



# **Tim Hortons Development Graham Road and Munroe Street, West Elgin Transportation Impact Study**

Paradigm Transportation Solutions Limited



March 2022  
220022

# Project Summary



## Project Number

220022

## Date: March 2022

Version 1.0.0

## Client

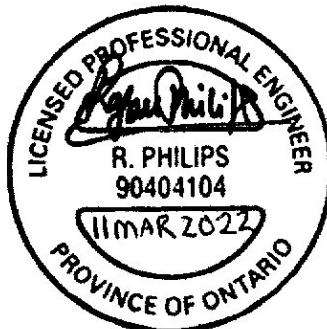
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# Executive Summary

## Content

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Study (TIS) for a proposed Tim Hortons development located at the northwest corner of Graham Road and Munroe Street in Municipality of West Elgin, Elgin County.

This TIS includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts for a horizon five years after development opening (2028), review of drive-through for stacking and onsite traffic circulation, and any recommendations, as appropriate, to accommodate the proposed development.

## Development Concept

The proposed development will include a new 38-seat, 2,240-sq.ft. GFA Tim Hortons outlet with drive-through arrangement.

An all-moves access is proposed on Munroe Street, along with 31 onsite parking spaces.

## TIS Scope

The scope of the Transportation Impact Study for the proposed development includes:

- ▶ **Study Area Intersections:**
  - Graham Road and Munroe Street; and
  - access intersection on Munroe Street.
- ▶ **Analysis Periods:** weekday AM and PM and Saturday peak hours.
- ▶ **Traffic Conditions:** existing (2022) and five years after development opening (2028).
- ▶ **Drive-through Assessment:** review of the proposed drive-through arrangement for stacking and on-site traffic circulation.



## Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Conditions:** the intersection of Graham Road and Munroe Street is currently operating at satisfactory levels of service (LOS A/B).
- ▶ **Development Trip Generation:** the development is forecast to generate 166, 77, and 99 new trips during the weekday AM, PM, and Saturday peak hours, respectively.
- ▶ **2028 Background Traffic Conditions:** the intersection of Graham Road and Munroe Street is forecast to operate at satisfactory levels of service (LOS A/B).
- ▶ **2028 Total Traffic Conditions:** the intersections of Graham Road at Munroe Street and Munroe Street at the site access are forecast to operate at satisfactory levels of service (LOS A/B).
- ▶ **Driveway Impact on Munroe Street:** The northside shoulder of Munroe Street along the subject site property line is currently used by vehicles for parking perpendicular to the road alignment. Parking spaces are not marked, however, approximately 40 vehicles could be parked on this section of the shoulder. The proposed driveway will eliminate approximately seven of the potential shoulder parking spaces. At the same time, the development will provide 31 onsite parking spaces.
- ▶ **Drive-through Assessment:** based on drive-through stacking requirements in other municipalities and results of queueing studies at two coffee shop locations in the Greater Toronto Area, the proposed 13 stacking spaces are sufficient to accommodate peak period queueing demands.

## Recommendations

Based on the findings and conclusions of this study, it is recommended that the development be considered for approval as proposed.



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# 1 Introduction

## 1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been retained to conduct this Transportation Impact Study (TIS) for a proposed Tim Hortons development located at the northwest corner of Graham Road and Munroe Street in the Municipality of West Elgin, Elgin County. **Figure 1.1** details the subject development location.

The proposed development will include a new 38-seat, 2,240-sq.ft. GFA Tim Hortons outlet with drive-through arrangement.

An all-moves access is proposed on Munroe Street, along with 31 onsite parking spaces.

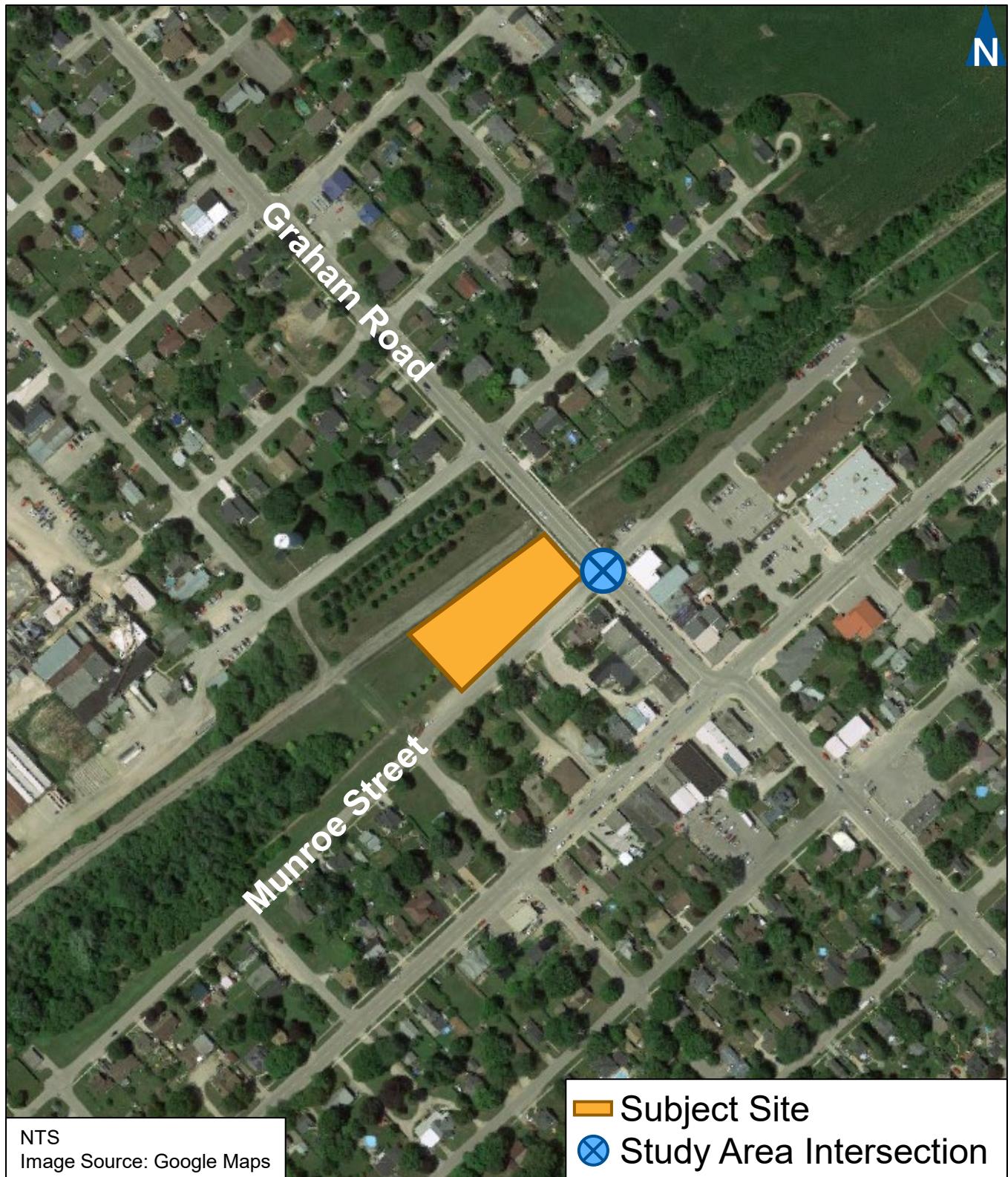
## 1.2 Purpose and Scope

The purpose of this report is to identify and assess the potential traffic impact resulting from the proposed development. The scope of the study, developed in consultation with Municipality of West Elgin and Elgin County staff via e-mail in February 2022, includes:

- ▶ assessment of the current traffic and site conditions within the study area;
- ▶ estimates of background traffic growth for five years after development (2028);
- ▶ estimates of additional traffic generated by the subject site;
- ▶ analyses of the impact of the future traffic on the surrounding road network, including the following study area intersections:
  - Graham Road and Munroe Street
  - access intersection on Munroe Street
- ▶ review of drive-thru for stacking and onsite traffic circulation;
- ▶ impact on shoulder parking on Munroe Street along the subject site; and
- ▶ onsite pedestrian and cycling movements.

**Appendix A** contains the pre-study consultation material and responses from the Municipality of West Elgin and Elgin County.





## Location of Subject Site

Tim Hortons Development, West Elgin TIS  
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**Figure 1.1**

## 2 Existing Conditions

### 2.1 Existing Roadways

The main roadways near the subject site considered in assessing the traffic impacts of the development include:

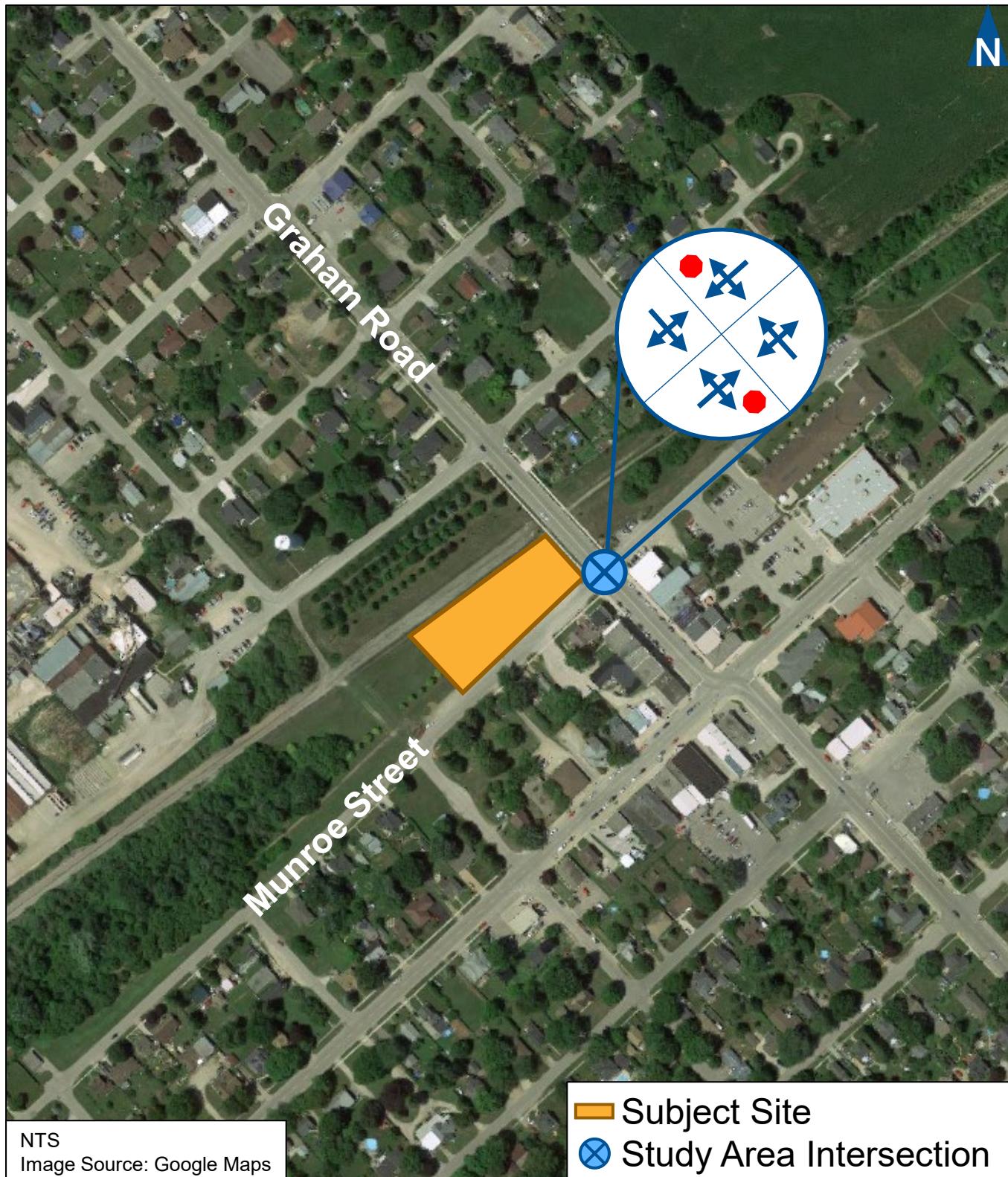
- ▶ **Graham Road (Elgin Road 76)** is a north-south county minor arterial<sup>1</sup> road with a two-lane cross section and a posted speed limit of 50 km/h. Sidewalks are provided along both sides of the roadway. In vicinity of the subject site, Graham Road is identified as part of the Tourism Corridor of Elgin County, which links tourism destinations with settlement and high-traffic areas. On-street parking is permitted on both sides of the roadway south of Munroe Street.
- ▶ **Munroe Street** is an east-west local road with a two-lane cross section and an assumed speed limit of 50 km/h. Gravel shoulders are provided on both sides of the roadway, and a sidewalk is provided on the south side of Munroe Street west of Graham Road. On-street parking is permitted in a gravel parking area on the north side of the roadway between Graham Road and Ridge Street.

**Figure 2.1** displays the traffic control and lane configuration at the Graham Road and Munroe Street intersection.

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<sup>1</sup> Official Plan of the County of Elgin, February 2015.





## Existing Lane Configuration and Traffic Control

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**Figure 2.1**

## 2.2 Traffic Volumes

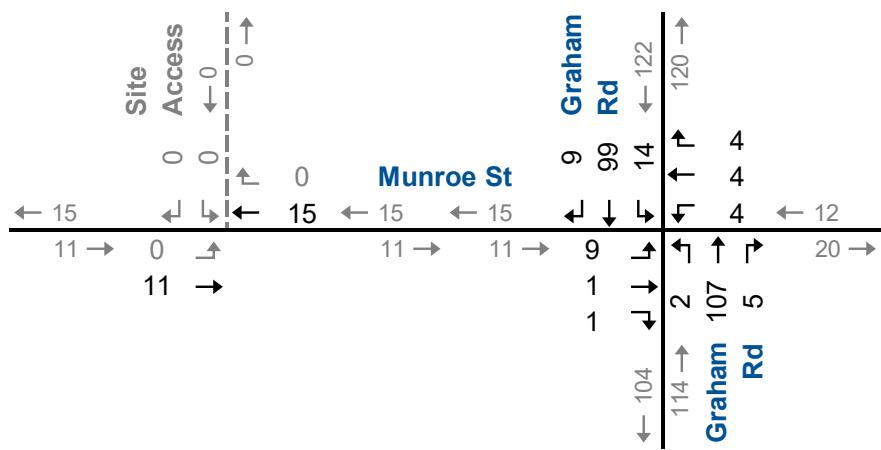
**Figure 2.2** illustrates the existing weekday AM (8:30AM – 9:30AM) and PM (4:00PM – 5:00PM) and Saturday (12:15PM – 1:15PM) peak hour turning movement traffic volumes collected by Paradigm on 24 and 26 February 2022.

**Appendix B** contains the detailed traffic counts at the intersection of Graham Road and Munroe Street.

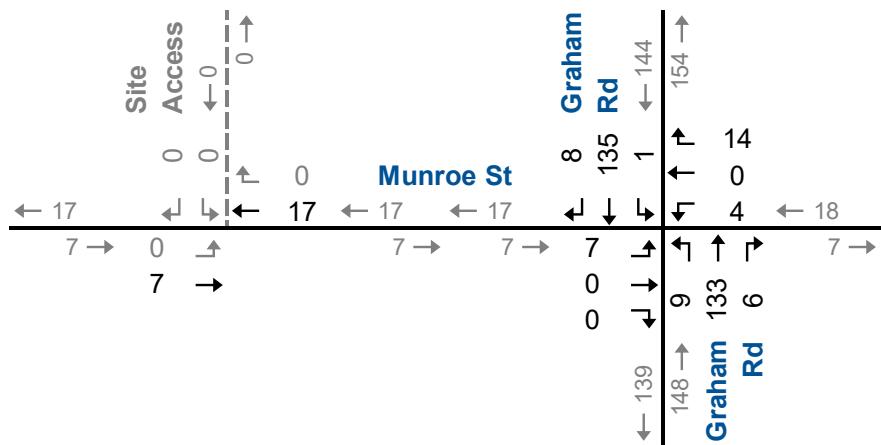




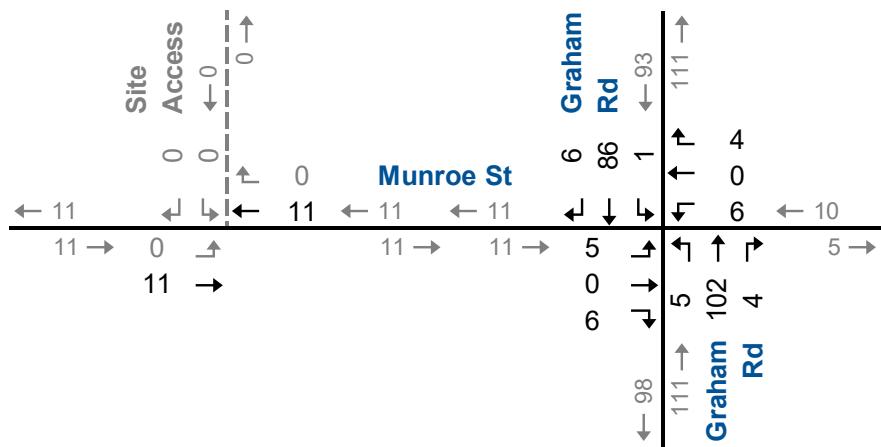
### AM Peak Hour



### PM Peak Hour



### Saturday Peak Hour



## Existing Traffic Volumes

Tim Hortons Development, West Elgin TIS  
220022

**Figure 2.2**

## 2.3 Traffic Operations

The level of service conditions at the study area intersections have been assessed through intersection operational analysis using Synchro 10.

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on several criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.00, the movement is classed as LOS F and remedial measures are usually implemented if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

Movements are considered critical under the following conditions:

- ▶ v/c ratios for movements increased to 0.85 or above;
- ▶ movements that exceed LOS 'E'; and
- ▶ 95th percentile queue lengths that exceed available lane storage.

**Table 2.1** summarizes the results of the intersection operational analysis under existing conditions, including the weekday AM and PM and Saturday peak hour level of service (LOS), v/c ratios, and 95th percentile queues experienced.

The results indicate that the intersection of Graham Road and Munroe Street is operating at acceptable levels of service, and with no problem movements.

**Appendix C** contains the detailed Synchro 10 reports.



**TABLE 2.1: EXISTING TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall	
				Eastbound				Westbound				Northbound				Southbound					
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	Graham Road & Munroe Street	TWSC	LOS Delay V/C Q	< < < <	B 11 0.02 1	> > > >	<b>B 11</b>	< < < <	B 10 0.02 1	> > > >	<b>B 10</b>	< < < <	A 8 0.00 0	> > > >	<b>A 0</b>	< < < <	A 8 0.01 0	> > > >	<b>A 1</b>		
PM Peak Hour	Graham Road & Munroe Street	TWSC	LOS Delay V/C Q	< < < <	B 11 0.01 0	> > > >	<b>B 11</b>	< < < <	A 10 0.03 1	> > > >	<b>A 10</b>	< < < <	A 8 0.01 0	> > > >	<b>A 0</b>	< < < <	A 8 0.00 0	> > > >	<b>A 0</b>		
Saturday Peak Hour	Graham Road & Munroe Street	TWSC	LOS Delay V/C Q	< < < <	A 10 0.02 0	> > > >	<b>A 10</b>	< < < <	A 10 0.02 0	> > > >	<b>A 10</b>	< < < <	A 7 0.00 0	> > > >	<b>A 0</b>	< < < <	A 8 0.00 0	> > > >	<b>A 0</b>		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

TWSC - Two-Way Stop Control

&lt;/&gt; - Shared with through movement



## 3 Development Concept

### 3.1 Development Description

The subject site is located at the northwest corner of Graham Road and Munroe Street in the Municipality of West Elgin. The proposed development will include a new 38-seat, 2,240-sq.ft. GFA Tim Hortons outlet with drive-through arrangement. 31 onsite parking spaces are also proposed.

An all-moves access is proposed on Munroe Street.

**Figure 3.1** shows the development concept.

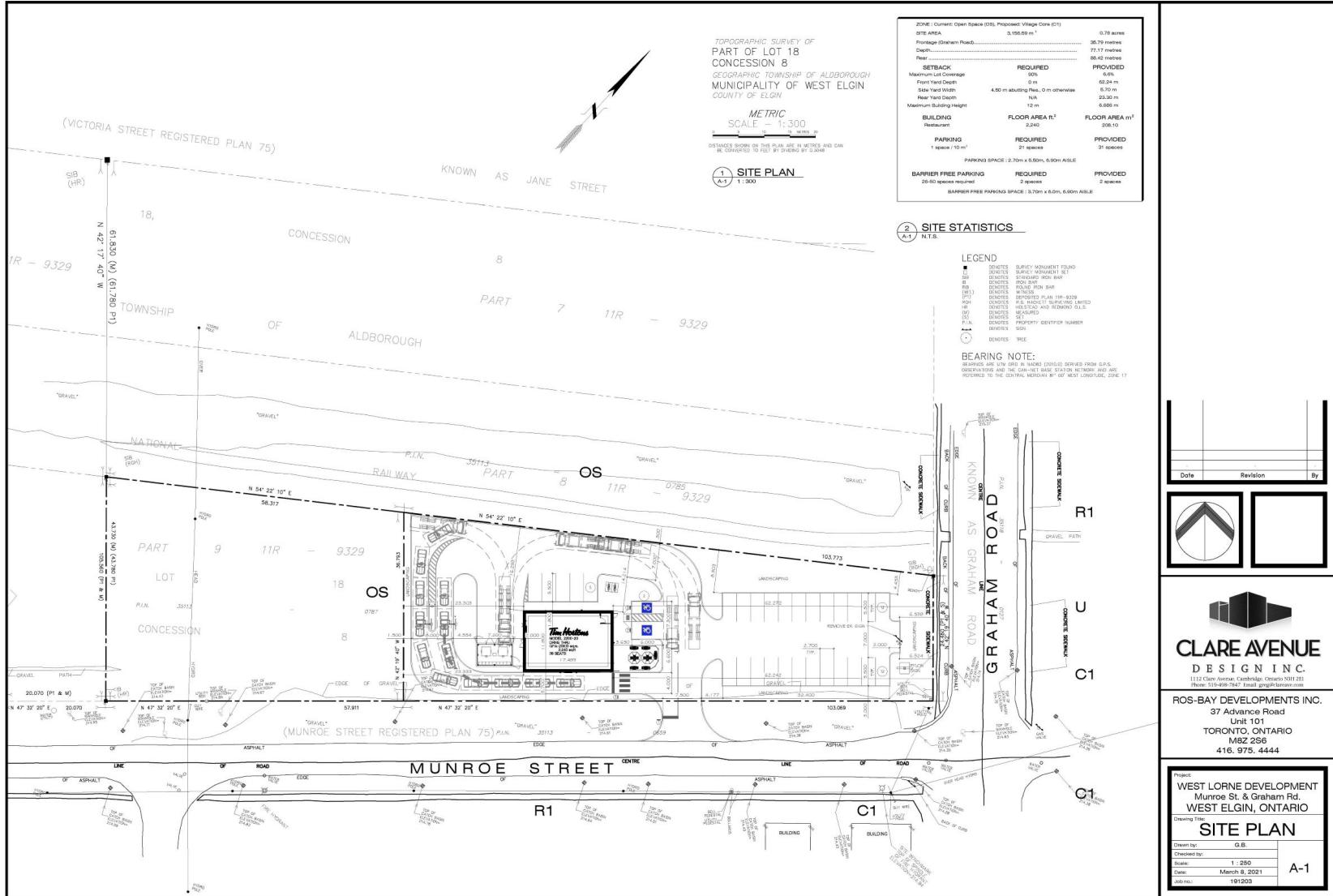
#### 3.1.1 Site Impacts

The northside shoulder of Munroe Street along the subject site property line is currently used by vehicles for parking perpendicular to the road alignment. Parking spaces are not marked, however, approximately 40 vehicles could be parked on this section of the shoulder. The proposed driveway will eliminate approximately seven of the potential shoulder parking spaces. At the same time, the development will provide 31 onsite parking spaces.

The subject site is well-served by sidewalk connections on the adjacent roadways. However, cyclists will have to share the roadway with automobile traffic.

The site design provides for safe onsite vehicular and pedestrian (and potential cycling) circulation. Specific to the drive-through arrangement, the safety of pedestrians and cyclists is addressed through the provision of a crosswalk is provided the exit of the drive-through lane with a stop-bar before the crosswalk.





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## Proposed Site Plan

Figure 3.1

## 3.2 Development Trip Generation

The trip generation for the Tim Hortons development is based on a 2018 BA Group Transportation Impact Study<sup>2</sup>, with rates of 148.36 trips per 1,000 sq.ft. and 69.2 trips per 1,000 sq.ft. for the weekday AM and PM peak hours, respectively. The Saturday peak hour trip generation is based on the average rate provided in the Institute of Transportation Engineers (ITE) Trip Generation Manual<sup>3</sup> Land Use Code (LUC) 937, Coffee/Donut Shop with Drive-Through Window.

Trip generation adjustments were made for pass-by traffic on Graham Road and Munroe Street. Similar to the BA Group study, a 50% pass-by trip rate was used for the weekday AM and PM and Saturday peak hours. This is similar to or more conservative than the pass-by rates provided in the ITE Trip Generation Manual<sup>4</sup>.

**Table 3.1** summarizes the forecast number of net new trips generated by the proposed development.

**TABLE 3.1: TRIP GENERATION**

Land Use	GFA	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total	Rate	In	Out	Total
Tim Hortons - BA Group TIS Rate	2,240 sq. ft.	148.36	166	166	332	69.2	78	77	155	87.91	99	98	197
<i>Pass-by Trips</i>		50%	83	83	166	50%	39	39	78	50%	49	49	98
<i>Net New Trips</i>			83	83	166		39	38	77		50	49	99

## 3.3 Development Trip Distribution and Assignment

The trip distribution was determined based on existing travel patterns on Graham Road and Munroe Street. **Table 3.2** displays the breakdown of trip distributions used in this study.

**TABLE 3.2: ESTIMATED TRIP DISTRIBUTION**

To/From	AM Peak Hour		PM Peak Hour		Saturday Peak Hour	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
North via Graham Road	49%	50%	48%	50%	43%	50%
South via Graham Road	46%	44%	49%	45%	52%	45%
West via Munroe Street	4%	6%	2%	5%	5%	5%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

<sup>2</sup> BA Consulting Group Ltd, 3585 Forest Glade Drive Proposed Commercial Development Traffic Impact Study, Windsor, Ontario, Updated February 2018.

<sup>3</sup> Institute of Transportation Engineers, Trip Generation Manual 11<sup>th</sup> Edition, September 2021.

<sup>4</sup> Fast-food restaurant with Drive-Through Window (LUC 934) – AM peak hour: 50%, PM peak hour: 55%.

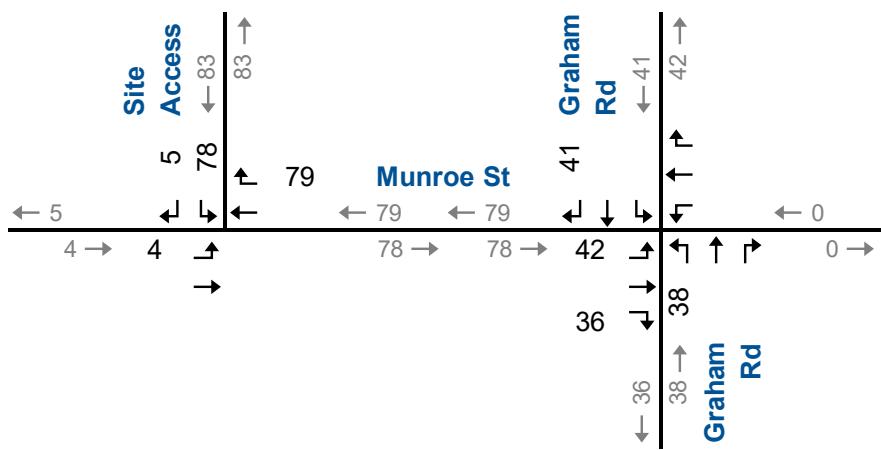


**Figure 3.2a** illustrates the net new site-generated traffic volumes for the weekday AM and PM and Saturday peak hours, and **Figure 3.2b** illustrates the pass-by site-generated traffic volumes for the weekday AM and PM and Saturday peak hours.

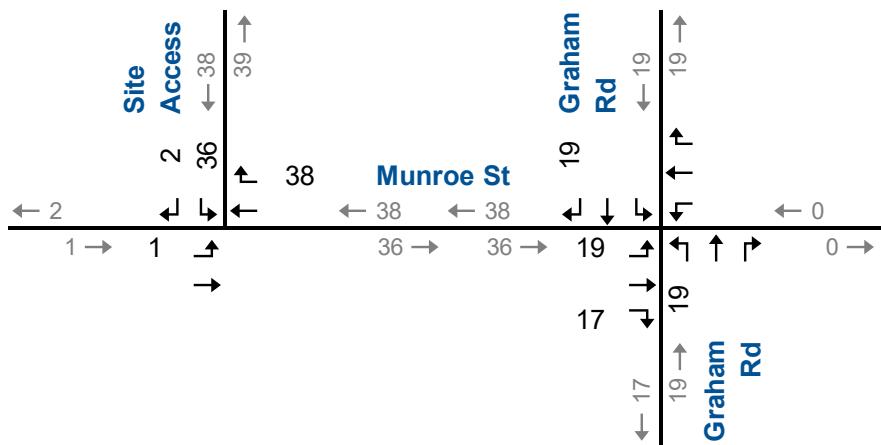




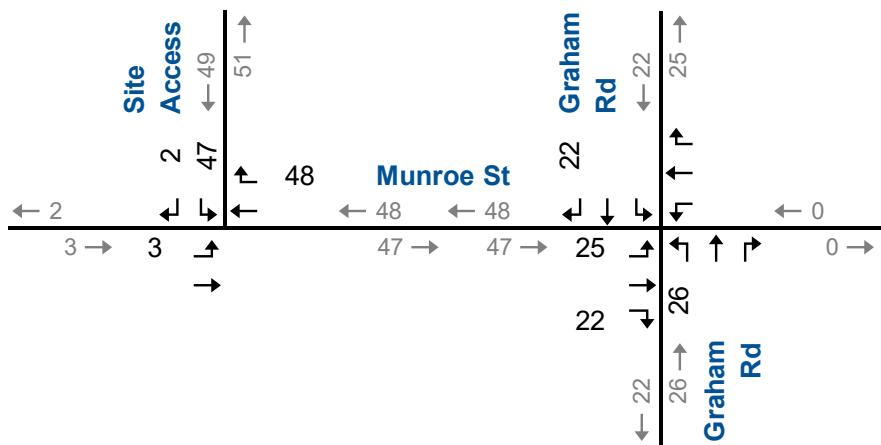
### AM Peak Hour



### PM Peak Hour



### Saturday Peak Hour



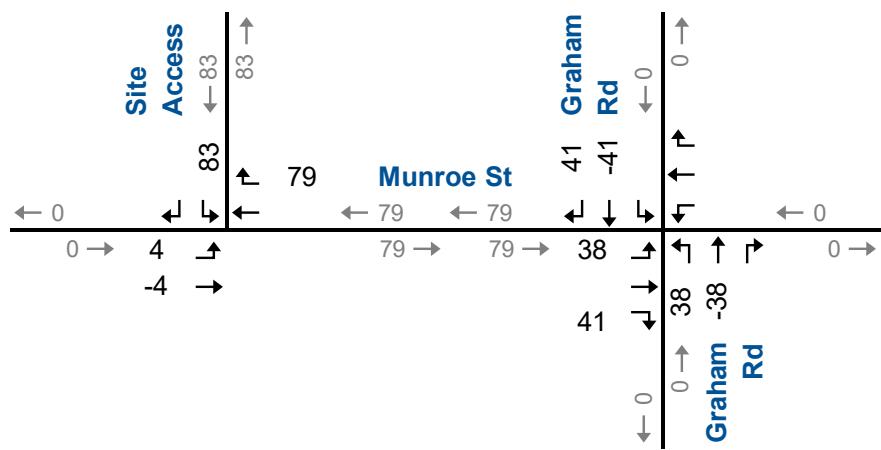
## Net New Site-Generated Traffic Volumes

Tim Hortons Development, West Elgin TIS  
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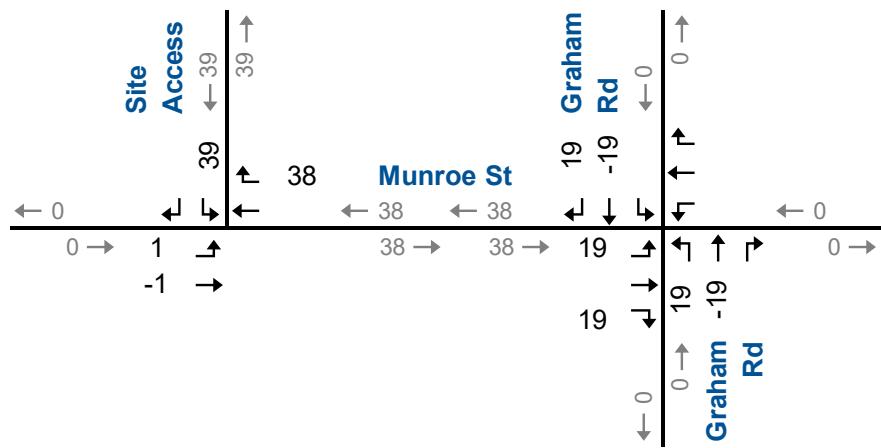
Figure 3.2a



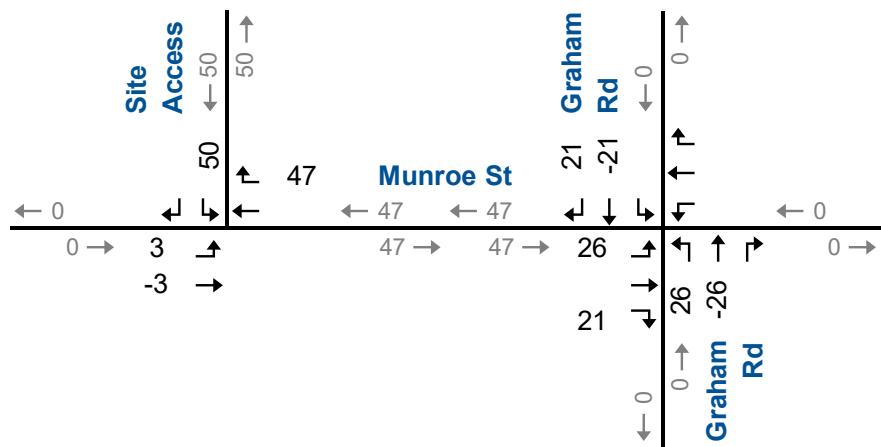
### AM Peak Hour



### PM Peak Hour



### Saturday Peak Hour



## 4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions contained in this section includes estimates of future background and total traffic volumes, and the analyses for a five-year horizon after the opening year of the development (2028).

### 4.1 Background Traffic Forecasts

In order to derive the 2028 generalized background traffic volumes, a growth rate of 2% per annum was applied to the existing roadway traffic volumes. This growth rate was confirmed with Municipal and County staff during the pre-study consultation.

No background developments were identified by the Municipality during the pre-study consultation.

### 4.2 2028 Background Traffic Operations

**Figure 4.1** illustrates the 2028 background traffic volumes, including road traffic growth on Graham Road.

The 2028 background traffic volumes have been analyzed using the same methodology as under existing traffic conditions.

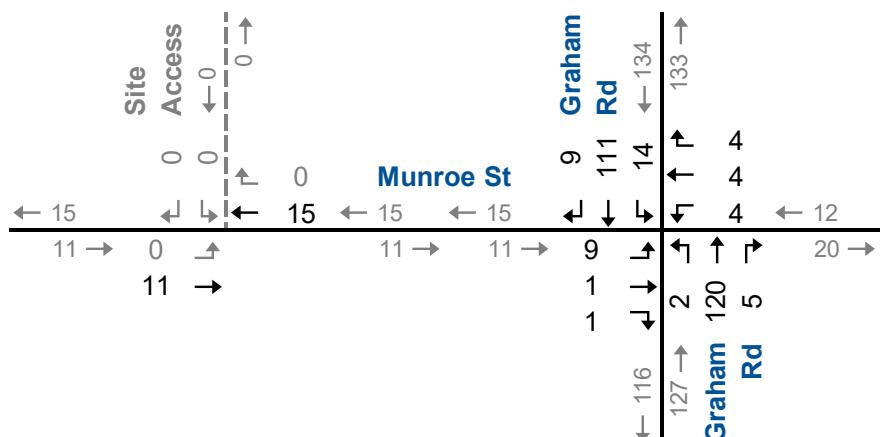
**Table 4.1** summarizes the results of the 2028 background traffic operations. The results indicate that the study area intersections are forecast to operate at satisfactory levels of service (LOS A/B) during the AM and PM peak hours.

**Appendix D** contains the supporting detailed Synchro 10 reports.

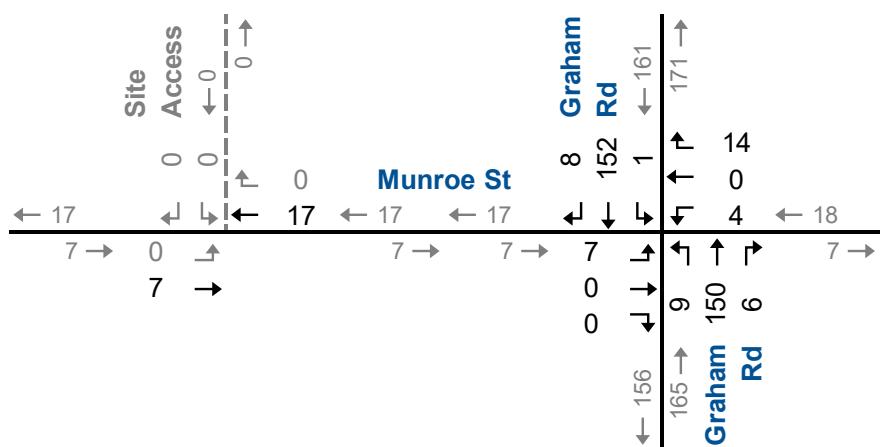




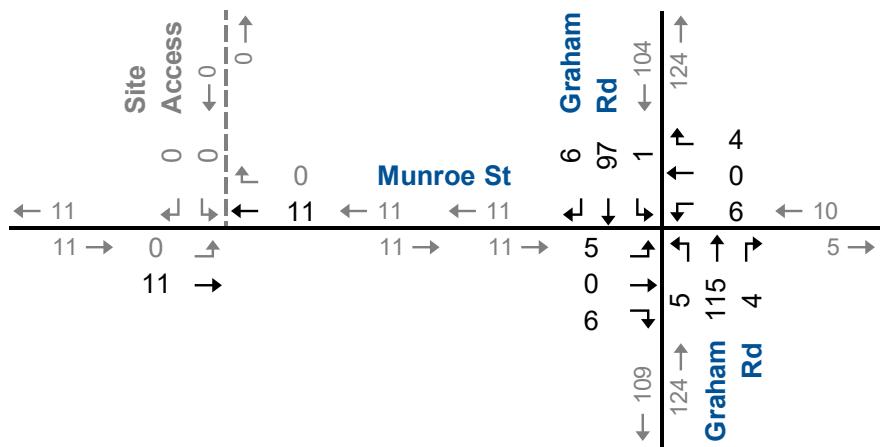
### AM Peak Hour



### PM Peak Hour



### Saturday Peak Hour



**TABLE 4.1: 2028 BACKGROUND TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach															Overall	
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Graham Road & Munroe Street	TWSC	LOS Delay V/C Q	< < < <	B 11 0.02 1	> > > >	<b>B 11</b>	< < < <	B 11 0.02 1	> > > >	<b>B 11</b>	< < < <	A 8 0.00 0	> > > >	<b>A 0</b>	< < < <	A 8 0.01 0	> > > >	<b>A 1</b>	
PM Peak Hour	Graham Road & Munroe Street	TWSC	LOS Delay V/C Q	< < < <	B 12 0.01 0	> > > >	<b>B 12</b>	< < < <	A 10 0.03 1	> > > >	<b>A 10</b>	< < < <	A 8 0.01 0	> > > >	<b>A 0</b>	< < < <	A 8 0.00 0	> > > >	<b>A 0</b>	
Saturday Peak Hour	Graham Road & Munroe Street	TWSC	LOS Delay V/C Q	< < < <	A 10 0.02 1	> > > >	<b>A 10</b>	< < < <	A 10 0.02 0	> > > >	<b>A 10</b>	< < < <	A 7 0.00 0	> > > >	<b>A 0</b>	< < < <	A 8 0.00 0	> > > >	<b>A 0</b>	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

TWSC - Two-Way Stop Control

&lt;/&gt; - Shared with through movement



## 4.3 2028 Total Traffic Operations

**Figure 4.2** illustrates the 2028 total traffic volumes, including trips generated by the proposed development.

The 2028 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions.

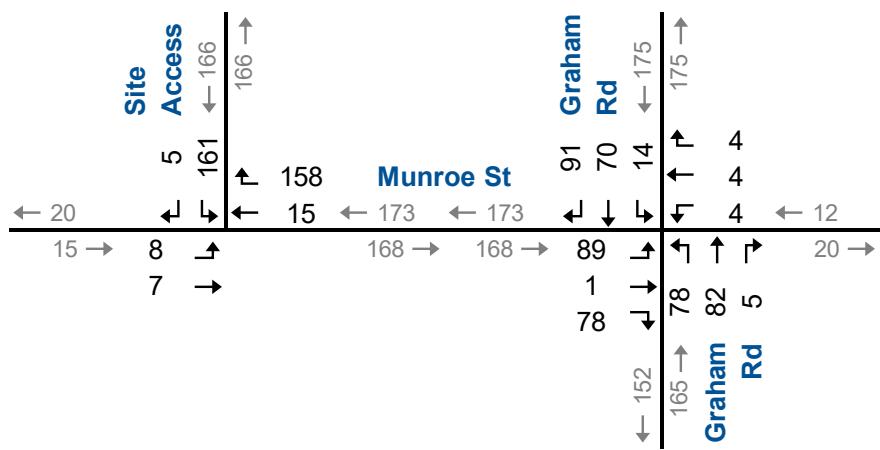
**Table 4.2** summarizes the results of the 2028 total traffic operations. The results indicate that the study area intersections, including the site access on Munroe Street, are forecast to operate at satisfactory levels of service (LOS A/B) during the AM and PM peak hours.

**Appendix E** contains the supporting detailed Synchro 10 reports.

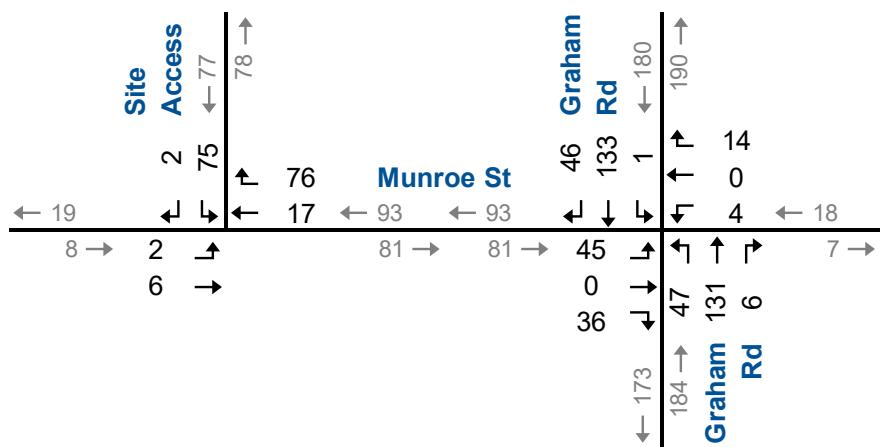




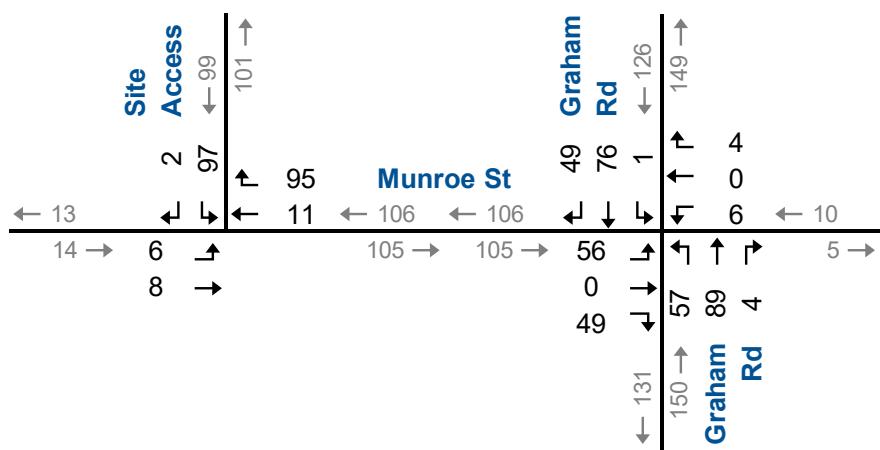
### AM Peak Hour



### PM Peak Hour



### Saturday Peak Hour



**TABLE 4.2: 2028 TOTAL TRAFFIC OPERATIONS**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach															Overall	
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Munroe Street & Site Access	TWSC	LOS Delay V/C Q	< 8 0.01 0	A 0.00 0	> 0.00 0	A 4	< 0.03 1	B 12	> 0.07 2	A 0	< 0.09 2	B 10	> 0.10 6	B 10 0.21 6	> 0.21 6	> 0.21 6	B 10		
	Graham Road & Munroe Street		LOS Delay V/C Q	< 14 0.34 11	B 12 0.34 11	> 0.34 11	B 14	< 0.03 1	B 12	> 0.07 2	A 0	< 0.09 2	A 8 0.01 0	> 0.01 0	A 8 0.01 0	> 0.01 0	A 1			
PM Peak Hour	Munroe Street & Site Access	TWSC	LOS Delay V/C Q	< 7 0.00 0	A 0.00 0	> 0.00 0	A 2	< 0.00 0	A 0	> 0.00 0	A 0	< 0.09 2	A 9 0.09 2	> 0.09 2	A 9 0.09 2	> 0.09 2	A 9			
	Graham Road & Munroe Street		LOS Delay V/C Q	< 12 0.16 4	B 12 0.16 4	> 0.16 4	B 12	< 0.03 1	B 10	> 0.04 1	A 0	< 0.04 1	A 8 0.00 0	> 0.00 0	A 8 0.00 0	> 0.00 0	A 0			
Saturday Peak Hour	Munroe Street & Site Access	TWSC	LOS Delay V/C Q	< 8 0.00 0	A 0.00 0	> 0.00 0	A 3	< 0.00 0	A 0	> 0.00 0	A 0	< 0.12 3	A 10 0.12 3	> 0.12 3	A 10 0.12 3	> 0.12 3	A 10			
	Graham Road & Munroe Street		LOS Delay V/C Q	< 11 0.18 5	B 11 0.18 5	> 0.18 5	B 11	< 0.02 1	B 11	> 0.05 1	A 0	< 0.05 1	A 7 0.00 0	> 0.00 0	A 7 0.00 0	> 0.00 0	A 0			

MOE - Measure of Effectiveness

Q - 95th Percentile Queue Length (m)

LOS - Level of Service

TWSC - Two-Way Stop Control

Delay - Average Delay per Vehicle in Seconds

&lt;/&gt; - Shared with through movement

V/C - Volume to Capacity Ratio



## 4.4 Left-Turn Lanes

The need for an auxiliary eastbound left-turn turning lane on Munroe Street at the proposed access, and a northbound left-turn lane on Graham Road at Munroe Street were assessed based on the requirements and procedures detailed in the Ministry of Transportation Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads<sup>5</sup>. The assessment is based on the nomographs for left-turn lanes on a two-lane undivided highway at an unsignalized intersection with a design speed of 10 kilometres per hour over the assumed and posted speed limits (60 km/h).

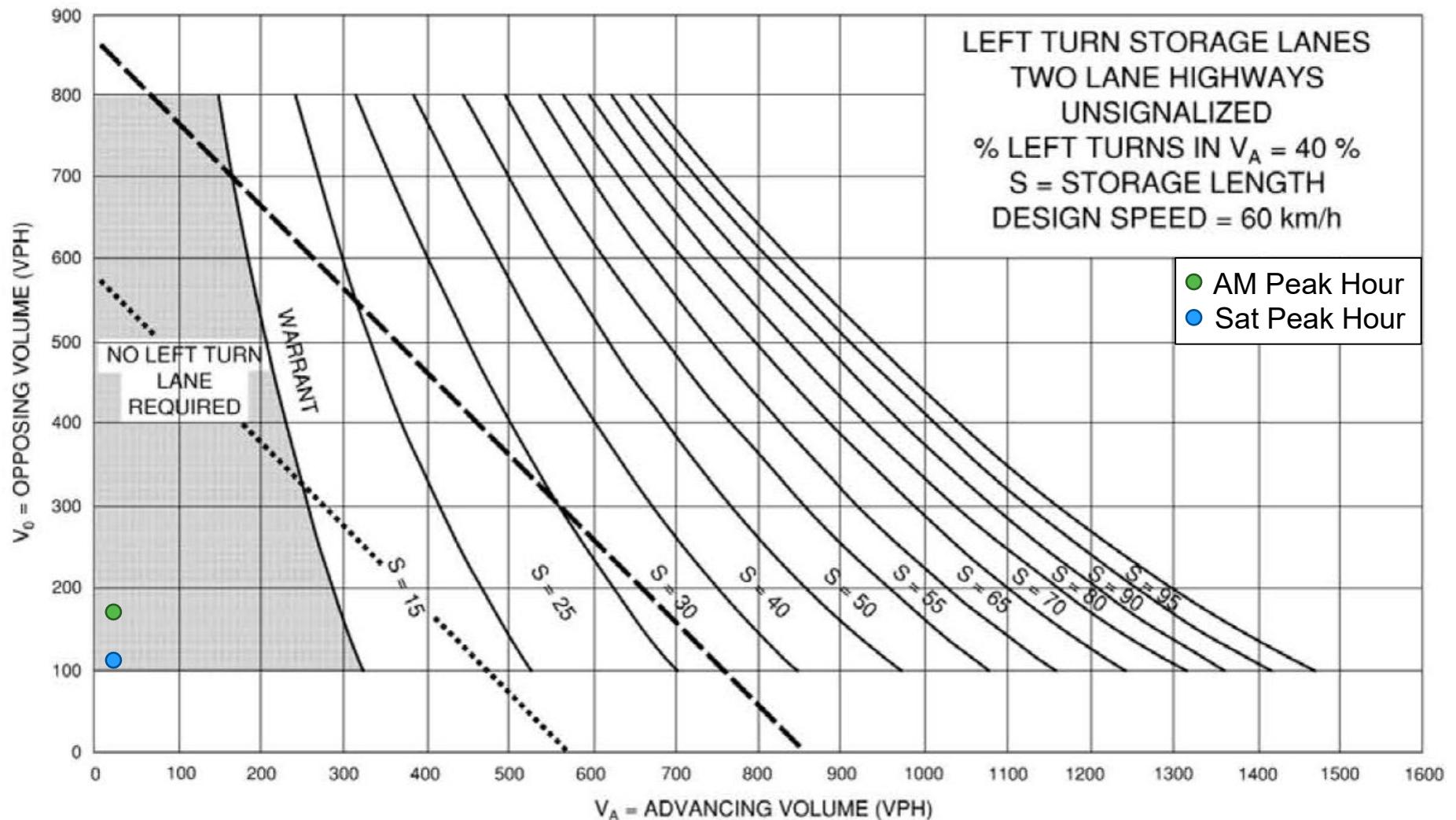
Based on these criteria, neither an eastbound left-turn lane on Munroe Street at the proposed access nor a northbound left-turn lane and on Graham Road at Munroe Street is warranted under 2028 total traffic conditions.

**Figures 4.3a, 4.3b, 4.3c, and 4.3d** contain the warrant nomographs.

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<sup>5</sup> MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads, June 2017.

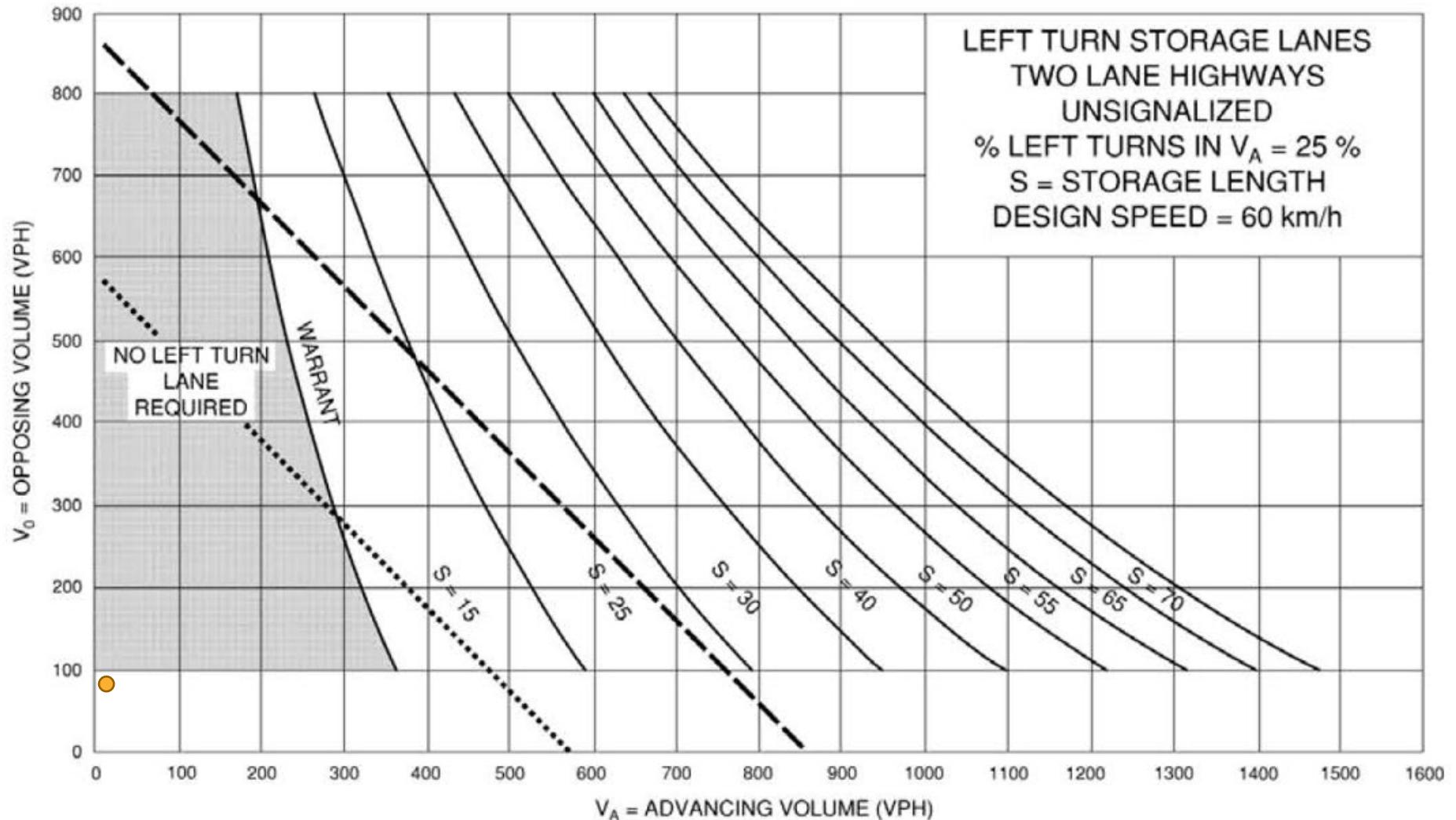




## Munroe Street & Site Access Eastbound Left-Turn Lane 2028 Total Conditions – AM & Saturday Peak Hours

Tim Hortons Development, West Elgin TIS  
220022

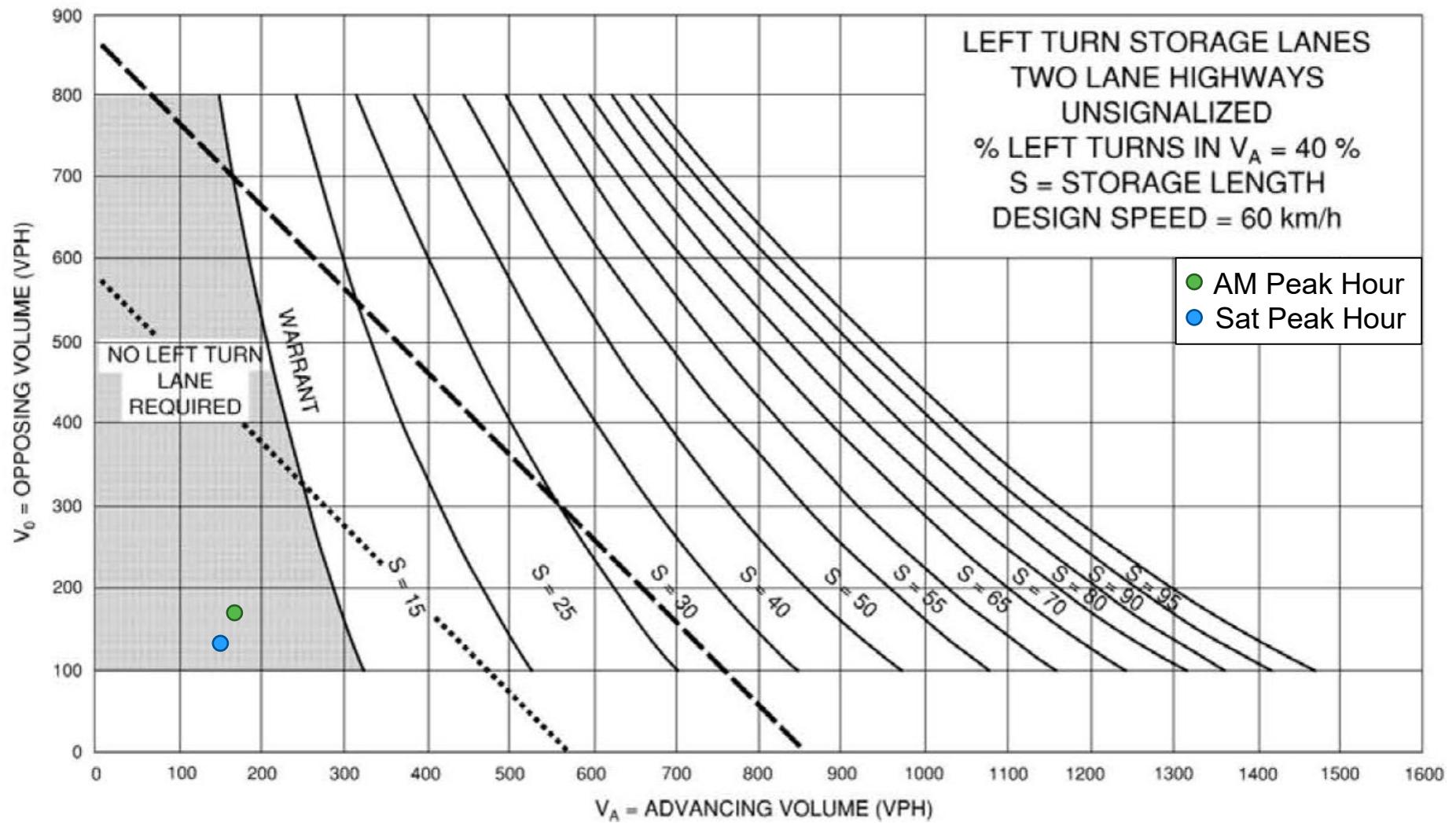
Figure 4.3a



Tim Hortons Development, West Elgin TIS  
220022

## Munroe Street & Site Access Eastbound Left-Turn Lane 2028 Total Conditions – PM Peak Hour

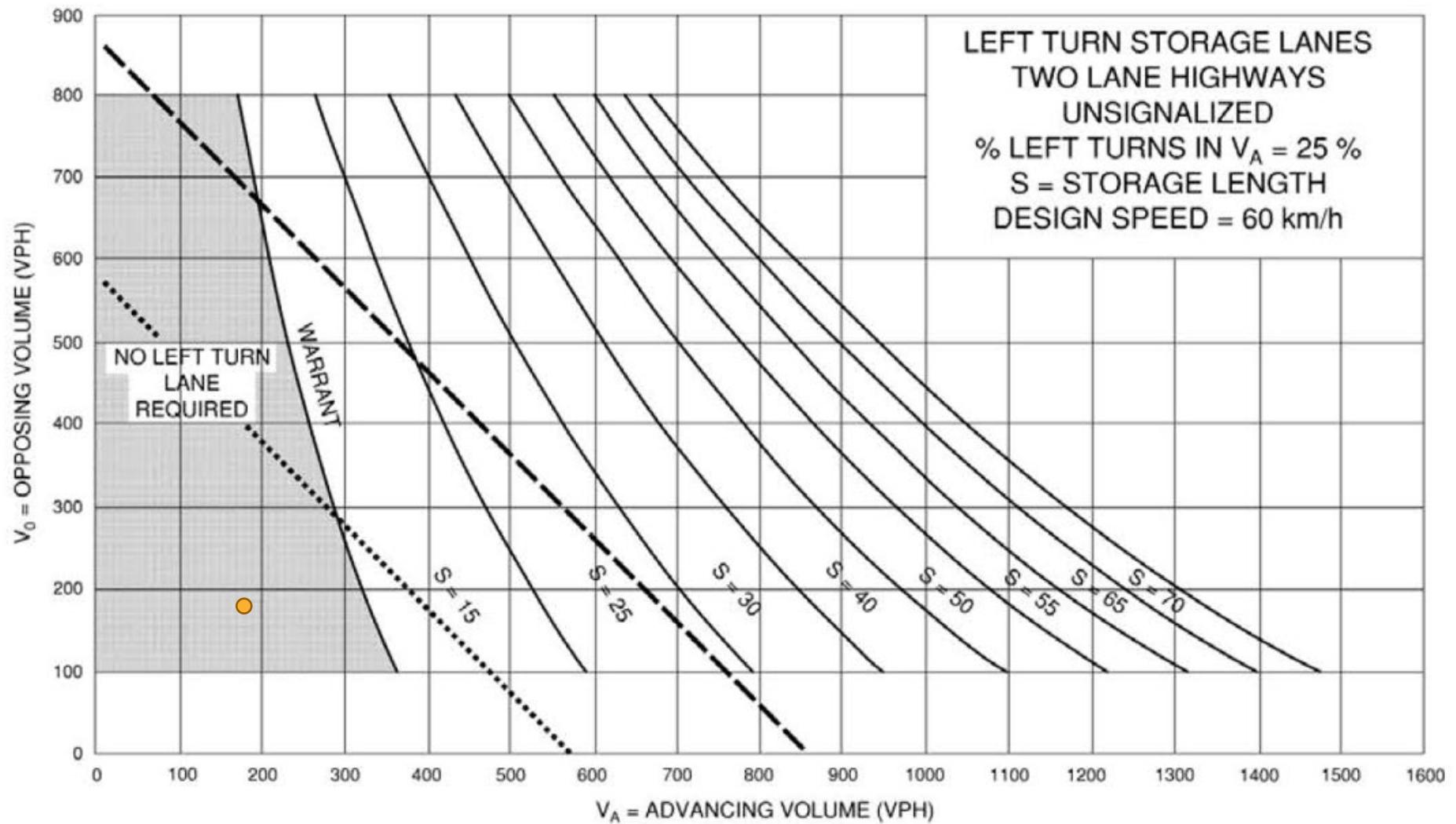
Figure 4.3b



**Munroe Street & Graham Road**  
**Northbound Left-Turn Lane**  
**2028 Total Conditions – AM & Saturday Peak Hours**

Tim Hortons Development, West Elgin TIS  
 220022

**Figure 4.3c**



Tim Hortons Development, West Elgin TIS  
220022

## Munroe Street & Graham Road Northbound Left-Turn Lane 2028 Total Conditions – PM Peak Hour

Figure 4.3d

## 4.5 Traffic Signal Control

The requirement for traffic signal control at the intersection of Graham Road and Munroe Street was assessed using the Ontario Traffic Manual (OTM) signal warrant guidelines<sup>6</sup>.

Based on the warrant analysis, traffic signal control is not warranted at Graham Road and Munroe Street under the 2028 total traffic conditions.

**Appendix F** contains the warrant analysis worksheets.

## 4.6 Drive-through Assessment

The proposed Tim Hortons development will have a 2,240-sq.ft. GFA and a drive-through with a stacking capacity for 13 vehicles. The Municipality of West Elgin has asked for a stacking review to justify the number of stacking spaces for the proposed drive-through facility. The stacking requirement is reviewed herein based on minimum requirements in other municipalities and the stacking provided in other coffee shops in southern Ontario.

### 4.6.1 Municipal Standards

The Municipality of West Elgin does not provide stacking requirements for a coffee shop/fast-food restaurant. To estimate the peak hour stacking demand of the proposed Tim Hortons, the requirements in other municipalities in southern Ontario have been reviewed.

**Table 4.3** provides a comparison of stacking requirements in Guelph<sup>7</sup>, Kitchener<sup>8</sup>, Ottawa<sup>9</sup>, and Toronto<sup>10</sup>, indicating a range of 6 to 13 spaces.

<sup>6</sup> Ontario Traffic Manual Book 12 – Traffic Signals.

<sup>7</sup> City of Guelph Engineering and Transportation Services, Development Engineering Manual, Version 2.0, January 2019.

<sup>8</sup> City of Kitchener, Zoning bylaw 2019-051, passed 29 April 2019.

<sup>9</sup> City of Ottawa, Zoning By-law 2008-250 Consolidation, 8 September 2021.

<sup>10</sup> City of Toronto, Urban Design Guidelines for Site with Drive-Through Facilities, May 2005.



**TABLE 4.3: STACKING REQUIREMENTS IN OTHER MUNICIPALITIES**

Municipality	Land Use	Stacking Requirement
Guelph	Coffee/Donut Shop	12 spaces
	Fast Food	6 spaces
Kitchener	Restaurant	13 spaces
Ottawa	Restaurant	11 spaces
Toronto	Restaurant/Food Sale	10 spaces

#### 4.6.2 Coffee Shop Queueing Studies

Drive-through Queue and Parking Demand studies were conducted by Paradigm at two coffee shop locations in Scarborough and Etobicoke in March 2019<sup>11</sup>. Data was collected over a 12-hour period at five-minute intervals. Both locations had a stacking capacity of seven vehicles and approximately 2,500 sq.ft. and 2,800 sq.ft. GFA.

The coffee shop in Scarborough (at 1156 Kennedy Road) had an 85<sup>th</sup> percentile queue of three vehicles and an average queue of two vehicles. The maximum queue length observed over the survey period was five vehicles, which only occurred once during the AM peak period and lasted less than five minutes.

The coffee shop in Etobicoke (at 6620 Finch Avenue West) had an 85<sup>th</sup> percentile queue of five vehicles and an average queue of three vehicles. The maximum queue length observed was seven vehicles.

The proposed Tim Hortons will provide 13 stacking spaces, which is greater than the maximum queues at both comparable coffee shops in Scarborough and Etobicoke. The 13 proposed stacking spaces are determined to be sufficient for the queue lengths during the peak hours.

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<sup>11</sup> Paradigm Transportation Solutions Limited, March 2019, 10 Spring Hill Drive, King City Drive-Through Queue and Parking Demand Study.



## 5 Conclusions and Recommendations

### 5.1 Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Existing Traffic Conditions:** the intersection of Graham Road and Munroe Street is currently operating at satisfactory levels of service (LOS A/B).
- ▶ **Development Trip Generation:** the development is forecast to generate 166, 77, and 99 new trips during the weekday AM, PM, and Saturday peak hours, respectively.
- ▶ **2028 Background Traffic Conditions:** the intersection of Graham Road and Munroe Street is forecast to operate at satisfactory levels of service (LOS A/B).
- ▶ **2028 Total Traffic Conditions:** the intersections of Graham Road at Munroe Street and Munroe Street at the site access are forecast to operate at satisfactory levels of service (LOS A/B).
- ▶ **Driveway Impact on Munroe Street:** The northside shoulder of Munroe Street along the subject site property line is currently used by vehicles for parking perpendicular to the road alignment. Parking spaces are not marked, however, approximately 40 vehicles could be parked on this section of the shoulder. The proposed driveway will eliminate approximately seven of the potential shoulder parking spaces. At the same time, the development will provide 31 onsite parking spaces.
- ▶ **Drive-through Assessment:** based on drive-through stacking requirements in other municipalities and results of queueing studies at two coffee shop locations in the Greater Toronto Area, the proposed 13 stacking spaces are sufficient to accommodate peak period queueing demands.

### 5.2 Recommendations

Based on the findings and conclusions of this study, it is recommended that the development be considered for approval as proposed.



## Appendix A

### Pre-Study Consultation



**From:** [Bryan Pearce](#)  
**To:** [Brian Lima](#); [Patrick Neal](#)  
**Cc:** [Rajan Philips](#); [Chris Lierman \(clierman@sprint.on.ca\)](#); [Lee Gosnell](#); [Bryan Pearce](#)  
**Subject:** RE: (220022) Tim Hortons, West Elgin TIS - Pre-Study Consultation  
**Date:** February 16, 2022 3:08:16 PM  
**Attachments:** [image015.png](#)  
  [image016.png](#)  
  [image017.png](#)  
  [image018.png](#)

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Hi Patrick,

Thanks for the email on this. I circulated to Municipal Operations and the Municipality's Engineering Consultant for comment for a coordinated response. West Elgin is satisfied with your principles and assumptions, as there are no background developments in the area that are approved of to-date. We request that you shall analyze the proposed improvements to Munroe for street parking in relation to development of the site. As well as general roadway configuration, intersection signalization warrant analysis and potential improvements, turn lanes, etc. As was mentioned with their team at the pre-consult, the review of pedestrian and cycling movements shall be reviewed as well with the proposed development, to ensure the internal/external site is designed in a safe manner, since intermixed with a drive-through facility, deliveries, and dine-in vehicular traffic, etc.

We look forward to reviewing and commenting on the TIS, when the developer proceeds with the future submission of the planning applications for the proposed development.

I hope this information helps. Please let us know if you require anything further.

Thanks.

Bryan Pearce, HBA, CPT, MCIP, RPP  
Planner  
Municipality of West Elgin  
22413 Hoskins Line  
Rodney ON N0L 2C0  
Phone: 519-785-0560  
Cell: 519-280-1028  
Fax: 519-785-0644  
Email: [planning@westelgin.net](mailto:planning@westelgin.net)

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**From:** Brian Lima <[blima@ELGIN.ca](mailto:blima@ELGIN.ca)>  
**Sent:** February 9, 2022 10:09 AM  
**To:** Patrick Neal <[pneal@ptsl.com](mailto:pneal@ptsl.com)>; Bryan Pearce <[planning@westelgin.net](mailto:planning@westelgin.net)>  
**Cc:** Rajan Philips <[rphilips@ptsl.com](mailto:rphilips@ptsl.com)>  
**Subject:** RE: (220022) Tim Hortons, West Elgin TIS - Pre-Study Consultation

Good Morning Patrick,

Your proposal seems reasonable to me.

I'll defer to Bryan to advise of any nearby developments for inclusion.

Regards,

**Brian Lima, P.Eng.**

*General Manager of Engineering, Planning & Enterprise / Deputy CAO*



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**From:** Patrick Neal <[pneal@ptsl.com](mailto:pneal@ptsl.com)>  
**Sent:** February 9, 2022 9:50 AM  
**To:** Brian Lima <[blima@ELGIN.ca](mailto:blima@ELGIN.ca)>; [planning@westelgin.net](mailto:planning@westelgin.net)  
**Cc:** Rajan Philips <[rphilips@ptsl.com](mailto:rphilips@ptsl.com)>  
**Subject:** (220022) Tim Hortons, West Elgin TIS - Pre-Study Consultation

Attention: Brian Lima (Elgin County) & Bryan Pearce (West Elgin)

Hi Brian and Bryan,

Paradigm has been retained to complete a Transportation Impact Study (TIS) for the proposed Tim Hortons development located at the northwest corner of Munroe Street and Graham Road in West Elgin, Elgin County.

The proposed development will include a new 38-seat, 2240-sq.ft. GFA Tim Hortons outlet with drive-thru arrangement. An all-moves access is proposed on Munroe Street.

The proposed site plan is attached.

The Municipality of West Elgin and Elgin County have asked for a TIS in support of the development.

Based on the above we will prepare the TIS with the following principles and assumptions and ask for these to be reviewed/confirmed:

- Weekday AM/PM and Saturday peak hours of traffic for analysis;
  - Study Area Intersections:
    - Munroe Street & Graham Road; and
    - Access intersection on Munroe Street.
- We will collect traffic data in February 2022.**
- Horizon Year: Five years after the opening year of development.
  - Background Growth Rate: 2.0% per annum. **Please confirm.**
  - Background Developments: **Please advise if any nearby developments are to be included.**
  - Trip Generation: ITE Trip Generation Manual (11<sup>th</sup> Edition) will be used to determine vehicle trips. We will also use rates obtained from Traffic Impact Studies for Tim Hortons outlets in Ontario.
  - Trip Distribution/Assignment: Will be based on existing traffic distribution at the Munroe Street/Graham Drive intersection.
  - Drive-thru Assessment: We will review the drive-thru for stacking and onsite traffic circulation.

Please let us know if you have any questions.

Regards,

**Patrick Neal**  
*Transportation Consultant*



**Paradigm Transportation Solutions Limited**

5A-150 Pinebush Road, Cambridge ON N1R 8J8

p: 416.479.9684 x510

m: 416.688.7338

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w: [www.ptsl.com](http://www.ptsl.com)

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**Notice:** A number of Elgin County services are unavailable at this time due to the evolving health situation (COVID-19). Please visit [www.elgincounty.ca](http://www.elgincounty.ca) for daily updates.

## Appendix B

### Existing Traffic Data





Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@ptsl.com

Count Name: Munroe Street & Graham Road - Weekday  
Site Code: 220022  
Start Date: 02/24/2022  
Page No: 1

### Turning Movement Data

Start Time	Munroe Street Eastbound						Munroe Street Westbound						Graham Road Northbound						Graham Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	4	0	0	0	1	4	0	1	1	0	1	2	1	33	0	0	1	34	0	6	0	0	0	6	46
7:15 AM	0	1	1	0	0	2	0	0	0	0	0	0	0	18	0	0	0	18	0	9	1	0	1	10	30
7:30 AM	1	0	1	0	1	2	0	0	0	0	1	0	0	17	0	1	2	18	1	19	1	0	0	21	41
7:45 AM	4	1	2	0	0	7	0	0	1	0	2	1	1	17	2	0	0	20	3	30	0	0	0	33	61
Hourly Total	9	2	4	0	2	15	0	1	2	0	4	3	2	85	2	1	3	90	4	64	2	0	1	70	178
8:00 AM	2	0	0	0	0	2	1	0	2	0	0	3	1	15	1	0	0	17	2	15	1	0	0	18	40
8:15 AM	0	0	0	0	0	0	1	0	0	0	1	1	1	19	0	0	0	20	6	15	1	0	0	22	43
8:30 AM	2	0	0	0	2	2	1	2	1	0	0	4	0	28	1	0	2	29	6	33	2	0	0	41	76
8:45 AM	1	0	1	0	1	2	1	0	1	0	2	2	1	33	0	1	2	35	4	31	6	0	0	41	80
Hourly Total	5	0	1	0	3	6	4	2	4	0	3	10	3	95	2	1	4	101	18	94	10	0	0	122	239
9:00 AM	5	1	0	0	0	6	1	1	1	0	3	3	1	27	0	0	1	28	3	21	0	0	0	24	61
9:15 AM	1	0	0	0	0	1	1	1	1	0	2	3	0	19	4	1	0	24	1	14	1	0	0	16	44
9:30 AM	3	0	2	0	1	5	0	0	2	0	0	2	2	17	5	1	0	25	1	23	2	0	0	26	58
9:45 AM	4	0	1	0	0	5	2	0	0	0	0	2	6	10	4	2	2	22	4	14	1	0	0	19	48
Hourly Total	13	1	3	0	1	17	4	2	4	0	5	10	9	73	13	4	3	99	9	72	4	0	0	85	211
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11:30 AM	2	0	1	0	0	3	1	0	3	0	0	4	1	19	0	0	2	20	0	25	3	0	0	28	55
11:45 AM	2	0	0	0	4	2	3	0	1	0	0	4	0	22	1	1	2	24	0	12	1	0	0	13	43
Hourly Total	4	0	1	0	4	5	4	0	4	0	0	8	1	41	1	1	4	44	0	37	4	0	0	41	98
12:00 PM	3	1	4	0	0	8	1	0	4	0	3	5	1	19	1	0	1	21	0	38	6	0	0	44	78
12:15 PM	5	0	1	0	0	6	2	0	1	0	6	3	0	32	2	1	3	35	0	30	1	0	0	31	75
12:30 PM	1	0	1	0	0	2	3	1	3	0	2	7	3	20	1	0	0	24	2	22	0	0	2	24	57
12:45 PM	2	0	2	0	0	4	3	0	3	0	1	6	5	13	5	3	2	26	7	19	2	0	0	28	64
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*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Hourly Total	5	0	12	0	1	17	1	2	6	0	4	9	8	51	2	2	2	63	6	38	1	1	0	46	135
4:00 PM	2	0	0	0	1	2	1	0	3	0	0	4	2	36	2	0	2	40	0	30	2	0	0	32	78
4:15 PM	0	0	0	1	0	0	0	0	2	0	0	2	3	32	2	0	1	37	1	39	0	0	0	40	79
4:30 PM	4	0	0	0	0	4	1	0	6	0	0	7	2	42	0	0	2	44	0	38	2	0	0	40	95
4:45 PM	1	0	0	0	1	1	2	0	3	0	0	5	2	23	2	1	0	28	0	28	4	0	0	32	66
Hourly Total	7	0	0	0	3	7	4	0	14	0	0	18	9	133	6	1	5	149	1	135	8	0	0	144	318
5:00 PM	2	0	1	0	1	3	0	0	1	0	1	1	1	23	2	0	0	26	0	29	0	1	0	30	60
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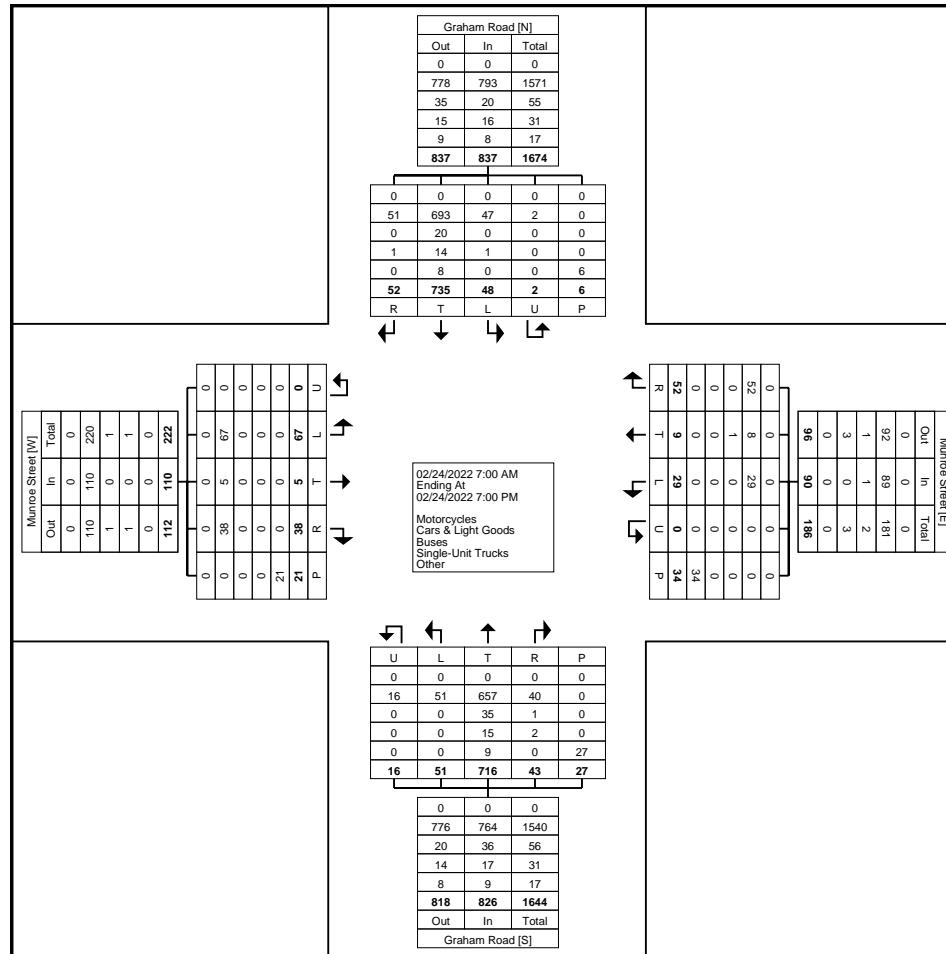
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5:45 PM	4	0	3	0	1	7	0	0	1	0	0	1	0	16	0	0	0	16	0	25	2	0	0	27	51
Hourly Total	9	1	6	0	3	16	0	1	4	0	4	5	1	79	6	2	0	88	1	111	9	1	0	122	231
6:00 PM	1	0	0	0	0	1	1	0	0	0	0	1	3	21	0	0	0	24	0	28	0	0	0	28	54
6:15 PM	0	0	1	0	2	1	1	0	1	0	0	2	1	16	0	0	0	17	0	18	5	0	0	23	43
6:30 PM	1	0	0	0	0	1	1	0	1	0	0	2	3	22	2	0	0	27	0	12	0	0	1	12	42
6:45 PM	2	0	2	0	2	4	0	0	1	0	2	1	2	16	0	0	0	18	0	17	0	0	2	17	40
Hourly Total	4	0	3	0	4	7	3	0	3	0	2	6	9	75	2	0	0	86	0	75	5	0	3	80	179
Grand Total	67	5	38	0	21	110	29	9	52	0	34	90	51	716	43	16	27	826	48	735	52	2	6	837	1863
Approach %	60.9	4.5	34.5	0.0	-	-	32.2	10.0	57.8	0.0	-	-	6.2	86.7	5.2	1.9	-	-	5.7	87.8	6.2	0.2	-	-	-
Total %	3.6	0.3	2.0	0.0	-	5.9	1.6	0.5	2.8	0.0	-	4.8	2.7	38.4	2.3	0.9	-	44.3	2.6	39.5	2.8	0.1	-	44.9	-
Motorcycles	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	0	0	
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Cars & Light Goods	67	5	38	0	-	110	29	8	52	0	-	89	51	657	40	16	-	764	47	693	51	2	-	793	1756
% Cars & Light Goods	100.0	100.0	100.0	-	-	100.0	100.0	88.9	100.0	-	-	98.9	100.0	91.8	93.0	100.0	-	92.5	97.9	94.3	98.1	100.0	-	94.7	94.3
Buses	0	0	0	0	-	0	0	1	0	0	-	1	0	35	1	0	-	36	0	20	0	0	-	20	57
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	11.1	0.0	-	-	1.1	0.0	4.9	2.3	0.0	-	4.4	0.0	2.7	0.0	0.0	-	2.4	3.1
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	15	2	0	-	17	1	14	1	0	-	16	33
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	2.1	4.7	0.0	-	2.1	2.1	1.9	1.9	0.0	-	1.9	1.8	
Articulated Trucks	0	0	0	0	-	0	0	0	0	-	0	0	9	0	0	-	9	0	8	0	0	-	8	17	
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	1.3	0.0	0.0	-	1.1	0.0	1.1	0.0	0.0	-	1.0	0.9	
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	
% Bicycles on Crosswalk	-	-	-	-	-	4.8	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	0.0	-	
Pedestrians	-	-	-	-	-	20	-	-	-	-	-	34	-	-	-	-	-	27	-	-	-	-	6	-	
% Pedestrians	-	-	-	-	-	95.2	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@ptsl.com

Count Name: Munroe Street & Graham Road - Weekday  
Site Code: 220022  
Start Date: 02/24/2022  
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@ptsl.com

Count Name: Munroe Street & Graham Road - Weekday  
Site Code: 220022  
Start Date: 02/24/2022  
Page No: 4

### Turning Movement Peak Hour Data (8:30 AM)

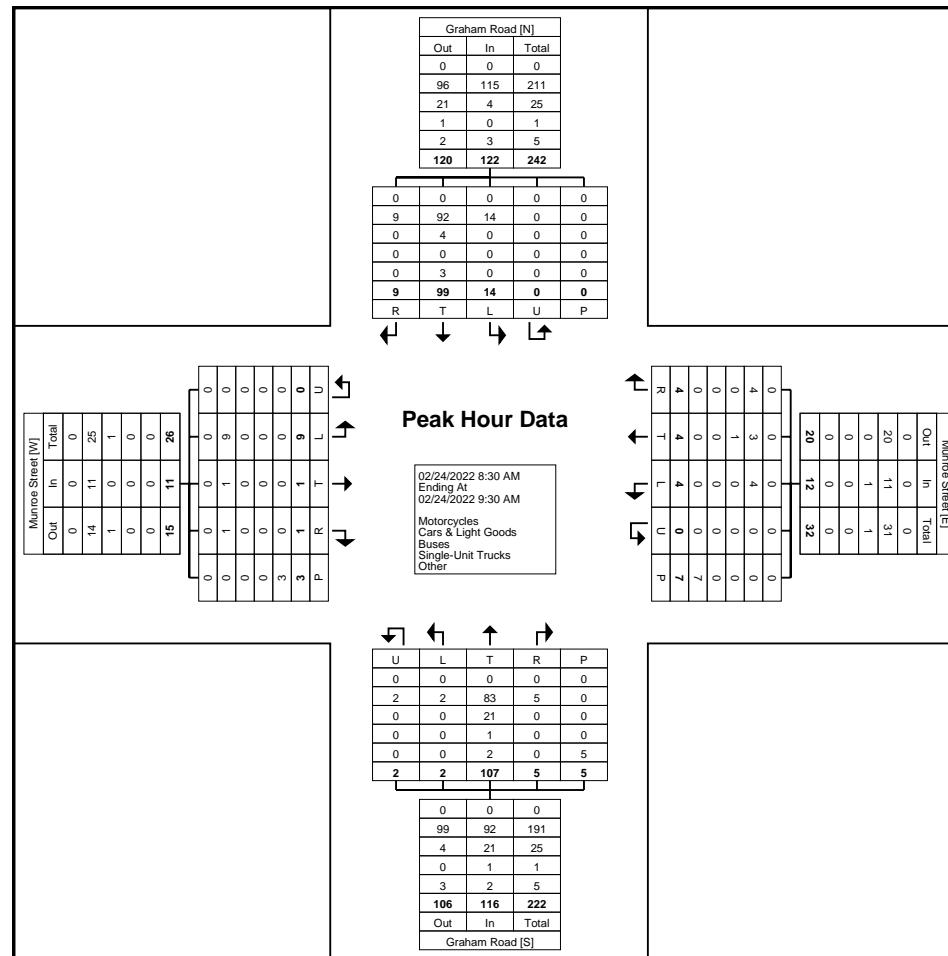
Start Time	Munroe Street Eastbound						Munroe Street Westbound						Graham Road Northbound						Graham Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:30 AM	2	0	0	0	2	2	1	2	1	0	0	4	0	28	1	0	2	29	6	33	2	0	0	41	76
8:45 AM	1	0	1	0	1	2	1	0	1	0	2	2	1	33	0	1	2	35	4	31	6	0	0	41	80
9:00 AM	5	1	0	0	0	6	1	1	1	0	3	3	1	27	0	0	1	28	3	21	0	0	0	24	61
9:15 AM	1	0	0	0	0	1	1	1	1	0	2	3	0	19	4	1	0	24	1	14	1	0	0	16	44
Total	9	1	1	0	3	11	4	4	4	0	7	12	2	107	5	2	5	116	14	99	9	0	0	122	261
Approach %	81.8	9.1	9.1	0.0	-	-	33.3	33.3	33.3	0.0	-	-	1.7	92.2	4.3	1.7	-	-	11.5	81.1	7.4	0.0	-	-	-
Total %	3.4	0.4	0.4	0.0	-	4.2	1.5	1.5	1.5	0.0	-	4.6	0.8	41.0	1.9	0.8	-	44.4	5.4	37.9	3.4	0.0	-	46.7	-
PHF	0.450	0.250	0.250	0.000	-	0.458	1.000	0.500	1.000	0.000	-	0.750	0.500	0.811	0.313	0.500	-	0.829	0.583	0.750	0.375	0.000	-	0.744	0.816
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	9	1	1	0	-	11	4	3	4	0	-	11	2	83	5	2	-	92	14	92	9	0	-	115	229
% Cars & Light Goods	100.0	100.0	100.0	-	-	100.0	100.0	75.0	100.0	-	-	91.7	100.0	77.6	100.0	100.0	-	79.3	100.0	92.9	100.0	-	-	94.3	87.7
Buses	0	0	0	0	-	0	0	1	0	0	-	1	0	21	0	0	-	21	0	4	0	0	-	4	26
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	25.0	0.0	-	-	8.3	0.0	19.6	0.0	0.0	-	18.1	0.0	4.0	0.0	-	-	3.3	10.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.9	0.0	0.0	-	0.9	0.0	0.0	0.0	-	-	0.0	0.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	3	0	0	-	3	5
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.9	0.0	0.0	-	1.7	0.0	3.0	0.0	-	-	2.5	1.9
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	33.3	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	7	-	-	-	-	-	5	-	-	-	-	-	0	-
% Pedestrians	-	-	-	-	-	66.7	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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Count Name: Munroe Street & Graham Road - Weekday  
Site Code: 220022  
Start Date: 02/24/2022  
Page No: 5



Turning Movement Peak Hour Data Plot (8:30 AM)



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
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Count Name: Munroe Street & Graham Road - Weekday  
Site Code: 220022  
Start Date: 02/24/2022  
Page No: 6

### Turning Movement Peak Hour Data (12:00 PM)

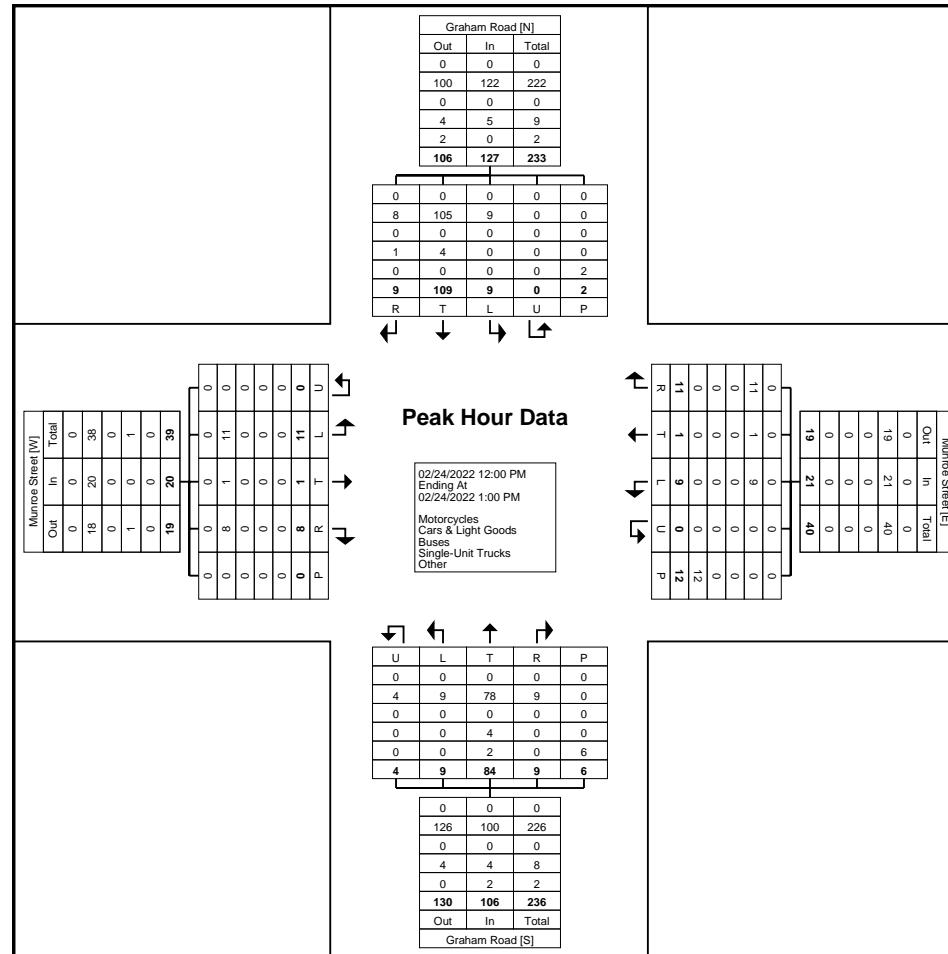
Start Time	Munroe Street Eastbound						Munroe Street Westbound						Graham Road Northbound						Graham Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	3	1	4	0	0	8	1	0	4	0	3	5	1	19	1	0	1	21	0	38	6	0	0	44	78
12:15 PM	5	0	1	0	0	6	2	0	1	0	6	3	0	32	2	1	3	35	0	30	1	0	0	31	75
12:30 PM	1	0	1	0	0	2	3	1	3	0	2	7	3	20	1	0	0	24	2	22	0	0	2	24	57
12:45 PM	2	0	2	0	0	4	3	0	3	0	1	6	5	13	5	3	2	26	7	19	2	0	0	28	64
Total	11	1	8	0	0	20	9	1	11	0	12	21	9	84	9	4	6	106	9	109	9	0	2	127	274
Approach %	55.0	5.0	40.0	0.0	-	-	42.9	4.8	52.4	0.0	-	-	8.5	79.2	8.5	3.8	-	-	7.1	85.8	7.1	0.0	-	-	-
Total %	4.0	0.4	2.9	0.0	-	7.3	3.3	0.4	4.0	0.0	-	7.7	3.3	30.7	3.3	1.5	-	38.7	3.3	39.8	3.3	0.0	-	46.4	-
PHF	0.550	0.250	0.500	0.000	-	0.625	0.750	0.250	0.688	0.000	-	0.750	0.450	0.656	0.450	0.333	-	0.757	0.321	0.717	0.375	0.000	-	0.722	0.878
Motorcycles	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0
Cars & Light Goods	11	1	8	0	-	20	9	1	11	0	-	21	9	78	9	4	-	100	9	105	8	0	-	122	263
% Cars & Light Goods	100.0	100.0	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	92.9	100.0	100.0	-	94.3	100.0	96.3	88.9	-	-	96.1	96.0
Buses	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	-	0	0	0	4	0	0	-	4	0	4	1	0	-	5	9
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	4.0	0.0	-	3.8	0.0	3.7	11.1	-	-	3.9	3.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	-	0	0	2	0	0	0	-	2	0	0	0	0	-	0	2
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	2.4	0.0	0.0	-	1.9	0.0	0.0	0.0	-	-	0.0	0.7	0.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	12	-	-	-	-	-	6	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@ptsl.com

Count Name: Munroe Street & Graham Road - Weekday  
Site Code: 220022  
Start Date: 02/24/2022  
Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@ptsl.com

Count Name: Munroe Street & Graham Road - Weekday  
Site Code: 220022  
Start Date: 02/24/2022  
Page No: 8

### Turning Movement Peak Hour Data (4:00 PM)

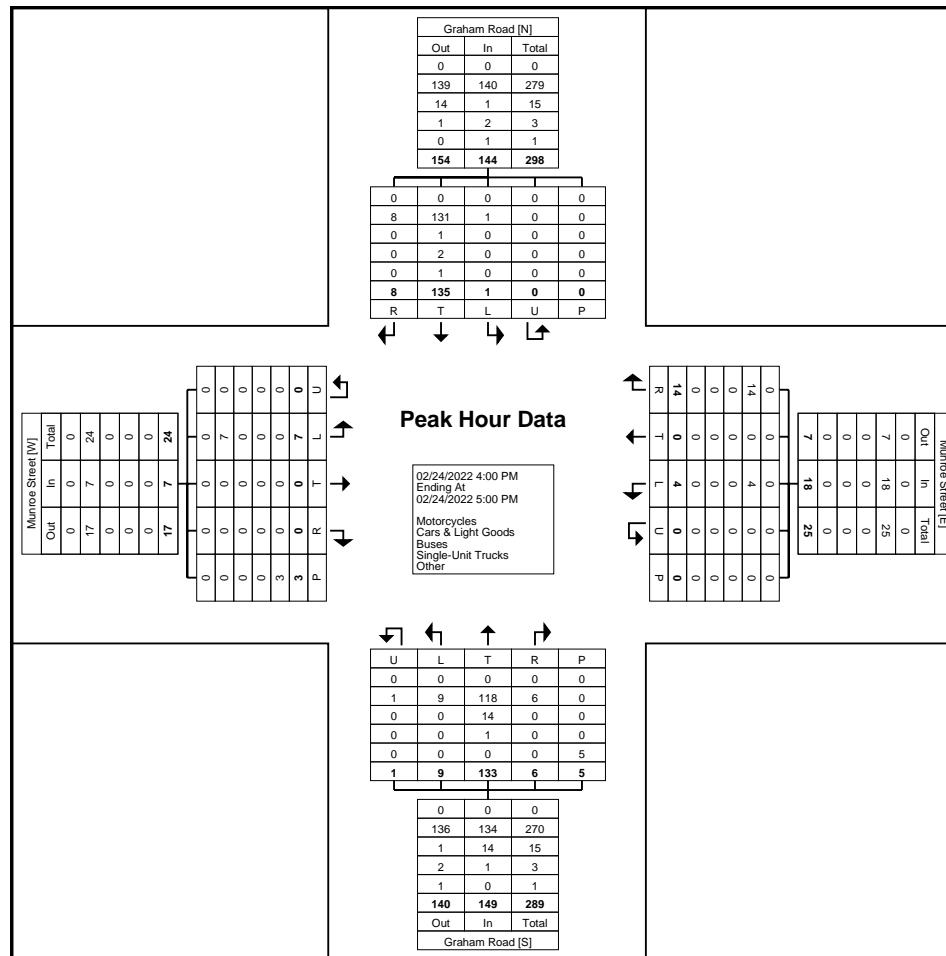
Start Time	Munroe Street Eastbound						Munroe Street Westbound						Graham Road Northbound						Graham Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	2	0	0	0	1	2	1	0	3	0	0	4	2	36	2	0	2	40	0	30	2	0	0	32	78
4:15 PM	0	0	0	0	1	0	0	0	2	0	0	2	3	32	2	0	1	37	1	39	0	0	0	40	79
4:30 PM	4	0	0	0	0	4	1	0	6	0	0	7	2	42	0	0	2	44	0	38	2	0	0	40	95
4:45 PM	1	0	0	0	1	1	2	0	3	0	0	5	2	23	2	1	0	28	0	28	4	0	0	32	66
Total	7	0	0	0	3	7	4	0	14	0	0	18	9	133	6	1	5	149	1	135	8	0	0	144	318
Approach %	100.0	0.0	0.0	0.0	-	-	22.2	0.0	77.8	0.0	-	-	6.0	89.3	4.0	0.7	-	-	0.7	93.8	5.6	0.0	-	-	-
Total %	2.2	0.0	0.0	0.0	-	2.2	1.3	0.0	4.4	0.0	-	5.7	2.8	41.8	1.9	0.3	-	46.9	0.3	42.5	2.5	0.0	-	45.3	-
PHF	0.438	0.000	0.000	0.000	-	0.438	0.500	0.000	0.583	0.000	-	0.643	0.750	0.792	0.750	0.250	-	0.847	0.250	0.865	0.500	0.000	-	0.900	0.837
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	-	-	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	
Cars & Light Goods	7	0	0	0	-	7	4	0	14	0	-	18	9	118	6	1	-	134	1	131	8	0	-	140	299
% Cars & Light Goods	100.0	-	-	-	-	100.0	100.0	-	100.0	-	-	100.0	100.0	88.7	100.0	100.0	-	89.9	100.0	97.0	100.0	-	-	97.2	94.0
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	14	0	0	-	14	0	1	0	0	-	1	15
% Buses	0.0	-	-	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	10.5	0.0	0.0	-	9.4	0.0	0.7	0.0	-	-	0.7	4.7
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	2	0	0	-	2	3
% Single-Unit Trucks	0.0	-	-	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.8	0.0	0.0	-	0.7	0.0	1.5	0.0	-	-	1.4	0.9
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Articulated Trucks	0.0	-	-	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.7	0.0	-	-	0.7	0.3	
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	-	0	0	
% Bicycles on Road	0.0	-	-	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	
Pedestrians	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	0	-	
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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Count Name: Munroe Street & Graham Road - Weekday  
Site Code: 220022  
Start Date: 02/24/2022  
Page No: 9



Turning Movement Peak Hour Data Plot (4:00 PM)



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@ptsl.com

Count Name: Munroe Street & Graham Road -  
Saturday  
Site Code: 220022  
Start Date: 02/26/2022  
Page No: 1

### Turning Movement Data

Start Time	Munroe Street Eastbound						Munroe Street Westbound						Graham Road Northbound						Graham Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
10:00 AM	1	0	0	0	0	1	1	0	0	0	0	1	1	28	0	2	0	31	1	18	0	0	0	19	52
10:15 AM	2	0	1	0	0	3	0	0	0	0	1	0	2	18	0	3	0	23	1	20	1	0	0	22	48
10:30 AM	1	0	2	0	1	3	0	0	2	0	0	2	2	28	2	0	3	32	0	19	4	0	0	23	60
10:45 AM	1	0	1	0	0	2	0	0	0	0	5	0	2	23	3	1	0	29	0	15	1	0	0	16	47
Hourly Total	5	0	4	0	1	9	1	0	2	0	6	3	7	97	5	6	3	115	2	72	6	0	0	80	207
11:00 AM	0	0	4	0	0	4	1	0	3	0	0	4	1	23	0	0	0	24	0	16	0	0	0	16	48
11:15 AM	1	0	1	0	0	2	0	0	0	0	3	0	2	21	2	1	3	26	1	15	2	0	0	18	46
11:30 AM	1	0	3	0	0	4	1	1	0	0	0	2	3	22	1	1	2	27	0	17	2	0	0	19	52
11:45 AM	3	0	2	0	0	5	0	0	1	0	0	1	4	27	0	1	0	32	0	18	1	0	0	19	57
Hourly Total	5	0	10	0	0	15	2	1	4	0	3	7	10	93	3	3	5	109	1	66	5	0	0	72	203
12:00 PM	0	0	3	0	1	3	1	0	3	0	3	4	1	27	3	0	1	31	0	20	2	0	0	22	60
12:15 PM	0	0	2	0	0	2	1	0	2	0	2	3	1	21	2	0	1	24	0	21	0	0	2	21	50
12:30 PM	3	0	2	0	0	5	0	0	1	0	1	1	1	21	0	0	1	22	0	19	2	0	0	21	49
12:45 PM	1	0	1	0	0	2	1	0	0	0	1	1	2	30	1	2	0	35	0	28	2	0	0	30	68
Hourly Total	4	0	8	0	1	12	3	0	6	0	7	9	5	99	6	2	3	112	0	88	6	0	2	94	227
1:00 PM	1	0	1	0	0	2	4	0	1	0	1	5	1	30	1	1	3	33	1	18	2	0	0	21	61
1:15 PM	0	0	3	0	0	3	3	0	1	0	0	4	6	13	0	1	3	20	1	17	3	0	0	21	48
1:30 PM	1	0	2	0	0	3	1	1	1	0	1	3	2	16	4	1	2	23	0	19	1	0	0	20	49
1:45 PM	3	0	3	0	0	6	0	0	0	0	0	0	2	20	2	2	1	26	0	17	0	0	0	17	49
Hourly Total	5	0	9	0	0	14	8	1	3	0	2	12	11	79	7	5	9	102	2	71	6	0	0	79	207
Grand Total	19	0	31	0	2	50	14	2	15	0	18	31	33	368	21	16	20	438	5	297	23	0	2	325	844
Approach %	38.0	0.0	62.0	0.0	-	-	45.2	6.5	48.4	0.0	-	-	7.5	84.0	4.8	3.7	-	-	1.5	91.4	7.1	0.0	-	-	-
Total %	2.3	0.0	3.7	0.0	-	5.9	1.7	0.2	1.8	0.0	-	3.7	3.9	43.6	2.5	1.9	-	51.9	0.6	35.2	2.7	0.0	-	38.5	-
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	19	0	31	0	-	50	14	2	15	0	-	31	33	367	21	16	-	437	5	293	23	0	-	321	839
% Cars & Light Goods	100.0	-	100.0	-	-	100.0	100.0	100.0	100.0	-	-	100.0	100.0	99.7	100.0	100.0	-	99.8	100.0	98.7	100.0	-	-	98.8	99.4
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	-	0	0	0	1	0	0	-	1	0	3	0	0	-	3	4
% Single-Unit Trucks	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	0.0	-	0.2	0.0	1.0	0.0	-	-	0.9	0.5
Articulated Trucks	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Articulated Trucks	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.3	0.0	-	-	0.3	0.1

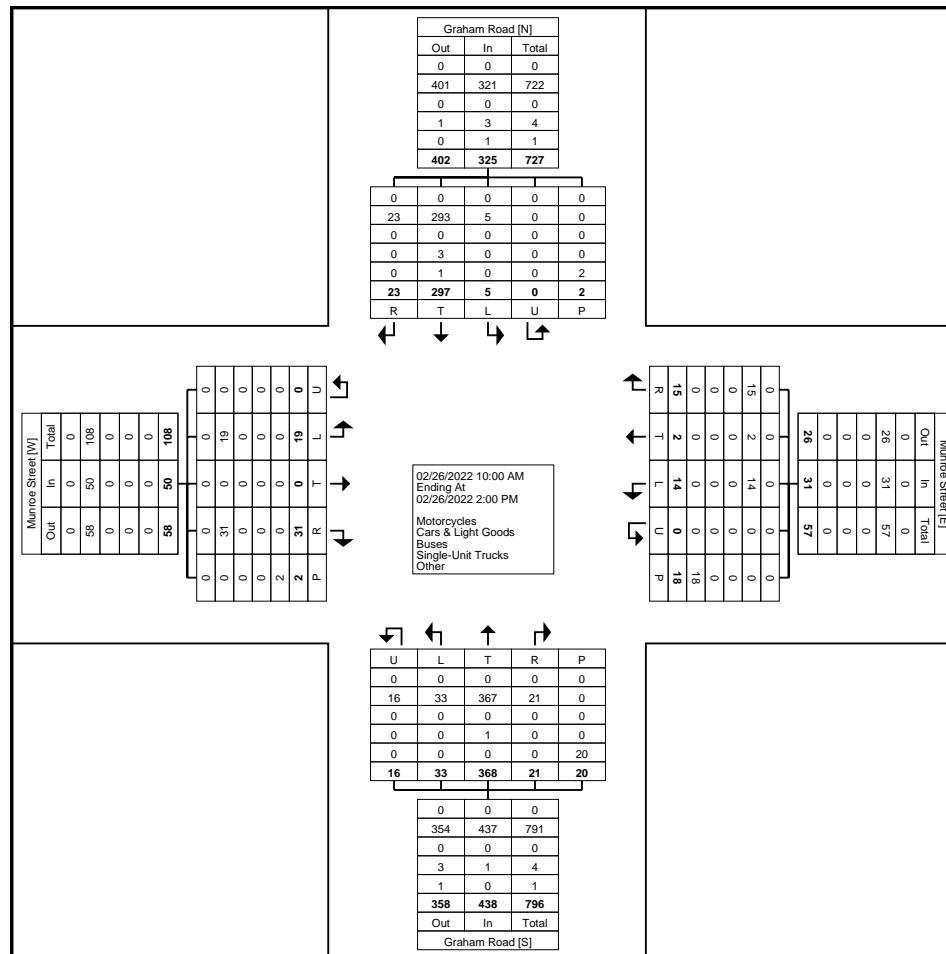
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-
% Bicycles on Crosswalk	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	0.0	-
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	18	-	-	-	-	-	20	-	-	-	-	2	-
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	100.0	-



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

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Count Name: Munroe Street & Graham Road -  
Saturday  
Site Code: 220022  
Start Date: 02/26/2022  
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited  
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8  
519-896-3163 cbowness@ptsl.com

Count Name: Munroe Street & Graham Road - Saturday  
Site Code: 220022  
Start Date: 02/26/2022  
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### Turning Movement Peak Hour Data (12:15 PM)

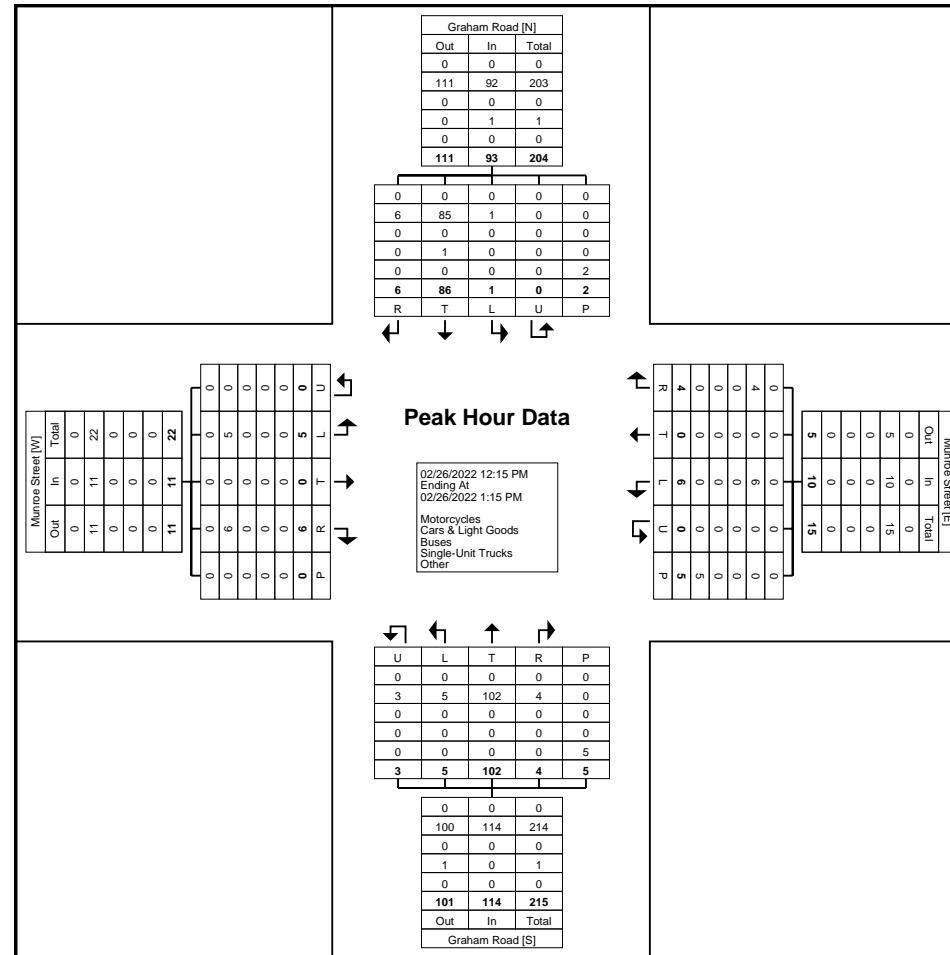
Start Time	Munroe Street Eastbound						Munroe Street Westbound						Graham Road Northbound						Graham Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:15 PM	0	0	2	0	0	2	1	0	2	0	2	3	1	21	2	0	1	24	0	21	0	0	2	21	50
12:30 PM	3	0	2	0	0	5	0	0	1	0	1	1	1	21	0	0	1	22	0	19	2	0	0	21	49
12:45 PM	1	0	1	0	0	2	1	0	0	0	1	1	2	30	1	2	0	35	0	28	2	0	0	30	68
1:00 PM	1	0	1	0	0	2	4	0	1	0	1	5	1	30	1	1	3	33	1	18	2	0	0	21	61
Total	5	0	6	0	0	11	6	0	4	0	5	10	5	102	4	3	5	114	1	86	6	0	2	93	228
Approach %	45.5	0.0	54.5	0.0	-	-	60.0	0.0	40.0	0.0	-	-	4.4	89.5	3.5	2.6	-	-	1.1	92.5	6.5	0.0	-	-	-
Total %	2.2	0.0	2.6	0.0	-	4.8	2.6	0.0	1.8	0.0	-	4.4	2.2	44.7	1.8	1.3	-	50.0	0.4	37.7	2.6	0.0	-	40.8	-
PHF	0.417	0.000	0.750	0.000	-	0.550	0.375	0.000	0.500	0.000	-	0.500	0.625	0.850	0.500	0.375	-	0.814	0.250	0.768	0.750	0.000	-	0.775	0.838
Motorcycles	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	5	0	6	0	-	11	6	0	4	0	-	10	5	102	4	3	-	114	1	85	6	0	-	92	227
% Cars & Light Goods	100.0	-	100.0	-	-	100.0	100.0	-	100.0	-	-	100.0	100.0	100.0	100.0	-	100.0	100.0	98.8	100.0	-	-	-	98.9	99.6
Buses	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Single-Unit Trucks	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	1.2	0.0	-	-	1.1	0.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	0	0	-	0	0	0	0	-	0	0	0
% Bicycles on Road	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	-	0	-	-	-	-	5	-	-	-	-	-	5	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited  
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Count Name: Munroe Street & Graham Road -  
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Site Code: 220022  
Start Date: 02/26/2022  
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Turning Movement Peak Hour Data Plot (12:15 PM)

## Appendix C

### Existing Traffic Operations Reports









## Appendix D

### 2028 Background Traffic Operations Reports









## Appendix E

### 2028 Total Traffic Operations Reports



Lanes, Volumes, Timings  
1: Munroe Street & Site Access

2028 Total AM Peak Hour  
Tim Hortons, West Elgin TIS (220022)

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	8	7	15	158	161	5
Future Volume (vph)	8	7	15	158	161	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.876		0.996		
Flt Protected		0.974		0.954		
Satd. Flow (prot)	0	1814	1632	0	1770	0
Flt Permitted		0.974		0.954		
Satd. Flow (perm)	0	1814	1632	0	1770	0
Link Speed (k/h)	50	50	50			
Link Distance (m)	112.1	74.2		83.1		
Travel Time (s)	8.1	5.3		6.0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	8	16	172	175	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	17	188	0	180	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0	0.0		3.6		
Link Offset(m)	0.0	0.0		0.0		
Crosswalk Width(m)	4.8	4.8		4.8		
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control	Free	Free		Stop		
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	26.4%					
Analysis Period (min)	15					
<b>ICU Level of Service A</b>						

HCM 6th TWSC  
1: Munroe Street & Site Access

2028 Total AM Peak Hour  
Tim Hortons, West Elgin TIS (220022)

Intersection	EBL	EBT	WBT	WBR	SBL	SBR
Int Delay, s/veh				5		
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol. veh/h	8	7	15	158	161	5
Future Vol. veh/h	8	7	15	158	161	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	8	16	172	175	5
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	188	0	-	0	128	102
Stage 1	-	-	-	-	102	-
Stage 2	-	-	-	-	26	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1386	-	-	-	866	953
Stage 1	-	-	-	-	922	-
Stage 2	-	-	-	-	997	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1386	-	-	-	860	953
Mov Cap-2 Maneuver	-	-	-	-	860	-
Stage 1	-	-	-	-	916	-
Stage 2	-	-	-	-	997	-
Approach	EB	WB	SB			
HCM Control Delay, s	4.1	0		10.3		
HCM LOS				B		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1386	-	-	-	863	
HCM Lane V/C Ratio	0.006	-	-	-	0.209	
HCM Control Delay (s)	7.6	0	-	-	10.3	
HCM Lane LOS	A	A	-	-	B	
HCM 95th %tile Q(veh)	0	-	-	-	0.8	



Lanes, Volumes, Timings  
1: Munroe Street & Site Access

2028 Total PM Peak Hour  
Tim Hortons, West Elgin TIS (220022)

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	6	17	76	75	2
Future Volume (vph)	2	6	17	76	75	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.889		0.997		
Flt Protected		0.989		0.953		
Satd. Flow (prot)	0	1842	1656	0	1770	0
Flt Permitted		0.989		0.953		
Satd. Flow (perm)	0	1842	1656	0	1770	0
Link Speed (k/h)		50	50	50		
Link Distance (m)		112.1	74.2	83.1		
Travel Time (s)		8.1	5.3	6.0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	7	18	83	82	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	9	101	0	84	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0	0.0		3.6		
Link Offset(m)	0.0	0.0		0.0		
Crosswalk Width(m)	4.8	4.8		4.8		
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25			15	25	15
Sign Control	Free	Free		Stop		
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.5%				ICU Level of Service A	
Analysis Period (min)	15					

HCM 6th TWSC  
1: Munroe Street & Site Access

2028 Total PM Peak Hour  
Tim Hortons, West Elgin TIS (220022)

Intersection						
Int Delay, s/veh	4.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol. veh/h	2	6	17	76	75	2
Future Vol. veh/h	2	6	17	76	75	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	7	18	83	82	2
<b>Major/Minor</b>						
Conflicting Flow All	101	0	-	0	71	60
Stage 1	-	-	-	-	60	-
Stage 2	-	-	-	-	11	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1491	-	-	-	933	1005
Stage 1	-	-	-	-	963	-
Stage 2	-	-	-	-	1012	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1491	-	-	-	932	1005
Mov Cap-2 Maneuver	-	-	-	-	932	-
Stage 1	-	-	-	-	962	-
Stage 2	-	-	-	-	1012	-
<b>Approach</b>						
Approach	EB	WB	SB			
HCM Control Delay, s	1.9	0		9.2		
HCM LOS				A		
<b>Minor Lane/Major Mvmt</b>						
Capacity (veh/h)	1491	-	-	-	934	
HCM Lane V/C Ratio	0.001	-	-	-	0.09	
HCM Control Delay (s)	7.4	0	-	-	9.2	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.3	



Lanes, Volumes, Timings  
1: Munroe Street & Site Access

2028 Total Saturday Peak Hour  
Tim Hortons, West Elgin TIS (220022)

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	6	8	11	95	97	2
Future Volume (vph)	6	8	11	95	97	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.879		0.997		
Flt Protected		0.979		0.953		
Satd. Flow (prot)	0	1824	1637	0	1770	0
Flt Permitted		0.979		0.953		
Satd. Flow (perm)	0	1824	1637	0	1770	0
Link Speed (k/h)	50	50	50			
Link Distance (m)	112.1	74.2	83.1			
Travel Time (s)	8.1	5.3	6.0			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	9	12	103	105	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	16	115	0	107	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	0.0	0.0	3.6			
Link Offset(m)	0.0	0.0	0.0			
Crosswalk Width(m)	4.8	4.8	4.8			
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25	15	
Sign Control	Free	Free		Stop		
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	18.6%		ICU Level of Service A			
Analysis Period (min)	15					

HCM 6th TWSC  
1: Munroe Street & Site Access

2028 Total Saturday Peak Hour  
Tim Hortons, West Elgin TIS (220022)

Intersection	EBL	EBT	WBT	WBR	SBL	SBR
Int Delay, s/veh	4.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Vol. veh/h	6	8	11	95	97	2
Future Vol. veh/h	6	8	11	95	97	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	9	12	103	105	2
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	115	0	-	0	87	64
Stage 1	-	-	-	-	64	-
Stage 2	-	-	-	-	23	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1474	-	-	-	914	1000
Stage 1	-	-	-	-	959	-
Stage 2	-	-	-	-	1000	-
Platoon blocked, %	-	-	-	-		
Mov Cap-1 Maneuver	1474	-	-	-	909	1000
Mov Cap-2 Maneuver	-	-	-	-	909	-
Stage 1	-	-	-	-	954	-
Stage 2	-	-	-	-	1000	-
Approach	EB	WB	SB			
HCM Control Delay, s	3.2	0	9.5			
HCM LOS			A			
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1474	-	-	-	911	
HCM Lane V/C Ratio	0.004	-	-	-	0.118	
HCM Control Delay (s)	7.5	0	-	-	9.5	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.4	



## Appendix F

### OTM Signal Warrants



# Signal Justification Calculation for Forecasted Volumes

## (OTM Book 12 - Justification 7)



Horizon Year: 2028  
 Region/City/Township: Municipality of West Elgin

Major Street: Graham Road  
 Minor Street: Munroe Street

North/South?: Y

Number of Approach Lanes: 1  
 Tee Intersection? N  
 Flow Conditions: Restricted

PM Forecast Only? N

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

Time Period	Major Street						Minor Street						Peds Crossing Main Road	
	Graham Road						Munroe Street							
	Northbound			Southbound			Eastbound			Westbound				
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right		
AM Peak Hour	78	82	5	14	70	91	89	1	78	4	4	4	0	
PM Peak Hour	47	131	6	1	133	46	45	0	36	4	0	14	0	
Average Hourly Volume	31	53	3	4	51	34	34	0	29	2	1	5	0	

Warrant	AHV
1A - All	246
1B - Minor	70
2A - Major	176
2B - Cross	37

### Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
		Free	Restricted	Free	Restricted	
	All Approaches	480	720	600	900	246
		% Fulfilled		34.1%		

1B	Approach Lanes	1		2 or more		Average Hourly Volume
		Free	Restricted	Free	Restricted	
	Minor Street Approaches	120	170	120	170	70
		% Fulfilled		41.0%		

### Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
		Free	Restricted	Free	Restricted	
	Major Street Approaches	480	720	600	900	176
		% Fulfilled		24.4%		

2B	Approach Lanes	1		2 or more		Average Hourly Volume
		Free	Restricted	Free	Restricted	
	Traffic Crossing Major Street	50	75	50	75	37
		% Fulfilled		48.7%		

## Signal Justification Calculation for Forecasted Volumes

### (OTM Book 12 - Justification 7)



Horizon Year: 2028  
 Region/City/Township: Municipality of West Elgin

Major Street: Graham Road  
 Minor Street: Munroe Street

North/South?: Y

Number of Approach Lanes: 1  
 Tee Intersection? N  
 Flow Conditions: Restricted

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

PM Forecast Only? Y

Time Period	Major Street						Minor Street						Peds Crossing Main Road	
	Graham Road						Munroe Street							
	Northbound			Southbound			Eastbound			Westbound				
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right		
Saturday Peak Hour	78	82	5	14	70	91	89	1	78	4	4	4	0	
Average Hourly Volume	39	41	3	7	35	46	45	1	39	2	2	2	0	

Warrant	AHV
1A - All	260
1B - Minor	90
2A - Major	170
2B - Cross	49

#### Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
		Free	Restricted	Free	Restricted	
	All Approaches	480	720	600	900	% Fulfilled
						36.1%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
		Free	Restricted	Free	Restricted	
	Minor Street Approaches	120	X	120	170	90
						52.9%

#### Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
		Free	Restricted	Free	Restricted	
	Major Street Approaches	480	X	600	900	170
						23.6%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
		Free	Restricted	Free	Restricted	
	Traffic Crossing Major Street	50	X	50	75	49
						64.7%