613 Helena Street
Town of Fort Erie
Transportation Impact Study Update

Paradigm Transportation Solutions Limited

December 2021
20371

ptsl.com

Project Summary

Project Number
210371

Date: December 2021
Version 1.0.0

Client
SS Fort Erie Inc.
4080 Confederation Parkway Unit 605
Mississauga, ON

Client Contact
Hunain Siddiqui
President

613 Helena Street
Town of Fort Erie
Transportation Impact Study Update

Consultant Project Team
Stew Elkins, B.E.S.
Erica Bayley, P.Eng.
Scott Catton, C.E.T.
Stefan Hajgato, P.Eng.

Paradigm Transportation Solutions Limited
5A-150 Pinebush Road
Cambridge ON N1R 8J8
p: 519.896.3163
905.381.2229
416.479.9684
www.ptsl.com

Erica Bayley, P.Eng.

Disclaimer

Copyright Notice

Executive Summary

Content

SS Fort Erie Inc. retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS), for a proposed townhouse development located at 613 Helena Street in the Town of Fort Erie.

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 subject site is located at 613 Helena Street in the Town of Fort Erie. The development concept includes 116 townhouse units.

Development and occupancy of the site is estimated to occur by Year 2024.

Vehicle access to the site is proposed via two new accesses to Helena Street.

Conclusions

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

- **Base Year Traffic 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.
- **Site Trip Generation**: The proposed development is estimated to generate approximately 55 AM peak hour vehicle trips and 67 PM peak hour vehicle trips.
- **Background Traffic Conditions**: The study area intersections are forecast to operate 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 Conditions**: The study area intersections are forecast to operate 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 driveways are forecast to operate in the LOS A-B range with a v/c of less than 0.05 and 95th percentile queue lengths of less than 15 m.

- **Remedial Measures**: No improvements to the existing and proposed form of traffic control are required at the study area intersections.

  Northbound left-turn lanes on Helena Street at the site driveways are not warranted based on forecast traffic volumes.

Recommendation

Based on the findings of this study, it is recommended that the site driveway approaches to Helena Street operate as unsignalized intersections.

Contents

Appendices

Figures

Tables

1 Introduction

SS Fort Erie Inc. retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Impact Study (TIS), for a proposed townhouse development located at 613 Helena Street in the Town of Fort Erie.

Figure 1.1 illustrates the location of the subject site.

The scope of the study includes:

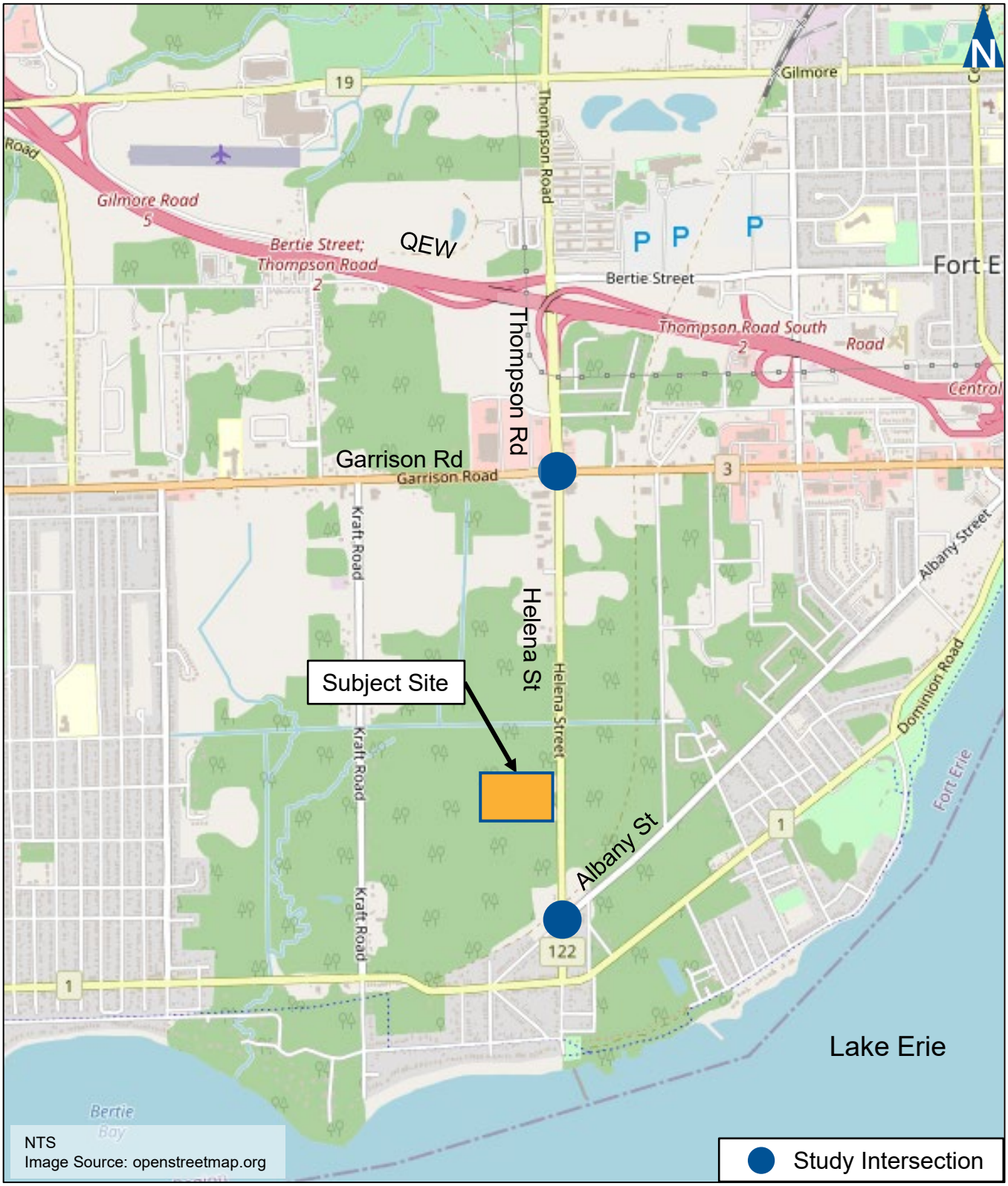
- An assessment of the current traffic and site conditions within the study area;
- Estimates of background traffic growth;
- Estimates of additional traffic generated by the subject site;
- Analyses of the impact of the future traffic on the surrounding road network; and
- Recommend remedial measures to mitigate the additional traffic on the study area road network, if required.

Appendix A contains the pre-study consultation correspondence with the Town of Fort Erie and Niagara Region. The study has been conducted in general accordance with the Niagara Region Traffic Impact Study Guidelines[1].

The study area intersections assessed include:

- Helena Street / Thompson Road at Garrison Road (signalized);
- Helena Street at Washington Road / Albany Street (unsignalized); and
- Two proposed site driveways to Helena Street.

[1] *Guidelines for Transportation Impact Studies*, Niagara Region, May 2021



paradigm TRANSPORTATION SOLUTIONS LIMITED

Site Location

613 Helena Street TIS Update
210371

Figure 1.1

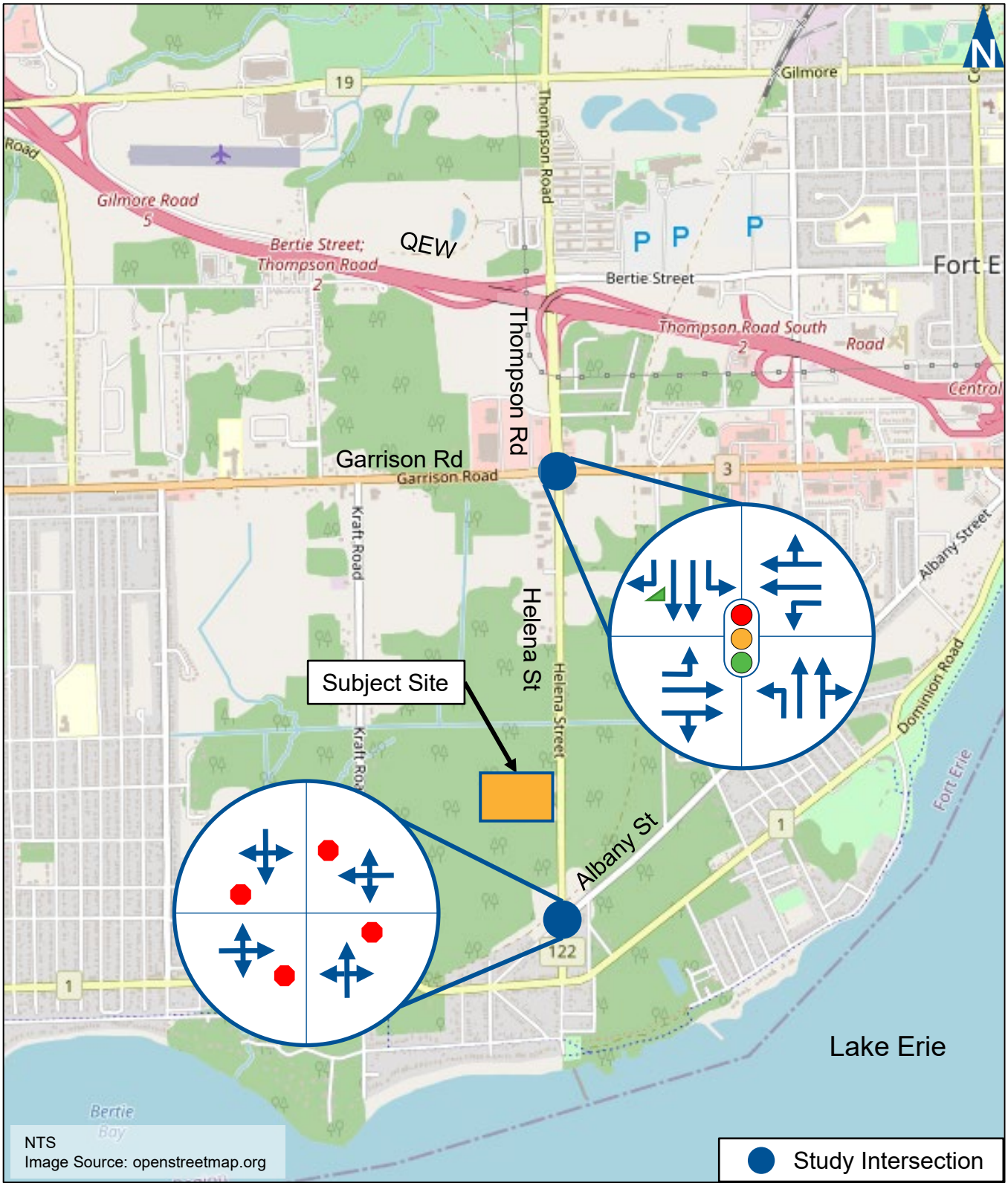
2 Existing Conditions

2.1 Road Network

The characteristics of the roadways within the study area are described as follows:

- **Garrison Road** (Regional Road 3) is an east / west roadway with 4-lanes and a posted speed limit of 60 km/h. Sidewalks are provided on both sides of the roadway within the study area. The intersection with Thompson Road / Helena Street is signalized.
- **Helena Street** (Regional Road 122) is a north / south roadway. The roadway has 2-lane and widens to 4-lanes near the Garrison Road intersection. There is a posted speed limit of 70 km/h north of the subject site, a transition to 50 km/h south of the subject site. No sidewalks are provided within the study area. The intersection with Washington Road / Albany Street is all-way stop controlled.
- **Thompson Road** (Regional Road 122) is a north / south roadway with 4-lanes and a posted speed limit of 70 km/h. There are sidewalks on both sides of the roadway.
- **Washington Road / Albany Street** is an east / west roadway with 2-lanes and a posted speed limit of 50 km/h. No sidewalks are present within the study area.

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



Existing Lane Configuration & Traffic Control

2.2 Active Transportation

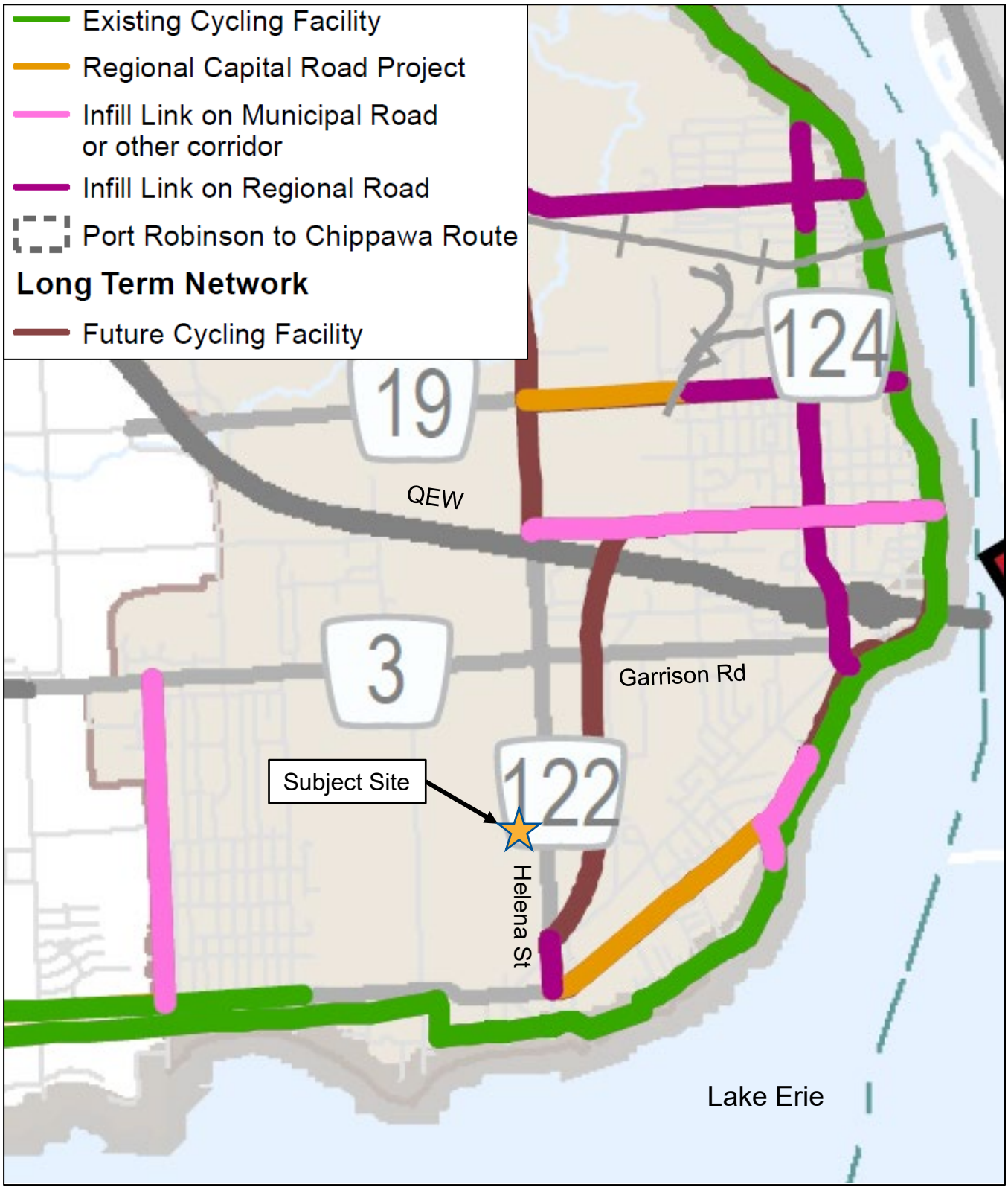
Sidewalks are provided on both sides of Garrison Road and Thompson Road. No sidewalks are present anywhere else in the study area. Marked crosswalks and pedestrian push buttons are provided on all approaches at the Helena Street / Thompson Road and Garrison Road intersection. No crosswalks are present at the Helena Street and Washington Road / Albany Street intersection.

No existing cycling infrastructure is identified within the study area.

A future cycling facility[2] is proposed to formalize an existing trail that crosses Helena Street approximately 70 metres north of Washington Road / Albany Street, runs between Helena Street and Alfred Street, then crosses Garrison Road.

Figure 2.2 illustrates the future cycling network.

[2] *Strategic Cycling Network Development Technical Paper*, IBI Group, June 2017.



paradigm TRANSPORTATION SOLUTIONS LIMITED

Future Cycling Network

613 Helena Street TIS Update
210371

Figure 2.2

2.3 Transit Network

Fort Erie Transit (FET) operates the public transit system in the Town of Fort Erie. **Figure 2.3** illustrates the existing transit network.

The closest transit stop is located approximately 650 m south of the subject site on Dominion Road at Helena Street. However, as no sidewalks are present on Helena Street, transit usage is expected to be low. The road authority should consider adding a sidewalk on Helena Street.

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 m (600 ft). Service is available Monday to Saturday from 6:00 AM to 9:00 PM but is unavailable Sunday or statutory holidays.

Existing Transit Network

613 Helena Street TIS Update
210371

Figure 2.3

2.4 Traffic Volumes

2.4.1 Turning Movement Count Data

Table 2.1 summarizes the location and date of the existing available Turning Movement Count (TMC) data used in the analysis. Paradigm collected TMC data at the Helena Street and Washington Road / Albany Street intersection and Niagara Region provided the data for the Helena Street / Thompson Road and Garrison Road intersection.

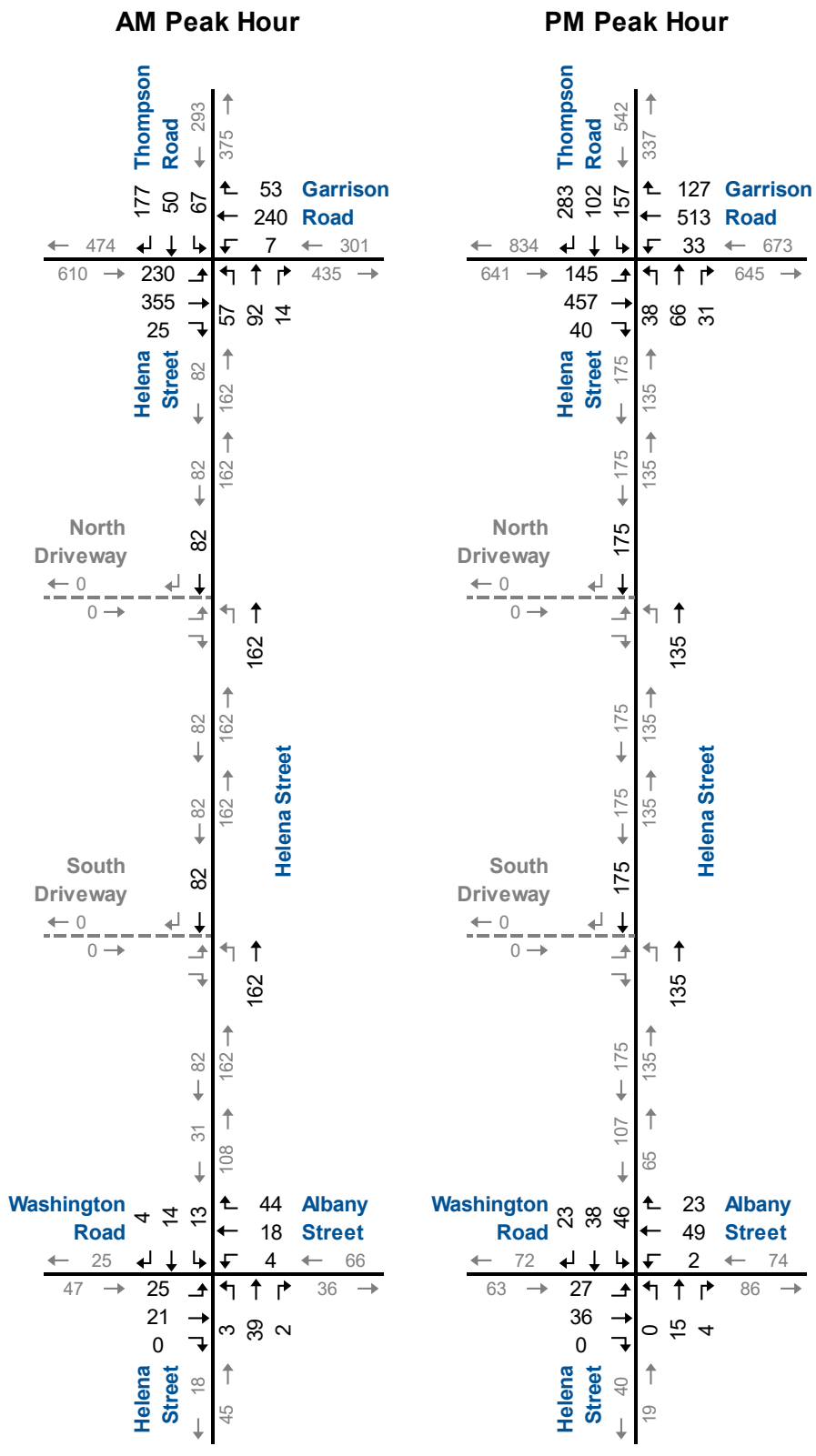
Appendix B contains the detailed existing count data and signal timing data for the study area intersection.

TABLE 2.1: EXISTING TURNING MOVEMENT COUNT DATA

Intersection	TMC Year
Helena St at Washington Rd / Albany St	January 2018
Helena St / Thompson Rd at Garrison Rd	May 2019

The TMC data was factored to a Year 2021 base year condition by applying a growth rate of 2.0% per annum. The methodology used to develop the base year forecasts was confirmed with the Town and Region during pre-study consultations.

Figure 2.4 illustrates the base year weekday AM and PM peak hour volumes.



Base Year Traffic Volumes

613 Helena Street TIS Update
210371

Figure 2.4

2.4.2 ATR Count

Pyramid Traffic Inc. undertook a 24-hour Automatic Traffic Recorder (ATR) count on Helena Street across the site's frontage. The count data provides the volume of vehicles, the speed, and the classification.

Traffic data was recorded on 28 July 2021 from midnight to 11:59 PM. The traffic count data was collected in 15-minute increments over a 24-hour period.

Appendix B contains the 24-Hour Speed / Volume / Classification Count data.

Table 2.2 summarizes the 2021 ATR count data and compares it to the 2018 ATR count data previously collected in the 2018 TIS[3]. The following is noted:

- The average 2021 speed is approximately 5 km/h higher than in 2018.
- The 2021 85th percentile speed is approximately 10 km/h higher than in 2018.
- The overall number of vehicles increased in 2021, however there was a significant decrease in the number of heavy vehicles.

TABLE 2.2: ATR SUMMARY

Attribute	Metric	2021 Data			Change from 2018		
		NB	SB	2-Way	NB	SB	2-Way
Speed (km/h)	Average	73	74	-	4	6	-
	85th Percentile	87	86	-	10	9	-
Volume	Recorded Vehicles	1136	1283	2419	112	312	424
Classification	Passenger Vehicles	1094	1235	2329	295	430	725
	Heavy Vehicles	7	14	21	-200	-145	-345
	Trucks / Buses	27	26	53	15	23	38
	Tractor Tailers	8	8	16	2	4	6

[3] *613 Helena Street TIS*, Paradigm Transportation Solutions, April 2018.

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 10.0 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. The intersection analysis considered three separate measures of performance:

- The LOS for each turning movement. LOS is based on the average control delay per vehicle and was evaluated using HCM 2000 procedures;
- The volume to capacity ratio for each intersection was evaluated using HCM 2000 procedures; and
- 95th percentile queue length (m) was evaluated using SimTraffic.

Under the Region's TIS Guidelines, the following criteria indicate critical conditions and signify that mitigation measures may need to be considered:

- 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, operate at LOS D or worse for an unsignalized intersection.

Table 2.3 summarizes the level of service conditions. No critical movements are noted.

Appendix C contains the detailed Synchro 10 reports.

TABLE 2.3: BASE YEAR TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Garrison Rd & Helena St / Thompson Rd	TCS	LOS	A	A	>	**A**	B	B	>	**B**	B	B	>	**B**	B	B	B	**B**	**B**
			Delay	7	7	>	**7**	15	14	>	**14**	17	16	>	**16**	17	16	16	**16**	**16**
			V/C	0.45	0.24	>		0.03	0.29	>		0.24	0.14	>		0.27	0.08	0.14		**0.39**
			Q	37	24	>		6	32	>		26	19	>		24	21	2		
			Ex	120	-	>		110	-	>		35	-	>		70	-	-		
			Avail.	84	-	>		104	-	>		9	-	>		46	-	-		
	Helena St & Washington Rd / Albany St	AWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	8	>	**8**	<	7	>	**7**	<	8	>	**8**	<	8	>	**8**	
			D.Util	<	0.06	>		<	0.08	>		<	0.06	>		<	0.04	>		
			Q	<	12	>		<	12	>		<	7	>		<	7	>		
PM Peak Hour	Garrison Rd & Helena St / Thompson Rd	TCS	LOS	A	A	>	**A**	B	B	>	**B**	B	B	>	**B**	C	B	B	**B**	**B**
			Delay	9	9	>	**9**	14	16	>	**16**	19	19	>	**19**	23	19	20	**19**	**15**
			V/C	0.40	0.31	>		0.12	0.52	>		0.13	0.10	>		0.54	0.13	0.22		**0.51**
			Q	31	35	>		13	48	>		19	19	>		39	29	8		
			Ex	120	-	>		110	-	>		35	-	>		70	-	-		
			Avail.	89	-	>		97	-	>		16	-	>		31	-	-		
	Helena St & Washington Rd / Albany St	AWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	8	>	**8**	<	8	>	**8**	<	8	>	**8**	<	8	>	**8**	
			D.Util	<	0.08	>		<	0.09	>		<	0.02	>		<	0.13	>		
			Q	<	11	>		<	13	>		<	5	>		<	11	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
V/C - Volume to Capacity Ratio
D.Util - Degree of Utilization

Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage
< - Shared Left-turn
> - Shared Right-turn

TCS - Traffic Control Signal
AWSC - All-Way Stop Control
TWSC - Two-Way Stop Control

3 Development Concept

3.1 Description

The subject site is located at 613 Helena Street in the Town of Fort Erie. The development concept includes 116 townhouse units.

Development and occupancy of the site is estimated to occur by Year 2024.

Vehicle access to the site is proposed via two new accesses to Helena Street.

Figure 3.1 illustrates the site concept plan.

Site Concept Plan

Figure 3.1

3.2 Site Trip Generation

ITE Trip Generation[4] data was used to estimate the vehicular trip generation. LUC 220 - Multifamily Housing (Low-Rise) was used to estimate the site's trip generation using regression equations. **Table 3.1** summarizes the estimated trip generation. To remain conservative, no modal split adjustments have been applied to the trip generation estimate to account for active transportation or transit-oriented trips.

The subject site is forecast to generate approximately 55 and 67 new vehicle trips during the AM and PM peak hours, respectively.

TABLE 3.1: SITE GENERATED TRAFFIC

Land Use	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
LUC 220 – 166 Units	13	42	55	42	25	67
Total Generation	13	42	55	42	25	67

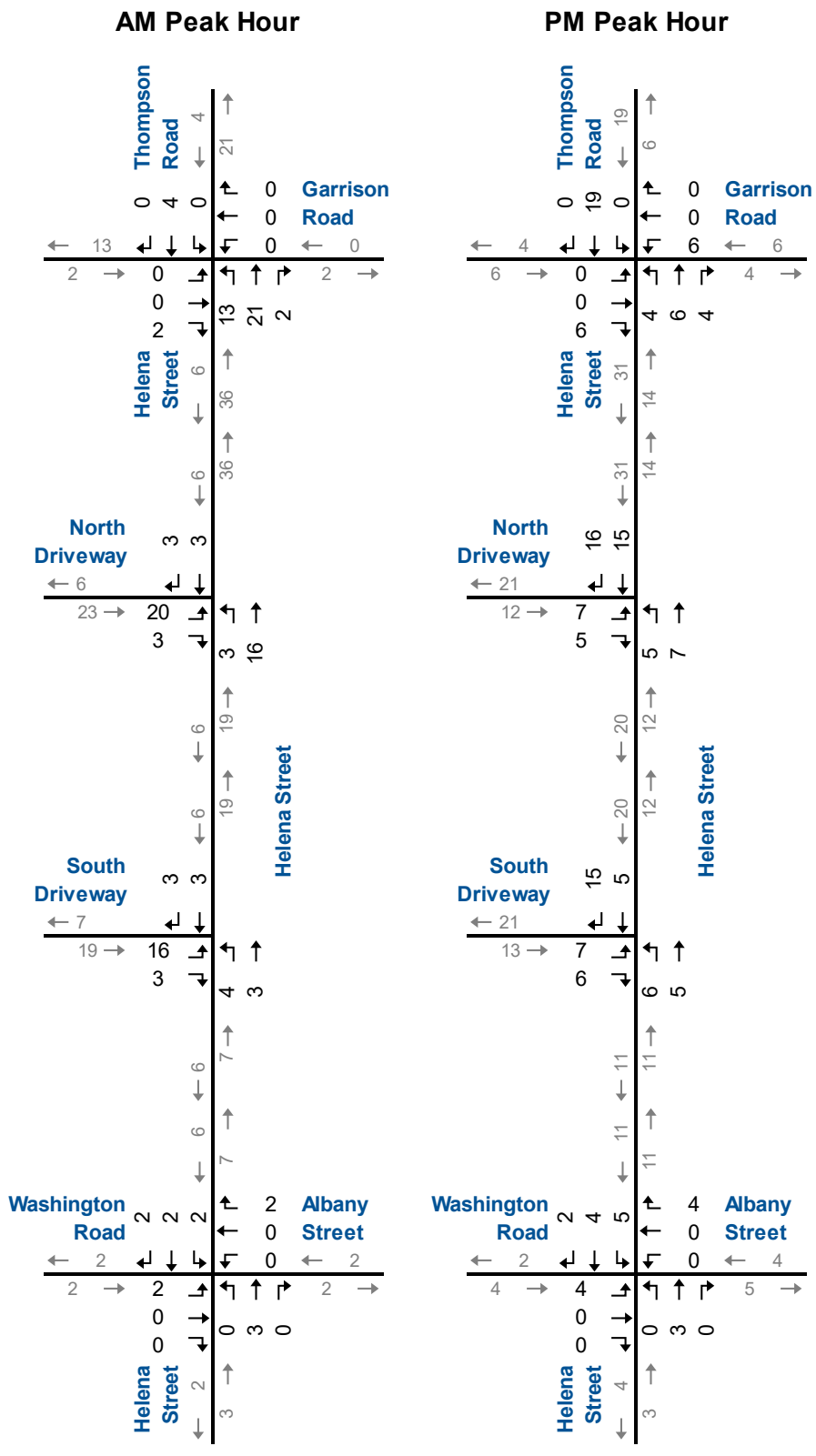
AM | Ln(T) = 0.95 Ln(X) – 0.51, PM | Ln(T) = 0.89 Ln(x) – 0.02

Table 3.2 summarizes the estimated trip distribution. The estimated distribution is based on existing conditions as the nearby area is primarily residential. **Figure 3.2** illustrates the site generated traffic.

TABLE 3.2:ESTIMATED TRIP DISTRIBUTION

Origin/Destination	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
North via Thompson Road	30%	50%	45%	25%
East via Garrison Road	5%	5%	15%	15%
West via Garrison Road	15%	30%	15%	15%
South via Helena Street	20%	5%	5%	15%
East via Albany Street	20%	5%	10%	20%
West via Washington Road	10%	5%	10%	10%
Total	100%	100%	100%	100%

[4] *Trip Generation Tenth Edition*, Institute of Transportation Engineers, Washington D.C., 2017.



Site Generated Traffic Volumes

3.3 Sight Distance

The available sight distance at the proposed driveway locations have been assessed based on the methodology outlined in the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads*[5] ("TAC Guide"). The following parameters have been referenced in the assessment:

- Object Height (vehicle tail or brake light) – 0.60 metres;
- Driver Eye Height – 1.08 metres; and
- Top of Car – 1.30 metres.

The sight distance requirements for the proposed driveway locations were determined based on a design speed of 90 km/h, which is 20 km/h above the posted speed limit Helena Street. **Table 3.3** summarizes the sight distance measurements set out in the TAC Guide for level (flat) roadways applicable to this analysis.

TABLE 3.3: TAC GUIDE SIGHT DISTANCES

Sight Distance	Distance (m) (90 km/h Design Speed)
Minimum Stopping Sight Distance[6] *Driver approaching the site driveway.*	160 m
Intersection Sight Distance (Left Turn from Stop)[7] *Driver looks to the right before turning left to exit the site.*	190 m
Intersection Sight Distance (Right Turn from Stop)[8] *Driver looks to the left before turning right to exit the site.*	165 m

Paradigm staff completed a site visit on 05 August 2021 to measure the existing sight distances at the proposed driveway locations. The

[5] Transportation Association of Canada. *Geometric Design Guide for Canadian Roads.* June 2017.
[6] Ibid. *Table 2.5.2: Stopping Sight Distance on Level Roadways for Automobiles.*
[7] Ibid. *Table 9.9.4: Design Intersection Sight Distance – Case B1, Left Turn from Stop.*
[8] Ibid. *Table 9.9.6: Design Intersection Sight Distance – Case B2, Right Turn from Stop.*

sight distances at the proposed driveway locations are greater than 300 m and exceed the sight distances identified in the TAC Guide for a design speed of 90 km/h.

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

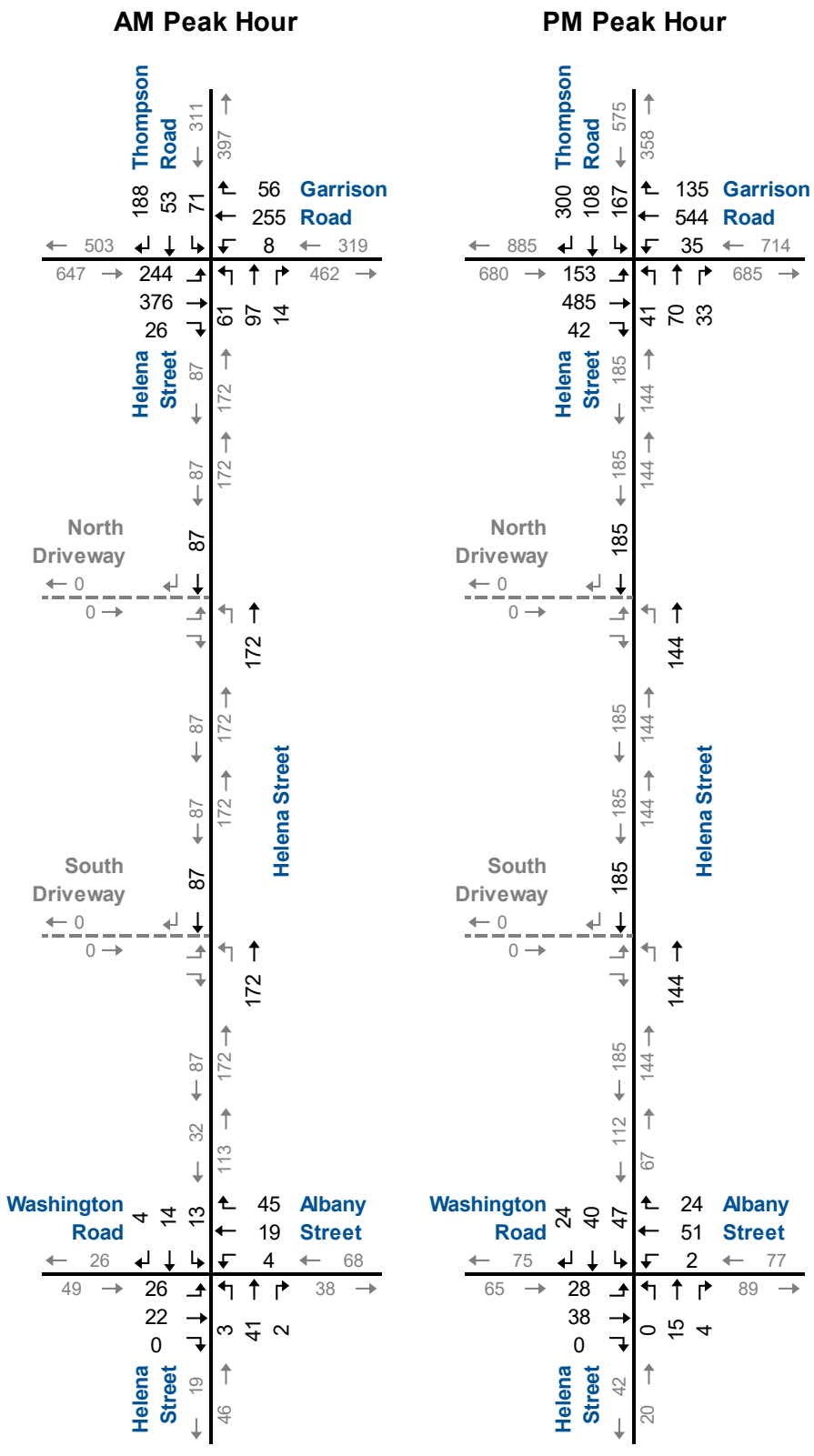
A five-year horizon (Year 2026) from TIS commission has been assessed. The likely future traffic volumes near the subject site are estimated to consist of:

- Increased non-site traffic (generalized background traffic growth). A growth rate of 2.0% per annum was confirmed by the Region during pre-study consultations; and
- Traffic generated by the proposed development.

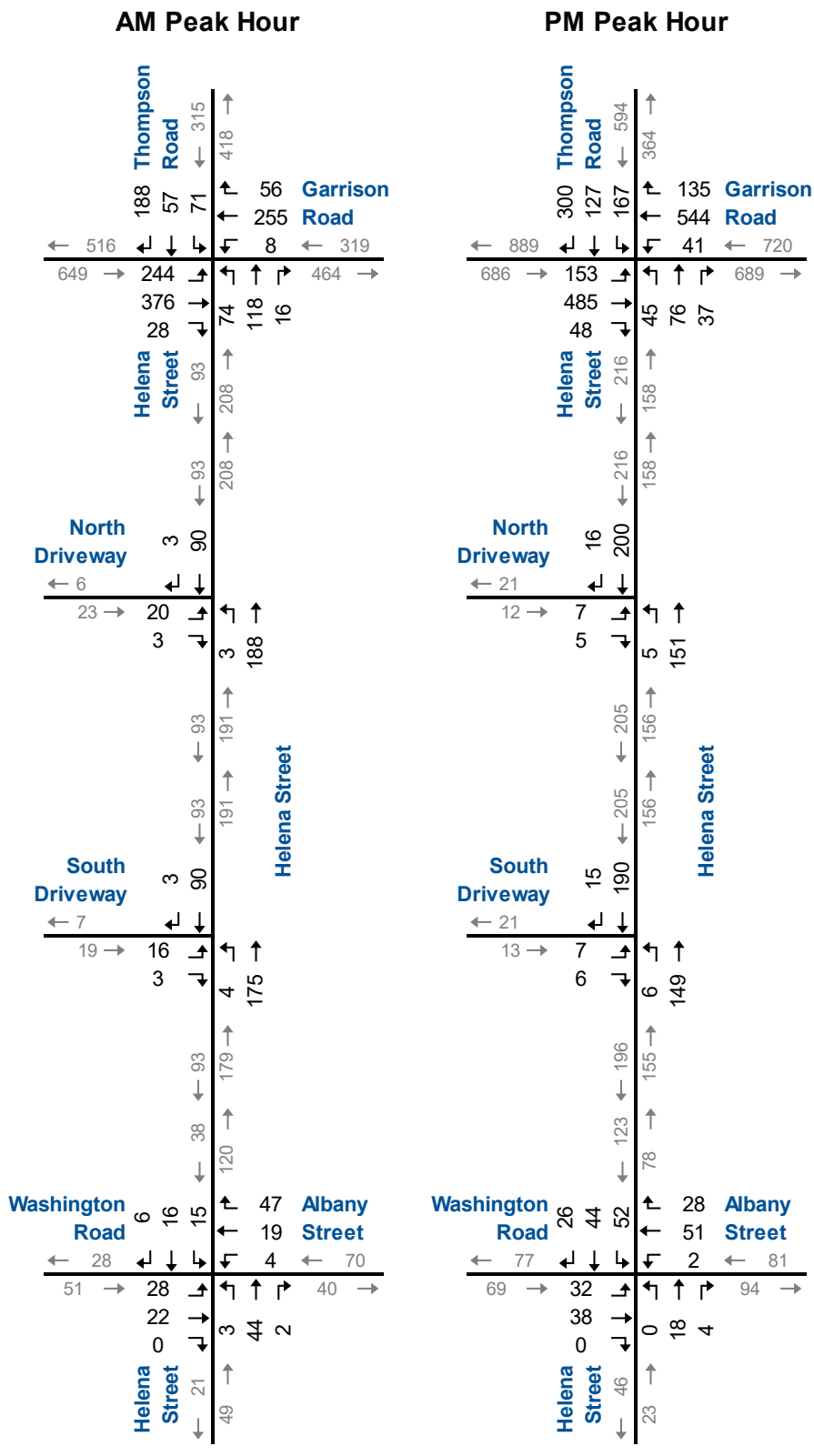
It is noted no other area background developments were identified by Region staff for inclusion within the traffic forecasts.

Figure 4.1 illustrates the forecast background traffic volumes.

Figure 4.2 illustrates the forecast total traffic volumes.



Forecast Background Traffic Volumes



Forecast Total Traffic Volumes

613 Helena Street TIS Update
210371

Figure 4.2

4.2 Background Traffic

The study area intersection operational analysis followed the same methodology used for existing conditions. No changes to the existing lane configurations or signal timings are assumed.

Table 4.1 summarizes the level of service conditions. No critical movements are noted.

Appendix D contains the detailed Synchro 10 reports.

TABLE 4.1: BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Garrison Rd & Helena St / Thompson Rd	TCS	LOS	A	A	>	**A**	B	B	>	**A**	B	B	>	**B**	B	B	B	**B**	**B**
			Delay	8	7	>	**8**	15	14	>	**7**	18	17	>	**15**	18	16	17	**15**	**12**
			V/C	0.47	0.25	>		0.04	0.31	>		0.25	0.16	>		0.29	0.09	0.15		**0.41**
			Q	37	24	>		6	34	>		24	20	>		24	21	2		
			Ex	120	-	>		110	-	>		35	-	>		70	-	-		
			Avail.	83	-	>		104	-	>		12	-	>		46	-	-		
	Helena St & Washington Rd / Albany St	AWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	8	>	**8**	<	7	>	**7**	<	8	>	**8**	<	8	>	**8**	
			D.Util	<	0.06	>		<	0.08	>		<	0.06	>		<	0.04	>		
			Q	<	12	>		<	14	>		<	7	>		<	7	>		
PM Peak Hour	Garrison Rd & Helena St / Thompson Rd	TCS	LOS	A	A	>	**A**	B	B	>	**B**	B	B	>	**B**	C	B	C	**B**	**B**
			Delay	10	10	>	**10**	14	16	>	**16**	19	19	>	**19**	24	19	20	**19**	**16**
			V/C	0.44	0.34	>		0.12	0.55	>		0.13	0.10	>		0.56	0.14	0.24		**0.54**
			Q	29	34	>		14	50	>		19	19	>		41	29	7		
			Ex	120	-	>		110	-	>		35	-	>		70	-	-		
			Avail.	91	-	>		96	-	>		16	-	>		29	-	-		
	Helena St & Washington Rd / Albany St	AWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	8	>	**8**	<	8	>	**8**	<	8	>	**8**	<	8	>	**8**	
			D.Util	<	0.08	>		<	0.09	>		<	0.02	>		<	0.14	>		
			Q	<	11	>		<	13	>		<	5	>		<	10	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
V/C - Volume to Capacity Ratio
D.Util - Degree of Utilization

Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage
< - Shared Left-turn
> - Shared Right-turn

TCS - Traffic Control Signal
AWSC - All-Way Stop Control
TWSC - Two-Way Stop Control

4.3 Total Traffic

The study area intersection operational analysis followed the same methodology used for existing conditions. No changes to the existing lane configurations or signal timings are assumed.

Table 4.2 summarizes the level of service conditions. No critical movements are noted.

The site driveways are forecast to operate in the LOS A-B range with a v/c of less than 0.05 and 95th percentile queue lengths of less than 15 m.

Appendix E contains the detailed Synchro 10 reports.

TABLE 4.2: TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Garrison Rd & Helena St / Thompson Rd	TCS	LOS	A	A	>	**A**	B	B	>	**B**	B	B	>	**B**	B	B	B	**B**	**B**
			Delay	8	7	>	**7**	15	14	>	**14**	18	17	>	**17**	18	16	17	**17**	**12**
			V/C	0.47	0.25	>		0.04	0.31	>		0.31	0.19	>		0.29	0.10	0.15		**0.41**
			Q	39	25	>		6	33	>		29	22	>		23	21	2		
			Ex	120	-	>		110	-	>		35	-	>		70	-	-		
			Avail.	81	-	>		104	-	>		7	-	>		47	-	-		
	Helena St & Washington Rd / Albany St	AWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	8	>	**8**	<	7	>	**7**	<	8	>	**8**	<	8	>	**8**	
			D.Util	<	0.06	>		<	0.08	>		<	0.06	>		<	0.05	>		
			Q	<	11	>		<	14	>		<	6	>		<	7	>		
	North Driveway & Helena St	TWSC	LOS	B		>	**B**					<	A		**A**		A	>	**A**	
			Delay	10		>	**10**					<	0		**0**		0	>	**0**	
			V/C	0.04		>						<	0.00				0.06	>		
			Q	13		>						<	1				-	>		
	South Driveway & Helena St	TWSC	LOS	B		>	**B**					<	A		**A**		A	>	**A**	
			Delay	10		>	**10**					<	0		**0**		0	>	**0**	
			V/C	0.03		>						<	0.00				0.06	>		
			Q	11		>						<	2				-	>		
PM Peak Hour	Garrison Rd & Helena St / Thompson Rd	TCS	LOS	A	A	>	**A**	B	B	>	**B**	B	B	>	**B**	C	B	C	**B**	**B**
			Delay	10	10	>	**10**	14	16	>	**16**	20	19	>	**19**	24	19	20	**19**	**16**
			V/C	0.44	0.34	>		0.14	0.55	>		0.15	0.11	>		0.56	0.16	0.24		**0.54**
			Q	33	37	>		15	50	>		19	20	>		42	35	9		
			Ex	120	-	>		110	-	>		35	-	>		70	-	-		
			Avail.	87	-	>		95	-	>		17	-	>		29	-	-		
	Helena St & Washington Rd / Albany St	AWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	8	>	**8**	<	8	>	**8**	<	8	>	**8**	<	8	>	**8**	
			D.Util	<	0.09	>		<	0.10	>		<	0.03	>		<	0.16	>		
			Q	<	11	>		<	12	>		<	5	>		<	13	>		
	North Driveway & Helena St	TWSC	LOS	A		>	**A**					<	A		**A**		A	>	**A**	
			Delay	10		>	**10**					<	0		**0**		0	>	**0**	
			V/C	0.01		>						<	0.00				0.14	>		
			Q	6		>						<	3				-	>		
	South Driveway & Helena St	TWSC	LOS	B		>	**B**					<	A		**A**		A	>	**A**	
			Delay	10		>	**10**					<	0		**0**		0	>	**0**	
			V/C	0.02		>						<	0.01				0.13	>		
			Q	10		>						<	3				-	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
V/C - Volume to Capacity Ratio
D.Util - Degree of Utilization
Q - 95th Percentile Queue Length
Ex. - Existing Available Storage
Avail. - Available Storage
< - Shared Left-turn
> - Shared Right-turn
TCS - Traffic Control Signal
AWSC - All-Way Stop Control
TWSC - Two-Way Stop Control

5 Remedial Measures

5.1 Auxiliary Left-Turn Lanes

The need for left-turn lanes on Helena Street at the site driveways were evaluated using the Ministry of Transportation's (MTO) Design Supplement for the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads[9]. The warrant nomographs determine if a left-turn lane is warranted based on the following criteria:

- Design speed of the road (20 km/h over the posted speed limit);
- Advancing volume;
- Opposing volume; and
- Percentage of advancing vehicles performing a left-turn movement.

Appendix F contains the left-turn lane warrant nomographs. The nomographs indicate that left-turn lanes are not warranted on Helena Street at the site driveways.

[9] MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads, June 2017 Appendix 9 for Chapter 9 Intersections

6 Conclusions and Recommendations

6.1 Conclusions

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

- **Base Year Traffic 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.
- **Site Trip Generation**: The proposed development is estimated to generate approximately 55 AM peak hour vehicle trips and 67 PM peak hour vehicle trips.
- **Background Traffic Conditions**: The study area intersections are forecast to operate 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 Conditions**: The study area intersections are forecast to operate 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 driveways are forecast to operate in the LOS A-B range with a v/c of less than 0.05 and 95th percentile queue lengths of less than 15 m.
- **Remedial Measures**: No improvements to the existing and proposed form of traffic control are required at the study area intersections.

  Northbound left-turn lanes on Helena Street at the site driveways are not warranted based on forecast traffic volumes.

6.2 Recommendations

Based on the findings of this study, it is recommended that the site driveway approaches to Helena Street operate as unsignalized intersections.

Appendix A

Pre-Study Consultation

Stefan Hajgato

From: Jeremy Korevaar <JKorevaar@forterie.ca>
Sent: July 27, 2021 9:47 AM
To: Stefan Hajgato
Cc: Scott Catton
Subject: RE: (210371: 613 Helena St) TIS Terms of Reference

Good Morning Stefan,

If the Region is accepting of factored traffic counts, that is fine with me.

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: "Stefan Hajgato" <shajgato@ptsl.com>
To: "Jeremy Korevaar (JKorevaar@forterie.ca)" <JKorevaar@forterie.ca>
Cc: "Scott Catton" <scatton@ptsl.com>
Date: 2021-07-26 10:33 AM
Subject: RE: (210371: 613 Helena St) TIS Terms of Reference

Hi Jeremy,

As mentioned in Susan's email, the Region does not require additional turning movement counts to be collected. Do you have any concerns with using historical data factored to 2021?

Thanks,

Stefan Hajgato, P.Eng.
Transportation Engineer
(He/Him)

Paradigm Transportation Solutions Limited
p: 519.896.3163 x209

From: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Sent: July 26, 2021 8:55 AM
To: Stefan Hajgato <shajgato@ptsl.com>
Cc: Jeremy Korevaar (JKorevaar@forterie.ca) <JKorevaar@forterie.ca>; Ramundo, Matteo <Matteo.Ramundo@niagararegion.ca>; Scott Catton <scatton@ptsl.com>
Subject: RE: (210371: 613 Helena St) TIS Terms of Reference

Hello Stefan,

Regional transportation staff have reviewed your TIS terms of reference and our comments are noted below in green.

If there are any improvements required a functional design should be included in the TIS.

If you require any additional information 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: Stefan Hajgato <shajgato@ptsl.com>
Sent: Monday, July 12, 2021 3:33 PM
To: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>; JKorevaar@forterie.ca
Cc: Scott Catton <scatton@ptsl.com>
Subject: (210371: 613 Helena St) TIS Terms of Reference

Hi Susan and Jeremy,

Paradigm has been retained to prepare a Transportation Impact Study (TIS) for a proposed 116-unit townhouse development at 613 Helena Street in the Town of Fort Erie. Two driveways are proposed to Helena Street approximately 475 and 560 metres north of Washington Road / Albany Street.

We are proposing the following scope:

Study Area Intersections:

- Helena Street / Thompson Road at Garrison Road (signalized); Accepted
- Helena Street at Washington Road / Albany Street (unsignalized); and Accepted

- Proposed site driveways (up to 2) to Helena Street. Accepted

Development (site plan attached):

- 116 townhouse units (bungalow and standard units).
- Build-out - Year 2024.

Horizon Year:

- Existing (Year 2021)
- Year 2026 (5-years from TIS commission).Accepted.

Growth Rate: 2.0% per annum.Accepted.

Existing Traffic Volumes: Please see discussion below.

Background Developments: Please identify.

Analysis Periods: Weekday AM & PM peak hours.Accepted.

Trip Generation: ITE Trip Generation Manual 10e.Accepted.

Trip Distribution: Local travel patterns. Accepted.

Planned Roadway Improvements: Please identify.

Capacity Analysis Software: Synchro. Paradigm to confirm the version of Synchro they are using.

Additional Studies: Paradigm to update their classification/speed study on Helena Street adjacent to the site that was requested and prepared for the 2018 TIS for the same previous reason. The purpose of this study is to address concerns that vehicles may be speeding on this road which could cause unsafe conditions for vehicles entering and exiting the subject site.

Existing Traffic Volumes
We can factor historical turning movements counts to 2021 conditions. Paradigm currently has 2016 counts at the Helena Street / Thompson Road and Garrison Road intersection and 2018 counts at the Helena Street and Washington Road / Albany Street intersection. Please advise if the Town or Region is able to provide more recent data.
As per the Region current TIS guidelines, traffic counts must be within at least 3 years of the study (ideally undertaken prior to the start of the pandemic in March 2020). 2018 counts for Helena Street and Washington Road/Albany Street intersection are accepted. The Region has 2019 counts for Helena Street/Thompson Road and Garrison Road intersection that can be purchased by Paradigm. In order to reflect todays counts we would ask that the older counts be increased by 2% each year to reach the anticipated 2021 counts. Regional counts can be obtained through our online system at the following link: https://www.niagararegion.ca/living/roads/permits/traffic-data-requests.aspx

Alternatively, we can collect current turning movement counts at the study intersections. However, traffic patterns may be altered due to potential / recently lifted travel restrictions at the time of data collection. Please advise if you would like us to go this route and if we should apply a factor to the counts to normalize volumes.
New traffic counts are not required as per above.

Feel free to reach out if you have any questions or comments.

Thanks,

Stefan Hajgato, P.Eng.
Transportation Engineer
(He/Him)

Paradigm Transportation Solutions Limited
150 Pinebush Road, Unit 5A, Cambridge ON N1R 8J8
p: 519.896.3163 x209
e: shajgato@ptsl.com
w: www.ptsl.com

This e-mail and any files transmitted with it are confidential and intended solely for the use of the individual or entity to whom they are addressed. If you have received this e-mail in error please notify the sender immediately. Please note that any views or opinions presented in this e-mail are solely those of the author and do not necessarily represent those of Paradigm Transportation Solutions Limited. Finally, the recipient should check this e-mail and any attachments for the presence of viruses. Paradigm Transportation Solutions Limited accepts no liability for any damage caused by any virus transmitted by this e-mail.

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.

Appendix B

Existing Data

Helena St @ Albany St

Morning Peak Diagram

Specified Period
From: 6:00:00
To: 9:00:00

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

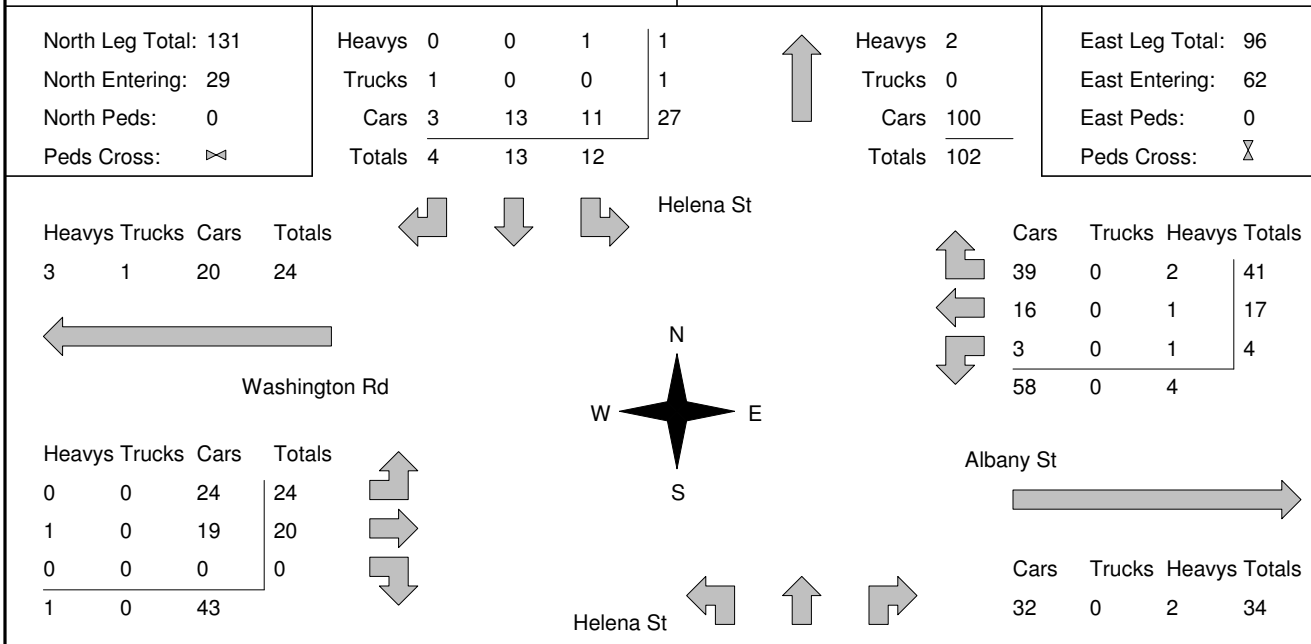
Municipality: Fort Erie
Site #: 0000000001
Intersection: Helena St & Albany St
TFR File #: 1
Count date: 16-Jan-2018

Weather conditions:
Clear/Wet

Person(s) who counted:
Cam

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

Major Road: Helena St runs N/S



Comments

Helena St @ Albany St

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 13:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

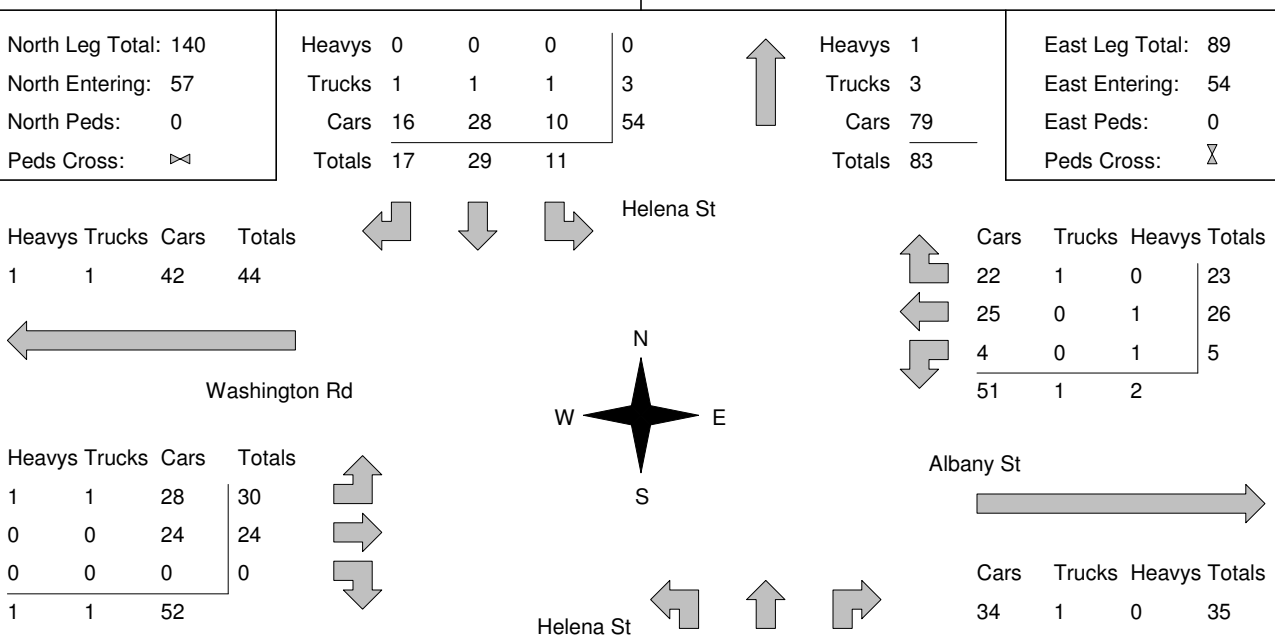
Municipality: Fort Erie
Site #: 0000000001
Intersection: Helena St & Albany St
TFR File #: 1
Count date: 16-Jan-2018

Weather conditions:
Clear/Wet

Person(s) who counted:
Cam

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

Major Road: Helena St runs N/S



Comments

Helena St @ Albany St

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

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

Municipality: Fort Erie
Site #: 0000000001
Intersection: Helena St & Albany St
TFR File #: 1
Count date: 16-Jan-2018

Weather conditions:
Clear/Wet

Person(s) who counted:
Cam

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

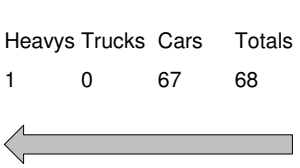
Major Road: Helena St runs N/S

North Leg Total: 162
North Entering: 101
North Peds: 0
Peds Cross: ⋈

Heavys	0	1	0	1
Trucks	0	0	0	0
Cars	22	35	43	100
Totals	22	36	43	

Heavys	1
Trucks	0
Cars	60
Totals	61

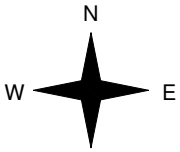
East Leg Total: 151
East Entering: 70
East Peds: 0
Peds Cross: ⧖



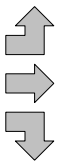
Heavys	Trucks	Cars	Totals
1	0	67	68

Washington Rd

Cars	Trucks	Heavys	Totals
22	0	0	22
45	0	1	46
1	0	1	2
68	0	2	



Heavys	Trucks	Cars	Totals
0	0	25	25
0	1	33	34
0	0	0	0
0	1	58	



Albany St

Cars	Trucks	Heavys	Totals
79	1	1	81

Helena St

Peds Cross: ⧖
West Peds: 0
West Entering: 59
West Leg Total: 127

Cars	36
Trucks	0
Heavys	2
Totals	38

Cars	0	13	3	16
Trucks	0	0	0	0
Heavys	0	1	1	2
Totals	0	14	4	

Peds Cross: ⋈
South Peds: 0
South Entering: 18
South Leg Total: 56

Comments

Helena St @ Albany St

Total Count Diagram

Municipality: Fort Erie
Site #: 0000000001
Intersection: Helena St & Albany St
TFR File #: 1
Count date: 16-Jan-2018

Weather conditions:
Clear/Wet

Person(s) who counted:
Cam

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

Major Road: Helena St runs N/S

North Leg Total:	995			
North Entering:	452			
North Peds:	0			
Peds Cross:	⋈			
Heavys	0	1	2	3
Trucks	4	1	1	6
Cars	119	194	130	443
Totals	123	196	133	
Heavys	15			
Trucks	4			
Cars	524			
Totals	543			
East Leg Total:	697			
East Entering:	390			
East Peds:	0			
Peds Cross:	⧖			

Helena St

Heavys	Trucks	Cars	Totals
8	7	300	315

Cars	Trucks	Heavys	Totals
171	1	8	180
178	3	6	187
18	0	5	23
367	4	19	

Washington Rd

N
W E
S

Heavys	Trucks	Cars	Totals
3	1	163	167
3	2	152	157
0	0	1	1
6	3	316	

Albany St

Cars	Trucks	Heavys	Totals
295	3	9	307

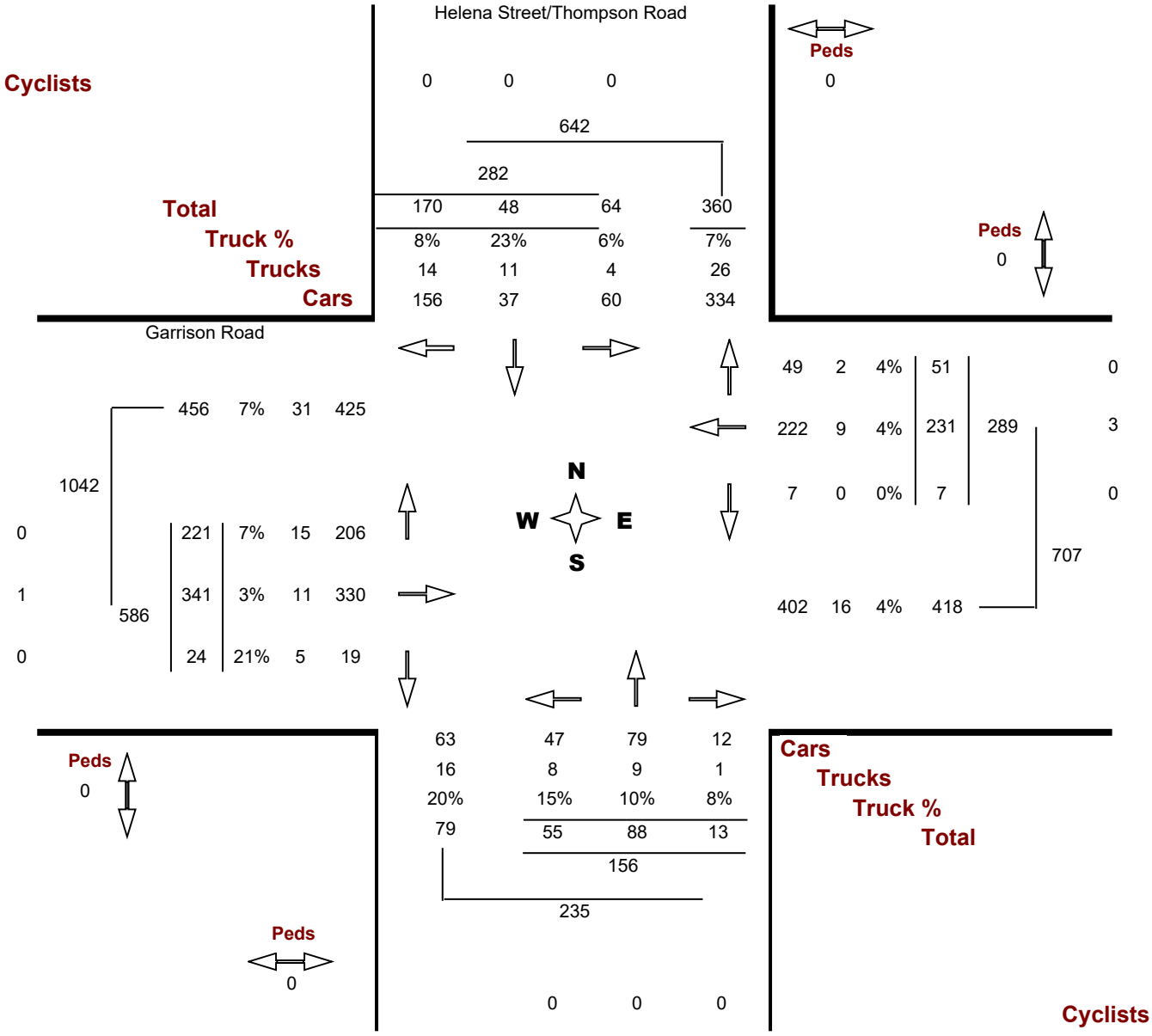
Helena St

Peds Cross:	⧖			
West Peds:	2			
West Entering:	325			
West Leg Total:	640			
Cars	213			
Trucks	1			
Heavys	6			
Totals	220			
Cars	3	190	13	206
Trucks	0	2	0	2
Heavys	2	4	4	10
Totals	5	196	17	
Peds Cross:	⋈			
South Peds:	6			
South Entering:	218			
South Leg Total:	438			

Comments

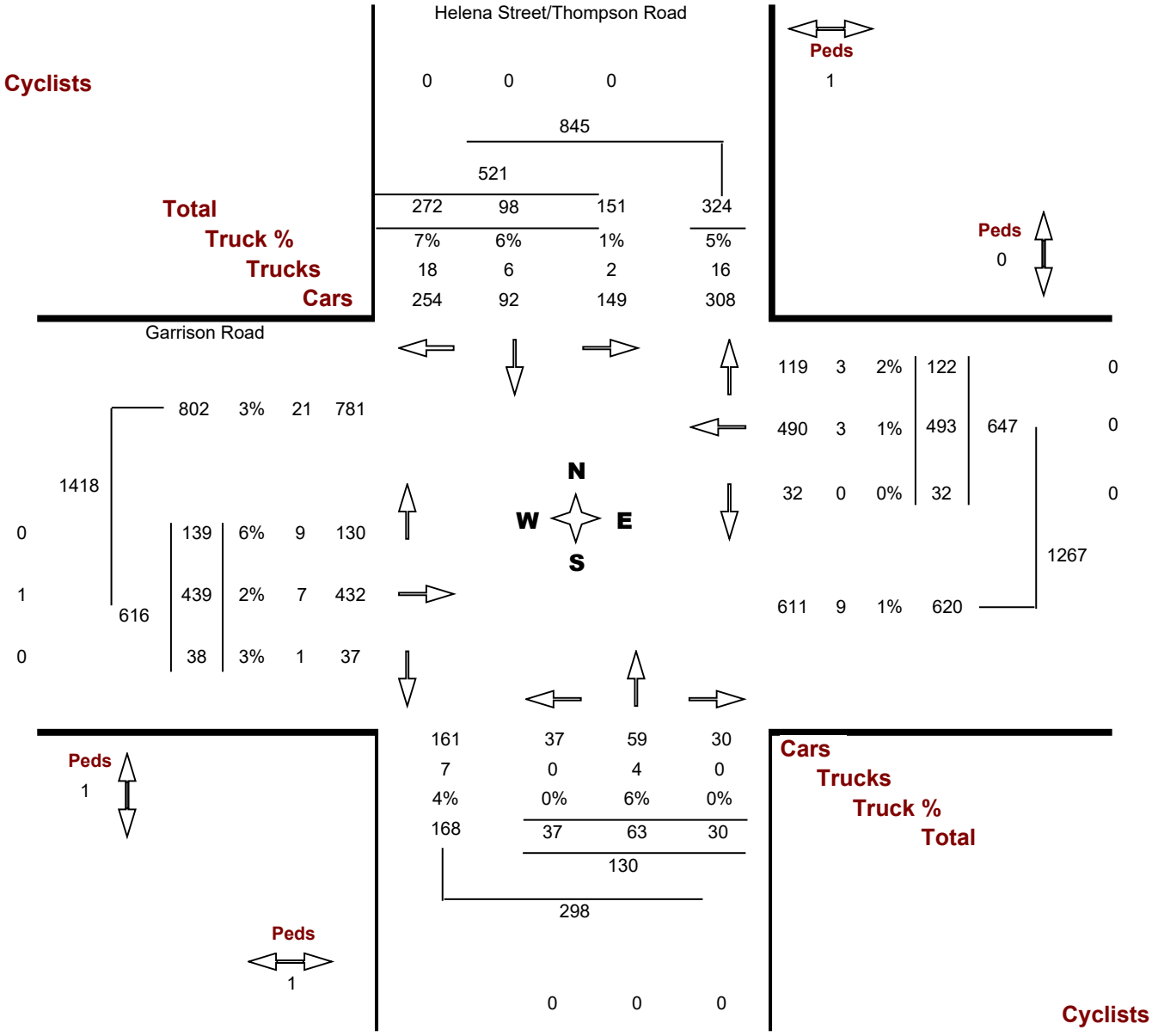
Turning Movements Report - AM Period

Location.....	Garrison Road @ Helena Street/Thompson Road	**GeoID.....**	01725
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



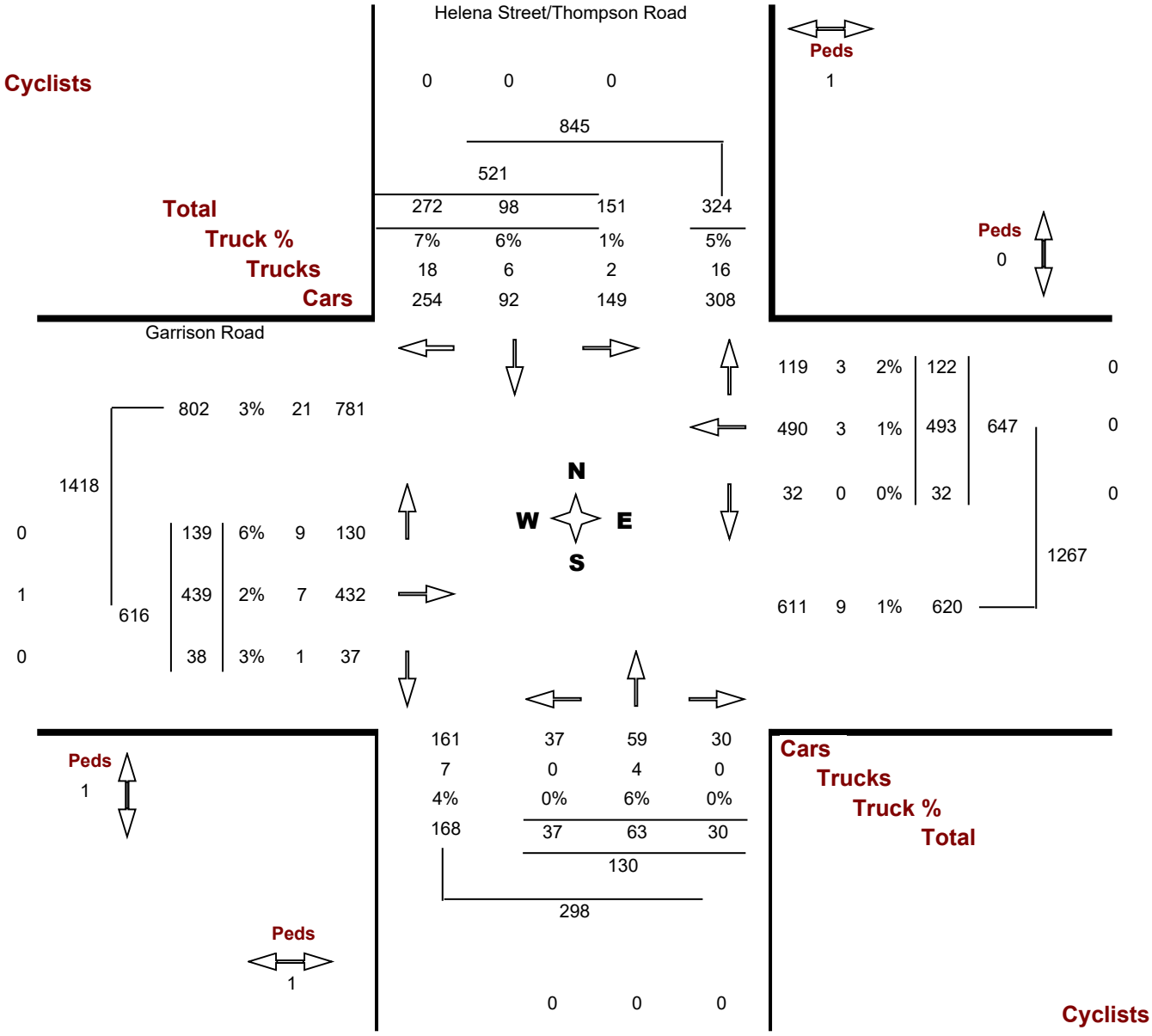
Turning Movements Report - PM Period

Location.....	Garrison Road @ Helena Street/Thompson Road	**GeoID.....**	01725
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



Turning Movements Report - Full Study

Location.....	Garrison Road @ Helena Street/Thompson Road	**GeoID.....**	01725
Municipality.	FORT ERIE	**Count Date.**	Thursday, 23 May, 2019
Traffic Cont.		**Count Time.**	07:00 AM — 06:00 PM
Major Dir.....	East west	**Peak Hour..**	03:30 PM — 04:30 PM



Turning Movement Count - Details Report (15 min)

Location..... Garrison Road @ Helena Street/Thompson Road

Municipality..... FORT ERIE

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

		Helena Street/Thompson Road											Garrison 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	12	10	22	0	44	3	15	2	0	20	2	16	5	0	23	21	44	2	0	67
07:15	07:30	5	10	21	0	36	4	12	2	0	18	1	27	8	0	36	42	43	5	0	90
07:30	07:45	5	5	27	0	37	6	24	3	0	33	2	36	8	0	46	36	53	4	0	93
07:45	08:00	13	9	46	0	68	12	20	4	0	36	2	62	7	0	71	44	80	3	0	127
Hourly Total		35	34	116	0	185	25	71	11	0	107	7	141	28	0	176	143	220	14	0	377
08:00	08:15	12	11	41	0	64	13	16	1	0	30	2	64	9	0	75	42	67	3	0	112
08:15	08:30	8	10	43	0	61	12	22	4	0	38	3	61	13	0	77	52	85	3	0	140
08:30	08:45	23	17	46	0	86	18	26	3	0	47	1	48	14	0	63	55	80	7	0	142
08:45	09:00	21	10	40	0	71	12	24	5	0	41	1	58	15	0	74	72	109	11	0	192
Hourly Total		64	48	170	0	282	55	88	13	0	156	7	231	51	0	289	221	341	24	0	586
11:00	11:15	27	18	30	0	75	4	15	5	0	24	3	105	14	0	122	28	94	3	0	125
11:15	11:30	32	15	37	0	84	6	11	4	0	21	5	93	31	0	129	35	86	4	0	125
11:30	11:45	32	13	39	0	84	7	17	3	0	27	4	80	24	0	108	36	78	6	0	120
11:45	12:00	32	22	39	0	93	12	15	6	0	33	3	97	30	0	130	26	125	2	0	153
Hourly Total		123	68	145	0	336	29	58	18	0	105	15	375	99	0	489	125	383	15	0	523
12:00	12:15	38	14	49	0	101	9	13	5	0	27	3	128	27	0	158	33	102	13	0	148
12:15	12:30	39	18	25	0	82	12	18	3	0	33	3	112	19	0	134	35	112	13	0	160
12:30	12:45	33	16	41	0	90	4	16	8	0	28	2	104	35	0	141	30	106	5	0	141
12:45	13:00	44	16	35	0	95	5	13	4	0	22	7	90	22	0	119	47	110	8	0	165
Hourly Total		154	64	150	0	368	30	60	20	0	110	15	434	103	0	552	145	430	39	0	614
13:00	13:15	42	6	35	0	83	5	16	9	0	30	4	94	23	0	121	33	110	5	0	148
13:15	13:30	36	9	41	0	86	7	19	6	0	32	7	81	32	0	120	36	101	2	0	139
13:30	13:45	37	15	28	0	80	8	7	9	0	24	5	98	19	0	122	37	82	11	0	130
13:45	14:00	35	15	44	0	94	3	12	8	0	23	2	98	27	0	127	47	95	8	0	150
Hourly Total		150	45	148	0	343	23	54	32	0	109	18	371	101	0	490	153	388	26	0	567
15:00	15:15	31	18	65	0	114	10	16	3	0	29	3	98	25	0	126	41	105	3	0	149
15:15	15:30	47	22	35	0	104	9	28	7	0	44	9	120	40	0	169	40	100	14	0	154
15:30	15:45	36	19	69	0	124	11	20	9	0	40	10	109	34	0	153	34	96	15	0	145
15:45	16:00	47	34	73	0	154	10	9	6	0	25	5	102	30	0	137	39	133	8	0	180
Hourly Total		161	93	242	0	496	40	73	25	0	138	27	429	129	0	585	154	434	40	0	628
16:00	16:15	41	19	63	0	123	8	21	8	0	37	3	135	30	0	168	28	89	8	0	125

		Helena Street/Thompson Road										Garrison 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	27	26	67	0	120	8	13	7	0	28	14	147	28	0	189	38	121	7	0	166
16:30	16:45	33	35	63	0	131	10	16	8	0	34	5	106	26	0	137	29	96	8	0	133
16:45	17:00	21	23	56	0	100	4	13	7	0	24	6	117	20	0	143	39	103	6	0	148
Hourly Total		122	103	249	0	474	30	63	30	0	123	28	505	104	0	637	134	409	29	0	572
17:00	17:15	43	28	71	0	142	8	19	3	0	30	5	109	27	0	141	38	110	9	0	157
17:15	17:30	23	21	50	0	94	3	13	8	0	24	4	118	26	0	148	38	97	5	0	140
17:30	17:45	34	20	74	0	128	3	8	4	0	15	7	98	13	0	118	33	87	5	0	125
17:45	18:00	30	22	50	0	102	7	12	4	0	23	4	95	21	0	120	34	92	6	0	132
Hourly Total		130	91	245	0	466	21	52	19	0	92	20	420	87	0	527	143	386	25	0	554
Grand Total		939	546	1465	0	2950	253	519	168	0	940	137	2906	702	0	3745	1218	2991	212	0	4421
Truck %		2%	9%	6%	0%	5%	8%	8%	5%	0%	7%	1%	2%	4%	0%	2%	6%	2%	8%	0%	4%

Signal Code: 003122
Intersection: RR3(Garrison) & RR122(Thompson Rd.)
Municipality: forterie
Owner: Region
Last Modified: 1/11/2018 8:51:15 AM

Timing Parameters	EBD & WBD ADVANCE GARRISON RD.	EBD & WBD THRU GARRISON RD.	NBD & SBD THRU THOMPSON RD./HELENA ST.	n/a	n/a	n/a
Min Green	6	10	10	0	0	0
Walk	0	12	12	0	0	0
Ped Clearance	0	20	20	0	0	0
Vehicle Ext.	2.5	5	3	0	0	0
Max Green	25	35	20	0	0	0
Yellow	3	5	4.1	0	0	0
All Red	0	2	2	0	0	0

		Offset
Minimum Cycle	33.1	0
Pedestrian Cycle	77.1	
Maximum Cycle	96.1	0
Operation	FA	

Installed On:
3/6/2004
Count Date:
10/13/2016

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

Close Window | Print Entry* | Refresh Entry

***Note: you need to change the paper orientation from Portriat to Landscape**

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Fort Erie
Street: 613 Helena St - NB
Location: 1

A study of vehicle traffic was conducted with the device having serial number 405258. The study was done in the NB lane at 613 Helena St - NB in Fort Erie, ON in county. The study began on 2021-07-28 at 12:00 AM and concluded on 2021-07-29 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 1,140 vehicles passed through the location with a peak volume of 31 on 2021-07-28 at [02:30 PM-02:45 PM] and a minimum volume of 0 on 2021-07-28 at [10:30 PM-10:45 PM]. The AADT count for this study was 1,140.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 70 - 80 KM/H range or lower. The average speed for all classifed vehicles was 73 KM/H with 59.07% vehicles exceeding the posted speed of 70 KM/H. 26.23% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 70KM/H and the 85th percentile was 86.65 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
0	3	2	3	18	118	321	373	191	76	15	9	7	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 1094 which represents 96 percent of the total classified vehicles. The number of Small Trucks in the study was 7 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 27 which represents 2 percent of the total classified vehicles. The number of Tractor Trailers in the study was 8 which represents 1 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
485	609	7	27	7	1	0	0							

CHART 2

HEADWAY

During the peak traffic period, on 2021-07-28 at [02:30 PM-02:45 PM] the average headway between vehicles was 28.125 seconds. During the slowest traffic period, on 2021-07-28 at [10:30 PM-10:45 PM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 22.00 and 44.00 degrees C.

MH Corbin Traffic Analyzer Study
Computer Generated Summary Report
City: Fort Erie
Street: 613 Helena St - SB
Location: 1

A study of vehicle traffic was conducted with the device having serial number 400181. The study was done in the SB lane at 613 Helena St - SB in Fort Erie, ON in county. The study began on 2021-07-28 at 12:00 AM and concluded on 2021-07-29 at 12:00 AM, lasting a total of 24.00 hours. Traffic statistics were recorded in 15 minute time periods. The total recorded volume showed 1,284 vehicles passed through the location with a peak volume of 46 on 2021-07-28 at [05:00 PM-05:15 PM] and a minimum volume of 0 on 2021-07-28 at [01:30 AM-01:45 AM]. The AADT count for this study was 1,284.

SPEED

Chart 1 lists the values of the speed bins and the total traffic volume for each bin. At least half the vehicles were traveling in the 70 - 80 KM/H range or lower. The average speed for all classifed vehicles was 74 KM/H with 62.67% vehicles exceeding the posted speed of 70 KM/H. 24.16% percent of the total vehicles were traveling in excess of 89 KM/H. The mode speed for this traffic study was 70KM/H and the 85th percentile was 86.00 KM/H.

< to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 to >
0	2	3	2	12	105	355	494	195	82	27	3	3	0	0

CHART 1

CLASSIFICATION

Chart 2 lists the values of the classification bins and the total traffic volume accumulated for each bin.
Most of the vehicles classified during the study were Passenger Vehicles. The number of Passenger Vehicles in the study was 1235 which represents 96 percent of the total classified vehicles. The number of Small Trucks in the study was 14 which represents 1 percent of the total classified vehicles. The number of Trucks/Buses in the study was 26 which represents 2 percent of the total classified vehicles. The number of Tractor Trailers in the study was 8 which represents 1 percent of the total classified vehicles.

< to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 to >							
713	522	14	26	5	1	2	0							

CHART 2

HEADWAY

During the peak traffic period, on 2021-07-28 at [05:00 PM-05:15 PM] the average headway between vehicles was 19.149 seconds. During the slowest traffic period, on 2021-07-28 at [01:30 AM-01:45 AM] the average headway between vehicles was 900 seconds.

WEATHER

The roadway surface temperature over the period of the study varied between 22.00 and 45.00 degrees C.

Class/Volume Report Graph

HI-Star ID: 62F0A
Street: 613 Helena St - NB
State: ON
City: Fort Erie
Area:

Begin: 2021-07-28 12:00 AM
Lane: NB
Oper: MD
Posted: 70
AADT Factor: 1

End: 2021-07-29 12:00 AM
Hours: 24:00
Period: 15
Raw Count: 1140
AADT Count: 1140

NC300 - Metres	0.0 to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 >	Total
2021-07-28 [12:00 AM-12:15 AM]	1	0	0	0	0	0	0	0	1
2021-07-28 [12:15 AM-12:30 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [12:30 AM-12:45 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [12:45 AM-01:00 AM]	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	1
2021-07-28 [01:00 AM-01:15 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [01:15 AM-01:30 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [01:30 AM-01:45 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [01:45 AM-02:00 AM]	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
2021-07-28 [02:00 AM-02:15 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [02:15 AM-02:30 AM]	1	1	0	0	0	0	0	0	1
2021-07-28 [02:30 AM-02:45 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [02:45 AM-03:00 AM]	0	0	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	0	1
2021-07-28 [03:00 AM-03:15 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [03:15 AM-03:30 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [03:30 AM-03:45 AM]	1	0	1	0	0	0	0	0	1
2021-07-28 [03:45 AM-04:00 AM]	0	0	0	0	0	0	0	0	0
	1	0	1	0	0	0	0	0	1
2021-07-28 [04:00 AM-04:15 AM]	1	1	0	0	0	0	0	0	1
2021-07-28 [04:15 AM-04:30 AM]	2	2	0	0	0	0	0	0	2
2021-07-28 [04:30 AM-04:45 AM]	1	1	0	0	0	0	0	0	1
2021-07-28 [04:45 AM-05:00 AM]	2	1	1	0	0	0	0	0	2
	6	5	1	0	0	0	0	0	6
2021-07-28 [05:00 AM-05:15 AM]	7	4	2	0	0	0	0	0	6
2021-07-28 [05:15 AM-05:30 AM]	3	0	3	0	0	0	0	0	3
2021-07-28 [05:30 AM-05:45 AM]	7	4	3	0	0	0	0	0	7
2021-07-28 [05:45 AM-06:00 AM]	7	4	3	0	0	0	0	0	7
	24	12	11	0	0	0	0	0	23
2021-07-28 [06:00 AM-06:15 AM]	10	5	5	0	0	0	0	0	10
2021-07-28 [06:15 AM-06:30 AM]	13	6	7	0	0	0	0	0	13
2021-07-28 [06:30 AM-06:45 AM]	15	5	10	0	0	0	0	0	15
2021-07-28 [06:45 AM-07:00 AM]	12	2	9	0	0	0	0	0	11
	50	18	31	0	0	0	0	0	49
2021-07-28 [07:00 AM-07:15 AM]	12	3	9	0	0	0	0	0	12
2021-07-28 [07:15 AM-07:30 AM]	17	7	9	0	1	0	0	0	17
2021-07-28 [07:30 AM-07:45 AM]	26	11	12	1	2	0	0	0	26
2021-07-28 [07:45 AM-08:00 AM]	25	11	12	0	0	1	0	0	24
	80	32	42	1	3	1	0	0	79
2021-07-28 [08:00 AM-08:15 AM]	22	15	6	0	0	0	1	0	22
2021-07-28 [08:15 AM-08:30 AM]	18	9	5	2	2	0	0	0	18
2021-07-28 [08:30 AM-08:45 AM]	16	7	7	0	1	1	0	0	16
2021-07-28 [08:45 AM-09:00 AM]	23	8	14	0	0	1	0	0	23
	79	39	32	2	3	2	1	0	79
2021-07-28 [09:00 AM-09:15 AM]	21	6	14	0	1	0	0	0	21
2021-07-28 [09:15 AM-09:30 AM]	26	8	16	0	2	0	0	0	26
2021-07-28 [09:30 AM-09:45 AM]	23	14	9	0	0	0	0	0	23
2021-07-28 [09:45 AM-10:00 AM]	19	6	12	0	1	0	0	0	19

	89	34	51	0	4	0	0	0	0	89
2021-07-28 [10:00 AM-10:15 AM]	27	14	13	0	0	0	0	0	0	27
2021-07-28 [10:15 AM-10:30 AM]	16	9	6	0	0	1	0	0	0	16
2021-07-28 [10:30 AM-10:45 AM]	26	13	13	0	0	0	0	0	0	26
2021-07-28 [10:45 AM-11:00 AM]	25	15	9	0	0	1	0	0	0	25
	94	51	41	0	0	2	0	0	0	94
2021-07-28 [11:00 AM-11:15 AM]	18	7	11	0	0	0	0	0	0	18
2021-07-28 [11:15 AM-11:30 AM]	11	4	7	0	0	0	0	0	0	11
2021-07-28 [11:30 AM-11:45 AM]	0	0	0	0	0	0	0	0	0	0
2021-07-28 [11:45 AM-12:00 PM]	0	0	0	0	0	0	0	0	0	0
	29	11	18	0	0	0	0	0	0	29
2021-07-28 [12:00 PM-12:15 PM]	22	13	8	1	0	0	0	0	0	22
2021-07-28 [12:15 PM-12:30 PM]	17	10	7	0	0	0	0	0	0	17
2021-07-28 [12:30 PM-12:45 PM]	22	7	15	0	0	0	0	0	0	22
2021-07-28 [12:45 PM-01:00 PM]	19	10	7	0	2	0	0	0	0	19
	80	40	37	1	2	0	0	0	0	80
2021-07-28 [01:00 PM-01:15 PM]	23	11	12	0	0	0	0	0	0	23
2021-07-28 [01:15 PM-01:30 PM]	24	6	17	0	1	0	0	0	0	24
2021-07-28 [01:30 PM-01:45 PM]	19	5	12	1	1	0	0	0	0	19
2021-07-28 [01:45 PM-02:00 PM]	22	12	9	0	1	0	0	0	0	22
	88	34	50	1	3	0	0	0	0	88
2021-07-28 [02:00 PM-02:15 PM]	27	4	22	0	1	0	0	0	0	27
2021-07-28 [02:15 PM-02:30 PM]	17	4	12	0	0	1	0	0	0	17
2021-07-28 [02:30 PM-02:45 PM]	31	12	18	0	1	0	0	0	0	31
2021-07-28 [02:45 PM-03:00 PM]	26	9	14	1	2	0	0	0	0	26
	101	29	66	1	4	1	0	0	0	101
2021-07-28 [03:00 PM-03:15 PM]	15	5	9	0	0	1	0	0	0	15
2021-07-28 [03:15 PM-03:30 PM]	23	13	10	0	0	0	0	0	0	23
2021-07-28 [03:30 PM-03:45 PM]	27	10	15	1	0	0	0	0	0	26
2021-07-28 [03:45 PM-04:00 PM]	21	8	13	0	0	0	0	0	0	21
	86	36	47	1	0	1	0	0	0	85
2021-07-28 [04:00 PM-04:15 PM]	24	13	9	0	2	0	0	0	0	24
2021-07-28 [04:15 PM-04:30 PM]	19	10	8	0	1	0	0	0	0	19
2021-07-28 [04:30 PM-04:45 PM]	14	7	7	0	0	0	0	0	0	14
2021-07-28 [04:45 PM-05:00 PM]	20	8	12	0	0	0	0	0	0	20
	77	38	36	0	3	0	0	0	0	77
2021-07-28 [05:00 PM-05:15 PM]	22	5	16	0	1	0	0	0	0	22
2021-07-28 [05:15 PM-05:30 PM]	16	7	9	0	0	0	0	0	0	16
2021-07-28 [05:30 PM-05:45 PM]	13	7	6	0	0	0	0	0	0	13
2021-07-28 [05:45 PM-06:00 PM]	26	10	15	0	1	0	0	0	0	26
	77	29	46	0	2	0	0	0	0	77
2021-07-28 [06:00 PM-06:15 PM]	14	5	9	0	0	0	0	0	0	14
2021-07-28 [06:15 PM-06:30 PM]	16	8	8	0	0	0	0	0	0	16
2021-07-28 [06:30 PM-06:45 PM]	12	5	7	0	0	0	0	0	0	12
2021-07-28 [06:45 PM-07:00 PM]	15	7	8	0	0	0	0	0	0	15
	57	25	32	0	0	0	0	0	0	57
2021-07-28 [07:00 PM-07:15 PM]	13	6	6	0	1	0	0	0	0	13
2021-07-28 [07:15 PM-07:30 PM]	15	7	8	0	0	0	0	0	0	15
2021-07-28 [07:30 PM-07:45 PM]	9	3	6	0	0	0	0	0	0	9
2021-07-28 [07:45 PM-08:00 PM]	16	7	9	0	0	0	0	0	0	16
	53	23	29	0	1	0	0	0	0	53
2021-07-28 [08:00 PM-08:15 PM]	10	3	7	0	0	0	0	0	0	10
2021-07-28 [08:15 PM-08:30 PM]	5	2	3	0	0	0	0	0	0	5
2021-07-28 [08:30 PM-08:45 PM]	12	7	5	0	0	0	0	0	0	12
2021-07-28 [08:45 PM-09:00 PM]	6	2	4	0	0	0	0	0	0	6
	33	14	19	0	0	0	0	0	0	33

2021-07-28 [09:00 PM-09:15 PM]		4	1	3	0	0	0	0	0	0	4
2021-07-28 [09:15 PM-09:30 PM]		3	1	2	0	0	0	0	0	0	3
2021-07-28 [09:30 PM-09:45 PM]		3	2	1	0	0	0	0	0	0	3
2021-07-28 [09:45 PM-10:00 PM]		4	3	1	0	0	0	0	0	0	4
		14	7	7	0	0	0	0	0	0	14
2021-07-28 [10:00 PM-10:15 PM]		8	3	3	0	2	0	0	0	0	8
2021-07-28 [10:15 PM-10:30 PM]		1	0	1	0	0	0	0	0	0	1
2021-07-28 [10:30 PM-10:45 PM]		0	0	0	0	0	0	0	0	0	0
2021-07-28 [10:45 PM-11:00 PM]		2	0	2	0	0	0	0	0	0	2
		11	3	6	0	2	0	0	0	0	11
2021-07-28 [11:00 PM-11:15 PM]		6	3	3	0	0	0	0	0	0	6
2021-07-28 [11:15 PM-11:30 PM]		1	0	1	0	0	0	0	0	0	1
2021-07-28 [11:30 PM-11:45 PM]		1	0	1	0	0	0	0	0	0	1
2021-07-28 [11:45 PM-12:00 AM]		1	0	1	0	0	0	0	0	0	1
		9	3	6	0	0	0	0	0	0	9
Daily Totals:		1140	485	609	7	27	7	1	0	0	1136
Total Counted:	1140										
Total Classified:	1136	1140	485	609	7	27	7	1	0	0	1136
Total Unclassified:	4										
Report Percentages:			42.69%	53.61%	0.62%	2.38%	0.62%	0.09%	0.00%	0.00%	

Peak Time: (AM): 2021-07-28 [10:00 AM-10:15 AM] Peak Count: 27
Peak Time: (PM): 2021-07-28 [02:30 PM-02:45 PM] Peak Count: 31

Class/Volume Report Graph

HI-Star ID: 61B35	Begin: 2021-07-28 12:00 AM	End: 2021-07-29 12:00 AM
Street: 613 Helena St - SB	Lane: SB	Hours: 24:00
State: ON	Oper: MD	Period: 15
City: Fort Erie	Posted: 70	Raw Count: 1284
Area:	AADT Factor: 1	AADT Count: 1284

NC300 - Metres	0.0 to 4.9	5.0 to 8.4	8.5 to 9.9	10.0 to 12.9	13.0 to 15.9	16.0 to 18.9	19.0 to 22.4	22.5 >	Total
2021-07-28 [12:00 AM-12:15 AM]	4	2	2	0	0	0	0	0	4
2021-07-28 [12:15 AM-12:30 AM]	2	2	0	0	0	0	0	0	2
2021-07-28 [12:30 AM-12:45 AM]	1	1	0	0	0	0	0	0	1
2021-07-28 [12:45 AM-01:00 AM]	4	3	1	0	0	0	0	0	4
	11	8	3	0	0	0	0	0	11
2021-07-28 [01:00 AM-01:15 AM]	1	0	1	0	0	0	0	0	1
2021-07-28 [01:15 AM-01:30 AM]	1	1	0	0	0	0	0	0	1
2021-07-28 [01:30 AM-01:45 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [01:45 AM-02:00 AM]	0	0	0	0	0	0	0	0	0
	2	1	1	0	0	0	0	0	2
2021-07-28 [02:00 AM-02:15 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [02:15 AM-02:30 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [02:30 AM-02:45 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [02:45 AM-03:00 AM]	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
2021-07-28 [03:00 AM-03:15 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [03:15 AM-03:30 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [03:30 AM-03:45 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [03:45 AM-04:00 AM]	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0
2021-07-28 [04:00 AM-04:15 AM]	1	1	0	0	0	0	0	0	1
2021-07-28 [04:15 AM-04:30 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [04:30 AM-04:45 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [04:45 AM-05:00 AM]	0	0	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	0	1
2021-07-28 [05:00 AM-05:15 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [05:15 AM-05:30 AM]	1	0	1	0	0	0	0	0	1
2021-07-28 [05:30 AM-05:45 AM]	2	2	0	0	0	0	0	0	2
2021-07-28 [05:45 AM-06:00 AM]	2	2	0	0	0	0	0	0	2
	5	4	1	0	0	0	0	0	5
2021-07-28 [06:00 AM-06:15 AM]	3	1	2	0	0	0	0	0	3
2021-07-28 [06:15 AM-06:30 AM]	3	1	0	1	1	0	0	0	3
2021-07-28 [06:30 AM-06:45 AM]	0	0	0	0	0	0	0	0	0
2021-07-28 [06:45 AM-07:00 AM]	2	2	0	0	0	0	0	0	2
	8	4	2	1	1	0	0	0	8
2021-07-28 [07:00 AM-07:15 AM]	10	4	4	1	1	0	0	0	10
2021-07-28 [07:15 AM-07:30 AM]	8	4	4	0	0	0	0	0	8
2021-07-28 [07:30 AM-07:45 AM]	11	6	4	0	1	0	0	0	11
2021-07-28 [07:45 AM-08:00 AM]	10	5	4	0	0	1	0	0	10
	39	19	16	1	2	1	0	0	39
2021-07-28 [08:00 AM-08:15 AM]	10	7	2	0	1	0	0	0	10
2021-07-28 [08:15 AM-08:30 AM]	11	4	6	1	0	0	0	0	11
2021-07-28 [08:30 AM-08:45 AM]	10	6	3	0	0	1	0	0	10
2021-07-28 [08:45 AM-09:00 AM]	10	6	4	0	0	0	0	0	10
	41	23	15	1	1	1	0	0	41
2021-07-28 [09:00 AM-09:15 AM]	12	7	5	0	0	0	0	0	12
2021-07-28 [09:15 AM-09:30 AM]	16	7	9	0	0	0	0	0	16
2021-07-28 [09:30 AM-09:45 AM]	15	9	6	0	0	0	0	0	15
2021-07-28 [09:45 AM-10:00 AM]	21	10	8	1	2	0	0	0	21
	64	33	28	1	2	0	0	0	64

2021-07-28 [10:00 AM-10:15 AM]	11	5	5	0	1	0	0	0	0	11
2021-07-28 [10:15 AM-10:30 AM]	15	11	3	1	0	0	0	0	0	15
2021-07-28 [10:30 AM-10:45 AM]	26	14	11	0	1	0	0	0	0	26
2021-07-28 [10:45 AM-11:00 AM]	15	10	4	0	1	0	0	0	0	15
	67	40	23	1	3	0	0	0	0	67
2021-07-28 [11:00 AM-11:15 AM]	19	9	9	0	1	0	0	0	0	19
2021-07-28 [11:15 AM-11:30 AM]	34	21	10	1	1	0	1	0	0	34
2021-07-28 [11:30 AM-11:45 AM]	45	22	21	1	0	1	0	0	0	45
2021-07-28 [11:45 AM-12:00 PM]	37	15	18	1	3	0	0	0	0	37
	135	67	58	3	5	1	1	0	0	135
2021-07-28 [12:00 PM-12:15 PM]	28	11	13	2	1	0	0	1	0	28
2021-07-28 [12:15 PM-12:30 PM]	23	11	12	0	0	0	0	0	0	23
2021-07-28 [12:30 PM-12:45 PM]	22	8	10	1	2	1	0	0	0	22
2021-07-28 [12:45 PM-01:00 PM]	17	10	7	0	0	0	0	0	0	17
	90	40	42	3	3	1	0	1	0	90
2021-07-28 [01:00 PM-01:15 PM]	19	11	8	0	0	0	0	0	0	19
2021-07-28 [01:15 PM-01:30 PM]	24	15	7	1	1	0	0	0	0	24
2021-07-28 [01:30 PM-01:45 PM]	26	15	9	0	1	1	0	0	0	26
2021-07-28 [01:45 PM-02:00 PM]	29	19	9	0	1	0	0	0	0	29
	98	60	33	1	3	1	0	0	0	98
2021-07-28 [02:00 PM-02:15 PM]	17	11	6	0	0	0	0	0	0	17
2021-07-28 [02:15 PM-02:30 PM]	29	12	15	0	1	0	0	0	0	28
2021-07-28 [02:30 PM-02:45 PM]	25	7	18	0	0	0	0	0	0	25
2021-07-28 [02:45 PM-03:00 PM]	32	19	12	0	0	0	0	1	0	32
	103	49	51	0	1	0	0	1	0	102
2021-07-28 [03:00 PM-03:15 PM]	19	12	7	0	0	0	0	0	0	19
2021-07-28 [03:15 PM-03:30 PM]	27	15	12	0	0	0	0	0	0	27
2021-07-28 [03:30 PM-03:45 PM]	21	11	8	1	1	0	0	0	0	21
2021-07-28 [03:45 PM-04:00 PM]	41	27	14	0	0	0	0	0	0	41
	108	65	41	1	1	0	0	0	0	108
2021-07-28 [04:00 PM-04:15 PM]	34	22	11	0	1	0	0	0	0	34
2021-07-28 [04:15 PM-04:30 PM]	37	19	18	0	0	0	0	0	0	37
2021-07-28 [04:30 PM-04:45 PM]	24	11	13	0	0	0	0	0	0	24
2021-07-28 [04:45 PM-05:00 PM]	27	16	10	0	1	0	0	0	0	27
	122	68	52	0	2	0	0	0	0	122
2021-07-28 [05:00 PM-05:15 PM]	46	28	17	1	0	0	0	0	0	46
2021-07-28 [05:15 PM-05:30 PM]	32	23	9	0	0	0	0	0	0	32
2021-07-28 [05:30 PM-05:45 PM]	31	19	12	0	0	0	0	0	0	31
2021-07-28 [05:45 PM-06:00 PM]	28	15	13	0	0	0	0	0	0	28
	137	85	51	1	0	0	0	0	0	137
2021-07-28 [06:00 PM-06:15 PM]	17	8	9	0	0	0	0	0	0	17
2021-07-28 [06:15 PM-06:30 PM]	15	11	4	0	0	0	0	0	0	15
2021-07-28 [06:30 PM-06:45 PM]	17	11	6	0	0	0	0	0	0	17
2021-07-28 [06:45 PM-07:00 PM]	11	5	6	0	0	0	0	0	0	11
	60	35	25	0	0	0	0	0	0	60
2021-07-28 [07:00 PM-07:15 PM]	4	0	3	0	1	0	0	0	0	4
2021-07-28 [07:15 PM-07:30 PM]	19	9	10	0	0	0	0	0	0	19
2021-07-28 [07:30 PM-07:45 PM]	24	14	10	0	0	0	0	0	0	24
2021-07-28 [07:45 PM-08:00 PM]	15	8	6	0	1	0	0	0	0	15
	62	31	29	0	2	0	0	0	0	62
2021-07-28 [08:00 PM-08:15 PM]	12	9	3	0	0	0	0	0	0	12
2021-07-28 [08:15 PM-08:30 PM]	15	11	4	0	0	0	0	0	0	15
2021-07-28 [08:30 PM-08:45 PM]	17	8	9	0	0	0	0	0	0	17
2021-07-28 [08:45 PM-09:00 PM]	18	10	8	0	0	0	0	0	0	18
	62	38	24	0	0	0	0	0	0	62
2021-07-28 [09:00 PM-09:15 PM]	15	9	6	0	0	0	0	0	0	15
2021-07-28 [09:15 PM-09:30 PM]	8	6	2	0	0	0	0	0	0	8

2021-07-28 [09:30 PM-09:45 PM]		4	4	0	0	0	0	0	0	0	4
2021-07-28 [09:45 PM-10:00 PM]		3	1	2	0	0	0	0	0	0	3
		30	20	10	0	0	0	0	0	0	30
2021-07-28 [10:00 PM-10:15 PM]		9	5	4	0	0	0	0	0	0	9
2021-07-28 [10:15 PM-10:30 PM]		9	4	5	0	0	0	0	0	0	9
2021-07-28 [10:30 PM-10:45 PM]		6	4	2	0	0	0	0	0	0	6
2021-07-28 [10:45 PM-11:00 PM]		4	1	3	0	0	0	0	0	0	4
		28	14	14	0	0	0	0	0	0	28
2021-07-28 [11:00 PM-11:15 PM]		4	2	2	0	0	0	0	0	0	4
2021-07-28 [11:15 PM-11:30 PM]		2	2	0	0	0	0	0	0	0	2
2021-07-28 [11:30 PM-11:45 PM]		2	2	0	0	0	0	0	0	0	2
2021-07-28 [11:45 PM-12:00 AM]		3	2	1	0	0	0	0	0	0	3
		11	8	3	0	0	0	0	0	0	11
Daily Totals:		1284	713	522	14	26	5	1	2	0	1283
Total Counted:	1284										
Total Classified:	1283	1284	713	522	14	26	5	1	2	0	1283
Total Unclassified:	1										
Report Percentages:			55.57%	40.69%	1.09%	2.03%	0.39%	0.08%	0.16%	0.00%	

Peak Time: (AM): 2021-07-28 [11:30 AM-11:45 AM] Peak Count: 45
Peak Time: (PM): 2021-07-28 [05:00 PM-05:15 PM] Peak Count: 46

Time/Speed Report

HI-Star ID: 62F0A
Street: 613 Helena St - NB
State: ON
City: Fort Erie
Area:

Begin: 2021-07-28 12:00 AM
Lane: NB
Oper: MD
Posted: 70
AADT Factor: 1

End: 2021-07-29 12:00 AM
Hours: 24:00
Period: 15
Raw Count: 1140
AADT Count: 1140

NC300 - km/h	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 >	Total
2021-07-28 [12:00 AM-12:15 AM]	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2021-07-28 [12:15 AM-12:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [12:30 AM-12:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [12:45 AM-01:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2021-07-28 [01:00 AM-01:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [01:15 AM-01:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [01:30 AM-01:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [01:45 AM-02:00 AM]	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
2021-07-28 [02:00 AM-02:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [02:15 AM-02:30 AM]	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2021-07-28 [02:30 AM-02:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [02:45 AM-03:00 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2021-07-28 [03:00 AM-03:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [03:15 AM-03:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [03:30 AM-03:45 AM]	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
2021-07-28 [03:45 AM-04:00 AM]	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	0	0	0	0	1
2021-07-28 [04:00 AM-04:15 AM]	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
2021-07-28 [04:15 AM-04:30 AM]	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
2021-07-28 [04:30 AM-04:45 AM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2021-07-28 [04:45 AM-05:00 AM]	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
	0	0	0	0	1	1	2	1	1	0	0	0	0	0	0	6
2021-07-28 [05:00 AM-05:15 AM]	0	0	0	0	0	0	2	2	1	1	0	0	0	0	0	6
2021-07-28 [05:15 AM-05:30 AM]	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	3
2021-07-28 [05:30 AM-05:45 AM]	0	0	0	0	1	1	2	1	0	1	0	0	1	0	0	7
2021-07-28 [05:45 AM-06:00 AM]	0	0	0	0	2	1	1	1	1	0	1	0	0	0	0	7
	0	0	0	0	3	2	6	5	2	2	2	0	1	0	0	23
2021-07-28 [06:00 AM-06:15 AM]	0	0	0	0	0	1	2	2	3	1	0	1	0	0	0	10
2021-07-28 [06:15 AM-06:30 AM]	0	0	0	0	0	0	7	3	3	0	0	0	0	0	0	13
2021-07-28 [06:30 AM-06:45 AM]	0	0	0	0	0	0	1	6	2	5	0	0	1	0	0	15
2021-07-28 [06:45 AM-07:00 AM]	0	0	0	0	0	1	2	1	5	2	0	0	0	0	0	11
	0	0	0	0	0	2	12	12	13	8	0	1	1	0	0	49
2021-07-28 [07:00 AM-07:15 AM]	0	0	0	0	0	2	2	5	3	0	0	0	0	0	0	12
2021-07-28 [07:15 AM-07:30 AM]	0	0	1	0	0	0	5	8	3	0	0	0	0	0	0	17
2021-07-28 [07:30 AM-07:45 AM]	0	0	0	0	0	3	8	8	4	1	1	1	0	0	0	26
2021-07-28 [07:45 AM-08:00 AM]	0	0	0	0	0	1	10	10	3	0	0	0	0	0	0	24
	0	0	1	0	0	6	25	31	13	1	1	1	0	0	0	79
2021-07-28 [08:00 AM-08:15 AM]	0	0	0	0	0	0	7	8	4	3	0	0	0	0	0	22
2021-07-28 [08:15 AM-08:30 AM]	0	0	0	0	0	4	3	3	4	3	0	0	1	0	0	18
2021-07-28 [08:30 AM-08:45 AM]	0	0	0	0	0	2	2	6	3	3	0	0	0	0	0	16
2021-07-28 [08:45 AM-09:00 AM]	0	0	0	0	0	1	6	7	3	5	0	1	0	0	0	23
	0	0	0	0	0	7	18	24	14	14	0	1	1	0	0	79
2021-07-28 [09:00 AM-09:15 AM]	0	0	0	0	1	4	8	5	3	0	0	0	0	0	0	21
2021-07-28 [09:15 AM-09:30 AM]	0	0	0	0	0	3	6	8	8	0	0	1	0	0	0	26
2021-07-28 [09:30 AM-09:45 AM]	0	0	0	0	0	2	7	9	5	0	0	0	0	0	0	23
2021-07-28 [09:45 AM-10:00 AM]	0	0	0	0	1	3	11	2	1	0	1	0	0	0	0	19
	0	0	0	0	2	12	32	24	17	0	1	1	0	0	0	89
2021-07-28 [10:00 AM-10:15 AM]	0	0	0	0	0	4	11	5	5	1	1	0	0	0	0	27
2021-07-28 [10:15 AM-10:30 AM]	0	0	0	0	2	4	4	4	1	1	0	0	0	0	0	16
2021-07-28 [10:30 AM-10:45 AM]	0	0	0	0	2	4	11	7	1	1	0	0	0	0	0	26
2021-07-28 [10:45 AM-11:00 AM]	0	0	0	1	0	7	8	5	1	3	0	0	0	0	0	25
	0	0	0	1	4	19	34	21	8	6	1	0	0	0	0	94
2021-07-28 [11:00 AM-11:15 AM]	0	0	0	0	0	3	11	1	2	1	0	0	0	0	0	18
2021-07-28 [11:15 AM-11:30 AM]	0	0	0	0	0	2	4	3	0	2	0	0	0	0	0	11
2021-07-28 [11:30 AM-11:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [11:45 AM-12:00 PM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	5	15	4	2	3	0	0	0	0	0	29
2021-07-28 [12:00 PM-12:15 PM]	0	3	0	0	1	5	4	4	3	1	0	1	0	0	0	22
2021-07-28 [12:15 PM-12:30 PM]	0	0	0	0	0	4	5	6	1	0	1	0	0	0	0	17
2021-07-28 [12:30 PM-12:45 PM]	0	0	0	0	1	1	5	9	3	2	1	0	0	0	0	22
2021-07-28 [12:45 PM-01:00 PM]	0	0	0	0	0	2	3	9	2	1	0	1	1	0	0	19
	0	3	0	0	2	12	17	28	9	4	2	2	1	0	0	80
2021-07-28 [01:00 PM-01:15 PM]	0	0	0	1	0	1	9	7	4	1	0	0	0	0	0	23
2021-07-28 [01:15 PM-01:30 PM]	0	0	0	0	0	0	6	8	7	1	1	0	1	0	0	24
2021-07-28 [01:30 PM-01:45 PM]	0	0	0	0	3	4	5	3	1	3	0	0	0	0	0	19
2021-07-28 [01:45 PM-02:00 PM]	0	0	0	0	0	2	5	10	5	0	0	0	0	0	0	22
	0	0	0	1	3	7	25	28	17	5	1	0	1	0	0	88
2021-07-28 [02:00 PM-02:15 PM]	0	0	0	0	0	2	7	12	2	3	1	0	0	0	0	27
2021-07-28 [02:15 PM-02:30 PM]	0	0	0	0	0	0	5	4	5	3	0	0	0	0	0	17
2021-07-28 [02:30 PM-02:45 PM]	0	0	0	0	1	1	9	14	3	1	1	1	0	0	0	31
2021-07-28 [02:45 PM-03:00 PM]	0	0	0	0	0	2	7	12	4	1	0	0	0	0	0	26
	0	0	0	0	1	5	28	42	14	8	2	1	0	0	0	101

2021-07-28 [03:00 PM-03:15 PM]	0	0	0	1	0	1	4	6	3	0	0	0	0	0	0	15
2021-07-28 [03:15 PM-03:30 PM]	0	0	0	0	0	3	2	9	9	0	0	0	0	0	0	23
2021-07-28 [03:30 PM-03:45 PM]	0	0	1	0	0	3	9	7	5	1	0	0	0	0	0	26
2021-07-28 [03:45 PM-04:00 PM]	0	0	0	0	0	2	7	10	2	0	0	0	0	0	0	21
	0	0	1	1	0	9	22	32	19	1	0	0	0	0	0	85
2021-07-28 [04:00 PM-04:15 PM]	0	0	0	0	0	8	5	8	2	0	1	0	0	0	0	24
2021-07-28 [04:15 PM-04:30 PM]	0	0	0	0	0	1	5	6	5	1	0	0	1	0	0	19
2021-07-28 [04:30 PM-04:45 PM]	0	0	0	0	0	0	5	4	4	1	0	0	0	0	0	14
2021-07-28 [04:45 PM-05:00 PM]	0	0	0	0	1	1	5	8	4	1	0	0	0	0	0	20
	0	0	0	0	1	10	20	26	15	3	1	0	1	0	0	77
2021-07-28 [05:00 PM-05:15 PM]	0	0	0	0	0	1	7	8	5	1	0	0	0	0	0	22
2021-07-28 [05:15 PM-05:30 PM]	0	0	0	0	0	4	6	1	3	2	0	0	0	0	0	16
2021-07-28 [05:30 PM-05:45 PM]	0	0	0	0	0	0	2	8	1	2	0	0	0	0	0	13
2021-07-28 [05:45 PM-06:00 PM]	0	0	0	0	0	4	4	10	5	3	0	0	0	0	0	26
	0	0	0	0	0	9	19	27	14	8	0	0	0	0	0	77
2021-07-28 [06:00 PM-06:15 PM]	0	0	0	0	0	3	3	3	5	0	0	0	0	0	0	14
2021-07-28 [06:15 PM-06:30 PM]	0	0	0	0	0	1	5	7	3	0	0	0	0	0	0	16
2021-07-28 [06:30 PM-06:45 PM]	0	0	0	0	1	0	4	3	2	1	1	0	0	0	0	12
2021-07-28 [06:45 PM-07:00 PM]	0	0	0	0	0	1	4	6	3	1	0	0	0	0	0	15
	0	0	0	0	1	5	16	19	13	2	1	0	0	0	0	57
2021-07-28 [07:00 PM-07:15 PM]	0	0	0	0	0	0	3	4	3	2	0	0	1	0	0	13
2021-07-28 [07:15 PM-07:30 PM]	0	0	0	0	0	1	2	6	5	1	0	0	0	0	0	15
2021-07-28 [07:30 PM-07:45 PM]	0	0	0	0	0	0	1	2	3	2	1	0	0	0	0	9
2021-07-28 [07:45 PM-08:00 PM]	0	0	0	0	0	1	3	9	0	2	0	1	0	0	0	16
	0	0	0	0	0	2	9	21	11	7	1	1	1	0	0	53
2021-07-28 [08:00 PM-08:15 PM]	0	0	0	0	0	0	3	2	2	1	1	1	0	0	0	10
2021-07-28 [08:15 PM-08:30 PM]	0	0	0	0	0	0	1	3	0	1	0	0	0	0	0	5
2021-07-28 [08:30 PM-08:45 PM]	0	0	0	0	0	2	2	7	1	0	0	0	0	0	0	12
2021-07-28 [08:45 PM-09:00 PM]	0	0	0	0	0	0	2	4	0	0	0	0	0	0	0	6
	0	0	0	0	0	2	8	16	3	2	1	1	0	0	0	33
2021-07-28 [09:00 PM-09:15 PM]	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	4
2021-07-28 [09:15 PM-09:30 PM]	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	3
2021-07-28 [09:30 PM-09:45 PM]	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	3
2021-07-28 [09:45 PM-10:00 PM]	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	4
	0	0	0	0	0	2	6	3	2	1	0	0	0	0	0	14
2021-07-28 [10:00 PM-10:15 PM]	0	0	0	0	0	0	4	1	2	1	0	0	0	0	0	8
2021-07-28 [10:15 PM-10:30 PM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2021-07-28 [10:30 PM-10:45 PM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [10:45 PM-11:00 PM]	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
	0	0	0	0	0	0	5	3	2	1	0	0	0	0	0	11
2021-07-28 [11:00 PM-11:15 PM]	0	0	0	0	0	1	0	3	2	0	0	0	0	0	0	6
2021-07-28 [11:15 PM-11:30 PM]	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2021-07-28 [11:30 PM-11:45 PM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2021-07-28 [11:45 PM-12:00 AM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	0	0	0	0	0	1	2	4	2	0	0	0	0	0	0	9
Daily Totals:	0	3	2	3	18	118	321	373	191	76	15	9	7	0	0	1136
Report Totals:	0	3	2	3	18	118	321	373	191	76	15	9	7	0	0	1136
Report Percentages:	0.00%	0.26%	0.18%	0.26%	1.58%	10.39%	28.26%	32.83%	16.81%	6.69%	1.32%	0.79%	0.62%	0.00%	0.00%	

Time/Speed Report

HI-Star ID: 61B35
Street: 613 Helena St - SB
State: ON
City: Fort Erie
Area:

Begin: 2021-07-28 12:00 AM
Lane: SB
Oper: MD
Posted: 70
AADT Factor: 1

End: 2021-07-29 12:00 AM
Hours: 24:00
Period: 15
Raw Count: 1284
AADT Count: 1284

NC300 - km/h	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 109	110 to 119	120 to 129	130 to 139	140 >	Total
2021-07-28 [12:00 AM-12:15 AM]	0	0	0	0	0	1	0	0	2	1	0	0	0	0	0	4
2021-07-28 [12:15 AM-12:30 AM]	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	2
2021-07-28 [12:30 AM-12:45 AM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2021-07-28 [12:45 AM-01:00 AM]	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	4
	0	0	0	0	0	1	4	2	3	1	0	0	0	0	0	11
2021-07-28 [01:00 AM-01:15 AM]	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
2021-07-28 [01:15 AM-01:30 AM]	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
2021-07-28 [01:30 AM-01:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [01:45 AM-02:00 AM]	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	0	0	0	0	0	2
2021-07-28 [02:00 AM-02:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [02:15 AM-02:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [02:30 AM-02:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [02:45 AM-03:00 AM]	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
2021-07-28 [03:00 AM-03:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [03:15 AM-03:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [03:30 AM-03:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [03:45 AM-04:00 AM]	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
2021-07-28 [04:00 AM-04:15 AM]	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
2021-07-28 [04:15 AM-04:30 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [04:30 AM-04:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [04:45 AM-05:00 AM]	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	0	0	0	0	0	0	1
2021-07-28 [05:00 AM-05:15 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [05:15 AM-05:30 AM]	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
2021-07-28 [05:30 AM-05:45 AM]	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
2021-07-28 [05:45 AM-06:00 AM]	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
	0	0	0	0	0	1	0	2	2	0	0	0	0	0	0	5
2021-07-28 [06:00 AM-06:15 AM]	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	3
2021-07-28 [06:15 AM-06:30 AM]	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3
2021-07-28 [06:30 AM-06:45 AM]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2021-07-28 [06:45 AM-07:00 AM]	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
	0	0	0	0	0	0	0	5	3	0	0	0	0	0	0	8
2021-07-28 [07:00 AM-07:15 AM]	0	0	0	0	0	0	2	2	5	1	0	0	0	0	0	10
2021-07-28 [07:15 AM-07:30 AM]	0	0	0	0	0	0	1	3	2	1	1	0	0	0	0	8
2021-07-28 [07:30 AM-07:45 AM]	0	0	0	0	0	0	3	6	1	1	0	0	0	0	0	11
2021-07-28 [07:45 AM-08:00 AM]	0	0	0	0	0	1	0	3	5	1	0	0	0	0	0	10
	0	0	0	0	0	1	6	14	13	4	1	0	0	0	0	39
2021-07-28 [08:00 AM-08:15 AM]	0	0	0	0	0	0	2	3	4	0	1	0	0	0	0	10
2021-07-28 [08:15 AM-08:30 AM]	0	0	0	0	0	1	4	5	1	0	0	0	0	0	0	11
2021-07-28 [08:30 AM-08:45 AM]	0	0	0	0	0	1	2	7	0	0	0	0	0	0	0	10
2021-07-28 [08:45 AM-09:00 AM]	0	0	0	0	0	0	4	3	2	0	1	0	0	0	0	10
	0	0	0	0	0	2	12	18	7	0	2	0	0	0	0	41
2021-07-28 [09:00 AM-09:15 AM]	0	0	0	0	0	3	4	4	1	0	0	0	0	0	0	12
2021-07-28 [09:15 AM-09:30 AM]	0	0	0	0	0	6	4	5	0	1	0	0	0	0	0	16
2021-07-28 [09:30 AM-09:45 AM]	0	0	0	0	0	1	6	5	3	0	0	0	0	0	0	15
2021-07-28 [09:45 AM-10:00 AM]	0	0	0	0	0	1	2	13	3	2	0	0	0	0	0	21
	0	0	0	0	0	11	16	27	7	3	0	0	0	0	0	64
2021-07-28 [10:00 AM-10:15 AM]	0	0	0	0	0	1	3	6	1	0	0	0	0	0	0	11
2021-07-28 [10:15 AM-10:30 AM]	0	0	0	0	0	5	4	4	1	1	0	0	0	0	0	15
2021-07-28 [10:30 AM-10:45 AM]	0	0	0	0	1	4	5	8	5	1	2	0	0	0	0	26
2021-07-28 [10:45 AM-11:00 AM]	0	0	0	0	0	3	5	5	2	0	0	0	0	0	0	15
	0	0	0	0	1	13	17	23	9	2	2	0	0	0	0	67
2021-07-28 [11:00 AM-11:15 AM]	0	1	0	1	1	3	7	5	1	0	0	0	0	0	0	19
2021-07-28 [11:15 AM-11:30 AM]	0	0	0	0	0	4	15	8	6	1	0	0	0	0	0	34
2021-07-28 [11:30 AM-11:45 AM]	0	0	0	0	2	9	17	14	1	1	0	0	1	0	0	45
2021-07-28 [11:45 AM-12:00 PM]	0	0	0	0	1	4	13	16	3	0	0	0	0	0	0	37
	0	1	0	1	4	20	52	43	11	2	0	0	1	0	0	135
2021-07-28 [12:00 PM-12:15 PM]	0	0	0	0	0	0	6	12	6	3	1	0	0	0	0	28
2021-07-28 [12:15 PM-12:30 PM]	0	0	0	0	0	1	2	10	7	2	0	1	0	0	0	23
2021-07-28 [12:30 PM-12:45 PM]	0	0	1	0	4	7	4	4	1	0	0	1	0	0	0	22
2021-07-28 [12:45 PM-01:00 PM]	0	0	0	0	0	1	4	7	4	0	1	0	0	0	0	17
	0	0	1	0	4	9	16	33	18	5	2	2	0	0	0	90
2021-07-28 [01:00 PM-01:15 PM]	0	0	0	0	0	1	2	8	4	4	0	0	0	0	0	19
2021-07-28 [01:15 PM-01:30 PM]	0	0	0	0	0	0	12	8	1	1	2	0	0	0	0	24
2021-07-28 [01:30 PM-01:45 PM]	0	0	0	0	0	0	7	13	2	3	1	0	0	0	0	26
2021-07-28 [01:45 PM-02:00 PM]	0	0	0	0	0	5	7	10	4	2	1	0	0	0	0	29
	0	0	0	0	0	6	28	39	11	10	4	0	0	0	0	98
2021-07-28 [02:00 PM-02:15 PM]	0	0	0	0	0	0	6	8	1	1	1	0	0	0	0	17
2021-07-28 [02:15 PM-02:30 PM]	0	0	0	0	0	1	10	11	3	3	0	0	0	0	0	28
2021-07-28 [02:30 PM-02:45 PM]	0	0	0	0	0	1	6	8	6	3	1	0	0	0	0	25
2021-07-28 [02:45 PM-03:00 PM]	0	0	0	0	0	4	12	12	2	1	1	0	0	0	0	32
	0	0	0	0	0	6	34	39	12	8	3	0	0	0	0	102

2021-07-28 [03:00 PM-03:15 PM]	0	0	0	0	0	0	3	8	7	1	0	0	0	0	0	19
2021-07-28 [03:15 PM-03:30 PM]	0	0	0	0	0	3	5	14	3	0	1	0	1	0	0	27
2021-07-28 [03:30 PM-03:45 PM]	0	0	0	0	0	2	8	7	3	1	0	0	0	0	0	21
2021-07-28 [03:45 PM-04:00 PM]	0	0	0	0	1	2	7	23	5	0	2	1	0	0	0	41
	0	0	0	0	1	7	23	52	18	2	3	1	1	0	0	108
2021-07-28 [04:00 PM-04:15 PM]	0	1	2	0	0	4	14	12	0	1	0	0	0	0	0	34
2021-07-28 [04:15 PM-04:30 PM]	0	0	0	0	0	1	10	15	9	2	0	0	0	0	0	37
2021-07-28 [04:30 PM-04:45 PM]	0	0	0	0	0	0	7	7	7	1	2	0	0	0	0	24
2021-07-28 [04:45 PM-05:00 PM]	0	0	0	0	0	0	8	11	5	1	2	0	0	0	0	27
	0	1	2	0	0	5	39	45	21	5	4	0	0	0	0	122
2021-07-28 [05:00 PM-05:15 PM]	0	0	0	0	0	1	13	21	9	2	0	0	0	0	0	46
2021-07-28 [05:15 PM-05:30 PM]	0	0	0	0	0	2	11	16	1	2	0	0	0	0	0	32
2021-07-28 [05:30 PM-05:45 PM]	0	0	0	0	0	1	8	11	3	8	0	0	0	0	0	31
2021-07-28 [05:45 PM-06:00 PM]	0	0	0	0	1	3	8	9	4	3	0	0	0	0	0	28
	0	0	0	0	1	7	40	57	17	15	0	0	0	0	0	137
2021-07-28 [06:00 PM-06:15 PM]	0	0	0	0	0	1	3	8	4	1	0	0	0	0	0	17
2021-07-28 [06:15 PM-06:30 PM]	0	0	0	0	0	2	4	6	2	1	0	0	0	0	0	15
2021-07-28 [06:30 PM-06:45 PM]	0	0	0	0	0	1	3	9	1	2	1	0	0	0	0	17
2021-07-28 [06:45 PM-07:00 PM]	0	0	0	1	0	0	2	4	3	0	1	0	0	0	0	11
	0	0	0	1	0	4	12	27	10	4	2	0	0	0	0	60
2021-07-28 [07:00 PM-07:15 PM]	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	4
2021-07-28 [07:15 PM-07:30 PM]	0	0	0	0	0	2	5	7	3	1	1	0	0	0	0	19
2021-07-28 [07:30 PM-07:45 PM]	0	0	0	0	0	1	10	7	2	4	0	0	0	0	0	24
2021-07-28 [07:45 PM-08:00 PM]	0	0	0	0	0	0	5	7	2	1	0	0	0	0	0	15
	0	0	0	0	0	3	20	23	9	6	1	0	0	0	0	62
2021-07-28 [08:00 PM-08:15 PM]	0	0	0	0	1	0	9	0	2	0	0	0	0	0	0	12
2021-07-28 [08:15 PM-08:30 PM]	0	0	0	0	0	3	6	3	0	2	1	0	0	0	0	15
2021-07-28 [08:30 PM-08:45 PM]	0	0	0	0	0	1	4	9	2	1	0	0	0	0	0	17
2021-07-28 [08:45 PM-09:00 PM]	0	0	0	0	0	1	3	6	5	3	0	0	0	0	0	18
	0	0	0	0	1	5	22	18	9	6	1	0	0	0	0	62
2021-07-28 [09:00 PM-09:15 PM]	0	0	0	0	0	0	5	4	2	4	0	0	0	0	0	15
2021-07-28 [09:15 PM-09:30 PM]	0	0	0	0	0	1	1	4	1	1	0	0	0	0	0	8
2021-07-28 [09:30 PM-09:45 PM]	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	4
2021-07-28 [09:45 PM-10:00 PM]	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	3
	0	0	0	0	0	1	7	13	3	5	1	0	0	0	0	30
2021-07-28 [10:00 PM-10:15 PM]	0	0	0	0	0	1	0	6	2	0	0	0	0	0	0	9
2021-07-28 [10:15 PM-10:30 PM]	0	0	0	0	0	0	3	2	2	2	0	0	0	0	0	9
2021-07-28 [10:30 PM-10:45 PM]	0	0	0	0	0	2	0	3	1	0	0	0	0	0	0	6
2021-07-28 [10:45 PM-11:00 PM]	0	0	0	0	0	0	1	0	1	1	1	0	0	0	0	4
	0	0	0	0	0	3	4	11	6	3	1	0	0	0	0	28
2021-07-28 [11:00 PM-11:15 PM]	0	0	0	0	0	0	1	0	2	0	0	0	1	0	0	4
2021-07-28 [11:15 PM-11:30 PM]	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
2021-07-28 [11:30 PM-11:45 PM]	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
2021-07-28 [11:45 PM-12:00 AM]	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	3
	0	0	0	0	0	0	2	2	5	1	0	0	1	0	0	11
Daily Totals:	0	2	3	2	12	105	355	494	195	82	27	3	3	0	0	1283
Report Totals:	0	2	3	2	12	105	355	494	195	82	27	3	3	0	0	1283
Report Percentages:	0.00%	0.16%	0.23%	0.16%	0.94%	8.18%	27.67%	38.50%	15.20%	6.39%	2.10%	0.23%	0.23%	0.00%	0.00%	

Appendix C

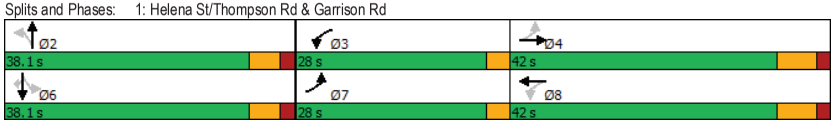
Base Year Traffic Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	229	354	24	7	240	53	57	91	13	66	49	176
Future Volume (vph)	229	354	24	7	240	53	57	91	13	66	49	176
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	120.0		0.0	110.0		0.0	35.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.991			0.973			0.981				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1554	3164	0	1662	3111	0	1446	2972	0	1568	2703	1377
Flt Permitted	0.432			0.511			0.721			0.681		
Satd. Flow (perm)	707	3164	0	894	3111	0	1097	2972	0	1124	2703	1377
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			27			14				191
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		228.1			304.7			100.2			351.7	
Travel Time (s)		13.7			18.3			5.2			18.1	
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 (%)	7%	3%	21%	0%	4%	4%	15%	10%	8%	6%	23%	8%
Adj. Flow (vph)	249	385	26	8	261	58	62	99	14	72	53	191
Shared Lane Traffic (%)												
Lane Group Flow (vph)	249	411	0	8	319	0	62	113	0	72	53	191
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	9.0	39.0		9.0	39.0		38.1	38.1		38.1	38.1	38.1
Total Split (s)	28.0	42.0		28.0	42.0		38.1	38.1		38.1	38.1	38.1
Total Split (%)	25.9%	38.9%		25.9%	38.9%		35.2%	35.2%		35.2%	35.2%	35.2%
Yellow Time (s)	3.0	5.0		3.0	5.0		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	0.0	2.0		0.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	1.0	-3.0		1.0	-3.0		-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		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	30.1	28.6		20.2	15.1		12.7	12.7		12.7	12.7	12.7
Actuated g/C Ratio	0.59	0.56		0.40	0.30		0.25	0.25		0.25	0.25	0.25
v/c Ratio	0.41	0.23		0.02	0.34		0.23	0.15		0.26	0.08	0.39
Control Delay	7.2	6.5		5.7	14.5		19.7	15.5		20.1	16.9	6.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	7.2	6.5		5.7	14.5		19.7	15.5		20.1	16.9	6.4
LOS	A	A		A	B		B	B		C	B	A
Approach Delay		6.8			14.3			17.0			11.3	
Approach LOS		A			B			B			B	
Queue Length 50th (m)	9.3	7.6		0.4	11.0		4.6	3.7		5.4	2.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	20.2	21.9		1.5	23.0		15.0	10.5		16.9	6.5	13.8
Internal Link Dist (m)		204.1			280.7			76.2			327.7	
Turn Bay Length (m)	120.0			110.0			35.0			70.0		
Base Capacity (vph)	823	2393		895	2358		744	2020		762	1833	995
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.30	0.17		0.01	0.14		0.08	0.06		0.09	0.03	0.19

Intersection Summary			
Area Type:	Other		
Cycle Length: 108.1			
Actuated Cycle Length: 50.9			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 10.6		Intersection LOS: B	
Intersection Capacity Utilization 43.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Helena St/Thompson Rd & Garrison Rd

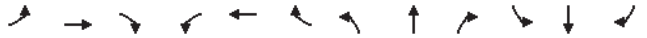


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	229	354	24	7	240	53	57	91	13	66	49	176
Future Volume (vph)	229	354	24	7	240	53	57	91	13	66	49	176
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1554	3163		1662	3110		1446	2973		1568	2703	1377
Flt Permitted	0.43	1.00		0.51	1.00		0.72	1.00		0.68	1.00	1.00
Satd. Flow (perm)	707	3163		894	3110		1097	2973		1124	2703	1377
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)	249	385	26	8	261	58	62	99	14	72	53	191
RTOR Reduction (vph)	0	3	0	0	18	0	0	11	0	0	0	145
Lane Group Flow (vph)	249	408	0	8	301	0	62	102	0	72	53	46
Heavy Vehicles (%)	7%	3%	21%	0%	4%	4%	15%	10%	8%	6%	23%	8%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	29.6	25.6		15.7	14.7		10.6	10.6		10.6	10.6	10.6
Effective Green, g (s)	28.6	28.6		13.7	17.7		12.7	12.7		12.7	12.7	12.7
Actuated g/C Ratio	0.54	0.54		0.26	0.33		0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	3.0	7.0		3.0	7.0		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	2.5	5.0		2.5	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	552	1697		229	1032		261	708		267	644	328
v/s Ratio Prot	c0.09	0.13			0.10			0.03			0.02	
v/s Ratio Perm	c0.15			0.01			0.06			c0.06		0.03
v/c Ratio	0.45	0.24		0.03	0.29		0.24	0.14		0.27	0.08	0.14
Uniform Delay, d1	7.0	6.6		14.8	13.2		16.4	16.0		16.5	15.8	16.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2		0.0	0.3		0.5	0.1		0.5	0.1	0.2
Delay (s)	7.4	6.7		14.9	13.5		16.9	16.1		17.1	15.8	16.2
Level of Service	A	A		B	B		B	B		B	B	B
Approach Delay (s)		7.0			13.5			16.4			16.3	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.39			
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	43.4%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	21	0	4	18	43	3	39	2	12	13	4
Future Volume (vph)	25	21	0	4	18	43	3	39	2	12	13	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
Frt					0.911			0.994			0.983	
Flt Protected		0.974			0.997			0.997			0.979	
Satd. Flow (prot)	0	1666	0	0	1494	0	0	1663	0	0	1580	0
Flt Permitted		0.974			0.997			0.997			0.979	
Satd. Flow (perm)	0	1666	0	0	1494	0	0	1663	0	0	1580	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		238.9			355.9			223.0			459.6	
Travel Time (s)		17.2			25.6			16.1			33.1	
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%	5%	0%	25%	6%	5%	67%	0%	0%	8%	0%	25%
Adj. Flow (vph)	27	23	0	4	20	47	3	42	2	13	14	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	50	0	0	71	0	0	47	0	0	31	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	21.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	25	21	0	4	18	43	3	39	2	12	13	4
Future Volume (vph)	25	21	0	4	18	43	3	39	2	12	13	4
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)	27	23	0	4	20	47	3	42	2	13	14	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	50	71	47	31
Volume Left (vph)	27	4	3	13
Volume Right (vph)	0	47	2	4
Hadj (s)	0.15	-0.28	0.06	0.12
Departure Headway (s)	4.3	3.8	4.2	4.3
Degree Utilization, x	0.06	0.08	0.06	0.04
Capacity (veh/h)	817	911	814	805
Control Delay (s)	7.6	7.2	7.5	7.5
Approach Delay (s)	7.6	7.2	7.5	7.5
Approach LOS	A	A	A	A

Intersection Summary					
Delay			7.4		
Level of Service			A		
Intersection Capacity Utilization			21.9%	ICU Level of Service	A
Analysis Period (min)			15		

Intersection: 1: Helena St/Thompson Rd & Garrison Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (m)	41.7	27.0	26.8	9.4	37.1	29.2	30.7	23.4	22.2	31.7	24.5	3.0
Average Queue (m)	21.1	13.3	10.4	1.3	18.5	10.5	11.9	8.0	8.5	10.9	8.0	0.1
95th Queue (m)	36.5	24.1	21.7	6.3	31.6	21.7	25.6	18.7	18.6	23.7	20.8	2.1
Link Distance (m)		212.3	212.3		289.8	289.8		77.0	77.0		335.9	335.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	120.0			110.0			35.0			70.0		
Storage Blk Time (%)							0	0				
Queuing Penalty (veh)							0	0				

Intersection: 2: Helena St & Washington Rd/Albany St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	16.2	14.1	11.9	9.9
Average Queue (m)	5.7	6.5	2.5	1.9
95th Queue (m)	12.0	12.0	7.1	6.8
Link Distance (m)	220.5	337.5	204.6	434.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	456	39	33	512	126	38	65	31	157	101	282
Future Volume (vph)	144	456	39	33	512	126	38	65	31	157	101	282
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	120.0		0.0	110.0		0.0	35.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00					0.99
Frt		0.988			0.970			0.951				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1568	3217	0	1662	3179	0	1662	3039	0	1646	3137	1390
Flt Permitted	0.247			0.452			0.682			0.686		
Satd. Flow (perm)	408	3217	0	791	3179	0	1192	3039	0	1189	3137	1372
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			31			34				307
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		228.1			304.7			100.2			351.7	
Travel Time (s)		13.7			18.3			5.2			18.1	
Confl. Peds. (#/hr)	1		1	1		1	1					1
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 (%)	6%	2%	2%	0%	1%	2%	0%	6%	0%	1%	6%	7%
Adj. Flow (vph)	157	496	42	36	557	137	41	71	34	171	110	307
Shared Lane Traffic (%)												
Lane Group Flow (vph)	157	538	0	36	694	0	41	105	0	171	110	307
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	9.0	39.0		9.0	39.0		38.1	38.1		38.1	38.1	38.1
Total Split (s)	28.0	42.0		28.0	42.0		38.1	38.1		38.1	38.1	38.1
Total Split (%)	25.9%	38.9%		25.9%	38.9%		35.2%	35.2%		35.2%	35.2%	35.2%
Yellow Time (s)	3.0	5.0		3.0	5.0		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	0.0	2.0		0.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	1.0	-3.0		1.0	-3.0		-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		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	39.7	36.7		31.3	25.9		18.3	18.3		18.3	18.3	18.3
Actuated g/C Ratio	0.60	0.55		0.47	0.39		0.28	0.28		0.28	0.28	0.28
v/c Ratio	0.38	0.30		0.08	0.55		0.13	0.12		0.52	0.13	0.51
Control Delay	9.4	9.9		7.6	17.7		21.6	15.0		29.0	20.4	6.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	9.4	9.9		7.6	17.7		21.6	15.0		29.0	20.4	6.4
LOS	A	A		A	B		C	B		C	C	A
Approach Delay		9.8			17.2			16.9			15.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			B			B			B	
Queue Length 50th (m)	7.4	14.1		1.6	32.3		3.8	3.4		17.9	5.3	0.0
Queue Length 95th (m)	20.4	40.8		6.2	64.7		13.3	11.0		45.6	14.0	18.7
Internal Link Dist (m)		204.1			280.7			76.2			327.7	
Turn Bay Length (m)	120.0			110.0			35.0			70.0		
Base Capacity (vph)	685	1999		804	1927		644	1658		642	1695	882
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.23	0.27		0.04	0.36		0.06	0.06		0.27	0.06	0.35

Intersection Summary			
Area Type:	Other		
Cycle Length: 108.1			
Actuated Cycle Length: 66.4			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 14.4		Intersection LOS: B	
Intersection Capacity Utilization 57.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Helena St/Thompson Rd & Garrison Rd

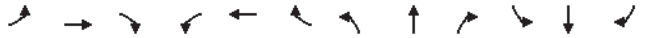
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	456	39	33	512	126	38	65	31	157	101	282
Future Volume (vph)	144	456	39	33	512	126	38	65	31	157	101	282
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1568	3218		1662	3180		1662	3040		1646	3137	1373
Flt Permitted	0.25	1.00		0.45	1.00		0.68	1.00		0.69	1.00	1.00
Satd. Flow (perm)	408	3218		790	3180		1194	3040		1188	3137	1373
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)	157	496	42	36	557	137	41	71	34	171	110	307
RTOR Reduction (vph)	0	4	0	0	18	0	0	25	0	0	0	225
Lane Group Flow (vph)	157	534	0	36	676	0	41	80	0	171	110	82
Confl. Peds. (#/hr)	1		1	1		1	1					1
Heavy Vehicles (%)	6%	2%	2%	0%	1%	2%	0%	6%	0%	1%	6%	7%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	38.6	33.5		27.0	24.9		16.0	16.0		16.0	16.0	16.0
Effective Green, g (s)	37.6	36.5		25.0	27.9		18.1	18.1		18.1	18.1	18.1
Actuated g/C Ratio	0.56	0.54		0.37	0.41		0.27	0.27		0.27	0.27	0.27
Clearance Time (s)	3.0	7.0		3.0	7.0		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	2.5	5.0		2.5	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	392	1734		305	1310		319	812		317	838	367
v/s Ratio Prot	c0.06	0.17		0.00	c0.21			0.03			0.04	
v/s Ratio Perm	0.16			0.04			0.03			c0.14		0.06
v/c Ratio	0.40	0.31		0.12	0.52		0.13	0.10		0.54	0.13	0.22
Uniform Delay, d1	8.4	8.6		13.8	14.9		18.8	18.7		21.2	18.8	19.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2		0.1	0.7		0.2	0.1		1.8	0.1	0.3
Delay (s)	8.9	8.8		13.9	15.5		19.0	18.7		23.0	18.9	19.6
Level of Service	A	A		B	B		B	B		C	B	B
Approach Delay (s)		8.9			15.5			18.8			20.5	
Approach LOS		A			B			B			C	

Intersection Summary				
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.51			
Actuated Cycle Length (s)	67.7	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	57.6%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	36	0	2	48	23	0	14	4	45	38	23
Future Volume (vph)	26	36	0	2	48	23	0	14	4	45	38	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
Frt					0.957			0.972			0.971	
Flt Protected		0.980			0.999						0.979	
Satd. Flow (prot)	0	1686	0	0	1631	0	0	1535	0	0	1646	0
Flt Permitted		0.980			0.999						0.979	
Satd. Flow (perm)	0	1686	0	0	1631	0	0	1535	0	0	1646	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		238.9			355.9			223.0			459.6	
Travel Time (s)		17.2			25.6			16.1			33.1	
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%	3%	0%	50%	2%	0%	0%	7%	25%	0%	3%	0%
Adj. Flow (vph)	28	39	0	2	52	25	0	15	4	49	41	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	67	0	0	79	0	0	19	0	0	115	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.0%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	26	36	0	2	48	23	0	14	4	45	38	23
Future Volume (vph)	26	36	0	2	48	23	0	14	4	45	38	23
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)	28	39	0	2	52	25	0	15	4	49	41	25

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	67	79	19	115
Volume Left (vph)	28	2	0	49
Volume Right (vph)	0	25	4	25
Hadj (s)	0.11	-0.14	0.06	-0.03
Departure Headway (s)	4.4	4.1	4.4	4.2
Degree Utilization, x	0.08	0.09	0.02	0.13
Capacity (veh/h)	788	838	776	824
Control Delay (s)	7.8	7.5	7.5	7.9
Approach Delay (s)	7.8	7.5	7.5	7.9
Approach LOS	A	A	A	A

Intersection Summary					
Delay			7.7		
Level of Service			A		
Intersection Capacity Utilization			30.0%	ICU Level of Service	A
Analysis Period (min)			15		

Intersection: 1: Helena St/Thompson Rd & Garrison Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (m)	37.4	43.5	36.1	15.2	58.2	51.7	22.0	20.0	23.1	46.5	37.1	14.2
Average Queue (m)	17.5	19.5	13.4	5.3	29.9	22.4	8.2	6.8	9.1	22.6	14.1	1.1
95th Queue (m)	30.7	34.8	26.8	13.2	48.4	41.6	18.9	15.8	18.9	39.1	28.7	7.7
Link Distance (m)		212.3	212.3		289.8	289.8		77.0	77.0		335.9	335.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	120.0			110.0			35.0			70.0		
Storage Blk Time (%)							0					
Queuing Penalty (veh)							0					

Intersection: 2: Helena St & Washington Rd/Albany St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	12.7	16.5	9.2	13.1
Average Queue (m)	6.5	7.6	1.4	4.7
95th Queue (m)	11.2	13.2	5.4	10.9
Link Distance (m)	220.5	337.5	204.6	434.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Appendix D

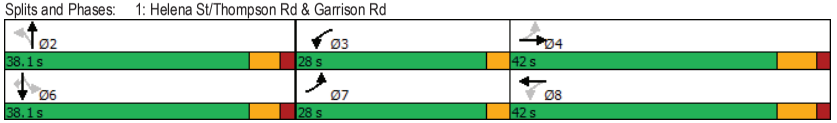
Background Traffic Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	376	26	7	255	56	60	97	14	70	52	187
Future Volume (vph)	244	376	26	7	255	56	60	97	14	70	52	187
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	120.0		0.0	110.0		0.0	35.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.990			0.973			0.981				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1554	3160	0	1662	3111	0	1446	2972	0	1568	2703	1377
Flt Permitted	0.426			0.498			0.718			0.676		
Satd. Flow (perm)	697	3160	0	872	3111	0	1093	2972	0	1116	2703	1377
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			27			15				203
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		228.1			304.7			100.2			351.7	
Travel Time (s)		13.7			18.3			5.2			18.1	
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 (%)	7%	3%	21%	0%	4%	4%	15%	10%	8%	6%	23%	8%
Adj. Flow (vph)	265	409	28	8	277	61	65	105	15	76	57	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	265	437	0	8	338	0	65	120	0	76	57	203
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	9.0	39.0		9.0	39.0		38.1	38.1		38.1	38.1	38.1
Total Split (s)	28.0	42.0		28.0	42.0		38.1	38.1		38.1	38.1	38.1
Total Split (%)	25.9%	38.9%		25.9%	38.9%		35.2%	35.2%		35.2%	35.2%	35.2%
Yellow Time (s)	3.0	5.0		3.0	5.0		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	0.0	2.0		0.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	1.0	-3.0		1.0	-3.0		-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		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	31.2	29.7		20.6	15.5		12.9	12.9		12.9	12.9	12.9
Actuated g/C Ratio	0.60	0.57		0.39	0.30		0.25	0.25		0.25	0.25	0.25
v/c Ratio	0.44	0.24		0.02	0.36		0.24	0.16		0.28	0.09	0.41
Control Delay	7.4	6.5		6.0	15.2		20.6	16.2		21.1	17.6	6.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	7.4	6.5		6.0	15.2		20.6	16.2		21.1	17.6	6.5
LOS	A	A		A	B		C	B		C	B	A
Approach Delay		6.9			14.9			17.7			11.7	
Approach LOS		A			B			B			B	
Queue Length 50th (m)	10.0	8.2		0.4	12.0		5.0	4.1		5.9	2.2	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	22.1	23.6		1.5	25.2		16.2	11.4		18.4	7.0	14.4
Internal Link Dist (m)		204.1			280.7			76.2			327.7	
Turn Bay Length (m)	120.0			110.0			35.0			70.0		
Base Capacity (vph)	817	2337		890	2307		725	1976		740	1793	981
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.32	0.19		0.01	0.15		0.09	0.06		0.10	0.03	0.21

Intersection Summary			
Area Type:	Other		
Cycle Length: 108.1			
Actuated Cycle Length: 52.2			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 11.0		Intersection LOS: B	
Intersection Capacity Utilization 45.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Helena St/Thompson Rd & Garrison Rd

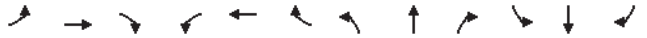


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	376	26	7	255	56	60	97	14	70	52	187
Future Volume (vph)	244	376	26	7	255	56	60	97	14	70	52	187
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1554	3162		1662	3111		1446	2973		1568	2703	1377
Flt Permitted	0.43	1.00		0.50	1.00		0.72	1.00		0.68	1.00	1.00
Satd. Flow (perm)	697	3162		872	3111		1092	2973		1116	2703	1377
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)	265	409	28	8	277	61	65	105	15	76	57	203
RTOR Reduction (vph)	0	3	0	0	18	0	0	11	0	0	0	155
Lane Group Flow (vph)	265	434	0	8	320	0	65	109	0	76	57	48
Heavy Vehicles (%)	7%	3%	21%	0%	4%	4%	15%	10%	8%	6%	23%	8%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	30.7	26.7		16.0	15.0		10.7	10.7		10.7	10.7	10.7
Effective Green, g (s)	29.7	29.7		14.0	18.0		12.8	12.8		12.8	12.8	12.8
Actuated g/C Ratio	0.54	0.54		0.26	0.33		0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	3.0	7.0		3.0	7.0		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	2.5	5.0		2.5	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	563	1723		224	1027		256	698		262	634	323
v/s Ratio Prot	c0.10	0.14			0.10			0.04			0.02	
v/s Ratio Perm	c0.16			0.01			0.06			c0.07		0.03
v/c Ratio	0.47	0.25		0.04	0.31		0.25	0.16		0.29	0.09	0.15
Uniform Delay, d1	7.0	6.5		15.2	13.6		17.0	16.6		17.1	16.3	16.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2		0.0	0.4		0.5	0.1		0.6	0.1	0.2
Delay (s)	7.5	6.7		15.2	14.0		17.5	16.7		17.7	16.4	16.7
Level of Service	A	A		B	B		B	B		B	B	B
Approach Delay (s)		7.0			14.0			17.0			16.9	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	11.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.41			
Actuated Cycle Length (s)	54.5	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	45.1%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	22	0	4	18	45	3	40	2	13	14	4
Future Volume (vph)	26	22	0	4	18	45	3	40	2	13	14	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
Frt					0.909			0.994			0.984	
Flt Protected		0.974			0.997			0.997			0.979	
Satd. Flow (prot)	0	1666	0	0	1491	0	0	1665	0	0	1584	0
Flt Permitted		0.974			0.997			0.997			0.979	
Satd. Flow (perm)	0	1666	0	0	1491	0	0	1665	0	0	1584	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		238.9			355.9			223.0			459.6	
Travel Time (s)		17.2			25.6			16.1			33.1	
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%	5%	0%	25%	6%	5%	67%	0%	0%	8%	0%	25%
Adj. Flow (vph)	28	24	0	4	20	49	3	43	2	14	15	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	52	0	0	73	0	0	48	0	0	33	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	26	22	0	4	18	45	3	40	2	13	14	4
Future Volume (vph)	26	22	0	4	18	45	3	40	2	13	14	4
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)	28	24	0	4	20	49	3	43	2	14	15	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	52	73	48	33
Volume Left (vph)	28	4	3	14
Volume Right (vph)	0	49	2	4
Hadj (s)	0.15	-0.28	0.06	0.12
Departure Headway (s)	4.3	3.9	4.3	4.3
Degree Utilization, x	0.06	0.08	0.06	0.04
Capacity (veh/h)	815	909	811	802
Control Delay (s)	7.6	7.2	7.5	7.5
Approach Delay (s)	7.6	7.2	7.5	7.5
Approach LOS	A	A	A	A

Intersection Summary					
Delay			7.4		
Level of Service			A		
Intersection Capacity Utilization			22.5%	ICU Level of Service	A
Analysis Period (min)			15		

Intersection: 1: Helena St/Thompson Rd & Garrison Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (m)	45.8	28.3	26.3	9.0	39.9	29.6	29.6	26.4	24.1	27.8	26.6	3.0
Average Queue (m)	21.5	13.0	10.7	1.2	19.9	11.4	10.8	8.2	9.1	11.7	9.1	0.1
95th Queue (m)	36.8	24.3	21.5	6.1	33.9	22.8	23.5	19.5	19.8	23.6	21.1	2.1
Link Distance (m)		212.3	212.3		289.8	289.8		77.0	77.0		335.9	335.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	120.0			110.0			35.0			70.0		
Storage Blk Time (%)							0	0				
Queuing Penalty (veh)							0	0				

Intersection: 2: Helena St & Washington Rd/Albany St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	12.7	18.7	11.4	12.7
Average Queue (m)	5.9	6.9	2.5	2.0
95th Queue (m)	11.6	13.8	7.0	6.7
Link Distance (m)	220.5	337.5	204.6	434.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	484	41	35	544	134	40	69	33	166	108	300
Future Volume (vph)	153	484	41	35	544	134	40	69	33	166	108	300
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	120.0		0.0	110.0		0.0	35.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00					0.99
Frt		0.988			0.970			0.951				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1568	3217	0	1662	3179	0	1662	3039	0	1646	3137	1390
Flt Permitted	0.226			0.437			0.678			0.682		
Satd. Flow (perm)	373	3217	0	764	3179	0	1185	3039	0	1182	3137	1372
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			31			36				326
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		228.1			304.7			100.2			351.7	
Travel Time (s)		13.7			18.3			5.2			18.1	
Confl. Peds. (#/hr)	1		1	1		1	1					1
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 (%)	6%	2%	2%	0%	1%	2%	0%	6%	0%	1%	6%	7%
Adj. Flow (vph)	166	526	45	38	591	146	43	75	36	180	117	326
Shared Lane Traffic (%)												
Lane Group Flow (vph)	166	571	0	38	737	0	43	111	0	180	117	326
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	9.0	39.0		9.0	39.0		38.1	38.1		38.1	38.1	38.1
Total Split (s)	28.0	42.0		28.0	42.0		38.1	38.1		38.1	38.1	38.1
Total Split (%)	25.9%	38.9%		25.9%	38.9%		35.2%	35.2%		35.2%	35.2%	35.2%
Yellow Time (s)	3.0	5.0		3.0	5.0		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	0.0	2.0		0.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	1.0	-3.0		1.0	-3.0		-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		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	41.5	36.5		32.7	27.3		19.1	19.1		19.1	19.1	19.1
Actuated g/C Ratio	0.60	0.53		0.47	0.40		0.28	0.28		0.28	0.28	0.28
v/c Ratio	0.42	0.33		0.09	0.58		0.13	0.13		0.55	0.13	0.53
Control Delay	10.3	11.4		7.9	18.6		22.2	15.4		30.5	21.0	6.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	10.3	11.4		7.9	18.6		22.2	15.4		30.5	21.0	6.5
LOS	B	B		A	B		C	B		C	C	A
Approach Delay		11.1			18.1			17.3			16.1	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			B	
Queue Length 50th (m)	8.4	23.2		1.8	35.9		4.2	3.8		20.1	6.0	0.0
Queue Length 95th (m)	22.4	45.0		6.7	72.1		14.2	11.6		49.2	15.0	19.7
Internal Link Dist (m)		204.1			280.7			76.2			327.7	
Turn Bay Length (m)	120.0			110.0			35.0			70.0		
Base Capacity (vph)	662	1932		788	1858		617	1600		615	1633	871
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.25	0.30		0.05	0.40		0.07	0.07		0.29	0.07	0.37

Intersection Summary			
Area Type:	Other		
Cycle Length: 108.1			
Actuated Cycle Length: 69			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 15.3		Intersection LOS: B	
Intersection Capacity Utilization 60.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Helena St/Thompson Rd & Garrison Rd

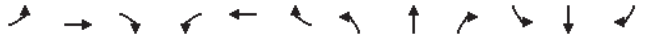
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	484	41	35	544	134	40	69	33	166	108	300
Future Volume (vph)	153	484	41	35	544	134	40	69	33	166	108	300
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1568	3218		1662	3180		1662	3040		1646	3137	1373
Flt Permitted	0.23	1.00		0.44	1.00		0.68	1.00		0.68	1.00	1.00
Satd. Flow (perm)	373	3218		765	3180		1186	3040		1181	3137	1373
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)	166	526	45	38	591	146	43	75	36	180	117	326
RTOR Reduction (vph)	0	4	0	0	18	0	0	26	0	0	0	237
Lane Group Flow (vph)	166	567	0	38	719	0	43	85	0	180	117	89
Confl. Peds. (#/hr)	1		1	1		1	1					1
Heavy Vehicles (%)	6%	2%	2%	0%	1%	2%	0%	6%	0%	1%	6%	7%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	39.7	33.4		29.0	25.7		16.9	16.9		16.9	16.9	16.9
Effective Green, g (s)	38.7	36.4		27.0	28.7		19.0	19.0		19.0	19.0	19.0
Actuated g/C Ratio	0.56	0.52		0.39	0.41		0.27	0.27		0.27	0.27	0.27
Clearance Time (s)	3.0	7.0		3.0	7.0		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	2.5	5.0		2.5	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	378	1680		325	1309		323	828		321	855	374
v/s Ratio Prot	c0.06	0.18		0.00	c0.23			0.03			0.04	
v/s Ratio Perm	0.18			0.04			0.04			c0.15		0.06
v/c Ratio	0.44	0.34		0.12	0.55		0.13	0.10		0.56	0.14	0.24
Uniform Delay, d1	9.0	9.7		13.4	15.6		19.1	19.0		21.8	19.2	19.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	0.3		0.1	0.8		0.2	0.1		2.2	0.1	0.3
Delay (s)	9.6	9.9		13.5	16.4		19.3	19.0		24.0	19.2	20.0
Level of Service	A	A		B	B		B	B		C	B	C
Approach Delay (s)		9.8			16.3			19.1			21.0	
Approach LOS		A			B			B			C	

Intersection Summary				
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.54			
Actuated Cycle Length (s)	69.7	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	60.0%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	37	0	2	50	24	0	15	4	47	39	24
Future Volume (vph)	27	37	0	2	50	24	0	15	4	47	39	24
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
Frt					0.957			0.973			0.971	
Flt Protected		0.979			0.999						0.979	
Satd. Flow (prot)	0	1684	0	0	1632	0	0	1540	0	0	1646	0
Flt Permitted		0.979			0.999						0.979	
Satd. Flow (perm)	0	1684	0	0	1632	0	0	1540	0	0	1646	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		238.9			355.9			223.0			459.6	
Travel Time (s)		17.2			25.6			16.1			33.1	
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%	3%	0%	50%	2%	0%	0%	7%	25%	0%	3%	0%
Adj. Flow (vph)	29	40	0	2	54	26	0	16	4	51	42	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	82	0	0	20	0	0	119	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 30.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	27	37	0	2	50	24	0	15	4	47	39	24
Future Volume (vph)	27	37	0	2	50	24	0	15	4	47	39	24
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)	29	40	0	2	54	26	0	16	4	51	42	26

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	69	82	20	119
Volume Left (vph)	29	2	0	51
Volume Right (vph)	0	26	4	26
Hadj (s)	0.11	-0.14	0.06	-0.03
Departure Headway (s)	4.4	4.1	4.4	4.2
Degree Utilization, x	0.08	0.09	0.02	0.14
Capacity (veh/h)	784	834	771	821
Control Delay (s)	7.8	7.6	7.5	7.9
Approach Delay (s)	7.8	7.6	7.5	7.9
Approach LOS	A	A	A	A

Intersection Summary					
Delay			7.8		
Level of Service			A		
Intersection Capacity Utilization			30.4%	ICU Level of Service	A
Analysis Period (min)			15		

Intersection: 1: Helena St/Thompson Rd & Garrison Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (m)	34.1	39.6	34.3	16.6	58.2	51.9	21.8	21.5	22.8	49.0	35.7	12.4
Average Queue (m)	17.0	20.6	13.7	6.0	31.2	24.9	8.3	6.8	9.0	23.4	14.7	0.9
95th Queue (m)	29.4	34.4	27.0	14.2	49.6	44.1	18.7	16.3	18.7	40.8	28.5	6.7
Link Distance (m)		212.3	212.3		289.8	289.8		77.0	77.0		335.9	335.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	120.0			110.0			35.0			70.0		
Storage Blk Time (%)								0		0		
Queuing Penalty (veh)								0		0		

Intersection: 2: Helena St & Washington Rd/Albany St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	13.0	15.9	8.1	13.0
Average Queue (m)	6.5	7.5	1.3	4.4
95th Queue (m)	10.9	13.1	4.9	10.3
Link Distance (m)	220.5	337.5	204.6	434.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 0

Appendix E

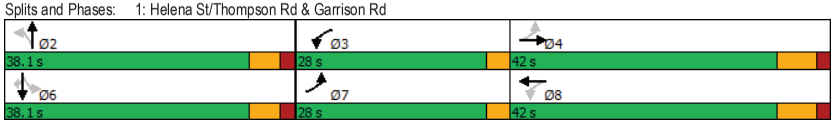
Total Traffic Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	376	28	7	255	56	73	118	16	70	56	187
Future Volume (vph)	244	376	28	7	255	56	73	118	16	70	56	187
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	120.0		0.0	110.0		0.0	35.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Frt		0.990			0.973			0.982				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1554	3158	0	1662	3111	0	1446	2975	0	1568	2703	1377
Flt Permitted	0.425			0.497			0.715			0.660		
Satd. Flow (perm)	695	3158	0	870	3111	0	1088	2975	0	1090	2703	1377
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			27			14				203
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		228.1			304.7			100.2			351.7	
Travel Time (s)		13.7			18.3			5.2			18.1	
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 (%)	7%	3%	21%	0%	4%	4%	15%	10%	8%	6%	23%	8%
Adj. Flow (vph)	265	409	30	8	277	61	79	128	17	76	61	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	265	439	0	8	338	0	79	145	0	76	61	203
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	9.0	39.0		9.0	39.0		38.1	38.1		38.1	38.1	38.1
Total Split (s)	28.0	42.0		28.0	42.0		38.1	38.1		38.1	38.1	38.1
Total Split (%)	25.9%	38.9%		25.9%	38.9%		35.2%	35.2%		35.2%	35.2%	35.2%
Yellow Time (s)	3.0	5.0		3.0	5.0		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	0.0	2.0		0.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	1.0	-3.0		1.0	-3.0		-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		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	31.4	29.9		20.6	15.5		13.0	13.0		13.0	13.0	13.0
Actuated g/C Ratio	0.60	0.57		0.39	0.30		0.25	0.25		0.25	0.25	0.25
v/c Ratio	0.44	0.24		0.02	0.36		0.29	0.19		0.28	0.09	0.41
Control Delay	7.5	6.6		6.1	15.3		21.5	16.6		21.3	17.6	6.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	7.5	6.6		6.1	15.3		21.5	16.6		21.3	17.6	6.5
LOS	A	A		A	B		C	B		C	B	A
Approach Delay		6.9			15.1			18.4			11.8	
Approach LOS		A			B			B			B	
Queue Length 50th (m)	10.0	8.2		0.4	12.1		6.2	5.2		6.0	2.4	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	22.7	24.1		1.6	25.6		18.9	13.5		18.4	7.4	14.4
Internal Link Dist (m)		204.1			280.7			76.2			327.7	
Turn Bay Length (m)	120.0			110.0			35.0			70.0		
Base Capacity (vph)	814	2326		887	2296		718	1969		719	1785	978
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.33	0.19		0.01	0.15		0.11	0.07		0.11	0.03	0.21

Intersection Summary			
Area Type:	Other		
Cycle Length: 108.1			
Actuated Cycle Length: 52.5			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 11.3		Intersection LOS: B	
Intersection Capacity Utilization 54.3%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 1: Helena St/Thompson Rd & Garrison Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	376	28	7	255	56	73	118	16	70	56	187
Future Volume (vph)	244	376	28	7	255	56	73	118	16	70	56	187
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		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1554	3157		1662	3111		1446	2976		1568	2703	1377
Flt Permitted	0.43	1.00		0.50	1.00		0.72	1.00		0.66	1.00	1.00
Satd. Flow (perm)	696	3157		870	3111		1088	2976		1090	2703	1377
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)	265	409	30	8	277	61	79	128	17	76	61	203
RTOR Reduction (vph)	0	4	0	0	18	0	0	11	0	0	0	155
Lane Group Flow (vph)	265	435	0	8	320	0	79	134	0	76	61	48
Heavy Vehicles (%)	7%	3%	21%	0%	4%	4%	15%	10%	8%	6%	23%	8%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	30.8	26.8		16.0	15.0		10.9	10.9		10.9	10.9	10.9
Effective Green, g (s)	29.8	29.8		14.0	18.0		13.0	13.0		13.0	13.0	13.0
Actuated g/C Ratio	0.54	0.54		0.26	0.33		0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	3.0	7.0		3.0	7.0		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	2.5	5.0		2.5	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	563	1716		222	1021		258	705		258	641	326
v/s Ratio Prot	c0.10	0.14			0.10			0.05			0.02	
v/s Ratio Perm	c0.15			0.01			c0.07			0.07		0.03
v/c Ratio	0.47	0.25		0.04	0.31		0.31	0.19		0.29	0.10	0.15
Uniform Delay, d1	7.1	6.6		15.3	13.8		17.2	16.7		17.1	16.3	16.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2		0.0	0.4		0.7	0.1		0.6	0.1	0.2
Delay (s)	7.5	6.8		15.4	14.1		17.9	16.8		17.8	16.4	16.7
Level of Service	A	A		B	B		B	B		B	B	B
Approach Delay (s)		7.1			14.2			17.2			16.9	
Approach LOS		A			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.41			
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	54.3%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	22	0	4	18	47	3	43	2	15	16	6
Future Volume (vph)	28	22	0	4	18	47	3	43	2	15	16	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
Frt					0.908			0.995			0.976	
Flt Protected		0.973			0.997			0.997			0.980	
Satd. Flow (prot)	0	1666	0	0	1490	0	0	1671	0	0	1556	0
Flt Permitted		0.973			0.997			0.997			0.980	
Satd. Flow (perm)	0	1666	0	0	1490	0	0	1671	0	0	1556	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		238.9			355.9			223.0			459.6	
Travel Time (s)		17.2			25.6			16.1			33.1	
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%	5%	0%	25%	6%	5%	67%	0%	0%	8%	0%	25%
Adj. Flow (vph)	30	24	0	4	20	51	3	47	2	16	17	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	54	0	0	75	0	0	52	0	0	40	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	23.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	28	22	0	4	18	47	3	43	2	15	16	6
Future Volume (vph)	28	22	0	4	18	47	3	43	2	15	16	6
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)	30	24	0	4	20	51	3	47	2	16	17	7

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	54	75	52	40
Volume Left (vph)	30	4	3	16
Volume Right (vph)	0	51	2	7
Hadj (s)	0.15	-0.29	0.05	0.10
Departure Headway (s)	4.3	3.9	4.3	4.3
Degree Utilization, x	0.06	0.08	0.06	0.05
Capacity (veh/h)	807	902	808	802
Control Delay (s)	7.6	7.2	7.6	7.6
Approach Delay (s)	7.6	7.2	7.6	7.6
Approach LOS	A	A	A	A

Intersection Summary				
Delay			7.5	
Level of Service			A	
Intersection Capacity Utilization			23.9%	ICU Level of Service A
Analysis Period (min)			15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	3	3	188	90	3
Future Volume (vph)	20	3	3	188	90	3
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	0.984				0.996	
Flt Protected	0.958			0.999		
Satd. Flow (prot)	1617	0	0	1714	1709	0
Flt Permitted	0.958			0.999		
Satd. Flow (perm)	1617	0	0	1714	1709	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	176.9			116.0	1195.0	
Travel Time (s)	12.7			8.4	86.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	22	3	3	204	98	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	0	207	101	0
Sign Control	Stop			Free	Free	

Intersection Summary				
Area Type:	Other			
Control Type: Unsignalized				
Intersection Capacity Utilization	23.3%			ICU Level of Service A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	3	3	188	90	3
Future Volume (Veh/h)	20	3	3	188	90	3
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)	22	3	3	204	98	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	310	100	101			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	310	100	101			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	681	956	1491			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	25	207	101
Volume Left	22	3	0
Volume Right	3	0	3
cSH	706	1491	1700
Volume to Capacity	0.04	0.00	0.06
Queue Length 95th (m)	0.9	0.0	0.0
Control Delay (s)	10.3	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	10.3	0.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		23.3%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	16	3	4	175	90	3
Future Volume (vph)	16	3	4	175	90	3
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	0.980				0.996	
Flt Protected	0.959			0.999		
Satd. Flow (prot)	1612	0	0	1714	1709	0
Flt Permitted	0.959			0.999		
Satd. Flow (perm)	1612	0	0	1714	1709	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	172.7			459.6	116.0	
Travel Time (s)	12.4			33.1	8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	3	4	190	98	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	0	0	194	101	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 23.5%			ICU Level of Service A
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	3	4	175	90	3
Future Volume (Veh/h)	16	3	4	175	90	3
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)	17	3	4	190	98	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	298	100	101			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	298	100	101			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	692	956	1491			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	20	194	101
Volume Left	17	4	0
Volume Right	3	0	3
cSH	722	1491	1700
Volume to Capacity	0.03	0.00	0.06
Queue Length 95th (m)	0.7	0.1	0.0
Control Delay (s)	10.1	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	10.1	0.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		23.5%	ICU Level of Service A
Analysis Period (min)		15	

Intersection: 1: Helena St/Thompson Rd & Garrison Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (m)	50.1	28.1	26.6	8.0	40.3	29.9	36.1	29.7	25.9	28.0	27.3	1.7
Average Queue (m)	23.0	14.1	11.2	1.3	19.5	11.8	14.1	10.5	11.2	11.5	9.2	0.1
95th Queue (m)	39.4	25.1	21.9	6.3	32.9	23.0	28.5	22.1	22.0	23.2	21.4	1.7
Link Distance (m)		212.3	212.3		289.8	289.8		77.0	77.0		335.9	335.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	120.0			110.0			35.0			70.0		
Storage Blk Time (%)							0	0				
Queuing Penalty (veh)							0	0				

Intersection: 2: Helena St & Washington Rd/Albany St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	13.7	17.4	11.4	12.6
Average Queue (m)	6.1	7.4	2.4	2.4
95th Queue (m)	11.4	13.7	6.4	7.2
Link Distance (m)	220.5	337.5	204.6	434.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Helena St & North Driveway

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	11.1	1.8
Average Queue (m)	5.1	0.1
95th Queue (m)	12.7	1.3
Link Distance (m)	168.4	99.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Helena St & South Driveway

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	9.2	2.6
Average Queue (m)	4.1	0.1
95th Queue (m)	11.4	1.5
Link Distance (m)	164.0	434.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	484	47	41	544	134	44	75	37	166	127	300
Future Volume (vph)	153	484	47	41	544	134	44	75	37	166	127	300
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	120.0		0.0	110.0		0.0	35.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00	1.00		1.00					0.99
Frt		0.987			0.970			0.951				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1568	3214	0	1662	3179	0	1662	3039	0	1646	3137	1390
Flt Permitted	0.226			0.435			0.664			0.675		
Satd. Flow (perm)	373	3214	0	761	3179	0	1161	3039	0	1170	3137	1372
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			31			40				326
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		228.1			304.7			100.2			351.7	
Travel Time (s)		13.7			18.3			5.2			18.1	
Confl. Peds. (#/hr)	1		1	1		1	1					1
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 (%)	6%	2%	2%	0%	1%	2%	0%	6%	0%	1%	6%	7%
Adj. Flow (vph)	166	526	51	45	591	146	48	82	40	180	138	326
Shared Lane Traffic (%)												
Lane Group Flow (vph)	166	577	0	45	737	0	48	122	0	180	138	326
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	9.0	39.0		9.0	39.0		38.1	38.1		38.1	38.1	38.1
Total Split (s)	28.0	42.0		28.0	42.0		38.1	38.1		38.1	38.1	38.1
Total Split (%)	25.9%	38.9%		25.9%	38.9%		35.2%	35.2%		35.2%	35.2%	35.2%
Yellow Time (s)	3.0	5.0		3.0	5.0		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	0.0	2.0		0.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	1.0	-3.0		1.0	-3.0		-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		4.0	4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Recall Mode	None	Min		None	Min		None	None		None	None	None
Act Effct Green (s)	41.5	36.5		32.9	27.4		19.3	19.3		19.3	19.3	19.3
Actuated g/C Ratio	0.60	0.53		0.48	0.40		0.28	0.28		0.28	0.28	0.28
v/c Ratio	0.42	0.34		0.10	0.58		0.15	0.14		0.55	0.16	0.53
Control Delay	10.4	11.6		8.0	18.7		22.4	15.3		30.5	21.1	6.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	10.4	11.6		8.0	18.7		22.4	15.3		30.5	21.1	6.4
LOS	B	B		A	B		C	B		C	C	A
Approach Delay		11.3			18.1			17.3			16.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			B	
Queue Length 50th (m)	8.4	23.7		2.1	36.1		4.7	4.2		20.1	7.1	0.0
Queue Length 95th (m)	22.5	46.1		7.6	72.3		15.3	12.4		49.0	17.1	19.6
Internal Link Dist (m)		204.1			280.7			76.2			327.7	
Turn Bay Length (m)	120.0			110.0			35.0			70.0		
Base Capacity (vph)	660	1924		786	1854		603	1599		608	1630	869
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.25	0.30		0.06	0.40		0.08	0.08		0.30	0.08	0.38

Intersection Summary			
Area Type:	Other		
Cycle Length: 108.1			
Actuated Cycle Length: 69.2			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 15.4		Intersection LOS: B	
Intersection Capacity Utilization 62.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 1: Helena St/Thompson Rd & Garrison Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	484	47	41	544	134	44	75	37	166	127	300
Future Volume (vph)	153	484	47	41	544	134	44	75	37	166	127	300
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		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1568	3213		1662	3180		1662	3039		1646	3137	1373
Flt Permitted	0.23	1.00		0.43	1.00		0.66	1.00		0.67	1.00	1.00
Satd. Flow (perm)	373	3213		761	3180		1162	3039		1169	3137	1373
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)	166	526	51	45	591	146	48	82	40	180	138	326
RTOR Reduction (vph)	0	5	0	0	18	0	0	29	0	0	0	237
Lane Group Flow (vph)	166	572	0	45	719	0	48	93	0	180	138	89
Confl. Peds. (#/hr)	1		1	1		1	1					1
Heavy Vehicles (%)	6%	2%	2%	0%	1%	2%	0%	6%	0%	1%	6%	7%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	39.8	33.4		29.2	25.8		17.0	17.0		17.0	17.0	17.0
Effective Green, g (s)	38.8	36.4		27.2	28.8		19.1	19.1		19.1	19.1	19.1
Actuated g/C Ratio	0.56	0.52		0.39	0.41		0.27	0.27		0.27	0.27	0.27
Clearance Time (s)	3.0	7.0		3.0	7.0		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	2.5	5.0		2.5	5.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	378	1673		327	1310		317	830		319	857	375
v/s Ratio Prot	c0.06	0.18		0.00	c0.23			0.03			0.04	
v/s Ratio Perm	0.18			0.05			0.04			c0.15		0.06
v/c Ratio	0.44	0.34		0.14	0.55		0.15	0.11		0.56	0.16	0.24
Uniform Delay, d1	9.0	9.8		13.4	15.6		19.3	19.0		21.8	19.3	19.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	0.3		0.1	0.8		0.2	0.1		2.3	0.1	0.3
Delay (s)	9.6	10.0		13.5	16.4		19.5	19.1		24.1	19.4	20.1
Level of Service	A	B		B	B		B	B		C	B	C
Approach Delay (s)		9.9			16.3			19.2			21.1	
Approach LOS		A			B			B			C	

Intersection Summary					
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.54				
Actuated Cycle Length (s)	69.9	Sum of lost time (s)		12.0	
Intersection Capacity Utilization	62.0%	ICU Level of Service		B	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	37	0	2	50	28	0	18	4	52	43	26
Future Volume (vph)	31	37	0	2	50	28	0	18	4	52	43	26
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
Frt					0.953			0.977			0.971	
Flt Protected		0.978			0.999						0.979	
Satd. Flow (prot)	0	1684	0	0	1627	0	0	1554	0	0	1646	0
Flt Permitted		0.978			0.999						0.979	
Satd. Flow (perm)	0	1684	0	0	1627	0	0	1554	0	0	1646	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		238.9			355.9			223.0			459.6	
Travel Time (s)		17.2			25.6			16.1			33.1	
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%	3%	0%	50%	2%	0%	0%	7%	25%	0%	3%	0%
Adj. Flow (vph)	34	40	0	2	54	30	0	20	4	57	47	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	74	0	0	86	0	0	24	0	0	132	0
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	31.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	37	0	2	50	28	0	18	4	52	43	26
Future Volume (vph)	31	37	0	2	50	28	0	18	4	52	43	26
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)	34	40	0	2	54	30	0	20	4	57	47	28

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	74	86	24	132
Volume Left (vph)	34	2	0	57
Volume Right (vph)	0	30	4	28
Hadj (s)	0.12	-0.16	0.07	-0.02
Departure Headway (s)	4.5	4.2	4.5	4.3
Degree Utilization, x	0.09	0.10	0.03	0.16
Capacity (veh/h)	773	826	761	803
Control Delay (s)	7.9	7.6	7.6	8.1
Approach Delay (s)	7.9	7.6	7.6	8.1
Approach LOS	A	A	A	A

Intersection Summary					
Delay		7.9			
Level of Service		A			
Intersection Capacity Utilization		31.3%	ICU Level of Service		A
Analysis Period (min)		15			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	5	5	150	200	16
Future Volume (vph)	0	5	5	150	200	16
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	0.865				0.990	
Flt Protected				0.999		
Satd. Flow (prot)	1484	0	0	1714	1699	0
Flt Permitted				0.999		
Satd. Flow (perm)	1484	0	0	1714	1699	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	176.9			116.0	1195.0	
Travel Time (s)	12.7			8.4	86.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	5	5	163	217	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	168	234	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	5	5	150	200	16
Future Volume (Veh/h)	0	5	5	150	200	16
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)	0	5	5	163	217	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	398	226	234			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398	226	234			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	605	814	1333			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	5	168	234
Volume Left	0	5	0
Volume Right	5	0	17
cSH	814	1333	1700
Volume to Capacity	0.01	0.00	0.14
Queue Length 95th (m)	0.1	0.1	0.0
Control Delay (s)	9.5	0.3	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5	0.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	23.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	6	6	148	190	15
Future Volume (vph)	7	6	6	148	190	15
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	0.937				0.990	
Flt Protected	0.974			0.998		
Satd. Flow (prot)	1566	0	0	1712	1699	0
Flt Permitted	0.974			0.998		
Satd. Flow (perm)	1566	0	0	1712	1699	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	172.7			459.6	116.0	
Travel Time (s)	12.4			33.1	8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	7	7	161	207	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	0	0	168	223	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	6	6	148	190	15
Future Volume (Veh/h)	7	6	6	148	190	15
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)	8	7	7	161	207	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	390	215	223			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	390	215	223			
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	99	99			
cM capacity (veh/h)	611	825	1346			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	15	168	223
Volume Left	8	7	0
Volume Right	7	0	16
cSH	695	1346	1700
Volume to Capacity	0.02	0.01	0.13
Queue Length 95th (m)	0.5	0.1	0.0
Control Delay (s)	10.3	0.4	0.0
Lane LOS	B	A	
Approach Delay (s)	10.3	0.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Helena St/Thompson Rd & Garrison Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	T
Maximum Queue (m)	40.9	44.0	39.4	16.7	53.6	52.9	23.2	21.4	22.3	48.4	42.0	13.4
Average Queue (m)	18.3	21.6	15.5	6.2	32.1	25.6	8.5	7.8	9.9	24.6	17.9	1.5
95th Queue (m)	33.2	37.3	30.4	14.6	49.9	45.4	18.5	17.4	20.0	41.5	34.9	9.1
Link Distance (m)		212.3	212.3		289.8	289.8		77.0	77.0		335.9	335.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	120.0			110.0			35.0			70.0		
Storage Blk Time (%)								0		0	0	
Queuing Penalty (veh)								0		0	0	

Intersection: 2: Helena St & Washington Rd/Albany St

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	13.7	15.3	9.6	14.5
Average Queue (m)	6.7	7.5	1.6	5.6
95th Queue (m)	10.8	12.3	5.4	12.5
Link Distance (m)	220.5	337.5	204.6	434.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Helena St & North Driveway

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	8.9	5.7
Average Queue (m)	1.2	0.3
95th Queue (m)	6.0	3.4
Link Distance (m)	168.4	99.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Helena St & South Driveway

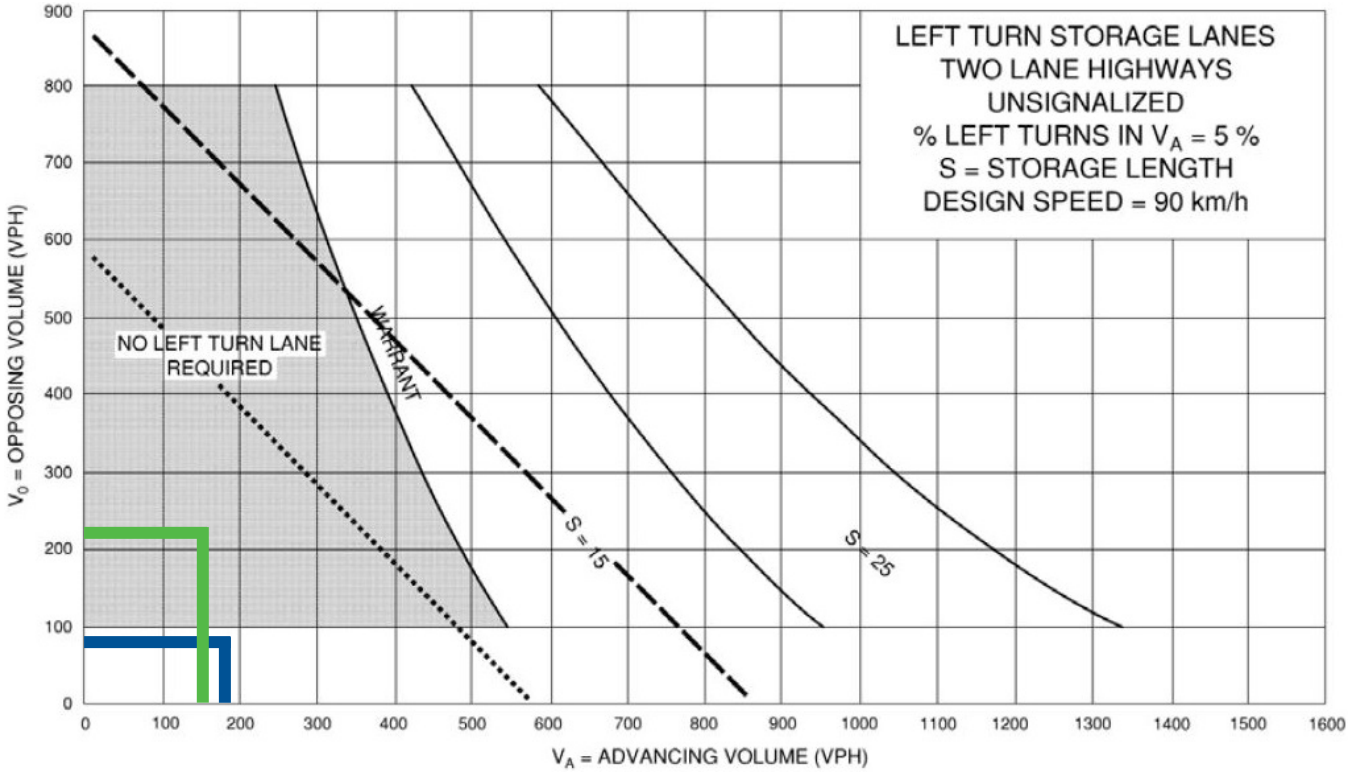
Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	9.7	6.1
Average Queue (m)	3.0	0.3
95th Queue (m)	10.0	2.9
Link Distance (m)	164.0	434.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

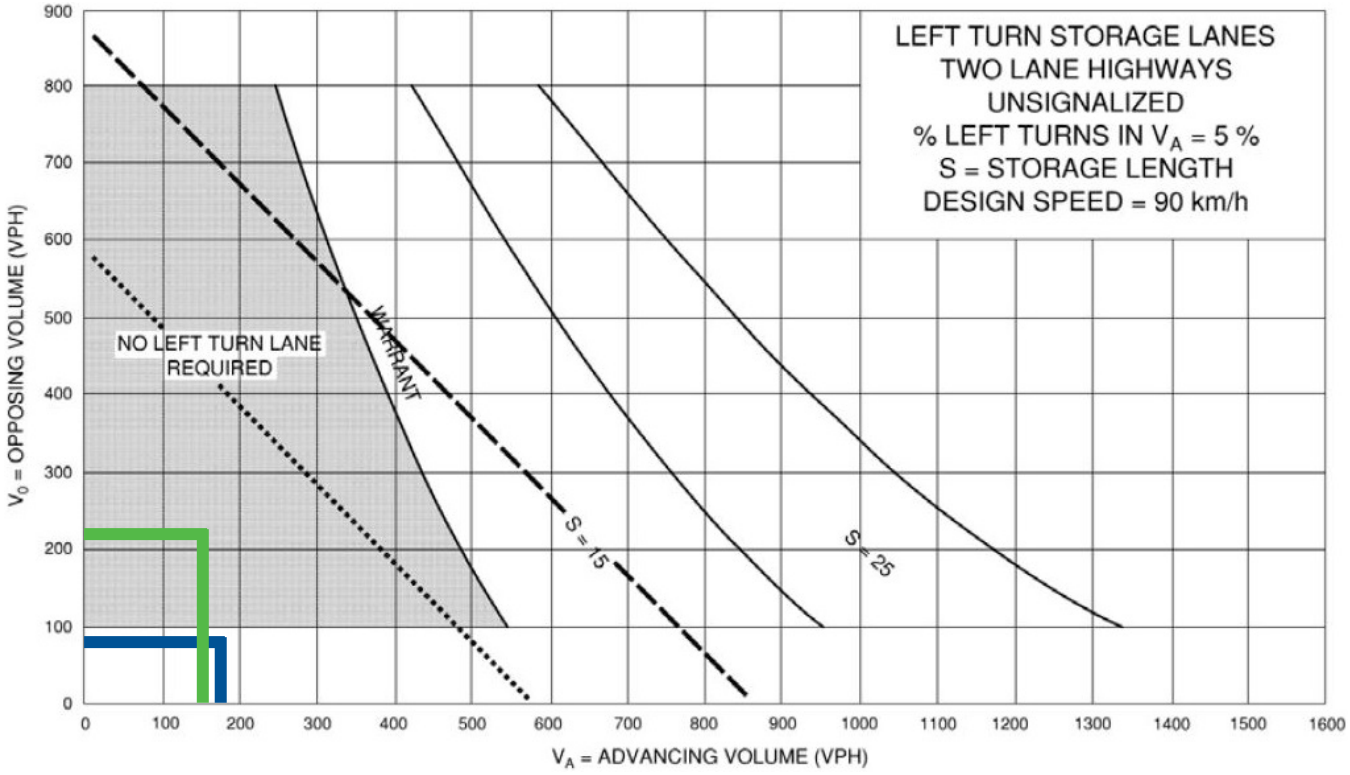
Appendix F

Left-Turn Lane Warrants



AM Peak Hour
PM Peak Hour

Left-Turn Lane Warrant Northbound Helena St at North Driveway - 2026 Total Conditions



AM Peak Hour
PM Peak Hour

Left-Turn Lane Warrant Northbound Helena St at South Driveway - 2026 Total Conditions