

5.5 SAFETY ANALYSIS OF THE 2045 NO-BUILD AND BUILD ALTERNATIVES

5.5.1 HSM Analysis

A safety analysis was conducted to study the impacts of the proposed Build Alternative on local street network within the AOI. The study area focused on the Florida's Turnpike freeway segments, ramp terminals and ramp segments, Boynton Beach Boulevard arterial segment and major intersection along the arterial. The analysis was conducted using the predictive methods in Chapters 12 and 19 of the HSM, where available, and the Enhanced Interchange Safety Analysis Tool (ISATe), which apply a combination of Safety Performance Functions (SPFs), CMFs, and calibration factors to estimate frequency and cost of crashes for each segment and intersection.

It is important to note that the current edition of the HSM does not include a predictive method for arterial segments with six or more lanes. A research effort under the NCHRP Project 17-58 is underway to develop predictive methods for six-lane urban and suburban arterials and will be included in the next edition of the HSM (Chapter 12). The analysis was conducted assuming the predictive methods for four-lane divided arterials for both the No-Build and Build Alternatives.

No-Build scenario assumes no widening on the Florida's Turnpike Mainline. Under the Build Alternative, the widening for this corridor is planned to include 10 lanes (5 each direction) to the south and 8 lanes (4 each direction) north of the Boynton Beach interchange. The Build Alternative has an additional merge segment along the southbound freeway when compared to the No-Build, which may result in a higher number of crashes but the reduction in congestion may result in fewer number of crashes. Also, the provision of added turn lanes on the interchange crossroad and removal of southbound weaving section between the southbound off-ramp and the southbound on-ramp are expected to reduce crashes.

The No-Build and Build Alternatives were evaluated, and the predicted number of crashes and associated costs were compared for the 2025 to 2045 analysis period. The results of the safety analysis are summarized in **Table 5.5**. It is important to note that the safety analysis tools available to date are deterministic in nature and estimate future crashes mainly based on AADTs and roadway characteristics. These tools do not account for vehicle interactions. The overall predicted crashes are lower for Build compared to the No-Build. Based on these results, the Build Alternative is predicted to have a 20-year crash cost savings of approximately \$46 Million compared to the No-Build Alternative, in 2020 present value. Detailed analysis tables are provided in **Appendix L**.

Table 5.5
2025 to 2045 Predicted Number of Crashes and Cost Saving

Site	No-Build		Build	
	N _{predicted} *	2020 Present Value	N _{predicted} *	2020 Present Value
Boynton Beach Boulevard Intersection				
Hagen Ranch Road	405.16	\$47,356,856	405.16	\$47,356,856
Boynton Beach Boulevard Segment				
Northbound Ramp Terminal and Hagen Ranch Road	140.61	\$16,449,720	140.61	\$16,449,720
Florida's Turnpike				
Freeway segments	1,536.25	\$139,214,729	1,242.33	\$112,930,182
Ramp segments	272.41	\$20,838,574	161.07	\$12,343,942
Ramp Terminals	700.82	\$74,791,318	607.32	\$63,696,545
Subtotal	2,509.47	\$234,844,620	2,010.72	\$188,970,669
Total	3,055.24	\$298,651,196	2,556.49	\$252,777,245
Crash Cost Saving	\$45,873,951			

*Predicted Crashes