

## **Executive Summary**

The Florida Department of Transportation (FDOT) District Seven, in coordination with Hillsborough County, prepared an Interchange Modification Report (IMR) to document the safety, operational and engineering acceptability of improving the I-75 (SR 93A) and CR 672 (Big Bend Road) interchange in Hillsborough County, Florida. The proposed improvements are needed to alleviate existing traffic congestion, improve highway safety, and provide for additional roadway capacity to support growth and economic development. The following summarizes the results of an evaluation of existing and future traffic operating conditions with and without the proposed improvements.

### **A. Existing Traffic Conditions**

The I-75 ramp terminal intersections at Big Bend Road exhibit failing Levels of Service (LOS) during both the morning and afternoon peak travel periods. In the morning, motorists on westbound Big Bend Road that desire to travel north on I-75 are required to perform a left turn movement from a single turn lane. Due to the magnitude of traffic volume performing the left turn movement (more than 1,200 vehicles per hour), there is insufficient capacity to service the left turn demand which results in a vehicle queue that forms in the inside travel lane of westbound Big Bend Road and extends 1.2 miles eastward to US 301. In the afternoon, the reciprocal traffic movement requires motorists on southbound I-75 that desire to travel eastbound on Big Bend Road to exit onto a lower speed loop off ramp located in the southwest quadrant of the interchange. Due to reduced vehicle operating speeds associated with the horizontal curvature of the loop ramp and limited vehicle storage for left turning vehicles, traffic backs up onto southbound I-75. Both above-referenced locations are identified safety concerns, as historical crash data from the FDOT Crash Analysis Reporting System (CARS) for the five-year period from 2014 to 2018 reveals that there is a disproportionate number of rear-end crashes. The I-75 mainline within the vicinity of Big Bend Road experiences a crash rate of 1.48 crashes per million vehicle miles traveled (MVMT), which is 1.6 times greater than the statewide average for similar interstate facilities across the State of Florida. Similarly, Big Bend Road experiences a crash rate of 7.86 crashes per MVMT, which is 2.3 times greater than the statewide average for similar four-lane, divided, arterial roadways. The economic loss due to these crashes is estimated to be \$140.7 million over the five-year period.

### **B. Future Traffic Conditions**

In order to alleviate existing operational and safety deficiencies, the widening of Big Bend Road to six lanes, modifications to the ramping of the I-75/Big Bend Road interchange to provide directional on and off ramp to/from the north, and elimination of the traffic signal and access on Big Bend Road at the entrance to East Bay High School are proposed. The following summarizes the results of the CORSIM microsimulation analysis conducted to evaluate the future traffic operations of the I-75/Big Bend Road interchange with (Build Alternative) and without (No Build Alternative) the proposed improvements under opening year (2025) and design year (2045) traffic conditions.

#### Opening Year (2025)

*No Build Alternative* – The No Build Alternative assumes that the existing traffic control and geometric features of the I-75/Big Bend Road interchange are maintained by the year 2025. However, the adjacent signalized intersections of Covington Garden Drive and Simmons Loop will receive turn lane improvements to accommodate traffic volumes generated by Hillsborough County planned development within the study area. The benefit of this alternative is that there are no additional costs associated with implementing the proposed transportation improvements. However, it is anticipated that the operational and safety deficiencies identified under existing conditions will be further exacerbated

with increasing levels of traffic; and the purpose and need of the project are not met. The following conclusions are derived from the opening year (2025) traffic analysis:

- Northbound and southbound I-75 freeway segments are projected to operate at failing LOS in the AM and PM peak periods;
- The northbound I-75 on ramp and the southbound I-75 off ramp are projected to exhibit failing LOS in the AM and PM peak periods, respectively;
- Both I-75 ramp terminal intersections are projected to experience excess overall vehicle delays that are greater than the LOS F threshold of 80 seconds/vehicle; and
- The average vehicle operating speeds on Big Bend Road are projected to be less than 20 miles per hour (mph).

*Build Alternative* – The Build Alternative consists of the widening of Big Bend Road to six lanes from Covington Garden Drive to Simmons Loop, providing directional on and off ramps on I-75 north of Big Bend Road, and eliminating both the existing traffic signal and access on Big Bend Road at the East Bay High School entrance. The results of the microsimulation analysis for opening year (2025) traffic conditions are listed below:

- The northbound and southbound I-75 freeway segments north of Big Bend Road are projected to continue to experience oversaturated traffic conditions. However, a substantial operational benefit is projected with the Build Alternative when compared to the No Build Alternative. Vehicle operating speeds on southbound I-75 north of Big Bend Road are projected to increase from a speed that is less than 20 mph to a speed that is approximately 60 mph;
- Both I-75 ramp terminal intersections are projected to experience overall vehicle delays that are less than 20 seconds/vehicle (LOS B or better) for both the AM and PM peak periods; and
- The average vehicle operating speeds on Big Bend Road are projected to be approximately 30 mph in both the eastbound and westbound directions during both the morning and afternoon peak periods. In comparison to the No Build Alternative, a substantial increase in operating speeds is anticipated on Big Bend Road with the Build Alternative.

#### *Design Year (2045)*

*No Build Alternative* – The No Build Alternative assumes that the existing traffic control and geometric features of the I-75/Big Bend Road interchange remain unchanged by the year 2045. However, the adjacent signalized intersections of Covington Garden Drive and Simmons Loop will receive turn lane improvements to accommodate traffic volumes generated by Hillsborough County planned development within the study area. Prior to the design year (2045), express lanes are planned for I-75 as part of the interstate modernization initiative of the Tampa Bay Next (TBNext) Program. With the express lanes in place, it is anticipated that a proportion of the traffic in the general use lanes of I-75 will redistribute to the express lanes, thus providing some relief to existing traffic congestion on I-75. There will be no connection of the I-75/Big Bend Road interchange ramps to the express lanes. The following conclusions are derived from the design year (2045) No Build traffic analysis:

- The I-75 freeway segments north and south of Big Bend Road are projected to operate at failing LOS in both the AM and PM peak periods;
- Both I-75 ramp terminal intersections are projected to experience failing LOS; and
- The average vehicle operating speed on Big Bend Road is projected to be less than 20 mph.

**Build Alternative** – The Build Alternative consists of the widening of Big Bend Road to six lanes from Covington Garden Drive to Simmons Loop, providing directional on and off ramps on I-75 north of Big Bend Road, and eliminating both the existing traffic signal and access on Big Bend Road at the East Bay High School entrance. Like the No Build Alternative, the Build Alternative also assumes that express lanes are provided on I-75. The results of the microsimulation analysis for design year (2045) traffic conditions are listed below:

- The northbound and southbound I-75 freeway segments north of Big Bend Road are projected to experience poor operating conditions in the AM and PM peak period, respectively. However, there is a substantial operational benefit when compared to the No Build Alternative;
- Both I-75 ramp terminal intersections are projected to operate at LOS C or better with overall vehicle delays less than 25 seconds/vehicle; and
- LOS D or better arterial operations are projected on Big Bend Road, with average speeds greater than 25 mph in both the eastbound and westbound directions during both the morning and afternoon peak periods.

### C. Alternatives Comparison

To compare the operational benefits of implementing the proposed improvements that are associated with the Build Alternative, network-wide Measures of Effectiveness (MOEs) from the CORSIM microsimulation analysis are summarized in **Table E1** for both the No Build Alternative and the Build Alternative under opening year (2025) and design year (2045) traffic conditions.

**Table E1 – Network-Wide CORSIM Measures of Effectiveness (MOEs)  
Opening Year (2025) and Design Year (2045) AM and PM Peak Hour Periods**

Measure of Effectiveness (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	131,239	148,631	13%	158,543	212,419	34%
	PM	147,673	159,479	8%	128,123	228,448	78%
Travel Time Total (hours)	AM	6,311	3,107	-51%	6,975	5,030	-28%
	PM	7,472	3,251	-56%	8,018	5,152	-36%
Speed Average (mph)	AM	23	46	100%	24	43	79%
	PM	21	49	133%	16	44	175%
Total Travel Delay (hours)	AM	4,212	674	-84%	4,471	1,539	-66%
	PM	5,150	642	-88%	5,944	1,401	-76%

The results of the microsimulation analysis shown in **Table E1** illustrate the substantial operational benefit that is provided by implementing the Build Alternative. This benefit is evidenced by an increase in vehicle miles traveled and average speed, while reducing travel time and total travel delay.

In addition, a quantitative safety analysis using procedures from the *Highway Safety Manual (HSM)* was conducted to estimate the safety benefits of implementing the proposed improvements. The quantitative safety analysis revealed that modifying the I-75/Big Bend Road interchange to provide the proposed Build Alternative improvements is projected to reduce 70 crashes per year, which equates to an annual cost savings of \$8.9 million. Comparing this annual cost savings to the annual cost of constructing the proposed improvements reveals that the safety benefit far outweighs the cost by a factor of nearly two; thereby indicating that the proposed improvements are economically justifiable. The Build Alternative improvements would provide a greater level of mobility and safety for all users of the I-75/Big Bend Road interchange.