The crash types and severity are shown in **Table 7-1** and **Table 7-2**. Of the two pedestrian related crashes, one occurred on Pine Forest Road and one occurred on I-10 west of SR US 29. Of the four fatal crashes, all occurred on I-10 or on I-10 ramps. The I-10 roadway segment crash rate analysis, which covers I-10 from east of the proposed Beulah Road to west of US 29, is shown in **Table 7-3**.

Table 7-1. Crashes by Year and Type

Type	2013	2014	2015	2016	2017	Total	Percent of Total
Angle	1	4	0	0	4	9	2.6%
Animal	0	1	0	1	0	2	0.5 %
Head On	0	0	1	0	0	1	0.3%
Left Turn	10	4	5	3	9	31	8.9%
Off Road	18	14	5	4	10	51	14.6%
Other	6	12	2	13	6	39	11.2%
Pedestrian	0	1	0	1	0	2	0.5%
Rear End	32	41	23	32	30	158	45.3%
Right Turn	3	0	0	0	0	3	0.9%
Rollover	5	1	1	4	0	11	3.2%
Sideswipe	6	8	6	7	10	37	10.6%
Unknown	0	1	0	2	2	5	1.4%
Total	**81**	**87**	**43**	**67**	**71**	**349**	**100.0%**

Table 7-2. Crash Severity Table

Year	Fatal Crashes	Injured Crashes	Property Damage Only Crashes	Total Crashes
2013	1	31	49	81
2014	0	28	59	87
2015	1	20	22	43
2016	0	15	52	67
2017	2	21	48	71
Totals	**4**	**115**	**230**	**349**

Table 7-3. Statistical Crash Analysis for the I-10 Mainline

FDOT District 3 Statistical Crash Analysis	
Average Annual Daily Traffic	44,600
Million Vehicles Per Year (Based on Average Annual Daily Traffic)	16.279
Length of Segment (Miles)	6.926
Reported Crashes from January 2013 – December 2017 (5 years)	132
FDOT Statistical Crash Rate Per Million Vehicle Miles	0.469
Actual Number of Crashes Per Million Vehicle Miles	0.234

7.2 HSM PREDICTIVE METHOD

The Highway Safety Manual Predictive methodology provides techniques to estimate crashes for a given facility, test the effectiveness of alternative designs on estimated crashes and evaluate the economic impact of crashes. The first step is to establish a prediction of annual crashes, based on existing traffic volumes, facility types, geometric conditions and observed crashes. This is followed by an estimate of future crashes with projected traffic volumes for selected alternatives.

The HSM safety analysis was completed using traffic AADT and turning movement projections for I-10 and the ramp terminii. For the analysis, the existing I-10 mainline was separated into 5 segments, and the ramps into 17 segments, with 6 exit ramp terminals. The proposed roadway was similar except there were 16 ramp segments.

The historic crashes utilized in the 2026 Expected Crash determination, using the EB Method, were those described in the historic crash data from the first section of this report. The crash modification factors are the default values in the ISATe spreadsheet – Florida specific calibration factors have not yet been developed. The CMF categories utilized in the model for fatal and injury crashes are summarized below. Further detail on CMFs is in **Appendix B**.

- Freeway Segment CMF Categories
    - Horizontal curvature, Lane width, outside shoulder width, inside shoulder width, median width, median barrier, shoulder rumble strip, outside clearance, outside barrier
- Ramp Segment CMF Categories
    - Horizontal curvature, lane width, right shoulder width, left shoulder width, right side barrier, left side barrier
- Crossroad Ramp Terminal CMF Categories
    - Non-ramp public street leg, segment length, protected left-turn operation, channelized right-turn on crossroad, channelized right-turn on exit ramp, access point frequency, crossroad left-turn lane, crossroad right-turn lane, median width, exit ramp capacity, skew angle

The predicted crashes in 2026 and 2046 No-Build and Build are shown in **Table 7-4**. The analysis results found that the total crashes decreased in the future Build Alternative compared to No-Build Alternative in both 2026 and 2046. The mainline crashes benefit from the additional lanes and show a decrease in crashes for the Build Alternative. This decrease is based on the published crash modification factor of 0.69 (i.e. 31% decrease in crashes) for widening from four to six freeway lanes and reflects a lower density of traffic spread across more lanes and the ability to maneuver more freely. There is an increase in predicted ramp crashes in the Build Alternative due to longer ramps in the diverging diamond design. The crossroad ramp terminal total crashes is predicted to decrease in the Build Alternative compared to the No-Build Alternative. Although the ISATe does not address DDI's, a recent addition to the CMF Clearinghouse shows a significant safety increase when converting a diamond interchange to a DDI. This specific CMF applies to the overall interchange and has a star rating of 4/5 stars (i.e. high reliability) and a value of 0.59 (i.e. 41% decrease in crashes). Thus, a DDI should result in safety improvements at crossroad ramp terminals, and along the crossroads serviced by the ramps.

Table 7-4. No-Build vs Build Predicted Crashes

Facility	2026 No-Build	2026 Build
Freeway Segments	94.3	88.3
Ramp Segments	8.9	10.9
Crossroad Ramp Terminals	38.6	27.2
Totals	141.7	126.4

Facility	2046 No-Build	2046 Build
Freeway Segments	159.1	143.2
Ramp Segments	10.5	13.2
Crossroad Ramp Terminals	45.6	28.7
Totals	215.2	185.1

7.3 BENEFIT-COST

Considering the predicted crashes for the No-Build and Build conditions allows a determination of the Benefit / Cost ratio for the project, using the following costs:

- Average cost per crash on a rural interstate segment of $327,385 (per the FDM)
- Average cost per crash on an urban interstate segment of $153,130 (per the FDM)
- Annualized capital cost of $2,051,807 (per the FDOT Cost-Per-Mile Model)

The benefit / cost analysis showed a favorable B/C ratio (greater than 1.0) for both future years 2026 and 2046 with the proposed improvements in place. The B/C ratios were determined by comparing the predicted crashes for the No-Build and Build Alternatives, per HSM methodologies. The 2026 annual benefit cost ratio is 1.792, and the 2046 annual benefit cost ratio is 3.525.

More information can be found in **Appendix B.**