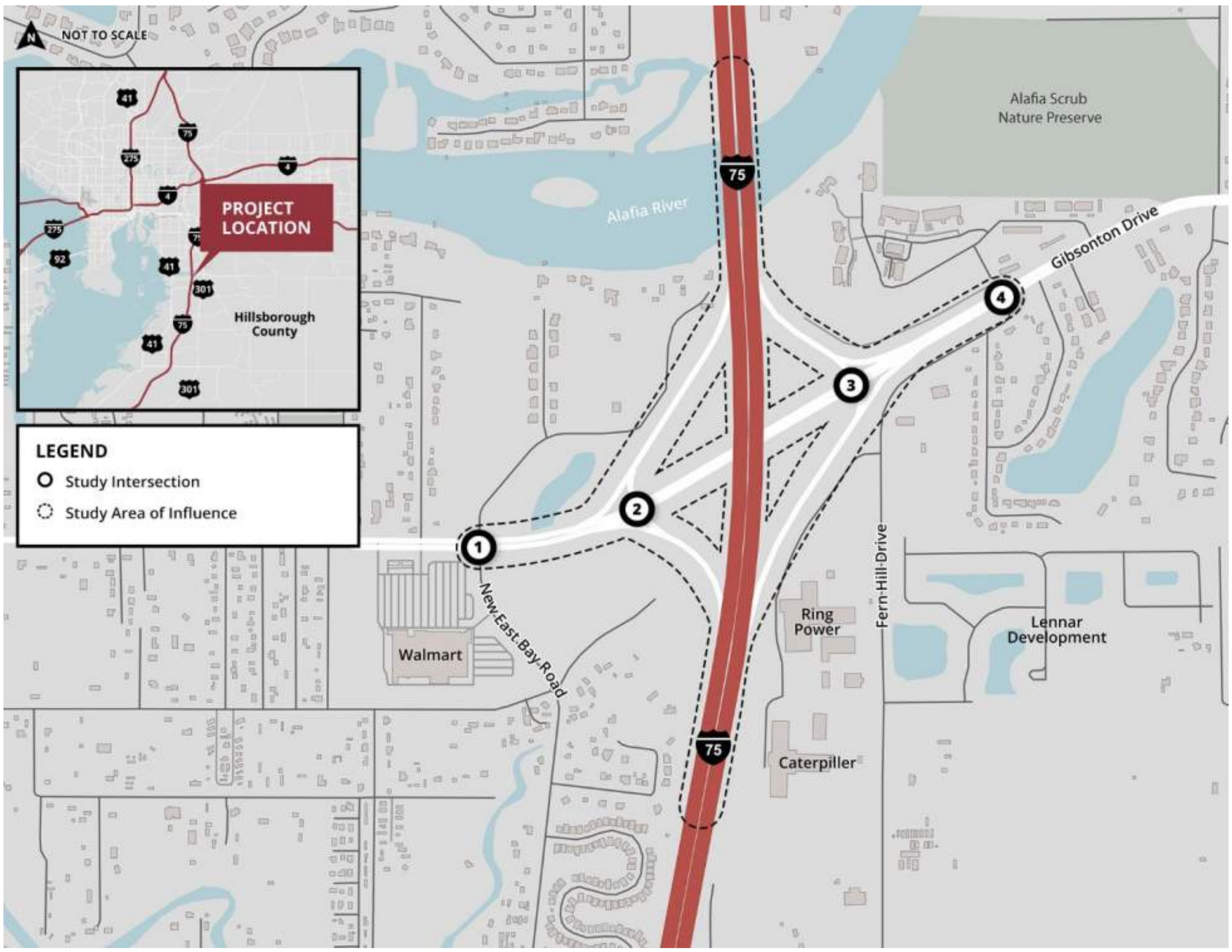


Figure 1.2: Area of Influence

The following interstate segments will also be analyzed:

1. Northbound I-75 south of Gibsonton Drive Off-Ramp
2. Northbound I-75 between Gibsonton Drive Off-Ramp and Gibsonton Drive On-Ramp
3. Northbound I-75 north of Gibsonton Drive On-Ramp
4. Southbound I-75 north of Gibsonton Drive Off-Ramp

5 Southbound I-75 between Gibsonton Drive Off-Ramp and Gibsonton Drive On-Ramp
6 Southbound I-75 south of Gibsonton Drive On-Ramp.

The following ramps will also be analyzed:

1 Southbound I-75 Off-Ramp (Diverge)
2 Southbound I-75 On-Ramp (Merge)
3 Northbound I-75 Off-Ramp (Diverge)
4 Northbound I-75 On-Ramp (Merge).

1.5 Methodology

This IMR was conducted utilizing methodologies and principles established in the 2021 Interchange Access Request User Guide (IARUG). The FDOT approved methodology for this report can be found in **Appendix A.**

1.6 Project Schedule

The I-75 and Gibsonton Drive interchange is currently programmed to begin Design in Fiscal Year 2025. Design is estimated to take approximately 24 months. Construction is not funded in the adopted 5-year work program.

There are no other existing IARs, either approved or pending approval, currently located within the area of influence. However, several planned and programmed projects exist within the AOI that could influence the traffic characteristics within the study area. These projects are in various stages of either the FDOT Work Program or Hillsborough County Capital Improvement Program (CIP), and are identified as follows:

- The ongoing I-75 Project Development and Environment (PD&E) Study from north of Moccasin Wallow Road in Manatee County to south of US 301 (WPI Segment No.: 419235-2) in Hillsborough County evaluates the need for tolled express lanes on I-75. The I-75 PD&E Study will incorporate the I-75 at Gibsonton Drive IMR's Build Alternative as a No-Build condition when evaluating design year (2045) traffic conditions. This study will recommend no additional modifications at the I-75 at Gibsonton Drive interchange.
- Hillsborough County recently completed the planning phase and is moving into the design phase for improvements to the Gibsonton Drive and Fern Hill Drive intersection adjacent to the northbound I-75 ramp terminal (CIP: 69600311). The project includes enhanced pedestrian operations and increases turning lanes along Fern Hill Drive to better service demand. Planning on the project is complete and the project has moved into design, with an anticipated construction completion by late 2022.

Hillsborough County has also identified, in their 2045 Long Range Transportation Plan (LRTP), the widening of Gibsonton Drive between the I-75 interchange and US 301 from the existing 4-lane roadway typical section to a 6-lane roadway typical section as a Cost Feasible Major Roadway Project (2025-2045). The PD&E on Gibsonton Drive from Fern Hill Drive to US 301 (450438-1) is currently funded in the FDOT Work Program for fiscal year 2022.

2.0 Existing Conditions

2.1 Roadway Geometry

Roadway characteristics data within the AOI was obtained from FDOT Straight Line Diagrams (SLD) database and can be found in **Appendix B**. Geographic Information System (GIS) shapefiles referencing FDOT Transportation data and the Roadway Characteristics Inventory (RCI) database were also used to summarize existing roadway features.

I-75 is a north-south, limited access facility through the Gibsonton Drive interchange area, with a posted speed limit of 70 miles per hour (mph). I-75 is a six-lane urban principal arterial interstate within the study area, with a fourth outside lane in the northbound and southbound directions, north of Gibsonton Drive, serving as auxiliary lanes to/from US 301. I-75 is also part of the FDOT SIS (Roadway ID: 10075000), making it one of Florida's high priority transportation facilities for Florida's economy and mobility. Roadway characteristics were gathered for each facility being analyzed in the study area and can be found in **Table 2.1**.

Table 2.1: Roadway Characteristics

Segment	Functional Classification	Length (mi)	Speed Limit (mph)	Typical Section	Directionality
I-75/SR 93A					
From South of Gibsonton Drive to North of Gibsonton Drive	Urban Principal Arterial Interstate	0.521	70	Six-Lane Divided	Two-Way
Gibsonton Drive					
From West of New East Bay Road to East of Fern Hill Drive	Urban Minor Arterial	1.000	45	Four-Lane Undivided	Two-Way

Gibsonton Drive is an east-west, four-lane Hillsborough County arterial with a 45-mph posted speed limit. Gibsonton Drive provides access to the unincorporated communities of Gibsonton, Riverview, Lithia, Boyette, Bloomingdale, and Fish Hawk in the greater Tampa Bay Region. The existing lane geometry and control type for each of the study intersections and I-75 mainline is shown in **Figure 2.1** and **Figure 2.2**.

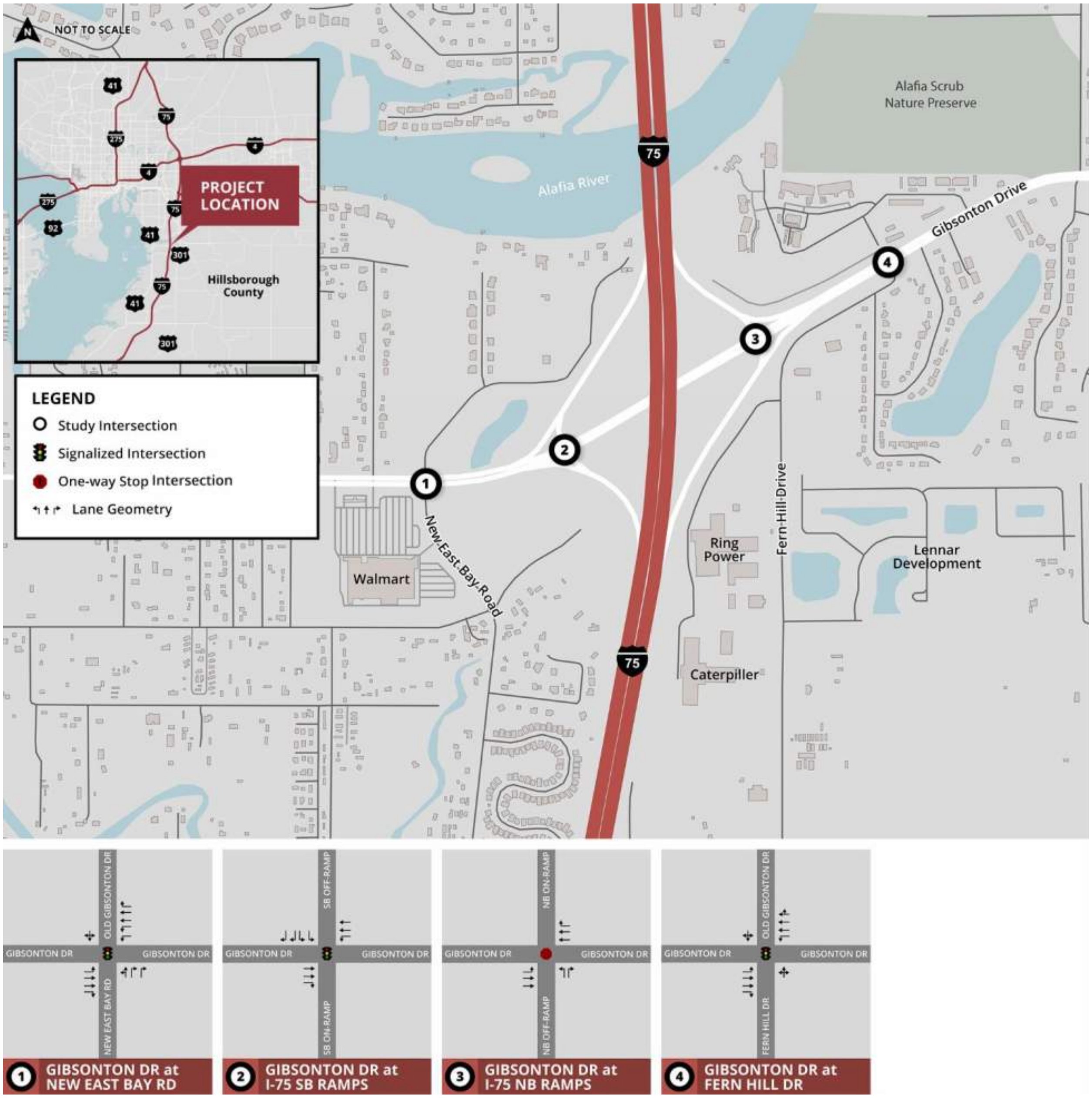


Figure 2.1: Existing Intersection Geometries and Traffic Control

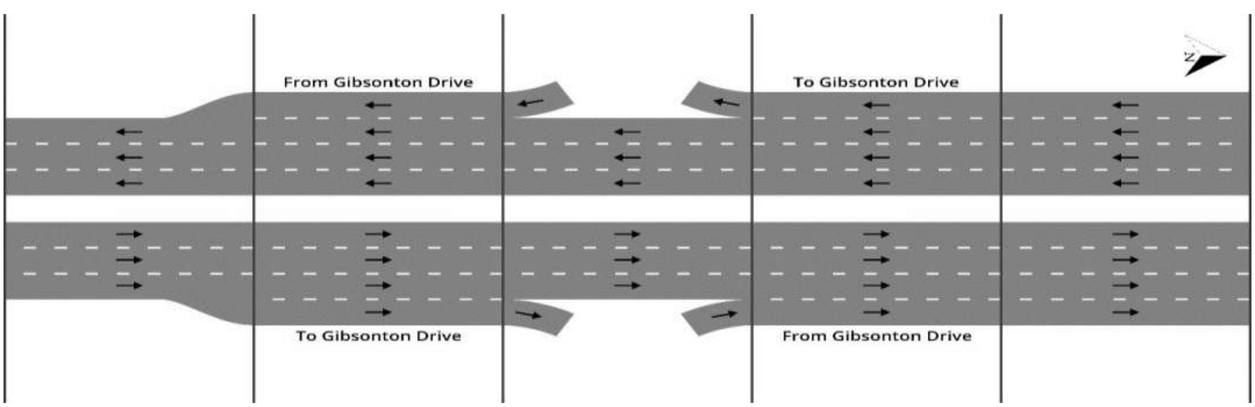


Figure 2.2: Existing I-75 Lane Geometry

2.2 Land-Use

Land-use maps, obtained from the Hillsborough County Planning Commission, were reviewed. Gibsonton Drive has a context classification of C3C-Suburban Commercial, for the roadway network within the study limits. This type of roadway network uses large blocks with large building footprints and parking lots on a disconnected or sparse roadway network. The existing land-use is predominantly comprised of light/heavy commercial, and single family/mobile homes. **Figure 2.3** shows the existing land-use of the area surrounding the I-75 and Gibsonton Drive interchange.

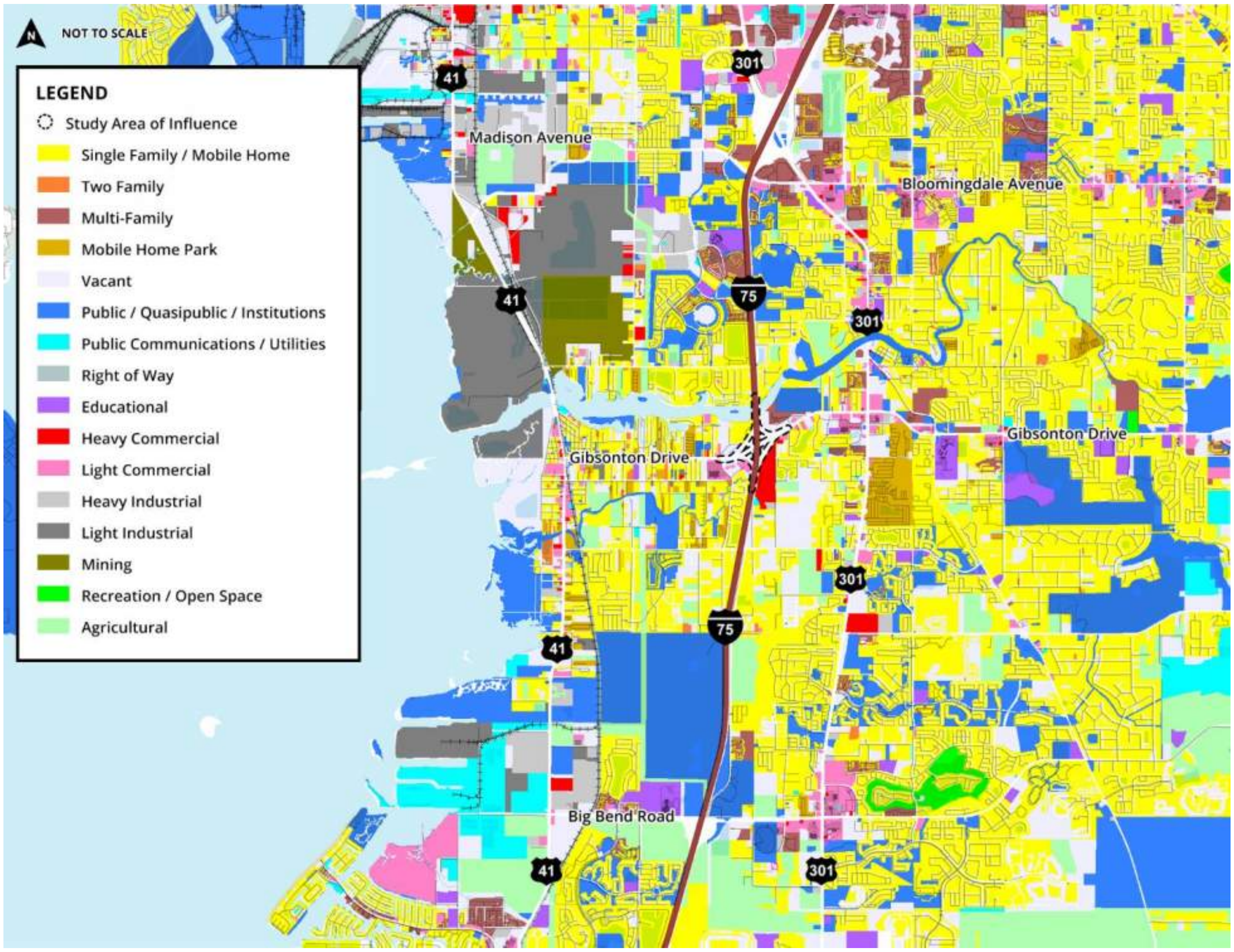


Figure 2.3: Existing Land Use Map

2.3 Safety

2.3.1 Crash Data

Historical crash data within the study area was obtained from FDOT's Crash Analysis Reporting (CAR) System and the University of Florida's Signal Four Analytic database for the five-year period from 2016 to 2020. The historical crash data included crashes that are coded to locations within the AOI, along Gibsonton Drive from New East Bay Road to Fern Hill Drive, including the I-75 merge/diverge ramps. The data collected includes crash frequency, type, severity, lighting conditions (day versus night), and pavement surface conditions (wet versus dry). Crash data and FDOT Statewide Segment and Intersection Crash Rates can be found in **Appendix C**.

2.3.2 Crash Analysis

A total of 557 total crashes, over the five-year period from 2016 to 2020, were reported within the study area. Of the 557 total crashes, there were three fatal crashes, 254 crashes involving personal injury, and 300 crashes that were property damage only. The overall crash frequency averaged an approximate 112 crashes per year. The highest three crash types included: 257 (46.1 percent) rear end crashes, 78 (14.0 percent) sideswipe crashes, and 70 (12.6 percent) left turn crashes. There were 123 (22.1 percent) crashes reported with wet surface conditions. A total of 211 (37.9 percent) crashes were reported under dark lighting conditions, which is higher than the statewide average of 35 percent for nighttime crashes. Crash data is summarized in **Table 2.2**. **Figure 2.4** shows the crash heat map for crashes within the study area.

Table 2.2: Crash Data Summary

Category	2016	2017	2018	2019	2020	Total	Mean	Percentage
Type								
Angle	16	16	5	1	2	40	8.0	7.18%
Bicycle	0	0	0	0	1	1	0.2	0.18%
Head On	0	1	0	0	0	1	0.2	0.18%
Hit Fixed Object	17	11	8	9	11	56	11.2	10.05%
Hit Non-Fixed Object	1	2	0	1	2	6	1.2	1.08%
Left Turn	8	10	21	17	14	70	14.0	12.57%
Other	3	1	3	2	0	9	1.8	1.62%
Overturn/Rollover	2	5	1	6	2	16	3.2	2.87%
Pedestrian	1	0	1	1	0	3	0.6	0.54%
Ran Off Road	0	0	1	0	0	1	0.2	0.18%
Rear End	53	61	44	49	50	257	51.4	46.14%
Right Turn	0	3	3	1	0	7	1.4	1.26%
Sideswipe	18	20	13	15	12	78	15.6	14.00%
Single Vehicle	3	1	2	1	5	12	2.4	2.15%
Total	122	131	102	103	99	557	111.4	100.00%
Severity								
Fatal	1	1	1	0	0	3	0.6	0.54%
Severe Injury	10	13	10	4	10	47	9.4	8.44%
Moderate Injury	22	19	18	19	21	99	19.8	17.77%
Minor Injury	25	19	14	28	22	108	21.6	19.39%
Property Damage Only	64	79	59	52	46	300	60.0	53.86%
Total	122	131	102	103	99	557	111.4	100.00%
Lighting Condition								
Day	83	80	70	59	54	346	69.2	62.12%
Dawn	2	3	5	2	2	14	2.8	2.51%
Dusk	6	12	7	4	9	38	7.6	6.82%
Dark - Lighted	17	24	15	31	25	112	22.4	20.11%
Dark - Not Lighted	14	12	5	7	9	47	9.4	8.44%
Total	122	131	102	103	99	557	111.4	100.00%
Surface Condition								
Dry	81	107	86	84	76	434	86.8	77.92%
Wet	41	24	16	19	23	123	24.6	22.08%
Total	122	131	102	103	99	557	111.4	100.00%

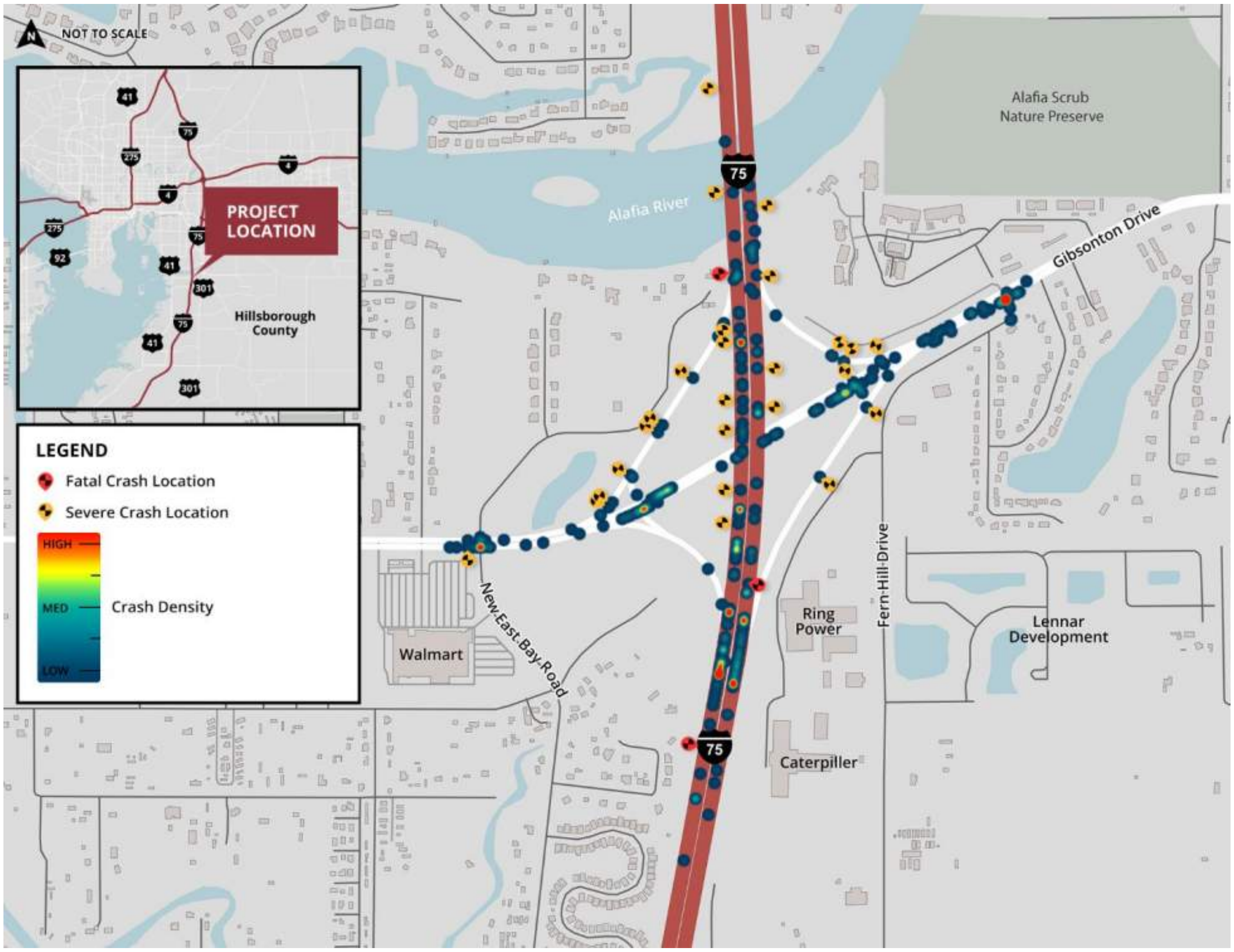


Figure 2.4: Crash Heat Map (2016 to 2020)

Roadway segments and intersection crash rates were calculated and compared with statewide averages for similar highway facilities throughout the State of Florida. For the purposes of this crash analysis, crashes were divided into three location types: segment, intersection, and ramp. Crashes located within 250 feet of an intersection were categorized as an Intersection related crash. Crash severities for northbound I-75, southbound I-75, combined intersections on Gibsonton Drive, combined segments on Gibsonton Drive, and combined northbound and southbound I-75 on/off-ramps over the five-year period are shown in **Figure 2.5**. Additionally, segments along I-75 and Gibsonton Drive were sorted into sections based on AADT.

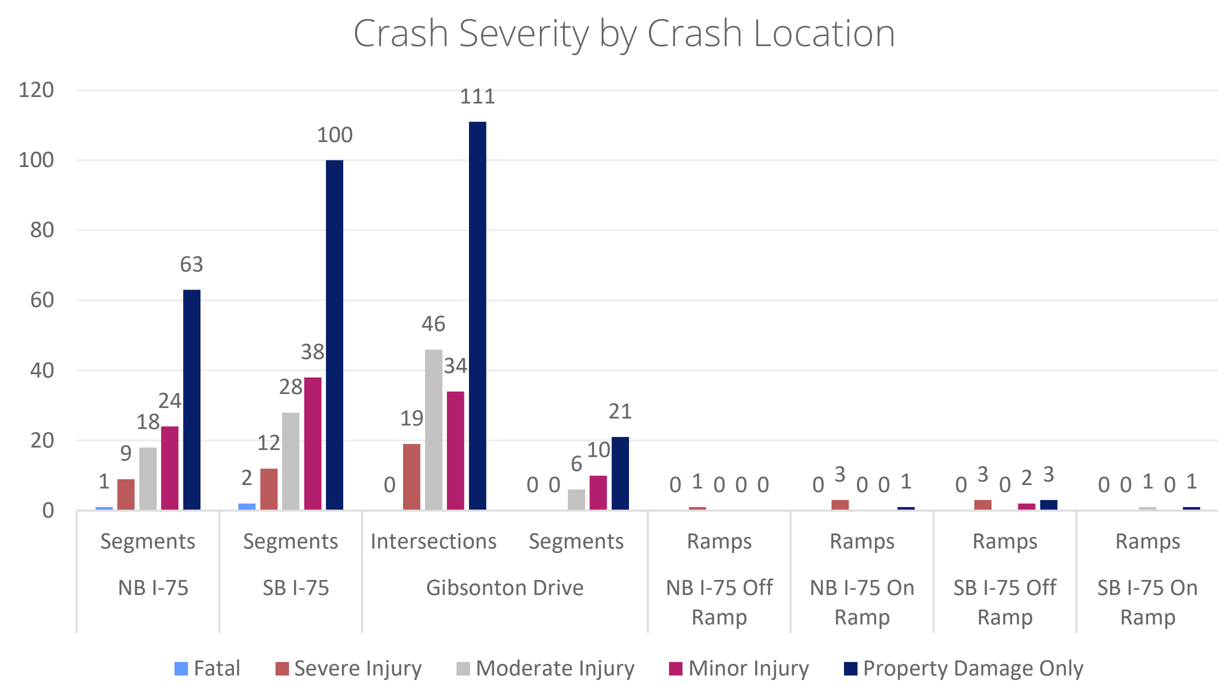


Figure 2.5: Crash Severity by Crash Location

Northbound I-75 roadway segments had 115 (20.6 percent) crashes. The most common crash type being rear end due to careless/negligent driving. Roadway conditions of interest for these predominant crashes are summarized by the location as follows:

- Northbound I-75 south of Gibsonton Drive off-ramp: 42 crashes
  - 43 percent occurred under dark conditions.
  - 33 percent occurred under wet surface conditions.
- Northbound I-75 from off-ramp to Gibsonton Drive to on-ramp from Gibsonton Drive: 60 crashes
  - 40 percent occurred under wet surface conditions.
- Northbound I-75 north of on-ramp from Gibsonton Drive: 13 crashes
  - 69 percent occurred under wet surface conditions.

Southbound I-75 roadway segments had 180 (32.3 percent) crashes. The most common crash type being rear end crashes due to careless/negligent driving. Roadway conditions of interest for these predominant crashes are summarized by location as follows:

- Southbound I-75 south of on-ramp from Gibsonton Drive: 23 crashes
  - 48 percent occurred under dark conditions.
- Southbound I-75 on-ramp from Gibsonton Drive to off-ramp to Gibsonton Drive: 148 crashes
  - 45 percent occurred under dark conditions.
- Southbound I-75 north of off-ramp to Gibsonton Drive: 9 crashes

Gibsonton Drive Intersections had 210 (37.7 percent) crashes. The most common crash type being rear end and left turn crashes due to careless/negligent driving and failing to yield the right-of-way. Roadway conditions of interest for these predominant crashes are summarized by location as follows:

- New East Bay Road: 31 crashes
- I-75 southbound ramps: 56 crashes
  - 43 percent occurred under dark conditions.
- I-75 northbound ramps: 42 crashes
  - 57 percent occurred under dark conditions.
- Fern Hill Drive: 81 crashes

Gibsonton Drive roadway segments reported a low crash frequency with 37 crashes. The most common crash type being rear end and sideswipe crashes due to careless driving. Roadway conditions of interest for these predominant crashes are summarized by location as follows:

- Gibsonton Drive between New East Bay Road and I-75 southbound ramps: 5 crashes
  - 40 percent occurred under dark conditions.
- Gibsonton Drive between I-75 southbound Ramps and I-75 northbound ramps: 15 crashes
- Gibsonton Drive between I-75 northbound Ramps and Fern Hill Dr: 17 crashes

I-75 off-ramps reported a low crash frequency with 9 crashes. The most common crash type being overturn/rollover crashes due to reckless driving and lane departure. Roadway conditions of interest for these predominant crashes are summarized by location as follows:

- NB I-75 off-ramp to Gibsonton Drive: 1 crash
- SB I-75 off-ramp to Gibsonton Drive: 8 crashes
  - 63 percent occurred under dark conditions.

I-75 on-ramps reported the lowest crash frequency with 6 crashes. The most common crash type being overturn/rollover crashes due to careless driving and lane departure. Roadway conditions of interest for these predominant crashes are summarized by location as follows:

- NB I-75 on-ramp from Gibsonton Drive: 4 crashes
  - 50 percent occurred under dark conditions.
- SB I-75 on-ramp from Gibsonton Drive: 2 crashes
  - 50 percent occurred under dark conditions.

2.3.3 Segment Crash Rate

The roadway segment crash rates for the AOI are shown in **Table 2.3**. The segment crash rates exclude crashes that occurred within 250 feet of study area intersections. The segment crash rates range from 0.255 crashes per million vehicle miles traveled (MVMT) (on southbound I-75, north of the off-ramp to Gibsonton Drive) to a high of 4.462 crashes per MVMT (on Gibsonton Drive, between the I-75 northbound ramps and Fern Hill Drive). Note that ramps do not have statewide average crash rates, there is no comparison threshold to determine if these crash rates are high or low.

For northbound I-75 there are two segments (south of the off-ramp to Gibsonton Drive and north of off-ramp to Gibsonton Drive to south of on-ramp from Gibsonton Drive) with crash rates higher than the statewide average. The majority of crashes within these areas, involved rear end and sideswipe crashes primarily due to congestion.

For southbound I-75 there is one segment (north of the on-ramp from Gibsonton Drive to south of the off-ramp to Gibsonton Drive) that is higher than the statewide average. Of the 148 crashes, reported on this segment, rear end and sideswipe crashes contributed 78 percent among all crash types. In this section, 45 percent of crashes occurred during dark conditions. Additionally, a fatal head-on crash occurred due to the at fault driver driving on the wrong side of the roadway.

Along Gibsonton Drive there are two segments (between the ramp terminals and between the I-75 northbound ramp terminal and Fern Hill Drive) that have crash rates higher than the statewide average. Rear end crashes contributed to approximately 73 percent of crashes along these segments. This may be primarily due to congestion.

Table 2.3: Segment Crash Rates

Location	Total 5-year Crashes	Crash Rate*	Statewide Average**
Segment NB I-75 (Urban Interstate)			
NB I-75 South of Off-ramp to Gibsonton Drive	42	1.362	0.992
NB I-75 North of Off-ramp to Gibsonton Drive to South of On-ramp from Gibsonton Drive	60	1.001	0.992
NB I-75 North of On-ramp From Gibsonton Drive	13	0.356	0.992
Segment SB I-75 (Urban Interstate)			
SB I-75 South of On-ramp From Gibsonton Drive	23	0.746	0.992
SB I-75 From North of On-ramp from Gibsonton Drive to South of Off-ramp to Gibsonton Drive	148	2.660	0.992
SB I-75 North of Off-ramp to Gibsonton Drive	9	0.255	0.992
Segment Gibsonton Dr (Suburban 4-5 2-way Divided Raised)			
Gibsonton Drive Between New East Bay Road and I-75 SB Ramps	5	1.328	1.747
Gibsonton Drive Between I-75 SB Ramps and I-75 NB Ramps	15	2.549	1.747
Gibsonton Drive Between I-75 NB Ramps and Fern Hill Drive	17	4.462	1.747

*Segment crash rate = number of crashes per million vehicle miles traveled
**Source: FDOT Crash Analysis Reporting (CAR) Online Database
Note: Red highlight indicates crash rate higher than the statewide crash average

2.3.4 Intersection Crash Rate

The intersection crash rates for the study area are shown in **Table 2.4**. The intersection crash rates range from a low of 1.006 crashes per million entering vehicles (MEV) at the Gibsonton Drive and southbound I-75 ramp terminal to a high of 3.551 crashes per MEV at the Gibsonton Drive and Fern Hill Drive intersection.

The crash rate at the Gibsonton Drive and New East Bay Road intersection is higher than the statewide average. Rear end crashes occurring during both AM and PM peak periods contributed to approximately 50 percent of crashes at this intersection. This may be primarily due to congestion at the intersection leading to stop-and-go conditions on Gibsonton Drive.

The crash rate at the Gibsonton Drive and Fern Hill Drive intersection is higher than the statewide average. The majority of crashes occur during AM, Midday, and PM peak periods, contributing to approximately 80 percent of crashes at this intersection. This is likely due to a higher proportion of left turn crashes related to the motorist failing to yield the right-of-way.

Table 2.4: Intersection Crash Rates

ID	Location	Total 5-year Crashes	Crash Rate*	Statewide Average**
1	Gibsonton Dr at New East Bay Rd (Suburban 4-5 Lane 2-way Divided Raised – 3 legs)	31	1.359	0.526
2	Gibsonton Dr at I-75 southbound ramps (Ramp Rural – 3 legs)	56	1.006	1.502
3	Gibsonton Dr at I-75 northbound ramps (Ramp Rural – 3 legs)	42	1.386	1.502
4	Gibsonton Dr at Fern Hill Dr (Suburban 4-5 Lane 2-way Divided Raised – 3 legs)	81	3.551	0.526

*Intersection crash rate = number of crashes per million entering vehicles
**Source: FDOT Crash Analysis Reporting (CAR) Online Database
Note: Red highlight indicates crash rate higher than the statewide crash average

2.3.5 Economic Loss

Monetary estimates of property damage and economic loss due to injury or a fatality were calculated using average unit costs from the United States Department of Transportation (USDOT)/Federal Highway Administration (FHWA) KABCO (K-Fatal; A-Incapacitating injury; B-Non incapacitating injury; C-Possible injury; and O-No injury) injury classification scale. FDOT's CAR Online provides unit costs for calculating the cost of crashes and injuries. Based on these unit costs that are documented in Table 122.6.2 of the Florida Design Manual (FDM), the crashes in the study area during the five-year period from 2016-2020 resulted in an estimated economic loss of approximately $105.4 million as shown in **Table 2.5**.

Table 2.5: Estimated Crash Economic Loss

Crash Severity	KABCO Cost*	Number of Crashes	Economic Loss
Fatal	$10,890,000	3	$32,267,000
Severe Injury (Incapacitating)	$888,030	47	$41,737,410
Moderate Injury (Non-incapacitating)	$180,180	99	$17,837,820
Minor Injury	$103,950	108	$11,226,600
Property Damage Only	$7,700	300	$2,310,000
Total		557	$105,378,830

*Source: FDOT State Safety Office's Crash Analysis Reporting (CARs) Online. Published 11/20/20.

2.4 Traffic

2.4.1 Traffic Data Collection

Due to the impacts of COVID-19 on data collection efforts, the 2017 data collection conducted to support the I-75 PD&E Study was used as a basis for this effort. Historical data from the 2019 Florida Traffic Online (FTO) database and forecasting efforts conducted during the I-75 PD&E Study was examined to develop existing year (2020) volumes. The 2017 data collection effort was conducted during the three-day period from June 6-8, 2017. Copies of the 2017 data collection, FTO count data, and signal timings provided by Hillsborough County can be found in **Appendix D**.

There were four 4-hour turning movement counts (TMCs) between 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM, eight 72-hour directional ramp counts, and eight 72-hour bi-directional traffic volumes along Gibsonton Drive and the cross streets. Data collection location and types are depicted in **Figure 2.6** and are listed as follows:

4-Hour (7 AM to 9 AM and 4 PM to 6 PM) Turning Movement Counts (4 Locations):

- Gibsonton Drive at New East Bay Road
- Gibsonton Drive at I-75 southbound ramps
- Gibsonton Drive at I-75 northbound ramps; and
- Gibsonton Drive at Fern Hill Drive

72-Hour Bi-Directional Traffic Volumes on Gibsonton Drive (4 Locations):

- West of New East Bay Road
- Between New East Bay Road and I-75 southbound ramps
- Between I-75 northbound ramps and Fern Hill Drive; and
- East of Fern Hill Drive

72-Hour Directional I-75 Ramp Counts (8 Locations):

- Northbound I-75 on-ramp from eastbound Gibsonton Drive
- Northbound I-75 on-ramp from westbound Gibsonton Drive
- Northbound I-75 off-ramp to eastbound Gibsonton Drive
- Northbound I-75 off-ramp to westbound Gibsonton Drive
- Southbound I-75 on-ramp from eastbound Gibsonton Drive
- Southbound I-75 on-ramp from westbound Gibsonton Drive
- Southbound I-75 off-ramp to eastbound Gibsonton Drive; and
- Southbound I-75 off-ramp to westbound Gibsonton Drive

72-Hour Machine Counts on Cross Streets (4 Locations):

- New East Bay Road south of Gibsonton Drive
- New East Bay Road/Old Gibsonton Drive north of Gibsonton Drive
- Fern Hill Drive south of Gibsonton Drive; and
- Fern Hill Drive/Old Gibsonton Drive north of Gibsonton Drive

FDOT Florida Traffic Online Sites (6 Locations):

- I-75 mainline south of Gibsonton Drive
- I-75 mainline north of Gibsonton Drive
- Northbound I-75 on-ramp
- Northbound I-75 off-ramp
- Southbound I-75 on-ramp; and
- Southbound I-75 off-ramp

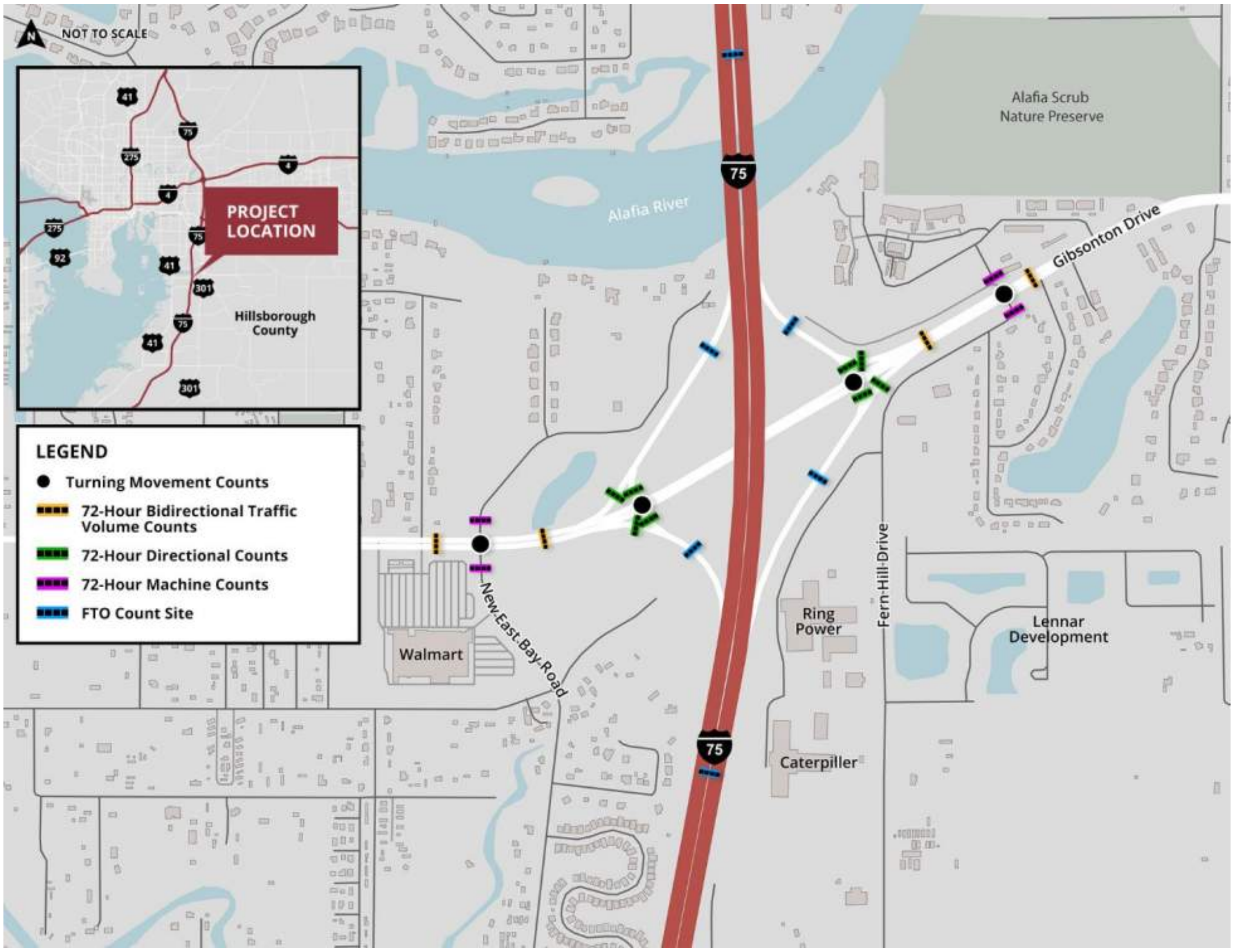


Figure 2.6: Traffic Count Locations

2.4.2 Design Traffic Factors

Design traffic factors, including design hour factor (K), directional factor (D), and Design Hour Truck factor (T_f), were determined using historical traffic data obtained from the FDOT 2019 Florida Traffic Online (FTO) database and field collected counts. A standard K factor of 9.0, defined in the *FDOT Project Traffic Forecasting Handbook (2019)*, was used for all volume development. T_f is identified by the *FDOT Project Traffic Forecasting Handbook (2019)* as half of the 24-hour truck percentage (T). Historical traffic data and traffic parameter calculations can be found in **Appendix D**. Reported factors for use in all analysis can be found in **Table 2.6**. Detailed information of K and D variation is shown in **Appendix E**.

Table 2.6: Design Traffic Factors

Segment	Recommended Traffic Factors				
	K	D	T	T_f	MOCF
I-75 (Mainline)	9.0%	58.0%	7.2%	4.0%	0.95
Gibsonton Drive	9.0%	58.0%	8.7%	5.0%	0.95

The AM and PM global peak hours were determined through observation of the collected field data and occur from 7:15 AM to 8:15 AM and 5:15 PM to 6:15 PM, respectively.

2.4.3 Existing Year (2020) Volume Development

The existing year (2020) Annual Average Daily Traffic (AADT) volumes were developed by interpolation between 2017 AADTs and 2045 AADTs from the I-75 PD&E Study. The existing year (2020) AADTs were reviewed throughout the study area to ensure demand throughout the network did not represent any unreasonable imbalance and all values were greater than the FDOT 2019 FTO counts. A summary of the resulting AADTs can be found in **Table 2.7**. Linear interpolation between the 2017 and 2045 design traffic volumes were used to yield the existing year (2020) directional design hour volumes (DDHVs) for this analysis.

Figure 2.7 and **Figure 2.8** show the existing year (2020) AADT and DDHVs for both the AM and PM peak hours, respectively. The Volume Development Memorandum can be found in **Appendix E**.

Table 2.7: Existing Year (2020) AADT Calculation

Segment	Forecast AADTs			Existing Year (2020) AADT
	2017	2045	AGR	
Gibsonton Drive				
West of New East Bay Road	15,000	37,300	5.3%	17,400
Between New East Bay Road and I-75 SB Ramp Terminal	28,300	52,900	3.1%	30,900
Between I-75 SB and I-75 NB Ramp Terminals	35,500	60,100	2.5%	38,100
Between I-75 NB Ramp Terminal and Fern Hill Drive	46,500	70,700	1.9%	49,100
East of Fern Hill Drive	44,600	68,600	1.9%	47,200
Cross Streets				
Old Gibsonton Drive, North of Gibsonton Drive	2,100	2,600	0.9%	2,200
New East Bay Road, South of Gibsonton Drive	11,900	14,800	0.9%	12,200
Fern Hill Drive, North of Gibsonton Drive	2,300	3,000	1.1%	2,400
Fern Hill Drive, South of Gibsonton Drive	3,200	4,100	1.0%	3,300
I-75 Ramps				
I-75 SB Off-Ramp	18,000	32,200	2.8%	19,500
I-75 NB Off-Ramp	4,300	5,300	0.8%	4,400
I-75 SB On-Ramp	5,200	6,800	1.1%	5,400
I-75 NB On-Ramp	18,500	29,700	2.2%	19,700
I-75 Mainline				
I-75 Mainline, North of Gibsonton Drive	147,500	261,000	2.7%	159,600
I-75 Mainline, South of Gibsonton Drive	120,500	211,200	2.7%	130,200

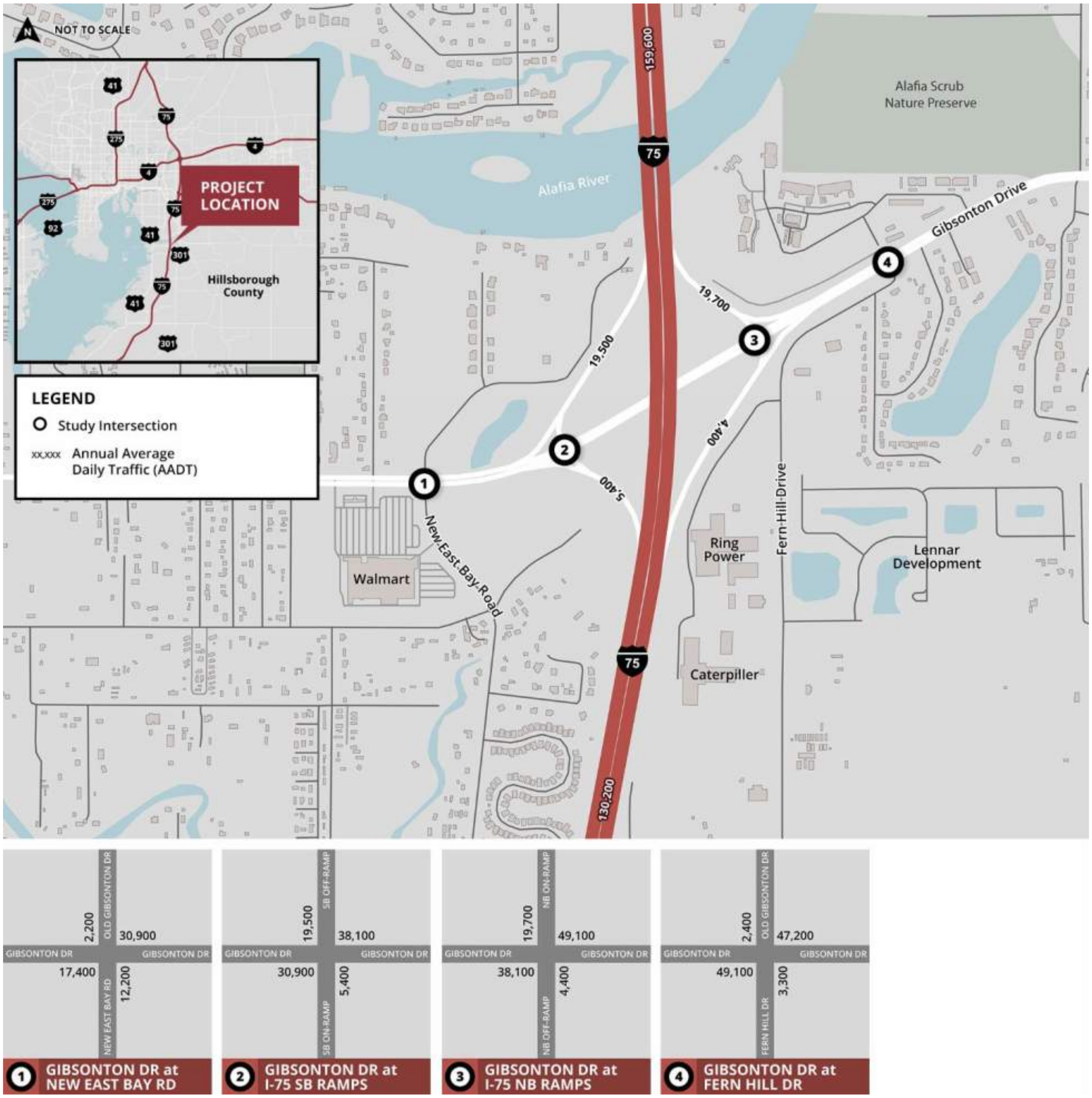


Figure 2.7: Existing Year (2020) AADTs

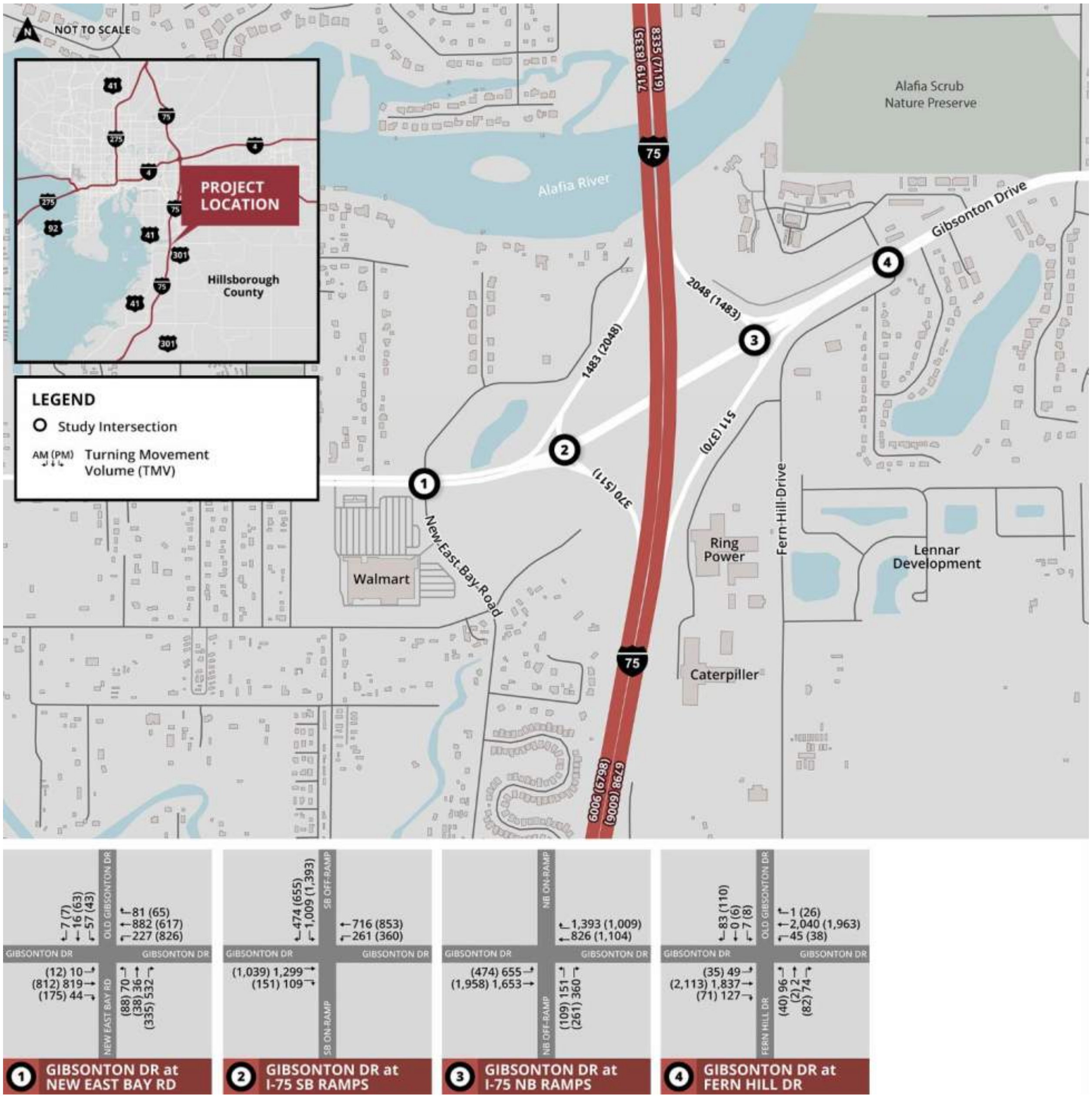


Figure 2.8: Existing Year (2020) DDHVs

2.5 Traffic Operational Analysis

Traffic Software Integrated System – Corridor Simulation (CORSIM), version 6.3, was used to evaluate the existing year (2020) operational characteristics of the I-75 and Gibsonton Drive interchange study area. The previously calibrated model for the 2017 I-75 PD&E Study was used as the baseline for this model. The study area, from the ramp terminal at Big Bend Road north to the ramp terminal at US-301 was extracted from this model and additional calibration efforts were performed at the I-75 at Gibsonton Drive interchange area of influence. Due to the effects of COVID-19 on the project team's ability to collect data at the project's inception, a check was conducted to ensure that the forecast volumes used as part of the I-75 PD&E could be effectively used to interpolate reasonable demand in the existing year (2020) used for analysis. 2017 and 2045 Demand volumes from the I-75 PD&E were interpolated and checked against 2019 FTO AADTs and it was determined reasonable to interpolate to estimate the existing year (2020) demand for use in microsimulation. However, as synthetic data cannot be calibrated, it was determined to use the raw data collected in 2017 along with RITIS speed data to calibrate the CORSIM model to a pre-COVID-19 condition that could be used to assess traffic operations. **Appendix F** provides the peak hour results of the calibration year (2017) CORSIM calibration analysis.

Currently, the existing traffic patterns within the study area suggest the peak direction of traffic flow in the AM peak period is northbound on I-75 (to Downtown Tampa) and to I-75 from Gibsonton Drive, while the peak direction of traffic flow in the PM peak period is southbound on I-75 (away from Downtown Tampa) and away from I-75 on Gibsonton Drive.

2.5.1 Calibration Methodology

The CORSIM microsimulation model was calibrated with travel time runs, observed speeds and to the initial model calibration year (2017) traffic counts collected in the field, which is consistent with the approved MLOU. A four-hour AM and four-hour PM peak period CORSIM analysis was conducted. **Table 2.8** provides the temporal distribution.

Table 2.8: Temporal Distribution

	Simulation Starting Time	Northbound I-75, south of Gibsonton Drive[2]	Southbound I-75, north of Gibsonton Drive[2]	Gibsonton Drive[1]
AM Seeding Period (0.5 hr)	5:45 AM	N/A	N/A	N/A
AM First Shoulder (1 hr)	6:15AM	97%	92%	94%
AM Peak Hour (1 hr)	7:15 AM	100%	100%	100%
AM Second Shoulder (1 hr)	8:15 AM	88%	86%	94%
AM Dissipating Period (0.5 hr)	8:45 AM	N/A	N/A	N/A
PM Seeding Period (0.5 hr)	3:45 PM	N/A	N/A	N/A
PM First Shoulder (1 hr)	4:15 PM	97%	100%	94%
PM Peak Hour (1 hr)	5:15 PM	100%	100%	100%
PM Second Shoulder (1 hr)	6:15 PM	80%	78%	94%
PM Dissipating Period (0.5 hr)	6:45 PM	N/A	N/A	N/A

Note:

1 – Temporal distribution is based on previously approved I-75 PD&E study.
2 – Temporal distribution is based on FTO counts on I-75 north of Gibsonton Drive and south of Gibsonton Drive

The extended period of microsimulation analysis provided "build-up" of traffic congestions and the corresponding durations. The evaluation of existing traffic operations was based on the results of ten (10) runs of the AM and PM CORSIM microsimulation models using varying random seed numbers. The microsimulation performed for this IMR is consistent with guidelines provided in the Federal Highway Administration (FHWA) Traffic Analysis Toolbox Volume III and the FDOT 2021 Traffic Analysis Handbook.

I-75 ramp and mainline volumes, and all CORSIM entry volumes, were calibrated to be within the thresholds specified below, as outlined in the FDOT 2021 Traffic Analysis Handbook:

- Low volume links - Individual link flows < 700 vehicles/hours - Threshold is to be within 100 vehicles/hour of field flows for more than 85 percent of the links.
- Medium volumes links - Individual link flows between 700 and 2,700 vehicles/hour -Threshold is to be within 15 percent of field flows for more than 85 percent of links;
- High volume links - Individual link flows > 2,700 vehicles/hour - Threshold is to be within 400 vehicles/hour of field flows for more than 85 percent of the links;
- Sum of all link flows across the network - Threshold to be within 5 percent of the sum of all link counts;
- Simulated and measured link flows – Threshold is to have a Geoffrey E. Havers (GEH) statistic value of five (5) or lower for 85% of the links;
- Speed is to be within 15% or 10 miles per hour (mph) of field measured values for 85% of the links.

2.5.2 Calibration Parameters and Results

Model parameters were set to ensure calibration targets met calibration year (2017) traffic conditions. The calibration analysis for the existing year (2017) AM and PM peak periods involved modifications to both the global and node-link specific model parameters. Field observed data and existing year (2017) traffic volumes provided a basis to compare simulated traffic volume. The following model parameters were changed in both the AM and PM peak hours from the I-75 PD&E Study CORSIM model:

- Car Following Sensitivity Multiplier Adjusted on the I-75 southbound approach to the off-ramp for links 310-311 (130 percent), 311-312 (140 percent), 312-314 (155 percent), 314-316 (155 percent), 316-318 (158 percent)
- Headway Distribution: Set to Erlang Distribution with parameter “a” set to 1

The calibration results summarized in **Table 2.9** indicate that the CORSIM model is sufficiently reproducing the calibration year (2017) field collected volumes for all freeway and cross street traffic. All roadway segments have a GEH value less than five during the AM and PM peak hours. The sum of volume in the network during both the AM and PM peak hours is within 5 percent of the field observed volumes during the same time. Both the AM and PM peak hours met the high, medium, and low volume checks.

Table 2.9: CORSIM Calibration Results (field collected counts vs. simulated traffic volume)

Location	AM Peak Hour					PM Peak Hour				
	Count Volume (vph)	Simulated Volume (vph)	Volume Diff. (vph)	% Diff.	GEH	Count Volume (vph)	Simulated Volume (vph)	Volume Diff. (vph)	% Diff.	GEH
Northbound I-75										
South of Gibsonton Drive	4,995	4,900	-95	-1.9%	1.4	3,953	3,861	-92	-2.3%	1.5
Between Gibsonton Drive Off and On Ramps	4,741	4,650	-91	-1.9%	1.3	3,579	3,515	-64	-1.8%	1.1
North of Gibsonton Drive	7,055	6,699	-356	-5.1%	4.3	4,619	4,457	-162	-3.5%	2.4
Southbound I-75										
North of Gibsonton Drive	4,367	4,182	-185	-4.2%	2.8	6,721	6,628	-93	-1.4%	1.1
Between Gibsonton Drive Off and On Ramps	3,422	3,252	-170	-5.0%	2.9	4,630	4,560	-70	-1.5%	1.0
South of Gibsonton Drive	3,844	3,658	-186	-4.8%	3.0	4,946	4,862	-84	-1.7%	1.2
Eastbound Gibsonton Drive										
West of New East Bay Road	467	457	-10	-2.1%	0.5	810	748	-62	-7.7%	2.2
New East Bay Road to SB I-75 Ramp Terminal	1,017	989	-28	-2.8%	0.9	938	864	-74	-7.9%	2.5
Between SB and NB I-75 Ramp Terminals	1,068	1,038	-30	-2.8%	0.9	1,698	1,593	-104	-6.1%	2.6
NB I-75 Ramp Terminal to Fern Hill Drive	1,023	987	-36	-3.5%	1.1	2,283	2,148	-135	-5.9%	2.9
East of Fern Hill Drive	1,008	979	-30	-2.9%	0.9	2,273	2,136	-137	-6.0%	2.9
Westbound Gibsonton Drive										
East of Fern Hill Drive	2,258	2,207	-51	-2.3%	1.1	1,248	1,153	-96	-7.7%	2.8
Fern Hill Drive to NB I-75 Ramp Terminal	2,301	2,192	-110	-4.8%	2.3	1,314	1,210	-104	-7.9%	2.9
Between NB and SB I-75 Ramp Terminals	624	677	53	8.5%	2.1	594	568	-25	-4.3%	1.1
SB I-75 Ramp Terminal to New East Bay Road	758	793	35	4.6%	1.3	1,078	1,063	-16	-1.4%	0.5
West of New East Bay Road	638	661	23	3.6%	0.9	502	500	-2	-0.4%	0.1
Northbound New East Bay Road										
South of Gibsonton Drive	640	625	-15	-2.3%	0.6	277	-23	-7.7%	1.4	300
North of Gibsonton Drive	93	95	2	2.2%	0.2	71	-8	-10.1%	0.9	79
Southbound New East Bay Road										
North of Gibsonton Drive	63	62	-1	-1.6%	0.1	63	58	-5	-7.9%	0.6
South of Gibsonton Drive	180	191	11	6.1%	0.8	732	710	-22	-3.0%	0.8
Northbound Fern Hill Drive										
South of Gibsonton Drive	165	99	-66	-40.0%	5.7	151	128	-23	-15.2%	1.9
North of Gibsonton Drive	72	68	-4	-5.6%	0.5	56	56	0	0.0%	0.0
Southbound Fern Hill Drive										
North of Gibsonton Drive	43	42	-1	-2.3%	0.2	64	59	-5	-7.8%	0.6
South of Gibsonton Drive	108	103	-5	-4.6%	0.5	103	89	-14	-13.6%	1.4

In addition to these volume-based calibration targets, the CORSIM model was calibrated to available field collected speed data provided in **Table 2.10**. The field collected speed data for I-75 and Gibsonton Drive was collected through the Regional Integrated Transportation Information System (RITIS) and is provided in **Appendix D**. RITIS is a clearinghouse for transportation related data. The specific data collected for this calibration was average five-minute speed data, collected for all Tuesdays, Wednesdays, and Thursdays from August 15, 2017, through September 7, 2017. The eastern segment of Gibsonton Drive was the only location that did not meet the speed criteria, with simulated speeds higher than the field observed speed in the eastbound direction during the PM peak hour and in the westbound direction during the AM Peak Hour. Calibrating the speed at this location, would require introducing additional friction which would decrease volume throughput. This location is well-calibrated from the perspective of volume throughput and therefore this one link was not adjusted to meet speed criteria at the risk of negatively impacting volume criteria.

Table 2.10: CORSIM Calibration Results (field collected speed vs. simulated speed)

Location	Posted Speed (mph)	AM Peak Hour				PM Peak Hour			
		Field Speed (mph)	Simulated Speed (mph)	Speed Diff. (mph)	% Diff.	Field Speed (mph)	Simulated Speed (mph)	Speed Diff. (mph)	% Diff.
Northbound I-75									
South of Gibsonton Drive	70	68.3	65.1	-3.2	-4.7%	68.3	66.0	-2.3	-3.3%
Between Gibsonton Drive Off and On Ramps	70	68.3	65.0	-3.3	-4.8%	68.3	66.0	-2.3	-3.3%
North of Gibsonton Drive	70	68.6	64.9	-3.7	-5.4%	67.6	66.6	-0.9	-1.4%
Southbound I-75									
North of Gibsonton Drive	70	70.6	66.7	-3.9	-5.5%	56.2	56.9	0.6	1.1%
Between Gibsonton Drive Off and On Ramps	70	70.6	65.0	-5.6	-7.9%	56.2	64.7	8.5	15.0%
South of Gibsonton Drive	70	70.5	65.1	-5.4	-7.7%	59.7	64.6	4.9	8.2%
Eastbound Gibsonton Drive									
West of SB I-75 Ramp Terminals	45	29.9	29.5	-0.5	-1.6%	27.6	25.1	-2.5	-9.1%
East of NB I-75 Ramp Terminals	45	34.8	34.0	-0.8	-2.4%	18.5	34.4	15.9	85.7%
Westbound Gibsonton Drive									
East of NB I-75 Ramp Terminals	45	23.1	34.0	10.9	47.1%	33.8	36.8	3.0	9.0%
West of SB I-75 Ramp Terminals	45	33.3	27.0	-6.3	-18.8%	35.4	25.7	-9.7	-27.3%

Note: Red highlight indicates that speed differences do not meet FDOT 2021 Traffic Analysis Handbook thresholds

2.5.3 Existing Year (2020) Measures of Effectiveness (MOEs)

The LOS target D, as defined for urbanized areas in the FDOT LOS Policy – FDOT procedure No. 000-525-006, was used for the operational analysis of the I-75 and Gibsonton Drive interchange. A direct comparison of CORSIM Measures of Effectiveness (MOEs) to the Highway Capacity Manual (HCM) LOS cannot be made, but the equivalent HCM LOS derived from CORSIM was provided for reference purposes.

To derive equivalent density-based Highway Capacity Manual (HCM)-based Level of Service, reported density outputs from the CORSIM outputs are developed by taking link level density per lane (veh/mi/ln) and dividing by heavy vehicle factor (f_{HV}) assuming level terrain to yield passenger car per mile per lane (pc/mi/ln) density.

MOEs [i.e., density, speed, and delay] and LOS threshold, as prescribed by the HCM, 6th Edition, were used to estimate existing and future LOS. All simulation outputs were based on the average data from 10 simulation runs. Consistent with the approved MLOU, the MOEs that were assessed from the simulation analysis include the following:

- Intersection Node Evaluation: Traffic volume, delay, and maximum queue length for the study area intersections for all movements.
- Link Evaluation Segments: Demand versus simulated traffic volume, vehicle density, and average speed within the study area.
- Network-Wide Output: Traffic volume including latent volume, total travel time, total delay time, average speed, and vehicle-miles traveled (VMT).

Appendix G provides the four-hour results of the existing year (2020) CORSIM Analysis.

2.5.4 Existing Year (2020) I-75 Mainline Segments and Ramp Merge/Diverge Areas

Within the AOI, an I-75 operational analysis was conducted for northbound and southbound mainline segments, including the ramp merge and diverge areas. The CORSIM microsimulation results for the existing year (2020) AM and PM Peak Level of Service (LOS) indicates that the southbound I-75, north of Gibsonton Drive and southbound off-ramp fail to meet the LOS target D. MOEs have been summarized for the I-75 mainline and I-75 ramp merge and diverge areas in **Table 2.11**. **Figure 2.9** illustrates the same MOEs for the interchange area. The CORSIM models supporting this analysis can also be found in **Appendix G.**

Table 2.11: Existing Year (2020) I-75 Freeway Segment and Ramp Merge/Diverge Area Speed, Density, and LOS

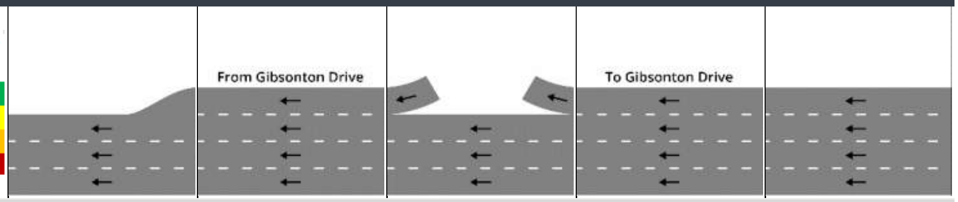
Basic Freeway Segment and Ramp Merge/Diverge Areas	Type	No. of Lanes	Time Period	Demand Volumes (vph)	Simulated Volume (vph)	Speed (mph)	Estimated Density (pc/mi/ln)	LOS*
Northbound I-75								
South of Gibsonton Drive	Basic Freeway	3	AM	6,798	6,267	64	31.2	D
			PM	6,006	5,868	65	29.0	D
Off-Ramp to Gibsonton Drive	Ramp Diverge	3	AM	6,798	6,262	58	30.8	D
			PM	6,006	5,868	59	28.3	D
Gibsonton Drive Off-Ramp to Gibsonton Drive On-Ramp	Basic Freeway	3	AM	6,287	5,757	64	28.8	D
			PM	5,636	5,519	65	27.5	D
On-Ramp from Gibsonton Drive	Ramp Merge	4	AM	8,335	7,702	61	30.6	D
			PM	7,119	6,800	61	26.5	D
North of Gibsonton Drive	Basic Freeway	4	AM	8,335	7,701	65	27.5	D
			PM	7,119	6,799	65	24.1	C
Southbound I-75								
North of Gibsonton Drive	Basic Freeway	4	AM	7,119	5,897	28	56.6	F
			PM	8,335	7,934	24	84.1	F
Off-Ramp to Gibsonton Drive	Ramp Diverge	4	AM	7,119	5,534	39	42.8	E
			PM	8,335	7,791	42	45.1	F
Gibsonton Drive Off-Ramp to Gibsonton Drive On-Ramp	Basic Freeway	3	AM	5,636	4,434	65	21.9	C
			PM	6,287	5,861	63	29.9	D
On-Ramp from Gibsonton Drive	Ramp Merge	3	AM	6,006	4,863	58	21.9	C
			PM	6,798	6,316	56	29.8	D
South of Gibsonton Drive	Basic Freeway	3	AM	6,006	4,892	65	24.2	C
			PM	6,798	6,309	64	31.7	D

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.

Note: Red highlight indicates that the density does not meet the LOS target, D

Southbound I-75 Mainline

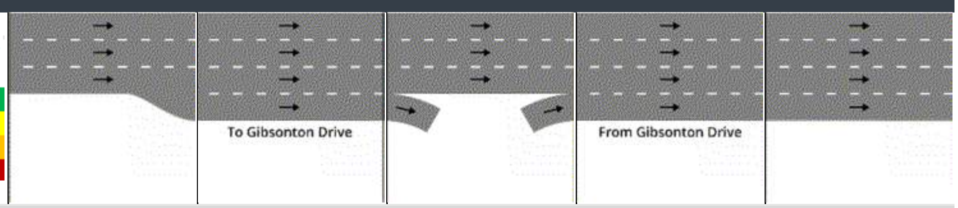
Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45



AM Peak Hour					
Demand (vph)	6,006	6,006	5,636	7,119	7,119
Simulated (vph)	4,892	4,863	4,434	5,534	5,897
Percent Processed	81%	81%	79%	78%	83%
Speed (mph)	65	58	65	39	28
Estimated Density (pc/mi/ln)	24.2	21.9	21.9	42.8	56.6
PM Peak Hour					
Demand (vph)	6,798	6,798	6,287	8,335	8,335
Simulated (vph)	6,309	6,316	5,861	7,791	7,934
Percent Processed	93%	93%	93%	93%	95%
Speed (mph)	64	56	63	42	24
Estimated Density (pc/mi/ln)	31.7	29.8	29.9	45.1	84.1

Northbound I-75 Mainline

Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45



AM Peak Hour					
Demand (vph)	6,798	6,798	6,287	8,335	8,335
Simulated (vph)	6,267	6,262	5,757	7,702	7,701
Percent Processed	92%	92%	92%	92%	92%
Speed (mph)	64	58	64	61	65
Estimated Density (pc/mi/ln)	31.2	30.8	28.8	30.6	27.5
PM Peak Hour					
Demand (vph)	6,006	6,006	5,636	7,119	7,119
Simulated (vph)	5,868	5,868	5,519	6,800	6,799
Percent Processed	98%	98%	98%	96%	96%
Speed (mph)	65	59	65	61	65
Estimated Density (pc/mi/ln)	29.0	28.3	27.5	26.5	24.1

Figure 2.9: Existing Year (2020) CORSIM Freeway MOEs

2.5.5 Existing Year (2020) I-75 Ramp Capacity

The I-75 on and off-ramp volumes were compared to the ramp capacities found in Exhibit 14-12 of the Highway Capacity Manual, 6th Edition (HCM). **Table 2.12** shows the volume to capacity ratios for each of the ramps. This analysis indicates that each of the ramps operates under capacity, however the northbound on-ramp during the AM peak hour and the southbound off-ramp during the PM peak hour are nearing capacity limits.

Table 2.12: Existing Year (2020) I-75 Ramp Capacity Check

I-75 On and Off Ramp Location	No. of Lanes	Ramp Free Flow Speed (mph)	Capacity (veh/hr)	Time Period	Demand Volume (veh/hr)	Volume to Capacity Ratio
Northbound I-75						
Off-Ramp to Gibsonton Drive	1	45	2100	AM	511	0.24
				PM	370	0.18
On-Ramp from Gibsonton Drive	1	45	2100	AM	2,048	0.98
				PM	1,483	0.71
Southbound I-75						
Off-Ramp to Gibsonton Drive	1	45	2100	AM	1,483	0.71
				PM	2,048	0.98
On-Ramp from Gibsonton Drive	1	45	2100	AM	370	0.18
				PM	511	0.24

2.5.6 Existing Year (2020) Gibsonton Drive Intersections

An intersection operational analysis was conducted at each of the study intersections within the AOI for the existing year (2020). The results of the existing year (2020) intersection analysis for the AM and PM peak hours are shown in **Table 2.13** and **Table 2.14**. The results of the analysis indicate the Southbound I-75 Ramp terminal and Northbound I-75 Ramp Terminal intersections fail to meet LOS D during the AM peak hour. A visual audit indicated that at the unsignalized eastbound left turn onto I-75 northbound was the primary bottleneck on Gibsonton Drive in the AM peak hour.

Table 2.13: Existing Year (2020) Intersection Vehicle Delay and LOS – AM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
New East Bay Road	EBL	10	8	93.0	F
	EBT	819	662	69.2	E
	EBR	44	36	36.1	D
	Approach	873	706	67.8	E
	WBL	227	176	41.0	D
	WBT	882	713	10.1	B
	WBR	81	69	1.0	A
	Approach	1,190	958	15.1	B
	NBL	70	70	34.5	C
	NBT	36	36	35.6	D
	NBR	532	521	13.9	B
	Approach	638	627	17.5	B
	SBL	57	56	52.4	D
	SBT	16	15	48.4	D
	SBR	7	7	24.3	C
	Approach	80	78	49.2	D
	Overall	2,781	2,369	32.5	C
Southbound I-75 Ramp Terminal	EBT	1,299	1,122	68.4	E
	EBR	109	99	16.2	B
	Approach	1,408	1,221	64.2	E
	WBL	261	361	87.3	F
	WBT	716	668	7.0	A
	Approach	977	1,029	35.2	D
	SBL	1,009	599	114.6	F
	SBR	474	282	3.4	A
	Approach	1,483	881	79.0	E
	Overall	3,868	3,131	58.8	E
Northbound I-75 Ramp Terminal	EBL	655	683	225.0	F
	EBT	1,653	1,026	3.0	A
	Approach	2,308	1,709	91.7	F
	WBT	826	883	1.0	A
	WBR	1,394	1,295	7.8	A
	Approach	2,220	2,178	5.1	A
	NBL	151	151	6.6	A
	NBR	360	350	3.4	A
	Approach	511	501	4.4	A
	Overall	5,039	4,388	38.7	E

Table 2.13 (Continued): Existing Year (2020) Intersection Vehicle Delay and LOS – AM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
Fern Hill Drive	EBL	49	29	86.6	F
	EBT	1,837	1,269	3.6	A
	EBR	127	80	0.4	A
	Approach	2,013	1,378	5.2	A
	WBL	45	38	88.6	F
	WBT	2,040	2,002	8.6	A
	WBR	1	0	0.0	A
	Approach	2,086	2,040	10.1	B
	NBL	96	94	81.5	F
	NBT	2	2	68.8	E
	NBR	74	73	57.4	E
	Approach	172	169	71.0	E
	SBL	7	7	81.3	F
	SBT	0	0	0.0	A
	SBR	83	81	44.9	D
	Approach	90	88	47.8	D
	Overall	4,361	3,675	12.0	B

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.
Note: Red highlight indicates that the delay does not meet the LOS target, D

Table 2.14: Existing Year (2020) Intersection Vehicle Delay and LOS – PM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
New East Bay Road	EBL	12	10	49.2	D
	EBT	812	789	29.8	C
	EBR	175	177	2.9	A
	Approach	999	976	25.1	C
	WBL	826	815	36.6	D
	WBT	617	613	8.1	A
	WBR	65	64	0.9	A
	Approach	1,508	1,492	23.4	C
	NBL	88	78	44.8	D
	NBT	38	37	47.7	D
	NBR	335	312	6.2	A
	Approach	461	427	16.8	B
	SBL	43	42	48.2	D
	SBT	63	61	47.4	D
	SBR	7	7	26.8	C
	Approach	113	110	46.4	D
	Overall	3,081	3,005	23.8	C

Table 2.14 (Continued): Existing Year (2020) Intersection Vehicle Delay and LOS – PM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
Southbound I-75 Ramp Terminal	EBT	1,039	1,003	51.9	D
	EBR	151	150	4.2	A
	Approach	1,190	1,153	45.7	D
	WBL	360	346	113.7	F
	WBT	853	878	17.6	B
	Approach	1,213	1,224	44.8	D
	SBL	1,393	1,325	40.8	D
	SBR	655	614	3.4	A
	Approach	2,048	1,939	29.0	C
	Overall	4,451	4,316	37.9	D
Northbound I-75 Ramp Terminal	EBL	474	408	17.4	C
	EBT	1,958	1,921	0.01	A
	Approach	2,432	2,329	3.1	A
	WBT	1,104	1,122	0.9	A
	WBR	1,009	949	5.3	A
	Approach	2,113	2,071	2.9	A
	NBL	109	94	7.0	A
	NBR	261	239	3.2	A
	Approach	370	333	4.3	A
	Overall	4,915	4,733	3.1	A
Fern Hill Drive	EBL	35	39	104.3	F
	EBT	2,113	2,060	4.3	A
	EBR	71	63	1.5	A
	Approach	2,219	2,162	6.0	A
	WBL	38	36	95.3	F
	WBT	1,963	1,922	7.9	A
	WBR	26	21	2.8	A
	Approach	2,027	1,979	9.5	A
	NBL	40	40	89.4	F
	NBT	2	2	92.7	F
	NBR	82	80	51.8	D
	Approach	124	122	64.8	E
	SBL	8	9	76.4	E
	SBT	6	7	82.7	F
	SBR	110	106	43.5	D
	Approach	124	122	48.2	D
	Overall	4,494	4,385	10.4	B

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.
Note: Red highlight indicates that the delay does not meet the LOS target, D

The available storage lengths and results of the existing year (2020) queue analyses for the AM and PM peak hour periods are shown in **Table 2.15**. The available storage for intersections represents the left or right turn storage bay measured from the stop bar to the taper. The available storage for the off-ramps is measured from the stop bar to the gore point, with adjustment for deceleration length where applicable. There are several locations along Gibsonton Drive at which the queues exceed the available storage lengths. The longest queue occurs for the eastbound through at the northbound I-75 ramp terminal during the AM peak hour. The eastbound left queue at this location also exceeds the available storage length. A visual review of the CORSIM simulation reveals that the eastbound left to northbound I-75 movement backs up and causes spillback through the interchange, which results in queue spillbacks for the eastbound through movements at both ramp terminals during the AM peak hour.

Table 2.15: Existing Year (2020) Intersection Vehicle Queue Lengths

Gibsonton Drive Signalized Intersection	Movement	Existing Storage (Feet)	Off-ramp Deceleration Length adjustment required (Yes/No - # of Feet)	Available Storage (Feet)	Maximum Vehicle Queue Length (Feet)			
					AM Peak	Queue extend to I-75 mainline	PM Peak	Queue extend to I-75 mainline
New East Bay Road	EBL	190	No	190	50	N/A	50	N/A
	EBT	1100	No	1100	1,250	N/A	375	N/A
	EBR	250	No	250	100	N/A	100	N/A
	WBL	530	No	530	225	N/A	500	N/A
	WBT	730	No	730	375	N/A	300	N/A
	WBR	730	No	730	75	N/A	50	N/A
	NBTL	410	No	410	175	N/A	200	N/A
	NBR	390	No	390	300	N/A	125	N/A
	SBLTR	430	No	430	175	N/A	200	N/A
Southbound I-75 Ramp Terminal	EBT	730	No	730	1,600	N/A	800	N/A
	EBR	520	No	520	50	N/A	25	N/A
	WBL	640	No	640	650	N/A	700	N/A
	WBT	1950	No	1950	225	N/A	450	N/A
	SBL	1810	Yes (440')	1370	1,650	Yes	1,300	No
	SBR	1860	Yes (440')	1420	575	No	300	No
Northbound I-75 Ramp Terminal	EBL	640	No	640	875	N/A	550	N/A
	EBT	1950	No	1950	2,375	N/A	100	N/A
	WBT	730	No	730	25	N/A	50	N/A
	WBR	730	No	730	500	N/A	75	N/A
	NBL	375	No	375	125	No	100	No
	NBR	2600	Yes (440')	2160	25	No	25	No
Fern Hill Drive	EBL	250	No	250	100	N/A	275	N/A
	EBT	730	No	730	325	N/A	650	N/A
	EBR	215	No	215	50	N/A	175	N/A
	WBL	330	No	330	150	N/A	175	N/A
	WBTR	1,170	No	1,170	825	N/A	725	N/A
	NBLTR	580	No	580	350	N/A	250	N/A
	SBLTR	410	No	410	225	N/A	250	N/A

Note:
1. The available storage lengths for through lanes on Gibsonton Drive are the roadway segment distance between upstream and downstream intersections.
2. Where vehicle queues exceed the length of the CORSIM link, queue lengths from upstream links are added.
3. Red highlight indicates that maximum vehicle queue length exceeds available storage length

2.5.7 Existing Year (2020) Gibsonton Drive Roadway Segments

Segment analysis was conducted along Gibsonton Drive for the existing year (2020) AM and PM peak hour directional volume and the results are provided in **Table 2.16**. This analysis was based on the speed thresholds defined in Exhibit 16-3 of the HCM, 6th Edition. The result of the analysis indicates that Gibsonton Drive fails to operate at the LOS target D on the eastbound segment from west of New East Bay Road to East Bay Road (in the AM and PM peak hours), the eastbound segment from New East Bay Road to the Southbound I-75 Ramp Terminal (in the AM peak hour), the eastbound segment from the Southbound I-75 Ramp Terminal to the Northbound I-75 Ramp Terminal (in the AM peak hour), and the westbound segment from east of Fern Hill Drive to Fern Hill Drive (in the AM and PM peak hours). On average, both directions of Gibsonton Drive operate at LOS C or D based on the speed threshold.

Table 2.16: Existing Year (2020) Gibsonton Drive Arterial Speed and LOS

Gibsonton Drive Arterial Roadway Segment		Free Flow Speed (mph)	AM PEAK		PM PEAK	
From	To		Speed (mph)	LOS*	Speed (mph)	LOS*
Eastbound						
West of New East Bay Road	New East Bay Road	45	10	F	16	E
New East Bay Road	Southbound I-75 Ramp Terminal	45	9	F	25	C
Southbound I-75 Ramp Terminal	Northbound I-75 Ramp Terminal	45	14	E	29	C
Northbound I-75 Ramp Terminal	Fern Hill Drive	45	30	B	28	C
Fern Hill Drive	East of Fern Hill Drive	45	31	B	29	C
Total			21	D	28	C
Westbound						
East of Fern Hill Drive	Fern Hill Drive	45	17	E	18	E
Fern Hill Drive	Northbound I-75 Ramp Terminal	45	26	C	31	B
Northbound I-75 Ramp Terminal	Southbound I-75 Ramp Terminal	45	31	B	30	B
Southbound I-75 Ramp Terminal	New East Bay Road	45	20	D	20	D
New East Bay Road	West of New East Bay Road	45	38	A	38	A
Total			25	C	26	C

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made. LOS is determined from Exhibit 16-3 of the HCM, 6th Edition.

Note: Red highlight indicates that the speed does not meet the LOS target, D

3.0 Future Travel Demand

3.1 Future Land-Use

A review of the land-use maps obtained from the Hillsborough County Planning Commission revealed that future land use is anticipated to remain predominantly comprised of light/heavy commercial, and single family/mobile homes. **Figure 3.1** shows the future land use of the area surrounding the I-75 and Gibsonton Drive interchange.

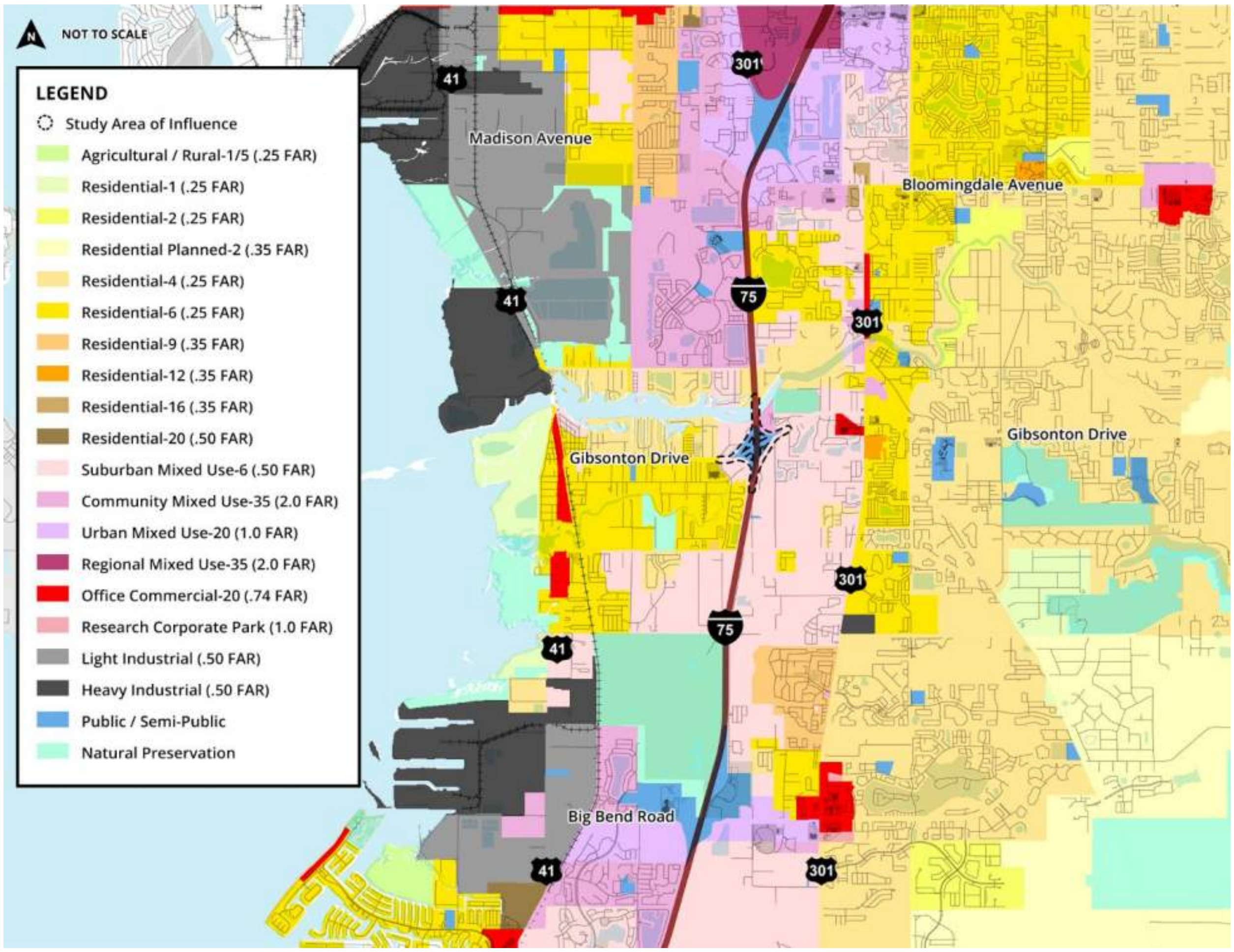


Figure 3.1: Future Land Use Map

3.2 Trend Analysis

3.2.1 BEBR Growth Trends

Data was gathered for the Bureau of Economic and Business Research's (BEBR) 'Projections of Florida Population by County, 2020-2045' and is summarized in **Table 3.1**. BEBR population forecasts provide a useful metric in measuring growth trends within counties by providing low, medium, and high forecast rates. With a design year of 2045, and the anticipated development within the study area, BEBR data indicates that medium to high population growth should range from 1.3 percent to 3.5 percent per year.

Table 3.1: Hillsborough County BEBR Population Forecasts 2020 to 2045

2020	2025		2030		2035		2040		2045	
1,478,759	Pop	Growth	Pop	Growth	Pop	Growth	Pop	Growth	Pop	Growth
Low	1,480,500	0.02%	1,533,000	0.4%	1,567,300	0.4%	1,591,700	0.4%	1,605,800	0.3%
Medium	1,614,200	1.8%	1,723,500	1.7%	1,811,800	1.5%	1,889,200	1.4%	1,958,300	1.3%
High	1,734,300	3.5%	1,905,000	2.9%	2,054,300	2.6%	2,198,900	2.4%	2,336,700	2.3%

3.2.2 Historical Count Trends

Historical count data was obtained from the FDOT FTO count stations located within or near the study area and growth rates were plotted from 2015 to 2019 and can be found in **Table 3.2**. The average weighted annual historical growth rate for the study area is 0.3 percent. Historical Count data and graphs can be found in **Appendix D**.

Table 3.2: Historical FTO Growth Trends

Count ID	Location	2015	2016	2017	2018	2019	Growth	R^2
109165	Gibsonton Drive, East of S US 41 Highway	11,700	11,900	12,100	12,500	13,000	2.8%	0.95
100146	I-75, North of Gibsonton Drive	143,000	147,500	144,500	143,500	144,500	0.3%	0.01
140030	I-75, North of Big Bend Road (South of Gibsonton Drive)	123,500	120,500	117,500	116,500	124,000	0.1%	0.02
	Total	278,200	279,900	274,100	272,500	281,500	0.3%	0.001

3.3 Future Volume Development

The future demand volumes for this study were developed with an emphasis on minimizing deviation from the recommended I-75 PD&E Study future project traffic volumes and ensuring future volumes reflect reasonable growth rates within the study area. While reviewing 2045 AADTs and DDHVs from the previous I-75 PD&E Study, this study found that the growth rates are in line with the BEBR and FDOT 2019 FTO count growth rates, as summarized in **Table 3.3**.

For consistency with the process to develop the existing year (2020) AADTs, interpolation was used to calculate opening year (2025) AADTs and compared to the I-75 PD&E Study. The interpolation results match with the 2025 AADTs in the I-75 PD&E Study and are shown in **Table 3.3** and depicted in **Figure 3.2**.

Opening year (2025) AADTs for the Build Alternative are the same as the No-Build except for the distribution of traffic on I-75 northbound on-ramps. Unlike the No-Build Alternative where the Gibsonton Drive eastbound left turn traffic merges with the westbound right to access northbound I-75, the Build Alternative channels the Gibsonton Drive eastbound and westbound traffic turning to northbound I-75 with two separated ramps. The Build Alternative opening year (2025) AADTs are depicted in **Figure 3.3**.

Table 3.3: Future Year AADT Forecast

Segment	I-75 PD&E Study		Forecasted Traffic			Annual Growth Rate (PD&E 2017-2045)	Annual Growth Rate (2020-2045)	BEBR Growth Rate
	2017	2045	2020	2025	2045			
Gibsonton Drive								
West of New East Bay Road	15,000	27,300	17,400	21,400	37,300	2.9%	4.6%	
Between New East Bay Road and I-75 SB Ramp Terminal	28,300	42,900	30,900	35,300	52,900	1.8%	2.8%	
Between I-75 SB and I-75 NB Ramp Terminals	35,500	50,100	38,100	42,500	60,100	1.5%	2.3%	
Between I-75 NB Ramp Terminal and Fern Hill Drive	46,500	70,700	49,100	53,400	70,700	1.9%	1.8%	
East of Fern Hill Drive	44,600	68,600	47,200	51,500	68,600	1.9%	1.8%	
Cross Streets								
Old Gibsonton Drive (west), North of Gibsonton Drive	2,100	2,600	2,200	2,200	2,600	0.9%	0.7%	
New East Bay Road, South of Gibsonton Drive	11,900	14,800	12,200	12,700	14,800	0.9%	0.9%	
Old Gibsonton Drive (east), North of Gibsonton Drive	2,300	3,000	2,400	2,500	3,000	1.1%	1.0%	0.3% to 2.3%
Fern Hill Drive, South of Gibsonton Drive	3,200	4,100	3,300	3,500	4,100	1.0%	1.0%	
I-75 Ramps								
I-75 SB Off-Ramp	18,000	32,200	19,500	22,100	32,200	2.8%	2.6%	
I-75 NB Off-Ramp	4,300	5,300	4,400	4,600	5,300	0.8%	0.8%	
I-75 SB On-Ramp	5,200	6,800	5,400	5,700	6,800	1.1%	1.0%	
I-75 NB On-Ramp	18,500	29,700	19,700	21,700	29,700	2.2%	2.0%	
I-75 Mainline								
I-75 Mainline, North of Gibsonton Drive	147,500	261,000	159,600	179,700	261,000	2.7%	2.5%	
I-75 Mainline, South of Gibsonton Drive	120,500	211,200	130,200	146,200	211,200	2.7%	2.5%	

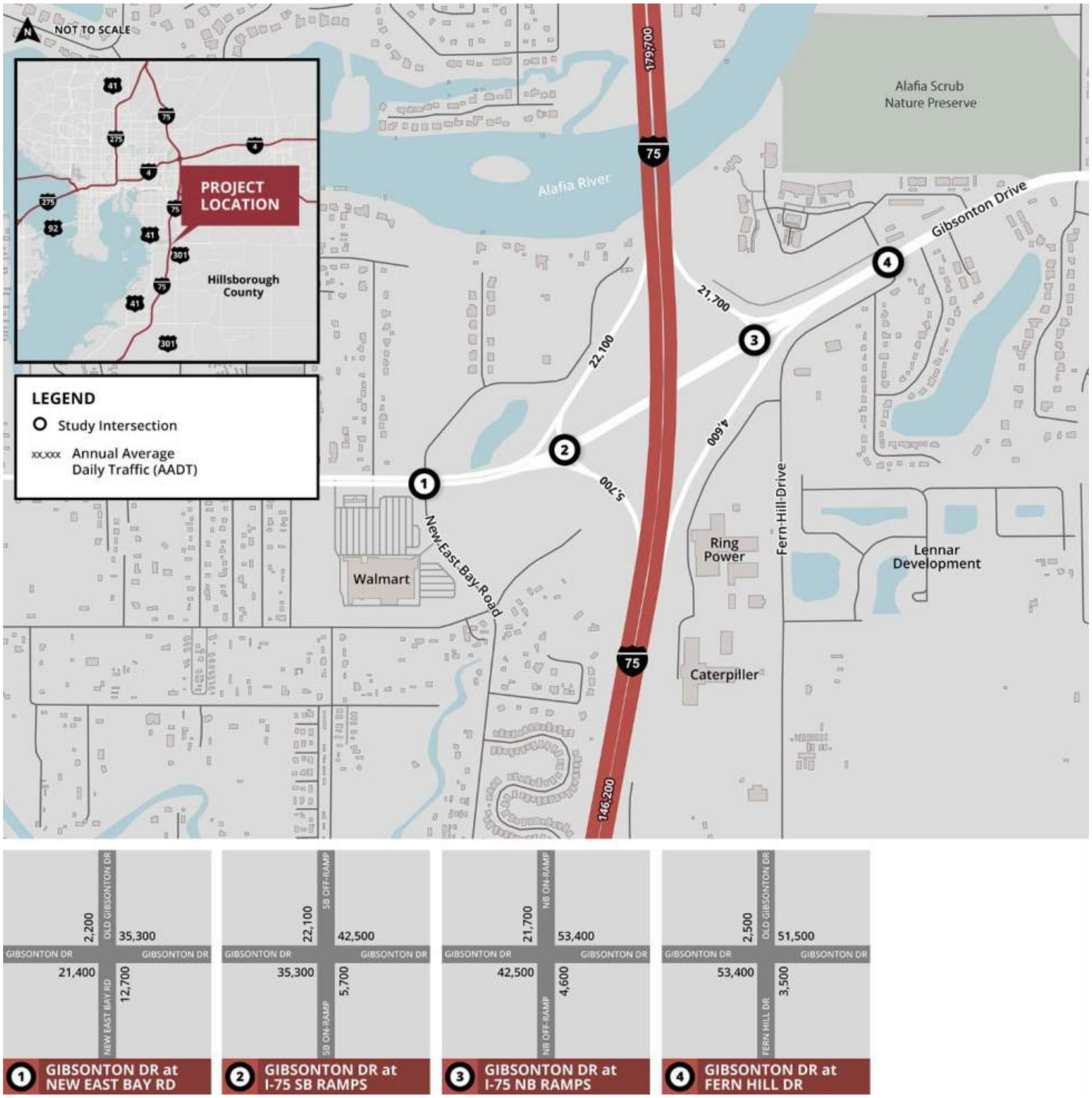


Figure 3.2: Opening Year (2025) No-Build AADTs

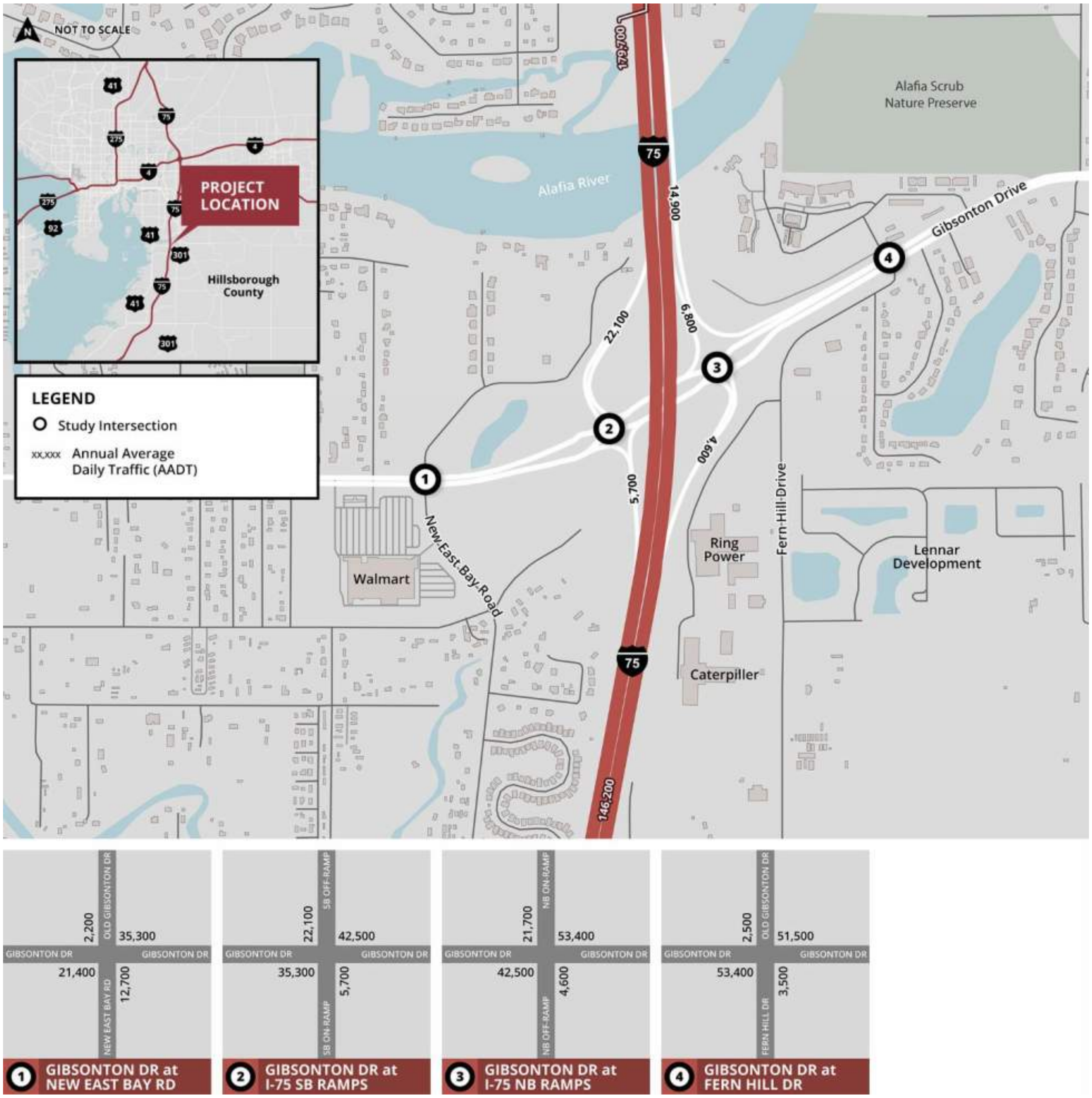


Figure 3.3: Opening Year (2025) Build AADTs

For consistency with existing year (2020) DDHV development, linear interpolation between the 2017 and 2045 design traffic data sets was used to yield the opening year (2025) DDHVs. The opening year (2025) DDHVs match with the 2025 traffic in I-75 PD&E Study and can be found in **Figure 3.4**.

DDHVs for the Build Alternative are the same as the No-Build Alternative except for traffic on I-75 northbound on-ramps which includes two separated ramps from Gibsonton Drive eastbound and westbound to I-75 northbound as it is shown in **Figure 3.5.**

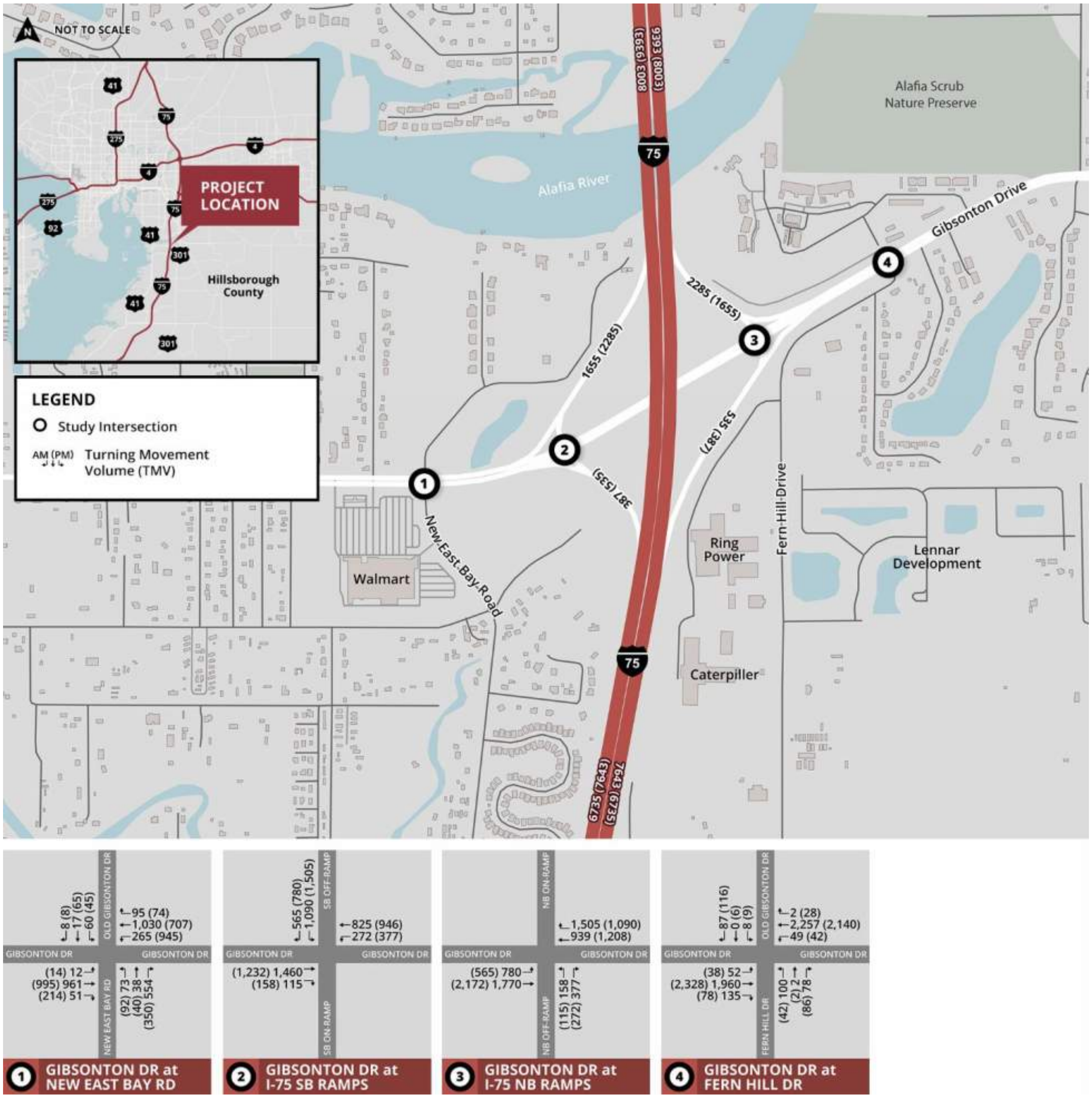


Figure 3.4: Opening Year (2025) No-Build DDHVs

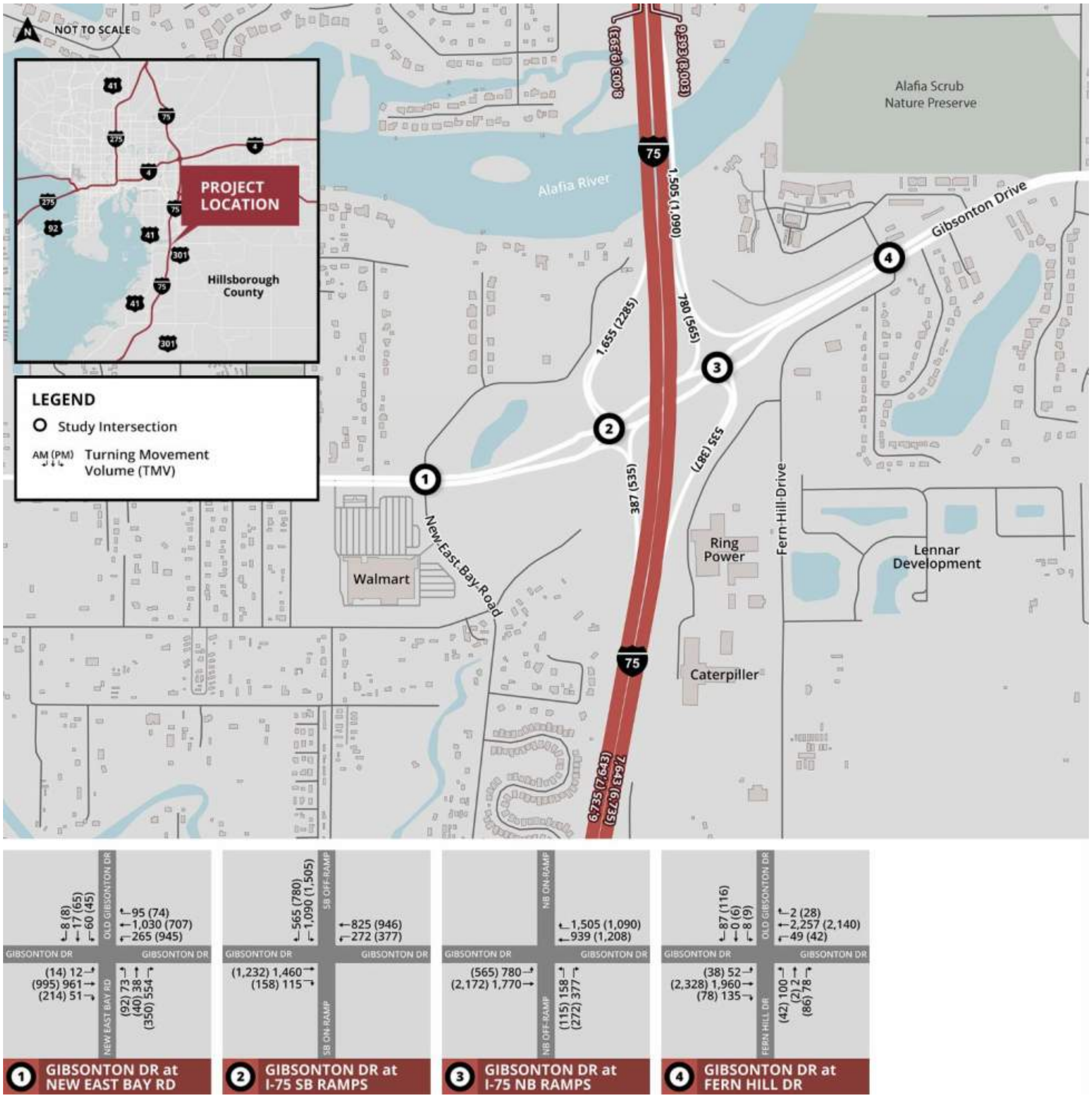


Figure 3.5: Opening Year (2025) Build DDHVs

Based upon this analysis, the design year (2045) AADTs from the I-75 PD&E Study were adjusted as previously discussed and can be found in **Table 3.3** and **Figure 3.6**. AADTs on express lanes along I-75 (shown in blue on **Figure 3.6** and **Figure 3.7**) are taken directly from the I-75 PD&E Study.

AADTs for the Build Alternative are the same as the No-Build Alternative except for traffic on I-75 northbound on-ramps. In the No-Build Alternative, the Gibsonton Drive eastbound left turning traffic merges with westbound right turning traffic to access northbound I-75, whereas in the Build Alternative, two separated ramps channel the Gibsonton Drive eastbound and westbound traffic turning north to I-75. The Build Alternative design year (2045) AADTs are depicted in **Figure 3.7**.

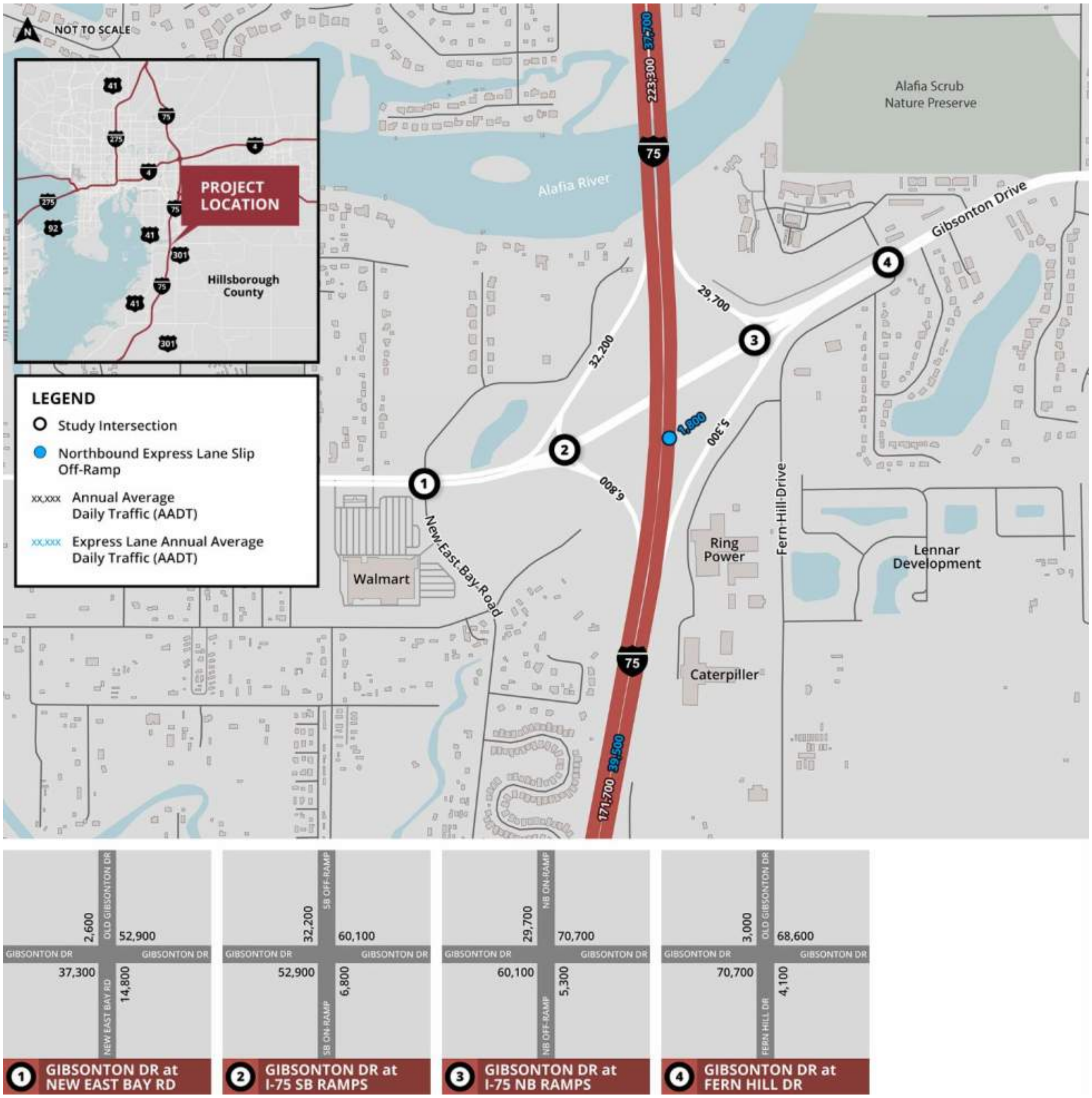


Figure 3.6: Design Year (2045) No-Build AADTs

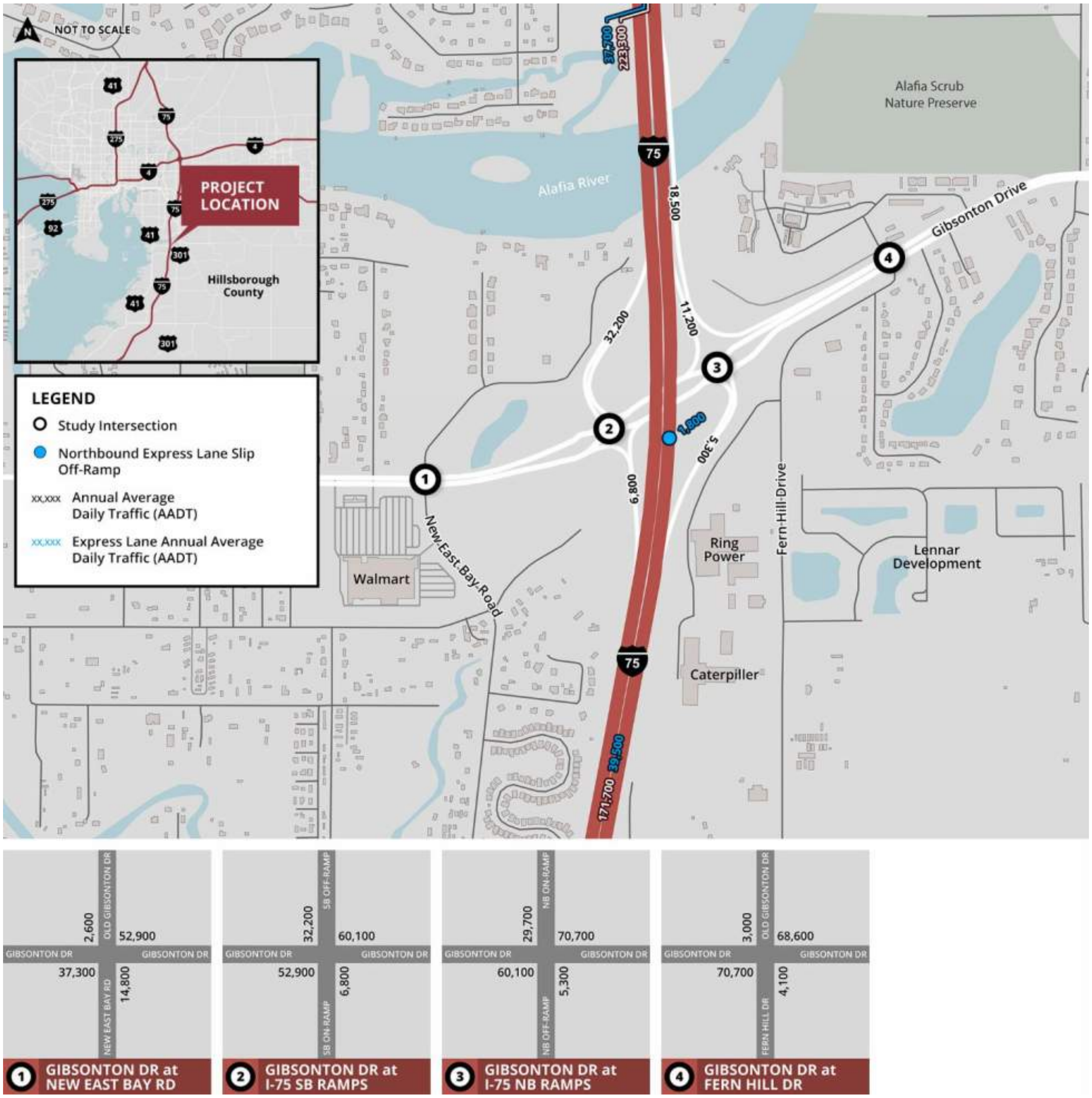


Figure 3.7: Design Year (2045) Build AADTs

Design year (2045) DDHVs were taken directly from the I-75 PD&E Study. The design year (2045) DDHVs can be found in **Figure 3.8**.

DDHVs for the Build Alternative are the same as the No-Build Alternative except for traffic on I-75 northbound on-ramps which includes two separated ramps from Gibsonton Drive eastbound and westbound to I-75 northbound, as shown in **Figure 3.9**. DDHVs on express lanes along I-75 are taken directly from the I-75 PD&E Study.

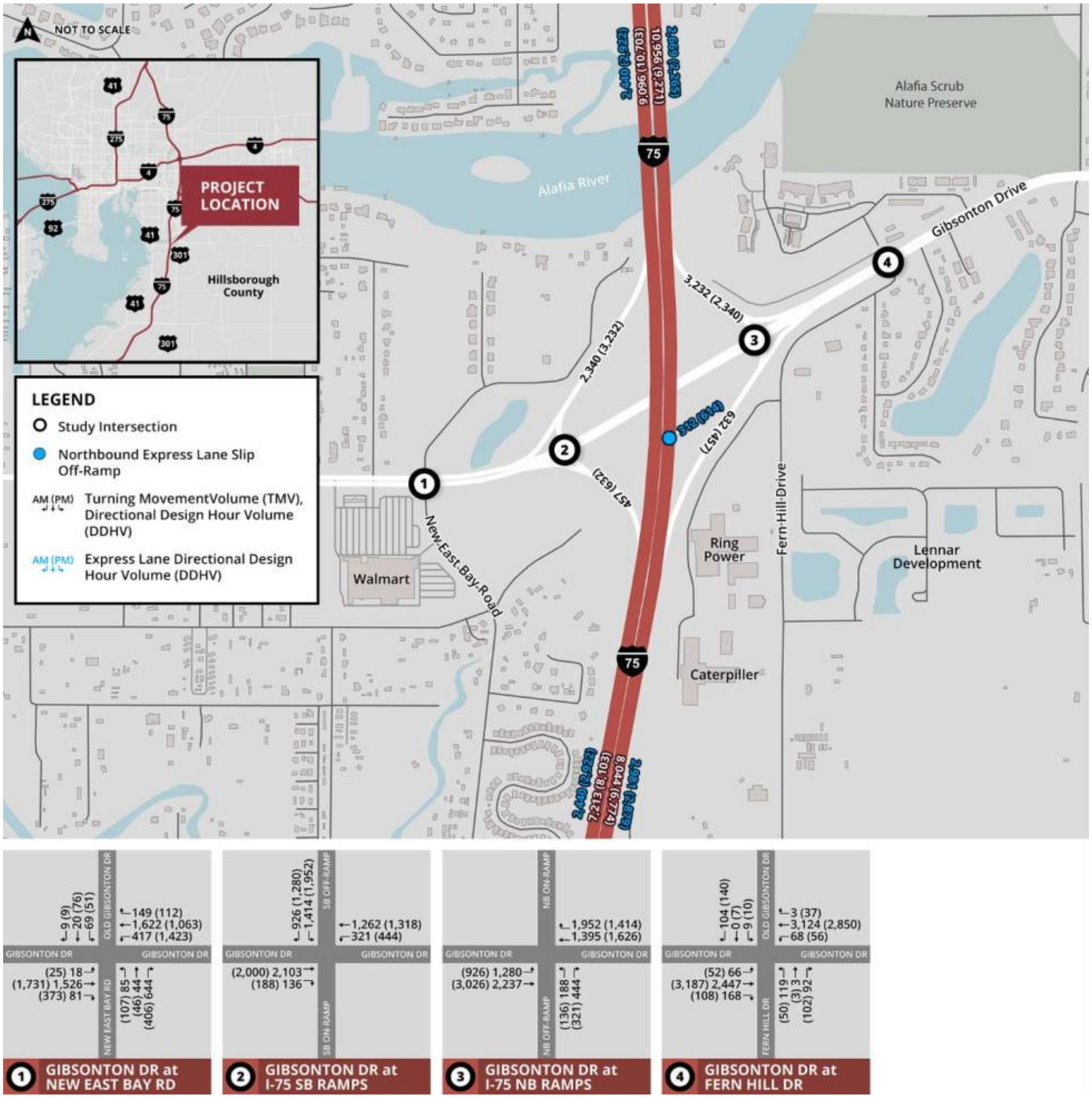


Figure 3.8: Design Year (2045) No-Build DDHVs

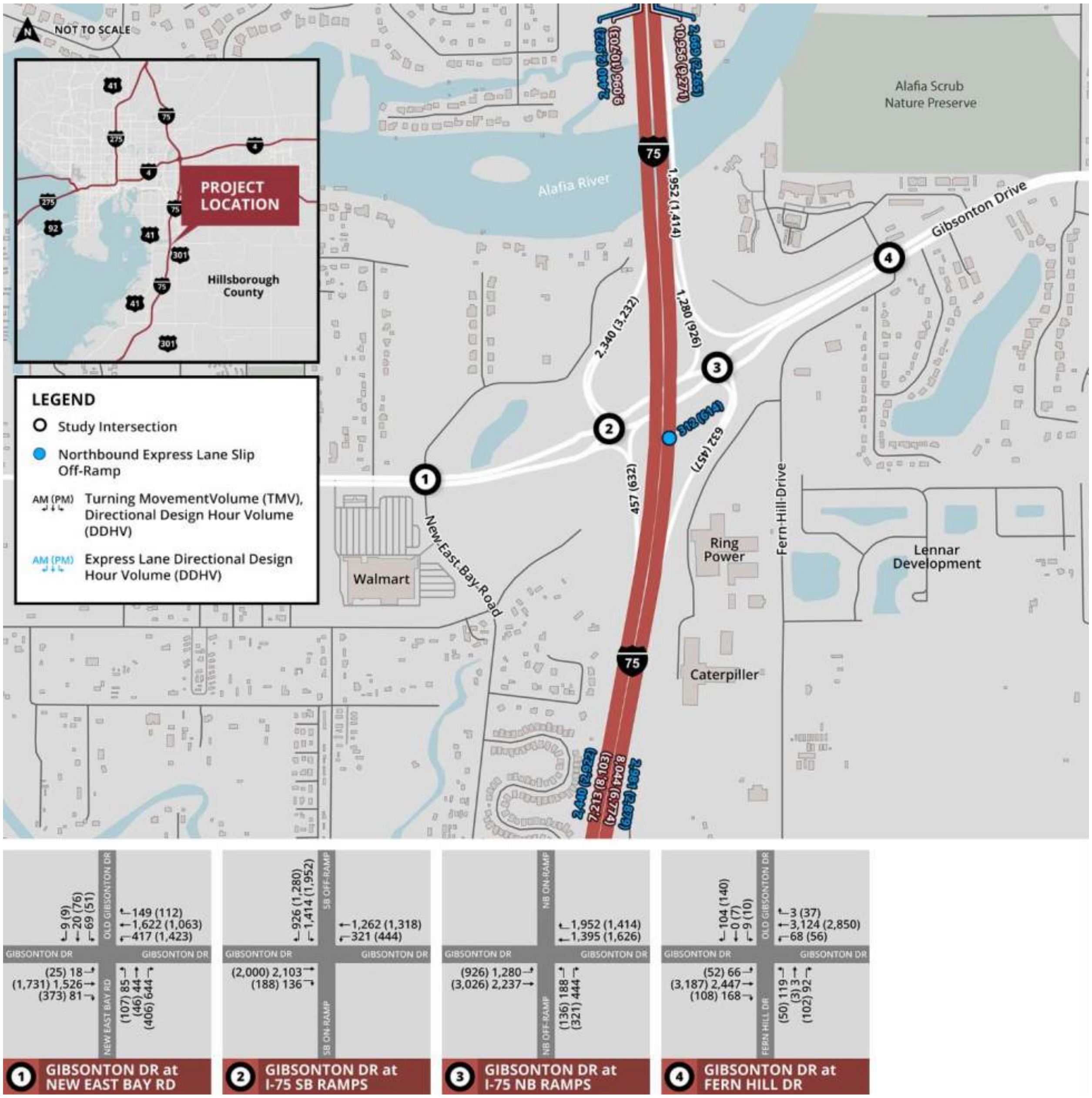


Figure 3.9: Design Year (2045) Build DDHVs

4.0 Alternatives Considered

4.1 No-Build Alternative

The No-Build Alternative maintains the current I-75 and Gibsonton Drive Diamond Interchange configuration, existing year (2020) lane configuration and traffic control at the study intersections within the AOI.

Under the No-Build Alternative, additional variations from the existing year (2020) conditions have been included based on two committed transportation improvement projects:

- The first committed project is a Hillsborough County project (managed by FDOT) and consists of enhancing the intersection geometry at Gibsonton Drive and Fern Hill Drive/ Old Gibsonton Drive, (WPI Segment No.: 439772-1). The primary proposed improvements include the widening of Fern Hill Drive to provide three exclusive left turn lanes, one through and one exclusive right turn lane at the south leg of the intersection for both the opening year (2025) and design year (2045).
- The second committed project includes the construction of 12-foot tolled express lanes on I-75 from Moccasin Wallow Road to S of US 301 for the design year (2045). It is assumed that the express lanes project will not be finished by the opening year (2025). The I-75 express lanes are being designed as part of the Tampa Bay Next project (TBNext) and managed by FDOT (WPI Segment No.: 419235-2).

  Note: The No-Build Alternatives for both 2025 and 2045 do not include the widening of the Gibsonton Drive between I-75 and US 301 from four to six lanes.

The lane geometry and intersection control for the No-Build Alternative can be found in Figure 4.1 and Figure 4.2.

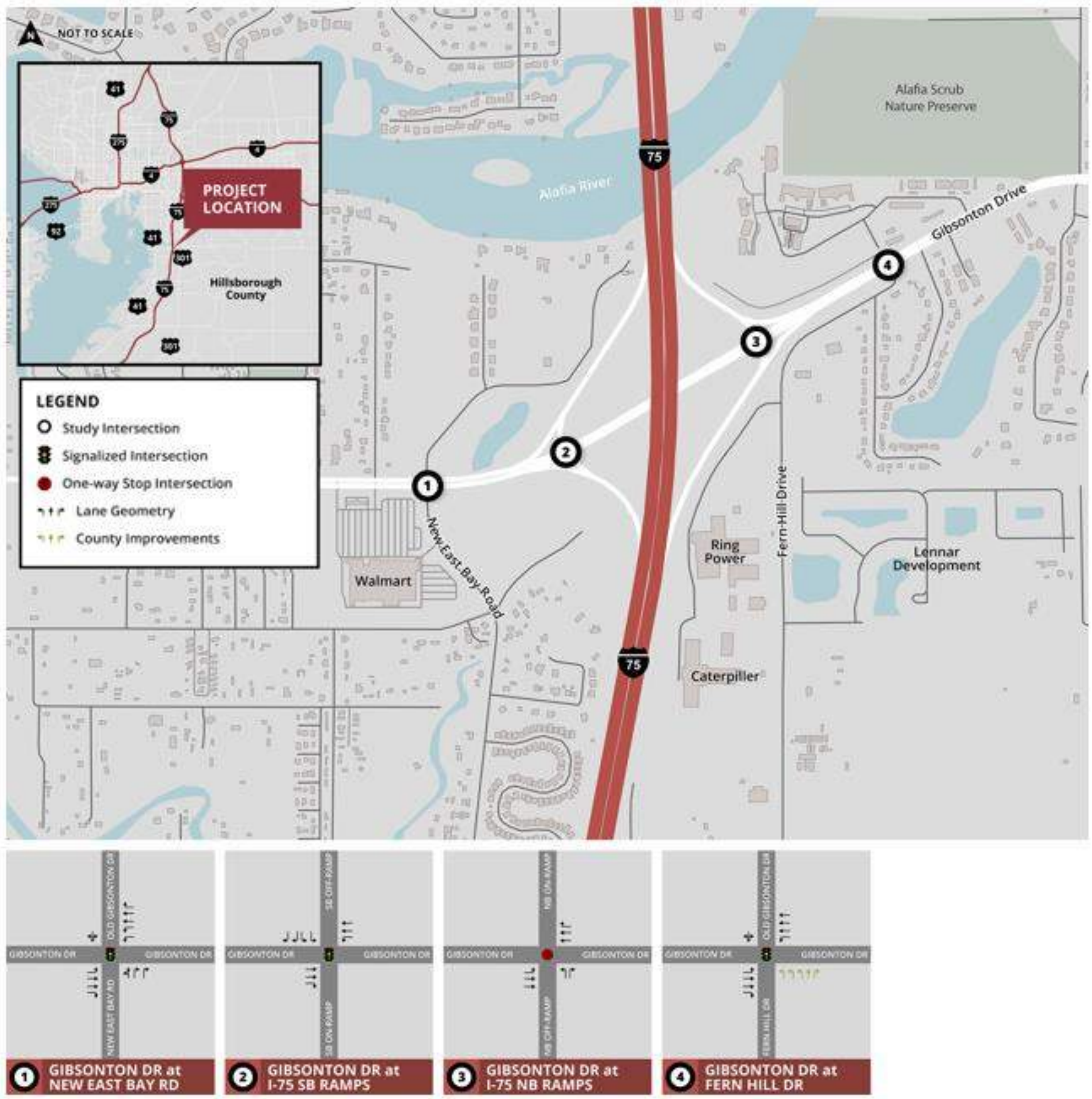


Figure 4.1: No-Build Alternative Intersection Geometries and Traffic Control

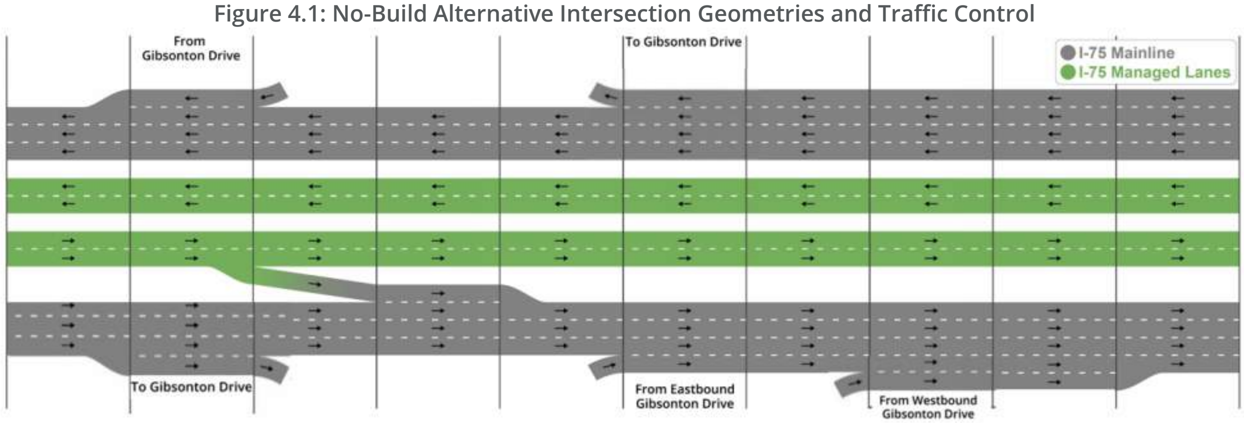


Figure 4.2: No-Build 2045 Alternative I-75 Lane Geometry

4.2 Build Alternative

Evaluation of measures leading to improvement of traffic flows through non-capacity improvements include but are not limited to Intelligent Traffic Systems (ITS) deployment, intersection optimization and enhanced multimodal accommodations for all roadway users. These types of improvements involve optimizing the use of existing facilities. Transportation Systems Management and Operations (TSM&O) improvements would not adequately accommodate forecasted traffic volumes within the I-75/Gibsonton Drive interchange area. Thus, a TSM&O Alternative is not considered a viable alternative for this IMR.

To address the existing safety and operational concerns at the Gibsonton Interchange, signalization of the northbound ramp terminal was the main priority. Upon examining forecasts and origin-destination patterns within the AOI, it was determined that a Diverging Diamond Interchange (DDI) would be the most logical interchange configuration to implement for the future development plans surrounding Gibsonton Drive Interchange area. Additionally, including mainline improvements to aid in the mainline challenges and capacity issues associated with the forecasted demand along I-75 as well as supporting the future managed lanes that were proposed for the area was considered. A wide variety of interchange configurations under the DDI and diverging points around the DDI were considered and ruled out using a variety of factors such as safety, construction cost, and general operational considerations. A more detailed discussion of these alternatives can be found in **Appendix H**.

The Build Alternative consists of reconstructing the current Diamond Interchange to a Diverging Diamond Interchange (DDI). Additional primary improvements include:

- Construction of a new 1,500-foot-long deceleration lane on I-75 northbound that becomes an exit lane to Gibsonton Drive, allowing the existing single lane exit to be converted to a two-lane exit. The two-lane off-ramp widens to four lanes, providing dual left and right turn lanes onto Gibsonton Drive.
- Reconfiguring the Gibsonton Drive access to I-75 northbound by separating the eastbound traffic from the westbound traffic. Eastbound Gibsonton Drive traffic has dual left turn lanes onto the northbound I-75 on-ramp which merges in a single lane on-ramp and enters I-75 northbound as an add lane south of the Alafia River. Westbound Gibsonton Drive traffic has dual right turn lanes onto the northbound I-75 on-ramp carried by a new bridge over the Alafia River and merges with I-75 north of the Riverview Drive overpass.
- Providing additional capacity for the Gibsonton Drive westbound to I-75 northbound on-ramp by extending the existing lane and constructing an additional lane, prior to the Gibsonton Drive and Fern Hill Drive intersection, resulting in three westbound through lanes, one left turn lane to Fern Hill Drive, and two auxiliary lanes that become the dual right turn lanes onto I-75 northbound.
- Converting the existing I-75 southbound off-ramp from a single exit to a two-lane exit. The two-lane exit widens to six-lanes, providing three right turn lane and three left turn lanes.
- Reconfiguring the I-75 southbound on-ramp to merge exclusive turn lanes from eastbound and westbound Gibsonton Drive.
- Widening Gibsonton Drive from a four-lane divided arterial typical section to a six-lane divided arterial between New East Bay Road and east of Fern Hill Drive. This will match the six-lane typical from I-75 to US 301 found in the Hillsborough County 2045 Long Range Transportation Plan. The County Capital Improvement Program (CIP) includes the Gibsonton Drive at Fern Hill Drive Intersection Improvements (CIP#: 69600311).
- Providing a third eastbound Gibsonton Drive thru lane at the New East Bay Road intersection.

- Installing new traffic signals at the two crossovers of the DDI.
- Modifying the traffic signal timings at New East Bay Road and Fern Hill Drive and coordinating with the new traffic signals at the DDI crossovers. This includes a phased process for the signal timings. During the opening year (2025), the cycle lengths at New East Bay Road and Fern Hill Drive are set to half the cycle length (75 seconds) of the DDI signals. During the design year (2045) this timing no longer works as the network reaches saturation and so the cycle length of 150 seconds (to equal the DDI signals) is more appropriate and services the design year (2045) vehicles more efficiently with less flow breakdown, particularly on the westbound approach to New East Bay Road.
- Providing pedestrian accommodations including 6-foot-wide sidewalks and high emphasis crosswalks on both sides of Gibsonton Drive between New East Bay Road and Fern Hill Drive. A single 10-foot-wide sidewalk is provided in the median within the DDI limits while ensuring continuity through the corridor.
- Providing bicyclist accommodations including dedicated bicycle lanes along Gibsonton Drive eastbound and westbound between New East Bay Road and Fern Hill Drive. Bicycle bailouts have been proposed approaching the DDI crossovers to provide an option for the bike to utilize the 10-foot-wide sidewalk.
- Similar to No-Build networks, the 2045 build network includes the 12-foot tolled express lanes on I-75 from Moccasin Wallow Road to S of US 301, with the assumption that it will not be constructed by the opening year (2025).

These improvements are anticipated to improve safety and provide the necessary capacity within the study area to allow for forecasted growth and development.

All proposed improvements are to be constructed within the existing right-of-way constraints. The lane geometry and intersection control for the Build Alternative can be found in **Figure 4.3** and **Figure 4.4**.

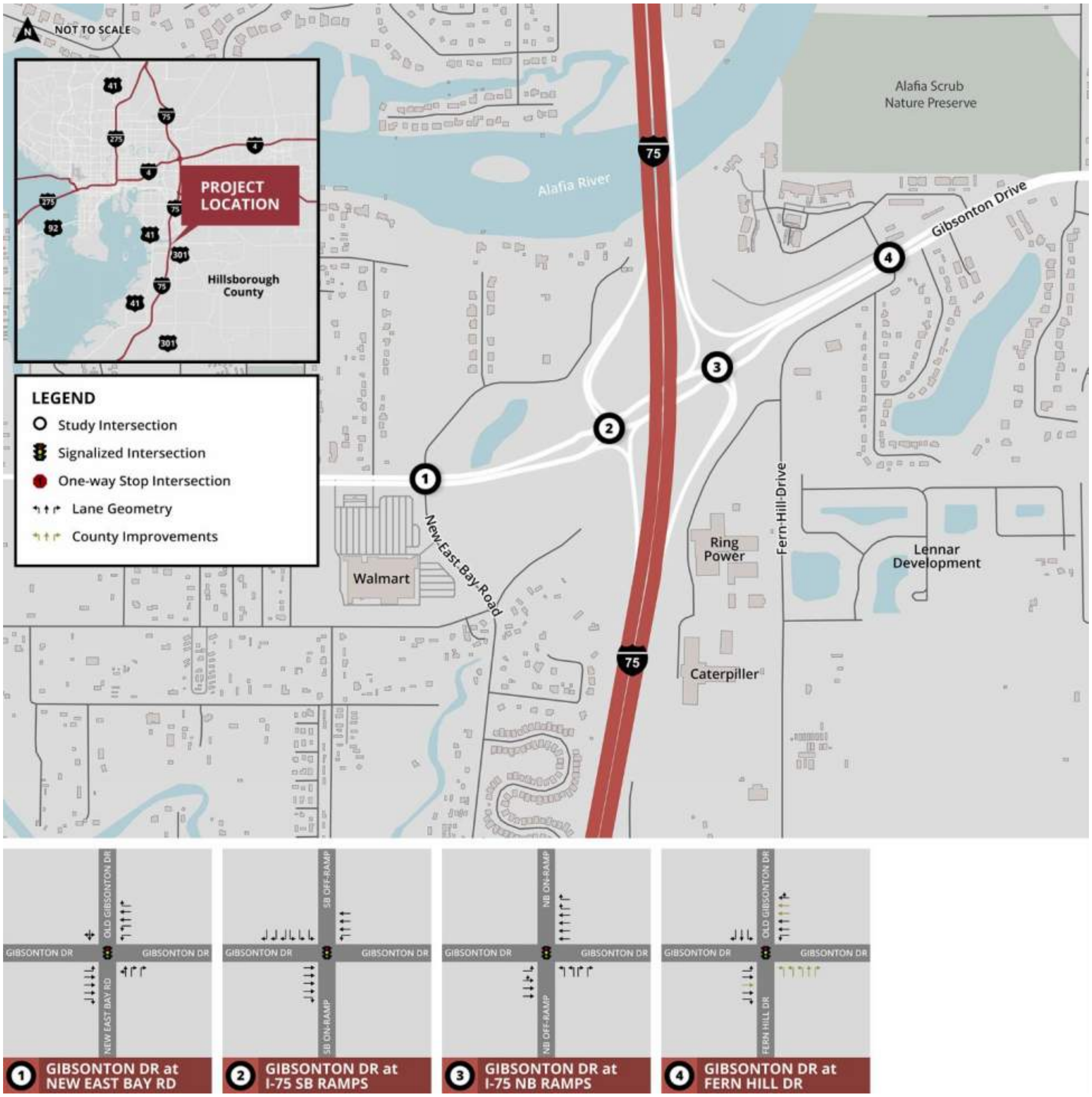


Figure 4.3: Build Alternative Intersection Geometries and Traffic Control

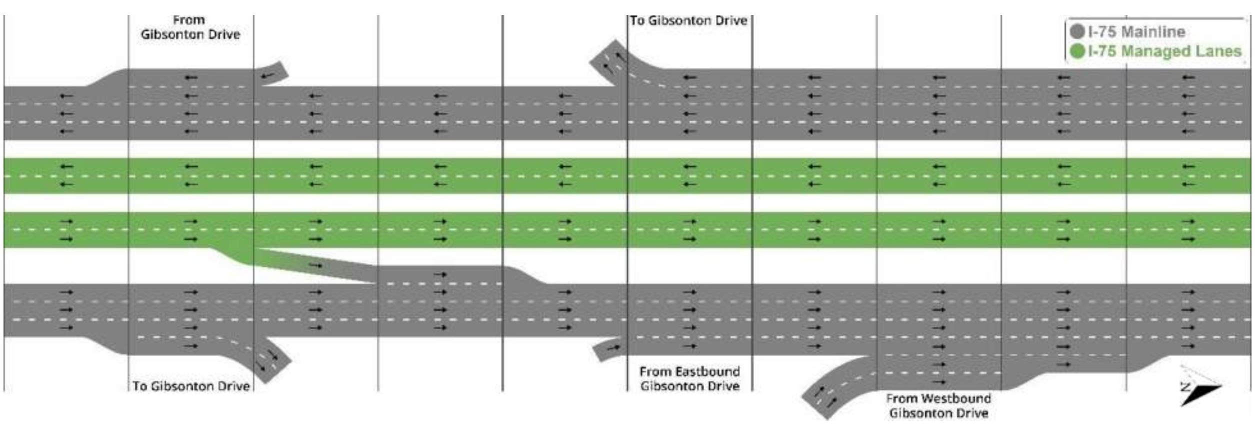


Figure 4.4: Build 2045 Alternative I-75 Lane Geometry

5.0 Future Traffic Operational Analysis

A summary of the microsimulation analysis results is detailed in this section to evaluate the future traffic operations of the I-75 at Gibsonton Drive interchange with and without the proposed improvements. To account for the stochastic nature of microsimulation modeling, ten iterations of CORSIM microsimulation were averaged. The key MOEs are summarized for mainline basic segments, weaving sections, ramp merge and diverge areas; arterial roadway segments; and intersections at ramp terminals and cross-streets. CORSIM MOEs are utilized for reference, and the equivalent HCM LOS are used to determine the need for roadway geometric and traffic control improvements within the AOI.

5.1 Opening Year (2025) Traffic Operational Analysis

The anticipated opening year for the proposed interchange improvements at the I-75 at Gibsonton Drive interchange is 2025. To evaluate the No-Build and Build Alternatives, analysis of the future traffic operations was conducted. The following sections summarize the MOEs for these alternatives.

5.1.1 No-Build Alternative

The No-Build Alternative retains existing roadway geometric and traffic control features within the AOI of the interchange and matches the No-Build conditions in the I-75 PD&E study. This section provides a summary of the operational results for the No-Build Alternative; full results are available in **Appendix I**.

The CORSIM microsimulation results of the evaluation of the I-75 basic freeway segments and ramp merge/diverge areas for the AM and PM peak hour periods are shown in **Table 5.1** and **Figure 5.1**.

As congestion worsens on southbound I-75, particularly as the I-75 southbound off-ramp faces more congestion, the number of vehicles that can be serviced is reduced in the AM peak hour. During the AM peak hour, southbound I-75 Gibsonton Drive Off-Ramp to Gibsonton Drive On-ramp, southbound I-75 On-ramp from Gibsonton Drive, and southbound I-75 south of Gibsonton Drive see a slight reduction in density. However, these are due to upstream bottlenecks.

Table 5.1 Opening Year (2025) I-75 Basic Freeway Segments and Ramps Merge/Diverge Area Vehicle Density and LOS – No-Build Alternative

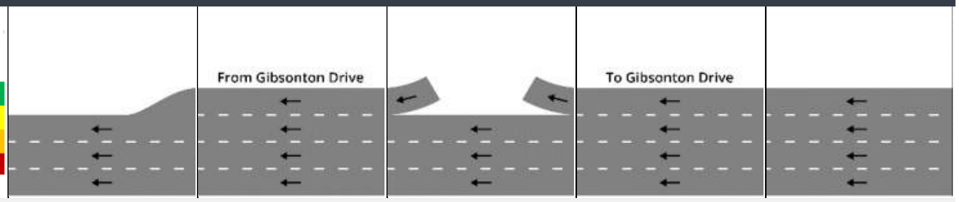
Basic Freeway Segment and Ramp Merge/Diverge Areas	Type	No. of Lanes	Time Period	Demand Volumes (vph)	Simulated Volume (vph)	Speed (mph)	Estimated Density (pc/mi/ln)	LOS*
Northbound I-75								
South of Gibsonton Drive	Basic Freeway	3	AM	7,643	6,672	64	33.4	D
			PM	6,735	6,569	64	32.8	D
Off-Ramp to Gibsonton Drive	Ramp Diverge	3	AM	7,643	6,667	58	33.0	D
			PM	6,735	6,569	59	32.1	D
Gibsonton Drive Off-Ramp to Gibsonton Drive On-Ramp	Basic Freeway	3	AM	7,108	6,197	64	31.3	D
			PM	6,348	6,173	64	31.0	D
On-Ramp from Gibsonton Drive	Ramp Merge	4	AM	9,393	8,079	61	32.0	D
			PM	8,003	7,647	61	30.1	D
North of Gibsonton Drive	Basic Freeway	4	AM	9,393	8,082	64	29.0	D
			PM	8,003	7,646	65	27.3	D
Southbound I-75								
North of Gibsonton Drive	Basic Freeway	4	AM	8,003	4,965	13	98.7	F
			PM	9,393	7,936	21	97.9	F
Off-Ramp to Gibsonton Drive	Ramp Diverge	4	AM	8,003	4,614	32	52.5	F
			PM	9,393	7,816	42	44.8	E
Gibsonton Drive Off-Ramp to Gibsonton Drive On-Ramp	Basic Freeway	3	AM	6,348	3,723	65	18.3	C
			PM	7,108	5,942	63	30.4	D
On-Ramp from Gibsonton Drive	Ramp Merge	3	AM	6,735	4,221	58	18.9	C
			PM	7,643	6,466	54	31.2	D
South of Gibsonton Drive	Basic Freeway	3	AM	6,735	4,259	65	20.8	C
			PM	7,643	6,462	64	32.6	D

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.

Note: Red highlight indicates that the density does not meet the LOS target, D

Southbound I-75 Mainline

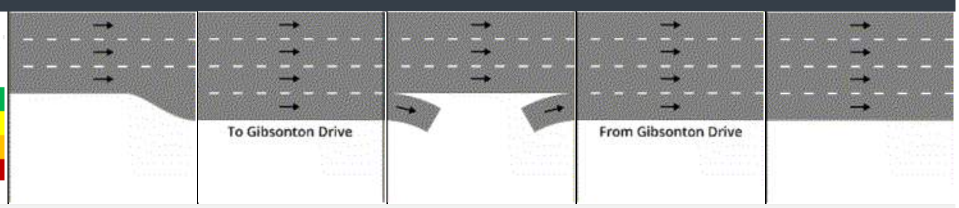
Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45



AM Peak Hour					
Demand (vph)	6,735	6,735	6,348	8,003	8,003
Simulated (vph)	4,259	4,221	3,723	4,614	4,965
Percent Processed	63%	63%	59%	58%	62%
Speed (mph)	65	58	65	32	13
Estimated Density (pc/mi/ln)	20.8	18.9	18.3	52.5	98.7
PM Peak Hour					
Demand (vph)	7,643	7,643	7,108	9,393	9,393
Simulated (vph)	6,462	6,466	5,942	7,816	7,936
Percent Processed	85%	85%	84%	83%	84%
Speed (mph)	64	54	63	42	21
Estimated Density (pc/mi/ln)	32.6	31.2	30.4	44.8	97.9

Northbound I-75 Mainline

Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45



AM Peak Hour					
Demand (vph)	7,643	7,643	7,108	9,393	9,393
Simulated (vph)	6,672	6,667	6,197	8,079	8,082
Percent Processed	87%	87%	87%	86%	86%
Speed (mph)	64	58	64	61	64
Estimated Density (pc/mi/ln)	33.4	33.0	31.3	32.0	29.0
PM Peak Hour					
Demand (vph)	6,735	6,735	6,348	8,003	8,003
Simulated (vph)	6,569	6,569	6,173	7,647	7,646
Percent Processed	98%	98%	97%	96%	96%
Speed (mph)	64	59	64	61	65
Estimated Density (pc/mi/ln)	32.8	32.1	31.0	30.1	27.3

Figure 5.1 Opening Year (2025) No-Build Alternative CORSIM Freeway MOEs

Volume-to-capacity ratios for each ramp of the I-75 interchange at Gibsonton Drive in the AM and PM time periods are summarized in **Table 5.2**. The results of this capacity check indicate that the on-ramp to northbound I-75 during the AM peak hour and the off-ramp to Gibsonton Drive from southbound I-75 during the PM peak hour exceed the capacity of the ramp.

Table 5.2: Opening Year (2025) I-75 Ramps Capacity Check - No-Build Alternative

I-75 On and Off Ramp Location	No. of Lanes	Ramp Free Flow Speed (mph)	Capacity (veh/hr)	Time Period	Demand Volume (veh/hr)	Volume to Capacity Ratio
Northbound I-75						
Off-Ramp to Gibsonton Drive	1	45	2100	AM	535	0.25
				PM	387	0.18
On-Ramp from Gibsonton Drive	1	45	2100	AM	2,285	**1.09**
				PM	1,655	0.79
Southbound I-75						
Off-Ramp to Gibsonton Drive	1	45	2100	AM	1,655	0.79
				PM	2,285	**1.09**
On-Ramp from Gibsonton Drive	1	45	2100	AM	387	0.18
				PM	535	0.25

Note: Red highlight indicates that the V/C ratio is over 1

The CORSIM microsimulation results of the I-75 ramp terminals and cross-streets at Gibsonton Drive are summarized for AM and PM peak hours of the opening year (2025) and shown in **Table 5.3** and **Table 5.4**. Compared to the existing year (2020), New East Bay Road intersection is expected to fail during the AM peak hour. No additional intersections fail in the PM peak hour compared to the AM peak hour.

Table 5.3: Opening Year (2025) Intersection Vehicle Delay and LOS - No-Build Alternative – AM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
New East Bay Road	EBL	12	6	286.3	F
	EBT	961	522	318.5	F
	EBR	51	28	240.1	F
	Approach	1,024	556	314.2	F
	WBL	265	194	45.0	D
	WBT	1,030	789	13.2	B
	WBR	95	77	1.2	A
	Approach	1,390	1,060	18.1	B
	NBL	73	82	31.3	C
	NBT	38	38	33.7	C
	NBR	554	533	39.7	D
	Approach	665	653	38.3	D
	SBL	60	60	88.1	F
	SBT	17	16	67.7	E
	SBR	8	7	54.9	D
	Approach	85	83	81.4	F
	Overall	3,164	2,352	96.0	F

Table 5.3 (Continued): Opening Year (2025) Intersection Vehicle Delay and LOS - No-Build Alternative – AM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
Southbound I-75 Ramp Terminal	EBT	1,460	1,042	103.3	F
	EBR	115	77	43.4	D
	Approach	1,575	1,119	99.2	F
	WBL	272	418	138.8	F
	WBT	825	756	8.7	A
	Approach	1,097	1,174	55.0	E
	SBL	1,090	578	168.4	F
	SBR	565	299	3.6	A
	Approach	1,655	877	112.2	F
	Overall	4,327	3,170	86.4	F
Northbound I-75 Ramp Terminal	EBL	780	510	475.3	F
	EBT	1,770	1,108	3.1	A
	Approach	2,550	1,618	151.9	F
	WBT	939	1,030	1.6	A
	WBR	1,505	1,365	10.0	B
	Approach	2,444	2,395	6.4	A
	NBL	158	142	9.2	A
	NBR	377	326	3.3	A
	Approach	535	468	5.1	A
	Overall	5,529	4,481	58.8	F
Fern Hill Drive	EBL	52	29	87.4	F
	EBT	1,960	1,326	1.6	A
	EBR	135	83	0.2	A
	Approach	2,147	1,438	3.2	A
	WBL	49	46	89.5	F
	WBT	2,257	2,213	6.4	A
	WBR	2	0	0.0	A
	Approach	2,308	2,259	8.1	A
	NBL	100	97	79.5	E
	NBT	2	1	82.5	F
	NBR	78	77	20.2	C
	Approach	180	175	53.5	D
	SBL	8	8	76.0	E
	SBT	0	0	0.0	A
	SBR	87	85	50.5	D
	Approach	95	93	52.7	D
	Overall	4,730	3,965	9.4	A

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.
Note: Red highlight indicates that the delay does not meet the LOS target, D

Table 5.4: Opening Year (2025) Intersection Vehicle Delay and LOS - No-Build Alternative – PM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
New East Bay Road	EBL	14	11	53.2	D
	EBT	995	955	49.6	D
	EBR	214	206	11.0	B
	Approach	1,223	1,172	42.9	D
	WBL	945	872	38.9	D
	WBT	707	668	8.7	A
	WBR	74	64	1.0	A
	Approach	1,726	1,604	24.8	C
	NBL	92	81	44.5	D
	NBT	40	38	48.0	D
	NBR	350	334	7.9	A
	Approach	482	453	17.8	B
	SBL	45	43	46.4	D
	SBT	65	61	46.8	D
	SBR	8	9	20.5	C
	Approach	118	113	44.6	D
	Overall	3,549	3,342	30.9	C
Southbound I-75 Ramp Terminal	EBT	1,232	1,189	53.4	D
	EBR	158	150	4.3	A
	Approach	1,390	1,339	47.9	D
	WBL	377	374	115.5	F
	WBT	946	967	17.7	B
	Approach	1,323	1,341	45.0	D
	SBL	1,505	1,246	43.2	D
	SBR	780	641	3.5	A
	Approach	2,285	1,887	29.7	C
	Overall	4,998	4,567	39.5	D
Northbound I-75 Ramp Terminal	EBL	565	490	35.8	E
	EBT	2,172	1,957	0.01	A
	Approach	2,737	2,447	7.2	A
	WBT	1,208	1,216	1.2	A
	WBR	1,090	969	5.3	A
	Approach	2,298	2,185	3.0	A
	NBL	115	114	7.2	A
	NBR	272	270	3.3	A
	Approach	387	384	4.4	A
	Overall	5,422	5,016	5.2	A

Table 5.4 (Continued): Opening Year (2025) Intersection Vehicle Delay and LOS - No-Build Alternative – PM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
Fern Hill Drive	EBL	38	39	105.3	F
	EBT	2,328	2,129	3.9	A
	EBR	78	62	1.4	A
	Approach	2,444	2,230	5.6	A
	WBL	42	44	94.4	F
	WBT	2,140	2,035	7.1	A
	WBR	28	23	3.5	A
	Approach	2,210	2,102	8.9	A
	NBL	42	40	84.7	F
	NBT	2	3	90.1	F
	NBR	86	81	31.6	C
	Approach	130	124	50.2	D
	SBL	9	9	82.0	F
	SBT	6	7	95.1	F
	SBR	116	108	49.6	D
	Approach	131	124	54.5	D
	Overall	4,915	4,580	9.6	A

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.
Note: Red highlight indicates that the delay does not meet the LOS target, D

The CORSIM microsimulation results evaluating vehicle queue lengths for intersections within the AOI of the I-75 at Gibsonton Drive interchange for AM and PM time periods of the opening year (2025) are summarized in **Table 5.5**. The available storage for intersections represents the left or right turn storage bay measured from the stop bar to the taper. The available storage for the off-ramps is measured from the stop bar to the gore point, with adjustment for deceleration length where applicable. As congestion increases, queues are expected to increase. During the AM peak hour, the following queues exceed the available storage lengths: the eastbound through at New East Bay Road, the eastbound through, westbound left, and southbound left at the southbound I-75 ramp terminal, and the eastbound through and left at the northbound I-75 ramp terminal. During the PM peak hour, the following queues exceed the available storage lengths: the westbound left at New East Bay Road, the eastbound through, westbound left and southbound left at the southbound I-75 ramp terminal, the eastbound left at the northbound I-75 ramp terminal, and the eastbound left at Fern Hill Drive. There are a few locations, other than Fern Hill Drive where a committed project is located, where the queue lengths show a slight reduction compared to the existing year (2020). However, these reductions are all within a single vehicle length. These slight reductions are due to additional upstream congestion in the system by the opening year (2025) at the southbound and northbound I-75 ramp terminals.

Table 5.5: Opening Year (2025) Intersection Vehicle Queue Lengths - No-Build Alternative

Gibsonton Drive Signalized Intersection	Movement	Existing Storage (Feet)	Off-ramp Deceleration Length adjustment required (Yes/No - # of Feet)	Available Storage (Feet)	Maximum Vehicle Queue Length (Feet)			
					AM Peak	Queue extend to I-75 mainline	PM Peak	Queue extend to I-75 mainline
New East Bay Road	EBL	190	No	190	50	N/A	50	N/A
	EBT	1100	No	1,100	1,350	N/A	625	N/A
	EBR	250	No	250	100	N/A	150	N/A
	WBL	530	No	530	225	N/A	625	N/A
	WBT	730	No	730	400	N/A	350	N/A
	WBR	730	No	730	75	N/A	75	N/A
	NBTL	410	No	410	175	N/A	225	N/A
	NBR	390	No	390	350	N/A	150	N/A
	SBLTR	430	No	430	200	N/A	200	N/A
Southbound I-75 Ramp Terminal	EBT	730	No	730	1,600	N/A	1,075	N/A
	EBR	520	No	520	75	N/A	0	N/A
	WBL	640	No	640	725	N/A	725	N/A
	WBT	1950	No	1,950	675	N/A	600	N/A
	SBL	1810	Yes (440’)	1,370	1,650	Yes	1,400	Yes
	SBR	1860	Yes (440’)	1,420	550	No	375	No
Northbound I-75 Ramp Terminal	EBL	640	No	640	875	N/A	725	N/A
	EBT	1950	No	1,950	2,400	N/A	150	N/A
	WBT	730	No	730	50	N/A	50	N/A
	WBR	730	No	730	550	N/A	100	N/A
	NBL	375	No	375	125	No	125	No
	NBR	2600	Yes (440’)	2160	25	No	25	No
Fern Hill Drive	EBL	250	No	250	125	N/A	300	N/A
	EBT	730	No	730	225	N/A	725	N/A
	EBR	215	No	215	50	N/A	200	N/A
	WBL	330	No	330	175	N/A	175	N/A
	WBTR	1,170	No	1,170	775	N/A	725	N/A
	NBLTR	580	No	580	100	N/A	50	N/A
	SBLTR	410	No	410	25	N/A	25	N/A

Note: The available storage lengths for through lanes on Gibsonton Drive are the roadway segment distance between upstream and downstream intersections.
Note: Where vehicle queues exceed the length of the CORSIM link, queue lengths from upstream links are added.
Note: Red highlight indicates that maximum vehicle queue length exceeds available storage length

The CORSIM microsimulation of the arterial operating speeds estimated for the various roadway segments along Gibsonton Drive for AM and PM peak hours are summarized in **Table 5.6**. Compared to the existing year (2020), travel speeds on Gibsonton Drive decrease with the additional congestion in the network. The same segments that failed in the existing year (2020) are expected to fail in the opening year (2025) except for westbound Gibsonton Drive from east of Fern Hill Drive to Fern Hill Drive. The results indicate that there is a minor increase in the speed on eastbound Gibsonton Drive, east of the northbound ramp terminal. However, this is due to upstream bottlenecks. It is noted that westbound Gibsonton Drive, east of Fern Hill Drive has a slight increase in speed between opening year (2025) and existing year (2020). A review of delay at westbound approach at Fern Hill Drive reveals a slight decrease in delay. Neither of these changes are significant and model coding was reviewed for accuracy at this location.

Table 5.6: Opening Year (2025) Gibsonton Drive Arterial Speed and LOS - No-Build Alternative

Gibsonton Drive Arterial Roadway Segments		Free Flow Speed (mph)	AM Peak		PM Peak	
From	To		Speed (mph)	LOS*	Speed (mph)	LOS*
Eastbound						
West of New East Bay Road	New East Bay Road	45	2	F	11	F
New East Bay Road	Southbound I-75 Ramp Terminal	45	3	F	21	D
Southbound I-75 Ramp Terminal	Northbound I-75 Ramp Terminal	45	14	F	27	C
Northbound I-75 Ramp Terminal	Fern Hill Drive	45	33	B	28	C
Fern Hill Drive	East of Fern Hill Drive	45	32	B	29	C
Total			22	D	26	D
Westbound						
East of Fern Hill Drive	Fern Hill Drive	45	19	D	19	D
Fern Hill Drive	Northbound I-75 Ramp Terminal	45	25	C	31	B
Northbound I-75 Ramp Terminal	Southbound I-75 Ramp Terminal	45	29	C	29	C
Southbound I-75 Ramp Terminal	New East Bay Road	45	20	D	20	D
New East Bay Road	West of New East Bay Road	45	38	A	38	A
Total			24	C	26	C

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.

Note: Red highlight indicates that either the density or speed does not meet the LOS target, D

5.1.2 Build Alternative

This section provides a summary of the operational results for the Build Alternative; full results are available in **Appendix J**. The CORSIM microsimulation results for the evaluation of the I-75 basic freeway segments and ramp merge/diverge areas for the AM and PM peak hour periods are shown in **Table 5.7** and **Figure 5.2**. The Build Alternative includes the various interchange improvements described previously in **Section 4**. These geometric improvements will improve capacity, particularly at the southbound off-ramp diverge area where the addition of a lane on the southbound I-75 ramp will allow vehicles to pre-position more effectively and safely. Therefore, the car following sensitivity multiplier was reset to a default value of 100 percent in the CORSIM model.

In the opening year (2025), northbound I-75 continues to meet the LOS target D under the Build Alternative. Southbound I-75, north of Gibsonton Drive, still fails during the PM peak hour period. This is due to the estimated demand volume-to-capacity exceeding 1.0 during the PM peak hour of opening year (2025). This identified capacity deficiency along southbound I-75 north of Gibsonton drive will be addressed by the implementation of express lanes on I-75 prior to the design year (2045).

Overall, the estimated density decreases, and the speed increases compared to the No-Build Alternative. Additionally, the number of vehicles serviced during the peak hour under the Build Alternative increases on every I-75 southbound segment compared to the No-Build Alternative. During the PM peak hour, the LOS on I-75 northbound, south of Gibsonton Drive degrades from D under the No-Build Alternative to E under the Build Alternative. However, this is due to alleviating upstream bottlenecks and allowing more vehicles to reach this point.

Table 5.7 Opening Year (2025) I-75 Basic Freeway Segments and Ramps Merge/Diverge Area Vehicle Density and LOS – Build Alternative

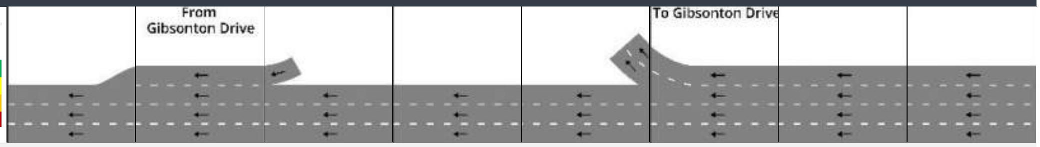
Basic Freeway Segment and Ramp Merge/Diverge Areas	Type	No. of Lanes	Time Period	Demand Volumes (vph)	Simulated Volume (vph)	Speed (mph)	Estimated Density (pc/mi/ln)	LOS*
Northbound I-75								
South of Gibsonton Drive	Basic Freeway	3	AM	7,643	6,682	64	33.5	D
			PM	6,735	6,568	64	32.8	D
Off-Ramp to Gibsonton Drive	Major Diverge	3	AM	7,643	6,675	62	25.6	C
			PM	6,735	6,566	63	26.2	D
Gibsonton Drive Off-Ramp to Gibsonton Drive Eastbound On-Ramp	Basic Freeway	3	AM	7,108	6,204	63	31.7	D
			PM	6,348	6,177	63	31.5	D
On-Ramp from Eastbound Gibsonton Drive	Ramp Merge	4	AM	7,888	7,058	64	26.6	D
			PM	6,913	6,888	64	25.8	C
Eastbound Gibsonton Drive On-Ramp to Westbound Gibsonton Drive On-Ramp	Basic Freeway	4	AM	7,888	7,058	65	26.1	D
			PM	6,913	6,887	66	25.4	C
On-Ramp from Westbound Gibsonton Drive	Ramp Merge	4	AM	9,393	8,464	61	21.4	C
			PM	8,003	7,901	62	19.8	C
On-Ramp from Westbound Gibsonton Drive	Ramp Merge	4	AM	9,393	8,463	62	26.8	D
			PM	8,003	7,904	63	24.5	C
North of Gibsonton Drive	Basic Freeway	4	AM	9,393	8,461	64	30.1	D
			PM	8,003	7,904	64	27.8	D
Southbound I-75								
North of Gibsonton Drive	Basic Freeway	4	AM	8,003	7,660	64	28.9	D
			PM	9,393	8,745	36	65.4	F
Off-Ramp to Gibsonton Drive	Major Diverge	4	AM	8,003	7,649	51	37.8	E
			PM	9,393	8,605	47	44.9	E
Gibsonton Drive Off-Ramp to Gibsonton Drive On-Ramp	Basic Freeway	3	AM	6,348	6,035	62	31.2	D
			PM	7,108	6,529	61	34.8	D
On-Ramp from Gibsonton Drive	Ramp Merge	3	AM	6,735	6,401	58	29.6	D
			PM	7,643	7,037	56	34.2	D
South of Gibsonton Drive	Basic Freeway	3	AM	6,735	6,399	64	32.3	D
			PM	7,643	7,030	63	36.0	E

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.

Note: Red highlight indicates that the density does not meet the LOS target, D

Southbound I-75 Mainline

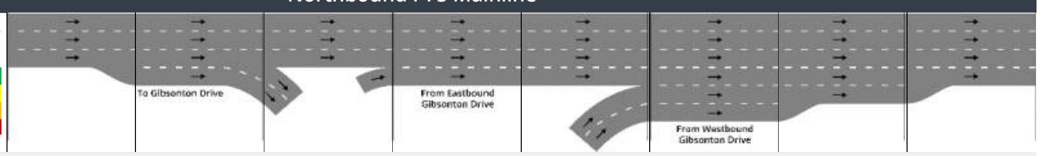
Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45



AM Peak Hour								
Demand (vph)	6,735	6,735		6,348		8,003	8,003	
Simulated (vph)	6,399	6,401		6,035		7,649	7,660	
Percent Processed	95%	95%		95%		96%	96%	
Speed (mph)	64	58		62		51	64	
Estimated Density (pc/mi/ln)	32.3	29.6		31.2		37.8	28.9	
PM Peak Hour								
Demand (vph)	7,643	7,643		7,108		9,393	9,393	
Simulated (vph)	7,030	7,037		6,529		8,605	8,745	
Percent Processed	92%	92%		92%		92%	93%	
Speed (mph)	63	56		61		47	36	
Estimated Density (pc/mi/ln)	36.0	34.2		34.8		44.9	65.4	

Northbound I-75 Mainline

Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45



AM Peak Hour								
Demand (vph)	7,643	7,643	7,108	7,888	7,888	9,393	9,393	9,393
Simulated (vph)	6,682	6,675	6,204	7,058	7,058	8,464	8,463	8,461
Percent Processed	87%	87%	87%	89%	89%	90%	90%	90%
Speed (mph)	64	62	63	64	65	61	62	64
Estimated Density (pc/mi/ln)	33.5	25.6	31.7	26.6	26.1	21.4	26.8	30.1
PM Peak Hour								
Demand (vph)	6,735	6,735	6,348	6,913	6,913	8,003	8,003	8,003
Simulated (vph)	6,567	6,563	6,168	6,879	6,878	7,895	7,896	7,896
Percent Processed	98%	97%	97%	100%	99%	99%	99%	99%
Speed (mph)	64	63	63	64	66	62	63	64
Estimated Density (pc/mi/ln)	32.8	26.2	31.5	25.9	25.4	19.8	24.6	27.8

Figure 5.2: Opening Year (2025) Build Alternative CORSIM Freeway MOEs

Volume-to-capacity ratios for each ramp of the I-75 at Gibsonton Drive interchange in the AM and PM time periods are summarized in **Table 5.8**. This capacity check indicates that the ramps will operate under capacity during opening year (2025).

Table 5.8: Opening Year (2025) I-75 Ramps Capacity Check – Build Alternative

I-75 On and Off Ramp Location	No. of Lanes	Ramp Free Flow Speed (mph)	Capacity (veh/hr)	Time Period	Demand Volume (veh/hr)	Volume to Capacity Ratio
Northbound I-75						
Off-Ramp to Gibsonton Drive	2	45	4200	AM	535	0.13
				PM	387	0.09
On-Ramp from Eastbound Gibsonton Drive	1	45	2100	AM	780	0.37
				PM	565	0.27
On-Ramp from Westbound Gibsonton Drive	2	45	4200	AM	1,505	0.36
				PM	1,090	0.26
Southbound I-75						
Off-Ramp to Gibsonton Drive	2	45	4200	AM	1,655	0.39
				PM	2,285	0.54
On-Ramp from Gibsonton Drive	1	45	2100	AM	387	0.18
				PM	535	0.25

The CORSIM microsimulation results of the I-75 ramp terminals and cross-streets at Gibsonton Drive for AM and PM peak hour periods of the opening year (2025) are summarized in **Table 5.9** and **Table 5.10**. During the opening year (2025), when comparing the No-Build and Build Alternatives, there are improvements throughout the network with serviced vehicles increasing at nearly every movement as congestion is relieved. During both the AM and PM peak hours there are improvements to delay and LOS, particularly at the I-75 ramp terminals which are no longer experiencing a failing LOS.

Some increase in delay at specific locations can be expected as upstream bottlenecks are alleviated and vehicle throughput is improved. No movements are expected to fail during the AM peak hour under the Build Alternative.

Table 5.9: Opening Year (2025) Intersection Vehicle Delay and LOS – Build Alternative – AM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
New East Bay Road	EBL	12	10	36.9	D
	EBT	961	942	14.4	B
	EBR	51	51	1.4	A
	Approach	1,024	1,003	13.9	B
	WBL	265	267	36.2	D
	WBT	1,030	1,031	5.6	A
	WBR	95	102	0.8	A
	Approach	1,390	1,400	11.1	B
	NBL	73	73	31.1	C
	NBT	38	39	33.6	C
	NBR	554	537	7.7	A
	Approach	665	649	11.9	B
	SBL	60	59	30.6	C
	SBT	17	16	30.2	C
	SBR	8	7	15.6	B
	Approach	85	82	29.2	C
	Overall	3,164	3,134	12.6	B
Southbound I-75 Ramp Terminal	EBT	1,460	1,441	19.2	B
	EBR	115	105	4.9	A
	Approach	1,575	1,546	18.3	B
	WBL	272	277	3.5	A
	WBT	825	841	51.2	D
	Approach	1,097	1,118	39.4	D
	SBL	1,090	1,071	25.3	C
	SBR	565	558	5.1	A
	Approach	1,655	1,629	18.4	B
	Overall	4,327	4,293	23.8	C
Northbound I-75 Ramp Terminal	EBL	780	861	6.2	A
	EBT	1,770	1,657	23.3	C
	Approach	2,550	2,518	17.4	B
	WBT	939	981	29.2	C
	WBR	1,505	1,417	7.8	A
	Approach	2,444	2,398	16.5	B
	NBL	158	135	17.5	B
	NBR	377	333	33.4	C
	Approach	535	468	28.8	C
	Overall	5,529	5,384	18.0	B

Table 5.9 (Continued): Opening Year (2025) Intersection Vehicle Delay and LOS – Build Alternative – AM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
Fern Hill Drive	EBL	52	58	28.3	C
	EBT	1,960	1,813	14.3	B
	EBR	135	120	1.5	A
	Approach	2,147	1,991	13.9	B
	WBL	49	45	33.9	C
	WBT	2,257	2,212	9.1	A
	WBR	2	0	0.0	A
	Approach	2,308	2,257	9.6	A
	NBL	100	99	32.7	C
	NBT	2	2	35.9	D
	NBR	78	77	9.4	A
	Approach	180	178	22.6	C
	SBL	8	9	32.5	C
	SBT	0	0	0.0	A
	SBR	87	84	14.2	B
	Approach	95	93	16.0	B
	Overall	4,730	4,519	12.2	B

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.
Note: Red highlight indicates that the delay does not meet the LOS target, D

Table 5.10: Opening Year (2025) Intersection Vehicle Delay and LOS – Build Alternative – PM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
New East Bay Road	EBL	14	10	37.6	D
	EBT	995	936	23.9	C
	EBR	214	210	3.1	A
	Approach	1,223	1,156	20.2	C
	WBL	945	895	23.2	C
	WBT	707	671	13.0	B
	WBR	74	69	2.1	A
	Approach	1,726	1,635	18.1	B
	NBL	92	81	38.8	D
	NBT	40	40	40.6	D
	NBR	350	333	5.4	A
	Approach	482	454	14.5	B
	SBL	45	42	41.4	D
	SBT	65	61	41.5	D
	SBR	8	9	22.9	C
	Approach	118	112	40.0	D
	Overall	3,549	3,357	19.1	B
Southbound I-75 Ramp Terminal	EBT	1,232	1,170	23.1	C
	EBR	158	143	6.2	A
	Approach	1,390	1,313	21.3	C
	WBL	377	361	4.3	A
	WBT	946	933	19.6	B
	Approach	1,323	1,294	15.3	B
	SBL	1,505	1,370	17.6	B
	SBR	780	700	7.0	A
	Approach	2,285	2,070	14.0	B
	Overall	4,998	4,677	16.4	B
Northbound I-75 Ramp Terminal	EBL	565	699	5.0	A
	EBT	2,172	1,846	11.6	B
	Approach	2,737	2,545	9.8	A
	WBT	1,208	1,183	32.9	C
	WBR	1,090	993	8.3	A
	Approach	2,298	2,176	21.6	C
	NBL	115	107	17.8	B
	NBR	272	270	35.0	D
	Approach	387	377	30.1	C
	Overall	5,422	5,098	16.3	B

Table 5.10 (Continued): Opening Year (2025) Intersection Vehicle Delay and LOS – Build Alternative – PM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
Fern Hill Drive	EBL	38	45	36.0	D
	EBT	2,328	2,009	9.4	A
	EBR	78	62	1.1	A
	Approach	2,444	2,116	9.8	A
	WBL	42	42	35.9	D
	WBT	2,140	2,026	5.8	A
	WBR	28	23	6.5	A
	Approach	2,210	2,091	6.4	A
	NBL	42	38	33.2	C
	NBT	2	3	37.5	D
	NBR	86	84	10.4	B
	Approach	130	125	18.0	B
	SBL	9	9	38.4	D
	SBT	6	7	40.3	D
	SBR	116	108	12.5	B
	Approach	131	124	15.9	B
	Overall	4,915	4,456	8.6	A

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.
Note: Red highlight indicates that the delay does not meet the LOS target, D

The CORSIM microsimulation results for intersection vehicle queue lengths within the AOI for AM and PM peak hour periods of the opening year (2025) are summarized in **Table 5.11**. The available storage for intersections represents the left or right turn storage bay measured from the stop bar to the taper. The available storage for the off-ramps is measured from the stop bar to the gore point, with adjustment for deceleration length where applicable. Compared to the No-Build Alternative, queue lengths are improved, and no queues exceed the available storage lengths.

Table 5.11: Opening Year (2025) Intersection Vehicle Queue Lengths – Build Alternative

Gibsonton Drive Intersection	Movement	Storage (Feet)	Off-ramp Deceleration Length adjustment required (Yes/No - # of Feet)	Available Storage (Feet)	Maximum Vehicle Queue Length (Feet)			
					AM Peak	Queue extend to I-75 mainline	PM Peak	Queue extend to I-75 mainline
New East Bay Road	EBL	190	No	190	50	N/A	50	N/A
	EBT	1,100	No	1,100	250	N/A	300	N/A
	EBR	250	No	250	50	N/A	100	N/A
	WBL	1,300	No	1,300	225	N/A	375	N/A
	WBT	1,780	No	1,780	375	N/A	350	N/A
	WBR	1,780	No	1,780	75	N/A	75	N/A
	NBTL	410	No	410	150	N/A	200	N/A
	NBR	390	No	390	200	N/A	150	N/A
	SBLTR	430	No	430	150	N/A	175	N/A
Southbound I-75 Ramp Terminal	EBT	1,780	No	1,780	375	N/A	350	N/A
	EBR	530	No	530	0	N/A	25	N/A
	WBL	900	No	900	0	N/A	75	N/A
	WBT	900	No	900	450	N/A	550	N/A
	SBL	1990	Yes (440')	1,550	450	No	500	No
	SBR	1970	Yes (440')	1,530	475	No	550	No
Northbound I-75 Ramp Terminal	EBL	900	No	900	150	N/A	25	N/A
	EBT	900	No	900	600	N/A	350	N/A
	WBT	1,810	No	1,810	275	N/A	450	N/A
	WBR	1,810	No	1,810	0	N/A	0	N/A
	NBL	2140	No	1,700	125	No	125	No
	NBR	2120	Yes (440')	1,680	250	No	175	No
Fern Hill Drive	EBL	420	No	420	125	N/A	100	N/A
	EBT	1,810	No	1,810	450	N/A	550	N/A
	EBR	420	No	420	75	N/A	75	N/A
	WBL	350	No	350	100	N/A	100	N/A
	WBTR	580	No	580	300	N/A	200	N/A
	NBL	200	No	200	100	N/A	50	N/A
	NBT	580	No	580	25	N/A	25	N/A
	NBR	240	No	240	100	N/A	100	N/A
	SBTL	410	No	410	50	N/A	75	N/A
	SBR	200	No	200	75	N/A	75	N/A

Note: The available storage lengths for through lanes on Gibsonton Drive are the roadway segment distance between upstream and downstream intersections.
Note: Where vehicle queues exceed the length of the CORSIM link, queue lengths from upstream links are added.
Note: Red highlight indicates that maximum vehicle queue length exceeds available storage length

The CORSIM microsimulation results of the arterial operating speeds estimated for the various roadway segments along Gibsonton Drive are summarized in **Table 5.12**. During the opening year (2025), only one segment along eastbound Gibsonton Drive fails in the PM peak hour compared to three failing segments under the No-Build Alternative. Additionally, this segment from west of New East Bay Road to New East Bay Road shows an increase in speed compared to the No-Build Alternative. No segments along westbound Gibsonton Drive fail in the AM or PM peak hour under the Build. There is a reduction in the westbound direction in the AM and PM peak hours between the ramp terminals compared to the No-Build Alternative, which coincides with the reduction in travel speed from 45 miles per hour to 35 miles per hour.

Table 5.12: Opening Year (2025) Gibsonton Drive Arterial Speed and LOS – Build Alternative

Gibsonton Drive Arterial Roadway Segments		Free Flow Speed* (mph)	AM Peak		PM Peak	
From	To		Speed (mph)	LOS**	Speed (mph)	LOS**
Eastbound						
West of New East Bay Road	New East Bay Road	45	20	D	16	E
New East Bay Road	Southbound I-75 Ramp Terminal	45	38	A	37	A
Southbound I-75 Ramp Terminal	Northbound I-75 Ramp Terminal	35	17	D	20	C
Northbound I-75 Ramp Terminal	Fern Hill Drive	45	26	C	28	C
Fern Hill Drive	East of Fern Hill Drive	45	34	B	34	B
Total			24	C	25	C
Westbound						
East of Fern Hill Drive	Fern Hill Drive	45	19	D	24	C
Fern Hill Drive	Northbound I-75 Ramp Terminal	45	27	C	29	C
Northbound I-75 Ramp Terminal	Southbound I-75 Ramp Terminal	35	21	C	20	C
Southbound I-75 Ramp Terminal	New East Bay Road	45	27	C	23	C
New East Bay Road	West of New East Bay Road	45	36	B	36	B
Total			24	C	24	C

* Free-flow speed between Southbound I-75 Ramp Terminal and Northbound I-75 Ramp Terminal is lowered by 10 mph, based on *FDOT Development Design Criteria: D217 Diverging Diamond Interchanges (Revised on 4/1/2022)*

**A direct comparison of CORSIM MOEs to HCM LOS cannot be made. LOS is determined from Exhibit 16-3 of the HCM, 6th Edition.

Note: Red highlight indicates that the speed does not meet the LOS target D

5.2 Design Year (2045) Traffic Operational Analysis

The anticipated design year for the proposed interchange improvements for the I-75 at Gibsonton Drive interchange is 2045. To evaluate the No-Build and Build Alternatives, analysis of the future traffic operations was conducted, as previously discussed. Volumes on I-75 in the design year (2045) are expected to be higher than 9,999 vehicles per hour during the peak hours which is the maximum allowed vehicle entry in CORSIM. Therefore, modifications to the input links in CORSIM were made, per recommendations from *Appendix I: Frequently Asked Questions of the FHWA Traffic Analysis Toolbox Volume IV: Guidelines for Applying CORSIM Microsimulation Modeling Software*. The following sections provide summary of the MOEs for these alternatives.

5.2.1 No-Build Alternative

The No-Build Alternative retains existing roadway geometric and traffic control features within the AOI and matches the No-Build conditions in the I-75 PD&E study plus the addition of Express Lanes in the median of I-75. This section provides a summary of the operational results for the No-Build Alternative. Full results are available in **Appendix K**.

The CORSIM microsimulation results of the I-75 basic freeway segments and ramp merge/diverge areas for the AM and PM peak hour periods are shown in **Table 5.13**, **Figure 5.3**, and **Figure 5.4**. During the design year (2045), congestion is expected to worsen, creating bottlenecks at the Gibsonton Drive southbound off-ramp. Heavy congestion and bottlenecking are still preventing a large percent of vehicles from being serviced. The PM peak hour is expected to experience more congestion and bottlenecking on southbound I-75 at the Gibsonton Drive off-ramp, causing a reduction in serviced volumes when compared to the opening year (2025). The comparison of speed from the opening year (2025) to the design year (2045) is difficult as bottlenecks within the system are causing some speeds to show increases. However, these increased speeds are the result of unserved demand.

Table 5.13 Design Year (2045) I-75 Basic Freeway Segments and Ramps Merge/Diverge Area Vehicle Density and LOS – No-Build Alternative

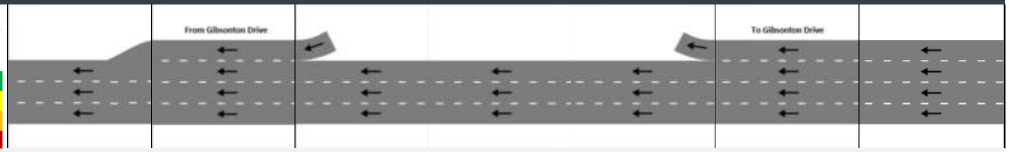
Basic Freeway Segment and Ramp Merge/Diverge Areas	Type	No. of Lanes	Time Period	Demand Volumes (vph)	Simulated Volume (vph)	Speed (mph)	Estimated Density (pc/mi/ln)	LOS*
Northbound I-75								
South of Gibsonton Drive	Basic Freeway	3	AM	8,044	6,678	64	33.5	D
			PM	6,679	6,559	64	32.9	D
Off-Ramp to Gibsonton Drive	Ramp Diverge	3	AM	8,044	6,678	57	32.2	D
			PM	6,669	6,536	58	31.3	D
Gibsonton Drive Off-Ramp to Managed Lane Ramp	Basic Freeway	3	AM	7,412	6,132	63	31.2	D
			PM	6,145	6,088	63	30.9	D
Ramp from Managed Lane	Ramp Merge	3	AM	7,724	6,425	63	24.5	C
			PM	6,435	6,687	62	26.1	D
Managed Lane Ramp to Gibsonton Drive On-Ramp	Basic Freeway	3	AM	7,724	6,425	63	32.8	D
			PM	6,434	6,688	61	35.3	E
On-Ramp from Gibsonton Drive	Ramp Merge	4	AM	10,956	8,399	62	32.4	D
			PM	8,419	8,095	62	31.3	D
North of Gibsonton Drive	Basic Freeway	4	AM	10,956	8,398	64	31.4	D
			PM	8,420	8,100	65	30.2	D
Southbound I-75								
North of Gibsonton Drive	Basic Freeway	4	AM	9,096	3,971	19	56.3	F
			PM	10,703	5,820	21	83.6	F
Off-Ramp to Gibsonton Drive	Ramp Diverge	4	AM	9,096	3,893	31	48.1	F
			PM	10,703	5,800	39	44.5	E
Gibsonton Drive Off-Ramp to Gibsonton Drive On-Ramp	Basic Freeway	3	AM	6,756	2,930	66	14.2	B
			PM	7,471	4,014	65	19.8	C
On-Ramp from Gibsonton Drive	Ramp Merge	3	AM	7,213	3,425	57	13.3	B
			PM	8,103	4,349	57	16.9	B
South of Gibsonton Drive	Basic Freeway	3	AM	7,213	3,463	66	16.8	B
			PM	8,103	4,368	65	21.4	C

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.

Note: Red highlight indicates that the density does not meet the LOS target, D

Southbound I-75 Mainline

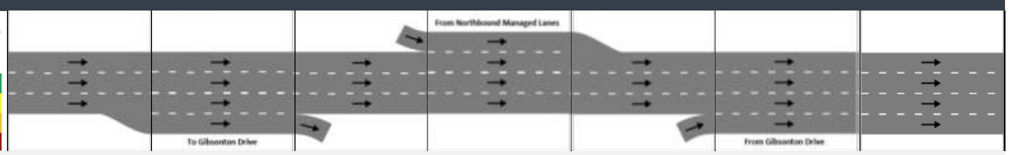
Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45



AM Peak Hour					
Demand (vph)	7,213	7,213	6,756	9,096	9,096
Simulated (vph)	3,463	3,425	2,930	3,893	3,971
Percent Processed	48%	47%	43%	43%	44%
Speed (mph)	66	57	66	31	19
Estimated Density (pc/mi/ln)	16.8	13.3	14.2	48.1	56.3
PM Peak Hour					
Demand (vph)	8,103	8,103	7,471	10,703	10,703
Simulated (vph)	4,368	4,349	4,014	5,800	5,820
Percent Processed	54%	54%	54%	54%	54%
Speed (mph)	65	57	65	39	21
Estimated Density (pc/mi/ln)	21.4	16.9	19.8	44.5	83.6

Northbound I-75 Mainline

Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45

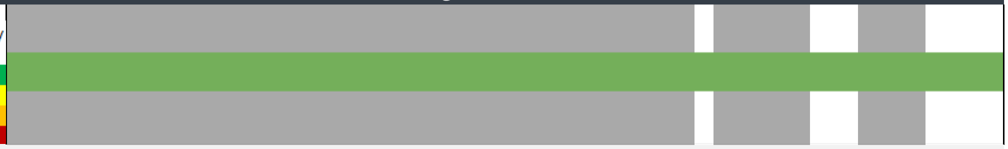


AM Peak Hour							
Demand (vph)	8,044	8,044	7,412	7,724	7,724	10,956	10,956
Simulated (vph)	6,678	6,678	6,132	6,425	6,425	8,399	8,398
Percent Processed	83%	83%	83%	83%	83%	77%	77%
Speed (mph)	64	57	63	63	63	62	64
Estimated Density (pc/mi/ln)	33.5	32.2	31.2	24.5	32.8	32.4	31.4
PM Peak Hour							
Demand (vph)	6,679	6,669	6,145	6,435	6,434	8,419	8,420
Simulated (vph)	6,559	6,536	6,088	6,687	6,688	8,095	8,100
Percent Processed	98%	98%	99%	104%	104%	96%	96%
Speed (mph)	64	58	63	62	61	62	65
Estimated Density (pc/mi/ln)	32.9	31.3	30.9	26.1	35.3	31.3	30.2

Figure 5.3: Design Year (2045) No-Build Alternative CORSIM Freeway MOEs

Southbound I-75 Managed Lanes

Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45



AM Peak Hour	
Demand (vph)	2,440
Simulated (vph)	2,134
Percent Processed	87%
Speed (mph)	66
Estimated Density (pc/mi/ln)	16.8
PM Peak Hour	
Demand (vph)	2,922
Simulated (vph)	2,740
Percent Processed	94%
Speed (mph)	60
Estimated Density (pc/mi/ln)	21.8

Northbound I-75 Managed Lanes

Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45

AM Peak Hour			
Demand (vph)	2,981	2,981	2,669
Simulated (vph)	2,927	2,926	2,633
Percent Processed	98%	98%	99%
Speed (mph)	64	57	63
Estimated Density (pc/mi/ln)	33.5	32.2	31.2
PM Peak Hour			
Demand (vph)	2,879	2,879	2,265
Simulated (vph)	2,812	2,809	2,215
Percent Processed	98%	98%	98%
Speed (mph)	61	60	61
Estimated Density (pc/mi/ln)	22.1	16.4	17.4

Figure 5.4: Design Year (2045) No-Build Alternative CORSIM Managed Lanes MOEs

Volume-to-capacity ratios for each ramp of the interchange are summarized in **Table 5.14**. Compared to the opening year (2025) No-Build Alternative, congestion is expected to increase, particularly on the northbound on-ramp from Gibsonton Drive, and the southbound off-ramp to Gibsonton Drive which will both fail during both peak periods in the design year (2045).

Table 5.14: Design Year (2045) I-75 Ramps Capacity Check - No-Build Alternative

I-75 On and Off Ramp Location	No. of Lanes	Ramp Free Flow Speed (mph)	Capacity (veh/hr)	Time Period	Demand Volume (veh/hr)	Volume to Capacity Ratio
Northbound I-75						
Off-Ramp to Gibsonton Drive	1	45	2100	AM	632	0.30
				PM	457	0.22
On-Ramp from Gibsonton Drive	1	45	2100	AM	3,232	1.54
				PM	2,340	1.11
Southbound I-75						
Off-Ramp to Gibsonton Drive	1	45	2100	AM	2,340	1.11
				PM	3,232	1.54
On-Ramp from Gibsonton Drive	1	45	2100	AM	457	0.22
				PM	632	0.30

Note: Red highlight indicates that the V/C ratio is over 1

The CORSIM microsimulation results of the I-75 ramp terminals and cross-streets at Gibsonton Drive for the design year (2045) are summarized in **Table 5.15** and **Table 5.16**. Like the results of the I-75 basic freeway segments and ramp merge/diverge areas, bottlenecks in the system are metering serviced demand.

While there are nine failing approaches in the design year (2045) compared to six failing approaches in the opening year (2025), there are some reductions in vehicle delay due to the upstream bottlenecks.

Although the northbound I-75 ramp terminal LOS improves from “E” to “D” based on the average overall delay for the un-signalized intersection in the design year (2045) in the AM peak hour, the actual delay at this terminal will be greater. Compared to the opening year (2025), the eastbound left movement will experience significantly higher movement delays and lower serviced volumes resulting in decreased overall delay for this un-signalized northbound I-75 ramp terminal intersection.

Compared to the opening year (2025) in the PM peak hour, the eastbound and southbound approaches and the overall intersection of New East Bay Road are expected to fail as congestion at the Gibsonton Drive at I-75 ramp terminals will extend back to New East Bay Road. The southbound I-75 ramp terminal is also expected to fail in the PM peak hour.

The intersection at Fern Hill Drive is expected to continue to experience congestion, however, the northbound left and through, southbound left and through, and eastbound right movements see a slight decrease in delay due to upstream metering of vehicles.

Table 5.15: Design Year (2045) Intersection Vehicle Delay and LOS - No-Build Alternative – AM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
New East Bay Road	EBL	18	5	357.6	F
	EBT	1,526	425	417.8	F
	EBR	81	24	308.7	F
	Approach	1,625	454	411.4	F
	WBL	417	284	48.3	D
	WBT	1,622	1,150	20.4	C
	WBR	149	112	1.8	A
	Approach	2,188	1,546	24.2	C
	NBL	85	181	28.7	C
	NBT	44	47	41.0	D
	NBR	644	524	81.9	F
	Approach	773	752	66.6	E
	SBL	69	67	134.6	F
	SBT	20	18	110.7	F
	SBR	9	8	102.1	F
	Approach	98	93	127.2	F
	Overall	4,684	2,845	100.5	F
Southbound I-75 Ramp Terminal	EBT	2,103	957	100.2	F
	EBR	136	63	47.0	D
	Approach	2,239	1,020	97.0	F
	WBL	321	396	361.4	F
	WBT	1,262	1,239	15.9	B
	Approach	1,583	1,635	99.6	F
	SBL	1,414	589	152.0	F
	SBR	926	305	3.6	A
	Approach	2,340	894	101.4	F
	Overall	6,162	3,549	99.3	F
Northbound I-75 Ramp Terminal	EBL	1,280	159	850.1	F
	EBT	2,237	1,377	5.5	A
	Approach	3,517	1,536	92.9	F
	WBT	1,395	1,514	2.7	A
	WBR	1,952	1,737	13.6	B
	Approach	3,347	3,251	8.5	A
	NBL	188	164	19.7	C
	NBR	444	381	3.4	A
	Approach	632	545	8.3	A
	Overall	7,496	5,332	32.8	D[1]

Table 5.15 (Continued): Design Year (2045) Intersection Vehicle Delay and LOS - No-Build Alternative – AM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
Fern Hill Drive	EBL	66	36	94.6	F
	EBT	2,447	1,619	3.6	A
	EBR	168	101	0.7	A
	Approach	2,681	1,756	5.3	A
	WBL	68	59	91.4	F
	WBT	3,124	3,031	12.2	B
	WBR	3	0	0.0	A
	Approach	3,195	3,090	13.8	B
	NBL	119	114	77.2	E
	NBT	3	2	78.0	E
	NBR	92	93	30.4	C
	Approach	214	209	56.4	E
	SBL	9	11	73.1	E
	SBT	0	0	0.0	A
	SBR	104	100	61.6	E
	Approach	113	111	62.7	E
	Overall	6,203	5,166	13.7	B

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.

Note: Red highlight indicates that the delay does not meet the LOS target, D

1. The overall average un-signalized intersection delay decreases because of unserviced EBL volumes in 2045. It is anticipated that this intersection will continue to deteriorate from 2025 No-Build condition, and operate at LOS F with greater delay.

Table 5.16: Design Year (2045) Intersection Vehicle Delay and LOS - No-Build Alternative – PM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
New East Bay Road	EBL	25	2	342.4	F
	EBT	1,731	179	411.4	F
	EBR	373	39	293.3	F
	Approach	2,129	220	389.9	F
	WBL	1,423	724	42.4	D
	WBT	1,063	566	7.8	A
	WBR	112	59	0.9	A
	Approach	2,598	1,349	26.1	C
	NBL	107	97	67.6	E
	NBT	46	44	73.4	E
	NBR	406	384	47.4	D
	Approach	559	525	53.3	D
	SBL	51	48	111.2	F
	SBT	76	70	97.8	F
	SBR	9	10	83.3	F
	Approach	136	128	101.7	F
	Overall	5,422	2,222	72.9	E
Southbound I-75 Ramp Terminal	EBT	2,000	559	157.1	F
	EBR	188	53	46.9	D
	Approach	2,188	612	147.6	F
	WBL	444	93	982.9	F
	WBT	1,318	828	81.9	F
	Approach	1,762	921	172.8	F
	SBL	1,952	1,009	60.2	E
	SBR	1,280	517	3.5	A
	Approach	3,232	1,526	41.0	D
	Overall	7,182	3,059	102.0	F
Northbound I-75 Ramp Terminal	EBL	926	25	1030.8	F
	EBT	3,026	1,545	3.9	A
	Approach	3,952	1,570	20.3	C
	WBT	1,626	797	32.8	D
	WBR	1,414	1,204	14.4	B
	Approach	3,040	2,001	21.7	C
	NBL	136	124	36.2	E
	NBR	321	288	3.3	A
	Approach	457	412	13.2	B
	Overall	7,449	3,983	20.3	C

Table 5.16 (Continued): Design Year (2045) Intersection Vehicle Delay and LOS - No-Build Alternative – PM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
Fern Hill Drive	EBL	52	35	97.1	F
	EBT	3,187	1,745	4.2	A
	EBR	108	54	1.2	A
	Approach	3,347	1,834	5.9	A
	WBL	56	40	100.6	F
	WBT	2,850	1,831	18.3	B
	WBR	37	19	11.6	B
	Approach	2,943	1,890	20.0	B
	NBL	50	48	84.1	F
	NBT	3	3	74.2	E
	NBR	102	94	35.1	D
	Approach	155	145	52.1	D
	SBL	10	10	70.6	E
	SBT	7	9	91.5	F
	SBR	140	130	52.8	D
	Approach	157	149	56.3	E
	Overall	6,602	4,018	16.0	B

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.
Note: Red highlight indicates that the delay does not meet the LOS target, D

The CORSIM microsimulation results for intersection vehicle queue lengths within the AOI during the design year (2045) are summarized in **Table 5.17**. The available storage for intersections represents the left or right turn storage bay measured from the stop bar to the taper. The available storage for the off-ramps is measured from the stop bar to the gore point, with adjustment for deceleration length where applicable. Compared to the opening year (2025) in the AM peak hour, the following movements will now have maximum queues that exceed the available storage lengths: the northbound right and northbound through/left at New East Bay Road, and the westbound through/right at Fern Hill Road. The eastbound through at the northbound I-75 ramp terminal indicates a slight reduction in queue lengths in the AM peak hour. However, this is due to bottlenecking in the system.

Compared to the opening year (2025) in the PM peak hour, the following movements will now have maximum queues that exceed the available storage lengths: the eastbound through, northbound right, and northbound through/ left at New East Bay Road, the westbound through and southbound left at the southbound I-75 ramp terminal, the eastbound through, westbound through, and westbound right at the northbound I-75 ramp terminal, and the westbound through/right at Fern Hill Drive.

Table 5.17: Design Year (2045) Intersection Vehicle Queue Lengths - No-Build Alternative

Gibsonton Drive Signalized Intersection	Movement	Existing Storage (Feet	Off-ramp Deceleration Length adjustment required (Yes/No - # of Feet)	Available Storage (Feet)	Maximum Vehicle Queue Length (Feet)			
					AM Peak	Queue extend to I-75 mainline	PM Peak	Queue extend to I-75 mainline
New East Bay Road	EBL	190	No	190	50	N/A	50	N/A
	EBT	1100	No	1,100	1,325	N/A	1,375	N/A
	EBR	250	No	250	100	N/A	225	N/A
	WBL	530	No	530	300	N/A	725	N/A
	WBT	730	No	730	600	N/A	375	N/A
	WBR	730	No	730	100	N/A	50	N/A
	NBTL	410	No	410	550	N/A	500	N/A
	NBR	390	No	390	575	N/A	500	N/A
	SBLTR	430	No	430	325	N/A	375	N/A
Southbound I-75 Ramp Terminal	EBT	730	No	730	1,625	N/A	1,600	N/A
	EBR	520	No	520	75	N/A	75	N/A
	WBL	640	No	640	850	N/A	850	N/A
	WBT	1950	No	1,950	2,325	N/A	2,400	N/A
	SBL	1810	Yes (440’)	1,370	1,650	Yes	1,650	Yes
	SBR	1860	Yes (440’)	1,420	525	No	525	No
Northbound I-75 Ramp Terminal	EBL	640	No	640	875	N/A	875	N/A
	EBT	1950	No	1,950	2,325	N/A	2,250	N/A
	WBT	730	No	730	550	N/A	1,225	N/A
	WBR	730	No	730	575	N/A	850	N/A
	NBL	375	No	375	275	No	325	No
	NBR	2600	Yes (440’)	2,500	25	No	25	No
Fern Hill Drive	EBL	250	No	250	225	N/A	250	N/A
	EBT	730	No	730	600	N/A	650	N/A
	EBR	215	No	215	150	N/A	150	N/A
	WBL	330	No	330	200	N/A	175	N/A
	WBTR	1,170	No	1,170	1,375	N/A	1,475	N/A
	NBLTR	580	No	580	150	N/A	175	N/A
	SBLTR	410	No	410	200	N/A	300	N/A

Note: The available storage lengths for through lanes on Gibsonton Drive are the roadway segment distance between upstream and downstream intersections.
Note: Where vehicle queues exceed the length of the CORSIM link, queue lengths from upstream links are added.
Note: Red highlight indicates that maximum vehicle queue length exceeds available storage length

The CORSIM microsimulation results of the arterial operating speeds estimated for the various roadway segments along Gibsonton Drive for the No-Build Alternative are summarized in **Table 5.18**. Overall travel speeds continue to decrease as there is more congestion. There are some increases to speed in the eastbound direction from the southbound I-75 ramp terminal to the northbound I-75 ramp terminal during the AM peak hour. However, this is a function of decreased serviced volume and not due to improvements. During the PM peak hour, the westbound direction will experience additional congestion and have an overall LOS of E.

Table 5.18: Design Year (2045) Gibsonton Drive Arterial Speed and LOS - No-Build Alternative

Gibsonton Drive Arterial Roadway Segments		Free Flow Speed (mph)	AM Peak		PM Peak	
From	To		Speed (mph)	LOS*	Speed (mph)	LOS*
Eastbound						
West of New East Bay Road	New East Bay Road	45	2	F	2	F
New East Bay Road	Southbound I-75 Ramp Terminal	45	3	F	3	F
Southbound I-75 Ramp Terminal	Northbound I-75 Ramp Terminal	45	16	E	23	D
Northbound I-75 Ramp Terminal	Fern Hill Drive	45	30	C	29	C
Fern Hill Drive	East of Fern Hill Drive	45	31	B	30	C
Total			22	D	25	C
Westbound						
East of Fern Hill Drive	Fern Hill Drive	45	12	F	10	F
Fern Hill Drive	Northbound I-75 Ramp Terminal	45	19	D	10	F
Northbound I-75 Ramp Terminal	Southbound I-75 Ramp Terminal	45	24	C	15	E
Southbound I-75 Ramp Terminal	New East Bay Road	45	19	D	17	E
New East Bay Road	West of New East Bay Road	45	37	A	38	A
Total			20	D	14	E

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.
Note: Red highlight indicates that the speed does not meet the LOS target, D

5.2.2 Build Alternative

The Build Alternative includes the various interchange improvements described previously in **Section 4**. These geometric modifications will improve capacity, particularly at the southbound off-ramp diverge area where the addition of an exit lane for southbound I-75, as exiting vehicles will be able to pre-position more effectively. Therefore, the car following sensitivity multiplier was reset to a default value of 100 percent in the CORSIM model. This section provides a summary of the operational results for the Build Alternative; full results are available in **Appendix L**.

The CORSIM microsimulation results and year of failure if applicable for the I-75 basic freeway segments and ramp merge/diverge for the Build Alternative are shown in **Table 5.19**, **Figure 5.5,** and **Figure 5.6.**

In the design year (2045), southbound I-75 segments, north of Gibsonton Drive and Off-ramp to Gibsonton Drive, still fail during the AM and PM peak hour period. This is due to the estimated demand volume-to-capacity exceeding 1.0 during the peak hours of design year (2045). However, the density is reduced and more vehicles are being serviced on these failing segments during both AM and PM peak hours, as compared to the No-Build 2045 condition.

Overall, serviced vehicles on southbound I-75 increase during both the AM and PM peak hours. No new segments of southbound I-75 fail due to the improvements made on Gibsonton Drive.

It is noted that southbound I-75 south of Gibsonton Drive improves from LOS E to LOS D between 2025 and 2045 under the Build Alternative. A review of queue lengths, service volumes, and delay at the southbound ramp terminal indicates that this is not due to improvements at the ramp terminal, but it is likely due to addition of managed lane in the design year (2045).

Along northbound I-75, the segment north of Gibsonton Drive degrades from a D under the No-Build Alternative to an E under the Build Alternative. The northbound I-75 from managed lane ramp to eastbound Gibsonton Drive on-ramp also fails under the Build Alternative. However, in both cases serviced volume increased and the expected year of failure is 2040 or beyond.

The mainline I-75 design as presented in this IMR represents the current PD&E concept that has been displayed for public review and comment. During this effort, changes to this concept will not be made. Operational shortcomings will be further addressed in subsequent IAR efforts as the FDOT District 7 Managed Lanes projects progress.

Table 5.19 Design Year (2045) I-75 Basic Freeway Segments and Ramps Merge/Diverge Area Vehicle Density and LOS – Build Alternative

Segment	Type	No of Lanes	Time Period	Demand Volumes (vph)	Simulated Volumes (vph)	Speed (mph)	Estimated Density (pc/mi/ln)	LOS*	YOF**
Northbound I-75									
South of Gibsonton Drive	Basic Freeway	3	AM	8,044	6,679	64	33.4	D	NA
			PM	6,774	6,589	64	32.9	D	NA
Off-Ramp to Gibsonton Drive	Major Diverge	3	AM	8,044	6,679	62	25.7	C	NA
			PM	6,774	6,593	62	25.3	C	NA
Gibsonton Drive Off-Ramp to Managed Lane Ramp	Basic Freeway	3	AM	7,412	6,141	62	31.8	D	NA
			PM	6,317	6,125	62	31.6	D	NA
Ramp from Managed Lane	Ramp Merge	3	AM	7,724	6,434	63	24.6	C	NA
			PM	6,931	6,709	62	26.3	D	NA
Managed Lane Ramp to Eastbound Gibsonton Drive On-Ramp	Basic Freeway	3	AM	7,724	6,434	63	33.0	D	NA
			PM	6,931	6,710	61	35.5	E	2043[1]
On-Ramp from Eastbound Gibsonton Drive	Ramp Merge	4	AM	9,004	7,666	63	29.2	D	NA
			PM	7,857	7,858	63	30.0	D	NA
Eastbound Gibsonton Drive On-Ramp to Westbound Gibsonton Drive On-Ramp	Basic Freeway	4	AM	9,004	7,667	65	28.5	D	NA
			PM	7,857	7,858	65	29.3	D	NA
On-Ramp from Westbound Gibsonton Drive	Ramp Merge	4	AM	10,956	9,304	61	23.7	C	NA
			PM	9,271	9,095	61	23.1	C	NA
On-Ramp from Westbound Gibsonton Drive (Second Merge Area)	Ramp Merge	4	AM	10,956	9,304	58	31.7	D	NA
			PM	9,271	9,097	59	30.6	D	NA
North of Gibsonton Drive	Basic Freeway	4	AM	10,956	9,304	60	37.6	E	2037[1]
			PM	9,271	9,096	61	36.3	E	2042[1]
Southbound I-75									
North of Gibsonton Drive	Basic Freeway	4	AM	9,096	8,457	33	63.6	F	2027[1]
			PM	10,703	8,519	28	76.2	F	See note 2
Off-Ramp to Gibsonton Drive	Major Diverge	4	AM	9,096	8,440	44	47.5	F	See note 3
			PM	10,703	8,512	46	46.2	F	See note 3

Segment	Type	No of Lanes	Time Period	Demand Volumes (vph)	Simulated Volumes (vph)	Speed (mph)	Estimated Density (pc/mi/ln)	LOS*	YOF**
Gibsonton Drive Off-Ramp to Gibsonton Drive On-Ramp	Basic Freeway	3	AM	6,756	6,178	61	32.7	D	NA
			PM	7,471	5,914	62	30.8	D	NA
On-Ramp from Gibsonton Drive	Ramp Merge	3	AM	7,213	6,657	57	29.6	D	NA
			PM	8,103	6,547	57	29.2	D	NA
South of Gibsonton Drive	Basic Freeway	3	AM	7,213	6,647	63	32.1	D	NA
			PM	8,103	6,543	64	31.5	D	NA

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.

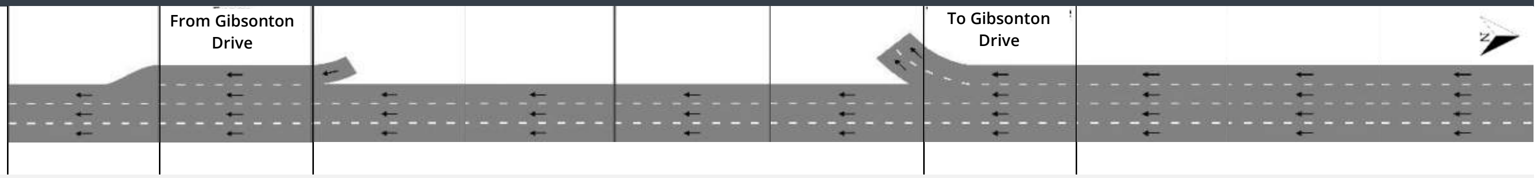
**YOF indicates Year of Failure

Note: Red highlight indicates that the density does not meet the LOS target, D

1. YOF analyses are based on Build 2045 and Build 2025 analysis results for failure segments
2. These failures reported are outside of the scope of this interchange project, as they are on the I-75 mainline. These are existing deficiencies and are expected to be addressed with the future construction of the express lanes. The date of construction of the express lanes is unknown at this time but is anticipated to be constructed between 2025 and 2045. However, due to growth and capacity constraints, this will return to a failing condition by 2045.
3. The SB off-ramp improvements do not improve the existing diverge failing condition for either 2025 or 2045 build conditions. Additional improvements were not explored due to r/w constraints that would have caused environmental impacts. However, the widening of the ramp improves the queue from the no-build "impacting mainline I-75" to the build "not impacting mainline I-75".

Southbound I-75 Mainline

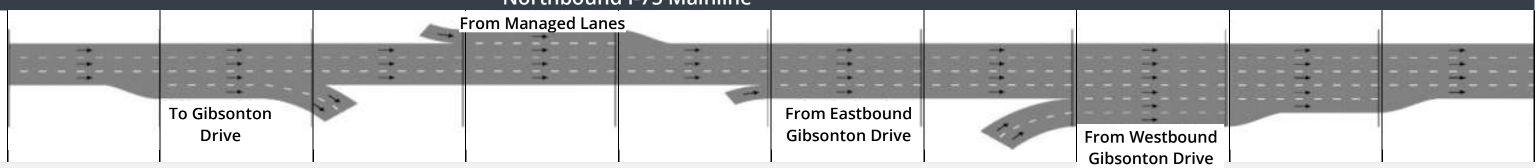
Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45



		From Gibsonton Drive		To Gibsonton Drive	
AM Peak Hour					
Demand (vph)	7,213	7,213	6,756	9,096	9,096
Simulated (vph)	6,647	6,657	6,178	8,440	8,457
Percent Processed	92%	92%	91%	93%	93%
Speed (mph)	63	57	61	44	33
Estimated Density (pc/mi/ln)	32.1	29.6	32.7	47.5	63.6
PM Peak Hour					
Demand (vph)	8,103	8,103	7,471	10,703	10,703
Simulated (vph)	6,543	6,547	5,914	8,512	8,519
Percent Processed	81%	81%	79%	80%	80%
Speed (mph)	64	57	62	46	28
Estimated Density (pc/mi/ln)	31.5	29.2	30.8	46.2	76.2

Northbound I-75 Mainline

Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45

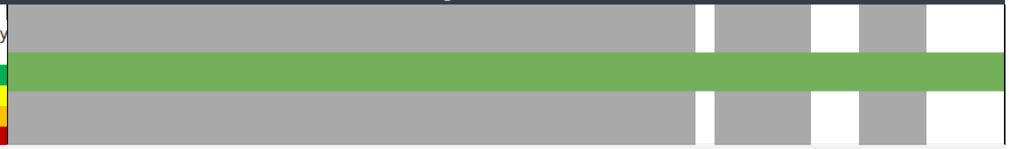


		To Gibsonton Drive		From Managed Lanes		From Eastbound Gibsonton Drive		From Westbound Gibsonton Drive		
AM Peak Hour										
Demand (vph)	8,044	8,044	7,412	7,724	7,724	9,004	9,004	10,956	10,956	10,956
Simulated (vph)	6,679	6,679	6,141	6,434	6,434	7,666	7,667	9,304	9,304	9,304
Percent Processed	83%	83%	83%	83%	83%	85%	85%	85%	85%	85%
Speed (mph)	64	62	62	63	63	63	65	61	58	60
Estimated Density (pc/mi/ln)	33.4	25.7	31.8	24.6	33.0	29.2	28.5	23.7	31.7	37.6
PM Peak Hour										
Demand (vph)	6,774	6,774	6,317	6,931	6,931	7,857	7,857	9,271	9,271	9,271
Simulated (vph)	6,589	6,593	6,125	6,709	6,710	7,858	7,858	9,095	9,097	9,096
Percent Processed	97%	97%	97%	97%	97%	100%	100%	98%	98%	98%
Speed (mph)	64	62	62	62	61	63	65	61	59	61
Estimated Density (pc/mi/ln)	32.9	25.3	31.6	26.3	35.5	30.0	29.3	23.1	30.6	36.3

Figure 5.5: Design Year (2045) Build Alternative CORSIM Freeway MOEs

Southbound I-75 Managed Lanes

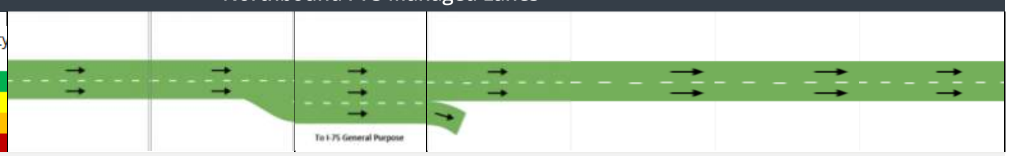
Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45



AM Peak Hour	
Demand (vph)	2,440
Simulated (vph)	2,386
Percent Processed	98%
Speed (mph)	61
Estimated Density (pc/mi/ln)	18.8
PM Peak Hour	
Demand (vph)	2,922
Simulated (vph)	2,887
Percent Processed	99%
Speed (mph)	60
Estimated Density (pc/mi/ln)	23.0

Northbound I-75 Managed Lanes

Speed (mph)	Estimated Density (pc/mi/ln)
>=63	<=26
<63-57	>26 - 35
<57-45	>35 - 45
<45	>45



AM Peak Hour			
Demand (vph)	2,981	2,981	2,669
Simulated (vph)	2,928	2,922	2,628
Percent Processed	98%	98%	98%
Speed (mph)	61	60	60
Estimated Density (pc/mi/ln)	23.1	16.8	20.9
PM Peak Hour			
Demand (vph)	2,879	2,879	2,265
Simulated (vph)	2,816	2,813	2,228
Percent Processed	98%	98%	98%
Speed (mph)	61	61	61
Estimated Density (pc/mi/ln)	22.2	16.1	17.5

Figure 5.6: Design Year (2045) Build Alternative CORSIM Managed Lanes MOEs

Volume-to-capacity ratios for each ramp are summarized in **Table 5.20**. This analysis indicates that the ramps will operate under capacity. This also suggests that poor operations on southbound I-75 north of Gibsonton Drive are due to a lack of capacity within the I-75 freeway segment between US 301 and Gibsonton Drive in the design year (2045) even with the implementation of managed lanes on I-75.

Table 5.20: Design Year (2045) I-75 Ramps Capacity Check – Build Alternative

I-75 On and Off Ramp Location	No. of Lanes	Ramp Free Flow Speed (mph)	Capacity (veh/hr)	Time Period	Demand Volume (veh/hr)	Volume to Capacity Ratio
Northbound I-75						
Off-Ramp to Gibsonton Drive	2	45	4200	AM	632	0.15
				PM	457	0.11
On-Ramp from Eastbound Gibsonton Drive	1	45	2100	AM	1,280	0.61
				PM	926	0.44
On-Ramp from Westbound Gibsonton Drive	2	45	4200	AM	1,952	0.46
				PM	1,414	0.34
Southbound I-75						
Off-Ramp to Gibsonton Drive	2	45	4200	AM	2,340	0.56
				PM	3,232	0.77
On-Ramp from Gibsonton Drive	1	45	2100	AM	457	0.22
				PM	632	0.30

The CORSIM microsimulation results of the I-75 ramp terminals and cross-streets at Gibsonton Drive for the design year (2045) are summarized in **Table 5.21** and **Table 5.22**. During the design year (2045), when comparing the No-Build and Build Alternatives, there are improvements throughout the network with serviced vehicles increasing at nearly every movement as congestion is relieved. During both the AM and PM peak hours there are improvements to delay and LOS, particularly at the I-75 ramp terminals which are no longer experiencing a failing LOS.

Some increase in delay at specific locations can be expected as upstream bottlenecks are alleviated and vehicle throughput is improved, such as the westbound left movement from Gibsonton Drive to southbound New East Bay Road. No additional intersections fail during the AM or PM peak hour.

Throughout the network, nearly any increase in delay from the No-Build Alternative, is accompanied by an increase in serviced volume and nearly any decrease in serviced volume is accompanied by a decrease in delay. These changes are due to either alleviating upstream or downstream bottlenecks, or by changes in signal timings to prioritize clearance of the DDI to avoid any impacts to the I-75 mainline.

The only locations that have both an increase in delay and a decrease in serviced volume include the northbound left and northbound through movement at New East Bay Road which does already fail during the PM peak hour and the northbound through movement at Fern Hill Drive during the PM peak hour which only services three vehicles. Nearly, or all, of the vehicles at these locations are being serviced still, and improvements to these locations will adversely affect operations elsewhere in the network. It should be noted, although there are specific movements that do not meet LOS targets at New East Bay Road intersection, the overall intersection delay does meet LOS targets.

Table 5.21: Design Year (2045) Intersection Vehicle Delay and LOS – Build Alternative – AM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
New East Bay Road	EBL	18	14	71.7	E
	EBT	1,526	1,494	23.5	C
	EBR	81	80	3.7	A
	Approach	1,625	1,588	22.9	C
	WBL	417	444	69.5	E
	WBT	1,622	1,731	7.4	A
	WBR	149	172	0.6	A
	Approach	2,188	2,347	18.6	B
	NBL	85	86	58.5	E
	NBT	44	46	59.6	E
	NBR	644	622	21.5	C
	Approach	773	754	28.1	C
	SBL	69	68	66.2	E
	SBT	20	19	65.9	E
	SBR	9	9	46.9	D
	Approach	98	96	64.3	E
	Overall	4,684	4,785	22.5	C
Southbound I-75 Ramp Terminal	EBT	2,103	2,065	13.2	B
	EBR	136	125	6.2	A
	Approach	2,239	2,190	12.8	B
	WBL	321	360	4.8	A
	WBT	1,262	1,438	38.4	D
	Approach	1,583	1,798	31.7	C
	SBL	1,414	1,382	23.2	C
	SBR	926	901	8.8	A
	Approach	2,340	2,283	17.5	B
	Overall	6,162	6,271	19.9[1]	B
Northbound I-75 Ramp Terminal	EBL	1,280	1,242	17.3	B
	EBT	2,237	2,203	22.3	C
	Approach	3,517	3,445	20.5	C
	WBT	1,395	1,634	27.1	C
	WBR	1,952	1,653	9.4	A
	Approach	3,347	3,287	18.2	B
	NBL	188	164	19.8	B
	NBR	444	373	34.5	C
	Approach	632	537	30.0	C
	Overall	7,496	7,269	20.2	C

Table 5.21 (Continued): Design Year (2045) Intersection Vehicle Delay and LOS – Build Alternative – AM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
Fern Hill Drive	EBL	66	76	80.0	F
	EBT	2,447	2,345	4.2	A
	EBR	168	156	0.3	A
	Approach	2,681	2,577	6.2	A
	WBL	68	62	67.0	E
	WBT	3,124	3,062	15.2	B
	WBR	3	0	0.0	A
	Approach	3,195	3,124	16.2	B
	NBL	119	119	65.6	E
	NBT	3	2	57.8	E
	NBR	92	89	14.9	B
	Approach	214	210	44.0	D
	SBL	9	10	68.8	E
	SBT	0	0	0.0	A
	SBR	104	100	35.2	D
	Approach	113	110	38.2	D
	Overall	6,203	6,021	13.3	B

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.
Note: Red highlight indicates that the delay does not meet the LOS target, D

1. 2045 Build condition delay results being reported are better than 2025 Build condition for the following reasons:

- More efficient eastbound-westbound thru-traffic movment along the corridor in 2045 because of using different optimized cycle length and off-set at adjacent intersections from 2025 model, and
- Slightly different turning movement percentages between 2025 and 2045

Table 5.22: Design Year (2045) Intersection Vehicle Delay and LOS – Build Alternative – PM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
New East Bay Road	EBL	25	22	73.9	E
	EBT	1,731	1,638	62.7	E
	EBR	373	375	30.0	C
	Approach	2,129	2,035	56.8	E
	WBL	1,423	1,300	69.3	E
	WBT	1,063	989	5.9	A
	WBR	112	94	0.6	A
	Approach	2,598	2,383	40.3	D
	NBL	107	97	77.1	E
	NBT	46	44	76.9	E
	NBR	406	388	11.9	B
	Approach	559	529	29.3	C
	SBL	51	49	110.7	F
	SBT	76	73	121.7	F
	SBR	9	10	98.7	F
	Approach	136	132	115.9	F
	Overall	5,422	5,079	47.7	D
Southbound I-75 Ramp Terminal	EBT	2,000	1,909	7.9	A
	EBR	188	178	6.3	A
	Approach	2,188	2,087	7.8	A
	WBL	444	443	5.0	A
	WBT	1,318	1,363	16.5	B
	Approach	1,762	1,806	13.6	B
	SBL	1,952	1,572	17.3	B
	SBR	1,280	1,015	10.1	B
	Approach	3,232	2,587	14.4	B
	Overall	7,182	6,480	12.1	B
Northbound I-75 Ramp Terminal	EBL	926	1,147	7.4	A
	EBT	3,026	2,340	12.2	B
	Approach	3,952	3,487	10.6	B
	WBT	1,626	1,665	44.0	D
	WBR	1,414	1,224	7.8	A
	Approach	3,040	2,889	28.7	C
	NBL	136	137	18.0	B
	NBR	321	316	35.7	D
	Approach	457	453	30.4	C
	Overall	7,449	6,829	19.6	B

Table 5.22 (Continued): Design Year (2045) Intersection Vehicle Delay and LOS – Build Alternative – PM Peak Hour

Intersection	Movement	Demand Volume (vph)	Simulated Volume (vph)	Movement Delay (sec/veh)	LOS
Fern Hill Drive	EBL	52	53	77.6	E
	EBT	3,187	2,545	16.5	B
	EBR	108	80	1.5	A
	Approach	3,347	2,678	17.3	B
	WBL	56	59	73.6	E
	WBT	2,850	2,702	6.2	A
	WBR	37	29	1.9	A
	Approach	2,943	2,790	7.6	A
	NBL	50	49	70.3	E
	NBT	3	4	67.8	E
	NBR	102	94	18.6	B
	Approach	155	147	37.2	D
	SBL	10	10	79.7	E
	SBT	7	8	92.4	F
	SBR	140	130	19.4	B
	Approach	157	148	27.4	C
	Overall	6,602	5,763	13.4	B

*A direct comparison of CORSIM MOEs to HCM LOS cannot be made, but the equivalent HCM LOS derived from CORSIM is provided for reference purposes.
Note: Red highlight indicates that the delay does not meet the LOS target, D

The CORSIM microsimulation vehicle queue length results for intersections within the AOI for the design year (2045) are summarized in **Table 5.23**. The available storage for intersections represents the left or right turn storage bay measured from the stop bar to the taper. The available storage for the off-ramps is measured from the stop bar to the gore point, with adjustment for deceleration length where applicable. During the design year (2045), compared to the No-Build Alternative, queue lengths are improved, and no queues exceed the available storage lengths.

Table 5.23: Design Year (2045) Intersection Vehicle Queue Lengths – Build Alternative

Gibsonton Drive Intersection	Movement	Storage (Feet)	Off-ramp Deceleration Length adjustment required (Yes/No - # of Feet)	Available Storage (Feet)	Maximum Vehicle Queue Length (Feet)			
					AM Peak	Queue extend to I-75 mainline	PM Peak	Queue extend to I-75 mainline
New East Bay Road	EBL	190	No	190	75	N/A	100	N/A
	EBT	1,100	No	1,100	475	N/A	925	N/A
	EBR	250	No	250	50	N/A	250	N/A
	WBL	1,300	No	1,300	375	N/A	800	N/A
	WBT	1,780	No	1,780	375	N/A	275	N/A
	WBR	1,780	No	1,780	75	N/A	50	N/A
	NBTL	410	No	410	250	N/A	300	N/A
	NBR	390	No	390	325	N/A	200	N/A
	SBLTR	430	No	430	200	N/A	350	N/A
Southbound I-75 Ramp Terminal	EBT	1,780	No	1,780	525	N/A	350	N/A
	EBR	530	No	530	25	N/A	25	N/A
	WBL	900	No	900	150	N/A	150	N/A
	WBT	900	No	900	700	N/A	725	N/A
	SBL	1990	Yes (440')	1,550	550	No	550	No
	SBR	1970	Yes (440')	1,530	600	No	600	No
Northbound I-75 Ramp Terminal	EBL	900	No	900	475	N/A	75	N/A
	EBT	900	No	900	900	N/A	550	N/A
	WBT	1,810	No	1,810	475	N/A	625	N/A
	WBR	1,810	No	1,810	0	N/A	50	N/A
	NBL	2140	No	1,700	150	No	125	No
	NBR	2120	Yes (440')	1,680	275	No	250	No
Fern Hill Drive	EBL	420	No	420	175	N/A	150	N/A
	EBT	1,810	No	1,810	225	N/A	950	N/A
	EBR	420	No	420	75	N/A	75	N/A
	WBL	350	No	350	175	N/A	150	N/A
	WBTR	580	No	580	500	N/A	400	N/A
	NBL	200	No	200	125	N/A	75	N/A
	NBT	580	No	580	25	N/A	25	N/A
	NBR	240	No	240	150	N/A	150	N/A
	SBTL	410	No	410	100	N/A	200	N/A
	SBR	200	No	200	75	N/A	75	N/A

Note: The available storage lengths for through lanes on Gibsonton Drive are the roadway segment distance between upstream and downstream intersections.
Note: Where vehicle queues exceed the length of the CORSIM link, queue lengths from upstream links are added.
Note: Red highlight indicates that maximum vehicle queue length exceeds available storage length

The CORSIM microsimulation results of the arterial operating speeds and associated year of failure if applicable for the various roadway segments along Gibsonton Drive for the design year (2045) are summarized in **Table 5.24**. During the design year (2045), the Build Alternative improves travel speeds on both eastbound and westbound Gibsonton Drive during the AM peak hour. In the eastbound direction, the segment from west of New East Bay Road to New East Bay Road still fails to meet the LOS target D in both the AM and PM peak hours, however the speeds are increased compared to the No-Build Alternative. Additionally, in the westbound direction, the segment from East of Fern Hill Drive to Fern Hill Drive fails to meet the LOS target D in the AM peak hour but shows an increase in speed compared to the No-Build Alternative.

Table 5.24: Design Year (2045) Gibsonton Drive Arterial Speed and LOS – Build Alternative

Gibsonton Drive Arterial Roadway Segments		Free Flow Speed* (mph)	AM Peak			PM Peak		
From	To		Speed (mph)	LOS**	YOF	Speed (mph)	LOS**	YOF
Eastbound								
West of New East Bay Road	New East Bay Road	45	15	E	2020	8	F	2020
New East Bay Road	Southbound I-75 Ramp Terminal	45	35	B	NA	37	A	NA
Southbound I-75 Ramp Terminal	Northbound I-75 Ramp Terminal	35	15	D	NA	20	C	NA
Northbound I-75 Ramp Terminal	Fern Hill Drive	45	30	B	NA	23	D	NA
Fern Hill Drive	East of Fern Hill Drive	45	37	A	NA	34	B	NA
Total			23	C		24	C	
Westbound								
East of Fern Hill Drive	Fern Hill Drive	45	14	F	2020	22	D	NA
Fern Hill Drive	Northbound I-75 Ramp Terminal	45	23	D	NA	31	B	NA
Northbound I-75 Ramp Terminal	Southbound I-75 Ramp Terminal	35	17	D	NA	17	D	NA
Southbound I-75 Ramp Terminal	New East Bay Road	45	24	C	NA	20	D	NA
New East Bay Road	West of New East Bay Road	45	37	A	NA	39	A	NA
Total			21	D		22	D	

* Free-flow speed between Southbound I-75 Ramp Terminal and Northbound I-75 Ramp Terminal is lowered by 10 mph, based on *FDOT Development Design Criteria: D217 Diverging Diamond Interchanges (Revised on 4/1/2022)*
**A direct comparison of CORSIM MOEs to HCM LOS cannot be made. LOS is determined from Exhibit 16-3 of the HCM, 6th Edition.
Note: Red highlight indicates that the speed does not meet the LOS target D

5.3 Alternatives Comparison of Network MOEs

In the preceding sections, MOEs were summarized for the mainline basic segments, weaving sections, ramp merge and diverge areas; arterial roadway segments; and intersections at ramp terminals and cross-streets under both the No-Build and Build Alternatives for the opening year (2025) and design year (2045) traffic conditions. This section will provide a comparative basis for the alternatives to illustrate the operational benefits of the Build Alternative through comparison of CORSIM network wide MOEs, shown in **Table 5.25**. The benefits shown here are for the entire four-hour peak periods. Comparison of the No-Build and Build Alternatives presented in this IMR indicate that the Build Alternative shows benefits in opening year (2025) and in design year (2045).

During the opening year (2025) the average speed increases by 80.5 percent during the AM peak period and by 23.5 percent during the PM peak period. The vehicle miles traveled (under static demand volumes) increases by 21.9 percent during the AM peak period and 3.9 percent during the PM peak period. Latent demand will decrease by 91.4 percent during the AM peak period and by 95.3 percent during the PM peak period.

During the design year (2045), the average speed increases by 37.1 percent during the AM peak period and by 44.8 percent during the PM peak period. The benefits of vehicles serviced is significant with an increase in vehicle miles traveled (under static demand volumes) of 31.3 percent during the AM peak period and 23.8 percent during the PM peak period. Latent demand will decrease by 80.0 percent during the AM peak period and by 91.5 percent during the PM peak period.

Table 5.25: Comparison of Network-Wide CORSIM MOEs for Opening Year (2025) and Design Year (2045) during AM and PM Peak Hour Periods

Network-Wide MOE	Analysis Time Period	Opening Year (2025)			Design Year (2045)		
		No-Build Alternative	Build Alternative	% Difference	No-Build Alternative	Build Alternative	% Difference
Vehicle Miles Traveled (veh-miles)	AM	338,022	412,070	21.9%	411,013	539,661	31.3%
	PM	399,953	415,387	3.9%	429,142	531,071	23.8%
Travel Time Total (hours)	AM	9,643	6,500	-32.6%	9,774	9,340	-4.4%
	PM	9,665	8,130	-15.9%	12,961	11,085	-14.5%
Speed Average (mph)	AM	35.1	63.4	80.5%	42.1	57.8	37.1%
	PM	41.4	51.1	23.5%	33.1	47.9	44.8%
Total Travel Delay (hours)	AM	4,802	576	-88.0%	3,719	1,420	-61.8%
	PM	3,916	2,162	-44.8%	6,683	3,286	-50.8%
Latent Demand (veh)	AM	12,090	1,036	-91.4%	16,889	3,385	-80.0%
	PM	10,990	518	-95.3%	19,942	1,692	-91.5%

*Latent demand at some of entry nodes exceeds maximum value reported by CORSIM of 9,999. 9,999 is assumed for these nodes, however the latent demand exceeds this value.

6.0 Future Safety Analysis

6.1 Quantitative Safety Analysis

The Highway Safety Manual procedures and historic crash data were used to quantitatively analyze the safety impacts of the No-Build and Build Alternatives. The quantitative safety analysis for the proposed Build Alternative conditions of converting a diamond interchange to a Diverging Diamond Interchange (DDI) follows the Countermeasure Crash Modification Factors (CMF) methodology and demonstrates the impact to the facility's safety within the AOI. The quantitative safety analysis complies with the guidelines of the FDOT Interchange Access Request User's Guide Safety Analysis Guidance in determining the estimated change in the expected number of crashes due to the proposed modifications of the project.

The Countermeasure CMF methodology utilizes CMFs to compute the expected number of crashes after implementing a selected countermeasure. CMFs were selected from the FHWA Crash Modification Factors Clearinghouse (www.cmfclearinghouse.org). The selected CMFs for the I-75/Gibsonton Interchange have a higher star rating than the minimum requirement of three stars to provide a greater level of confidence when estimating the safety performance by determining the reduction of crashes and the annual cost of the crash reduction. The CMF criteria for the selected Diverging Diamond Interchange countermeasure and reducible crash details are summarized in **Table 6.1.**

Table 6.1: Crash Reduction Factor Application

Location	Improvement	CRF ID[1]	Stars	CRF	Crash Types Impacted	Severity	Number of Reducible Crashes	Total Reduced Crashes	Crash Reduction Per Year
Ramp Terminals and Ramps	Diverging Diamond Interchange	10761	4	14.2%	All Types	All	113	16	3.2

1 CRF Source: https://www.cmfclearinghouse.org/

Using procedures from the Highway Safety Manual (HSM), all collisions associated with the ramp terminals and ramps are expected to be reduced by up to 14.2 percent and provide a 3.2 crash reduction per year. The CMF Details are presented in **Appendix M**.

6.2 Qualitative Safety Analysis

While the conversion of a Diamond Interchange into a Diverging Diamond interchange was able to be quantified for us in the estimation of crash reduction for the project, some improvements lack research to provide CRFs but still provide safety improvements that require examination. The three most notable improvements with no associated CRF are the impacts of the construction of a new two-lane westbound to northbound on-ramp, modification of the existing I-75 single lane northbound off-ramp to a two-lane off ramp, and the modification of the existing I-75 single lane southbound off-ramp to a two-lane off ramp.

The northbound on-ramp, northbound off-ramp, and the southbound off-ramp experienced low crash frequencies under the existing conditions. The most common crash type being overturn/rollover crashes occurring under dark conditions. Additionally, the northbound on-ramp during the AM peak hour and the southbound off-ramp during the PM peak hour are nearing capacity limits affecting flow and driving behaviors. Under the Build Alternative, additional lighting will improve roadway conditions and the additional lane at each ramp is anticipated to improve AM and PM peak hours improving flow and safety through the interchange.

7.0 Coordination/Consistency with Other Plans/Projects

The I-75 Gibsonton Drive IMR is consistent with the FDOT's Work Program planned and ongoing projects within the study area, as listed in Section 1.5. Several planned maintenance, Transportation Systems Management and Operations (TSM&O), and Hillsborough County projects that are in various stages may influence the study area are listed as follows:

- I-75 PD&E Study from Moccasin Wallow Road to south of US 301 (WPID: 419235-2)
- Gibsonton Drive and Fern Hill Drive intersection improvements (WPID: 439772-1)
- Gibsonton Drive from I-75 to US 301 widening (Hillsborough County Cost Feasible Major Roadway Projects for 2025-2045)

Improvements to this interchange have local government support and are included in the Hillsborough County Metropolitan Planning Organization (MPO) 2045 Long Range Transportation Plan (LRTP), as it indicates the I-75 interchange at Gibsonton Drive as being a top regional priority for future funding.

8.0 Environmental Considerations

The I-75 and Gibsonton Drive interchange is located within the Gibsonton/Riverview area, which is rapidly developing and has limited natural habitat. Based on the National Wetlands Inventory (NWI) and the Southwest Florida Water Management District (SWFWMD) 2017 land-use and land cover data, there are four (4) wetland systems located within the in-fields of the interchange: three (3) freshwater marshes (FLUCFCS: 641; USFWS code: PEM1/SS1C) are located within the northwest, northeast, and southeast quadrants of the interchange and one (1) wet prairie (FLUCFCS: 643; USFWS code: PSS1C) is located within the southwest quadrant of the interchange. Two (2) reservoirs (FLUCFCS: 534; USFWS code: PUBHx), are located along the northbound and southbound off-ramps. There are various wet ditches (FLUCFCS: 510; USFWS code: PEM1Cx) located adjacent to the on-ramps and off-ramps surrounding the interchange. In addition to wetlands and other surface water systems, the Alafia River is located approximately 0.31 miles north of the interchange.

The wetlands present throughout the interchange could provide suitable habitat for various wading birds. However, due to the adjacent development and the low quality of the wetland systems present, the potential for protected species involvement is low.

9.0 Anticipated Design Variations

The design for the Build Alternative, being proposed as part of the I-75 Gibsonton Drive IMR, is expected to follow FDOT and FHWA policies, rules, and standards. Design exceptions and variations are not anticipated for this project. Should any discrepancies be identified during the development of this project, design exceptions and variations will be processed per FDOT and FHWA Guidelines during the design phase of the project

10.0 Conceptual Signing Plan

A conceptual signing and marking plan were prepared in accordance with FHWA and with the Manual on Uniform Traffic Control (MUTCD) guidelines for the Build Alternative. The signing plan establishes the locations and types of advanced signing to be installed under the proposed Build DDI configuration. The conceptual signing plan also details existing signs, relocated signs and proposed signs anticipated as part of the interchange's reconfiguration. The conceptual signing plan is provided in **Appendix N** and may be subject to change for construction within the final design plans.

11.0 Access Management

This IMR documents the access management provided by the future traffic operations evaluations as part of the Build Alternative. The Build Alternative evaluation resulted in easier access to the interstate due to the following reasons:

- An additional northbound I-75 entrance ramp provides a separate merge area and increasing the number of entrance and exit ramps from four to five.
- Motorists travelling on Gibsonton Drive do not have to cross opposing traffic to make a left turn within the DDI.
- The new traffic signal at the northbound I-75 ramp terminal will be coordinated with the southbound I-75 ramp terminal and will operate with two-phases.
- Intuitive advance warning signs, pavement markings, and easily accessible ingress and egress points will be incorporated.
- Intersection improvements at Gibsonton Drive and Fern Hill Drive facilitates increased local trips.
- Sidewalks and marked crosswalks will be provided to assist pedestrians in safely navigating the interchange.

The access management within the AOI will not be changed by the proposed operational and safety improvements. Therefore, an Access Management Plan or any update to an already existing Access Management Plan was not completed for this IMR.

12.0 FHWA Policy Points

This IMR follows the FHWA's Policy on Access to the Interstate System requirements for the justification and documentation needed to substantiate any proposed changes in access to the Interstate System. The Interstate System provides a key role in facilitating the distribution of goods and services sustaining the economic health, mobility and safety of a region and state. As part of the United States transportation system that provides access to local highways using a network of limited access freeways, it is important to invest in the preservation and enhancement of the Interstate System to meet the needs of the 21st century. All new or modified points of access must be approved by FHWA and developed in accordance with federal laws and regulations (as specified in 23 U.S.C. 109 and 111, 23 C.F.R. 625.4, and 49 C.F.R. 1.48(b)(1)). The following sections document the adherence of the proposed improvements to the two FHWA Policy Criteria (effective as of May 22, 2017).

Policy Point 1

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)).

Satisfaction of Policy Point 1

An operational and safety analysis was conducted to evaluate the Build and No-Build Alternatives. The Build Alternative consists primarily of reconstructing the current Diamond Interchange to a Diverging Diamond Interchange along with improvements at New East Bay Road and Fern Hill Drive while the No-Build Alternative maintains the current I-75 and Gibsonton Drive Diamond Interchange configuration, existing year (2020) lane configuration and traffic control, with the committed improvements at south leg of Fern Hill at the study intersections within the AOI.

The CORSIM microsimulation results of the I-75 basic freeway segments and ramp merge/diverge areas for the Build Alternative indicate that during the design year (2045), serviced vehicles on southbound I-75 increase during both the AM and PM peak hours compared to the No-Build Alternative. No new segments of southbound I-75 fail due to the improvements made on Gibsonton Drive. Additionally, the segment of southbound I-75 north of Gibsonton Drive and the diverge segment at the southbound I-75 off-ramp to Gibsonton Drive show increases in speed and decreases in density under the Build Alternative.

Volume-to-capacity ratios were checked for each ramp of the I-75 at Gibsonton Drive interchange in the AM and PM time periods for the No-Build and Build Alternatives in the design year (2045). This check indicated that compared to the opening year (2025) No-Build Alternative, congestion is expected to increase, particularly on the northbound on-ramp from Gibsonton Drive, and the southbound off-ramp to Gibsonton Drive which will both fail during both peak periods in the design year (2045). Under the Build Alternative, the ramps will continue to operate under capacity during the design year (2045).

The CORSIM microsimulation results of the I-75 ramp terminals and cross-streets at Gibsonton Drive for the design year (2045) indicate that during the design year (2045), when comparing the No-Build and Build Alternatives, there are improvements throughout the network with serviced vehicles increasing at nearly every movement as congestion is relieved. In the Build Alternative, during the AM and PM peak hours, all four study intersections have an LOS of D or better. The reduction of maximum queue spillbacks under the Build Alternative is also largely mitigated with no queues exceeding the available storage lengths in the design year (2045).

During the design year (2045), the average speed increases by 37.1 percent during the AM peak period and by 44.8 percent during the PM peak period. The benefits of vehicles serviced is significant with an increase in vehicle miles traveled (under static demand volumes) of 31.3 percent during the AM peak period and 23.8 percent during the PM peak period. Latent demand will decrease by 80.0 percent during the AM peak period and by 91.5 percent during the PM peak period.

When examining FDOT crash modification factors between the No-Build and Build Alternatives, the proposed improvements are expected to improve safety along the corridor. With the proposed improvements under the Build Alternative, all collisions associated with the ramp terminals and ramps are expected to be reduced by up to 14.2 percent and provide a 3.2 crash reduction per year.

Based upon this analysis, the Build Alternative provides significant improvements to the network configuration that improve corridor operation, mitigate congestion, and enhance safety within the study AOI.

Policy Point 2

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.

Satisfaction of Policy Point 2

The proposed Build Alternative will maintain full access to all traffic movements on Gibsonton Drive to and from I-75. The design will meet current standards for the projects on the interstate system and comply with the American Association of State Highway and Transportation Officials (AASHTO) and FDOT design standards. There are no design exceptions or variations to FDOT or FHWA policies, rules, or standards anticipated with the Build Alternative.

13.0 Summary and Conclusion

The purpose of this IOAR is to identify safety, operational, and geometric improvements to mitigate the existing safety and operational deficiencies for the I-75 and Gibsonton Drive interchange. The following are the key findings and conclusions of this IOAR:

Existing Traffic Conditions:

- AM and PM Peak Level of Service (LOS) indicate that southbound I-75 (north of Gibsonton Drive) and the southbound off-ramp failed to meet target LOS D. Further volume-to-capacity ratios check shows that that the southbound off-ramp is not capacity constrained and poor operation at this location causes congestion and queueing;
- The unsignalized eastbound left turn at the northbound I-75 ramp terminal will continue to be a primary contributor to congestion and cause spillback through the interchange, which results in queue spillbacks for the eastbound through movements at both ramp terminals during the AM peak hour;
- Gibsonton Drive fails to operate at target LOS D eastbound to the west of New East Bay Road (during the AM and PM Peak hours), eastbound between New East Bay Road and the southbound I-75 ramp terminal, eastbound between the ramp terminals (during the AM peak hour), and westbound from east of Fern Hill Drive to Fern Hill Drive (during the AM and PM peak hours). On average through the study area, both directions of Gibsonton Drive operate at LOS C or D based on the speed threshold; and
- Historical crash data, during the five-year period from 2016-2020, included a total of 557 crashes within the project study area. Of the 557 total crashes, there were three fatal crashes, 254 crashes involving personal injury, and 300 crashes that were property damage only. Crashes in the study area resulted in an estimated economic loss of approximately $105.4 million. Multiple high crash roadway segments and intersections were identified within the AOI. The segment crash rates range from 0.255 crashes per million vehicle miles traveled (MVMT) (on the southbound I-75 roadway segment, north of the off-ramp to Gibsonton Drive) to a high of 4.462 crashes per MVMT (along the Gibsonton Drive roadway segment, between the I-75 northbound ramps and Fern Hill Drive). The intersection crash rates range from a low of 1.006 crashes per million entering vehicles (MEV) at the Gibsonton Drive and southbound I-75 ramp terminal to a high of 3.551 crashes per MEV at the Gibsonton Drive and Fern Hill Drive intersection.

Future Traffic Conditions:

No-Build Alternative:

Opening Year (2025):

- No-Build Alternative maintains the current I-75 and Gibsonton Drive Diamond Interchange configuration, existing year (2020) lane configuration and traffic control at the study intersections within the AOI;
- Additional transportation improvement includes three exclusive left turn lanes, one through and one exclusive right turn lane at the south leg of the Gibsonton Drive and Fern Hill Drive/Old Gibsonton Drive intersection.

Design Year (2045):

- No-Build Alternative is based on Opening Year No-Build Alternative;
- The construction of express lanes on I-75 from Moccasin Wallow Road to S of US 301.

Build Alternative:

Opening Year (2025):

- The Opening year (2025) Build Alternative includes of the current Diamond Interchange to a Diverging Diamond Interchange (DDI);
- Construction of a new 1,500-foot-long deceleration lane on I-75 northbound that becomes an exit lane to Gibsonton Drive, allowing the existing single lane exit to be converted to a two-lane exit. The two-lane off-ramp widens to four lanes, providing dual left and right turn lanes onto Gibsonton Drive;
- Reconfiguring the Gibsonton Drive access to I-75 northbound by separating the eastbound traffic from the westbound traffic. Eastbound Gibsonton Drive traffic has dual left turn lanes onto the northbound I-75 on-ramp which merges in a single lane on-ramp and enters I-75 northbound as an add lane south of the Alafia River. Westbound Gibsonton Drive traffic has dual right turn lanes onto the northbound I-75 on-ramp carried by a new bridge over the Alafia River and merges with I-75 north of the Riverview Drive overpass;
- Providing additional capacity for the Gibsonton Drive westbound to I-75 northbound on-ramp by extending the existing lane and constructing an additional lane, prior to the Gibsonton Drive and Fern Hill Drive intersection, resulting in three westbound through lanes, one left turn lane to Fern Hill Drive, and two auxiliary lanes that become the dual right turn lanes onto I-75 northbound;
- Converting the existing I-75 southbound off-ramp from a single exit to a two-lane exit. The two-lane exit widens to six-lanes, providing three right turn lane and three left turn lanes;
- Reconfiguring the I-75 southbound on-ramp to merge exclusive turn lanes from eastbound and westbound Gibsonton Drive;
- Widening Gibsonton Drive from a four-lane divided arterial typical section to a six-lane divided arterial between New East Bay Road and east of Fern Hill Drive;
- Providing a third eastbound Gibsonton Drive thru lane at the New East Bay Road intersection;
- Installing new traffic signals at the two crossovers of the DDI;
- Modifying the traffic signal timings at New East Bay Road and Fern Hill Drive and coordinating with the new traffic signals at the DDI crossovers;
- Providing pedestrian accommodations including 6-foot-wide sidewalks and high emphasis crosswalks on both sides of Gibsonton Drive between New East Bay Road and Fern Hill Drive. A single 10-foot-wide sidewalk is provided in the median within the DDI limits while ensuring continuity through the corridor;
- Providing bicyclist accommodations including dedicated bicycle lanes along Gibsonton Drive eastbound and westbound between New East Bay Road and Fern Hill Drive. Bicycle bailouts have been proposed approaching the DDI crossovers to provide an option for the bike to utilize the 10-foot-wide sidewalk.

Design Year (2045):

- Design Year (2045) Build Alternative is based on Opening Year Build Alternative;
- Optimizing the traffic signal timings at New East Bay Road and Fern Hill Drive and coordinating with the new traffic signals at the DDI crossovers for the design Year (2045) demand traffic. During the design year (2045), the opening year (2025)'s timing no longer works as the network reaches saturation and so the cycle length of 150 seconds (to equal the DDI signals) is more appropriate and services the design year (2045) vehicles more efficiently with less flow breakdown, particularly on the westbound approach to New East Bay Road;
- The construction of express lanes on I-75 from Moccasin Wallow Road to S of US 301.

No-Build Alternative Operational Analysis:

- Congestion will continue to worsen on the southbound I-75, particularly north of Gibsonton Drive and southbound off-ramp. The results of volume-to-capacity ratios check indicate that the on-ramp to northbound I-75 and the off-ramp to Gibsonton Drive from southbound I-75 exceed the capacity of the ramp in the design year (2045);
- Gibsonton Drive will experience more approach movement delay and intersections failures in the opening year (2025) and design year (2045). The queue spillback of the eastbound left turn at the northbound I-75 ramp terminal will continue to worsen; and
- Overall travel speeds on Gibsonton Drive will continue to decrease as there is more congestion in the opening year (2025) and design year (2045). Some segments see a slight increase in speed. However, this is a function of decreased serviced volume and not due to improvements.

Build Alternative Operational Analysis:

- Based on the analyses documented in this IMR, the Build Alternative is expected to improve the operation and overall safety of the study intersections. The results of the CORSIM microsimulation analysis provide evidence of substantial benefits associated with implementing the Build Alternative;
- During both the AM and PM peak hours there are improvements to delay and LOS, particularly at the I-75 ramp terminals, which are no longer experiencing a failing LOS in the design year (2045);
- During the AM and PM peak hours, no new approaches or overall intersections will fail.
- During the AM peak hour, the number of failing approaches is reduced from nine to one and the number of failing intersections is reduced from two to zero;
- During the PM peak hour, the number of failing approaches is reduced from eight to two and the number of failing intersections is reduced from two to zero;
- Operational benefits under the Build Alternative were demonstrated by an increase in vehicle miles traveled and average speed. The increased vehicle miles traveled and average speeds for the opening year (2025) and design year (2045) were documented as follows:
    - During the opening year (2025) the average speed increases by 80.5 percent during the AM peak period and by 23.5 percent during the PM peak period. The vehicle miles traveled (under static demand volumes) increases by 21.9 percent during the AM peak period and 3.9 percent during the PM peak period;
    - During the design year (2045), the average speed increases by 37.1 percent during the AM peak period and by 44.8 percent during the PM peak period. The benefits of vehicles serviced is significant with an increase in vehicle miles traveled (under static

demand volumes) of 31.3 percent during the AM peak period and 23.8 percent during the PM peak period;

- The CORSIM microsimulation analysis indicates that more vehicles can be serviced with the improvements at the Gibsonton Drive interchange, delay and travel time are reduced, and speed is increased;
- The quantitative safety analysis provided additional safety benefits to the operational benefits for implementing the Build Alternative. Using procedures from the Highway Safety Manual (HSM), all collisions associated with the ramp terminals and ramps are expected to be reduced by up to 14.2 percent and provide a 3.2 crash reduction per year;
- Improvements to this interchange have local government support and are included in the Hillsborough County Metropolitan Planning Organization (MPO) 2045 Long Range Transportation Plan (LRTP), as it indicates the I-75 at Gibsonton Drive interchange as being a top regional priority for future funding;
- The proposed improvements under Build Alternative will not require the acquisition of any ROW. Therefore, it is anticipated there will be minimal to no natural, cultural, or socio-economic impacts associated with implementing the proposed improvements;
- There are no anticipated design exceptions or variations to FDOT or FHWA policies, rules, or standards anticipated for this project, but if any exception/variation should arise it will be processed per FHWA and FDOT standards;
- The access management within the AOI of the I-75 and Gibsonton Drive interchange will not be changed by the proposed improvements to be implemented as part of the Build Alternative;
- Based upon this analysis, the proposed modifications under Build Alternative provide significant improvements to corridor operation, mitigate congestion, and enhance safety within the study AOI.

Appendices