The results show four ramp terminal intersections with average queue lengths exceeding available storage during the Opening Year (2025) AM peak period and three during the Opening Year (2025) PM peak period. By Design Year (2045), two ramp terminal intersections have average queue lengths that exceed available storage during the AM peak period and three during the PM peak period. These intersections are summarized below.

Opening Year (2025):

- US 1 at I-295 northbound ramp terminal (AM and PM)
- US 1 at I-295 southbound ramp terminal (AM and PM)
- Gate Parkway at SR 202 ramp terminal (AM)
- Kernan Boulevard at SR 202 eastbound ramp terminal (AM and PM)

Design Year (2045):

- US 1 at I-295 northbound ramp terminal (AM and PM)
- Gate Parkway at SR 202 ramp terminal (AM and PM)
- Kernan Boulevard at SR 202 westbound ramp terminal (PM)

The above intersections are considered adjacent to the project location and are not within the vicinity of the project.

Maximum queue length tables are provided in **Appendix J** of this report for ramp terminal intersections.

7.4 Predictive Safety Analysis Summary

A crash predictive method analysis was performed as per Chapter 18 of the AASHTO Highway Safety Manual (HSM) Supplement utilizing the Enhanced Interchange Safety Analysis Tool (ISATe) to obtain an estimate of the predicted average crash frequency during the Opening Year (2025) and the Design Year (2045) associated with the two alternatives: the Original Build Alternative and the Preferred Build Alternative. The Original Build Alternative considers the improvements currently under construction as shown in the I-295 East Express Phase I SIMR Re-evaluation (July 2016). The Preferred Build Alternative contains all the proposed roadway geometry modifications as described in **Section 5**.

Since the Original Build Alternative and the Preferred Build Alternative require significant changes in the cross-section design from the Existing Condition and adds additional through lanes within the study area, the Predictive Method for Freeways using the Empirical-Bayes Method was not used for this study in accordance with the following language found in Appendix A, Section A.2.1, Page A-16 of the Highway Safety Manual (HSM), 1st edition.

> "The EB Method should be applied for the analyses involving the following future project types: Projects in which the roadway cross section is modified but the basic number of through lanes remains the same"

Section 18.1, Page 18-56 of the HSM supplement states that the predictive method has a limitation of not accounting for the influence of limited access managed lanes that are buffer separated from the GP lanes. Additionally, Section 18.11.1, Page 18-57 of the HSM supplement states that in evaluating freeways with managed lanes, the managed lanes can be treated as part of the median. The managed lane's entry or exit points are treated as entrance or exit ramps respectively, on the adjacent freeway. This approach can be used to evaluate the safety condition of the GP lanes without addressing the safety of managed lanes. The two alternatives evaluated have very similar managed lanes geometry and the analysis assumes that the safety condition in the managed lanes will not be affected by the proposed modifications. Therefore, the predictive safety analysis in this section only presents an estimate of the predicted crash frequency that occur in the GP lanes evaluated by using GP lanes geometry and volumes.

A summary of the predicted average crash frequency obtained by HSM analysis is presented in **Table 7-18**. **Appendix K** presents the input data used to perform the predictive safety analysis and the output summary for all the alternatives evaluated.

Table 7-18: GP Lanes Predicted Average Crash Frequency (Crashes/Year)

Analysis Year	Alternative	Predicted Crash Frequency by Severity					Total	Percent Change
		K	A	B	C	PDO*		
2025	Original Build	1.010	2.666	18.289	37.028	148.755	207.747	-3%
	Preferred Build	1.002	2.645	18.142	36.729	143.693	202.211	
2045	Original Build	1.835	4.838	33.183	66.971	303.151	409.979	-4%
	Preferred Build	1.812	4.777	32.754	66.091	289.702	395.135	

K – fatal injury; A – serious injury; B – minor injury; C – possible injury
*PDO – property damage only

The analysis indicates that the predicted average crash frequencies along I-295 from US 1 to Town Center Parkway with the Original Build Alternative are estimated to be approximately 207.7 crashes per year and 410.0 crashes per year in the Opening Year (2025) and Design Year (2045), respectively. The Preferred Build Alternative decreases the predicted average crash frequencies to approximately 202.2 crashes per year and 395.1 crashes per year in the Opening Year (2025) and Design Year (2045), respectively. When compared to the Original Build Alternative, this is approximately a 3 percent decrease and a 4 percent decrease in the total predicted average crash frequency in the Opening Year (2025) and Design Year (2045), respectively.

Generally, the Preferred Build Alternative shows safety improvement along the I-295 GP lanes when compared to the Original Build Alternative. A segment by segment comparison between the two analyzed alternatives as presented in **Appendix K** shows that there is a negative safety impact at the I-295 northbound exit to Baymeadows Road. At this location the ramp exit design is proposed to be changed from a lane drop to a taper design. A parallel ramp exit design with a sufficient deceleration lane length can help to mitigate the adverse safety impacts. Additionally, the predictive safety analysis shows a slight increase in the predicted fatal and injury crashes that only involves a single vehicle in all the segments where there is an increase in the number of lanes. This observation is also supported by the HSM supplement Safety Performance Function (SPF) coefficients for single vehicle fatal and injury crashes as shown in Table 18-7, Page 18-28 of the HSM supplement. This table indicates that for all multi-vehicle crashes and single-vehicle property damage only (PDO) crashes, an increase in lanes along a corridor will decrease the predicted number of crashes. However, the increase in lanes along a corridor is expected to increase the number of predicted single-vehicle fatal and injury crashes as shown in this table. Overall, there is a reduction in the predicted number of crashes with the Preferred Build Alternative when compared with the Original Build Alternative.

7.5 Safety Benefits

The Preferred Build Alternative shows a reduction in the predicted average crash frequency when compared to the Original Build Alternative. To compare the benefits of potential crash reduction resulting from the Preferred Build Alternative when compared to the Original Build Alternative, the predicted average crash frequencies at different severity levels were converted to monetary values by using the FDOT KABCO crash costs from Table 122.6.2 of the 2020 Florida Design Manual. **Table 7-19** provides a summary of the predicted crash costs of the two alternatives.

Table 7-19: Summary of Predicted Crash Costs

Analysis Year	Description	Crash Severity					Total	Annual Benefit
		K	A	B	C	PDO		
Cost per Crash		$10,670,000	$872,612	$174,018	$106,215	$7,700		
2025	Original Build	$10,773,619	$2,326,063	$3,182,611	$3,932,895	$1,145,415	$21,360,602	$200,442
	Preferred Build	$10,687,656	$2,307,747	$3,157,113	$3,901,209	$1,106,435	$21,160,160	
2045	Original Build	$19,582,372	$4,222,022	$5,774,505	$7,113,297	$2,334,266	$39,026,462	$576,157
	Preferred Build	$19,331,514	$4,168,457	$5,699,810	$7,019,820	$2,230,703	$38,450,305	

Source: FDOT KABCO Crash Costs, Table 122.6.2, 2020 FDOT FDM

The annual crash costs predicted for the Preferred Build Alternative are lower than the Original Build Alternative by approximately $200,400 and $576,200 in the Opening Year (2025) and Design Year (2045), respectively. This is approximately a **0.9 percent** and a **1.5 percent** reduction in the crash costs in the Opening Year (2025) and Design Year (2045), respectively.