

### 6.3.6 User Benefit Analysis

A user benefit over a 21-year project life span of the Build Alternative with and without Livingston Road interchange was estimated using projected reduction in network travel time. Fuel consumption and emissions were not included. Based on 2022 dollars, the estimated user benefit is \$72 million for travel time saving from year 2030 to 2050. Therefore, inclusion of the new full reliever interchange improves the operations at the US 192 interchange by rerouting traffic to the Livingston Road interchange. Relief in congestion, redistribution of traffic, and modified ramp segments are expected to result in a reduced number of potential crashes at US 192 interchange. The table used to estimate the user benefit is presented in **Appendix I**.

## 6.4 FUTURE SAFETY EVALUATION

A future conditions safety analysis was conducted to study the impacts of the proposed Build Alternative within the AOI. The study area focused on the SR 429 freeway segments, ramp terminals and ramp segments, Sinclair Road, Livingston Road, US 192, Western Way and Seidel Road arterial segments, and major intersections along the arterials. The analysis was conducted using the predictive methods in Chapters 12 and 19 of the Highway Safety Manual (HSM), and Interchange Safety Analysis Tool (ISATe), which apply a combination of Safety Performance Factors (SPFs), Crash Modification Factors (CMFs), and calibration factors to estimate frequency and cost of crashes for each segment and intersection. Note that the resulting predictions should be used with caution if the input AADTs (highlighted cell in the HSM tools) exceed the range of data used to develop one or more of the SPFs. The growth rates were estimated based on 2030 and 2050 AADTs.

The following crash severity level costs were used for the crash cost savings analysis (Source: FDOT 2022 Design Manual Crash Cost Table 122.6.2):

- Fatal (K) \$10,890,000
- Severe Injury (A) \$888,030
- Moderate Injury (B) \$180,180
- Minor Injury (C) \$103,950
- Property Damage Only (O) \$7,700

The No-Build and Build Alternatives were evaluated, and the predicted number of crashes and associated costs were compared for the 2030 to 2050 analysis period. The results of the safety analysis are summarized in **Table 6.19**. It is important to note that the safety analysis tools available to date are deterministic in nature and estimate future crashes mainly based on AADT and roadway characteristics. These tools do not account for vehicle interactions (driver behaviors). The No-Build Alternative is expected to have extensive congestion and queues that may potentially impact crashes especially along SR 429. Consequently, cost savings would be higher than reported. Nevertheless, the overall predicted crashes are lower for the Build Alternative compared to the No-Build Alternative due to added capacity along SR 429. The Build Alternative enhanced ramp reconfigurations are anticipated to provide safer operations with less traffic congestion and smoother merging/diverging movements. Relief in congestion, redistribution of traffic, and modified ramp segments are expected to result in a reduced number of potential crashes. The results of the safety analysis are summarized in **Table 6.19** and detailed analysis tables are provided in **Appendix I**.

The following intersections are anticipated to experience improved safety under Build conditions. The reduction in the number of projected crashes is due to the anticipated diversion of traffic related to the new interchange at Livingston Road.

- Sinclair Road and both ramp terminals
- US 192 and both ramp terminals
- US 192 and East Orange Lake Boulevard
- US 192 and Inspiration Drive
- US 192 and Formosa Gardens Boulevard

The Build Alternative has additional merge and diverge segments with new access points at Livingston Road and along the freeway when compared to the No-Build Alternative, which results in a higher percentage of potential crashes. However, the overall predicted number of crashes is lower for the Build Alternative as compared to the No-Build Alternative. Based on these results, the Build Alternative is predicted to have a 21-year crash cost savings of approximately **\$10 Million** compared to the No-Build Alternative, in 2022 present value.

**Table 6.19  
2030 to 2050 Predicted Number of Crashes and Cost Savings**

Site	No-Build		Build	
	N <sub>predicted</sub> *	2022 Present Value	N <sub>predicted</sub> *	2022 Present Value
<b>Western Beltway</b>				
Freeway Segments	3,457.49	\$310,792,420	3,217.52	\$291,083,450
Sinclair Road Ramp Segments	33.58	\$2,569,379	28.95	\$2,214,929
Sinclair Road Ramp Terminals	114.71	\$11,879,846	110.64	\$11,411,850
US 192 Ramp Segments	59.00	\$4,496,517	54.02	\$4,116,748
US 192 Ramp Terminals	479.88	\$50,324,436	410.34	\$43,070,647
Livingston Ramp Segments	-	-	33.23	\$2,547,767
Livingston Ramp Terminals	-	-	61.81	\$6,509,253
Western Way Ramp Segments	160.07	\$12,196,406	200.28	\$15,244,250
Western Way Ramp Terminals	212.97	\$21,906,711	279.40	\$29,082,413
Seidel Road Ramp Segments	32.01	\$2,429,316	33.68	\$2,556,196
Seidel Road Ramp Terminals	86.79	\$8,679,912	145.79	\$15,167,061
<b>SUBTOTAL:</b>	<b>4,636.50</b>	<b>\$425,274,943</b>	<b>4,575.65</b>	<b>\$423,004,565</b>
<b>US 192 Segments</b>				
West Orange Lake Boulevard to SB Ramps	163.87	\$19,463,716	154.81	\$18,393,890
NB Ramps to East Orange Lake Boulevard	21.65	\$2,573,389	18.89	\$2,250,371
East Orange Lake Boulevard to Inspiration Drive	186.33	\$22,165,406	165.98	\$19,767,172
Inspiration Drive to Formosa Gardens Boulevard	280.61	\$33,351,083	248.69	\$29,597,666
<b>US 192 Intersection</b>				
US 192 and West Orange Lake Boulevard	462.62	\$55,193,583	519.68	\$61,775,476
US 192 and East Orange Lake Boulevard	508.92	\$60,473,040	373.79	\$44,441,974
US 192 and Inspiration Drive	371.87	\$44,149,090	338.21	\$40,187,386
US 192 and Formosa Gardens Boulevard	535.82	\$63,677,587	508.33	\$60,414,386
<b>SUBTOTAL:</b>	<b>2,531.69</b>	<b>\$301,046,894</b>	<b>2,328.38</b>	<b>\$276,828,321</b>

\*Predicted Crashes; Sources: FDOT 2022 Design Manual Crash Cost Table 122.6.2 HSM Crash Distribution for Florida Table 122.6.4

Table 6.13 (continued)  
2030 to 2050 Predicted Number of Crashes and Cost Savings

Site	No-Build		Build	
	N <sub>predicted</sub> *	2022 Present Value	N <sub>predicted</sub> *	2022 Present Value
<b>Formosa Garden Boulevard and Livingston Road Segments</b>				
Formosa Gardens Boulevard, US 192 to Livingston Road	115.56	\$13,606,427	147.69	\$17,342,423
Livingston Road, Formosa Garden Boulevard to Ramp Terminal	-	-	16.79	\$1,971,367
<b>Formosa Garden Boulevard and Livingston Road Intersection</b>				
Formosa Gardens Boulevard and Livingston Road	49.84	\$5,833,268	135.76	\$15,894,168
<b>SUBTOTAL:</b>	<b>165.40</b>	<b>\$19,439,695</b>	<b>300.24</b>	<b>\$35,207,958</b>
<b>Western Way Segments</b>				
Flagler Avenue to Flamingo Crossings Boulevard	337.65	\$3,600,696	337.65	\$3,600,696
Flamingo Crossings Blvd to Ramp Terminal	343.35	\$3,399,605	343.35	\$3,461,865
<b>Western Way Intersections</b>				
Western Way and Flagler Avenue	129.01	\$15,126,741	129.01	\$15,126,741
Western Way and Flamingo Crossings Boulevard	215.01	\$25,232,575	218.29	\$25,616,688
<b>SUBTOTAL:</b>	<b>1025.03</b>	<b>\$47,359,617</b>	<b>1028.30</b>	<b>\$47,805,991</b>
<b>Seidel Road Segments</b>				
Avalon Road to Ramp Terminal	23.36	\$2,716,337	22.50	\$2,639,049
Ramp Terminal to Lakeshore Pointe Drive	27.34	\$3,210,468	27.34	\$3,210,468
<b>Seidel Road Intersections</b>				
Seidel Road and Avalon Road	299.94	\$35,027,620	303.48	\$35,454,400
Seidel Road and Lakeshore Pointe Drive	219.95	\$25,855,872	219.95	\$25,855,872
<b>SUBTOTAL:</b>	<b>570.59</b>	<b>\$66,810,298</b>	<b>573.27</b>	<b>\$67,159,789</b>
<b>TOTAL</b>	<b>8929.21</b>	<b>\$859,931,447</b>	<b>8805.85</b>	<b>\$850,006,623</b>
<b>Crash Cost Savings</b>	<b>\$9,924,824</b>			

\*Predicted Crashes; Sources: FDOT 2022 Design Manual Crash Cost Table 122.6.2 HSM Crash Distribution for Florida Table 122.6.4