

SP 02 /1 75)	Movement	Available	Queue (ft) ⁽²⁾				
56-75)	wovement	Storage (ft) ⁽¹⁾	AM	РМ			
Southbound Ramp Terminal	SB to WB (R)	4,430	381	930			
	SB to EB (R)	3,690	1,950	1,752			
Northbound Ramp Terminal	NB to EB (L)	6,940	579	900			
	NB to WB (R)	7,710	480	1,116			

Table 5.3 – Opening Year 2025: Build Off-Ramp Signal Queuing Analysis Results

(1) The available storage length was calculated accounting for changes in number of lanes.

(2) The queuing distance was obtained by multiplying the resulting queue per lane and number of lanes on the approach.

SP 02 /1 75)	Movement	Available	Queue (ft) ⁽²⁾	
36-33 (1-73)	wovement	Storage (ft) ⁽¹⁾	AM	РМ
Southbound Ramp Terminal	SB to WB (R)	4,430	489	1,044
	SB to EB (R)	3,690	2,625	2,025
Northbound Ramp Terminal	NB to EB (L)	6,940	684	1,038
	NB to WB (R)	7,710	537	1,317

Table 5.4 – Design Year 2045: Build Off-Ramp Signal Queuing Analysis Results

(1) The available storage length was calculated accounting for changes in number of lanes.

(2) The queuing distance was obtained by multiplying the resulting queue per lane and number of lanes on the approach.

5.5 Build (Enhanced) Alternative Safety Analysis

It should be noted that the System Interchange Modification Report (SIMR) conducted as part of the original 2012 PD&E (which included the subject SR 93 (I-75) and SR 820 (Pines Boulevard) interchange) recommended the following improvements: implement express lanes; improve skid resistance for the pavement surface and provide adequate drainage; remove, relocate or shield fixed objects; implement auxiliary lanes; and reduce friction areas.

The implementation of express lanes has occurred under project 421707-4, SR-93 (I-75) Manage Lane System - Segment C (from south of Miramar Parkway to south of Sheridan Street). The existing crash data analysis reflects the safety improvements from this project. As expected, the crash data shows a spike on the number of crashes on 2016 during final stages of construction and a subsequent significant decrease on the number of crashes as the Express Lanes became operational.

The other recommended improvements have been recently implemented by project 437832-1, SR-93 (I-75) (from Miami-Dade County Line to Sheridan Street) or are part of both, the No-Build (PD&E Preferred) and Build (Enhanced) alternatives for the subject project 415152-1, SR-93 (I-75) and SR-820 (Pines Boulevard) Interchange. Therefore, the following safety analysis is focused on the interchange improvements required to implement a P&R facility on the southeast quadrant of the interchange in accordance with the Purpose and Need for this project.



The safety analysis was conducted for the SR-93 (I-75) NB Ramp Terminal intersection with SR-820 (Pines Boulevard) to evaluate the Build conditions for Opening Year 2025 and Design Year 2045. The evaluation assesses the safety impacts of the interchange modifications necessary to provide a P&R facility on the southeast quadrant of the interchange. The safety target for this evaluation is to maintain or reduce the projected number of crashes under the No-Build (PD&E Preferred) Alternative.

The intersection safety analysis was conducted using the FHWA Safety Performance for Intersection Control Evaluation (SPICE) Tool. The SPICE tool calculates crash frequency and severity by utilizing HSM strategies to perform a comparative predictive safety analysis of different intersection control strategies. This tool was developed by FHWA to automate the predictive analysis of intersections. This tool allows conducting Intersection Control Evaluations (ICE) by developing the appropriate Safety Performance Functions (SPFs) based on the Empirical Bayes (EB) method and implementation of Crash Modification Factor (CMF) as applicable.

For purpose of this analysis, the primary modification is the conversion from at-grade to grade-separation at the intersection. This modification relocates the eastbound through movements along SR-820 (Pines Boulevard) and the SR-93 (I-75) northbound to eastbound movements to a new grade-separated intersection. Full access to the P&R facility is provided at the SR-93 (I-75) NB Off-Ramp at-grade intersection.

The analysis was completed for two alternatives, the No-Build (PD&E Preferred) at-grade configuration shown as "Traffic Signal" in the analysis and the proposed Build (Enhanced) grade-separated configuration shown as "Other 1" in the analysis. All of the inputs utilized were consistent for both alternatives except that a Crash Modification Factor (CMF) of 0.73 for the implementation of grade-separation counter measure was utilized in order to assess the safety impact of this change. The CMF was obtained from the FHWA Crash Modification Factors Clearinghouse. Different CMFs are developed based on the different study parameters: crash severity, intersection geometry and traffic control. A review of the applicable CMFs shows a range between 0.58 to 0.84. The CMF of 0.73 was selected since the study parameters best represent the conditions for the analysis.

The safety analysis indicates that the Build (Enhanced) Alternative will improve safety conditions. Based on the results of the SPICE analysis, the proposed condition with grade-separation would reduce the predicted total project life cycle crashes by a total of 101 crashes. Of those 101 crashes, 31 are predicted to be fatal/injury crashes. **Table 5.5** summarizes the results of the safety analysis for the SR-93 (I-75) NB Ramp Terminal intersection with SR-820 (Pines Boulevard). A Ranking of 1 is given to the safest alternative. Documentation of the Build Alternative traffic intersection safety analysis is provided in **Appendix R**.

Control Strategy	Crash Type	Opening Year 2025	Design Year 2045	Total Crashes Project Life	Rank ⁽¹⁾	Source of Prediction
No-Build ⁽²⁾	Total	21.39	22.64	462.35	2	SPF w/EB
	Fatal & Injury	6.65	7.08	144.15		
Build ⁽³⁾	Total	16.69	17.66	360.75	1	CMF
	Fatal & Injury	5.18	5.52	112.44	Ť	

Table 5.5 – Safety Analysis Results

(1) A Ranking of 1 is given to the safest alternative.

(2) No-Build (PD&E Preferred) At-Grade Alternative.

(3) Build (Enhanced) Grade-Separated Alternative.



It should also be noted that the relocation of the SR-93 (I-75) NB to EB off-ramp under the Build (Enhanced) Alternative configuration prevents vehicular queues from reaching the upstream gore area between the two northbound off-ramps; thus, reducing conflicts and providing additional safety improvement over the No-Build (PD&E Preferred) Alternative).