



**436, 440, & 462
Ridge Road North
Fort Erie (Ridgeway) ON
Transportation Impact
Assessment**

Paradigm Transportation Solutions Limited

January 2022
210670



Project Number
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436, 440, & 462 Ridge Road North, Fort Erie (Ridgeway) ON Transportation Impact Assessment



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Executive Summary

Content

ePrime Construction Management retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Assessment (TIA) for a proposed residential development located at 436, 440, & 462 Ridge Road North in the Town of Fort Erie (Ridgeway).

This study determines the impacts of the development traffic on the surrounding road network and identifies the recommended improvements to accommodate the site generated traffic.

Development Concept

The site concept includes 13 townhouse units and 72 apartment units. Vehicle access to the site is proposed by a connection to Ridge Road North located approximately 160 metres south of the east leg of the Hazel Street intersection. Build-out of the site is anticipated to occur by Year 2027.

Conclusion

The main findings and conclusions of this study are as follows:

- ▶ **Base Year Traffic:** The study area intersections are operating at acceptable levels of service and all movements are well within capacity during the weekday AM and PM peak hours. No critical movements are noted.
- ▶ **Site Concept:** The site concept includes 13 townhouse units and 72 apartment units. Vehicle access to the site is proposed by a private driveway to Ridge Road North located approximately 160 metres south of Hazel Street. Build-out of the site is anticipated to occur by Year 2027 which is subject to change pending market conditions.
- ▶ **Trip Generation:** The site's trip generation is estimated to be approximately 47 AM peak hour vehicle trips and 54 PM peak hour vehicle trips.
- ▶ **Background Traffic:** The study area intersections are operating at acceptable levels of service and all movements are well within capacity during the weekday AM and PM peak hours. No critical movements are noted.
- ▶ **Total Traffic:** The study area intersections are operating at acceptable levels of service and all movements are well within



capacity during the weekday AM and PM peak hours. No critical movements are noted.

The site driveway is forecast to operate in the LOS A range with a v/c ratio of 0.05 or less during the weekday AM and PM peak hours. Queues on the Ridge Road North approaches to the site driveway are forecast to be one vehicle or less during the AM and PM peak hours.

- ▶ **Remedial Measures:** No changes to the existing lane configurations or traffic control are recommended to support the development of the subject site.

Recommendations

Based on the findings of this study, it is recommended that the site driveway approach to Ridge Road North operates as stop control. A stop sign should be placed on the driveway approach to Ridge Road North in accordance with the Ontario Traffic Manuals.



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1 Introduction

1.1 Overview

ePrime Construction Management retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Assessment (TIA) for a proposed residential development located at 436, 440, & 462 Ridge Road North in the Town of Fort Erie (Ridgeway).

Figure 1.1 illustrates the site location.

The scope of the study includes:

- ▶ Determine and assess the current study area traffic conditions;
- ▶ Forecast the additional traffic generated by the proposed development;
- ▶ Analyze the impacts of this additional traffic on the study area road network; and
- ▶ Recommend any necessary remedial measures required to mitigate these impacts.

Appendix A contains the pre-study consultation material and responses from the Town of Fort Erie and Niagara Region. The study generally follows the Niagara Region¹ Transportation Impact Study (TIS) guidelines.

The study area intersections assessed in this study include:

- ▶ Ridge Road North at Dominion Road (signalized);
- ▶ Ridge Road North at Hazel Street (unsignalized); and
- ▶ Ridge Road North at the proposed site driveway (unsignalized).

¹ *Guidelines for Transportation Impact Studies*, Niagara Region, May 2012.





Site Location

Ridge Road North
 210670

Figure 1.1

2 Existing Conditions

2.1 Road Network

The roadways of interest within the study area include:

- ▶ **Ridge Road North** is a north / south local road. The road has a two-lane cross-section and a posted speed limit of 50 km/h. Sidewalks are provided on both sides of the road. The intersection with Dominion Road (Regional Road 1) is signalized and the intersection with Hazel Street is stop controlled.
- ▶ **Dominion Road** (Regional Road 1) is an east / west regional road². The road has a two-lane cross-section and a posted speed limit of 50 km/h. Sidewalks are provided on both sides of the road; and
- ▶ **Hazel Street** is an east / west local road with a two-lane cross-section. The road has a posted speed limit of 40 km/h west of Ridge Road North and a 50 km/h to the east. A sidewalk is provided on the north side of the road west of Ridge Road North. The east leg of the Ridge Road North intersection is offset approximately 10 m south of the west leg.

Figure 2.1 illustrates the existing lane configuration and traffic control at the study area intersections.

2.2 Active Transportation

The Town's active transportation infrastructure includes on-street and off-street cycling facilities and pedestrian walkways. On-street cycling facilities comprise of cycling lanes, signed cycling routes, and paved shoulders. Off-street facilities are in the form of multi-use or informal trails. **Figure 2.2** illustrates the active transportation facilities near the subject site³.

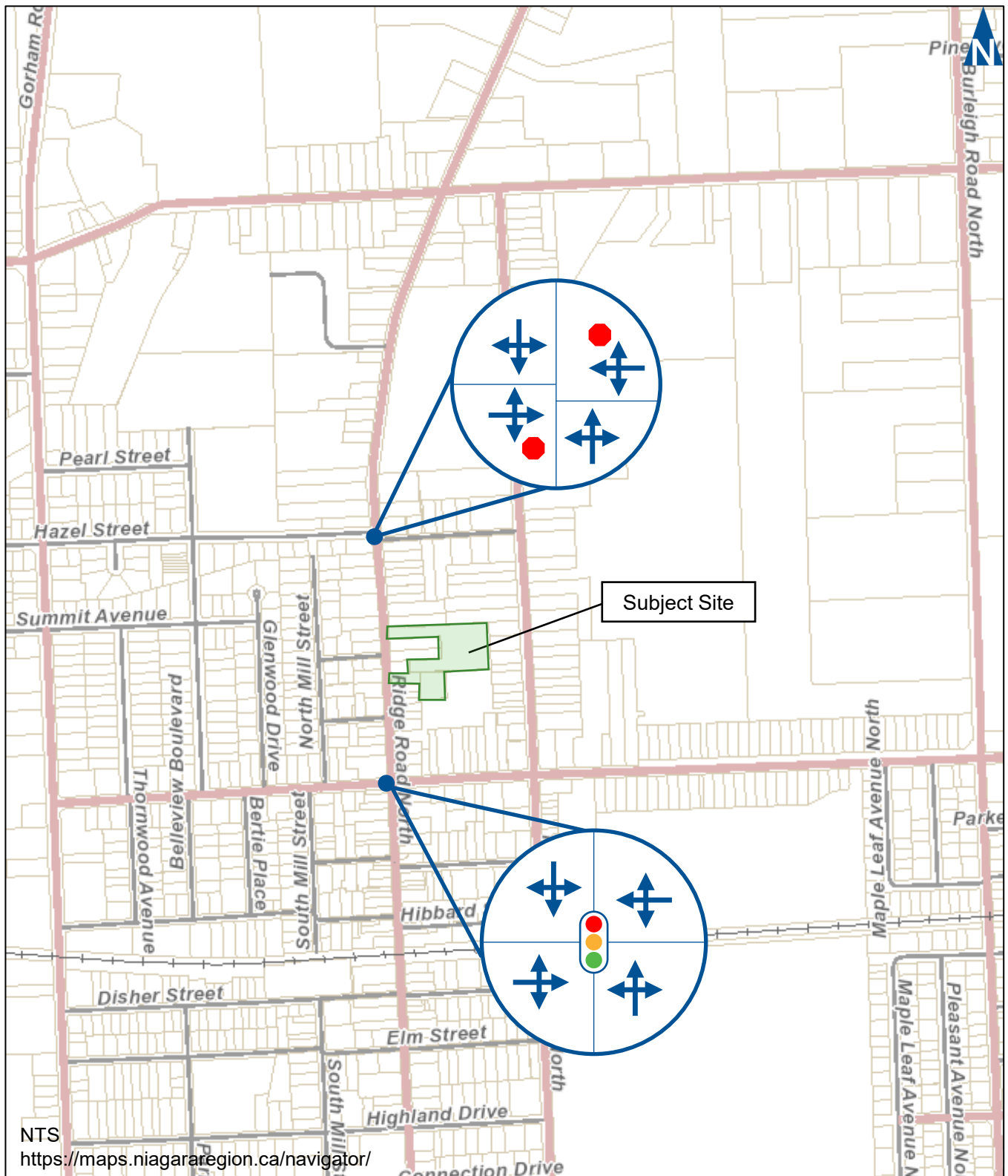
The Region's Strategic Cycling Network Technical Paper⁴ identifies the cycling network in Niagara Region. An infill link is identified on Ridge Road North, but no specific planned improvements are noted.

² <https://www.niagararegion.ca/exploring/pdf/regional-niagara.pdf>, Printed 2020-03-17.

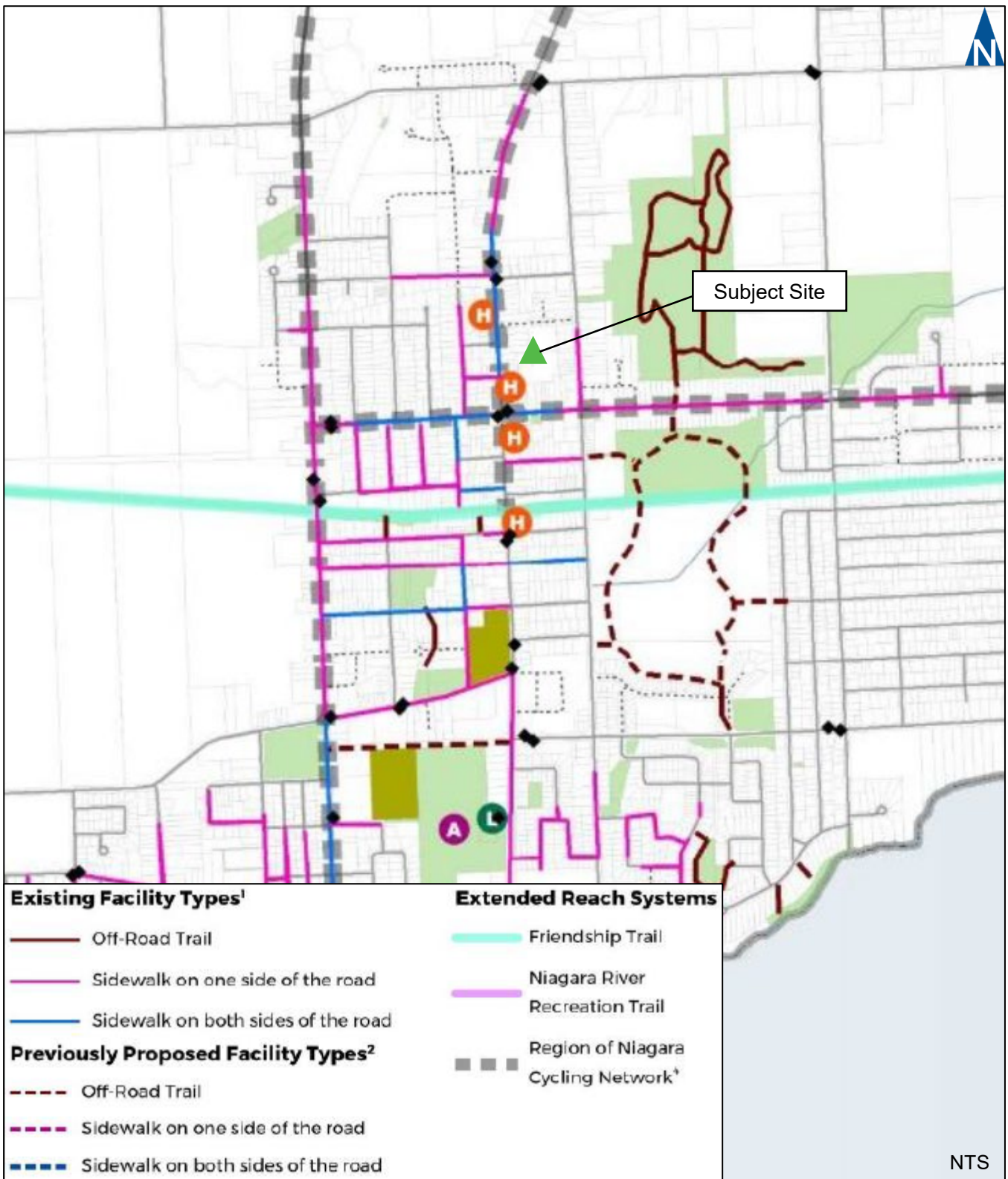
³ Map 2b – Existing and Previously Planned Pedestrian and Trail Conditions – Active Transportation Master Plan Technical Memo #1, Town of Fort Erie, June 2019.

⁴ Strategic Cycling Network Development Technical Paper, Niagara Region, June 2017.





Existing Lane Configuration & Traffic Control



2.3 Transit Service

Fort Erie Transit operates the public transit system in the Town of Fort Erie. Starting 04 October 2021, the Town has replaced its fixed-route service with an On-Demand service⁵.

The On-Demand service is a shared-ride public transit service without a fixed schedule or route. The vehicles' path is optimized by software and is based upon rider trip requests. As the service operates within the entire Town, riders can travel without transfers. Riders may have to walk up to 400 metres to a bus stop or point of interest to meet their vehicle. Rides can be booked by calling customer service, booking online, or through the app from Monday to Saturday from 6:00 AM to 9:00 PM. The service is unavailable Sunday or Statutory holidays.

Fort Erie Accessible Specialized Transit (FAST) provides curb-to-curb transportation services within Fort Erie to people who, due to a mobility challenge, would be physically unable to board the conventional transit buses or walk 175 metres. Service is available Monday to Saturday from 6:00 AM to 9:00 PM but is unavailable Sunday or Statutory holidays.

2.4 Traffic Volumes

Existing traffic volumes were collected by Paradigm on 11 November 2021.

An adjustment factor was applied to the November 2021 data to account for the impacts on travel patterns related to the COVID-19 pandemic. The factor was determined by comparing the November 2021 Turning Movement Count (TMC) data to historical data provided by Niagara Region for the Ridge Road North and Dominion Road intersection.

Figure 2.3 illustrates the forecast base year weekday peak hour traffic volumes.

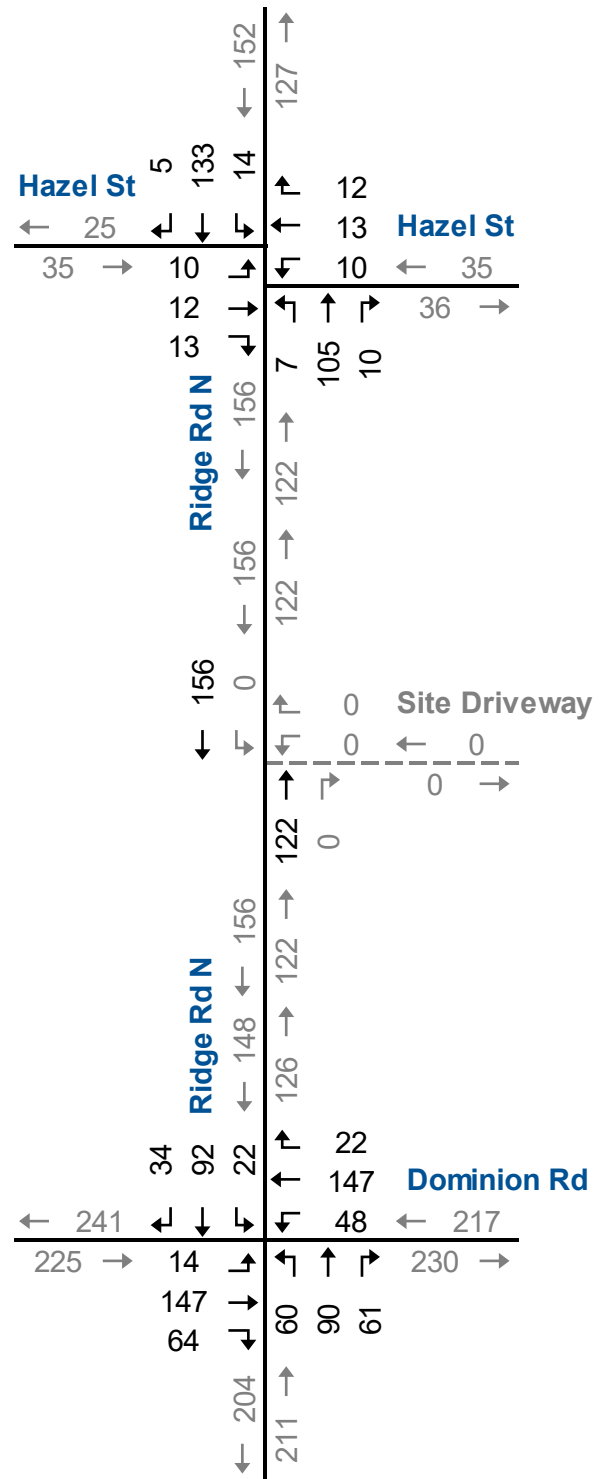
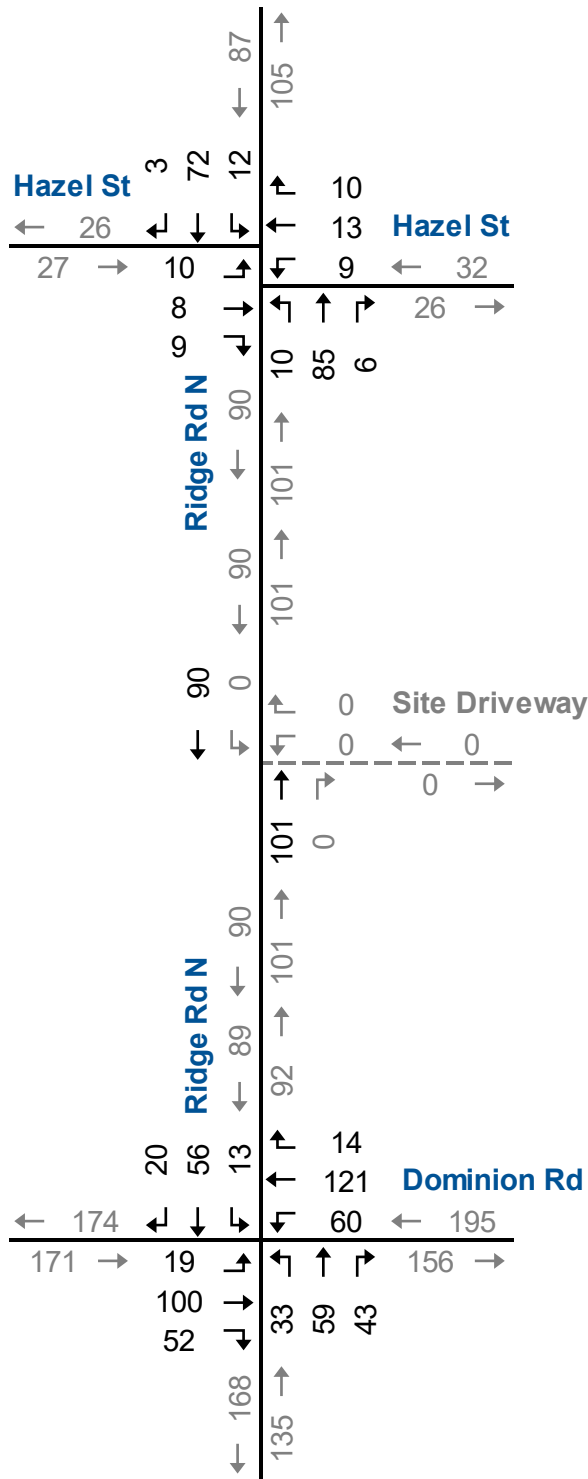
Appendix B contains the TMC and signal timing data.

⁵ www.fetransit.ca



AM Peak Hour

PM Peak Hour



Base Year Traffic Volumes

2.5 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the efficiency of traffic flow 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 wanting to make a movement, compared to the estimated capacity for that movement. The capacity is based on several criteria related to the opposing traffic flows. The highest possible rating is LOS A, under which the average total delay is equal or less than 10 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections (50 seconds at unsignalized), the movement is considered to have a LOS F and remedial measures are usually implemented if they are feasible.

The operations of the intersections in the study area were evaluated under existing conditions using Synchro 10 and HCM 2000 procedures. The intersection analysis considered three separate measures of performance:

- ▶ The LOS for each turning movement;
- ▶ The volume to capacity ratio (v/c) for each movement; and
- ▶ The 95th percentile queue lengths using Synchro 10.

Under the Region's TIS Guidelines, the operational analysis must include identification of signalized and unsignalized intersections where:

- ▶ Volume to Capacity ratios (v/c) for through or shared through/turning movements that exceed 0.85 at a signalized intersection;
- ▶ v/c ratios for exclusive turning movements that exceed 0.90 at a signalized intersection;
- ▶ The 95th percentile queues for an individual movement are projected to exceed available turning lane storage; and
- ▶ LOS, based on average delay per vehicle on individual movements, operates at LOS D or worse for unsignalized intersections.

Table 2.1 summarizes the level of service conditions.

The study area intersections are operating at acceptable levels of service and all movements are well within capacity during the weekday AM and PM peak hours. No critical movements are noted.



Appendix C contains the detailed Synchro 10 reports.



TABLE 2.1: BASE YEAR 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	Dominion Road & Ridge Road North	TCS	LOS Delay	<	B	>	B	<	B	>	B	<	A	>	A	<	A	>	A	B
			V/C	<	12	>	12	<	13	>	13	<	0	>	0	<	0	>	0	13
			Q	<	0.32	>		<	0.15	>		<	0.00	>		<	0.00	>		0.29
				<	30	>		<	17	>		<	0	>		<	0	>		
AM Peak Hour	Hazel Street & Ridge Road North	TWSC	LOS Delay	<	B	>	B	<	B	>	B	<	A	>	A	<	A	>	A	A
			V/C	<	12	>	12	<	13	>	13	<	0	>	0	<	0	>	0	3
			Q	<	0.32	>		<	0.15	>		<	0.00	>		<	0.00	>		
				<	30	>		<	17	>		<	0	>		<	0	>		
PM Peak Hour	Dominion Road & Ridge Road North	TCS	LOS Delay	<	B	>	B	<	B	>	B	<	A	>	A	<	A	>	A	B
			V/C	<	12	>	12	<	14	>	14	<	0	>	0	<	0	>	0	14
			Q	<	0.34	>		<	0.26	>		<	0.00	>		<	0.00	>		0.37
				<	33	>		<	26	>		<	0	>		<	0	>		
PM Peak Hour	Hazel Street & Ridge Road North	TWSC	LOS Delay	<	B	>	B	<	A	>	A	<	A	>	A	<	A	>	A	A
			V/C	<	11	>	11	<	1	>	1	<	0	>	0	<	0	>	0	3
			Q	<	0.06	>		<	0.01	>		<	0.00	>		<	0.00	>		
				<	1	>		<	0	>		<	0	>		<	0	>		

Delay - Average Delay per Vehicle in Seconds
 LOS - Level of Service
 MOE - Measure of Effectiveness

Q - 95th Percentile Queue Length
 TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control

V/C - Volume to Capacity Ratio
 < - Shared Left-turn
 > - Shared Right-turn



3 Development Concept

3.1 Description

The subject site is located at 436, 440, & 462 Ridge Road North in the Town of Fort Erie (Ridgeway).

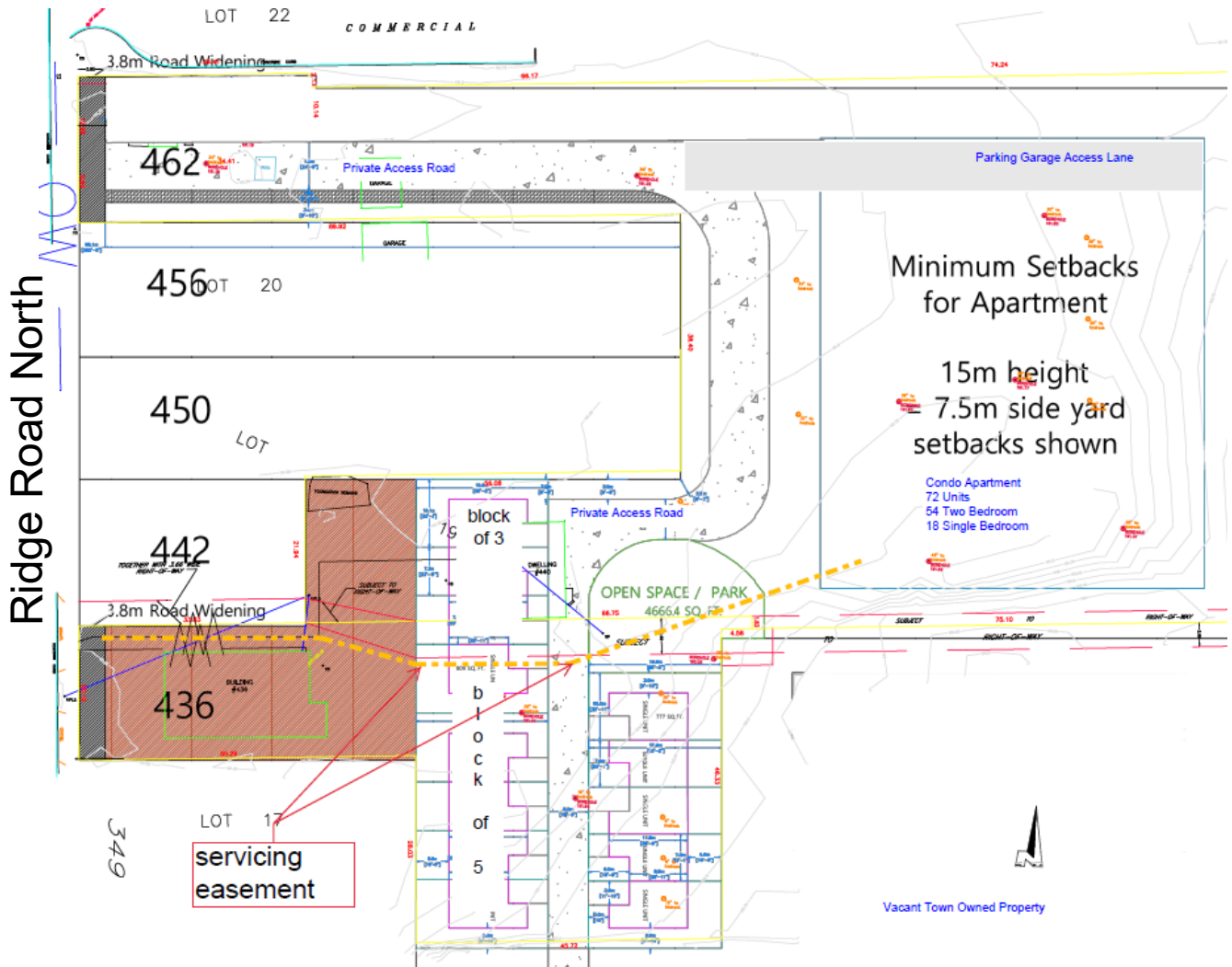
The site concept includes 13 townhouse units and 72 apartment units. Vehicle access to the site is proposed by a private driveway to Ridge Road North located approximately 160 metres south of Hazel Street. The site driveway approach to Ridge Road North is assumed to operate under stop control.

Ridge Road North at the site driveway is straight and flat with no sight distances issues noted for the site driveway location.

Build-out of the site is anticipated to occur by Year 2027, subject to market conditions.

Figure 3.1 illustrates the site concept plan.





3.2 Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation⁶ methods are used to estimate the site trip generation. The following Land Use Codes (LUC) were used to estimate the site trip generation using the fitted curve equations:

- ▶ LUC 220 – Multifamily Housing (Low-Rise)⁷; and
- ▶ LUC 221 – Multifamily Housing (Mid-Rise)⁸;

To remain conservative, no modal split adjustments have been applied to the trip generation estimate to account for active transportation or transit-oriented trips.

Table 3.1 summarizes the estimated trip generation. The subject site is forecast to generate approximately 47 and 54 vehicle trips during the AM and PM peak hours, respectively.

TABLE 3.1: ESTIMATED TRIP GENERATION

Land Use	AM Peak Hour			PM Peak Hour		
	In	Out	Sum	In	Out	Sum
Multifamily Housing (Low-Rise) Not Close to Rail Transit (220) 13 Units	6	21	27	16	10	26
Multifamily Housing (Mid-Rise) Not Close to Rail Transit (221) 72 Units	5	15	20	17	11	28
Total Generation	11	36	47	33	21	54

Table 3.2 summarizes the estimated trip distribution. The distribution was developed using the Transportation Tomorrow Survey⁹ (TTS) data for the zone containing the subject site. **Appendix D** contains the TTS survey data. **Figure 3.2** illustrates the site-generated traffic volumes.

⁶ *Trip Generation Eleventh Edition*, Institute of Transportation Engineers, Washington D.C., 2021

⁷ AM: $T = 0.31(X) + 22.85$ | PM: $T = 0.43(X) + 20.55$

⁸ AM: $T = 0.44(X) - 11.61$ | PM: $T = 0.39(X) + 0.34$

⁹ *Transportation Tomorrow Survey 2016*, University of Toronto Data Management Group. Zone 6337



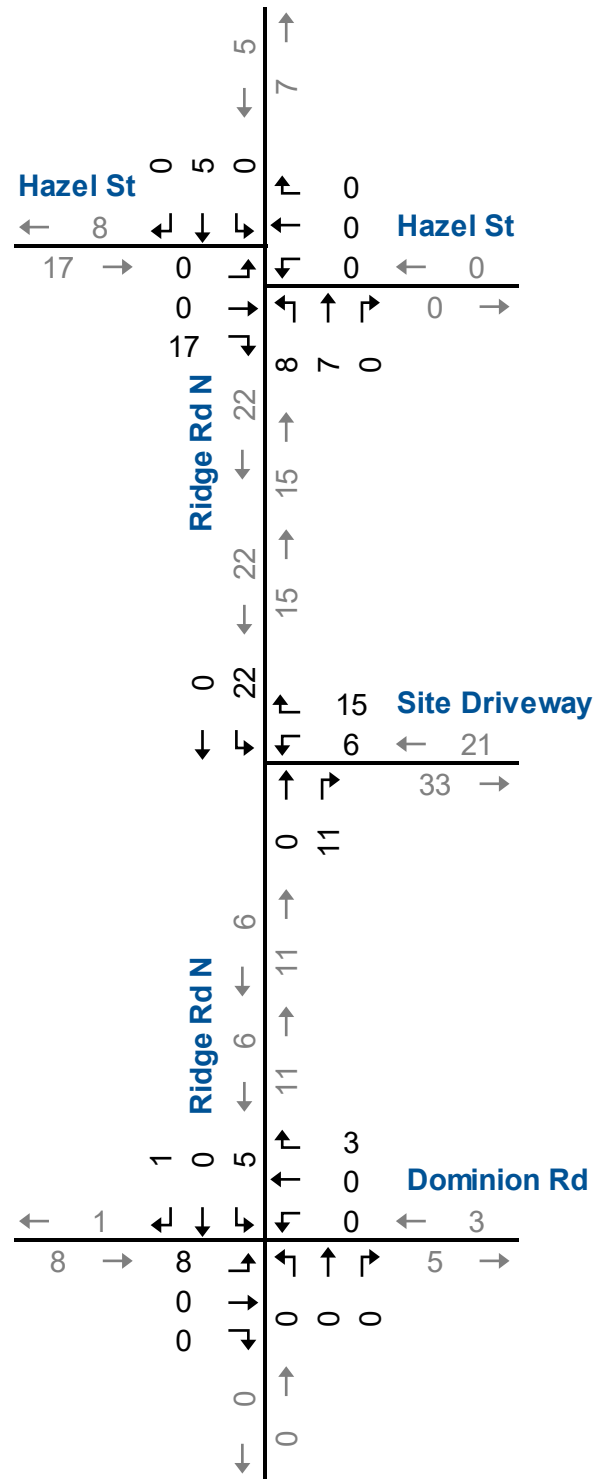
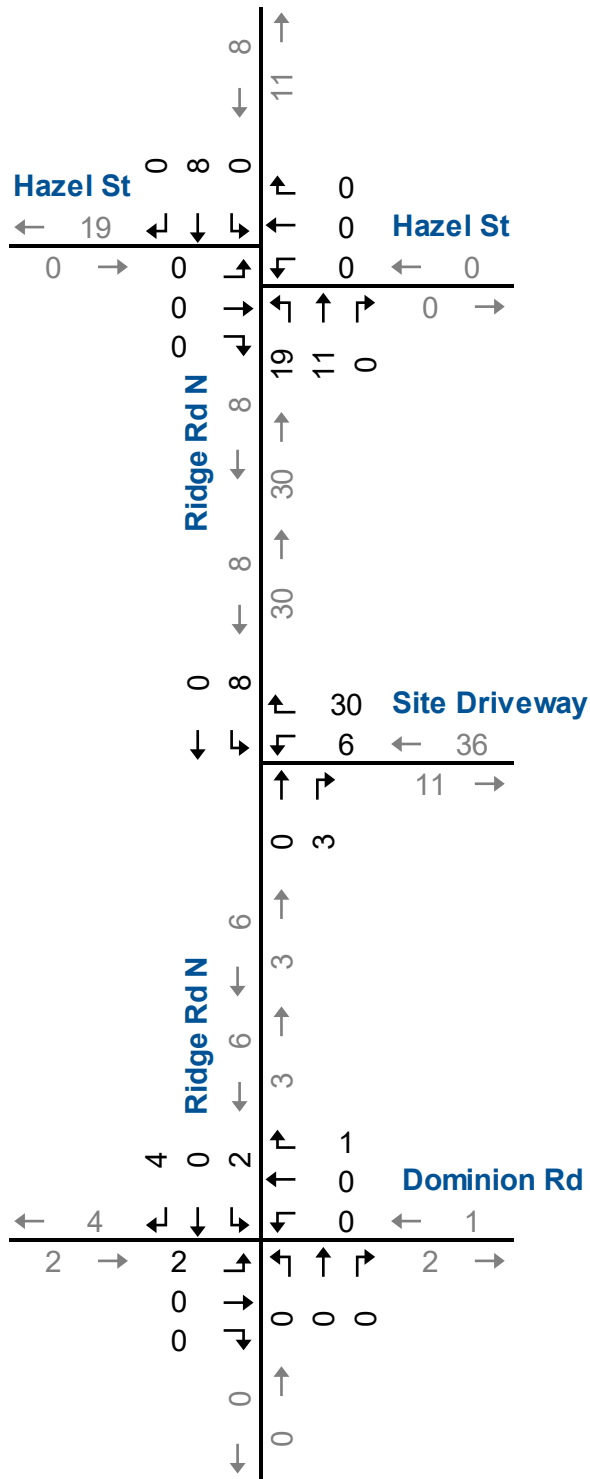
TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

Origin/Destination	AM		PM	
	In	Out	In	Out
North via Ridge Road North	70%	30%	15%	35%
South via Ridge Road North	0%	0%	0%	0%
East via Dominion Road	10%	5%	10%	25%
West via Dominion Road	20%	10%	25%	5%
East via Hazel Street	0%	0%	0%	0%
West via Hazel Street	0%	55%	50%	35%
Total	100%	100%	100%	100%



AM Peak Hour

PM Peak Hour



Forecast Site Traffic

4 Future Traffic Conditions

The assessment of future conditions in this section includes the following components:

- ▶ Future background traffic estimates;
- ▶ Level of service analysis for background traffic (pre-development);
- ▶ Future total traffic estimates; and
- ▶ Level of service analysis for total traffic (post-development).

4.1 Forecast Traffic

A five-year horizon (Year 2027) from the date of the study is assessed. The likely future traffic volumes near the subject site are estimated to consist of:

- ▶ Increased non-site traffic (generalized background traffic growth);
- ▶ Traffic generated by the proposed development.

No background developments were identified by Town or Regional staff during pre-study consultation for inclusion in the traffic forecasts.

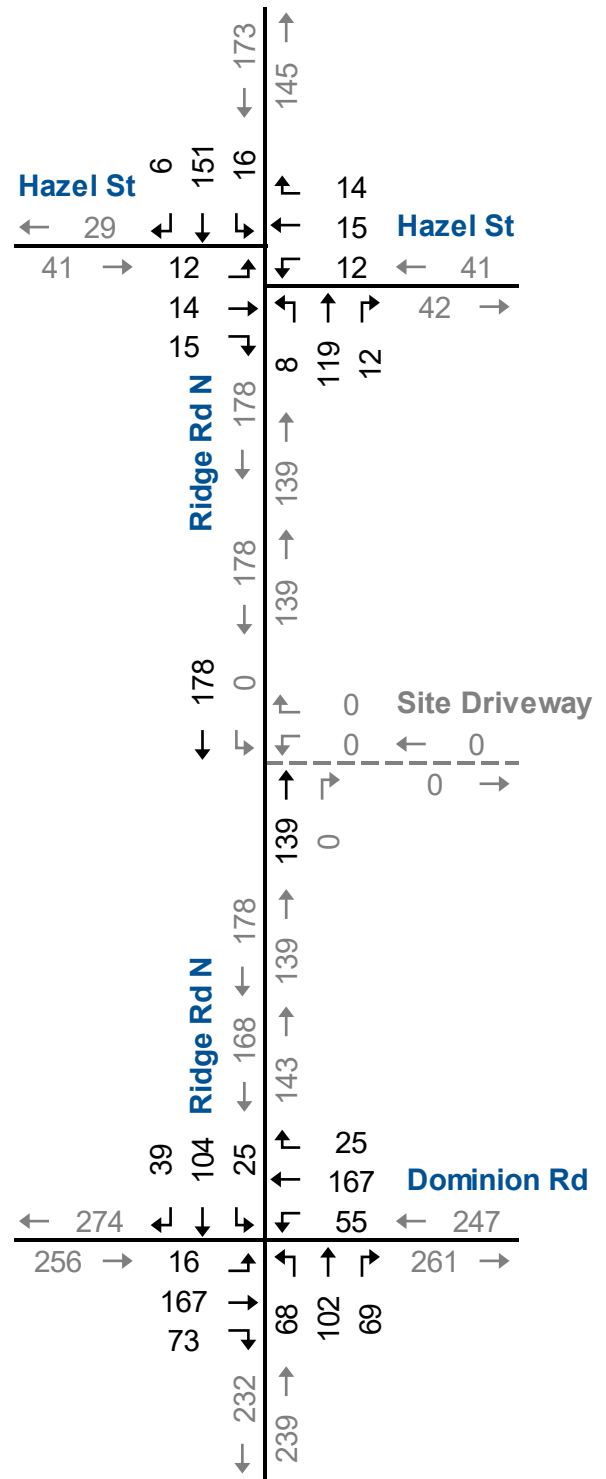
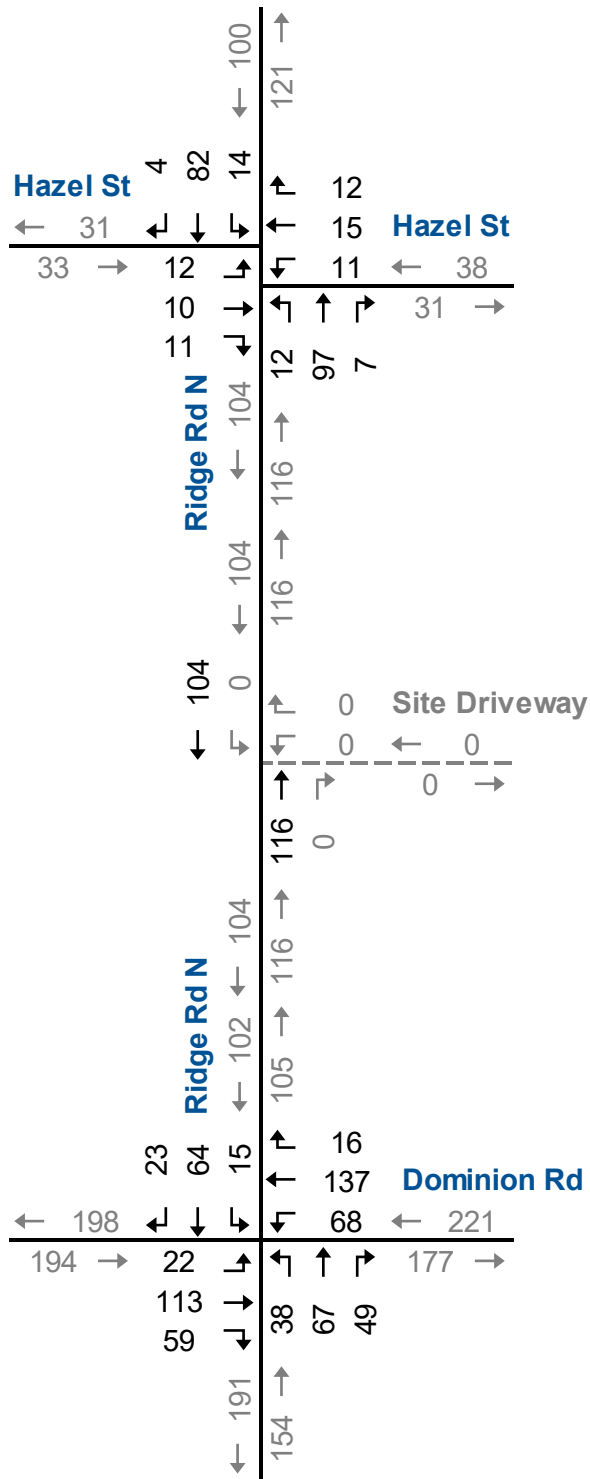
A background growth rate of 2.0% per annum was applied to base year traffic volumes to forecast future conditions.

Figure 4.1 illustrates the forecast background traffic volumes for the weekday AM and PM peak hours. **Figure 4.2** illustrates the forecast total traffic volumes for the weekday AM and PM peak hours.



AM Peak Hour

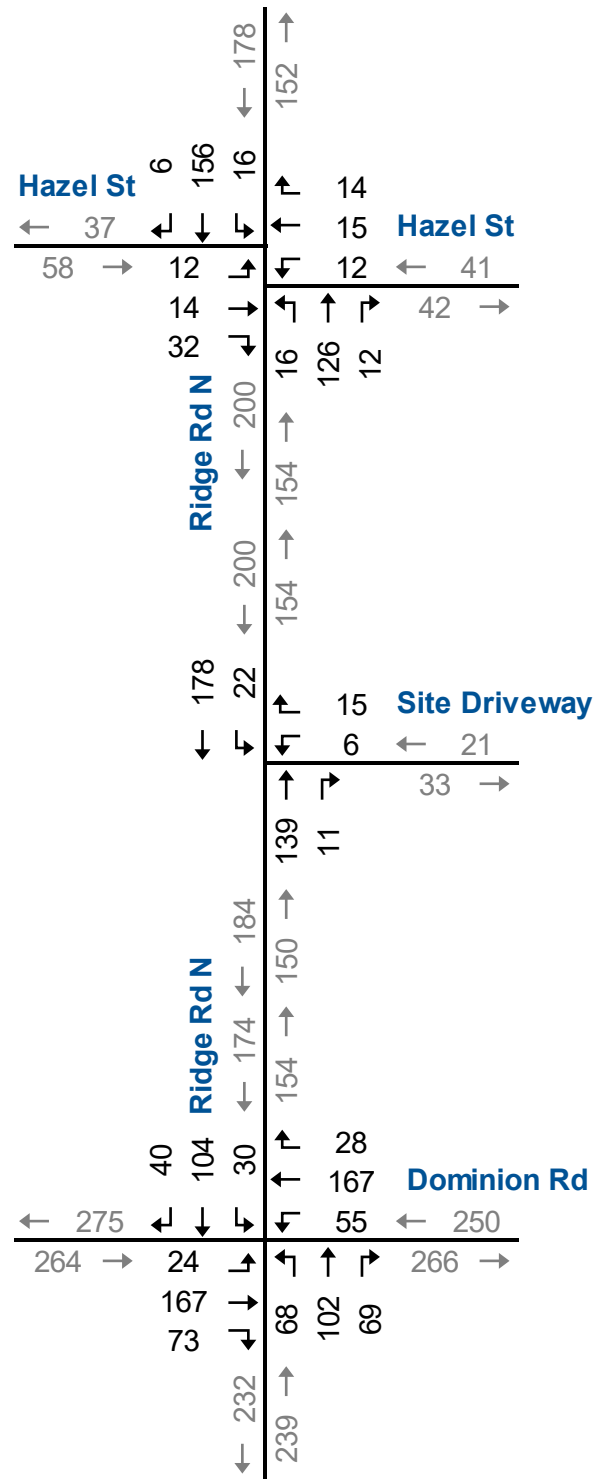
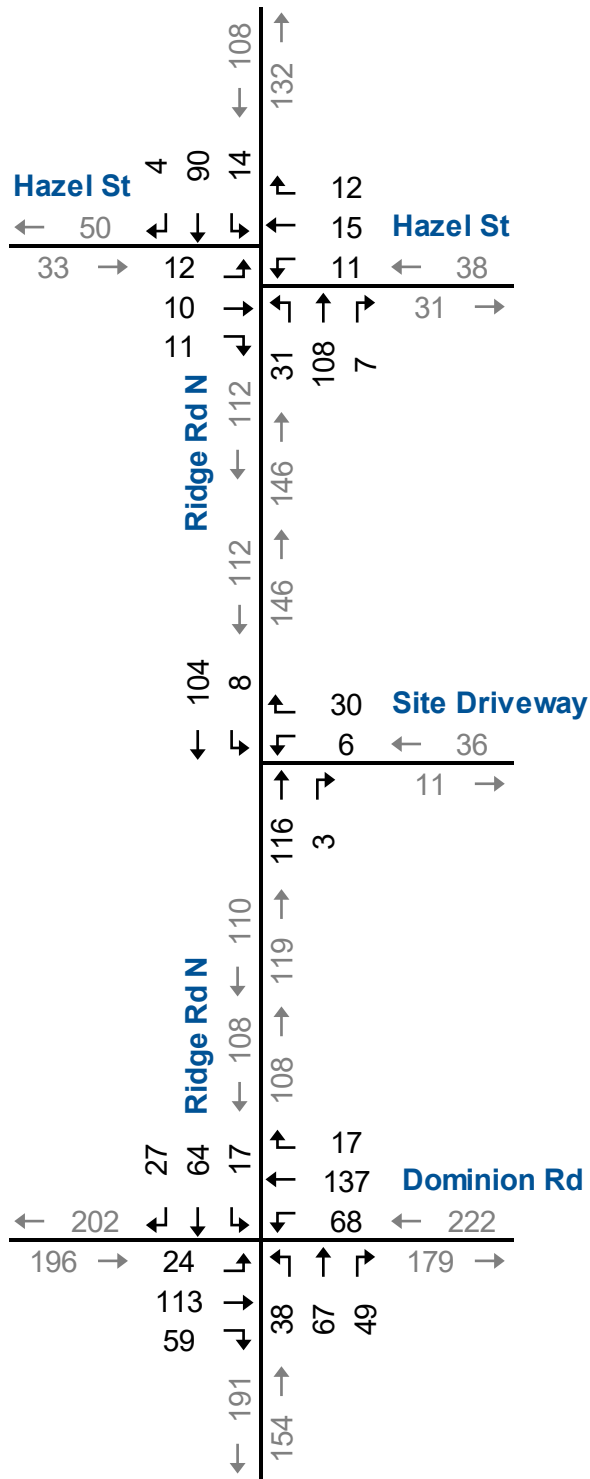
PM Peak Hour



Forecast Background Traffic

AM Peak Hour

PM Peak Hour



Forecast Total Traffic

Figure 4.2

4.2 Forecast Traffic Operations

4.2.1 Background Traffic Operations

The study area intersection operations analyses followed the same methodology used for base year conditions. No changes to the existing signal timings or lane configurations are assumed.

Table 4.1 summarizes the level of service conditions.

The study area intersections are operating at acceptable levels of service and all movements are well within capacity during the weekday AM and PM peak hours. No critical movements are noted.

Appendix E contains the detailed Synchro 10 reports.



TABLE 4.1: BACKGROUND 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	Dominion Road & Ridge Road North	TCS	LOS Delay	<	B	>	B	<	B	>	B	<	A	>	A	<	A	>	A	B
			V/C	<	13	>	13	<	14	>	14	<	0	>	0	<	0	>	0	B
			Q	<	0.37	>	0.37	<	0.18	>	0.18	<	0.00	>	0.00	<	0.00	>	0.00	0.33
			Q	<	35	>	35	<	19	>	19	<	0	>	0	<	0	>	0	
AM Peak Hour	Hazel Street & Ridge Road North	TWSC	LOS Delay	<	B	>	B	<	A	>	A	<	A	>	A	<	A	>	A	A
			V/C	<	11	>	11	<	1	>	1	<	0	>	0	<	0	>	0	A
			Q	<	0.06	>	0.06	<	0.01	>	0.01	<	0.00	>	0.00	<	0.00	>	0.00	3
			Q	<	2	>	2	<	0	>	0	<	0	>	0	<	0	>	0	
PM Peak Hour	Dominion Road & Ridge Road North	TCS	LOS Delay	<	B	>	B	<	B	>	B	<	A	>	A	<	A	>	A	B
			V/C	<	13	>	13	<	15	>	15	<	0	>	0	<	0	>	0	B
			Q	<	0.40	>	0.40	<	0.29	>	0.29	<	0.00	>	0.00	<	0.00	>	0.00	0.42
			Q	<	38	>	38	<	29	>	29	<	0	>	0	<	0	>	0	
PM Peak Hour	Hazel Street & Ridge Road North	TWSC	LOS Delay	<	B	>	B	<	A	>	A	<	A	>	A	<	A	>	A	A
			V/C	<	11	>	11	<	1	>	1	<	0	>	0	<	0	>	0	A
			Q	<	0.07	>	0.07	<	0.01	>	0.01	<	0.00	>	0.00	<	0.00	>	0.00	3
			Q	<	2	>	2	<	0	>	0	<	0	>	0	<	0	>	0	

Delay - Average Delay per Vehicle in Seconds
 LOS - Level of Service
 MOE - Measure of Effectiveness

Q - 95th Percentile Queue Length
 TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control

V/C - Volume to Capacity Ratio
 < - Shared Left-turn
 > - Shared Right-turn



4.2.2 Total Traffic Operations

The study area intersection operations analyses followed the same methodology used for base year conditions. No changes to the existing signal timings or lane configurations are assumed.

Table 4.2 summarizes the level of service conditions. The study area intersections are operating at acceptable levels of service and all movements are well within capacity during the weekday AM and PM peak hours. No critical movements are noted.

The site driveway is forecast to operate in the LOS A range with a v/c ratio of 0.05 or less during the weekday AM and PM peak hours. Queues on the Ridge Road North approaches to the site driveway are forecast to be one vehicle or less during the AM and PM peak hours.

Appendix F contains the detailed Synchro 10 reports.



TABLE 4.2: 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	Dominion Road & Ridge Road North	TCS	LOS Delay V/C Q	< < < <	B 13 0.37 35	> > > >	B 13	< < < <	B 14 0.19 20	> > > >	B 14	< < < <	A 0 0.00 0	> > > >	A 0	< < < <	A 0 0.00 0	> > > >	A 0	B 13 0.33
	Hazel Street & Ridge Road North	TWSC	LOS Delay V/C Q	< < < <	B 11 0.06 2	> > > >	B 11	< < < <	A 1 0.01 0	> > > >	A 1	< < < <	A 0 0.00 0	> > > >	A 0	< < < <	A 0 0.00 0	> > > >	A 0	A 4
	Ridge Road North & Site Driveway	TWSC	LOS Delay V/C Q					A 9 0.05 1				A 0		A 0 0.08 0		A 0	< < < <	A 1 0.01 0		A 1
PM Peak Hour	Dominion Road & Ridge Road North	TCS	LOS Delay V/C Q	< < < <	B 13 0.40 39	> > > >	B 13	< < < <	B 15 0.31 31	> > > >	B 15	< < < <	A 0 0.00 0	> > > >	A 0	< < < <	A 0 0.00 0	> > > >	A 0	B 15 0.43
	Hazel Street & Ridge Road North	TWSC	LOS Delay V/C Q	< < < <	B 12 0.07 2	> > > >	B 12	< < < <	A 1 0.01 0	> > > >	A 1	< < < <	A 0 0.00 0	> > > >	A 0	< < < <	A 0 0.00 0	> > > >	A 0	A 3
	Ridge Road North & Site Driveway	TWSC	LOS Delay V/C Q					A 10 0.03 1				A 0		A 0 0.10 0		A 0	< < < <	A 1 0.02 0		A 1

Delay - Average Delay per Vehicle in Seconds
 LOS - Level of Service
 MOE - Measure of Effectiveness

Q - 95th Percentile Queue Length
 TCS - Traffic Control Signal
 TWSC - Two-Way Stop Control

V/C - Volume to Capacity Ratio
 < - Shared Left-turn
 > - Shared Right-turn



5 Remedial Measures

5.1 Left-turn Lanes

The Ministry of Transportation's Design Supplement to the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads¹⁰ provides guidance on the assessment of and/or need for auxiliary left-turn lanes at intersections. The warrant nomograph to determine if a left-turn lane is needed is based on the following criteria:

- ▶ Design speed of the road (posted speed + 10 km/h);
- ▶ Advancing Volume;
- ▶ Opposing Volume; and
- ▶ Percent of advancing vehicles performing a left-turn maneuver.

The movements were analyzed using the nomographs for left-turn lanes on two-lane undivided highways at unsignalized intersections. **Appendix G** contains the left-turn warrant nomographs. The results indicate that left-turn lanes are not warranted at the unsignalized study area intersections.

No changes to the existing lane configuration are recommended. The site driveway intersection with Ridge Road North should operate with a single travel lane on all approaches.

5.2 Traffic Control Signals

The need for traffic control improvements was assessed using the Ontario Traffic Manual (OTM Book 12) signal warrant¹¹ procedures. To warrant the installation of a traffic control signal with forecast traffic volumes (average hourly volumes), at least one warrant must be fulfilled by 120% for an existing intersection or 150% for a proposed intersection.

Traffic signals are not warranted at the unsignalized intersections in the study area. No changes to the existing form of traffic control are recommended. **Appendix H** contains the traffic signal warrants.

¹⁰ Transportation Association of Canada, *MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads – Appendix 9A*, Ministry of Transportation of Ontario, 2017.

¹¹ *Ontario Traffic Manual Book 12*, Ministry of Transportation of Ontario, July 2001.



6 Conclusions and Recommendations

6.1 Conclusions

The main findings and conclusions of this study are as follows:

- ▶ **Base Year Traffic:** The study area intersections are operating at acceptable levels of service and all movements are well within capacity during the weekday AM and PM peak hours. No critical movements are noted.
- ▶ **Site Concept:** The site concept includes 13 townhouse units and 72 apartment units. Vehicle access to the site is proposed by a private driveway to Ridge Road North located approximately 160 metres south of Hazel Street. Build-out of the site is anticipated to occur by Year 2027 which is subject to change pending market conditions.
- ▶ **Trip Generation:** The site's trip generation is estimated to be approximately 47 AM peak hour vehicle trips and 54 PM peak hour vehicle trips.
- ▶ **Background Traffic:** The study area intersections are operating at acceptable levels of service and all movements are well within capacity during the weekday AM and PM peak hours. No critical movements are noted.
- ▶ **Total Traffic:** The study area intersections are operating at acceptable levels of service and all movements are well within capacity during the weekday AM and PM peak hours. No critical movements are noted.

The site driveway is forecast to operate in the LOS A range with a v/c ratio of 0.05 or less during the weekday AM and PM peak hours. Queues on the Ridge Road North approaches to the site driveway are forecast to be one vehicle or less during the AM and PM peak hours.

- ▶ **Remedial Measures:** No changes to the existing lane configurations or traffic control are recommended to support the development of the subject site.

6.2 Recommendations

Based on the findings of this study, it is recommended that the site driveway approach to Ridge Road North operates as stop control. A stop sign should be placed on the driveway approach to Ridge Road North in accordance with the Ontario Traffic Manuals.



Appendix A

Pre-Study Consultation



Scott Catton

From: Jeremy Korevaar <JKorevaar@forterie.ca>
Sent: 26-Nov-21 11:14
To: Scott Catton
Subject: Re: 210670 (436-462 Ridge Rd N) TIS Terms of Reference

Categories: Agency Comments

Good Morning Scott,

We have no comments or objections tot he proposed terms of reference.

Regards,

Jeremy Korevaar, C.E.T.
Coordinator, Development Approvals

Town of Fort Erie
1 Municipal Centre Drive
Fort Erie, Ontario
Canada
L2A 2S6

TEL: 1-905-871-1600 ext.2505
FAX: 1-905-871-6411

From: "Scott Catton" <scatton@ptsl.com>
To: "JKorevaar@forterie.ca" <JKorevaar@forterie.ca>, "Dunsmore, Susan" <Susan.Dunsmore@niagararegion.ca>
Date: 2021-11-23 03:53 PM
Subject: 210670 (436-462 Ridge Rd N) TIS Terms of Reference

Hi Jeremy & Susan,

Paradigm was retained to undertake a Transportation Impact Study for a proposed residential development located at 436, 440 & 462 Ridge Road North in the Town of Fort Erie. The concept plan includes 13 townhouse units and 60 stack townhouse units. Vehicle access is proposed by private driveway to Ridge Road North. The driveway is located where #462 Ridge Road North has frontage to Ridge Road North.

Attached is a concept plan for the site and below is our proposed Terms of Reference for the study.

Please review the Terms of Reference for the study and provide comment at your earliest convenience. Thank you.

PROPOSED TERMS OF REFERENCE

Study Area Intersections:

- Ridge Road North at Dominion Road (Regional Road 1);
- Ridge Road North at Hazel Street; and

- Site driveway to Ridge Road North.

Study Horizon

- Five-years from the date of the study (Year 2026)

Analysis Periods

- Weekday AM and PM peak hour

Existing Data

- Existing signal timing plans to be obtained from the Region.
- New TMC data to be obtained.
- A COVID adjustment factor will be applied to the new count data using available historical count data.

Analysis

- Synchro 10, HCM 2000

Background Traffic

- Generalized growth rate of 2% per annum (Region TIS Guidelines)
- Active Development **Applications to be identified by Town.**

Planned Road Improvements

- None, unless identified by Region or Town.

Trip Generation

- ITE Trip Generation Data 11th Edition - Multifamily Housing (Low-Rise) - Not Close to Rail Transit (220).
- Preliminary Trip Generation
 - Weekday AM Peak Hour – Fitted Curve: 45 (Total), 10 (Entry), 35 (Exit)
 - Weekday AM Peak Hour – Fitted Curve: 52 (Total), 33 (Entry), 19 (Exit)

Site Traffic Distribution

- Existing travel patterns/TTS 2016 data

Report

- We will document the study methodologies, findings, and conclusions in a report with appendices containing the detailed analysis results and any data collected. The Report will include

Thanks

Scott Catton, C.E.T.

Senior Project Manager



Paradigm Transportation Solutions Limited

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

p: 905.381.2229 x302

e: scatton@pts1.com

w: www.pts1.com

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Thanks for connecting.

For up-to-date information about the Town of Fort Erie's response to the COVID-19 virus, please visit <https://www.forterie.ca/pages/Covid19News>

We also strongly encourage you to stay-up-to-date with the latest advice from Niagara Region Public Health at <https://www.niagararegion.ca/health/covid-19/default.aspx>

All critical services, including water and wastewater and road operations as well as fire services will continue to operate to support our community. For after-hours services, including road or wastewater operations, please call 905-871-1600. For emergency assistance from fire services please call 911.

As many Town staff are focusing on emergency management at this time, we thank you in advance for your patience.

Scott Catton

From: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Sent: 23-Nov-21 16:52
To: Scott Catton
Cc: JKorevaar@forterie.ca; Ramundo, Matteo
Subject: RE: 210670 (436-462 Ridge Rd N) TIS Terms of Reference

Hello Scott

Regional staff do not have any comments on your terms of reference, a TIS was not required by the Region however, we will receive and review the TIS when it is completed with respect to the Regional intersections. Should you required Regional traffic data please submit a request through the follow website link: <https://www.niagararegion.ca/living/roads/permits/traffic-data-requests.aspx>. If there are any improvements required at the Regional intersection functional designs are to be included in the TIS.

If you require anything further please contact me at your convenience.

Thank you

Susan M. Dunsmore, P. Eng.
Manager, Development Engineering
Planning and Development Services

Phone: (905) 980-6000 or 1-800-263-7215 ext 3661
Address: 1815 Sir Isaac Brock Way, Thorold ON, L2V4T7



From: Scott Catton <scatton@ptsl.com>
Sent: Tuesday, November 23, 2021 3:53 PM
To: JKorevaar@forterie.ca; Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Subject: 210670 (436-462 Ridge Rd N) TIS Terms of Reference

CAUTION EXTERNAL EMAIL: This email originated from outside of the Niagara Region email system. Use caution when clicking links or opening attachments unless you recognize the sender and know the content is safe.

Hi Jeremy & Susan,
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Site Traffic Distribution

- Existing travel patterns/TTS 2016 data

Report

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Thanks

Scott Catton, C.E.T.
Senior Project Manager



Paradigm Transportation Solutions Limited

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w: www.pts1.com

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Appendix B

Existing Data





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Ridge Road N & Dominion Road
Site Code: 210670
Start Date: 11/11/2021
Page No: 1

Turning Movement Data

Start Time	Dominion Road Eastbound						Dominion Road Westbound						Ridge Road N Northbound						Ridge Road N 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	0	3	0	0	2	3	2	11	1	0	0	14	5	8	2	0	0	15	1	5	2	0	0	8	40
7:15 AM	0	16	1	0	0	17	3	19	1	0	0	23	3	4	2	0	0	9	0	6	2	0	1	8	57
7:30 AM	2	22	5	0	0	29	3	23	3	0	1	29	8	11	6	0	0	25	1	5	0	0	0	6	89
7:45 AM	0	21	4	0	0	25	4	16	4	0	1	24	3	4	4	0	0	11	2	9	3	0	0	14	74
Hourly Total	2	62	10	0	2	74	12	69	9	0	2	90	19	27	14	0	0	60	4	25	7	0	1	36	260
8:00 AM	5	20	6	0	2	31	7	21	1	0	0	29	6	11	6	0	1	23	2	7	2	0	1	11	94
8:15 AM	2	12	5	0	3	19	7	27	5	0	0	39	5	16	11	0	0	32	1	11	6	0	2	18	108
8:30 AM	4	17	5	0	3	26	14	24	3	0	2	41	3	16	6	0	2	25	1	14	3	0	3	18	110
8:45 AM	3	24	23	0	0	50	23	33	2	0	1	58	11	13	12	0	1	36	5	18	5	0	0	28	172
Hourly Total	14	73	39	0	8	126	51	105	11	0	3	167	25	56	35	0	4	116	9	50	16	0	6	75	484
9:00 AM	6	25	6	0	6	37	13	21	6	0	0	40	5	22	10	0	0	37	2	16	4	0	2	22	136
9:15 AM	4	26	15	0	1	45	7	29	3	0	1	39	8	12	8	0	1	28	3	7	3	0	1	13	125
9:30 AM	4	19	5	0	1	28	13	31	2	0	0	46	7	8	10	0	1	25	2	11	6	0	0	19	118
9:45 AM	7	27	8	0	2	42	7	27	6	0	0	40	4	16	15	0	0	35	2	15	3	0	0	20	137
Hourly Total	21	97	34	0	10	152	40	108	17	0	1	165	24	58	43	0	2	125	9	49	16	0	3	74	516
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	5	27	9	0	2	41	9	28	1	0	1	38	13	13	12	0	0	38	2	10	4	0	0	16	133
11:45 AM	4	35	17	0	0	56	7	22	3	0	0	32	7	20	18	0	0	45	6	17	10	0	0	33	166
Hourly Total	9	62	26	0	2	97	16	50	4	0	1	70	20	33	30	0	0	83	8	27	14	0	0	49	299
12:00 PM	4	32	25	0	1	61	11	36	4	0	1	51	11	18	13	0	0	42	6	16	7	0	2	29	183
12:15 PM	2	37	14	0	1	53	8	29	1	0	0	38	18	11	15	0	0	44	2	14	7	0	0	23	158
12:30 PM	5	25	11	0	5	41	8	25	3	0	3	36	10	19	9	0	0	38	7	22	4	0	2	33	148
12:45 PM	5	28	9	0	3	42	8	25	4	0	0	37	15	16	7	0	2	38	4	17	7	0	0	28	145
Hourly Total	16	122	59	0	10	197	35	115	12	0	4	162	54	64	44	0	2	162	19	69	25	0	4	113	634
1:00 PM	3	23	12	0	1	38	14	34	2	0	0	50	11	20	13	0	0	44	2	22	5	0	0	29	161
1:15 PM	8	23	9	0	1	40	8	26	6	0	0	40	9	19	5	0	0	33	7	13	8	0	1	28	141
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	11	46	21	0	2	78	22	60	8	0	0	90	20	39	18	0	0	77	9	35	13	0	1	57	302
3:00 PM	5	34	14	0	2	53	14	29	7	0	1	50	9	22	11	0	1	42	2	29	7	0	2	38	183
3:15 PM	2	32	11	0	2	45	10	29	4	0	0	43	17	26	16	0	0	59	9	19	8	0	0	36	183
3:30 PM	2	32	19	0	5	53	10	31	4	0	0	45	13	17	16	0	2	46	3	24	11	0	1	38	182
3:45 PM	4	40	16	0	4	60	11	49	5	0	0	65	17	19	14	0	1	50	6	14	6	0	1	26	201
Hourly Total	13	138	60	0	13	211	45	138	20	0	1	203	56	84	57	0	4	197	20	86	32	0	4	138	749
4:00 PM	3	40	7	0	3	50	12	35	7	0	0	54	14	14	16	0	1	44	7	17	6	0	0	30	178
4:15 PM	5	29	15	0	0	49	14	25	5	0	1	44	11	19	9	0	2	39	7	27	7	0	0	41	173

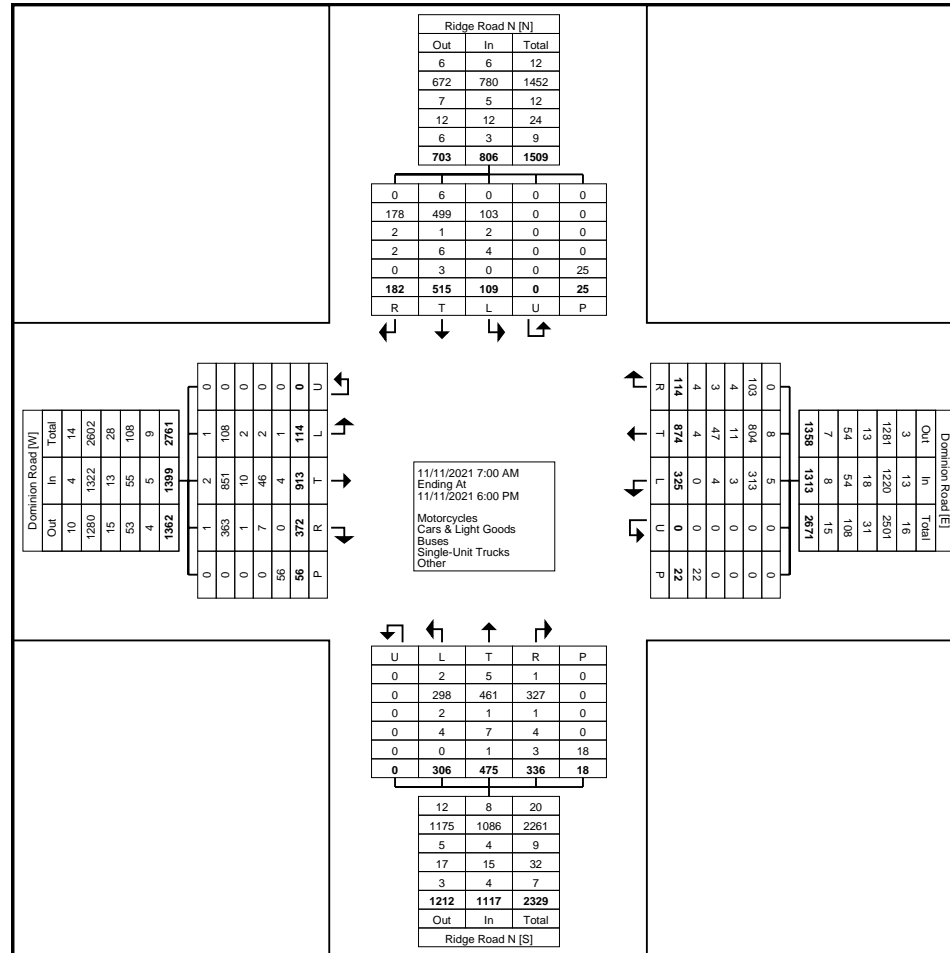
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4:45 PM	1	48	18	0	0	67	16	25	6	0	1	47	9	13	16	0	0	38	3	17	12	0	1	32	184
Hourly Total	13	154	58	0	3	225	59	119	19	0	4	197	42	61	53	0	6	156	23	88	31	0	1	142	720
5:00 PM	3	45	15	0	0	63	9	29	2	0	3	40	13	17	15	0	0	45	2	22	8	0	2	32	180
5:15 PM	2	40	13	0	3	55	13	32	3	0	3	48	16	15	11	0	0	42	1	22	14	0	1	37	182
5:30 PM	4	38	18	0	1	60	11	27	2	0	0	40	8	5	5	0	0	18	2	17	4	0	0	23	141
5:45 PM	6	36	19	0	2	61	12	22	7	0	0	41	9	16	11	0	0	36	3	25	2	0	2	30	168
Hourly Total	15	159	65	0	6	239	45	110	14	0	6	169	46	53	42	0	0	141	8	86	28	0	5	122	671
Grand Total	114	913	372	0	56	1399	325	874	114	0	22	1313	306	475	336	0	18	1117	109	515	182	0	25	806	4635
Approach %	8.1	65.3	26.6	0.0	-	-	24.8	66.6	8.7	0.0	-	-	27.4	42.5	30.1	0.0	-	-	13.5	63.9	22.6	0.0	-	-	-
Total %	2.5	19.7	8.0	0.0	-	30.2	7.0	18.9	2.5	0.0	-	28.3	6.6	10.2	7.2	0.0	-	24.1	2.4	11.1	3.9	0.0	-	17.4	-
Motorcycles	1	2	1	0	-	4	5	8	0	0	-	13	2	5	1	0	-	8	0	6	0	0	-	6	31
% Motorcycles	0.9	0.2	0.3	-	-	0.3	1.5	0.9	0.0	-	-	1.0	0.7	1.1	0.3	-	-	0.7	0.0	1.2	0.0	-	-	0.7	0.7
Cars & Light Goods	108	851	363	0	-	1322	313	804	103	0	-	1220	298	461	327	0	-	1086	103	499	178	0	-	780	4408
% Cars & Light Goods	94.7	93.2	97.6	-	-	94.5	96.3	92.0	90.4	-	-	92.9	97.4	97.1	97.3	-	-	97.2	94.5	96.9	97.8	-	-	96.8	95.1
Buses	2	10	1	0	-	13	3	11	4	0	-	18	2	1	1	0	-	4	2	1	2	0	-	5	40
% Buses	1.8	1.1	0.3	-	-	0.9	0.9	1.3	3.5	-	-	1.4	0.7	0.2	0.3	-	-	0.4	1.8	0.2	1.1	-	-	0.6	0.9
Single-Unit Trucks	2	46	7	0	-	55	4	47	3	0	-	54	4	7	4	0	-	15	4	6	2	0	-	12	136
% Single-Unit Trucks	1.8	5.0	1.9	-	-	3.9	1.2	5.4	2.6	-	-	4.1	1.3	1.5	1.2	-	-	1.3	3.7	1.2	1.1	-	-	1.5	2.9
Articulated Trucks	1	4	0	0	-	5	0	2	3	0	-	5	0	1	1	0	-	2	0	2	0	0	-	2	14
% Articulated Trucks	0.9	0.4	0.0	-	-	0.4	0.0	0.2	2.6	-	-	0.4	0.0	0.2	0.3	-	-	0.2	0.0	0.4	0.0	-	-	0.2	0.3
Bicycles on Road	0	0	0	0	-	0	0	2	1	0	-	3	0	0	2	0	-	2	0	1	0	0	-	1	6
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.9	-	-	0.2	0.0	0.0	0.6	-	-	0.2	0.0	0.2	0.0	-	-	0.1	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	18.2	-	-	-	-	-	0.0	-	-	-	-	-	4.0	-	-
Pedestrians	-	-	-	-	56	-	-	-	-	-	18	-	-	-	-	-	18	-	-	-	-	-	24	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	81.8	-	-	-	-	-	100.0	-	-	-	-	-	96.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Ridge Road N & Dominion Road
Site Code: 210670
Start Date: 11/11/2021
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Ridge Road N & Dominion Road
Site Code: 210670
Start Date: 11/11/2021
Page No: 4

Turning Movement Peak Hour Data (8:45 AM)

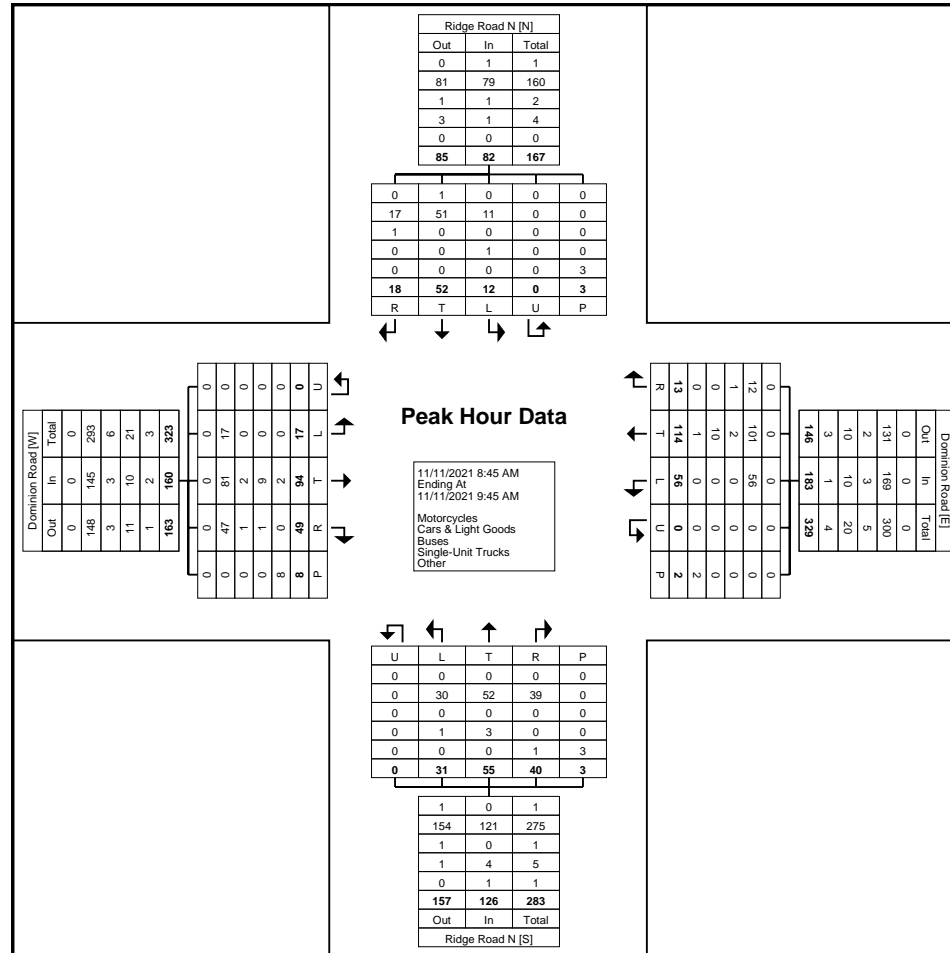
Start Time	Dominion Road Eastbound						Dominion Road Westbound						Ridge Road N Northbound						Ridge Road N Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:45 AM	3	24	23	0	0	50	23	33	2	0	1	58	11	13	12	0	1	36	5	18	5	0	0	28	172
9:00 AM	6	25	6	0	6	37	13	21	6	0	0	40	5	22	10	0	0	37	2	16	4	0	2	22	136
9:15 AM	4	26	15	0	1	45	7	29	3	0	1	39	8	12	8	0	1	28	3	7	3	0	1	13	125
9:30 AM	4	19	5	0	1	28	13	31	2	0	0	46	7	8	10	0	1	25	2	11	6	0	0	19	118
Total	17	94	49	0	8	160	56	114	13	0	2	183	31	55	40	0	3	126	12	52	18	0	3	82	551
Approach %	10.6	58.8	30.6	0.0	-	-	30.6	62.3	7.1	0.0	-	-	24.6	43.7	31.7	0.0	-	-	14.6	63.4	22.0	0.0	-	-	-
Total %	3.1	17.1	8.9	0.0	-	29.0	10.2	20.7	2.4	0.0	-	33.2	5.6	10.0	7.3	0.0	-	22.9	2.2	9.4	3.3	0.0	-	14.9	-
PHF	0.708	0.904	0.533	0.000	-	0.800	0.609	0.864	0.542	0.000	-	0.789	0.705	0.625	0.833	0.000	-	0.851	0.600	0.722	0.750	0.000	-	0.732	0.801
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% 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	1.9	0.0	-	-	1.2	0.2
Cars & Light Goods	17	81	47	0	-	145	56	101	12	0	-	169	30	52	39	0	-	121	11	51	17	0	-	79	514
% Cars & Light Goods	100.0	86.2	95.9	-	-	90.6	100.0	88.6	92.3	-	-	92.3	96.8	94.5	97.5	-	-	96.0	91.7	98.1	94.4	-	-	96.3	93.3
Buses	0	2	1	0	-	3	0	2	1	0	-	3	0	0	0	0	-	0	0	0	1	0	-	1	7
% Buses	0.0	2.1	2.0	-	-	1.9	0.0	1.8	7.7	-	-	1.6	0.0	0.0	0.0	-	-	0.0	0.0	0.0	5.6	-	-	1.2	1.3
Single-Unit Trucks	0	9	1	0	-	10	0	10	0	0	-	10	1	3	0	0	-	4	1	0	0	0	-	1	25
% Single-Unit Trucks	0.0	9.6	2.0	-	-	6.3	0.0	8.8	0.0	-	-	5.5	3.2	5.5	0.0	-	-	3.2	8.3	0.0	0.0	-	-	1.2	4.5
Articulated Trucks	0	2	0	0	-	2	0	1	0	0	-	1	0	0	1	0	-	1	0	0	0	0	-	0	4
% Articulated Trucks	0.0	2.1	0.0	-	-	1.3	0.0	0.9	0.0	-	-	0.5	0.0	0.0	2.5	-	-	0.8	0.0	0.0	0.0	-	-	0.0	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	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	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Ridge Road N & Dominion Road
Site Code: 210670
Start Date: 11/11/2021
Page No: 5



Turning Movement Peak Hour Data Plot (8:45 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Ridge Road N & Dominion Road
Site Code: 210670
Start Date: 11/11/2021
Page No: 6

Turning Movement Peak Hour Data (11:45 AM)

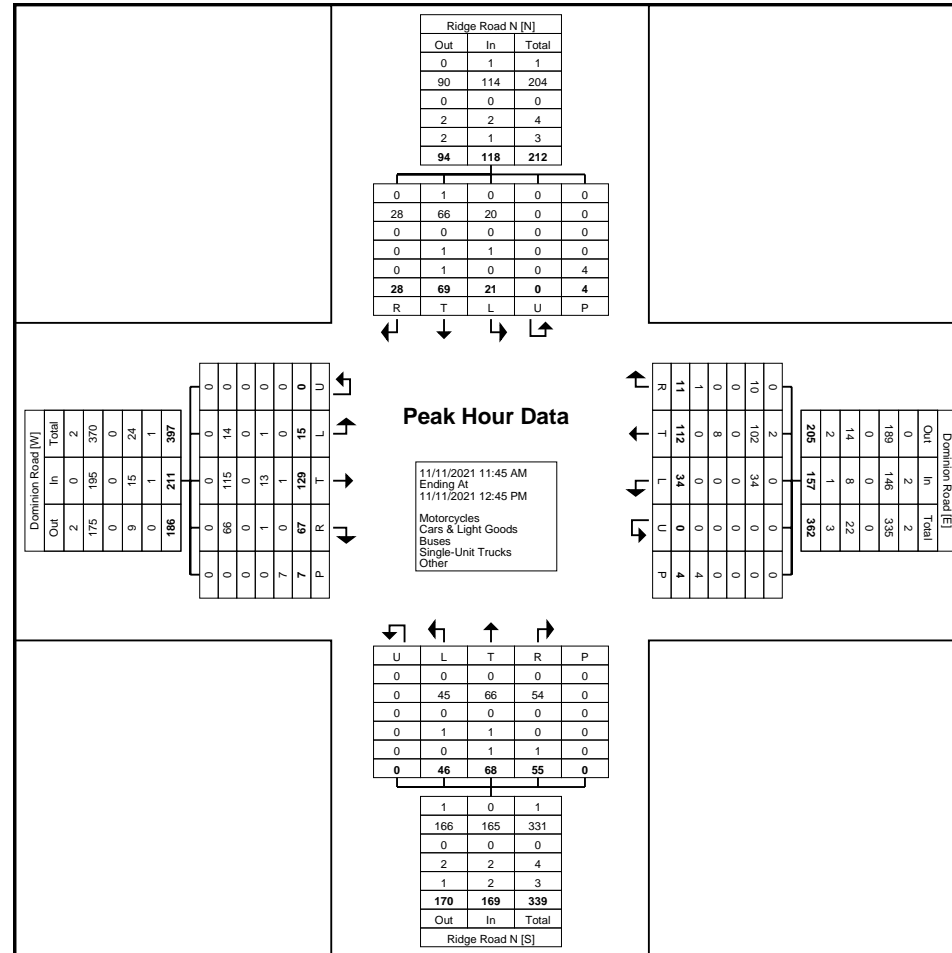
Start Time	Dominion Road Eastbound						Dominion Road Westbound						Ridge Road N Northbound						Ridge Road N Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:45 AM	4	35	17	0	0	56	7	22	3	0	0	32	7	20	18	0	0	45	6	17	10	0	0	33	166
12:00 PM	4	32	25	0	1	61	11	36	4	0	1	51	11	18	13	0	0	42	6	16	7	0	2	29	183
12:15 PM	2	37	14	0	1	53	8	29	1	0	0	38	18	11	15	0	0	44	2	14	7	0	0	23	158
12:30 PM	5	25	11	0	5	41	8	25	3	0	3	36	10	19	9	0	0	38	7	22	4	0	2	33	148
Total	15	129	67	0	7	211	34	112	11	0	4	157	46	68	55	0	0	169	21	69	28	0	4	118	655
Approach %	7.1	61.1	31.8	0.0	-	-	21.7	71.3	7.0	0.0	-	-	27.2	40.2	32.5	0.0	-	-	17.8	58.5	23.7	0.0	-	-	-
Total %	2.3	19.7	10.2	0.0	-	32.2	5.2	17.1	1.7	0.0	-	24.0	7.0	10.4	8.4	0.0	-	25.8	3.2	10.5	4.3	0.0	-	18.0	-
PHF	0.750	0.872	0.670	0.000	-	0.865	0.773	0.778	0.688	0.000	-	0.770	0.639	0.850	0.764	0.000	-	0.939	0.750	0.784	0.700	0.000	-	0.894	0.895
Motorcycles	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	0	1	0	0	-	1	3
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	1.8	0.0	-	-	1.3	0.0	0.0	0.0	-	-	0.0	0.0	1.4	0.0	-	-	0.8	0.5
Cars & Light Goods	14	115	66	0	-	195	34	102	10	0	-	146	45	66	54	0	-	165	20	66	28	0	-	114	620
% Cars & Light Goods	93.3	89.1	98.5	-	-	92.4	100.0	91.1	90.9	-	-	93.0	97.8	97.1	98.2	-	-	97.6	95.2	95.7	100.0	-	-	96.6	94.7
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	1	13	1	0	-	15	0	8	0	0	-	8	1	1	0	0	-	2	1	1	0	0	-	2	27
% Single-Unit Trucks	6.7	10.1	1.5	-	-	7.1	0.0	7.1	0.0	-	-	5.1	2.2	1.5	0.0	-	-	1.2	4.8	1.4	0.0	-	-	1.7	4.1
Articulated Trucks	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	3
% Articulated Trucks	0.0	0.8	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	1.5	0.0	-	-	0.6	0.0	1.4	0.0	-	-	0.8	0.5
Bicycles on Road	0	0	0	0	-	0	0	0	1	0	-	1	0	0	1	0	-	1	0	0	0	0	-	0	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	9.1	-	-	0.6	0.0	0.0	1.8	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	25.0	-	-	-	-	-	-	-	-	-	-	-	25.0	-	-
Pedestrians	-	-	-	-	7	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	75.0	-	-	-	-	-	-	-	-	-	-	-	75.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Ridge Road N & Dominion Road
Site Code: 210670
Start Date: 11/11/2021
Page No: 7



Turning Movement Peak Hour Data Plot (11:45 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Ridge Road N & Dominion Road
Site Code: 210670
Start Date: 11/11/2021
Page No: 8

Turning Movement Peak Hour Data (3:00 PM)

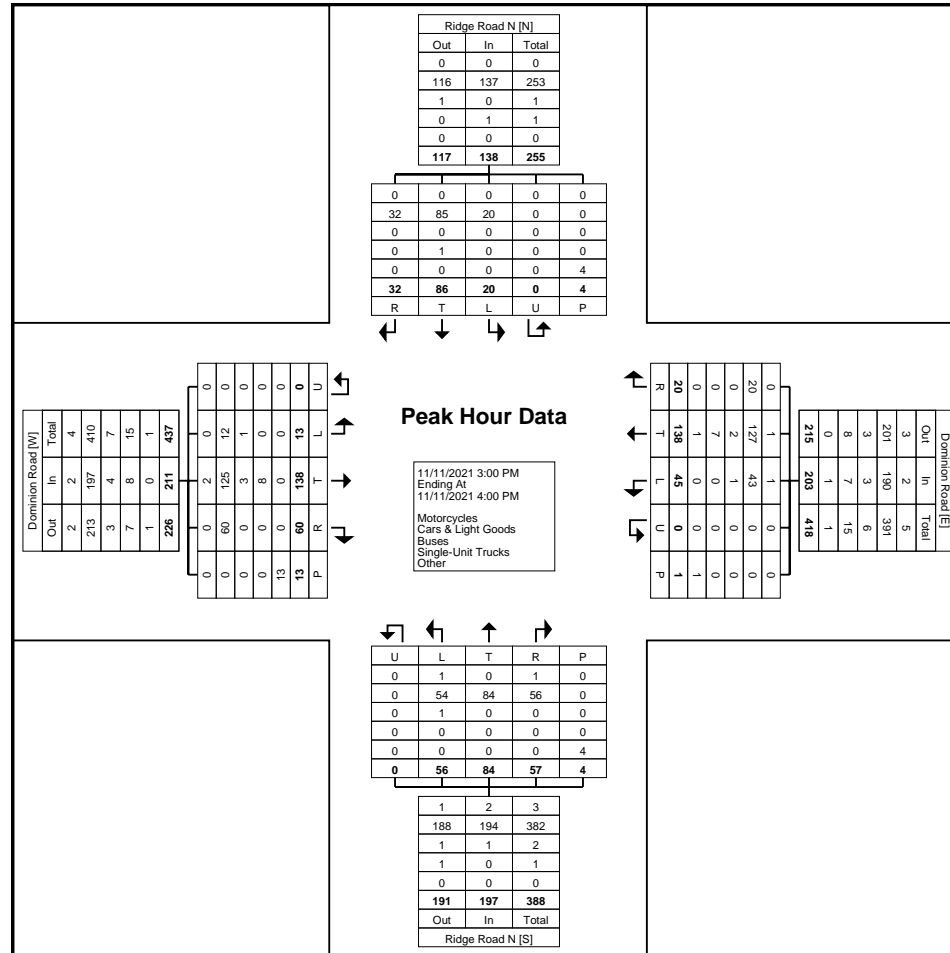
Start Time	Dominion Road Eastbound						Dominion Road Westbound						Ridge Road N Northbound						Ridge Road N Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
3:00 PM	5	34	14	0	2	53	14	29	7	0	1	50	9	22	11	0	1	42	2	29	7	0	2	38	183
3:15 PM	2	32	11	0	2	45	10	29	4	0	0	43	17	26	16	0	0	59	9	19	8	0	0	36	183
3:30 PM	2	32	19	0	5	53	10	31	4	0	0	45	13	17	16	0	2	46	3	24	11	0	1	38	182
3:45 PM	4	40	16	0	4	60	11	49	5	0	0	65	17	19	14	0	1	50	6	14	6	0	1	26	201
Total	13	138	60	0	13	211	45	138	20	0	1	203	56	84	57	0	4	197	20	86	32	0	4	138	749
Approach %	6.2	65.4	28.4	0.0	-	-	22.2	68.0	9.9	0.0	-	-	28.4	42.6	28.9	0.0	-	-	14.5	62.3	23.2	0.0	-	-	-
Total %	1.7	18.4	8.0	0.0	-	28.2	6.0	18.4	2.7	0.0	-	27.1	7.5	11.2	7.6	0.0	-	26.3	2.7	11.5	4.3	0.0	-	18.4	-
PHF	0.650	0.863	0.789	0.000	-	0.879	0.804	0.704	0.714	0.000	-	0.781	0.824	0.808	0.891	0.000	-	0.835	0.556	0.741	0.727	0.000	-	0.908	0.932
Motorcycles	0	2	0	0	-	2	1	1	0	0	-	2	1	0	1	0	-	2	0	0	0	0	-	0	6
% Motorcycles	0.0	1.4	0.0	-	-	0.9	2.2	0.7	0.0	-	-	1.0	1.8	0.0	1.8	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.8
Cars & Light Goods	12	125	60	0	-	197	43	127	20	0	-	190	54	84	56	0	-	194	20	85	32	0	-	137	718
% Cars & Light Goods	92.3	90.6	100.0	-	-	93.4	95.6	92.0	100.0	-	-	93.6	96.4	100.0	98.2	-	-	98.5	100.0	98.8	100.0	-	-	99.3	95.9
Buses	1	3	0	0	-	4	1	2	0	0	-	3	1	0	0	0	-	1	0	0	0	0	-	0	8
% Buses	7.7	2.2	0.0	-	-	1.9	2.2	1.4	0.0	-	-	1.5	1.8	0.0	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	1.1
Single-Unit Trucks	0	8	0	0	-	8	0	7	0	0	-	7	0	0	0	0	-	0	0	1	0	0	-	1	16
% Single-Unit Trucks	0.0	5.8	0.0	-	-	3.8	0.0	5.1	0.0	-	-	3.4	0.0	0.0	0.0	-	-	0.0	0.0	1.2	0.0	-	-	0.7	2.1
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	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.7	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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519-896-3163 cbowness@ptsll.com

Count Name: Ridge Road N & Dominion Road
Site Code: 210670
Start Date: 11/11/2021
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Turning Movement Peak Hour Data Plot (3:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Hazel Street & Ridge Road N
Site Code: 210670
Start Date: 11/11/2021
Page No: 1

Turning Movement Data

Start Time	Hazel Street Eastbound						Hazel Street Westbound						Ridge Road N Northbound						Ridge Road N 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	2	0	0	0	0	2	0	1	1	0	0	2	0	6	0	0	0	6	0	9	0	0	0	9	19
7:15 AM	2	0	1	0	0	3	0	1	0	0	0	1	0	8	0	0	0	8	1	6	1	0	0	8	20
7:30 AM	0	0	1	0	0	1	0	1	3	0	0	4	3	12	1	0	0	16	1	5	0	0	0	6	27
7:45 AM	0	1	3	0	0	4	1	0	4	0	0	5	1	8	1	0	0	10	2	12	1	0	1	15	34
Hourly Total	4	1	5	0	0	10	1	3	8	0	0	12	4	34	2	0	0	40	4	32	2	0	1	38	100
8:00 AM	3	2	3	0	1	8	3	4	2	0	0	9	1	13	1	0	0	15	2	7	2	0	0	11	43
8:15 AM	3	2	0	0	0	5	1	6	1	0	1	8	3	20	1	0	1	24	2	13	0	0	0	15	52
8:30 AM	1	1	2	0	2	4	1	2	3	0	0	6	2	19	1	0	0	22	1	14	2	0	2	17	49
8:45 AM	2	2	2	0	1	6	5	2	0	0	0	7	2	16	1	0	0	19	2	24	0	0	0	26	58
Hourly Total	9	7	7	0	4	23	10	14	6	0	1	30	8	68	4	0	1	80	7	58	4	0	2	69	202
9:00 AM	3	2	4	0	0	9	1	2	5	0	1	8	2	25	2	0	0	29	6	16	0	0	0	22	68
9:15 AM	0	0	3	0	0	3	3	1	0	0	0	4	0	8	1	0	0	9	4	6	0	0	0	10	26
9:30 AM	2	2	1	0	0	5	2	3	3	0	0	8	1	14	0	0	0	15	1	15	0	0	0	16	44
9:45 AM	0	1	1	0	0	2	2	2	2	0	0	6	5	16	0	0	0	21	2	16	1	0	0	19	48
Hourly Total	5	5	9	0	0	19	8	8	10	0	1	26	8	63	3	0	0	74	13	53	1	0	0	67	186
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:30 AM	0	0	1	0	1	1	1	6	2	0	2	9	0	15	0	0	1	15	1	16	1	0	0	18	43
11:45 AM	1	3	0	0	0	4	2	1	0	0	0	3	2	23	2	0	0	27	0	28	0	0	0	28	62
Hourly Total	1	3	1	0	1	5	3	7	2	0	2	12	2	38	2	0	1	42	1	44	1	0	0	46	105
12:00 PM	0	4	0	0	1	4	0	2	1	0	0	3	0	22	0	0	0	22	1	25	2	0	0	28	57
12:15 PM	1	0	2	0	0	3	1	1	0	0	2	2	1	15	0	0	0	16	0	17	3	0	0	20	41
12:30 PM	1	2	1	0	0	4	2	4	0	0	0	6	1	25	0	0	1	26	1	26	1	0	0	28	64
12:45 PM	2	3	2	0	0	7	3	0	5	0	0	8	1	25	1	0	0	27	0	20	0	0	0	20	62
Hourly Total	4	9	5	0	1	18	6	7	6	0	2	19	3	87	1	0	1	91	2	88	6	0	0	96	224
1:00 PM	1	3	1	0	3	5	0	3	3	0	0	6	1	18	2	0	0	21	0	23	1	0	0	24	56
1:15 PM	1	1	2	0	1	4	0	2	2	0	0	4	4	22	3	0	0	29	0	20	2	0	0	22	59
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	2	4	3	0	4	9	0	5	5	0	0	10	5	40	5	0	0	50	0	43	3	0	0	46	115
3:00 PM	2	1	1	0	0	4	3	3	2	0	0	8	3	28	5	0	0	36	5	38	0	0	0	43	91
3:15 PM	3	4	4	0	0	11	2	2	4	0	0	8	1	26	2	0	0	29	3	33	4	0	0	40	88
3:30 PM	2	4	4	0	0	10	1	2	3	0	0	6	1	17	1	0	1	19	2	30	0	0	0	32	67
3:45 PM	2	2	3	0	2	7	3	5	2	0	0	10	1	28	1	0	0	30	3	24	0	0	0	27	74
Hourly Total	9	11	12	0	2	32	9	12	11	0	0	32	6	99	9	0	1	114	13	125	4	0	0	142	320
4:00 PM	3	1	1	0	0	5	0	1	1	0	0	2	3	20	2	0	0	25	7	26	3	0	0	36	68
4:15 PM	0	5	0	0	2	5	0	2	2	0	0	4	2	23	1	0	0	26	4	41	1	0	0	46	81

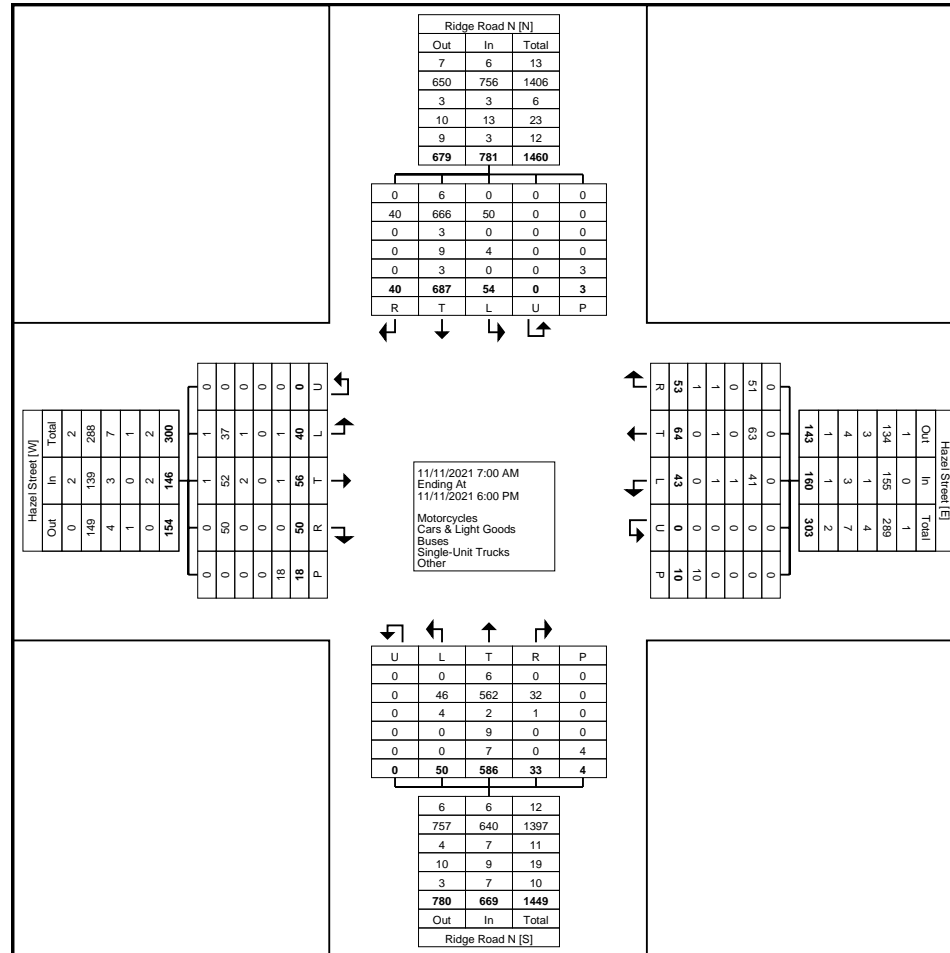
4:30 PM	0	4	3	0	0	7	3	1	0	0	0	4	3	16	1	0	0	20	0	36	3	0	0	39	70
4:45 PM	1	2	0	0	0	3	1	1	0	0	0	2	2	17	1	0	0	20	0	26	1	0	0	27	52
Hourly Total	4	12	4	0	2	20	4	5	3	0	0	12	10	76	5	0	0	91	11	129	8	0	0	148	271
5:00 PM	1	0	1	0	0	2	1	1	0	0	1	2	1	30	2	0	0	33	1	35	5	0	0	41	78
5:15 PM	0	1	2	0	1	3	0	2	0	0	3	2	0	18	0	0	0	18	1	28	4	0	0	33	56
5:30 PM	0	1	1	0	2	2	0	0	1	0	0	1	1	15	0	0	0	16	0	24	1	0	0	25	44
5:45 PM	1	2	0	0	1	3	1	0	1	0	0	2	2	18	0	0	0	20	1	28	1	0	0	30	55
Hourly Total	2	4	4	0	4	10	2	3	2	0	4	7	4	81	2	0	0	87	3	115	11	0	0	129	233
Grand Total	40	56	50	0	18	146	43	64	53	0	10	160	50	586	33	0	4	669	54	687	40	0	3	781	1756
Approach %	27.4	38.4	34.2	0.0	-	-	26.9	40.0	33.1	0.0	-	-	7.5	87.6	4.9	0.0	-	-	6.9	88.0	5.1	0.0	-	-	-
Total %	2.3	3.2	2.8	0.0	-	8.3	2.4	3.6	3.0	0.0	-	9.1	2.8	33.4	1.9	0.0	-	38.1	3.1	39.1	2.3	0.0	-	44.5	-
Motorcycles	1	1	0	0	-	2	0	0	0	0	-	0	0	6	0	0	-	6	0	6	0	0	-	6	14
% Motorcycles	2.5	1.8	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	1.0	0.0	-	-	0.9	0.0	0.9	0.0	-	-	0.8	0.8
Cars & Light Goods	37	52	50	0	-	139	41	63	51	0	-	155	46	562	32	0	-	640	50	666	40	0	-	756	1690
% Cars & Light Goods	92.5	92.9	100.0	-	-	95.2	95.3	98.4	96.2	-	-	96.9	92.0	95.9	97.0	-	-	95.7	92.6	96.9	100.0	-	-	96.8	96.2
Buses	1	2	0	0	-	3	1	0	0	0	-	1	4	2	1	0	-	7	0	3	0	0	-	3	14
% Buses	2.5	3.6	0.0	-	-	2.1	2.3	0.0	0.0	-	-	0.6	8.0	0.3	3.0	-	-	1.0	0.0	0.4	0.0	-	-	0.4	0.8
Single-Unit Trucks	0	0	0	0	-	0	1	1	1	0	-	3	0	9	0	0	-	9	4	9	0	0	-	13	25
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	2.3	1.6	1.9	-	-	1.9	0.0	1.5	0.0	-	-	1.3	7.4	1.3	0.0	-	-	1.7	1.4
Articulated Trucks	1	0	0	0	-	1	0	0	0	0	-	0	0	6	0	0	-	6	0	2	0	0	-	2	9
% Articulated Trucks	2.5	0.0	0.0	-	-	0.7	0.0	0.0	0.0	-	-	0.0	0.0	1.0	0.0	-	-	0.9	0.0	0.3	0.0	-	-	0.3	0.5
Bicycles on Road	0	1	0	0	-	1	0	0	1	0	-	1	0	1	0	0	-	1	0	1	0	0	-	1	4
% Bicycles on Road	0.0	1.8	0.0	-	-	0.7	0.0	0.0	1.9	-	-	0.6	0.0	0.2	0.0	-	-	0.1	0.0	0.1	0.0	-	-	0.1	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	18	-	-	-	-	10	-	-	-	-	-	-	4	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Hazel Street & Ridge Road N
Site Code: 210670
Start Date: 11/11/2021
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Hazel Street & Ridge Road N
Site Code: 210670
Start Date: 11/11/2021
Page No: 4

Turning Movement Peak Hour Data (8:15 AM)

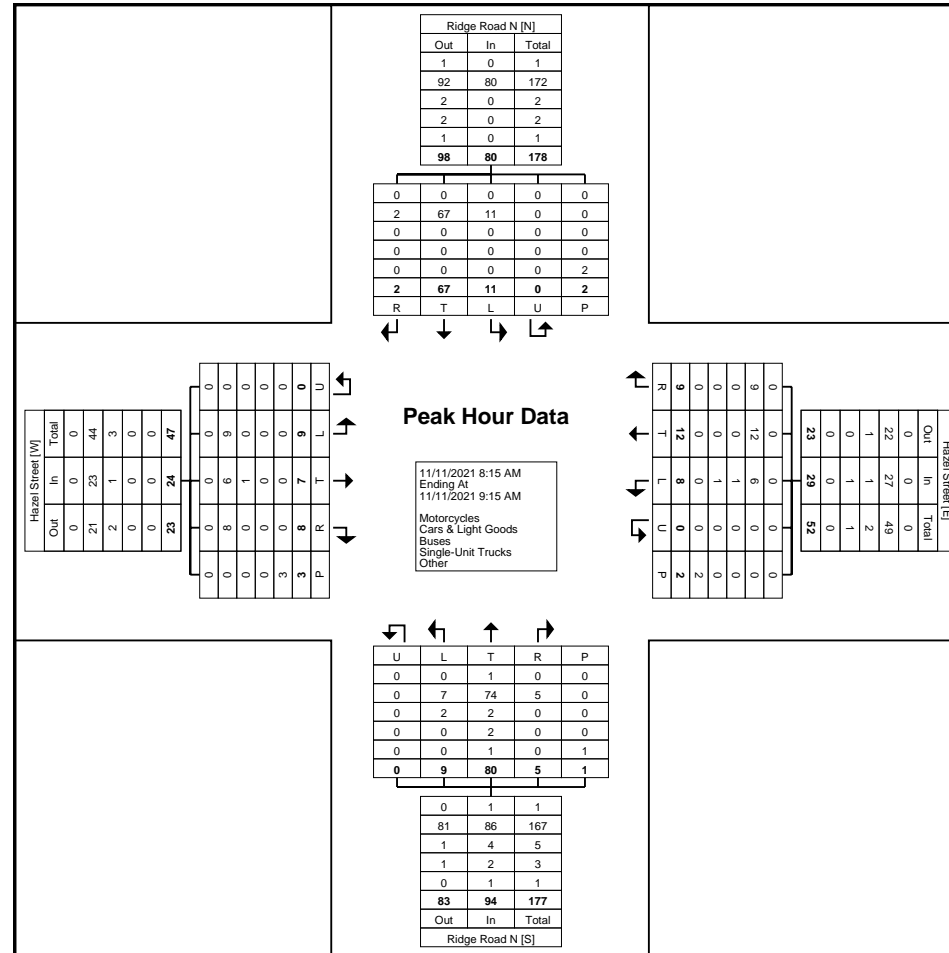
Start Time	Hazel Street Eastbound						Hazel Street Westbound						Ridge Road N Northbound						Ridge Road N Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:15 AM	3	2	0	0	0	5	1	6	1	0	1	8	3	20	1	0	1	24	2	13	0	0	0	15	52
8:30 AM	1	1	2	0	2	4	1	2	3	0	0	6	2	19	1	0	0	22	1	14	2	0	2	17	49
8:45 AM	2	2	2	0	1	6	5	2	0	0	0	7	2	16	1	0	0	19	2	24	0	0	0	26	58
9:00 AM	3	2	4	0	0	9	1	2	5	0	1	8	2	25	2	0	0	29	6	16	0	0	0	22	68
Total	9	7	8	0	3	24	8	12	9	0	2	29	9	80	5	0	1	94	11	67	2	0	2	80	227
Approach %	37.5	29.2	33.3	0.0	-	-	27.6	41.4	31.0	0.0	-	-	9.6	85.1	5.3	0.0	-	-	13.8	83.8	2.5	0.0	-	-	-
Total %	4.0	3.1	3.5	0.0	-	10.6	3.5	5.3	4.0	0.0	-	12.8	4.0	35.2	2.2	0.0	-	41.4	4.8	29.5	0.9	0.0	-	35.2	-
PHF	0.750	0.875	0.500	0.000	-	0.667	0.400	0.500	0.450	0.000	-	0.906	0.750	0.800	0.625	0.000	-	0.810	0.458	0.698	0.250	0.000	-	0.769	0.835
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.3	0.0	-	-	1.1	0.0	0.0	0.0	-	-	0.0	0.4
Cars & Light Goods	9	6	8	0	-	23	6	12	9	0	-	27	7	74	5	0	-	86	11	67	2	0	-	80	216
% Cars & Light Goods	100.0	85.7	100.0	-	-	95.8	75.0	100.0	100.0	-	-	93.1	77.8	92.5	100.0	-	-	91.5	100.0	100.0	100.0	-	-	100.0	95.2
Buses	0	1	0	0	-	1	1	0	0	0	-	1	2	2	0	0	-	4	0	0	0	0	-	0	6
% Buses	0.0	14.3	0.0	-	-	4.2	12.5	0.0	0.0	-	-	3.4	22.2	2.5	0.0	-	-	4.3	0.0	0.0	0.0	-	-	0.0	2.6
Single-Unit Trucks	0	0	0	0	-	0	1	0	0	0	-	1	0	2	0	0	-	2	0	0	0	0	-	0	3
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	12.5	0.0	0.0	-	-	3.4	0.0	2.5	0.0	-	-	2.1	0.0	0.0	0.0	-	-	0.0	1.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.3	0.0	-	-	1.1	0.0	0.0	0.0	-	-	0.0	0.4
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	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
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Count Name: Hazel Street & Ridge Road N
Site Code: 210670
Start Date: 11/11/2021
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Turning Movement Peak Hour Data Plot (8:15 AM)



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Count Name: Hazel Street & Ridge Road N
Site Code: 210670
Start Date: 11/11/2021
Page No: 6

Turning Movement Peak Hour Data (12:30 PM)

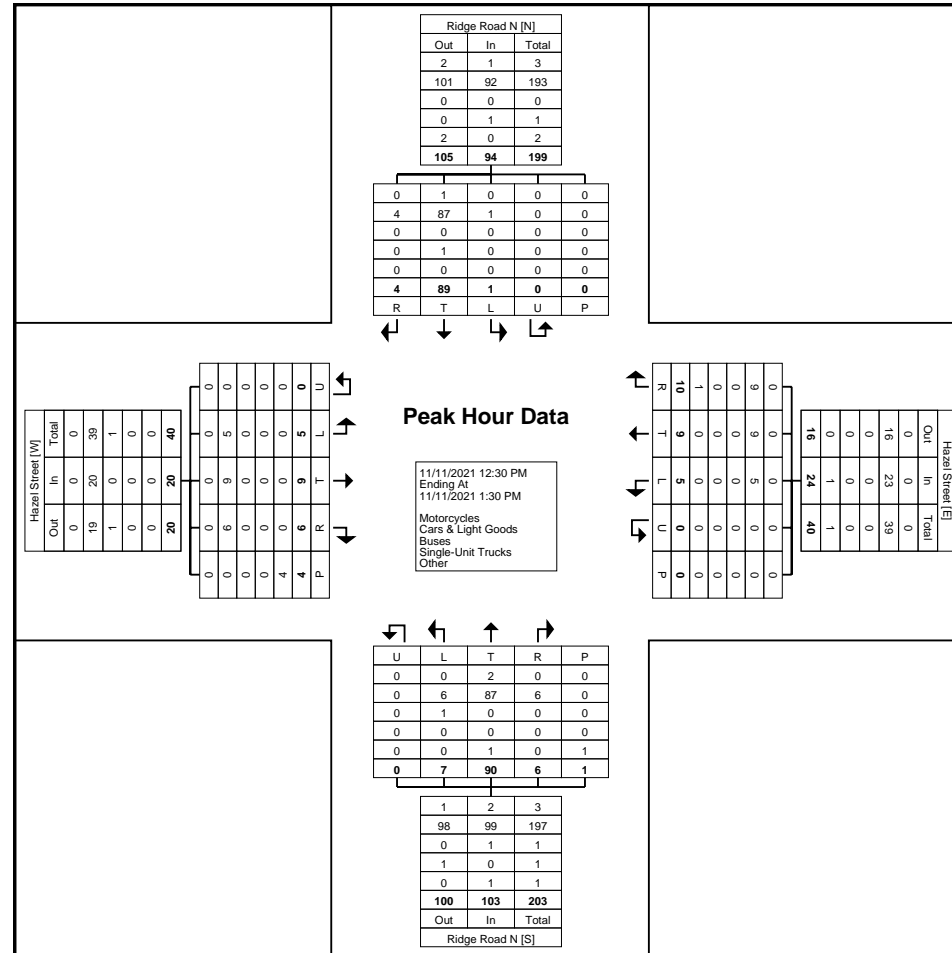
Start Time	Hazel Street Eastbound						Hazel Street Westbound						Ridge Road N Northbound						Ridge Road N Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:30 PM	1	2	1	0	0	4	2	4	0	0	0	6	1	25	0	0	1	26	1	26	1	0	0	28	64
12:45 PM	2	3	2	0	0	7	3	0	5	0	0	8	1	25	1	0	0	27	0	20	0	0	0	20	62
1:00 PM	1	3	1	0	3	5	0	3	3	0	0	6	1	18	2	0	0	21	0	23	1	0	0	24	56
1:15 PM	1	1	2	0	1	4	0	2	2	0	0	4	4	22	3	0	0	29	0	20	2	0	0	22	59
Total	5	9	6	0	4	20	5	9	10	0	0	24	7	90	6	0	1	103	1	89	4	0	0	94	241
Approach %	25.0	45.0	30.0	0.0	-	-	20.8	37.5	41.7	0.0	-	-	6.8	87.4	5.8	0.0	-	-	1.1	94.7	4.3	0.0	-	-	-
Total %	2.1	3.7	2.5	0.0	-	8.3	2.1	3.7	4.1	0.0	-	10.0	2.9	37.3	2.5	0.0	-	42.7	0.4	36.9	1.7	0.0	-	39.0	-
PHF	0.625	0.750	0.750	0.000	-	0.714	0.417	0.563	0.500	0.000	-	0.750	0.438	0.900	0.500	0.000	-	0.888	0.250	0.856	0.500	0.000	-	0.839	0.941
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	1	0	0	-	1	3
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	2.2	0.0	-	-	1.9	0.0	1.1	0.0	-	-	1.1	1.2
Cars & Light Goods	5	9	6	0	-	20	5	9	9	0	-	23	6	87	6	0	-	99	1	87	4	0	-	92	234
% Cars & Light Goods	100.0	100.0	100.0	-	-	100.0	100.0	100.0	90.0	-	-	95.8	85.7	96.7	100.0	-	-	96.1	100.0	97.8	100.0	-	-	97.9	97.1
Buses	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	14.3	0.0	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.4
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	1.1	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	1	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	2
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	10.0	-	-	4.2	0.0	1.1	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.8
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
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Count Name: Hazel Street & Ridge Road N
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Start Date: 11/11/2021
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Turning Movement Peak Hour Data Plot (12:30 PM)



Paradigm Transportation Solutions Limited
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Count Name: Hazel Street & Ridge Road N
Site Code: 210670
Start Date: 11/11/2021
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Turning Movement Peak Hour Data (3:00 PM)

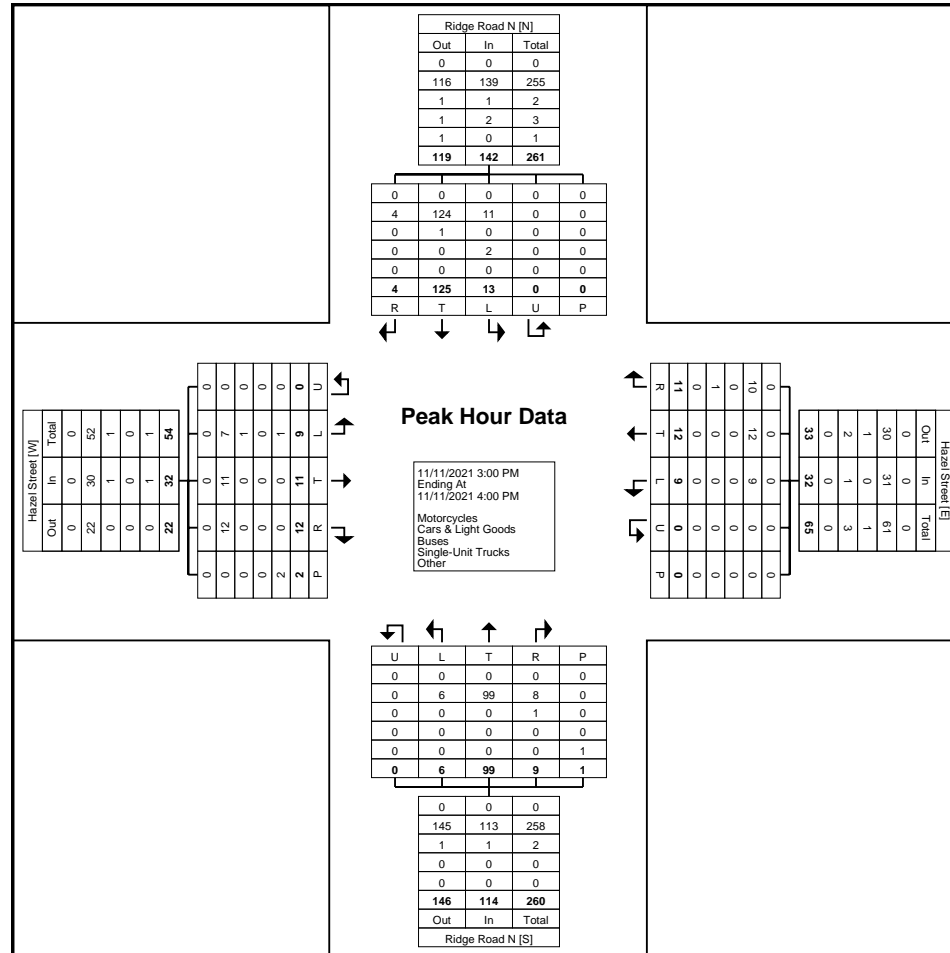
Start Time	Hazel Street Eastbound						Hazel Street Westbound						Ridge Road N Northbound						Ridge Road N Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
3:00 PM	2	1	1	0	0	4	3	3	2	0	0	8	3	28	5	0	0	36	5	38	0	0	0	43	91
3:15 PM	3	4	4	0	0	11	2	2	4	0	0	8	1	26	2	0	0	29	3	33	4	0	0	40	88
3:30 PM	2	4	4	0	0	10	1	2	3	0	0	6	1	17	1	0	1	19	2	30	0	0	0	32	67
3:45 PM	2	2	3	0	2	7	3	5	2	0	0	10	1	28	1	0	0	30	3	24	0	0	0	27	74
Total	9	11	12	0	2	32	9	12	11	0	0	32	6	99	9	0	1	114	13	125	4	0	0	142	320
Approach %	28.1	34.4	37.5	0.0	-	-	28.1	37.5	34.4	0.0	-	-	5.3	86.8	7.9	0.0	-	-	9.2	88.0	2.8	0.0	-	-	-
Total %	2.8	3.4	3.8	0.0	-	10.0	2.8	3.8	3.4	0.0	-	10.0	1.9	30.9	2.8	0.0	-	35.6	4.1	39.1	1.3	0.0	-	44.4	-
PHF	0.750	0.688	0.750	0.000	-	0.727	0.750	0.600	0.688	0.000	-	0.800	0.500	0.884	0.450	0.000	-	0.792	0.650	0.822	0.250	0.000	-	0.826	0.879
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	7	11	12	0	-	30	9	12	10	0	-	31	6	99	8	0	-	113	11	124	4	0	-	139	313
% Cars & Light Goods	77.8	100.0	100.0	-	-	93.8	100.0	100.0	90.9	-	-	96.9	100.0	100.0	88.9	-	-	99.1	84.6	99.2	100.0	-	-	97.9	97.8
Buses	1	0	0	0	-	1	0	0	0	0	-	0	0	0	1	0	-	1	0	1	0	0	-	1	3
% Buses	11.1	0.0	0.0	-	-	3.1	0.0	0.0	0.0	-	-	0.0	0.0	0.0	11.1	-	-	0.9	0.0	0.8	0.0	-	-	0.7	0.9
Single-Unit Trucks	0	0	0	0	-	0	0	0	1	0	-	1	0	0	0	0	-	0	2	0	0	0	-	2	3
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	9.1	-	-	3.1	0.0	0.0	0.0	-	-	0.0	15.4	0.0	0.0	-	-	1.4	0.9
Articulated Trucks	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	11.1	0.0	0.0	-	-	3.1	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
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	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-



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Turning Movement Peak Hour Data Plot (3:00 PM)

Location..... Dominion Road @ Ridge Road North

GeoID..... 01473

Municipality. FORT ERIE

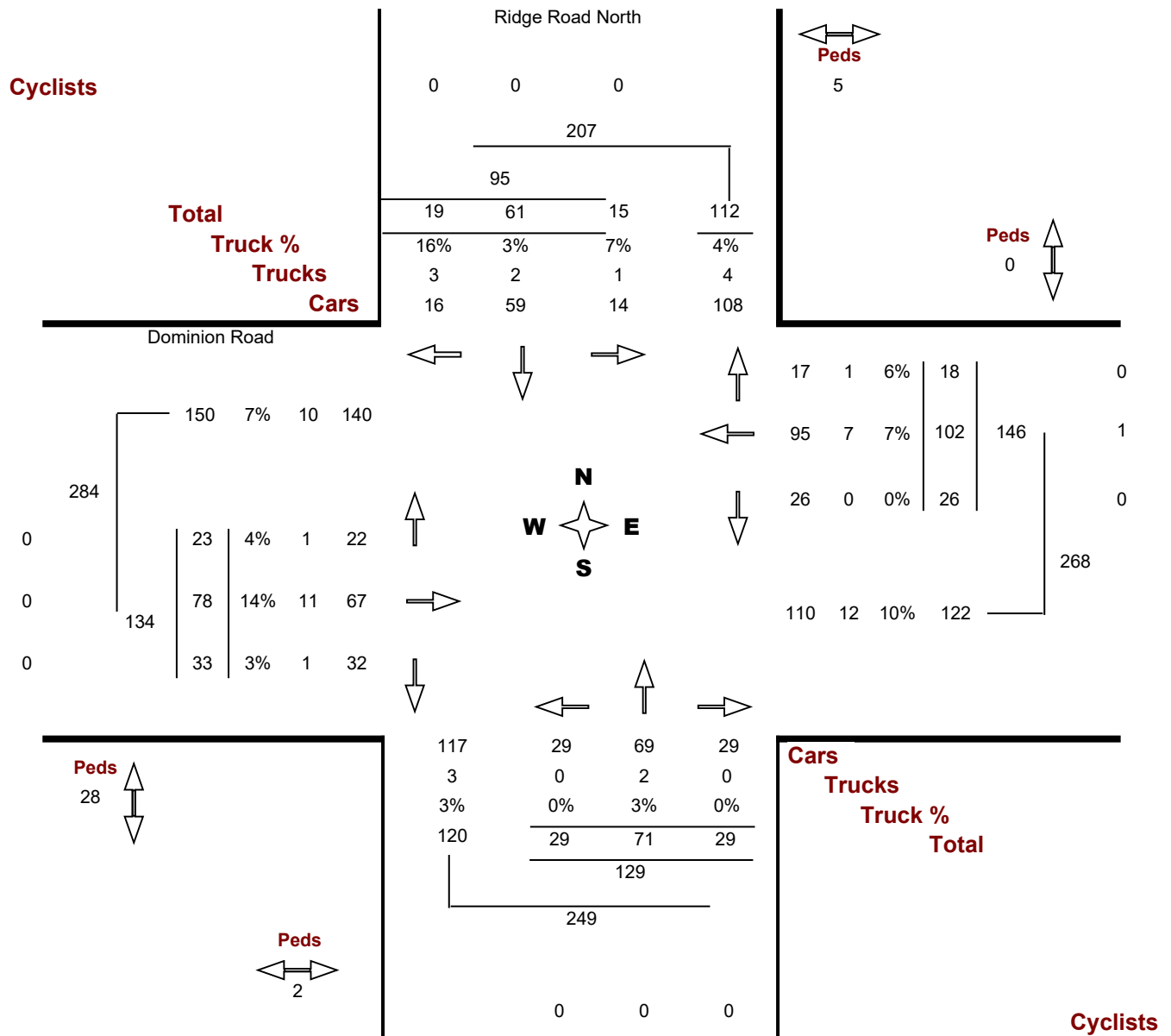
Count Date. Thursday, 23 May, 2019

Traffic Cont.

Count Time. 07:00 AM — 09:00 AM

Major Dir..... East west

Peak Hour.. 08:00 AM — 09:00 AM



Location..... Dominion Road @ Ridge Road North

GeoID..... 01473

Municipality. FORT ERIE

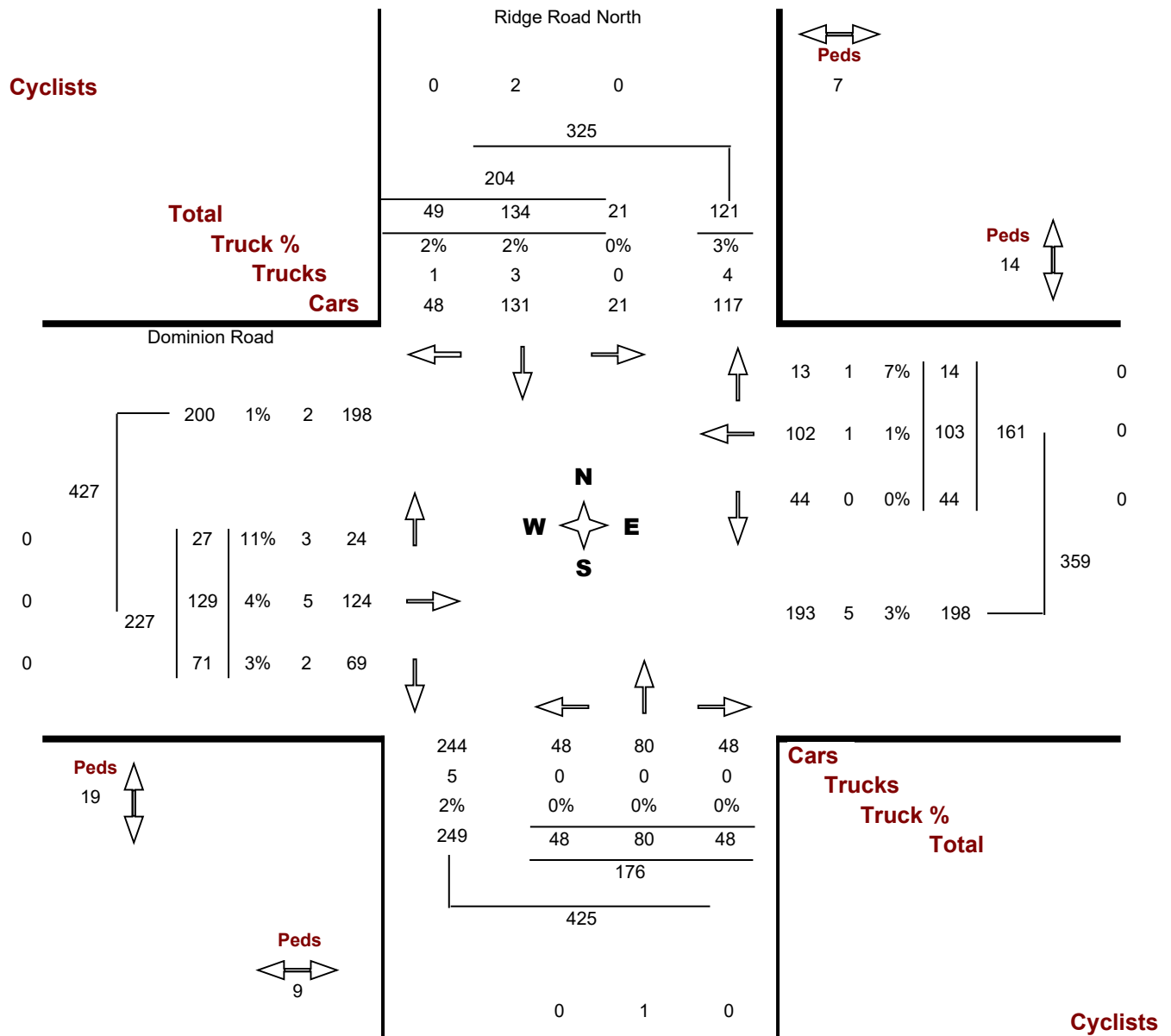
Count Date. Thursday, 23 May, 2019

Traffic Cont.

Count Time. 03:00 PM — 06:00 PM

Major Dir..... East west

Peak Hour.. 03:30 PM — 04:30 PM

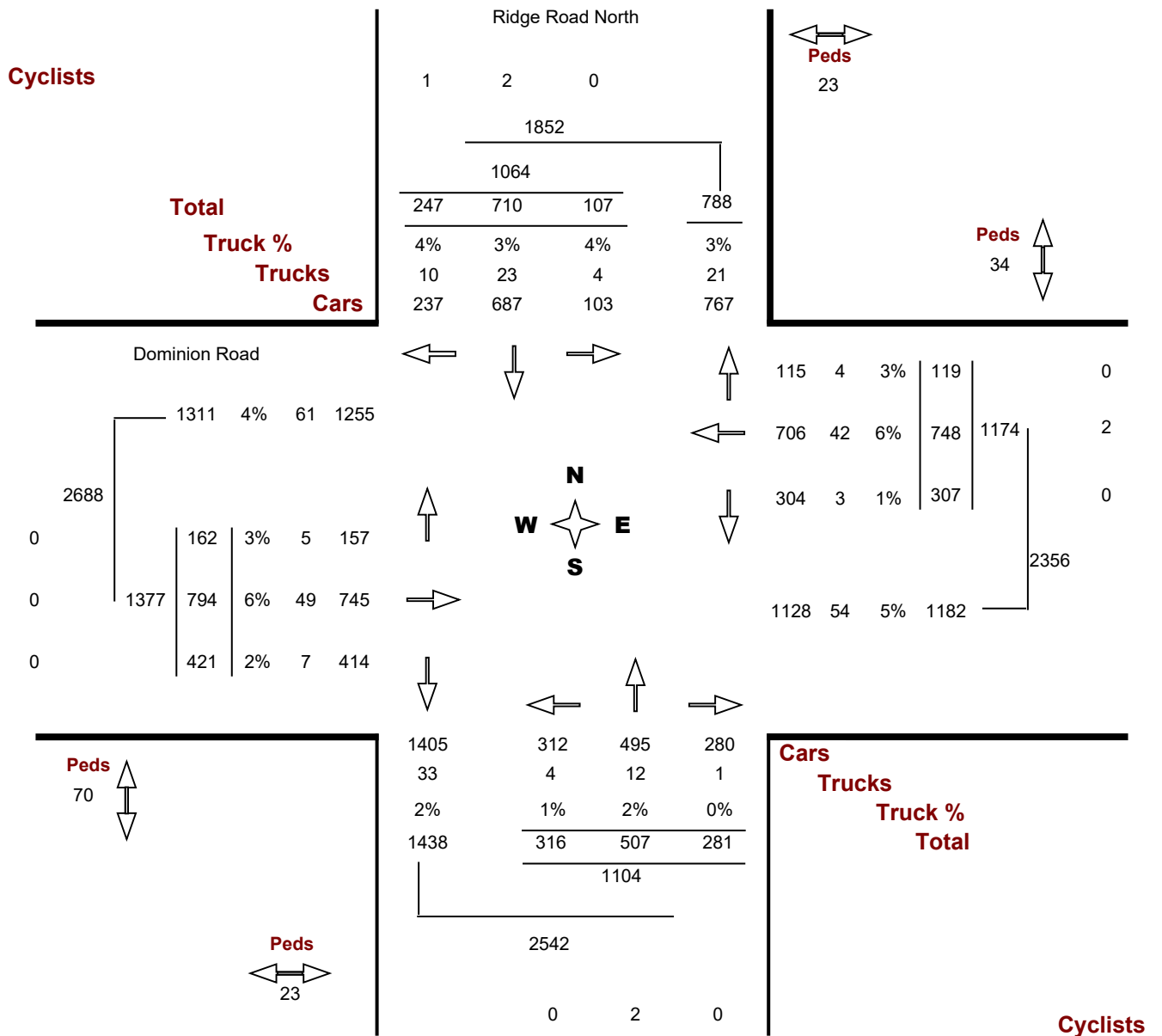


Location..... Dominion Road @ Ridge Road North

Municipality..... FORT ERIE

GeoID..... 01473

Count Date..... Thursday, 23 May, 2019



Turning Movement Count - Details Report (15 min)

Location..... Dominion Road @ Ridge Road North

Municipality..... FORT ERIE

Count Date..... Thursday, May 23, 2019

Ridge Road North

Dominion Road

North Approach

South Approach

East Approach

West Approach

Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
07:00 07:15	4	7	2	0	13	4	13	2	0	19	1	14	6	0	21	2	9	2	0	13
07:15 07:30	2	12	1	0	15	3	14	1	0	18	5	15	3	0	23	2	12	4	0	18
07:30 07:45	2	7	5	0	14	3	15	7	0	25	6	23	3	0	32	2	13	5	0	20
07:45 08:00	1	15	1	0	17	11	16	4	0	31	3	17	0	0	20	3	19	7	0	29
Hourly Total	9	41	9	0	59	21	58	14	0	93	15	69	12	0	96	9	53	18	0	80
08:00 08:15	3	13	5	0	21	9	22	5	0	36	4	16	3	0	23	5	17	3	0	25
08:15 08:30	1	17	2	0	20	5	14	6	0	25	2	26	6	0	34	8	14	6	0	28
08:30 08:45	5	17	5	0	27	9	16	8	0	33	7	26	2	0	35	6	21	11	0	38
08:45 09:00	6	14	7	0	27	6	19	10	0	35	13	34	7	0	54	4	26	13	0	43
Hourly Total	15	61	19	0	95	29	71	29	0	129	26	102	18	0	146	23	78	33	0	134
11:00 11:15	5	22	6	0	33	8	19	8	0	35	8	16	3	0	27	2	19	16	0	37
11:15 11:30	4	19	16	0	39	5	17	12	0	34	7	26	5	0	38	5	20	17	0	42
11:30 11:45	7	20	9	0	36	8	12	10	0	30	9	22	0	0	31	1	14	9	0	24
11:45 12:00	4	25	10	0	39	7	20	7	0	34	11	17	2	0	30	4	21	15	0	40
Hourly Total	20	86	41	0	147	28	68	37	0	133	35	81	10	0	126	12	74	57	0	143
12:00 12:15	1	21	10	0	32	12	10	8	0	30	8	30	4	0	42	2	29	16	0	47
12:15 12:30	1	28	8	0	37	17	7	5	0	29	5	15	3	0	23	4	33	18	0	55
12:30 12:45	2	24	9	0	35	12	19	7	0	38	13	13	8	0	34	3	25	13	0	41
12:45 13:00	3	21	1	0	25	14	17	9	0	40	16	24	4	0	44	5	24	20	0	49
Hourly Total	7	94	28	0	129	55	53	29	0	137	42	82	19	0	143	14	111	67	0	192
13:00 13:15	1	16	7	0	24	9	11	12	0	32	15	25	5	0	45	7	22	11	0	40
13:15 13:30	2	17	14	0	33	9	13	9	0	31	12	27	3	0	42	6	35	13	0	54
13:30 13:45	5	16	9	0	30	8	10	13	0	31	6	22	2	0	30	7	17	17	0	41
13:45 14:00	1	26	11	0	38	12	15	6	0	33	11	23	3	0	37	6	24	20	0	50
Hourly Total	9	75	41	0	125	38	49	40	0	127	44	97	13	0	154	26	98	61	0	185
15:00 15:15	1	25	3	0	29	14	10	12	0	36	19	25	1	0	45	8	20	14	0	42
15:15 15:30	6	26	6	0	38	12	11	10	0	33	13	29	6	0	48	5	38	16	0	59
15:30 15:45	6	36	9	0	51	11	28	18	0	57	8	31	4	0	43	6	37	20	0	63
15:45 16:00	5	31	16	0	52	11	21	9	0	41	13	25	5	0	43	8	34	21	0	63
Hourly Total	18	118	34	0	170	48	70	49	0	167	53	110	16	0	179	27	129	71	0	227
16:00 16:15	6	27	18	0	51	9	14	10	0	33	13	29	3	0	45	5	26	15	0	46

Ridge Road North

Dominion Road

North Approach

South Approach

East Approach

West Approach

Time Period	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT	LT	TH	RT	U-Turn	TOT
16:15 16:30	4	40	6	0	50	17	17	11	0	45	10	18	2	0	30	8	32	15	0	55
16:30 16:45	2	31	7	0	40	9	20	14	0	43	10	32	1	0	43	3	23	13	0	39
16:45 17:00	2	33	10	0	45	9	17	15	0	41	10	21	5	0	36	5	35	16	0	56
Hourly Total	14	131	41	0	186	44	68	50	0	162	43	100	11	0	154	21	116	59	0	196
17:00 17:15	6	30	9	0	45	18	23	10	0	51	10	33	6	0	49	5	27	13	0	45
17:15 17:30	3	25	11	0	39	11	19	10	0	40	21	27	6	0	54	3	34	14	0	51
17:30 17:45	0	28	5	0	33	14	17	6	0	37	5	25	4	0	34	8	39	15	0	62
17:45 18:00	6	21	9	0	36	10	11	7	0	28	13	22	4	0	39	14	35	13	0	62
Hourly Total	15	104	34	0	153	53	70	33	0	156	49	107	20	0	176	30	135	55	0	220
Grand Total	107	710	247	0	1064	316	507	281	0	1104	307	748	119	0	1174	162	794	421	0	1377
Truck %	4%	3%	4%	0%	3%	1%	2%	0%	0%	2%	1%	6%	3%	0%	4%	3%	6%	2%	0%	4%

Signal Code: 001RDG

Intersection: RR1 (DOMINION RD.) & RIDGE RD.

Municipality: forterie

Owner: operation

Last Modified: 2021-10-05 11:48:15 AM

Timing Parameters	EBD & WBD DOMINION	NBD & SBD RIDGE	n/a	n/a	n/a	n/a
Min Green	10	8	0	0	0	0
Walk	7	7	0	0	0	0
Ped Clearance	12	12	0	0	0	0
Vehicle Ext.	2.1	2.1	0	0	0	0
Max Green	30	25	0	0	0	0
Yellow	4.1	4.1	0	0	0	0
All Red	2	2	0	0	0	0

		Offset
Minimum Cycle	30.2	0
Pedestrian Cycle	50.2	
Maximum Cycle	67.2	0
Operation	operation	

Installed On: 2010-07-13

Count Date: 2007-09-18

FA = Fully Actuated SA = Semi Actuated FT = Fixed Time

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Appendix C

Base Year Traffic Operations Reports



Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

Base Year AM
210670

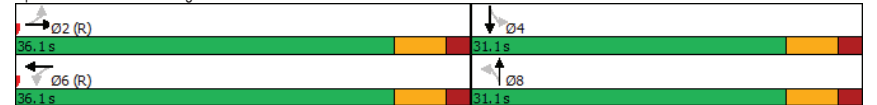
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	19	100	52	60	121	14	33	59	43	13	56	20
Future Volume (vph)	19	100	52	60	121	14	33	59	43	13	56	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99			1.00			0.99			0.99		
Frt	0.959			0.990			0.957			0.969		
Fit Protected	0.994			0.985			0.988			0.993		
Satd. Flow (prot)	0	1509	0	0	1577	0	0	1571	0	0	1608	0
Fit Permitted	0.959			0.868			0.923			0.959		
Satd. Flow (perm)	0	1455	0	0	1388	0	0	1463	0	0	1552	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)	50			50			50			50		
Link Speed (k/h)	114.5			175.5			129.4			437.0		
Link Distance (m)	8.2			12.6			9.3			31.5		
Travel Time (s)	3		3	3	3	8	2	2	2	2	8	
Confl. Peds. (#/hr)	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Peak Hour Factor	0%	14%	5%	0%	12%	8%	4%	6%	3%	9%	2%	6%
Heavy Vehicles (%)	21	109	57	65	132	15	36	64	47	14	61	22
Adj. Flow (vph)	Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	187	0	0	212	0	0	147	0	0	97	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	25.1	25.1		25.1	25.1		25.1	25.1		25.1	25.1	
Minimum Split (s)	36.1	36.1		36.1	36.1		31.1	31.1		31.1	31.1	
Total Split (s)	53.7%	53.7%		53.7%	53.7%		46.3%	46.3%		46.3%	46.3%	
Total Split (%)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Yellow Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
All-Red Time (s)		-2.1			-2.1			-2.1			-2.1	
Lost Time Adjust (s)	4.0			4.0			4.0			4.0		
Total Lost Time (s)	Lead/Lag											
Lead-Lag Optimize?	32.1			32.1			27.1			27.1		
Act Effct Green (s)	0.48			0.48			0.40			0.40		
Actuated g/C Ratio	0.27			0.32			0.25			0.16		
v/c Ratio	11.8			12.5			14.8			13.7		
Control Delay	0.0			0.0			0.0			0.0		
Queue Delay	11.8			12.5			14.8			13.7		
Total Delay	B			B			B			B		
LOS	11.8			12.5			14.8			13.7		
Approach Delay	B			B			B			B		
Approach LOS	13.9			16.2			12.4			7.8		
Queue Length 50th (m)	26.2			30.1			24.4			16.9		
Queue Length 95th (m)	90.5			151.5			105.4			413.0		
Internal Link Dist (m)												
Turn Bay Length (m)	695			663			589			625		
Base Capacity (vph)	0			0			0			0		
Starvation Cap Reductn												

Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

Base Year AM
210670

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0			0			0			0		
Storage Cap Reductn	0			0			0			0		
Reduced v/c Ratio	0.27			0.32			0.25			0.16		
Intersection Summary												
Area Type:	Other											
Cycle Length:	67.2											
Actuated Cycle Length:	67.2											
Offset:	25 (37%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle:	55											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.32											
Intersection Signal Delay:	13.0						Intersection LOS: B					
Intersection Capacity Utilization:	46.8%						ICU Level of Service A					
Analysis Period (min):	15											

Splits and Phases: 1: Ridge Rd N & Dominion Rd



HCM Signalized Intersection Capacity Analysis
1: Ridge Rd N & Dominion Rd

Base Year AM
210670

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	19	100	52	60	121	14	33	59	43	13	56	20
Future Volume (vph)	19	100	52	60	121	14	33	59	43	13	56	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			1.00			1.00		
Frb, ped/bikes	0.99			1.00			0.99			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.96			0.99			0.96			0.97		
Flt Protected	0.99			0.98			0.99			0.99		
Satd. Flow (prot)	1509			1575			1566			1608		
Flt Permitted	0.96			0.87			0.92			0.96		
Satd. Flow (perm)	1456			1388			1463			1553		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	109	57	65	132	15	36	64	47	14	61	22
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	187	0	0	212	0	0	147	0	0	97	0
Confl. Peds. (#/hr)	3		3		3		8		2		2	
Heavy Vehicles (%)	0%	14%	5%	0%	12%	8%	4%	6%	3%	9%	2%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2				6				8		4	
Permitted Phases	2				6				8		4	
Actuated Green, G (s)	30.0				30.0				25.0		25.0	
Effective Green, g (s)	32.1				32.1				27.1		27.1	
Actuated g/C Ratio	0.48				0.48				0.40		0.40	
Clearance Time (s)	6.1				6.1				6.1		6.1	
Lane Grp Cap (vph)	695			663			589			626		
v/s Ratio Prot												
v/s Ratio Perm	0.13			c0.15			c0.10			0.06		
v/c Ratio	0.27			0.32			0.25			0.15		
Uniform Delay, d1	10.5			10.8			13.3			12.8		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	1.0			1.3			1.0			0.5		
Delay (s)	11.5			12.1			14.3			13.3		
Level of Service	B			B			B			B		
Approach Delay (s)	11.5				12.1				14.3		13.3	
Approach LOS	B				B				B		B	

Intersection Summary			
HCM 2000 Control Delay	12.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Ridge Rd N & Hazel St

Base Year AM
210670

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	10	8	9	9	13	10	10	85	6	12	72	3
Future Volume (vph)	10	8	9	9	13	10	10	85	6	12	72	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.955			0.958			0.991			0.996		
Flt Protected	0.982			0.986			0.995			0.993		
Satd. Flow (prot)	0	1570	0	0	1543	0	0	1583	0	0	1731	0
Flt Permitted	0.982			0.986			0.995			0.993		
Satd. Flow (perm)	0	1570	0	0	1543	0	0	1583	0	0	1731	0
Link Speed (k/h)	40			50			50			50		
Link Distance (m)	166.6			187.1			437.0			126.5		
Travel Time (s)	15.0			13.5			31.5			9.1		
Confl. Peds. (#/hr)	2		1	1		2	3		2	2		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	15%	0%	25%	0%	23%	8%	0%	0%	0%	0%	0%
Adj. Flow (vph)	11	9	10	10	14	11	11	92	7	13	78	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	30	0	0	35	0	0	110	0	0	94	0
Sign Control	Stop				Stop				Free		Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	18.6%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
2: Ridge Rd N & Hazel St

Base Year AM
210670

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔			↔		
Traffic Volume (veh/h)	10	8	9	9	13	10	10	85	6	12	72	3	
Future Volume (Veh/h)	10	8	9	9	13	10	10	85	6	12	72	3	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	11	9	10	10	14	11	11	92	7	13	78	3	
Pedestrians	3			2			1			2			
Lane Width (m)	3.6			3.6			3.6			3.6			
Walking Speed (m/s)	1.2			1.2			1.2			1.2			
Percent Blockage	0			0			0			0			
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	246	232	84	240	230	100	84						101
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	246	232	84	240	230	100	84						101
tC, single (s)	7.1	6.7	6.2	7.3	6.5	6.2	4.3						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.1	3.3	3.7	4.0	3.3	2.4						2.2
p0 queue free %	98	99	99	98	98	99	99						99
cM capacity (veh/h)	679	633	978	642	660	958	1387						1502
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	30	35	110	94									
Volume Left	11	10	11	13									
Volume Right	10	11	7	3									
cSH	738	725	1387	1502									
Volume to Capacity	0.04	0.05	0.01	0.01									
Queue Length 95th (m)	1.0	1.2	0.2	0.2									
Control Delay (s)	10.1	10.2	0.8	1.1									
Lane LOS	B	B	A	A									
Approach Delay (s)	10.1	10.2	0.8	1.1									
Approach LOS	B	B											
Intersection Summary													
Average Delay	3.2												
Intersection Capacity Utilization	18.6%			ICU Level of Service			A						
Analysis Period (min)	15												

Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

Base Year PM
210670

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	14	147	64	48	147	22	60	90	61	22	92	34
Future Volume (vph)	14	147	64	48	147	22	60	90	61	22	92	34
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99			1.00			0.99			0.99		
Frt	0.961			0.986			0.961			0.969		
Flt Protected	0.997			0.989			0.986			0.993		
Satd. Flow (prot)	0	1555	0	0	1598	0	0	1620	0	0	1647	0
Flt Permitted	0.978			0.894			0.879			0.940		
Satd. Flow (perm)	0	1525	0	0	1443	0	0	1436	0	0	1559	0
Right Turn on Red	No			No			No			No		
Satd. Flow (RTOR)	50			50			50			50		
Link Speed (k/h)	114.5			175.5			129.4			437.0		
Travel Time (s)	8.2			12.6			9.3			31.5		
Confl. Peds. (#/hr)	4	4		4	4		13	1		1	13	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	10%	0%	5%	8%	0%	4%	0%	2%	0%	2%	0%
Adj. Flow (vph)	15	160	70	52	160	24	65	98	66	24	100	37
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	245	0	0	236	0	0	229	0	0	161	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2		6		6		8		8		4	
Permitted Phases	2		6		6		8		8		4	
Minimum Split (s)	25.1	25.1		25.1	25.1		25.1	25.1		25.1	25.1	
Total Split (s)	36.1	36.1		36.1	36.1		31.1	31.1		31.1	31.1	
Total Split (%)	53.7%	53.7%		53.7%	53.7%		46.3%	46.3%		46.3%	46.3%	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.1		-2.1		-2.1		-2.1		-2.1		-2.1	
Total Lost Time (s)	4.0		4.0		4.0		4.0		4.0		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	32.1			32.1			27.1			27.1		
Actuated g/C Ratio	0.48			0.48			0.40			0.40		
v/c Ratio	0.34			0.34			0.40			0.26		
Control Delay	12.6			12.8			16.8			14.8		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	12.6			12.8			16.8			14.8		
LOS	B			B			B			B		
Approach Delay	12.6			12.8			16.8			14.8		
Approach LOS	B			B			B			B		
Queue Length 50th (m)	18.9			18.3			20.7			13.6		
Queue Length 95th (m)	33.9			33.3			37.8			26.2		
Internal Link Dist (m)	90.5			151.5			105.4			413.0		
Turn Bay Length (m)												
Base Capacity (vph)	728			689			579			628		
Starvation Cap Reductn	0			0			0			0		

Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

Base Year PM
210670

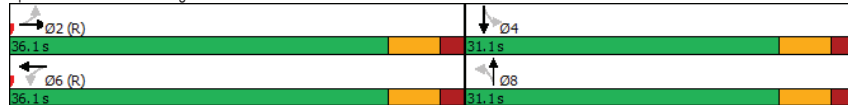


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.34			0.34			0.40			0.26	

Intersection Summary

Area Type:	Other
Cycle Length:	67.2
Actuated Cycle Length:	67.2
Offset:	25 (37%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	55
Control Type:	Pretimed
Maximum v/c Ratio:	0.40
Intersection Signal Delay:	14.1
Intersection LOS:	B
Intersection Capacity Utilization:	57.3%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 1: Ridge Rd N & Dominion Rd



HCM Signalized Intersection Capacity Analysis
1: Ridge Rd N & Dominion Rd

Base Year PM
210670



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	14	147	64	48	147	22	60	90	61	22	92	34
Future Volume (vph)	14	147	64	48	147	22	60	90	61	22	92	34
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frbp, ped/bikes		0.99			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Fr		0.96			0.99			0.96			0.97	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		1555			1597			1612			1646	
Flt Permitted		0.98			0.89			0.88			0.94	
Satd. Flow (perm)		1526			1443			1437			1558	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	160	70	52	160	24	65	98	66	24	100	37
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	245	0	0	236	0	0	229	0	0	161	0
Confl. Peds. (#/hr)	4		4	4		4	13		1	1		13
Heavy Vehicles (%)	8%	10%	0%	5%	8%	0%	4%	0%	2%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		30.0			30.0			25.0			25.0	
Effective Green, g (s)		32.1			32.1			27.1			27.1	
Actuated g/C Ratio		0.48			0.48			0.40			0.40	
Clearance Time (s)		6.1			6.1			6.1			6.1	
Lane Grp Cap (vph)		728			689			579			628	
v/s Ratio Prot												
v/s Ratio Perm		0.16			0.16			0.16			0.10	
v/c Ratio		0.34			0.34			0.40			0.26	
Uniform Delay, d1		10.9			11.0			14.2			13.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.2			1.4			2.0			1.0	
Delay (s)		12.2			12.3			16.3			14.3	
Level of Service		B			B			B			B	
Approach Delay (s)		12.2			12.3			16.3			14.3	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: Ridge Rd N & Hazel St

Base Year PM
210670

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	10	12	13	10	13	12	7	105	10	14	133	5
Future Volume (vph)	10	12	13	10	13	12	7	105	10	14	133	5
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.950			0.954			0.989			0.996	
Fit Protected		0.986			0.986			0.997			0.995	
Satd. Flow (prot)	0	1537	0	0	1592	0	0	1709	0	0	1711	0
Fit Permitted		0.986			0.986			0.997			0.995	
Satd. Flow (perm)	0	1537	0	0	1592	0	0	1709	0	0	1711	0
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		166.6			187.1			437.0			126.5	
Travel Time (s)		15.0			13.5			31.5			9.1	
Confl. Peds. (#/hr)			1	1			2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	0%	0%	0%	0%	10%	0%	0%	12%	0%	1%	16%
Adj. Flow (vph)	11	13	14	11	14	13	8	114	11	15	145	5
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	0	0	38	0	0	133	0	0	165	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 23.2%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
2: Ridge Rd N & Hazel St

Base Year PM
210670

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	10	12	13	10	13	12	7	105	10	14	133	5
Future Volume (Veh/h)	10	12	13	10	13	12	7	105	10	14	133	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	13	14	11	14	13	8	114	11	15	145	5
Pedestrians		2						1				
Lane Width (m)		3.6						3.6				
Walking Speed (m/s)		1.2						1.2				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	335	320	150	334	318	120	152			125		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	335	320	150	334	318	120	152			125		
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	98	98	98	98	98	99	99			99		
cM capacity (veh/h)	554	589	899	594	592	911	1439			1474		

Direction, Lane #

	EB 1	WB 1	NB 1	SB 1
Volume Total	38	38	133	165
Volume Left	11	11	8	15
Volume Right	14	13	11	5
cSH	661	673	1439	1474
Volume to Capacity	0.06	0.06	0.01	0.01
Queue Length 95th (m)	1.5	1.4	0.1	0.2
Control Delay (s)	10.8	10.7	0.5	0.8
Lane LOS	B	B	A	A
Approach Delay (s)	10.8	10.7	0.5	0.8
Approach LOS	B	B		

Intersection Summary

Average Delay	2.7
Intersection Capacity Utilization	23.2%
ICU Level of Service	A
Analysis Period (min)	15

Appendix D

TTS Survey Data



Wed Nov 24 2021 08:55:18 GMT-0500 (Eastern Standard Time) - Run Time: 2382ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of destination - gta06_dest In 6337
and
Trip purpose of destination - purp_dest In H
and
Start time of trip - start_time In 700-1000

Trip 2016

Table:

,6317,6327,6336,6337,6342,6349
6337,44,13,27,100,15,44

Wed Nov 24 2021 09:07:59 GMT-0500 (Eastern Standard Time) - Run Time: 2500ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of destination - gta06_dest In 6337
and
Trip purpose of destination - purp_dest In H
and
Start time of trip - start_time In 1500-1800

Trip 2016

Table:

,3514,6096,6163,6191,6200,6212,6217,6218,6235,6236,6261,6275,6303,6325,6336,6337,6340,6342,6345,6350,9998
6337,54,22,55,12,38,22,24,12,58,15,59,24,44,77,223,81,26,93,17,21,23

Wed Nov 24 2021 08:56:07 GMT-0500 (Eastern Standard Time) - Run Time: 2355ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
2006 GTA zone of origin - gta06_orig In 6337
and
Trip purpose of origin - purp_orig In H
and
Start time of trip - start_time In 700-1000

Trip 2016
Table:

,6033,6157,6163,6166,6200,6217,6219,6236,6275,6311,6317,6325,6336,6337,6340,6342,6344,6345,6349,6350
6337,58,27,55,6,38,24,81,15,24,26,44,77,112,246,43,24,13,12,44,164

Wed Nov 24 2021 09:02:13 GMT-0500 (Eastern Standard Time) - Run Time: 2450ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
2006 GTA zone of origin - gta06_orig In 6337
and
Trip purpose of origin - purp_orig In H
and
Start time of trip - start_time In 1500-1800

Trip 2016
Table:

,6151,6157,6226,6336,6337,6338,6340,6341,6345,9998
6337,27,5,27,13,55,22,55,21,5,59

Appendix E

Background Traffic Operations Reports



Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

2027 Background AM
210670

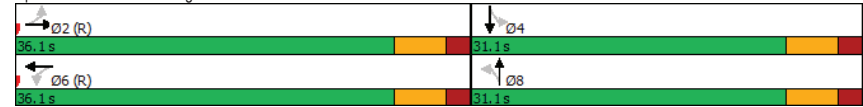
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	22	113	59	68	137	16	38	67	49	15	64	23
Future Volume (vph)	22	113	59	68	137	16	38	67	49	15	64	23
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99			1.00			0.99			0.99		
Frt	0.959			0.990			0.957			0.970		
Flt Protected	0.994			0.985			0.988			0.993		
Satd. Flow (prot)	0	1509	0	0	1577	0	0	1571	0	0	1610	0
Flt Permitted	0.954			0.855			0.917			0.955		
Satd. Flow (perm)	0	1448	0	0	1367	0	0	1454	0	0	1548	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)	50			50			50			50		
Link Speed (k/h)	114.5			175.5			129.4			437.0		
Link Distance (m)	8.2			12.6			9.3			31.5		
Travel Time (s)	3		3	3	3	8	2	2	2	2	8	8
Confl. Peds. (#/hr)	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Peak Hour Factor	0%	14%	5%	0%	12%	8%	4%	6%	3%	9%	2%	6%
Heavy Vehicles (%)	24	123	64	74	149	17	41	73	53	16	70	25
Adj. Flow (vph)	Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	211	0	0	240	0	0	167	0	0	111	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	25.1	25.1		25.1	25.1		25.1	25.1		25.1	25.1	
Minimum Split (s)	36.1	36.1		36.1	36.1		31.1	31.1		31.1	31.1	
Total Split (s)	53.7%	53.7%		53.7%	53.7%		46.3%	46.3%		46.3%	46.3%	
Total Split (%)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
Yellow Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
All-Red Time (s)	-2.1	-2.1		-2.1	-2.1		-2.1	-2.1		-2.1	-2.1	
Lost Time Adjust (s)	4.0			4.0			4.0			4.0		
Total Lost Time (s)	Lead/Lag											
Lead-Lag Optimize?	Act Effect Green (s)											
Act Effect Green (s)	32.1			32.1			27.1			27.1		
Actuated g/C Ratio	0.48			0.48			0.40			0.40		
v/c Ratio	0.31			0.37			0.28			0.18		
Control Delay	12.3			13.2			15.2			13.9		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	12.3			13.2			15.2			13.9		
LOS	B			B			B			B		
Approach Delay	12.3			13.2			15.2			13.9		
Approach LOS	B			B			B			B		
Queue Length 50th (m)	16.0			18.9			14.3			9.1		
Queue Length 95th (m)	29.5			34.6			27.6			18.9		
Internal Link Dist (m)	90.5			151.5			105.4			413.0		
Turn Bay Length (m)	Base Capacity (vph)											
Base Capacity (vph)	691			652			586			624		
Starvation Cap Reductn	0			0			0			0		

Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

2027 Background AM
210670

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0			0			0			0		
Storage Cap Reductn	0			0			0			0		
Reduced v/c Ratio	0.31			0.37			0.28			0.18		
Intersection Summary												
Area Type:	Other											
Cycle Length:	67.2											
Actuated Cycle Length:	67.2											
Offset:	25 (37%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle:	55											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.37											
Intersection Signal Delay:	13.5						Intersection LOS: B					
Intersection Capacity Utilization:	49.7%						ICU Level of Service A					
Analysis Period (min):	15											

Splits and Phases: 1: Ridge Rd N & Dominion Rd



HCM Signalized Intersection Capacity Analysis
1: Ridge Rd N & Dominion Rd

2027 Background AM
210670

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	22	113	59	68	137	16	38	67	49	15	64	23
Future Volume (vph)	22	113	59	68	137	16	38	67	49	15	64	23
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			1.00			1.00		
Frbp, ped/bikes	0.99			1.00			0.99			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.96			0.99			0.96			0.97		
Fit Protected	0.99			0.98			0.99			0.99		
Satd. Flow (prot)	1509			1576			1566			1608		
Fit Permitted	0.95			0.86			0.92			0.96		
Satd. Flow (perm)	1449			1368			1454			1547		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	123	64	74	149	17	41	73	53	16	70	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	211	0	0	240	0	0	167	0	0	111	0
Confl. Peds. (#/hr)	3		3	3		3	8		2	2		8
Heavy Vehicles (%)	0%	14%	5%	0%	12%	8%	4%	6%	3%	9%	2%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	30.0			30.0			25.0			25.0		
Effective Green, g (s)	32.1			32.1			27.1			27.1		
Actuated g/C Ratio	0.48			0.48			0.40			0.40		
Clearance Time (s)	6.1			6.1			6.1			6.1		
Lane Grp Cap (vph)	692			653			586			623		
v/s Ratio Prot	0.15			c0.18			c0.11			0.07		
v/c Ratio	0.30			0.37			0.28			0.18		
Uniform Delay, d1	10.7			11.1			13.5			12.9		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	1.1			1.6			1.2			0.6		
Delay (s)	11.9			12.7			14.7			13.5		
Level of Service	B			B			B			B		
Approach Delay (s)	11.9			12.7			14.7			13.5		
Approach LOS	B			B			B			B		

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Ridge Rd N & Hazel St

2027 Background AM
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	12	10	11	11	15	12	12	97	7	14	82	4
Future Volume (vph)	12	10	11	11	15	12	12	97	7	14	82	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.955			0.957			0.991			0.995		
Frt	0.982			0.986			0.995			0.993		
Fit Protected	0		0	0		0	0		0	0		0
Satd. Flow (prot)	1569		0	1539		0	1583		0	1729		0
Fit Permitted	0.982			0.986			0.995			0.993		
Satd. Flow (perm)	0		1569	0		0	1539		0	1583		0
Link Speed (k/h)	40			50			50			50		
Link Distance (m)	166.6			187.1			437.0			126.5		
Travel Time (s)	15.0			13.5			31.5			9.1		
Confl. Peds. (#/hr)	2		1	1		2	3		2	2		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	15%	0%	25%	0%	23%	8%	0%	0%	0%	0%	0%
Adj. Flow (vph)	13	11	12	12	16	13	13	105	8	15	89	4
Shared Lane Traffic (%)	0		36	0		0	41		0	0		108
Lane Group Flow (vph)	0	36	0	0	41	0	0	126	0	0	108	0
Sign Control	Stop			Stop			Free			Free		

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	19.6%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
2: Ridge Rd N & Hazel St

2027 Background AM
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔			↔			↔			↔			
Traffic Volume (veh/h)	12	10	11	11	15	12	12	97	7	14	82	4	
Future Volume (Veh/h)	12	10	11	11	15	12	12	97	7	14	82	4	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	13	11	12	12	16	13	13	105	8	15	89	4	
Pedestrians	3			2			1			2			
Lane Width (m)	3.6			3.6			3.6			3.6			
Walking Speed (m/s)	1.2			1.2			1.2			1.2			
Percent Blockage	0			0			0			0			
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	282	265	95	276	263	113	96						115
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	282	265	95	276	263	113	96						115
tC, single (s)	7.1	6.7	6.2	7.3	6.5	6.2	4.3						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.1	3.3	3.7	4.0	3.3	2.4						2.2
p0 queue free %	98	98	99	98	97	99	99						99
cM capacity (veh/h)	638	604	964	603	630	942	1372						1484
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	36	41	126	108									
Volume Left	13	12	13	15									
Volume Right	12	13	8	4									
cSH	705	694	1372	1484									
Volume to Capacity	0.05	0.06	0.01	0.01									
Queue Length 95th (m)	1.3	1.5	0.2	0.2									
Control Delay (s)	10.4	10.5	0.9	1.1									
Lane LOS	B	B	A	A									
Approach Delay (s)	10.4	10.5	0.9	1.1									
Approach LOS	B	B											
Intersection Summary													
Average Delay	3.3												
Intersection Capacity Utilization	19.6%			ICU Level of Service			A						
Analysis Period (min)	15												

Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	16	167	73	55	167	25	68	102	69	25	104	39
Future Volume (vph)	16	167	73	55	167	25	68	102	69	25	104	39
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99			1.00			0.99			0.99		
Frt	0.962			0.986			0.961			0.969		
Fit Protected	0.997			0.989			0.986			0.993		
Satd. Flow (prot)	0	1556	0	0	1598	0	0	1620	0	0	1647	0
Fit Permitted	0.976			0.881			0.868			0.934		
Satd. Flow (perm)	0	1523	0	0	1422	0	0	1419	0	0	1549	0
Right Turn on Red	No			No			No			No		
Satd. Flow (RTOR)												
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	114.5			175.5			129.4			437.0		
Travel Time (s)	8.2			12.6			9.3			31.5		
Confl. Peds. (#/hr)	4		4	4		4	13		1	1		13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	10%	0%	5%	8%	0%	4%	0%	2%	0%	2%	0%
Adj. Flow (vph)	17	182	79	60	182	27	74	111	75	27	113	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	278	0	0	269	0	0	260	0	0	182	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Minimum Split (s)	25.1	25.1		25.1	25.1		25.1	25.1		25.1	25.1	
Total Split (s)	36.1	36.1		36.1	36.1		31.1	31.1		31.1	31.1	
Total Split (%)	53.7%	53.7%		53.7%	53.7%		46.3%	46.3%		46.3%	46.3%	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.1			-2.1			-2.1			-2.1		
Total Lost Time (s)	4.0			4.0			4.0			4.0		
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	32.1			32.1			27.1			27.1		
Actuated g/C Ratio	0.48			0.48			0.40			0.40		
v/c Ratio	0.38			0.40			0.45			0.29		
Control Delay	13.2			13.5			17.9			15.2		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	13.2			13.5			17.9			15.2		
LOS	B			B			B			B		
Approach Delay	13.2			13.5			17.9			15.2		
Approach LOS	B			B			B			B		
Queue Length 50th (m)	22.0			21.4			24.1			15.6		
Queue Length 95th (m)	38.9			38.4			43.6			29.4		
Internal Link Dist (m)	90.5			151.5			105.4			413.0		
Turn Bay Length (m)												
Base Capacity (vph)	727			679			572			624		
Starvation Cap Reductn	0			0			0			0		

Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

2027 Background PM
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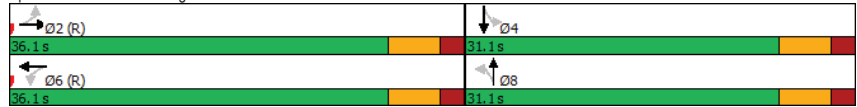


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.38			0.40			0.45			0.29	

Intersection Summary

Area Type:	Other
Cycle Length:	67.2
Actuated Cycle Length:	67.2
Offset:	25 (37%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	55
Control Type:	Pretimed
Maximum v/c Ratio:	0.45
Intersection Signal Delay:	14.9
Intersection LOS:	B
Intersection Capacity Utilization:	64.2%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 1: Ridge Rd N & Dominion Rd



HCM Signalized Intersection Capacity Analysis
1: Ridge Rd N & Dominion Rd

2027 Background PM
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	16	167	73	55	167	25	68	102	69	25	104	39
Future Volume (vph)	16	167	73	55	167	25	68	102	69	25	104	39
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frbp, ped/bikes		0.99			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Flt		0.96			0.99			0.96			0.97	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		1555			1597			1613			1646	
Flt Permitted		0.98			0.88			0.87			0.93	
Satd. Flow (perm)		1522			1423			1420			1548	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	182	79	60	182	27	74	111	75	27	113	42
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	278	0	0	269	0	0	260	0	0	182	0
Confl. Peds. (#/hr)	4		4	4		4	13		1	1		13
Heavy Vehicles (%)	8%	10%	0%	5%	8%	0%	4%	0%	2%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		4			
Actuated Green, G (s)		30.0			30.0			25.0			25.0	
Effective Green, g (s)		32.1			32.1			27.1			27.1	
Actuated g/C Ratio		0.48			0.48			0.40			0.40	
Clearance Time (s)		6.1			6.1			6.1			6.1	
Lane Grp Cap (vph)		727			679			572			624	
v/s Ratio Prot												
v/s Ratio Perm		0.18			0.19			0.18			0.12	
v/c Ratio		0.38			0.40			0.45			0.29	
Uniform Delay, d1		11.2			11.3			14.6			13.6	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.5			1.7			2.6			1.2	
Delay (s)		12.7			13.0			17.2			14.7	
Level of Service		B			B			B			B	
Approach Delay (s)		12.7			13.0			17.2			14.7	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: Ridge Rd N & Hazel St

2027 Background PM
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	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	12	14	15	12	15	14	8	119	12	16	151	6
Future Volume (vph)	12	14	15	12	15	14	8	119	12	16	151	6
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.951			0.954			0.988			0.995	
Fit Protected		0.985			0.985			0.997			0.995	
Satd. Flow (prot)	0	1535	0	0	1590	0	0	1706	0	0	1707	0
Fit Permitted		0.985			0.985			0.997			0.995	
Satd. Flow (perm)	0	1535	0	0	1590	0	0	1706	0	0	1707	0
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		166.6			187.1			437.0			126.5	
Travel Time (s)		15.0			13.5			31.5			9.1	
Confl. Peds. (#/hr)			1	1			2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	0%	0%	0%	0%	10%	0%	0%	12%	0%	1%	16%
Adj. Flow (vph)	13	15	16	13	16	15	9	129	13	17	164	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	44	0	0	44	0	0	151	0	0	188	0
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	25.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
2: Ridge Rd N & Hazel St

2027 Background PM
210670

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	12	14	15	12	15	14	8	119	12	16	151	6
Future Volume (Veh/h)	12	14	15	12	15	14	8	119	12	16	151	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	15	16	13	16	15	9	129	13	17	164	7
Pedestrians		2						1				
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	380	364	170	380	360	136	173			142		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	380	364	170	380	360	136	173			142		
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.4	2.2			2.2		
p0 queue free %	97	97	98	98	97	98	99			99		
cM capacity (veh/h)	512	556	876	551	559	892	1414			1453		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	44	44	151	188
Volume Left	13	13	9	17
Volume Right	16	15	13	7
cSH	623	637	1414	1453
Volume to Capacity	0.07	0.07	0.01	0.01
Queue Length 95th (m)	1.8	1.8	0.2	0.3
Control Delay (s)	11.2	11.1	0.5	0.8
Lane LOS	B	B	A	A
Approach Delay (s)	11.2	11.1	0.5	0.8
Approach LOS	B	B		

Intersection Summary

Average Delay	2.8
Intersection Capacity Utilization	25.0%
ICU Level of Service	A
Analysis Period (min)	15

Appendix F

Total Traffic Operations Reports



Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

2027 Total AM
210670

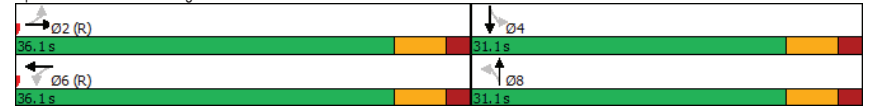
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	24	113	59	68	137	17	38	67	49	17	64	27
Future Volume (vph)	24	113	59	68	137	17	38	67	49	17	64	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99			1.00			0.99			0.99		
Frt	0.959			0.990			0.957			0.967		
Fit Protected	0.994			0.985			0.988			0.992		
Satd. Flow (prot)	0	1511	0	0	1577	0	0	1571	0	0	1600	0
Fit Permitted	0.950			0.855			0.916			0.951		
Satd. Flow (perm)	0	1443	0	0	1367	0	0	1452	0	0	1533	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	114.5			175.5			129.4			259.8		
Travel Time (s)	8.2			12.6			9.3			18.7		
Confl. Peds. (#/hr)	3		3	3		3	8		2	2		8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	14%	5%	0%	12%	8%	4%	6%	3%	9%	2%	6%
Adj. Flow (vph)	26	123	64	74	149	18	41	73	53	18	70	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	213	0	0	241	0	0	167	0	0	117	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Minimum Split (s)	25.1	25.1		25.1	25.1		25.1	25.1		25.1	25.1	
Total Split (s)	36.1	36.1		36.1	36.1		31.1	31.1		31.1	31.1	
Total Split (%)	53.7%	53.7%		53.7%	53.7%		46.3%	46.3%		46.3%	46.3%	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)			-2.1			-2.1			-2.1			-2.1
Total Lost Time (s)	4.0			4.0			4.0			4.0		
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)	32.1			32.1			27.1			27.1		
Actuated g/C Ratio	0.48			0.48			0.40			0.40		
v/c Ratio	0.31			0.37			0.29			0.19		
Control Delay	12.3			13.2			15.2			14.0		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	12.3			13.2			15.2			14.0		
LOS	B			B			B			B		
Approach Delay	12.3			13.2			15.2			14.0		
Approach LOS	B			B			B			B		
Queue Length 50th (m)	16.2			18.9			14.3			9.6		
Queue Length 95th (m)	29.9			34.7			27.6			19.7		
Internal Link Dist (m)	90.5			151.5			105.4			235.8		
Turn Bay Length (m)												
Base Capacity (vph)	689			652			585			618		
Starvation Cap Reductn	0			0			0			0		

Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

2027 Total AM
210670

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0			0			0			0		
Storage Cap Reductn	0			0			0			0		
Reduced v/c Ratio	0.31			0.37			0.29			0.19		
Intersection Summary												
Area Type:	Other											
Cycle Length:	67.2											
Actuated Cycle Length:	67.2											
Offset:	25 (37%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green											
Natural Cycle:	55											
Control Type:	Pretimed											
Maximum v/c Ratio:	0.37											
Intersection Signal Delay:	13.6					Intersection LOS: B						
Intersection Capacity Utilization:	48.8%					ICU Level of Service A						
Analysis Period (min):	15											

Splits and Phases: 1: Ridge Rd N & Dominion Rd



HCM Signalized Intersection Capacity Analysis
1: Ridge Rd N & Dominion Rd

2027 Total AM
210670

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	24	113	59	68	137	17	38	67	49	17	64	27
Future Volume (vph)	24	113	59	68	137	17	38	67	49	17	64	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0			4.0			4.0			4.0		
Lane Util. Factor	1.00			1.00			1.00			1.00		
Frbp, ped/bikes	0.99			1.00			0.99			0.99		
Flpb, ped/bikes	1.00			1.00			1.00			1.00		
Frt	0.96			0.99			0.96			0.97		
Flt Protected	0.99			0.98			0.99			0.99		
Satd. Flow (prot)	1511			1575			1566			1599		
Flt Permitted	0.95			0.86			0.92			0.95		
Satd. Flow (perm)	1444			1367			1452			1532		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	123	64	74	149	18	41	73	53	18	70	29
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	213	0	0	241	0	0	167	0	0	117	0
Confl. Peds. (#/hr)	3		3	3		3	8		2	2		8
Heavy Vehicles (%)	0%	14%	5%	0%	12%	8%	4%	6%	3%	9%	2%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	30.0			30.0			25.0			25.0		
Effective Green, g (s)	32.1			32.1			27.1			27.1		
Actuated g/C Ratio	0.48			0.48			0.40			0.40		
Clearance Time (s)	6.1			6.1			6.1			6.1		
Lane Grp Cap (vph)	689			652			585			617		
v/s Ratio Prot	0.15			c0.18			c0.12			0.08		
v/c Ratio	0.31			0.37			0.29			0.19		
Uniform Delay, d1	10.8			11.1			13.5			13.0		
Progression Factor	1.00			1.00			1.00			1.00		
Incremental Delay, d2	1.2			1.6			1.2			0.7		
Delay (s)	11.9			12.7			14.7			13.6		
Level of Service	B			B			B			B		
Approach Delay (s)	11.9			12.7			14.7			13.6		
Approach LOS	B			B			B			B		

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
2: Ridge Rd N & Hazel St

2027 Total AM
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	12	10	11	11	15	12	31	108	7	14	90	4
Future Volume (vph)	12	10	11	11	15	12	31	108	7	14	90	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.955			0.957			0.993			0.995		
Frt	0.982			0.986			0.989			0.994		
Flt Protected	0.982			0.986			0.989			0.994		
Satd. Flow (prot)	0	1569	0	0	1539	0	0	1551	0	0	1731	0
Flt Permitted	0.982			0.986			0.989			0.994		
Satd. Flow (perm)	0	1569	0	0	1539	0	0	1551	0	0	1731	0
Link Speed (k/h)	40			50			50			50		
Link Distance (m)	166.6			187.1			177.2			126.5		
Travel Time (s)	15.0			13.5			12.8			9.1		
Confl. Peds. (#/hr)	2		1	1		2	3		2	2		3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	15%	0%	0%	25%	0%	23%	8%	0%	0%	0%	0%
Adj. Flow (vph)	13	11	12	12	16	13	34	117	8	15	98	4
Shared Lane Traffic (%)	0			41			0			159		
Lane Group Flow (vph)	0	36	0	0	41	0	0	159	0	0	117	0
Sign Control	Stop			Stop			Free			Free		

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	24.3%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
2: Ridge Rd N & Hazel St

2027 Total AM
210670

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔			↔		
Traffic Volume (veh/h)	12	10	11	11	15	12	31	108	7	14	90	4	
Future Volume (Veh/h)	12	10	11	11	15	12	31	108	7	14	90	4	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	13	11	12	12	16	13	34	117	8	15	98	4	
Pedestrians	3			2			1			2			
Lane Width (m)	3.6			3.6			3.6			3.6			
Walking Speed (m/s)	1.2			1.2			1.2			1.2			
Percent Blockage	0			0			0			0			
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	345	328	104	340	326	125	105						127
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	345	328	104	340	326	125	105						127
tC, single (s)	7.1	6.7	6.2	7.3	6.5	6.2	4.3						4.1
tC, 2 stage (s)													
tF (s)	3.5	4.1	3.3	3.7	4.0	3.3	2.4						2.2
p0 queue free %	98	98	99	98	97	99	98						99
cM capacity (veh/h)	572	548	953	539	572	928	1362						1469
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	36	41	159	117									
Volume Left	13	12	34	15									
Volume Right	12	13	8	4									
cSH	650	638	1362	1469									
Volume to Capacity	0.06	0.06	0.02	0.01									
Queue Length 95th (m)	1.4	1.6	0.6	0.2									
Control Delay (s)	10.9	11.0	1.8	1.0									
Lane LOS	B	B	A	A									
Approach Delay (s)	10.9	11.0	1.8	1.0									
Approach LOS	B	B											
Intersection Summary													
Average Delay	3.5												
Intersection Capacity Utilization	24.3%			ICU Level of Service			A						
Analysis Period (min)	15												

Lanes, Volumes, Timings
3: Ridge Rd N & Site Driveway

2027 Total AM
210670

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↔			↔
Traffic Volume (vph)	6	30	116	3	8	104
Future Volume (vph)	6	30	116	3	8	104
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.889		0.997			
Fit Protected	0.991				0.996	
Satd. Flow (prot)	1542		0		1743	
Fit Permitted	0.991				0.996	
Satd. Flow (perm)	1542		0		1743	
Link Speed (k/h)	50		50		50	
Link Distance (m)	153.0		259.8		177.2	
Travel Time (s)	11.0		18.7		12.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	33	126	3	9	113
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	129	0	0	122
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	23.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Ridge Rd N & Site Driveway

2027 Total AM
210670

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	30	116	3	8	104
Future Volume (Veh/h)	6	30	116	3	8	104
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	33	126	3	9	113
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)			260			
pX, platoon unblocked						
vC, conflicting volume	258	128			129	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	258	128			129	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	96			99	
cM capacity (veh/h)	730	928			1469	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	40	129	122			
Volume Left	7	0	9			
Volume Right	33	3	0			
cSH	886	1700	1469			
Volume to Capacity	0.05	0.08	0.01			
Queue Length 95th (m)	1.1	0.0	0.1			
Control Delay (s)	9.3	0.0	0.6			
Lane LOS	A		A			
Approach Delay (s)	9.3	0.0	0.6			
Approach LOS	A		A			
Intersection Summary						
Average Delay		1.5				
Intersection Capacity Utilization		23.1%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

2027 Total PM
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	167	73	55	167	28	68	102	69	30	104	40
Future Volume (vph)	24	167	73	55	167	28	68	102	69	30	104	40
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.99			1.00			0.99			0.99	
Frt		0.963			0.985			0.961			0.969	
Flt Protected		0.995			0.989			0.986			0.991	
Satd. Flow (prot)	0	1555	0	0	1597	0	0	1620	0	0	1645	0
Flt Permitted		0.959			0.880			0.866			0.919	
Satd. Flow (perm)	0	1498	0	0	1419	0	0	1416	0	0	1525	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		114.5			175.5			129.4			259.8	
Travel Time (s)		8.2			12.6			9.3			18.7	
Confl. Peds. (#/hr)	4		4	4		4	13		1	1		13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	10%	0%	5%	8%	0%	4%	0%	2%	0%	2%	0%
Adj. Flow (vph)	26	182	79	60	182	30	74	111	75	33	113	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	287	0	0	272	0	0	260	0	0	189	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8		4			
Minimum Split (s)	25.1	25.1		25.1	25.1		25.1	25.1		25.1	25.1	
Total Split (s)	36.1	36.1		36.1	36.1		31.1	31.1		31.1	31.1	
Total Split (%)	53.7%	53.7%		53.7%	53.7%		46.3%	46.3%		46.3%	46.3%	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.1			-2.1			-2.1			-2.1	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		32.1			32.1			27.1			27.1	
Actuated g/C Ratio		0.48			0.48			0.40			0.40	
v/c Ratio		0.40			0.40			0.46			0.31	
Control Delay		13.5			13.6			17.9			15.4	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.5			13.6			17.9			15.4	
LOS		B			B			B			B	
Approach Delay		13.5			13.6			17.9			15.4	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		23.0			21.8			24.2			16.4	
Queue Length 95th (m)		40.5			39.2			43.6			30.7	
Internal Link Dist (m)		90.5			151.5			105.4			235.8	
Turn Bay Length (m)												
Base Capacity (vph)		715			677			571			614	
Starvation Cap Reductn		0			0			0			0	

Lanes, Volumes, Timings
1: Ridge Rd N & Dominion Rd

2027 Total PM
210670

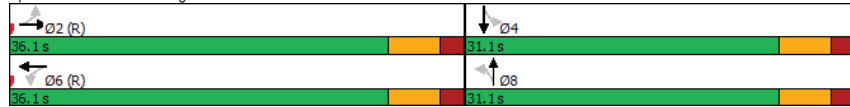


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.40			0.40			0.46			0.31	

Intersection Summary

Area Type:	Other
Cycle Length:	67.2
Actuated Cycle Length:	67.2
Offset:	25 (37%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	55
Control Type:	Pretimed
Maximum v/c Ratio:	0.46
Intersection Signal Delay:	15.0
Intersection LOS:	B
Intersection Capacity Utilization:	58.3%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 1: Ridge Rd N & Dominion Rd



HCM Signalized Intersection Capacity Analysis
1: Ridge Rd N & Dominion Rd

2027 Total PM
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	24	167	73	55	167	28	68	102	69	30	104	40
Future Volume (vph)	24	167	73	55	167	28	68	102	69	30	104	40
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frbp, ped/bikes		0.99			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.99			0.96			0.97	
Flt Protected		1.00			0.99			0.99			0.99	
Satd. Flow (prot)		1554			1596			1613			1645	
Flt Permitted		0.96			0.88			0.87			0.92	
Satd. Flow (perm)		1498			1420			1417			1525	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	182	79	60	182	30	74	111	75	33	113	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	287	0	0	272	0	0	260	0	0	189	0
Confl. Peds. (#/hr)	4		4	4		4	13		1	1		13
Heavy Vehicles (%)	8%	10%	0%	5%	8%	0%	4%	0%	2%	0%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		30.0			30.0			25.0			25.0	
Effective Green, g (s)		32.1			32.1			27.1			27.1	
Actuated g/C Ratio		0.48			0.48			0.40			0.40	
Clearance Time (s)		6.1			6.1			6.1			6.1	
Lane Grp Cap (vph)		715			678			571			614	
v/s Ratio Prot												
v/s Ratio Perm		0.19			0.19			0.18			0.12	
v/c Ratio		0.40			0.40			0.46			0.31	
Uniform Delay, d1		11.3			11.3			14.7			13.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.7			1.8			2.6			1.3	
Delay (s)		13.0			13.1			17.3			15.0	
Level of Service		B			B			B			B	
Approach Delay (s)		13.0			13.1			17.3			15.0	
Approach LOS		B			B			B			B	

Intersection Summary

HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
2: Ridge Rd N & Hazel St

2027 Total PM
210670

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	12	14	32	12	15	14	16	126	12	16	156	6
Future Volume (vph)	12	14	32	12	15	14	16	126	12	16	156	6
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.925			0.954			0.989			0.995	
Fit Protected		0.990			0.985			0.995			0.996	
Satd. Flow (prot)	0	1530	0	0	1590	0	0	1706	0	0	1709	0
Fit Permitted		0.990			0.985			0.995			0.996	
Satd. Flow (perm)	0	1530	0	0	1590	0	0	1706	0	0	1709	0
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		166.6			187.1			177.1			126.5	
Travel Time (s)		15.0			13.5			12.8			9.1	
Confl. Peds. (#/hr)			1	1			2					2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	23%	0%	0%	0%	0%	10%	0%	0%	12%	0%	1%	16%
Adj. Flow (vph)	13	15	35	13	16	15	17	137	13	17	170	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	44	0	0	167	0	0	194	0
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.5%			ICU Level of Service A								
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
2: Ridge Rd N & Hazel St

2027 Total PM
210670

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕			↕			↕		
Traffic Volume (veh/h)	12	14	32	12	15	14	16	126	12	16	156	6	
Future Volume (Veh/h)	12	14	32	12	15	14	16	126	12	16	156	6	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	13	15	35	13	16	15	17	137	13	17	170	7	
Pedestrians		2						1					
Lane Width (m)		3.6			3.6								
Walking Speed (m/s)		1.2			1.2								
Percent Blockage		0			0								
Right turn flare (veh)													
Median type								None			None		
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	410	394	176	428	390	144	179			150			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	410	394	176	428	390	144	179			150			
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.3	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.7	4.0	3.3	3.5	4.0	3.4	2.2			2.2			
p0 queue free %	97	97	96	97	97	98	99			99			
cM capacity (veh/h)	486	532	870	497	534	883	1407			1444			
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	63	44	167	194									
Volume Left	13	13	17	17									
Volume Right	35	15	13	7									
cSH	662	602	1407	1444									
Volume to Capacity	0.10	0.07	0.01	0.01									
Queue Length 95th (m)	2.5	1.9	0.3	0.3									
Control Delay (s)	11.0	11.5	0.9	0.7									
Lane LOS	B	B	A	A									
Approach Delay (s)	11.0	11.5	0.9	0.7									
Approach LOS	B	B											
Intersection Summary													
Average Delay	3.2												
Intersection Capacity Utilization	24.5%			ICU Level of Service						A			
Analysis Period (min)	15												

Lanes, Volumes, Timings
3: Ridge Rd N & Site Driveway

2027 Total PM
210670

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↷	↷	↷	↰	↷
Traffic Volume (vph)	6	15	139	11	22	178
Future Volume (vph)	6	15	139	11	22	178
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.906	0.990				
Flt Protected	0.985				0.995	
Satd. Flow (prot)	1562	0	1732	0	0	1741
Flt Permitted	0.985				0.995	
Satd. Flow (perm)	1562	0	1732	0	0	1741
Link Speed (k/h)	50	50		50		
Link Distance (m)	153.4	259.8		177.1		
Travel Time (s)	11.0	18.7		12.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	16	151	12	24	193
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	0	163	0	0	217
Sign Control	Stop	Free		Free		

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.5% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
3: Ridge Rd N & Site Driveway

2027 Total PM
210670

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↷	↷	↷	↰	↷
Traffic Volume (veh/h)	6	15	139	11	22	178
Future Volume (Veh/h)	6	15	139	11	22	178
Sign Control	Stop	Free		Free		
Grade	0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	16	151	12	24	193
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)	260					
pX, platoon unblocked						
vC, conflicting volume	398	157			163	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398	157			163	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			98	
cM capacity (veh/h)	601	894			1428	

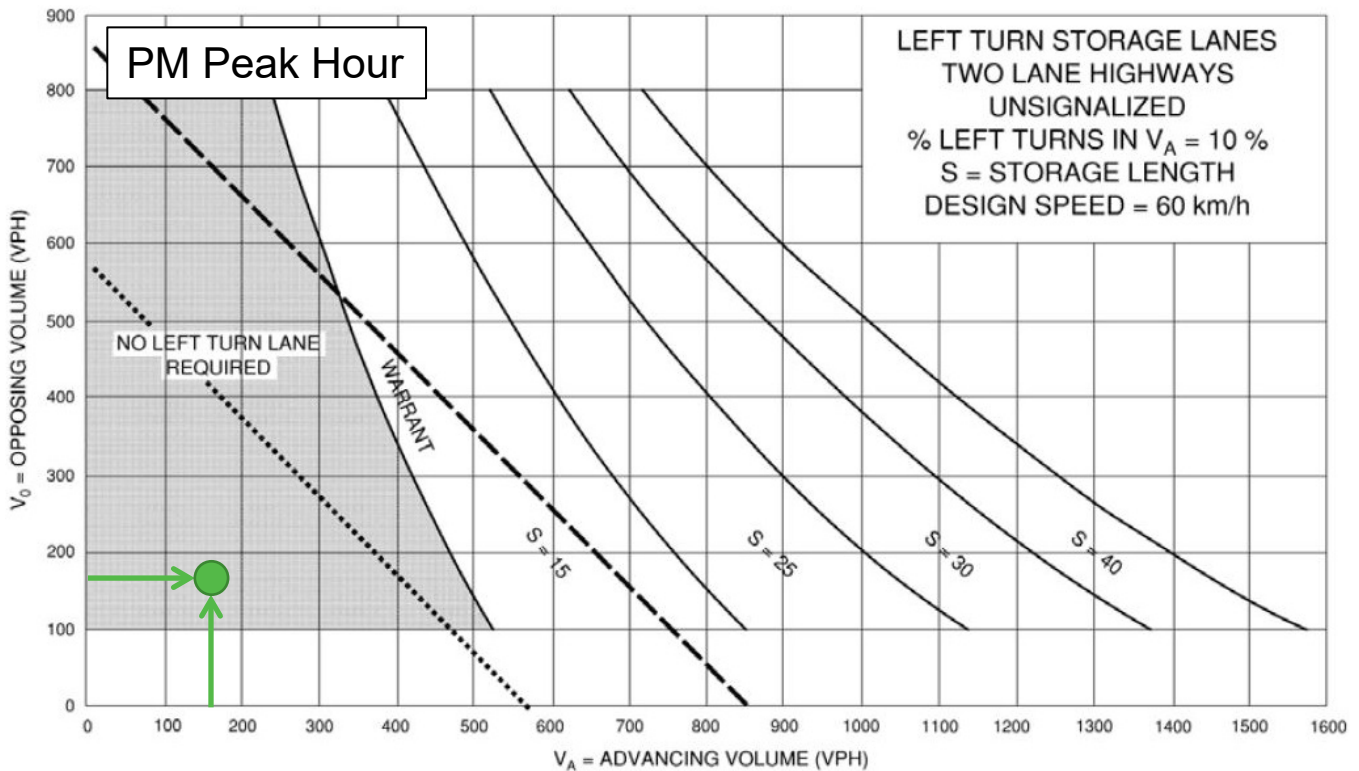
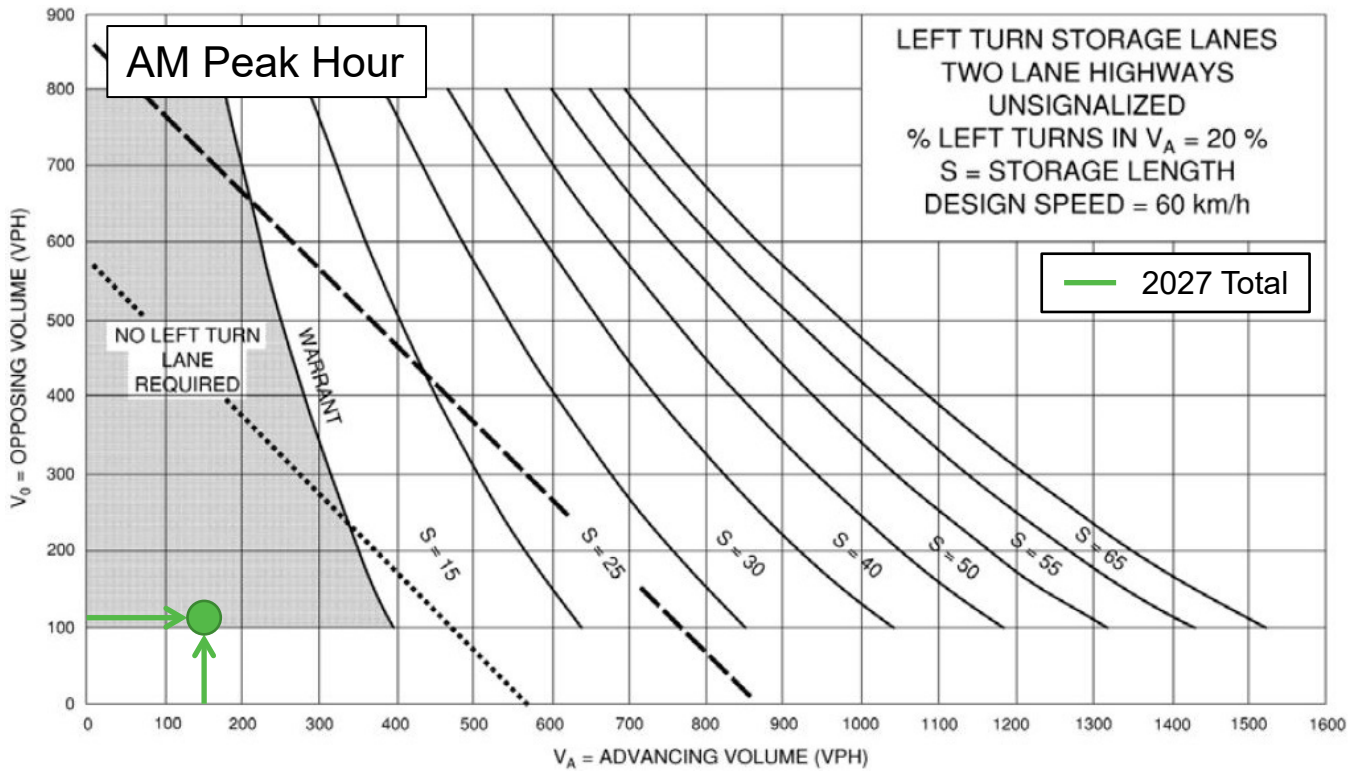
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	23	163	217
Volume Left	7	0	24
Volume Right	16	12	0
cSH	778	1700	1428
Volume to Capacity	0.03	0.10	0.02
Queue Length 95th (m)	0.7	0.0	0.4
Control Delay (s)	9.8	0.0	1.0
Lane LOS	A	A	
Approach Delay (s)	9.8	0.0	1.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

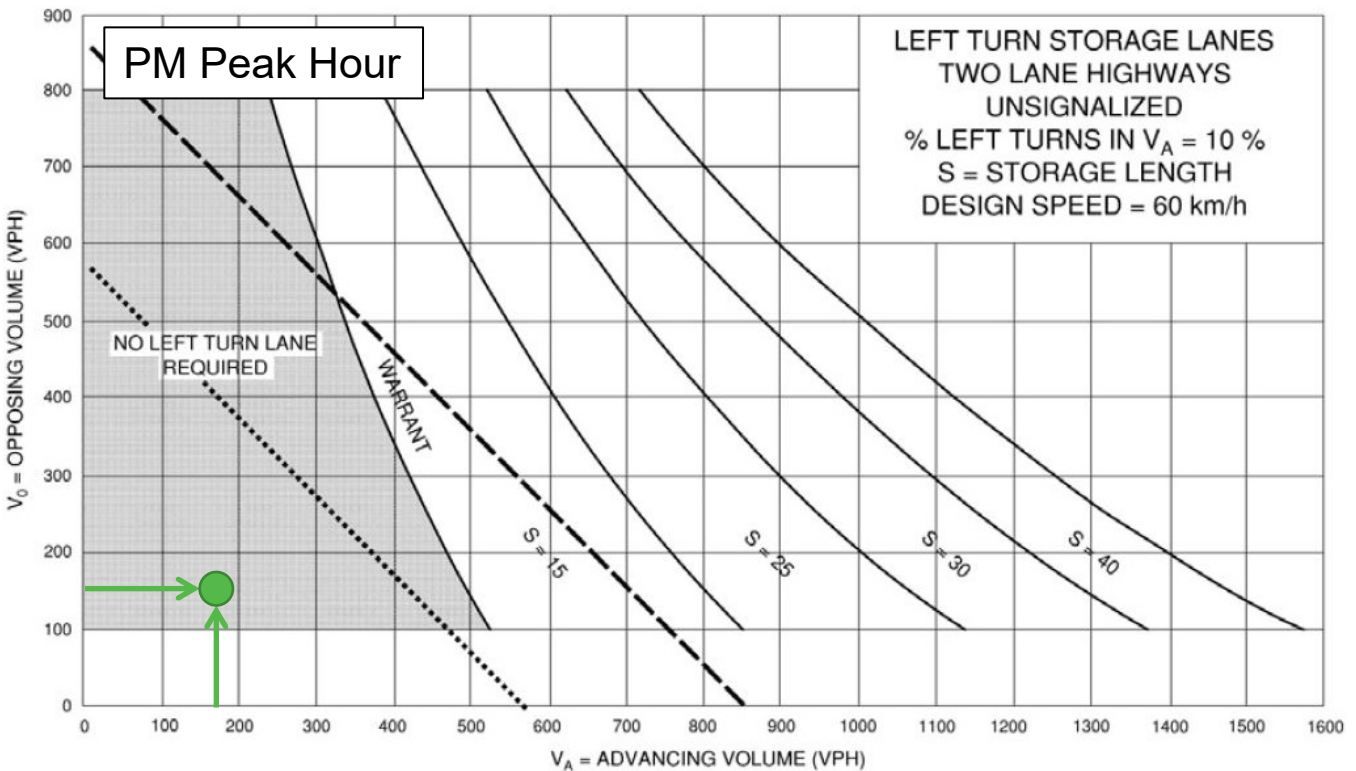
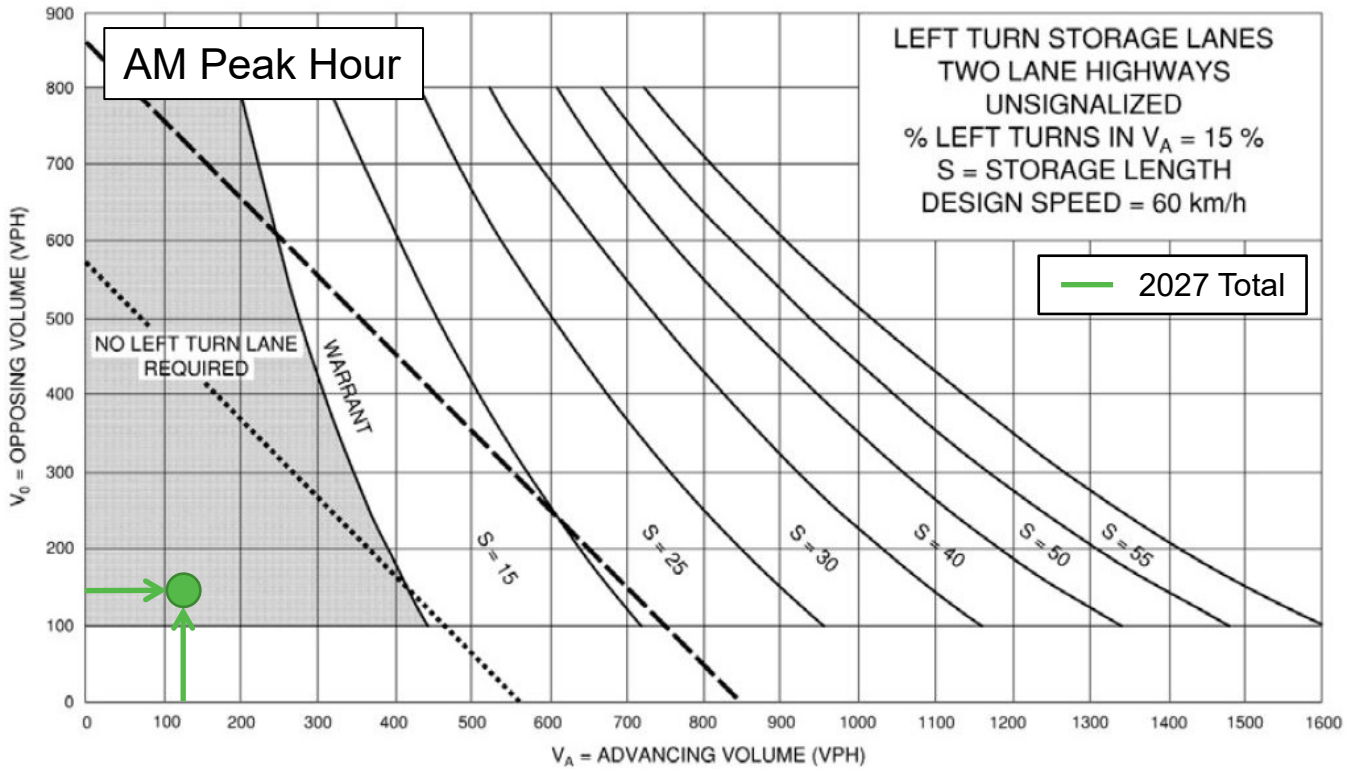
Appendix G

Left-Turn Lane Warrants

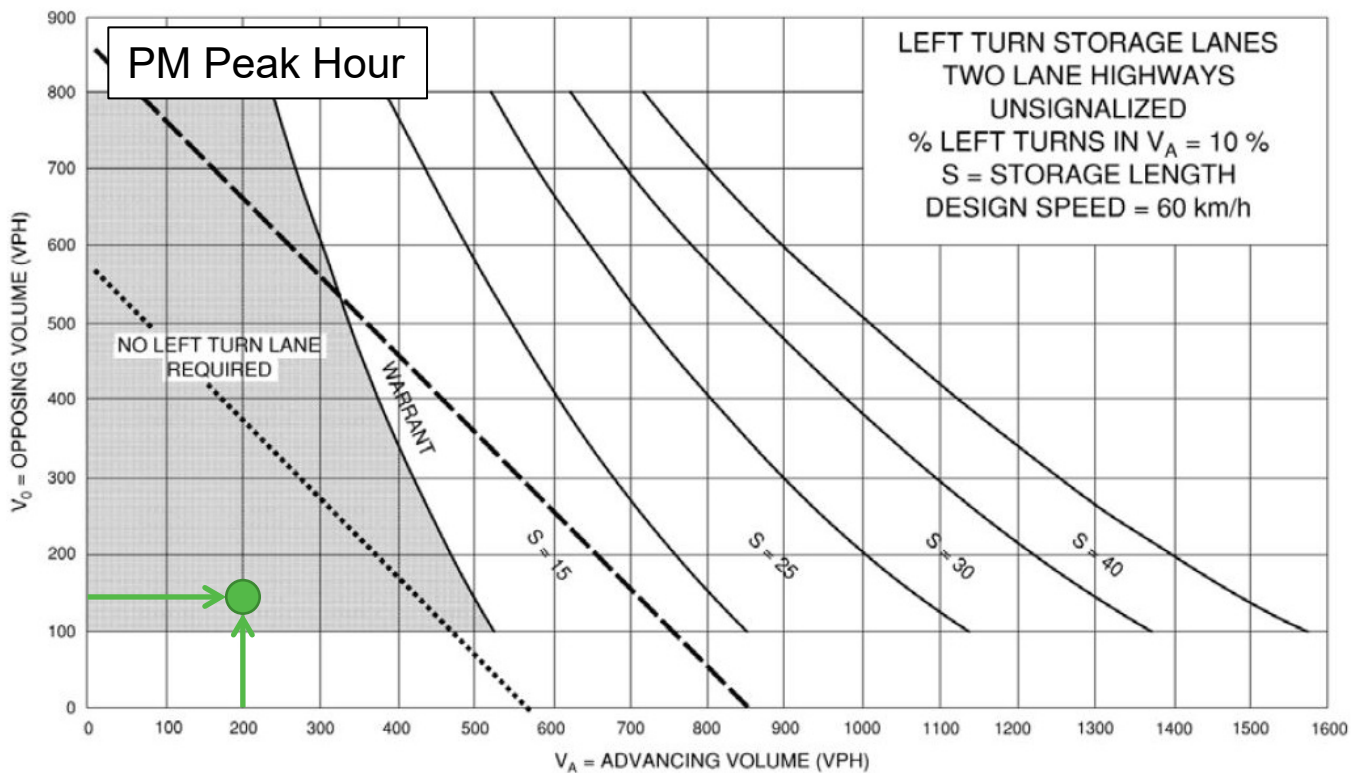
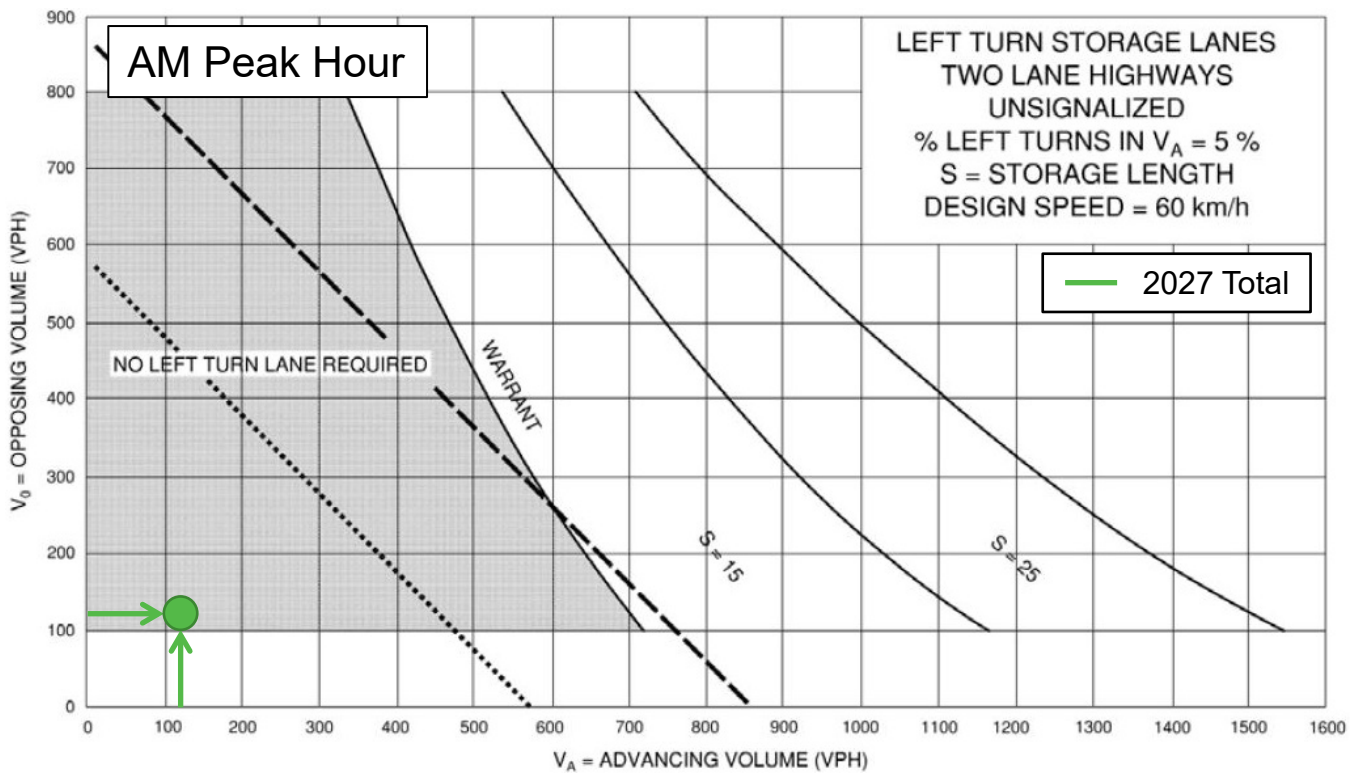




Northbound Left-Turn Lane Warrant Ridge Road North at Hazel Street



Southbound Left-Turn Lane Warrant Ridge Road North at Hazel Street



Southbound Left-Turn Lane Warrant Ridge Road North at Site Driveway

Appendix H

Signal Warrants



Signal Justification Calculation for Forecasted Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2027 Total
 Region/City/Township: Fort Erie

Major Street: Ridge Road North
 Minor Street: Hazel 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? N

Time Period	Major Street Ridge Road North						Minor Street Hazel Street						Peds Crossing
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
	AM Peak Hour	31	108	7	14	90	4	12	10	11	11	15	
PM Peak Hour	16	126	12	16	156	6	12	14	32	12	15	14	1
Avg. Hourly Volume	12	59	5	8	62	3	6	6	11	6	8	7	1

Warrant	AHV
1A - All	189
1B - Minor	43
2A - Major	147
2B - Cross	20

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	All Approaches	480	720	600	900	
					% Fulfilled	26%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	Minor Street Approaches	120	170	120	170	
					% Fulfilled	25%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	Major Street Approaches	480	720	600	900	
					% Fulfilled	20%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	Traffic Crossing Major Street	50	75	50	75	
					% Fulfilled	27%



Signal Warrant Ridge Road North at Hazel Street

Signal Justification Calculation for Forecasted Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2027 Total
 Region/City/Township: Fort Erie

Major Street: Ridge Road North North/South?: Y
 Minor Street: Site Driveway

Number of Approach Lanes: 1
 Tee Intersection?: Y
 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? N

Time Period	Major Street Ridge Road North						Minor Street Site Driveway						Peds Crossing
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour		116	3	8	104					6		30	0
PM Peak Hour		139	11	22	178					6		15	0
Avg. Hourly Volume	0	64	4	8	71	0	0	0	0	3	0	11	0

Warrant	AHV
1A - All	160
1B - Minor	14
2A - Major	145
2B - Cross	3

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	All Approaches	480	720	600	900	
					% Fulfilled	22%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	Minor Street Approaches	180	255	180	255	
					% Fulfilled	6%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	Major Street Approaches	480	720	600	900	
					% Fulfilled	20%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
	Traffic Crossing Major Street	50	75	50	75	
					% Fulfilled	4%



Signal Warrant Ridge Road North at Site Driveway