
Safety Study

NYS Route 5 (Buffalo Skyway)

PIN 5134.48

City of Buffalo, Erie County
New York

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New York State
Department of Transportation

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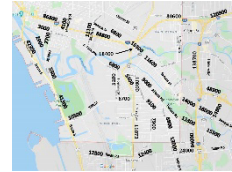
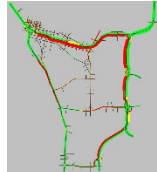
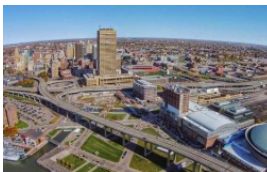


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1. Introduction

The following crash analysis was conducted as part of the NYS Route 5 (Buffalo Skyway) project and will assess the crashes on the facility to be removed (Buffalo Skyway) and crashes on the surrounding roadway network resulting from its removal. Listed below are the roadway segments studied categorized into two tiers: Primary and Secondary.

Primary Roadways

- Buffalo Skyway/Route 5 – Tifft Street to Church Street including all on/off ramps. (3.4 Miles)
- Tifft Street – Fuhrmann Boulevard to South Park Avenue (1.8 Miles)
- South Park Avenue – Tifft Street to Michigan Avenue (3.3 Miles)
- Interstate 190 – Exit 3 (Seneca Street) to Exit 6 (Elm Street)/Michigan Avenue (2.5 Miles)
- Michigan Avenue – Ohio Street to North Division Street (0.67 Miles)

Secondary Roadways

- Fuhrmann Boulevard – Ridge Road to Ohio Street (1.9 Miles)
- Ohio Street – Fuhrmann Boulevard to Michigan Avenue (1.5 Miles)
- Bailey Avenue – South Park Avenue to Clinton Street (1.2 Miles)

2. Study Approach

The methodology used for this report is based on the New York State Highway Design Manual, Chapter 5 Basic Design, dated September 1, 2017. The crash data utilized in this study was provided by New York State Department of Transportation (NYSDOT) Region 5 and includes the latest three years (May 1, 2016 to April 30, 2019) of available crashes in the Accident Location Information System (ALIS). The data reviewed included summaries of crash type, severity, location, weather conditions, time of day, as well as the police MV-104 crash reports.

The crash rate per million vehicle miles (Acc/Mvm) for all midblock segments and corridors with combined mainline and juncture analysis along the Project roadways was calculated using the following formula:

Segment Crash Rate (Acc/Mvm) = $\frac{1,000,000 \times \text{No. of crashes}}{\text{AADT of entering vehicles} \times \text{No. of yrs.} \times 365 \text{ days/yr.} \times \text{length of segment (mile)}}$

The crash rate per million entering vehicles (Acc/Mem) for all intersections within the Project limits was calculated using the following formula:

Intersection Crash Rate (Acc/Mev) = $\frac{1,000,000 \times \text{No. of crashes at intersection}}{\text{The sum of directional AADTs on all approaches} \times \text{No. of yrs.} \times 365 \text{ days/yr.}}$

The Annual Average Daily Traffic (AADT) volumes were obtained from the NYSDOT's Traffic Data Viewer GIS web-based application. In addition, the AADT for the intersection was calculated using the lower approach AADT for conservative purposes.

The calculated crash rates were compared to the statewide average crash rates to determine whether the segment or intersection location exceeds the statewide average rate of similar locations. The statewide average crash rate was obtained from the NYSDOT 2017-2018 Average Accident Rates for State Highways By Facility Type.

3. NYS Route 5 (Buffalo Skyway) Crash Analysis

3.1 Summary

The Buffalo Skyway (NYS Route 5) transverses north-south within the Project limits extending for approximately 3.4 miles from Tifft Street to Church Street. Classified as a Principal Arterial Expressway, the roadway is comprised of two lanes in each direction with acceleration and deceleration lanes for the on and off-ramps. The AADT for 2016 on the Buffalo Skyway just north of Fuhrmann Boulevard was approximately 42,300 vehicles with 21,700 vehicles in the northbound direction and 20,600 in the southbound direction. The posted speed limit is 55 MPH.

Crash data was analyzed on the mainline and on the on-ramps and off-ramps between reference marker 5 53023005 (located just south of Tifft Street) and reference marker 5 53023036 (located just south of Church Street) on the Buffalo Skyway. A map identifying the Project limits is shown in **Figure 3.1**.

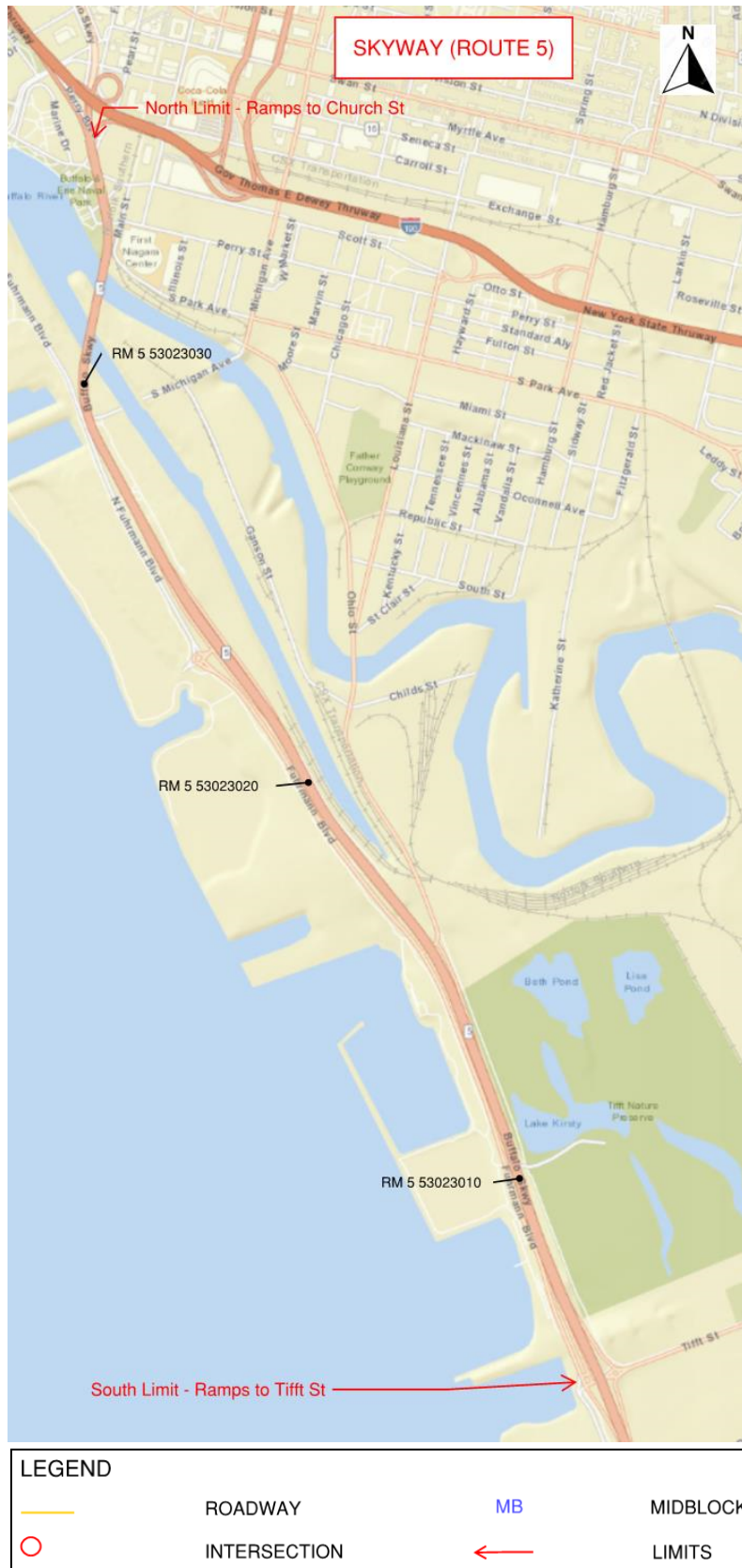


Figure 3.1 – NYS Route 5 (Buffalo Skyway) Location Map

A total of 57 crashes were identified between Tiftt Street and Church Street during the three-year study period (from May 1, 2016 to April 30, 2019). A total of 33 crashes (58%) occurred in the northbound direction and 24 crashes (42%) occurred in the southbound direction. Of the total 33 crashes that occurred in the northbound direction, 19 involved property damage, 12 resulted in injuries and two were non-reportable. Of the total 24 crashes that occurred in the southbound direction, 16 involved property damage only and eight resulted in injuries. There were no fatalities that occurred within the study area and no non-reportable crashes in the southbound direction on the Buffalo Skyway during the time period analyzed.

The total number of crashes listed by type and severity for the northbound and southbound corridors are shown in **Table 3.1**.

Table 3.1 – NYS Route 5 (Buffalo Skyway) - Mainline & Juncture Crash Summaries

Corridor	Crash Type													Severity				
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overtaken	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable	Property Damage Only	Injury	Fatal
1 NB - Tiftt Street On/Off Ramps to Church Street	18	5					7					2	1	33	2	19	12	
2 SB - Church Street to Tiftt Street On/Off Ramps	13	4					6					1		24		16	8	
Total	31	9	0	0	0	0	13	0	0	0	0	3	1	57	2	35	20	0

Note: Signalized intersections are in bold.

Below is summary of additional patterns identified in the total study area crash analysis:

- Weather Conditions:
 - 42% Clear
- Time of Day:
 - 38% 10:00am - 4:00pm
 - 55% Day light
- Time of Year:
 - 51% Winter (Dec-Feb)

A collision diagram was created to represent the locations that crashes occurred within the study area. The diagram plots the crash types and quantity and

identifies any clusters of crashes in relation to the existing roadway geometry or design. Within the three-year analysis period, a cluster of four rear-end crashes occurred on the on-ramp from I-190 to the Buffalo Skyway. Additionally, 25 crashes (or 45% of the total crashes on the Buffalo Skyway) occurred in the northbound and southbound travel lanes on the segment between and including the on-ramp and off-ramps for Tifft Street.

The Buffalo Skyway crash rates were calculated along the mainline and junctures and compared to the statewide average crash rates (from January 1, 2017 to December 31, 2018) to determine any locations above the statewide average rate. The crash rate per million vehicle miles (Acc/Mvm) were calculated for the overall limits of the Buffalo Skyway and included the mainline and the junctures (on-ramps/off-ramps) for the northbound and southbound corridors. The statewide average crash rate for a controlled urban, divided roadway with a total of four lanes is 1.24 Acc/Mvm. The calculated crash rate for the northbound corridor of the Buffalo Skyway from Tifft Street to Church Street (including on and off ramps) is 0.39 Acc/Mvm and the calculated crash rate for the southbound corridor of the Buffalo Skyway from Church Street to Tifft Street (including on and off ramps) is 0.30. The calculated crash rates for both corridors are below the statewide average crash rate.

The Buffalo Skyway is planned for removal, as such no mitigation measures are proposed along this highway.

4. Tifft Street Crash Analysis

4.1 Summary

Tifft Street transverses east-west within the Project limits and extending for approximately 1.8 miles from South Park Avenue to the east to Fuhrmann Boulevard to the west. Classified as a Minor Arterial, the roadway consists primarily of two lanes in each direction. The two-way AADT on Tifft Street just east of Ship Canal Parkway in 2015 was approximately 11,000 vehicles with 5,100 vehicles in the eastbound direction and approximately 5,000 in the westbound direction. The posted speed limit is 30 mph.

Crash data was analyzed at all the midblock and intersection locations within the Project limits as shown in **Figure 4.1.a**.

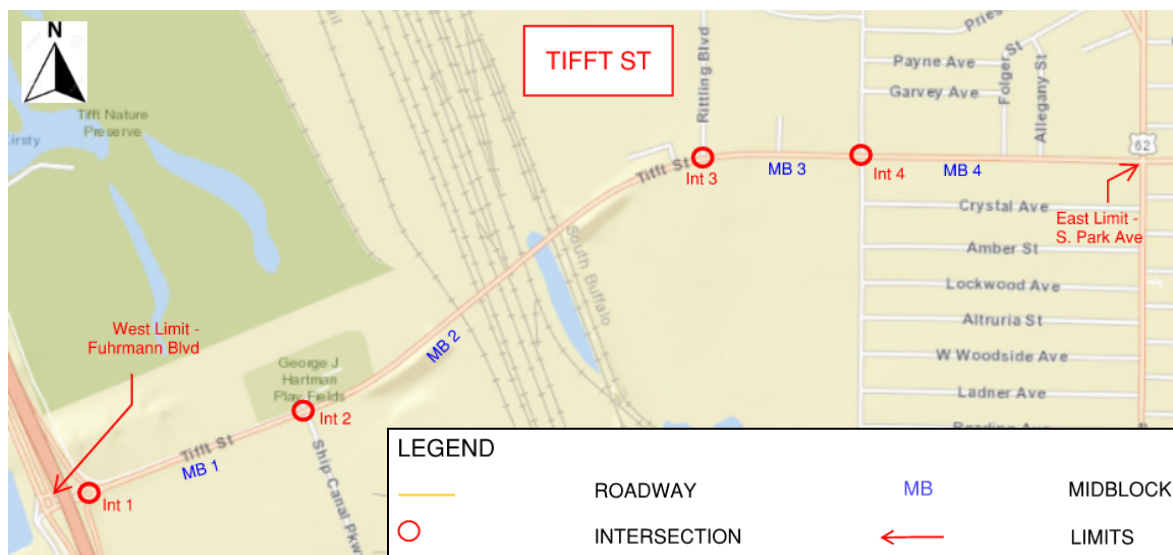


Figure 4.1.a - Tift Street Location Map

A total of 29 crashes were reported within the study area during the three-year period from May 1, 2016 through April 30, 2019. The crashes included 22 (76%) intersection crashes and seven (24%) midblock crashes. The total number of crashes listed by type and severity at each midblock and intersection location is shown in **Table 4.1**.

Table 4.1 - Tift Street – Intersection and Midblock Crash Summaries

Intersection	Crash Type													Severity				
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overturned	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable	Property Damage Only	Injury	Fatal
1 Tift Street/Hwy 5 Roundabout	1													1		1		
2 Tift Street/Ship Canal Parkway	2	2												4		4		
3 Tift Street/Rittling Boulevard			1					1						2	1		1	
4 Tift Street/Hopkins Street	2	3		3	1	3	2						1	15		9	14	
Total	5	5	1	3	1	3	2	1	0	0	0	0	1	22	1	14	15	0

Note: Signalized intersections are in bold.

Table 4.1 - Tiftt Street – Intersection and Midblock Crash Summaries (cont.)

Midblocks	Crash Type														Severity			
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overtuned	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable	Property Damage Only	Injury	Fatal
1 Hwy 5 on/off ramp to Ship Canal Parkway												1		1	1			
2 Ship Canal Parkway to Rittling Boulevard	1	1	1									1		4	2	2		
3 Rittling Boulevard to Hopkins Street							1							1	1			
4 Hopkins Street to Folger Street	1													1	1			
Total	2	1	1	0	0	0	1	0	0	0	0	2	0	7	0	5	2	0

Below is a summary of additional patterns identified in the total Tiftt Street study area crash analysis:

- Weather Conditions:
 - 18% Rain/Snow
- Time of Day:
 - 36% 10:00am - 4:00pm
 - 61% Day light
- Time of Year:
 - 48% Winter (Dec-Feb)

The only cluster of crashes was identified at the Hopkins Street signalized intersection which resulted in 15 (52%) of the 29 total crashes.

The Tiftt Street crash rates were calculated along the midblock segments and intersection locations and compared to the statewide average crash rates to determine any locations above the statewide average rate. The calculations show that each of the four intersections exceed the statewide average crash rates as listed below and identified on **Figure 4.1.b**.

- Crash Rates Above Statewide Average:
 - Int #2 – Tiftt Street at Ship Canal Parkway
 - Int #3 – Tiftt Street at Rittling Boulevard
 - Int #4 – Tiftt Street at Hopkins Street

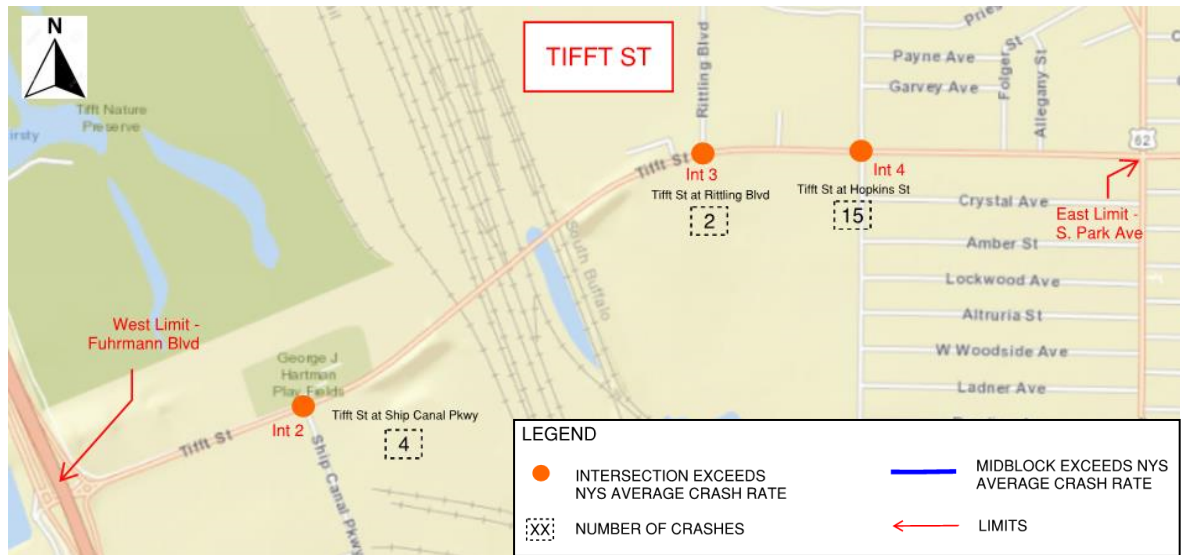


Figure 4.1.b – Tiff Street – Locations with Crashes Above Statewide Average Rate

No mitigation measures are proposed along the portion of Tiff Street in the study area as no midblock segments exceed the statewide.

Refer to section 4.2 regarding locations that exceed the statewide average rate.

4.2 Tiff Street Locations Above Statewide Average Crash Rate

Intersection #2 – Tiff Street at Ship Canal Parkway

This section of Tiff Street consists of two lanes in each direction where Ship Canal Parkway terminates to form a signalized 4-way intersection with the driveway to George J Hartman Play Fields.

A total of four crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities and 100% involved property damage only. Of the total crashes, two were westbound rear-ends and two were sideswipes in the same direction. The calculated crash rate per Mev was 0.32 which is higher than the statewide average of 0.23. These types of crashes are typical of signalization, however the two westbound rear-end crashes may be attributable to the appearance that the stop bar is far from the intersection. The driveway to George J Hartman Play Fields on the north side of the intersection has a significantly smaller width than the Ship Canal Parkway approach. Therefore, installing a “Stop Here On Red” sign at the westbound stop bar on Tiff Street is recommended.

Intersection #3 – Tift Street at Rittling Boulevard

This section of Tift Street consists of two lanes in each direction where Rittling Boulevard terminates to form an unsignalized stop controlled T-intersection. Rittling Boulevard is a dead-end road that consists of one lane in each direction servicing a manufacturing building Zehnder Rittling.

A total of two crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities; one involved an injury and one was designated as non-reportable. One crash was a head-on collision and one crash was a sideswipe in the opposite direction. Neither of the crashes involved vehicles accessing Rittling Boulevard. The calculated crash rate per Mev is 0.18 which is higher than the statewide average of 0.07. It is possible crashes along this section of Tift Street are attributable to the slight horizontal curvature of the roadway. There are no mitigation measures proposed at this location.

Intersection #4 – Tift Street at Hopkins Street

This signalized 4-way intersection is located at the east end of the Project limits and consists of one lane entering the intersection at each approach, with the exception of the eastbound approach consisting of one shared left-thru lane and one shared right-thru lane.

A total of 15 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities; 61% involved injuries and 39% reported property damage only. The most common type of crashes includes three sideswipes in the same direction, three left-turn crashes, and three right-angle crashes. However, no patterns were found related to crash type or direction. The calculated crash rate per Mev is 1.11 which is higher than the statewide average of 0.54. Slippery pavement was a contributing factor for two of the 15 crashes.

The types of crashes reported are consistent with crashes at signalized intersections, however the intersection lane and stop bar striping has significantly faded and is recommended to be updated. To improve intersection visibility traffic signal backplates are recommended as no overhead signs are on the signal span wire. In addition, restriping the eastbound approach to one exclusive lane and one through lane should be considered to minimize vehicle conflicts.

5. South Park Avenue Crash Analysis

5.1 Summary

South Park Avenue transverses east-west within the Project limits and extends for approximately 3.3 miles from Tifft Street at the east limits to Michigan Avenue at the west limits. Classified as a Minor Arterial, the roadway consists primarily of two lanes in each direction. The two-way AADT in 2015 on South Park Avenue ranged from approximately 5,200 near Chicago Street to 8,600 near Bailey Street. The posted speed limit is 30 mph.

Crash data was analyzed at all the midblock and intersection locations within the Project limits as shown in **Figure 5.1.a**.

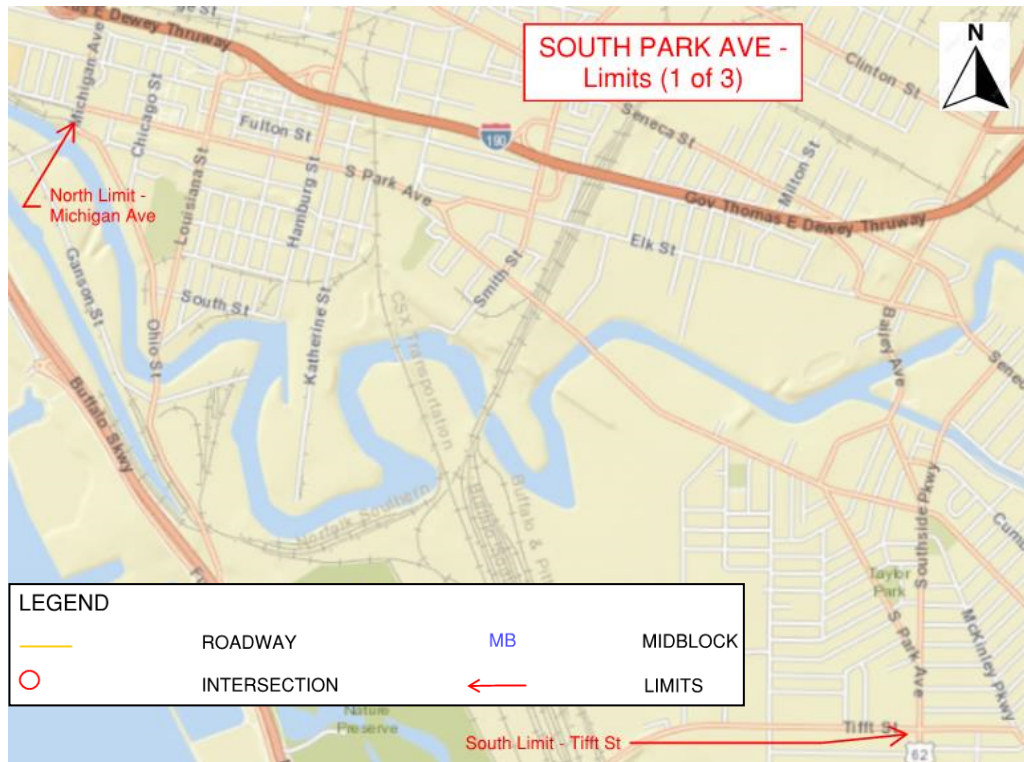


Figure 5.1.a – South Park Avenue Overall Location Map

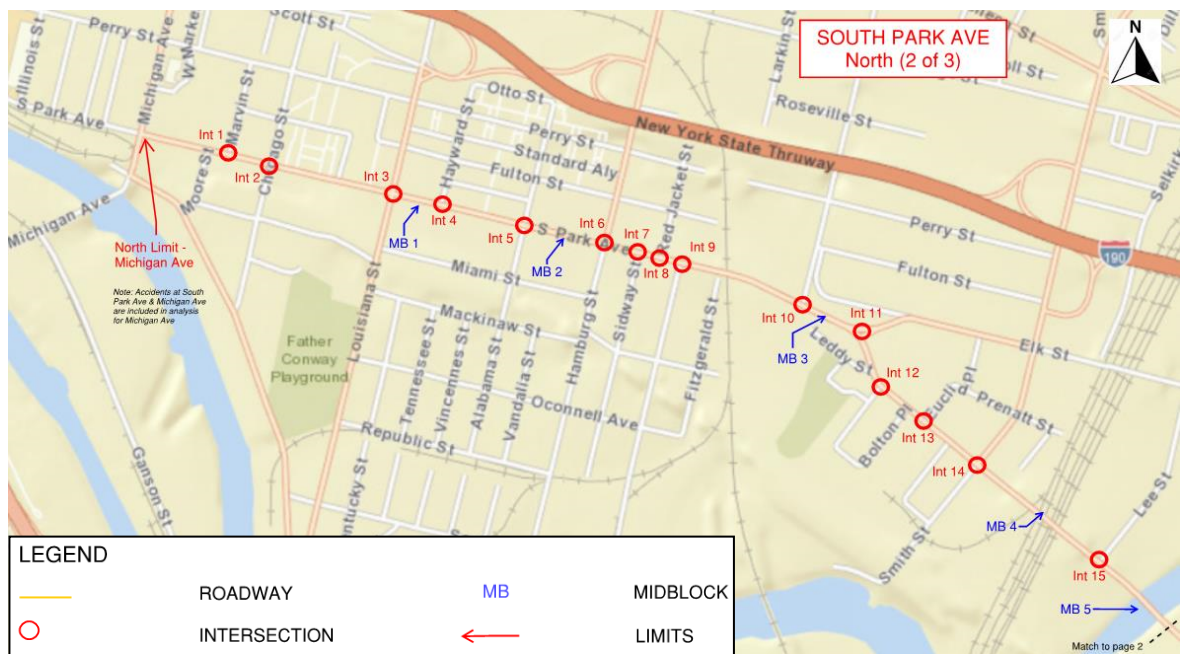


Figure 5.1.b – South Park Avenue Location Map (North Limit)

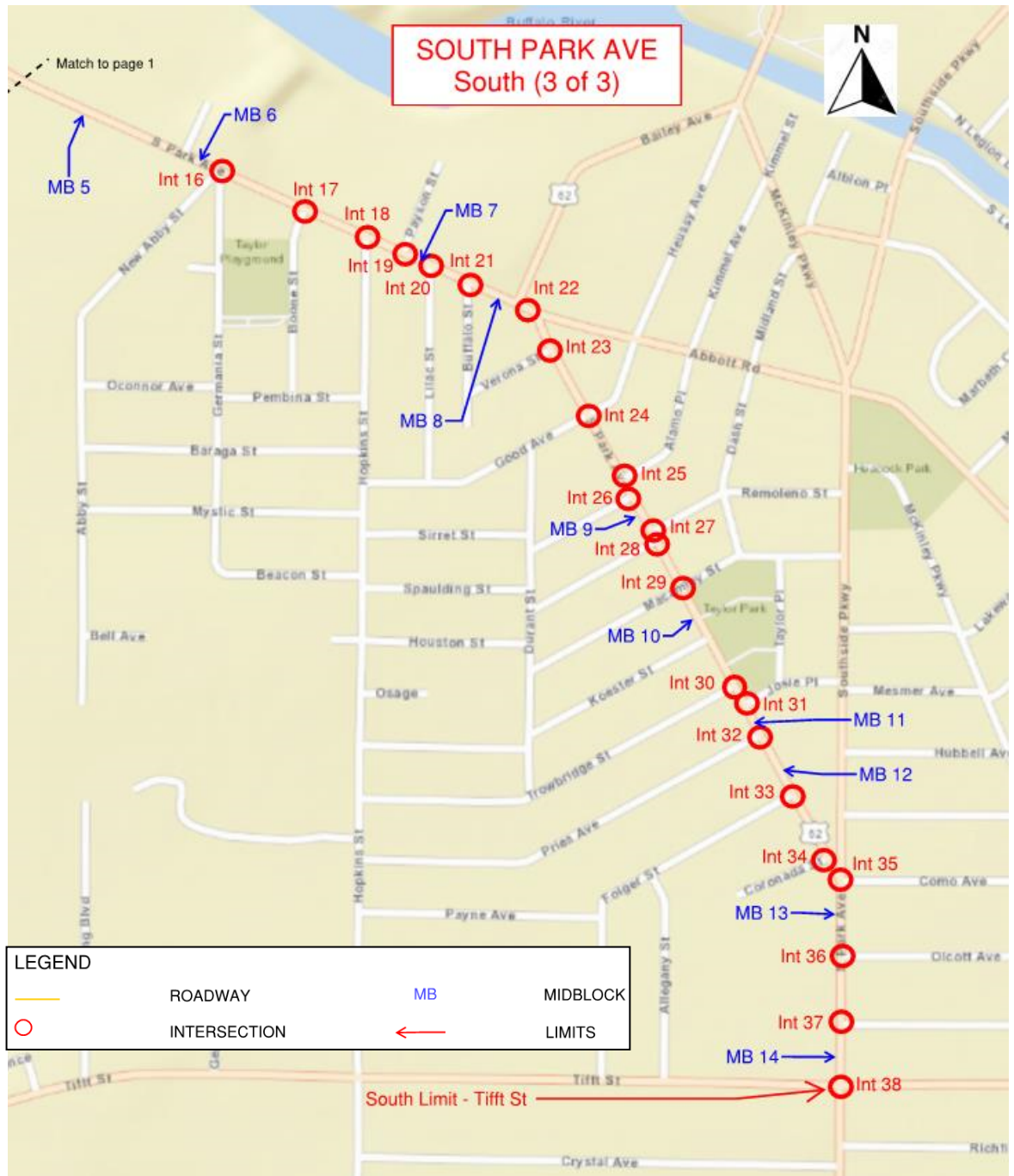


Figure 5.1.c – South Park Avenue Location Map (South Limit)

A total of 184 crashes were reported within the study area during the three-year period from May 1, 2016 through April 30, 2019. The crashes included 158 intersection crashes and 26 midblock crashes. The total number of crashes listed by type and severity at each midblock and intersection location is shown in Table 5.1.

Table 5.1 - South Park Avenue – Intersection and Midblock Crash Summaries

Intersection	Crash Type													Severity				
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overturned	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable	Property Damage Only	Injury	Fatal
1 Marvin Street	1													1			1	
2 Chicago Street	1	2				6								9		6	3	
3 Louisiana Street	4	3		1	1	6							1	16		13	3	
4 Hayward Street							1							1		1		
5 Alabama Street												1	1	2		2		
6 Hamburg Street	2	1		2		3	1						2	11	1	8	2	
7 Sidway Street	1				1									2		2		
8 Red Jacket Street	1													1		1		
9 Katherine Street								1						1		1		
10 Van Rensselear Street	1					1								2			2	
11 Elk Street	2	1		1				1			1		1	7		4	3	
12 Harvey Place													1	1			1	
13 Euclid Place		1											1	2		2		
14 Smith Street	7	3		4										14	1	8	5	
15 Lee Street	5	2	1			1	1				1			11		6	5	
16 New Abby Street	1													1			1	
17 Boone Street	1													1		1		
18 Hopkins Street	1	6	1	2		2					1		1	14		11	3	
19 Payson Avenue				3										3			3	
20 Lilac Street						1								1		1		
21 Buffalo Street				1										1		1		
22 Bailey Avenue/Abbott Road	3	3		1	1		1			2	1			12	1	5	6	
23 Verona Street		1												1		1		
24 Good Avenue						1								1			1	
25 Alamo Place	1			1										2		2		
26 Sirret Street		2									1			3		2	1	
27 Remoleno Street													1	1		1		
28 Spaulding Street										1				1			1	
29 Macamley Street											1			1			1	
30 Trowbridge Street	1			1									1	3		2	1	
31 Josie Place				1		1								2		1	1	
32 Pries Avenue		1					1							2		2		
33 Folger Street				1										1			1	
34 Coronada Street											1			1			1	
35 Southside Pkwy/Como Avenue	3			1							1		1	6		2	4	
36 Olcott Avenue											1			1			1	
37 Columbus Avenue						1							1	2		1	1	
38 Tiff Street	6	4		1		2				1	1			16	1	8	7	
Total	42	30	2	21	3	25	5	2	0	4	10	1	13	158	4	95	59	0

Note: Signalized intersections are in bold.

Table 5.1 - South Park Avenue – Intersection and Midblock Crash Summaries (cont.)

Midblocks	Crash Type														Severity			
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overtuned	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable	Property Damage Only	Injury	Fatal
1 Louisiana Street and Hayward Street							1							1	1			
2 Alabama Street and Hamburg Street	1			1										2	2			
3 Van Rensselear Street and Elk Street												1		1	1			
4 Smith Street and Lee Street	2													2	1	1		
5 Lee Street and Tesla Gigafactory	3						2					2	1	8	4	4		
6 Tesla Gigafactory and New Abby Street							1	1						2		2		
7 Payson Avenue and Lilac Street							1							1	1			
8 Buffalo Street and Bailey Avenue													1	1	1			
9 Sirret Street to Remoleno Street													1	1	1			
10 Macamley Street and Koester Street							1							1	1			
11 Josie Place to Pries Avenue													1	1	1			
12 Pries Avenue and Folger Street													2	2	1	1		
13 Como Avenue and Olcott Avenue	1													1	1			
14 Columbus Avenue and Tiftt Street						1				1				2		2		
Total	7	0	0	1	0	1	6	0	1	1	0	3	6	26	0	16	10	0

Below is a summary of additional patterns identified in the total South Park Avenue study area crash analysis:

- Weather Conditions:
 - 18% Rain/Snow
- Time of Day:
 - 33% 10:00am - 4:00pm
 - 71% Day light
- Time of Year:
 - 47% Winter (Dec-Feb)

Locations with crash clusters included the following intersections with South Park Avenue:

- Chicago Street
- Louisiana Street
- Hamburg Street
- Smith Street

- Lee Street
- Hopkins Street
- Bailey Avenue/Abbott Road
- Tifft Street

The crashes that occurred at these intersections accounted for 103 of the 158 total intersection crashes.

The South Park Avenue crash rates were calculated along the midblock segments and intersection locations and compared to the statewide average crash rates to determine any locations above the statewide average rate. The calculations show 19 of the 38 intersections exceed the statewide average crash rates as listed below and identified on **Figure 5.1.d**.

Crash Rates Higher than Statewide Average:

- Int #2 – South Park Avenue at Chicago Street
- Int #3 – South Park Avenue at Louisiana Street
- Int #6 – South Park Avenue at Hamburg Street
- Int #7 – South Park Avenue at Sidway Street
- Int #10 – South Park Avenue at Van Rensselaer Street
- Int #11 – South Park Avenue at Elk Street
- Int #13 – South Park Avenue at Euclid Street
- Int #14 – South Park Avenue at Smith Street
- Int #15 – South Park Avenue at Lee Street
- Int #18 – South Park Avenue at Hopkins Street
- Int #19 – South Park Avenue at Payson Avenue
- Int #22 – South Park Avenue at Bailey Avenue/Abbott Road
- Int #25 – South Park Avenue at Alamo Place
- Int #26 – South Park Avenue at Sirret Street
- Int #30 – South Park Avenue at Trowbridge Street
- Int #31 – South Park Avenue at Josie Street
- Int #32 – South Park Avenue at Pries Avenue
- Int #35 – South Park Avenue at Southside Parkway/Como Avenue
- Int #38 – South Park Avenue at Tifft Street
- MB #2 – South Park Avenue from Alabama Street to Hamburg Street
- MB #6 – South Park Avenue from Tesla Gigafactory to New Abby Street
- MB #7 – South Park Avenue from Payson Avenue to Lilac Street
- MB #9 – South Park Avenue from Sirret Street to Remoleno Street
- MB #10 – South Park Avenue from Macamely Street to Koester Street
- MB #11 – South Park Avenue from Josie Place to Pries Avenue
- MB #12 – South Park Avenue from Pries Avenue to Folger Street
- MB #14 – South Park Avenue from Columbus Avenue to Tifft Street

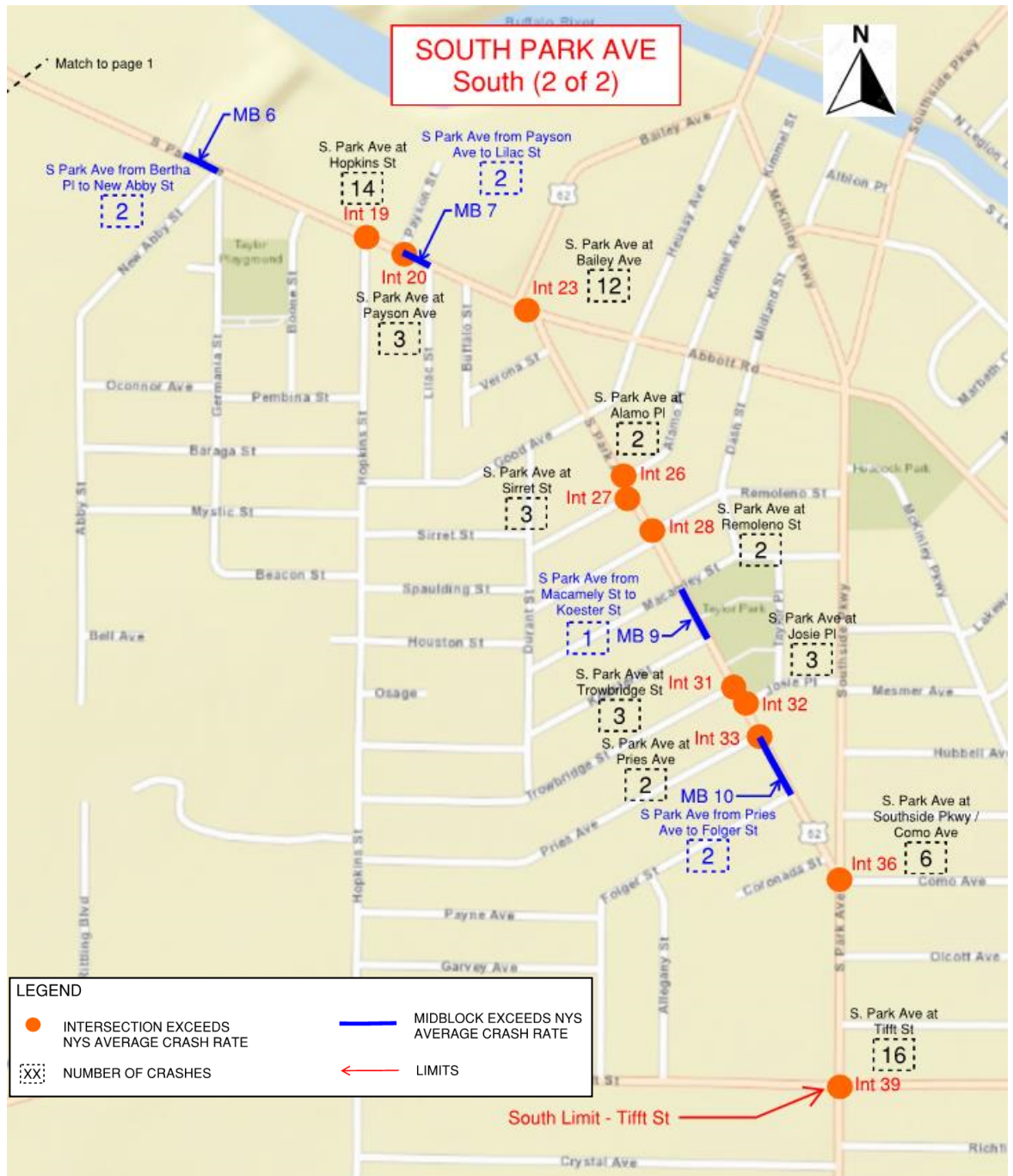


Figure 5.1.d – South Park Avenue – Locations with Crashes Above Statewide Average Rate (South Limit)

Refer to section 5.2 regarding locations that exceed the statewide average rate.

5.2 South Park Avenue Locations Above Statewide Average Crash Rate

Intersection #2 – South Park Avenue at Chicago Street

This section of South Park Avenue consists of one lane in each direction with right turn pockets/shared bike lanes at Chicago Street forming an unsignalized 4-way intersection. Stop signs are located on the northbound and southbound approaches of Chicago Street. On-street parking along South Park Avenue is restricted to the north. Chicago Street consists of one lane in each direction with on-street parking.

A total of nine crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities; three involved injuries and six reported property damage only. The most common type of crashes were six right angle crashes with four of those occurring in the northbound/eastbound direction. The calculated crash rate per MEV was 1.69 which is higher than the statewide average of 0.15. These types of crashes are typical of unsignalized intersections. Installing stop signs on the eastbound and westbound approaches are recommended.

Intersection #3 – South Park Avenue at Louisiana Street

This section of South Park Avenue consists of one lane in each direction with on-street parking and right turn pockets/shared bike lanes at Louisiana Street forming a signalized 4-way intersection. Louisiana Street consists of one lane in each direction, with on-street parking.

A total of 16 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities, three involved injuries and 13 reported property damage only. Of the total crashes, six were right angles and four were rear-ends. The calculated crash rate per MEV was 1.84 which is higher than the statewide average of 0.20. These crash types are typical of signalization. Restriping the intersection approaches to add a left turn pocket for each approach is recommended.

Intersection #6 – South Park Avenue at Hamburg Street

This section of South Park Avenue consists of one lane in each direction with on-street parking lanes and right turn pockets at Hamburg Street forming a signalized 4-way intersection. Hamburg Street consists of one lane in each direction with on-street parking.

A total of 11 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities, eight involved property

damage only, two resulted in injuries, and one was non-reportable. Of the total crashes, two were westbound rear-ends and two were sideswipes in the same direction. The calculated crash rate per MEV was 1.16 which is higher than the statewide average of 0.54. No discernible crash patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #7 – South Park Avenue at Sidway Street

This section of South Park Avenue consists of one lane in each direction with on-street parking lanes and bike lanes where Sidway Street terminates to form an unsignalized stop controlled T-intersection. Sidway Street consists of one lane in each direction.

A total of two crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities and 100% involved property damage only. Of the total crashes, one was a northbound rear-end and one was an eastbound right-turn crash. The calculated crash rate per MEV was 0.28 which is higher than the statewide average of 0.18. No discernible crash patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #10 – South Park Avenue at Van Rensselaer Street

This section of South Park Avenue consists of one lane in each direction where Van Rensselaer Street terminates to form an unsignalized stop-controlled T-intersection. South Park Avenue also has a shared bike lane/shoulder in each direction. Van Rensselaer Street consists of one lane in each direction.

A total of two crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities, but 100% involved injury. Of the total crashes, one was a southbound rear-end and one was a northbound/westbound right-angle crash. The calculated crash rate per MEV was 0.25 which is higher than the statewide average of 0.17. No discernible crash patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #11 – South Park Avenue at Elk Street

At this signalized 3-legged intersection, South Park Avenue bends toward the south, while Elk Street terminates at an angle to the northeast. South Park Avenue consists of one lane in each direction, with a shared bike lane/shoulder in each direction. Elk Street consists of one lane for left turns controlled by the traffic signal, and a right turn lane protected by an island, which is controlled with a yield sign.

A total of seven crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities, four involved property damage only, and three resulted in injuries. Of the total crashes, two were westbound rear-ends and two were sideswipes in the same direction. The calculated crash rate per MEV was 0.78 which is higher than the statewide average of 0.31. No discernible crash patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #13 – South Park Avenue at Euclid Street

This section of South Park Avenue consists of one lane in each direction with on-street parking lanes and bike lanes where Euclid Street terminates to form an unsignalized stop controlled T-intersection. Euclid Street is a one-way street to the northeast. There is a designated crosswalk across South Park Avenue at the south side of the intersection.

A total of two crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities and 100% involved property damage only. Of the two crashes, one was a right-turning vehicle who struck a parked vehicle on Euclid and one was a southbound sideswipe in the same direction. The calculated crash rate per MEV was 0.28 which is higher than the statewide average of 0.05. No discernible crash patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #14 – South Park Avenue at Smith Street

This section of South Park Avenue consists of one lane in each direction with on-street parking lanes and right turn pockets and shared bike lanes at Smith Street forming a signalized 4-way intersection. Smith Street consists of one lane in each direction, with on-street parking. The pavement markings are worn on all four approaches.

A total of 14 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities, eight involved property damage only, five resulted in injuries, and one was non-reportable. The most common crash type was seven rear-ends, five of which were in the northbound direction. The calculated crash rate per MEV was 1.25 which is higher than the statewide average of 0.20. These types of crashes are typical of signalization. New pavement markings and the installation of backplates on the overhead traffic signals for each approach is recommended

Intersection #15 – South Park Avenue at Lee Street

This section of South Park Avenue consists of one lane in each direction with right turn pockets/shared bike lanes where Lee Street terminates forming an unsignalized T-intersection. Lee Street consists of one lane in each direction. Stop bars are not present on any of the intersection approaches.

A total of 11 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities, five involved injuries and six involved property damage only. Of the total crashes, five were rear-end crashes and two were sideswipes in the same direction. The calculated crash rate per MEV was 1.25 which is higher than the statewide average of 0.17. New pavement markings are recommended for each approach.

Intersection #18 – South Park Avenue at Hopkins Street

At this intersection, South Park Avenue consists of one lane in each direction with a left-turn lane on the northbound approach and a right-turn pocket/shared bike lane on the southbound approach. Hopkins Street is one lane in each direction, with on-street parking, and terminates at an angle to form a signalized 3-leg intersection. Stop bars are not present on any of the intersection approaches.

A total of 14 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities, three involved injuries, and 11 involved property damage only. Of the total crashes, six were sideswipes in the same direction. The calculated crash rate per MEV was 1.05 which is higher than the statewide average of 0.23. These types of crashes are typical of signalization. New pavement markings are recommended for each approach.

Intersection #19 – South Park Avenue at Payson Avenue

This section of South Park Avenue consists of one lane and a shared bike lane in the southbound direction, and single lane with a bike lane transitioning into two lanes in the northbound direction. Parking is restricted at this intersection. Payson Avenue terminates at this intersection forming an unsignalized T-intersection. Payson Avenue is one lane in each direction.

A total of three crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities, but 100% involved injuries. All crashes found at this intersection were southbound left-turn crashes. The calculated crash rate per MEV was 0.30 which is higher than the statewide average of 0.18. No discernible crash patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #22 – South Park Avenue at Bailey Avenue/Abbott Road

At this signalized 4-way intersection, South Park Avenue bends to the south with two southbound lanes, and a single northbound lane with a bus stop on the curb on the northwest leg. The south leg of South Park Avenue consists of one drive lane and a bike lane southbound, and a drive lane with a right turn pocket/shared bike lane heading northbound. Bailey Avenue consists of two lanes in each direction. Abbott Road consists of one lane in each direction, with on-street parking. The pavement markings on each approach are worn.

A total of 12 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities, six involved injuries, five were property damage only, and one was non-reportable. Of the total crashes, three were rear-ends crashes and three were sideswipes in the same direction. The calculated crash rate per MEV was 0.68 which is higher than the statewide average of 0.23. New pavement markings are recommended for each approach.

Intersection #25 – South Park Avenue at Alamo Place

This section of South Park Avenue consists of one lane in each direction with parking and a bike lane. At the northbound approach there is a right turn pocket/shared bike lane where Alamo Place terminates forming an unsignalized T-intersection. Alamo Place is a one-way northeast-bound single lane with parking and is a short connection to Abbott Road.

A total of two crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities and 100% involved property damage only. Of the two crashes, one was a northbound rear-ends and one was a southbound left-turn crash. The calculated crash rate per MEV was 0.31 which is higher than the statewide average of 0.05. No discernible crash patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #26 – South Park Avenue at Sirret Street

This section of South Park Avenue consists of one lane in each direction with parking and a bike lane. At the southbound approach there is a right turn pocket/shared bike lane where Sirret Street terminates forming an unsignalized T-intersection.

A total of three crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities, one involved injury, and two were property damage only. Of the total crashes, one was a bicycle crash and two were northbound sideswipes in the same direction. The calculated crash rate per MEV was 0.47 which is higher than the statewide average of 0.18. No discernible crash patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #30 – South Park Avenue at Trowbridge Street

This section of South Park Avenue consists of one lane in each direction with parking and a bike lane. At the southbound approach there is a right turn pocket/shared bike lane where Trowbridge Street terminates forming an unsignalized T-intersection.

A total of three crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities, one involved injury, and two were property damage only. Of the three crashes, one was a left turn crash from Trowbridge Street, one was an illegal U-turn crash, and one was a northbound rear-end crash. The calculated crash rate per MEV was 0.43 which is higher than the statewide average of 0.18. No discernible crash patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #31 – South Park Avenue at Josie Place

This section of South Park Avenue consists of one lane in each direction with parking and a bike lane. At the northbound approach there is a right turn pocket/shared bike lane where Josie Place terminates forming an unsignalized T-intersection. Josie Place is a one-way street with traffic inbound to the intersection from the northeast.

A total of two crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities, one involved injury, and one was property damage only. Of the two crashes, one was a left turn crash, and one was a right-angle crash. The calculated crash rate per MEV was 0.431, which is higher than the statewide average of 0.18. No discernible crash

patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #32 – South Park Avenue at Pries Avenue

This section of South Park Avenue consists of one lane in each direction with parking and a bike lane. At the southbound approach there is a right turn pocket/shared bike lane where Pries Avenue terminates forming an unsignalized T-intersection.

A total of two crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities and 100% involved property damage only. Of the two crashes, one was a sideswipe (in the same direction), and one was classified as a crash with a fixed object. The calculated crash rate per MEV was 0.29 which is higher than the statewide average of 0.18. No discernible crash patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #35 – South Park Avenue at Southside Parkway/Como Avenue

At this signalized 4-way intersection, South Park Avenue bends to the south with a single lane, and a shared bike lane at the southbound approach, and the northbound approach consisting of a right/thru lane and an exclusive left turn lane. Southside Parkway consists of one lane in each direction with parking in the northbound direction. Como Avenue is a one-way eastbound road with parking on the south side.

A total of six crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities, four involved injury, and two were property damage only. The most common type of crash was three rear-end crashes, two of which were southbound on South Park Avenue. The calculated crash rate per MEV was 0.33 which is higher than the statewide average of 0.23. No discernible crash patterns occurred at this intersection during the time period studied. Accordingly, no mitigation measures are being proposed.

Intersection #38 – South Park Avenue at Tift Street

At this signalized 4-way intersection, South Park Avenue consists of one lane in each direction with on-street parking lanes and right turn pockets/shared bike lanes at Tift Street. Tift Street consists of one lane in each direction. The pavement markings are worn on each approach.

A total of 16 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities, seven involved injury, eight were property damage only and one was non-reportable. The most common type of crash was six rear-end crashes, four of which occurred on the southbound approach. There were also four side-swipe crashes (in the same direction). The calculated crash rate per MEV was 0.86 which is higher than the statewide average of 0.54. New pavement markings are recommended for each approach.

Midblock #2 – South Park Avenue from Alabama Street to Hamburg Street

This section of South Park Avenue from Alabama Street to Hamburg Street is comprised of one lane in each direction, with bike lanes and on-street parking lanes on both sides.

A total of two crashes occurred along the 0.12-mile segment during the three-year study period. None of the crashes involved fatalities and 100% involved property damage only. One of the crashes that occurred in this segment was a left turn crash and one was a rear-end crash. The calculated crash rate per MVM is 2.93 which is higher than the statewide average of 2.25. No discernible crash patterns occurred on this segment during the time period studied. Accordingly, no mitigation measures are being proposed.

Midblock #6 – South Park Avenue from Tesla Gigafactory to New Abby Street

This section of South Park Avenue from the Tesla Gigafactory to New Abby Street is comprised of one lane in each direction with bike lanes, and a northbound left-turn lane at the Tesla Gigafactory.

A total of two crashes occurred along the 0.09-mile segment during the three-year study period. None of the crashes involved fatalities, however 100% involved injuries. One of the crashes that occurred in this segment was an over-turn crash and one crash occurred with a fixed object. The calculated crash rate per MVM is 2.93 which is higher than the statewide average of 2.25. No discernible crash patterns occurred on this segment during the time period studied. Accordingly, no mitigation measures are being proposed.

Midblock #7 – South Park Avenue from Payson Avenue to Lilac Street

This section of South Park Avenue from Payson Avenue to Lilac Street is comprised of one drive lane and one bike lane in the northbound direction, and one drive lane, and a shared bike line in the southbound direction.

Only one crash occurred along the 0.03-mile segment during the three-year study period. The property damage only crash was classified as occurring with a fixed object. The calculated crash rate per MVM is 3.52 which is higher than the

statewide average of 2.25. No discernible crash patterns occurred on this segment during the time period studied. Accordingly, no mitigation measures are being proposed.

Midblock #9 – South Park Avenue from Sirret Street to Remoleno Street

This section of South Park Avenue from Sirret Street to Remoleno Street is comprised of one lane in each direction, with bike lanes and on-street parking lanes on both sides.

Only one crash described as “other” occurred along the 0.04-mile segment during the three-year study period. The crash resulted in property damage only. The calculated crash rate per MVM is 4.25 which is higher than the statewide average of 2.25. No discernible crash patterns occurred on this segment during the time period studied. Accordingly, no mitigation measures are being proposed.

Midblock #10 – South Park Avenue from Macamely Street to Koester Street

This section of South Park Avenue from Macamely Street to Koester Street is comprised of one lane in each direction, with bike lanes and on-street parking lanes on both sides.

Only one crash occurred along the 0.05-mile segment during the three-year study period. The fixed-object crash resulted in property damage only. The calculated crash rate per MVM is 3.40 which is higher than the statewide average of 2.25. No discernible crash patterns occurred on this segment during the time period studied. Accordingly, no mitigation measures are being proposed.

Midblock #11 – South Park Avenue from Josie Place to Pries Avenue

This section of South Park Avenue from Josie Place to Pries Avenue is comprised of one lane in each direction, with bike lanes and on-street parking lanes on both sides.

Only one crash occurred along the 0.03-mile segment during the three-year study period. The crash described as “other” resulted in property damage only. The calculated crash rate per MVM is 5.67 which is higher than the statewide average of 2.25. No discernible crash patterns occurred on this segment during the time period studied. Accordingly, no mitigation measures are being proposed.

Midblock #12 – South Park Avenue from Pries Avenue to Folger Street

This section of South Park Avenue from Pries Avenue to Folger Street is comprised of one lane in each direction, with bike lanes and on-street parking lanes on both sides.

A total of two crashes occurred along the 0.06-mile segment during the three-year study period. None of the crashes involved fatalities, however one involved injury, and the other was property damage only. Both crashes were described as “other”. The calculated crash rate per MVM is 5.67 which is higher than the statewide average of 2.25. No discernible crash patterns occurred on this segment during the time period studied. Accordingly, no mitigation measures are being proposed.

Midblock #14 – South Park Avenue from Columbus Avenue to Tiff Street

This section of South Park Avenue from Columbus Avenue to Tiff Street is comprised of one lane in each direction, with bike lanes and on-street parking lanes on both sides.

A total of two crashes occurred along the 0.06-mile segment during the three-year study period. One pedestrian crash occurred, and one right angle crash, both of which resulted in injury. The calculated crash rate per MVM is 2.43 which is higher than the statewide average of 2.25. No discernible crash patterns occurred on this segment during the time period studied. Accordingly, no mitigation measures are being proposed.

6. Interstate 190 (Exit 3 to Exit 6) Crash Analysis

6.1 Summary

The Interstate 190 (I-190) Project limits includes Exit 3 (Seneca Street) as the south limit and Exit 6 (Oak Street/Elm Street) as the north limit extending for approximately 2.5 miles. The interstate is classified as an urban Principal Arterial by NYSDOT and is a divided highway consisting of three lanes in each direction with acceleration and deceleration lanes for the on and off-ramps. The AADT for 2016 on the I-190 north of Exit 3 (Seneca Street) was approximately 88,800 vehicles with 43,800 vehicles in the northbound direction and 45,000 in the southbound direction. The posted speed limit is 55 mph.

Crash data was analyzed within the I-190 Project limits for seven segments that consist of mainline segments and on/off ramp segments separated into northbound and southbound directions. A map identifying the Project limits is shown in **Figure 6.1.a**.

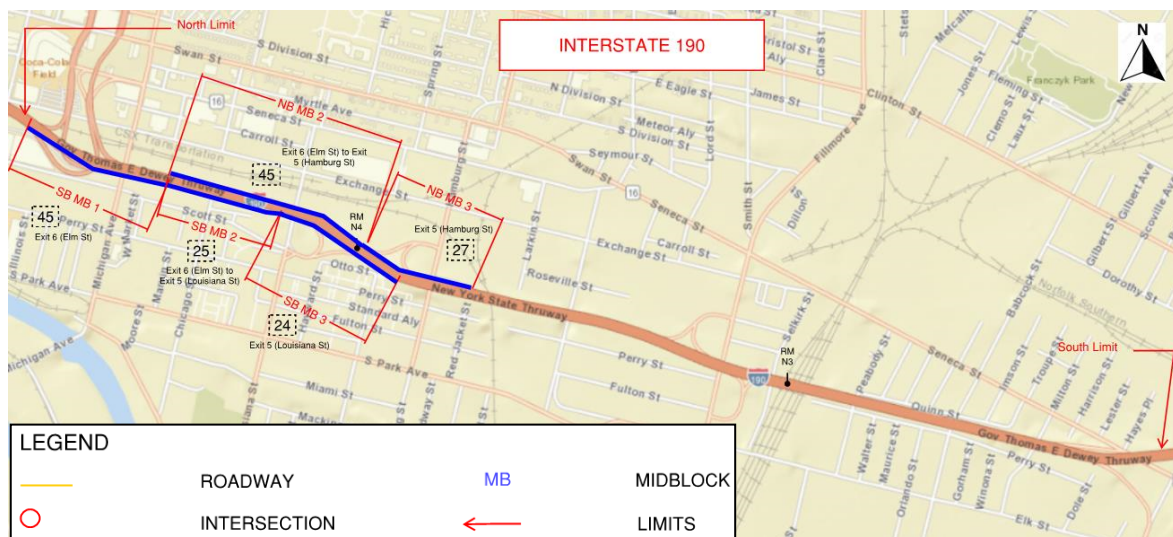


Figure 6.1.a - Interstate 190 (Exit 3 to Exit 6) Location Map

A total of 376 crashes were identified between Exit 3 (Seneca Street) and Exit 6 (Oak Street/Elm Street) during the three-year study period (from May 1, 2016 to April 30, 2019). The crashes occurred in the northbound and southbound directions on the mainline and on six of the 14 on/off ramps. A total of 178 crashes (47%) occurred in the northbound direction, 174 crashes (46%) occurred in the southbound direction, and 24 (7%) occurred on a ramp location.

Of the total 178 crashes that occurred in the northbound direction, 105 involved property damage only, 50 resulted in injuries and 23 were non-reportable. Of the total 178 crashes that occurred in the southbound direction, 99 involved property damage only, 46 resulted in injuries, and 29 were non-reportable. Crashes that occurred only on the ramps in the study area resulted in 24; 15 involved property damage only, 7 resulted in injuries, and two were non-reportable. There were no fatalities that occurred within the I-190 study area during the time period analyzed. The most common type of crash in the study area were rear end collisions that made up 43% of the northbound crashes and 48% of the southbound crashes. Side-swipes in the same direction was the next leading crash type with 27% in the northbound direction and 28% in the southbound direction. In addition, fixed object crashes (majority with the median or jersey barriers) made up 24% of the northbound crashes and 19% of the southbound crashes.

The total number of crashes listed by type and severity for the northbound and southbound directions and on/off ramp locations are shown in **Table 6.1**.

Table 6.1 – Interstate 190 - Mainline & Juncture Crash Summary Table

Midblock Sections I-190 Northbound	Crash Type													Severity				
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overtuned	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable	Property Damage Only	Injury	Fatal
1 Exit 6 (Oak Street / Elm Street)	5	4					4							13	1	6	6	
2 Exit 6 (Elm St) to Exit 5 (Hamburg St)	19	13					9	1				2	1	45	5	28	12	
3 Exit 5 (Hamburg Street)	9	6					8					1	2	26	4	11	11	
4 Exit 5 (Hamburg Street) to Exit 4 (Smith Street)	6	4					5					2		17	1	12	4	
5 Exit 4 (Smith St)	9	6					3						1	19	3	12	4	
6 Exit 4 (Smith Street) to Exit 3 (Seneca Street)	19	12					8						1	40	7	26	7	
7 Exit 3 (Seneca Street)	9	3					5					1		18	2	10	6	
Total	76	48	0	0	0	0	42	1	0	0	0	6	5	178	23	105	50	0

Midblock Sections I-190 Southbound	Crash Type													Severity				
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overtuned	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable	Property Damage Only	Injury	Fatal
1 Exit 6 (Oak Street / Elm Street)	8	14					6						1	29	4	20	5	
2 Exit 6 (Elm Street) to Exit 5 (Louisiana Street)	21	4												25	1	14	10	
3 Exit 5 (Louisiana Street)	7	6					9					1	1	24	3	14	7	
4 Exit 5 (Louisiana Street) to Exit 4 (Smith Street)	17	8					4						2	31	7	16	8	
5 Exit 4 (Smith Street)	2	5					2					1	2	12	4	6	2	
6 Exit 4 (Smith Street) to Exit 3 (Seneca Street)	23	7					7							37	10	18	9	
7 Exit 3 (Seneca Street)	5	5					5						1	16		11	5	
Total	83	49	0	0	0	0	33	0	0	0	0	2	7	174	29	99	46	0

Below is a summary of additional patterns identified in the total Interstate 190 study area crash analysis:

Weather Conditions:
25% Rain/Snow
Time of Day:
28% 10:00 am - 4:00 pm
70% Day light
Time of Year:
48% Winter (Dec-Feb)
Roadway Characteristics:
55% Straight & Level

The following is a summary of cluster of crashes with the most common identified crash type in the study area:

Interstate 190 Northbound

MB #2 – Exit 6 (Elm Street) to Exit 5 (Hamburg Street)
42% Rear-end (19 crashes)
30% Side-swipe same direction (13 crashes)

MB #3 – Exit 5 (Hamburg Street)
33% Rear-end (9 crashes)
33% Fixed object (9 crashes)

MB #5 – Exit 4 (Smith Street)
47% Rear-end (9 crashes)

MB #6 – Exit 4 (Smith Street) to Exit 3 (Seneca Street)
48% Rear-end (19 crashes)
30% Side-swipe same direction (12 crashes)

MB #7 – Exit 3 (Seneca Street)
47% Rear-end (9 crashes)

Interstate 190 Southbound

MB #1 – Exit 6 (Oak Street/Elm Street)
36% Fixed object (16 crashes)
36% Side-swipe same direction (16 crashes)

MB #2 – Exit 6 (Elm Street) to Exit 5 (Louisiana Street)
84% Rear-end (21 crashes)

MB #3 – Exit 5 (Louisiana Street)
38% Fixed object (9 crashes)

MB #4 – Exit 5 (Louisiana Street) to Exit 4 (Smith Street)
55% Rear-end (17 crashes)

MB #5 – Exit 4 (Smith Street)
42% Side-swipe same direction (5 crashes)

MB #6 – Exit 4 (Smith Street) to Exit 3 (Seneca Street)
62% Rear-end (23 crashes)

Interstate 190 Ramps only

Ramp 1 – (Exit 6 SB Off to Elm Street)
75% Fixed object (6 crashes)

The Interstate 190 crash rates were calculated along the mainline and junctures and compared to the statewide average crash rates (from January 1, 2017 to December 31, 2018) to determine any locations above the statewide average rate. The accident rate per million vehicle miles (Acc/Mvm) were calculated for the midblock sections and included the mainline and the junctures (on-ramps/off-ramps) for the northbound and southbound corridors. The statewide average crash rate for an urban, divided roadway with a total of six lanes is 1.55 Acc/Mvm. The calculated crash rates result in two of the seven northbound sections and three of the seven southbound sections being higher than the statewide average rate as listed below and shown in **Figure 6.2.b**.

Crash Rates Above Statewide Average:

Northbound

MB #2 – Exit 6 (Elm Street) to Exit 5 (Hamburg Street)
MB #3 – Exit 5 (Hamburg Street)

Southbound

MB #1 – Exit 6 (Oak Street/Elm Street)
MB #2 – Exit 6 (Elm Street) to Exit 5 (Louisiana Street)
MB #3 – Exit 5 (Louisiana Street)

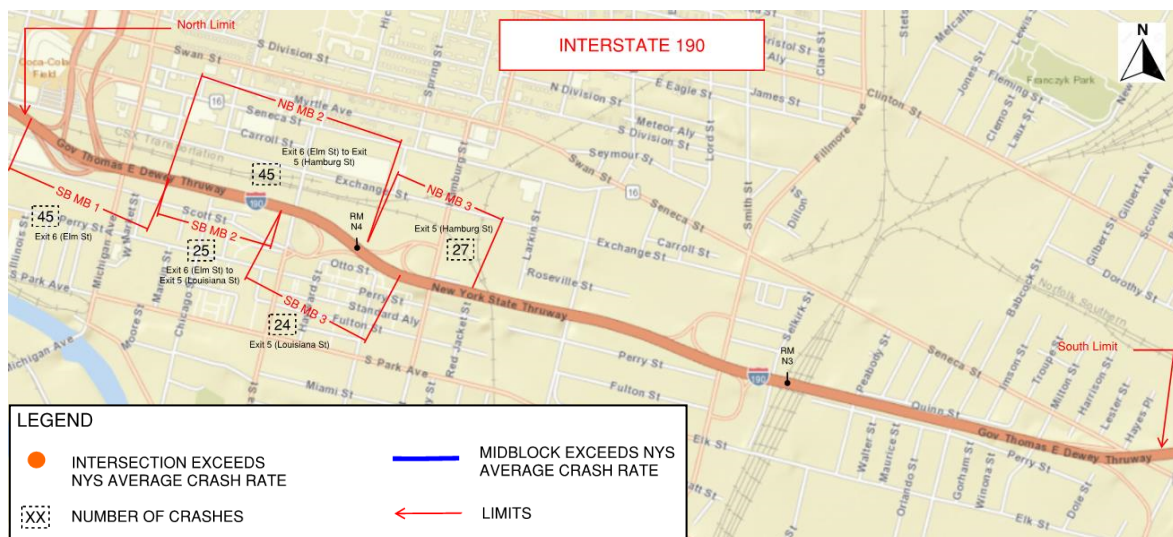


Figure 6.1.b - Interstate 190 (Exit 3 to Exit 6) – Locations with Crashes Above Statewide Average Rate

Refer to section 6.2 regarding locations that exceeded the statewide average crash rate.

It should be noted that a Potential High Accident Location Analysis was performed for Interstate 190 from I-90 at Exit 53 to Exit 7 from 2014 to 2018. A total of 1,039 crashes occurred along the highway section analyzed during the time period studied. There were no fatalities that occurred on this segment during this time period.

6.2 Interstate 190 (Exit 3 to Exit 6) Locations Above Statewide Average Crash Rate

The north end of the Interstate 190 study area from Exit 5 to Exit 6 in both directions including the main line and juncture sections were found to exceed the statewide average crash rates, with the exception of midblock #1 northbound Exit 6 (Oak Street/Elm Street). The crash analysis found a pattern of crashes during the morning and evening peak hours with a several rear-end, side-swipe in the same direction, and fixed object type crashes (median and jersey barrier). These crash patterns may indicate significant traffic congestion during the peak hour, therefore implementing geometric improvements (potentially, including auxiliary lanes) should be considered to improve traffic safety. In addition, existing signage should be evaluated to identify any improvements to sign location, visibility, etc. Finally, the installation of dynamic message signs (DMS) is recommended to be evaluated around this section of I-190 to inform drivers of traffic congestion and other potential events.

Below is a summary of the crash analysis for each segment in excess of the statewide average rate.

Northbound

Midblock #2 – Northbound Main Line Only – Exit 5 (Hamburg Street) to Exit 6 (Elm Street)

This section of I-190 consists of three northbound lanes between Exit 5 and Exit 6. No on/off ramps are located within this main line section.

A total of 45 crashes were identified within this segment during the three-year study period. None of the crashes involved fatalities, 27% involved injuries, 62% involved property damage only, and 11% were non-reportable. A high number of crashes were rear-end and side-swipes in the same direction as listed below:

42% Rear-end (19 crashes)

30% Side-swipe same direction (13 crashes)

The calculated crash rate per Mvm is 2.16 which is higher than the statewide average of 1.55. Contributing factors for collisions in this section include following too closely, unsafe lane change, and unsafe speed. In addition, 29% of the crashes occurred in the morning peak hour between 7:00 am and 9:00 am. Traffic congestion maybe a contributing factor in the high rear-end type crashes. Implementing geometric improvements (potentially, including auxiliary lanes) is recommended.

Midblock #3 – Northbound Main Line & Juncture – Exit 5 (Hamburg Street)

This section of I-190 consists of three northbound lanes and the Exit 5 off and on-ramps. The northbound off and on-ramps for Hamburg Street both consist of a single ramp lane with deceleration and acceleration lanes on I-190, respectively.

A total of 27 crashes were identified within this main line and ramp segment during the three-year study period. None of the crashes involved fatalities, 42% involved injuries, 42% involved property damage only, and 16% were non-reportable. More than half of the crashes were found to be rear-end and fixed object type (median and jersey barrier) crashes listed below:

33% Rear-end (9 crashes)

33% Fixed object (9 crashes)

The calculated crash rate per Mvm is 2.07 which is higher than the statewide average of 1.55. Contributing factors for collisions in this section include following too closely, unsafe lane change, and unsafe speed. In addition, 33% of

the crashes occurred in the morning peak hour between 7:00 am and 9:00 am. The slight s-curvature in the roadway and traffic congestion maybe a contributing factor in the high rear-end and fixed object crashes. Implementing geometric improvements (potentially, including auxiliary lanes) is recommended to reduce crashes in this section.

Southbound

Midblock #1 – Southbound Main Line & Juncture – Exit 6 (Oak Street/Elm Street)

This section of I-190 consists of three southbound lanes and the Exit 6 off and on-ramps. The southbound off-ramp to Elm Street and the on-ramps from Washington Street and Oak Street all consist of one lane. Washington Street and Oak Street approach the I-190 as two separate lanes and merge approximately 200 ft before the I-190 on-ramp. Both the off and on-ramps include deceleration and acceleration lanes on I-190, respectively.

A total of 45 crashes were identified within this segment during the three-year study period. None of the crashes involved fatalities, 22% involved injuries, 67% involved property damage only, and 11% were non-reportable. More than half of the crashes were attributed to fixed object (median and jersey barrier), side-swipes in the same direction, and rear-end crashes as listed below:

- 36% Fixed object (16 crashes)
- 36% Side-swipe same direction (16 crashes)
- 20% Rear-end (9 crashes)

The calculated crash rate per Mvm is 3.11 which is higher than the statewide average of 1.55. Contributing factors for collisions in this section include unsafe lane change, unsafe speed, and following too closely. In addition, 22% of the crashes occurred in the evening peak hour between 7:00 pm and 9:00 pm. The pattern of sideswipe and fixed object type crashes may indicate a problem with vehicles merging onto I-190 southbound as a result of the geometry and close proximity of the two merging points from the Washington Street and Oak Street ramps.

It is recommended to review the striping and signage for the merge points of both Washington Street and Oak Street ramps onto I-190. Additionally, implementing geometric improvements (potentially, including auxiliary lanes) is recommended.

Midblock #2 – Southbound Main Line Only – Exit 6 (Elm Street) to Exit 5 (Louisiana Street)

This section of I-190 consists of three southbound lanes between Exit 6 and Exit 5. No on/off ramps are located within this main line section.

A total of 25 crashes were identified within this segment during the three-year study period. None of the crashes involved fatalities, 40% involved injuries, 56% involved property damage only, and 4% were non-reportable. Rear-end crashes represented more than eight out of 10 crashes as listed below.:

- 84% Rear-end (21 crashes)
- 16% Side-swipe same direction (4 crashes)

The calculated crash rate per Mvm is 1.98 which is higher than the statewide average of 1.55. Contributing factors for collisions in this section include following too closely and reaction to other uninvolved vehicles. In addition, 92% of the crashes occurred in the evening peak hour between 3:30 pm and 6:00 pm. Traffic congestion maybe a contributing factor in the high rear-end and side-swipe type crashes. Implementing geometric improvements (potentially, including auxiliary lanes) is recommended.

Midblock #3 – Southbound Main Line & Juncture – Exit 5 (Louisiana Street)

This section of I-190 consists of three southbound lanes and the Exit 5 off and on-ramps. The southbound off and on-ramps to Louisiana Street both consist of one lane ramps with deceleration and acceleration lanes on I-190, respectively.

A total of 24 crashes were identified within this segment during the three-year study period. None of the crashes involved fatalities, 29% involved injuries, 58% involved property damage only, and 13% were non-reportable. The highest number of crashes were fixed object (median and jersey barrier) and rear-end crashes were the next highest crash type as listed below:

- 38% Fixed object (9 crashes)
- 29% Rear-end (7 crashes)
- 25% Side-swipe same direction (6 crashes)

The calculated crash rate per Mvm is 1.98 which is higher than the statewide average of 1.55. Contributing factors for collisions in this section include following too closely, unsafe lane change, and unsafe speed. In addition, 20% of the crashes occurred in the evening peak hour between 4:00 pm and 6:00 pm. The slight s-curvature in the roadway and traffic congestion maybe a contributing factor in the types of crashes identified above. Implementing geometric improvements (potentially, including auxiliary lanes) is recommended.

7. Michigan Avenue Crash Analysis

7.1 Summary

Michigan Avenue transverses north-south within the Project limits and extends for approximately 0.67 miles from North Division Street at the north limit to Ohio Street at the south limit. Classified as a Minor Arterial, the roadway consists primarily of one lane in each direction with auxiliary lanes at some major intersections. A center two-way-left turn lane is located on the southern portion of the street section between South Park Avenue and Perry Street. The two-way AADT on Michigan Avenue north of South Park Avenue in 2015 was approximately 6,900 vehicles with 3,000 vehicles in the northbound direction and approximately 3,900 in the southbound direction. The posted speed limit is 30 mph.

Crash data was analyzed at all the midblock and intersection locations within the Project limits as shown in **Figure 7.1.a**.



Figure 7.1.a – Michigan Avenue Location Map

A total of 99 crashes were reported within the study area during the three-year period from May 1, 2016 through April 30, 2019. The crashes included 97 intersection crashes and two midblock crashes. The total number of crashes listed by type and severity at each midblock and intersection location is shown in **Table 7.1**.

Table 7.1 Michigan Avenue – Intersection and Midblock Crash Summary Table

Intersection	Crash Type													Severity				
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overtaken	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable Property Damage Only	Injury	Fatal	
1 Ohio Street	1			1										2	1	1		
2 South Park Avenue	1	2				1	1				1			6	6	1		
3 Perry Street	1	3		3	1	1	1			2				12	6	6		
4 Scott Street	1	1	1	4	1	22	1							31	17	14		
5 Carroll Street		1		2			1							4	2	2		
6 Seneca Street	1	4		4	1	7								17	11	6		
7 Swan Street	3	1		2	2	5								13	1	7	5	
8 S. Division Street	1	1				7								9		6	3	
9 N. Division Street				3										3			3	
Total	9	13	1	19	5	43	4	0	0	2	1	0	0	97	1	56	41	0

Note: Signalized intersections are in bold.

Midblocks	Crash Type													Severity				
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overtaken	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable Property Damage Only	Injury	Fatal	
1 Perry Street to Scott Street								1						1		1		
2 Scott Street to Carroll Street													1	1	1			
Total	0	0	0	0	0	0	0	1	0	0	0	0	1	2	0	1	1	0

Below is a summary of additional patterns identified in the total Michigan Avenue study area crash analysis:

- Weather Conditions:
 - 18% Rain/Snow
- Time of Day:
 - 39% 10:00am - 4:00pm
 - 71% Day light
- Time of Year:
 - 42% Winter (Dec-Feb)

Right-angle crashes were found to make up 43% (43 of 99) of the total crashes on the portion of Michigan Avenue analyzed for the Project. Furthermore, a significant cluster of right-angle crashes were identified at the signalized intersection of Michigan Avenue with Scott Street which resulted in 71% (22 of 31) of the total intersection crashes.

The Michigan Avenue crash rates were calculated along the midblock segments and intersection locations and compared to the statewide average crash rates to determine any locations above the statewide average rate. The calculations show eight of the nine intersections and none of the midblock sections exceed the statewide average crash rates as listed below and shown on **Figure 7.1.b**.

Crash Rates Above Statewide Average:

- Int #1 – Michigan Avenue at Ohio Street
- Int #2 – Michigan Avenue at South Park Avenue
- Int #3 – Michigan Avenue at Perry Street
- Int #4 – Michigan Avenue at Scott Street
- Int #5 – Michigan Avenue at Carroll Street
- Int #6 – Michigan Avenue at Seneca Street
- Int #7 – Michigan Avenue at Swan Street
- Int #9 – Michigan Avenue at Division Street



Figure 7.1.b – Michigan Avenue – Locations with Crashes Above Statewide Average Rate

Refer to section 7.2 regarding locations that exceed the statewide average rate.

7.2 Michigan Avenue Locations Above Statewide Average Crash Rate

Intersection #1 – Michigan Avenue at Ohio Street

This 4-way unsignalized intersection consists of one lane on Michigan Avenue with bicycle lanes on the north leg of the intersection in both directions. Ohio Street is stop controlled and has one travel lane including bicycle shared lane markings (sharrows) on the east leg of the intersection in both directions. The west leg of the intersection is also controlled by a stop sign and provides access to a parking lot.

A total of two crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities, one involved injury, and one involved property damage only. Of the two crashes, one was a rear-end and one involved a left-turn. Both crashes involved vehicles traveling northbound on Michigan Avenue. Due to the bridge structure and horizontal and vertical curvature of the roadway on the northbound approach to the intersection, there appears to be poor sight distance for the eastbound approach for vehicles exiting the park lot. The calculated crash rate per MEV is 0.23 which is higher than the statewide average of 0.15. It is recommended to evaluate the intersection sight distance and feasibility of adding stop signs to Michigan Avenue making the location a 4-way stop controlled intersection.

Intersection #2 – Michigan Avenue at South Park Avenue

The 4-way signalized intersection of Michigan Avenue and South Park Avenue are both comprised of one lane in each direction with left turn lanes and exclusive bike lanes.

A total of six crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities; only one involved injury and 5 reported property damage only. The only pattern identified was four of the six total crashes were on the South Park Avenue westbound approach. The calculated crash rate per MEV was 0.49 which is above the statewide average of 0.23. It is recommended to update the intersection pavement markings and install overhead left-turn lane signs to improve driver visibility and channelization.

Intersection #3 – Michigan Avenue at Perry Street

This section of Michigan Avenue consists of one travel lane and a bike lane in both directions. An exclusive left-turn lane exists on the northbound approach and an exclusive right-turn lane exists on the southbound approach. Perry Street is one lane in each direction where it intersects Michigan Avenue to form a signalized 4-way intersection.

A total of 12 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities, six involved injuries, and six involved property damage only. Of the total crashes, the highest types included three side-swipes, three left-turns, and two crashes with a pedestrian. Of the 12 total crashes 42% (5) involved a vehicle traveling northbound on Michigan Avenue. The calculated crash rate per MEV is 1.18 which is higher than the statewide average of 0.23. The most common contributing factor was driver inattention/distraction. Although some of the crashes are typical of signalization, it is recommended to improve the intersection visibility. Updating the striping, including high visibility continental crosswalks (in lieu of just two parallel lines that exist today), and installing left and right-turn lane overhead signs can all improve intersection visibility.

Intersection #4 – Michigan Avenue at Scott Street

This section of Michigan Avenue consists of two lanes in each direction where Scott Street intersects to form an unsignalized 4-way intersection. A bicycle lane also exists on the south leg of the intersection traveling southbound. Scott Street on the east leg consists of one lane in each direction, while the west leg consists of a shared right/thru lane and an exclusive left turn lane. Stop signs are present on both Scott Street approaches.

A total of 31 crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities, 14 involved injury, and 17 involved property damage only. Of the total 31 crashes, 71% (22) were right-angle crashes. Eastbound vehicles on Scott Street were involved in 14 of the 22 crashes (64%) and 12 of the 22 crashes (55%) involved southbound vehicles on Michigan Avenue. The calculated crash rate per MEV was 1.68 which is higher than the statewide average of 0.15. The most common contributing factors reported include failure to yield the right of way and driver inattention/distraction. It appears the vertical curvature in the roadway and the 4-lane road on Michigan Avenue both reduce visibility for vehicles entering from Scott Street. It is recommended to improve the intersection visibility by updating the intersection striping. In addition, a lane reduction to a 3-lane section should be considered to improve visibility and minimize conflicts.

Intersection #5 – Michigan Avenue at Carroll Street

This section of Michigan Avenue consists of two lanes in each direction where Carroll Street intersects to form a non-standard unsignalized 4-way stop controlled intersection. Carroll Street to the east consists of one lane in each direction, while to the west is a dead-end street providing access to business parking lots and delivery bays, with one lane in each direction.

A total of four crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities, while two involved injuries and two involved property damage only. Of the total crashes, two were vehicles making a left-turn onto Michigan Avenue; one at each Carroll Street approach. The calculated crash rate per MEV was 0.27 which is higher than the statewide average of 0.17. The left-turn type crashes may be attributable to the 4-lane section and vertical curvature of the roadway. It is recommended to improve the intersection visibility by updating the intersection striping. In addition, a lane reduction to a 3-lane section should be considered to improve visibility and minimize conflicts.

Intersection #6 – Michigan Avenue at Seneca Street

This section of Michigan Avenue consists of two lanes in each direction where Seneca Street intersects to form a signalized 4-way intersection. Seneca Street is one-way westbound with two through lanes, and an exclusive left turn lane, while the eastbound direction consists of one right and one left-turn only lanes.

A total of 17 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities and 65% involved property damage only and 35% involved injuries. Of the total crashes, 41% (7 of 17) were right-angles, 24% (4 of 17) were left-turn crashes, and 24% (4 of 17) were sideswipes in the same direction. The calculated crash rate per MEV was 0.76 which is higher than the statewide average of 0.23. These types of crashes are typical of signalization, however a pattern right-angle crashes involving eastbound vehicles on Seneca Street were found consisting of 86% (6 of 7) of the right-angle crashes. This is possibly due to the one-way westbound street on Seneca Street. The most common contributing factors include driver inattention/distraction and passing/lane usage improper. It is recommended to improve the intersection visibility by updating the intersection striping and adding a “stop here on red” sign to the eastbound approach on Seneca Street.

Intersection #7 – Michigan Avenue at Swan Street

At this signalized 4-way intersection, Michigan Avenue consists of two lanes in each direction with limited on-street parking available on the west side, north of the intersection. Swan street consists of one lane with an exclusive left-turn lane, in each direction, and restricted parking.

A total of 13 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities and 54% (7 of 13) involved property damage only, 38% (5 of 13) involved injuries, and 8% (1 of 13) was a non-reportable. Of the total crashes, 38% (5 of 13) were right-angles, and

23% (3 of 13) were rear-end crashes. The calculated crash rate per MEV was 0.89 which is higher than the statewide average of 0.23. These types of crashes are typical of signalization. No discernible patterns were found involving the right-angle crashes, however the three rear-end crashes all took place in the southbound direction on Michigan Avenue with a common contributing factor of driver inattention/distraction. This is possibly due to the close proximity of the signal at S. Division street to the north. Accordingly, no mitigation measures are being proposed.

Intersection #9 – Michigan Avenue at N. Division Street

At this unsignalized T-intersection, Michigan Avenue consists of one lane in each direction with parking along the west side. North Division Street is a one-way westbound street with parking on both sides.

A total of three crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities and 100% involved injuries. Each of the crashes were left-turn crashes involving a southbound vehicle on Michigan Avenue and a vehicle making a northbound left-turn onto North division Street. The calculated crash rate per MEV was 0.32 which is higher than the statewide average of 0.18. No common contributing factors were involved in these crashes, but they included driver inattention/distraction and turning improperly. No mitigation measures are being proposed as there are no countermeasures to address driver inattention/distraction and turning improperly.

8. Fuhrmann Boulevard Crash Analysis

8.1 Summary

Fuhrmann Boulevard transverses north-south within the Project limits and extends approximately 1.9 miles from Ohio Street to the north to Ridge Road to the south. Classified as a Local Street, the roadway consists primarily of two lanes in each direction. The two-way AADT on Fuhrmann Boulevard north of Tiff Street in 2013 was approximately 3,800 vehicles with 400 vehicles in the northbound direction and approximately 3,400 in the southbound direction. The posted speed limit is 30 mph.

Crash data was analyzed at all the midblock and intersection locations within the Project limits as shown in **Figure 8.1**.

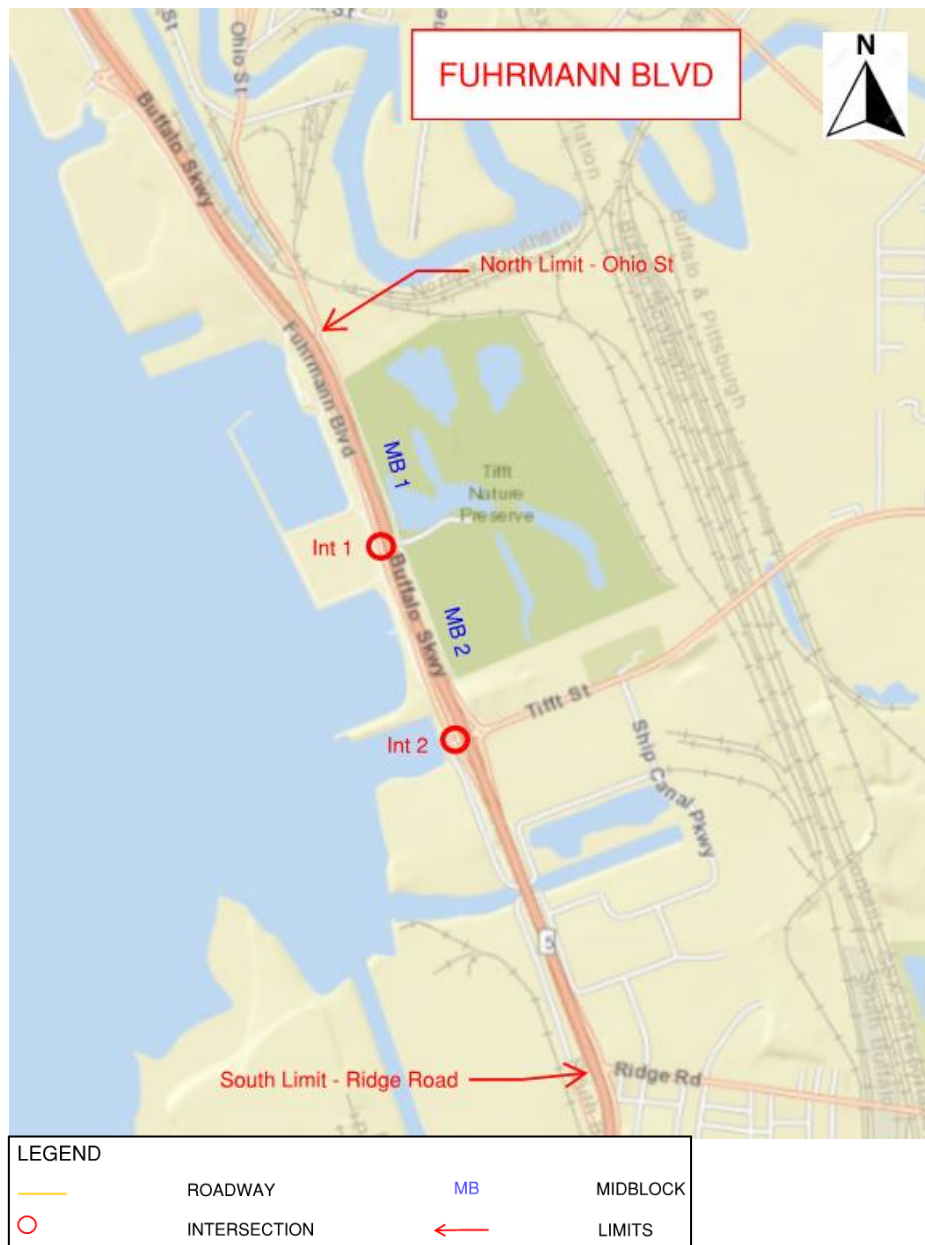


Figure 8.1 – Fuhrmann Boulevard Location Map

A total of 5 crashes were reported within the study area during the three-year period from May 1, 2016 through April 30, 2019. The crashes included one intersection crashes and four midblock crashes. The total number of crashes listed by type and severity at each midblock and intersection location is shown in **Table 8.1**.

Table 8.1 - Fuhrmann Boulevard – Intersection and Midblock Crash Summary Table

Intersection	Crash Type														Severity			
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overtaken	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable	Property Damage Only	Injury	Fatal
1 Tiftt Nature Preserve														0				
2 Tiftt Street		2				1	3				1			7		3	4	
Total	0	2	0	0	0	1	3	0	0	0	1	0	0	7	0	3	4	0

Note: Signalized intersections are in bold.

Midblocks	Crash Type														Severity			
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overtaken	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable	Property Damage Only	Injury	Fatal
1 Ohio Street to Tiftt Nature Preserve		1					1							2		1	1	
2 Tiftt Nature Preserve to Tiftt Street		1					1							2	1		1	
Total	0	2	0	0	0	0	2	0	0	0	0	0	0	4	1	1	2	0

Below is a summary of additional patterns identified in the total Fuhrmann Boulevard study area crash analysis:

- Weather Conditions:
 - 13% Rain/Snow
- Time of Day:
 - 38% 10:00am - 4:00pm
 - 50% Day light
- Time of Year:
 - 63% Summer (Jun-Aug)

No crash clusters were identified along Fuhrmann Boulevard within the three-year analysis period.

The Fuhrmann Boulevard crash rates were calculated along the midblock segments and intersection locations and compared to the statewide average crash rates to determine any locations above the statewide average rate. The calculations show that one of the two intersections exceed the statewide crash rates and none of the two midblock sections exceed the statewide average crash rates.

Refer to section 8.2 regarding locations that exceed the statewide average rate.

8.2 Fuhrmann Boulevard Location Above Statewide Average Crash Rate

Intersection #2 – Fuhrmann Boulevard at Tifft Street

This signalized intersection consists of two lanes in the southbound direction on Fuhrmann Boulevard. The street ties into Tifft Street just west of I-190. Tifft Street is comprised of two approach lanes at the signalized intersection. The southern leg of the intersection is comprised of an on-ramp onto I-190.

A total of seven crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities, four involved injuries and three involved property damage only. Of the seven crashes, two were side-swipe crashes, one was an angle, three were with a fixed object and one involved a bicycle. The calculated crash rate per MEV is 0.46 which is higher than the statewide average of 0.23. It is recommended to evaluate the signal timing to assure that ample time is available for higher volume movements onto the on-ramp onto I-190.

9. Ohio Street Crash Analysis

9.1 Summary

Ohio Street transverses north-south within the Project limits and extends for approximately 1.5 miles from Michigan Avenue to the north to Fuhrmann Boulevard to the south. Classified as a Minor Arterial, the roadway consists primarily of one lane in each direction with left turn lanes at Ganson Street and Fuhrmann Boulevard. A center two-way-left turn lane is located on the northern portion of the street section between Ganson Street and Fuhrmann Boulevard. The two-way AADT on Ohio Street south of Ganson Street in 2015 was approximately 5,400 vehicles with 2,600 vehicles in the northbound direction and approximately 2,800 in the southbound direction. The posted speed limit is 30 mph.

Crash data was analyzed at all the midblock and intersection locations within the Project limits as shown in **Figure 9.1**.

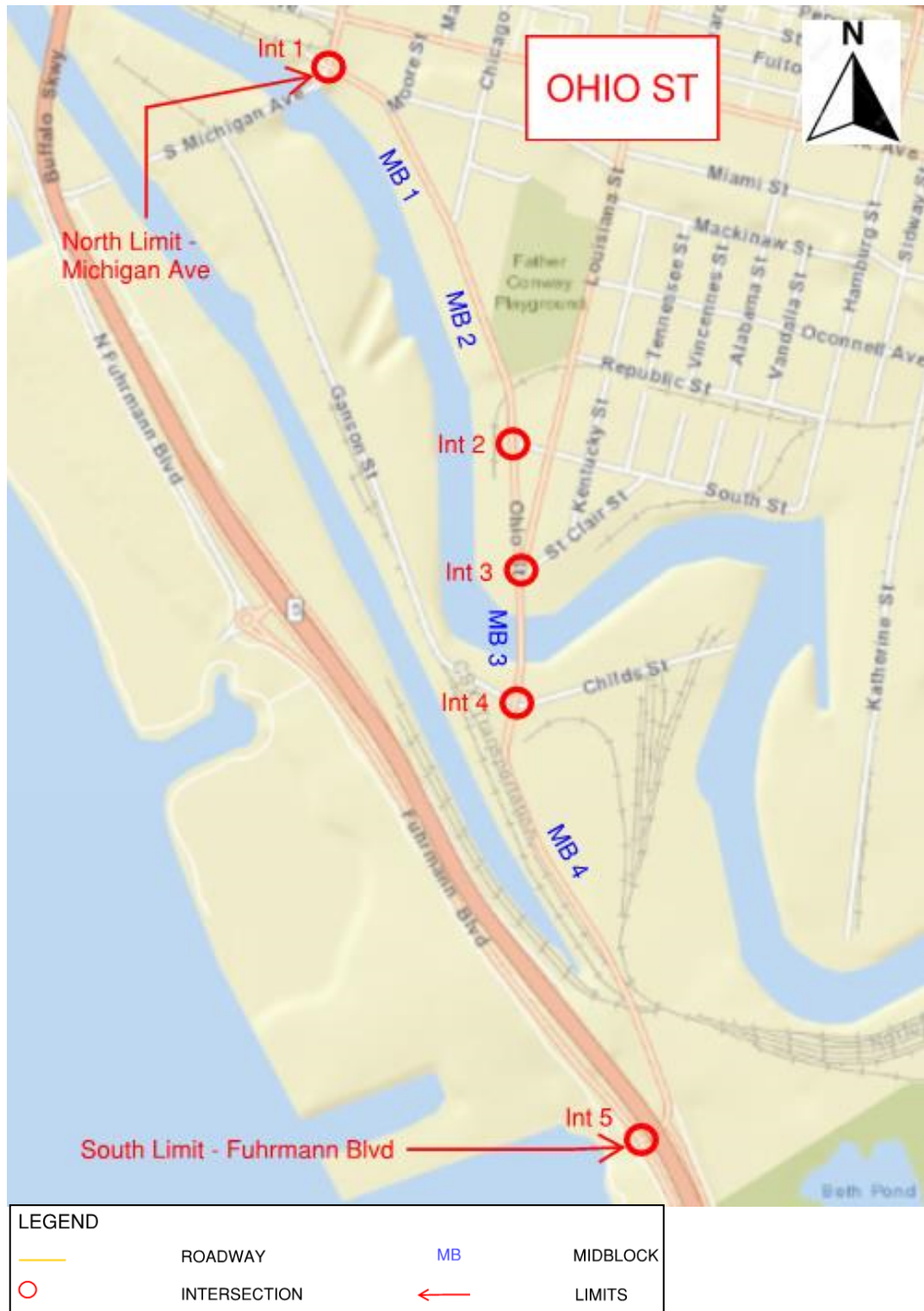


Figure 9.1a - Ohio Street Location Map

A total of 21 crashes were reported within the study area during the three-year period from May 1, 2016 through April 30, 2019. The crashes included 15 intersection crashes and six midblock crashes. The total number of crashes listed by type and severity at each midblock and intersection location is shown in Table 9.1a.

Table 9.1 Ohio Street – Intersection and Midblock Crash Summary Table

Intersection	Crash Type														Severity			
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overturned	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable Property Damage Only	Injury	Fatal	
1 Ohio Street and South Michigan Avenue	1			1										2	1	1		
2 Ohio Street and South Street						2								2	2			
3 Ohio Street-Louisiana Street-St. Clair Street	4	2											1	7	2	5		
4 Ohio Street- Garson Street- Silo City Row	1	1												2	2			
5 Ohio Street and Fuhrmann Blvd.				1									1	2	2	1		
Total	6	3	0	2	0	2	0	0	0	0	0	0	2	15	2	12	2	0

Note: Signalized intersections are in bold

Midblocks	Crash Type														Severity			
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overturned	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable Property Damage Only	Injury	Fatal	
1 Ohio Street from Moore Street to Chicago Street						1								1	1			
2 Ohio Street from Chicago Street to South Street							2						1	3	1	2		
3 Ohio Street from Louisiana Street/St. Clair Street to Ganson Street/Silo City Row	1													1	1	1		
4 Ohio Street from Ganson Street/Silo City Row to Fuhrmann Blvd		1												1	1			
Total	1	1	0	0	0	1	2	0	0	0	0	0	1	6	0	4	3	0

Below is a summary of additional patterns identified in the total Ohio Street study area crash analysis:

- Weather Conditions:
 - 30% Rain/Snow
- Time of Day:
 - 35% 6:00am - 10:00am
 - 35% 10:00am - 4:00pm
 - 78% Day light
- Time of Year:
 - 39% Summer (Jun-Aug)

A cluster of crashes was identified at the signalized intersection of Ohio Street with St. Clair Street and Louisiana Street which resulted in seven of the 21 total crashes.

The Ohio Street crash rates were calculated along the midblock segments and intersection locations and compared to the statewide average crash rates to determine any locations above the statewide average rate. The calculations show three of the five intersections and one of the four midblock sections exceed the statewide average crash rates as listed below and shown on **Figure 9.1.b**.

Crash Rates Above Statewide Average:

- Int #2 – Ohio Street at South Street
- Int #3 – Ohio Street at Louisiana Street/St. Clair Street
- Int #4 – Ohio Street at Ganson Street/Silo City Row
- MB #2 – Ohio Street from Chicago Street to South Street



Figure 9.1.b - Ohio Street – Locations with Crashes Above Statewide Average Rate

Refer to section 9.2 to regarding locations that exceed the statewide average rate.

9.2 Ohio Street Locations Above Statewide Average Crash Rate

Intersection #2 – Ohio Street at South Street

This section of Ohio Street consists of one lane in each direction where South Street terminates to form an unsignalized 3-legged intersection with Ohio Street. There are no turning lanes at the intersection.

A total of two crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities and 100 % involved property damage. The incidents occurred in opposite directions and were both angle crashes. The calculated crash rate per MEV was 0.46 which is higher than the statewide average of 0.31. Although angle crashes are typical at stop-controlled intersections, the crashes at this location may be attributable to impeded (southbound) sight distance as drivers on South Street need to pull up beyond the stop bar and into the pedestrian crosswalk to attain the necessary sight distance to turn onto Ohio Street. Installing an intersection warning sign on the northbound approach before South Street is recommended to warn northbound drivers of traffic exiting the street.

Intersection #3 – Ohio Street at Louisiana Street/St Clair Street

This section of Ohio Street consists of two lanes in each direction where Louisiana Street and St. Clair Street terminates and ties in at skewed angles into Ohio Street to form a signalized intersection. St. Clair Street is one-way in the northeast direction and Louisiana Street ties in from the north, nearly adjacent to Ohio Street. There are no turning lanes at this intersection.

A total of seven crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities; 5 involved property damage and one was designated as non-reportable. Four were rear-end crashes, two were side-swipe crashes in the opposite direction and one crash was described as “other”. The calculated crash rate per MEV is 1.9 which is higher than the statewide average of 0.54. It is possible crashes at this location are attributable to the absence of turning lanes on Ohio Street and the skewed intersection. Installing a southbound left-turn lane and a northbound right-turn lane on Ohio Street at this intersection is recommended.

Intersection #4 – Ganson Street/Silo City Row

The intersection of Ohio Street with Ganson Street and Silo City Row is signalized. At this 4-way intersection, Ohio Street is comprised of one lane in each direction with left turn lanes at the Ganson Street and Silo City Row.

Over the three-year analysis period, two crashes were found at this signalized intersection. None of the crashes involved fatalities and 100% reported property damage only. One rear-end crash and one side-swipe occurred on Ohio Street at this intersection in the opposite direction. The crash rate per MEV was calculated at 0.26 which is higher than the statewide average of 0.23. Accordingly, no mitigation measures proposed at this location.

Midblock #2 – Ohio Street from Chicago Street to South Street

This section of Ohio Street from Chicago Street to South Street is comprised of one lane in each direction with parking along the west side of the road.

A total of three crashes occurred along the 0.16-mile segment during the three-year study period. None of the crashes involved fatalities, however 67% involved injuries. One of the crashes that occurred in this segment was referenced as “other” and two crashes were described as crashes with fixed objects. The calculated crash rate per MVM is 3.39 which is higher than the statewide average of 3.23. No clusters of crashes occurred on this segment. Accordingly, no mitigation measures are proposed for the midblock segment of Ohio Street from Chicago Street to South Street.

10. Bailey Avenue Crash Analysis**10.1 Summary**

Bailey Avenue transverses north-south within the Project limits extends for approximately 1.2 miles from Clinton Street to the north to South Park Avenue to the south. Classified as a Principal Arterial, the roadway consists primarily of two lanes in each direction. The two-way AADT on Bailey Avenue in 2015 was approximately 22,400 vehicles with 10,800 vehicles in the northbound direction and approximately 11,600 in the southbound direction. The posted speed limit is 30 mph.

Crash data was analyzed at all the midblock and intersection locations within the Project limits as shown in **Figure 10.1.a**.

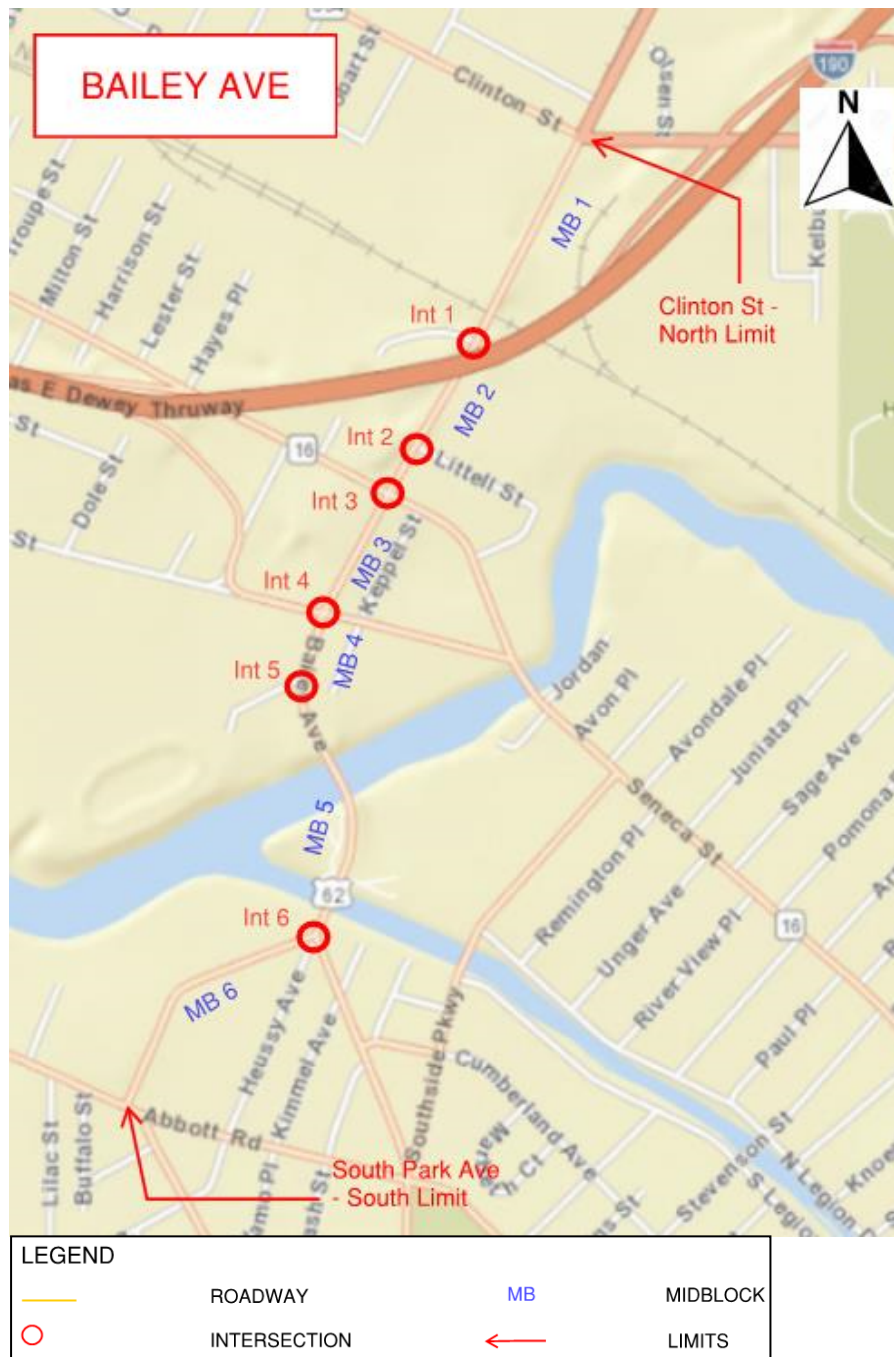


Figure 10.1.a – Bailey Avenue Location Map

A total of 125 crashes were reported within the study area during the three-year period from May 1, 2016 through April 30, 2019. The crashes included 110 intersection crashes and 15 midblock crashes. The total number of crashes listed by type and severity at each midblock and intersection location is shown in **Table 10.1**.

Table 10.1 Bailey Avenue – Intersection and Midblock Crash Summary Table

Intersection	Crash Type													Severity				
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overtuned	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable	Property Damage Only	Injury	Fatal
1 Bailey Avenue and Buffalo China Road	5													5	5	3		
2 Bailey Avenue and Littell Avenue		1	1			1								3	3			
3 Bailey Avenue and Seneca Street	24	5		19	2	6	1			1			1	59	45	29		
4 Bailey Avenue and Elk Street	7	8		1		4	1						1	22	17	6		
5 Bailey Avenue and Old Bailey Road			1				1						1	3	2	1		
6 Bailey Avenue and McKinley Pkwy. / Heussy Avenue	10	4		1			1	2						18	13	8		
Total	46	18	2	21	2	11	4	2	0	1	0	0	3	110	0	85	47	0

Note: Signalized intersections are in bold.

Midblocks	Crash Type													Severity				
	Rear-end	Side-swipe (Same Direction)	Side-swipe (Opposite Direction)	Left-turn	Right-turn	Angle	Fixed Object	Head-On	Overtuned	Pedestrian	Bicycle	Deer/Animal	Other	Total	Non-Reportable	Property Damage Only	Injury	Fatal
1- Bailey Avenue btwn Clinton and Buffalo China Road	1		1	1			1							4		3	1	
2- Bailey Avenue btwn Buffalo China Road and Littell Avenue		1												1			1	
3- Bailey Avenue btwn Seneca Street and Elk Street	1		1											2			2	
4- Bailey Avenue btwn Elk Street Old Bailey Road	1						1						1	3		2	1	
5- Bailey Avenue btwn Old Bailey Road and McKinley Pkwy.	1		1						1				1	4		1	3	
6- Bailey Avenue btwn Mckinley Pkway and S. Park Avenue										1				1			1	
Total	4	1	3	1	0	0	2	0	1	1	0	0	2	15	0	6	9	0

Below is a summary of additional patterns identified in the total Bailey Avenue study area crash analysis:

Weather Conditions:

17% Rain/Snow

Time of Day:

32% 6:00am - 10:00pm

32% 10:00am - 4:00pm

75% Day light

Time of Year:

54% Winter (Dec-Feb)

A cluster of crashes was identified at the Seneca Street signalized intersection which resulted in 59 of the 126 (47%) total crashes. Additional signalized locations with crash clusters were identified at the intersections of Bailey Avenue at Elk Street with 22 (17%) crashes and at Bailey Avenue and McKinley Parkway/Heussy Avenue with 19 (15%) crashes.

The Bailey Avenue crash rates were calculated along the midblock segments and intersection locations and compared to the statewide average crash rates to determine any locations above the statewide average rate. The calculations show that each of the six intersections exceed the statewide average crash rates as listed below and identified on **Figure 10.1.b**

Intersections with Crash Rates Higher than Statewide Average:

- Int #2 – Bailey Avenue and Littell Avenue
- Int #3 – Bailey Avenue and Seneca Street
- Int #4 – Bailey Avenue and Elk Street
- Int #5 – Bailey Avenue and Old Bailey Road
- Int #6 – Bailey Avenue and McKinley Parkway /Heussy Avenue



Figure 10.1.b – Bailey Avenue – Locations with Crashes Above Statewide Average Rate

Refer to section 10.2 to regarding locations that exceed the statewide average rate.

10.2 Bailey Avenue Locations Above Statewide Average Crash Rate

Intersection #2 – Bailey Avenue and Littell Avenue

This section of Bailey Avenue consists of two lanes in each direction where Littell Avenue Boulevard terminates to form an unsignalized stop controlled T-intersection. Littell Avenue is a city residential street comprised of one lane in each direction.

A total of 3 crashes were found at this unsignalized intersection during the three-year study period. None of the crashes involved fatalities and all three involved property damage. Two crashes were sideswipes; one in the same direction and one in the opposite direction and one crash occurred at an angle. The calculated crash rate per MEV is 0.13 which is higher than the statewide average of 0.07. The sideswipe in the same direction crash occurred during a snow event and it is possible the crash occurred as a result of snowy and icy pavement conditions. However, the remaining two crashes are attributable to vehicles turning onto Littell Avenue. There are no mitigation measures proposed at this location as the crashes were weather related.

Intersection #3 – Bailey Avenue and Seneca Street

This signalized 4-way intersection is located just north of interstate 190. Each approach is comprised of two lanes in each direction with left turn lanes on the northbound and southbound approaches.

A total of 59 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities; 29 involved injuries and 45 reported property damage only. The most common type of collisions included 24 rear-ends and 19 left-turn crashes. Additionally, 5 sideswipes (in the same direction) occurred, two right-turns, six angle crashes and 1 fixed object crash. A pattern of rear-end crashes and left-turn crashes were found on the northbound and southbound approaches. The calculated crash rate per MEV was 1.68 which is higher than the statewide average of 0.23.

Rear-end crashes as reported for this intersection are consistent with crashes at signalized intersections. Additionally, left-turn crashes also commonly occur at signalized approaches without protected left turn movements. To improve intersection visibility, traffic signal backplates with larger traffic signal heads are recommended. Additionally, a protected northbound and southbound left-turn signal phase with overhead left turn signs are recommended to reduce the left-

turn crashes. In addition, new pavement striping is recommended on each approach as the pavement stripes, stop bars, left-turn arrows and pedestrian crosswalk striping are faded.

Intersection #4 – Bailey Avenue and Elk Street

This signalized 4-way intersection is located to the south of interstate I-190. The northbound and southbound approaches are comprised of two lanes in each direction with a southbound left turn lane onto Elk Street (a one-way street).

A total of 22 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities; six involved injuries and 17 reported property damage only. The most common type of collisions included eight sideswipes (in the same direction) and seven rear-end crashes. Additionally, four angle crashes occurred, one left-turn crash, one fixed object crash and one crash attributed to “other” were reported for this intersection. The calculated crash rate per MEV was 0.81 which is higher than the statewide average rate of 0.23.

Similar to Intersection n#3 – Bailey Avenue and Seneca Street, rear-end crashes are consistent with crashes at signalized intersections. To improve intersection visibility, traffic signal backplates are recommended and a left turn only sign for the southbound approach. Additionally, traffic signal timing plans and pavement striping conditions should be evaluated.

Intersection #5 – Bailey Avenue and Old Bailey Road

This section of Bailey Avenue adjacent to Old Bailey Road is comprised of two lanes in each direction. Old Bailey Road is essentially an access road to several businesses including a towing company and a vehicle salvage yard. It is not a through street and aside from the street name, there are no stop signs or pavement markings present.

A total of three crashes were found at this location during the three-year study period. None of the crashes involved fatalities, one resulted in an injury and two involved property damage. One crash was described as a sideswipe, one was attributed to a fixed object and one was attributed to “other”. The calculated crash rate per MEV is 0.14 which is higher than the statewide average of 0.12. It is possible the crashes at this location are attributable to vehicles turning onto old Bailey Road. Accordingly, no mitigation measures proposed at this location.

Intersection #6 – Bailey Avenue and McKinley Parkway /Heussy Avenue

This signalized 4-way intersection is located near the south end of Bailey Avenue. Heussy Avenue is a residential one-way street located on the south side of the

intersection with one lane in the southbound direction. The southbound approach is comprised of two approach lanes: an exclusive left-turn lane and a shared through/right turn lane. The eastbound approach includes two approach lanes: an exclusive left-turn lane and an exclusive right turn lane. The westbound approach is comprised of an exclusive left-turn lane and a through lane. The overhead span wire signs “NO TURN ON RED” are present on eastbound and westbound approaches.

A total of 18 crashes were found at this signalized intersection during the three-year study period. None of the crashes involved fatalities; eight involved injuries and 13 reported property damage only. The most common type of collisions included 10 rear-end crashes and four sideswipes (in the same direction). One left-turn collision and one crash attributed to “other” were reported for this intersection. The calculated crash rate per MEV was 0.46 which is higher than the statewide average rate of 0.23.

Similar to other intersections along Bailey Avenue with crash rates higher than the state-wide averages, rear-end crashes are typical types of crashes found to occur at signalized intersections. Recent improvements to the intersection were made that aligned the northern leg of Bailey Avenue with the eastern leg of McKinley Parkway to improve traffic flow. New lighting, pedestrian accommodations, signing, and striping were also added. A majority of the crashes occurred prior to the intersection improvements. However, adding backplates to the traffic signals will heighten driver’s attention to the traffic signal heads.

11. NYSDOT Potential High Accident Location Analysis

11.1 Summary

Highway Safety Investigations (HSI) are routinely conducted by NYSDOT on the State highway system to identify Potential High Accident Locations (PHAL’s). PHALs are identified as locations with accident rates that exceed than the average rate for the highway type and are presumed to have occurred as a result of some contributing factor. NYSDOT routinely addresses 20% of the PHALs annually that have occurred over a five-year period as required by federal law. Within the project limits two state highways are present: NYS Route 5 (Buffalo Skyway) and Interstate 190. The following sections identify safety information data available between 2016 and 2019 on the state highway segments located within the project limits.

NYS Route 5 (Buffalo Skyway)

Highway Accident Location (HAL) reports were identified by NYSDOT for the segment of NYS Route 5 (Buffalo Skyway) from reference marker 53023005 to 53023039 from 2016 to 2018 and for the first nine months of 2019 for the project. The HAL reports identified details of Safety Deficient Locations (SDLs) and PILs on the following segments along NYS Route 5 (Buffalo Skyway):

SDL's

2016: RM 53023004 – RM 53023006

2017: RM 53023003 – RM 53023005

RM 53023005 – RM 53023007

2018: RM 53023003 – RM 53023005

PIL's

2016: RM 53023037 – RM 53023200

2017: RM 53023037 – RM 53023200

2018: RM 53023037 – RM 53023039

There were no fatalities that occurred on this segment of interstate NYS Route 5 (Buffalo Skyway) during this time period.

Interstate 190

Potential High Accident Location (PHAL) Analysis was performed by NYSDOT for the segment of Interstate 190 from the I-90 junction at Exit 53 (MP 0.00) to Exit 7 (MP 5.2) from 2016 to 2018. A total of 1,039 crashes occurred along the highway section analyzed during the time period studied. The following provides a summary of locations and years where PHAL's were identified along the segment:

2017: MP 4.1 to MP 4.2

2018: MP 4.5 to MP 4.8 & MP 5.0

There were no fatalities that occurred on this segment of interstate 190 during this time period.

12. Safety Improvement Recommendations

12.1 Summary

The following sections detail intersections and midblock sections with crash rates higher than the statewide crash rates with crash clusters that can be mitigated with recommended improvement strategies.

12.2 Tifft Street

Intersection #1 – Tifft Street at Ship Canal Parkway

Installing a “Stop Here On Red” sign at the westbound stop bar on Tifft Street is recommended.

Intersection #4 – Tifft Street at Hopkins Street

Intersection lane and stop bar striping has significantly faded and is recommended to be updated. To improve intersection visibility traffic signal backplates are recommended as no overhead signs are on the signal span wire. In addition, restriping the eastbound approach to one exclusive lane and one through lane should be considered to minimize vehicle conflicts.

12.3 South Park Avenue

Intersection #2 – South Park Avenue at Chicago Street

Installing stop signs on the eastbound and westbound approaches are recommended.

Intersection #3 – South Park Avenue at Louisiana Street

Restriping the intersection approaches to add a left turn pocket for each approach is recommended.

Intersection #14 – South Park Avenue at Smith Street

New pavement markings and the installation of backplates on the overhead traffic signals for each approach is recommended.

Intersection #15 – South Park Avenue at Lee Street

New pavement markings are recommended for each approach.

Intersection #18 – South Park Avenue at Hopkins Street

New pavement markings are recommended for each approach.

Intersection #19 – South Park Avenue at Payson Avenue**Intersection #22 – South Park Avenue at Bailey Avenue/Abbott Road**

New pavement markings are recommended for each approach.

Intersection #38 – South Park Avenue at Tiff Street

New pavement markings are recommended for each approach.

12.4 Interstate 190**Northbound – Midblock #2 – Exit 6 (Elm Street) to Exit 5 (Hamburg Street)**

The pattern of rear-end and sideswipe crashes may indicate a problem with congestion along the expressway in this segment.

Implementing geometric improvements (potentially, including auxiliary lanes) is recommended.

Northbound – Midblock #3 – Exit 5 (Hamburg Street)

The pattern of rear-end and fixed object type crashes may indicate a problem with vehicles merging onto I-190 northbound.

It is recommended to review adding signs to indicate the merge point of the Hamburg Street ramp onto I-190. Implementing geometric improvements (potentially, including auxiliary lanes) is also recommended.

Southbound – Midblock #1 – Exit 6 (Oak Street/Elm Street)

The pattern of sideswipe and fixed object type crashes may indicate a problem with vehicles merging onto I-190 southbound as a result of the geometry and close proximity of the two merging points from the Washington Street and Oak Street ramps.

It is recommended to review the striping and signage for the merge points of both Washington Street and Oak Street ramps onto I-190. Implementing geometric improvements (potentially, including auxiliary lanes) is recommended.

Southbound – Midblock #2 – Exit 6 (Elm Street) to Exit 5 (Louisiana Street)

The pattern of rear-end crashes may indicate a problem with vehicle congestion along the segment of I-190 southbound.

Implementing geometric improvements (potentially, including auxiliary lanes) is recommended.

Southbound – Midblock #3 – Exit 5 (Louisiana Street)

The pattern of rear-end, side-swipe and fixed object type crashes may indicate a problem with vehicles merging onto I-190 southbound as a result of the geometry at the Exit 5 interchange.

Implementing geometric improvements (potentially, including auxiliary lanes) is recommended to allow traffic to merge and diverge at this interchange.

12.5 Michigan Avenue**Intersection #1 – Michigan Avenue at Ohio Street**

It is recommended to evaluate the intersection sight distance and feasibility of adding stop signs to Michigan Avenue making the location a 4-way stop controlled intersection.

Intersection #2 – Michigan Avenue at South Park Avenue

It is recommended to update the intersection pavement markings and install overhead left-turn lane signs to improve driver visibility and channelization.

Intersection #3 – Michigan Avenue at Perry Street

Updating the striping, including high visibility continental crosswalks (in lieu of just two parallel lines that exist today), and installing left and right-turn lane overhead signs can all improve intersection visibility.

Intersection #4 – Michigan Avenue at Scott Street

It is recommended to improve the intersection visibility by updating the intersection striping. In addition, a lane reduction to a 3-lane section should be considered to improve visibility and minimize conflicts.

Intersection #5 – Michigan Avenue at Carroll Street

It is recommended to improve the intersection visibility by updating the intersection striping. In addition, a lane reduction to a 3-lane section should be considered to improve visibility and minimize conflicts.

Intersection #6 – Michigan Avenue at Seneca Street

It is recommended to improve the intersection visibility by updating the intersection striping and adding a “stop here on red” sign to the eastbound approach on Seneca Street.

Intersection #7 – Michigan Avenue at Swan Street

It is recommended to improve the intersection visibility by updating the intersection striping and adding a “stop here on red” sign to the eastbound approach on Seneca Street.

12.6 Ohio Street

Intersection #2 – Ohio Street at South Street

Installing an intersection warning sign on the northbound approach before South Street is recommended.

Intersection #3 – Ohio Street at Louisiana Street/St Clair Street

Installing a southbound left-turn lane and a northbound right-turn lane on Ohio Street at this intersection is recommended.

12.7 Bailey Avenue

Intersection #3 – Bailey Avenue and Seneca Street

Traffic signal backplates and 12” traffic signal heads are recommended. Additionally, a protected northbound and southbound left-turn signal phase with overhead left turn signs are recommended along with new pavement striping on each approach.

Intersection #4 – Bailey Avenue and Elk Street

Traffic signal backplates and a left turn only sign for the southbound approach are recommended. Additionally, traffic signal timing plans and pavement striping conditions should be evaluated.

Intersection #6 – Bailey Avenue and McKinley Parkway /Heussy Avenue

Traffic signal backplates are recommended.