

The logo for the company 'wood.' is displayed in a bold, lowercase, sans-serif font. The word 'wood.' is positioned in the upper right quadrant of the page. The background features large, light gray curved shapes that sweep across the page from the top left and bottom left towards the right.

## **Appendix H**

**Update to Traffic Operations Analysis/Safety Assessment (2018)**

# Memo

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**To:** Syed Rizvi – Town of Oakville  
**From:** Ravi Bhim and Behzad Rouhieh – Wood  
**Date:** October 2, 2018  
**File:** TPB166147  
**cc:** David Sinke – Wood, Bob Felker - Wood  
**Re:** **Update to Traffic Operations Analysis/Safety Assessment for Lakeshore Road West Improvements Class EA (Final Memorandum)**

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## 1.0 Introduction

In 2016, Wood was retained by the Town of Oakville (referred as “The Town” hereinafter) to complete a Schedule ‘C’ Municipal Class Environmental Assessment (EA) for roadway improvements on Lakeshore Road West from Mississaga Street to Dorval Drive. As part of the study, Wood had prepared two separate reports (available under separate covers) documenting the road safety performance assessment (completed by Intus) and traffic analysis of the study corridor in May 2017 and February 2018 respectively.

The 2017 Traffic Analysis and 2018 Road Safety Report recommended a cross-section of one lane per direction for Lakeshore Road West with the inclusion of a two-way center left turn lane (TWLTL) between Mississaga Street and Dorval Drive. The inclusion of the TWLTL was recommended to promote safety for left turning vehicles into the many driveways along the segment. The key consideration was given to the high driveway density along the study corridor, particularly between Dorval Drive and East Street.

Upon reviewing the previously submitted technical reports, the Town has expressed an interest in re-evaluating the justification and feasibility outlined in the 2017/2018 traffic analysis and safety reports based on input received from stakeholders. As such, a scope change request was issued in May 2018 which included additional traffic operation analysis and road safety performance assessment along the study corridor. As part of the additional scope of work, Wood has completed an updated traffic operational analysis and road safety assessment which the inclusion of a TWLTL using updated counts and collisions data. The study corridor limits for this additional scope of work focused on Lakeshore Road between East Street and Dorval Drive. This memorandum documents the analyses and findings of the additional scope of work.

## 2.0 Traffic Operation Analysis

The following sections discuss the update to traffic analysis including methodology and the operational impacts with the inclusion of TWLTL on Lakeshore Road West. The updated analysis would also quantify the improvement regarding travel times along the corridor, as the availability of left-turning lanes typically facilitates traffic flow by removing turning traffic from the through-moving lanes.



## 2.1. Model Methodology

The May 2017 study had reviewed existing conditions and future needs to year 2021 and year 2031 along the study corridor using VISSIM microsimulation software. For the analysis update, the same models were modified with the inclusion of a TWLTL between East Street and Dorval Drive. Subsequently, the segment between Mississaga Street and East Street was removed from the model.

To capture the interaction between the vehicles entering and/or exiting to/from the local streets with through traffic along Lakeshore Road, side streets were aggregated and included as *sinks and sources* between key intersections within the model. The traffic demand for each sink and source location was calculated based on land use in accordance with the Trip Generation Manuals of the Institute of Transportation Engineers, 10<sup>th</sup> Edition (2017). The updated VISSIM model is illustrated in **Figure 1**.



Figure 1: Updated VISSIM model

It should be noted that in the original study, traffic growth in the period from 2021 to 2031 was estimated to be either zero or negative, such that the highest traffic volumes for the analysis period occur in 2021. Therefore, the additional analysis of future traffic operations was focused on 2021 as the critical year to forecast traffic impacts. The Town of Oakville has also set overall mode share targets of 10% for 2021, with mode share including public transit, active transportation (walking and cycling), carpooling and teleworking.

As a result, two scenarios were developed for both AM and PM peak hours (4 models in total):

- 2021 do-nothing scenario: AM and PM peak hours; and
- 2021 with TWLTL and 10% modal split: AM and PM peak hours.

## 2.2. Traffic Operation Analysis Results

The analysis revealed the impact of the inclusion of a TWLTL on travel times is minimal. A comparison of travel times of the two scenarios are shown in **Figure 2** through **Figure 5**. The travel times are represented based on peak hour and direction.

As shown, the differences in travel times between the do-nothing scenario (existing configuration) and the inclusion of TWLTL are expected to be marginal.

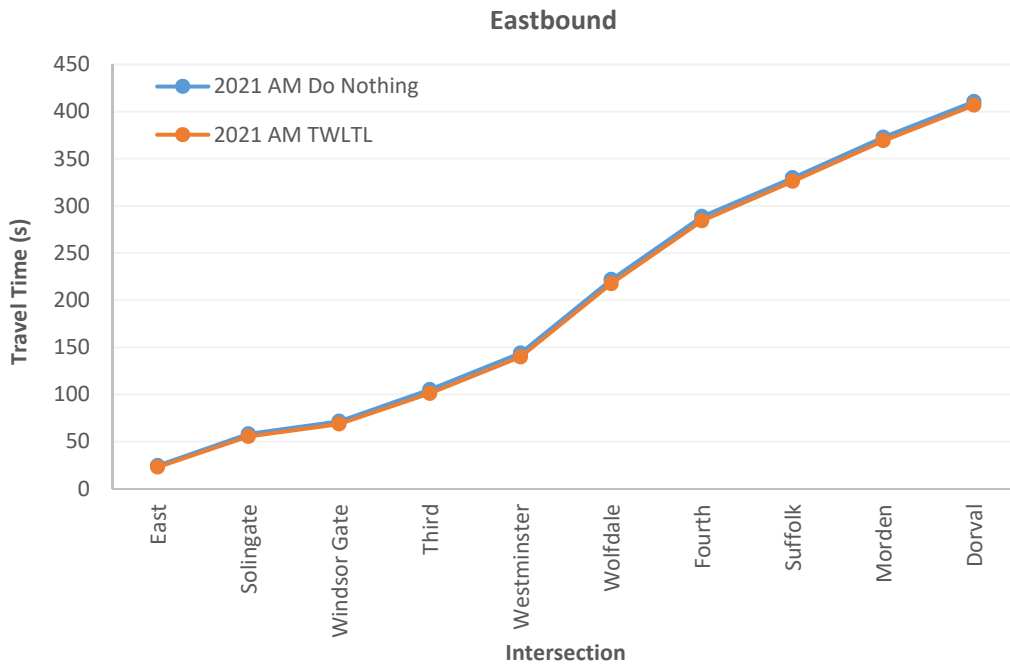


Figure 2: Travel Time Plots - 2021 AM Peak Hour, Eastbound

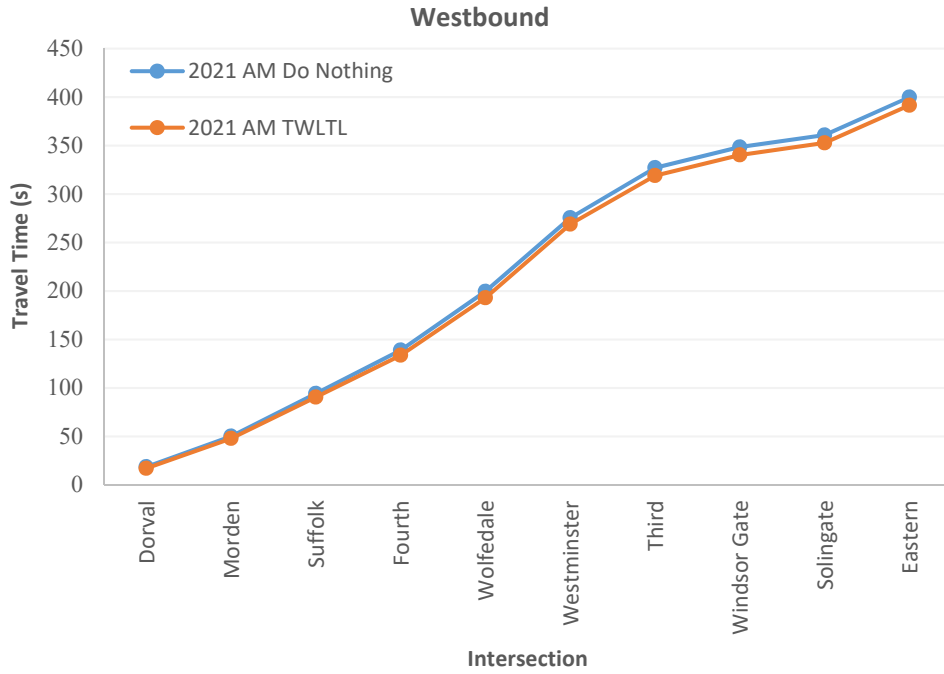


Figure 3: Travel Time Plots - 2021 AM Peak Hour, Westbound

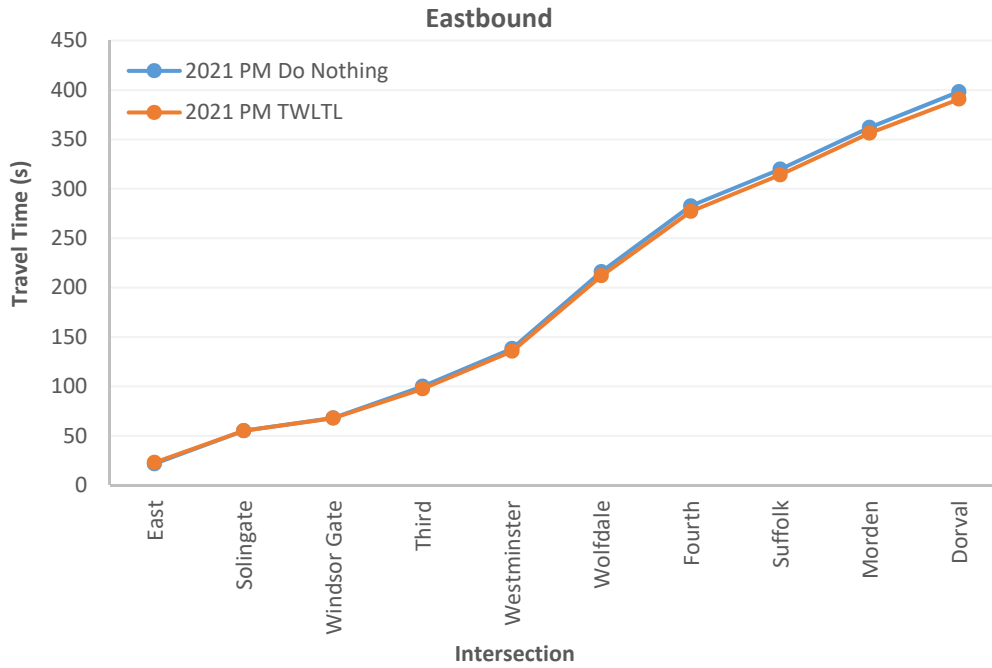


Figure 4: Travel Time Plots - 2021 PM Peak Hour, Eastbound

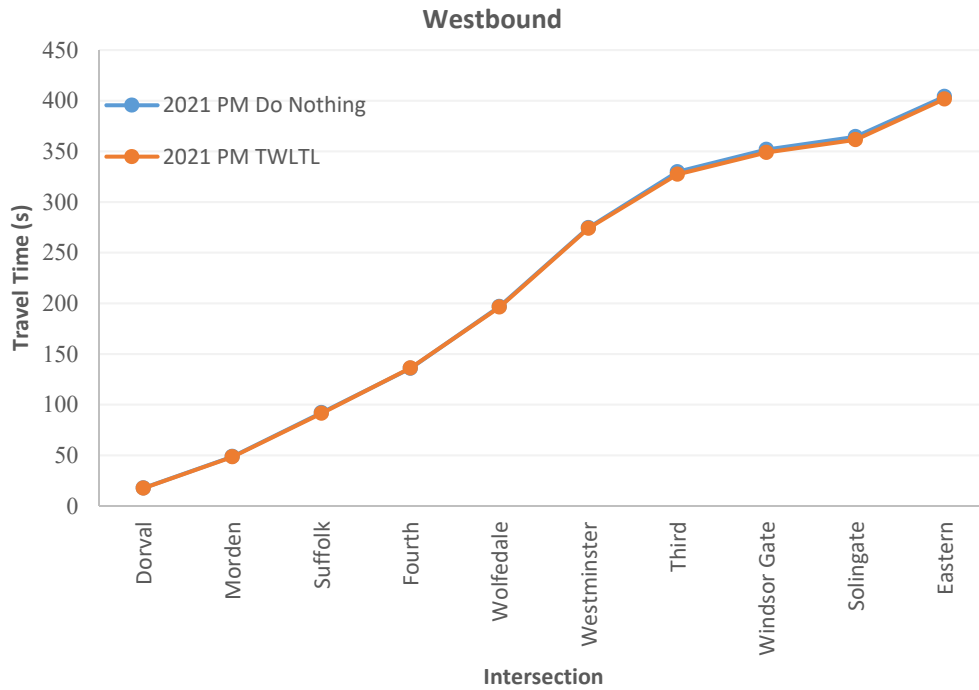


Figure 5: Travel Time Plots - 2021 PM Peak Hour, Westbound

The speed contour plots provided in **Appendix A** show speed reduction near intersections as expected. Similar speed reductions can be observed near the sink and source links (representing driveway accesses). Comparing the speed plots between existing and after the implementation of a TWLTL shows minimal improvement due to the inclusion of a TWLTL.

The results of intersection level of service analysis also indicated marginal changes for traffic operations, with all intersections between East Street and Dorval Drive operating at levels of service “C” or better by 2021 regardless of the implementation of the TWLTL. The key findings are as follows:

- The traffic volumes turning in and out of the various driveways along the corridor do not presently impact capacity.
- Even though the TWLTL facilitates traffic flow by removing turning traffic from the through lanes, the expected improvement of traffic operations within the study limits are minimal.

The intersection capacity analysis results are provided in **Appendix B** and illustrated in **Figure 6** through **Figure 9**.

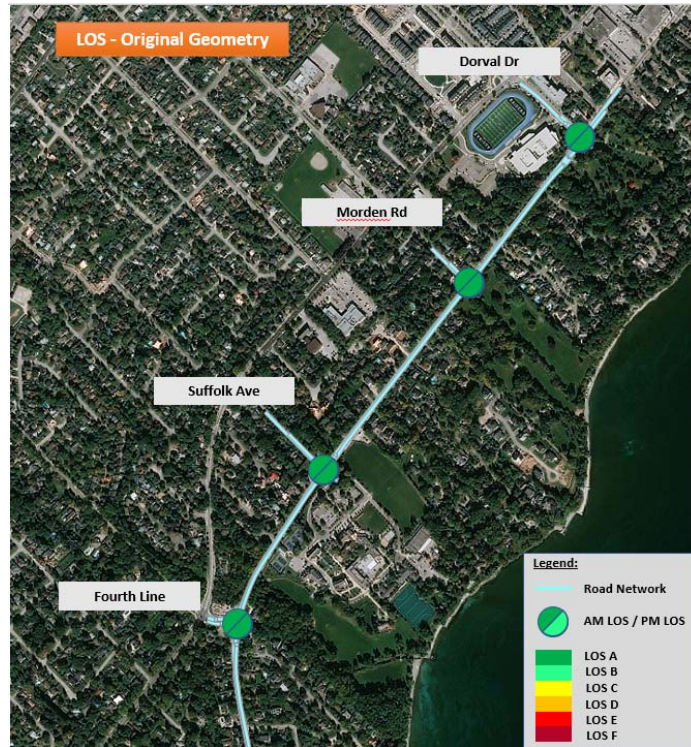


Figure 6: Intersection Level of Service Plot - 2021 AM/PM Peak Hour, Original Geometry (North Segment)

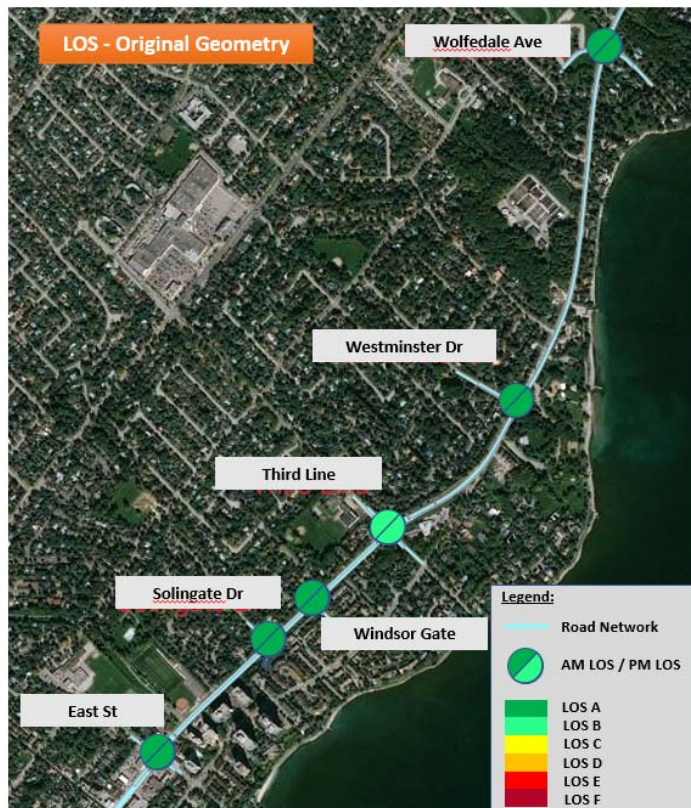


Figure 7: Intersection Level of Service Plot - 2021 AM/PM Peak Hour, Original Geometry (South Segment)



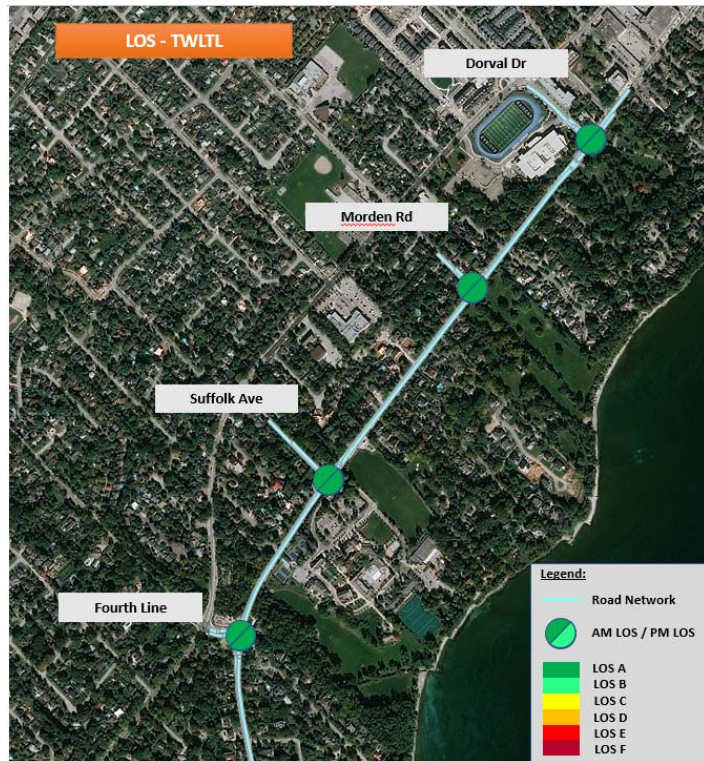


Figure 8: Intersection Level of Service Plot - 2021 AM/PM Peak Hour, TWLTL (North Segment)

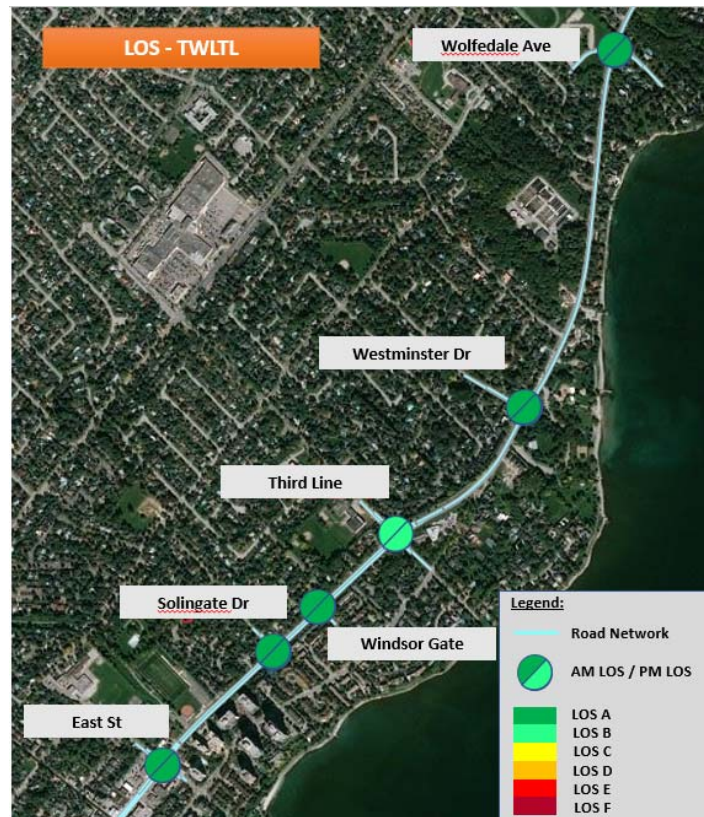


Figure 9: Intersection Level of Service Plot - 2021 AM/PM Peak Hour, TWLTL (South Segment)



### 3.0 Road Safety Performance Assessment

The road safety performance assessment serves as an update to the May 2017 Road Safety Report (completed by Intus), with a focus primarily on identifying the location of collisions with respect to collision types and severity. As such, a review of the most recent five years of collision data (2013-2017) was undertaken to validate and confirm the findings as documented in the 2017 Road Safety report by considering the safety needs of all road users. The purpose is to provide advice to the Town as well as the design team on modifications and considerations that will enhance the safety of the road design.

The scope of this task was limited to updating the analysis of road safety performance of the existing conditions in the analysis area limits between East Street and Dorval Drive.

#### 3.1. Historical Collision Trends

The most recent inclusive collision records from January 1, 2013 to December 31, 2017 were provided by The Town of Oakville, as presented in **Figure 10** and **Table 1**. In total, there are 87 collisions recorded within the study limits that resulted in 73 (or 84%) Property Damage Only (PDO), 12 (or 14%) non-fatal injuries and 2 (or 2%) in fatalities.

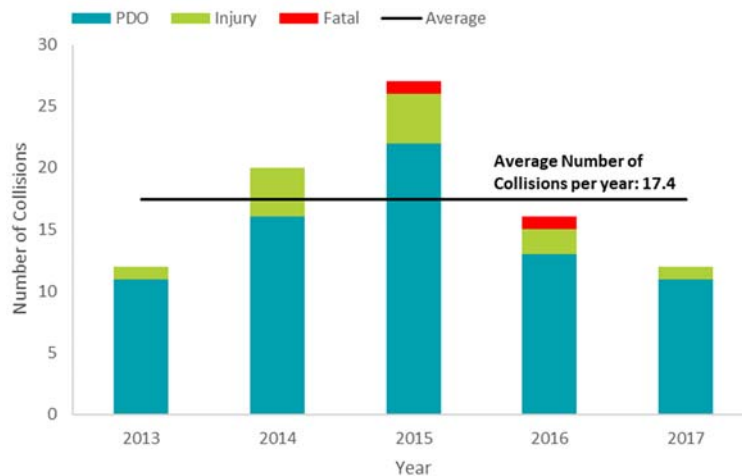


Figure 10: Collisions by Severity and Year (2013-2017)

As shown, there is a steady increase in the number of collisions from 2013 to 2015, followed by a decline in the subsequent years. On average, the study corridor experienced, 17.4 collisions annually within the analysis period as noted in **Figure 10**.

Table 1: Collisions by Severity and Year (2013-2017)

	2013	2014	2015	2016	2017	Total	Percentage
<b>PDO</b>	11	16	22	13	11	<b>73</b>	84%
<b>Injury</b>	1	4	4	2	1	<b>12</b>	14%
<b>Fatal</b>			1	1		<b>2</b>	2%
<b>Total</b>	<b>12</b>	<b>20</b>	<b>27</b>	<b>16</b>	<b>12</b>	<b>87</b>	100%
<b>Percentage</b>	14%	23%	31%	18%	14%	100%	

#### 3.2. Fatal Collisions

The two fatal collisions were not access-related incidents as shown in **Table 2**. These were single-motor-vehicle (SMV) and rear-end collisions that occurred at Third Line and Fourth Line intersections respectively.

The SMV collision took place under dark light condition whereby poor lighting condition could be a contributing factor. Insufficient information is available to determine the casual factors for the fatal rear-end collision.

Table 2: Fatal Collision Details

Location	Date	Collision Type	Initial Impact Type	Location	Light	Initial Travel Direction
Lakeshore Road West / Fourth Line	2/4/2015	Fatal	SMV	Not on roadway - left side	Dark, artificial	South
Lakeshore Road West /Third Line	8/14/2016	Fatal	Rear End	Within intersection	Daylight	West

### 3.3. Collision by Impact Types

The collisions by impact type are presented in **Figure 11** and **Table 3**. The predominate impact type is rear-end collision (45% or 39 out of 87) followed by angle (18% or 16 out of 87) and single-motor-vehicle (SMV) collisions (12% or 10 out of 87). Due to limited resolution in the collision dataset, the team was not able to summarize the driver behaviours associated with these collisions. There is a higher likelihood for rear-end, angle and turning collisions to be attributable to vehicles making turning movements to access adjacent properties due to abrupt braking or insufficient traffic gaps.

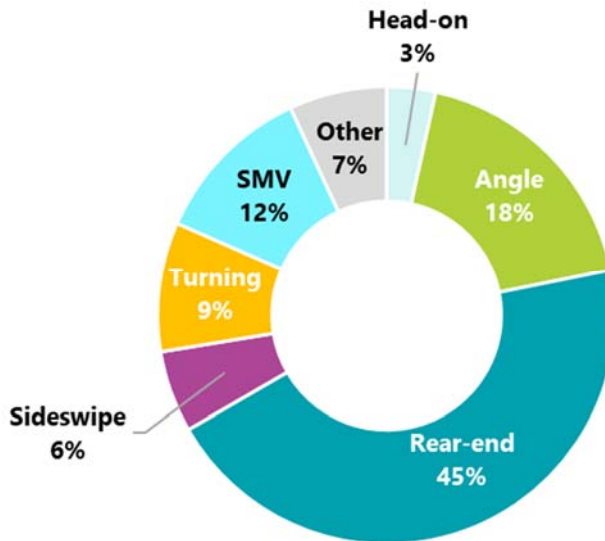


Figure 11: Collisions by Impact Types

Table 3: Collision by Impact Types

	2013	2014	2015	2016	2017	Total	Percentage
<b>Rear-end</b>	6	10	13	5	5	<b>39</b>	<b>45%</b>
<b>Angle</b>	2	4	4	4	2	<b>16</b>	<b>18%</b>
<b>SMV</b>	2	-	4	2	2	<b>10</b>	<b>11%</b>
<b>Head-on</b>	-	2	1	-	-	<b>3</b>	<b>3%</b>
<b>Turning</b>	-	2	2	3	1	<b>8</b>	<b>9%</b>
<b>Other</b>	2	1	2	-	1	<b>6</b>	<b>7%</b>
<b>Sideswipe</b>	-	1	1	2	1	<b>5</b>	<b>6%</b>
<b>Total</b>	<b>12</b>	<b>20</b>	<b>27</b>	<b>16</b>	<b>12</b>	<b>87</b>	<b>100%</b>

### 3.4. Location of Collisions

A more detailed analysis on collision locations was undertaken to understand whether the collisions are susceptible to the density of driveway accesses within the study limits. As summarized in **Table 4**, of the 87 incidents, approximately 40% (or 35 out of 87) are non-intersection related. These collisions occurred in mid-blocks, at/near private driveway or at underpass or tunnel, as summarized in **Table 4** and illustrated in **Figure 12**.

To obtain a better understanding of the non-intersection related collisions, we have extracted additional information from scanned Motor-Vehicle-Accident-Reports (MVARs) to confirm if these accidents are related to access points. However, only about 50% contain such information due to the different formats of the MVARs (e.g. some entries are illegible, or reports contain info on vehicle 1 actions only)

Using available data, it was found that approximately 46% of the non-intersection related collision were due to drivers following too closely, making improper turn, improper lane change or misjudging traffic gap.

Table 4: Collisions by Locations (2013-2017)

Accident Location	Fatal	Injury	PDO	Total
Intersection related	-	3	26	<b>29</b>
Non-intersection	-	4	21	<b>25</b>
At intersection	2	3	19	<b>24</b>
At/near private drive	-	1	7	<b>8</b>
Underpass or tunnel	-	1		<b>1</b>
<b>Total</b>	<b>2</b>	<b>12</b>	<b>53</b>	<b>87</b>

Collisions were further analyzed to understand the spatial relationships of the occurrences and impact types. As shown in **Figure 12**, Third Line intersection experienced the highest number of collisions (13) followed by East Street and Dorval Drive intersections. Segments that exhibited relatively higher number of collisions are between East Street and Woodhaven Park Drive with the highest occurrence of 7 collisions in the five-year analysis period (approximately 1.4 collision on average over the five-year analysis period).

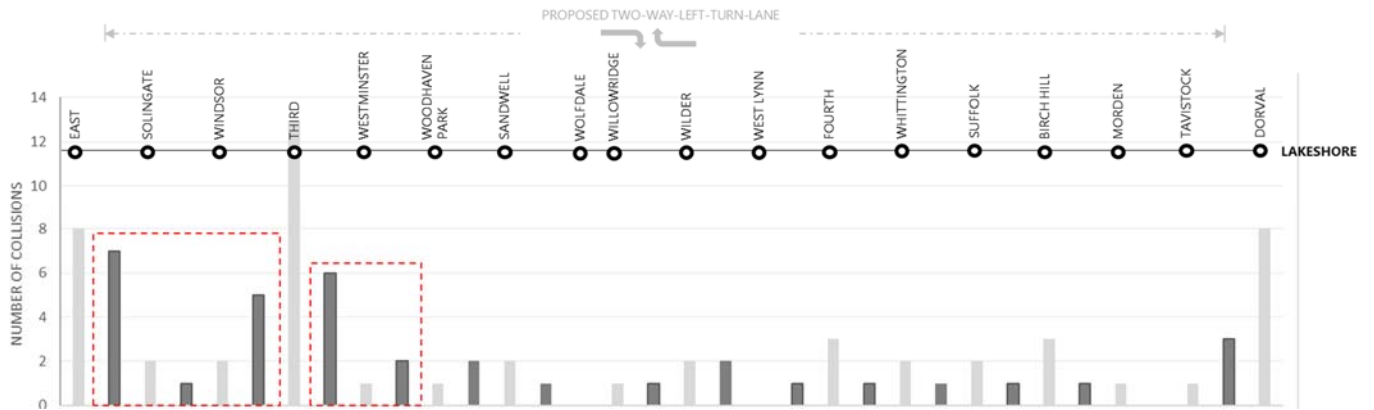


Figure 12: Total Collisions Plot by Location

Rear-end collisions were isolated from the dataset and plotted along the corridor as shown in **Figure 13**. Segments between East Street and Woodhaven Park Drive exhibited higher number of rear-end collisions

compared to other locations along the Lakeshore corridor. Overall, historical collision data does not show an overrepresentation of rear-end collision along mid-block segments.

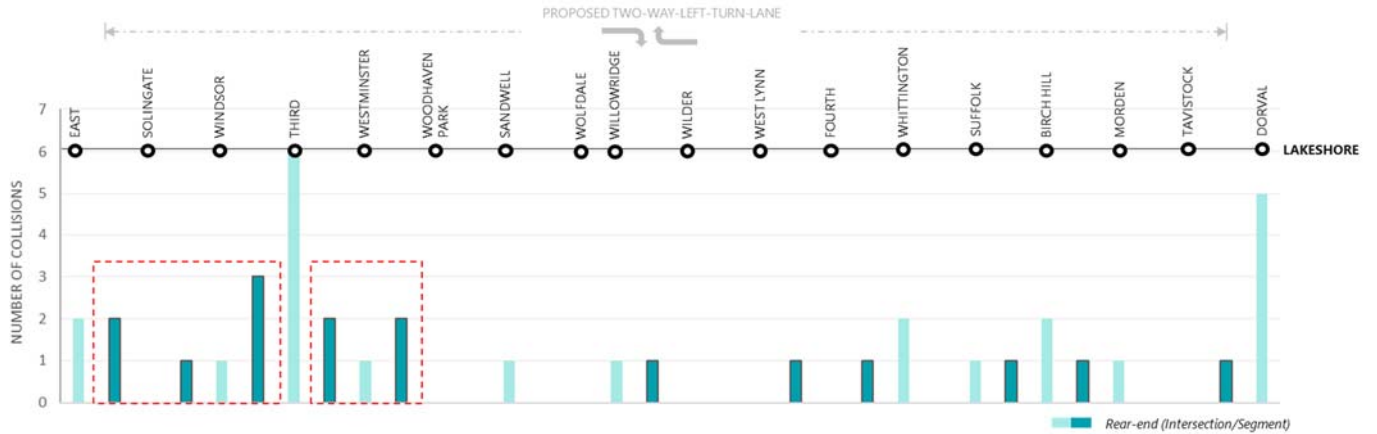


Figure 13: Rear-end Collisions by Locations

Moreover, access-related collisions (rear-end, angle and turning) were further examined as illustrated in **Figure 14**. Depicting similar patterns as rear-end collisions in **Figure 13**, segments between East Street and Woodhaven Park Drive exhibited relatively higher number of potential access-related collisions along the Lakeshore corridor. Overall, historical collision data does not show an overrepresentation of segment-related collisions.

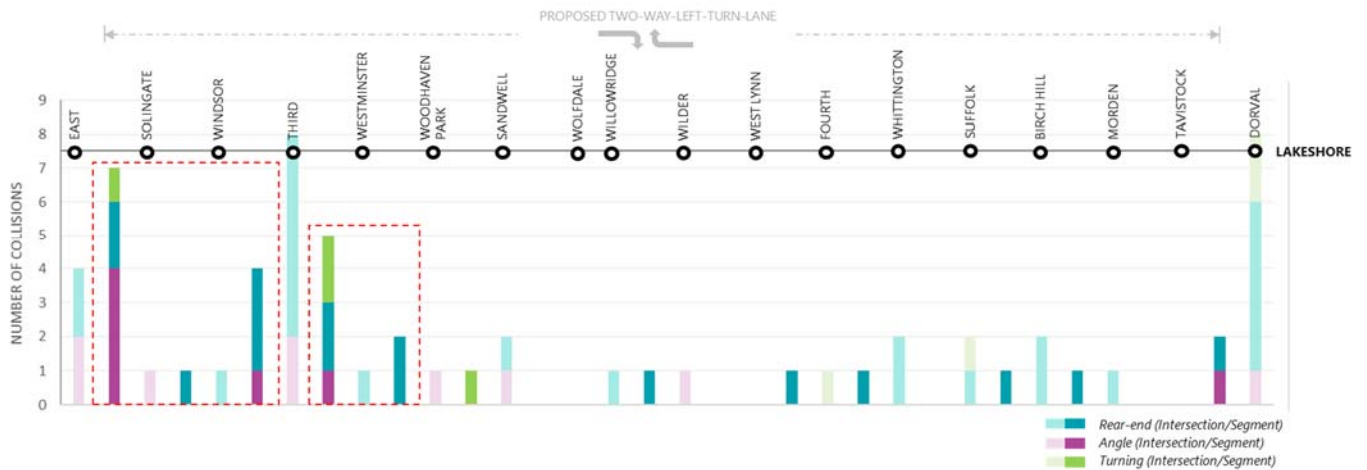


Figure 14: Potential Access-Related Collisions

From the safety perspective, only segments between East Street and WoodHaven Park will likely benefit from a reduction in access-related collisions.

### 3.5. Crash Modification Factors

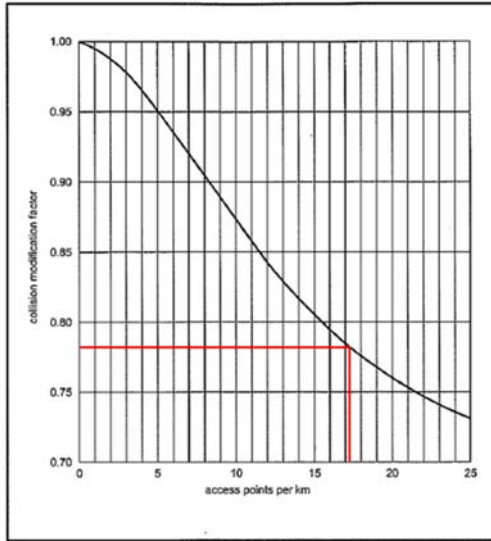


Figure 15: Collision Modification Factor vs. Access points per km for TWLTLs (source: TAC Guidelines 2017, Chapter 8, Figure 8.6.2)

Based on industry standards and directives such as Transportation Association of Canada (TAC) guidelines, benefits can be realized with a TWLTL due to the frequency of accesses and by removing turning traffic from the through lanes. The addition of a TWLTL will also reduce overall corridor travel times by eliminating frequent stoppage for through traffic behind left turning vehicles. This improvement is typically implemented to improve traffic safety and capacity.

According to TAC guidelines, the safety benefit for adding a TWLTL on the study corridor is estimated to be 23% potential reduction in collisions, predominantly in reducing the potential of conflicts involving left-turn maneuvers. This was derived based on CMF calculation as set out in TAC manual Chapter 8 (Access) Section 8.6.3.1, presented in **Figure 15**.

The CMF is determined to be 0.77;  $(1 - 0.77 \times 100) = 23\%$  reduction in overall collisions. Note that the number of accesses within the study limits were estimated during our desktop review using Google Streetview.

## 4.0 Recommendations

Based on the updated traffic and safety analyses findings, two locations were further considered for improvements. These locations are Lakeshore Boulevard and Third Line intersection and section between East Street and Wood Haven Park.

### 4.1. Lakeshore Boulevard and Third Line intersection

Lakeshore Boulevard and Third Line intersection exhibited a higher proportion of angle and rear end collisions based on historical collision data. A review of existing signal timing plan found that the clearance times for north-south phases are insufficient (**Table 5**) which may contribute to this location being more susceptible to angle collisions. It is recommended to increase the amber and all-red times to ensure adequate clearance times are provided at this intersection in order to reduce the potential risks for rear end and angle collisions.

Table 5: Vehicle Clearance Time Review for Lakeshore Boulevard and Third Line intersection

Through Movement Phase				
	EB/WB		NB/SB	
	Required	Existing	Required	Existing
<b>Amber (s)</b>	3.3	3.3	2.8	3.3
<b>All-Red (s)</b>	2.4	2.5	2.7	2.1
<b>Clearance Time (s)</b>	5.7	5.8	5.5	5.4

Note: Vehicle clearance review undertaken in accordance with Ontario Traffic Manual Book 12

Rear end collisions, occurred predominantly in the westbound direction, were recorded in the spring and summer months during the late afternoon hours. Sun glares during sunset hours could affect a driver's



ability to see signal heads particularly traveling westbound approaching this intersection. Although a signal ahead sign is currently provided in the east approach; a supplementary flashing beacon (as per OTM Book 6) may be considered to increase driver’s attention and visibility. It is also recommended that on-going monitoring of potential view obstruction such as vegetation is not affecting the visibility of the signal heads for both east and west approaches of this intersection.

#### 4.2. Segment between East Street and Wood Haven Park

The section between East Street and Wood Haven Park exhibited higher proportion of access-related collisions (average of 1.2 rear end collisions per year) compared to the rest of the corridor. To improve the overall safety performance for this section, it is recommended to reduce the travel lane width to reduce the potential risks of access-related collisions. The reduced lane width naturally slows down travel speed and acts as a traffic calming measure. The slower travel speed also influences the reaction time for driver to respond to unexpected events as well as reduces collision severity. A second potential countermeasure include implementing signage to warn drivers of turning vehicles ahead near access points. This could improve driver’s expectation and alertness for vehicles turn in/out of driveway accesses.

### 5.0 Conclusions

An update to traffic and safety analyses were conducted to review the effectiveness of the addition of a TWLTL on Lakeshore Road West between East Street and Dorval Drive. Results indicated that the traffic volumes entering and exiting driveway accesses along the corridor do not presently compromise capacity. Even though the TWLTL could improve general traffic flows by removing turning traffic from the through lanes within the study limits, such improvement is considered as nominal. As a result, the traffic operational analysis does not warrant the implementation of a TWLTL.

Safety performance assessment was also undertaken using the most recent historical collision data between 2013 and 2017. Locations of collisions by impact types were reviewed in detail to identify safety risks that are attributable to driveway access. The results of safety assessment did not show an overrepresentation of access-related collisions. Particularly, only segments between East Street and WoodHaven Park will likely benefit from a reduction in access-related collisions.

Should the implementation of a TWLTL warrant further consideration, it can be noted that general safety benefits can be realized with a TWLTL due to the frequency of accesses and by removing turning traffic from the through lanes. The additional lane would remove the left-turning vehicles out of the through vehicles thereby minimizing the impact on the general traffic flow along the Lakeshore corridor. In accordance with TAC guidelines, a 23% reduction in total collisions is estimated based on the existing driveway density within the study limits.

Additionally, other recommendations were proposed for two key locations that exhibited higher proportion of rear end and angle collisions as discussed in **Section 4.0**. These are summarized in **Table 6**.

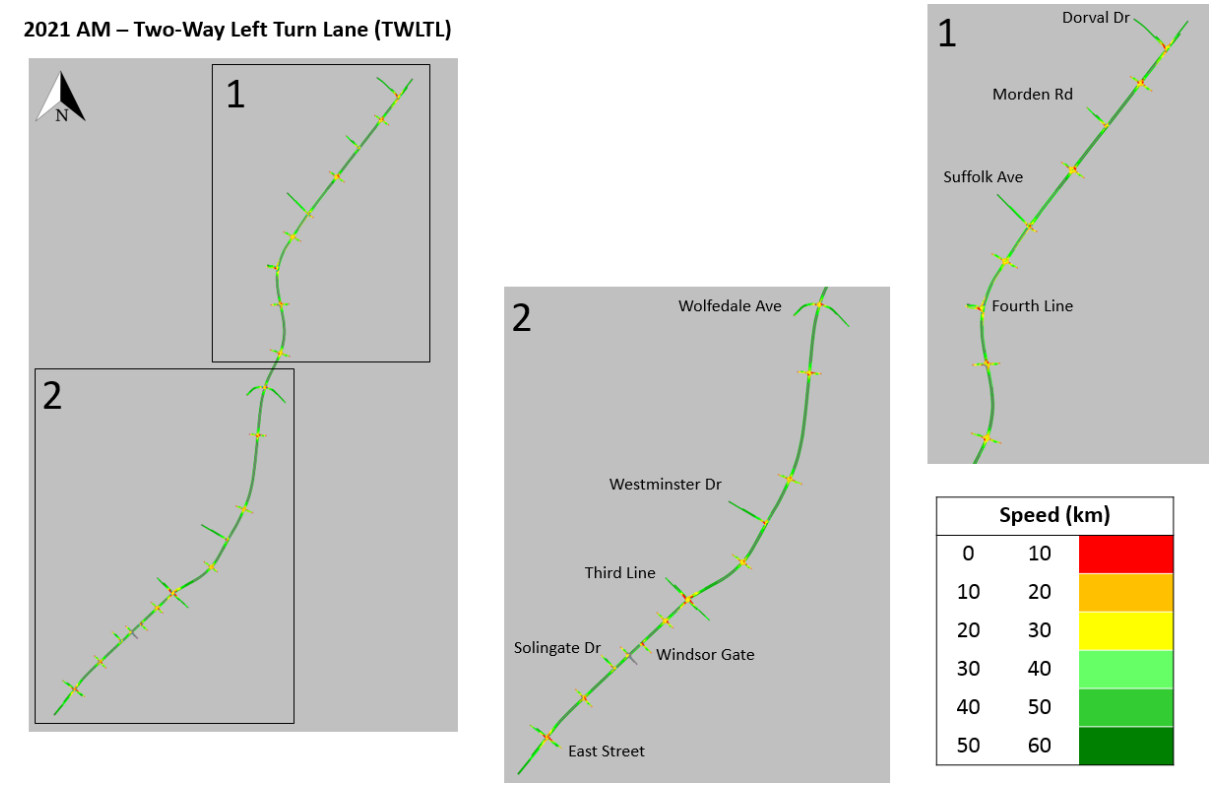
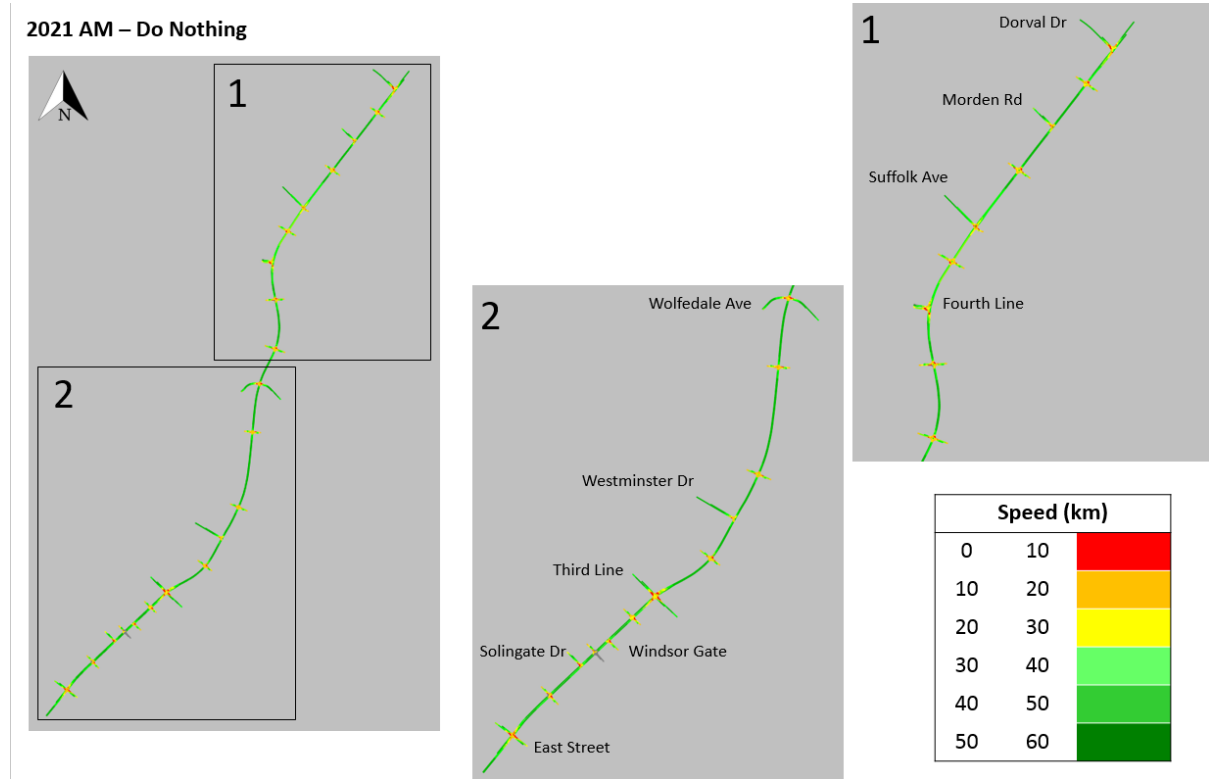
Table 6: Recommendations

Location	Potential Countermeasures	Benefits
Lakeshore and Third Line Intersection	Signal timing improvements	Provide adequate clearance times to reduce the potential risks of angle collisions
	Consider supplementary flashing beacon for signal ahead signage in the westbound direction	To increase driver’s attention and visibility
	On-going review of potential hazards of view obstruction	To ensure adequate visibility of traffic signals

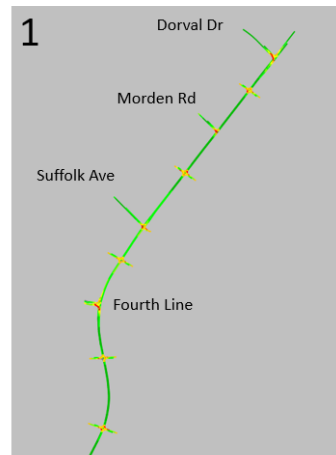
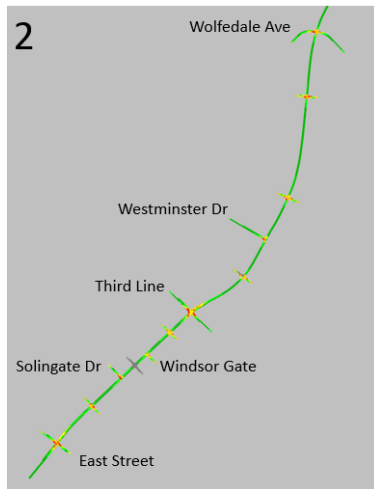
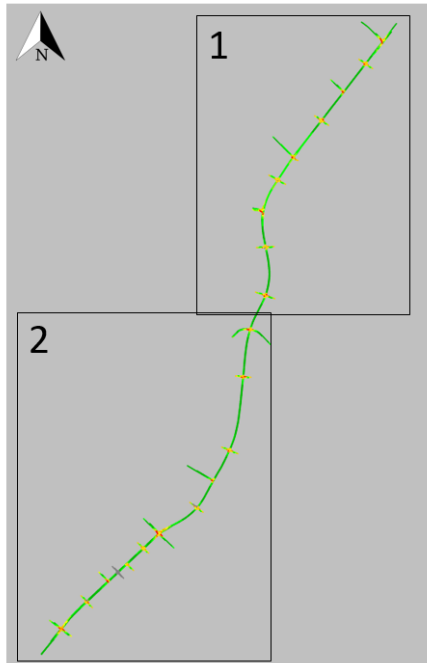
Location	Potential Countermeasures	Benefits
Section between East Street and Wood Haven Park	Reduce lane width	The narrower lane width naturally slows down traffic and serves as a traffic calming measure. The slower travel speed influences the reaction time for driver to respond to unexpected events as well as reduces collision severity.
	Implement signage to warn drivers of turning vehicles ahead	Improve driver's expectation and reduces reaction time to respond to vehicles turn in/out of driveway access

Generally, it is recommended that the Town should monitor the traffic and safety operations of the study corridor with respect to any increase in rear end collisions and turning volumes which may warrant further analysis to determine if other access management measures need to be considered.

## APPENDIX A –Speed Contour Plots

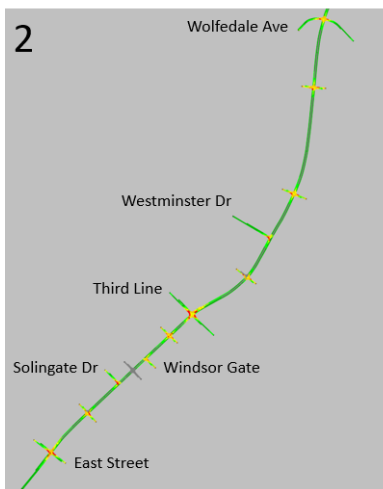
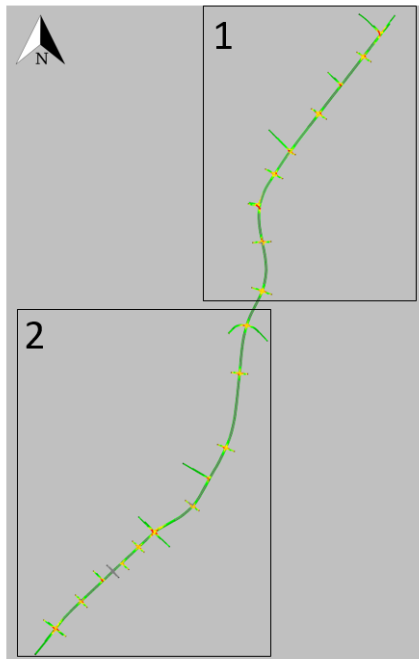


2021 PM – Do Nothing



Speed (km)		
0	10	Red
10	20	Orange
20	30	Yellow
30	40	Light Green
40	50	Green
50	60	Dark Green

2021 PM – Two-Way Left Turn Lane (TWLTL)



Speed (km)		
0	10	Red
10	20	Orange
20	30	Yellow
30	40	Light Green
40	50	Green
50	60	Dark Green

**APPENDIX B – Intersection Capacity Analysis Results**

Intersection/Movement		AM Peak	AM Peak - Original Geometry				AM Peak - TWLTL			
		Observed Volume	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)
Lakeshore Rd W @ East St	<b>OVERALL</b>				A				A	
	Eastbound Left	17	15	9	A	6	15	10	B	6
	Eastbound Through	635	633	9	A	78	634	8	A	77
	Eastbound Right	19	18	6	A	78	18	6	A	77
	Westbound Left	21	19	16	B	10	20	16	B	15
	Westbound Through	273	264	7	A	38	265	6	A	35
	Westbound Right	15	16	5	A	38	16	5	A	35
	Northbound Left	54	55	21	C	39	55	20	C	28
	Northbound Through	28	27	23	C	39	27	21	C	28
	Northbound Right	53	50	12	B	39	50	12	B	28
	Southbound Left	44	42	20	C	22	42	21	C	23
	Southbound Through	17	17	21	C	22	17	19	B	23
Southbound Right	27	23	9	A	22	23	9	A	23	
Lakeshore Rd W @ Solingate Dr	<b>OVERALL</b>				A				A	
	Eastbound Left	52	53	4	A	0	53	3	A	0
	Eastbound Through	680	662	2	A	0	662	1	A	0
	Westbound Through	306	299	1	A	0	300	1	A	0
	Westbound Right	26	28	1	A	0	28	1	A	0
	Southbound Left	26	23	13	B	6	23	11	B	6
	Southbound Right	3	3	8	A	6	3	7	A	6



Intersection/Movement		AM Peak	AM Peak - Original Geometry				AM Peak - TWLTL			
		Observed Volume	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)
Lakeshore Rd W @ Windsor Gate	<b>OVERALL</b>				A			A		
	Eastbound Through	674	655	1	A	0	655	1	A	0
	Eastbound Right	33	33	1	A	0	33	1	A	0
	Westbound Left	8	8	7	A	0	8	6	A	0
	Westbound Through	320	312	1	A	0	312	0	A	0
	Northbound Left	10	12	11	B	5	12	11	B	5
	Northbound Right	6	5	9	A	5	5	9	A	5
Lakeshore Rd W @ Third Line	<b>OVERALL</b>				B			B		
	Eastbound Left	164	156	13	B	48	156	13	B	48
	Eastbound Through	512	497	11	B	86	499	11	B	80
	Eastbound Right	4	5	11	B	86	5	7	A	80
	Westbound Left	22	18	23	C	8	18	24	C	8
	Westbound Through	229	205	15	B	40	206	14	B	41
	Westbound Right	60	51	8	A	0	51	7	A	0
	Northbound Left	2	1	19	B	32	2	9	A	27
	Northbound Through	106	112	20	B	36	111	18	B	36
	Northbound Right	95	97	13	B	36	97	12	B	36
	Southbound Left	113	119	28	C	31	119	28	C	33
	Southbound Through	69	74	18	B	30	74	19	B	31
Southbound Right	98	104	9	A	30	104	9	A	31	
Lakeshore Rd W @ Westminster Dr	<b>OVERALL</b>				A			A		
	Eastbound Left	6	5	3	A	0	5	3	A	0
	Eastbound Through	715	691	1	A	0	693	1	A	0
	Westbound Through	277	241	2	A	0	241	2	A	0
	Westbound Right	16	14	2	A	0	14	2	A	0
	Southbound Left	54	54	13	B	12	54	11	B	11

Intersection/Movement		AM Peak	AM Peak - Original Geometry				AM Peak - TWLTL			
		Observed Volume	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)
Lakeshore Rd W @ Wolfedale Ave	Southbound Right	33	33	8	A	12	33	7	A	11
	<b>OVERALL</b>				A				A	
	Eastbound Left	0	1	2	A	0	1	0	A	0
	Eastbound Through	764	729	3	A	0	730	3	A	0
	Eastbound Right	5	3	3	A	0	3	4	A	0
	Westbound Left	5	3	11	B	0	3	5	A	0
	Westbound Through	281	239	2	A	0	240	1	A	0
	Westbound Right	1	1	1	A	0	1	0	A	0
	Northbound Left	10	10	12	B	6	10	12	B	6
	Northbound Through	0	0	0	A	6	0	0	A	6
	Northbound Right	15	15	9	A	6	15	9	A	6
	Southbound Left	5	5	11	B	1	5	10	B	1
	Southbound Through	1	1	7	A	1	1	7	A	1
Southbound Right	3	2	6	A	1	2	7	A	1	
Lakeshore Rd W @ Fourth Line	<b>OVERALL</b>				A				A	
	Eastbound Left	174	167	10	A	23	167	9	A	22
	Eastbound Through	610	586	8	A	87	585	8	A	80
	Westbound Through	181	175	6	A	26	175	7	A	28
	Westbound Right	38	36	3	A	0	35	3	A	0
	Southbound Left	59	57	23	C	20	57	22	C	21
	Southbound Right	105	109	7	A	15	109	7	A	17

Intersection/Movement		AM Peak	AM Peak - Original Geometry				AM Peak - TWLTL			
		Observed Volume	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)
Lakeshore Rd W @ Suffolk Ave	<b>OVERALL</b>				A			A		
	Eastbound Through	584	610	5	A	0	610	5	A	0
	Eastbound Right	85	89	4	A	0	88	4	A	0
	Westbound Left	181	163	9	A	0	160	6	A	0
	Westbound Through	210	196	3	A	0	196	0	A	0
	Westbound Right	4	4	6	A	0	4	1	A	0
	Northbound Left	9	8	14	B	17	8	16	C	17
	Northbound Right	179	168	7	A	17	168	7	A	17
	Southbound Right	0	1	6	A	0	1	6	A	0
Lakeshore Rd W @ Morden Rd	<b>OVERALL</b>				A			A		
	Eastbound Left	73	70	4	A	0	70	4	A	0
	Eastbound Through	690	693	1	A	0	693	1	A	0
	Westbound Through	343	320	1	A	0	320	1	A	0
	Westbound Right	22	19	2	A	0	19	1	A	0
	Southbound Left	16	16	14	B	8	16	12	B	8
	Southbound Right	51	53	8	A	8	53	8	A	8
	<b>OVERALL</b>				A			A		
Lakeshore Rd W @ Dorval Dr	<b>OVERALL</b>				A			A		
	Eastbound Left	200	200	11	B	27	200	11	B	27
	Eastbound Through	505	523	7	A	55	523	7	A	53
	Westbound Through	240	241	7	A	40	241	7	A	37
	Westbound Right	81	80	5	A	40	80	4	A	37
	Southbound Left	140	143	27	C	33	143	27	C	35
	Southbound Right	124	121	6	A	13	121	7	A	12

Intersection/Movement		PM Peak	PM Peak - Original Geometry				PM Peak - TWLTL			
		Observed Volume	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)
Lakeshore Rd W @ East St	<b>OVERALL</b>				A				A	
	Eastbound Left	48	48	14	B	11	48	15	B	9
	Eastbound Through	399	389	6	A	46	389	6	A	44
	Eastbound Right	29	30	5	A	46	30	5	A	44
	Westbound Left	76	79	11	B	23	78	11	B	19
	Westbound Through	630	637	7	A	88	638	7	A	90
	Westbound Right	38	39	7	A	88	39	7	A	90
	Northbound Left	41	42	25	C	22	42	25	C	22
	Northbound Through	23	21	24	C	22	21	26	C	22
	Northbound Right	46	46	10	B	22	45	11	B	22
	Southbound Left	26	25	22	C	18	24	22	C	19
	Southbound Through	24	24	21	C	18	24	22	C	19
	Southbound Right	20	19	12	B	18	19	11	B	19
Lakeshore Rd W @ Solingate Dr	<b>OVERALL</b>				A				A	
	Eastbound Left	25	25	7	A	0	24	7	A	0
	Eastbound Through	446	421	2	A	0	422	1	A	0
	Westbound Through	701	721	1	A	0	723	1	A	0
	Westbound Right	9	9	1	A	0	9	1	A	0
	Southbound Left	4	4	13	B	6	4	11	B	6
	Southbound Right	43	45	10	A	6	46	10	B	6

Intersection/Movement		PM Peak	PM Peak - Original Geometry				PM Peak - TWLTL			
		Observed Volume	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)
Lakeshore Rd W @ Windsor Gate	<b>OVERALL</b>				A			A		
	Eastbound Through	419	401	1	A	0	401	0	A	0
	Eastbound Right	31	33	1	A	0	33	1	A	0
	Westbound Left	11	13	4	A	0	12	3	A	0
	Westbound Through	652	674	1	A	0	676	1	A	0
	Northbound Left	58	55	14	B	7	55	12	B	7
	Northbound Right	11	14	8	A	7	14	9	A	7
Lakeshore Rd W @ Third Line	<b>OVERALL</b>				B			B		
	Eastbound Left	128	122	15	B	35	122	15	B	26
	Eastbound Through	299	285	9	A	40	285	9	A	41
	Eastbound Right	5	5	6	A	40	5	7	A	41
	Westbound Left	75	76	18	B	16	76	19	B	17
	Westbound Through	500	504	15	B	96	504	15	B	98
	Westbound Right	69	73	10	B	3	73	10	B	4
	Northbound Left	4	3	27	C	14	3	25	C	12
	Northbound Through	74	78	21	C	24	79	20	B	25
	Northbound Right	40	38	9	A	24	38	10	A	25
	Southbound Left	56	59	27	C	19	59	24	C	18
	Southbound Through	118	121	22	C	51	121	21	C	49
Southbound Right	158	164	15	B	51	164	14	B	49	
Lakeshore Rd W @ Westminster Dr	<b>OVERALL</b>				A			A		
	Eastbound Left	3	3	4	A	0	3	5	A	0
	Eastbound Through	390	369	1	A	0	370	1	A	0
	Westbound Through	622	604	3	A	0	605	3	A	0
	Westbound Right	3	2	3	A	0	2	1	A	0
	Southbound Left	4	3	13	B	6	3	9	A	6



Intersection/Movement		PM Peak	PM Peak - Original Geometry				PM Peak - TWLTL			
		Observed Volume	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)
	Southbound Right	23	23	8	A	6	23	8	A	6
	<b>OVERALL</b>				A				A	
Lakeshore Rd W @ Wolfedale Ave	Eastbound Left	8	7	7	A	0	7	6	A	0
	Eastbound Through	373	334	3	A	0	334	2	A	0
	Eastbound Right	13	12	3	A	0	12	2	A	0
	Westbound Left	18	16	5	A	0	16	4	A	0
	Westbound Through	617	595	2	A	0	595	2	A	0
	Westbound Right	4	4	2	A	0	4	2	A	0
	Northbound Left	5	4	11	B	5	4	10	B	5
	Northbound Through	0	0	0	A	5	0	0	A	5
	Northbound Right	9	10	7	A	5	10	7	A	5
	Southbound Left	4	6	11	B	1	6	11	B	1
	Southbound Through	0	1	5	A	1	1	4	A	1
	Southbound Right	2	2	10	A	1	2	7	A	1
	<b>OVERALL</b>				A				A	
Lakeshore Rd W @ Fourth Line	Eastbound Left	99	89	12	B	19	89	12	B	21
	Eastbound Through	287	263	7	A	32	264	7	A	34
	Westbound Through	464	460	9	A	75	462	9	A	68
	Westbound Right	61	64	5	A	0	64	5	A	1
	Southbound Left	65	64	20	C	18	64	20	C	17
	Southbound Right	176	173	8	A	17	173	8	A	16

Intersection/Movement		PM Peak	PM Peak - Original Geometry				PM Peak - TWLTL			
		Observed Volume	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)	Throughput Volume	Delay (s)	LOS	95th Percentile Queue (m)
Lakeshore Rd W @ Suffolk Ave	<b>OVERALL</b>				A			A		
	Eastbound Through	325	312	2	A	0	312	1	A	0
	Eastbound Right	27	27	1	A	0	27	1	A	0
	Westbound Left	64	58	3	A	0	57	2	A	0
	Westbound Through	463	458	1	A	0	457	1	A	0
	Westbound Right	5	4	2	A	0	4	1	A	0
	Northbound Left	54	48	11	B	13	48	11	B	12
	Northbound Right	114	109	7	A	13	109	7	A	12
Southbound Right	8	10	10	A	2	10	10	A	2	
Lakeshore Rd W @ Morden Rd	<b>OVERALL</b>				A			A		
	Eastbound Left	45	40	5	A	0	40	4	A	0
	Eastbound Through	395	370	1	A	0	370	1	A	0
	Westbound Through	499	490	1	A	0	490	1	A	0
	Westbound Right	13	12	1	A	0	12	1	A	0
	Southbound Left	7	7	12	B	6	7	10	B	6
	Southbound Right	32	34	8	A	6	34	8	A	6
Lakeshore Rd W @ Dorval Dr	<b>OVERALL</b>				A			A		
	Eastbound Left	129	118	14	B	23	118	13	B	22
	Eastbound Through	274	260	5	A	28	260	5	A	26
	Westbound Through	406	410	7	A	58	409	7	A	57
	Westbound Right	106	107	5	A	58	107	5	A	57
	Southbound Left	108	108	23	C	28	108	25	C	28
Southbound Right	105	102	8	A	12	103	7	A	12	