Loon Call Markdale

Municipality of Grey Highlands

Traffic Impact Study for

LC Development Group Inc.

Type of Document:
Final Report

Project Number:
JDE – 20067

Date Submitted:
November 8th, 2021

John Northcote, P.Eng.
Professional License #: 100124071

Maitham Dinani, P.Eng.
Professional License #: 100192544

ENGINEERING

JD Northcote Engineering Inc.
86 Cumberland Street
Barrie, ON
705.725.4035
www.JDEngineering.ca

Legal Notification

This report was prepared by **JD Northcote Engineering Inc.** for the account of **LC Development Group Inc.**

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. **JD Northcote Engineering Inc.** accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

Executive Summary

This report summarizes the traffic impact study prepared for the proposed development municipally known as 775309 Highway 10, located in the northeast corner of the community of Markdale, on the north side of Highway 10 in the Municipality of Grey Highlands [Municipality], County of Grey [County]. The report assesses the impact of traffic related to the development on the adjacent roadway and provides recommendations to accommodate this traffic in a safe and efficient manner.

The proposed development, as illustrated in **Appendix A**, is anticipated to approximately include the following:

- 156 townhouses; and
- 313 single family detached houses.

Phases 1 and 2 of the proposed development are anticipated to include +/- 96 residential lots with the following approximate unit breakdown:

- 24 townhouses; and
- 72 single family detached houses.

The proposed development is anticipated to include one full movement access roadway onto Highway 10 [North Access] and include the extension of Margaret Elizabeth Avenue [South Access] and Stan Baker Boulevard [East Access] into the subject site. The East Access will be constructed as part of Phase 1 of the proposed development. The North Access and South Access will be constructed after the completion of Phase 1 and 2 of the proposed development.

The scope of this analysis includes a review of the following intersections:

- Fairway Heights / Margaret Elizabeth Avenue (Functional review);
- Fairway Heights & Commercial Driveway / Toronto Street; and
- North Access / Highway 10.

Conclusions

1. The proposed development is expected to generate a total of 294 AM and 384 PM peak hour trips with Phase 1 and 2 of the proposed development expected to generate a total of 66 AM and 88 PM peak hour trips.
2. Detailed turning movement traffic and pedestrian counts for the Toronto Street / Fairway Heights & Commercial Driveway and Toronto Street / Main Street intersections were commissioned by JD Engineering. Detailed turning movement traffic and pedestrian counts for the Toronto Street / Main Street intersection we also obtained from the Municipality.
3. An intersection operation analysis was completed at the study area intersections, using the existing (2021) and background (2026 and 2031) traffic volumes, with the adjacent development traffic and without the proposed development traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development, if the proposed development did not proceed. No geometric lane improvements or traffic signal improvements are recommended within the study area.
4. An estimate of the amount of traffic that would be generated by the proposed development was prepared and assigned to the study area streets and intersections.
5. An intersection operation analysis was completed under total (2026 and 2031) traffic volumes with the proposed development operational at the study area intersections. The following

geometric lane improvements or traffic signal improvements are recommended within the study area to accommodate the proposed development.

North Access / Highway 10

- Construction of an auxiliary southbound left turn lane with a 30 metre storage length, 45 metre parallel length and 60 metre taper length
- Extension of the Toronto Street 50 km/hr speed limit to 100 metres north of the North Access

6. It is recommended the Municipality explore constructing a two-way-left-turn lane [TWLTL] on Toronto Street within the community of Markdale.
7. The North Access will operate efficiently as a full-movement access, with one-way stop control for the westbound movements. A single eastbound and westbound lane at the North Access roadway will provide the necessary capacity to service the proposed development together with the Margaret Elizabeth Avenue and Stan Baker Boulevard extensions.
8. The sight distance available for the North Access meets the minimum stopping and intersection sight distance requirements.
9. The North Access is not required to be constructed as a part of Phase 1 and 2 of the proposed development. The North Access will be required with the occupancy of the first unit of Phase 3 of the proposed development.
10. In summary, the proposed development will not cause any operational issues and will not add a notable delay or congestion to the local roadway network.

Table of Contents

List of Tables

List of Figures

List of Appendices

1 Introduction

1.1 Background

LC Development Group Inc. [The Developer] is proposing to develop the property municipally known as 775309 Highway 10, located in the northeast corner of the community of Markdale, on the north side of Highway 10 in the Municipality of Grey Highlands [Municipality], County of Grey [County].

The proposed development, as illustrated in **Appendix A**, is anticipated to approximately include the following:

- 156 townhouses; and
- 313 single family detached houses.

Phases 1 and 2 of the proposed development are anticipated to include +/- 96 residential lots with the following approximate unit breakdown:

- 24 townhouses; and
- 72 single family detached houses.

The proposed development is anticipated to include one full movement access roadway onto Highway 10 [North Access] and include the extension of Margaret Elizabeth Avenue [South Access] and Stan Baker Boulevard [East Access] into the subject site. The East Access will be constructed as part of Phase 1 of the proposed development. The North Access and South Access will be constructed after the completion of Phase 1 and 2 of the proposed development.

The Developer has retained **JD Northcote Engineering Inc.** [JD Engineering] to prepare this traffic impact study in support of the proposed development.

1.2 Study Area

Figure 1 shows the location of the proposed development and study area intersections, in relation to the surrounding area. The Concept Plan by Pinestone Engineering Ltd. is provided in **Appendix A**.

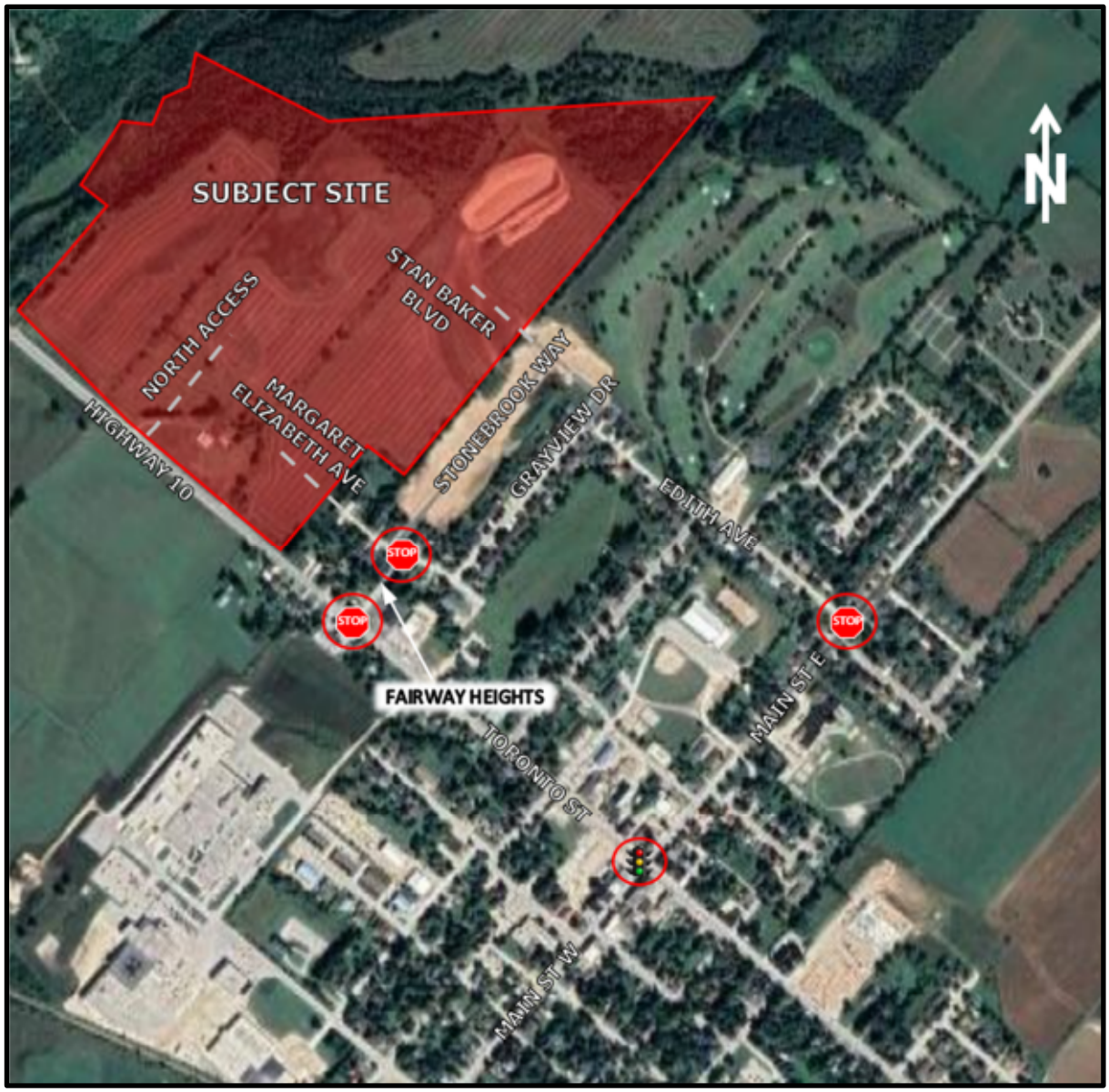
The proposed development is bound by Highway 10 to the south, a golf course and residential lands to the east, undeveloped lands to the north and a river and undeveloped lands to the west.

The following intersections will be analysed as part of the study:

- Fairway Heights / Margaret Elizabeth Avenue (Functional review);
- Fairway Heights & Commercial Driveway / Toronto Street; and
- North Access / Highway 10.

In addition to the above noted intersections analyzed, it is noted that traffic generated by the proposed development has also been assigned to the Main Street / Edith Street intersection.

Figure 1 – Proposed Site Location and Study Area



1.3 Study Scope and Objectives

The purpose of this study is to identify the potential impacts to traffic flow at the site access and on the surrounding roadway network. The study analysis includes the following tasks:

- Consult with the Municipality, County and Ontario Ministry of Transportation [MTO] to address any traffic-related issues or concerns they have with the proposed development;
- Determine existing traffic volumes and circulation patterns;
- Review traffic impact studies for the proposed adjacent developments within the study area;
- Estimate future traffic volumes if the proposed development was not constructed, including the impact of additional proposed developments in the area;

- Complete level-of-service [LOS] analysis of horizon year (without the proposed development) traffic conditions and identify operational deficiencies;
- Estimate the amount of traffic that would be generated by the proposed development and assign to the roadway network;
- Complete LOS analysis of horizon year (with the proposed development) traffic conditions and identify additional operational deficiencies;
- Identify improvement options to address operational deficiencies; and
- Document findings and recommendations in a final report.

1.4 Horizon Year and Analysis Periods

Traffic scenarios for the existing year (2021), 5-year horizon (2026) and 10-year horizon (2031) were selected for analysis of traffic operations in the study area. The weekday morning [AM] and weekday afternoon [PM] peak hours have been selected as the analysis periods for this study.

2 Information Gathering

2.1 Street and Intersection Characteristics

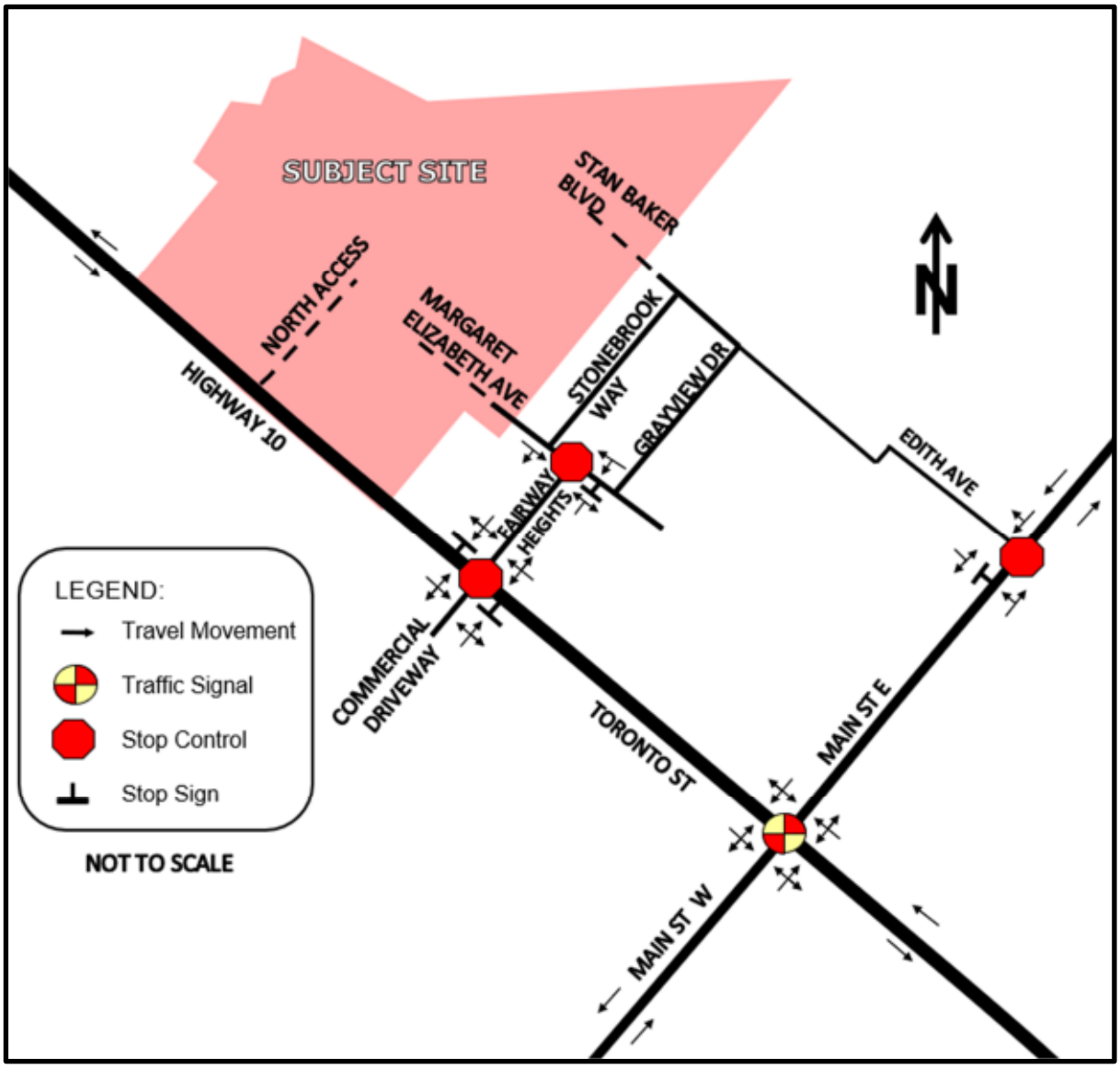
Highway 10 (Toronto Street) is a two lane-lane 2B arterial highway. Within the study area, Highway 10 has an urban and rural cross-section south and north of the southeast corner of the subject site, respectively. Highway 10 has a sidewalk on both sides of the road south of Fairway Heights, generally has an asphalt shoulder on both sides of the road between the southeast corner of the subject site and Fairway Heights, and generally has a gravel shoulder on both sides of the road, north of the southeast corner of the subject site, within the study area. Highway 10 has a posted speed limit of 80 km/hr and is under the jurisdiction of the MTO north of 100 metres north of the southeast corner of the subject site and has a posted speed limit of 50 km/hr and is under the jurisdiction of the Municipality (via a connecting link agreement) south of 100 metres north of the southeast corner of the subject site within the study area.

Fairway Heights is a two-lane local road with an urban cross-section and a sidewalk on the east side of the road. Fairway Heights has an assumed (unposted) speed limit of 50km/h and is under the jurisdiction of the Municipality.

Margaret Elizabeth Avenue is a two-lane local road with a rural cross-section and no sidewalks. Margaret Elizabeth Avenue has an assumed (unposted) speed limit of 50km/h and is under the jurisdiction of the Municipality.

The existing lane configuration within the study area is illustrated in **Figure 2**.

Figure 2 – Existing Lane Configuration within Study Area



2.2 Local Transportation Infrastructure Improvements

Based on a review of MTO's highways program webpage, there are no planned infrastructure improvements within the study area.

2.3 Transit Access

The County's transit service provider, GRT, provides one bus route within the study area. The No. 1 (Owen Sound to Dundalk) bus route provides service on Highway 10 within the study area.

The No. 1 bus route operates between 06:45 – 20:59 on weekdays with service three times a day for each of the northbound and southbound directions. The closest bus stops to the proposed development for the No. 1 bus route are located at 206 Toronto Street.

2.4 Other Developments within the Study Area

Based on our discussions with Municipal staff, there are four adjacent developments nearby the study area that will impact the traffic generation rates, specifically:

- Centre Point South Residential;
- Markdale Hospital;
- 105 Toronto Street; and
- Stonebrook Residential.

For the purposes of this study, it has been assumed that all traffic generated by the adjacent developments within the study area will be new traffic and would not be in the study area if the developments were not constructed.

2.4.1 Centre Point South Residential

The Centre Point South Residential development is located in the southeast quadrant of the community of Markdale and is anticipated to include 293 single-family detached residential units and 100 townhouse units. It is anticipated that the Centre Point South Residential Development will be fully occupied by the 2026 horizon year.

Traffic generated by the Centre Point South Residential development has been estimated based on the November 2017 Centre Point South Residential traffic impact study by Tatham Engineering Limited [Centre Point TIS] (excerpts provided in **Appendix B**).

Figure 3 illustrates the Centre Point South Residential development traffic within the study area.

2.4.2 Markdale Hospital

The proposed Markdale Hospital is located in the southwest quadrant of Toronto Street / Uplands Drive intersection and is anticipated to include 39,000 sq.ft. ground floor hospital space and a partially completed basement with support and nutrition services, staff facilities and storage. It is anticipated that the proposed Markdale Hospital will be fully occupied by the 2026 horizon year.

Traffic generated by the proposed Markdale Hospital has been estimated based on the June 2018 Markdale Hospital traffic impact study by Paradigm Transportation Solutions Limited [Hospital TIS] (excerpts provided in **Appendix B**).

Figure 4 illustrates the proposed Markdale Hospital traffic within the study area.

2.4.3 105 Toronto Street

The proposed 105 Toronto Street development is located in the southeast corner of the Toronto Street South / Victoria Street intersection and is anticipated to include a 33,415 sq.ft. supermarket and 3,690 sq.ft. additional commercial space. It is anticipated that he proposed 105 Toronto Street development will be fully occupied by the 2026 horizon year.

Traffic generated by the proposed 105 Toronto Street development has been estimated based on the December 2016 105 Toronto Street traffic impact study by Paradigm Transportation Solutions Limited [105 Toronto TIS] (excerpts provided in **Appendix B**).

Figure 5 illustrates the proposed 105 Toronto Street development traffic within the study area.

2.4.4 Stonebrook Residential

The Stonebrook Residential development is located just east of the subject site, north of Toronto Street and is anticipated to include a total of 133 townhouse units. It is anticipated that the Stonebrook Residential development will be fully occupied by the 2026 horizon year.

Traffic generation for the Stonebrook Residential development has been calculated based on the data provided in the Institute of Transportation Engineers [ITE] *Trip Generation Manual* (10th Edition) [ITE Trip Generation Manual]. The following ITE land uses have been applied to estimate the traffic from the Stonebrook Residential Development:

- ITE land use 220 (Multifamily Housing (Low-Rise)) – General Urban / Suburban Setting.

The estimated trip generation of the Stonebrook Residential development is illustrated below in **Table 1**.

Table 1 – Estimated Traffic Generation – Stonebrook Residential development

Land Use	Size	AM Peak Hour			PM / SAT Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Multifamily Housing (Low-Rise) ITE Land Use: 220	133 units	17	56	73	55	33	88

The distribution of traffic for the Stonebrook Residential development is based on the distribution of the existing traffic volumes illustrated in Table 9, Section 4.2

Using the traffic distribution pattern noted above, the traffic assignment for the Stonebrook Residential development within the study area was calculated for the AM and PM peak hour and is illustrated in **Figure 6**.

Figure 3 – Centre Point South Residential Development Traffic Volumes within Study Area

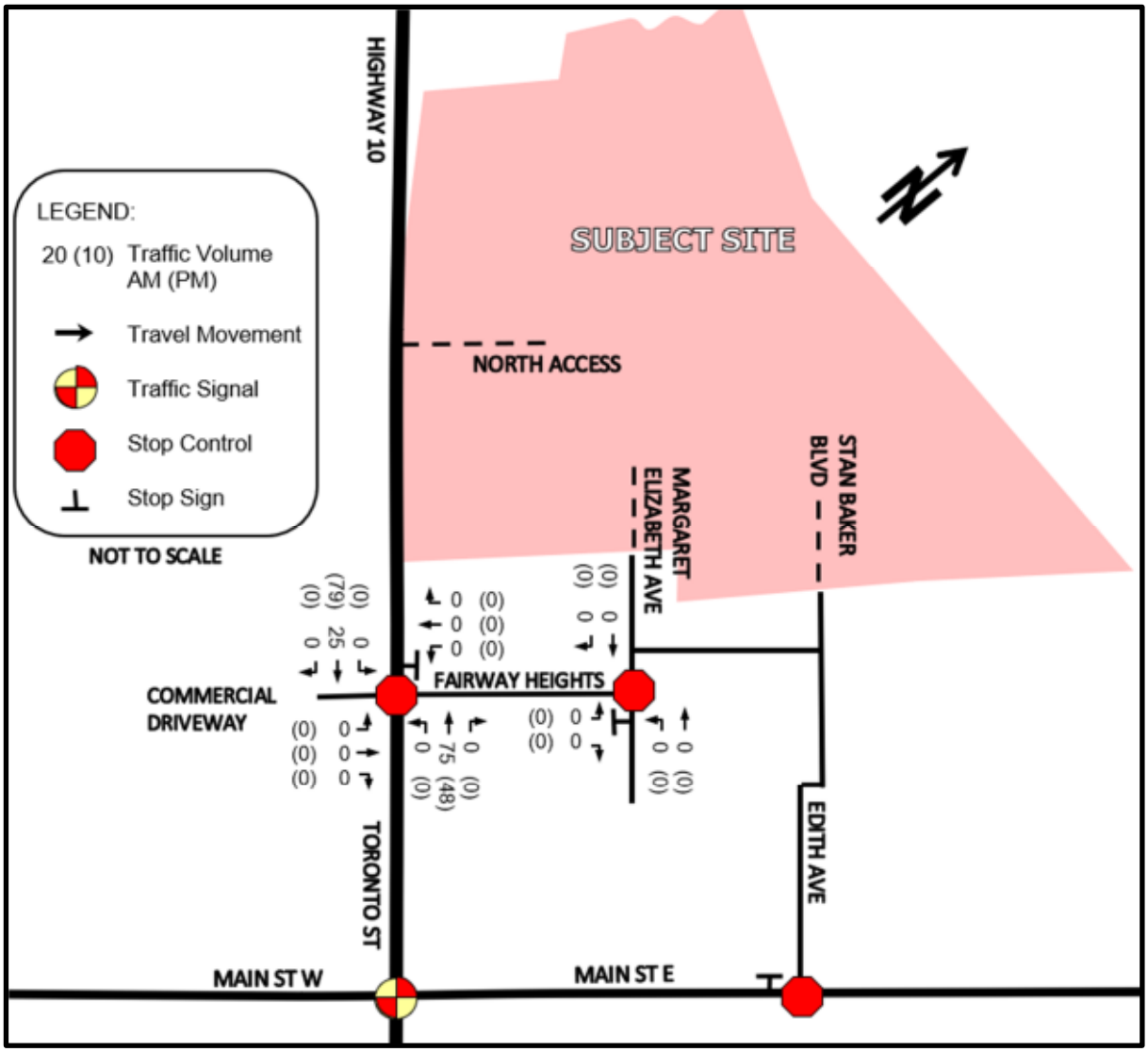


Figure 4 – Markdale Hospital Development Traffic Volumes within Study Area

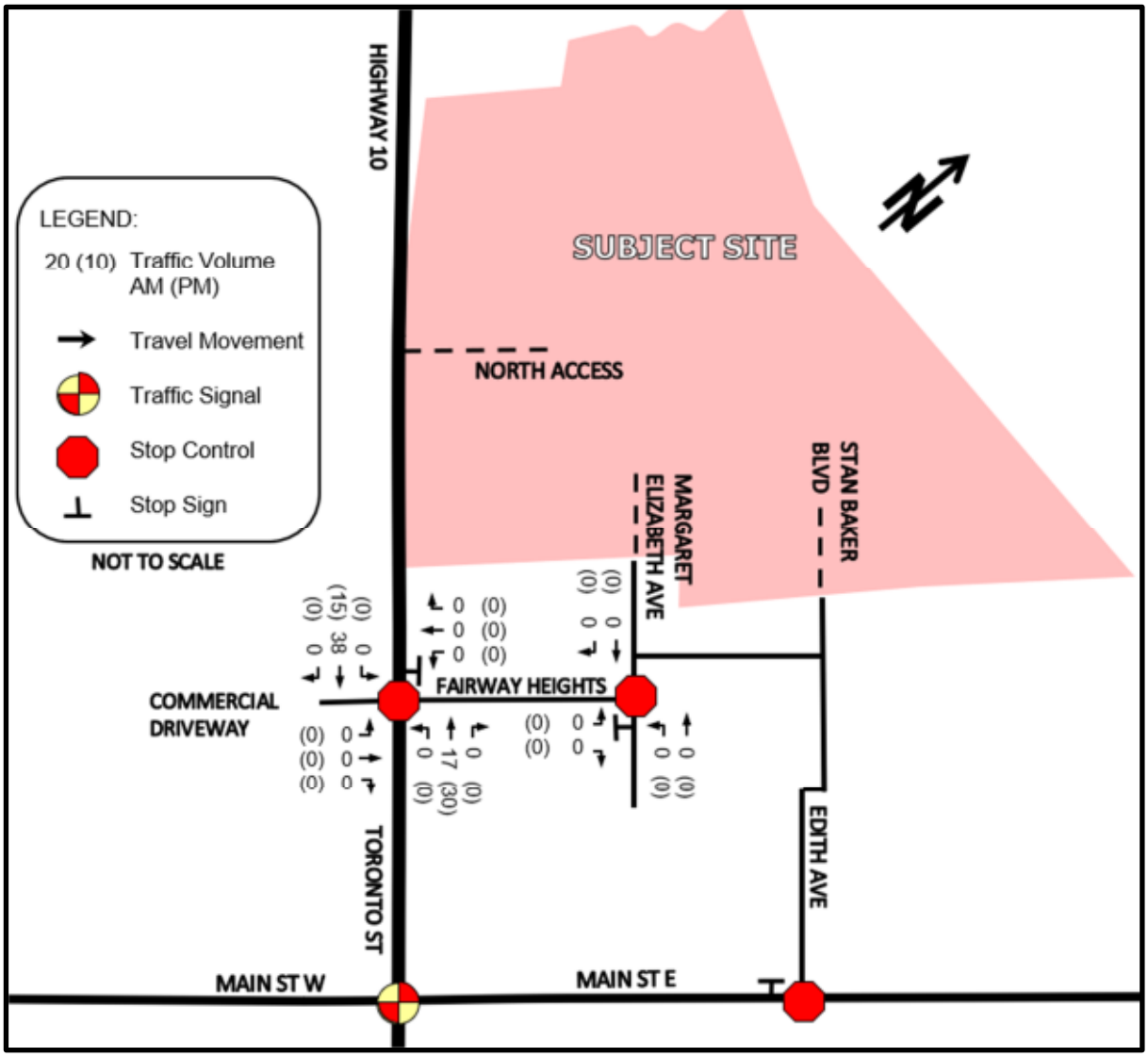


Figure 5 – 105 Toronto Street Development Traffic Volumes within Study Area

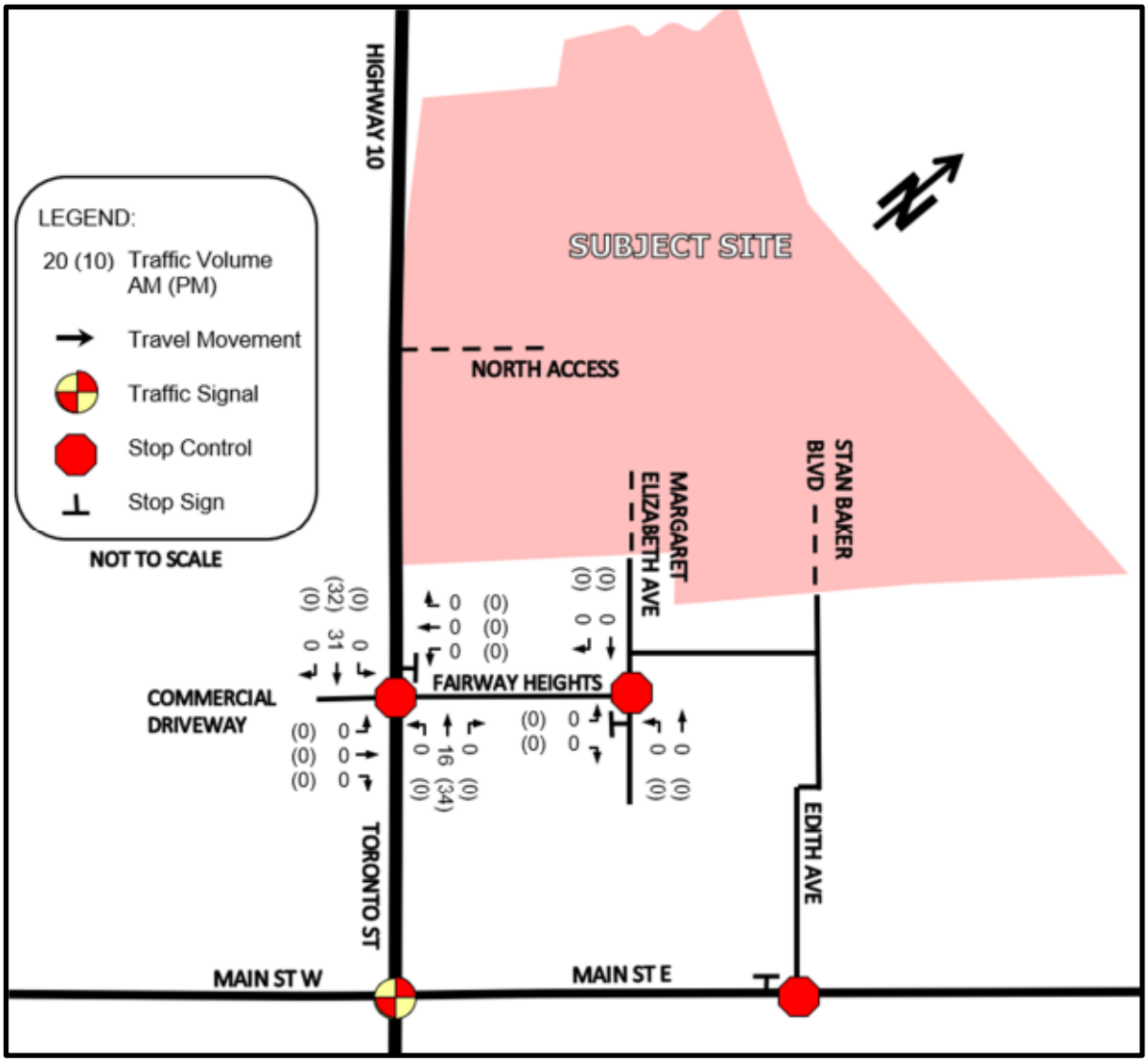
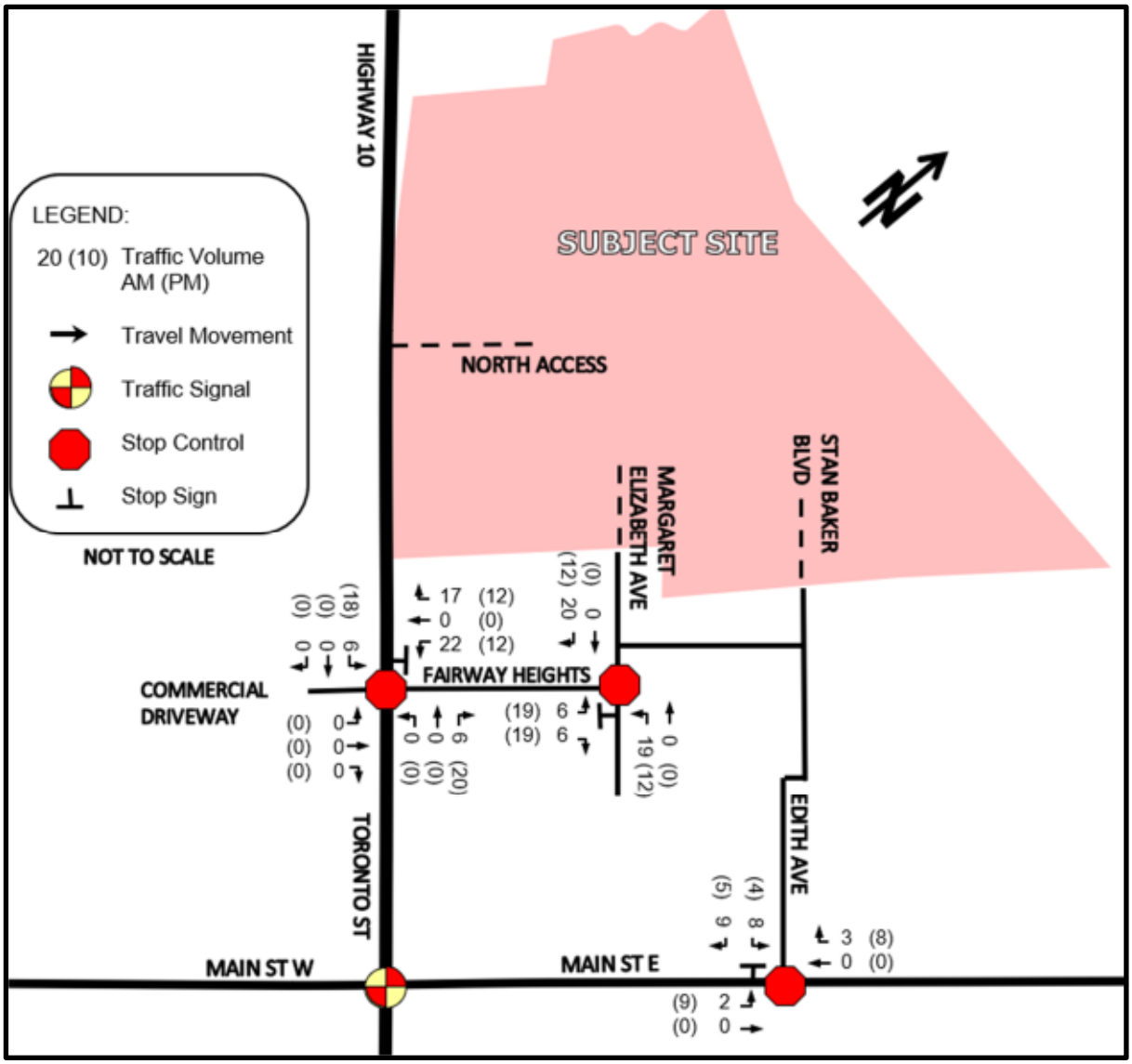


Figure 6 – Stonebrook Residential Development Traffic Volumes within Study Area



2.5 Background Growth Rate

Based on MTO historical Average Annual Daily Traffic [AADT] and Summer Average Daily Traffic [SADT] data, a general background traffic growth rate of 2.0% per year has been selected for Toronto Street within the study area. No background growth rate has been utilized for Fairway Heights and Margaret Elizabeth Avenue as these roads only service the local area.

2.6 Traffic Counts

Detailed turning movement traffic and pedestrian counts for the Toronto Street / Fairway Heights & Commercial Driveway and Toronto Street / Main Street intersections were commissioned by JD Engineering. Detailed turning movement traffic and pedestrian counts for the Toronto Street / Main Street intersection we also obtained from the Municipality.

Table 2 summarizes the traffic count data collection information.

Table 2 – Traffic Count Data

Intersection (E-W Street / N-S Street)	Count Date	AM Peak Hour	PM Peak Hour	Source
Fairway Heights & Commercial Driveway / Toronto Street	Thursday, April 22, 2021	07:15 – 08:15	16:30 – 17:30	JD Eng.*
Main Street / Toronto Street	Thursday, April 22, 2021	07:30 – 08:30	16:00 – 17:00	JD Eng.*
	Wednesday, October 5, 2016	08:15 – 09:15	16:30 – 17:30	Municipality

*Traffic counts were completed by Accu-Traffic Inc. on behalf of JD Engineering.

Detailed traffic count data can be found in **Appendix C**. The peak hours of traffic generation for the study area intersections generally aligned with the anticipated peak hour of traffic generation by the proposed development. Although the AM and PM peak periods at all study area intersections did not exactly align, for the purpose of this report, we have assumed that the AM and PM peak hours are concurrent.

Heavy vehicle percentages from the traffic count data have also been included in the Synchro analysis.

2.6.1 Calculation of Existing (2021) Traffic Volumes

2.6.1.1 Toronto Street / Fairway Heights & Commercial Driveway

Although the traffic data was obtained in 2021 for the Toronto Street / Fairway Heights & Commercial Driveway intersection, COVID-19 physical distancing requirements were implemented in Ontario at this time; consequently, these traffic counts do not reflect typical traffic conditions. To verify the 2021 counts, a comparison of the 2021 counts and 2016 counts for the north leg of the Toronto Street / Main Street intersection was completed.

To determine the equivalent 2021 traffic volumes from the 2016 counts, for accurate comparison to the 2021 counts, the background traffic growth rate noted in Section 2.5 was applied to the 2016 counts. Based on a comparison of the 2021 counts and the equivalent 2021 counts, the northbound and southbound through volumes at the Toronto Street / Fairway Heights & Commercial Driveway intersection were increased by 94% and 40% in the AM peak hour for the northbound and southbound directions respectively and increased by 65% and 47% in the PM peak hour for the northbound and southbound directions respectively. The traffic volumes for the west leg of the Toronto Street / Fairway Heights & Commercial Driveway intersection (commercial driveway) were also increased by the percentages noted above; however, only to the pass-by portion of trips from the commercial development (Based on ITE Land Use 945, 62% and 56% of trips from the commercial development are anticipated to be pass-by trips during the AM and PM peak hour). The traffic volumes for the east leg of the Toronto Street / Fairway Heights & Commercial Driveway intersection were not increased as there are only local traffic volumes entering or existing Fairway Heights and the existing traffic volumes at this leg are anticipated to be minimal compared to the anticipated traffic volumes at this leg from the Stonebrook Residential development and the proposed development.

2.6.1.2 Margaret Elizabeth Avenue / Fairway Heights

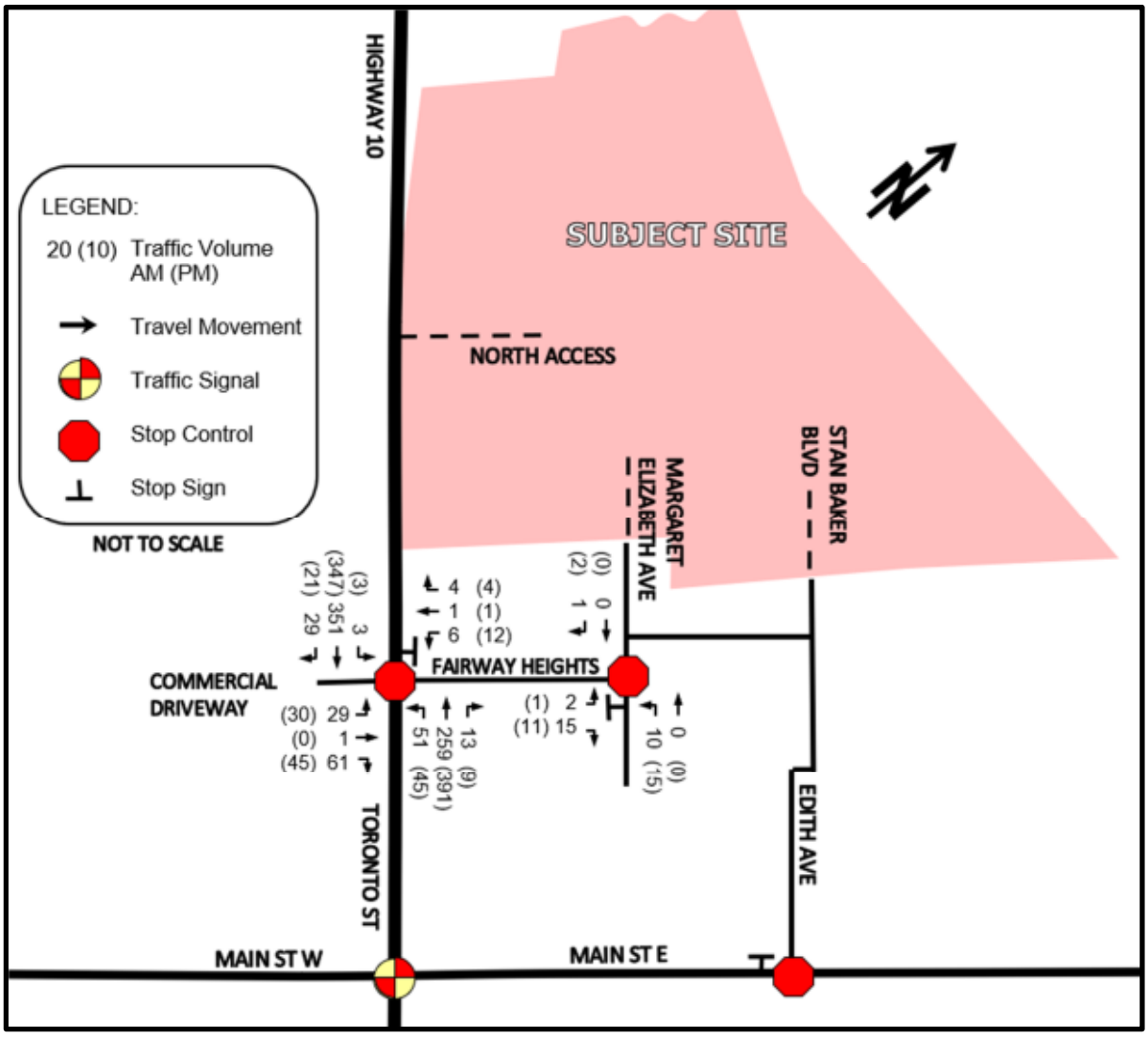
The Margaret Elizabeth Avenue / Fairway Heights intersection traffic volumes were calculated by taking the traffic volumes at the east leg of the Toronto Street / Fairway Heights & Commercial Driveway intersection and assigning them through the Margaret Elizabeth Avenue / Fairway Heights intersection based on the number of residential units on either side of the intersection.

2.6.1.3 Seasonal Variation Adjustment

Based on MTO historical AADT and SADT, there is seasonal variation within the study area with traffic volumes approximately 35% higher during summer months. Consequently, in order to be conservative with our analysis, we have increased the northbound and southbound through volumes on Toronto Street by 35%.

Figure 7 illustrates the existing (2021) AM and PM peak hour traffic volumes within the study area.

Figure 7 – Existing (2021) Traffic Volumes



2.7 Horizon Year Traffic Volumes

In addition to the adjacent development traffic volumes discussed in Section 2.4, the background traffic growth rates discussed in Section 2.5 have been applied to the existing traffic volumes to estimate the background (2026 and 2031) horizon year traffic volumes.

Figures 8 and **9** illustrate the background (2026 and 2031) horizon year AM and PM peak hour traffic volumes in the study area.

Figure 8 – Background (2026) Traffic Volumes

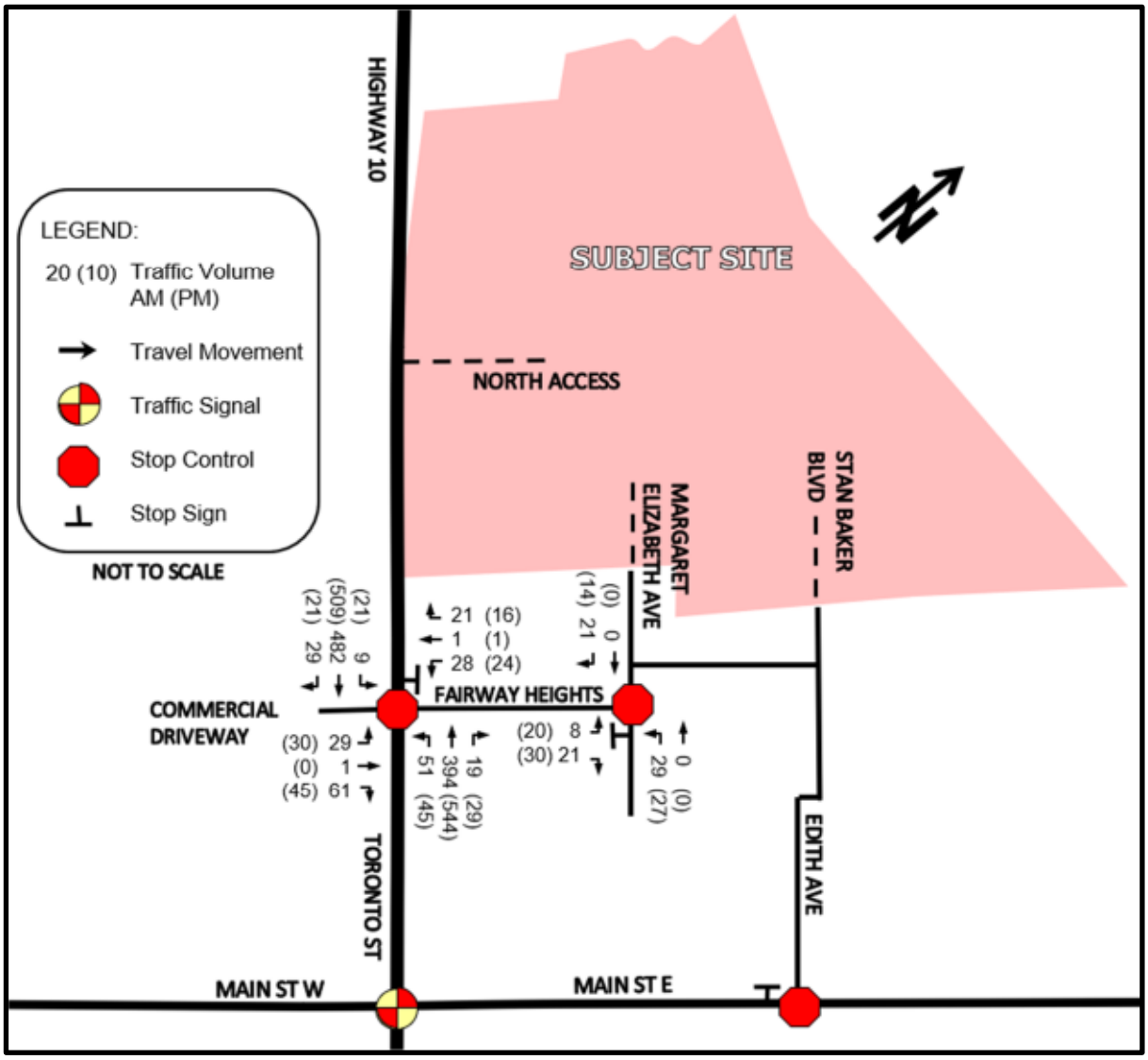
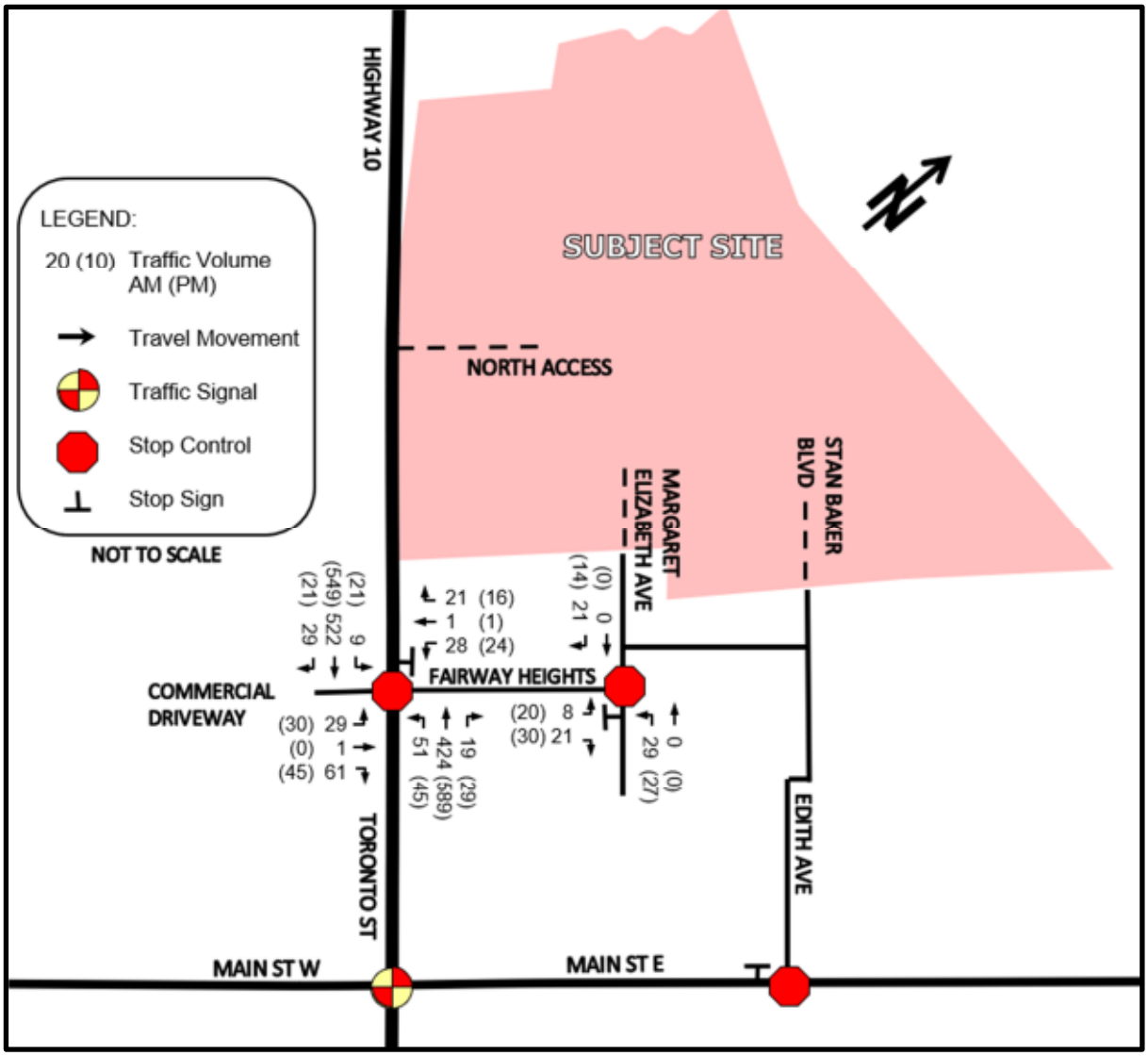


Figure 9 – Background (2031) Traffic Volumes



3 Intersection Operation without Proposed Development

3.1 Introduction

Existing year operational conditions were established to determine how the street network within the study area is currently functioning without the proposed development. This provides a base case scenario to compare with future development scenarios. Traffic operations within the study area were evaluated using the 2021 traffic volumes with the existing road configuration and traffic control. The intersection performance was measured using the traffic analysis software, Synchro 11, a deterministic model that employs Highway Capacity Manual and Intersection Capacity Utilization methodologies for

analyzing intersection operations. These procedures are accepted by provincial and municipal agencies throughout North America.

Synchro 11 enables the study area to be graphically defined in terms of streets and intersections, along with their geometric and traffic control characteristics. The user is able to evaluate both signalized and unsignalized intersections in relation to each other, thus not only providing level of service for the individual intersections, but also enabling an assessment of the impact the various intersections in a network have on each other in terms of spacing, traffic congestion, delay, and queuing.

3.2 Intersection Capacity Analysis Criteria

Individual turning movements with a volume-to-capacity [V/C] ratio of 0.85 or greater are considered to be critical movements and have been highlighted in the LOS tables.

The intersection operations were also evaluated in terms of the LOS. LOS is a common measure of the quality of performance at an intersection and is defined in terms of vehicular delay. This delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS is expressed on a scale of A through F, where LOS A represents very little delay (i.e. less than 10 seconds per vehicle) and LOS F represents very high delay (i.e. greater than 50 seconds per vehicle for a stop sign controlled intersection and greater than 80 seconds per vehicle for a signalized intersection).

The LOS criteria for signalized and stop sign controlled intersections are shown in **Table 3**. A description of traffic performance characteristics is included for each LOS.

Table 3 – Level of Service Criteria for Intersections

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	**Stop Controlled Intersections**
A	Very low delay; most vehicles do not stop (**Excellent**)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (**Very Good**)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping **(Good**)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (**Satisfactory**)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of **acceptable** delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (**Unacceptable**)	greater than 80.0	greater than 50.0

3.3 Existing (2021) Intersection Operation

The results of the LOS analysis under existing traffic volumes during the AM and PM peak hour can be found below in **Table 4**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 4 – Existing (2021) LOS

Location (E-W Street / N-S Street)	AM Peak Hour			PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Commercial Driveway & Fairway Heights / Toronto Street (unsignalized)	-	2.7	A	-	2.5	B
EB	0.23	15.6	C	0.22	17.2	C
WB	0.04	18.1	C	0.09	23.7	C

The results of the LOS analysis indicate that the Commercial Driveway & Fairway Heights / Toronto Street intersection is operating within the typical design limits noted in Section 3.2.

An analysis was completed for left turn movements at the Commercial Driveway & Fairway Heights / Toronto Street intersection based on the criteria outlined in Appendix 9A of the Ontario Ministry of Transportation Design Supplement for TAC Geometric Design Guide for Canadian Roads June 2017 [MTO DS]. According to the above-noted criteria a left turn lane is warranted in the northbound direction of the intersection (results are provided in **Appendix G**). The need for left turn lanes along Toronto Street is discussed further in Section 5.3.

A review of the need for an auxiliary right turn lane at the unsignalized study area intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary right turn lane is not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized study area intersections (results are provided in **Appendix H**).

No infrastructure improvements are recommended within the study area.

3.4 Background (2026) Intersection Operation

The results of the LOS analysis under background (2026) traffic volumes during the AM and PM peak hour can be found below in **Table 5**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix E**.

Table 5 – Background (2026) LOS

Location (E-W Street / N-S Street)	AM Peak Hour			PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Commercial Driveway & Fairway Heights / Toronto Street (unsignalized)	-	4.1	B	-	4.3	B
EB	0.34	23.6	C	0.39	32.3	D
WB	0.29	32.0	D	0.35	46.7	E

The results of the LOS analysis indicate that the Commercial Driveway & Fairway Heights / Toronto Street intersection is operating within the typical design limits noted in Section 3.2.

An analysis was completed for left turn movements at the Commercial Driveway & Fairway Heights / Toronto Street intersection based on the criteria outlined in Appendix 9A of the MTO DS. According to the above-noted criteria a left turn lane is warranted in the northbound and southbound directions of

the intersection (results are provided in **Appendix G**). The need for left turn lanes along Toronto Street is discussed further in Section 5.3.

A review of the need for an auxiliary right turn lane at the unsignalized study area intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary right turn lane is not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized study area intersections (results are provided in **Appendix H**).

No infrastructure improvements are recommended within the study area.

3.5 Background (2031) Intersection Operation

The results of the LOS analysis under background (2031) traffic volumes during the AM and PM peak hour can be found below in **Table 6**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix E**.

Table 6 – Background (2031) LOS

Location (E-W Street / N-S Street)	AM Peak Hour			PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Commercial Driveway & Fairway Heights / Toronto Street (unsignalized)	-	4.4	C	-	4.8	B
EB	0.38	26.7	D	0.44	38.8	E
WB	0.33	37.2	E	0.40	57.7	F

The results of the LOS analysis indicate that the control delay in the westbound direction for the Commercial Driveway & Fairway Heights / Toronto Street intersection is operating outside the typical design limits noted in Section 3.2 during the PM peak hour; however, no improvements are recommended as the delay is only marginally outside design limits.

An analysis was completed for left turn movements at the Commercial Driveway & Fairway Heights / Toronto Street intersection based on the criteria outlined in Appendix 9A of the MTO DS. According to the above-noted criteria a left turn lane is warranted in the northbound and southbound directions of the intersection (results are provided in **Appendix G**). The need for left turn lanes along Toronto Street is discussed further in Section 5.3.

A review of the need for an auxiliary right turn lane at the unsignalized study area intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary right turn lane is not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized study area intersections (results are provided in **Appendix H**).

No infrastructure improvements are recommended within the study area.

4 Proposed Development Traffic Generation and Assignment

4.1 Traffic Generation

The traffic generation for the proposed development has been based on the ITE Tip Generation Manual. The following ITE land uses have been applied to estimate the traffic from the proposed development:

- ITE land use 210 (Single-Family Detached Housing) – General Urban / Suburban Setting; and
- ITE land use 220 (Multifamily Housing (Low-Rise)) – General Urban / Suburban Setting.

The estimated trip generation of Phase 1 and 2 of the proposed development and the ultimate development is illustrated below in **Tables 7** and **8**. The AM and PM peak traffic generation for the proposed development is not expected to exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

Table 7 – Estimated Traffic Generation of Proposed Development (Phase 1 & 2)

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family Detached Housing ITE Land Use: 210	72 units[1]	14	40	54	45	26	71
Multifamily Housing (Low-Rise) ITE Land Use: 220	24 units	3	9	12	11	6	17
TOTAL TRIP GENERATION		17	49	66	56	32	88

Table 8 – Estimated Traffic Generation of Proposed Development (ultimate)

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family Detached Housing ITE Land Use: 210	313 units[2]	55	166	221	186	110	296
Multifamily Housing (Low-Rise) ITE Land Use: 220	156 units	17	56	73	55	33	88
TOTAL TRIP GENERATION		72	222	294	241	143	384

[1] The traffic generation noted in the Table 7 is based on a previous iteration of the Site Plan which included 69 single detached units and 24 townhouse units, which is slightly less than the current version of the Site Plan. The variation in unit counts will have a negligible impact on the modeling, analysis and recommendations.
[2] The traffic generation noted in the Table 8 is based on a previous iteration of the Site Plan which included 305 single detached units and 157 townhouse units, which is slightly less than the current version of the Site Plan. The variation in unit counts will have a negligible impact on the modeling, analysis and recommendations.

No transportation modal split has been applied to the above-noted traffic generation calculation.

4.2 Traffic Assignment

For the purposes of this study, it has been assumed that all traffic generated by the proposed development will be new traffic and would not be in the study area if the development was not constructed.

In Section 4.1, the anticipated percentage of new traffic entering and exiting during the peak hour was established. The distribution of traffic entering at each access location is based on our review of the internal road network, in conjunction with the external traffic distribution.

The distribution of traffic for the proposed development is based on the distribution of the existing traffic volumes within the study area. **Table 9** illustrates the calculation of the distribution of ingress and egress traffic for the proposed development.

Table 9 – Proposed Development Traffic Distribution

Travel Direction (to / from)	AM Peak Hour		PM Peak Hour	
	Ingress	Egress	Ingress	Egress
East via Main Street	16%	15%	15%	13%
West via Main Street	21%	16%	19%	22%
North via Toronto Street	38%	30%	32%	35%
South via Toronto Street	25%	39%	34%	30%
TOTAL	**100%**	**100%**	**100%**	**100%**

Using the traffic distributions pattern noted above, the traffic assignment for Phase 1 and 2 of the proposed development and the ultimate development was calculated for the AM and PM peak hour and are illustrated in **Figures 10** and **11**.

4.3 Total Horizon Year Traffic Volumes with the Proposed Development

For the total (2026) horizon year traffic volumes, the Phase 1 and 2 proposed development traffic was added to the background (2026) traffic volumes. For the total (2031) horizon year traffic volumes, the ultimate development traffic was added to the background (2031) traffic volumes. The resulting total (2026 and 2031) horizon year traffic volumes for the AM and PM peak hour are illustrated in **Figures 12** and **13**.

Figure 10 – Proposed Development Traffic Assignment – Phase 1 & 2

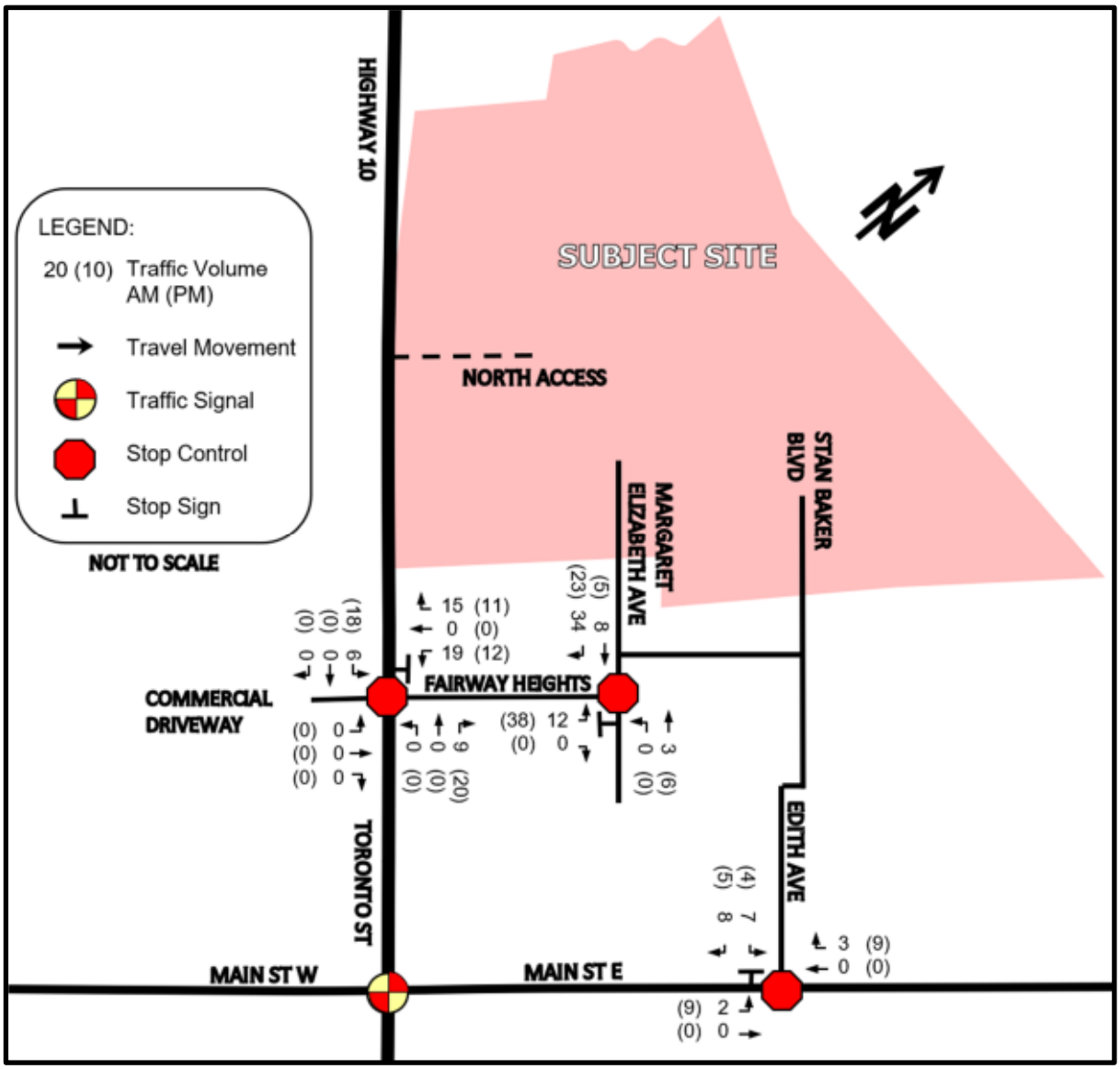


Figure 11 – Proposed Development Traffic Assignment – Ultimate Development

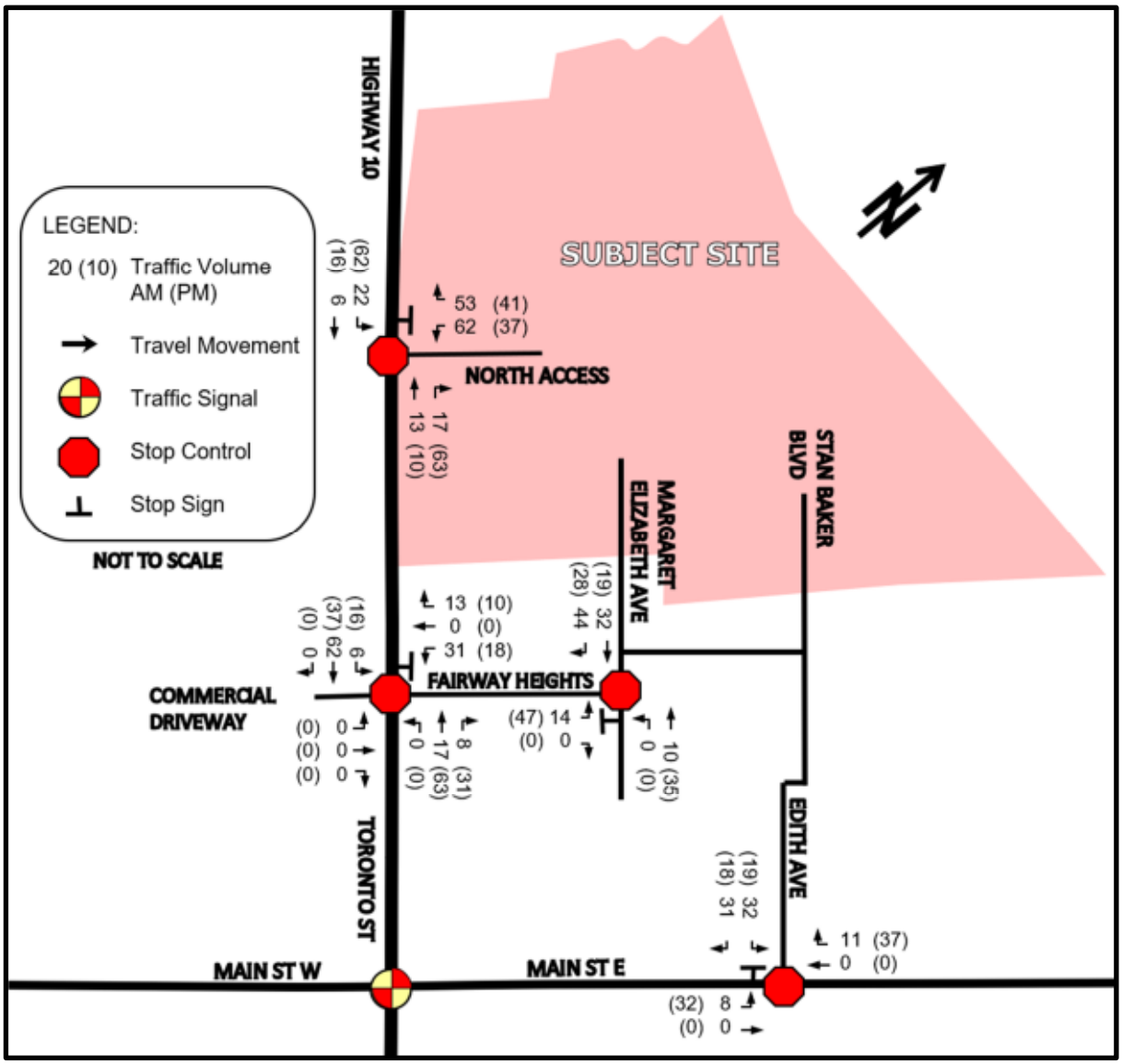


Figure 12 – Total (2026) Traffic Volumes

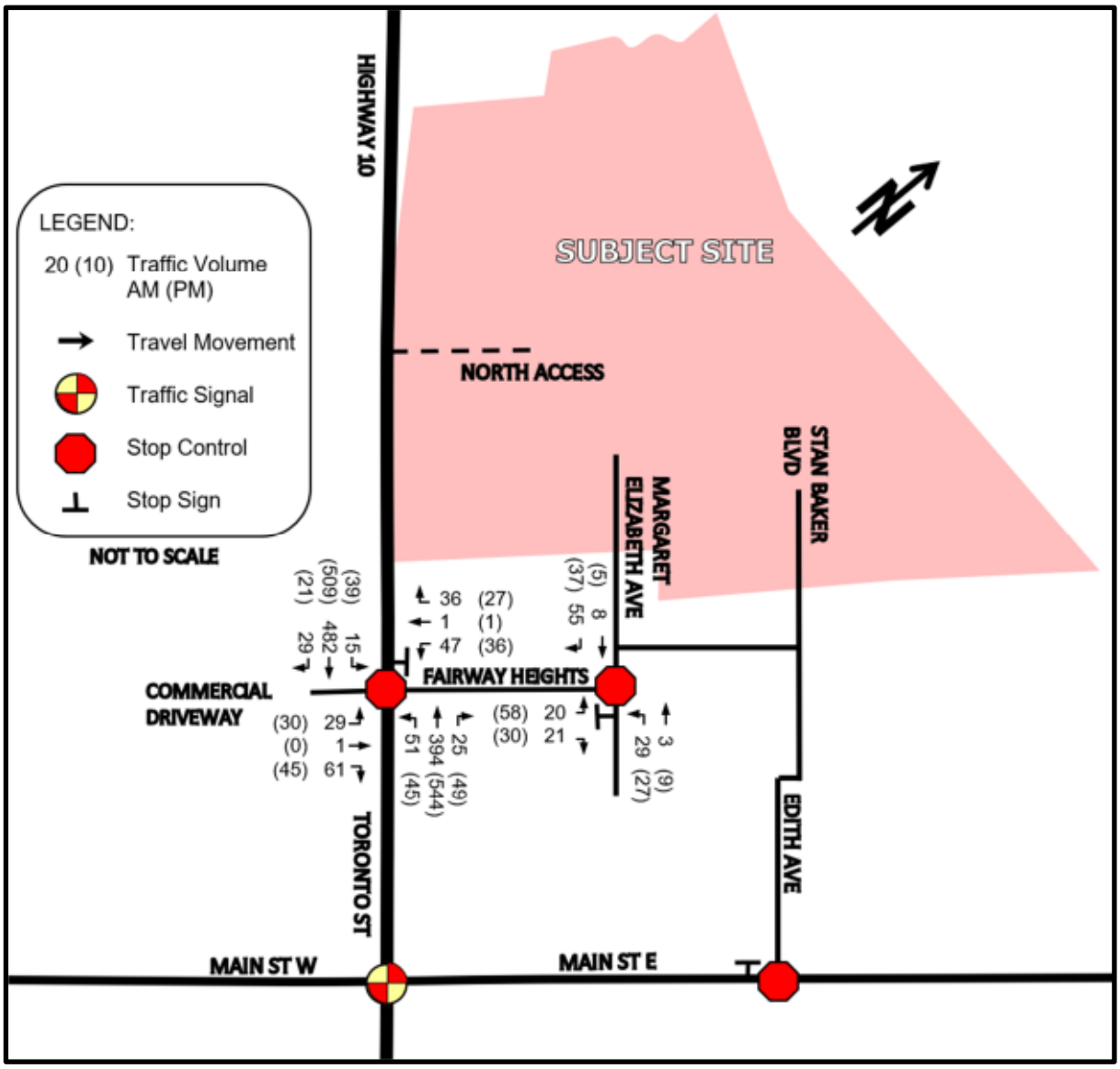
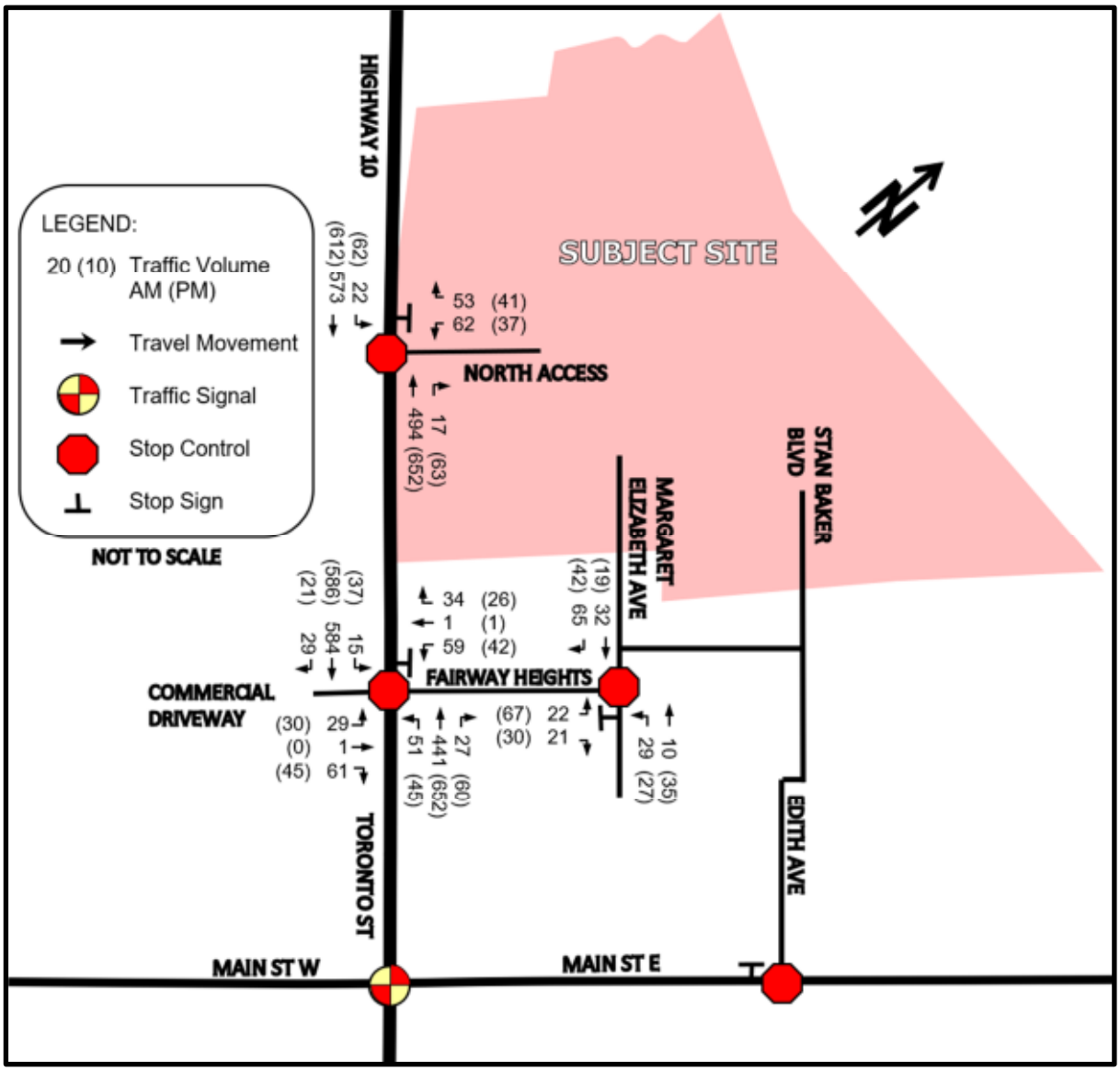


Figure 13 – Total (2031) Traffic Volumes



5 Intersection Operation with Proposed Development

5.1 Total (2026) Intersection Operation

The results of the LOS analysis under total (2026) traffic volumes during the AM and PM peak hour can be found below in **Table 10**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix F**.

Table 10 – Total (2026) LOS

Location (E-W Street / N-S Street)	AM Peak Hour			PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Commercial Driveway & Fairway Heights / Toronto Street (unsignalized)	-	5.9	B	-	6.6	B
EB	0.36	25.2	D	0.43	37.7	E
WB	0.51	43.1	E	0.59	70.0	F

The results of the LOS analysis indicate that the control delay in the westbound direction for the Commercial Driveway & Fairway Heights / Toronto Street intersection is operating outside the typical design limits noted in Section 3.2 during the PM peak hour; however, no improvements are recommended as the delay is only marginally outside design limits and this is anticipated to be a temporary condition until the North Access is constructed.

An analysis was completed for left turn movements at the Commercial Driveway & Fairway Heights / Toronto Street intersection based on the criteria outlined in Appendix 9A of the MTO DS. According to the above-noted criteria a left turn lane is warranted in the northbound and southbound directions of the intersection (results are provided in **Appendix G**). The need for left turn lanes along Toronto Street is discussed further in Section 5.3.

A review of the need for an auxiliary right turn lane at the unsignalized study area intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary right turn lane is not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized study area intersections (results are provided in **Appendix H**).

No infrastructure improvements are recommended within the study area.

5.2 Total (2031) Intersection Operation

The results of the LOS analysis under total (2031) traffic volumes during the AM and PM peak hour can be found below in **Table 11**. Existing intersection geometry and traffic control have been utilized for this scenario with the following exception

Based on the criteria outlined in Appendix 9A of the MTO DS, an auxiliary southbound left turn lane is recommended at the North Access / Highway 10 intersection with a 30 metre storage length, 45 metre parallel length and 60 metre taper length[3] (results are provided in **Appendix G**).

Detailed output of the Synchro analysis can be found in **Appendix F**.

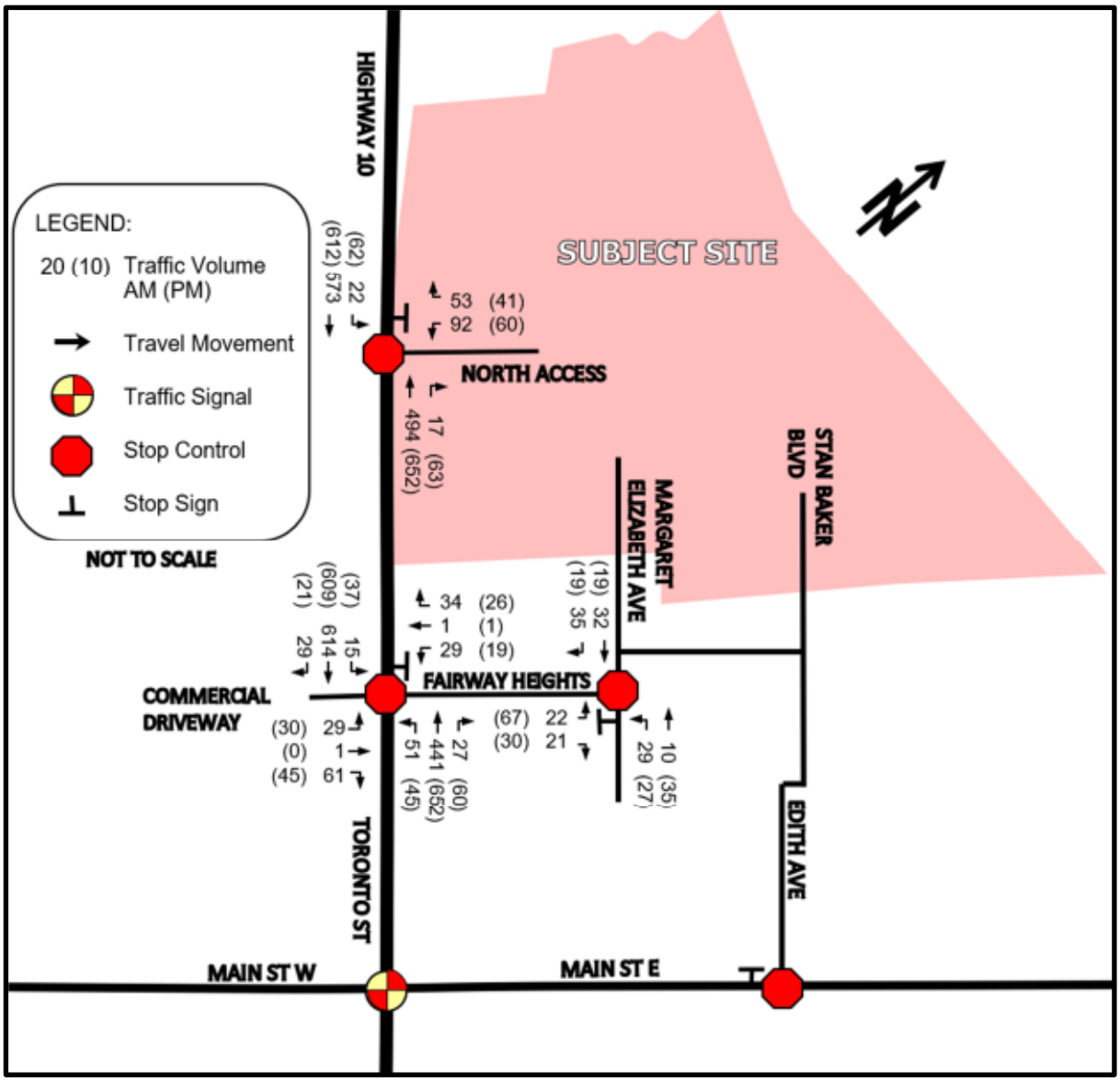
[3] Based on the reduced speed limit recommended in Section 5.5

Table 11 – Total (2031) LOS

Location (E-W Street / N-S Street)	AM Peak Hour			PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Commercial Driveway & Fairway Heights / Toronto Street (unsignalized)	-	10.4	C	-	11.9	C
EB	0.46	34.3	D	0.58	61.4	F
WB	0.82	101.7	F	0.94	172.0	F
North Access / Highway 10 (unsignalized)	-	3.2	B	-	2.7	B
WB	0.48	30.2	D	0.48	42.5	E

The results of the LOS analysis indicate that the control delay in the eastbound and westbound directions for the Commercial Driveway & Fairway Heights / Toronto Street intersection are operating outside the typical design limits noted in Section 3.2. As the control delay for westbound movements at the Commercial Driveway & Fairway Heights / Toronto Street intersection increases, vehicles will change their route and alternatively utilize the North Access until the control delay between the two intersections balance. **Figure 14** illustrates the redistributed total (2031) AM and PM peak hour traffic volumes in the study area.

Figure 14 – Redistributed Total (2031) Traffic Volumes



The results of the LOS analysis under the redistributed total (2031) traffic volumes during the AM and PM peak hour can be found below in **Table 12**. Detailed output of the Synchro analysis with the redistributed total (2031) traffic volumes can be found in **Appendix F**.

Table 12 – Total with redistribution (2031) LOS

Location (E-W Street / N-S Street)	AM Peak Hour			PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Commercial Driveway & Fairway Heights / Toronto Street (unsignalized)	-	5.7	C	-	6.5	C
EB	0.48	37.1	E	0.61	66.1	F
WB	0.46	46.6	E	0.49	69.0	F
North Access / Highway 10 (unsignalized)	-	5.4	B	-	5.3	B
WB	0.65	43.6	E	0.72	71.6	F

The results of the LOS analysis indicate that the control delay in the eastbound and westbound directions for the study area intersections are operating outside the typical design limits noted in Section 3.2 during the PM peak hour; however, no improvements are recommended as the control delay is only marginally outside design limits.

An analysis was completed for left turn movements at the Commercial Driveway & Fairway Heights / Toronto Street intersection based on the criteria outlined in Appendix 9A of the MTO DS. According to the above-noted criteria a left turn lane is warranted in the northbound and southbound directions of the intersection (results are provided in **Appendix G**). The need for left turn lanes along Toronto Street is discussed further in Section 5.3.

A review of the need for an auxiliary right turn lane at the unsignalized study area intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, an auxiliary right turn lane is not recommended.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at the unsignalized study area intersections (results are provided in **Appendix H**).

No infrastructure improvements are recommended within the study area.

5.3 Two Way Left Turn Lane on Toronto Street

A left turn lane is warranted at the Commercial Driveway & Fairway Heights / Toronto Street intersection in the northbound direction in the existing (2021) scenario and in the southbound direction in the background (2026) scenario based on the criteria outlined in Appendix 9A of the MTO DS. With the increasing volume of traffic on Toronto Street, it is anticipated that a left turn lane will be warranted for multiple roads and access driveways along Toronto Street. Consequently, it is recommended that the Municipality explore widening Toronto Street to include a two-way-left-turn lane [TWLTL] within the community of Markdale.

A TWLTL will also have the added benefit of reducing the control delay for left turn vehicles from local roads and developments onto Toronto Street.

5.4 Margaret Elizabeth Avenue / Fairway Heights Traffic Impact Review

The volume of traffic approaching the Margaret Elizabeth Avenue / Fairway Heights intersection in each direction is less than 100 vehicles during the critical total (2031) scenario. This volume of traffic can be conveyed by an unsignalized T-intersection with a high level of service and significant excess capacity. The existing configuration of the Margaret Elizabeth Avenue / Fairway Heights intersection

can safely and efficiently accommodate the anticipated traffic for the total (2031) scenario. No additional improvements are recommended at this intersection.

5.5 Speed Limit on Highway 10

Highway 10 has a posted speed limit of 80 km/hr north of 100 metres north of the southeast corner of the subject site and Toronto Street has a posted speed limit of 50 km/hr south of 100 metres north of the southeast corner of the subject site. The proposed location for the North Access is within the 80 km/hr zone. It is recommended that the 50 km/hr speed limit is extended to 100 metres north of the North Access to provide reduced speeds for vehicles turning to/from the residential North Access and to reflect the residential nature of the adjacent lands.

5.6 Timing of North Access Construction

Based on the intersection operation analysis in Section 5.1, the North Access is not required to be constructed as a part of Phase 1 and 2 of the proposed development. The North Access will be required with the occupancy of the first unit of Phase 3 of the proposed development.

5.7 Active Transportation Review

There are no cycling routes within the study area; however, “The Grey County CP Trail” runs generally parallel to Highway 10 on the west end of the community of Markdale within the study area. Cyclists from the subject site would be required to share the existing road network with all other users within the community of Markdale.

The proposed development will include a sidewalk along all internal roads, to provide pedestrian connectivity and connect into existing and future sidewalk infrastructure adjacent to the subject site.

5.8 Sight Distance Review

A review of the available sight distance for the proposed site access roadway was completed as part of this analysis.

The sight distance north and south of the North Access at Highway 10 (greater than 300 metres) is greater than the minimum stopping and intersection sight distance requirements as identified in the Transportation Association of Canada *Design Guide for Canadian Roads* (2017) [TAC Guidelines] for a design speed of 100km/h (185 metres and 210 metres).

There are no issues with the sight distance for the proposed site access roadway.

5.9 Site Access

The North Access at Highway 10 will operate efficiently as a full-movement access, with one-way stop control for the westbound movements. A southbound left turn lane with a 30 metre storage length, 45 metre parallel length and a 60 metre taper length is recommended on Highway 10 at the North Access. A single eastbound and westbound lane at the North Access at Highway 10 will provide the necessary capacity to service the proposed development.

6 Summary

LC Development Group Inc. retained **JD Engineering** to prepare this traffic impact study in support of the proposed development of a property municipally known as 775309 Highway 10 in the Municipality of Grey Highlands [Municipality], County of Grey [County]. The proposed Site Plan is shown in **Appendix A**. This chapter summarizes the conclusions and recommendations from the study.

The proposed development, as illustrated in **Appendix A**, is anticipated to approximately include the following:

- 156 townhouses; and
- 313 single family detached houses.

Phase 1 and 2 of the proposed development is anticipated to include +/- 93 residential lots with the following approximate unit breakdown:

- 24 townhouses; and
- 72 single family detached houses.

The East Access will be constructed as part of Phase 1 of the proposed development. The North Access and South Access will be constructed after the completion of Phase 1 and 2 of the proposed development.

1. The proposed development is expected to generate a total of 294 AM and 384 PM peak hour trips with Phase 1 and 2 of the proposed development is expected to generate a total of 66 AM and 88 PM peak hour trips.
2. Detailed turning movement traffic and pedestrian counts for the Toronto Street / Fairway Heights & Commercial Driveway and Toronto Street / Main Street intersections were commissioned by JD Engineering. Detailed turning movement traffic and pedestrian counts for the Toronto Street / Main Street intersection we also obtained from the Municipality.
3. An intersection operation analysis was completed at the study area intersections, using the existing (2021) and background (2026 and 2031) traffic volumes, with the adjacent development traffic and without the proposed development traffic, if the proposed development did not proceed. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development. No geometric lane improvements or traffic signal improvements are recommended within the study area.
4. An estimate of the amount of traffic that would be generated by the proposed development was prepared and assigned to the study area streets and intersections.
5. An intersection operation analysis was completed under total (2026 and 2031) traffic volumes with the proposed development operational at the study area intersections. The following geometric lane improvements or traffic signal improvements are recommended within the study area to accommodate the proposed development.

   North Access / Highway 10

   - Construction of an auxiliary southbound left turn lane with a 30 metre storage length, 45 metre parallel length and 60 metre taper length
   - Extension of the Toronto Street 50 km/hr speed limit to 100 metres north of the North Access
6. It is recommended the Municipality explore constructing a two-way-left-turn lane [TWLTL] on Toronto Street within the community of Markdale.

7. The North Access will operate efficiently as a full-movement access, with one-way stop control for the westbound movements. A single eastbound and westbound lane at the North Access roadway will provide the necessary capacity to service the proposed development together with the Margaret Elizabeth Avenue and Stan Baker Boulevard extensions.
8. The sight distance available for the North Access meets the minimum stopping and intersection sight distance requirements.
9. The North Access is not required to be constructed as a part of Phase 1 and 2 of the proposed development. The North Access will be required with the occupancy of the first unit of Phase 3 of the proposed development.
10. In summary, the proposed development will not cause any operational issues and will not add a notable delay or congestion to the local roadway network.

Appendix A –
Site Plan

CONCEPT PLAN
LCDG GH1 DEVELOPMENT
MARKDALE, ONTARIO
SCALE 1:1250
NOVEMBER 05, 2021

LEGEND

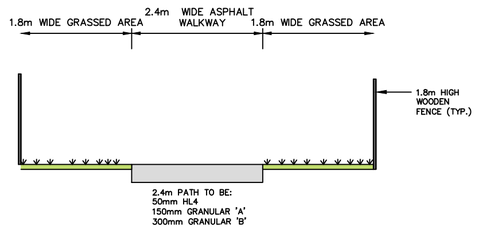
- URBAN SETTLEMENT AREA BOUNDARY
- INTERPRETED URBAN SETTLEMENT AREA LIMIT
- AREA REQUIRING FURTHER STUDY (LOCATION APPROX.)
- EXISTING EXCAVATOR TRAILS (LOCATION APPROX.)
- EXISTING VEGETATION AREA

PHASING:

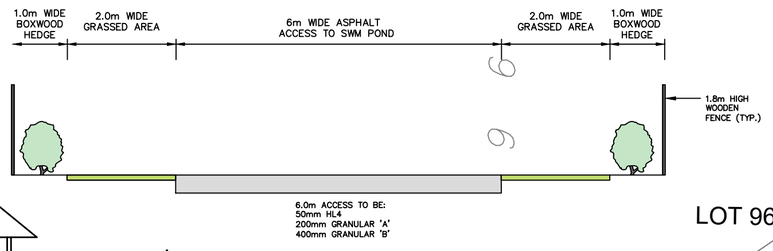
- PHASE 1
- PHASE 2
- PHASE 3
- PHASE 4
- PHASE 5
- PHASE 6
- PHASE 7
- PHASE 8

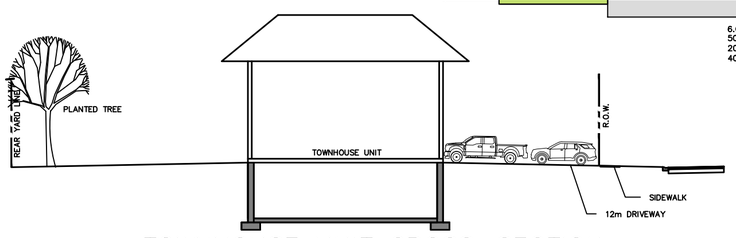
- PROPOSED TREE PLANTING
- PROPOSED MAIL BOX LOCATION

6.0 WALKWAY DETAIL
N.T.S.

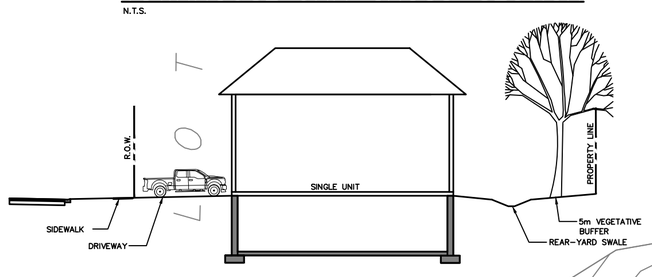


SWM POND ACCESS BLOCK DETAIL
N.T.S.





TOWNHOUSE UNIT CROSS-SECTION
N.T.S.

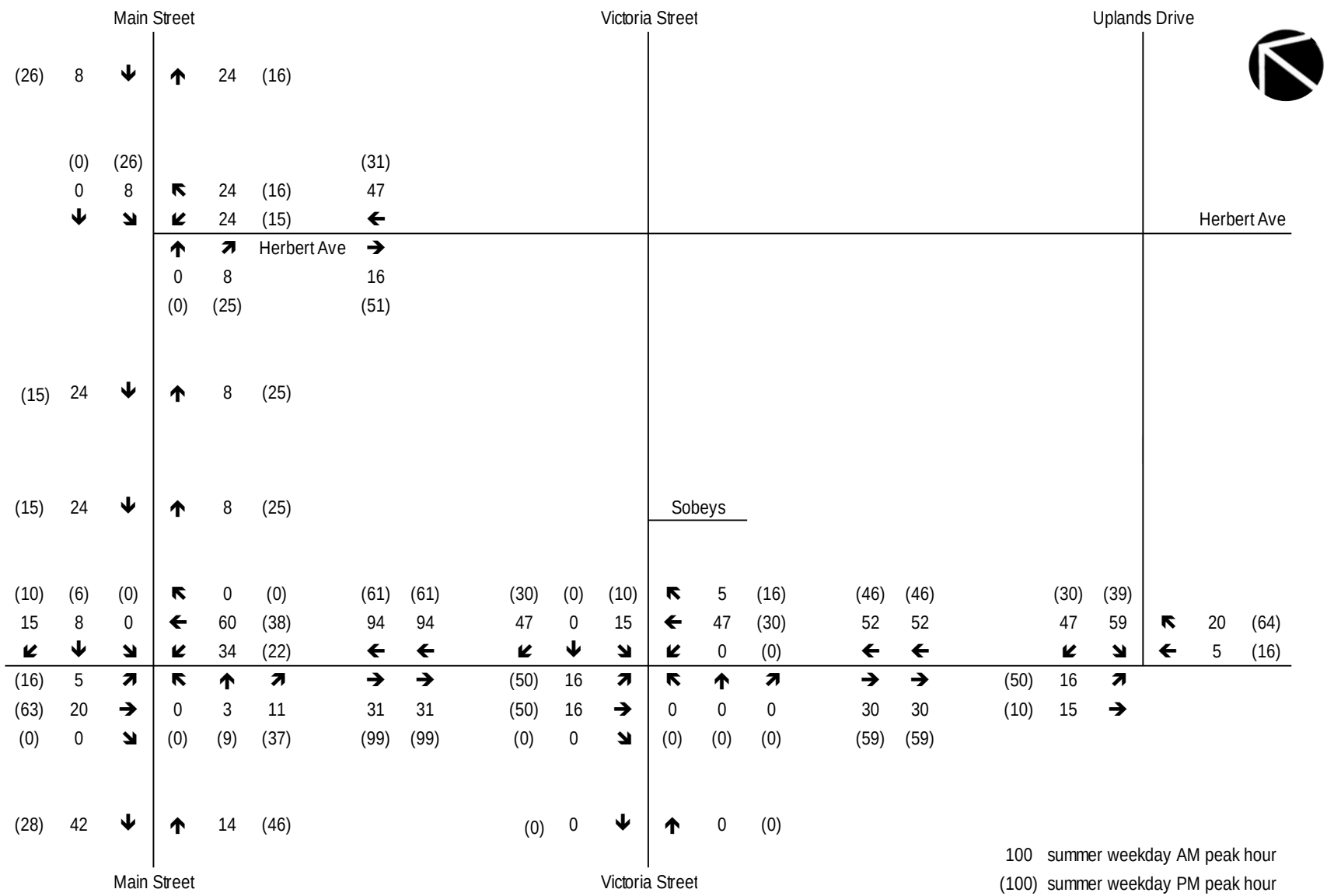


SINGLE UNIT CROSS-SECTION
N.T.S.

LOT 97
LOT 96
LOT 95
BLOCK O
BLOCK N
BLOCK M
BLOCK K
BLOCK G
BLOCK F
BLOCK J
BLOCK I
BLOCK E
BLOCK A
BLOCK B
BLOCK C
BLOCK D
EDGE OF WATERCOURSE
EDGE OF RIVER
INTERPRETED URBAN SETTLEMENT AREA LIMIT
Tableland 3357.0m²
VALLEYLAND 13,481.3m²
PARK 4933m²
PLAY GROUND BLOCK H 1219m²
LANDS TO BE RETAINED BY THE MUNICIPALITY (NOT PART OF PROPOSED PLAN OF SUBDIVISION)
LANDS TO BE CONVEYED BY MUNICIPALITY TO GH1 DEVELOPMENT INC.
PROPOSED SWM EXTENSION
SWM ACCESS BLOCK
TEMPORARY TURNING CIRCLE
8m WIDE OUTLET BLOCK
SWP AND SAN. PIPE AREA = 4363m²
OPEN SPACE / CONSERVATION
14m HIGHWAY SETBACK
HIGHWAY 10
MARGARET ELIZABETH AVE
PART 1 PLAN 16R-11402
PART 17 PLAN 16R-11402
DEPOSITED PLAN 51661
THE CORPORATION OF THE TOWN OF MARKDALE
SUCCESSIONAL TREE PLANTINGS: NATIVE TREE SAPLINGS, OF BOTH LARGER AND SMALLER SIZES, WITH AN ABUNDANCE OF CONIFER, TO BE PLANTED AT APPROXIMATE 2m SPACING

PEL
PINESTONE ENGINEERING LIMITED | www.pel.ca

Appendix B –
Adjacent Development Excerpts



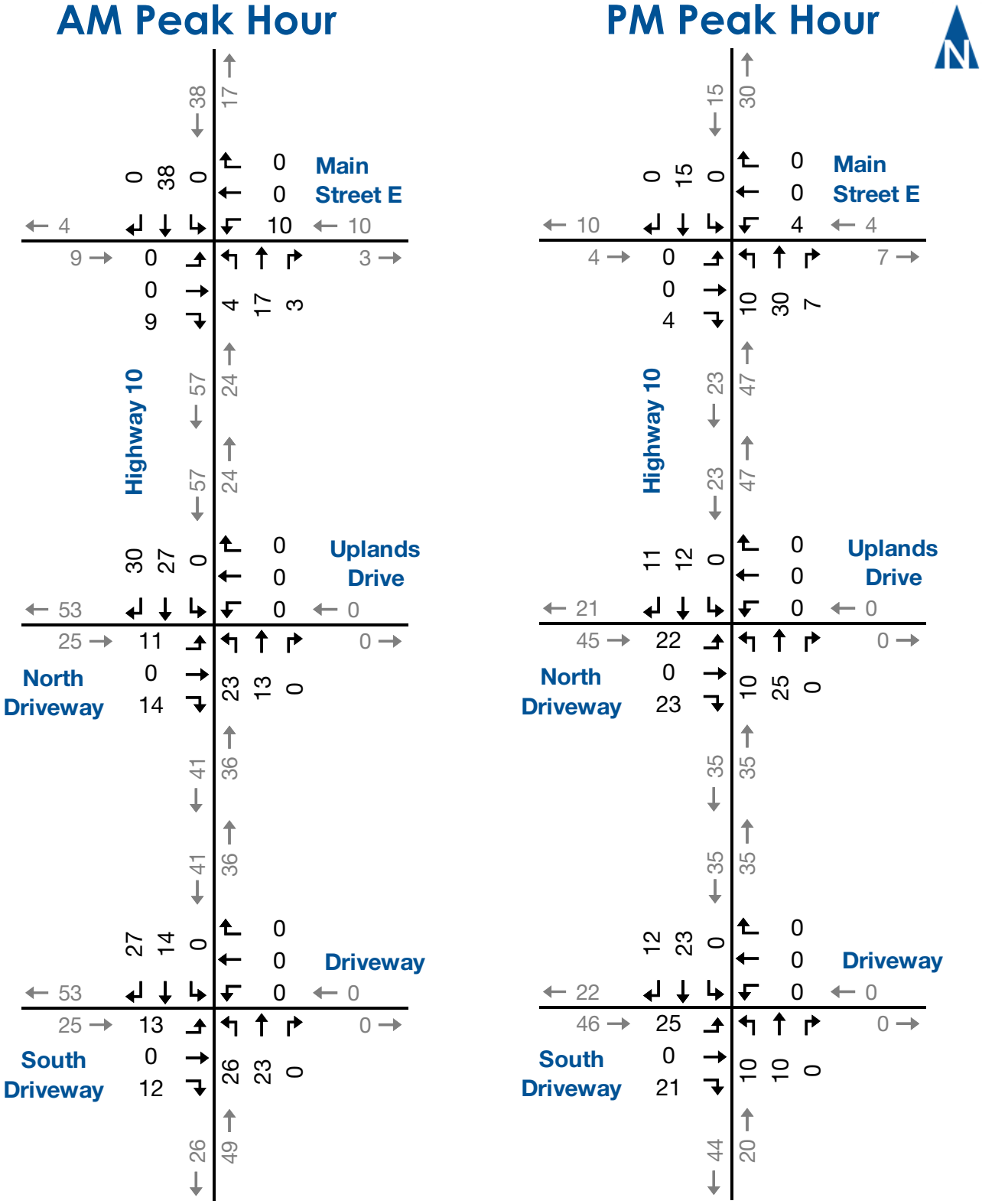
C.C. Tatham & Associates Ltd.
Consulting Engineers

Centre Point South Residential Development

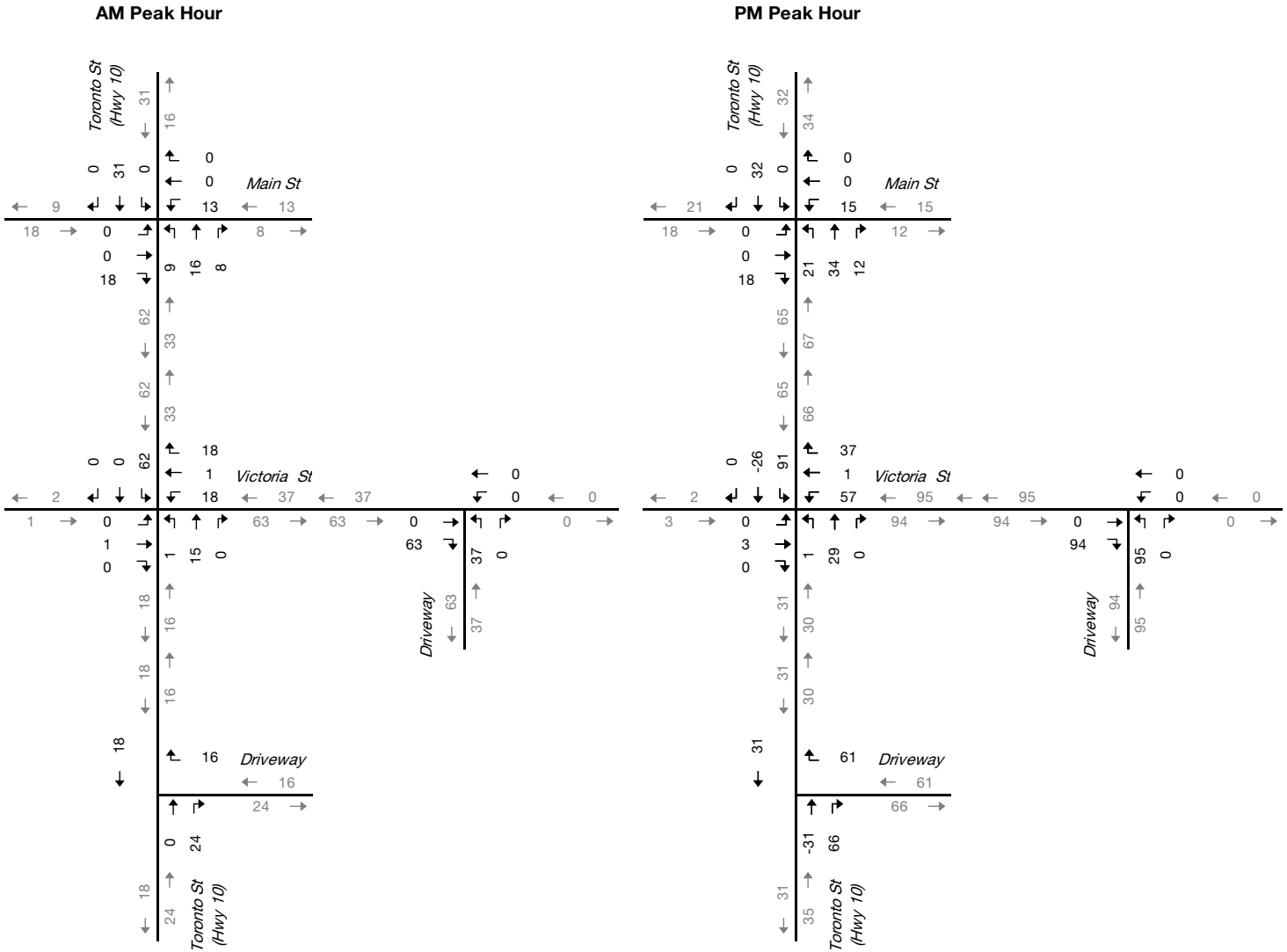
Centre Point South Site Traffic

Figure

10



Site Generated Traffic Volumes



Development Generated Traffic Volumes

105 Toronto Street South, Markdale TIS
162060

Figure 3.2

Appendix C –
Traffic Count Data

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:15:00
To: 8:15:00

Municipality: Markdale
Site #: 2103700001
Intersection: Hwy 10 & Fairway Heights
TFR File #: 1
Count date: 22-Apr-21

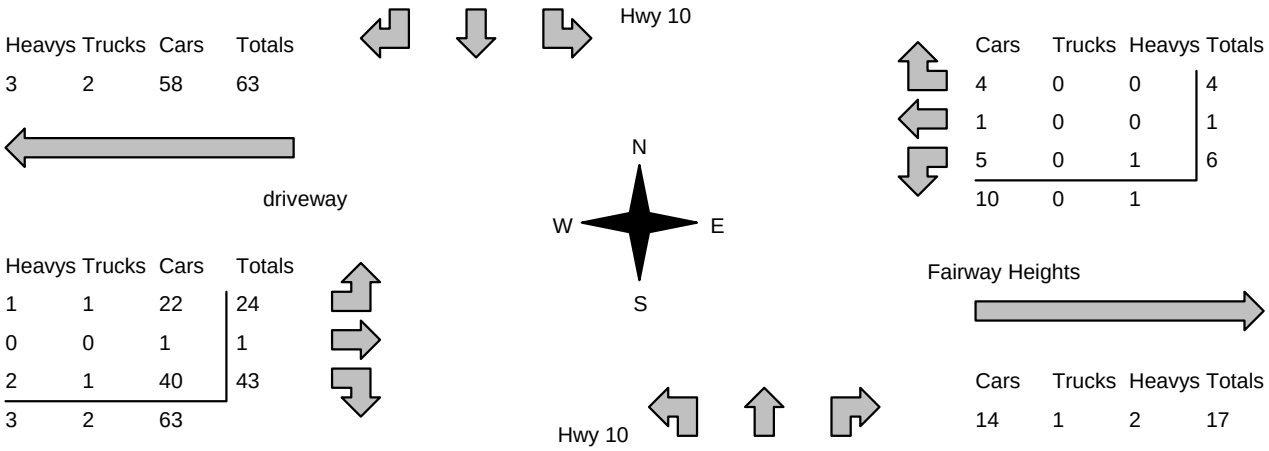
Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Hwy 10 runs N/S

North Leg Total:	322			
North Entering:	157			
North Peds:	2			
Peds Cross:	⋈			
Heavys	1	12	0	13
Trucks	1	4	0	5
Cars	18	118	3	139
Totals	20	134	3	
Heavys	22			
Trucks	7			
Cars	136			
Totals	165			
East Leg Total:	28			
East Entering:	11			
East Peds:	2			
Peds Cross:	⧖			



Peds Cross:	⧖							Peds Cross:	⋈
West Peds:	0							South Peds:	3
West Entering:	68							South Entering:	192
West Leg Total:	131							South Leg Total:	375
Cars	163				Cars	39	110	10	159
Trucks	5				Trucks	1	6	1	8
Heavys	15				Heavys	2	21	2	25
Totals	183				Totals	42	137	13	

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 19:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

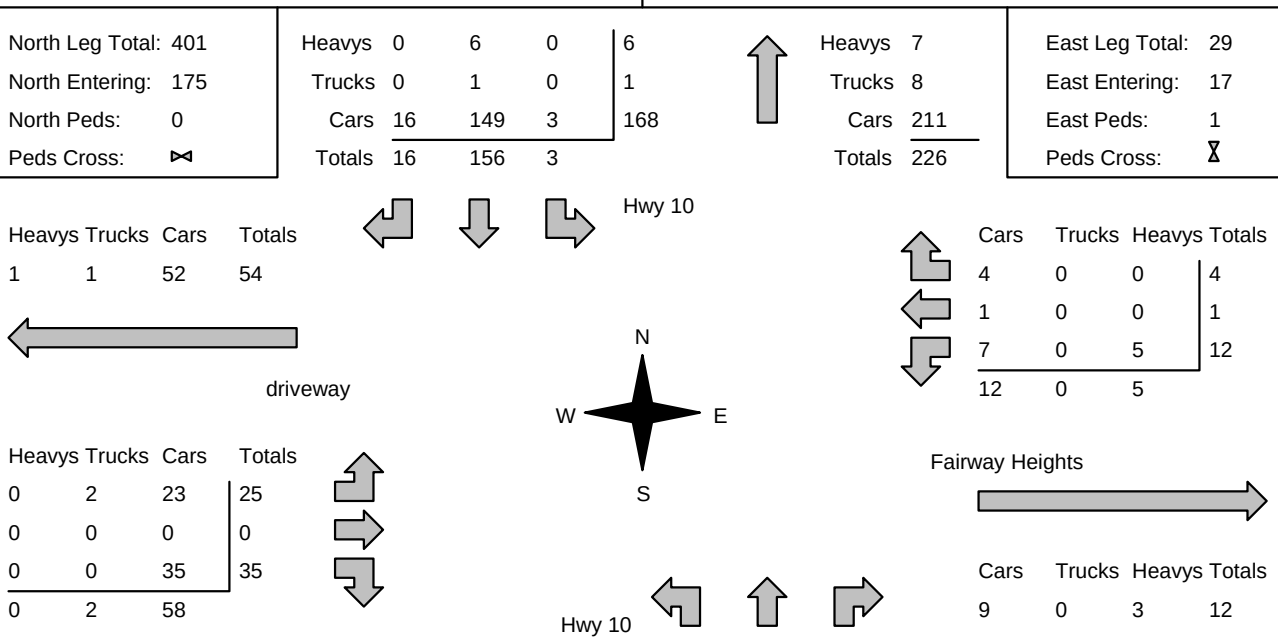
Municipality: Markdale
Site #: 2103700001
Intersection: Hwy 10 & Fairway Heights
TFR File #: 1
Count date: 22-Apr-21

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Hwy 10 runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Total Count Diagram

Municipality: Markdale
Site #: 2103700001
Intersection: Hwy 10 & Fairway Heights
TFR File #: 1
Count date: 22-Apr-21

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Hwy 10 runs N/S

North Leg Total:	1619			
North Entering:	727			
North Peds:	5			
Peds Cross:	⋈			
Heavys	2	44	0	46
Trucks	2	12	0	14
Cars	75	579	13	667
Totals	79	635	13	
Heavys	57			
Trucks	24			
Cars	811			
Totals	892			
East Leg Total:	140			
East Entering:	61			
East Peds:	5			
Peds Cross:	⧖			

Hwy 10

Heavys	Trucks	Cars	Totals
6	4	231	241

driveway

Cars	Trucks	Heavys	Totals
15	1	1	17
3	0	1	4
30	0	10	40
48	1	12	

N
W E
S

Heavys	Trucks	Cars	Totals
1	3	86	90
1	0	10	11
2	3	148	153
4	6	244	

Fairway Heights

Cars	Trucks	Heavys	Totals
65	3	11	79

Hwy 10

Peds Cross:	⧖			
West Peds:	0			
West Entering:	254			
West Leg Total:	495			
Cars	757			
Trucks	15			
Heavys	56			
Totals	828			
Cars	153	710	42	905
Trucks	2	20	3	25
Heavys	3	55	10	68
Totals	158	785	55	
Peds Cross:	⋈			
South Peds:	6			
South Entering:	998			
South Leg Total:	1826			

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Traffic Count Summary

Intersection: Hwy 10 & Fairway Heights | **Count Date:** 22-Apr-21 | **Municipality:** Markdale

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*2*	*131*	*24*	*157*	*1*
9:00:00	*2*	*113*	*14*	*129*	*3*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*4*	*138*	*13*	*155*	*0*
18:00:00	*3*	*148*	*19*	*170*	*0*
19:00:00	*2*	*105*	*9*	*116*	*1*
Totals:	13	635	79	727	5

North/South Total Approaches: 1725

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*46*	*133*	*8*	*187*	*4*
9:00:00	*22*	*140*	*19*	*181*	*1*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*34*	*193*	*15*	*242*	*0*
18:00:00	*38*	*187*	*10*	*235*	*0*
19:00:00	*18*	*132*	*3*	*153*	*1*
S Totals:	158	785	55	998	6

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*7*	*1*	*4*	*12*	*1*
9:00:00	*6*	*2*	*3*	*11*	*2*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*12*	*1*	*3*	*16*	*1*
18:00:00	*8*	*0*	*3*	*11*	*0*
19:00:00	*7*	*0*	*4*	*11*	*1*
Totals:	40	4	17	61	5

East/West Total Approaches: 315

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*25*	*1*	*45*	*71*	*0*
9:00:00	*14*	*5*	*25*	*44*	*0*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*20*	*1*	*31*	*52*	*0*
18:00:00	*24*	*1*	*30*	*55*	*0*
19:00:00	*7*	*3*	*22*	*32*	*0*
W Totals:	90	11	153	254	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	*7:00*	*8:00*	*9:00*	*16:00*	*17:00*	*18:00*	*19:00*	*0:00*
Crossing Values:	*0*	*38*	*29*	*0*	*33*	*33*	*19*	*0*

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Apr-21 Site #: 2103700001

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Heavys - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	27	27	5	5	0	0	0	0	0	0	0	0	3	3	0	0	0	0
7:30:00	0	0	50	23	7	2	0	0	0	0	1	1	0	0	3	0	0	0	0	0
7:45:00	1	1	82	32	14	7	0	0	0	0	1	0	0	0	5	2	1	1	1	1
8:00:00	2	1	116	34	22	8	0	0	3	3	1	0	0	0	12	7	1	0	1	0
8:15:00	3	1	145	29	23	1	0	0	4	1	1	0	0	0	15	3	1	0	2	1
8:30:00	3	0	170	25	27	4	0	0	7	3	2	1	0	0	19	4	1	0	4	2
8:45:00	3	0	194	24	30	3	0	0	7	0	2	0	0	0	19	0	1	0	4	0
9:00:00	4	1	216	22	34	4	0	0	7	0	2	0	0	0	21	2	2	1	4	0
9:15:00	4	0	216	0	34	0	0	0	7	0	2	0	0	0	21	0	2	0	4	0
16:00:00	4	0	216	0	34	0	0	0	7	0	2	0	0	0	21	0	2	0	4	0
16:15:00	6	2	246	30	38	4	0	0	7	0	2	0	0	0	22	1	2	0	4	0
16:30:00	6	0	274	28	40	2	0	0	8	1	2	0	0	0	25	3	2	0	4	0
16:45:00	6	0	310	36	43	3	0	0	8	0	2	0	0	0	27	2	2	0	4	0
17:00:00	8	2	346	36	47	4	0	0	9	1	2	0	0	0	27	0	2	0	4	0
17:15:00	9	1	392	46	52	5	0	0	9	0	2	0	0	0	30	3	2	0	4	0
17:30:00	9	0	423	31	56	4	0	0	9	0	2	0	0	0	31	1	2	0	4	0
17:45:00	11	2	452	29	61	5	0	0	9	0	2	0	0	0	33	2	2	0	4	0
18:00:00	11	0	487	35	66	5	0	0	9	0	2	0	0	0	34	1	2	0	4	0
18:15:00	12	1	512	25	69	3	0	0	9	0	2	0	0	0	39	5	2	0	4	0
18:30:00	13	1	534	22	71	2	0	0	10	1	2	0	0	0	41	2	2	0	4	0
18:45:00	13	0	557	23	75	4	0	0	11	1	2	0	0	0	43	2	2	0	5	1
19:00:00	13	0	579	22	75	0	0	0	12	1	2	0	0	0	44	1	2	0	5	0
19:15:00	13	0	579	0	75	0	0	0	12	0	2	0	0	0	44	0	2	0	5	0
19:15:15	13	0	579	0	75	0	0	0	12	0	2	0	0	0	44	0	2	0	5	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Apr-21 Site #: 2103700001

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Heavys - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	3	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	6	3	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
8:00:00	6	0	1	0	4	2	0	0	0	0	0	0	1	1	0	0	0	0	1	0
8:15:00	6	0	1	0	5	1	0	0	0	0	0	0	1	0	0	0	0	0	2	1
8:30:00	7	1	1	0	5	0	0	0	0	0	0	0	1	0	0	0	0	0	3	1
8:45:00	9	2	2	1	6	1	0	0	0	0	0	0	1	0	1	1	1	1	3	0
9:00:00	11	2	2	0	6	0	0	0	0	0	0	0	2	1	1	0	1	0	3	0
9:15:00	11	0	2	0	6	0	0	0	0	0	0	0	2	0	1	0	1	0	3	0
16:00:00	11	0	2	0	6	0	0	0	0	0	0	0	2	0	1	0	1	0	3	0
16:15:00	11	0	2	0	6	0	0	0	0	0	0	0	2	0	1	0	1	0	3	0
16:30:00	14	3	2	0	6	0	0	0	0	0	1	1	2	0	1	0	1	0	3	0
16:45:00	18	4	3	1	8	2	0	0	0	0	1	0	4	2	1	0	1	0	3	0
17:00:00	20	2	3	0	8	0	0	0	0	0	1	0	5	1	1	0	1	0	4	1
17:15:00	20	0	3	0	10	2	0	0	0	0	1	0	7	2	1	0	1	0	4	0
17:30:00	21	1	3	0	10	0	0	0	0	0	1	0	7	0	1	0	1	0	4	0
17:45:00	21	0	3	0	11	1	0	0	0	0	1	0	8	1	1	0	1	0	4	0
18:00:00	24	3	3	0	11	0	0	0	0	0	1	0	9	1	1	0	1	0	4	0
18:15:00	26	2	3	0	11	0	0	0	0	0	1	0	9	0	1	0	1	0	4	0
18:30:00	29	3	3	0	12	1	0	0	0	0	1	0	10	1	1	0	1	0	4	0
18:45:00	29	0	3	0	14	2	0	0	0	0	1	0	10	0	1	0	1	0	5	1
19:00:00	30	1	3	0	15	1	0	0	0	0	1	0	10	0	1	0	1	0	5	0
19:15:00	30	0	3	0	15	0	0	0	0	0	1	0	10	0	1	0	1	0	5	0
19:15:15	30	0	3	0	15	0	0	0	0	0	1	0	10	0	1	0	1	0	5	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Apr-21 Site #: 2103700001

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	12	12	27	27	1	1	0	0	1	1	0	0	0	0	3	3	0	0	1	1
7:30:00	22	10	59	32	1	0	1	1	2	1	0	0	1	1	10	7	0	0	1	0
7:45:00	35	13	87	28	3	2	1	0	2	0	0	0	1	0	13	3	1	1	4	3
8:00:00	43	8	110	23	7	4	1	0	3	1	0	0	2	1	20	7	1	0	4	0
8:15:00	51	8	137	27	11	4	1	0	7	4	1	1	2	0	24	4	2	1	4	0
8:30:00	55	4	167	30	14	3	1	0	8	1	1	0	2	0	27	3	2	0	5	1
8:45:00	59	4	199	32	17	3	1	0	9	1	2	1	2	0	29	2	2	0	5	0
9:00:00	65	6	229	30	21	4	1	0	10	1	3	1	2	0	34	5	3	1	5	0
9:15:00	65	0	229	0	21	0	1	0	10	0	3	0	2	0	34	0	3	0	5	0
16:00:00	65	0	229	0	21	0	1	0	10	0	3	0	2	0	34	0	3	0	5	0
16:15:00	71	6	275	46	27	6	1	0	12	2	3	0	2	0	36	2	5	2	5	0
16:30:00	81	10	317	42	28	1	1	0	12	0	3	0	2	0	37	1	7	2	5	0
16:45:00	85	4	366	49	31	3	2	1	13	1	3	0	3	1	37	0	8	1	5	0
17:00:00	97	12	414	48	31	0	2	0	13	0	3	0	3	0	39	2	8	0	5	0
17:15:00	110	13	460	46	33	2	2	0	14	1	3	0	3	0	41	2	8	0	5	0
17:30:00	116	6	501	41	34	1	2	0	18	4	3	0	3	0	44	3	10	2	5	0
17:45:00	126	10	548	47	35	1	2	0	18	0	3	0	3	0	44	0	10	0	5	0
18:00:00	135	9	586	38	39	4	2	0	19	1	3	0	3	0	48	4	10	0	5	0
18:15:00	139	4	626	40	40	1	2	0	20	1	3	0	3	0	50	2	10	0	5	0
18:30:00	143	4	656	30	41	1	2	0	20	0	3	0	3	0	52	2	10	0	6	1
18:45:00	149	6	676	20	41	0	2	0	20	0	3	0	3	0	53	1	10	0	6	0
19:00:00	153	4	710	34	42	1	2	0	20	0	3	0	3	0	55	2	10	0	6	0
19:15:00	153	0	710	0	42	0	2	0	20	0	3	0	3	0	55	0	10	0	6	0
19:15:15	153	0	710	0	42	0	2	0	20	0	3	0	3	0	55	0	10	0	6	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Apr-21 Site #: 2103700001

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	6	6	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	11	5	0	0	18	9	1	1	0	0	1	1	0	0	0	0	0	0	0	0
7:45:00	13	2	1	1	35	17	1	0	0	0	1	0	0	0	0	0	1	1	0	0
8:00:00	23	10	1	0	42	7	1	0	0	0	1	0	1	1	0	0	2	1	0	0
8:15:00	28	5	1	0	49	7	1	0	0	0	1	0	1	0	0	0	2	0	0	0
8:30:00	34	6	3	2	55	6	1	0	0	0	2	1	1	0	0	0	2	0	0	0
8:45:00	36	2	4	1	58	3	1	0	0	0	2	0	1	0	1	1	2	0	0	0
9:00:00	37	1	5	1	66	8	1	0	0	0	2	0	1	0	1	0	2	0	0	0
9:15:00	37	0	5	0	66	0	1	0	0	0	2	0	1	0	1	0	2	0	0	0
16:00:00	37	0	5	0	66	0	1	0	0	0	2	0	1	0	1	0	2	0	0	0
16:15:00	40	3	5	0	73	7	1	0	0	0	3	1	1	0	1	0	2	0	0	0
16:30:00	44	4	6	1	78	5	1	0	0	0	3	0	1	0	1	0	2	0	0	0
16:45:00	49	5	6	0	86	8	2	1	0	0	3	0	1	0	1	0	2	0	0	0
17:00:00	55	6	6	0	96	10	3	1	0	0	3	0	1	0	1	0	2	0	0	0
17:15:00	60	5	6	0	104	8	3	0	0	0	3	0	1	0	1	0	2	0	0	0
17:30:00	67	7	6	0	113	9	3	0	0	0	3	0	1	0	1	0	2	0	0	0
17:45:00	75	8	6	0	115	2	3	0	0	0	3	0	1	0	1	0	2	0	0	0
18:00:00	79	4	7	1	126	11	3	0	0	0	3	0	1	0	1	0	2	0	0	0
18:15:00	80	1	8	1	135	9	3	0	0	0	3	0	1	0	1	0	2	0	0	0
18:30:00	82	2	8	0	140	5	3	0	0	0	3	0	1	0	1	0	2	0	0	0
18:45:00	84	2	9	1	145	5	3	0	0	0	3	0	1	0	1	0	2	0	0	0
19:00:00	86	2	10	1	148	3	3	0	0	0	3	0	1	0	1	0	2	0	0	0
19:15:00	86	0	10	0	148	0	3	0	0	0	3	0	1	0	1	0	2	0	0	0
19:15:15	86	0	10	0	148	0	3	0	0	0	3	0	1	0	1	0	2	0	0	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

Municipality: Markdale
Site #: 2103700002
Intersection: Hwy 10 & Main St
TFR File #: 1
Count date: 22-Apr-21

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Hwy 10 runs N/S

North Leg Total:	362
North Entering:	173
North Peds:	0
Peds Cross:	⋈

Heavys	2	16	0	18
Trucks	2	7	1	10
Cars	30	100	15	145
Totals	34	123	16	

Heavys	19	
Trucks	10	
Cars	160	
Totals	189	

East Leg Total:	141
East Entering:	78
East Peds:	0
Peds Cross:	⧖

Heavys	Trucks	Cars	Totals
9	6	101	116

Hwy 10

Main St

Cars	Trucks	Heavys	Totals
15	0	0	15
33	1	0	34
28	1	0	29
76	2	0	

N
W E
S

Heavys	Trucks	Cars	Totals
1	0	22	23
2	0	21	23
4	0	44	48
7	0	87	

Main St

Cars	Trucks	Heavys	Totals
57	2	4	63

Hwy 10

Peds Cross:	⧖
West Peds:	1
West Entering:	94
West Leg Total:	210

Cars	172
Trucks	8
Heavys	20
Totals	200

Cars	38	123	21	182
Trucks	3	10	1	14
Heavys	7	18	2	27
Totals	48	151	24	

Peds Cross:	⋈
South Peds:	1
South Entering:	223
South Leg Total:	423

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 19:00:00

One Hour Peak
From: 16:00:00
To: 17:00:00

Municipality: Markdale
Site #: 2103700002
Intersection: Hwy 10 & Main St
TFR File #: 1
Count date: 22-Apr-21

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

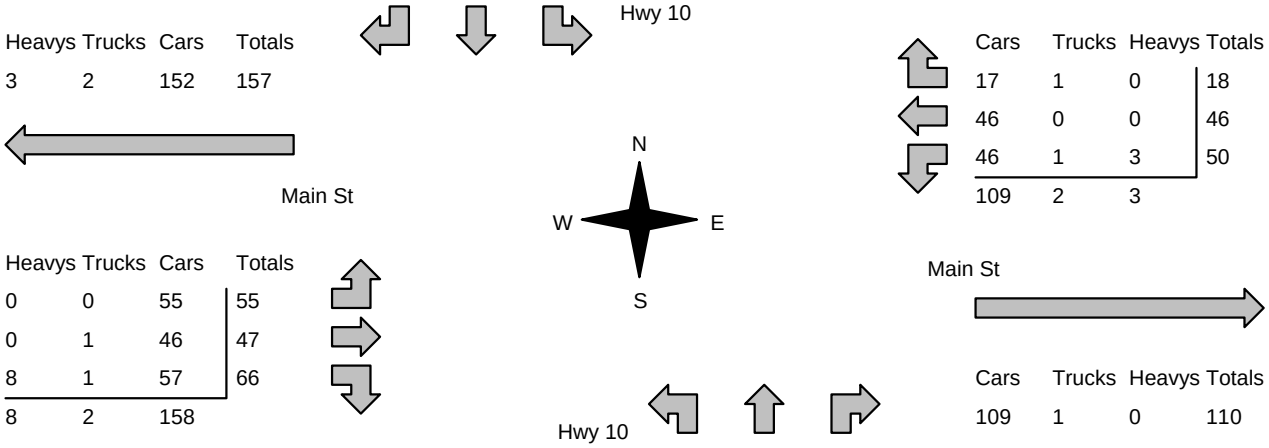
Major Road: Hwy 10 runs N/S

North Leg Total: 478
North Entering: 214
North Peds: 4
Peds Cross: ⋈

Heavys	0	9	0	9
Trucks	0	2	0	2
Cars	50	134	19	203
Totals	50	145	19	

Heavys	10
Trucks	5
Cars	249
Totals	264

East Leg Total: 224
East Entering: 114
East Peds: 10
Peds Cross: ⧖



Heavys	Trucks	Cars	Totals
3	2	152	157

Cars	Trucks	Heavys	Totals
17	1	0	18
46	0	0	46
46	1	3	50
109	2	3	

Heavys	Trucks	Cars	Totals
0	0	55	55
0	1	46	47
8	1	57	66
8	2	158	

Cars	Trucks	Heavys	Totals
109	1	0	110

Peds Cross: ⧖
West Peds: 5
West Entering: 168
West Leg Total: 325

Cars	237			
Trucks	4			
Heavys	20			
Totals	261			

Cars	56	177	44	277
Trucks	2	4	0	6
Heavys	3	10	0	13
Totals	61	191	44	

Peds Cross: ⋈
South Peds: 2
South Entering: 296
South Leg Total: 557

Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Total Count Diagram

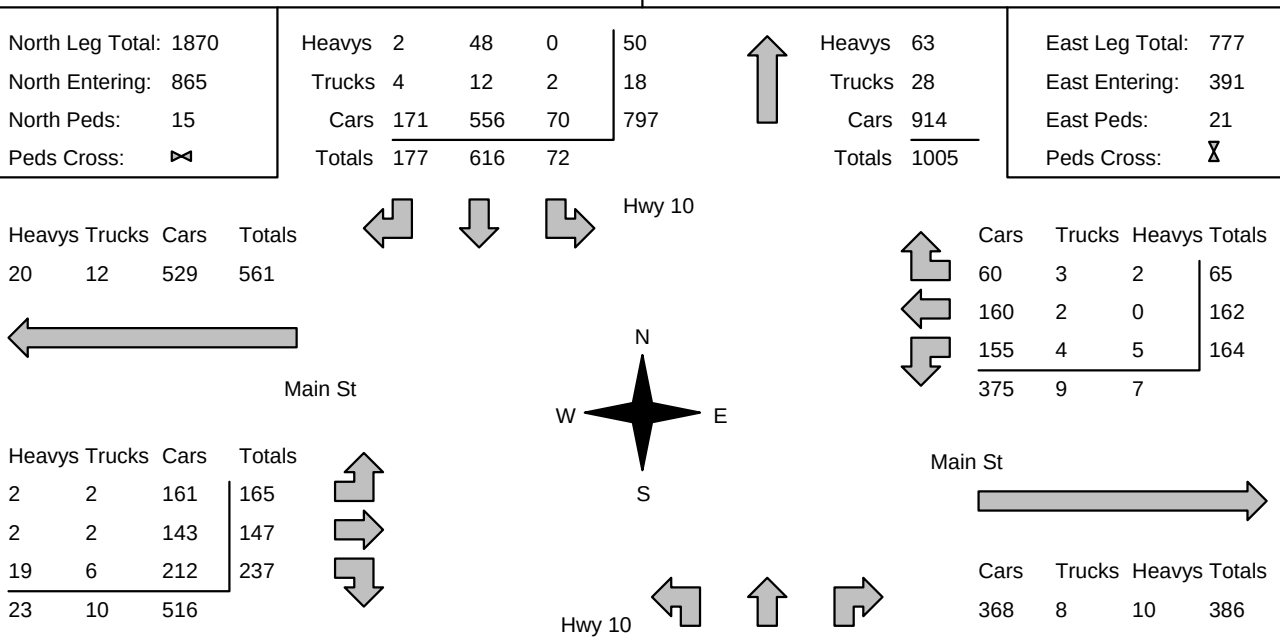
Municipality: Markdale
Site #: 2103700002
Intersection: Hwy 10 & Main St
TFR File #: 1
Count date: 22-Apr-21

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Hwy 10 runs N/S



Comments

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Traffic Count Summary

Intersection: Hwy 10 & Main St | **Count Date:** 22-Apr-21 | **Municipality:** Markdale

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	North/South Total Approaches
	Left	Thru	Right	Grand Total		
7:00:00	*0*	*0*	*0*	*0*	*0*	*0*
8:00:00	*15*	*125*	*31*	*171*	*1*	*372*
9:00:00	*9*	*103*	*23*	*135*	*1*	*365*
16:00:00	*0*	*0*	*0*	*0*	*0*	*0*
17:00:00	*19*	*145*	*50*	*214*	*4*	*510*
18:00:00	*19*	*143*	*42*	*204*	*3*	*475*
19:00:00	*10*	*100*	*31*	*141*	*6*	*307*
Totals:	72	616	177	865	15	2029

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*32*	*140*	*29*	*201*	*1*
9:00:00	*52*	*142*	*36*	*230*	*0*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*61*	*191*	*44*	*296*	*2*
18:00:00	*51*	*186*	*34*	*271*	*2*
19:00:00	*26*	*116*	*24*	*166*	*6*
S Totals:	222	775	167	1164	11

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	East/West Total Approaches
	Left	Thru	Right	Grand Total		
7:00:00	*0*	*0*	*0*	*0*	*0*	*0*
8:00:00	*31*	*28*	*14*	*73*	*0*	*166*
9:00:00	*23*	*26*	*10*	*59*	*2*	*169*
16:00:00	*0*	*0*	*0*	*0*	*0*	*0*
17:00:00	*50*	*46*	*18*	*114*	*10*	*282*
18:00:00	*34*	*47*	*14*	*95*	*3*	*201*
19:00:00	*26*	*15*	*9*	*50*	*6*	*122*
Totals:	164	162	65	391	21	940

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total	
7:00:00	*0*	*0*	*0*	*0*	*0*
8:00:00	*29*	*22*	*42*	*93*	*1*
9:00:00	*34*	*22*	*54*	*110*	*1*
16:00:00	*0*	*0*	*0*	*0*	*0*
17:00:00	*55*	*47*	*66*	*168*	*5*
18:00:00	*25*	*30*	*51*	*106*	*0*
19:00:00	*22*	*26*	*24*	*72*	*7*
W Totals:	165	147	237	549	14

Calculated Values for Traffic Crossing Major Street

Hours Ending:	*7:00*	*8:00*	*9:00*	*16:00*	*17:00*	*18:00*	*19:00*	*0:00*
Crossing Values:	*0*	*90*	*84*	*0*	*158*	*111*	*86*	*0*

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Apr-21 Site #: 2103700002

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Heavys - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	3	3	30	30	5	5	0	0	0	0	0	0	0	0	2	2	0	0	1	1
7:30:00	4	1	54	24	10	5	0	0	0	0	1	1	0	0	2	0	0	0	1	0
7:45:00	10	6	87	33	18	8	1	1	0	0	1	0	0	0	4	2	0	0	1	0
8:00:00	14	4	109	22	29	11	1	0	4	4	1	0	0	0	12	8	1	1	1	0
8:15:00	17	3	131	22	33	4	1	0	5	1	1	0	0	0	15	3	1	0	1	0
8:30:00	19	2	154	23	40	7	1	0	7	2	3	2	0	0	18	3	2	1	1	0
8:45:00	20	1	177	23	41	1	1	0	7	0	4	1	0	0	18	0	2	0	2	1
9:00:00	23	3	202	25	48	7	1	0	7	0	4	0	0	0	19	1	2	0	2	0
9:15:00	23	0	202	0	48	0	1	0	7	0	4	0	0	0	19	0	2	0	2	0
16:00:00	23	0	202	0	48	0	1	0	7	0	4	0	0	0	19	0	2	0	2	0
16:15:00	27	4	233	31	56	8	1	0	7	0	4	0	0	0	20	1	2	0	2	0
16:30:00	32	5	263	30	67	11	1	0	8	1	4	0	0	0	23	3	2	0	2	0
16:45:00	36	4	299	36	84	17	1	0	8	0	4	0	0	0	27	4	2	0	5	3
17:00:00	42	6	336	37	98	14	1	0	9	1	4	0	0	0	28	1	2	0	6	1
17:15:00	51	9	381	45	111	13	1	0	10	1	4	0	0	0	32	4	2	0	6	0
17:30:00	56	5	412	31	124	13	1	0	10	0	4	0	0	0	33	1	2	0	8	2
17:45:00	60	4	438	26	129	5	1	0	10	0	4	0	0	0	36	3	2	0	8	0
18:00:00	61	1	468	30	140	11	1	0	10	0	4	0	0	0	38	2	2	0	9	1
18:15:00	62	1	502	34	151	11	2	1	10	0	4	0	0	0	42	4	2	0	12	3
18:30:00	67	5	523	21	153	2	2	0	11	1	4	0	0	0	45	3	2	0	13	1
18:45:00	69	2	540	17	163	10	2	0	11	0	4	0	0	0	47	2	2	0	14	1
19:00:00	70	1	556	16	171	8	2	0	12	1	4	0	0	0	48	1	2	0	15	1
19:15:00	70	0	556	0	171	0	2	0	12	0	4	0	0	0	48	0	2	0	15	0
19:15:15	70	0	556	0	171	0	2	0	12	0	4	0	0	0	48	0	2	0	15	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Apr-21 Site #: 2103700002

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Heavys - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	9	9	5	5	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0
7:30:00	12	3	7	2	5	4	0	0	0	0	1	1	0	0	0	0	1	0	0	0
7:45:00	24	12	16	9	10	5	0	0	0	0	1	0	0	0	0	0	1	0	0	0
8:00:00	30	6	27	11	12	2	1	1	1	1	1	0	0	0	0	0	1	0	0	0
8:15:00	33	3	30	3	15	3	1	0	1	0	1	0	0	0	0	0	1	0	0	0
8:30:00	40	7	40	10	20	5	1	0	1	0	1	0	0	0	0	0	1	0	0	0
8:45:00	45	5	46	6	20	0	2	1	1	0	1	0	0	0	0	0	1	0	0	0
9:00:00	52	7	53	7	22	2	2	0	1	0	1	0	0	0	0	0	1	0	2	2
9:15:00	52	0	53	0	22	0	2	0	1	0	1	0	0	0	0	0	1	0	2	0
16:00:00	52	0	53	0	22	0	2	0	1	0	1	0	0	0	0	0	1	0	2	0
16:15:00	62	10	69	16	29	7	3	1	1	0	1	0	0	0	0	0	1	0	4	2
16:30:00	74	12	81	12	30	1	3	0	1	0	1	0	1	1	0	0	1	0	7	3
16:45:00	84	10	91	10	35	5	3	0	1	0	2	1	2	1	0	0	1	0	12	5
17:00:00	98	14	99	8	39	4	3	0	1	0	2	0	3	1	0	0	1	0	12	0
17:15:00	110	12	114	15	40	1	3	0	1	0	2	0	3	0	0	0	1	0	13	1
17:30:00	118	8	127	13	46	6	3	0	1	0	2	0	3	0	0	0	1	0	14	1
17:45:00	128	10	137	10	48	2	3	0	1	0	2	0	3	0	0	0	1	0	15	1
18:00:00	132	4	146	9	52	4	3	0	1	0	2	0	3	0	0	0	2	1	15	0
18:15:00	141	9	149	3	56	4	3	0	1	0	3	1	5	2	0	0	2	0	15	0
18:30:00	146	5	150	1	57	1	4	1	1	0	3	0	5	0	0	0	2	0	17	2
18:45:00	148	2	154	4	58	1	4	0	2	1	3	0	5	0	0	0	2	0	20	3
19:00:00	155	7	160	6	60	2	4	0	2	0	3	0	5	0	0	0	2	0	21	1
19:15:00	155	0	160	0	60	0	4	0	2	0	3	0	5	0	0	0	2	0	21	0
19:15:15	155	0	160	0	60	0	4	0	2	0	3	0	5	0	0	0	2	0	21	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Apr-21 Site #: 2103700002

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Heavys - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	3	3	21	21	5	5	0	0	1	1	0	0	0	0	2	2	0	0	0	0
7:30:00	11	8	49	28	16	11	0	0	2	1	0	0	1	1	9	7	1	1	0	0
7:45:00	17	6	81	32	21	5	0	0	3	1	0	0	4	3	13	4	1	0	0	0
8:00:00	27	10	116	35	27	6	0	0	5	2	0	0	5	1	19	6	2	1	1	1
8:15:00	39	12	143	27	32	5	0	0	10	5	0	0	7	2	24	5	2	0	1	0
8:30:00	49	10	172	29	37	5	3	3	12	2	1	1	8	1	27	3	3	1	1	0
8:45:00	60	11	201	29	50	13	3	0	12	0	2	1	11	3	27	0	5	2	1	0
9:00:00	68	8	237	36	58	8	3	0	13	1	2	0	13	2	32	5	5	0	1	0
9:15:00	68	0	237	0	58	0	3	0	13	0	2	0	13	0	32	0	5	0	1	0
16:00:00	68	0	237	0	58	0	3	0	13	0	2	0	13	0	32	0	5	0	1	0
16:15:00	84	16	275	38	71	13	4	1	16	3	2	0	13	0	35	3	5	0	2	1
16:30:00	100	16	319	44	80	9	4	0	17	1	2	0	16	3	38	3	5	0	2	0
16:45:00	112	12	365	46	90	10	5	1	17	0	2	0	16	0	40	2	5	0	3	1
17:00:00	124	12	414	49	102	12	5	0	17	0	2	0	16	0	42	2	5	0	3	0
17:15:00	143	19	452	38	105	3	5	0	17	0	2	0	18	2	44	2	6	1	4	1
17:30:00	151	8	495	43	116	11	5	0	21	4	3	1	18	0	49	5	7	1	5	1
17:45:00	165	14	543	48	126	10	5	0	21	0	3	0	18	0	49	0	7	0	5	0
18:00:00	173	8	584	41	133	7	5	0	22	1	3	0	18	0	53	4	7	0	5	0
18:15:00	183	10	614	30	140	7	5	0	23	1	3	0	18	0	55	2	8	1	6	1
18:30:00	189	6	645	31	147	7	5	0	23	0	3	0	18	0	56	1	8	0	7	1
18:45:00	196	7	665	20	150	3	6	1	23	0	4	1	18	0	57	1	8	0	11	4
19:00:00	198	2	693	28	155	5	6	0	23	0	4	0	18	0	59	2	8	0	11	0
19:15:00	198	0	693	0	155	0	6	0	23	0	4	0	18	0	59	0	8	0	11	0
19:15:15	198	0	693	0	155	0	6	0	23	0	4	0	18	0	59	0	8	0	11	0

Accu-Traffic Inc.
Traffic Monitoring & Data Analysis

Accu-Traffic Inc.

Count Date: 22-Apr-21 Site #: 2103700002

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Heavys - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	8	8	3	3	9	9	0	0	0	0	1	1	0	0	0	0	2	2	1	1
7:30:00	18	10	7	4	18	9	0	0	0	0	1	0	0	0	0	0	2	0	1	0
7:45:00	22	4	11	4	30	12	0	0	0	0	1	0	0	0	1	1	2	0	1	0
8:00:00	28	6	20	9	37	7	0	0	0	0	1	0	1	1	2	1	4	2	1	0
8:15:00	34	6	26	6	50	13	0	0	0	0	1	0	1	0	2	0	4	0	1	0
8:30:00	40	6	28	2	62	12	0	0	0	0	1	0	1	0	2	0	6	2	2	1
8:45:00	51	11	35	7	71	9	1	1	0	0	2	1	2	1	2	0	9	3	2	0
9:00:00	59	8	42	7	80	9	2	1	0	0	5	3	2	0	2	0	11	2	2	0
9:15:00	59	0	42	0	80	0	2	0	0	0	5	0	2	0	2	0	11	0	2	0
16:00:00	59	0	42	0	80	0	2	0	0	0	5	0	2	0	2	0	11	0	2	0
16:15:00	73	14	57	15	101	21	2	0	0	0	5	0	2	0	2	0	14	3	3	1
16:30:00	80	7	65	8	115	14	2	0	1	1	5	0	2	0	2	0	15	1	4	1
16:45:00	99	19	78	13	133	18	2	0	1	0	5	0	2	0	2	0	18	3	5	1
17:00:00	114	15	88	10	137	4	2	0	1	0	6	1	2	0	2	0	19	1	7	2
17:15:00	123	9	97	9	156	19	2	0	2	1	6	0	2	0	2	0	19	0	7	0
17:30:00	128	5	107	10	174	18	2	0	2	0	6	0	2	0	2	0	19	0	7	0
17:45:00	133	5	112	5	181	7	2	0	2	0	6	0	2	0	2	0	19	0	7	0
18:00:00	139	6	117	5	188	7	2	0	2	0	6	0	2	0	2	0	19	0	7	0
18:15:00	148	9	127	10	193	5	2	0	2	0	6	0	2	0	2	0	19	0	10	3
18:30:00	150	2	131	4	199	6	2	0	2	0	6	0	2	0	2	0	19	0	11	1
18:45:00	158	8	135	4	206	7	2	0	2	0	6	0	2	0	2	0	19	0	14	3
19:00:00	161	3	143	8	212	6	2	0	2	0	6	0	2	0	2	0	19	0	14	0
19:15:00	161	0	143	0	212	0	2	0	2	0	6	0	2	0	2	0	19	0	14	0
19:15:15	161	0	143	0	212	0	2	0	2	0	6	0	2	0	2	0	19	0	14	0

Toronto Street (Hwy 10) & Main Street

Morning Peak Diagram

Specified Period
From: 6:00:00
To: 10:00:00

One Hour Peak
From: 8:15:00
To: 9:15:00

Municipality: Markdale
Site #: 0000007301
Intersection: Toronto Street (Hwy 10) & Main Stre
TFR File #: 1
Count date: 5-Oct-2016

Weather conditions:
Clear
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Toronto Street (Hwy 10) runs N/S

North Leg Total:	542
North Entering:	303
North Peds:	12
Peds Cross:	⋈

Heavys	0	9	1	10
Trucks	0	14	1	15
Cars	54	193	31	278
Totals	54	216	33	

Heavys	12
Trucks	10
Cars	217
Totals	239

East Leg Total:	241
East Entering:	125
East Peds:	2
Peds Cross:	⧖

Toronto Street (Hwy 10)

Heavys	Trucks	Cars	Totals
5	1	125	131

Cars	Trucks	Heavys	Totals
33	0	0	33
47	0	3	50
36	1	5	42
116	1	8	

Main Street

N
W E
S

Heavys	Trucks	Cars	Totals
1	1	48	50
5	1	58	64
1	6	49	56
7	8	155	

Main Street

Cars	Trucks	Heavys	Totals
105	2	9	116

Toronto Street (Hwy 10)

Peds Cross:	⧖
West Peds:	7
West Entering:	170
West Leg Total:	301

Cars	278			
Trucks	21			
Heavys	15			
Totals	314			

Cars	24	136	16	176
Trucks	1	9	0	10
Heavys	2	11	3	16
Totals	27	156	19	

Peds Cross:	⋈
South Peds:	16
South Entering:	202
South Leg Total:	516

Comments

Toronto Street (Hwy 10) & Main Street

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 19:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Markdale
Site #: 0000007301
Intersection: Toronto Street (Hwy 10) & Main Stre
TFR File #: 1
Count date: 5-Oct-2016

Weather conditions:
Clear
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Toronto Street (Hwy 10) runs N/S

North Leg Total:	672			
North Entering:	320			
North Peds:	13			
Peds Cross:	⋈			
Heavys	0	14	0	14
Trucks	2	6	0	8
Cars	78	188	32	298
Totals	80	208	32	
Heavys	5			
Trucks	8			
Cars	339			
Totals	352			
East Leg Total:	280			
East Entering:	152			
East Peds:	9			
Peds Cross:	⧖			

Toronto Street (Hwy 10)

Heavys	Trucks	Cars	Totals
2	5	208	215

Cars	Trucks	Heavys	Totals
42	1	0	43
73	1	1	75
34	0	0	34
149	2	1	

Main Street

N
W E
S

Heavys	Trucks	Cars	Totals
0	1	62	63
0	1	65	66
2	0	51	53
2	2	178	

Main Street

Cars	Trucks	Heavys	Totals
127	1	0	128

Toronto Street (Hwy 10)

Peds Cross:	⧖			
West Peds:	8			
West Entering:	182			
West Leg Total:	397			
Cars	273			
Trucks	6			
Heavys	16			
Totals	295			
Cars	57	235	30	322
Trucks	2	6	0	8
Heavys	1	5	0	6
Totals	60	246	30	
Peds Cross:	⋈			
South Peds:	18			
South Entering:	336			
South Leg Total:	631			

Comments

Toronto Street (Hwy 10) & Main Street

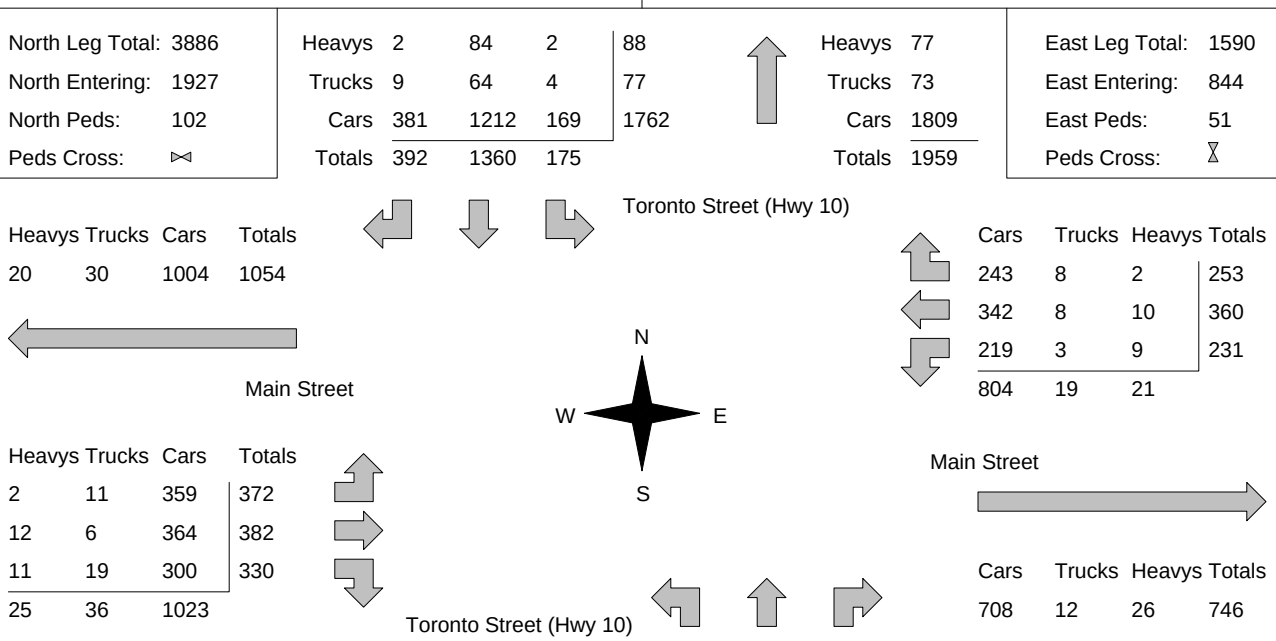
Total Count Diagram

Municipality: Markdale
Site #: 0000007301
Intersection: Toronto Street (Hwy 10) & Main Stre
TFR File #: 1
Count date: 5-Oct-2016

Weather conditions:
Clear
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Toronto Street (Hwy 10) runs N/S



Comments

Toronto Street (Hwy 10) & Main Street
Traffic Count Summary

Intersection: Toronto Street (Hwy 10) & Main St | **Count Date:** 5-Oct-2016 | **Municipality:** Markdale

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
6:00:00	0	0	0	0	0	0
7:00:00	5	117	36	158	1	247
8:00:00	27	132	40	199	4	375
9:00:00	33	219	45	297	10	490
10:00:00	19	172	51	242	14	484
15:00:00	0	0	0	0	0	0
16:00:00	28	208	58	294	24	593
17:00:00	25	214	59	298	23	619
18:00:00	24	162	64	250	16	558
19:00:00	14	136	39	189	10	386
Totals:	175	1360	392	1927	102	3752

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
6:00:00	0	0	0	0	0
7:00:00	19	64	6	89	0
8:00:00	28	134	14	176	2
9:00:00	30	147	16	193	15
10:00:00	37	170	35	242	24
15:00:00	0	0	0	0	0
16:00:00	60	209	30	299	46
17:00:00	48	251	22	321	16
18:00:00	59	214	35	308	15
19:00:00	21	145	31	197	7
Totals:	302	1334	189	1825	125

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
6:00:00	0	0	0	0	0	0
7:00:00	6	13	17	36	1	98
8:00:00	13	26	29	68	2	181
9:00:00	44	51	33	128	3	296
10:00:00	29	44	27	100	2	218
15:00:00	0	0	0	0	0	0
16:00:00	45	64	39	148	16	320
17:00:00	31	54	44	129	13	302
18:00:00	37	70	45	152	9	329
19:00:00	26	38	19	83	5	184
Totals:	231	360	253	844	51	1928

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
6:00:00	0	0	0	0	0
7:00:00	29	15	18	62	4
8:00:00	54	32	27	113	2
9:00:00	52	63	53	168	8
10:00:00	39	45	34	118	11
15:00:00	0	0	0	0	0
16:00:00	55	59	58	172	21
17:00:00	60	55	58	173	9
18:00:00	58	67	52	177	10
19:00:00	25	46	30	101	5
Totals:	372	382	330	1084	70

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	10:00	16:00	17:00	18:00	19:00
Crossing Values:	51	105	184	151	234	185	196	114

Toronto Street (Hwy 10) & Victoria Street

Morning Peak Diagram

Specified Period
From: 6:00:00
To: 10:00:00

One Hour Peak
From: 8:15:00
To: 9:15:00

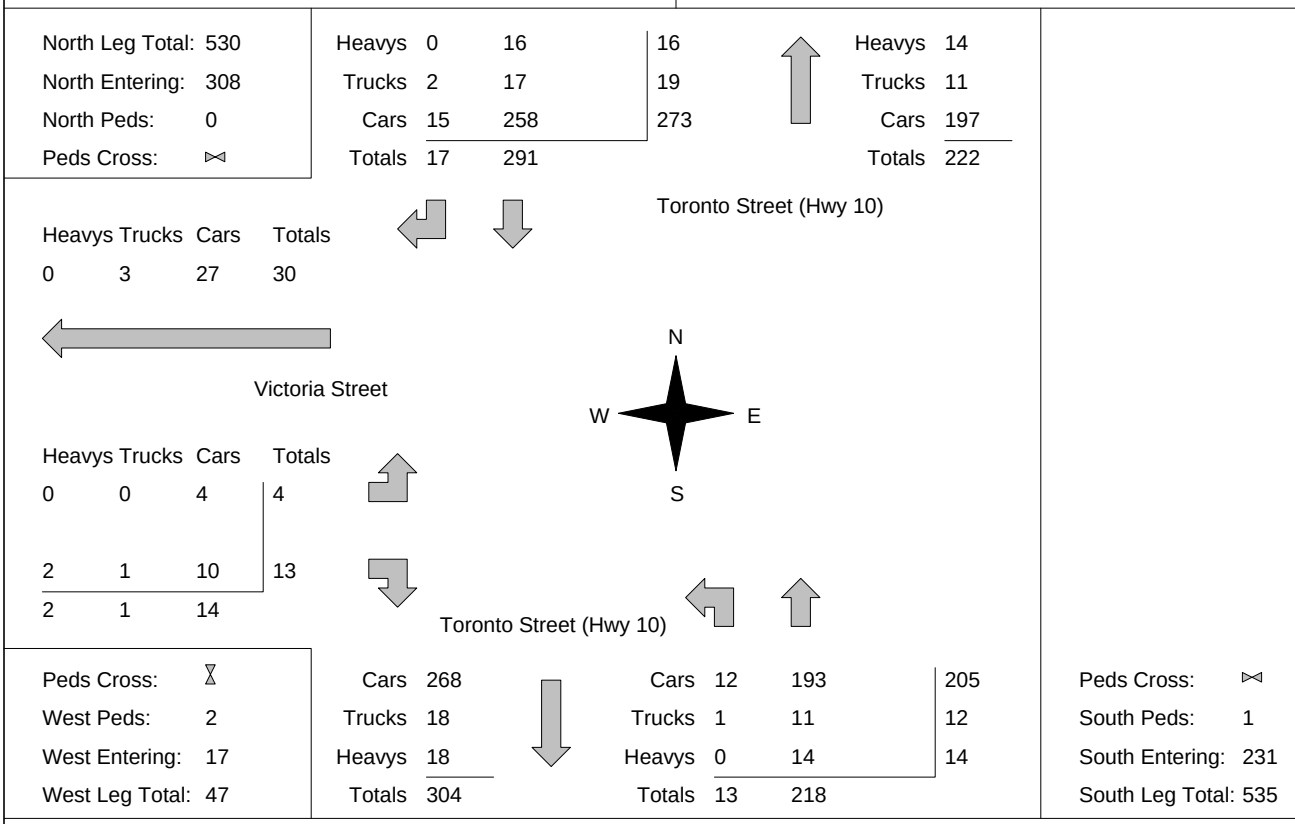
Municipality: Markdale
Site #: 0000007302
Intersection: Toronto Street (Hwy 10) & Victoria S
TFR File #: 1
Count date: 5-Oct-2016

Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Toronto Street (Hwy 10) runs N/S



Comments

Toronto Street (Hwy 10) & Victoria Street

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 19:00:00

One Hour Peak
From: 15:15:00
To: 16:15:00

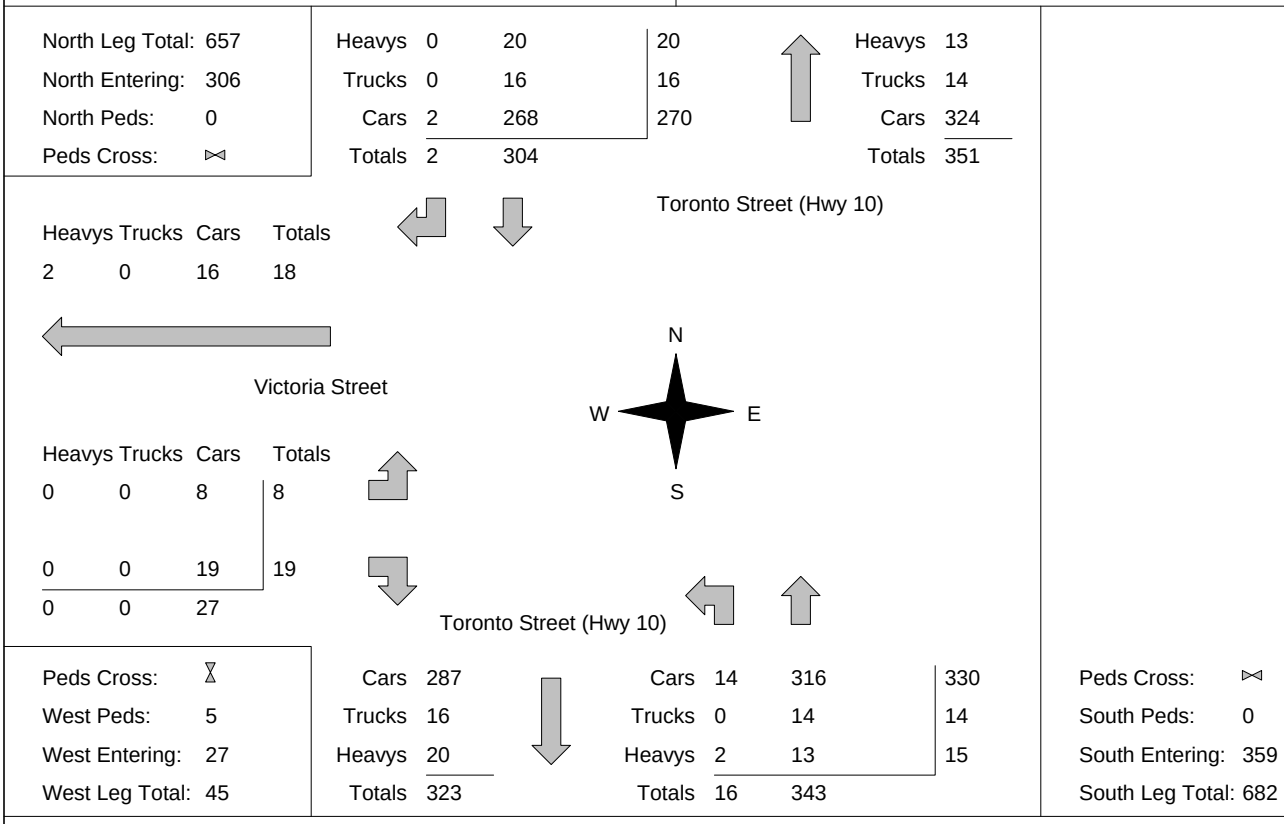
Municipality: Markdale
Site #: 0000007302
Intersection: Toronto Street (Hwy 10) & Victoria S
TFR File #: 1
Count date: 5-Oct-2016

Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Toronto Street (Hwy 10) runs N/S



Comments

Toronto Street (Hwy 10) & Victoria Street

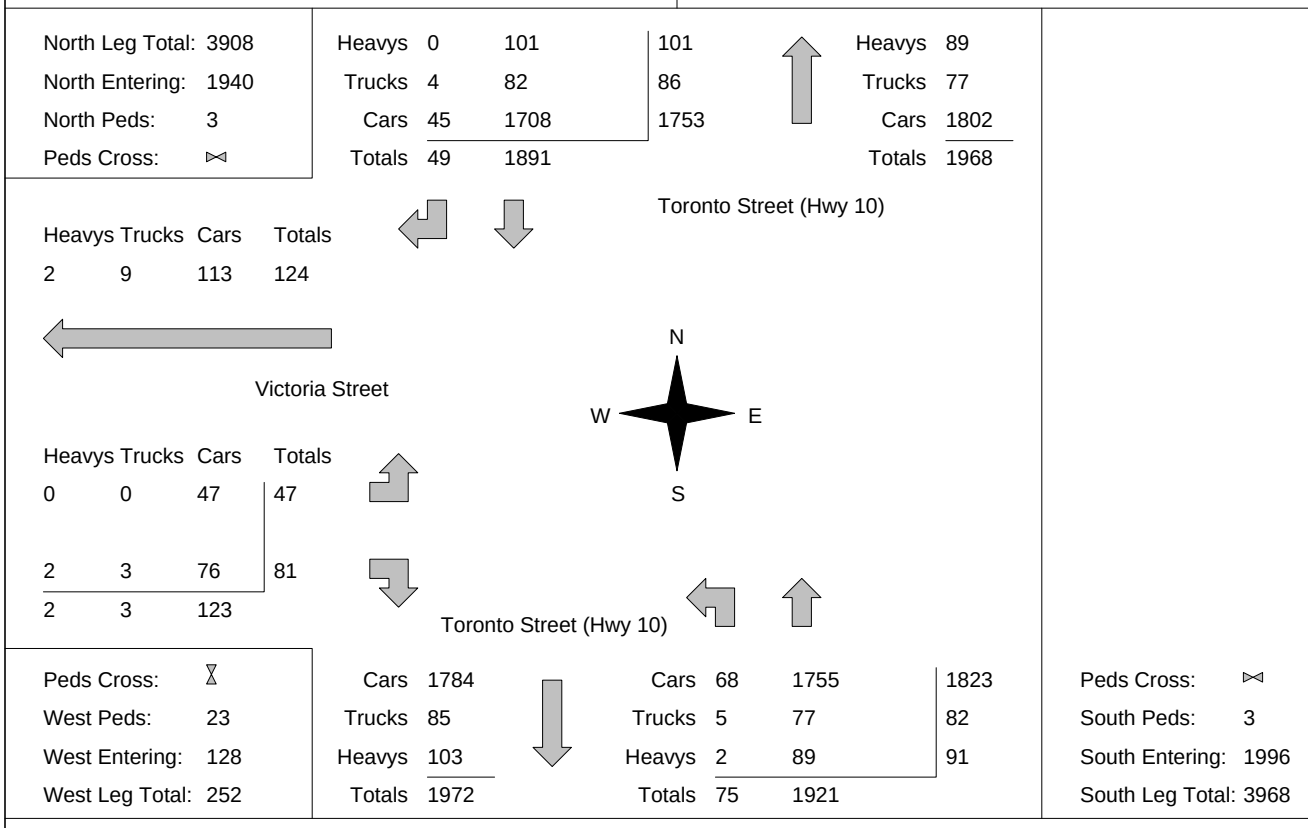
Total Count Diagram

Municipality: Markdale
Site #: 0000007302
Intersection: Toronto Street (Hwy 10) & Victoria S
TFR File #: 1
Count date: 5-Oct-2016

Weather conditions: Clear
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Toronto Street (Hwy 10) runs N/S



Comments

Toronto Street (Hwy 10) & Victoria Street
Traffic Count Summary

Intersection: Toronto Street (Hwy 10) & Victoria | **Count Date:** 5-Oct-2016 | **Municipality:** Markdale

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
6:00:00	0	0	0	0	0	0
7:00:00	0	144	1	145	0	243
8:00:00	0	174	5	179	0	371
9:00:00	0	292	16	308	1	525
10:00:00	0	235	11	246	0	510
15:00:00	0	0	0	0	0	0
16:00:00	0	318	3	321	0	671
17:00:00	0	298	5	303	0	640
18:00:00	0	249	5	254	0	580
19:00:00	0	181	3	184	2	396
Totals:	0	1891	49	1940	3	3936

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
6:00:00	0	0	0	0	0
7:00:00	2	96	0	98	0
8:00:00	7	185	0	192	1
9:00:00	11	206	0	217	1
10:00:00	10	254	0	264	1
15:00:00	0	0	0	0	0
16:00:00	22	328	0	350	0
17:00:00	7	330	0	337	0
18:00:00	9	317	0	326	0
19:00:00	7	205	0	212	0
Totals:	75	1921	0	1996	3

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
6:00:00	0	0	0	0	0	0
7:00:00	0	0	0	0	0	6
8:00:00	0	0	0	0	0	9
9:00:00	0	0	0	0	0	12
10:00:00	0	0	0	0	0	24
15:00:00	0	0	0	0	0	0
16:00:00	0	0	0	0	0	20
17:00:00	0	0	0	0	0	30
18:00:00	0	0	0	0	0	17
19:00:00	0	0	0	0	0	10
Totals:	0	0	0	0	0	128

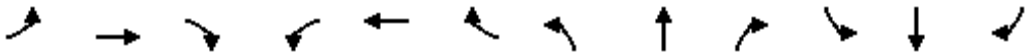
West Approach Totals

Hour Ending	Includes Cars, Trucks, & Heavys: Left	Thru	Right	Grand Total	Total Peds
6:00:00	0	0	0	0	0
7:00:00	0	0	6	6	0
8:00:00	4	0	5	9	4
9:00:00	1	0	11	12	2
10:00:00	13	0	11	24	1
15:00:00	0	0	0	0	0
16:00:00	7	0	13	20	3
17:00:00	13	0	17	30	4
18:00:00	7	0	10	17	8
19:00:00	2	0	8	10	1
Totals:	47	0	81	128	23

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	10:00	16:00	17:00	18:00	19:00
Crossing Values:	0	5	3	14	7	13	7	4

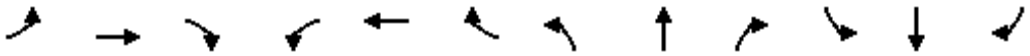
Appendix D –
Synchro Analysis Output –
Existing Traffic Volumes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	1	61	6	1	4	51	259	13	3	351	29
Future Volume (Veh/h)	29	1	61	6	1	4	51	259	13	3	351	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	32	1	68	7	1	4	57	288	14	3	390	32
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)											402	
pX, platoon unblocked												
vC, conflicting volume	826	828	406	890	837	295	422			302		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	826	828	406	890	837	295	422			302		
tC, single (s)	7.2	6.5	6.3	7.3	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.7	4.0	3.3	2.3			2.2		
p0 queue free %	88	100	89	97	100	99	95			100		
cM capacity (veh/h)	271	292	634	212	289	749	1111			1270		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	101	12	359	425
Volume Left	32	7	57	3
Volume Right	68	4	14	32
cSH	441	287	1111	1270
Volume to Capacity	0.23	0.04	0.05	0.00
Queue Length 95th (m)	6.6	1.0	1.2	0.1
Control Delay (s)	15.6	18.1	1.8	0.1
Lane LOS	C	C	A	A
Approach Delay (s)	15.6	18.1	1.8	0.1
Approach LOS	C	C		

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	53.4%	ICU Level of Service	A	
Analysis Period (min)	15			

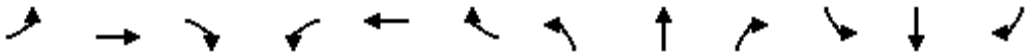


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	45	12	1	4	45	391	9	3	347	21
Future Volume (Veh/h)	30	0	45	12	1	4	45	391	9	3	347	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	33	0	49	13	1	4	49	430	10	3	381	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	936	936	392	980	943	435	404			440		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	936	936	392	980	943	435	404			440		
tC, single (s)	7.2	6.5	6.2	7.5	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.9	4.0	3.3	2.2			2.2		
p0 queue free %	86	100	93	92	100	99	96			100		
cM capacity (veh/h)	229	255	661	173	253	625	1139			1131		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	82	18	489	407
Volume Left	33	13	49	3
Volume Right	49	4	10	23
cSH	375	211	1139	1131
Volume to Capacity	0.22	0.09	0.04	0.00
Queue Length 95th (m)	6.2	2.1	1.0	0.1
Control Delay (s)	17.2	23.7	1.3	0.1
Lane LOS	C	C	A	A
Approach Delay (s)	17.2	23.7	1.3	0.1
Approach LOS	C	C		

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	57.8%	ICU Level of Service	B	
Analysis Period (min)	15			

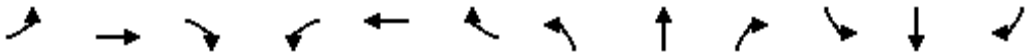
Appendix E –
Synchro Analysis Output –
Background Traffic Volumes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	1	61	28	1	21	51	394	19	9	482	29
Future Volume (Veh/h)	29	1	61	28	1	21	51	394	19	9	482	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	32	1	68	31	1	23	57	438	21	10	536	32
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1158	1145	552	1203	1150	448	568			459		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1158	1145	552	1203	1150	448	568			459		
tC, single (s)	7.2	6.5	6.3	7.3	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.7	4.0	3.3	2.3			2.2		
p0 queue free %	79	99	87	75	99	96	94			99		
cM capacity (veh/h)	153	188	524	124	186	615	980			1113		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	101	55	516	578
Volume Left	32	31	57	10
Volume Right	68	23	21	32
cSH	294	187	980	1113
Volume to Capacity	0.34	0.29	0.06	0.01
Queue Length 95th (m)	11.3	8.8	1.4	0.2
Control Delay (s)	23.6	32.0	1.6	0.3
Lane LOS	C	D	A	A
Approach Delay (s)	23.6	32.0	1.6	0.3
Approach LOS	C	D		

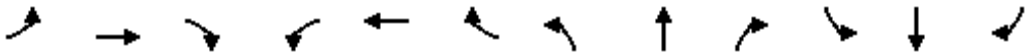
Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	63.6%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	45	24	1	16	45	544	29	21	509	21
Future Volume (Veh/h)	30	0	45	24	1	16	45	544	29	21	509	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	33	0	49	26	1	18	49	598	32	23	559	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1347	1344	570	1378	1340	614	582			630		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1347	1344	570	1378	1340	614	582			630		
tC, single (s)	7.2	6.5	6.2	7.5	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.9	4.0	3.3	2.2			2.2		
p0 queue free %	71	100	91	70	99	96	95			98		
cM capacity (veh/h)	113	142	524	86	143	496	978			962		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	82	45	679	605
Volume Left	33	26	49	23
Volume Right	49	18	32	23
cSH	212	130	978	962
Volume to Capacity	0.39	0.35	0.05	0.02
Queue Length 95th (m)	13.0	10.7	1.2	0.6
Control Delay (s)	32.3	46.7	1.3	0.6
Lane LOS	D	E	A	A
Approach Delay (s)	32.3	46.7	1.3	0.6
Approach LOS	D	E		

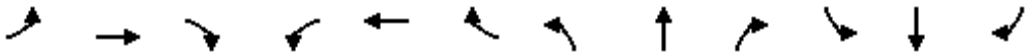
Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	60.0%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	1	61	28	1	21	51	424	19	9	522	29
Future Volume (Veh/h)	29	1	61	28	1	21	51	424	19	9	522	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	32	1	68	31	1	23	57	471	21	10	580	32
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1235	1222	596	1280	1228	482	612			492		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1235	1222	596	1280	1228	482	612			492		
tC, single (s)	7.2	6.5	6.3	7.3	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.7	4.0	3.3	2.3			2.2		
p0 queue free %	76	99	86	71	99	96	94			99		
cM capacity (veh/h)	135	169	494	108	167	589	943			1082		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	101	55	549	622
Volume Left	32	31	57	10
Volume Right	68	23	21	32
cSH	265	166	943	1082
Volume to Capacity	0.38	0.33	0.06	0.01
Queue Length 95th (m)	12.9	10.3	1.5	0.2
Control Delay (s)	26.7	37.2	1.6	0.3
Lane LOS	D	E	A	A
Approach Delay (s)	26.7	37.2	1.6	0.3
Approach LOS	D	E		

Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	65.7%	ICU Level of Service	C	
Analysis Period (min)	15			

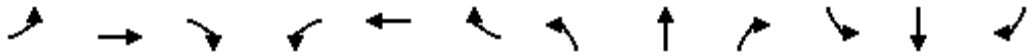


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	45	24	1	16	45	589	29	21	549	21
Future Volume (Veh/h)	30	0	45	24	1	16	45	589	29	21	549	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	33	0	49	26	1	18	49	647	32	23	603	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1440	1438	614	1470	1433	663	626			679		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1440	1438	614	1470	1433	663	626			679		
tC, single (s)	7.2	6.5	6.2	7.5	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.9	4.0	3.3	2.2			2.2		
p0 queue free %	66	100	90	64	99	96	95			98		
cM capacity (veh/h)	96	124	495	73	125	465	941			923		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	82	45	728	649
Volume Left	33	26	49	23
Volume Right	49	18	32	23
cSH	186	111	941	923
Volume to Capacity	0.44	0.40	0.05	0.02
Queue Length 95th (m)	15.5	12.8	1.3	0.6
Control Delay (s)	38.8	57.7	1.3	0.7
Lane LOS	E	F	A	A
Approach Delay (s)	38.8	57.7	1.3	0.7
Approach LOS	E	F		

Intersection Summary				
Average Delay	4.8			
Intersection Capacity Utilization	62.9%	ICU Level of Service	B	
Analysis Period (min)	15			

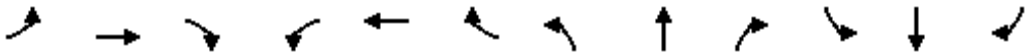
Appendix F –
Synchro Analysis Output –
Total Traffic Volumes



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	1	61	47	1	36	51	394	25	15	482	29
Future Volume (Veh/h)	29	1	61	47	1	36	51	394	25	15	482	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	32	1	68	52	1	40	57	438	28	17	536	32
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1192	1166	552	1220	1168	452	568			466		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1192	1166	552	1220	1168	452	568			466		
tC, single (s)	7.2	6.5	6.3	7.3	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.7	4.0	3.3	2.3			2.2		
p0 queue free %	77	99	87	57	99	93	94			98		
cM capacity (veh/h)	140	181	524	120	181	612	980			1106		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	101	93	523	585
Volume Left	32	52	57	17
Volume Right	68	40	28	32
cSH	278	184	980	1106
Volume to Capacity	0.36	0.51	0.06	0.02
Queue Length 95th (m)	12.2	19.1	1.4	0.4
Control Delay (s)	25.2	43.1	1.6	0.4
Lane LOS	D	E	A	A
Approach Delay (s)	25.2	43.1	1.6	0.4
Approach LOS	D	E		

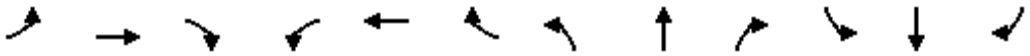
Intersection Summary				
Average Delay	5.9			
Intersection Capacity Utilization	61.7%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	45	36	1	27	45	544	49	39	509	21
Future Volume (Veh/h)	30	0	45	36	1	27	45	544	49	39	509	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	33	0	49	40	1	30	49	598	54	43	559	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1410	1406	570	1428	1391	625	582			652		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1410	1406	570	1428	1391	625	582			652		
tC, single (s)	7.2	6.5	6.2	7.5	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.9	4.0	3.3	2.2			2.2		
p0 queue free %	66	100	91	48	99	94	95			95		
cM capacity (veh/h)	97	127	524	77	130	488	978			944		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	82	71	701	625
Volume Left	33	40	49	43
Volume Right	49	30	54	23
cSH	190	121	978	944
Volume to Capacity	0.43	0.59	0.05	0.05
Queue Length 95th (m)	15.1	22.0	1.2	1.1
Control Delay (s)	37.7	70.0	1.3	1.2
Lane LOS	E	F	A	A
Approach Delay (s)	37.7	70.0	1.3	1.2
Approach LOS	E	F		

Intersection Summary				
Average Delay	6.6			
Intersection Capacity Utilization	56.7%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	1	61	59	1	34	51	441	27	15	584	29
Future Volume (Veh/h)	29	1	61	59	1	34	51	441	27	15	584	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	32	1	68	66	1	38	57	490	30	17	649	32
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1356	1333	665	1386	1334	505	681			520		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1356	1333	665	1386	1334	505	681			520		
tC, single (s)	7.2	6.5	6.3	7.3	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.7	4.0	3.3	2.3			2.2		
p0 queue free %	70	99	85	26	99	93	94			98		
cM capacity (veh/h)	107	143	451	89	143	571	889			1056		

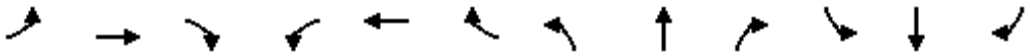
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	101	105	577	698
Volume Left	32	66	57	17
Volume Right	68	38	30	32
cSH	221	128	889	1056
Volume to Capacity	0.46	0.82	0.06	0.02
Queue Length 95th (m)	16.7	37.9	1.6	0.4
Control Delay (s)	34.3	101.7	1.7	0.4
Lane LOS	D	F	A	A
Approach Delay (s)	34.3	101.7	1.7	0.4
Approach LOS	D	F		

Intersection Summary				
Average Delay	10.4			
Intersection Capacity Utilization	67.5%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	62	53	494	17	22	573
Future Volume (Veh/h)	62	53	494	17	22	573
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	69	59	549	19	24	637
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1244	558			568	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1244	558			568	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	63	89			98	
cM capacity (veh/h)	188	529			1004	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	128	568	661
Volume Left	69	0	24
Volume Right	59	19	0
cSH	267	1700	1004
Volume to Capacity	0.48	0.33	0.02
Queue Length 95th (m)	18.4	0.0	0.6
Control Delay (s)	30.2	0.0	0.6
Lane LOS	D		A
Approach Delay (s)	30.2	0.0	0.6
Approach LOS	D		

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	45	42	1	26	45	652	60	37	586	21
Future Volume (Veh/h)	30	0	45	42	1	26	45	652	60	37	586	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	33	0	49	46	1	29	49	716	66	41	644	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1614	1618	656	1634	1596	749	667			782		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1614	1618	656	1634	1596	749	667			782		
tC, single (s)	7.2	6.5	6.2	7.5	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.9	4.0	3.3	2.2			2.2		
p0 queue free %	52	100	90	15	99	93	95			95		
cM capacity (veh/h)	69	94	469	54	97	415	909			845		

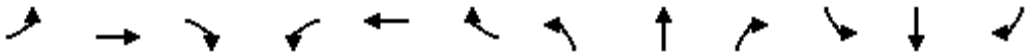
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	82	76	831	708
Volume Left	33	46	49	41
Volume Right	49	29	66	23
cSH	141	81	909	845
Volume to Capacity	0.58	0.94	0.05	0.05
Queue Length 95th (m)	22.7	38.1	1.3	1.2
Control Delay (s)	61.4	172.0	1.4	1.3
Lane LOS	F	F	A	A
Approach Delay (s)	61.4	172.0	1.4	1.3
Approach LOS	F	F		

Intersection Summary				
Average Delay	11.9			
Intersection Capacity Utilization	65.1%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	37	41	652	63	62	612
Future Volume (Veh/h)	37	41	652	63	62	612
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	41	46	724	70	69	680
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1577	759			794	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1577	759			794	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	63	89			92	
cM capacity (veh/h)	110	406			827	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	87	794	69	680
Volume Left	41	0	69	0
Volume Right	46	70	0	0
cSH	180	1700	827	1700
Volume to Capacity	0.48	0.47	0.08	0.40
Queue Length 95th (m)	17.8	0.0	2.1	0.0
Control Delay (s)	42.5	0.0	9.7	0.0
Lane LOS	E		A	
Approach Delay (s)	42.5	0.0	0.9	
Approach LOS	E			

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	1	61	29	1	34	51	441	27	15	614	29
Future Volume (Veh/h)	29	1	61	29	1	34	51	441	27	15	614	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	32	1	68	32	1	38	57	490	30	17	682	32
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1390	1366	698	1420	1367	505	714			520		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1390	1366	698	1420	1367	505	714			520		
tC, single (s)	7.2	6.5	6.3	7.3	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.4	3.7	4.0	3.3	2.3			2.2		
p0 queue free %	68	99	84	62	99	93	93			98		
cM capacity (veh/h)	101	136	432	83	136	571	863			1056		

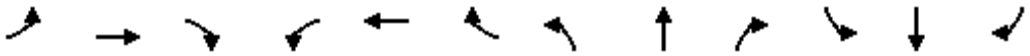
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	101	71	577	731
Volume Left	32	32	57	17
Volume Right	68	38	30	32
cSH	210	155	863	1056
Volume to Capacity	0.48	0.46	0.07	0.02
Queue Length 95th (m)	18.0	16.1	1.6	0.4
Control Delay (s)	37.1	46.6	1.7	0.4
Lane LOS	E	E	A	A
Approach Delay (s)	37.1	46.6	1.7	0.4
Approach LOS	E	E		

Intersection Summary				
Average Delay	5.7			
Intersection Capacity Utilization	64.2%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	92	53	494	17	22	573
Future Volume (Veh/h)	92	53	494	17	22	573
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	102	59	549	19	24	637
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1244	558			568	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1244	558			568	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	46	89			98	
cM capacity (veh/h)	188	529			1004	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	161	568	661
Volume Left	102	0	24
Volume Right	59	19	0
cSH	246	1700	1004
Volume to Capacity	0.65	0.33	0.02
Queue Length 95th (m)	31.2	0.0	0.6
Control Delay (s)	43.6	0.0	0.6
Lane LOS	E		A
Approach Delay (s)	43.6	0.0	0.6
Approach LOS	E		

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	0	45	19	1	26	45	652	60	37	609	21
Future Volume (Veh/h)	30	0	45	19	1	26	45	652	60	37	609	21
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	33	0	49	21	1	29	49	716	66	41	669	23
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1639	1642	680	1658	1621	749	692			782		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1639	1642	680	1658	1621	749	692			782		
tC, single (s)	7.2	6.5	6.2	7.5	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.9	4.0	3.3	2.2			2.2		
p0 queue free %	50	100	89	59	99	93	94			95		
cM capacity (veh/h)	66	91	454	51	94	415	889			845		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	82	51	831	733
Volume Left	33	21	49	41
Volume Right	49	29	66	23
cSH	135	104	889	845
Volume to Capacity	0.61	0.49	0.06	0.05
Queue Length 95th (m)	23.9	16.5	1.3	1.2
Control Delay (s)	66.1	69.0	1.4	1.3
Lane LOS	F	F	A	A
Approach Delay (s)	66.1	69.0	1.4	1.3
Approach LOS	F	F		

Intersection Summary				
Average Delay	6.5			
Intersection Capacity Utilization	64.8%	ICU Level of Service	C	
Analysis Period (min)	15			

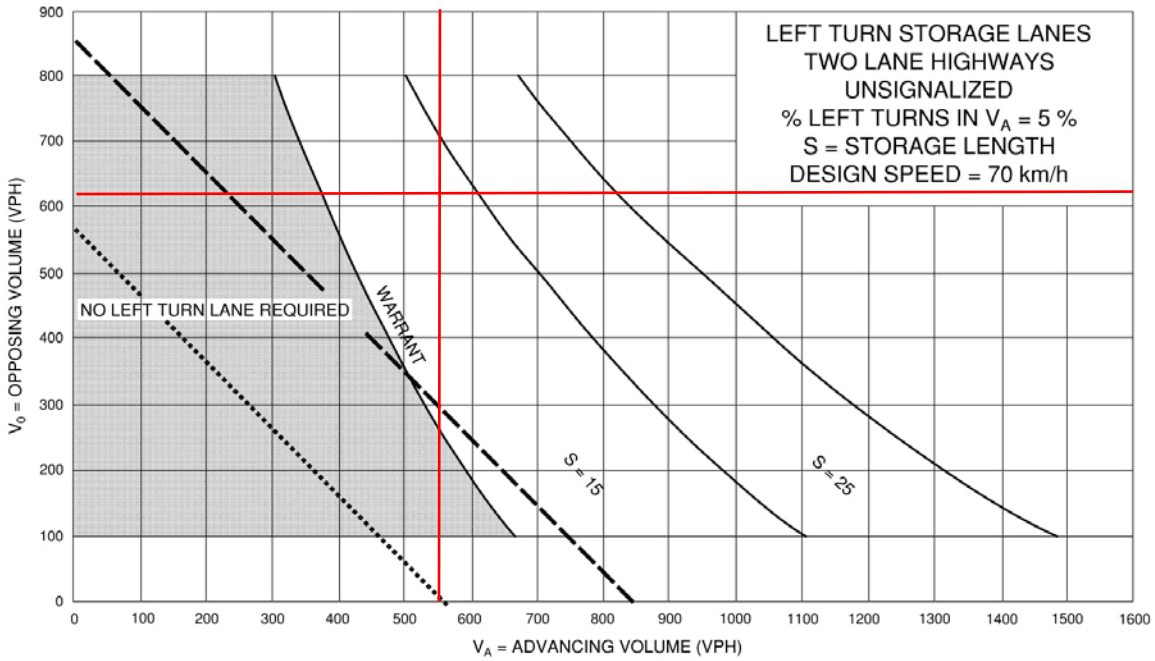
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	60	41	652	63	62	612
Future Volume (Veh/h)	60	41	652	63	62	612
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	67	46	724	70	69	680
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1577	759			794	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1577	759			794	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	39	89			92	
cM capacity (veh/h)	110	406			827	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	113	794	69	680
Volume Left	67	0	69	0
Volume Right	46	70	0	0
cSH	157	1700	827	1700
Volume to Capacity	0.72	0.47	0.08	0.40
Queue Length 95th (m)	32.8	0.0	2.1	0.0
Control Delay (s)	71.6	0.0	9.7	0.0
Lane LOS	F		A	
Approach Delay (s)	71.6	0.0	0.9	
Approach LOS	F			

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

Appendix G –
MTO Left Turn Warrant Analysis

Exhibit 9A-10



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

Commercial Driveway & Fairway Heights / Toronto St
Existing 2021 - Northbound
PM Peak Hour (Critical Scenario)

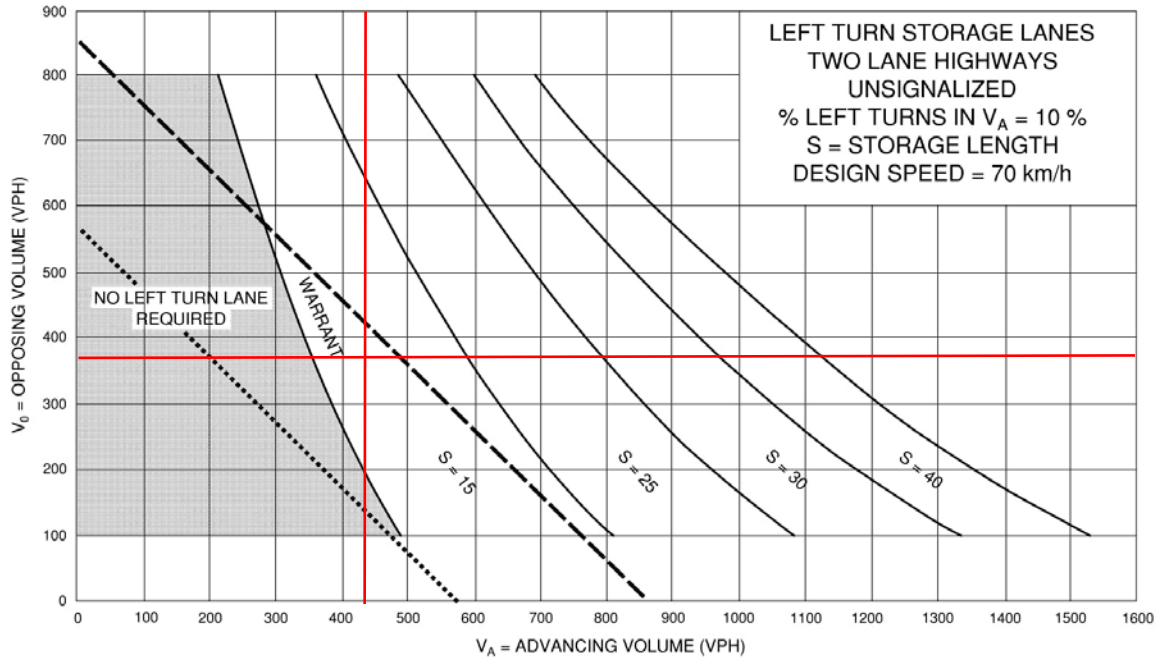
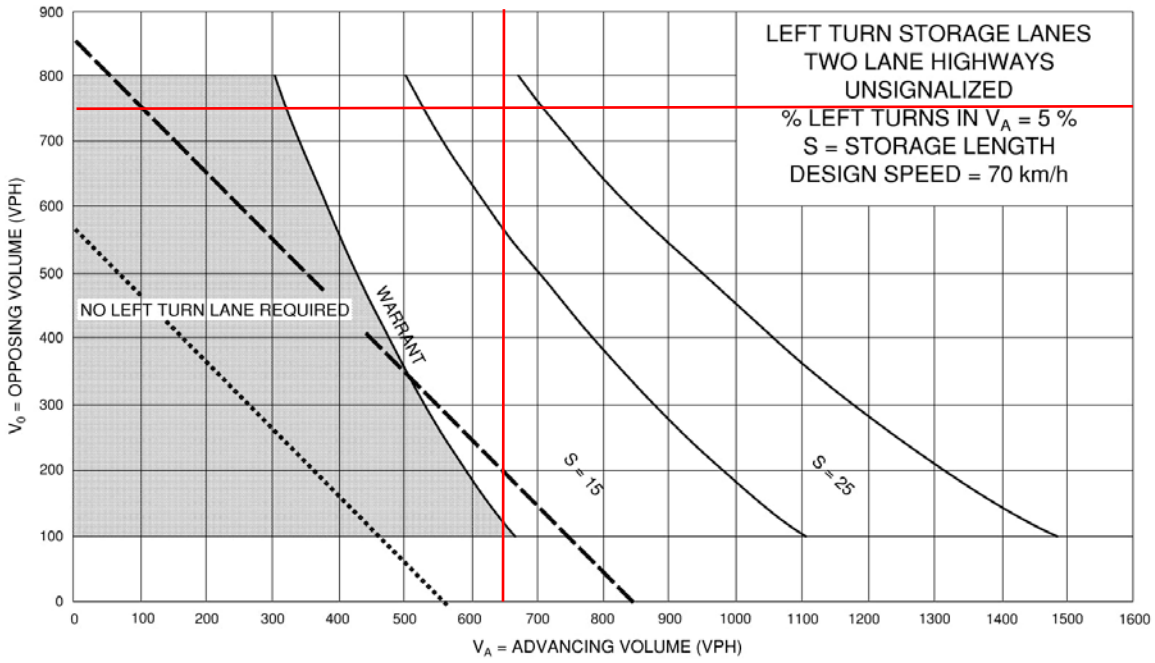


Exhibit 9A-10



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

North Access / Toronto St
Total 2031 - Southbound
PM Peak Hour (Critical Scenario)

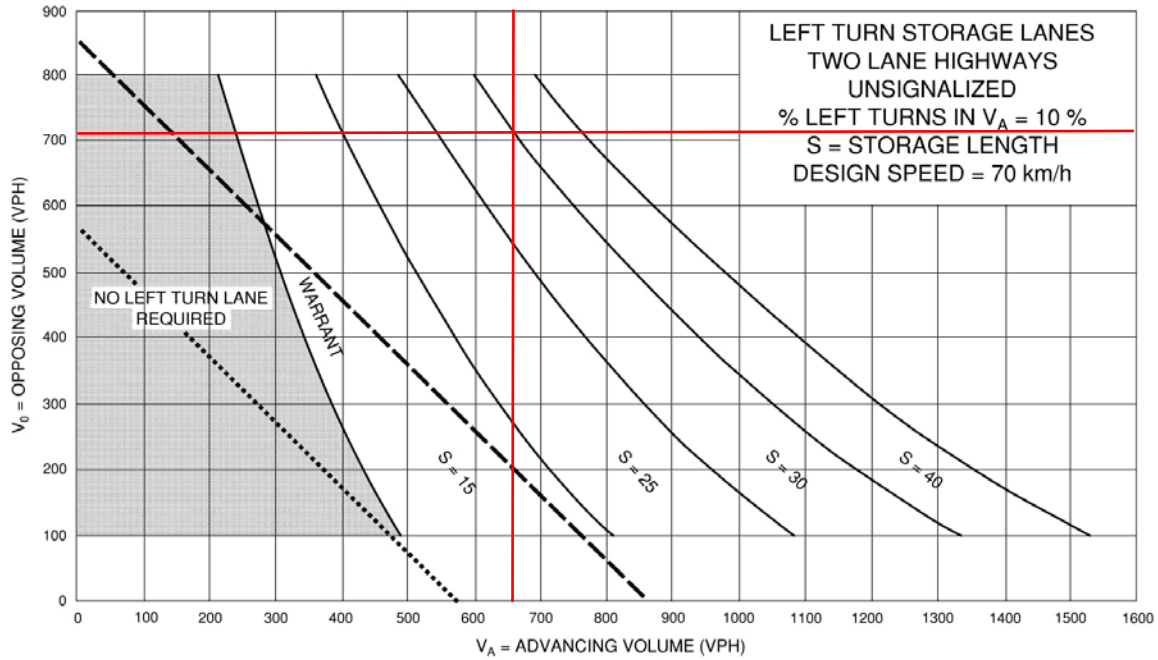
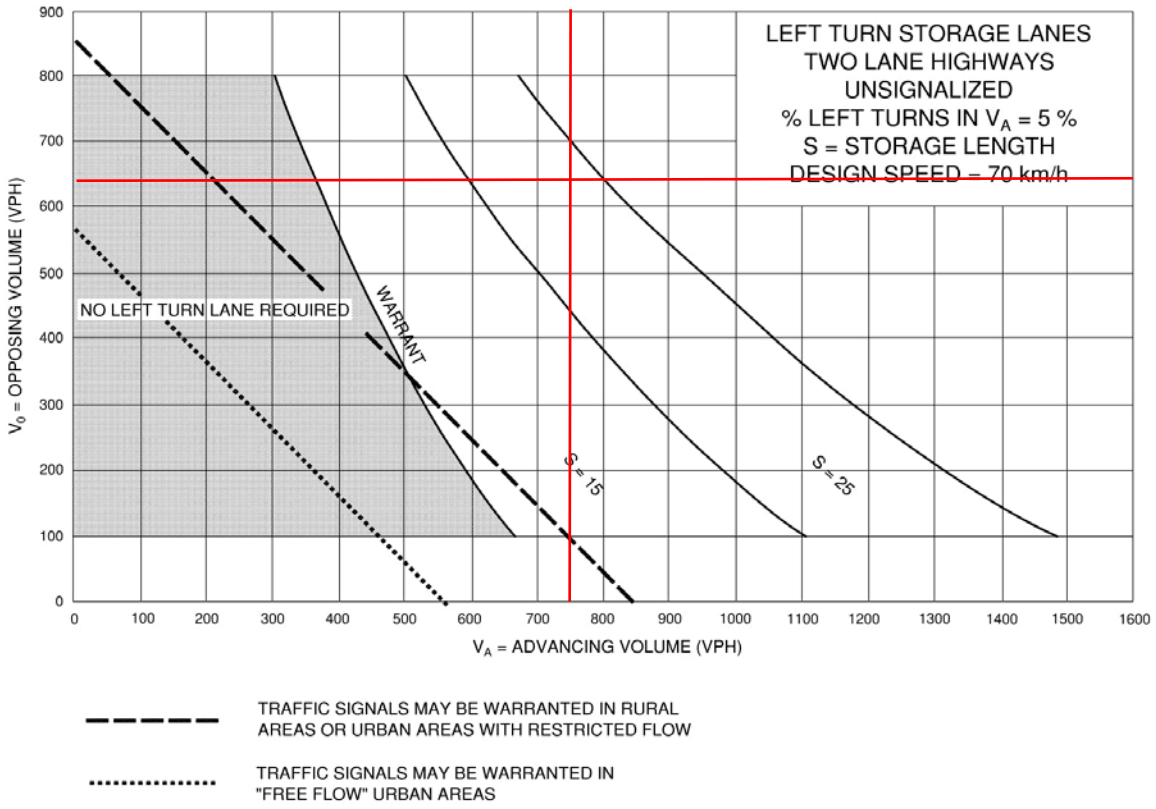
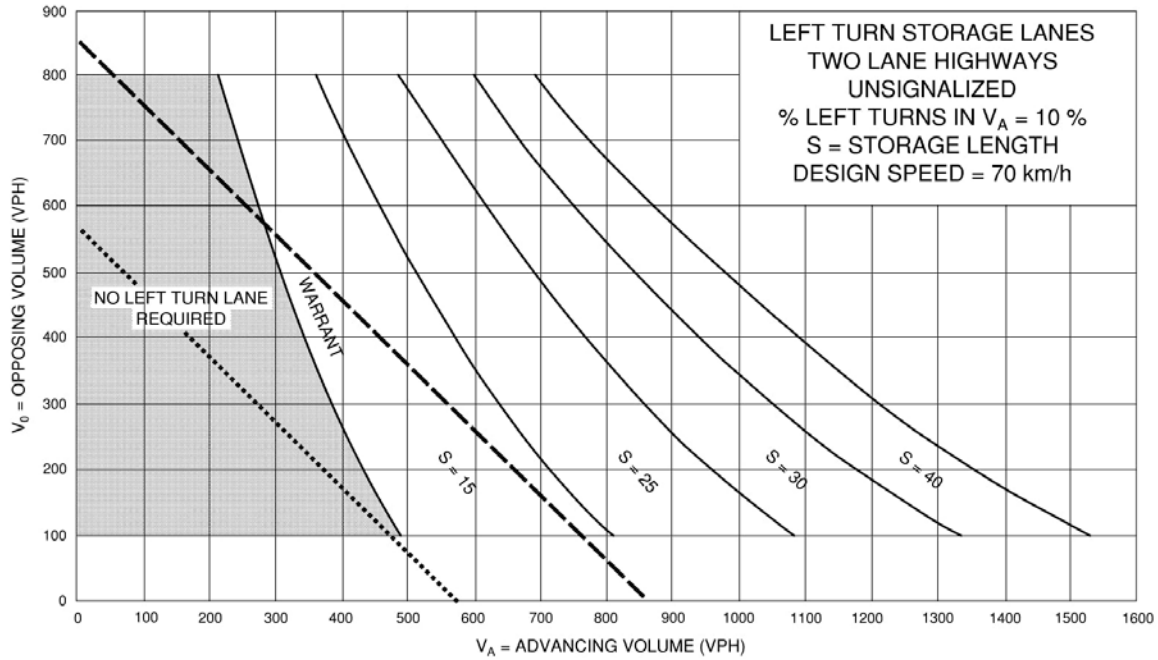


Exhibit 9A-10





Appendix H –
OTM Signal Justification Sheets

Justification No. 7 - 2031 Total Traffic (Critical Case)

Highway 10 / North Acces

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Free Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	480	672	140%	18%	NO	YES
	B. Vehicle volume, along minor streets (average hour)	180	48	27%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	480	604	126%	33%	NO	YES
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	25	50%		NO	NO

Justification No. 7 - 2031 Total Traffic (Critical Case)

Toronto St / Fairway Heights & Commercial Driveway

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Rest. Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	720	719	100%	40%	NO	NO
	B. Vehicle volume, along minor streets (average hour)	170	82	48%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	603	84%	45%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	41	54%		NO	NO