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TRANSPORTATION SOLUTIONS LIMITED

Beatty Line North, Fergus
Transportation Impact Study

Paradigm Transportation Solutions Limited

July 2018

Project Summary

Project Number
180135

July 2018

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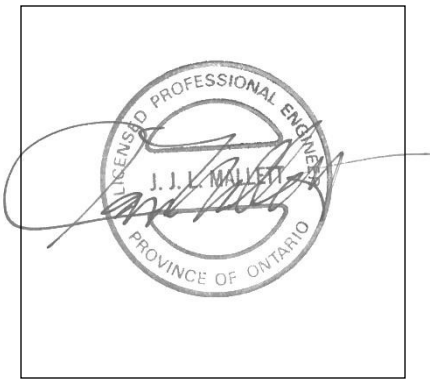
Beatty Line North, Fergus Transportation Impact Study

Signatures and Seals



Signature

Engineer's Seal

Disclaimer

Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Transportation Impact Study for a residential development located in the southwest corner of the Beatty Line and Side Road 18 / Farley Road intersection in Fergus, Ontario. The development is expected to be constructed in two (2) phases. The first phase is proposed to include 16 semi-detached residential lots (32 housing units) and 1 single detached lot. The second phase is proposed to include a four-storey 71 unit apartment building.

The first phase of the development, semi-detached and single detached residential lots, will include a common element condominium road that will provide access to these . Access is proposed by two (2) full-move accesses, one (1) to Farley Road and one (1) to Beatty Line North.

The second phase of the development, apartment block, is proposed to have access by two (2) full-move driveways, one (1) to Farley Road and the one (1) to Beatty Line North.

Phase 1 is expected to build-out by Year 2020. Phase 2 is expected to build-out by Year 2021.

Conclusions

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

- The study area intersections are operating at acceptable levels of service during the AM and PM peak hours
- The build-out of Phase 1 of the subject site is forecast to generate approximately 25 trips during the AM peak hour and approximately 34 trips during the PM peak hour. The full build-out of site is forecast to generate approximately 51 trips during the AM peak hour and approximately 65 trips during the PM peak hour.
- Under the forecast 2020 background traffic conditions, the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours with the following exception:
  - The southbound shared left/through/right-turn movement at the intersection of Beatty Line North and St. Andrews Street is forecast to operate at LOS E with a v/c ratio of 0.76 during the PM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on St. Andrews Street which limits the number of available gaps for side street traffic.

- Under the forecast 2020 total traffic conditions, the study area intersections are forecast to operate similar to the 2020 background traffic operations. Inclusion of the site-generated traffic increases the overall intersection delay by two (2) seconds or less during the AM and PM peak hours.
- Under the forecast 2021 background traffic conditions, the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours with the following exception:
  - The southbound shared left/through/right-turn movement at the intersection of Beatty Line North and St. Andrews Street is forecast to operate at LOS E with a v/c ratio of 0.78 during the PM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on St. Andrews Street which limits the number of available gaps for side street traffic.
- Under the forecast 2021 total traffic conditions, the study area intersections are forecast to operate similar to the 2021 background traffic operations. Inclusion of the site-generated traffic increases the overall intersection delay by three (3) seconds or less during the AM and PM peak hours.
- Under the forecast 2026 background traffic conditions, the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours with the following exception:
  - The eastbound left-turn movement at the intersection of Beatty Line North and Colborne Street is forecast to operate at LOS E with a v/c ratio of 0.73 during the PM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on Beatty Line North which limits the number of available gaps for side street traffic.
- Under the forecast 2026 total traffic conditions, the study area intersections are forecast to operate similar to the 2026 background traffic operations. Inclusion of the site-generated traffic increases overall intersection delays by four (4) seconds or less during the AM and PM peak hours.
- Left-turn lanes at the subject site driveways are not warranted under 2026 total traffic conditions.
- No remedial measures beyond what is identified in the NWFSP Traffic Study are required to accommodate the increase in traffic due to the proposed development.

Recommendations

Based on the findings of this study, it is recommended that:

- The County of Wellington and Township of Centre Wellington monitor the future traffic conditions at the intersections of Beatty Line North at St. Andrews Street and Colborne Street and implement the recommended improvements identified in the NWFSP Traffic Study accordingly.

Contents

Appendices

Figures

Tables

1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) was retained to conduct this Transportation Impact Study for a residential development located in the southwest corner of the Beatty Line and Side Road 18 / Farley Road intersection in Fergus, Ontario. **Figure 1.1** details the location of the subject development.

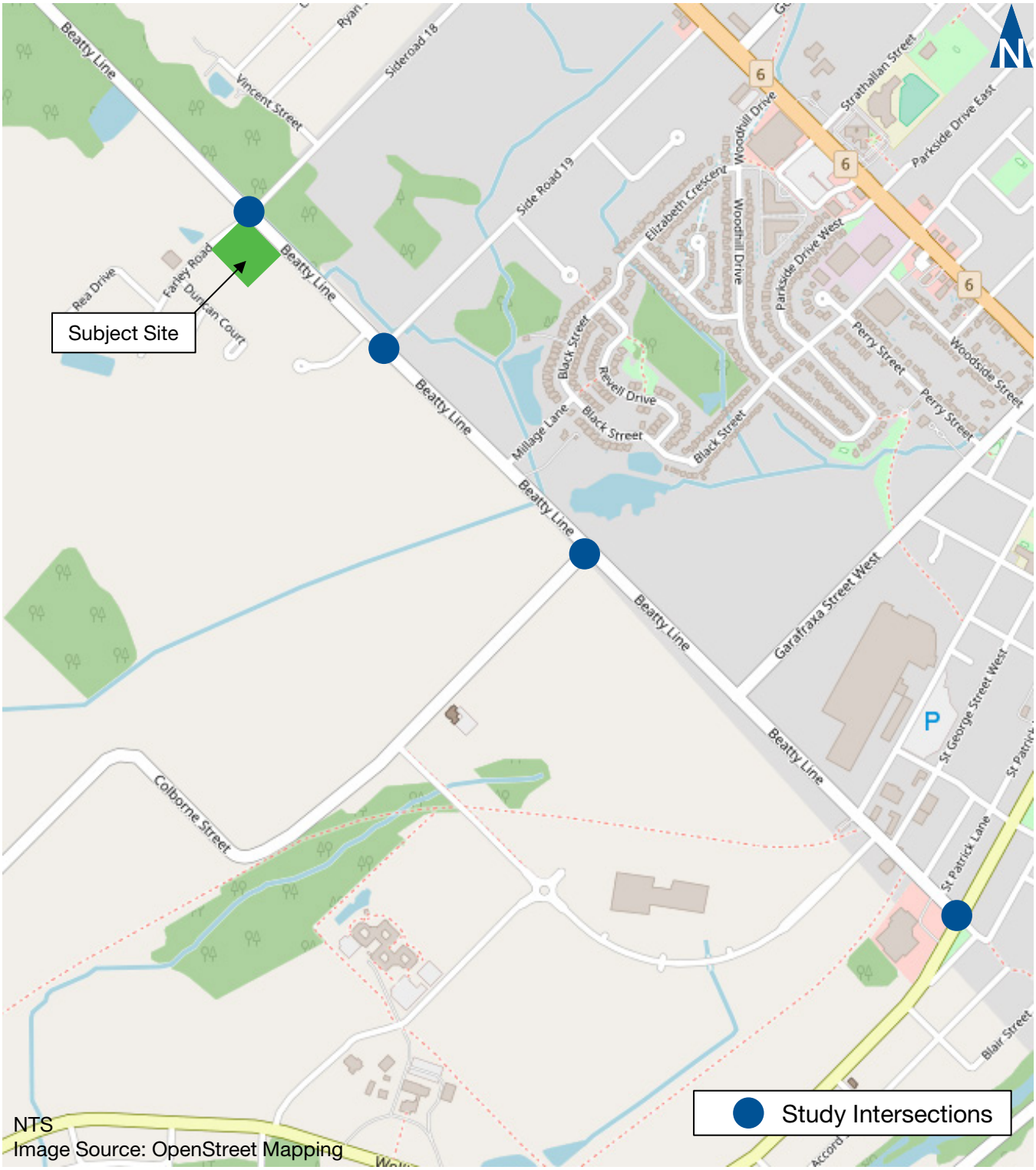
The scope of the study includes a determination and assessment of the current traffic conditions near the existing site, the additional traffic that will be generated by the proposed development, analyses of the impact that this traffic may have on the adjacent street system and recommendations regarding any necessary remedial measures required to mitigate the site generated traffic in a satisfactory manner. More specifically, the purpose of this report is to address the anticipated traffic impact of the proposed development by determining the forecast impact of traffic generated by the upgraded site on the adjacent street network at the intersections of:

- Beatty Line North and Farley Road/Side Road 18
- Beatty Line North and Side Road 19;
- Beatty Line North and Colborne Street
- Beatty Line North and St. Andrews Street; and
- The proposed site driveway connections to Beatty Line North and Farley Road.

This Transportation Impact Study (TIS) includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts for an assumed year for phase 1 of the development (2020), full build-out (2021), a horizon of five years from full build-out (2026), and recommendations to improve future traffic conditions. The scope of the project was developed in consultation with Township of Centre Wellington and the County of Wellington and is included in **Appendix A.**

Where applicable, the Traffic Impact Study in Support of Draft Plan Approval (Phases 2 &3) North West Fergus Secondary Plan[1] (NWFSP) was used as a guide for this study. NWFSP used the AM and PM peak hours for analysis, which this study will follow.

[1] Traffic Impact Study in Support of Draft Plan Approval (Phases 2 & 3), Township of Centre Wellington, North West Fergus Secondary Plan, R.J. Burnside & Associates Limited, December 2016



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Study Area & Subject Development Location

2 Existing Conditions

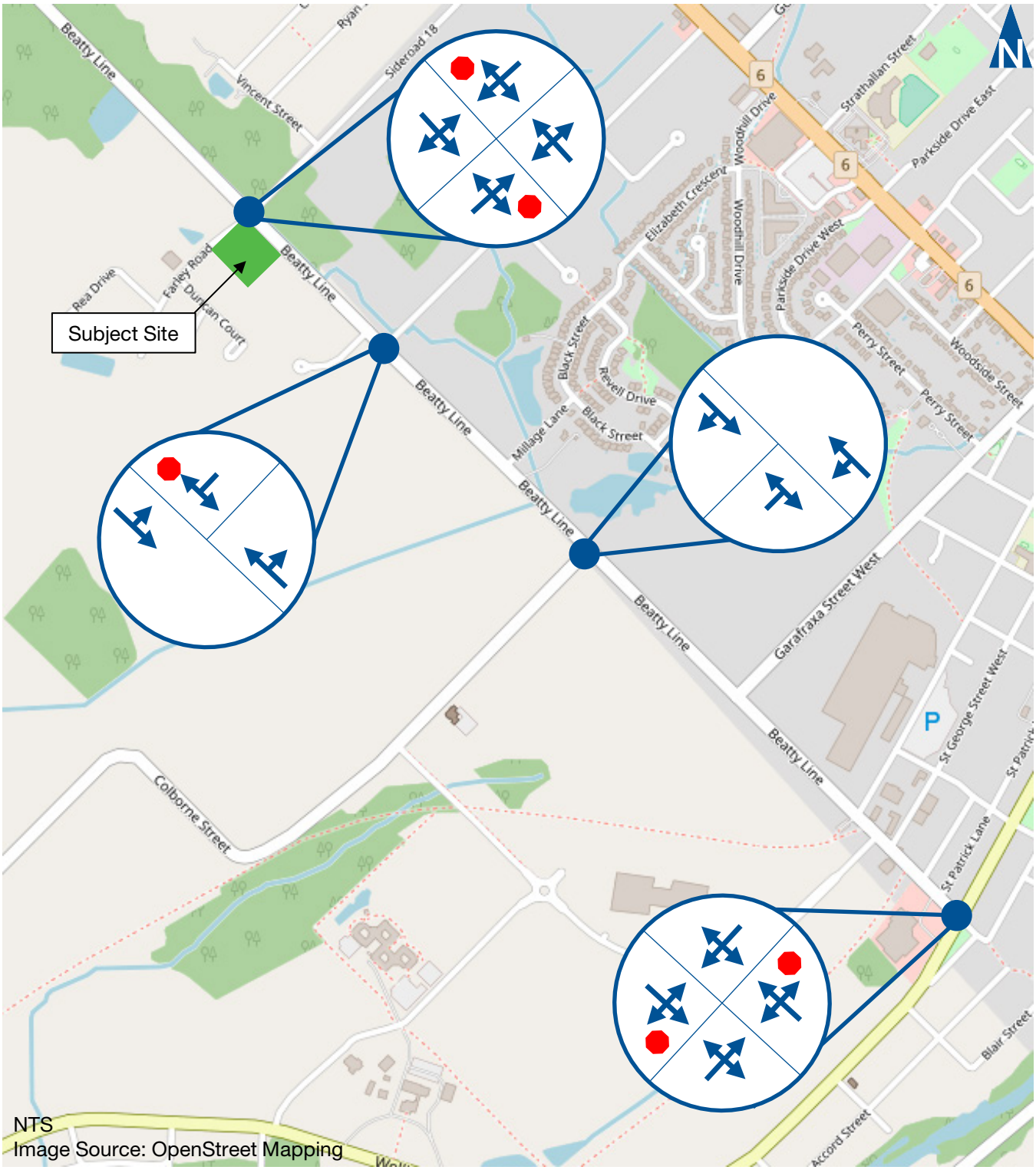
This section documents the current traffic conditions, operational deficiencies, and constraints experienced by the public travelling at the intersections within the study area. The operational deficiencies and constraints identified at this stage will be fundamental to the process of defining the required remedial measures.

2.1 Road Network

Beatty Line North and Side Road 18 / Farley Road are the roadways that will be directly impacted by the proposed development. Information regarding each is as follows:

- **Beatty Line North** is a north-south collector roadway with a two-lane cross-section under the jurisdiction of the Township of Centre Wellington. The posted speed limit is 50 kilometres per hour. Within the study area there is a sidewalk on the west side of Beatty Line that runs south from Farley Road to Side Road 19. From Side Road 19, the sidewalk continues on the east side of the roadway.
- **Side Road 18 / Farley Road** is an east-west local roadway with a two-lane cross-section under the jurisdiction of the Township of Centre Wellington. The posted speed limit is 50 kilometres per hour. Side Road 18 / Farley Road is two-way stop control with Beatty Line North. There is a sidewalk on the south side of Side Road 18 from Beatty Line North to Vincent Street. There is also a sidewalk on the south side of Farley Road that runs west from Beatty Line North.

The existing lane configurations and traffic control for the study area intersections are shown in **Figure 2.1**.



Existing Lane Configuration & Traffic Control

Beatty Line North, Fergus TIS
180135

Figure 2.1

2.2 Traffic Volumes

Turning movement volumes for the study area intersections were counted by Paradigm during May 2018. **Figure 2.2** summarizes the existing AM and PM peak hour traffic volumes. The observed turning movement counts have been included in **Appendix B**.

2.3 Traffic Operations

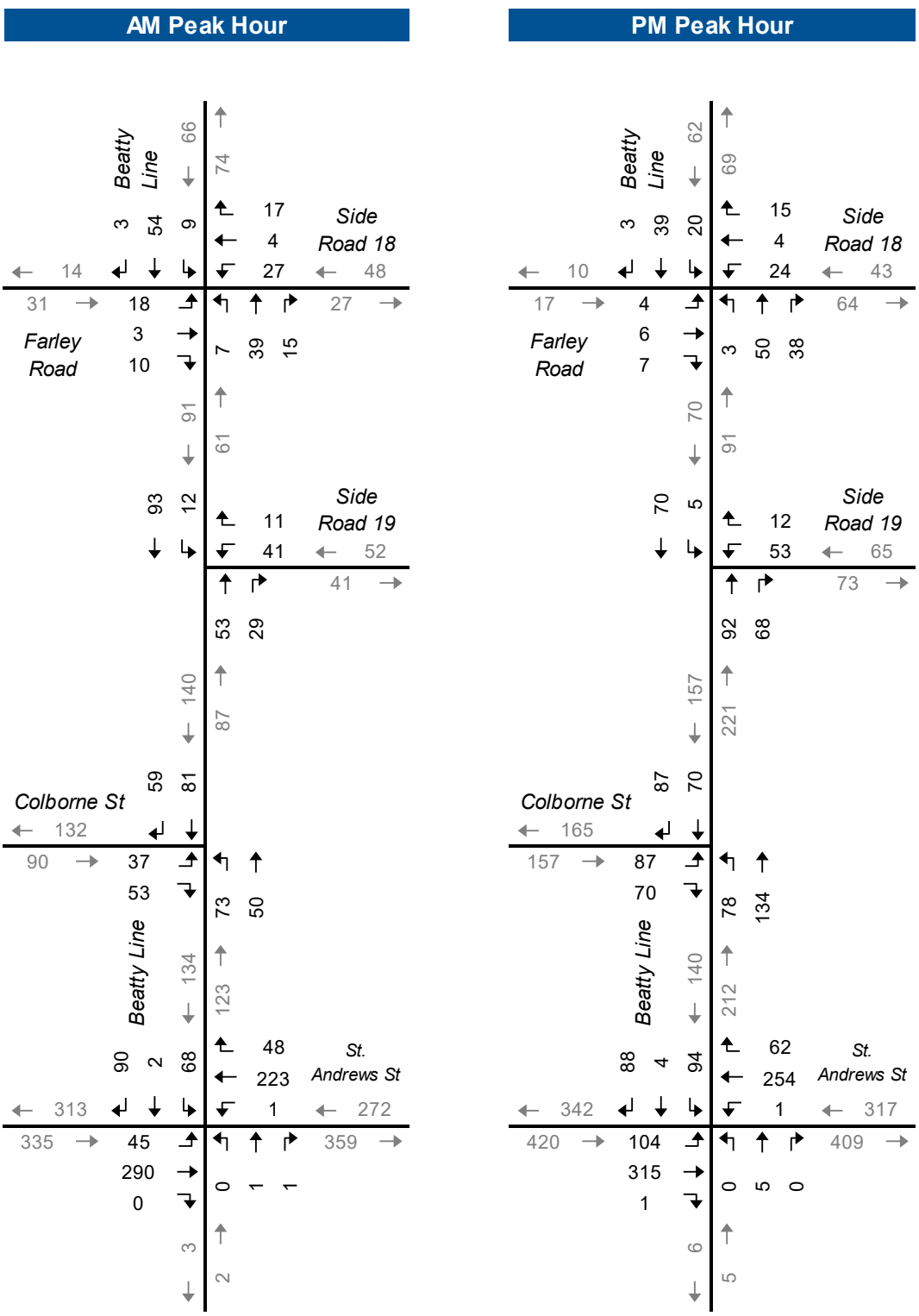
Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to make a movement,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

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are usually implemented, if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

The operations of the study area intersections were evaluated under the existing traffic volumes using Synchro 9 and HCM 2000 procedures. The intersection analysis considered the following measures of performance:

- The volume to capacity ratio for each intersection; and
- The LOS for each turning movement. LOS is based on the average control delay per vehicle.

The existing intersection operations are summarized in **Table 2.1** indicating the existing levels of service (LOS), volume to capacity ratios (v/c) and 95th percentile queues experienced within the study area, for the AM and PM peak hours. The results indicate that the study area intersections are currently operating with acceptable levels of service during the AM and PM peak hours. Detailed Synchro reports are provided in **Appendix C**.



Existing Traffic Volumes

Figure 2.2

TABLE 2.1: EXISTING TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	OVERALL
AM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	10	>	**10**	<	10	>	**10**	<	1	>	**1**	<	1	>	**1**	**4**
			V/C	<	0.04	>		<	0.07	>		<	0.01	>		<	0.01	>		
			95th	<	1	>		<	2	>		<	0	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		A	**A**		A	>	**A**	<	A		**A**	
			Delay					<		10	**10**		0	>	**0**	<	1		**1**	**3**
			V/C					<		0.08			0.06	>		<	0.01			
			95th					<		2			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	<		B	**B**					<	A		**A**		A	>	**A**	
			Delay	<		10	**10**					<	5		**5**		0	>	**0**	**4**
			V/C	<		0.12						<	0.05				0.09	>		
			95th	<		3						<	1				0	>		
	Beatty Ln N & St. Andrews St	TWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	B	>	**B**	<	C	>	**C**	
			Delay	<	2	>	**2**	<	0	>	**0**	<	13	>	**13**	<	16	>	**16**	**4**
			V/C	<	0.05	>		<	0.00	>		<	0.00	>		<	0.36	>		
			95th	<	1	>		<	0	>		<	0	>		<	13	>		
PM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	10	>	**10**	<	10	>	**10**	<	0	>	**0**	<	3	>	**3**	**4**
			V/C	<	0.02	>		<	0.06	>		<	0.00	>		<	0.02	>		
			95th	<	1	>		<	2	>		<	0	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	**B**		A	>	**A**	<	A		**A**	
			Delay					<		10	**10**		0	>	**0**	<	1		**1**	**2**
			V/C					<		0.10			0.11	>		<	0.00			
			95th					<		3			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	<		B	**B**					<	A		**A**		A	>	**A**	
			Delay	<		13	**13**					<	3		**3**		0	>	**0**	**5**
			V/C	<		0.27						<	0.06				0.10	>		
			95th	<		9						<	2				0	>		
	Beatty Ln N & St. Andrews St.	TWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	C	>	**C**	<	D	>	**D**	
			Delay	<	3	>	**3**	<	0	>	**0**	<	20	>	**20**	<	28	>	**28**	**7**
			V/C	<	0.10	>		<	0.00	>		<	0.02	>		<	0.58	>		
			95th	<	3	>		<	0	>		<	1	>		<	28	>		

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

Q - 95th Percentile Queue Length (m)
< - Shared Left-turn
< - Shared Right-turn

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

3 Development Concept

3.1 Development Description

The subject site is in the southwest corner of the Beatty Line and Side Road 18 / Farley Road intersection in Fergus, Ontario. The development is expected to be constructed in two (2) phases. The first phase is proposed to include 16 semi-detached residential lots (32 housing units) and a single detached lot. The second phase is proposed to include a four-storey 71 unit apartment building. The site plan is shown in **Figure 3.1**.

The first phase of the development, semi-detached and single detached residential lots, will include a common element condominium road that will provide access to these . Access is proposed by two (2) full-move accesses, one (1) to Farley Road located approximately 115 metres west of Beatty Line North and one (1) to Beatty Line North located approximately 100 metres south of Farley Road. Phase 1 is expected to build-out by Year 2020.

The second phase of the development, apartment block, is proposed to have access by two (2) full-move driveways, one (1) to Farley Road located approximately 65 metres west of Beatty Line North and one (1) to Beatty Line North located approximately 60 metres south of Farley Road. Phase 2 is expected to build-out by Year 2021.

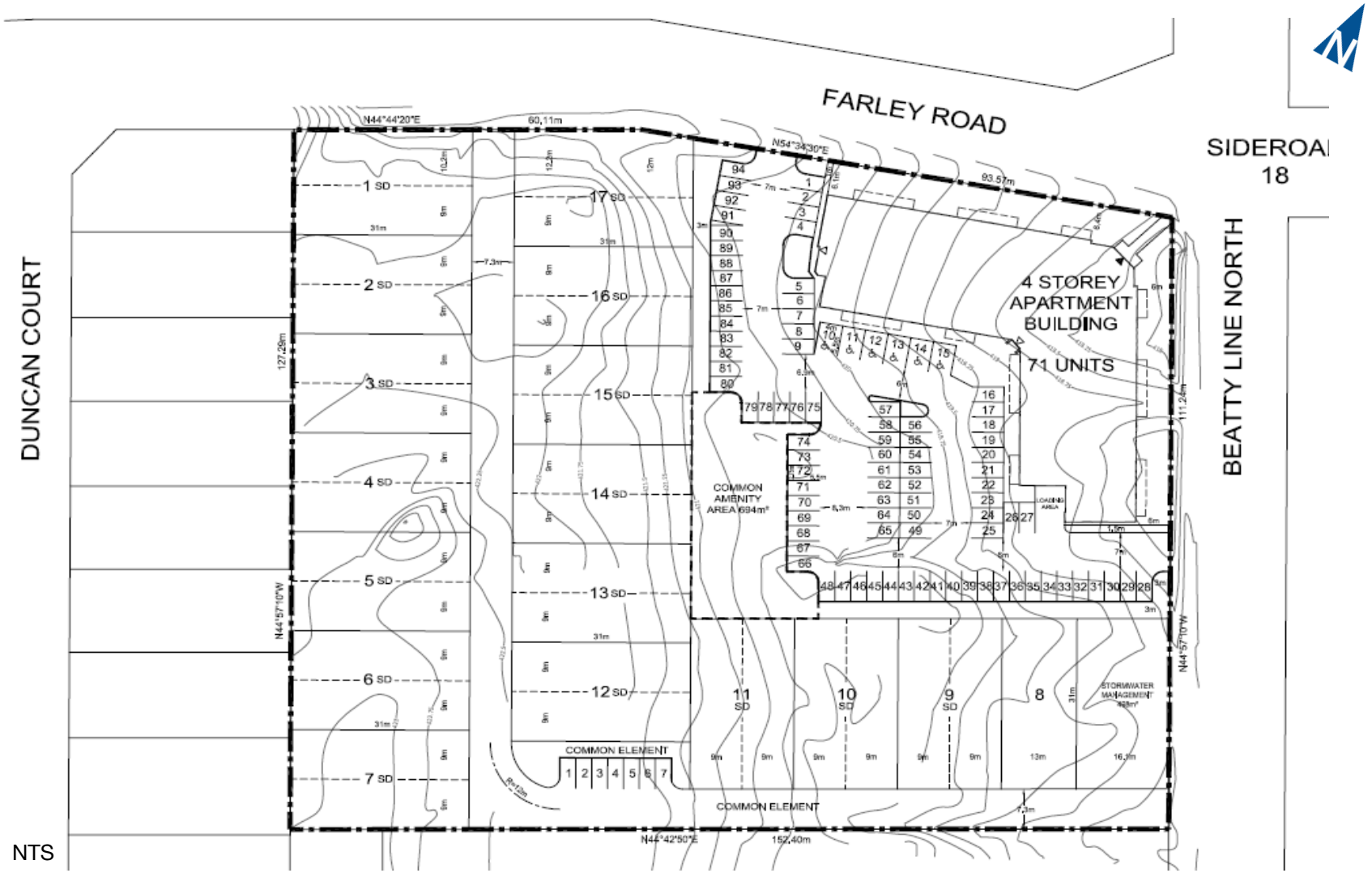
3.1.1 Sight Distance

Both Beatty Line North and Farley Road are relatively straight and level, however, there is a slight gradient on Farley Road west of Beatty Line. The sightlines along Beatty Line North and Farley Road at the proposed driveway connections were reviewed. The sight distance from the two driveway connections to Beatty Line exceed 300 metres to the north and south. The two driveway connections to Farley Road are positioned approximately at the crest of the gradient and the available sight distance to the east exceeds 300 metres (past the stop-controlled intersection with Beatty Line North) while the sight distance to the west is approximately 150 metres.

A design speed of 60 km/h (10 km/h over the posted speed) was used to assess the sight lines. The Transportation Association of Canada (TAC) describes the minimum stopping sight distance for a 60 kilometre per hour design speed to be 85 metres[2]. The minimum sight distance for a vehicle making a left-turn from stop is 130 metres[3], and for a vehicle making a right-turn/crossing from stop is 110 metres[4].

[2] Transportation Association of Canada Geometric Design Guide for Canadian Roads, June 2017 Table 2.5.2
[3] Transportation Association of Canada Geometric Design Guide for Canadian Roads, June 2017 Table 9.9.4
[4] Transportation Association of Canada Geometric Design Guide for Canadian Roads, June 2017 Table 9.9.6

The available sight distance at the four driveways exceeds the minimum stopping sight distance, the minimum sight distance for vehicles making a left-turn from stop and a vehicle making a right-turn/crossing movement from stop for a roadway with a design speed of 60 kilometres per hour. Therefore, under these circumstances and with the available sight distance, it can be concluded that the proposed driveways would have sufficient sightlines to function safely.



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Development Site Plan

Figure 3.1

3.2 Development Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual[5] was used to estimate the peak hour traffic generated by the development. The descriptions for the Land Use Codes (LUC) used in this study, as given by the Trip Generation Manual are as follows:

- **Land Use 210 (Single-Family Detached Housing)** includes all single-family detached homes on individual lots. As semi-detached lots share only one wall with a neighbouring unit, semi-detached can be included in the land use category; and
- **Land Use 221 (Multifamily Housing [Mid-Rise])** includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three and 10 levels (floors).

The estimated total trip generation for phase 1 of the development is displayed in **Table 3.1** which indicates that a net total of 25 and 34 trips are forecast to be generated during the AM and PM peak hours, respectively. **Table 3.2** displays the estimated total trip generation for the full build out of the development and indicates that a net total of 51 and 65 trips are forecast to be generated during the AM and PM peak hours, respectively.

TABLE 3.1: PHASE 1 TRIP GENERATION

Land Use Code	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
210 - Single-Family Detached Housing (Units)	34	0.74	6	19	25	0.99	21	13	34
Net Total Trip Generation			**6**	**19**	**25**		**21**	**13**	**34**

TABLE 3.2: FULL BUILDOUT TRIP GENERATION

Land Use Code	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
210 - Single-Family Detached Housing (Units)	34	0.74	6	19	25	0.99	21	13	34
221 - Multifamily Housing (Mid-Rise)	71	0.36	7	19	26	0.44	19	12	31
Net Total Trip Generation			**13**	**38**	**51**		**40**	**25**	**65**

[5] Trip Generation Manual, 10th Edition, Institute of Transportation Engineers, September 2017.

3.3 Development Trip Distribution and Assignment

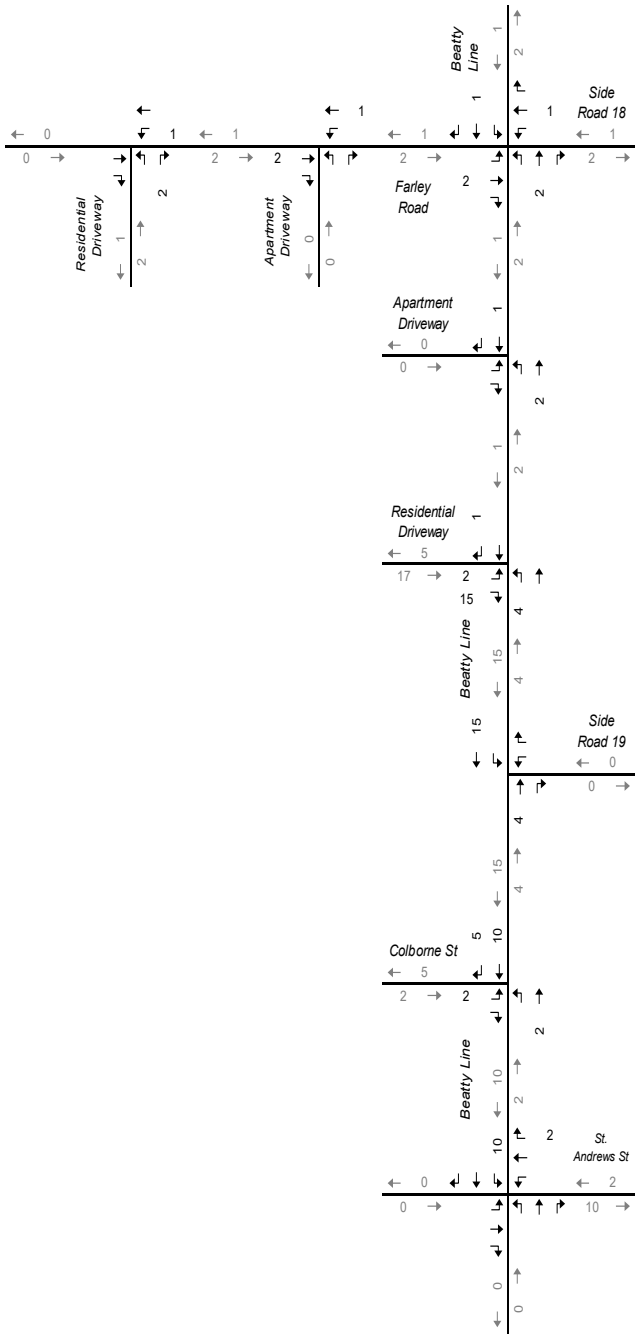
The trip distribution was based on the likely origin/destination of trips generated by the development. Given that this development located near the NWFSP area, the likely trip origins and destinations would be similar to that study. Therefore, the trip distribution used in the NWFSP Traffic Study was used for this study as shown in **Table 3.3**.

TABLE 3.3: TRIP DISTRIBUTION

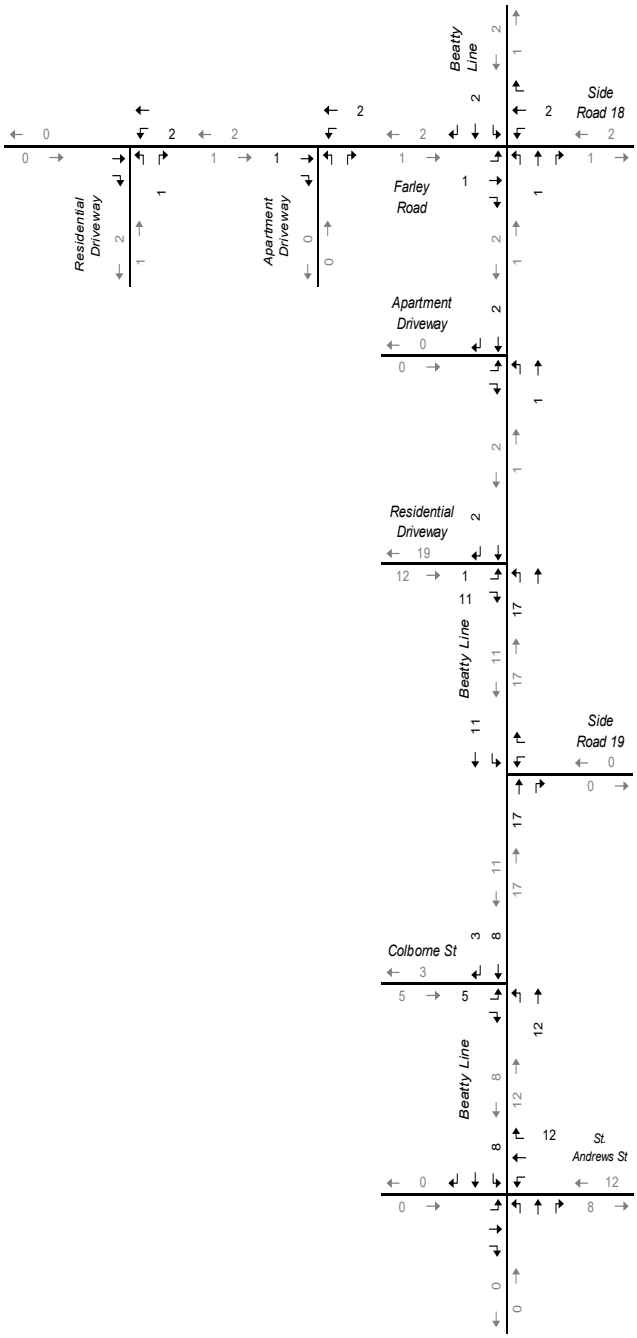
Route	Direction	to/from
Beatty Line	North	10%
Side Road 18	East	10%
Colborne	West	25%
Beatty Line	South	55%
Total		**100%**

The trip assignment by Phase 1 of the development is shown in **Figure 3.2** and the trip assignment for the full build out of the development is shown in **Figure 3.3**.

AM Peak Hour



PM Peak Hour



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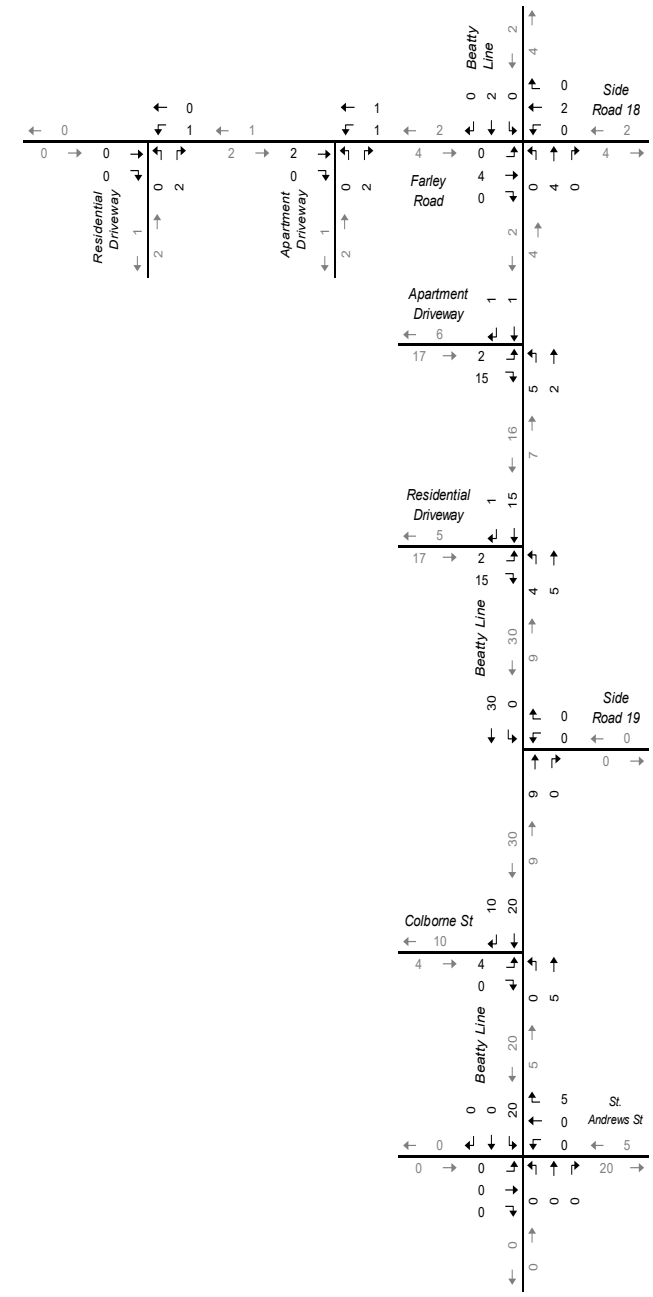
Phase 1 Development Traffic Forecasts

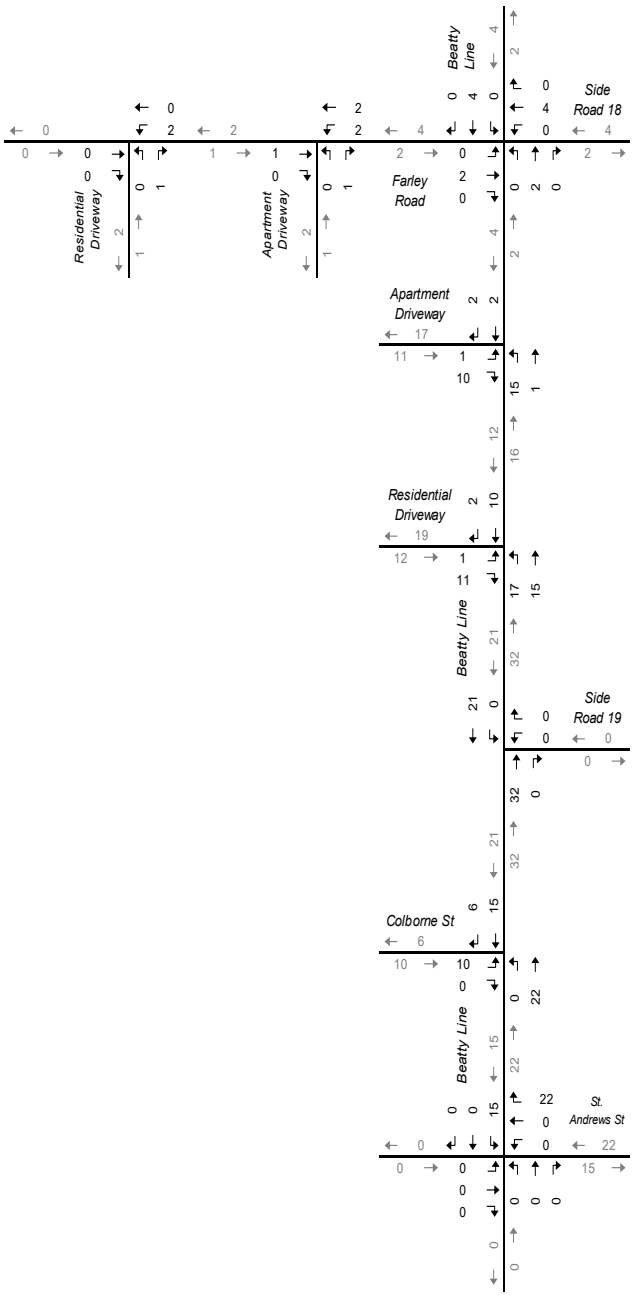
Beatty Line North, Fergus TIS
180135

Figure 3.2

AM Peak Hour



PM Peak Hour



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Full Development Traffic Forecasts

4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions contained in this section includes estimates of future background and total traffic analysis for the 2020, 2021, and 2026 horizons. The future traffic volumes near the development will likely consist of increased non-site traffic volumes (background traffic), traffic generated by other developments, and the traffic forecast to be generated by the proposed development.

4.1 2020 Horizon

4.1.1 2020 Background Traffic Growth

The non-site traffic increase represents generalized traffic growth in the Fergus area. A growth rate of 1% per annum was used for all existing traffic in the study area. This growth rate was used in the NWFSP Traffic Study to account for generalized background growth in traffic.

Figure 4.1 shows the 2020 background traffic growth for the weekday AM and PM peak hours.

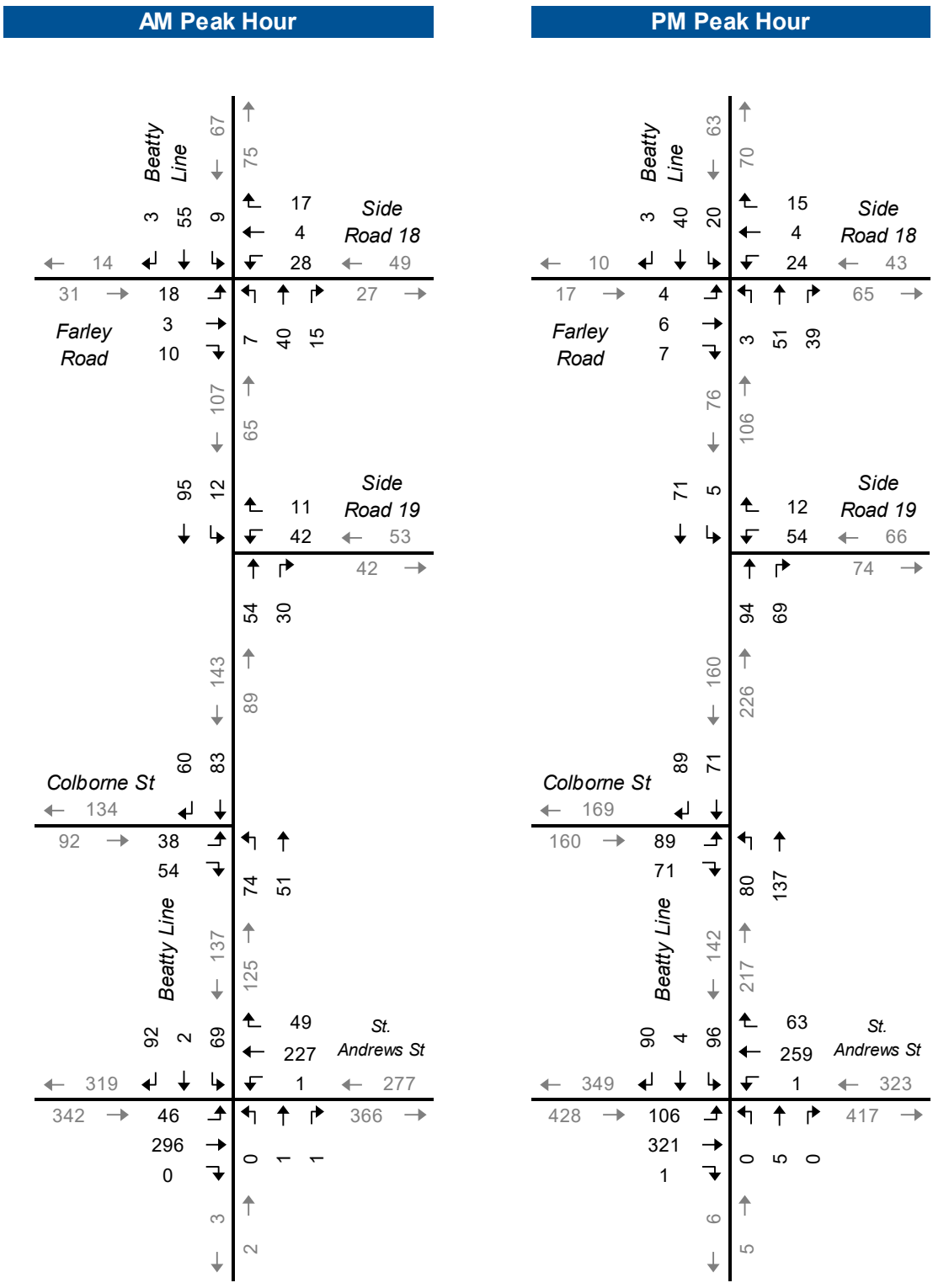
4.1.2 Other Planned Developments

Several other developments are currently under construction and/or planned in the vicinity of the study area. These developments are described in the NWFSP Traffic Study and include the NWFSP Phase 1 lands, Groves Memorial Hospital / County of Wellington Lands, as well as the Keating Subdivision Lands. The traffic forecasts for these developments were taken from its NWFSP Traffic Study and were included in the background traffic forecasts.

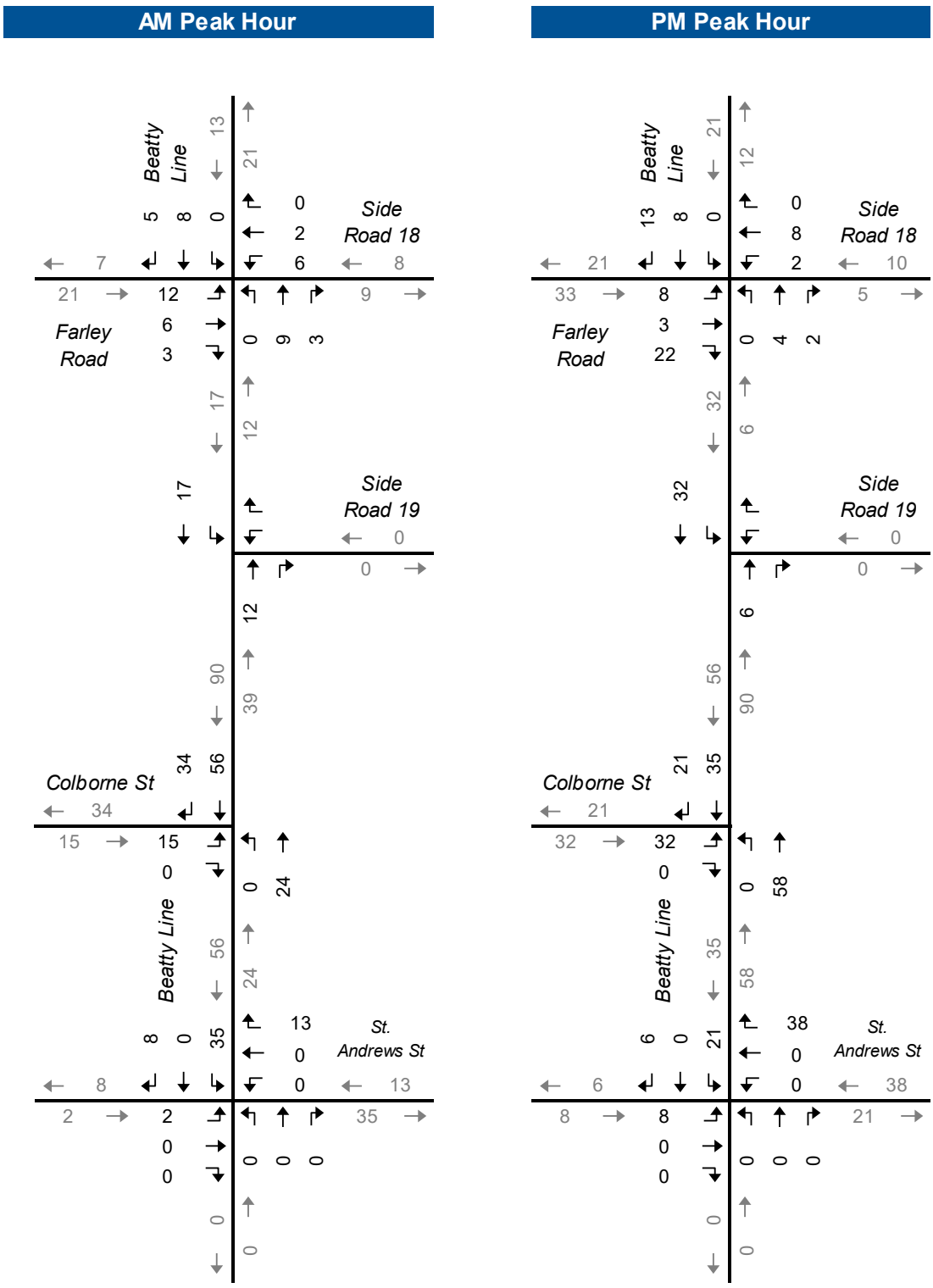
Figure 4.2 shows the 2020 background development traffic for the weekday AM and PM peak hours.

4.1.3 2020 Background Traffic Volumes

The background development traffic was added to the general background traffic to produce the 2020 background traffic forecasts shown in **Figure 4.3**.

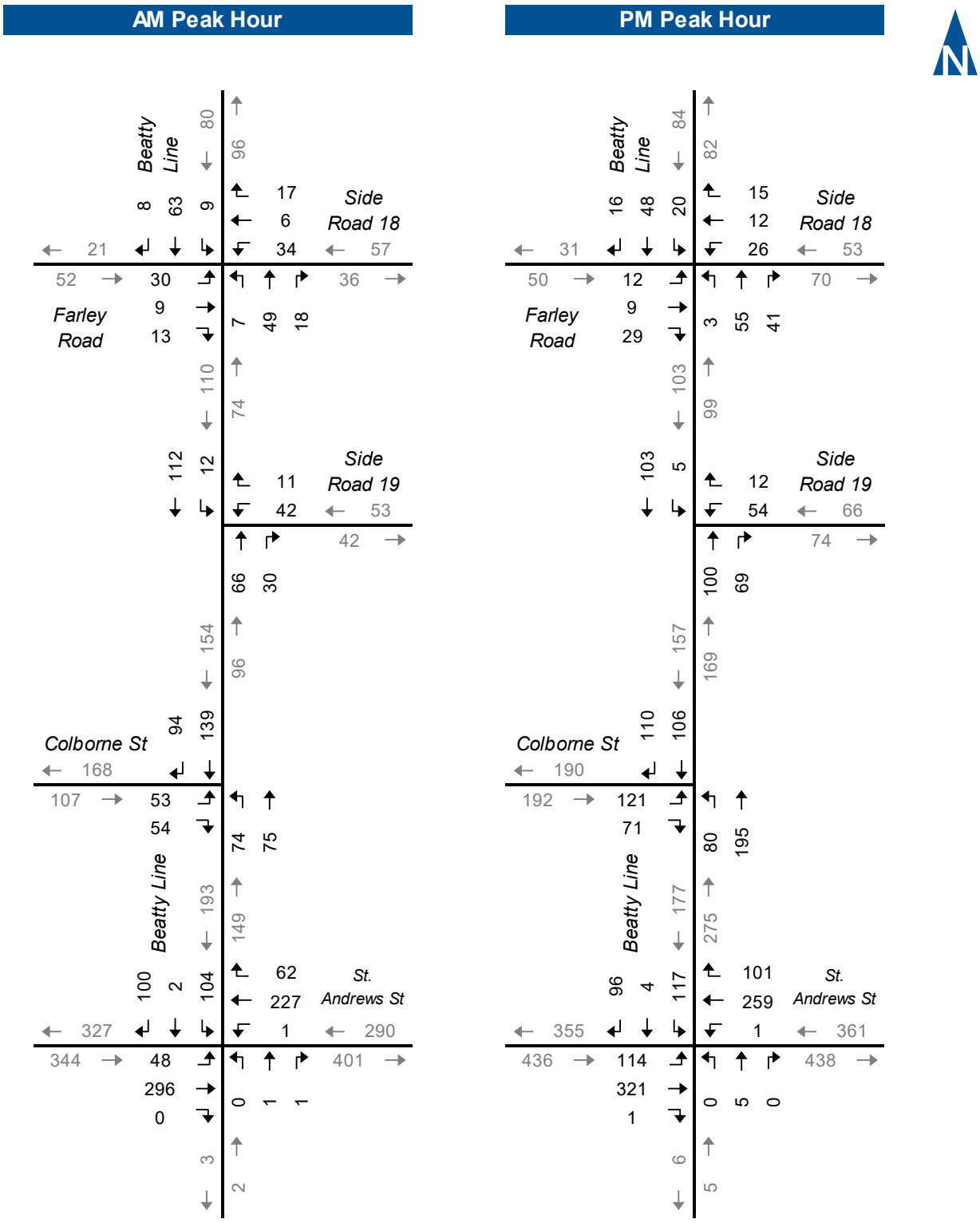


2020 Background Growth Traffic Forecasts



2020 Background Development Traffic Forecasts

Figure 4.2



2020 Background Traffic Forecasts

Figure 4.3

4.1.4 2020 Background Traffic Operations

Based on the forecast 2020 background traffic volumes, operational analyses have been conducted using Synchro 9 to determine the peak hour conditions at the study area intersections. No changes to the existing road network were made in the analysis. The 2020 background traffic operations are summarized in **Table 4.1.** The results indicate that the study area intersections are currently operating at acceptable levels of service during the AM and PM peak hours with the following exception:

- The southbound shared left/through/right-turn movement at the intersection of Beatty Line North and St. Andrews Street is forecast to operate at LOS E with a v/c ratio of 0.76 during the PM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on St. Andrews Street which limits the number of available gaps for side street traffic.

The Synchro 9 reports are included in **Appendix D**.

TABLE 4.1: 2020 BACKGROUND OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	OVERALL
AM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	B	>	**B**	<	B	>	**B**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	10	>	**10**	<	10	>	**10**	<	1	>	**1**	<	1	>	**1**	**5**
			V/C	<	0.08	>		<	0.09	>		<	0.01	>		<	0.01	>		
			95th	<	2	>		<	2	>		<	0	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	**B**		A	>	**A**	<	A		**A**	
			Delay					<		10	**10**		0	>	**0**	<	1		**1**	**2**
			V/C					<		0.09			0.07	>		<	0.01			
			95th					<		2			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	<		B	**B**					<	A		**A**		A	>	**A**	
			Delay	<		12	**12**					<	4		**4**		0	>	**0**	**4**
			V/C	<		0.17						<	0.06				0.15	>		
			95th	<		5						<	2				0	>		
	Beatty Ln N & St. Andrews St	TWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	B	>	**B**	<	C	>	**C**	
			Delay	<	2	>	**2**	<	0	>	**0**	<	13	>	**13**	<	21	>	**21**	**6**
			V/C	<	0.05	>		<	0.00	>		<	0.00	>		<	0.50	>		
			95th	<	1	>		<	0	>		<	0	>		<	22	>		
PM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	A	>	**A**	<	B	>	**B**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	10	>	**10**	<	10	>	**10**	<	0	>	**0**	<	2	>	**2**	**4**
			V/C	<	0.07	>		<	0.08	>		<	0.00	>		<	0.02	>		
			95th	<	2	>		<	2	>		<	0	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	**B**		A	>	**A**	<	A		**A**	
			Delay					<		11	**11**		0	>	**0**	<	0		**0**	**2**
			V/C					<		0.10			0.11	>		<	0.00			
			95th					<		3			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	<		C	**C**					<	A		**A**		A	>	**A**	
			Delay	<		16	**16**					<	3		**3**		0	>	**0**	**6**
			V/C	<		0.40						<	0.07				0.14	>		
			95th	<		15						<	2				0	>		
	Beatty Ln N & St. Andrews St	TWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	C	>	**C**	<	E	>	**E**	
			Delay	<	3	>	**3**	<	0	>	**0**	<	22	>	**22**	<	45	>	**45**	**11**
			V/C	<	0.11	>		<	0.00	>		<	0.02	>		<	0.76	>		
			95th	<	3	>		<	0	>		<	1	>		<	47	>		

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

Q - 95th Percentile Queue Length (m)
< - Shared Left-turn
< - Shared Right-turn

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

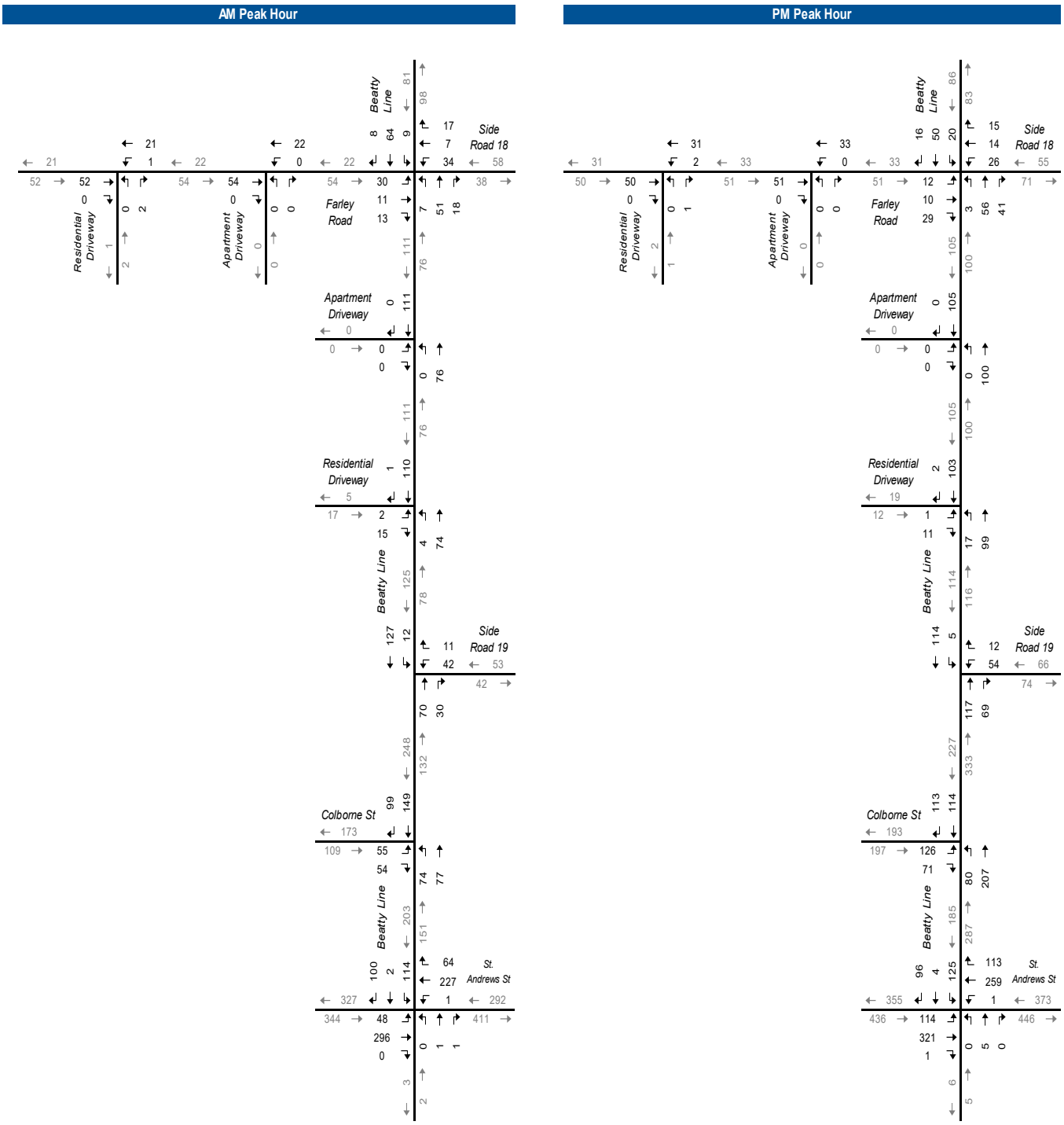
4.1.5 2020 Total Traffic Operations

The total trips expected in 2020, which is the addition of the phase 1 development traffic to the background traffic is shown in **Figure 4.4**. Based on the forecast 2020 total traffic volumes, operations analyses have been conducted using Synchro 9 to determine the peak hour conditions at the study area intersections.

A summary of the LOS conditions is provided in **Table 4.2** and detailed Synchro reports can be found in **Appendix E**. Based on the analyses it is concluded that the intersections are forecast to operate similarly to the background conditions with the following exceptions:

- The southbound shared left/through/right-turn movement at the intersection of Beatty Line North and St. Andrews Street is forecast to operate at LOS F with a v/c ratio of 0.81 during the PM peak hour. The v/c ratio indicates the delay is likely due to the high volume of through traffic on St. Andrews Street which limits the number of available gaps for side street traffic.

The addition of the site-generated trips increases the overall intersection delays by two (2) seconds or less during the AM and PM peak hours.



2020 Total Traffic Forecasts

Beatty Line North, Fergus TIS
180135

Figure 4.4

TABLE 4.2: 2020 TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	B	>	B	<	B	>	B	<	A	>	A	<	A	>	A	
			Delay	<	10	>	10	<	10	>	10	<	1	>	1	<	1	>	1	5
			V/C	<	0.08	>		<	0.09	>		<	0.01	>		<	0.01	>		
			95th	<	2	>		<	2	>		<	0	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	B		A	>	A	<	A		A	
			Delay					<		11	11		0	>	0	<	1		1	2
			V/C					<		0.09			0.07	>		<	0.01			
			95th					<		2			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	<		B	B					<	A		A		A	>	A	
			Delay	<		12	12					<	4		4		0	>	0	4
			V/C	<		0.18						<	0.06				0.16	>		
			95th	<		5						<	2				0	>		
	Beatty Ln N & St. Andrews St	TWSC	LOS	<	A	>	A	<	A	>	A	<	B	>	B	<	C	>	C	
			Delay	<	2	>	2	<	0	>	0	<	13	>	13	<	22	>	22	6
			V/C	<	0.05	>		<	0.00	>		<	0.00	>		<	0.53	>		
			95th	<	1	>		<	0	>		<	0	>		<	25	>		
	Farley Rd & Residential Driveway	TWSC	LOS		A	>	A	<	A		A	<		A	A				A	
			Delay		0	>	0	<	0		0	<		9	0				0	0
			V/C		0.03	>		<	0.00			<		0.00						
			95th		0	>		<	0			<		0						
	Beatty Ln N & Residential Driveway 2	TWSC	LOS	<		A	A					<	A		A		A	>	A	
			Delay	<		9	0					<	0		0		0	>	0	1
			V/C	<		0.02						<	0.07				0.00	>		
			95th	<		1						<	0				0	>		
PM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	A	>	A	<	B	>	B	<	A	>	A	<	A	>	A	
			Delay	<	10	>	10	<	11	>	11	<	0	>	0	<	2	>	2	4
			V/C	<	0.07	>		<	0.09	>		<	0.00	>		<	0.02	>		
			95th	<	2	>		<	2	>		<	0	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	B		A	>	A	<	A		A	
			Delay					<		11	11		0	>	0	<	0		0	2
			V/C					<		0.11			0.12	>		<	0.00			
			95th					<		3			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	<		C	C					<	A		A		A	>	A	
			Delay	<		17	17					<	3		3		0	>	0	6
			V/C	<		0.42						<	0.07				0.15	>		
			95th	<		17						<	2				0	>		
	Beatty Ln N & St. Andrews St	TSC	LOS	<	A	>	A	<	A	>	A	<	C	>	C	<	F	>	F	
			Delay	<	3	>	3	<	0	>	0	<	22	>	22	<	52	>	52	13
			V/C	<	0.11	>		<	0.00	>		<	0.02	>		<	0.81	>		
			95th	<	3	>		<	0	>		<	1	>		<	53	>		
	Farley Rd & Residential Driveway	TWSC	LOS		A	>	A	<	A		A	<		A	A				A	
			Delay		9	>	9	<	0		0	<		0	0				0	0
			V/C		0.00	>		<	0.03			<		0.00						
			95th		0	>		<	0			<		0						
	Beatty Ln N & Residential Driveway 2	TWSC	LOS	<		A	A					<	A		A		A	>	A	
			Delay	<		9	0					<	0		0		1	>	0	1
			V/C	<		0.01						<	0.07				0.01	>		
			95th	<		0						<	0				0	>		

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

Q - 95th Percentile Queue Length (m)
< - Shared Left-turn
< - Shared Right-turn

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

4.2 2021 Horizon

4.2.1 2021 Background Traffic Growth

The non-site traffic increase represents generalized traffic growth in the Fergus area. A growth rate of 1% per annum was used for all existing traffic in the study area. This growth rate was used in the NWFSP Traffic Study to account for generalized background growth in traffic.

Figure 4.5 shows the 2021 background traffic growth for the weekday AM and PM peak hours.

4.2.2 Other Planned Developments

Several other developments are currently under construction and/or planned in the vicinity of the study area. These developments are described in the NWFSP Traffic Study and include the NWFSP Phase 1 lands, Groves Memorial Hospital / County of Wellington Lands, as well as the Keating Subdivision Lands. The traffic forecasts for these developments were taken from its NWFSP Traffic Study and were included in the background traffic forecasts.

Figure 4.2 shows the 2021 background development traffic for the weekday AM and PM peak hours.

4.2.3 2021 Background Traffic Volumes

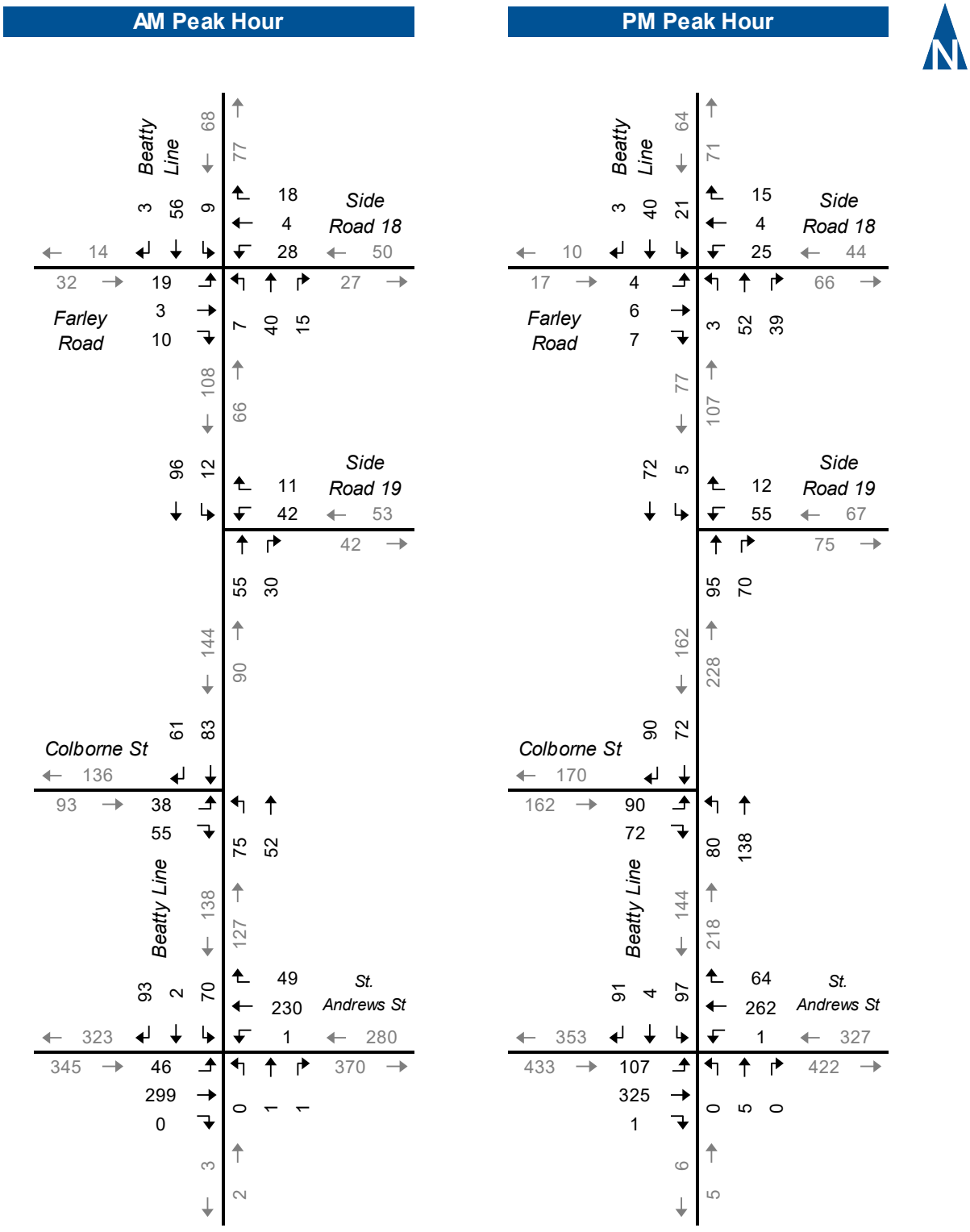
The background development traffic was added to the general background traffic to produce the 2021 background traffic forecasts shown in **Figure 4.6**.

4.2.4 2021 Background Traffic Operations

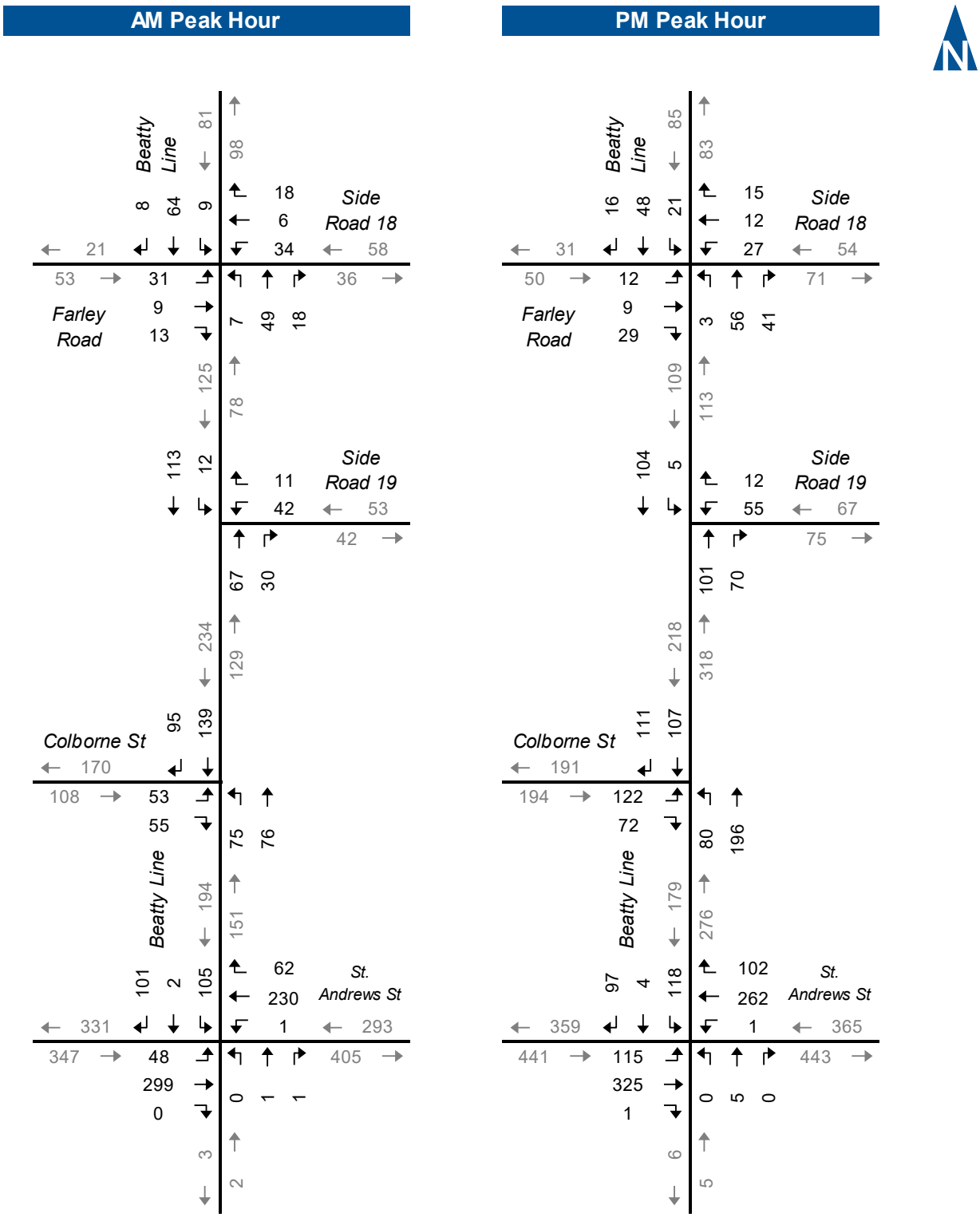
Based on the forecast 2021 background traffic volumes, operational analyses have been conducted using Synchro 9 to determine the peak hour conditions at the study area intersections. . No changes to the existing road network were made in the analysis. The 2021 background traffic operations are summarized in **Table 4.3.** The results indicate that the study area intersections are currently operating at acceptable levels of service during the AM and PM peak hours with the following exception:

- The southbound shared left/through/right-turn movement at the intersection of Beatty Line North and St. Andrews Street is forecast to operate at LOS E with a v/c ratio of 0.78 during the PM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on St. Andrews Street which limits the number of available gaps for side street traffic.

The Synchro 9 reports are included in **Appendix F**.



2021 Background Growth Traffic Forecasts



2021 Background Traffic Forecasts

Figure 4.6

TABLE 4.3: 2021 BACKGROUND OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	B	>	**B**	<	B	>	**B**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	10	>	**10**	<	10	>	**10**	<	1	>	**1**	<	1	>	**1**	**5**
			V/C	<	0.08	>		<	0.09	>		<	0.01	>		<	0.01	>		
			95th	<	2	>		<	2	>		<	0	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	**B**		A	>	**A**	<	A		**A**	
			Delay					<		10	**10**		0	>	**0**	<	1		**1**	**2**
			V/C					<		0.09			0.07	>		<	0.01			
			95th					<		2			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	<		B	**B**					<	A		**A**		A	>	**A**	
			Delay	<		12	**12**					<	4		**4**		0	>	**0**	**4**
			V/C	<		0.18						<	0.06				0.15	>		
			95th	<		5						<	2				0	>		
	Beatty Ln N & St. Andrews St	TWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	B	>	**B**	<	C	>	**C**	
			Delay	<	2	>	**2**	<	0	>	**0**	<	13	>	**13**	<	21	>	**21**	**6**
			V/C	<	0.05	>		<	0.00	>		<	0.00	>		<	0.51	>		
			95th	<	1	>		<	0	>		<	0	>		<	23	>		
PM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	A	>	**A**	<	B	>	**B**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	10	>	**10**	<	11	>	**11**	<	0	>	**0**	<	2	>	**2**	**4**
			V/C	<	0.07	>		<	0.09	>		<	0.00	>		<	0.02	>		
			95th	<	2	>		<	2	>		<	0	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	**B**		A	>	**A**	<	A		**A**	
			Delay					<		11	**11**		0	>	**0**	<	0		**0**	**2**
			V/C					<		0.10			0.11	>		<	0.00			
			95th					<		3			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	<		C	**C**					<	A		**A**		A	>	**A**	
			Delay	<		16	**16**					<	3		**3**		0	>	**0**	**6**
			V/C	<		0.40						<	0.07				0.14	>		
			95th	<		15						<	2				0	>		
	Beatty Ln N & St. Andrews St	TWSC	LOS	<	A	>	**A**	<	A	>	**A**	<	C	>	**C**	<	E	>	**E**	
			Delay	<	3	>	**3**	<	0	>	**0**	<	22	>	**22**	<	48	>	**48**	**12**
			V/C	<	0.11	>		<	0.00	>		<	0.02	>		<	0.78	>		
			95th	<	3	>		<	0	>		<	1	>		<	49	>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
< - Shared Left-turn
< - Shared Right-turn
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control

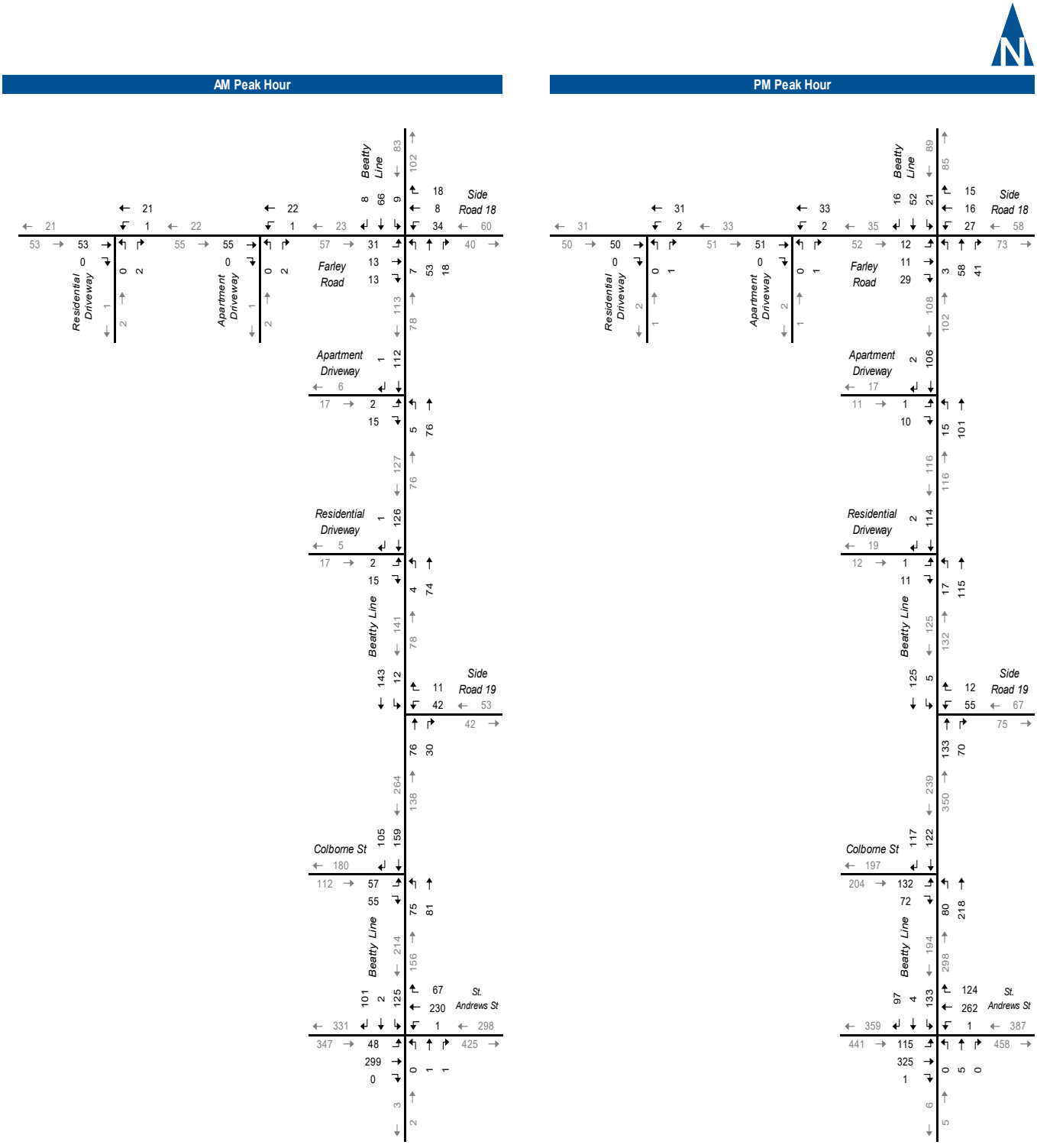
4.2.5 2021 Total Traffic Operations

The total trips expected in 2021, which is the addition of the full build out development traffic to the background traffic is shown in **Figure 4.7**. Based on the forecast 2021 total traffic volumes, operations analyses have been conducted using Synchro 9 to determine the peak hour conditions at the study area intersections.

A summary of the LOS conditions is provided in **Table 4.4** and detailed Synchro reports can be found in **Appendix G**. Based on the analyses it is concluded that the intersections are forecast to operate similarly to the background conditions with the following exceptions:

- The southbound shared left/through/right-turn movement at the intersection of Beatty Line North and St. Andrews Street is forecast to operate at LOS F with a v/c ratio of 0.87 during the PM peak hour. The v/c ratio indicates the delay is likely due to the high volume of through traffic on St. Andrews Street which limits the number of available gaps for side street traffic.

The addition of the site-generated trips increases the overall intersection delays by three (3) seconds or less during the AM and PM peak hours.



2021 Total Traffic Forecasts

Beatty Line North, Fergus TIS
180135

Figure 4.7

TABLE 4.4: 2021 TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																	OVERALL
				Eastbound				Westbound				Northbound				Southbound					
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
AM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	B	>	B	<	B	>	B	<	A	>	A	<	A	>	A		
			Delay	<	10	>	10	<	10	>	10	<	1	>	1	<	1	>	1	5	
			V/C	<	0.09	>		<	0.09	>		<	0.01	>		<	0.01	>			
			95th	<	2	>		<	2	>		<	0	>		<	0	>			
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	B		A	>	A	<	A		A		
			Delay					<		11	11		0	>	0	<	1		1	2	
			V/C					<		0.09			0.08	>		<	0.01				
			95th					<		2			0	>		<	0				
	Beatty Ln N & Colborne St	TWSC	LOS	<		B	B					<	A		A		A	>	A		
			Delay	<		12	12					<	4		4		0	>	0	4	
			V/C	<		0.19						<	0.06				0.17	>			
			95th	<		6						<	2				0	>			
	Beatty Ln N & St. Andrews St	TWSC	LOS	<	A	>	A	<	A	>	A	<	B	>	B	<	C	>	C		
			Delay	<	2	>	2	<	0	>	0	<	13	>	13	<	24	>	24	7	
			V/C	<	0.05	>		<	0.00	>		<	0.00	>		<	0.58	>			
			95th	<	1	>		<	0	>		<	0	>		<	29	>			
	Farley Rd & Apartment Driveway 1	TWSC	LOS		A	>	A	<	A		A	<		A	A						
			Delay		0	>	0	<	0		0	<		9	0					0	
			V/C		0.04	>		<	0.00			<		0.00							
			95th		0	>		<	0			<		0							
	Beatty Ln N & Apartment Driveway 2	TWSC	LOS	<		A	A					<	A		A		A	>	A		
			Delay	<		9	0					<	0		0		0.4	>	0	1	
			V/C	<		0.02						<	0.07				0.00	>			
			95th	<		1						<	0				0.1	>			
	Farley Rd & Residential Driveway	TWSC	LOS		A	>	A	<	A		A	<		A	A				A		
			Delay		9	>	9	<	0		0	<		0	0				0	0	
			V/C		0.00	>		<	0.03			<		0.00							
			95th		0	>		<	0			<		0							
	Beatty Ln N & Residential Driveway 2	TWSC	LOS	<		A	A					<	A		A		A	>	A		
			Delay	<		9	0					<	0		0		0	>	0	1	
			V/C	<		0.00						<	0.03				0.00	>			
			95th	<		0						<	0				0	>			
PM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	A	>	A	<	B	>	B	<	A	>	A	<	A	>	A		
			Delay	<	10	>	10	<	11	>	11	<	0	>	0	<	2	>	2	4	
			V/C	<	0.07	>		<	0.09	>		<	0.00	>		<	0.02	>			
			95th	<	2	>		<	3	>		<	0	>		<	0	>			
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	B		A	>	A	<	A		A		
			Delay					<		11	11		0	>	0	<	0		0	2	
			V/C					<		0.11			0.13	>		<	0.00				
			95th					<		3			0	>		<	0				
	Beatty Ln N & Colborne St	TWSC	LOS	<		C	C					<	A		A		A	>	A		
			Delay	<		18	18					<	3		3		0	>	0	6	
			V/C	<		0.45						<	0.07				0.16	>			
			95th	<		18						<	2				0	>			
	Beatty Ln N & St. Andrews St.	TWSC	LOS	<	A	>	A	<	A	>	A	<	C	>	C	<	F	>	F		
			Delay	<	3	>	3	<	0	>	0	<	23	>	23	<	63	>	63	15	
			V/C	<	0.11	>		<	0.00	>		<	0.02	>		<	0.87	>			
			95th	<	3	>		<	0	>		<	1	>		<	62	>			
	Farley Rd & Apartment Driveway 1	TWSC	LOS		A	>	A	<	A		A	<		A	A						
			Delay		0	>	0	<	0		0	<		0	0					0	
			V/C		0.03	>		<	0.00			<		0.00							
			95th		0	>		<	0			<		0							
	Beatty Ln N & Apartment Driveway 2	TWSC	LOS	<		A	A					<	A		A		A	>	A		
			Delay	<		9	0					<	0		0		1	>	0	1	
			V/C	<		0.01						<	0.07				0.01	>			
			95th	<		0						<	0				0.3	>			
	Farley Rd & Residential Driveway	TWSC	LOS		A	>	A	<	A		A	<		A	A				A		
			Delay		9	>	9	<	0		0	<		0	0				0	0	
			V/C		0.00	>		<	0.03			<		0.00							
			95th		0	>		<	0			<		0							
	Beatty Ln N & Residential Driveway 2	TWSC	LOS	<		A	A					<	A		A		A	>	A		
			Delay	<		9	0					<	0		0		1	>	0	1	
			V/C	<		0.01						<	0.07				0.01	>			
			95th	<		0						<	0				0	>			

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

Q - 95th Percentile Queue Length (m)
< - Shared Left-turn
< - Shared Right-turn

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

4.3 2026 Horizon

4.3.1 2026 Background Traffic Growth

The non-site traffic increase represents generalized traffic growth in the Fergus area. A growth rate of 1% per annum was used for all existing traffic in the study area. This growth rate was used in the NWFSP Traffic Study to account for generalized background growth in traffic.

Figure 4.8 shows the 2026 background traffic growth for the weekday AM and PM peak hours.

4.3.2 Other Planned Developments

Several other developments are currently under construction and/or planned in the vicinity of the study area. These developments are described in the NWFSP Traffic Study and include the NWFSP Phase 1 lands, Groves Memorial Hospital / County of Wellington Lands, as well as the Keating Subdivision Lands. The traffic forecasts for these developments were taken from its NWFSP Traffic Study and were included in the background traffic forecasts.

Figure 4.9 shows the 2026 background development traffic for the weekday AM and PM peak hours.

4.3.3 2026 Background Traffic Volumes

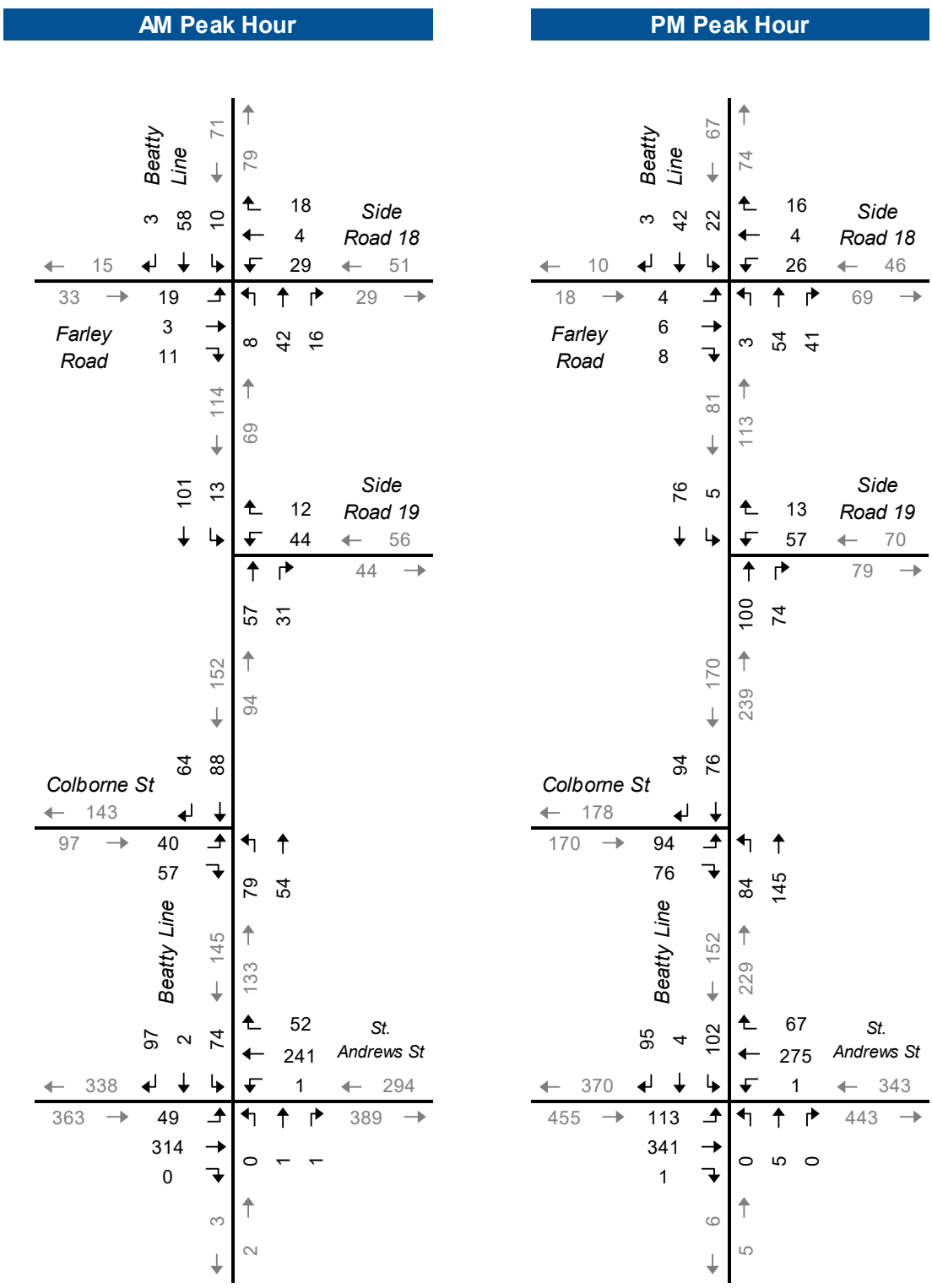
The background development traffic was added to the general background traffic to produce the 2026 background traffic forecasts shown in **Figure 4.10**.

4.3.4 Road Network Improvements

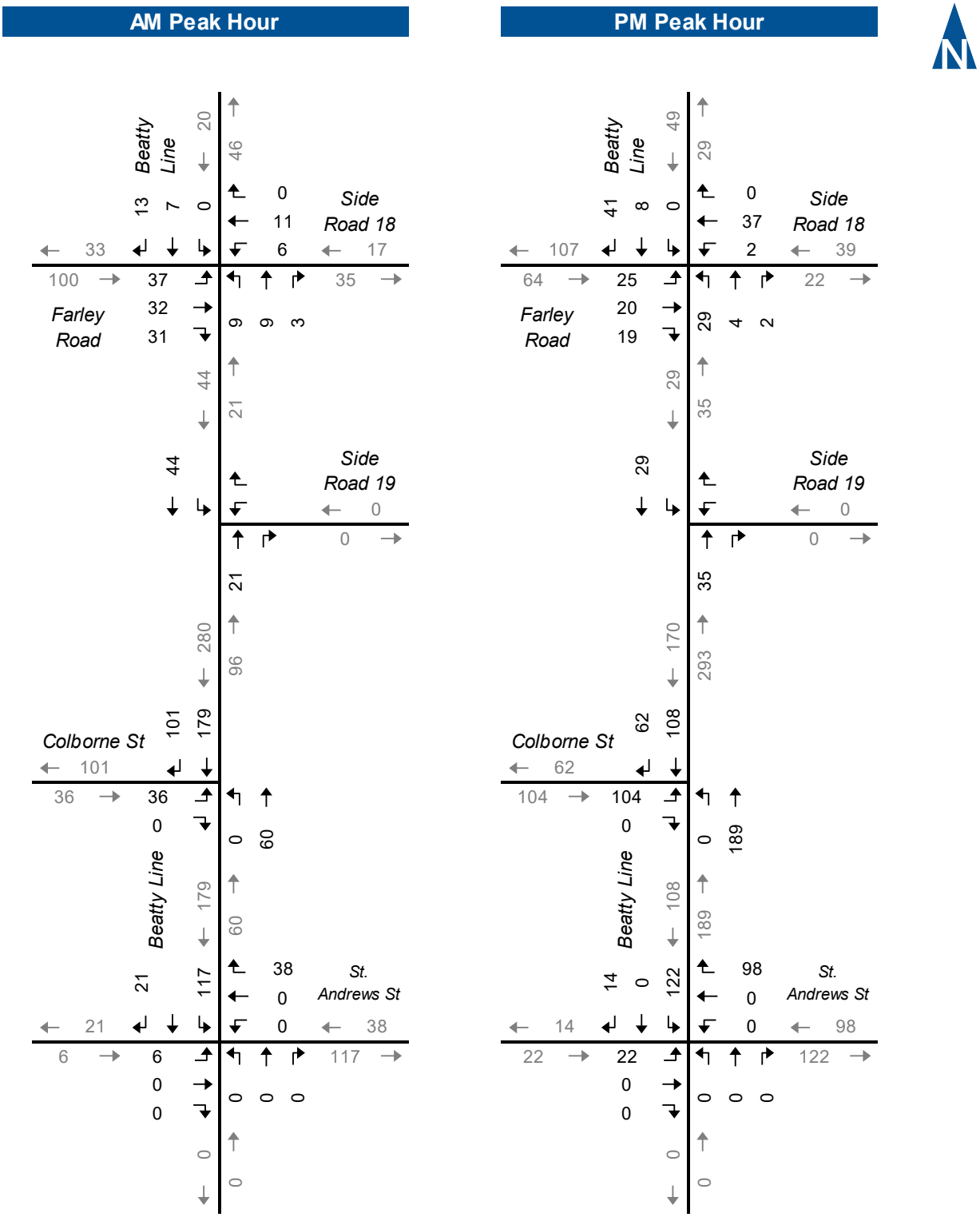
The NWFSP Traffic Study have identified the following improvements which are to be implemented by the 2026 horizon year:

- Beatty Line North at Colborne Street:
  - Addition of an eastbound left-turn lane; and
  - Addition of a northbound left-turn lane.
- Beatty Line North at St. Andrews Street:
  - Installation of traffic control signals;
  - Addition of an eastbound left-turn lane; and
  - Addition of a southbound left-turn lane.

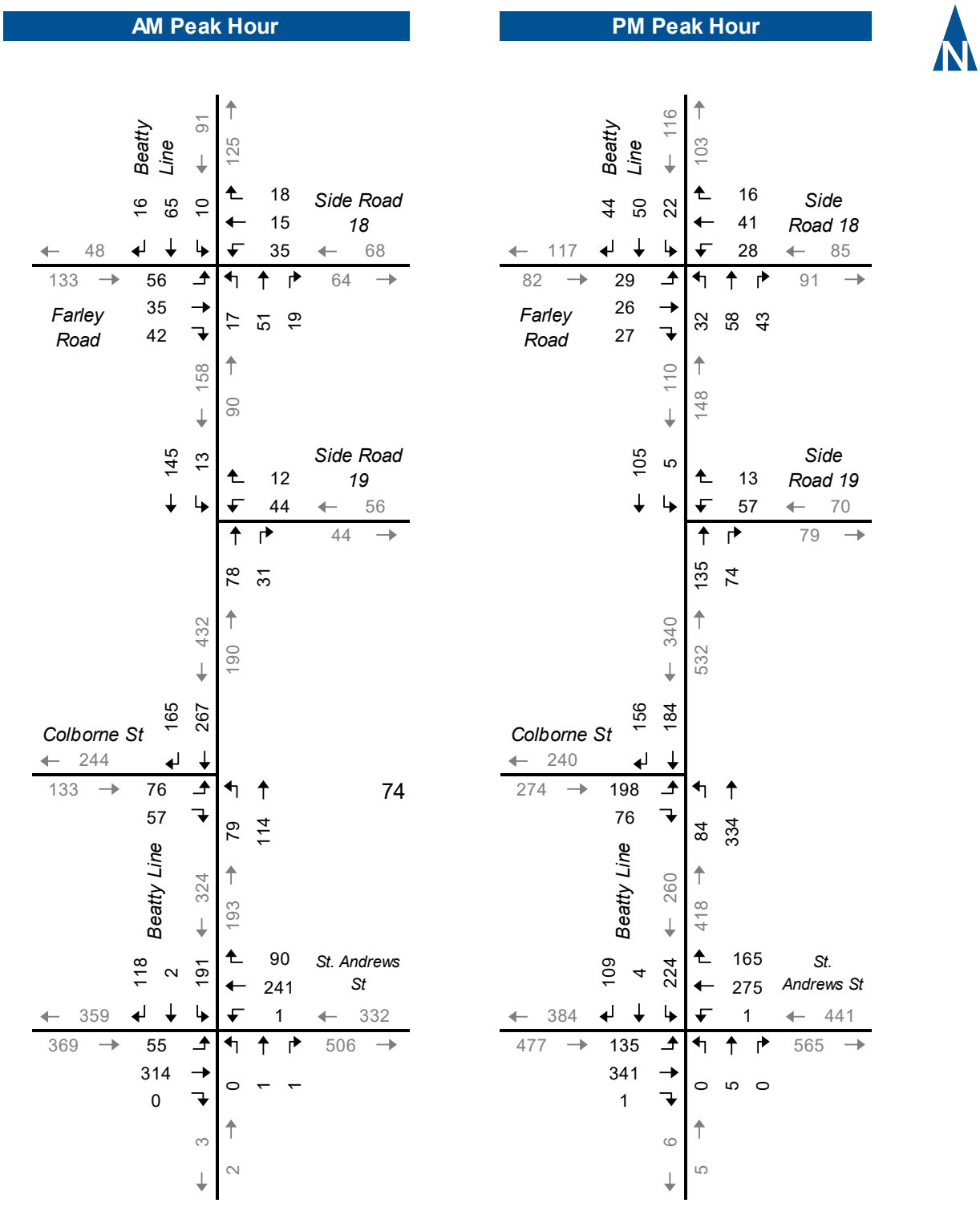
These improvements have been included in this analysis.



2026 Background Growth Traffic Forecasts



2026 Background Development Traffic Forecasts



2026 Background Traffic Forecasts

Figure 4.10

4.3.5 2026 Background Traffic Operations

Based on the forecast 2021 background traffic volumes, operational analyses have been conducted using Synchro 9 to determine the peak hour conditions at the study area intersections. The 2026 background traffic operations are summarized in **Table 4.5**. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours with the following exceptions:

- The eastbound left-turn movement at the intersection of Beatty Line North and Colborne Street is forecast to operate at LOS E with a v/c ratio of 0.73. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on Beatty Line North which limits the number of available gaps for side street traffic.

The Synchro 9 reports are included in **Appendix H**.

TABLE 4.5: 2026 BACKGROUND OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	OVERALL
AM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	B	>	**B**	<	B	>	**B**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	11	>	**11**	<	11	>	**11**	<	2	>	**2**	<	1	>	**1**	**7**
			V/C	<	0.22	>		<	0.12	>		<	0.01	>		<	0.01	>		
			95th	<	7	>		<	3	>		<	0	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	**B**		A	>	**A**	<	A		**A**	
			Delay					<		11	**11**		0	>	**0**	<	1		**1**	**2**
			V/C					<		0.10			0.08	>		<	0.01			
			95th					<		3			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	C		B	**C**					A	A		**A**		A	>	**A**	
			Delay	17		11	**17**					9	0		**9**		0	>	**0**	**3**
			V/C	0.21		0.09						0.08	0.07				0.27	>		
			95th	6		2						2	0				0	>		
	Beatty Ln N & St. Andrews St	TCS	LOS	B	B	>	**B**	<	B	>	**B**	<	B	>	**B**	B	B	>	**B**	**B**
			Delay	15	17	>	**17**	<	19	>	**19**	<	20	>	**20**	18	16	>	**17**	**18**
			V/C	0.31	0.62	>		<	0.66	>		<	0.66	>		0.52	0.10	>		**0.50**
			95th	14	56	>		<	57	>		<	57	>		38	11	>		
PM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	B	>	**B**	<	B	>	**B**	<	A	>	**A**	<	A	>	**A**	
			Delay	<	12	>	**12**	<	12	>	**12**	<	2	>	**2**	<	2	>	**2**	**6**
			V/C	<	0.14	>		<	0.16	>		<	0.02	>		<	0.02	>		
			95th	<	4	>		<	5	>		<	1	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	**B**		A	>	**A**	<	A		**A**	
			Delay					<		11	**11**		0	>	**0**	<	0		**0**	**2**
			V/C					<		0.11			0.14	>		<	0.00			
			95th					<		3			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	E		B	**E**					A	A		**A**		A	>	**A**	
			Delay	43		11	**43**					8	0		**8**		0	>	**0**	**10**
			V/C	0.73		0.11						0.08	0.22				0.22	>		
			95th	43		3						2	0				0	>		
	Beatty Ln N & St. Andres St.	TCS	LOS	B	B	>	**B**	<	B	>	**B**	<	C	>	**C**	C	B	>	**C**	**B**
			Delay	19	16	>	**17**	<	19	>	**19**	<	25	>	**25**	24	18	>	**22**	**19**
			V/C	0.59	0.55	>		<	0.70	>		<	0.03	>		0.64	0.09	>		**0.59**
			95th	#35.4	62	>		<	81	>		<	4	>		54	12	>		

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

Q - 95th Percentile Queue Length (m)
< - Shared Left-turn
< - Shared Right-turn

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

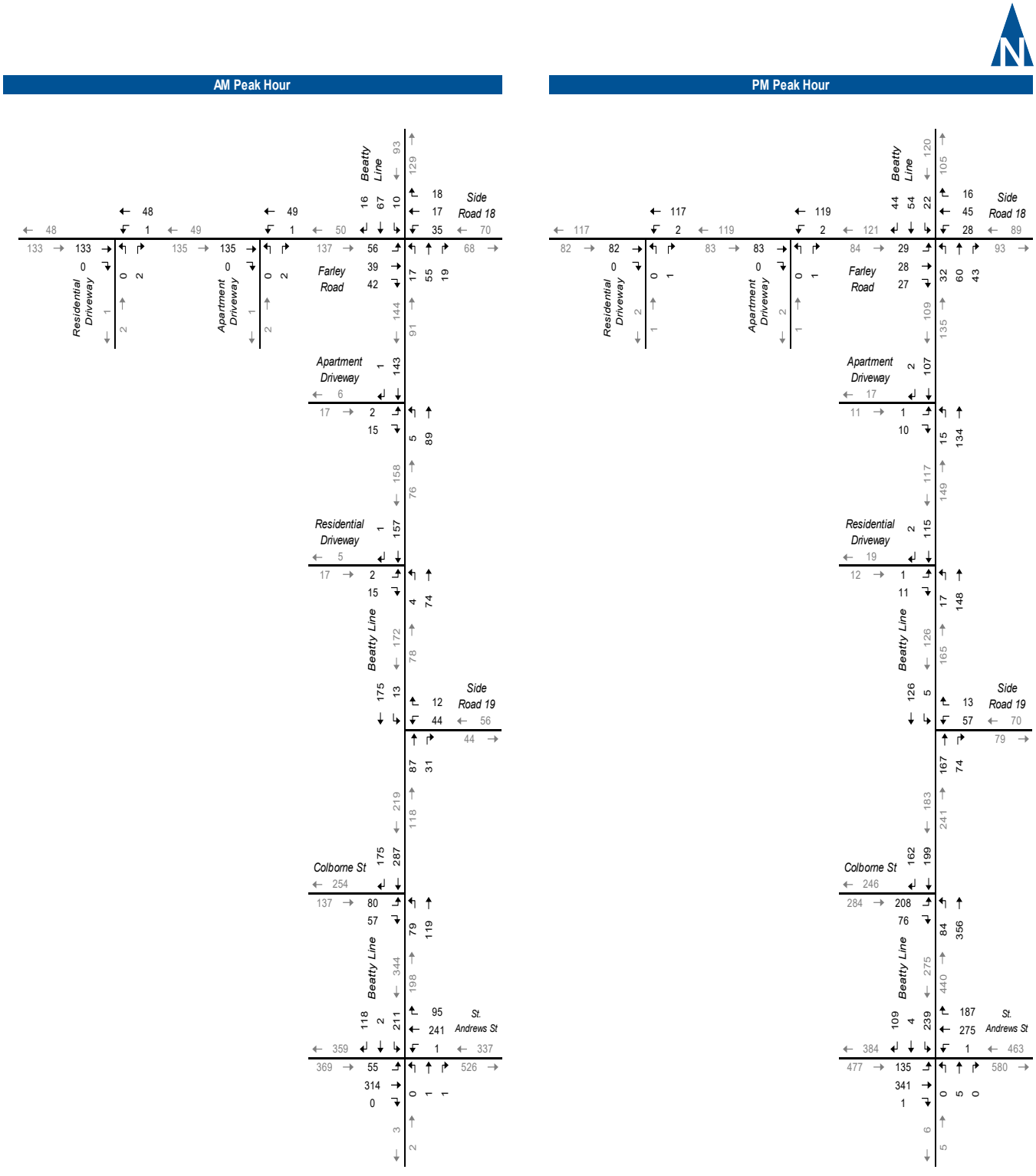
4.3.6 2026 Total Traffic Operations

The total trips expected in 2026, which is the addition of the full build out development traffic to the background traffic is shown in **Figure 4.11**. Based on the forecast 2026 total traffic volumes, operations analyses have been conducted using Synchro 9 to determine the peak hour conditions at the study area intersections.

A summary of the LOS conditions is provided in **Table 4.6** and detailed Synchro reports can be found in **Appendix I**. Based on the analyses it is concluded that the intersections are forecast to operate similarly to the background conditions with the following exceptions:

- The eastbound left-turn movement at the intersection of Beatty Line North and Colborne Street is forecast to operate at LOS F with a v/c ratio of 0.82 during the PM peak hour. The v/c ratio indicates the delay is likely due to the high volume of through traffic on St. Andrews Street which limits the number of available gaps for side street traffic.

The addition of the site-generated trips increases the overall intersection delays by four (4) seconds or less during the AM and PM peak hours.



2026 Total Traffic Forecasts

Beatty Line North, Fergus TIS
180135

Figure 4.11

TABLE 4.6: 2026 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	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	B	>	B	<	B	>	B	<	A	>	A	<	A	>	A	
			Delay	<	12	>	12	<	11	>	11	<	2	>	2	<	1	>	1	7
			V/C	<	0.22	>		<	0.13	>		<	0.01	>		<	0.01	>		
			95th	<	7	>		<	3	>		<	0	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	B		A	>	A	<	A		A	
			Delay					<		11	11		0	>	0	<	1		1	2
			V/C					<		0.10			0.08	>		<	0.01			
			95th					<		3			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	C		B	B					A	A		A		A	>	A	
			Delay	17		11	11					9	0		9		0	>	0	3
			V/C	0.23		0.09						0.08	0.08				0.29	>		
			95th	7		3						2	0				0	>		
	Beatty Ln N & St. Andrews St	TCS	LOS	B	B	>	B	<	B	>	B	<	C	>	C	B	B	>	B	B
			Delay	11	13	>	13	<	14	>	14	<	23	>	23	16	14	>	15	14
			V/C	0.24	0.55	>		<	0.59	>		<	0.03	>		0.53	0.10	>		0.55
			95th	14	57	>		<	60	>		<	2	>		41	11	>		
			Storage Avail.																	
	Farley Rd & Apartment Driveway 1	TWSC	LOS		A	>	A	<	A		A	<		A	A					
			Delay		0	>	0	<	0		0	<		9	0					0
			V/C		0.09	>		<	0.00			<		0.00						
			95th		0	>		<	0			<		0						
	Beatty Ln N & Apartment Driveway 2	TWSC	LOS	<		A	A					<	A		A		A	>	A	
			Delay	<		9	0					<	0		0		0	>	0	1
			V/C	<		0.02						<	0.09				0.00	>		
			95th	<		1						<	0				0	>		
	Farley Rd & Residential Driveway	TWSC	LOS		A	>	A	<	A		A	<		A	A				A	
			Delay		9	>	9	<	0		0	<		0	0				0	0
			V/C		0.00	>		<	0.09			<		0.00						
			95th		0	>		<	0			<		0						
	Beatty Ln N & Residential Driveway 2	TWSC	LOS	<		A	A					<	A		A		A	>	A	
			Delay	<		9	0					<	0		0		0.0	>	0	1
			V/C	<		0.02						<	0.10				0	>		
			95th	<		1						<	0				0	>		
PM Peak Hour	Farley Rd/Side Rd 18 & Beatty Ln N	TWSC	LOS	<	B	>	B	<	B	>	B	<	A	>	A	<	A	>	A	
			Delay	<	12	>	12	<	13	>	13	<	2	>	2	<	2	>	2	6
			V/C	<	0.15	>		<	0.17	>		<	0.02	>		<	0.02	>		
			95th	<	4	>		<	5	>		<	1	>		<	0	>		
	Beatty Ln N & Side Rd 19	TWSC	LOS					<		B	B		A	>	A	<	A		A	
			Delay					<		11	11		0	>	0	<	0		0	2
			V/C					<		0.12			0.16	>		<	0.01			
			95th					<		3			0	>		<	0			
	Beatty Ln N & Colborne St	TWSC	LOS	F		B	B					A	A		A		A	>	A	
			Delay	57		11	11					8	0		0		0	>	0	12
			V/C	0.82		0.12						0.08	0.24				0.24	>		
			95th	54		3						2	0				0	>		
	Beatty Ln N & St. Andrews St.	TCS	LOS	B	B	>	B	<	B	>	B	<	C	>	C	C	B	>	C	B
			Delay	12	12	>	12	<	14	>	14	<	30	>	30	24	17	>	22	15
			V/C	0.45	0.46	>		<	0.62	>		<	0.17	>		0.66	0.09	>		0.62
			95th	33	62	>		<	86	>		<	4	>		53	12	>		
			Storage Avail.																	
	Farley Rd & Apartment Driveway 1	TWSC	LOS		A	>	A	<	A		A	<		A	A					
			Delay		0	>	0	<	0		0	<		9	0					0
			V/C		0.05	>		<	0.00			<		0.00						
			95th		0	>		<	0			<		0						
	Beatty Ln N & Apartment Driveway 2	TWSC	LOS	<		A	A					<	A		A		A	>	A	
			Delay	<		9	0					<	0		0		1	>	0	1
			V/C	<		0.01						<	0.07				0.01	>		
			95th	<		0						<	0				0	>		
	Farley Rd & Residential Driveway	TWSC	LOS		A	>	A	<	A		A	<		A	A				A	
			Delay		9	>	9	<	0		0	<		0	0				0	0
			V/C		0.00	>		<	0.05			<		0.00						
			95th		0	>		<	0			<		0						
	Beatty Ln N & Residential Driveway 2	TWSC	LOS	<		A	A					<	A		A		A	>	A	
			Delay	<		9	0					<	0		0		1	>	0	1
			V/C	<		0.01						<	0.07				0.01	>		
			95th	<		0						<	0				0	>		

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

Q - 95th Percentile Queue Length (m)
< - Shared Left-turn
< - Shared Right-turn

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

5 Remedial Measures

5.1 Left-turn Lanes

The need for left-turn lanes on Beatty Line North and Farley Road at the site driveways was assessed for the 2026 future total traffic horizon. The warrants were conducted using the MTO left-turn lane warrants for an unsignalized intersection with a two-lane cross-section for a 60 kilometre per hour design speed (10 kilometres per hour over the posted speed limit). The warrant nomographs can be found in **Appendix J** and indicate that left-turn lanes are not warranted at the site driveways based on future total traffic volumes.

6 Conclusions and Recommendations

6.1 Conclusions

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

- The study area intersections are operating at acceptable levels of service during the AM and PM peak hours
- The build-out of Phase 1 of the subject site is forecast to generate approximately 25 trips during the AM peak hour and approximately 34 trips during the PM peak hour. The full build-out of site is forecast to generate approximately 51 trips during the AM peak hour and approximately 65 trips during the PM peak hour.
- Under the forecast 2020 background traffic conditions, the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours with the following exception:
  - The southbound shared left/through/right-turn movement at the intersection of Beatty Line North and St. Andrews Street is forecast to operate at LOS E with a v/c ratio of 0.76 during the PM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on St. Andrews Street which limits the number of available gaps for side street traffic.
- Under the forecast 2020 total traffic conditions, the study area intersections are forecast to operate similar to the 2020 background traffic operations. Inclusion of the site-generated traffic increases the overall intersection delay by two (2) seconds or less during the AM and PM peak hours.
- Under the forecast 2021 background traffic conditions, the study area intersections are forecast to operate with acceptable levels of service during the AM and PM peak hours with the following exception:
  - The southbound shared left/through/right-turn movement at the intersection of Beatty Line North and St. Andrews Street is forecast to operate at LOS E with a v/c ratio of 0.78 during the PM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on St. Andrews Street which limits the number of available gaps for side street traffic.
- Under the forecast 2021 total traffic conditions, the study area intersections are forecast to operate similar to the 2021 background traffic operations. Inclusion of the site-generated traffic increases the overall intersection delay by three (3) seconds or less during the AM and PM peak hours.
- Under the forecast 2026 background traffic conditions, the study area intersections are forecast to operate with acceptable levels of

service during the AM and PM peak hours with the following exception:

- The eastbound left-turn movement at the intersection of Beatty Line North and Colborne Street is forecast to operate at LOS E with a v/c ratio of 0.73 during the PM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on Beatty Line North which limits the number of available gaps for side street traffic.

- Under the forecast 2026 total traffic conditions, the study area intersections are forecast to operate similar to the 2026 background traffic operations. Inclusion of the site-generated traffic increases overall intersection delays by four (4) seconds or less during the AM and PM peak hours.
- Left-turn lanes at the subject site driveways are not warranted under 2026 total traffic conditions.
- No remedial measures beyond what is identified in the NWFSP Traffic Study are required to accommodate the increase in traffic due to the proposed development.

6.2 Recommendations

Based on the findings of this study, it is recommended that:

- The County of Wellington and Township of Centre Wellington monitor the future traffic conditions at the intersections of Beatty Line North at St. Andrews Street and Colborne Street and implement the recommended improvements identified in the NWFSP Traffic Study accordingly.

Appendix A

Scope of Work Approval

5000 Yonge Street, Suite 1901
Toronto, ON M2N 7E9
p: 416.479.9684
f: 1.855.764.7349

www.ptsl.com

18 May 2018
Project: 180135

Pasquale Costanzo, C.E.T.
Technical Services Supervisor | Roads Division
County of Wellington | 519.837.2601 x 2250
pasqualec@wellington.ca

Colin Baker
Managing Director of Infrastructure Services
Centre Wellington | 519.846.9691 x357
cbaker@centrewellington.ca

Dear Mr. Costanzo & Mr. Baker:

RE: TRANSPORTATION IMPACT STUDY TERMS OF REFERENCE – BEATTY LINE NORTH RESIDENTIAL DEVELOPMENT – TOWN OF FERGUS

Paradigm Transportation Solutions Limited is pleased to submit these proposed terms of reference for professional consulting services to undertake the above-noted Transportation Impact Study (TIS) report for the proposed residential development on the southwest quadrant of Farley Road/Sideroad 18 and Beatty Line North in the Town of Fergus, County of Wellington.

Project Understanding

The TIS will evaluate the effects of the proposed development on the transportation system, and recommend improvements, if necessary, to address potential impacts. The site concept plan includes approximately 105 residential units consisting of semi-detached residential units (34 units) and mid-rise apartment units (71 units). Vehicular access is proposed by two (2) new connections to both Farley Road and Beatty Line North. Build-out is expected to occur in two (2) phases, low density units by year 2020 and mid-rise apartment units by year 2021. **Figure 1** (Attached) details the site concept plan.

In assessing the transportation impacts, we intend to analyze the operation of the following intersections, subject to Wellington County's concurrence:

- Beatty Line North and Farley Road/Sideroad 18
- Beatty Line North and Sideroad 19;
- Beatty Line North and Colborne Street; and
- The proposed site driveway connections to Beatty Line North and Farley Road.

Work Plan

- **Task 1 - Pre-Study Consultation**: We will contact the review agencies (County of Wellington and Centre Wellington) to confirm and refine the study scope and assumptions prior to undertaking the TIS.

- **Task 2 - Data Collection**: Through pre-study consultation with the review agencies, we will request available traffic counts, background growth rates, relevant background reports, and any other information about the study area pertinent to the assessment (e.g., other development applications in the vicinity). If the review agencies do not have traffic counts collected within the past two years, we will arrange for 8-hour traffic counts to be conducted on a weekday at the study area intersections.

  Paradigm will undertake a site visit to confirm the existing transportation network, the proposed access arrangement, traffic control, adjacent driveway locations, adjacent land use and operational conditions within the study area.

- **Task 3 - Traffic Forecasting**: We have assumed that we will be requested to develop traffic forecasts for the weekday AM and PM peak hours for five years from the build-out of the development. The components of the traffic forecasts are as follows:

  - **Existing (Base Year) Traffic** - We will develop Existing vehicle traffic volumes for the AM and PM peak hours from available counts for the study area intersections.
  - **Future (Five-Year Horizon) Background Traffic** - We will estimate Future Background vehicle traffic volumes for the AM and PM peak hours by applying a growth rate to the Existing volumes and adding anticipated trips from the North West Fergus Secondary Plan (NWFSP) area and any nearby approved developments identified in Task 1-2.
  - **Future (Five-Year Horizon) Total Traffic** - We will forecast the AM and PM peak hour vehicle traffic volumes generated by the proposed development based on a combination of data collected by Paradigm from similar sites or the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition) as appropriate. The site vehicle trips will be distributed to the adjacent road network based on existing traffic patterns, and added to the Future Background estimates to produce Future Total traffic volumes for each horizon year.

- **Task 4 - Operational Analyses**: We will evaluate the operation of the study area intersections for the Existing, Future (Five-Year Horizon) Background and Total AM and PM peak hour traffic conditions. The operational analyses will assess volume-to-capacity (v/c) ratios, Level of Service (LOS) and queuing conditions. Based on the analysis results, we will identify any existing deficiencies, as well as the net traffic impact of the proposed development on the study area road network. We will advise on the access design and locations for the proposed site driveway connections. The need for road improvements (e.g., provision of auxiliary turn lanes) and/or modifications to traffic control devices (e.g., addition of traffic control signals) to address any deficiencies will be determined. An assessment of whether these measures are required due to non-site traffic (i.e. Existing or Future Background) or the increase in traffic resulting from the proposed development will be completed.

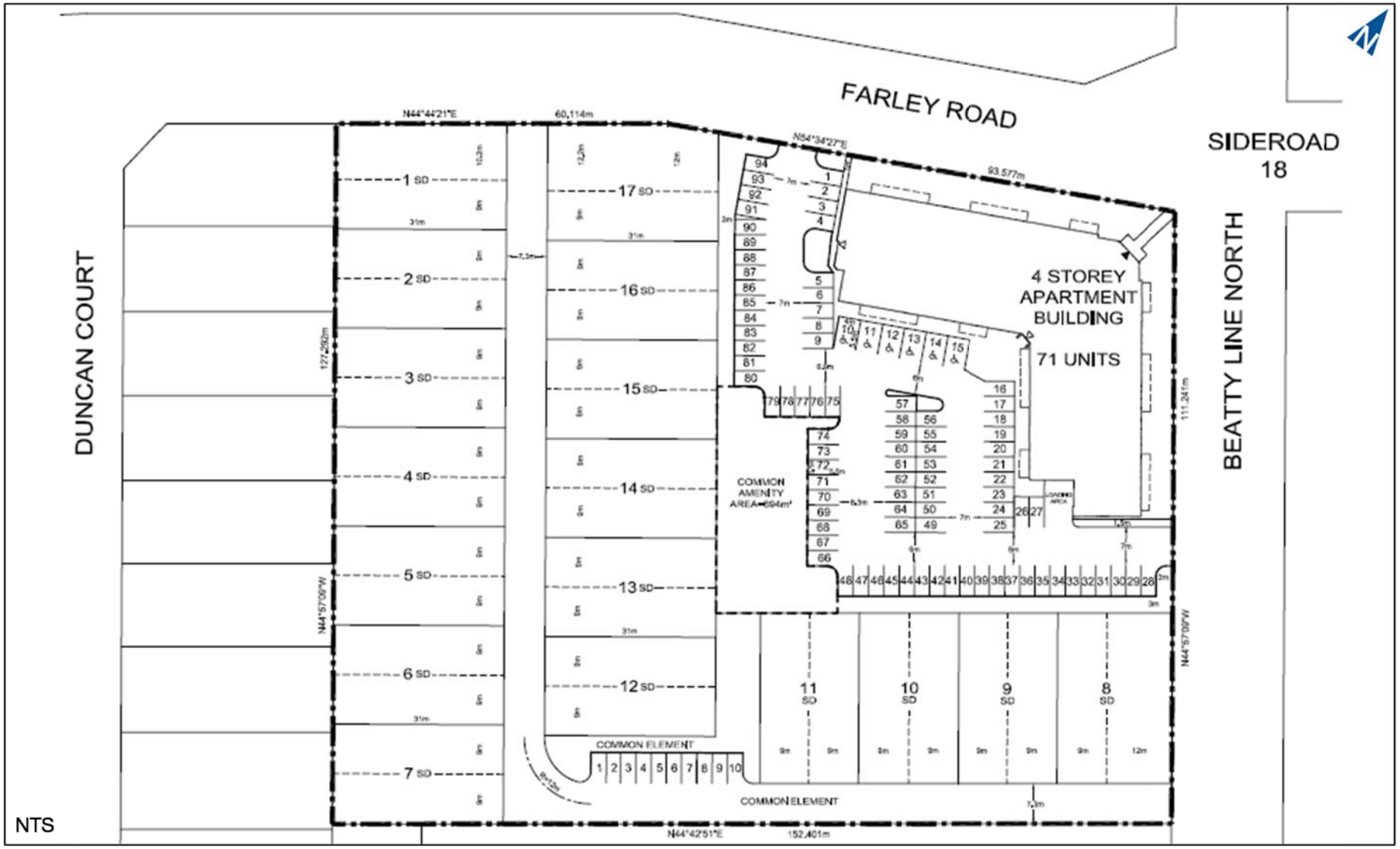
- **Task 5 – Report and Recommendations**: We will prepare and submit a report documenting the study findings and conclusions, and providing recommendations regarding the proposed development from a transportation perspective. The final report will include appendices containing relevant traffic data as well as the detailed output generated by the operational analysis software.

If you have any questions related to this proposal, please contact me at (905) 381-2229 x103 or by email at selkins@ptsl.com.

Yours very truly,

PARADIGM TRANSPORTATION SOLUTIONS LIMITED

Stew Elkins, B. E. S., MITE
Vice President



paradigm TRANSPORTATION SOLUTIONS LIMITED

Site Concept Plan

Beatty Line TIS
180135

Figure 1

Scott Catton

From: Pasquale Costanzo <pasqualec@wellington.ca>
Sent: Tuesday, 29 May, 2018 08:03 AM
To: Scott Catton; cbaker@centrewellington.ca
Cc: Andrew Evans
Subject: RE: 180135 (Beatty Line TIS) Terms of Reference

Hello Scott,

We will require that the intersection of Wellington Road 18/St. Andrew St at Beatty Line be included as part of the TIS.

Any questions call.

Pasquale Costanzo, C.E.T.
Technical Services Supervisor | Roads Division
County of Wellington | 519.837.2601 Ext. 2250

From: Scott Catton <scatton@ptsl.com>
Sent: Monday, May 28, 2018 9:58 AM
To: cbaker@centrewellington.ca; Pasquale Costanzo <pasqualec@wellington.ca>
Cc: Andrew Evans <aevans@ptsl.com>
Subject: RE: 180135 (Beatty Line TIS) Terms of Reference

Good morning Colin
Thanks for taking my call this morning, if you would kindly review the study's terms of reference and let us know your comments as soon as possible it would be appreciated.

As mentioned, we're also scoping the study with Pasquale at the County of Wellington. I've left Pasquale a voicemail this morning to the same effect.

Thanks

Scott Catton, Dipl. T., C.E.T., MITE
Transportation Engineering Technologist

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300, Waterloo ON N2J 1N8
p: 905.381.2229 x302
m: 519.498.2797
e: scatton@ptsl.com
w: www.ptsl.com

From: Scott Catton
Sent: Friday, 18 May, 2018 08:53
To: pasqualec@wellington.ca; cbaker@centrewellington.ca

Cc: Andrew Evans <aevans@ptsl.com>
Subject: 180135 (Beatty Line TIS) Terms of Reference

Good morning Pasquale & Colin
We've been retained to conduct the Transportation Impact Study for the proposed residential development on the southwest quadrant of Farley Road/Sideroad 18 and Beatty Line North in the Town of Fergus. The site concept plan includes approximately 105 residential units. Vehicular access is proposed by two (2) new connections to both Farley Road and Beatty Line North. Build-out is expected to occur by year 2021.

Would you kindly review the attached terms of reference for the study and provide comment at your earliest convenience?

Items that we would like to clarify/confirm include:

- Study area intersections
- Available count data (if any) for the study area intersections
- Appropriate generalized background growth rates
- Adjacent development applications in the area that should be include in the traffic forecast.

If you have any questions or require any additional information, please feel free to contact me. Thank you.

Scott Catton, Dipl. T., C.E.T., MITE
Transportation Engineering Technologist

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300, Waterloo ON N2J 1N8
p: 905.381.2229 x302
m: 519.498.2797
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Appendix B

Existing Traffic Volumes

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Colborne Street
Site Code:
Start Date: 05/31/2018

Turning Movement Data

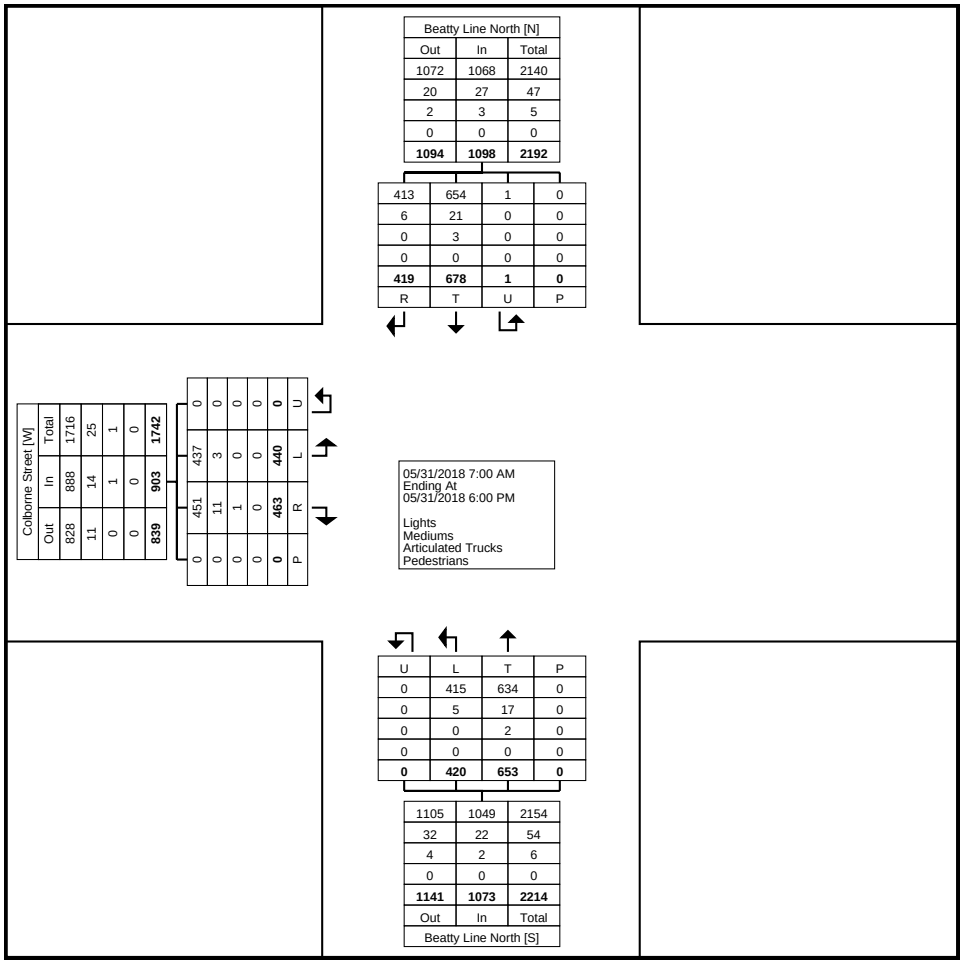
Start Time	Colborne Street Eastbound					Beatty Line North Northbound					Beatty Line North Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	10	1	0	0	11	2	9	0	0	11	16	6	0	0	22	44
7:15 AM	12	6	0	0	18	8	8	0	0	16	19	7	0	0	26	60
7:30 AM	4	6	0	0	10	4	6	0	0	10	22	2	1	0	25	45
7:45 AM	9	12	0	0	21	5	14	0	0	19	35	9	0	0	44	84
Hourly Total	35	25	0	0	60	19	37	0	0	56	92	24	1	0	117	233
8:00 AM	8	12	0	0	20	4	12	0	0	16	23	18	0	0	41	77
8:15 AM	9	10	0	0	19	8	13	0	0	21	25	10	0	0	35	75
8:30 AM	9	14	0	0	23	12	14	0	0	26	24	17	0	0	41	90
8:45 AM	14	19	0	0	33	18	12	0	0	30	20	12	0	0	32	95
Hourly Total	40	55	0	0	95	42	51	0	0	93	92	57	0	0	149	337
9:00 AM	5	9	0	0	14	27	13	0	0	40	17	12	0	0	29	83
9:15 AM	9	11	0	0	20	16	11	0	0	27	20	18	0	0	38	85
9:30 AM	10	14	0	0	24	15	15	0	0	30	18	13	0	0	31	85
9:45 AM	8	13	0	0	21	8	11	0	0	19	12	7	0	0	19	59
Hourly Total	32	47	0	0	79	66	50	0	0	116	67	50	0	0	117	312
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	14	15	0	0	29	16	22	0	0	38	20	20	0	0	40	107
11:15 AM	10	13	0	0	23	12	16	0	0	28	21	16	0	0	37	88
11:30 AM	18	16	0	0	34	6	23	0	0	29	20	3	0	0	23	86
11:45 AM	18	34	0	0	52	10	14	0	0	24	24	17	0	0	41	117
Hourly Total	60	78	0	0	138	44	75	0	0	119	85	56	0	0	141	398
12:00 PM	13	13	0	0	26	18	20	0	0	38	16	15	0	0	31	95
12:15 PM	10	13	0	0	23	11	20	0	0	31	17	11	0	0	28	82
12:30 PM	14	12	0	0	26	13	16	0	0	29	23	13	0	0	36	91
12:45 PM	15	14	0	0	29	16	20	0	0	36	26	11	0	0	37	102
Hourly Total	52	52	0	0	104	58	76	0	0	134	82	50	0	0	132	370
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	25	23	0	0	48	13	21	0	0	34	24	12	0	0	36	118
3:15 PM	15	17	0	0	32	18	33	0	0	51	25	18	0	0	43	126
3:30 PM	18	23	0	0	41	13	32	0	0	45	12	16	0	0	28	114
3:45 PM	18	16	0	0	34	21	19	0	0	40	16	15	0	0	31	105
Hourly Total	76	79	0	0	155	65	105	0	0	170	77	61	0	0	138	463
4:00 PM	27	13	0	0	40	23	28	0	0	51	22	20	0	0	42	133
4:15 PM	17	18	0	0	35	17	35	0	0	52	21	16	0	0	37	124
4:30 PM	23	26	0	0	49	22	36	0	0	58	23	17	0	0	40	147
4:45 PM	20	13	0	0	33	16	35	0	0	51	20	13	0	0	33	117
Hourly Total	87	70	0	0	157	78	134	0	0	212	86	66	0	0	152	521
5:00 PM	17	10	0	0	27	10	40	0	0	50	26	18	0	0	44	121

5:15 PM	17	12	0	0	29	11	21	0	0	32	28	11	0	0	39	100
5:30 PM	13	22	0	0	35	19	34	0	0	53	20	17	0	0	37	125
5:45 PM	11	13	0	0	24	8	30	0	0	38	23	9	0	0	32	94
Hourly Total	58	57	0	0	115	48	125	0	0	173	97	55	0	0	152	440
Grand Total	440	463	0	0	903	420	653	0	0	1073	678	419	1	0	1098	3074
Approach %	48.7	51.3	0.0	-	-	39.1	60.9	0.0	-	-	61.7	38.2	0.1	-	-	-
Total %	14.3	15.1	0.0	-	29.4	13.7	21.2	0.0	-	34.9	22.1	13.6	0.0	-	35.7	-
Lights	437	451	0	-	888	415	634	0	-	1049	654	413	1	-	1068	3005
% Lights	99.3	97.4	-	-	98.3	98.8	97.1	-	-	97.8	96.5	98.6	100.0	-	97.3	97.8
Mediums	3	11	0	-	14	5	17	0	-	22	21	6	0	-	27	63
% Mediums	0.7	2.4	-	-	1.6	1.2	2.6	-	-	2.1	3.1	1.4	0.0	-	2.5	2.0
Articulated Trucks	0	1	0	-	1	0	2	0	-	2	3	0	0	-	3	6
% Articulated Trucks	0.0	0.2	-	-	0.1	0.0	0.3	-	-	0.2	0.4	0.0	0.0	-	0.3	0.2
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Colborne Street
Site Code:
Start Date: 05/31/2018



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
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Waterloo, Ontario, Canada N2J 1N8
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Count Name: Beatty Line North & Colborne Street
Site Code:
Start Date: 05/31/2018

Turning Movement Peak Hour Data (8:30 AM)

Start Time	Colborne Street Eastbound					Beatty Line North Northbound					Beatty Line North Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:30 AM	9	14	0	0	23	12	14	0	0	26	24	17	0	0	41	90
8:45 AM	14	19	0	0	33	18	12	0	0	30	20	12	0	0	32	95
9:00 AM	5	9	0	0	14	27	13	0	0	40	17	12	0	0	29	83
9:15 AM	9	11	0	0	20	16	11	0	0	27	20	18	0	0	38	85
Total	37	53	0	0	90	73	50	0	0	123	81	59	0	0	140	353
Approach %	41.1	58.9	0.0	-	-	59.3	40.7	0.0	-	-	57.9	42.1	0.0	-	-	-
Total %	10.5	15.0	0.0	-	25.5	20.7	14.2	0.0	-	34.8	22.9	16.7	0.0	-	39.7	-
PHF	0.661	0.697	0.000	-	0.682	0.676	0.893	0.000	-	0.769	0.844	0.819	0.000	-	0.854	0.929
Lights	37	53	0	-	90	72	46	0	-	118	79	58	0	-	137	345
% Lights	100.0	100.0	-	-	100.0	98.6	92.0	-	-	95.9	97.5	98.3	-	-	97.9	97.7
Mediums	0	0	0	-	0	1	4	0	-	5	2	1	0	-	3	8
% Mediums	0.0	0.0	-	-	0.0	1.4	8.0	-	-	4.1	2.5	1.7	-	-	2.1	2.3
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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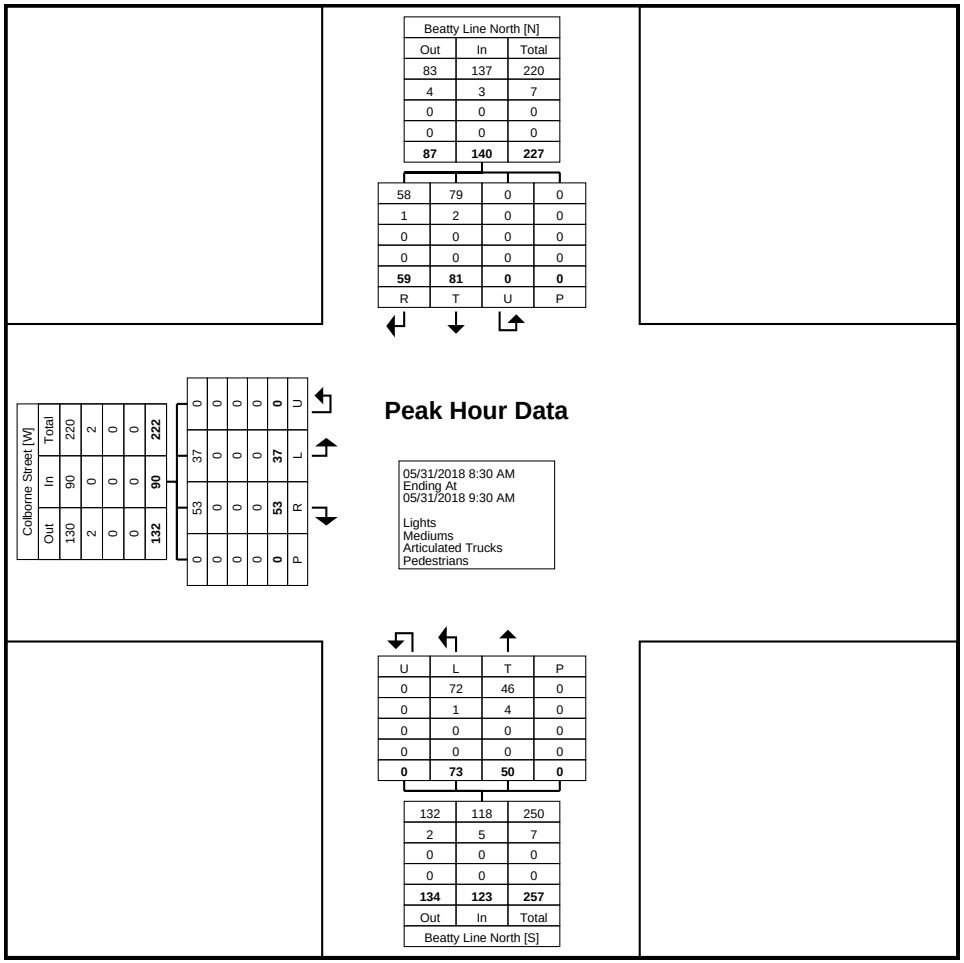
Count Name: Beatty Line North & Colborne Street
Site Code:
Start Date: 05/31/2018



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

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Beatty Line North & Colborne Street
Site Code:
Start Date: 05/31/2018

Turning Movement Peak Hour Data (11:00 AM)

Start Time	Colborne Street Eastbound					Beatty Line North Northbound					Beatty Line North Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
11:00 AM	14	15	0	0	29	16	22	0	0	38	20	20	0	0	40	107
11:15 AM	10	13	0	0	23	12	16	0	0	28	21	16	0	0	37	88
11:30 AM	18	16	0	0	34	6	23	0	0	29	20	3	0	0	23	86
11:45 AM	18	34	0	0	52	10	14	0	0	24	24	17	0	0	41	117
Total	60	78	0	0	138	44	75	0	0	119	85	56	0	0	141	398
Approach %	43.5	56.5	0.0	-	-	37.0	63.0	0.0	-	-	60.3	39.7	0.0	-	-	-
Total %	15.1	19.6	0.0	-	34.7	11.1	18.8	0.0	-	29.9	21.4	14.1	0.0	-	35.4	-
PHF	0.833	0.574	0.000	-	0.663	0.688	0.815	0.000	-	0.783	0.885	0.700	0.000	-	0.860	0.850
Lights	59	77	0	-	136	43	74	0	-	117	81	56	0	-	137	390
% Lights	98.3	98.7	-	-	98.6	97.7	98.7	-	-	98.3	95.3	100.0	-	-	97.2	98.0
Mediums	1	1	0	-	2	1	1	0	-	2	3	0	0	-	3	7
% Mediums	1.7	1.3	-	-	1.4	2.3	1.3	-	-	1.7	3.5	0.0	-	-	2.1	1.8
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	1	0	0	-	1	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	1.2	0.0	-	-	0.7	0.3
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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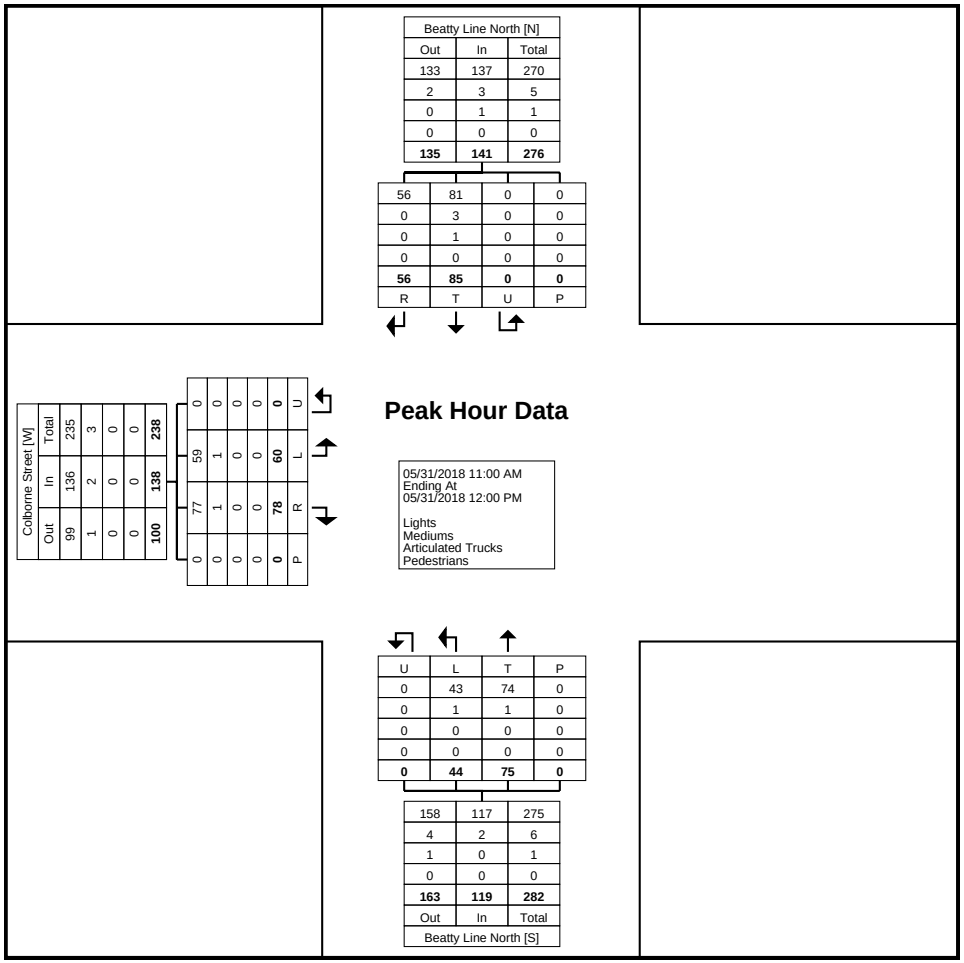
Count Name: Beatty Line North & Colborne Street
Site Code:
Start Date: 05/31/2018



Turning Movement Peak Hour Data Plot (11:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Beatty Line North & Colborne Street
Site Code:
Start Date: 05/31/2018

Turning Movement Peak Hour Data (4:00 PM)

Start Time	Colborne Street Eastbound					Beatty Line North Northbound					Beatty Line North Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:00 PM	27	13	0	0	40	23	28	0	0	51	22	20	0	0	42	133
4:15 PM	17	18	0	0	35	17	35	0	0	52	21	16	0	0	37	124
4:30 PM	23	26	0	0	49	22	36	0	0	58	23	17	0	0	40	147
4:45 PM	20	13	0	0	33	16	35	0	0	51	20	13	0	0	33	117
Total	87	70	0	0	157	78	134	0	0	212	86	66	0	0	152	521
Approach %	55.4	44.6	0.0	-	-	36.8	63.2	0.0	-	-	56.6	43.4	0.0	-	-	-
Total %	16.7	13.4	0.0	-	30.1	15.0	25.7	0.0	-	40.7	16.5	12.7	0.0	-	29.2	-
PHF	0.806	0.673	0.000	-	0.801	0.848	0.931	0.000	-	0.914	0.935	0.825	0.000	-	0.905	0.886
Lights	87	68	0	-	155	78	132	0	-	210	86	65	0	-	151	516
% Lights	100.0	97.1	-	-	98.7	100.0	98.5	-	-	99.1	100.0	98.5	-	-	99.3	99.0
Mediums	0	2	0	-	2	0	2	0	-	2	0	1	0	-	1	5
% Mediums	0.0	2.9	-	-	1.3	0.0	1.5	-	-	0.9	0.0	1.5	-	-	0.7	1.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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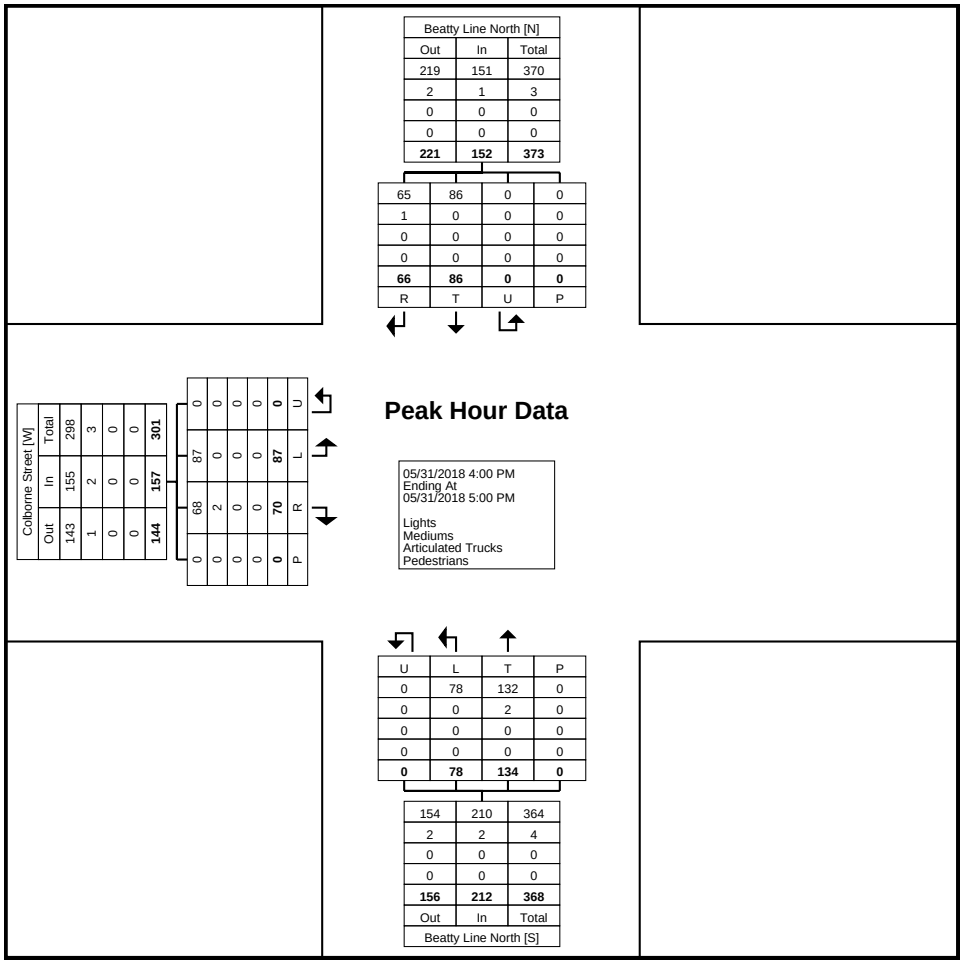
Count Name: Beatty Line North & Colborne Street
Site Code:
Start Date: 05/31/2018



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

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Count Name: Beatty Line North & Colborne Street
Site Code:
Start Date: 05/31/2018

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Farley Road/Sideroad 18
Site Code:
Start Date: 05/31/2018

Turning Movement Data

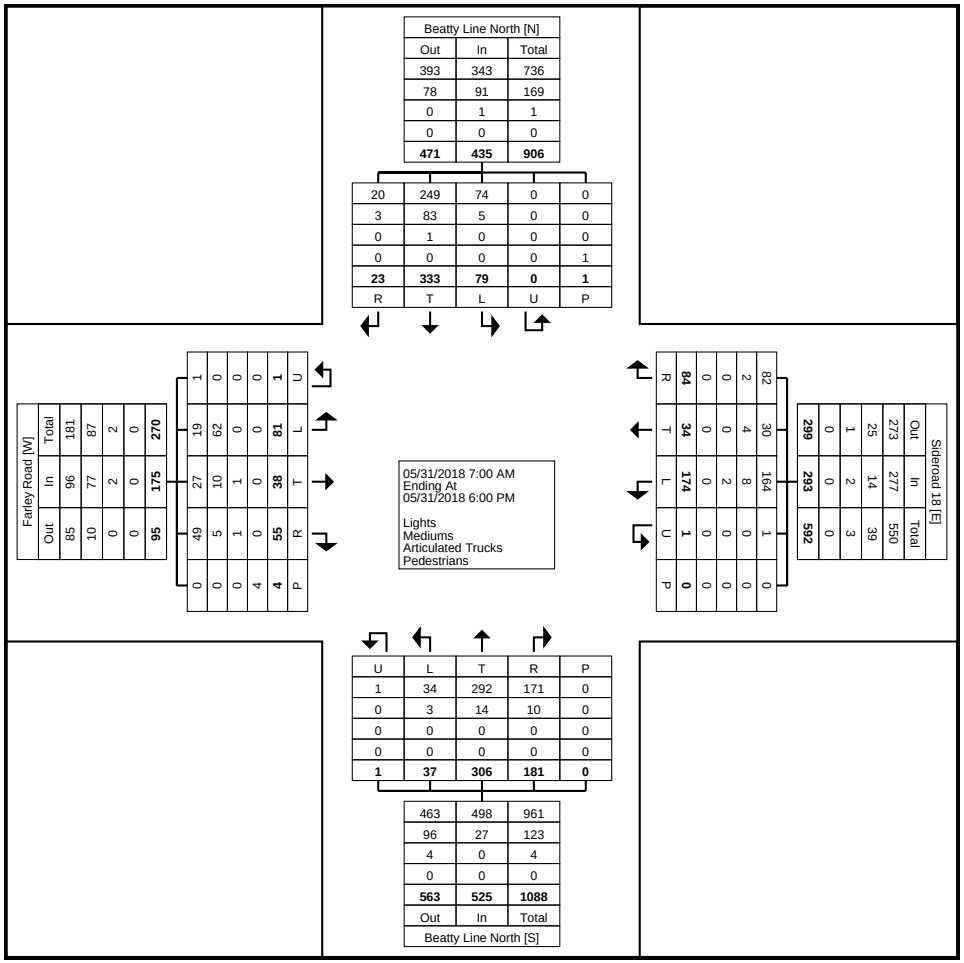
Start Time	Farley Road Eastbound						Sideroad 18 Westbound						Beatty Line North Northbound						Beatty Line North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	1	1	0	0	2	1	1	2	0	0	4	0	13	5	0	0	18	1	4	1	0	0	6	30
7:15 AM	0	1	0	0	2	1	5	0	3	0	0	8	2	5	5	0	0	12	0	6	1	0	0	7	28
7:30 AM	1	0	5	0	0	6	5	2	3	0	0	10	2	3	5	0	0	10	4	12	2	0	0	18	44
7:45 AM	8	1	1	0	0	10	7	1	3	0	0	11	2	13	3	0	0	18	2	19	0	0	0	21	60
Hourly Total	9	3	7	0	2	19	18	4	11	0	0	33	6	34	18	0	0	58	7	41	4	0	0	52	162
8:00 AM	3	1	4	0	0	8	7	3	2	0	0	12	2	8	3	0	0	13	1	13	2	0	0	16	49
8:15 AM	6	0	4	0	0	10	6	0	3	0	0	9	2	13	5	0	0	20	2	9	0	0	0	11	50
8:30 AM	1	1	1	0	0	3	7	0	9	0	0	16	1	5	4	0	0	10	4	13	1	0	0	18	47
8:45 AM	4	0	0	0	0	4	4	0	1	0	0	5	1	3	6	0	0	10	3	13	1	0	0	17	36
Hourly Total	14	2	9	0	0	25	24	3	15	0	0	42	6	29	18	0	0	53	10	48	4	0	0	62	182
9:00 AM	5	1	0	0	0	6	2	0	2	0	0	4	1	5	3	0	0	9	3	6	0	0	0	9	28
9:15 AM	3	1	0	0	0	4	2	0	0	0	0	2	0	10	3	0	0	13	1	10	1	0	0	12	31
9:30 AM	5	2	1	0	0	8	3	1	1	0	0	5	2	5	3	0	0	10	1	9	1	0	0	11	34
9:45 AM	1	3	1	0	0	5	5	1	2	0	0	8	1	13	4	0	0	18	1	9	2	0	0	12	43
Hourly Total	14	7	2	0	0	23	12	2	5	0	0	19	4	33	13	0	0	50	6	34	4	0	0	44	136
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	3	3	1	1	0	8	8	2	0	0	0	10	1	9	3	0	0	13	4	5	1	0	0	10	41
11:15 AM	1	1	1	0	0	3	6	3	1	0	0	10	1	9	2	0	0	12	2	11	0	0	0	13	38
11:30 AM	8	1	2	0	0	11	4	3	1	0	0	8	1	6	5	0	0	12	0	13	0	0	0	13	44
11:45 AM	4	3	2	0	0	9	8	3	3	0	0	14	2	9	4	0	0	15	1	11	0	0	0	12	50
Hourly Total	16	8	6	1	0	31	26	11	5	0	0	42	5	33	14	0	0	52	7	40	1	0	0	48	173
12:00 PM	7	2	2	0	0	11	2	1	0	0	0	3	1	8	3	0	0	12	0	10	0	0	0	10	36
12:15 PM	2	1	2	0	0	5	6	1	3	0	0	10	0	9	2	0	0	11	1	11	0	0	0	12	38
12:30 PM	4	2	2	0	0	8	5	0	1	1	0	7	3	6	2	0	0	11	0	17	1	0	0	18	44
12:45 PM	2	1	1	0	0	4	3	1	1	0	0	5	1	14	11	1	0	27	1	14	2	0	0	17	53
Hourly Total	15	6	7	0	0	28	16	3	5	1	0	25	5	37	18	1	0	61	2	52	3	0	0	57	171
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	1	3	0	0	4	8	2	5	0	0	15	0	15	4	0	0	19	5	9	0	0	0	14	52
3:15 PM	1	0	2	0	0	3	7	1	3	0	0	11	1	16	8	0	0	25	5	13	0	0	0	18	57
3:30 PM	0	0	0	0	0	0	4	1	1	0	0	6	0	8	11	0	0	19	9	8	0	0	0	17	42
3:45 PM	1	0	3	0	0	4	5	1	4	0	0	10	1	11	6	0	0	18	1	10	0	0	0	11	43
Hourly Total	2	1	8	0	0	11	24	5	13	0	0	42	2	50	29	0	0	81	20	40	0	0	0	60	194
4:00 PM	0	2	2	0	0	4	8	0	4	0	0	12	3	10	9	0	0	22	2	9	0	0	0	11	49
4:15 PM	2	1	1	0	0	4	9	1	4	0	0	14	0	13	6	0	0	19	5	11	0	0	0	16	53
4:30 PM	0	1	1	0	0	2	3	0	5	0	0	8	3	16	9	0	0	28	5	10	0	0	0	15	53
4:45 PM	1	1	2	0	0	4	6	1	1	0	0	8	0	12	8	0	0	20	6	8	1	0	1	15	47
Hourly Total	3	5	6	0	0	14	26	2	14	0	0	42	6	51	32	0	0	89	18	38	1	0	1	57	202

5:00 PM	1	3	3	0	0	7	6	2	5	0	0	13	0	9	15	0	0	24	4	10	2	0	0	16	60
5:15 PM	4	1	1	0	1	6	7	1	5	0	0	13	2	5	7	0	0	14	2	11	2	0	0	15	48
5:30 PM	2	1	4	0	1	7	5	1	3	0	0	9	1	17	10	0	0	28	2	8	1	0	0	11	55
5:45 PM	1	1	2	0	0	4	10	0	3	0	0	13	0	8	7	0	0	15	1	11	1	0	0	13	45
Hourly Total	8	6	10	0	2	24	28	4	16	0	0	48	3	39	39	0	0	81	9	40	6	0	0	55	208
Grand Total	81	38	55	1	4	175	174	34	84	1	0	293	37	306	181	1	0	525	79	333	23	0	1	435	1428
Approach %	46.3	21.7	31.4	0.6	-	-	59.4	11.6	28.7	0.3	-	-	7.0	58.3	34.5	0.2	-	-	18.2	76.6	5.3	0.0	-	-	-
Total %	5.7	2.7	3.9	0.1	-	12.3	12.2	2.4	5.9	0.1	-	20.5	2.6	21.4	12.7	0.1	-	36.8	5.5	23.3	1.6	0.0	-	30.5	-
Lights	19	27	49	1	-	96	164	30	82	1	-	277	34	292	171	1	-	498	74	249	20	0	-	343	1214
% Lights	23.5	71.1	89.1	100.0	-	54.9	94.3	88.2	97.6	100.0	-	94.5	91.9	95.4	94.5	100.0	-	94.9	93.7	74.8	87.0	-	-	78.9	85.0
Mediums	62	10	5	0	-	77	8	4	2	0	-	14	3	14	10	0	-	27	5	83	3	0	-	91	209
% Mediums	76.5	26.3	9.1	0.0	-	44.0	4.6	11.8	2.4	0.0	-	4.8	8.1	4.6	5.5	0.0	-	5.1	6.3	24.9	13.0	-	-	20.9	14.6
Articulated Trucks	0	1	1	0	-	2	2	0	0	0	-	2	0	0	0	0	-	0	0	1	0	0	-	1	5
% Articulated Trucks	0.0	2.6	1.8	0.0	-	1.1	1.1	0.0	0.0	0.0	-	0.7	0.0	0.0	0.0	0.0	-	0.0	0.0	0.3	0.0	-	-	0.2	0.4
Pedestrians	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Farley Road/Sideroad 18
Site Code:
Start Date: 05/31/2018



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Farley Road/Sideroad 18
Site Code:
Start Date: 05/31/2018

Turning Movement Peak Hour Data (7:45 AM)

Start Time	Farley Road Eastbound						Sideroad 18 Westbound						Beatty Line North Northbound						Beatty Line North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:45 AM	8	1	1	0	0	10	7	1	3	0	0	11	2	13	3	0	0	18	2	19	0	0	0	21	60
8:00 AM	3	1	4	0	0	8	7	3	2	0	0	12	2	8	3	0	0	13	1	13	2	0	0	16	49
8:15 AM	6	0	4	0	0	10	6	0	3	0	0	9	2	13	5	0	0	20	2	9	0	0	0	11	50
8:30 AM	1	1	1	0	0	3	7	0	9	0	0	16	1	5	4	0	0	10	4	13	1	0	0	18	47
Total	18	3	10	0	0	31	27	4	17	0	0	48	7	39	15	0	0	61	9	54	3	0	0	66	206
Approach %	58.1	9.7	32.3	0.0	-	-	56.3	8.3	35.4	0.0	-	-	11.5	63.9	24.6	0.0	-	-	13.6	81.8	4.5	0.0	-	-	-
Total %	8.7	1.5	4.9	0.0	-	15.0	13.1	1.9	8.3	0.0	-	23.3	3.4	18.9	7.3	0.0	-	29.6	4.4	26.2	1.5	0.0	-	32.0	-
PHF	0.563	0.750	0.625	0.000	-	0.775	0.964	0.333	0.472	0.000	-	0.750	0.875	0.750	0.750	0.000	-	0.763	0.563	0.711	0.375	0.000	-	0.786	0.858
Lights	0	2	9	0	-	11	23	4	17	0	-	44	6	37	12	0	-	55	8	38	3	0	-	49	159
% Lights	0.0	66.7	90.0	-	-	35.5	85.2	100.0	100.0	-	-	91.7	85.7	94.9	80.0	-	-	90.2	88.9	70.4	100.0	-	-	74.2	77.2
Mediums	18	1	1	0	-	20	4	0	0	0	-	4	1	2	3	0	-	6	1	16	0	0	-	17	47
% Mediums	100.0	33.3	10.0	-	-	64.5	14.8	0.0	0.0	-	-	8.3	14.3	5.1	20.0	-	-	9.8	11.1	29.6	0.0	-	-	25.8	22.8
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
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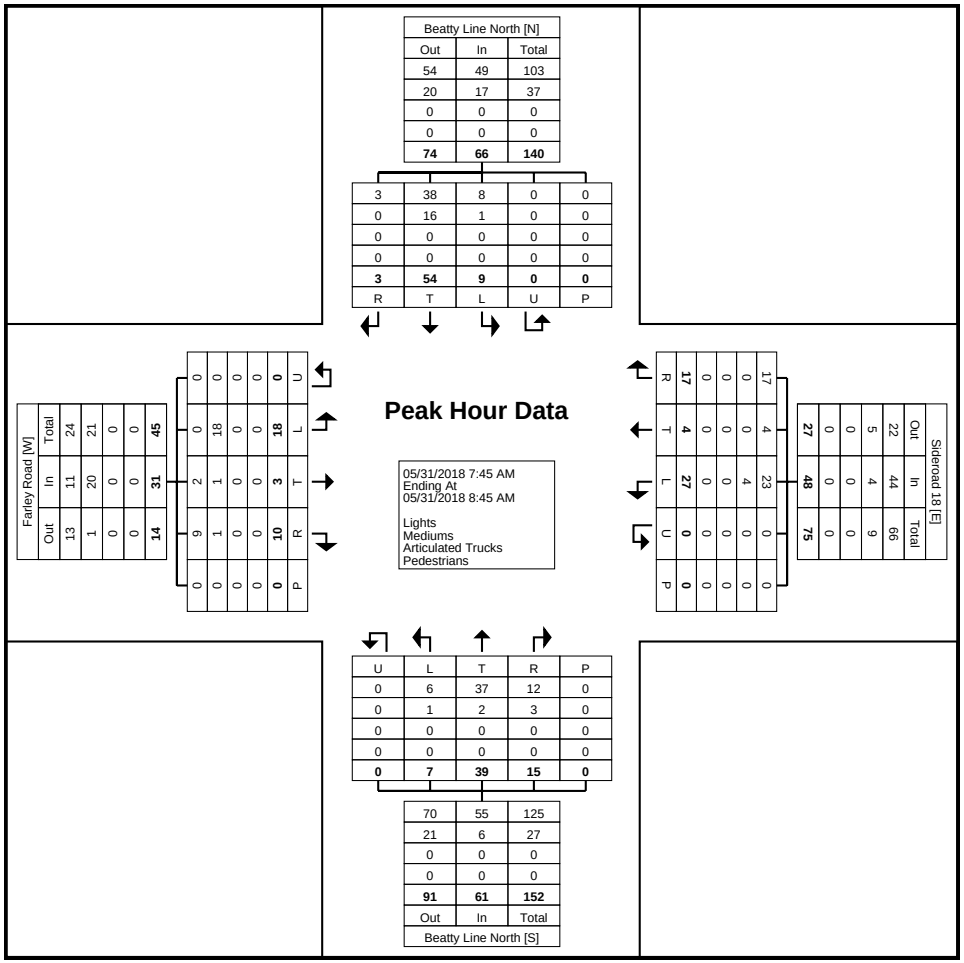
Count Name: Beatty Line North & Farley Road/Sideroad 18
Site Code:
Start Date: 05/31/2018



Turning Movement Peak Hour Data Plot (7:45 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Farley Road/Sideroad 18
Site Code:
Start Date: 05/31/2018

Turning Movement Peak Hour Data (11:00 AM)

Start Time	Farley Road Eastbound						Sideroad 18 Westbound						Beatty Line North Northbound						Beatty Line North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	3	3	1	1	0	8	8	2	0	0	0	10	1	9	3	0	0	13	4	5	1	0	0	10	41
11:15 AM	1	1	1	0	0	3	6	3	1	0	0	10	1	9	2	0	0	12	2	11	0	0	0	13	38
11:30 AM	8	1	2	0	0	11	4	3	1	0	0	8	1	6	5	0	0	12	0	13	0	0	0	13	44
11:45 AM	4	3	2	0	0	9	8	3	3	0	0	14	2	9	4	0	0	15	1	11	0	0	0	12	50
Total	16	8	6	1	0	31	26	11	5	0	0	42	5	33	14	0	0	52	7	40	1	0	0	48	173
Approach %	51.6	25.8	19.4	3.2	-	-	61.9	26.2	11.9	0.0	-	-	9.6	63.5	26.9	0.0	-	-	14.6	83.3	2.1	0.0	-	-	-
Total %	9.2	4.6	3.5	0.6	-	17.9	15.0	6.4	2.9	0.0	-	24.3	2.9	19.1	8.1	0.0	-	30.1	4.0	23.1	0.6	0.0	-	27.7	-
PHF	0.500	0.667	0.750	0.250	-	0.705	0.813	0.917	0.417	0.000	-	0.750	0.625	0.917	0.700	0.000	-	0.867	0.438	0.769	0.250	0.000	-	0.923	0.865
Lights	2	5	5	1	-	13	25	9	5	0	-	39	5	33	13	0	-	51	6	21	1	0	-	28	131
% Lights	12.5	62.5	83.3	100.0	-	41.9	96.2	81.8	100.0	-	-	92.9	100.0	100.0	92.9	-	-	98.1	85.7	52.5	100.0	-	-	58.3	75.7
Mediums	14	3	0	0	-	17	1	2	0	0	-	3	0	0	1	0	-	1	1	19	0	0	-	20	41
% Mediums	87.5	37.5	0.0	0.0	-	54.8	3.8	18.2	0.0	-	-	7.1	0.0	0.0	7.1	-	-	1.9	14.3	47.5	0.0	-	-	41.7	23.7
Articulated Trucks	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	16.7	0.0	-	3.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.6
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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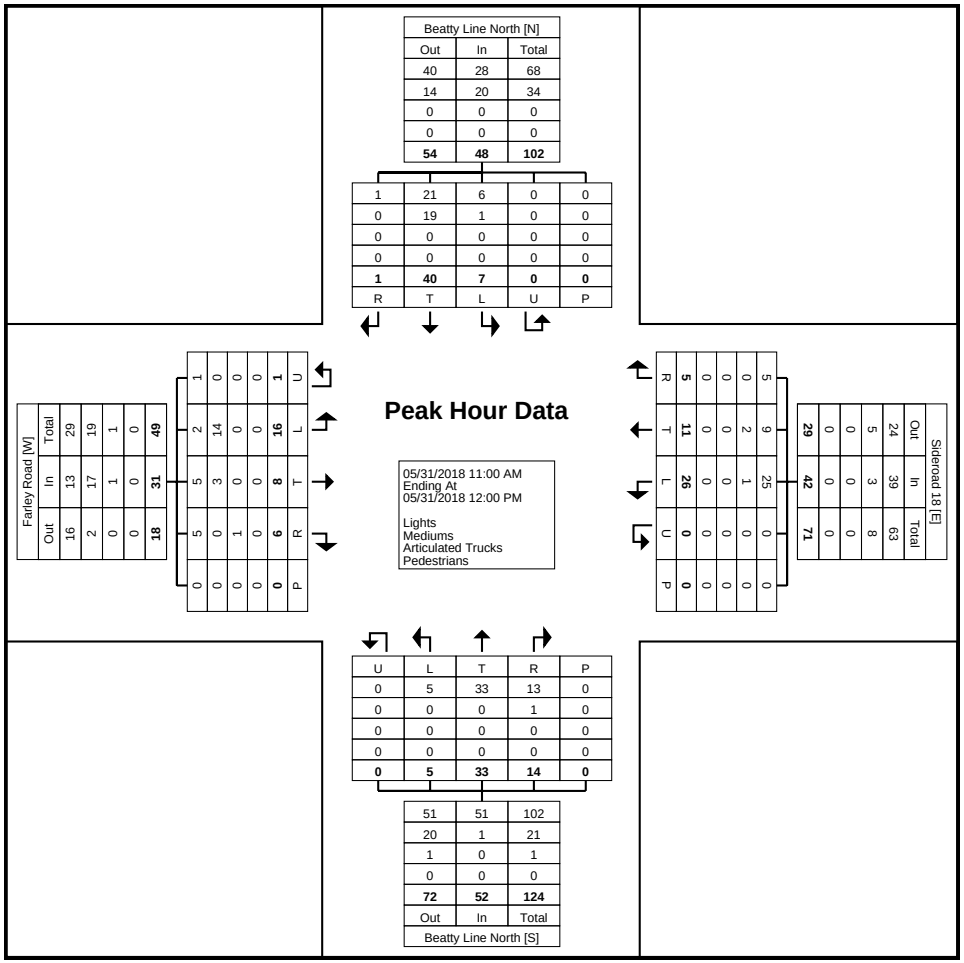
Count Name: Beatty Line North & Farley Road/Sideroad 18
Site Code:
Start Date: 05/31/2018



Turning Movement Peak Hour Data Plot (11:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Farley Road/Sideroad 18
Site Code:
Start Date: 05/31/2018

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Farley Road Eastbound						Sideroad 18 Westbound						Beatty Line North Northbound						Beatty Line North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	2	1	1	0	0	4	9	1	4	0	0	14	0	13	6	0	0	19	5	11	0	0	0	16	53
4:30 PM	0	1	1	0	0	2	3	0	5	0	0	8	3	16	9	0	0	28	5	10	0	0	0	15	53
4:45 PM	1	1	2	0	0	4	6	1	1	0	0	8	0	12	8	0	0	20	6	8	1	0	1	15	47
5:00 PM	1	3	3	0	0	7	6	2	5	0	0	13	0	9	15	0	0	24	4	10	2	0	0	16	60
Total	4	6	7	0	0	17	24	4	15	0	0	43	3	50	38	0	0	91	20	39	3	0	1	62	213
Approach %	23.5	35.3	41.2	0.0	-	-	55.8	9.3	34.9	0.0	-	-	3.3	54.9	41.8	0.0	-	-	32.3	62.9	4.8	0.0	-	-	-
Total %	1.9	2.8	3.3	0.0	-	8.0	11.3	1.9	7.0	0.0	-	20.2	1.4	23.5	17.8	0.0	-	42.7	9.4	18.3	1.4	0.0	-	29.1	-
PHF	0.500	0.500	0.583	0.000	-	0.607	0.667	0.500	0.750	0.000	-	0.768	0.250	0.781	0.633	0.000	-	0.813	0.833	0.886	0.375	0.000	-	0.969	0.888
Lights	4	6	6	0	-	16	23	3	15	0	-	41	3	50	37	0	-	90	20	39	3	0	-	62	209
% Lights	100.0	100.0	85.7	-	-	94.1	95.8	75.0	100.0	-	-	95.3	100.0	100.0	97.4	-	-	98.9	100.0	100.0	100.0	-	-	100.0	98.1
Mediums	0	0	1	0	-	1	1	1	0	0	-	2	0	0	1	0	-	1	0	0	0	0	-	0	4
% Mediums	0.0	0.0	14.3	-	-	5.9	4.2	25.0	0.0	-	-	4.7	0.0	0.0	2.6	-	-	1.1	0.0	0.0	0.0	-	-	0.0	1.9
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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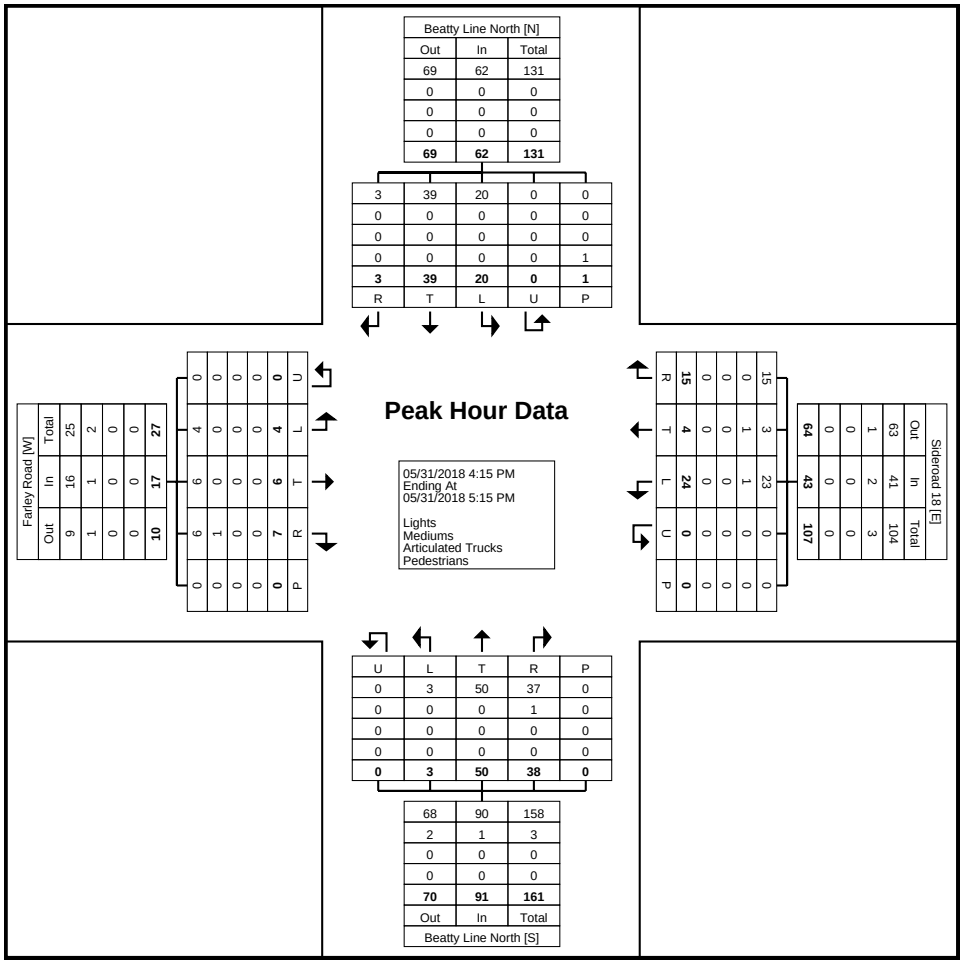


Turning Movement Peak Hour Data Plot (4:15 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Farley Road/Sideroad 18
Site Code:
Start Date: 05/31/2018

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Sideroad 19
Site Code:
Start Date: 05/31/2018

Turning Movement Data

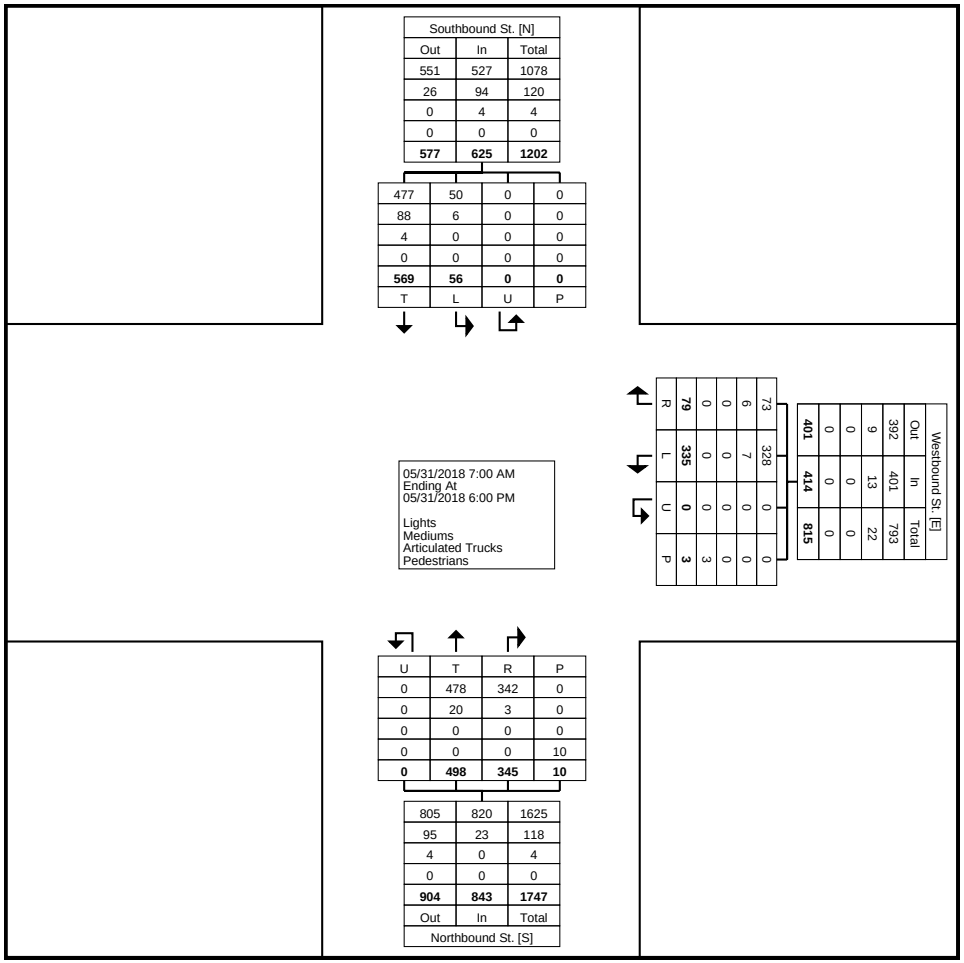
Start Time	Westbound St. Westbound					Northbound St. Northbound					Southbound St. Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
7:00 AM	7	2	0	0	9	13	3	0	0	16	3	8	0	0	11	36
7:15 AM	3	1	0	0	4	11	9	0	0	20	0	13	0	0	13	37
7:30 AM	6	2	0	0	8	9	4	0	0	13	5	19	0	0	24	45
7:45 AM	12	1	0	1	13	16	10	0	1	26	3	30	0	0	33	72
Hourly Total	28	6	0	1	34	49	26	0	1	75	11	70	0	0	81	190
8:00 AM	8	1	0	0	9	12	8	0	1	20	5	21	0	0	26	55
8:15 AM	10	5	0	0	15	18	6	0	3	24	3	19	0	0	22	61
8:30 AM	11	4	0	0	15	7	5	0	0	12	1	23	0	0	24	51
8:45 AM	10	4	0	0	14	10	8	0	0	18	0	18	0	0	18	50
Hourly Total	39	14	0	0	53	47	27	0	4	74	9	81	0	0	90	217
9:00 AM	9	2	0	0	11	9	5	0	0	14	1	11	0	0	12	37
9:15 AM	13	1	0	1	14	10	8	0	0	18	0	16	0	0	16	48
9:30 AM	9	0	0	0	9	9	5	0	0	14	1	11	0	0	12	35
9:45 AM	5	3	0	0	8	16	5	0	0	21	1	14	0	0	15	44
Hourly Total	36	6	0	1	42	44	23	0	0	67	3	52	0	0	55	164
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	16	0	0	0	16	14	11	0	0	25	1	14	0	0	15	56
11:15 AM	13	3	0	0	16	10	9	0	1	19	1	19	0	0	20	55
11:30 AM	7	2	0	0	9	11	15	0	0	26	2	17	0	0	19	54
11:45 AM	9	6	0	0	15	14	17	0	0	31	1	23	0	0	24	70
Hourly Total	45	11	0	0	56	49	52	0	1	101	5	73	0	0	78	235
12:00 PM	11	3	0	0	14	10	15	0	1	25	1	13	0	0	14	53
12:15 PM	6	3	0	0	9	11	8	0	0	19	2	21	0	0	23	51
12:30 PM	9	2	0	0	11	9	8	0	1	17	4	20	0	0	24	52
12:45 PM	15	3	0	0	18	22	13	0	0	35	3	18	0	0	21	74
Hourly Total	41	11	0	0	52	52	44	0	2	96	10	72	0	0	82	230
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	10	2	0	0	12	19	7	0	0	26	0	19	0	0	19	57
3:15 PM	16	3	0	0	19	24	15	0	0	39	4	22	0	0	26	84
3:30 PM	8	2	0	0	10	19	22	0	0	41	2	12	0	0	14	65
3:45 PM	8	4	0	0	12	16	13	0	0	29	2	16	0	0	18	59
Hourly Total	42	11	0	0	53	78	57	0	0	135	8	69	0	0	77	265
4:00 PM	17	5	0	0	22	20	17	0	0	37	1	22	0	0	23	82
4:15 PM	12	3	0	0	15	16	23	0	0	39	1	18	0	0	19	73
4:30 PM	15	2	0	0	17	34	16	0	0	50	2	15	0	0	17	84
4:45 PM	9	2	0	0	11	22	12	0	0	34	1	15	0	0	16	61
Hourly Total	53	12	0	0	65	92	68	0	0	160	5	70	0	0	75	300
5:00 PM	19	0	0	0	19	26	12	0	0	38	0	19	0	0	19	76

5:15 PM	8	3	0	0	11	17	10	0	1	27	1	19	0	0	20	58
5:30 PM	12	4	0	1	16	27	15	0	1	42	0	22	0	0	22	80
5:45 PM	12	1	0	0	13	17	11	0	0	28	4	22	0	0	26	67
Hourly Total	51	8	0	1	59	87	48	0	2	135	5	82	0	0	87	281
Grand Total	335	79	0	3	414	498	345	0	10	843	56	569	0	0	625	1882
Approach %	80.9	19.1	0.0	-	-	59.1	40.9	0.0	-	-	9.0	91.0	0.0	-	-	-
Total %	17.8	4.2	0.0	-	22.0	26.5	18.3	0.0	-	44.8	3.0	30.2	0.0	-	33.2	-
Lights	328	73	0	-	401	478	342	0	-	820	50	477	0	-	527	1748
% Lights	97.9	92.4	-	-	96.9	96.0	99.1	-	-	97.3	89.3	83.8	-	-	84.3	92.9
Mediums	7	6	0	-	13	20	3	0	-	23	6	88	0	-	94	130
% Mediums	2.1	7.6	-	-	3.1	4.0	0.9	-	-	2.7	10.7	15.5	-	-	15.0	6.9
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	4	0	-	4	4
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.7	-	-	0.6	0.2
Pedestrians	-	-	-	3	-	-	-	-	10	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Sideroad 19
Site Code:
Start Date: 05/31/2018



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Sideroad 19
Site Code:
Start Date: 05/31/2018

Turning Movement Peak Hour Data (7:45 AM)

Start Time	Westbound St. Westbound					Northbound St. Northbound					Southbound St. Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
7:45 AM	12	1	0	1	13	16	10	0	1	26	3	30	0	0	33	72
8:00 AM	8	1	0	0	9	12	8	0	1	20	5	21	0	0	26	55
8:15 AM	10	5	0	0	15	18	6	0	3	24	3	19	0	0	22	61
8:30 AM	11	4	0	0	15	7	5	0	0	12	1	23	0	0	24	51
Total	41	11	0	1	52	53	29	0	5	82	12	93	0	0	105	239
Approach %	78.8	21.2	0.0	-	-	64.6	35.4	0.0	-	-	11.4	88.6	0.0	-	-	-
Total %	17.2	4.6	0.0	-	21.8	22.2	12.1	0.0	-	34.3	5.0	38.9	0.0	-	43.9	-
PHF	0.854	0.550	0.000	-	0.867	0.736	0.725	0.000	-	0.788	0.600	0.775	0.000	-	0.795	0.830
Lights	38	8	0	-	46	49	28	0	-	77	9	78	0	-	87	210
% Lights	92.7	72.7	-	-	88.5	92.5	96.6	-	-	93.9	75.0	83.9	-	-	82.9	87.9
Mediums	3	3	0	-	6	4	1	0	-	5	3	15	0	-	18	29
% Mediums	7.3	27.3	-	-	11.5	7.5	3.4	-	-	6.1	25.0	16.1	-	-	17.1	12.1
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	1	-	-	-	-	5	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-

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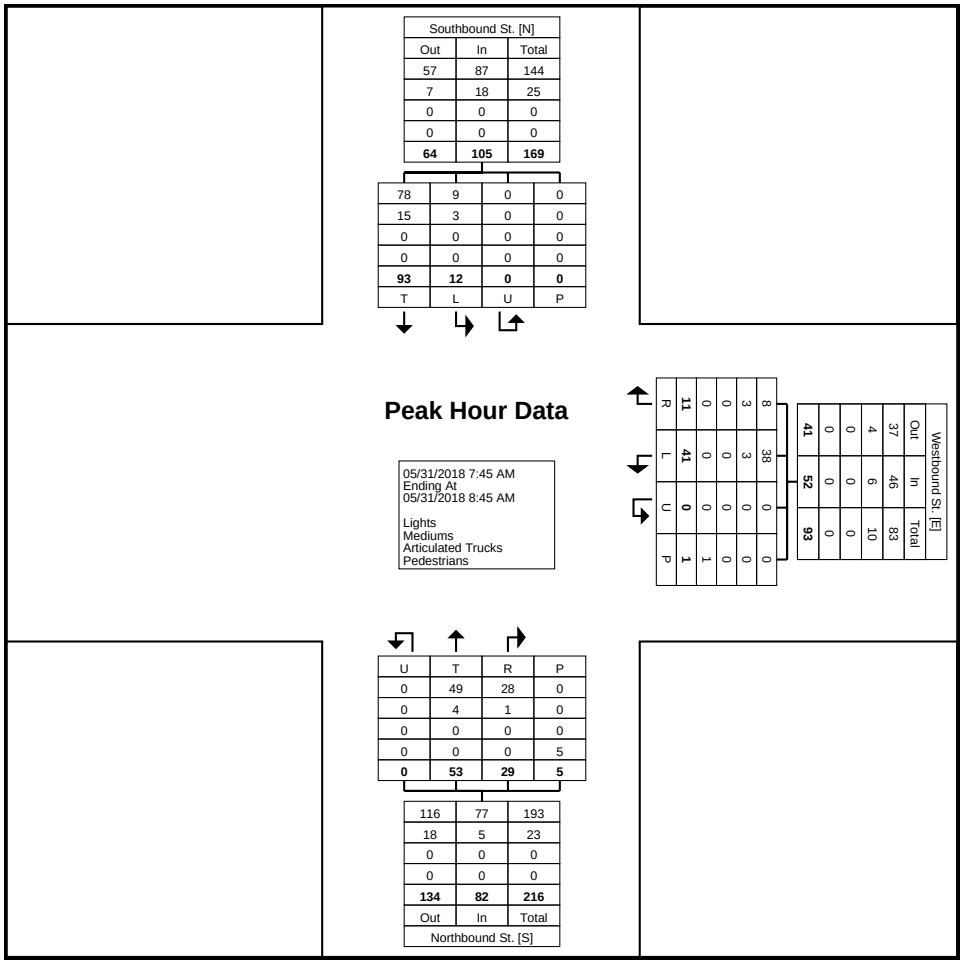
Count Name: Beatty Line North & Sideroad 19
Site Code:
Start Date: 05/31/2018



Turning Movement Peak Hour Data Plot (7:45 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Sideroad 19
Site Code:
Start Date: 05/31/2018

Turning Movement Peak Hour Data (11:00 AM)

Start Time	Westbound St. Westbound					Northbound St. Northbound					Southbound St. Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
11:00 AM	16	0	0	0	16	14	11	0	0	25	1	14	0	0	15	56
11:15 AM	13	3	0	0	16	10	9	0	1	19	1	19	0	0	20	55
11:30 AM	7	2	0	0	9	11	15	0	0	26	2	17	0	0	19	54
11:45 AM	9	6	0	0	15	14	17	0	0	31	1	23	0	0	24	70
Total	45	11	0	0	56	49	52	0	1	101	5	73	0	0	78	235
Approach %	80.4	19.6	0.0	-	-	48.5	51.5	0.0	-	-	6.4	93.6	0.0	-	-	-
Total %	19.1	4.7	0.0	-	23.8	20.9	22.1	0.0	-	43.0	2.1	31.1	0.0	-	33.2	-
PHF	0.703	0.458	0.000	-	0.875	0.875	0.765	0.000	-	0.815	0.625	0.793	0.000	-	0.813	0.839
Lights	44	11	0	-	55	48	52	0	-	100	4	53	0	-	57	212
% Lights	97.8	100.0	-	-	98.2	98.0	100.0	-	-	99.0	80.0	72.6	-	-	73.1	90.2
Mediums	1	0	0	-	1	1	0	0	-	1	1	19	0	-	20	22
% Mediums	2.2	0.0	-	-	1.8	2.0	0.0	-	-	1.0	20.0	26.0	-	-	25.6	9.4
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	1	0	-	1	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	1.4	-	-	1.3	0.4
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-

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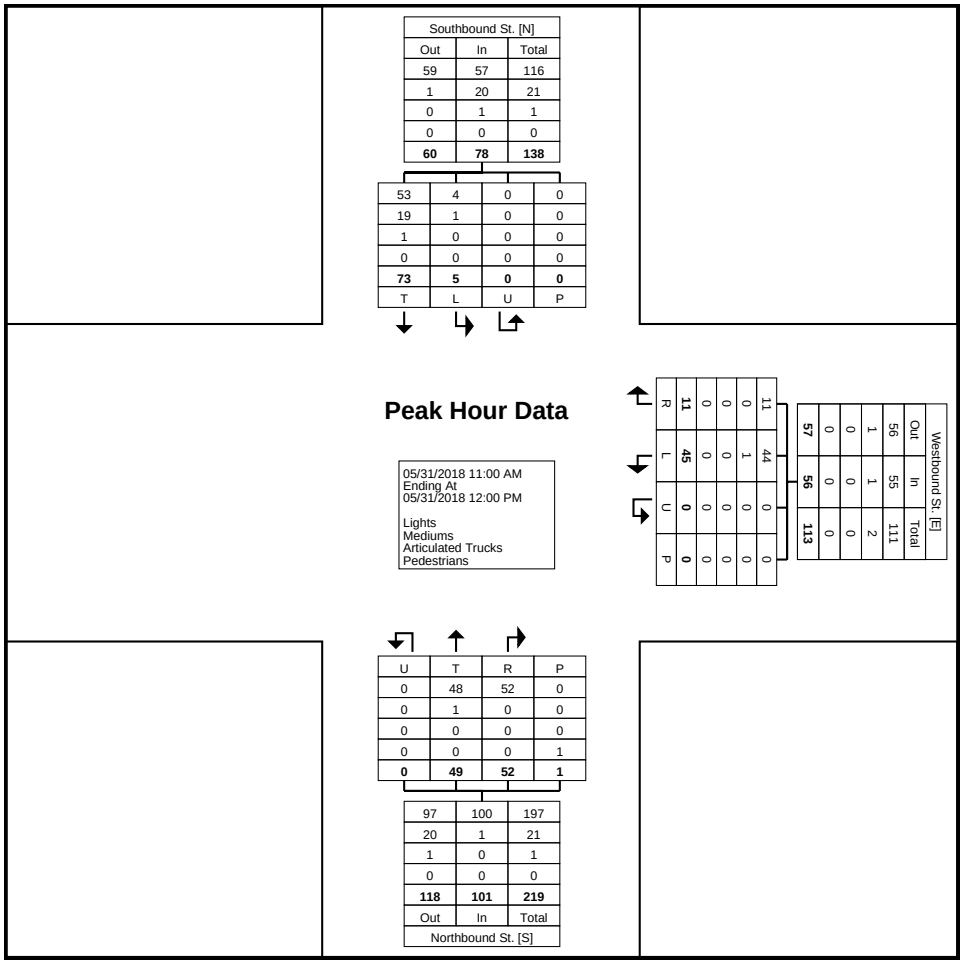
Site Code:
Start Date: 05/31/2018



Turning Movement Peak Hour Data Plot (11:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Beatty Line North & Sideroad 19
Site Code:
Start Date: 05/31/2018

Turning Movement Peak Hour Data (4:00 PM)

Start Time	Westbound St. Westbound					Northbound St. Northbound					Southbound St. Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
4:00 PM	17	5	0	0	22	20	17	0	0	37	1	22	0	0	23	82
4:15 PM	12	3	0	0	15	16	23	0	0	39	1	18	0	0	19	73
4:30 PM	15	2	0	0	17	34	16	0	0	50	2	15	0	0	17	84
4:45 PM	9	2	0	0	11	22	12	0	0	34	1	15	0	0	16	61
Total	53	12	0	0	65	92	68	0	0	160	5	70	0	0	75	300
Approach %	81.5	18.5	0.0	-	-	57.5	42.5	0.0	-	-	6.7	93.3	0.0	-	-	-
Total %	17.7	4.0	0.0	-	21.7	30.7	22.7	0.0	-	53.3	1.7	23.3	0.0	-	25.0	-
PHF	0.779	0.600	0.000	-	0.739	0.676	0.739	0.000	-	0.800	0.625	0.795	0.000	-	0.815	0.893
Lights	52	11	0	-	63	89	68	0	-	157	4	69	0	-	73	293
% Lights	98.1	91.7	-	-	96.9	96.7	100.0	-	-	98.1	80.0	98.6	-	-	97.3	97.7
Mediums	1	1	0	-	2	3	0	0	-	3	1	1	0	-	2	7
% Mediums	1.9	8.3	-	-	3.1	3.3	0.0	-	-	1.9	20.0	1.4	-	-	2.7	2.3
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Count Name: Beatty Line North & Sideroad 19
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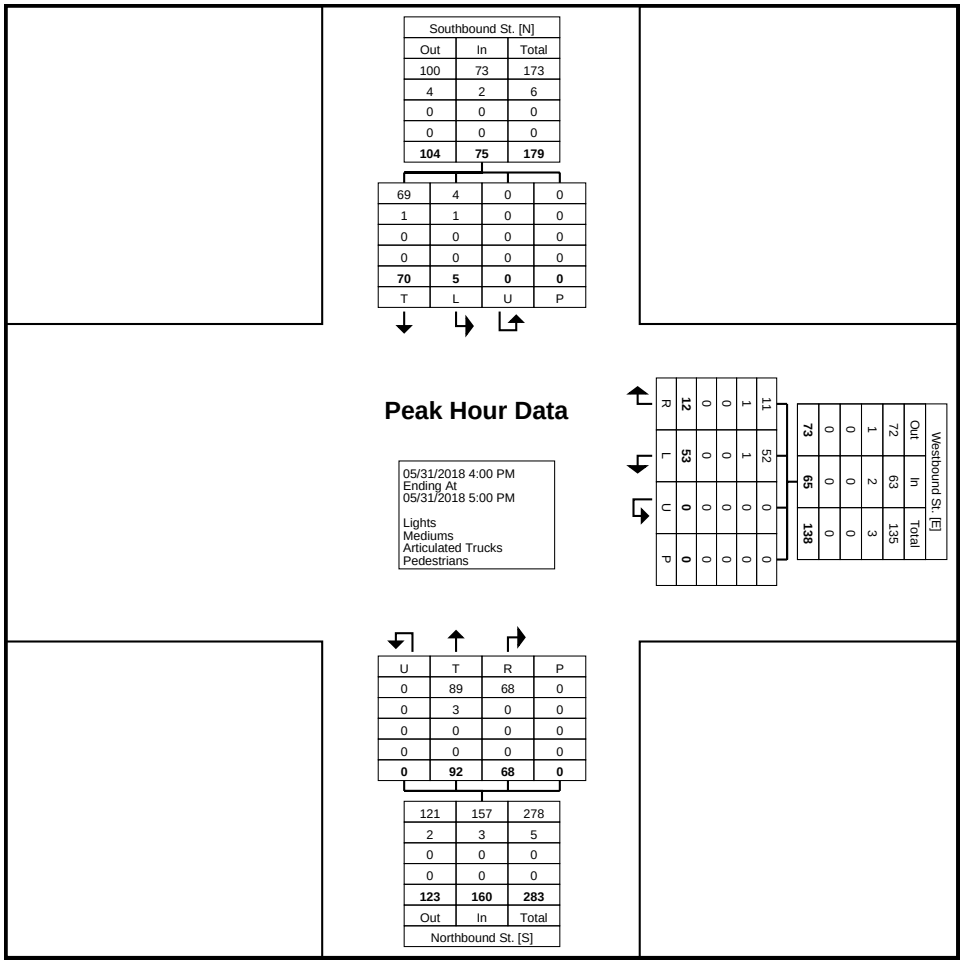
Start Date: 05/31/2018



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

Paradigm Transportation Solutions Limited
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Count Name: Beatty Line North & Sideroad 19
Site Code:
Start Date: 05/31/2018

Paradigm Transportation Solutions Limited
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Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Wellington Road 18
Site Code:
Start Date: 05/31/2018

Turning Movement Data

Start Time	Wellington Road 18 Eastbound						St. Andrew Street Westbound						Beatty Line North Northbound						Beatty Line North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	8	31	0	0	0	39	0	20	10	0	0	30	0	0	0	0	0	0	12	0	11	0	0	23	92
7:15 AM	9	32	0	0	0	41	0	22	14	0	0	36	0	1	0	0	0	1	13	0	5	0	0	18	96
7:30 AM	5	38	0	0	0	43	0	38	8	0	0	46	1	0	1	0	0	2	14	0	18	0	0	32	123
7:45 AM	10	55	0	0	1	65	0	50	19	0	0	69	0	1	0	0	0	1	19	0	25	0	0	44	179
Hourly Total	32	156	0	0	1	188	0	130	51	0	0	181	1	2	1	0	0	4	58	0	59	0	0	117	490
8:00 AM	11	57	0	0	0	68	0	53	6	0	0	59	0	1	0	0	0	1	17	1	21	0	0	39	167
8:15 AM	6	81	0	0	0	87	0	63	6	0	0	69	0	1	1	0	0	2	20	1	16	0	0	37	195
8:30 AM	9	63	0	0	0	72	0	42	12	0	0	54	0	0	0	0	0	0	15	0	24	0	0	39	165
8:45 AM	18	80	0	0	0	98	1	54	10	0	0	65	0	0	0	0	0	0	20	1	25	0	1	46	209
Hourly Total	44	281	0	0	0	325	1	212	34	0	0	247	0	2	1	0	0	3	72	3	86	0	1	161	736
9:00 AM	12	66	0	0	0	78	0	64	20	0	0	84	0	0	0	0	0	0	13	0	25	0	0	38	200
9:15 AM	12	42	0	0	0	54	0	64	14	0	0	78	0	0	1	0	0	1	15	1	18	0	0	34	167
9:30 AM	13	41	0	0	0	54	0	53	11	0	0	64	0	0	0	0	0	0	17	0	13	0	4	30	148
9:45 AM	7	52	0	0	0	59	0	63	18	0	0	81	0	0	0	0	0	0	12	0	19	0	1	31	171
Hourly Total	44	201	0	0	0	245	0	244	63	0	0	307	0	0	1	0	0	1	57	1	75	0	5	133	686
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	18	56	0	0	0	74	0	70	14	0	0	84	0	0	0	0	0	0	17	0	20	0	0	37	195
11:15 AM	16	67	0	0	0	83	0	65	13	0	0	78	0	0	0	0	0	0	16	0	20	0	0	36	197
11:30 AM	21	76	0	0	0	97	1	70	16	0	0	87	0	0	0	0	0	0	18	0	22	0	1	40	224
11:45 AM	15	73	0	0	0	88	0	71	13	0	0	84	0	0	0	1	0	1	28	0	24	0	0	52	225
Hourly Total	70	272	0	0	0	342	1	276	56	0	0	333	0	0	0	1	0	1	79	0	86	0	1	165	841
12:00 PM	17	65	0	0	0	82	0	61	16	0	0	77	0	0	0	0	0	0	24	1	25	0	2	50	209
12:15 PM	12	82	0	0	0	94	0	65	13	0	0	78	0	0	0	0	0	0	11	0	20	0	1	31	203
12:30 PM	19	74	0	0	0	93	0	71	8	0	0	79	0	0	0	0	0	0	18	0	19	0	4	37	209
12:45 PM	22	64	0	0	0	86	0	82	16	0	0	98	0	0	0	0	0	0	14	0	25	0	1	39	223
Hourly Total	70	285	0	0	0	355	0	279	53	0	0	332	0	0	0	0	0	0	67	1	89	0	8	157	844
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	23	72	0	0	0	95	1	67	15	0	0	83	0	0	2	0	0	2	19	2	22	0	1	43	223
3:15 PM	23	51	0	0	0	74	0	39	9	0	0	48	0	0	2	0	0	2	22	1	28	0	0	51	175
3:30 PM	19	93	0	0	0	112	2	68	13	0	0	83	0	0	1	0	0	1	18	3	15	0	0	36	232
3:45 PM	25	70	0	0	0	95	2	41	10	0	0	53	0	0	1	0	0	1	12	1	20	0	0	33	182
Hourly Total	90	286	0	0	0	376	5	215	47	0	0	267	0	0	6	0	0	6	71	7	85	0	1	163	812
4:00 PM	30	74	0	0	0	104	0	73	16	0	0	89	0	1	0	0	0	1	19	0	19	0	0	38	232
4:15 PM	21	63	1	0	0	85	1	71	15	0	0	87	0	2	0	0	0	2	20	2	29	0	0	51	225
4:30 PM	23	102	0	0	0	125	0	58	16	0	1	74	0	1	0	0	0	1	31	2	23	0	0	56	256
4:45 PM	30	76	0	0	1	106	0	52	15	0	0	67	0	1	0	0	1	1	24	0	17	0	0	41	215
Hourly Total	104	315	1	0	1	420	1	254	62	0	1	317	0	5	0	0	1	5	94	4	88	0	0	186	928

5:00 PM	24	73	0	0	0	97	1	60	15	0	0	76	0	0	0	0	0	0	31	0	16	0	0	47	220
5:15 PM	19	64	0	0	0	83	1	52	9	0	0	62	0	0	0	0	0	0	18	1	23	0	0	42	187
5:30 PM	13	58	2	0	0	73	0	57	24	0	0	81	0	1	0	0	0	1	18	0	14	0	0	32	187
5:45 PM	21	61	0	0	2	82	0	63	13	0	0	76	0	0	0	0	0	0	21	0	21	0	0	42	200
Hourly Total	77	256	2	0	2	335	2	232	61	0	0	295	0	1	0	0	0	1	88	1	74	0	0	163	794
Grand Total	531	2052	3	0	4	2586	10	1842	427	0	1	2279	1	10	9	1	1	21	586	17	642	0	16	1245	6131
Approach %	20.5	79.4	0.1	0.0	-	-	0.4	80.8	18.7	0.0	-	-	4.8	47.6	42.9	4.8	-	-	47.1	1.4	51.6	0.0	-	-	-
Total %	8.7	33.5	0.0	0.0	-	42.2	0.2	30.0	7.0	0.0	-	37.2	0.0	0.2	0.1	0.0	-	0.3	9.6	0.3	10.5	0.0	-	20.3	-
Lights	443	1991	3	0	-	2437	8	1780	402	0	-	2190	1	8	8	1	-	18	563	15	548	0	-	1126	5771
% Lights	83.4	97.0	100.0	-	-	94.2	80.0	96.6	94.1	-	-	96.1	100.0	80.0	88.9	100.0	-	85.7	96.1	88.2	85.4	-	-	90.4	94.1
Mediums	87	56	0	0	-	143	2	56	16	0	-	74	0	2	1	0	-	3	17	2	92	0	-	111	331
% Mediums	16.4	2.7	0.0	-	-	5.5	20.0	3.0	3.7	-	-	3.2	0.0	20.0	11.1	0.0	-	14.3	2.9	11.8	14.3	-	-	8.9	5.4
Articulated Trucks	1	5	0	0	-	6	0	6	9	0	-	15	0	0	0	0	-	0	6	0	2	0	-	8	29
% Articulated Trucks	0.2	0.2	0.0	-	-	0.2	0.0	0.3	2.1	-	-	0.7	0.0	0.0	0.0	0.0	-	0.0	1.0	0.0	0.3	-	-	0.6	0.5
Pedestrians	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	16	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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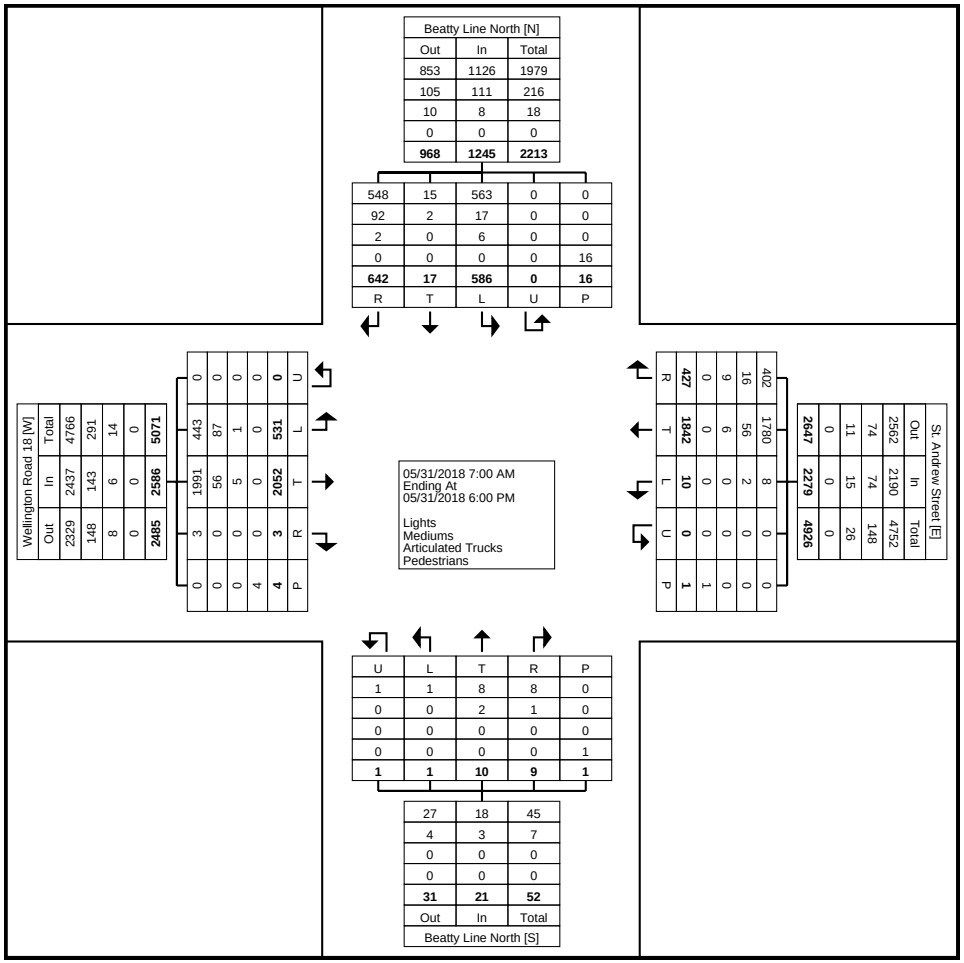
Start Date: 05/31/2018



Turning Movement Data Plot

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Count Name: Beatty Line North & Wellington Road 18
Site Code:
Start Date: 05/31/2018

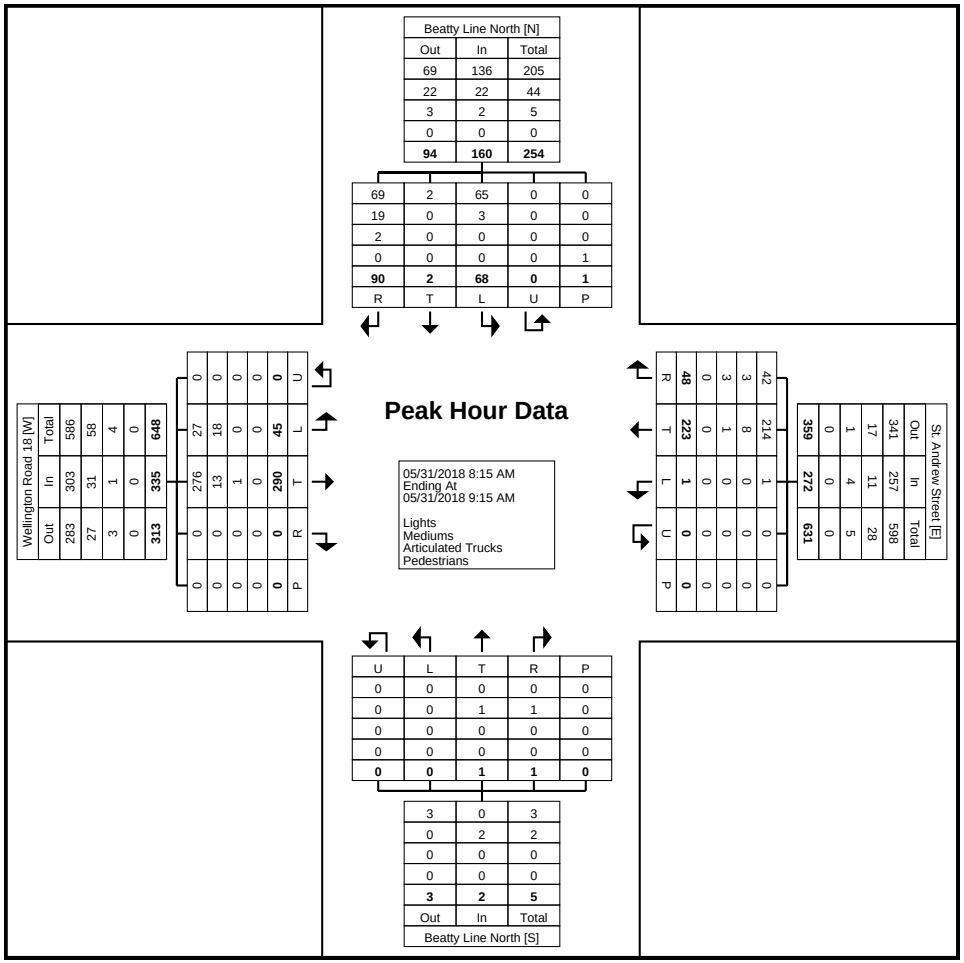
Turning Movement Peak Hour Data (8:15 AM)

Start Time	Wellington Road 18 Eastbound						St. Andrew Street Westbound						Beatty Line North Northbound						Beatty Line North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:15 AM	6	81	0	0	0	87	0	63	6	0	0	69	0	1	1	0	0	2	20	1	16	0	0	37	195
8:30 AM	9	63	0	0	0	72	0	42	12	0	0	54	0	0	0	0	0	0	15	0	24	0	0	39	165
8:45 AM	18	80	0	0	0	98	1	54	10	0	0	65	0	0	0	0	0	0	20	1	25	0	1	46	209
9:00 AM	12	66	0	0	0	78	0	64	20	0	0	84	0	0	0	0	0	0	13	0	25	0	0	38	200
Total	45	290	0	0	0	335	1	223	48	0	0	272	0	1	1	0	0	2	68	2	90	0	1	160	769
Approach %	13.4	86.6	0.0	0.0	-	-	0.4	82.0	17.6	0.0	-	-	0.0	50.0	50.0	0.0	-	-	42.5	1.3	56.3	0.0	-	-	-
Total %	5.9	37.7	0.0	0.0	-	43.6	0.1	29.0	6.2	0.0	-	35.4	0.0	0.1	0.1	0.0	-	0.3	8.8	0.3	11.7	0.0	-	20.8	-
PHF	0.625	0.895	0.000	0.000	-	0.855	0.250	0.871	0.600	0.000	-	0.810	0.000	0.250	0.250	0.000	-	0.250	0.850	0.500	0.900	0.000	-	0.870	0.920
Lights	27	276	0	0	-	303	1	214	42	0	-	257	0	0	0	0	-	0	65	2	69	0	-	136	696
% Lights	60.0	95.2	-	-	-	90.4	100.0	96.0	87.5	-	-	94.5	-	0.0	0.0	-	-	0.0	95.6	100.0	76.7	-	-	85.0	90.5
Mediums	18	13	0	0	-	31	0	8	3	0	-	11	0	1	1	0	-	2	3	0	19	0	-	22	66
% Mediums	40.0	4.5	-	-	-	9.3	0.0	3.6	6.3	-	-	4.0	-	100.0	100.0	-	-	100.0	4.4	0.0	21.1	-	-	13.8	8.6
Articulated Trucks	0	1	0	0	-	1	0	1	3	0	-	4	0	0	0	0	-	0	0	0	2	0	-	2	7
% Articulated Trucks	0.0	0.3	-	-	-	0.3	0.0	0.4	6.3	-	-	1.5	-	0.0	0.0	-	-	0.0	0.0	0.0	2.2	-	-	1.3	0.9
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Wellington Road 18
Site Code:
Start Date: 05/31/2018



Turning Movement Peak Hour Data Plot (8:15 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Wellington Road 18
Site Code:
Start Date: 05/31/2018

Turning Movement Peak Hour Data (11:30 AM)

Start Time	Wellington Road 18 Eastbound						St. Andrew Street Westbound						Beatty Line North Northbound						Beatty Line North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:30 AM	21	76	0	0	0	97	1	70	16	0	0	87	0	0	0	0	0	0	18	0	22	0	1	40	224
11:45 AM	15	73	0	0	0	88	0	71	13	0	0	84	0	0	0	1	0	1	28	0	24	0	0	52	225
12:00 PM	17	65	0	0	0	82	0	61	16	0	0	77	0	0	0	0	0	0	24	1	25	0	2	50	209
12:15 PM	12	82	0	0	0	94	0	65	13	0	0	78	0	0	0	0	0	0	11	0	20	0	1	31	203
Total	65	296	0	0	0	361	1	267	58	0	0	326	0	0	0	1	0	1	81	1	91	0	4	173	861
Approach %	18.0	82.0	0.0	0.0	-	-	0.3	81.9	17.8	0.0	-	-	0.0	0.0	0.0	100.0	-	-	46.8	0.6	52.6	0.0	-	-	-
Total %	7.5	34.4	0.0	0.0	-	41.9	0.1	31.0	6.7	0.0	-	37.9	0.0	0.0	0.0	0.1	-	0.1	9.4	0.1	10.6	0.0	-	20.1	-
PHF	0.774	0.902	0.000	0.000	-	0.930	0.250	0.940	0.906	0.000	-	0.937	0.000	0.000	0.000	0.250	-	0.250	0.723	0.250	0.910	0.000	-	0.832	0.957
Lights	51	283	0	0	-	334	1	258	54	0	-	313	0	0	0	1	-	1	80	1	80	0	-	161	809
% Lights	78.5	95.6	-	-	-	92.5	100.0	96.6	93.1	-	-	96.0	-	-	-	100.0	-	100.0	98.8	100.0	87.9	-	-	93.1	94.0
Mediums	14	13	0	0	-	27	0	8	2	0	-	10	0	0	0	0	-	0	1	0	11	0	-	12	49
% Mediums	21.5	4.4	-	-	-	7.5	0.0	3.0	3.4	-	-	3.1	-	-	-	0.0	-	0.0	1.2	0.0	12.1	-	-	6.9	5.7
Articulated Trucks	0	0	0	0	-	0	0	1	2	0	-	3	0	0	0	0	-	0	0	0	0	0	-	0	3
% Articulated Trucks	0.0	0.0	-	-	-	0.0	0.0	0.4	3.4	-	-	0.9	-	-	-	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.3
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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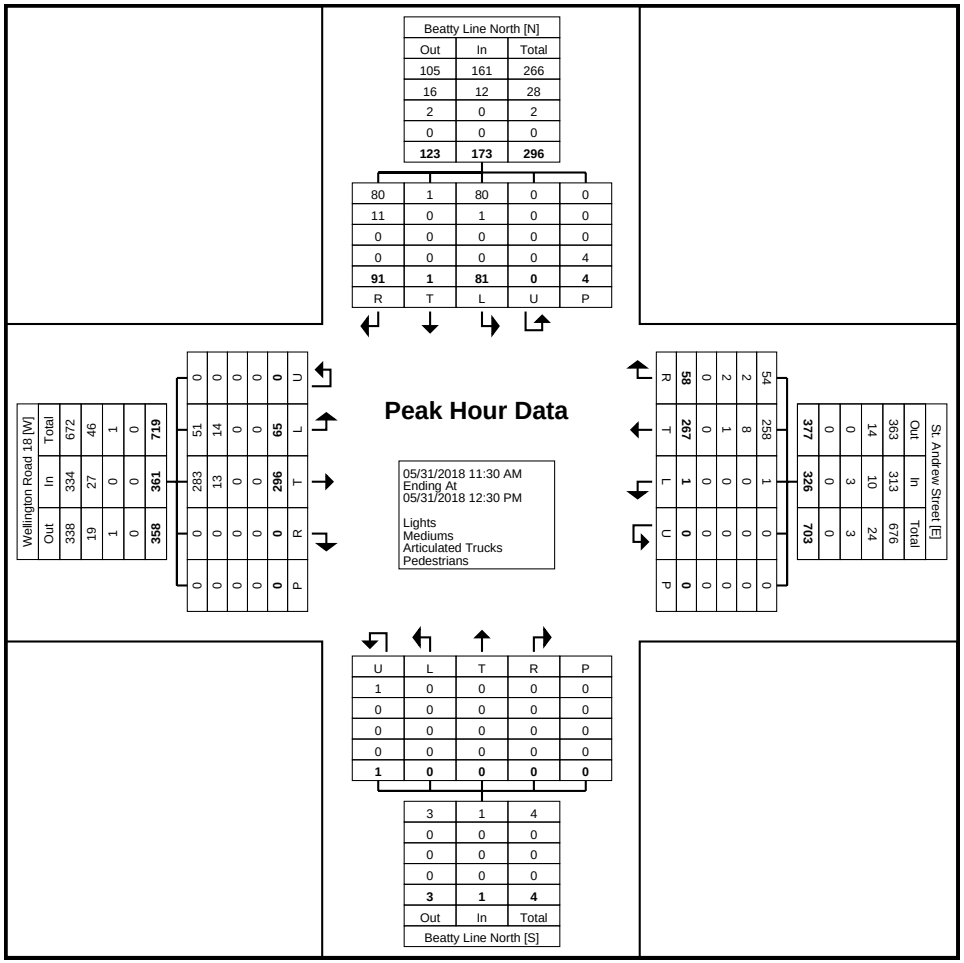
Start Date: 05/31/2018



Turning Movement Peak Hour Data Plot (11:30 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Wellington Road 18
Site Code:
Start Date: 05/31/2018

Turning Movement Peak Hour Data (4:00 PM)

Start Time	Wellington Road 18 Eastbound						St. Andrew Street Westbound						Beatty Line North Northbound						Beatty Line North Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	30	74	0	0	0	104	0	73	16	0	0	89	0	1	0	0	0	1	19	0	19	0	0	38	232
4:15 PM	21	63	1	0	0	85	1	71	15	0	0	87	0	2	0	0	0	2	20	2	29	0	0	51	225
4:30 PM	23	102	0	0	0	125	0	58	16	0	1	74	0	1	0	0	0	1	31	2	23	0	0	56	256
4:45 PM	30	76	0	0	1	106	0	52	15	0	0	67	0	1	0	0	1	1	24	0	17	0	0	41	215
Total	104	315	1	0	1	420	1	254	62	0	1	317	0	5	0	0	1	5	94	4	88	0	0	186	928
Approach %	24.8	75.0	0.2	0.0	-	-	0.3	80.1	19.6	0.0	-	-	0.0	100.0	0.0	0.0	-	-	50.5	2.2	47.3	0.0	-	-	-
Total %	11.2	33.9	0.1	0.0	-	45.3	0.1	27.4	6.7	0.0	-	34.2	0.0	0.5	0.0	0.0	-	0.5	10.1	0.4	9.5	0.0	-	20.0	-
PHF	0.867	0.772	0.250	0.000	-	0.840	0.250	0.870	0.969	0.000	-	0.890	0.000	0.625	0.000	0.000	-	0.625	0.758	0.500	0.759	0.000	-	0.830	0.906
Lights	98	309	1	0	-	408	0	253	60	0	-	313	0	4	0	0	-	4	93	4	87	0	-	184	909
% Lights	94.2	98.1	100.0	-	-	97.1	0.0	99.6	96.8	-	-	98.7	-	80.0	-	-	-	80.0	98.9	100.0	98.9	-	-	98.9	98.0
Mediums	5	5	0	0	-	10	1	1	2	0	-	4	0	1	0	0	-	1	0	0	1	0	-	1	16
% Mediums	4.8	1.6	0.0	-	-	2.4	100.0	0.4	3.2	-	-	1.3	-	20.0	-	-	-	20.0	0.0	0.0	1.1	-	-	0.5	1.7
Articulated Trucks	1	1	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	3
% Articulated Trucks	1.0	0.3	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	-	0.0	-	-	-	0.0	1.1	0.0	0.0	-	-	0.5	0.3
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

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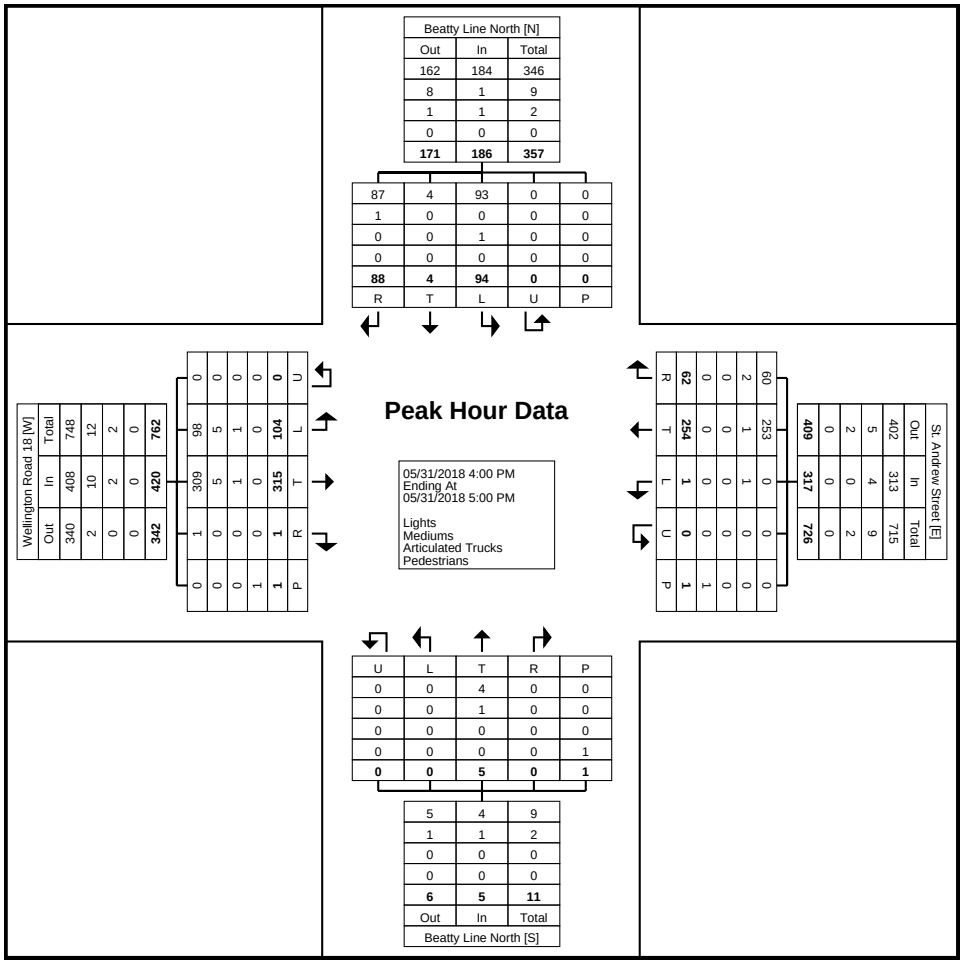
Start Date: 05/31/2018



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

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Beatty Line North & Wellington Road 18
Site Code:
Start Date: 05/31/2018

Appendix C

Existing Operation Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	3	10	27	4	17	7	39	15	9	54	3
Future Volume (Veh/h)	18	3	10	27	4	17	7	39	15	9	54	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	21	3	12	31	5	20	8	45	17	10	63	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	176	162	64	168	156	54	66			62		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	176	162	64	168	156	54	66			62		
tC, single (s)	7.1	6.8	6.3	7.2	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.3	3.4	3.6	4.0	3.3	2.3			2.3		
p0 queue free %	97	100	99	96	99	98	99			99		
cM capacity (veh/h)	764	674	978	749	731	1019	1463			1485		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	36	56	70	76
Volume Left	21	31	8	10
Volume Right	12	20	17	3
cSH	814	826	1463	1485
Volume to Capacity	0.04	0.07	0.01	0.01
Queue Length 95th (m)	1.1	1.7	0.1	0.2
Control Delay (s)	9.6	9.7	0.9	1.0
Lane LOS	A	A	A	A
Approach Delay (s)	9.6	9.7	0.9	1.0
Approach LOS	A	A		

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	14.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	41	11	53	29	12	93
Future Volume (Veh/h)	41	11	53	29	12	93
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	49	13	64	35	14	112
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	222	82			99	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	222	82			99	
tC, single (s)	6.5	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.5			2.4	
p0 queue free %	93	99			99	
cM capacity (veh/h)	748	913			1362	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	62	99	126
Volume Left	49	0	14
Volume Right	13	35	0
cSH	777	1700	1362
Volume to Capacity	0.08	0.06	0.01
Queue Length 95th (m)	2.1	0.0	0.2
Control Delay (s)	10.0	0.0	0.9
Lane LOS	B		A
Approach Delay (s)	10.0	0.0	0.9
Approach LOS	B		

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	22.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	37	53	73	50	81	59
Future Volume (Veh/h)	37	53	73	50	81	59
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	40	57	78	54	87	63
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	328	118	150			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	328	118	150			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	94	95			
cM capacity (veh/h)	634	939	1437			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	97	132	150
Volume Left	40	78	0
Volume Right	57	0	63
cSH	783	1437	1700
Volume to Capacity	0.12	0.05	0.09
Queue Length 95th (m)	3.4	1.4	0.0
Control Delay (s)	10.2	4.7	0.0
Lane LOS	B	A	
Approach Delay (s)	10.2	4.7	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	29.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	290	0	1	223	48	0	1	1	68	2	90
Future Volume (Veh/h)	45	290	0	1	223	48	0	1	1	68	2	90
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	49	315	0	1	242	52	0	1	1	74	2	98
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	294			315			782	709	315	684	683	268
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	294			315			782	709	315	684	683	268
tC, single (s)	4.5			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.6			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	95			100			100	100	100	79	99	86
cM capacity (veh/h)	1079			1257			261	345	730	346	357	723

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	364	295	2	174
Volume Left	49	1	0	74
Volume Right	0	52	1	98
cSH	1079	1257	468	490
Volume to Capacity	0.05	0.00	0.00	0.36
Queue Length 95th (m)	1.1	0.0	0.1	12.7
Control Delay (s)	1.6	0.0	12.7	16.3
Lane LOS	A	A	B	C
Approach Delay (s)	1.6	0.0	12.7	16.3
Approach LOS			B	C

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	58.5%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	6	7	24	4	15	3	50	38	20	39	3
Future Volume (Veh/h)	4	6	7	24	4	15	3	50	38	20	39	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	5	7	8	27	5	17	3	57	43	23	44	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	196	198	46	188	178	78	47			100		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	196	198	46	188	178	78	47			100		
tC, single (s)	7.1	6.5	6.3	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.2	3.3	2.2			2.2		
p0 queue free %	99	99	99	96	99	98	100			98		
cM capacity (veh/h)	741	690	991	747	665	988	1573			1505		

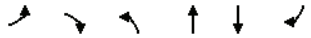
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	20	49	103	70
Volume Left	5	27	3	23
Volume Right	8	17	43	3
cSH	801	805	1573	1505
Volume to Capacity	0.02	0.06	0.00	0.02
Queue Length 95th (m)	0.6	1.6	0.0	0.4
Control Delay (s)	9.6	9.8	0.2	2.5
Lane LOS	A	A	A	A
Approach Delay (s)	9.6	9.8	0.2	2.5
Approach LOS	A	A		

Intersection Summary				
Average Delay	3.6			
Intersection Capacity Utilization	21.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	53	12	92	68	5	70
Future Volume (Veh/h)	53	12	92	68	5	70
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	60	13	103	76	6	79
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	232	141			179	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	232	141			179	
tC, single (s)	6.4	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.4	
p0 queue free %	92	98			100	
cM capacity (veh/h)	753	845			1269	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	73	179	85
Volume Left	60	0	6
Volume Right	13	76	0
cSH	767	1700	1269
Volume to Capacity	0.10	0.11	0.00
Queue Length 95th (m)	2.5	0.0	0.1
Control Delay (s)	10.2	0.0	0.6
Lane LOS	B		A
Approach Delay (s)	10.2	0.0	0.6
Approach LOS	B		

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	19.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	87	70	78	134	70	87
Future Volume (Veh/h)	87	70	78	134	70	87
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	98	79	88	151	79	98
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	455	128	177			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	455	128	177			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	91	94			
cM capacity (veh/h)	531	919	1411			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	177	239	177
Volume Left	98	88	0
Volume Right	79	0	98
cSH	655	1411	1700
Volume to Capacity	0.27	0.06	0.10
Queue Length 95th (m)	8.7	1.6	0.0
Control Delay (s)	12.5	3.2	0.0
Lane LOS	B	A	
Approach Delay (s)	12.5	3.2	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		5.0		
Intersection Capacity Utilization		39.5%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	104	315	1	1	254	62	0	5	0	94	4	88
Future Volume (Veh/h)	104	315	1	1	254	62	0	5	0	94	4	88
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	114	346	1	1	279	68	0	5	0	103	4	97
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	347			347			988	924	346	892	890	313
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	347			347			988	924	346	892	890	313
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	90			100			100	98	100	57	98	87
cM capacity (veh/h)	1190			1223			181	245	701	241	257	730

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	461	348	5	204
Volume Left	114	1	0	103
Volume Right	1	68	0	97
cSH	1190	1223	245	354
Volume to Capacity	0.10	0.00	0.02	0.58
Queue Length 95th (m)	2.5	0.0	0.5	27.6
Control Delay (s)	2.8	0.0	20.0	28.2
Lane LOS	A	A	C	D
Approach Delay (s)	2.8	0.0	20.0	28.2
Approach LOS			C	D

Intersection Summary				
Average Delay		7.0		
Intersection Capacity Utilization		67.1%	ICU Level of Service	C
Analysis Period (min)		15		

Appendix D

2020 Background Traffic Operations Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	9	13	34	6	17	7	49	18	9	63	8
Future Volume (Veh/h)	30	9	13	34	6	17	7	49	18	9	63	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	35	10	15	40	7	20	8	57	21	10	73	9
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	204	192	78	201	186	68	82			78		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	204	192	78	201	186	68	82			78		
tC, single (s)	7.1	6.8	6.3	7.2	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.3	3.4	3.6	4.0	3.3	2.3			2.3		
p0 queue free %	95	98	98	94	99	98	99			99		
cM capacity (veh/h)	730	648	962	703	704	1002	1443			1465		

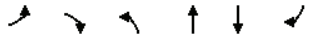
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	60	67	86	92
Volume Left	35	40	8	10
Volume Right	15	20	21	9
cSH	760	772	1443	1465
Volume to Capacity	0.08	0.09	0.01	0.01
Queue Length 95th (m)	2.1	2.3	0.1	0.2
Control Delay (s)	10.1	10.1	0.7	0.9
Lane LOS	B	B	A	A
Approach Delay (s)	10.1	10.1	0.7	0.9
Approach LOS	B	B		

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	16.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	11	66	30	12	112
Future Volume (Veh/h)	42	11	66	30	12	112
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	51	13	80	36	14	135
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	261	98			116	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	261	98			116	
tC, single (s)	6.5	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.5			2.4	
p0 queue free %	93	99			99	
cM capacity (veh/h)	710	894			1341	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	64	116	149
Volume Left	51	0	14
Volume Right	13	36	0
cSH	741	1700	1341
Volume to Capacity	0.09	0.07	0.01
Queue Length 95th (m)	2.3	0.0	0.3
Control Delay (s)	10.3	0.0	0.8
Lane LOS	B		A
Approach Delay (s)	10.3	0.0	0.8
Approach LOS	B		

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	23.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	53	54	74	75	139	94
Future Volume (Veh/h)	53	54	74	75	139	94
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	57	58	80	81	149	101
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	440	200	250			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	440	200	250			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	93	94			
cM capacity (veh/h)	543	847	1321			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	115	161	250
Volume Left	57	80	0
Volume Right	58	0	101
cSH	663	1321	1700
Volume to Capacity	0.17	0.06	0.15
Queue Length 95th (m)	5.0	1.5	0.0
Control Delay (s)	11.6	4.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.6	4.2	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	37.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	296	0	1	227	62	0	1	1	104	2	100
Future Volume (Veh/h)	48	296	0	1	227	62	0	1	1	104	2	100
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	322	0	1	247	67	0	1	1	113	2	109
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	314			322			818	742	322	710	708	280
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	314			322			818	742	322	710	708	280
tC, single (s)	4.5			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.6			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	95			100			100	100	100	66	99	85
cM capacity (veh/h)	1060			1249			241	329	724	331	344	711

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	374	315	2	224
Volume Left	52	1	0	113
Volume Right	0	67	1	109
cSH	1060	1249	452	448
Volume to Capacity	0.05	0.00	0.00	0.50
Queue Length 95th (m)	1.2	0.0	0.1	21.9
Control Delay (s)	1.6	0.0	13.0	20.8
Lane LOS	A	A	B	C
Approach Delay (s)	1.6	0.0	13.0	20.8
Approach LOS			B	C

Intersection Summary				
Average Delay	5.8			
Intersection Capacity Utilization	62.7%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	9	29	26	12	15	3	55	41	20	48	16
Future Volume (Veh/h)	12	9	29	26	12	15	3	55	41	20	48	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	14	10	33	30	14	17	3	63	47	23	55	18
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	226	226	64	240	212	86	73			110		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	226	226	64	240	212	86	73			110		
tC, single (s)	7.1	6.5	6.3	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.2	3.3	2.2			2.2		
p0 queue free %	98	98	97	96	98	98	100			98		
cM capacity (veh/h)	699	665	968	668	636	978	1540			1493		

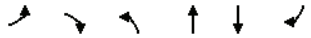
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	57	61	113	96
Volume Left	14	30	3	23
Volume Right	33	17	47	18
cSH	824	724	1540	1493
Volume to Capacity	0.07	0.08	0.00	0.02
Queue Length 95th (m)	1.8	2.2	0.0	0.4
Control Delay (s)	9.7	10.4	0.2	1.9
Lane LOS	A	B	A	A
Approach Delay (s)	9.7	10.4	0.2	1.9
Approach LOS	A	B		

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	23.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	54	12	100	69	5	103
Future Volume (Veh/h)	54	12	100	69	5	103
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	61	13	112	78	6	116
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	279	151			190	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	279	151			190	
tC, single (s)	6.4	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.4	
p0 queue free %	91	98			100	
cM capacity (veh/h)	707	834			1257	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	74	190	122
Volume Left	61	0	6
Volume Right	13	78	0
cSH	727	1700	1257
Volume to Capacity	0.10	0.11	0.00
Queue Length 95th (m)	2.7	0.0	0.1
Control Delay (s)	10.5	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	10.5	0.0	0.4
Approach LOS	B		

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	19.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	121	71	80	195	106	110
Future Volume (Veh/h)	121	71	80	195	106	110
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	136	80	90	219	119	124
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	580	181	243			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	580	181	243			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	70	91	93			
cM capacity (veh/h)	448	859	1335			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	216	309	243
Volume Left	136	90	0
Volume Right	80	0	124
cSH	544	1335	1700
Volume to Capacity	0.40	0.07	0.14
Queue Length 95th (m)	15.1	1.7	0.0
Control Delay (s)	15.9	2.7	0.0
Lane LOS	C	A	
Approach Delay (s)	15.9	2.7	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	5.6			
Intersection Capacity Utilization	48.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	321	1	1	259	101	0	5	0	117	4	96
Future Volume (Veh/h)	114	321	1	1	259	101	0	5	0	117	4	96
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	125	353	1	1	285	111	0	5	0	129	4	105
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	396			354			1053	1002	354	948	946	340
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	396			354			1053	1002	354	948	946	340
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			100	98	100	41	98	85
cM capacity (veh/h)	1141			1216			158	218	695	217	234	704

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	479	397	5	238
Volume Left	125	1	0	129
Volume Right	1	111	0	105
cSH	1141	1216	218	313
Volume to Capacity	0.11	0.00	0.02	0.76
Queue Length 95th (m)	2.9	0.0	0.6	46.8
Control Delay (s)	3.1	0.0	21.9	45.2
Lane LOS	A	A	C	E
Approach Delay (s)	3.1	0.0	21.9	45.2
Approach LOS			C	E

Intersection Summary				
Average Delay	11.1			
Intersection Capacity Utilization	72.3%	ICU Level of Service		C
Analysis Period (min)	15			

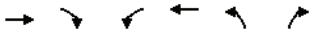
Appendix E

2020 Total Traffic Operations Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	11	13	34	7	17	7	51	18	9	64	8
Future Volume (Veh/h)	30	11	13	34	7	17	7	51	18	9	64	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	35	13	15	40	8	20	8	59	21	10	74	9
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	208	194	78	206	188	70	83			80		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	208	194	78	206	188	70	83			80		
tC, single (s)	7.1	6.8	6.3	7.2	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.3	3.4	3.6	4.0	3.3	2.3			2.3		
p0 queue free %	95	98	98	94	99	98	99			99		
cM capacity (veh/h)	725	646	960	696	701	999	1442			1463		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	63	68	88	93
Volume Left	35	40	8	10
Volume Right	15	20	21	9
cSH	750	765	1442	1463
Volume to Capacity	0.08	0.09	0.01	0.01
Queue Length 95th (m)	2.2	2.3	0.1	0.2
Control Delay (s)	10.2	10.2	0.7	0.9
Lane LOS	B	B	A	A
Approach Delay (s)	10.2	10.2	0.7	0.9
Approach LOS	B	B		

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	16.8%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	54	0	0	22	0	0
Future Volume (Veh/h)	54	0	0	22	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	0	0	24	0	0
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			59		83	59
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			59		83	59
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1545		924	1012

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	59	24	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1545	1700
Volume to Capacity	0.03	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	6.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	11	70	30	12	127
Future Volume (Veh/h)	42	11	70	30	12	127
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	51	13	84	36	14	153
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	283	102			120	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	283	102			120	
tC, single (s)	6.5	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.5			2.4	
p0 queue free %	93	99			99	
cM capacity (veh/h)	689	889			1337	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	64	120	167
Volume Left	51	0	14
Volume Right	13	36	0
cSH	722	1700	1337
Volume to Capacity	0.09	0.07	0.01
Queue Length 95th (m)	2.3	0.0	0.3
Control Delay (s)	10.5	0.0	0.7
Lane LOS	B		A
Approach Delay (s)	10.5	0.0	0.7
Approach LOS	B		

Intersection Summary				
Average Delay		2.3		
Intersection Capacity Utilization		24.0%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	55	54	74	77	149	99
Future Volume (Veh/h)	55	54	74	77	149	99
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	59	58	80	83	160	106
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	456	213	266			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	456	213	266			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	93	94			
cM capacity (veh/h)	531	832	1304			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	117	163	266
Volume Left	59	80	0
Volume Right	58	0	106
cSH	647	1304	1700
Volume to Capacity	0.18	0.06	0.16
Queue Length 95th (m)	5.2	1.6	0.0
Control Delay (s)	11.8	4.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.8	4.2	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		3.8		
Intersection Capacity Utilization		38.4%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	296	0	1	227	64	0	1	1	114	2	100
Future Volume (Veh/h)	48	296	0	1	227	64	0	1	1	114	2	100
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	322	0	1	247	70	0	1	1	124	2	109
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	317			322			820	745	322	712	710	282
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317			322			820	745	322	712	710	282
tC, single (s)	4.5			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.6			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	95			100			100	100	100	62	99	85
cM capacity (veh/h)	1057			1249			240	328	724	331	343	709

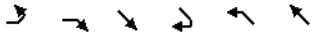
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	374	318	2	235
Volume Left	52	1	0	124
Volume Right	0	70	1	109
cSH	1057	1249	451	440
Volume to Capacity	0.05	0.00	0.00	0.53
Queue Length 95th (m)	1.2	0.0	0.1	24.6
Control Delay (s)	1.6	0.0	13.0	22.2
Lane LOS	A	A	B	C
Approach Delay (s)	1.6	0.0	13.0	22.2
Approach LOS			B	C

Intersection Summary				
Average Delay	6.3			
Intersection Capacity Utilization	63.3%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	52	0	1	21	0	2
Future Volume (Veh/h)	52	0	1	21	0	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	57	0	1	23	0	2
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			57		82	57
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			57		82	57
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1560		924	1015

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	57	24	2
Volume Left	0	1	0
Volume Right	0	0	2
cSH	1700	1560	1015
Volume to Capacity	0.03	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.3	8.6
Lane LOS		A	A
Approach Delay (s)	0.0	0.3	8.6
Approach LOS			A

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	0	0	111	0	0	76
Future Volume (Veh/h)	0	0	111	0	0	76
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	0	121	0	0	83
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	204	121			121	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	204	121			121	
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	100			100	
cM capacity (veh/h)	789	936			1479	

Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	0	121	83
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1479
Volume to Capacity	0.00	0.07	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		9.2%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	2	15	110	1	4	74
Future Volume (Veh/h)	2	15	110	1	4	74
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)	2	16	120	1	4	80
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	208	120			121	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	208	120			121	
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	98			100	
cM capacity (veh/h)	782	936			1479	

Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	18	121	84
Volume Left	2	0	4
Volume Right	16	1	0
cSH	916	1700	1479
Volume to Capacity	0.02	0.07	0.00
Queue Length 95th (m)	0.5	0.0	0.1
Control Delay (s)	9.0	0.0	0.4
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	0.4
Approach LOS	A		

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		17.2%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Beatty Ln N & Farley Rd/Side Rd 18

2020 Total PM
16 Beatty Line Fergus

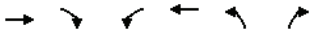
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	10	29	26	14	15	3	56	41	20	50	16
Future Volume (Veh/h)	12	10	29	26	14	15	3	56	41	20	50	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	14	11	33	30	16	17	3	64	47	23	57	18
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	230	229	66	244	214	88	75			111		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	230	229	66	244	214	88	75			111		
tC, single (s)	7.1	6.5	6.3	7.1	6.8	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.2	3.3	2.2			2.3		
p0 queue free %	98	98	97	95	97	98	100			98		
cM capacity (veh/h)	693	662	965	664	633	976	1537			1425		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	58	63	114	98
Volume Left	14	30	3	23
Volume Right	33	17	47	18
cSH	817	717	1537	1425
Volume to Capacity	0.07	0.09	0.00	0.02
Queue Length 95th (m)	1.8	2.3	0.0	0.4
Control Delay (s)	9.7	10.5	0.2	1.9
Lane LOS	A	B	A	A
Approach Delay (s)	9.7	10.5	0.2	1.9
Approach LOS	A	B		

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	23.8%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
4: Apartment Driveway 1 & Farley Rd

2020 Total PM
16 Beatty Line Fergus



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	51	0	0	33	0	0
Future Volume (Veh/h)	51	0	0	33	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	0	0	36	0	0
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			55		91	55
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			55		91	55
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1563		914	1018

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	55	36	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1563	1700
Volume to Capacity	0.03	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary				
Average Delay	0.0			
Intersection Capacity Utilization	6.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	54	12	117	69	5	114
Future Volume (Veh/h)	54	12	117	69	5	114
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	61	13	131	78	6	128
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	170			209	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	310	170			209	
tC, single (s)	6.4	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.4	
p0 queue free %	91	98			100	
cM capacity (veh/h)	679	813			1236	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	74	209	134
Volume Left	61	0	6
Volume Right	13	78	0
cSH	699	1700	1236
Volume to Capacity	0.11	0.12	0.00
Queue Length 95th (m)	2.8	0.0	0.1
Control Delay (s)	10.8	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	10.8	0.0	0.4
Approach LOS	B		

Intersection Summary				
Average Delay		2.0		
Intersection Capacity Utilization		20.8%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	126	71	80	207	114	113
Future Volume (Veh/h)	126	71	80	207	114	113
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	142	80	90	233	128	127
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	604	192	255			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	604	192	255			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	67	91	93			
cM capacity (veh/h)	433	848	1322			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	222	323	255
Volume Left	142	90	0
Volume Right	80	0	127
cSH	525	1322	1700
Volume to Capacity	0.42	0.07	0.15
Queue Length 95th (m)	16.6	1.8	0.0
Control Delay (s)	16.8	2.7	0.0
Lane LOS	C	A	
Approach Delay (s)	16.8	2.7	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		5.7		
Intersection Capacity Utilization		49.6%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	321	1	1	259	113	0	5	0	125	4	96
Future Volume (Veh/h)	114	321	1	1	259	113	0	5	0	125	4	96
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	125	353	1	1	285	124	0	5	0	137	4	105
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	409			354			1060	1014	354	955	953	347
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	409			354			1060	1014	354	955	953	347
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			100	98	100	36	98	85
cM capacity (veh/h)	1129			1216			156	214	695	215	232	698

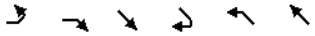
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	479	410	5	246
Volume Left	125	1	0	137
Volume Right	1	124	0	105
cSH	1129	1216	214	305
Volume to Capacity	0.11	0.00	0.02	0.81
Queue Length 95th (m)	3.0	0.0	0.6	52.7
Control Delay (s)	3.1	0.0	22.3	51.7
Lane LOS	A	A	C	F
Approach Delay (s)	3.1	0.0	22.3	51.7
Approach LOS			C	F

Intersection Summary				
Average Delay	12.6			
Intersection Capacity Utilization	73.5%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	1	50	0	2	31
Future Volume (Veh/h)	0	1	50	0	2	31
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	1	54	0	2	34
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	92	54			54	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	92	54			54	
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	100			100	
cM capacity (veh/h)	912	1019			1564	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	54	36
Volume Left	0	0	2
Volume Right	1	0	0
cSH	1019	1700	1564
Volume to Capacity	0.00	0.03	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	8.5	0.0	0.4
Lane LOS	A		A
Approach Delay (s)	8.5	0.0	0.4
Approach LOS	A		

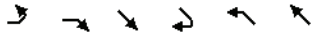
Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	0	0	105	0	0	100
Future Volume (Veh/h)	0	0	105	0	0	100
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	0	114	0	0	109
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	223	114			114	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	223	114			114	
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	100			100	
cM capacity (veh/h)	770	944			1488	

Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	0	114	109
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1488
Volume to Capacity	0.00	0.07	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.0		
Intersection Capacity Utilization		8.9%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	1	11	103	2	17	99
Future Volume (Veh/h)	1	11	103	2	17	99
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)	1	12	112	2	18	108
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	257	113			114	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	257	113			114	
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			99	
cM capacity (veh/h)	727	945			1488	

Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	13	114	126
Volume Left	1	0	18
Volume Right	12	2	0
cSH	924	1700	1488
Volume to Capacity	0.01	0.07	0.01
Queue Length 95th (m)	0.3	0.0	0.3
Control Delay (s)	9.0	0.0	1.1
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	1.1
Approach LOS	A		

Intersection Summary				
Average Delay		1.0		
Intersection Capacity Utilization		22.8%	ICU Level of Service	A
Analysis Period (min)		15		

Appendix F

2021 Background Traffic Operations Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	9	13	34	6	18	7	49	18	9	64	8
Future Volume (Veh/h)	31	9	13	34	6	18	7	49	18	9	64	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	36	10	15	40	7	21	8	57	21	10	74	9
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	206	192	78	202	186	68	83			78		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	206	192	78	202	186	68	83			78		
tC, single (s)	7.1	6.8	6.3	7.2	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.3	3.4	3.6	4.0	3.3	2.3			2.3		
p0 queue free %	95	98	98	94	99	98	99			99		
cM capacity (veh/h)	727	647	960	702	703	1002	1442			1465		

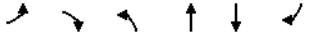
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	61	68	86	93
Volume Left	36	40	8	10
Volume Right	15	21	21	9
cSH	757	774	1442	1465
Volume to Capacity	0.08	0.09	0.01	0.01
Queue Length 95th (m)	2.1	2.3	0.1	0.2
Control Delay (s)	10.2	10.1	0.7	0.9
Lane LOS	B	B	A	A
Approach Delay (s)	10.2	10.1	0.7	0.9
Approach LOS	B	B		

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	16.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	11	67	30	12	113
Future Volume (Veh/h)	42	11	67	30	12	113
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	51	13	81	36	14	136
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	263	99			117	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	263	99			117	
tC, single (s)	6.5	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.5			2.4	
p0 queue free %	93	99			99	
cM capacity (veh/h)	708	893			1340	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	64	117	150
Volume Left	51	0	14
Volume Right	13	36	0
cSH	739	1700	1340
Volume to Capacity	0.09	0.07	0.01
Queue Length 95th (m)	2.3	0.0	0.3
Control Delay (s)	10.3	0.0	0.8
Lane LOS	B		A
Approach Delay (s)	10.3	0.0	0.8
Approach LOS	B		

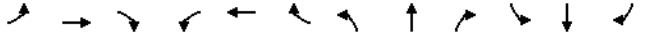
Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	23.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	53	55	75	76	139	95
Future Volume (Veh/h)	53	55	75	76	139	95
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	57	59	81	82	149	102
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	444	200	251			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	444	200	251			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	93	94			
cM capacity (veh/h)	540	846	1320			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	116	163	251
Volume Left	57	81	0
Volume Right	59	0	102
cSH	662	1320	1700
Volume to Capacity	0.18	0.06	0.15
Queue Length 95th (m)	5.1	1.6	0.0
Control Delay (s)	11.6	4.2	0.0
Lane LOS	B	A	
Approach Delay (s)	11.6	4.2	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	37.6%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	299	0	1	230	62	0	1	1	105	2	101
Future Volume (Veh/h)	48	299	0	1	230	62	0	1	1	105	2	101
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	325	0	1	250	67	0	1	1	114	2	110
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	317			325			826	748	325	716	714	284
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	317			325			826	748	325	716	714	284
tC, single (s)	4.5			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.6			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	95			100			100	100	100	65	99	84
cM capacity (veh/h)	1057			1246			238	326	721	328	341	708

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	377	318	2	226
Volume Left	52	1	0	114
Volume Right	0	67	1	110
cSH	1057	1246	449	445
Volume to Capacity	0.05	0.00	0.00	0.51
Queue Length 95th (m)	1.2	0.0	0.1	22.5
Control Delay (s)	1.6	0.0	13.1	21.2
Lane LOS	A	A	B	C
Approach Delay (s)	1.6	0.0	13.1	21.2
Approach LOS			B	C

Intersection Summary				
Average Delay	5.9			
Intersection Capacity Utilization	63.1%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	9	29	27	12	15	3	56	41	21	48	16
Future Volume (Veh/h)	12	9	29	27	12	15	3	56	41	21	48	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	14	10	33	31	14	17	3	64	47	24	55	18
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	230	229	64	244	214	88	73			111		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	230	229	64	244	214	88	73			111		
tC, single (s)	7.1	6.5	6.3	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.2	3.3	2.2			2.2		
p0 queue free %	98	98	97	95	98	98	100			98		
cM capacity (veh/h)	695	662	968	665	633	976	1540			1492		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	57	62	114	97
Volume Left	14	31	3	24
Volume Right	33	17	47	18
cSH	822	720	1540	1492
Volume to Capacity	0.07	0.09	0.00	0.02
Queue Length 95th (m)	1.8	2.3	0.0	0.4
Control Delay (s)	9.7	10.5	0.2	1.9
Lane LOS	A	B	A	A
Approach Delay (s)	9.7	10.5	0.2	1.9
Approach LOS	A	B		

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	23.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	55	12	101	70	5	104
Future Volume (Veh/h)	55	12	101	70	5	104
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	62	13	113	79	6	117
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	282	152			192	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	282	152			192	
tC, single (s)	6.4	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.4	
p0 queue free %	91	98			100	
cM capacity (veh/h)	705	832			1255	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	75	192	123
Volume Left	62	0	6
Volume Right	13	79	0
cSH	724	1700	1255
Volume to Capacity	0.10	0.11	0.00
Queue Length 95th (m)	2.8	0.0	0.1
Control Delay (s)	10.5	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	10.5	0.0	0.4
Approach LOS	B		

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	20.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	122	72	80	196	107	111
Future Volume (Veh/h)	122	72	80	196	107	111
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	137	81	90	220	120	125
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	582	182	245			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	582	182	245			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	69	91	93			
cM capacity (veh/h)	446	857	1333			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	218	310	245
Volume Left	137	90	0
Volume Right	81	0	125
cSH	543	1333	1700
Volume to Capacity	0.40	0.07	0.14
Queue Length 95th (m)	15.4	1.7	0.0
Control Delay (s)	16.0	2.7	0.0
Lane LOS	C	A	
Approach Delay (s)	16.0	2.7	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		5.6		
Intersection Capacity Utilization		48.3%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	325	1	1	262	102	0	5	0	118	4	97
Future Volume (Veh/h)	115	325	1	1	262	102	0	5	0	118	4	97
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	126	357	1	1	288	112	0	5	0	130	4	107
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	400			358			1064	1012	358	958	956	344
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	400			358			1064	1012	358	958	956	344
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			100	98	100	39	98	85
cM capacity (veh/h)	1137			1212			155	214	691	214	231	701

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	484	401	5	241
Volume Left	126	1	0	130
Volume Right	1	112	0	107
cSH	1137	1212	214	310
Volume to Capacity	0.11	0.00	0.02	0.78
Queue Length 95th (m)	3.0	0.0	0.6	49.1
Control Delay (s)	3.1	0.0	22.2	47.7
Lane LOS	A	A	C	E
Approach Delay (s)	3.1	0.0	22.2	47.7
Approach LOS			C	E

Intersection Summary				
Average Delay		11.6		
Intersection Capacity Utilization		72.9%	ICU Level of Service	C
Analysis Period (min)		15		

Appendix G

2021 Total Traffic Operations Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	31	13	13	34	8	18	7	53	18	9	66	8
Future Volume (Veh/h)	31	13	13	34	8	18	7	53	18	9	66	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	36	15	15	40	9	21	8	62	21	10	77	9
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	216	200	82	212	194	72	86			83		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	216	200	82	212	194	72	86			83		
tC, single (s)	7.1	6.8	6.3	7.2	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.3	3.4	3.6	4.0	3.3	2.3			2.3		
p0 queue free %	95	98	98	94	99	98	99			99		
cM capacity (veh/h)	716	641	957	687	696	995	1438			1459		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	66	70	91	96
Volume Left	36	40	8	10
Volume Right	15	21	21	9
cSH	738	759	1438	1459
Volume to Capacity	0.09	0.09	0.01	0.01
Queue Length 95th (m)	2.3	2.4	0.1	0.2
Control Delay (s)	10.4	10.2	0.7	0.8
Lane LOS	B	B	A	A
Approach Delay (s)	10.4	10.2	0.7	0.8
Approach LOS	B	B		

Intersection Summary				
Average Delay	4.8			
Intersection Capacity Utilization	17.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	55	0	1	22	0	2
Future Volume (Veh/h)	55	0	1	22	0	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	0	1	24	0	2
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			60		86	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			60		86	60
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1544		920	1011

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	60	25	2
Volume Left	0	1	0
Volume Right	0	0	2
cSH	1700	1544	1011
Volume to Capacity	0.04	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.3	8.6
Lane LOS		A	A
Approach Delay (s)	0.0	0.3	8.6
Approach LOS			A

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	42	11	76	30	12	143
Future Volume (Veh/h)	42	11	76	30	12	143
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	51	13	92	36	14	172
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	110			128	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	310	110			128	
tC, single (s)	6.5	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.5			2.4	
p0 queue free %	92	99			99	
cM capacity (veh/h)	665	880			1327	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	64	128	186
Volume Left	51	0	14
Volume Right	13	36	0
cSH	700	1700	1327
Volume to Capacity	0.09	0.08	0.01
Queue Length 95th (m)	2.4	0.0	0.3
Control Delay (s)	10.7	0.0	0.7
Lane LOS	B		A
Approach Delay (s)	10.7	0.0	0.7
Approach LOS	B		

Intersection Summary				
Average Delay		2.1		
Intersection Capacity Utilization		24.9%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	57	55	75	81	159	105
Future Volume (Veh/h)	57	55	75	81	159	105
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	61	59	81	87	171	113
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	476	228	284			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	476	228	284			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	93	94			
cM capacity (veh/h)	516	817	1284			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	120	168	284
Volume Left	61	81	0
Volume Right	59	0	113
cSH	630	1284	1700
Volume to Capacity	0.19	0.06	0.17
Queue Length 95th (m)	5.6	1.6	0.0
Control Delay (s)	12.1	4.1	0.0
Lane LOS	B	A	
Approach Delay (s)	12.1	4.1	0.0
Approach LOS	B		

Intersection Summary				
Average Delay		3.7		
Intersection Capacity Utilization		39.7%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	48	299	0	1	230	67	0	1	1	125	2	102
Future Volume (Veh/h)	48	299	0	1	230	67	0	1	1	125	2	102
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	52	325	0	1	250	73	0	1	1	136	2	111
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	323			325			830	754	325	719	718	286
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	323			325			830	754	325	719	718	286
tC, single (s)	4.5			4.1			7.1	6.5	6.2	7.1	6.5	6.4
tC, 2 stage (s)												
tF (s)	2.6			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	95			100			100	100	100	58	99	84
cM capacity (veh/h)	1051			1246			235	324	721	327	340	705

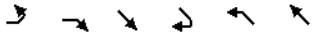
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	377	324	2	249
Volume Left	52	1	0	136
Volume Right	0	73	1	111
cSH	1051	1246	447	430
Volume to Capacity	0.05	0.00	0.00	0.58
Queue Length 95th (m)	1.2	0.0	0.1	28.6
Control Delay (s)	1.6	0.0	13.1	24.3
Lane LOS	A	A	B	C
Approach Delay (s)	1.6	0.0	13.1	24.3
Approach LOS			B	C

Intersection Summary					
Average Delay	7.0				
Intersection Capacity Utilization	64.6%	ICU Level of Service	C		
Analysis Period (min)	15				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	2	53	0	1	21
Future Volume (Veh/h)	0	2	53	0	1	21
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	2	58	0	1	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	83	58			58	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	83	58			58	
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	100			100	
cM capacity (veh/h)	923	1014			1559	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	2	58	24
Volume Left	0	0	1
Volume Right	2	0	0
cSH	1014	1700	1559
Volume to Capacity	0.00	0.03	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	8.6	0.0	0.3
Lane LOS	A		A
Approach Delay (s)	8.6	0.0	0.3
Approach LOS	A		

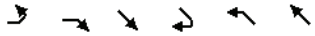
Intersection Summary					
Average Delay	0.3				
Intersection Capacity Utilization	13.3%	ICU Level of Service	A		
Analysis Period (min)	15				



Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	2	15	112	1	5	76
Future Volume (Veh/h)	2	15	112	1	5	76
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)	2	16	122	1	5	83
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	216	122			123	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	216	122			123	
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	98			100	
cM capacity (veh/h)	775	934			1477	

Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	18	123	88
Volume Left	2	0	5
Volume Right	16	1	0
cSH	913	1700	1477
Volume to Capacity	0.02	0.07	0.00
Queue Length 95th (m)	0.5	0.0	0.1
Control Delay (s)	9.0	0.0	0.4
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	0.4
Approach LOS	A		

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		18.1%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	2	15	126	1	4	74
Future Volume (Veh/h)	2	15	126	1	4	74
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)	2	16	137	1	4	80
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	226	138			138	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	226	138			138	
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	98			100	
cM capacity (veh/h)	765	916			1458	

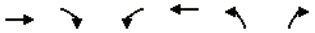
Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	18	138	84
Volume Left	2	0	4
Volume Right	16	1	0
cSH	897	1700	1458
Volume to Capacity	0.02	0.08	0.00
Queue Length 95th (m)	0.5	0.0	0.1
Control Delay (s)	9.1	0.0	0.4
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	0.4
Approach LOS	A		

Intersection Summary				
Average Delay		0.8		
Intersection Capacity Utilization		17.2%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	11	29	27	16	15	3	58	41	21	52	16
Future Volume (Veh/h)	12	11	29	27	16	15	3	58	41	21	52	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	14	13	33	31	18	17	3	66	47	24	59	18
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	238	235	68	251	220	90	77			113		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	238	235	68	251	220	90	77			113		
tC, single (s)	7.1	6.5	6.3	7.1	6.8	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.2	3.3	2.2			2.3		
p0 queue free %	98	98	97	95	97	98	100			98		
cM capacity (veh/h)	683	656	963	655	628	974	1535			1422		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	60	66	116	101
Volume Left	14	31	3	24
Volume Right	33	17	47	18
cSH	805	706	1535	1422
Volume to Capacity	0.07	0.09	0.00	0.02
Queue Length 95th (m)	1.9	2.5	0.0	0.4
Control Delay (s)	9.8	10.6	0.2	1.9
Lane LOS	A	B	A	A
Approach Delay (s)	9.8	10.6	0.2	1.9
Approach LOS	A	B		

Intersection Summary				
Average Delay	4.4			
Intersection Capacity Utilization	24.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	51	0	2	33	0	0
Future Volume (Veh/h)	51	0	2	33	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	0	2	36	0	0
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			55		95	55
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			55		95	55
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1563		908	1018

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	55	38	0
Volume Left	0	2	0
Volume Right	0	0	0
cSH	1700	1563	1700
Volume to Capacity	0.03	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.4	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.4	0.0
Approach LOS			A

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	6.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	55	12	133	70	5	125
Future Volume (Veh/h)	55	12	133	70	5	125
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	62	13	149	79	6	140
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	340	188			228	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	340	188			228	
tC, single (s)	6.4	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.4	
p0 queue free %	90	98			100	
cM capacity (veh/h)	652	793			1216	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	75	228	146
Volume Left	62	0	6
Volume Right	13	79	0
cSH	673	1700	1216
Volume to Capacity	0.11	0.13	0.00
Queue Length 95th (m)	3.0	0.0	0.1
Control Delay (s)	11.0	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	11.0	0.0	0.4
Approach LOS	B		

Intersection Summary				
Average Delay		2.0		
Intersection Capacity Utilization		21.7%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	132	72	80	218	122	117
Future Volume (Veh/h)	132	72	80	218	122	117
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	148	81	90	245	137	131
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	628	202	268			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	628	202	268			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	65	90	93			
cM capacity (veh/h)	419	836	1307			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	229	335	268
Volume Left	148	90	0
Volume Right	81	0	131
cSH	509	1307	1700
Volume to Capacity	0.45	0.07	0.16
Queue Length 95th (m)	18.4	1.8	0.0
Control Delay (s)	17.7	2.6	0.0
Lane LOS	C	A	
Approach Delay (s)	17.7	2.6	0.0
Approach LOS	C		

Intersection Summary				
Average Delay		5.9		
Intersection Capacity Utilization		51.2%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	115	325	1	1	262	124	0	5	0	133	4	97
Future Volume (Veh/h)	115	325	1	1	262	124	0	5	0	133	4	97
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	126	357	1	1	288	136	0	5	0	146	4	107
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	424			358			1076	1036	358	970	968	356
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	424			358			1076	1036	358	970	968	356
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	89			100			100	98	100	30	98	84
cM capacity (veh/h)	1114			1212			151	207	691	209	227	690

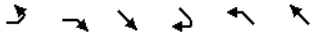
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	484	425	5	257
Volume Left	126	1	0	146
Volume Right	1	136	0	107
cSH	1114	1212	207	295
Volume to Capacity	0.11	0.00	0.02	0.87
Queue Length 95th (m)	3.1	0.0	0.6	61.7
Control Delay (s)	3.2	0.0	22.8	63.0
Lane LOS	A	A	C	F
Approach Delay (s)	3.2	0.0	22.8	63.0
Approach LOS			C	F

Intersection Summary				
Average Delay	15.2			
Intersection Capacity Utilization	75.1%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	1	50	0	2	31
Future Volume (Veh/h)	0	1	50	0	2	31
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	1	54	0	2	34
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	92	54			54	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	92	54			54	
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	100			100	
cM capacity (veh/h)	912	1019			1564	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	54	36
Volume Left	0	0	2
Volume Right	1	0	0
cSH	1019	1700	1564
Volume to Capacity	0.00	0.03	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	8.5	0.0	0.4
Lane LOS	A		A
Approach Delay (s)	8.5	0.0	0.4
Approach LOS	A		

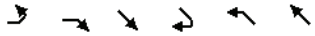
Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	1	10	106	2	15	101
Future Volume (Veh/h)	1	10	106	2	15	101
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)	1	11	115	2	16	110
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	258	116			117	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	258	116			117	
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			99	
cM capacity (veh/h)	727	942			1484	

Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	12	117	126
Volume Left	1	0	16
Volume Right	11	2	0
cSH	919	1700	1484
Volume to Capacity	0.01	0.07	0.01
Queue Length 95th (m)	0.3	0.0	0.3
Control Delay (s)	9.0	0.0	1.0
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	1.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		22.8%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	1	11	114	2	17	115
Future Volume (Veh/h)	1	11	114	2	17	115
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)	1	12	124	2	18	125
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	286	125			126	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	286	125			126	
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			99	
cM capacity (veh/h)	700	931			1473	

Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	13	126	143
Volume Left	1	0	18
Volume Right	12	2	0
cSH	908	1700	1473
Volume to Capacity	0.01	0.07	0.01
Queue Length 95th (m)	0.3	0.0	0.3
Control Delay (s)	9.0	0.0	1.0
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	1.0
Approach LOS	A		

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		23.7%	ICU Level of Service	A
Analysis Period (min)		15		

Appendix H

2026 Background Traffic Operations Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	35	42	35	15	18	17	51	19	10	65	16
Future Volume (Veh/h)	56	35	42	35	15	18	17	51	19	10	65	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	65	41	49	41	17	21	20	59	22	12	76	19
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	249	230	86	289	229	70	95			81		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	249	230	86	289	229	70	95			81		
tC, single (s)	7.1	6.8	6.3	7.2	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.3	3.4	3.6	4.0	3.3	2.3			2.3		
p0 queue free %	90	93	95	93	97	98	99			99		
cM capacity (veh/h)	669	610	952	565	659	998	1427			1462		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	155	79	101	107
Volume Left	65	41	20	12
Volume Right	49	21	22	19
cSH	718	661	1427	1462
Volume to Capacity	0.22	0.12	0.01	0.01
Queue Length 95th (m)	6.5	3.2	0.3	0.2
Control Delay (s)	11.4	11.2	1.6	0.9
Lane LOS	B	B	A	A
Approach Delay (s)	11.4	11.2	1.6	0.9
Approach LOS	B	B		

Intersection Summary				
Average Delay	6.6			
Intersection Capacity Utilization	23.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	44	12	78	31	13	145
Future Volume (Veh/h)	44	12	78	31	13	145
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	53	14	94	37	16	175
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	320	112			131	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	320	112			131	
tC, single (s)	6.5	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.5			2.4	
p0 queue free %	92	98			99	
cM capacity (veh/h)	656	877			1324	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	67	131	191
Volume Left	53	0	16
Volume Right	14	37	0
cSH	692	1700	1324
Volume to Capacity	0.10	0.08	0.01
Queue Length 95th (m)	2.6	0.0	0.3
Control Delay (s)	10.8	0.0	0.7
Lane LOS	B		A
Approach Delay (s)	10.8	0.0	0.7
Approach LOS	B		

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	25.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	76	57	79	114	267	165
Future Volume (Veh/h)	76	57	79	114	267	165
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	82	61	85	123	287	177
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	668	376	464			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	668	376	464			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	91	92			
cM capacity (veh/h)	393	675	1103			

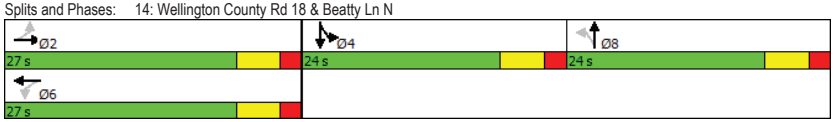
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	82	61	85	123	464
Volume Left	82	0	85	0	0
Volume Right	0	61	0	0	177
cSH	393	675	1103	1700	1700
Volume to Capacity	0.21	0.09	0.08	0.07	0.27
Queue Length 95th (m)	6.2	2.4	2.0	0.0	0.0
Control Delay (s)	16.5	10.9	8.5	0.0	0.0
Lane LOS	C	B	A		
Approach Delay (s)	14.1		3.5		0.0
Approach LOS	B				

Intersection Summary				
Average Delay		3.4		
Intersection Capacity Utilization		42.7%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	55	314	1	241	1	191	2
Future Volume (vph)	55	314	1	241	1	191	2
Turn Type	Perm	NA	Perm	NA	NA	Split	NA
Protected Phases		2		6	8	4	4
Permitted Phases	2		6				
Detector Phase	2	2	6	6	8	4	4
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	27.0	27.0	27.0	27.0	24.0	24.0	24.0
Total Split (%)	36.0%	36.0%	36.0%	36.0%	32.0%	32.0%	32.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	Min	Min	Min
Act Effct Green (s)	15.4	15.4		15.4	5.7	11.6	11.6
Actuated g/C Ratio	0.30	0.30		0.30	0.11	0.23	0.23
v/c Ratio	0.31	0.63		0.68	0.01	0.53	0.33
Control Delay	19.3	21.6		22.0	21.5	23.4	6.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	19.3	21.6		22.0	21.5	23.4	6.8
LOS	B	C		C	C	C	A
Approach Delay		21.2		22.0	21.5		17.1
Approach LOS		C		C	C		B

Intersection Summary			
Cycle Length: 75			
Actuated Cycle Length: 51.1			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 20.2		Intersection LOS: C	
Intersection Capacity Utilization 67.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 14: Wellington County Rd 18 & Beatty Ln N



Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	60	341	361	2	208	130
v/c Ratio	0.31	0.63	0.68	0.01	0.53	0.33
Control Delay	19.3	21.6	22.0	21.5	23.4	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	21.6	22.0	21.5	23.4	6.8
Queue Length 50th (m)	4.3	27.3	27.1	0.1	17.4	0.2
Queue Length 95th (m)	13.9	55.7	57.4	1.9	37.9	11.2
Internal Link Dist (m)		117.8	100.4	20.2		236.0
Turn Bay Length (m)	50.0				50.0	
Base Capacity (vph)	271	761	738	639	625	557
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.45	0.49	0.00	0.33	0.23

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	314	0	1	241	90	0	1	1	191	2	118
Future Volume (vph)	55	314	0	1	241	90	0	1	1	191	2	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frt	1.00	1.00			0.96			0.93		1.00	0.85	
Flt Protected	0.95	1.00			1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1289	1810			1724			1772		1736	1320	
Flt Permitted	0.48	1.00			1.00			1.00		0.95	1.00	
Satd. Flow (perm)	646	1810			1722			1772		1736	1320	
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)	60	341	0	1	262	98	0	1	1	208	2	128
RTOR Reduction (vph)	0	0	0	0	17	0	0	1	0	0	99	0
Lane Group Flow (vph)	60	341	0	0	344	0	0	1	0	208	31	0
Heavy Vehicles (%)	40%	5%	0%	0%	4%	12%	0%	0%	0%	4%	0%	23%
Turn Type	Perm	NA		Perm	NA			NA		Split	NA	
Protected Phases		2			6			8		4	4	
Permitted Phases	2			6			8					
Actuated Green, G (s)	15.3	15.3			15.3			5.7		11.6	11.6	
Effective Green, g (s)	15.3	15.3			15.3			5.7		11.6	11.6	
Actuated g/C Ratio	0.30	0.30			0.30			0.11		0.23	0.23	
Clearance Time (s)	6.0	6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	195	547			520			199		397	302	
v/s Ratio Prot		0.19						c0.00		c0.12	0.02	
v/s Ratio Perm	0.09				c0.20							
v/c Ratio	0.31	0.62			0.66			0.01		0.52	0.10	
Uniform Delay, d1	13.6	15.2			15.4			19.9		17.1	15.4	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.9	2.2			3.1			0.0		1.3	0.2	
Delay (s)	14.5	17.4			18.5			19.9		18.3	15.5	
Level of Service	B	B			B			B		B	B	
Approach Delay (s)		17.0			18.5			19.9			17.3	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.50			
Actuated Cycle Length (s)	50.6	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	67.0%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	26	27	28	41	16	32	58	43	22	50	44
Future Volume (Veh/h)	29	26	27	28	41	16	32	58	43	22	50	44
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	33	30	31	32	47	18	36	66	49	25	57	50
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	336	319	82	340	320	90	107			115		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	336	319	82	340	320	90	107			115		
tC, single (s)	7.1	6.5	6.3	7.1	6.8	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.2	3.3	2.2			2.2		
p0 queue free %	94	95	97	94	91	98	98			98		
cM capacity (veh/h)	552	577	945	549	539	973	1497			1487		

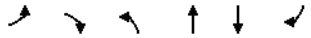
Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	94	97	151	132
Volume Left	33	32	36	25
Volume Right	31	18	49	50
cSH	650	591	1497	1487
Volume to Capacity	0.14	0.16	0.02	0.02
Queue Length 95th (m)	4.0	4.7	0.6	0.4
Control Delay (s)	11.5	12.3	1.9	1.5
Lane LOS	B	B	A	A
Approach Delay (s)	11.5	12.3	1.9	1.5
Approach LOS	B	B		

Intersection Summary				
Average Delay	5.8			
Intersection Capacity Utilization	23.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	57	13	135	74	5	105
Future Volume (Veh/h)	57	13	135	74	5	105
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	64	15	152	83	6	118
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	324	194			235	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	324	194			235	
tC, single (s)	6.4	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.4	
p0 queue free %	90	98			100	
cM capacity (veh/h)	667	788			1208	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	79	235	124
Volume Left	64	0	6
Volume Right	15	83	0
cSH	687	1700	1208
Volume to Capacity	0.11	0.14	0.00
Queue Length 95th (m)	3.1	0.0	0.1
Control Delay (s)	10.9	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	10.9	0.0	0.4
Approach LOS	B		

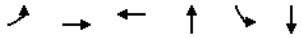
Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	22.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	198	76	84	334	184	156
Future Volume (Veh/h)	198	76	84	334	184	156
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	222	85	94	375	207	175
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	858	294	382			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	858	294	382			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	27	89	92			
cM capacity (veh/h)	304	742	1188			

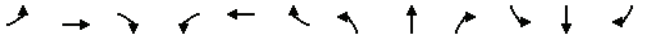
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	222	85	94	375	382
Volume Left	222	0	94	0	0
Volume Right	0	85	0	0	175
cSH	304	742	1188	1700	1700
Volume to Capacity	0.73	0.11	0.08	0.22	0.22
Queue Length 95th (m)	42.7	3.1	2.1	0.0	0.0
Control Delay (s)	43.2	10.5	8.3	0.0	0.0
Lane LOS	E	B	A		
Approach Delay (s)	34.1		1.7		0.0
Approach LOS	D				

Intersection Summary				
Average Delay		9.7		
Intersection Capacity Utilization		44.8%	ICU Level of Service	A
Analysis Period (min)		15		



Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	148	376	484	5	268	124
v/c Ratio	0.59	0.55	0.71	0.03	0.65	0.27
Control Delay	27.5	19.1	22.1	28.4	29.9	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	19.1	22.1	28.4	29.9	6.7
Queue Length 50th (m)	13.6	33.8	43.0	0.6	30.6	0.4
Queue Length 95th (m)	#35.4	62.4	81.0	3.7	53.8	11.8
Internal Link Dist (m)		117.8	100.4	20.2		236.0
Turn Bay Length (m)	50.0				50.0	
Base Capacity (vph)	301	821	808	579	545	574
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.46	0.60	0.01	0.49	0.22

Intersection Summary
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	341	1	1	275	165	0	5	0	244	4	109
Future Volume (vph)	135	341	1	1	275	165	0	5	0	244	4	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frt	1.00	1.00			0.95			1.00		1.00	0.85	
Flt Protected	0.95	1.00			1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1703	1862			1784			1900		1787	1609	
Flt Permitted	0.38	1.00			1.00			1.00		0.95	1.00	
Satd. Flow (perm)	684	1862			1783			1900		1787	1609	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	148	375	1	1	302	181	0	5	0	268	4	120
RTOR Reduction (vph)	0	0	0	0	25	0	0	0	0	0	92	0
Lane Group Flow (vph)	148	376	0	0	459	0	0	5	0	268	32	0
Heavy Vehicles (%)	6%	2%	0%	0%	0%	3%	0%	0%	0%	1%	0%	1%
Turn Type	Perm	NA		Perm	NA			NA		Split	NA	
Protected Phases		2			6			8		4	4	
Permitted Phases	2			6			8					
Actuated Green, G (s)	22.1	22.1			22.1			5.9		14.0	14.0	
Effective Green, g (s)	22.1	22.1			22.1			5.9		14.0	14.0	
Actuated g/C Ratio	0.37	0.37			0.37			0.10		0.23	0.23	
Clearance Time (s)	6.0	6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	251	685			656			186		416	375	
v/s Ratio Prot		0.20						c0.00		c0.15	0.02	
v/s Ratio Perm	0.22				c0.26							
v/c Ratio	0.59	0.55			0.70			0.03		0.64	0.09	
Uniform Delay, d1	15.3	15.0			16.1			24.5		20.8	18.0	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	3.5	0.9			3.3			0.1		3.4	0.1	
Delay (s)	18.8	15.9			19.4			24.5		24.2	18.1	
Level of Service	B	B			B			C		C	B	
Approach Delay (s)		16.7			19.4			24.5			22.2	
Approach LOS		B			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.59			
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	77.8%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

Appendix I

2026 Total Traffic Operations Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	56	39	42	35	17	18	17	55	19	10	67	16
Future Volume (Veh/h)	56	39	42	35	17	18	17	55	19	10	67	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	65	45	49	41	20	21	20	64	22	12	78	19
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	258	238	88	298	236	75	97			86		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	258	238	88	298	236	75	97			86		
tC, single (s)	7.1	6.8	6.3	7.2	6.5	6.2	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.3	3.4	3.6	4.0	3.3	2.3			2.3		
p0 queue free %	90	93	95	93	97	98	99			99		
cM capacity (veh/h)	658	604	949	553	653	992	1424			1455		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	159	82	106	109
Volume Left	65	41	20	12
Volume Right	49	21	22	19
cSH	707	651	1424	1455
Volume to Capacity	0.22	0.13	0.01	0.01
Queue Length 95th (m)	6.9	3.4	0.3	0.2
Control Delay (s)	11.6	11.3	1.5	0.9
Lane LOS	B	B	A	A
Approach Delay (s)	11.6	11.3	1.5	0.9
Approach LOS	B	B		

Intersection Summary				
Average Delay	6.6			
Intersection Capacity Utilization	23.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	135	0	1	49	0	2
Future Volume (Veh/h)	135	0	1	49	0	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	147	0	1	53	0	2
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			147		202	147
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			147		202	147
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1435		791	905

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	147	54	2
Volume Left	0	1	0
Volume Right	0	0	2
cSH	1700	1435	905
Volume to Capacity	0.09	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.1
Control Delay (s)	0.0	0.1	9.0
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	9.0
Approach LOS			A

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	17.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	44	12	87	31	13	175
Future Volume (Veh/h)	44	12	87	31	13	175
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	53	14	105	37	16	211
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	366	124			142	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	366	124			142	
tC, single (s)	6.5	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.6	3.5			2.4	
p0 queue free %	91	98			99	
cM capacity (veh/h)	616	864			1311	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	67	142	227
Volume Left	53	0	16
Volume Right	14	37	0
cSH	655	1700	1311
Volume to Capacity	0.10	0.08	0.01
Queue Length 95th (m)	2.7	0.0	0.3
Control Delay (s)	11.1	0.0	0.6
Lane LOS	B		A
Approach Delay (s)	11.1	0.0	0.6
Approach LOS	B		

Intersection Summary				
Average Delay		2.0		
Intersection Capacity Utilization		26.6%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	57	79	119	287	175
Future Volume (Veh/h)	80	57	79	119	287	175
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	86	61	85	128	309	188
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	701	403	497			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	701	403	497			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	91	92			
cM capacity (veh/h)	376	652	1072			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	86	61	85	128	497
Volume Left	86	0	85	0	0
Volume Right	0	61	0	0	188
cSH	376	652	1072	1700	1700
Volume to Capacity	0.23	0.09	0.08	0.08	0.29
Queue Length 95th (m)	7.0	2.5	2.1	0.0	0.0
Control Delay (s)	17.4	11.1	8.6	0.0	0.0
Lane LOS	C	B	A		
Approach Delay (s)	14.8		3.5		0.0
Approach LOS	B				

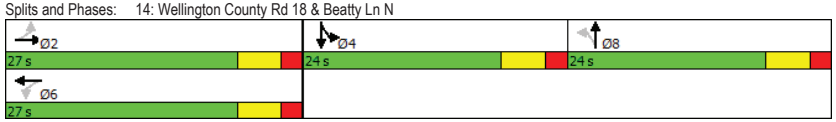
Intersection Summary				
Average Delay		3.4		
Intersection Capacity Utilization		44.6%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	55	314	1	241	1	211	2
Future Volume (vph)	55	314	1	241	1	211	2
Turn Type	Perm	NA	Perm	NA	NA	Split	NA
Protected Phases		2		6	8	4	4
Permitted Phases	2		6				
Detector Phase	2	2	6	6	8	4	4
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	27.0	27.0	27.0	27.0	24.0	24.0	24.0
Total Split (%)	36.0%	36.0%	36.0%	36.0%	32.0%	32.0%	32.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	None	None	None
Act Effct Green (s)	15.9	15.9		15.9	5.9	11.4	11.4
Actuated g/C Ratio	0.38	0.38		0.38	0.14	0.27	0.27
v/c Ratio	0.22	0.49		0.54	0.01	0.48	0.29
Control Delay	13.9	14.5		14.7	19.5	17.5	5.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	13.9	14.5		14.7	19.5	17.5	5.7
LOS	B	B		B	B	B	A
Approach Delay		14.4		14.7	19.5		13.2
Approach LOS		B		B	B		B

Intersection Summary

Cycle Length: 75
Actuated Cycle Length: 41.6
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 14.1 — Intersection LOS: B
Intersection Capacity Utilization 68.4% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 14: Wellington County Rd 18 & Beatty Ln N



Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	60	341	366	2	229	130
v/c Ratio	0.22	0.49	0.54	0.01	0.48	0.29
Control Delay	13.9	14.5	14.7	19.5	17.5	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.9	14.5	14.7	19.5	17.5	5.7
Queue Length 50th (m)	2.4	15.6	15.8	0.1	11.3	0.1
Queue Length 95th (m)	13.9	57.4	59.9	2.0	41.4	11.1
Internal Link Dist (m)		117.8	100.4	20.2		236.0
Turn Bay Length (m)	50.0				50.0	
Base Capacity (vph)	379	965	929	810	793	673
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.35	0.39	0.00	0.29	0.19

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	314	0	1	241	95	0	1	1	211	2	118
Future Volume (vph)	55	314	0	1	241	95	0	1	1	211	2	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frt	1.00	1.00			0.96			0.93		1.00	0.85	
Flt Protected	0.95	1.00			1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1289	1810			1720			1772		1736	1320	
Flt Permitted	0.52	1.00			1.00			1.00		0.95	1.00	
Satd. Flow (perm)	712	1810			1719			1772		1736	1320	
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)	60	341	0	1	262	103	0	1	1	229	2	128
RTOR Reduction (vph)	0	0	0	0	17	0	0	1	0	0	96	0
Lane Group Flow (vph)	60	341	0	0	349	0	0	1	0	229	34	0
Heavy Vehicles (%)	40%	5%	0%	0%	4%	12%	0%	0%	0%	4%	0%	23%
Turn Type	Perm	NA		Perm	NA			NA		Split	NA	
Protected Phases		2			6			8		4	4	
Permitted Phases	2			6			8					
Actuated Green, G (s)	15.9	15.9			15.9			0.8		11.4	11.4	
Effective Green, g (s)	15.9	15.9			15.9			0.8		11.4	11.4	
Actuated g/C Ratio	0.34	0.34			0.34			0.02		0.25	0.25	
Clearance Time (s)	6.0	6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	245	624			592			30		429	326	
v/s Ratio Prot		0.19						c0.00		c0.13	0.03	
v/s Ratio Perm	0.08				c0.20							
v/c Ratio	0.24	0.55			0.59			0.03		0.53	0.10	
Uniform Delay, d1	10.8	12.2			12.4			22.3		15.0	13.4	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.0			1.5			0.5		1.3	0.1	
Delay (s)	11.3	13.2			13.9			22.7		16.3	13.5	
Level of Service	B	B			B			C		B	B	
Approach Delay (s)		12.9			13.9			22.7			15.3	
Approach LOS		B			B			C			B	

Intersection Summary				
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	46.1	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	68.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	2	133	0	1	48
Future Volume (Veh/h)	0	2	133	0	1	48
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	2	145	0	1	52
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	199	145			145	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	199	145			145	
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	100			100	
cM capacity (veh/h)	794	908			1450	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	2	145	53
Volume Left	0	0	1
Volume Right	2	0	0
cSH	908	1700	1450
Volume to Capacity	0.00	0.09	0.00
Queue Length 95th (m)	0.1	0.0	0.0
Control Delay (s)	9.0	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	0.1
Approach LOS	A		

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	17.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	2	15	143	1	5	89
Future Volume (Veh/h)	2	15	143	1	5	89
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)	2	16	155	1	5	97
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	262	156			156	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	262	156			156	
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	98			100	
cM capacity (veh/h)	728	896			1436	

Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	18	156	102
Volume Left	2	0	5
Volume Right	16	1	0
cSH	873	1700	1436
Volume to Capacity	0.02	0.09	0.00
Queue Length 95th (m)	0.5	0.0	0.1
Control Delay (s)	9.2	0.0	0.4
Lane LOS	A		A
Approach Delay (s)	9.2	0.0	0.4
Approach LOS	A		

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		18.8%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	2	15	157	1	4	74
Future Volume (Veh/h)	2	15	157	1	4	74
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)	2	16	171	1	4	80
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	260	172			172	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	260	172			172	
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	98			100	
cM capacity (veh/h)	732	877			1417	

Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	18	172	84
Volume Left	2	0	4
Volume Right	16	1	0
cSH	858	1700	1417
Volume to Capacity	0.02	0.10	0.00
Queue Length 95th (m)	0.5	0.0	0.1
Control Delay (s)	9.3	0.0	0.4
Lane LOS	A		A
Approach Delay (s)	9.3	0.0	0.4
Approach LOS	A		

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		18.3%	ICU Level of Service	A
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
2: Beatty Ln N & Farley Rd/Side Rd 18

2026 Total PM
16 Beatty Line Fergus

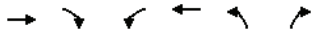
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	29	28	27	28	45	16	32	60	43	22	54	44
Future Volume (Veh/h)	29	28	27	28	45	16	32	60	43	22	54	44
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	33	32	31	32	51	18	36	68	49	25	61	50
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	344	325	86	348	326	92	111			117		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	344	325	86	348	326	92	111			117		
tC, single (s)	7.1	6.5	6.3	7.1	6.8	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.4	3.5	4.2	3.3	2.2			2.3		
p0 queue free %	94	94	97	94	90	98	98			98		
cM capacity (veh/h)	541	572	941	541	534	970	1492			1417		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	96	101	153	136
Volume Left	33	32	36	25
Volume Right	31	18	49	50
cSH	640	583	1492	1417
Volume to Capacity	0.15	0.17	0.02	0.02
Queue Length 95th (m)	4.2	5.0	0.6	0.4
Control Delay (s)	11.6	12.5	1.9	1.5
Lane LOS	B	B	A	A
Approach Delay (s)	11.6	12.5	1.9	1.5
Approach LOS	B	B		

Intersection Summary				
Average Delay	5.9			
Intersection Capacity Utilization	24.2%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Unsignalized Intersection Capacity Analysis
4: Apartment Driveway 1 & Farley Rd

2026 Total PM
16 Beatty Line Fergus



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	83	0	2	119	0	1
Future Volume (Veh/h)	83	0	2	119	0	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	90	0	2	129	0	1
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			90		223	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			90		223	90
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1518		769	973

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	90	131	1
Volume Left	0	2	0
Volume Right	0	0	1
cSH	1700	1518	973
Volume to Capacity	0.05	0.00	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.1	8.7
Lane LOS		A	A
Approach Delay (s)	0.0	0.1	8.7
Approach LOS			A

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	17.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	57	13	167	74	5	126
Future Volume (Veh/h)	57	13	167	74	5	126
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	64	15	188	83	6	142
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	384	230			271	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	384	230			271	
tC, single (s)	6.4	6.5			4.3	
tC, 2 stage (s)						
tF (s)	3.5	3.5			2.4	
p0 queue free %	90	98			99	
cM capacity (veh/h)	616	751			1171	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	79	271	148
Volume Left	64	0	6
Volume Right	15	83	0
cSH	638	1700	1171
Volume to Capacity	0.12	0.16	0.01
Queue Length 95th (m)	3.4	0.0	0.1
Control Delay (s)	11.4	0.0	0.4
Lane LOS	B		A
Approach Delay (s)	11.4	0.0	0.4
Approach LOS	B		

Intersection Summary				
Average Delay		1.9		
Intersection Capacity Utilization		23.9%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	208	76	84	356	199	162
Future Volume (Veh/h)	208	76	84	356	199	162
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	234	85	94	400	224	182
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	903	315	406			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	903	315	406			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	18	88	92			
cM capacity (veh/h)	285	723	1164			

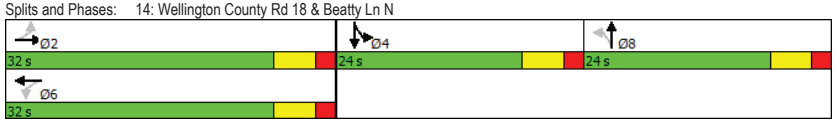
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	234	85	94	400	406
Volume Left	234	0	94	0	0
Volume Right	0	85	0	0	182
cSH	285	723	1164	1700	1700
Volume to Capacity	0.82	0.12	0.08	0.24	0.24
Queue Length 95th (m)	53.6	3.2	2.1	0.0	0.0
Control Delay (s)	56.5	10.6	8.4	0.0	0.0
Lane LOS	F	B	A		
Approach Delay (s)	44.3		1.6		0.0
Approach LOS	E				

Intersection Summary				
Average Delay		12.2		
Intersection Capacity Utilization		46.5%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	135	341	1	275	5	239	4
Future Volume (vph)	135	341	1	275	5	239	4
Turn Type	Perm	NA	Perm	NA	NA	Split	NA
Protected Phases		2		6	8	4	4
Permitted Phases	2		6				
Detector Phase	2	2	6	6	8	4	4
Switch Phase							
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	32.0	32.0	32.0	32.0	24.0	24.0	24.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	30.0%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0	6.0	6.0
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	Min	Min	Min	Min	None	None	None
Act Effct Green (s)	24.6	24.6		24.6	5.9	12.6	12.6
Actuated g/C Ratio	0.48	0.48		0.48	0.11	0.25	0.25
v/c Ratio	0.41	0.42		0.58	0.02	0.60	0.26
Control Delay	15.8	12.4		14.0	25.2	24.7	6.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	15.8	12.4		14.0	25.2	24.7	6.3
LOS	B	B		B	C	C	A
Approach Delay		13.3		14.0	25.2		18.8
Approach LOS		B		B	C		B

Intersection Summary			
Cycle Length: 80			
Actuated Cycle Length: 51.4			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 78.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 14: Wellington County Rd 18 & Beatty Ln N



Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	148	376	508	5	263	124
v/c Ratio	0.41	0.42	0.58	0.02	0.60	0.26
Control Delay	15.8	12.4	14.0	25.2	24.7	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	12.4	14.0	25.2	24.7	6.3
Queue Length 50th (m)	7.6	19.3	25.7	0.5	22.0	0.3
Queue Length 95th (m)	32.7	62.4	86.1	3.7	52.6	11.8
Internal Link Dist (m)		117.8	100.4	20.2		236.0
Turn Bay Length (m)	50.0				50.0	
Base Capacity (vph)	394	970	945	685	644	657
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.39	0.54	0.01	0.41	0.19

Intersection Summary

HCM Signalized Intersection Capacity Analysis
14: Wellington County Rd 18 & Beatty Ln N

2026 Total PM
16 Beatty Line Fergus

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	341	1	1	275	187	0	5	0	239	4	109
Future Volume (vph)	135	341	1	1	275	187	0	5	0	239	4	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Frt	1.00	1.00			0.95			1.00		1.00	0.85	
Flt Protected	0.95	1.00			1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1703	1862			1775			1900		1787	1609	
Flt Permitted	0.42	1.00			1.00			1.00		0.95	1.00	
Satd. Flow (perm)	759	1862			1774			1900		1787	1609	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	148	375	1	1	302	205	0	5	0	263	4	120
RTOR Reduction (vph)	0	0	0	0	25	0	0	0	0	0	93	0
Lane Group Flow (vph)	148	376	0	0	483	0	0	5	0	263	31	0
Heavy Vehicles (%)	6%	2%	0%	0%	0%	3%	0%	0%	0%	1%	0%	1%
Turn Type	Perm	NA		Perm	NA			NA		Split	NA	
Protected Phases		2			6			8		4	4	
Permitted Phases	2			6			8					
Actuated Green, G (s)	24.6	24.6			24.6			0.9		12.6	12.6	
Effective Green, g (s)	24.6	24.6			24.6			0.9		12.6	12.6	
Actuated g/C Ratio	0.44	0.44			0.44			0.02		0.22	0.22	
Clearance Time (s)	6.0	6.0			6.0			6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	332	816			777			30		401	361	
v/s Ratio Prot		0.20						c0.00		c0.15	0.02	
v/s Ratio Perm	0.20				c0.27							
v/c Ratio	0.45	0.46			0.62			0.17		0.66	0.09	
Uniform Delay, d1	11.0	11.1			12.2			27.2		19.8	17.2	
Progression Factor	1.00	1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.4			1.6			2.6		3.8	0.1	
Delay (s)	11.9	11.5			13.7			29.9		23.6	17.3	
Level of Service	B	B			B			C		C	B	
Approach Delay (s)		11.6			13.7			29.9			21.6	
Approach LOS		B			B			C			C	

Intersection Summary				
HCM 2000 Control Delay	15.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	56.1	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	78.9%	ICU Level of Service	D	
Analysis Period (min)	15			
c Critical Lane Group				

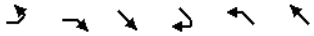
HCM Unsignalized Intersection Capacity Analysis
18: Farley Rd & Residential Driveway 1

2026 Total PM
16 Beatty Line Fergus

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	1	82	0	2	117
Future Volume (Veh/h)	0	1	82	0	2	117
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	1	89	0	2	127
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	220	89			89	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	220	89			89	
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	100			100	
cM capacity (veh/h)	772	975			1519	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	89	129
Volume Left	0	0	2
Volume Right	1	0	0
cSH	975	1700	1519
Volume to Capacity	0.00	0.05	0.00
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	8.7	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	0.1
Approach LOS	A		

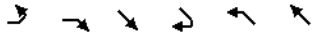
Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	17.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	1	10	107	2	15	134
Future Volume (Veh/h)	1	10	107	2	15	134
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)	1	11	116	2	16	146
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	295	117			118	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	295	117			118	
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			99	
cM capacity (veh/h)	693	941			1483	

Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	12	118	162
Volume Left	1	0	16
Volume Right	11	2	0
cSH	913	1700	1483
Volume to Capacity	0.01	0.07	0.01
Queue Length 95th (m)	0.3	0.0	0.3
Control Delay (s)	9.0	0.0	0.8
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	0.8
Approach LOS	A		

Intersection Summary				
Average Delay		0.8		
Intersection Capacity Utilization		24.5%	ICU Level of Service	A
Analysis Period (min)		15		



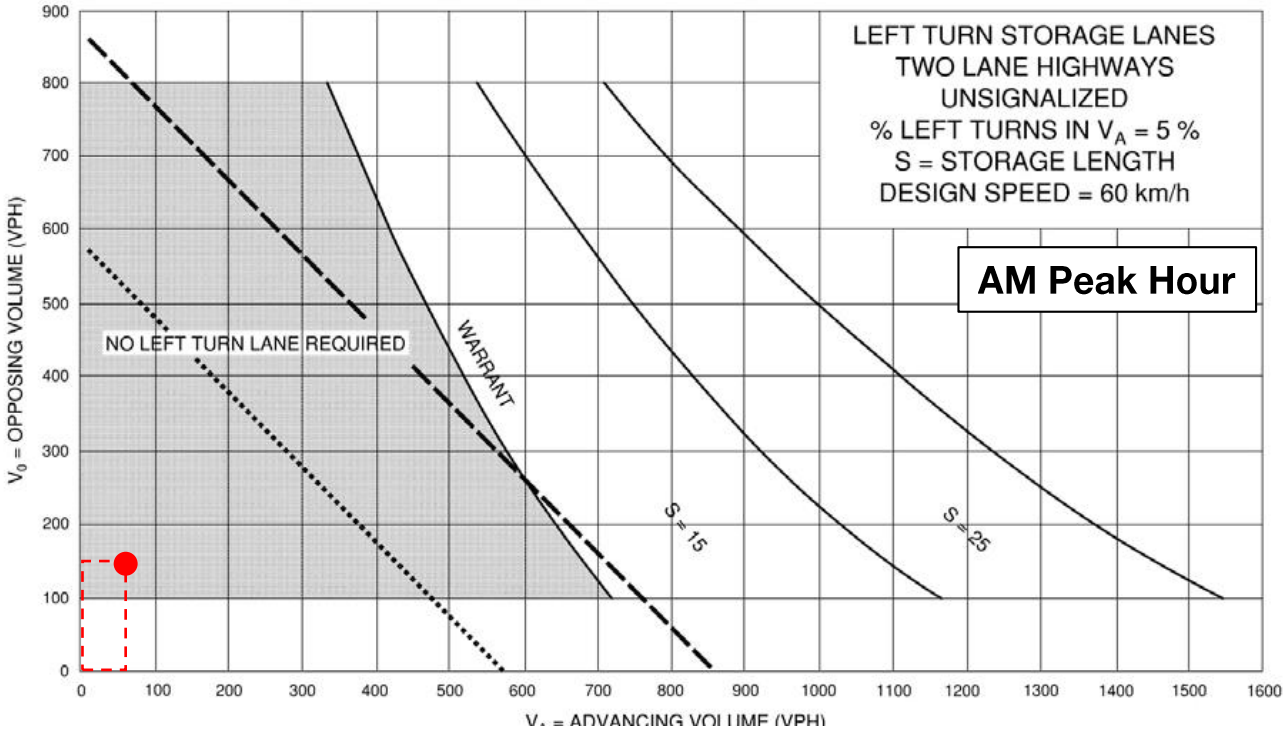
Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Traffic Volume (veh/h)	1	11	115	2	17	148
Future Volume (Veh/h)	1	11	115	2	17	148
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	12	125	2	18	161
Pedestrians						
Lane Width (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	323	126			127	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	323	126			127	
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			99	
cM capacity (veh/h)	667	930			1472	

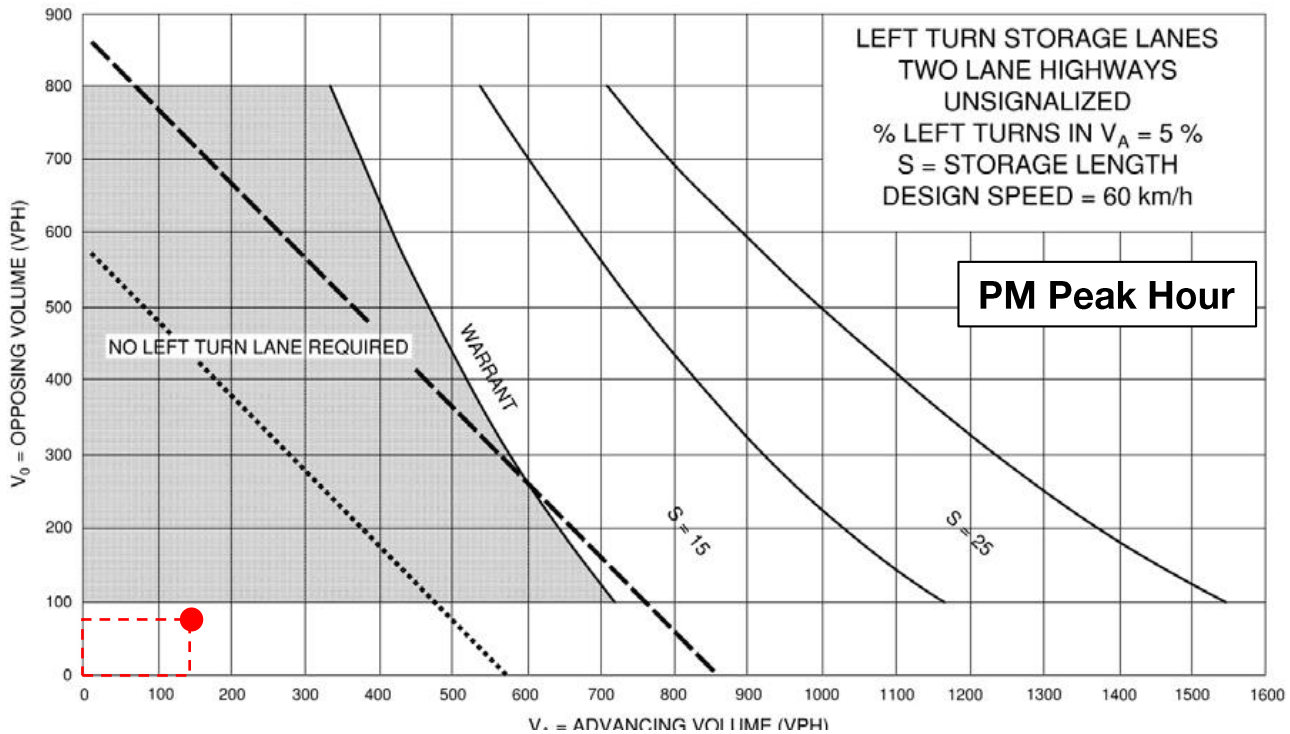
Direction, Lane #	EB 1	SE 1	NW 1
Volume Total	13	127	179
Volume Left	1	0	18
Volume Right	12	2	0
cSH	902	1700	1472
Volume to Capacity	0.01	0.07	0.01
Queue Length 95th (m)	0.4	0.0	0.3
Control Delay (s)	9.0	0.0	0.8
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	0.8
Approach LOS	A		

Intersection Summary				
Average Delay		0.8		
Intersection Capacity Utilization		25.4%	ICU Level of Service	A
Analysis Period (min)		15		

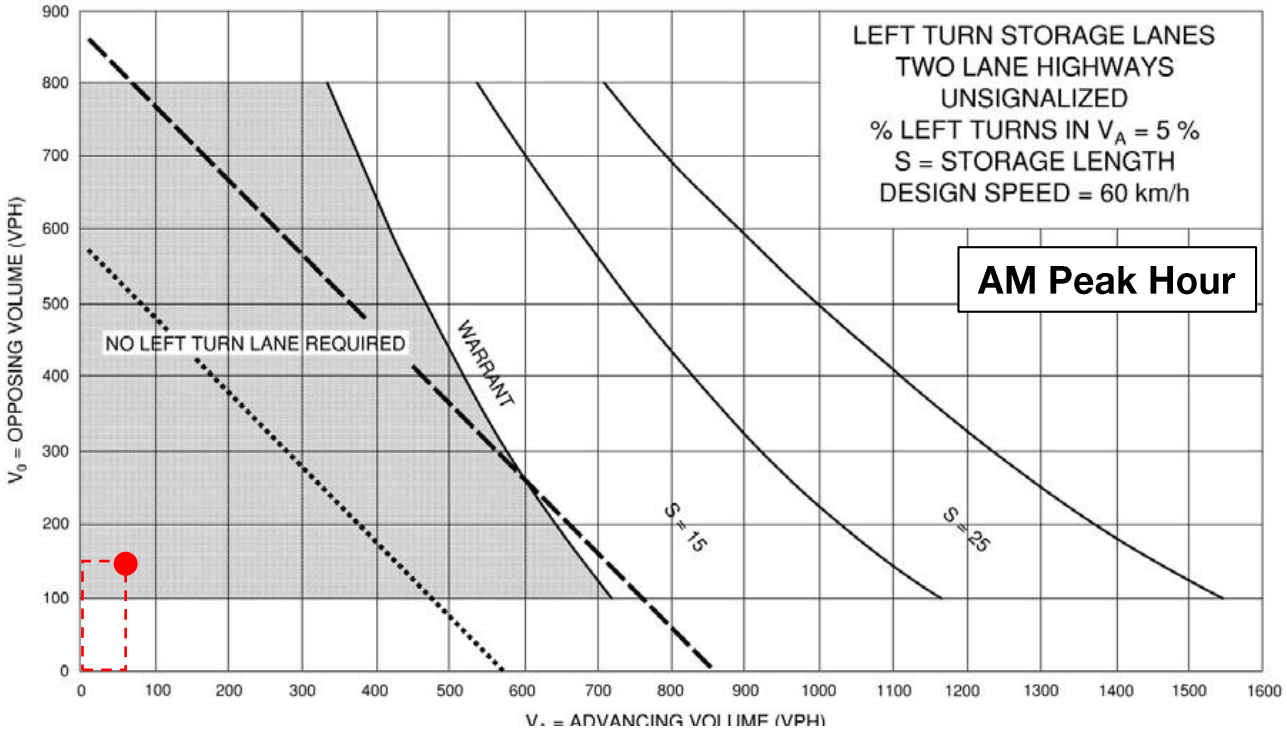
Appendix J

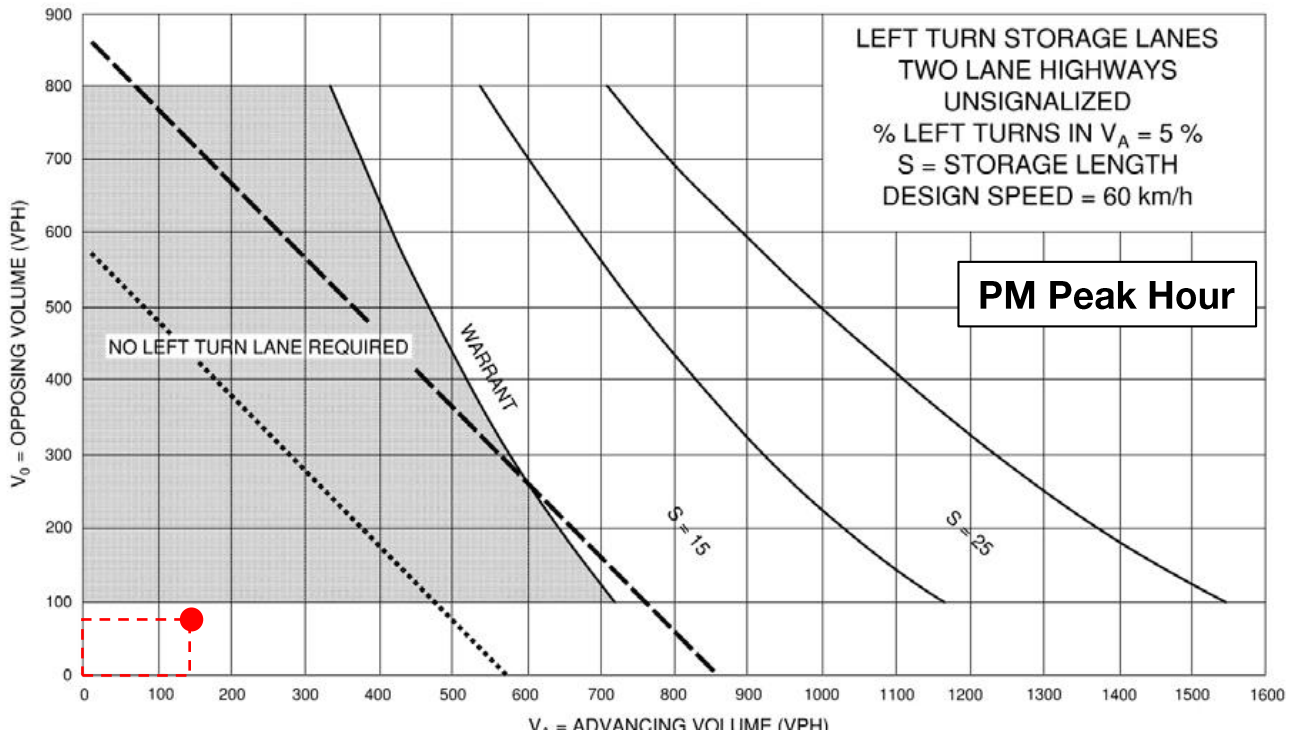
Left-Turn Lane Warrant Nomographs



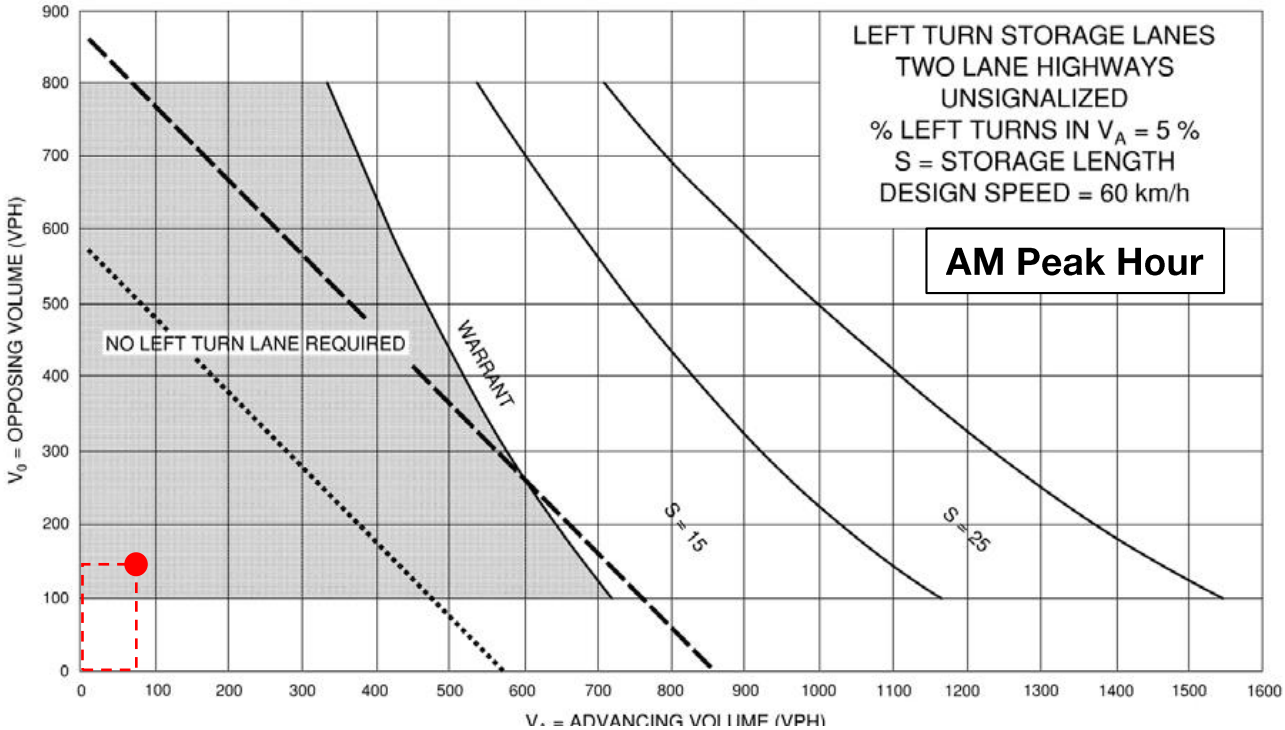


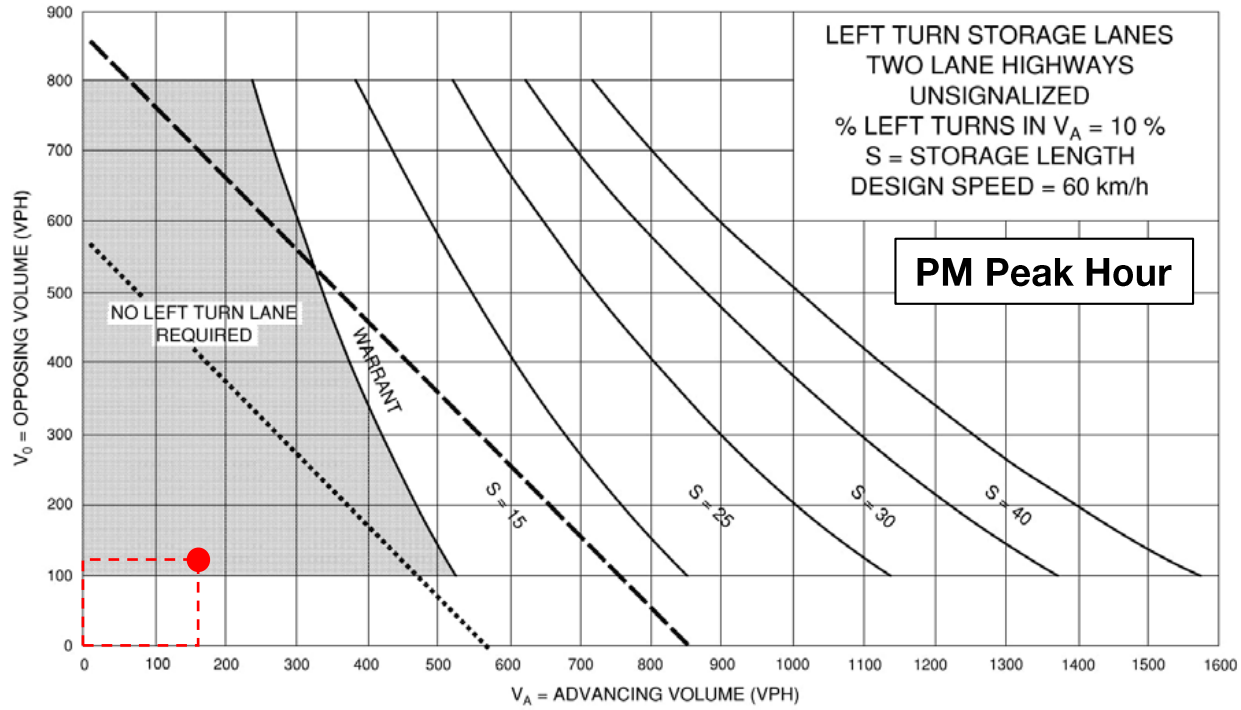
Left-Turn Lane Warrant
Farley Road at Site Driveway (Residential)
2026 Total Traffic





Left-Turn Lane Warrant
Farley Road at Site Driveway (Apartment)
2026 Total Traffic





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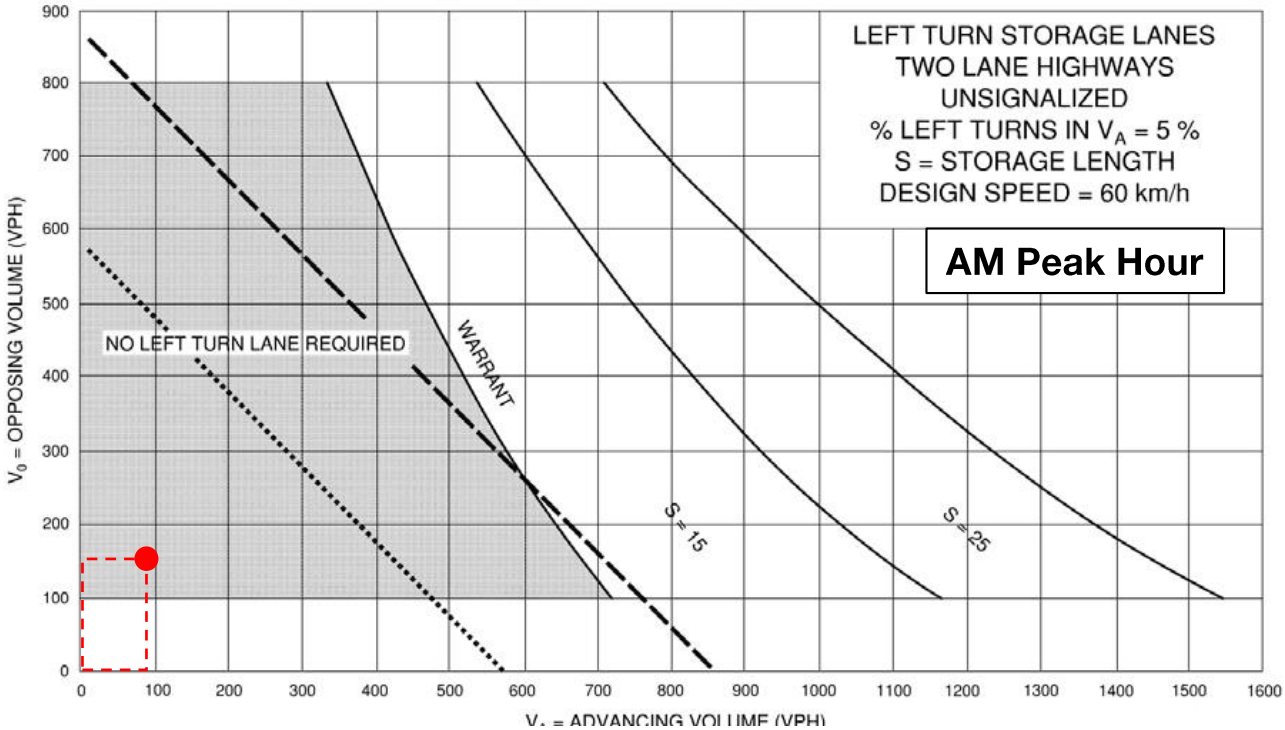
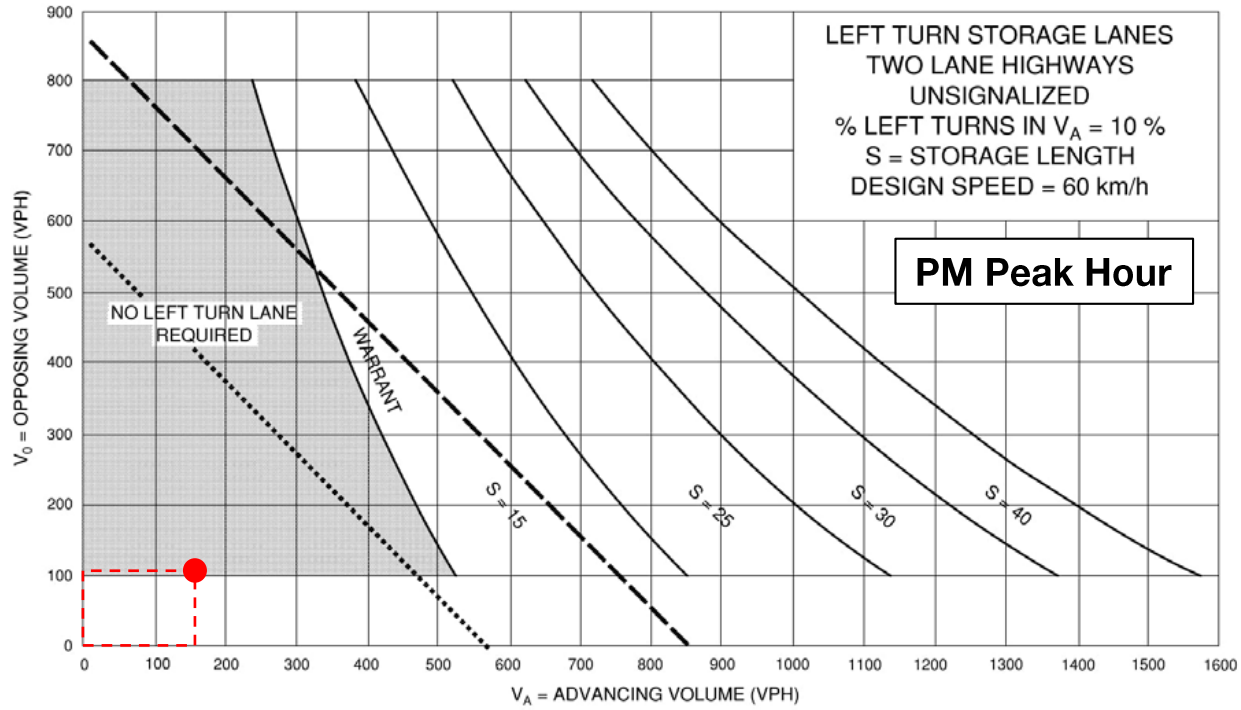
Left-Turn Lane Warrant
Beatty Line at Site Driveway (Residential)
2026 Total Traffic





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Left-Turn Lane Warrant
Beatty Line at Site Driveway (Apartment)
2026 Total Traffic